Réponse à la consultation publique
"Preparing the future of mobile networks"
Arcep - 23 May 2022 to 23 September 2022

Introduction

We welcome the opportunity to contribute to Arcep's public consultation "Preparing the future of mobile networks".

"The most important phone call you ever make may be a call to 911" Jessica Rosenworcel, Chairwoman of the US FCC (17/12/2021)

Emergency calls really do save lives. Please do not belittle them.

Question 1. What are the most significant developments brought by 5G Release 16 and Release 17? What is the timeline for these developments to become available on networks and devices? If applicable, what new frequency requirements will these developments generate?

A year ago, the French government criticized Orange for its slow crisis management during a major network outage. According to Reuters, Orange failed to quickly alert the country's authorities about the extent of the network outage, which affected calls to emergency services for several hours. Thousands of calls across the country could not be transmitted to emergency services on 2 June 2021, putting people's lives at risk.

A year ago, the French government commissioned Arcep to review the shortcomings of Orange and to strengthen the regulatory framework for emergency calls.

Yet, one year later, Arcep does not highlight the inability of the major players to ensure and guarantee the proper routing of emergency communications with VoNR (5G) and VoLTE (4G). Why is this crucial issue not emphasised? [VoLTE: Voice over LTE - VoNR: Voice over New Radio]

Suggestions for further reading:

"*The lack of 4G interoperability of certain phones and certain mobile network operators results in the impossibility to make any voice call when roaming in countries which have already phased out 2G and 3G networks, as it is the case in the United States. This means that in case of danger, these users are also not able to alert the emergency services.*"
EENA: "*Many Europeans cannot call 911 when traveling to the US*" (25/07/2022)
Source: *https://eena.org/knowledge-hub/press-releases/many-europeans-cannot-call-911-when-traveling-to-the-us/*

"*2G, 3G, 112, roaming and eCall are European global success stories. It works everywhere and for everyone.*"
ResearchGate: "*RE-VoLTE: Should we stop the shutdown of 2G/3G to save lives? A lack of VoLTE standardisation breaks voice calling globally*" (07/2022)
Source: *https://www.researchgate.net/publication/362404587_RE-VoLTE_Should_we_stop_the_shutdown_of_2G3G_to_save_lives_A_lack_of_VoLTE_standardisation_breaks_voice_calling_globally*

"*The issues affecting the US are only the beginning. Other nations will soon see 2G and 3G networks phased out too. Mobile network operators around the globe must act fast to update partnerships, agreements and technology to ensure seamless voice roaming services continue.*"
Capacitymedia: "*VoLTEgate: Tomia says 50m visitors to US this year will be cut off from voice roaming*" (24/06/2022)
Source: *https://www.capacitymedia.com/article/2a9s377bx0f611rx9lfr5/news/voltegate-tomia-says-50m-visitors-to-us-this-year-will-be-cut-off-from-voice-roaming*

Orange plans to shut down the 2G network in France by the end of 2025 and 3G by the end of 2028.
Orange: "*Orange annonce une nouvelle étape dans la transformation de ses réseaux mobiles en Europe, avec l'arrêt progressif des réseaux 2G et 3G avant la fin de la décennie*" (01/03/2022)
Source: *https://www.orange.com/fr/newsroom/communiques/2022/orange-annonce-une-nouvelle-etape-dans-la-transformation-de-ses-reseaux*

"*2G and 3G mobile networks are being switched off and the 4G voice service, Voice over Long-Term Evolution (VoLTE), is implemented in different ways on different networks with variations between handsets, chipsets and software versions. Compatibility and interoperability issues between networks and handsets are starting to emerge which means that a voice service may not be guaranteed depending on the handset/network combination to roaming end-users.*"
EENA: "*The Potential Perils of 2G and 3G Switch Offs*" (12/09/2022)
Source: *https://eena.org/knowledge-hub/press-releases/the-potential-perils-of-2g-and-3g-switch-offs/*

