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Response to European Commission Radio Spectrum Policy Group consultation on “Draft RSPG Opinion on Strategic Challenges facing Europe in addressing the Growing Spectrum Demand for Wireless Broadband” from Nokia¹ and Nokia Siemens Networks²

Nokia and Nokia Siemens Networks (NSN) welcome this opportunity to respond to the “Draft RSPG Opinion on Strategic Challenges facing Europe in addressing the Growing Spectrum Demand for Wireless Broadband”. The draft opinion contains useful and forward-looking views on, how the expected Wireless Broadband spectrum need could be fulfilled. We agree with many of the statements related to the existing IMT bands, e.g. the narrow bands may not be that attractive from mobile broadband operation point of view. We hope that RSPG takes into account the past experiences and gives full notice to the fact that not all the spectrum bands have the same appreciation and value from WBB business point of view. Harmonized and sufficiently wide spectrum is always the most attractive alternative for operators that need to invest in and build the mobile broadband (MBB) networks. This is also the best way to ensure sufficient equipment availability.

We have comments on the draft opinion itself, and also on the key potential frequency bands for Wireless Broadband.

Comments related to the draft opinion:

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When considering future demand for spectrum for wireless broadband and the potential frequency bands to meet the demand certain assumptions need to be drawn.

Mobile broadband networks typically use a minimum bandwidth of 5 MHz for TDD or supplemental downlink networks and 2 x 5 MHz for FDD networks. The

additional frequency bands should in principle also support multiple operators. For the TDD networks the recent studies in CEPT have shown that frequency bands limited to a maximum width of 20 MHz (e.g., 1900 – 1920 MHz and 2010 – 2025 MHz) are not attractive enough for manufacturers to develop equipment. Hence, where there is a requirement for additional spectrum to support TDD operation in mobile networks in the future larger bandwidths should be considered.

- In the highlighted sentence, a reference to supplemental downlink looks unnecessary, as there are no such deployments nor spectrum so far in Europe. It is proposed to change the sentence to be:

Mobile broadband spectrum is typically licensed in 2x5MHz (paired) or 5MHz (unpaired) blocks.

¹ About Nokia

Nokia is a world leader in mobile communications, driving the growth and sustainability of the broader mobility industry. Nokia connects people to each other and the information that matters to them with easy-to-use and innovative products like mobile phones, devices and solutions for imaging, games, media and businesses. Nokia provides equipment, solutions and services for network operators and corporations.

² About Nokia Siemens Networks

Nokia Siemens Networks (NSN) is the world's specialist in mobile broadband. From the first ever call on GSM, to the first call on LTE, NSN operates at the forefront of each generation of mobile technology.

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Bringing into use additional frequency bands has a cost for the operators who need to upgrade their networks and pay for spectrum. Increasing capacity through the higher density networks also has a considerable cost. Therefore, mobile operators in particular have an interest in offloading the traffic from their radio access networks by encouraging the use of alternative wireless technologies such as Wifi, while retaining the customer within the network.

- So far, exclusive spectrum despite its price in auctions has been key to mobile operators business models as exclusive spectrum provides for guaranteed rights of use of the spectrum and thus for predictable Quality of Service. Offloading using Wi-Fi can be one way to complement exclusive spectrum and contribute additional capacity. Wi-Fi seems to be attractive for the consumers, as the usage is often free of charge. This has been the main driver for its popularity. Nevertheless the business case for mobile operator Wi-Fi is less obvious and overall consumer benefit may be reduced by unpredictable Quality of Service due to the unlicensed nature of Wi-Fi.

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In relation to the 2.1 GHz (unpaired bands 1900-1920 MHz and 2010-2025 MHz) band, there are, again, several possible interconnected reasons for the lack of use of the unpaired bands. These unpaired bands were packaged in 5 MHz channels suitable for TDD use. Post 2000, research and development clearly focussed on FDD technologies resulting in a relatively little development of TDD technologies. This, in conjunction with a lack of demand at 2010-2025 MHz, which is believed to be a result of complex co-existence issues with FDD at 1920 MHz, resulted in the unpaired bands being almost entirely unused.

