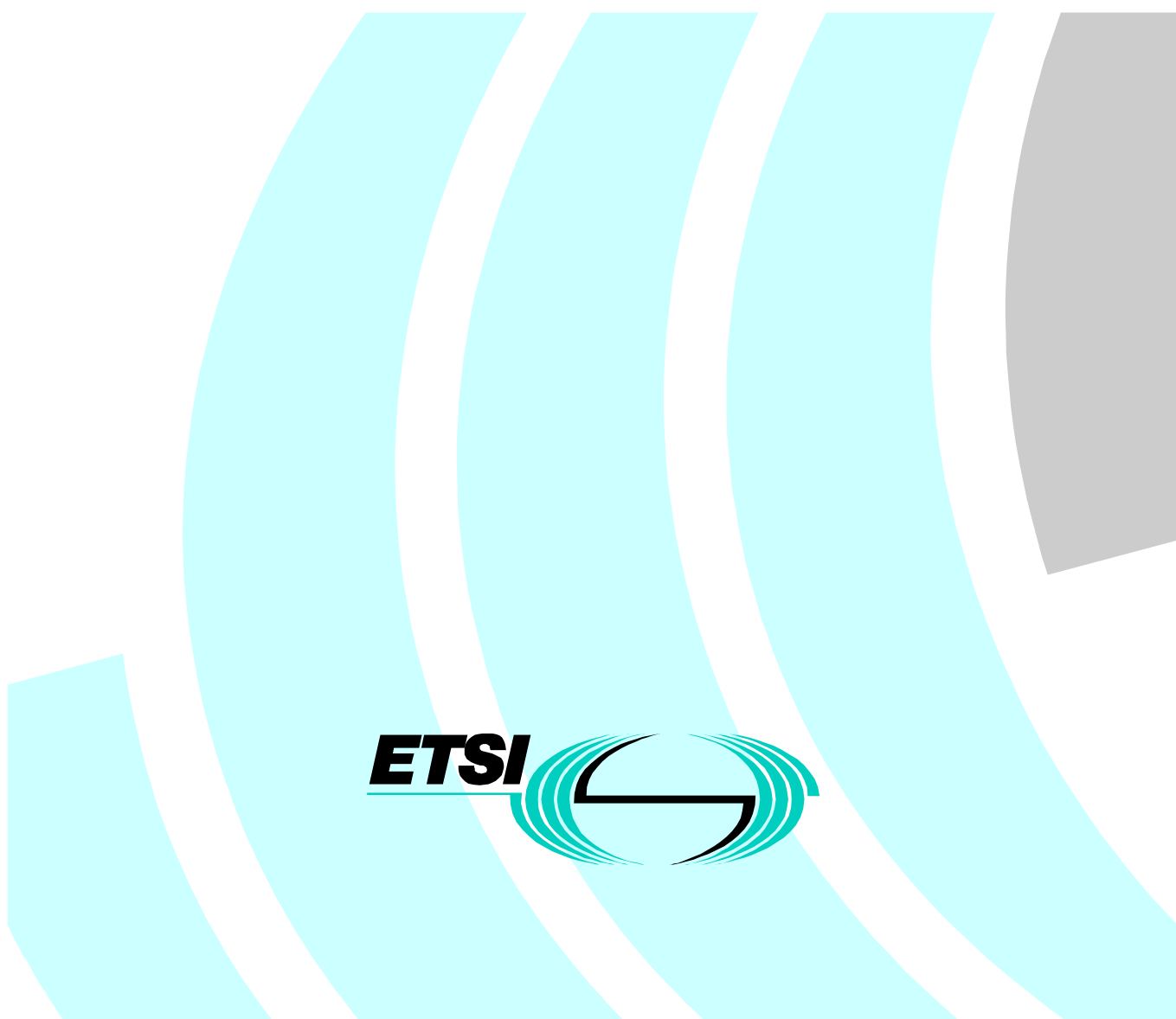


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European Standard (Telecommunications series)

Fixed Radio Systems; Point-to-multipoint equipment; Part 3: Point-to-multipoint digital radio systems below 1 GHz - Additional parameters for FH-CDMA systems



Reference

DEN/TM-04055-3

Keywords

CDMA, DRRS, FWA, multipoint, radio, RLL

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Transmission and Multiplexing (TM).

