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February 21, 2017

**CONFIDENTIAL MATERIALS ATTACHED
BY HAND AND ELECTRONIC FILING**

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: **REQUEST FOR CONFIDENTIAL TREATMENT
Comments of Inmarsat Inc., IB Docket No. 17-16**

Dear Ms. Dortch:

Pursuant to Section 0.459 of the Federal Communications Commission's ("Commission") Rules, 47 C.F.R. § 0.459, Inmarsat Inc. ("Inmarsat"), by its attorneys, respectfully requests that the redacted portions of the enclosed comments in IB Docket 17-16 be withheld from public inspection and afforded confidential treatment in accordance with Section 552(b)(4) of the Freedom of Information Act, 5 U.S.C. § 552(b)(4), and Sections 0.457(d)(2) and 0.459(b) of the Commission's Rules, 47 C.F.R. §§ 0.457(d)(2), 0.459(b). Accordingly, the enclosed submission is labeled "Confidential – Not for Public Inspection." A redacted copy of the enclosed submission is being filed on the Commission's Electronic Comment Filing System marked "Redacted – For Public Inspection."

Section 552(b)(4) of the Freedom of Information Act permits an agency to withhold from public disclosure any information that qualifies as "trade secrets and commercial or financial information obtained from a person and privileged or confidential." 5 U.S.C. § 552(b)(4). Section 0.457(d)(2) of the Commission's Rules allows persons submitting materials that they wish withheld from public inspection in accordance with Section 552(b)(4) to file a request for non-disclosure. 47 C.F.R. § 0.457(d)(2). The requirements governing such requests are set forth in Section 0.459(b) of the Commission's rules. In accordance with Section 0.459(b) of the Commission's Rules, this request is supported by the following showing:



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(1) Identification of Specific Information for Which Confidential Treatment is Sought (Section 0.459(b)(1)).

Inmarsat seeks to maintain confidentiality of the enclosed comments dated February 21, 2017, and marked “Confidential – Not for Public Inspection” (“Confidential Comments”).

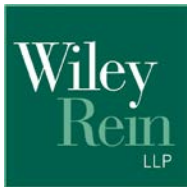
(2) Description of Circumstances Giving Rise to Submission (Section 0.459(b)(2)).

The Confidential Comments are being filed voluntarily in response to the Commission’s Public Notice, DA 17-18, in IB Docket 17-16.

(3) Explanation of the Degree to Which the Information is Commercial or Financial, or Contains a Trade Secret or is Privileged (Section 0.459(b)(3)).

The Confidential Comments contain proprietary business information detailing the adverse impact that the Galileo radionavigation-satellite system would have on Inmarsat’s deployed mobile satellite services (“MSS”). Such information is plainly sensitive commercial information that companies would normally keep confidential and that Inmarsat, in fact, keeps confidential. *See* 5 U.S.C. § 552(b)(4). Disclosure of the Confidential Comments could have a significant impact on Inmarsat’s commercial operations by enabling competitors to have a better understanding of Inmarsat’s strengths and weaknesses, enabling such competitors to better compete against Inmarsat.

The Confidential Comments contain information about Inmarsat that is clearly “commercial” in nature. *See Board of Trade v. Commodity Futures Trading Comm’n*, 627 F.2d 392, 403 & n.78 (D.C. Cir. 1980) (courts have given the term “commercial,” as used in Section 552(b)(4), its ordinary meanings). In addition, the information voluntarily provided is “confidential.” Under well-settled case law, such material “is ‘confidential’ . . . if disclosure of the information is likely to have either of the following effects: (1) to impair the government’s ability to obtain necessary information in the future; or (2) to cause substantial harm to the competitive position of the person from whom the information was obtained.” *National Parks and Conservation Ass’n v. Morton*, 498 F.2d 764, 770 (D.C. Cir. 1974) (footnote omitted); *see also Critical Mass Energy Project v. NRC*, 975 F.2d 871 (D.C. Cir. 1992), *cert. denied*, 113 S. Ct. 1579 (1993) (holding that voluntarily



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provided information is confidential for the purpose of FOIA Exemption 4 if it is a kind that would customarily not be released to the public by the person from whom it was obtained).

(4) Explanation of the Degree to Which the Information Concerns a Service that is Subject to Competition (Section 0.459(b)(4)).

Substantial competition exists in the mobile satellite services industry. Other providers of mobile satellite services include Iridium, Globalstar, and Thuraya, among others.

