

FCC and ISED Test Report

Manufacturer: Iridium Satellite LLC
Model: 9704



In accordance with FCC 47 CFR Part 25, FCC 47 CFR Part 2 and Industry Canada RSS-170 and ISED RSS-GEN (Iridium)

Prepared for: Iridium Satellite LLC
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FCC ID: Q639704 IC: 4629A-9704

COMMERCIAL-IN-CONFIDENCE

Document 75963958-01 Issue 01

SIGNATURE			
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Steve Marshall	Senior Engineer	Authorised Signatory	19 May 2025
Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD document control rules.			
RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Neil Rousell	19 May 2025	
	Ahmad Javid	19 May 2025	

EXECUTIVE SUMMARY / ENGINEERING STATEMENT
The measurements shown in this report were made in accordance with the procedures described on the test pages A sample of this product was tested to demonstrate limited compliance with FCC 47 CFR Part 25: 2022, FCC 47 CFR Part 2: 2023, Industry Canada RSS-170: Issue 4 (09-2022) and ISED RSS-GEN: Issue 5 (04-2018) + A2 (02-2021) for the tests detailed in section 1.3. The sample tested was found to comply with the requirements defined in the applied rules.

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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
01	First version	19 May 2025

Table 1

1.2 Introduction

Applicant	Iridium Satellite LLC
Manufacturer	Iridium Satellite LLC
Model Number(s)	9704
Serial Number(s)	1A009W
Hardware Version(s)	S5L5-V5
Software Version(s)	SX-1.4.9
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 25: 2022 FCC 47 CFR Part 2: 2023 Industry Canada RSS-170: Issue 4 (09-2022) ISED RSS-GEN: Issue 5 (04-2018) + A2 (02-2021)
Order Number	96695
Date	05-March-2025
Date of Receipt of EUT	02-May-2025
Start of Test	07-May-2025
Finish of Test	09-May-2025
Name of Engineer(s)	Neil Rousell and Ahmad Javid
Related Document(s)	ANSI C63.26 (2015) Test Report 75961753-03, Issue 1



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 25, FCC 47 CFR Part 2 and Industry Canada RSS-170 and ISED RSS-GEN is shown below.

Section	Specification Clause				Test Description	Result	Comments/Base Standard
	Part 25	Part 2	RSS-170	RSS-GEN			
Configuration and Mode: DC Powered - Iridium (B1)							
2.1	25.204	2.1046	5.5	6.12	Equivalent Isotropic Radiated Power	Pass	ANSI C63.26 (2015)
Configuration and Mode: DC Powered - Iridium (C1)							
2.1	25.204	2.1046	5.5	6.12	Equivalent Isotropic Radiated Power	Pass	ANSI C63.26 (2015)
Configuration and Mode: DC Powered - Iridium (C2)							
2.1	25.204	2.1046	5.5	6.12	Equivalent Isotropic Radiated Power	Pass	ANSI C63.26 (2015)
Configuration and Mode: DC Powered – Iridium C2 (Worst Case)							
2.2	25.202(f)	2.1053	5.8	6.13	Radiated Spurious Emissions	Pass	ANSI C63.26 (2015)

Table 2



1.4 Customer Supplied Form

Equipment Description

Technical Description: (Please provide a brief description of the intended use of the equipment including the technologies the product supports)		A data terminal for communication with the Iridium satellite network.	
Manufacturer:		Iridium Satellite LLC	
Model:		Iridium 9704 Transceiver	
Part Number:		IRID0258A	
Hardware Version:		S5L5-V5	
Software Version:		SX-1.4.9	
FCC ID of the product under test – see guidance here		Q639704	
IC ID of the product under test – see guidance here		4629A-9704	
Device Category	Mobile ☒	Portable ☐	Fixed ☐
Equipment is fitted with an Audio Low Pass Filter		Yes ☐	No ☒

Table 3

Intentional Radiators

Technology						
Frequency Range (MHz to MHz)	1616 to 1626.5					
Conducted Declared Output Power (dBm)	+32.0					
Antenna Gain (dBi)	5					
Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	0.04167 0.08333					
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	QPSK					
ITU Emission Designator (see guidance here) (not mandatory for Part 15 devices)	41K7Q7W 83K3Q7W					
Bottom Frequency (MHz)	1616.04167					
Middle Frequency (MHz)	1621.04167					
Top Frequency (MHz)	1625.9583					

Table 4



Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	3255MHz
Lowest frequency generated or used in the device or on which the device operates or tunes	19.2MHz
Class A Digital Device (Use in commercial, industrial or business environment) ☒	
Class B Digital Device (Use in residential environment only) ☐	

Table 5

AC Power Source

AC supply frequency:		Hz
Voltage		V
Max current:		A
Single Phase ☐ Three Phase ☒		

Table 6

DC Power Source

Nominal voltage:	3.7	V
Extreme upper voltage:	4.5	V
Extreme lower voltage:	3.5	V
Max current:	10.0	A

