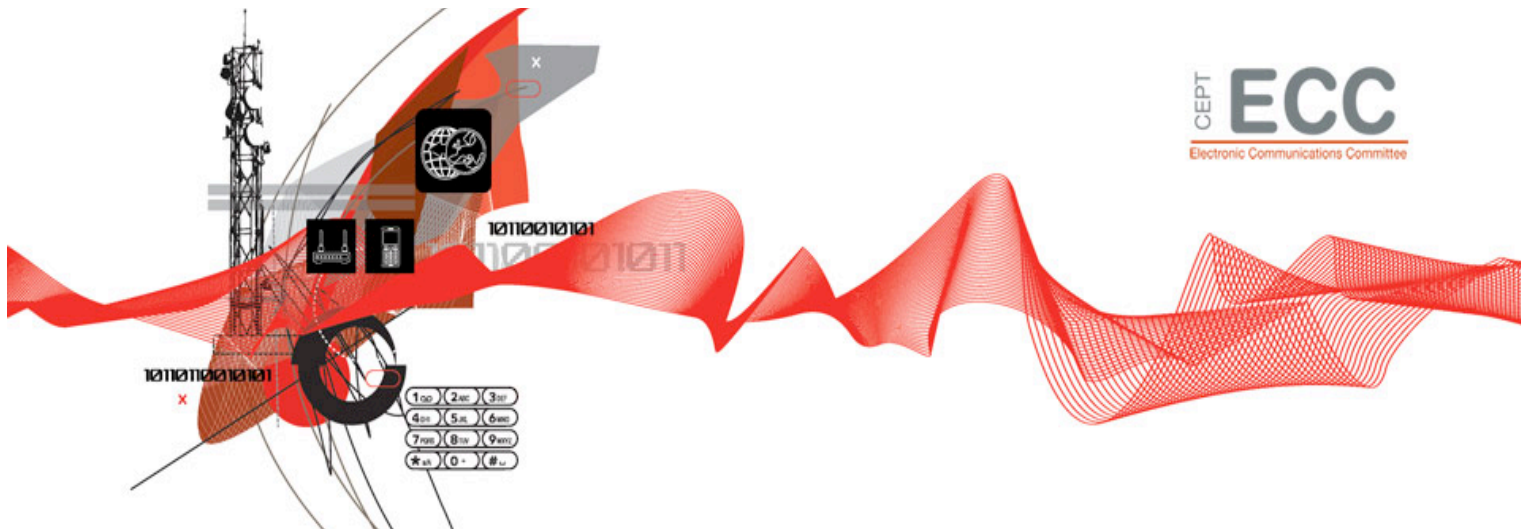




Supporting European interests at WRC-15

At the eighth meeting of the ECC's Conference Preparatory Group (CPG-15) in September, CEPT, the European Conference of Postal and Telecommunications Administrations, finalised its preparations for the WRC-15. The event takes place in Geneva, from 2 to 27 November.

The group prepared and approved 53 European Common Proposals for the work of the Conference, an impressive achievement given the broad range of topics under consideration. The work centred around Europe's common spectrum interests, and has been accomplished through the hard work and dedication of the CPG membership in a spirit of collaboration and compromise.

As reported in our [January 2015 special edition](#), CEPT put emphasis on preparing for the future of mobile broadband. It is of the view that globally harmonised spectrum is vital to realising all the benefits of ICT, i.e. economies of scale, ease of roaming and bridging the digital divide.

The CEPT administrations had various views on potential candidate bands, but reached an agreement for the proposals to identify the frequency bands 1427-1518 MHz and 3400-3800 MHz for IMT. It also agreed to allocate the latter band for mobile services on a primary basis. Discussions continued right up until the very last minute about opportunities for sharing the frequency band 2700-2900 MHz between mobile broadband and existing radars (air-traffic and meteorological). However, in the absence of a visible solution in a foreseeable timeframe, CEPT agreed to maintain the current status in this band.

When it comes to the conditions related to the 'extended digital dividend' band (694 - 790 MHz), CEPT is adopting the same strategy it used in preparation for WRC-12 for the 800 MHz band. Then, it relied on successful bilateral coordination agreements between concerned administrations.