(5) Explanation of How Disclosure of the Information Could Result in Substantial Competitive Harm (Section 0.459(b)(5)).

The commercially sensitive information for which Inmarsat seeks confidential treatment includes details regarding the interference tolerance of Inmarsat's mobile satellite service. These details are proprietary and reflect Inmarsat's internal analysis and conclusions. Such information is plainly sensitive commercial information that companies would normally keep confidential and that Inmarsat, in fact, keeps confidential. *See* 5 U.S.C. § 552(b)(4). Disclosure of the Confidential Comments could have a significant impact on Inmarsat's commercial operations by enabling competitors to have a better understanding of Inmarsat's strengths and weaknesses, enabling such competitors to better compete against Inmarsat. Under these circumstances, it is "virtually axiomatic" that the information qualifies for withholding under Exemption 4 of the Freedom of Information Act, *see National Parks and Conservation Ass'n v. Kleppe*, 547 F.2d 673, 684 (D.C. Cir. 1976), and under Sections 0.457(d)(2) and 0.459(b).

(6) Identification of Measures Taken to Prevent Unauthorized Disclosure (Section 0.459(b)(6)).

Inmarsat keeps this kind of sensitive commercial information confidential and does not make it publicly available.



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(7) Identification of Whether the Information is Available to the Public and the Extent of Any Previous Disclosure of Information to Third Parties (Section 0.459(b)(7)).

None of the information in the Confidential Comments for which Inmarsat seeks confidential treatment has been provided to the public.

(8) Justification of Period During Which the Submitting Party Asserts that the Material Should Not be Available for Public Disclosure (Section 0.459(b)(8)).

Inmarsat respectfully requests that the Commission withhold the information in the Confidential Comments from public inspection indefinitely. Inmarsat would not, in the normal course of business, provide this information to the public.

Please contact the undersigned with any questions. Thank you for your assistance.

Respectfully Submitted,

/s/ Umair Javed

Umair Javed
Counsel to Inmarsat, Inc.

Enclosure

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)
)
FCC SEEKS COMMENT ON WAIVER) IB Docket No. 17-16
OF PART 25 LICENSING REQUIREMENT)
FOR RECEIVE-ONLY EARTH STATIONS)
OPERATING WITH THE GALILEO)
RADIONAVIGATION-SATELLITE SERVICE)
)

COMMENTS OF INMARSAT

Inmarsat Inc. (“Inmarsat”) hereby comments on the European Commission’s (“EC”) request for a waiver of the Commission’s Part 25 licensing requirements for receive-only earth stations operating with the Galileo radionavigation-satellite system. The EC request for a waiver is to permit all non-Federal receive-only earth stations to operate with Galileo signals E1 (1559-1591 MHz), E2 (1164-1219 MHz), and E6 (1260-1300 MHz). On January 6, 2017, the Commission requested comments on this waiver, and specifically “whether E1 transmissions raise any interference or other concerns with respect to non-Federal RNSS, ARNS and Mobile Satellite Service (MSS) receiver operations.”¹

Inmarsat, through its global satellite systems, offers a wide range of satellite communications solutions to customers at sea, on land and in the air utilizing L- and Ka-band spectrum. Inmarsat’s L-band MSS satellites operate its space-to-Earth transmissions in the 1525-1559 MHz band which is adjacent to frequencies over which Galileo seeks to provide service using the E1 signal. Given the important services provided by Inmarsat in L-band, including safety of life, it is essential that the L-Band remain free from in-band or out-of-band interference.

¹ *FCC Seeks Comment On Waiver Of Part 25 Licensing Requirement For Receive-Only Earth Stations Operating With The Galileo Radionavigation-Satellite Service*, IB Docket No. 17-16, Public Notice, DA 17-18 (Jan. 6, 2017) (“Public Notice”).

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These comments are limited to addressing the Galileo E1 signal and do not opine on the E2 or E6 signals.

The Part 25 rule for which the EC seeks a waiver requires that foreign licensed satellite operators obtain a license for operation of receive only earth stations.² Inmarsat believes that the EC request for waiver of Part 25 licensing requirements for receive-only earth stations operating with Galileo is overly broad. For example, as the Commission recognized in the Public Notice, the information provided about the E1 signal in the Form 312 submitted with the EC application varies from other publically available source material.³ Therefore, it is not clear exactly what types of services Galileo intends to provide in the US. Grant of the waiver would give Galileo the ability to operate unfettered without providing US licensed operators the ability to determine potential interference from Galileo's operations nor would it provide the Commission with any indication of Galileo's satellite transmissions in the US. The only parameters that Galileo will be constrained to operate under are those in their ITU filing, which, as the Commission noted,⁴ specifies a power level approximately 7 dB higher for the E1 signal compared to the level specified in waiver request.

