

DECISION

**Amendment of the right of use of frequencies held by DENSE AIR Portugal
and**

Future use of the 3.4-3.8 GHz frequency band

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1. Spectrum planning and management for 5G in a European context

There are currently specific policy targets for the development of 5G in Europe, which are based on the 5G Action Plan for Europe¹, launched by the European Commission (EC) in September 2016, with which the aim is for Europe² to take a world-leading position in 5G networking by 2025 and quickly benefit from the new market opportunities created by these networks, not only in the telecommunications sector, but also in the economy and society at large.

In particular, this Action Plan emphasizes the objective of *“Ensuring that each Member State identifies at least one major city that is “5G-enabled” by the end of 2020 and that all urban areas and major terrestrial transport paths have uninterrupted 5G coverage by 2025”*.

Within this framework, and taking into account point 3.2. (*“Making 5G radio spectrum available”*) of the Plan, in November 2016, the European Union Radio Spectrum Policy Group (RSPG) published its first *“Opinion on spectrum related aspects for next-generation wireless systems (5G)”*³, which highlights the elements that are considered strategic for the rapid launch of wireless services on 5G systems and identifies as relevant bands for this purpose: (i) 700 MHz, suitable for ensuring the transition to the next generation of networks and coverage in different areas, (ii) 3.4-3.8 GHz, suitable for the capacity required for services supported on 5G systems, and (iii) 26 GHz (24.25 to 27.5 GHz), suitable for offering ultra-fast⁴ capacity.

The EC strategy was further strengthened by the favourable response of the European Parliament, as expressed in a Resolution dated 1 June 2017 on *“Internet connectivity for growth, competitiveness and cohesion: European gigabit society and 5G”*⁵, and the

¹ European Commission Communication “5G for Europe: an Action Plan” (COM(2016) 588 final), available at <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:52016DC0588>.

² The action plan refers to Europe in general, even though, given the context, the actions of this plan focus on the countries of the European Union.

³ English version available at http://rspg-spectrum.eu/wp-content/uploads/2013/05/RPSG16-032-Opinion_5G.pdf.

⁴ The 3rd Generation Partnership Project (3GPP) classifies ultra-fast broadband as a mobile system capable of delivering speeds of 20 gigabits per second, at least uni-directionally, and without specific latency requirements.

⁵ Available at <https://eur-lex.europa.eu/legal-content/PT/TXT/?uri=CELEX:52017IP0234>.

Declaration “*Making 5G a success for Europe*”⁶, endorsed by the European Union (EU) Ministers of Telecommunications, Transport and Energy on 18 July 2017, as part of the Roadmap for the introduction of 5G in Europe⁷ which, inter alia, calls on the EC to take the necessary steps to establish, in 2019 and on the basis of the conclusions of the work of the RSPG, the technical harmonisation of the 3.4-3.8 GHz band.

Subsequently, in January 2018, the RSPG published its second opinion on 5G networks (“*Strategic Spectrum Roadmap towards 5G for Europe*”)⁸, in which it reiterates that the availability of the 5G pioneer band, 3.4-3.8 GHz, will be critical to the success of 5G in Europe, and therefore recommends that Member States (MS) consider the adoption of appropriate defragmentation measures in this band in time to authorise the use of sufficiently large spectrum blocks by 2020.

Subsequently, the European Electronic Communications Code (EECC)⁹, adopted in December 2018, established a number of measures aimed at facilitating the implementation of electronic communications networks, in particular 5G networks, establishing, under Article 54, a coordinated timetable for allocation of specific 5G bands, according to which MS should, by 31 December 2020, take the necessary steps to, inter alia, reorganise and allow the use of sufficiently large blocks in the 3.4-3.8 GHz band.

Following these measures, on 24 January 2019, the EC finally adopted Implementing Decision (EU) 2019/235¹⁰, which amended Decision 2008/411/EC, of 21 May, concerning the updating of certain technical conditions applicable to the 3.4-3.8 GHz frequency band. In that Decision, the EC urged MS to advocate for defragmentation of the aforementioned band with a view to making large contiguous spectrum blocks available, as they facilitate the efficient deployment of high-speed 5G broadband wireless services, with high reliability and low latency, in line with the political goal of connectivity for a “gigabit society”. Without prejudice to the continuity of other current uses of this band, this Decision also provides that in the whole 3.4-3.8 GHz band, the mode of operation shall be time division duplex (TDD)

⁶ English version available at https://www.eu2017.ee/sites/default/files/inline-files/Ministerial%20declaration%205G_final_0.pdf.

⁷ English version available at www.mkm.ee/sites/default/files/8.a_b_aob_5g_roadmap_final.pdf.

⁸ English version available at https://circabc.europa.eu/sd/a/fe1a3338-b751-43e3-9ed8-a5632f051d1f/RSPG18-005final-2nd_opinion_on_5G.pdf.

⁹ Available at <https://eur-lex.europa.eu/legal-content/PT/TXT/?uri=CELEX:32018L1972>.

¹⁰ Available at <https://eur-lex.europa.eu/legal-content/PT/TXT/?uri=CELEX:32019D0235>.

and that the block size shall correspond to 5 MHz, i.e. a 5 MHz channel.

In this context, however, it is for the competent authorities of each MS to determine how best to achieve the targets set under the European strategy, taking into account the specific conditions of their countries, their markets and their specific needs.

Thus, in March 2018, the Autoridade Nacional de Comunicações (ANACOM) launched a public consultation on the availability of the 700 MHz frequency band and other bands that could be of interest for simultaneous availability, namely the 3.4-3.8 GHz band¹¹.

