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XVIIth PLENARY ASSEMBLY  
DÜSSELDORF, 1990



INTERNATIONAL TELECOMMUNICATION UNION

# RECOMMENDATIONS OF THE CCIR, 1990

(ALSO RESOLUTIONS AND OPINIONS)

VOLUME XIII

VOCABULARY (CCV)

**CCIR** INTERNATIONAL RADIO CONSULTATIVE COMMITTEE

Geneva, 1990

## CCIR

1. The International Radio Consultative Committee (CCIR) is the permanent organ of the International Telecommunication Union responsible under the International Telecommunication Convention "... to study technical and operating questions relating specifically to radiocommunications without limit of frequency range, and to issue recommendations on them..." (International Telecommunication Convention, Nairobi 1982, First Part, Chapter I, Art. 11, No. 83):\*

2. The objectives of the CCIR are in particular:

- a) to provide the technical bases for use by administrative radio conferences and radiocommunication services for efficient utilization of the radio-frequency spectrum and the geostationary-satellite orbit, bearing in mind the needs of the various radio services;
- b) to recommend performance standards for radio systems and technical arrangements which assure their effective and compatible interworking in international telecommunications;
- c) to collect, exchange, analyze and disseminate technical information resulting from studies by the CCIR, and other information available, for the development, planning and operation of radio systems, including any necessary special measures required to facilitate the use of such information in developing countries.

\* See also the Constitution of the ITU, Nice, 1989, Chapter 1, Art. 11, No. 84.



XVIIth PLENARY ASSEMBLY  
DÜSSELDORF, 1990



INTERNATIONAL TELECOMMUNICATION UNION

# **RECOMMENDATIONS OF THE CCIR, 1990**

(ALSO RESOLUTIONS AND OPINIONS)

**VOLUME XIII**

**VOCABULARY (CCV)**

**CCIR** INTERNATIONAL RADIO CONSULTATIVE COMMITTEE

92-61-04311-9

Geneva, 1990



**PLAN OF VOLUMES I TO XV  
XVIIth PLENARY ASSEMBLY OF THE CCIR**

(Düsseldorf, 1990)

<b>VOLUME I</b> (Recommendations) <i>Annex to Vol. I</i> (Reports)	Spectrum utilization and monitoring
<b>VOLUME II</b> (Recommendations) <i>Annex to Vol. II</i> (Reports)	Space research and radioastronomy services
<b>VOLUME III</b> (Recommendations) <i>Annex to Vol. III</i> (Reports)	Fixed service at frequencies below about 30 MHz
<b>VOLUME IV-1</b> (Recommendations) <i>Annex to Vol. IV-1</i> (Reports)	Fixed-satellite service
<b>VOLUMES IV/IX-2</b> (Recommendations) <i>Annex to Vols. IV/IX-2</i> (Reports)	Frequency sharing and coordination between systems in the fixed-satellite service and radio-relay system
<b>VOLUME V</b> (Recommendations) <i>Annex to Vol. V</i> (Reports)	Propagation in non-ionized media
<b>VOLUME VI</b> (Recommendations) <i>Annex to Vol. VI</i> (Reports)	Propagation in ionized media
<b>VOLUME VII</b> (Recommendations) <i>Annex to Vol. VII</i> (Reports)	Standard frequencies and time signals
<b>VOLUME VIII</b> (Recommendations)  <i>Annex 1 to Vol. VIII</i> (Reports)  <i>Annex 2 to Vol. VIII</i> (Reports) <i>Annex 3 to Vol. VIII</i> (Reports)	Mobile, radiodetermination, amateur and related satellite services Land mobile service — Amateur service — Amateur satellite service Maritime mobile service Mobile satellite services (aeronautical, land, maritime, mobile and radiodetermination) — Aeronautical mobile service
<b>VOLUME IX-1</b> (Recommendations) <i>Annex to Vol. IX-1</i> (Reports)	Fixed service using radio-relay systems
<b>VOLUME X-1</b> (Recommendations) <i>Annex to Vol. X-1</i> (Reports)	Broadcasting service (sound)
<b>VOLUMES X/XI-2</b> (Recommendations) <i>Annex to Vols. X/XI-2</i> (Reports)	Broadcasting-satellite service (sound and television)
<b>VOLUMES X/XI-3</b> (Recommendations) <i>Annex to Vols. X/XI-3</i> (Reports)	Sound and television recording
<b>VOLUME XI-1</b> (Recommendations) <i>Annex to Vol. XI-1</i> (Reports)	Broadcasting service (television)
<b>VOLUME XII</b> (Recommendations) <i>Annex to Vol. XII</i> (Reports)	Television and sound transmission (CMTT)
<b>VOLUME XIII</b> (Recommendations)	Vocabulary (CCV)
<b>VOLUME XIV</b>	Administrative texts of the CCIR
<b>VOLUME XV-1</b> (Questions)	Study Groups 1, 12, 5, 6, 7
<b>VOLUME XV-2</b> (Questions)	Study Group 8
<b>VOLUME XV-3</b> (Questions)	Study Groups 10, 11, CMTT
<b>VOLUME XV-4</b> (Questions)	Study Groups 4, 9

All references within the texts to CCIR Recommendations, Reports, Resolutions, Opinions, Decisions and Questions refer to the 1990 edition, unless otherwise noted; i.e., only the basic number is shown.

# DISTRIBUTION OF TEXTS OF THE XVIIth PLENARY ASSEMBLY OF THE CCIR IN VOLUMES I TO XV

Volumes and Annexes I to XV, XVIIth Plenary Assembly, contain all the valid texts of the CCIR and succeed those of the XVIth Plenary Assembly, Dubrovnik, 1986.

1. Recommendations, Resolutions, Opinions are given in Volumes I-XIV and Reports, Decisions in the Annexes to Volumes I-XII.

## 1.1 Numbering of texts

When a Recommendation, Report, Resolution or Opinion is modified, it retains its number to which is added a dash and a figure indicating how many revisions have been made. Within the text of Recommendations, Reports, Resolutions, Opinions and Decisions, however, reference is made only to the basic number (for example Recommendation 253). Such a reference should be interpreted as a reference to the latest version of the text, unless otherwise indicated.

The tables which follow show only the original numbering of the current texts, without any indication of successive modifications that may have occurred. For further information about this numbering scheme, please refer to Volume XIV.

## 1.2 Recommendations

Number	Volume	Number	Volume	Number	Volume
48	X-1	368-370	V	479	II
80	X-1	371-373	VI	480	III
106	III	374-376	VII	481-484	IV-1
139	X-1	377, 378	I	485, 486	VII
162	III	380-393	IX-1	487-493	VIII-2
182	I	395-405	IX-1	494	VIII-1
215, 216	X-1	406	IV/IX-2	496	VIII-2
218, 219	VIII-2	407, 408	X/XI-3	497	IX-1
239	I	411, 412	X-1	498	X-1
240	III	415	X-1	500	XI-1
246	III	417	XI-1	501	X/XI-3
257	VIII-2	419	XI-1	502, 503	XII
265	X/XI-3	428	VIII-2	505	XII
266	XI-1	430, 431	XIII	508	I
268	IX-1	433	I	509, 510	II
270	IX-1	434, 435	VI	513-517	II
275, 276	IX-1	436	III	518-520	III
283	IX-1	439	VIII-2	521-524	IV-1
290	IX-1	441	VIII-3	525-530	V
302	IX-1	443	I	531-534	VI
305, 306	IX-1	444	IX-1	535-538	VII
310, 311	V	446	IV-1	539	VIII-1
313	VI	450	X-1	540-542	VIII-2
314	II	452, 453	V	546-550	VIII-3
326	I	454-456	III	552, 553	VIII-3
328, 329	I	457, 458	VII	555-557	IX-1
331, 332	I	460	VII	558	IV/IX-2
335, 336	III	461	XIII	559-562	X-1
337	I	463	IX-1	565	XI-1
338, 339	III	464-466	IV-1	566	X/XI-2
341	V	467, 468	X-1	567-572	XII
342-349	III	469	X/XI-3	573, 574	XIII
352-354	IV-1	470-472	XI-1	575	I
355-359	IV/IX-2	473, 474	XII	576-578	II
362-364	II	475, 476	VIII-2	579, 580	IV-1
367	II	478	VIII-1	581	V

# IV

## 1.2 Recommendations (cont.)

Number	Volume	Number	Volume	Number	Volume
582, 583	VII	625-631	VIII-2	676-682	V
584	VIII-1	632, 633	VIII-3	683, 684	VI
585-589	VIII-2	634-637	IX	685, 686	VII
591	VIII-3	638-641	X-1	687	VIII-1
592-596	IX-1	642	X-1	688-693	VIII-2
597-599	X-1	643, 644	X-1	694	VIII-3
600	X/XI-2	645	X-1 + XII	695-701	IX-1
601	XI-1	646, 647	X-1	702-704	X-1
602	X/XI-3	648, 649	X/XI-3	705	X-1 <sup>(1)</sup>
603-606	XII	650-652	X/XI-2	706-708	X-1
607, 608	XIII	653-656	XI-1	709-711	XI-1
609-611	II	657	X/XI-3	712	X/XI-2
612, 613	III	658-661	XII	713-716	X/XI-3
614	IV-1	662-666	XIII	717-721	XII
615	IV/IX-2	667-669	I	722	XII
616-620	V	670-673	IV-1	723, 724	XII
622-624	VIII-1	674, 675	IV/IX-2		

## 1.3 Reports

Number	Volume	Number	Volume	Number	Volume
19	III	319	VIII-1	472	X-1
122	XI-1	322	VI <sup>(1)</sup>	473	X/XI-2
137	IX-1	324	I	476	XI-1
181	I	327	III	478	XI-1
183	III	336*	V	481-485	XI-1
195	III	338	V	488	XII
197	III	340	VI <sup>(1)</sup>	491	XII
203	III	342	VI	493	XII
208	IV-1	345	III	496, 497	XII
209	IV/IX-2	347	III	499	VIII-1
212	IV-1	349	III	500, 501	VIII-2
214	IV-1	354-357	III	509	VIII-3
215	X/XI-2	358	VIII-1	516	X-1
222	II	363, 364	VII	518	VII
224	II	371, 372	I	521, 522	I
226	II	375, 376	IX-1	525, 526	I
227*	V	378-380	IX-1	528	I
228, 229	V	382	IV/IX-2	533	I
238, 239	V	384	IV-1	535, 536	II
249-251	VI	386-388	IV/IX-2	538	II
252	VI <sup>(1)</sup>	390, 391	IV-1	540, 541	II
253-255	VI	393	IV/IX-2	543	II
258-260	VI	395	II	546	II
262, 263	VI	401	X-1	548	II
265, 266	VI	404	XI-1	549-551	III
267	VII	409	XI-1	552-558	IV-1
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272, 273	I	430-432	VI	562-565	V
275-277	I	435-437	III	567	V
279	I	439	VII	569	V
285	IX-1	443	IX-1	571	VI
287*	IX-1	445	IX-1	574, 575	VI
289*	IX-1	448, 449	IV/IX-2	576-580	VII
292	X-1	451	IV-1	584, 585	VIII-2
294	X/XI-3	453-455	IV-1	588	VIII-2
300	X-1	456	II	607	IX-1
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311-313	XI-1	463, 464	X-1	612-615	IX-1
314	XII	468, 469	X/XI-3	622	X/XI-3

\* Not reprinted, see Dubrovnik, 1986.

<sup>(1)</sup> Published separately.

1.3 *Reports (cont.)*

Number	Volume	Number	Volume	Number	Volume
624-626	XI-1	790-793	IV/IX-2	972-979	I
628, 629	XI-1	795	X-1	980-985	II
630	X/XI-3	798, 799	X-1	987, 988	II
631-634	X/XI-2	801, 802	XI-1	989-996	III
635-637	XII	803	X/XI-3	997-1004	IV-1
639	XII	804, 805	XI-1	1005, 1006	IV/IX-2
642, 643	XII	807-812	X/XI-2	1007-1010	V
646-648	XII	814	X/XI-2	1011, 1012	VI
651	I	815, 816	XII	1016, 1017	VII
654-656	I	818-823	XII	1018-1025	VIII-1
659	I	826-842	I	1026-1033	VIII-2
662-668	I	843-854	II	1035-1039	VIII-2
670, 671	I	857	III	1041-1044	VIII-2
672-674	II	859-865	III	1045	VIII-3
676-680	II	867-870	IV-1	1047-1051	VIII-3
682-685	II	872-875	IV-1	1052-1057	IX-1
687	II	876, 877	IV/IX-2	1058-1061	X-1
692-697	II	879, 880	V	1063-1072	X-1
699, 700	II	882-885	V	1073-1076	X/XI-2
701-704	III	886-895	VI	1077-1089	XI-1
706	IV-1	896-898	VII	1090-1092	XII
709	IV/IX-2	899-904	VIII-1	1094-1096	XII
710	IV-1	908	VIII-2	1097-1118	I
712, 713	IV-1	910, 911	VIII-2	1119-1126	II
714-724	V	913-915	VIII-2	1127-1133	III
725-729	VI	917-923	VIII-3	1134-1141	IV-1
731, 732	VII	925-927	VIII-3	1142, 1143	IV/IX-2
735, 736	VII	929	VIII-3 (1)	1144-1148	V
738	VII	930-932	IX-1	1149-1151	VI
739-742	VIII-1	934	IX-1	1152	VII
743, 744	VIII-2	936-938	IX-1	1153-1157	VIII-1
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751	VIII-3	943-947	X-1	1169-1186	VIII-3
760-764	VIII-3	950	X/XI-3	1187-1197	IX-1
766	VIII-3	951-955	X/XI-2	1198	X-1 (1)
770-773	VIII-3	956	XI-1	1199-1204	X-1
774, 775	VIII-2	958, 959	XI-1	1205-1226	XI-1
778	VIII-1	961, 962	XI-1	1227, 1228	X/XI-2
780*	IX-1	963, 964	X/XI-3	1229-1233	X/XI-3
781-789	IX-1	965-970	XII	1234-1241	XII

\* Not reprinted, see Dubrovnik, 1986.

(1) Published separately.

1.3.1 *Note concerning Reports*

The individual footnote "Adopted unanimously" has been dropped from each Report. Reports in Annexes to Volumes have been adopted unanimously except in cases where reservations have been made which will appear as individual footnotes.

1.4 *Resolutions*

Number	Volume	Number	Volume	Number	Volume
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14	VII	63	VI	88	I
15	I	64	X-1	89	XIII
20	VIII-1	71	I	95	XIV
23	XIII	72, 73	V	97-109	XIV
24	XIV	74	VI	110	I
33	XIV	76	X-1	111, 112	VI
39	XIV	78	XIII	113, 114	XIII
61	XIV	79-83	XIV		



## VI

### 1.5 Opinions

Number	Volume	Number	Volume	Number	Volume
2	I	45	VI	73	VIII-1
11	I	49	VIII-1	74	X-1 + X/XI-3
14	IX-1	50	IX-1	75	XI-1 + X/XI-3
15	X-1	51	X-1	77	XIV
16	X/XI-3	56	IV-1	79-81	XIV
22, 23	VI	59	X-1	82	VI
26-28	VII	63	XIV	83	XI-1
32	I	64	I	84	XIV
35	I	65	XIV	85	VI
38	XI-1	66	III	87, 88	XIV
40	XI-1	67-69	VI	89	IX-1
42	VIII-1	71-72	VII	90	X/XI-3
43	VIII-2				

### 1.6 Decisions

Number	Volume	Number	Volume	Number	Volume
2	IV-1	60	XI-1	87	IV/IX-2
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6	VI	64	IV-1	90, 91	XI-1
9	VI	65	VII	93	X/XI-2
11	VI	67, 68	XII	94	X-1
18	X-1 + XI-1 +	69	VIII-1	95	X-1 + XI-1
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27	I	71	VIII-3	98	X-1 + XII
42	XI-1	72	X-1 + XI-1	99	X-1
43	X/XI-2		IV-1 + X-1 +	100	I
51	X/XI-2	76	XI-1 + XII	101	II
53, 54	I	77	XII	102	V
56	I	78, 79	X-1	103	VIII-3
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58	XI-1	81	VIII-3	106	XI-1
59	X/XI-3	83-86	VI		

## 2. Questions (Vols. XV-1, XV-2, XV-3, XV-4)

### 2.1 Numbering of texts

Questions are numbered in a different series for each Study Group: where applicable a dash and a figure added after the number of the Question indicate successive modifications. The number of a Question is completed by an *Arabic figure indicating the relevant Study Group*. For example:

- Question 1/10 would indicate a Question of Study Group 10 with its text in the original state;
- Question 1-1/10 would indicate a Question of Study Group 10, whose text has been once modified from the original; Question 1-2/10 would be a Question of Study Group 10, whose text has had two successive modifications.

*Note* – The numbers of the Questions of Study Groups 7, 9 and 12 start from 101. In the case of Study Groups 7 and 9, this was caused by the need to merge the Questions of former Study Groups 2 and 7 and Study Groups 3 and 9, respectively. In the case of Study Group 12, the renumbering was due to the requirement to transfer Questions from other Study Groups.

### 2.2 Assignment of Questions

In the plan shown on page II, the relevant Volume XV in which Questions of each Study Group can be found is indicated. A summary table of all Questions, with their titles, former and new numbers is to be found in Volume XIV.

### 2.3 *References to Questions*

As detailed in Resolution 109, the Plenary Assembly approved the Questions and assigned them to the Study Groups for consideration. The Plenary Assembly also decided to discontinue Study Programmes. Resolution 109 therefore identifies those Study Programmes which were approved for conversion into new Questions or for amalgamation with existing Questions. It should be noted that references to Questions and Study Programmes contained in the texts of Recommendations and Reports of Volumes I to XIII are still those which were in force during the study period 1986-1990.

Where appropriate, the Questions give references to the former Study Programmes or Questions from which they have been derived. New numbers have been given to those Questions which have been derived from Study Programmes or transferred to a different Study Group.

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## VOLUME XIII

## VOCABULARY AND RELATED SUBJECTS

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*Note* — Resolutions which already appear in the table of contents, are not reproduced in this index.

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(In order to facilitate the retrieval of a given text, the page number of Volume XIII of the XVIth Plenary Assembly (Dubrovnik, 1986) is indicated.)

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<sup>(1)</sup> Replaced by Resolution 113.



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## VOCABULARY AND RELATED SUBJECTS

*Terms of reference of the Joint Study Group for Vocabulary, CMV (1986-1990)*

### 1. Vocabulary

1.1 To coordinate the terminology work within the CCIs and to seek agreement among all other Study Groups concerned to ensure acceptability of the definitions. In particular, to assist both CCIs in arriving at mutually acceptable definitions of technical terms of common interest.

1.2 To ensure liaison with other organizations dealing with terminology work in the telecommunication field, namely with the International Electrotechnical Commission (IEC) by means of the "CCI-IEC Joint Coordinating Group for Vocabulary" (JCG).

### 2. Related subjects

2.1 To collect the needs of the other Study Groups concerning graphical symbols (to be used in diagrams or on equipment), and to ensure liaison with the "CCI-IEC Joint Working Group for Graphical Symbols and Diagrams" (JWG).

2.2 To study the needs of the other Study Groups concerning letter symbols and other means of expression, systematic classification, units of measurement, etc., in cooperation with the relevant IEC Technical Committee (Technical Committee No. 25) and with the International Organization for Standardization (ISO).

1986-1990 *Chairman:* M. THUÉ (France)

*Vice-Chairmen:* M. DUCOMMUN (Switzerland) (until 1988)  
V. MIRALLES MORA (Spain)  
T. MYLES (United Kingdom)

The XVIIth Plenary Assembly decided to replace the CMV by a Coordination Committee for Vocabulary (CCV).

Annex III to Resolution 61-4 details the scope of the work which will be undertaken by the CCV and the names of the Chairman and Vice-Chairmen:

## CCV

### COORDINATION COMMITTEE FOR VOCABULARY

#### *Scope:*

Coordination within the CCIR, and liaison with the CCITT, the ITU General Secretariat and other interested organizations (mainly the IEC) concerning:

- vocabulary, including abbreviations and initials;
- related subjects (quantities and units, graphical and letter symbols).

1990-1994 *Chairman:* M. THUÉ (France)

*Vice-Chairmen:* J. FAIRBROTHER (United Kingdom)  
V. MIRALLES MORA (Spain)

## INTRODUCTION BY THE CHAIRMAN

**1. General**

At the CMV's Interim Meeting (27 April-5 May 1988), some delegates proposed that at future meetings the CMV should concern itself with the methods of drawing up and coordinating terms and definitions, leaving the terminology work essentially to Study Group experts.

At its IXth Plenary Assembly (14-25 November 1988), the CCITT considered that the terminology work should be entrusted to Study Groups, coordination and liaison with other organs being undertaken by a three-member "Terminology Coordination Committee" (TCC), assisted by the CCITT Secretariat (Recommendation A.10, revised in 1988). The CCITT also withdrew from the CMV.

At its Final Meeting (24-27 October 1989), which lasted only four days, the CMV was essentially concerned with deciding on a new organization of vocabulary work in the CCIR. Two draft Resolutions were prepared and submitted to the Plenary Assembly which approved them.

**2. Organization of work**

Resolution 113 proposes the following methods of work:

- each Study Group should assume responsibility for terminology in its particular field and appoint a permanent Special Rapporteur for Vocabulary to coordinate its work;
- a Coordination Committee for Vocabulary (CCV) should ensure coordination among the Special Rapporteurs for Vocabulary and liaise with the CCITT and the IEC.

The Study Group experts should take note of the general methods advocated for the selection of terms and preparation of definitions (Resolution 89) and the presentation of texts on terminology (Resolution 78).

Resolution 114 specifies the membership and terms of reference of the proposed coordination body, to be known as the "Coordination Committee for Vocabulary" (CCV).

The CCV is composed of members designated by administrations and by other participants in the work of the CCIR. Its work is directed by three members who should be English-speaking, French-speaking and Spanish-speaking respectively. The special Rapporteurs for Vocabulary are the equivalent of the CCV in the Study Groups and receive copies of CCV documents.

The CCV should work mainly by correspondence. It should arrange for CCIR experts to participate in the "CCI-IEC Joint Coordination Group for Vocabulary" and its Working Parties and with which it should assure liaison.

The CCV should liaise with other organizations, not only on questions of vocabulary, but also on "related subjects" (graphical symbols and documentation, letter symbols, quantities and units, abbreviations).

The CCV functions as a Group of Experts: the contributions received are distributed only to the members, the CCV and to the special Rapporteurs for Vocabulary. These contributions should, in particular, be concerned with the up-dating or the revision of terms contained in the present Volume or new draft texts to be submitted to the next Plenary Assembly.

**3. Organization of texts**

The present Volume contains:

**3.1 Recommendations of a general character concerning vocabulary (terms and definitions):**

- Recommendation 573 concerning the definition of terms specific to radiocommunications and used by several CCIR Study Groups;
- Recommendation 662 concerning terms common to the CCIR and CCITT and references to the "Telecommunication" chapters (Series 700) of the International Electrotechnical Vocabulary (IEV) published by the International Electrotechnical Commission (IEC);
- Recommendation 663 concerning certain terms linked with physical quantities.

3.2 Recommendation 461 relative to graphical symbols and rules for the preparation of documentation with reference to the pertinent texts published by the IEC.

3.3 Recommendations relative to scale, units and associated symbols, as follows:

- Recommendation 430 on the international system of units (SI), together with Recommendation 607 on the units for information quantities and Recommendation 665 on the traffic intensity unit;
- Recommendation 608 on letter symbols;
- Recommendation 431 on the nomenclature of the frequency and wavelength bands;
- Recommendation 574 on the use of “logarithmic units” (decibel and neper).

3.4 Recommendation 666 on abbreviations and initials used in telecommunications.

3.5 Resolutions relative to the organization of work in the CCIR Secretariat and cooperation with other organizations, beyond that given in the basic Resolutions 113 and 114 referred to in § 4:

- Resolution 89 which gives guidelines for the selection of terms and the preparation of definitions;
  - Resolution 78 on the presentation of terms and definitions;
  - Resolution 23 on collaboration with the IEC on graphical symbols and diagrams.
-

## SECTION A: TERMINOLOGY

## RECOMMENDATION 573-3\*

## RADIOCOMMUNICATION VOCABULARY

(1978-1982-1986-1990)

The CCIR,

## CONSIDERING

- (a) that Article 1 of the Radio Regulations contains the definitions of terms for regulatory purposes;
- (b) that the CCIR Study Groups have a need to establish new and amended definitions for technical terms that do not appear in Article 1 or that are so defined as to be unsuitable for CCIR Study Group purposes;
- (c) that it would be desirable for some of these terms and definitions established by the Study Groups to be more widely used within the CCIR,

## UNANIMOUSLY RECOMMENDS

that the terms listed in Article 1 of the Radio Regulations and in Annex I below should be used as far as possible with the meaning ascribed to them in the corresponding definition.

*Note 1* – Study Groups are invited, where there is a difficulty in using any of the terms with the meaning given in the corresponding definition, to forward to the CCV a proposal for revision or alternative application, accompanied by substantiating argument.

*Note 2* – A number of terms in this Recommendation appear also in Article 1 of the Radio Regulations with a different definition. These terms are identified by (RR ..., MOD) or (RR ...(MOD)) if the modifications consist only of editorial changes. Modifications are proposed for two reasons:

- some Radio Regulations definitions only take into account regulatory aspects, while the CCV proposes definitions of a technical nature;
- some Radio Regulations definitions give rise to difficulties of interpretation, in these cases, modifications or additions proposed by the CCV may be useful later for draft revisions of the Radio Regulations definitions in accordance with Recommendation No. 72 of WARC-79.

Only terms and definitions contained in the Radio Regulations should be used when applying the Regulations.

*Note 3* – At the request of Study Group 8, in Appendix A to this Recommendation, definitions (extracted from the Radio Regulations) have been listed of those categories of stations in mobile services, which are most useful for Study Group 8 work.

*Note 4* – The present Recommendation is completed by an alphabetical list of terms defined in CCIR texts, giving for each term the corresponding terms in the other two working languages and the reference to the corresponding text and Volume in which the definition is found (also an alphanumeric reference), for the terms of this Recommendation.

## ANNEX I

The terms and definitions in this Annex are arranged according to subject as follows:

## A Stations and links

- A1 – General terms and stations
- A2 – Links
- A3 – Space radiocommunications links
- A4 – Terms concerning attenuation in a radio link
- A5 – Coverage area and associated terms

\* This Recommendation will be addressed by the Chairman of the CV to the Chairmen and Special Rapporteurs for vocabulary of all CCIR Study Groups.



- B Frequencies and bandwidths
  - B0 — Frequency bands
  - B1 — Arrangement of radio channels
- C Radiation and emission
- D Transmitters and classes of emission
- E Power and radiated power
- F Receivers, noise and interference
  - F0 — Noise
  - F1 — Interference
  - F2 — Signal to interference ratio, protection ratio
  - F3 — Field strength and power flux density
  - F4 — Diversity reception
- G Propagation
  - G0 — Terms related to radio waves
  - G1 — Tropospheric propagation
  - G2 — Ionospheric propagation
- H Space radiocommunications
  - H0 — General terms
  - H1 — Types of satellites
  - H2 — Geostationary satellite
  - H3 — Space research — Earth exploration
  - H4 — Broadcasting

J Standard frequencies and time signals

In cases where the definition of a term is identical to that appearing in another text (International telecommunication convention, Annex 2\* — CONV—, Article 1 of the Radio Regulations — RR—, CCIR Recommendation or Report, — Rec. or Rep.—) the reference to the other text concerned is given in brackets after the definition. If the reference definition has been modified, the symbol MOD is added to the reference.

## SECTION A — STATIONS AND LINKS

### Sub-section A1 — General terms and stations

A01 **radiocommunication**; *radiocommunication*; *radiocomunicación*

(CONV, MOD)

(RR 7, MOD)

Telecommunication by means of radio waves.

*Note* — The definition of the term “telecommunication” is included in Appendix II of Recommendation 662 dealing with general terms.

A02

(RR 6, MOD)

**radio waves, hertzian waves**; *ondes radioélectriques, ondes hertziennes; ondas radioeléctricas, ondas hertzianas*

An electromagnetic wave propagated in space without artificial guide and having by convention a frequency lower than 3000 GHz.

*Note* — The electromagnetic waves having frequencies around 3000 GHz may be regarded either as radio waves or optical waves.

A03

(RR 5, MOD)

**radio**; *radio, radioélectrique; radio, radioeléctrico*

Pertaining to the use of radio waves.

*Note* — In French and in Spanish “radio” is always a prefix.

\* Constitution of the International Telecommunication Union, Annex 1 (Nice, 1989).

A04  
(RR 58 (MOD))

(radio) **station**; *station (radioélectrique); estación (radioeléctrica)*

One or more transmitters or receivers of a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunication service, or the radioastronomy service.

*Note 1* — In the Radio Regulations, each station shall be classified by the service in which it operates permanently or temporarily.

*Note 2* — **Radiocommunication service**; *Service de radiocommunication; Servicio de radiocomunicación* (RR 20 (MOD))

A service as defined in the Radio Regulations involving the transmission, emission and/or reception of radio waves for specific telecommunication purposes.

A05  
(RR 61)

**space station**; *station spatiale; estación espacial*

A station located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere.

A06  
(RR 60)

**earth station**; *station terrienne; estación terrena*

A station located either on the Earth's surface or within the major portion of the Earth's atmosphere and intended for communication:

- with one or more space stations; or
- with one or more stations of the same kind by means of one or more reflecting satellites or other objects in space.

A07  
(RR 9)

**space radiocommunication**; *radiocommunication spatiale; radiocomunicación espacial*

Any radiocommunication involving the use of one or more space stations or the use of one or more reflecting satellites or other objects in space.

A08  
(RR 8)

**terrestrial radiocommunication**; *radiocommunication de terre; radiocomunicación terrenal*

Any radiocommunication other than space radiocommunication or radioastronomy.

A09  
(RR 59, MOD)

**terrestrial station**; *station de terre; estación terrenal*

A station effecting terrestrial radiocommunication.

A10  
(RR 65)

**mobile station**; *station mobile; estación móvil*

A station in the mobile service intended to be used while in motion or during halts at unspecified points.

*Note 1* — **Mobile service**; *Service mobile; Servicio móvil* (CONV) (RR 26) A radiocommunication service between mobile and land stations, or between mobile stations.

*Note 2* — The definitions of those categories of stations in mobile services, which are most useful for Study Group 8 work are given in Appendix A to this Recommendation.

A11  
(RR 67)

**land station**; *station terrestre; estación terrestre*

A station in the mobile service not intended to be used while in motion.

## Sub-section A2 — Links

A21

**radio link**; *liaison radioélectrique; radioenlace*

A telecommunication facility of specified characteristics between two points provided by means of radio waves.

- A22**  
(Rec. 592, MOD, Vol. IX) **radio-relay system ; *faisceau hertzien; sistema de relevadores radioeléctricos***
- Radiocommunication system between specified fixed points operating at frequencies above about 30 MHz which uses tropospheric propagation and which normally includes one or more intermediate stations.
- A23**  
(Rec. 592, Vol. IX) **transhorizon radio-relay system ; *faisceau hertzien transhorizon; sistema de relevadores radioeléctricos transhorizonte***
- Radio-relay system using transhorizon tropospheric propagation, chiefly forward scatter.
- Sub-section A3 – Space communication links (see also Sub-section H0)**
- A31**  
(RR 107) **satellite link ; *liaison par satellite; enlace por satélite***
- A radio link between a transmitting earth station and a receiving earth station through one satellite.
- A satellite link comprises one up link and one down link.
- A31a**  
(RR 107, MOD) **up link ; *liaison montante; enlace ascendente***
- A radio link between a transmitting earth station and a receiving space station.
- A31b**  
(RR 107, MOD) **down link ; *liaison descendante; enlace descendente***
- A radio link between a transmitting space station and a receiving earth station.
- A31c**  
(RR 109, MOD) **feeder link ; *liaison de connexion; enlace de conexión***
- A radio link from an earth station at a given location to a space station, or *vice versa*, conveying information for a space radiocommunication service other than for the fixed-satellite service. The given location may be at a specified point, or at any fixed point within specified areas.
- Note* – Examples of feeder links:
- an up link for a broadcasting satellite;
  - a down link for a data collection or Earth exploration satellite;
  - an up link and down link between a coast earth station and a satellite in the maritime mobile-satellite service.
- A32**  
(RR 108) **multi-satellite link ; *liaison multisatellite; enlace multisatélite***
- A radio link between a transmitting earth station and a receiving earth station through two or more satellites, without any intermediate earth station.
- A multi-satellite link comprises one up link, one or more satellite-to-satellite links and one down link.
- A33** **inter-satellite link ; *liaison intersatellite; enlace entre satélites***
- A radio link between a transmitting space station and a receiving space station without an intermediate earth station.
- A34**  
(RR 105, MOD) **satellite system ; *système à satellite; sistema de satélites***
- A space system using one or more artificial satellites.
- Note* – If the primary body of the satellite or satellites of a specific system is not the Earth, it should be identified.



A35  
(RR 104)

**space system ; système spatial; sistema espacial**

Any group of cooperating earth stations and/or space stations employing space radio communication for specific purposes.

A36  
(RR 106)

**satellite network ; réseau à satellite; red de satélite**

A satellite system or a part of a satellite system, consisting of only one satellite and the cooperating earth stations.

#### Sub-section A4 – Terms concerning attenuation in a radio link \*

A41  
(Rec. 341, MOD,  
Vol. V)

**total loss (of a radio link); affaiblissement global (d'une liaison radioélectrique); pérdida total (de un enlace radioeléctrico)\***

(Symbol:  $L_t$  or  $A_t$ )

The ratio, usually expressed in decibels, between the radio-frequency power supplied by the transmitter of a radio link and the radio-frequency power supplied to the corresponding receiver in real installation, propagation and operational conditions.

*Note* – It is necessary to specify in each case the points at which the power supplied by the transmitter and the power supplied to the receiver are determined, for example:

- before or after the radio frequency filters or multiplexers that may be employed at the sending or the receiving end,
- at the input or at the output of the transmitting and receiving antenna feed lines.

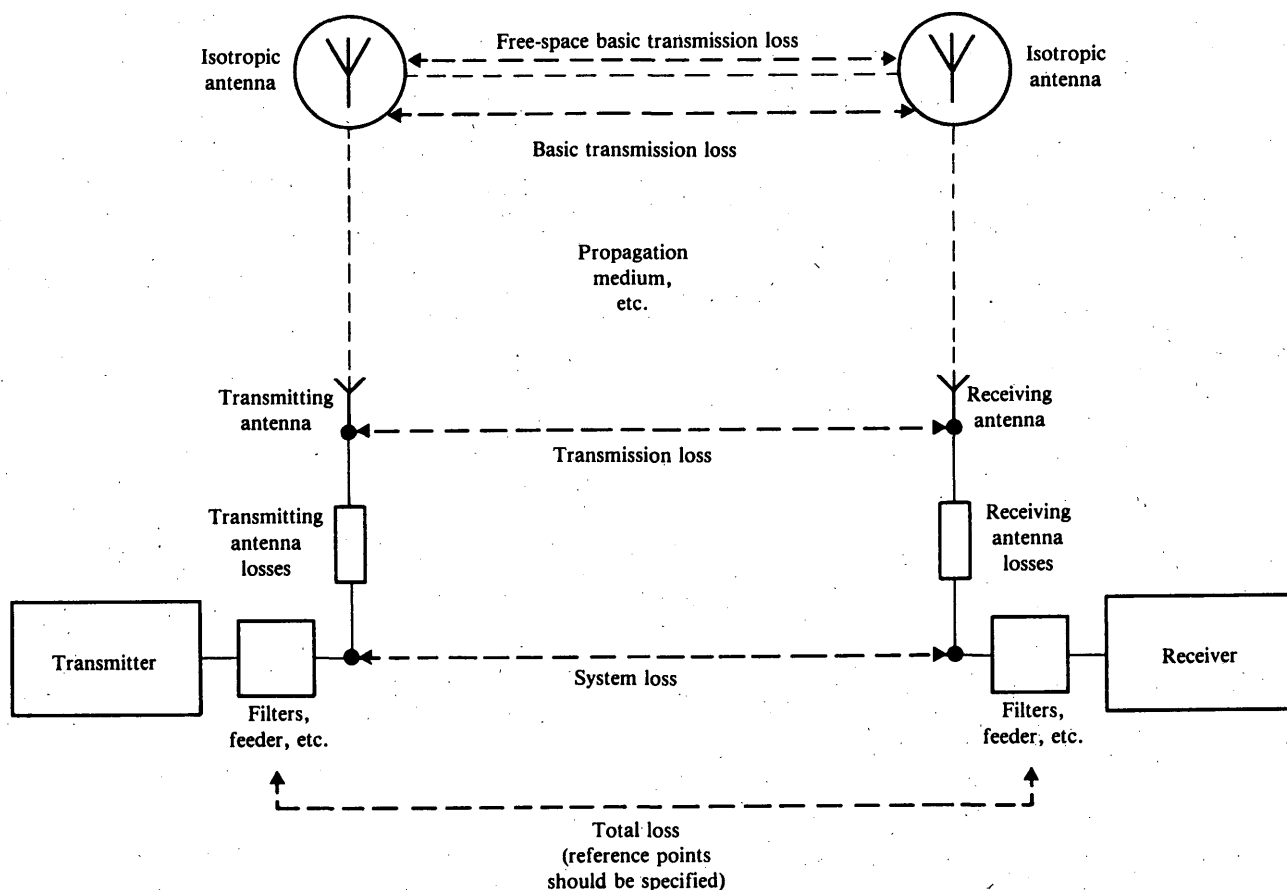


FIGURE 1 – Graphical depiction of terms used in the transmission loss concept

\* A graphical depiction of these terms is given in Fig. 1.

A42  
(Rec. 341, MOD,  
Vol. V)

**system loss**; *affaiblissement entre bornes d'antennes, affaiblissement du système; pérdida del sistema*

(Symbol:  $L_s$  or  $A_s$ )

The ratio, usually expressed in decibels, for a radio link, of the radio frequency power input to the terminals of the transmitting antenna and the resultant radio frequency signal power available at the terminals of the receiving antenna.

*Note 1* — The available power is the maximum active power which a source can deliver to a load i.e. the power which would be transferred if the impedances were conjugately matched.

*Note 2* — The system loss may be expressed by:

$$L_s = 10 \lg (p_t/p_a) = P_t - P_a \quad \text{dB} \quad (1)$$

where:

$p_t$ : radio frequency power input to the terminals of the transmitting antenna;

$p_a$ : resultant radio frequency signal power available at the terminals of the receiving antenna.

*Note 3* — The system loss excludes losses in feeder lines but includes all losses in radio-frequency circuits which are integral parts of the antenna, such as losses in conducting or dielectric radiating elements, antenna loading coil losses, terminating resistor losses, and ground losses in the vicinity of the antenna.

A43  
(Rec. 341, MOD,  
Vol. V)

**transmission loss** (of a radio link); *affaiblissement de transmission (d'une liaison radioélectrique); pérdida de transmisión (de un enlace radioeléctrico)*

(Symbol:  $L$  or  $A$ )

The ratio, usually expressed in decibels, for a radio link, of the power radiated by the transmitting antenna to the power that would be available at the receiving antenna output if there were no loss in the radio-frequency circuits of the antennas, it being assumed that the antenna radiation characteristics are retained.

*Note 1* — Transmission loss is equal to system loss minus the loss in the radio-frequency circuits which are integral parts of the antennas.

*Note 2* — The transmission loss may be expressed by:

$$L = L_s - L_{tc} - L_{rc} \quad \text{dB} \quad (2)$$

where  $L_{tc}$  and  $L_{rc}$  are the losses, expressed in decibels, in the transmitting and receiving antenna circuits respectively, excluding the dissipation associated with the antennas radiation, i.e., the definitions of  $L_{tc}$  and  $L_{rc}$  are  $10 \lg (r'/r)$ , where  $r'$  is the resistive component of the antenna circuit and  $r$  is the radiation resistance.

A44  
(Rec. 341, MOD,  
Vol. V)

**basic transmission loss** (of a radio link); *affaiblissement de propagation (d'une liaison radioélectrique), affaiblissement entre antennes isotropes (d'une liaison radioélectrique); pérdida básica de transmisión (de un enlace radioeléctrico)*

(Symbol:  $L_b$  or  $A_i$ )

The transmission loss that would occur if the antennas were replaced by isotropic antennas with the same polarization as the real antennas, the propagation path being retained, but the effects of obstacles close to the antennas being disregarded.

*Note 1* — The basic transmission loss is equal to the ratio of the equivalent isotropically radiated power of the transmitter system and the power, available from an isotropic receiving antenna.

*Note 2* — The effect of the local ground close to the antenna is included in computing the antenna gain, but not in the basic transmission loss.

A45 **free space basic transmission loss; affaiblissement d'espace libre (d'une liaison radioélectrique);**  
(Rec. 341, Vol. V) **pérdida básica de transmisión en el espacio libre**

(Symbol:  $L_{bf}$  or  $A_0$ )

The transmission loss that would occur if the antennas were replaced by isotropic antennas located in a perfectly dielectric, homogeneous, isotropic and unlimited environment, the distance between the antennas being retained.

*Note* — If the distance  $d$  between the antennas is much greater than the wavelength  $\lambda$ , the free space attenuation in decibels will be:

$$L_{bf} = 20 \lg \left( \frac{4\pi d}{\lambda} \right) \quad \text{dB} \quad (3)$$

A46 **ray path transmission loss; affaiblissement de transmission pour un trajet radioélectrique;**  
(Rec. 341, Vol. V) **pérdida de transmisión en el trayecto de un rayo**

(Symbol:  $L_t$  or  $A_t$ )

The transmission loss for a particular ray propagation path, equal to the basic transmission loss minus the transmitting and receiving antenna gains in the ray path directions.

*Note* — The ray path transmission loss may be expressed by:

$$L_t = L_b - G_t - G_r \quad \text{dB} \quad (4)$$

where  $G_t$  and  $G_r$  are the plane-wave directive gains of the transmitting and receiving antennas for the directions of propagation and polarization considered.

A47 **loss relative to free space; affaiblissement par rapport à l'espace libre (d'une liaison radioélectrique);**  
(Rec. 341, MOD; Vol. V) **pérdida relativa al espacio libre**

(Symbol:  $L_m$  or  $A_m$ )

The difference, between the basic transmission loss and the free space basic transmission loss, expressed in decibels.

*Note 1* — The loss relative to free space may be expressed by:

$$L_m = L_b - L_{bf} \quad \text{dB} \quad (5)$$

*Note 2* — Loss relative to free space may be divided into losses of different types, such as:

- *absorption loss* for example by ionospheric, atmospheric gases or hydrometeors;
- *diffraction loss* as for ground waves;
- *effective reflection or scattering loss*, as in the ionospheric case including the results of any focusing or defocusing due to curvature of a reflecting layer;
- *polarization coupling loss*, which can arise from any polarization mismatch between the antennas for the particular ray path considered;
- *antenna gain degradation*, as in tropospheric scatter propagation;
- *losses due to phase interference between the direct ray and rays reflected* from the ground, other obstacles or atmospheric layers.

A48 **spreading loss; affaiblissement géométrique, atténuation géométrique; pérdida por dispersión**

The attenuation of an electromagnetic wave due uniquely to the fact that with increasing distance the energy is distributed over a wider area.

*Note* — In a homogeneous and isotropic medium, the spreading loss is characterized by a decrease of the power flux-density in proportion to the reciprocal of the square of the distance to the source.

## Sub-section A5 — Coverage area and associated terms

A51a **coverage area** (of a space station); *zone de couverture (d'une station spatiale)*; *zona de cobertura (de una estación espacial)*

Area associated with a space station for a given service and a specified frequency within which, under specified technical conditions, it is feasible for radiocommunications to be established with one or several earth stations, either for reception or transmission or both.

*Note 1* — Several coverage areas may be associated with one and the same station, for example, a satellite with several antenna beams.

*Note 2* — The technical conditions include the following: characteristics of the equipment used both at the transmitting and receiving stations, how it is installed, quality of transmission desired, e.g., protection ratios and operating conditions.