"*VoLTE status*" (03/2022)
GSMA: "*2G/3G Sunset & VoLTE Roaming*" (09/2022)
Source*: https://www.gsma.com/aboutus/workinggroups/key-topics/volte-roaming*

"*Device Testing: A key issue is to reduce the variations across the TS.32 IMS configuration parameters and create a limited number of service profiles so that the device test costs, efforts and delay can be dramatically reduced. NG GERI defined six service related profiles to fully test the device functionally for both non-roaming and roaming cases.*"
GSMA: "*VoLTE Implementation Guide*" (07/2022)
Source: https://www.gsma.com/aboutus/workinggroups/wp-content/uploads/2022/07/VoLTE-Implementation-Guide-Jul-2022.pdf

"*In the European Union, access to emergency services is a right of all citizens. That right is enshrined in legislation and those authorised to provide electronic communications networks and services are entrusted and required to ensure that access is constantly available to their customers. Access to*

emergency services can never be allowed to become an afterthought in the design of any future electronic communications networks and services. This current situation suggests it has become an afterthought."
EENA: "*The Potential Perils of 2G and 3G Switch Offs*" (12/09/2022)
Source: *https://eena.org/knowledge-hub/press-releases/the-potential-perils-of-2g-and-3g-switch-offs/*

France/Reuters: "*French government blames Orange's slow crisis management of its network outage*" (22/07/2021)
Source: *https://www.reuters.com/world/europe/french-government-blames-oranges-slow-crisis-management-its-network-outage-2021-07-22/*

France: "*Evaluation de la gestion par l'opérateur Orange de la panne du 2 juin 2021 et de ses conséquences sur l'accès aux services d'urgence*" (03/08/2021)
Source: *https://www.interieur.gouv.fr/fr/Publications/Rapports-de-l-IGA/Rapports-recents/Evaluation-de-la-gestion-par-l-operateur-Orange-de-la-panne-du-2-juin-2021-et-de-ses-consequences-sur-l-acces-aux-services-d-urgence*

Arcep: "*Communications d'urgence*" (09/2022)
Source: *https://extranet.arcep.fr/portail/Communications%C3%A9lectroniques/Communicationsdurgence.aspx*

Question 2. Same question for Release 18 ("5G Advanced"), 6G and Wi-Fi 7.

According to our sources, in late June 2022, at a working meeting of ITU-R WP 5D (NB: one of 6G/IMT-2030's global standardization hotspots for several years now), a group of global operators and equipment vendors requested and obtained the deletion of a key passage from the new ITU-R Report ITU-R M.[IMT.Future Technology Trends of Terrestrial IMT Systems towards 2030 and beyond], and did so just prior to the general approval of the new ITU-R Report.

Here is the key passage that has been removed from the new ITU-R Report:

"*7.3 Stand-alone support of voice services*
Voice services have been a part of wireless telecom since its earliest days of commercial operation. It could be said to be the 'killer app' of all the services that have been offered. We know that humans are verbal creatures and while add on services such as texting, email, etc. have become a big part of our lives, voice is still the quickest way to communicate with other people. Basic voice services will continue to be a part of any future mobile telecom offering. Humanity is not diverting from verbal communication, so no matter what new features a next generation transport service may offer, voice has to be included. How voice will be offered in the next generation is worth a serious discussion. One expects that there will be more voice services, possibly bundled with OTT applications as well as carrier grade voice over the main air interface. That carrier grade service along with all its regulatory encumbrances needs to be a part of the basic feature set in any new generation of telecom technology. It is critical that when the next IMT-system launches, carrier grade standalone voice is part of that release. This also requires emergency and location services, lawful interception, other voice regulatory requirements, and lastly ID security to be part of that feature."

As a result, the new ITU-R Report ITU-R M.[IMT.Future Technology Trends of Terrestrial IMT Systems towards 2030 and beyond] no longer contains the word "*voice*" at all and no longer deals with access to emergency services. Arcep does not seem to care. Why this indifference?

