



## EUROPEAN COMMISSION

Directorate-General for Communications Networks, Content and Technology

Electronic Communications Networks and Services  
**Radio Spectrum Policy**

Brussels, 6 March 2018

DG CONNECT/B4

**RSCOM18-16**

**PUBLIC DOCUMENT**

# **RADIO SPECTRUM COMMITTEE**

## **Working Document**

**Subject: Final CEPT Report 66 on 900 MHz and 1800 MHz**

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**To**

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**Date**

6<sup>th</sup> March 2018

**Our reference**

L18-ECC-005

**Subject**

CEPT Report 66

**Enclosure**

CEPT Report 66

**Your reference**

Dear Mr Geiss,

I am pleased to inform you that ECC, during its 47<sup>th</sup> meeting in Lisbon (Portugal), adopted the final CEPT Report 66 in response to the Mandate issued by the European Commission on "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".

Herewith I assume that all obligations resulting from this Mandate has been fulfilled.

Yours sincerely,



Eric Fournier

Chairman CEPT Electronic Communications Committee



# 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”

Report approved on 02 March 2018 by the ECC

## 0 EXECUTIVE SUMMARY

This CEPT Report responds to the EC mandate on 900/1800 MHz and provides 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.

CEPT studied and assessed the harmonised technical conditions applicable to the 880-915 MHz / 925-960 MHz and 1710-1785 MHz / 1805-1880 MHz frequency bands (EC Decision 2011/251/UE) with a view to their suitability for IoT applications.

CEPT focused its work on the following technologies recently developed by standardisation:

- EC-GSM-IoT (Extended Coverage GSM IoT);
- LTE MTC and LTE-eMTC (LTE evolved Machine Type Communication);
- NB-IoT (Narrowband IoT).

CEPT developed its analysis in this report on the basis of the ECC Report 266 [1] "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"

CEPT proposes relevant amendments of the harmonised technical conditions accordingly and ensuring both backward compatibility with existing use in 900/1800 MHz, and suitability for IoT applications based on the above IoT cellular systems (see section 5).

CEPT will develop relevant cross-border coordination deliverables to support bilateral and multilateral cross-border coordination process between administrations including EU Members States. CEPT did not identify unmanageable cross-border coordination issues resulting from the introduction of the three above technologies in these frequency bands.

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## LIST OF ABBREVIATIONS

<b>Abbreviation</b>	<b>Explanation</b>
<b>3GPP</b>	Third Generation Partnership Project
<b>BS</b>	Base Station
<b>CEPT</b>	European Conference of Postal and Telecommunications Administrations
<b>EC</b>	European Commission
<b>ECC</b>	Electronic Communications Committee
<b>EC-GSM-IoT</b>	Extended Coverage GSM IoT
<b>EU</b>	European Union
<b>GB</b>	Guard Band
<b>GSM</b>	Global System for Mobile Communications
<b>IoT</b>	Internet of Things
<b>LRTC</b>	Least Restrictive Technical Conditions
<b>LTE</b>	Long Term Evolution
<b>LTE-eMTC</b>	LTE evolved Machine Type Communications
<b>LTE-MTC</b>	LTE Machine Type Communications
<b>M2M</b>	Machine-to-Machine
<b>MNO</b>	Mobile Network Operator
<b>MTC</b>	Machine Type Communications
<b>NB-IoT</b>	Narrowband IoT
<b>OFDMA</b>	Orthogonal Frequency Division Multiple Access
<b>SA</b>	Standalone Alone
<b>UE</b>	User Equipment
<b>WBB ECS</b>	Wireless Broadband Electronic Communication Services

## 1 INTRODUCTION

In July 2017 the European Commission (EC) issued a Mandate to CEPT 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 (IoT) in the Union. The Mandate is provided in ANNEX 1: CEPT was tasked in particular to:

- “ 1. Study and assess the harmonised technical conditions applicable to the 880-915 MHz / 925-960 MHz and 1710-1785 MHz / 1805-1880 MHz frequency bands with view to their suitability for IoT applications.
2. Based on the results under Task 1, amend, if necessary, the harmonised technical conditions applicable to both bands, with focus on applicable technology standards, for the provision of terrestrial wireless broadband electronic communications services, so as to ensure both, backward compatibility with existing use, and suitability for IoT applications.

The amended technical conditions to address IoT use should also be sufficient to ensure co-existence with GSM and other incumbent services and services/applications in adjacent bands, in line with their regulatory status, including at the EU outer borders.”