*Note 3* — The following may be distinguishable:

- interference free coverage area, i.e., that limited solely by natural or artificial noise;
- the nominal coverage area: it is defined, when establishing a frequency plan, by taking into account the foreseen transmitters;
- the actual coverage area, i.e., with allowance made for the noise and interference which exist in practice.

*Note 4* — The concept of "coverage area" cannot be simply applied to a space station on board a non-geostationary satellite for which further study is necessary.

*Note 5* — Furthermore, the term "service area" should have the same technical basis as for "coverage area", but also include administrative aspects.

The following text has been suggested as an example:

**service area**; *zone de service*; *zona de servicio*

Area associated with a station for a given service and a specified frequency under specified technical conditions where radiocommunications may be established with existing or projected stations and within which the protection afforded by a frequency assignment or allotment plan or by any other agreement must be respected.

*Note 1* — Several separate service areas involving both reception and/or transmission, may be associated with the same station.

*Note 2* — The technical conditions include the following: characteristics of the equipment used both at the transmitting and receiving stations, how it is installed, quality of transmission desired and operating conditions.

A51b **coverage area** (of a terrestrial transmitting station); *zone de couverture (d'une station d'émission de Terre)*; *zona de cobertura (de una estación transmisora terrenal)*

Area associated with a transmitting station for a given service and a specified frequency within which, under specified technical conditions, radiocommunications may be established with one or several receiving stations.

*Note 1* — Several coverage areas may be associated with one and the same station.

*Note 2* — The technical conditions include the following: characteristics of the equipment used both at the transmitting and receiving stations, how it is installed, quality of transmission desired, e.g., protection ratios and operating conditions.

*Note 3* — The following may be distinguishable:

- interference-free coverage area, i.e., that limited solely by natural or artificial noise;

- the nominal coverage area: it is defined, when establishing a frequency plan by taking into account the foreseen transmitters;
- the actual coverage area, i.e., with allowance made for the noise and interference which exists in practice.

*Note 4* — Furthermore, the term “service area” should have the same technical basis as for “coverage area”, but also include administrative aspects.

A52

**capture area** (of a terrestrial receiving station); *zone de captage (d'une station de réception de Terre)*; *zona de captación (de una estación receptora terrenal)*

Area associated with a receiving station for a given service and a specified frequency within which, under specified technical conditions, radiocommunications may be established with one or several transmitting stations.

*Note* — The notes concerning the coverage area (of a transmitting station) are valuable also, *mutatis mutandis*, for the capture area.

## SECTION B — FREQUENCIES AND BANDWIDTHS

### Sub-section B0 — Frequency bands

B01

(radio frequency) **channel, RF channel**; *canal radioélectrique, radiocanal, canal RF; radio-canal, canal radioeléctrico, canal RF*

Part of the radio spectrum intended to be used for an emission and which may be defined by two specified limits, or by its centre frequency and the associated bandwidth, or by any equivalent indication.

*Note 1* — Usually the specified part of the radio spectrum is that which corresponds to the assigned frequency band.

*Note 2* — A radio frequency channel may be time-shared in order to allow radiocommunication in both directions by simplex operation.

*Note 3* — In some countries and certain texts of the existing Radio Regulations, the term “channel” (F and S: canal) is also used to denote a radio frequency circuit or, in other words, two associated radio frequency channels within the meaning of the proposed definition, each of which is used for one of the two directions of transmission.

*Note 4* — Recommendation 662 defines the general term “frequency channel” (Term 2.05).

B02

(RR 146)

**necessary bandwidth**; *largeur de bande nécessaire; anchura de banda necesaria*

For a given class of emission, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions.

B03

(RR 141, MOD)

**assigned frequency band**; *bande de fréquences assignée; banda de frecuencias asignada*

The frequency band within which the emission of a station is authorized; the width of the band equals the necessary bandwidth plus twice the absolute value of the frequency tolerance. Where space stations are concerned, the assigned frequency band includes twice the maximum Doppler shift that may occur in relation to any point of the Earth's surface.

*Note 1* — For certain services, the term “Assigned channel” is equivalent.

*Note 2* — For the definition of “Frequency tolerance” see § D. (Term D02)

B04

(RR 147)

**occupied bandwidth**; *largeur de bande occupée; anchura de banda ocupada*

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage  $\beta/2$  of the total mean power of a given emission.

Unless otherwise specified by the CCIR for the appropriate class of emission, the value of  $\beta/2$  should be taken as 0.5%.

**B05** **occupied band ;** *bande occupée; banda ocupada*

The frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage  $\beta/2$  of the total mean power of a given emission. Unless otherwise specified by the CCIR, for the appropriate class of emission, the value of  $\beta/2$  should be taken as 0.5%.

#### **Sub-section B1 – Arrangement of radio channels**

In the definitions which follow, the expression “given set of radio channels” may be considered to refer to similar phrases used by several Study Groups, for example:

- Study Group 9: Arrangement of radio channels;
- Study Groups 4, 8, 10, 11: Frequency plan;
- Study Group 2: Channel plan.

The term “characteristic frequency” refers to RR 143, “A frequency which can be easily identified and measured in a given emission”. In some Study Groups, the term “characteristic frequency” may, for example, also refer to “centre frequency” or “carrier frequency”.

**B10** **reference frequency ;** *fréquence de référence; frecuencia de referencia*

To be defined later.

**B11** **adjacent channel ;** *canal adjacent; canal adyacente*

In a given set of radio channels, the RF channel whose characteristic frequency is situated next above or next below that of a given channel.

*Note 1* – The adjacent channel situated above the given channel is known as the “upper adjacent channel” and the one below it as the “lower adjacent channel”.

*Note 2* – Two adjacent channels may have part of the frequency spectrum in common and this may be referred to as frequency overlap.

**B12** **second adjacent channel ;** *deuxième canal adjacent; segundo canal adyacente*

In a given set of radio channels, the RF channel whose characteristic frequency is situated next above that of the upper adjacent channel or next below that of the lower adjacent channel.

**B13** **co-channel ;** *cocanal, cōfréquence; cocanal*

Refers to the use of the same RF channel by two or more emissions.

**B14** **orthogonal co-channel ;** *cocanal (orthogonal); cocanal (ortogonal)*

Refers to the use of the same RF channel by two emissions with orthogonal polarizations, for the transmission of two independent signals.

**B15** **channel spacing ;** *espacement entre canaux; separación de canales*

In a given set of radio channels, the difference in frequency between the characteristic frequencies of two adjacent channels.

**B16** **offset ;** *décalé; separado*

In a given set of radio channels, this term refers to a change of the characteristic frequency of a radio-frequency channel in relation to its nominal frequency, by a specified value which is generally small compared to the channel spacing.

B17 **interleaved**; *intercalé; intercalado*

In a given set of radio channels, this term refers to the insertion of additional channels between the main channels (or each RF channel and its adjacent channels), the characteristic frequencies of the additional channels being different from those of the main channels by a specified value, generally a significant portion (e.g. one half) of the nominal channel spacing.

B18 **alternated** (polarization); (*à polarisation*) *alternée*; (*con polarización*) *alternada*

In a given set of radio channels, this term refers to an arrangement of channels in which two adjacent channels have orthogonal polarizations.

## SECTION C – RADIATION AND EMISSION

C01 **radio-frequency radiation**; *rayonnement (radioélectrique); radiación (radioeléctrica)*  
(RR 131, MOD)

1. The phenomenon by which energy in the form of electromagnetic waves, in the radio-frequency range, emanates from a source into space.
2. Energy transferred through space in the form of electromagnetic waves in the radio-frequency range.

*Note* – By extension the term “radio-frequency radiation” sometimes also covers induction phenomena.

C02 **emission**; *emission; emisión*  
(RR 132, MOD)

1. Radio-frequency radiation in the case where the source is a radio transmitter.
2. Radio waves or signals produced by a radio transmitting station.

*Note 1* – The energy from the local oscillator of a radio receiver if transferred to external space, is a radiation and not an emission.

*Note 2* – In radiocommunication, the French term «émission» applies only to intentional radiation.

C03 **out-of-band emission**; *émission hors bande; emisión fuera de banda*  
(RR 138)

Emission on a frequency or frequencies immediately outside the necessary bandwidth which results from the modulation process, but excluding spurious emissions.

C04 **spurious emission**; *rayonnement non essentiel; emisión no esencial*  
(RR 139)

Emission on a frequency or frequencies which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions.

C05 **unwanted emissions**; *rayonnements non désirés; emisiones no deseadas*  
(RR 140 MOD)

Emissions consisting of spurious emissions and out-of-band emissions.

C06 **harmonic emission**; *rayonnement harmonique; emisión armónica*  
(Rec. 329, Vol. I)

Spurious emissions at frequencies which are whole multiples of those contained in the band occupied by an emission.

C07 **intermodulation products** (of a transmitting station); *produits d'intermodulation* (d'une station émettrice); *productos de intermodulación* (de una estación transmisora)

Each spectral component produced by intermodulation at one of the combination frequencies:

$$f = pf_1 + qf_2 + rf_3 \dots$$

where  $p, q, r$  are positive, negative or nil integers and where  $f_1, f_2, \dots$  are the frequencies of the various oscillations existing in a transmitting station, such as the carrier frequencies of the different transmitters, the sub-carrier or local oscillation frequencies, the frequencies of sidebands due to modulation, etc., where the sum  $|p| + |q| + |r| + \dots$  is the order of an individual intermodulation product.

## SECTION D – TRANSMITTERS AND CLASSES OF EMISSION

D01 **(radio) transmitter**; *émetteur* (radioélectrique); *transmisor* (radioeléctrico)

Apparatus producing radio-frequency energy for the purpose of radiocommunication.

D02 **frequency tolerance**; *tolérance de fréquence*; *tolerancia de frecuencia*  
(RR 145, MOD)

The maximum permissible departure by the centre frequency of the frequency band occupied by an emission from the assigned frequency or, by the characteristic frequency of an emission from the reference frequency.

*Note* – The frequency tolerance is expressed in parts in  $10^6$  or in hertz.

D03 **class of emission**; *classe d'émission*; *clase de emisión*  
(RR 133)

The set of characteristics of an emission, designated by standard symbols, e.g. type of modulation of the main carrier, modulating signal, type of information to be transmitted, and also if appropriate, any additional signal characteristics.

D03a **sideband**; *bande latérale*; *banda lateral*

To be defined later.

D03b **double sideband**; *double bande latérale*; *doble banda lateral*

To be defined later.

D04 **single sideband ... (SSB)**; *... à bande latérale unique, (BLU)*; *... de banda lateral única, (BLU)*  
(RR 134)

Pertaining to a transmission or emission where only either the lower sideband or the upper sideband resulting from amplitude modulation is preserved.

D05 **full carrier ...**; *... à porteuse complète*; *... de onda portadora completa*

Pertaining to a transmission or emission with amplitude modulation where, by convention, the power of the sinusoidal carrier component is no more than 6 dB below the peak envelope power.

*Note 1* – Double-sideband amplitude-modulated emissions normally comprise a full carrier with a power level exactly 6 dB below the peak envelope power at 100% modulation.

*Note 2* – In single-sideband full-carrier emissions, a carrier at a power level of 6 dB below the peak envelope power is emitted, to enable the use of a receiver designed for double-sideband full-carrier operation.



D06 **reduced carrier** ...; ... *à porteuse réduite; ... de onda portadora reducida*

Pertaining to a transmission or emission with amplitude modulation where the power of the sinusoidal carrier component is, by convention, reduced by more than 6 dB below the peak envelope power but remains at such a level that it can be reconstituted and used for demodulation.

*Note 1* — The level of the reduced carrier is normally between 6 dB and 32 dB and preferably between 16 dB and 26 dB below the peak envelope power of the emission.

*Note 2* — The reduced carrier may also be used to achieve automatic frequency control and/or gain control at the receiver.

D07 **suppressed carrier** ...; ... *à porteuse supprimée; ... de onda portadora suprimida*

Pertaining to a transmission or emission with amplitude modulation where the power of the sinusoidal carrier component is reduced to a level such that it generally cannot be reconstituted and used for demodulation.

*Note* — A carrier is regarded as being suppressed when its level is at least 32 dB and preferably 40 dB or more below the peak envelope power of the emission.

D08 **vestigial-sideband** (qualifying term) ...; ... *à bande latérale résiduelle; ... de banda lateral residual*

Pertaining to a transmission or emission in which one complete sideband and its complementary vestigial sideband are utilized.

D08a **vestigial sideband (VSB);** *bande latérale résiduelle (BLR); banda lateral residual (BLR)*

A sideband in which only the spectral components corresponding to the lower frequencies of the modulating signals, are preserved, the other components being strongly attenuated.

## SECTION E — POWER AND RADIATED POWER

E01 **peak envelope power** (of a radio transmitter); *puissance en crête (d'un émetteur radioélectrique); potencia en la cresta de la envolvente (de un transmisor radioeléctrico)*  
(RR 151)

The average power supplied to the antenna transmission line by a transmitter during one radio-frequency cycle at the crest of the modulation envelope, taken under normal operating conditions.

E02 **mean power** (of a radio transmitter); *puissance moyenne (d'un émetteur radioélectrique); potencia media (de un transmisor radioeléctrico)*  
(RR 152)

The average power supplied to the antenna transmission line by a transmitter during an interval of time sufficiently long compared with the lowest frequency encountered in the modulation taken under normal operating conditions.

E03 **carrier power** (of a radio transmitter); *puissance (de la) porteuse (d'un émetteur radio-électrique); potencia de la portadora (de un transmisor radioeléctrico)*  
(RR 153, MOD)

The average power supplied to the antenna transmission line by a transmitter during one radio-frequency cycle taken under the condition of no modulation.

*Note* — With some types of modulating signals the concept of carrier power is meaningless.

E04 **antenna gain**; *gain d'une antenne; ganancia de una antena*  
(RR 154)

The ratio, usually expressed in decibels, of the power required at the input of a loss free reference antenna to the power supplied to the input of a given antenna to produce, in a given direction, the same field strength of the same power flux-density at the same distance. When not specified otherwise, the gain refers to the direction of maximum radiation. The gain may be considered for a specified polarization.

Depending on the choice of the reference antenna, a distinction is made between:

- (a) absolute or isotropic gain ( $G_i$ ), when the reference antenna is an isotropic antenna isolated in space;
- (b) gain relative to a half-wave dipole ( $G_d$ ), when the reference antenna is a half-wave dipole isolated in space whose equatorial plane contains the given direction;
- (c) gain relative to a short vertical antenna ( $G_v$ ), when the reference antenna is a linear conductor, much shorter than one quarter of the wavelength, normal to the surface of a perfectly conducting plane which contains the given direction.

E05 **cymomotive force (c.m.f.)** (in a given direction); *force cymomotrice (f.c.m.) (dans une direction donnée)*; *fuerza cimomotriz (f.c.m.) (en una dirección dada)*  
(Rec. 561, Vol. X)

The product formed by multiplying the electric field strength at a given point in space, due to a transmitting station, by the distance of the point from the antenna. This distance must be sufficient for the reactive components of the field to be negligible; moreover, the finite conductivity of the ground is supposed to have no effect on propagation.

*Note 1* — The cymomotive force (c.m.f.) is a vector; when necessary it may be expressed in terms of components along axes perpendicular to the direction of propagation.

*Note 2* — The c.m.f. is expressed in volts; it corresponds numerically to the field strength in mV/m at a distance of 1 km.

E06 **antenna directivity diagram**; *diagramme de directivité d'antenne*; *diagrama de directividad de una antena*

A curve representing in polar or cartesian coordinates, a quantity proportional to the gain of antenna in the various directions in a particular plane or cone.

E06a **horizontal directivity pattern**; *diagramme de directivité horizontal*; *diagrama de directividad horizontal*

An antenna directivity diagram in the horizontal plane.

E06b **vertical directivity pattern**; *diagramme de directivité vertical*; *diagrama de directividad vertical*

An antenna directivity diagram in a specified vertical plane.

E07 **equivalent isotropically radiated power (e.i.r.p.)**; *puissance isotrope rayonnée équivalente (p.i.r.e.)*; *potencia isotropa radiada equivalente (p.i.r.e.)*  
(RR 155, MOD)

The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain).

*Note* — The isotropic antenna, when fed with a power of 1 kW, is considered to provide an e.i.r.p. of 1 kW in all directions and to produce a field strength of 173 mV/m at 1 km distance.

E08 **effective radiated power (e.r.p.)** (in a given direction); *puissance apparente rayonnée (p.a.r.)* *(dans une direction donnée)*; *potencia radiada aparente (p.r.a.) (en una dirección dada)*  
(RR 156, MOD)

The product of the power supplied to the antenna and its gain relative to a half-wave dipole in a given direction.

*Note* — The reference antenna, when fed with a power of 1 kW, is considered to radiate an e.r.p. of 1 kW in any direction in the equatorial plane and produces a field strength of 222 mV/m at 1 km distance.

E09 **effective monopole radiated power (e.m.r.p.)** (in a given direction); *puissance apparente rayonnée sur une antenne verticale courte (p.a.r.v.) (dans une direction donnée)*; *potencia radiada aparente referida a una antena vertical corta (p.r.a.v.) (en una dirección dada)*  
(RR 157, MOD)

The product of the power supplied to the antenna and its gain relative to a short vertical antenna in a given direction.

*Note* — The reference antenna, when fed with a power of 1 kW, is considered to radiate an e.m.r.p. of 1 kW in any direction in the perfectly conducting plane and produces a field strength of 300 mV/m at 1 km distance (equivalent to a c.m.f. of 300 V).

## SECTION F – RECEIVERS, NOISE AND INTERFERENCE

## Sub-section F0 – Noise

F00 **noise; bruit; ruido**

To be defined later.

F01 **spot noise temperature** (of a one-port network); *température de bruit (d'un monoporte); temperatura de ruido puntual (de una red con una sola puerta)*

The exchangeable noise power spectral density at a given frequency of a one-port electrical network, divided by Boltzmann's constant.

*Note 1* – This definition assumes that quantum effects are negligible.

*Note 2* – The spot noise temperature has the sign of the real part of the network impedance.

*Note 3* – If the network has an impedance with a positive real part, its noise temperature at a given frequency equals the thermodynamic temperature to which a resistor equal in value to the real part of the impedance should be brought in order to obtain an available power of thermal noise equal to the available power of the noise of the network at the same frequency.

*Note 4* – A receiving antenna can be regarded as a one-port electrical network when viewed from its output port.

F02 **equivalent (spot) noise temperature** (of a linear two-port network); *température équivalente de bruit (d'un biporte linéaire); temperatura de ruido equivalente (puntual) (de una red lineal con dos puertas)*

(Symbol:  $T(f)$ )

The amount by which at a given frequency the noise temperature of a one-port electrical network connected to the input of a given linear two-port electrical network would have to be increased, if the noise due to this two-port network was temporarily suppressed, in order to cause the noise power spectral density at the output frequency corresponding to input frequency, to be the same as that of the total noise of the one-port and two-port networks.

*Note 1* – This definition assumes that quantum phenomena are negligible.

*Note 2* – The equivalent spot noise temperature of a two-port network is dependent on the impedance of the one-port network connected to input.

F03 **spot noise factor, spot noise figure** (of a linear two-port network); *facteur de bruit (d'un biporte linéaire); factor de ruido puntual (de una red lineal con dos puertas)*

(Symbol:  $F(f)$ )

The ratio of the exchangeable power spectral density of the noise appearing at a given frequency at the output of a given linear two-port electrical network, to the spectral density which would be present at the output if the only source of noise were the thermal noise due to a one-port electrical network connected to the input and which is assumed to have at all frequencies a noise temperature equal to the reference thermodynamic temperature fixed, by convention, around 290 K.

*Note 1* – The spot noise factor  $F(f)$  is related to the equivalent spot noise temperature  $T(f)$  as follows:

$$F(f) = 1 + \frac{T(f)}{T_0}$$

where  $T_0$  is the thermodynamic reference temperature.

*Note 2* – The value of the ratio  $F(f)$  may be expressed in decibels. In English, the term "noise factor" is generally employed when the ratio is expressed arithmetically, and "noise figure" is employed when the ratio is expressed in decibels.

## Sub-section F1 — Interference

F11a **radio (frequency) noise; *bruit radioélectrique; ruido radioeléctrico***

A time-varying electromagnetic phenomenon having components in the radio-frequency range, apparently not conveying information and which may be superimposed on, or combined with, a wanted signal.

*Note 1* — In certain cases a radio-frequency noise may convey information on some characteristics of its source, for example its nature and location.

*Note 2* — An aggregate of signals may appear as radio-frequency noise, when they are not separately identifiable.

F11b **radio-frequency disturbance; *perturbation radioélectrique, parasite (radioélectrique); perturbación radioeléctrica, parásito (radioeléctrico)***

Any electromagnetic phenomenon having components in the radio-frequency range, which may degrade the performance of a device, equipment or system, or affect adversely living or inert matter.

*Note* — A radio-frequency disturbance may be a radio-frequency noise, an unwanted signal or a change in the propagation medium itself.

F11c **radio-frequency interference (RFI); *brouillage (radioélectrique); interferencia (radioeléctrica)***

Degradation of the reception of a wanted signal caused by a radio-frequency disturbance.

*Note 1* — Often man-made noise is not included in interference.

*Note 2* — Various levels of interference are defined for administrative purposes in the Radio Regulations viz. *permissible interference* (RR 161), *accepted interference* (RR 162) and *harmful interference* (RR 163). The first term describes a level of interference which in the given conditions involves degradation of reception quality to an extent considered insignificant, but which must be taken into account in the planning of systems. The level of permissible interference is usually laid down in CCIR Recommendations and/or other international agreements. The second term describes a higher level of interference involving a moderate degradation of reception quality which in given conditions is deemed to be acceptable by the administrations concerned. The third term describes a level of interference which “seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service”.

*Note 3* — The English words “interference” and “disturbance” are often used indiscriminately; the expression “radio-frequency interference” is also commonly applied to a radio-frequency disturbance or to an unwanted signal.

F12 **interfering source; *source de brouillage; fuente interferente***

An emission, radiation, or induction which is determined to be a cause of interference in a radiocommunication system.

## Sub-section F2 — Signal-to-interference ratio, protection ratio

F21 **signal-to-interference ratio; signal/interference ratio; *rapport signal sur brouillage, rapport signal/brouillage; relación señal/interferencia***

The ratio, generally expressed in decibels, of the power of the wanted signal to the total power of interfering signals and noise, evaluated in specified conditions at a specified point of a transmission channel.

*Note 1* — A distinction is made, for example, between:

- at the receiver input, the RF signal-to-interference ratio;
- at the receiver output, the AF signal-to-interference ratio and the VF signal-to-interference ratio.

*Note 2* – In each individual case, the noise and interfering signals taken into account should be specified.

*Note 3* – The term “signal-to-disturbance ratio” or its abbreviated form “signal/disturbance ratio”, which is already used for electromagnetic compatibility, may be used as a synonym.

F22

**protection ratio ; *rapport de protection ; relación de protección***

The minimum value of the signal-to-interference ratio required to obtain a specified reception quality under specified conditions and at a specified point.

*Note 1* – Various CCIR Recommendations contain definitions for specific applications. The minimum value is usually laid down in these Recommendations and in other international agreements.

*Note 2* – The specified conditions comprise *inter alia*:

- the nature and characteristics of the wanted signal;
- the nature and characteristics of the radio-frequency disturbance or the noise and interfering signals;
- the receiver and antenna characteristics;
- the propagation conditions.

*Note 3* – A distinction is made for example between:

- the RF protection ratio;
- the VF protection ratio;
- the AF protection ratio.

F23

**protection margin ; *marge de protection ; margen de protección***

The difference between the signal-to-interference ratio and the protection ratio, these ratios being expressed in logarithmic form.

*Note 1* – Generally, care is taken to ensure that the difference between the ratios is positive to ensure reliability of communication.

*Note 2* – Various Recommendations contain definitions for specific applications (e.g. Recommendation 566).

### Sub-section F3 – Field strength and power flux-density

F31

**minimum usable field-strength, [minimum usable power flux-density]; *champ minimal utilisable, [puissance surfacique minimale utilisable]; intensidad de campo mínima utilizable, [densidad de flujo de potencia mínima utilizable]***

(Symbols:  $E_{min}$  and  $P_{min}$ )

Minimum value of the field-strength [minimum value of the power flux-density] necessary to permit a desired reception quality, under specified receiving conditions, in the presence of natural and man-made noise, but in the absence of interference from other transmitters.

*Note 1* – The desired quality is determined in particular by the protection ratio against noise, and for fluctuating noise, by the percentage of time during which this protection ratio must be ensured.

*Note 2* – The receiving conditions include, *inter alia*:

- the type of transmission, and frequency band used;
- the receiving equipment characteristics (antenna gain, receiver characteristics, siting, etc.);
- receiver operating conditions, particularly the geographical zone, the time and the season.

*Note 3* – Where there is no ambiguity, the term “minimum field-strength” [“minimum power flux-density”] may be used.

*Note 4* – The term “minimum usable field-strength” corresponds to the term “minimum field-strength to be protected” which appears in many ITU texts.

F32

**usable field-strength, [usable power flux-density];** *champ utilisable, [puissance surfacique utilisable]; intensidad de campo utilizable, [densidad de flujo de potencia utilizable]*

(Symbols:  $E_u$  and  $P_u$ )

Minimum value of the field-strength [minimum value of the power flux-density] necessary to permit a desired reception quality, under specified receiving conditions, in the presence of natural and man-made noise and of interference, either in an existing situation or as determined by agreements or frequency plans.

*Note 1* — The desired quality is determined in particular by the protection ratios against noise and interference and in the case of fluctuating noise or interference, by the percentage of time during which the required quality must be ensured.

*Note 2* — The receiving conditions include, *inter alia*:

- the type of transmission and frequency band used;
- the receiving equipment characteristics (antenna gain, receiver characteristics, siting, etc.);
- receiver operating conditions, particularly the geographical zone, the time and the season, or the fact that, if the receiver is mobile, a median field strength for multipath propagation must be considered.

*Note 3* — The term “usable field-strength” corresponds to the term “necessary field-strength” which appears in many ITU texts.

F33

**reference usable field-strength, [reference usable power flux-density];** *champ utilisable de référence, [puissance surfacique utilisable de référence]; intensidad de campo de referencia utilizable, [densidad de flujo de potencia de referencia utilizable]*

(Symbols:  $E_{ref}$  and  $P_{ref}$ )

The agreed value of the usable field-strength [the agreed value of the usable power flux-density] that can serve as a reference or basis for frequency planning.

*Note 1* — Depending on the receiving conditions and the quality required, there may be several reference usable field-strength [reference usable power flux-density] values for the same service.

*Note 2* — Where there is no ambiguity, the term “reference field-strength” [“reference power flux-density”] may be used.

#### Sub-section F4 — Diversity reception

F41

(Rec. 592, Vol. IX)

**diversity reception; réception en diversité; recepción por diversidad**

A reception method in which one resultant signal is obtained from several received radio signals which convey the same information but for which the radio path or the transmission channel differs by at least one characteristic such as frequency, polarization, or the position or orientation of antennas.

*Note 1* — The quality of the resultant signal can be higher than that of the individual signals, due to the partial decorrelation of propagation conditions over the different radio paths or transmission channels.

*Note 2* — The term “time diversity” is sometimes used to refer to the repetition of a signal or part of a signal over a single radio path or transmission channel.

F42

(Rec. 592, Vol. IX)

**order of diversity; ordre de diversité; orden de diversidad**

The number of different radio signals used for diversity reception. For two signals, reception is said to be “double diversity”, and so on.

F43

(Rec. 592, Vol. IX)

**space diversity reception; réception en diversité d'espace; recepción por diversidad en espacio**

Diversity reception in which several antennas are used at appropriate distances from each other in a radio station.

*Note* — For line-of-sight radio-relay systems, separation is generally vertical, whereas for trans-horizon radio-relay systems, it is generally horizontal.

F45 **frequency diversity reception**; *réception en diversité de fréquence*; *recepción por diversidad en frecuencia*  
(Rec. 592, Vol. IX)

Diversity reception in which several radio channels are used with appropriate frequency separations.

*Note* — If the channels are situated in different frequency bands, the frequency diversity is said to be “cross-band diversity”.

## SECTION G — PROPAGATION

### Sub-section G0 — Terms related to radio waves

G00 **polarization**; *polarisation*; *polarización*

To be defined later.

G01 **cross-polarization**; *transpolarisation*; *transpolarización*, *polarización cruzada*

The appearance, in the course of propagation, of a polarization component which is orthogonal to the expected polarization.

G02 **cross-polarization discrimination**; *discrimination de polarisation*, *découplage de polarisation*; *discriminación por polarización*

For a radio wave transmitted with a given polarization, the ratio at the reception point of the power received with the expected polarization to the power received with the orthogonal polarization.

*Note* — The cross-polarization discrimination depends both on the characteristics of the antennas and on the propagation medium.

G03 **cross-polarization isolation**; *isolement de polarisation*; *aislamiento por polarización cruzada*  
(Rec. 310, Vol. V)

For two radio waves transmitted at the same frequency with the same power and orthogonal polarization, the ratio of the co-polarized power in a given receiver to the cross polarized power in that receiver.

G04 **depolarization**; *dépolarisation*; *despolarización*

A phenomenon by virtue of which all or part of the power of a radio wave transmitted with a defined polarization may no longer have a defined polarization after propagation.

G04a **elliptical polarization**; *polarisation elliptique*; *polarización elíptica*

To be defined later.

G05 **right-hand polarization, clockwise polarization**; *polarisation dextrorsum*, *polarisation dextrogyre* (deprecated in this sense); *polarización dextrógira*, *polarización en el sentido de las agujas del reloj*  
(RR 148, MOD)

An elliptical polarization for which the electric flux-density vector observed in any fixed plane not containing the direction of propagation, whilst looking in this direction, rotates with time in a right-hand or clockwise direction.

G06 **left-hand polarization, counter-clockwise polarization**; *polarisation senestrorsum*, *polarisation lévogyre* (deprecated in this sense); *polarización levógira*, *polarización en el sentido contrario de las agujas del reloj*  
(RR 149, MOD)

An elliptical polarization for which the electric flux-density vector observed in any fixed plane not containing the direction of propagation, whilst looking in this direction, rotates with time in a left-hand or counter-clockwise direction.

**Sub-section G1 – Tropospheric propagation**

**G11** **free-space propagation ; *propagation en espace libre; propagación en espacio libre***  
(Rec. 310, Vol. V)

Propagation of an electromagnetic wave in a homogeneous ideal dielectric medium which may be considered of infinite extent in all directions.

*Note* – For propagation in free space, the magnitude of each vector of the electromagnetic field in any given direction from the source beyond a suitable distance determined by the size of the source and the wavelength is proportional to the reciprocal of the distance from the source.

**G11a** **ray ; *trajet radioélectrique; trayecto radioeléctrico***  
(Rec. 310, Vol. V)

To be defined later.

**G12** **line-of-sight propagation ; *propagation en visibilité; propagación con visibilidad directa***  
(Rec. 310, Vol. V)

Propagation between two points for which the direct ray is sufficiently clear of obstacles for diffraction to be of negligible effect.

**G13** **troposphere ; *troposphère; troposfera***  
(Rec. 310, Vol. V)

The lower part of the Earth's atmosphere extending upwards from the Earth's surface, in which temperature decreases with height except in local layers of temperature inversion. This part of the atmosphere extends to an altitude of about 9 km at the Earth's poles and 17 km at the equator.

**G14** **tropospheric propagation ; *propagation troposphérique; propagación troposférica***

Propagation within the troposphere and by extension, propagation beneath the ionosphere, when not influenced by the ionosphere.

**G15** **radio horizon ; *horizon radioélectrique; horizonte radioeléctrico***  
(Rec. 310, Vol. V)

The locus of points at which the direct rays from a point source of radio waves are tangential to the surface of the Earth.

*Note* – As a general rule, the radio and geometric horizons are different because of atmospheric refraction.

**G16** **trans-horizon propagation ; *propagation (troposphérique) transhorizon; propagación (troposférica) transhorizonte***  
(Rec. 310, Vol. V)

Tropospheric propagation between points close to the ground, the reception point being beyond the radio horizon of the transmission point.

*Note* – Trans-horizon propagation may be due to a variety of tropospheric mechanisms such as diffraction, scattering, reflection from tropospheric layers. However ducting is not included because in a duct there is no radio horizon.

**G17** **tropospheric radio-duct ; *conduit troposphérique; conducto radioeléctrico troposférico***  
(Rec. 310, Vol. V)

A quasi-horizontal stratification in the troposphere within which radio energy of a sufficiently high frequency is substantially confined and propagates with much lower attenuation, than would be obtained in a homogeneous atmosphere.

**G18** **ducting ; *propagation troposphérique guidée; propagación troposférica guiada (por conducto)***  
(Rec. 310, Vol. V)

Guided propagation of radio waves inside a tropospheric radio-duct.

**G19** **tropospheric-scatter (propagation) ; *(propagation par) diffusion troposphérique; (propagación por) dispersión troposférica***  
(Rec. 310, Vol. V)

Tropospheric propagation by scattering from many inhomogeneities and/or discontinuities in the refractive index of the atmosphere.



- G19a **precipitation-scatter (propagation);** (*propagation par*) *diffusion sur les précipitations; (propagación por) dispersión debida a las precipitaciones*

Tropospheric propagation due to scattering caused by hydrometeors, mainly rain.

- G19b **multipath propagation;** *propagation par trajets multiples; propagación por trayectos múltiples*  
(Rec. 310, MOD, Vol. V)

Propagation between a transmission point and a reception point over a number of separate propagation paths simultaneously.

- G19c **ground wave;** *onde de sol; onda de superficie*

A radio wave basically determined by the properties of the ground which propagates in the troposphere and which is mainly due to diffraction around the Earth.

#### Sub-section G2 — Ionospheric propagation

- G21 **ionosphere;** *ionosphère; ionosfera*

That part of the upper atmosphere characterized by the presence of ions and free electrons mainly arising from photo-ionization, the electron density being sufficient to produce significant modification of the propagation of radio waves in certain frequency bands.

*Note* — The Earth's ionosphere extends approximately from a height of 50 km to a height of 2000 km.

- G22 **ionospheric propagation;** *propagation ionosphérique; propagación ionosférica*

Radio propagation involving the ionosphere.

- G24 **trans-ionospheric propagation;** *propagation transionosphérique; propagación transionosférica*

Radio propagation between two points situated below and above the height of the maximum electron density of the ionosphere.

- G25 **(propagation by) ionospheric scatter propagation;** (*propagation par*) *diffusion ionosphérique; (propagación por) dispersión ionosférica*

Ionospheric propagation involving scatter from irregularities in the electron density in the ionosphere.

- G26 **(propagation by) ionospheric reflection;** (*propagation par*) *réflexion ionosphérique; (propagación por) reflexión ionosférica*

Ionospheric propagation at a sufficiently low frequency that, for given conditions, transionospheric propagation is not possible; the radio wave is then subject to progressive refraction which, when considered from a sufficiently large distance, may be considered as equivalent to reflection from a hypothetical surface.

- G27 **ionospheric wave;** *onde ionosphérique; onda ionosférica*

A radio wave returned to the Earth by ionospheric reflection.

- G28 **hop (ionospheric propagation);** *bond (saut) (en propagation ionosphérique); salto (en propagación ionosférica)*

A propagation path between two points on the surface of the Earth, comprising one or more ionospheric reflections but without intermediate reflection by the ground.

G29  
(Rec. 373, MOD,  
Vol. VI)

**basic MUF; *MUF de référence; MUF básica***

The highest frequency at which a radio wave can propagate between given terminals below the ionosphere on a specified occasion, by ionospheric refraction alone.

*Note* — The acronym MUF stands for "Maximum Usable Frequency".

G30  
(Rec. 373, MOD,  
Vol. VI)

**operational MUF, MUF; *MUF d'exploitation, MUF; MUF de explotación, MUF***

The highest frequency that would permit acceptable performance of a radio circuit by signal propagation via the ionosphere between given terminals below the ionosphere at a given time under specified working conditions.

*Note 1* — Acceptable performance may for example be quoted in terms of maximum error ratio or required signal/noise ratio.

*Note 2* — Specified working conditions may include such factors as antenna types, transmitter power, class of emission and required information rate.

G31  
(Rec. 373, MOD,  
Vol. VI)

**lowest useful frequency, LUF; *fréquence minimale utilisable LUF; frecuencia mínima utilizable LUF***

The lowest frequency that would permit acceptable performance of a radio circuit by signal propagation via the ionosphere between given terminals below the ionosphere at a given time under specified working conditions.

*Note* — See Notes 1 and 2 of term G30 "operational MUF".

## SECTION H — SPACE RADIOCOMMUNICATIONS

### Sub-section H0 — General terms\* (See also Sub-section A3)

H01  
(RR 170)  
(Rec. 673, Vol. IV)

**spacecraft; *engin spatial; vehículo espacial***

A man-made vehicle which is intended to go beyond the major part of the Earth's atmosphere.

H02  
(RR 169)  
(Rec. 610, Vol. II)

**deep space; *espace lointain; espacio lejano***

Space at distances from the Earth equal to, or greater than,  $2 \times 10^6$  km.

H03  
(Rec. 673, Vol. IV)

**space probe; *sonde spatiale; sonda espacial***

A spacecraft designed for making observations or measurements in space.

H04  
(RR 171 + Note)  
(Rec. 673, Vol. IV)

**satellite; *satellite; satélite***

A body which revolves around another body of preponderant mass and which has a motion primarily and permanently determined by the force of attraction of that other body.

*Note* — A body so defined which revolves around the Sun is called a planet or planetoid.

\* The terms of celestial mechanics, relating to orbits, used in these definitions are defined in Recommendation 673 (Vol. IV).

- H05**  
(Rec. 673, Vol. IV) **orbit; orbite; órbita**
1. The path, relative to a specified frame of reference, described by the centre mass of a satellite or other object in space, subjected solely to forces of natural origin, mainly the force of gravity.
  2. By extension, the path described by the centre of mass of a body in space subjected to forces of natural origin and occasional low-energy corrective forces exerted by a propulsive device in order to achieve and maintain a desired path.
- Note* — In the Radio Regulations, the above two definitions are combined in the following form (RR 176):
- “The path, relative to a specified frame of reference, described by the centre of mass of a satellite or other object in space subjected primarily to natural forces, mainly the force of gravity.”
- H06**  
(RR 177, MOD)  
(Rec. 673, Vol. IV) **inclination (of a satellite orbit); inclinaison (d'une orbite de satellite); inclinación (de una órbita de satélite)**
- The angle between the plane of the orbit of a satellite and the principal reference plane.
- Note* — By convention, the inclination of a direct orbit of a satellite is an acute angle and the inclination of a retrograde orbit is an obtuse angle.
- H07**  
(RR 178)  
(Rec. 673, MOD, Vol. IV) **period (of a satellite); période (d'un satellite); periodo (de un satélite)**
- The time elapsing between two consecutive passages of a satellite through a characteristic point on its orbit.
- H08**  
(RR 179)  
(Rec. 673, Vol. IV) **altitude of the apogee [perigee]; altitude de l'apogée [du périée]; altitud del apogeo [del perigeo]**
- The altitude of the apogee [perigee] above a specified hypothetical reference surface serving to represent the surface of the Earth.
- H09a**  
(Rec. 673, Vol. IV) **geocentric angle; angle géocentrique; ángulo geocéntrico**
- The angle formed by imaginary straight lines that join any two points with the centre of the Earth.
- H09b**  
(Rec. 673, Vol. IV) **topocentric angle; angle topocentrique; ángulo topocéntrico**
- The angle formed by imaginary straight lines that join any two points in space with a specific point on the surface of the Earth.
- H09c**  
(Rec. 673, Vol. IV) **exocentric angle; angle exocentrique; ángulo exocéntrico**
- The angle formed by imaginary straight lines that join any two points with a specific point in space.
- Sub-section H1 — Types of satellites**
- H11**  
(RR 172)  
(Rec. 673, Vol. IV) **active satellite; satellite actif; satélite activo**
- A satellite carrying a station intended to transmit or retransmit radiocommunication signals.
- H12**  
(RR 173 (MOD))  
(Rec. 673, Vol. IV) **reflecting satellite; satellite réflecteur; satélite reflector**
- A satellite intended to reflect radiocommunication signals.
- H13**  
(Rec. 673, Vol. IV) **station-keeping satellite; satellite maintenu en position; satélite de posición controlada**
- A satellite, the position of the centre of mass of which is controlled to follow a specified law, either in relation to the positions of other satellites belonging to the same space system or in relation to a point on Earth which is fixed or moves in a specified way.

- H14 **synchronized satellite, phased satellite** (deprecated); *satellite synchronisé, satellite en phase* (deprecated); *satélite sincronizado, satélite en fase* (deprecated)  
(Rec. 673, Vol. IV)

A satellite controlled so as to have an anomalistic period or a nodal period equal to that of another satellite or planet, or to the period of a given phenomenon, and to pass a characteristic point in its orbit at specified instants.

- H15 **attitude-stabilized satellite**; *satellite à commande d'orientation; satellite de actitud estabilizada*  
(Rec. 673, Vol. IV)

A satellite with at least one axis maintained in a specified direction, e.g. toward the centre of the Earth, the Sun or a specified point in space.

- H16 **synchronous satellite**; *satellite synchrone; satélite sincrónico*  
(Rec. 673, Vol. IV)

A satellite for which the mean sidereal period is equal to the sidereal period of rotation of the primary body about its own axis; by extension, a satellite for which the mean sidereal period of revolution is approximately equal to the sidereal period of rotation of the primary body.

- H17 **geosynchronous satellite**; *satellite géosynchrone; satélite geosincrónico*  
(Rec. 673, MOD, Vol. IV)

A synchronous Earth satellite.

*Note* — The sidereal period of rotation of the Earth is about 23 hours 56 minutes.

- H18 **sub-synchronous [super-synchronous] satellite**; *satellite sous-synchrone [super-synchrone]; satélite subsincrónico [supersincrónico]*  
(Rec. 673, Vol. IV)

A satellite for which the mean sidereal period of revolution about the primary body is a sub-multiple (an integral multiple) of the sidereal period of rotation of the primary body about its own axis.

- H19 **stationary satellite**; *satellite stationnaire; satélite estacionario*  
(Rec. 673, Vol. IV)

A satellite which remains fixed in relation to the surface of the primary body; by extension, a satellite which remains approximately fixed in relation to the surface of the primary body.

*Note* — A stationary satellite is a synchronous satellite with an orbit which is equatorial, circular and direct.

## Sub-section H2 — Geostationary satellite

- H21 **geostationary satellite**; *satellite géostationnaire; satélite geoestacionario*  
(Rec. 673, Vol. IV)

A stationary satellite having the Earth as its primary body.

*Note* — A geostationary satellite remains approximately fixed relative to the Earth (RR 181).

- H22 **geostationary-satellite orbit**; *orbite des satellites géostationnaires; órbita de los satélites geoestacionarios*  
(Rec. 673, Vol. IV)

The unique orbit of all geostationary satellites.

- H23 **visible arc**; *arc de visibilité; arco visible*  
(Rec. 673, Vol. IV)

The common part of the arc of the geostationary satellite over which the space station is visible above the local horizon from each associated earth station in the service area.

- H24 **service arc**; *arc de service; arco de servicio*  
(Rec. 673, Vol. IV)

The arc of the geostationary satellite orbit within which the space station could provide the required service (the required service depends upon the system characteristics and user requirements) to all of its associated earth stations in the service area.

H25 **frequency re-use satellite network**; *réseau à satellite à réutilisation de fréquence*; *red de satélites con reutilización de frecuencias*  
(Rec. 673, Vol. IV)

A satellite network in which the satellite utilizes the same frequency band more than once, by means of antenna polarization discrimination, or by multiple antenna beams, or both.

### Sub-section H3 — Space research — Earth exploration

H31 **active sensor**; *détecteur actif, capteur actif; sensor activo*  
(RR 174, MOD)

A measuring instrument in the earth exploration-satellite service or in the space research service by means of which information is obtained by transmission and reception of electromagnetic waves.

*Note* — The definitions given in RR 174 and 175 are modified by changing the phrase “radio waves” to “electromagnetic waves”. From a technical point of view, the change is necessary because some remote sensors make measurements at wavelengths that correspond to frequencies above the upper limit of radio waves, conventionally fixed at 3000 GHz.

