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INTERNATIONAL TELECOMMUNICATION UNION
REGIONAL FORUM FOR EUROPE: 5G STRATEGIES, POLICIES AND
IMPLEMENTATION
VIRTUAL SESSION
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>> Look at Belarus, it's near enough to the European Union. Look at what's happening there. The perception is that as OTT is increasing, linear TV is going down. And Antonio talked about this earlier on and in the EU, we still have 106.42 million households which are receiving DTH, and it has gone up since 2016.

So OTT is increasing, but on this slide when you see the OTT, it's always in addition to another main mode of reception.

I'm almost at my last slide.

Secure communications is a fundamental issue in today's politics and today's policy making. I'm sure everybody has heard about the European Union exploring future investment in GovSatcom which includes exploring a LEO broadband constellation. It's to bridge the digital divide, we'll support 5G and 6G. And, in fact, that was my last slide. I just have a thank you slide at the end.

>> JAROSLAW PONDER: Thank you very much for this.

>> Thanks.

>> JAROSLAW PONDER: Thank you very much for bringing additional perspective for the 5G rollout and also the rollout of the satellite operators in this gain and the market development. So we are very grateful for this contribution and I hope I see the number of participants, we didn't lose almost any.

So thank you very much for keeping us very much excited regarding these messages you are transmitting.

Ladies and gentlemen, with this, we will have to break now. I think we need a little bit of the break. Our speakers are still staying with us, and will be able to -- to make the conversation in the chat box, but the agenda, that we will be -- we will be starting with the agenda point two, with the session two right now. We propose to have a break of ten minutes that everybody can stretch a little bit and have the -- a little bit of the fresh air.

So with this, we would like to thank all speakers for the great presentations and. Contribution. In the normal environment, we would clap the hands and raise the applause, but this environment, we just say thank you very much. for all of your presentations.

All the presentations are on the website and if you don't see, they will be coming very shortly. So we encourage you to do so. And let's now take seven minutes break and we will meet back at 1:10. So thank you very much for this first session and thank you very much one more time to all our speakers being with us.

So see you and hear you in ten minutes.

Thank you.

(Break).

>> JULIAN McNEILL: Okay. So I'm chipping in, replacing Jaroslaw because he had a little urgency. So I would just invite the speakers for this session to make sure that you are connected.

I also have the -- well, just one second. Okay. So dear delegates, thank you very much for being connected with us and I'm now introducing session two, national 5G strategies and policies in EU countries which will be moderated by Dr. Vadym Kaptur with vice chairman of ITU-D Study Group 1, and is co-rapporteur on ITU-D Question 1/1, so without further hesitation, I would invite Vadym to take the floor. I would just have one request, we received from Mr. Dominick Kopera who has an urgent meeting later on, I would ask Vadym, if you would call on Mr. Kopera to give the presentation just Dr. Mr. Frederic Pujol. Thank you very much.

>> VADYM KAPTUR: Thank you very much. Thank you, Julian. Good afternoon, dear colleagues and nice to see and hear you. For this meeting. So you already know that the broad band network has benefit as input in public structure and it plays a crucial role in promoting economic growth and changing role, the drivers and housing long-term activities. Countries around the world have all included broad band in the priority -- the priority areas of development. According to the ITU telecommunication regulatory base, at the end of 2019, more than 164 countries has adopted national broadband plans, up from in cooperation 136 in 2010.

The economic stimulus strategy or something like this. Also, as -- at the end of 2019, 119 countries reported they would build or document this type. In almost all cases, these documents contain aspects of broadband development. And one of the national plans includes building broadband infrastructure.

So in the framework of session two, we will be talking about national 5G strategies in the European countries and for this we will have one and a half hour, and as we no from the experience of previous session, we should give the time frame for a lot more than ten minutes per panelist. So I will be starting from the setting the context of this session. It will be provided by Mr. Frederick Pujol. With IDATE, and

he's also the focal point for the 5G Observatory.
Frederic, you have the floor.

>> FREDERIC PUJOL: Good afternoon. Can you hear me?

So I will present you the latest results of the European 5G Observatory. This was set up by European Commission to monitor the follow-up of the goals of the 5G Action Plan. Next slide, please.

So we have established a website in order to the 5G development in Europe and also around the world, so the 5Gobservatory.EU address. And there you have access to use the spectrum assignments on the commercial launches of 5G networks on the availability -- the availability of devices and there is also a database of 5G trials. Another database of spectrum assignments and quite a lot of information, and also the quarterly reports and latest one was published last week.

So we also published scoreboards covering the EU and the rest of the world. So this first scoreboard of ex U shows the progress as far as the 5G action plan is concerned. So we already identified close to 205 5G trial cities in the EU2017 and the UK. We keep the UK until the end of the year. And there are 12 cross-border corridors, mainly for tests for the time being in order to ensure that 5G works cross-borders and 13 Member States have published their national 5G roadmap, and their main objectives. And there is also a lot of detail on the spectrum.

So next slide, please. You can see that 26% of the spectrum of the three pioneer bands have been assigned in the EU. So the three pioneer bands are the 700 megahertz band, the 3.6 and the 26 gigahertz band. So you can see that almost half of the 3.6 band has already been assigned. So this is the band that is widely used in Europe for early 5G launches, because it's a very good compromise between coverage and capacity. So it's -- it's quite easy for operators to reuse existing cell sites and launch 5G services.

You can see in blue here, we identify spectrum that has been assigned, but is not yet usable this year. So, for instance, in the 700 megahertz band, this is a spectrum which is still used by DTT spectrum for the validity of operators for television, digital

television. For instance, in Italy. But the 3.4 spectrum has been identified and can be used by operators.

Next slide, please.

As far as the international situation is concerned. So the most active countries outside of Europe are the US, South Korea, China, and Japan. So US and South Korea launch commercial 5G services on March, almost at the same time in the last year, in April. There was some, let's say technical launches, for instance, in Finland in June 2018, but at that time, there was no 5G device available. So it was only a few base stations.

And since then, there has been a commercial launch in China and in Japan and in China, there are already close to 150,000,00 5G subscribers. And so it's a real massive deployment there.

Next slide, please.

So to that, there are already 18 commercial, 5G commercial services available in the ex U, plus the UK. You can see that among the largest countries, France doesn't have yet 5G commercial services. So this should be the case in December as the 3.6 gigahertz was assigned at the beginning of October. So we should see commercial services very soon in France.

Next slide, please.

What we see around the world, we can see very large-scale deployments such as in China and South Korea. For instance, in China there are already more than 500,000 5G base stations. And in other countries, many European countries, deployments are to only a few hundred base stations, but these numbers are going to grow very quickly with more dense coverage.

Next slide, please.

So what we see today with the 5G commercial launches, it's mainly enhanced broadband services. So it's more higher data rates and more capacity. And what we see today is really services dedicated to consumer and not yet to business -- to businesses. So business-to-business services will be available in one or two years, once the operator has deployed the stand alone network and able to manage slicing.

So today, we can see fixed wireless access

services in a few countries and also 5G mobile services. So new applications with high-definition video, 4K video, also virtual reality. And more recently, some 5G services have been pushed by the COVID-19 pandemic, such as services for virtual office or work at home, and also e-health services.

Next slide, please.

So to conclude, 5G deployments are underway in the EU but spectrum assignments are a little bit lagging behind, only, sorry, the figure is not correct here. It's 26.4%. Only 26% of the spectrum has been assigned in the three pioneer bands. So it should have been 100% at the end of this year, according to the 5G action plan from the European commission. So we will be quite far from this figure.

And the impact of the COVID-19 pandemic has been quite important in terms of delaying a few options and delaying a few deployments, but it has also showed that 5G will be really necessary to provide mobile broadband services, and new services, data services in the coming years.

Thank you very much for your attention.

>> VADYM KAPTUR: Thank you very much. I realized that if I mute myself, it is not too easy to resume the moderating mode. (Chuckles).

So thank you very much for this excellent setting the stage and highlighting the situation in our countries, including the problems that we still have including delays, et cetera, with the deployment of broadband and 5G.

Dear colleagues, we will be continuing and as mentioned earlier, you can view the chat for raising questions to our rapporteurs. And as it already mentioned by Julian, now we have a small change in our agenda, and now we will have the presentation for intervention from Mr. Dominick Kopera, would is acting director in -- acting deputy director in the communication department of the chancellery of the Prime Minister of the Republic of Poland. Then we'll go back to the regular agenda. Dominik, you have the floor.

>> DOMINIK KOPERA: Good afternoon. Thank you for the change in agenda, and sorry for the inconvenience, but we can -- we can start.

So I will have the opportunity to show you our

approach to the 5G strategies. So maybe we can go to the next slide.

And these are the main pillars that set the scene for 5G in European Union, very high capacity networks are, of course, necessary to maximize the growth potential of European digital economy and to ensure territorial cohesion for every citizen in every community across Europe to be part -- part of and to benefit from the digital single market. We have various Strategic Goals to achieve in the upcoming years, and by 2025, we should have gigabit connectivity for all main social economic drivers, such as schools, transport hubs and main providers of public services, as well as digitally intensive enterprises and open areas and all major threshold transport paths should -- should have uninterrupted 5G coverage. All European households, rural and urban should have access to Internet connectivity offering at least 100 megabits per second to gigabit speed.

And of course, we have the intermediate goal for 2020, 5G technology to be available as a commercial service in at least one major city in each Member States. So we can go to the next slide. So we can talk about tools how we are going to meet those very ambitious goals.

First of all, we have the European electronic communications code, which should be implemented by Member States by the end of this year. It's a big challenge for Member States. The new director for the EU regulatory framework for electronic communication. The code contains solutions aimed at increasing competition and stimulating investment in very high capacity networks, as well as fostering the development of 5G networks. And the requirements for the capabilities of electronic communications network are constantly increasing, while in the past they mainly concerned increasing the bandwidth available for general and individual users.

Other parameters such as latency is, availability and reliability are gaining importance today. In response to this, demand, optical fibers are to be installed closer and closer to the end user and future very high capacity networks require performance parameters equivalent to those of a fiber-based network.

And in the case of wireless connections, this corresponds to a network performance similar to that which can be achieved in installing optical fiber to the base station considered the base of service. When it comes to Polish law, we telecommunications law, which we amended in 2017, thanks to which the president of the office of electronic communications does not charge a fee for the temporary use of a radio transmitting or transmitting receiving device for research, testing and experiments.

Such permits are granted for a period of one year, with the possibility of extension for another year. In 2019, we made another amendment in terms of auction provision. The main purpose of this amendment was to increase the efficiency of radio Spectrum Management, and to ensure increased interest in the implementation of the new technologies on the telecommunications market, including, of course, 5G.

On the basis of the telecommunications law, we have introduced regulations of the minister of digital affairs regarding the tender, auction and competition for the reservation of frequencies or orbital resources, which defines the conditions and the procedures for announcing and organizing a tender, auction and competition, as well as detailed requirements for the content of the documentation, and -- and when it comes to developing -- developing broadband networks, our goal is, of course, to eliminate white spots and access to the broadband Internet and more effective implementation of projects implemented with EU support, which is the main -- the main financial source for -- for broadband projects right now.

We also want an effective efficient connection of schools to the nationwide educational network. The solutions that we proposed include also the tools to cover the entire territory of the country with wireless broadband communications. So we can go to the next slide.

So let me talk a little about the national broadband plan in Poland. So first, when it comes to gigabit Internet access, currently appropriate infrastructure is being developed in Poland, which can successfully become a starting point to provide gigabit access for places responsible for

socioeconomic growth, but also for whole households. We have projects from digital Poland that will providing over 2 million households.

Also very important is the national educational network. The task of the network is to provide all schools in Poland Internet access at least with symmetrical bandwidth of 170 bits per second and the schools are free of charge.