- The requirement for TDD spectrum was justified as a demand for capacity bands due to increased traffic. In the beginning of mobile (3G) deployments, there was no capacity problem even when using the FDD part only. New FDD bands, 2.6GHz and 800MHz, were made available before there was a real urgent need for additional capacity. It has been easier for operators to add capacity by adding new FDD bands in the existing sites. If (and when) adjacent band TDD base station cannot be installed in the same site as FDD but require new sites for TDD, the operators could easily use the additional sites rather for FDD carriers. So far, the mobile operators have considered the requirement of TDD-synchronization too complex and the quite narrow 5MHz TDD blocks may not look too attractive either. On the other hand, there is no fundamental showstopper in using TDD but the industry focus has been greatly only in FDD bands so far.

The opinion of the RSPG:

The RSPG notes that:

(a) broadband networks are evolving in order to deliver linear and non-linear video services and data services to mobile devices. The impact of the increasing mobile traffic asymmetry on channelling arrangements needs to be assessed;

- Yes, we agree the statement in the 1st sentence. The trend is that TV content is delivered more and more via many other media (IPTV, MBB, cable) and the importance of terrestrial DTV delivery (DVB-T) for TV content delivery is rapidly decreasing. The consumption of video and TV content is more and more happening via PCs, tablets and smartphones by mobile broadband delivery like LTE.

(b) broadcasting networks are evolving in order to deliver high-definition and ultra high-definition programmes, to increase delivery to portable/mobile receivers and are envisaged for the delivery of linear and non-linear video services and data services to mobile devices;

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- We disagree that broadcast network delivery of video services and data services to mobile devices is increasing, e.g. DVB-T2 does not really address that aspect at all. Also, the mobiles already feature Wi-Fi and IMT/LTE. Therefore, broadcasting network delivery to mobile devices does not look attractive for the users' point of view and the trials of e.g. DVB-H indicate the same. On the contrary, linear broadcast can be integrated more efficiently into the mobile networks via mobile technologies such as LTE Broadcast (eMBMS) if customer demand arises.

(c) the actual use of bands for wireless broadband in Member States will vary, depending on the national requirements for broadband access and for other services;

- OK

(d) the frequency band 694-790 MHz represents 30% of the total remaining UHF TV spectrum. The impact of a reallocation of this spectrum for broadband will potentially be significantly more important for terrestrial broadcasting in some countries than in the case of the 800 MHz band;

- Today it may look so but, in this respect, the world is changing rapidly. A suitable transition time from broadcasting to mobile service should resolve the issue. Member states have to weigh the overall societal benefits of Mobile Broadband including the possibility to add the 30 Mbps to all households targets of the Digital Agenda for Europe versus the benefits of terrestrial TV distribution (noting that in many member states, more efficient TV content distribution networks such as satellite and cable are already extensively used).

(e) as sharing of the band between mobile services and DTT broadcasting will not be feasible, it is likely that they will compete for access to the 700MHz band. However, the situation for the digital terrestrial platform spectrum requirement varies amongst Member States;

- The 700MHz is very attractive as mobile service coverage band and coverage remains to be an issue for mobile operators. This holds true in particular where Mobile Broadband shall add to the targets of the Digital Agenda for Europe of 30 Mbps to all households in less populated areas. The mutual importance between mobile and broadcasting needs may vary in different countries but the trend is clearly towards mobile service. Suitable transition time from broadcasting to mobile service would help here.

(f) the reallocation of the 700 MHz band to mobile service would require in many countries the implementation of new technologies (e.g. DVB-T2/HEVC). Therefore, any EU-policy decision regarding the use of the 700 MHz band by wireless broadband has to be accompanied by a recognition that certain Member States may need to take measures to transition DTT receivers to more efficient technologies;

- There is a trend towards more spectrum efficient technologies in any case and this should be applied to broadcasting as well.