H32 **passive sensor**; *détecteur passif, capteur passif; sensor pasivo*  
(RR 175, MOD)

A measuring instrument in the earth exploration-satellite service or in the space research service by means of which information is obtained by reception of electromagnetic waves of natural origin.

*Note* — See Note for term H31.

H33 **data relay satellite**; *satellite relais de données; satélite de retransmisión de datos*

A satellite whose main purpose is the relay of data from one or more mission satellites or space probes to one or more earth stations. It may also provide for communication in the other direction. Additionally, it may be used as a relay for the space operation service.

*Note* — Data relay satellites are generally geostationary.

H34 **data collection satellite**; *satellite de collecte de données; satélite de adquisición de datos*

A satellite whose main purpose is the collection of data from stations on the Earth or in the atmosphere of the Earth, and subsequent forwarding of those data to one or more earth stations. It may also provide for communication in the other direction.

H35 **remote sensing satellite**; *satellite de télédétection; satélite de teledetección*

A satellite whose purpose is remote observation by reception of electromagnetic waves using active or passive sensors (these two types of sensors are defined in this Recommendation 573 — H31 and H32).

### Sub-section H4 — Broadcasting

H41 **individual reception** (in the broadcasting-satellite service); *réception individuelle (dans le service de radiodiffusion par satellite); recepción individual (en el servicio de radiodifusión por satélite)*  
(RR 123)

The reception of emissions from a space station in the broadcasting-satellite service by simple domestic installations and in particular those possessing small antennas.

H42  
(RR 124)

**community reception** (in the broadcasting-satellite service); *reception communautaire (dans le service de radiodiffusion par satellite)*; *recepción comunal (en el servicio de radiodifusión por satélite)*

The reception of emissions from a space station in the broadcasting-satellite service by receiving equipment, which in some cases may be complex and have antennas larger than those used for individual reception, and intended for use:

- by a group of the general public at one location; or
- through a distribution system covering a limited area.

H43  
(Rec. 566 (MOD),  
Vol. X/XI-2)

**direct distribution**; *distribution directe*; *distribución directa*

Use of a satellite link of the fixed-satellite service to relay broadcasting programmes from one or more points of origin, directly to terrestrial broadcasting stations without any intermediate distribution stages (possibly including other signals necessary for their operation).

H44  
(Rec. 566 (MOD),  
Vol. X/XI-2)

**indirect distribution**; *distribution indirecte*; *distribución indirecta*

Use of a satellite link of the fixed-satellite service to relay broadcasting programmes from one or more points of origin to various earth stations for further distribution to the terrestrial broadcasting stations (possibly including other signals necessary for their operation).

## SECTION J – STANDARD FREQUENCIES AND TIME SIGNALS

J01  
(Rec. 686, Vol. VII)

**frequency standard**; *étalon de fréquence*; *patrón de frecuencia*

A generator, the output of which is used as a frequency reference.

J02  
(Rec. 686, Vol. VII)

**standard frequency**; *fréquence étalon*; *frecuencia patrón*

A frequency with a known relationship to a frequency standard.

*Note* – The term standard frequency is often used for the signal whose frequency is a standard frequency.

J03  
(Rec. 686, Vol. VII)

**standard-time-signal emission**; *émission des signaux horaires*; *emisión de señales horarias*

An emission which disseminates a sequence of time signals at regular intervals with a specified accuracy.

J04  
(Rec. 686, Vol. VII)

**international atomic time (TAI)**; *temps atomique international (TAI)*; *Tiempo Atómico Internacional (TAI)*

The time scale established by the Bureau international des poids et mesures (BIPM) on the basis of data from atomic clocks operating in several establishments conforming to the definition of the second, the unit of time of the International System of Units (SI).

J05  
(Rec. 686, Vol. VII)

**universal time (UT)**; *temps universel (UT)*; *Tiempo Universal (UT)*

Universal Time (UT) is the general designation of time scales based on the rotation of the Earth. In applications in which precision of a few tenths of a second cannot be tolerated, it is necessary to specify the form of UT which should be used:

- UT0 is the mean solar time of the prime meridian obtained from direct astronomical observation;
- UT1 is UT0 corrected for the effects of small movements of the Earth relative to the axis of rotation (polar variation) (see Recommendation 460);
- UT2 is UT1 corrected for the effects of a small seasonal fluctuation in the rate of rotation of the Earth.

J06 **coordinated universal time (UTC); temps universel coordonné (UTC); Tiempo Universal**  
(Rec. 686, Vol. VII) *Coordinado (UTC)*

The time scale, maintained by the BIPM and the international Earth Rotation Service (IERS), which forms the basis of a coordinated dissemination of standard frequencies and time signals. UTC corresponds exactly in rate with TAI, but differs from it by an integral number of seconds.

The UTC scale is adjusted by the insertion or deletion of seconds (positive or negative leap seconds) to ensure approximate agreement with UT1.

# APPENDIX A TO RECOMMENDATION 573-3 STATIONS IN MOBILE SERVICES

See in Section A of Recommendation 573:

A10 Mobile station (RR 65)

A11 Land station (RR 67)

A10a **land mobile station; station mobile terrestre; estación móvil terrestre**  
(RR 69)

A *mobile station* in the *land mobile service* capable of surface movement within the geographical limits of a country or continent.

A11a **base station; station de base; estación de base**  
(RR 68)

A *land station* in the *land mobile service*.

A10b **ship station; station de navire; estación de barco**  
(RR 72)

A *mobile station* in the *maritime mobile service* located on board a vessel which is not permanently moored, other than a *survival craft station*.

A11b **coast station; station côtière; estación costera**  
(RR 70)

A *land station* in the *maritime mobile service*.

A10c **aircraft station; station d'aéronef; estación de aeronave**  
(RR 78)

A *mobile station* in the *aeronautical mobile service*, other than a *survival craft station*, located on board an aircraft.

A11c **aeronautical station; station aéronautique; estación aeronáutica**  
(RR 76 (MOD))

A *land station* in the *aeronautical mobile service*.

*Note* — In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea.

A10d **survival craft station; station d'engin de sauvetage; estación de embarcación o dispositivo de salvamento**  
(RR 62)

A *mobile station* in the *maritime mobile service* or the *aeronautical mobile service* intended solely for survival purposes and located on any lifeboat, life-raft or other survival equipment.

A10e **radar beacon (racon); balise radar (racon); baliza de radar (racon)**  
(RR 97)

A transmitter-receiver associated with a fixed navigational mark which, when triggered by a *radar*, automatically returns a distinctive signal which can appear on the display of the triggering *radar*, providing range, bearing and identification information.

A10f **emergency position-indicating radiobeacon station; station de radiobalise de localisation des sinistres; estación de radiobaliza de localización de siniestros**  
(RR 88)

A *station* in the *mobile service* the *emissions* of which are intended to facilitate search and rescue operations.

*Note* — The extension of this definition in the case of stations the emissions of which are intended to be relayed by satellite, needs further study.

## COMPLEMENT TO RECOMMENDATION 573-3

## ALPHABETICAL LIST OF TERMS DEFINED IN CCIR TEXTS

This list comprises for each term:

- 1st column: the term in the working language of the document and below, the term in the two other CCIR working languages;  
 2nd column: asterisk indicating that the term has not been explicitly defined in a CCIR text;  
 3rd column: the kind and number of the text;  
 4th column: the reference in the text, if necessary (An.: Annex; Ap.: Appendix; P.: Part);  
 5th column: the number of the Volume.

## A

**absolute gain (of an antenna) ( $G_i$ ), isotropic gain (of an antenna) ( $G_i$ )**

*F: gain absolu (d'une antenne) ( $G_i$ ), gain isotrope (d'une antenne) ( $G_i$ )*

*S: ganancia absoluta (de una antena) ( $G_i$ ), ganancia isotropa (de una antena) ( $G_i$ )*

\* Rec. 341 An. I § 2 V  
 \* Rec. 573 No. E04a XIII

**accepted interference**

*F: brouillage accepté*

*S: interferencia aceptada*

\* Rec. 573 No. F11c XIII  
 (Note 2)

**accuracy**

*F: exactitude*

*S: exactitud*

Rec. 686 VII

**accuracy**

see: precision, uncertainty

**active satellite**

*F: satellite actif*

*S: satélite activo*

Rec. 673 An. IV-1  
 Rec. 573 No. H11 XIII

**active sensor**

*F: détecteur actif*

*S: sensor activo*

Rec. 573 No. H31 XIII

**actual coverage area**

see: coverage area

**adjacent channel**

*F: canal adjacent*

*S: canal adyacente*

Rec. 566 § 4.4 X/XI-2  
 Rec. 573 No. B11 XIII

**aeronautical station**

*F: station aéronautique*

*S: estación aeronáutica*

Rec. 573 Ap. XIII  
 No. A11c

**aerosols**

*F: aérosols*

*S: aerosoles*

Rec. 310 No. C28 V

**ageing**

*F: vieillissement*

*S: envejecimiento*

Rec. 686 VII

**aircraft station**

*F: station d'aéronef*

*S: estación de aeronave*

Rec. 573 Ap. XIII  
 No. A10c

**alternated (arrangement of radio channels)**

*F: alternée (disposition)*

*S: alternada (disposición)*

Rec. 592 § 1.7 IX-1

**alternated (polarization)**

*F: alternée (à polarisation)*

*S: alternada (con polarización)*

Rec. 573 No. B18 XIII



**altitude of the apogee (perigee)***F: altitude de l'apogée (du périgée)**S: altitud del apogeo (del perigeo)***anomalistic period***F: période anomalistique**S: periodo anomalístico***antenna**

see: directivity, economic standard antenna, gain, interference sector (*I*) (of a directional antenna), minimum standard antenna, service sector (*S*) (of a directional antenna)

**antenna butterfly***F: papillon (d'une antenne)**S: mariposa (de una antena)***antenna directivity diagram***F: diagramme de directivité d'antenne**S: diagrama de directividad de antena***antenna directivity factor (*M*)***F: coefficient de directivité de l'antenne (*M*)**S: factor de directividad de la antena (*M*)***antenna gain**

see: gain of an antenna

**antenna-to-medium coupling loss**

see: gain degradation

**apoapsis***F: apoastre, apoapside**S: apoastro, apoapside***apogee***F: apogée**S: apogeo***area**

see: actual coverage area, capture area, coverage area, feeder-link service area, interference-free coverage area, nominal coverage area, service area

**articulation index***F: indice de netteté**S: indice de nitidez***articulation score***F: appréciation de la netteté (note)**S: apreciación de la nitidez (nota)***ascending (descending) node***F: nœud ascendant (descendant)**S: nodo ascendente (descendente)***assigned frequency***F: fréquence assignée**S: frecuencia asignada***assigned frequency band***F: bande de fréquences assignée**S: banda de frecuencia asignada***atomic time scale***F: échelle de temps atomique**S: escala de tiempo atómico***attenuation coefficient***F: affaiblissement linéique**S: coeficiente de atenuación***attenuation loss***F: affaiblissement, atténuation**S: atenuación, pérdida***attenuation-slope (of the passband)***F: pente aux frontières (de la bande passante)**S: pendiente en los límites (de una banda de paso)***attitude-stabilized satellite***F: satellite à commande d'orientation**S: satélite de actitud estabilizada***audioconference***F: audioconférence**S: audioconferencia*

	Rec. 673 Rec. 573	An. No. H08	IV-1 XIII
	Rec. 673	An.	IV-1
*	Rep. 682	§ 3	An. Vol. II
	Rec. 573	No. E06	XIII
	Rec. 162	§ 1.6	III
	Rec. 673	An.	IV-1
	Rec. 673	An.	IV-1
*	Rep. 526	§ 3	An. Vol. I
*	Rep. 526	§ 2	An. Vol. I
	Rec. 673	An.	IV-1
	Rec. 328	§ 1.16	I
	Rec. 328 Rec. 573	§ 1.15 No. B03	I XIII
	Rec. 686		VII
	Rec. 662	Ap. II, No. 5.04	XIII
	Rec. 662	Ap. II, No. 5.01	XIII
*	Rec. 332	§ 4.3	I
	Rec. 673 Rec. 573	An. No. H15	IV-1 XIII
	Rec. 662	Ap. II, No. 1.26	XIII

**audio-frequency (AF) protection ratio***F: rapport de protection en audiofréquence**S: relación de protección en audiofrecuencia***audio-frequency (AF) signal-to-interference ratio***F: rapport signal/brouillage en audiofréquence**S: relación señal/interferencia en audiofrecuencia***automatic switching for television circuits***F: commutation automatique pour circuits de télévision**S: conmutación automática para circuitos de televisión***avoidance angle***F: angle d'évitement**S: ángulo de evitación***B****band**

see: assigned frequency band, baseband, frequency band, occupied band

**bandwidth***F: largeur de bande**S: anchura de banda***bandwidth**

see: baseband bandwidth, modulation acceptance bandwidth, necessary bandwidth, occupied bandwidth, width of the effective overall noise band, x dB bandwidth

**bandwidth expansion ratio***F: rapport d'étalement de la largeur de bande**S: relación de expansión de la anchura de banda***base-station***F: station de base**S: estación de base***base station area***F: zone de la station de base**S: zona de la estación de base***baseband***F: bande de base**S: banda de base***baseband bandwidth***F: largeur de la bande de base**S: anchura de banda de la banda de base***basic amplitude (data signal in television)***F: amplitude de base (signal de données en télévision)**S: amplitud de base (señal de datos en televisión)***basic MUF***F: MUF de référence**S: MUF básica***basic transmission loss (of a radio link)***F: affaiblissement de propagation (d'une liaison radioélectrique),**affaiblissement entre antennes isotropes (d'une liaison radioélectrique)**S: pérdida básica de transmisión (de un enlace radioeléctrico)***beam area (for broadcasting-satellite service)***F: empreinte d'un faisceau (pour le service de radiodiffusion par satellite)**S: zona del haz (para el servicio de radiodifusión por satélite)***bidirectional***F: bilatéral, bidirectionnel**S: bilateral, bidireccional***bit error ratio (BER)***F: taux d'erreur binaire (TEB)**S: proporción de bits erróneos (BER)***broadcast videography, teletext***F: vidéographie diffusée, teletext**S: videografía radiodifundida, teletexto*

*	Rec. 573	No. F22 (Note 3)	XIII
	Rec. 638	§ 1.2	X-1
*	Rec. 573	No. F21 (Note 1)	XIII
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*	Q. 41/ CMTT	Note 1	XV-3
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	Rec. 328	§ 1.1	I
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*	Rep. 956	Ap. I, P. I, § 4	An. Vol. XI-1
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**broadcasting***F: télédiffusion**S: teledifusión***broadcasting**

see: (radio) broadcasting, sound broadcasting, television (broadcasting)

**broadcasting-satellite service***F: service de radiodiffusion par satellite**S: servicio de radiodifusión por satélite***broadcasting-satellite space station***F: station spatiale de radiodiffusion par satellite**S: estación espacial de radiodifusión por satélite***build-up time of a telegraph signal***F: temps d'établissement d'un signal télégraphique**S: tiempo de establecimiento de una señal telegráfica***build-up time of a telegraph signal**

see: relative build-up time of a telegraph signal

**butterfly**

see: antenna butterfly

**C****cabled distribution***F: télédistribution, câblodistribution**S: teledistribución por cable, teledistribución***calibration***F: étalonnage**S: calibración***call***F: communication**S: comunicación***call (attempt) (by a user)***F: tentative d'appel (par un usager)**S: (tentativa de) llamada (por un usuario)***capture area (of a terrestrial receiving station)***F: zone de captage (d'une station de réception de Terre)**S: zona de captación (de una estación receptora terrenal)***carrier***F: porteuse**S: portadora***carrier (component)***F: (composante) porteuse**S: portadora (componente)***carrier power (of a radio transmitter)***F: puissance de la porteuse (d'un émetteur radioélectrique)**S: potencia de la portadora (de un transmisor radioeléctrico)***cell***F: cellule**S: célula***channel**

see: (frequency) channel, radio-frequency channel; RF channel, telephone-type channel, (transmission) channel

**channel spacing***F: espacement entre canaux**S: separación de canales***characteristic frequency***F: fréquence caractéristique**S: frecuencia característica***circuit**

see: hypothetical reference circuit, telecommunication circuit, telephone-type circuit

see also: path

**circular orbit (of a satellite)***F: orbite circulaire (d'un satellite)**S: órbita circular (de un satélite)***class of emission***F: classe d'émission**S: clase de emisión*

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<b>clock</b> <i>F: horloge</i> <i>S: reloj</i>	Rec. 686		VII
<b>clock time difference</b> <i>F: différence entre temps d'horloge</i> <i>S: diferencia de tiempo de reloj</i>	Rec. 686		VII
<b>coast station</b> <i>F: station côtière</i> <i>S: estación costera</i>	Rec. 573	Ap. No. A11b	XIII
<b>co-channel</b> <i>F: cocanal, cofréquence</i> <i>S: cocanal</i>	Rec. 592 Rec. 573	§ 1.6 No. B13	IX-1 XIII
<b>co-channel (orthogonal)</b> <i>F: cocanal orthogonal</i> <i>S: cocanal (orthogonal)</i>	Rec. 662	Ap. II, No. B14	XIII
<b>code</b> <i>F: code</i> <i>S: código</i>	Rec. 662	Ap. II, No. 3.07	XIII
<b>code division</b> <i>F: répartition en code</i> <i>S: división por código</i>	Rec. 662	Ap. II, § 3.17	XIII
<b>coherence of frequency</b> <i>F: cohérence de fréquence</i> <i>S: coherencia de frecuencia</i>	Rec. 686		VII
<b>coherence of phase</b> <i>F: cohérence de phase</i> <i>S: coherencia de fase</i>	Rec. 686		VII
<b>communication</b> <i>F: communication</i> <i>S: comunicación</i>	Rec. 662	Ap. II, No. 1.05	XIII
<b>community reception (in the broadcasting-satellite service)</b> <i>F: réception communautaire (dans le service de radiodiffusion par satellite)</i> <i>S: recepción comunal (en el servicio de radiodifusión por satélite)</i>	Rec. 566 Rec. 573	§ 1.3.2 No. H42	X/XI-2 XIII
<b>(complete) connection</b> <i>F: chaîne de connexion complète, (chemin de) communication</i> <i>S: cadena de conexión completa, (camino de) comunicación</i>	Rec. 662	Ap. II, No. 3.02	XIII
<b>conditional access control</b> <i>F: commande de l'accès conditionnel</i> <i>S: control de acceso condicional</i>	* Rep. 1079	An. I	XI-1
<b>connection</b> <i>F: chaîne de connexion</i> <i>S: cadena de conexión</i>	Rec. 662	Ap. II, No. 3.01	XIII
<b>continuous multiplexing</b> <i>F: multiplexage continu</i> <i>S: multiplaje continuo</i>	* Rep. 954	§ 4.1	An. Vol. X/XI-2
<b>contribution link</b> <i>F: liaison de contribution</i> <i>S: enlace de contribución</i>	Rec. 662	Ap. II, No. 2.19	XIII
<b>controlled slip</b> <i>F: glissement maîtrisable</i> <i>S: deslizamiento controlado</i>	Rep. 967	§ 5.2	An. Vol. XII
<b>conversation (in telecommunication)</b> <i>F: conversation (en télécommunication)</i> <i>S: conversación (en telecomunicación)</i>	Rec. 662	Ap. II, No. 3.06	XIII
<b>coordinate clock</b> <i>F: horloge coordonnée</i> <i>S: reloj coordinado</i>	Rec. 686		VII
<b>coordinate time</b> <i>F: temps-coordonnée</i> <i>S: tiempo coordinada</i>	Rec. 686		VII
<b>coordinated time scale</b> <i>F: échelle de temps coordonnée</i> <i>S: escala de tiempo coordinada</i>	Rec. 686		VII
<b>Coordinated Universal Time (UTC)</b> <i>F: temps universel coordonné (UTC)</i> <i>S: Tiempo Universal Coordinado (UTC)</i>	Rec. 686 Rec. 460 Rec. 573	An. § I, C No. J06	VII VII XIII

**coordination : distance, contour, area***F: coordination: distance, contour, zone**S: coordinación: distancia, contorno, zona***coverage area (of a broadcasting transmitter in a given broadcasting band)***F: zone de couverture (d'un émetteur de radiodiffusion dans une bande de radiodiffusion donnée)**S: zona de cobertura (de un transmisor de radiodifusión en una banda de radiodifusión determinada)***coverage area (of a space station)***F: zone de couverture (d'une station spatiale)**S: zona de cobertura (de una estación espacial)*

The following may be distinguishable:

**actual coverage area***F: zone de couverture réelle**S: zona de cobertura real***interference-free coverage area***F: zone de couverture en l'absence de brouillage**S: zona de cobertura sin interferencias***nominal coverage area***F: zone de couverture nominale**S: zona de cobertura nominal***coverage area (of a transmitting terrestrial station)***F: zone de couverture (d'une station d'émission de Terre)**S: zona de cobertura (de una estación transmisora terrenal)*

The following may be distinguishable:

**actual coverage area***F: zone de couverture réelle**S: zona de cobertura real***interference-free coverage area***F: zone de couverture en l'absence de brouillage**S: zona de cobertura sin interferencias***nominal coverage area***F: zone de couverture nominale**S: zona de cobertura nominal***coverage area (for the broadcasting-satellite service)***F: zone de couverture (pour le service de radiodiffusion par satellite)**S: zona de cobertura (para el servicio de radiodifusión por satélite)***coverage factor (case of sound broadcasting in band 6 (MF))***F: facteur de couverture (cas de radiodiffusion sonore en ondes hectométriques)**S: factor de cobertura (para la radiodifusión sonora en ondas hectométricas)***cross-modulation noise (case of companders for sound-programme circuits)***F: bruit de transmodulation (cas de compresseurs-extenseurs pour circuits de transmissions radiophoniques)**S: ruido diafónico (caso de compresores-expansores para circuitos de transmisiones radiofónicas)***cross polarization***F: transpolarisation**S: polarización cruzada (o transpolarización)***cross-polarization canceller (circuit)***F: (circuit) annuleur de transpolarisation**S: (circuito) cancelador de transpolarización***cross-polarization discrimination***F: discrimination de polarisation**S: discriminación por polarización cruzada***cross-polarization isolation***F: isolement de polarisation**S: aislamiento por polarización cruzada***cymomotive force (c.m.f.) (in a given direction)***F: force cymomotrice (f.c.m.) (dans une direction donnée)**S: fuerza cimomotriz (f.c.m.) (en una dirección dada)*

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*	Rec. 573	Note 3	XIII
*	Rec. 573	Note 3	XIII
*	Rec. 573	Note 3	XIII
	Rec. 573	No. A51b	XIII
*	Rec. 573	Note 3	XIII
*	Rec. 573	Note 3	XIII
*	Rec. 573	Note 3	XIII
	Rec. 566	§ 3.2	X/XI-2
*	Rec. 598	An. I, § 2	X-1.
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## D

## data

F: données  
S: datos

## data above voice (transmission) (DAV)

F: (transmission de) données supra vocales  
S: (transmisión de) datos en la parte superior de la banda de base (DAV)

## data collection satellite

F: satellite de collecte de données  
S: satélite de adquisición de datos

## data communication, data transmission (deprecated in this sense)

F: communication de données, transmission de données (terme déconseillé dans ce sens)  
S: comunicación de datos, transmisión de datos (desaconsejado en este sentido)

## data group (for teletext)

F: groupe de données (pour télétexte)  
S: grupo de datos (para teletexto)

## data line (for teletext)

F: ligne de données  
S: línea de datos

## data packet (for teletext)

F: paquet de données  
S: paquete de datos

## data relay satellite

F: satellite relais de données  
S: satélite de retransmisión de datos

## data signal in television

see: basic amplitude, decoding margin, decoding threshold, eye height, eye width, mid-level, peak-to-peak amplitude, proportional jitter

## data under voice (transmission) (DUV)

F: (transmission de) données infra vocales  
S: (transmisión de) datos en la parte inferior de la banda de base (DUV)

## data unit (for teletext)

F: unité de données  
S: unidad de datos

## date

F: date  
S: fecha

## decoding margin (data signal in television)

F: marge de décodage (signal de données en télévision)  
S: margen de decodificación (señal de datos en televisión)

## decoding threshold (data signal in television)

F: seuil de décodage (signal de données en télévision)  
S: umbral de decodificación (señal de datos en televisión)

## deep space

F: espace lointain  
S: espacio lejano

## degraded minute (DM)

F: minute dégradée (MD)  
S: minuto degradado (MD)

## demultiplexing

F: démultiplexage  
S: demultiplexación

## depolarization

F: dépolarisation  
S: despolarización

## descrambling

F: désembrouillage  
S: desaleatorización

## diffuse reflection coefficient

F: coefficient de réflexion diffuse  
S: coeficiente de reflexión difusa

## digital radio concentrator (system)

F: concentrateur en radiocommunications numériques  
S: (sistema) concentrador de radiocomunicaciones digitales

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*	Rec. 653	§ 4.1	XI-1
*	Rec. 653	§ 4.3	XI-1
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*	Rec. 653	§ 4.2	XI-1
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*	Rep. 956	Ap. I, An. I, § 12	An. Vol. XI-1
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*	Rep. 1079	An. I	An. Vol. XI-1
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	Rec. 592	§ 1.15	IX-1

**digital radio path***F: conduit hertzien numérique**S: trayecto radiodigital***digital radio-relay for synchronous hierarchy (SDH-DRRS)***F: faisceau hertzien numérique pour hiérarchie synchrone (HNS-FHN)**S: relevador radioeléctrico digital para jerarquías sincronas (JDS-RRD)***digital radio section***F: section hertzienne numérique**S: sección radiodigital***direct distribution (of broadcasting programmes)***F: distribution directe (de programmes de radiodiffusion)**S: distribución directa (de programas de radiodifusión)***direct (retrograde) orbit (of a satellite)***F: orbite directe (rétrograde) (de satellite)**S: órbita directa (retrograda) (de un satélite)***direct sequence (DS) spread spectrum***F: étalement du spectre à séquence directe (SD)**S: espectro ensanchado por secuencia directa (DS)***directive gain (in a given direction) (see also: directivity), (of a directional antenna in the bands 4 to 28 MHz)***F: gain de directivité (dans une direction donnée)**S: ganancia directiva (en una dirección dada)***directivity***F: directivité**S: directividad***directivity**

see: antenna directivity diagram, antenna directivity factor, directive gain (in a given direction), horizontal directivity pattern, vertical directivity pattern

**distribution**

see: direct distribution (of broadcasting programmes), indirect distribution (of broadcasting programmes)

**distribution link***F: liaison de distribution**S: enlace de distribución***diversity reception***F: réception en diversité**S: recepción por diversidad***down link**

see: satellite link

**drift***F: dérive**S: deriva***duct**

see: elevated duct, ground-based duct (surface duct), tropospheric radio duct

**duct height***F: hauteur du conduit (troposphérique)**S: altura del conducto (troposférico)***duct intensity***F: intensité du conduit**S: intensidad del conducto***duct thickness***F: épaisseur du conduit**S: espesor del conducto***ducting***F: propagation troposphérique guidée**S: propagación guiada (troposférica)***ducting layer***F: couche de guidage**S: capa de propagación***duplex, full duplex***F: duplex, bilatéral simultané**S: dúplex***DUT1***F: DUT1**S: DUT1*

*	Rec. G.702 Mentioned in Rec. 390		CCITT IX-1
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*	Rec. G.702 Mentioned in Rec. 390		CCITT IX-1
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*	Rec. 341	An. I, § 1	V
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	Rec. 310	No. C17	V
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**E****earth station***F: station terrienne**S: estación terrena***economic standard antenna (case of a directional antenna in the band 4 to 28 MHz)***F: antenne normale économique**S: antena normal económica***effective Earth-radius factor (*k*)***F: facteur multiplicatif du rayon terrestre (*k*)**S: factor del radio ficticio de la Tierra (*k*)***effective monopole-radiated power (e.m.r.p.)***F: puissance apparente rayonnée sur antenne verticale courte (p.a.r.v.)**S: potencia radiada aparente referida a una antena vertical corta (p.r.a.v.)***effective radiated power (e.r.p.)***F: puissance apparente rayonnée (p.a.r.)**S: potencia radiada aparente (p.r.a.)***effective radius of the Earth***F: rayon terrestre équivalent**S: radio ficticio de la Tierra***effective selectivity (for the purpose of studying the selectivity in the non-linear region with two or more input signals)***F: sélectivité effective d'un récepteur (pour l'étude de la sélectivité dans la région non linéaire, c'est-à-dire dans le cas de deux ou plusieurs signaux à l'entrée)**S: selectividad efectiva de un receptor (para estudiar la selectividad en la región no lineal, es decir, en el caso de dos o más señales a la entrada)***electronic news gathering (ENG)***F: reportages électroniques d'actualités (ENG)**S: (ENG) ("electronic news gathering")***elevated duct***F: conduit élevé (troposphérique)**S: conducto elevado***elliptical orbit (of a satellite)***F: orbite elliptique (de satellite)**S: órbita elíptica (de un satélite)***emergency position-indicating radiobeacon station***F: station de radiobalise de localisation des sinistres**S: estación de radiobaliza de localización de siniestros***emission***F: émission**S: emisión***emission of a transmitter, optimum from the standpoint of spectrum economy***F: émission optimale du point de vue de l'économie du spectre**S: emisión óptima de un transmisor desde el punto de vista de la economía del espectro***enhanced television***F: télévision améliorée**S: televisión mejorada***equatorial orbit (of a satellite)***F: orbite équatoriale (de satellite)**S: órbita ecuatorial (de un satélite)***equivalent isotropically radiated power (e.i.r.p.)***F: puissance isotrope rayonnée équivalente (p.i.r.e.)**S: potencia isotropa radiada equivalente (p.i.r.e.)***(equivalent) noise temperature (of a linear two-port network)***F: température équivalente de bruit (d'un biporte linéaire)**S: temperatura (equivalente) de ruido (de una red lineal con dos puertas)***error***F: erreur**S: error***(error) concealment***F: dissimulation (d'erreurs)**S: ocultamiento (de errores)*

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*	Rep. 803	§ 1	An. Vol. X/XI-3
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	Rec. 573	Ap., No. A10f	XIII
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*	Rep. 1077	§ 2	An. Vol. XI-1
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	Rec. 573	No. F02	XIII
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*	Rep. 967	§ 4.4	An. Vol. XII



**(error) correction**

*F: correction (d'erreurs)*  
*S: corrección (de errores)*

**errored second (ES)**

*F: seconde avec erreurs, seconde entachée d'erreurs (SE)*  
*S: segundo con errores (SE)*

**exocentric angle**

*F: angle exocentrique*  
*S: ángulo exocéntrico*

**eye height (data signal in television)**

*F: hauteur de l'œil (signal de données en télévision)*  
*S: altura del diagrama en ojo (señal de datos en televisión)*

**eye width (data signal in television)**

*F: largeur de l'œil (signal de données en télévision)*  
*S: anchura del diagrama en ojo (señal de datos en televisión)*

**F****facsimile**

*F: télécopie*  
*S: facsímil, fax*

**feeder link**

*F: liaison de connexion*  
*S: enlace de conexión*

**feeder-link beam area**

*F: empreinte d'un faisceau de liaison de connexion*  
*S: zona del haz de un enlace de conexión*

**feeder-link service area**

*F: zone de service de liaison de connexion*  
*S: zona de servicio de un enlace de conexión*

**field strength**

see: minimum usable field strength ( $E_{min}$ ), usable field strength ( $E_u$ )

**figure of merit**

*F: facteur de qualité*  
*S: factor de calidad*

**FOT**

see: optimum working frequency

**free-space propagation**

*F: propagation en espace libre*  
*S: propagación en el espacio libre*

**free-space transmission loss**

*F: affaiblissement d'espace libre (d'une liaison radioélectrique)*  
*S: pérdida básica de transmisión en el espacio libre*

**frequency**

*F: fréquence*  
*S: frecuencia*

**frequency (characteristics of emissions)**

see: assigned frequency, carrier frequency, characteristic frequency, reference frequency

**frequency (ionospheric propagation)**

see: basic MUF, FOT, lowest usable frequency, LUF, maximum usable frequency, MUF, operational MUF, optimum working frequency, OWF

**frequency band**

*F: bande de fréquences*  
*S: banda de frecuencias*

**(frequency) channel**

*F: canal (de fréquences)*  
*S: canal (de frecuencias)*

**frequency departure**

*F: écart de fréquence*  
*S: desajuste de frecuencia*

**frequency difference**

*F: différence de fréquence*  
*S: diferencia de frecuencia*

**frequency diversity reception**

*F: réception en diversité de fréquence*  
*S: recepción con diversidad de frecuencia*

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* Rep. 956	Ap. I, P. I, § 8	An. Vol. XI-1
* Rep. 956	Ap. I, P. I, § 10	An. Vol. XI-1
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* Rec. 566	§ 4.1	X/XI-2
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Rec. 566	§ 4.3	X/XI-2
* Rep. 473	§ 2	An. Vol. X/XI-2
Rec. 310	No. B1	V
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Rec. 341	§ 5	V
Rec. 573	No. A45	XIII
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**frequency division**

*F: répartition en fréquence, répartition fréquentielle*  
*S: división en frecuencia*

**frequency drift**

*F: dérive de fréquence*  
*S: deriva de frecuencia*

**frequency-hopping (FH) spread spectrum**

*F: étalement du spectre à sauts de fréquence (SF)*  
*S: espectro ensanchado por saltos de frecuencia (FH)*

**frequency instability**

*F: instabilité de fréquence*  
*S: inestabilidad de frecuencia*

**frequency offset**

*F: décalage de fréquence*  
*S: separación de las frecuencias*

**frequency re-use satellite network**

*F: réseau à satellite à réutilisation de fréquence*  
*S: red de satélites con reutilización de frecuencia*

**frequency shift**

*F: déplacement de fréquence*  
*S: desplazamiento de frecuencia*

**frequency stability**

*F: stabilité de fréquence*  
*S: estabilidad de frecuencia*

**frequency standard**

*F: étalon de fréquence*  
*S: patrón de frecuencia*

**frequency tolerance**

*F: tolérance de fréquence*  
*S: tolerancia de frecuencia*

**full carrier emission**

*F: émission à porteuse complète*  
*S: emisión de onda portadora completa*

**full duplex, duplex**

*F: duplex*  
*S: dúplex*

**G****gain**

*F: gain*  
*S: ganancia*

**gain degradation, antenna-to-medium coupling loss**

*F: dégradation du gain, perte par couplage antenne-milieu*  
*S: degradación de la ganancia, pérdida por acoplamiento entre la antena y el medio*

**gain in relation to a half-wave dipole ( $G_d$ )**

*F: gain par rapport à un doublet demi-onde ( $G_d$ )*  
*S: ganancia con relación a un dipolo de media onda ( $G_d$ )*

**gain in relation to a short vertical antenna ( $G_v$ )**

*F: gain par rapport à une antenne verticale courte ( $G_v$ )*  
*S: ganancia con relación a una antena vertical corta ( $G_v$ )*

**gain of an antenna**

*F: gain d'une antenne*  
*S: ganancia de una antena*

**gain of antenna**

sec: absolute gain (of an antenna), directive gain in a given direction, directivity, gain of an antenna, gain in relation to a half-wave dipole, gain in relation to a short vertical antenna, isotropic gain (of an antenna),

**geocentric angle**

*F: angle géocentrique*  
*S: ángulo geocéntrico*

**geostationary satellite**

*F: satellite géostationnaire*  
*S: satélite geoestacionario*

	Rec. 662	Ap. II, No. 3.16	XIII
	Rec. 686		VII
*	Rep. 651	§ 2.1	An. Vol. I
	Rec. 686		VII
	Rec. 686		VII
	Rec. 662	Ap. II, No. 4.08	XIII
	Rec. 673	An.	IV-1
	Rec. 573	No. H25	XIII
	Rec. 686		VII
	Rec. 662	Ap. II, No. 4.06	XIII
	Rec. 686		VII
	Rec. 686		VII
	Rec. 573	No. J01	XIII
	Rec. 328	§ 1.19	I
	Rep. 785	§ 2	An. Vol. IX-1
	Rec. 573	No. D02	XIII
	Rec. 573	No. D05	XIII
	Rec. 662	An., No. 3.19	XIII
	Rec. 662	Ap. II, No. 5.02	XIII
	Rec. 310	No. C32	V
*	Rec. 341	An. I, § 2	V
*	Rec. 573	No. E04b	XIII
*	Rec. 341	An. I, § 2	V
*	Rec. 573	No. E04c	XIII
	Rec. 341	An. I, § 2	V
	Rec. 573	No. E04	XIII
	Rec. 673	An.	IV-1
	Rec. 573	No. H09a	XIII
	Rec. 673	An.	IV-1
	Rec. 573	No. H21	XIII

<b>geostationary-satellite orbit</b> <i>F: orbite des satellites géostationnaires</i> <i>S: órbita de los satélites geoestacionarios</i>	Rec. 673 Rec. 573	An. No. H22	IV-1 XIII
<b>geosynchronous satellite</b> <i>F: satellite géosynchrone</i> <i>S: satélite geosincrónico</i>	Rec. 673 Rec. 573	An. No. H17	IV-1 XIII
<b>geosynchronous satellite orbit</b> <i>F: orbite des satellites géosynchrones</i> <i>S: órbita de los satélites geosincrónicos</i>	* Rep. 548	§ 2.3.2	An. Vol. II
<b>ground-based duct (surface duct)</b> <i>F: conduit au sol (conduit de surface) (troposphérique)</i> <i>S: conducto sobre el suelo (conducto de superficie)</i>	Rec. 310	No. C19	V
<b>ground wave</b> <i>F: onde de sol</i> <i>S: onda de superficie</i>	Rec. 573	No. G19c	XIII
<b>group delay</b> <i>F: temps de propagation de groupe</i> <i>S: retardo de grupo</i>	Rec. 662	Ap. II, § 5.07	XIII
<b>H</b>			
<b>halo orbit</b> <i>F: orbite halo</i> <i>S: órbita de halo</i>	* Rep. 986	An. I, § 4	An. Vol. II
<b>hand-off</b> <i>F: transfert</i> <i>S: conmutación de llamada en curso</i>	Rec. 624	An. I, § 8	VIII
<b>harmful interference</b> <i>F: brouillage préjudiciable</i> <i>S: interferencia perjudicial</i>	Rec. 573	No. F11c (Note 2)	XIII
<b>harmonic emissions</b> <i>F: rayonnement harmonique</i> <i>S: radiación armónica</i>	Rec. 329 Rec. 573	§ 1.2 No. C06	I XIII
<b>hertzian waves, radio waves</b> <i>F: ondes hertziennes, ondes radioélectriques</i> <i>S: ondas hertzianas, ondas radioeléctricas</i>	Rec. 573	No. A02	XIII
<b>high-definition television</b> <i>F: télévision à haute définition</i> <i>S: televisión de alta definición</i>	* Rep. 801	§ 1	An. Vol. XI-1
<b>highly elliptical orbit</b> <i>F: orbite très elliptique (par rapport à la Terre)</i> <i>S: órbita elíptica de gran excentricidad</i>	* Rep. 548	§ 2.3.3	An. Vol. II
<b>high power flux-density (in the broadcasting-satellite service)</b> <i>F: puissance surfacique importante (pour le service de radiodiffusion par satellite)</i> <i>S: gran densidad de flujo de potencia (para el servicio de radiodifusión por satélite)</i>	Rec. 566	§ 1.5.1	X/XI-2
<b>homogeneous section (telephony)</b> <i>F: section homogène (téléphonie)</i> <i>S: sección homogénea (para la telefonía)</i>	* Rec. 390	§ 1.3	IX-1
<b>hop (in ionospheric propagation)</b> <i>F: saut, bond</i> <i>S: salto</i>	Rec. 573	No. G28	XIII
<b>horizontal directivity pattern</b> <i>F: diagramme de directivité horizontale</i> <i>S: diagrama de directividad horizontal</i>	Rec. 573	No. E06a	XIII
<b>hybrid spread spectrum</b> <i>F: étalement du spectre hybride</i> <i>S: espectro ensanchado híbrido</i>	* Rep. 651	§ 2.1	An. Vol. I
<b>hydrometeors</b> <i>F: hydrométéores</i> <i>S: hidrometeoros</i>	Rec. 310	No. C27	V

**hypothetical reference circuit**

see: terrestrial hypothetical reference circuit (television)

**hypothetical reference circuit for sound-programme transmissions (systems in the fixed-satellite service)***F: circuit fictif de référence pour transmissions radiophoniques (systèmes de service fixe par satellite)**S: circuito ficticio de referencia para transmisiones radiofónicas (sistemas del servicio fijo por satélite)***hypothetical reference circuit for sound-programme transmissions (terrestrial systems)***F: circuit fictif de référence pour transmissions radiophoniques (systèmes de Terre)**S: circuito ficticio de referencia para transmisiones radiofónicas (sistemas terrenales)***hypothetical reference circuit for systems using analogue transmission in the fixed-satellite service (telephone and television networks)***F: circuit fictif de référence pour les systèmes utilisant la transmission analogique dans le service fixe par satellite (réseaux de téléphonie et de télévision)**S: circuito ficticio de referencia para los sistemas que utilizan la transmisión analógica en el servicio fijo por satélite (redes telefónicas y de televisión)***hypothetical reference circuit (for telephony)***F: circuit fictif de référence (pour la téléphonie)**S: circuito ficticio de referencia (para la telefonía)***hypothetical reference circuit for telephony on line-of-sight or near line-of-sight radio-relay systems (using frequency-division multiplex (for more than 60 telephone channels))***F: circuit fictif de référence pour la téléphonie sur les faisceaux hertziens à visibilité directe ou s'approchant de la visibilité directe (à multiplexage par répartition en fréquence (ayant une capacité de plus de 60 voies téléphoniques))**S: circuito ficticio de referencia para la telefonía por sistemas de relevadores radioeléctricos con visibilidad directa o casi directa (multicanal con distribución de frecuencia (con capacidad para más de 60 canales telefónicos))***hypothetical reference circuit for telephony on line-of-sight or near line-of-sight radio-relay systems (using frequency-division multiplex (with a capacity of 12 to 60 telephone channels))***F: circuit fictif de référence pour la téléphonie sur les faisceaux hertziens à visibilité directe ou s'approchant de la visibilité directe (à multiplexage par répartition en fréquence (ayant une capacité de 12 à 60 voies téléphoniques))**S: circuito ficticio de referencia para la telefonía por sistemas de relevadores radioeléctricos con visibilidad directa o casi directa (multicanal con distribución de frecuencia (con capacidad de 12 a 60 canales telefónicos))***hypothetical reference circuit (general term)***F: circuit fictif de référence (généralité)**S: circuito ficticio de referencia (en general)*

Note. — See for general definitions, CCITT Recommendation G.212.