Table 7

Battery Power Source

Voltage:		V
End-point voltage:		V (Point at which the battery will terminate)
Alkaline ☐ Leclanche ☐ Lithium ☐ Nickel Cadmium ☐ Lead Acid* ☐ *(Vehicle regulated)		
Other ☐	Please detail:	

Table 8

Charging

Can the EUT transmit whilst being charged	Yes ☐ No ☐
---	--

Table 9

Temperature

Minimum temperature:	-40	°C
Maximum temperature:	85	°C

Table 10



Cable Loss

Adapter Cable Loss (Conducted sample)		dB
--	--	----

Table 11

Antenna Characteristics

Antenna connector ☒		State impedance	50	Ohm
Temporary antenna connector ☐		State impedance		Ohm
Integral antenna ☐	Type:		Gain	dBi
External antenna ☐	Type:		Gain	dBi
For external antenna only: Standard Antenna Jack ☐ If yes, describe how user is prohibited from changing antenna (if not professional installed): Equipment is only ever professionally installed ☐ Non-standard Antenna Jack ☐ All part 15 applications will need to show how the antenna gain was derived either from a manufacturer data sheet or a measurement. Where the gain of the antenna is inherently accounted for as a result of the measurement, such as field strength measurements on a part 15.249 or 15.231 device, so the gain does not necessarily need to be verified. However, enough information regarding the construction of the antenna shall be provided. Such information maybe photographs, length of wire antenna etc.				

Table 12

Ancillaries (if applicable) Details in P5042-TP-006

Manufacturer:		Part Number:	
Model:		Country of Origin:	

Table 13

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

Name: Ben Goode
Position held: Principal RF Engineer
Date: 23/04/2025



1.5 Product Information

1.5.1 Technical Description

A data terminal for communication with the Iridium satellite network.

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
Model: 9704 Transceiver , Serial Number: 1A009W			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 14

1.8 Test Location

TÜV SÜD conducted the following tests at our Octagon House Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: Iridium (B1)		
Equivalent Isotropic Radiated Power	Neil Rousell	UKAS
Configuration and Mode: Iridium (C1)		
Equivalent Isotropic Radiated Power	Neil Rousell	UKAS
Configuration and Mode: Iridium (C2)		
Equivalent Isotropic Radiated Power	Neil Rousell	UKAS
Radiated Spurious Emissions	Ahmad Javid	UKAS

Table 15

Laboratory Address: TÜV SÜD, Octagon House,
Concorde Way, Fareham, Hampshire,
PO15 5RL, United Kingdom



2 Test Details

2.1 Equivalent Isotropic Radiated Power

2.1.1 Specification Reference

FCC 47 CFR Part 25, Clause 25.204
FCC 47 CFR Part 2, Clause 2.1046
Industry Canada RSS-170, Clause 5.5
ISED RSS-GEN, Clause 6.12

2.1.2 Equipment Under Test and Modification State

9704, S/N: 1A009W - Modification State 0

2.1.3 Date of Test

07-May-2025

2.1.4 Test Method

Power Spectral Density measurements in a 4 kHz bandwidth were performed in accordance with ANSI C63.26, clause 5.2.3.5 (Peak-PSD).

The RBW was configured to 3 kHz and the reference level offset increased to account for the correction factor required to show the result as 4 kHz bandwidth. The correction factor was obtained using the following formula:
 $10\log(4/3) = 1.25 \text{ dB}$

Total EIRP measurements were performed in accordance with ANSI C63.26, clause 5.2.4.4 (average power with integration). The Antenna Gain was added to the measured Conducted Output Power to determine the EIRP.

2.1.5 Environmental Conditions

Ambient Temperature	20.7 °C
Relative Humidity	38.0 %



2.1.6 Test Results

Iridium (B1)

Mode	EIRP (dBm/4kHz)		
	Bottom Channel	Middle Channel	Top Channel
QPSK	32.23	32.96	32.87

Table 16 - EIRP/4 kHz Results Table

Mode	Bottom Channel		Middle Channel		Top Channel	
	EIRP (dBm)	Δ from rated power (dB)	EIRP (dBm)	Δ from rated power (dB)	EIRP (dBm)	Δ from rated power (dB)
QPSK	37.75	+0.75	37.28	+0.28	37.53	+0.53

Table 17 - EIRP Results Table

Iridium (C1)

Mode	EIRP (dBm/4kHz)		
	Bottom Channel	Middle Channel	Top Channel
QPSK	32.65	32.01	32.56

Table 18 - EIRP/4 kHz Results Table

Mode	Bottom Channel		Middle Channel		Top Channel	
	EIRP (dBm)	Δ from rated power (dB)	EIRP (dBm)	Δ from rated power (dB)	EIRP (dBm)	Δ from rated power (dB)
QPSK	37.35	+0.35	37.12	+0.12	37.62	+0.62

Table 19 - EIRP Results Table

Iridium (C2)

Mode	EIRP (dBm/4kHz)		
	Bottom Channel	Middle Channel	Top Channel
QPSK	30.84	29.76	30.84

Table 20 - EIRP/4 kHz Results Table

Mode	Bottom Channel		Middle Channel		Top Channel	
	EIRP (dBm)	Δ from rated power (dB)	EIRP (dBm)	Δ from rated power (dB)	EIRP (dBm)	Δ from rated power (dB)
QPSK	37.62	+0.62	37.41	+0.41	37.48	+0.48

Table 21 - EIRP Results Table



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.

