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Fiksni radijski sistemi ï Veļ toļ kovna oprema ï Veļ toļ kovnai digitalni radijski sistemi, ki delujejo v frekvenļ nem obmoļ ju od 31,0 GHz do 33,4 GHz (32 GHz)

Fixed Radio Systems; Multipoint equipment; Multipoint digital radio systems operating in the 31,0 GHz to 33,4 GHz (32 GHz) frequency range

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Foreword

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

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Introduction

Due to similarities between the frequency raster of the 26 GHz/28 GHz and the 32 GHz band (mainly 31,8 GHz to 33,4 GHz) consideration has been given to the same access methods as well as the respective system parameters in the 32 GHz as in the 26 GHz/28 GHz band. Therefore the main radio frequency parameters have been assumed to be the same as in EN 301 213 (all parts).

All emissions are prohibited in the band 31,3 GHz to 31,5 GHz (see footnote S5.340 of the Radio Regulations [17]), therefore this band is not available for FS systems.

At the drafting date of the present document, the levels of unwanted emissions from Fixed Service (FS) systems that may fall in the bands 31,3 GHz to 31,5 GHz and 31,5 GHz to 31,8 GHz are still discussed under Agenda Item 1.8.2 of WRC 03 (protection of passive services).

In the band 31,5 GHz to 31,8 GHz, there are sharing issues between the Fixed Services and the Passive Services (in particular, the EESS). National Administrations, using this band under the provision of footnote S5.546 of the Radio Regulations [17], should act appropriately when these issues arise. This issue will be addressed by ITU-R in the near future (see Question 232/7).

1 Scope

The present document specifies the minimum requirements for FDD and TDD equipment and system parameters, including parameters necessary to plan co-existence, of broadband multipoint systems including Fixed Wireless Access (FWA) operating in the 31,0 GHz to 33,4 GHz frequency band (subsequently referred to as the 32 GHz frequency band). Multipoint systems include both point to multipoint (P-MP) and multipoint to multipoint (MP-MP). The 31,8 GHz to 33,4 GHz band has been identified and designated within CEPT with an ERC Recommendation CEPT/ERC/REC 01-02 [1] on the designation of the harmonized frequency band 31,8 GHz to 33,4 GHz for the introduction of Fixed Service (FS) including FWA and point-to-point radio relays.

The 31,0 GHz to 31,3 GHz band is available in some countries and included in the CEPT report 25. The present document therefore also covers the 31,0 GHz to 31,3 GHz band provided that the channel arrangement is based on the channel separation as stated in the CEPT/ECC/REC 02-02 [42].

The present document is applicable to system and equipment parameters required to be able to plan the radio inter-operator co-existence of a number of possible systems operating in the 32 GHz frequency band.

The following access methods are covered:

- FDMA;
- TDMA;
- MC-TDMA.

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 and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

[1] CEPT/ERC/REC 01-02: "Preferred channel arrangement for digital fixed service systems operating in the frequency band 31.8 - 33.4 GHz".

[2] ETSI EN 300 019 (all parts): "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment".

[3] ETSI ETS 300 132-1: "Equipment Engineering (EE); Power supply interface at the input to telecommunications equipment; Part 1: Operated by alternating current (ac) derived from direct current (dc) sources".

[4] ETSI ETS 300 132-2: "Equipment Engineering (EE); Power supply interface at the input to telecommunications equipment; Part 2: Operated by direct current (dc)".

[5] ETSI EN 300 385: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for fixed radio links and ancillary equipment".

[6] ITU-T Recommendation G.773: "Protocol suites for Q-interfaces for management of transmission systems".

[7] ITU-T Recommendation G.810: "Definitions and terminology for synchronization networks".

[8] ITU-T Recommendation G.812: "Timing requirements of slave clocks suitable for use as node clocks in synchronization networks".

[9] ITU-T Recommendation G.813: "Timing characteristics of SDH equipment slave clocks (SEC)".

[10] ITU-T Recommendation G.823: "The control of jitter and wander within digital networks which are based on the 2 048 kbit/s hierarchy".

[11] ITU-T Recommendation G.825: "The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)".

[12] ITU-T Recommendation G.131: "Control of talker echo".

[13] ITU-T Recommendation G.711: "Pulse code modulation (PCM) of voice frequencies".

[14] ITU-T Recommendation G.726: "40, 32, 24, 16 kbit/s adaptive differential pulse code modulation (ADPCM)".

[15] ITU-T Recommendation G.728: "Coding of speech at 16 kbit/s using low-delay code excited linear prediction".

[16] ITU-T Recommendation G.729: "Coding of speech at 8 kbit/s using conjugate-structure algebraic-code-excited linear-prediction (CS-ACELP)".

[17] ITU-R Radio Regulations.

[18] ITU-R Recommendation F.1249: "Maximum equivalent isotropically radiated power of transmitting stations in the fixed service operating in the frequency band 25.25-27.5 GHz shared with the inter-satellite service".

