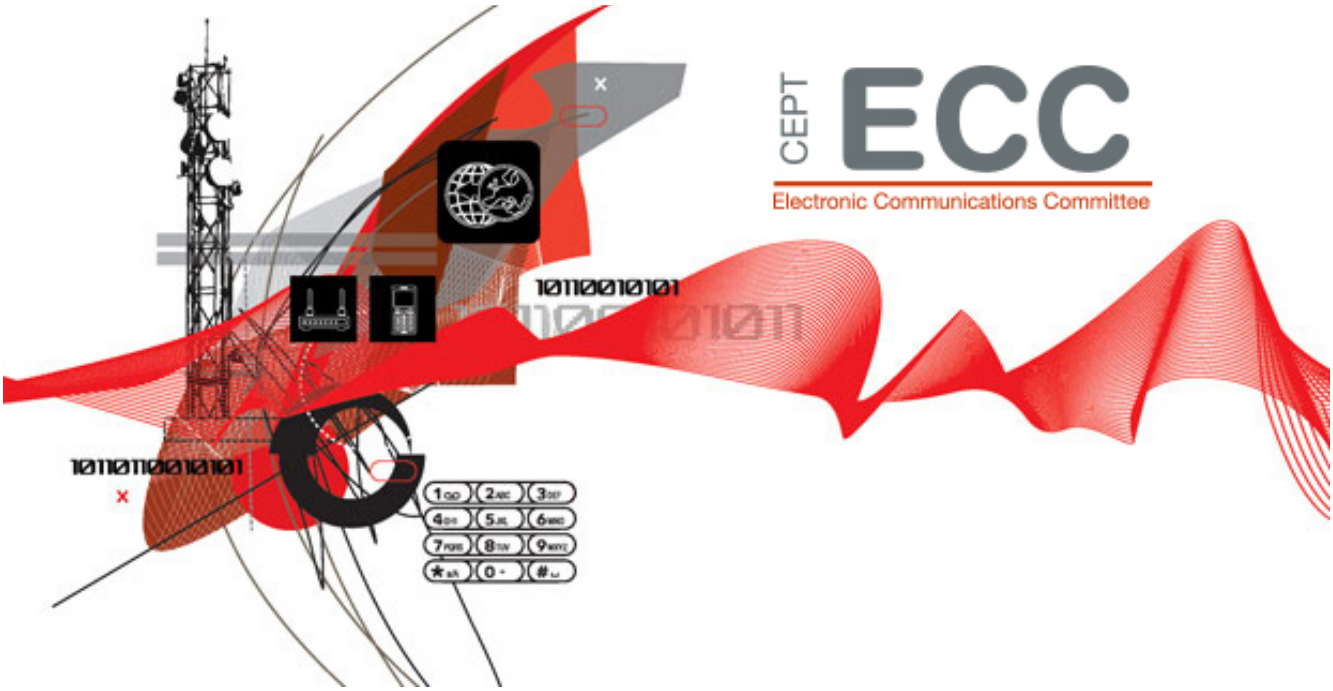

ECC Newsletter August 2019

Spectrum for railway mobile applications to head in new directions

Robin Donoghue, Spectrum Expert with the European Communications Office, provides an overview of the relevant activities within ECC and the planned work in response to the EC Mandate

Railway networks across Europe make use of many different radio systems using many different frequency bands. In addition to traditional rail signalling infrastructure such as the Balise – a high frequency transponder which is placed between the rails of a railway to record when a train passes over it – the railways use other communications technologies. These include RFID – radio frequency identification – to record information on individual rolling stock, object detection radar and video surveillance.

There have, however, been two recent initiatives relating to rail that have triggered significant studies within the ECC:

- GSM-R replacement by Future Railway Mobile Communication System (FRMCS)
- Urban Rail intelligent transport systems (ITS)

FRMCS

The first initiative is FRMCS, which is seen as the potential successor to GSM-R, the rail variant of Global Systems for Mobile Communications (GSM).

GSM-R has been standardised for almost 20 years and has proven a successful solution for both voice and data communication to trains. GSM-R is used in all EU Member States with rail networks, and there are also a few other deployments across the globe. It is a relatively secure means of communication and it remains reliable for high-speed trains. ECC Decision (02)05 sets out the frequency designation in CEPT Administrations for GSM-R.

The future of GSM technologies is unknown. There are clear business cases such as smart metering where GSM could potentially continue to prove the ideal communications means. However, newer technologies including LTE and 5G NR may also provide these services, and there will be clear economies of scale in utilising these newer communications standards. As such it may become increasingly cumbersome to support GSM-R if the wider GSM networks and their supporting eco-systems become obsolete.

In Europe, GSM-R currently operates in the frequency bands 876–880 MHz (uplink) and 921–925 MHz (downlink) giving a spectrum allocation of 2 x 4 MHz.

