

Inmarsat response to the Ofcom consultation:

Notice of proposal to make Wireless Telegraphy Exemption Regulations 2016

26 August 2016

Introduction

Inmarsat is pleased to provide a response to the consultation document: "Notice of proposal to make Wireless Telegraphy Exemption Regulations 2016". Our comments are focussed on proposals related to the "2 GHz band" (1980-2010 MHz and 2170-2200 MHz). Inmarsat is currently developing the "European Aviation Network" that will operate in these bands from 2017.

We have reviewed the proposed new requirements for MSS user terminals operating within the 2 GHz band. Ofcom has proposed technical requirements applicable to the user terminals transmitting to the satellite, but appears not to have proposed requirements applicable to the user terminals transmitting to the CGC base stations. It is our understanding that the proposed new IR2016.10 and 2016.11 should cover both terminals transmitting to the satellite and to the CGC base station. It is however necessary to differentiate between user terminals which transmit to a CGC base station and user terminals which transmit to the satellite. The technical characteristics are different and some of the technical parameters are key to sharing with other services and applications in the adjacent frequency bands.

We therefore propose modifications to the Draft Interface Requirements to cover additionally the use of terminals transmitting to the CGC base station. Some other more minor changes are also proposed to the draft Interface Requirements.

We also request that Ofcom consider the need for testing of the communication terminals when the aircraft is on the ground and to adjust relevant regulations to enable such testing.

We provide more specific comments first on the requirements related to land terminals and then on the requirements related to aircraft terminals.

Land terminals

With regard to the use of land based user terminals, we agree that these should be covered by the Licence Exemption regulations. For land terminals, we understand that these will be covered by licence exemption regulations that will refer to IR2016.10. It is our understanding that the licence exemption regulations should cover the user terminals irrespective of whether they transmit to the satellite or to the CGC base station.

For the operation of land user terminals when operating with the CGC, the user terminal should look much like a UE in a terrestrial mobile network. As is stated in the Executive Summary of ECC Report 197:

"UE terminals operating within a satellite/CGC systems are assumed to have a maximum output power of +24dBm, when operating to CGC base station networks, in conformance with ETSI EN 302 574-2 [5]. They are assumed to be built and to operate in similar ways as terrestrial ECN networks and to provide similar applications/services. Therefore, MSS terminal operated in a CGC mode are not studied in detail within this report."

The maximum e.i.r.p. values proposed by Ofcom for Draft IR 2016.10 are applicable for user terminals when transmitting to the satellite and have a maximum value of 47 dBm. The values proposed are consistent with those in ECC Report 197 for terminals transmitting to the satellite but are significantly higher than the 24 dBm maximum that typically applies to terrestrial user terminals and to the assumptions behind Report 197.

When land terminals are used to transmit to the CGC base station, the e.i.r.p. should be limited to 24 dBm. Consequently, Inmarsat proposes to modify Draft IR 2016.10 to specify that when transmitting to the CGC base station, the e.i.r.p. should not exceed 24 dBm.

Taking into account the comments above, Inmarsat suggests changes to Draft IR2016.10. Additional changes are proposed to clarify the description of the radio service and the application.

Draft IR2016.10

Minimum requirements for the use of land mobile satellite systems operating in the 1980 – 2010 MHz band		
Mandatory (1-10)		
1	Frequency band(s)	Earth to space 1980 – 2010 MHz (space to Earth 2170 – 2200 MHz)
2	Radiocommunication Service	Land mobile satellite and land mobile
3	Application	Land mobile satellite, including systems utilising a complementary ground component
4	Channelling	N/A
5	Modulation / Occupied bandwidth	N/A
6	Direction / Separation	N/A
7	/Maximum Transmit Power / Power Density	Narrowband stations with a bandwidth of less than 1 MHz transmitting to a satellite: 45 dBm / 200 kHz e.i.r.p Wideband stations with a bandwidth 1 MHz or greater transmitting to a satellite: 47 dBm / 5 MHz e.i.r.p Stations transmitting to a CGC base station: 24 dBm e.i.r.p.
8	Channel access and occupation rules	N/A
9	Authorisation regime	Licence Exempt in accordance with requirements of Exemption Regulations.
10	Additional essential requirements	None
Informative (11-13)		
11	Frequency planning assumptions	N/A
12	Planned changes	
13	Reference	ETSI EN 302 574-3 ETSI EN 302 574-2
14	Notification	
15	Remarks	Ofcom may impose additional restrictions on the maximum power used for specific frequencies and locations.

