

Huawei response to the Radio Spectrum Policy Group public consultation: Work Programme for 2020 and beyond

Summary

Huawei welcomes the opportunity to provide feedback on this important consultation.

On the matter of **spectrum sharing**, we consider that it might be helpful to frame the discussions in terms of inter-service and intra-service sharing, rather than static vs. dynamic sharing:

- a) We acknowledge that with the growing demand for spectrum, and the fact that frequency re-planning or clearance of existing users are not always viable options, increasing levels of **inter-service** spectrum sharing will be inevitable going forward. Such inter-service spectrum sharing can be facilitated through coordination (assisted by databases provided by administrations, where required) and/or through the use of advanced radio technologies such as active antenna systems. Administrations' decisions on the feasibility of sharing should rely on compatibility studies which adopt the most accurate modelling (including for path loss, clutter loss and building penetration loss) of interference.
- b) We consider that the existing authorisation categories of individual licensing (including national, regional, or local licensing) and general authorisation (licence exemption) – complemented by the possibility of market-led trading or leasing of spectrum usage rights at specific locations – can cater for all foreseen cases in the context of **intra-service** spectrum sharing.

As a complement to intra-service spectrum sharing, a number of measures should be further exploited in the context of 5G within the individual national licensing regime to ensure that different users can benefit from the same (scarce) spectrum resource. Such measures may include wholesale provision of 5G capacity by MNOs to new players, provision of indoor coverage by neutral hosts using MNOs' licensed spectrum and in cooperation with the MNOs, and spectrum leasing (including "use it or lease it") in circumstances where other parties might require connectivity in areas where the MNOs do not consider it economically viable to invest.

On the matter of **additional spectrum needs** for future wireless broadband networks, we consider that additional low and mid band spectrum (2 to 10 GHz) will be required in the 2025-2030 time frame to support the second wave of 5G NR deployments in Europe. This is driven by the need to provide high capacity city-wide coverage. Once the spectrum needs are confirmed, EU Member States should:

- Identify suitable low bands (e.g., within the 470-694 MHz range) and mid bands (e.g., 2300 MHz, 3800-4200 MHz, 6425-7125 MHz);
- Assess the sharing opportunities with incumbent services and define the associated sharing frameworks;

- Initiate regulatory action at the EC and CEPT to develop harmonised least restrictive technical conditions for the use of the identified bands by electronic communication networks, subject to the protection of the incumbents;
- Ensure spectrum availability in a timely manner based on market demand.

On the matter of **combatting climate change**, we encourage the RSPG to build on the work undertaken by a number of standardisation organisations such as ETSI and the ITU, and to strengthen its links with these and other organisations.

On the matter of the **Peer Review Forum**, in light of the expectation that this will not be open to industry participation, we encourage the RSPG to continue organising stakeholder workshops on awards, and to publish annual reports on awards experiences and best practices.

On the matter of **WRC-23**, we support the RSPG's intention to prepare an Opinion on WRC-23 Agenda Items, and with reference to IMT, would specifically draw the RSPG's attention to Agenda Items 1.2, 1.3 and 1.5.

Huawei's comments in relation to the RSPG work programme for 2020 and beyond

Spectrum sharing – pioneer initiatives and bands

Today, spectrum sharing is rather static and, due to this static nature, in some cases overly conservative (putting limiting sharing conditions for new spectrum users or even preventing such new uses). One result of the working group on European Spectrum Strategy is that, in particular spectrum sharing needs further action, especially with regard to its potential to achieve more efficient use of radio spectrum, and to give incentives for innovation. Furthermore, the promotion of the shared use of radio spectrum is a key objective contained in the Directive 2018/1972 establishing the European Electronic Communications Code (hereafter referred to as “EECC”, see Articles 45 (2e) and 46 (1)). New technologies create new opportunities for more dynamic and efficient spectrum sharing. However, before such new technologies can be introduced on a wider scale, there is a need to build trust among users as well as Member States. Strategically, it is therefore important to facilitate trials, exchange of experiences and collaboration among the Member States. A proof of concept helps facilitate a change in the mind-set.

