

Ofcom Consultation: Non-geostationary satellite systems - Licensing updates

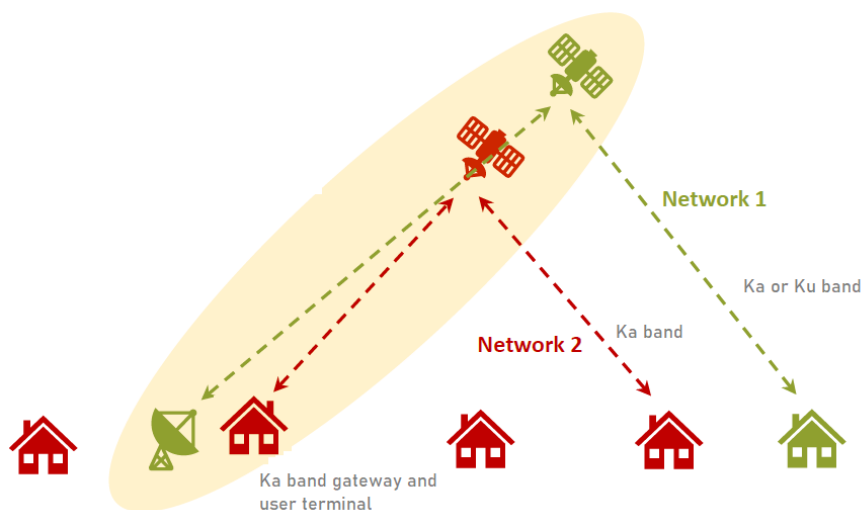
Response from: Mangata Networks Ltd

Date: 27 September 2021

**Note: references to certain sections of the Ofcom consultation document are marked with the section symbol “§” (§ x.y)**

***Question 1: Do you have any comments on our assessment of the interference challenges raised by NGSO systems and their potential impact on a) service quality; and b) competition?***

1.1 The Consultation document (§ 3.5) identifies two inline events. There is another inline event (or a variant of that shown in Fig 4 – inline events: Gateway links) to be considered; involving Ka band gateway links and Ka band user links as shown in the figure below.



The interference scenario (amongst others) to be noted is the inline event that relates to the Ka band gateway link (of network 1) causing interference to the Ka band satellite receiver (of network 2), which receives signals from user terminals operating in network 2. It should be noted that in this scenario, the satellite could suffer interference over a longer period of time due to the high power of the gateway (even after taking into account the narrower beamwidth of the gateway). Interference caused to the satellite could make the service from this satellite unavailable to all, if not most, of its users over a longer period of time. For this reason, careful consideration should be given to the location of such Ka band gateways, if possible, to locate them away from populated areas and require the gateway operator to enter into necessary coordination/spectrum sharing agreements with other Ka band NGSO operators.

1.2 We agree with the statement “...the challenges of managing interference between NGSO systems could have implications for competition”. For instance, a system deploying a mega-constellation (with the associated requirement for larger number of gateway stations) would cause more inline events to another NGSO system. If the other system has a smaller constellation, then the smaller constellation/system could be burdened with significantly more interference management responsibilities. Unless the mega-constellation is required to take measures to avoid such a burden on a smaller constellation, this could have the effect of lessening competition.

1.3 The consultation makes it clear (see § 2.16) when setting licensing conditions etc for NGSO systems, Ofcom's focus was limited to the interference management considerations in the UK<sup>1</sup>. We expect that it is clear to Ofcom that almost all NGSO systems plan to offer worldwide services and therefore the evaluation of interference situations and the associated interference mitigation will be carried out on a regional if not on a worldwide basis, and will not be limited or unique to the UK. To this end, it may be beneficial for both regulators and satellite operators to look for, as a minimum, a pan-European approach for a NGSO spectrum management framework (including licensing), established through the CEPT, similar to the approaches taken in the past for NGSO/S-PCS (LEOs above 1 GHz and below 1 GHz). Also see our response to Question 2.

***Question 2: Do you have any comments on our approach to dealing with the interference challenges raised by NGSO systems?***

2.1 The consultation document, for the reasons stated therein, does not discuss interference mitigation techniques. However, it should be noted that in the case of interference between NGSO systems, the interference mitigation techniques available are limited to look aside and band segmentation (use of opposite polarisation would also assist some extent). It also follows that a system deploying a mega-constellations will have more potential to cause inline events and equally will have more freedom to implement look aside and band segmentation (due to the greater number of satellites visible to gateways/user terminals) compared to a system deploying a smaller constellation. For this reason, a mega-constellation should be placed with greater responsibility for mitigating inline interference.

2.2 Ofcom stated that its application process would include (see §1) *"....a check that systems being licensed can coexist without degrading consumer services"*. This would only be possible if Ofcom proactively engages in ensuring that this condition is met. We propose the following to be considered for licensing conditions of NGSO systems:

- i) the NGSO system being considered for licensing should be the "actual operational system" that has been notified to the ITU or to be notified to the ITU by the administration of the operator (actual operational system characteristics may differ from those notified, but should place the system within the interference envelope of the notified system);
- ii) the applicant has entered into coexistence agreements with other UK licensed NGSO operators or its assurance that such agreements will be concluded in due course (if such agreements are being negotiated at the time of application), and also the assurance that applicants and licensees are willing enter into similar agreements with applicants for later deployed NGSO systems. To this end applicants (also existing licensees) should share system information, including ephemeris data with other UK licensees/applicants. This will contribute towards compliance with Ofcom's statement on competition (see § 3.23);
- iii) Licensees should notify Ofcom of any changes to their operational systems, prior to implementation, with necessary technical assessments to demonstrate that such changes do not affect other licensed systems (or those under consideration to be licensed). In case such changes result in an increase in interference or making the system more susceptible to interference, then the licensee should be required to demonstrate that it has reached necessary agreements with other operators (licensed or to be licensed) or has realistic proposals to overcome such difficulties by conducting negotiations with others, if relevant, under the ITU process. [Note, this comment recognises that an operator may change its operational characteristics but still remain within the characteristics notified to the ITU]

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<sup>1</sup> There could also be additional international or bilateral issues to be considered. For example, a Ka band gateway station located/licensed in the UK could cause interference to a satellite (as illustrated in 1.1 above) offering services to user terminals in a neighbouring European country or in international waters/airspace.

