



ECC Decision (17)06

The harmonised use of the frequency bands
1427-1452 MHz and 1492-1518 MHz for
Mobile/Fixed Communications Networks
Supplemental Downlink (MFCN SDL)

Approved 17 November 2017

Corrected 2 March 2018

EXPLANATORY MEMORANDUM

1 INTRODUCTION

This ECC Decision harmonises the use of the 1427-1452 MHz and 1492-1518 MHz bands for terrestrial Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL) while allowing CEPT countries to adapt to specific national circumstances for incumbent terrestrial services currently operating in the bands. It provides the harmonised technical conditions including the least restrictive technical conditions for the deployment of MFCN SDL within CEPT.

An MFCN SDL is a mobile broadband system, which by means of base station transmitters in the network, uses unpaired spectrum in the downlink to provide a supplemental downlink capacity to carry comprehensive text, audio, images, data, sound and video content in general, in a unicasting, multicasting or broadcasting mode.

The harmonisation of the 1427-1452 MHz and 1492–1518 MHz frequency bands for MFCN SDL through this ECC Decision is important to enhance the downlink capability of mobile broadband systems and represents a strategic tool to tackle the growing mobile data traffic asymmetry.

This ECC Decision contains annexes defining the harmonised frequency arrangement and applicable least restrictive technical conditions (LRTC) through Block Edge Masks (BEMs) for the use of the bands by MFCN SDL within CEPT.

This ECC Decision complements ECC Decision (13)03 on the harmonised use of the frequency band 1452-1492 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL) [1]. It ensures that MFCN SDL could benefit from up to 90 MHz of harmonised spectrum.

2 BACKGROUND

ECC/DEC/(13)03 harmonises the use of the band 1452-1492 MHz for terrestrial Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL). Since 2015, authorisations have been granted for MFCN SDL in this band in some CEPT countries.

At WRC-15, the frequency bands 1427-1452 MHz and 1492-1518 MHz were identified globally for International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC-15) [2].

In addition, for the protection of the Earth Exploration Satellite Service (EESS) passive, WRC-15 also introduced in Resolution 750 (Rev.WRC-15) [2] relevant limits of unwanted emission power in the band 1400-1427 MHz applying to IMT stations operating in the band 1427-1452 MHz. It is noted that the radio astronomy service (RAS) also has a primary allocation in the passive band 1400-1427 MHz, and that Recommendation ITU-R RA.769 [3] sets the threshold input power into the RAS frequency band 1400-1427 MHz to -205 dBW for broadband observations and to -220 dBW/20 kHz for narrow band observations. In order to meet these power threshold levels additional mitigation methods are required at the location of RAS stations, such as setting adequate separation distances between RAS stations and IMT base stations. The size of these separation distances will be determined on an individual basis for the affected RAS stations.

WRC-15 also requested studies to address adjacent band compatibility between IMT systems and MSS systems which operate in the band 1518-1525 MHz (see Resolution 223 (Rev.WRC-15)). CEPT conducted studies in this regard which are contained in ECC Report 263 [4].

It is noted that Recommendation T/R 13-01 (1375-1400 MHz frequency band paired with 1427-1452 MHz and 1350-1375 MHz paired with 1492-1518 MHz) applies for low capacity fixed links and it is implemented in several countries (see ECC Report 173).

It is noted that the 1427-1452 MHz and 1492-1518 MHz bands are also used for land military systems in some CEPT countries according to ERC Report 25 (The European table of frequency allocations and applications in the frequency range 8.3 kHz to 3000 GHz (ECA Table)).

CEPT supported an IMT identification in the bands 1427-1452 MHz and 1492-1518 MHz. Further to the IMT identification of these bands at WRC-15, CEPT conducted a questionnaire on timing for the harmonisation of the 1427-1452 MHz and 1492-1518 MHz frequency bands and their availability for MFCN. Based on the responses to the questionnaire, ECC supports the use of parts or all of the frequency band 1427-1518 MHz for a one direction MFCN downlink service, used in connection with another MFCN band that provides the uplink capabilities, and to initiate the development of this ECC Decision.

