Summary of the public hearing on digital broadcasting and the use of the EU-harmonised 700 MHz frequency band

held on 11 July 2017

1. Introduction

On 9 June 2017, the Office of the National Media and Infocommunications Authority (hereinafter: the NMHH) published a call for a public hearing on digital broadcasting and the use of the EU-harmonised 700 MHz frequency band. On 27 June 2017, the NMHH published a consultation paper on the "national roadmap" – public hearing on digital broadcasting and the use of the EU-harmonised 700 MHz frequency band.

On 11 July 2017, the NMHH held a public hearing pursuant to Section 39 (1) of Act C of 2003 on Electronic Communications (hereinafter: Electronic Communications Act) to provide a platform for professional positions and opinions on electronic communications legislation and the measures to enforce those as well as the preparation and elaboration of legal implementation. The agenda of the public hearing includes the plans and the schedule for the utilisation of the VHF III and UHF bands (174-230, 470-790 MHz), i.e. the future of digital broadcasting, and the options available for mobile broadband frequency use. The preparation of and consultation on a national roadmap is required by Article 5 (1) of Decision (EU) 2017/899 of the European Parliament and of the Council of 17 May 2017 on the use of the 470–790 MHz frequency band in the Union. The NMHH plans to use the public hearing to listen to the opinions of the stakeholders on digital broadcasting and the use of the EU-harmonised 700 MHz frequency band.

In accordance with Section 39 (5) of the Electronic Communications Act, the Authority will prepare a summary or record on the public hearing containing the comments and proposals presented and expressed at the hearing, except data classified by commenters or proposers as trade secrets. The Authority shall publish the summary within thirty days of the date of the hearing on its website.

Accordingly, this summary covers the contributions to the public hearing held on 11 July 2017 and contains the comments submitted in writing in relation to the public hearing. Pursuant to Section 39 (5) of the Electronic Communications Act, the document to be published will not contain any data classified by commenters as trade secrets.

The public hearing was opened by **Dr. László Pados**, the Chairman presiding over the meeting. Dr. László Pados informed participants that, in the absence of any opposition, an audio recording of the event would be made by the NMHH. When explicitly asked, no one raised any objections to the plan to make a recording.

Participants in the public hearing were welcomed by Director-General of the Office of the NMHH **dr. Janka Aranyosné Börcs**, who went on to describe the historical background.

Deputy Director-General of the NMHH **Péter Vári** presented the available spectrum, the technologies to be applied in the specific band and the legislative environment prevailing in the European Union. In respect of the available frequency bands, he advised attendees on the current status of international coordination and the issue of border area usage. At the end of the presentation, statements included in the summary published for the public hearing were projected, highlighting the most important parts, thereby encouraging participants to express their views.

2. Summary of comments and contributions made verbally at the public hearing

BASYS PRO-AUDIO Kft.

Questions were raised concerning the NMHH's plans for PMSE. What will the Authority do to make up for reduced bandwidth? Does the NMHH plan to provide a dedicated bandwidth? Is a licensing obligation to be expected for tertiary use? Does the NMHH plan to inform stakeholders?

With a view to the growing number of PMSE users who find that the 2.4 GHz frequency band, i.e. the range of available frequencies, is not suitable for this purpose as it fails to provide secure service, making the use of the 470 to 694 MHz band increasingly problematic, what will the legislator and/or the Authority do to make up for reduced spectrum bandwidth? Does the Authority plan to designate a quasi-protected frequency? Is any restriction to be expected concerning PMSE after DD2? What type of communication does the Authority plan to employ to inform stakeholders, i.e. theatres, PMSE users and merchants, before 30 June 2018? What is the Authority's approach to the use of the VHF III band with regard to DAB and DVB-T?

Antenna Hungária Zrt.

Antenna Hungária Zrt. noted that it had submitted its opinion in writing as well and briefly outlined its relevant points. It welcomed the NMHH's ideas concerning audiences of free television broadcasts. More than one million people, comprising the most vulnerable population group, would be affected most severely if they incurred additional costs related to their TV options. It was requested that the 3 DVB-T multiplexes remain operational. MindigTV's offering provides a full range of entertainment and information options; therefore it was expressly requested that the 3 DVB-T multiplexes continue to operate on unchanged terms to the extent possible, even after September 2020.

In its view, following the decrease in frequencies available for use, keeping the 3 multiplexes operational would involve around half a year of work in terms of network management, based on its current knowledge. It was in favour of the 12-year licence duration. It agreed with PPDR operation. It considered PMSE options to be viable. In digital radio broadcasting, it found sectoral commitment to be necessary. With regard to DAB+, it indicated that it wanted to deploy a digital radio network in Hungary.

Hungarian Cable Television and Telecommunication Association (HCTTA)

The HCTTA highlighted two important aspects. The first important aspect is that of 4.1 million households, about 600,000 is covered by terrestrial broadcasting, approximately 1 million watch satellite broadcasts and 2.5 million have cable, representing the majority of television viewers.

For transmission purposes, networks and the interests of around 2.5 million cable subscribers are greatly affected by the loss of the 700 MHz band. Due to the loss of the 700 MHz frequency band, cable operators are faced with significant challenges in terms of replacing their equipment.