This CEPT Report is the response to the tasks of the EC Mandate.

## 2 IoT TECHNOLOGY AND DEPLOYMENT SCENARIOS

### 2.1 INTRODUCTION TO M2M IoT CELLULAR SYSTEMS

Machine-to-Machine (M2M) communication and the Internet of Things (IoT) are widely considered as applications with significant growth potential. Among IoT technologies, some are designed to operate in licenced spectrum, in the context of terrestrial wireless broadband electronic communications services (WBB ECS).

In the foreseen usage of these bands for M2M cellular IoT standardised by 3GPP and ETSI, ECC Report 266 [1] provides and 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)<sup>1</sup> and Narrowband IoT (NB-IoT).

M2M IoT cellular systems are typically narrowband compared to the technologies leveraged in mobile broadband, due to the lower data rate requirements, the need for lower power requirements (operating for a number of years on a battery) and the requirement for a better link budget.

### 2.2 OVERVIEW OF M2M IoT CELLULAR SYSTEMS

#### 2.2.1 EC-GSM-IoT

EC-GSM-IoT is an evolution of the existing GSM air interface with a channel bandwidth of 200 kHz. EC-GSM-IoT is part of the GSM system for carrying IoT traffic. Since EC-GSM-IoT is part of the GSM system, the BS and UE spectrum masks are the same as a normal GSM system as referenced in Directive 2009/114/EC [2].

#### 2.2.2 LTE MTC/eMTC

LTE MTC is a feature of the LTE standard to support Machine-to-Machine communication. LTE MTC uses some radio resources blocks of an LTE carrier for Machine Type Communication. LTE eMTC is an enhancement of LTE MTC.

LTE-MTC and LTE-eMTC have been standardised in 3GPP's Releases 12 and 13 and beyond of the LTE standard respectively. The main transmitter and receiver technical characteristics are described in TS 36.101 for User Equipment (UE) [3] and TS 36.104 for Base Station (BS) [4].

From the UE perspective, LTE-MTC corresponds to UEs fulfilling 3GPP category 0 while LTE-eMTC correspond to UEs fulfilling 3GPP category M1 specifications. It is worth noticing that a terminal supporting category 0 and category M1 needs to also support LTE general requirements. In case there is a difference in requirements between the general LTE requirements and the additional requirements, the tighter requirements are applicable. This implies that LTE-MTC and LTE-eMTC transmitter requirements are equal to, or tighter than, legacy LTE requirements.

LTE eMTC has extended coverage (155.7 dB vs. 140.7 dB) and adding the 20 dBm power class to the 23 dBm of LTE MTC. LTE-eMTC allows to use 6 contiguous resource blocks anywhere in a LTE channel for M2M applications, each resource block is 180 kHz, 6x180 =1080 kHz. The deployment model is in consequence 'in-band'.

<sup>1</sup> In 3GPP terms, LTE-MTC corresponds to LTE Cat-1 or LTE Cat-0 and LTE-eMTC corresponds to LTE Cat-M1.



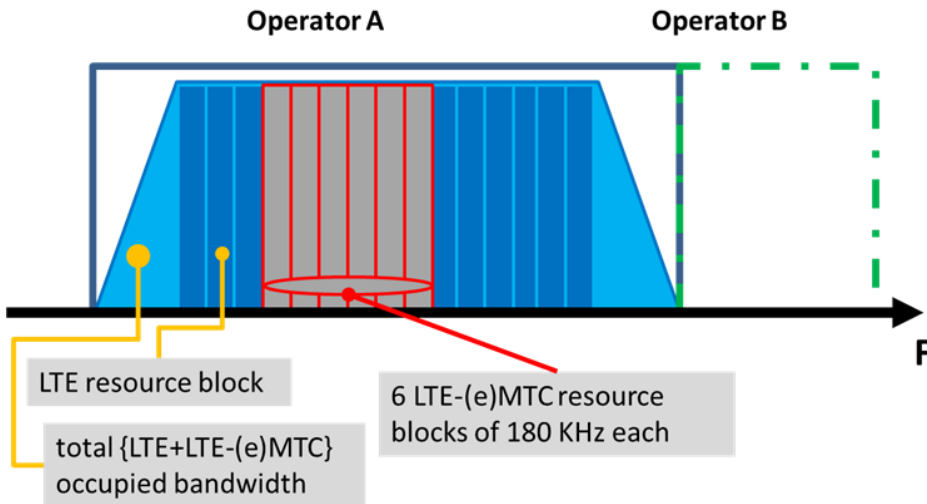


Figure 1: In-band deployment of LTE (e)-MTC

### 2.2.3 NB-IoT

NB-IoT standalone is a narrowband system.

