

DECISION

**Changes to the DTT network (MUX A) in the context of the release
of the 700 MHz band**

Development plan and schedule

ANACOM

2019

– PUBLIC VERSION –

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1. Background and framework

1.1. ANACOM's decision on the evolution of the DTT network (MUX A)

By determination of 16.05.2013¹, the Board of Directors of Autoridade Nacional de Comunicações (ANACOM) defined the model for the evolution of the digital terrestrial television (DTT) network connected to Multiplexer A (Mux A) - which resulted in the conversion of the SFN² network into an SFN MFN³ network - and, in this context, it was determined upon MEO - Serviços de Comunicações e Multimédia, S.A. (previously PT Comunicações, S.A., hereinafter referred to as MEO) that *«following any harmonisation at international or Community level or when a higher degree of security exists as to the need of implementation of the digital dividend 2 and respective conditions, and according to an autonomous decision on the part of [this Authority], including the schedule and development plan that are established and published further to a proposal by the network operator, MEO shall be required to:*

- a) *Pursue the installation of the MFN network (SFN MFN), using frequencies provided for assignments/areas in annex 1 hereto;*
- b) *Return channel 56 (750-758 MHz) to ICP-ANACOM, after an appropriate simulcast period to be defined.»*⁴ (emphasis added).

In the same determination, bearing in mind the planned evolution, ANACOM (i) imposed on MEO an additional set of conditions - subsequently set out in the Right of Use for Frequencies ICP-ANACOM No. 06/2008 when it was reissued (hereinafter RUF ICP-ANACOM No. 06/2008 or DTT RUF) - which are explained in point 1.4 below; and (ii) decided to *«amend the National Frequency Allocation Plan (NFAP) (...), providing for the reservation of remaining frequencies identified in annex 1 hereto, with full access of the RUF holder⁵ to the digital terrestrial television broadcasting service, connected to Multiplexer A, intended for the broadcast of free-to-air unrestricted access television programme services.»*

¹ Available at: <https://www.anacom.pt/render.jsp?contentId=1161743>.

² Single Frequency Network.

³ Multiple Frequency Network.

⁴ Cfr. point 3.1. of the deliberative section of the decision concerned, now underlined. Available at: <https://www.anacom.pt/render.jsp?contentId=1161743>.

⁵ It is recalled that, in the context of this reservation, MEO was subsequently allocated frequencies by determination of 01.10.2015, available at: <https://www.anacom.pt/render.jsp?contentId=1368580>.

1.2. Decision (EU) on the use of the 470-790 MHz frequency band

Decision (EU) 2017/899 of the European Parliament and of the Council, of 17 May⁶, on the use of the 470-790 MHz frequency band in the European Union (hereinafter Decision 2017/899) aims to ensure a coordinated approach to the use of the 470-790 MHz frequency band in the Union in accordance with common objectives⁷.

Paragraph 1 of article 1 of the referred decision lays down that *«By 30 June 2020, Member States shall allow the use of the 694-790 MHz ('700 MHz') frequency band for terrestrial systems capable of providing wireless broadband electronic communications services (...).»*.

Paragraph 1 of article 5 of decision 2017/899 lays down that *«...as soon as possible and no later than 30 June 2018, Member States shall adopt and make public their national plan and schedule (...), including detailed steps for fulfilling their obligations under Articles 1 and 4.»*.

1.3. National Roadmap for the release of the 700 MHz band

In compliance with paragraph 1 of article 5 of Decision 2017/899, ANACOM approved, on 27.06.2018, a roadmap for the release of the 700 MHz band (hereinafter "National Roadmap")⁸, which was approved by order of the then Secretary of State for Infrastructures.

As far as the release of the 700 MHz band is concerned, involving migration of the DTT network, the National Roadmap outlines, in brief, the following path:

- *«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»;*
- *«migration should occur according to the plan indicated in Annex 1 [vide Picture 1 below], and [...] the timetable for altering the radio channel of each of the transmitters (detailed*

⁶ Decision and respective corrigendum available at <https://www.anacom.pt/render.jsp?contentId=1410359>.

⁷ Cfr. Recital (23).

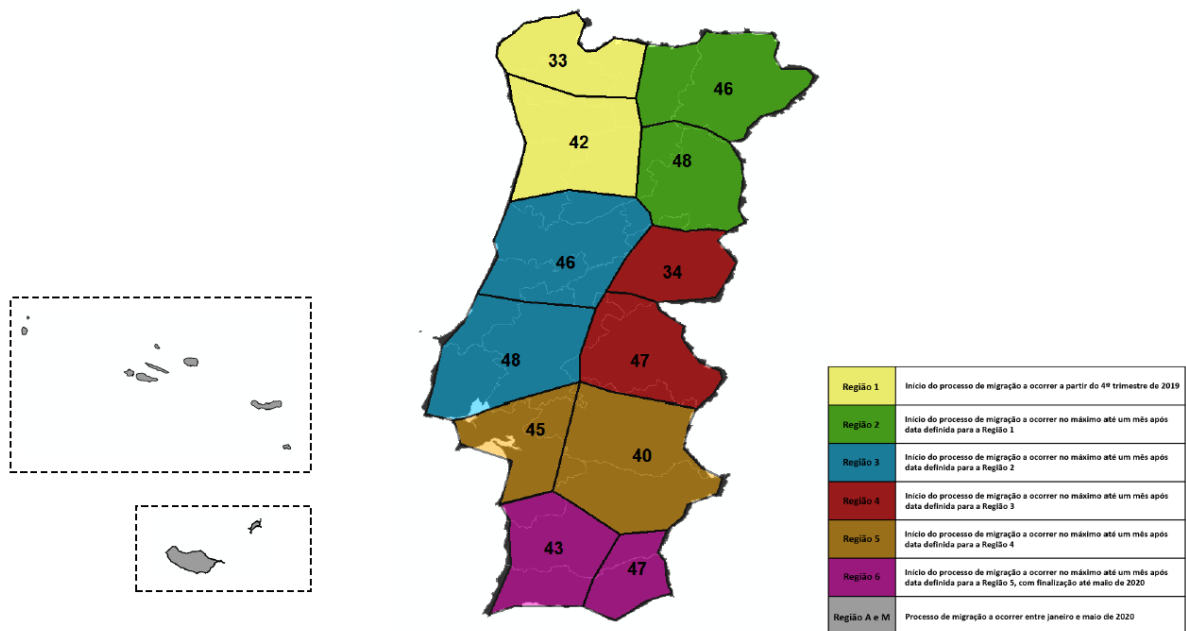
⁸ Available at <https://www.anacom.pt/render.jsp?contentId=1456516>.

in Annex 2 [vide Picture 2 below]) should be as referred to in that annex, notwithstanding any future decisions that may be taken»;

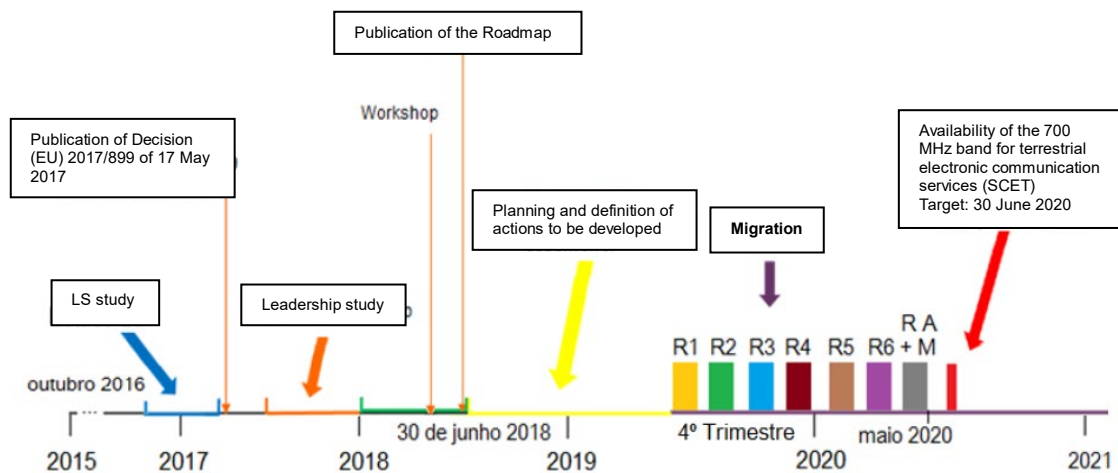
- «In the Autonomous Region of Madeira, current channel 54 will be replaced by one of the following radio channels, already coordinated internationally: 21; 22; 24; 27; 33; 40; 46 and 47»;
- «In the Autonomous Region of the Azores and due the Region’s geographical isolation, there is no need for international coordination of frequencies; the network transmitters in operation, using channels 49, 55 and 56, will switch to using the radio channels that ANACOM deems most appropriate».

The National Roadmap also provides that each transmitter station will be switched off so that the frequency and other necessary settings can be changed and then switched on immediately at the new frequency.

Picture 1 – Network change operationalization map, per region (Annex 1 to the National Roadmap)



Picture 2 – Schedule of actions provided for in the network change process (Annex 2 to the National Roadmap)



1.4. Right of Use for Frequencies ICP-ANACOM No. 06/2008 (reissued)

In the case at hand, the (reissued) DTT RUF⁹ held by MEO provides as follows:

«7.1. The frequencies to be used, in the Mainland and in the Autonomous Regions, for the purpose of national coverage connected to MUX A, shall be as follows:

a) Mainland:

- (i) Channel 40 (622-630 MHz);
- (ii) Channel 42 (638-646 MHz);
- (iii) Channel 45 (662-670 MHz);
- (iv) Channel 46 (670-678 MHz);
- (v) Channel 47 (678-686 MHz);
- (vi) Channel 48 (686-694 MHz);
- (vii) Channel 49 (694-702 MHz);
- (viii) Channel 56 (750-758 MHz);

b) Autonomous Region of the Azores:

- (i) Channel 47 (678-686 MHz);
- (ii) Channel 48 (686-694 MHz);
- (iii) Channel 49 (694-702 MHz);

⁹ It is recalled that by determination of 22 June 2017, the Board of Directors of ANACOM approved the amendment and reissue of the DTT RUF. Available at: <https://www.anacom.pt/render.jsp?contentId=1413969>
(Reissued) DTT RUF available at: <https://www.anacom.pt/render.jsp?categoryId=375275&tab=&a=287162&b=303315&c=>

- (iv) Channel 55 (742-750 MHz);
- (v) Channel 56 (750-758 MHz).

c) *Autonomous Region of Madeira: Channel 54 (734-742 MHz).*

7.2. *Frequencies indicated in sub-points (i) to (vii) of point a) of the preceding paragraph shall be used according to assignments/areas set out in Annex 1 to this title, deemed to be an integral part hereof.*

7.3. *Further to any harmonization at international or Community levels, frequencies indicated in the preceding paragraph may be changed during the period of validity of this title, under article 20 of ECL, where the management of specific frequencies require the respective reallocation.*

(...)

9.1. *In accordance with points a) and b) of paragraph 1 of article 32 of ECL, MEO shall be required to use frequencies allocated to it in an effective and efficient manner, and to comply with the following coverage obligations:*

(...)

c) *To ensure compliance, in the Mainland, as from 02.10.2015, with obligations of terrestrial population coverage, per municipality, set out in the table included in Annex 2 to this title, of which it is an integral part, being directly associated with the information included in the shapefile submitted by MEO to ANACOM, in annex to the letter dated 26 November 2015.*

(...)