When it comes to frequencies for 5G, frequencies in the 3.4, 3.8 gigahertz and 26 gigahertz bands will be allocated in equal blocks to operators who will apply for them as part of the selection procedure. The construction and the expansion of the network will, of course, burden the private operators. As part of the selection procedure, the president will be able to define particular obligations including network development obligations and -- and obligations as to coverage of gigahertz with the network.

In the case of 700 megahertz band, national broadband plan prefers the construction of one nationwide network using the 700 megahertz. The network should be open to operators on the basis of wholesale access, regulators of course by the president of UKA. And this should provide the most effective use the radio spectrum and the lowest network construction costs, while ensuring an open and nondiscriminatory wholesale access.

Next slide, please.

Of course, there are some barriers when it comes to developing broadband networks. A key barrier is the economic profitability of investments in modern infrastructure, in particular in rural areas, characterized by high levels of dispersed buildings and very low population. That's why we have set -- we have a set of tools that act as a remedy to this problem. First one will be establishment of the broadband fund, financed with the state budget supporting the development of the telecommunications network and the demands for Internet access.

We have introduction of investment agreements for local governments, which may be an incentive for the development of the broadband networks at a local level. Introduction of coverage agreement as a regulatory tool for stimulating the mobile network market in Poland.

Suppression of the investment barrier related to the placement of radio installations in the health resorts, and national parks and nature reserves, suppression of investment barriers related to the amount of fees for the occupation of road lanes and placing the telecommunications infrastructure in the road lane. And suppression of the investment barrier related to the amount of the fee for the infrastructure placement in forested areas.

When it comes to -- when it comes to the demand, we are supporting the purchase of hand devices, and user devices and acquisition of digital competencies and by end users in difficult financial situation. A total of almost 138,000 computers and over 66,000 tablets were purchased, which allowed support for over 23,000 schools over 50,000 teachers, and 335 students.

For that we have allocated around 93 million Euros. As a part of information campaigns and other promotional activities, we aim at developing citizens awareness and knowledge of benefits of having access to high-speed broadband networks, and the use of modern digital services and everyday life and work. Of course, including e-government and e-health solutions that are very important right now in the -- in these difficult times.

So next slide.

>> VADYM KAPTUR: Dominik, sorry, you are practically out of time. Can you go to the conclusions?

>> DOMINIK KOPERA: Very quickly. The actions and initiatives concerning 5G, the most important -- the most important action was to change the very strict EMF limits that we have -- had until the end of 2019, as you may know. Our limits were 100,000 -- were 100 times more restrictive than ECNIP. But thanks to counteracting this and the fake news, we were able to increase these limits starting January 1st, 2020, but we still have a lot to do when it comes to disinformation on the effects of 5G on health. That's why also we have the white paper that was very useful in the changing of the EMF limits.

And just to sum up, I would like to inform you that we have an annual international scientific conference on EMF and 5G, that is organized by the national institute of telecommunications and now the

chancellery of the Prime Minister. It will take place in early December of this year and it will focus on this information, EMF measurements and research on the impact of EMF and 5G on health. It will, of course, be held online and I would like to invite you all to participate in this conference.

Thank you very much.

>> VADYM KAPTUR: Thank you very much for your excellent presentation.

So dear colleagues, as promised, we are going back to our agenda now. And for the next -- for the next presentation, I want to invite Dr. Stelios Himonas, Permanent Secretary, Deputy Ministry of Research, Innovation and Digital Policy of Cyprus. So Dr. Himonas, the floor is yours.

>> STELIOS HIMONAS: Thank you, Vadym. I hope all hear me. Good afternoon, everyone. I will spend the next few minutes talking to you and explaining the 5G network that we have applied here in Cyprus.

First a few words about the organization that I represent, the deputy ministry of research innovation and digital policy is a brand new ministry in Cyprus. It's -- it has been established on March 1st, 2020. So we are about eight months old.

Our vision is to build a knowledge-based digital economy and society supported by modern efficient and reliable structures driven by research, innovation and technological advancement and our ultimate goals for that is to is chief sustainable economic growth, social prosperity, and competitiveness of our economy.

Next slide, please. Our digital policy has four main pillars. The first one is to provide high quality digital services to the people and/our businesses in a speedy way. And enablers. For that is the development and the usage of modern technologies such as AI, blockchain, as well as agile methodologies in providing services.

Also key are digital skills. In the department of electronic communications our objective is to boost our broadband infrastructure and, of course, to roll out 5G networks, and also important is to safeguard the networks and our data. So cybersecurity is important as well.

Now, what are our gigabit or broadband strategic objectives for 2025? The next slide. Sorry.

The overarching objective is to provide gigabit connectivity for all main socioeconomic drivers. All premises and organized communities to have access to Internet connectivity with a download speed of at least 100 megabits per second.

Also with regard to 5G, we would like to cover all organized communities and highways and roads, again with the download speed of at least 100 megabits per second and we also have a take up target of 70% of the households with an Internet connection of 100 megabits per second.

Next slide, please.

Now, what is the landscape with regard to mobile in Cyprus? We have a little over 1.2 million subscribers. We have four operators. The traditional -- there is good competition between the traditional operators, CYTA, and our cablenet is catching up.

Next slide, please.

Now, what is the situation with regard to spectrum? We have basically assigned so far all the spectrum that has been harmonized in the traditional 800 and 900 megahertz bands and also in the 1.8, 2, and 2.6 gigahertz bands and the remaining spectrum in the 700 and 3.6 gigahertz band or in the process of being licensed. We are not licensing for the moment the 26 gigahertz band because in the public consultation that we have heard -- we have held there, was no market demand for it band. So that would come later.

Next slide, please.

Now, with regard to awarding 5G licenses, we have invited proposals in July of this year. The deadline for the submission of applications is tomorrow. By the end of November, we expect that we will finish with the selection process and select the bidders. The auction is envisaged to take place around mid-December. And latest by the end of January we expect to award the licenses and the gap between the end of the auction and the awarding licenses is to give time to the winners of auction to meet their post-auction requirements which are basically to pay the license fee.

And here it is important to say that we give the winners payment options. They do not have to pay the

whole thing right away. They can choose to pay 15% up front, provide a bank guarantee of 20% of the license fee, and choose to pay the remaining in the following year or in four annual installments or in -- or in ten annual installments. So we are trying to give them some options.

The auction process. Next slide, please.

We will license the whole of the 700 megahertz, and the 3.6 gigahertz bands. We divided the -- the bands into building blocks. The 600 megahertz blocks. 2.5 megahertz blocks and the 3.6 into 50 megahertz blocks and there's a spectrum cap of 2 by 10 megahertz in the 700 megahertz band and 100 megahertz in the 3.6 gigahertz band.

Now in the framework for the bidding process, it's going to go in stages, which I will describe in a minute. We will have four basic packages which will consist of one basic block in the 700 and another basic block in the 3.6 gigahertz band and the additional spectrum in the two bands will be licensed in a subsequent state.

Next slide, please.

As I said, the auction will have four stages. First, in the first stage, we will license the four packages. It will be a multiple round auction at ascending prices. Each participant in the auction can obtain only one package, and at this stage, in this stage, participation is mandatory.

Then we are going to have a second stage where those who have failed to acquire spectrum in the first stage -- no, no. Previous slide, please. Thank you.

Those who have failed to acquire spectrum in the first stage or those who need to top up their basic package can participate, and so here participation is optional, and then we will have a third stage. It is the spectrum assignment stage where the procedure will determine who chooses first, second, third and so on.

Next slide, please.

>> VADYM KAPTUR: Dr. Himonas, you are practically out of time.

>> STELIOS HIMONAS: Yes, I'm wrapping up.

70% of the population, all highways and main roads and they need to provide speeds of at least 100 megabits per second. And if you allow me a few words on the permitting framework, and I will leave the rest

of the slides for interested people to read. Next slide, please.

It's going to be -- it is a four tier process, with different actors having the distinct responsibilities. The Ministry of Health sets exposure limits which are set for the exposure limits. And the planning author issues planning permits and the building authorities issues building compliance, and then the department of electronic communications looks at the national exposure limits.

I need to say I won't go -- since I'm running out of time -- I won't go over the other slides. We have a strict monitoring program with respect to exposure to electronic radiation and I think this sort of comforts, as well, the public because we are trying to be very transparent and open as you can read in the following slides.

So while I will end it here, and I will turn it over to you, Vadym, thank you very much for your attention.

>> VADYM KAPTUR: Thank you very much, Dr. Himonas. Dear colleagues, you can still use the chat to ask questions of the distinguished presenters. They will be able to have discussion with you on the important questions that you raised in their presentations.

We move forward, and the next presentation will be delivered by Mr. Jeremy Godfrey from Commission for Communications regulation of Ireland. So, Jeremy, the floor is yours.

(No audio).

Do we have Jeremy online?

>> JEREMY GODFREY: Yes, I was -- I was waiting to be unmuted.

>> VADYM KAPTUR: Yes, okay.

>> JEREMY GODFREY: You are going to share the slides. Okay. Thank you very much, everybody. Thank you for inviting me. I see a number of friends in the participant list, but -- so welcome to old friends and new friends.

ComReg is the telecommunications regulator in Ireland but, of course, we have a ministry that is responsible for regulations.

So I will give some insights from both sides. Next slide, please.

So I will start off by talking about spectrum and this shows some chronological order of some awards but I will maybe talk about some bands. So first of all, we'll talk about the 3.6 gig band, which you can see we assigned in 2017. Ireland was, in fact, the first EU Member States to assign this band. We -- I think that was more kind of accident of history that the previous use licenses that -- the users of the bands, their licenses expired in 2016. So it was convenient for us to assign early. And, in fact, doing, this it was before 3.6 was a band.

We foresaw two quite different uses being made of the band. One was for fixed wireless access in rural areas. So Ireland has a big rural population. So rural broadband is very important, and, in fact, rural broadband was the previous use of the band. And then, of course, there was 5G, which we saw as being much more likely in the -- in cities.

Now, although the spectrum was awarded on a service and technology neutral basis, we wanted to design something that would facilitate both of those uses. We had regional lots. Some of which were urban lots and rural lots. And people could bid for either rural or -- or city lots or combination of both.

And what ended up was quite interesting. All three existing mobile network operators acquired spectrum, nationally, both urban and rurally. One the large of the rural broadband companies acquired just rural spectrum and the company called Dense Air, who I will talk about later on acquired primarily urban spectrum.

Then I will talk about 700, which was cleared from broadcasting at the beginning of this year, in February. And we -- I think we set a record for ourselves, if not a world record of then reassigning that spectrum within about six weeks of it being cleared from the -- vacated by the broadcasters. And that was on a temporary basis because of the COVID operators. The broadband were experiencing high levels of data usage. So we took all the spectrum -- most of the spectrum we had been planning for a long-term award, which as you can see on the slide is due to happen in early 2021, and we assigned that on a temporary basis for 100 Euros per operator.

What we found quite interesting was that at least

some of the operators in Ireland had fairly recently deployed base stations for 800 megahertz and 900 megahertz that allowed Dynamic Spectrum Sharing. And so they were very quickly able to use that spectrum for 4G at 700 megahertz. Of course, at the moment for 5G would have made very little difference because so few handsets or in the hands of users. So currently 700 is being used in Ireland for 4G coverage and capacity.