**hypothetical reference circuit (in the fixed-satellite service) (Television)***F: circuit fictif de référence (pour le service fixe par satellite) (Télévision)**S: circuito ficticio de referencia (en el servicio fijo por satélite) (Televisión)***hypothetical reference circuit on trans-horizon radio-relay systems (using frequency-division multiplex)***F: circuit fictif de référence pour la téléphonie sur faisceaux hertziens transhorizon (à multiplexage par répartition en fréquence)**S: circuito ficticio de referencia por sistemas de relevadores radioeléctricos transhorizonte (multicanal con distribución de frecuencia)***hypothetical reference digital path***F: conduit numérique fictif de référence**S: trayecto digital ficticio de referencia***hypothetical reference digital path (for radio-relay systems for telephony — systems with a capacity above the second hierarchical level)***F: conduit numérique fictif de référence (pour les faisceaux hertziens de téléphonie — systèmes ayant une capacité supérieure au deuxième niveau hiérarchique)**S: trayecto digital ficticio de referencia (para sistemas de relevadores radioeléctricos para telefonía — sistemas con una capacidad superior al segundo nivel jerárquico)*

\* Rec. 502

XII

\* Rec. 502

XII

\* Rec. 352

IV-1

Rec. 390 § 1.2

IX-1

\* Rec. 392

IX-1

\* Rec. 391

IX-1

Rec. 390 § 1.1

IX-1

Rec. 567 § A1.3

XII

\* Rec. 396

IX-1

\* Rec. G.721  
Mentioned  
in Rec. 390CCITT  
IX-1

\* Rec. 556

IX-1

## I

**image-rejection ratio (of a receiver)***F: affaiblissement sur la fréquence conjuguée (d'un récepteur)**S: atenuación para la frecuencia imagen (de un receptor)***impulse rate***F: taux d'impulsions**S: frecuencia de los impulsos***impulsive noise tolerance***F: tolérance de bruit impulsif**S: tolerancia al ruido impulsivo***inclination (of a satellite orbit)***F: inclinaison (d'une orbite de satellite)**S: inclinación (de una órbita de satélite)***inclined orbit (of a satellite)***F: orbite inclinée (de satellite)**S: órbita inclinada (de un satélite)***index of cooperation***F: module de coopération**S: índice de cooperación***indirect distribution (of broadcasting programmes)***F: distribution indirecte (de programmes de radiodiffusion)**S: distribución indirecta (de programas de radiodifusión)***individual reception (in the broadcasting-satellite service)***F: réception individuelle (dans le service de radiodiffusion par satellite)**S: recepción individual (en el servicio de radiodifusión por satélite)***information***F: information**S: información***instant***F: instant**S: instante***interface***F: interface**S: interfaz***interference**

see: accepted interference, harmful interference, permissible interference, quasi-impulsive interference

**interference canceller***F: annuleur (ou supprimeur) de brouillage**S: cancelador (o supresor) de interferencia***interference-free coverage area**

see: coverage area

**interference noise***F: bruit de brouillage**S: ruido de interferencia***interference sector (I) (of a directional antenna in the bands 4 to 28 MHz)***F: secteur de brouillage (I)**S: sector de interferencia (I)***interference (to a wanted signal)***F: brouillage (d'un signal utile)**S: interferencia (a una señal útil)***interfering source***F: source de brouillage**S: fuente interferente***interleaved***F: intercalé**S: intercalado***intermediate-frequency rejection ratio (of a receiver)***F: affaiblissement sur la fréquence intermédiaire (d'un récepteur)**S: atenuación para la frecuencia intermedia (de un receptor)*

*	Rec. 332	§ 4.4	I
	Rep. 358	§ 1.3.1.3	An. Vol. VIII
	Rep. 358	§ 1.3.1.4	An. Vol. VIII
	Rec. 673 Rec. 573	An. No. H06	IV-1 XIII
	Rec. 673	An.	IV-1
*	Rep. 588	§ 3.3	An. Vol. VIII
	Rec. 566 Rec. 573	§ 2.1 No. H44	X/XI-2 XIII
	Rec. 566 Rec. 573	§ 1.3.1 No. H41	X/XI-2 XIII
	Rec. 662	Ap. II, No. 1.01	XIII
	Rec. 686		VII
	Rec. 662	Ap. II, No. 2.15	XIII
*	Rep. 875	§ 2	An. Vol. IV-1
*	Rep. 830	§ 1	An. Vol. I
*	Rep. 828	§ 3	An. Vol. I
	Rec. 162	§ 1.3	III
	Rec. 664	Ap. II, No. 5.09	XIII
	Rec. 573	No. F12	XIII
	Rec. 573 Rec. 592	No. B17 § 1.8	XIII IX-1
*	Rec. 332	§ 4.5	I

**intermodulation component (in a radio transmitter for amplitude-modulated emissions)**

*F: oscillation d'intermodulation (dans un émetteur radioélectrique à modulation d'amplitude)*

*S: oscilación de intermodulación (en un transmisor radioeléctrico de modulación de amplitud)*

**intermodulation products (of a transmitting station)**

*F: produits d'intermodulation (d'une station émettrice)*

*S: productos de intermodulación (de una estación transmisora)*

**International Atomic Time (TAI)**

*F: temps atomique international (TAI)*

*S: Tiempo Atómico Internacional (TAI)*

**international television connection**

*F: communication télévisuelle internationale*

*S: conexión internacional de televisión*

**inter-satellite link**

*F: liaison intersatellite*

*S: enlace intersatélite*

**ionosphere**

*F: ionosphère*

*S: ionosfera*

**ionospheric propagation**

*F: propagation ionosphérique*

*S: propagación ionosférica*

**ionospheric reflection**

*F: réflexion ionosphérique*

*S: reflexión ionosférica*

**ionospheric (reflection) propagation**

*F: propagation (par réflexion) ionosphérique*

*S: propagación (por reflexión) ionosférica*

**ionospheric scatter propagation**

*F: propagation par diffusion ionosphérique*

*S: propagación por dispersión ionosférica*

**ionospheric wave**

*F: onde ionosphérique*

*S: onda ionosférica*

**isotropic gain (of an antenna) ( $G_i$ ); absolute gain (of an antenna) ( $G_i$ )**

*F: gain isotrope d'une antenne ( $G_i$ ); gain absolu d'une antenne ( $G_i$ )*

*S: ganancia isotrópica (de una antena) ( $G_i$ ); ganancia absoluta (de una antena) ( $G_i$ )*

**J****julian date**

*F: date julienne*

*S: fecha juliana*

**julian date**

see: modified julian date

**julian day number**

*F: numéro de jour julien*

*S: número de día juliano*

**K****keraunic level**

*F: niveau kéraunique*

*S: nivel ceráunico*

**L****land mobile station**

*F: station mobile terrestre*

*S: estación móvil terrestre*

**land station**

*F: station terrestre*

*S: estación terrestre*

*	Rec. 326	§ 1.2	I
	Rec. 573	No. C07	XIII
	Rec. 573 Rec. 686	No. J04	XIII VII
*	Rec. 567	A.1.1	XII
	Rec. 573	No. A33	XIII
	Rec. 573	No. G21	XIII
	Rec. 573	No. G22	XIII
	Rec. 573	No. G26	XIII
	Rec. 573	No. G26	XIII
	Rec. 573	No. G25	XIII
	Rec. 573	No. G27	XIII
*	Rec. 341	An. I, § 2	V
*	Rec. 573	No. E04a	XIII
	Rec. 686		VII
	Rec. 686		VII
*	Rep. 932	§ 2.2	An. Vol. IX-1
	Rec. 573	Ap. No. A10a	XIII
	Rec. 573	No. A11	XIII

**leaky cables***F: câbles à fuite**S: cables con fuga***leap second***F: seconde intercalaire**S: segundo intercalar***left-hand polarization***F: polarisation senestrorsum, polarisation lévogyre**S: polarización levógira***line-of-sight propagation***F: propagation en visibilité**S: propagación con visibilidad directa***linear receiver***F: récepteur linéaire**S: receptor lineal***link***F: liaison**S: enlace***link***see: bidirectional, inter-satellite link, multi-satellite link, radio link, satellite link, unidirectional***location area***F: zone de localisation**S: zona de localización***location register***F: enregistreur de positions**S: registro de localización***location registration***F: enregistrement de la position**S: registro de la posición***logatom***F: logatome**S: logatomo***loss***see: basic transmission loss, free-space transmission loss, loss relative to free-space, ray path transmission loss, system loss, total loss, transmission loss***loss relative to free space***F: affaiblissement par rapport à l'espace libre (d'une liaison radioélectrique)**S: pérdida relativa al espacio libre***lowest usable frequency (LUF)***F: fréquence minimale utilisable (LUF)**S: frecuencia mínima utilizable (LUF)***low orbit (of a satellite)***F: orbite basse (d'un satellite)**S: órbita baja (de un satélite)***low power flux-density (in the broadcasting-satellite service)***F: puissance surfacique limitée (pour le service de radiodiffusion par satellite)**S: pequeña densidad de flujo de potencia (para el servicio de radiodifusión por satélite)***LUF***see: lowest usable frequency***M****macrosegmentation (of the frequency bands)***F: macrosegmentation (des bandes de fréquences)**S: macrosegmentación (de las bandas de frecuencias)***maximum sensitivity (for sound broadcast and television receivers)***F: sensibilité maximale (cas des récepteurs de radiodiffusion sonore ou visuelle (télévision))**S: sensibilidad máxima (para los receptores de radiodifusión sonora o visual (televisión))*

*	Rep. 902	§ 1	An. Vol. VIII
	Rec. 686		VII
	Rec. 573	No. G06	XIII
	Rec. 573 Rec. 310	No. 612 No. B2	XIII V
*	Rec. 331	§ 1	I
	Rec. 662	Ap. II, No. 2.06	XIII
	Rec. 624	An. I, § 3	VIII
*	Rec. 624	An. I, § 2	VIII
	Rec. 624	An. I, § 4	VIII
*	Rep. 751	§ 3.1.2	An. Vol. VIII
	Rec. 341 Rec. 573	§ 7 No. A47	V XIII
	Rec. 373 Rec. 573	No. G31	VI XIII
	Rep. 548	§ 2.3.1	An. Vol. II
	Rec. 566	§ 1.5.3	X/XI-2
*	Rep. 1000	§ 2.1	An. Vol. IV-1
*	Rec. 331	§ 1.01	I

**maximum usable frequency (MUF)***F: fréquence maximale utilisable (MUF)**S: frecuencia máxima utilizable (MUF)*

see: basic MUF, operational MUF

**maximum usable (gain-limited) sensitivity***F: sensibilité maximale utilisable limitée par l'amplification**S: sensibilidad máxima utilizable limitada por la amplificación***maximum usable (noise-limited) sensitivity***F: sensibilité maximale utilisable limitée par le bruit**S: sensibilidad máxima utilizable limitada por el ruido***maximum usable sensitivity (distortion limited or mutilation limited)***F: sensibilité maximale utilisable (limité par la mutilation ou la distortion)**S: sensibilidad máxima utilizable (limitada por la mutilación o la distorsión)***maximum usable sensitivity (for radiotelegraph receivers for aural reception)***F: sensibilité maximale utilisable (cas des récepteurs de radiotélégraphie pour réception auditive)**S: sensibilidad máxima utilizable (para los receptores radiotelegráficos para recepción auditiva)***maximum usable sensitivity, including the reproducing equipment (for radiotelegraph receivers for aural reception)***F: sensibilité maximale utilisable, y compris l'équipement de reproduction (cas de récepteurs de radiotélégraphie pour réception auditive)**S: sensibilidad máxima utilizable incluido el equipo reproductor (para los receptores radiotelegráficos para recepción auditiva)***mean power of a radio transmitter***F: puissance moyenne d'un émetteur radioélectrique**S: potencia media de un transmisor radioeléctrico***measurement of terrain irregularity  $\Delta h$** *F: mesure de l'irrégularité du terrain  $\Delta h$* *S: medida de la irregularidad del terreno  $\Delta h$* **medium power flux-density (in the broadcasting-satellite service)***F: puissance surfacique moyenne (pour le service de radiodiffusion par satellite)**S: densidad intermedia de flujo de potencia (para el servicio de radiodifusión por satélite)***meteor burst**

see: meteor-burst propagation

**meteor-burst propagation***F: propagation (ionosphérique) par impulsions météoriques**S: propagación (ionosférica) por impulsos meteóricos***microsegmentation (of the frequency bands)***F: microsegmentation (des bandes de fréquences)**S: microsegmentación (de las bandas de frecuencias)***mid-level (data signal in television)***F: niveau moyen (signal de données en télévision)**S: nivel medio (señal de datos en televisión)***minimum interference threshold***F: seuil inférieur de brouillage**S: umbral inferior de interferencia***minimum standard antenna (case of a directional antenna in the band 4 to 28 MHz)***F: antenne normale minimale**S: antena normal mínima***minimum usable field strength ( $E_{min}$ )***F: champ minimal utilisable ( $E_{min}$ )**S: intensidad de campo mínima utilizable ( $E_{min}$ )***minimum usable power flux-density ( $P_{min}$ )***F: puissance surfacique minimale utilisable ( $P_{min}$ )**S: densidad espectral de potencia mínima utilizable ( $P_{min}$ )***mixing ratio***F: rapport de mélange**S: relación de mezcla*

*	Rec. 331	§ 4.2	I	
*	Rec. 331	§ 4.2	I	
*	Rec. 331	§ 9.1	I	
*	Rec. 331	§ 9.1	I	
*	Rec. 331	§ 9.2	I	
	Rec. 573	No. E02	XIII	
	Rec. 310	No. B8	V	
	Rec. 566	§ 1.5.2	X/XI-2	
*	Rep. 251	§ 1	An. Vol. VI	
*	Rep. 1000	§ 2.3	An. Vol. IV-1	
*	Rep. 956	Ap. I, An. I, § 3	An. Vol. XI-1	
*	Rep. 526	§ 4	An. Vol. I	
*	Rec. 162	§ 1.4	III	
	Rec. 573	No. F31	XIII	
	Rec. 638	§ 2.1	X-1	
	Rec. 573	No. F31	XIII	
	Rec. 310	No. C3	V	



**mobile service***F: service mobile**S: servicio móvil***mobile services switching centre (MSC)***F: centre de commutation pour les services mobiles (CCM)**S: centro de conmutación de los servicios móviles (CCM)***mobile station***F: station mobile**S: estación móvil***modified julian date (MJD)***F: date julienne modifiée (DJM)**S: fecha modificada del calendario juliano (FMCJ)***modified Julian Day***F: jour julien modifié**S: día juliano modificado***modified refractive index***F: indice de réfraction modifié**S: índice de refracción modificado***modulation***F: modulation**S: modulación***modulation acceptance bandwidth of a receiver other than those used for broadcast reception, for frequency- or phase-modulated signals***F: bande passante correspondant à la déviation de fréquence maximale admissible pour un récepteur autre que la radiodiffusion, pour des signaux modulés en fréquence ou en phase**S: anchura de banda correspondiente a la desviación de frecuencia máxima admisible por un receptor que no sea de radiodifusión, para las señales con modulación de frecuencia o de fase***MUF**

see: maximum usable frequency, operational MUF

**multi-level modulation***F: modulation multiniveaux**S: modulación multiniveles***multipath propagation***F: propagation par trajets multiples**S: propagación por trayectos múltiples***multiple access***F: accès multiple**S: acceso múltiple***multiplexing***F: multiplexage**S: multiplaje***multi-satellite link***F: liaison multisatellite**S: enlace multisatélite***multi-state modulation***F: modulation multiétats**S: modulación multiestados***M-unit***F: unité M**S: unidad M***N****N (refractivity)**

see: refractivity, N

**near-Earth space***F: espace proche de la Terre**S: espacio próximo a la Tierra**Note. — See also comments of the Chairman of Study Group 2 (Edition 1986) § 4, second paragraph.***necessary bandwidth***F: largeur de bande nécessaire**S: anchura de banda necesaria*

Rec. 573	No. A10 (Note 1)	XIII
Rec. 624	An. I, § 1	VIII
Rec. 573	No. A10	XIII
Rec. 686		VII
Rec. 686		VII
Rec. 310	No. C7	V
Rec. 662	Ap. II, No. 3.08	XIII
* Rec. 332	§ 4.2	I
Rec. 592	§ 4.3	IX-1
Rec. 310 Rec. 573	No. C30 No. G19b	V XIII
Rec. 662	Ap. II, No. 3.13	XIII
Rec. 662	Ap. II, No. 3.11	XIII
Rec. 573	No. A32	XIII
Rec. 592	§ 4.4	IX-1
Rec. 310	No. C9	V
* Rep. 548	§ 1	An. Vol. II
Rec. 328 Rec. 573	§ 1.3 No. B02	I XIII

**nodal period***F: période nodale**S: periodo nodal***noise**

see: cross-modulation noise (case of compandors for sound-programme circuits),  
impulsive noise tolerance, trailing noise (case of compandors for  
sound-programme circuits)

**noise amplitude distribution***F: courbe de répartition de l'amplitude du bruit**S: distribución de la amplitud del ruido***noise factor (noise figure)***F: facteur de bruit**S: factor de ruido***noise figure**

see: noise factor

**noise (in telecommunication)***F: bruit (en télécommunication)**S: ruido (en telecomunicación)***noise temperature**

see: equivalent satellite link noise temperature

**noise temperature (of a one-port network)***F: température du bruit (d'un monoporte)**S: temperatura de ruido (de una red con una sola puerta)***nominal coverage area**

see: coverage area

**nominal orbital position***F: position nominale sur l'orbite**S: posición orbital nominal***nominal value***F: valeur nominale**S: valor nominal***normalized frequency***F: fréquence normée**S: frecuencia normalizada***normalized frequency departure***F: écart de fréquence normé**S: desajuste de frecuencia normalizado***normalized frequency difference***F: différence de fréquence normée**S: diferencia de frecuencia normalizada***normalized frequency drift***F: dérive de fréquence normée**S: deriva normalizada de frecuencia***normalized frequency offset***F: décalage de fréquence normé**S: separación de frecuencia normalizada***normalized offset***F: décalage normé**S: separación normalizada***normalized signal-to-noise ratio***F: rapport signal/bruit normalisé**S: relación señal/ruido normalizada***normalized value***F: valeur normée**S: valor normalizado***n-state quadrature amplitude modulation (n-QAM)***F: modulation d'amplitude en quadrature à n états (MAQ-n)**S: modulación de amplitud en cuadratura de n estados (MAQ-n)***N-unit***F: unité N**S: unidad N*

Rec. 673	An.	IV-1
Rep. 358	§ 1.3.1.1	An. Vol. VIII
Rec. 573	No. F03	XIII
Rec. 662	Ap. II, No. 5.08	XIII
Rec. 573	No. F01	XIII
Rec. 566	§ 3.4	X/XI-2
Rec. 686		VII
Rec. 686		VII
Rec. 686		VII
Rec. 686		VII
Rec. 686		VII
Rec. 686		VII
Rec. 686		VII
* Rec. 331	§ 9.5	I
Rec. 686		VII
Rec. 592	§ 4.1	IX-1
Rec. 310	No. C6	V

## O

**obstacle gain**

*F: gain d'obstacle*  
*S: ganancia de obstáculo*

**occupied band**

*F: bande occupée*  
*S: banda ocupada*

**occupied bandwidth**

*F: largeur de bande occupée*  
*S: anchura de banda ocupada*

**offset**

*F: décalé (canal)*  
*S: separado*

**operational MUF**

*F: MUF d'exploitation*  
*S: MUF de explotación*

**optimum working frequency (OWF or FOT)**

*F: fréquence optimale de travail (FOT)*  
*S: frecuencia óptima de trabajo (FOT)*

**orbit**

*F: orbite*  
*S: órbita*

**orbit**

see: circular orbit, direct (retrograde) orbit, elliptical orbit, equatorial orbit, geostationary-satellite orbit, inclined orbit, low orbit, polar orbit, unperturbed orbit

**orbital**

see: nominal orbital position

**orbital elements (of a satellite or other object in space)**

*F: éléments d'une orbite (d'un satellite ou autre corps spatial)*  
*S: elementos de una órbita (de satélite u otro objeto espacial)*

**orbital period (of a satellite), period of revolution (of a satellite)**

*F: période orbitale (d'un satellite), période de révolution (d'un satellite)*  
*S: periodo orbital (de un satélite), periodo de revolución (de un satélite)*

**orbital plane (of a satellite)**

*F: plan de l'orbite (d'un satellite)*  
*S: plano de la órbita (de un satélite)*

**order of diversity**

*F: ordre de diversité*  
*S: orden de diversidad*

**orthogonal co-channel**

*F: cocanal (orthogonal)*  
*S: cocanal (ortogonal)*

**out-of-band emission**

*F: émission hors bande*  
*S: emisión fuera de banda*

**out-of-band power (of an emission)**

*F: puissance hors bande (d'une émission)*  
*S: potencia fuera de banda (de una emisión)*

**out-of-band spectrum (of an emission)**

*F: spectre hors bande (d'une émission)*  
*S: espectro fuera de banda (de una emisión)*

**overall adjacent channel protection margin**

*F: marge de protection globale pour le canal adjacent*  
*S: margen de protección global para canal adyacente*

**overall carrier-to-interference ratio**

*F: rapport global porteuse/brouillage*  
*S: relación global portadora/interferencia*

**overall co-channel protection margin**

*F: marge de protection globale dans le même canal*  
*S: margen de protección, cocanal global*

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Rec. 573	No. B16	XIII
Rec. 373 Rec. 573	§ 1 No. G30	VI XIII
Rec. 373	An. I, § 1	VI
Rec. 673 Rec. 573	An. No. H05	IV-1 XIII
Rec. 673	An.	IV-1
Rec. 673	An.	IV-1
Rec. 673	An.	IV-1
Rec. 592 Rec. 573	§ 1.11 No. F42	IX-1 XIII
Rec. 592 Rec. 573	§ 1.6 No. B14	IX-1 XIII
Rec. 328 Rec. 573	§ 1.6 No. C03	I XIII
Rec. 328	§ 1.11	I
Rec. 328	§ 1.5	I
Rec. 566	§ 4.9	X/XI-2
Rec. 566	§ 4.6	X/XI-2
Rec. 566	§ 4.8	X/XI-2

**overall equivalent protection margin***F: marge de protection globale équivalente**S: margen de protección global equivalente***overall second adjacent channel protection margin***F: marge de protection globale pour le canal deuxième adjacent**S: margen de protección global para segundo canal adyacente***OWF**

see: optimum working frequency

**P****packet multiplexing***F: multiplexage par paquets**S: multiplexaje por paquetes***parasitic emissions***F: rayonnement parasite**S: radiación parásita***passband (for amplitude-modulated signals)***F: bande passante (cas de signaux à modulation d'amplitude)**S: banda de paso (para las señales con modulación de amplitud)***passive sensor***F: détecteur passif**S: sensor pasivo***path**

see: digital radio path, hypothetical reference digital path, transmission path

**peak envelope power (of a radio transmitter)***F: puissance en crête (d'un émetteur radioélectrique)**S: potencia en la cresta de la envolvente (de un transmisor radioeléctrico)***peak-to-peak amplitude (data signal in television)***F: amplitude crête-à-crête (signal de données en télévision)**S: amplitud de cresta a cresta (señal de datos en televisión)***Pedersen ray***F: rayon de Pedersen**S: rayo de Pedersen***penetration depth***F: profondeur de pénétration (dans le sol)**S: propundidad de penetración (en el suelo)***periapsis***F: périastre, periapsis**S: periastro, periápside***perigee***F: périgée**S: perigeo***period (of a satellite)***F: période (d'un satellite)**S: periodo (de un satélite)***period of revolution (of a satellite), orbital period (of a satellite)***F: période de révolution (d'un satellite), période orbitale (d'un satellite)**S: periodo de revolución (de un satélite), periodo orbital (de un satélite)***permissible interference***F: brouillage admissible**S: interferencia admisible***permissible out-of-band power***F: puissance hors bande admissible**S: potencia fuera de banda admisible***permissible out-of-band spectrum (of an emission)***F: spectre hors bande admissible (d'une émission)**S: espectro fuera de banda admisible (de una emisión)***phase***F: phase**S: fase***phase change coefficient***F: déphasage linéique**S: coeficiente del desfasaje***phase delay***F: temps de propagation de phase**S: retardo de fase*

	Rec. 566	§ 4.11	X/XI-2
	Rec. 566	§ 4.10	X/XI-2
*	Rep. 954	§ 4.2	An. Vol. X/XI-2
	Rec. 329	§ 1.5	I
*	Rec. 332	§ 4.1	I
	Rec. 573	No. H32	XIII
	Rec. 573	No. E01	XIII
*	Rep. 956	Ap. I, P. I, § 7	An. Vol. XI-1
*	Rep. 250	§ 1 and 2	An. Vol. VI
	Rec. 310	No. B4	V
	Rec. 673	An.	IV-1
	Rec. 673	An.	IV-1
	Rec. 573	No. H07	XIII
	Rec. 673	An.	IV-1
	Rec. 573	No. F11c (Note 2)	XIII
	Rec. 328	§ 1.12	I
	Rec. 328	§ 1.10	I
	Rec. 686		VII
	Rec. 662	Ap. II, No. 5.05	XIII
	Rec. 662	Ap. II, § 5.06	XIII

<b>phase deviation</b> <i>F: décalage de phase</i> <i>S: desviación de fase</i>	Rec. 686		VII
<b>phase shift</b> <i>F: déphasage</i> <i>S: desplazamiento de fase</i>	Rec. 686		VII
<b>point-to-area communication</b> <i>F: communication point à zone</i> <i>S: comunicación punto a zona</i>	Rec. 592 Rec. 662	§ 1.5 Ap. II, No. 2.09	IX-1 XIII
<b>point-to-multipoint communication</b> <i>F: communication point à multipoint</i> <i>S: comunicación punto a multipunto</i>	Rec. 592 Rec. 662	§ 1.4 Ap. II, No. 2.08	IX-1 XIII
<b>point-to-point communication</b> <i>F: communication point à point</i> <i>S: comunicación punto a punto</i>	Rec. 592 Rec. 662	§ 1.3 Ap. II, No. 2.07	IX-1 XIII
<b>polar orbit (of a satellite)</b> <i>F: orbite polaire (de satellite)</i> <i>S: órbita polar (de un satélite)</i>	Rec. 673	An.	IV-1
<b>polarized wave</b> see: left-hand polarized wave, right-hand polarized wave			
<b>port (of a network)</b> <i>F: accès (d'un réseau)</i> <i>S: puerto (de una red)</i>	Rec. 662	Ap. II, No. 2.13	XIII
<b>power</b> see: carrier power (of a radio transmitter), effective monopole-radiated power (e.m.r.p.), effective radiated power (e.r.p.), equivalent isotropically radiated power (e.i.r.p.), mean power of a radio transmitter, out-of-band power (of an emission), peak envelope power (of a radio transmitter), permissible out-of-band power			
<b>power flux-density</b> see: high power flux-density, low power flux-density, medium power flux-density			
<b>precipitation rate, rainfall rate</b> <i>F: intensité de précipitation, intensité de pluie</i> <i>S: intensidad de precipitación, índice de pluviosidad, intensidad de lluvia</i>	Rec. 310	No. C33	V
<b>precipitation-scatter propagation</b> <i>F: propagation par diffusion par les précipitations</i> <i>S: propagación por dispersión debida a las precipitaciones</i>	Rec. 310 Rec. 573	No. C29 No. G19a	V XIII
<b>precision</b> <i>F: précision</i> <i>S: precisión</i>	Rec. 686		VII
<b>precision</b> see: accuracy, uncertainty			
<b>primary body (in relation to a satellite)</b> <i>F: corps principal (pour un satellite)</i> <i>S: cuerpo primario (para un satélite)</i>	Rec. 673	An.	IV-1
<b>primary clock</b> <i>F: horloge primaire</i> <i>S: reloj primario</i>	Rec. 686		VII
<b>primary distribution link</b> <i>F: liaison de distribution primaire</i> <i>S: enlace de distribución primaria</i>	Rec. 662	Ap. II, No. 2.17	XIII
<b>primary frequency standard</b> <i>F: étalon primaire de fréquence</i> <i>S: patrón primario de frecuencia</i>	Rec. 686		VII
<b>primary grade of reception quality (in the broadcasting-satellite service)</b> <i>F: qualité primaire de réception (dans le service de radiodiffusion par satellite)</i> <i>S: grado primario de calidad de recepción (en el servicio de radiodifusión por satélite)</i>	Rec. 566	§ 1.4.1	X/XI-2
<b>propagation</b> ionospheric propagation see: ionospheric (reflection) propagation, ionospheric scatter propagation, trans-ionospheric propagation tropospheric propagation see: multipath propagation, precipitation scatter propagation, trans-horizon propagation			

**propagation coefficient***F: exposant linéique de propagation**S: coeficiente de propagación***proper time***F: temps propre**S: tiempo propio***proportional jitter (data signal in television)***F: gigue proportionnelle**S: fluctuación de fase (o temblor) proporcional***protection margin***F: marge de protection**S: margen de protección***protection ratio***F: rapport de protection**S: relación de protección***protection ratio**

see: audio-frequency (AF) protection ratio, radio-frequency (RF) protection ratio, video-frequency (VF) protection ratio

**Q****quasi-impulsive interference***F: brouillage quasi impulsif**S: interferencia de carácter cuasi impulsivo***R****radar beacon (racon)***F: balise radar (racon)**S: baliza de radar (racon)***radiating cables**

see: leaky cables

**radiation (in radiocommunication)***F: rayonnement (radioélectrique)**S: radiación (radioeléctrica)***radio***F: radio, radioélectrique**S: radio***(radio) broadcasting***F: radiodiffusion**S: radiodifusión***radiocommunication***F: radiocommunication**S: radiocomunicación***radiocommunication service***F: service de radiocommunication**S: servicio de radiocomunicación***radio-frequency channel, RF channel***F: canal radioélectrique, radiocanal, canal RF**S: radiocanal, canal radioeléctrico***radio-frequency disturbance***F: perturbation radioélectrique, parasite (radioélectrique)**S: perturbación electromagnética, parásito (electromagnético)***radio (frequency) noise***F: bruit radioélectrique**S: ruido radioeléctrico***radio-frequency (RF) protection ratio***F: rapport de protection en radiofréquence (RF)**S: relación de protección en radiofrecuencia (RF)***radio-frequency (RF) signal-to-interference ratio***F: rapport signal/brouillage en radiofréquence (RF)**S: relación señal/interferencia en radiofrecuencia (RF)***radio horizon***F: horizon radioélectrique**S: horizonte radioeléctrico*

	Rec. 662	Ap. II, No. 5.03	XIII
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*	Rep. 956	Ap. I, An. I, § 11	An. Vol. XI-1
	Rec. 566 Rec. 573	§ 4.7 No. F23	X/XI-2 XIII
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*	Rep. 183	§ 1	An. Vol. III
	Rec. 573	Ap. No. A10e	XIII
	Rec. 573	No. C01	XIII
	Rec. 573	No. A03	XIII
	Rec. 662	Ap. II, No. 1.3.5	XIII
	Rec. 573	No. A01	XIII
	Rec. 573	No. A04 (Note 2)	XIII
	Rec. 573	No. B01	XIII
	Rec. 573	No. F11b	XIII
	Rec. 573	No. F11a	XIII
*	Rec. 573	No. F22 (Note 3)	XIII
	Rec. 655 Rec. 638	§ 1 § 1.4	XI-1 X-1
*	Rec. 573	No. F21 (Note 1)	XIII
	Rec. 638	§ 1.1	X-1
	Rec. 310 Rec. 573	No. B3 No. G15	V XIII

<b>radio link</b> <i>F: liaison radioélectrique</i> <i>S: radioenlace</i>	Rec. 573	No. A21	XIII
<b>radio paging</b> <i>F: radiorecherche, radiomessagerie</i> <i>S: radiobúsqueda</i>	* Rep. 499 * Rec. 584		An. Vol. VIII VIII
<b>radio-paging system</b> see: radio paging			
<b>radio-relay system</b> <i>F: faisceau hertzien</i> <i>S: sistema de relevadores radioeléctricos</i>	Rec. 592 Rec. 573	§ 1 No. A22	IX-1 XIII
<b>radio-relay system</b> see: trans-horizon radio-relay system			
<b>radio station</b> see: station			
<b>(radio) transmitter</b> <i>F: émetteur (radioélectrique)</i> <i>S: transmisor (radioeléctrico)</i>	Rec. 573	No. D01	XIII
<b>radio waves, hertzian waves</b> <i>F: ondes radioélectriques, ondes hertziennes</i> <i>S: ondas radioeléctricas, ondas hertzianas</i>	Rec. 573	No. A02	XIII
<b>ray path transmission loss</b> <i>F: affaiblissement de transmission pour un trajet radioélectrique</i> <i>S: pérdida de transmisión en el trayecto de un rayo</i>	Rec. 341 Rec. 573	§ 6 No. A46	V XIII
<b>reception (in the broadcasting-satellite service)</b> see: community reception, individual reception			
<b>reciprocal mixing</b> <i>F: mélange réciproque</i> <i>S: mezcla recíproca</i>	Rec. 612	An. I, § 1	III
<b>reduced carrier emission</b> <i>F: émission à porteuse réduite</i> <i>S: emisión de onda portadora reducida</i>	Rec. 573	No. D06	XIII
<b>reference atmosphere for refraction</b> <i>F: atmosphère de référence pour la réfraction</i> <i>S: atmósfera de referencia para la refracción</i>	Rec. 310 Rec. 369	No. C12	V V
<b>reference frequency</b> <i>F: fréquence de référence</i> <i>S: frecuencia de referencia</i>	Rec. 328	§ 1.18	I
<b>reference sensitivity</b> <i>F: sensibilité de référence</i> <i>S: sensibilidad de referencia</i>	* Rec. 331	§ 5	I
<b>reference usable field strength (<math>E_{ref}</math>)</b> <i>F: champ utilisable de référence (<math>E_{ref}</math>)</i> <i>S: intensidad de campo de referencia utilizable (<math>E_{ref}</math>)</i>	Rec. 573 Rec. 638	No. F33 § 2.3	XIII X-1
<b>reference usable power flux-density (<math>P_{ref}</math>)</b> <i>F: puissance surfacique utilisable de référence (<math>P_{ref}</math>)</i> <i>S: densidad espectral de potencia de referencia utilizable (<math>P_{ref}</math>)</i>	Rec. 573	No. F33	XIII
<b>reflecting satellite</b> <i>F: satellite réflecteur</i> <i>S: satélite reflector</i>	Rec. 673 Rec. 573	An. No. H12	IV-1 XIII
<b>refraction</b> see: M-unit, modified refractive index, reference atmosphere for refraction, refractive index ( $n$ ), refractive modulus; M, sub-refraction, super refraction			
<b>refractive index (<math>n</math>)</b> <i>F: indice de réfraction (<math>n</math>)</i> <i>S: índice de refracción (<math>n</math>)</i>	Rec. 310	No. C14	V
<b>refractive modulus; M</b> <i>F: module de réfraction; M</i> <i>S: módulo de refracción; M</i>	Rec. 310	No. C8.	V
<b>refractivity, N</b> <i>F: coindice, N</i> <i>S: coíndice, N</i>	Rec. 310	No. C5	V



**rejection ratio**

see: image-rejection ratio, intermediate-frequency rejection ratio,  
spurious-response rejection ratio

**relative build-up time of a telegraph signal**

*F: temps d'établissement relatif d'un signal télégraphique*

*S: tiempo relativo de establecimiento de una señal telegráfica*

**remote data processing [teleinformatics]**

*F: téléinformatique*

*S: teleinformática*

**reproducibility**

*F: reproductibilité*

*S: reproductibilidad*

**remote alarm**

*F: téléalarme*

*S: telealarma*

**remote sensing satellite**

*F: satellite de télédétection*

*S: satélite de teledetección*

**resettability**

*F: fidélité*

*S: reposicionabilidad*

**residual bit error ratio (RBER)**

*F: taux d'erreur binaire résiduel (TEBR)*

*S: proporción de bits erróneos residual (BER-R)*

**right-hand polarization**

*F: polarisation dextrorsum, polarisation dextrogyre*

*S: polarización dextrógira*

**rough surface**

*F: surface rugueuse*

*S: superficie rugosa*

**S****satellite**

*F: satellite*

*S: satélite*

**satellite**

see: active satellite, attitude-stabilized satellite, geostationary satellite,  
geosynchronous satellite, reflecting satellite, station-keeping satellite,  
stationary satellite, sub-synchronous satellite, synchronized satellite,  
synchronous satellite

**satellite link**

*F: liaison par satellite*

*S: enlace por satélite*

**up link**

*F: liaison montante*

*S: enlace ascendente*

**down link**

*F: liaison descendante*

*S: enlace descendente*

**satellite link**

see: down link, inter-satellite link, multi-satellite link, up link

**satellite network**

*F: réseau à satellite*

*S: red de satélite*

**satellite network**

see: frequency re-use satellite network

**satellite system**

*F: système à satellites*

*S: sistema de satélites*

**scintillation**

*F: scintillation*

*S: centelleo*

**scrambling**

*F: embrouillage (en radiodiffusion)*

*S: aleatorización*

Rec. 328	§ 1.2.1	I
Rec. 662	Ap. II, No. 1.15	XIII
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Rec. 662	Ap. II, No. 1.33	XIII
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Rec. 573	No. G05	XIII
Rec. 310	No. B6	V
Rec. 673 Rec. 573	An. No. H04	IV-1 XIII
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Rec. 573	No. A.31.b	XIII
Rec. 573	No. A.36	XIII
Rec. 573	No. A.34	XIII
Rec. 320	No. C31	V
* Rep. 1079	An. I	An. Vol. XI-1



<b>second adjacent channel</b> <i>F: canal deuxième adjacent</i> <i>S: segundo canal adyacente</i>	Rec. 566 Rec. 573	§ 4.5 No. B12	X/XI-2 XIII
<b>secondary distribution link</b> <i>F: liaison de distribution secondaire</i> <i>S: enlace de distribución secundaria</i>	Rec. 662	Ap. II, No. 2.18	XIII
<b>secondary frequency standard</b> <i>F: étalon secondaire de fréquence</i> <i>S: patrón secundario de frecuencia</i>	Rec. 686		VII
<b>secondary grade of reception quality (in the broadcasting-satellite service)</b> <i>F: qualité secondaire de réception (dans le service de radiodiffusion par satellite)</i> <i>S: grado secundario de calidad de recepción (en el servicio de radiodifusión por satélite)</i>	Rec. 566	§ 1.4.2	X/XI-2
<b>selectivity of a receiver</b> <i>F: sélectivité d'un récepteur</i> <i>S: selectividad de un receptor</i>	* Rec. 332	§ a	I
<b>selectivity of a receiver</b> see: effective selectivity			
<b>sending (in telecommunication)</b> <i>F: émission (en télécommunication)</i> <i>S: emisión (en telecomunicación)</i>	Rec. 662	Ap. II, No. 1.04	XIII
<b>sensitivity factor (earth station)</b> <i>F: facteur de sensibilité (station terrienne)</i> <i>S: factor de sensibilidad (estación terrena)</i>	* Rep. 382	§ 2.3.2	An. Vol. IV/IX-2
<b>sensitivity of a receiver</b> <i>F: sensibilité d'un récepteur</i> <i>S: sensibilidad de un receptor</i>	* Rec. 331	§ a	I
<b>sensitivity of a receiver</b> see: maximum sensitivity, maximum usable sensitivity (several definitions), reference sensitivity			
<b>sensor</b> see: active sensor, passive sensor			
<b>service</b> see: broadcasting-satellite service, mobile service, radiocommunication service, standard frequency satellite service, [teleinformatics], teletext service, time signal-satellite service			
<b>service arc</b> <i>F: arc de service</i> <i>S: arco de servicio</i>	Rec. 673 Rec. 573	An. No. H24	IV-1 XII
<b>service area (for the broadcasting-satellite service)</b> <i>F: zone de service (pour le service de radiodiffusion par satellite)</i> <i>S: zona de servicio (para el servicio de radiodifusión por satélite)</i>	Rec. 566	§ 3.1	X/XI-2
<b>service area (of a space station)</b> <i>F: zone de service (d'une station spatiale)</i> <i>S: zona de servicio (de una estación espacial)</i>	Rec. 573	No. A51a (Note 5)	XIII
<b>service sector (S), (of a directional antenna in the band 4 to 28 MHz)</b> <i>F: secteur de service (S)</i> <i>S: sector de servicio (S)</i>	Rec. 162	§ 1.2	III
<b>severely errored second (SES)</b> <i>F: seconde gravement entachée d'erreurs (SGE)</i> <i>S: segundo con muchos errores (SME)</i>	* Rec. 592 Rec. 662	§ 2.4 Ap. II, No. 5.13	IX-1 XIII
<b>shaped-beam antenna</b> <i>F: antenne à faisceau modelé</i> <i>S: antena con bases conformados</i>	* Rec. 566	§ 3.2 (Note 3)	X/XI-2
<b>ship station</b> <i>F: station de navire</i> <i>S: estación de barco</i>	Rec. 573	Ap. No. A10b	XIII
<b>sidereal period of revolution (of a satellite)</b> <i>F: période de révolution sidérale (d'un satellite)</i> <i>S: periodo de revolución sidereal (de un satélite)</i>	Rec. 673	An.	IV-1

**sidereal period of rotation (of an object in space)***F: période de rotation sidérale (d'un corps spatial)**S: periodo de rotación sideral (de un objeto espacial)***signal***F: signal**S: señal***signal-to-interference ratio***F: rapport signal/brouillage**S: relación señal/interferencia***signal-to-interference ratio**

see: audio-frequency (AF) signal-to-interference ratio, radio-frequency (RF)

signal-to-interference ratio, video frequency (VF) signal-to-interference ratio

**simple modulation***F: modulation simple**S: modulación simple***simplex***F: simplex, à l'alternat, semi-duplex (déconseillé)**S: simplex***single-sideband emission, SSB emission***F: émission à bande latérale unique, émission BLU**S: emisión de banda lateral única, emisión BLU***smooth surface***F: surface lisse**S: superficie lisa, especular***sound broadcasting***F: radiodiffusion sonore**S: radiodifusión sonora***spacecraft***F: engin spatial**S: vehículo espacial***space diversity reception***F: réception en diversité d'espace**S: recepción con diversidad de espacio***space division***F: répartition spatiale**S: división espacial***space probe***F: sonde spatiale**S: sonda espacial***space radiocommunication***F: radiocommunication spatiale**S: radiocomunicación espacial***space station***F: station spatiale**S: estación espacial***space system***F: système spatial**S: sistema espacial***spectrum**

see: out-of-band spectrum (of an emission), permissible out-of-band spectrum (of an emission)

**spectrum amplitude***F: amplitude du spectre**S: amplitud del espectro***spectrum efficiency***F: efficacité de l'emploi du spectre**S: eficacia de utilización del espectro***spread spectrum (SS) system***F: système à modulation avec étalement du spectre (MES)**S: sistema de modulación de espectro ensanchado (o sistema SS (spread spectrum system))***spreading loss***F: affaiblissement géométrique, atténuation géométrique**S: pérdida geométrica***spurious emissions***F: rayonnement non essentiel**S: radiación no esencial*

Rec. 673	An.	IV-1
Rec. 662	Ap. II, No. 1.02	XIII
* Rec. 573	No. F21	XIII
Rec. 592	§ 4.2	IX-1
Rec. 662	Ap. II, No. 3.18	XIII
Rec. 573	No. D04	XIII
Rec. 310	No. B5	V
Rec. 662	Ap. II, No. 1.3.6	XIII
Rec. 673 Rec. 573	An. No. H01	IV-1 XIII
Rec. 592 Rec. 573	§ 1.12 No. F43	IX-1 XIII
Rec. 662	Ap. II, No. 3.14	XIII
Rec. 673 Rec. 573	No. H03	IV-1 XIII
Rec. 573	No. A07	XIII
Rec. 573	No. A05	XIII
Rec. 573	No. A35	XIII
Rep. 358	§ 1.3.1.2	An. Vol. VIII
* Rep. 662	§ 2.2	An. Vol. I
* Rep. 651	§ 1	An. Vol. I
Rec. 573	No. A48	XIII
Rec. 329 Rec. 328 Rec. 573	§ 1.1 § 1.7 No. C04	I I XII