NB-IoT UE only needs to support half duplex operations. NB-IoT is a new air interface using the Orthogonal Frequency Division Multiple Access (OFDMA) multiple access scheme in downlink and Single-Carrier Frequency Division Multiple Access (SC-FDMA) with a cyclic prefix in the uplink.

A Half Duplex (for UE) and Frequency Division Duplex (for BS) scheme has been specified.

The channel bandwidth is 200 kHz and the transmission bandwidth 180 kHz (leaving 10 kHz guard bands on each side from channel edges), equivalent to one LTE resource block.

The channel raster for NB-IoT in-band, guard band and standalone operation is 100 kHz.

NB-IoT uses in both downlink and uplink a fixed total carrier bandwidth of 180 kHz (standalone).

Moreover, it can utilise LTE resource blocks within a normal LTE carrier (in-band) or unused part of the MNO blocks in the guard band of an LTE carrier (guard band). Nevertheless, it is not integrated dynamically into an LTE system.

#### 2.2.3.1 NB-IoT In-band

For an in-band deployment, the NB-IoT cellular system will use some of the resources of an existing wideband carrier. This corresponds to a change of transmission mode on some subcarriers of a wideband signal. This is very similar to what happens when a specific modulation is selected by the BS to serve a specific terminal.

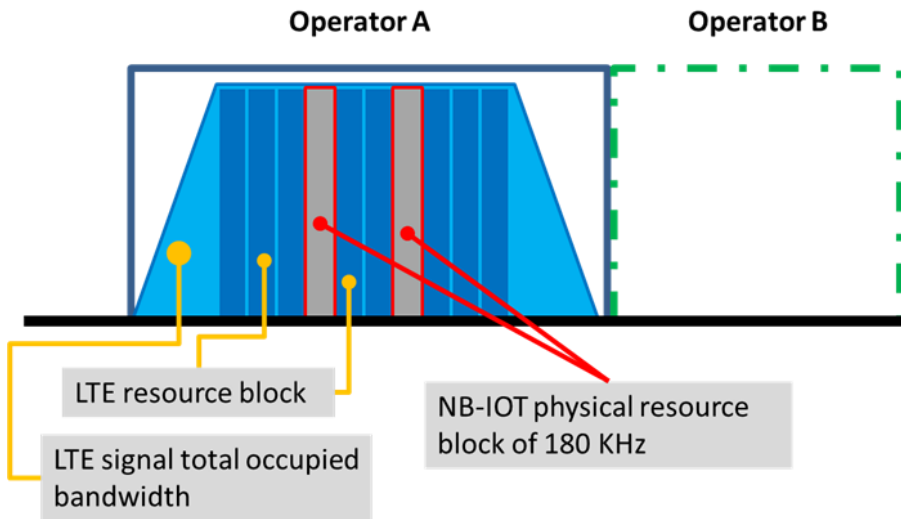


Figure 2: In-band deployment of IoT

2.2.3.2 NB-IoT Standalone

NB-IoT is operating standalone when it utilises its own spectrum, for example the spectrum currently being used by GSM systems as a replacement of two GSM carriers, as well as scattered spectrum for potential IoT deployment.