Industry Canada RSS-170, Limit Clause 5.3

The application for MES certification shall state the MES e.i.r.p. that is necessary for satisfactory communication. The maximum permissible e.i.r.p. will be the stated necessary e.i.r.p. plus a 2 dB margin. If a detachable antenna is used, the certification application shall state the recommended antenna type and manufacturer, the antenna gain and the maximum transmitter output power at the antenna terminal.



2.1.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 2.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	17-Mar-2026
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	17-Mar-2026
PXA Signal Analyser	Keysight Technologies	N9030A	4654	12	24-Feb-2026
Cable (18 GHz)	Rosenberger	LU7-071-1000	5097	12	10-Jun-2025
Attenuator 5W 30dB DC-18GHz	Aaren	AT40A-4041-D18-30	5504	12	16-Jul-2025
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB 40	5604	12	26-Nov-2025
GPSDR Frequency standard	Orolia	SecureSync 2402-053	6339	6	18-Sep-2025
Multimeter	Fluke	115	6343	12	27-Feb-2026

Table 22



2.2 Radiated Spurious Emissions

2.2.1 Specification Reference

FCC 47 CFR Part 25, Clause 25.202(f)
FCC 47 CFR Part 2, Clause 2.1053
Industry Canada RSS-170, Clause 5.8
ISED RSS-GEN, Clause 6.13

2.2.2 Equipment Under Test and Modification State

9704, S/N: 1A009W - Modification State 0

2.2.3 Date of Test

08-May-2025 to 09-May-2025

2.2.4 Test Method

A preliminary profile of the Radiated Spurious Emissions was obtained up to the 10th harmonic by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber.

Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

C2 modulation signal was identified as worst case mode based on the highest level of output power and the widest channel bandwidth as recorded in 75961753-03.

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

Pre-scans and final measurements were performed using the direct field strength method.

Field strength measurements were performed and then converted to Equivalent Power Measurements in accordance with ANSI C63.26, Clause 5.2.7 equation c)

Example calculation:

$E \text{ (dBuV/m)} + 20\log(d) - 104.8 = \text{EIRP (dBm)}$ where (d) is the measurement distance.

$82.2 \text{ (dBuV/m)} + 20\log(3) - 104.8 = \text{EIRP (dBm)}$

$-13.0 = \text{EIRP (dBm)}$

2.2.5 Example Test Setup Diagram

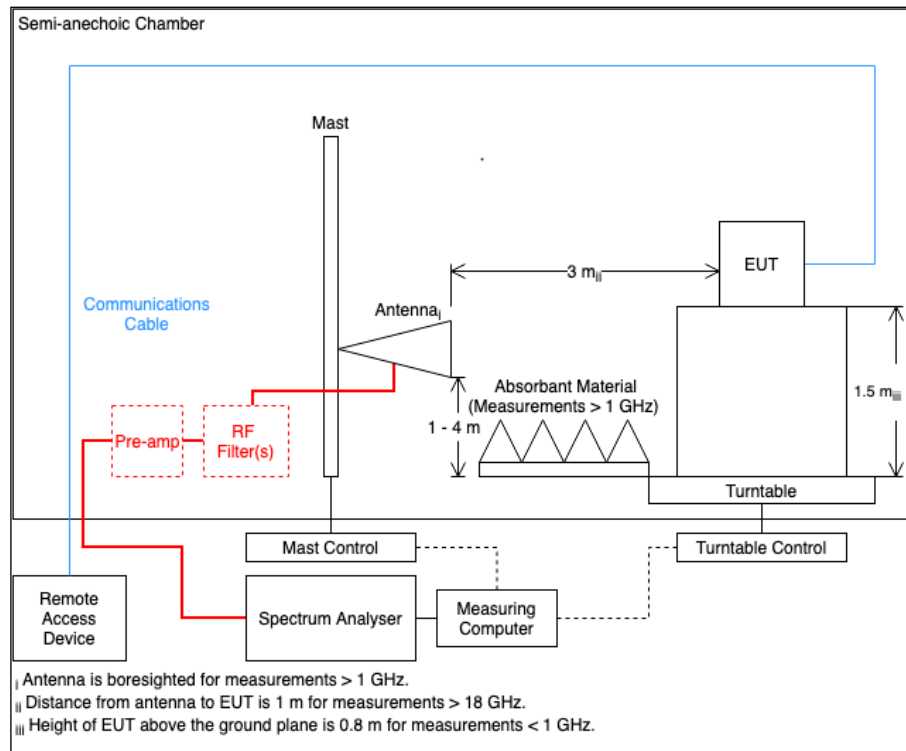


Figure 1

2.2.6 Environmental Conditions

Ambient Temperature	20.2 - 20.4 °C
Relative Humidity	38.6 - 39.8 %



2.2.7 Test Results

Iridium (C2)