In the E1 spectrum, Galileo operates two types of signals. One is the Open Service (OS) signal and the other is the Public Regulated Service (PRS) signal. Inmarsat is particularly concerned with the PRS signal. Without filtering, the level of the PRS signal in the MSS band is only a few dBs below the PRS maximum level. The waiver request does not address the level of filtering that Galileo would implement to ensure that the out-of-band emissions do not cause interference to MSS operations below 1559 MHz.

The Annex to this document contains an analysis of the impact of Galileo PRS signal to Inmarsat operational mobile earth stations (MES) that shows that without significant filtering by Galileo, all MES terminal types could suffer interference from Galileo satellites and MES

² 47 C.F.R. §25.131(j)(1).

³ See Public Notice at 4-5.

⁴ *Id.* at 5.

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terminals with high gain antennas would receive interference across virtually the entire MSS L-band. Filtering must be applied to the PRS signal to meaningfully reduce the potential of out-of-band emissions below 1559 MHz.

Given the likelihood of interference to licensed MSS terminals, Inmarsat opposes grant of the waiver as requested by EC. Should the EC desire to introduce Galileo service in the United States, it should be required to file a complete application for their receive-only earth stations as required by the Commission's rules. In the course of considering such a future application, Inmarsat recommends the Commission seek further information regarding how specifically Galileo will avoid out-of-band interference to the adjacent MSS spectrum. Based on the information the Commission may need to adopt certain operational constraints on the Galileo E1 signal to ensure that MSS operators can continue to provide the critical services provided today. Going through the full application process specified in the rules is the only way to compile a sufficient record and to adopt any conditions/constraints on the operation of the Galileo E1 signal that the Commission deems necessary to protect adjacent MSS operations.

Respectfully submitted,

/s/ Giselle Creeser
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Director, Regulatory

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21 February 2017

Annex

Technical Analysis of Interference from Galileo E1 signal to MSS services

Introduction

The Galileo E1 signal operates in the band 1559-1610 MHz and consists of two distinct signals using the same carrier frequency: The “Open Service” signal (OS) and the Public Regulated Service signal (PRS). The spectral shape of each signal is defined by equations given in ITU-R Recommendation M.1787-2. The figure below shows the spectral plot of the two signals and the boundary of the RNSS/MSS band at 1559 MHz.

