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ITU REGIONAL FORUM FOR EUROPE 5G STRATEGIES, POLICIES AND IMPLEMENTATION ITU REGIONAL FORUM FOR EUROPE 5G STRATEGIES, POLICIES AND IMPLEMENTATION

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>> JAROSLAW PONDER: A short announcement, we'll be started with a small delay of 5 minutes in case somebody still wants to test their audio and video, this would be a good opportunity.

Thank you.

Ladies and gentlemen, it is 10:05. It is our great pleasure to welcome you to the ITU Regional Forum for Europe 5G Strategies, Policies and Implementation. Before we're starting, I would like to invite our moderator and person supporting our digital platform to make a short intervention providing us the guidance of how to use the platform.

The floor is yours.

>> Moderator:

>> JAROSLAW PONDER: We cannot hear you.

>> Moderator: One second. I'm having technical issues.

>> JAROSLAW PONDER: Absolutely.

>> Moderator: Welcome to ITU Regional Forum for

Europe 5G Strategies, Policies and Implementation. If you want to intervene, raise your hand and I'll provide all of the presentations.

Thank you.

>> JAROSLAW PONDER: Great, thank you very much for this introduction. This is the time when we'll be starting our official part of the important meeting for the Europe region, which is the meeting organized under the ITU regional initiative for Europe. It is my great pleasure to welcome with us our Director of the Telecommunication Development Bureau Madam Doreen Bogdon-Martin and I would like to invite you to provide the opening remarks.

Madam, the floor is yours.

>> DOREEN BOGDON-MARTIN: Thank you so much, Jaroslaw.

Good morning, Secretariat of State in charge of Digital Affairs, Chancellery of the Republic of Poland, Colleagues from the European region, ladies and gentlemen, I'm pleased to be able to welcome you and welcome you to this ITU Regional Forum for Europe 5G Strategies, Policies and Implementation organized by the International Telecommunication Union with support of the Chancellery of the Prime Minister of the Republic of Poland.

Europe has some of the most advanced economies in the world and is really leading in access and use of ICTs. According to ITU's measuring digital development facts and figures annual report the European region has the highest Internet usage rates averaging 82.5% of individuals actively connected and 92.3% mobile network coverage by LTE and 118.4 mobile subscriptions per every 100 inhabitants. Europe's combination of strong connectivity and enabling regulatory environment and its vibrant ecosystem of digital technologies and services has proven to be fundamental in ensuring the regions resilience during this COVID-19 pandemic. As highlighted during the 20th Edition of the global symposium for regulators last September governments and the private sector responses ensure continuity of operations while strengthening digital transformation within their countries. The pandemic has exacerbated existing digital divides and it has demonstrated the crucial role of digitalization in all sectors.

At the ITU we are fully committed to making sure that digital technologies and connectivity are aimed at reducing these gaps and that regulation is driven by the highest standards of the 5th generation regulation, we call is G5 based on inclusive, collaborative practices. As you may all know, the World Radiocommunication Conference 2019 opened up the opportunity to introduce innovative and

advanced services in the field of telecommunications by identifying spectrum for international mobile telecommunications 2020, otherwise known as 5G. By paving the way for new and more innovative ways to connect, these international agreements can positively impact the lives of billions of people around the world and create a digital landscape for a sustainable growth and development.

This regional forum for Europe organized within the framework of the ITU regional initiative for Europe on broadband infrastructure, broadcasting, spectrum management will be addressed withing regional and national 5G strategies as well as some of the main challenges to 5G implementation.

It will offer a space to discuss and also to identify priority actions to be adopted by the region. It cannot be denied that 5G has the potential to bring condition create benefits to all sectors of industry and society and while Europe advances rapidly on 5G implementation we must ensure that these dynamics leave no space for creating new divides.

According to ITU's recent study entitled connecting humanity, assessing investment needs of connecting humanity to the Internet by 2030 we have estimated global investment of over 400 billion U.S. dollars would be required to reach the unconnected by 2030. Only in Europe and Central Asia over 33 billion U.S. dollars would be needed over the next ten years. With the rapid expansion of 5G these numbers will be even higher. This will require solid return on investments which we all know can also be ensured by establishing a favorable and enabling environment. We have prepared for you a very rich program and lots of back ground papers for this forum which is the aim of advancing 5G in the region.

Just as the deployment in 4G was carried out across Europe with a strong focus on leaving no one behind, it is now our duty to ensure that an enabling regulatory environment sustains the deployment of 5G in a way that connectivity is leveraged by all and for all.

Ladies and gentlemen, let me conclude by congratulating the Government of The Republic of Poland for the great gross achieved so far in the field of 5G and also for the continued collaboration with the ITU in organizing this virtual Conference and in all other activities that sow kindly support.

I would also like to express my sincere thanks to the European Commission, to BAREK, eastern partnership and to CPET for their continuous collaboration in creating an

enabling environment for 5G. With that, I wish you all a very fruitful forum.

Back over to you. Thank you very much.

>> JAROSLAW PONDER: Thank you for the opening speech. It is my great pleasure, honor to invite His Excellency Marek Zagorski, Secretary of State Government of Plenipotentiary for Cybersecurity, representing the Chancellery of the Prime Minister of Republic of Poland.

Marek Zagorski, Excellency, the floor is yours.

>> MAREK ZAGORSKI: Madam Director Doreen Bogdon-Martin, ladies and gentlemen, first of all, I would like to thank you for your warm welcome and this very warm words addressed to us.

We're of course, very, very happy and have great pleasure to welcome you at this Conference. I was truly hoping that we could meet in person, but in the current situation it proved not to be possible because of the health, safety issues that we're aware of. I believe it is important to look for the silver lining in the most demanding circumstances, that's why I'm sure we should also treat the current situation as a great opportunity to take very good lessons for the future. One of the most obvious conclusions is the importance of staying connected which is maintaining existing infrastructure and communication technologies and introducing new ones.

Connecting the unconnected across the digital divide still remains one of the most SDGs to achieve worldwide. Being connected is more important than ever, therefore we should undertake actions to ensure everyone has access to the Internet, it is crucial for maintaining jobs, continuing education and last but not least, being able to stay in touch with your close ones.

Polish government achieved significant success in this field. We can proudly say that the broadband infrastructure is no longer an exclusive product but it is considered as a standard by majority of Polish citizens, reflecting the services that come with it at the final stage of development. We have connected many schools with the broadband access and the service is designed to be used by over 5 million users. We're also able to introduce our citizens to work, education and more.

That doesn't mean that we're resting on our Laurels as government, we must adjust to constantly changing environment and by enhancing and polarizing the use of ICTs keep strengthening the digital transformation.

That's why we perceive critical implementation of the 5G technologies, an important goal that should greatly

country butt to the shape of the economy, this strategy I believe will contribute to modernizing the vision of turning priority into an Internet Society by 2025.

I'm glad this event brings together both government officials and representatives of international organizations as well as private sector, stakeholder, business leaders, industrial experts, innovation promoter, startups and academic, we can achieve these goals only by working together and I wish you all good and productive discussions.

Once again, thank you for your presence.

>> JAROSLAW PONDER: Thank you very much, His Excellency, for this opening remarks and thank you very much one more time for the constant support to the actions of the regional level and the global level.

With this, let me thank on behalf of all participants to our distinguished speakers of the opening ceremony and with this, we would declare the opening ceremony as closed, but the event open! This brings us to the next agenda item, which is the setting of the context for the Conference. We have already heard that this Conference is organized within the framework of the ITU regional initiative for Europe, however, it is building upon the immense work of the ITU membership which contributes to the work of the three sectors of the ITU-T, ITU-R and ITU-D and this is the reason why we're so pleased to welcome today with us Mr. Bilel Jamoussi, chief of the Study Groups Department of The Telecommunication Standardization Bureau of the ITU and I would like to invite Mr. Bilel Jamoussi to make a presentation setting the context from the standardization point of view.

>> BILEL JAMOUSSI: Thank you very much.

Excellency Marek Zagorski, Excellency Doreen Bogdon-Martin, distinguished colleagues, ladies and gentlemen, it is really a pleasure to join the session onsetting the context and to be able to share with you some of the work that's been ongoing within the standardization sector of the ITU and the insights and discussions we have been having with the executives of the industry, both vendors and operators in the 5G context.

My presentation will be really based on those two major input elements.

On the next slide most of us know the promise now of 5G whether it is about enhanced mobile broadband, massive machine-type communication and ultrareliable low latency. The initial deployments we have seen, that many of the CTOs that share shared with us in the discussion of CTO meetings

that the ITU-T regularly has, most revolves around enhanced mobile broadband that seemed to be an easy thing for the industry to first develop and deploy. The other two, the massive machine-type communication and the ultralow latency, that's harder to come back and they require some fundamental pieces of technology to be put in place in the network.

On the next slide, we take you slightly in the journey on this innovation to bring the network, the 5G network which requires significant innovation in the fixed network. This work was initiated in the context of the focus group almost five years ago and that focus group analyzed how emerging 5G technologies would interact in future networks, laying the ground to provide insights on networking innovation that's required. That's where the notion of software -- soft network or the programmability of the network, the network slicing concepts and many concepts we see today in the 5G network is the genesis of that focus group which was then adopted from one of our Study Group, Study Group 13. On the next slide we see some of the initial standards that were published by the ITU in this context, defining softwarization, slicing and fixed mobile convergence. A critical aspect is the programmability of 5G, that programmability is really conversion of two domain, we see the conversions of the compute industry and the Telecom industry. It is really about bringing programmability, a lot of software development and software control of the network, all aspects of the network. That convergence, it is quite powerful but it is also something that brings some new challenges and new technology-focus around deploying IT technology in a carrier grade network from a security perspective, control perspective and management perspective.

On the next slide we see that the network slicing concept, it is a very powerful concept. The experience with industrial IoT applications for example as part of the development or deployment of 5G, it is important to have the network slicing.

We're on slide 6.

That allows the network to be really having the same hardware infrastructure but having multiple usages and separate usages. This is one of the critical aspects of the 5G networks.

On the next slide, 7, we look at the 5G network management and orchestration. This is probably one of the most challenging aspects of the 5G network, the optimization of network management and orchestration is

becoming increasingly challenging and increasingly important as they gain diversity to support the diverse range of services. As we spoke to the CTOs of the industry, they highlighted realtime network monitoring, artificial intelligence, machine learning, automation will form the foundation of self-driving networks, the optimization of network management and orchestration capitalizing on realtime network performance, data, artificial intelligence, machine learning for prediction and self-learning and the automated building and configuration of virtual network functions will improve ICT services and introduce new cost efficiencies.

