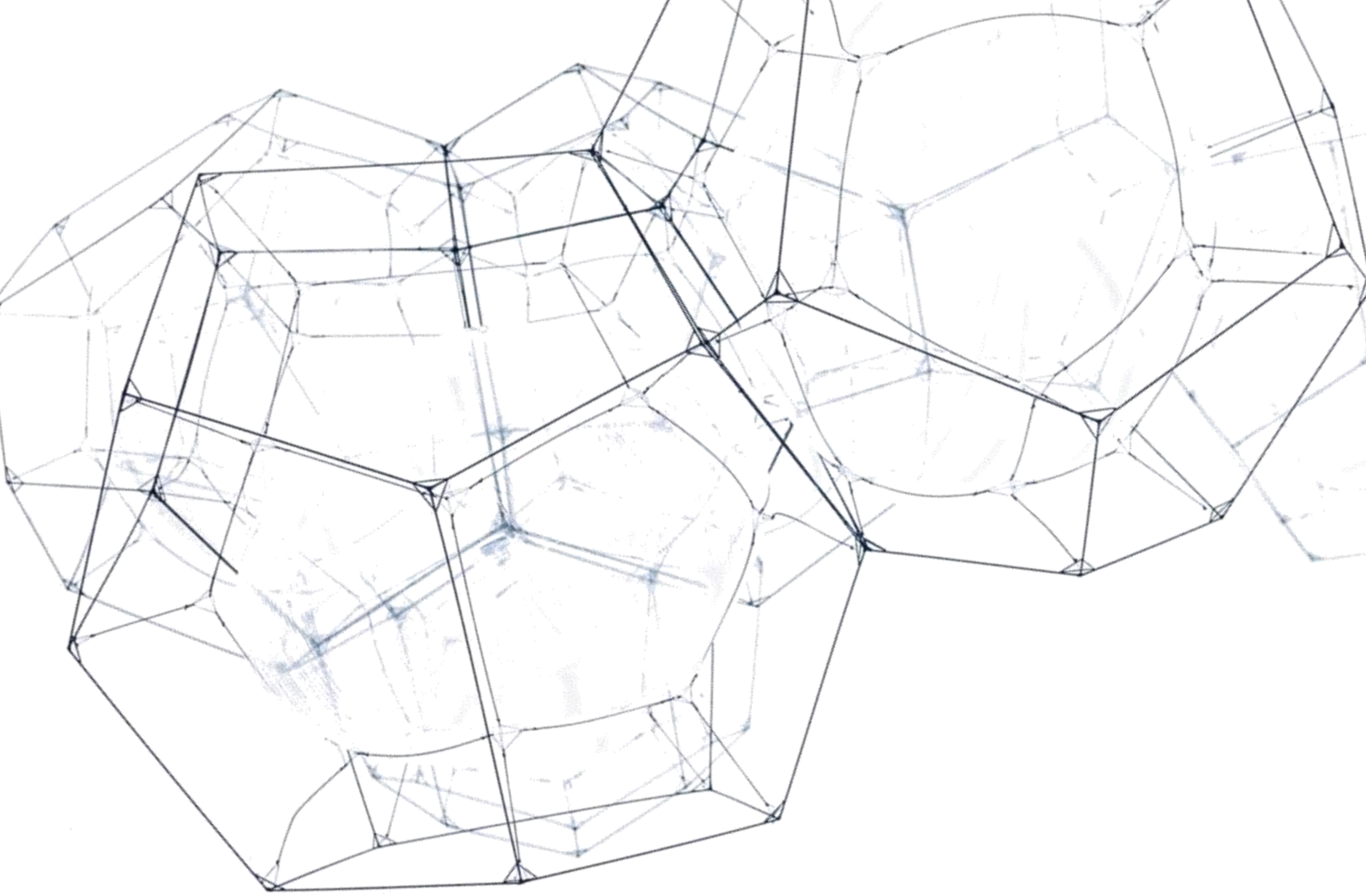

National Roadmap

for the UHF band between 470 – 790 MHz

June 2018

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spectrum

MALTA COMMUNICATIONS AUTHORITY

ensuring connectivity

Contents

National Roadmap

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June 2018

MCA/O/18-3256

Disclaimer

No liability can be accepted by the MCA, its directors or employees for any loss occasioned to any person or entity acting or failing to act as a result of anything contained in or omitted from the content of this roadmap or our proposals as stated.

