



ECC Decision (06)13

Designation of the bands 880-915 MHz, 925-960 MHz, 1710-1785 MHz and 1805-1880 MHz for terrestrial UMTS, LTE, WiMAX and IoT cellular systems¹

Approved 01 December 2006

Amended 8 March 2019

¹ Comparable technical specifications to those given in this ECC Decision are given in Commission Decision 2009/766/EC amended by Commission Decision 2011/251/EU. EU Member States and, if so approved by the EEA Joint Committee, Iceland, Liechtenstein and Norway are obliged to implement the EC Decision.

EXPLANATORY MEMORANDUM

1 INTRODUCTION

Since 1997 CEPT has adopted a series of Decisions and Reports regarding the implementation of Mobile/Fixed Communications Networks (MFCN). These CEPT deliverables include:

- ERC Report 060 on global circulation of IMT-2000 terminals [1];
- ECC Report 82 on the compatibility study for UMTS operating within the GSM 900 and GSM 1800 frequency bands [2];
- ECC Report 96 on the compatibility between UMTS 900/1800 and systems operating in adjacent bands [3];
- CEPT Report 42 on compatibility between UMTS and existing and planned aeronautical systems above 960 MHz [4].

The 900 MHz (880-915 MHz, 925-960 MHz) and 1800 MHz (1710-1785 MHz and 1805-1880 MHz) bands have been subject to several harmonisation measures taken at EU level or by the ECC:

- Council Directive 87/372/EEC [5] and the related Council Recommendation 87/371/EEC [6], which came into force in 1987;
- ERC Decision (94)01 on the frequency bands to be designated for the coordinated introduction of the GSM digital pan-European communications system [7];
- ERC Decision (95)03 on the frequency bands to be designated for the introduction of DCS 1800 [8];
- ERC Decision (97)02 on the extended frequency bands to be used for the GSM Digital Pan-European Communication System [9].

In 2009, Directive 2009/114/EC [10] of the European Parliament and of the Council amending Council Directive 87/372/EEC [5] was approved opening the 880-915 MHz and 925-960 MHz frequency bands (the 900 MHz band) to the Universal Mobile Telecommunications System (UMTS) and to other terrestrial systems capable of providing electronic communications services that can co-exist with the Global System for Mobile communications (GSM).

During 2009, the European Commission issued a mandate to CEPT on the technical conditions for allowing LTE and possibly other technologies within the bands 880-915 MHz / 925-960 MHz and 1710-1785 MHz / 1805-1880 MHz (900 MHz and 1800 MHz bands). It was verified that WiMAX is another technology besides LTE showing interest for the 900 MHz and 1800 MHz bands. Compatibility studies were done and the technical conditions under which LTE and WiMAX technologies can be deployed in the 900/1800 MHz bands are identified in the following CEPT Reports approved by the ECC in 2010:

- CEPT Report 40 on compatibility study for LTE and WiMAX operating within the bands 880-915 MHz / 925-960 MHz and 1710-1785 MHz / 1805-1880 MHz (900 MHz and 1800 MHz bands) [11];
- CEPT Report 41 on compatibility between LTE and WiMAX operating within the bands 880-915 MHz / 925-960 MHz and 1710-1785 MHz / 1805-1880 MHz (900 MHz and 1800 MHz bands) and systems operating in adjacent bands [12].

Based on the above CEPT reports, the European Commission updated the EU regulatory framework accordingly to address also LTE and WiMAX with Decision 2011/251/EU [13].

In 2017, ECC assessed the suitability of the current ECC regulatory framework for the usage of Wideband and Narrowband M2M in the frequency bands 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2.1 GHz and 2.6 GHz and published the ECC Report 266 [14] accordingly.

ECC proposes relevant amendments of the harmonised technical conditions accordingly and ensuring both backward compatibility with existing use in 900/1800 MHz frequency band, and suitability for IoT applications. ECC developed its analysis in CEPT Report 66 [15] on the basis of the ECC Report 266. Based on CEPT Report 66, the European Commission updated the EU regulatory framework accordingly to address also IoT cellular with Decision 2018/637/EU [16].