(g) there are merits in developing a common EU strategy on the whole UHF band 470-790 MHz, taking into account internal market and cross-border issues. However, this strategy has to reflect the variety of situations in Member States concerning the digital terrestrial platform and developments in terms of converged use of the spectrum;

- Full support for this. All relevant aspects should be considered but there is no need to put e.g. the developments in converged use of spectrum as higher priority than any other use like MBB use.

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(h) there is increasing pressure on the spectrum available for SAB/SAP (audio and video) applications;

- The strategic plan for spectrum use should propose a suitable solution also for SAB/SAP.

(i) in the case of TDD networks, the recent studies¹⁸ in CEPT have shown that frequency bands limited to a maximum width of 20 MHz (e.g., 1900 – 1920 MHz and 2010 – 2025 MHz) are not attractive enough for manufacturers to develop equipment;

- The problem of unused TDD band is not (at least only) because of the size of the band as described earlier in this response. The situation is likely to change now, when LTE TDD has been introduced in those bands (e.g. in China) and TDD equipment will become available.

(j) more than half of smartphone data traffic is routed over WiFi networks and this nomadic traffic is growing faster than mobile data traffic;

- This may be true but most of this traffic is not utilizing the mobile operator network but bypasses operators totally, as different entities offer free Wi-Fi for consumers.

(k) Mobile operators are also relying on some licence exempt spectrum for offloading of traffic to increase network capacity, improve coverage in buildings and to save costs.

- See our related comments under considering j).

The RSPG recommends that:

1. On the basis of the analysis in Annex 1 and the roadmap for future broadband spectrum in Annex 2 of this Opinion a strategic plan should be developed by the Commission to make the necessary spectrum available to meet the future demand for wireless (terrestrial & satellite) broadband services in the time frame 2013-2020, including the intermediate target in the RSPP of at least 1200 MHz of spectrum by 2015.

- There is no need to consider future demand of satellite MBB spectrum, so the reference to “satellite” has to be removed.
- Related to terrestrial MBB spectrum requirements, ITU-R SG5 WP5D has recently updated the estimate for year 2020 and the requirement is 1960MHz (higher user density settings) and 1340MHz (lower user density settings). RSPG should consider the spectrum demand of mobile broadband in a longer term as well, keeping in mind that most European countries have high user densities and that an ITU-R estimate of 1960MHz of total spectrum requirement by year 2020 would be a valid estimate for most European countries.

2. The strategic plan should include: -

- a detailed analysis of the usage of all bands identified in Annex 2, including the 700 MHz, 1.5 GHz, 2.3 GHz and 3.8-4.2 GHz bands, in Member States and their potential for wireless broadband services on a harmonised basis, prioritising the bands in accordance with their potential and timeframe in which they are likely to be available;
- further exploration of the economic and social implications of the various options at macro level;
- the spectrum needs for SAB/SAP (both audio and video applications);
- an analysis of the need for licence exempt spectrum for WBB.

- Agree

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3. In addition to the above, the RSPG recommends the development by the Commission, in cooperation with the Member States, of a long-term strategic policy on the future use of the UHF band (470-790 MHz), taking account of, in particular, the spectrum needs of the DTT platforms in the EU, the spectrum needs of PMSE, and the possible benefits arising from future convergent broadcasting mobile platforms to deliver linear media/audiovisual services and high-audience video and data to mobile devices (smartphones, tablets, etc.).

- Agree on the development of a long-term strategic plan. All related aspects should be taken in account without prioritizing any specific option.