This is highlighted in one of the ITU standards recommendation ITU Y.3110. On the next slide, 8, we look at machine learning. It was a phenomena focus group under Study Group 13, phenomenal as you see in the slide here in terms of the number of downloads of the ITU-T recommendation. You see almost a hockey stick, the next financial growth of downloads of the ITU recommendation on this topic and this is because there's a marriage and synchronization between the standard development and the opensource development. Because 5G is software intensive the opensource development by the community is a critical aspect of delivering 5G promise of massive connectivity and the programmability of the network.

Dr. Shaw will address this in more detail later in his talk, I think tomorrow, where on the next slide we highlight the challenge around implementing AI and machine learning in 5G, because the 5G is more complex it requires new tools to be able to in realtime manage and operate a 5G network. To bring this to massive scale, we have this challenge where globally experts from around the world are participating in this challenge to implement use cases where we have the standard on paper married with the opensource implementation, delivering a real use case.

Next, please.

We also have significant innovation in terms of the underlying fiberoptic infrastructure, the initial deployments of 5G in the Middle East, U.A.E., Saudi Arabia, other countries, it shows the importance of having a robust fiberoptic infrastructure behind the 5G deployment. What we see in Study Group 15 on the next slide, it is significant innovation in the front hall and back hall network because the low latency cannot be obtained by having -- by traversing the entire network so there has to be a significant amount of processing at the edge of the network. This is where the front hall connectivity where

Study Group 15 has been operating and working on bringing new standards.

On the next slide we see that there is reuse of existing passive optical network, for example, and one of the use cases that's being introduced is to connect the wireless towers to the passive optical network technology. On the next slide, we see other innovation in terms of bringing radio over fiber, so analogue radio frequency over the 5G front haul network, another standard being developed by the ITU and on slide 14, on the next slide, we see that there's whole suite of new standards from OTM, beyond the 100 gig because 5G requires more capacity to the metro transport network and the network and frequency, time synchronization, management and control of the network.

A significant number of projects in this space.

Next I would like to touch on 5G security. When we talk about the massive connectivity of 5G we're talking about bringing IoT devices to the 5G network increasing tremendously the threat parameter. For an operator who has to have -- (technical issue) -- and create investment in security.

The next point that's critical and could hinder the deployment of 5G and I would like to take this opportunity to thank Poland for championing this work in our ITU Study Group 5 on EMF for 5G. This is, of course, there is a lot of emotional debates in the industry and public arenas. Good news is, guidelines have been published on EMF this year and based on the guideline, WHO has worked on its associated standards and resolutions and ITU Study Group 5 has also updated its measurement standards for the EMF exposure limits. We're hoping with the new set of documents that the public opinion can be accredited with scientific evidence on the impact of EMF to 5G enabling the rollout of networks in Europe and worldwide.

Perhaps the final point is around the quality of service. The next slide we have Study Group 12 working on QoS for new and existing applications for VR, virtual reality, augmented reality and the measurement of speed of the network and these are quite important standards that operators and regulators rely on looking at the service levels that are required to be delivered to the network.

The work touches all Study Groups in ITU-T and a number of partners outside of the ITU-T. With that, I thank you very much and hope that that gives you under the hood view of the standards development where the industry and operators, what's keeping them awake at night and what are the major challenges in massively deploying 5G with the

other two use case, massive connectivity and low latency which are yet to come.

Thank you.

>> JAROSLAW PONDER: Thank you very much, Bilel Jamoussi, for this intervention.

This brings me to the second intervention of our colleagues, representing the Radiocommunication Bureau, Mr. Uwe Lowenstein, Counselor of Study Group 5, Study Group 5, presenting the work of the ITU-R in the spectrum in context of the 5G and development.

Mr. Uwe Lowenstein, the floor is yours.

>> UWE LOWENSTEIN: Hello. Here we go. Sorry.

Thanks, Jaroslaw, a warm welcome from my side as well to the participants, in particular to His Excellency Marek Zagorski, in addition to standards aspects of 5G as presented by my colleague Bilel. I have a pleasure to give a brief insight into the work of ITU-R in 5G and the radio part of it talking about the following topics: We will have a brief insight into the process, I will present you the results of the World Radio Conference 2019 and some work towards the next one, which is going to happen in the year 2023 as scheduled so far and I'll give you the particularities of the current situation of the 5G bands in Europe.

On the third slide, we see very important IMT2020 or 5G process which is actually split in two parts. We have the radio interface standardization process where we have been starting, as you can see with the development plan and, of course, a vision for IMT-2020. We then made the technical performance requirements based on the members of ITU-R. They have been specified and we invited the proposers for radio interface technologies.

The second part, it is the IMT-2020 spectrum allocation process. Here we're talking about the physical frequency band and the spectrum arrangements which are available for 5G or to become available to 5G post the World Radio Conference 2015 because with that work, we already started at 2012.

The recent year, we will define the technical proposals and we have had a lot of evaluation of the radio interface technologies and as a result we also try to align these standards to the bands and will look at the arrangements which we'll elaborate on later and we'll have the detailed IMT-2020 radio specifications as you remember for UMTS, the third generation of mobile, we had 6 interface specifications and we'll see later that we have for the time being five interfaces and there is more to

come in the next revision.

Right now we have also results of the World Radio Conference and the subsequent CPM meet, we have spectrum bands, arrangements for 5G available. When we click in the last session of Working Party 5D scheduled for the 17th to 19th of November we will have fulfilled and finalized the IMT-2020 process which is why there is only left a little bit of blue color.

We see the 5G related spectrum decisions that have been done at the World Radio Conference 19. We have identified five new spectrum bands which is the 26 gigahertz band, I think already known to a lot of colleagues of you, and we have three new bands identified for deployment of IMT which is the 40 gigahertz band, the 50 gigahertz band and the 66 gigahertz band and when clicking we have allocated altogether 17.25 gigahertz of new spectrum which is available in the future for 5G and IMT services. Not only for the current band, but when clicking also for the work towards the World Radio Conference 23, the new cycle will start. We have new bands which are under investigation and where we will be studying making and when double-clicking, we will see that these are in the range of 4 to 20 gigahertz which is currently not covered by the bands available for 5G and IMT because it is either below 4 gigahertz or above 20 gigahertz.

WRC-23 also decided and agreed to study and identify frequencies for new components of 5G. As we have seen in the presentation before. 5G will comprise a lot of facets and capability and we also are looking for spectrum for high altitude IMT bay stations and also ITU-R will work on the regulatory provisions for this by looking at additional frequency bands in addition to IMT bands.

On the third slide, this is a comprehensive chart and we don't need to learn it by heart right now. It is showing you really across all the frequency bands beginning below 1 gigahertz and up to close to 100 gigahertz the according 5G bands with the region, the U.S., Canada, European Union and the Chinese, Korean, Japanese market and what we'll see in Europe, we have three bands implemented by the European Commission with according implementation decisions and we have the 700 megahertz band where we have -- when we look at GSMA figures as of August, 2020 already 9 networks launched within the CEPT. We have the 3.6 gigahertz band with 12 networks and actually this is to my understanding the band with the most networks deployed so far in Europe but we have also the 26 gigahertz band where the licensing is ongoing and for instance Germany is

planning to start the auction by beginning of next year.

We'll focus on Europe in the fourth slide.

As I said, 700/36 megahertz is deployed. For the implementation of the new band coming after WRC-19, there is a European Commission decision implemented already back in 2019 to make available by the end of this year in each Member State this band. Doesn't have to be a service or operating, but the ability has to be implemented by a European Commission decision by the end of this year in each Member State.

We have various report, one is 317 on authorization regime, it will be different compared to the 703.6 gigahertz because it is shared with adjacent services and it is very important.

That's also the reason why there are some additional ECC decisions.

When I click on the presentation, you see a very neat chart that these three frequency bands in Europe, it is also called 5G pioneer bands, actually all three together provide a basket for mobile operator to address the universal coverage in rural areas using 700 megahertz band, in urban, wider coverage, suburban areas when you need capacity increase for the mobile network, you can use the 3.6 gigahertz band and last but not least, when you had hot spot coverage and for fixed wireless access applications, up to 10 gigabit a second, they'll be the 26 gigahertz band used for the 5G services in Europe.

Where do the new bands come into the game? You see here, when clicking again, we have additionally the 40 gigahertz band and the 66 gigahertz band which have been implemented in WRC-19, and in Europe the CEPT does not support the implementation of the 50 gigahertz band but for the 40 gigahertz band and the 66 gigahertz band, the work as described here, it is ongoing and all three bands together when I click now, these three bands are the bands where we have had a lot of information and discussions throughout this year already in the press and media.

Let's come to my last slide. I would like to thank you for the attention and if you have any question, I'm happy to cover all the questions, you see contact details here. I do wish you further good meeting. Thank you for your attention.

>> JAROSLAW PONDER: Thank you very much, Mr. Uwe Lowenstein. It was very comprehensive overview.

Now this brings us to the next presentation, which I will have the pleasure to make, I would like to request Julian to present the slides. This is setting the regional

content, you heard of the activities going on in the context of the standardization and in the context of radiocommunication and two very important parameters of the implementation of the 5G and putting, setting the foundations for 5G implementation but nevertheless, the strategies and policies are very important. This is the field where the development sector is working quite heavily with all stakeholders in order to make sure that the 5G is not a longstanding component in the strategies of the countries but is integrated in the development strategy of the country.

We're guided by regional initiatives which determines and the five regional initiatives supported by the thematic priorities, in particular in the context of the 5G we're counting on the services and research and advisory of services done by two thematic priorities, the network and infrastructure and the policy and regulation.

In this sense, we are already most probably -- you are familiar with several different platforms used with the 5G and we have raised the issue of the strategies and policies through the paper onsetting the scene for 5G and then we took a look at different aspects of the 5G through -- from the perspective of the regulators and bringing 5G as the topic to the ITU GSR of 2018/19 but also last year which resulted in the setting of the guidelines and issuing the global guidelines for the regulator. We're marking the infrastructure of serving how 5G is also broke out by the backbone infrastructure in assisting countries in developing networks and taking a look at how the 5G would help in answering the challenge of COVID, those posed by COVID. At least, but not last, also we are working with all membership on study questions under the ITU-D Study Group 1 and Study Group 2, taking a look in particular under the Study Group question 1 of the Study Group 1 on the issue of the rollout of the broadband and the national strategies and later today, we would have the great pleasure to be joined also by the European Vice-Chair of the Study Group who will be chairing one of these sessions.

Next slide.

In this context, of course, for us, the question is how we're responding lieu the expectations of the membership set through the regional initiative.

Next slide, we have since three year, we have been doing studies of different discussions and supporting different activities in the context of the 5G rollout, including the 5G declaratory, the Baltic state platform for advancing 5G and this year we asked the question do we

understand the full dynamics of 5G in the whole region? There's a lot of work done at the level of the European Union countries with the 5G observatory but what's not happening in the countries that are not E.U., is the 5G still relevant to them or they should not worry, of course they should worry and -- not worry, but also look for the opportunities.