In 2018, ECC assessed in ECC Report 297 [17] the suitability of the current harmonised ECC regulatory framework for the deployment of 5G based on New Radio ("5G New Radio" is abbreviated as "NR" in this Decision) with non-AAS BS in 880-915 MHz and 925-960 MHz frequency bands (i.e. '900 MHz band') and NR with non-AAS BS, NR AAS BS and LTE AAS BS in the 1710-1785 MHz and 1805-1880 MHz frequency bands (i.e. '1800 MHz band').

Non-AAS (non-active antenna systems) refers to MFCN base stations that provide one or more antenna connectors, which are connected to one or more separately designed passive antenna elements to radiate radio waves. The amplitude and phase of the signals to the antenna elements is not continually adjusted in response to short term changes in the radio environment.

AAS (Active Antenna Systems) refers to MFCN base stations and antenna systems where the amplitude and/or phase of the signals from the various antenna elements is continually adjusted resulting in an antenna pattern that varies in response to short term changes in the radio environment. This is intended to exclude long term beam shaping such as fixed electrical down tilt.

ECC also assessed the suitability of the current ECC regulatory framework for the deployment of NR Supplemental Uplink (SUL) operation in frequency bands 880-915 MHz and 1710-1785 MHz i.e. NR uplink operation without paired downlink NR channel in the same band, on the basis of the current FDD usage of the band plan.

ECC noted that the current EU framework Decision 2009/766/EC [18] (as amended in 2011/251/EU [19] and 2018/637/EU) allows in 900/1800 MHz use of other systems, which are not listed in the annex of this EU framework, under the condition of ensuring coexistence with the GSM system and the systems: UMTS, LTE, WiMAX and IoT cellular. In consequence, this updated ECC harmonised framework facilitates compliance with this current EU 900/1800 MHz framework in order to accommodate LTE AAS and New Radio (Non-AAS and AAS) providing relevant harmonised technical conditions allowing the use in 900/1800 MHz of this new systems while ensuring coexistence with the technologies currently listed in this Decision.

2 BACKGROUND

In line with CEPT proposals, WRC-07 identified for IMT the spectrum that was already used on a large scale for GSM systems having in mind that IMT would be implemented in the longer term in these frequency bands as part of the migration from 2G to 3G, 4G and 5G networks.

In the meantime, the licensing process for IMT has taken place starting in the "core" (2 GHz) band, followed by other frequency bands (e.g. 800 MHz, 1800 MHz or 2.6 GHz). IMT networks have been deployed over Europe in these frequency bands and are rapidly growing.

UMTS coverage in the 2 GHz band is challenging and there is a strong demand for ubiquitous access to mobile broadband services including in rural areas. The possibility to deploy mobile broadband networks in 900 MHz and 1800 MHz bands, and particularly in the 900 MHz band, provides an opportunity for operators to increase significantly the cell size and therefore extending the mobile broadband network coverage in rural areas at a reasonable cost and facilitating indoor coverage in urban and suburban areas. These bands can be used for UMTS, LTE, NR, WiMAX and IoT cellular technologies.

CEPT Reports 40 [11], 41 [12] and 66 [15] concluded that LTE, WiMAX and IoT cellular systems can be introduced in the 900 MHz and 1800 MHz bands using appropriate values for the separation between the channel edges of the respective carriers. It is also recognised that there is a wide range of licensing situations for GSM, UMTS and LTE networks which have to be addressed on a national level to enable the progressive transition from GSM networks to UMTS, LTE, NR, WiMAX and IoT cellular networks.

In the foreseen usage of these bands for M2M systems standardised by 3GPP and ETSI, ECC Report 266 [14] analyses the suitability of the current ECC framework for the usage of Machine-to-Machine applications according to the following technologies: Extended Coverage GSM IoT (EC-GSM-IoT), LTE Machine Type Communication (LTE-MTC), evolved MTC (LTE-eMTC)² and Narrowband IoT (NB-IoT). It describes the various deployment models for the technologies. Deployment models refer to how Mobile Network Operators (MNO) can deploy M2M/IoT technologies, taking into account that these are narrowband technologies, while MNOs' networks are often based on wideband technologies. The deployment models are as follows:

- as a fully independent deployment (standalone (SA) deployment);
- by pre-empting some of the resources of an existing carrier (in-band deployment);
- by being deployed on the side of an existing carrier (guard band deployment).

