700 MHz band

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National Roadmap (Decision)

1. Introduction

Given the growing requirement for spectrum by terrestrial systems capable of providing terrestrial wireless broadband electronic communications services, coupled with the spectral efficiency of today's broadcasting systems, in 2015, the European Commission initiated a process providing for the allocation of the 694-790 MHz band ("700 MHz band") for terrestrial electronic communications services. The process was undertaken, in the most part, through forums focused on telecommunications where, defending Portugal's positions and interests, Autoridade Nacional de Comunicações (ANACOM) actively participates.

This band provides an opportunity for global harmonisation and coordination of the broadband wireless spectrum, providing economies of scale and scope, enabling the development of innovative new digital services in urban areas and enabling provision of broadband services in rural or remote areas, ensuring access and connectivity.

This process culminated in the publication, on 25 May 2017, of Decision (EU) 2017/899 of the European Parliament and of the Council of 17 May (Decision 2017/899) on the use of the 470-790 MHz frequency band in the Union, which states (article 1), that Member States are to make the 694-790 MHz band (“700 MHz band”) available for terrestrial electronic communications services by 30 June 2020. Since DTT (Digital Terrestrial Television) networks are currently operating on frequencies of the 700 MHz band, Member States are required to migrate such uses to frequencies in the 470-694 MHz band.

To fulfil the obligations which stem from the Decision, article 5 of the same Decision sets out that Member States will approve and publish their national plans and timetables ("national road maps") by 30 June 2018.

In this context, two actions should be undertaken in parallel by 30 June 2020:

I. Release of the 700 MHz band from current uses of DTT - it will be necessary to change the broadcast frequency of about 240 stations that form part of the current DTT network;
II. Allocation of the 700 MHz band - definition of the process for the allocation and use of this spectrum for the provision of terrestrial wireless broadband electronic communications services.

The status of the activities undertaken, as associated and related to these two actions, is detailed in the following two sections.

2. Process of releasing the 700 MHz band

2.1 Preparation

Currently, in Portugal, as under the National Table of Frequency Allocations (NTFA), the 694-790 MHz band is used by DTT, with further permitted use by auxiliary broadcasting equipment.

It should also be noted that approval and publication of the "National Roadmap", as regards the release of spectrum currently used by DTT, has a direct impact on the allocation of spectrum in the 700 MHz frequency band, in particular given the time limits under the Decision. As mentioned above, it is stipulated in the Decision that this frequency band is to be made available for wireless broadband electronic communications services by 30 June 2020, although it should be noted that the Decision sets out reasons which may allow release of the 700 MHz band to be postponed from 2020 until 2022. These reasons include:

a) Outstanding issues of cross-border coordination related to harmful interference;

b) The need and complexity of ensuring technical migration of a significant part of the population to advanced broadcasting standards;

c) Transitional financial costs which exceed revenues expected from procurement procedures;

d) Situations of force majeure.

In Mainland Portugal, release of the 700 MHz band necessarily entails migration of the only DTT network in operation, a single frequency network (SFN) broadcast on channel 56, to a multi-frequency network (MFN), given the lack of a planned SFN network below 694 MHz; this is expected to entail significant costs.

This situation entails some complexity, since the SFN network comprises around 240 transmitters, requiring detailed coordination with the DTT network operator in order to define and implement the operational parameters of each transmitter in a timely manner, so that the work of user support teams on the ground can be synchronised.

The migration scenario will depend on several factors, which should be taken into account, including definition of the future topology of the DTT network (which may be different from current topology), a possible period of coexistence between the two networks (SFN and MFN) as well as a technological upgrading (e.g. DVB-T2).

In order to outline and evaluate the various transition options, taking into account, as referenced above, the technology and structure/topology of the new network as well as a period of coexistence between the two networks (current and new), in October 2016,

ANACOM selected LS Telcom to conduct a study[1] with the objective of supporting the migration scenario to be adopted, in both technical and economic terms. This preliminary and internal study saw participation by a number of television and telecommunications operators who had opportunity to add their perspectives to the conclusions reached in the study. The final report of the study was received in March 2017, together with a proposal for action (with two alternatives), so that the Government might consider the solution to be adopted. This final report was sent to the Secretary of State for Infrastructure on 6 June 2017. Two alternatives were formulated, with the following scenarios:

- Base scenario, where the only change made is the radio channel for each station, with the network structure and technology remaining unchanged in its entirety;
- A more complex scenario in which technology is upgraded alongside migration.

