

**Fixed Radio Systems;
Generic definitions, terminology and applicability
of essential requirements under the article 3.2
of 99/05/EC Directive to Fixed Radio Systems**



Reference

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DRRS, FWA, radio, regulation, RLL, terminal

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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Transmission and Multiplexing (TM).

1 Scope

The present document, is intended for complementing the EG 201 399 [1] "A guide to the production of Harmonized standards for Application under the R&TTE Directive" [1] for guidance in the production of candidate harmonized standards under the Council Directive 99/5/EC [2] (commonly identified as the R&TTE Directive). Consequently the present document shall always be used in conjunction with EG 201 399 [1] whenever Fixed Digital Radio Systems (FDRS) are concerned.

The present document identifies, among the generic attributes and technical phenomena, relevant for the article 3.2 of the Directive, presently quoted by EG 201 399 [1], those which are relevant and applicable, for the various typologies of Fixed Digital Radio Systems.

Moreover it gives the cross reference from the generic terminology used in EG 201 399 [1] and that currently used within the Fixed Radio technical community.

Considerations about attributes and technical phenomena related to articles 3.1 (health,safety and EMC) and 3.3 (interworking and other special requirements) of the R&TTE Directive [2] are outside the scope of the present document.

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, subsequent revisions do apply.
- 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] EG 201 399: "A guide to the production of Harmonized standards for Application under the R&TTE Directive".
- [2] Directive 1999/05/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] ITU-T Recommendation G.826: "Error performance parameters and objectives for international, constant bit rate digital paths at or above the primary rate".
- [4] ITU-T Recommendation G.827: "Availability parameters and objectives for path elements of international constant bit-rate digital paths at or above the primary rate".
- [5] ITU-R Recommendation F.1092: "Error performance objectives for constant bit rate digital path at or above the primary rate carried by digital radio-relay systems which may form part of the international portion of a 27 500 km hypothetical reference path".
- [6] ITU-R Recommendation F.1189: "Error performance objectives for constant bit rate digital paths at or above the primary rate carried by digital radio-relay systems which may form part or all of the national portion of a 27 500 km hypothetical reference path".
- [7] ITU-R Recommendation F.1241: "Performance degradation due to interference from other services sharing the same frequency bands on a primary basis with digital radio-relay systems operating at or above the primary rate and which may form part of the international portion of a 27 500 km hypothetical reference path".

- [8] 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".
- [9] CEPT/ERC Recommendation 74-01: "Spurious Emissions".
- [10] EN 301 126-1: "Fixed Radio Systems; Conformance testing; Part 1: Point-to-Point equipment - Definitions, general requirements and test procedures".
- [11] EN 301 126-2-1: "Fixed Radio Systems; Conformance testing; Part 2-1: Point-to-Multipoint equipment - Definitions and general requirements".
- [12] EN 301 126-2-2: "Fixed Radio Systems; Conformance testing; Part 2-2: Point-to-Multipoint equipment - Test procedures for FDMA systems".
- [13] EN 301 126-2-3: "Fixed Radio Systems; Conformance testing; Part 2-3: Point-to-Multipoint equipment - Test procedures for TDMA systems".
- [14] EN 301 126-2-4: "Fixed Radio Systems; Conformance testing; Part 2-4: Point-to-Multipoint equipment - Test procedures for FH-CDMA systems".
- [15] EN 301 126-2-5: "Fixed Radio Systems; Conformance testing; Part 2-5: Point-to-Multipoint equipment - Test procedures for DS-CDMA systems".
- [16] EN 301 126-3-1: "Fixed Radio Systems; Conformance testing; Part 3-1: Point-to-Point antennas - Definitions, general requirements and test procedures".
- [17] EN 301 126-3-2: "Fixed Radio Systems; Conformance testing; Part 3-2: Point-to-Multipoint antennas - Definitions, general requirements and test procedures".
- [18] CEPT/ERC Recommendation 12-09: "Radio Frequency channel arrangement for fixed service systems operating in the band 57,0 - 59,0 GHz which do not require frequency planning".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