10.1. *Under ANACOM's determination of 16.05.2013, following any harmonisation at international or Community level or when a higher degree of security exists as to the need of implementation of the digital dividend 2 and respective conditions, and according to an autonomous decision on the part of [this Authority], including the schedule and development plan that are established and published further to a proposal by the network operator, MEO shall be required to:*

a) *Pursue the installation of the MFN network (SFN MFN), using frequencies provided for assignments/areas in annex 1 hereto;*

b) *Return channel 56 (750-758 MHz) to ICP-ANACOM, after an appropriate simulcast period to be defined.*

10.2. *The installation of "main" transmitters in assignments of the map set out in Annex 3 to this title shall take place earlier than the period provided for in the preceding paragraph, and MEO shall bear the costs incurred, if it is anticipated or as soon as it is established that the network in*

operation does not provide the necessary stability to provide the service at the levels of quality set out in Recommendation ITU-R BT.1735-1 and subsequent reviews thereof.

10.3. *MEO shall be required to update with ANACOM the information provided for in point 3.A of ANACOM's determination of 16.05.2013, whenever changes in the network's geographical coverage occur, namely as a result of the installation of new stations.*

10.4. *MEO shall be required to send to ANACOM on a quarterly basis a status report of actions taken as regards situations of identification and of difficulties in receiving the DTT signal, including all actions to optimise the network, and respective conclusions.*

(...)

11.4. *In compliance with ANACOM's decision of 16.05.2013, the solution to be implemented by MEO, under the preceding paragraphs, shall only and necessarily consist of the strengthening of the SFN network coverage or in anticipating migration to the MFN network, whereby MEO undertakes to guarantee the levels of terrestrial coverage set out in Annex 2 to this title.*

11.5. *In the context of the solution to be implemented under the preceding paragraphs, MEO shall be required to update and keep updated the information on the DTT website (<http://tdt.telecom.pt>), as regards the indication of the best-server transmitter, as well as to ensure the provision of information to all potentially affected end-users, according to the proposal submitted to ANACOM and subject to this Authority's validation, fully assuming the additional costs that such users may incur, namely those related to the redirection of receiving antennas, tuning of the DTT receiver and/or replacement/tuning of the amplifier.»*

2. MEO's proposal and ANACOM's views

On 09.01.2019, further to the publication of the National Roadmap and to technical meetings held on 26.10.2018 and 17.12.2018, MEO submitted to ANACOM, in accordance with the decision of 16.05.2013 and paragraph 10.1. of the DTT RUF, its proposal for migrating the DTT network to the sub-700 MHz band¹⁰, which in brief, includes the methodology, the respective schedule and the estimate of costs which the company considers it will incur.

After examination of the referred proposal, and on the basis of the principle that changes to the DTT network (MUX A) should be restricted to those actually required to maintain the current terrestrial coverage, some of the options presented by MEO raised technical doubts.

¹⁰ MEO's letter with reference S0062019DRJ.

In this context, ANACOM sent MEO, on 25.02.2019¹¹, a request for clarification, which MEO replied to by letter dated 12.03.2019¹².

Subsequently, on 17.04.2019¹³, MEO submitted an update of the proposal for migrating the DTT network to the sub-700 MHz band. As a result of its examination, ANACOM considered that it was necessary to clarify some relevant issues of the proposal, and for this purpose, a new technical meeting was held on 24.05.2019.

Following the referred meeting, MEO, by email dated 12.06.2019, submitted to ANACOM a set of information and clarifications, having this Authority, by letter of 28.06.2019¹⁴, sent to MEO a memorandum with the main conclusions of the meeting held on 24.05.2019, and informed that there were still some aspects pending analysis.

MEO replied by letter dated 03.07.2019¹⁵, referring to clarifications already provided on 12.06.2019.

Notwithstanding, in order to clarify aspects of MEO's proposal which according to ANACOM required clarification, a new technical meeting was held on 18.07.2019, following which MEO clarified, by email of 19.07.2019, what it advocates regarding the methodology for allocating frequencies in its proposal for maintaining the MFN overlay network - as further detailed below in point 2.3.

Following the technical meetings to discuss and clarify the terms of the proposal for migrating the current DTT network to the sub-700 MHz band, submitted by MEO on 09.01.2019, reviewed on 17.04.2019 and supplemented by the exchange of communications between the parties in order to clarify some of the proposed actions, as noted above, this Authority, by letter dated 24.07.2019¹⁶, requested MEO to submit its final migration proposal (actions and schedule), bearing in mind and considering all the technical work that had been carried out, so that ANACOM could take it into account in the scope of the draft decision to be adopted.

¹¹ Letter with reference ANACOM-S003708/2019.

¹² MEO's letter with reference S0632019DRJ.

¹³ MEO's letter with reference S0852019DRJ.

¹⁴ ANACOM's letter with reference 2019133233.

¹⁵ MEO's letter with reference S1552019DRJ.

¹⁶ ANACOM's letter with reference 2019190967, AH014487/2019.

By letter of 29.07.2019¹⁷, MEO replied stating, in summary, that it saw no reason to review that proposal it had submitted, given that it identified a single point on which there could be a convergent change with ANACOM's position, which the company could address in its comments in the scope of the prior hearing.

With regard to the points of its proposal that were identified as being sensitive during technical contacts that had taken place, and which had not deserved ANACOM's agreement, MEO maintained the terms of its proposal. In this context, the company identified as the most critical point the macro schedule of the proposal it had presented - in brief, the implementation period for the rollout process and pilot tests were indicated as the critical issues. Given that the schedule presented was based on the assumption that a decision on the release of the 700 MHz band would be issued in the course of the 1st quarter of 2019, which was not the case, MEO felt that such schedule «*should be properly "slid" forward in time*». This issue is developed in point 2.6. below.

As structural documents of its proposal, MEO identified the proposal submitted on 09.01.2019, reviewed on 17.04.2019, supplemented by clarifications provided in the meantime, in particular those that concern the overlay MFN network, submitted to ANACOM on 19.07.2019.

As such, in the absence of a single and final document, as requested to MEO, and bearing in mind the documents identified above, as well as clarifications provided by the company, in meetings held on 26.10.2018, 24.05.2019 and 18.07.2019, ANACOM takes the view that the proposal is embodied in the points that are further identified below.

In any case, it should be noted that, being incumbent on MEO to submit a proposal for migrating the DTT network (from a SFN with partial overlay to a SFN MFN), the company chose to present two alternative technical solutions for this purpose (with and without maintenance of the overlaid network), specifying the consequences of options to be taken in this context - as further detailed below.

It is now for ANACOM to assess the network development plan and schedule proposed by MEO, on the basis of objectives set - migration of the DTT network to the sub-700 MHz band, in the light of Decision 2017/899 -, bearing in mind the criteria underlying the weighing

¹⁷ Letter with reference S1692019DRJ.

up of the network evolution model, defined in ANACOM's decision of 16.05.2013: **(i)** impact on the population; **(ii)** implementation costs; **(iii)** ensuring predictability for all stakeholders¹⁸.

One final note on the logic behind views that are expressed from now on in relation to the cost estimate presented by MEO in the proposal. In fact, it must be stressed that this analysis and decision fall within the scope of this Authority's competences in accordance with powers conferred on it as Regulatory Authority - points e) and h) of paragraph 1 of article 8 of the Statutes¹⁹. As such, notwithstanding the fact that this Authority, in the weighing up that preceded the drafting of this decision, took into due account the costs presented, it shall not express here its views on the conditions and general criteria for the compensation to which MEO is entitled, under Decree-Law No. 151-A/2000, of 20 July²⁰, to cover, in whole or in part, costs that are proven to have been incurred with the migration of the DTT network to the sub-700 MHz band, the definition of which falls to the Government. ANACOM will come back to this matter in point 2.7. below.

2.1. Actions to be implemented

Here, ANACOM lists and analyses the actions that MEO proposes to carry out for the purpose of migrating the DTT network (MUX A) to the sub-700 MHz band.

2.1.1. Retuning of transmitters

MEO's proposal

MEO proposes the total swap of filters, instead of retuning each one, given that, according to the company, this option significantly simplifies reinstallation procedures and speeds up the scheduled rollout, as all actions involved in the logistics of collection, transport and delivery of filters, as well as highly specialised on-site technical work, are no longer necessary. These activities, according to MEO, are highly critical, as any failure could impact the pace of the rollout. In fact, in the company's opinion, any unexpected event that could occur in this context would be likely to significantly interrupt or prevent the progress of the filter retuning work and, ultimately, compromise the schedule.

¹⁸ Cfr. identified decision, page 10.

¹⁹ Approved by Decree-Law No. 39/2015, of 16 March.

²⁰ Under article 4, paragraphs 2 and 4 of Decree-Law No. 151-A/2000, of 20 July.

This approach being taken into consideration, each transmitter station's retuning operation includes, according to MEO's proposal:

- Retuning of the transmission equipment in the new frequency, which involves the interruption of transmission during this process, a task which takes about 6 hours for medium- and high-power transmitters (over 100W) and about 3 hours for low-power transmitters (under 100W);
- Replacing the existing filter for a new filter previously tuned to the new transmission frequency (swap).

MEO identifies the following possibilities for scheduling work:

- a) Daytime (typically between 9 am and 6 pm);
- b) Night time (typically between 12 am and 9 am);
- c) Daytime, but with the use of a portable transmitter, which ensures a continuous transmission while the transmitter station's retuning operation is carried out, thus avoiding long periods of unavailability of the service and causing the least possible impact on DTT users,

and proposes the adoption of alternative c).

ANACOM's view

ANACOM is also of the opinion that the full swap of filters makes it possible to simplify the process significantly, as operations required for the collection, transport and subsequent retuning of filters, which could involve delays and unforeseen events, are fully removed. This is the case given that filters to be used in the swap operation will already be tuned in beforehand, only needing to be inserted into the transmission chain. This solution thus optimizes the resetting time and prevents failures and hazards that could arise if the filters were the same but retuned in.

Accordingly, ANACOM takes the view that the average time of interventions estimated by MEO could be reduced in relation to what was forecast.

Given that costs estimated by MEO for the total filter swap and filter retuning options are very similar, ANACOM agrees with MEO's proposal to implement the total filter swap strategy.

As regards the work schedule, ANACOM agrees with the adoption of alternative c) proposed by MEO, as it allows the population served by the transmitter under intervention to continue to access the service in the course of ongoing resetting operations, and it is deemed that the acquisition cost of these portable transmitters justifies the benefits resulting from the adoption of this measure.

2.1.2. Radiating systems with Yagi antennas

MEO's proposal

Radiating systems of some of the DTT transmitter stations consist of narrowband antennas of the Yagi type, optimized for channel 56 ("C56"), which do not perform adequately in the new operating frequencies of the broadcasting network. In case these antennas continued to be used, this would result in the decrease of the area of terrestrial coverage. These antennas will therefore have to be replaced by others specifically designed for the future frequencies to be used, in order to maintain coverage areas that are currently guaranteed.

Transmitter stations in these conditions are as follows:

Table 1 – Transmitter stations with narrowband radiating systems (proposal)

Alter do Chão	Celorico de Basto	Montedor	Tocha
Alverca	Évora Centro	Porto de Mós	Vila Franca de Xira
Arronches	Ferreira do Alentejo	Ribeira Grande	Vila Franca de Xira - Montegordo
Boa Viagem 2	Logo de Deus - Coimbra	Sapiãos, Boticas	Vila Nova de São Bento
	Mealhada	Sátão	

In most places where these transmitters are installed, MEO considers that it is highly risky to carry out the antenna replacement work on the day of the migration, as weather conditions may affect, or even prevent, the access thereto. In this case, the alternative, according to MEO, is to install, before the date of migration, a second radiating system (including coaxial cable and antennas) so that on the day of the migration only the switching to the new radiating system takes place.