***Question 3: Do you have any comments on the proposed updates to our process for NGSO gateway and network licences?***

3.1 Ofcom proposes to offer a 4 week commenting period on applications published by Ofcom. This is most welcome. However, given the complex nature of NGSO systems, it is necessary to ensure at the outset that the application for a licence is so designed to capture all required information that would allow the public to comment in a meaningful way. To this end it would be beneficial for Ofcom consult the industry (for example, through its national satellite consultative committee) on the preparation of applications for the gateway licence and the network licence.

3.2 Ofcom should not that Ka band gateways in the UK has the potential to constrain the deployment of not only other Ka band gateways, but also Ka band user terminals of other systems (as illustrated in our response at 1.1 above), therefore Ofcom should consider appropriate measures to overcome such limitations, for instance by requiring such gateways to be located away from populated areas and require the gateway operator to enter into a necessary coordination/spectrum sharing agreements with other Ka band NGSO operators.

3.2. Ofcom discussed (§ 4.16) the need for credible evidence on coexistence. It will be necessary for the veracity of such statements and the practicability of implementing such methods to be judged by Ofcom and peer reviewed at public consultations. If at a later date if such statements were to be proved inaccurate, it would be necessary for Ofcom be in a position to require the licensee to apply measures to mitigate the situation or in the absence of such measures, apply appropriate sanctions on the applicant. In updating the NGSO gateway and network licences Ofcom should consider the points we made in our response at 2.2 above) reproduced below for ease of reference.

- i) the NGSO system being considered for licensing should be the “actual operational system” that has been notified to the ITU or to be notified to the ITU by the administration of the operator (actual operational system characteristics may differ from those notified, but should place the system within the interference envelope of the notified system);
- ii) the applicant has entered into coexistence agreements with other UK licensed NGSO operators or its assurance that such agreements will be concluded in due course (if such agreements are being negotiated at the time of application), and also the assurance that applicants and licensees are willing enter into similar agreements with applicants for later deployed NGSO systems. To this end applicants (also existing licensees) should share system information, including ephemeris data with other UK licensees/applicants. This will contribute towards compliance with Ofcom’s statement on competition (see § 3.23);
- iii) Licensees should notify Ofcom of any changes to their operational systems, prior to implementation, with necessary technical assessments to demonstrate that such changes do not affect other licensed systems (or those under consideration to be licensed). In case such changes result in an increase in interference or making the system more susceptible to interference, then the licensee should be required to demonstrate that it has reached necessary agreements with other operators (licensed or to be licensed) or has realistic proposals to overcome such difficulties by conducting negotiations with others, if relevant, under the ITU process. [Note, this comment recognises that an operator may change its operational characteristics but still remain within the characteristics notified to the ITU]

***Question 4: Do you have any comments on the proposed updates to existing and new NGSO network licences?***

4.1 Please note many of the comments we have made under Question 3 above also apply to this question.

***Question 5: Do you have any comments on the proposed updates to existing and new NGSO gateway licences?***

5.1 As illustrated in our response at 1.1 above NGSO satellite systems operating with Ka band gateways and located in the UK have the potential to cause interference to Ka band user terminals located in the UK. Therefore, those currently holding Ka band gateway licences and any new applicants for Ka band gateway licences should be required (possibly in association with the satellite operator, if the satellite operator is a separate party) to engage in coordination with other UK licenced Ka band operators or those seeking licences in the UK, to resolve any potential interference situations.

5.2 Mention was also made to the possibility of NGSO satellite systems operating with gateways at Ka band in the UK causing interference to user terminals located outside the UK, including those in international waters/airspace. Such interference situations may be brought to the attention of Ofcom by other administrations or operators. The Ka band gateway licensees should be required (possibly in association with the satellite operator, if the satellite operator is a separate party) to engage in coordination with affected system operators (or administrations) to resolve any potential interference situations.

5.3 With respect to the situations mentioned above, if the gateway operator is not the same legal entity as the satellite operator, it may be necessary for the gateway operator to have a back to back legally binding agreement with the satellite operator (who should be a network licence holder) to ensure that:

- i) any licence conditions imposed on the gateway operator could also be made binding on the satellite operator;
- ii) any directions issued by Ofcom to the gateway operator (for example to mitigate any national or international interference situations) be communicated to the satellite operator, requiring the satellite operator to act on such directions without delay.

***Question 6: Do you agree with our proposal regarding NGSO terminals operating in Ka band?***

6.1 We agree with the proposals made. Rescinding licence exemption from Ka band land terminals would provide a level playing field for all satellite operators who plan to offer services in the UK. It will also prohibit any satellite operator, who may not be licensed in the UK or subjected to the same licensing conditions as other UK licensees, seeking to provide services to land terminals, thus causing possible interference situations.

6.2 Since the consideration of exemption of Ka band land terminals originated from CEPT regulations (ECC Decision) this matter should be brought to the attention of the CEPT (WGFM/FM44), also with a view to implementing a revised pan European (CEPT) regulatory framework addressing NGSO in general. Also see our comment at 1.3 above.