air interface interoperability: requirement by which FDRS terminals from different manufacturer can be connected inside the same radio systems. It requires standardisation of the physical radio layer (e.g. modulation format, digital codings, synchronisation procedures...) and part or all of the higher network layers protocols

harmonized radio frequency band: commonly referred as a portion of the frequency spectrum that CEPT/ERC allocates to a specific service through a CEPT/ERC Decision (proper definition is currently under study by CEPT/ERC). It should be noted that, presently, radio frequency bands allocated to Fixed Service are not harmonized

essential phenomenon: radio frequency phenomenon related to the essential requirements under article 3.2 of the Directive capable of being expressed in terms of quantifiable technical parameters

radio Equipment (Article 2 of 99/05/EC Directive [2]): radio equipment means a product, or relevant component thereof, capable of communication by means of the emission and/or reception of radio waves utilizing the spectrum allocated to terrestrial/space radiocommunication

telecommunications terminal equipment (Article 2 of 99/05/EC Directive [2]): telecommunications terminal equipment means a product enabling communication or a relevant component thereof which is intended to be connected directly or indirectly by any means whatsoever to interfaces of public telecommunications networks (that is to say, telecommunications networks used wholly or partly for the provision of publicly available telecommunications services)

3.2 Symbols

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

dB _i	decibels relative to isotropic radiator
GHz	GigaHertz

3.3 Abbreviations

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

ATPC	Automatic Transmission Power Control
BER	Bit Error Ratio
BTS	Base Station
CDMA	Code Division Multiple Access
CRS	Central Radio Station
CW	Continuous Wave
EIRP	Effective Isotropic Radiation Power
FDMA	Frequency Division Multiple Access
FDRS	Fixed Digital Radio Systems
FH	Frequency Hopping
GSM	Global System Mobile
PCN	Public Communication Network
P-MP	Point to Multipoint
P-P	Point to Point
QoS	Quality of Service
R&TTE	Radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity
RE	Radio Equipment
RFC	Remote Frequency Control
RPE	Radiation Pattern Envelope
RSL	Received Signal Level
RTPC	Remote Transmit Power Control
TCAM	Telecommunication Conformity Assessment and Market Surveillance Committee
TDMA	Time Division Multiple Access
TTE	Telecommunication Terminal Equipment
WG TM4	Working group 4 of ETSI Technical Committee Transmission and Multiplexing
XPD	Cross Polar Discrimination

4 General principles

The objective of a Harmonized Standard under the R&TTE Directive [2] for a FDRS is to define clear and unambiguous provisions for the essential requirements referred in the Directive, which are applicable to the system concerned.

To aid the ETSI Technical Bodies in the production of candidate harmonized standards, ETSI produced the EG 201 399 [1] that expands the general concepts of essential requirements into a more detailed subdivision and gives guidance for categorizing Telecommunication Terminal Equipment (TTE) and Radio Equipment (RE) in order to identify the technical phenomena relevant to the essential requirement under consideration.

However, particularly in the parts that refer to article 3.2 "The effective use of the radio spectrum" of the R&TTE Directive, also EG 201 399 [1] uses terminology and concepts that, when applied to a specific family of radio systems such as the Fixed Radio, proves to be still too generic; therefore further guidance, more technically based on the technology and terminology used by the relevant technical community, is reported in the present document. Therefore the present document shall always be used in conjunction with the EG 201 399 [1] whenever Fixed Digital Radio Systems (FDRS) are concerned.

It is commonly understood that article 3.2 of the Directive apply to radio system parameters comprising transmitter and receiver , required for the coexistence, in the same geographical area, of FDRS commonly used in not harmonized, but co-ordinated frequency bands. For the similar purpose of harmonizing conformity assessment procedures, according to the mutual agreement of that assessment, under the MoU between the national regulatory bodies involved, WG TM4 produced a number of "Conformance testing ENs" such as EN 301 126-1 [10] , EN 301 126-2 [11], [12], [13], [14], [15] and EN 301 126-3 [16], [17] for P-P, P-MP and antenna equipments, respectively.