In February 2017, ETSI published a Systems Reference Document (SRDoc) entitled GSM-R Networks Evolution (TR 103 333). This SRDoc noted the need for end-of-life planning and suggested GSM-R could be challenging to support beyond 2030. The SRDoc requested additional spectrum for FRMCS, asking for an extension of 2 x 3 MHz in the frequency bands immediately below the current allocations.

Then in 2018, following revisions to ERC Recommendation 70-03, the European Commission issued a Decision (2018/1538/EU) on short range devices (SRD), recognising that "the 874.4-876 and 919.4-921 MHz sub-bands should be reserved for potential future railway use". This Decision noted, however, that the "reservation of the 874.4-876 and 919.4-921 MHz bands for FRMCS is subject to further study".

Furthermore, within a few CEPT Administrations, GSM-R use is authorised on a national basis and in certain geographic areas over the wider frequency bands 873–880 MHz and 918–925 MHz (for use in shunting yards, for example).

Rail operators have invested heavily in building the infrastructure network to support GSM-R. There are clear commercial drivers to get as much value from the network as possible. Therefore the rail industry is looking to replace GSM-R with a network that provides maximum data throughput. This would mean that additional features can be added which will not only ensure rail travel safety but also improve punctuality and increase rail line capacity. Better and more timely signalling and control of rolling stock could allow more trains to use the rail network and those trains could be better coordinated in their movement.

ETSI TR 103 333 led to the European Commission issuing a mandate to CEPT (RSCOM18-05) on 12 July 2018 on spectrum for the future railway mobile communications system. The purpose of the mandate is "to consider the required amount of

spectrum, identify appropriate spectrum bands, study technical feasibility and develop harmonised technical conditions for a sustainable and efficient use of such bands for the operation of the future railway mobile communications system (FRMCS), which is the successor of GSM-R". The mandate invites CEPT to study the frequency bands 874.4-880 MHz, 919.4-925 MHz, 1900-1920 MHz. In addition, further spectrum bands, for example the band 2 290-2 400 MHz on a tuning range basis, can also be considered.

Notably, the mandate also suggests that the use of commercial mobile networks may also be studied. This recognises that it may prove sensible to consider solutions such as network slicing of commercial networks as a solution, rather than building a new network to cover all rail eventualities in all geographic locations.

Within the ECC, WG FM's Project Team FM56 has been tasked with developing the CEPT reports in response to the mandate. Two reports are planned and FM56 has already developed the draft structure of the first of these CEPT Reports. The ECO has sent a questionnaire to CEPT Administrations about the current and future use of the 2290-2400 MHz range. The questionnaire closed on 23 August 2019.

For the frequency bands 874.4-880 MHz and 919.4-925 MHz, the studies appear relatively straightforward with FRMCS simply replacing GSM-R in the upper part of the band. In the lower part of the band it will share with pre-existing SRD, authorised in several CEPT Administrations. The technical parameters for the SRD were set to ensure protection of GSM-R (see ECC Reports 189 and 200).

For the frequency band 1900-1920 MHz, the studies will be more complex as there are more than just rail systems requesting access to this band. Unmanned aerial systems are being considered in Project Team FM59 and proposals for DECT are expected from ETSI in the near future.

Urban rail ITS

The second initiative relates to urban rail networks such as the Paris Metro. Urban rail intelligent transport systems (ITS) are intended to move vast numbers of people around cities at relatively high speed. They are essential in keeping the movement of people around cities flowing.

In exactly the same way as applies to other rail networks, safety and capacity can be improved with better signalling and control systems.

ITS in general provide an opportunity for transport networks to work more efficiently. In a simple example, two vehicles can travel closer behind one another if the following vehicle knows everything about velocity changes in the lead vehicle and can alter its own velocity accordingly. Clearly in this example, latency limitations become a key parameter in

ensuring the safe operation of both vehicles. Where the communication is by radio, the radio link needs to be sufficiently robust to ensure the timely communication between the two vehicles.

ITS are currently designated to operate in the 5.9 GHz band. ECC Decision (08)01 is intended to harmonise, in CEPT Administrations, the frequency band 5875-5925 MHz for ITS, with the sub band 5875-5905 MHz designated on a non-exclusive basis to traffic safety applications. ECC Recommendation (08)01 suggests CEPT Administrations make the band 5855-5875 MHz available for non-safety ITS applications. Within the EU, the sub band 5875-5905 MHz has been harmonised for ITS by all Member States (Decision 2008/671/EC). These current designations resulted from ETSI making proposals for ITS in 2006 through two technical reports (TR) – TR 102 492-1 (critical road safety applications) and TR102 492-2 (non-safety related ITS applications).