As described in greater detail in the respective report¹², this public consultation resulted in special and more pressing market interest in the 3.4-3.8 GHz band, with various entities highlighting its relevance to the development of 5G technology, especially if there is the prospect of using large spectrum blocks to provide capacity or coverage solutions.

Regarding the timetable for spectrum allocation, it should be noted that in the aforementioned public consultation - and as results from the corresponding Report - NOS Comunicações, SA (NOS) considered that the allocation of Right of Use of Frequencies (RUF) in the 3.6 GHz band is essential to satisfy the desire to promote evolution to 5G, and under no circumstances should these be allocated after those of the 700 MHz band, which are only expected to be required a some years later - an aspect that it considered should, in any case, be taken into account under the conditions of use to be established for both bands. Additionally, the company also highlighted the lack of clarity regarding the technical harmonisation of the 3.6 GHz band (indicating that it should only take place in 2019), noting that only with effect from that time will network equipment be available, and that there will only be terminals in 2020.

In turn, MEO – Serviços de Comunicações e Multimédia, SA (MEO) stated that the availability of this spectrum should be preceded by the finalisation of the harmonised technical conditions for 5G, technical testing, the definition and scheduling of refarming, as well as the release of the appropriate contiguous spectrum band for commercial exploitation of 5G. MEO noted that CPE-type terminal equipment was only expected to arrive in 2019,

¹¹ Available at <https://www.anacom.pt/render.jsp?contentId=1431843>.

¹² Available at <https://www.anacom.pt/render.jsp?contentId=1431846>.

with smartphones remaining on hold until 2020, as a result of which it considered that spectrum should only be made available from 2020.

Vodafone Portugal – Comunicações Pessoais, SA (VODAFONE) made the case that it is essential for Portugal not to miss the opportunity to stand out for its pioneering and swift implementation of the most innovative technologies, at all times following, as far as possible, the European timetable.

It follows from the foregoing that, although the drafting of the action plan for the development of 5G in Europe began in late 2016, it was not until January 2019, with the adoption of Implementing Decision (EU) 2019/235, that the (new) harmonised technical conditions to be observed by the MS, which are necessary for their respective actions at this level, were established.

It is therefore within this framework that, in view of the best and most appropriate implementation of 5G, ANACOM considers it appropriate (i) to review the current technical conditions of use of the 3.4-3.8 GHz band, as they are not in line with the recent amendment of Decision 2008/411/EC, and (ii) to promote a reorganisation of that band, leading to more efficient use and ensuring that the greatest possible quantity of spectrum is made available to the market in sufficiently large and contiguous blocks.

2. 3.4-3.8 GHz band in Portugal

Until very recently it was found that, in the 3.4-3.8 GHz band, MEO had a right of use of frequencies (RUF) over 56 MHz in the geographical areas 1, 5, 6 and 7. In turn, Dense Air Portugal, Unipessoal, Lda (DENSE AIR) has RUF over 168 MHz in Lisbon (area 1), 112 MHz in Porto (area 2) and 56 MHz in areas 3 to 8.

Figure 1: Location of the RUF in the Band

Zona Geográfica	3,1- 3,4 GHz	10 MHz	3,4-3,5 GHz/3,5-3,6 GHz				3,6-3,7 GHz/3,7-3,8 GHz							
			3,410-3,438 GHz 3,510-3,538 GHz 2x28 MHz	2x 3 MHz	3,441-3,469 GHz 3,541-3,569 GHz 2x28 MHz	2x 3 MHz	3,472-3,500 GHz 3,572-3,600 GHz 2x28 MHz	2x 2 MHz	3,602-3,630 GHz 3,702-3,730 GHz 2x28 MHz	2x 3 MHz	3,633-3,661 GHz 3,733-3,761 GHz 2x28 MHz	2x 3 MHz	3,664-3,692 GHz 3,764-3,792 GHz 2x28 MHz	2x 8 MHz
1: Leiria, Lisboa, Santarém, Setúbal	Radares Militares	Faixa de Guarda (FG)	MEO	FG	Dense Air	FG	Dense Air	FG	Dense Air	FG	Livre	FG	Livre	FG
2: Braga, Porto, Viana do Castelo			Livre		Dense Air		Dense Air		Livre		Livre			
3: Aveiro e Coimbra			Livre		Livre		Dense Air		Livre		Livre			
4: Bragança, Guarda, Vila Real, Viseu			Livre		Livre		Dense Air		Livre		Livre			
5: Castelo Branco, Portalegre			MEO		Livre		Dense Air		Livre		Livre			
6: Beja, Évora, Setúbal			MEO		Livre		Dense Air		Livre		Livre			
7: Faro			MEO		Livre		Dense Air		Livre		Livre			
8: R.A.A.			Livre		Livre		Dense Air		Livre		Livre			
9: R.A.M.			Livre		Livre		Livre		Livre		Livre			

However, on 26 June 2019, MEO requested the “cancellation” of its RUF, with effect from 30 June 2019, a request that was the subject of a favourable decision of ANACOM, adopted on this date, as a result of which this spectrum is currently available.

Regarding DENSE AIR, according to the corresponding title, ICP-ANACOM no. 04/2010, it is noted that this company currently has RUF for Broadband Wireless Access (BWA) in the above-mentioned geographical areas. The guard bands (GB) are designed to facilitate coordination between neighbouring networks, thereby assisting in the fulfilment of the conditions referred to in EC Decision 2008/411/EC of 21 May (§ 1, paragraphs 1 and 3), which the company must observe when using the spectrum assigned to it.