Again according to our sources, this same group of global operators and equipment vendors then refused to allow the deleted key passage to be included in the Working Document of the future ITU-R Recommendation ITU-R M.[IMT.VISION 2030 AND BEYOND]. Unfortunately, this key topic is now only mentioned in one sentence of the latter document: "Stand-alone support of voice services is an integral part of immersive communications".

As a result, how to ensure and guarantee the proper routing of all emergency communications with 6G (IMT-2030), and avoid the disaster scenario (please see our answer to Question 1) that we experience with 4G (VoLTE) and 5G (VoNR), is no longer addressed at all in any ITU-R WP 5D document. This does not seem to move Arcep. Why this indifference?

As regards the possibility of calling 112 with Wi-Fi and 4G, the situation is slowly improving in some pioneer countries, such as the Netherlands, following strong government and regulatory intervention. Arcep doesn't talk about this much. Why not learn from these pioneer countries?

Suggestions for further reading:

"*Emergency number 112 can now be reached using 4G (voice over LTE) and Wi-Fi calling with all mobile telecom operators in the Netherlands. This has been mandatory since the policy rule regarding calls to Dutch emergency number 112 came into effect in July last year. Still, the Netherlands Authority for Consumers and Markets (ACM) in late 2021 had to confront telecom operators with the fact that, in some situations, 112 could not be reached. All telecom operators now comply with the policy rule.*"
The Netherlands: "*Emergency number 112 can now be reached using 4G and Wi-Fi calling with all mobile operators*" (11/02/2022)
Source: *https://www.acm.nl/en/publications/acm-emergency-number-112-can-now-be-reached-using-4g-and-wi-fi-calling-all-mobile-operators*

"*At the moment, mobile calls to emergency number 112 are usually made over the 2G or 3G networks. Over the next few years, 2G and 3G will gradually be replaced, which means that, in more and more situations, it must be possible to make mobile calls using 4G networks. Mobile telecom operators must ensure that Dutch emergency number 112 can be reached (officially in Dutch: 'aankiesbaar', which translates to 'dialable') using all technologies that they use for establishing regular mobile calls, which include newer technologies such as 4G and Wi-Fi calling. In that way, the emergency number can be reached at all times, now and in the future. Note that, in this context, it is about voice services that are offered by telecom operators, not about voice services offered by apps such as WhatsApp or FaceTime.*"
The Netherlands: "*ACM urges telecom operators to enable calls to emergency number 112 using Wi-Fi and 4G*" (10/11/2021)
Source: *https://www.acm.nl/en/publications/acm-urges-telecom-operators-enable-calls-emergency-number-112-using-wi-fi-and-4g*

The Netherlands: "*ACM stelt beleidsregel vast voor mobiel bellen naar alarmnummer 112*" (24/07/2020)
Source: *https://www.acm.nl/nl/publicaties/acm-stelt-beleidsregel-vast-voor-mobiel-bellen-naar-alarmnummer-112*

The Netherlands: "*Consultation of ACM's policy rule regarding calls to Dutch emergency number 112*" (02/06/2020)
Source: *https://www.acm.nl/en/publications/consultation-acms-policy-rule-regarding-calls-dutch-emergency-number-112*

ITU Radiocommunication Sector (ITU-R) Working Party 5D (WP 5D) - IMT Systems
Source: *https://www.itu.int/en/ITU-R/study-groups/rsg5/rwp5d/Pages/default.aspx*

Question 3. Have you identified other developments in mobile technologies for specific uses that could generate new frequency needs, e.g. communications between devices or broadcasting/multicasting? If so, which and for what uses?

On the one hand, according to Ericsson, "*The European Union (EU) is proposing legislation, which focuses on using ViLTE and ViNR to improve the 112 services for the hearing impaired and people in general who cannot orally describe the urgency to an emergency dispatcher. The legislation is intended for EU member countries, but the concept may also be applied by other countries in the world.*" [ViLTE: Video over LTE - ViNR: Video over New Radio]

On the other hand, France is not the only advanced economy to have recently experienced a major nationwide network outage. In recent years, several high-income OECD members have experienced the same misfortune, each time affecting millions of people and their ability to reach emergency services providers. Examples include: USA (June 2020), South Korea (October 2021), Japan (July 2022), Canada (July 2022).

