

Synthesis of replies received to the questionnaire
Preliminary consultation on the appropriateness of allocating the 2300 - 2335 MHz
sub-band for broadband wireless electronic communications services

During 21 October - 20 November 2020, the National Authority for Management and Regulation in Communications of Romania (hereinafter *ANCOM* or the *Authority*) has conducted a preliminary public consultation on the appropriateness of allocating the 2300-2335 MHz sub-band in the 2300-2400 MHz band (*the 2300 MHz band*) for broadband wireless electronic communications services.

The public consultation thus aimed at gathering the views of all stakeholders on the opportunity of designating and allocating the 2300-2335 MHz sub-band for terrestrial systems capable of providing broadband wireless electronic communications services.

The Authority sought to obtain relevant information in order to identify the level of interest from the market in the use of the 2300-2335 MHz sub-band in view of provision of public networks and of broadband electronic communications services.

Given the importance of the available spectrum scarce resource, the impact of the decision to be made concerning the future use of this frequency band and the effects on the Romanian electronic communications market, ANCOM deemed useful to consult all stakeholders with a view to ensuring the transparency and impartiality in the decision-making process and the predictability of the adopted regulatory measures.

In this sense, ANCOM elaborated a document which based the consultation and contained a questionnaire aimed at stakeholders by which the Authority wished to learn the views and arguments concerning the need and opportunity to designate and allocate the 2300-2335 MHz sub-band for broadband mobile/fixed electronic communications networks, the level of interest for acquiring usage rights in this sub-band, the means and conditions for awarding these rights, respectively a series of technical and economic aspects related to the spectrum resource access such as: minimum spectrum requirements, limitation of the amount of radio frequency usage rights that can be awarded (number of licences), area of services provision, validity of the rights, coverage obligations associated to the licences, type of procedure for awarding the usage rights and information on the licence fee for obtaining the usage rights.

Furthermore, the public consultation initiated by the Authority sought to gather the stakeholders' opinions on the need and opportunity to hold a selection procedure to award the usage rights in the 2300-2335 MHz sub-band, as well as on the preferred time horizon for holding such procedure.

Eight respondents (4 operators of mobile and fixed communications, two radio equipment manufacturers, one legal person and one state institution) provided answers to the public consultation.

ANCOM has analysed the answers received, presented below, and will - in substantiating the decision on the future use of the radio spectrum available in the envisaged sub-band and setting the future actions for the implementation of the made decision - take into account the opinions, intentions and recommendations expressed during the consultation.

The replies received to the Authority's questionnaire are presented below.

1. Need and appropriateness of designating and awarding the 2300-2335 MHz sub-band for MFCN

Question no. 1

Keeping into account the context of the technological and regulatory evolution at international level for the 2300 MHz band, as well as the structure of the broadband mobile/fixed communications networks in Romania and the current allocation of radio spectrum in the frequency bands intended for the provision of broadband mobile/fixed communications public networks,

do you consider necessary and appropriate to designate in the NTFA the 2300-2335 MHz sub-band in the 2300 MHz band for terrestrial systems capable of providing electronic communications services (MFCN), in view of allocating the frequencies in this sub-band for the provision of public networks and of broadband wireless electronic communications and services?

Please substantiate your answer.

Five respondents deem appropriate to designate and award the whole 2300-2400 MHz band (*the 2300 MHz band*), the B40 band (LTE)/n40(NR) according to 3GPP standards, for MFCN, in line with the international standards and respectively the CEPT/ECC Decision 14(02).

The arguments presented by a **first respondent**, in supporting this opinion, are as follows:

- The partial awarding of the 2300-2400 MHz band, respectively of the 2300-2335 MHz sub-band, for MFCN, leaving the other technologies to operate in the rest of the 2300-2400 MHz band, will trigger the need to develop customized equipment and solutions exclusively for the sub-band in question (to avoid mutual harmful interferences towards other existing technologies) which will limit the availability of the equipment on the market.
- The option for a sub-band non-harmonised at an international level will lead to the impossibility to reap the advantages of an existing more extensive ecosystem for the B40 3GPP band, with a direct impact on the business competitiveness of the solutions offered to operators and end-users.

A second respondent, who deems as appropriate the awarding of the B40/n40 (2300 MHz TDD) band for LTE and 5G, brings the following arguments:

- The respondent appreciates that the n40 (2300 MHz TDD) band is essential for allowing a large 5G coverage with reasonable capacity performances.
- The 2300 MHz TDD band has been globally identified for IMT from 2007 (WRC-2007) and, correspondingly, in 2019, the specifications for 5G NR (New Radio) have been standardized by 3GPP including for this band.
- The availability of the frequency spectrum in the 2300 MHz band is rising worldwide. So far, more than 60 mobile communications operators have acquired spectrum in this band and more new auctions are planned to take place. For instance, only in Europe, the n40 band was awarded in United Kingdom, Denmark, Lithuania, Latvia, Estonia and recently in Sweden, whereas in the next three months, Slovenia, Norway and Denmark (partially) plan to auction out this band for IMT.

- The greater availability of this spectrum across Europe leads to the updating of the existing framework in order to consider the AAS 5G base stations (with active antennae systems) which envisage the efficient and technologically neutral use of this band for cellular mobile communications services.
- The network solution and the ecosystem of devices which support this band for the LTE and 5G systems are already mature. According to the GSMA reports, there are more than 6400 LTE devices. At the same time, many important providers of chipsets have launched 5G chipsets which support this band and there are terminals (both CPE and mobile phones) available on the market, including: Samsung, Realme, Oppo, Huawei and Apple. It can be said that, at present, in 2020, all major manufacturers of chipsets and devices support 5G in the n40 band.
- The commercial network solutions existing both for LTE and 5G in the 2300 MHz band include also the M-MIMO AAS 64T64R products, as well as the solutions with passive conventional antennae, with 8T8R RRU (Radio Remote Unit) and broadband passive antenna that offers the beamforming 8T8R functionality.
- The 2300 MHz TDD is seen as the next most important band after the C band (B42, B43) for 5G, from the spectrum area that includes the medium frequency bands for 5G.

A third respondent deems appropriate to designate in the NTFA the 2300-2335 MHz sub-band in the 2300 MHz band for terrestrial systems capable of providing electronic communications services (MFCN), as, across EU, the demand for TDD spectrum is continually rising since the 4G TDD and 5G TDD technologies have appeared.

As well, taking into account the need to allocate spectrum continuously for the roll out of networks based on TDD technologies, the respondent deems opportune to reallocate the governmental applications from the 3.4-3.8 GHz band into this band (these two bands being substitutable).

A fourth respondent considers that the 2300 MHz band is adequate for allocation in view of the provision of broadband mobile/fixed communications public networks, according to CEPT Decision, but does **not consider opportune the partial opening of the 2300 MHz band** for electronic communications services (MFCN), since the 35 MHz available at present in the 2300-2335 MHz band are not sufficient to ensure fair and viable opportunities for all market operators.

In the respondent's view, the partial allocation of only 35 MHz in the 2300 MHz band for broadband communications services is not efficient and does not ensure equal conditions for all the operators present on the market.

The respondent believes that, if subsequent evolutions of the Romanian communications market will justify a decision on the opening of the 2300 MHz band for MFCN, then **the entire band will need to be allocated, in a transparent and non-discriminatory manner.**

A fifth respondent supports, in principle, the allocation of the spectrum in the 2300 MHz band for MFCN, however considers that a **bandwidth of only 35 MHz does not represent an efficient spectrum allocation.**

The respondent also underlines that, in order to adapt to the extreme traffic demand of the next years, the operators will have to implement solutions that would offer high capacities at low costs.

In the respondent's opinion, an allocation of just 35 MHz TDD, possibly available for more operators, does not meet this desideratum and consequently would not lead to an efficient implementation from an economic point of view.

Three of the respondents consider appropriate the designation and allocation of the 2300-2335 MHz sub-band for MFCN, for certain contexts and scenarios of use, as shown in the replies below.

A sixth respondent believes the answer is complex and can be expressed from two different perspectives, yet with common objectives – one perspective is that of the regulatory authority (ANCOM) and the other is that of the electronic communications operator.

From an electronic communications operator's standpoint, including an operator whose exclusive shareholder is the Romanian state, the analysis of the ANCOM proposal is interpreted by the respondent as follows:

- *the need* – can be justified through an analysis based on data/solutions preponderantly technical that would indicate the need of spectrum resources in the respective band.

As the *need* is concerned, the respondent deems that the ANCOM initiative of allocating additional spectrum resources including from the 2300 MHz band, for terrestrial systems capable of providing broadband electronic communications services (MFCN), *is a pertinent solution because the propagation characteristics in this band can support extremely useful radio planning scenarios, in the context of 5G networks implementation.*

- *the opportunity* – can be justified through an analysis based on data/solutions preponderantly economic that would indicate the results, meaning the benefits (in most cases – the revenues) obtained through the spectrum need, in the respective scenario.

As the *opportunity* is concerned, the respondent thinks that the initiative of allocating additional spectrum resources including from the 2300 MHz band, for terrestrial systems capable of providing broadband wireless electronic communications services (MFCN), *is a pertinent solution only in the specific context of analysis and calculations of each operator.*

In conclusion, the respondent appreciates that each scenario must be treated in context and punctually in light of each operator's development strategy, the aspect concerning the spectrum resources that an operator already holds in various frequency bands being essential in this analysis, but appreciates the ANCOM initiative as positive.

A seventh respondent considers that, where an entity wishes to use the spectrum in the 2300-2335 MHz band to provide electronic communications services, the need and opportunity of designating in the NTFA the 2300-2335 MHz sub-band for terrestrial systems capable of providing electronic communications services (MFCN) is only a legal phase needed to comply with certain procedures and objectives imposed by the national legislation (at the moment GEO 111/2011 with the subsequent amendments and completions), as well as by the European one (Directive (EU) 2018/1972).

In this sense, the respondent invokes art. 26 of GEO 111/2011, which reads that, upon a formal request, ANCOM awards the usage right through a competitive or comparative selection, based on an objective, transparent, non-discriminatory and proportionate procedure, that would not effect in restricting, hindering or harming competition, within 8 months from receiving a request therefor.