The discontinuation of the use of the 800 MHz band had already caused problems due to mutual interference; however, this was resolved joint coordination within the Communications Reconciliation Council (CRC).

In the HCTTA's view, the government should use the revenues obtained from selling frequencies in the 700 MHz band to provide assistance with funding the replacement of equipment.

The Association also pointed out another aspect, namely, that tests had been conducted on how this interference is mutual and how it can be addressed; manufacturers should be involved in studies in one way or another. Coordination with mobile network operators would be needed to prevent interferences. It considered an “overnight” transition to be a very optimistic scenario and rather recommended the introduction of a transitional period.

Csaba TV, National Association of Local Television Channels

It noted in its opinion that 10-15% of local TV stations are affected by the change as the others were moved to the band below 700 MHz during the transition in 2013. It thanked for the collaboration with the NMHH. For local TVs, it wanted to break up the process into two parts: those below 700 MHz and those over 700 MHz as they receive assistance from municipalities and are free-to-air.

Hungarian Cable Communications Association

It agreed with the argument presented by Gergely Ökrös, head of the HCTTA. It indicated in its comment that cable operators are secondary users and miss being mentioned in the NMHH’s paper. It should be about coexistence based on cooperation. The CRC’s Spectrum Management Task Force (SMTF) would be a suitable forum for this purpose, but the NMHH should also be involved. They would publish a written document in this respect. It called on the NMHH to make its measuring capacity available to the HCCA. Practical testing should be performed. The cable sector does not stand in the way of progress, but calls for cooperation.

Head of CRC’s Spectrum Management Task Force (CRC SMTF)

He noted that there had been less interference in the 800 MHz frequency band than expected.

In its opinion previously submitted to the NMHH, the CRC SMTF mentioned that the data volume to be transmitted might increase for mobile operators, although not to the extent described in the paper. In its opinion submitted in response to the NMHH’s Radio Spectrum Strategy, it stated concerning PPDR that the CRC SMTF is in favour of Option C based on ECC Report 218, considering the use of 2X5 MHz as the appropriate solution. It is against the option that would not ensure a dedicated frequency for European harmonised use, i.e. M2M, with reference to the above.

Ministry of Interior

In its view, the direction of further development was determined by the Schengen Agreement. 700 MHz is mentioned in a number of international documents. The Hungarian Government had already confirmed that broadband development was required in PPDR as well. Launched in 2006, the Unified Digital Radio Communications System (UDRCS) was implemented using the TETRA system and is still functioning well to this day; however, broadband data transmission is needed. According to the Government Decree in December, 2X15 MHz would be required to meet the needs. The direction is relatively clear. 2X15 MHz should not necessarily be available in one band. Although 410-430 MHz had been mentioned in the NMHH’s preparatory document as an option, but carrier aggregation was not seen as fully ensured. As a start, 2X8 MHz could be enough, but 2X10 or rather 2X15 MHz would be required to meet broadband PPDR needs.

Ministry of National Development

The representative of the Ministry of National Development read a statement, included in this summary under Section 3.

Ministry of Interior

The representative of the Ministry of Interior pointed out that current communications equipment must be upgraded in order to be able to serve its function. For that purpose, an independent, protected solution was needed. It might not be an ideal solution to use market operators' networks to ensure compliance with coverage requirements. To perform their core duties, emergency response organisations need a market-independent frequency and data transmission in order to be able to tackle the challenges they are faced with in extraordinary situations.

UPC Magyarország Kft.

The representative of UPC noted that they had seen concerning the 700 MHz MFCN roadmap that a market needs assessment was scheduled for this year. They considered it to be too early and requested it to be delayed by six months as 5G tests were just getting launched. It would be useful to know the test results before conducting a market needs assessment.

For 700 MHz, they asked for sustainable mobile competition and its promotion as well as the MVNO model to be taken into account. Important aspects also include pricing, number of actors and obligation structure.

Magyar Telekom Nyrt.

They noted that strong competition already exists on the market so they did not want to make public statements on certain issues. Fundamentally, they agreed with the NMHH's suggestions, approach to the problem and the proposed solutions. The number of subscribers is lower than expected. The cycles for which frequencies are made available to operators are getting shorter. Currently, frequency demand is not high as 800 MHz networks are just being deployed, while the expected replacement of a large number of terminal equipment did not take place. They noted that a fine balance must be sought both in terms of consumer welfare and price development. Besides a set of frequencies capable of being financed, proper devices and subscriptions are needed.

The Chairwoman of the CRC stated that a balance had been achieved within the Spectrum Management Task Force, but no such meetings were held when the frequencies were sold, which no longer seems sensible. Therefore they call on the Authority to provide a roadmap allowing for the isolation of well-defined responsibilities that are essential for the implementation of the roadmap.

Telenor Magyarország Zrt.

In their view, the date for putting the 800 MHz frequency band to use was approaching. They considered it important to learn about PPDR needs and cross-border interference. They called on the Authority to hold a consultation on these issues. They stated that there would be a 30-40% increase in the volume of bands available for use, while the demand for superfast internet access would not grow so revenues of operators were expected to stagnate. They would not consider a proportionate increase in frequency fees acceptable. They found the roadmap to be suitable. They would consider a slight delay acceptable.

Vodafone Magyarország Zrt.