Therefore, the means to improve spectrum sharing and to implement innovative sharing solutions should be investigated, especially by promoting trials (sandboxes), pioneer scenarios/bands, new forms of licensing and a strategic focus on take-up of methods using databases and LSA. In addition, the development and market opportunities for methods, including Artificial Intelligence, should be studied with a view to making concrete proposals for coordinated actions at EU level that bring added value to the Member States.

Scope of RSPG activity

Building on previous relevant deliverables from RSPG and taking into account different spectrum sharing options, this activity will investigate more dynamic spectrum sharing options.

The RSPG will develop a roadmap for increased spectrum sharing and identify key pioneer initiatives and bands.

We support the efforts of the RSPG in considering future spectrum management techniques which might result in more efficient and optimum use of spectrum. We also acknowledge that the growing demand for wireless connectivity, and the fact that frequency re-planning or clearance of existing use may not be possible in all cases, imply that increasing levels of spectrum sharing may be inevitable going forward.

We consider that the discourse should not necessarily be framed in terms of whether spectrum sharing should be static or dynamic. In fact there are many important use cases where a dynamic spectrum sharing framework might not meet the quality of services requirements of the users, and a more static framework would be preferred. We consider that what is far more important is that any spectrum sharing framework is as simple as possible, effective, efficient and least restrictive.

We also note that the issues of inter-service and intra-service spectrum sharing often get conflated, and result in misunderstandings. For this reason, we treat these separately in what follows:

a) Inter-service spectrum sharing

In the context of sharing of spectrum between users of different services, we consider that where the geographic coordinates of the incumbent users are fixed and known, **coordination** techniques can be applied to facilitate coexistence with new users. Such coordination might be implemented and assisted through the use of databases provided – and appropriately updated – by the EU Member States' national regulatory authorities. It is highly recommended that any approaches adopted for communication between users and spectrum management databases are based on well-recognised standards in order to exploit global economies of scale to the greatest extent possible.

Where the geographic coordinates of the incumbent users are not known, or where these vary in time, to the extent that spectrum sharing via coordination or database assisted access might not be possible or might be impractical, then the EU Member States should perform **cost-benefit analyses** of the various available options in their **regulatory toolbox**, ranging from the placing of appropriate (potentially restrictive) technical conditions on the new uses, to the clearance of the band by the incumbent.

Needless to say, in all cases, national regulatory authorities should ensure that coexistence studies use realistic assumptions in the modelling of harmful interference (including accurate models of path loss, clutter loss, and building penetration loss), and that these account for the latest advanced mitigating technologies – such as active antenna systems and beamforming.

b) Intra-service spectrum sharing

In the context of sharing of spectrum among users of the same service, we consider that the two existing paradigms of technology neutral **individual licensing** (including national, regional or local licensing) and **general authorisation** (also known as licence exemption), complemented by the possibility of market-led trading or leasing of spectrum usage rights at specific locations, can cater for all foreseen cases of spectrum sharing.

General authorisation allows users to share spectrum in an autonomous manner through the use of mechanisms ranging from simple restrictions on duty cycle to more sophisticated statistical medium access control (MAC) protocols. These are inevitably at the expense of a reduction in radio communication performance, especially when the airwaves are congested.

Authorisation through **individual licensing** provides certainty of access to spectrum which is an important requirement in many applications where quality of service plays a critical role, and/or where commitments to high levels of investment in radio equipment are necessary. Where the spectrum is only required to be used within the confines of a limited geographic area, it can be shared through **individual regional/local licensing** at a sub-national level, while still ensuring that quality of service can be maintained. Such regional or local licensing have been common practice for many applications, including for fixed links, fixed wireless access, and PMSE. More recent examples of individual local licensing for 5G include the approaches adopted by Germany at 3.7-3.8 GHz, and by the UK at 3.8-4.2 GHz (and other bands).

We consider that the range of authorisation models described above can cater for all foreseen demand for intra-service spectrum sharing.

As a complement to intra-service spectrum sharing, a number of measures should be further exploited in the context of 5G within the **individual national licensing** regime to ensure that different users can benefit from the same (scarce) spectrum resource. Such measures may include:

- Wholesale provision of 5G capacity by MNOs to new players (e.g. MVNOs) with focus on E2E services and solutions for the verticals;
- Provision of indoor coverage by neutral hosts using MNOs' nationally licensed spectrum and in cooperation with the MNOs;
- Spectrum leasing (including "use it or lease it") in circumstances where other parties might require connectivity in areas where the MNOs do not consider it economically viable to invest.

