**CEPT roadmap for 5G**

(Version 6, Revised 6 July 2018)

The 43rd ECC Plenary meeting in Prague, 15-18 November 2016, approved a comprehensive list of actions regarding the fifth generation of mobile technology (5G) named “CEPT roadmap for 5G”.

It outlines the CEPT’s actions for 5G, taking into account the views from all stakeholders expressed during the CEPT Workshop on 5G from 2-4 November 2016 in Mainz.

It also identifies, when appropriate, the related ECC activities (such as Work Items (WI) in the [ECC Work Programme](http://eccwp.cept.org/)) and the areas where further considerations are expected.

The CEPT roadmap for 5G will be reviewed at each ECC Plenary meeting with an assessment of the related activities.

History:

* Version 1: approved 18 November 2016 (43rd ECC Plenary);
* Version 2: approved 3 March 2017 (44th ECC Plenary). No change to the Roadmap list of actions. Update of the related ECC activities;
* Version 3: approved 28 June 2017 (45th ECC Plenary). Further update of the related ECC activities and minor modification to action B6 related to the ITU-R activities on 5G characteristics;
* Version 4: approved 17 November 2017 (46th ECC Plenary).
  + Modifications and reordering of actions B1 to B4 related to WRC-19 in order to reflect the progress of the studies and other considerations regarding future 5G bands in Europe.
  + New action A3.2 on the development of a toolbox supporting introduction of 5G in 26 GHz with FS in operation.
  + Update of the related ECC activities for the relevant actions.
* Version 5: approved 2 March 2018 (47th ECC Plenary). Update of the related ECC activities, in particular to reflect the progress achieved within ECC and the decisions taken during this Plenary meeting.
* Version 6: approved 6 July 2018 (48th ECC Plenary):
  + Modifications to actions A1 (3.5 GHz), A3.1 and A3.2 (26 GHz) and D4 (60 GHz);
  + Suppression of actions (A5, B5, B6, C5) no longer relevant;
  + Update of the related ECC activities for the relevant actions.