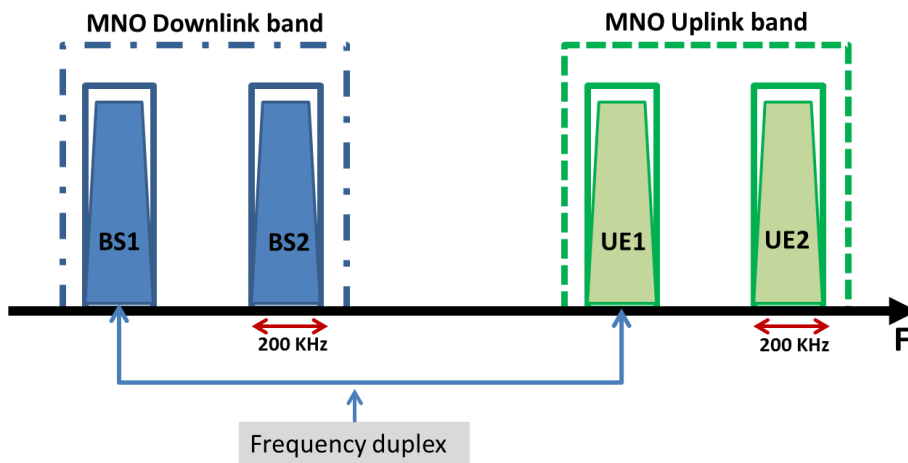


Figure 3: Standalone deployment of IoT

### *2.2.3.3 NB-IoT Guard Band*

A guard band deployment corresponds to the case where a narrowband transmission is added on the side of an existing wideband carrier. This is made possible by the fact that wideband transmission technologies typically transmit a signal narrower than the channel bandwidth, i.e. they implement implicit guard bands within their transmission channel.

With regard to interference with adjacent services/applications no additional interference from guard band NB-IoT is expected compared to a LTE 5 MHz channel. Moreover, the receiver characteristics of NB-IoT are similar to those of regular LTE receivers.

Table 1: NB-IoT carrier placement within the LTE channel guard band

LTE Chan. BW (MHz)	#RBs	Half LTE channel band width (kHz)	Last RB edge frequency (kHz)	Ideal NB-IoT centre frequency for OFDM orthogonality	Distance from a 100 kHz grid (kHz)	Offset from LTE ( $m \cdot 15\text{kHz}$ ) $m=0..4$	Gap after offset (kHz)	Final NB-IoT frequency (kHz)	Maximum NB-IoT RB edge to LTE edge	NB-IoT GB centre frequency offset to the lower/ upper Base Station RF Bandwidth (kHz)
1.4	6	700	547.5	637.5	62.5	60	2,5	697.5	-87.5	No NB-IoT GB (exceeds LTE channel edge)
3	15	1500	1357.5	1447.5	52.5	45	7.5	1492.5	-82.5	No NB-IoT GB (exceeds LTE channel edge)
5	25	2500	2257.5	2347.5	52.5	45	7.5	2392.5	17.5	NB-IoT carrier close to LTE channel edge
10	50	5000	4507.5	4597.5	2.5	0	2.5	4597.5	312.5	402.5
15	75	7500	6757.5	6847.5	52.5	45	7.5	6892.5	517.5	607.5
20	100	10000	9007.5	9097.5	2.5	0	2.5	9097.5	812.5	902.5

### 2.3 DEPLOYMENT MODELS

There are 3 possible deployment modes where:

- the standalone (SA) operation mode is a fully independent deployment mode;
- the 'in-band' operation mode pre-empt some of the resources of an existing carrier (in-band deployment);
- the 'guard band' operational mode refers to a deployment of the NB IoT system on the side of an existing carrier (guard band (GB) deployment).

It has to be noted that EC-GSM-IoT is considered to be deployed in standalone mode and in-band mode, LTE-MTC/eMTC is considered to be deployed in-band mode and NB-IoT encompasses all the three modes referred above.

**Table 2: M2M IoT cellular systems references**

IoT cellular systems	Harmonised standard	Deployment			Bandwidth (kHz)
		Standalone	In-band	Guard band	
EC-GSM-IoT	ETSI EN 301 502 [8] (BS) ETSI EN 301 511 [9] (UE) ETSI EN 301 908-18 [7] (BS)	X	X		200
LTE-MTC	ETSI EN 301 908-1 [11] ETSI EN 301 908-13 [6] (UE) ETSI EN 301 908-14 [10] (BS) ETSI EN 301 908-15 [12] (Repeater) ETSI EN 301 908-18 [7](BS)		X		1080 - 18000
LTE-eMTC	ETSI EN 301 908-1 [11] ETSI EN 301 908-13 [6] (UE) ETSI EN 301 908-14 [10] (BS) ETSI EN 301 908-15 [12] (Repeater) ETSI EN 301 908-18 [7] (BS)		X		1080
NB-IoT	ETSI EN 301 908-1 [11] ETSI EN 301 908-13 [6] (UE) ETSI EN 301 908-14 [10] (BS) ETSI EN 301 908-15 [12] (Repeater) ETSI EN 301 908-18 [7] (BS)	X	X	X	15/3.75 - 180

### 3 REGULATORY FRAMEWORK

The current regulatory framework has been developed on a technology basis, by explicitly considering all allowed technologies and taking into account the various adjacent band issues (references CEPT reports 900/1800 MHz: CEPT reports 19, 39, 40, 41, 42). Various technologies are currently referenced in the EC framework (GSM, UMTS, LTE, WiMAX): Directive 2009/114/EC [2], Decision 2011/251/EU [5].