ECC identified synergies between the harmonised MFCN SDL in 1452-1492 MHz and further considered that:

- without prejudice of the designation of the frequency bands 1427-1452 MHz and 1492-1518 MHz for MFCN SDL in this ECC Decision making available these bands in addition to 1452-1492 MHz, national scenarios are foreseen where the entire range might not be fully available in some CEPT countries;
- this ECC Decision takes into account the existing standardisation framework and activities at the worldwide level, and an appropriate frequency arrangement.

3 REQUIREMENT FOR AN ECC DECISION

The ECC recognises that the bands 1427-1452 MHz and 1492-1518 MHz together with 1452-1492 MHz could be made available for MFCN SDL based on least restrictive technical conditions (LRTC). A harmonised frequency arrangement will maximise the opportunities and benefits for end users, will reduce capital expenditure for operators and cost of manufacturing equipment and will secure future investments by providing economy of scale.

An ECC Decision is required to support the development of innovation with mobile systems that are capable of aggregating multiple downlink channels in multiple bands. Providing harmonised technical conditions for the use of 1427-1452 MHz and 1492-1518 MHz by MFCN SDL, will enable the industry to implement the 1427-1518 MHz band as MFCN SDL band in chipsets, devices and equipment thus ensuring relevant economies of scale and development of radio equipment on a large scale.

Moreover, the ECC recognises that an ECC Decision harmonising technical conditions for the use of the frequency bands 1427-1452 MHz and 1492-1518 MHz needs to leave flexibility for administrations with regards to the use of incumbent services and applications to adapt to specific national circumstances. Such flexibility does not impact the harmonised technical conditions in the Annex and, according to market demand, ensures that MFCN SDL could be introduced either in 1427-1452 MHz and/or 1492 -1518 MHz, or in parts of these bands.

ECC DECISION OF 17 NOVEMBER 2017 ON THE HARMONISED USE OF THE FREQUENCY BANDS 1427-1452 AND 1492-1518 MHz FOR MOBILE/FIXED COMMUNICATIONS NETWORKS SUPPLEMENTAL DOWNLINK (MFCN SDL) (ECC/DEC/(17)06) CORRECTED 2 MARCH 2018

“The European Conference of Postal and Telecommunications Administrations,

considering

- a) that the frequency bands 1427-1452 MHz and 1492-1518 MHz are allocated to the mobile service (except aeronautical mobile service) and fixed service on a co-primary basis and identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) in ITU Region 1, in accordance with RR No 5.341A of the ITU Radio Regulation;
- b) that in some CEPT countries the band 1429-1518 MHz is also allocated on a co-primary basis to aeronautical mobile service for the purpose of aeronautical telemetry within the national territory according to No 5.342 of the ITU Radio Regulation;
- c) that ECC Decision (13)03 [1] already harmonises the use of the band 1452-1492 MHz for terrestrial Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL) based on ECC Report 202 [8] and takes into account the new designation of the band 1427-1452 and 1492-1518 MHz;
- d) that the protection of services in frequency bands below 1427 MHz and above 1518 MHz needs to be addressed;
- e) that Resolution 750 (Rev.WRC-15) [2] provides relevant limits of unwanted emission power in the band 1400-1427 MHz applying to IMT stations operating in the band 1427-1452 MHz;
- f) that for the protection of radio astronomy observations in the passive band 1400-1427 MHz from IMT systems in the band 1427-1452 MHz, unwanted emission power limits in Resolution 750 (Rev.WRC-15) may not be sufficient and there is therefore a need to consider at national level relevant separation distances around radio telescopes, and other mitigation techniques such as additional filtering and/or a guard band for MFCN IMT stations, as required;
- g) that ECC Report 263 [4] addresses adjacent band compatibility studies between IMT operating in the frequency band below 1518 MHz and the MSS operating in the frequency band above 1518 MHz;
- h) that there are ongoing studies in CEPT of measures to address potential blocking of MES operating in bands adjacent to 1518 MHz (including 1525-1559 MHz) at sea ports and airports and propose proportionate solutions to address this issue;
- i) that the 1427-1452 and 1492-1518 MHz bands are also used for land military systems in some countries according to ERC Report 25 [7] (ECA Table), however this does not exclude the utilisation for civil applications;
- j) that terrestrial Mobile/Fixed Communications Networks (MFCN) for the purpose of this Decision includes IMT and other communications networks in the mobile and fixed services;
- k) that harmonised frequency arrangements facilitate economies of scale and availability of low-cost equipment;
- l) that a MFCN Supplemental Downlink (SDL) is a mobile broadband system, which by means of base station transmitters in the network, uses the downlink to provide a supplemental downlink capacity to carry comprehensive text, audio, images, data, sound and video content in general, in a unicasting, multicasting or broadcasting mode;
- m) that a MFCN SDL could aggregate the usual downlink channel of a MFCN band with a supplemental downlink channel(s) to increase the downlink capacity;
- n) that there could be differences in the market demand for spectrum for MFCN SDL and that different licensing schemes across CEPT countries on incumbent services could lead to different timescales concerning the introduction of Mobile/Fixed Communication services in the frequency bands 1427-1452 MHz and 1492-1518 MHz;
- o) that different national usage plans could lead to only partial availability of the frequency bands 1427-1452 MHz and/or 1492-1518 MHz for the introduction of MFCN SDL;

