



Comments on the Draft Report RSPG24-030_

Submitted by Leaf Space SpA

December 2024

TABLE OF CONTENTS

TABLE OF CONTENTS	1
1 Introduction	2
2 Comments on the EU RSPG Draft Report RSPG24-030 FINAL	3
2.1 Comments to “1.1 Input from stakeholders”	5
2.2 Comments to “2.1 The Transition from 5G Non-Stand-Alone to 5G Stand-Alone” .	5
2.3 Comments to “3. Early Policy initiative on 6G”	6
2.4 Comments to “4.2 6G usage scenarios and their implications on spectrum”	7
2.5 Comments to “8.2 6G goals for spectrum use”	7
2.6 Comments to “8.4 Spectrum implications of use cases”	8
2.7 Comments to “8.5 6G spectrum ecosystem stakeholders, roles and motivations” .	8
2.8 Comments to “8.7 Launch readiness for 6G in 2030 for mass market for services and equipment”	9
2.9 Comments to “8.9 Role of license exempt spectrum”	10
2.10 Comments to “8.12 Sustainability”	10
2.11 Comments to “9.2 View from operators”	10
2.12 Comments to “10 Spectrum for launching 6G in EU and paving its initial development”	11
2.13 Comments to “10.1 Densification of public mobile network”	12
2.14 Comments to “10.2.2 A need for coordinated timing and new band(s)”	12
3 Conclusion	13

1 Introduction

Leaf Space SpA (“Leaf Space”, or “Leaf”) is an Italian satellite ground segment service provider, operating across dozens of regulatory frameworks and working with administrations of the three ITU Regions, including seven different CEPT Member States.

Leaf Space welcomes the opportunity to comment the Draft Report RSPG24-030 FINAL and to be part of the Union’s telecommunication and spectrum policy-making process.

Leaf is grateful for the EU RSPG leadership and effort in compiling such a comprehensive vision on the future of the Union with regards to 6G.

Leaf supports the highlighted necessity of a timely recognition of 6G spectrum allocations, as this will facilitate the initial launch and operation of 6G networks/services. As such, and in the light of:

1. lessons learnt from the 5G rollout vis-à-vis initial expectations and proposition;
2. 5G current spectrum utilization; and
3. desired timelines for a “pioneer” 6G deployment;

Leaf Space urges the RSPG to consider, for IMT-2030, bands already identified for IMT by the World Radiocommunication Conference 2019 (WRC-19) and the WRC-23, as well as legacy bands already in use by legacy IMT generations (2G, 3G, 4G, 5G).

Leaf Space invites the RSPG to adopt a balanced approach for 6G-related decision- and policy-making, ensuring that *all* relevant stakeholders – including administrations, academia, equipment manufacturers, Mobile Network Operators (MNOs), use cases developers, end users, *and* potentially impacted incumbent spectrum users – can contribute to and benefit from the definition and rollout of the next generation of mobile technology.

With this in mind, Leaf Space respectfully submits below its comments on the EU RSPG Draft Report **RSPG24-030 FINAL**.

2 Comments on the EU RSPG Draft Report RSPG24-030 FINAL

After a successful rollout of 4G paired with a global uptake of smartphones, 5G was introduced with boastful optimism and the promise to revolutionize various aspects of everyday life, industry, and technology, through its key features of higher speed, lower latency, and high capacity for device connectivity.^{1, 2, 3}

The full potential of 5G, achievable with the deployment of the “real 5G” – as 5G Stand-Alone (5G SA) has been dubbed⁴ – is yet to be seen across Europe and globally, as reported by the EU RSPG Draft Opinion itself,⁵ as well as by different industry outlets over the past years.^{6,7,8}

At the same time, in the past 12 months, the telecommunication sector has seen an emerging number of mildly cautious and/or conservative voices addressing the apparent decrease in mobile data consumption growth rate,^{9, 10, 11} with doubts arising on whether investments in 5G are giving desired returns to Mobile Network Operators (MNOs),^{12,13} and with equipment manufacturers more or less overtly taking action to address the slowing down of demand.^{14,15,16}