But we would expect when it's licensed on the longer term basis for the operators to start using it for 5G as well, but probably with the dynamic allocation of the -- of the rights between 4 and 5G. So that is -- that is what we are planning for, for next spring. The other thing I would say about the auction that's coming up is in terms of coverage obligations, we would have a voice coverage obligation of 98% of the population, and the data coverage obligation, which would, defined as being able to support 30 megabits per second at the cell edge, and over time, I think within five years, we will have a 95% coverage obligation. But there will -- even when those things are met, there will be a few black -- the possibility of black spots. We are also in discussion with various stakeholders in the government, about whether or not some further obligation might be imposed or some other measure might be taken to address black spots, but the ones we have proposed, we regard as precautionary. We think they are the -- it's a level of coverage that would be achieved through normal operation of competition, but we want to make sure that we protect ourselves against the possibility, that competition won't turn out to have the outcome that we expect.

And finally, just a word on 26 gigahertz. I think some of the commentators have -- they are assigned 26 gigahertz. I think I ought to confess that what we have done in 26 gigahertz we have taken a small part of the band and used it for block licenses for fixed links. So we haven't yet assigned 26 gigahertz on licensed terms that could be used for 5G. We are about to begin a study of how we might do this.

As our colleague from Cyprus said, there's no market demand for 26 gigahertz spectrum for 5G at the moment. We suspect that when we come to license it,

we may not necessarily license all or any of it potentially on a national basis. The industrial users of -- the industrial uses of 26 gigahertz in the manufacturing or in ports may well be private uses. So I think we will be quite open to new licensing models of 26 gig, and I would suggest to Frederic, that the observatory has the spectrum of assigned, it might be more meaningful to restrict that to 700 and 3.6 gigs because 26 is quite different.

So using the 3.6 gig spectrum, all three mobile operators have launched 5G. And I think it was typical of the -- of what we heard from Frederic, it's hundreds, not tens of base stations. It's by no means national coverage. It is focused on towns and cities. It's using existing cell sites, deploying 3.6 giga high sites and a third population is maybe covered.

ComReg, does individual in 3G and 2G and 4G, but not 5G. It's several months away.

>> VADYM KAPTUR: Jeremy, you are practically out of time.

>> JEREMY GODFREY: Okay. Dense Air, the new operator has been working on neutral host model for small cell deployments and if I can, just I think the last slide comes next.

Oh, no, two more slides. So just a 5G health concerns have been a big issue in Ireland as elsewhere. Maybe the tide is beginning to turn because of the 5G conspiracy theorists have gotten themselves a bad name by burning down masts and politicians are willing to push back against them.

The final slide. I just want to say that there are many, many other policy issues related to 5G deployments besides the spectrum issues and I want to give a little bit of a -- an advertisement for the BEREC 5G radar which ComReg has been involved in.

We have been looking at machine-to-machine numbering. And allowing those to be used extra territorially. We will do a study on how to promote three eSIMs and security is a big issue in Ireland.

In term of back haul issues, there's a national broad band plan, which will have a lot of states subsidized fiber into more rural areas. There are broadband offices in every local authority to help telecom's companies with deployment issues. We are reviewing fixed links in Ireland, how we license

those, which will also be an important part of back haul.

So I would say when it comes to thinking about 5G policies and regulatory issues, apart from the standards, there are, in fact, a lot of other issues wind chill have a very big impact on the development of the 5G and the 5G ecosystem. And I will put into the chat the link to the 5G BEREC radar. Some of those issues have to be addressed on an international basis, but others nationally.

With that, I will stop and say thank you very much.

>> VADYM KAPTUR: Okay. Thank you. Thank you very much for this presentation, and dear participants, please do not hesitate to raise your questions in the chat. So the next presentation will be delivered by Mr. Antonio Fernandez-Paniagua Diaz Flores, the Deputy Director of Radio Spectrum Planning and Management, the State Secretary of Telecommunications and Digital Infrastructure, Ministry of Economic Affairs and Digital Transformation of Spain. Antonio, the floor is yours.

>> ANTONIO FERNANDEZ-PANIAGUA DIAZ-FLORES: Yes. Thank you. Can you hear me now?

>> VADYM KAPTUR: Yes.

>> ANTONIO FERNANDEZ-PANIAGUA DIAZ-FLORES: Yes. Good afternoon, everybody. Thank you very much for inviting us to participate in these ITU Regional Forum for Europe 5G strategies, policies and implementations.

5G is key to the transformation of the economy in the next era. Big data, and high definitions and the telecommunication networks and on a whole 5G platform, and the ecosystem must be created through innovation and entrepreneurship.

Next slide, please.

And this slide just stresses that broad band activity has been one of the important priorities of European Union. And now we have the digital strategy and now the communications of digital future, in February. The European Union strategies, priorities in the digital field.

Next slide, please.

We see that the technology context, we are moving. We find that there are 5G launch plans in all

technology leading nationals in Europe around the world. And, of course, 5G is the digital future of Europe.

We will look to the telecommunications network. We have LTE availability for more than 99% of the population. And with 63.5 million new generation access installed. 52.8 million of which are off the fiber, with the way the European fiber network.

At the end, in Spain, we have 30 million of fixed broadband subscribers, most of them, with more than 100 megabits per second.

This slide was also presented by Mr. Pujol. According to the 5G indicators in Europe, Spain is one of the top ten countries in terms of 5G trials. It's a country of EU with more than 5G enabled cities and one of the second countries that has published the national roadmap, including a spectrum strategy.

Next slide, please.

Next slide, please.

Despite the 5G national plan, 2018-2020 was developed with the objective of introducing a number of regulatory and innovations with making most of 5G, the 5G national plan aims to place Spain in the most advanced countries in developing digital technology so that by the time 5G reaches the technological maturity, Spain may be ready to benefit from all the advantages that 5G that will offer to the country.

First with respect to management and planning, which include actions aimed at securing the availability of the necessity frequency band for the availability of communication services over 5G networks, within the relevant timelines. Second, driving 5G technology, including pilot projects and the development activities. The pilot project promoted by the administration to experiment with the new technology with a view to developing 5G ecosystems and ensuring a required 5G services in the future and to identify business models.

And to develop the legal instruments in addition to those applied to Spectrum Management and fourth area, planned coordination and international cooperation.

Next slide, please.

Here you have the 5G national plan key actions. In 2017, the national plan was developed on the basis

of the 51% of stakeholders during 2018, different activities were carried out. We made the option of the broad band. We approved 700 megahertz band roadmap.

During 2019-2020, the deployment of pilot projects and use cases started. The process release the second digital dividend was carried out. We complete this process at the end of this no, just in a few days and more commercial deployments of 5G.

Next slide, please.

In this next slide, you can see the 5G commercial deployment by operators just now by October of 2020. In June of 2020, when in Spain launched the commercial 5G services, in the five figure band, and we now offer services in total of 21 cities and in September of 2020, Telefonica and Masmovil have launched their commercial 5G services. Telefonica is not the only 5G networks and they are also in the 3.5 gigahertz band.

Right now they are offering services in all of their capitals in the Spanish provinces. The objective of Telefonica is to have 15 -- no, 75% of the population covered by -- by the end of this year 2020.

Spain also launched the 5G services and are now in Spain and offered in these 5G services.

Next slide, please.

Next one. The digital national plan. We have the option of the digital Spain 2025 agenda. Digital Spain 2025 agenda proposes cross-cutting objectives closely aligned with the sustainable development goals and the 2030 Agenda. Digital Spain 2025 contains a collection of measures and investments organized our own strategies that you can see in this slide, that are aligned with the digital policies defined by the European Commission for the new period.

The first of these ten axis. The next slide, please.

It's produced on ensuring digital connectivity for 100% of the population. There's a goal to 2025 to have 100% of the population with coverage of 100 megabit per second.

It's important to obtain the instruments that we have available in order to extend the domestic connectivity in the cross-border infrastructure we provide high quality global connectivity. This

digital connectivity plan will have four main objectives that you can see in this slide.

Next one, please.

>> VADYM KAPTUR: Antonio, you are very close to the end of the time frame.

>> ANTONIO FERNANDEZ-PANIAGUA DIAZ-FLORES: Okay. Just very quickly.

The second one and this is -- the second axis is promoting 5G technology. And the digital national plan with 5G, we have followed up and the new 5G strategic plan includes a lot of measures that will help the deployment, the rollout of 5G Spain, with the goal for 2025 to have 100% for 5G. This plan digital plan has three specific objectives. Next one, please.

There are a number of specific measures that will be completed in the 5G technology that has now been prepared and, of course, these 5G establishments that we are now working on, that will include all the necessary measures to -- to pursue 5G Digital Spain can be successful.

Thank you.

>> VADYM KAPTUR: Thank you for this presentation. So the next speaker is Mr. Darius Stravinskas, Advisor to the Minister, Ministry of Transport and Communications of the Republic of Lithuania. Darius, the floor is yours.

>> DARIUS STRAVINSKAS: Okay. Hello, everyone. Do you hear me?

>> VADYM KAPTUR: Yes.

>> DARIUS STRAVINSKAS: Perfect.

Okay. I would like to start my slides. Could you give me a control or will you start my slides?

>> I think you have the control now. Check, it please.

>> DARIUS STRAVINSKAS: Yes. So thank you for the opportunity to present the national strategy of 5G of Lithuania. As I was introduced, I'm Darius Stravinskas, the Ministry of Transport and Communication of Lithuania.

And last year, ministry has initiated and formed a task force of more than 20 experts and stakeholders from public and private stakeholders which included the representatives from ministries. The task force defined and included 20 actions in the strategy, which was approved by the Lithuania government last June.

The first issue we faced in the task force was ten times lower EMF exposure than in other Member States or recommended by the EU. So we started working on that issue and we have already successful change regulation, according to Europe recommendations. And all necessary information is being and will be provided for society about EMF exposure related to 5G deployment.

As frequency bands is a key element for 5G successful deployment, so 700 megahertz and 3.5 gigahertz frequency bands are going to be assigned at the end of this year in Lithuania and public consultations will be initiated for 26 gigahertz frequency bands as well.

To build a new 5G transmission towers special areas will be included in general plan in Lithuania.

The legal regulation will be simplified to installation of 5G infrastructure in public places and objects followed by state and municipalities. That means inside the buildings on the roofs and other engineering structures.

New regulation will allow M & Os free of charge, to access state owned physical infrastructure, like streetlights, bus stops and all other infrastructure, which is technically suitable for the installation of the small cells.

Those commercial 5G services will be available in train and airport and bus and rail stations. With no delay in the 5G commercial service deployment. There's possibilities for M & Os to install easily communication networks near the road, lanes, in the bridges and the panels, as well to access the railway infrastructure on equal and current conditions.

With the new regulation in place 5G commercial services will cover all main roads and railways in 2025. We have already agreed that Rail Baltica is the main 5G cross border corridors in the region. Together with Baltic States and Poland, we have already signed a memorandum of understanding to have a correspond body for 5G cross border coordination. For that reason, Lithuania has allocated a budget for investment in which the 5G coverage of the Via/Rail Baltica until 2025. And they are going to be fully covered with 5G commercial services still in 2025.

To meet the goals of 5G, Lithuania has

installation projects in rural areas, covered white spots where no connectivity exists. More than 60% of Lithuania territory will be covered and more than 96% of households will have access to high capacity broadband connectivity after 2023.

All this network infrastructure will be used for 5G connectivity as well.

Therefore, Lithuania seeks to have one largest city covered with commercial 5G services till 2022 and five largest cities till 2023 with 98% of households covered in the cities and 95% in towns, with not less than 100 megabits of connectivity for each household.

Highways and roads coverage with 50 megabits and sea and airports with 30 megabits.

Pane and last but not least, network infrastructure sharing should be shared and accessible for all 5G service providers. That 5G could be deployed very fast and in an efficient way.

Lithuania is the not first country where commercial 5G services started, but with the national 5G strategy, I just introduced Lithuania will be one of the leading countries which will have the best 5G coverage till 2025. And with that said, I would love to answer your questions about the national 5G strategy of Lithuania.

Thank you.