In particular, each technology can be deployed as follows:

- **EC-GSM-IoT:**
 - in-band and standalone modes, that can be deployed only in the 900 and 1800 MHz bands;
 - guard band mode does not apply to EC-GSM-IoT;
- **LTE-MTC/eMTC:**
 - in-band mode, that can be deployed in any harmonised MFCN band;
 - standalone and guard band mode do not apply to LTE-MTC/eMTC;
- **NB-IoT:**
 - in-band mode, that can be deployed in any MFCN band;
 - standalone NB-IoT operation, that is considered in the report only in the 900 and 1800 MHz bands, with some minimum separation requirements;
 - guard band NB-IoT, that should operate provided that the NB-IoT RB band edge is placed at least 200 kHz away from the LTE channel edge.

ECC analysed in ECC Report 297 [17] the characteristics of the NR non-AAS BS systems including Supplemental Uplink (SUL) operation as developed by standardisation bodies compared to LTE non-AAS BS and concluded that they are generally equivalent for the purpose of co-existence studies.

ECC also analysed the characteristics of the NR AAS BS and LTE AAS BS systems and concluded that they are generally aligned and are also equivalent for the purpose of co-existence studies to those of LTE non-AAS BS system with the same functionality.

- ECC noted that AAS (Active Antenna Systems) is not implemented in User Equipment at 900/1800 MHz frequency bands;
- ECC analysed and confirmed that the conclusions of the adjacent bands compatibility studies from CEPT Report 41 and CEPT Report 42 [4] are applicable to LTE non-AAS in 900/1800 MHz frequency bands are also applicable to both NR non-AAS 900/1800 MHz and to LTE/NR AAS 1800 MHz;
- ECC analysed and confirmed that the conclusions of the in-band compatibility studies are applicable to LTE non-AAS in 900/1800 MHz bands from CEPT Report 40 are also applicable to NR AAS, NR non-AAS and LTE AAS in 1800 MHz band and to NR non-AAS in 900 MHz band.

In particular, the following requirements apply to NR (AAS or non-AAS) and to LTE AAS:

- Frequency separation of 200 kHz or more between the NR channel edge and the GSM carrier's channel edge. This requirement is already fulfilled by the NR specification due the channel characteristics of NR (5MHz or above channel bandwidth). The same applies to coexistence between NR system and EC-GSM-IoT systems;

² In 3GPP terms, LTE-MTC corresponds to LTE Cat-1 or LTE Cat-0 and LTE-eMTC corresponds to LTE Cat-M1.

- No frequency separation is required between NR channel edge and the UMTS carrier's channel edge;
- No frequency separation is required between NR channel edge and the LTE carrier's channel edge. The same applies to coexistence with LTE MTC/eMTC system;
- No frequency separation is required between NR channel edges between two neighbouring NR networks;
- A frequency separation of 200 kHz or more is needed between the standalone NB-IoT channel edge of one network and the NR channel edge of the neighbouring network. This requirement is already fulfilled by the NR specification due the channel characteristics of NR (5MHz or above channel bandwidth³).

3 REQUIREMENT FOR AN ECC DECISION

The ECC recognises that a harmonised implementation of UMTS, LTE, NR, WiMAX and IoT cellular technologies will be of greatest benefit to operators, manufacturers as well as users and will facilitate the successful deployment of UMTS, LTE, NR, WiMAX and IoT cellular technologies. Furthermore, the ECC recognises the demand for the introduction of IoT cellular technologies, i.e. LTE-MTC/eMTC (LTE evolved Machine Type Communication), EC-GSM-IoT (Extended Coverage GSM IoT) and NB-IoT (Narrowband IoT).

The ECC recognises that the introduction of UMTS, LTE, NR and WiMAX systems in the bands 880-915 MHz, 925-960 MHz, 1710-1785 MHz and 1805-1880 MHz provides opportunity for better coverage for UMTS, LTE, NR, WiMAX and IoT cellular networks and, ultimately, more capacity. These frequency bands are already widely harmonised in Europe for GSM, UMTS and LTE networks.