MEO thus proposes the adoption of this strategy, emphasizing that it cannot be implemented in the Évora Centro transmitter, which despite having a radiating system installed at the top of a building in an urban environment, with access less dependent on weather conditions, presents space constraints that do not allow for the accommodation of additional drop cables, through the existing gutter inside the building.

Subsequently, in the scope of the prior hearing that preceded this decision, MEO in its comments identified an additional situation, that concerns the radiating system of the transmitter station of Termas de Monfortinho, the model of which is optimized to operate in UHF Band V - for which the manufacturer specifies a frequency range between 606 and 860 MHz, that is, above channel 38 inclusively.

ANACOM's view

ANACOM confirmed that stations indicated in Table 1 use in fact narrowband Yagi antennas and that the antenna of the Termas de Monfortinho transmitter station, which needs to be optimized to the 606-860 MHz frequency band, requires a change, thus the Authority agrees that these stations need to be replaced, in the light of the consequences that may arise if they are maintained.

ANACOM takes the view that there are grounds for MEO's two-step proposal, which is a more prudent strategy for the replacement of the referred antennas: (i) installation of a new radiating system (coaxial cable and antennas) on a date prior to the migration of the respective transmitter station, and (ii) switching to the new radiating system on the day the transmitting channel is changed. In this way, and for these specific situations, it is possible to shorten the period of time required to retune stations, by performing the set of planned tasks in different stages.

2.1.3. Replacement of transmitters [BCI] [ECI] with operational constraints

MEO's proposal

By way of precaution, MEO indicates the need to replace [BCI][ECI], as constraints of an operational nature could arise. Although theoretically, their [BCI][ECI], MEO takes the view that they should be replaced.

ANACOM's view

Given that the proposal to install these new transmitters is due merely to a cautious position on the part of MEO, on the basis of an empirical assumption, ANACOM takes the view that:

- a) As regards [BCI][ECI], the company is able to use either the Monte da Virgem transmitter (400 W), which

currently transmits on channel 56, but will soon be switched off, or portable transmitters (also 400 W), to be used during the migration process.

However, it is acknowledged that portable transmitters are not provided with backup/redundancy units, thus they cannot be used as a permanent solution for the future.

In the light of the above, and in order to optimize resources and costs, ANACOM believes that [BCI][ECI], may be retuned for the time being.

In case any of these transmitters cause any problem, the Monte da Virgem transmitter may be used, in a first instance, and if such problems spread to more than one transmitter, ANACOM will then accept the purchase of final transmitter(s) (with redundancy). In the meantime, during the period of time required for the respective purchase, the service shall be ensured by portable transmitters.

- b) As regards the transmitter [BCI][ECI], ANACOM agrees that this transmitter station requires the immediate purchase of a new 800 W transmitter, as there is no viable alternative in line with the preceding view.

In brief, ANACOM takes the view that it is not clear that the simple retuning of these transmitters will compromise the continuity of the service, and that this action is essentially of a precautionary nature. Notwithstanding, so that this situation does not compromise the quality of access to the service by the population that accesses the transmitter of [BCI][ECI], ANACOM agrees that MEO should purchase a new 800 W transmitter for that transmitter station.

2.1.4. Porto Santo transmitter (Autonomous Region of Madeira)

MEO's proposal

MEO identifies gains in coverage optimisation in case the Porto Santo transmitter uses a different frequency from the other transmitters on Madeira Island.

In its opinion, this proposal aims to overcome the constraints that result, in particular, from the geographical location of Porto Santo island in relation to the archipelago to which it

belongs, the size of the territory, the location of the Porto Santo transmitter and the 1/8 guard interval of the SFN network, adopted for the Autonomous Region of Madeira, factors which, taken together, and in case all transmitters of the archipelago used the same frequency, would favour the emergence of unwanted areas of self-interference.

In this context, MEO takes the view that in case the Porto Santo transmitter were to use a different frequency, the potential for self-interference would be sharply reduced.

ANACOM's view

Given that MEO's proposal does not entail any increase in costs, nor does it show any technical disadvantages, including in the perspective of radio spectrum management, and, in addition, presents benefits in terms of radio coverage, it is deemed that the Porto Santo transmitter should switch to channel 46 (670-678 MHz) while other transmitters installed in the Madeira island will use channel 47 (678-686 MHz).

This entails a change of frequency which must be set out in the DTT RUF, as will be shown below.

2.1.5. Coverage optimisation – Radiating systems

MEO's proposal

In case it is not possible to maintain an overlaid network - as proposed in point 2.3. below - , MEO declares that it will be necessary to use radiating systems other than those used today in some of the transmitter stations, to address new situations of self-interference and of "0 dB echoes", in order to continue to provide the population with conditions of access to the service equivalent to those currently available by terrestrial means.

This is the case for the following transmitter stations:

Table 2 – Transmitter stations where radiating systems will be changed (proposal)

Benfica, Lisboa	Lisboa - Xabregas	Sines
Candeeiros	Redondo	Volta da Pedra, Palmela

MEO notes that changes to radiating systems, considered herein, involve (i) at the Benfica transmitter station, in Lisbon, the need to replace the transmitting equipment with a lower-powered one; (ii) at the Redondo transmitter station, the transmitting equipment, in this

case, needs to be replaced with a higher-powered one; and (iii) the need to install a new transmitter station at Chalrito.

ANACOM's view

As explained below, ANACOM agrees with MEO's proposal to maintain, in the future, the overlaid network, thus changes suggested here as regards radiating systems will no longer be necessary, in line, in fact, with the company's position, and will therefore not be taken into consideration.

2.1.6. Coverage optimisation – Replacement for higher-powered transmitters

MEO's proposal

MEO declares it is necessary to replace transmitting equipment where the radiation diagram of the respective radiating system, in the new transmission frequency, shows a lower gain than the current one, which will result on an impact on coverage, without the transmitter having sufficient margin to deliver a higher power to the antenna and, thus, compensate for this possible degradation of gain.

Under these circumstances, MEO considers that it is necessary to replace the current equipment for a new and higher-powered one, that enables the effective radiated power (e.r.p.) made available today to be maintained.

This is the case for the following transmitter stations:

Table 3 – Transmitter stations where radiating systems require a replacement for higher-powered ones (proposal)

Braga, Santa Marta	Guimarães Penha	Vila Praia de Âncora
Junqueira	Vouzela	Alvaiázere
Monte do Facho	Caparica	Santiago do Cacém

ANACOM's view

With regard to this proposal, and according to information provided by MEO, the maintenance of the current e.r.p. of stations indicated in table 3 would require the replacement of:

- Seven 200 W (23 dBW) transmitters for seven 300 W (24.77 dBW) transmitters;

- One 400 W (26 dBW) transmitter for one 600 W (27.77 dBW) transmitter;
- One 10 W (10 dBW) transmitter for one 30 W (14.77 dBW) transmitter.

MEO thus intends to increase power by 1.77 dB at eight transmitters and by 4.77 dB at one of them.

However, the use of radio channels with lower frequencies, in the UHF band, tends to favour the coverage of stations, as the response of the propagation channel - the air interface - does not attenuate radio signals of lower frequencies as much and, for this reason, the minimum electric field level required for the purpose of the reception of the service is also less demanding.

Bearing in mind these factors and according with calculations prepared by ANACOM, and submitted to MEO on 25.02.2019, even with current transmitting equipment, the coverage area of all stations concerned, on new radio channels, will be wider than it is today, thus this Authority considers that their replacement is not justified.

Notwithstanding, in case there are coverage failures in the course of the process of changing stations under consideration, and in case it is proved that any coverage failures are effectively due to the lack of power of such transmitters, ANACOM will authorize the implementation of this solution, following the submission of a request from MEO that shall attach the relevant supporting documents.

2.2. Partial simulcast in the Mainland

MEO's proposal

In its proposal, MEO refers that the network change process set out in the National Roadmap does not provide for a simulcast period, that is, a period of simultaneous transmissions on new frequencies of regional SFNs and on old frequencies of the national SFN. This decision, in its opinion, may have an impact on the continuity of the access to the service, to the detriment, in particular, of the older population.

MEO adds that, in half the geographical “sets”²¹ on the Mainland, the respective “main transmitters” already operate on sub-700 MHz frequencies, thus users accessing the

²¹ “Set” corresponds, in the terminology used by MEO in its proposal, to what ANACOM calls an assignment.

service through these transmitters, which integrate the current overlaid MFN, will not be affected by migration.

In this context, MEO declares that the effects of an absence of simulcast could be mitigated through the early installation of new “main transmitters”, associated with the geographical “sets” that currently do not have “main transmitters”. Under this option, which MEO considers to have limited estimated costs, and which bears no impact on the overall schedule of the process, transmitters would be installed and activated a few months before the start of the general network retuning process, providing covered populations with an extended simulcast period.

MEO considers also that the coverage of these “main transmitters”, as well as of “main transmitters” of the remaining “sets” is very relevant, both in terms of geography and covered population, and therefore proposes that the 8 transmitters to be considered in this option are as follows:

Table 4 – “Main transmitters” to be installed in advance

Transmitter	Power	Observations
Muro	300 W	New transmitter
Bornes	600 W	Replacement of the current transmitter (100 W)
Marão	400 W	New transmitter
Gardunha	1 kW	Replacement of the current transmitter (300 W)
Montejunto	600 W	New transmitter
Monsanto	300 W	New transmitter
Fóia	300 W	New transmitter
São Miguel	1 kW	Replacement of the current transmitter (400 W)

The costs associated with this partial simulcast may, in MEO’s opinion, be further reduced where SFN transmitters (channel 56) co-located with transmitters of the current MFN overlaid network are switched off in advance. Given that, in these locations, transmitters of the MFN overlaid network have been in operation for several years, MEO believes that a large proportion of the users covered by such transmitters will have already tuned the frequencies of these transmitters by now.

Transmitters to be considered in this context are as follows:

Table 5 – Transmitters tuned to channel 56 co-located with the overlaid network, to be switched off in advance (proposal)

Transmitter	Power	Observations
Monte da Virgem	400 W	May be reused at Marão
Marofa	300 W	May be reused at Muro
Lousã	600 W	May be reused at Montejunto
Boa Viagem	300 W	May be reused at Fóia
Palmela	300 W	May be reused at Monsanto
Mendro	100 W	May be reused at the new Chalrito transmitter, not deemed to be a main transmitter

ANACOM's view

ANACOM considers that the existence of a simulcast period of the kind proposed by MEO could, in theory, ensure a smoother transition and allow a minor part of users to migrate, over a defined simulcast period, to new frequencies.

However, the issue of the existence of a simulcast period cannot be analysed in isolation, as the costs of this option need to be taken into consideration in comparison with the benefits it could provide. As such, the option of whether or not a simulcast should take place must be always weighted in the light of the perspective that DTT users would be likely to migrate to new frequencies, on their own initiative, even if, in that period, they could watch TV on the current frequency.

The experience with the migration process from analogue to digital TV (which, it is recalled, maintained exactly the same offer of television programme services and the same image quality), namely the purchase pattern of set-top-boxes, clearly showed that the 3 years of the simulcast period had no relevant impact on the migration process, as the population migrated at the end of the period only. And given that there is no other incentive for migration in the current case, namely the offer of new programme services, the population will only migrate to the new technology - or, in this case, to the new radio channel -, where no other alternative exists, that is, when the service is over.

In this process, this situation means that the population would only no longer have access to the DTT signal when the simulcast period ended, that is, when the transmitter of the coverage area of their address, tuned to currently channel 56, was switched off.

Moreover, in many situations, in order to take advantage of the simulcast period, users would have to redirect their receiving antennas, thereby incurring costs, which would be unnecessary.

Moreover, ANACOM recalls that assumptions associated with this frequency migration are significantly different from those that occurred at the time of the migration from analogue TV to DTT, which involved a technological change that affected 100% of users accessing the service.