[19] ETSI EN 301 213-2: "Fixed Radio Systems; Point-to-multipoint equipment; Point-to-multipoint digital radio systems in frequency bands in the range 24,25 GHz to 29,5 GHz using different access methods; Part 2: Frequency Division Multiple Access (FDMA) methods".

[20] ETSI EN 301 213-3: "Fixed Radio Systems; Point-to-multipoint equipment; Point-to-multipoint digital radio systems in frequency bands in the range 24,25 GHz to 29,5 GHz using different access methods; Part 3: Time Division Multiple Access (TDMA) methods".

[21] CEPT/ERC/REC 74-01: "Spurious emissions".

[22] ETSI EN 301 390: "Fixed Radio Systems; Point-to-point and Point-to-Multipoint Systems; Spurious emissions and receiver immunity at equipment/antenna port of Digital Fixed Radio Systems".

[23] ITU-T Recommendation Q.552: "Transmission characteristics at 2-wire analogue interfaces of digital exchange".

[24] ITU-T Recommendation Q.553: "Transmission characteristics at 4-wire analogue interfaces of digital exchanges".

[25] ITU-T Recommendation G.703: "Physical/electrical characteristics of hierarchical digital interfaces".

[26] ITU-T Recommendation G.957: "Optical interfaces for equipments and systems relating to the synchronous digital hierarchy".

[27] ITU-T Recommendation G.964: "V-interfaces at the digital local exchange (LE) - V5.1 interface (based on 2 048 kbit/s) for the support of access network (AN)".

[28] ITU-T Recommendation G.965: "V-interfaces at the digital local exchange (LE) - V5.2 interface (based on 2 048 kbit/s) for the support of access network (AN)".

[29] ETSI EN 300 324 (all parts): "V interfaces at the digital Local Exchange (LE); V5.1 interface for the support of Access Network (AN)".

[30] ETSI EN 300 347 (all parts): "V interfaces at the digital Local Exchange (LE); V5.2 interface for the support of Access Network (AN)".

[31] ITU-T Recommendation G.961: "Digital transmission system on metallic local lines for ISDN basic rate access".

[32] ITU-T Recommendation G.707: "Network node interface for the synchronous digital hierarchy (SDH)".

[33] ETSI EN 300 833: "Fixed Radio Systems; Point-to-point Antennas; Antennas for point-to-point fixed radio systems operating in the frequency band 3 GHz to 60 GHz".

[34] ETSI EN 301 215 (all parts): "Fixed Radio Systems; Point to Multipoint Antennas; Antennas for point-to-multipoint fixed radio systems in the 11 GHz to 60 GHz band".

[35] IEC 60154-2: "Flanges for waveguides. Part 2: Relevant specifications for flanges for ordinary rectangular waveguides".

[36] ITU-T Recommendation G.723.1: "Dual rate speech coder for multimedia communications transmitting at 5.3 and 6.3 kbit/s".

[37] ETSI EN 301 213-5: "Fixed Radio Systems; Point-to-multipoint equipment; Point-to-multipoint digital radio systems in frequency bands in the range 24,25 GHz to 29,5 GHz using different access methods; Part 5: Multi-Carrier Time Division Multiple Access (MC-TDMA) methods".

[38] ETSI EN 300 011-1: "Integrated Services Digital Network (ISDN); Primary rate User Network Interface (UNI); Part 1: Layer 1 specification".

[39] ITU-T Recommendation G.962: "Access digital section for ISDN primary rate at 2 048 kbit/s".

[40] ETSI ETS 300 012: "Integrated Services Digital Network (ISDN); Basic user-network interface; Layer 1 specification and test principles".

[41] ITU-R Recommendation F.1520: "Radio-frequency arrangements for systems in the fixed service operating in the band 31.8-33.4 GHz".

[42] CEPT/ECC/REC 02-02: "Channel arrangements for digital fixed service systems (point-to-point and point-to-multipoint) operating in the frequency band 31 - 31.3 GHz".

[43] ISO/IEC 8802-3: "Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications".

[44] ATM User-Network Interface Specification V3.1.

[45] ETSI EN 301 489-1: " Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements".

[46] ETSI EN 301 489-4: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 4: Specific conditions for fixed radio links and ancillary equipment and services".

[47] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

gross bit rate: transmission bit rate over the air

NOTE: In the case of a transmitter working in burst mode, the gross bit rate is the instantaneous maximum bit rate during the burst. The gross bit rate has a unique relation to the symbol rate through the implemented modulation format.

multi-carrier: systems where more than one modulated sub-carrier is radiated from the same transmitter

NOTE 1: A system that uses several transmitters into a non-active antenna is not considered as a multi-carrier system. Systems using FDM/OFDM modulation formats are also not considered multi-carrier unless more that one separate FDM/OFDM signal set is transmitted from the same transmitter.