Frequency (MHz)	Level (dBm)	Polarisation	Orientation
*			

Table 23 - 1616.04167 MHz, 30 MHz to 18 GHz

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

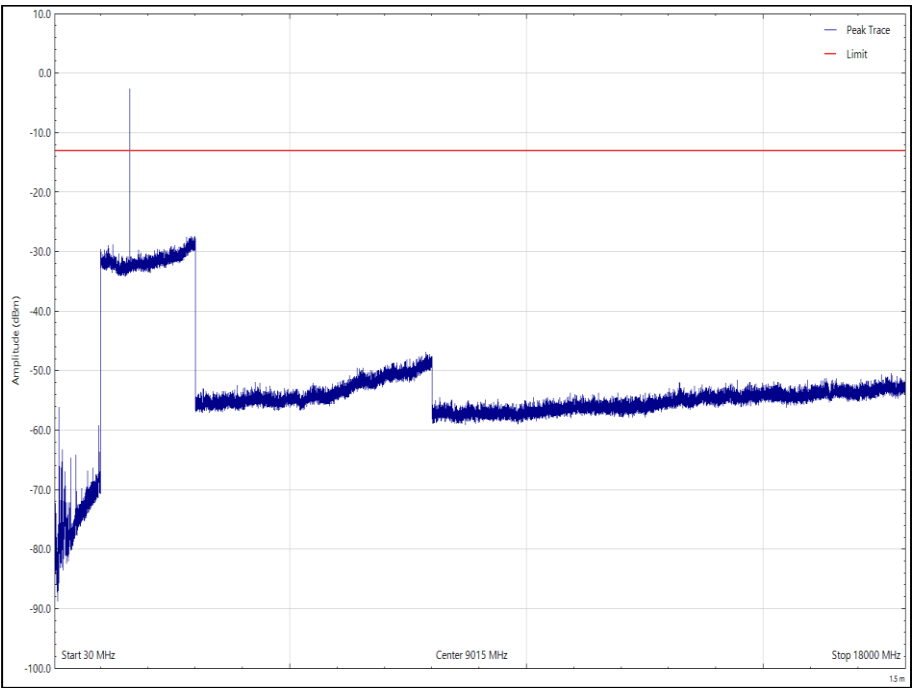


Figure 2 - 1616.04167 MHz - 30 MHz to 18GHz, Horizontal, X Orientation

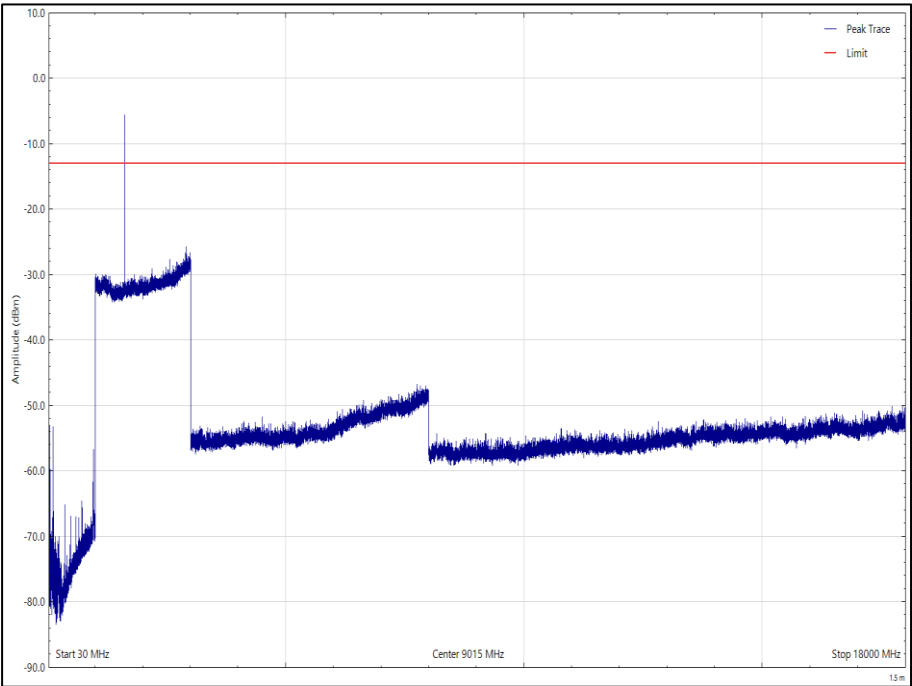