<b>spurious frequency conversion products</b> <i>F: produits non essentiels de conversion de fréquence</i> <i>S: productos no esenciales de conversión de frecuencia</i>	*	Rec. 329	§ 1.4	I
<b>spurious intermodulation products</b> <i>F: produits d'intermodulation non essentiels</i> <i>S: productos de intermodulación no esenciales</i>	*	Rec. 329	§ 1.3	I
<b>spurious-response rejection ratio (for a receiver)</b> <i>F: affaiblissement sur la fréquence parasite (d'un récepteur)</i> <i>S: atenuación para la frecuencia parásita (para un receptor)</i>	*	Rec. 332	§ 4.6	I
<b>standard frequency</b> <i>F: fréquence étalon</i> <i>S: frecuencia patrón</i>		Rec. 686 Rec. 573	No. J02	VII XIII
<b>standard frequency emission</b> <i>F: émission de fréquences étalon</i> <i>S: emisión de frecuencias patrón</i>		Rec. 686		VII
<b>standard frequency and/or time-signal station</b> <i>F: station de fréquence étalon et/ou de signaux horaires</i> <i>S: estación de frecuencias patrón y/o de señales horarias</i>		Rec. 686		VII
<b>standard frequency-satellite service</b> <i>F: service des fréquences étalon par satellite</i> <i>S: servicio de frecuencias patrón por satélite</i>		Rec. 686		VII
<b>standard radio atmosphere</b> <i>F: atmosphère radioélectrique normale</i> <i>S: atmósfera radioeléctrica normal</i>		Rec. 310	No. C11	V
<b>standard refractivity vertical gradient</b> <i>F: gradient normal du coindice</i> <i>S: gradiente normal del coindice</i>		Rec. 310	No. C10	V
<b>standard time-signal emission</b> <i>F: émission de signaux horaires</i> <i>S: emisión de señales horarias</i>		Rec. 686 Rec. 573	No. J03	VII XIII
<b>station</b> <i>F: station</i> <i>S: estación</i>		Rec. 573	No. A04	XIII
<b>station</b> see: broadcasting-satellite space station, earth station, land station, mobile station, space station, standard frequency and/or time-signal station, terrestrial station				
<b>stationary satellite</b> <i>F: satellite stationnaire</i> <i>S: satélite estacionario</i>		Rec. 673 Rec. 573	An. No. H19	IV-1 XIII
<b>station-keeping satellite</b> <i>F: satellite maintenu en position</i> <i>S: satélite de posición relativa constante</i>		Rec. 673 Rec. 573	An. No. H13	IV-1 XIII
<b>still-picture television (SPTV)</b> <i>F: télévision à images fixes</i> <i>S: televisión de imágenes fijas</i>		Rec. 662	Ap. II, No. 1.17	XIII
<b>still-picture videophony</b> <i>F: visiophonie à images fixes</i> <i>S: videofonía de imágenes fijas</i>		Rec. 662	Ap. II, No. 1.24	XIII
<b>sub-refraction</b> <i>F: infraréfraction</i> <i>S: infrarrefracción</i>		Rec. 310	No. C13	V
<b>subscriber's line, subscriber's loop</b> <i>F: ligne d'abonné, ligne de rattachement</i> <i>S: línea de abonado, bucle de abonado</i>		Rec. 662	Ap. II, No. 2.12	XIII
<b>sub-synchronous (super-synchronous) satellite</b> <i>F: satellite sous-synchrone (super-synchrone)</i> <i>S: satélite subsincrónico (supersincrónico)</i>		Rec. 673 Rec. 573	An. No. H18	IV-1 XIII
<b>super refraction</b> <i>F: superréfraction</i> <i>S: superrefracción</i>		Rec. 310	No. C14	V
<b>suppressed carrier emission</b> <i>F: émission à porteuse supprimée</i> <i>S: emisión de onda portadora suprimida</i>		Rec. 573	No. D07	XIII

**survival craft station***F: station d'engin de sauvetage**S: estación de embarcación o dispositivo de salvamento***switching***see: automatic switching for television circuits***switching (in telecommunication)***F: commutation (en télécommunication)**S: conmutación (en telecomunicación)***synchronism***F: synchronisme**S: sincronismo***synchronized satellite, phased satellite (deprecated)***F: satellite synchronisé, satellite en phase (déconseillé)**S: satélite sincronizado, satélite en fase (desaconsejado)***synchronous satellite***F: satellite synchrone**S: satélite sincrónico***system loss***F: affaiblissement entre bornes d'antennes, affaiblissement du système**S: pérdida del sistema***T****TAI***see: international atomic time***telecommand***F: télécommande**S: telemando***telecommunication***F: télécommunication**S: telecomunicación***telecommunication circuit***F: circuit de télécommunication**S: circuito de telecomunicación***telecommunication network***F: réseau de télécommunication**S: red de telecomunicación***(telecommunication) terminal***F: terminal (de télécommunication)**S: terminal (de telecomunicación)***teleconference***F: téléconférence**S: teleconferencia***telecontrol***F: téléconduite**S: telecontrol***telegraphy***F: télégraphie**S: telegrafia***teleguidance***F: téléguidage**S: teleguiaje***[teleinformatics], teleprocessing***F: téléinformatique**S: teleinformática (teleproceso)***telematics (services)***F: télématique (services de)**S: telemática (servicios de)***telemetry, telemetering***F: télémessure**S: telemedida*

Rec. 573	Ap. No. A10d	XIII
Rec. 662	Ap. II, No. 3.03	XIII
Rec. 686		VII
Rec. 673 Rec. 573	An. No. H14	IV-1 XIII
Rec. 673 Rec. 573	An. No. H16	IV-1 XIII
Rec. 341 Rec. 573	§ 2 No. A42	V XIII
Rec. 662	Ap. II, No. 1.29	XIII
Rec. 662	Ap. II, No. 1.06	XIII
Rec. 662	Ap. II, No. 2.03	XIII
Rec. 662	Ap. II, No. 2.10	XIII
Rec. 662	Ap. II, No. 2.11	XIII
Rec. 662	Ap. II, No. 1.25	XIII
Rec. 662	Ap. II, No. 1.30	XIII
Rec. 662	Ap. II, No. 1.08	XIII
Rec. 662	Ap. II, No. 1.31	XIII
Rec. 662	Ap. II, No. 1.15	XIII
Rec. 662	Ap. II, No. 1.18	XIII
Rec. 662	Ap. II, No. 1.28	XIII

<b>telemonitoring</b> F: <i>télésurveillance</i> S: <i>telesupervisión</i>	Rec. 662	Ap. II, No. 1.32	XIII
<b>telephone-type channel</b> F: <i>voie de type téléphonique</i> S: <i>canal de tipo telefónico</i>	Rec. 662	Ap. II, No. 2.02	XIII
<b>telephone-type circuit</b> F: <i>circuit de type téléphonique</i> S: <i>circuito de tipo telefónico</i>	Rec. 662	Ap. II, No. 2.04	XIII
<b>telephony</b> F: <i>téléphonie</i> S: <i>telefonía</i>	Rec. 662	Ap. II, No. 1.07	XIII
<b>teletex</b> F: <i>télétex</i> S: <i>teletex</i>	Rec. 662	Ap. II, No. 1.22	XIII
<b>teletext, broadcast videography</b> F: <i>télétexte, vidéographie diffusée</i> S: <i>teletexto, videografía radiodifundida</i>	Rec. 662	Ap. II, No. 1.20	XIII
<b>teletext service</b> F: <i>service de télétexte</i> S: <i>servicio de teletexto</i>	* Rep. 802	§ 3.1	An. Vol. XI-1
	Rec. 653	§ 2	XI-1
<b>television</b> F: <i>télévision</i> S: <i>televisión</i>	Rec. 662	No. 1.16	XIII
<b>television (broadcasting)</b> F: <i>radiodiffusion visuelle, (radiodiffusion de) télévision</i> S: <i>(radiodifusión de) televisión</i>	Rec. 662	Ap. II, No. 1.37	XIII
<b>telewriting</b> F: <i>téléécriture</i> S: <i>teleescritura</i>	Rec. 662	Ap. II, No. 1.11	XIII
<b>telex (service)</b> F: <i>(service) télex</i> S: <i>(servicio) télex</i>	Rec. 662	Ap. II, No. 1.09	XIII
<b>temperature inversion</b> F: <i>inversion de température</i> S: <i>inversión de temperatura</i>	Rec. 310	No. C2	V
<b>terrain irregularity <math>\Delta h</math></b> see: measurement of terrain irregularity $\Delta h$			
<b>terrestrial hypothetical reference circuit (television)</b> F: <i>circuit fictif de référence pour système de Terre (télévision)</i> S: <i>circuito ficticio de referencia terrenal (televisión)</i>	* Rec. 567	§ A.1.2	XII
<b>terrestrial radiocommunication</b> F: <i>radiocommunication de Terre</i> S: <i>radiocomunicación terrenal</i>	Rec. 573	No. A07	XIII
<b>terrestrial station</b> F: <i>station de Terre</i> S: <i>estación terrenal</i>	Rec. 573	No. A09	XIII
<b>time</b> see: coordinated universal time (UTC), DUT1, international atomic time (TAI)			
<b>time</b> F: <i>temps</i> S: <i>tiempo</i>	Rec. 686		VII
<b>time code</b> F: <i>code horaire</i> S: <i>código horario</i>	Rec. 686		VII
<b>time comparison</b> F: <i>comparaison de temps</i> S: <i>comparación de tiempo</i>	Rec. 686		VII
<b>time division</b> F: <i>répartition temporelle</i> S: <i>división en el tiempo</i>	Rec. 662	Ap. II, No. 3.15	XII
<b>time interval</b> F: <i>intervalle de temps</i> S: <i>intervalo de tiempo</i>	Rec. 686		VII

<b>time marker</b> <i>F: repère de temps</i> <i>S: marca de tiempo</i>	Rec. 686		VII
<b>time scale difference</b> <i>F: différence entre échelles de temps</i> <i>S: diferencia entre escalas de tiempo</i>	Rec. 686		VII
<b>time scales in synchronism</b> <i>F: échelles de temps en synchronisme</i> <i>S: escalas de tiempo en sincronismo</i>	Rec. 686		VII
<b>time scale reading</b> <i>F: lecture d'une échelle de temps</i> <i>S: lectura de una escala de tiempo</i>	Rec. 686		VII
<b>time scale unit</b> <i>F: unité d'une échelle de temps</i> <i>S: unidad de escala de tiempo</i>	Rec. 686		VII
<b>time signal-satellite service</b> <i>F: service de signaux horaires par satellite</i> <i>S: servicio de señales horarias por satélite</i>	Rec. 686		VII
<b>time standard</b> <i>F: étalon de temps</i> <i>S: patrón de tiempo</i>	Rec. 686		VII
<b>time step</b> <i>F: saut de temps</i> <i>S: salto de tiempo</i>	Rec. 686		VII
<b>topocentric angle</b> <i>F: angle topocentrique</i> <i>S: ángulo topocéntrico</i>	Rec. 673 Rec. 573	An. No. H09b	IV-1 XIII
<b>total loss (of a radio link)</b> <i>F: affaiblissement global (d'une liaison radioélectrique)</i> <i>S: pérdida total (de un enlace radioeléctrico)</i>	Rec. 341 Rec. 573	§ 1 No. A41	V XIII
<b>trailing noise (case of companders for sound-programme circuits)</b> <i>F: bruit de trainage (cas de compresseurs-extenseurs pour circuits de transmissions radiophoniques)</i> <i>S: ruido residual (caso de compresores-expansores para circuitos de transmisiones radiofónicas)</i>	Rep. 493	§ 3	An. Vol. XII
<b>trans-horizon propagation</b> <i>F: propagation transhorizon</i> <i>S: propagación transhorizonte</i>	Rec. 310 Rec. 573	No. C25 No. G16	V XIII
<b>trans-horizon radio-relay system</b> <i>F: faisceau hertzien transhorizon</i> <i>S: sistema de relevadores radioeléctricos transhorizonte</i>	Rec. 592 Rec. 573	§ 2 No. A23	IX-1 XIII
<b>trans-ionospheric propagation</b> <i>F: propagation transionosphérique</i> <i>S: propagación transionosférica</i>	Rec. 573	No. G24	XIII
<b>transmission</b> <i>F: transmission</i> <i>S: transmisión</i>	Rec. 662	Ap. II, No. 1.03	XIII
<b>transmission bit slip</b> <i>F: glissement de bits</i> <i>S: deslizamiento de bits en la transmisión</i>	Rep. 967	§ 5	An. Vol. XII
<b>(transmission) channel</b> <i>F: voie (de transmission)</i> <i>S: canal (de transmisión)</i>	Rec. 662	Ap. II, No. 2.01	XIII
<b>transmission channel</b> see: channel, circuit			
<b>transmission loss (of a radio link)</b> <i>F: affaiblissement de transmission (d'une liaison radioélectrique)</i> <i>S: pérdida de transmisión (de un enlace radioeléctrico)</i>	Rec. 341 Rec. 573	§ 3 No. A43	V XIII
<b>transmission path</b> <i>F: trajet de transmission</i> <i>S: trayecto de transmisión</i>	Rec. 662	Ap. II, No. 2.14	XIII
<b>transmitter</b> see: (radio) transmitter			

**troposphere***F: troposphère**S: troposfera***tropospheric propagation***F: propagation troposphérique**S: propagación troposférica***tropospheric radioduct***F: conduit troposphérique, guide troposphérique**S: conducto troposférico***tropospheric-scatter propagation***F: propagation par diffusion troposphérique**S: propagación por dispersión troposférica***U****uncertainty***F: incertitude**S: incertidumbre***uncertainty**

see: accuracy, precision

**uncontrolled slip***F: glissement non maîtrisable**S: deslizamiento no controlado***unidirectional***F: unilatéral, unidirectionnel, simplex (déconseillé)**S: unilateral, unidireccional***Universal Time (UT)***F: temps universel (UT)**S: Tiempo Universal (UT)***unperturbed orbit (of a satellite)***F: orbite non perturbée (d'un satellite)**S: órbita no perturbada (de un satélite)***unwanted emissions***F: rayonnements non désirés**S: emisiones no deseadas***up link**

see: satellite link

**usable field strength ( $E_u$ )***F: champ utilisable ( $E_u$ )**S: intensidad de campo utilizable ( $E_u$ )***usable field strength**see: minimum usable field strength ( $E_{min}$ ), reference usable field strength ( $E_{min}$ )**usable power flux-density ( $P_u$ )***F: puissance surfacique utilisable ( $P_u$ )**S: densidad espectral de potencia utilizable ( $P_u$ )***usable power flux-density**see: minimum usable power flux-density ( $P_{min}$ ), reference usable power flux-density ( $P_{ref}$ )**UTC**

see: Coordinated Universal Time

**V****vertical directivity pattern***F: diagramme de directivité vertical**S: diagrama de directividad vertical***vestigial sideband (VSB)***F: bande latérale résiduelle (BLR)**S: banda lateral residual (BLR)***vestigial-sideband emission***F: émission à bande latérale résiduelle**S: emisión con banda lateral residual***video conference***F: visioconférence, vidéoconférence**S: video conferencia*

Rec. 310	No. C1	V
Rec. 573	No. G13	XIII
Rec. 573	No. 614	XIII
Rec. 310	No. C18	V
Rec. 573	No. G17	XIII
Rec. 310	No. C26	V
Rec. 573	No. G19	XIII
Rec. 686		VII
Rep. 967	§ 5.1	An. Vol. XII
Rec. 662	Ap. II, No. 3.20	XIII
Rec. 686		VII
Rec. 460	An. I, § A	VII
Rec. 573	No. J05	XIII
Rec. 673	An.	IV-1
Rec. 328	§ 1.8	I
Rec. 573	No. C05	XIII
Rec. 573	No. A31a	XIII
Rec. 573	No. F32	XIII
Rec. 638	§ 2.2	X-1
Rec. 573	No. F32	XIII
Rec. 573	No. E06b	XIII
Rec. 573	No. D08a	XIII
Rec. 573	No. D08	XIII
Rec. 662	Ap. II No. 1.27	XIII

**video-frequency (VF) protection ratio***F: rapport de protection en vidéofréquence (VF)**S: relación de protección en videofrecuencia (VF)***video-frequency (VF) signal-to-interference ratio***F: rapport signal/brouillage en vidéofréquence (VF)**S: relación señal/interferencia en videofrecuencia (VF)***videography***F: vidéographie**S: videografía***videography**

see: broadcast videography, teletext, videotex; interactive videography

**videophony***F: visiophonie; vidéophonie (terme déconseillé dans ce sens)**S: videofonía***videophony**

see: still-picture videophony

**videotex, interactive videography***F: vidéotex, vidéographie interactive**S: videotex, videografía interactiva***visible arc***F: arc de visibilité**S: arco visible***W****wave**

see: ground wave; hertzian waves, radio waves; ionospheric wave; radio waves, hertzian waves

**way (operation mode call)**— **one way***F: à sens unique**S: sentido único*— **both way***F: à double sens**S: doble sentido***whistler mode propagation***F: propagation (ionosphérique) suivant le mode des sifflements**S: propagación (ionosférica) según el «modo de silbidos»***width of the effective overall noise band***F: largeur de bande effective globale de bruit**S: anchura de banda efectiva global de ruido***worst month***F: mois le plus défavorable**S: mes más desfavorable***X****x dB bandwidth***F: largeur de bande «à x dB» (d'un signal)**S: anchura de banda entre puntos a «x dB»*

*	Rec. 573	No. F22 (Note 3)	XIII
*	Rec. 573	No. F21 (Note 1)	XIII
	Rec. 662	Ap. II, No. 1.19	XIII
	Rec. 662	Ap. II, No. 1.23	XIII
	Rec. 662	Ap. II, No. 1.21	XIII
	Rec. 673 Rec. 573	An. No. H23	IV-1 XIII
	Rec. 662	Ap. II, Nos. 3.22, 3.23	XIII
*	Rep. 262	§ 1 and 2	An. Vol. VI
*	Rec. 331	§ 3	I
*	Rep. 723		An. Vol. V
	Rec. 328 Rec. 662	§ 1.14 Ap. II, No. 4.04	I XIII



## RECOMMENDATION 662-1

## TERMS AND DEFINITIONS

(1986-1990)

The CCIR,

## CONSIDERING

- (a) that it is desirable to have, in addition to specific terminology texts produced by Study Groups, definitions of the general technical terms used in CCIR texts;
- (b) that the CCIR is cooperating with the International Electrotechnical Commission (IEC) in the production of the International Electrotechnical Vocabulary (IEV) (see Resolution 113),

## UNANIMOUSLY RECOMMENDS

1. that administrations and recognized private operating agencies who are members of the CCIR, as well as the CCIR Secretariat, should use as far as possible, technical terms in the field of telecommunications with the meaning given in the IEV, the plan of which is given in Appendix I to this Recommendation;
2. that general terms common to several Study Groups should be used with the meaning given in Appendix II to this Recommendation, which is generally close to the meaning given in the IEV but adapted for CCIR needs.

*Note* — The definitions given in the IEV Chapters, like those included in Appendix II, are of a general nature; their purpose is that all Study Groups should use general terms with the same meaning. In certain cases they may be slightly different from more complete definitions prepared, or being prepared, by some Study Groups for their specific needs, but they are not in contradiction with the latter.

These definitions do not replace definitions contained in CCIR or CCITT Recommendations (or in the Radio Regulations, the International Telecommunication Regulations or the ITU Convention or Constitution) which are to be used in their respective fields of application.

## APPENDIX I

“TELECOMMUNICATIONS” CHAPTERS OF THE  
INTERNATIONAL ELECTROTECHNICAL VOCABULARY (IEV)

The IEV is IEC Publication No. 50; it comprises a great number of chapters, published in separate fascicles. Chapters of the 700 series deal with telecommunications and are prepared by Joint Working Groups, in which CCI experts take part, coordinated by the JCG.

The series 700 chapters which are dealt with by Joint Working Groups are as follows:

Chapters and Sections	Status in 1990
<p>701 – <i>Telecommunications, channels and networks</i></p> <p>1 – Forms of telecommunications</p> <p>2 – Channels, circuits and networks</p> <p>3 – Use and operation of circuits and networks</p>	Published in 1988
<p>702 – <i>Oscillations, signals and related devices</i></p> <p>1 – Frequencies</p> <p>2 – Oscillations and waves</p> <p>3 – Pulses</p> <p>4 – Signals; general terms</p> <p>5 – Discrete signals and digital signals; coding</p> <p>6 – Modulation and demodulation</p> <p>7 – Noise and interference</p> <p>8 – Transmission characteristics and performance; distortion</p> <p>9 – Linear and non-linear networks and devices</p>	Being published
<p>704 – <i>Transmission</i></p> <p>1 to 8 – General aspects of transmission</p> <p>9 to 12 – Analogue transmission</p> <p>13 to 15 – Time division multiplexing</p> <p>16 to 21 – Digital transmission</p> <p>22 to 26 – Pulse code modulation</p>	Being published
<p>705 – <i>Radio waves propagation</i></p> <p>1 – Essential characteristics of electromagnetic fields and waves</p> <p>2 – Radiation, paths and velocity of electromagnetic waves</p> <p>3 – Electromagnetic properties of propagation media</p> <p>4 – Phenomena related to boundaries of propagation media</p> <p>5 – Tropospheric propagation and effects of the ground</p> <p>6 – Terrestrial ionized media</p> <p>7 – Effects of the ionosphere on radio wave propagation</p> <p>8 – Influence of propagation on radiocommunications</p>	Being published
<p>712 – <i>Antennas</i></p> <p>1 – Basic terms for antennas and antennas assemblies</p> <p>2 – Electrical or radiating characteristics of antenna</p> <p>3 – Types of antennas defined by their electrical or radiating characteristics</p> <p>4 – Antennas and antenna elements consisting mainly of radiating conductors</p> <p>5 – Antennas and antenna elements consisting mainly of radiating surfaces and apertures</p> <p>6 – Devices associated with antennas</p>	Being published
<p>713 – <i>Radiocommunications: transmitters, receivers, networks and operation</i></p> <p>1 – Basic terms</p> <p>2 – Mobile radiocommunications</p> <p>3 – Radiodetermination and radionavigation</p> <p>4 – Other types of radiocommunication</p> <p>5 – Frequencies and channels</p> <p>6 – Signal processing</p> <p>7 – Transmitters and transmitters-receivers</p> <p>8 – Transmission characteristics</p> <p>9 – Radio reception</p> <p>10 – Radio-frequency noise and interference</p> <p>11 – Receiver characteristics</p> <p>12 – Radio-frequency networks and operation</p>	First draft sent for observations
<p>714 – <i>Switching and signalling (in telecommunications)</i></p> <p>01 – General terms</p> <p>02 to 05 – Switching functions and techniques</p> <p>06 to 14 – Signalling functions and techniques</p> <p>15 and 16 – Control functions and techniques</p> <p>17 to 20 – Equipment and hardware</p> <p>21 to 24 – Executive software</p>	Being published

Chapters and Sections	Status in 1990
<p>715 — <i>Telecommunication networks, teletraffic and operation</i></p> <ul style="list-style-type: none"> <li>1 — Basic terms</li> <li>2 — Resources</li> <li>3 — Calls</li> <li>4 — Times and delays</li> <li>5 — Traffic</li> <li>6 — Circuit groups</li> <li>7 — Traffic engineering</li> <li>8 — Networks</li> <li>9 — Circuit switched networks</li> <li>10 — Message switched networks</li> <li>11 — Packet switched networks</li> </ul>	Being published
<p>716 — <i>Integrated services digital networks</i></p> <ul style="list-style-type: none"> <li>1 — Basic terms on ISDNs</li> <li>2 — Services</li> <li>3 — Networks</li> <li>4 — Access</li> <li>5 — Wideband ISDN</li> </ul>	<p>Being approved</p> <p>Being prepared</p>
<p>720 — <i>Telematics</i></p> <ul style="list-style-type: none"> <li>0 — General</li> <li>1 — Security, information protection</li> <li>2 — Voice telematic services</li> <li>3 — Facsimile, telefax</li> <li>4 — Videotex, teletext</li> <li>5 — Electronic funds transfer</li> <li>6 — Message handling systems, electronic mail, directory services</li> <li>7 — Value-added networks</li> <li>8 — Local area networks</li> <li>9 — Teleaction services</li> </ul>	Being prepared
<p>721 — <i>Telegraphy and data communication</i></p> <ul style="list-style-type: none"> <li>01 — Forms of telecommunications using discrete signals</li> <li>02 to 08 — Discrete signals and transmission using discrete signals</li> <li>09 to 12 — Telegraphy and data communication</li> <li>13 to 15 — Facsimile</li> <li>16 to 19 — Telegraph and data networks, switching, operation and sources</li> </ul>	Being published
<p>722 — <i>Telephony</i></p> <ul style="list-style-type: none"> <li>1 — General terms</li> <li>2 — Telephone set components</li> <li>3 — Telephone set feeding and signalling</li> <li>4 — Telephone set types</li> <li>5 — Telephone set accessories</li> <li>6 — Telephone networks</li> <li>7 — Telephone exchanges</li> <li>8 — Private telephone systems</li> <li>10 — Telephone calls description</li> <li>12 — Local line networks</li> <li>13 — Telephone station usage</li> <li>15 — Transmission performance</li> <li>16 — Measuring apparatus</li> <li>17 — Telephonometry</li> <li>9, 11, 14 (services, operation)</li> </ul>	<p>Being published</p> <p>Waiting</p>

Chapters and Sections	Status in 1990
<p>723 – <i>Broadcasting services: sound broadcasting and television</i></p> <ul style="list-style-type: none"> <li>1 – General terms</li> <li>2 – Common sound/television broadcasting terms</li> <li>3 – Sound broadcasting</li> <li>4 – Television: General terms</li> <li>5 – Television: Picture analysis and display video signals</li> <li>6 – Picture quality and impairment</li> <li>7 – Equipment devices used in television</li> <li>8 – Specific terms for colour television systems</li> <li>9 – Cable distribution system</li> </ul>	Being published
<p>725 – <i>Space radiocommunications</i></p> <ul style="list-style-type: none"> <li>1 – Satellites, spacecraft and orbits</li> <li>2 – Space radiocommunication systems</li> <li>3 – Antennas and beams</li> <li>4 – Transmission</li> </ul>	<p>Published in 1982 (Sections 1 and 2)</p> <p>Being revised</p> <p>Being approved</p>
<p>726 – <i>Transmission lines and waveguides</i></p> <ul style="list-style-type: none"> <li>01 – Transmission line, waveguide and cavity resonator configurations</li> <li>02 to 07 – Propagation in transmission lines and waveguides</li> <li>08 to 10 – Waveguide connections</li> <li>11 to 15 – Waveguide components</li> <li>16 to 18 – Non-reciprocal effects and devices</li> <li>19 to 21 – Measurements on transmission lines</li> </ul>	Published in 1982 (partial revision to be undertaken)
<p>731 – <i>Optical fibre communication</i></p> <ul style="list-style-type: none"> <li>1 – General concepts</li> <li>2 – Fibre construction and optical characteristics</li> <li>3 – Propagation characteristics</li> <li>4 – Cables</li> <li>5 – Connectors and couplers etc.</li> <li>6 – Optical sources and detectors</li> <li>7 – Measurement techniques</li> <li>8 – Systems</li> </ul>	Being published
<p>161* – <i>Electromagnetic compatibility</i></p> <ul style="list-style-type: none"> <li>1 – Basic concepts</li> <li>2 – Waveforms</li> <li>3 – Interference control related terms</li> <li>4 – Measurements</li> <li>5 – Equipment classification</li> <li>6 – Receiver and transmitter terms</li> <li>7 – Power control and network impedances</li> <li>8 – Voltage changes and flicker</li> </ul>	Being published
<p>191** – <i>Reliability, maintainability and quality of service</i></p> <ul style="list-style-type: none"> <li>1 – Dependability – Common terms</li> <li>2 – Quality of service in telecommunications</li> </ul>	Being published

\* This Chapter has not been prepared under the responsibility of the JCG, but representatives of the JCG participated in the Working Group.

\*\* Although prepared by a Working Group of the JCG, in collaboration with TC 56 of the IEC, this Chapter is included in the IEC 100 Series (Basic terms).

## APPENDIX II

## GENERAL TERMINOLOGY OF TELECOMMUNICATIONS

(Terms common to the CCIR and the CCITT)

In order to assure that telecommunication terms employed by the CCIs have the same meaning, the general terms used in the texts of different Study Groups together with their definitions, have been collected together.

The terms and definitions in this Appendix have been arranged according to subject as follows:

1. Forms of telecommunications.
2. Channels, circuits and networks.
3. Use and operation of circuits and networks.
4. Frequencies and bandwidths.
5. Oscillations and waves.

Administrations and Study Groups are invited to comment on these terms and definitions, and particularly, to forward to CCV their proposals for revision or for alternative applications, accompanied by appropriate justifications.

When examining these definitions, it should be borne in mind that Recommendation 573 on radiocommunication vocabulary contains terms relating more specifically to the CCIR.

The following Notes should also be taken into account:

*Note 1* — Definitions of "forms of telecommunication" have been produced in cooperation with the CCI-IEC Joint Coordination Group on Vocabulary (JCG), to be used by CCIR and CCITT Study Groups.

These definitions of "forms of telecommunication" are of a general nature and are not in contradiction with definitions of services presently specified by the CCITT and CCIR. Definitions of services are produced by the Study Group responsible for these services (mainly CCITT Study Groups I and II for telecommunication services and CCIR Study Groups 10 and 11 for broadcasting services).

*Note 2* — A number of terms in the Recommendation appear also in Article 1 of the Radio Regulations with a different definition. These terms are identified by (RR . . . , MOD). Modifications are proposed for two reasons:

- (a) Some Radio Regulations definitions only take into account regulatory aspects, while the proposed definitions are of a technical nature;
- (b) Some Radio Regulations definitions give rise to difficulties of interpretation, in these cases the proposed modifications or additions may be useful later for draft revisions of the Radio Regulations definitions in accordance with Recommendation No. 72 of WARC-79.

For regulatory applications, only the terms and definitions in the Radio Regulations may be used.

*Note 3* — Terms and definitions relating to the quality of service have not been included in this Recommendation because they usually have rather specific applications. However, the introduction to CCITT Recommendation E.800 which contains some general information on all services, is given in Annex I to this Appendix.

## 1. FORMS OF TELECOMMUNICATIONS

### 1.01 **information**; *information*; *información*

Intelligence or knowledge capable of being represented in forms suitable for communication, storage or processing.

*Note* — Information may be represented for example by signs, symbols, pictures or sounds.

### 1.02 **signal**; *signal*; *señal*

A physical phenomenon one or more of whose characteristics may vary to represent information.

*Note* — The physical phenomenon may be for instance an electromagnetic wave or acoustic wave and the characteristic may be an electric field, a voltage or a sound pressure.

1.03 **transmission**; *transmission*; *transmisión*

The transfer of information from one point to one or more other points by means of signals.

*Note 1* — Transmission can be effected directly or indirectly, with or without intermediate storage.

*Note 2* — The use of the English word “transmission” in the sense of “emission” in radiocommunication and of “sending” is deprecated.

1.04 **sending** (in telecommunication), **transmission** (deprecated in this sense); *émission* (*en télécommunication*); *emisión* (*en telecomunicación*)

The production of a signal at an input port of a transmission line or into a transmission medium.

*Note* — In French the term “émission” has other meanings in radiocommunications, as given in Recommendation 573.

1.05 **communication**; *communication*; *comunicación*

Information transfer according to agreed conventions.

*Note* — In French and Spanish the corresponding terms “communication” and “comunicación” have additional specific meanings in telecommunications (see 3.05 and 3.02).

1.06 **telecommunication**; *télécommunication*; *telecomunicación*

Communication by wire, radio, optical or other electromagnetic systems.

*Note* — The following definition is given in the International Telecommunication Convention (Nairobi, 1982)\* (and RR 4):

Any transmission, emission or reception of signs, signal, writing, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems.

1.07 **telephony**; *téléphonie*; *telefonía*

A form of telecommunication primarily intended for the exchange of information in the form of speech.

*Note* — This is the definition given in the International Telecommunication Convention (Nairobi, 1982)\* (RR 117, MOD).

1.08 **telegraphy**; *télégraphie*; *telegrafia*

A form of telecommunication in which the transmitted information is intended to be recorded on arrival as a graphic document; the transmitted information may sometimes be presented in an alternative form or may be stored for subsequent use.

*Note 1* — A graphic document records information in a permanent form and is capable of being filed and consulted; for example, it may take the form of written or printed matter or a fixed image.

*Note 2* — This is the definition given in the International Telecommunication Convention (Nairobi, 1982)\* (RR 111, MOD).

*Note 3* — Telegraph does not include television or videography.

*Note 4* — Moreover, in the Convention and the RR, the following restriction is given:

“For the purpose of the Radio Regulations, unless otherwise specified therein, telegraphy shall mean a form of telecommunication for the transmission of written matter by the use of a signal code” (RR 111, extract).

1.09 **telex (service)**; (*service*) *télex*; (*servicio*) *télex*

A telegraph service enabling subscribers to communicate directly and temporarily with each other by means of start-stop apparatus and telecommunication circuits of the public telecommunication network.

1.10 **facsimile**; *télécopie*; *facsimil*, *fax*

A form of telecommunication for the reproduction at a distance of graphic documents in the form of other graphic documents geometrically similar to the original.

\* Constitution of the International Telecommunication Union (Nice, 1989).

1.11 **telewriting**; *téléécriture; teleescritura*

A form of telecommunication for the purpose of transmitting graphical information as it is being manually written or drawn and for simultaneously generating a reproduction at the distant terminal either on a screen or in some other form.

*Note* — In cases where the reproduction at the receiving end is in the form of a graphic document, the term “téléautographie” can be employed in French.

1.12 **data**; *données; datos*

Information represented in a manner suitable for automatic processing.

1.13 **data communication, data transmission** (deprecated in this sense); *communication de données, transmission de données* (deprecated in this sense); *comunicación de datos, transmisión de datos* (deprecated in this sense)

A form of telecommunication intended for the transfer of information between data processing equipments.

1.14 **data transmission**; *transmission de données; transmisión de datos*

The conveying of data from one place to another by telecommunication.

*Note* — The term “data transmission” is deprecated in the sense of “data communication”.

1.15 **teleprocessing, teleinformatics**; *téléinformatique, télétraitement; teleinformática, teleproceso*

The association of telecommunication and data processing techniques to process information at a distance.

1.16 **television**; *télévision; televisión*

A form of telecommunication for the transmission of signals representing scenes; images of the scenes being reproduced on a screen as they are received.

*Note 1* — The received signals may be stored for subsequent display of the images on a screen.

*Note 2* — This form of telecommunication finds major application in television broadcasting and the word “television” is often used without qualification to describe this application. The same technique is also used for industrial, scientific, medical and other applications; such applications are often referred to as “closed-circuit television”.

1.17 **still-picture television (SPTV)**; *télévision à images fixes; televisión de imágenes fijas*

Television in which the time interval between a displayed picture and the display of either an updated version of the same picture, or a new picture forming part of a sequence, exceeds (generally by an appreciable factor) the usual time interval between pictures.

*Note* — The question as to whether still-picture television includes certain modes in teletext, broadcast videography (see 1.20), is still under study.

1.18 **telematics (services)**; *télématique (services de); telemática (servicios de)*

Telecommunication services supplementing conventional telegraphic or telephonic services, generally using teleprocessing techniques to permit a user to receive or send public or private information, or to effect operations such as file consultation, reservations, commercial or banking transactions.

Examples of telematics services: facsimile, teletex, videography, telewriting.

*Note* — Telematics services do not include broadcasting of sound or television program.

1.19 **videography**; *vidéographie; videografía*

A form of telecommunication in which information generally, in the form of digital data, is transmitted primarily in order to permit the selection and display of textual or pictorial information to a user on a visual display unit, for instance on the screen of a television receiver.

*Note* — The teletext service and various forms of telegraphy are not forms of videography.

1.20 **teletext, broadcast videography**; *vidéographie diffusée, télétexte; videografía radiodifundida, teletexto*

Videography in which information is broadcast utilizing the means of transmission used for normal television broadcasting and the desired part of this information may be selected by any user having suitable equipment.

*Note 1* — Information may be transmitted simultaneously with normal television pictures.

*Note 2* — The terms "teletext" and "teletex" refer to two different concepts.

*Note by Secretariat* — In Report 802, § 3.1, CCIR Study Group 11 has provided the following definition for a teletext service:

"A digital data broadcasting service which may be transmitted either within the structure of an analogue television signal or by using digital modulation systems. The service is primarily intended to display text or pictorial material in two-dimensional form reconstructed from coded data on the screens of suitably equipped television receivers."

1.21 **videotex, interactive videography**; *vidéotex, vidéographie interactive; videotex, videografía interactiva*

Videography in which a telecommunication network is used for transmission of the user's requirements as well as the answers to his requests.

1.22 **teletex (service)**; *(service) télétext; (servicio) teletex*

A telematics service for text transmission offering additional facilities to the telex service, in particular further typewriter functions and remote text processing facilities.

*Note* — The terms "teletex" and "teletext" refer to two different concepts.

1.23 **video-telephony, viewphone, visual telephone**; *visiophonie, vidéophonie (deprecated); videofonía, videotelefonía*

An association of telephone and television techniques which allows users to see each other during their telephone conversation.

1.24 **still-picture video-telephony**; *visiophonie à images fixes; videofonía de imágenes fijas*

Video-telephony in which the time interval between a displayed picture and the display of either an updated version of the same picture, or a new picture forming part of a sequence, exceeds (generally by an appreciable factor) the usual time interval between pictures.

1.25 **teleconference**; *téléconférence; teleconferencia*

A conference between more than two participants located in two or more different places and utilizing telecommunication facilities.

1.26 **audioconference**; *audioconférence; audioconferencia*

A teleconference in which participants are connected by telephone circuits; the transmission of other signals such as facsimile or telewriting signals may be possible in addition to speech signals.

1.27 **videoconference**; *visioconférence vidéoconférence; videoconferencia*

A teleconference in which participants are connected by television circuits providing for the transmission of animated images in addition to that of speech and graphic documents.

1.28 **telemetry, telemetering**; *télémessure; telemidida*

A process in which measurements are made at some remote location and the results are transmitted by telecommunication.

1.29 **telecommand**; *télécommande; telemando*

The transmission of signals to initiate, modify or terminate functions of distant equipment.

1.30 **telecontrol**; *téléconduite; telecontrol*

The control of operational equipment at a distance using a combination of telemetry and telecommand.



1.31 **teleguidance ; téléguidage ; teleguiage**

The guidance and control of distant mobile craft by telecommunication.

1.32 **telemonitoring ; télésurveillance ; telesupervisión**

The observation at a distance by telecommunication of industrial processes, operational equipment, natural phenomena or individuals.

1.33 **remote alarm ; téléalarme ; telealarma**

The alerting of a central point by telecommunication to the occurrence of an unwanted situation or event.

1.34 **broadcasting ; télédiffusion ; teledifusión**

A form of unidirectional telecommunication intended for a large number of users having appropriate receiving facilities, and carried out by means of radio or by cable networks.

*Note* — In English, it should be assumed that “broadcasting by radio waves” is intended where the word “broadcasting” is used without qualification, unless the context indicates the contrary.

*Examples:* Sound broadcasting or television broadcasting, teletext, the distribution of time signals and navigational warnings, the distribution of news from press agencies.

1.35 **broadcasting (service) ; radiodiffusion ; radiodifusión**

Radiocommunication in which transmissions are intended for direct reception by the general public; these may include sound transmissions, television transmissions and other types of transmission.

*Note* — By common usage in French and Spanish the meaning of “radiodiffusion” and “radiodifusión” is frequently restricted to “sound broadcasting”.

1.36 **sound broadcasting (service) ; radiodiffusion sonore ; radiodifusión sonora**

A broadcasting service limited to sound programmes.

1.37 **television broadcasting (service) ; radiodiffusion visuelle, (radiodiffusion de) télévision ; (radiodifusión de) televisión**

A broadcasting service of visual programmes with associated sounds.

1.38 **cabled distribution ; télédistribution, câblodistribution (Canada) ; distribución por cable**

A form of telecommunication for the distribution of television or sound programmes over networks of cables to a number of users.

*Note* — Some systems may transmit other signals and provide return channels.

## 2. CHANNELS, CIRCUITS AND NETWORKS

2.01 **(transmission) channel ; voie (de transmission) ; canal (de transmisión)**

A means of transmission of signals in one direction between two points.

*Note 1* — Several channels may share a common path; for example each channel is allocated a particular frequency band or a particular time slot.

*Note 2* — In some countries the term “communication channel” or its abbreviation “channel” is also used to mean “telecommunication circuit”, i.e. to encompass the two directions of transmission. This usage is deprecated.

*Note 3* — A transmission channel may be qualified by the nature of the transmitted signals, or by its bandwidth, or by its digit rate; for example: telephone channel, telegraph channel, data channel, 10 MHz channel, 34 Mbit/s channel.

2.02 **telephone-type channel ; voie de type téléphonique ; canal de tipo telefónico**

A transmission channel suitable for the transmission of speech but which is used for the transmission of other signals.

2.03 **(telecommunication) circuit**; *circuit (de télécommunication); circuito (de telecomunicación)*

A combination of two transmission channels, permitting transmission, in both directions between two points, of the signals exchanged between the same terminals.

*Note 1* — If the telecommunication is by nature unidirectional, e.g. long-distance television transmission, the term “circuit” is sometimes used to designate the single transmission channel providing the facility, but this usage is deprecated.

*Note 2* — A telecommunication circuit may be qualified by the nature or characteristics of the transmitted signals; for example: telephone circuit, telegraph circuit, data circuit, digital circuit.

*Note 3* — Such characteristics of the transmission channels as bandwidth, digit rate, may be different in the two directions of transmission.

*Note 4* — In telephony, usage of the term “telephone circuit” is generally limited to a telecommunication circuit directly connecting two switching centres.

2.04 **telephone-type circuit**; *circuit de type téléphonique; circuito de tipo telefónico*

A pair of associated telephone-type channels permitting transmission in both directions between two points.

2.05 **(frequency) channel**; *canal (de fréquences); canal (de frecuencias)*

Part of the frequency spectrum intended to be used for the transmission of signals and which may be defined by two specified limits, or by its centre frequency and the associated bandwidth, or by any equivalent indication.

*Note 1* — A frequency channel may be time-shared in order to allow communication in both directions by simplex operation.

*Note 2* — The use of the term “channel” to mean “telecommunication circuit” is deprecated.

*Note 3* — The term “radio-frequency channel” used in radiocommunication is defined in Recommendation 573.

2.06 **link**; *liaison; enlace*

A means of telecommunication with specified characteristics between two points.

*Note* — The type of the transmission path or the capacity is normally indicated, e.g. radio link, coaxial link, broadband link.

2.07 **point-to-point communication**; *communication point à point; comunicación punto a punto*

Communication provided by a link, for example, a radio-relay link between two stations located at specified fixed points.

2.08 **point-to-multipoint communication**; *communication point à multipoint; comunicación punto a multipunto*

Communication provided by links, for example, radio-relay links between a single station located at a specified fixed point and a number of stations located at specified fixed points.

2.09 **point-to-area communication**; \* *communication point à zone; comunicación punto a zona*

Communication provided by links between a station located at a specified fixed point and any number of stations located at non-specified points in a given area which is the *coverage area* of the station located at the fixed point.

*Note* — When point-to-area communication involves unidirectional links from a single fixed point to a number of points, this type of communication is commonly referred to as “broadcasting” (see 1.34).

2.10 **telecommunication network, telecommunication system** (United States of America); *réseau de télécommunication; red de telecomunicación*

All the means of providing telecommunication services between a number of locations where equipment provides access to these services.

\* This type of communication, which is mainly used by broadcast and mobile services, is included here for comparison with terms 2.07 and 2.08.

2.11 **(telecommunication) terminal**; *terminal (de télécommunication); terminal (de telecomunicación)*

An equipment connected to a telecommunication network to provide access to one or more specific services.

*Note* — The term may be qualified to indicate the type of service or user, e.g. “data terminal”, “subscriber’s terminal”.

2.12 **subscriber’s line, subscriber loop**; *ligne d’abonné, ligne de rattachement; línea de abonado, bucle de abonado*

A link between equipment in a subscriber’s premises and the telecommunication centre providing the required services.

2.13 **port (of a network)**; *accès (d’un réseau), porte* (term not to be used in this sense); *puerta (de una red)*

A termination through which signals can enter or leave a network.

2.14 **transmission path**; *trajet de transmission; trayecto de transmisión*

The course taken by a signal during its transmission between two points.

2.15 **interface**; *interface; interfaz*

A boundary between two systems or between two parts of the same system, defined by the specification of suitable characteristics, usually for the purpose of ensuring format, function, signal and interconnection compatibility at the boundary.

*Note* — An interface may be defined, for example, at a plug and socket connection, at the aperture of an antenna or between layers of a hierarchical system.

2.16 \* **distribution link**; *liaison de distribution; enlace de distribución*

A link for the transmission of sound or television broadcasting programmes to the users, generally from a programme production centre, when no further post-production processing is intended.

2.17 \* **primary distribution link**; *liaison de distribution primaire; enlace de distribución primaria*

The part of a distribution link from a programme production centre to either a broadcast transmitting centre or the head-end of a cabled distribution network.