Deployment of operational ITS has been slow. One factor has been the existence of alternative communications technologies (such as ETSI G5 and LTE-V), with vehicle manufacturers and road operators yet to decide how to accommodate or not, multiple ITS technologies.

In alignment with ECC Decision (08)01 spectrum designation, but also recognising the slow deployment of ITS, the Commission issued a mandate to CEPT (RSCOM17-26) in October 2017 asking CEPT to study the possibility of harmonising the whole band 5875-5925 MHz. The mandate asked that "in addition to road transport, allowing other means of transport such as Urban Rail1 (using Communication Based Train Control, (CBTC)) in the EC harmonised safety-related ITS band".

In March 2019 the CEPT responded to the mandate with CEPT Report 71.

CEPT Report 71 proposes harmonisation of the frequency band 5875-5925 MHz for safety-related ITS applications thereby removing any restriction limiting the use to road transportation. However, road ITS should have priority over Urban Rail ITS in the frequency bands below 5915 MHz and Urban Rail ITS above 5915 MHz. Additionally, CEPT Report 71 proposes to harmonise the frequency band 5925-5935 MHz for safety-related urban rail ITS applications, subject to national coordination with existing fixed service networks and/or national studies to determine the sharing conditions. The above mentioned ECC Decision (08)01 were recently revised taking these elements from CEPT Report 71 onboard. It is subject to public consultation ending 15 November 2019.

These proposals followed the technical analysis undertaken in ECC Report 290.

The issue is further complicated by channel arrangements for the specific train technology CBTC. CBTC is an evolving technology. For example, the channel arrangement may not fit the 10 MHz channelling arrangement assumed to date for other ITS installations.

CEPT Report 71 notes the ongoing work in ETSI to finalise "polite" protocols and/or proper co-channel sharing mechanisms that could allow all ITS applications, including between road technologies and rail technologies, to operate within the same frequency band. It therefore suggests reviewing the current proposed framework after no more than three years.

Added importance to keep the designation of dedicated spectrum to Urban Rail ITS under this three-year review comes from the need to allocate additional radio spectrum for wireless access systems including radio local area networks. Mobile data offloading reduces the amount of data being carried on the cellular bands, freeing bandwidth for other users. For Europe to fully experience the benefits foreseeable from the introduction of 5G, mobile data offloading is likely to be essential.

Following ECC creating a work item on 5925-6425 MHz WAS/RLAN and ETSI developing the System Reference Document on WAS/RLANs in the 5925-6725 MHz band, the European Commission issued a further mandate to CEPT to "study feasibility and identify harmonised technical conditions for wireless access systems including radio local area networks in the 5925-6425 MHz band for the provision of wireless broadband services".

Draft CEPT Report 73, in response to that mandate, has been developed and is currently under public consultation ending 13 September 2019.

The work in ECC in developing the CEPT Reports will enable the benefits of ITS for road and rail to be realised in the very near future, while being mindful of the need to bring 6 GHz WAS/RLANs into everyday use.

Where now for spectrum and industry?

A two-day CEPT workshop in May discussed new spectrum solutions for ever-changing industry sectors, writes Peter Faris, Spectrum Expert, European Communications Office

Ongoing developments in technology are changing the way the spectrum is managed. There is increasing demand for spectrum from a diverse range of new applications, requiring new features such as super-low network latency and mission critical application support. At the same time there are opportunities including much higher radio network capacities, a high degree of flexibility to organise networks – such as 'slicing' –and new tools enabling the sharing of spectrum.

In order to understand how ECC can balance these requirements and opportunities, it held a CEPT workshop on new spectrum solutions for industry sectors. More than 150 radio industry and regulatory experts, including 38 speakers, gathered in Copenhagen for the two-day event in early May. The workshop attempted to predict identifiable spectrum requirements to fulfil upcoming communications needs of different sectors of industry.

Different sectors have different requirements

Speakers from a diverse range of sectors – including transportation, telemetry and automation, consumer applications and public safety – delivered presentations on their current and upcoming connectivity needs.

Speakers from the transportation sector noted opportunities for common transport platforms based on similar requirements such as the analogous needs of the automotive and rail sectors for tactical information and "infotainment". In addition to the move towards autonomous driving in the automotive sector, the maritime industry is also considering increasing use of autonomy. There is interest in the 5.8-5.9 GHz range from the automotive, rail and maritime sectors.