Next slide, please.

This is the reason why we decided to develop and to propose to the countries and develop jointly a set of the national case studies where different countries stand with the development of the 5G at the country level and focusing on the ICT background, the foundations of the 5G, broadband and mobile telecommunication sector and also current progress on the 5G in terms of the strategy, policies and development in the spectrum assignment and taking a look at the electromagnetic field levels which as we know, in Europe, it is posing a lot of different emotions around the region. It is very often a topic and the implementation of what we need to address.

Next slide.

There is several good new, when taking a look at the group of the non-E.U. countries, just to remind Europe region as defined by the ITU consists of the 46 countries, 27 are belonging to the E.U. and they're covered by the results of the 5G observatory that will be presented in the next session and the question would be what can we do, also with the other countries and do we need to support them and also what is the dynamics of the implementation of the 5G in those. Good news, those countries are doing excellent progress in terms of the connectivity and despite several millions people are already connected and the significant progress has been done in terms of getting people on the Internet despite of the 78 million people that's been included in using the Internet since 2000, still 33 million people remain unconnected across the 18 countries. This makes us a little bit worried and creates a great opportunity for the future and that we can take a look at what 5G can bring to the region as it was happening.

Next slide please.

We have observed in the last few years, five year, focus on -- we have observed the 10 fold increase in domestic mobile broadband traffic in the country since 2010, estimated at 6exabytes in 2019 and growing by an average of 44.64% over the past two years, which means that the consumption of data is growing, using the mobile broadband and there are significant efforts done in order

to bring as many stakeholders and people and the users on the broadband network.

Let's look at how much of the population has been covered by 4G in the Europe region. We see the divide between the non-E.U. and E.U. countries is significantly diminished. We don't see -- next slide, please.

We don't have much of the worry. Also at the level of the cost, going down, but still it was possible to observe the drive of the 5G and the coverage in the non-E.U. countries which have enabled additional 57 million people and to enjoy fast mobile connectivity over the past five years which is significant growth but is related to the significant efforts of the countries to make this possible, not only the countries, but also the private sector investing in the innovation.

Next slide, please.

Let's take a look where we stand with the 5G implementation.

Beyond 5G, strategies, there are 12 countries which have the 5G consultations and the 10 countries out of the 17 adopted Ad Hoc identifying strategies or provisions in existing policy frameworks and 7 countries allocated frequencies for 5G. We see that still some work is going to be done.

Next slide, it is showing which countries are spending where and we will now be able to better understand where each of the country as stands, like for example, in Macedonia, the country, they have freed up 700 megahertz band and will proceed with the optioning of the 5G by the end of 2020. In Serbia, the country, they have made both digital dividends free and we will proceed with optioning in quarter 1, 2021. It has been shifted from the recent plan of the Q3, Q4, the 2020 due to COVID. There is no specific regulations or strategies in place as the government is focusing on freeing the DD, 2 at the moment, new developments by the end of 2020 will invite future optioning while in Bosnia, the countries currently are accelerating implementation of the 4G taking necessary steps to reduce the investment cycle. 5G tests are being carried out.

As we see in the next slide, as we see, the 5G, it is happening also in those countries and this makes us very happy.

Next slide, please.

Also in terms of the implementation of the decisions and the advice of the WRC and the CEPT decisions where the spectrum for 5G has been identified following those

decisions. With regard to the specific bands identified for 5G, it is important to highlight the 3.6 gigahertz band is allocated for 5G across almost the countries, in the countries of 5G options, they have not yet taken place and 26 gigahertz and the 700 megahertz bands are usually held back in terms of testing in terms of the risk of the interference. In the processes, we observed in the last months delays because of COVID.

Last slide, this slide, the electromagnetic field level effects the implementation and there are several countries with still very restrictive limits or limits imposed as what affects the investment, the cost of investments and some measures to counterpart this challenge and need to be found. That's why as my colleague Mr. Bilel Jamoussi mentioned, we're very grateful for Poland for piloting the initiative at the ITU level and addressing this issue, the strategic level.

Next slide.

Of course, talking for the EMF, it requires a little bit deeper consideration and this is the reason why the last session of this forum will dive into the material of EMF and we're already now requesting and inviting you to take a look at the background paper introduced for your reference and that we can have profound discussion on the EMF also later on.

Next slide.

Across the region we're observing significant number of the 5G commercial launches announcements and the trials, several platforms have been created, to create the innovation ecosystem, to drive implementation of the 5G like in Liechtenstein and Turkey and other platforms, 5G Techritory supporting the rollout of 5G in Baltic State Regions and we're very proud to be supporters of this process within the framework of the ITU regional initiative.

Dear ladies and gentlemen, I hope that this brings you a little bit of the highlight of what's happening in the region and we encourage you to take a look at the material presented for this Conference.

With this, I thank you very much for your attention in regards to this, setting the context agenda point.

And with this, I would invite the speakers of the next session to get prepared while thanking to my colleagues Mr. Bilel Jamoussi and our colleagues for their interventions.

Thank you very much.

Now we would proceed to the next agenda point of this

meeting.

Ladies and gentlemen, this session focuses on the regional 5G strategies and the policies. We have with great pleasure and honor to invite to take the floor on behalf of the Presidency of the Council of the European Union Mr. Wolfgang Crasemann, Head of the Division of the International Digital and Postal Policy, G7 and G20, Federal Ministry of Economic Affairs and Energy of Germany.

Mr. Wolfgang Crasemann, the floor is yours.

>> WOLFGANG CRASEMANN: Ladies and gentlemen, good morning, everybody.

Hopefully you can hear me. Is everything okay? We have had a lot of technical problems this morning in our ministry and therefore I had to use my private laptop. Fortunately, I decided to bring my private laptop because I don't trust the IT in the ministry. Hopefully it works right now.

Is it working?

>> JAROSLAW PONDER: It is working very well.

>> WOLFGANG CRASEMANN: Okay. Fine.

I'm delighted to talk to you, as you know, Germany has a European presidency and therefore I would like to give you some opening remarks, more in a general context -- well, when you look at Europe, in comparison to eastern Asian countries and in comparison to North American countries and when we see where we stand in the 5G network I think we're pretty advanced already. When you think about our systems compared to other systems, we have some advantages of other systems and we have some disadvantages. Therefore, I think it is always important to know this. The advantages, we have a strong economy. We have powerful -- a lot of money to invest. We have a freebies environment. We have many small, medium-sized enterprises which are very flexible and bring a lot of innovation in the market and maybe the most important thing, we have a skilled workforce.

However, we have some disadvantages -- well, you all know that we have many more countries and each country has different regulation and the European Commission makes a great effort to give general guidelines and to give Directors, I would like to mention the European Directors for electronic communication code which is very important and tries to harmonize all of the different regulations. Another disadvantage, it is the strong consumer rights and we know that Germany in particular when a Telecom company would like to install a new antenna, then you find a lot of people around this antennas saying it is great to install

antenna, please not in my garden. We have a lot of strong privacy rules. When you think about it, the Asian countries, they have a lot of advantages from a top-down approach and they can when it comes to new technology, they can implement this new technology much faster than we.

My last point, and this aspect, we have private company, which first of all is very good, private companies, they have the business attitude of very fast, however it shows by installing the 5G networks, there is one big disadvantage, surprisingly, in brackets, they look for profits and in the city, in the big business campus, they're profitable, no problem there, in the rural area, they don't invest enough. In Germany we have tried to have coverage obligations however we realized that the coverage obligations didn't function so well, they were lazy, behind, and we have had a lot of difficulty was the Telecom companies to make them invest in rural areas. In particular, we have the problem, for example, in railroads, when our Minister travels first class and then suddenly he couldn't reach the Internet and can you imagine the problems we have there. In other countries, they may have similar countries but also it may be a typical German phenomena.

These short introductory words show that we have to make great efforts because the infrastructure is in the future, it is the most important infrastructure and element for competitiveness of our societies, of our business, and therefore at least it is as important as railroads, water basin, so on. Therefore we really should strive and I see from the speakers, from the previous discussions, there is a lot going on, but we have to be fast, we have to implement all of what we have as an objection.

I would like to come to the priorities of our European presidency, you see it on the slide, the one core issue, everything is let's say grouping around, that is digital sovereignty and defined that we're -- when it comes to this, we pretty much are dependent on China and everybody knows we have had good devices for installing antennas and so on, we're dependent on American companies like Facebook, Google so much and therefore it is very important that we really care for more sovereignty and we have installed a commission already, something is on the way and we as a Germany presidency, we will support it, we do it together with the following presidency, with Portugal, with Slovenia, you know those will last longer.

When it comes to the issues that we have seen, some remarks, what's important, the monitoring system and we

have to -- there are a lot of indicators already on the way but there is always a task to make the indicators more detailed, in particular when it comes to capacity, for example, when it comes to skills, so on.

Then maybe in this e ra here, the most important thing, we need investment which means here we have a private business, society, we need in particular private investments and what we can do as public authorities, we should try to present good conditions and also we give support programs, we know that the European Commission does a lot and also the countries and for the rural areas, so on, something is going on. Then, the important thing, it is we need resilient European data infrastructure and this is the most important thing, a toolbox for 5G networks that means that there is obligations for security and the catalog of obligations and however it is monitoring and the countries recommended to follow-up these requirements and maybe two different ways to do it. One, when you have a company installing the devices and you don't trust the company, you can say, okay, I do not allow them to be a part of the whole game, however, in Germany, we go another way, we say, well, all companies should have the same right to participate in auctions and public bidding, so on. However, they have -- they have to guarantee that their devices are secure and we have strong, security obligations, and all company, they have the same, right. One thing also which has some connections to the 5G network, it is the European Cloud initiative, it started in Germany, we call it GAIA-X. It was a French, German initiative, now it is a Europe initiative. The main thing is, we would like to be independent from big Cloud providers in the United States, from Google for example and the idea is to bring together a lot of companies which can offer data storage capacities and link them together and by that, we install a Cloud and we hope it will work, we have talked to experts. I think it will work.

Still, it is in the static phase and we have a lot of interests from companies in all over Europe which would like to participate there because it would like to be independent from other big Cloud providers. Then you have artificial intelligence, there is research projects going on, but as we emphasize always in artificial intelligence, it should be human-centric, that a human being should run the intelligence, not the other way around.

Finally, we have regular framework, maybe the biggest new issue which is done in our presidency, it is the digital service act which deals with the regulation of

eCommerce and we already talked with the European Commission and we think by the next Council, they'll provide us with a first act of the digital service act and then following they'll discuss about the services act.

I come to an end. I wish you all great success and looking forward to the other speakers and in particular also to discuss some issues and I hope I could give you some introductory words.

Thank you very much.

>> JAROSLAW PONDER: Thank you very much, Mr. Wolfgang Crasemann for the introduction, setting the context, the European context from the perspective of the European Union.