This ensures the implementation of the technology neutrality principle in these two bands.

## 4 SUITABILITY OF EXISTING TECHNICAL CONDITIONS FOR IoT APPLICATIONS

### 4.1 EC-GSM-IOT

An EC-GSM-IoT system is deployed in an in-band mode in the 900 and 1800 MHz bands. EC-GSM-IoT uses the same frequency planning as GSM, e.g. either with fixed frequency reuse or with frequency hopping. EC-GSM-IoT is covered by the ETSI EN 301 502 (BS) [8], ETSI EN 301 511 (UE) [9] and ETSI EN 301 908-18 (BS) [7]. In consequence there is no need to update the regulatory framework to introduce EC-GSM-IoT.

### 4.2 LTE MTC AND LTE eMTC

LTE-MTC/eMTC systems operate in "in-band mode" only following the technical conditions applicable to LTE; LTE-MTC and LTE-eMTC are covered by EN 301 908-1 [11], EN 301 908-13 [6], EN 301 908-14 [10], EN 301 908-15 [12][H2] and EN 301 908-18 [7]. In consequence, the same parameters as for LTE are applicable for LTE MTC and LTE eMTC.

### 4.3 NB-IOT

NB-IoT is covered by the LTE Harmonised Standard (EN 301 908-1, EN 301 908-13, EN301 908-14, EN 301 908-15 and EN 301 908-18).

#### 4.3.1 NB-IOT in-band

NB-IoT in-band is covered by the LTE Harmonised Standard. Embedding an NB-IoT in an LTE carrier does not change the power or the Spectrum Emission Mask (SEM), either on the BS or the UE side.

In consequence, NB-IoT in-band does not raise any specific regulatory or technical (coexistence) issues with WBB ECS systems listed in the regulatory framework and can be deployed as LTE in 900 MHz and 1800 MHz bands.

#### 4.3.2 NB-IOT Standalone

Standalone NB-IoT equipment complies with the relevant technical conditions (maximum permitted EIRPs and minimum frequency separations from other adjacent services) which apply in the context of GSM, and may be deployed in the 900/1800 MHz bands without any increase in the likelihood of harmful interference.

For the frequency separation between two standalone NB-IoT carriers or between a standalone NB-IoT and a GSM carrier of different operators, the existing practice of frequency separation between two GSM carriers of different operators should be used, i.e. 200 kHz frequency spacing between channel edges.

Such arrangement is possible provided that deployment of these cellular systems is coordinated between operators.

In conclusion, Standalone NB-IoT operation shall comply with following minimum separation requirements:

- 200 kHz separation between the GSM channel edge and Wideband UMTS/LTE/WiMAX channel edge, where LTE includes LTE-MTC/eMTC, in-band NB-IoT and guard band NB-IoT, GSM includes EC-GSM-IoT;
- 200 kHz separation between the standalone NB-IoT channel edge and Wideband UMTS/LTE/WiMAX channel edge, where LTE includes LTE-MTC/eMTC, in-band NB-IoT and guard band NB-IoT;
- 200 kHz separation between the standalone NB-IoT channel edge and the GSM channel edge, where GSM includes EC-GSM-IoT, subject to coordination between operators.

Field Code Changed

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#### **4.3.3 Guard band NB-IoT**

Guard band NB-IoT may be deployed in 900/1800 MHz frequency bands, provided that the NB-IoT RB band edge is placed at least 200 kHz away from the LTE channel edge. 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. The usage of guard band NB-IoT is possible in LTE channel bandwidth of 10 MHz or higher.

Mobile operators may deploy guard band NB-IoT for smaller channel bandwidth in between their blocks, if agreed by bilateral agreements.



## 5 PROPOSED AMENDMENTS TO EXISTING TECHNICAL CONDITIONS

CEPT proposes to include the content of the following table, containing the technical conditions for the roll-out of wide-band and narrow-band 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 3: Technical conditions**

IoT cellular systems	Applicable ETSI standards	Technical conditions
EC-GSM-IoT	EN 301 502 [8] <b>Error! Reference source not found.</b> EN 301 511 [9] EN 301 908-18 [7]	Same parameters as for GSM in EC Decision 2011/251/EU [5]apply.
LTE MTC/eMTC	EN 301 908-1 [11] EN 301 908-13 [6] EN 301 908-14 [10] EN 301 908-15 [12] EN 301 908-18 [7]	Same parameters as for LTE in EC Decision 2011/251/EU [5] apply.
NB-IoT	EN 301 908-1 [11] EN 301 908-13 [6] EN 301 908-14 <b>Error! Reference source not found.[40]</b> EN 301 908-15 [12] EN 301 908-18 [7]	<p>Standalone mode:</p> <p>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.</p> <p>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: same parameters as for LTE in EC Decision 2011/251/EU [5] apply</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>

## 6 CONCLUSIONS

This CEPT Report is the response to the tasks of the EC Mandate.