Aircraft terminals

Considering aircraft user terminals, there are two terminals to consider: (1) a terminal which communicates with the satellite and is located on the top of the aircraft, and (2) a terminal which communicates with the CGC ground stations and is located on the underside of the aircraft. Ofcom states that in order to authorise the use of similar 2 GHz MSS equipment on an aircraft, it intends to extend the existing aeronautical licensing regime via the use of a Notice of Variation (NoV) to an aircraft radio WT Act licence which will align with the technical parameters set out in IR2016.11. We support this approach for both aircraft terminal types.

The technical requirements proposed by Ofcom in Draft IR2016.11 do not differentiate between terminals transmitting to the satellite and terminals transmitting to the CGC base station. However the technical conditions for the two different terminals are different and to remain consistent with the assumptions in CEPT ECC Report 233, the main technical parameters may need to be specified differently for each case.

For the terminal which communicates with the satellite, the requirement proposed by Ofcom for a limit of 45 dBm/200 kHz for altitudes at 1000 metres or above is indeed applicable and is acceptable to Inmarsat. As was stated by Ofcom in its earlier consultation, this value is 5 dB higher than the value assumed in ECC Report 233 but that increase does not have any additional impact on the risk of harmful interference¹. As already referenced by Ofcom in the Draft IR2016.11, the applicable ETSI standard for the aircraft terminal which communicates with the satellite is EN 301 473.

However for the terminal which communicates with the CGC base stations, different power limits apply and a different ETSI standard applies. The e.i.r.p. value used in Report 233 was 40 dBm. The applicable ETSI standard to the terminal which communicates with the CGC base station is EN 302 574-2. As is stated by Ofcom in the previous consultation, the ACLR applied through the latest version of EN 302 574-2 has been improved and this allows operation down to a minimum altitude of 1000m. For the operation of terminals below 1000m altitude, although not specifically addressed in ECC Report 233, we agree with Ofcom's proposal in the draft IR that operation may be permitted with a limit of 24 dBm as this is the maximum value for land based user terminals.

We highlight that in meeting these requirements, this would address potential adjacent band interference to "conventional CGCs" that may be deployed by the other operator of the 2 GHz MSS bands in the UK, as concluded by ECC Report 233.

Taking into account the comments above, Inmarsat suggests changes to Draft IR 2016.11. Additional changes are proposed to clarify the description of the radio service and the application and to clarify that the power limits are e.i.r.p. values.

¹ See Para A5.20 of the consultation document: "Authorisation of terrestrial mobile networks complementary to 2 GHz mobile satellite systems"

Draft IR2016.11

Minimum requirements for the use of land -mobile satellite systems on Aircraft operating in the 1980 – 2010 MHz band		
Mandatory (1-10)		
1	Frequency band(s)	Earth to space 1980 – 2010 MHz (space to Earth 2170 – 2200.0 MHz)
2	Radiocommunication Service	Land -Aeronautical mobile satellite and aeronautical mobile
3	Application	Land -mobile satellite on aircraft, including systems utilising a complementary ground component
4	Channelling	N/A
5	Modulation / Occupied bandwidth	N/A
6	Direction / Separation	N/A
7	Maximum Transmit Power / Power Density	Stations transmitting to a satellite: 45 dBm / 200 kHz e.i.r.p. bandwidth for altitudes at 1000 meters or above Stations transmitting to a CGC base station: 40 dBm/5 MHz e.i.r.p. bandwidth for altitudes at 1000 meters or above 24 dBm/5 MHz e.i.r.p. for altitudes below 1000 meters
8	Channel access and occupation rules	N/A
9	Authorisation regime	Licensed
10	Additional essential requirements	None
Informative (11-13)		
11	Frequency planning assumptions	N/A
12	Planned changes	
13	Reference	ETSI EN 301 473 ETSI EN 301 574-2
14	Notification	
15	Remarks	

In addition to the proposed changes to the draft Interface Requirements described above, we ask Ofcom to consider the possible need for regulations to enable the testing of the aircraft satellite communication terminal when the aircraft is on the ground. While we do not anticipate that the terminal transmitting to the satellite will operate in flight when below 1000m altitude, there will be a requirement for the occasional testing of terminals when the aircraft is on the ground (i.e. at an airport). For example technicians may wish to check the functioning of the terminal before the aircraft takes off. We do not believe there is any significant risk of interference from such operations – in fact the e.i.r.p. limit of 45 dBm/200 kHz for aircraft user terminals is the same as the power limit that applies for ground based satellite user terminals. However, it is important to clarify the precise mechanism to authorise such operations and to ensure that the regulation under consultation does not unnecessarily restricts testing on the ground.

Concluding comments

Inmarsat thanks Ofcom for the opportunity to comment on these important proposed new regulations and requirements. We ask Ofcom to consider the proposed modifications to the draft Interface Requirements that we describe above and also to clarify the situation for the testing of aircraft terminals when the aircraft is on the ground.