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ITU-T

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OF ITU

B.15

(10/96)

SERIES B: MEANS OF EXPRESSION: DEFINITIONS,
SYMBOLS, CLASSIFICATION

**Nomenclature of the frequency and wavelength
bands used in telecommunications**

ITU-T Recommendation B.15

(Previously CCITT Recommendation)

ITU-T B-SERIES RECOMMENDATIONS
MEANS OF EXPRESSION: DEFINITIONS, SYMBOLS, CLASSIFICATION

For further details, please refer to ITU-T List of Recommendations.

ITU-T RECOMMENDATION B.15

NOMENCLATURE OF THE FREQUENCY AND WAVELENGTH BANDS USED IN TELECOMMUNICATIONS

Source

ITU-T Recommendation B.15 was approved by the WTSC (Geneva, 9-18 October 1996).

FOREWORD

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the ITU. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Recommendation B.15¹

**NOMENCLATURE OF THE FREQUENCY AND WAVELENGTH BANDS
USED IN TELECOMMUNICATIONS**

(revised in 1996)

The ITU-T,

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,

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 B.3 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 A:
 - Table A.1 and Notes 1 and 2, which take account of No. 208 of the Radio Regulations, and
 - Note 3, which contains the proposal of the International Union of Radio Sciences (URSI),except in those cases where this would inevitably cause very serious difficulties.

¹ Similar text is to be found in ITU-R Recommendation V.431-6.

ANNEX A

Table A.1/B.15

Band number	Symbols	Frequency range (lower limit exclusive, upper limit inclusive)	Corresponding metric subdivision	Metric abbreviations for the bands
3	ULF	300 to 3000 kHz	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 0.3×10^N to 3×10^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 A.2.)

Table A.2/B.15

Band number	Symbols ^{a)}	Frequency range (lower limit exclusive, upper limit inclusive)	Corresponding metric subdivision	Metric abbreviations for the bands
-1		0.03 to 0.3 Hz	Gigametric waves	B.Gm
0	ELF	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

^{a)} The symbol EBF is used in French.

NOTE 4 – In most countries, the frequency ranges used for FM sound broadcasting and television are designated by the Roman numerals I-V. The frequency ranges are indicated in Table A.3. It should be noted that these ranges are, in some cases, not exclusive to the broadcasting services.

Table A.3/B.15

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

NOTE 5 – Certain frequency bands are sometimes designated by letters other than the symbols and abbreviations recommended in Tables A.1 and A.2. 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.

For information, letter designations used by some authors, mainly in the field of radar and space communications, are set out in Table A.4.

Table A.4/B.15

Letter symbols	Radar (GHz)		Space radiocommunications	
	Spectrum regions	Examples	Nominal designations	Examples (GHz)
L	1-2	1.215-1.4	1.5 GHz band	1.525-1.710
S	2-4	2.3-2.5 2.7-3.4	2.5 GHz band	2.5-2.690
C	4-8	5.25-5.85	4/6 GHz band	3.4-4.2 4.5-4.8 5.85-7.075
X	8-12	8.5-10.5	–	–
Ku	12-18	13.4-14.0 15.3-17.3	11/14 GHz band 12/14 GHz band	10.7-13.25 14.0-14.5
K ¹⁾	18-27	24.05-24.25	20 GHz band	17.7-20.2
Ka ¹⁾	27-40	33.4-36.0	30 GHz band	27.5-30.0

¹⁾ For space radiocommunications, K and Ka bands are often designated by the single symbol K_a.

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