The Russian Federation and neighbouring countries have invested a lot of time and effort in reaching bilateral agreements and any ongoing bilateral discussions are expected to be finalised in time for the Conference.

Regarding frequency bands for Public Protection and Disaster Relief (PPDR), Europe agrees on a flexible approach. On one hand, it wants to gain the benefits of worldwide harmonisation, which is important for vendors and manufacturers, but on the other hand it wants to leave detailed decisions at national level.

The approach includes a general framework in the Radio Regulations, whilst up-to-date information regarding available PPDR frequency ranges in different countries/regions should be specified using non-binding instruments, such as ITU-R Recommendations or Reports.

CEPT has a well-established tradition of supporting and promoting an active and rational use of orbit/spectrum resources. In that regard it has submitted to WRC-15 a set of proposals aimed at fostering the use of frequencies for satellite communications.

These proposals address two areas: improved regulatory procedures for getting access to orbit/spectrum resources; and additional frequency allocations to satellite services (for example, in the 8/7 GHz or 13 GHz ranges).

Most of the proposals in the field of satellite regulatory provisions build upon the decisions of WRC-12. For example:

- CEPT aims to clarify certain issues that have emerged during the first years of implementation of new “bringing into use” and “suspension” mechanisms. CEPT also proposes to more clearly define the rights for protection against interference of incumbent satellite systems. It aims to prevent warehousing spectrum by claiming unrealistic protection requirements. Finally, some CEPT proposals consolidate the use of the 5 GHz frequency band by non-geostationary mobile-satellite systems, and propose to adapt the current regulations related to Earth Stations on board Vessels to new transmission technologies.
- When it comes to additional Fixed Satellite Services (FSS) allocation in the frequency range between 10 GHz and 17 GHz, CEPT has a common proposal for the space-to-Earth direction. However, it has no proposal for the reverse direction due to diverging views on the use of the 14.5-14.8 GHz band.

CEPT has been quite successful in addressing the topic of Global Flight Tracking raised by the ITU Plenipotentiary Conference in 2014.

CEPT is proposing a two-step approach with a new allocation in 2015 for the satellite reception of Automatic Dependent Surveillance-Broadcast messages from aircraft. This is in accordance with International Civil Aviation Organization standards. It is also supporting a new agenda item for WRC-19 with the objective of achieving a global air traffic surveillance and management system.

Despite the fact that a decision was taken at the very last moment not to develop European Common Proposals on agenda items regarding Unmanned Aircraft Systems (UAS) via FSS allocation (Agenda Item 1.5) and Leap Second (Agenda Item 1.14¹), Europe will participate actively in the discussions during the Conference in order to solve both issues.

Although still four years away, the initial development of agenda items for the next conference in 2019 is certain to be one of the hot topics at WRC-15. In this context, CEPT has already prepared 12 proposals for the 2019 agenda including:

- Meteorological Satellite service allocation at 460-470 MHz;
- Use of 275-450 GHz by land mobile and fixed services;
- New allocations for FSS (Earth-to-space) at 51.4-52.4 GHz and regulatory framework in the range 37.5-52.4 GHz;
- New allocation(s) usable for small non-GSO satellites²;
- Global Aeronautical Distress and Safety System (GADSS);
- International regulations on maritime radio devices.

In line with the approach adopted by other Regions, CEPT also agreed with large support on an item about spectrum for future mobile broadband applications (often referred to as “5G”). This is focused on a limited number of bands above 24 GHz.

With the preparatory work finalised, CEPT is now ready - and in a strong position - to represent the interests of Europe in supporting policies that promote continuous efficient and effective use of radio spectrum and that bring the full benefits of ICT to the European economy and society.

Alexander Kuehn (Chairman of the ECC's CPG15), Alexandre Vallet (Co-chairman of the ECC's CPG PTB), Stella Lyubchenko (Spectrum Expert, ECO)

¹ To read details regarding 'Leap second' item in the article: WRC-15 AI 1.14 (Co-ordinated Universal Time and Leap Seconds) please click [here](#)).