In addition, the respondent invokes Recital (109) of the European Electronic Communications Code, which provides for the release of radio frequency bands for fulfilling the EU objective to ensure, by end-2020, access for all citizens - including indoor - to broadband speeds of at least 30 Mbps, concluding that, by supplementing the spectrum available for MFCN (by amending the NTFA), the ANCOM action would contribute to fulfilling this objective.

An eighth respondent expresses the interest for a possible opportunity of allocating the 2300-2335 MHz sub-band for broadband wireless electronic communications networks, which can support the roll out of a broadband mobile communications network intended for PPDR (Public Protection and Disaster Relief).

The expressed interest is justified by the need of fulfilling point 23 of the Action Plan under the *5G Strategy for Romania*, a document approved by Government Decision no. 429 of 20.06.2019, which also designated the institution in charge with launching the BB-PPDR (Broadband PPDR) services for institutions such as the National Defence System, Public Order and National Security.

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| Question no. 2 |
| <i>If your answer to the previous question was affirmative, for what business models and, respectively, for what technologies do you deem the band under discussion is appropriate?</i> |

ANCOM received replies from 7 respondents to this question.

A first respondent fully supports the allocation of all bands provided at international level to be used for the successful roll out of 3GPP (4G/5G) technologies on various markets, in line with the market demand.

The respondent recommends allocating the whole B40 3GPP band to be used by the 3GPP technologies (4G/5G TDD) and specifies that, in some countries, B40 is used for industrial purposes.

A second respondent makes the following mentions regarding the business models and the technologies it deems the band under discussion is appropriate for:

The 2300 MHz TDD band offers attractive spectrum resources to treat the issue of the data use increase. The provision of such sufficiently large spectrum blocks (>80 MHz) would allow for meeting the ITU-R requirement for a better "speed coverage" which envisages a downlink data speed experienced by the user of 100 Mbps.

The allocation of narrower spectrum blocks, considered by ANCOM, can ensure a valuable resource sufficient to build a FWA (Fixed Wireless Access) network, using dedicated spectrum to offer: broadband services at home, as well as a viable alternative for fixed connections for small enterprises or organisations, where the dedicated fibre optic connection is not a feasible solution. The private radio connections dedicated to business customers represent a new trend noticed globally, due to the more efficient and more stable cellular technology. In Europe, such services are already offered at least in UK, Finland, Germany, Switzerland and Austria.

Alongside the dedicated FWA links, the 2300 MHz spectrum adds essential resources to support the existing largely used mobile services. The 5G NR technology offers significantly lower costs per bit compared to LTE, therefore all business models developed for LTE are more efficient if using the 5G technology.

Commercial solutions to enable both LTE and 5G technologies in the 2300 MHz spectrum are available. Moreover, the hybrid solutions which allow DSS (Direct Spectrum Sharing) between LTE and NR by using the same 2300 MHz spectrum are also technically mature and commercially available.

A third respondent considers that the 2300-2335 MHz sub-band is suitable for:

- governmental structures, institutions from the National Defence System, Public Order and National Security;
- local fixed telecommunication operators providing internet access in rural areas;
- operators of public mobile communications networks.

A fourth respondent appreciates that the 2300 MHz band is appropriate for eMBB (enhanced Mobile Broadband) by means of the LTE and respectively 5G New Radio technologies, but, in any case, its allocation should be technologically neutral. The respondent does not believe this band is suitable for FWA.

A fifth respondent to this question considers two scenarios and proposes them for analysis:

1.Scenario 1 – 5G public networks, where the 2300 MHz band is assimilated to a "mid band 5G", together with the 2600 MHz/3400-3800 MHz bands, for broadband wireless electronic communications services.

In the context of the *carrier-aggregation – intra/inter-band 5G implementations*, the example below is considered eloquent.

In December 2019, the Australian operator Optus made the first end-end 5G data connection using the 2300 MHz band, in Sidney, Australia. The operator communicated it also holds spectrum resources in the 3500 MHz band and that it will use the 2300 MHz band as a complementary band.

2. Scenario 2 –5G private networks, where it is proposed that the 2300 MHz band be reserved for business scenarios such as *Private 5G* and/or *IoT*, for electronic communications for various areas of Industry 4.0 – *Industrial IoT*, *private transport networks*, *institutions (e-government)*, *Smart City applications etc.*

The first spectrum allocations for such networks are reported at the EU level.

The respondent believes that, alongside this band, other bands may also be considered for 5G private networks - 3400-3800 MHz, 26/28 GHz etc., following the model of other EU Member States. *Source:* <https://5gobservatory.eu/5g-private-licences-spectrum-in-europe/>

A sixth respondent specifies that, currently, the only technologies available for the 2300 MHz band are LTE(4G) and NR(5G), but due to the time of delivery of the hardware equipment and availability of softs from the European equipment providers, LTE-TDD remains the only feasible technology this year. The respondent appreciates that, starting mid-2021, the NR (5G) technology will become technically available, but the respondent is not convinced that it will also be financially feasible.

A seventh respondent considers opportune allocating minimum 10 MHz within the 2300-2335 MHz band for the roll out of a broadband mobile communications network intended for PPDR, using LTE and/or NR.

Question no. 3

Making abstraction of your interest in the use of the 2300 MHz band, how do you appreciate the attractiveness (technical, commercial) of this band? With which of the bands already allocated or to be allocated for the provision of public networks and electronic communications services do you think the 2300 MHz is potentially substitutable? And complementary?

Please substantiate your answer, keeping in mind the bands harmonised at European level for the terrestrial systems capable of providing wireless electronic communications services.

A first respondent considers that the B40 3GPP band is a potential solution for the provision of additional capacity for an existing network. In this scenario, the respondent states that the B40 band cannot be considered as a substitute for any of the existing bands.

From a technical perspective, the respondent recommends, in the case of allocating the band for LTE and NR, to apply the TDD synchronisation scheme where a sufficient geographic separation distance cannot be ensured or in case of *indoor-to-outdoor* isolation.

A second respondent thinks that the 2300 MHz band is an additional spectrum resource.

A third respondent believes that the spectrum under discussion can be attractive for the operators with more reduced TDD spectrum needs.

A fourth respondent considers that the use of the 2300 MHz band is not efficient due to the reduced territorial coverage (weak propagation characteristics).

According to the same respondent, the band is useful for increasing the capacity, as the efficiency of the band rises by aggregation with other LTE bands.

The respondent believes the 2300 MHz band is equivalent to the 2600 MHz TDD (band 38) and complementary to the LTE FDD bands (1800 MHz, 2100 MHz, 2600 MHz FDD).

A fifth respondent considers that the 2300 MHz is complementary to all the main frequency bands but says that there will be a special attractiveness for the 3.4-3.8 GHz as this band offers a larger bandwidth and implicitly a higher capacity.

However, in the respondent's opinion, a bandwidth of only 35 MHz in the 2300 MHz band is an important limitation when it comes to ensuring a proper coverage level, under conditions of economic efficiency.

The respondent also thinks that, if all the spectrum in the 2300 MHz band was made available, this band would be substitutable to the 3.x GHz band.

A sixth respondent specifies that, according to the existing public data, the 2300 MHz band and implicitly the 2300-2335 MHz sub-band frame into the spectrum area called "mid band", in the 5G context, alongside the 2600 MHz/3400-3800 MHz bands.

Therefore, the respondent finds these spectrum resources can be technically and economically attractive from two perspectives:

1. the respective operator does not currently hold spectrum resources around the 2600 MHz/3400-3800 MHz bands nor will wish to acquire resources around these bands;
2. the respective operator currently holds spectrum resources in the 2600 MHz/3400-3800 MHz band and no longer wishes or no longer can obtain additional spectrum resources in these bands and will wish to acquire new resources in the 2300 MHz band as a complementary solution.

The respondent thinks that the 2300 MHz band and implicitly the 2300-2335 MHz sub-band can be substitutable to any spectrum resource around the 700 MHz, 800 MHz, 900 MHz, 1500 MHz, 1800 MHz, 2600 MHz bands, but this aspect must be treated, in a particular way, from operator to operator, as each operator defines its own strategies from this perspective, in keeping with its own business features.

An eloquent example in the respondent's view is UK, where each operator holds a licence for the use of spectrum in various spectrum areas, depending on their own development strategy. The 2300 MHz band is held by one major operator – O2 and 3 MVNOs. (*Source – <https://www.4g.co.uk/4g-frequencies-uk-need-know/>*).

A seventh respondent makes the following specifications about the substitutability of the 2300 MHz band:

Although the regulatory authority from Norway (Nkom) considers the 2300 MHz band as potentially substitutable to the 3400-3800 MHz band for the provision of 5G services, the respondent does not share this view.

Taking into account the propagation characteristics of the various frequency bands, the means and technical conditions for their use, the amount of available spectrum, the equipment existing in the analysed bands, the harmonised technical conditions for the use of the band under discussion, the respondent thinks that the 2300 MHz band is totally substitutable to the 2600 MHz TDD band, respectively partially substitutable to the 2600 MHz FDD band.

As regards the attractiveness (technical, commercial) of the band under discussion, the respondent has the following opinion:

As:

- the technical network equipment is significantly pricy (including here the hardware, and the mandatory software licences, including as well as the costs incurred by the installation of equipment in that band),
- the possible restrictions/limitations of legal nature (minimum coverage obligations, a certain availability of services etc.) have a major impact on the business profitability,

- the availability and time of delivery of the access devices for the end-users (phones, smartphones, modems etc.) generate a cost for the provider of mobile communications services,

it is clear that the “technical attractiveness” of a frequency band cannot be dissociated from the “commercial attractiveness” of that band and, in this sense, maybe the most appropriate term would be “technical-commercial attractiveness”.

Therefore, the respondent considers that the technical-commercial attractiveness of a frequency band for civil and commercial applications is given (in order, from the most important to the least important) by:

1. the intentions and the business model pursued by the possible holder of a licence for the use of frequencies (LUF) in that band, including here the marketing strategy;
2. the amount of available spectrum which can ensure the business model, including the validity period of the rights awarded under the licence;
3. the availability, the cost and the delivery time of equipment for the radio access network;
4. the availability and the cost of the equipment for the access of the end-users to the radio network.