The 900 MHz and 1800 MHz bands are intensively used. This ECC Decision will enable flexibility and increased spectrum efficiency in these bands.

This ECC Decision provides the necessary provisions for the designation of the bands 880-915 MHz, 925-960 MHz, 1710-1785 MHz and 1805-1880 MHz for terrestrial UMTS, LTE, NR and WiMAX systems. The Decision also contains provisions for IoT cellular systems in their various operating modes: "in-band", "guard band" and "standalone".

Decisions that "designate" a frequency band for a harmonised application are intended to foster the deployment of an application to meet a market demand in a harmonised manner throughout CEPT. Members implementing the Decision commit themselves to make spectrum available for this harmonised application which includes assessing when and where there is a demand for the harmonised service/application and deciding whether that demand is great enough to exclude other services and applications from the harmonised band. Such Decisions shall not inhibit radiocommunication equipment meeting different standards from operating in an identified frequency band provided it offers the same spectrum use and application as specified in a Decision for the band and is placed on the market in conformity with the essential requirements i.e. it makes effective use of the spectrum allocated to terrestrial/space radiocommunications so as to avoid harmful interference⁴.

³ The available minimum guard band for each NR BS/UE channel bandwidth and sub-carrier spacing is always larger than 200 kHz. This minimum guard band increases with the channel bandwidth and with sub-carrier spacing.

⁴ This paragraph is Article 12.1.2 of the ECC Rules of Procedure, edition 13, Vilnius, 2 November 2012.

ECC DECISION OF 1 DECEMBER 2006 ON THE DESIGNATION OF THE BANDS 880-915 MHZ, 925-960 MHZ, 1710-1785 MHZ AND 1805-1880 MHZ FOR TERRESTRIAL UMTS, LTE, 5G NEW RADIO (NR), WIMAX AND IOT CELLULAR SYSTEMS (ECC/DEC/(06)13), AMENDED 21 JUNE 2013, 2 MARCH 2018 AND 8 MARCH 2019

“The European Conference of Postal and Telecommunications Administrations,

considering

- a) that there is a growing demand for interoperable mobile voice services and interoperable mobile data services;
- b) that IMT systems have been developed to meet this demand;
- c) that IMT comprises IMT-2000, IMT-Advanced and IMT-2020, as defined in Resolution ITU-R 56 (on Naming for International Mobile Telecommunications) [20];
- d) that detailed specifications of IMT radio interfaces are described in Recommendation ITU-R M.1457 [21] and Recommendation ITU-R M.2012 [22];
- e) that UMTS, LTE and WiMAX are mobile broadband systems included in the IMT family;
- f) that there is on-going work in ITU-R to standardise IMT-2020 as a part of the IMT family;
- g) that NR systems have been developed to meet a new demand for enhanced mobile broadband (eMBB), massive machine type communications (mMTC), and ultra-reliable and low latency communications (URLLC);
- h) that Non-AAS (non-active antenna systems) refers to MFCN base stations that provide one or more antenna connectors, which are connected to one or more separately designed passive antenna elements to radiate radio waves. The amplitude and phase of the signals to the antenna elements is not continually adjusted in response to short term changes in the radio environment;
- i) that AAS (Active Antenna Systems) refers to MFCN base stations and antenna systems where the amplitude and / or phase between antenna elements is continually adjusted resulting in an antenna pattern that varies in response to short term changes in the radio environment. This is intended to exclude long-term beam shaping such as fixed electrical down tilt;
- j) that there is a growing demand for Machine-to-Machine (M2M) type and Internet of things (IoT) communications;
- k) ERC Decision (94)01 on the frequency bands to be designated for the coordinated introduction of the GSM digital pan-European communications system [7];
- l) ERC Decision (95)03 on the frequency bands to be designated for the introduction of DCS 1800 [8];
- m) ERC Decision (97)02 on the extended frequency bands to be used for the GSM Digital Pan-European Communications System [9];
- n) Council Directive 87/372/EEC [5] amended by Council Directive 2009/114/EC [10] and the related Council Recommendation 87/371/EEC [6] which came into force in 1987;
- o) the importance of facilitating the deployment of mobile broadband networks in rural areas and improving indoor coverage;
- p) that LTE, NR, WiMAX and IoT cellular technologies provide a substantial level of improvement in performance and capabilities with respect to the IMT systems initially deployed;
- q) that the introduction of UMTS, LTE, NR, WiMAX and IoT cellular networks would increase the spectrum efficiency in the 900 MHz and 1800 MHz bands;
- r) that GSM/UMTS networks will progressively migrate to LTE, NR, WiMAX or IoT cellular networks. The migration schedule and process will depend on market demand and conditions, national regulatory conditions and licensing schemes;
- s) that ECC Report 82 [2] provides conclusions on the compatibility study for UMTS operating within the GSM 900 and GSM 1800 frequency bands and relevant measures to be applied by administrations and/or operators;