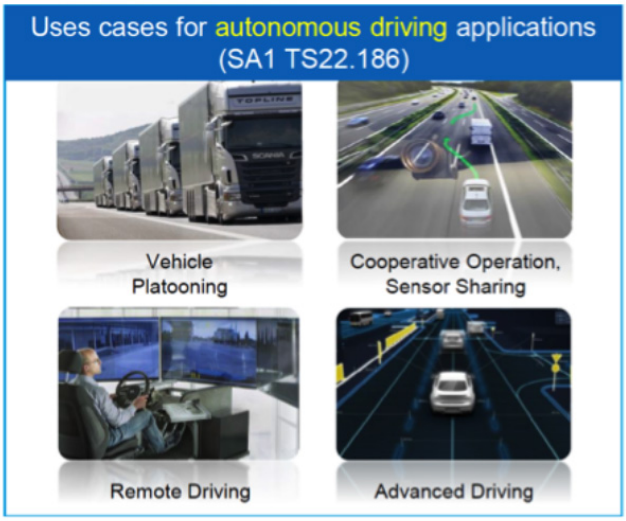

Figure 1: Use cases for autonomous driving applications. Source: 5GAA

For telemetry and automation there are requirements for both sub 1 GHz and millimetre wave bands. Speakers noted the need for improved spectrum harmonisation and dedicated spectrum in some cases, as well as interest in spectrum sharing. High reliability is key for applications such as healthcare and smart grids

Private cellular networks, including existing 4G networks and future 5G networks, are seen as important to support industrial automation. The aviation industry is also interested in the use of such networks in airports.

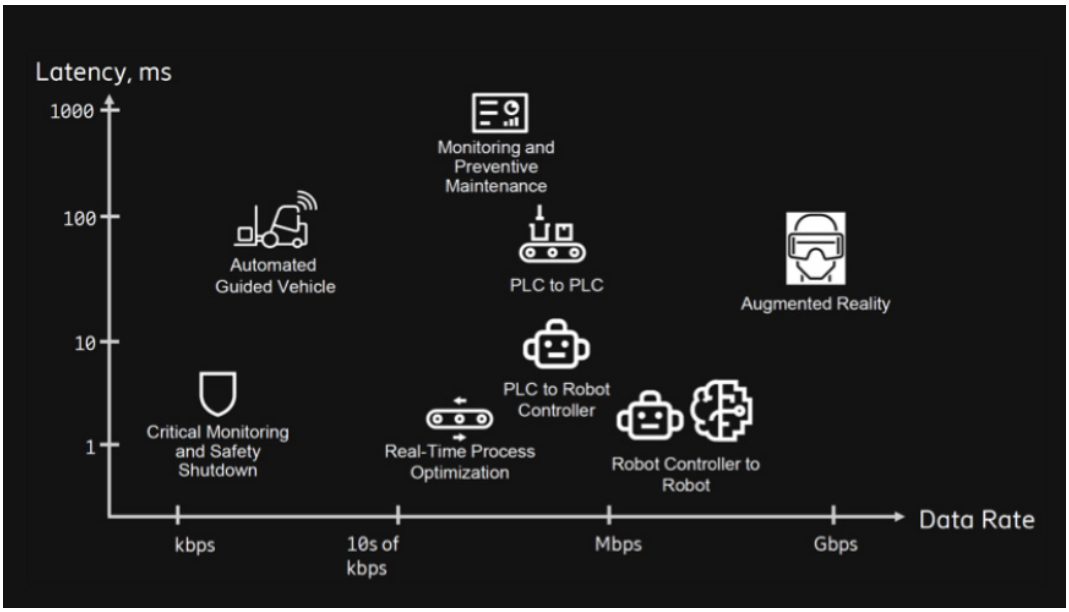

Figure 2: Use cases in factory automation. Source: GSA

Virtual reality was noted as an important development for consumer applications in both smart homes and smart cities.

There is interest in 5G from the media and entertainment sector, however, it is expected to complement rather than replace existing spectrum allocations. More standardisation is needed for 5G to address latency critical applications such as programme making and special events.

The public safety sector believes hybrid networks will play an important role in the future, with a combination of dedicated and commercial spectrum. New use cases include real-time video, augmented reality, large swarms of micro-drones and large-scale, body-worn sensor networks.

