

FCC Testing of the Iridium Certus ProtoTerminal / 9801CertusH1 In accordance with FCC 47 CFR Part 25 and FCC 47 CFR Part 2

Prepared for: Iridium Satellite LLC
1750 Tysons Boulevard
Suite 1400
McLean
VA 22102
United States

FCC ID: Q639801CertusH1



Product Service

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Date: March 2017

Document Number: 75936147-01 | Issue: 02

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Steven White	22 March 2017	
Authorised Signatory	Simon Bennett	22 March 2017	

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 25 and FCC 47 CFR Part 2. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Matthew Russell	22 March 2017	
Testing	Graeme Lawler	22 March 2017	

FCC Accreditation

90987 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be in compliance with FCC 47 CFR Part 25: 2015 and FCC 47 CFR Part 2: 2015.



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Registered in Scotland at East Kilbride,
Glasgow G75 0QF, United Kingdom
Registered number: SC215164

TÜV SÜD Ltd is a
TÜV SÜD Group Company

Phone: +44 (0) 1489 558100
Fax: +44 (0) 1489 558101
www.tuv-sud.co.uk

TÜV SÜD Product Service
Octagon House
Concorde Way
Fareham
Hampshire PO15 5RL
United Kingdom



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ANNEX A Calculated Total Peak Power EIRPA.2

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	01 March 2017
2	Further testing details added as requested by the manufacturer	22 March 2017

Table 1

1.2 Introduction

Applicant	Iridium Satellite LLC
Manufacturer	Iridium Satellite LLC
Model Number(s)	Iridium Certus ProtoTerminal / 9801CertusH1
Serial Number(s)	300008080004080
Hardware Version(s)	A2
Software Version(s)	A
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 25: 2015 FCC 47 CFR Part 2 :2015
Order Number	38114/JEHJ
Date	24-August-2016
Date of Receipt of EUT	04-November-2016
Start of Test	13-November-2016
Finish of Test	08-March-2017
Name of Engineer(s)	Matthew Russell and Graeme Lawler
Related Document(s)	ANSI C63.26 (2015)



Product Service

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 25 and FCC 47 CFR Part 2 is shown below.

Section	Specification Clause		Test Description	Result	Comments/Base Standard
	Part 25	Part 2			
Configuration and Mode: B1 - QPSK					
2.1	-	2.1049	Occupied Bandwidth	Pass	ANSI C63.26
2.2	25.202(d)	2.1055	Frequency Tolerance	Pass	ANSI C63.26
2.3	25.202(f)	2.1051	Spurious Emissions at Antenna Terminals	Pass	ANSI C63.26
2.4	25.204	-	Equivalent Isotropic Radiated Power	Pass	ANSI C63.26
Configuration and Mode: C1 - QPSK					
2.1	-	2.1049	Occupied Bandwidth	Pass	ANSI C63.26
2.2	25.202(d)	2.1055	Frequency Tolerance	Pass	ANSI C63.26
2.3	25.202(f)	2.1051	Spurious Emissions at Antenna Terminals	Pass	ANSI C63.26
2.4	25.204	-	Equivalent Isotropic Radiated Power	Pass	ANSI C63.26
Configuration and Mode: C2 - QPSK					
2.1	-	2.1049	Occupied Bandwidth	Pass	ANSI C63.26
2.2	25.202(d)	2.1055	Frequency Tolerance	Pass	ANSI C63.26
2.3	25.202(f)	2.1051	Spurious Emissions at Antenna Terminals	Pass	ANSI C63.26
2.4	25.204	-	Equivalent Isotropic Radiated Power	Pass	ANSI C63.26



Product Service

Section	Specification Clause		Test Description	Result	Comments/Base Standard
	Part 25	Part 2			
Configuration and Mode: C8 - QPSK					
2.1	-	2.1049	Occupied Bandwidth	Pass	ANSI C63.26
2.2	25.202(d)	2.1055	Frequency Tolerance	Pass	ANSI C63.26
2.3	25.202(f)	2.1051	Spurious Emissions at Antenna Terminals	Pass	ANSI C63.26
2.4	25.204	-	Equivalent Isotropic Radiated Power	Pass	ANSI C63.26
2.5	25.216	-	Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radionavigation-Satellite Service	Pass	ANSI C63.26
Configuration and Mode: Iridium - Transmit					
2.6	-	2.1047 (d)	Modulation Characteristics	Declaration	
Configuration and Mode: C8 - 16-APSK					
2.1	-	2.1049	Occupied Bandwidth	Pass	ANSI C63.26
2.2	25.202(d)	2.1055	Frequency Tolerance	Pass	ANSI C63.26
2.3	25.202(f)	2.1051	Spurious Emissions at Antenna Terminals	Pass	ANSI C63.26
2.7	25.202(f)	2.1051	Radiated Spurious Emissions	Pass	ANSI C63.26
2.4	25.204	-	Equivalent Isotropic Radiated Power	Pass	ANSI C63.26 FCC Inquiry Tracking Number 609683

Table 2



1.4 Application Form

EQUIPMENT DESCRIPTION	
Model Name/Number	Iridium Certus ProtoTerminal / 9801CertusH1
Part Number	PT-H1
Hardware Version	A2
Software Version	A
Technical Description (Please provide a brief description of the intended use of the equipment)	Iridium satellite communications terminal

POWER SOURCE	
☐ AC mains	State voltage
AC supply frequency	46-63 (Hz)
110-240 VAC	
Max Current	
Hz	
☐ Single phase	☐ Three phase
And / Or	
☐ External DC supply	
Nominal voltage	V Max Current A
Extreme upper voltage	V
Extreme lower voltage	V
Battery	
☐ Nickel Cadmium	☐ Lead acid (Vehicle regulated)
☐ Alkaline	☐ Leclanche
☐ Lithium	☐ Other Details :
Volts nominal.	
End point voltage as quoted by equipment manufacturer	V

FREQUENCY INFORMATION					
Frequency Range	1616 to 1626	MHz			
Channel Spacing (where applicable)	41.7 kHz, 83.3 kHz, 333 kHz				
Test Frequencies*	Bottom	1616	MHz	Channel Number (if applicable)	1
	Middle	1621	MHz	Channel Number (if applicable)	121
	Top	1626	MHz	Channel Number (if applicable)	240
If alternate test modes are available resulting in different test frequencies please specify which mode is applicable:					



POWER CHARACTERISTICS			
Maximum TX power	EIRP 33.1	W	
Minimum TX power		W (if variable)	
Is transmitter intended for :			
Continuous duty		☐ Yes	☒ No
Intermittent duty		☒ Yes	☐ No
If intermittent state DUTY CYCLE			
Transmitter ON	0.03312 seconds		
Transmitter OFF	0.05688 seconds		

ANTENNA CHARACTERISTICS			
☐ Antenna connector	State impedance	Ohm	
☐ Temporary antenna connector	State impedance	Ohm	
☒ Integral antenna	State impedance	dBi	

MODULATION CHARACTERISTICS			
☒ Amplitude	☐ Frequency		
☒ Phase	☐ Other (please provide details):		
Can the transmitter operate un-modulated?			☐ Yes ☒ No

CLASS OF EMISSION USED	
ITU designation or Class of Emission:	
1	41K7Q7W
(if applicable) 2	83K3Q7W
(if applicable) 3	333KQ7W
If more than three classes of emission, list separately:	

EXTREME CONDITIONS			
Extreme test voltages (Max)	V	Extreme test voltages (Mix)	V
Nominal DC Voltage	V	DC Maximum Current	A
Maximum temperature	30 °C	Minimum temperature	20 °C

I hereby declare that that the information supplied is correct and complete.

Name: Jeremy Lavine
Date: January 27, 2017

Position held: Senior Engineer

1.5 Product Information

1.5.1 Technical Description

Iridium satellite communications terminal.

1.5.2 System Configuration

All testing, unless otherwise stated, was performed with the EUT configured as per the diagram below:

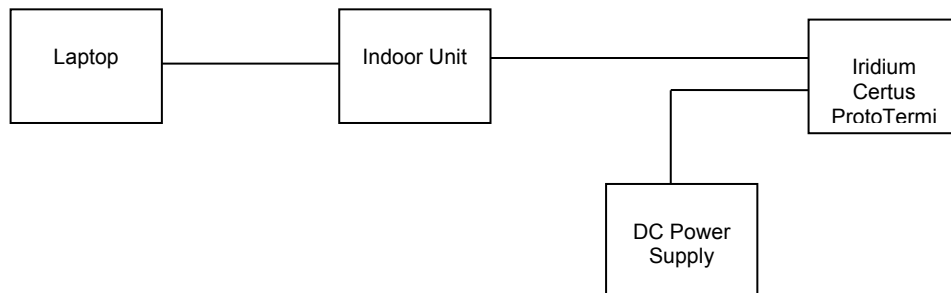


Figure 1 - System Configuration Diagram

1.6 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Serial Number: N/A			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

1.8 Test Location

TÜV SÜD Product Service conducted the following tests at our Fareham Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: B1 - QPSK		
Occupied Bandwidth	Matthew Russell	UKAS
Frequency Tolerance	Matthew Russell	UKAS
Spurious Emissions at Antenna Terminals	Graeme Lawler	UKAS
Equivalent Isotropic Radiated Power	Graeme Lawler	UKAS
Configuration and Mode: C1 - QPSK		
Occupied Bandwidth	Matthew Russell	UKAS
Frequency Tolerance	Matthew Russell	UKAS
Spurious Emissions at Antenna Terminals	Graeme Lawler	UKAS
Equivalent Isotropic Radiated Power	Graeme Lawler	UKAS
Configuration and Mode: C2 - QPSK		
Occupied Bandwidth	Matthew Russell	UKAS
Frequency Tolerance	Matthew Russell	UKAS
Spurious Emissions at Antenna Terminals	Graeme Lawler	UKAS
Equivalent Isotropic Radiated Power	Graeme Lawler	UKAS
Configuration and Mode: C8 - QPSK		
Occupied Bandwidth	Matthew Russell	UKAS
Frequency Tolerance	Matthew Russell	UKAS
Spurious Emissions at Antenna Terminals	Graeme Lawler	UKAS
Equivalent Isotropic Radiated Power	Graeme Lawler	UKAS
Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radionavigation-Satellite Service	Graeme Lawler	UKAS
Configuration and Mode: Iridium - Transmit		
Modulation Characteristics	Matthew Russell	UKAS
Configuration and Mode: C8 - 16-APSK		
Occupied Bandwidth	Matthew Russell	UKAS
Frequency Tolerance	Matthew Russell	UKAS
Spurious Emissions at Antenna Terminals	Graeme Lawler	UKAS
Radiated Spurious Emissions	Graeme Lawler	UKAS
Equivalent Isotropic Radiated Power	Graeme Lawler	UKAS

Table 4



Product Service

Office Address:

Octagon House
Concorde Way
Segensworth North
Fareham
Hampshire
PO15 5RL
United Kingdom



2 Test Details

2.1 Occupied Bandwidth

2.1.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1049

2.1.2 Equipment Under Test and Modification State

Iridium Certus ProtoTerminal / 9801CertusH1, S/N: 300008080004080 - Modification State 0

2.1.3 Date of Test

18-November-2016

2.1.4 Test Method

This test was performed in accordance with ANSI C63.26, Clause 5.4.4.

2.1.5 Environmental Conditions

Ambient Temperature 21.8 °C
Relative Humidity 28.5 %

2.1.6 Test Results

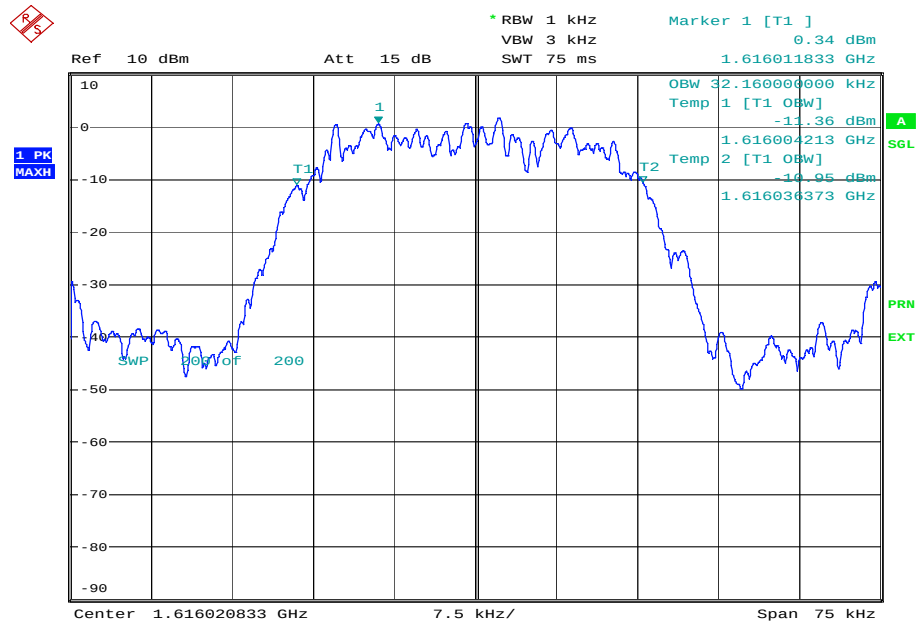
B1 - QPSK

Occupied Bandwidth (kHz)		
1616.020833 KHz	1621.020833 KHz	1625.979166 KHz
32.16	32.10	31.68

Table 5

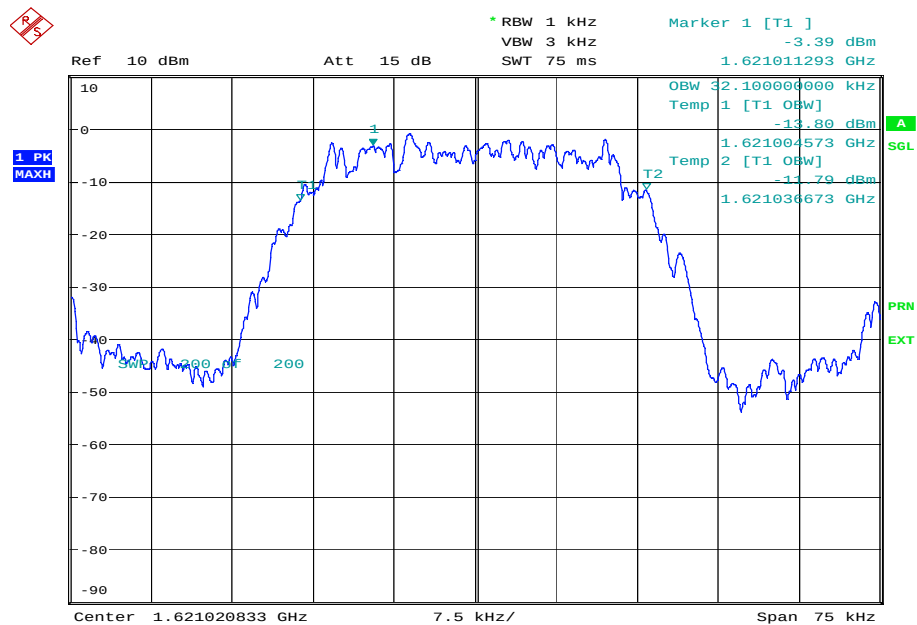


Product Service



Date: 2. JAN. 2000 00:19:42

Figure 2 - 1616.020833 MHz



Date: 2. JAN. 2000 00:18:49

Figure 3 - 1621.020833 MHz

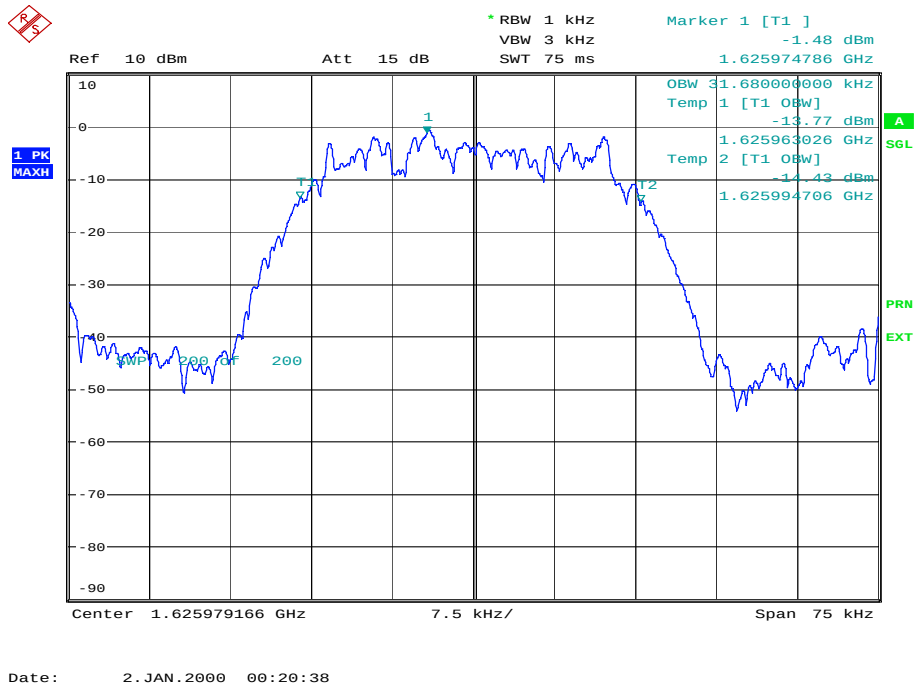


Figure 4 - 1625.979166 MHz

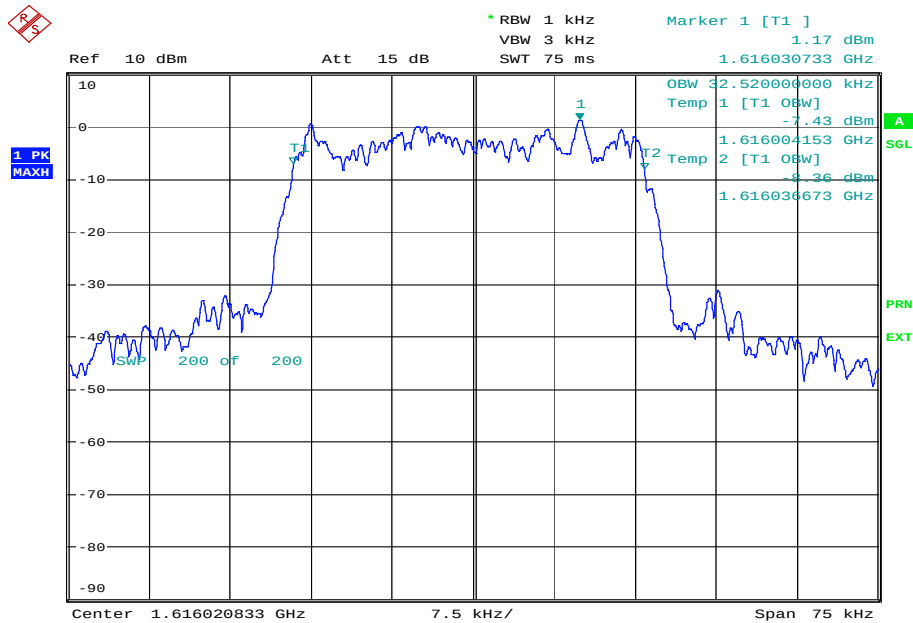
FCC 47 CFR Part 2, Limit Clause 2.1049

None specified.