They thanked for the great deal for work done to enable the extension of mobile bands. They suggested that PPDR needs should be known first and then should mobile bands be sold. They expressed their support for conducting tests on cable coexistence. With regard to bands other than 700 MHz, they saw a demand for bandwidth-intensive applications in the longer term. They welcome the opportunities within the 5G coalition to be able to make progress on the relevant tasks together.

3. Comments submitted in writing in relation to the public hearing

Antenna Hungária

National roadmap for the utilisation of the VHF III (174-230 MHz) and UHF (470-790 MHz) frequency bands

The future of digital broadcasting and mobile broadband frequency use options

Public hearing

Position of Antenna Hungária

Antenna Hungária Zrt. welcomes the consultation launched by the National Media and Infocommunications Authority on the future of the frequency bands used for digital terrestrial television and radio broadcasting, and presents its position on the issues cover in the consultation paper below.

As a preliminary point, we would like to stress that we consider it a top priority to protect the interests of the audiences of all free-to-air terrestrial television and radio services as this is the key to the long-term survival of these platforms and fully meeting the needs of audiences. Therefore, we would like to propose that the service to be provided under the new licence awarded in a future tender procedure should not result in interference for the population using any free-to-air media services, causing us to implement technical changes or even incur a financial burden.

1. The winning applicant of the tender for the national digital television broadcasting network for the frequency band 470-694 MHz and the free-to-air broadcasting station operating licence needs at least one year of preparation before launching the service. Therefore, the winner of the tender must be published by 5 September 2019 at the latest.

*For Antenna Hungária, this timing is acceptable as a final deadline. However, we want to note that the existing public contract grants the right-holder rights to use the relevant frequencies until 5 September 2020, but the preliminary roadmap envisages the vacation of the DD2 band by 5 September 2020, that is prior to the expiry of the existing licence at all or almost all sites. To achieve an optimal result, a multi-step iteration process*1 *should be launched to adapt the DVB-T network and reconfigure frequency-dependent components (transmitters and combiners), involving a restriction on the use of transmitters.*

Transmitters at sites use a common antenna system by having combiner components combine the output signals of individual transmitters, daisy-chaining them one after the other. These combiners are frequency-dependent narrowband components that must be retuned during a frequency change, dismounting inputs and outputs, mechanically reconfiguring the cavities in them, all the while continuously measuring the frequency response of the equipment. After that, inputs and outputs must

be reinstalled and then the now complete chain of combiners must be fine-tuned again to prevent any interference among individual combiner cells. Depending on the number of frequencies, this involves 1 or 2 days' work at each site, provided that appropriate preparations are made. Retuning requires specific expertise; only the manufacturer is able to do it for high-performance combiners and the German Spinner factory currently only has two engineers with such expertise.

Including equipment purchasing, this process should take around one year (one and a half or even two years including planning). At the moment, without knowledge of the NMHH's new frequency plan, it is not possible to say how many transmitters will be affected by the conversion; however, ***we think it would be worth considering that frequencies should be vacated during a 6-month period after 5 September 2020, with a view to the interests of terrestrial audiences.***

2. NMHH considers viewer interest as the top priority in the tendering procedure for the utilisation of the 470-694 MHz frequency band, which in this particular case means access to public service content in the same format and under the same terms and conditions. Due to the possibility offered by the technological upgrade, the winning applicant can make its own business decision to develop and deploy its terrestrial broadcasting network.

When preparing the draft of the tender, we propose that a primary objective should be the protection of the interests of audiences of all free-to-air media services, thereby maintaining the strength and significance of the free-to-air terrestrial television platform. Considerable importance is attached to free-to-air terrestrial television platform as the only source of entertainment and information of the most vulnerable households and also acts as a counterbalance to pay TV subscriptions provided by multinational corporations from the point of view of the national economy. ***Currently, free-to-air content is provided using 3 DVB-T MUX's so the National Roadmap's objective to ensure the continued operation of the free-to-air platform requires 3 identical DVB-T MUXs (preferably the current A, C and D multiplexes) with ~99% national coverage to be available under unchanged conditions after 5 September 2020.***

In Hungary, 80-85% of households have subscriptions for TV. The average gross monthly cost of HUF 3,000-4,000 represents a substantial burden for many households. The prevalence of pay TV can be attributed to the fact that only 3 channels were available for free prior to the launch of the digital terrestrial platform. At the same time, the number of Hungarian-language channels, and especially theme programmes (sports, kids, music, etc.), saw a rapid growth in the past decade; however, these may only be accessed by audiences for a subscription fee.

Available free of charge on the digital terrestrial platform, the MinDig TV service now includes 12 channels and offers a full range of themes. With this offering, the free plan now represents a competitive alternative to cable subscriptions including a smaller range of channels. Being free also allows for greater flexibility; audiences may access programmes anywhere, even in their weekend homes, they are not bound to any operator and do not incur any additional costs resulting from bundling, there are no contracts or loyalty statements. In our view, a competitive range of themes and offering do not only serve the purpose of providing public-service content in unchanged form and under the same conditions, but also retaining the most post popular commercial channels and a further expansion of the offering which, incidentally, the key to the long-term success of the platform (until the expiry of the licence in 2032).