² To read details regarding nano- and picosatellites in the article 'Size matters for satellites – big or small', please click [here](#)).

Flexible Harmonisation of Radio Frequencies for broadband PPDR

The Public Protection and Disaster Relief (PPDR) community and CEPT, the European Conference of Postal and Telecommunications Administrations, have been working for a number of years to advance the migration towards Broadband radio capacity for PPDR services (BB-PPDR). As its campaign nears its conclusion, bringing broadband application coverage from large events - especially the scene of major accidents - could soon become a reality.

In our [August 2013](#) Newsletter we gave some background to our work.

The PPDR user community has said that BB-PPDR, from a technical standpoint, wants to be part of the global LTE ecosystem. This, they say, will bring several advantages including a wider choice of terminals and potentially lower equipment prices such as lower costs for chipsets and duplex filters. It could also benefit roaming over commercial networks, whereby end user radio terminal equipment can obtain mobile communication services under the coverage of another radio communication network (the “visited network”).

Work on developing the LTE technology to support BB-PPDR specific functionalities has already started in international standardisation organisations. Support has come from the mobile industry, while PPDR stakeholders have also been involved. However, it is expected to take several years before key features and facilities identified by the PPDR community are fully specified, implemented, tested and integrated into LTE solutions.

European countries are increasingly experiencing the need to give and receive PPDR assistance within areas such as international crime and trafficking, near-border accidents, natural disasters, terror attacks etc.

Different national choices within CEPT will require - within an implementable tuning range – multiple band BB-PPDR user equipment. Such equipment can be used in either dedicated, commercial or hybrid LTE networks.

The required level of interoperability is to be realised on multiple layers through the availability of multiple band PPDR user equipment, the adoption of common technical standards (i.e. LTE and its evolutions), utilising different PPDR network types, and also by standard conformance and interoperability specifications.

In CEPT, the new [ECC Report 218](#) on the *'harmonised conditions and spectrum bands for the implementation of future European broadband PPDR systems'* has been published. This is an important step towards a CEPT harmonisation measure on spectrum for BB-PPDR. It is most likely to be approved by the Electronic Communications Committee (ECC) in 2016.

This Report proposes the concept of “flexible harmonisation” to enable an efficient implementation of BB-PPDR within CEPT. This includes three major elements:

- a common technical standard (i.e. LTE and its evolutions);
- national flexibility to decide how much spectrum and which specific frequency ranges should be designated for BB-PPDR networks within harmonised tuning range(s), according to national needs;
- national choice of the most suitable implementation model (either dedicated, commercial or hybrid BB-PPDR network solution).

Based on the above, it is not necessary to designate a single frequency band for BB-PPDR.

ECC Report 218 is complementary to the [ECC Report 199](#) on 'User requirements and spectrum needs for future European broadband PPDR systems (Wide Area Networks) ', approved in May 2013. This Report calculates a capacity need of 2x10 MHz for BB-PPDR spectrum.

Conclusions on spectrum compatibility of the options included in the ECC Report 218 are derived from [ECC Report 239](#) and [ECC Report 240](#).

The new [ECC Report 218](#), meanwhile, addresses spectrum options for the implementation of BB-PPDR services in CEPT countries in the 400 MHz and 700 MHz frequency ranges:

The 400 MHz Range

Tuning ranges in the 400 MHz frequency bands for BB-PPDR Uplinks (UL) and Downlinks (DL) are considered (the duplex spacing is always 10 MHz) as shown in Figure 1:

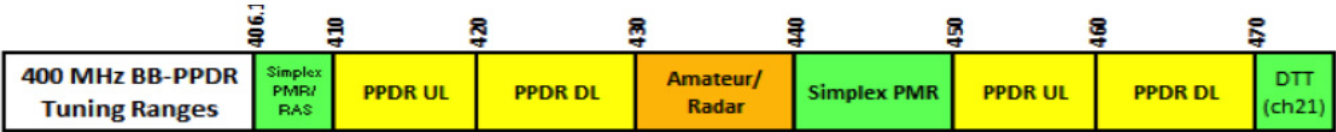


Figure 1: 400 MHz BB-PPDR tuning range and other primary use

ECC Report 218 concludes that the 400 MHz range can offer national flexibility for BB-PPDR, e.g. in the context of additional spectrum beside the 700 MHz range. The spectrum compatibility with, among other things, the radio astronomy service, radiolocation service and the terrestrial broadcasting service, has been assessed in ECC Report 240, indicating the technical measures needed to ensure their co-existence. A spectrum of up to 2 x 5 MHz could be realised in the band 410-430 MHz, as well as in 450-470 MHz.