Meanwhile, in order to support expansion of the provision of DTT programme services, ensuring proper technical conditions and price control. as regards provision of the DTT signal transmission and distribution service, Law no. 33/2016 of 24 August (as subsequently amended by Law no. 2/2017 of 16 January) established that ANACOM and ERC - Entidade Reguladora para a Comunicação Social (Media Regulatory Authority) shall jointly promote financial, technical and legal studies to analyse the various possibilities of further extending the provision of programmes on the Digital Terrestrial Television Platform (paragraph 1 of article 5).

In this context, Leadership Business Consulting, S.A. was contracted to conduct the study promoted by ANACOM on 20 July 2017; the final report was received by ANACOM on 14 December 2017 and submitted to *Assembleia da República* (Assembly of the Republic) and the Office of His Excellency the Secretary of State for Infrastructure on 22 December 2017. As regards the advantages and disadvantages of the different possible scenarios for migration, this study[2] corroborates the conclusions of the *LS Telcom* study.

Finally, and very recently, ANACOM organised and hosted a Workshop on the future of DTT in Portugal, held on 30 May 2018, at Fundação Portuguesa das Comunicações (Portuguese Communications Foundation) in Lisbon. Various stakeholders took part, including:

- Independent regulatory bodies and other public entities - Autoridade da Concorrência (Portuguese Competition Authority), Entidade Reguladora para a Comunicação

[1]Future Development of DTT in Portugal

[2]Available at https://www.anacom.pt/render.jsp?contentId=1427736&languageId=1

Social (Media Regulatory Authority) and Direção Geral do Consumidor (Directorate General for the Consumer);

- Television operators (RTP, SIC and TVI);
- The principal telecom operators (MEO, NOS, NOWO and VODAFONE);
- Various representatives from civil society and other private law entities (Obercom, ACIST, ANMP).

In this Workshop, which had about 60 participants, a debate was held on the future prospects for DTT in Portugal to assess the national experience of DTT, given the necessary release of the 700 MHz band, with Leadership Business Consulting, S.A. and Deloitte Consultores, S.A.[3]- presenting their studies.

From the discussions held at the workshop, a convergent position emerged around adoption of the simpler migration scenario, since this option would not jeopardise or invalidate any solution that may be adopted for the future expansion of the DTT offer in Portugal.

2.2 Migration

In these circumstances, and in view of the results obtained in the studies, as well as the convergent position that resulted from the Workshop, it is considered that current technology [DVB-T/MPEG-4 (H.264/AVC)] should be maintained in migration of the current DTT network and that there will be no need to establish any simulcast period, i.e. no period of coexistence between the two networks (current and new).

Migration should take place according to the plan[4] indicated in Annex 1, while the timetable for altering the radio channel of each transmitter is referred to in that annex, notwithstanding any future decisions that may be taken on these matters. Annex 2 also contains a graphical diagram of the various stages of the process.

In the Autonomous Region of Madeira, the current channel 54 will be replaced by one of the following radio channels, already coordinated internationally: 21; 22; 24; 27; 33; 40; 46 and 47.

In the Autonomous Region of the Azores and due the Region's geographical isolation, there is no need for international coordination of the frequencies; the network transmitters in operation, using channels 49, 55 and 56, will switch to using the radio channels that ANACOM

[3] Author of the study promoted by ERC, under Law no. 33/2016 of 24 August and available at: http://www.erc.pt/pt/estudos-e-publicacoes/media-imprensa-radio-tv/estudo-sobre-alargamento-da-oferta-na-plataforma-de-televisao-digital-terrestre

[4] Note that there are planned alternative radio channels that could be used if they are considered more appropriate.

deems most appropriate. Each transmitting station will be switched off so that it is possible to change the frequency and make other necessary adjustments, and will be connected soon after to transmit on the new frequency.