With the decline of the free-to-air platform, the average total cost for Hungarian households continues to grow. TV spending per household may be reduced by making the free-to-air platform more attractive and stronger. A 10 percentage-point increase in the share of the free-to-air platform could yield in a 12-14% reduction in total domestic TV costs, equivalent to savings of HUF 3,000 per month or HUF 30,000-40,000 per year for each household that currently has a cable subscription.

An important objective of the government is to ease the burden on the population and reduce basic expenses. Expanding the range of channels available on the platform is an important opportunity for both Antenna Hungária and the Authority, allowing them to contribute to the specific reduction of the population's TV expenses through the extension of the platform. Any changes to the DVB-T system that would force users to act (device replacement, antenna replacement, antenna conversion, retuning, worst case scenario: loss of coverage area) carry the risk of audiences of the free-to-air platform being attracted by promotional offers from pay operators which causes a decline in the free-to-air platform's use with viewers leaving. With the free-to-air platform's audience shares dwindling, the significance of the platform in the market and for the national economy does not decrease in a linear fashion, but rather takes a plunge under a certain number of viewers, practically losing its importance. If major commercial and public-service channels no longer see value in the terrestrial free-to-air platform and do not use its broadcasting service that will lead to the death of the platform. A premature DVB-T2 transition would pose an especially great risk as it not only requires viewers to act, but also makes device replacement and any associated financial implications necessary in most cases. Should a DVB-T2 transition take place, indeed, the most deprived population groups would be required to buy new TV sets or STBs. In Hungary, people do not buy durable goods for only a couple of years; such an additional burden 5-6 years after the digital transition would prove to be extremely onerous on them.

As long as there is no demand from content provider to improve the quality of free-to-air broadcasts (HD, 4k, 8k) or introduce a large number of new free-to-air channels, audiences would not receive any new value in exchange for such financial implications: they could watch the same channels as before. The first digital transition had a clear benefit and sense: 12 channels were made available instead of 3 (7 right from the start) and HD broadcasts were included as well. Another change in the DVB-T system would not yield such benefits apparent to and enjoyed by the population.

As it is a key aspect for Antenna Hungária, we were happy to read in the paper that the technological upgrade option could be a business decision for subscription services. With a view to the characteristics of the Hungarian market for pay TV services (strong price competition, very low margin) and the limitation of digital terrestrial technology (no backward communication, no xPlay packaging option), the return on investment of a transition without a sound business case is questionable and even result in the discontinuation of the service and subscribers leaving the platform.

Based on the above, in order to ensure the continued availability of public-service and commercial broadcasts on the free-to-air platform, we propose that 3 identical DVB-T MUXs (preferably the current A, C and D multiplexes) with ~99% national coverage be available under unchanged conditions even after 5 September 2020.

3. Due to the need for uniform frequency management of the spectrum remaining after the clearance of the 700 MHz frequency band on 5 September 2020, the broadcasting station operating tender for audiovisual media services broadcast via local coverage broadcasting are practical and advisable to run parallel with the operating tender of the national terrestrial digital television broadcasting network.

On behalf of Antenna Hungária, we are in favour of the proposal.

4. Based on the information introduced above, protection for Hungarian broadcasting (including PMSE applications) must be provided until 2032 taking into consideration that as a result of a tender procedure the rights of use are obtained for 12 years according to the to the regulation in force.

On behalf of Antenna Hungária, we are in favour of the proposal.

5. Please explain your opinion whether you think it is justified, for the purpose of a unified management of the spectrum available for digital radio broadcasting based on broadcasting infrastructural considerations, to proceed with at least one tender for a network providing radio media services with nationwide coverage in parallel with the tender for national terrestrial digital television broadcasting.

Antenna Hungária would welcome the launch of digital radio broadcasting; however, this requires commitment to DAB from stakeholders critical to success. Besides cooperation from the Authority, it is also necessary for MTVA to declare its commitment to Antenna Hungária's DAB platform or ensure digital broadcasting of public-service radio stations for the company in the long term. If stakeholders shared a common intention, we at Antenna Hungária would consider unified management acceptable.

6. NMHH makes available the 2x30 MHz (6 x 2x5 MHz blocks) of the spectrum within the 700 MHz frequency band for FDD based MFCN within the frame of an award procedure to ensure that from 6 September 2020 frequency use for MFCN purposes becomes possible in most areas of the country.

Maintaining the proposals outlined under Question 1, Antenna Hungária supports the NMHH's proposal to provide additional bandwidth for BB-PPDR services with 2x8 MHz in addition to the 2x30 MHz available for MFCN in the 700 MHz frequency band and some more in the 400 MHz band. The role of wireless communication technologies and key wireless networks for national security gained importance over the recent period and the needs of services based on these also grew as technology evolved. Serving emergency response organisations, the Unified Digital Radio Communications System (UDRCS) is basically only capable of voice transmission as per its original purpose, but the isolation of a dedicated PPDR band for state purposes would enable the implementation of the system's data transmission capability.

7. NMHH is not planning to run an award procedure before 2020 to introduce the SDL in the duplex gap within the 700 MHz frequency band.

On behalf of Antenna Hungária, we are in favour of the proposal.

8. Considering the use of MFCN and PPDR, we are not making the use of PMSE applications available in the 694-703 MHz and the 733-758 MHz frequency bands.

On behalf of Antenna Hungária, we are in favour of the proposal.