>> VADYM KAPTUR: Thank you very much, Darius, for this excellent and interesting presentation, and for -- as I said earlier, you can use the chat to ask any questions about the presentation delivered.

So the next speaker is Mr. Ioannis Neokosmidis, he's CEO of INCITES and it's delivered on behalf of the Department of Media, Telecommunications and Digital Policies of the Ministry of the State of Luxembourg. Ioannis. You have the floor.

>> IOANNIS NEOKOSMIDIS: Hello? I can present?

>> VADYM KAPTUR: Yes, you are not the last.

>> IOANNIS NEOKOSMIDIS: Okay. Thank you very much, I am present you the Luxembourg's national 5G strategy implementation.

I represent INCITES consulting which is a consulting company in Luxembourg and is a consultant of the government for the let's say the last three 5G-related project.

They set up the 5G strategy system. The next

slide.

A few words about the history between 5G in Luxembourg in 2018, we drafted the 5G strategy and then in 2019, we call for 5G pilot project was announced. And in 2020, the auction has been performed. The licenses were awarded for 700 megahertz and 3.6 megahertz. And four players won.

5G services is lit on by Post and Proximus in the next month. Wireless consultation on the 26 gigahertz auction will start very soon. In 2020 and 2021, 5G implementations will start.

While after the 5G-related ecosystem, let's say project, which is now running, in 2021, we hope to set up the national and pan-European ecosystem around 5G. Next slide, please.

Next one.

Regarding the 5G strategy, we -- back in 2018, we performed, let's say, a number of interviews with stakeholders in order to understand the situation in Luxembourg and draft the 5G strategy. The government understood that there is no killer application as most of the governments and players have understood, and that only enhanced mobile broadband will be successful as well as some, let's say applications and services that cannot be achieved through previous generations.

Also new players are expected to enter the market. There are infrastructure owners and neutral host operators. They are also expected to play a significant role.

Next slide, please.

And these all are able due to the 5G business model and the 5G concept, allowing the slices under the one physical, let's say network, with different characteristics. Next slide, please.

Next slide. Thank you.

We have also performed 5G forecasting in order to understand the market and the economics and we found that at least 39% of the population can have 5G subscription by 2025.

I would also like to note that this is possible in Luxembourg because it's a quite rich country, and people can afford buying 5G-enabled devices.

Next slide, please.

Then the government has decided to provide

30 million Euros in order to co-fund pilot projects and we formed this analysis and found that the most relevant and interesting areas were the commercial, let's say center, at Kirchberg, the logistics center of CFL, the transport network, and the university campus, and automotive hub, where several companies like Goodyear are working.

In the framework of three-year period.

Next slide, please. Next one due to the time limit.

About the 5G deployment barriers. As most of the countries, the organization, certification and permits, and having the ability of electricity in the sites. And, of course, the radiation limits, and access to public infrastructure, and the skills in order to deploy the 5G network, the lack of skills.

Next slide, please. We came with a number of recommendations, facilitated timely availability of spectrum, provide incentives for investments in 5G, and process simplification that reduces the administrative complexity in due course, because in order to -- to grant an authorization there is a need for, let's say 100 page paperwork.

Another one is to alleviate public concerns, address any environmental considerations and increase the availability of sites with power and backhaul.

Next slide.

Next one.

Very quickly about the 5G call for project. The government launched in June 2019 the call for 5G pilot projects. 28 proposals have been submitted and 27 of them retained for grant negotiation and several topics sectors like electromagnetic field, agriculture, health, security, construction, media, et cetera. And in -- these are the next months, these projects will kick off.

Next one.

Thank you.

Very quickly, the objective is to test the provision of innovative and reliable services and gain experience with the 5G networks and optimize the 5G network with synergies and include the socioeconomic drivers such as schools and administrations.

Next one, please.

Of course, the 5G entrepreneurship and it

includes innovation and marketing competition and using technology that can be substituted and/or compliments to 5G. next one, please. About the scope of these projects, all participants should identify the operator and the network that will be used. The regulation will be between six and 24 months and the maximum of 80% of co-funding cannot be surpassed.

All the projects have been carefully evaluated by expert committee and the final review has been performed by interministerial 5G commission. Next one, please.

Very quickly, about the auction. Next one. Next one, please.

>> VADYM KAPTUR: You are very close to the end of time.

>> IOANNIS NEOKOSMIDIS: Yes, yes. As mentioned, before several consultations have been carried out. On July, the auction was performed for 3.6 gigahertz. And now we are in a public consultation for 26 gigahertz. Next one, please.

Some requirements and limitations as well as some coverage obligations are taken into account.

Next one because I would like to say a few words about the 5G ecosystem. The government has understood the importance of the 5G ecosystem for the success of 5G. So we are now running, and we have interviewed more than 50 stakeholders, operators, vendors, software houses, and entire companies related or not to 5G.

In order to understand the necessity of, let's say common platform in space, for the different stakeholders to change the ideas and try to find solutions to common problems.

And of course, to try to make Luxembourg the 5G hub for European service offerings which is quite challenging, however, as mentioned in one of the previous presentations, one operator or one vendor cannot be deployed in 5G network and there is a need for the 5G ecosystem.

So the government -- next slide, please, would like to, let's say, institutionalize this effort, and investigate if it's possible to set up a new entity or an agency that will coordinate this effort. And the role of the government will be the promoter and the facilitator for deployment of 5G networks.

Thank you very much. I hope that I was on time.

>> VADYM KAPTUR: Thank you, Ioannis. Your colleagues, we should start the next session for delivering the two next presentations. So the next will be Vilem Vesely, with the Czech Republic. Vilem, the floor is yours.

>> VILEM VESELY: Okay. Good afternoon, everyone. And thanks a lot for the invitation and it's great to participate here.

So I will try to be as brief as possible because much has been said previously today, and very much is in the presentation itself. So I will try to focus on further details. Next slide, please.

Yes, this one is just very, very brief and technical. So we can stipulate this one. Next one, please.

Yep. This is to show that the national strategy fits in a broader context and broader frame in the Czech administration and Czech policy making. If we move to the next slide, it shows more or less the same, but here you can better see that the 5G strategy is a part of the whole framework of national strategies for particular areas falling under a umbrella of Digital Czechia which is the digital strategy for the Czech Republic.

The next slide, please.

Yes, it's just to summarize the basic opportunities and what's coming out of it when we talk about 5G. So it's advanced mobile high-speed networks. It's highly reliable communication with low latency and so on which affects an RVU and expressed by many others, mainly the industrial enterprises. So transport, IoT, healthcare and so on and so on. We try to focus on smart cities, smart regions and smart homes projects here in Czechia.

Next slide, please.

Well, the document I wanted to present is basically a strategic vision on 5G networks, on their implementation and development, and it was approved this January by Czech government. Next slide, please.

Yeah. Here I will just try to briefly summarize what is in the document.

The aim is to define the strategic approach to the deployment and use of 5G networks. To promote the new opportunities for the industry, to engage the

professional public, local governments and academia together and raise the smart city and smart region concepts to a higher level of competition in the market for services provided through 5G networks.

In order to achieve the best conditions for end users.

The document doesn't deal only -- just with definitions and so on and their prerequisite and use of the 5G networks. The opportunities to finance some of the activities, as well as the support for testing such as the security of 5G networks which is one of the very important parts of the whole game. It doesn't stress the optical networks because that's in another part of the gnat national strategy which is the national plan for the development of very high capacity networks.

But we think mainly that without the close cooperation of the state administration with various market players, from business, which is the main implementer of the transition to 5G networks and services, to cities and villages, academia, and consumer representatives would be -- that nothing would be positive. It would not be possible to fulfill the general plan of 5G. So stuck just a little bit with this one. Can we move to the next slide, please.

Yes, here we can see basically the implementing steps that are, again, very much like in other countries that are presented earlier today. So the next slide, please.

As mentioned, smart cities, supportive testing, basically it repeats itself, but that's because the document is quite comprehensive and brings the -- all the issues together. I would highlight the smart cities and the 5G ready municipality initiative in Czechia. It's -- it is something that is important and I will come back to it slightly later with the 5G for 5 cities.

The next slide, please.

The main milestones. The last year, it was basically preparations. This year, five smart cities were selected for the testing of the 5G networks. The 700 megahertz band, together with 2.6 gigahertz, the auction is about to start by the end of this year the process has started. September and October, we have

called for more inputs and it's going to start early November, I would say.

And the gigahertz band should be band and the national plan for very high capacity networks.

And on the next slide.

>> VADYM KAPTUR: You are close to the end of the time frame.

>> VILEM VESELY: Sure. Sure. So you see the coverage plan for '25, for the years '25 and 2030, where basically, 99% of residents and 90% of area should be covered in every Czech district.

The next slide, please.

Great. This just summarizes the 5G for five cities. You see the cities that were selected, named on the -- on the slide, but the main thing is that the applications which should be tested should focus on quality of life improvements for residents and boosting the town's attractiveness for entrepreneurship and trade and ensuring data accessibility.

The next slide. This is one important point. In August, there was a 5G alliance established in Czechia. It has some key areas named here, but it brings together many stakeholders from around Czechia to discuss things over and work together, concerning also the misinformation which is one of very -- very important and sharp topics and issues we have also in Czechia. So we need to work on it together.

The next slide, please. Yes, we can skip this up with. The next one. Cybersecurity being a very important part of the whole game. Just because of the reasons that were mentioned earlier today. You made it easy for me.

So the next one. The next slide, please.

Great.

Here I stopped just for a couple of seconds. We would like to thank very much Poland for their initiative. As has been said earlier today, we think we should coordinate at the EU level and this area and probably even on broader levels. So there was a letter prepared, addressing this -- these issues and it's going to be sent to the main European Commissioners who are involved in the consumer protection end and further activities.

So that's something very, very important, because the misinformation is a sharp edge, so to say. We

need to work together and not nationally but on an international level.

So the next slide, please. Here. I summarized the main links for your convenience. You can see them. Some of them are only in Czech, I'm sorry for that, but I think you can have them translated automatically and just to orient what to -- in what is happening in Czechia.

One more important thing in terms of cooperation is to thank Germany and Bavaria, in particular, because this is a project of 5G corridor between Prague and Munich and that's something that we are quite active and I would like to pinpoint a very good cooperation between our parts. So just to show that there are some -- some projects where we participate in our part of Europe and would like to share the best practice even afterwards when it comes to any endings or targets.

And the last slide is just my contact. Feel free to use it whenever you feel like contacting me. Thank you very much for the time.

>> VADYM KAPTUR: Thank you. Dear colleagues, we are moving to the last but not least presentation for this session. So I'm giving the floor to Mr. Wolfgang Crasemann, who is the head of division international digital and postal policy, G3 and G20, federal ministry for economic affairs and energy Germany. Wolfgang, the floor is yours.

>> WOLFGANG CRASEMANN: Thank you very much, and good afternoon. I'm now the last speaker and I was the first speaker talking about the European strategies. And therefore, I would like to change my presentation a bit, and please could you go to the slides 5G spectrum auction, because time is running out and also, I would like, as I'm the last speaker, maybe wrap up a bit what we have heard this morning, or this afternoon. Only two points which I think are remarkable.

Please, would you maybe go to the 5G spectrum auction in 2019. We skipped this. We don't have time. There are more general things about our strategy. Yes, this one.

This one I think shows you where we stand and Germany right now, we had in 2019, the 5G spectrum auction and the interesting point is we learned. The

first auction was quite generous. Now, we are not so generous anymore and that means our four telecom companies had to make a lot of coverage obligations. So to make you are sure that 98% of all of our households have download speed of at least 100 megabits per second, that means in 2022, I think all -- nearly all households have -- have let's say the basic 5G availability and also, it's important that all roads are connected and the telecom operators have to install 1,000 new 5G base stations by the end of 2022.

