ECC Newsletter December 2021

Getting on board with 5G for passengers on aircraft and ships

As the take-up of 5G technology becomes ubiquitous across Europe, the Electronic Communications Committee (ECC) must re-examine regulations for aircraft and ships, writes Peter Faris, Spectrum Expert, European Communications Office

In 2016, ECC developed regulations to allow mobile connectivity on board ships and aircraft, as explored in a newsletter in October of that year.

As mobile technology evolves with the widespread uptake of 5G technology across Europe and globally, so too must these regulations. That evolution will ensure consumers enjoy the same high-speed connectivity while travelling as they experience in other everyday situations.

The growing use of 5G on board ships and aircraft has been facilitated by developments in the satellite sector. They allow for higher-speed, lower-cost backhaul connections to ships and aircraft, as reflected in various updates to the ECC framework for earth stations in motion in recent years.

Review of regulations for mobile communications on board aircraft

In this context, ECC has recently reviewed the existing regulations for mobile communications on board aircraft (MCA) in response to a European Commission Mandate. The result of this work, which was undertaken in ECC PT1, is published in CEPT Report 81. It provides technical conditions to allow 5G connectivity for MCA in the 1800 MHz frequency band. The proposed conditions are limited to 5G systems which do not use active antenna systems (AAS), as it would not be feasible to install AAS base stations on board aircraft.

These technical conditions will now be incorporated in the relevant European Commission regulations. A corresponding update of the ECC framework in ECC Decision (06)07 is also under development and is planned to be finalised in July 2022.

Network Control Unit requirement

The European Commission Mandate also separately tasked the CEPT/ECC with reviewing whether the on-board network control unit is still considered necessary. The network control unit is essentially a legal "jamming" device which is designed to ensure on-board mobile devices do not accidentally attempt to connect to base stations on the ground and thus potentially cause interference to the wider ground network.

Figure 1: Potential for interference from MCA to ground networks

The requirement for this device results in costs for the airline or MCA operator, as well as taking up valuable cabin space and weight on board the aircraft. Additionally, mobile devices are now permitted to be operated on board non-MCA equipped aircraft without a network control unit in accordance with European Union Aviation Safety Agency (EASA) regulations, without any known interference issues. It is therefore worth reviewing if the network control unit is still needed at all.

The analysis in CEPT Report 81 concluded that a network control unit is not necessary to protect 5G networks on the ground, however it may still be necessary to protect legacy Universal Mobile Telecommunications System (UMTS/3G) networks. UMTS networks currently operate in both the 900 MHz and 2 GHz frequency bands. While it is expected that the 2 GHz will be migrated to 4G and 5G networks, in some European countries 3G networks are expected to remain in operation in the 900 MHz frequency band for some time. As a result, CEPT Report 81 concluded that the network control unit is still required for protection of 900 MHz UMTS networks, while the usage in the 2 GHz band may be made optional in the near future. This issue will be further considered in the context of the above-mentioned update of ECC Decision (06)07.

Connectivity on board ships

Shipping is another important transport market in Europe where passengers can benefit from high-speed connectivity, for example, on board cruise ships and passenger ferries.

ECC PT1 is currently undertaking work to update the existing technical conditions in ECC Decision (08)08 for mobile communications on board vessels (MCV) to allow 5G non-AAS connectivity in the 1800 MHz and 2.6 GHz frequency bands. The recently completed analysis shows that the existing technical and operational constraints which were developed for 4G LTE are also sufficient to ensure the protection of land-based networks from interference from 5G non-AAS on board vessels. This analysis is available in draft ECC Report 336, which is currently undergoing public consultation alongside a corresponding draft revision of the ECC Decision. Both deliverables are planned to be finalised in March 2022.

Benefits to transport sector and passengers

The updated framework for both MCA and MCV will allow airlines and shipping companies to provide a wider range of high-speed on-board applications. They may choose to offer such connectivity as a premium service, thus providing much-needed additional revenue streams for the transport sector in the wake of the COVID-19 pandemic, while also providing passengers with improved options for communications, entertainment and business connectivity while on the move.

EC-CEPT Workshop on WRC-23 hears a wide range of views

The European Commission, CEPT and industry stakeholders discuss agenda items for World Radiocommunication Conference 2023

Planning for the ITU World Radiocommunication Conference 2023 (WRC-23) is well underway. In November, the European Commission (EC) and European Conference of Postal and Telecommunications (CEPT) hosted a workshop to discuss EU policy ahead of the conference, which is held every four years. The next event takes place in the United Arab Emirates in November and December 2023.

Due to the size of the WRC, it was no surprise that the schedule for the seminar to discuss its agenda items was packed. More than 30 speakers participated over the course of the day.