Figure 3 - 1616.04167 MHz - 30 MHz to 18GHz, Vertical, X Orientation

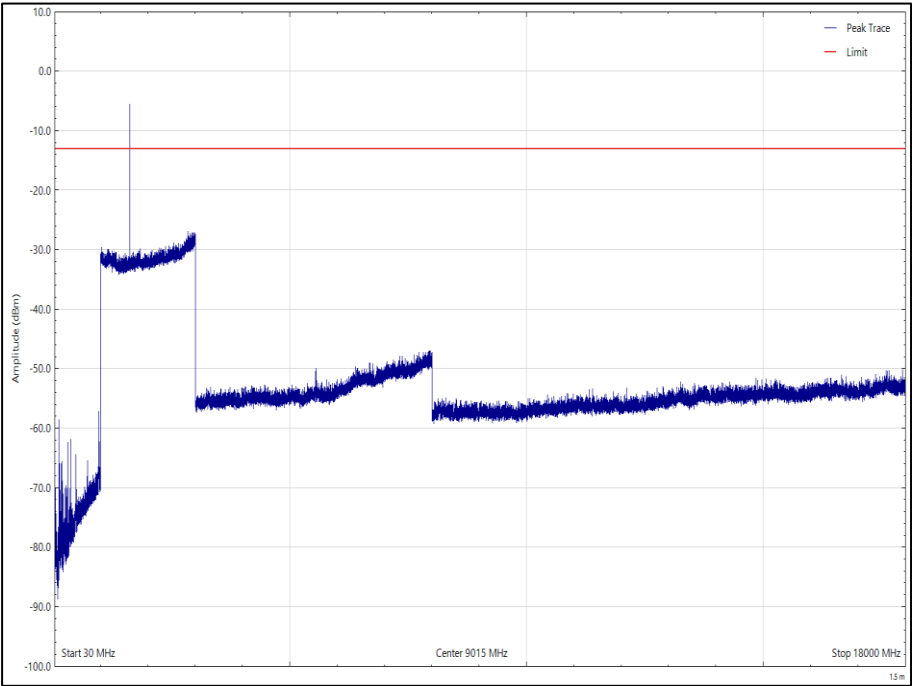


Figure 4 - 1616.04167 MHz - 30 MHz to 18GHz, Horizontal, Y Orientation

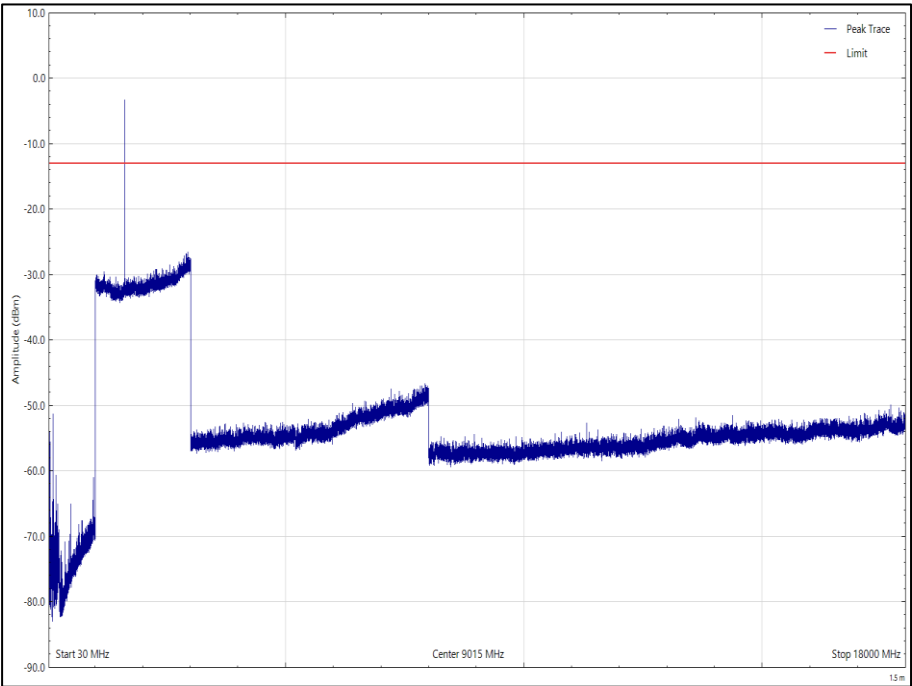


Figure 5 - 1616.04167 MHz - 30 MHz to 18GHz, Vertical, Y Orientation