- p) that data based traffic over mobile broadband networks is predicted to increase over the coming years with a particular evolution towards asymmetrical traffic due to mobile multimedia usage leading to an increasing demand for downlink capacity;
- q) that some radio-communication standards enable the efficient delivery of live and on-demand content to mobile devices over MFCN SDL for example using broadcast over eMBMS (evolved Multimedia Broadcast Multicast Service) and dynamic unicast/broadcast hand-off techniques;
- r) that the appropriate frequency block size for MFCN SDL is 5 MHz, or a multiple thereof, which does not preclude smaller channel bandwidths within a block;
- s) that the block edge mask (BEM) concept has been developed by CEPT to facilitate implementation of spectrum rights of use which are as technology neutral as possible;
- t) that if 5G specifications are consistent with the proposed harmonised technical conditions contained in CEPT Report 65, then it will be suitable for the implementation of 5G terrestrial wireless systems;
- u) that the designation of the frequency bands 1427-1452 MHz and 1492-1518 MHz to MFCN SDL does not prevent administrations from using either of the bands, or parts thereof, for other terrestrial applications to adapt to national circumstances;
- v) that MFCN SDL to aeronautical telemetry cross-border coordination in the frequency bands 1429–1452 MHz and 1492-1518 MHz will be studied in order to provide further guidance, where needed, to administrations for bi/multi-lateral negotiations;
- w) that MFCN SDL to MFCN SDL cross-border coordination in the frequency bands 1427-1452 MHz and 1492-1518 MHz needs to be addressed and is expected to be addressed in an appropriate ECC Recommendation;
- x) that in EU/EFTA countries the radio equipment that is under the scope of this Decision shall comply with the RE Directive [9]. Conformity with the essential requirements of the RE 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 RE Directive.

DECIDES

1. that the **purpose of this ECC Decision** is to harmonise technical conditions for the use of the bands 1427-1452 and 1492-1518 MHz for terrestrial Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL);
2. that CEPT administrations shall designate the frequency bands 1427-1452 MHz and 1492–1518 MHz to MFCN SDL, ensuring, when needed, the necessary flexibility to respond to national needs, taking into account considering u) above, and market demand;
3. that, for the purpose of this ECC Decision, the **following technical and operational parameters** apply to MFCN SDL in the frequency bands 1427-1452 and 1492-1518 MHz:
 - a) the harmonised frequency arrangement is given in Annex 1;
 - b) the least restrictive technical conditions (LRTC) are specified in Annex 2;
4. that this Decision **enters into force** on 17 November 2017;
5. that the preferred **date for implementation** of this Decision shall be 17 May 2018;
6. that CEPT administrations shall communicate the **national measures** implementing this Decision to the ECC Chairman and the Office when this ECC Decision is nationally implemented.