The present document is part 3 of a multi-part deliverable covering the Fixed Radio Systems; Point-to-multipoint equipment, as identified below:

- Part 1: "Point-to-multipoint digital radio systems below 1 GHz - Common parameters";
- Part 2: "Point-to-multipoint digital radio systems below 1 GHz - Additional parameters for TDMA systems";
- Part 3: "Point-to-multipoint digital radio systems below 1 GHz - Additional parameters for FH-CDMA systems";**
- Part 4: "Point-to-multipoint digital radio systems below 1 GHz - Additional parameters for FDMA systems";
- Part 5: "Point-to-multipoint digital radio systems below 1 GHz - Additional parameters for DS-CDMA systems".

National transposition dates	
Date of adoption of this EN:	13 October 2000
Date of latest announcement of this EN (doa):	31 January 2001
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 July 2001
Date of withdrawal of any conflicting National Standard (dow):	31 July 2001

1 Scope

1.1 Applications

Refer to EN 301 460-1 [1].

1.2 Frequencies

Refer to EN 301 460-1 [1].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] ETSI EN 301 460-1: "Fixed Radio Systems Point-to-multipoint equipment;
Part 1: Point-to-multipoint digital radio systems below 1 GHz - Common Parameters".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 301 460-1 [1] and the following apply.

Radio Frequency channel (RF channel): partition of a radio frequency band which may be assigned by the authorities in accordance with CEPT, ITU-R Recommendations or national authorities regulations on channel arrangement

channel spacing: separation between the centre frequencies of neighbouring RF channels

assigned band: aggregation of all RF channels assigned to a FH-CDMA system. The assigned band may consist of several non-contiguous RF channels (see figure 1)

sub-channel: integer sub-division of the RF channel(s) as determined by the equipment manufacturer (see figure 1)

Frequency Hopping (FH): spread spectrum technique whereby individual radio links are continually switched from one sub-channel to another. Such links are not constrained to a single RF channel

dwel time: duration of a transmission on a particular sub-channel

transition time: period between successive transmissions on different sub-channels during which no transmission is made

hopping sequence: sequence of sub-channels which a particular link follows

hopping period: time between the starts of successive transmissions on a different sub-channel. This is the sum of dwell time and transition time

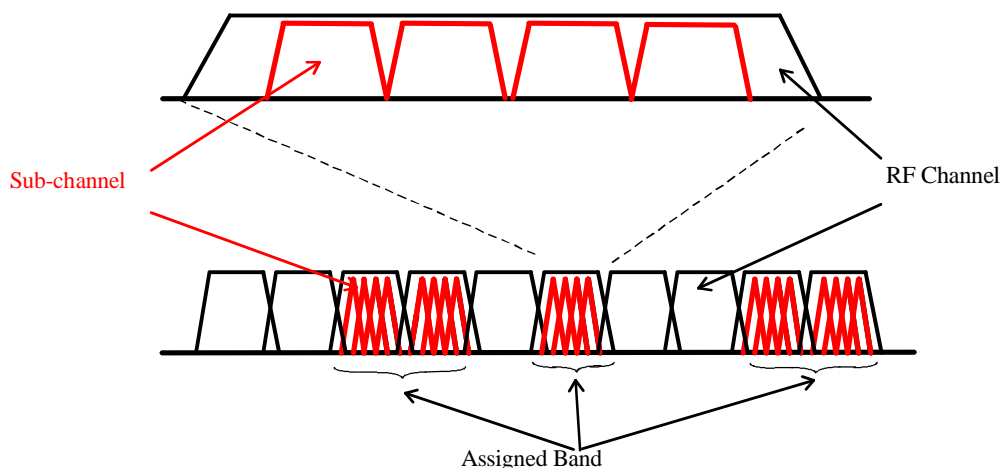


Figure 1: Relationship between "sub-channel", "RF channel" and "assigned band"

3.2 Symbols

Refer to EN 301 460-1 [1].

3.3 Abbreviations

Refer to EN 301 460-1 [1].

4 General characteristics

4.1 General system architecture

Refer to EN 301 460-1 [1].

4.2 Frequency bands and channel arrangements

Refer to EN 301 460-1 [1].

4.2.1 Channel plan

Refer to EN 301 460-1 [1].

4.2.2 Duplex methods

Refer to EN 301 460-1 [1].

4.3 Compatibility requirements

Refer to EN 301 460-1 [1].

4.4 Transmission error performance

Refer to EN 301 460-1 [1].

4.5 Environmental conditions

Refer to EN 301 460-1 [1].

4.5.1 Equipment within weather protected locations (indoor locations)

Refer to EN 301 460-1 [1].