It has been developed on the basis of ECC Report 266 [1] which studied the suitability of the current ECC regulatory framework for the usage of Wideband and Narrowband M2M in a range of frequency bands, including 900 MHz and 1800 MHz. The report concluded the following:

1. LTE-MTC/eMTC and EC-GSM IoT are implemented as intrinsic parts of existing LTE and GSM technologies respectively. Therefore, no change to the ECC regulatory framework is needed to address LTE-MTC/eMTC and EC-GSM-IoT;
2. Revision of the relevant regulatory framework is necessary to accommodate the use of guard band and standalone NB-IoT in the 900 MHz and 1800 MHz bands.

CEPT proposes the technical conditions in section 5 to update the EC framework for EC-GSM-IoT, LTE MTC/LTE-eMTC and NB IoT.

The proposed technical conditions in section 5 above applying to EC GSM IoT, LTE MTC/LTE eMTC and NB-IoT have been also considered for the relevant ECC framework, which will be updated accordingly. It ensures coherence between ECC and EC frameworks.

CEPT will develop relevant cross-border coordination deliverable to support bi-lateral and multi-lateral cross border coordination process between administrations including EU Member States. CEPT did not identify unmanageable cross border coordination issues resulting from the introduction of the 3 above technologies in these frequency bands.

**ANNEX 1: CEPT MANDATE**



**EUROPEAN COMMISSION**  
Communications Networks Content & Technology Directorate-General  
Electronic Communications Networks & Services  
**Spectrum**

Brussels, 12 July 2017  
DG CONNECT/B4

**RSCOM17-22rev1**

**FINAL**

**RADIO SPECTRUM COMMITTEE**

**Working Document**

**Opinion of the RSC**  
**pursuant to Advisory Procedure under Article 4 of Regulation 182/2011/EU and**  
**Article 4.2 of Radio Spectrum Decision 676/2002/EC**

**Subject: Mandate to CEPT 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**

*This is a Committee working document which does not necessarily reflect the official position of the Commission. No inferences should be drawn from this document as to the precise form or content of future measures to be submitted by the Commission. The Commission accepts no responsibility or liability whatsoever with regard to any information or data referred to in this document.*

## **MANDATE TO THE CEPT**

### **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**

#### **PURPOSE**

This Mandate aims at reviewing and adapting, if necessary, the EU-harmonised technical conditions for the continued use of the EU-harmonised 880-915 MHz / 925-960 MHz ('900 MHz') and 1710-1785 MHz / 1805-1880 MHz ('1800 MHz') frequency bands for terrestrial wireless broadband (WBB) electronic communications services (ECS) with view to responding to evolution of market demand with particular focus on applications for the Internet of Things (IoT) including machine-type communications. Its deliverables should observe the principle of technology and service neutrality, promote flexible and efficient spectrum use and facilitate economies of scale of equipment.

The Commission is monitoring standardisation and market developments related to 5G and will assess in due time the need to amend the technical conditions in both bands, based on a follow-up mandate to CEPT, in order to ensure these are '5G-ready'.

#### **POLICY CONTEXT AND INPUTS**

The ITU-R vision for the next-generation (5G) mobile telecommunications sets out three major 5G usage scenarios – enhanced mobile broadband, massive machine type communications, and ultra-reliable and low latency communications. In particular, the latter two scenarios imply that pervasive IoT wireless communications are timely integrated in spectrum usage conditions for relevant EU-harmonised bands.

In terms of IoT, there are multiple technologies using different bands. Regarding mobile cellular bands, three novel technologies have been defined: (i) Extended Coverage GSM IoT, (ii) LTE Machine Type Communication (MTC) and evolved MTC (eMTC), and (iii) Narrowband IoT (NB-IoT) which can operate in an in-band, guard-band or stand-alone mode. These technologies can be readily used in bands designated for terrestrial WBB ECS. 5G standardisation is making progress at 3GPP<sup>2</sup> with the goal to deliver comprehensive norms, including on IoT use, at the end of 2019. A major track of 5G standardisation is dedicated to the so-called New Radio (NR) interface.