- t) that ECC Report 96 [3] provides conclusions on the compatibility study between UMTS 900/1800 and systems operating in adjacent bands and relevant measures to be applied by administrations;
- u) that ECC Report 297 [17] provides an analysis of the suitability and update of the regulatory technical conditions for 5G MFCN and AAS operation in the 900 MHz and 1800 MHz bands;
- v) that the results of the compatibility studies to accommodate technologies other than GSM and UMTS in the frequency bands 880-915/925-960 MHz and 1710-1785/1805-1880 MHz can be found in CEPT Reports 40 [11] and 41 [12];
- w) that CEPT Report 41 [12] and 42 [4] provide information and recommendations on how to mitigate interference between UMTS, LTE and WiMAX and aeronautical systems above 960 MHz;
- x) that NR and LTE systems may use only non-AAS BS in 900 MHz frequency band and may use either non-AAS BS or AAS BS in the 1800 MHz frequency band;
- y) that NR systems in frequency bands 900/1800 MHz using non-AAS BS have generally equivalent technical parameters to those of LTE for the purpose of co-existence studies;
- z) that AAS does not apply to user terminals in the 900 MHz and 1800 MHz frequency bands;
- aa) that NR systems in the 1800 MHz frequency band using AAS BS have generally equivalent technical parameters to those of LTE using AAS BS for the purpose of co-existence studies and that NR AAS BS or LTE AAS BS systems are also considered generally equivalent, for the purpose of co-existence studies, to non-AAS BS systems with equivalent functionality;
- bb) that current NR specifications in 900 MHz frequency band support channel bandwidths ranging from 5 MHz up to 20 MHz;
- cc) that current NR specifications in 1800 MHz frequency band support channel bandwidths ranging from 5 MHz up to 30 MHz;
- dd) that for AAS base stations in the 1800 MHz frequency band as described in Annexes 1 and 2 below, the spurious domain for the base station starts 10 MHz from the band edge and the spurious emissions limits are defined in ERC Recommendation 74-01 (for the coexistence studies in ECC report 297 the value of -30 dBm/MHz was used);
- ee) that NR systems in frequency bands 880-915 MHz and/or 1710-1785 MHz may operate in Supplemental Uplink (SUL) mode, (i.e. NR uplink operation without paired NR downlink channel in the 925-960 MHz and 1805-1880 MHz frequency bands respectively);
- ff) that SUL operation in the 880-915 MHz and 1710-1785 MHz frequency bands is combined with NR downlink operation in other MFCN frequency bands than the 925-960 MHz and 1805-1880 MHz frequency bands;
- gg) that the compatibility conclusions applicable to LTE non-AAS systems in CEPT Report 40 [11], CEPT Report 41 [12] and CEPT Report 42 [4] are also applicable to NR systems with AAS BS or non-AAS BS and to LTE AAS systems in 1800 MHz frequency band and to NR non-AAS systems in 900 MHz band;
- hh) that ECC Report 266 [14] describes the various wideband and narrow band M2M systems (ECGSM-IoT, LTE-eMTC and NB IoT) and their operational modes (in-band, standalone, guard band, where appropriate) and provides an analysis of the compatibility between EC-GSM-IoT, LTE-eMTC and NB IoT systems in the bands 880-915 MHz, 925-960 MHz, 1710-1785 MHz and 1805-1880 MHz and other in-band usages as well as systems operating in adjacent bands and relevant measures to be applied by administrations;
- ii) that there are three possible deployment modes where the standalone operational mode is a fully independent deployment mode (standalone (SA) deployment), the 'in-band' operational mode pre-empt some of the resources of an existing carrier (in-band deployment), and the 'guard band' operational mode refers to a deployment of the NB IoT system on the side of an existing carrier (guard band deployment);
- jj) that EC-GSM-IoT systems operate in 'standalone' and 'in-band' modes for the 900 and 1800 MHz bands only following the technical conditions applicable to GSM;
- kk) that LTE-eMTC systems operate in "in-band mode" and can be deployed in any harmonised MFCN band only following the technical conditions applicable to LTE;