Moreover, in this case, as the technology currently used is the same [DVB-T/MPEG-4(H.264/AVC)] and the continuity of the current overlaid MFN network, which is already in operation for some years now, and which will coexist with new regional SFNs, is ensured, the process of frequency migration will affect a significantly smaller percentage of DTT users, when compared to the previous migration (from analogue to digital). In fact, and as referred by MEO, overlaid transmitters of half the assignments/areas in the Mainland already operate in sub-700 MHz frequencies, ensuring DTT coverage that roughly covers 40% to 50% of the population, thus users who already have access to the service through these transmitters will not be affected by this migration.

On the other hand, although a period of simulcast could provide greater certainty about the possibility of any coverage problem that was occurring - which is unlikely -, it would not be easily perceived, as measurements that were carried out on the ground to measure signal quality would always be limited and time consuming.

Consequently, having weighted the high costs associated with a possible simulcast option, the different nature of the current migration process, compared to the one that preceded the technological migration, as well as the experience obtained at the time, namely the natural disposition of DTT users to delay migration until such time as it is inevitable, otherwise they are deprived of access to the service, ANACOM takes the view, in line with the position taken in the National Roadmap, that the existence of a simulcast period, namely of the kind proposed by MEO, is not justified.

As regards the change of characteristics and/or the installation of new “main transmitters”, ANACOM believes that this solution could imply that locations currently covered by a given transmitter would receive a stronger signal from a new transmitter, thus the population, now served by this new best-server transmitter, would likely be required to redirect their receiving antennas to access the service with quality, thus incurring unnecessary costs. By

comparison, it is noted that the implementation of an SFN MFN network, as planned, will not force users to redirect their receiving antennas. In fact, they shall only be required to retune their equipment.

On the other hand, the option of changing characteristics and/or installing new “main transmitters”, proposed by MEO, involves relevant additional costs, by around **[BCI]** **[ECI]**, and is not deemed to be a strictly necessary change to maintain the current coverage.

For the reasons set out above, ANACOM believes that the adoption of this proposal is not justified.

2.3. Maintenance of the overlaid network

MEO's proposal

MEO considers that the overlaid MFN network provides a more stable alternative in terms of terrestrial coverage, and for this reason, although the size of future SFNs is much smaller than the current national SFN, the company believes that, without this alternative, end users could experience events of signal reception degradation, in particular in specific situations of change in propagation conditions.

Moreover, MEO considers that there are other phenomena that contribute to the events of degradation of SFN signal quality, namely those associated with the so-called “0 dB echo” situations and the high density of signals from different transmitters, albeit within the guard interval.

MEO thus believes that, in general, the overlaid MFN network is the best solution for this problem. As such, the alternative of installing the new Chalrito transmitter and the changes to radiating systems indicated in Table 2 above only arises in case it is not possible to maintain the overlaid network, with the objective of mitigating some of these problems.

Another aspect which MEO stresses with regard to the overlaid MFN network is related to the **[BCI]** **[ECI]**, which would prevent the unavailability of the service.

MEO declares that this strategy **[BCI]****[ECI]**.

Finally, MEO considers that maintaining the overlaid network will not involve investment costs and makes it possible to avoid the impacts and costs related to the installation of the new Chalrito transmitter and changes to radiating systems indicated in Table 2 above.

In the scope of this proposal, MEO recommends that transmitters that currently integrate the overlaid MFN network maintain their operating frequency (except for the Montejunto transmitter, which must change its transmission frequency - channel 49 -, because it is in the 700 MHz band to be released), in order to prevent impacts on the population that uses the DTT service served by these transmitters.

Current transmitters of the SFN network (on channel 56) will thus require their transmission channel to be changed to a separate channel, to be identified by ANACOM, of the overlaid transmitter of the respective "set".

ANACOM's view

As a preliminary point, it should be noted that MEO, as holder of the DTT RUF, currently has, for the provision of the DTT service, a national coverage network (which on the Mainland corresponds to an SFN network composed of around 240 transmitters on channel 56) and an overlaying MFN network, in 7 assignments duly identified in the respective title (vd. Annex 1 of the DTT RUF)²², which consists of the first stage of implementation of the SFN MFN network established in ANACOM's determination of 16.05.2013.

Under that same decision and paragraph 10.1. of the DTT RUF, and given that the 700 MHz band (the so-called Digital Dividend 2) must in fact be released, as is now the case, MEO is required to complete the implementation of the SFN MFN network already started in the Mainland, using for the purpose the frequencies provided for in assignments set out in Annex 3 to the DTT RUF²³, and release channel 56.

In this context, it is deemed that MEO's proposal, in line with the plan, consists of **(i)** completing the coverage of the SFN MFN network in accordance with Annex 3 of the DTT RUF held by the company, which means maintaining the current transmission channel in the 7 assignments where main transmitters in that network are already operating (with the exception of the Montejunto transmitter which must change its transmission channel -

²² It is noted that the Mainland was divided into 12 assignments.

²³ This process will naturally also involve the migration of the DTT network in the Autonomous Regions, as provided for in the National Roadmap, as well as the replacement of channel 49 by another channel in the sub-700MHz band.

channel 49 -, since it is part of the 700 MHz band to be released) and **(ii)** releasing channel 56. In addition, MEO proposes **(iii)** to keep the overlaid network in the 7 assignments that currently benefit from it, whereby the various transmitters currently transmitting in channel 56 would be required to change their transmission channel to a different channel of the SFN MFN transmitter in the respective assignment/area.

Therefore, the overlay proposal now presented by MEO, which inevitably involves the assignment of several new radio channels to replace channel 56, is found to occur only in the assignments/areas where this type of solution is already available. In other areas, the evolution planned for the Mainland in the decision of 16.05.2013, in paragraph 10.1. of the DTT RUF and in the National Roadmap, is maintained.

This proposal thus involves maintaining the use of spectrum equivalent to that currently available to MEO, but with the allocation of new frequencies in view of the necessary release of channel 56, which is in the 700 MHz band.

From ANACOM's perspective, this solution is inefficient in terms of spectrum, given that in the areas of the overlaying network two different and overlapping radio channels are used, so that of the current 6 networks planned under the 2006 Geneva Agreement (GE-06), only 4 networks will be available for immediate allocation. It should also be noted that the assumption that justified the allocation of the spectrum for MEO to overlay the network (the synchronisation of a very extensive single frequency network) is currently not met (frequency networks will be small, so their synchronisation is much simpler).

However, this spectrum inefficiency does not result in spectrum scarcity, given that, in the current situation, it is expected that the coverage that remains available will be sufficient to accommodate possible future requirements, as regards the availability of television programme services that use radio spectrum.

ANACOM agrees with MEO that the overlaid network makes it possible to mitigate or reduce events where end users may experience signal reception degradation, namely in specific situations of change of propagation conditions or in situations of "0 dB echo" and high density of signals from different transmitters, albeit within the guard interval, given that, as there is only one transmitter station to transmit on a given radio channel, these situations are unlikely to occur.

On the other hand, the maintenance of the overlaid network will make the installation of the new Chalrito transmitter and the changes to the radiating systems indicated in Table 2 above unnecessary, in order to ensure that the population covered by these transmitter stations that currently have terrestrial coverage maintains this type of coverage after this process is completed.

As this requirement is no longer necessary, this means that the cost of migration will obviously be lower, the migration operationalisation will be simpler, and there will be no need to redirect the population's receiving antennas in the areas covered by these transmitter stations - and if there is no need to redirect the antennas, the population will not incur the respective costs.

With a view to a decision as to whether or not to maintain an overlaid solution for the purpose of providing the DTT service, it is important to bear in mind and weight the objectives and principles that govern ANACOM's regulatory activity, in particular as regards spectrum management.

As such, it is ANACOM's regulatory objective to «*promote competition in the provision of electronic communications networks and services*», and, in this scope, its aim is «*to ensure that users, including disabled users, elderly users and users with special social needs derive maximum benefit in terms of choice, price, and quality*», and «*to encourage an efficient use and to ensure an effective management of radio frequencies*» [cfr. article 5, paragraph 1, point a) and paragraph 2 a) and d) of the Electronic Communications Law or ECL²⁴].

As radio frequencies are a scarce and valuable public resource, it is in the public interest that they are managed as rationally as possible.

In this scope, it is incumbent upon ANACOM to ensure an efficient management of radio frequencies taking into account the important social, cultural and economic value of these frequencies (cfr. article 15, paragraph 1 of ECL), whereby the planning of frequencies must take into consideration the following criteria: *a)* the availability of radio spectrum; *b)* the guarantee of conditions of effective competition in the relevant markets; *c)* the effective and efficient use of frequencies; and *d)* the balance of interests of radio spectrum users (cfr. article 15, paragraph 2 of ECL).

²⁴ Law No. 5/2004, of 10 February, as it stands.

This means that the Regulatory Authority is required, when ensuring an efficient management of spectrum, to bear in mind the public interest in its several strands.

In this scope, the criteria underlying the definition of the DTT network evolution model (MUX A), approved by ANACOM's decision of 16.05.2013, are also recalled: (i) impact on the population; (ii) implementation costs; (iii) ensuring predictability for all stakeholders, which must again be taken into account in this decision-making process. In other words, now, as in 2013, ANACOM aims to find the best compromise solution between the quality of the service provided by the network, spectrum efficiency and the impact on the population.

It is well known that the digital terrestrial television broadcasting service, connected to Multiplexer A, is intended for the broadcast of free-to-air unrestricted access television programme services, which includes public service television, thus the social and cultural value of frequencies that support it bears one of its clearest and most easily understandable signs.

DTT guarantees free access to culture and information, promotes citizenship and social and territorial cohesion, and is an important link for the less literate, more vulnerable and older social classes.

In this context, as in 2013, ANACOM is required to bear in mind how essential it is to take into account the criterion for minimising the impact on the population of the implementation of migration.

MEO's proposal, which involves, in this case, the implementation of a partially overlaid SFN MFN network (i.e. in the 7 assignments currently benefiting from it), is the one that, in the current context, seems to minimise the impact on the respective end-users of the migration of the DTT network to the sub-700 MHz band.

In fact, among other reasons, and as stated earlier, maintaining the overlaid network will make it unnecessary to redirect the population's receiving antennas in the areas covered by stations indicated in Table 2 and to install the new Chalrito transmitter, the respective additional costs thus being avoided.

As such, although the solution now proposed by MEO is not as efficient in spectrum terms as the one determined in 2013 and set out in the DTT RUF (since it did not involve a partial overlay of the network), the advantages that result from it justify, in ANACOM's view, its adoption.

In addition, this solution is without prejudice to the accommodation of possible future frequency allocations for the provision of digital terrestrial television broadcasting services, as there are still 4 networks planned for this purpose, thus ensuring that spectrum is available to accommodate any future requirements, as far as the provision of television programme services is concerned.

In order to implement this solution, it is therefore important to provide MEO with the necessary means within the scope of the 7 assignments in which the company intends to maintain it, bearing in mind the return of channel 56. In fact, within the scope of its overlay network maintenance proposal, MEO recommends the reallocation of the DTT network radio channels according to the methodology described in Annex I of the clarification submitted to ANACOM by electronic communication of 19.07.2019, in which the need for the assignment of new channels is highlighted.

In line with the legal framework of ANACOM's decision of 16.05.2013 (*vide* point 4 of the referred decision's explanatory part), this solution involves an amendment to the DTT RUF provided for by law and subject to the requirements and procedure provided for in article 20 of ECL.

It also remains very clear to ANACOM that the digital terrestrial television broadcasting service intended for the broadcast of free-to-air unrestricted access television programme services requires that the use of the associated frequencies is subject to service coverage and technical quality requirements, and that objectives of general interest are taken into account - the so-called conditions, which result from the DTT RUF allocated to MEO.