The 900 MHz and 1800 MHz frequency bands are harmonised for terrestrial WBB ECS<sup>3</sup> in a technology-neutral way on the basis of multiple wireless communications standards, which ensure coexistence with GSM systems. At present, the 1800 MHz band is a leading band for 4G deployments as it accommodates more than 45% of the world-wide LTE networks<sup>4</sup>. At the same time, both bands are still used for 2G technology (GSM and its enhancements), including for machine-type communications.

In its Spectrum Roadmap for IoT<sup>5</sup>, the Radio Spectrum Policy Group (RSPG) takes the view that designating additional bands for IoT is not needed as further access to spectrum

<sup>2</sup> 3GPP Releases 15 and 16

<sup>3</sup> By virtue of Council Directive 87/372/EEC as amended by Directive 2009/114/EC, and Commission Decision 2009/766/EC as amended by Commission Decision 2011/251/EU

<sup>4</sup> Source: Global mobile Suppliers Association, November 2016

<sup>5</sup> RSPG17-006 final

for IoT can be enabled in other ways, including through technical harmonisation measures which allow IoT use. In this regard, as frequency bands designated for WBB ECS may be used for emerging IoT applications and services, it should be ensured in line with the principle of technology neutrality that the existing harmonised technical conditions in such bands fit with IoT requirements.

Therefore, the suitability of the EU regulatory framework for the 900 MHz and 1800 MHz bands needs to be studied with particular focus on IoT applications. Such approach would incentivise investment, reduce equipment cost and capital expenditure through economies of scale, and render benefits for businesses and citizens. For the sake of continuity in the regulatory framework, these studies should focus on applicable *standards* and relevant frequency parameters and also ensure co-existence with current deployments in both bands.

CEPT has completed analysis of the technical conditions for the future deployment of wideband and narrowband machine-to-machine communications in EU-harmonised bands currently in use for terrestrial WBB ECS (s. ECC Report 266<sup>6</sup>). The outcome of these studies would generate synergies in delivering results under this Mandate within a short timeframe and may also advise on the need to review the technical conditions in other EU-harmonised bands. According to ECC Report 266, for the EU-harmonised frequency bands under FDD mode other than the 900 MHz and 1800 MHz bands, the current regulatory framework based on least restrictive technical conditions (BEM) does not require a particular update for usage for IoT, including the three novel technologies as described above.

In its "Strategic Roadmap towards 5G for Europe: Opinion on spectrum related aspects for next-generation wireless systems (5G)"<sup>7</sup>, the RSPG recognises the need to ensure that technical and regulatory conditions for all EU-harmonised frequency bands for wireless broadband electronic communications services *are fit for 5G use*. The Commission services are monitoring technology and market developments on 5G and will respond to any need to amend the technical conditions of EU-harmonised bands used for terrestrial WBB ECS (including the 900 MHz and 1800 MHz bands) in a follow-up mandate to CEPT.

#### **JUSTIFICATION**

Pursuant to Article 4(2) of the Radio Spectrum Decision the Commission may issue mandates to the CEPT for the development of technical implementing measures with a view to ensuring harmonised conditions for the availability and efficient use of radio spectrum necessary for the functioning of the internal market. Such mandates shall set the tasks to be performed and their timetable. Pursuant to Article 1 of the Radio Spectrum Decision, activities under the Decision must facilitate policy making with regard to the strategic planning and harmonisation of radio spectrum use as well as ensure the effective implementation of radio spectrum policy in the EU while serving the aim of coordination of policy approaches. Furthermore, they shall take due account of the work of international organisations related to spectrum management such as the ITU and the CEPT.

<sup>6</sup> Link: <http://www.erodocdb.dk/Docs/doc98/official/pdf/ECCRep266.pdf>

<sup>7</sup> RSPG16-032 final

The Radio Spectrum Policy Programme (RSPP) requires Member States and the Commission to foster the development of standards and the harmonisation of spectrum allocation for IoT communications across the Union<sup>8</sup>.