CRC SMTF

In my capacity as head of the CRC SMTF, I submit my comments on Sections 4 and 5 of the National Roadmap published on 20 June, presented at today's public hearing on the 700 MHz band, in writing below.

4. Broadband mobile use

*In the years ahead, data traffic could rise **exponentially**; some envision **a thousandfold increase** by the 2020s.*

In our view, this is a wildly exaggerated estimate as noted by CRC on 5 July 2016 when delivering an opinion on the NMHH's Radio Spectrum Strategy 2016-2020, which also included the same unsubstantiated forecast. According to the June 2017 **Ericsson Mobility Report**, global mobile data traffic is expected to grow from **8.8 EB per month to 71 EB per month** between 2016 and 2022, corresponding to an **eightfold** increase. For Hungary, the growth rate will probably be even less during that period.

5. PPDR radio application

*"NMHH proposes to deploy a dedicated network by providing additional bandwidth for BB-PPDR services with **2x8 MHz** in addition to the 2x30 MHz available for MFCN in the 700 MHz frequency band and some more in the 400 MHz band (especially in the 410-430 MHz range and/or in the 450 MHz band)."*

In its opinion of 2 June 2015, the CRC preferred the band plan corresponding to Option C in the CEPT ECC Report 218, i.e. the alternative with 2x5 MHz blocks, while the NMHH, in its National Roadmap, was in favour of Option B, i.e. the alternative that would ensure 2x8 MHz of bandwidth from the 700 MHz band for BB-PPDR. The 8 MHz bandwidth consists of a 5 MHz and a 3 MHz block. The 3 MHz BB-PPDR block in the **733-736/788-791** MHz sub-band completely overlaps with the European harmonised sub-band planned for use for the purpose of LTE-based M2M connections. PPDR and M2M applications are mutually exclusive. The CRC maintains its position and continues to support Option C.

Közlekedéstudományi Intézet Nonprofit Kft.

On behalf of the employees of KTI, we thank you for the opportunity to have participated in the public hearing.

We were happy to establish that the Authority seeks to manage the frequency spectrum as a limited national resource carefully and effectively.

Today we can see that the world of information and communication have gone through some very significant changes. With the increase in broadband internet penetration and smartphones and tablets becoming prevalent, content consumption patterns have fundamentally changed. We welcome the notion that systems based on outdated technology are upgraded and even new, innovative or hybrid services are created with the potential to provide a more cost-effective platform primarily for applications and content relevant to a small group of consumers.

From 2020, de deployment of 5G networks is expected to transform transport, industrial production, healthcare, and information and communication as a whole, thereby improving people's everyday lives. Collectively, these are called a smart ecosystem fundamentally built on the communication between intelligent devices, networks and people. In transport, 5G networks will facilitate the spread of autonomous vehicles that present developers with a serious technological challenge.

Progress and the human safety are equally important to all of us. Transport plays a key role in the country's productivity and development. The uptake of new technologies in transport is mainly demonstrated by the development of ITS (Intelligent Transport System), understood as a uniform system of information and communication technologies used in transport enabling the optimisation of modes of transport, the enhancement of cost efficiency, the reduction of environmental load and the improvement of transport safety, information and comfort both in social and individual terms. The most important pillar of the overall ITS development concept is that good-quality radio network capacity,

accessible everywhere, must be provided and secure applications based on it must comply with the General Data Protection Regulation (GDPR) adopted by the EU in terms of data protection.

Ministry of National Development

In my letter, I confirm in writing the following position of the Ministry of National Development, declared at the public hearing on digital broadcasting and the use of the EU-harmonised 700 MHz frequency band held on 11 July 2017.

“Based on the experience of the last 12 years, the Unified Digital Radio Communications System (UDRCS) as a Hungarian PPDR radio application has proven to be suitable and, without exaggeration, essential in everyday use for providing radio communication between PPDR organisations.

Of course, the UDRCS is currently widely associated with TETRA technology, but nowadays UDRCS should be rather seen as the platform for the service meeting the PPDR needs of the current era in compliance with existing standards, which means a TETRA network at present, but will be LTE and then 5G technology in the future.

The needs of UDRCS users and current challenges for security policy now made it necessary for the well-established standard, geared towards voice transmission and involving dispatch functionality, to provide broadband data transmission capability, while maintaining its benefits.

It is our view that the TETRA system operated today in Hungary and its improved version using TEDS technology will not be able to meet PPDR needs requiring significantly faster data transmission rates than currently possible, even in the short term.

We consider a solution based on LTE technology to be the next logical step, taking into account 5G technology in the longer term, following international trends.

When adopting its position the Ministry of National Development took account of wired and wireless telecommunications networks currently available and to be deployed in the future within the control of the government in Hungary with regard to the radio communications infrastructure of public protection and disaster relief services.

The Ministry of National Development can fully support the NMHH’s proposal to provide additional bandwidth for broadband PPDR purposes with 2x8 MHz in the 700 MHz frequency band and some more in the 400 MHz band for the provision of BB-PPDR services.

Hungarian Cable Television and Telecommunication Association

The statements found in the working document received are fundamentally correct and future-oriented; however, they do not cover short- and long-term coexistence of mobile and cable television network and mutual interference issues.