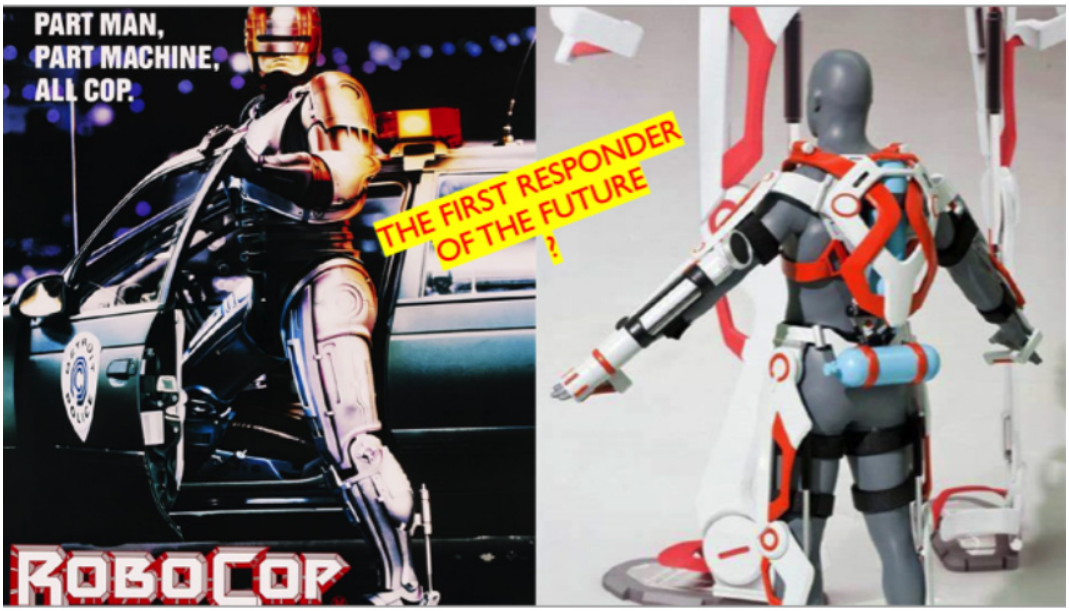

Figure 3: New use cases for public safety applications – large-scale, body-worn sensor networks. Source: PSCE-PSRG

What spectrum solutions are available to meet the needs of industry?

After the industry requirements had been presented the workshop moved on to consider suitable spectrum solutions to address the identified needs of the different sectors. Speakers from a range of industry associations and companies presented options for spectrum sharing, including the use of licence-exempt spectrum, licenced assisted access and cognitive radio, as well as the use of cellular networks and satellite solutions.

Wi-Fi is expected to play an important role within licence-exempt solutions. Traffic growth is expected to complement 5G, including in new bands such as 6 GHz and 57-71 GHz. Networked short range devices provide opportunities for low-power and low-cost networks below 1 GHz. They will be used for a range of applications such as smart grids and agriculture, but there is a need for liberalised regulations.

Licensed assisted access, where licence-exempt spectrum is used to complement licensed network access, is now a commercial reality for 4G networks, and is expected to play an important role in 5G, which will require a large amount of spectrum using a mix of bands and licensing approaches.

Cognitive techniques including dynamic spectrum access can play a role, but there is a need for better device standardisation. Licensed shared access at 2.3 GHz, increased use of TV white space, and private cellular networks in 3.4-4.2 GHz offer future potential in Europe. Warehouse applications are a good example of cases where networks can safely operate in licence-exempt or shared spectrum without risk of wider interference. This is due to sufficient shielding or cases where latency isn't critical. It is important to understand the specific needs of each application, in particular whether applications are considered as critical and require dedicated spectrum, or if there are opportunities for sharing.

Cellular networks, including 5G, are well placed to support vertical industries through wide area coverage, as well as small cells, and can help to grow new use cases. It is necessary to understand which requirements are most crucial for each use case in order to optimise these requirements. In addition to massive machine-type communications (mMTC), 5G can also support "critical" MTC as part of the ultra-reliable low latency communications requirement of 5G. A number of trials are ongoing to test these use cases.

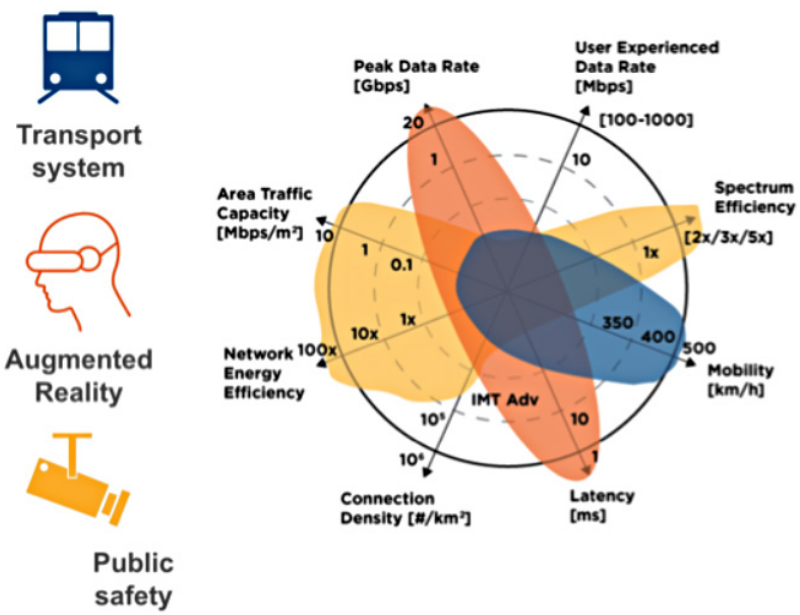

Figure 4: Implications of 5G requirements for some use cases. Source: GSMA

There are differing views within the cellular industry on the possibility of setting aside spectrum for private local networks. Operators see these as a threat to the wider success of 5G, as well as creating coexistence challenges, whereas vendors see opportunities for these types of networks noting that a range of models will be needed to support the needs of vertical sectors.