The 700 MHz Range

The following options have been considered within the 700 MHz range (duplex spacing is always 55 MHz) as shown in Figure 2:

PPDR in spectrum harmonised for MFCN (ECC/DEC(15)01)



Figure 2: 700 MHz Options for BB-PPDR

- (1) [CEPT Report 53](#) considers alternative options (M2M, SDL, PMSE, BB-PPDR) for this part of the band and these have been listed in [ECC/DEC/\(15\)01](#). The Supplementary Downlink (SDL) option is one of them and uses zero up to four blocks of 5 MHz. Thus this approach provides flexibility for combining different options.
- (2) CEPT Report 53 considers Machine to Machine (M2M) as an alternative national option for 733-736 MHz UL / 788-791 MHz DL. Synergies with BB-PPDR could be explored in the 733-736 MHz and 788-791 MHz.
- (3) BB-PPDR usage could be anywhere within the harmonised MFCN band plan using a 55 MHz duplex spacing.
- (4) The use of the 2x2x5 MHz into a combined 10 MHz duplex channel arrangement in 698-708 MHz paired with 753-763 MHz has not been studied.

BB-PPDR can be accommodated within the 700 MHz range by either designating spectrum for dedicated BB-PPDR, use of a commercial mobile fixed communication network (MFCN)¹ or a combination of both to fulfil national PPDR requirements. Harmonised technical requirements for the use of MFCN in the 700 MHz band (703-733 MHz and 758-788 MHz) already exist in [ECC Decision \(15\)01](#).

The spectrum compatibility with the MFCN (see Figure 2) and the terrestrial broadcasting service below 694 MHz has been assessed in ECC Report 239, indicating the technical measures needed to ensure their co-existence.

[Project Team FM49](#) within the ECC Working Group on Frequency Management will continue to work on the harmonisation deliverable for BB-PPDR in the near future. This deliverable will cover the flexible harmonisation concept according to ECC Report 218 and the technical conditions to be defined for dedicated BB-PPDR spectrum in the 700 MHz and 400 MHz ranges.

Further investigation is needed on some additional aspects of future spectrum use for BB-PPDR such as direct terminal-to-terminal communications (off-network working), Air-Ground-Air, ad-hoc networks, critical voice communications over the BB-PPDR Wide Area Network and cross-border coordination.

Finally, the assumption is that mission critical voice (and narrowband data) will continue to be carried in most CEPT countries by the existing dedicated TETRA and Tetrapol networks until 2025 to 2030. The spectrum for these networks have been designated in the [ECC Decision \(08\)05](#). However, in some CEPT countries, PPDR agencies could migrate all of their mission critical voice and data services into networks using broadband technology such as LTE. And they may do so in a shorter timescale.

Thomas Weber and José Carrascosa, ECO Experts - Spectrum Management

¹ For those countries opting for a commercial or hybrid BB-PPDR solution, any Mobile Fixed Communication Network (MFCN) band harmonised in CEPT may also be used for BB-PPDR meeting the specified requirements. Such use is also subject to BB-PPDR equipment roaming capabilities

