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16 November 2016

Dear Sir, Madam,

RE: EETT Public Consultation for MSS - AERO CGC

I am delighted to enclose on behalf of **Inmarsat Ventures Limited** (in Annex) a response to the **EETT Public Consultation for MSS - AERO CGC.**

Inmarsat welcomes and commends the EETT's overall initiative to open this consultation, as it seeks to implement a regulatory framework to finally authorise Inmarsat's use of the 2GHz spectrum - specifically the 1980–1995 MHz / 2170–2185 MHz bands awarded pursuant to Commission Decision 449/2009/EC of 13 May 2009 – for the provision of Inmarsat's planned aviation mobile satellite services in Greece (the "European Aviation Network"). This initiative follows in the footsteps of a number of other European Member States that have equally embraced Inmarsat's planned 2GHz MSS/CGC network (EAN) and have introduced an appropriate framework to authorise it.

We look forward to engaging further with the EETT on this matter, together with our local EAN partners, and we remain at your full disposal should you require any further information or assistance.

Sincerely,

Ann Vandenbroucke
Director, International Policy and Regulatory Issues
Inmarsat Plc

Annex:

Inmarsat Response to EETT Public Consultation for MSS - AERO CGC

A. Responses to Questions in Appendix C:

1) Do you agree with the proposed Regulation on the Terms of Use? Justify your answer.

Inmarsat welcomes the EETT's general proposal (under Annex A) for an amendment to the existing EETT regulation on 2GHz MSS terms of use to include a new category of authorisation specifically for Inmarsat's planned use of CGC for Aeronautical services (i.e. the Aero CGCs forming part of European Aviation Network).

Inmarsat welcomes and fully agrees with the EETT's analysis that has led to this proposal – i.e. that the EU Decisions on 2GHz MSS do not in any way prohibit such use of CGC. Furthermore, retaining the existing licensing option allows flexibility for the two selected satellite operators to opt and apply for the one they deem most appropriate when applying for the required MSS 2GHz CGC authorisation, in full respect to the specific type of services being offered and the market in question.

Notwithstanding the above, Inmarsat would like to comment on just two technical aspects of the proposed amendments to the regulation on terms of use under Annex A:

i) EETT proposals relating to ECC Report 233

The EETT proposes that the operation of aeronautical CGC terminals and Aero CGC stations not be allowed on the ground or at a height of less than 3000 meters from the surface. Inmarsat however believes that the EETT *could* authorise the operation of aeronautical CGC terminals at any altitude above 1000m and that to do so would not cause interference to other users in the adjacent frequency bands. A minimum operating limit of 1000m would result in a better service for aircraft passengers in Greece, allowing passengers to use on-board Wi-Fi during longer portions of the flight, particularly during most of the ascent and decent phase.

ECC Report 233 analysed the impact of aeronautical CGC terminals operating with a minimum altitude of 1000m and determined that additional mitigation was required to protect some other services in the adjacent frequency band. With regard to potential interference from the aeronautical CGC terminal transmitting to the Aero CGC ground station to mobile networks

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operating below 1980 MHz (scenario 2 in Report 233), the Report identifies two mitigations that can be applied to ensure that excessive interference is not caused when operating with a minimum altitude of 1000m. Those mitigations are "Improved Tx filtering" or "e.i.r.p. reduction depending on aircraft altitude". The ETSI standard applicable to the aeronautical terminal transmitting to the CGC ground station (ETSI EN 302 574-2) has been recently revised and has implemented improved transmitter filtering, as suggested by Report 233. In the new ETSI harmonised standard, the required ACLR value is 44 dB, compared with 37 dB assumed in Report 233. Aeronautical terminals will comply with ETSI EN 302 574-2 and hence will be able to operate with a minimum altitude of 1000m, consistent with Report 233, without causing interference to users in the adjacent frequency bands.

Incidentally, we note that according to the information provided in the consultation document, the closest use of the band below 1980 MHz for a mobile system is the band 1950.3-1965.3 MHz which is licensed to COSMOTE. This apparently leaves a guard band of 14.7 MHz with respect to MSS operations above 1980 MHz. Even if the band below 1980 MHz (i.e. 1965.3-1980 MHz) were to be licensed for mobile operations in the future in Greece, there would be no risk of excessive interference to that system.