In 2024, mmWave 5G uptake is still “aspirational”,¹⁷ and telecom analysts report on how 5G will not deliver on the lower latency promised and that this should raise questions on the “credibility” and “lack of diligence” of the 5G proponents.¹⁸

Additionally, it is worth highlighting recent research by OpenSignal Ltd, whose findings show

¹ Pennington, A., MWC 2018: With 5G, World Is 'On the Cusp of Hyper Connectivity' (2018) Streaming Media Europe <<https://www.streamingmediaglobal.com/Articles/ReadArticle.aspx?ArticleID=123431>>

² Rosenberg, D., How 5G Will Change the World (2018) World Economic Forum <<https://www.weforum.org/stories/2018/01/the-world-is-about-to-become-even-more-interconnected-here-s-how/>>

³ Gurnani, C., 5G Isn't Just a Buzzword. It Will Change the World (2019) World Economic Forum <<https://www.weforum.org/stories/2019/01/here-s-how-5g-will-revolutionize-the-digital-world/>>

⁴ Andersen, D., The Path to “Full” 5G: Challenges and Opportunities in Standalone 5G Deployment (2024) OOKLA <<https://www.ookla.com/articles/the-path-to-standalone-5g-deployments>>

⁵ EU RSPG Draft Report RSPG24-030 FINAL, p. 6

⁶ Morris, I., The Slow March to Standalone 5G (2022) Light Reading <<https://www.lightreading.com/5g/the-slow-march-to-standalone-5g>>

⁷ Lennighan, M., EU Report Casts Doubt on 2030 Digital Targets (2023) Telecoms <<https://www.telecoms.com/wireless-networking/eu-report-casts-doubt-on-2030-digital-targets>>

⁸ Harvey, P., Why 5G Mobile Core Forecasts Keep Slipping (2024) Light Reading <<https://www.lightreading.com/mobile-core/why-5g-mobile-core-forecasts-keep-slipping>>

⁹ Morris, I., Data Traffic Growth or Decline – There's No Upside for Telecom (2024) Light Reading <<https://www.lightreading.com/5g/data-traffic-growth-or-decline-there-s-no-upside-for-telecom>>

¹⁰ Van Best, M., Decline, Rather Than Growth Seems To Be The Trend For The Mobile Data Market (2024) Techzine <<https://www.techzine.eu/blogs/infrastructure/125550/decline-rather-than-growth-seems-to-be-the-trend-for-the-mobile-data-market/>>

¹¹ Sherrington, S., Operators and Vendors Need to Plan For More Conservative Mobile Data Growth In The Near Future (2023) Analysys Mason <<https://www.analysysmason.com/research/content/articles/cellular-data-traffic-rdnt0/>>

¹² Wooden, A., The Telecoms Industry's Biggest Problem? Failure To Monetise 5G (2024) Telecoms <<https://www.telecoms.com/5g-6g/the-telecoms-industry-s-biggest-problem-failure-to-monetise-5g>>

¹³ Pegoraro, R., 6G Summit Brings Unusual Plea From Carriers: Slow Your Roll (2023) Light Reading <<https://www.lightreading.com/6g/6g-summit-brings-unusual-plea-from-carriers-slow-your-roll>>

¹⁴ Jackson, A., Nokia to Cut 14,000 Jobs by 2026, Blaming Slowing 5G Demand (2023) Mobile Magazine <<https://mobile-magazine.com/5g-and-iot/nokia-to-cut-14-000-jobs-by-2026-blaming-slowing-5g-demand>>

¹⁵ Ran Vendors, E., Ericsson Warns Low Operator 5G Spend is Not Sustainable (2024) Mobile World Live <<https://www.mobileworldlive.com/ranvendors/ericsson-warns-low-operator-5g-spend-is-not-sustainable/>>

¹⁶ Morris, I., Led by Ericsson, Mobile Traffic Forecasts Are Looking Suspect (2024) Light Reading <<https://www.lightreading.com/5g/led-by-ericsson-mobile-traffic-forecasts-are-looking-suspect>>

¹⁷ Koziol, M., 5G Networks Are Performing Worse. What's Going On? (2023) IEEE Spectrum <<https://spectrum.ieee.org/5g-rollout-disappointments>>