C1 - QPSK

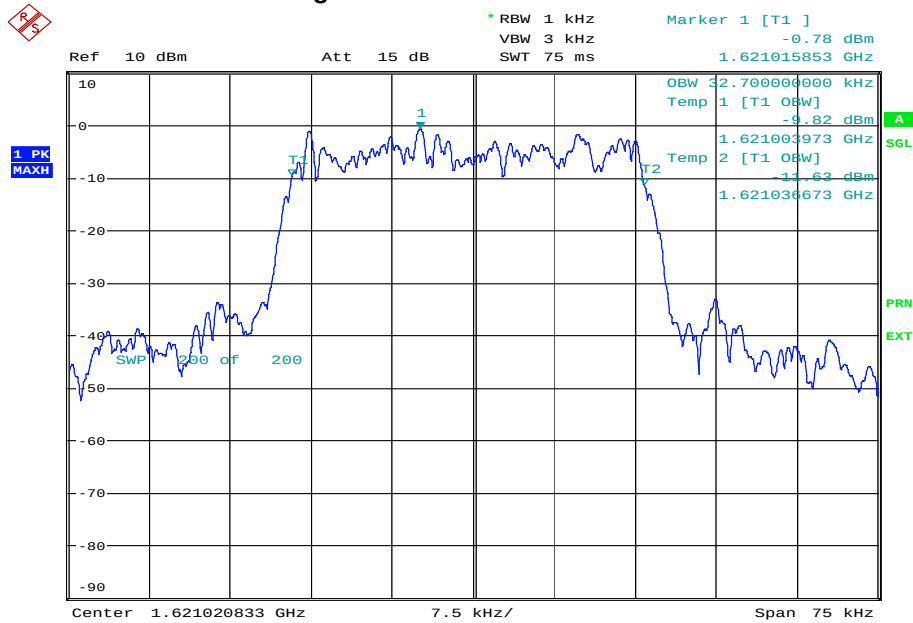
Occupied Bandwidth (kHz)		
1616.020833 KHz	1621.020833 KHz	1625.979166 KHz
32.52	32.70	32.64

Table 6



Date: 2. JAN. 2000 00:23:49

Figure 5 - 1616.020833 MHz



Date: 2. JAN. 2000 00:22:26

Figure 6 - 1621.020833 MHz

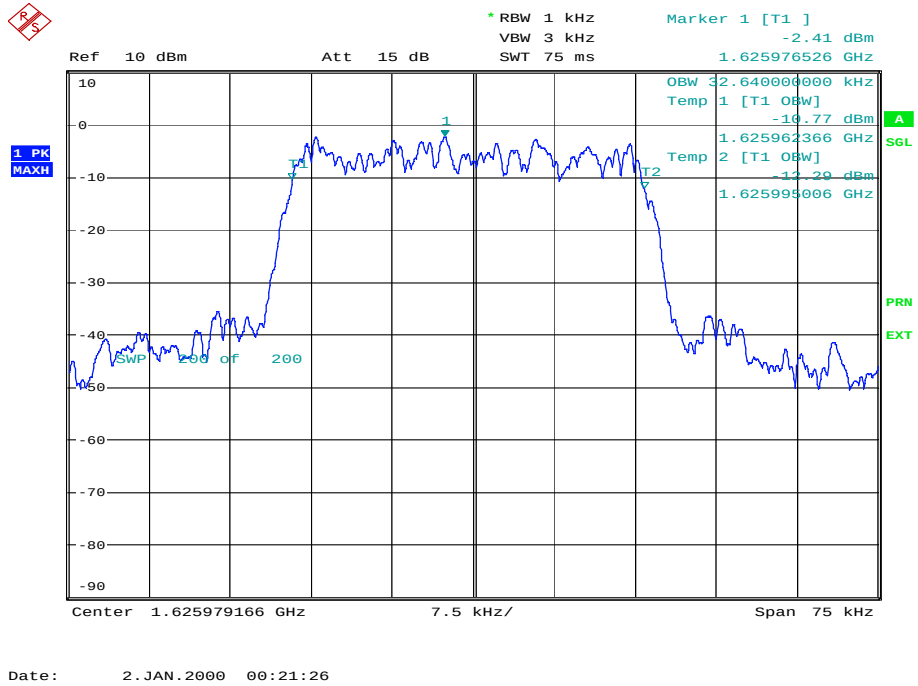


Figure 7 - 1625.979166 MHz

FCC 47 CFR Part 2, Limit Clause 2.1049

None specified.



C2 - QPSK

Occupied Bandwidth (kHz)		
1616.041666 KHz	1621.041666 KHz	1625.958332 KHz
64.24	64.32	64.08

Table 7

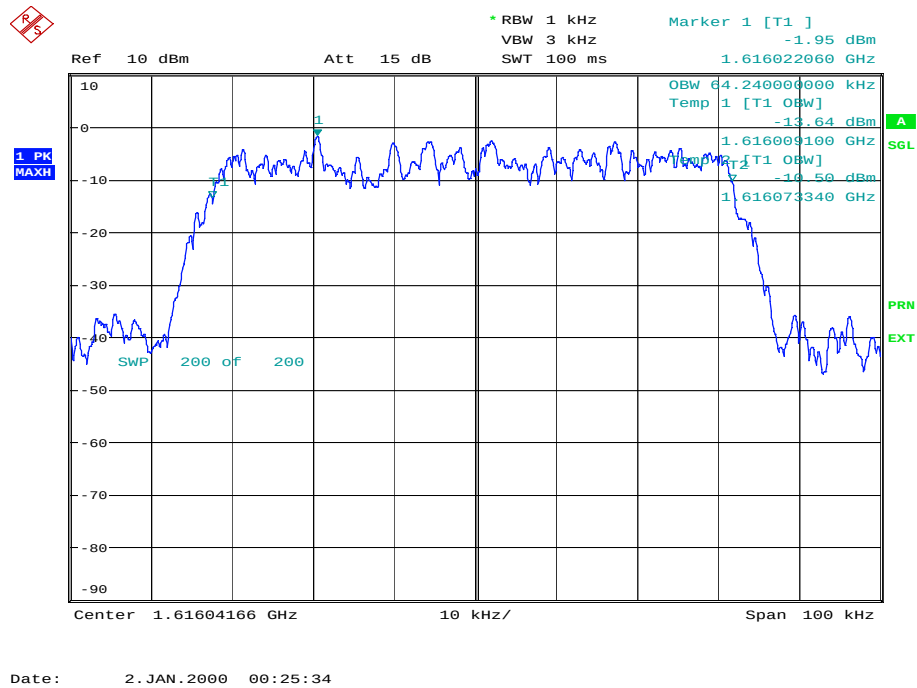
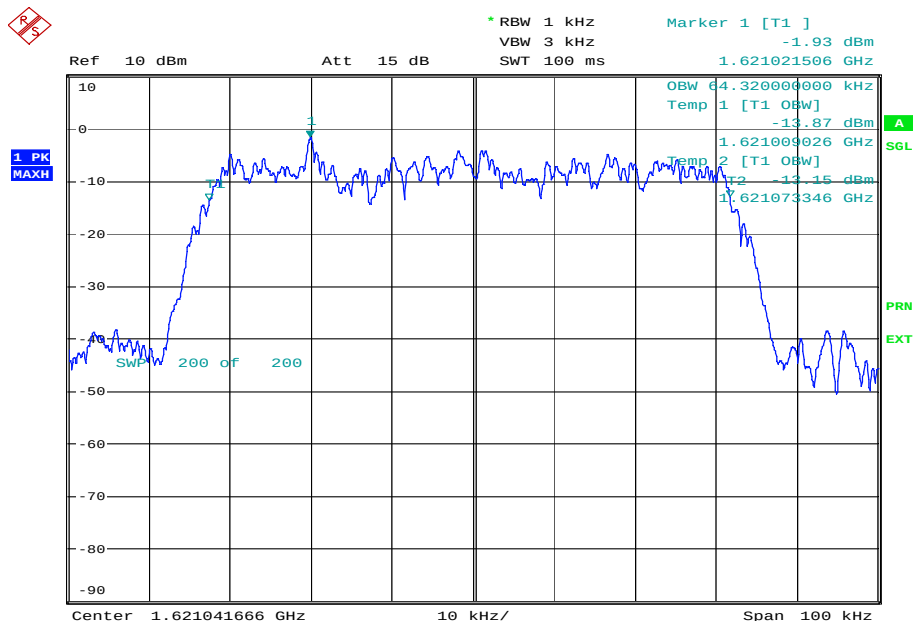


Figure 8 - 1616.041666 MHz

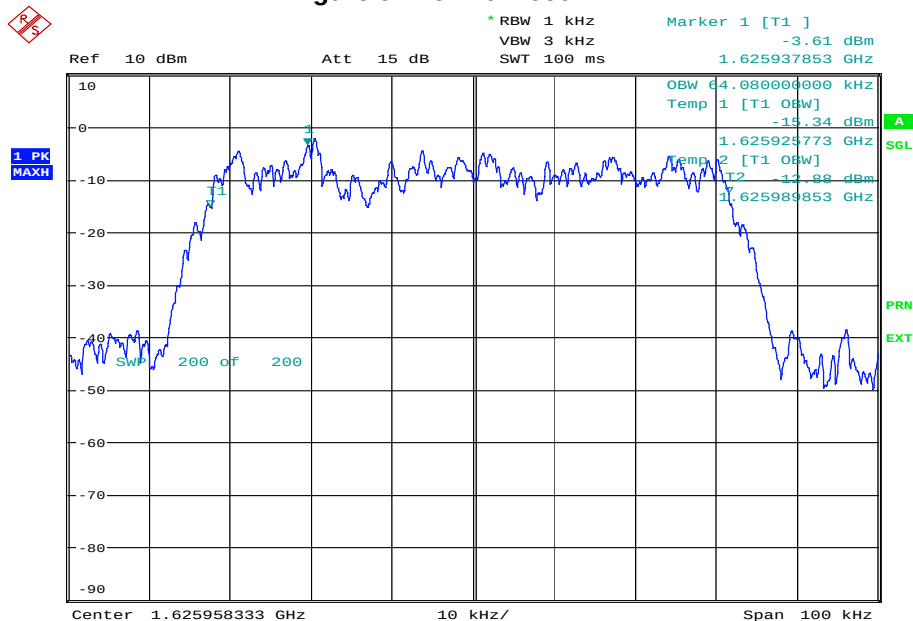


Product Service



Date: 2.JAN.2000 00:26:25

Figure 9 - 1621.041666 MHz



Date: 2.JAN.2000 00:27:25

Figure 10 - 1625.958332 MHz

FCC 47 CFR Part 2, Limit Clause 2.1049

None specified.



C8 - QPSK

Occupied Bandwidth (kHz)		
1616.166666 KHz	1621.166666 KHz	1625.833332 KHz
256.80	256.40	256.00

Table 8

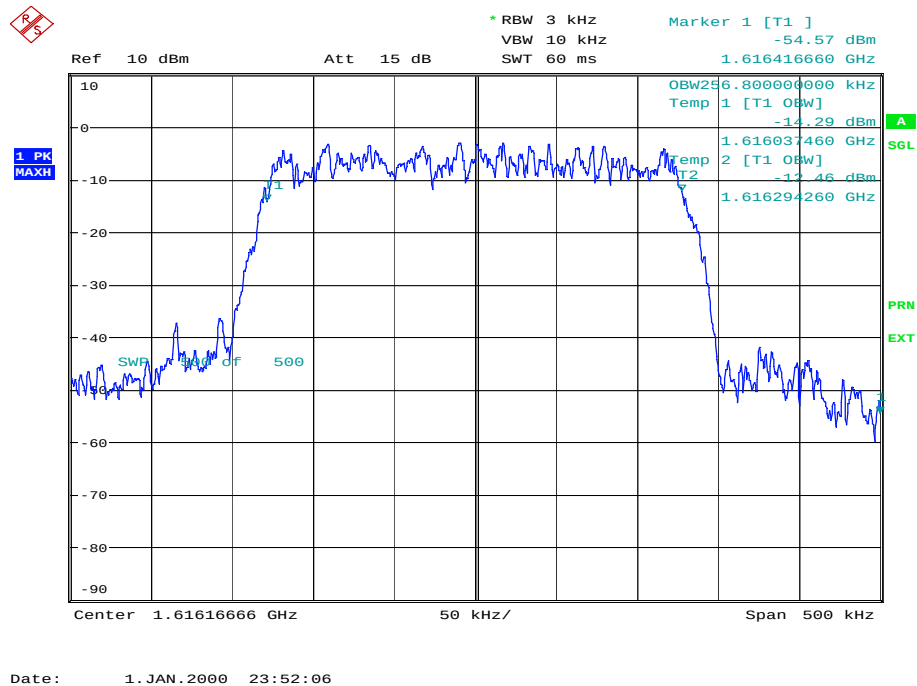
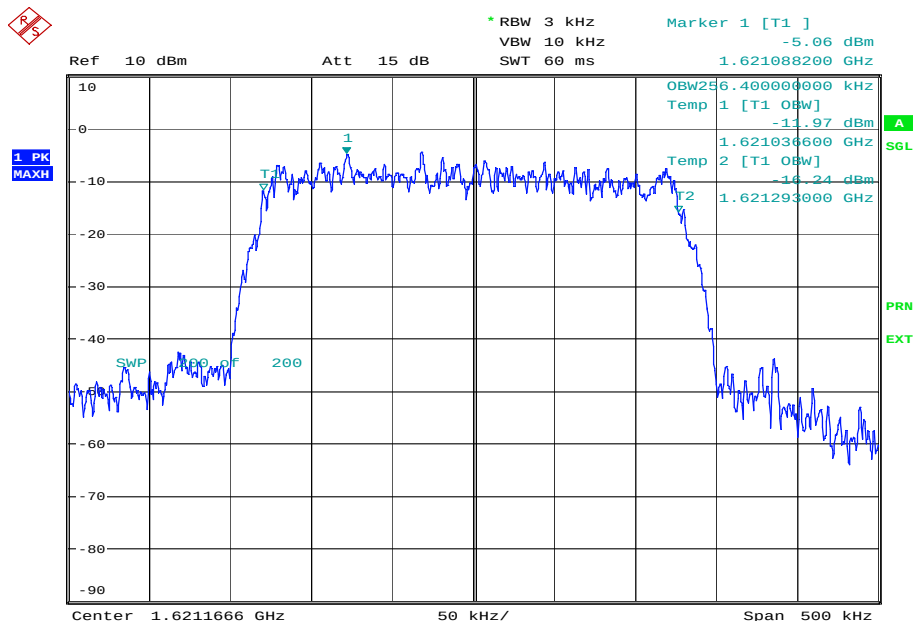


Figure 11 - 1616.166666 MHz

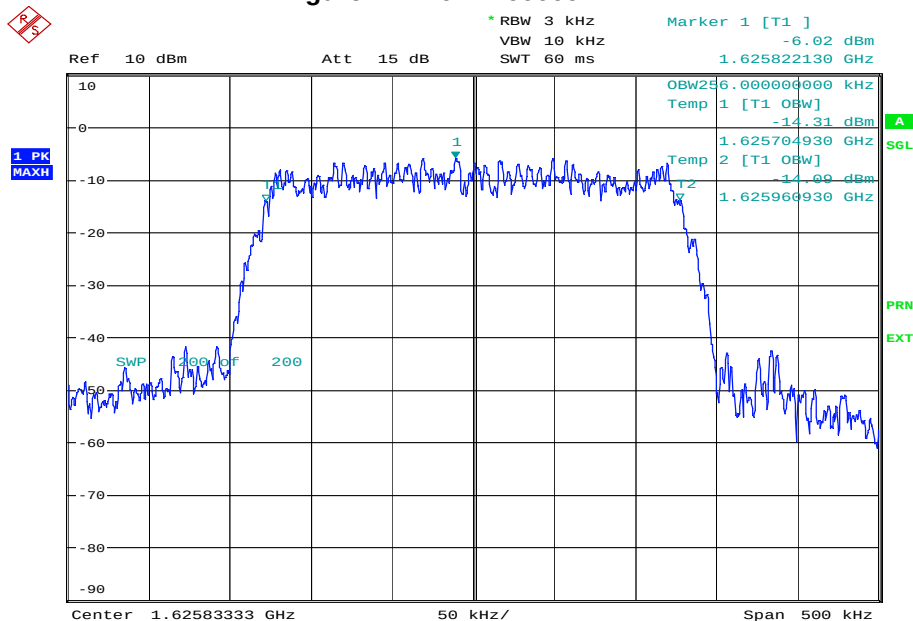


Product Service



Date: 1. JAN. 2000 23:54:20

Figure 12 - 1621.166666 MHz



Date: 1. JAN. 2000 23:55:17

Figure 13 - 1625.833332 MHz

FCC 47 CFR Part 2, Limit Clause 2.1049

None specified.