While the roadmap indicates the MCA commitment to a particular course of action, the proposals made within this document may be subject to change. Such a strategy, whilst providing for the necessary regulatory commitments, shall at the same time allow for the amendments necessary in order to reflect market and technological developments at that time.

1 Introduction

Technology and consumer trends are expected to influence spectrum demand over the coming years.

Spectrum is an essential building block for ubiquitous, affordable, high-speed broadband and narrowband connectivity. Such connectivity is critical in meeting the needs of consumers and public and private sectors throughout the digital mobile ecosystem.

The repurposing of spectrum in the 700 MHz frequency band for data connectivity will present a number of benefits to society at large, as outlined in the 5G action plan for Europe (COM(2016) 588). To start with, it will cater for part of the anticipated increase in the demand for wireless broadband (WBB). Furthermore, UHF spectrum has unique benefits that cannot be provided by higher frequency bands. The inherent technical characteristics of the 700 MHz frequency band, in conjunction with its coordinated use, allow for increased cost efficiencies in service coverage, especially in-building. Lastly, from 2020 onwards, the availability of the 700 MHz spectrum will also facilitate the roll out of next generation wireless networks, such as 5G. Thus, the repurposing of spectrum in the 700 MHz frequency band gives rise to both economic and market opportunities; further facilitating the provision of nationwide wireless broadband services including possible new business models.

Such change of use will inevitably result in the depletion of spectrum for other services, in this case Digital Terrestrial Television (DTT). In order to compete effectively with fixed television distribution platforms, as well as to keep up with technological developments in the distribution of content, sufficient spectrum needs to be secured to ensure competition. Whilst noting that the migration towards new higher quality digital encoding and transmission formats may be a necessary evolution for DTT, such development will depend

significantly on the national context, particularly so, the maturity and penetration of complementary and alternative platforms.

In line with Decision (EU) 2017/899, the MCA has embarked on a process to repurpose the 700 MHz and sub 700 MHz bands respectively.

The overall objective for the repurposing of the respective bands is to facilitate the efficient use of spectrum and maximise economic benefit to the society. Prior to the publication of the national roadmap, the MCA carried out preliminary discussions with the relevant stakeholders. It also published a public consultation (MCA/C/18-3191) on the optimal use for the 700 MHz and sub 700 MHz band and associated timeframes. The submissions to the consultation feedback facilitated the analysis carried out by the MCA, the scope of which was to help identify and better address the spectrum needs of the local Maltese scenario.

2 The 470 – 790 MHz band at present

Global demand for pervasive wireless connectivity is continuously growing, driven mainly by the demand arising from smart devices and their applications. In view of this rising demand for wireless connectivity, the EU has re-purposed part of the spectrum in the UHF band for mobile broadband.

The (UHF) band comprises the range 470-790 MHz. It is currently used for digital terrestrial television - **DTT** and for wireless audio programme making and special events - **PMSE** equipment.

Wireless audio **PMSE** services encompass a range of radio equipment such as radio microphones, in-ear monitoring systems or audio links used mainly for the production of broadcast programmes or in theatrical productions, corporate and concert events. PMSE equipment is usually capable of operating over a range of frequency bands or tuning ranges including the spectrum swathe between 470 MHz – 790 MHz. Although at face value it might appear that a large amount of spectrum has been identified for use by PMSE on a tuning range basis, it should be noted that such allocations are typically shared on a non-protection basis.

In September 2017 the MCA consulted with the PMSE stakeholders on their future needs for spectrum in the 700 MHz band (MCA/C/17-2933), particularly between 694 MHz and 758 MHz. The MCA, in the afore mentioned consultation has, in accordance with the timeframes stipulated in Decision (EU) 2017/899, proposed the introduction of a new limitation to **prohibit the use of wireless audio PMSE apparatus from using the 694 - 790 MHz band as from 1 January 2021.** This limitation was mainly introduced to avoid harmful interference problems with wireless broadband services. The MCA, in the responses

submitted to the Consultation, did not receive any objections to the above proposal. The MCA notes that the 470MHz – 694MHz band remains available for PMSE equipment.

Like most other European countries, audio-visual media services form an essential part of the Maltese culture and society. **DTT** has so far been a major platform in delivering linear audio-visual services to the TV sets located within our homes. The commercial DTT platform currently licenced in Malta, uses the DVB-T broadcasting standards together with the MPEG2 source coding standard. These commercial services currently reach approximately 25% of the population (MCA/R/18-3060). Furthermore as per the 2017 Audience Surveys carried out by the Broadcasting Authority, approximately 5% of the population make use of the free-to-air platform addressing General Interest programmes.