Satellite can also play an important role in supporting MTC, including standalone operations with direct access and backhauling in bands below 3 GHz, as well as the possibility for hybrid systems using terrestrial and satellite connectivity in different bands.

The satellite deployment model is changing to move to large constellations of small satellites in lower orbits and away from traditional deployments, bringing a significant increase in available capacity. This means that satellite can play an increasing role in supporting key 5G usage scenarios.

National level plans

Several CEPT administrations presented national views on how to address the gap between industry demands and availability of suitable spectrum, as well as information on national plans for specific bands. Various pilot programmes involving new applications and new spectrum sharing techniques are ongoing or planned.

The way forward for ECC

The workshop concluded with a presentation from the ECC Chairman Chris Woolford identifying the common themes and a way forward to address the identified requirements, noting a number of challenges.

It was clear from the workshop that connectivity is becoming increasingly important for a wide range of services and applications. However, if demand for dedicated spectrum continues, there is insufficient spectrum to meet the stated needs of all industry sectors. Demand exists across all frequency bands (from VHF to millimetre wave) and the optimal frequency range varies for different sectors.

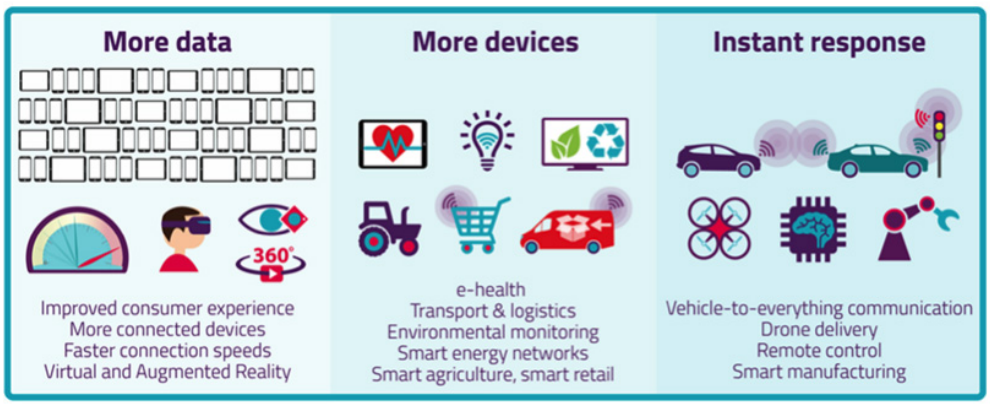

Figure 5: 5G and other wireless services are expected to deliver a range of new services, requiring additional spectrum. Source: Ofcom

In future it will be important to better understand the needs of industry sectors and how these translate into spectrum requirements. Possible synergies across sectors should be identified, based on common radio interface requirements. Options for spectrum sharing and appropriate authorisation schemes should be further explored. There is a need to facilitate complementary and hybrid solutions between services and applications. It is also important to learn from one another's experience, especially from ongoing tests and trials.

Challenges to be addressed include the increasing intensity of use of spectrum and balancing the different approaches for provision of spectrum. Harmonisation is considered as important for some sectors, but this needs to be balanced with flexibility, taking into account the specific needs in each case. Similarly, whether to allocate licensed spectrum locally or nationally, and whether the use of dedicated or shared spectrum is more appropriate, needs to be considered carefully on a case-by-case basis. All of this should be undertaken with an overall aim to ensure enhanced spectrum efficiency.

Overall, the workshop was a success, providing insight into connectivity requirements from a range of sectors, as well as innovative solutions, which can help to inform ongoing and future work within ECC. Watch this space for future thematic CEPT workshops.

The presentations from the workshop are available here.

Europe prepares to harmonise the 6 GHz spectrum band for Radio Local Area Networks

With wireless access systems set for rapid growth, there is a push in Europe to open the new band, writes Doriana Guiducci, Spectrum Expert, European Communications Office

Whereas it was once confined to large buildings and few homes, Wi-Fi has become ubiquitous in our lives. Today, smartphone, tablet and laptop users have access to Wi-Fi on public transport, in small cafes and even in public parks.