C8 - 16-APSK

Occupied Bandwidth (kHz)		
1616.166666 KHz	1621.166666 KHz	1625.833332 KHz
259.20	260.80	259.20

Table 9

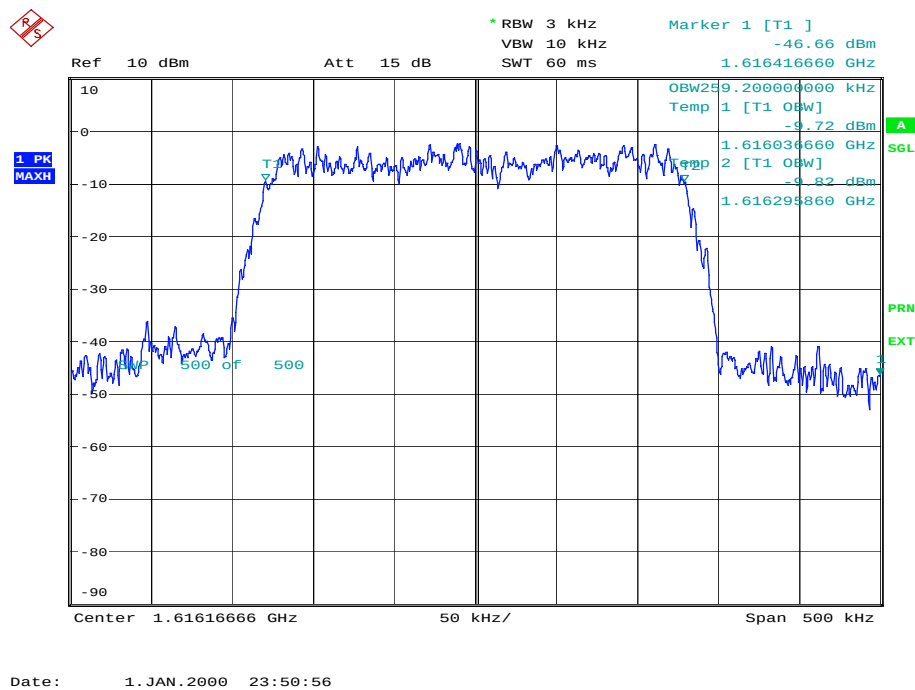
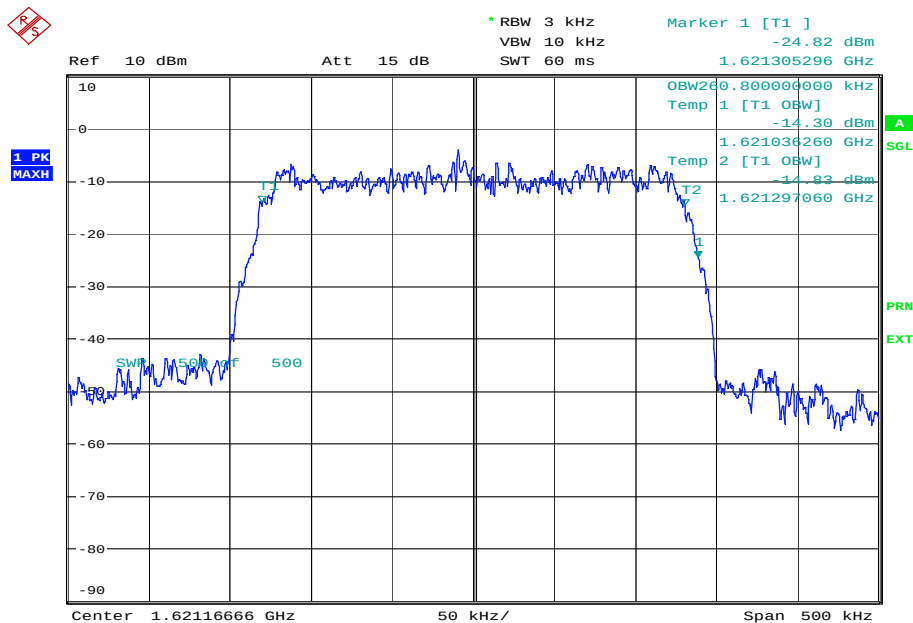


Figure 14 - 1616.166666 MHz

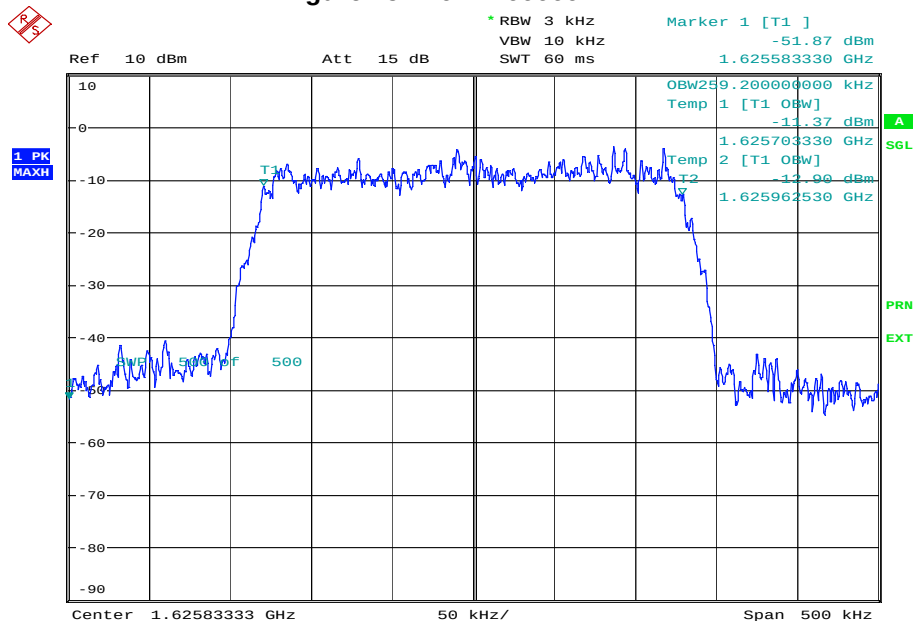


Product Service



Date: 1. JAN. 2000 23:45:58

Figure 15 - 1621.166666 MHz



Date: 1. JAN. 2000 23:49:20

Figure 16 - 1625.833332 MHz

FCC 47 CFR Part 2, Limit Clause 2.1049

None specified.

2.1.7 Test Location and Test Equipment Used

This test was carried out in Climatec 3 Chamber.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
RF Coupler	TUV SUD Product Service	RFC1	414	-	TU
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	29-Jan-2017
Climatic Chamber	Climatec	CLIMATEC 3	2846	12	01-Jul-2017
TRUE RMS MULTIMETER	Fluke	179	4006	12	09-Dec-2016
4 Channel PSU	Rohde & Schwarz	HMP4040	4736	-	TU

Table 10

TU - Traceability Unscheduled



Product Service

2.2 Frequency Tolerance

2.2.1 Specification Reference

FCC 47 CFR Part 25, Clause 25.202(d)
FCC 47 CFR Part 2, Clause 2.1055

2.2.2 Equipment Under Test and Modification State

Iridium Certus ProtoTerminal / 9801CertusH1, S/N: 300008080004080 - Modification State 0

2.2.3 Date of Test

17-November-2016 to 18-November-2016

2.2.4 Test Method

This test was performed in accordance with ANSI C63.26, Clause 5.6.

2.2.5 Environmental Conditions

Ambient Temperature	19.6 - 21.8 °C
Relative Humidity	28.5 - 68.9 %

2.2.6 Test Results

B1 - QPSK

Frequency Stability over Variation in Temperature

Test Condition	1621.020833 MHz	
Temperature	Frequency Error (%)	Frequency Error (ppm)
-30°C	0.000019	0.190929
-20°C	0.000059	0.592836
-10°C	0.000024	0.243982
0°C	-0.000030	-0.295801
10°C	-0.000010	-0.096236
20°C	-0.000010	-0.096853
30°C	-0.000010	-0.096853
40°C	-0.000009	-0.092843
50°C	-0.000011	-0.111658

Table 11

Frequency Stability when Varying Supply Voltage

Test Condition	1621.020833 MHz	
Supply Voltage	Frequency Error (%)	Frequency Error (ppm)
40.8 V DC	-0.000005	-0.049660
48.0 V DC	-0.000010	-0.096853
55.2 V DC	-0.000020	-0.196790

Table 12

FCC 47 CFR Part 25, Limit Clause 25.202(d)

The carrier frequency of each earth station transmitter authorized in these services shall be maintained within 0.001 percent of the reference frequency.



C1 - QPSK

Frequency Stability over Variation in Temperature

Test Condition	1621.020833 MHz	
Temperature	Frequency Error (%)	Frequency Error (ppm)
-30°C	0.000006	0.061381
-20°C	0.000039	0.394504
-10°C	0.000016	0.155766
0°C	-0.000014	-0.140652
10°C	-0.000034	-0.337750
20°C	-0.000044	-0.437379
30°C	-0.000063	-0.634477
40°C	-0.000075	-0.750761
50°C	-0.000011	-0.110733

Table 13

Frequency Stability when Varying Supply Voltage

Test Condition	1621.020833 MHz	
Supply Voltage	Frequency Error (%)	Frequency Error (ppm)
40.8 V DC	0.000025	0.254778
48.0 V DC	-0.000044	-0.437379
55.2 V DC	-0.000026	-0.256628

Table 14

FCC 47 CFR Part 25, Limit Clause 25.202(d)

The carrier frequency of each earth station transmitter authorized in these services shall be maintained within 0.001 percent of the reference frequency.

C2 - QPSK

Frequency Stability over Variation in Temperature

Test Condition	1621.041666 MHz	
Temperature	Frequency Error (%)	Frequency Error (ppm)
-30°C	0.000001	0.005860
-20°C	0.000032	0.316463
-10°C	0.000007	0.065082
0°C	-0.000071	-0.711579
10°C	-0.000077	-0.768025
20°C	-0.000067	-0.671482
30°C	0.000050	0.502146
40°C	-0.000040	-0.401902
50°C	0.000039	-0.386788

Table 15

Frequency Stability when Varying Supply Voltage

Test Condition	1621.041666 MHz	
Supply Voltage	Frequency Error (%)	Frequency Error (ppm)
40.8 V DC	-0.000002	-0.018507
48.0 V DC	-0.000067	-0.671482
55.2 V DC	-0.000037	-0.371366

Table 16

FCC 47 CFR Part 25, Limit Clause 25.202(d)

The carrier frequency of each earth station transmitter authorized in these services shall be maintained within 0.001 percent of the reference frequency.

C8 - QPSK

Frequency Stability over Variation in Temperature

Test Condition	1621.166666 MHz	
Temperature	Frequency Error (%)	Frequency Error (ppm)
-30°C	0.000075	0.751249
-20°C	0.000001	0.012275
-10°C	-0.000034	0.338583
0°C	-0.000074	-0.739961
10°C	-0.000075	-0.74952
20°C	-0.000063	-0.627079
30°C	0.000011	0.112512
40°C	0.000067	0.666125
50°C	-0.000040	-0.396998

Table 17

Frequency Stability when Varying Supply Voltage

Test Condition	1621.166666 MHz	
Supply Voltage	Frequency Error (%)	Frequency Error (ppm)
40.8 V DC	-0.000001	-0.013015
48.0 V DC	-0.000063	-0.627079
55.2 V DC	-0.000063	-0.628005

Table 18

FCC 47 CFR Part 25, Limit Clause 25.202(d)

The carrier frequency of each earth station transmitter authorized in these services shall be maintained within 0.001 percent of the reference frequency.



C8 - 16-APSK

Frequency Stability over Variation in Temperature

Test Condition	1621.166666 MHz	
Temperature	Frequency Error (%)	Frequency Error (ppm)
-30°C	-0.000066	-0.659155
-20°C	0.000075	0.747240
-10°C	-0.000086	-0.859011
0°C	0.000139	1.392146
10°C	0.000047	0.466886
20°C	-0.000024	-0.240629
30°C	0.000026	0.259011
40°C	-0.000008	-0.081485
50°C	0.000028	0.279984

Table 19

Frequency Stability when Varying Supply Voltage

Test Condition	1621.166666 MHz	
Supply Voltage	Frequency Error (%)	Frequency Error (ppm)
40.8 V DC	-0.000024	-0.240012
48.0 V DC	-0.000024	-0.240629
55.2 V DC	-0.000098	-0.983613

Table 20

FCC 47 CFR Part 25, Limit Clause 25.202(d)

The carrier frequency of each earth station transmitter authorized in these services shall be maintained within 0.001 percent of the reference frequency.

2.2.7 Test Location and Test Equipment Used

This test was carried out in Climatec 3 Chamber.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Rubidium Frequency Standard	Quartzlock	A10-B	92	12	18-Feb-2017
RF Coupler	TUV SUD Product Service	RFC1	414	-	TU
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	29-Jan-2017
Climatic Chamber	Climatec	CLIMATEC 3	2846	12	01-Jul-2017
TRUE RMS MULTIMETER	Fluke	179	4006	12	09-Dec-2016
4 Channel PSU	Rohde & Schwarz	HMP4040	4736	-	TU

Table 21

TU - Traceability Unscheduled

2.3 Spurious Emissions at Antenna Terminals

2.3.1 Specification Reference

FCC 47 CFR Part 25, Clause 25.202(f)
FCC 47 CFR Part 2, Clause 2.1051

2.3.2 Equipment Under Test and Modification State

Iridium Certus ProtoTerminal / 9801CertusH1, S/N: 300008080004080 - Modification State 0

2.3.3 Date of Test

04-December-2016

2.3.4 Test Method

This test was performed in accordance with ANSI C63.26 clause 5.5.

For B1 and C1 configurations, the RBW of the spectrum analyser was reduced to 1 kHz so that the true spectral shape of the emission could be seen. To compensate the limit was reduced by $10\log(1/4) = 6$ dB, for B1 and C1 configurations.

2.3.5 Environmental Conditions

Ambient Temperature 19.6 - 21.8 °C
Relative Humidity 24.0 - 26.0 %

2.3.6 Test Results

B1 - QPSK

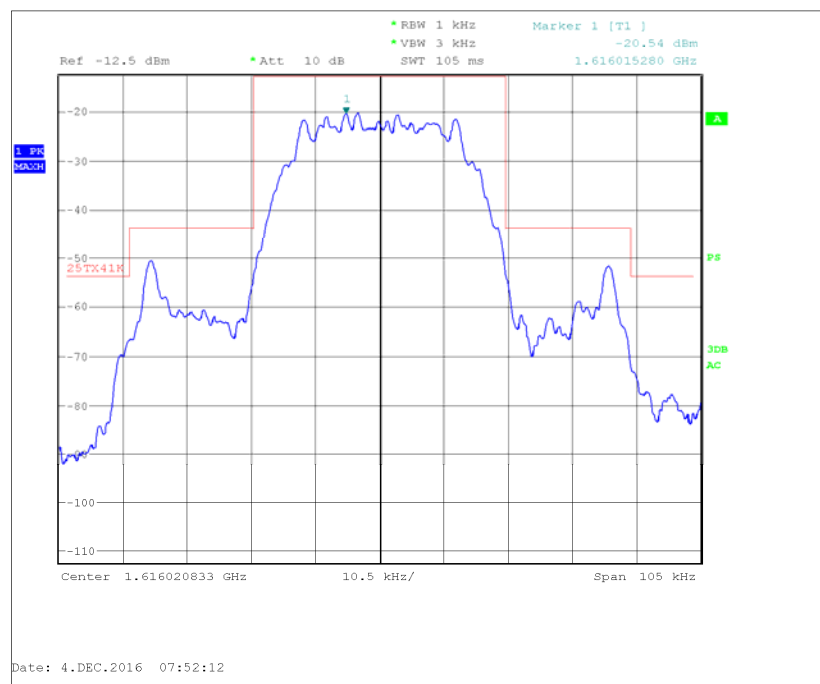


Figure 17 - 1616.020833 MHz - Emission Mask

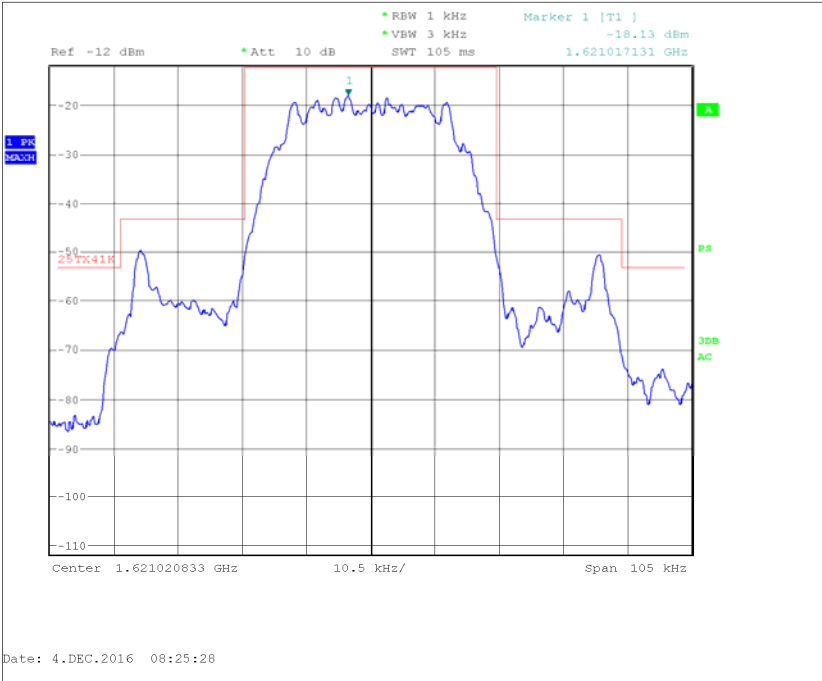


Figure 18 - 1621.020833 MHz - Emission Mask



Figure 19 - 1625.979166 MHz - Emission Mask



FCC 47 CFR Part 25, Limit Clause 25.202(f)

The average power of unwanted emissions shall be attenuated below the average output power, P(dBW), of the transmitter, as specified below:

- 1) 25 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 50%, up to and including 100% of the authorised bandwidth;
- 2) 35 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 100%, up to and including 250% of the authorised bandwidth;
- 3) $43 + 10 \log p$ (watts) in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 250% of the authorised bandwidth.



C1 - QPSK

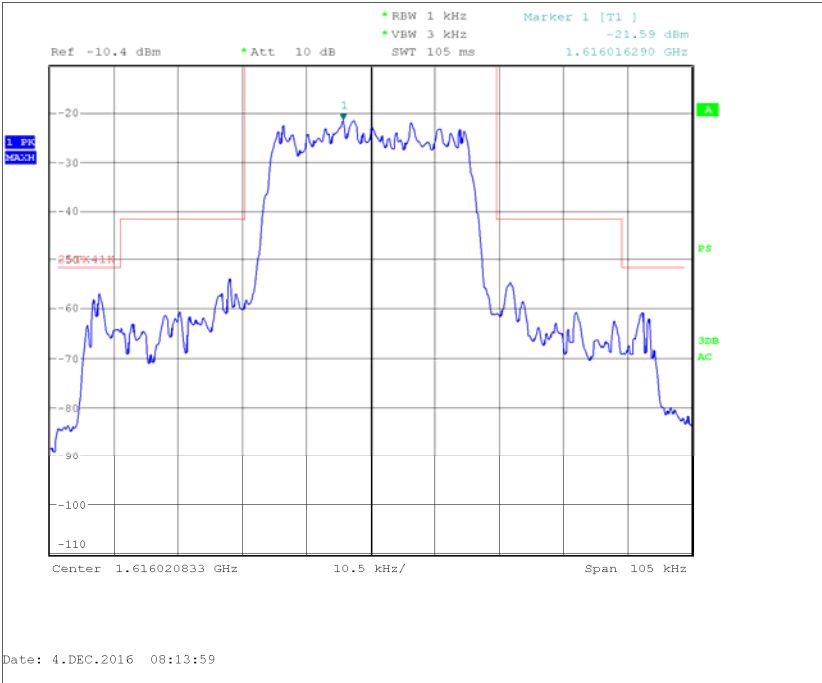


Figure 20 - 1616.020833 MHz - Emission Mask

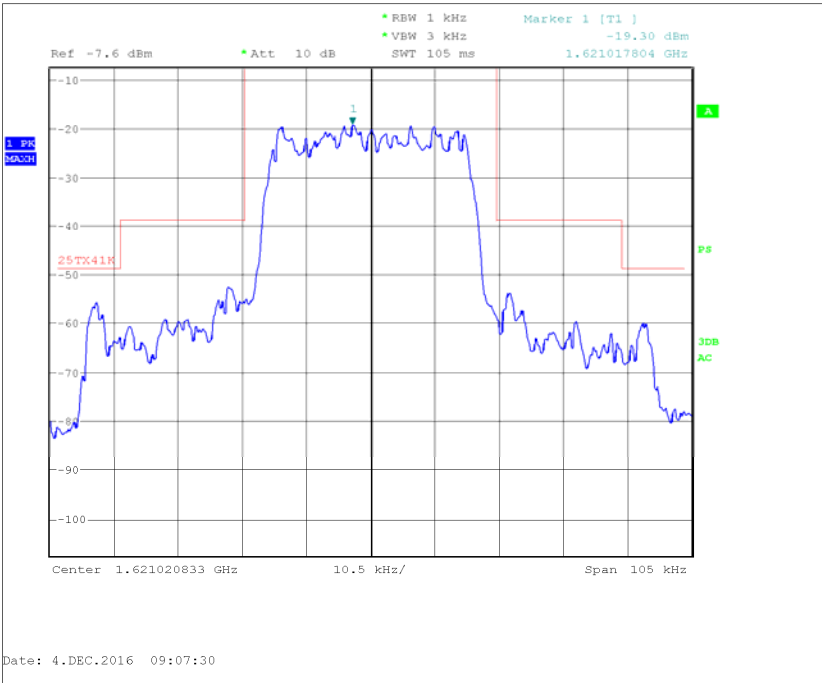


Figure 21 - 1621.020833 MHz - Emission Mask

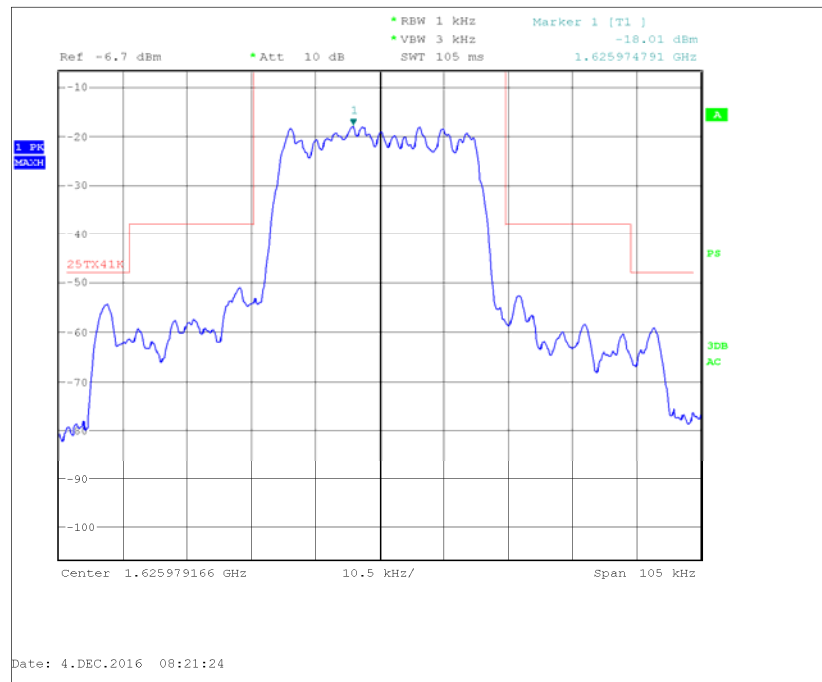


Figure 22 - 1625.979166 MHz - Emission Mask

FCC 47 CFR Part 25, Limit Clause 25.202(f)

The average power of unwanted emissions shall be attenuated below the average output power, P(dBW), of the transmitter, as specified below:

- 4) 25 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 50%, up to and including 100% of the authorised bandwidth;
- 5) 35 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 100%, up to and including 250% of the authorised bandwidth;
- 6) $43 + 10 \log p$ (watts) in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 250% of the authorised bandwidth.