In the last 25 years, multi-channel television programme distribution went through a rapid evolution in Hungary as well since requirements from audiences made it necessary for more and more channels to be added to networks, which could only be implemented by extending the frequency band. Therefore, a significant proportion of cable television networks were rebuilt to use up to 860 MHz. The continuous replacement/upgrade of cables and other technical equipment required/requires considerable investment from cable television operators.

The transfer/sale of the 800 MHz band for mobile service purposes resulted in issues due to mutual interference in many cases, but problems could be resolved quickly and locally owing to the limited number of affected operators.

We cable television operators regretfully have to accept the international decision. In our view, the frequency demand from mobile operators has not subsided and, as a result, broadcasting had to be terminated in the 700 MHz band as well. However, mobile operators made statements basically to the contrary, claiming that subscriber needs do not necessitate the opening up of more and more frequency bands. So where does the truth lie?

Proposal:

Please investigate the issues that surfaced as it may very well be the case that 700 MHz is not necessary for mobile purposes.

Note that although cable television operators use this frequency band as a secondary option, but the two networks (potentially) cause mutual interference in numerous instances, thereby evoking the anger/complaint of subscribers.

Where such mutual interference can occur:

- The cable TV network is not properly closed (can be resolved through collaboration)
- The terminal equipment in the cable TV network are not properly closed (e.g. modems, TVs, TV connectors, other devices) ??
- In-house networks in apartment buildings and detached houses, outside the competence of the cable TV operator (??)
- Wrong equipment used by mobile operators (can be resolved through collaboration)
- Mobile operators transmitting with greater power than allowed (??)

Experience with the 800 MHz band transfer shows that there are types of interference that can only be addressed by terminating and relocation a broadcast channel. However, the number of channel available to use for broadcasting in the cable TV network will be drastically reduced once again due to the transfer of the 700 MHz band as of 2020. Cable television operators who did not upgrade their networks to 860 MHz will be better off, but there are hardly any such operators.

This gave rise to the question: what is the solution?

- The primary option is collaboration, for which some examples can already be seen, but this is not free of problems either, contrary to one-sided success reports.
- Another option is the accelerated upgrade and switchover of cable television networks to digital broadcasting as this would enable more programmes to be broadcasted over fewer channels and also ensure the broadcast of higher-definition (HD) programmes. However, we are yet to cover 3D broadcasting which have taken a back seat for the time being, but I personally think that it represents the future of television as opposed to the (current trend of) increasing the resolution.

  Today, programme distribution is still analogue only in many networks, primarily the ones having a limited number of subscribers. But it must be realised that this is the very essence of a cable television network: one subscription allows for watching different programmes on multiple TV sets (even on CRTs). Surveys show that households in Hungary typically have 2 receivers, but the number of dwellings having 3 receivers is growing.

  In recent years, cable television operators started to introduce digital broadcasting, but this process takes longer than expected as networks today are not able to generate the kind of revenue (reduced subscription fees, high programme costs) needed for their modernisation.

Proposal:

Please use the revenue from the sale of the 700 MHz frequency band to provide a financial allocation to small and mid-sized cable television operators to enable them to implement the aforementioned upgrades.

We welcome, support and have been making proposals for 2 years to help the successful implementation of the Digital Welfare Programme.

However, it must be seen that the tender under the Superfast Internet Programme (funding) is only used to deploy broadband networks in underdeveloped and commercially unattractive areas.

Proposal:

In parallel to implementing the Programme, we propose that financial assistance be provided for the purpose of switching over the aforementioned broadcast-capable networks to digital.

A comparison at European level reveals that state-of-the-art cable networks have actually been built/developed in Hungary as opposed to other V4 countries because first the Hungarian National Radio and TV Commission and later the Government provided support for the deployment/upgrade of cable TV networks several times. Today, a significant proportion of television viewership in Hungary (2.5 million of 4.1 million viewers) has access to programmes through a cable television subscription.

If we intend to maintain the achieved level/standard within Europe, we consider the provision of support necessary as the transition to DVB-T2 and the launch of digital radio broadcasting (DAB+) are both required again for terrestrial broadcasting. This can be implemented by cable television operators on their networks quickly, seamlessly and with reduced costs. Cable television networks are also capable of transmitting local television programmes which is another reason why they should be upgraded as soon as possible.

Hungarian Professional Event Technology Association

Position on the frequency use of radio microphones

Radio microphones have been in use for around 65 years. Initially, they were only used by the broadcast industry, but later made their way into theatre and then became a part of event technology. Today, more than 8 million radio microphones are in daily use across the EU. 80% of television programmes are produced using radio microphones. The music industry would simply not exist without radio microphones. In addition, the number of radio microphones sold increases by around 5% every year, confirming an upward trend.

The wavelength range used by UHF radio microphones is within the few decimetre range, resulting in relatively high utility, although requiring more careful use than VHF radio microphones. When hitting an obstacle far exceeding their wavelength, radio waves, similarly to other waves, do not enter the (shadow) space behind the obstacle. As the wavelength range of UHF radio microphones covers a few decimetres, obstacles creating a shadow are within the size range of surrounding obstacles and the human body. Thus practitioners can readily plan the area covered by a radio microphone.

The frequency band above the UHF TV band is harder to plan due to the shorter wavelength. In the 2.4 GHz band (a wavelength of about 12.5 cm), it is very easy to block the signal, i.e. the path between the transmitting and the receiving antennae can be interrupted by almost any objects, thereby causing dropout.