As referred earlier, in the exercise of powers conferred by law upon it, it is incumbent on ANACOM, in the scope of spectrum management, to plan frequencies and to allocate spectrum (article 15 of ECL). In this context, it must be taken into consideration that planned MFN networks, duly coordinated at international level in GE-06 and available for immediate implementation, exist, integrating channels that allow the overlay solution proposed by MEO, and, under the NFAP, the 470-694 MHz frequency band is allocated, among other secondary applications, to digital television broadcasting.

The adoption of the overlay solution implies, as such, extending the frequency allocation provided for in decision of 16.05.2013 for the SFN MFN network to the channels required for the purpose, granting the RUF holder with full access for the provision of the digital terrestrial television broadcasting service, connected to Multiplexer A, intended for the

broadcast of free-to-air unrestricted access television programme services, in accordance with the assignments set out in **Annex 1** hereto, which is deemed to be an integral part hereof, the NFAP being amended accordingly.

In light of the above, considering the advantages and disadvantages of adopting the overlay solution proposed by MEO, and taking into account that ANACOM wants this process to have a minimal impact on the population and take place smoothly, this Authority considers that such solution may be adopted, the new frequencies under consideration being integrated into the DTT RUF and the NFAP being amended accordingly in the part of the uses. For these purposes, MEO confirmed the request for the allocation of this radio spectrum in the framework of the prior hearing that preceded this decision.

2.4. Customer Service

MEO's proposal

MEO believes that the existing DTT user helpline should not be used in this process and that a new specific helpline should be created for the purpose of this project, considering its specificity and expected volume. In this context, it presented a proposal for the establishment of a new call centre, associated with a new telephone number, intended to support and clarify users on any questions they may have about the network change process.

To provide this service, MEO estimates a cost in the range of **[BCI]** **[ECI]**, according to the number of calls likely to be received during the process, which according to this company will not be less than **[BCI]** **[ECI]**, and reach values greater than **[BCI]** **[ECI]**.

ANACOM's view

ANACOM understands MEO's position that a new specific helpline should be established for the purposes of this project, given its specificity, volume and timeliness, which are in fact different from the current telephone helpline in operation.

A benchmarking analysis was carried out, through an informal market consultation, and after careful analysis of MEO's proposal, namely its sizing in relation to the estimate of incoming calls, it was found that the costs presented by MEO, to ensure the availability of this telephone line, namely the costs per call, would be very high **[BCI]** **[ECI]**. ANACOM also believes that the detail of costs of the various items of this action is poorly

substantiated, and the reason why MEO adopted some of the assumptions considered is unclear.

ANACOM considers it essential to ensure effective support for users, which is not conditioned by any other interests and which favours the clarification and resolution of any difficulties. For this purpose, it is important to ensure various channels of assistance and support to citizens, not only by telephone, but also in person. It should be noted that, despite the simplicity of the change to be made, in-person support may be the only form of effective support, namely in the case of elderly people with more difficulties in understanding the steps to be taken to tune the new frequencies. Therefore, ANACOM has decided to be responsible for implementing and supervising the various customer support and assistance modalities, with the collaboration of *Agência de Modernização Administrativa* (AMA - the Agency for Administrative Modernisation), *Associação Nacional de Municípios* (ANMP - the National Association of Municipalities) and *Associação Nacional de Freguesias* (ANAFRE - the National Association of Parishes).

The helpline through which the population's contacts are made will be based on a freephone number, which will be made public in due course. This call centre will clarify any doubts that may arise regarding the change of channel, the dates and regions covered, providing information on the need to retune the respective receiver (TV or box) and clarifications regarding the retuning process. Dimensioned so that it can be adjusted to the needs and in order to meet the requests, the recording of all calls, which ANACOM will be able to access, shall be ensured, as a guarantee of the quality of the information transmitted and of user satisfaction with the resolution of the situation. It will operate for an extended period, so as to include support for Portuguese emigrants who will only come to Portugal in the summer of 2020 and will only then be able to retune their television set, for which help may be required. The question also arises in the case of second homes. The call centre provided by ANACOM will provide extended in-person service, both day and night, weekends and holidays included.

ANACOM will also ensure a close connection to the population, ensuring that requests for retuning technical support, received through the dedicated helpline, are resolved by teams on the ground, coordinated by ANACOM, which will provide technical assistance to the local population in case of any difficulties in retuning the channel.

2.5. Pilot stages

MEO's proposal

As this migration is, in MEO's opinion, a project of a significant scale, the company recommends that two pilot tests are carried out in the Mainland, enabling an evaluation of the methodology in a limited environment in terms of the number of transmitters involved, as described below.

Pilot test 1: retuning transmitters

For the purpose of testing the entire chain involved, including implementation in the network and consequent impact on the users of the service, MEO proposes to perform a pilot retuning test on a set of 2-3 transmitters, suggesting the following for this purpose:

- Odivelas
- Vale de Cambra

MEO proposes to carry out this action during the 2nd quarter of 2019.

Pilot test 2: switch-off of "C56" transmitters co-located with transmitters of the overlay MFN network

MEO proposes an early switch-off of the following "C56" transmitters:

- Monte da Virgem
- Marofa
- Lousa
- Boa Viagem
- Palmela
- Mendro

These transmitters are co-located with transmitters of the MFN overlaid network that are already operating for several years, and MEO assumes that most of the users covered by them have already tuned frequencies of the overlaid network. MEO thus finds it likely that the population will suffer but a limited impact.

On the other hand, and as referred above, the early switch-off of these transmitters, which takes place before the start of the migration process, could provide for a reduction in the overall investment of the project.

In this context, MEO proposes to carry out this action during the 3rd quarter of 2019.

ANACOM's view

ANACOM agrees that a pilot test should be conducted in the Mainland in advance and in a limited environment, to assess the methodology of the migration process and the planned user support actions. In fact, and taking into account that this process, with regard to the procedures that the population will have to adopt, will be relatively simple - retuning of the respective receivers -, ANACOM believes that there are no grounds for performing two pilot tests.

Bearing in mind that the migration process will be phased in according to areas, i.e. on a given day, stations to be switched off will be close to each other, ANACOM considers, on the one hand, that MEO's proposal - changing two stations so far away from each other - would not be representative of the process itself and, on the other, that it would be preferable to concentrate resources and means on one area only.

With regard to the second pilot test proposed by MEO, ANACOM estimates that the population currently accessing the identified transmitters on channel 56 is not significant or, possibly, non-existent at all, since in each of the areas served by the transmitters, identified in MEO's proposal, there is a co-located transmitter that transmits at a higher power and at a frequency other than that of the transmitter on channel 56, these areas thus being areas that benefit from the current overlaid solution. This means that at the input of the receiving antenna, the signal strength from the overlaid transmitter operating on a channel other than 56 is much greater and with a higher quality index, so that the natural choice when tuning will be to opt for the transmitter operating on a channel different than 56.

ANACOM thus takes the view that this second pilot test to be carried out by MEO is not justified and that MEO will be able to switch off transmitters right from the beginning of the migration process for the area where they are located.

As regards the (single) transmitter to be switched off in the pilot test, having the alternatives proposed by MEO (Odivelas and Vale de Cambra) been weighted and considering that, in the prior hearing that preceded the present decision, MEO, in its assessment, and as for

the 2nd transmitter to be retuned, suggested other alternatives, such as, for example, Odivelas Centro, Póvoa de Santo Adrião or Malveira, ANACOM concludes that the retuning operation of the Odivelas Centro transmitter is appropriate for the pilot test.

The adoption of the Odivelas Centro transmitter station allows the pilot test to be carried out in a controlled environment, and the theoretical (potential) coverage of this station is more consistent with the actual coverage.

The adoption of this station also makes it possible to achieve all the objectives related to the performance of a pilot test, namely the evaluation of the migration process methodology, the planned user support actions and the communication campaign.

This pilot test, which will take place on 27 November 2019, will allow the assessment, in a limited environment, of the methodology and planned user support actions, as well as their adjustment, where appropriate, to the remaining process.

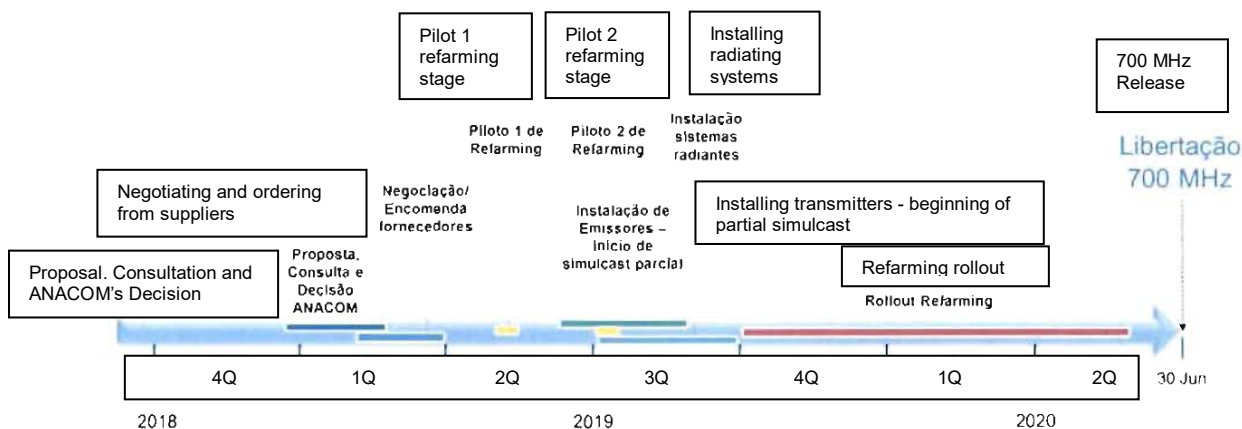
2.6. Schedule

MEO's proposal

MEO states that, according to the Annex 1 of the National Roadmap, the operation involving the release of the 700 MHz band throughout the national territory must take place between the 4th quarter of 2019 and the end of May 2020.

In order to meet these requirements, the following figure shows the schedule proposed by MEO, in which the roll-out of the 700 MHz band release operation is carried out over 8 months, between October 2019 and May 2020, with a 3-week break, during the Christmas and New Year season - *vide* Figure 3.

Figure 3 – Schedule (MEO's proposal)



ANACOM's view

The schedule presented by MEO is too long, both in the light of technical changes required by the network, and of actions to be taken by the population in order to receive the signal, the migration process thus being unnecessarily extended.

In fact, in terms of technical changes, it is recalled that in 2011, when the transition from channel 67 to current channel 56 took place, in an entirely similar operation, MEO required around 2 months to change almost 140 transmitter stations that made up the network at the time.

In this process, around 240 transmitter stations will be changed, which means that the number of stations that require this change is less than double the number of stations changed in 2011, and from a technical point of view, ANACOM fails to understand why it is necessary to extend this operation by 8 months, almost 4 times the period that was necessary in 2011.

On the other hand, the operation at the level of reception will be very simple, given that only the retuning of the receiver by end users will be required - it should also be recalled in this respect that ANACOM accepts the overlay solution presented by MEO, which avoids the need to redirect antennas that would result from the change in radiating systems and the need for a new transmitter at Chalrito.

