

Exhibit C
PETITION FOR WAIVER OF SECTION 25.137 AND 25.114 AND OF
THE U.S. TABLE OF FREQUENCY ALLOCATIONS

I. TO THE EXTENT THEY APPLY, GOOD CAUSE EXISTS FOR A WAIVER OF CERTAIN PORTIONS OF SECTIONS 25.137 AND 25.114

Universal Space Network, Inc. (USN) is provided limited legal and technical information for the GALILEO (GSAT215, GSAT216, GSAT217, and GSAT218), sixteenth thru nineteenth spacecraft of the “Full Operational Capability” series) Satellites.¹ Pursuant to Section 25.137 of the Federal Communications Commission’s (“Commission” or “FCC”) rules, the same technical information required by Section 25.114 for U.S.-licensed space station, and certain legal information, must be submitted by earth station applicants “requesting authority to operate with a non-U.S. licensed space station to serve the United States...”² USN seeks authority to support the needed Telemetry, Tracking, and Control (“TT&C”) during launch and early orbit support (“LEOP”) of the GALILEO (GSAT215, GSAT216, GSAT217, and GSAT218) spacecraft from launch to medium earth orbit, not commercial service to the United States, and thus believes that Section 25.137 does not apply.

To the extent the Commission determines, however, that USN’s request for authority to provide LEOP on a special temporary basis is a request to serve the United States with a non-U.S.-licensed satellite, USN respectfully requests a waiver of Sections 25.137 and 25.114 of the Commission’s rules, to the extent that USN has not herein provided the information required by these rules.³ The Commission may grant a waiver for good cause shown.⁴ A waiver is therefore appropriate if special circumstances warrant a deviation from the general rule, and such a deviation will serve the public interest.

In this case, good cause for a waiver of portions of Section 25.114 exists. USN seeks authority only to conduct LEOP support for GALILEO (GSAT215, GSAT216, GSAT217, and GSAT218). Thus, any information sought by Section 25.114 that is not relevant to the LEOP – e.g., antenna patterns, energy and propulsion and orbital debris - USN does not have. In addition, USN would not easily be able to obtain such information because USN is not the operator of the GALILEO (GSAT215, GSAT216, GSAT217, and GSAT218) satellites, nor is USN in contractual privity with that operator. Rather, USN has contracted with Swedish Space Corporation, Solona Sweden (SSC) to support the Launch and Early Orbit (LEOP) portion in S-Band of the satellite prior to its operation.

As evidenced by the Comsearch report attached to this request, USN has coordinated the LEOP of the GALILEO (GSAT215, GSAT216, GSAT217, and GSAT218) satellites with potentially affected terrestrial operators. Moreover, as with any STA, USN will conduct the LEOP on an unprotected, non-interference basis to government operations.

¹ FCC Form 312 Section B

² 47 C.F.R. § 25.137(a)

³ 47 C.F.R. §§25.137 and 25.114

⁴ 47 C.F.R. §1.3

Because it is not relevant to the service for which USN seeks authorization, and because obtaining the information would be a hardship, USN seeks a waiver of all the technical and legal information required by Section 25.114, to the extent it is not provided herein. As noted above, USN has provided the required information to the extent that it is relevant to the LEOP service for which USN seeks authorization.

Good cause also exists to waive portions of Section 25.137, to the extent the information required is not herein provided. Section 25.137 is designed to ensure that “U.S.-licensed satellite systems have effective competitive opportunities to provide analogous services” in other countries. Here, there is no service being provided by the satellite; USN is providing TT&C while the satellite is on the way to its medium earth orbit. Thus, the purpose of the information required by Section 25.137 is not implicated here. For example, Section 25.137(d) requires earth station applicants requesting authority to operate with a non-U.S.-licensed space station that is not in orbit and operating to post a bond.⁵ The underlying purpose in having to post a bond – i.e., to prevent warehousing of orbital locations by operators seeking to serve the United States – would not be served by requiring USN to post a bond in order to conduct 14 days of LEOP support of the GALILEO (GSAT215, GSAT216, GSAT217, and GSAT218) satellites.

It is USN’s understanding that GALILEO (GSAT215, GSAT216, GSAT217, and GSAT218) is licensed by ESA (European Space Agency). GALILEO (GSAT215, GSAT216, GSAT217, and GSAT218) are the sixteenth thru nineteenth spacecraft of the European navigation constellation. The spacecraft family is primarily meant to serve the EU. Thus, the purpose of Section 25.137 – to ensure that U.S. satellite operators enjoy “effective competitive opportunities” to serve foreign markets and to prevent warehousing of orbital locations service the United States – will not be undermined by grant of this waiver request.