C2 - QPSK

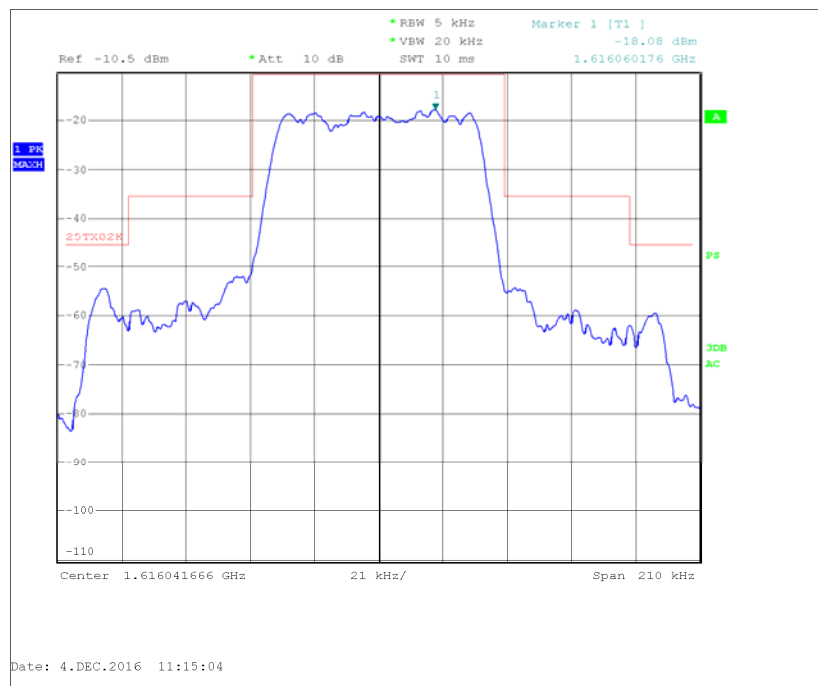


Figure 23 - 1616.041666 MHz - Emission Mask

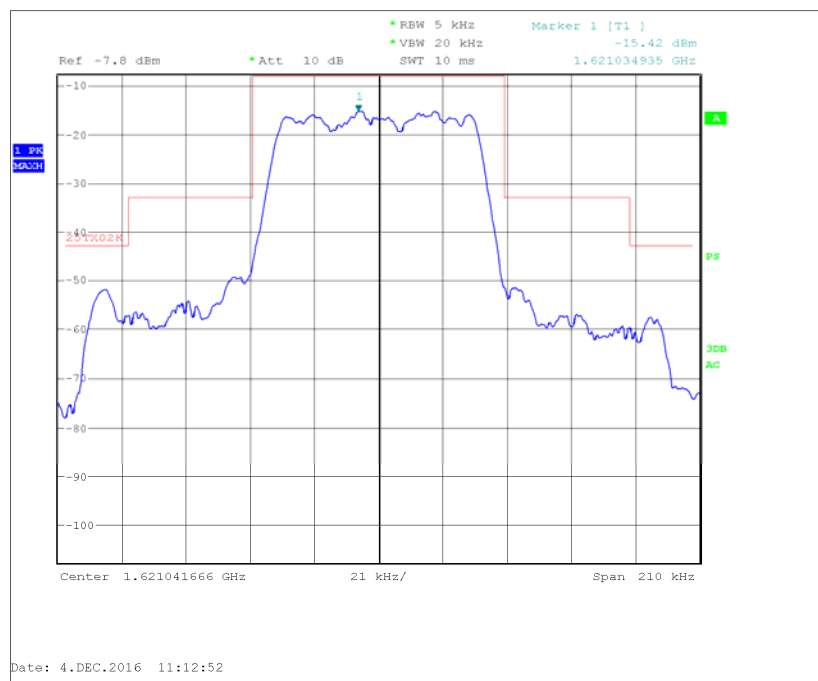


Figure 24 - 1621.041666 MHz - Emission Mask

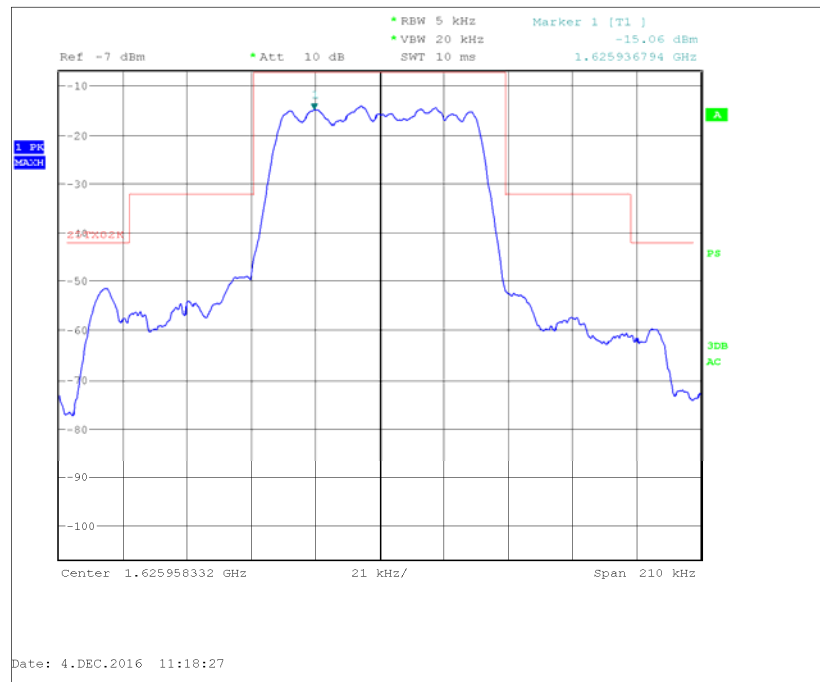


Figure 25 - 1625.958332 MHz - Emission Mask

FCC 47 CFR Part 25, Limit Clause 25.202(f)

The average power of unwanted emissions shall be attenuated below the average output power, P(dBW), of the transmitter, as specified below:

- 7) 25 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 50%, up to and including 100% of the authorised bandwidth;
- 8) 35 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 100%, up to and including 250% of the authorised bandwidth;
- 9) $43 + 10 \log p$ (watts) in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 250% of the authorised bandwidth.



C8 - QPSK

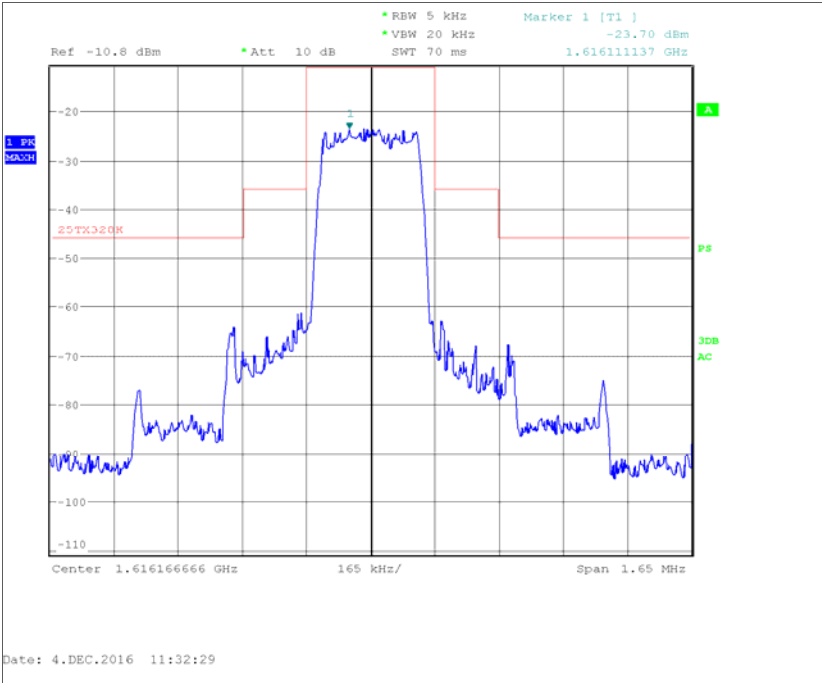


Figure 26 - 1616.166666 MHz - Emission Mask

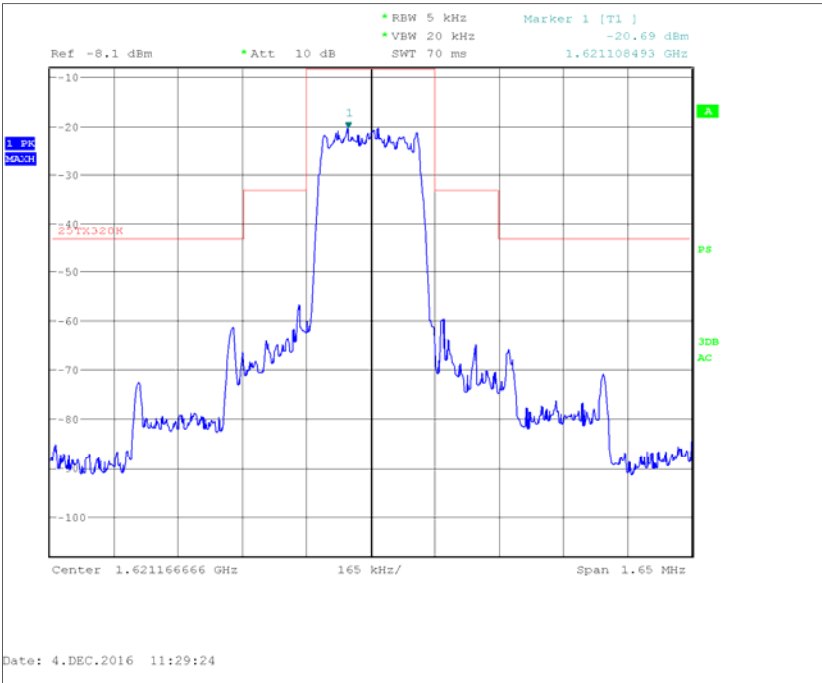


Figure 27 - 1621.166666 MHz – Emission Mask

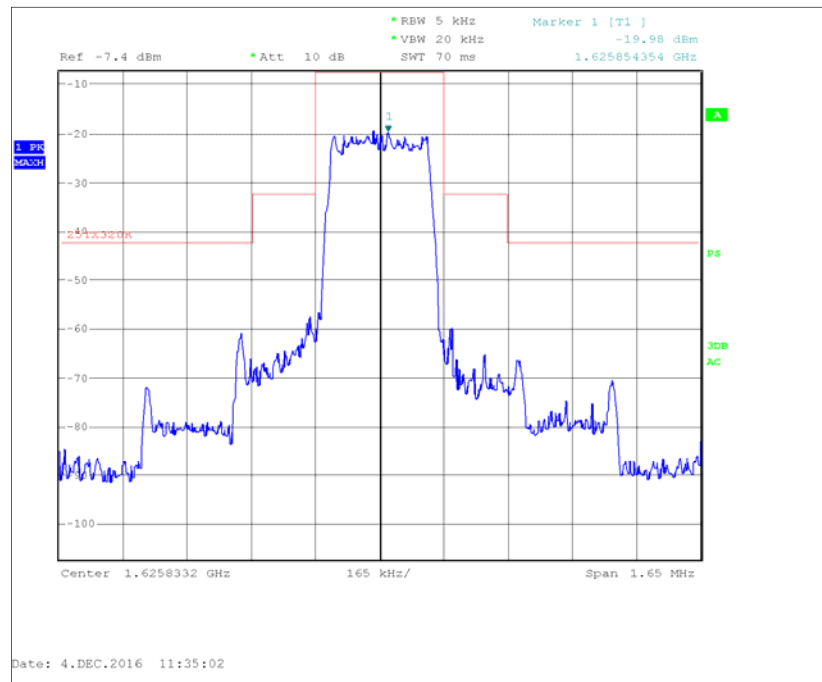


Figure 28 - 1625.833332 MHz - Emission Mask

FCC 47 CFR Part 25, Limit Clause 25.202(f)

The average power of unwanted emissions shall be attenuated below the average output power, P(dBW), of the transmitter, as specified below:

- 10) 25 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 50%, up to and including 100% of the authorised bandwidth;
- 11) 35 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 100%, up to and including 250% of the authorised bandwidth;
- 12) $43 + 10 \log p$ (watts) in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 250% of the authorised bandwidth.

C8 - 16-APSK

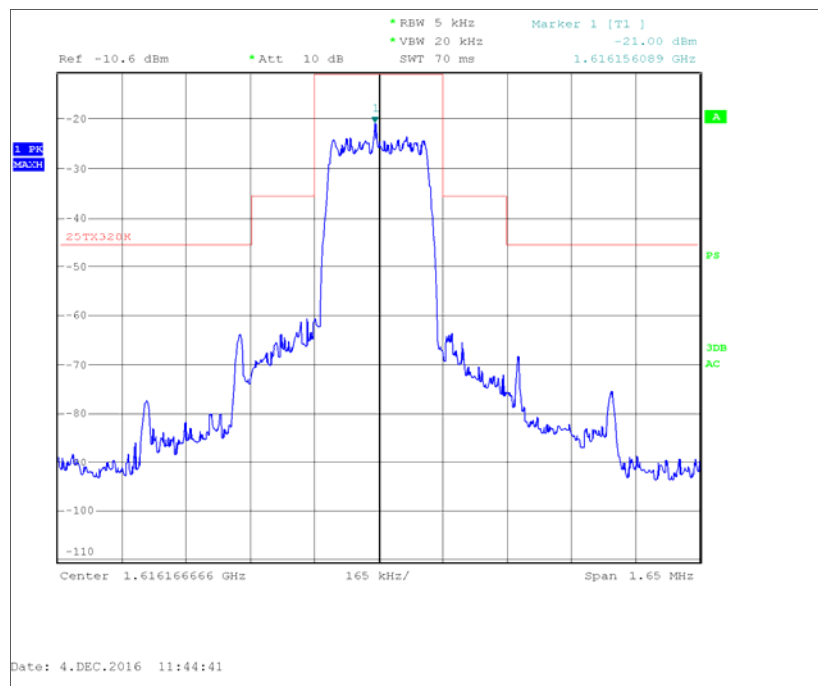


Figure 29 - 1616.166666 MHz - Emission Mask

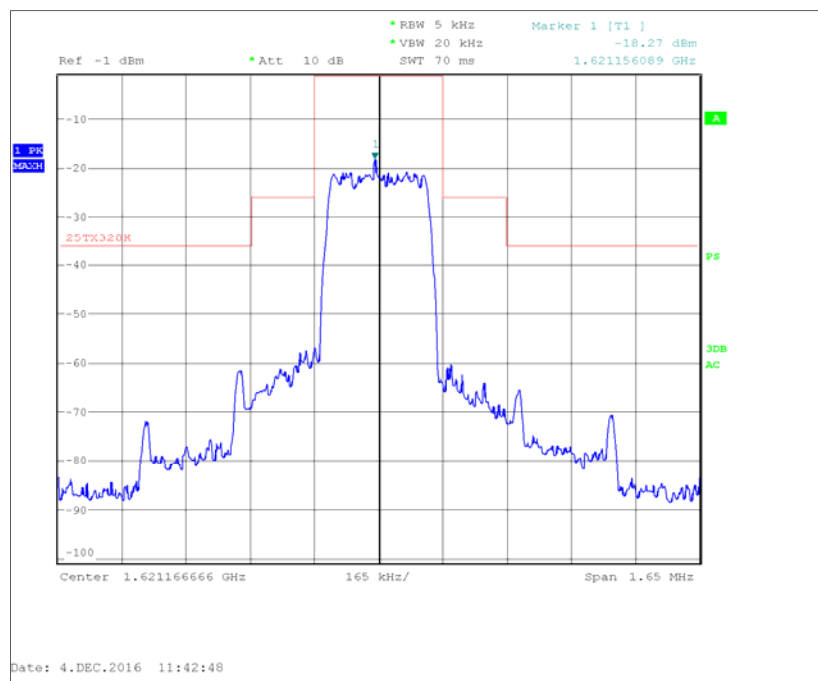


Figure 30 - 1621.166666 MHz - Emission Mask

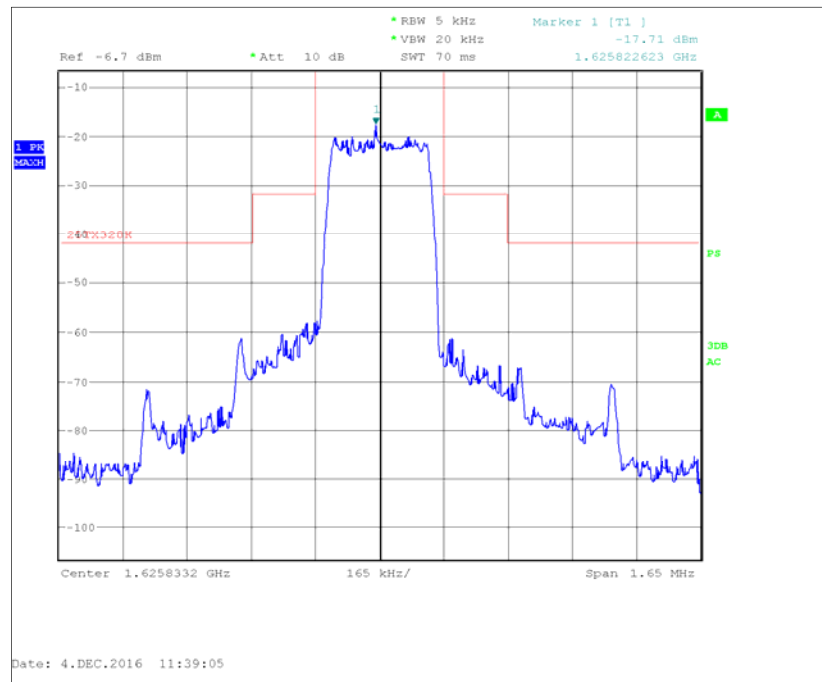


Figure 31 - 1625.833332 MHz - Emission Mask

FCC 47 CFR Part 25, Limit Clause 25.202(f)

The average power of unwanted emissions shall be attenuated below the average output power, P(dBW), of the transmitter, as specified below:

- 13) 25 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 50%, up to and including 100% of the authorised bandwidth;
- 14) 35 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 100%, up to and including 250% of the authorised bandwidth;
- 15) $43 + 10 \log p$ (watts) in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 250% of the authorised bandwidth.