That title also indicates that the 3.4-3.8 GHz band was designated, in accordance with Decision 2008/411/EC, on a non-exclusive basis for terrestrial electronic communications networks, as a result of which, safeguarding the development of the operation of the BWA system, ANACOM may put in place measures that facilitate coexistence with other allocations and applications identified in the National Table of Frequency Allocations (see § 4, paragraph 2).

These RUF were granted for a period of 15 years from the date of issuance of the corresponding title, which expires on 05 August 2025.

3. Proposal for amendment of RUF presented by DENSE AIR

In 2018, following a corporate restructuring¹³, DENSE AIR contacted ANACOM on several occasions to provide details of its investment plan and the use of the spectrum over which it holds rights of use, and presented a proposal for the reorganisation of the 3.4-3.8 GHz band and the reconfiguration of its entitlement in accordance with the technical conditions applicable to that band, as laid down in the revision of Decision 2008/411/EC, by means of the above-mentioned Implementing Decision (EU) 2019/235, in particular as regards spectrum contiguity, mode of operation, block size and channelling.

¹³ This restructuring resulted from the company Wireless Projects, LLC having transferred to Airspan Spectrum Holdings Limited the sole share of the registered capital of Broadband Portugal BBP - Unipessoal, Lda, on 13 March 2018. Following this, Broadband Portugal BBP - Unipessoal, Lda changed its name to Dense Air Portugal, Unipessoal, Lda.

Furthermore, DENSE AIR provided details of a number of initiatives that it has been developing and which, in its view, underline its unequivocal intention to establish itself in the domestic market.

In this context, at a meeting held on 10 May 2019, and in respective supporting documentation received on 27 May 2019, the company presented to ANACOM a proposal which may be summarised as follows:

- consolidation of the spectrum it holds into a single block with 5 MHz channelling, in accordance with Implementing Decision (EU) 2019/235;
- reduction of the quantity of spectrum it holds in Lisbon (area 1) from 168 MHz to 100 MHz, and the spectrum held in Porto (area 2) from 112 MHz to 100 MHz;
- granting, *in return* for the abovementioned reduction, of a national 100 MHz licence, claiming that this is the simplest solution to allow for the densification of its services offered in the cities and more significant implementation in the regions; and
- conclusion of an agreement on the conditions for renewal of its RUF in 2025, taking into account the efficient use of the spectrum it declares it will make by that date.

This proposal has been examined by ANACOM as described below. However, it has been subject to amendments culminating in the submission by DENSE AIR, on 18 October 2019, of a reformulated proposal, as shown below.

3.1 Framework

The proposal made by DENSE AIR, dated May 2019, consists of a request to amend the conditions associated with the RUF that it currently owns, which, pursuant to Article 20 of the Electronic Communications Law (ECL), may be amended in objectively justified cases and in accordance with the principle of proportionality, by law, regulation or administrative act, as the case may be.

The amendment of the conditions of an RUF consists of a change in the constituent/attributive administrative instrument governing that right, an amendment that is permissible under the terms of Article 173 of the Code of Administrative Procedure (CAP), with the regulatory rules of the revocation applying (see Articles 165 et seq. of the CAP).

Therefore, where faced with a request to amend a constituent instrument of a right, based on the interests and motivations of the respective holder, it is incumbent upon ANACOM, mindful, specifically, of the provisions of 1. above, to assess how and if the public interest underlying the adoption of such an instrument will be impacted by the individual's claim.

3.2. Analysis of the proposal made by DENSE AIR

3.2.1. ANACOM's preliminary analysis and request for information from DENSE AIR

On 24 July 2019, after careful consideration of the proposal submitted by DENSE AIR, ANACOM informed the company of its preliminary findings and requested a comprehensive set of information related to its activity.

In the aforementioned message, the Authority underlined that, in the context of the implementation of EU decisions and directives regarding the 3.4-3.8 GHz band, it has taken a number of steps to adopt measures that best allow the release and facilitate the availability of that band under a single allocation procedure, involving other equally relevant bands, namely the 700 MHz band. As already conveyed in previous communications dated 31 July 2018 and 05 February 2019, ANACOM also indicated that it still could not identify reasons or grounds, in fact or in law, to cease consideration of a possible early revocation and/or amendment of the RUF held by DENSE AIR, or to bring forward a potential decision to renew the current RUF.

Within this context, as a result of the preliminary analysis carried out at that time, ANACOM concluded, and informed the company by means of the aforementioned message dated 24 July 2019, that the conditions had not been fulfilled for accepting the proposed amendment of the RUF with the reduction presented by the company (RUF of 100 MHz nationwide), as this would imply the use of spectrum over which the company holds no rights - the spectrum pertaining to area 9 (100 MHz) and areas 3 to 8 (44 MHz in each area) - in contravention of the applicable rules, which require open, objective, transparent, proportionate and non-discriminatory allocation procedures.

ANACOM further remarked that, within the context set out in paragraph 1. above¹⁴, it cannot consider an additional spectrum allocation that could potentially call into question not only the public interest that underlies any frequency allocation, but also the interests of the market, whose actors should be given equal opportunity to access the spectrum available in that band under proportionate and non-discriminatory conditions.

Stressing that it has been working to prepare, reorganise and make available to the market the aforementioned 3.4-3.8 GHz band under conditions that ensure compliance with the relevant EU decisions and directives, in particular the technical conditions laid down in Implementing Decision (EU) 2019/235, ANACOM deemed inevitable the reorganisation of the band based on 5 MHz channels that allow the use of contiguous spectrum in time division duplex (TDD) operating mode, with a view to making available blocks that are sufficiently large and, as such, capable of offering 5G services, and may, in this context, potentially and where duly justified, allow for a scenario in which, on the basis of the proposal submitted by DENSE AIR, the respective RUF would be amended as follows:

- reconfigure the spectrum of areas 1 and 2 into a single 100 MHz block;
- reconfigure the spectrum of areas 3 to 8 into a single 55 MHz block;
- relocate this contiguous spectrum to the lower edge of the band, respectively to the 3.4-3.5 GHz sub-band for areas 1 and 2, and to the 3.4-3.455 GHz sub-band for areas 3 to 8;
- impose technical conditions for the protection of services in the adjacent band, particularly military radars.