We note that EETT suggests that: "Additionally, the possibility of a transmitting power control feature must exist". Although the Inmarsat CGC terminals will indeed use power control for communication with the ground station, power control is not necessary to provide for adjacent band compatibility provided that the additional filtering referred to above is implemented. Consequently we suggest that the EETT requires that aeronautical terminals communicating with the ground station be required to meet the requirements of ETSI standard EN 302 574-2 ~~and to~~ which in effect comes down to operating with a minimum altitude of 1000m. With the inclusion of a reference to the general requirements of EN 30 574-2 , there should be no need for any further technical conditions or requirements on Inmarsat's general operations in Greece.

There will be occasions where aeronautical terminals will need to be tested when the aircraft is on the ground outside of the hangar. This would be limited to test or maintenance purposes such as during equipment installation and not for day-to-day operations of the system. We request that EETT makes provision in the national regulations for such operations at airports in Greece.

ii) EETT proposals relating to ECC Report 66

Inmarsat notes that EETT refers to ECC Report 66 as a proposed "Additional Requirement" in Annex A of the consultation document. This does not appear to be a valid reference when considering the operation of Inmarsat's European Aviation Network (EAN). The currently available ECC Report 66 does not apply to the 2 GHz MSS band frequencies nor to the

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operational geometry of Inmarsat's EAN and hence there are no requirements or constraints in ECC Report 66 that are applicable to the current case.

Furthermore, CEPT project team FM 44 has recently established that both the methodology as well as the aircraft protection criteria used in ECC Report 66 are incorrect and has consequently raised a work item within WG FM to review the Report. In fact, Inmarsat would like to commend EETT for its active efforts at FM 44 to update Report 66 to reflect up-to-date aeronautical Electromagnetic Compatibility (EMC) requirements. EETT should also be aware that FM 44 has asked project team SE 40 to review Report 66 while specifically limiting it to C, Ku and Ka band frequency ranges.

In conclusion, ECC Report 66 currently reflects incorrect aeronautical safety requirements and does not include - nor is it intended to include (during the review of the Report) - considerations about Inmarsat's 2 GHz network. As such, Inmarsat would like to request that reference to this Report should be removed. Inmarsat would nonetheless like to confirm its commitment to aeronautical EMC safety and remains open for further discussions with EETT and Greece's aviation authority on this matter.

2) Do you agree with the proposed Regulation on Fees of Spectrum use? Justify your answer.

Inmarsat welcomes the proposed amendment (under Annex B) to the EETT's existing MSS 2GHz CGC licence fee regulation to include a new level of fee that is aligned specifically to Inmarsat's planned use of CGC for aeronautical services, rather than, for example, fees comparable to those paid for terrestrial mobile services.

Inmarsat welcomes the EETT's perfectly balanced approach of taking into account other fee levels set by other European Member States, many of which have also adopted a 'per tower' model. This approach and the proposed feel level set are particularly suitable, reasonable and proportionate to the EAN, which will use a network consisting of 20-25 Aero CGC towers in Greece, to complement the satellite.

As set out in our answer to Question 3, below, terrestrial mobile services constitute a completely different and separate market from that of Aero Services and therefore aligning MSS spectrum fees to those paid for terrestrial mobile operator licences would be entirely disproportionate.

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3) Do you agree that the provision of mobile satellite services on aircraft (i.e. Inmarsat's EAN service) has no impact on competition in connection with the provision of terrestrial mobile service in the Greek territory? Justify you answer.

Inmarsat welcomes and entirely agrees with the EETT's view - as expressed in Section 5.5 of the consultation document - that the provision of Inmarsat's EAN service has no impact in terms of competition with the provision of terrestrial mobile services in Greece. Inmarsat sets out its reasons below.

Firstly, as the EETT correctly points out in Section 5.1, from a technical perspective the operation of the EAN service does not in any way constitute a terrestrial mobile electronic communications service.

Unlike a terrestrial mobile electronic communications network, the EAN is a highly innovative, integrated network consisting of a satellite, aeronautical commentary ground components ("Aero CGCs") located at fixed locations on the ground, a satellite Gateway station (in Nemea), and aeronautical terminals installed outside the aircraft to communicate with both network components of the integrated EAN system.