We are also today joined by the European Broadcasting Union and this is my great pleasure to invite Antonio Arcidiacono to join us, to make some comments.

We remind all speakers to be brief and to focus 8 minutes of interventions as we have discussed earlier and to be able to give the opportunity to have equal contribution of time for all speakers and we hope not to run too late! We'll run late! With you we should not run too late!

The floor is yours. One more time, thank you very much to Mr. Wolfgang Crasemann for setting the context from the European Union perspective.

>> ANTONIO ARCIDIACONO: Thank you very much. Thank you very much.

Good morning, ladies and gentlemen. We're very pleased to intervene in this Conference.

Just to stay within the 8 minutes, I'll speak about 5G and media. This is an area which is very important because as you know between 80 and 95% of the content being distributed over broadband networks and over 5G as a consequence is all the time media-based content. This is representing the largest quantity of data that's being exchanged over IT networks in general.

For this reason, we have been very active in proposing solutions on using technologies, 5G technologies for the delivering of media, but also for using the 5G for media production and contribution. I would start from there.

If we speak about 5G, for content distribution, this is really important, of course, for distributing don't which is linear TV, radio, news, sports, life in general but for the non-linear content, the catch up, on-demand broadcast, et cetera, when combining the two, the linear part, the non-linear part, other parts, it is for realtime, not realtime. And the last but not least, it is the fact

that the broadcasting infrastructure, the broadcasting, physical infrastructure, they're all the time used also to send public warning services to reach the entire population and this is by far the best solution for reaching the entire population for guaranteed quality of service like in any broadcast service. These are services provided by public service providers, but also by commercial media organizations. What we're proposing to the 5G community is to use the technologies that are possible in the 5G, not only for having services but by combining services together. This is in content distribution.

Speaking about media production and contribution, the arrival of the 5G technology is also opening a further step in the direction of using 5G for condition tri contributing con ten, producing content in a better way, we see this becoming a reality in large scale because of the COVID crisis and the remote production, the remote production cloud base of using 5G and connectivity, forgetting content from events into the cloud network and then to the end users, it is a very important part of the business that's going to develop in the future, in the media business in general and we'll also open new ways of redistributing content and new ways of contributing content such that new stories can be imagined, new ways of delivering content. The more we go and stay in this COVID crisis you see how important it is for us to be able to contribute from anyplace with broadband connectivity and with low latency, et cetera, and also how important it is to reach 100% of the population in any circumstances.

Next slide, please.

Now, why 5G distribution. The 5G, it is a different standard. It is very important. As has been said by colleagues before in this same Conference, it supports IP distribution on a multilayer sense. The possibility of combining different technologies and having orchestration among themselves in a softer base, you can imagine having together all the modes working together in a single architecture N a seamless way for the end user, in a way that's optimizing the performances. On top of it, 5G is a global standard. This access to word wide market, the economies of scale, they're going with this, and it is also a practical way to access all devices from the mobile phones to the car, to the home, to any place using this multilayer approach.

The UNICAST solution, it has a number of problem, it lacks scalability when the audiences are increasing if you want to serve millions of people with the same content or

you want to redistribute the same episode of a series, you can put your network under strain because there would be a big tick in traffic in the network. The coverage is dependent on the terrestrial network operators and the spread of the bay stations and what we can see, the number of bay stations, it is increasing In fact, in the 5G case and if you look, for example, today you need 150,000 bay stations deployed to cover just the Beijing area. If you scale it, you can see that this cannot be deployed on 100% of the territory or for 100% of the population.

There are limitations in terms of access for users. You need to always have a subscription to a telco operator. If you want to reach the operation, you need to find the solution for the free access for specific contents and the quality of service cannot be guaranteed in front of the tick in the traffic otherwise the economical equation will not work.

This has do with the redistribution cost and has to do also with the gate keeping in the distribution chain if the infrastructure is not able to reach everybody.

Next slide.

For this reason, what we're proposing if you click over, this slide is for -- the basic idea here, it is to use the law of physics where they work best. Combining UNICAST and also combining broadcast for UNICAST so that for all contents, one too many, all of the live event, new series, episodes, all contents that are reaching a large population, you use terrestrial towers for broadcasting like they're using today for the television, leak they're using today for this and you see the satellite overlay to cover the area, the nation, the continent, so wherever the end user wants to reach content, it can be reached in a cost effective way because it is by combined law of physics that you will able to on one side reduce the traffic that you will have in case of large events and on the other side, you can cover all areas.

This will work through intelligent receivers, so devices that are typically 5G devices but with an on-top layer that will be able to manage the broadcast and the multicast.

Next slide, please.

This is important in sustainability terms and ecological terms. The basic idea, it is that if you are combining the network, just giving here an idea, a pictorial idea over France. France is a very large country and there are plenty of area where is the density of population is very low. This is the gray areas you would

see there in this picture. By combining the three layers, one on top of the other, you reach 100% of the population, reducing the cost of your infrastructure in terms of calculations, you would use the broadcast and multicast from towers in the urban, suburban areas and reach the overall population, overall country by using satellite overlay and by using satellite overlay you will be able to serve all other reception. This multilayer approach that's foreseen in the 5G standardization, it is fundamental to reach this level of penetration and service.

Next slide, please.

At the same time, what happens, in a normal broadcasting system, you will use this during a few hours for actually real live content, a football match, news, but you use the remaining part of the day to send multicast traffic, one that can be stored at the edges of the network, the edges being a part of the network but also could be the end gateway in your home or, in fact, even the end device with storage there. By combining edge casting with local storage, you also reduce further the cost of your infrastructure, optimize the quality of service and in the end have a better, sustainable network not only for broadcasting but for also the telco operators that need to invest less and have a better return on their investment.

Next slide.

What we're doing, we're looking at different industries, of course, the media industry which we're optimizing the media delivery over 5G. Next one, but same technologies -- next one, please, the same technologies are used for the automotive industry when you want to redistribute software to connected cars and not only for entertainment, and when you want to distribute map upgrades and update regularly every second the corrections of your genesis system, your automotive self-driving cars, this is very important. By combining all these for entertainment, safety, software updates, the automotive industry will profit a lot. This is a strong European industry.

Next slide.

This is also very important for warning services. This is the broadcasting multicast viewings, it is the only solution that can serve the whole population without suffering the dip in traffic with underrepresented population willing to connect to the network.

This has been for the past -- this solution, this should be for the future, the combination of broadcast and UNICAST to reach all populations when the needs arise.

Next one, it is the synergies within industry

vertical, here what we do for 5G in production and contribution can be used by other domains in the industrial area, but also in the health area, for example, let me give you the example of remote surgery, what we need in terms of high-definition, ultra-definition, contribution using 5G can be used also from a surgery room when you want to contribute with the low latency images. The same solutions can be used in multiple ways.

Next one.

What are next steps? Ensuring that in the 5G, the requirements, they're taken into account and this media contribution, distribution, it part of the full implementation. Looking at the business model, the deployment implementation, and what are the requirements that we need to have so that the network, terminal, infrastructure, they'll embed this. In order to do all of this, next slide, we have created a specific organization called 5G Media Action Group that's looking at implementing all the specifications that exist already in GDP into commercial services.

>> JAROSLAW PONDER: We need to wrap up.

>> ANTONIO ARCIDIACONO: I'm finished. Next one is done.

This group exists, please join us and work with us so that we can bring this to the 5G world in practical terms and to sustain and guarantee the European sovereignty.

Thank you very much for listening today. Ready to take any questions, if you have any. Thank you very much.

>> JAROSLAW PONDER: Thank you very much for this intervention and comprehensive overview from your perspective.

I would encourage all participants to use the chat room and to raise direct questions to the speakers and please use this opportunity to interact directly with them. We're not sure if the time remaining will allow us to have the questions and answer session at this time.

Having said that, it brings me to the next distinguished speaker, Karol Krzywicki representing today the Eastern Partnership Regulator Partnership which is chaired this year by the Office of Electronic Communications and Karol Krzywicki being the Deputy President of the Office of Electronic Communication will highlight and provide a highlight on the activities and developments under the Eastern Partnership in the context of the 5G.

Karol Krzywicki, the floor is yours.

>> KAROL KRZYWICKI: Thank you. Thank you

distinguished representatives of ITU and Your Excellencies, ladies and gentlemen. It is my great pleasure to participate in this ITU regional forum. I will provide you some general information about the EaPeReg work and the challenges around the 5G networks, especially the context of our partner countries. Also I will say a few words about the identified bodies to achieve this goal.

Going to the main tasks of the EaPeReg serving the purpose of construction of the 5G network, it is the signing of the regional spectrum agreement, we call is RSA. This RSA lace the foundations for coordinated release and reassignments of spectrum and next to the coordination of the 5G networks in the partnership region the regional spectrum agreement is an expression of our willingness, readiness of our countries, especially to the implementation of the technologies with the new standards and decisions and also to ensure the common harmonized usage of spectrum resources with the technical parameters across Europe.

The provisions of the regional spectrum agreement, the harmonization of the megahertz band and other bands in certain countries for the usage of mobile and fixed communication networks, also the cross-border coordination which is very important and the compliance of course with the E.U. conditions. As a part of our work on RSA, the four main bodies for the 5G bands and distribution and the coordination were identified. First, necessity of the megahertz from an EDD broadcasting service, so it is common with the region, secondly, the need to coordinate the co-existence of systems operating in these frequencies with planned 5G networks, the necessity of cross-border coordination of the 700 band which is specifically in this region also a political challenge and we have identified the needs to establish on the basis most of the bilateral agreements and also for the use of C band taking into account the radio regulation and other regulations which is also, as I said previously, it is also a big political challenge for us. An important aspect of creating 5G networks mentioned today, a need to rise the electromagnetic field so that the 5G networks can function affectively. The same has been done recently in Poland and other neighboring countries of the E.U.

In the context of EMF limits, it is necessary to underline or support the fight against this dissemination of fake news and make society aware of the neutrality of the 5G and the standards on our half.

To summarize, I would like to underline that we're

ready and preparing documents and to remind that identified bodies and we have also, as I mentioned, related challenges. Thank you for that and for letting me give you back the floor.

You are muted.

>> JAROSLAW PONDER: Thank you for that great introduction and we're looking forward to close collaboration on these issues and for taking into account that this group of countries, that it is also going beyond the boundaries of the regular recognition of the European region and indeed spectrum harmonization and creating the environment, it is a key for the success of the process. Thank you very much one more time for your intervention.

This brings us to the next of our presenters, who is representing the Nordic Council of Minister. We have mentioned already a few times the importance of creating special ecosystems enabling the 5G rollout and the strategic terms and the Nordic Council of Minister, it is one of the great examples of how do this really if he can effectively and efficiently. It is our pleasure to welcome Morten Friis Moller with us, providing a highlight on this and reminding him to keep the time to 8 minutes. Thank you.