In accordance with the Geneva 2006 (GE06) agreement of the International Telecommunication Union (ITU), Malta can make use of 8 channels (28, 31, 38, 43, 45, 56, 58, 60) for terrestrial television transmissions (within the 470-790 MHz band). At present, the spectrum bands available for DTT in Malta are licensed to GO plc for **the provision of commercial TV services until May 2021,** and to PBS Ltd. for the delivery of broadcasting content meeting general interest objectives. The licence enjoyed by PBS Ltd. has an indefinite term.

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3 The future of the 470 – 790 MHz band

The European Commission, Parliament and Council have reached an agreement on an EU wide approach for the use of the 470-790 MHz band. The primary objective for such an agreement is to ensure access and connectivity, whilst facilitating the deployment of innovative digital services over wireless broadband networks.

In this regard the Decision of the European Parliament and Council puts a number of obligations on the Member States which need to be implemented within strict timeframes.

European Parliament and Council obligations on the Member States

- Make available the 700 MHz band (694-790 MHz) band for terrestrial systems capable of providing wireless broadband electronic communications services by 30 June 2020. On the basis of certain justified reasons (as per the Annex to the Decision), this deadline may be extended by two years.
- Conclude all frequency coordination agreements with other EU member states by 31 December 2017.
- Undertake frequency coordination activities with third countries with respect to the use of the 470-790 MHz band, both for terrestrial broadcasting as well as for wireless broadband electronic communications services.
- Ensure, at least until 2030, the availability of the sub 700 MHz band (470-694 MHz) for terrestrial broadcasting services and wireless audio programme making and special events (PMSE) equipment.
- By not later than 30 June 2018, adopt and publish a national plan and schedule ('national roadmap') showing how the various obligations of the Decision are going to be met, following consultation with the relevant stakeholders.

The repurposing of the UHF band will have a direct influence on various stakeholders, namely:-

***citizens**, who will benefit from new and innovative mobile broadband applications and services (in particular innovative on-demand and live streaming audio visual services).*	***mobile service providers,** will have access to additional valuable sub-1GHz spectrum to respond to increasing demand for mobile data traffic, in particular for indoor coverage.*	***providers of commercial DTT services** and users of wireless audio PMSE equipment, who will have to make use of alternative frequency bands following the allocation of the 700 MHz band to wireless broadband.*	***Government and civil society** in general will benefit from economic opportunities that this new spectrum band will create.*

In view of the multitude of stakeholders involved, and prior to adopting and publishing of this roadmap, the MCA carried out a consultation on the underlying principles that will shape the future use of both the 700 MHz and sub 700 MHz band.

Consultation on the underlying principles shaping the future of the 470 – 790 MHz band

In order to help meet spectrum demands for the new digital telecommunication services, the MCA published a consultation on the roadmap for the UHF band between 470 - 790 MHz (MCA/C/18-3191). The MCA carried out this public consultation on the band in question in order to identify and better address the spectrum needs of providers and users of electronic communication services. During the consultation process, the interested stakeholders were invited to express their opinion on the key questions highlighted in the consultation document together with any other comments that in their opinion were considered relevant.

The consultation period ran from the 23rd April to the 28th May 2018. A total of 8 responses were received by the submission deadline. The MCA would like to take the opportunity to thank all the respondents for their contributions.

The key aspects that were consulted upon were:-

The underlying principles shaping the future of the 470 - 790 MHz band

- **The date by when the 700 MHz duplex band is to be made available for commercial WBB services,**
- **The primary allocation and use of the 700 MHz centre gap and guard bands, and**
- **Use of DTT in the sub 700 MHz band over the next ten years and beyond.**

After taking into consideration the feedback received, the MCA is publishing the Roadmap reflecting the following primary milestones;

Roadmap primary milestones

1 ***The 700 MHz duplex band, will be made available for commercial mobile WBB services as from June 2021***

2 ***The 700 MHz centre gap and guard bands will be reserved for SDL and PPDR services subject to demand aspects including those related to IoT***

3 ***The primary use of the sub 700 MHz band for DTT is being secured until 2030***

4 The way forward

This roadmap lays down the foundation to ensure that Malta is well positioned to adopt and benefit from future technologies while sustaining competitiveness in the rapidly changing digital world.

700 MHz duplex frequency band

The European Commission implementing decision 2016/687 on the harmonisation of the 700 MHz band allocates 2x30 MHz (703–733 MHz and 758–788 MHz) for wireless broadband electronic communications services on a primary basis.