In terms of service reception, this scenario will merely entail retuning of the same reception equipment, and practical measures are being considered to assist the population, in particular the most disadvantaged sections of the population.

Furthermore, it is important that the migration process is accompanied by effective campaigns of communication and user support - which will involve associated investments - so that the migration can proceed smoothly, given that the process of introducing DTT into Portugal occurred recently (2012) and was not entirely without incident.

3. Allocation of the 700 MHz band

As set out in ANACOM's 2018-2020 Multi-Year Activities Plan[5], ANACOM aims to "(...) assign the 700 MHz band (and other relevant bands) considering the national interest and the European and national regulatory framework"; Accordingly, and by determination of 7 March 2018, a public consultation was launched to sound out the market[6] and stakeholders, seeking, in particular, to set out relevant developments and those expected at an international level, such as relevant EU decisions. As such, manufacturers, operators, private and public entities, users and others were consulted on the availability of the 700 MHz band and other bands where there might be interest in joint deployment. In this consultation, 30 contributions (a total of 246 pages) were received from participants in different sectors of society, including:

- Business and professional associations;
- Local authorities;
- Manufacturers;
- Operators (service providers);
- Entities within the scope of the scientific and technological system;
- Sector regulators;
- Security and defence sector;
- Public services.

Although the report has not yet been completed, several parties have stated that the process of allocating the 700 MHz band should not occur until 2020 or later, due to constraints that

[5] https://www.anacom.pt/render.jsp?contentId=1428459&languageId=1 .

[6] https://www.anacom.pt/render.jsp?contentId=1431846&languageId=1 .

arise from the migration of DTT. It was also proposed that allocation should take place only after allocation of the 3.6 GHz band or occur simultaneously with other frequency bands, even if full use is only possible later.

In view of the need for cross-border coordination, in particular with Spain and Morocco, it should be noted that the use of this frequency band should be subject to the technical conditions which aim to allow coexistence between networks operating in different countries.

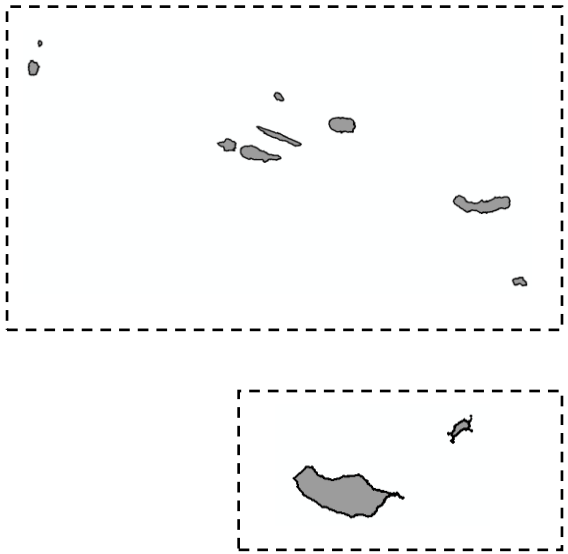
4. Conclusions

In view of the above, migration will take place with maintenance of the currently used technology [DVB-T/MPEG-4 (H.264/AVC)] and without the need to establish a period of simulcast.

Following a process that has benefited from in-depth technical studies and an ongoing focus on transparency and public participation, it is considered that migration should occur according to the plan indicated in Annex 1, and that the timetable for altering the radio channel of each of the transmitters (detailed in Annex 2) should be as referred to in that annex, notwithstanding any future decisions that may be taken. Annex 2 also contains a graphical diagram of the various stages of the process. It should be noted that conditions of flexibility are guaranteed, both in terms of radio planning and in terms of the dates of the various stages of the process, which allow careful and smooth management of the transition.