- ll) that there are three possible modes for NB-IoT: in-band, in guard bands and standalone deployment and that NB-IoT is included in the ETSI harmonised standard EN 301 908 [23]
- mm) that AAS MFCN systems should not claim more protection than provided to non-AAS MFCN systems;
- nn) that in EU/EFTA countries the radio equipment that is under the scope of this Decision shall comply with the Radio Equipment Directive (2014/53/EU) [24]. Conformity with the essential requirements of the Radio Equipment Directive may be demonstrated by compliance with the applicable harmonised European standard(s) or by using the other conformity assessment procedures set out in the Radio Equipment Directive.

DECIDES

1. that for the purpose of this Decision, UMTS, LTE, NR and WiMAX are defined in Annex 1 to this Decision;
2. that for the purpose of this Decision, IoT cellular systems are defined in Annex 2 to this Decision with associated technical conditions;
3. that administrations shall take all necessary measures to ensure the protection of the continued operation of GSM systems in the 900 MHz and 1800 MHz bands;
4. that the frequency bands 880-915 MHz, 925-960 MHz, 1710-1785 MHz and 1805-1880 MHz are designated⁵, for terrestrial UMTS, LTE, NR, WiMAX and IoT cellular systems, subject to market demand and national licensing schemes;
5. that the frequency bands 880-915 MHz, 925-960 MHz, 1710-1785 MHz and 1805-1880 MHz may also be used by other mobile systems subject to market demand and national licensing schemes, provided that they can coexist with GSM and the systems covered by this decision as well as systems in adjacent bands;
6. that administrations shall take all necessary measures to ensure the coexistence of GSM, UMTS, LTE, NR, WiMAX and IoT cellular systems in the 900 MHz and 1800 MHz bands;
7. that this Decision shall enter into force on date: 8 March 2019;
8. that the preferred date for implementation of this Decision shall be: 8 September 2019;
9. that CEPT administrations shall communicate the national measures implementing this Decision to the ECC Chairman and the Office when the Decision is nationally implemented.”

Note:

Please check the Office documentation database <https://www.ecodocdb.dk> for the up to date position on the implementation of this and other ECC Decisions.

⁵ See section 3 of the Explanatory Memorandum.

ANNEX 1: DESCRIPTION OF GSM, UMTS, LTE, NR AND WIMAX (NON-IOT CELLULAR SYSTEMS)

Table 1: Description of GSM, UMTS, LTE, NR and WiMAX

Technology	Terminology in ITU-R Recommendations (e.g. Recommendation ITU-R M.1457 [21])	Standards Development Organisations (SDO)	Terms used by SDO	Applicable ETSI standards	Other terms commonly used
GSM		3GPP ETSI	GSM GSM/EDGE	EN 301 502 [25] EN 301 511 [26] EN 301 908-18 [27]	GPRS, EDGE
UMTS	IMT-2000 CDMA Direct Spread	3GPP ETSI	UMTS UTRA	EN 301 908-1 [23] EN 301 908-2 [28] EN 301 908-3 [29] EN 301 908-11 [30] EN 301 908-18 [27]	IMT-2000/ UMTS; W- CDMA; HSPA
LTE	IMT-2000 CDMA Direct Spread (E UTRAN) ⁽¹⁾	3GPP ETSI	LTE E-UTRA E-UTRA AAS	EN 301 908-1 [23] EN 301 908-13 [31] EN 301 908-14 [32] EN 301 908-15 [33] EN 301 908-18 [27] EN 301 908-23 [36]	IMT- Advanced/ LTE- Advanced
WiMAX	IMT-2000 OFDMA TDD WMAN ⁽²⁾	IEEE	WiMAX	EN 301 908-1 [23] EN 301 908-21 [34] EN 301 908-22 [35]	
NR	IMT-2020 ⁽³⁾	3GPP ETSI	NR 5G NR 5G New Radio	EN 301 908-24 [37] EN 301 908-25 [38] EN 301 908-18 [27]	

(1) This radio interface now includes an option using OFDM modulation.