2.3.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Hygrometer	Rotronic	A1	1388	12	13-Apr-2017
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygrometer	Rotronic	HYGROPALM 1	2338	12	21-Sep-2017
8m Cable	Rhophase	NPS-2302-8000-NPS	3248	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	12-Nov-2017
Tilt Antenna Mast	maturio GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturio GmbH	NCD	3917	-	TU
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	29-Dec-2016
4 Channel PSU	Rohde & Schwarz	HMP4040	4736	-	TU

Table 22

TU - Traceability Unscheduled

2.4 Equivalent Isotropic Radiated Power

2.4.1 Specification Reference

FCC 47 CFR Part 25, Clause 25.204

2.4.2 Equipment Under Test and Modification State

Iridium Certus ProtoTerminal / 9801CertusH1, S/N: 300008080004080 - Modification State 0

2.4.3 Date of Test

13-November-2016 to 23-November-2016

2.4.4 Test Method

Total EIRP measurements were performed in a radiated configuration in accordance with ANSI C63.26, clause 5.2.3.3 in order to determine the configuration with the highest output power.

Power density in a 5 kHz resolution bandwidth was performed in a radiated configuration in accordance with ANSI C63.26, clause 5.2.3.5 and 6.3 in the configuration with highest total EIRP. Measurements were made with a peak detector and max hold trace.

The EUT supports spherical beam-forming however the steering of the elevation of the beam is restricted from 20° to 90°. In ANSI C63.26, clause 6.3.2.2, where measurements at $\Theta = 0^\circ$ are required, measurements were made at the lowest supported value of Θ which is 20°. Where measurements of $\Theta = 30^\circ$ are required, measurements were made at the next available setting which is 39°.

From the list of Elevation and Azimuth required to test not all combinations were supported by the EUT. The combinations that could not be tested were as follows:

Elevation (Θ)	Not Supported Angles of Azimuth specified to test by ANSI C63.26 clause 6.3.2.2.
20	-
39	-90, -30, +30 and +90
60	-45 and +45
90	-45 and +45

This method was used as per the pre-approval guidance issued in FCC inquiry 609683.

It was neither practical, nor representative of normal operation for the EUT to be vertically mounted, therefore the EUT was placed in the worst case condition with respect to vertical polarization of the EUT which was confirmed by the manufacturer as 60 degrees with respect to the horizontal ground plane.

A final EIRP value was obtained by using the substitution method described in ANSI C63.26, clause 5.5.3.

EIRP results integrated over the measured occupied bandwidth of the EUT, have been calculated and are reported in Annex A of the present document at the request of the manufacturer.

2.4.5 Environmental Conditions

Ambient Temperature 19.2 - 20.0 °C
Relative Humidity 36.0 - 37.0 %

2.4.6 Test Results

Relative Total EIRP Measurements

B1 - QPSK

EIRP (dBm)		
1616.166666 MHz	1621.166666 MHz	1625.833332 MHz
34.80*	34.69*	33.50*

Table 23

C1 - QPSK

EIRP (dBm)		
1616.166666 MHz	1621.166666 MHz	1625.833332 MHz
36.98*	37.18*	36.00*

Table 24

C2 - QPSK

EIRP (dBm)		
1616.166666 MHz	1621.166666 MHz	1625.833332 MHz
37.13*	37.45*	36.08*

Table 25

C8 - QPSK

EIRP (dBm)		
1616.166666 MHz	1621.166666 MHz	1625.833332 MHz
36.83*	37.19*	35.82*

Table 26

C8 - 16-APSK

EIRP (dBm)		
1616.166666 MHz	1621.166666 MHz	1625.833332 MHz
37.45*	37.81*	36.16*

Table 27

*The measurements obtained above are relative measurements purely to determine the worst case modulation and channel scheme. The results recorded above were not made in the highest combination of azimuth and elevation nor were they maximised for height/orientation and angle of the measurement antenna and EUT.

Power Density Measurements (C8 - 16-APSK)

1616.166666 MHz

APV Value	Azimuth Φ	Elevation Θ	EUT Orientation	Test Antenna Polarity	Final EIRP/5 kHz
1	0	90	Horizontal	Vertical	27.64
1	0	90	Horizontal	Horizontal	26.88
1	0	90	60 Deg	Vertical	33.25
1	0	90	60 Deg	Horizontal	35.33
1	0	60	Horizontal	Vertical	26.80
1	0	60	Horizontal	Horizontal	27.10
1	0	60	60 Deg	Vertical	25.85
1	0	60	60 Deg	Horizontal	28.69
9	30	60	Horizontal	Vertical	30.27
9	30	60	Horizontal	Horizontal	29.19
9	30	60	60 Deg	Vertical	28.68
9	30	60	60 Deg	Horizontal	27.85
10	60	60	Horizontal	Vertical	29.73
10	60	60	Horizontal	Horizontal	30.15
10	60	60	60 Deg	Vertical	32.69
10	60	60	60 Deg	Horizontal	34.14
11	90	60	Horizontal	Vertical	29.83
11	90	60	Horizontal	Horizontal	30.10
11	90	60	60 Deg	Vertical	33.88
11	90	60	60 Deg	Horizontal	33.47
17	-90	60	Horizontal	Vertical	29.97
17	-90	60	Horizontal	Horizontal	26.90
17	-90	60	60 Deg	Vertical	35.64
17	-90	60	60 Deg	Horizontal	34.91
18	-60	60	Horizontal	Vertical	29.99
18	-60	60	Horizontal	Horizontal	30.46
18	-60	60	60 Deg	Vertical	32.95
18	-60	60	60 Deg	Horizontal	32.39
19	-30	60	Horizontal	Vertical	29.31
19	-30	60	Horizontal	Horizontal	28.31
19	-30	60	60 Deg	Vertical	27.45
19	-30	60	60 Deg	Horizontal	28.98
20	0	39	Horizontal	Vertical	34.18
20	0	39	Horizontal	Horizontal	32.19
20	0	39	60 Deg	Vertical	26.02
20	0	39	60 Deg	Horizontal	25.49



APV Value	Azimuth Φ	Elevation Θ	EUT Orientation	Test Antenna Polarity	Final EIRP/5 kHz
23	60	39	Horizontal	Vertical	34.45
23	60	39	Horizontal	Horizontal	32.37
23	60	39	60 Deg	Vertical	32.93
23	60	39	60 Deg	Horizontal	35.55
35	-60	39	Horizontal	Vertical	33.59
35	-60	39	Horizontal	Horizontal	32.89
35	-60	39	60 Deg	Vertical	31.52
35	-60	39	60 Deg	Horizontal	31.78
38	0	20	Horizontal	Vertical	32.01
38	0	20	Horizontal	Horizontal	31.85
38	0	20	60 Deg	Vertical	28.49
38	0	20	60 Deg	Horizontal	30.46
40	30	20	Horizontal	Vertical	35.43
40	30	20	Horizontal	Horizontal	33.45
40	30	20	60 Deg	Vertical	28.68
40	30	20	60 Deg	Horizontal	26.36
41	45	20	Horizontal	Vertical	32.98
41	45	20	Horizontal	Horizontal	31.06
41	45	20	60 Deg	Vertical	26.98
41	45	20	60 Deg	Horizontal	29.21
42	60	20	Horizontal	Vertical	33.02
42	60	20	Horizontal	Horizontal	32.07
42	60	20	60 Deg	Vertical	32.67
42	60	20	60 Deg	Horizontal	32.98
44	90	20	Horizontal	Vertical	33.34
44	90	20	Horizontal	Horizontal	31.26
44	90	20	60 Deg	Vertical	34.49
44	90	20	60 Deg	Horizontal	35.51
56	-90	20	Horizontal	Vertical	33.42
56	-90	20	Horizontal	Horizontal	33.29
56	-90	20	60 Deg	Vertical	34.46
56	-90	20	60 Deg	Horizontal	35.30
58	-60	20	Horizontal	Vertical	34.82
58	-60	20	Horizontal	Horizontal	33.31
58	-60	20	60 Deg	Vertical	32.79
58	-60	20	60 Deg	Horizontal	30.56
60	-30	20	Horizontal	Vertical	35.51
60	-30	20	Horizontal	Horizontal	35.61



APV Value	Azimuth Φ	Elevation Θ	EUT Orientation	Test Antenna Polarity	Final EIRP/5 kHz
60	-30	20	60 Deg	Vertical	28.01
60	-30	20	60 Deg	Horizontal	28.3

Table 28

Maximum Results = 35.64 dBm



1621.166666 MHz

APV Value	Azimuth Φ	Elevation Θ	EUT Orientation	Test Antenna Polarity	Final EIRP/5 kHz
1	0	90	Horizontal	Vertical	28.33
1	0	90	Horizontal	Horizontal	27.93
1	0	90	60 Deg	Vertical	33.94
1	0	90	60 Deg	Horizontal	35.61
1	0	60	Horizontal	Vertical	28.39
1	0	60	Horizontal	Horizontal	27.51
1	0	60	60 Deg	Vertical	28.00
1	0	60	60 Deg	Horizontal	29.05
9	30	60	Horizontal	Vertical	30.90
9	30	60	Horizontal	Horizontal	29.38
9	30	60	60 Deg	Vertical	29.97
9	30	60	60 Deg	Horizontal	27.91
10	60	60	Horizontal	Vertical	30.09
10	60	60	Horizontal	Horizontal	29.25
10	60	60	60 Deg	Vertical	33.70
10	60	60	60 Deg	Horizontal	34.16
11	90	60	Horizontal	Vertical	30.97
11	90	60	Horizontal	Horizontal	29.43
11	90	60	60 Deg	Vertical	35.37
11	90	60	60 Deg	Horizontal	36.49
17	-90	60	Horizontal	Vertical	30.47
17	-90	60	Horizontal	Horizontal	27.36
17	-90	60	60 Deg	Vertical	36.33
17	-90	60	60 Deg	Horizontal	35.08
18	-60	60	Horizontal	Vertical	29.40
18	-60	60	Horizontal	Horizontal	30.89
18	-60	60	60 Deg	Vertical	34.23
18	-60	60	60 Deg	Horizontal	32.94
19	-30	60	Horizontal	Vertical	30.53
19	-30	60	Horizontal	Horizontal	28.80
19	-30	60	60 Deg	Vertical	29.79
19	-30	60	60 Deg	Horizontal	29.63
20	0	39	Horizontal	Vertical	34.51
20	0	39	Horizontal	Horizontal	33.35
20	0	39	60 Deg	Vertical	27.08
20	0	39	60 Deg	Horizontal	27.01
23	60	39	Horizontal	Vertical	35.14
23	60	39	Horizontal	Horizontal	33.11



APV Value	Azimuth Φ	Elevation Θ	EUT Orientation	Test Antenna Polarity	Final EIRP/5 kHz
23	60	39	60 Deg	Vertical	34.13
23	60	39	60 Deg	Horizontal	35.94
35	-60	39	Horizontal	Vertical	35.07
35	-60	39	Horizontal	Horizontal	32.99
35	-60	39	60 Deg	Vertical	33.21
35	-60	39	60 Deg	Horizontal	31.58
38	0	20	Horizontal	Vertical	33.19
38	0	20	Horizontal	Horizontal	32.75
38	0	20	60 Deg	Vertical	28.99
38	0	20	60 Deg	Horizontal	30.48
40	30	20	Horizontal	Vertical	36.44
40	30	20	Horizontal	Horizontal	34.26
40	30	20	60 Deg	Vertical	30.79
40	30	20	60 Deg	Horizontal	25.64
41	45	20	Horizontal	Vertical	33.64
41	45	20	Horizontal	Horizontal	32.13
41	45	20	60 Deg	Vertical	28.12
41	45	20	60 Deg	Horizontal	29.10
42	60	20	Horizontal	Vertical	34.05
42	60	20	Horizontal	Horizontal	32.58
42	60	20	60 Deg	Vertical	32.76
42	60	20	60 Deg	Horizontal	33.66
44	90	20	Horizontal	Vertical	35.09
44	90	20	Horizontal	Horizontal	32.81
44	90	20	60 Deg	Vertical	35.05
44	90	20	60 Deg	Horizontal	36.25
56	-90	20	Horizontal	Vertical	34.51
56	-90	20	Horizontal	Horizontal	33.73
56	-90	20	60 Deg	Vertical	33.78
56	-90	20	60 Deg	Horizontal	35.60
58	-60	20	Horizontal	Vertical	34.82
58	-60	20	Horizontal	Horizontal	32.68
58	-60	20	60 Deg	Vertical	32.99
58	-60	20	60 Deg	Horizontal	29.94
60	-30	20	Horizontal	Vertical	36.39
60	-30	20	Horizontal	Horizontal	34.68
60	-30	20	60 Deg	Vertical	27.32
60	-30	20	60 Deg	Horizontal	26.54

Table 29



Maximum Results = 36.49 dBm

1625.833332 MHz

APV Value	Azimuth Φ	Elevation Θ	EUT Orientation	Test Antenna Polarity	Final EIRP/5 kHz
1	0	90	Horizontal	Vertical	27.97
1	0	90	Horizontal	Horizontal	28.85
1	0	90	60 Deg	Vertical	34.06
1	0	90	60 Deg	Horizontal	36.25
1	0	60	Horizontal	Vertical	28.47
1	0	60	Horizontal	Horizontal	28.09
1	0	60	60 Deg	Vertical	28.14
1	0	60	60 Deg	Horizontal	29.54
9	30	60	Horizontal	Vertical	31.02
9	30	60	Horizontal	Horizontal	31.22
9	30	60	60 Deg	Vertical	30.09
9	30	60	60 Deg	Horizontal	28.46
10	60	60	Horizontal	Vertical	29.92
10	60	60	Horizontal	Horizontal	28.72
10	60	60	60 Deg	Vertical	33.08
10	60	60	60 Deg	Horizontal	33.88
11	90	60	Horizontal	Vertical	30.78
11	90	60	Horizontal	Horizontal	29.07
11	90	60	60 Deg	Vertical	35.08
11	90	60	60 Deg	Horizontal	36.69
17	-90	60	Horizontal	Vertical	30.00
17	-90	60	Horizontal	Horizontal	28.47
17	-90	60	60 Deg	Vertical	35.80
17	-90	60	60 Deg	Horizontal	35.62
18	-60	60	Horizontal	Vertical	31.54
18	-60	60	Horizontal	Horizontal	30.93
18	-60	60	60 Deg	Vertical	34.18
18	-60	60	60 Deg	Horizontal	32.89
19	-30	60	Horizontal	Vertical	30.96
19	-30	60	Horizontal	Horizontal	28.42
19	-30	60	60 Deg	Vertical	29.86
19	-30	60	60 Deg	Horizontal	31.93
20	0	39	Horizontal	Vertical	35.68
20	0	39	Horizontal	Horizontal	34.07



APV Value	Azimuth Φ	Elevation Θ	EUT Orientation	Test Antenna Polarity	Final EIRP/5 kHz
20	0	39	60 Deg	Vertical	28.12
20	0	39	60 Deg	Horizontal	27.55
23	60	39	Horizontal	Vertical	34.83
23	60	39	Horizontal	Horizontal	31.99
23	60	39	60 Deg	Vertical	33.25
23	60	39	60 Deg	Horizontal	36.01
35	-60	39	Horizontal	Vertical	34.89
35	-60	39	Horizontal	Horizontal	33.29
35	-60	39	60 Deg	Vertical	33.09
35	-60	39	60 Deg	Horizontal	32.29
38	0	20	Horizontal	Vertical	33.83
38	0	20	Horizontal	Horizontal	32.60
38	0	20	60 Deg	Vertical	28.60
38	0	20	60 Deg	Horizontal	31.16
40	30	20	Horizontal	Vertical	36.03
40	30	20	Horizontal	Horizontal	33.21
40	30	20	60 Deg	Vertical	29.83
40	30	20	60 Deg	Horizontal	24.39
41	45	20	Horizontal	Vertical	33.73
41	45	20	Horizontal	Horizontal	31.02
41	45	20	60 Deg	Vertical	26.66
41	45	20	60 Deg	Horizontal	27.80
42	60	20	Horizontal	Vertical	33.89
42	60	20	Horizontal	Horizontal	33.36
42	60	20	60 Deg	Vertical	31.26
42	60	20	60 Deg	Horizontal	32.91
44	90	20	Horizontal	Vertical	34.93
44	90	20	Horizontal	Horizontal	33.63
44	90	20	60 Deg	Vertical	33.72
44	90	20	60 Deg	Horizontal	36.61
56	-90	20	Horizontal	Vertical	35.02
56	-90	20	Horizontal	Horizontal	35.06
56	-90	20	60 Deg	Vertical	34.02
56	-90	20	60 Deg	Horizontal	35.77
58	-60	20	Horizontal	Vertical	34.49
58	-60	20	Horizontal	Horizontal	34.18
58	-60	20	60 Deg	Vertical	32.49
58	-60	20	60 Deg	Horizontal	30.67



APV Value	Azimuth Φ	Elevation Θ	EUT Orientation	Test Antenna Polarity	Final EIRP/5 kHz
60	-30	20	Horizontal	Vertical	36.23
60	-30	20	Horizontal	Horizontal	35.24
60	-30	20	60 Deg	Vertical	27.08
60	-30	20	60 Deg	Horizontal	26.72

Table 30

Maximum Results = 36.69 dBm

FCC 47 CFR Part 25, Limit Clause 25.204

+40 dBW in any 4 kHz band for $\theta \leq 0^\circ$

+40 + 3 θ dBW in any 4 kHz band for $0^\circ < \theta \leq 5^\circ$

For angles of elevation of the horizon greater than 5° there shall be no restriction as to the equivalent isotropically radiated power transmitted by an earth station towards the horizon.