4.5.2 Equipment for non weather-protected locations (outdoor locations)

Refer to EN 301 460-1 [1].

4.6 Power supply

Refer to EN 301 460-1 [1].

4.7 Electromagnetic compatibility

Refer to EN 301 460-1 [1].

4.8 TMN interfaces

Refer to EN 301 460-1 [1].

4.9 Synchronization of interface bit rates

Refer to EN 301 460-1 [1].

4.10 Branching / feeder / antenna requirements

4.10.1 Antenna radiation pattern

Refer to EN 301 460-1 [1].

4.10.2 Antenna port characteristics

Refer to EN 301 460-1 [1].

4.11 Frequency Hopping (FH) characteristics

The hopping period shall not exceed 0,4 sec.

5 System parameters

5.1 System capacity

Refer to EN 301 460-1 [1].

5.2 Round trip delay

Refer to EN 301 460-1 [1].

5.3 Transparency

Refer to EN 301 460-1 [1].

5.4 Voice coding methods

Refer to EN 301 460-1 [1].

5.5 Transmitter characteristics

Refer to EN 301 460-1 [1].

5.5.1 Transmitter output power

Refer to EN 301 460-1 [1].

5.5.2 Automatic Transmit Power Control (ATPC)

Refer to EN 301 460-1 [1].

5.5.3 Tx Local Oscillator (LO) frequency arrangements

Refer to EN 301 460-1 [1].

5.5.4 RF spectrum mask

The spectrum measurement point C' of system block diagram shall be performed with the maximum hold and appropriate time gating function on the spectrum analyser selected.

The reference level of the output spectrum means that the 0 dB level is the top of the modulated spectrum, disregarding the residual carrier.

The mask does not include frequency tolerances.