The idea of the workshop was not to provide solutions but to give attendees an insight into "aspects of EU policy that will have a bearing on Europe's position at WRC-23". It was also aimed at helping CEPT members to proceed with the preparation of the conference, working towards a common goal. Stakeholders were given the opportunity to present their views on the various items in the agenda of the event.

To begin with, attendees were given an update on the state of CEPT preparation for WRC-23, which proceeds at a good pace despite the challenges of the Covid-19 pandemic. The Chairman of the CEPT Conference Preparatory Group (CPG) highlighted several key agenda items which are expected to be the most debatable at the conference in 2023. They span from science and transport to mobile and satellite issues.

The co-chairs of the Radio Spectrum Preparatory Group (RSPG) subgroup on WRC-23 explained how 12 out of 33 WRC-23 agenda items or topics are relevant to EU policy. The EU has not yet developed an opinion on all of the items, however, and a final opinion will contain further analysis of the agenda in light of EU policies and legislation.

Science issues

Agenda items 1.12, 1.13, 1.14 and 9.1a and 9.1d at WRC will cover science issues. The workshop heard how these agenda items have some relevance for current EC programmes and other EU policies. For example, agenda items 1.12 and 1.14 will consider spectrum for Earth observation use. While the former will focus on 45 MHz, the latter will look to the

range 231.5 to 252 GHz. Neither of these are identified for the Sentinel satellites in the EU's Copernicus programme but could be of future interest. In addition, 45 MHz could be used for the Common Security and Defence Policy and other space-borne uses.

The EC has yet to form a policy around agenda item 1.13, which will consider an upgrade of the allocation of the frequency band 14.8 to 15.35 GHz to the space research service (SRS). However, it has noted that there could be adjacent passive band protection requirements.

On agenda item 1.14, CEPT sees the need for passive microwave sensor measurements within the frequency range 231.5-252 GHz and supports the assessment of the frequency bands 239.2-242.2 GHz and 244.2-247.2 GHz for a possible primary allocation to the EESS (passive). CEPT has also formed its preliminary position on agenda item 1.13, supporting the upgrade of space research service (SRS) allocation while ensuring protection to services in-band and adjacent bands, while it is still working on the CEPT view on agenda item 1.12.

Aeronautical and maritime issues

Aeronautical and maritime issues will get a good outing at WRC-23 with a number of agenda items dedicated to them – agenda items 1.6 to 1.11. Whatever the outcome it is agreed that discussions around spectrum should focus on creating a "safe, smart and sustainable" aviation and maritime sector. The industry is also working on making better use of spectrum.

The preparation of WRC-23 is key for the development of the EU Sustainable and Smart Mobility Strategy, which regards maritime, road, rail and aviation. In relation to the aviation sector, in August 2021, the International Civil Aviation Organisation (ICAO) Council, including EU Member States, agreed its position for WRC-23. For example, agenda item 1.6 will look at regulatory provisions for facilitating radiocommunications for sub-orbital vehicles – those vehicles that reach the upper atmosphere but don't make a full orbit of the earth. The ICAO supports modifications to the Radio Regulations that help enable the integration of sub-orbital vehicles into airspace structure.

In its preliminary position CEPT has addressed the categorisation of suborbital vehicles flying in shared or non-shared airspace. Suborbital vehicles should not interfere with other services or applications operated in the same services, nor shall they affect radiocommunications of conventional satellite launches.

The preparation of WRC-23 also sees CEPT working on the European view to allow the operation of unmanned aircraft over long distances, which require satellite links. Under agenda item 1.8, WRC-23 will need to review the Radio Regulations to solve open

questions on the applicability of current provisions and adopt further provisions to be established in ICAO.

The modernisation of the Global Maritime Distress and Safety System (GMDSS) is part of the regular update of provisions for the maritime mobile service, together with the implementation of e-navigation and the introduction of additional satellite systems into the GMDSS itself. Under agenda item 1.11, CEPT supports regulatory actions based on the decisions that are currently being taken within the International Maritime Organisation (IMO).

Fixed and mobile issues

EU policy around 5G has changed in recent years. Back in 2016, the aim was to have 5G in all urban areas, along main transport paths and connected in schools and companies. By 2030, all households will have connectivity to 5G, which will be available in all populated areas. This, of course, will lead to additional spectrum needs. WRC-23 will discuss issues around those needs and also spectrum sharing.

A range of fixed and mobile issues, including that of 5G, will be discussed at WRC-23. Many of the items will concern uses of mid-band spectrum, which, as heard from several stakeholders, is very important for dealing with the expansion of 5G.

“The spectrum being considered under these agenda items will be critical to provide increased capacity for mobile broadband on a citywide basis at an affordable cost,” said one contributor.