As such,

- in order to allow teams that will assist the population on the ground in retuning their receivers to have a good capacity of response, which might not be the case if the migration period was shorter (note that if the pace of change of transmitter stations was similar to the pace in 2011, the migration period could take just over 3 months);

- in order to comply with the date laid down in Decision 2017/899, which is at the source of the launch of this procedure - which establishes that *«by 30 June 2020, Member States shall allow the use of the '700 MHz' frequency band for terrestrial systems capable of providing wireless broadband electronic communications services only under harmonised technical conditions...»*;
- Whereas Christmas and the New Year are, by their very nature, less appropriate periods to start and develop a migration process such as this one - an aspect which, in fact, leads MEO, in its schedule, to propose a three-week break exactly during this festive season;
- Taking into account the need for a typical 4-month period before equipment is received and services start to be provided by suppliers;

ANACOM, in the light of the above, considers it necessary and justified to set the start of the migration process for the period between the 3rd week of January 2020 and the 1st week of February 2020 and its end on 30 June 2020.

This schedule ensures the typical 4-month period up to the reception of equipment and the start of service provision by suppliers, indicated by MEO, and it also allows, where the full period proves not to be necessary, the process to start at an earlier date, which will enable the decrease of the pace of the daily retuning of transmitter stations, taking into account the need for the process to be completed by 30 June 2020.

This period of approximately 5 to 5 and a half months, depending on the effective date when the process begins, implies that MEO retunes, on average, two or three stations per working day, the retuning work on public holidays and weekends not being required.

The migration phasing-in procedure must comply with point 3. below, and in order to enable ANACOM to carry out the various user support actions and the planned communication campaign, MEO is required to submit by 15 November 2019 a detailed network change planning, in accordance with the provisions set forth herein, including the date of change of each transmitter station and consequently the effective date when the migration process will start.

2.7. Cost estimate

MEO's proposal

MEO presents a cost estimate for the DTT network migration operation to the sub-700 MHz band. The figures presented are its best estimates, «...*taking into account the historical costs of technologies used in the DTT network, as well as the mapping of operational activities to be carried out on the ground by both internal [company] teams and teams of suppliers of network installation and setting services*». According to MEO, the figures presented do not constitute final figures, as their definition will depend on the conclusion of the negotiating processes with suppliers, «... *which in turn depend on the definition of the scope of supplies of equipment and services to be procured*».²⁵

MEO considers also that «*the conditions and general criteria for awarding compensation for costs incurred with this frequency-changing process should be part of the scope of the public consultation that ANACOM will launch on the implementation of the Roadmap, so that, for the sake of legal certainty, the Government Administrative Rule on this matter is approved and published in the first half of 2019*».

ANACOM's view

Paragraph 2 of article 4 of Decree-Law No. 151-A/2000, of 20 July, as it stands, provides that, in the exercise of powers conferred by law, ANACOM is entitled «... *at any time, to change, cancel or replace the allocation of frequencies for the operation and use of radiocommunication networks and stations, insofar as this is required to safeguard the public interest, within the scope of radio spectrum management, and in accordance with the principle of proportionality and respect for established rights*», such as in this case.

In these situations, compensation shall be granted to licence holders to cover all or part of costs they prove to have incurred as a consequence of the change, cancellation or replacement of frequency allocations, under the conditions and general criteria to be established by administrative rule of the member of the Government responsible for the communications area (cfr. paragraph 4 of the same article).

It should be stressed that the general conditions and criteria for compensation are defined by the Government, as MEO is well aware.

²⁵ Cfr. point 5 of MEO's proposal.

ANACOM's action is guided by the principles of legality²⁶ and speciality²⁷, from which it follows, respectively, that the law is the assumption, reason and limit for its activity and that this Authority *«shall not exercise activities or use its powers outside the scope of its assignment or allocate its resources for purposes other than those entrusted to it»*.

In this context, and bearing in mind that it is incumbent on ANACOM *«to support the Government in the field of communications, at the latter's request and on its own initiative, including by providing the necessary technical assistance and by producing opinions, studies, information and draft legislation»*²⁸, this Authority will not fail, at the appropriate time, to submit to the Assistant Secretary of State and for Communications its assessment and proposal on this issue. For this purpose and at the latest by 15 November 2019, MEO is required to send ANACOM all the relevant information, as it did in the past, in the context of Digital Dividend 1.

As regards MEO's proposal, that the conditions and general criteria for awarding compensation for costs incurred with this frequency-changing process - to be included in an administrative rule - are submitted to public consultation, ANACOM, within the scope of its activity of provision of support to the Government, will not fail to comply with guarantees granted in the Code of Administrative Procedure to citizens, in particular in the context of the procedure for drafting administrative regulations which, in this case, it is incumbent on the Government to promote.

²⁶ Cfr. article 3 of the Code of Administrative Procedure.

²⁷ Cfr. article 6 of ANACOM's Statutes.

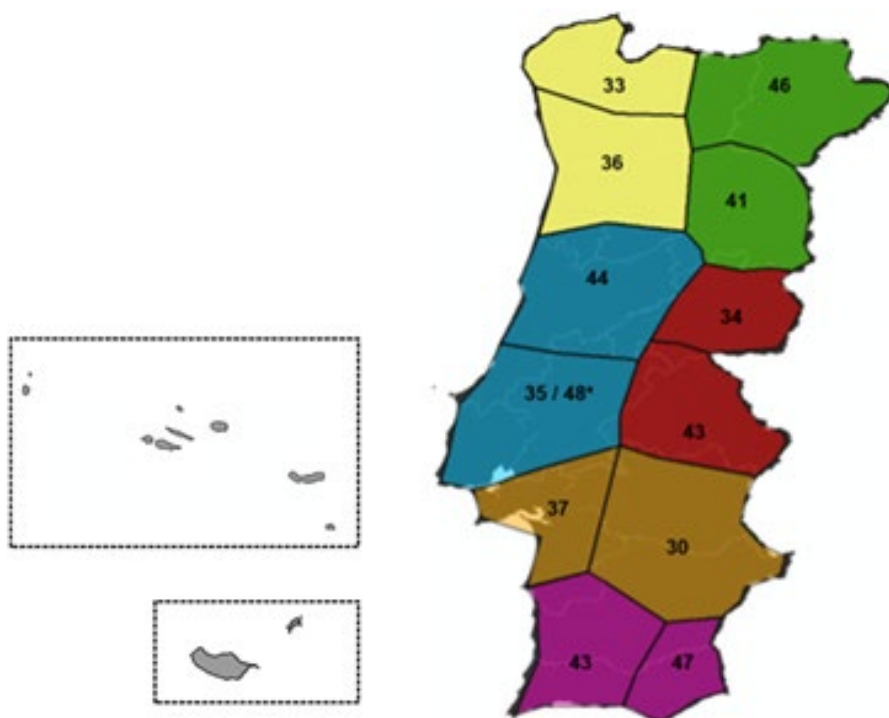
²⁸ Cfr. article 8, paragraph 2, point b) of ANACOM's Statutes.

3. Development plan and schedule

Having MEO's proposal been considered, it is now necessary, in accordance with the decision of 16.05.2013 and paragraph 10.1. of the DTT RUF, to establish the development plan for the migration of the DTT network to the sub-700MHz band and the respective schedule, which involves the adjustment of the National Roadmap, in accordance with provisions set out herein, as well as the respective amendment of the DTT RUF.

In this context, ANACOM believes that the referred migration process, i.e. the retuning of transmitters currently transmitting in the 694-790 MHz band²⁹, should take place according to the following planning, taking already in consideration the new channels that allow MEO to maintain the overlaid network (according to assignments in **Annex 1** hereto):

Figure 4 – Migration process planning



*only the currently overlaid Montejunto transmitter will migrate to channel 48

In the Autonomous Region of the Azores, radio channels 44, 45 and 46 will be used, while radio channel 47 will be used in Madeira Island, and radio channel 46 in Porto Santo Island.

²⁹ Except for current transmitters co-located with transmitters of the overlaid network.

The migration process will follow the following phasing-in stages:

Table 6 – Migration process phasing-in

Region 1	Beginning of the migration process to take place between the 3 rd week of January 2020 and the 1 st week of February 2020
Region 2	Beginning of the migration process to take place no later than one month after the beginning of the migration process in Region 1
Region 3	Beginning of the migration process to take place no later than one month after the beginning of the migration process in Region 2
Region 4	Beginning of the migration process to take place no later than one month after the beginning of the migration process in Region 3
Region 5	Beginning of the migration process to take place no later than one month after the beginning of the migration process in Region 4
Region 6	Beginning of the migration process to take place no later than one month after the beginning of the migration process in Region 5, and to be completed by June 2020
Region A and M	Migration process to take place in June 2020

It should be noted that the National Roadmap provides that *“migration should occur in accordance with the planning⁴ indicated in Annex 1, whereby the schedule for changing the radio channel of each of the transmitters is referred in that Annex, without prejudice to future decisions that may be taken in these matters. A graphical layout of the various stages of the process is also included in Annex 2”*.

In summary, it was announced, on the one hand, that migration should begin in the Mainland, North-South direction, beginning in the area in yellow in Annex 1 of the Roadmap, which roughly corresponds to the Minho and Douro litoral regions³⁰, and, on the other hand, that migration should take place as from the 4th quarter of 2019.

However, taking into account that the first area to migrate corresponds to a region where the winter months are severe, with very adverse weather conditions, with heavy rain and wind, and that such weather conditions have a direct impact on the retuning work of transmitter stations, usually installed in the mountains, or in high places due to the surrounding orography, where these conditions are felt with greater intensity, it is deemed that the sequence planned for intervention in the different regions should be changed.

As such, in order to remedy the situation described in the previous paragraph, the migration phasing-in sequence is hereby amended, to start with the region in purple on the map, i.e. to the south of the Mainland, where the weather conditions are much milder during the

³⁰ Areas in yellow in the map in annex 1 to the National Roadmap.

winter months, thus allowing the network to migrate to the northern part of the Mainland in the course of Spring.

As regards the schedule, the process shall start between the 3rd week of January 2020 and the 1st week of February, and end on 30.06.2020.

The actions to be undertaken by MEO for the purpose of the migration process shall be adopted in accordance with ANACOM's views as set out and justified in point 2. above.

MEO is required to submit to ANACOM, by 15 November 2019, a detailed network change planning, in accordance with determinations set out herein, including in particular the date on which the change in each transmitter station is to take place.

The development plan also involves a pilot test to be carried out by MEO, with the retuning of the Odivelas Centro transmitter from channel 56 to channel 35, to take place on 27 November, which will allow the methodology and user support actions to be evaluated in advance and in a limited environment.

4. Adjustment of the National Roadmap

Having the migration process development plan and the respective schedule been specified, ANACOM considers it appropriate, necessary and justified to adjust the National Roadmap, under the terms set out below. As such:

- a) On the one hand, and due to the weather conditions which may have an impact on the development of the process, as detailed in the previous point, the phasing-in sequence programme must be, instead of from North to South, from South to North;
- b) On the other hand, ANACOM believes that the migration process should begin between the 3rd week of January 2020 and the 1st week of February 2020, and end on 30 June 2020 (cfr. ANACOM's views in points 2.6. and 3. above),

Therefore, the National Roadmap must be adjusted accordingly, Annexes 1 and 2 thereto (which correspond to **Annexes 2 and 3** to this Decision, deemed to be an integral part hereof) being amended.

5. Amendment to RUF ICP-ANACOM No. 6/2008 granted to MEO

MEO holds a right of use for frequencies of a national scope for the provision of the terrestrial television broadcasting service, connected to MUX A, intended for the broadcast of free-to-air unrestricted access television programme services, the above-mentioned RUF ICP-ANACOM No. 6/2008, reissued by determination of the Board of Directors of 22 June 2017.

The following points explain the justified amendments that must be made to the DTT RUF as a result of the development plan defined in point 3 above, which will be part of Endorsement No. 1 to the DTT RUF set out in **Annex 4** hereto, which is deemed to be an integral part hereof.

5.1. Frequencies to be integrated in the DTT RUF

The frequency bands assigned to the digital terrestrial television broadcasting service and allocated to MEO, for this purpose, are identified in paragraph 7. of the DTT RUF.