Another characteristic of using radio microphones is that transmission must be real-time. When opening a web page or downloading an email, it is perfectly acceptable to resend lost packets. This is not possible with radio microphones, meaning that digital technology can hardly improve transmission security if at all.

With a view to the above, it is evident that frequencies below 1 GHz are required to use radio microphones. Since there is a growing demand, more frequencies are needed and not fewer.

The first phase of the Digital Dividend, i.e. the introduction of 800 MHz LTE, severely affected radio microphone users. Many devices operating in the frequency band concerned became unusable. This placed a considerable financial burden on users, caused issues for merchants (guarantee, storage) as well as manufacturers (guarantee, storage, development), thus imposing huge overall costs on all actors in the sound engineering industry.

Professional radio microphones are not cheap. Their prices range from HUF 200,000 to 600,000-800,000 per channel. They are usually rugged, robust devices with a life cycle of at least 10-15 years. Depending on its size, an event technology company typically keeps a set of radio microphones for 4 to 40 channels. Theatres generally use 8, 16, 32 and often even more radio microphones. Orchestras' own equipment often includes 4 to 8 radio microphones and it is not uncommon to have as many wireless in-ear microphones.

These devices represent long-term investment for users. They do not get replaced every 1, 2 or 3 years like telephones or cars. Manufacturer model cycles are longer, typically around 10 years (although this fundamentally changed in recent years as a result of DD1 as manufacturers were forced to develop).

The further narrowing planned for the UHF TV band would again cause a similar issue for the industry. Many devices would become unusable again. Users would be faced with additional costs, while manufacturers and distributors with another crisis of confidence.

Although considered future-proof, microphones operating on frequencies below 700 MHz would become more complicated to use as a reduced UHF TV band also means a reduced White Space where radio microphones operate.

With a view to the above, **the Hungarian Professional Event Technology Association wishes to declare its intention as large a proportion of the 470–694 MHz UHF TV band and the 700 MHz LTE band as possible for the purpose of operating radio microphones.**

In addition, the APWPT study shows that the LTE duplex gap is far from the most ideal frequency band for the professional use of radio microphone. Making the duplex gap available for exclusive use by radio microphones instead of the frequency bands taken from terrestrial TV broadcasting, and thereby from radio microphones, is not sufficient compensation under the technical conditions existing at the time of conducting the test.

Additionally, please provide information as to whether any steps were taken based on the proposals presented in Section 8 of the APWPT report, either at international or national level.

The proposals are as follows:

We urgently advise the following:

- *further research to confirm the interference effects observed from live signals and to describe them in greater detail;*
- *Reconsideration of test conditions and certification requirements for LTE end user equipment;*
- *Joint efforts to provide the next generation of LTE end equipment with significantly reduced transmission transients.*

Ministry of Interior

A dedicated chapter in the consultation paper addresses networks serving the radio communication needs of Public Protection and Disaster Relief (hereinafter: PPDR) organisations.

In Hungary, currently the nationally deployed Unified Digital Radio Communications System (hereinafter: UDRCS) provides voice and, to a limited extent, data transmission capabilities in accordance with Government Decree 346/2010 (XII.28) on Networks for Governmental Purposes (hereinafter: the Decree) to authorised organisations defined therein in carrying out their duties.

According to the definition set out in the Decree, the UDRCS is a digital, trunked radio network for governmental purposes complying with the requirements laid down in Articles 44 and 132 of the Convention Implementing the Schengen Agreement signed in Schengen on 19 June 1990.

Pursuant to Government Decree 152/2014 (VI. 6) on the Responsibilities and Powers of Members of Government, the Minister of Interior supervises the communication provider for governmental purposes, the operator of the central electronic service provision system and the operation of the Unified Digital Radio Communications System as well as the activities of organisations providing the infrastructural basis for these networks.

Since the UDRCS's launch in 2006, the demand for broadband data transmission has significantly increased. It is proposed that broadband data transmission be implemented as an integral part of the UDRCS for optimal support for the activity. The specialised activity control systems required for this purpose have been established; however, radio communications systems providing broadband data transmission still need to be developed.

In its Decree 1854/2016. (XII. 27.) on the Improvement of the Broadband Capability of the Unified Digital Radio Communications System, the Government agreed on the necessity of development.

With a view to the Convention Implementing the Schengen Agreement mentioned in the Decree, the framework for the development of the UDRCS is also subject to international requirements. With regard to PPDR systems, a number of international reports, recommendations and decisions were made in the recent period, covering both applicable frequency bands and technology.

They define the 700 MHz band as the basic harmonised spectrum for Broadband PPDR (hereinafter: BB PPDR) systems, providing that additional spectrum can be secured in the 400 MHz band.

It was also laid down that BB PPDR systems require at least 2 x 10 MHz.

The studies commissioned by the Ministry of Interior on this topic conclude that a spectrum of 2x15 MHz are required in order to provide a broadband data transmission capability, based on the identified needs of Hungarian PPDR organisations.

In line with the above, we would like to claim an appropriate frequency spectrum allocated for BB PPDR systems in the 700 MHz frequency band to be freed up.