ANACOM also informed the company that, given the availability of the remaining spectrum in a future frequency allocation procedure, if it so desired, DENSE AIR could gain access to additional spectrum in a proportional and non-discriminatory procedure, either in areas where it does not have any spectrum or in areas where it already has, without prejudice to the conditions that may be laid down in that procedure, with the aim of fulfilling its purpose of having 100 MHz of spectrum at national level.

¹⁴ Furthermore, consideration should be given to the fact that the band concerned has been designated as a pioneer band for the provision of 5G services and, as such, has been considered in allocation processes promoted in other MS and in the network and terminal equipment ecosystem, with trials having been conducted and commercial offers launched in Europe.

Finally, ANACOM informed the company that consideration of such a possibility of amending said RUF required DENSE AIR to make available a set of information which, subject to further regulatory assessment by the Regulator, would enable a decision to be made.

To this end, ANACOM requested from DENSE AIR a comprehensive set of information on the current and potential status of the effective implementation of its business and respective network in the domestic market, involving, inter alia, information on segmentation and type of commercial offers, implementation areas, network equipment, agreements with other entities and company structure.

3.2.2. Information provided by DENSE AIR

In response to ANACOM's request, DENSE AIR submitted a set of information on 08 August 2019, stating that *"it welcomes ANACOM's openness to the reorganisation of the 3400 MHz - 3800 MHz band"* and that *"it is willing to give up the valuable spectrum it holds in urban centres, which will contribute positively towards the domestic 5G market"*. It added that *"This change will contribute towards the overall spectral efficiency of the domestic 5G market and will be equally beneficial to all parties, including ANACOM and Portuguese consumers, whose experience will be improved"*.

On 13, 27 and 30 September, and on 15 October 2019, on its own initiative, DENSE AIR sent ANACOM information that it considered relevant and complementary to that which it had previously made available.

Succinctly and respecting the need to protect information deemed confidential, due to the fact that it may reveal, inter alia, business, industrial or internal secrets, it appears that DENSE AIR intends to provide B2B services through the implementation of small cells that, according to the company, will allow greater network capacity and coverage, as well as improve the overall efficiency of spectrum use, especially in terms of indoor coverage, offering mobile network operators a way to cover economically unprofitable areas. According to the company, another innovative point of its business model is "Relay UE", a solution that, according to the company, is highly economical, especially for implementation in buildings and outdoors.

DENSE AIR reported that, in Portugal, “*significant commitments*” have been made to customers, mobile network operators (MNO) and FTTH (“Fibre to the Home”) providers, underlining that, despite the benefits of its technical solutions, adopting them is a lengthy process as, being innovative, their implementation on the ground requires long sales cycles involving demonstrations of Proof of Concept (PoC). In this context, the difficulty of managing the strategy and migration of current 4G technologies and architectures to 5G is also stressed.

DENSE AIR also indicated that it carried out a detailed set of measurements (which it compiled into a report on the current 4G LTE service in Portugal) which, through data correlated with location information obtained by means of GPS and using Big Data analysis, allow the quality of the MNO networks to be determined, and buildings with unsatisfactory or zero LTE coverage to be identified in Lisbon and Porto. According to the company, such results would mean that, from a conservative perspective, each building identified would support a minimum of two Small Cells, a number which could double in rural areas and in other cities.

The company stated that it intended to offer a Small Cell as a Service (SCaaS) service to all operators, providing the investment to build the network and charging the MNO that use these services a fee per unit implemented. The 4G LTE and 5G NR¹⁵ services to be provided by the company will be available to the MNO upon successful completion of PoC integrations. In this context, the company provided information on an agreement with an MNO and on pilot testing.

DENSE AIR said it intended to follow an additional business model, which involves the use of wireless technology to extend fibre network services to rural communities. According to DENSE AIR, its spectrum will ensure stable capacity by the use of small cells, which will allow rapid deployment at a very low cost when compared to fibre deployment at selected locations. It indicated that it had started negotiations with an entity, with an evaluation of the technical and commercial performance of its wireless fibre extension (WFE¹⁶) solution being planned, which it has already started working on.

¹⁵ 5G New Radio (NR).

¹⁶ WFE - Wireless fibre extension.

Finally, DENSE AIR has indicated that it also intends to provide 4G and 5G Private Networks for industry 4.0, Smart Cities and the transport industry. It states that it has identified a number of partners who wish to bring these services to industry and other uses, as well as to other markets, such as airports, ports, hospitals and manufacturing facilities. It added that, in other countries, it is in the pre-commercial phase.

It further mentioned the signing of memoranda of understanding with some local authorities.

In terms of network development, DENSE AIR stated that it is implementing significant 5G “Pilot” systems in various Portuguese cities, with a view to validating its business models. In this regard, it noted that the recommended bandwidth for the 5G NR is a contiguous 100 MHz bandwidth and that, although deployment at 20 MHz or 40 MHz is possible (using multi-block carrier aggregation), this solution is not economically viable.