NOTE 2: FDMA systems are intrinsically multicarrier, because any single sub-carrier may be easily discriminated at RF level (unlike OFDM modulations) and activated according to the traffic requirements. However, for the purpose of the present document, a FDMA system are also considered as a whole (fully loaded) single signal set, unless more that one FDMA signal set is transmitted from the same transmitter.

3.2 Symbols

For the purposes of the present document, the following symbols apply:

dB	decibel
dBm	decibel relative to 1 mW
GHz	Gigahertz
km	kilometre
Mbit/s	Megabit per second
MHz	Megahertz
ns	nanosecond
ppm	parts per million

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AGC	Automatic Gain Control
ATPC	Automatic Transmit Power Control
BER	Bit Error Ratio
CBR	Constant Bit Rate
CCS	Central Controller Station
CEPT	Conference des administrations Européennes des Postes et Télécommunications
CRS	Central Radio Station
CS	Central Station
CS-ACELP	Conjugate-Structure Algebraic Code-Excited Linear-Prediction
EIRP	Equivalent Isotropically Radiated Power
EMC	ElectroMagnetic Compatibility
FDD	Frequency Division Duplex
FDMA	Frequency Division Multiple Access
FS	Fixed Service
FWA	Fixed Wireless Access
IF	Intermediate Frequency
ISDN	Integrated Service Digital Network
ITU	International Telecommunications Union
LO	Local Oscillator

MC-TDMA	MultiCarrier TDMA
MP	MultiPoint
MP-MP	MultiPoint to MultiPoint
NNI	Network Node Interface
OJEC	Official Journal of the European Communities
PDH	Plesisynchronous Digital Hierarchy
P-MP	Point to Multipoint
RF	Radio Frequency
RS	Repeater Station
RSL	Receive Signal Level
Rx	Receiver
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
TE	Terminal Equipment
TM	Transmission and Multiplex
TMN	Telecommunications Management Network
TS	Terminal Station
Tx	Transmitter

4 General characteristics

4.1 General system architecture

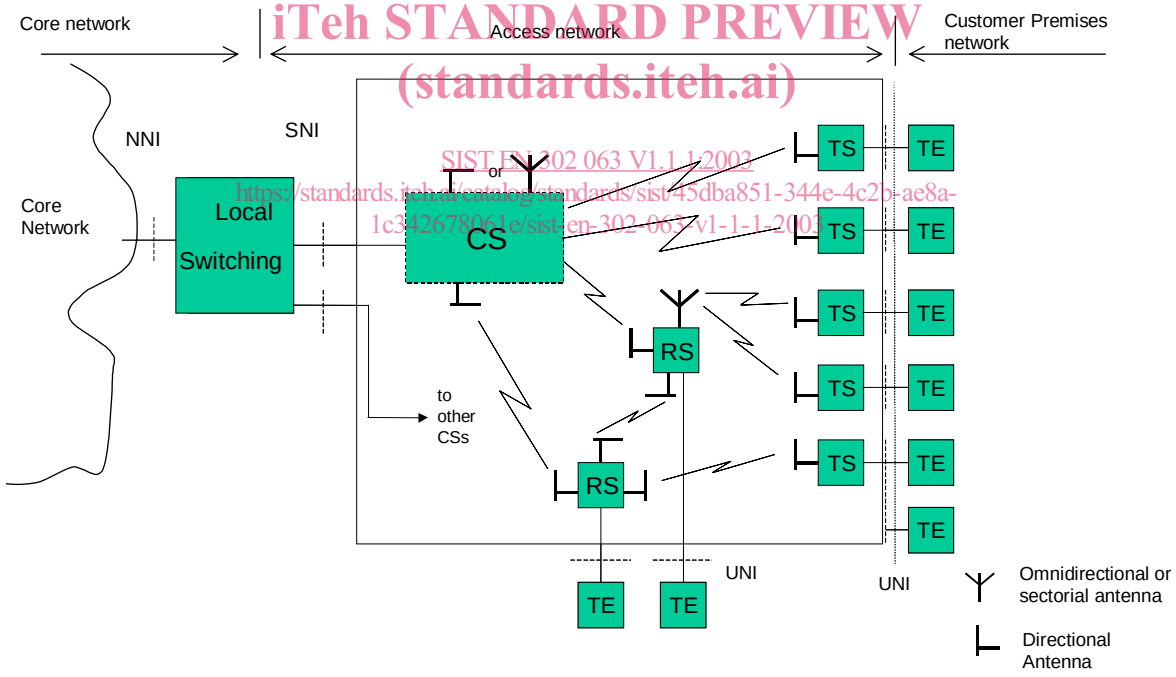

Figure 1: Reference diagram

CS: The Central Station, which interfaces the network. It can be integrated or divided into two units:

i) the Central Controller Station (CCS);

ii) the Central Radio Station (CRS) also called the radio unit, which is the central baseband/radio transceiver equipment. More than one CRS may be controlled by one CCS.

TS: The Terminal Station (outstations with subscriber interfaces). A TS may serve more than one Terminal Equipment (TE).