The Aero CGC ground stations form an integral part of the satellite system and are controlled by the satellite resource and network management system of Inmarsat. In particular - as also noted in the consultation document - the network components constituting EAN will be connected to integrated control functions developed and operated by Inmarsat as the satellite operator, both on board the aircraft (the "communications manager") and within the ground network infrastructure ("the integrated transport centre"). The network will use the 2GHz MSS frequencies allocated to Inmarsat in EC Decision 2009/449/EC ("the Award Decision"). Aero CGCs will only be deployed within the coverage of the S-Band satellite, and operate in full accordance with the conditions and definitions relating to CGC under Decision 626/2008/EC of the European Parliament. Aero CGCs will therefore not operate independently from the satellite system, nor provide services to terminal users on the ground, nor to end users of any other Mobile or Fixed ground network service in Greece.

Furthermore, unlike terrestrial stations used to provide terrestrial mobile communications services, Aero CGC stations on the ground will point exclusively upwards towards aircraft flying at altitude and cannot therefore be accessed in any way by end users of mobile terrestrial communications services on the ground in Greece (or in any other country for that matter in which the EAN service is being offered). The Aero CGC network on the ground is also entirely separate from the terrestrial mobile electronic communications networks operated by mobile network operators (e.g. 3G or 4G), including those operated separately by COSMOTE and/or DT. Moreover, the number of towers needed to ensure coverage for Aero CGC services will be a fraction of those needed to deploy a terrestrial mobile network (i.e. 10-15 Aero CGCs for an average European country, as opposed to 1000's of terrestrial mobile towers for a similar country).

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Terrestrial mobile services also constitute a completely different and separate market from that of communications services to the aviation industry. A number of factors show this, including for example:

- **Type of service**: As an aero service the EAN is a wholesale backhaul service offered to airlines (who themselves control access to end-users of the communications services offered on-board their aircraft) rather than a retail terrestrial communications service offered directly to end users. Airlines will hold the relationship with the end-user of the communications services and will equip their aircraft with the EAN radio equipment;
- **Type of terminals**: Unlike hand-held user terminals such as those used to access traditional terrestrial mobile communications services, the EAN terminals are antennas mounted outside the aircraft fuselage, which only a few highly specialised suppliers of aeronautical terminal equipment produce. For the EAN, end-user passengers on board the aircraft will access in-cabin broadband connectivity services by connecting their own devices (smartphones, tablets, laptops etc.) to a standard Wi-Fi router connection inside the aircraft cabin, which uses on-board Wi-Fi frequencies <u>not</u> in S-Band. There will therefore be no handheld consumer terminals on the market communicating in S-Band as part of the EAN, either for use by end-users on the ground or inside the aircraft;
- **Number of customers**: As stated above, EAN customers are airlines who purchase and install specialised equipment, as opposed to the millions of end-users served by terrestrial mobile operators through handheld mobile devices.

To conclude, Inmarsat's EAN service does not in any way affect competition with terrestrial mobile services in Greece (or in any other country for that matter where EAN is offered) and this is abundantly clear given the fundamental differences in both the markets being served and the unique network configuration of the EAN. Inmarsat's EAN service is placed within the aviation connectivity market and actually strengthens competition in this specific market, as opposed to harming it, and EAN is a perfect complement to the existing market offering.

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B. Response to EETT proposals on International Coordination (in s.6)

Regarding the considerations for international coordination included in section 6 of the consultation document, Inmarsat agrees with the general approach proposed by the Regulator, in the sense that coordination shall be processed only when there is a threat on the functioning of the CGC systems, or the functioning of the neighboring countries networks (page 14 of the Consultation Document). Therefore, the international procedure for registration of sites shall serve the purpose to flag the sites that are likely to cause these two types of threat, in accordance with ECC Report 233, and further technical recommendations. As suggested, Inmarsat can and will provide at the stage of the application to the EETT for the aeronautical CGC radio frequency usage right, the T12 and T13 forms for station registration. Inmarsat will also provide the relevant technical studies that support those ground stations planned which may be in need of cross-border coordination with neighboring countries.

Given that international coordination processes might take an extensive period of time, we urge the EETT to adopt an approach whereby the completion of such processes is not a pre-requisite to issuing the overall CGC network authorisation itself. Instead, we would request that the overall CGC network authorisation be issued with operating conditions relating to cross-border coordination processes that only impact those specific stations where such coordination is needed. Under this approach, all other stations not requiring cross-border coordination can therefore be operated without delay under the overall CGC network authorisation. In accordance with the EETT's proposals under Annex A, in advance of network operation Inmarsat will submit to the EETT all relevant characteristics for the individual Aero CGC stations forming part of the CGC network in Greece, including the specific technical and location details.

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