Enlightened governments and regulators are now calling on the major players to take swift and decisive action, on a scale rarely seen before, to strengthen network reliability and security, including ensuring robust emergency roaming services.

And let's not forget the European legislation on eCall, which since 2018 requires the presence of this emergency call system in new vehicles initially, and then in all types of vehicles. eCall is based on technology available on 2G and 3G telecommunications networks.

Unfortunately, European legislation does not seem to impose an obligation to maintain such an emergency call service. Some in the automotive industry are therefore already talking about the future death of eCall, which was created to save lives, due to the foreseeable deterioration, and eventual disappearance, of 2G/3G coverage in Europe. This does not seem to move Arcep. Why this indifference?

Emergency calls really do save lives. Please do not belittle them.

Suggestions for further reading:

"*On July 11, in the days following the massive Rogers network outage, I convened a meeting with the CEOs of Rogers and the other major wireless telecommunications companies. I first expressed in no uncertain terms the frustration of millions of Canadians, emergency services providers and small businesses who were affected for more than 15 hours. I directed them to take immediate action to improve network reliability across Canada, giving them 60 days to enter into a formal agreement to ensure and guarantee emergency roaming, mutual assistance, and a communications protocol for advising the public and government during major outages and other emergencies.*"

Canada: "*Statement from Minister Champagne on Canada's Telecommunications Reliability Agenda following Rogers' outage on July 8, 2022*" (07/09/2022)
Source: *https://www.canada.ca/en/innovation-science-economic-development/news/2022/09/statement-from-minister-champagne-on-canadas-telecommunications-reliability-agenda-following-rogers-outage-on-july-8-2022.html*

"Today, I can report to Canadians that a formal agreement has been reached by these companies, along with a number of other telecommunications service providers offering Internet and mobile services. As of September 9th, should one of these providers be faced with a major network outage, the other companies have committed to provide the support and assistance necessary so that Canadians can reach loved ones, access 911, and conduct business transactions. As part of this agreement, the companies also commit to providing clear and timely communications to keep Canadians and appropriate authorities informed about response and restoration during major network outages."
Canada: "*Statement from Minister Champagne on Canada's Telecommunications Reliability Agenda following Rogers' outage on July 8, 2022*" (07/09/2022)
Source: *https://www.canada.ca/en/innovation-science-economic-development/news/2022/09/statement-from-minister-champagne-on-canadas-telecommunications-reliability-agenda-following-rogers-outage-on-july-8-2022.html*

"*Police services reported that 911 services were inaccessible on many mobile phones. Hospitals reported communications problems, and one Ontario hospital had to redirect cancer patients when emergency radiation treatments were affected by the outage.*"
Canada/BBC: "*Rogers outage: Why a network upgrade pushed millions in Canada offline*" (20/07/2022)
Source: *https://www.bbc.com/news/world-us-canada-62174477*

"*Following KDDI's network outage last month, Japan is looking to beef up backup systems to ensure that users will be able to access communications networks in times of emergency. Leaders of major mobile carriers have stressed the need to work with each other to provide emergency roaming services, while the government is also becoming more serious about facilitating discussions on the issue. "KDDI's network disruption is not somebody else's problem," Nippon Telegraph and Telephone (NTT) chief Akira Shimada said at a news conference last week. "As for emergency roaming … we are willing to cooperate to make it happen as soon as possible.""*
Japan Times: "*KDDI outage spurs action in Japan over emergency communication system*" (16/08/2022)
Source: *https://www.japantimes.co.jp/news/2022/08/16/business/corporate-business/kddi-outage-backup-systems-efforts/*

"*People now largely depend on mobile phones in the event of an emergency, and there are far fewer alternatives than in the past. The number of pay phones has been reduced by nearly half in the past decade while the number of households that do not have a landline has increased.*"
Japan/Asahi Shimbun: "*KDDI failure highlights vulnerabilities of Japan's networks*" (05/07/2022)
Source: *https://www.asahi.com/ajw/articles/14661502*