To support the above, the respondent brings the following examples from the Romanian market:

- One of the providers that launch “kamikaze” commercial offers, the continuous promotions with “4G INTERNET and national minutes UNLIMITED” standing as proof, under the conditions in which in rural areas only 5 MHz duplex from the 800 MHz band are used for 4G, the capacity of its network being known among end-users, given the continuous decrease of the number of subscribers.

The respondent considers that it can be said, thus, that the 800 MHz band is extremely attractive for this provider because the 5 MHz duplex solves its intention to exit the Romanian telecom market (despite a coverage of 99% of the population).

Because the exemplified provider also holds spectrum in the 2600 MHz FDD band (2x10 MHz) – not used so far – and considering that the 2600 MHz FDD band is partly substitutable to the 2300 MHz TDD band, the respondents thinks that it will be difficult to find a pertinent justification for this provider to declare the 2300 MHz as attractive.

- Another provider, which also launches “kamikaze” commercial offers – “Unlimited internet in the 4G network”, for just EUR 2/month – under the conditions in which, at national level, the 5 MHz duplex in the 900 MHz band were split in 3 MHz LTE + 9 x 200 kHz in GSM in rural areas, and the 15 MHz duplex in the 2100 MHz band were split in 10 MHz LTE + 5 MHz UMTS predominantly in urban areas.

The respondent believes that, in this case, it can be said that the 900 MHz band is extremely attractive for this provider because it ensures a national coverage with LTE and GSM services. The respondent also specifies that, although the provider holds a licence for the use of radio frequencies (LUF) for unpaired 30 MHz in the 2600 MHz TDD band, the spectrum is used only in the main urban areas and just 20 MHz of the 30 MHz held at national level. Considering that the 2600 MHz TDD band is fully substitutable to the 2300 MHz TDD band, the respondent believes that it will be extremely hard to find a pertinent justification for this provider to declare the 2300 MHz as attractive.

- Another provider already holds a LUF for unpaired 15 MHz in the 2600 MHz TDD band which it does not use at all neither in urban areas nor in rural or mountainous ones. Thus, the respondent thinks that it will be hard to find a pertinent justification for this provider to declare the 2300 MHz as attractive.
- Another provider already holds a LUF for 2 x 20 MHz in the 2600 MHz FDD band, the band being exclusively used in urban areas and not at all in sub-urban, rural or mountainous areas. In this case as well, based on the substitutability of the 2600 MHz FDD band with the 2300 MHz TDD band, the respondent is of view that it will be hard to find a pertinent justification for this provider to declare the 2300 MHz as attractive.

The respondent, a provider that wishes to enter the Romanian telecom market, considers that the 2300 MHz band is attractive because it is the only band not used until now, not requested by other providers and yet compatible at this moment with more than 1,700 models of phones, as shown by the statistics available on the GSMARENA website: <https://www.gsmarena.com/search.php3?s4Gs=40>

An eighth respondent considers that, given the need to develop BB-PPDR services, the 2300-2335 MHz sub-band can be complementary to the bands intended for PPDR services.

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| Question no. 4 |
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| <i>What opportunities/challenges do you foresee in the extension of the future use of the 2300 MHz band for MFCN?</i> |
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A first respondent refers to the answer provided to question no. 3 (the reply of the first respondent).

A second respondent specifies that it does not operate mobile communications networks.

A third respondent considers that the obstacle that could reduce the operator's interest in the spectrum in the 2300 MHz band is the low level of ecosystem development. Yet, the respondent thinks that, given that the ecosystem for this band is already developed in South Eastern Asia, it is possible to overcome this obstacle quite fast.

A fourth respondent appreciates that the opportunity offered by the 2300 MHz band is that it represents an additional spectrum resource for extending the capacity of the broadband services.

The respondent identifies the following obstacles in the future use of this band:

- the risk that the band is affected by interferences if MMDS/PMSE uses are to co-exist in this band;
- the TDD use: the protection to interferences on the link between the terminal and the base station must be ensured.

A fifth respondent thinks that there would be an interest in the use of the 2300 MHz band if the whole band was available, considering that the operators need large capacities in order to meet the traffic demand that will increase exponentially.

Consequently, the respondent appreciates that the entire band should be made available to the operators.

To avoid spectrum fragmentation, the respondents think that the band should be made available together with the 3.8-4.2 GHz band.

A sixth respondent foresees the following opportunities as regards the use of the 2300 MHz band for MFCN:

- new possibilities and a wider range of solutions for operators in the context of the auction; from an operator's perspective, the respondent appreciates that this spectrum extension can reduce the competition pressure on the 3400-3800 MHz spectrum area in particular;
- in the context of the *5G Carrier Aggregation*, the operators are practically no longer limited by the acquisition of continuous band, and, in certain scenarios, the frequency differentiation/spacing can be useful in planning the radio networks, by removing the interferences and increasing the access capacities (bandwidth);
- an important support for the roll out of new services in the area of private 5G networks.

The challenges identified by the same respondent are as follows:

- since in the 2300-2335 MHz interval, the total available bandwidth is of only 35 MHz, so quite small for the *broadband* scenario, the respondent considers that the use of this resource can be a viable scenario in the context of the *5G Carrier Aggregation*;
- the implementation at a smaller scale in this band, the equipment cost is likely to be higher; this band can be seen as *exotic*, similarly to some extent to the case of the 3600-3800 MHz band in the context of the development of FWA-WiMAX networks;
- at this time, the band is still not harmonized at EU level.

A seventh respondent believes that the opportunity can be both for the provider and for the end-user.

- As a provider, the opportunity to amend the NTFA for MFCN in the 2300 MHz band will mean the chance to participate in a competitive or comparative selection, hoping to win it;
- For the end-users, the opportunity to amend the NTFA will mean the possibility of a new mobile communications operator to enter the market, with a different approach towards its potential customers.

As for the obstacles foreseen by the respondent, these could appear, in the respondent's opinion, only from some mobile operators already existing on the market, that, through a strong lobby, could advise the regulatory authority either to postpone taking a decision on the extension of the future use of the 2300 MHz band for MFCN or to not approve this amendment of the NTFA, the real purpose being that of creating a barrier to the market entry for a new competitor.

An eighth respondent believes that the opportunity is given by the presence on the market of the terminals that have the capability to use this band.

Question no. 5

When do you believe would be appropriate to launch the use of the 2300-2335 MHz sub-band for the provision of broadband electronic communications services in Romania? Do you think that the radio ecosystem for the use of the 2300 MHz band is currently sufficiently mature to allow for a competitive use with that of the other frequency bands intended for the provision of electronic communications public networks and services?

Please substantiate your answer.

A first respondent proposes the allocation of the entire band B40 (2300-2400 MHz) in Romania, for 3GPP technologies, the arguments supporting this proposal being presented in the replies to the previous questions.

A second respondent reiterates that the terminal equipment and the network solution are already forming a complete, mature ecosystem that supports the 2300 MHz band.

In this sense, the respondent specifies the following:

According to the most recent GSMA report, the number of devices capable to support LTE in the 2300 MHz TDD band reached 6,345.

The 5G terminal ecosystem is also developing fast. This year, all large phone and CPE manufacturers have launched products that support this band (for example: Samsung S20, Iphone 12, Realme X50, Oppo Find x2, Huawei CPE Pro2 and other models).

A third respondent states that the launch of the 2300-2335 MHz band for the provision of broadband electronic communications services in Romania should be taken into consideration only after this band is harmonised and the ecosystem is developed across EU.

The respondent argues that, currently, at the EU level, the ecosystem is poorly developed, and the interest is low due to the coexistence with other applications (MMDS, military).

The respondent also specifies that, considering that this band is preponderantly used in Asia, the equipment providers are mainly from this region. Thus, the development of the ecosystem in the EU depends, in the respondent's view, including on the clarification of the obligations concerning the network security requirements related to the providers' authorisation.

A fourth respondent does not see as opportune the launch of the 2300-2335 MHz sub-band for the provision of broadband electronic communications services in Romania.

The respondent makes also reference to the answer provided at question no. 1 (the reply of the fourth respondent).

The respondent thinks that the launch of the 2300 MHz band for broadband mobile communications could be done in future, if the entire bandwidth or a large part of it would be available for the development of broadband electronic communications services in Romania, corroborated with the development on large scale of the required network equipment.

A fifth respondent appreciates that the ecosystem corresponding to this band is sufficiently mature, the band being already used (mostly in China), so the band could be used immediately. However, the relatively small available bandwidth would make its use less attractive, especially taking into consideration that the 3.x GHz band is the preferred band for the short-term implementation of 5G technology.

In the respondent's view, the use of the 2300 MHz band will be necessary when the 3.x GHz will be fully used.

A sixth respondent sees as opportune the launch of the 2300-2335 MHz sub-band for the provision of electronic communications services in Romania, in the **2023-2025** timeframe, both for *scenario 1 – public 5G networks*, and for *scenario 2 – private networks*, in the context of the reply given at question no. 2.

The respondent considers that the approaches taken so far concerning the 2300 MHz band are not eloquent enough to define or identify a trend or a strategy extended at the operators' level, at least in the EU. To support this opinion, the respondent reminds the information included in the *5G Observatory Quarterly Report 8 – Up to June 2020* – according to which, for the 2300 MHz band, in 2020, Denmark and Ireland had planned selection procedures, and just Slovenia for 2021.

The respondent also thinks that, in an extensive analysis, the effect of the pandemic at global level should also be considered. During this pandemic, the end-users experienced an incredible level of use of the electronic communications services, while for the operators this period has meant a high level of network loading, as well as the accumulation of uncertainties concerning new investments. That is why the prediction for the 2023-2024 timeframe is seen as balanced and realistic. The respondent believes that, similarly to the 2009-2010 economic crisis, which was followed by a comeback of the communications market for almost 4-6 years, such a scenario could repeat after the pandemic is over - post 2021.

In conclusion, the respondent opines that, so far, a more restricted approach is noticed at EU level concerning the 2300 MHz band.

However, the respondent believes that the initiative on the 2300 MHz band must be analysed realistically and by considering each specific context of the communications market from a country and in the wider context of the pandemic impact at global level.