2.18 \* **secondary distribution link**; *liaison de distribution secondaire; enlace de distribución secundaria*

The part of a distribution link from the head-end of a cabled distribution network to the users.

2.19 \* **contribution link**; *liaison de contribution; enlace de contribución*

A link for the transmission of sound or television broadcasting signals to a programme production centre.

### 3. USE AND OPERATION OF CIRCUITS AND NETWORKS

3.01 **connection**; *chaîne de connexion; cadena de conexión*

A temporary association of transmission channels or telecommunication circuits, switching and other functional units set up to provide for the transfer of information between two or more points in a telecommunication network.

\* Draft definitions of the terms “distribution”, “primary distribution”, “secondary distribution” and “contribution” are been studied within CMTT, in conjunction with the other Study Groups concerned.

- 3.02 **(complete) connection**; *chaîne de connexion complète, (chemin de) communication; cadena de conexión completa, (camino de) comunicación*

A connection between users' terminals.

*Note* — In French and in Spanish, the terms “communication” and “comunicación”, have also a more general meaning (see 1.05).

- 3.03 **switching** (in telecommunication); *commutation (en télécommunication); conmutación (en telecomunicación)*

The process of temporarily associating functional units, transmission channels or telecommunication circuits for the purpose of providing a desired telecommunication facility.

- 3.04 **call attempt** (by a user); *(tentative d') appel (par un usager); (tentativa de) llamada (por un usuario)*

A single sequence of operations made by a user of a telecommunication network trying to obtain the desired user, terminal or service.

*Note* — This definition differs slightly from the definition of the same term which appears in CCITT Recommendation P.10 (§ 21 — Telephone calls description).

- 3.05 **call**; *communication; comunicación*

The establishment and use of a complete connection, following a call attempt.

*Note* — In French and in Spanish, the terms “communication” and “comunicación”, have also a more general meaning (see 1.05).

- 3.06 **conversation** (in telecommunication); *conversation (en télécommunication); conversación (en telecomunicación)*

An exchange of information between terminals.

- 3.07 **code**; *code; código*

A system of rules defining a one-to-one correspondence between information and its representation by characters, symbols or signal elements.

- 3.08 **modulation**; *modulation; modulación*

A process by which a quantity which characterizes an oscillation or wave follows the variations of a signal or of another oscillation or wave.

*Note* — Modulation may be intentional or unintentional.

- 3.09 **carrier**; *porteuse; portadora*

An oscillation or wave, usually periodic, some characteristic of which is intended to be constrained by modulation to follow the values of a signal or of another oscillation.

- 3.10 **carrier (component)**; *(composante) porteuse; portadora (composante)*

In a modulated oscillation or wave, the spectral component having the frequency of the periodic oscillation or wave prior to modulation.

- 3.11 **multiplexing**; *multiplexage; multiplexación*

A reversible process for assembling signals from several separate sources into a single composite signal for transmission over a common transmission channel; this process is equivalent to dividing the common channel into distinct channels for transmitting independent signals in the same direction.

- 3.12 **demultiplexing**; *démultiplexage; demultiplexación*

A process applied to a composite signal formed by multiplexing, for recovering the original independent signals or groups of these signals.

*Note* — Demultiplexing may be partial, for instance for extracting a group from a supergroup of telephony channels.

- 3.13 **multiple access**; *accès multiple; acceso múltiple*

Any technique whereby a number of terminals are able to share the transmission capacity of a link in a predetermined manner or in accordance with traffic demand.

3.14 **space division**; *répartition spatiale; división espacial*

A technique whereby a separate individual transmission path is used for each transmission channel for example in multiplexing, switching or multiple access operations.

3.15 **time division**; *répartition temporelle; división en el tiempo*

A technique whereby a separate distinct recurrent time interval is used for each transmission channel, for example in multiplexing, switching or multiple access operations.

3.16 **frequency division**; *répartition en fréquence, répartition fréquentielle; división en frecuencia*

A technique whereby a separate distinct frequency band is used for each transmission channel, for example in multiplexing, switching or multiple access operations.

3.17 **code division**; *répartition en code; división por código*

A technique whereby orthogonal signals are used to provide distinct transmission channels, for example in multiplexing, switching or multiple access operations; such signals being distinguishable even when they share the same frequency bands and the same time intervals.

3.18 **simplex, half duplex** (deprecated); *simplex, à l'alternat, semi-duplex* (deprecated in this sense); *simplex, semiduplex*

Designating or pertaining to a method of operation in which information can be transmitted in either direction, but not simultaneously, between two points.

3.19 **duplex, full duplex** (deprecated); *duplex, bilatéral simultané; dúplex*

Designating or pertaining to a mode of operation by which information can be transmitted in both directions simultaneously between two points.

3.20 **unidirectional**; *unilatéral, unidirectionnel, simplex* (term deprecated in this sense); *unidireccional, unilateral*

Pertaining to a link where the transfer of users' information is possible in one preassigned direction only.

*Note* — This term should not be used to describe the direction of call set-ups.

3.21 **bidirectional**; *bilatéral, bidirectionnel, duplex* (term deprecated in this sense); *bidireccional, bilateral*

Pertaining to a link where the transfer of users' information is possible simultaneously in both directions between two points.

*Note 1* — The transmission channel capacity and signalling rate are not necessarily the same in both directions.

*Note 2* — This term should not be used to describe the directions of call set-ups.

3.22 **one way**; *à sens unique, spécialisé* (term deprecated in this sense); *de sentido único*

Pertaining to an operational mode in which the call set-ups always occur in one direction.

*Note* — This term should not be used to describe the direction of transfer of users' information.

3.23 **both-way**; *à double sens, mixte; de doble sentido*

Pertaining to an operational mode in which the call set-ups occur in both directions.

*Note 1* — The amount of traffic flowing is not necessarily the same in both directions.

*Note 2* — These terms should not be used to describe the direction of transfer of users' information.

*Note 3* — The term "two-way" is sometimes used in English in place of "both-way"; this usage is not recommended.

## 4. FREQUENCIES AND BANDWIDTHS

### 4.01 frequency band; *bande de fréquences; banda de frecuencias*

A continuous set of frequencies lying between two specified limiting frequencies.

*Note* – A frequency band is characterized by two values which define its position in the frequency spectrum, for example, its lower and upper limiting frequencies.

### 4.02 (frequency) bandwidth; *largeur de bande (de fréquences); anchura de banda (de frecuencia)*

The quantitative difference between the limiting frequencies of a frequency band.

*Note 1* – The term “bandwidth” is usually associated with a qualification, for example:

- baseband bandwidth;
- necessary bandwidth;
- bandwidth of an amplifier or other device.

*Note 2* – A bandwidth is defined by a single value and does not depend upon the position of the band in the frequency spectrum.

### 4.03 baseband; *bande de base; banda de base*

1. The frequency band occupied by one signal, or by a number of multiplexed signals intended to be conveyed by a radio transmission system or a line transmission system.

*Note 1* – In the case of radiocommunication, the baseband signal constitutes the signal modulating the transmitter.

*Note 2* – The following definition given in IEV Chapter 702, was also found to be acceptable.

2. That frequency band occupied by one signal or by a number of multiplexed signals at specified input and output points of a transmission system.

*Note 1* – In the case of a radiocommunication, the baseband is that band which is occupied by the signal modulating the transmitter.

*Note 2* – When the transmission involves multiple modulation, it is generally considered that the baseband is that band occupied by the signal which is applied to the first modulation stage and not the band occupied by an intermediate modulated signal.

### 4.04 *x* dB bandwidth (of a signal); *largeur de bande «à x dB»; anchura de banda entre puntos a «x dB»*

The width of a frequency band such that beyond its lower and upper limits any spectral line or any power spectral density of the spectrum of a signal is at least *x* dB lower than a reference level specified for the type of signal considered.

### 4.05 frequency departure; *écart de fréquence, déviation de fréquence* (term deprecated in this sense); *desajuste de frecuencia*

An unintentional frequency separation from a stated frequency.

### 4.06 frequency shift; *déplacement de fréquence; desplazamiento de frecuencia*

An intentional frequency change produced by modulation, or an unintentional change due to a natural phenomenon.

### 4.07 frequency drift; *dérive de fréquence; deriva de frecuencia*

An undesired progressive and slow change in frequency with time.

### 4.08 frequency offset; *décalage de fréquence; separación de la frecuencia*

A small intentional frequency change for purposes other than that of modulation.

*Note* – A frequency offset may be effected, for example, as a means of avoiding or minimizing interference.

## 5. OSCILLATIONS AND WAVES

### 5.01 **attenuation, loss**; *affaiblissement, atténuation; atenuación, pérdida*

1. A decrease between two points of an electric, electromagnetic or acoustic power.
2. The quantitative expression of a power decrease, by the ratio of the values at two points of a power or of a quantity related to power in a well-defined manner.

*Note 1* — By extension, the words “attenuation” or “loss” may represent the ratio of powers in a given situation and in a reference condition; for example “insertion loss”.

*Note 2* — Although the term “loss” is not synonymous in English with “attenuation” in every context, it is used to express the ratio of two powers in certain specified conditions as for example in “insertion loss” and “return loss” equivalent in French to “affaiblissement d’insertion” and “facteur d’adaptation”.

*Note 3* — Attenuation is generally expressed in logarithmic units by a positive value. In some cases, attenuation could be used instead of gain, when the logarithmic unit value of a gain is negative.

### 5.02 **gain**; *gain; ganancia*

1. An increase between two points of an electric, electromagnetic, or acoustic power.
2. The quantitative expression of a power increase, by the ratio of the values at two points of a power or of a quantity related to power in a well-defined manner.

*Note 1* — By extension, the word “gain” may represent the ratio of powers in a given situation and in a reference condition; for example the “gain of an antenna”.

*Note 2* — Gain is generally expressed in logarithmic units by a positive or negative value. When a gain has a negative value in logarithmic units, attenuation may be used instead of gain.

### 5.03 **propagation coefficient, propagation constant** (deprecated term); *exposant linéique de propagation, constante de propagation* (deprecated term); *coeficiente de propagación, constante de propagación* (deprecated term)

(Symbol:  $\gamma$ )

Limit of the quotient of the natural logarithm of the ratio of values of a specified component of an electromagnetic field, at two points aligned in the direction of propagation of a guided or plane wave of given frequency, or of a wave practically plane in a limited space domain, by the distance of the two points when this distance tends to zero.

*Note* — The propagation coefficient is usually a complex function of frequency and has the dimension of the reciprocal of a distance.

### 5.04 **attenuation coefficient, attenuation constant** (deprecated term); *affaiblissement linéique, constante d'affaiblissement* (deprecated term); *coeficiente de atenuación, constante de atenuación* (deprecated term)

(Symbol:  $\alpha$ )

1. The real part of a propagation coefficient.
2. Limit of the quotient of attenuation between two points on the axis of a transmission line or waveguide by the distance between the points when this distance tends to zero.

### 5.05 **phase-change coefficient, phase constant** (deprecated term); *déphasage linéique, constante de phase* (deprecated term); *coeficiente del desfasaje, constante de fase* (deprecated term)

(Symbol:  $\beta$ )

1. The imaginary part of a propagation coefficient.
2. Limit of the quotient of the phase change of a field quantity between two points on the axis of a transmission line or waveguide by the distance between the points when this distance tends to zero.

5.06 **phase delay**; *temps de propagation de phase; retardo de fase*

The time taken by a mobile point, associated with a sinusoidal travelling wave and defined by a constant real phase of a field quantity, to move between two given points in a propagation medium.

*Note* — The phase delay is the time duration between the instants when a wave front of a sinusoidal travelling wave, defined by a specific phase, passes two given points in space.

5.07 **group delay**; *temps de propagation de groupe; retardo de grupo*

The propagation time between two points of a signal which may be ideally represented by two superimposed sinusoidal waves of equal amplitude and slightly different frequencies approaching a common limiting value.

*Note* — In a homogeneous medium, or on a uniform line, the group delay is equal to the derivative with respect to the angular frequency of the difference, at the same time, of the phases at the two points of the common limit wave.

5.08 **noise** (in telecommunication); *bruit (en télécommunication); ruido (en telecomunicación)*

Any variable physical phenomenon apparently not conveying information and which may be superimposed on, or combined with, a wanted signal.

*Note* — The term "radio-frequency noise" is defined in Recommendation 573.

5.09 **interference** (to a wanted signal); *brouillage (d'un signal utile); interferencia (a una señal útil)*

Disturbance of the reception of a wanted signal caused by interfering signals, noise or electromagnetic disturbance.

*Note* — The term "radio-frequency interference" is defined in Recommendation 573.

5.10 **bit error ratio (BER)**; *taux d'erreur binaire (TEB); proporción de bits erróneos (BER)*

For a binary digital signal, the ratio of the number of errored bits received to the total number of bits received over a given time interval.

5.11 **residual bit error ratio (RBER)**; *taux d'erreur binaire résiduel (TEBR); proporción de bits erróneos residual (BER-R)*

Bit error ratio in the absence of fading, including allowance for system inherent errors, environment, aging effects and long-term interference.

5.12 **errored second (ES)**; *seconde avec erreurs (SE); seconde entachée d'erreurs (SE); segundo con errores (SE)*

Time interval of one second during which a given digital signal is received with one or more errors.

*Note* — According to CCITT Recommendations, an errored second is defined for each direction of a 64 kbit/s circuit-switched connection.

5.13 **severely errored second (SES)**; *seconde gravement entachée d'erreurs (SGE); segundo con muchos errores (SME)*

Time interval of one second during which a given digital signal is received with an error ratio greater than a specified value.

*Note* — According to CCITT Recommendations, a severely errored second is defined for each direction of a 64 kbit/s circuit-switched connection and the specified BER value is  $10^{-3}$ .

5.14 **degraded minute (DM)**; *minute dégradée (MD); minuto degradado (MD)*

Time interval comprising  $m$  seconds 60 of them being not severely errored seconds but for which the error ratio is greater than a specified value.

*Note 1* — According to CCITT Recommendations, a degraded minute is defined for each direction of a 64 kbit/s circuit-switched connection and the specified BER value is  $10^{-6}$ .

*Note 2* — If the time interval includes  $n$  severely errored seconds,  $m = 60 + n$ .



## ANNEX I TO APPENDIX II

## QUALITY OF SERVICE AND DEPENDABILITY VOCABULARY

1 Introduction to CCITT Recommendation E.800<sup>1), 2)</sup>

A consistent set of terms and definitions is necessary for the development of Recommendations in the important areas of *quality of service* and *network performance* by the numerous Study Groups responsible for the Recommendations. Terminology standardization is also necessary to align the work of the various groups and to avoid confusing the users of Recommendations by the introduction of conflicting terms and definitions. Therefore, this Recommendation sets forth a simple set of terms and definitions relating to the concept of the quality of telecommunications services and *network performance*. These terms and definitions apply to all telecommunications services and all network arrangements used to provide the services.

The diagram in Figure 1/E.800 is intended to provide an overview of the factors which contribute collectively to the overall *quality of service* as perceived by the *user* of a telecommunication service. The terms in the diagram can be thought of as generally applying either to the quality of service levels actually achieved in practice, to objectives which represent *quality of service* goals to be achieved, or to requirements which reflect design specifications.

The diagram in Figure 1/E.800 is also structured to show that one quality of service factor can depend on a number of others. It is important to note — although it is not explicitly stated in each of the definitions to follow — that the value of a characteristic measure of a particular factor may depend directly on corresponding values of other factors which contribute to it. This necessitates, whenever the value of a measure is given, that all of the conditions having an impact on that value be clearly stated.

An essential aspect of the global evaluation of a service is the opinion of the users of the service. The result of this evaluation expresses the users' degrees of satisfaction. This Recommendation establishes:

- 1) a general framework for the *quality of service* concept
- 2) the relationship between *quality of service* and *network performance*
- 3) a set of measures for these performances.

It is obvious that a service can be used only if it is provided, and it is desirable that the provider have a detailed knowledge about the quality of the offered service. From the provider's viewpoint, *network performance* is a concept by which network characteristics can be defined, measured and controlled to achieve a satisfactory level of service quality. The interests and the viewpoints of users and providers are different, and usually require a compromise between quality and economics.

In the utilization of a *service* the *user* identifies two «bodies»:

- 1) the «Organization(s)», i.e., the telecommunication Administration, operating company, etc. providing the means and facilities for the access to and the utilization of the *service*;
- 2) the «network», i.e., the necessary means (terminals<sup>3)</sup>, lines, switches, etc.) actually used.

The contribution of the Organization to the *quality of service* is characterized by one performance concept, *service support performance*, as shown in Figure 1/E.800.

The contribution of the network to the *quality of service* is characterized by three performance concepts, which are:

- *service operability performance*, i.e., the ease by which the *service* can be used, including the characteristics of terminal equipment, the intelligibility of tones and messages, etc.;
- *serveability performance*, the ability of a *service* to be obtained — within specified tolerances and other given conditions — when requested by the *user* and continue to be provided for the requested duration. Thus, *serveability performance* describes the response of the network during the establishment, retention and release of a service connection;
- *service integrity*, the degree to which a *service* is provided without excessive impairments, once obtained. Thus, *service integrity* is primarily concerned with the level of reproduction of the transmitted signal at the receiving end.

<sup>1)</sup> Formerly part of Recommendation G.106, *Red Book*, Fascicle III.1

<sup>2)</sup> Terms printed in italics in the text may be found with their related definitions in Supplement No. 6 or in Recommendation E.800.

<sup>3)</sup> In some countries' terminals are not part of the network and are or may be customer-provided

The *serveability performance* is further subdivided into two terms:

- *service accessibility performance*, the ability of a *service* to be obtained – within specified tolerances and other given conditions – when requested by the *user*, further subdivided into (1) *network accessibility*, which is the ability of the *user* to obtain access to the network for a service request, and (2) *connection accessibility*, which is the ability of the network to provide the *user* with a satisfactory connection to the intended *destination*;
- *service retainability performance*, which is the ability of the *service*, once obtained, to continue to be provided under given conditions for a requested period of time. That is, *service retainability performance* covers the proper retention of *connections* and the *release* (disengagement) when requested by the *user*.

*Serveability performance* is divided into *trafficability performance*, *dependability* and *propagation performance* as shown in Figure 1/E.800. The *trafficability performance* is described in purely teletraffic engineering terms (see Recommendation E.600). The *measures* are expressed in terms of losses and delay times. *Dependability* is the combined aspects of availability, reliability, maintainability and maintenance support performances and relates to the ability of an *item* to be in a state to perform a *required function* (see Supplement No. 6). *Propagation performance* refers to the ability of the transmitting medium to transmit the signal within intended tolerances.

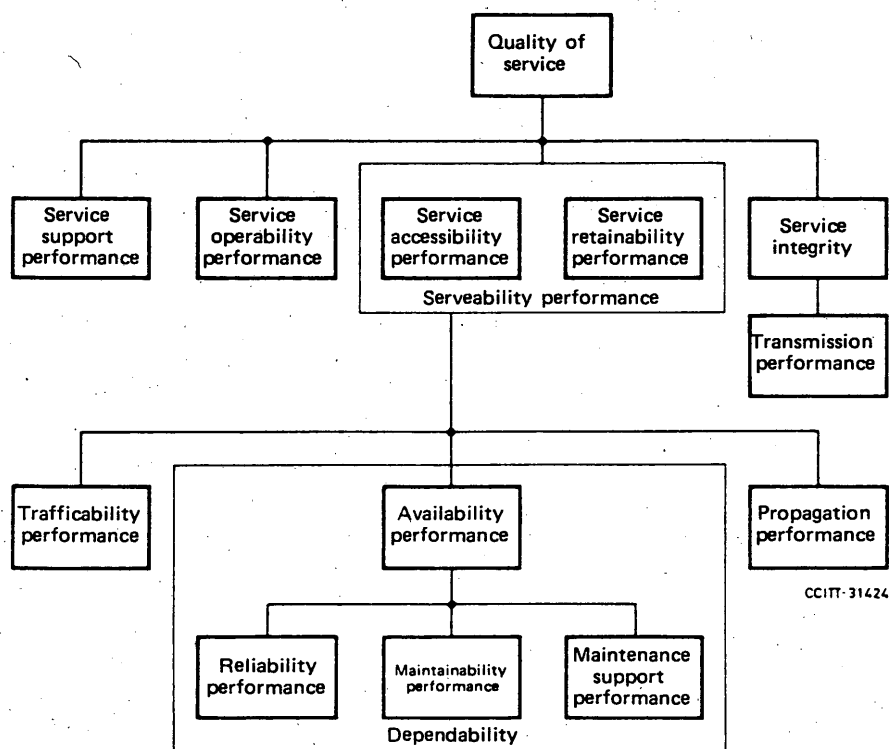


FIGURE 1/E.800

Performance concepts

Measures for all of the above performances may be related to an instant of time (instantaneous, etc.) or expressed as a mean value over a time interval. These and other recommended qualifiers (measure modifiers) are found in Supplement No. 6.

Supplement No. 6 further provides recommended statistical terms and definitions for use in the application of measures related to all performances.

While dependability is used only for a general description in non-quantitative terms, the actual quantification is done under the heading of availability performance, reliability performance, maintainability performance and maintenance support performance.

The most important of these dependability-related measures are found in Supplement No. 6, Part I. The properties expressed by these measures impact the measures related to quality of service and network performance and are thus implicitly characterizations of these performances.

Measures are connected to events (failure, restoration, etc.), states (fault, up state, down state, outage, etc.) or activities (e.g. maintenance), with their time durations.

Part I of Supplement No. 6 provides necessary identification of times, events, states and maintenance activities.

## **2 Related Recommendations and Supplements**

Recommendation E.600: Terms and definitions of traffic engineering

Supplement No. 6: Terms and definitions for quality of service, network performance, dependability and trafficability studies.

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## RECOMMENDATION 663-1

## USE OF CERTAIN TERMS LINKED WITH PHYSICAL QUANTITIES

(1986-1990)

The CCIR,

## CONSIDERING

- (a) that ITU technical texts contain a number of terms expressing a relationship between quantities, such as quotient, ratio, coefficient, factor, index, constant, rate, etc., and that their meaning is liable to cause confusion owing to a lack of consistency;
- (b) that the situation is particularly confused owing to the existence of three working languages, as can be seen from such texts as the Provisional Glossary of Telecommunications Terms published by the ITU in 1979;
- (c) that attempts at standardization have been made in certain countries, in vocabularies recently prepared by the IEC and the JCG and in ISO International Standards,

## UNANIMOUSLY RECOMMENDS

1. that certain terms linked with physical quantities should be used by authors and translators of ITU texts, according to the guidelines annexed to this Recommendation;
2. that these guidelines should be used to ensure that the term chosen to denote a quantity, fully describes its nature;
3. that these guidelines should be followed when forming new terms or reviewing existing terms which deviate from the guidelines.

## ANNEX I

GUIDELINES FOR THE USE IN ITU TEXTS OF CERTAIN TERMS  
LINKED WITH PHYSICAL QUANTITIES IN FRENCH, ENGLISH AND SPANISH**1. Quotient**

The term "quotient" is used to express the result of the division of two numbers or two quantities. For example, when  $A/B = C$ , C is the quotient of A by B.

This very general mathematical term is not used in the composition of the names of quantities, but does form part of the definition of some of them.

In the context of definitions, quotient is a difficult word to use in English as it is often much more practical to use the expression "A divided by B" rather than "the quotient of A by B".

*Example:* the pulse repetition frequency is the number of pulses in a pulse train divided by the duration of the pulse train.

**2. Coefficient and factor**

The words "coefficient" and "factor" are used for expressions representing the quotient of two quantities. They are used to form terms expressing certain quantities.

## 2.1 Coefficient

The word “coefficient” is used when two quantities are of different kinds. A coefficient has therefore a dimension.

*Examples:*

E	F	S
Hall coefficient temperature coefficient coefficient of linear expansion	coefficient de Hall coefficient de température coefficient de dilatation linéique	coeficiente de Hall coeficiente de temperatura coeficiente de dilatación lineal

The word “coefficient” is also used in mathematics to express a number that multiplies the value of an algebraic quantity and in statistics (see ISO Standard 3534).

*Examples:*

E	F	S
coefficient of an equation coefficient of correlation coefficient of variation confidence coefficient (level)	coefficient d'une équation coefficient de corrélation coefficient de variation niveau de confiance	coeficiente de una ecuación coeficiente de correlación coeficiente de variación coeficiente (nivel) de confianza

## 2.2 Factor

The word “factor” is used when the two quantities are of the same kind. A factor is therefore dimensionless.

*Examples:*

E	F	S
reflection factor noise factor quality factor ( $Q$ ) figure of merit ( $M$ )	facteur de réflexion facteur de bruit facteur de qualité ( $Q$ ) facteur de qualité ( $M$ )	factor de reflexión factor de ruido factor de calidad ( $Q$ ) factor de calidad ( $M$ )

### 3. Constant

The term “constant” should only be used to denote an invariable number or quantity.

*Examples:* mathematical constants such as  $\pi$ , universal physical constants.

E	F	S
Planck's constant electric constant magnetic constant	constante de Planck constante électrique constante magnétique	constante de Planck constante eléctrica constante magnética

The word “constant” is sometimes used incorrectly, in conjunction with a qualifier, to indicate a variable characteristic quantity of a system or substance. In such cases, the use of the word is deprecated, and a specific term should be used (frequently the word “coefficient” suitably qualified) or in French, in the absence of such a term, the word “caractéristique”.

Deprecated term			Correct term		
E	F	S	E	F	S
dielectric constant	constante diélectrique	constante dieléctrica	permittivity	permittivité	permitividad
propagation constant	constante de propagation	constante de propagación	propagation coefficient	exposant linéique de propagation	exponente lineal de propagación
attenuation constant	constante d'affaiblissement	constante de atenuación	attenuation coefficient	affaiblissement linéique	coeficiente de atenuación
phase constant	constante de phase	constante de fase	phase coefficient	déphasage linéique	coeficiente de fase
—	constantes du sol	constantes del suelo	—	caractéristiques du sol	características del suelo

However, the term “time constant” (E), “constante de temps” (F), “constante de tiempo” (S) is acceptable, as it is in common use.

### 4. Index

In French and Spanish the term “indice” (F), “índice” (S) is sometimes used instead of “facteur” (F), “factor” (S). In English “index” is sometimes used instead of “ratio” in those cases where one of the two quantities is a reference quantity.

*Examples:*

E	F	S
refractive index modulation index	indice de réfraction indice de modulation	índice de refracción índice de modulación

The term also designates a quantity which is not clearly defined or which is identifiable rather than measurable.

*Example:*

E	F	S
ionospheric index	indice ionosphérique	índice ionosférico

In all the above cases extension of the usage of the term is not recommended. It should be replaced wherever possible by the terms coefficient, factor or (in English) ratio, or by a specific term of magnitude. Thus the French term "l'indice de force des sons" was replaced by "l'affaiblissement pour la sonie", "loudness rating" (E), "coeficiente de sonoridad" (S).

## 5. Ratio

The term "ratio" is used to express the result of the division of two numbers or two quantities of the same kind. It may therefore be used in this case as an equivalent of the term "quotient".

*Examples:*

- Attenuation is defined as the ratio of two powers.
- Ratio of A to B.
- Ratio of width to height (picture).

In English and in Spanish, the word "ratio" ("relación") is also used to explicitly indicate the fractional expression of the relationship between two quantities before the division is performed, e.g. written as a fraction or a relationship as 5/21 or 5 : 21 rather than the resulting 0.238. The two quantities may or may not be the same, e.g. power/weight ratio, relación potencia/peso.

In French and in Spanish the term "rapport" (F) ("relación" (S)) should not be used when the two quantities are not the same physical kind, or when they are of a different mathematical kind, for example, to express the quotient of a vector or a tensor by a scalar number.

The word is also used to form terms for expressing dimensionless quantities.

*Examples:*

E	F	S
standing wave ratio	rapport d'onde stationnaire	relación de onda estacionaria
signal-to-noise ratio	rapport signal sur bruit	relación señal/ruido
protection ratio	rapport de protection	relación de protección
error ratio	taux d'erreur	proporción de errores

*Note* – Error ratio is normally expressed as a decimal fraction, e.g.  $4 \cdot 10^{-5}$ .

## 6. Rate, ratio (E); Taux, débit (F); Tasa/proporción/frecuencia (S)

Although in English the term "rate" may be used to express the relationship between two quantities of the same kind, it is generally used to express the relationship of quantities of a different kind (particularly a quantity per unit of time). For expressing the proportion of errors in telecommunication however, the use of this term can be confusing and is deprecated. The term "ratio" should be used for this purpose.

The term "taux" in French designates a factor usually expressed as a percentage or any decimal fraction such as a thousandth or a millionth. It does not always correspond with the English term "rate". In particular, it should not be used to express the relationship of a quantity with a unit of time. In such cases, an appropriate term such as "débit" (F), "fréquence" (F), "vitesse" (F) should be used. An exception which has been established by usage is "failure rate" (E), "taux de défaillance" (F), "tasa de fallos" (S) in the field of reliability.

In Spanish, the term “tasa” should not be used to express the relationship between a quantity and the unit of time. There are a number of different terms which should be used for this purpose depending on the quantity e.g. “velocidad” (S) for distance, “frecuencia” (S) for events, “caudal” (S) for volume flow, etc.

In Spanish, the term “tasa” is also frequently used incorrectly to indicate a factor or index usually expressed as a percentage or in hundredths or as a smaller decimal fraction such as a thousandth or millionth. The use of this term for this purpose in Spanish is deprecated and should be replaced by the term “proporción” (S).

*Examples:*

E	F	S
sampling rate	fréquence d'échantillonnage	frecuencia de muestreo
digit rate	débit numérique	velocidad digital
fading rate	cadence d'évanouissement	ritmo de desvanecimiento
rain rate	intensité de pluie	intensidad de lluvia
modulation rate	rapidité de modulation	velocidad de modulación
failure rate	taux de défaillance	tasa de fallos
error ratio *	taux d'erreur	proporción de errores
harmonic factor	taux d'harmoniques	proporción de armónicos
modulation factor	taux de modulation	factor de modulación

\* In English, “error rate” is used to denote the number of errors/unit time. In this case in French “fréquence des erreurs” may be used.



## SECTION B: GRAPHICAL SYMBOLS

## RECOMMENDATION 461-4

GRAPHICAL SYMBOLS AND RULES FOR THE PREPARATION OF DOCUMENTATION  
IN TELECOMMUNICATIONS

(1970-1974-1978-1982-1990)

## The CCIR

which cooperates in the work of the CCI/IEC Joint Working Group set up for the purpose of establishing internationally agreed graphical symbols and rules for the preparation of documentation and for item designations (see CCITT Recommendation A.13 and CCIR Resolution 23),

## UNANIMOUSLY RECOMMENDS

that, on diagrams for international use concerning telecommunications, the administrations and recognized private operating agencies of the CCIR and the CCIR Secretariat should use the graphical symbols for diagrams given in IEC Series 617 publications and should observe the rules for the preparation of documentation and for item designation laid down in IEC Publication 113 and 750.

Administrations wishing to use symbols on equipment are recommended to refer to IEC Publication 417.

*Note* — References of relevant publications (updated in 1990):

*IEC Publication 113: "Diagrams, charts, tables"*

113-1 (1971)	(Definitions and classification)
113-2 (1971)	(Item designation of components) replaced by Publication 750
113-3 (1974)	(General recommendations for the preparation of diagrams)
113-4 (1975)	(Recommendations for the preparation of circuit diagrams)
113-5 (1975)	(Preparation of interconnection diagrams and tables)
113-6 (1976 and Amend. 1 1983)	(Preparation of unit wiring diagrams and tables)
113-7 (1981)	(Preparation of logic diagrams)
113-8 (1982 and Amend. 1 1983)	(Preparation of diagrams for system manuals)

*IEC Publication 117: "Recommended graphical symbols" replaced by Publication 617*

*IEC Publication 416 (1988): "General principles for the formulation of graphical symbols"*

*IEC Publication 417 (1973 and 8 Supplements of 1974, 1975, 1977, 1978, 1980, 1982, 1985 and 1987): "Graphical symbols for use on equipment"*

*IEC Publication 617: "Graphical symbols for diagrams"*

617-1 (1985)	(General information, General Index. Cross-reference tables)
617-2 (1983)	(Symbol elements, qualifying symbols and other symbols having general application)
617-3 (1983)	(Conductors and connecting devices)
617-4 (1983)	(Passive components)
617-5 (1983)	(Semi-conductor and electron tubes)
617-6 (1983)	(Production and conversion of electrical energy)
617-7 (1983)	(Switchgear, control gear and protective devices)
617-8 (1983)	(Measuring instruments, lamps and signalling devices)
617-9 (1983)	(Telecommunications: Switching and peripheral equipment)
617-10 (1983)	(Telecommunications: Transmission)
617-11 (1983)	(Architectural and topographical installation plans and diagrams)
617-12 (1983)	(Binary logic elements)
617-13 (1978)	(Analogue elements)

*IEC Publication 750 (1983): "Item designation in electrotechnology"*

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## RECOMMENDATION 664

ADOPTION OF THE CCITT SPECIFICATION  
AND DESCRIPTION LANGUAGE (SDL)

(1986)

The CCIR

## CONSIDERING

- (a) that there is a need for a common method or procedure for the unambiguous specification and description of the behaviour of telecommunication systems;
- (b) that a specification of a system is the description of its required behaviour;
- (c) that a description of a system is the description of its actual behaviour;
- (d) that a universal method for specification and description should bring economic benefits;
- (e) that the CCITT has adopted such a method called the Specification and Description Language (SDL) as described in CCITT Recommendation Z.100,

## UNANIMOUSLY RECOMMENDS

1. the general use within the ITU of the CCITT Specification and Description Language (SDL) for unambiguous specification and description of telecommunication systems (see Annex I);
2. that the possibilities for application of SDL in areas of common interest for the purposes of standardization be brought to the attention of other international bodies (e.g. the IEC and ISO) for their consideration.

## ANNEX I

## INTRODUCTION TO SDL

The purpose of recommending SDL is to provide a language for unambiguous *specification* and *description* of the behaviour of telecommunications *systems*. The *specifications* and *descriptions* using SDL are intended to be formal in the sense that it is possible to analyse and interpret them unambiguously.

The terms *specification* and *description* are used with the following meaning:

- a *specification* of a *system* is the description of its required *behaviour*, and
- a *description* of a *system* is the description of its actual *behaviour*.

SDL also provides structuring concepts which allow a *system* to be partitioned so that it can be defined, developed and understood one part at a time.

These concepts are of value both initially in specifying a *system*, when different aspects can be independently dealt with, and later in describing a *system*, when the description structures should match the *system* structure.

SDL gives a choice of the use of two different forms when representing SDL descriptions; a graphic representation (SDL/GR) and a textual phrase representation (SDL/PR). As they are both specific representations of the same SDL semantics, they are equivalent from a semantic point of view.

### *Objectives*

The general objectives when defining SDL have been to provide a language that:

- is easy to learn, use and interpret in relation to the needs of an operating organization;
- provides unambiguous specifications and descriptions for ordering and tendering;
- may be extended to cover new developments;
- is able to support several methodologies of system specification and design, without assuming any one of these.

### *Scope*

The main area of application for SDL is the description of the behaviour of aspects of telecommunications systems. Applications include:

- call processing (e.g. call handling, telephony signalling, metering) in stored programme control (SPC) switching systems;
- maintenance and fault treatment (e.g. alarms, automatic fault clearance, routine tests) in general telecommunications systems;
- system control (e.g. overload control, modification and extension procedures);
- data communication protocols.

SDL can of course also be used for the description of any behaviour capable of being described using a discrete model, i.e. communicating with its environment by discrete messages.

A description of SDL is given in CCITT Recommendation Z.100.

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## SECTION C: OTHER MEANS OF EXPRESSION

## RECOMMENDATION 430-3

## USE OF THE INTERNATIONAL SYSTEM OF UNITS (SI)

(1953–1963–1978–1982–1990)

The CCIR,

## UNANIMOUSLY RECOMMENDS

1. that the various ITU organs, as well as administrations and recognized private operating agencies should use in their mutual relations:
    - the units of the international system of units (SI) adopted by the General Conference of Weights and Measures (CGPM) and supported by the International Organization for Standardization (ISO); this system is based on the rationalized form of electromagnetic and electrotechnical relations;
    - the symbols adopted in the SI system to represent units;
    - rules similar to those of the SI system when it is necessary to form names of other units and their symbols in the field of telecommunications as in Recommendations 607 and 608;
  2. that, with the exception of unit symbols frequently used in telecommunications, the first time a symbol is used in a particular text, its full meaning should be given either in the body of the text or in a footnote.
- Note* — References of relevant publications (updated in 1990).

*BIPM publications:* “BIPM Publication: Le système international d’unités” (SI).

*International Standard ISO 31:* “General principles concerning quantities, units and symbols”

Parts of International Standard ISO 31 of greatest interest for telecommunications:

0	(General principles)
I	(Quantities and units of space and time)
II	(Quantities and units of periodic and related phenomena)
V	(Quantities and units of electricity and magnetism)
VI	(Quantities and units of light and related electromagnetic radiations)
VII	(Quantities and units of acoustics)
XI	(Mathematical signs and symbols)

*International Standard ISO 1000:* “SI units and recommendations for the use of their multiples and of certain other units”

*IEC Publication 27:* see Recommendation 608.

See also ISO Standards Handbook 2 (1982) “Units of measurement”.

## RECOMMENDATION 607-2\*

TERMS AND SYMBOLS FOR INFORMATION QUANTITIES  
IN TELECOMMUNICATIONS

(1982-1986-1990)

The CCIR,

## CONSIDERING

- (a) that in telecommunications data transmission is more and more widely used;
- (b) that the ISO/IEC Joint Technical Committee for information technology (JTC/1) is concerned with international standardisation in the field of data processing;
- (c) that IEC Technical Committee No. 25 has requested the CCIs to assist with the definition of letter symbols for terms and units used in data communication;
- (d) that CCIR texts and documents sometimes contain equivalent designations of the baud or its multiples, for example the megasymbol per second and its symbol MSPS,

## UNANIMOUSLY RECOMMENDS

1. that the terms "binary digit" or "bit", "baud", "shannon", "byte" or "octet" or "8-bit byte" and "n-bit byte" should be used with the definitions appearing in Annex I, which are extracted from the International Electrotechnical Vocabulary or from the vocabulary established by JTC/1, and that other terms should not be used for the same concept;
2. that the term "bit" is synonymous with "binary digit", and is also used as the letter symbol for this unit; the term being an abbreviation of the English term "binary digit" and being adopted also in French and Spanish; for multiples of this unit and for derived units letter symbols such as kbit, Mbit, kbit/s should be used;
3. that the unit "baud" should have as its letter symbol Bd with possible multiples such as kBd and MBd;
4. that the unit "shannon" should have as its letter symbol Sh;
5. that for the term "byte" it is the task of the JTC/1 or TC 25 to provide the letter symbol it judges to be necessary. In the meantime this term and its multiples should be written in full in the documents and texts of the CCIs. For example 10 kilo-bytes, 1 mega-byte. The term "N-bit byte" has no multiples.

## ANNEX I

**binary digit, bit; élément binaire, bit; dígito binario, bit**

A member of a set of two elements commonly used to represent information.

*Note* — In the interest of clarity, it is recommended that the term "bit" shall not be used in two-condition start-stop modulation instead of "unit-element".

**binary digit rate, bit rate; débit binaire; velocidad binaria**

The number of binary elements transferred in a time interval divided by that time.

*Note* — The binary digit rate is expressed in bits per second (bit/s) and multiples of this unit.

\* The Director is invited to submit this Recommendation to the IEC.

**baud (Bd); baud (Bd); baudio (Bd)**

The unit of modulation rate in telegraphy and data communication or the unit of line digit rate in digital transmission; when expressed in terms of this unit, the modulation rate or line digit rate equals the reciprocal of the duration in seconds of the shortest signal element or of the unit interval in a digital signal composed of signal elements of constant duration.

*Example:* If the duration of the unit interval is 20 milliseconds, the modulation rate is 50 bauds.

**shannon; shannon; shannon**

A unit of logarithmic measure of information equal to the decision content of a set of two mutually exclusive events expressed as a logarithm to base two.

*Example:* The decision content of a character set of eight characters equals 3 shannons ( $\log_2 8 = 3$ ).

**byte, octet, 8-bit byte; octet; octeto (byte)**

An ordered set group of 8 binary digits operated upon as an entity.

**n-bit byte; multiplet, n-uplet; multibit, n-bit**

An ordered set of a specified number of binary digits operated upon as an entity.

*Note* — This IEV definition is compatible with the definition of JTC/1 (Data Processing — Vocabulary. Part 4: Data Organization).

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## RECOMMENDATION 665-1 \*

## TRAFFIC INTENSITY UNIT

(1986-1990)

The CCIR,

## CONSIDERING

- (a) that in CCITT texts concerning telephone operations and tariffs and in CCIR texts concerning radiotelephone transmissions (e.g. telephone radio-relay systems and the maritime mobile service radiotelephony), the quantity "traffic intensity" is used together with the unit in which it is expressed. With progress in telecommunications, increasing use will be made of this term and this unit;
- (b) that CCITT Recommendation E.600 defines the erlang as the unit of traffic;
- (c) that IEV Chapter 715 (Telecommunication networks, teletraffic and operation) defines the quantity "traffic intensity" and its unit "erlang" in a manner compatible with CCITT,

## UNANIMOUSLY RECOMMENDS

1. that *traffic intensity* is the *number* of simultaneously busy resources in a given pool of resources\*\*;
2. that the *erlang* is the unit of traffic intensity corresponding to the occupancy of one resource;
3. that the erlang should be represented by the symbol E.

*Note* — The name "erlang" was given to the traffic unit in 1946 by the CCIF, in honour of the Danish mathematician, A. K. Erlang (1878-1929), who was the founder of traffic theory in telephony.

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\* The Director, CCIR, is requested to bring this Recommendation to the attention of the International Electrotechnical Commission (IEC; Technical Committee No. 25).

\*\* The term "resource" means any physically or conceptually identifiable entity, whose use and state at any time can be unambiguously determined, for example, a telecommunication circuit, a switching equipment or a subscriber line.



## RECOMMENDATION 608-1

## LETTER SYMBOLS FOR TELECOMMUNICATIONS

(1982-1990)

The CCIR,

## CONSIDERING

- (a) that in order to simplify the reading of documents dealing with telecommunication technique, it is essential to use simple notations in a homogeneous system and having well-defined meaning; that, moreover, it is an advantage, wherever possible, to have notations that have been universally adopted;
- (b) that the CCIs are collaborating with Technical Committee No. 25 of the IEC,

## UNANIMOUSLY RECOMMENDS

that in their mutual relations the ITU and its permanent organs and administrations and recognized private operating agencies use in all languages, wherever possible, the letter symbols and the notations recommended by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) to represent the physical quantities and the mathematical operations.

*Note* — References of relevant publications (updated in 1990):

*International Standard ISO 31: "General principles concerning quantities, units and symbols"*

Parts of International Standard ISO 31 of greatest interest for telecommunications:

- 0 (General principles)
- I (Quantities and units of space and time)
- II (Quantities and units of periodic and related phenomena)
- V (Quantities and units of electricity and magnetism)
- VI (Quantities and units of light and related electromagnetic radiations)
- VII (Quantities and units of acoustics)
- XI (Mathematical signs and symbols)

*IEC Publication 27: "Letter symbols to be used in electrical technology"*

- 27-1 (General) (1971 5th Edition, with Amendment 1 (1974) and Amendment 2 (1977)). (1983 Amendment 4, including 1981 Amendment 3)
- 27-1A (1976) (First supplement: Time-dependent quantities)
- 27-2 (1972) (Telecommunications and electronics)
- 27-2A (1975) (First supplement: Waveguide propagation; scattering matrix and transfer matrix; static convectors; automatic control science and technology)
- 27-2B (1980) (Second supplement: linear n-port networks)
- 27-3 (1974) (Logarithmic quantities and units) (see Recommendation 574)
- 27-4 (1985) (Quantities to be used for rotating electrical machines)

See also IEC Handbook "Letter Symbols" (1983) and the "Directives applicable to the work of the IEC on letter symbols" (1986).