The floor is yours.

>> MORTEN FRIIS MOLLER: Thank you so much. Thank you for having the opportunity once again to present the Nordic Cooperation on 5G and the Nordic Council of Ministers is available for collaborating on the digital agenda and we have now the Nordic Council of Ministers at the political level supporting this work.

I'll tell you a little bit about that.

We are in the process of developing, following up on a prime ministerial declaration for 5G preparation, but also have interesting presentations earlier about the rollout of 5G. I will take a different take and move into how 5G could be available platform for innovation in our region and how could we, as an intergovernmental organization supporting the regional collaboration support and promote innovation on this new platform.

Next slide.

We tend to look at our self as digital frontrunners and it is evidence in many international indexes and we're celebrating it every time and we're happy for that when it comes to digital government, however we also have some challenges and I'll come back to them later on. We're looking at national levels among the Nordics, and all countries have ambitious strategies for digital society and

also for taking advantage of society, they have comprehensive strategies covering all levels of governments from national level to local levels which is a good foundation to move on but the regional collaboration. The countries have a major and secure digital infrastructure, that's not only broadband but it is a coverage of 4G and broad coverage of 5G in all parts of society. This is an opportunity but an obstacle. We'll come back to that later.

We have strong digital ecosystems and start-up communities here and it is advanced in the Telecom industry and we do see our businesses looking into this and they have strong Telecom providers backed by Nokia, Ericson, so we're in a very good position to take the new step into the 5G and gigabit society.

We have ambitious goals for the collaboration on 5G. We're following closely what's happening in the countries. A lot of things is happening at the moment. We are an intergovernmental organization, we're very close to this process, looking into how the countries have deployed and rolled out 5G and bay stations across the region. These are the goals for the Nordic cooperation, encouraging new testing facilities, ensure the technical coordination of the 5G frequency bands within the region, when it comes to the coordination of frequency bands and standards, we're very much relying on the very important work done by the European Commission and also ITU. Thank you for that.

We're more keen to work more into the application of 5G which I will tell you more about in a moment.

Remove obstacles extensions to the 5G network and this is also having to do with how to -- how to look at the standards and also about how to -- how to look into the business models to promote this deployment.

I will tell you a little bit about that in a moment.

Finally, encourage the monitoring of the development of 5G and we're taking concrete steps now to actually come up with that too.

We have E.U. 5G observatory as a platform and we think it is important to look into the 5G network.

Next slide, please.

We have done a SWOT analysis looking into what is the driving forces up here. Looking at 5G network, not only as technical infrastructure but it is a platform for digital innovation and how do they promote the digital innovation business of course providing this costly infrastructure, but also in order to actually take advantage and make sure that this new infrastructure will support other political

goals, such as the future of welfare, growth, of course also support the region system, we have to look more into the region's strengths and weaknesses. As you see here on this screen, all Nordic features are driving different forces and we're looking into different sectors and areas and we do see that we have strongholds up here that are not a big surprise. We have industries that are very advanced and willing to invest in this costly infrastructure which is highly demand-driven, it is not really, we're looking to invest in this infrastructure. We have increasing areas, we have located 50 and it is accelerating rapidly for the moment and we'll do that continuously and follow-up and look more into different sectors.

We have local initiatives on 5G and we also see high activity and municipal tis at local levels which is very important also to look into how businesses are attracted and providing 5G infrastructure.

This is something I would also like to come back to. We have many very strong manufacturing, fishery, transport, others, next slide, please.

As I said before, 5G is also enabling platform for digital innovation for other parts of societies and it is important for us also that it will promote solutions and support green transition. We see a lot of activity within environment protection and monitoring, we see smart electricity grid, using 5G technologies and we also see high activity within agriculture, within effective use of natural resources by use of drone, by use of autonomies tools.

We also see within mining industries, especially, and in also within the offshore industry, we have a lot of activity there.

Next slide, please.

The opportunities for Nordic and regional collaboration, it has been raised in previous presentation, I think it is important now, developing this, implementing this new infrastructure, we believe it is time to consider the cross-border perspectives. As I said, in the introduction, there's a lot of things going on national levels and we're following that closely. As long as the countries are moving ahead, implementing this infrastructure, we believe it is important to think the cross-border perspective in it from vet beginning and throughout the looking at the drones and there is coverage across border, this is an important task to support this. As other speakers stressed, we're a small countries and we have to cooperate and really take advantage of the special

and advanced areas that we have and making them cooperate across cross-border, we support cross-border collaboration and activities and we do have different strongholds up here related to different commercial interests and we believe by facilitating this community ecosystem is very highly valuable activity and we should do that I think in a broader stroke and at European level.

As I said, common standards provide enabling policy, it also is important activity in order to make that happen. We need that in place. We appreciate the important work done by ITU and the European Commission.

We need to speed up that work with standards and in order to ensure this cross-border coverage and interoperability.

Also mentioned, we have many small and medium-sized enterprises in our region. There's also good reasons to look into this business structure and also to make sure that the new network will be beneficial for all parts of our business environments and not only the big businesses. This is an important priority for us when the countries have options to support innovation in small and medium-sized enterprises.

Next slide, please.

Yeah. Now also some weaknesses. It is not just a fairytale, it is also -- we do have some very big issues also to work with. We have maybe compliance sectors and also areas up here where we don't see that much activity for instance in health and welfare area, we would like to see more activity, especially a time of coronavirus where the distance services is highly a priority and we would like to promote new innovations within health. As I said, you see very only little collaboration of 5G and this is something that we would like to promote even further. We $do expect and recognize that there are issues right now but we want to represent the cross-border perspectives in this new network.

>> JAROSLAW PONDER: You have to wrap up.

>> MORTEN FRIIS MOLLER: Next slide, please.

Back to some actions we would like to promote at the moment. We're for building up a regional 5G ecosystem, 5G, it is a good platform for that I know that we'll talk more about that later on, and it is very important to promote this and to secure and ensure a good platform for the collaboration between test environments.

Also facilitating policy dialogue with stakeholders from the ICT industry, we do have roundtable meetings and Conferences for those that want to promote a closer

collaboration between the ecosystems. Back to the monitoring and benchmarking, we're now developing more monitoring tool for driving forces and business models that are promoting the 5G, it is costly and we want to know more about how we can support this rollout by looking into the driving forces.

Last, but not least, we are trying to share with you also some showcasing, showcase, I think it is a very good thing to visualize and look into concrete examples of how and why businesses are using, investing in the infrastructure. These are three actions we would like to address for next year and we would like to come back to you again with more information on how to collaborate around this.

Thank you very much.

>> JAROSLAW PONDER: Thank you very much, Morten for this. We learned really an excellent example of how to create the subregional ecosystem and we have talked about the whole region. We'll come back to you while working with other countries. Be prepared.

Thank you very much. Thank you for that.

You mentioned in your example 5G, that brings us to the next speaker, Neils Kalnins, Director of Business Development 5G Techritory and Office of Electronic communications and will tell us what's so special about this and particularly this year in Techritory.

The floor is yours.

We'll use this moment. The break to say that we're aiming at wrapping up this session by 12:30 and therefore I reiterate my call to the speakers to keep your presentations up to 8 minutes.

Thank you. Neils Kalnins, the floor is yours. We cannot hear you.

There's some challenge with the microphone.

It is some challenge. We cannot hear you.

>> Let me check with him. Can we go the next speaker.

>> JAROSLAW PONDER: Absolutely. We'll do that.

Neils Kalnins, we'll come back to you once the audio is fixed.

This is my great pleasure to introduce the next speaker, Lise Fuhr, Director General of ETNO, European Telecommunication Network Operators Association.

So Madam, the floor is yours.

>> LISE FUHR: Thank you. I hope you can hear me.

>> JAROSLAW PONDER: We hear you very well.

>> LISE FUHR: Good. Thank you.

I'm delighted to join you here today as Director

General of ETNO, representing some of the main telco players in Europe. Our members represent 70% of the investment in Telecom infrastructure in Europe.

As an association we're sector members of the ITU where members bring business perspective of this standardization. It is wonderful to be invaded here to discuss 5G here today. It is an understatement to say that 5G is important for ETNO. It is extremely important and our members are very busy with the rollout of 5G infrastructure and services in Europe. We know this is the background of the European infrastructure and will enable digital economy and society as such.

Before we are looking into the policies and strategies needed to realize 5G in Europe, I think there is -- it will be helpful to take a step back and to consider in what context will 5G have a strategy, how it will take shape. Why is the regional strategy needed? 5G is not nice to have an add on only, it is a must have and we can only look at the policy challenges and the promise of future 5G news cases to understand why it is important to have a timely rollout and uptick of this technology.

If we take the challenge with the environment, reducing emissions, realizing efficiency, it can be done by developing Smart Cities for example or enabling connected vehicles to operate the most efficient way. This requires greater bandwidth, high speed, super low latency, and here again, the answer is 5G. Beyond that, from the industry point of view, 5G will be transformative to enable new technologies such as robotics, Internet of Things, remote control, virtual reality. This will allow for value creating innovation that we cannot imagine yet all of us.

We also see a major shift in the majority of telco subscriptions right now coming not from individuals but from verticals and that's the industry itself, that's using 5G networks. We have a recent study conducted by ETNO together with other, learning the majority of Europeans are positive about 5G, saying that it will enable, foster connectivity, allow for development of new technological applications. It will improve health service, make remote working even better and that's extremely important in these difficult times that we're having right now. We find ourselves key employing 5G and drafting policies and strategies. We also see that there is an urgent need for 5G and also a considerable desire for 5G throughout Europe. There is a need, there is a desire, we see a lot of promise, but will it actually happen? Well, our State of digital report in 2020 found that IoT connections in

Europe, which rely on exactly next generation of connectivity will increase from around 95 million active connections in 2017 to a forecast of 740 million in 2026. We see that the most advanced vertical sector in IoT right now it the automation, and that sector will continue to represent a very important share of connections using 5G what's particularly exciting, Smart City, buildings, utility, they're all using IoT today and that will increase even more in 5G connectivity, it will grow in the next 5 to 10 years, there are vast opportunities and we have the initial demand, and the question is how do we meet and monetize that demand. The telco sector, we need to promote investment in mobile and fiber networks and we need the European government and economics to help with that. We need a time friendly regulatory framework, talking about a pro investment in the European code here and we have to look at new business models and to look at network share, co-investment and on another point, we need governments to facilitate cost reduction and related to all of the deployment of 5G. That's about opportunity and the spectrum of what is supporting the local commissions and also we need Europe to set aspirational targets on the demand side. We need to encourage traditional European industry, the public secretary, the consumers, to bring their ways of working to the digital age as such.

