



European Space Policy Institute

C-Band, Satellites and 5G

1. *The U.S. C-band story - transitioning the use of C-band from satellite to mobile wireless*

The utility of the 3.4 - 4.2 GHz C-band spectrum in enabling the roll-out of 5G mobile networks, on top of other commonly recognized bands for 5G, such as 700 MHz or 26 GHz, has yielded quarrels among satellite operators, mobile network operators (MNOs) and regulatory authorities. The most prominent case has been lately playing out in the USA. After few years of discussions and authorizing the 3.55 - 3.7 GHz for commercial wireless operations in 2015, in November 2019 the Federal Communications Commission (FCC) decided for clearing of lower 280 MHz of the 3.7 – 4.2 GHz range. Historically, the 3.7 – 4.2 GHz band has been instrumental for SATCOM business

In March 2020, the FCC released the final decision on repurposing the C-band spectrum. The lower 280 MHz of the 3.7 - 4.2 GHz range shall be cleared no later than December 5, 2025. The public auction for frequencies is scheduled to take place in December 2020 with MNOs bidding for spectrum rights currently held by satellite operators. Satellite operators involved in the process (Intelsat, SES, Eutelsat, Telesat and Claro) need to migrate their C-band services to 4.0 - 4.2 GHz, for which they will be:

- **reimbursed for relocation costs** associated with moving out of the spectrum (\$3.5 - \$5.2 billion for procurement of new satellites, TT&C and gateway consolidation, technology upgrades...);
- **entitled to receive accelerated relocation payments** totalling \$9.7 billion if they commit to, and succeed in, clearing the spectrum early (there are two specific deadlines for this purpose – in December 2021 and December 2023).

2. *U.S. industry secured all of the related satellite manufacturing contracts so far*

To meet these deadlines for accelerated payments, eligible satellite operators, including Luxembourg-based SES and Paris-based Eutelsat, commenced the procurement of new C-band satellites. Intelsat and SES, both taking up individually more than 40% of U.S. satellite C-band market, announced contracts, so far, for manufacturing of 10 new spacecraft in total. A few more orders are still expected.

A noticeable fact, from a European perspective, is that none of these new contracts was signed with European satellite manufacturers (4 for Northrop Grumman, 4 for Maxar, 2 for Boeing). A few more orders to be announced will likely be given to U.S. industry too. As European Airbus and Thales Alenia Space are usually successful in the GEO market, this is an extraordinarily favourable result for the U.S. space industry. It could be also expected that related launches in 2022 / 2023 will be mostly supplied to U.S. launch providers. In this context, SES already announced it will use U.S. launch services.

How can this situation be interpreted? Public sources do not provide for an evidence of a mandatory “buy U.S.” policy for satellite operators in this matter. FCC Chair Ajit Pai stated such measure could be considered exclusively if there were national security concerns. An absence of a “buy U.S.” obligation was criticised by one U.S. Senator. In 2018, before the decision was made to proceed with public auction, eligible satellite operators proposed to commit to buy U.S.-made satellites, should FCC allow them to proceed with a private sale of spectrum rights to MNOs. Such offer, however, was not explicitly reiterated after FCC eventually decided for a public auction in 2019. In this context, the possible explanations of no orders to European satellite manufacturers are either:

- market mechanisms (free and open competition between manufacturers); or
- some kind a “soft pressure” from U.S. public authorities, leveraging e.g. publicly unknown conditions of accelerated payments or some other form of concealed governmental incentives.

Be it one or the other, both scenarios pose ramifications for the European space industry and policy. If the market forces are the main factor of the success of U.S. satellite manufacturers, then the question of the competitiveness of the European space industry at foreign markets comes into consideration. If it is the soft pressure scenario, then this is an evidence of dedicated U.S. procurement policy tools in support of domestic industries, something which is comparably less utilised in European space policy.

3. *Can a comparable C-band repurposing process be expected in Europe?*

Unsurprisingly, European countries and the EU are highly motivated in launching 5G mobile networks. Similarly to other global actors, Europe has also recognized the importance of C-band in expanding available frequencies for 5G. However, a scenario comparable to the U.S. one, in terms of the scale of C-band repurposing or financial incentives for accelerated clearing, is unlikely to materialize, due to:

- **Different usage of C-band for satellite services in Europe** – Europe witnesses a diminishing use of legacy C-band applications vis-à-vis fibre or satellite services in Ku- and Ka-bands. Also, in Europe, C-Band is not used as much for satellite TV broadcasting.
- **No pan-European spectrum allocation** – Allocation of spectrum rights in Europe is done nationally, leading to few dozens of individual national processes, which are somewhat coordinated but not formally harmonized.
- **Ongoing allocations in Europe targeting different portion of C-band for 5G** – Spectrum allocations for 5G in Europe in the C-band are, for now, targeting mostly lower frequencies in 3.4 - 3.8 GHz, not putting a substantial pressure to satellite services in 3.7 - 4.2 GHz, as in the USA.
- **Unique geopolitical motives associated with fast delivery of 5G** – The large-scale roll-out of next-gen mobile networks is now a part of the geopolitical Sino-American rivalry. Comparable competitive dynamics are not visible in Europe at the moment.

4. *Outstanding questions for SATCOM*

Although Europe does not face a C-band turmoil similar to the U.S. one, the apparent pressure on satellite operators by MNOs in spectrum affairs will likely persist and maybe even increase. The latest ITU's World Radio Conference (WRC) in 2019 greatly expanded available frequencies for mobile networks (17.25 GHz compared to 1.9 GHz available before). Other satellite frequencies (such as the Ku-band in 10.7 - 11.7 GHz) are now being considered for repurposing to mobile networks as well.

Therefore, the recent U.S. C-band story might not be an isolated process, but rather a milestone of the ongoing evolution of the connectivity paradigm. In this context, two outstanding questions arise:

- **Should spectrum allocations be decided upon on pure economic grounds?** If so, then a further decrease of the SATCOM business might lead to an additional repurposing of spectrum rights from satellite services to terrestrial wireless operations. This raises concerns regarding the long-term perspective for satellite communications if deprived from strategic asset of spectrum.
- **What is the place of satellite operators in the broader telecommunications domain?** The era of fully independent terrestrial and satellite communications networks is most likely over. The key challenge for SATCOM in the current framework is to ensure complementarity with terrestrial infrastructure on 5G as well as a full and seamless integration with ground networks.

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European Space Policy Institute, ESPI
Schwarzenbergplatz 6 • A-1030 Vienna • Austria

Tel: +43 1 718 11 18 -0 / Fax: -99

Email: office@espi.or.at

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