The MCA, based on: (i) the need to ensure minimal disruption to the current commercial DTT services, (ii) the DTT frequency co-ordination negotiations with the neighbouring countries and (iii) ensuring that existing spectrum holdings do not become a limiting factor in the growth of wireless broadband, will be making available **the 700 MHz duplex band for commercial WBB as from June 2021**.

Deployment of commercial wireless broadband electronic communications services in the 700 MHz band will allow for increased cost effectiveness in service coverage (including in building) whilst promoting innovative wireless broadband services.

In line with Decision 2017/899/EU, fulfilling the 5G action plan for Europe (COM(2016) 588) where the 700 MHz band is identified as a pioneer band critical for the success of 5G services, the MCA will in due course consult on and publish the spectrum assignment and management framework comprising the applicable licence conditions.

making available the 700 MHz duplex band for commercial WBB as from June 2021

Q2-3 2019	Public consultation with interested stakeholders on the 700 MHz band applicable regulatory conditions and legislative criteria
Q3-4 2019	Adopt the assignment and management principles for the 700 MHz spectrum
Q4 2019	Issue EoI for the 700 MHz spectrum
Q2 2020	Award of the 700 MHz band
Q2 2021	700 MHz duplex band available for commercial mobile WBB services

700 MHz spectrum in the centre gap and guard bands

The European Commission implementing decision 2016/687 on the harmonisation of the 694–790 MHz band (700 MHz band) foresees four different use options for the 700 MHz spectrum in the centre gap and guard bands from which EU member states can choose, namely:

(i) Up to 20 MHz in the duplex gap (one to four blocks of 5 MHz) can be awarded as supplemental downlink (SDL) for wireless broadband;
(ii) Public protection and disaster relief (PPDR) services can use either 2x5 MHz just below the commercial services, or 2x3 MHz just above, or both;
(iii) Machine-to-machine radio communications (M2M) can use 2x3 MHz just above the commercial services; and
(iv) PMSE equipment (like wireless microphones), which in most countries already use the band, can be allowed to continue using 694-703 and 733-758 MHz or parts of it.

While existing spectrum allocations in Malta address the current market needs for M2M / IoT and PMSE applications, additional spectrum may be required in the future to address the

increase in mobile data services (SDL) as well as the possible need for the deployment of a BB-PPDR communication networks. **The MCA earmarks the use of the centre gap and guard bands frequencies primarily for the use by SDL technology and potentially BB - PPDR networks, without ruling out an IoT allocation based on market demand.**

In view of the above, the MCA, will embark on a consultation in order to determine national BB-PPDR needs and subsequently establish the framework for the assignment and management of this band.

the primary use for the 700 MHz spectrum in the centre gap and guard bands

Q1 2019	**Launch a public consultation on the need and deployment models for BB-PPDR networks**
Q3-4 2019	**Establish the assignment and management principles for the 700 MHz spectrum in the centre gap and guard bands (applicable regulatory conditions and legislative criteria)**
Q4 2019	**Issue EoI for the 700 MHz spectrum in the centre gap and guard bands**
Q2 2020	**Award of the 700 MHz band in the centre gap and guard bands**
Q2 2021	**700 MHz spectrum in the centre gap and guard bands available for commercial services**

Sub 700 MHz spectrum

In Europe, the 700 MHz band, also known as 'the second digital dividend', is currently used for digital terrestrial television on a primary basis and wireless audio programme making and

special events equipment on a secondary non protection basis. Taking note that the repurposing of spectrum in this band further reduces the frequencies available for terrestrial broadcasting, the European Parliament and Council through Decision (EU) 2017/899, ensure that **frequencies in the sub-700 MHz band (470-694 MHz), will remain available, as a priority, for terrestrial broadcasting services until 2030**. In view of this obligation, the National Frequency Plan will continue to permit the use of the sub 700 MHz band for DTT on a primary basis.

