**CEPT roadmap for 5G and beyond**

The [ECC strategic plan 2020-2025](https://cept.org/files/16100/ECC%2820%29093%20Annex%2012_ECC%20Strategic%20Plan%202020-2025.pdf) identifies wireless broadband and connectivity as a major topic to be studied during this period. This roadmap aims to identify relevant ECC actions in order to respond to this objective.

It builds on the [previous CEPT roadmap for 5G](https://www.cept.org/Documents/ecc/57839/ecc-20-055-annex-15_cept_5g_roadmap) which was maintained between 2016-2020. ECC#52 decided to finalise the previous roadmap and to commence a new future looking roadmap.

The roadmap will be regularly reviewed in order to report on the progress of ECC activities as well as to update the list of actions where appropriate.

**History:**

* Version 1, approved by ECC#54 20 November 2020 (as a living document)
* Version 2, approved by ECC#55, March 2021
* Version 3, approved by ECC#56, July 2021
* Version 4, approved by ECC#57, November 2021
* Version 5, approved by ECC#58, March 2022
* Version 6, approved by ECC#59, July 2022
* Version 7, approved by ECC#60, November 2022

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| Topics  | Related ECC activity  |
| 1. **Harmonisation**
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| Mandate to CEPT about mm-wave bands above 24 GHz (40.5-43.5 GHz & 66-71 GHz)  | * 66-71 GHz - [CEPT Report 78](https://docdb.cept.org/document/18493)
* 40.5-43.5 GHz:
* ECC Decision (22)06 (approved for publication at ECC#60)
* CEPT Report 82 (approved for publication at ECC#60)
* ECC Recommendation (22)01, in-band MFCN/FSS coexistence (approved for publication at ECC#60)
* ECC Recommendation (22)02, adjacent band MFCN/FSS coexistence (approved for publication at ECC#60)
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| Revision of EC and CEPT framework for 900 MHz and 1800 MHz (EC Mandate) | * Revision of [ECC/DEC/(06)13](https://docdb.cept.org/document/406) (approved for publication at ECC#58)
* [CEPT Report 80](https://docdb.cept.org/document/19385) (approved for publication at ECC#56)
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| Review of existing conditions in 2.3-2.4 GHz for suitability for 5G while maintaining the current regulatory status of the band | * ECC Report 347, review of existing conditions for AAS (approved for publication at ECC#60)
* Revision of [ECC/DEC/(14)02](https://docdb.cept.org/document/443) (approved for public consultation at ECC#60)
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| Develop relevant frameworks for cross-border coordination, including synchronisation, of 5G networks | * Revision of [ECC/REC/(15)01](https://docdb.cept.org/document/515) for 3.4-3.8 GHz (approved for publication at WGFM#102)
* possible future activity for 1427-1517 MHz
* WI [PT1\_22](http://eccwp.cept.org/WI_Detail.aspx?wiid=678) – 26 GHz new ECC Recommendation
* [ECC Report 331](https://docdb.cept.org/document/22509) on efficient usage of 3.4-3.8 GHz between MFCN TDD networks (approved for publication at ECC#57)
* [ECC/REC/(20)03](https://docdb.cept.org/document/15492) on frame structures for 3.4-3.8 GHz
* WI PT\_48: Revision of ECC Recommendation (14)04 on cross-border coordination in the frequency band 2300-2400 MHz
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| Shared use of 3.8-4.2 GHz for local-area connectivity (EC Mandate) | * WI [FM\_56](http://eccwp.cept.org/WI_Detail.aspx?wiid=800) – Task 2
* WI [PT1\_47](http://eccwp.cept.org/WI_Detail.aspx?wiid=804) – Task 1
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| 1. **WRC-23**
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| CPG activities on WRC-23 agenda items in relation to IMT, in particular on AI 1.1, 1.2, 1.3, 1.4, 1.5 and Art. 21.5 | Relevant activities in the CPG, its PTs and ECC PT1 |
| 1. **Other spectrum challenges**
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| Investigate new sharing opportunities and challenges that new technologies (e.g. AAS) can bring | * ECC Recommendation (22)01 and ECC Recommendation (22)02, 40 GHz mobile and satellite sharing (approved for publication at ECC#60)
* [ECC/REC/(21)02](https://docdb.cept.org/document/22514) on guidance for application of LRTC in 3.4-3.8 GHz for indoor small cells (approved for publication at ECC#57)
* WI [PT1\_40](http://eccwp.cept.org/WI_Detail.aspx?wiid=775) – compatibility between MFCN operating in 3400-3800 MHz and Radio Altimeters (RA) operating in 4200-4400 MHz
* ECC Report 348, use of Aerial UEs with AAS base stations in 1.8 GHz, 2 GHz and 2.6 GHz (approved for publication at ECC#60)
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| Carry out activities on FS channelling, potentially suitable for 5G backhauling | * ECC Report 342, PMP via AAS (approved for publication at WGSE#92)
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| Investigate the impact of the use of spectrum for 5G in higher frequency bands (>24 GHz) in relation with general authorisation regime | [ECC Report 317](https://docdb.cept.org/document/15238) (26 GHz) |
| Develop techniques for measurements and modelling of AAS | * WI [SE21\_25](http://eccwp.cept.org/WI_Detail.aspx?wiid=748) – field measurement techniques:
	+ ECC Report 345 – in-band (approved for publication at WGSE#92)
	+ Further work ongoing to address unwanted emissions
* WI [SE21\_22](http://eccwp.cept.org/WI_Detail.aspx?wiid=695) – lab measurements of unwanted emissions of 5G BS and UE:
	+ Update to ECC Report 249 including BS measurements in 3.4-3.8 GHz
	+ WI on hold pending further measurements
* WI [PT1\_35](http://eccwp.cept.org/WI_Detail.aspx?wiid=755) – modelling techniques (WI on hold)
* [ECC Report 341](https://docdb.cept.org/document/28561) on coverage availability and performance aspects for 5G NR (approved for publication at ECC#59)
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| Further studies on the role of satellite in future cellular networks, in particular for rural connectivity and backhaul | CEPT satellite workshop – 21-22 November 2022 (see [here](https://cept.org/ecc/tools-and-services/cept-workshops/cept-workshop-on-satellite-innovations-and-regulatory-challenges))[ECC Report 280](https://docdb.cept.org/document/2989), Satellite Solutions for 5G |
| Update regulatory conditions for mobile communications on aircraft and vessels to allow 5G use | * Revision of [ECC/DEC/(06)07](https://docdb.cept.org/document/401) to allow 5G non-AAS for MCA in 1800 MHz (approved for publication at ECC#59)
* EC MCA Mandate – [CEPT Report 81](https://docdb.cept.org/document/22513) (approved for publication at ECC#57)
* [ECC Report 336](https://docdb.cept.org/document/27243) on technical conditions for 5G-NR non-AAS in 1800 MHz and 2.6 GHz on-board vessels (approved for publication at ECC#58)
* EC MCV Mandate – draft CEPT Report 83 (approved for public consultation at ECC#60)
* Revision of [ECC/DEC/(08)08](https://docdb.cept.org/document/419) to allow 5G non-AAS for MCV in 1800 MHz and 2.6 GHz (approved for publication at ECC#58)
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| Monitor the evolution of technologies for possible regulatory opportunities or challenges:* New antenna technology and intelligent surfaces
* AI and machine learning, e.g. for channel modelling, propagation, interference predictions
* Blockchain for spectrum management
* Network densification
 | Any specific actions to be agreed by the ECC |
| Investigate regulatory options and challenges for frequencies in the ‘THz’ range | Any specific actions to be agreed by the ECC |