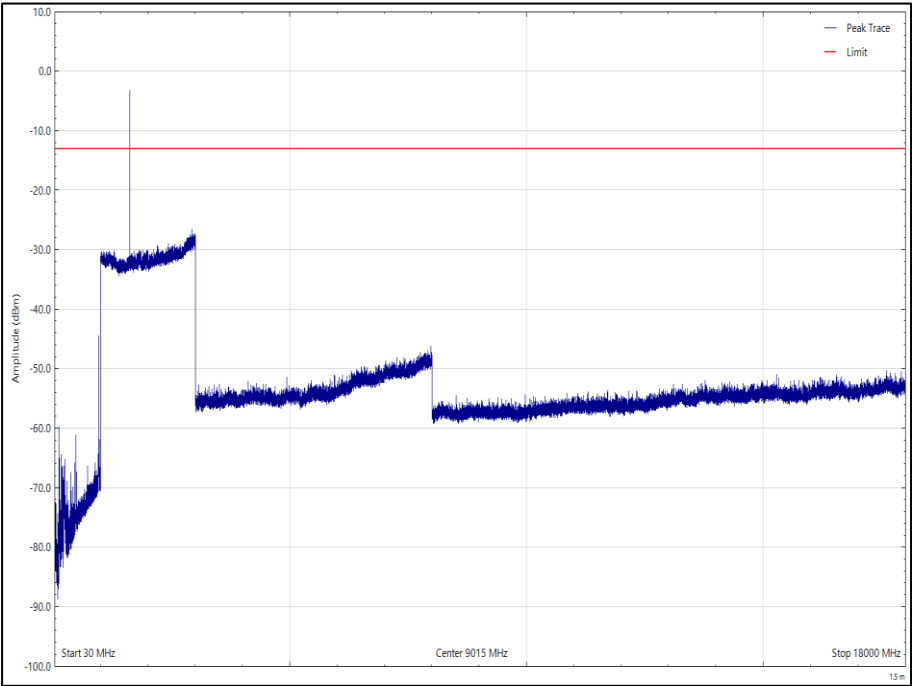


Figure 6 - 1616.04167 MHz - 30 MHz to 18GHz, Horizontal, Z Orientation

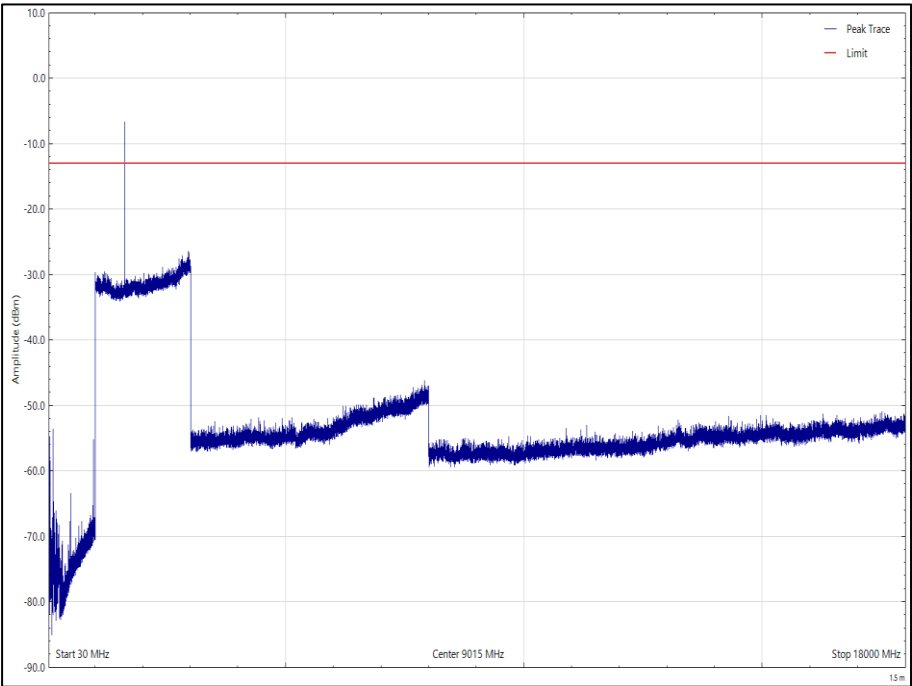


Figure 7 - 1616.04167 MHz - 30 MHz to 18GHz, Vertical, Z Orientation



Frequency (MHz)	Level (dBm)	Polarisation	Orientation
*			

Table 24 - 1621.04167 MHz, 30 MHz to 18 GHz