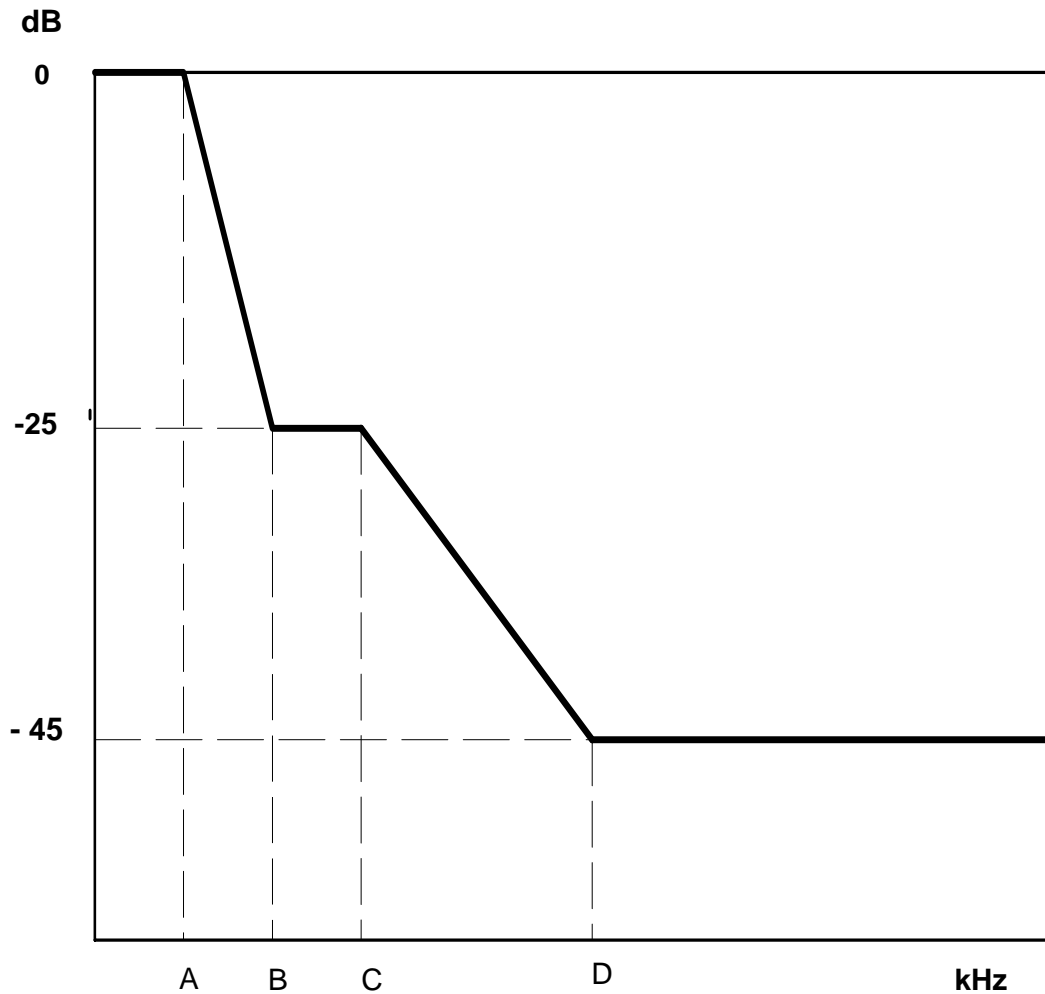


Figure 2: Power spectrum mask

Table 1: Channel spacing against spectrum mask reference points

Relative level→	Point A 0 dB	Point B -25 dB	Point C -25 dB	Point D -45 dB
Channel spacing (MHz)↓	0,5 x channel spacing	0,8 x channel spacing	1,0 x channel spacing	1,5 x channel spacing
1	0,5 MHz	0,8 MHz	1 MHz	1,5 MHz
2	1 MHz	1,6 MHz	2,0 MHz	3,0 MHz

Table 2: Spectrum analyser settings

Res. BW	Video BW	Sweep time
30 KHz	300 Hz	10 s

5.5.5 Radio frequency tolerance

Refer to EN 301 460-1 [1].

5.5.6 Spurious emissions

Refer to EN 301 460-1 [1].

5.6 Receiver characteristics

5.6.1 Input level range

The BER shall be less than 10^{-3} for an input level range which exceeds 40 dB.

5.6.2 Spurious emissions

Refer to EN 301 460-1 [1].

5.7 System performance

5.7.1 Dynamic level range

Not applicable.

5.7.2 BER as a function of the RSL

For a FH-CDMA signal, the receiver Bit Error Rate (BER) threshold shall be equal to or lower than the values stated below, referenced to point C in the system diagram (figure 2 of part 1), with no multipath signal distortion.

Table 3: BER vs receiver input signal level

Bit rate	BER 10^{-3}	BER 10^{-6}
0,5 Mbit/s	-94	-90
1,0 Mbit/s	-91	-87
1,75 Mbit/s	-89	-85

NOTE 1: For these systems the reference levels may be calculated from the following formulas:
 For BER = 10^{-3} $(-91 + 10\log_{10}[\text{bit rate Mbit/s}])$ dBm;
 For BER = 10^{-6} $(-87 + 10\log_{10}[\text{bit rate Mbit/s}])$ dBm.

NOTE 2: Incoherent demodulation may be used for packet data applications. When incoherent demodulation and higher modulation states are used, the signal levels specified above are increased by 7 dB for 4FSK modulation and 15 dB for 8FSK modulation.

5.7.3 Interference sensitivity (external)

5.7.3.1 Co-channel interference

For a system with an input wanted signal at a level greater by 1 or 3 dB than the level specified in table 3, an applied additional co-channel interferer with uncorrelated like-modulation, at the levels indicated in table 4, shall not cause the BER to exceed 10^{-6} .

Table 4: Co-channel interference sensitivity

Threshold Degradation →	1 dB	3 dB
Sub-Channel Spacing MHz ↓	Interference level (dBm)	Interference level (dBm)
1,0	-117	-111
2,0	-114	-108
3,5	-112	-106
7,0	-109	-103
14,0	-106	-100

5.7.3.2 Adjacent channel interference

All receive signal levels and interference level measurements are referred to point C of the system block diagram, given in figure 2 of part 1.

The limits of adjacent channel interference for an uncorrelated like-modulated signal shall be as in table 5.

Table 5: Adjacent channel sensitivity for BER = 10⁻⁶

Threshold degradation →	1 dB	3 dB
Sub-channel spacing MHz ↓	Interference level (dBm)	Interference level (dBm)
1,0	-101	-95
2,0	-98	-92
3,5	-96	-90
7,0	-93	-87
14,0	-90	-84

5.7.4 Distortion sensitivity

Refer to EN 301 460-1 [1].

5.7.5 CW interference

Refer to EN 301 460-1 [1].

5.7.6 Two tone interference

Refer to EN 301 460-1 [1].

5.7.7 Impulsive interference

Refer to EN 301 460-1 [1].

6 Types of interfaces at the subscriber equipment and the network exchange

Refer to EN 301 460-1 [1].

History

Document history		
V1.1.1	January 2000	Public Enquiry PE 200021: 2000-01-26 to 2000-05-26
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