¹⁸ Webb, W., Why Cellular Will Not Deliver Low Latency (2024) LinkedIn <<https://www.linkedin.com/pulse/why-cellular-deliver-low-latency-william-webb-e3wbe/>>

that, at least in the United States, smartphone data traffic is driven primarily (**up to 90%**) by WiFi vis-à-vis mobile networks, including outside of users' homes.¹⁹

Today, touted 6G applications remind of those promised by 5G (XR/AR, IoT, Smart Cities, Autonomous Vehicles and Drones and robotic machines conducting complex tasks) with the addition of AI and sensing, whilst a sectorial survey by Telecoms.com Intelligence shows that, for industry insiders, 6G is currently the second most overhyped sectorial technology (39%) right after Generative AI (41%), highlighting how this could be the result of what was over-promised and under-delivered by 5G.^{20, 21}

Relevant voices (including the EU RSPG Draft Report in consideration) invite to consider 6G more as an evolution rather than a revolution.^{22,23} Likewise, Telecom consultant and relevant voice in the sector William Webb recently suggested the need for 6G to build on 4G, as “it may be that not all MNOs decide to adopt SA so 6G should be able to work with NSA. **The base station density will not be higher**, so any new frequency bands (**if needed**) must work with the existing grid structure. **Few of the 5G objectives [...] have been met, so 6G should [...] understand why metrics were not met and whether they are still important.**” [emphasis added]²⁴

With the world telecommunications community already spearheading with the development of the 6G / IMT-2030 standards, and given the mixed results of 5G rollout pointed above, Leaf Space questions whether a reality-check is needed on claims by some of the 6G proponents.

Leaf Space considers it in the interest of Europe to approach 6G in a balanced manner when dealing with 6G strategy and policies, so that *all* relevant stakeholders – including administrations, academia, equipment manufacturers, MNOs, use cases developers, end users, *and* potentially impacted incumbent spectrum users – contribute to and benefit from the definition of the next generation of mobile technology.

Such balanced approach can help the telecommunications community in better defining the 6th and any future generation of mobile technologies, and doing so with real sustainability, efficient use of spectrum, and maximisation of users benefit in mind.

¹⁹ Popov, A., Wi-Fi Drives Smartphone Data Consumption in the US, but Trends Vary Across Operators (2024) Open Signal

<<https://www.opensignal.com/2024/10/31/wi-fi-drives-smartphone-data-consumption-in-the-us-but-trends-vary-across-operators>>

²⁰ Satari, A., Annual Industry Survey 2024 Report (2024) Telecoms <<https://www.telecoms.com/communications-service-provider/annual-industry-survey-2024-report>>

²¹ Morris, I., 6G is Shaping Up to Disappoint, and The Industry Can Blame Itself (2023) LightReading <<https://www.lightreading.com/6g/6g-is-shaping-up-to-disappoint-and-the-industry-can-blame-itself>>

²² Buskirk, H., 6G More Likely an Evolution Than a Revolution, Experts Say (2023) Trade Law Daily <https://tradelawdaily.com/article/2023/02/17/6g-more-likely-an-evolution-than-a-revolution-experts-say-2302160057?BC=bc_67444df4d3058>

²³ Morris, I., Don't Expect A Revolution With 6G, Says ETSI Boss (2024) LightReading <<https://www.lightreading.com/6g/don-t-expect-a-revolution-with-6g-says-etsi-boss>>

²⁴ Webb, W., Why 6G Needs To Build on 4G (2024) LinkedIn <<https://www.linkedin.com/pulse/why-6g-needs-build-4g-william-webb-enxtf>>

2.1 Comments to “1.1 Input from stakeholders”

The Draft Report’s section **1.1 Input from stakeholders** reports that “Stakeholders stated a need of 200 MHz for each MNO in mid band spectrum. This would enable implementation of 6G use cases that require more capacity than 5G services and provide reasonable coverage in suburban/urban areas utilising the same base station towers as for 3.5 GHz.”²⁵

Leaf Space questions the measurability of whether real-life 6G use cases will require significantly more capacity than 5G services: as described further by the Draft Report itself, “most of the technological evolution provided with 5G is enabled by 5G SA”.²⁶ The report highlights that, “there are still a significant number of European MNOs in an intermediate stage of 5G adoption, as they maintain the massive use of 5G NSA without a clear perspective for adopting 5G SA”.²⁷ Given this lack of perspective to adopt 5G SA, and given 5G SA being the real enabler of the use cases which 5G was introduced for, Europe has yet to truly see the scale of capacity required by 5G SA, let alone future generations.