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

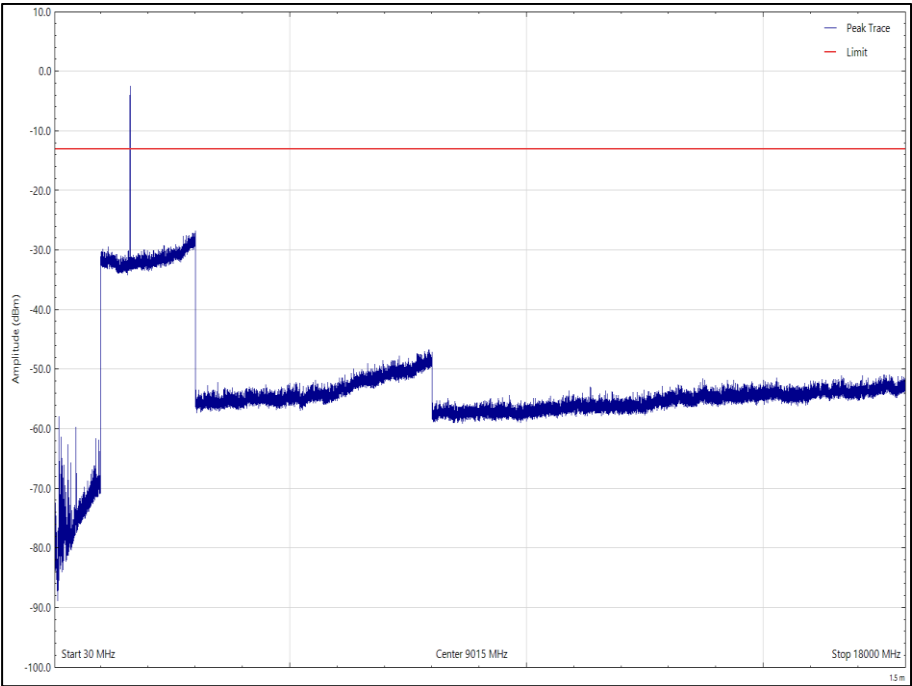


Figure 8 - 1621.04167 MHz - 30 MHz to 18GHz, Horizontal, X Orientation

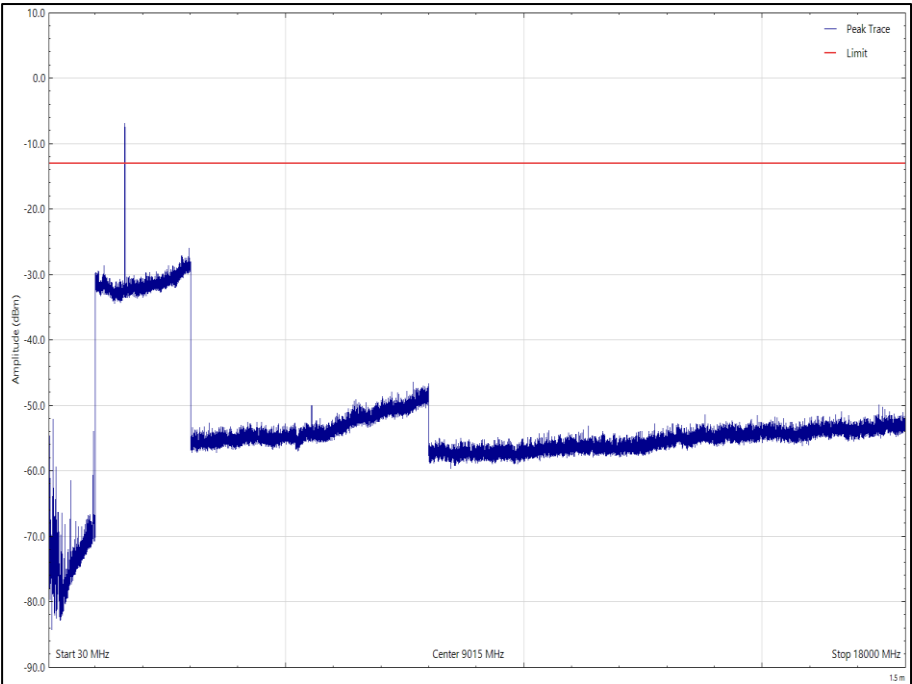


Figure 9 - 1621.04167 MHz - 30 MHz to 18GHz, Vertical, X Orientation

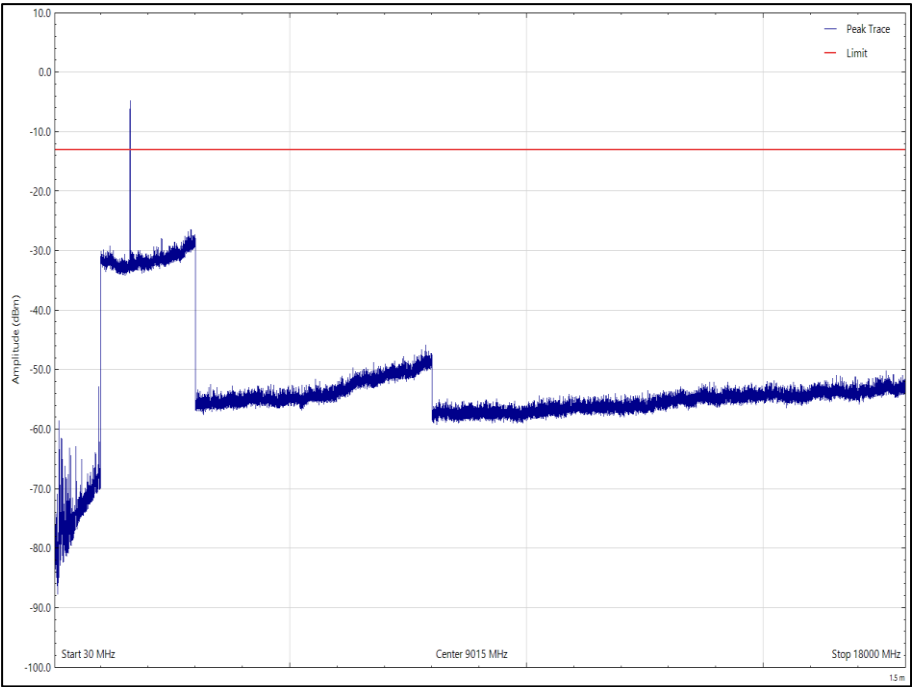