Regardless of the limitations of the existing 5G NR channel plan, DENSE AIR has reported that it has already introduced a solution and is using 20 MHz channels within 28 MHz allocations to provide coverage for a series of buildings. DENSE AIR believes that ANACOM should rapidly complete the band reconfiguration process to prevent its technical implementation from blocking the band. It further states that any mass deployment of 5G services - which is its preferred approach - will clearly be affected by the band reconfiguration to be carried out by ANACOM, as well as by commercial agreements with target customers.

DENSE AIR mentioned using equipment that conforms to 5G in non-standalone mode, requiring a 4G anchor to operate. According to the company, standalone mode will not be available on core networks and deployed devices for several years, making time to market critical. Reorganisation of the bands is also needed and supported by DENSE AIR in order to make 5G implementation more efficient and to maximise customer benefits.

The company emphasised that it has a solution that is unique to the market, as its first 4G deployments mimic the 5G deployment model, enabling migration to the latter with a significant reduction in technical and commercial problems. In this regard, it noted that this is its “added value”, as it allows it to “pave the way” for 5G while delivering value to operators and customers.

In addition to the communications mentioned above dated 23 September 2019, DENSE AIR reaffirmed that it was prepared to reduce the quantity of spectrum it holds in areas 1 and 2 to 100 MHz, on condition that it obtained 5 MHz contiguous blocks for operation in TDD mode, the spectrum held in the remaining regions could be adjusted to 60 MHz per region, it were subject to technical conditions equivalent to those to be established for other RUF in the 3.4-3.8 GHz frequency band and provided that there were a clear process for renewing its RUF in 2025.

On 08 October 2019, DENSE AIR sent further correspondence stating that, following ANACOM's "request", it would be prepared to consider reducing the quantity of spectrum held in areas 1 and 2 to 80 MHz, into a single contiguous block bordering the lower portion of the band, provided that it could ensure contiguous blocks with 5 MHz channels in TDD mode, that the spectrum held in the remaining regions could be adjusted to 60 MHz, it were subject to technical conditions equivalent to those to be established for other RUF in the 3.4-3.8 GHz frequency band, there were a clear process for renewing its RUF, applicable in 2025, and that the obligations and rates would be appropriate to the respective business model.

In the light of that communication, on 10 October 2019, ANACOM sent a letter to the company clarifying the terms of the RUF allocation procedures and its decision-making process and stating that it should unambiguously clarify whether or not it intended to return part of the spectrum it holds - in addition to the reduction reported in May 2019. On 11 October 2019, DENSE AIR replied, briefly stating that it could not agree to return part of the frequencies without first knowing in detail the terms and conditions to which it might be subject after the band were adapted to the new EC Decision.

This process culminated in the DENSE AIR correspondence dated 18 October 2019, in which it confirmed its intention to *"(...) reduce the frequencies allocated to it in the 3.4-3.8 GHz band in support of the plans of ANACOM to reconfigure the band to allow the efficient use of 5G services in Portugal"*.

DENSE AIR thus makes it clear that *"it will unilaterally reduce the frequencies assigned to it in geographical area 1 of the current FDD band configuration from 168 MHz to 100 MHz TDD; in geographical area 2 from 112 MHz to 100 MHz TDD; and in the other mainland areas (geographical areas 3, 4, 5, 6 and 7) and the Autonomous Region of the Azores from*

56 MHz to 55 MHz TDD”, on the assumption that ANACOM will apply the conditions of Commission Implementing Decision (EU) 2019/235, of 24 January 2019, which amends Decision 2008/411/EC”.

3.2.3. Additional information collected by ANACOM

In September 2019, ANACOM requested information from various entities (including municipalities and electronic communications providers) with whom DENSE AIR had established some contact. The information obtained confirmed that *memoranda of understanding* have been signed to carry out Proof of Concept and that, in one case, testing has already taken place.

ANACOM has also obtained some information regarding other countries where DENSE AIR has a presence, namely Belgium, where DENSE AIR Belgium has acquired a company that owns RUF over 45 MHz in the 2.6 GHz band with the intention of offering wholesale services, but where implementation remains limited or nonexistent; Ireland, where DENSE AIR has acquired, in the 3.6 GHz band, RUF covering 25 MHz nationally, plus 35 MHz in some regions, and is currently conducting tests in Dublin with a view to installing a small cell network; Australia, where it acquired spectrum in some regions in the 3.6 GHz band (between 5 MHz and 35 MHz per region), with the intention of offering a wholesale business based on the installation of small cells; and New Zealand, where it acquired 70 MHz in the 2.5 GHz and 2.6 GHz band from two companies, with the intention of developing a small cell wholesale business, having recently established a partnership with a network operator and jointly launching a small-scale, fixed and wireless 5G service, which is available by invitation to certain residential and business customers.

4. Change of RUF

As ANACOM informed DENSE AIR, by means of the abovementioned letter dated 24 July 2019, ANACOM understands that any amendment of its RUF under the terms then considered by the Authority, in the wake of the company’s proposal of May 2019, would require a careful assessment of the information it provided in the meantime, and on the basis of which ANACOM intended to assess the current and potential status of effective implementation of its business in the domestic market.

In this context, the information provided by DENSE AIR, and the information gathered by ANACOM from other entities, allowed partial confirmation that the company has some initiatives ongoing aimed at the provision of 4G LTE and 5G NR services, using the spectrum allocated to it for the provision of publicly available electronic communications services - DENSE AIR having indicated that, in Portugal, *“commercial offers targeting mobile network operators (...) should be available in the first quarter of 2020”*.

ANACOM should also consider the information conveyed by the company regarding the initiatives and efforts it has been making, involving, inter alia, agreements with operators and municipalities to carry out Proof of Concept and pilot tests aimed at enabling the provision of its services in the short run.