## RECOMMENDATION 431-5

NOMENCLATURE OF THE FREQUENCY AND WAVELENGTH BANDS  
USED IN TELECOMMUNICATIONS

(Question 3/CMV)

(1953-1956-1959-1963-1966-1974-1978-1982-1986)

The CCIR,

## CONSIDERING

- (a) that the merits of Heinrich Hertz (1857-1897), as a research worker on the basic phenomena of radio waves, are universally recognized, as was confirmed at the centenary of his birth; and that as early as 1937 the IEC adopted the hertz (symbol: Hz) as a name for the unit of frequency (see *inter alia*, Publication 27);
- (b) that the nomenclature in this Recommendation should be as synoptic as possible and that the designation of frequency bands should be as concise as possible,

## UNANIMOUSLY RECOMMENDS

1. that the hertz (Hz) be accepted for use in publications of the ITU, as the name for the unit of frequency in accordance with Recommendation 430 on the use of the international system of units (SI);
2. that administrations should always use the nomenclature of the frequency and wavelength bands given in Annex I:
  - in Table I and Notes 1 and 2, which take account of No. 208 of the Radio Regulations, and
  - in Note 3 (Table II), which contains the proposal of the International Union of Radio Sciences (URSI),except in those cases where this would inevitably cause very serious difficulties.

## ANNEX I

TABLE I

Band number	Symbols	Frequency range (lower limit exclusive, upper limit inclusive)	Corresponding metric subdivision	Metric abbreviations for the bands
3	ULF	300 to 3000 Hz	Hectokilometric waves	B.hkm
4	VLF	3 to 30 kHz	Myriametric waves	B.Mam
5	LF	30 to 300 kHz	Kilometric waves	B.km
6	MF	300 to 3000 kHz	Hectometric waves	B.hm
7	HF	3 to 30 MHz	Decametric waves	B.dam
8	VHF	30 to 300 MHz	Metric waves	B.m
9	UHF	300 to 3000 MHz	Decimetric waves	B.dm
10	SHF	3 to 30 GHz	Centimetric waves	B.cm
11	EHF	30 to 300 GHz	Millimetric waves	B.mm
12		300 to 3000 GHz	Decimillimetric waves	B.dmm
13		3 to 30 THz	Centimillimetric waves	B.cmm
14		30 to 300 THz	Micrometric waves	B.μm
15		300 to 3000 THz	Decimicrometric waves	B.dμm

Note 1 – “Band number N” extends from  $0.3 \times 10^N$  to  $3 \times 10^N$  Hz.

Note 2 – Symbols: Hz: hertz,

k: kilo ( $10^3$ ), M: mega ( $10^6$ ), G: giga ( $10^9$ ), T: tera ( $10^{12}$ ).

μ: micro ( $10^{-6}$ ), m: milli ( $10^{-3}$ ), c: centi ( $10^{-2}$ ), d: deci ( $10^{-1}$ ).

da: deca ( $10$ ); h: hecto ( $10^2$ ), Ma: myria ( $10^4$ ).

Note 3 – This nomenclature, used for designating frequencies in the field of telecommunications, may be extended to cover the ranges shown below, as is proposed by the International Union of Radio Science (URSI) (see Table II).

Note 4 – In most countries the frequency ranges used for FM sound broadcasting and television are designated by the Roman numerals I to V. The frequency ranges are indicated in Table III. It should be noted that these ranges are, in some cases, not exclusive to the broadcasting services.

Note 5 – Certain frequency bands are sometimes designated by letter other than the symbols and abbreviations recommended in Tables I and II. The symbols in question consist of capital letters which may be accompanied by an index (usually a small letter). There is at present no standard correspondence between the letters and the frequency bands concerned, and the same letter may be used to designate a number of different bands. It is not advisable to use these symbols in ITU publications. If, however, a letter symbol is used, reference should be made to the corresponding frequency band limits or at least to a frequency in the band, if that information is sufficient in itself, the first time the symbol appears in the text.

TABLE II

Band number	Symbols <sup>(1)</sup>	Frequency range (lower limit exclusive, upper limit inclusive)	Corresponding metric subdivision	Metric abbreviations for the bands
-1	ELF	0.03 to 0.3 Hz	Gigametric waves	B.Gm
0		0.3 to 3 Hz	Hectomegametric waves	B.hMm
1		3 to 30 Hz	Decamegametric waves	B.daMm
2		30 to 300 Hz	Megametric waves	B.Mm

<sup>(1)</sup> The symbol EBF is used in French.

TABLE III

Designation	Frequency range (MHz)		
	Region 1	Region 2	Region 3
I	47 - 68	54 - 68	47 - 68
II	87.5 - 108	88 - 108	87 - 108
III	174 - 230	174 - 216	174 - 230
IV	470 - 582	470 - 582	470 - 582
V	582 - 960	582 - 890	582 - 960

## RECOMMENDATION 574-3\*

## USE OF THE DECIBEL AND THE NEPER IN TELECOMMUNICATIONS\*\*

(1978-1982-1986-1990)

The CCIR,

## CONSIDERING

- (a) the frequent use by the CCIR of the decibel and the neper for expressing quantities;
- (b) the IEC Publication 27-3 (1974) on logarithmic quantities and units;
- (c) the collaboration of the CCIs with Technical Committee No. 25 of the IEC which permits coordination with a view to establishing further Recommendations;
- (d) International Standard ISO 31;
- (e) the convenience of using only one unit to express in logarithmic form the numerical values of international specifications and the results of measurements in exchanges at international level;
- (f) the use in radiocommunications of the decibel alone to express the results of measurements in logarithmic form;
- (g) the need, within the ITU, to publish a guide on this subject,

## UNANIMOUSLY RECOMMENDS

that symbols used for the logarithmic expression of quantities that directly or indirectly refer to power should be chosen with the guidance of Annex I.

## ANNEX I

## USE OF THE DECIBEL AND THE NEPER

## 1. Definition of the decibel

1.1 The *bel* (symbol B) expresses the ratio of two powers by the decimal logarithm of this ratio. This unit is not often used, having been replaced by the *decibel* (symbol dB) which is one-tenth of a bel.

1.2 The decibel may be used to express the ratio of two *field quantities*, such as voltage, current, sound pressure, electric field, charge velocity or density, the square of which in linear systems is proportional to power. To obtain the same numerical value as a power ratio, the logarithm of the field quantity ratio is multiplied by the factor 20, assuming that the impedances are equal.

The relationship between a current or voltage ratio and that of the corresponding power ratio is impedance dependent. Use of the decibel when the impedances are not equal is not appropriate unless adequate information is given concerning the impedances involved.

For example, if  $P_1$  and  $P_2$  are two powers, their ratio expressed in decibels is:

$$10 \lg \frac{P_1}{P_2}$$

If  $P_1$  and  $P_2$  represent the powers dissipated by currents  $I_1$  and  $I_2$  in resistances  $R_1$  and  $R_2$ :

$$10 \lg \frac{P_1}{P_2} = 10 \lg \frac{I_1^2 R_1}{I_2^2 R_2} = 20 \lg \frac{I_1}{I_2} + 10 \lg \frac{R_1}{R_2}$$

\* The Director, CCIR, is requested to bring this Recommendation to the attention of the International Electrotechnical Commission (IEC, Technical Committee No. 25).

\*\* In this Recommendation, the notation  $\lg$  is used for the decimal logarithm in accordance with ISO 31 (Part XI) and usage within the IEC (Publication 27-3). The notation  $\log_{10}$  is also used within ISO and the IEC.

1.3 The decibel may also be used to express the ratio of two values of a quantity connected with power by a well-defined relationship. In this case, the logarithm of this ratio must be multiplied by a factor representing the relationship which connects the quantity with a power, and a term representing a multiplying factor may be added to it.

The corresponding formulae, together with an example, are given in § 2 of Appendix I.

## 2. Definition of the neper

The *neper* (symbol Np) expresses the ratio of two field quantities such as voltage or current, the square of which is proportional to power by the natural logarithm of this ratio. The value of a power ratio in nepers is one-half of the natural logarithm of the power ratio. The values in nepers of the ratio of two field quantities and of the corresponding powers are equal only if the impedances are equal.

One neper corresponds to the value of  $e$  of a field quantity ratio and to the value  $e^2$  of a power quantity ratio.

Sub-multiples such as the decineper (dNp) are also used.

In some disciplines, nepers may be used to express the logarithm of a power ratio without the factor 1/2. An example is optical depth or attenuation in radiometry. Such usage is prohibited in telecommunications in order to prevent ambiguity. Under this definition, the neper would in fact be equal to 4.34 dB, instead of 8.68 dB as is traditionally the case.

## 3. Use of the decibel and neper

Countries can continue to use either the neper or the decibel for measurement purposes within their own territory and, to avoid conversion of values, countries which prefer to do so may continue to use the neper between themselves by bilateral agreement.

For the international exchange of information concerning transmission measurement and related values and for the international specification of limits for such values, the only logarithmic expression to be used is the decibel.

For theoretical or scientific calculations, where ratios are expressed in terms of Napierian logarithms, the neper will always be used, implicitly or explicitly.

As a result of some calculations on complex quantities, a real part in nepers and an imaginary part in radians are obtained. Factors may be applied for converting to decibels or degrees.

The conversion values between the neper and the decibel are as follows:

$$\begin{aligned} 1 \text{ Np} &= (20 \lg e) \text{ dB} \approx 8.686 && \text{dB} \\ 1 \text{ dB} &= (0.05 \ln 10) \text{ Np} \approx 0.1151 && \text{Np} \end{aligned}$$

## 4. Rules for the use of the symbols where dB is included

Concerning the symbols that include the symbol dB, the following rules should be used as far as possible:

### 4.1 The symbol dB without additional indication

The symbol dB without additional indication should be used to indicate a difference between two power levels or a ratio of two powers, two power densities, or two other quantities clearly connected with power.

### 4.2 The symbol dB followed by additional information within parenthesis

The symbol dB followed by additional information within parenthesis should be used to express an absolute level of power, power flux-density or any other quantity clearly connected with power, in relation to a reference value within the parenthesis. In some cases, however, common use may give rise to simplified symbols, such as dBm instead of dB(mW).

### 4.3 The symbol dB followed by additional information without parenthesis

The symbol dB followed by additional information without parenthesis should be used to express by convention, special conditions such as measurements through specified filters or at a specified point of a circuit.

## 5. Loss and gain

The *attenuation* or *loss* is a decrease between two points of an electric, electromagnetic or acoustic power. The attenuation is also the quantitative expression of a power decrease, generally in decibels; this decrease is expressed by the ratio of the values at two points of a power or of a quantity related to power in a well-defined manner.

The *gain* is the increase between two points of an electric, electromagnetic or acoustic power. The gain is also the quantitative expression of a power increase, generally in decibels; this increase is expressed by the ratio of the values at two points of a power or of a quantity related to power in a well-defined manner.

The exact designation of the loss or gain in question must be given (e.g. image-attenuation coefficient, insertion loss, antenna gain) which in fact refers to the precise definitions of the ratio in question (terminal impedances, reference conditions, etc.).

### 5.1 *Transmission loss* (Refs. Recommendation 341, and Recommendation 573, term A43)

This is the ratio, expressed in decibels, of the transmitted power ( $P_t$ ) to the received power ( $P_r$ ):

$$L = 10 \lg (P_t / P_r) \quad \text{dB}$$

### 5.2 *Antenna gain* (Refs. Radio Regulations, Article 1, No. 154 and Recommendation 573, term E04)

This is "the ratio, usually expressed in decibels of the power required at the input of a loss free reference antenna ( $P_0$ ) to the power supplied to the input of the given antenna ( $P_a$ ) to produce, in a given direction, the same field strength or the same power flux-density at the same distance."

$$G = 10 \lg (P_0 / P_a) \quad \text{dB}$$

## 6. Levels

In many cases, the comparison of a quantity, here called  $x$ , with a specified reference quantity of the same kind (and dimension),  $x_{ref}$  is expressed by the logarithm of the ratio  $x/x_{ref}$ . This logarithmic expression is often called "the level of  $x$  (with respect to  $x_{ref}$ )" or "the  $x$ -level (with respect to  $x_{ref}$ )". With the general letter symbol for level  $L$ , the level of the quantity  $x$  may be written  $L_x$ .

Other names and other symbols exist and can be used.  $x$  may in itself be a single quantity, e.g. power  $P$ , or a ratio, e.g.  $P/A$ , where  $A$  is area,  $x_{ref}$  is here supposed to have a fixed value, e.g. 1 mW, 1 W, 1  $\mu\text{W}/\text{m}^2$ , 20  $\mu\text{Pa}$ , 1  $\mu\text{V}/\text{m}$ .

The level representing the quantity  $x$  with reference quantity  $x_{ref}$  may be indicated by the quantity symbol:  $L_x$  (with respect to  $x_{ref}$ ), and may be expressed in decibels, when the reference quantity is a power, or a quantity linked to power, in a well-defined way.

*Example:*

The statement that the level of a certain power,  $P$ , is 15 dB above the level corresponding to 1 W can be written:

$$L_P(\text{with respect to } 1 \text{ W}) = 15 \text{ dB, which means } 10 \lg (P/1 \text{ W}) = 15^*$$

$$\text{or } 10 \lg P(\text{in watts}) = 15$$

In many cases it is found practical to use a condensed notation based only on the unit, which in this case would be:

$$L_P = 15 \text{ dB}(1 \text{ W}).$$

The number "1" in the expression of the reference quantity can be omitted, but this is not recommended in cases where confusion may occur. (Such omission has been made in some of the examples below.) In other words, where no number is shown, the number 1 is to be understood.

There exist condensed notations for special cases, such as dBW, dBm, dBm0 (see § 8 below).

Below are given some examples in which the reference level is expressed after the unit in a condensed form. It must be observed that the condensed notation is often insufficient for characterizing a quantity, and that then a clear definition or another appropriate description of the quantity must be given.

\* In the ratio  $(P/1 \text{ W})$ , it is evident that  $P$  must be expressed in watts.

6.1 *Power*

The "absolute power level" corresponds to the ratio of  $P$  and a reference power, e.g. 1 W.

If  $P = 100$  W and the reference power 1 W, we obtain:

$$\begin{aligned} L_P &= 10 \lg (P/1 \text{ W}) \quad \text{dB} \\ &= 10 \lg (100 \text{ W}/1 \text{ W}) \quad \text{dB} \\ &= 20 \text{ dB} \end{aligned}$$

with the condensed notation 20 dB(1 W) or 20 dBW, dBW being the abbreviation for: dB(1 W). With the reference power 1 mW and  $P = 100$  W we obtain 50 dB(1 mW), or with the special notation mentioned earlier, 50 dBm, being the abbreviation for: dB(1 mW). The notations dBW and dBm are currently used in the CCIR and the CCITT (see § 8 below).

6.2 *Power spectral density*

The logarithmic expression corresponds to the ratio of  $P/\Delta f$  (where  $\Delta f$  denotes a bandwidth) and a reference quantity, e.g. 1 mW/kHz.  $P$  may be a noise power. The logarithm will in this case, as in all other cases, be taken of a pure number.

An example with a condensed notation is 7 dB(mW/kHz) or that which is the same thing: 7 dB(W/MHz) or 7 dB( $\mu$ W/Hz).

6.3 *Power flux-density*

The logarithmic expression corresponds to the ratio of  $P/A$ , where  $A$  is area, and a reference power density, e.g. 1 W/m<sup>2</sup>. A notation in a certain case can be:

$$-40 \text{ dB(W/m}^2\text{)}$$

or  $-10 \text{ dB(mW/m}^2\text{)}$ .

6.4 *Power density with respect to temperature*

The logarithmic expression corresponds to the ratio of  $P/T$ , where  $T$  is temperature, and a reference power density, e.g. 1 mW/K, where K is kelvin.

$$\begin{aligned} \text{Example :} \quad &45 \text{ dB(mW/K)} \\ &\text{or } 15 \text{ dB(W/K)}. \end{aligned}$$

6.5 *Spectral power-flux-density*

The logarithmic expression corresponds to the ratio of  $P/(A \cdot \Delta f)$  and a reference density e.g. 1 W/(m<sup>2</sup> · Hz).

$$\begin{aligned} \text{Example :} \quad &-18 \text{ dB(W/(m}^2 \cdot \text{Hz))} \\ &\text{or } -18 \text{ dB(W} \cdot \text{m}^{-2} \cdot \text{Hz}^{-1}\text{)}. \end{aligned}$$

A variant sometimes used is, dB(W/(m<sup>2</sup> · 4 kHz)).

6.6 *Absolute level of an electromagnetic field*

The strength of an electromagnetic field can be expressed by a power flux-density ( $P/A$ ), by an electric field-strength  $E$  or by a magnetic field-strength  $H$ . The field-strength level  $L_E$  is the logarithm of the ratio of  $E$  and a reference field-strength, usually 1  $\mu$ V/m.

An example with a condensed notation is:

$$L_E = 5 \text{ dB}(\mu\text{V/m}).$$

As the power carried by an electromagnetic field is linked to the square of the field strength, this notation means:

$$20 \lg E(\mu\text{V/m}) = 5$$

6.7 *Sound pressure level*

The level corresponds to the ratio of sound pressure and a reference pressure, often 20  $\mu$ Pa.

Example: 15 dB(20  $\mu$ Pa).

As acoustic power is linked to the square of sound pressure, this means:

$$20 \lg (p/20 \mu\text{Pa}) = 15^*$$

\* In the ratio  $(p/20\mu\text{Pa})$ , it is evident that both sound pressures must be expressed in the same units.



## 7. Ratios expressing transmission quality

### 7.1 Signal-to-noise ratio

This is either the ratio of the signal power ( $P_s$ ) to the noise power ( $P_n$ ), or the ratio of the signal voltage ( $U_s$ ) to the noise voltage ( $U_n$ ) measured at a given point with specified conditions. It is expressed in decibels:

$$R = 10 \lg (P_s/P_n) \quad \text{dB} \quad \text{or} \quad R = 20 \lg (U_s/U_n) \quad \text{dB}$$

The ratio of the wanted signal to the unwanted signal is expressed in the same way.

### 7.2 Protection ratio

This is either the ratio of the wanted signal power ( $P_w$ ) to the maximum permissible interfering signal power ( $P_i$ ), or the ratio of the wanted signal field-strength ( $E_w$ ) to the maximum permissible interfering signal field-strength ( $E_i$ ). It is expressed in decibels:

$$A = 10 \lg (P_w/P_i) \quad \text{dB} \quad \text{or} \quad A = 20 \lg (E_w/E_i) \quad \text{dB}$$

### 7.3 Carrier to spectral noise density ratio ( $C/N_0$ )

This is the ratio  $P_c/(P_n/\Delta f)$  — where  $P_c$  is the carrier power,  $P_n$  the noise power,  $\Delta f$  the corresponding frequency bandwidth. This ratio has a dimension of frequency, it cannot be expressed without caution in terms of decibels, for power is not linked with frequency on a well-defined basis.

This ratio could be expressed in relation with a reference quantity such as 1 W/(W/Hz) which clearly indicates the origin of the result.

For example, with  $P_c = 2$  W,  $P_n = 20$  mW, and  $\Delta f = 1$  MHz, for the logarithmic expression corresponding to  $C/N_0$  we have:

$$10 \lg \frac{P_c}{P_n/\Delta f} = 50 \text{ dB(W/(W/kHz))}$$

This expression is abbreviated to read 50 dB(kHz) which should however be avoided if it is liable to give rise to any misunderstanding.

### 7.4 Figure of merit ( $M$ )

The figure of merit ( $M$ ) characterizing a receiving radio station is a logarithmic expression which is related to the antenna gain  $G$  (in decibels) and the overall noise temperature  $T$  (in kelvins) in the following way:

$$M = \left[ G - 10 \lg \frac{T}{1\text{K}} \right] \text{ dB(W/(W} \cdot \text{K))}$$

The decibel notation may be abbreviated to read dB(K<sup>-1</sup>) which should however be avoided if it is liable to give rise to misunderstanding.

## 8. Special notations

Examples of special notations, the use of which may be continued, are given below. These notations are often made in addition to other notations.

*For absolute power level (see Appendix I, § 1.1)*

- dBW: absolute power level with respect to 1 watt, expressed in decibels;
- dBm: absolute power level with respect to 1 milliwatt, expressed in decibels;
- dBm0: absolute power level with respect to 1 milliwatt, expressed in decibels, referred to a point of zero relative level;
- dBm0p: absolute psophometric power level (weighted for telephony) with respect to 1 milliwatt, expressed in decibels, referred to a point of zero relative level;
- dBm0s: absolute power level with respect to 1 milliwatt, expressed in decibels, referred to a point of zero relative level in sound programme transmission;
- dBm0ps: absolute psophometric power level (weighted for sound-programme transmission) with respect to 1 milliwatt, expressed in decibels, referred to a point of zero relative level in sound programme transmission.



*For absolute level of an electromagnetic field* (see Appendix I, § 2.1)

**dB<sub>μ</sub>** or **dBu**: absolute level of the electromagnetic field with respect to 1 μV/m, expressed in decibels.

*For absolute voltage level including the audio-frequency noise level* (see Appendix I, § 2.2 and 2.3)

**dBu**: absolute voltage level with respect to 0.775 V, expressed in decibels.

**dBu0**: absolute voltage level with respect to 0.775 V, referred to a point of zero relative level;

**dBu0s**: absolute voltage level with respect to 0.775 V, referred to a point of zero relative level in sound-programme transmission;

**dBqps**: absolute weighted voltage level measured according to Recommendation 468 in sound-programme transmission;

**dBq0ps**: absolute weighted voltage level measured according to Recommendation 468 referred to a point of zero relative level in sound-programme transmission;

**dBq0s**: absolute unweighted voltage level measured according to Recommendation 468 in sound-programme transmission with respect to 0.775 V referred to a point of zero relative level.

*For relative power level* (see Appendix I, § 1.2)

**dB<sub>r</sub>**: decibels (relative);

*For relative voltage level in sound-programme transmission* (see Appendix I, § 2.4)

**dB<sub>r</sub>s**: relative voltage level expressed in decibels, referred to another point in sound-programme transmission.

*For absolute acoustic pressure level*

**dBA** (or **dBB**, **dB<sub>C</sub>**): weighted acoustic pressure level with respect to 20 μPa, mentioning the weighting curve used (curves A, B or C, see IEC Publication 123).

*For antenna gain in relation to an isotropic antenna*

**dB<sub>i</sub>**.

*For antenna gain in relation to a half-wave dipole*

**dB<sub>d</sub>**.

*Note 1* — In the case of the ratio “energy per bit to spectral noise density”,  $E/N_0$ , which is used in digital transmission, the ratio is made between two quantities homogeneous with spectral power density, and this ratio may normally be expressed in decibels, like power ratios (see § 1 above). However, it is necessary to ensure that the units used for the expression of both terms in the ratio are equivalent; for example, joule (J) for energy and watts per hertz (W/Hz) for spectral noise density.

*Note 2* — Appendix I gives the principles for the use of the term decibel in telecommunications.

The examples given in the present Recommendation are illustrations of these principles.

*Note 3* — In Appendix II is given the principle of the notation recommended by the IEC for expressing the level of a quantity with respect to a specified reference. The notations used in the present Recommendation are applications of this principle.

## APPENDIX I

### USE OF THE TERM DECIBEL IN TELECOMMUNICATIONS

#### 1. Use of the decibel for ratios of quantities directly connected with power

##### 1.1 Absolute power level

The absolute power level is the ratio, generally expressed in decibels, between the power of a signal at a point in a transmission channel and a specified reference power.

It should be specified in every case whether the power is real or apparent.

It is necessary for the reference power to be indicated by a symbol:

- when the reference power is one watt, the absolute power level is expressed in “decibels relative to one watt” and the symbol “dBW” is used;
- when the reference power is one milliwatt, the absolute power level is expressed in “decibels relative to one milliwatt” and the symbol “dBm” is used.

## 1.2 Relative power level and related concepts

### 1.2.1 Definition

The relative power level is the ratio, generally expressed in decibels, between the power of a signal at a point in a transmission channel and the same power at another point in the channel chosen as a reference point, generally at the origin of the channel.

It should be specified in every case whether the power is real or apparent.

Unless otherwise specified, the relative power level is the ratio of the power of a sinusoidal test signal (at 800 or 1000 Hz) at a point in the channel to the power of that reference signal at the transmission reference point.

### 1.2.2 Transmission reference point

In the old transmission plan, the CCITT had defined "the zero relative-level point" as being the two-wire origin of a long distance circuit (point O of Fig. 1).

In the presently recommended transmission plan the relative level should be  $-3.5$  dBr at the virtual switching point on the sending side of a four-wire international circuit (point V of Fig. 2). The "transmission reference point" or "zero relative level point" (point T of Fig. 2) is a virtual two-wire point which would be connected to V through a hybrid transformer having a loss of 3.5 dB. The conventional load used for the computation of noise on multi-channel carrier systems corresponds to an absolute mean power level of  $-15$  dBm at point T.

### 1.2.3 Meaning of "dBm0"

If a measuring signal with an absolute power level  $L_M$  (in dBm) is applied at point T, the absolute power level of signal appearing at a point X, where the relative level is  $L_{XR}$  (in dBr), will be  $L_M + L_{XR}$  (in dBm).

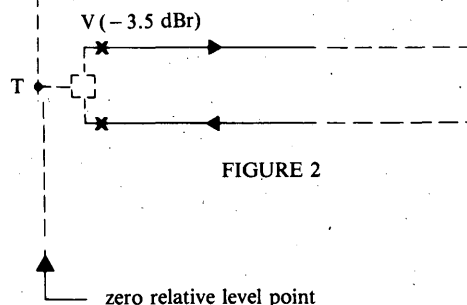
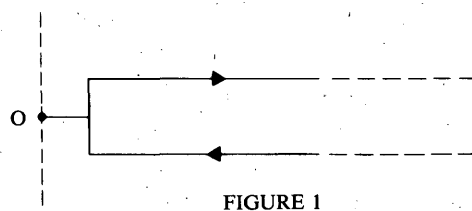
Conversely, if a signal at X has an absolute power level  $L_{XA}$  (in dBm), it is often convenient to "refer it to a zero relative level point" by computing  $L_0$  (in dBm0) by the formula:

$$L_0 = L_{XA} - L_{XR}$$

This formula may be used, not only for signals, but also for noise (weighted or unweighted), which helps in the computation of a signal-to-noise ratio.

*Note* — More detailed explanations are given in the following Recommendations published in Volume III of the CCITT:

- G.101, § 5 and G.223 for § 1.2.1 and 1.2.2 above.



### 1.3 Power density

*Definition:* Quotient of a power by another quantity, for example, an area, a bandwidth, a temperature.

*Note 1* — The quotient of a power by an area is called “power flux-density” (“puissance surfacique”) and is commonly expressed in “watts per square metre” (symbol:  $W \cdot m^{-2}$  or  $W/m^2$ ).

The quotient of a power by a frequency bandwidth is called “power spectral density” and can be expressed in “watts per hertz” (symbol:  $W \cdot Hz^{-1}$  or  $W/Hz$ ). It can also be expressed with a unit involving a bandwidth characteristic of the technique concerned, for example, 1 kHz or 4 kHz in analogue telephony, 1 MHz in digital transmission or in television; the power spectral density is then expressed in “watts per kilohertz” ( $W/kHz$ ) or in “watts per 4 kHz” ( $W/4 kHz$ ) or even in “watts per megahertz” ( $W/MHz$ ).

The quotient of a power by a temperature, used particularly in the case of noise powers, has no specific name. It is usually expressed as “watts per kelvin” (symbol:  $W \cdot K^{-1}$  or  $W/K$ ).

*Note 2* — In some cases a combination of several types of power densities can be used, for example a “spectral power flux-density” which is expressed as “watts per square metre and per hertz” (symbol:  $W \cdot m^{-2} \cdot Hz^{-1}$  or  $W/(m^2 \cdot Hz)$ ).

### 1.4 Absolute power density level

*Definition:* Expression in logarithmic form, usually in decibels, of the ratio between the power density at a given point and a reference power density.

*Note* — For example, if one watt per square metre is chosen as the reference power flux-density, the absolute power flux-density levels are expressed as “decibels with respect to one watt per square metre” (symbol:  $dB(W/m^2)$ ).

Similarly, if one watt per hertz is chosen as the spectral reference power density, the absolute spectral power density levels are expressed as “decibels with respect to one watt per hertz” (symbol:  $dB(W/Hz)$ ).

If one watt per kelvin is chosen as the reference for power density per unit temperature, the absolute power density levels per temperature unit are expressed as “decibels with respect to one watt per kelvin” (symbol:  $dB(W/K)$ ).

This notation can easily be extended to combined densities. For example, the absolute spectral density levels of the flux-density are expressed as “decibels with respect to one watt per square metre and per hertz” for which the symbol is:  $dB(W/(m^2 \cdot Hz))$ .

## 2. Use of the decibel for ratios of quantities indirectly connected with power

Current practice has led to an extension of the use of the term decibel to ratios of quantities which are only indirectly connected with power or which are linked to it through the medium of a third quantity. In these various cases, the decibel should be used with the utmost precaution and should always be accompanied by a note indicating the conventions adopted and the sphere of validity of this usage.

A case extremely common in practice, is where the ratio of two powers  $P_1$  and  $P_2$  depends solely on the ratio of the values  $X_1$  and  $X_2$  of another quantity  $X$  by an equation in the form:

$$P_1/P_2 = (X_1/X_2)^\alpha$$

$\alpha$  being any real number. The corresponding number of decibels can then be calculated from the ratio:

$X_1/X_2$  from the equation:

$$N = 10 \lg (P_1/P_2) = 10 \alpha \lg (X_1/X_2) \quad \text{dB}$$

It should be noted that a quantity  $X$  is not always associated with the same value of the number  $\alpha$ , and therefore it is not possible, without some other indication, to express in decibels the ratio of two values of the quantity  $X$ .

Most often  $\alpha$  is equal to 2, and then the expression in decibels of ratios of currents or voltages or other analogous quantities in other fields, is:

$$N = 20 \lg (X_1/X_2) \quad \text{dB}$$

An example where  $\alpha$  is other than 2 is the relationship between cross-polarization (*XPD*) and the co-polarized path attenuation (*CPA*) given by the empirical relationship (see Report 722):

$$XPD = U - V \lg (CPA) \quad \text{dB}$$

## 2.1 Absolute level of the electromagnetic field

The electromagnetic field set up by a transmitter is of concern to some services. At considerable distances from the antenna this field is generally defined by its electric component  $E$ , for which it is often convenient to use a logarithmic scale.

For a non-guided wave propagated in a vacuum, or in practice in the atmosphere, there is a clearly defined relationship between the electric field  $E$  and the power flux-density  $p$ :

$$E^2 = Z_0 p$$

$Z_0$ , which is the intrinsic impedance of the vacuum, having a fixed numerical value of  $120 \pi$  ohms. In particular, a field of 1 microvolt per metre corresponds to a power flux-density of  $-145.8 \text{ dB(W/m}^2\text{)}$ .

The absolute level of the electric field can then be defined by the equation:

$$N = 20 \lg \left( \frac{E}{E_0} \right)$$

$E_0$  being a reference field, generally 1 microvolt per metre. In this case,  $N$  represents the absolute field level in "decibels with respect to 1 microvolt per metre", the symbol for which is "dB( $\mu\text{V/m}$ )".

In accordance with International Standard ISO 2955, the symbol "dB( $\mu\text{V/m}$ )" may be used when the character set employed does not comprise Greek letters. This symbol is sometimes further abbreviated to "dBu". This symbol does however have another use which is defined in § 3.2.

## 2.2 Absolute voltage level

The absolute voltage level is the ratio, generally expressed in decibels, of the voltage of a signal at a point in a transmission channel to a specified reference voltage.

The nature of the voltage in question, e.g. r.m.s. value, should be specified in every case.

A reference voltage with an r.m.s. of 0.775 volt is generally adopted which corresponds to a 1 milliwatt power dissipated in a resistance of 600 ohms, since 600 ohms represents a rough approximation to the characteristic impedance of certain balanced telephone lines.

2.2.1 If the impedance at the terminals of which the voltage  $U_1$  is measured, is in fact 600 ohms, the absolute voltage level thus defined, corresponds to the absolute power level with respect to 1 milliwatt, and so the number  $N$  exactly represents the level in decibels with respect to 1 milliwatt (dBm).

2.2.2 If the impedance at the terminals of which the voltage  $U_1$  is measured, is  $R$  ohms,  $N$  equals the number of dBm increased by the quantity  $10 \lg (R/600)$ .

## 2.3 Absolute audio-frequency noise level in broadcasting, sound recording or sound-programme transmission

Measurement of audio-frequency noise in broadcasting, sound recording or sound-programme transmission is made, normally through a weighting network and by following the quasi-peak value method of Recommendation 468 using a reference voltage of 0.775 volt at 1 kHz and a nominal impedance of 600 ohms and expressing the results normally in dBqp.

*Note* — The two notations in "dBq" and "dBm" should not be used interchangeably. In sound-programme transmission the notation "dBq" is restricted to level measurements of noise with single or multiple tone bursts whereas the notation "dBm" only applies to sinusoidal signals used for lining up the circuit.

## 2.4 Relative voltage levels in sound-programme transmission

The relative voltage level at a point in a sound-programme transmission chain is the ratio, expressed in dB, of the voltage level of a signal at that point relative to the voltage level of the same signal at the reference point. This ratio is expressed in "dBrS", the "r" indicating "relative level" and "s" indicating that the ratio refers to levels in a "sound-programme" system. At the reference point (the point of zero relative level, 0 dBrS) a test signal at the alignment level (see Recommendation 645), has a level of 0 dBu. Note that in some broadcasting chains, there may be no point of zero relative level. However, points of measurements and interconnection may still be given a level (in dBrS) relative to a hypothetical reference point.

## 3. Use of the decibel, by extension, for ratios of quantities not connected with power

### 3.1 Voltage ratios

In certain spheres such as audio frequencies, the concept of voltage is sometimes more important than that of power. This is the case, for example, when low output- and high input-impedance two-port networks are associated in tandem. In this way a deliberate departure is made from the impedance matching conditions in order to simplify the formation of these networks. When this is done, only the voltage ratios at different points in the link need to be taken into consideration.

It is then convenient to express these voltage ratios in a logarithmic scale, e.g. to the base 10, by defining the number  $N$  of corresponding units by means of the equation:

$$N = K \lg \left( \frac{U_1}{U_2} \right)$$

In this equation the coefficient  $K$  is *a priori* arbitrary. However, by analogy with the operation:

$$N = 20 \lg \left( \frac{U_1}{U_2} \right)$$

which expresses in decibels the ratio of the  $I^2R$  loss as in two equal resistances at the terminals of which the voltages  $U_1$  and  $U_2$  respectively, are applied, one is led to adopt the value 20 for the coefficient  $K$ . The number  $N$  then expresses in decibels the power ratios which would correspond to the voltage ratios, if the latter were applied to equal resistances, although in practice this is not generally the case.

### 3.2 Absolute voltage level

If the impedance at the terminals of which the voltage is measured is not specified, the corresponding power level cannot be calculated. However, a number  $N$  can be defined conventionally in accordance with § 3.1 with respect to a reference voltage and can be expressed in decibels. To avoid any confusion, it is essential to specify that an absolute voltage level is concerned and the symbol dBu must be used. The symbol dBu appears to create no confusion with the use defined in § 2.1 as the absolute level of the electromagnetic field referred to 1 microvolt per metre. If, however, there is any risk of confusion, the expression dB (775 mV) must be written, at least the first time.

## APPENDIX II

### NOTATION FOR EXPRESSING THE REFERENCE OF A LEVEL

(Part 5 of IEC Publication 27-3)

A level representing the quantity  $x$  with the reference quantity  $x_{ref}$  may be indicated by:

$L_x$  (with respect to  $x_{ref}$ ) or by  $L_x/x_{ref}$ .

*Examples:*

The statement that a certain sound pressure level is 15 dB above the level corresponding to a reference pressure of 20  $\mu$ Pa can be written as:

$$L_p \text{ (re 20 } \mu\text{Pa)} = 15 \text{ dB or as } L_{p/20 \mu\text{Pa}} = 15 \text{ dB}$$

The statement that the level of a current is 10 Np below 1 ampere can be written as:

$$L_I \text{ (with respect to 1 A) } = -10 \text{ Np.}$$

The statement that a certain power level is 7 dB above 1 milliwatt can be written as:

$$L_P \text{ (with respect to 1 mW) } = 7 \text{ dB.}$$

The statement that a certain electric field-strength is 50 dB above 1 microvolt per metre can be written as:

$$L_E \text{ (with respect to 1 } \mu\text{V/m) } = 50 \text{ dB.}$$

In presenting data, particularly in tabular form or in graphical symbols, a condensed notation is often needed for identifying the reference value. Then, the following condensed form, illustrated by application to the above examples, may be used:

15 dB(20  $\mu$ Pa)  
-10 Np(1 A)  
7 dB(1 mW)  
50 dB(1  $\mu$ V/m).

The number 1 in the expression of a reference quantity is sometimes omitted. This is not recommended in cases when confusion may occur.

When a constant level reference is used repeatedly in a given context and explained in the context, it may be omitted.\*

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\* The omission of the reference level, permitted by the IEC, is not permitted in CCIR texts.

## RECOMMENDATION 666-1

## ABBREVIATIONS AND INITIALS USED IN TELECOMMUNICATIONS

(1986-1990)

The CCIR,

## CONSIDERING

- (a) the rapid increase in the number of abbreviations and initials used in the texts of the CCIR;
- (b) that it is sometimes difficult to find the precise meaning of an abbreviation or acronym appearing in CCIR texts;
- (c) that Recommendation 430 is concerned with unit symbols,

## UNANIMOUSLY RECOMMENDS

1. that with the exception of abbreviations frequently used in telecommunications, abbreviations and acronyms should not be used in CCIR texts unless they make the text easier to read, i.e. when an abbreviation may be used several times in the same text;
2. that, with the exception of abbreviations frequently used in telecommunications, the first time an abbreviation is used in a particular text its full meaning should be given, either in the body of the text or in a footnote;
3. that an alphabetical list of abbreviations used in the CCIR Volumes should be published either at the end of each Volume or in a separate fascicle;
4. that for the abbreviations most frequently used in telecommunications, the administrations, CCIR Secretariat and other participants in the work of the CCIR should as far as possible use the abbreviations contained in Appendix I with the meaning indicated therein;
5. that for abbreviations specific to certain fields, the administrations, CCIR Secretariat and other participants in the work of the CCIR should use the abbreviations which appear in the publications listed in Appendix II.

## APPENDIX I

ABBREVIATIONS AND INITIALS FOR TERMS COMMONLY  
USED IN TELECOMMUNICATIONS

The abbreviations are those which are most frequently used in the texts of the CCIR and the CCITT and in the working languages of the ITU.

Annex I consists of the list of abbreviations, initials and terms in the three working languages. These are classified in the various fields of telecommunications and include a serial number for each term.

Annex II comprises a complete list of the abbreviations and initials in alphabetical order and the corresponding serial numbers given in Annex I.

*Note* — An alphabetical list of abbreviations and initials used in the CCITT Volumes is included in Fascicle I.3 "Terms and definitions" of the CCITT.



## ANNEX I

## LIST OF ABBREVIATIONS AND INITIALS CLASSIFIED BY TECHNICAL FIELD

Serial No.	Term	Abbreviations and initials		
		E	F	S
<b>A</b>	<i>Frequency-related terms</i>			
01	audio frequency audiofréquence audiofrecuencia	AF	AF	AF
02	radio frequency radiofréquence radiofrecuencia	RF	RF	RF
03	video frequency vidéofréquence videofrecuencia	VF *	VF	VF
04	intermediate frequency fréquence intermédiaire frecuencia intermedia	IF	FI	FI
05	pulse repetition frequency fréquence de répétition des impulsions frecuencia de repetición de impulsos	PRF	FRI	FRI
<b>B</b>	<i>Analogue modulation</i>			
01	continuous wave onde entretenue onda continua	CW		CW
02	amplitude modulation modulation d'amplitude modulación de amplitud	AM	MA	MA
03	double sideband double bande latérale doble banda lateral	DSB	DBL	DBL
04	single sideband bande latérale unique banda lateral única	SSB	BLU	BLU
05	independent sideband bandes latérales indépendantes banda lateral independiente	ISB	BLI	BLI
06	vestigial sideband bande latérale résiduelle banda lateral residual	VSB	BLR	BLR
07	upper sideband bande latérale supérieure banda lateral única superior	USB	BLsup	BLUS
08	lower sideband bande latérale inférieure banda lateral única inferior	LSB	BLinf	BLUI
09	quadrature amplitude modulation modulation d'amplitude en quadrature modulación de amplitud en cuadratura	QAM	MAQ	MAQ
10	frequency modulation modulation de fréquence modulación de frecuencia	FM	MF	MF
11	narrow band frequency modulation modulation de fréquence à bande étroite modulación de frecuencia de banda estrecha	NBFM	MFBE	MFBE

\* VF is also used as an abbreviation for "voice frequency".