We partially agree with the NMHH's proposal presented in Chapter 5 PPDR Radio Application of the National Roadmap, according to which additional bandwidth should be provided for BB-PPDR services with 2x8 MHz in addition to the 2x30 MHz available for MFCN in the 700 MHz frequency band and some more in the 400 MHz band (especially in the 410-430 MHz range and/or in the 450 MHz band).

For the proper functioning of BB PPDR systems, either a continuous frequency spectrum or a so-called carrier aggregation capability is required both at system and terminal equipment level. Since the proposal includes the provision of only 2 x 8 MHz in the 700 MHz band and the carrier aggregation method is yet to be standardised for the 410-430 MHz band, we consider that further consultation is needed on the viability of the proposal.

Hungarian Cable Communications Association

The cable operation as a whole acknowledges that the 700 MHz band previously used for broadcasting purposes will be used for mobile service provision as of 2020.
We agree with the statements in the roadmap published for discussion. However, we are disappointed that there is not even a mention in the paper of the fact that the same band is also used by wired broadcasting networks for television and internet service provision purposes.
We are aware that wireless use has priority over wire use, but it is our view that we should prepare for the permanent coexistence of these two types of use, requiring both types of operators to have mutual respect for each other. This issue was not so crucial for the use of the 800 MHz DD1 band for mobile purposes as that band is used only by a fraction of cable operators who will abandon it as soon as mobile service provision commences. We would like to point out that the 700 MHz band in question is used by all cable operators and will also be essential in the future in order to be able to meet the growing needs of 2.5 million Hungarian households for multi-channel and HD-quality television and real broadband internet access services.

Therefore, the possibility of abandoning the 700 MHz band did not even come up as the remaining capacity is not enough to provide high-quality services in the majority of the cases.
The measurements carried out for the 800 MHz band by the NMHH revealed that transmission by mobile services can cause interference even with cable networks comprised of standard components. The situation is expected to be the same for the 700 MHz band, the only difference being that interference may cause problems for cable network components not owned by the operator (e.g. TV sets, in-house networks). The protection of these devices against interference or their replacement could involve expenses for subscribers and operators to the tune of hundreds of millions of forints in total; they will not be able to cover such expenses alone. Cable operators will initiate a consultation on the aspects and conditions of coexistence with mobile operators within the CRC's Spectrum Management Task Force.

With a view to the fact that considerable consumer interests could be at stake or jeopardised here, we call on the Authority to conduct the required preliminary technical evaluations and impact assessments and cooperate in defining the conditions for the permanent coexistence of mobile and cable services, including any support.

Vodafone Magyarország Zrt.

1. Planned timing of band utilisation for mobile purposes, SDL

This point of the response contains trade secrets.

2. PPDR

Of course, we understand and accept the necessity of PPDR implementation. We also consider the proposed dedicated model to be suitable.

However, as we mentioned within the CRC before, we consider Option C from the options previously outlined in the ECC document to be better.

As to the PPDR, the representative of the Ministry of Interior attending the consultation informed us that they consider a spectrum need of 2x15 MHz to be necessary, but only a part of it would be in 700 MHz band (another part would be in the 450 MHz band). However, if it would consist of three (or more) spectrum blocks (represented by Option B in practice, with regard to the 450 MHz sub-band made additionally available to them), it could carry risk from a technological standpoint.

The latter suggests that Option B is not necessarily needed.

3. Issue concerning cable operators

We think that the rules for the coexistence with PPDR and the coexistence with cable operators must be clearly laid down in the tender documentation.

In our view, if the government allocated this band to be utilised for mobile purposes, it would mean that operators using a given frequency in any other transmission media would have to adapt to the new reality. Under no circumstances should winning applicants be faced with significant restrictions in using the band. Of course, we understand the issues raised by cable operators, but we think that these should be addressed outside the tender process. As we have mentioned earlier, we are happy to help with the preliminary identification of nature and severity of the issue (e.g. through joint testing), but the solution must be found and any costs settled by cable operators and the contracting Hungarian State on a bilateral basis.

National Association of Local Television Channels

With this letter, I wish to confirm in writing my comments made at the consultation held yesterday. My statement, as presented verbally and contained in this letter, reflects the views and comments of the National Association of Local Television Channels and Csaba TV as one of its member television channels.

The presentations and comments made at the consultation were much needed so as to allow the different views of the full spectrum of frequency users to be represented and made known all at once, broadening our professional outlook and influencing our opinions and comments. With a view to these facts, I made my comment on behalf of the National Association of Local Television Channels and the thoughts have been reinforced in me since then.

During the digital transition in 2013, equipment purchasing by local television channels was publicly funded. To protect government resources, only some local television channels are affected by the technical transition scheduled for 05.09.2020. Therefore, we wish propose that local television channels' programme production contracts for the period after 2020 be extended with a grace period of two years, as mentioned in your presentation. Local television channels operating above 700 MHz should be transferred to the range below 700 MHz as scheduled. Thereby, the Authority would gain time to plan for the future with regard to the frequencies thus occupied by local television channels and its professional ramifications. Thereby, the Authority will be able to plan for the possibility of responding to questions raised later concerning frequency management and we could get clearer answers concerning the frequency range used by local television channels and its utilisation rate.

Magyar Telekom Nyrt. classified its comments as trade secrets.