Finally, USN notes that it expects to communicate with the GALILEO (GSAT215, GSAT216, GSAT217, and GSAT218) satellite using its U.S. earth station for a period of 14 days. Requiring USN to obtain technical and legal information from an unrelated party, where there is no risk of interference and the operation will cease within 14 days would pose undue hardship without serving underlying policy objectives. Given these particular facts, the waiver sought herein is appropriate.

⁵ 47 C.F.R. §25.137(d)(4)

II. GOOD CAUSE EXISTS FOR A WAIVER OF THE UNITED STATES TABLE OF FREQUENCY ALLOCATIONS

USN further requests a waiver of the United States Table of Frequency Allocations ("U.S. Table") as described in section 2.106 of the rules for the frequency bands 2025 – 2110 MHz (Earth-to-Space) and 2200 – 2290 MHz (Space-to-Earth).⁶ Section footnotes allow for non-federal Government use of these bands in the United States on a case-by-case non-interference basis. Such use by USN necessitates a waiver of the U.S. Table.

Good cause exists to grant USN a limited waiver of the U.S. Table to allow LEOP of the GALILEO (GSAT215, GSAT216, GSAT217, and GSAT218) satellites. In considering request for case-by-case spectrum uses, the Commission has indicated that it would generally grant such waivers "where there is little potential for interference into any service authorized under the Table of Frequency Allocations and when the case-by-case operator accepts any interference from authorized services."⁷ USN will coordinate with other parties operating communication systems in compliance with the Table of Frequency Allocations to ensure that no harmful interference is caused. USN seeks to operate only pursuant to special temporary authorization and thus agrees to accept any interference from authorized services. In summary, USN's operation on a non-interference, non-protected basis support waiver of the U.S. Table.

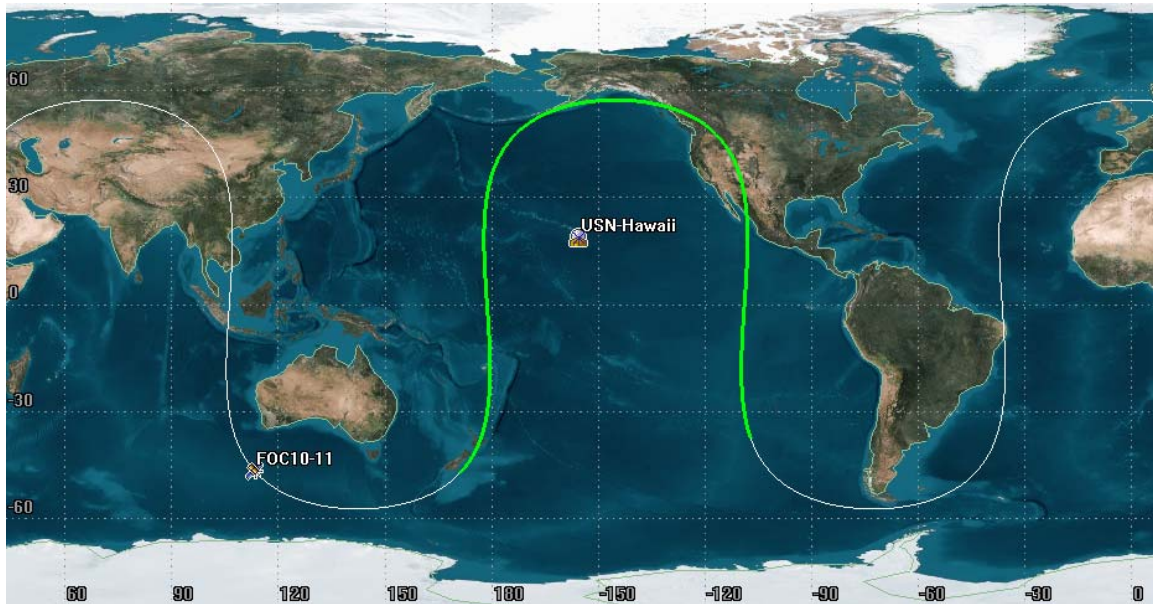
⁶ 47 C.F.R. §2.106

⁷ Previously approved STA's for Universal Space Network SES-STA-20020725-01174; SES-STA-20021112-02008; SES-STA-20040315-00475

LEOP support of Galileo Constellation Launch Flight #9 (GSAT215, GSAT216, GSAT217, and GSAT218 vehicles) from USN's Hawaii ground station

Galileo Flight #9 will place the 16th, 17th, 18th, and 19th spacecraft of the "Full Operational Capability" in their operational orbit of the Galileo navigation constellation for the EU. The launch consists of 4 spacecraft that will be launched from French Guiana on an Ariane 5 ES vehicle on December 12th 2017 at 18:36:07 UTC. USN has been contracted to support the Galileo spacecraft LEOP(s) for a period of up to 14 days and then a subsequent period of 30 days early in 2018 for orbit raising subject to a future analysis.