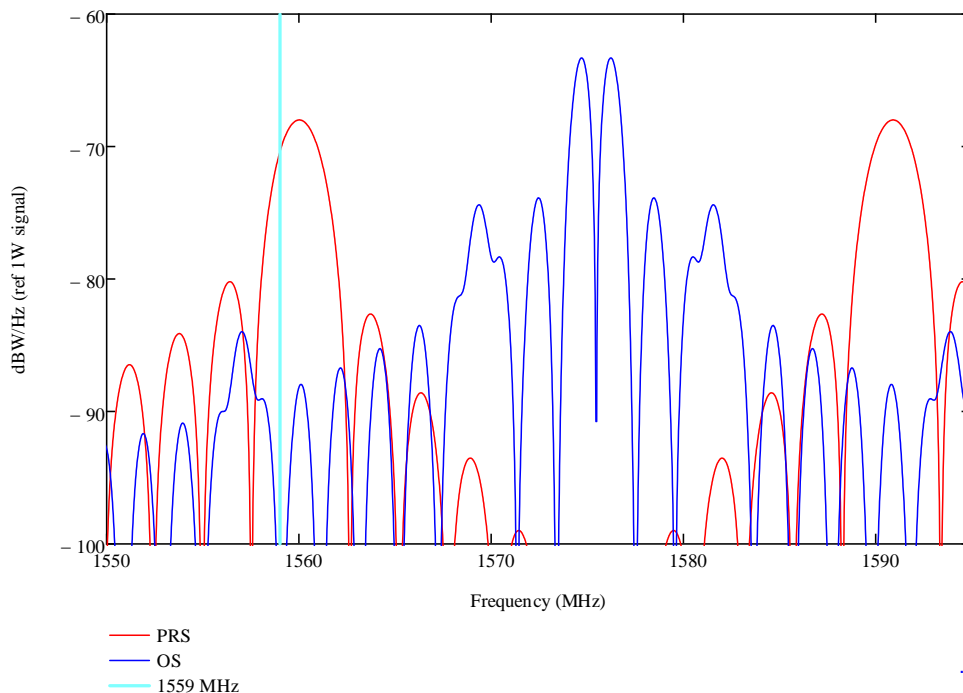


Figure 1. Galileo E1 signal spectra

The emissions from the both the OS signal and the PRS signal extend outside the RNSS allocated band, into the MSS band below 1559 MHz. A mobile earth station (MES) receiving below 1559 MHz will receive the out-of-band emissions of both signals from every visible satellite in the Galileo constellation. The PRS signal is the more significant issue since at the upper edge of the MSS band, the level of the PRS signal is only 2 dB below its maximum level.

This annex shows some results of simulations of interference from the Galileo constellation into different Inmarsat MESs.

Galileo satellite characteristics

Some Galileo characteristics are provided in the “Galileo Open Service Signal In Space Interface Control Document”⁵.

⁵ <https://www.gsc-europa.eu/gnss-markets/segments-applications/os-sis-icd>

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When fully operational, the Galileo constellation will consist of 24 operational satellites and up to 6 active spares, positioned in three circular medium Earth orbit planes. Each orbit has a nominal average semi-major axis of 29 600 km, and an inclination of 56 degrees with reference to the equatorial plane. The system design anticipates between 24 and 30 operational satellites and our analysis has assumed 27 operational satellites, nine in each of the three planes.

The Galileo satellites aim to provide a constant pfd on the earth surface, irrespective of the elevation angle. According to the Galileo “Signal-in-space Interface Control Document”, the minimum power received by a reference 0 dBi antenna is -157 dBW, which is equivalent to a power flux density (pfd) of -131.7 dBW. The maximum power is not expected to exceed this value by more than 3 dB. Hence the received pfd from each satellite is in the range -131.7 to -128.7 dBW.

While these power levels are defined for the OS signal, we understand that the same power level applies to the PRS signal. Our modelling of the interference caused by the PRS signal assumes the following pfd mask for each satellite.

Elevation (°)	pfd (dBW/m ²)
0	-131,6
5	-131,4
10	-131,1
15	-130,8
20	-130,5
25	-130,1
30	-129,9
35	-129,6
40	-129,4
45	-129,2
50	-129,2
55	-129,2
60	-129,5
65	-129,8
70	-130,1
75	-130,4
80	-130,7
85	-131,0
90	-131,0

Table 1: GALILEO PRS PFD Mask

The following figure shows the Galileo signals just below 1559 MHz. The interference will be the sum of the two transmitted signals, PRS and OS. From the information provided in Recommendation ITU-R M.1787-2, it can be determined that the power in the 4 kHz channel at the upper edge of the MSS band is -33.2 dB relative to the total power in the emission. As the figure shows, the interference level reduces for frequencies further below 1559 MHz.