Well, the bidders are the four large telecom companies in country, Deutsche Telecom, Telefonica and Vodafone, and Drillisch. That's interesting compared to France. I think in France, the auction was cheaper. And then it was said earlier. The telecom companies have more money available for investment. That's, I think, a good strategy, although we have a little bit of different strategy. We collect as much money as possible but then we invest this money into schools and municipalities. Maybe it's interesting to compare these two different strategies.

Please next slide.

Well, here you see how far we are now in 2020. You see all large telecom providers. They did a lot of installing base stations and Telekom, they say they will reach 80% of the population by 2020.

The next slide, please. We have now a lot of challenges in particular the rural areas. We need more 700 to 900 megahertz band and now some satellite solutions to be checked out. We heard it also this morning, and let's say you, there's one interesting example. It's cooperation between Deutsche Telekom and the British start-up Stratuferic and they fly drones and they think they can cover all rural areas in 4G -- in 4G actually. I think it is a good example of how innovation is happening and how different possibilities are to be checked to really cover the whole area.

Well, then also the German government provided more support programs, and we will spend 1.1 billion Euros for the construction of 5,000 towers that we have hopefully by 2022, and all area is covered.

However, all of this is not enough, because that is, let's say the basic 5G network, but what is needed

in the end, the 5G so-called standalone solution, that means we need a 5G fiber backhauling which means we need a lot of fiber cable connect the different large antennas to have a core network -- a 5G network, just to make more data available.

And then when you look at the end user devices, maybe you just heard that Apple introduced the new 12 generation. That means only now mobile companies -- mobile phone providers introduce mobiles on the market can really use the 5G networks. Then they also have the security demands I told you this morning. We have a strategy not to exclude any rural companies but there are strict security demands to make sure that the network is really resilient.

Well, then I come to the last slide, what I would like to offer here. It's maybe an interesting aspect. We have a 5G campus networks which means they are networks and different location. It could be business campus, start-up centers, individual companies, radio stations, stadiums, wherever you can think about, this morning we heard the case of the end map and harbor and these are all locations where it's possible to have many more devices or robots commuting with each other and then these networks function independently from the large telecom providers and there you can test out new solutions, for example, to reduce latency is or to go into high advanced applications and have more reliable standards and in particular, can have like large industries. You can -- so-called small factory concept. You can be -- you can have these small factories where you have thousands, many millions of different devices communicated to each other.

Well, that's the end of my slides. I wanted to prepare you, but I think it's maybe interesting and hopefully most of you have listened to all speakers in the morning and this afternoon on what is going on in Europe. I think we all make a great effort and telecommunication companies, policymakers and so on. Therefore, we could be very optimistic for the future to cope with the other large economic areas. And let me say, I think there are three points which are, in particular, remarkable.

First of all, it's international cooperation. We heard of the Baltics from the Nordic Council, the

great cooperation there and just the speaker from Czech Republic, spoke of our cooperation. I think it could be done more often.

The second thing, I think it's learning from each other. I think the slides were interesting and I will try to -- and I will -- I will share the slides with my technical colleagues. And we can learn from each other, much more than maybe our days. I think it would be interesting to know -- to study -- the study is already on the way, to compare the different strategies how do we approach this topic and how we proceed in installing a good and 5G network all over Europe.

All right. Thank you very much for your attention and I wish you good luck for the future, in particular in this time we also have to mention to stay healthy.

Thank you.

>> VADYM KAPTUR: Thank you very much, Wolfgang for your excellent presentation. And with this want to thank will panelists, who have presented their interesting overview of the situation with the national 5G strategies in European countries.

So with this I want to close the session 2 of our event, and to -- to give the floor to the moderator the next session, Mr. Jaroslav Ponder. The session 3 of national 5G strategies and policies in non-European countries.

>> JAROSLAW PONDER: Thank you very much, Mr. Kaptur. Thank you very much for the great moderation and all the speakers. We are very happy that you are with us. And we are creating the link between the region and also work with the Study Groups, focusing on the best practices. And so today is really a great demonstration of what is happening across the European countries.

Thank you very much one more time.

Now, ladies and gentlemen, let's move to the next session, and session 3 on the national 5G strategies in non-EU countries. We have already seen the subregional trends, including this what is happening in the 17 non-EU countries. Today, we are very much graced by the seven representatives of non-EU countries and different states and also aiming at the EU and those not having this plan, however, they have

very strong commitments towards the 5G implementation.

So before we are starting, I would like to invite Inga Popovici, the chair of the eastern partnership network to make the introductory remarks and we would move to the status of the presentation, which would be kicked off by the intervention of Her Excellency Assistant Minister of the Republic of Serbia.

But before doing so, let me invite Inga Popovici and make the first intervention.

Inga, the floor is yours.

>> INGA POPOVICI: Thank you. Thank you very much, Jaroslaw. I would ask Evgeniia to share the slides I have prepared for this short introduction.

First of all, let me briefly introduce myself, I'm Inga Popovici. I'm responsible for broad band development in Eastern Partnership Region. It was presented earlier by Carlos from the electronic communications of Poland, in his capacity as of chair of the EaPeReg. It consists of not only of regulators of six partner countries but also of EU Member States. I work for the Romanian regulator on Com and also for Western Balkan countries.

At this meetings, we have colleagues of awful three areas are present and on their behalf, I would like to thank ITU for this invitation. We have been waiting for this event since it was first announced for February of this year in Russia. Of course, we would have preferred a face-to-face event to discuss about 5G challenges.

Nevertheless, we are here in this virtual environment, and we are very lucky to have the possibility to connect, and to have a good connection.

At the same time, we represented administrations, organizations responsible for taking actions in order to ensure connectivity for all, especially in this pandemic year that has been a great revealer for the importance of digital inclusion.

I would like to say that I am honored to have been given the floor before the panel that brings together representatives from different countries with different experiences, starting from the UK, the first adopting 5G in the region and Georgia, they are a member that has been taking fast steps to ensure innovative solutions in the country.

Today, I'm representing EaPeReg, I will list some

things that have been taken by our network.

I must say that 5G has not been set out as a strategic priority in EaPeReg, at least not yet. We have nevertheless, analyzed it in context of our work. So first of all, what I have included in the first bullet in the slide, we reviewed the current regulations, possibility and obstacles in the eastern partnership countries, related to 5G implementation.

So in cooperation with the World Bank Group, a report only go -- and regulatory roadmap has been issued and in report has a dedicated plan for 5G. And we observed that 700 megahertz in the Balkans, eastern countries was not free for 5G implementation and in order to overcome this obstacles, in cooperation with the technical experts facilitated by European Commission, the experts have elaborated roadmaps for freeing up the assignment of 700 megahertz band.

This document is already finished. The all the experts of the Working Group level and now it is on the table of the policymakers of the EaPeReg countries.

What is important to say about these roadmaps is that they include the current use of 700 megahertz frequency band. Also, they list the stakeholders that are responsible for coordination assignment and management of radio frequencies and also references to the international order nation and interference risk from the neighboring countries.

About spectrum regional agreement, Carl has spoken in his intervention. I would want to add that this document was entirely elaborated by the expert of Working Group of EaPeReg, that coordinates this thematic without any technical assistance and support so EaPeReg is really proud of the outcome, and it should be designed by the countries to ensure in the region a coordinated usage of networked based on European Commission recommendations and the CPTs.

During our work and mainly this year, we have conducted several workshops so one of the workshop was held on 5G auction. As it was presented earlier, not all countries are ready to conduct this exercise in the near future. However, the countries that are very interested to keep the pace with the EU Member States countries. Therefore, we have organized this auction and analyzed the experiences of countries who have

already conducted auction, among them, Austria, Germany, Hungary and Ireland.

A very sensitive and at this moment difficult matter regarding 5G rollout in the non-EU region is the EEMF exposure limits. We also have heard earlier today that there are countries, and the EAP countries in which the EMF reference level is much lower than most EU and therefore, it makes very difficult and very restrictive work for 5G rollout. So we organized a workshop a few weeks ago and together with the E U. Member States and the representatives and the EAP, we have analyzed different countries' situation on this matter and if I ask your support to present the next slide, you will see -- you will see basically the countries that have analyzed the situation and also studies that present that this should be adjusted in order to facilitate 5G, 5G rollout because otherwise some difficulties may occur.

Coming back to the previous slides, we have identified some steps forward, and one of it is organization of workshop, hopefully in cooperation with the European Commission, and AN IS ax. We hope to have a secure 5G networks and also the same is in the near future to identify some means to formulate, to elaborate guidelines for European and electronic code and implementation in this region. Because this document aims to stimulate investments and also sets new spectrum rules for mobile connectivity and 5G.

At the end of this short intro, I would like to echo with the panelists from the previous sessions and say that regional strategies are, indeed needed, as well as cooperation and the coordination for successful implementation of 5G. I'm very sure that the discussion will be very beautiful. Jaroslaw.

>> JAROSLAW PONDER: Thank you very much, Inga, for the highlights. They are very interesting developments. Also in terms of the impacted generated at the country level and the regional as well. And now dear ladies and gentlemen, it's our great pleasure to start the status of the presentation. This will be co-moderated Julian, who you very well know. Julian comes from the Europe office. And it's my great pleasure and honor to invite as the first speaker Her Excellency, Irini Reljin, the Assistant Minister of Electronic Communications of Serbia to provide first

intervention.

>> IRINI RELJIN: So at the beginning, greetings from Serbia.

I will give you the most important data about the strategy of 5G development in the Republic of Serbia.

Next slide, please.

Next slide, please.

Oh, I have to do my own. So I will tell you a little bit about the mobile electronic communications market, and the strategy for new generation networks, and the 5G spectrum issues and the study on EM radiation regarding 5G.

Next slide, please.

If we speak about the mobile penetration, we should say we have 121% of penetration, in fact, and we have three mobile operators, one is Telekom Serbia which has more than 50% state owns. And then we have Telenor Serbia which is a famous European operator. And now it's owned by the funds, the Czech funds as I suppose you already know and we have VIP Mobile which is a part of Austrian mobile group. And so all operators are working within their groups and region.

All of them, all three are working the same way.

Additionally, we have two virtual mobile operators please, next slide, please.

We have the DSM structure. I think we have missed or avoided one of the slides with the text.

Yes. The strategy for development of the until 2023 has been adopted in 2018, and we have vast analysis of infrastructure and services in different areas. And as well, we will have the main goal to have the infrastructure for digital single market.

The strategy considers conditions for effective expansion of three most important technology, which are cloud computing, and Internet of things and 5G. So next slide, please.

The structure of the digital simple market, you can see here. And most important here in red are three technologies, and all of them are working towards the digital transformation of networks, and so the 56G networks, together with the IoT and the cloud computing and also supported by artificial intelligence will go to introducing the transformation of industry we believe it will be very successful. Please, next slide. Thank you. We adopted the basis

of development of initial networks for testing the new technologies, which are very necessary for our goals within the strategy. So it has been adopted in 2019, and according to it, we have -- we have the first base station of the initial network -- the 5G network, it's been issued by the regulatory issue and the base station worked in the most important, I would say frequency band which is 3.4 and 3.8 gigahertz. It was -- we devoted 100 megahertz for that I would say trial and it was also supported by the LTE, as it was not standalone equipment. Next slide, please.

Well, if we are going from 5% radio frequency spectrum, which is something that was common for all the countries and now we have a new one, 17.25 gigahertz allocated to 5G technologies. Also in the meantime we have digital dividends. We also have were very successful with the first one, with 800 megahertz band. We have devoted it to mobile operators and we have networks from 2016 up until now. The next digital dividend two, is not devoted and it is not allocated to anyone.