2.4.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Signal Generator	Marconi	2031	53	12	28-Nov-2017
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	1002	12	14-Oct-2017
Hygrometer	Rotronic	A1	1388	12	13-Apr-2017
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (DRG Horn)	ETS-Lindgren	3115	3125	12	25-Jul-2017
8m Cable	Rhophase	NPS-2302-8000-NPS	3248	-	TU
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	26-Feb-2017
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	12-Nov-2017
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
10 mohm Resistor	Cropico	RS3	3616	48	12-Mar-2017
Tilt Antenna Mast	matur GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matur GmbH	NCD	3917	-	TU
Digital thermo Hygrometer	Radio Spares	1260	4300	12	23-Aug-2017
1501A 4.0M Km Km Cable	Rhophase	KPS-1501A-4000-KPS	4301	12	03-Aug-2017
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	-	O/P Mon
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	29-Dec-2016
4 Channel PSU	Rohde & Schwarz	HMP4040	4736	-	TU

Table 31

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibration equipment



Product Service

2.5 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radionavigation-Satellite Service

2.5.1 Specification Reference

FCC 47 CFR Part 25, Clause 25.216

2.5.2 Equipment Under Test and Modification State

Iridium Certus ProtoTerminal / 9801CertusH1, S/N: 300008080004080 - Modification State 0

2.5.3 Date of Test

28-November-2016 and 08-March-2017

2.5.4 Test Method

This test was performed in accordance with ANSI C63.26, Clause 5.5.

2.5.5 Environmental Conditions

Ambient Temperature	19.0 °C
Relative Humidity	29.0 %



2.5.6 Test Results

C8 - QPSK

1616.166666 MHz – Broadband Emission Results

Frequency (MHz)	Level (dBW)
*	

Table 32

*No emissions were detected within 10 dB of the limit.

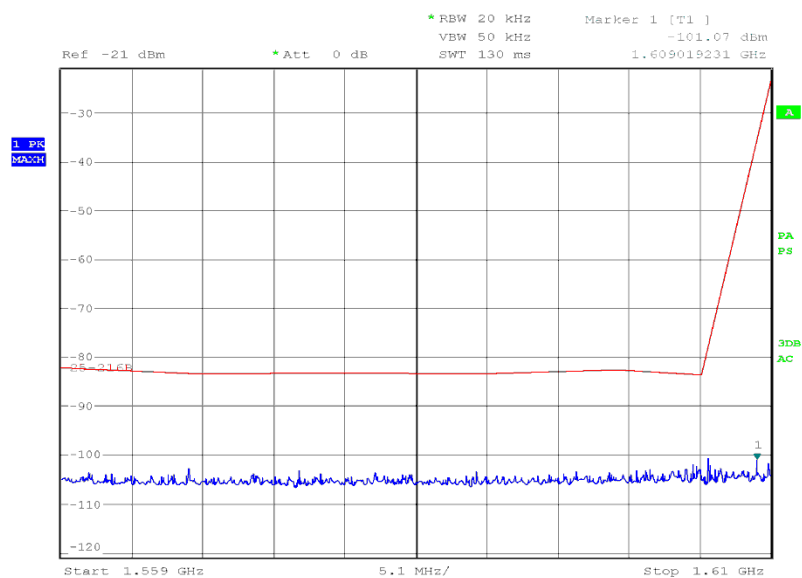


Figure 32 - Broadband Emissions Result - 1616.166666 MHz

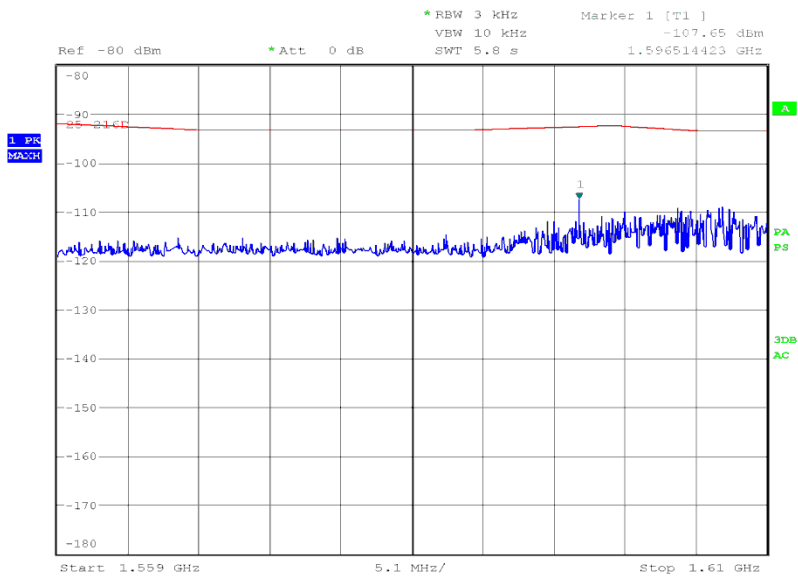


1616.166666 MHz – Discrete Emission Results

Frequency (MHz)	Level (dBW)
*	

Table 33

*No emissions were detected within 10 dB of the limit.



Date: 28.NOV.2016 21:28:39

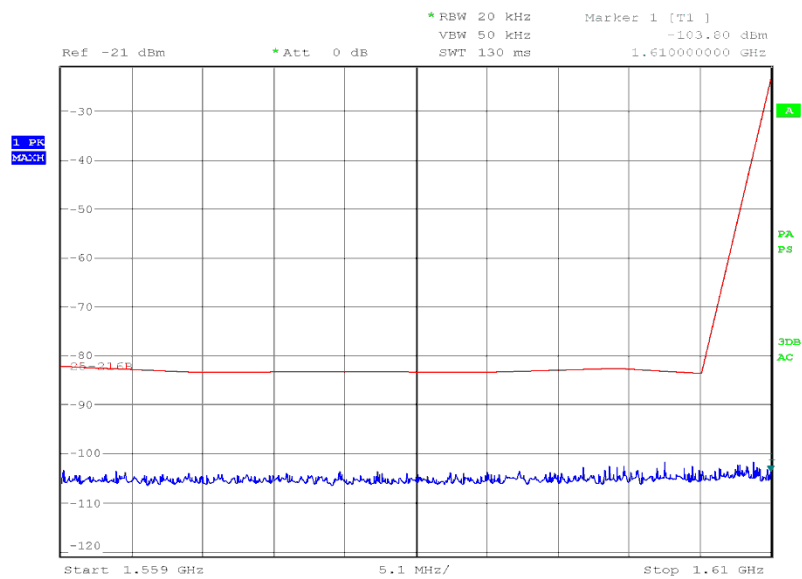
Figure 33 - Discrete Emissions Result - 1616.166666 MHz

1621.166666 MHz – Broadband Emission Results

Frequency (MHz)	Level (dBW)
*	

Table 34

*No emissions were detected within 10 dB of the limit.



Date: 28.NOV.2016 22:02:38

Figure 34 - Broadband Emissions Results - 1621.166666 MHz

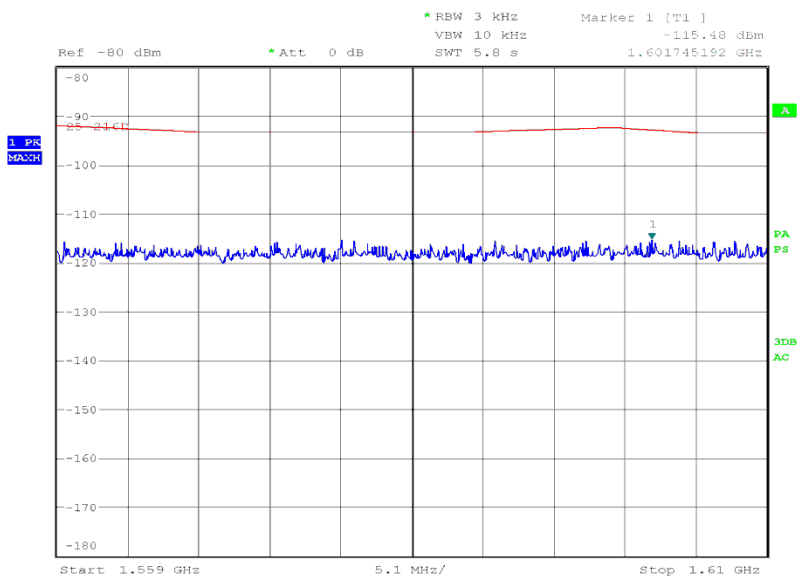


1621.166666 MHz – Discrete Emission Results

Frequency (MHz)	Level (dBW)
*	

Table 35

*No emissions were detected within 10 dB of the limit.



Date: 28.NOV.2016 22:05:47

Figure 35 - Discrete Emissions Results - 1621.166666 MHz

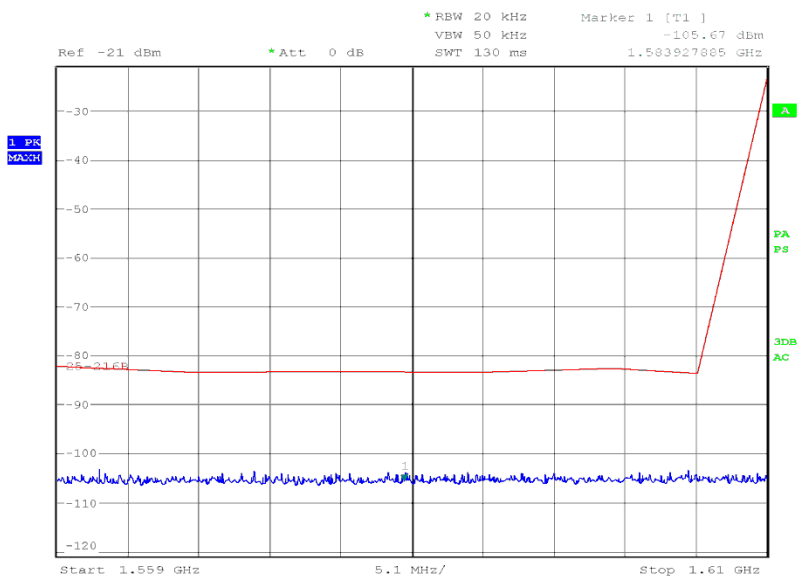


1625.833332 MHz – Broadband Emission Results

Frequency (MHz)	Level (dBW)
*	

Table 36

*No emissions were detected within 10 dB of the limit.



Date: 28.NOV.2016 22:14:02

Figure 36 - Broadband Emissions Results - 1625.833332 MHz

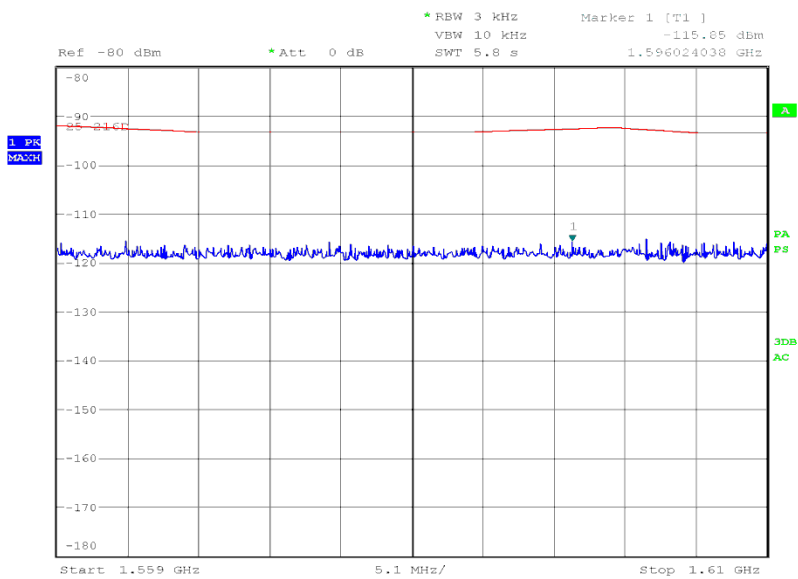


1625.833332 MHz – Discrete Emission Results

Frequency (MHz)	Level (dBW)
*	

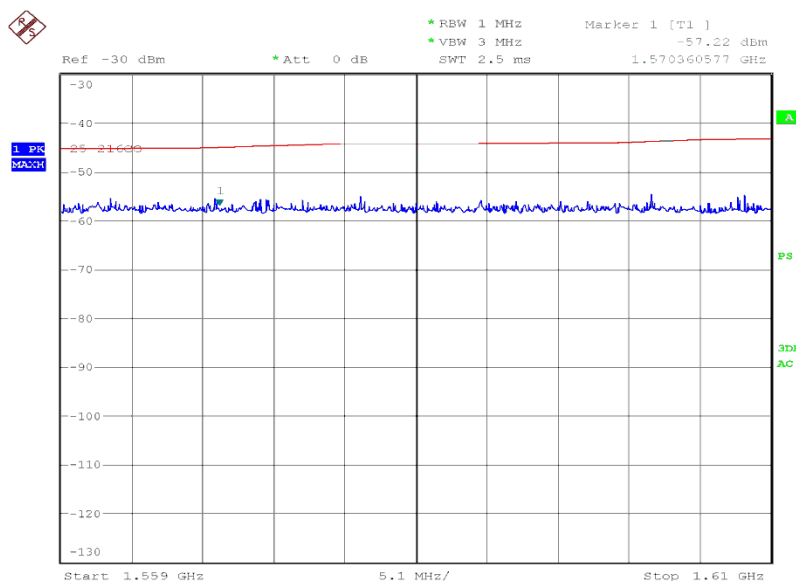
Table 37

*No emissions were detected within 10 dB of the limit.



Date: 28.NOV.2016 22:10:20

Figure 37 - Discrete Emissions Results - 1625.833332 MHz



Date: 8.MAR.2017 18:50:28

Figure 38 - Carrier Off Emissions

FCC 47 CFR Part 25, Limit Clause 25.216

25.216(c) The e.i.r.p. density of emissions from mobile earth stations placed in service after July 21, 2002 with assigned uplink frequencies between 1610 MHz and 1660.5 MHz shall not exceed -70 dBW/MHz, averaged over any 2 millisecond active transmission interval, in the band 1559–1605 MHz. The e.i.r.p. of discrete emissions of less than 700 Hz bandwidth from such stations shall not exceed -80 dBW, averaged over any 2 millisecond active transmission interval, in the 1559–1605 MHz band.

25.216(g) Mobile earth stations manufactured more than six months after FEDERAL REGISTER publication of the rule changes adopted in FCC 03–283 with assigned uplink frequencies in the 1610–1626.5 MHz band shall suppress the power density of emissions in the 1605–1610 MHz band-segment to an extent determined by linear interpolation from -70 dBW/MHz at 1605 MHz to -10 dBW/MHz at 1610 MHz averaged over any 2 millisecond active transmission interval. The e.i.r.p. of discrete emissions of less than 700 Hz bandwidth from such stations shall not exceed a level determined by linear interpolation from -80 dBW at 1605 MHz to -20 dBW at 1610 MHz, averaged over any 2 millisecond active transmission interval.

2.5.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Tuneable Notch Filter	K&L Microwave	5TNF-1500/3000-N/N	435	-	TU
Hygrometer	Rotronic	A1	1388	12	13-Apr-2017
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
8m Cable	Rhophase	NPS-2302-8000-NPS	3248	-	TU
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	26-Feb-2017
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	12-Nov-2017
Handheld Digital Multimeter	Agilent Technologies	U1241A	3625	12	30-Sep-2017
Tilt Antenna Mast	mature GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	mature GmbH	NCD	3917	-	TU
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	-	O/P Mon
Cable (Rx, SMAm-SMAm 0.5m)	Scott Cables	SLSLL18-SMSM-00.50M	4528	6	03-Feb-2017
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	29-Dec-2016
4 Channel PSU	Rohde & Schwarz	HMP4040	4736	-	TU
1 - 18GHz DRG Antenna	ETS-Lindgren	3117	4738	12	04-Feb-2017

Table 38

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



Product Service

2.6 Modulation Characteristics

2.6.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1047 (d)

2.6.2 Equipment Under Test

Iridium Certus ProtoTerminal / 9801CertusH1

2.6.3 Test Results

Iridium - Transmit

In its BASELINE mode the Traffic, Broadcast, Acquisition and Ring alert channels all use differentially encoded quaternary phase shift keyed (DE-QPSK) modulation with 40% square-root raised cosine pulse shaping, and a symbol transmission rate of 25ksps.

In its NEXT mode other Traffic channel modulation schemes are used with selectable bandwidths. Most of these traffic channels use quaternary phase shift keyed (QPSK) modulation with 20% square-root raised cosine pulse shaping, and a symbol transmission rate selected from 30ksps, 60ksps, 120ksps, or 240ksps, depending on the channel operating bandwidth. The highest symbol rate traffic channel also uses a 16APSK modulation scheme with 20% square-root raised cosine pulse shaping, at a symbol transmission rate of 240ksps.

FCC 47 CFR Part 2, Limit Clause 2.1047 (d)

A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

2.7 Radiated Spurious Emissions

2.7.1 Specification Reference

FCC 47 CFR Part 25, Clause 25.202(f)
FCC 47 CFR Part 2, Clause 2.1051.

2.7.2 Equipment Under Test and Modification State

Iridium Certus ProtoTerminal / 9801CertusH1, S/N: 300008080004080 - Modification State 0

2.7.3 Date of Test

13-November-2016 to 23-November-2016

2.7.4 Test Method

This test was performed in accordance with ANSI C63.26, clause 5.5.

2.7.5 Environmental Conditions

Ambient Temperature 19.6 °C
Relative Humidity 26.0 %

2.7.6 Test Results

C8 - 16-APSK

30 MHz to 1 GHz

Frequency (MHz)	Result (dBm)
*	

Table 39

*No emissions were found within 20 dB of the limit.



Product Service

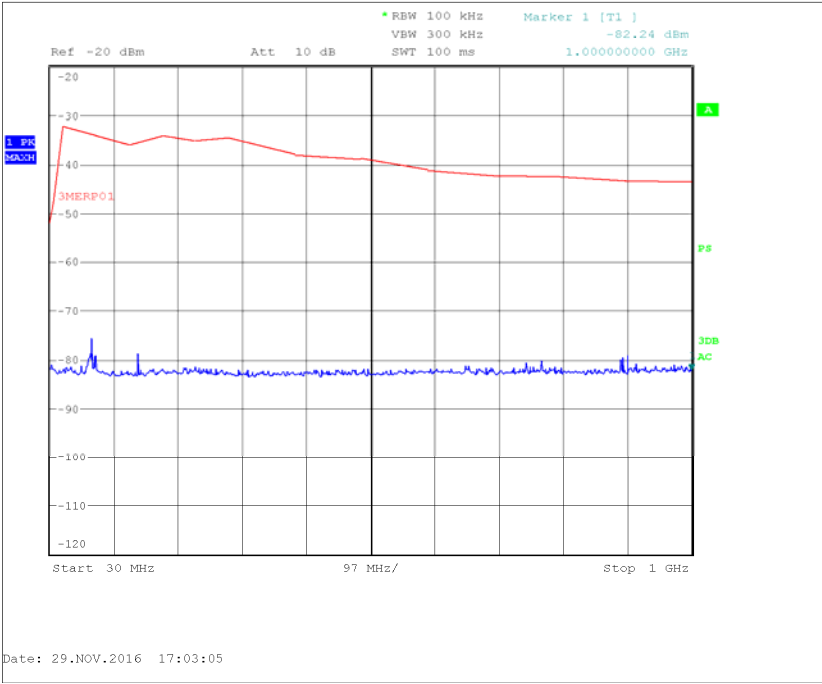


Figure 39 - 1616.166666 MHz – Frequency Range Under Test: 30 MHz to 1 GHz

1 GHz to 17 GHz

Frequency (MHz)	Result (dBm)
*	

Table 40

*No emissions were found within 20 dB of the limit.