The spacecraft(s) are a Medium Earth Orbiting (MEO) spacecraft in a high mid-latitude orbit (56 degrees) with a near circular orbit of altitude of 23400 Km. This orbit allows a nominal 1 visibility over the USN Hawaii station every day. Each spacecraft contact is on the order of 1 to 16 hours.



GSAT215, GSAT216, GSAT217, and GSAT218 nominal orbit and Hawaii coverage

The spacecraft's will be supported from injection and three initial orbital maneuvers for spacing. A subsequent orbital plane change campaign will take place in early 2018 to place satellites in their operational orbits. USN will apply for a separate authorization for the orbital plane raising campaign. The below analysis covers all possible visibilities from USN Hawaii, but not all visibilities will be supported.

Spacecraft injection

All four spacecraft are still in same antenna beamwidth after injection for passes one thru four (1 – 4) and then begin to drift apart. For the first four passes the spacecraft's are supported by selecting different RF frequencies. Subsequent to the first four passes the spacecraft(s) are supported separately. Post maneuver TLE's and maximum visibilities are shown below for each event and each spacecraft.

	Downlink	Uplink
GSAT215	2215.818 MHz	2040.399 MHz
GSAT216	2234.232 MHz	2057.355 MHz
GSAT217	2228.094 MHz	2051.703 MHz
GSAT218	2221.956 MHz	2046.051 MHz

GSAT215-injection

1 98989 17999A 17346.92490972 +.00000000 +00000-9 +74809-3 2 00006
2 98989 056.9998 306.8913 0005819 213.0893 356.8190 01.72999713000000

GSAT216-injection

1 98987 17999B 17346.93880324 +.00000000 +00000-9 +74805-3 2 00005
2 98987 057.0011 306.8861 0004271 243.9876 334.6012 01.73051388000007

GSAT217-injection

1 98988 17999C 17346.92490972 +.00000000 +00000-9 +74806-3 2 00002
2 98988 056.9998 306.8912 0002174 021.1002 188.8083 01.73205976000005

GSAT218-injection

1 98986 17999D 17346.93880324 +.00000000 +00000-9 +74804-3 2 00003
2 98986 057.0011 306.8861 0001746 081.5614 136.9927 01.73184593000009

GSAT215 Injection

Access	Start Time (UTCG)	Stop Time (UTCG)
1	13 Dec 2017 01:59:58	13 Dec 2017 12:58:32
2	14 Dec 2017 10:13:31	14 Dec 2017 17:28:29
3	14 Dec 2017 20:03:43	15 Dec 2017 00:54:00
4	15 Dec 2017 16:24:42	15 Dec 2017 17:22:55
5	15 Dec 2017 22:40:07	16 Dec 2017 08:03:34

GSAT215 Maneuvers and possible support times pass # 6 - 16

GSAT215-V1

1 98989 17999A 17350.33914352 +.00000000 +00000-9 +75196-3 2 00009
2 98989 056.9912 306.7968 0066121 179.3166 357.0006 01.71404180000002

Access	Start Time (UTCG)	Stop Time (UTCG)
6	17 Dec 2017 04:20:06	17 Dec 2017 14:50:04

GSAT215-V2

1 98989 17999A 17351.79964120 +.00000000 +00000-9 +75585-3 2 00000
2 98989 056.9900 306.7572 0004758 202.9980 154.5418 01.69828890000007

Access	Start Time (UTCG)	Stop Time (UTCG)
7	18 Dec 2017 13:01:07	18 Dec 2017 18:11:17
8	18 Dec 2017 20:39:57	18 Dec 2017 21:45:00*

* Note that spacecraft stays in view of Hawaii during TLE update V3 below, therefore visibility continues into pass #9.