Similarly, this section reports that “Further, operators have expressed their need for more spectrum to provide increased network capacity in the coming years.”²⁸ **Leaf Space questions whether additional spectrum needs could be addressed, rather than identifying new bands, by refarming spectrum already in use by previous IMT generations, as well as spectrum already identified for IMT and not fully utilized yet,** such as that in mmWave bands, or the one identified during WRC-23²⁹.

2.2 Comments to “2.1 The Transition from 5G Non-Stand-Alone to 5G Stand-Alone”

In **2.1 The Transition from 5G Non-Stand-Alone to 5G Stand-Alone**³⁰ the Draft comments:

- “The change from a 4G to a 5G core network implementation in the early twenties was a big and risky step for mobile network operators to take, without very clear return of investment (ROI) prospects at that time.”
- “[...] most of the technological evolution provided with 5G is enabled by 5G SA.”
- “Currently, there are still a significant number of European MNOs in an intermediate stage of 5G adoption, as they maintain the massive use of 5G NSA without a clear perspective for adopting 5G SA.”

²⁵ Ibid., pp. 2-3

²⁶ Ibid., p. 5

²⁷ Ibid.

²⁸ Ibid., p. 3

²⁹ Satari, A., WRC-23 Wraps Up With New Low-To-Mid-Band Spectrum for IMT (2023) Telecoms <<https://www.telecoms.com/spectrum/wrc-23-wraps-up-with-new-low-to-mid-band-spectrum-for-imt>>

³⁰ EU RSPG Draft Report RSPG24-030 FINAL, pp. 5-6

- “This implies relevant limitations, innovative features of 5G, including network slicing based on the 5G SA version, preventing the deployment of relevant use cases.”
- “European operators had been relatively hesitant in making the transformation to 5G SA compared to the US and Asia due to system complexity and a limited SA supporting device ecosystem.”

With what highlighted in Draft Report section 2.1., **Leaf Space would consider relevant, for a European 6G Strategic Vision and for future policies, to address realistic measures on how, whether and at what cost European MNOs are expected, in the next 5 years, to:**

1. Continue investments and deployment of 5G SA;
2. Initiate investing in 6G equipment;
3. (potentially) bid resources and make nation-wide commitments to obtain and hold onto new spectrum;
4. Rollout initial/pioneer 6G services in 2030.

2.3 Comments to “3. Early Policy initiative on 6G”

In the section **3. Early Policy initiative on 6G**, the EU RSPG Draft Report reports that “Europe needs to be active in its actions towards 6G and contribute to the international harmonisation initiatives and promote the European interests.”³¹

Leaf Space agrees and support a strong and proactive Europe. In Leaf Space’s view, it **would be in the European interest to advocate internationally for a more balanced approach to 6G’s desired features, requirements and rollout timelines.**

Policies should particularly consider the already discussed doubts on ROI over 5G, the lack of appetite to build up 6G by operators, and the apparent decreasing growth rate in data consumption. **A more balanced and realistic set of expectations for 6G, ideally established internationally thanks to European contributions, would allow for European telecom stakeholders to realistically meet rollout plans rather than lag behind international competitors.**

For what concerns spectrum, in the same section , the Draft reports that “Except for 7125-7250 MHz, the European position at WRC-23 was to oppose studying additional IMT identifications in frequency bands where IMT would have the potential to jeopardise strategic and important European spectrum use with international footprint (satellite, maritime, aeronautical).”³²

³¹ Ibid.; p. 11

³² Ibid.

Leaf Space believes that spectrum not identified for IMT, as aligned with the European position at WRC-23, still remains strategic and important. The Geopolitical environment has not changed for the better since December 2023. As such, the spectrum between 7 and 24 GHz that was not considered fit for IMT by CEPT still remains unfit. Looking at WRC-27, it is clear that AI 1.7 is jeopardising strategic and important European spectrum use, and European policy should make clear from now that this spectrum cannot be threatened by future IMT allocations.