(2) This radio interface now supports FDD.

(3) This radio interface supports both FDD and SUL.

ANNEX 2: DESCRIPTION AND TECHNICAL CONDITIONS FOR IOT CELLULAR SYSTEMS

The following technical conditions shall be applied as an essential component necessary to ensure coexistence between neighbouring networks. Operators may agree, on a bilateral or multilateral basis, different technical parameters providing that they continue to comply with the technical conditions applicable for the protection of other services, applications or networks and with their cross-border obligations.

Table 2: Description and technical conditions for IoT Cellular Systems

Technologies	Applicable ETSI standards	Technical conditions
EC-GSM-IoT	EN 301 502 [25] EN 301 511 [26] EN 301 908-18 [27]	No specific requirements in addition to GSM (note 1) and the applicable harmonised standards
LTE MTC/eMTC	EN 301 908-1 [23] EN 301 908-13 [31] EN 301 908-14 [32] EN 301 908-15 [33] EN 301 908-18 [27]	No specific requirements in addition to LTE (note 2) and the applicable harmonised standards
NB-IoT	EN 301 908-1 [23] EN 301 908-13 [31] EN 301 908-14 [32] EN 301 908-15 [33] EN 301 908-18 [27]	<p>Standalone mode: A frequency separation of 200 kHz or more between the standalone NB-IoT channel edge of one network and the UMTS/LTE channel edge of the neighbouring network. A frequency separation of 200 kHz or more between the standalone NB-IoT channel edge of one network and the GSM channel edge of the neighbouring network.</p> <p>In-band mode: No specific requirements in addition to LTE (note 2) and the applicable harmonised standards</p> <p>Guard band mode: A frequency separation of 200 kHz or more between the NB-IoT channel edge and the edge of the operator's block, taking into account existing guard bands between operators' block edges or the edge of the operating band (adjacent to other services).</p>
<p>Note 1: Frequency separation requirements on GSM as defined in ECC Report 266 [14] Note 2: Frequency separation requirements on LTE as defined in ECC Report 266 [14]</p>		

ANNEX 3: LIST OF REFERENCES

This annex contains the list of relevant reference documents.

Note: where version numbers of harmonised standards are not stated, the latest published version applies.