That can be done by digitalizing public services, enabling policy frameworks for IoT, AI, and we also of course need to have the end user inclusion and digital skills here. We need to encourage the demand side to use 5G. So spectrum, it as building for a successful strategy, without spectrum and investment, there is no 5G services but there remains one other issue that should be addressed in these regional strategies because the rollout and uptick of 5G can be hampered by misinformation surrounding exactly to the 5G technology. This slows down the work of regulators to introduce 5G in regions and this is a major obstacle in the development of a light deployment regime and in the actual deployment of the infrastructure itself.

We need to look at -- we don't want to call the enthusiasm and availability of investors and capitals and we have to be aware of the misinformation, it should not stifle the innovation or make it harder to generate the demand, the demand needed to use 5G.

It is extremely important that misinformation doesn't lead to outrageous and dangerous acts of vandalism, of arson, physical, verbal abuse of employees, we have seen that in the past six months here in Europe. Misinformation

around 5G can actually derail the 5G strategies and we think it is important that the European Commission and the Council have many -- that they can use legislative, non-legislative tools to drive the rollout and uptick of 5G but that can be all hampered by misinformation.

We're pleased also to see the recent communication from E.U. Member States calling on the commission to coordinate and step up the actions in combating misinformation. After all, governments, local, regional, public authorities, they're among the most trusted sources on the issue of 5G. So ETNO and our members are vocal around this, we hold regular dialogues with the authorities, the European Commission, national governments, and we also offer our support and expertise on these issues. We're holding a series of workshops that we call 5G user forums that are aimed at illustrating the key applications of 5G and infrastructure, healthcare, transport, and we're supporting our work by engaging the citizens to understand the real sentiments behind 5G.

My conclusion, having seen what 5G can do in our societies, in our economies, as well as we can be doing to encourage its rollout and up take, do we need a regional strategy, of course we do. Yes. If we look at an important indicator of how advanced other regions are in 5G considering the number of 5G connections, we can see that by 2025 Europe is expected to see around 538 million 5G connections. The Americas, around 642. That's completely over shadowed by an estimated 1.7 billion in Asia-Pacific. What must a 5G strategy be? It must be forward looking. It must be comprehensive. It must recognize the sheer scale of the benefits that 5G can bring to our economy and also our society. It must be honest, democratic, able to respond to the legitimate questions and concerns on EMF and security and respond to the concerns informational way.

Thank you for hearing from ETNO and we're happy to contribute to this very important discussion.

>> JAROSLAW PONDER: Thank you, Madam, for this message. The voice of the private sector is key. The stakeholder, accommodating all investment risks and we have to be very careful of what's happening at the regional, subregional and other levels and to help those who are investing in the future. Thank you very much for this. I still encourage our colleagues to use the opportunity to interact with our speakers on the chat box.

Having said that, I would like to invite the Vice President of the GSMA, policy and regulation and head of the Europe, Russia and CIS, GSMA, Mr. Daniel Pataki who

will take the floor.

>> DANIEL PATAKI: Thank you for inviting us.

It is a long debate. I'm the seventh person talking about this here, and I know that we're short of time. I'll try to be very brief and also not reading my script but maybe giving food for thought for the discussion.

I'm a veteran in Telecom policy, more than 20 years, many of you are the same. I was thinking recently, maybe the last 20 years, I was -- all my work, it was about either explaining, if I was on the policy side, the regulator side, convincing as I'm now in the industry side, how this Telecom industry is important for any government or any society. I think something has changed with COVID, now I think it goes without saying, so we had the chance with the Prime Minister of Poland to hear from, any country now, it goes without saying that this industry is coming from, there is a recognition that we're not important but that we're essential from now on. This is something which is important.

The other point, the other message what, I wanted to share with you, it has been said already by more than one, that 5G is not another G, it is not just another addition or another decision of technology. We see at GSMA, our members see this as an opportunity to transform economies, so when we talk about Europe, this is also an opportunity to transform the European economy, enabling digital transformation like the Nordic Council I think it was. Why is it important other than lip service? There are studies saying digital economy, digital transformation cannot add up to 1.21% GDP growth in the European, that mean it is it is a 40% growth by 2030 which is basically the GDP of Italy, this is a magnitude that we're talking about.

This panel about 5G policies and strategy, if I turn there, I hope there are still a lot of regulator, policymakers listening to us, I would like to -- I think that there are two main objective it is I was a regulator, a policymaker. There is an objective that used to be there, how to connect everyone. This objective had a kind of a twist now, it is not only how to connect everyone but how to connect everything. This is an objective with a twist. There is a new policy objective about data. How to process, how to store data? 5G, it is bringing this new kind -- new way of looking at things in policy, how can you do it efficiently and respecting the values.

After 5G, I would like to give food for thought, there will not be discussion but we'll be discussing this, what are the strategic questions for consideration for

policymakers? I would say three things here and some of it has been already talked about. The first one, which has been mentioned, the investment gap, it is the difficulty, you know, some people call it the 5G conundrum, how you make and solve the problem between coverage, capital incentive and intensity or in other words investment and profitability.

How you can make that happen. I think there is a good -- at least in the European Union, the next generation of the fund, it is a good tool and I think that the industry, stakeholders around Europe should think about it, how to spend this widely.

This goes to the first challenge to connect. I think for the second challenge of data, I would mention too tower strategic question, one which has been raised about digital sovereignty, in Europe how the commissioner talk about it at the personal data debate, it has begun, Europe has lost that battle and now the industrial data is coming, how this could, you know, how Europe can increase its competitiveness or being digital. This is a discussion we should have.

The third one, it has been discussed a little bit, it is Cybersecurity, which is basically the problem of today or the future, many people think that in five years now there will be an outage in 5G networks and it will have the same problems or same difficulties for us as a power cut today.

Last but not least, I thought I would try to be pragmatic about if I'm a regulator listening to this discussion, what can I do about this tomorrow? We think with our member, there are at least three things you can do tomorrow, one, about spectrum, a lot has been said in the beginning about spectrum get the spectrum allocation, right. Meaning, you know, make spectrum available, make it available at the right price and don't let free riders get that spectrum if I want to be blunt because we're running out of time. The second one that's been mentioned by Lise as well, making 5G rollout easier. There are still administrative burdens there. You as regulate, a policymaker in different countries listening to us, you can do a lot. Last but not least, it has been mentioned before by some of the panelists as well, it is let's put together in our mind how we can fight, smartly fight against misinformation or disinformation in 5G, we see in many European countries that this is a big problem.

Last but not least, I would like to offer GSMA, we have been involved in the discussions, we're -- I

personally as well and with my colleague, we're prepared to serve this cause and be a partner in this discussion.

Thank you very much.

>> JAROSLAW PONDER: Great. Thank you very much, Daniel Pataki, for bringing so many issues to the table. We're pleased to see that there convergence of the challenges raised in context of the 5G which you in fact summed up for us, it is great analytics already of our discussion. I thank you personally.

For sure, there is a lot of work to be done and also some of those challenges will be discussed in the fourth session on misinformation, where we want to take a little bit of a closer look at the challenge of how we can handle this at the regional level, strengthening efforts and maybe also coordinating with different actors at the regional level and to generate some strong impact and to help the private sector with the investment and the recovery of the return of the investment.

Thank you very much.

Thank you for that.

Let me now also call all participants to use the opportunity to chat with you in the chat box and in the meantime, let me come back to Neils and hoping that it will work this time and that the technology would be with us and with the 5G -- I would give the floor to Neils Kalnins and we'll have a second chance.

>> NEILS KALNINS: The magic of restarting a computer helps! Warm greetings! It is really good to see you here. Sadly, we didn't see each other for a long time, I hope that spring will come and we'll have some ITU session where we can participate altogether and see each other face-to-face. Today I would like to talk about our initiative. As you know, I'm coming from electronic communication office in Latvia, we're a state-owned enterprise and we're technical regulators responsible with the planning and supervision of radio spectrum here in Latvia.

As I mentioned, today my topic will be about cooperation and cooperation in a sense, a scale that's much more than Latvia. I would like to start in relation to 5G. The hope, the hype, for digital future, I think this sentence we heard several times and actually when we think what's goes on in the 5G world we often came to this question, it is a hype or hope.

Next slide, please.

Actually when we started work on development of 5G ecosystem here in Latvia, when we started to look around,

what's going on in the region, we recognized clearly that there is a huge gap actually between companies who really are deep inside of 5G technologies, who are developing them, and the software, hardware, all related things and there is definitely the other world where other companies, administrative organizations live, they know that 5G exists, 5G will come, but they do not understand so well actually how practically 5G will influence our life. In the meantime actually there came up also the question that 5G could be dangerous in some sense talking about radio wave, security, other things, this actually make this gap not smaller and that's the reason why we created 5G Techritory, aiming to bring all of the parties together at least here in the Nordic Baltic region.

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When we started to develop this platform, actually we created three principles which we are trying to follow very strongly. The 5G Techritory should be cross-border cooperation, cross-sector cooperation and cross level cooperation because this is the only way how we can see that through integrated activities you really can implement 5G in reality, from our point of view, this is not a question about the spectrum because here in Latvia, everything is fine, planned, the operators had an opportunity to use the frequency bands but the question is why the 5G technologies are not deployed outside of the building in the air, sea, et cetera.

Please, next slide.

Yeah.

We can go to the next slide as well.

Talking about the partnership platform, actually our aim is very simple to establish Nordic Baltic coordination and cooperation platform, to develop and commercialize 5G technologies. Here is one special sense from our side, when we talk about cooperation and coordination, we're not talking about the political statements and wonderful documents and everything, what we have heard quite often, we talk about very practical cooperation that universities work with each other, that the work is with each other and nevertheless they stay in Norway, Latvia, Sweden, when we talk about companies, we do our best to bring them together, to do, to think, to create a new project aiming to achieve the goal of deployment of 5G.

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Here are some activities, what we do, what we'll do in the next four years. Actually I would just like to stress my attention on a few of them which are essential from my

point of view.

We as a region, the northern Baltic region, we need a common 5G strategy and why it is needed because the region consists from very simple, small countries, and the market is very fragmented.

If we think about true commercialization of 5G technologies, deployment, I think that markets should be unified, at least here in the northern Baltic region and dhow it, how to convince the government, company, that's the question of why we need strategy. How to do it appropriately.

Next, sorry -- can you come back a little bit for some other things? I would like to underline one more issue it is a lot of legal acts. One reason why 5G is so purely deployed here in Europe from our point of view, it is because there is no legal acts which allow to fly drones out of direct vision of the power, there are no rules to supervise remotely driving cars, there is no rules for self-driving ships. The technologies are here and companies invested already billions of euros to develop the technology, the question is why the technologies have not bought good things to our society yet. As we have talked about before, we're trying to be as practical as we can. We would like to describe some projects we're working on, one is the digital Baltic road, and second slide, the second project we're working on right now, the digital Baltic sea project, we have a unique resource in the Baltic sea and around the sea, there is a wonderful country that's developed in technologies and we hope that we can establish where new technologies for future logistics, future mobility could be realized and tested at first stage.