2.4 Comments to “4.2 6G usage scenarios and their implications on spectrum”

In **4.2 6G usage scenarios and their implications on spectrum** the EU RSPG Draft focuses among others on Massive Communication and Virtual Worlds.³³ This does not seem to differ significantly from the promises on Smart Cities, IoT and XR/AR uses cases that were connected to 5G. The report comments “Comparing with 5G, 6G intends to increase the number and density of connected devices”,³⁴ however **Leaf Space questions whether a comparison with 5G is currently appropriate in Europe: the delayed and still incomplete rollout of 5G SA as reported by the Draft, results in the impossibility to concretely measure the impact of 5G SA and the applications/devices that it will enable. Uncertainty surrounding the impact of 5G SA then could be transposed to uncertainty regarding predictions on the number and density of 6G connected devices.**

2.5 Comments to “8.2 6G goals for spectrum use”

In **8.2 6G goals for spectrum use**, the Draft reports on the goal of 6G to “Provide indoor coverage: Increasing volumes of indoor mobile data can be supported by 1) outdoor to indoor coverage from outdoor base stations in low and mid frequency ranges and/or 2) Indoor to indoor coverage with indoor radio solutions in higher frequency ranges.”³⁵

Leaf Space is in support of improved indoor coverage. However, **Leaf Space does not consider identifying additional spectrum for IMT a solution for this next generation of mobile technology**. As discussed at the beginning of this document, WiFi seems to be having a predominant role in mobile traffic consumption:³⁶ to better serve the average technology-agnostic user, **a growing and seamless integration between WIFI and Cellular coverage could be beneficial, and serve the “Service Continuity” 6G goal for spectrum use as identified by the draft report.**³⁷ This convergence could be advocated for by Europe, for

³³ Ibid., p. 14

³⁴ Ibid., p. 15

³⁵ Ibid., p. 27

³⁶ Popov, A., Wi-Fi Drives Smartphone Data Consumption In The US, But Trends Vary Across Operators (2024) Open Signal <<https://www.opensignal.com/2024/10/31/wi-fi-drives-smartphone-data-consumption-in-the-us-but-trends-vary-across-operators>>

³⁷ EU RSPG Draft Report RSPG24-030 FINAL, p. 27

instance, leveraging 6 GHz bands identified respectively for WiFi and IMT during WRC-23.

2.6 Comments to “8.4 Spectrum implications of use cases”

In **8.4 Spectrum implications of use cases**, the Draft reports that “since achievable data rate and capacity in low frequency band deployments is limited, higher frequency bands (sub-7 GHz) are claimed to be needed by stakeholders, including the upper 6 GHz band, as well as new bands in the 7-15 GHz range, which would supplement low band deployments to achieve the needed capacity for both existing and new use cases, for instance in urban and sub-urban environments. The lower the frequency within 7-15 GHz, the better (e.g., 7/8 GHz).”³⁸

In the light of discussions of low appetite to increase densification of stations, fully deploy 5G SA, bid and pay for additional spectrum currently not identified nor harmonized for IMT, **Leaf Space argues whether mid-bands such as the 7/8 GHz or higher are really needed, and if the effort to clear them from incumbents is truly justified. Compared to low-band spectrum, these higher bands will have worse propagation AND will not be able to be properly leveraged for outdoor-to-indoor coverage (in contrast with the urban and sub-urban environments” context described), whilst would require significant efforts for MNOs to properly integrate them in existing or new grids.**

2.7 Comments to “8.5 6G spectrum ecosystem stakeholders, roles and motivations”

In **8.5 6G spectrum ecosystem stakeholders, roles and motivations**, the Draft reports the position of Mobile Network Operators as “6G is expected to be deployed in the same frequency bands as earlier generations. Nationwide area coverage can be achieved using sub-GHz (below 1 GHz) spectrum while spectrum in the 1-6 GHz range as well as new bands (e.g., Upper 6 GHz and 7/8 GHz (or parts thereof)) can be used for coverage and capacity and can re-use existing base station grids.”³⁹ **Leaf Space notes the inconsistency between the expectation of MNOs that 6G will be deployed in the same bands as earlier generations vis-à-vis the need for new bands. Additionally, Leaf Space also questions the feasibility of deploying 6G by re-using existing base-station grids, in particular when European MNOs are hesitant in deploying 5G SA, on which 6G should be based.**

³⁸ Ibid., p. 28

³⁹ Ibid.