Advances in standardisation regarding IoT, also relevant for the evolution towards 5G, call for a swift and coordinated Union-level process on updating the technical conditions in EU-harmonised bands, wherever necessary. Therefore, the harmonised technical conditions for terrestrial WBB ECS in the 900 and 1800 MHz frequency bands should be reviewed and timely adapted to cater for growing IoT use in the short term. Such approach will contribute to the overarching Union policy objective of providing high-quality (wireless) connectivity.

#### TASK ORDER AND SCHEDULE

CEPT is herewith mandated to review the harmonised technical conditions for spectrum use in the 900 MHz and 1800 MHz frequency bands for the continued provision of terrestrial wireless broadband electronic communications services with view to supporting IoT usage scenarios and applications. CEPT should give utmost consideration to overarching Union-level spectrum policy objectives<sup>9</sup> such as efficient spectrum use and take utmost account of applicable principles of Union law such as technological and service neutrality, non-discrimination and proportionality insofar as technically possible.

CEPT is requested to collaborate actively with the European Telecommunications Standardisation Institute (ETSI) which develops harmonised standards for conformity under the Radio Equipment Directive. In particular, CEPT should also take into consideration emerging technologies and ETSI (harmonised) standards which facilitate shared spectrum use and foster economies of scale.

In particular, CEPT is tasked to:

1. *Study and assess* the harmonised technical conditions applicable to the **880-915 MHz / 925-960 MHz and 1710-1785 MHz / 1805-1880 MHz** frequency bands with view to their suitability for IoT applications.
2. Based on the results under Task 1, *amend, if necessary*, the harmonised technical conditions applicable to both bands, with focus on applicable technology standards, for the provision of terrestrial wireless broadband electronic communications services, so as to ensure both, backward compatibility with existing use, and suitability for IoT applications.

The amended technical conditions to address IoT use should also be sufficient to ensure co-existence with GSM and other incumbent services and services/applications in adjacent bands, in line with their regulatory status, including at the EU outer borders.

CEPT should provide deliverables according to the following schedule:

Delivery	Deliverable	Subject
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<sup>8</sup> Article 8(6), RSPP, s. <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32012D0243>

<sup>9</sup> Enshrined in the RSPP and the Radio Spectrum Decision

Field Code Changed

<b>Date</b>		
November 2017 <sup>10</sup>	Draft Report from the CEPT to the Commission	Description of the work undertaken and the results.
March 2018 <sup>11</sup>	Final Report from the CEPT to the Commission taking into account the outcome of the public consultation	Description of the work undertaken and the results.

CEPT is requested to report on the progress of its work pursuant to this Mandate in advance of all meetings of the Radio Spectrum Committee taking place during the course of the Mandate.

The Commission, with the assistance of the Radio Spectrum Committee and pursuant to the Radio Spectrum Decision, may consider applying the results of this mandate in the EU, pursuant to Article 4 of the Radio Spectrum Decision and subject to the results of the spectrum inventory and relevant guidance of the RSPG.

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<sup>10</sup> Subject to a public consultation

<sup>11</sup> In time for the RSC meeting in March 2018

## ANNEX 2: LIST OF REFERENCE

- [1] 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, 30 June 2017
- [2] Directive 2009/114/EC of the European Parliament and of the Council of 16 September 2009 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
- [3] 3GPP TS 36.101 V15.1.0: Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception (Release 15)
- [4] 3GPP TS 36.104 V15.1.0: Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception
- [5] 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
- [6] ETSI EN 301 908-13 V11.1.1 - IMT cellular networks; Harmonised EN covering the essential requirements of article 3.2 of the R&TTE Directive; Part 13: Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE)
- [7] ETSI EN 301 908-18 V11.1.1 - IMT cellular networks; Harmonised EN covering the essential requirements of article 3.2 of the R&TTE Directive; Part 18: E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS)
- [8] ETSI EN 301 502 V11.1.1 - Global System for Mobile communications (GSM); Harmonised EN covering the essential requirements of article 3.2 of the R&TTE Directive
- [9] ETSI EN 301 511 V9.0.2 - Global System for Mobile communications (GSM); Harmonised EN for mobile stations in the GSM 900 and GSM 1800 bands covering essential requirements of article 3.2 of the R&TTE directive (1999/5/EC)
- [10] ETSI EN 301 908-14 v11.1.1- IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 14: Evolved Universal Terrestrial Radio Access (E-UTRA) Base Stations (BS)
- [11] ETSI EN 301 908-1 V11.1.1 - IMT cellular networks; Harmonised EN covering the essential requirements of article 3.2 of the R&TTE Directive; Part 1: Introduction and common requirements
- [12] 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