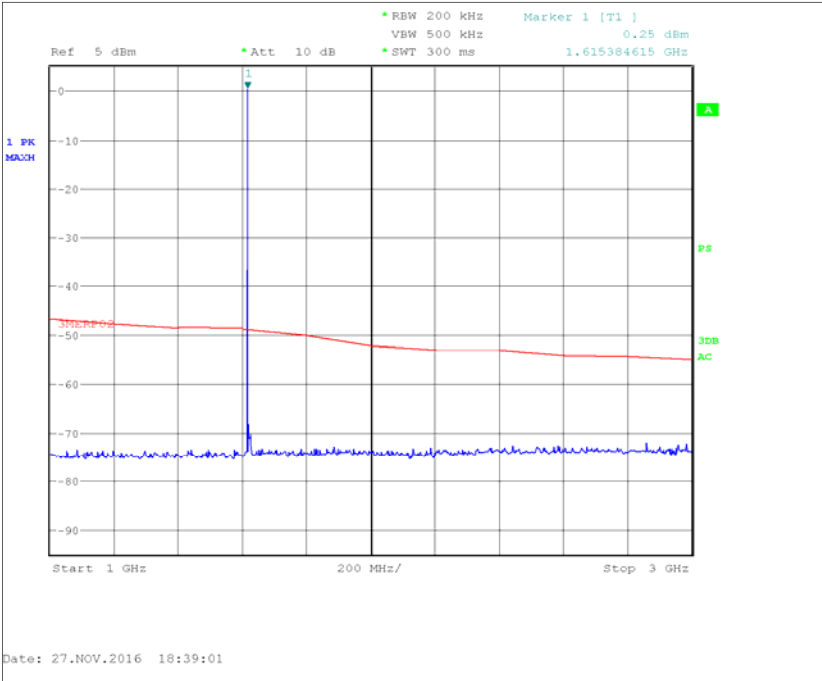


Figure 40 - 1616.166666 MHz - Frequency Range Under Test: 1 GHz to 3 GHz

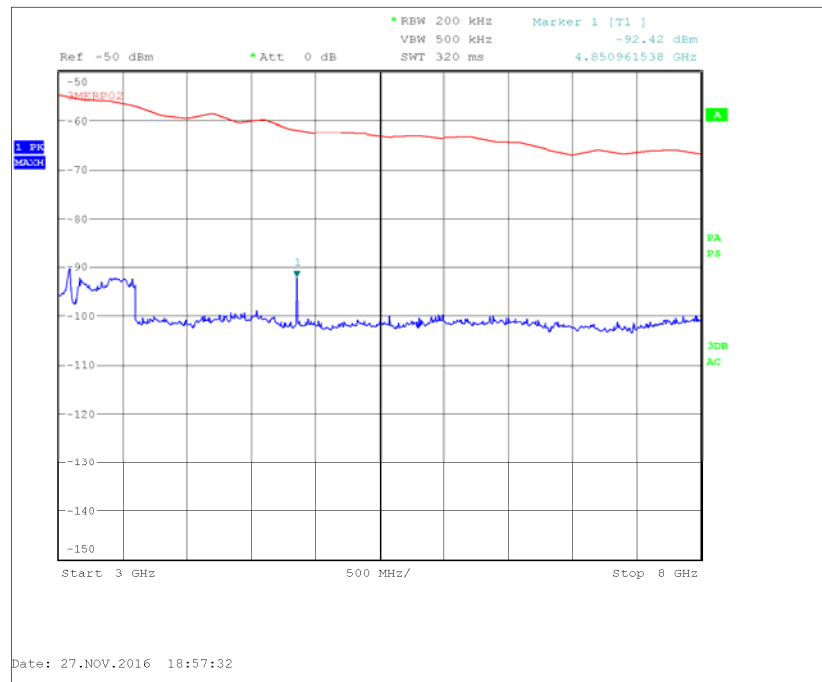


Figure 41 - 1616.166666 MHz - Frequency Range Under Test: 3 GHz to 8 GHz

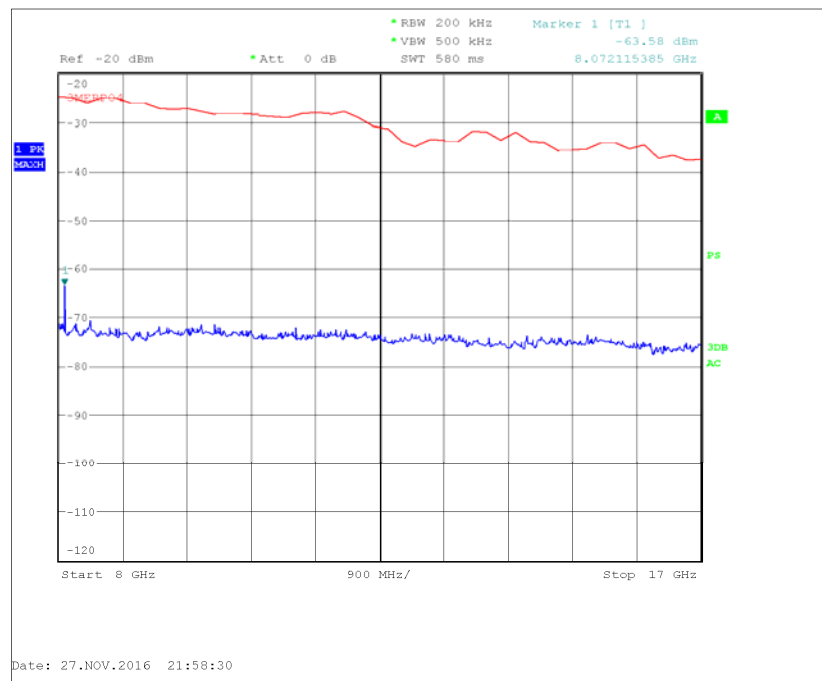


Figure 42 - 1616.166666 MHz - Frequency Range Under Test: 8 GHz to 17 GHz



30 MHz to 1 GHz

Frequency (MHz)	Result (dBm)
*	

Table 41

*No emissions were found within 20 dB of the limit.

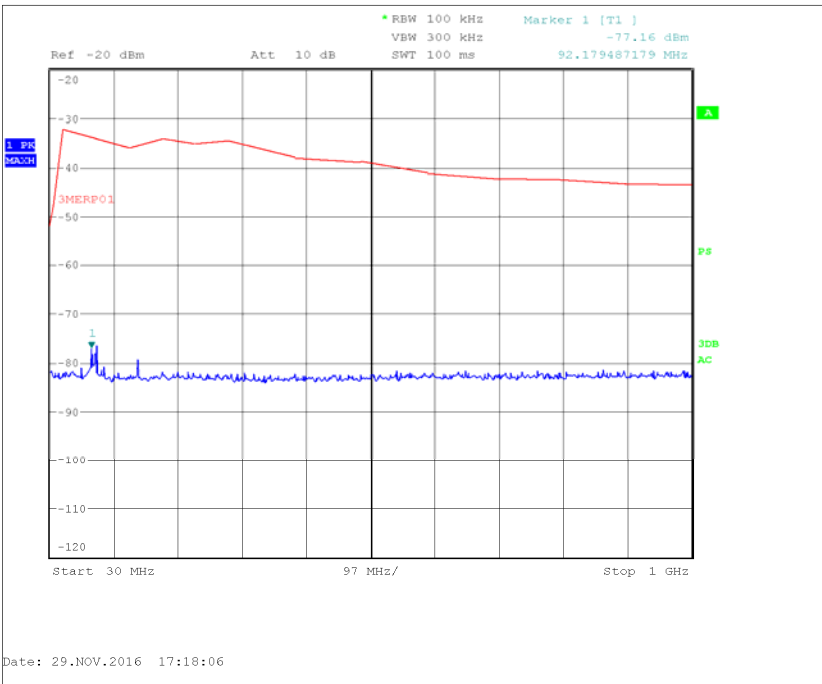


Figure 43 - 1621.166666 MHz - Frequency Range Under Test: 30 GHz to 1 GHz



1 GHz to 17 GHz

Frequency (MHz)	Result (dBm)
3242.334	-25.75

Table 42

No other emissions were found within 20 dB of the limit.

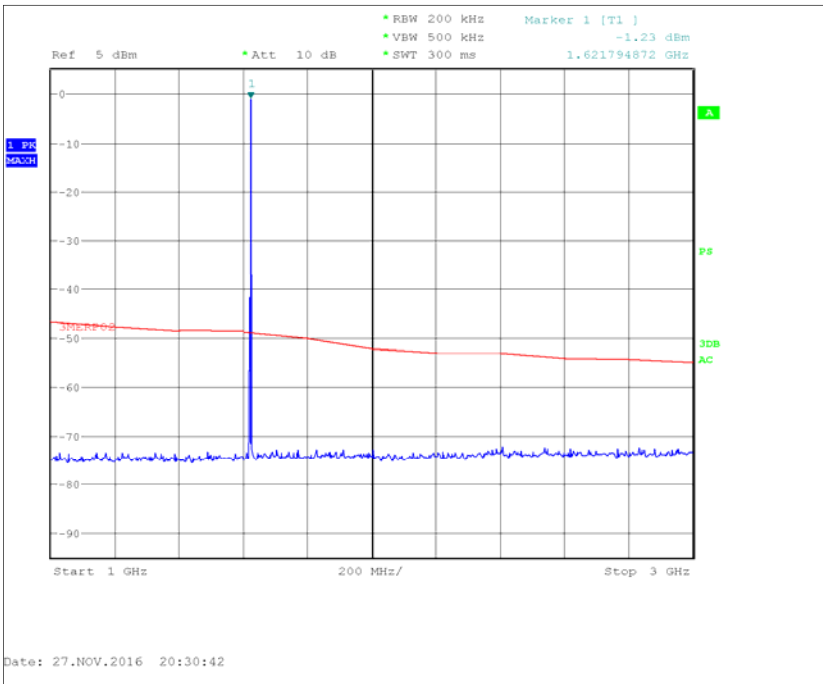


Figure 44 - 1621.166666 MHz - Frequency Range Under Test: 1 GHz to 3 GHz

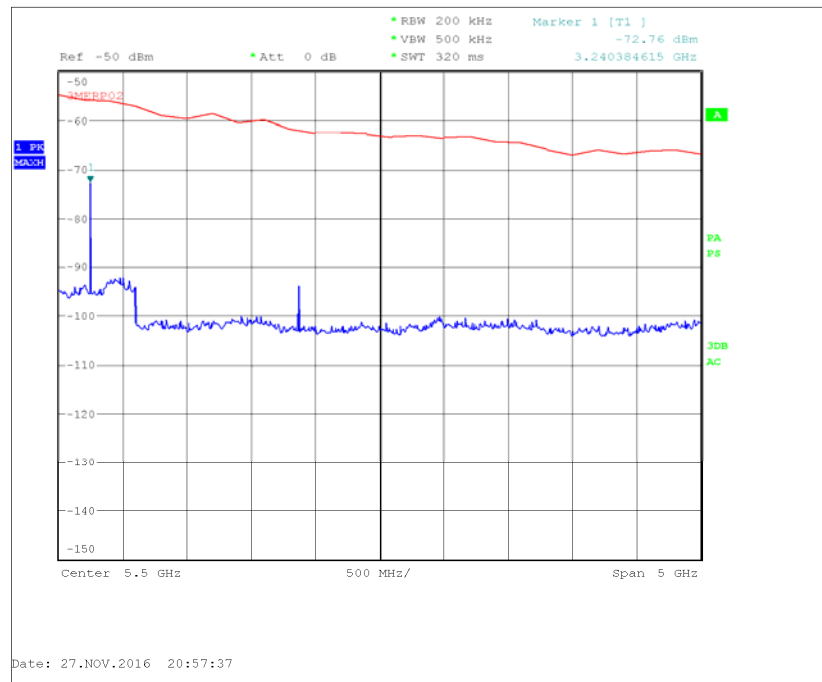


Figure 45 - 1621.166666 MHz - Frequency Range Under Test: 3 GHz to 8 GHz

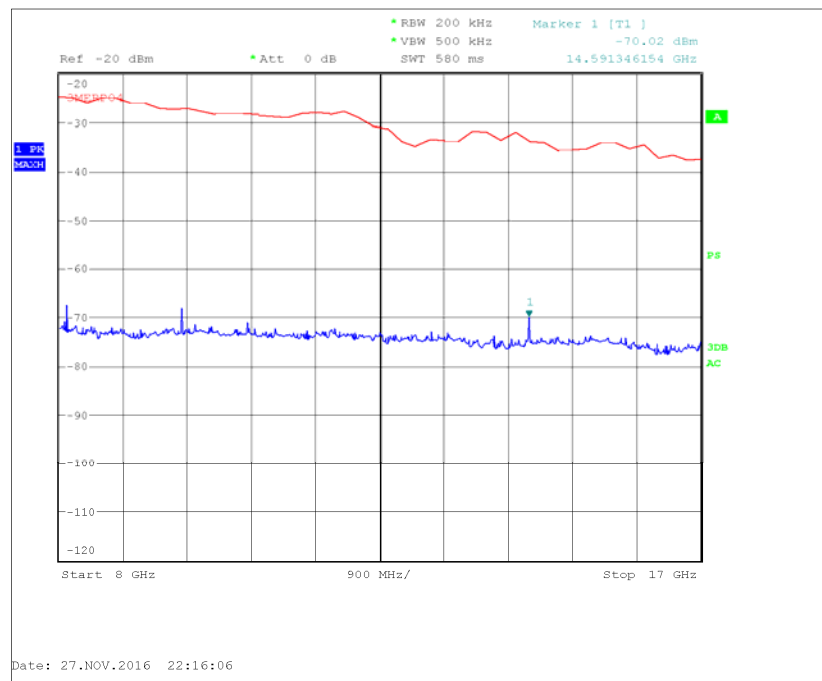


Figure 46 - 1621.166666 MHz - Frequency Range Under Test: 8 GHz to 17 GHz



30 MHz to 1 GHz

Frequency (MHz)	Result (dBm)
*	

Table 43

*No emissions were found within 20 dB of the limit.

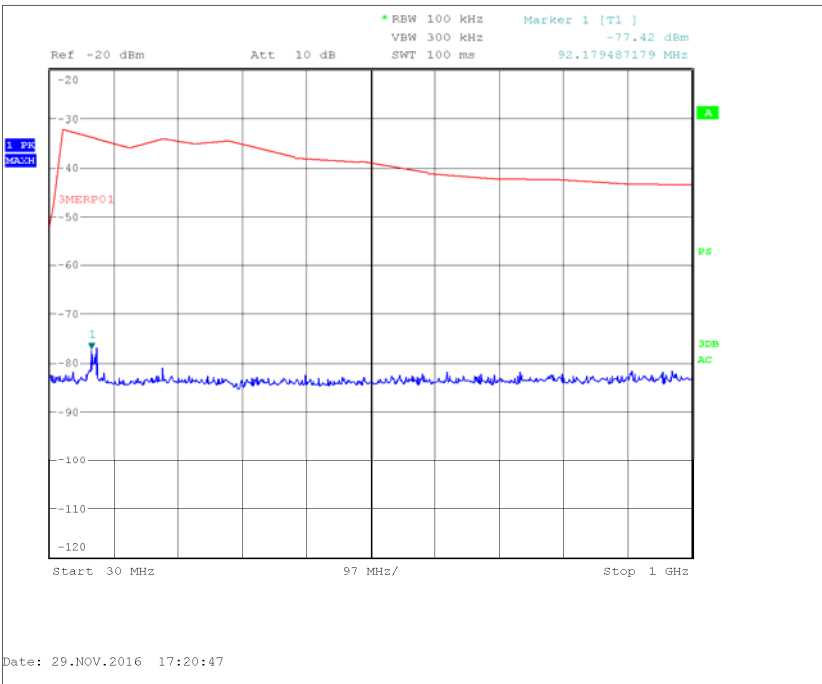


Figure 47 - 1625.833332 MHz - Frequency Range Under Test: 30 MHz to 1 GHz



1 GHz to 17 GHz

Frequency (MHz)	Result (dBm)
3251.606	-30.49

Table 44

No other emissions were found within 20 dB of the limit.