Finally, while we are highly supportive of Europe's principle of technology neutrality in spectrum management, we note that there can be circumstances in relation to the general authorisation model where **co-channel coexistence** of different technologies would impact their performance to the extent that this could **endanger user safety**. A prime example of this is the case of vehicle-to-vehicle communications for intelligent transportation systems (ITS) in the 5.9 GHz band.

In such special cases, where user safety might be so directly impacted, it might be prudent for EU Member States to consider the option of assigning different channels to different technologies (as being proposed for 5.9 GHz by the FCC in the US), or failing that, to encourage industry to come to an arrangement for the use of different channels for different technologies.

Additional spectrum needs and guidance on the fast rollout of future wireless broadband networks

5G is the most important evolution of wireless broadband in the near future. The RSPG has developed three Opinions as its strategic roadmap towards 5G for Europe, in which it has identified 5G pioneer bands and addressed implementation challenges for 5G:

- RSPG Opinion on spectrum related aspects for next-generation wireless systems (5G), 30 November 2016
- RSPG Second Opinion on 5G networks (Strategic Spectrum Road Map Towards 5G for Europe), 30 January 2018
- RSPG Opinion on 5G implementation challenges (RSPG 3rd opinion on 5G), 30 January 2019.

The commercial launch of 5G in Europe has started. Within this work item, the RSPG will further investigate additional spectrum and harmonisation needs (coverage, capacity and innovation) as well as authorisation regimes within the remits of the EECC for successful deployment, taking into account bands identified at WRC-19.

Scope of RSPG activity

Regarding the pivotal role of wireless broadband, the RSPG will consider additional spectrum as well as the necessity to make a certain amount of harmonised spectrum available by 2025/2030.

RSPG will carry on to engage in the sharing of information and experience in support of a successful roll-out of 5G in the EU, including questions related to the measurement of EMF-limits, and provide targeted guidance on authorisation and implementation issues, if need is identified.

Additional spectrum

We agree with the RSPG's view that 5G is the most important evolution of wireless broadband in the near future and we welcome the consideration of additional harmonised spectrum to be made available by 2025/2030.

We expect that data usage levels in Europe will increase from around 5 GB/month/user to over 150 GB/month/user by 2025, driven by high capacity citywide use cases, including eMBB (video consumption on the move), AR/VR, and safe/smart city applications. Our calculations indicate a need for 400 – 900 MHz of *additional mid-band* spectrum for this purpose by 2025.

We note that the C-band (3400-3800 MHz) is either not fully available for 5G in many European countries, or is geographically limited by cross-border restrictions. We also note that the extended C-band (3800-4200 MHz) is being considered by some Member States for use by the verticals via local licensing, but not for eMBB. Furthermore, we note that while mm-waves can provide very high hot-spot capacities, they are not especially well-suited for contiguous citywide coverage and mobility.

We are encouraged by the farsighted decision of administrations at WRC-19 to initiate studies of the mid-band frequencies 6425-7025 MHz (in Region 1) and 7025-7125 MHz globally in relation to the potential for IMT identification at WRC-23. Our preliminary studies indicate that:

- a) Co-existence between IMT and the incumbent fixed links at 6425-7125 MHz can be possible through coordination on a case by case basis, and – where required – through the use of database assisted spectrum sharing (see ECC Report 254 for possible frameworks). Other options in the regulatory toolbox include the frequency re-planning of the fixed links within the band, migration of the fixed links to other bands, and the replacement of the fixed links with other access technologies (fibre), all supported by appropriate financial incentives.
- b) Co-existence between macro-cellular IMT deployments and the incumbent fixed satellite service uplink at 6425-7125 MHz can be possible through the use of active antenna systems at the IMT base stations, which – depending on the latitude of the deployment – can result in 30-50 dB of mitigation of harmful interference.

We consider the band 6425-7125 MHz to be essential for the second wave of 5G NR deployments in Europe. We encourage EU Member States to assess the possibility to initiate regulatory action at the EC and CEPT to develop harmonised least restrictive technical conditions for the use of 6425-7125 MHz by electronic communication networks, and to ensure its availability based on market demand subject to the protection of the incumbents.