It is also recognised that implementation of these efforts in the market requires time, even though the company has not provided the detailed information requested by ANACOM regarding its investment plan or the respective operational and commercial planning, which would allow it to assess, more specifically, the respective sales cycle.

It is noted that, as part of its supervisory and monitoring functions, ANACOM found that, of the two stations that make up the DENSE AIR network, only one was using the consigned spectrum bands, and there was another transmission at a different location.

Having analysed and weighted the information submitted by DENSE AIR and the other facts that have been collected in the meantime, ANACOM maintains the view that the reorganisation of the spectrum held by the company, into a single block, with 5 MHz channelling and its use in time division duplex (TDD) operating mode, in accordance with Implementing Decision (EU) 2019/235, is inevitable, according to criteria of adequacy, necessity and balance.

In fact, taking into account the data collected, as mentioned above, only in this way can the public interest underlying the use of this spectrum be adequately ensured, in particular considering the objective of making sufficiently large blocks of spectrum available by the end of 2020 that are capable of offering 5G networks and services, as is apparent from Article 54 of the EECC and the aforementioned Implementing Decision (EU) 2019/235 - also satisfying that which DENSE AIR itself requested from ANACOM.

In addition to meeting the company's request, the assessment of the proportionality of the measure of reducing the quantity of spectrum it holds in Lisbon (area 1) from 168 MHz to 100 MHz, as well as the spectrum held in Porto (area 2) from 112 MHz to 100 MHz, also highlights the fact that the company confirmed, in its correspondence of 08 August 2019, that this does not render unviable its commercial operation, providing evidence that such *“change will contribute to the overall spectral efficiency of the domestic 5G market, and will be equally beneficial for all parties, including ANACOM and Portuguese consumers, whose experience will be improved”*.

Additionally, as it is also in the public interest to ensure that the spectrum to be made available within a 5G context is not fragmented, in order to enable the availability and use of sufficiently large blocks of spectrum, in accordance with European directives, ANACOM maintains the understanding, conveyed to DENSE AIR on 24 July 2019, that the allocated spectrum should be relocated to the lower edge of the band (between 3.4 and 3.5 GHz) and the mitigation techniques identified in the Annex to the above Decision should be implemented in order to protect radiolocation systems in Portugal below 3.4 GHz.

In this context, it is important to note that defragmenting the band as it stands - by reconfiguring the block size and relocating the RUF held by DENSE AIR to the lower edge of the band - will allow for more efficient use of the spectrum, to the benefit of all entities that may, in the meantime, access this band. The possibility of holding contiguous blocks of spectrum will allow companies to cut costs, for example those associated with the equipment needed to develop their networks, which will enable them to leverage their investments and will have an impact on service innovation for the benefit of end users.

In view of the above and taking due account of the request made by DENSE AIR, in this regard, ANACOM understands that the RUF held by the company should be subject to the following amendments (as set out in draft endorsement no. 5 to RUF ICP-ANACOM no. 04/2010, which is attached to this draft decision, and of which it forms an integral part):

- the spectrum of areas 1 and 2 is reconfigured to a single 100 MHz block;
- the spectrum of areas 3 to 8 is reconfigured to a single 55 MHz block;
- the spectrum is relocated to the lower edge of the band, respectively to the 3.4-3.5 GHz sub-band for areas 1 and 2, and to the 3.4-3.455 GHz sub-band for areas 3 to 8;

- spectrum use will be subject to the technical parameters set out in Implementing Decision (EU) 2019/235;
- spectrum use will be subject to the implementation of mitigation techniques as set out in Implementing Decision (EU) 2019/235, in order to ensure the protection of existing radiolocation systems in Portugal below 3.4 GHz;
- spectrum use will be subject to such conditions of use as may be defined by ANACOM under the framework of the implementation of Implementing Decision (EU) 2019/235, when other users in the band come into existence.

In the context of the next frequency allocation procedure, which will involve, inter alia, this band, its use should be subject to the fulfilment of obligations which will then be defined and which may involve, for example, network access obligations under non-discriminatory conditions.

At that time, fair treatment of RUF holders in this band being paramount, ANACOM will be obliged to reflect, proportionally, these conditions in the use of the spectrum allocated to DENSE AIR until 2025, modifying its RUF in an appropriate manner.

This fairness should also be reflected in the fees due for the use of that spectrum. ANACOM believes that DENSE AIR should be placed under conditions equivalent to those applicable to entities that acquire spectrum under the aforementioned allocation procedure. However, this is a matter for the Government, and as such, depends on what comes to be established in this regard. ANACOM, within the scope of its own radio spectrum management powers and its duty to assist the Government, will submit a proposal that it deems appropriate in relation to the amendment to Administrative Rule 1473-B/2008, of 17 December, in its current wording (Fees Administrative Rule).

5. Future use of the 3.4-3.8 GHz band

As shown in paragraph 1. above, the 3.4-3.8 GHz band was identified as the first pioneer band for the development of 5G networks in bands below 6 GHz, and was the band that generated the most interest among the various entities that made representations during the public consultation held in 2018.

Moreover, ANACOM believes that, within the scope of its duties to ensure efficient spectrum management, it must guarantee a level playing field between entities wishing to develop networks and launch products/services based on the 3.4-3.8 GHz band, without unjustifiably favouring or harming any entity wishing to access that spectrum.

Within this context, ANACOM should also consider the fact that spectrum shortage is one of the most significant barriers to market entry, in particular for the provision of mobile networks and services. Although there are other ways of accessing this market - and consideration may be given to alternative measures and incentives that create conditions for any interested entity to develop operations in the mobile market - it is certain that the impossibility of using spectrum may place significant constraints on those operations. It is also true that, in the domestic market, the vast majority of mobile operations and services have been made available by companies that support these services on their own respective mobile networks and hold RUF for this purpose.