4. In developing this strategic policy for the future use of the UHF Band the Commission should in the short-term, develop:

- a) a common European policy objective in time for WRC-15 on the refinement of the lower band edge and on possible channelling arrangements for mobile services in the 700 MHz band; and
- b) an EU-wide strategy to be discussed at political level on the future use of the 700 MHz band. This strategy should consider elements such as duration of broadcasting licenses, the necessity to transition to new technologies, the variety of digital terrestrial platforms in Member States and cross-border frequency coordination issues; and
- c) a clear policy to facilitate any migration which may ease making available the 700 MHz band to wireless broadband while allowing Member States to take measures relating to TV receivers in order to mandate more efficient technologies (e.g., DVB-T2, HEVC); and
- d) a review of ETSI and CENELEC standards applicable to DVB-C and DVB-T reception. This includes a need for a clear EU policy on improving spectrum efficiency, where it would be an essential requirement to construct TV receivers so as to avoid harmful interference;

- Agree

5. For the band 1452-1492 MHz, noting that CEPT has established a project to develop harmonised implementation measures for SDL applications, the Commission should consider adopting complementary measures to further promote the use of this band for SDL, while preserving the possibility for Member States to use part of this band for other uses such as broadcasting.

- A strategic plan for the whole 1.5GHz band should be developed for Europe before deciding on the specific use of any sub band. The WRC-15 preparations are still going on and fixing one band usage now could decrease the possibility to find a new, globally harmonized FDD band in this frequency range.

6. In the case of the 2GHz bands identified for use by Mobile Satellite Services with Complementary Ground Component (1980-2010 MHz/2170-2200 MHz), if future actions taken by Member States in relation to Decision 2011/667/EU result in the withdrawal of licences, the Commission should consider re-allocation of the bands to terrestrial mobile services.

- Full support for this. The same kind of activity is going on at least in the US and Korea.

7. For the band 2300-2400 MHz, noting that CEPT has established a project to develop harmonised implementation measures for MFCN in the band, the Commission should consider adopting complementary measures to further promote shared and flexible use of the band between wireless broadband applications and other services, based on LSA regulatory provisions, facilitating the long-term incumbent use of the band in the territory of those Member States that wish to maintain such use.

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- Agree

8. The frequency range 3800-4200 MHz may play a role in the provision of ECS to enhance future capacity requirements especially in urban areas. The Commission should study the possibility of sharing in Europe between the FSS and terrestrial wireless broadband services in this frequency range, while recognizing that the situation within and outside Europe may differ, thus not enabling worldwide harmonisation for shared use of the band by wireless broadband services.

- Agree

9. In considering the harmonisation of frequency bands for wireless broadband the Commission should take into account the fact that the actual use of bands for wireless broadband in Member States will vary, depending on the national requirements for broadband access and for other services.

- We believe that individual member states will take the harmonized bands in wireless broadband use sooner or later, if there is a plausible plan and roadmap for the wireless broadband. A long enough transition period is needed and it could help also in finding new spectrum for WBB.

Comments related to key frequency bands with potential for Wireless Broadband

The most important topic in the possible new WBB spectrum is that the spectrum is widely harmonized and wide enough to support the mobile broadband applications.

700MHz

- This band is very important, as it has potential for 2x30MHz spectrum of almost global harmonization. It also offers favorable propagation characteristics for both rural area (c.f. our earlier comments on the targets of the Digital Agenda for Europe) and indoor coverage.

1.5GHz band

- As a number of sub-bands are under discussion in the preparations of WRC-15 agenda item 1.1, it would be best to look this band as a whole and evaluate, if there is potential for globally harmonized FDD band for WBB. Currently, there are activities going on in EC (and CEPT) to reallocate 1452-1492MHz of the spectrum to MFCN supplemental downlink and 1492-1518MHz for PMSE. Before finalizing these, it would be beneficial to make a long term strategic plan for Europe also for this band evaluating also the possibility for a harmonized FDD WBB band.

2GHz MSS bands

- Despite the long availability of the band for MSS, this service has not started. It would provide harmonized 2x30MHz close to the existing 2GHz WBB bands and is attractive for the WBB operation.

2300-2400MHz

- This band is already identified for IMT globally, commercially in use in various countries and should be taken into WBB use, where possible, also by using LSA where needed.

3800-4200MHz

- This band should be a European candidate band for IMT in WRC-15 agenda item 1.1. It has potential to support wide channel bandwidths and real wideband services. The possible interference and coexistence issues in some portions of this band can be largely solved with LSA.