2.8 Comments to “8.7 Launch readiness for 6G in 2030 for mass market for services and equipment”

In **8.7 Launch readiness for 6G in 2030 for mass market for services and equipment** the Draft highlights how “Coverage is crucial. Indoor coverage as well as remote and rural area coverage present challenges and should be a priority in the 6G era”.⁴⁰ **Leaf Space strongly agrees and thinks a good approach for Europe would be, for instance, that of supporting convergence and interoperability of the 6G (outdoor) and WIFI (indoor) standards, leveraging 6GHz bands and already established users habits.**

The same section also reports that “Technology developments aiming at efficiency enhancement can reduce the actual capacity demands. Especially the role of edge computing and increasing processing power in end devices will reduce the amount of data that needs to be transferred. **This needs to be accounted in spectrum needs** [emphasis added].”⁴¹ **Leaf Space is of the opinion that a sustainable 6G policy should incentivize this reduction of data transferred in the name of efficient use of spectrum, rather than second larger bandwidths of spectrums identified for IMT and assigned to MNOs irrespective of the effort to move data efficiently.**

Similarly, the section argues that “What matters is making the same spectrum bands available in different European countries for achieving economies of scale.”⁴² **Leaf Space would agree, and it is of the opinion that with 5G spectrum already harmonized, it is not necessary for Europe to work towards additional spectrum for IMT as of today.** This would in fact require, prior to being able to rollout 6G Europe-wide:

1. Work to identify a European position on new spectrum to open up;
2. Work internationally, within the WRC process, for the identification of this spectrum for IMT;
3. Approve its usage at the European level after WRC, for instance by transposing it into the European Common Allocation Table;
4. Have 27 separate member states work towards internal harmonization and clearance.

IMT spectrum already exists, it is identified and harmonized across Europe (and, in some bands as mmWave bands, underutilized). A faster 6G rollout can be enabled by selecting existing, already identified spectrum.

⁴⁰ Ibid. p. 30

⁴¹ Ibid.

⁴² Ibid.

2.9 Comments to “8.9 Role of license exempt spectrum”

In **8.9 Role of license exempt spectrum**, the Report notes “Understanding and accepting the roles of different wireless technologies without biases, especially in the context of indoor usage, is important. End users use a variety of wireless technologies in a variety of spectrum bands under different spectrum access models without noticing it or the need to notice it. Unnecessary confrontations emphasising communities (e.g., WiFi/3GPP/satellite community) are not helpful in promoting digitalisation of societies but have created barriers.”⁴³

Leaf Space strongly supports this view. With this in mind, Leaf Space would encourage Europe to explore seamless interoperability between wireless technologies such as WiFi and 6G: 6G would not require additional spectrum for indoor coverage, if interoperable with and/or properly complemented by WiFi.

2.10 Comments to “8.12 Sustainability”

The Draft Section **8.12 Sustainability** focuses on the need for 6G to address sustainability, with the Draft reporting “Overall goal is to maximise positive sustainability impacts and minimise negative impacts”.⁴⁴ **It is Leaf Space’s opinion that positive or negative sustainability impacts should also take into consideration the impact of forcing existing incumbent spectrum users to relocate from bands that become identified for IMT.**

A clear example of this is the 7/8 GHz band as currently discussed by AI 1.7 of WRC-27. Incumbents in this band are satellite operators in the MetSat and Earth Exploration Satellite Services. No other band is currently available on a primary basis for these services, with the 26 GHz allocation being secondary in Europe, as identified for IMT by WRC-2019. **MetSat and EESS satellites are vital in weather forecasting, climate monitoring, crisis prevention, mitigation, and management. Losing access to data from these satellites would have a strong impact on sustainability.**^{45,46}