After the world radio conference last year, we have to -- the new issue -- we issued the new bylaws and I would say that before that, Serbia has preserved 700 megahertz band which has been almost free from 2015 up until now and 3.4 or 3.8 gigahertz, which is not assigned. We have devoted it for mobile operators. After that, we have allocated the spectrum, the next spectrum for 5G and it has been adopted this year so we have the new allocations we have confirmed the 700 megahertz band and for 2020 purposes the 3.4, or 3.8 gigahertz band was already allocated for the EMF test and now we have split that part of spectrum. The first part first 100 megahertz is reserved for the projects that we will test new technologies and these trials could last for the next three years. At the end of the 2023, it has to be freed and allocated and assigned to different operators.

The 300 megahertz band in that bandwidth will be subject of next option in Serbia and we hope that next year, we will have this auction.

Please, next slide.

We have adopted bylaws and the new spectrum and assign plans for the 2500 gigahertz, to 2.69

gigahertz, and it will be devoted -- are also devoted by the allocation plan for 5G technologies and these assignment bylaws for the spectrum assignment has been prepared for our regulatory agency, and both of them have been adopted it was done two days ago and so we have a very -- a very new bylaws. If we are talking about the issues that are very important for introducing the 5G in general in mobile networks, we have to point out that ministry in cooperation with organization for security and cooperation in Europe have organized workshops intended for local government representatives on the territory of Serbia. We have three of them and the response of our colleagues from our cities were very good and we are planning to do that in the next year also, but these new workshops will be organized as virtual workshops.

The workshops highlighted the importance of new technologies in the industry. And I would say representatives from ministry, RATEL, our regulatory agency and academics introduced the relevant data and challenges related to the setting up of base stations.

And also, we were talking a lot about the limits of exposure levels of electromagnetic radiation produced by mobile systems.

It's very important for us to point out that we had to do this as we have as many countries in the world, I would say, especially in Europe, we have a lot of opponents regarding the mobile networks and now we are trying to aware the citizens that this is technology that could bring only the success and not the very and not any problem with health and biodiversity.

So next slide, please.

Organization for security and cooperation in Europe initiates a study that covers major aspects of the introduction of the 5G, and this study is going to be finished, I think before the auction and it will be on our portal explaining the regular citizens everything regarding the electromagnetic radiation.

The study's aimed not only for experts as I told but it will give insight to public about main 5G performances as well as obstacles in developing the networks.

We believe the delay in introducing the 5G networks will not produce any problem with people and

many opponents throughout the world. Thank you. Next slide, please.

Auction plans such as I told you for the next year, 2021, and we believe the frequency of 3.4 and 3.8 gigahertz is going to be the object of the next auction.

We were talking about minimal requirements. We had a lot of conversations with our operators and the regulatory agencies and we believe the minimal requirements for the option and the bylaw that the ministry has already prepared, will take in account that the coverage should not be very -- that the coverage -- the coverage should not be severe. We see that 5G is mostly industrial standards. So we believe that we have now like space division multiplex and we will use the spectrum for vertical operators on different aisles through the country.

Introduction of the IPv6 is the same as necessary for 5G, IoT, and artificial intelligence work.

We believe that the three main topics will give better results through their synergy.

So next slide, please.

We will say that common for development to cloud computing, IoT and 5G is the necessity for broadband infrastructure availability. Fortunately, our operators worked a lot on the availability of optical infrastructure. I think we have better results and also we have a lot of projects concerning the schools and connecting the schools through all the country. So we believe that these results will help us also as a support for 5G network.

I will stop here. Next slide, please.

Thank you for your attention and I will be very happy to give you any answer if you have questions. Thank you.

>> JAROSLAW PONDER: Great. Thank you very much, Her Excellency for a very expressive presentation and congratulations to all the successful implementations so far.

And this brings us to the other speakers. I encourage you to raise the questions in the chat box which can be directly answered in the chat room, but also which can be raised later on once the time permits. So now I would like to invite the next distinguished speaker, Mr. Andrei Gavrisi, with the

National Service for Radio Frequencies Management,
Ministry of Economy and Infrastructure Moldova. I
would ask Julian also for taking over the moderation.

So --

>> ANDREI GAVRISI: Good afternoon. I hope you
see and hear me well.

Sod I have the implementation of the 5G in the
Republic of Moldova. I would like to thank the
International Telecommunication Union and the
government of the Republic of Moldova of the speakers
presenting very interesting information, and now I
would like to the current situation regarding the
implementation of 5G in Moldova.

Next slide, please.

Well, what is the current situation? Next slide,
please because I think we know the advantages of
regional networks.

Well, the ministry of economy and infrastructure,
the Republic of Moldova, in partnership with the
experts from the ITU and the Korean Information
Society development institute is developing the
Spectrum Management program for the 2021-2025 period
which continues this Spectrum Management program for
the previously seven years which also was developed by
our ministry. Next slide, please. It's developed
simultaneously with the draft modification of the
national table of the frequency allocations of the
Republic of Moldova which reflects the changes in the
Radio Regulations, decided during WRC-19.

Overall, the program continues the harmonization
measures established in the previous program with the
common European practice, all technical requirements
and channel arrangements included in the program are
based on CEPT decisions and recommendations.

And at the moment, we have concluded the public
consultations on the modification in our NTFA, and the
approval is expected in the next year -- the next
month. Sorry.

Next slide, please.

What is the situation in Moldova? We have three
mobile network operators and at the moment, all of
these three operators have the nationwide coverage in
the different -- in different frequency bands. And at
the present, they use the frequency spectrum within
the bands 800, 900, 1800, 2100 and 26 municipality

megahertz.

Next slide, please.

Well, what was -- what were the preconditions for nut program? It was creating the legal framework for sustainable development of terrestrial mobile, electronic broadband communications and other types of communications for the next five years by continuing our previous program.

The need to harness the radio frequency, we need to continue the best applications with the reference to the implementation of European Union policy program in the field spectrum.

Ensuring the possibility of implementing broad wand communication systems which offers to its citizens and industries, the competitive advantages necessary for development in favorable environment.

Next slide, please.

The program is to ensure continuous development of the electronic communications industry, information technology and communications sector in Moldova. In mar, public broad band mobile electronic communications network and services, according to market requirements and providing of radio spectrum resources necessary for the continuous development of terrestrial mobile broadband networks.

Next slide, please.

The main focus of the -- this program is on the frequency bands identified for the IMT in the ITU regulations, particularly designated for the Europe or early 5G implementations. Targeted bands are the following: 700 megahertz band, 3600 megahertz band, 26 gigahertz band and also 1500 megahertz and 2300 megahertz.

The program also targets available spectrum are resources in the existing used bands which are 450 megahertz and 900 and 2100 and 26 megahertz bands.

Next slide, please.

The okay. Just a second. The program is developed in the transparent manner in cooperation with the main stakeholders and all concerned parties are involved in the very early stage.

The program is in added drafting stage. Now it's on the public consultations page and the executive part is constructed in two stages. The first stage is for the first two years is more ordered for the

frequency bands to provide more flexibility and neutrality to offer the implementation of the Next Generation customer networks.

And the second stage last three years will have new pioneer events in the 5G implement I refer for the 700 megahertz, and 24 gigahertz.

And also 2024, we expect to perform reforming in the 21 megahertz band in order to provide for all three mobile network operators, their necessary bandwidth in order to implementation 5G network in the existing networks which have already have practically 99 coverage of the territory and the population of Moldova. Next slide, please.

What are the main tasks of the future policy? It's to conclude the activities for the release of the spectrum in the 700 megahertz band because we still have some broadcasting stations which are functioning within this band. Also creating the legal framework for organization of an objective and transparent and nondiscriminatory and proportionate auction process for the targeted spectrum resources.

Developing long-term spectrum policy and ensuring medium and long-term predictable of radio spectrum resources and maximizing the efficiency of the use of limit radio spectrum resources and stimulating the competition on the mobile electronic communications market.

Next slide, it triggers initiation and accompanied by related activity to have the 5G launch and aligning it to the research findings and the international recommendations on this subject. And also reviewing the secondary legislation pertaining access to properties and infrastructure sharing with the objective of creating more favorable conditions for the fast and efficient build out of modern dense cellular infrastructure.

Next slide, please.

And what are the expected outcomes for the next period within five years is ensuring efficient and the new applications and the business cases that 5G can deliver and increasing the capacity of existing networks.

Attracting new investments in the information and the communications technology sector on the national economy.

Next slide, please.

Increasing the turnover the companies in this sector. And increase in the state budget generated by the capitalization of the radio spectrum resources and in the market, the mobile electronic communication services.

Development of other sectors of the national economy as a result of modernization and continuous development of the radio communications infrastructure and the offer of mobile electronic broadband communication services. Increasing the broad band offerings to the community. And reducing the digital divide between rural and urban areas.

Also, creating new jobs and increasing the average wage of the ICT sector on the national level.

What are the objectives to is chief?

>> JULIAN McNEILL: Just to draw your attention that your time is running out. Thanks.

(Silence).

>> ANDREI GAVRISI: Regarding the sector from the process and managing the radio technical spectrum, efficient investments and radio communications infrastructure.

Technology neutrality and acceleration of implementation of new technologies and services. Efficient competition on the market broadband. Increased use of broadband Internet access services including the rural areas and substantively reduce the digital divide between urban and rural areas.

For your attention -- if you have any questions, I will be happy to respond to them in the chat. Thank you.

>> JULIAN McNEILL: Thank you very much, Mr. Gavrisi for the communication and keeping the time and providing an excellent overview of the situation in Moldova. So let me now turn to the next speaker, which is Mr. Boris Jevric, deputy executive director and head of radiocommunication department, at the agency for electronic communications and postal services, of Montenegro. Boris, the floor is yours.

>> BORIS JEVRIC: Thank you for the invitation to speak today on this session on behalf of the agency for electronic communications and postal services of Montenegro.

Please next slide.

During the presentation, I will present a short overview of mobile network, current status of initial 5G implementation, and our plans regarding 5G and, of course, our views regarding spectrum auction.

Next slide. We have three mobile networks in Montenegro at high level of development and with the latest technologies for a few of mobile operators that are part of with which is Deutsche Telekom, and Crnogorski Telekom, and we support the broadband data transmission services due to continuous need of the users to have higher data transmissions, speeds and mobile operators in Montenegro continuously improve their network in order to meet the growing needs of the community, thus keeping the pace with technological abilities of the users.

All three mobile networks in Montenegro are based on harmonized on second third and fourth generation as you can see on this slide.

The dominant technology UMS and that LTE.

Next slide, please.

Regarding population coverage, rate of mobile network signals, Montenegro is comfortable with the most developed European countries, namely coverage with the GSM is 98% and UMTS is 98%. And what makes Montenegro with very good coverage. Regarding the results of the coverage, predict, and it's approximately 97%, while the coverage with the signal of LE with minimum downlink. It's to approximately 96.7 population.

The penetration of mobile users in Montenegro is at the level of 175%. The 5G implementation is 700 megahertz and you can see at this slide, this band is free since the middle of 2017, and it can be used for 5G. Next slide, please.

From 2007, 3.4 and 3.8 gigahertz, there's success until today of 2022, and the whole band from 3.6 to 3.8 megahertz is free now. So usage for 5G is possible with any status. With the band 26 gigahertz is good. In the lower part of this band, of 24 to 25.5, apparently we have some links and with the agreement with the operators, it will be possible to migrate the links to the other demands when we understand the demand from the spectrum, the spectrum from we indicate that this part is possible for 5G now.

Next slide, please.