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I would like to finish my presentation with a kind invitation to all of you to participate in the third event of our cooperation platform, our forum, it will be held this year in Riga, digitally, we cannot participate so much physically but we can participate digitally. That's the reason I didn't we call this event Figital, and the key topic will be lessons learned from first year of 5G and there will be a collection together of examples and practical lessons learned from China, from South Korea, from Japan, United States, from all around Europe. Your welcome to the event, it is free of charge for everyone. I hope we will see each other in Riga soon.

To conclude again once again my presentation, I would like to stress our attention to the following things -- could you come back? Thank you.

One vender alone, one government alone, one operator alone will not implement the strategy of 5G and will not implement the technology as such. That's the reason why we should be very, very practically cooperating with each other, not just in Baltic and Nordic region but in whole Europe.

Thank you very much.

>> JAROSLAW PONDER: Thank you very much for this and also for bringing so much of the innovation to the discussion, also the new context of the digital sea. It is a lot of inspiration, apart from the name, you always surprise us and also innovate in bringing technology to the territory and now the physical presence, the digital presence. Thank you very much for this. We're looking forward to continuing our faithful collaboration and also the studies of the different panels and session of the strategic issues of the 5G implementation.

Having said that, this brings me to the next speaker and thank you very much for your contribution.

Let's move on now to the next speaker, who is representing the European compensate active radiocommunication association, Luc Hindrycks will draw our attention to the other dimension that was not addressed so much so far.

We look forward to the contribution.

>> LUC HINDRYCKS: I would like to start by thanking ITU for giving us the opportunity to provide our views and, of course, it is a challenge after so many good speakers to try to say something that's not been said yet.

Next slide, please.

A few words about who we are, we are the European competitive telecommunication association representing the competitive players, those that are in the organization of the market and that have contributed with operators at the very beginning to connect the European cities and during the pandemic time, the connectivity towards the data centers was resilient and also we have many players that moved now from these activities to the mobile activities with the recent market entries in Germany, Italy, so on, also moving up in offering digital services because it has been said that the Telecom infrastructure is the fundamental layer and fundamental for years to come but also on top of that, the digital services that will be offered on top of that.

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Let's go through investment. It has been said investment needs are very important. One euro can only be

spent once, if you send it in auctions, you will not spend it in network. Then we see differences across Europe. Let me mention here the example of France, for example, the auction has provided reasonable price and reasonable operates, we thing that the French authorities designed it to be so if we compare with other country, Germany for example, the result was quite expensive.

Let's look at the graph with the investment in fixed and mobiles, excluding fees that reached 10.4 billion only last year. Next slide, please.

Also it is really a very important lesson that we can learn for 5G, it is what happens with 4G. I don't have a better example than the example of France. What was happening? If you remember well at that time, you could not choose the frequencies where you wanted to deploy your technology because the technology neutrality, it is not like it is today. You needed to be able to deploy certain technology in certain bands. If you see in April 2013 the French authorities, the French authorized a Telecom to deploy 4G in the 18 gigahertz band. What happens with that, we started to duo employ 4G, it started the race for deployment in 4G, you see the evolution of the deployment and the number of antennas deployed in the 18 gigahertz band and on the left side you see all of the frequency bands used by different players to deploy 4G along with megahertz 800 and 2.6 and you really see it is the moment that we decided to launch that orange area.

Looking ahead, competition should not be taken for granted, many strong voices say there is enough competition, we have to have European champions, don't forget the big tech U.S. companies started from nothing and are not issued from champions, from the U.S. champions. That's an important element. The second point I wanted to make, there are doubts, many questions on the benefits of 5G and what will be the business cases and also some politicians are reluctant because of EMF issues and so on. Other industrial players have understood more than that, more than others what the strategic importance of 5G is. To the extent some businesses have asked for reserve of private use, a case in Germany and other countries, if you also look at what's being said about the industry 4.0 and a pillar of that, it will be 5G, of course, it is the IoT and the connectivity, it is acceleration due to COVID.

Next slide. I want to illustrate we support Antwerp and the picture you see on the right-hand side, it is what was announced the day before yesterday by the City of Antwerp, you see the port, they're leading digital transfer

medication and laying the foundation for jobs in the future. It is an interesting example. More than a year ago already the port of Antwerp made studies on the benefits, the efficiency benefits if they implement 5G on all the port. The benefits were in the double digit benefits and they look at that in a strategic way to get an advantage in not only Europe, but also on a global scale. That's very important that really some industrial will drive the rollout of 5G and they understand more than others the important and benefit of what can be taken out of it.

Next slide, please.

I was inspired to make this on the other topic, for us, the focus of the next decade will be B to B, the benefits, most benefits from 5G will come from the Telecom perspective, from the B to B activities and of course that's where the focus needs to be.

Next slide.

What we see, it is that means there is a digital transformation for the structures, it has to change, we have seen many operators focusing on the consumer market, on the product leadership, operational excellence, now they have to rely on customer and to look at the other sectors and to think about what is the new business models to allow the new business models to emerge.

This intimacy between the Telecom sector and other sectors is crucial.

Next slide.

Now if we look at what does this bring? It is the home and the promise, they're -- speaker before me, they have said it. What we see, it is that all of this will have high impact on all other aspects of the economy and society and the rapidly evolving digital technology will transform all sectors and play a crucial role in society in confronting challenges. It has been said, environment, resources, Climate Change, so on. The good news, it is that Telecom sector, more generally, the competitive digital ecosystem, it plays a crucial role and catalyst and can be a driving force for all sectors of the economy to successfully address this challenge.

Please, next slide.

I represent that this slide, it is a small figure, when you see in fact on the right, all of the benefits that will come from all of the other sectors of the economy, here we are not in the Telecom-centric but what are the results by all of the other sectors of the economy, it is increasing innovation, increased competitiveness, more

jobs, welfare, security, more inclusiveness, it is very important. For this to happen, the innovation potential of all of those sectors need to be released and to do that one of the prerequisites is that they can benefit the variety of products and services from the variety provided, small and large. That's very essential.

There are pitfalls, we have to think about the European champion, it is not champions that brought the innovation and the competitiveness on the European market. The innovation came because of the competition and very often by small players. The other thing that we see, that's very recently more sensitive, it is the element of the value chain, you need to have enough competition, if you have enough competition that will guarantee that your innovation potential will be maximized and what we see, it is that there is a trend on the supply side element of the value chain, that there is a reduction of competition. The number of provider, that Telecom operator cans use to deploy the network, it is reduced. This will not only have consequences in the value chain, but also on the operator side, by increasing their cost, delaying the deployment in 5G network, and in constraining the innovation potential and other digital service providers. This will have an impact because it will reduce the innovation potential of enterprises small and large in all of the sectors of the economy.

This will have an impact of the previous side that I showed you and limit the innovation potential on which policymaker placed so much hope for the future but competition should be considered as an important driver and the fact is, competition, not only benefits consumers, but also businesses in different ways.

Next slide, please.

How can we help? It has been mentioned, the first thing, it is to increase the return on capital infrastructure sharing, it is something that's certainly something that needs to be discussed, you see that BAREC is organizing workshops on that on a none discriminatory way, what we're seeing, the number one or number two, we have agreed to share infrastructure, and the other players, they have been excluded, that's not working. There is a redline also in infrastructure sharing that cannot be crossed. We need to think about that. What's important, it is that each player can keep and define the products and services. There are three main legislative finds that are common, the one, the first win, the recommendation that's linked more to what happens on the fixed network, that I think it has

been said at the very beginning, without good fiber network, they won't have 5G and for that, the 5G, the fiber network, it needs to be as competitive even more competitive than the 5G one.

The second one, the cost, the review of the cost reduction, they don't compete unfairly and more importantly, that the rules in fact will not benefit or design in such a way that only historical incumbents can benefit from it.

>> JAROSLAW PONDER: We have to wrap up.

>> LUC HINDRYCKS: It is my last slide. To force competition, it is one of the key elements, because from what we have seen and what we have seen, competition is a driving force in investment and network and services and we welcome that in the auctions, and for example, definitely announced today, hope nothing change, in Portugal where they favor the market entry.

Next slide. Conclude.

Thank you very much. I give it over to you. Thank you.

>> JAROSLAW PONDER: Thank you very much for this insight. You raised very pertinent questions and also drew our attention to the importance of the competition. Thank you very much for this. I encourage all participants to use the opportunity to chat, autonomous navigation the chat box.

We have still two presentations to go. I hope that it will not affect your focus. We are aiming for a short break, but before break, I would like to invite our colleagues from DIGITALEUROPE, Albert Di Felice, Policy Director to make a presentation on your perspective.

The floor is yours.

>> ALBERTO DI FELICE: Thank you. Hope you can hear me. I will try to be as brief as I can given the time and everybody's lunch plans.

By way of introduction, important to put it in context in the sense that we are an association representing the digital technology industry broadly speaking in Europe both national trade associations from all European countries and beyond the E.U. and 76 corporate members that represents the full spectrum of digital companies from providers, key provider, digital technologies, including very important purposes for today, infrastructure vendors and chip vendors and key users of the digital technologies, in full spectrum, including recently so-called verticals and we have seen an increase in digital manufacturing healthcare, connected cars.

With this in mind, it is fair to say that full connectivity in Europe is a high priority for the association and what we're seeing now, clearly Member States throughout Europe have reached 100%, basic broadband penetration, the pandemic clearly has shown that not all children can study online, not all members of a household can watch student services on TV or communicate through messaging services or work reliably from home.

So the rollout of 5G, clearly it complemented fixed connectivity, it is a crucial element of ensuring ubiquitous connectivity not only for consumers but crucially for economic recovery, to meet enterprise connectivity needs as businesses are transitioning to more circular and sustainable economic models.

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I guess this backdrop what, we're seeing today, it is that unfortunately two-thirds of E.U. countries have not assigned mid band spectrum whereas South Korea, China as all know allocated 3.5 gigahertz band in June of 2018 and 2019 respectively.

At the same time, half of new Member States have not launched commercial services, whereas the first commercial services were available in South Korea and the U.S. a year ago. Now, this is the situation. Let me expand on what we think are some key challenges when it comes to rollout of 5G in Europe.

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As I have shown in my previous slides, clearly ensuring swift, harmonized spectrum availability is essential for the rollout, this is key to ensure that Member States proceed swiftly with making spectrum available for the bands identified and there is no additional delays beyond those caused by the COVID-19 pandemic.