Note:

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

ANNEX 1: HARMONISED FREQUENCY ARRANGEMENT FOR THE BANDS 1427-1452 AND 1492-1518 MHZ

The harmonised frequency arrangements are based on a block size of 5 MHz, resulting in the following 10 frequency blocks in the bands 1427-1452 and 1492-1518 MHz:

Table 1: Harmonised frequency arrangement for 1427-1452 MHz

| | | | | |
|---|-----------|-----------|-----------|-----------|
| 1427-1432* | 1432-1437 | 1437-1442 | 1442-1447 | 1447-1452 |
| Downlink (base station transmit) | | | | |
| 25 MHz (5 blocks of 5 MHz) | | | | |

*Block conditions: see ANNEX 2

Table 2: Harmonised frequency arrangement for 1492-1518 MHz

| | | | | | |
|---|-----------|-----------|-----------|-------------|-------------------|
| 1492-1497 | 1497-1502 | 1502-1507 | 1507-1512 | 1512-1517** | 1517-1518 |
| Downlink (base station transmit) | | | | | Guard band |
| 25 MHz (5 blocks of 5 MHz) | | | | | 1 MHz |

**Restricted power: see ANNEX 2

Table 3: Combined harmonised frequency arrangement (incl. ECC/DEC/(13)03 for informative purpose)

1427 MHz

1518 MHz

| | | | | | | | | | | | | | | | | | | |
|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------------------|
| 1427 | 1432 | 1437 | 1442 | 1447 | 1452 | 1457 | 1462 | 1467 | 1472 | 1477 | 1482 | 1487 | 1492 | 1497 | 1502 | 1507 | 1512 | 1517 |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1432* | 1437 | 1442 | 1447 | 1452 | 1457 | 1462 | 1467 | 1472 | 1477 | 1482 | 1487 | 1492 | 1497 | 1502 | 1507 | 1512 | 1517* | 1518 |
| Downlink (base station transmit) | | | | | | | | | | | | | | | | | | Guard band |
| 90 MHz (18 blocks of 5 MHz) | | | | | | | | | | | | | | | | | | 1 MHz |

*Block conditions and **Restricted power: see ANNEX 2

Table 3 for information reveals the potential synergy with ECC Decision (13)03 [1].

ANNEX 2: LEAST RESTRICTIVE TECHNICAL CONDITIONS

The least restrictive technical conditions (LRTC) are in the form of a block-edge mask (BEM) and out-of-block emission limits. LRTC are related to the avoidance of interference between users of spectrum. The LRTC in the 1427-1452 MHz and 1492-1518 MHz bands are optimised for, but are not limited to MFCN SDL.

A BEM is an emission mask that is defined, as a function of frequency, relative to the block edge of spectrum. BEMs are emission restrictions without implication on the levels of the emission restriction applicable to the spurious domain. The term block edge refers to the frequency boundary of spectrum licensed to a mobile/fixed communication network.

The BEM has been derived to allow coexistence between MFCN SDL systems in the 1427-1452 MHz and 1492-1518 MHz bands.

In addition, out-of-block emission limits for MFCN SDL have been defined to address compatibility between MFCN SDL in the 1427-1452 MHz and 1492-1518 MHz bands and other applications in adjacent bands.

Operators of MFCN in the 1427-1452 MHz and 1492-1518 MHz bands 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. Administrations should ensure that these technical parameters can be used, if agreed among all affected parties.

A2.1 TECHNICAL CONDITIONS FOR BASE STATIONS

Administrations should take into account the following aspects:

It is not desirable to restrict the in-band e.i.r.p. for base stations operating in 1427-1452 MHz and 1492-1512 MHz, as the band could be aggregated with FDD coverage bands in lower frequencies and thus higher in-band e.i.r.p. for a base station allows benefiting of the SDL capacity across the base station cell.

Based on deployment requirements and on compatibility studies with other services operating in adjacent bands, or with legacy services operating in the band, an administration could at national level:

- restrict base stations in-band e.i.r.p. in the band 1427-1452 and 1492-1512 MHz. Such a limit may range up to 68 dBm. Higher e.i.r.p. may be considered in specific circumstances;
and/or
- according to the service considered: handle coordination of stations.

It should be noted that it is not expected that base station operating in the block 1427-1432 MHz can transmit a large power while respecting the emission limits detailed in Table 6 below. On the contrary, it is expected that only lower power base stations can be deployed in the block 1427-1432 MHz. It is not appropriate to introduce regulatory emission limits for these bands, as such limits are only related to current state-of-the-art of the technology and specific deployment models.