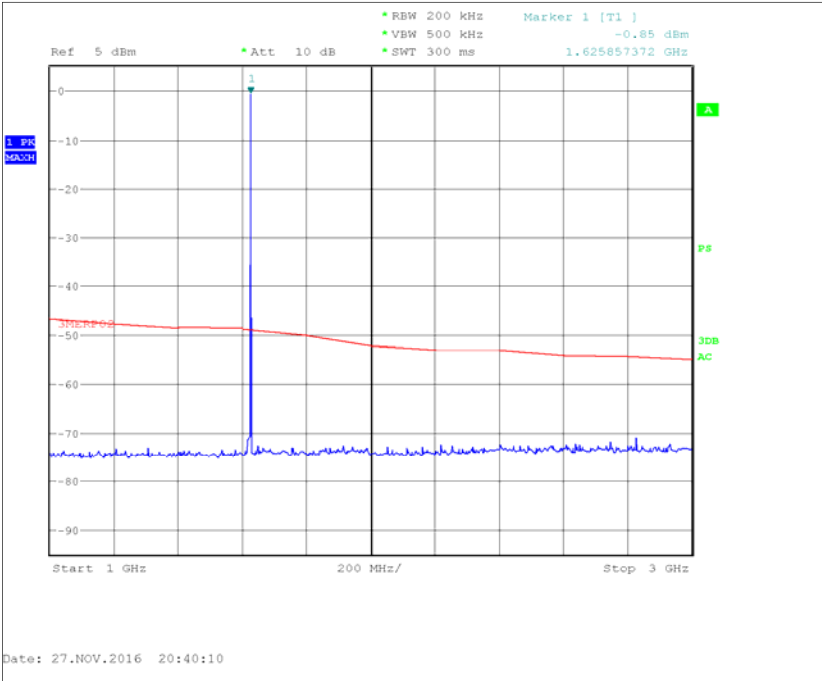


Figure 48 - 1625.833332 MHz - Frequency Range Under Test: 1 GHz to 3 GHz

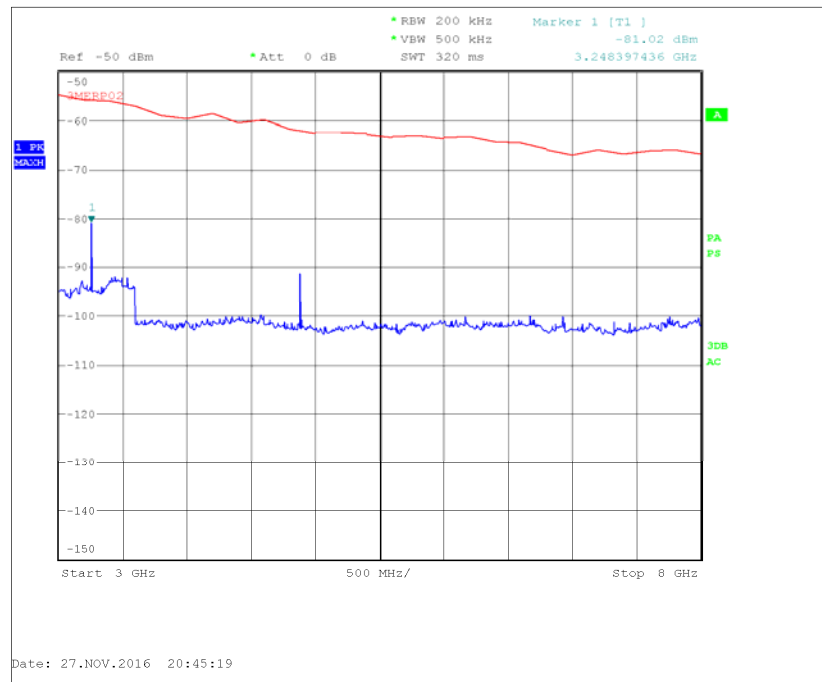


Figure 49 - 1625.833332 MHz - Frequency Range Under Test: 3 GHz to 8 GHz

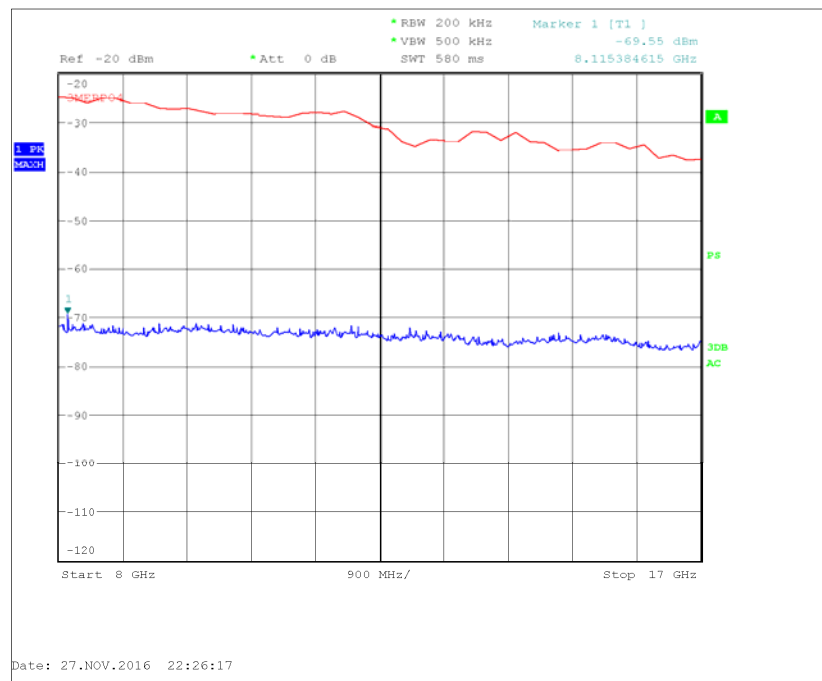


Figure 50 - 1625.833332 MHz - Frequency Range Under Test: 8 GHz to 17 GHz



Product Service

FCC 47 CFR Part 25, Limit Clause 25.202(f)

The average power of unwanted emissions shall be attenuated below the average output power, P(dBW), of the transmitter, as specified below:

- 1) 25 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 50%, up to and including 100% of the authorised bandwidth;
- 2) 35 dB in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 100%, up to and including 250% of the authorised bandwidth;
- 3) $43 + 10 \log p$ (watts) in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 250% of the authorised bandwidth.

2.7.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	29-Apr-2017
Hygrometer	Rotronic	A1	1388	12	13-Apr-2017
Pre-Amplifier	Phase One	PS04-0086	1533	12	29-Jul-2017
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	11-Jun-2017
8m Cable	Rhophase	NPS-2302-8000-NPS	3248	-	TU
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	26-Feb-2017
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	12-Nov-2017
Tilt Antenna Mast	matur GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matur GmbH	NCD	3917	-	TU
Cable 1503 2M 2.92(P)m 2.92(P)m	Rhophase	KPS-1503A-2000-KPS	4293	12	09-Jun-2016
Suspended Substrate Highpass Filter	Advance Power Components	11SH10-3000/X18000-O/O	4411	12	23-Mar-2017
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	-	O/P Mon
Cable (Rx, SMAm-SMAm 0.5m)	Scott Cables	SLSLL18-SMSM-00.50M	4528	6	03-Feb-2017
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	29-Dec-2016
4 Channel PSU	Rohde & Schwarz	HMP4040	4736	-	TU

Table 45

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibration equipment

3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Occupied Bandwidth	± 4.76 kHz
Frequency Tolerance	± 3.54 Hz
Spurious Emissions at Antenna Terminals	± 3.08 dB
Equivalent Isotropic Radiated Power	Conducted: ± 0.7 dB Radiated: ± 6.3 dB (1 GHz to 18 GHz)
Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radionavigation-Satellite Service	Radiated: ± 6.3 dB Conducted: ± 3.45 dB
Modulation Characteristics	-
Radiated Spurious Emissions	30 MHz to 1 GHz: ± 5.1 dB 1 GHz to 18 GHz: ± 6.3 dB

Table 46

ANNEX A

CALCULATED TOTAL PEAK POWER EIRP

Total Peak Power EIRP Results

The total EIRP, which was determined by integrating the power over the occupied bandwidth of the EUT as per the tables below are included in this test report at the request of the manufacturer. The results are derived by calculation from the measured EIRP Peak Power Spectral Density Results reported in section 2.4 of this report.

The following formula was used to derive the total power:

$$P_{\text{WIDEBAND}} = P_{\text{EIRP/5 kHz}} + 10 * \text{LOG}(\text{OBW}/5)$$

Where OBW = the 99% occupied bandwidth measured in section 2.1.

1616.166666 MHz

APV Value	Azimuth Φ	Elevation Θ	EUT Orientation	Test Antenna Polarity	Integrated Power over EUT OCB (dBm)
1	0	90	Horizontal	Vertical	44.80
1	0	90	Horizontal	Horizontal	44.04
1	0	90	60 Deg	Vertical	50.41
1	0	90	60 Deg	Horizontal	52.49
1	0	60	Horizontal	Vertical	43.96
1	0	60	Horizontal	Horizontal	44.26
1	0	60	60 Deg	Vertical	43.01
1	0	60	60 Deg	Horizontal	45.85
9	30	60	Horizontal	Vertical	47.43
9	30	60	Horizontal	Horizontal	46.35
9	30	60	60 Deg	Vertical	45.84
9	30	60	60 Deg	Horizontal	45.01
10	60	60	Horizontal	Vertical	46.89
10	60	60	Horizontal	Horizontal	47.31
10	60	60	60 Deg	Vertical	49.85
10	60	60	60 Deg	Horizontal	51.30
11	90	60	Horizontal	Vertical	46.99
11	90	60	Horizontal	Horizontal	47.26
11	90	60	60 Deg	Vertical	51.04
11	90	60	60 Deg	Horizontal	50.63
17	-90	60	Horizontal	Vertical	47.13
17	-90	60	Horizontal	Horizontal	44.06
17	-90	60	60 Deg	Vertical	52.80
17	-90	60	60 Deg	Horizontal	52.07
18	-60	60	Horizontal	Vertical	47.15
18	-60	60	Horizontal	Horizontal	47.62
18	-60	60	60 Deg	Vertical	50.11
18	-60	60	60 Deg	Horizontal	49.55

APV Value	Azimuth Φ	Elevation Θ	EUT Orientation	Test Antenna Polarity	Integrated Power over EUT OCB (dBm)
19	-30	60	Horizontal	Vertical	46.47
19	-30	60	Horizontal	Horizontal	45.47
19	-30	60	60 Deg	Vertical	44.61
19	-30	60	60 Deg	Horizontal	46.14
20	0	39	Horizontal	Vertical	51.34
20	0	39	Horizontal	Horizontal	49.35
20	0	39	60 Deg	Vertical	43.18
20	0	39	60 Deg	Horizontal	42.65
23	60	39	Horizontal	Vertical	51.61
23	60	39	Horizontal	Horizontal	49.53
23	60	39	60 Deg	Vertical	50.09
23	60	39	60 Deg	Horizontal	52.71
35	-60	39	Horizontal	Vertical	50.75
35	-60	39	Horizontal	Horizontal	50.05
35	-60	39	60 Deg	Vertical	48.68
35	-60	39	60 Deg	Horizontal	48.94
38	0	20	Horizontal	Vertical	49.17
38	0	20	Horizontal	Horizontal	49.01
38	0	20	60 Deg	Vertical	45.65
38	0	20	60 Deg	Horizontal	47.62
40	30	20	Horizontal	Vertical	52.59
40	30	20	Horizontal	Horizontal	50.61
40	30	20	60 Deg	Vertical	45.84
40	30	20	60 Deg	Horizontal	43.52
41	45	20	Horizontal	Vertical	50.14
41	45	20	Horizontal	Horizontal	48.22
41	45	20	60 Deg	Vertical	44.14
41	45	20	60 Deg	Horizontal	46.37
42	60	20	Horizontal	Vertical	50.18
42	60	20	Horizontal	Horizontal	49.23
42	60	20	60 Deg	Vertical	49.83
42	60	20	60 Deg	Horizontal	50.14
44	90	20	Horizontal	Vertical	50.50
44	90	20	Horizontal	Horizontal	48.42
44	90	20	60 Deg	Vertical	51.65
44	90	20	60 Deg	Horizontal	52.67
56	-90	20	Horizontal	Vertical	50.58
56	-90	20	Horizontal	Horizontal	50.45

APV Value	Azimuth Φ	Elevation Θ	EUT Orientation	Test Antenna Polarity	Integrated Power over EUT OCB (dBm)
56	-90	20	60 Deg	Vertical	51.62
56	-90	20	60 Deg	Horizontal	52.46
58	-60	20	Horizontal	Vertical	51.98
58	-60	20	Horizontal	Horizontal	50.47
58	-60	20	60 Deg	Vertical	49.95
58	-60	20	60 Deg	Horizontal	47.72
60	-30	20	Horizontal	Vertical	52.67
60	-30	20	Horizontal	Horizontal	52.77
60	-30	20	60 Deg	Vertical	45.17
60	-30	20	60 Deg	Horizontal	45.46

Table 47

Maximum Result = 52.71 dBm

1621.166666 MHz

APV Value	Azimuth Φ	Elevation Θ	EUT Orientation	Test Antenna Polarity	Integrated Power over EUT OCB (dBm)
1	0	90	Horizontal	Vertical	45.50
1	0	90	Horizontal	Horizontal	45.10
1	0	90	60 Deg	Vertical	51.11
1	0	90	60 Deg	Horizontal	52.78
1	0	60	Horizontal	Vertical	45.56
1	0	60	Horizontal	Horizontal	44.68
1	0	60	60 Deg	Vertical	45.17
1	0	60	60 Deg	Horizontal	46.22
9	30	60	Horizontal	Vertical	48.07
9	30	60	Horizontal	Horizontal	46.55
9	30	60	60 Deg	Vertical	47.14
9	30	60	60 Deg	Horizontal	45.08
10	60	60	Horizontal	Vertical	47.26
10	60	60	Horizontal	Horizontal	46.42
10	60	60	60 Deg	Vertical	50.87
10	60	60	60 Deg	Horizontal	51.33
11	90	60	Horizontal	Vertical	48.14
11	90	60	Horizontal	Horizontal	46.60
11	90	60	60 Deg	Vertical	52.54
11	90	60	60 Deg	Horizontal	53.66
17	-90	60	Horizontal	Vertical	47.64
17	-90	60	Horizontal	Horizontal	44.53
17	-90	60	60 Deg	Vertical	53.50
17	-90	60	60 Deg	Horizontal	52.25
18	-60	60	Horizontal	Vertical	46.57
18	-60	60	Horizontal	Horizontal	48.06
18	-60	60	60 Deg	Vertical	51.40
18	-60	60	60 Deg	Horizontal	50.11
19	-30	60	Horizontal	Vertical	47.70
19	-30	60	Horizontal	Horizontal	45.97
19	-30	60	60 Deg	Vertical	46.96
19	-30	60	60 Deg	Horizontal	46.80
20	0	39	Horizontal	Vertical	51.68
20	0	39	Horizontal	Horizontal	50.52
20	0	39	60 Deg	Vertical	44.25
20	0	39	60 Deg	Horizontal	44.18
23	60	39	Horizontal	Vertical	52.31
23	60	39	Horizontal	Horizontal	50.28

APV Value	Azimuth Φ	Elevation Θ	EUT Orientation	Test Antenna Polarity	Integrated Power over EUT OCB (dBm)
23	60	39	60 Deg	Vertical	51.30
23	60	39	60 Deg	Horizontal	53.11
35	-60	39	Horizontal	Vertical	52.24
35	-60	39	Horizontal	Horizontal	50.16
35	-60	39	60 Deg	Vertical	50.38
35	-60	39	60 Deg	Horizontal	48.75
38	0	20	Horizontal	Vertical	50.36
38	0	20	Horizontal	Horizontal	49.92
38	0	20	60 Deg	Vertical	46.16
38	0	20	60 Deg	Horizontal	47.65
40	30	20	Horizontal	Vertical	53.61
40	30	20	Horizontal	Horizontal	51.43
40	30	20	60 Deg	Vertical	47.96
40	30	20	60 Deg	Horizontal	42.81
41	45	20	Horizontal	Vertical	50.81
41	45	20	Horizontal	Horizontal	49.30
41	45	20	60 Deg	Vertical	45.29
41	45	20	60 Deg	Horizontal	46.27
42	60	20	Horizontal	Vertical	51.22
42	60	20	Horizontal	Horizontal	49.75
42	60	20	60 Deg	Vertical	49.93
42	60	20	60 Deg	Horizontal	50.83
44	90	20	Horizontal	Vertical	52.26
44	90	20	Horizontal	Horizontal	49.98
44	90	20	60 Deg	Vertical	52.22
44	90	20	60 Deg	Horizontal	53.42
56	-90	20	Horizontal	Vertical	51.68
56	-90	20	Horizontal	Horizontal	50.90
56	-90	20	60 Deg	Vertical	50.95
56	-90	20	60 Deg	Horizontal	52.77
58	-60	20	Horizontal	Vertical	51.99
58	-60	20	Horizontal	Horizontal	49.85
58	-60	20	60 Deg	Vertical	50.16
58	-60	20	60 Deg	Horizontal	47.11
60	-30	20	Horizontal	Vertical	53.56
60	-30	20	Horizontal	Horizontal	51.85
60	-30	20	60 Deg	Vertical	44.49
60	-30	20	60 Deg	Horizontal	43.71

Table 48

Maximum Result = 53.66 dBm

1625.833332 MHz

APV Value	Azimuth Φ	Elevation Θ	EUT Orientation	Test Antenna Polarity	Integrated Power over EUT OCB (dBm)
1	0	90	Horizontal	Vertical	45.12
1	0	90	Horizontal	Horizontal	46.00
1	0	90	60 Deg	Vertical	51.21
1	0	90	60 Deg	Horizontal	53.40
1	0	60	Horizontal	Vertical	45.62
1	0	60	Horizontal	Horizontal	45.24
1	0	60	60 Deg	Vertical	45.29
1	0	60	60 Deg	Horizontal	46.69
9	30	60	Horizontal	Vertical	48.17
9	30	60	Horizontal	Horizontal	48.37
9	30	60	60 Deg	Vertical	47.24
9	30	60	60 Deg	Horizontal	45.61
10	60	60	Horizontal	Vertical	47.07
10	60	60	Horizontal	Horizontal	45.87
10	60	60	60 Deg	Vertical	50.23
10	60	60	60 Deg	Horizontal	51.03
11	90	60	Horizontal	Vertical	47.93
11	90	60	Horizontal	Horizontal	46.22
11	90	60	60 Deg	Vertical	52.23
11	90	60	60 Deg	Horizontal	53.84
17	-90	60	Horizontal	Vertical	47.15
17	-90	60	Horizontal	Horizontal	45.62
17	-90	60	60 Deg	Vertical	52.95
17	-90	60	60 Deg	Horizontal	52.77
18	-60	60	Horizontal	Vertical	48.69
18	-60	60	Horizontal	Horizontal	48.08
18	-60	60	60 Deg	Vertical	51.33
18	-60	60	60 Deg	Horizontal	50.04
19	-30	60	Horizontal	Vertical	48.11
19	-30	60	Horizontal	Horizontal	45.57
19	-30	60	60 Deg	Vertical	47.01
19	-30	60	60 Deg	Horizontal	49.08
20	0	39	Horizontal	Vertical	52.83
20	0	39	Horizontal	Horizontal	51.22
20	0	39	60 Deg	Vertical	45.27
20	0	39	60 Deg	Horizontal	44.70
23	60	39	Horizontal	Vertical	51.98

APV Value	Azimuth Φ	Elevation Θ	EUT Orientation	Test Antenna Polarity	Integrated Power over EUT OCB (dBm)
23	60	39	Horizontal	Horizontal	49.14
23	60	39	60 Deg	Vertical	50.40
23	60	39	60 Deg	Horizontal	53.16
35	-60	39	Horizontal	Vertical	52.04
35	-60	39	Horizontal	Horizontal	50.44
35	-60	39	60 Deg	Vertical	50.24
35	-60	39	60 Deg	Horizontal	49.44
38	0	20	Horizontal	Vertical	50.98
38	0	20	Horizontal	Horizontal	49.75
38	0	20	60 Deg	Vertical	45.75
38	0	20	60 Deg	Horizontal	48.31
40	30	20	Horizontal	Vertical	53.18
40	30	20	Horizontal	Horizontal	50.36
40	30	20	60 Deg	Vertical	46.98
40	30	20	60 Deg	Horizontal	41.54
41	45	20	Horizontal	Vertical	50.88
41	45	20	Horizontal	Horizontal	48.17
41	45	20	60 Deg	Vertical	43.81
41	45	20	60 Deg	Horizontal	44.95
42	60	20	Horizontal	Vertical	51.04
42	60	20	Horizontal	Horizontal	50.51
42	60	20	60 Deg	Vertical	48.41
42	60	20	60 Deg	Horizontal	50.06
44	90	20	Horizontal	Vertical	52.08
44	90	20	Horizontal	Horizontal	50.78
44	90	20	60 Deg	Vertical	50.87
44	90	20	60 Deg	Horizontal	53.76
56	-90	20	Horizontal	Vertical	52.17
56	-90	20	Horizontal	Horizontal	52.21
56	-90	20	60 Deg	Vertical	51.17
56	-90	20	60 Deg	Horizontal	52.92
58	-60	20	Horizontal	Vertical	51.64
58	-60	20	Horizontal	Horizontal	51.33
58	-60	20	60 Deg	Vertical	49.64
58	-60	20	60 Deg	Horizontal	47.82
60	-30	20	Horizontal	Vertical	53.38
60	-30	20	Horizontal	Horizontal	52.39
60	-30	20	60 Deg	Vertical	44.23

APV Value	Azimuth Φ	Elevation Θ	EUT Orientation	Test Antenna Polarity	Integrated Power over EUT OCB (dBm)
60	-30	20	60 Deg	Horizontal	43.87

Table 49

Maximum Result = 53.84 dBm