In the specific case of the 3.4-3.8 GHz band, and as indicated in paragraph 1., it is recalled that the RSPG reiterated, in January 2018, that the availability of this pioneer band would be fundamental to the success of 5G in Europe, and urged MS to consider appropriate defragmentation measures in this range in time to allow the use of sufficiently large blocks of spectrum by 2020.

With the publication, in December 2018, of the EECC, Article 54 of which stipulates that MS should, by 31 December 2020, take the necessary steps to reorganise and allow the use of sufficiently large blocks in the 3.4-3.8 GHz band, and with the publication, in February 2019, of Implementing Decision (EU) 2019/235, which harmonises the technical conditions for such use, the regulatory framework applicable to this band and the conditions under which it may be used for the provision of 5G services were finally consolidated, as a result of which it is now up to ANACOM to advocate for its optimal use, with a view to the best and most efficient implementation of 5G in Portugal within the timetable set at European level.

In this context, it is extremely important to create conditions to allow the maximisation of the amount of spectrum available in the 3.4-3.8 GHz band to enable any entity to provide electronic communications services.

Additionally, as it is considered a priority band for the implementation of 5G services and applications, which will underpin developments in various sectors of the economy, its use

will have an impact that transcends the electronic communications sector, it also being anticipated that it could have a significant impact on society at large.

Against this background, it is even more important to provide equal opportunities in access to a spectrum that will allow for a diverse range of services, contributing not only, but also, to the dynamism of the mobile electronic communications sector. And it is not just about everyone being able to access the available spectrum at the same time and thus be placed on equal terms, in particular as regards the timing of investment decisions taken by each entity.

It is also about ensuring that this (scarce) asset in the public domain may be used by the entities that value it most, in order to create value for society at large and to ensure that all entities are subject to equivalent conditions and obligations.

In view of the foregoing, ANACOM believes that it is justified in making available all of the 400 MHz existing in the 3.4-3.8 GHz band in the future RUF allocation procedure.

In exercising its discretionary powers, specifically with respect to efficient spectrum management, ANACOM must, of course, analyse the circumstances surrounding each specific case, weighing up the public interest underlying the allocation, maintenance or renewal of rights of use of frequencies, under penalty of unjustified exercise of its discretionary powers.

However, weighing up the facts and considerations mentioned above regarding the availability of this band, which is strategic and fundamental for the success of 5G in Europe and, in particular, in Portugal, for reasons of public interest, security and legal certainty, as well as inherent regulatory predictability - which always guides ANACOM in the exercise of its powers - and given that this is a matter of abiding importance in the medium term, ANACOM believes that it is already in a position to decide to make available all of the 400 MHz of the 3.4-3.8 GHz band in the future RUF allocation procedure, and consequently, the RUF held by DENSE AIR will terminate on the date of expiry, on 05 August 2025.

Indeed, it must be considered that ensuring the continuity of the RUF after 2025, even if subject to conditions and obligations, would put the company, or any other company in a similar situation, in a position of unjustified positive discrimination vis-à-vis the others, which would have to compete with each other for the remaining spectrum in the 3.4-3.8 GHz band,

and access would not be guaranteed to other entities that could also use this spectrum for the benefit of users and consumers.

Against this background, with the pursuit of the public interest paramount, ANACOM should promote competition by ensuring that there are no distortions or obstacles to its development, in order to provide end users with the maximum benefit in terms of choice, price and quality, to support innovation in infrastructure and to promote efficient investment, as well as consider these objectives in the light of the need to promote efficient spectrum management. In the case at hand, this is reflected in the need to ensure that the amount of spectrum to be made available to the market is adequate for launching 5G, which will benefit from the availability of large blocks of contiguous spectrum. ANACOM must also adopt the decision that best complies with the European directives and which best ensures that the domestic market and its players can follow the rapid technological development of Europe.

Therefore, taking into account the public interest that ANACOM has to pursue and safeguard, the Authority believes that the most appropriate solution for the domestic market, which guarantees fairness among all current and potential players, will be to make available to the market all existing spectrum in the 3.4-3.8 GHz band, i.e. 400 MHz, as a result of which the RUF allocated to DENSE AIR, as reflected in title ICP-ANACOM 04/2010, will cease to be effective on 05 August 2025.

However, this decision allows DENSE AIR to continue to exercise its RUF until 2025, in accordance with the reconfiguration requested by it and explained above, i.e. by reducing the amount of spectrum and applying the technical conditions of use set out in Implementing Decision (EU) 2019/235, and may form a critical judgment regarding the development of the network and the commercial launch of the services and their respective timetables, including with regard to possible participation in a future RUF allocation procedure for this spectrum, although the conditions and rules of this procedure have not yet been defined.

In this context, the market, including DENSE AIR ITSELF, is also provided with greater regulatory predictability for spectrum use in the 3.4-3.8 GHz band, which will be made available to the market, subject to conditions ensuring that all interested parties, including, of course, DENSE AIR, are placed in an equivalent position, although a portion of that spectrum (that which DENSE AIR holds) may be subject to restrictions of use until 2025, if it ends up being allocated to other entities.

Finally, being an operation that, although still at an early stage, not least due to the circumstances associated with the availability of 5G equipment and infrastructure, involves some initiatives, namely at the wholesale level, and partnerships that may have some significance in the context of 5G networks and services, the consideration of a possible early revocation of the RUF pertaining to DENSE AIR appears disproportionate at this stage, bearing in mind that other mechanisms/options may be considered in order to ensure a level playing field in the market that affect to a lesser degree the subjective position of the company, as is the case with this decision to make all of the 400 MHz in the 3.4-3.8 GHz band available in the future RUF allocation procedure.