In these ENs the concept of subdivision of equipment parameters in "essential" (those needed for the efficient use of the radio spectrum, coexistence and frequency planning and for EMC), "complementary" and "optional" was already introduced and has been used in the present document as a base for labelling as "essential" phenomena which are related to the "essential" requirements under article 3.2 of the Directive.

5 Application of Equipment Attributes in EG 201 399 to Fixed Digital Radio Systems (FDRS)

5.1 Equipment Attributes

Presently EG 201 399 [1] defines the following attributes for RE (radio equipment) and TTE (telecommunication terminal equipment) or both:

- A RE that is unable to transmit before receiving an appropriate enabling signal under any circumstances.
- B RE that is able to transmit without receiving an appropriate enabling signal.
- C RE capable of receive only.
- D Apparatus intended for use in 'Emergency applications'.
- E Short range radio transmitting devices.
- F RE intended for installation in sites which may be shared with other RE without co-ordination from a single operator.
- G RE sharing radio spectrum resources with or without operational co-ordination
- H TTE using an electrical interface for communication.
- I TTE using an optical interface for communication.

5.2 Equipment attributes and their applicability to FDRS

5.2.1 Attribute A: RE that is unable to transmit before receiving an appropriate enabling signal under any circumstances.

This attribute is typical of systems like GSM, of which terminals of different manufacturer can be connected at any time to a BTS; in this case the radio frequency interface is standardized in GSM coexistence standards and air interface interoperability.

Even without requirement for air interface interoperability, some P-MP terminals need granting from CRS, however, in this case, the enabling signal still is an "intra system" feature, therefore not relevant from the point of view of the essential requirements under the R&TTE Directive.

This attribute would be relevant for FDRS only in the case of standards that would possibly be developed requiring air interface interoperability.

The analysis of the relevant phenomena is left for further study, if required.

5.2.2 Attribute B: RE that is able to transmit without receiving an appropriate enabling signal.

In principle conventional FDRS transmit without enabling signals. However, in order to avoid harmful or unacceptable interference and to ensure the efficient use of the spectrum in not harmonized frequency bands, allocated to the Fixed Service, national frequency co-ordination and link by link licensing is applied. In not harmonized and not co-ordinated bands (e.g. 58 GHz) the argument is not relevant.

The "national licensing" may be considered as an "enabling signal" of different nature, therefore this attribute is considered not relevant for conventional FDRS.

Presently, for FDRS, this attribute could be relevant only to transportable equipment for provisional links (in the event that the national licensing policy is different from permanent links). This type of equipment is in general not considered specifically in WG TM-4 standards, but is possibly offered independently by suppliers to specific customers as not standardized options.

The analysis of the relevant phenomena is left for further study, if required.

5.2.3 Attribute C: RE capable of receive only.

This attribute is presently considered not relevant for FDRS presently standardized in WG TM-4, because FDRS applies only to telecommunications.

5.2.4 Attribute D: Apparatus intended for use in 'Emergency applications'.

This attribute is also more detailed in the EG 201 399 [1] as "A guide to the production of Harmonized standards for Application under the R&TTE Directive".

This attribute is the only one that presently require as essential phenomena the "(Maximum usable) sensitivity (including duplex)" and the "co-channel rejection" that are commonly required for frequency co-ordination purpose in order to guarantee the link performance and availability.

It is commonly understood that when used in PCN (Public Communication Networks), FDRS, as all other media equipment, shall meet a number of ITU-T and ITU-R performance and availability recommendations (e.g. ITU-T Recommendation G.826 [3], G.827 [4] and ITU-R Recommendation F.1092 [5], F.1189 [6], F.1241 [7]), which are essential for national and international communications that may commonly include any kind of high priority government, business and emergency communications.