As explained in point 2.3. above, MEO must be provided with the radio resources required to maintain an overlaid network solution (in accordance with assignments in **Annex 1** to this Decision), channel 56 being released. For this purpose, MEO confirmed its request for the allocation of this radio spectrum in the scope of the prior hearing that preceded this Decision.

In addition, and as already provided for in the National Roadmap, the radio frequency channel of the Montejunto transmitter must be changed (from current channel 49 to channel 48).

Finally, the transmitting channels in the Autonomous Regions must be defined, so that MEO may release channels in the 700 MHz band that currently operate in these geographical areas.

As such, the following frequencies are integrated into the DTT RUF, in accordance with the assignments/areas listed in **Annex 1** to this Decision:

- a) In the Mainland³¹:
- (i) Channel 30 (542-550 MHz);
 - (ii) Channel 33 (566-574 MHz);
 - (iii) Channel 34 (574-582 MHz);
 - (iv) Channel 35 (582-590 MHz);
 - (v) Channel 36 (590-598 MHz);
 - (vi) Channel 37 (598-606 MHz);
 - (vii) Channel 41 (630-638 MHz);
 - (viii) Channel 43 (646-654 MHz);
 - (ix) Channel 44 (654-662 MHz).
- b) In the Autonomous Region of the Azores³²:
- (i) Channel 44 (654-662 MHz);
 - (ii) Channel 45 (662-670 MHz);
 - (iii) Channel 46 (670-678 MHz).
- c) In the Autonomous Region of Madeira³³:
- (i) Madeira Island, channel 47 (678-686 MHz);
 - (ii) Porto Santo Island, channel 46 (670-678 MHz).

The use of frequencies identified above is subject to the conditions defined in RUF ICP-ANACOM No. 06/2008.

5.2. Conditions associated with the DTT RUF

The adoption of the overlaid solution (point 2.3. above) and the current integration of frequencies in RUF ICP-ANACOM No. 06/2008 justify that ANACOM reviews conditions associated with the referred RUF, including the obligation to provide information, to enable an accurate monitoring of the service provided, and terrestrial coverage obligations.

³¹ In the Mainland, channels currently provided for in paragraph 7.1., point a), sub-points (i) to (vi) of the DTT RUF remain allocated, and channels 49 and 56, corresponding to sub-points (vii) and (viii) are returned.

³² MEO returns channels 49, 55 and 56, on which it currently transmits in this Autonomous Region.

³³ MEO returns channels 54, on which it currently transmits in this Autonomous Region.

It is recalled that it already follows from DTT RUF granted to MEO that it is required to provide ANACOM with the information requested under paragraph 1 of article 108 of ECL, for the purposes set out in article 109 thereof [cfr. paragraph 5 d) of DTT RUF], as well as that the company must update with ANACOM the information provided for in paragraph 3.A of ANACOM's decision of 16.05.2013, whenever there are changes in the geographical coverage of the network (cfr. paragraph 10.3 of DTT RUF).

In this context, ANACOM requires MEO, in compliance with paragraph 10.3 of DTT RUF, to make available, within 9 months from the conclusion of the migration process of the DTT network, the following coverage information, following the migration of the current DTT network:

- Detailed identification of the DTT and DTH (satellite) geographical coverage provided by the network after the conclusion of the change process, indicating the assumptions used, namely those that determine the level of coverage presented, such as the level of C/I and the characteristics assumed when setting the reception parameters (for example, as regards the height and characteristics of antennas), if the latter differ from those presented further to ANACOM's determination of 16.05.2013.

The information should be provided by means of an electronic file (e.g. shapefile in vector format), coverage areas being duly identified at geographical level.

- Detailed information on the population actually covered by DTT and DTH; the information provided should quantify, according to parishes, the percentage of residing population (on the basis of the 2011 Census) with access to each type of coverage (DTT and DTH). This percentage of the residing population must be derived from the following layers of information:
 - Subsection unit (2011 Census) available at <http://mapas.ine.pt/download/index2011.phtml>, or another and more detailed source in case such information is available; where this solution is used it should be duly detailed;
 - *Carta administrativa oficial* (the Official Administrative Map) for 2011, available at <http://www.igeo.pt/produtos/cadaastro/caop/versao2011.htm>.

Upon reception of the information listed above, it will be assessed by ANACOM, further to which, with any amendments that may be determined, it will become an integral part of RUF

ICP-ANACOM No. 6/2008, binding the operator to minimum values under consideration as from that date.

This condition is justified and proportionate in view of the fact that the switch from an SFN network to a SFN MFN network, combined with an overlaid network, significantly reduces the areas of self-interference of the network, which results in an increase in the terrestrial coverage of the respective network and the fact that the network uses “lower” radio channels, implies a reduction in the minimum field strength required for reception, whereby the attenuation to electromagnetic wave propagation is also lower, which entails a potential increase in the coverage of each transmitter station and, consequently, of the network itself. On the other hand, MEO will not be required to provide greater terrestrial coverage than that declared to be already made available, insofar as it exceeds the minimum currently required, after a period of consolidation of the coverage information, intended to enable its actual evaluation on the ground.

6. Applicable consultation procedures

By determination of 21 August 2019, the Board of Directors of ANACOM approved the «*Draft decision on changes to the DTT network (MUX A) in the context of the release of the 700 MHz band, development plan and schedule*»³⁴. (DD)

The referred DD was submitted to the prior hearing of the MEO, under articles 121 and 122 of the Administrative Procedure Code, as well as to the general consultation procedure, provided for in article 8 of the Electronic Communications Law, by reference of article 20, paragraph 3 of the same law, interested parties being given in both cases a period of 20 working days to provide their opinion.

In addition, the Regulatory Authority for the Media (ERC) was notified to provide its opinion on the DD within the same period, if it so wished, in accordance with article 14 of the Television Law³⁵.

In response to the prior hearing and to the general consultation procedure, the responses from the following entities were received by ANACOM within the deadline:

- ACIST – Associação Empresarial de Comunicações de Portugal (ACIST)

³⁴ Available at: <https://www.anacom.pt/render.jsp?contentId=1480773>

³⁵ Law No. 27/2007, of 30 July, as it stands.

- Associação Portuguesa para a Defesa do Consumidor (DECO)
- Blogue TDT em Portugal (Blogue TDT)
- Governo Regional dos Açores (GRA)
- MEO – Serviços de Comunicações e Multimédia, S.A. (MEO)
- NOS, Comunicações S.A. (NOS)
- Rádio e Televisão de Portugal, S.A. (RTP)
- Vodafone Portugal – Comunicações Pessoais, S.A. (Vodafone)

A contribution from ERC was also received, after the deadline.

The corresponding report, which is an integral part of this Decision, was subsequently drawn up, which includes the positions expressed on the DD, as well as ANACOM's views thereon.

Under point d) of paragraph 3 of ANACOM's Consultation Procedures, approved by determination of 12.02.2004, this Authority makes the responses received available at its website, safeguarding information of a confidential nature.

7. Decision

As such, for the above-mentioned reasons, ANACOM's Board of Directors, in the scope of assignments provided for in article 8, paragraph 1 e) and h) of its Statutes, approved by Decree-Law No. 39/2015, of 16 March, in pursue of regulatory objectives provided for in article 5, paragraph 1 a) and c), paragraph 2 a) and d) and paragraph 4 d) of the Electronic Communications Law and under powers provided for in article 9, paragraph 1 b) of its Statutes, articles 8, 15, 16, 20, 30, 32, paragraph 1 a) and b) of its Statutes, and article 109, paragraph 1 c), *ex vi* article 27, paragraph 1 t), all of the Electronic Communications Law, and article 4 of Decree-Law No. 151-A/2000, of 20 July, and further to ANACOM's decision of 16 May 2013 and paragraph 10.1. of RUF ICP No.6/2008 (reissued), and also under article 5, paragraph 1, of Decision EU 2017/899, hereby determines:

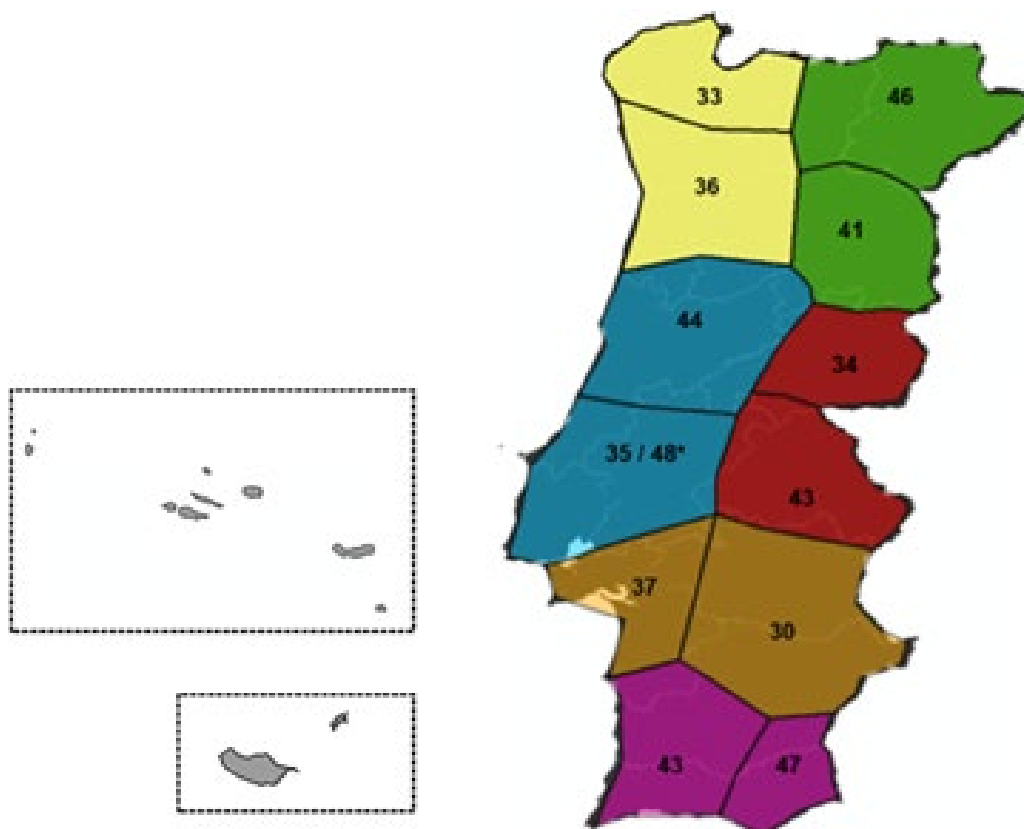
1. To approve the DTT network migration development plan for the sub-700MHz band and respective schedule, to be complied with by MEO, in accordance with **point 3. above;**
2. To order MEO to carry out a pilot test, on November 27, 2019, in order to retune the Odivelas Centro transmitter station from channel 56 to channel 35;

3. To order MEO to submit to ANACOM, by 15 November 2019, a detailed network change planning, in accordance with the plan approved in point 1., including in particular the date on which the change in each transmitter station is to take place;
4. To order MEO to submit to ANACOM, by 15 November 2019, a reviewed estimate of costs associated with the migration process;
5. To amend the National Frequency Allocation Plan (NFAP) so as to reserve frequencies identified in Annex 1 hereto, the RUF holder being granted full access for the provision of the digital terrestrial television broadcasting service, connected to Multiplexer A, intended for the broadcast of free-to-air unrestricted access television programme services;
6. To amend RUF ICP-ANACOM No. 06/2008, granted to MEO, under the terms set out in **Endorsement No. 1**, included in **Annex 4** to this Decision, integrating frequencies identified in **point 5.1 above** into the referred RUF and submitting the use of frequencies to the conditions defined in the RUF;
7. To order MEO to return the following radio channels, after conclusion of the DTT network migration process under the conditions determined herein:
 - a) In the Mainland, channels 49 (694-702 MHz) and 56 (750-758 MHz);
 - b) In the Autonomous Region of the Azores, channels 49 (694-702 MHz), 55 (742-750 MHz) and 56 (750-758 MHz);
 - c) In the Autonomous Region of Madeira, channel 54 (734-742 MHz);
8. To amend the NFAP in accordance with paragraphs 6 and 7;
9. To order MEO to make available the information detailed in **point 5.2. above**, within 9 months from the conclusion of the migration process of DTT network, under the conditions determined herein;
10. To determine that minimum values resulting from the information provided under the preceding paragraph, further to ANACOM's assessment and subject to any amendments that may be determined, become an integral part of RUF ICP-ANACOM No. 6/2008, binding the operator as from that date;
11. To amend Annex 1 (planning) and Annex 2 (process stages) of the National Roadmap under the terms provided for, respectively, in **Annexes 2 and 3** to this Decision.