A seventh respondent considers opportune the launch of the 2300-2335 MHz sub-band for the provision of broadband electronic communications services and request the awarding, as soon as possible, of local radio licences (at the level of administrative-territorial units) to test technically and commercially the viability of using the 2300 MHz band in LTE-TDD technology in rural and mountainous areas.

An eighth respondent believes that the worldwide radio ecosystem is mature enough to allow for the competitive use. Concerning the opportunity of launching the sub-band for the provision of broadband electronic communications services as well, the respondent does not have objections to the timing of the selection procedure, but if this is to be organised, the respondent expresses the

interest in a portion of spectrum of **minimum 10 MHz**, which would help developing and extending the current PPDR services.

Question no. 6

If your answer to Question no. 1 is affirmative, do you consider appropriate to hold, in the near future, a selection procedure for awarding usage rights for the frequencies available in the 2300-2335 MHz sub-band? If your answer is yes, when do you think it would be suitable to hold such a selection procedure?

Please substantiate your answer.

Replies from 6 respondents were received to this question.

In the opinion of a **first respondent**, the allocation of 2300 MHz TDD spectrum together with other 5G bands (C band) would support the operators in a long-term planning and a more complete implementation of 5G strategy.

The respondent supports early spectrum allocation in the 2300 MHz band during the future auction planned for the first quarter of 2021.

A second respondent considers that the selection procedure for awarding rights in this band should be held after this band is harmonised at EU level, and the ecosystem is highly developed.

A third respondent does not think that it would be appropriate to hold a selection procedure in the following period. The respondent thinks that the band should not be subject to a selection procedure before its entire 100 MHz capacity is available for MFCN.

A fourth respondent considers that a selection procedure for awarding usage rights in the 2300-2335 MHz sub-band should be held after 2022.

In the opinion of a **fifth respondent**, the 2300-2335 MHz sub-band should be subjected to a comparative (not competitive under any circumstances) selection procedure, arguing this in the replies offered to the previous questions.

The respondent believes that the selection procedure in this band should take place simultaneously with the 5G auction foreseen for 2021.

A sixth respondent does not raise any objections in relation to the period for launching the selection procedure should this be organised.

Question no. 7

If your answer to Question no. 6 is affirmative, would you participate in a selection procedure organised in 2021, for awarding usage rights in the 2300-2335 MHz sub-band?

Four respondents provided replies to this question.

A first respondent specified it does not operate mobile networks but is promoting this band among the operators.

A second respondent confirms the interest for this band but specifies that the proposed timeline is not appropriate given the arguments presented in the reply to question no. 5 (the reply of the third respondent).

A third respondent specifies that it will analyse this aspect within the strategic context ensured by MTIC. At this point, it does not express an engaging opinion in this respect.

A fourth respondent confirms that it will participate in a selection procedure in this sub-band.

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| Question no. 8 |
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| <i>If your answer to Question no. 6 is negative, when do you think the selection procedure for awarding usage rights in the 2300 MHz band should be organised?</i> |
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| <i>Please substantiate your answer.</i> |
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Replies from 5 respondents were received to this question.

A first respondent specifies it supports the early spectrum allocation during the future auction planned for the first quarter of 2021.

A second respondent considers appropriate the holding of a selection procedure for awarding usage rights in the 2300-2335 MHz sub-band starting from 2023.

This respondent estimates that all the necessary premises (the development of the ecosystem at the EU level, the clarification of the providers' authorisation regime in the context of the regulations on network security) for the efficient use of this sub-band will be created in this time horizon.

A third respondent refers to its reply offered to question no. 1 (the reply of the fourth respondent).

A fourth respondent considers that the organisation of a selection procedure would be appropriate only when the entire capacity of 100 MHz would be available for MFCN, and the bands of 700 MHz and respectively 3.x GHz will be fully used on the market for the implementation of 5G.

A fifth respondent refers to its reply offered to question no. 7 (the reply of the fourth respondent).

2. Limitation of the number of usage rights/licences in the 2300-2335 MHz sub-band; Area of provision of network/networks for which the licences will be granted

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| Question no. 9 |
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| <i>Do you think that the spectrum available in the 2300 MHz band, respectively 35 MHz for TDD use, is sufficient for the efficient implementation of MFCN at national level and for supporting a viable business model? What about for the implementation of MFCN at local/regional level?</i> |
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| <i>Please substantiate your answer.</i> |
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A first respondent thinks that the 35 MHz TDD in the 2300-2335 MHz sub-band offers relatively limited possibilities to support viable business models at national or local/regional level. The same respondent assesses there are a few examples of LTE-TDD in the world that operate with approx. 40 MHz to provide FWA-type services.

The respondent appreciates that, in the perspective of the rising demand of capacity and speed from the users of broadband services, the availability of only 35 MHz will represent just an important restricting factor to a sustainable growth.

The opinion of a **second respondent** is that the 35 MHz would be enough for only one operator, considering that 5G requires a broader band to ensure a substantial increase of the transfer speed.

In the view of a **third respondent**, the spectrum amount available in this sub-band can support only a low traffic volume. The respondent thinks that, in the case of a network with national coverage, the spectrum could be used either to solve some capacity issues (hot spot), by increasing the existing capacity of the MFCN, or for a network dedicated to a limited population of users as number of data links at fixed point or to mobiles that require a low data volume.

In conclusion, the respondent appreciates that the spectrum in the 2300-2335 MHz is insufficient for the efficient implementation of a MFCN at national or local level.

Moreover, in its opinion, the coordination of the TDD use is very difficult in the case of the local/regional allocations.

A fourth respondent considers that the 35 MHz available in the 2300 MHz band are not sufficient for the implementation of an independent MFCN at national/local/regional level.

According to this respondent, the 2300 MHz band could be used for extending the capacity of an existing network. Given the propagation characteristics, it is appreciated that there are no premises for the use of this band as a single coverage layer, even if the allocation would be at local/regional level.

Therefore, the respondent believes that the implementation of a MFCN at national/regional level is not technically nor commercially efficient, little less using exclusively the 35 MHz available in the 2300 MHz band at this moment.

In the opinion of a **fifth respondent**, the bandwidth of 35 MHz is insufficient to allow for an efficient implementation of a MFCN at national level from an economic standpoint.

The respondent specifies that this band requires separate radio modules and, therefore, separate antennae. Given that nowadays the implementations are usually performed with multi-band radio modules, it is appreciated that an implementation for a single band, with only 35 MHz, would not be efficient from the cost perspective. The use of multiband modules for the 2300 MHz and 2600 MHz TDD bands could improve the situation only for some of the holders of usage rights in the 2600 MHz band.

A sixth respondent considers the following:

- for scenario 1 – public 5G networks – the efficient implementation of a MFCN at national level and the supporting of a viable business model can be regarded only in the wider scenario associated to the development of a national network and of the use of the 2300 MHz band in complementary configuration with other frequency bands. In this scenario, it is appreciated that the development of a viable business plan for the 2300 MHz band is achievable. In the scenario of development of a viable business plan for the 2300 MHz band separately from this context, the respondent appreciates this is hard to achieve.
- for scenario 2 – private 5G networks - the efficient implementation of a MFCN at local/regional/national level and the supporting of a viable business model can be regarded in a more restricted context and focused on a certain market niche – *target*. In this scenario, a determining component is connected to the network *slice*, which will create the possibility for the apparition of MVNO-5G operators, a scenario deemed more plausible than the apparition of several MNOs at national level from *scenario 1- public 5G networks*. In this scenario, the respondent deems that the development of a viable business plan for the 2300 MHz band is easier to achieve.

A seventh respondent specifies that its answer is partly comprised in the answer to question 3, because the business model of a provider dictates the strategy and the commercial attractiveness.

The respondent also specifies that at this moment it is unable to give a pertinent answer to this question because the company's business model requires some technical performances which, at least in theory, can be reached with only 35 MHz TDD spectrum (irrespective of the band used), but some innovative technical solutions (e.g. Massive-MIMO equipment also called active antennae) must be tested to validate the requirements specified in the business plan.

In this context, the respondent requests local licences for the use of frequencies (LUF) (at the level of the administrative territorial unit) to perform technical tests (innovating configurations and cutting edge equipment), and commercial tests (to be able to validate the sufficiency or insufficiency of the network coverage at local/regional level).

Considering that, so far, all the LUF issued by ANCOM for the MFCN implementation have been national, and local/regional LUF have never been granted, any statements (referring to the spectrum sufficiency) from any network provider are, in the respondent's view, pure speculations.

An eighth respondent considers satisfactory the spectrum amount of *minimum 10 MHz* in this band for the implementation of a MFCN and, eventually, depending on the bandwidth of the agreed radio channel, the spectrum necessary of such a network can be efficiently completed; in this context, the respondent opts for the national allocation.

Question no. 10

Which of the following options do you find suitable as regards both the radio spectrum efficient use and the need of spectrum resources for the provision of public networks and broadband electronic communications services in the 2300-2335 MHz sub-band:

- a) One licence for a national broadband mobile communications network;*
- b) More licences at national level for broadband mobile/fixed communications networks;*
- c) More licences for local/regional broadband mobile/fixed communications networks.*

Please substantiate your choice.

Replies from 7 respondents were received to this question.

A first respondent proposes **option a)**.

This respondent deems that the allocation of the entire spectrum resource to only one operator allows for maximising the efficiency of the costs incurred by the initiative of extending the network and, therefore, supporting faster investments and then the availability of broadband services. The spectrum resources are deemed too little to allow several operators to build efficient projects from costs standpoint based on the 10 MHz channel raster (supported by the network equipment and recommended by GSA).

The respondent supports the allocation of national licences because the individual national licences were an essential factor that ensured the success of mobile communications services. In the respondent's opinion, a different approach in the 5G bands could perturb a well-established regulatory framework and could ruin the adoption of 5G services in the band.

A second respondent considers appropriate **options a) or b)** only where synchronisation is imposed.

The respondent believes that, in the case of option c), it is very hard to achieve the coordination between the operators in the neighbouring areas.

A third respondent refers to its answer to question no. 1.

This respondent assesses that the correct option, respectively the allocation at a later stage of the entire 2300 MHz band, is not among the proposals put forward by ANCOM.

Its proposal is to allocate the entire 2300 MHz band for broadband mobile communications, respectively:

- More national licences for broadband mobile communications networks.