Authorisation

In line with provisions in the EEC, enhancement of harmonised spectrum policies among Member States is essential to increase predictability and encourage investments in 5G networks. Aspects linked to harmonised licence duration and transparent licence renewal conditions and timely release of new spectrum bands in a consistent manner among the Member States are to be considered if Europe wishes to keep pace in the 5G race. To this end, auction design and reasonable spectrum fees should be considered across RSPG members to support the targets set by the 5G Action Plan.

EMF

Regarding the EMF-related issues, we draw attention to the fact that several activities on EMF exposure measurement are already being undertaken by IEC/CENELEC. Accordingly, we see little benefit for the RSPG to engage in providing guidance on EMF exposure measurements. However, we see benefits for a joint RSPG-BEREC collaboration on BEREC's initiative to provide consistent positions and combat end-user misinformation regarding EMF health effects in the context of 5G and mobile technologies in general.

As misinformation on EMF has been fuelling unjustified concerns while negatively impacting network rollout in Europe, we see benefits in a coordinated effort of EU Member States to proactively support consistent science- and evidence-based communication on 5G and EMF at the EU and national/local levels, in line with the internationally accepted recommendations of WHO/ICNIRP. Such a coordinated campaign on EMF-related issues should aim at a better understanding of the compliance with the limits on the general public's exposure to radiofrequencies and removing unjustified barriers against the rollout of 5G networks.

Role of radio spectrum policy to help combat climate change

Radio spectrum is the basis for electronic communications and broadband, but also key to important areas like climate change. Climate change is one of the predominant topics in European Union policies. In her political guidelines, the new Commission President Ursula von der Leyen has prioritised a 'green deal' stating: "I want Europe to strive for more by becoming the first climate-neutral continent". The climate-neutral target for Europe is 2050. The RSPG shares the opinion that the fight against climate change and its negative consequences is of utmost importance. Therefore, the RSPG establishes a work item to focus on spectrum policy aspects which are closely related to the efforts of ensuring climate-neutrality.

Scope of RSPG activity

Under the Climate Change work item, the RSPG will issue a debate within the Group, as well as with the relevant stakeholders, on how spectrum policy can help to combat climate change. To this end, questions that should be addressed are:

- Identify climate change-related aspects within spectrum management;
- How can spectrum management help to combat climate change?
- What concrete actions should be recommended at EU-Level?

We agree with the importance of the radio spectrum for the development of electronic communications and broadband as basis for the digitalization of industries, in line with the EU priorities and policies. We equally acknowledge the importance of combatting climate change, and that the climate-neutral target for Europe is 2050.

We consider that it would be desirable for any actions which the RSPG might consider in relation to climate change builds on existing work in this area. Accordingly, it would be desirable for the RSPG to strengthen its links with global standardization organizations (such as, but not limited to, ETSI and the ITU) which have working groups addressing environmental aspects, and which have undertaken studies covering areas related to climate change (assessment methods, energy efficiency of systems, etc.).

“Good offices” to assist in bilateral negotiations between Member States

No comments.

Peer review and Member States cooperation on authorisations and awards

This work item was originally established in 2017 to facilitate peer learning between Member States on spectrum awards and authorisation. Therefore, the RSPG hosts a voluntary “Peer Review” platform (EC CIRCABC website) allowing Member States to share documents and experience and to seek advice from their peers during the award design process. In addition, the RSPG holds Peer Review workshops to share experience and expertise on specific (planned or completed) awards.

According to Article 35 EECC, and at the latest from 21 December 2020 on, this informal process will be formalised for draft selection measures that are subject to Article 55 (2) EECC in relation to radio spectrum, which has been harmonised in accordance with Decision No 676/2002/EC in order to enable its use for wireless broadband networks and services. It is normally up to the national authority concerned to decide whether to subject its draft measure to a Peer Review Forum under Art. 35 EECC. The RSPG may also exceptionally take the initiative to convene a Peer Review Forum where it considers that any draft measure would significantly prejudice the ability of the national authority to achieve the objectives set in Articles 3, 45, 46 and 47 EECC.