It's all thanks to wireless access systems including radio local area networks (WAS/RLANs), which are intended to cover smaller geographic areas like homes or offices, with WAS/RLAN deployments providing broadband wireless access in public locations such as airports, railway stations, conference centres and hotels. WAS/RLANs are also used to provide network access on trains, buses, cars or aboard aircraft.

In addition, the provision of free connectivity for citizens in public spaces including parks, squares, public buildings, libraries and museums is becoming more and more popular, as evidenced for example by the WiFi4EU initiative in the European Union, which promotes free access to Wi-Fi connectivity in such places throughout Europe.

Billions of WAS/RLAN devices are already in operation, and rapid growth is expected in the foreseeable future. Equipment will use different power levels and different technologies to meet the demand for greater throughput for advanced wireless applications. Based on current market share projections, the dominant technology is likely to be IEEE 802.11-based, although uptake of unlicensed cellular technologies (Licensed Assisted Access, MulteFire and 5G New Radio) is also expected.

Currently, the main frequency bands used by WAS/RLANs are in the 2.4 GHz and 5 GHz ranges. The frequency range 2400-2483.5 MHz is designated for industrial, scientific and medical (ISM) applications and radiocommunication services operating within these bands must accept harmful interference possibly caused by these applications. This frequency band is available for short range device (SRD) applications on a global basis. In Europe, ERC Recommendation 70-03 (Annex 3) covers frequency bands and recommends regulatory as well as informative parameters for Wideband Data Transmission Systems. The use of the 5150-5350 MHz and 5470-5725 MHz bands for WAS/RLANs is harmonised by ECC Decision (04)08, currently under revision, while ERC Recommendation 70-03

(Annex A) includes references to the harmonised European standard and national implementation information. WAS/RLAN use is also possible under the existing SRD regulation in the frequency band 5725-5875 MHz as per ERC/REC 70-03 Annex 1.

However, the increasing demand for spectrum for WAS/RLANs has already triggered several actions, with the aim of identifying bands that offer sufficient capacity. Such bands include the 57-71 GHz range for which the relevant regulation has been recently updated by ECC. CEPT has also assessed if proper conditions and mitigation techniques would allow additional WAS/RLAN use in the 5 GHz range; this task is part of the preparation of the upcoming World Radiocommunication Conference (WRC-19). Though, CEPT is of the view that no change to the Radio Regulation has to be applied except for the 5150-5250 MHz band, in line with ECC Decision (04)08. In that band, CEPT supports in-car usage up to 40 mW and in-train usage up to 200 mW e.i.r.p. It is also in favour of limited outdoor use with a maximum of 200 mW e.i.r.p.

In this situation, the possible opening of the 6 GHz band to WAS/RLAN is gaining momentum within Europe and beyond to provide an adequate amount of spectrum and to use channels with a bandwidth of up to 160 MHz. Last October, the Federal Communications Commission in the US proposed rules to promote new opportunities for unlicensed use in the 5925-7125 MHz band, while ensuring that licensed services already operating in the band continue to do so. A strong interest on this proposal has been registered both from the RLAN and cellular telecommunications community, and the discussion is still ongoing. ECC has been exploring further opportunities to make spectrum in the 5925-6425 MHz band available for WAS/RLANs, while protecting other radio services and applications currently in use.

In particular, in May 2017, a work item was created within ECC to study the technical feasibility of the introduction of low power WAS/RLAN in the band 5925-6425 MHz on a non-protected basis while ensuring certainty of continued operation, development and protection of existing services. ETSI was simultaneously developing Technical Report 103 524 with the System Reference Document on WAS/RLANs in the 5925-6725 MHz band.

The ETSI Technical Report was published in October 2018 and contains information to support CEPT activities covering the band 5925-6425 MHz, as per the co-operation between ETSI and ECC. It provides justification for additional licence-exempt spectrum for WAS/RLANs, and requests modifications to the regulatory rules of the 5925-6725 MHz frequency range. This would enable the operation in this band of WAS/RLANs which implement advanced spectrum-sharing techniques as appropriate. Nonetheless, frequencies above 6425 MHz are not under consideration by ECC.

In December 2017, CEPT received the Mandate from the European Commission (EC) to study and identify harmonised technical conditions for WAS/RLANs in the 5925-6425 MHz band for the provision of wireless broadband services. The Mandate presents two

tasks that CEPT has to address by July 2020 with different timelines. Task 1 regards the study of compatibility and coexistence scenarios in the band 5925-6425 MHz, as well as the identification of relevant parameters and coexistence conditions to be implemented in the regulatory framework. These would enable coexistence between existing uses and WAS/RLAN systems. Task 2 deals with the development of harmonised technical conditions which would ensure operation of WAS/RLAN on a coexistence basis with the incumbent uses, taking into account possible mitigation techniques.