“WRC-23 and the decisions made there have the potential to provide increased harmonisation both for existing bands such as 3.6 GHz and new bands for 5G such as the upper 6 GHz.”

The 3.6-3.8 GHz band discussed in agenda item 1.3 is already harmonised and used for 5G in Europe. CEPT is considering the upgrade of the mobile allocation in Region 1 to improve opportunities for the mobile applications in Europe. This is subject to the conditions that the current use and the protection of primary services can be continued under the existing CEPT regulatory framework, without additional undue constraints on existing services and their future development.

CEPT has not yet developed its view on the possible identification of the band 6425-7025 MHz for International Mobile Telecommunication (IMT) under agenda item 1.2. Intense debate is already ongoing on this and is expected to continue at WRC-23. The interest around this portion of spectrum in the 6 GHz is very high and its possible use for Radio Local Area Network is also considered globally, alongside the ongoing work for the preparation of the Conference.

Fervent discussions are underway also on the use of IMT systems in the fixed services. This matter was not supported as a dedicated agenda item by CEPT at WRC-19 and was finally agreed as topic c under agenda item 9.1. CEPT has a very clear view on this, particularly where it is addressing fixed wireless broadband: CEPT opposes any changes to the Radio Regulations at WRC.

UHF issues

Agenda item 1.5 at WRC-23 will discuss a review of the spectrum use and spectrum needs of existing services in the frequency band 470-960 MHz in Region 1, the UHF band. It will also consider possible regulatory actions in the frequency band 470-694 MHz. Ultimately, this could have an impact on terrestrial broadcasting, which is seen as an important part of the European audio-visual model. The workshop heard it fulfils "major public policy objectives such as cultural diversity and media platform".

The EC has committed to protect the sub-700 MHz band until 2030. It is to report on the developments in the band to ensure the best use of spectrum by 2025, and in October 2021 launched a study on the use of the band.

In both presentations and a lengthy discussion, various stakeholders shared their views on the UHF band and the agenda item, which they said was of "crucial importance".

While there has been progress made on a preliminary CEPT position regarding UHF, the workshop heard that CEPT is "some way off forming a view as to whether there is a need for possible further regulatory action in the sub-700 MHz band. Before making any decision in this regard, we need to fully assess the current spectrum environment and also look at the potential impact of introducing new services to that environment," a contributor said.

Satellite issues

A number of agenda items will focus on satellite issues, which will be of interest to the EC. For example, the Commission launched a new secure connectivity initiative, which allows for multi-orbit constellation. Agenda items 1.15 and 1.16, dealing with satellite connectivity of earth stations in motion (ESIMs), will discuss issues that affect this. These agenda items are supported in CEPT, which has developed preliminary positions to establish a regulatory framework and technical requirements for the operation of ESIMs. This regard both ESIMs on board aircraft and vessels communicating with geostationary space (GSO) stations in the Ku-band and ESIMs communicating with non-GSO systems in the Ka-band.

The EC sees "huge market growth in the EU and beyond for low data-rate satellite services" and sees agenda item 1.18 for "potentially supporting that growth".

CEPT's view is that the spectrum needs of low data-rate satellite could be satisfied through possible new primary or secondary allocations to the mobile-satellite service within the bands considered under agenda item 1.18, while noting the fragmentation that could derive considering different portions of spectrum across the different regions.

However, the workshop heard that before going ahead with any new allocations, in-band and adjacent band coexistence of low data-rate satellite applications with systems operated under existing allocations has to be demonstrated through sharing and compatibility studies.

The workshop heard that there are opportunities for satellite issues within the agenda items but also a "potential dilemma for agenda items when coexistence between space science services and satellite communications are at stake".

Galileo

Under agenda item 9.1b in WRC-23, the aim is "to review the amateur and amateur—satellite-services allocation in the frequency band 1240-1300 MHz, without considering their removal, to determine if additional measures are required to ensure protection of the radionavigation-satellite service (space-to-Earth) operating in the same band".

The workshop heard that this particular agenda item could have an impact on Galileo, a global navigation satellite system set up by the EU. The band is shared with primary radars and secondary radio amateurs, and there have been several known interference cases.

While the EC would be happy to see the continued amateur use, it would like to see a solution that reduces the potential for interference.

CEPT, meanwhile, said it supports "the development of a new ITU-R Report or Recommendation to provide guidance towards the implementation of technical and operational measures for the continued use of the frequency band 1240-1300 MHz by the amateur and amateur-satellite services in accordance with the Radio Regulations." And that those measures be applied to the use of amateur and amateur-satellite services.

From start to finish, the EC-CEPT workshop was informative and useful, with valuable contributions from various stakeholders. It was a good step in the path towards WRC-23.

Further details can be found here.