GSAT215-V3

1 98989 17999A 17352.90667824 +.00000000 +00000-9 +75604-3 2 00007
2 98989 056.9890 306.7276 0004465 242.3504 072.0278 01.69748470000004

Access	Start Time (UTCG)	Stop Time (UTCG)
9	18 Dec 2017 21:45:00	19 Dec 2017 04:08:38
10	20 Dec 2017 01:55:59	20 Dec 2017 13:11:15
11	21 Dec 2017 11:10:15	21 Dec 2017 17:48:29
12	21 Dec 2017 19:40:46	22 Dec 2017 02:10:52
13	23 Dec 2017 00:10:57	23 Dec 2017 11:24:43
14	24 Dec 2017 09:10:16	24 Dec 2017 16:45:08
15	24 Dec 2017 19:22:26	25 Dec 2017 00:20:37
16	25 Dec 2017 22:34:34	26 Dec 2017 09:14:41

GSAT216 Injection

Access	Start Time (UTCG)	Stop Time (UTCG)
1	13 Dec 2017 01:59:53	13 Dec 2017 12:58:12
2	14 Dec 2017 10:12:14	14 Dec 2017 17:27:42
3	14 Dec 2017 20:03:52	15 Dec 2017 00:52:27
4	15 Dec 2017 16:20:12	15 Dec 2017 17:25:54
5	15 Dec 2017 22:38:38	16 Dec 2017 07:58:36

GSAT216 Maneuvers and possible support times pass # 6 - 16

GSAT216-V1

1 98987 17999B 17350.94049769 +.00000000 +00000-9 +75065-3 2 00000
2 98987 056.9956 306.7742 0043496 195.9734 355.6465 01.71988178000000

Access	Start Time (UTCG)	Stop Time (UTCG)
6	17 Dec 2017 03:57:34	17 Dec 2017 14:34:40

GSAT216-V2

1 98987 17999B 17352.40087963 +.00000000 +00000-9 +75324-3 2 00009
2 98987 056.9944 306.7342 0002621 200.5385 175.2979 01.70937019000006

Access	Start Time (UTCG)	Stop Time (UTCG)
7	18 Dec 2017 12:22:32	18 Dec 2017 18:10:59
8	18 Dec 2017 20:15:06	19 Dec 2017 03:14:59

GSAT216-V3

1 98987 17999B 17353.42355324 +.00000000 +00000-9 +75337-3 2 00005
2 98987 056.9934 306.7066 0003159 237.1583 048.0125 01.70883419000005

Access	Start Time (UTCG)	Stop Time (UTCG)
9	20 Dec 2017 00:57:19	20 Dec 2017 12:07:39
10	21 Dec 2017 09:44:05	21 Dec 2017 17:05:40
11	21 Dec 2017 19:33:53	22 Dec 2017 00:41:38
12	22 Dec 2017 22:43:37	23 Dec 2017 09:11:02
13	24 Dec 2017 05:34:43	24 Dec 2017 15:11:13
14	24 Dec 2017 20:04:58	24 Dec 2017 21:50:26
15	25 Dec 2017 13:23:17	25 Dec 2017 17:36:23
16	25 Dec 2017 20:42:58	26 Dec 2017 04:31:59

GSAT217 Injection

Access	Start Time (UTCG)	Stop Time (UTCG)
1	13 Dec 2017 01:59:55	13 Dec 2017 12:57:11
2	14 Dec 2017 10:09:02	14 Dec 2017 17:25:37
3	14 Dec 2017 20:04:17	15 Dec 2017 00:48:19
4	15 Dec 2017 16:09:17	15 Dec 2017 17:32:54
5	15 Dec 2017 22:34:19	16 Dec 2017 07:43:28
6	17 Dec 2017 03:45:27	17 Dec 2017 14:20:53
7	18 Dec 2017 11:50:27	18 Dec 2017 18:03:51
8	18 Dec 2017 19:58:07	19 Dec 2017 02:23:10
9	19 Dec 2017 23:50:36	20 Dec 2017 10:32:26

GSAT217 Maneuvers and possible support times pass # 10 - 17

GSAT217-V1

1 98988 17999C 17354.73814815 +.00000000 +00000-9 +74989-3 2 00008
2 98988 057.0025 306.6828 0030868 040.2074 001.6422 01.72463847000005

Access	Start Time (UTCG)	Stop Time (UTCG)
10	21 Dec 2017 07:03:14	21 Dec 2017 15:43:17
11	21 Dec 2017 20:03:38	21 Dec 2017 22:29:04

GSAT217-V2

1 98988 17999C 17356.18248843 +.00000000 +00000-9 +75170-3 2 00004
2 98988 057.0013 306.6428 0002677 060.7477 157.8557 01.71724932000006