2.11 Comments to “9.2 View from operators”

In **9.2 Views from operators**, the Draft reports that “Mid band spectrum providing wider channels of at least 200 MHz per operator, e.g. in 6 GHz, is key to provide full blown 5G SA as a basis to implement 6G, and to achieve national and international digitisation goals.”⁴⁷ **Given the status of 5G SA deployment and the uncertainty of data consumption as both highlighted in the Draft Report section 8.7, Leaf Space questions the need for the**

⁴³ Ibid., p. 32

⁴⁴ Ibid., p. 33

⁴⁵ Feldscher, J., EO Providers Defend Their Spectrum Access (2024) Payload <<https://payloadspace.com/eo-providers-defend-their-spectrum-access/>>

⁴⁶ Various, Bridging Space and Earth: The role of 7/8 GHz in Delivering Space-Based Insights (2024) <<https://payloadspace.com/wp-content/uploads/2024/10/EESS-Xband-White-Paper-V2.4.pdf>>

⁴⁷ EU RSPG Draft Report RSPG24-030 FINAL, p. 35

identification of additional IMT spectrum. Lower-than-projected ROI, rollout network complexities, and decreasing data consumption growth rates seem to be the reason behind a slow 5G SA uptake, rather than lack of additional IMT spectrum.

2.12 Comments to “10 Spectrum for launching 6G in EU and paving its initial development”

In **10 Spectrum for launching 6G in EU and paving its initial development**, the Draft outlines how the following bands are identified by the RSPG as suitable candidates for 6G:

- “Spectrum bands already harmonised for ECS (WBB) under EU Spectrum Decisions
 - Low bands: 700 MHz, 800 MHz, 900 MHz
 - Mid bands: 1800 MHz, 2 GHz, 2.6 GHz, 3.6 GHz
 - High bands: 26 GHz, 42 GHz
- Spectrum band 3.8-4.2 GHz for low/medium power local area networks (under harmonisation)
- 6425-7125 MHz is already identified for IMT at international level and also used for the implementation of wireless access systems (WAS), including radio local area networks (RLANs). This band is subject to RSPG investigation on its long-term use”⁴⁸

Leaf Space supports the use and reuse of bands already identified for IMT at the European level. Being these bands already harmonized or under harmonization, these will more quickly be available for an initial 6G rollout by 2030.

The same section further remarks that “RSPG noted that the following spectrum bands on the WRCs agenda (WRC 27 or WRC 31) are subject to many uncertainties.

- Spectrum bands to be studied at WRC 27: 4400-4800 MHz, 7125-7250 MHz and 7750-8400 MHz (or parts thereof), 14.8-15.35 GHz. However, due to European strategic usages, CEPT opposed at WRC 23 to study frequency bands listed in WRC AI 1.7 except 7125-7250 MHz. This position and European strategic usages that remain valid will impact any future positions to be developed for WRC 27.”⁴⁹

Leaf Space keeps supporting the CEPT position for WRC-23. Geopolitical and strategic scenarios have not changed (for the better, at least) in 2024.

Leaf Space considers the WRC-27 AI 1.7 a threat to European strategic positioning globally. The bands under study in the AI 1.7 are NATO-harmonised, and the 7/8 GHz band is a lifeline for remote sensing and weather forecasting satellites.⁵⁰

⁴⁸ Ibid., p. 36

⁴⁹ Ibid.

⁵⁰ Various, Bridging Space and Earth: The role of 7/8 GHz in Delivering Space-Based Insights (2024) <<https://payloadspace.com/wp-content/uploads/2024/10/EESS-Xband-White-Paper-V2.4.pdf>>

Looking at ITU filings,^{51, 52} in fact, the X-band is utilized by:

1. the EU Earth Observation Programme Copernicus,
2. the European Weather Forecasting satellite fleet operated by EUMETSAT,
3. the various national space earth observation assets of EU Member States such as those of France, Germany and Italy.

Additionally, the band is utilized or will be utilized by satellite systems **part of NextGeneration EU-funded programmes** such as the Italian IRIDE programme,⁵³ Greece's National Satellite Space Project,⁵⁴ or Spain's Atlantic Constellation,⁵⁵ among others.