Something about our plans for AG, most important is that the regulatory framework for spectrum will be completed until the end of this year. I would like to stress that our government conducted a new national frequency allocation plan, which is fully in compliance with the decisions of WRC-19 and the least restrictive technical operations for the three bands will be conducted until the end of this year. And also very important for us is intensive and good cooperation and communication with national regulatory authority and the neighboring countries for the deadline for the bands 700 megahertz for the communications networks.

Next slide, please.

In the next three months, we will conduct public consultation with stakeholders on 5G and in parallel with the strategies for our need we will finish the document strategy for implementation of 5G mobile networks in Montenegro.

Before two days we sign a contract and the contract which is the unit of University of Montenegro has obligations to prepare and submit to our agency the study in the period of the next four months.

Due to very high interest and concern of Montenegro, for the next year, we are planning to prepare the guidelines for authorization of 5G stations from the aspects of electromagnetic radiation.

Next slide, please.

The structure for implementation of 5G in Montenegro will identify technological, regulatory security, spectral and structural challenges to the constraints and barriers to the deployment of the 5G infrastructure, and they will develop the guidelines by the end of 2022. We will have more than ten chapters and we expect it will be a very useful document for state and local administrations as well as the other stakeholders.

Next slide, please.

And at the end of my presentation, some words about our activities regarding the spectrum auction process which is planned for 2021. Until the end of this year, we will conduct consultations with mobile and other interested parties and a public tender for

consultancy service and auction software.

After that on the base of public consultation, those strategies and aims which we expect, we will prepare the information document for auction process. Our plan is to organize the auction in Q3/Q4 of 202-1678 all of these are in the program for 2021.

Next slide, please. Open the auction process and the subject of auction, we will be creating bands. 700 megahertz band and 2.3 and 2.8 megahertz brand and 26 gigahertz band. We will get decisions regarding license duration and block size and auction format, the spectrum caps which are important for the options. The question about coverage requirements and do on. Please, next slide.

And conclusion for us in Montenegro is to make spectrum available for early implementation of 5G networks, in particular the 700 megahertz band as soon as possible, and no later than the end of June 2022.

This will depend also on the situation in neighboring countries and we have neighboring countries especially with Albania is very important for us. Especially regarding the interference from their side channels 51 and 59. Area other channels of the 53, 57, and 59, and we hope the interfering signals of Croatia will sold in the middle of 2022 working in accordance with the decision of EU and the European Parliament. Thank you for your attention and if you have any additional question, you can ask me through the chat and send email to me and my colleague. Thank you.

>> JULIAN McNEILL: Thank you for the presentation on this can country.

I would take the opportunity to indicate the cooperation with E KIP. We were not able to have the regulatory forum in September. It will be held in December virtually and we will draw your attention in the chat later to this event.

But now let me turn to the next speaker, which is Ms. Ketevan Rekhviashvili, who is the tech specialist at the Georgian National Communications Commission. So Ms. Rekhviashvili, the floor is yours.

>> KETEVAN REKHVIASHVILI: Can you hear me? First of all, greetings to everyone and thank you for this opportunity to present the steps and actions Georgia has taken towards 5G.

I will try to keep this short and in case any questions, I'm always ready to answer.

So the communications commission is the regulator for electronic communications and broadcasting in Georgia. And policymaker in electronic communications is the ministry of economy.

Last year, the government has adapted the national broadband development strategy, and, please, next slide.

Most of the targets, as you can see are basically the same as European targets and we aim to have 100 megabits connection for every household and coverage of 99% for the whole territory of Georgia.

As of 5G, we have a plan to have at least three municipalities covered specially, by 2025. Next slide, please.

Had.

And it's ironic the communications commission has addressed several aspects while addressing the 5G strategy and it's a spectrum availability, pricing, legal framework, obligations, cross-border coordination, and the auction processes.

Next one, please.

So as for the spectrum, we have freed up the whole 700 megahertz band. We have 3.4, 3.6 totally available. Only small portion of 3.6, 3.8 gigahertz is occupied but it's until 2025, and afterwards the whole band will be available. We plan to have auction by end of 2025, but unfortunately, pandemic has changed our plans a bit.

We have done the price calculations as well, and the reserve price for each 5G bands is already calculated. We used our time during pandemic and had public consultation on the strategy and the pricing as well. Next one, please.

And we are actively working on the cross-border coordination via the partnership platform and thank you for all the participants and the members for their active involvement. The document has been designed which discusses all the technical parameters, and it's created with the vision of creating 5G corridors as well. So hopefully, when the document is finally agreed and the parameters agreed, we will have the 5G corridors implied.

Next one, please.

We also have some barriers and some challenges on our way, and I would like to emphasize the legal parts of it. Unfortunately for the moment, our legislation does not give us the ability to choose between auction or beauty contest, so we have to go with the auction, and also we're not able to provide frequencies in a framework for test bed and testing purposes, but we have developed amendments to the law, and it's -- and in the ministry and in the parliament, and hopefully after our elections in October, we will be able to proceed with the amendments and they will be implemented. So we'll have already some pilot projects on our way.

As for the obligations, we going to include, as I mentioned, three municipalities will have to be covered. All the main roads, railways and airports will be covered, and also some additional regulations on EMF and infrastructure will be included.

Next one, please.

With all the plans and actions delivered on time, we will have our auction announced in the first half of 2021, and the frequencies which will be auctioned will be for the 700 megahertz, the part of 800 megahertz were left and 3.4, and 3.8 are available band.

Thank you very much. This was in short for the status update of Georgia, where we are for the 5G and also I will take my opportunity to thank our European colleagues who helped us within our twinning project and EBR-funded project to be this -- ahead of the game here. Thank you.

>> JULIAN McNEILL: Thank you very much for the excellent presentation providing really good snapshot on the situation in Georgia. So let me now turn to the next speaker, who is Mr. Mohammed Lari, led of cross-government and international coordination, 5G testbeds and trials program from the department for digital, culture media and sport of United Kingdom. Mr. Lari, the floor is yours.

>> MOHAMMAD LARI: Thank you, Chair and thank you to the various delegates who are participating today. I'm glad to go after Georgia, given the last name, which is the recurrency is' name.

Digital connectivity was once a nice to have and perhaps a luxury. It's now essential. It creates new

business opportunities and opens up new markets and supports our sort of varied interest in the -- in the ultra universe that we currently provide. The existing networks continue to hold up well in the UK, and the shift to remote working and remote education. And it's much less affected than other industries like transport.

We have accelerated our plans to ensure that they have excellent coverage and connectivity across the UK, whether that's in 4G geographic coverage and increasing to over 95% by the end of 2025 or when we look towards our strategy for 5G, we are looking to facilitate the transition that is a collaborative approach, using government, industry, and academia.

Next slide, please.

The approach was further detailed in the U K.'s 5G strategy that was published in early 2017, and that serves as a blueprint for how we are looking to support research and development, and deployment of 4G and 5G infrastructure. Part of it is also looking at strategic investments that government has made over that time period, and overall, if I actually calculate everything, it's over about 6 billion pounds that the UK government has invested to deploy fiber, to deploy 4G and to extend that sort of coverage for 5G.

When we look at 5G in particular, what we're finding is that the investment for research and development certainly stems from the interest and the propulsion from government. The UK's 5G testbed program launched in the later half 2019, and we continue to March of 2022. We are looking to the market to deploy as rapidly and efficiently as possible despite the uncertainty on value for money for the operators.

Next slide, please.

We want the UK to enjoy the benefits new 5G networks early. To do that, we are looking to build a business case for 5G, thinking about possibilities well beyond mobile connectivity. We wanted to foster and develop the 5G ecosystem, and working with our SDOs to help lead the research and development that allows for 5G technologies to actually appear in the market and while doing, that I think we are focusing on business cases to incentive suppliers and operators to connect the entire country. It's just as important

in the urban centers and the rural and remote regions.

Since the start of our program, we have now funded over 24 testbeds across the U.K. and between them they trialed over 80 different use cases, technologies and applications. In the UK, we have over 100 towns or about 600 sites connected to 5G networks by all four operators and that's reflective of the work and the commitment that we have done as part of government, but also the interest from industry.

Overall, our ambition for the UK government is to provide the majority of the population with a 5G by 2027. And it looks like we are well on our way to meeting that target.

We begin with the initial portfolio. This one. Perfect.

We begin with an initial portfolio of projects and you can see on the right and the left-hand side of our map what those investments look like, everything from agritech, to health and social care to looking at manufacturing, trains and transport networks.

And what we have done over the last sort of initial basis of our programs is hone in on which particular sectors we think there will be a government need to incentivize and also a sort of supplementary investment from industry.

This is looking in terms of consortium model to help develop the business case, working alongside SME, the small and medium enterprises and working alongside the large hardware suppliers and the vertical industries and you can't forget the local authorities that are part of equation.

Alongside our group in the test bed and trials are the barrier busting task force. They work collectively with the local authorities and one of our sort of projects in the urban community, the black -- I guess dots on the map, look at how do we actually remove the barriers to deployment? That's looking at planning, street works. That's looking at building new developments and encouraging them to focus on providing coverage to their inhabitants, as well as the use of street furniture assets, mapping the street furniture assets so we can work together with the operators to help to deploy mountain MIMO are the very large assets into the right areas in the local

authority.

Next slide, please.

As we look towards the sort of wide range of use cases, this is just an example of what the consortia looks like and on the left-hand side what the example of use cases that we trialed in one of our test beds. This consists of about 36 organizations, this particular one, 5G rural first, it includes large players that you were well aware of like Cisco and BT and more importantly this includes local SMEs, such as Zeetta networks and we are able to test the high-speed networks and be IoT, satellite connectivity, the whole lot of convergence in rural applications such as in the remote Orkney Islands and we have plugged in cameras in the salmon farms.

We employed new ways and models -- (Garbled audio) that are cost prohibitive for operators to traditionally operate but make it easier for us to intersect and reduce that cost for R&D, to actually drive that innovation to commercial basis.

Other use cases in this particular example include areas where we are able to splice the various spectrum, ensure that our learnings feed into of com, the UK regulator to formalize the regulations around how we can facilitate sharing of spectrum, especially in the rural areas where oftentimes it's not utilized to the greater potential.

Next slide, please.

The growing ecosystem of project partners and I have heard this from the presentations this morning, the growing ecosystem of project partners and other interested parties need a place where they can talk into. They need a place where they can have strategic discussions and -- (Garbled audio) we have UK 5G to do a lot of this work for us to help with the promotion of research, to help with the collaboration, and to identify industrial applications.

It is through this body that we are actually able to help collaborate the initiatives that we are funding, the initiatives that academia is funding and what we are funding. This makes electric I place for international customers to dock into and share some of the learnings from their trials and ours and promote best practices. For international businesses, this is an easy place to look at which UK partners, academia,

industry, otherwise to develop those commercial relationships with.

And it allows for easier access to the UK market.

Next slide, please.

Now, our work really isn't complete with the test beds, right? Some of the challenges have already been covered by a lot of our partners or a lot of our participants this morning, but we are talking about site acquisition and rent. The high cost of deploying RAN equipment, or the radio access network, the high cost of deploying fiber, the backhaul, whether it's satellite or fiber, whether it's fixed wireless access. The high cost of allocating spectrum, managing that spectrum and the operations that go with that in the networks.

So taking a step back and looking at the 4G apparatus behind the wheels, what we are looking to do in the UK is build that network for 4G, and then ensure that fiber reaches the corners of the UK geography. We are making it easier for network builder to access leasehold properties to allow for new homes and new buildings to actually have gigabit capable networks already embedded in their residents prior to tenants moving in and we are looking at massive infrastructure, beyond what BT currently owns and what the wider sort of public sphere on the other hands in terms of backs and poles, to make it easier. They committed 5 billion pounds to better provide connectivity to the rural communities so we can actually stand up 5G networks on those fiber lines.