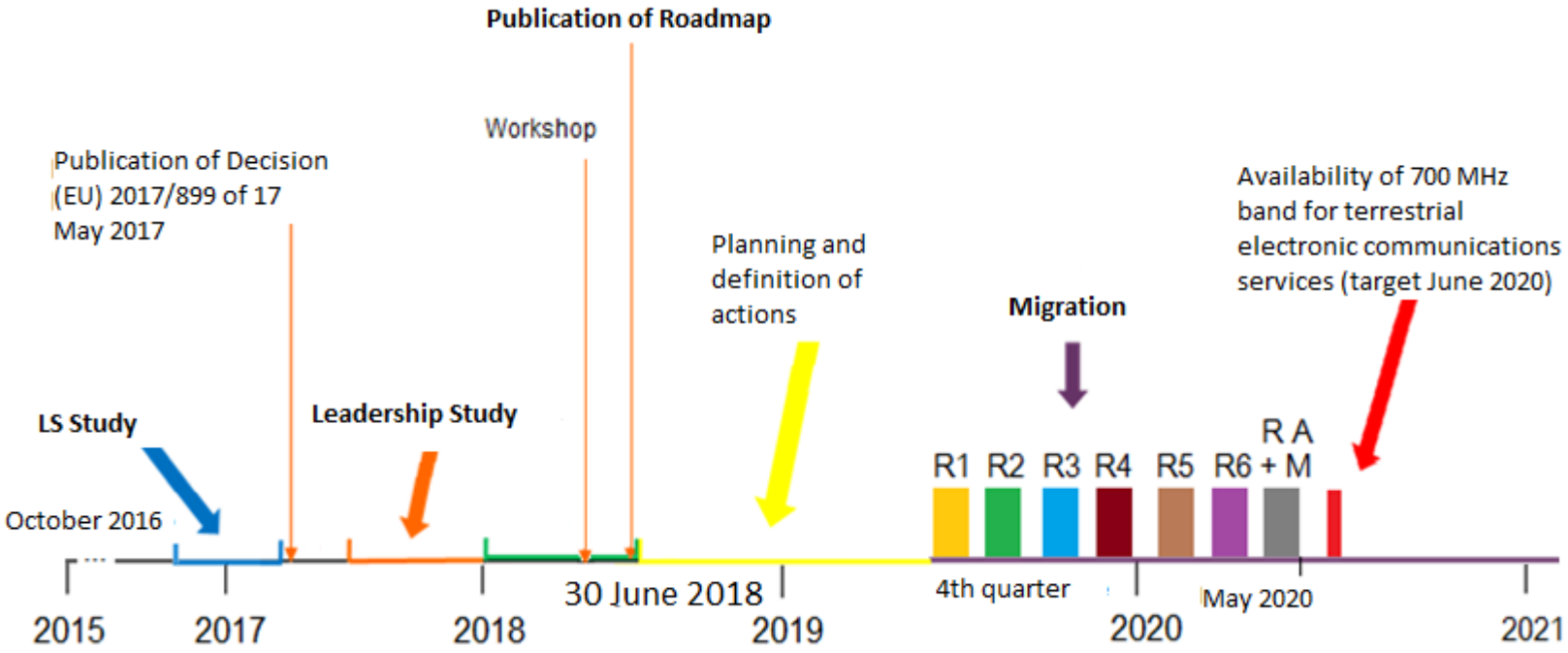
As regards availability of the frequency band, ANACOM will, following approval of the market consultation report, analyse and weigh up the different scenarios with the aim of undertaking allocation of this spectrum in accordance with the time limits established in the Decision 2017/899, i.e., by 30 June 2020. Naturally, ANACOM will not fail to consider the different constraints that may affect use of this spectrum.

Annex 1



Region 1	Migration process to commence from 4th quarter 2019
Region 2	Migration process to commence within one month from date defined for Region 1
Region 3	Migration process to commence within one month from date defined for Region 2
Region 4	Migration process to commence within one month from date defined for Region 3
Region 5	Migration process to commence within one month from date defined for Region 4
Region 6	Migration process to commence within one month from date defined for Region 5. To be completed no later than May 2020
Region A & M	Migration process to occur between January and May 2020

Annex 2


Publication of Roadmap
Workshop
Publication of Decision (EU) 2017/899 of 17 May 2017
Planning and definition of actions
Availability of 700 MHz band for terrestrial electronic communications services (target June 2020)
Migration
LS Study
Leadership Study
R1 R2 R3 R4 R5 R6 R A + M
October 2016
30 June 2018
4th quarter
May 2020
2015
2017
2018
2019
2020
2021