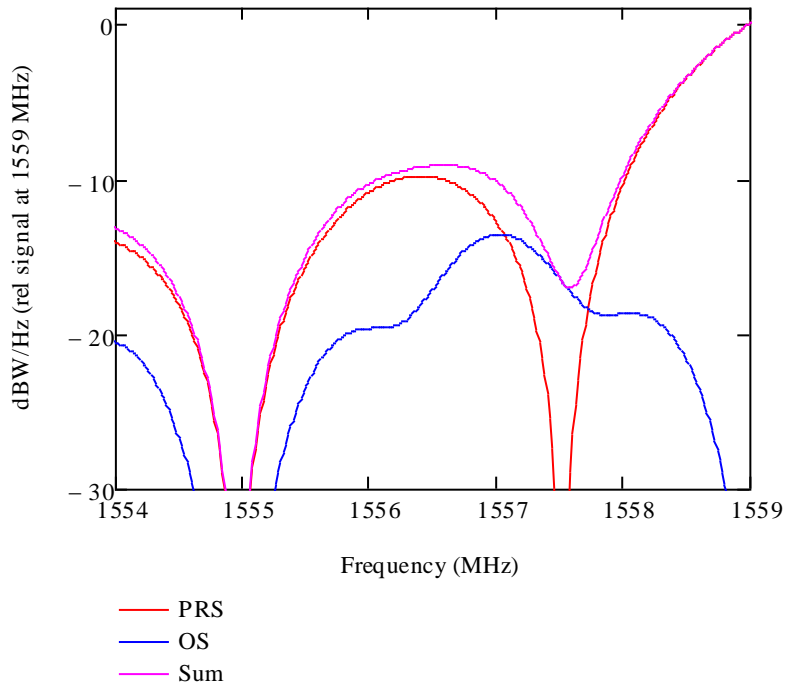
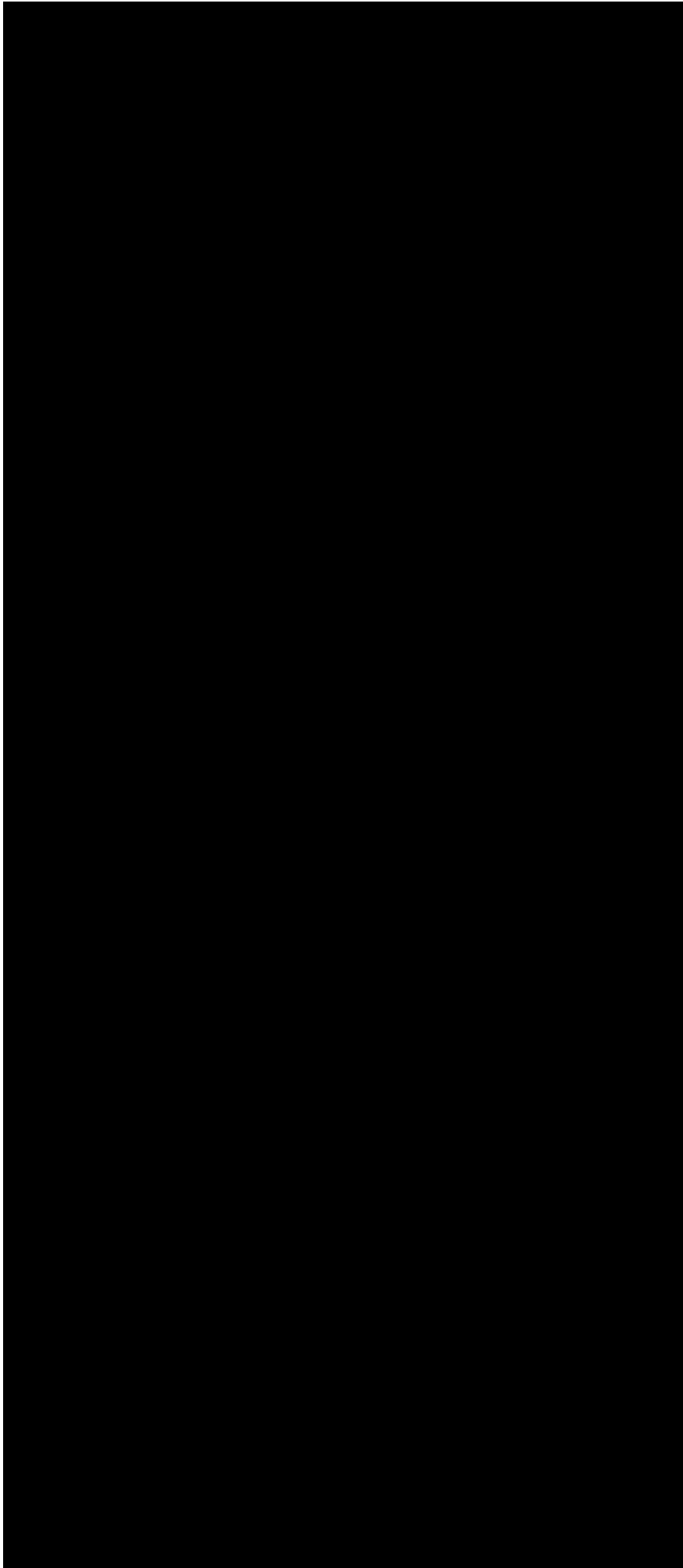


Figure 2. Galileo signal spectra below 1559 MHz

Simulations of interference into three types of Inmarsat MES have been performed. The three types are “Fleet-77”, “BGAN Class 1” and “GSPS”. These have been chosen to represent the broad range of Inmarsat terminal types. In terms of susceptibility to interference, other types of Inmarsat MES would generally fall within the range of these terminals. Antenna patterns to represent the average MES antenna sidelobe level have been used.

Results

[REDACTED]



[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]
