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European Standard (Telecommunications series)

**Fixed Radio Systems;
Point-to-multipoint equipment;
Part 4: Point-to-multipoint DRRS below 1 GHz -
Additional Parameters for FDMA Systems**



Reference

DEN/TM-04055-4

Keywords

DRRS, FDMA, 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), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure.

The present document is part 4 of a multi-part EN 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 DRRS below 1 GHz - Additional Parameters for TDMA Systems";
- Part 3: "Point-to-multipoint DRRS below 1 GHz - Additional Parameters for FH-CDMA Systems";
- Part 4: "Point-to-multipoint DRRS below 1 GHz - Additional Parameters for FDMA Systems";**
- Part 5: "Point-to-multipoint DRRS below 1 GHz - Additional Parameters for DS-CDMA Systems".

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
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Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

Introduction

Refer to EN 301 460-1 [1].

1 Scope

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] 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

Refer to EN 301 460-1 [1].

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].

4.10.2.1 RF interface

Refer to EN 301 460-1 [1].

4.10.2.2 Return loss

Refer to EN 301 460-1 [1].

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 Frequency Arrangements

Refer to EN 301 460-1 [1].

5.5.4 RF Spectrum Mask

5.5.4.1 RF Spectrum Mask for the Central Radio Station

The 0 dB level shown on the spectrum masks is the maximum of the modulated spectrum disregarding residual carriers.

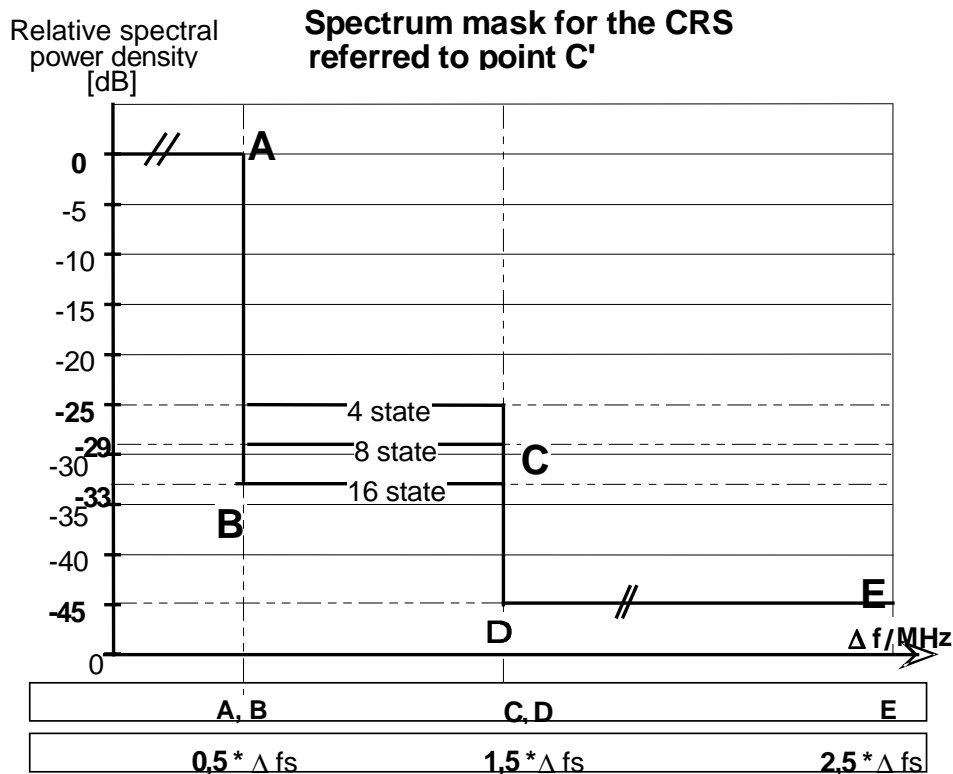
General test load conditions to measure the spectrum mask for the CRS transceiver:

- Number (N) of carriers transmitted over one CRS transceiver should correspond with the FCL of the measured CRS. The number N shall be declared by the manufacturer;

- the output power of the CRS shall be equally distributed among the N single carriers;
- the capacity of the CRS shall be equally distributed among the N single carriers.