Additionally investment friendly mechanisms that have been mentioned, but previous speakers, to make spectrum available should be promoted, you should rollout networks quickly rather than inflating short-term revenue for the state, or a use by Member States of payment arrangements that support the investments required to guarantee optimal use of radio spectrum. Plus considering that enhanced wi-fi connectivity complements 5G and 4G, wi-fi, licensed LT all work together, both licensed and unlicensed spectrum will be needed and therefore enabling the development of promoting efficient, appropriate spectrum resources will help to promote the experience of connectivity and will be important as a complement to keep use cases particularly on

education and on video streaming as I said.

In addition, I also mentioned by my -- as mentioned by my colleagues, simplified site access and permissions is essential, planning and permission with cumbersome drawn out processes that add signature cost to deployment and therefore we're supportive of the work that's been done on harmonizing the requirements for a small cell deployment in Europe and looking forward to the review of the broadband cost reduction directive that the commission has announced which will include sustainability targets for the deployment of 5G networks and fiber networks and to ensure alignment with the code.

Next slide. On the topic of security of networks and applications, we greatly value closer collaboration between Telecoms, regulators, and it is important that technical conditions are harmonized throughout Europe, particularly through certification schemes developed under the Cybersecurity act and the uptake of the additional innovations and in the market, that it is not curbed.

Additionally, 5G networks are being built out and performance and capacity gains are available for new use cases including what we call old use cases, one of the first being fixed wireless access which was one of the early cases of 5G and so fixed wireless access can complement as faster, cost effective alternative to provide broadband connectivity to homes and also to SMEs crucially, clearly rural area where is there is lower population density and this was also mentioned by previous speakers.

Lastly, we're convinced that -- this will be the topic of the last session, as you have already said, tomorrow, that governments and Telecom regulators together with operators and other stakeholders play a vital role in providing consistent, fact-based positions in finding this information regarding electromagnetic field health effects and it has become apparent that misinformation on EMF is negatively impacting network rollout in Europe and if we want to promote efficient investment in innovation in new, enhanced infrastructure, it is important to have a sound societal debate around this issue with all of the relevant, sound data.

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Looking at the opportunities, business models provided by 5G and digital transformation, clearly this is key for the change that we want to see in wider sections of the economy leading to improvements and automation and pro productivity and innovation, a key regulatory requirement for this, it is that any new regulatory action should not

be premature, excessive, and needs to be minimized and needs to treat all business models equally in regulatory bias that favors one business model over another. At this stage, all of the use cases, this is very important if we want to have a competitive market. In addition, we must remember that IoT and 5G-driven innovations is essential in a large extent will be international applications and need to move seamlessly over national borders, particularly within Europe where we're already seeing operators increasingly offering solutions to companies operating in European scale and beyond the operators traditional own market. This is one example of why the cross-border nature of these services and activities makes regulatory harmonization efforts pursued by the E.U., particularly timely and relevant.

This is particularly important in the context of national implementations of the European Electronic Communication Code. When it comes to network slice, we believe that the Open Internet Regulation in Europe strikes a reasonable balance between protecting user rights and ensuring freedom to continue to innovate and develop new services across the entire technology ecosystem. This being said, what's worrisome, perhaps inconsistent application of the open Internet regulation to 5G slicing, that it may negatively impact the development of offerings that are adapted to market needs and again resupport harmonization of the regulation and interpretation enforcement throughout Europe.

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On addition to the new capabilities of the 5G key to remember, 5G will be to interoperate with other networking technology, not unique or limited to 5G but central to delivering end-to-end transformation and mobile networks, most notably, virtualization and reliance on software. Network slicing, automation. In order for 5G networks to enable digitalization for verticals, above and beyond providing them with enhanced connectivity and higher speeds, the shift to 5G has to go beyond the radio access network and transform the network end-to-end from the core or to the transport layer and to the radio access work.

Against this background, it is key to encourage interoperability particularly interoperable standard as an important vehicle for harmonization of technologies, business models and policy considerings and thus also for the issue of additional single market in Europe.

Finally, 5G networks and improved connectivity will have a two-fold role in the sustainability targets and

beyond the importance of 5G network energy efficiency for the Telecom industry side of things, the connectivity enabled take up of solutions can contribute to making our societies greater and we mentioned use cases for promoting diagnostics, reducing the need to repair machinery in trucks, farm, minimizing pesticide over use, managing water consumption more efficiently. We believe strongly that there is a need to deploy capacity networks that will contribute to the new climate objectives and this goes hand in hand with better, more efficient use of digital tools more effectively to ensure that the data centers are powered with clean energy and this is the cornerstone of efforts across industry to improve our environmental footprint across the board. With that, I'll conclude and hand over to you.

>> JAROSLAW PONDER: Thank you very much.

Thank you very much for the insight.

This brings us to the last, not least speaker, who is representing the satellite operators association, the European satellite operator association, and Madam Aarti Holls-Maini, Secretary-General, and I would like to hand over the floor to her not delaying and still requesting you at your understanding for this delay.

>> AARTI HOLLA-MAINI: Thank you very much. Thank you. Thank you for inviting us to participate.

I'm delighted to speak here. My presentation will firstly talk about how satellite continues to embed the crucial role in 5G but also to touch on COVID and other real world considerations that have to factor into policymaking going forward. That means talking about factors such as economics, inclusion, resilience, climate and environment because that impacts the food supply, access to information, live events and secure communication, all of these factors underscore the role the satellite.

To start with satellite in 5G, I'm sure many people are aware that the European Commission as well as the European space agency have supported multiple projects involving satellite operators, terrestrial operators, other stakeholders as well and those projects have served to validate satellite technology for its integration into 5G, to give you some examples of the cloud computing side we have partnerships that happened between some of our members, notably those listed working together with IBM and Microsoft and other, those partnership, they're using satellite to optimize the delivery of large video files using the Cloud, deliver industrial IoT based solutions to

verticals and even to help enterprise customers extend their cloud based applications to wherever needed in the world.

Sticking with 5G, I wanted to give you an example, very recent, just on the first of October, in the U.K., 02, working with our member hispas -- Hispasat launched a lab, testing autonomy vehicles, and it is open to companies that want to test proofs of concept and explore how it could work for connected, autonomies vehicles. I wanted to quote Derrick McManus, the Chief Operating Officer of 02 saying this is the next step of getting the vehicles on the road and making the U.K. transport network greener. We could be talking about the U.K., we could talk about anywhere else, it is clear that this is a great initiative I'm not showing this video. Don't click on it whoever is managing the slides. This is an interesting video on the trial for you to look at afterwards.

So still with 5G obviously IoT and massive machine to machine communications is an important market for the satellite sector. I want you to refer you to an example A trial happening recently between the chip manufacturing company, the trial talked about the terrestrial chip sets with existing geostationary satellites, they successfully communicated information through a satellite from an unmodified terminal using a demonstration of a single device for connecting satellite and cellular networks., it is a foundation for hybrid satellite cellular networks to enable this globally.

Next slide.

Still with I wanted to mention a cooperation, with the next generation mobile network alliance, they requested to enter into a cooperation with ESOA because they were eager to support the work within 3G33, from that side, working with member, they assessed a list of verticals that you see there, all the way from land, mobile, community wi-fi to IoT, Maritime, back hall, connected cars, and based on their conclusions and the collaboration, they published a white paper which you can find I have given the link there, and that's served as a strong support for our seconder to include the normative work on new radio to support satellite and also to support satellite which is ongoing now, normative work and study work early 17, we're continuing the cooperation as we go into the standardization place, but for our members, I think that the most important thing right now, it is that MNOs should be open and start getting their hands on to satellite technology to test it for themselves so I'm talking about

pilots with real users in controlled environments, and they can make use of the European space agency's space for 5G program which is a cofunding support for convergence projects. That's what we think is really important going forward. Next slide.

So 5G is all slow nice, lots happening, satellite is very much part of it, meanwhile, the world looks completely different. Connecting everybody in this new normal means we cannot ignore the fact that usage patterns have changed, there will be more suburban, rural usage and a chance that it will stand a permanent basis, so bridging the digital divide, including in Europe is a priority.

We talk about 5G, and when we're at event, there is always a lot of statements made how Europe risks lagging behind the rest of the world because indeed 5G is a global phenomenon, but I thought it would be interesting to share with you the results, they have asked the community, the participants, but also an important segment of regulators, what has COVID highlighted the greatest need for. You can see that dominant throughout this, resilience, coverage. The coverage is obviously in those countries that have larger territories still requiring a lot of development, lacking infrastructure and even in the more developed economies within Europe, within the U.S., resilience came out very important. I'm not ignoring speed, just putting it in context, when we think on a global -- with a global perspective, there are many different factors we need to bear in mind.

Next slide.

Possibly one of the most important one, also highlighted by COVID is the economics of rolling out tomorrow's connectivity and the need for inclusion.

If we look at Europe, we know that we have 3% -- only 3% -- it is tiny! In fact, it is 6 million households in the E.U. who still are unconnected against targets which have been set by the European Commission ranging from 30 to 50 megabit a second over the years for 100% of the population. We know that rolling out fiber is prohibitive, it is cost prohibitive, I'm using GSA figures here with this example of Germany, they made an assessment saying it is costs 2700 euros per household, fixed wireless access is not better. You have to extend bay stations and fiber backhaul to complete the solution. That's also expensive. Satellite is providing pan-EU availability today and the rates are maximum 50 megabit a sec, 100 is coming at the end of next year, beginning of 2020, competitive prices. The conclusion of this, it is that there will never be a

one-size-fits-all solution and there is a very high-risk of a 5G divide. Ultimately when it comes to rolling out 5G, 4G even and closing the digital divide it is not a question of spectrum but economics.

Next slide.

I wanted to show you -- next slide, please.

Thank you. This is building on resilience.

The other factor that we saw people around the world think is crucial to the networks. This slide uses material that's come from BT. In the U.K. BT was selected to deliver the radio access network service for the U.K.'s emergency services. They have two priorities, one was coverage for emergency services and the second was resiliency. The terminals, VSAT terminals there, you see that next to a bay station there, it allows BT to back up the fiber and micro waive link was satellite, it is an effective way they said of significantly increasing the uptime of the network.

They said that this is ever more important for them because they're delivering more reliable and going forward with reliable services and applications and said it was vital for BT to decouple failures in the terrestrial network and having a space-based component made it easier. Beyond resiliency, it is for emergency services and extending mobile broadband and in the future it is for IoT.

BT today has 1,000 installations in place using RSAT. Going forward, they're looking at the model of increasing the satellite backhaul in the network, making use of the NGSO constellations and said that activities will increase the use cases and therefore justify even more their investment in satellite.

Next slide.

Even through lockdown, we have seen forest fires, cyclones, disasters, all kinds of things coming from the climate and the environment. It is not just an outside the E.U. phenomenon. It is a global phenomenon playing into policymaking globally, including in Europe. It most importantly affects the food supply, here is a snapshot of things that members are doing using satellite communications to support precision farming, monitor livestock, support fish farming, complying with E.U. regulations and supporting transport going forward.

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