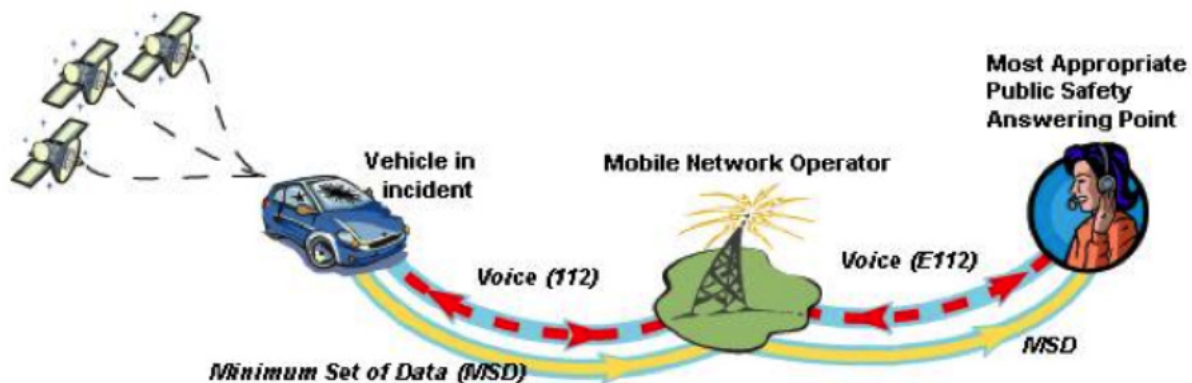
The eCall numbering challenge

From 31 March 2018, all new cars sold in Europe must have eCall capability. As the day fast approaches, however, a number of regulatory and technical challenges must be overcome.

Chief among them is the provision of a sustainable numbering framework for eCall devices, which will provide sufficient capacity and sustainability in the long term. The ECC is playing a central role in addressing the number challenge. But first let us take a look at eCall, its history and its benefits.

What is eCall?

eCall is an initiative intended to bring rapid assistance to motorists involved in a collision anywhere in Europe. It works using in-vehicle sensors which when activated - for example, by deployment of the vehicle's airbags - automatically call the pan-European Emergency Number 112.



(Source: European Commission)

A voice connection is then established with the relevant Public Safety Answering Point (PSAP) and a minimum set of data (MSD) including GPS coordinates and other information (if available) such as speed at impact, number of engaged seatbelt points and direction of travel, are sent to the PSAP. eCall can also be activated manually by pressing a dedicated eCall button in the vehicle.

The main objective of this data-gathering exercise was to ascertain the requirements and expectations of emergency services organisations in terms of accuracy and reliability of caller location information. It also aimed to understand the electronic communications industry's perspective on the various positioning techniques, their implementation challenges, potential benefits and associated costs.

Time saved = Lives saved

Road deaths on European roads totalled over 25,700 in 2014 alone, [according to figures from the EU](#). According to [official statistical data](#), on eCall, the service is estimated to have the potential to save up to 2,500 lives annually, while also reducing the severity of injuries by 10% to 15%.

Getting an immediate alert in the event of an accident and knowing the exact location of the crash site cuts emergency services' response time by 50% in rural and 40% in urban areas. In cold hard financial terms, Europe's [economic loss](#) caused by road accidents amounts to more than €160 billion per year. If all cars were equipped with the eCall system, up to €20 billion could be saved annually.

Legislation for eCall in the European Union

A three-pronged regulatory approach has been implemented to make eCall a reality in Europe. The legislation addresses the in-vehicle system, the PSAPs and the mobile communications networks.

In-vehicle requirements: An EU [Regulation](#) amending the type-approval Directive for motor vehicles was published on 29 April 2015. This concerned type-approval requirements for the deployment of the eCall in-vehicle system in all new M1 (passenger cars) and N1 (light duty) types of vehicles. The regulation requires all new car models to be equipped with eCall technology from 31 March 2018.

Public Safety Answering Points: An [EU Decision](#), published on 15 May 2014, provides that Member States ensure all PSAPs are equipped to handle eCalls as expeditiously and effectively as any other call made to 112. They should also receive the data contents of the MSD and present them to the PSAP operator clearly and understandably. The PSAP must also have access to an appropriate Geographical Information System (GIS) or an equivalent system. This will allow the PSAP operator to identify the position and heading of the vehicle to a minimum degree of accuracy based on the location coordinates presented in the MSD.

The necessary infrastructure to handle eCalls must be in place at least six months before the type-approval requirements for the corresponding in-vehicle device start to apply. This means no later than **1 October 2017**.