As a result of this work, ECC Report 302 was published in May 2019 and contains studies between WAS/RLAN systems and existing incumbents in the 5925-6425 MHz band and adjacent bands. In line with the European Common Allocations Table, which shows fixed, fixed-satellite and mobile as primary services allocated in the 5935-6425 MHz and adjacent 5850-5925 MHz band, the studies assess coexistence and compatibility scenarios between WAS/RLAN and the fixed service, the fixed-satellite service, as well as road intelligent transport systems and communication-based train control in the adjacent band. The radio astronomy service has also been taken into account, as some portions in the 6 GHz range are of importance for the observation of methanol and hydroxyl. Coexistence with ultra-wide band (UWB) systems has also been considered, bearing in mind that UWB devices are only authorised on a non-interference and non-protected basis. No change to existing regulations around UWB is foreseen.

Communication-based train control systems are used in some metropolitan cities in France (5915-5935 MHz), Denmark (5925-5975 MHz) and Spain (5905-5925 MHz) and some projects are planned in Austria, Belgium, Denmark, France, Germany and Spain. It´s worth noting that ECC agreed to propose the harmonisation of the 5925-5935 MHz band for safety-related urban rail intelligent transport systems applications, subject to national coordination with existing fixed-service networks and/or national studies to determine the sharing conditions. This is specified in CEPT Report 71, published in response to the EC Mandate to CEPT on intelligent transport systems. Therefore, adjacent compatibility studies between communication-based train control in the 5915-5935 MHz band and WAS/RLAN above 5935 MHz are specifically addressed in light of this proposal. Further details on this harmonisation activity for urban rail in Europe are available in the article on spectrum for railway mobile applications which is also available in this edition of the ECC Newsletter.

The assessment of sharing and compatibility scenarios in ECC Report 302 aims to identify technical conditions which would enable coexistence between existing uses and WAS/RLAN systems, without constraining incumbents in CEPT countries. The statistical and worst-case scenario studies rest on an agreed set of inputs. These include parametric inputs and distributions for scenarios based on models of 2025 deployments for WAS/RLAN, with power up to 1 W e.i.r.p., outdoor devices, and scenarios that assume indoor-only usage.

Based on the results of ECC Report 302, CEPT has now developed Draft Report 73 in response to the Task 1−the feasibility of coexistence scenarios for WAS/RLAN in the band 5925-6425 MHz−of the EC Mandate to CEPT. Draft CEPT Report 73 is under public consultation and provides an assessment of the technical studies and the feasibility of some of the regulatory models which could be implemented for WAS/RLAN in the 5925-6425 MHz GHz band.

According to the studies conducted so far, CEPT expects that compatibility and coexistence between WAS/RLAN and existing services within and adjacent to the band 5925-6425 MHz is technically feasible under certain conditions. In particular, for scenarios with indoor-only deployment with a maximum e.i.r.p. in the range of 200-250 mW, the studies indicate that coexistence is feasible with fixed satellite services and with fixed services when considering the long-term aggregated interference protection criterion.

Coexistence with communication-based train control systems and road-intelligent transport systems would be technically feasible assuming suitable measures are implemented such as a guard band and requirements on WAS/RLAN in-band and/or out-of-band emissions. These measures would limit the available spectrum for WAS/RLAN to less than the entire 5925-6425 MHz band.

Other high-power and outdoor devices present a risk of harmful interference to the incumbents when sharing the band without restrictions.

The new Draft CEPT Report, which is being developed in response to Task 2 - the development of harmonised technical conditions - of the EC Mandate, will provide a regulatory framework including all relevant technical conditions. It will also address possible mitigation techniques and the use of geolocation methods. ECC has now started complementary studies and analyses in support of this new CEPT Report. It aims to address the short-term protection of point-to-point fixed services from WAS/RLAN indoor-only deployment, as well as from potential WAS/RLAN portable devices which operate outdoor with power levels significantly lower than those for indoor use. These additional studies may consider the design criterion and the link budget margins typically applied across CEPT when planning point-to-point links in this band. They should aim to quantify and qualify both the risk and possible effect of short-term interference occurring with respect to fixed-link availability at different WAS/RLAN maximum power levels.

A new work item has also been approved by ECC to develop a Decision to define harmonised technical conditions for WAS/RLANs in the 5925-6425 MHz band for the provision of wireless broadband services. This ECC Decision will be developed taking into account the results of ECC Report 302 and CEPT Reports in response to the EC Mandate, and should be based on the expectation of free circulation and use under a licence-exempt regime. With this Decision, expected by the end of 2020, ECC will develop a framework for the 48 CEPT countries in parallel to the ongoing process in the European Union. This

timely development of a framework for WAS/RLAN in the 6 GHz band will provide regulatory certainty to industry and will place Europe in a leading position to pave the way for future broadband connectivity based on unlicensed regimes.