The respondent's arguments are as follows:

- The band is standardized for mobile communications;
- The option of regional sharing does not allow for an efficient use of the spectrum by the operators.

A fourth respondent opts for a licence for a national broadband mobile communications network. In its opinion, the available spectrum is insufficient for the implementation of fixed broadband networks.

A fifth respondent expressed the following opinions, in the context of the reply to question no. 2, for the two scenarios proposed for analysis:

- Scenario 1 – public 5G networks: - it is considered appropriate both in terms of efficiency of the radio spectrum use and need of the spectrum resources for the provision of public networks and of broadband electronic communications services in the 2300-2335 MHz sub-band - **option b**). In the context of 5G – *Carrier Aggregation*, the respondent thinks that 7 blocks x 5 MHz can be used much more efficiently to compensate the needs of spectrum resources, on the “cost-effective” principle, of each interested operator.
- Scenario 2 – private networks - it is considered appropriate both in terms of provision of public networks and of electronic communications services in the 2300-2335 MHz band and efficiency of the radio spectrum use and need to identify new spectrum resources – **option c**). In the context of private 5G/IoT networks, the respondent deems that 7 blocks x 5 MHz can be used much more efficiently to compensate the needs of spectrum resources, on the “cost-effective” principle, of each interested operator.

Option a) is not deemed appropriate due to the quite reduced bandwidth – of only 35 MHz.

A sixth respondent gives examples of non-use of already licensed radio spectrum, not used neither “regionally” (namely the spectrum is used exclusively in the urban area and not at all in the rural and mountainous areas), nor even nationally (meaning it is not used at all across Romania).

In this context, the respondent invokes the provisions of Art. 27 of GEO 111/2011 (including the references to other articles), assessing that the law provided two different situations concerning the radio spectrum hoarding:

- “passive hoarding” of radio spectrum, meaning that new LUF are not issued for frequencies that are not used at their actual capacity (for more than 6 months, out of reasons imputable to the holder), this hoarding being basically made by the authority;
- “active hoarding”, meaning that by active participation to competitive auctions, winning of national LUF and the subsequent non-use of the limited resources at the level of the allocation under the licences, this time the hoarding being made by the providers of mobile networks.

The respondent also specifies that the law thus recognizes that any type of hoarding makes impossible the ensuring of an effective competition on the market and simultaneously represents a barrier to the market entry (of a new network provider), the effects of hoarding being the restriction, hindering or distortion of competition.

To support above statements, the respondent mentions that, although they hold national licences for the use of frequency bands, some operators do not use these frequencies at the level of the allocations under the licences. In this regard, the respondent gives the example of an operator that uses only 20 MHz of the 30 MHz held in the 2600 MHz TDD band (band 38 TDD) and only in

certain urban areas (not at all in sub-urban, rural and mountainous areas) and of another operator that does not use at all the 15 MHz held in the same band.

In this circumstance, the respondent shows, the result is that ANCOM cannot issue LUF at local/regional level for the band 38 TDD (although the bands are not used for more than 6 months, out of reasons imputable to the holders), and no other interested provider can install LTE equipment in this band.

The respondent opines that, in these circumstances, in the absence of self-referral and then enforcement of art. 27 of GEO 111/2011 by ANCOM and corroborated with the absence of issuance of LUF at local/regional level for the implementation of MFCN, any statements referring to the efficiency of radio spectrum use, from any network provider, are pure speculations.

The respondent also mentions that – being itself a network provider – it cannot give a pertinent answer to this question. This is the reason why it requests local LUF (at the level of the administrative territorial units) in order to test the efficiency of the use of awarded radio spectrum only locally and only afterwards will it be able to give an adequate answer.

A seventh respondent deems that, in terms of efficiency of radio spectrum use and need of the spectrum resources necessary for the provision of broadband mobile communications services, it is beneficial the awarding of several national licences for broadband mobile/fixed communications networks.

Question no. 11

What licensing regime do you believe is suitable for the use of the spectrum available in the 2300 MHz band:

- a) awarding of individual exclusive usage rights;*
- b) licensed shared access (LSA);*
- c) other.*

Please substantiate your choice, correlating your answer with your option expressed in Question no. 10.

To this question answers were received from 7 respondents.

A first respondent proposes **option a)**, its arguments being similar to those presented in the answer to question no. 10 (the answer of the first respondent).

A second respondent considers that the adequate licensing regime for this band is the one under **point a)**.

This respondent mentions that, in the case under point b), both the coordination and the synchronisation between the operators are necessary for the efficient use of spectrum, and where synchronisation is not possible, it would be necessary the allocation of a guard band that would significantly reduce the usable spectrum.

In the opinion of the **third respondent**, for the subsequent allocation of the entire 2300 MHz band, it is preferable **option a)**, the awarding of individual exclusive usage rights – this being in line with the allocation employed in Romania so far.

The respondent thinks that option b) should be discussed and analysed to clarify the conditions of allocation and implementation considered by the authority.

A fourth respondent also opts for the awarding of individual exclusive usage rights - **option a)**.

In its opinion, the shared access would reduce even more the interest in this band.

A fifth respondent offers substantiated answers, in the context of its answers given to questions no. 2 (the answer of the fifth respondent) and no. 10 (the answer of the fifth respondent), thus:

- for scenario 1 – public 5G networks: considers that the adequate licensing regime for the use of spectrum available in the 2300 MHz band is **option a**).
- for scenario 2 – private networks: considers that the adequate licensing regime for the use of spectrum available in the 2300 MHz band is **option b**).

A sixth respondent considers that the adequate licensing regime depends primarily on the level of the radio licence awarded by ANCOM.

In its opinion, in the case of the licences for local/regional mobile communications networks, the awarding of individual exclusive usage rights is the only option. Otherwise, it would be extremely hard to manage local shared access, multiplied by the number of administrative territorial units for which access would be requested.

For the national licences, the respondent appreciates that local shared access can be the proper solution, but, unfortunately, there is no precedent, no experience in this regard on the Romanian communications market, so the consequences are not known with certainty.

The respondent highlights that, in the case of the licences for local/regional networks in the rural areas, it is obvious that some localities will be less profitable than others and, to mediate the efficiency at the network level, it might be necessary to auction out one licence with national validity.

As well, the respondent specifies there is the risk – without being a certitude yet – that the allocation of radio licences at local or even regional level does not solve the issue of the profitability averaging and that those local/regional networks are not sustainable on the long term.

The respondent requests local LUF (at the level of the administrative territorial units) to be able to test the sustainability only locally, without expecting it to be profitable in this pilot project.

The respondent argues that it does not have the option to turn to a consultancy firm that would be capable to elaborate a pertinent answer for Romania, regarding the efficient provision of a quality public network and broadband electronic communications services.

A seventh respondent deems adequate the awarding of individual exclusive usage rights.

Question no. 12

Which do you believe is the minimum necessary spectrum amount that a new entrant should hold in the 2300 MHz band to be able to efficiently provide quality (at speeds specific to 4G) broadband electronic communications public networks and services?

Please substantiate your answer, by also taking into consideration the hypothesis of providing electronic communications networks and services both at national and local/regional level.

A first respondent refers to its answer to question no. 1 (the answer of the first respondent).

A second respondent considers that the entire 2300-2335 MHz sub-band would be the necessary minimum spectrum amount that a new entrant should hold, also referring to the previous answers.

In the opinion of **a third respondent**, the necessary minimum spectrum amount that a new entrant should hold in the 2300 MHz band is *40 MHz*.

A fourth respondent does not consider viable such an option for a new entrant, neither nationally nor locally/regionally. The respondent refers to its answer to question no. 9 (the answer of the fourth respondent).

In the opinion of a **fifth respondent**, a new entrant could not be interested in obtaining usage rights in the 2300 MHz band since this is not appropriate for allowing a contiguous coverage.

A sixth respondent offered the following substantiated answer:

- In the context of 4G LTE – *Carrier Aggregation*, the respondent believes that the necessary minimum spectrum amount that a new entrant should hold in the 2300 MHz band, in order to be able to efficiently provide a quality public broadband network/networks and electronic communications services is minimum *1 block of 5 MHz (1x5 MHz TDD)*.
- In the context of 4G LTE – without *Carrier Aggregation*, the respondent believes that the necessary minimum spectrum amount that a new entrant should hold in the 2300 MHz band, in order to be able to efficiently provide a quality public broadband electronic communications network/networks is minimum *35 MHz*.

A seventh respondent expressed the following point of view:

Given the available spectrum amount in the 2300 MHz band (only 35 MHz TDD spectrum), and taking into consideration the limitations on the uplink side of LTE-TDD technology, practically the only technology available in this band at present – it is necessary to award one radio licence in the 2300-2335 MHz band.

As for the hypothesis of provision of networks and electronic communications services at national or local/regional level, the necessary minimum spectrum amount is given, as shown in question no. 3, by the technical-commercial attractiveness defined by each operator.

Although it would consider a spectrum amount even higher than 35 MHz to be able to offer real broadband services in rural and mountainous areas, the lack of availability of radio spectrum in harmonised bands at European level obligates to choosing more efficient technologies to the classic ones, an example being the Massive-Mimo equipment. With such equipment and with the available 35 MHz, the respondent thinks that it would be able to efficiently provide quality broadband electronic communications networks and services.

A seventh respondent specifies that the tests performed on the bandwidth necessary for a radio access network in LTE/NR technology showed that an allocation of minimum *10 MHz* is necessary.

Question no. 13

Do you believe that, in order to ensure the premises for a fair competition and access to the spectrum resources intended for the provision of broadband mobile/fixed communications networks and services, in the situation of awarding new usage rights in the 2300-2335 MHz sub-band, it is necessary to impose a limit on the maximum amount of spectrum over which an operator can hold rights in the bands above 1 GHz (including the frequency allocations for which the operators already hold usage rights) ?

Please substantiate your answer.

To this question, answers from 6 respondents were received.

A first respondent says that it is not necessary to limit the maximum amount of spectrum that an operator can hold in the frequency bands above 1 GHz if the investment in this equipment is additional.

The answer of a **second respondent** refers to capping the maximum spectrum amount in the 2300-2335 MHz band, and not in the frequency bands above 1 GHz, which the question

envisaged. Thus, the respondent does not consider necessary to impose a cap on the maximum spectrum amount in the 2300-2335 MHz band, since it is a reduced total spectrum amount.