Alongside that, what we are doing is that I think we all recognize on this call, that 5G will require a significant increase in the number of small radio cells deployed on street furniture, on the side of buildings, et cetera. And for that we are working with local authorities to repurpose and redevelop some of those planning regulations and enjoy that deployment meets the demand and the need for operators to access those facilities.

What we have also done is worked with all four of the main operators in the UK to get a memorandum in place, an agreement in place, to build a shared rural network to improve 4G coverage across the country where all four of the operators will share the assets both the physical assets, as well as the spectrum

assets, to eliminate the partial hotspots for each provider.

The industry is shifting to more of a cloud, more of a software environment with open RAN, allocation, usage of spectrum and the wider virtualization of network functions. The test beds and trials programs and our partners in industry and academia are looking to improve our understanding and to help accelerate our adoption. We are looking to drive down costs overall and where we need to, what we are doing is working alongside the technologies to enforce and to help regulate in terms of standards that the appropriate SDIs or the standard defining organizations.

Collectively, I think what we need are concrete examples and a common framework, energy management and security and I think those drivers that will help to get the operators on board of some of these new innovations.

I didn't cover spectrum on this round and the reason why, I have an Ofcom colleague joining the call tomorrow. But spectrum is widely available. We have one-year trial spectrum licenses in the U K. We have -- we have previously auctioned off 2.3, 3.4 to 3.6, and we have local licenses in place from 3.8 to 4-point, 2 and you can sort of rent them out for about 900 pounds on an annual basis. We have other spectrum allocated from 24 gigahertz for local licenses and we have an auction for the 700 megahertz and the 3.6 and 3.8.

And lastly, and the next slide, please. Lastly, I would like to just say thank you for joining me on this sort of whirlwind tour of the K.UK and I would be happy to answer questions. And I mentioned UK5G, if you want to follow what we are doing. We release a quarterly publication. Again, if you email me, I would be able to share more information.

Thank you again, Chair. Much appreciated.

>> JULIAN McNEILL: Mr. Lari, thank you for this presentation. I think it was very interesting on how from the public perspective you are building -- you are helping to build the business case. And this is something that tomorrow, we will see from the private sector perspective in session 4, but now let me turn to the last speaker of this session, last but not

least, and end of the day, Mr. Ramazan Yilmaz, head of technical regulations department, information and communication technologies of Turkey. Mr. Yilmaz, the floor is yours.

>> RAMAZAN YILMAZ: Can you hear me?

>> JULIAN McNEILL: Absolutely.

>> RAMAZAN YILMAZ: Thank you. As the moderator said, I'm the last speaker for today, and I have very limited time, I know. By the way, good afternoon and good evening for everyone.

I would like to welcome you all, first of all. I would like to thank International Telecommunication Union and the Republic of Poland for organizing and supporting this event. I hope it would be very fruitful for all of us.

Next slide, please.

Before, I would like to make presentation regarding the initiatives like 5G capabilities in Turkey, but before we have to know what the capabilities of 5G and mobile technologies are. As other speakers mentioned and as my dear colleague and my friend in the morning session explained, according to 5G standardization -- (No audio).

The remaining two are -- regarding the release, we have two standardized network topology. One is the not stand alone and the other one is the standalone and those two standardization efforts have been done during the 2017 and 2018. Compared to the 4G, the 5G, it gives us 100 times bigger capacity and coverage and much more energy efficiency as we all know, and two times spectrum efficiency and one to five second latency is and those parameters are requirements for intelligent transportation systems, as well as providing a platform for M2M and IoT devices and new kinds of services.

Next slide, please.

If you look at the numbers, as Mr. Ponder in the morning underlined the importance of the growing user demands for data, according to Cisco, the annual global IP traffic would reach nearly 5 Zettabytes and SmartPhone traffic would exceed PC traffics and two-thirds of all traffic will be wireless and mobile this year.

According to Ericsson and other statistics we have, there would be nearly 5 million 40 subscribers

globally and this number will exceed 1 billion as of 2025. So at the same time, 4G deployments would remain as we all know, because operators are making the investment on it and it means the operators would possibly deploy first non-stand alone 5G radio because they don't need to change. And then they might change their networks with optimum options, 5G options. As the global perspective if IT network would be 30% by 2025.

Next slide, please.

As was mentioned in the morning some people, it's good size in 5G with the killer applications but some other experts claim that 5G is a partnership and they think that there would be a lot of new use cases for other industries. I think also 5G is a platform that gives us a low latency and mid-submission and looking in the morning session, we mentioned about 5G and beyond technologies would change the business model from B2B and B2C, or some say business-to-business. Or business-to-customer and it would be enabling technology for other kinds of services. For all other vertical industries like education, health, energy, agriculture, transport, and we have a lot of use cases with vehicles, connected cars, et cetera. And I try to summarize that 5G would be a game changer for all industries.

The next slide, please.

And as the vertical sectors, as I said, it affects all the sectors and automotive companies, vendors and they establish new initiatives such as 5G automotive association. And so there would be a lot of new applications. Services and use cases we are going to see in the -- in the era in the industry. Let me give you some other examples. They mainly based on the smart mapping the electromagnetic level and so on and so forth. I'm going to -- I'm not going to read all of the applications as you can see in the screen. But we have an opportunity to implement other kind of applications in the industries.

Next one. So in terms of transportation system, I can say that it didn't start with 5G but it would grow the potential of international -- intelligent transportation system. Why? Because ITS is only efficient with low latency, and the only way we present these services deploying, is competing as we

all know, because it -- (No audio) can gives us --
(No audio).

As an example, the third person of energy usage, 20% of traffic delays and those are as I mentioned just examples. They facilitated the -- the next one, please.

When it comes to the spectrum issues, all around the world, countries are making the 5G auctions for many frequency bands as Mr. Lowenstein explained. In the morning, they may not, 700 megahertz and 26 gigahertz. 3.4 to 3.8 gigahertz would be used for enhanced mobile broadband, and when it comes to 2.4, to 3.6 gigahertz, it would be useful for fixed wireless access. Some people say it compliments. Some people say it's a competitor of the fiber access. And in many countries like the UK, the USA, Japan, China, Germany, Italy and a lot of countries make the 5G, the regulator -- I mean, we as the regulatory body, the information and the communication technology authority, we are prepared the mobile broadband spectrum strategy to define the supply and demand of the frequencies and to identify the official roadmap of the 5G. They work -- the study consists of all spectrum identified for IMT services and the strategy, and it's classified and it's mainly 700 megahertz, 2.5 gigahertz, 3.4 to 3.8 gigahertz and 25 gigahertz in the short term, as I mentioned for IMT services.

With regarding to the -- (No audio) the 26 gigahertz bands but they have not been planned and decided in our country yet, but the regulators announced that based on the renewal of the infrastructure, by the operators from the 4G option, they can automatically be used without the need for any additional licensing period.

So the next one, please.

In 5G, with the Information Society strategy, they have prepared the national broadband strategy and action plan, which is aiming at improvement of the broadband infrastructure expanding fiber optic access networks, increasing capacity and speed of the broadband connectivity, and another one is developing the demand on the broadband services and those are the reasons why public authorities have tried to initiate and coordinate 5G and beyond for the last couple of years and new business-to-business to customer model

is required for establishing an ecosystem. So we built 5GTR forum, for establishing an ecosystem, and Mr. Ponder mentioned earlier in the morning, like other examples such as 5G Japan, and 5G US, and we have members from governmental bodies, operators, domestic and international vendors, technology companies, nongovernmental organizations, universities, academia and some other parts from the vertical industries.

The next slide, please.

>> JULIAN McNEILL: Just to let you know that time is running out.

>> RAMAZAN YILMAZ: I will keep it short. Those are the names. I will not detail with the names but we have four groups in the forum, one of them is called -- the other one is physical access. The third one is the application and the last one is the standardization.

Next one, please.

We organized or attend a lot of events. Why? Because we have to enhance the awareness of the potential of 5G in our country. So we explain a lot of workshops and some studies and the next one.

>> Regarding the international collaborations, we have the memorandum of understanding with and other forums like 5GTR forum and Korea. And the next one is our forum wrote a white paper first, they discussed what are the 5G elements and technical requirements for 5G deployments.

The next one is -- this is the domestic vendor. ULAK, it was founded in 2013 and they have 4G based stations and all the stations we have been using in our mobile operators successfully. The next one is the clustering initiative, communication technology cluster is another initiative for aiming to develop 5G radio and having capability. And we have mobile operators and they try to develop some domestic solutions.

Next one.

Regarding the 5G valley open test area. We build -- we establish open test area, and our institution headquarters and three distinguishing universities are there and two telecom and Vodafone Turkey is there and it's an open environment where the universities and the telecoms can test the

applications and create added value.

The next one is the -- those are the technology companies and they deployed the -- some network solutions to the valley.

The next one.

When it comes to the beneficiaries, they could have a chance to carry out some various tests, for example, 5.9 gigahertz, energy harvesting and 28 gigahertz intra-vehicular channel, et cetera.

The next one is 5G and beyond joint graduate program has initiates a program. Currently 30 graduate researchers from three distinguished universities, as I mentioned, have been employed in mobile operators and they continue their academic studies at the same time.

The programming to produce sustainability competency on advanced information technology and produce outputs.

The last -- my last, before this. The important thing is not to deploy 5G first in the world, but to optimize best and for new users and vertical partners and comply with the B2B and B2C model and they need more ARPU since they need to invest on technology and they need to get more return.

Both international and international cooperation is very wide in this area. IT has begun discussing 6G. And as the -- as a country we have our success story. We have the Polar Codes and it has been decided for the 5G.

Thanks for having me. Thanks for listening.

>> JULIAN McNEILL: Thank you, Mr. Yilmaz. And sorry for speeding up a little bit in the end.

I would remind the delegates that the slides are now online on the website of the event. And also I wanted to remind you that all proceedings will be published soon also on the website.

So thanking all the panelists from this session, I just wanted to wrap up. So we have seen excellent work on the spectrum carried out at the partnership level which is creating really good impact at the country level.

And also, we have benefited presentations at the country level, detailing the -- well, the details on the adoption of plans to adopt 5G in the future in Moldova Montenegro and Serbia and Georgia and various

pressures to gain experiences from experiences that have already implemented 5G, like the UK. And also, it's very interesting to have seen how it is important not only to go ahead with the auctioning process, but to really develop an ecosystem.

So thanks again to all the panels from this session.

So now, let me also before closing this session and proceeding to closing today, just wanted to draw your attention that the ITU office has the background papers on 5G for the non-EU countries. These were developed and I want to thank my colleague Yago who has been working extensively this on this project.

And I also wanted to thank you once more, all the administrations and the national regulatory agencies and I would invite you to check this item on the website.

So just to conclude wrapping up today, we -- today we have focused very much on the policy and the views of public and private sector organizations around 5G in the region.

And it is interesting to identify one main and common trend which is a priority from the ITU perspective, and this is that 5G must be a collaborative effort, where all stakeholders participate.

And while the discussion focused around -- touched upon this point in on many occasions, there are also two main elements that have emerged. The first one is that while 5G is being implemented, it is important that market finds its return on investment, while delivering country benefits to the businesses and consumers.

And tomorrow, in session 4, which will be chaired by Mr. Istvan Dozsoki of the ITU, and various segments of the industry will also discuss exactly this.

The other trend is that the clarity around the challenge of the EMF which has been raised many times today. So beyond drawing attention to the background paper, which has been prepared by the ITU, on this topic, I would also like to invite you to take active part in session 5 tomorrow, that will be chaired by Dr. Mazar. I would like to thank the captioners once again and apologizes for running late this morning and also the IS moderator and all who were involved in

today's organization, and we declare the first day of the forum concluded and look forward to see you all tomorrow.

Thank you very much.

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