Therefore it is considered that, for P-P and P-MP equipment used in the "public core and access networks", offering "high performance leased lines option" this attribute is applicable.

For equipment intended only for "residential access network" (where entertainment and commercial traffic may dominate) and private networks, the subject is left to a case-by-case analysis.

By the nature and usage of not co-ordinated bands (e.g. 58 GHz band referenced in CEPT/ERC Recommendation 12-09 [12]), equipment designed for these bands, are not considered suitable for this attribute.

5.2.5 Attribute E: Short range radio transmitting devices.

This attribute is not relevant for FDRS.

5.2.6 Attribute F: RE intended for installation in sites which may be shared with other RE without co-ordination from a single operator.

This attribute is specifically referred by EG 201 399[1] as applicable to FDRS.

However at least one other attribute shall accompany this attribute.

The suggested phenomena for this attribute, to be considered in defining essential requirements, cover only transmitter and receiver intermodulation, which are a consequence of the shared installation site, not elsewhere covered by other equipment specific attributes.

The justification for differentiation of this attribute is principally because the equipment is stationary and thus if any problems do arise the assumption shall be that the problem is permanent and thus may permanently degrade the intended usage.

Examples of such equipment "sharing" the same site or its close vicinity are base stations of any type, fixed link stations broadcast transmitters , and pager stations.

Also other receiver effects may become more important. Due to a possible large number of antennas and FDRS types, installed at the same site or in close vicinity to an existing site, the interference from "unwanted" emissions may become more critical. However the traditional solutions of antenna filters, circulators, etc are commonly used in FDRS.

5.2.7 Attribute G: RE sharing radio spectrum resources with or without operational co-ordination

FDRS need this attribute differentiation for coexistence with similar systems deployed in the same geographical area and using the same frequency band.

This attribute is the most appropriate for FDRS and contains most of the radio frequency co-ordination parameters, including antenna parameters.

Logically, for bands not requiring co-ordination, a reduced sub-set of receiver and antenna essential parameters is required in comparison to those required for co-ordinated bands.

5.2.8 Attribute H: TTE using an electrical interface for communication.

The phenomena list for this attribute is presently empty.

A radio equipment may have also an electrical interface towards the network or user side. When the equipment is also considered a TTE (see definition of TTE), this attribute may be applicable also to radio equipment.

The relevant phenomena, if any, will be defined after specific TCAM requirement which would fall under article 3.3 of the R&TTE Directive that is outside the scope of the present document.

5.2.9 Attribute I: TTE using an optical interface for communication.

The phenomena list for this attribute is presently empty.

A radio equipment may have also an optical interface towards the network or user side. When the equipment is also considered a TTE (see definition of TTE), this attribute may be applicable also to radio equipment.

The relevant phenomena, if any, will be defined after specific TCAM requirement which would fall under article 3.3 of the R&TTE Directive that is outside the scope of the present document.

6 Attribute sets relevant to FDRS

From previous discussion the following sets of attributes can be identified for different application of FDRS.

6.1 FDRS which do not require air interface interoperability

6.1.1 Point to point and point to multipoint systems in not harmonized frequency bands where co-ordination is required

Attributes F, G and D are considered appropriate for FDRS intended for the application in the public core and access networks offering high network performance (e.g. leased lines).

For equipment intended only for the application in the residential access network and private networks, a subset of the receiver parameters referred in the above attributes may be applicable but the subject is left for further study.

6.1.2 Point to point and point to multipoint systems in frequency bands where co-ordination is not required

Attributes F and G are considered appropriate for this category of FDRS .

6.2 FDRS which do require air interface interoperability

Presently no such cases are foreseen in any standards for FDRS.

Whenever required, the analysis is left for future study.

7 Application of technical phenomena in EG 201 399 to FDRS

The content of the present document follows the guidance of the present status of Annex A of ETSI Guide EG 201 399 [1].