Mobile Communications Networks: Interestingly, there is no mandatory requirement on Mobile Network Operators (MNOs) regarding any aspect of the eCall service. An [EC Recommendation](#) adopted on 08 September 2011 requires EU member states to ensure that mobile networks could handle eCalls by 31 December 2014. This is achieved by implementing what is known as “the eCall Discriminator Flag”. This provides additional information in the signalling to the PSAP to allow it to discriminate between eCalls to 112 and normal calls to 112. The flag also allows the PSAP to determine if the eCall was initiated automatically by the vehicle following an accident or if it was initiated manually by the occupant of the vehicle.

eCall in the CEPT area

While the legislation makes eCall mandatory within the European Union, other CEPT countries are also taking steps to implement eCall. For example, the Russian Federation implemented its own version of eCall on 1 January 2015, and Turkey was actively involved in the eCall pilot projects. Now, the system is expected to be rolled out right across the continent. WG NaN, the ECC's Working Group on Numbering and Networks, is also planning an ECC deliverable on numbering for eCall once the potential solutions have been fully considered.

Stakeholder Initiatives

The successful implementation of eCall depends on close cooperation and collaboration between all relevant stakeholders. Two important stakeholder initiatives include:

1. European eCall Implementation Platform ([EeIP](#))

The EeIP is a coordination body bringing together representatives of the relevant stakeholders who support the implementation of eCall in Europe. It aims to guide, coordinate and monitor the progress of the implementation of the eCall service to ensure a timely, effective and harmonised deployment.

2. Harmonised eCall European Pilot ([HeERO](#))

HeERO was a three-year project, which started in January 2011 and was partially funded by the European Commission under the ICT Policy Support Programme. The pilot gathered 40 partners from all over Europe

including user organisations and telecommunications companies. Fifteen countries took part in the project, the purpose of which was to prepare for the deployment of the necessary infrastructure in Europe to make eCall a reality. The project's deployments were based on ETSI, the European Telecommunications Standards Institute, and CEN, the European Committee for Standardisation, standards. The objective was to carry out proof of concept testing and to identify interoperability issues. In the different countries the full eCall service chain (PSAPs, Emergency Dispatch and Management Centres, Mobile Network Operators, Fleet owners, Public and Private Road Operators, Original Equipment Manufacturers) was covered for the execution of the pilot.

The HeERO project concluded with the final HeERO conference which took place in Madrid on 27-28 November 2014. The purpose of the conference was to highlight the final outcomes, impact and results of the HeERO project. Each pilot site shared its experiences, and participants had the opportunity to see eCall demonstrations.

With EU legislation now in place and proof of concept completed, the relevant stakeholders are in the process of preparing for deployment by 31 March 2018. There are still interoperability issues to be resolved and [ERTICO's](#) interoperability working group is addressing some of these challenges. In parallel, the EeIP has set up task forces to address several challenges including that of providing a sustainable numbering and addressing framework for eCall communications devices. The inclusion of the number challenge in the terms of reference of this group was successfully argued by the WG NaN.

Numbering for eCall

The ECC first identified the potential challenges with providing a sustainable number solution for eCall in 2013 and the subject has been a priority work item since then. At first, it was not very clear how eCall would work, and WG NaN established a dialogue with the EeIP to find out more.

eCall has all the characteristics of a mobile service and its success is dependent on good geographical coverage and the ability to roam across national and international networks. Therefore each eCall device requires a valid SIM card, and consequently, an E.212 International Mobile Subscriber Identity (IMSI) number - for network authentication and registration - and an E.164 telephone number for making and receiving calls.

From a numbering perspective, eCall is a Machine-to-Machine (M2M) application. Some commentators might argue that eCall facilitates voice communications between humans and is therefore not machine-to-machine. However, the reality is that numbering resources will be required for millions of eCall devices installed over a wide geographic area. Furthermore, the owner of the vehicle containing the eCall device will not be the subscriber of the communications service. Therefore it fits neatly in to the M2M category, and because of these characteristics poses a number of interesting questions for national numbering plan managers.