"*The routers were installed at an enterprise network system in Busan, but the wrong information was then sent to those in Seoul and rippled across the country. KT failed to detect the error during two*

rounds of verification carried out before the command was — or wasn't — inputted. "Two rounds of trial processes existed, but the error was not detected because they were done by humans," a statement released by the ministry said. What compounds the matter is that the network routing work was conducted during the daytime, although the outsourced entity reported to KT that it would be done between 1 a.m. through 6 a.m. No KT workers participated in the work, although those from the network provider are supposed to join in order to oversee the work. "The task was carried out wholly by the technicians from an outsourced company without any supervisor [at KT], and there was no system to prevent such an accident," the statement said. To prevent the recurrence, the ministry vowed to strengthen scrutiny over telecom operators' network management, asking three major telecom companies — SK Telecom, KT and LG U+ — to come up with ways to improve network management."
South Korea/Korea JoongAng Daily: "*Omission of 'exit' command caused nationwide KT crash*" (29/10/2021)
Source: *https://koreajoongangdaily.joins.com/2021/10/29/business/tech/KT-network-failure/20211029184239427.html*

"*South Korean telecommunications operator KT suffered a nationwide network outage on Monday, causing widespread disruptions to daily tasks requiring connectivity. Virtual classrooms were down, food delivery orders were lost, and clinics couldn't access patient data.*"
South Korea/The Korea Herald: "*KT suffers major network outage nationwide*" (25/10/2021)
Source: *https://www.koreaherald.com/view.php?ud=20211025000650*

"*Overall, PSHSB [FCC's Public Safety and Homeland Security Bureau] estimated that more than 250 million calls or 73% originating from other carriers' subscribers to T-Mobile customers didn't go through, based on confidential and non-confidential data other operators shared with the FCC.*"
USA/FierceWireless: "*At least 41% of calls failed during T-Mobile's June network outage, FCC finds*" (22/10/2020)
Source: *https://www.fiercewireless.com/operators/at-least-41-calls-failed-during-t-mobile-s-june-network-outage-fcc-investigation-finds*

"*The FCC's Enforcement Bureau today announced that it has settled five investigations into communications providers' compliance with the agency's 911 reliability rules during network outages that occurred last year. To resolve the matters, each company —AT&T, CenturyLink (now Lumen Technologies), Intrado, and Verizon— has agreed to make a settlement payment and implement a compliance plan to ensure adherence to these 911 rules. The combined settlement payments total more than $6 million.*"
USA/FCC: "*Four Companies Settle FCC Investigations of Compliance with 911 Rules*" (17/12/2021)
Source: *https://www.fcc.gov/document/four-companies-settle-fcc-investigations-compliance-911-rules*

"*Le règlement européen sur l'Ecall impose depuis mai 2018 la présence d'un système d'appel d'urgence ou ecall tout d'abord sur les véhicules neufs puis sur tout type de véhicule. Ce système est basé sur une technologie disponible sur les réseaux télécom 2G et 3G (la règlementation ecall nouvelle génération basée sur un protocole IP applicable sur les réseaux 4G, 5G et au-delà doit paraitre en 2022 avec date d'application estimée à partir de 2024 ou 2025 selon les types). Les opérateurs de télécom ont commencé à supprimer les réseaux 2G et 3G un peu partout dans le monde pour récupérer les fréquences et utiliser des réseaux 4G puis 5G beaucoup plus efficaces à la place. De ce fait il y a un risque fort de détérioration de la couverture ecall à court terme puis*

disparition de ce service à moyen terme (2030 ?) ; or à cette échéance, il restera encore des millions de véhicules en Europe équipés de cette seule solution technologique."
PFA : "*Ecall et obsolescence des réseaux 2G et 3G*" (02/2022)
Source: *https://pfa-auto.fr/wp-content/uploads/2022/03/PTF_ecall-etobsolescence-des-reseaux-2G-et-3G_2022.pdf*