Access	Start Time (UTCG)	Stop Time (UTCG)
12	22 Dec 2017 13:46:27	22 Dec 2017 17:46:29
13	22 Dec 2017 21:00:47	23 Dec 2017 04:49:01

GSAT217-V3

1 98988 17999C 17357.32340278 +.00000000 +00000-9 +75179-3 2 00005
2 98988 057.0005 306.6116 0001719 090.9073 113.0296 01.71687127000002

Access	Start Time (UTCG)	Stop Time (UTCG)
14	24 Dec 2017 02:04:28	24 Dec 2017 13:05:32
15	25 Dec 2017 10:44:14	25 Dec 2017 17:25:25
16	25 Dec 2017 19:21:16	26 Dec 2017 01:29:12
17	26 Dec 2017 23:14:08	27 Dec 2017 00:00:00

GSAT218 Injection

Access	Start Time (UTCG)	Stop Time (UTCG)
1	13 Dec 2017 01:59:58	13 Dec 2017 12:57:19
2	14 Dec 2017 10:09:39	14 Dec 2017 17:25:55
3	14 Dec 2017 20:04:11	15 Dec 2017 00:49:01
4	15 Dec 2017 16:10:53	15 Dec 2017 17:31:57
5	15 Dec 2017 22:34:57	16 Dec 2017 07:45:38
6	17 Dec 2017 03:46:56	17 Dec 2017 14:21:55
7	18 Dec 2017 11:52:02	18 Dec 2017 18:04:12
8	18 Dec 2017 19:58:37	19 Dec 2017 02:24:55
9	19 Dec 2017 23:52:13	20 Dec 2017 02:59:00*

* Note that spacecraft stays in view of Hawaii during TLE update V1 below, therefore visibility continues into pass #10.

GSAT218 Maneuvers and possible support times pass # 10 - 18

GSAT218-V1

1 98986 17999D 17354.12445602 +.00000000 +00000-9 +75057-3 2 00000
2 98986 056.9932 306.6849 0041267 020.8147 357.8051 01.72142263000001

Access	Start Time (UTCG)	Stop Time (UTCG)
10	20 Dec 2017 02:59:00	20 Dec 2017 10:40:43
11	21 Dec 2017 07:26:48	21 Dec 2017 14:02:00*

* Note that spacecraft stays in view of Hawaii during TLE update V2 below, therefore visibility continues into pass #12.

GSAT218-V2

1 98986 17999D 17355.58487269 +.00000000 +00000-9 +75311-3 2 00009
2 98986 056.9920 306.6448 0002156 323.1577 240.5148 01.71107631000007

Access	Start Time (UTCG)	Stop Time (UTCG)
12	21 Dec 2017 14:02:00	21 Dec 2017 15:54:20
13	21 Dec 2017 19:55:16	21 Dec 2017 22:54:24
14	22 Dec 2017 14:15:09	22 Dec 2017 17:39:12

GSAT218-V3

1 98986 17999D 17356.76188657 +.00000000 +00000-9 +75324-3 2 00003
2 98986 056.9911 306.6128 0002253 270.2483 298.4626 01.71057033000001

Access	Start Time (UTCG)	Stop Time (UTCG)
15	22 Dec 2017 21:21:54	23 Dec 2017 05:38:50
16	24 Dec 2017 02:47:16	24 Dec 2017 13:42:39
17	25 Dec 2017 11:33:45	25 Dec 2017 17:40:18
18	25 Dec 2017 19:36:57	26 Dec 2017 02:24:06

Flux Density impinging on the ground in Hawaii from Galileo GSAT215, GSAT216, GSAT217, and GSAT218

The Flux density is calculated as:

$$\text{Flux density} = \text{EIRP} \div (4 \pi Rse^2)$$

Where **Rse** is the distance from spacecraft to the ground?

Where **EIRP** is the Effective Isotropic Radiated Power of the spacecraft?

Data from the spacecraft vendor indicates that the nominal EIRP of each GSAT spacecraft is -1.10 dBW. Being a near circular orbit, the altitude (and thus the closest distance to earth during an overhead pass) is = 23,400 Km.

Converting -1.10 dBW to scalar watts = 0.776 watts transmitted at 2221.9 MHz

Therefor:

$$\text{Flux density} = 0.776 \div (4 \pi * 23,400,000 \text{ meters}^2)$$

Flux density = 1.127 x 10⁻¹⁶ Watts/meter²

Or

Flux density = 1.127 x 10⁻¹⁷ mW/cm²