NOTE: The above are test load conditions. Under operational conditions, capacity and output power are usually adjusted to actual requirements, which might result in unequally distributed between carriers.

The spectrum mask for the CRS transceiver is shown in figure 1.



NOTE 1: The different spectral power density levels for C are related to different modulation schemes.

NOTE 2: Frequency tolerances are not included in the mask.

Δfs : RF-channel spacing (co-polar) between the centre frequencies of two adjacent CRS.

Figure 1: Spectrum Mask for the CRS

The spectrum analyser settings for measuring the RF-spectrum mask are listed in table 1.

Table 1: Spectrum Analyser Settings for RF Power Spectrum Measurement

Resolution BW	Video BW	Sweep time
30 KHz	300 Hz	10 sec

5.5.4.2 RF-Spectrum mask for the Terminal Station and the Repeater Station

The RF-spectrum mask for the TS and the RS shall comply with the spectrum mask for the CRS transceiver.

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

The dynamic level range shall be large enough to enable the system to maintain its performance under the entire range of path loss values the system is defined to cope with.

The dynamic level range shall exceed 50 dB.

5.7.2 BER as a function of receiver input signal level (RSL)

For a single FDMA signal, the receiver input signal level thresholds for achieving a given BER performance depends on the transmission rate and on the modulation level, and is given in the following formula:

$$P_e = x + 10 \times \log_{10} (\text{"bit rate"}/\text{Mbit/s}).$$

The value of x in the above formula is given in table 2 below.

The "bit rate" parameter in the above formula refers to the payload transmission rate of the single FDMA signal under consideration. For links with continuous transmission, e.g. FDD systems, "bitrate" refers to one way transmission channel (CRS to RS or RS to CRS). For links systems with alternate CRS to RS and RS to CRS transmission, e.g. TDD, "bitrate" refer to the sum of both transmission channels (BS to RS and RS to BS).

Table 2: Values of x for calculation of BER performance thresholds

BER level → Modulation States ↓	$\leq 10^{-3}$	$\leq 10^{-6}$
4	-93 dBm	-89 dBm
8	-90 dBm	-86 dBm
16	-87 dBm	-82 dBm

For example, the receiver input signal level thresholds for a 64 kbits/second channel in a FDD system is given in table 3.

Table 3: BER performance thresholds for a 64 kbits/sec channel in an FDD system

BER level → Modulation States ↓	$\leq 10^{-3}$	$\leq 10^{-6}$
4	-105 dBm	-101 dBm
8	-100 dBm	-97 dBm
16	-95 dBm	-92 dBm

Receiver input signal level is referred to point C in figure 2 of part 1.

5.7.3 Interference Sensitivity (external)

5.7.3.1 Co-channel interference

The limits of co-channel interference (external) shall be as in table 3a, giving maximum S/I values for 1 dB and 3 dB degradation of the 10^{-3} and 10^{-6} BER limits specified in subclause 5.7.2.

Table 3a: Co-channel Interference Sensitivity

BER	Degradation	Minimal S/I level		
		4 state modulation	8 state modulation	16 state modulation
10^{-3}	1 dB	21	24	27
10^{-3}	3 dB	17	20	23
10^{-6}	1 dB	24	27	30
10^{-6}	3 dB	20	23	26

5.7.3.2 Adjacent Channel Interference

The limits of adjacent channel interference (external) shall be as given in table 4 for like modulated signals, giving maximum S/I values for 1 dB and 3 dB degradation of the 10^{-3} and 10^{-6} BER limits specified in subclause 5.7.2.

Table 4: Adjacent Channel Interference Sensitivity

BER	Degradation	Minimal S/I level		
		4 state modulation	8 state modulation	16 state modulation
10^{-3}	1 dB	-3	-3	-3
10^{-3}	3 dB	-7	-7	-7
10^{-6}	1 dB	0	0	0
10^{-6}	3 dB	-4	-4	-4

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