- [1] ERC Report 060: "Global circulation of IMT-2000 terminals", September 1998
- [2] ECC Report 82: "Compatibility study for UMTS operating within the GSM 900 and GSM 1800 frequency bands", May 2006
- [3] ECC Report 96: "Compatibility between UMTS 900/1800 and systems operating in adjacent bands", April 2007
- [4] CEPT Report 42: "Compatibility between UMTS and existing and planned aeronautical systems above 960 MHz", November 2010
- [5] Council Directive 87/372/EEC of 25 June 1987 on the frequency bands to be reserved for the coordinated introduction of public pan-European cellular digital land-based mobile communications in the Community
- [6] Council Recommendation 87/371/EEC of 25 June 1987 on the coordinated introduction of public pan-European cellular digital land-based mobile communications in the Community
- [7] ERC Decision (94)01: "The frequency bands to be designated for the coordinated introduction of the GSM digital pan-European communications system", October 1994
- [8] ERC Decision (95)03: "The frequency bands to be designated for the introduction of DCS 1800", December 1995
- [9] ERC Decision (97)02: "The extended frequency bands to be used for the GSM Digital Pan-European Communication System", March 1997
- [10] Directive 2009/114/EC of the European Parliament and of the Council amending Council Directive 87/372/EEC on the frequency bands to be reserved for the coordinated introduction of public pan-European cellular digital land-based mobile communications in the Community
- [11] CEPT Report 40: "Compatibility study for LTE and WiMAX operating within the bands 880-915 MHz / 925-960 MHz and 1710-1785 MHz / 1805-1880 MHz (900/1800 MHz bands)", November 2010
- [12] CEPT Report 41: "Compatibility between LTE and WiMAX operating within the bands 880-915 MHz / 925-960 MHz and 1710-1785 MHz / 1805-1880 MHz (900/1800 MHz bands) and systems operating in adjacent bands", November 2010
- [13] EC Decision 2011/251/EU amending Decision 2009/766/EC on the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community
- [14] ECC Report 266: "The suitability of the current ECC regulatory framework for the usage of Wideband and Narrowband M2M in the frequency bands 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2.1 GHz and 2.6 GHz", June 2017
- [15] CEPT Report 66: Report from CEPT to the European Commission in response to the Mandate "to review the harmonised technical conditions for use of the 900 MHz and 1800 MHz frequency bands for terrestrial wireless broadband electronic communications services in support of the Internet of Things in the Union"
- [16] EC Decision 2018/637/EU - amending Decision 2009/766/EC on the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community as regards relevant technical conditions for the Internet of Things
- [17] ECC Report 297: "Analysis of the suitability and update of the regulatory technical conditions for 5G MFCN and AAS operation in the 900 MHz and 1800 MHz bands", March 2019
- [18] EC Decision 2009/766/EC: Commission Decision of 16 October 2009 on the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community
- [19] EC Decision 2011/251/EU: Commission Implementing Decision of 18 April 2011 amending Decision 2009/766/EC on the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community
- [20] Resolution ITU-R 56: "Naming for International Mobile Telecommunications"
- [21] Recommendation ITU-R M.1457-13: "Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2000 (IMT-2000)"

- [22] Recommendation ITU-R M.2012-3: "Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications Advanced (IMT-Advanced)"
- [23] ETSI EN 301 908-1 V11.1.1: "IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 1: Introduction and common requirements"
- [24] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC
- [25] ETSI EN 301 502 V12.5.2: "Global System for Mobile communications (GSM); Harmonized EN for Base Station Equipment covering the essential requirements of article 3.2 of the R&TTE Directive"
- [26] ETSI EN 301 511 V 12.5.1: "Global System for Mobile communications (GSM); Mobile Stations (MS) equipment; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU"
- [27] ETSI EN 301 908-18 : "IMT cellular networks; Harmonized EN covering the essential requirements of article 3.2 of the Radio Equipment Directive 2014/53/EU; Part 18: E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS)"
- [28] ETSI EN 301 908-2 V11.1.2: "IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU; Part 2: CDMA Direct Spread (UTRA FDD) User Equipment (UE)"
- [29] ETSI EN 301 908-3 V11.1.3: "IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU; Part 3: CDMA Direct Spread (UTRA FDD) Base Stations (BS)"
- [30] ETSI EN 301 908-11 V11.1.2: "IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 11: CDMA Direct Spread (UTRA FDD) Repeaters"
- [31] ETSI EN 301 908-13 V11.1.2: "IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU; Part 13: Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE)"
- [32] ETSI EN 301 908-14 V11.1.2: "IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU; Part 14: Evolved Universal Terrestrial Radio Access (E-UTRA) Base Stations (BS)"
- [33] ETSI EN 301 908-15 V11.1.2: "IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU; Part 15: Evolved Universal Terrestrial Radio Access (E-UTRA FDD) Repeaters"
- [34] ETSI EN 301 908-21 V6.1.1: "IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 21: OFDMA TDD WMAN (Mobile WiMAX) FDD User Equipment (UE)"
- [35] ETSI EN 301 908-22 V6.1.1: "IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 22: OFDMA TDD WMAN (Mobile WiMAX) FDD Base Stations (BS)"
- [36] ETSI EN 301 908-23: "IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 23: Active Antenna System (AAS) Base Station (BS); Conducted conformance testing"
- [37] ETSI EN 301 908-24: "IMT cellular networks; Harmonized Standard for access to radio spectrum Part 24: New Radio (NR) Base Stations (BS)"
- [38] ETSI EN 301 908-25: "IMT cellular networks; Harmonized Standard covering the essential requirements of article 3.2 of the Radio Equipment Directive 2014/53/EU; Part 25: New Radio (NR) User Equipment (UE)"