As also required by Decision 2017/899/EU, member states, including Malta, embarked on a frequency co-ordination exercise with neighbouring countries in order to ensure that the 700 MHz band may be used for wireless broadband services in a timely and interference-free manner and at the same time negotiate additional spectrum for DDT beyond the minimum remaining ITU GE06 allocations. Malta managed to conclude bilateral agreements with Italy and Greece resulting in the potential exclusive use of 11 DTT channels together with an additional two shared DTT channels between Italy and Malta. The outcome of the bilateral agreement with Italy is subject to any frequency coordination activities that are deemed necessary between Italy and Malta on the one hand and 3rd countries, namely Tunisia and Libya on the other. Should any newly coordinated channels become available, beyond the ITU GE06 allocations (Ch 28, 31, 38, 43, 45), these can only be utilised for DTT service provision as from **1 July 2022.**

- Commercial DTT service

Approximately 25% of the Maltese population consume audio visual services over the available commercial DTT platform. Whilst acknowledging that DTT technologies have been instrumental in enhancing competition in the provision of linear audio visual services within our homes, the MCA notes that the migration from DTT to IP-based platforms which enable a richer experience through both linear and non-linear content, continues to grow steadily. The appeal of a wider selection of content, in conjunction with the benefits of on-demand interactive engagement is difficult to replicate on the traditional DTT platforms alone. This may signal that, for DTT to compete effectively for viewership, significant investments are necessary in both transmission and receiving infrastructure, possibly in combination with alternative systems that can complement the on-demand aspects.

The future of DTT necessitates a feasibility assessment across technological, financial and market aspects, including national broadcasting needs. Noting that spectrum availability guarantees in the sub-700 MHz band are limited to 2030, the viability of investments need to be thoroughly assessed and their benefits weighed against the availability of alternative TV distribution platforms and any potential alternative uses for this band.

Through this roadmap, the MCA is establishing a phased programme of work which addresses the mandate to make the 700 MHz band available for wireless broadband use as soon as possible, whilst safeguarding the ongoing delivery of commercial DTT and minimising undue disruption to viewers both during the interim period (May 2021 – June 2022) and for the future (beyond 2022). This programme of work will start in earnest during the second half of 2018 through the establishment of the assignment and management principles for sub-700 MHz spectrum enabling commercial DTT services. This will be followed with an expression of interest during the first half of 2019.

- Digital Broadcasting that meet General Interest Objectives

The obligations put forward in Decision 2017/899/EU are considered critical for meeting the ambitious 5G timeframes which the EU has set. This roadmap sets out an ambitious work programme with strict timeframes concerning both commercial WBB and DTT spectrum in this 700 MHz band. Nonetheless, the MCA notes that these timeframes also have implications on the national broadcasting aspects meeting general interest objectives, particularly since these share the transmission infrastructure of the commercial DTT operator under a subcontracting arrangement with the designated national network operator for broadcasting.

The MCA, in line with its published annual plan, will undertake a review of the elements laid out in the national broadcasting policy and which fall under its regulatory remit during the second half of 2018. The Authority is also seeking to participate in a wider Government-led review of the national broadcasting policy with the involvement of the relevant regulatory authorities (Malta Communications Authority, Broadcasting Authority), the national broadcaster (PBS Ltd) and industry stakeholders.

sub-700 MHz band (470-694 MHz), will remain available, as a priority, for terrestrial broadcasting services until 2030.

Q2 - Q4 2018	Review of the Broadcasting Policy with regard to the GIO needs in the near future
Q4 2018	Assess the best way forward for DTT service continuity during May 2021 & June 2022 (transition period)
Q4 2018 - Q1 2019	Establish the assignment and management principles for the right of use of sub 700 MHz spectrum
Q1 2019	Implement restrictive measures for DVB-T2 / MPEG 4 transition for DTT
Q4 2019	Issue EoI for the sub 700 MHz spectrum
Q2 2020	Award of the sub 700 MHz spectrum
Q1 2021	Implementation of measures for the continuation of commercial DTT service during transition period
Q2 2022	Sub 700 MHz band available for commercial DTT service

5 Appendix

Consultation

The development of this Roadmap was led by the MCA in consultation with stakeholders across the telecommunications, broadcasting and PPDR entities. A series of discussions were held with the aforementioned stakeholders prior throughout this consultation process. The discussions were held with the aim to facilitate the expression of the opinions and relevant inputs by the stakeholders. Submission to the public consultation published by the MCA were received from:-

Vodafone Malta Limited	fliving
GO plc	Public Broadcasting Services Limited
Melita Limited	DAB Electronica Co. Limited
One Productions Limited	Mr Jon Camilleri

Although divergent opinions as well as future concerns were expressed in the submissions to the consultation, in general, the feedback received was aligned with the primary aim of the public consultation. The MCA, cognisant of the feedback received, together with other influencing facts which effect the 470 – 790 MHz band, has prepared a roadmap which ensures the efficient and effective use of the 470 – 790 MHz band.

Abridged responses to the consultation

700 MHz band

#1 The MCA invites the stakeholder to submit their feedback on the proposed date by when the MCA shall make available the 700 MHz band for commercial WBB.