Serial No.	Term	Abbreviations and initials		
		E	F	S
12	wideband frequency modulation modulation de fréquence à bande large modulación de frecuencia de banda ancha	WBFM	MFBL	MFBA
13	phase modulation modulation de phase  modulación de fase	PM	[MP MΦ	MP
14	pulse amplitude modulation modulation d'impulsions en amplitude modulación de impulsos en amplitud	PAM	MIA	MIA
15	[pulse duration modulation pulse width modulation modulation d'impulsions en durée modulation d'impulsions en largeur modulación de impulsos en duración modulación de impulsos en anchura	[PDM PWM	MID	MID
16	pulse position modulation modulation d'impulsions en position modulación de impulsos en posición	PPM	MIP	MIP
17	pulse time modulation modulation d'impulsions dans le temps modulación de impulsos en tiempo	PTM	MIT	MIT
18	pulse frequency modulation modulation d'impulsions en fréquence modulación de impulsos en frecuencia	PFM	MIF	MIF
19	pulse interval modulation modulation des intervalles entre impulsions modulación del intervalo entre impulsos	PIM		
C	<i>Digital modulation</i>			
01	amplitude shift keying modulation par déplacement d'amplitude modulación por desplazamiento de amplitud	ASK	MDA	MDA
02	frequency-shift keying modulation par déplacement de fréquence modulación por desplazamiento de frecuencia	FSK	MDF	MDF
03	minimum shift keying modulation par déphasage minimal modulación por desplazamiento mínimo	MSK	MDM	MDM
04	gaussian filtered minimum shift keying modulation par déphasage minimal avec filtrage gaussien modulación por desplazamiento mínimo con filtrado gaussiano	GMSK	MDMG	
05	phase-shift keying modulation par déplacement de phase modulación por desplazamiento de fase	PSK	MDP	MDP
06	differential phase-shift keying modulation par déplacement de phase différentielle modulación por desplazamiento de fase diferencial	DPSK	MDPD	MDPD
07	coherent phase-shift keying modulation par déplacement de phase cohérente modulación por desplazamiento de fase coherente	CPSK	MDPC	MDPC
08	differential coherent phase-shift keying modulation par déplacement de phase cohérente différentielle modulación diferencial por desplazamiento de fase coherente	DCPSK	MDPCD	MDPCD
09	binary phase-shift keying  modulation par inversion de phase modulación por desplazamiento de fase binaria	[BPSK 2-PSK	MDP-2	MDP-2

Serial No.	Term	Abbreviations and initials		
		E	F	S
10	quadraphase shift keying modulation par quadrature de phase modulación por desplazamiento de fase cuaternaria	QPSK 4-PSK 4 $\phi$ -PSK	MDP-4 MDPQ	MDP-4
11	multiple phase-shift keying modulation par déplacement de phase à $n$ états modulación por desplazamiento de fase múltiple de $n$ estados o $n$ -aria	MPSK	MDP- $n$	MDP- $n$
12	spread spectrum phase-shift keying modulation par déplacement de phase à étalement du spectre modulación por desplazamiento de fase de espectro ensanchado	SSPSK		
13	offset phase shift keying modulation par déplacement de phase décalée modulación por desplazamiento de fase separada	OPSK	MDPO	
14	amplitude phase keying modulation par déplacement d'amplitude et de phase modulación por desplazamiento de fase y de amplitud	APK	MDAP	MDPA
15	$n$ -state quadrature amplitude modulation modulation d'amplitude en quadrature à $n$ états modulación de amplitud en cuadratura de $n$ estados o $n$ -aria	$n$ -QAM	MAQ- $n$	MAQ- $n$
D	<i>Conversion and coding</i>			
01	analogue to digital (conversion) (conversion) analogique/numérique (conversión) analógica-digital	A/D	A/N	A/D
02	digital to analogue (conversion) (conversion) numérique/analogique (conversión) digital-analógica	D/A	N/A	D/A
03	pulse-code modulation modulation par impulsions et codage modulación por impulsos codificados	PCM	MIC	MIC
04	differential pulse-code modulation modulation par impulsions et codage différentiel modulación por impulsos codificados diferencial	DPCM	MICD	MICD
05	adaptive differential pulse-code modulation modulation par impulsions et codage différentiel adaptatif modulación por impulsos codificados diferencial adaptable	ADPCM	MICDA	MICDA
06	delta modulation modulation delta modulación delta	DM $\Delta$ M	MD M $\Delta$	MD M $\Delta$
07	companded delta modulation modulation delta avec compression et extension modulación delta con compansión	CDM		
08	single integration delta modulation modulation delta sigma modulación delta de integración única	SIDM	M $\Delta$ $\Sigma$	
09	adaptive delta modulation modulation delta adaptative modulación delta adaptable	ADM	MDA	MDA
10	adaptive transform coding codage par transformation adaptatif codificación por transformación adaptable	ATC	CTA	CTA
11	adaptive predictive coding codage par prédiction adaptatif codificación por predicción adaptable	APC	CPA	CPA
12	sub-band coding codage de sous-bande codificación de sub-banda	SBC	CSB	CSB

Serial No.	Term	Abbreviations and initials		
		E	F	S
13	multipulse excited coding codage actionné par impulsions multiples codificación por excitación multimpulso	MPEC	CAIM	CEMI
14	linear prediction coding codage par prédiction linéaire codificación por predicción lineal	LPC	CPL	CPL
15	residual excited linear prediction coding codage par prédiction linéaire actionné par les résidus codificación por predicción lineal con excitación residual	RELPC	PLAR	PLER
16	voice excited linear coding codage linéaire actionné par la voix codificación lineal con excitación por voz	VELC	CLAV	CLEV
E	<i>Multiplexing and multiple access</i>			
01	frequency division multiplexing multiplexage (par répartition) en fréquence multiplex por división en frecuencia	FDM	MRF	MDF
02	time division multiplexing multiplexage par répartition dans le temps; multiplexage temporel multiplex por división en tiempo	TDM	MRT	MDT
03	code division multiplexing multiplexage par répartition en code multiplex por división de código	CDM	MRC	MDC
04	wavelength division multiplexing multiplexage par répartition en longueur d'onde multiplex por división en longitud de onda	WDM	MRL	MDL
05	frequency division multiple access accès multiple (par répartition) en fréquence acceso múltiple por división en frecuencia	FDMA	AMRF	AMDF
06	time division multiple access accès multiple (par répartition) dans le temps acceso múltiple por división en tiempo	TDMA	AMRT	AMDT
07	code division multiple access accès multiple par répartition en code acceso múltiple por división de código	CDMA	AMRC	AMDC
08	spread spectrum multiple access accès multiple par étalement du spectre acceso múltiple por ensanchamiento del espectro	SSMA	AMES	AMEE
09	demand assignment multiple access accès multiple avec assignation à la demande acceso múltiple por asignación según demanda	DAMA	AMAD	AMAD
10	pulse address multiple access accès multiple avec adressage par impulsions acceso múltiple por dirección de impulsos	PAMA	AMAI	AMDI
11	single channel per carrier ... monovoie (... à une seule voie par porteuse) un solo canal por portadora	SCPC	SCPC	SCPC
12	demand assignment signalling and switching signalisation et commutation avec assignation en fonction de la demande señalización y conmutación con asignación por demanda	DASS		
13	satellite switched commutation dans le satellite conmutación en el satélite	SS	CS	CS
14	digital speech interpolation concentration numérique des conversations interpolación digital de señales vocales	DSI	CNC	DSI

Serial No.	Term	Abbreviations and initials		
		E	F	S
15	data above voice (transmission) (transmission de) données supravocales (transmisión de) datos en la parte superior de la banda de base	DAV	DAV	DAV
16	data under voice (transmission) (transmission de) données infravocales (transmisión de) datos en la parte inferior de la banda de base	DUV	DUV	DUV
17	time slot créneau temporel (intervalle de temps) intervalo de tiempo	TS	IT	IT
F	<i>Encoding</i>			
01	alternate mark inversion bipolaire alternant (code de signal) inversiones de marcas alternadas	AMI		
02	code mark inversion codé CMI inversión de marcas codificadas	CMI	CMI	
03	return to zero retour au zéro retorno a cero	RZ	RZ	RZ
04	non-return to zero non-retour au zéro sin retorno a cero	NRZ	NRZ	NRZ
05	high density bipolar bipolaire à haute densité bipolar de alta densidad	HDB	HDB	HDB
06	Bose Chaudhuri Hocquenghem code code de Bose Chaudhuri Hocquenghem código de Bose Chaudhuri Hocquenghem	BCH	BCH	BCH
07	error correction by automatic repetition correction d'erreur par détection et répétition corrección de errores por detección y repetición	ARQ	ARQ	ARQ
08	forward error correction correction d'erreur directe (sans voie de retour) corrección de errores en recepción sin canal de retorno	FEC	CED	FEC
09	error control device dispositif de protection contre les erreurs dispositivo de control de errores	ECD		
10	binary coded decimal décimal codé binaire decimal codificado en binario	BCD	DCB	BCD
G	<i>Quality and reliability</i>			
01	signal-to-noise ratio rapport signal/bruit relación señal/ruido	S/N	S/N	S/N
02	carrier-to-noise ratio rapport porteuse/bruit relación portadora/ruido	C/N	C/N	C/N
03	carrier-to-interference ratio rapport porteuse/brouillage relación portadora/interferencia	C/I	C/I	C/I
04	figure of merit facteur de qualité factor de calidad	$\left[ \frac{M}{G/T} \right]$	$\left[ \frac{M}{G/T} \right]$	$\left[ \frac{M}{G/T} \right]$

Serial No.	Term	Abbreviations and initials		
		E	F	S
05	electromagnetic compatibility compatibilité électromagnétique compatibilidad electromagnética	EMC	CEM	CEM
06	industrial, scientific and medical (equipments) (appareils) industriels, scientifiques et médicaux (equipos) industriales, científicos y médicos	ISM	ISM	ICM
07	modulated noise reference unit appareil de référence pour la production de bruit modulé unidad de referencia de ruido modulado	MNRU	ARBPM	URRM
08	transmitter intermodulation intermodulation dans l'émetteur intermodulación en el transmisor	TIM *		
09	receiver intermodulation intermodulation dans le récepteur intermodulación en el receptor	RIM		
10	mean time between failures moyenne des temps de bon fonctionnement tiempo medio entre fallos	MTBF	MTBF	MTBF
11	mean time to failure durée moyenne de fonctionnement avant défaillance tiempo medio de funcionamiento antes de fallo	MTTF	MTTF	MTTF
12	mean time to restore durée moyenne de panne tiempo medio de reparación	MTTR	MTTR	MTTR
13	bit error ratio (rate) taux d'erreur binaire proporción de bits erróneos	BER	TEB	BER
14	residual bit error ratio taux d'erreur binaire résiduel proporción de bits erróneos residual	RBER	TEBR	BER-R
15	character error ratio taux d'erreur sur les caractères proporción de caracteres erróneos	CER	TEC	PCE
16	error-free second seconde sans erreur segundo sin error	EFS	SSE	SSE
17	errored second seconde avec erreurs — seconde entachée d'erreurs segundo con errores	ES	SE	SE
18	severely errored second seconde gravement entachée d'erreurs segundo con muchos errores	SES	SGE	SME
19	degraded minute minute dégradée minuto degradado	DM	MD	MD
H	<i>Power</i>			
01	effective radiated power puissance apparente rayonnée potencia radiada aparente	e.r.p.	p.a.r.	p.a.r.
02	equivalent isotropically radiated power puissance isotrope rayonnée équivalente potencia isotrópica radiada equivalente	e.i.r.p.	p.i.r.e.	p.i.r.e.
03	effective monopole radiated power puissance apparente rayonnée sur antenne verticale courte potencia radiada referida a una antena vertical corta	e.m.r.p.	p.a.r.v.	p.r.a.v.
04	cymomotive force force cymomotrice fuerza cimomotriz	c.m.f.	f.c.m.	f.c.m.

\* TIM is also used as an abbreviation for terrestrial interface module.

Serial No.	Term	Abbreviations and initials		
		E	F	S.
J	<i>Propagation</i>			
01	co-polar attenuation affaiblissement copolaire atenuación de la componente copolar	CPA	CPA	CPA
02	cross-polarization discrimination découplage de polarisation discriminación por polarización cruzada	XPD	XPD	XPD
03	cross-polar isolation isolement de polarisation aislamiento por polarización cruzada	XPI	XPI	XPI
11	maximum usable frequency fréquence maximale utilisable frecuencia máxima utilizable	MUF	MUF	MUF
12	lowest usable frequency fréquence minimale utilisable frecuencia mínima utilizable	LUF	LUF	LUF
13	optimum working frequency  fréquence optimale de travail frecuencia óptima de trabajo	OWF FOT	FOT	FOT
14	total electron content contenu électronique total contenido electrónico total	TEC	CET	CET
15	sudden ionospheric disturbance perturbation ionosphérique à début brusque perturbación ionosférica súbita	SID	PIDB	
K	<i>Space radiocommunications</i>			
01	geostationary-satellite orbit orbite des satellites géostationnaires órbita de los satélites geoestacionarios	GSO	OSG	OSG
02	tracking, telemetry and telecommand poursuite, télémessure et télécommande seguimiento, telemetría y telemando	TTC	PTT *	STT
03	data relay satellite satellite relais de données satélite de retransmisión de datos	DRS	SRD	
04	search for extraterrestrial intelligence recherche de messages extraterrestres búsqueda de inteligencia extraterrestre	SETI	SETI	SETI
05	fixed-satellite service service fixe par satellite servicio fijo por satélite	FSS	SFS	SFS
06	mobile-satellite service service mobile par satellite servicio móvil por satélite	MSS	SMS	SMS
07	broadcasting-satellite service service de radiodiffusion par satellite servicio de radiodifusión por satélite	BSS	SRS	SRS
08	Earth exploration-satellite service service d'exploration de la Terre par satellite servicio de exploración de la Tierra por satélite	EESS	SETS	SETS
09	aeronautical (ground) earth station station terrienne (au sol) aéronautique estación terrena (tierra) aeronáutica	GES	STSA	
10	aircraft earth station station terrienne d'aéronef estación terrena de aeronave	AES	STAA	

\* PTT is also used as an abbreviation for Posts and Telecommunications administrations.

Serial No.	Term	Abbreviations and initials		
		E	F	S
L	<i>Time</i>			
01	universal time temps universel tiempo universal	UT	UT	UT
02	coordinated universal time temps universel coordonné tiempo universal coordinado	UTC	UTC	UTC
03	international atomic time temps atomique international tiempo atómico internacional	TAI	TAI	TAI
M	<i>Networks</i>			
01	hypothetical reference digital path conduit numérique fictif de référence trayecto digital ficticio de referencia	HRDP	CNFR	TDFR
02	public switched telephone network réseau téléphonique public avec commutation red telefónica pública con conmutación	PSTN	RTPC	RTPC
03	public data network réseau public pour données red pública de datos	PDN	RPD	RPD
04	integrated digital network réseau numérique intégré red digital integrada	IDN	RNI	RDI
05	integrated services digital network réseau numérique à intégration de services red digital de servicios integrados	ISDN	RNIS	RDSI
06	data terminal equipment équipement terminal de traitement de données equipo terminal de datos	DTE	ETTD	ETD
07	data circuit terminating equipment équipement de terminaison de circuit de données equipo de terminación de circuito de datos	DCE	ETCD	ETCD
08	digital radio concentrator system système numérique à concentration radioélectrique sistema digital concentrador radioeléctrico	DRCS	SNCR	SDCR
N	<i>Equipment</i>			
01	automatic frequency control commande automatique de fréquence control automático de frecuencia	AFC	CAF	CAF
02	automatic gain control commande automatique de gain control automático de ganancia	AGC	CAG	CAG
03	local oscillator oscillateur local oscilador local	LO	OL	OL
04	voltage-controlled oscillator oscillateur commandé par tension oscilador controlado por tensión	VCO	OCT	VCO
05	field effect transistor transistor à effet de champ transistor de efecto de campo	FET	TEC	FET
06	travelling wave tube tube à ondes progressives tubo de ondas progresivas	TWT	TOP	TOP



Serial No.	Term	Abbreviations and initials		
		E	F	S
<b>O</b>	<i>Terrestrial fixed service</i>			
01	fixed service service fixe servicio fijo	FS	SF	SF
02	point-to-multipoint point à multipoint punto a multipunto (comunicación)	P-MP	P-MP	P-MP
03	multipoint distribution system système de distribution multipoint sistema de distribución multipunto	MDS	SDM	SDM
04	digital radio-relay for synchronous hierarchy faisceau hertzien numérique pour hiérarchie synchrone relevador radioeléctrico digital para jerarquías síncronas	SDH-DRRS	HNS-FHN	JDS-RRD
<b>P</b>	<i>Miscellaneous</i>			
01	specification description language langage de spécification et de description fonctionnelles lenguaje de especificación y descripción	SDL	LDS	LED
02	stored programme control commande par programme enregistré control por programa almacenado	SPC	SPC	SPC

## ANNEX II

## ALPHABETICAL LIST OF ABBREVIATIONS AND INITIALS

Abbreviations and initials		Serial No.
<b>A</b>		
A/D	E,S	D 01
ADM	E	D 09
ADPCM	E	D 05
AES	E	K 10
AF	E,F,S	A 01
AFC	E	N 01
AGC	E	N 02
AM	E	B 02
AMAD	F,S	E 09
AMAI	F	E 10
AMDC	S	E 07
AMDF	S	E 05
AMDI	S	E 10
AMDT	S	E 06
AMEE	S	E 08
AMES	F	E 08
AMI	E	F 01
AMRC	F	E 07
AMRF	F	E 05
AMRT	F	E 06
A/N	F	D 01
APC	E	D 11
APK	E	C 14
ARBPM	F	G 07
ARQ	E,F,S	F 07
ASK	E	C 01
ATC	E	D 10
<b>B</b>		
BCD	E,S	F 10
BCH	E,F,S	F 06
BER	E,S	G 13
BER-R	S	G 14
BLI	F,S	B 05
BLinf	F	B 08
BLR	F,S	B 06
BLsup	F	B 07
BLU	F,S	B 04
BLUI	S	B 08
BLUS	S	B 07
BPSK	E	C 09
BSS	E	K 07
<b>C</b>		
CAF	F,S	N 01
CAG	F,S	N 02

Abbreviations and initials		Serial No.
CAIM	F	D 13
CDM	E	D 07, E 03
CDMA	E	E 07
CED	F	F 08
CEM	F,S	G 05
CEMI	S	D 13
CER	E	G 15
CET	F,S	J 14
C/I	E,F,S	G 03
CLAV	F	D 16
CLEV	S	D 16
c.m.f.	E	H 04
CMI	E,F	F 02
C/N	E,F,S	G 02
CNC	F	E 14
CNFR	F	M 02
CPA	F,S; E,F,S	D 11, J 01
CPL	F,S	D 14
CPSK	E	C 07
CS	F,S	E 13
CSB	F,S	D 12
CTA	F,S	D 10
CW	E,S	B 01
D		
D/A	E,S	D 02
DAMA	E	E 09
DASS	E	E 12
DAV	E,F,S	E 15
DBL	F,S	B 03
DCB	F	F 10
DCE	E	M 07
DCPSK	E	C 08
DM	E	G 19
DM, ΔM	E	D 06
DPCM	E	D 04
DPSK	E	C 06
DRCS	E	M 08
DRS	E	K 03
DSB	E	B 03
DSI	E,S	E 14
DTE	E	M 06
DUV	E,F,S	E 16
E		
ECD	E	F 09
EESS	E	K 08
EFS	E	G 16
e.i.r.p.	E	H 02
EMC	E	G 05
e.m.r.p.	E	H 03
e.r.p.	E	H 01
ES	E	G 17
ETCD	F,S	M 07
ETD	S	M 06
ETTD	F	M 06
F		
f.c.m.	F,S	H 04
FDM	E	E 01
FDMA	E	E 05
FEC	E,S	F 08

Abbreviations and initials		Serial No.
FET	E,S	N 05
FI	F,S	A 04
FM	E	B 10
FOT	E,F,S	J 13
FRI	F,S	A 05
FS	E	O 01
FSK	E	C 02
FSS	E	K 05
G		
GES	E	K 09
GMSK	E	C 04
GSO	E	K 01
G/T	E,F,S	G 04
H		
HDB	E,F,S	F 05
HNS-FHN	F	O 04
HRDP	E	M 01
I		
IDN	E	M 04
IF	E	A 04
ISB	E	B 05
ISDN	E	M 05
ISM	E,F,S	G 06
IT	F,S	E 17
J		
JDS-RRD	S	O 04
L		
LDS	F	P 01
LED	S	P 01
LO	E	N 03
LPC	E	D 14
LSB	E	B 08
LUF	E,F,S	J 12
M		
M	E,F,S	G 04
MA	F,S	B 02
MAQ	F,S	B 09
MAQ-n	F,S	C 15
MD	F,S	G 19
MD, MΔ	F,S	D 06
MDA	F,S	C 01, D 09
MDAP	F	C 14
MDC	S	E 03
MDF	F,S; S	C 02, E 01
MDL	S	E 04
MDM	F,S	C 03
MDMG	F	C 04
MDP	F,S	C 05
MDPA	S	C 14
MDPC	F,S	C 07
MDPCD	F,S	C 08
MDPD	F,S	C 06
MDPO	F	C 13
MDP-n	F,S	C 11
MDP-2	F,S	C 09
MDP-4	F,S	C 10

Abbreviations and initials		Serial No.
MDPQ	F	C 10
MΔΣ	F	D 08
MDS	E	O 03
MDT	S	E 02
MF	F,S	B 10
MFBA	S	B 12
MFBE	F,S	B 11
MFBL	F	B 12
MIA	F,S	B 14
MIC	F,S	D 03
MICD	F,S	D 04
MICDA	F,S	D 05
MID	F,S	B 15
MIF	F,S	B 18
MIP	F,S	B 16
MIT	F,S	B 17
MNRU	E	G 07
MP	F,S	B 13
MΦ	F	B 13
MPEC	E	D 13
MPSK	E	C 11
MRC	F	E 03
MRF	F	E 01
MRL	F	E 04
MRT	F	E 02
MSK	E	C 03
MSS	E	K 06
MTBF	E,F,S	G 10
MTTF	E,F,S	G 11
MTTR	E,F,S	G 12
MUF	E,F,S	J 11
N		
N/A	F	D 02
NBFM	E	B 11
n-QAM	E	C 15
NRZ	E,F,S	F 04
O		
OCT	F	N 04
OL	F,S	N 03
OPSK	E	C 13
OSG	F,S	K 01
OWF	E	J 13
P		
PAM	E	B 14
PAMA	E	E 10
p.a.r.	F,S	H 01
p.a.r.v.	F	H 03
PCE	S	G 15
PCM	E	D 03
PDM	E	B 15
PDN	E	M 03
PFM	E	B 18
PIDB	F	J 15
PIM	E	B 19
p.i.r.e.	F,S	H 02
PLAR	F	D 15
PLER	S	D 15
PM	E	B 13

Abbreviations and initials		Serial No.
P-MP	E,F,S	O 02
PPM	E	B 16
p.r.a.v.	S	H 03
PRF	E	A 05
PSK	E	C 05
PSTN	E	M 02
PTM	E	B 17
PTT	F	K 02
PWM	E	B 15
Q		
QAM	E	B 09
QPSK	E	C 10
R		
RBER	E	G 14
RDI	S	M 04
RDSI	S	M 05
RELP	E	D 15
RF	E,F,S	A 02
RIM	E	G 09
RNI	F	M 04
RNIS	F	M 05
RPD	F,S	M 03
RTPC	F,S	M 02
RZ	E,F,S	F 03
S		
SBC	E	D 12
SCPC	E,F,S	E 11
SDCR	S	M 08
SDH-DRRS	E	O 04
SDL	E	P 01
SDM	F,S	O 03
SE	F,S	G 17
SES	E	G 18
SETI	E,F,S	K 04
SETS	F,S	K 08
SF	F,S	O 01
SFS	F,S	K 05
SGE	F	G 18
SID	E	J 15
SIDM	E	D 08
SME	S	G 18
SMS	F,S	K 06
S/N	E,F,S	G 01
SNCR	F	M 08
SPC	E,F,S	P 02
SRD	F	K 03
SRS	F,S	K 07
SS	E	E 13
SSB	E	B 04
SSE	F,S	G 16
SSMA	E	E 08
SSPSK	E	C 12
STAA	F	K 10
STSA	F	K 09
STT	S	K 02
T		
TAI	E,F,S	L 03
TDFR	S	M 01

Abbreviations and initials		Serial No.
TDM	E	E 02
TDMA	E	E 06
TEB	F	G 13
TEBR	F	G 14
TEC	F; E; F	G 15; J 14; N 05
TIM	E	G 08
TOP	F,S	N 06
TS	E	E 17
TTC	E	K 02
TWT	E	N 06
U		
URRM	S	G 07
USB	E	B 07
UT	E,F,S	L 01
UTC	E,F,S	L 02
V		
VCO	E,S	N 04
VELC	E	D 16
VF	E,F,S	A 03
VSB	E	B 06
W		
WBFM	E	B 12
WDM	E	E 04
X		
XPD	E,F,S	J 02
XPI	E,F,S	J 03
2-PSK	E	C 08
4-PSK	E	C 10
4 $\phi$ -PSK	E	C 10
$\Delta$ M	E	D 06

## APPENDIX II

## REFERENCES TO LISTS OF SPECIFIC ABBREVIATIONS

## 1. Frequency and wavelength bands

See CCIR Recommendation 431.

## 2. Alphabets, codes, routing codes and identities

See the relevant CCITT Recommendations (Index of the Blue Book, Fascicle I.4).

## 3. Codes contained in the Radio Regulations

3.1 Designation of emissions: Article 2.

3.2 Symbols for the various types of antenna: Appendix 2, Section III.

3.3 Q code, general section (QRA to QUZ): Appendix 13, Section I.

3.4 Miscellaneous abbreviations: Appendix 13, Section II.

3.5 SINPO and SINPFEMO codes: Appendix 15.

**4. Abbreviations used by the ITU for the names of countries**

See the Preface to the International Frequency List, Table I. (Different abbreviations have been approved by ISO.)

**5. Acronyms of international organizations involved in telecommunications**

See the ITU "List of Addresses", § 3.

**6. Symbols and names for units**

6.1 Recommendation 430 gives the sources to be used. This Recommendation refers to IEC Publication 27 and to ISO International Standards 31 and 1000.

6.2 Recommendation 607: Terms and symbols for information quantities in telecommunications.

6.3 Recommendation 665: Traffic intensity unit.

6.4 Recommendation 431 (Note 2) — Frequency unit.

6.5 Recommendation 574: Use of the decibel and the neper in telecommunications.

**7. Letter symbols**

Recommendation 608 "Letter symbols for telecommunications" provides guidelines to be followed to simplify the reading of documents dealing with telecommunication technique; it refers to IEC Publication 27 and to ISO International Standard 31 for letter symbols to represent physical quantities and mathematical operations.

**8. Chemical symbols**

See the table published by the International Union of Pure and Applied Chemistry (IUPAC).

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## RESOLUTIONS

## RESOLUTION 113

## THE ORGANISATION OF VOCABULARY WORK

(1990)

The CCIR,

## CONSIDERING

- (a) that it is important for the work of the ITU and in particular of the CCIs and for liaison with other interested organisations that terms and their definitions be standardised as far as possible;
- (b) the importance of avoiding misunderstanding within the CCIR and between the CCIR and the CCITT and the IEC, respectively, in the use of terms and definitions;
- (c) the need to establish lists of terms and definitions for information within the CCIR and for the information of the CCITT and the IEC, and to update such lists rapidly and regularly,

## UNANIMOUSLY DECIDES

1. that the CCIR, within its terms of reference, should continue its work on technical and operational terms and their definitions which may be required for regulatory or administrative purposes and also on specialized terms which may be required by Study Groups in the course of their work, these terms and definitions being published rapidly and regularly by the CCIR;
2. that each Study Group should assume responsibility for terminology in its particular field of interest with the assistance of the Coordination Committee for Vocabulary (CCV) if necessary;
3. that each Study Group shall appoint a permanent Special Rapporteur for Vocabulary to coordinate its efforts regarding terms and definitions and related subjects and to act as a contact person for the Study Group in this domain. The Special Rapporteur may be assisted by experts in different languages and different technical subjects;
4. that the responsibilities of the Special Rapporteur for Vocabulary should be as given in Annex I;
5. that each Study Group should consider terms included within its texts and should define them if necessary, or at least explain new concepts or clarify the text used to express existing concepts. Dependent upon the generality of usage terms and definitions should be published in:
  - a separate text of the Study Group,
  - a specifically labelled section of each text,
  - or, within the text associated with the first usage of the term;
6. that where more than one Study Group is defining the same concept, efforts should be made to select a single term and a single definition which is acceptable to all of the Study Groups concerned;
7. that, when selecting terms and preparing definitions, the Study Group, and those entities responsible to the Study Group, shall take into account the established use of terms and existing definitions in CCIR and CCITT as well as those found in the International Electrotechnical Vocabulary (IEV);
8. that the Secretariat should collect all new terms and definitions proposed by the Study Group, and provide them to CCV which shall act as an interface with the CCITT and the IEC;
9. that the CCV shall communicate with individual Special Rapporteurs for Vocabulary and, if necessary, promote meetings of experts where inconsistencies are found between terms and definitions in the CCIR, the CCITT and the IEC. These mediation efforts should seek agreement to the extent that such agreement is feasible, with remaining inconsistencies duly noted;
10. that the CCV should review the texts previously drawn up by the CMV, revised texts, and proposed new texts on general subjects, being submitted to the CCIR Plenary Assembly;

11. that Study Groups, administrations and other participants in the work of the CCIR, may submit contributions concerning vocabulary and related subjects to the CCV;

12. that Special Rapporteurs for Vocabulary should take into account any available CCITT lists of emerging terms and draft IEV chapters, to seek consistency of CCIR terms wherever practicable.

*Note* — Annex II contains a flowchart for CCIR vocabulary and related subjects.

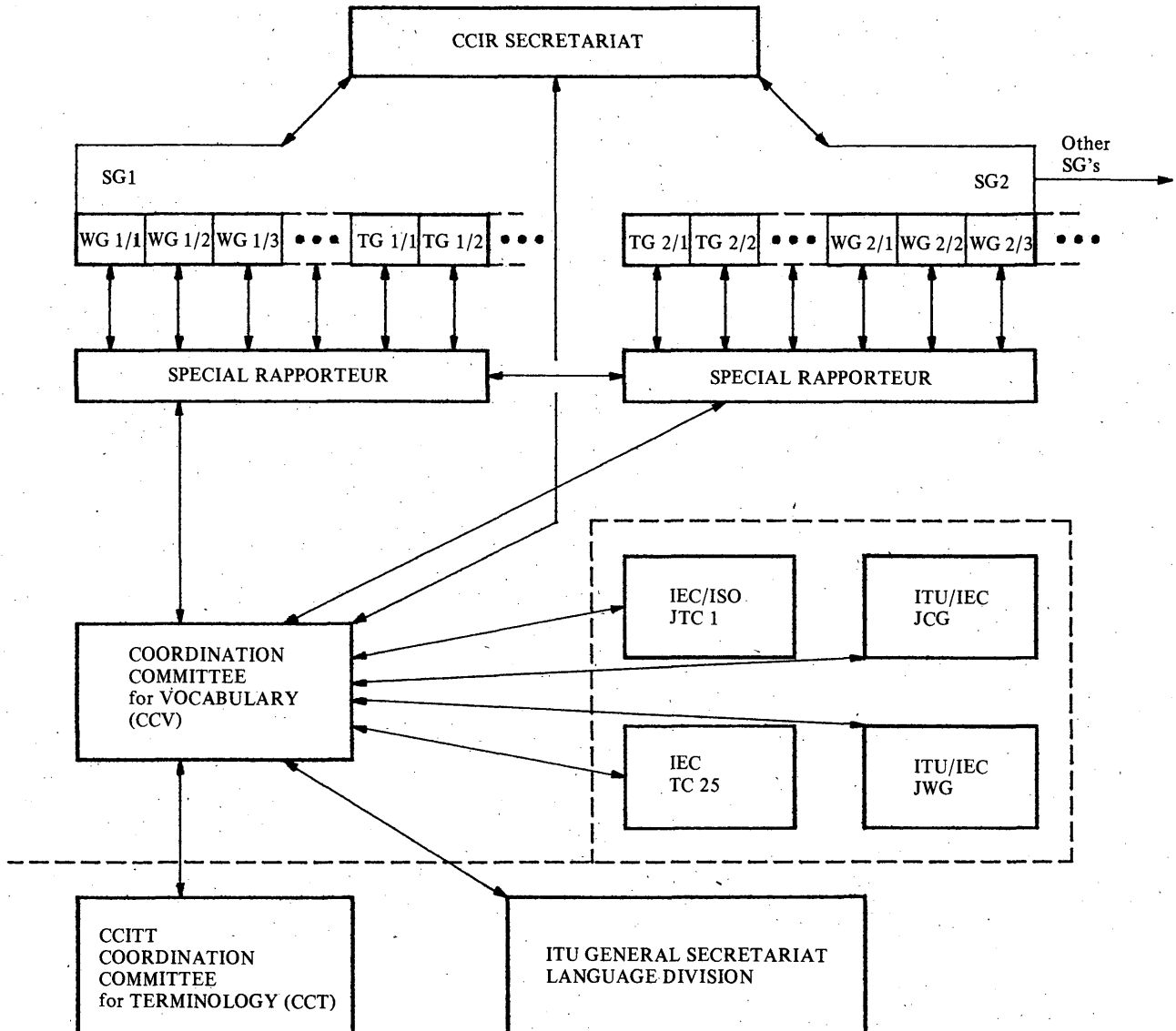
## ANNEX I

### RESPONSIBILITIES OF SPECIAL RAPORTEURS FOR VOCABULARY

1. The Special Rapporteurs shall study vocabulary and related subjects referred to them by:
  - Working Groups or Task Groups of the same Study Group,
  - the Study Group as a whole,
  - the Chairman of the Study Group,
  - the Special Rapporteur for Vocabulary of another Study Group, or by
  - the CCV.
2. The Special Rapporteurs shall be responsible for coordination of vocabulary and related subjects within their own Study Groups and with other CCIR Groups in conjunction with the CCV; the objective being to achieve the agreement of the Study Groups concerned.
3. The Special Rapporteurs shall be responsible for liaison between their Study Group and the CCV with regard to the activities of the CCI-IEC Joint Coordination Group for Vocabulary and the CCI-IEC Joint Working Group on Graphical Symbols and Documentation.

## ANNEX II

## FLOWCHART FOR CCIR VOCABULARY AND RELATED SUBJECTS



- TC 25: Quantities and Units and their Letter Symbols  
 JTC/1: Joint Technical Committee for Information Technology  
 JCG: Joint Coordination Group for Telecomms Vocabulary  
 JWG: Joint Working Group for Graphical Symbols, etc.  
 TG: Task Group

## RESOLUTION 114

## THE COORDINATION OF VOCABULARY AND RELATED SUBJECTS

(1990)

The CCIR,

## CONSIDERING

- (a) that CCITT at its IXth Plenary Assembly, whilst noting the importance of terminology, decided to withdraw from CMV and established instead a three member Terminology Coordination Committee;
- (b) that it is desirable to seek the most efficient method of organizing vocabulary work within the CCIR;
- (c) that it is important for the work of the ITU, and in particular of the CCIs and for liaison with other interested organisations, that terms and their definitions, graphical symbols for documentation, letter symbols and other means of expression, units of measurement etc., be standardized as far as possible;
- (d) the difficulty of achieving agreement on definitions when more than one Study Group is involved;
- (e) that the CCIs are collaborating with the International Electrotechnical Commission (IEC) (Technical Committee No. 1) in order to provide an internationally agreed vocabulary of telecommunications and that for this purpose a Joint Coordination Group (JCG) has been established;
- (f) that the CCIs are collaborating with the IEC (Technical Committee No. 3) in order to provide internationally agreed graphical symbols for diagrams and for use on equipment, approved rules for the preparation of documentation and for item designation and that for this purpose a Joint Working Group (JWG) has been established;
- (g) that the CCIs are collaborating with the IEC (Technical Committee No. 25) in order to provide internationally agreed letter symbols and units;
- (h) that the CCIR has published certain terms with their definitions in the Plenary Assembly Publications and that there is a continuing need for the publication of terms and definitions appropriate to the work of particular Study Groups;
- (j) that unnecessary or duplicated work can be avoided by effective coordination of all work on vocabulary and related subjects carried out by the CCIR Study Groups;
- (k) that the long-term objective of the terminology work must be the preparation of a comprehensive vocabulary of telecommunications in the working languages of the ITU,

## UNANIMOUSLY DECIDES

1. that the CMV be replaced by a CCIR Coordination Committee for Vocabulary (CCV) comprised of experts in the various working languages and members designated by interested administrations and other participants in the work of the CCIR, as well as the Special Rapporteurs for Vocabulary of the CCIR Study Groups;
2. that the terms of reference of the CCV should be as given in Annex I;
3. that the CCV should work mainly by correspondence according to Resolution 24;
4. that the CCV should review and, where necessary, revise the texts drawn up by CMV;
5. that administrations and other participants in the work of the CCIR may submit, to the CCV and to the Study Groups, contributions concerning vocabulary and related subjects;
6. that the Chairman of the CCV should be chosen by the CCIR Plenary Assembly.

## ANNEX I

## TERMS OF REFERENCE FOR THE COORDINATION COMMITTEE FOR VOCABULARY

**1. Vocabulary**

1.1 To coordinate vocabulary work, including abbreviations and initials, within the CCIR and to seek agreement among all concerned Study Groups to ensure acceptability of definitions.

1.2 To liaise with the CCITT Terminology Coordination Committee to ensure, so far as is practicable, that definitions of technical terms of common interest are mutually acceptable.

1.3 To liaise with the Language Division of the ITU General Secretariat, and with other organisations dealing with vocabulary work in the telecommunications field, for example with the IEC and the International Organisation for Standardization (ISO) by means of the CCI-IEC Joint Coordination Group for Vocabulary (JCG) and the IEC-ISO Joint Technical Committee for Information Technology (JTC 1).

**2. Related subjects**

2.1 To ensure coordination between the CCIR Study Groups concerning graphical symbols to be used in documentation or on equipment, the objective being to achieve the agreement of all Study Groups, and to ensure liaison with the CCI-IEC Joint Working Group for Graphical Symbols and Documentation (JWG).

2.2 To ensure coordination between the CCIR Study Groups concerning letter symbols and other means of expression, systematic classification, units of measurement, etc., the objective being to achieve the agreement of all Study Groups, and to cooperate with the relevant IEC Technical Committee (Technical Committee No. 25) and with the ISO.

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## RESOLUTION 89-1

**GUIDELINES FOR THE SELECTION OF TERMS  
AND PREPARATION OF DEFINITIONS**

(1986-1990)

The CCIR,

**CONSIDERING**

- (a) that the individual Study Groups of the CCIR have a responsibility for the selection of terms and preparation of definitions;
- (b) that there is sometimes a wide diversity of approach in the implementation of these procedures;
- (c) that there is a need for conformity in their implementation,

**UNANIMOUSLY DECIDES**

that when selecting terms and preparing definitions, the Study Groups of the CCIR should use the guidelines given in Annex I.

**ANNEX I****GUIDELINES FOR THE SELECTION OF TERMS  
AND PREPARATION OF DEFINITIONS****1. Introduction**

Given below are guidelines for:

- selection of terms,
- preparation of definitions.

**2. Terms****2.1 What is meant by a term?**

A term is a word or a group of words used to express a definite concept.

**2.2 Conciseness of terms**

The term should be selected to be as concise as possible, without impairing the understanding of the text containing the term.

When a term is used in more than one field in a general vocabulary, the field of application should be added between brackets, for example:

- coverage area (of a space station),
- coverage area (of a terrestrial transmitting station).

**2.3 Ambiguous terms**

The occurrence of terms with more than one meaning is occasionally inevitable. When one term has several meanings, confusion can arise in the following cases:

- the meanings are very similar,
- the terms appearing in the same text with different meanings (for instance when they are in the same field).

In such cases different terms should be found to express the different meanings of such ambiguous terms.

**2.4 Complex terms**

A complex term should reflect the combination of concepts included in the definition. However, it need not include every constituent of the combination of concepts shown in the definition.

Care should be taken to avoid the unnecessary proliferation of terms and definitions where an already-defined qualifying term, used in conjunction with a simpler term, would suffice.

### 3. Definitions

#### 3.1 *What is meant by definition?*

To define, is to state clearly, accurately and precisely what is a concept. This should preferably be done in one sentence, expressing exactly the meaning of the term used to designate the concept.

A definition should describe the concept fully for the engineering expert and contain sufficient data for the concept to be perfectly understood and its limits properly identified. The definition must be simple, clear and relatively brief. If necessary, additional information should be in the form of notes.

#### 3.2 *Use of terms in definitions*

The following general principles may be adopted for the terms used in a definition:

- all the technical terms which appear in a definition must either be well known or defined elsewhere in the text,
- the term or terms representing a concept to be defined should not appear in the definition,
- the meaning of a term must not be expressed using another term which is itself defined by means of the first term.

#### 3.3 *Accuracy of definitions*

The degree of accuracy of definitions may depend on their intended use. Attempts to achieve greater accuracy may lengthen the text unnecessarily. This may involve the use of more specific and hence less familiar technical terms, thereby making the definition harder rather than easier to understand.

#### 3.4 *Changes to, or limitation of, generally accepted terms*

No attempt should be made to modify or limit the established usage of a term, unless the use of the existing terms causes confusion or ambiguity. In this case the use of the term may be deprecated.

When certain general terms are used in a restricted sense in the telecommunications field, the definition should include an indication of this constraint.

#### 3.5 *Formulation of definitions*

The wording of the definition should clearly indicate whether the term is a substantive noun, a verb or an adjective.

#### 3.6 *Incomplete definitions*

Care should be taken not to omit the specific characteristics of a term in its definition. Such definitions are incomplete. The term and its definition should be interchangeable.

#### 3.7 *Definitions with more than one term*

It sometimes occurs that more than one term may apply to the same concept. In such cases the alternative term should also be shown (separated by a semicolon).

#### 3.8 *Definitions of limited application*

In general, the definitions which appear in ITU publications are of limited application, i.e. are valid only in the particular publication or field concerned.

The International Telecommunication Constitution (Nice, 1989) stipulates that the terms used in the Constitution and defined in its Annex 1 shall have the meanings assigned to them in that Annex. The same applies to the terms used in the Nice Convention and defined in the Annex thereto, those used in the Radio Regulations (1979, revised 1988) and defined in Article 1 thereof, and those used in the International Telecommunication Regulations (1988) and defined in Article 2 thereof. It is also stated that these terms and definitions do not necessarily apply for other purposes. The same considerations hold good for the terms defined by the experts of a Study Group for the specific requirements of their Study Group.

However, when the experts of a Study Group develop, for an existing term, a specific new definition which differs from an existing definition in a text that has already been approved, they should ensure that the new definition does not contradict the one which already exists for the same term.

In the case of definitions which are applicable in other Study Groups, the relevant experts are requested to prepare their definitions to allow them to be used in the widest possible field.

### 3.9 *Illustrations*

Illustrations can often be used to clarify or explain a definition. The type of illustration used will depend on each specific case; an example of a graphical depiction of terms used in the transmission loss concept can be seen in Recommendation 341 (see also Recommendation 573, sub-section A4).

### 3.10 *Further use of terms and definitions*

It should be borne in mind that it may be useful later to include a definition in a dictionary and, in this case, it would be valuable if the definition were fully comprehensible even when taken out of context. It could then be included in the dictionary without amendment.

## 4. **Presentation of terms and definitions**

4.1 For the presentation of terms and definitions, reference should be made to Resolution 78 which states that the terms, definitions and where necessary the abbreviations, should be published in the different working languages and presented in a logical order by subject which is the same in each language.

### 4.2 *Index of terms*

Should there be a need for an index, complex terms may be shown under one or other of the key words.

### 4.3 *Printing of terms*

Initial letters of terms should be printed in upper-case or lower-case letters as they would appear within a sentence according to the usage in each language.

## 5. **Further references**

For further and more specific guidance on the drafting of terms and definitions, reference may be made to the following publications:

- ISO Recommendation R704 "Principles and methods for terminology" (1987).
  - "IEC Guide for work relative to terminology (TC 1), graphical symbols (TC 3) and letter symbols (TC 25)" (1986).
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## RESOLUTION 78-1

## PRESENTATION OF TEXTS ON TERMINOLOGY

(1982-1990)

The CCIR,

## CONSIDERING

- (a) that it is essential that the terminology work done by the CCIs should be widely disseminated, as regards both terms and definitions;
- (b) that users generally have ITU publications at their disposal in one language only but are often required to read or write technical texts in one of the other working languages;
- (c) that texts on vocabulary and glossaries, such as the collection of terms and definitions in the CCITT Books, are not as a rule directly available to users interested in a particular volume;
- (d) that a terminological supplement to the Plenary Assembly Books does not cover all ITU terminology, nor even that of the publishing CCI, for example, as used in the handbooks;
- (e) that an alphabetical presentation of terms in a vocabulary results in a different order of terms for each language and that it is not very practical for users wanting to compare definitions in different languages;
- (f) that the user of vocabulary texts often wants each term to be grouped with other terms on the same subject, these terms being presented in a logical order.

## UNANIMOUSLY DECIDES

1. that the texts on vocabulary and the parts of texts dealing specifically with definitions of terms, published by the CCIR in the Volumes resulting from its Plenary Assembly, manuals or other publications, shall include the equivalents of all the terms defined in the other working languages of the ITU;
  2. that the practical means of providing the equivalents of terms in addition to the full text of terms and definitions in one of the languages is left to the discretion of the CCIR (see examples given in Recommendations 573 and 662);
  3. that in the texts on vocabulary and the parts of texts dealing specifically with definitions of terms, published by the CCIR in the Volumes resulting from its Plenary Assembly, in manuals or other publications, the terms are presented in a logical order by subjects which should be the same in all languages, and that the vocabulary should be completed if necessary by an alphabetical index giving the reference number of each term.
- Note* — When an abbreviation (or initials) exists to represent a term, it should be given immediately after the term, in the different working languages.
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## RESOLUTION 23-3

**COLLABORATION WITH THE INTERNATIONAL ELECTROTECHNICAL COMMISSION ON  
GRAPHICAL SYMBOLS AND DOCUMENTATION USED IN TELECOMMUNICATIONS**

(1963-1978-1982-1990)

The CCIR

## UNANIMOUSLY DECIDES

that the CCIR should continue to cooperate in the work of the CCI/IEC Joint Working Group which has been set up to prepare, for international telecommunications:

- an approved list of graphical symbols for diagrams and for use on equipment;
- approved rules for the preparation of documentation and for item designation,

## IT BEING UNDERSTOOD THAT

within the Joint Working Group, the ITU (itself represented by members from the CCIR and CCITT) is represented on an equal footing with the IEC;

the Joint Working Group, while being fully representative, is as small as possible to be able to work effectively and quickly;

CCIR members of the Joint Working Group are empowered to take decisions on questions relating to symbols and the rules referred to above, so that the publication of an approved list does not have to await formal approval by a following Plenary Assembly of the CCIR.

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