A third respondent considers that limiting the spectrum amount in the bands above 1 GHz should distinguish between FDD and TDD allocations.

Thus, in the respondent's opinion, a possible limitation of the TDD spectrum amount in the frequency bands above 1 GHz, which would include the 2300 MHz band, could be discussed.

A fourth respondent appreciates that, to ensure the premises for a fair competition, it would be necessary to impose a cap on the maximum amount of spectrum that can be held in the bands below, as well as above 1 GHz. The respondent also thinks that it is necessary a specific regulation for the bands with a large bandwidth (e.g. 3.x GHz and 26 GHz).

A fifth respondent offered the following answer, in the context of the answers to questions no. 2 and no. 10, for the scenarios proposed for analysis:

- for scenario 1 – public 5G networks: considers that for awarding new usage rights in the 2300-2335 MHz sub-band, **it is not necessary** to cap the maximum spectrum amount that an operator can hold in the frequency bands above 1 GHz.

In this scenario, the respondent appreciates that imposing a cap is irrelevant because in most cases the spectrum resources will be used complementarily to others already existing or to be acquired in *mid-band* area.

- for scenario 2 – private networks: the respondent considers that for awarding new usage rights in the 2300-2335 MHz sub-band, **it is necessary** to cap the maximum spectrum amount that an operator can hold in the frequency bands above 1 GHz.

In this scenario, the respondent appreciates that imposing a cap is extremely relevant because the resources are used exclusively/dedicated for private networks, and the available spectrum width is not very high – just 35 MHz, which can be shared efficiently in 7 blocks of 5 MHz (7x5 MHz).

A sixth respondent considers that, given including its answer to question no. 10 (the sixth respondent), the rule of "*spectrum amount below/above 1 GHz*" is pointless, if the goal is truly to not restrict, hinder or distort competition. In its opinion, a rule on "forbidding the participation of certain persons in the selection procedure" acc. to Art. 26 para. (4) of GEO 111/2011 would rather be suitable, namely of those providers that already hold a LUF and do not use the limited resources according to the allocation under the licence.

The respondent argues that, if a spectrum auction was organised, there is no guarantee that a mobile network that can offer broadband services will be rolled out. The respondent thinks that not only the "signal coverage" is relatively easy to achieve by means of low frequencies (not necessarily those auctioned out), but, if the winner is one of the existing operators – each of the four operators having been applied fines for failure to observe the coverage obligations in the licences – capping the maximum spectrum amount by arbitrarily choosing the classification "below/above 1 GHz" does not ensure the premises for a fair competition and an equal access to the spectrum resources.

Question no. 14

If your answer to Question no. 13 is affirmative, please specify which would be, in your opinion, the maximum amount of spectrum that an operator should hold in the bands above 1 GHz (FDD/TDD), in correlation with the minimum spectrum amount in the bands above 1 GHz under which the efficient use of the frequencies is no longer possible for the provision of broadband electronic communications services at performances specific to 4G?

Please substantiate your answer.

To this question, replies from 5 respondents were received.

A first respondent appreciates that a new entrant should hold a minimum spectrum amount of **10 MHz below 1 GHz**, in association with a minimum of **40 MHz in bands above 1 GHz**, to efficiently use the frequencies held in view of the provision of broadband electronic communications services, at performances specific to 4G.

A second respondent reiterates the opinion expressed in the previous replies, that this band is not appropriate for achieving the national/regional coverage and its use should pursue the extension of the capacity of broadband services offered by means of other bands.

Therefore, in the respondent's opinion, the maximum spectrum amount held by an operator must be set on competition related criteria, considering the entire TDD spectrum above 1 GHz available in Romania in relation to the number of operators on the market.

The respondent also considers that capping the spectrum amount in the bands above 1 GHz should distinguish between the FDD and TDD allocations.

A third respondent specifies that it will analyse the mentioned aspects and will express its opinion in one of the future consultations.

A fourth respondent refers to its reply to question no. 13 (the fifth respondent).

A fifth respondent mentions that it did not answer affirmatively to question no. 13, considering pointless the rule on the "spectrum amount below/above 1 GHz".

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| Question no. 15 |
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| <i>If you are interested in obtaining usage rights in the 2300-2335 MHz sub-band, what minimum amount of spectrum do you intend to purchase? And maximum spectrum amount?</i> |
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Six respondents provided answers to this question.

A first respondent specified it would be interested in acquiring a spectrum amount of minimum 20 MHz and respectively of maximum 35 MHz in the 2300-2335 MHz sub-band.

A second respondent does not consider opportune and viable the allocation of the 2300-2335 MHz sub-band. See also its answer to question no. 1 (the fourth respondent).

A third respondent specifies that, as it mentioned previously, the bandwidth of only 35 MHz would not allow for an efficient implementation economically so acquiring less than 35 MHz would not be justified from the perspective of economic efficiency.

In the respondent's opinion, the making available of radio spectrum in the 2300 MHz band, under the conditions presented, is not a beneficial measure for the market.

A fifth respondent mentions that it will analyse this aspect, in the strategic context ensured by MTIC. At this point, it cannot express an engaging answer in this regard.

A sixth respondent says that it is interested in obtaining usage rights in the entire 2300-2335 MHz sub-band, this being the minimum spectrum amount and, sadly, also the maximum spectrum amount.

A seventh respondent considers that it is appropriate to allocate minimum 10 MHz, maximum 35 MHz, in the 2300-2335 MHz band, for the roll out of a broadband mobile communications network (in LTE and/or NR technology), intended for PPDR.

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| Question no. 16 |
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| <i>How do you believe should the spectrum in the 2300-2335 MHz sub-band be organised (number and width of the spectrum blocks) if awarded through a competitive selection procedure? And if awarded by comparative selection procedure?</i> |
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Answer from 5 respondents were received to this question.

A first respondent thinks that, in accordance with the GSA recommendations, the awarding procedure should be based on a 10 MHz channel, however, considering the narrow total bandwidth available for allocation, suggests the **allocation of the entire band for only one operator**.

A second respondent considers that, for the competitive selection procedure, the spectrum should be organised in **one block of 20 MHz and one of 15 MHz**.

In its opinion, the most adequate procedure for awarding the usage rights would be the competitive selection procedure which ensures a high level of competition and maximizes, on the one side, the efficient use of spectrum and, on the other side, the capitalization of the resource in favour of the state.

As regards the comparative selection, in its view, this is very rigid, with a low level of competitiveness.

A third respondent considers that the awarding of usage rights for the entire 2300 MHz band for broadband mobile communications networks must observe the same allocation principles applied for the other frequency bands granted for the provision of broadband communications networks in Romania.

The respondent reiterates that it does not deem viable the partial allocation – only of the 2300-2335 MHz sub-band – for the roll out of broadband services in Romania.

The respondent thinks that, from competition standpoint, the holding of a comparative selection procedure for this band is not acceptable, considering that all the other bands for broadband mobile communications networks have been allocated through competitive selection procedure.

As for the bandwidth of the blocks in the 2300 MHz band, the respondent sees it necessary to use the 5 MHz standard channelling.

A fourth respondent considers that, in the context of its answers to questions no. 2 and no. 10, for both scenarios proposed for analysis, the spectrum in the 2300-2335 MHz sub-band (number and width of the spectrum blocks), if awarded through a selection procedure, should be organised in 7 blocks of 5 MHz each – 7x5 MHz, in TDD duplex mode.

A fifth respondent considers that the entire 2300-2335 MHz sub-band should be allocated to one operator, and the number and width of the spectrum blocks used should be left to the decision of the operator that wins the respective LUF.

The respondent mentions that, in reality, irrespective of the type of selection procedure (competitive or comparative), it is not even up to the operator to decide, but rather the technologies available in that band dictate the arrangement and width of the spectrum blocks. In the case of the 2300 MHz band, the only viable technology is LTE-TDD, according to the 3GPP specifications.

3. Validity of the radio frequency usage rights

Question no. 17

Should a selection procedure for awarding usage rights in the 2300-2335 MHz sub-band be held, which should be, in your opinion, the date of entry into force of the usage rights to be granted in this sub-band?

Please substantiate your answer.

To this question, 7 respondents provided replies.

A first respondent considers that the usage rights in the 2300-2335 MHz sub-band should enter into force in **2021**. See also the answer to question no. 6 (first respondent).

A second respondent thinks that the usage rights in the 2300-2335 MHz sub-band should enter into force in **January 2024**.

It is estimated that before this date the ecosystem in the EU will not be sufficiently developed to sustain a profitable investment.

A third respondent does not think it is appropriate nor viable to allocate the 2300-2335 MHz sub-band.

Therefore, it does not find appropriate to hold a selection procedure for awarding usage rights in the 2300-2335 MHz sub-band. See also the answer to question no. 1 (fourth respondent).

A fourth respondent considers it is not appropriate to hold a selection procedure at present for the 2300-2335 MHz band.

A fifth respondent considers that the the usage rights to be awarded in this band should enter into force in the **2022-2023** timeframe, in the context of the replies offered to question no. 2 (fifth respondent) and no. 10 (fifth respondent), for both scenarios proposed for analysis.

In the opinion of a **sixth respondent**, not only the operator must be efficient in using the spectrum, but also the regulatory authority in communications must be efficient in managing the radio spectrum.

According to this respondent, this means that, when deciding on the entry into force of the usage rights to be awarded in this band, ANCOM must bear in mind:

- the level of allocation of the licence (national/regional/local) – the date of entry into force must ensure a reasonable period for building the radio network (a period proportional to the level of the licence) for the operator to not fall under the incidence of the provisions of Art. 27 para. (1) letter e) of GEO 111/2011.
- the availability and time of delivery of the equipment for the radio access network – if the equipment is available for delivery in 10-12 weeks, then the usage rights should not enter into force earlier than 10 weeks from the issuance of the LUF.

In supporting the statements above, the respondent brings the example of the 1500 MHz SDL band, for which the lack of equipment for the radio access network will lead to the failure to auction out the 1500 MHz SDL band.

The respondent specifies that, in the case of the 2300 MHz band, the equipment is available for delivery in minimum 10 weeks from a firm order placed by the LUF holder.