"*In 4G, 2 major technologies could be used for emergency call management:*

- *CSFB - Circuit Switched Fall Back: mobile operators could decide to use CSFB capability to manage the emergency call (see previous section related to 2G/3G).*
- *IMS- Voice over LTE (VoLTE): Emergency call is managed by the IP Multimedia Subsystem IMS Core Network. If the visited network has implemented an IMS subsystem supporting emergency calls, it is possible to set up emergency calls initiated by an emergency call number as described in the simplified call flow hereunder.*"

GSMA: "*Official Document NG.119 - Emergency Communication Version 1.1*" (08/06/2022)
Source: *https://www.gsma.com/newsroom/resources/ng-119-emergency-communication-v1-1/*

"*With 5G Core (5GC), the only way to manage the voice service is Voice over IMS (VoIMS). CS Fall-back is not supported with 5GC. Nevertheless, the overall logic and principles to manage Voice over New Radio VoNR remain unchanged. It is recommended to use the same approach as 4G to manage the IMS emergency call (section 2.4).*"
GSMA: "*Official Document NG.119 - Emergency Communication Version 1.1*" (08/06/2022)
Source: *https://www.gsma.com/newsroom/resources/ng-119-emergency-communication-v1-1/*

"*The GSMA is and remains fully committed to ensure the successful deployment of eCall, both now and in the future cooperating with all relevant stakeholders, including vehicle manufacturers and Member State authorities. This can be traced back to the GSMA's signature of the initial eCall Memorandum of Understanding in 2009, which has more recently been complemented by specific initiatives from the mobile industry to address existing eCall deployment issues.*"
GSMA: "*Position Paper on eCall Support and Mobile Network Evolution*" (22/11/2019)
Source: *https://www.gsma.com/gsmaeurope/wp-content/uploads/2020/01/GSMA-position-paper-eCall-November-2019.pdf*

"*Given the sensitivity of the in-band modem to time-warping that may be employed in commercial VoIP networks, the use of the eCall in-band modem is not recommended for operation over IMS. Besides jitter problems, the other limitations of CS eCall would remain with this option such as only 140 octets MSD, loss of voice channel, and delay in establishing a voice path.*"
GSMA: "*Official Document NG.119 - Emergency Communication Version 1.1*" (08/06/2022)
Source: *https://www.gsma.com/newsroom/resources/ng-119-emergency-communication-v1-1/*

EC: "*Regulation (EU) 2015/758 of the European Parliament and of the Council of 29 April 2015 concerning type-approval requirements for the deployment of the eCall in-vehicle system based on the 112 service and amending Directive 2007/46/EC*"
Source: *https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015R0758*

EC: "*Consolidated text: Regulation (EU) 2015/758 of the European Parliament and of the Council of 29 April 2015 concerning type-approval requirements for the deployment of the eCall in-vehicle system based on the 112 service and amending Directive 2007/46/EC*"
Source*: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02015R0758-20180331*

EC: "*Commission Implementing Regulation (EU) 2017/78 of 15 July 2016 establishing administrative provisions for the EC type-approval of motor vehicles with respect to their 112-based eCall in-vehicle systems and uniform conditions for the implementation of Regulation (EU) 2015/758 of the European Parliament and of the Council with regard to the privacy and data protection of users of such systems (Text with EEA relevance.)*"
Source: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017R0078

EC: "*Commission Delegated Regulation (EU) 2017/79 of 12 September 2016 establishing detailed technical requirements and test procedures for the EC type-approval of motor vehicles with respect to their 112-based eCall in-vehicles systems, of 112-based eCall in-vehicle separate technical units and components and supplementing and amending Regulation (EU) 2015/758 of the European Parliament and of the Council with regard to the exemptions and applicable standards (Text with EEA relevance.)*"
Source*: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017R0079*

Ericsson: "*Voice and communication services in 4G and 5G networks*" (07/2022)
Source: *https://www.ericsson.com/en/reports-and-papers/white-papers/voice-and-communication-services-in-4g-and-5g-networks*

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