NOTE: The EG 201 399 [1] was released by TC ERM to other technical bodies for preliminary use in production of Candidate Harmonized Standards.

7.1 FDRS which do not require air interface interoperability

From the guidance given by the EG 201 399 [1] and from the considerations made on equipment attributes in clause 5 of the present document that lead to their selection for FDRS purpose as shown in clause 6.1.1 and 6.1.2 above, a more detailed applicability to FDRS of phenomena related to essential requirements may be derived as shown in Table 1.

Table 1: Essential requirements and phenomena relevant to FDRS which do not require air interface interoperability; related background and terminology for phenomena reported in EG 201 399 [1] for the attributes F, G and D.

Essential Requirement	Phenomena	Relevance as standardized parameter for FDRS	Alternative WG TM4 terminology	Essential parameter Y=yes N=no
3.2 (System at transmitting site)	Frequency error / stability, and designation of channels	As frequency error/stability only	Radio frequency tolerance	Y
	Transmitter power	FDRS standards define only the maximum output power; in practice a radio link may be designed in order to transmit, with suitable power setting methods, the appropriate transmission power to fulfil the performance, availability and interference requirements. Therefore for the essential requirements, relevant is the power tolerance on the nominal activation (licensed) value (including ATPC effects), within Remote and / or Automatic Transmit Power Control (RTPC / ATPC) ranges, if any, to guarantee stable frequency co-ordination.	Nominal transmitter output power and its tolerance, or Transmitter power range	Y
	Adjacent channel power	Common practice for FDRS is to define a mask for spectral density relative to actual centre frequency ranging up to 2.5 times of the actual radio-frequency channel separation, from which adjacent channel interference may be derived in conjunction with the receiver selectivity.	Radio Frequency spectrum mask, Transmitter Spectrum Mask and Spectral lines at symbol rate and Remote /Automatic transmit power control (RTPC/ ATPC)	Y
	Spurious emissions	They are relevant as defined by CEPT/ERC Recommendation 74/01 [9] or the more stringent EN 301 390 [8]	Spurious emissions-external	Y
	Inter-modulation attenuation	FDRS commonly use non-reciprocal passive circuits (e.g. isolators) at transmitter output for guaranteeing the required return loss and for preventing intermodulation phenomena on the final active power devices of transmitter. The output power of FDRS is commonly rather low, therefore also any intermodulation produced by these non-reciprocal devices is irrelevant. Moreover FDRS antennas are passive and usually highly directive. Therefore this phenomenon has never been considered relevant. However in case of systems that will eventually adopt active antennas this parameter may become relevant and should be defined to comply with the R&TTE Directive	None	Y (active antennas only) N (all other cases)