E.212 IMSI numbering – Leveraging economies of scale and avoiding “operator lock-in”

[ECC Report 212](#) addresses evolution in the use of E.212 Mobile Network Codes (MNCs). The MNC is 2 digits in length and represents the 4th and 5th digit of a 15-digit IMSI number. Each SIM card has a unique IMSI number. MNCs are mainly assigned to mobile network operators but the supply chain for mobile communications is changing, and there are valid business cases, including eCall, where it may be more practical to assign these resources to entities other than MNOs. This subject is comprehensively covered in the aforementioned ECC Report.

As vehicle manufacturers are mandated to install eCall devices in all vehicles, it would seem logical to execute this task at the point of manufacture to leverage economies of scale. This would also mean that the IMSI number would need to be pre-configured on embedded eCall devices before shipment to the different countries. This poses the question of the most appropriate E.212 resource to use and who it should be assigned to. Is it appropriate for a car manufacturer to use the E.212 resources of one country to address eCall devices in all domestic markets it will export to? Furthermore, if millions of devices are installed through a partnership with a single MNO, then changing the underlying service provider could be problematic.

Under national and European legislation for Electronic Communications, end-users of electronic communications services in Europe have a right to switch their service provider. Individual customers of mobile services can easily switch provider by physically changing the SIM card in their device. A car manufacturer with SIM cards embedded into potentially thousands of cars located in multiple countries is a bigger switching challenge. The ECC is involved at ITU-T (the ITU telecommunications standardisation sector) level and is in discussions with the GSMA, which represents the interests of mobile operators worldwide, and ETSI to find administrative and technical solutions to resolve the operator lock-in problem.

Impact on E.164 numbering

One of the principle responsibilities of national numbering plan managers is to ensure sufficient numbering capacity for new and existing market entrants in order to facilitate competition and innovation. Statistics show that there are over 230 million vehicles in Europe and 87% of these are private cars. Around 5% of the vehicle stock is upgraded every year. Table 1 below, based on figures from the European Automobile Manufacturers Association (ACEA), shows the average number of new vehicles registered over the last five years.

Year	2010	2011	2012	2013	2014	5 year average
New Registrations (000,000)	14	13,5	12,5	12,3	13	13

Table 1: New vehicle registrations (EU+EFTA) 2009 – 2014 (source: [ACEA](#))

Projections based on the above figures suggest that approximately 13 million E.164 new numbers will be required for eCall devices each year from 2018. This could have a negative impact on the available stock of mobile numbers particularly in the larger European countries with automotive industry activity. This is a key concern for national administrations as the cost of number changes is extremely high and requires lengthy planning. The ECC is investigating the possibility of using new dedicated M2M numbering ranges for eCall where the digit string is as long as possible (max 15 digits) in order to avoid number exhaustion in existing mobile ranges. It is also looking at global numbering solutions such as ITU-T international numbering ranges.

Recycling of numbering resources to ensure efficient use

Another issue that needs to be addressed is the efficient use of these resources when vehicles are decommissioned at end of life. In 10 to 15 years after eCall implementation, a substantial number of vehicles will reach end of life each year and the numbering resources used by these vehicles should be recovered, quarantined and then recycled. The end-of-life issue is also important for MNOs as they need to know when vehicles have been decommissioned and the eCall devices are no longer allowed to attach to mobile networks. Furthermore, linking the IMSI number to the Vehicle Identification Number will allow for the implementation of a testing regime, and eCall functionality to be tested as part of the mandatory national car testing regimes already in place. The ECC is active within the EeIP's Task Force on Life Cycle Management (LCM) which plans to produce a report covering the numbering, testing and end-of-life subjects by Spring 2016.

Policy Options?

So the key question for regulators and policy makers in the context of numbering for eCall is whether the traditional approach to numbering on a national basis is suitable. Can national numbering arrangements cope with potentially millions of eCall and other M2M devices being assigned numbering resources in one European country for connectivity in another? Is an international solution a better approach in the long term?

The ECC will remain at the heart of the debate in the coming months and will be actively involved in discussions with all stakeholders taking place within EeIP, ERTICO and the European Commission. The discussions should provide further light on the best numbering solution(s) to adopt in order to avoid fragmentation and ensure sustainability in the long term.

Freddie McBride, ECO Expert – Numbering & Networks