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| List of actions (Approved 18 November 2016, Revised 6 July 2018) | Related ECC activity (Updated 6 July 2018) |
| 1. **Harmonisation** | |
| **A.1** Revise the harmonisation measures for 3.4-3.8 GHz so as to make it suitable for 5G | Ongoing work within ECC/PT1 ([WI PT1\_SWG\_C\_20](http://eccwp.cept.org/WI_Detail.aspx?wiid=581)): revision of ECC/DEC/(11)06 approved by ECC#48 for Public Consultation.  Related work in response to EC Mandate on 5G: CEPT Report 67 approved for publication . |
| **A.2** Provide guidance to administrations for defragmenting the 3.4-3.8 GHz band, in which there are existing licences in many CEPT countries and for developing plans and intended timescale for the future utilization of this band. | Draft ECC Reports under development:   * [WI PT1\_02](http://eccwp.cept.org/WI_Detail.aspx?wiid=624) on defragmentation of the frequency band 3400-3800 MHz, draft ECC Report approved for public consultation at ECC#48; * [WI PT1\_17](http://eccwp.cept.org/WI_Detail.aspx?wiid=660) on options for synchronization between MFCN |
| **A.3.1** Develop an harmonisation decision setting the conditions for the introduction of 5G in the 26 GHz band, taking into account, as appropriate, the compatibility and protection with all existing services in the same and adjacent frequency bands. | ECC Decision (18)06 approved.  Related work in response to EC Mandate on 5G: CEPT Report 68 approved. |
| **A.3.2** Develop additional guidelines to support the implementation of ECC Decision (18)06, including:   * a tool box to help the national decision process supporting introduction of 5G in 26 GHz with FS in operation providing mechanisms which allow for continued FS operation, where necessary; * Guidelines to facilitate introduction of 5G while ensuring the coexistence with EESS/SRS and FSS earth stations; * Options for synchronisation between MFCNs. | * Toolbox for IMT-FS coexistence ([WI PT1\_11](https://eccwp.cept.org/WI_Detail.aspx?wiid=651)); * Draft ECC Recommendation under development in relation to EESS/SRS earth stations ([WI PT1\_15](http://eccwp.cept.org/WI_Detail.aspx?wiid=658)); * Draft ECC Recommendation under development in relation to FSS earth stations ([WI PT1\_16](http://eccwp.cept.org/WI_Detail.aspx?wiid=659)); * New PT1 work item on guidance and options to identify the most appropriate synchronisation framework at national level ([WI PT1\_19](https://eccwp.cept.org/WI_Detail.aspx?wiid=675)) |
| **A.4** Review ECC decisions in MFCN bands to ensure they are suitable for 5G | * 3.4-3.8 GHz: See A.1. * 700 MHz, 800 MHz and 1.5 GHz ECC Decisions are already suitable for 5G (technology neutral and no AAS assumed in these frequency bands). * 2.1 GHz: [WI PT1\_12](http://eccwp.cept.org/WI_Detail.aspx?wiid=655) to review ECC Decision (06)01. * 2.6 GHz: [WI PT1\_13](http://eccwp.cept.org/WI_Detail.aspx?wiid=656) to review ECC Decision (05)05. * 1800 (and 900 MHz): [WI PT1\_14](http://eccwp.cept.org/WI_Detail.aspx?wiid=657) to review ECC Decision (06)13 * Further considerations expected from ECC/PT1 for2.3GHz. |
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| 1. **WRC-19 (IMT>24 GHz)** | |
| **B.1** Signal clearly that CEPT supports an IMT Identification in the 24.25 – 27.5 GHz band and intends to harmonise this band in Europe for 5G before WRC-19 through the adoption of an harmonisation decision and to promote it for worldwide harmonisation | * CPG and PT1 activities on WRC-19 AI1.13 * Reflected in draft CEPT Brief on AI 1.13 * Articles in the ECC newsletters (see [here](http://apps.ero.dk/eccnews/dec-2016/cept_roadmap_-_guiding_the_way_for_5g_in_europe.html).) |
| **B.2** Signal clearly that, in addition to the 26 GHz band (see B.1), CEPT considers that the bands 40.5-43.5 GHz and 66-71 GHz have good potential for future harmonisation in Europe. The process for developing harmonisation decisions for the additional bands may be launched immediately after WRC-19. | * CPG and PT1 activities on WRC-19 AI1.13. * Reflected in draft CEPT Brief on AI 1.13.   Note the band overlap with AI 1.6 (NGSO FSS) and 1.14 (HAPS)).   * The CEPT priorities for the studies may be updated depending on the CEPT positions established by CPG on each frequency bands listed in Resolution 238 (WRC-15). |
| **B.3** Signal clearly that Europe has harmonised the 27.5-29.5 GHz band for broadband satellite and is supportive of the worldwide use of this band for ESIM. This band is therefore not available for 5G. | * CPG activities * Reflected in draft CEPT Brief on AI 1.5 and on 1.13 * Articles in the ECC newsletters (see [here](http://apps.ero.dk/eccnews/dec-2016/cept_roadmap_-_guiding_the_way_for_5g_in_europe.html) and also [here](http://apps.ero.dk/eccnews/oct-2016/index.html) in relation to ESIM.) |
| **B.4** Engage in discussions with other regional organisations to facilitate consensus at WRC-19 | CPG activities |
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| 1. **Verticals** | |
| **C.1** Monitor common use cases for functional requirement of verticals (e.g. PPDR, industrial automation, automotive, utilities, rails, …) which would require spectrum harmonisation measures | To be taken into account by WGFM through monitoring of relevant standardisation activities (e.g. ETSI, 3GPP). |
| **C.2** Consider how 5G standardisation will accommodate the verticals specific requirements | To be taken into account by ECC/PT1 and WGFM. |
| **C.3** Investigate the possibility for verticals to share common platforms (e.g., a shared private network or hosted on a mobile operator network) | To be considered by WGFM in its existing activities relating to verticals, e.g. for rail ([FM 56](http://www.cept.org/ecc/groups/ecc/wg-fm/fm-56/page/terms-of-reference/)).  Preliminary discussions in ECC/PT1 relating connectivity by means of MFCN in the band 3.4-3.8 GHz (e.g. for connected cars), in response to the 5G Mandate. |
| **C.4** Investigate the impact of the use of licensed-exempt regime for critical applications of verticals (e.g. automotive), | WG FM to investigate the matter (e.g. work on ITS under EC Mandate for 5.9 GHz). |
| **C.5** Review spectrum regulations applicable to verticals to assess whether these are “5G compatible” | To be considered by ECC/PT1 and WGFM, taking into account the list of harmonisation decisions (and recommendations) [for review](http://test.ecodocdb.dk/docdb/document/category/ECC_Decisions/review) . |
| 1. **Other spectrum challenges** | |
| **D.1** Take into consideration what satellite solutions can bring for 5G | Work completed: ECC Report 280 on satellite solutions for 5G approved by WG FM in May 2018. |
| **D.2** Investigate new sharing opportunities and challenges that new technologies (e.g. AAS) can bring. | ECC/PT1 to report on this matter, taking into account its work on 24.25-27.5 GHz and 3.4-3.8 GHz |
| **D.3** Carry out activities on FS channelling in 92-105 GHz band and 130-175 GHz band | Related WIs [SE19\_37](http://eccwp.cept.org/WI_Detail.aspx?wiid=534) and [SE19\_38](http://eccwp.cept.org/WI_Detail.aspx?wiid=537) on guidelines on deployment of FS.  Work completed for the 130-175 GHz band with the publication of ECC Recommendation (18)01. Draft ECC/REC/(18)02 on 92-115 GHz and related ECC Report 282 approved by WGSE for public consultation in May 2018. |
| **D.4** Ensure least restrictive, flexible and streamlined regulations in the band 57-71 GHz which would accommodate 5G and WiGig technologies and applications, also taking into account ITS in this frequency range. | Related WIs [SRD-MG\_44](http://eccwp.cept.org/WI_Detail.aspx?wiid=563) and [SE19\_39](http://eccwp.cept.org/WI_Detail.aspx?wiid=642) on the evaluation of proposals for a relaxed regulation for wideband data transmission systems in all or parts of 57-66 GHz.  ECC agreed to look at the band 66 - 71 GHz for license-exempt use in the future. ETSI TR 103 583 is expected. |
| **D.5** Investigate the impact of the use of spectrum for 5G in higher frequency bands (>24 GHz) in relation with general authorization regime, | To be considered by ECC/PT1 for future activities as appropriate. |