#2 The MCA invites stakeholders to submit their feedback on potential assignment and management principles that may be appropriately adopted for the use of the 700 MHz spectrum band within the Maltese mobile industry.

While divergent opinions were expressed with regards to the timing for when the 700 MHz band shall be made available for commercial WBB use, stakeholders proposed that the potential assignment and management principles adopted should be aligned to the principles adopted in the recent spectrum awards.

BB-PPDR

#3 Do you consider the need for the deployment of a BB-PPDR communication network in Malta in order to meet the challenges in the near future? If so, what are the timeframes envisaged by when the PPDR entities will need to make use of a broadband network?

#4 In your opinion, which of the modes described above (dedicated, commercial, or hybrid) will be more suitable for the Maltese BB-PPDR needs? Whilst taking into consideration the deployment plans of LTE in the 700 MHz band, should mobile ECS providers be earmarked for providing a nationwide broadband PPDR communication network? If so, which are the regulatory aspects that the MCA needs to take into consideration in order to enable such an operational model?

#5 What is the adequate amount of spectrum necessary for a BB-PPDR network to be able to address the future challenges that are encountered by PPDR entities?

#6 In your opinion, which potential assignment and management principles may be appropriately adopted for the use of the 700 MHz spectrum band for BB-PPDR.

Despite the interest expressed during the one to one meetings with the respective PPDR entities, no formal responses to the consultation were submitted by the latter. On the other hand, MNOs, expressed an interest to carry PPDR networks on their 700 MHz networks.

In view of the interest expressed in BB-PPDR services, the MCA will in 2019 launch a public consultation on PPDR services with a view of instituting a tangible use case for 5G.

SDL

#7 In view of the still evolving state of technology operating in the 700 MHz band, will it be opportune for the MCA at this stage to postpone the decision on the primary use of the 700 MHz centre gap frequency to a later date? What are your opinions on allocating in the National Frequency Plan the primary use of the centre gap spectrum (738-758 MHz) primarily for Downlink Transmissions?

#8 Which assignment and management principles (including licence conditions and price attached) are best suited for the earmarked use of the 700 MHz centre gap spectrum?

The respondents highlighted that given the early state of SDL technologies, it would be more appropriate for the MCA to assign the use for the spectrum band in question at a later stage when the technology has matured further.

M2M

#9 Do you consider necessary the need to primarily allocate the spectrum band 733-736 MHz and 788-791 MHz for M2M applications? If so, what are the timeframes envisaged by when the M2M industry will need to make use of such spectrum network?

#10 Which licensing regime (General Authorisation or Individual Licences) do you consider more appropriate for the use of the spectrum band by M2M equipment?

#11 Based on the applicable licensing regime highlighted in question #10 above, in your opinion, which assignment and management principles (including licence conditions and price attached) are best suited for the use of the 700 MHz centre gap spectrum for M2M applications?

Stakeholders highlighted that existing licenced spectrum and related technologies already meet M2M market needs. Hence no specific allocation is necessary.

Sub 700 MHz band

#12 Currently, 27% of the Maltese population view linear TV provided over the DTT platform (GIO and Commercial). The National Frequency Plan shall permit the use of the sub 700 MHz band (490 – 694 MHz) for DTT service on a primary basis until 2030. How do you foresee the development of the audio-visual market (GIO and commercial DTT offerings) in Malta for the next 10 years?

#13 Which elements may exert an influence on the foreseeable development of the audio-visual market in Malta? Will the migration to next generation DTT broadcasting technologies (DVB-T & MPEG-4 or DVB-T2 & MPEG-4) be considered necessary in order to address the local DTT market needs?

#14 Do you concur with the earmarked regulatory proceedings aimed at ensuring the ongoing delivery of commercial DTT minimising undue disruption to viewers for both the interim (May 2021 – June 2022) and future (beyond 2022) time periods? Do you consider it necessary to provide for regulatory intervention or initiatives in order to facilitate the technological evolution of the DTT platform post 2021?

#15 How can the assignment and management principles attached with the right of use for the sub 700 MHz Band facilitate the future deployment of DTT in Malta? Should the MCA consider issuing the sub 700 MHz band for DTT with a licence for a term of 15 years (beyond 2030) subject to any obligations as may be imposed in future EU legislation?

The MCA positively notes that the exploratory questions put forward in the consultation elicited considerable debate across commercial TV operators and broadcasters alike, fulfilling MCA's aim of bringing the future of DTT at the forefront in the national agenda and gathering the relevant input thereof.


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