Compatibility requirements identified in ECC Report 263 [4] and ECC Report 269 [5] require restricting the in-block e.i.r.p. for base stations operating in 1512-1517 MHz to 58 dBm in band e.i.r.p.

Table 4, Table 5, Table 6 and Table 7 below define, respectively, the maximum in-block e.i.r.p. for BS operating in 1512-1517 MHz per cell, the base station BEM out-of-block e.i.r.p. limits for emissions within the band 1427-1452 MHz and 1492-1517 MHz per antenna, the base station maximum unwanted emission power in the band 1400-1427 MHz for base stations operating in 1427-1452 MHz and the base station unwanted emission limits per cell above 1518 MHz for base stations operating in 1492-1517 MHz. In a multi sector site "cell" refers to one of the sectors.

Table 4: Maximum in-block e.i.r.p. for BS operating in 1512-1517 MHz per cell^{1,2}

| MFCN block | Maximum in band e.i.r.p. | Measurement bandwidth |
|---------------|--------------------------|-----------------------|
| 1512-1517 MHz | 58 dBm | 5 MHz |

Table 5: Base station BEM out-of-block e.i.r.p. limits for emissions within the band 1427-1452 MHz and 1492-1517 MHz per antenna³

| Frequency range of out-of-block emissions | Maximum mean out-of-block e.i.r.p. | Measurement Bandwidth |
|---|------------------------------------|-----------------------|
| -10 to -5 MHz from lower block edge | 11 dBm | 5 MHz |
| -5 to 0 MHz from lower block edge | 16.3 dBm | 5 MHz |
| 0 to +5 MHz from upper block edge | 16.3 dBm | 5 MHz |
| +5 to +10 MHz from upper block edge | 11 dBm | 5 MHz |
| Remaining MFCN SDL frequencies | 9 dBm | 5 MHz |

Table 6: Base station maximum unwanted emission power in the band 1400-1427 MHz for base stations operating in 1427-1452 MHz

| Frequency range | Maximum unwanted emission power ⁴ | Measurement Bandwidth |
|-----------------|--|-----------------------|
| 1400-1427 MHz | -72 dBW | 27 MHz |

Table 7: Base station out-of-block e.i.r.p. limits per cell² above 1518 MHz for base stations operating in 1492-1517 MHz.

| Frequency range of out-of-block emissions | Maximum out-of-block e.i.r.p. | Measurement Bandwidth |
|---|-------------------------------|-----------------------|
| Between 1518 and 1520 MHz | -0.8 dBm | 1 MHz |
| Between 1520 and 1559 MHz | -30 dBm | 1 MHz |

¹ Corresponding minimum blocking requirements for MSS terminals operating above 1518 MHz were defined in ECC Report 263, taking into account, in particular, a maximum in band e.i.r.p. of 58 dBm for BS operating in 1512-1517 MHz.

² In a multi-sector site, the value per 'cell' corresponds to the value for one of the sectors.

³ The same conditions are applicable within the range 1452-1492 MHz, as specified in ECC/DEC/(13)03

⁴ The unwanted emission power level is to be understood here as the level measured at the antenna port.

ANNEX 3: LIST OF REFERENCE

- [1] ECC Decision (13)03: The harmonised use of the frequency band 1452-1492 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL), November 2013 and amended in July 2015), November 2013 and amended July 2015
- [2] ITU Radio Regulations Edition of 2016
- [3] Recommendation ITU-R RA.769
- [4] ECC Report 263: Adjacent band compatibility studies between IMT operating in the frequency band 1492-1518 MHz and the MSS operating in the frequency band 1518-1525 MHz, March 2017
- [5] ECC Report 269: Least restrictive technical conditions for Mobile/Fixed Communications Networks in 1427-1452 MHz and 1492-1518 MHz, November 2017
- [6] ECC Report 173: Fixed Service in Europe, March 2012
- [7] ERC Report 25: The European table of frequency allocations and applications in the frequency range 8.3 kHz to 3000 GHz, June 2016
- [8] ECC Report 202: Out-of-Band emission limits for Mobile/Fixed Communication Networks (MFCN) Supplemental Downlink (SDL) operating in the 1452-1492 MHz band, September 2013
- [9] 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