2.13 Comments to "10.1 Densification of public mobile network"

In **10.1 Densification of public mobile network**, the Draft reports that "Introducing new spectrum bands to existing base stations has a smaller environmental impact than densifying networks by building new base station locations."⁵⁶

Leaf Space would argue that this is true only for low-band frequencies, given that new mid-band or higher band spectrum would suffer from higher propagation losses and result in need for a higher number of base stations to provide the same coverage.

2.14 Comments to "10.2.2 A need for coordinated timing and new band(s)"

In **10.2.2 A need for coordinated timing and new band(s)**, the Draft reports that "Coordinated timing for a launch of 6G services does not appear practical at EU level in current harmonised bands due to different timings of national awards and technology neutrality, including operators' migration plans for switching to new technologies. Timing of 6G launch will depend on mobile operator's strategy, availability of spectrum resources and expiration dates of existing authorisations."⁵⁷ On the basis of this, the Draft suggests that "Therefore, coordinated timing for 6G launch in EU only seems possible in new spectrum band(s)."⁵⁸ Leaf Space does not agree with this statement. Identifying, harmonizing, clearing, and then auctioning bands is an effort that would require multiple years across the different Member States, with each member states having, as outlined by the report itself, different timings of national awards, etc.

⁵¹ ITU Space Network List Online, List of non-geostationary satellites in non-planned services operating in frequency range from 8025 MHz to 8400 MHz <<https://tinyurl.com/mrhwb8wn>>

⁵² ITU Space Network List Online, List of geostationary satellites in non-planned services operating in frequency range from 8025 MHz to 8400 MHz and longitude range from -180 ° to 180 ° <<https://tinyurl.com/46w23y4e>>

⁵³ https://www.esa.int/Applications/Observing_the_Earth/Moving_ahead_with_Italy_s_constellation_of_Earth_observation_satellites

⁵⁴ Moving Ahead With Italy's Constellation of Earth Observation Satellites (2024) European Space Agency <https://www.esa.int/Applications/Observing_the_Earth/ESA_signs_contracts_advancing_Greece_s_Earth_observation_capabilities>

⁵⁵ Parsonson, A., Spain Partner with ESA to Build €80M Atlantic Constellation (2023) European Spaceflight <<https://europeanspaceflight.com/spain-partner-with-esa-to-build-80m-euro-atlantic-constellation/>>

⁵⁶ EU RSPG Draft Report RSPG24-030 FINAL, p. 37

⁵⁷ Ibid., p.38

⁵⁸ Ibid.

Particularly, if the identification of new spectrum is tied to the WRC process, one could expect European Member States to initiate transposing international and European decisions only from after 2028, and with only the most experienced Member States (and those with better staffed Authorities) able to follow through similar timelines. Given this, Leaf Space questions the feasibility of a 2030 6G initial rollout unless already-harmonised spectrum is not selected for the endeavour.

3 Conclusion

In conclusion, Leaf Space considers imperative for Europe that the approach to 6G development and deployment does not replicate the challenges experienced with 5G. A balanced strategy must be adopted, one that considers the lessons learned from previous generations of mobile technology to ensure sustainable, efficient, and maximally beneficial outcomes for all stakeholders.

Leaf Space firmly believes that 6G does not necessitate the identification of new spectrum, but rather should make optimal use of the existing bands already identified for IMT, being these harmonized or under harmonization. This includes leveraging underutilized spectrum, such as the mmWave bands, which still hold significant potential for enhancing network capabilities without the need for further spectrum allocation.

Leaf Space considers vital for Europe to advocate for a balanced approach to 6G, ensuring not only that European operators and use cases developers can keep pace with international developments but also that the sustainability of existing services is not compromised in the rush to deploy new technologies. In doing so, Europe can lead by example, promoting an international consensus on 6G that prioritizes spectrum efficiency, technological interoperability, and long-term sustainability over short-term gains.

Finally, the geopolitical landscape, strategic considerations, and the current spectrum utilization landscape underscore the importance of maintaining the position taken by CEPT at WRC-23, also for future World Radiocommunication Conferences. The WRC-27 Agenda Item 1.7 poses a significant threat to European strategic stances globally, for instance with regards to military communications within the framework of NATO, as well as with regards to satellite services critical for Earth observation and weather forecasting.



SPACE CONNECTED, LIMITS GONE.