Essential Requirement	Phenomena	Relevance as standardized parameter for FDRS	Alternative WG TM4 terminology	Essential parameter Y=yes N=no
	Release time	This parameter is relevant for network equipment, only when a terminal will be ordered to vacate a channel for a number of different reasons (e.g. it terminates the call or it moves to another cell). Obviously if the other user appears before the first user has vacated the channel there will be severe interference which will cause the new user to lose his connection. In FDRS technology the sharing, by different systems, of the same RF channel in the same geographical area, is achieved by frequency planning (co-ordination). Sub-channels sharing within the same P-MP system, being possible with dynamic traffic control, is an intra-system problem only. This parameter is not relevant for FDRS	None	N
	Transient behaviour of the transmitter	Transmitters can have dynamic variation in both power (e.g. ATPC, TDMA operation.....) and frequency (e.g. RFC, FH or FDMA with dynamic "channel" allocation ...). It is relevant that during these transition the relevant spectrum parameters (Licensed power, Spectrum mask, frequency tolerance) should not be exceeded or should be controlled by specific requirements	Automatic Transmit Power Control (ATPC) and Remote Frequency Control (RFC)	Y
	Modulation Accuracy	This parameter may be relevant only in case of standardized radio frequency interface for interoperability of equipment from different manufacturer (e.g. GSM-like air interface interoperability)	Presently none	Y (systems designed for interoperability) N (all other cases)
	Duty cycle	This parameter may be relevant only in case of standardized radio frequency interface for interoperability of equipment from different manufacturer (GSM-like air interface interoperability)	Presently none	Y (systems designed for interoperability) N (all other cases)
3.2 (Antennas, directional)	Off-axis EIRP density	Provided the normally high directivity of FDRS antennas, this parameter is relevant for frequency co-ordination in not harmonized frequency bands. Furthermore this parameter is mandatory to ensure the efficient use of the spectrum also in not co-ordinated frequency bands. It is consequently relevant for all FDRS.	Radiation Pattern Envelope (RPE)	Y
	Antenna gain	The absolute value of this parameter is conventionally not standardized in TM4 standards provided that many options are required to cover the Network requirements; only a minimum gain for each antenna class is required; however the actual gain shall be declared by the supplier in conformance testing. Even if the antenna gain is required for frequency co-ordination (as the absolute transmitter power) to evaluate the EIRP, a specific values is not required from the point of view of its standardisation, since its value may be determined link by link during the desing. However it is essential for complying with R&TTE Directive that the supplier declares the value, above the minimum required by the relevant antenna class, with the relative tolerance.	Antenna gain	Y (value declaration above the minimum)

Essential Requirement	Phenomena	Relevance as standardized parameter for FDRS	Alternative WG TM4 terminology	Essential parameter Y=yes N=no
	Antenna X-polar discrimination	Relevant for frequency co-ordination in not harmonized frequency bands, consequently relevant for FDRS. Furthermore this parameter is mandatory to ensure the efficient use of the spectrum because of the relatively high XPD of FDRS antennas	Antenna Cross-Polar Discrimination (XPD) or Cross-polar radiation pattern	Y (for co-ordinated bands only)
	Antenna pointing accuracy/control	In case of systems that will eventually apply adaptive antennas this parameter may become relevant and should be defined to comply with the R&TTE Directive	Presently none	Y (for equipment with adaptive antennas in co-ordinated bands) N (all other cases)
3.2 (System at the receiving site)	(Maximum usable) sensitivity (inc. duplex)	This parameter is the base on which, through proper frequency co-ordination techniques to assure the efficient use of the spectrum, the required QoS and availability for FDRS in public core and access networks, offering high network performance (e.g. for leased lines), may be assessed and calculated in presence of interference . This parameter is the only system parameter at the receive site, which enables to assess the co-channel rejection and the adjacent selectivity (see below)	BER as a function of receiver input signal level (RSL)	Y (for co-ordinated bands only)
	Co-channel rejection	This parameter is required to define the amount of frequency reuse still assuring the required QoS for fixed radio in public communication networks (e.g. in a nodal station or in systems on a geographical area). Therefore this parameter is mandatory to ensure the efficient use of the spectrum.	Co-channel interference sensitivity or Co-channel "external" interference sensitivity	Y (for co-ordinated bands only)
	Adjacent channel selectivity	This parameter is required for frequency co-ordination among different FDRS operated in the same geographical area by network operators (e.g. more than one). It defines the amount of frequency separation (e.g. at P-P nodal stations) or the amount of geographical separation (e.g. in P-MP systems deployment) for adjacent channel , still assuring the required QoS for FDRS in public communication networks. Therefore this parameter is mandatory to ensure the efficient use of the spectrum.	Adjacent channel interference sensitivity	Y (for co-ordinated bands only)