A seventh respondent considers appropriate that the usage rights in the 2300-2335 MHz sub-band enter into force from **01.01.2022**, in view of the implementation of BB-PPDR services.

Question no. 18

Should a selection procedure for awarding usage rights in the 2300-2335 MHz sub-band be held, which should be, in your opinion, the validity period for the granted rights?

Please substantiate your answer.

To this question, answers were received from 7 respondents.

A first respondent suggests that the licence be granted for a period of **minimum 15 years**, to guarantee the stability of the enterprises and the return of investments.

A second respondent thinks that the validity of the usage rights in this band should be **minimum 15 years**, as long-term predictability is necessary for the roll out of new networks.

A third respondent does not consider appropriate and viable the allocation of the 2300-2335 MHz sub-band. Therefore, it does not deem appropriate the holding of a selection procedure for awarding usage rights in the 2300-2335 MHz sub-band.
See also the answer to question no. 1 (fourth respondent).

In the opinion of a **fourth respondent**, it is not appropriate to hold a selection procedure at present. This respondent considers that, in any case, the validity of the rights should be established in accordance with the provisions of the European Electronic Communications Code.

A fifth respondent provided the following answer:

In the context of the answers to questions no. 2, no. 10 and no. 19:

- for **public 5G networks**:
 - that use frequency resources in "*low band*" – awarding of individual exclusive usage rights – 10-15 years;
 - that use frequency resources in "*mid and high band*" – awarding licensed shared access (LSA) – 5 years;
- for **private 5G networks**:
 - that will use frequency resources in "*mid and high band*" – awarding licensed shared access (LSA) – 5 years;

The 2300 MHz band frames, in the respondent's view, in the "mid and high band" area. See also the answer of the same respondent to question no. 19 (fourth respondent).

In the opinion of a **sixth respondent**, the validity of the rights awarded by LUF – irrespective of the frequency band, of the spectrum amount and of whether it is an existing operator or a new entrant – must ensure a period for recovering the investment and a period in which the investor can enjoy the profit.

The respondent mentions that this aspect is provided not only by the trade laws, but by the fiscal legislation as well which states, for commercial companies, that any activity and any expense must, at some point, also generate a profit.

From the respondent's point of view, if the validity of the usage rights is too small (e.g. 5 years), then the provider must also announce that the services will be available until the last day of LUF validity, which will negatively influence the users' decision to choose a communications service from that operator. Thus, a validity of the rights too small will be taken into consideration in the "technical-commercial attractiveness" of the respective band.

A seventh respondent believes that, to be able to offer services in a predictable way, it is appropriate to award the licences for 10 years, with the possibility of extension.

4. Coverage obligations associated to licences in the 2300-2335 MHz sub-band

Question no. 19

What minimum coverage obligations do you think should be associated to the usage rights of a new entrant that would obtain spectrum in the 2300-2335 MHz sub-band?

Please substantiate your answer, correlating it with the answer you provided to Question no. 12 concerning the minimum spectrum requirements for a new entrant.

Replies from 5 respondents were received to this question.

One respondent considers that the coverage obligations should be set as number of installed base stations in this spectrum, in a certain period of time.

A second respondent mentions that, as it showed in its replies to the previous questions, the 2300-2335 MHz sub-band is not suitable for achieving the coverage objectives, being a capacity band. See also its answers to questions no. 1 (fourth respondent), no. 9 (fourth respondent), no. 10 (third respondent) and no. 12 (fourth respondent).

In the opinion of a **third respondent**, a new entrant could not be interested in obtaining usage rights in the 2300 MHz band as it does not allow for ensuring a contiguous coverage.

A fourth respondent provided the following answer to this question:

Bearing in mind:

- the answer to question no. 12 and that:
- the implementation and use of "*carrier aggregation*" *inter-band* and *intra-band* is already a reality in terms of both specifications of the last 5G-3GPP releases, and commercial implementations existing on the market, in 5G Non-Stand Alone (NSA) and/or Stand-Alone (SA) configuration.

The dynamic and shared use – *spectrum sharing* – of the frequency resources held by an operator modify fundamentally the static principles, applied so far for the 2G/3G/4G networks, where the main criterion was related to the conditions of coverage associated directly to a certain band (network-frequency band).

In this new context, it is proposed that *ANCOM analyses a totally different approach for the strategy on the allocation of the resources of frequencies to be put out for auction, resources suitable for the implementation of 5G networks.*

The issue of the minimum coverage obligations that should be associated to the radio frequency usage rights in the case of the public and private 5G infrastructures (the 5G ecosystem) should be redefined by taking into account the impact of implementation of new technologies, such as DSS (Dynamic Spectrum Sharing), which fully change the concept of planning and development ensemble compared to the 2G/3G even 4G networks.

In this sense, it is proposed for analysis the following approach, in principle:

1. dividing the bands for the implementation of 5G networks in 3 areas:
 - "*low band*"(<2 GHz): 700 MHz, 800 MHz, 900 MHz, 1500 MHz, 1800 MHz;
 - "*mid band*"(between 2 GHz and 6-7 GHz): e.g. **2300 MHz**, 2600 MHz, 3400-3800 MHz;
 - "*high band*"(>6-7 GHz): e.g. 26 GHz, 28 GHz, etc.
2. identifying a way to define the service coverage area in the context of – 5G *carrier aggregation* and *KPIs* enlisted below.

3. The minimum coverage obligations should necessarily comprise the set of key performance indicators (KPI), as defined by ITU-R/IMT – e.g. speed (Gbps), *delay* (ms), *area traffic capacity* (Mbps/m²), *user experienced data rate* (Mbps), etc.
4. The adequate licensing regime for the use of spectrum for 5G networks:
 - for *public 5G networks*:
 - that use frequency resources in "*low band*" – awarding individual exclusive usage rights;
 - that use frequency resources in "*mid and high band*" – awarding licensed shared access (LSA);
 - for *private 5G networks*:
 - that will use frequency resources in "*mid and high band*" – awarding licensed shared access (LSA).

In conclusion, the respondent considers that *imposing minimum coverage obligations associated to the usage rights for an operator that would obtain spectrum in the 2300-2335 MHz sub-band*, must be analysed in a whole new context, imposed by the new technologies and by a new strategic approach concerning the radio spectrum resources that will be used by 5G networks (public or private).

In this sense, the respondent proposes that the licensed shared access (LSA) be obtained through a simplified procedure – based on a request submitted by the electronic communications operator, including online, through a transparent, easy and fast procedure. As well, the respondent proposes for the ANCOM analysis a validity of the LSA of maximum 3-4 years.

The respondent believes that this approach will encourage and dynamize the communications market from Romania and will contribute to the faster development of both public and private 5G networks that will directly support Industry 4.0.

A fifth respondent proposes and supports the exemption from the coverage obligations in rural and mountainous areas for all frequencies under the 5G Auction, thus making the auction more attractive financially for the participants.

Thus, according to the respondent's proposal, these rural and mountainous areas would be covered by a new frequency – the 2300 MHz band – won by a new operator, which would be imposed coverage obligations under the licence.

Question no. 20

Should usage rights in the 2300-2335 MHz sub-band be granted to existing operators, what additional coverage obligations do you believe should be imposed in addition to those set by the licences already granted in other bands, taking also into account the obligations proposed to be associated the usage rights in the bands to be auctioned off next year?

Please substantiate your answer.

Replies from 5 respondents were received to this question.

A first respondent considers that the coverage obligations which must be imposed on the spectrum holders in the 2300 MHz band must be similar for existing operators and new entrants and should be set as number of installed base stations, in this spectrum, in a certain period of time.

A second respondent reiterates that it does *not consider opportune nor viable the allocation of the 2300-2335 MHz sub-band*. See also the answer to question no. 1 (fourth respondent).

Therefore, the respondent does not consider opportune neither the holding of a selection procedure for awarding usage rights in the 2300-2335 MHz sub-band.

If the entire 2300 MHz band was allocated, the respondent thinks that imposing specific coverage obligations for these rights is not justified as the band is not suitable for achieving coverage.

As well, the respondent does not find necessary to impose additional obligations for the existing operators, these having already coverage obligations in place (either under the licences already awarded or as a result of the next year's 5G auction). The respondent reiterates that this band will be used for extending the capacity of the broadband services offered by means of other bands. In its opinion, the possible obligations could exclusively concern the use of the band to avoid the spectrum hoarding.

A third respondent does not think it is necessary to impose additional coverage obligations. In its view, imposing such obligations would only artificially impose an inefficient use of the available financial resources.

A fourth respondent thinks that the same approach expressed in the reply to question no. 19 (fourth respondent) must be applied to the existing operators and to a new entrant.

A fifth respondent appreciates that, where the usage rights in the 2300-2335 MHz sub-band are awarded to existing operators – each of the 4 mobile operators pretending a coverage of 100% of urban population – it is evident that the only coverage obligations one can think of are those referring to rural and mountainous areas.

The respondent says however that, as most of today's revenues come from urban areas, an existing operator will not have a real interest in investing in rural or mountainous areas, which bring modest revenues.

The respondent thinks that for a new entrant, the rural and mountainous areas will be the sole chance for earning revenues at the beginning, the new entrant having maximum interest for investing in these areas deprived by state-of-the-art communications technologies.

The respondent also assesses that the current COVID-19 pandemic has generated a decrease in the users' buying power which caused a chain reaction and led to the decrease of the mobile operators' revenues, so a bigger pressure will be put on expenses (including investments in radio licences, infrastructure equipment etc.).

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| Question no. 21 |
| <i>Dou you consider that the use of the spectrum in the 2300-2335 MHz sub-band is suitable for improving or extending the coverage with broadband electronic communications services of the areas that are not properly covered or that are not covered at all by communications services?</i> |
| <i>Please substantiate your answer.</i> |

Answers from 6 respondents were received to this question.

A first respondent thinks that the 2300-2335 MHz sub-band is suitable for improving or extending the coverage with broadband electronic communications services in the areas that are not properly covered or do not benefit from coverage with communications services, *especially if the spectrum is awarded to one operator.*

The arguments are provided in the answers to the previous questions.

A second respondent considers that the 2300-2335 MHz sub-band does not allow for extending and/or improving the coverage in the rural areas. The propagation in the 2300-2335 MHz sub-band is not adequate for covering long distances, characteristic to the rural area.