Lisbon, 4 October 2019.

Annex 1

Radio spectrum to be used in the migration process



* only the currently overlaid Montejunto transmitter will migrate to channel 48

Autonomous Region of the Azores

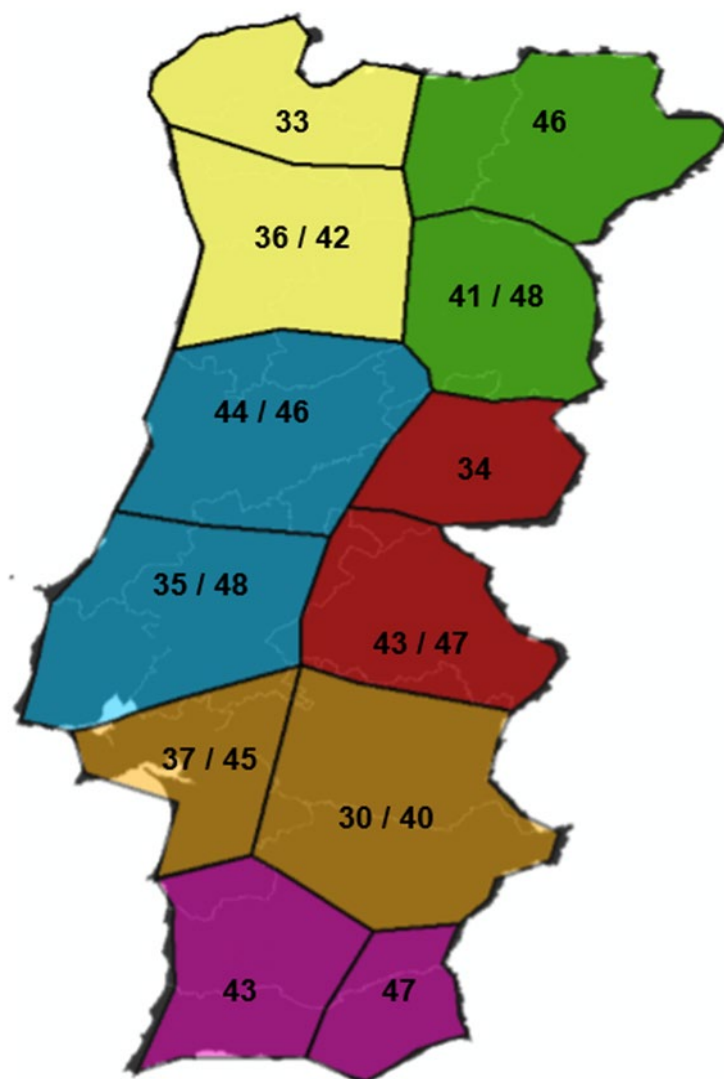
- (i) Channel 44 (654-662 MHz);
- (ii) Channel 45 (662-670 MHz);
- (iii) Channel 46 (670-678 MHz);

Autonomous Region of Madeira

- (i) Madeira Island, channel 47 (678-686 MHz);
- (ii) Porto Santo Island, channel 46 (670-678 MHz).

Annex 2

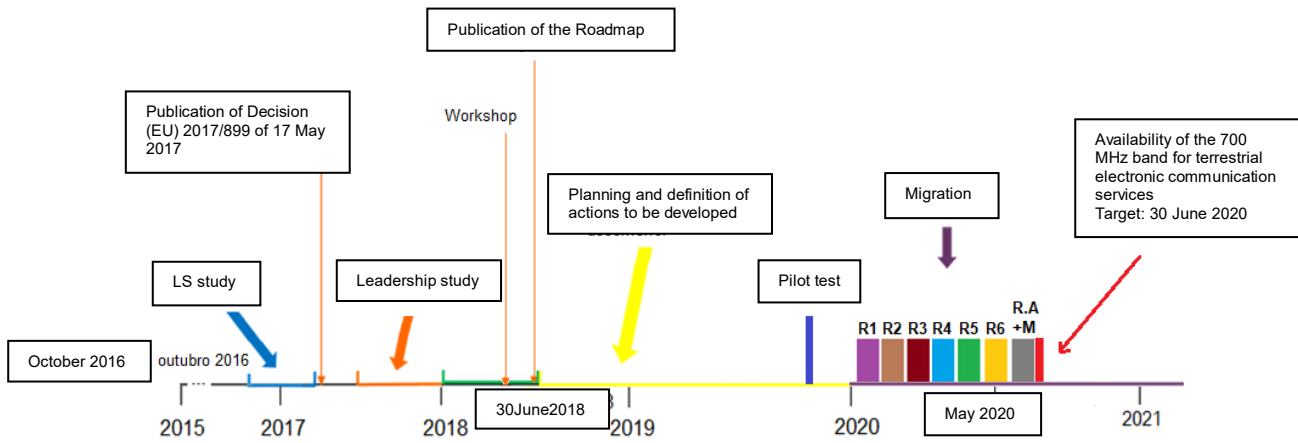
Annex 1 to the National Roadmap



Region 1	Beginning of the migration process to take place between the 3 rd week of January 2020 and the 1 st week of February 2020
Region 2	Beginning of the migration process to take place no later than one month after the beginning of the migration process in Region 1
Region 3	Beginning of the migration process to take place no later than one month after the beginning of the migration process in Region 2
Region 4	Beginning of the migration process to take place no later than one month after the beginning of the migration process in Region 3
Region 5	Beginning of the migration process to take place no later than one month after the beginning of the migration process in Region 4
Region 6	Beginning of the migration process to take place no later than one month after the beginning of the migration process in Region 5, to be completed by June 2020
Region A and M	Migration process to take place in June 2020

Annex 3

Annex 2 to the National Roadmap



Annex 4

RIGHT OF USE FOR FREQUENCIES

ICP-ANACOM No. 06/2008 (reissued)

ENDORSEMENT No. 1

1. Paragraph 7.1. of this title is hereby amended to read as follows:

«7.1. The frequencies to be used, in the Mainland and in the Autonomous Regions, for the purpose of national coverage connected to MUX A, shall be as follows:

a) Mainland:

- (i) Channel 30 (542-550 MHz);
- (ii) Channel 33 (566-574 MHz);
- (iii) Channel 34 (574-582 MHz);
- (iv) Channel 35 (582-590 MHz);
- (v) Channel 36 (590-598 MHz);
- (vi) Channel 37 (598-606 MHz);
- (vii) Channel 40 (622-630 MHz);
- (viii) Channel 41 (630-638 MHz);
- (ix) Channel 42 (638-646 MHz);
- (x) Channel 43 (646-654 MHz)
- (xi) Channel 44 (654-662 MHz);
- (xii) Channel 45 (662-670 MHz);
- (xiii) Channel 46 (670-678 MHz);
- (xiv) Channel 47 (678-686 MHz);
- (xv) Channel 48 (686-694MHz);

b) Autonomous Region of the Azores:

- (i) Channel 44 (654-662 MHz);
- (ii) Channel 45 (662-670 MHz);

(iii) Channel 46 (670-678 MHz);

(iv) Channel 47 (678-686 MHz);

(v) Channel 48 (686-694MHz);

c) Autonomous Region of Madeira:

(i) Madeira Island, channel 47 (678-686 MHz);

(ii) Porto Santo Island, channel 46 (670-678 MHz).

2. Paragraph 7.2. of this title is hereby amended to read as follows:

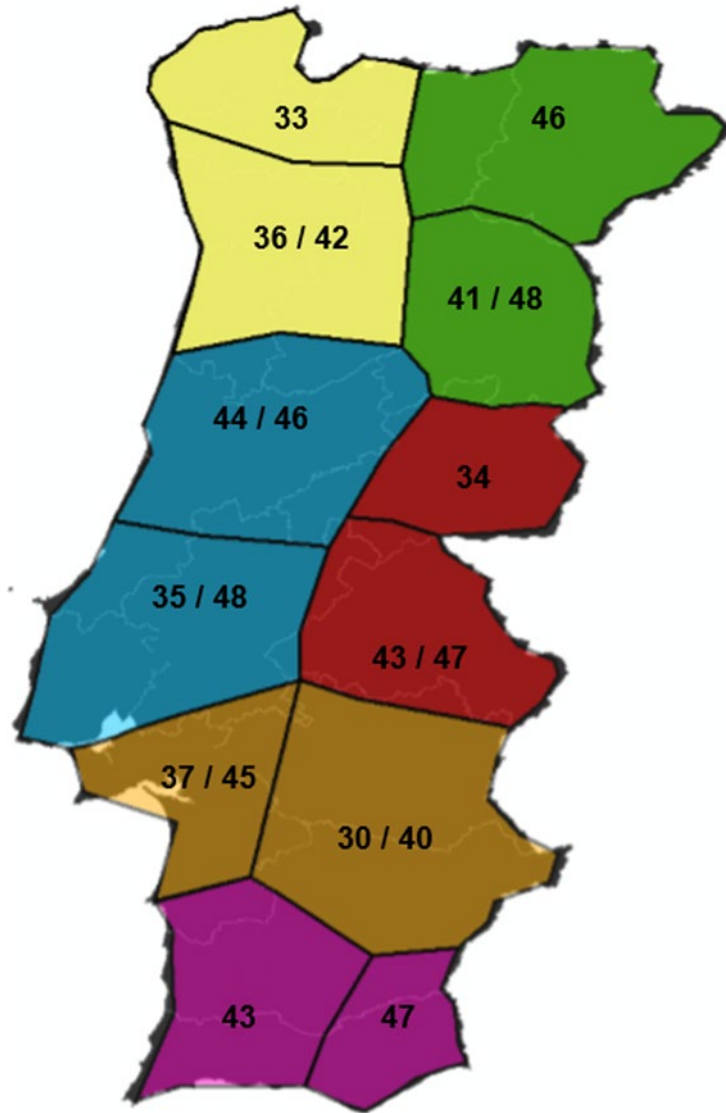
«**7.2.** Frequencies indicated in sub-points (i) to (xv) of point a) of the previous paragraph shall be used according to assignments/areas set out in Annex 1 to this title, deemed to be an integral part hereof.»

3. Paragraphs 10.1, 10.2 and 10.4 of this title are hereby removed.

4. Paragraph 11.4. of this title is hereby amended to read as follows

«**11.4.** In accordance with ANACOM's determination of 16.05.2013, the solution to be implemented by MEO, under the preceding paragraphs, will only and necessarily consist of the strengthening of the terrestrial network coverage, whereby MEO undertakes to guarantee the levels of terrestrial coverage set out in Annex 2 to this title.»

5. The map in Annex 1 to this title is replaced by the following figure:



6. Annex 3 to this title is removed.