Naturally, should circumstances so require, ANACOM will reassess the situation, exercising its powers where necessary and appropriate.

In the above context and although the amendment of the RUF in question is the result of an initiative of the holder itself, ANACOM considered that a decision of this nature reflects a change in its RUF, which has a significant impact on the market. As a result, the draft decision, adopted on 22 October 2019¹⁷, was subject to the general consultation procedure provided for under Article 8, as laid down under Article 20 (3) of the ECL, for a period of 20 working days.

A prior hearing of DENSE AIR was also organised, pursuant to Article 121 et seq. of the Code of Administrative Procedure and for a period of 20 working days.

The aforementioned periods were then extended, by ANACOM decision of 07 November 2019, and the following entities made representations by the deadline, on 27 November 2019:

- DENSE AIR Portugal, Unipessoal, Lda.
- Ericsson Telecomunicações, Lda.
- MEO – Serviços de Comunicações e Multimédia, SA.
- NOS Comunicações, SA, NOS Açores Comunicações SA and NOS Madeira Comunicações SA.

¹⁷ Available at <https://www.anacom.pt/render.jsp?contentId=1492981>.

- Joint position of NOWO Communications, SA and ONITELECOM - Infocomunicações, SA.
- VODAFONE Portugal – Comunicações Pessoais, SA.

Following this, ANACOM prepared a report on the prior hearing and the public consultation to which the draft decision was submitted, which forms an integral part of this decision and includes a summary of the positions expressed by the interested parties and ANACOM's understanding of them.

Pursuant to paragraph 3 (d) of the “ANACOM Consultation Procedures”, as approved by determination dated 12 February 2004¹⁸, ANACOM makes the representations received available on its website, safeguarding confidential information and the above-mentioned report.

6. Decision

Thus, the **ANACOM Management Board**, in pursuit of its regulatory objectives, namely those provided for under Article 5 (2) (b) and (d) of the Electronic Communications Law, pursuant to the provisions of Articles 15, 16, 20 and 33 of that same Law, in the exercise of the powers conferred upon it by Article 9 (1) (b) of its Charter, as approved by Decree-Law 39/2015, of 16 March, as well as by Article 167, applicable pursuant to Article 173, both of the CAP, **decides**:

1. To amend the right of use of frequencies granted to DENSE AIR, as reflected in title ICP-ANACOM no. 04/2010, under the terms of endorsement no. 5, to integrate the qualifying title and which is attached to this decision.
2. To make available to the market, in the future frequency allocation procedure, the entire 3.4-3.8 GHz band, as a result of which the right of use of frequencies allocated to DENSE AIR, as reflected in title ICP-ANACOM no. 04/2010, will cease to be effective on 05 August 2025.
3. To amend the National Table of Frequency Allocations (NTFA) in accordance with the

¹⁸ Available at <https://www.anacom.pt/render.jsp?contentId=420767>.

present decision.

4. In the context of the next frequency allocation procedure, which will involve the 3.6 GHz band, to incorporate into the right of use of frequencies allocated to DENSE AIR the conditions of use of the spectrum allocated to it until 2025, in accordance with such objectives of public interest as may be defined for the band, and under non-discriminatory and proportionate conditions.

Lisbon, 23 December 2019.

RIGHT OF USE OF FREQUENCIES

ICP-ANACOM no. 04/2010

ENDORSEMENT NO. 5

Paragraph 1 of this title shall henceforward read as follows:

1. 1. Dense Air Portugal, Unipessoal, Lda (hereinafter referred to as Dense Air), legal entity no. 509033482, having registered offices at Praça Duque de Saldanha, no. 1, 1050 094, Lisbon, is entitled to use frequencies for Broadband Wireless Access (BWA) in the following geographical areas:

Spectrum	Geographical areas
3400-3500 MHz	1 and 2
3400-3455 MHz	3,4,5,6,7 and 8

2. (...)
3. The use of the allocated frequencies is subject to the technical parameters set out in the Annex to Commission Decision 2008/411/EC, of 21 May 2008, on the harmonisation of the 3400-3800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community, as amended by Commission Implementing Decision 2014/276/EU, of 02 May 2014, and Commission Implementing Decision (EU) 2019/235, of 24 January 2019 (hereinafter Decision 2008/411/EC).
4. Notwithstanding the preceding paragraph, Dense Air shall:
 - a) Implement mitigation techniques in accordance with the Annex to Decision 2008/411/EC to ensure the protection of radiolocation systems operating in the adjacent frequency band below 3400 MHz, as well as fixed satellite service systems operating in the 3700-3800 MHz and 3800-4200 MHz frequency bands;
 - b) Use the frequencies assigned in accordance with the technical conditions to be defined by ANACOM, in accordance with Decision 2008/411/EC, to safeguard coexistence with other networks operating in the 3400-3800 MHz band.

4. 1. (...).

2. In accordance with Decision 2008/411/EC, the 3400-3800 MHz band is designated on a non-exclusive basis for terrestrial electronic communications networks, as a result of which ANACOM may define measures to facilitate coexistence with other duties and applications identified in the National Table of Frequency Allocations (NTFA) in force for this band.

5. (...).

a) (...);

b) Comply with the conditions laid down in Decision 2008/411/EC.

10. The right of use of frequencies is granted for a period of 15 years from the date of issuance of this title, expiring on 05 August 2025.

Lisbon, 23 December 2019.