Essential Requirement	Phenomena	Relevance as standardized parameter for FDRS	Alternative WG TM4 terminology	Essential parameter Y=yes N=no
	Inter-modulation response rejection	<p>This parameter covers the receivers capability of rejecting (withstanding) more than one interfering signals, spaced by two or several channels that may possibly create 3rd order intermodulation products which fall in band of the main receive signal.</p> <p>This parameter is not relevant for systems which foresee multichannel branching with relatively narrow RF filters for each channel; it may be relevant only for systems with an RF duplexer pass-band relatively large compared to the RF-channel bandwidth.</p> <p>However this parameter is understood as derived from mobile systems requirements, where the receivers have to withstand a large amount of unwanted adjacent channel signals (interferer) due to relatively wide band RF-filtering (e.g. in portable terminals) in conjunction with antennas having poor or no directivity at all and where the interference scenario is continuously changing with possible danger of random blocking because of intermodulation among adjacent carriers.</p> <p>On the contrary, the interference scenario for FDRS is stable in the time and antennas are directive, therefore this phenomenon, if experienced, is confined once in a time during the commissioning of a link or of one of its adjacent channels; this means that countermeasures may be taken to overcome the problem when happening.</p> <p>Also in EN 301 126-1 [10] , developed in order to unify the procedure for type approval among various regulatory bodies, this parameter has not been considered essential even for those systems that already provided it in the relevant EN.</p> <p>Therefore it will be commonly considered not essential unless for specific cases presently not identified.</p>	Front-end non-linearity requirements (two-tone CW spurious interference)	N (Common choice) Y (special cases only)
	Blocking or desensitisation (inc. duplex)	<p>This parameter is relevant for showing the receiver capability of supporting interference at frequencies far away from the adjacent channel. It was also required for harmonized standards under present EMC directive; therefore it is relevant also for the new R&TTE Directive.</p> <p>Presently trunk systems with narrow-band RF filters do not include such requirement because obviously irrelevant, however the EN 301 390 [8] may be referenced for them.</p>	CW Spurious Interference or Receivers immunity at antenna port	Y (for co-ordinated bands only)
	Spurious response rejection (inc. duplex)	<p>This parameter is complementary to the previous dealing only with specific frequency(ies) response that may have been excluded from it due to different sensitivity than the generic rejection capability required under the "blocking or desensitisation"</p> <p>It is "optional" but relevant if there are frequencies excluded from the previous "blocking or desensitisation" and mentioned here</p>	Presently none	Y (if eventually foreseen by the relevant EN)
	Spurious emissions	They are relevant as defined by CEPT/ERC Recommendation 74/01 [9] or the more stringent EN 301 390 [8]	Spurious emissions-external	Y

Essential Requirement	Phenomena	Relevance as standardized parameter for FDRS	Alternative WG TM4 terminology	Essential parameter Y=yes N=no
	Multipath sensitivity	This parameter is mentioned only in Attribute D list. For "not-line-of-sight" systems (e.g. cellular mobile systems), the multipath is intended due to multiple reflection phenomena (e.g. building reflections) and it may highly impair the connection, even blocking the transmission. In FDRS the distortion sensitivity (i.e. signature data) is only required in order to design a link which fulfil "high performance quality" in frequency bands below 18 GHz, since it defines the sensitivity to multipath phenomena produced by atmospheric diffraction in "line of sight" links. This parameter is not used for frequency co-ordination purpose, therefore it is not relevant for FDRS.	distortion sensitivity	N
3.2 (System Control and Monitoring Functions for Terminal; e.g. TDMA, CDMA, FDMA, FH)	Sharing Protocols	This parameter, when in conjunction with equipments falling in Attribute G category, may be relevant only in case of any sharing procedure for enabling the transmission in not co-ordinated frequency bands. In other cases may be relevant only in case of standardized radio frequency interface for interoperability of equipments from different manufacturer (e.g. GSM-like air interface interoperability), presently not foreseen by TM4 standards.	Interference avoidance requirement	Y (for systems requiring sharing procedure) N (all other cases)

7.2 FDRS which do require air interface interoperability

Presently no such cases are foreseen in any ETSI standards for FDRS.

Whenever required, detailed analysis, beyond the phenomena, relevant for general frequency co-ordination purpose, eventually reported in table 1, is left for future study.

History

Document history		
V1.1.1	January 2000	Publication