Scope of RSPG activity

With regard to harmonised spectrum, the RSPG will provide the formalised processes according to Article 35 EECC.

In addition, the exchanges based on the current informal platform and workshops for past and future awards will continue. It is to be noted that this scope of the RSPG work is somewhat larger than anticipated in Article 35 EECC.

We see benefits in better collaboration between Member States with regards to spectrum awards and authorisations through the “Peer Review” platform and workshops. We understand that while the Peer Review Forum will be formalised by 21 December 2020, it will remain closed to the industry. We would like to emphasize the importance of transparency and encourage the RSPG to continue with organising stakeholder workshops on awards and to publish annual reports on awards experiences and best practices.

WRC

One of the decisions taken at WRC-19 is the draft Agenda for the next WRC. The RSPG should start to prepare recommendations for European Union position(s) on items which are of particular importance for EU policies as early as possible in the preparation process for the next WRC (WRC-23), similar to the processes successfully carried out for past WRCs.

A review of the WRC-19 results should provide a follow-up of the “Council Decision on the position to be taken on behalf of the European Union in the International Telecommunication Union (ITU) World Radiocommunication Conference 2019 (WRC-19)” and assess whether and how the preparation of WRCs could be improved in order to update, if needed, the recommendations provided in RSPG Opinion on “EU coordination at ITU-R Radiocommunication Conferences”².

Scope of RSPG activity

The RSPG plans to:

1. Review and report on the outcome of WRC-19, including the Agenda for the next WRC and identify any issues of relevance for EU spectrum policy;
2. Prepare an Opinion for positions on Agenda Items of WRC-23 with relevance to EU-policies in order to assist the European Commission in formulating proposals for a council decision.
3. Possibly identify actions for the European Commission in order to provide political support to promote European Union position(s) in regular meetings between EC and non-EU countries.

We support the RSPG’s intention to prepare an Opinion on the Agenda Items of WRC-23.

With reference to IMT, the administrations at WRC-19 agreed the following WRC-23 Agenda Items:

- 1.2 to consider identification of the frequency bands 3 300-3 400 MHz, 3 600-3 800 MHz, 6425-7025 MHz, 7025-7125 MHz and 10.0-10.5 GHz for International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution COM6/2 (WRC-19)¹;
- 1.3 to consider primary allocation of the band 3600-3800 MHz to mobile service within Region 1 and take appropriate regulatory actions, in accordance with Resolution COM6/3 (WRC-19);
- 1.5 to review the spectrum use and spectrum needs of existing services in the frequency band 470-960 MHz in Region 1 and consider possible regulatory actions in the frequency band 470-694 MHz in Region 1 on the basis of the review in accordance with Resolution 235 (WRC-15);

¹ With reference to ITU-R Region 1, the “resolves to invite ITU-R” 2 in Resolution COM6/2 (WRC-19) states: “to conduct and complete in time for WRC-23 the sharing and compatibility studies, with a view to ensuring the protection of services to which the frequency band is allocated on a primary basis, without imposing additional regulatory or technical constraints on those services, and also, as appropriate, on services in adjacent bands, for the frequency bands:

- 3 600 - 3 800 MHz and 3 300-3 400 MHz (Region 2);
- 3 300 - 3 400 MHz (amend footnote in Region 1);
- 7 025 - 7 125 MHz (globally);
- 6 425 - 7 025 MHz (Region 1);
- 10 000 - 10 500 MHz (Region 2),”

With regards to 6425-7125 MHz, it is worth noting that some European administrations at WRC-19 supported consideration of this band for potential IMT identification at WRC-23, while other European administrations did not.

Agenda Item 1.3 will consider the upgrade of the current mobile service allocation at 3600-3800 MHz in Region 1 from secondary to primary. This might be of little direct interest to the European Union, since the band is already designated for electronic communication networks in the Union. However, a Region 1 primary allocation to the mobile service will facilitate countries in Africa and the Middle East to follow the European example in this band. This would indirectly benefit Europe in the form of improved economies of scale.

In the light of the above, and of our understanding of European interests, we consider that the issues in the WRC-23 Agenda Items which might have greater relevance to EU spectrum policy are those related to the 470-960 MHz, 3600-3800 MHz and 6425-7125 MHz bands.

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