A third respondent does not consider the 2300 MHz band adequate for improving or extending the coverage with broadband services. As it emphasized in its previous answers to the

previous questions, the respondent considers this band is not suitable for achieving coverage, being a capacity band, little less with the 35 MHz available at this moment.
See the answers to questions no. 20 (second respondent), no. 9 (fourth respondent) and no. 1 (fourth respondent).

A fourth respondent answered negatively to this question.

A fifth respondent considers that the approach expressed in the answer to question no. 19 (fourth respondent) responds including to the issue of the areas that are not covered properly or that do not benefit from coverage with communications services.

A sixth respondent considers that the spectrum in the 2300-2335 MHz sub-band is adequate for improving and even extending the coverage with broadband electronic communications services of the areas that are not covered properly or that do not benefit from coverage with communications services at present.

The respondent appreciates that the likely modest revenues from these areas (also called white zones) can be sufficient for a new entrant mobile operator that comes with a new approach and strategies and technical solutions totally different from the other mobile operators which always declared that where there is no coverage there is no demand or it is not profitable for them.

Question no. 22

Do you consider appropriate the inclusion in the licences awarded for the use of frequencies in the 2300-2335 MHz sub-band of certain obligations of priority coverage of rural/suburban areas that do not benefit from proper coverage with broadband mobile/fixed communications services that would allow high speed internet access?

Please substantiate your answer.

To this question, 5 respondents provided answers.

A first respondent does not believe it is appropriate to include in the licence coverage obligations for the rural areas because the propagation characteristics of the 2300-2335 MHz sub-band are not suited for the rural area where large areas need to be covered.

A second respondent answered negatively to this question, referring to its answer to question no. 21 (third respondent).

A third respondent also answered negatively to this question.

The available spectrum amount is considered too small anyway to allow for an implementation that would ensure access to high speed internet.

A fourth respondent considers that, in the context expressed in the answer to question no. 19, imposing priority coverage obligations for certain areas, exclusively for the 2300 MHz band/ 2300-2335 MHz sub-band, *is not opportune*.

The respondent considers appropriate an approach by which, for certain areas and/or zones/environments, to impose gradual conditions over time, to reach performances connected to the broadband electronic communications services at the end-user (KPIs, see the answer to question no. 19).

The respondent considers that the final goal of this strategic approach must be to ensure access to the high speed internet/other services for the Romanian citizens, using 5G networks/infrastructures in different bands, irrespective of the environment – densely urban, urban, pre-urban, rural etc., to which we can turn at a given time on the Romanian territory.

In substance, technically speaking, the respondent appreciates as absolutely necessary the imposition, through the terms of reference, of certain services to the end-user (the Romanian citizen) of high quality and performance, in accordance with the ITU-R Recommendations and the "5G KPIs".

The respondent considers that, in the context of 5G, the availability of the service and the performance level of the service to the end-users come first as central concept before the issue of coverage per separate bands and the calculation of territorial coverages associated statically, a means specific to the networks of previous generation (2G/3G/4G).

In the opinion of a **fifth respondent**, the priority coverage of rural/sub-urban areas which do not benefit from proper coverage with broadband mobile/fixed communications services (that would allow access to high speed internet) should be a question of "priority zero" for ANCOM (not "zero priority" in any case), the regulatory authority having certain legal obligations to fulfil, as all Romanian citizens have the same rights, irrespective of the geographic area where they live.

The respondent believes that, considering the ANCOM experience concerning the transfer of radio licences and the enforcement of fines for non-observance of the coverage obligations under the LUF, the Authority should adopt a change of strategy.

The respondent reminds that Romania has been criticized by the European Commission in the DESI 2020 Report because, for the third year in a row, the digital gap between the urban and rural areas is the biggest in the EU, precisely because of the poor coverage with broadband internet services, either fixed or mobile. In the respondent's view, the explanation is simple: the coverage with mobile services has always been done from urban to rural, and so, the rural areas have always been left behind technology.

5. Procedure of awarding the usage rights

Question no. 23

Depending on the options you expressed at the questions under Section V.2 relating to the limitation of the number of usage rights that could be granted in the 2300-2335 MHz sub-band, which do you believe would be the most appropriate procedure for awarding the usage rights:

- a) a competitive selection procedure, as defined in paragraph (3¹) of art. 28 of the Framework-Ordinance;*
- b) a comparative selection procedure, as defined in paragraph (3) of art. 28 of the Framework-Ordinance;*
- c) a direct awarding procedure (after undergoing a simplified selection procedure), if the demand of spectrum does not exceed the amount of spectrum available in the area of provision of the wireless network.*

Please substantiate your answer.

To this question, replies were received from 5 respondents.

In the view of a **first respondent**, the most appropriate procedure for awarding usage rights is the *competitive selection procedure*, which ensures a high level of competition and maximizes the efficient use of spectrum, on the one side, and the capitalization of the resource in favour of the state, on the other side.

A second respondent refers to its answer to question no. 1 (fourth respondent).

This respondent believes that the entire 2300 MHz band will need to be allocated in a transparent and non-discriminatory way, similarly to the other radio frequency bands already used for the provision of broadband communications services in Romania. In this context, the only viable

option, in the respondent's view, is the *competitive selection procedure*, as defined in paragraph (3¹) of art. 28 of the Framework-ordinance.

A third respondent considers appropriate a *competitive selection procedure*.

A fourth respondent refers to its answer to question no. 19 (fourth respondent).

A fifth respondent proposes a *comparative selection procedure*, including as a solution of exemption from certain coverage obligations for other bands, in its opinion, being necessary a new approach for addressing certain issues.

The respondent considers that a competitive selection procedure does not provide any guarantee that a mobile network that can offer broadband services will be rolled out (see the case of 2K Telecom, which participated and won in front of Vodafone 30 MHz in the 2600 MHz TDD band).

Another argument the respondent brings in favour of the comparative selection procedure is that, financially speaking, ANCOM was confronted, both in 2012 and in 2015, with situations where the final price for the packages of frequencies auctioned out in a competitive selection procedure was equal to the reserve price (the 800 MHz, 900 MHz, 2600 MHz bands etc.).

Therefore, in the respondent's view, the competitive selection does not ensure the guarantee of reaching higher prices, above the reserve prices.

Question no. 24

If the option you expressed at the previous question was competitive selection procedure, do you believe that the usage rights in the 2300-2335 MHz sub-band should be awarded through the same awarding procedure with the one for awarding usage rights in other complementary/substitutable bands to the band in question or through a distinct procedure?

Please substantiate your answer.

Answers from 5 respondents were received to this question.

A first respondent considers that the usage rights in the 2300-2335 MHz sub-band should be awarded through a distinct procedure or a common procedure with other bands, but only when the conditions necessary for ensuring the efficient use of spectrum will be met – see the arguments on the development of the ecosystem, the network security requirements etc.

A second respondent does not believe the allocation of the 2300-2335 MHz sub-band is appropriate nor viable. See the answer to question no. 1 (fourth respondent). Therefore, the same respondent does not consider necessary nor appropriate to hold a selection procedure for awarding usage rights in the 2300-2335 MHz sub-band.

In the opinion of a **third respondent**, the band should be made available together with the 3.8-4.2 GHz band.

A fourth respondent refers to its answer to question no. 19 (fourth respondent).

A fifth respondent specifies that, although its answer to the previous question was not affirmative (considering that the comparative selection is the adequate procedure), it believes that the usage rights in the 2300-2335 MHz sub-band should be awarded through a single assignment procedure, carried before the 5G Auction, so that the result of the selection procedure in the 2300-2335 MHz sub-band to be a guarantee of the attractiveness of the rights to be awarded in the other frequency bands (700 MHz, 800 MHz, 1500 MHz, 2600 MHz, 3400-3800 MHz, 26 GHz).

6. Licence fee

Question no. 25

With which of the harmonised bands above 1 GHz (1800 MHz, 2100 MHz, 2600 MHz FDD, 2600 MHz TDD, 3400-3800 MHz) do you appreciate that the 2300 MHz band should have a sensitively close economic value, in relation to a similar bandwidth?

Please substantiate your answer, taking into consideration the propagation characteristics of various frequency bands, the means and the technical conditions for their use, the spectrum amount available and the equipment existing in the analysed frequency bands, other aspects that can concur to the technical and commercial attractiveness of the bands.

To this question, answers from 5 respondents were received.

A first respondent finds that the bands above 1 GHz with which the 2300 MHz band should have a close economic value, considering the similar bandwidth, are the 2600 MHz FDD/TDD respectively 3.4-3.8 GHz bands because the propagation characteristics and the spectrum amount necessary to obtain comparable results in these bands is alike.

A second respondent believes the 2300 MHz band could be equivalent to the 2600 MHz TDD band.

In the view of a **third respondent**, only the 2600 MHz TDD band could have a close value, considering the similar bandwidth and propagation characteristics.

A fourth respondent considers that the economic value of the 2300 MHz band should be analysed in relation to the two contexts – public 5G and private 5G.

- in the context of *public 5G networks*, it considers that the economic value of the 2300 MHz band can be *sensitively close, considering the same bandwidth, to the harmonised frequency bands above 2 GHz (2600 MHz TDD or 3400-3800 MHz TDD)*;
- in the context of *private 5G networks*, it considers that the economic value of the 2300 MHz band can be *sensitively close, considering the same bandwidth, to the harmonised frequency bands above 26 GHz (26 GHz TDD)*.

For the development of the communications market, in the context of the answer above, the respondent proposes ANCOM to analyse the opportunity and need to implement a mechanism for reducing the tariff for the use of spectrum, as a means for encouraging/stimulating the electronic communications operators to invest in new infrastructures and technologies.

A fifth respondent thinks that the 2300 MHz band should have a sensitively close economic value to the 2600 MHz TDD band, given the propagation characteristics of the various frequency bands, the means and technical conditions for their use, the amount of available spectrum, the equipment existing in the analysed bands, the harmonised technical conditions for the use of the 2300 MHz band, as well as the substitutability of this band with the 2600 MHz TDD band.

The respondent thinks however that some price corrections should be considered if coverage obligations are imposed in disfavoured areas under the sanction of licence annulment.