Figure 10 - 1621.04167 MHz - 30 MHz to 18GHz, Horizontal, Y Orientation

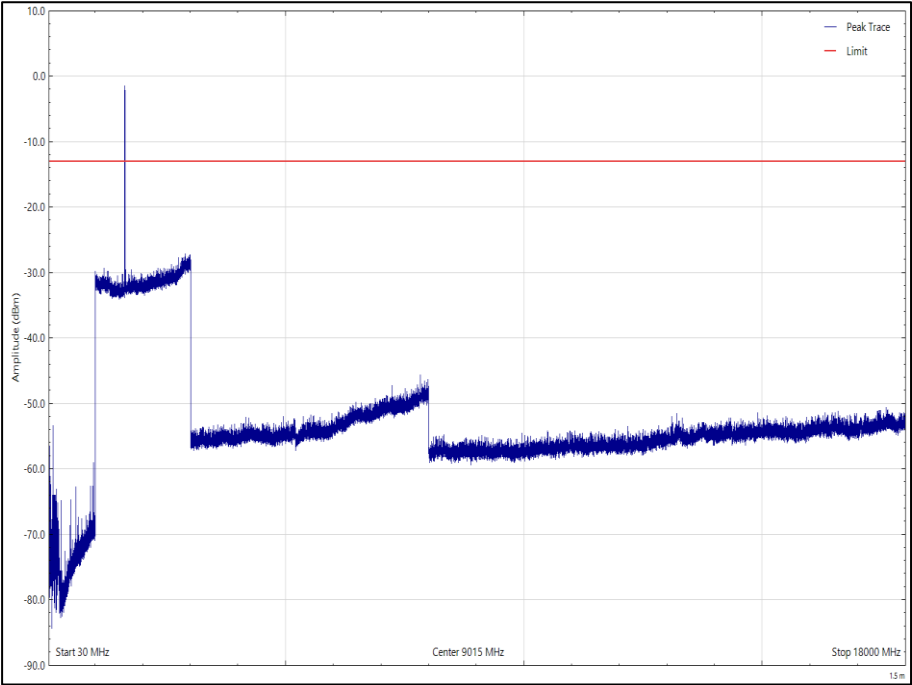


Figure 11 - 1621.04167 MHz - 30 MHz to 18GHz, Vertical, Y Orientation

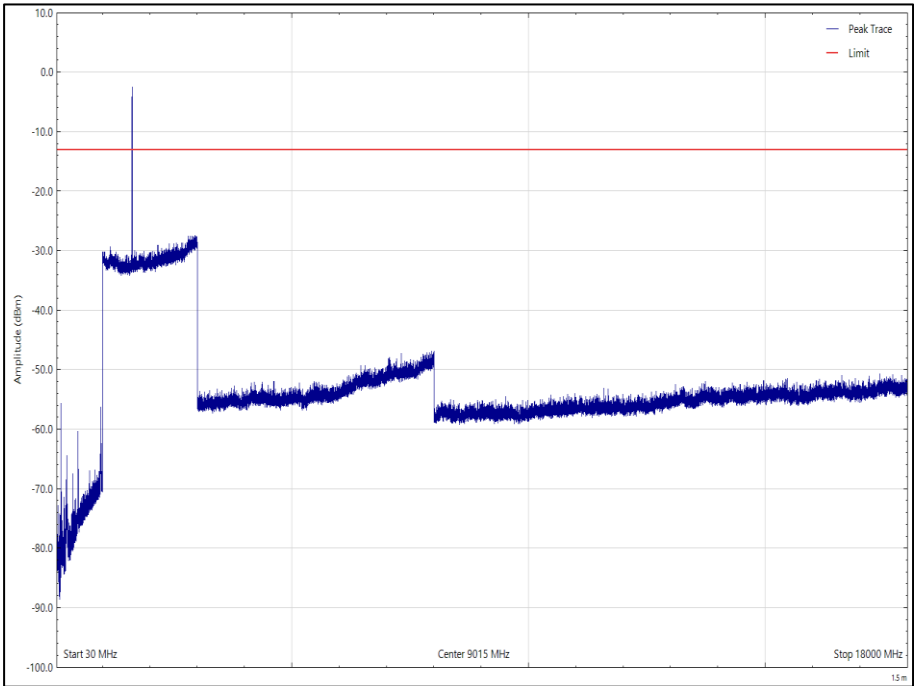


Figure 12 - 1621.04167 MHz - 30 MHz to 18GHz, Horizontal, Z Orientation

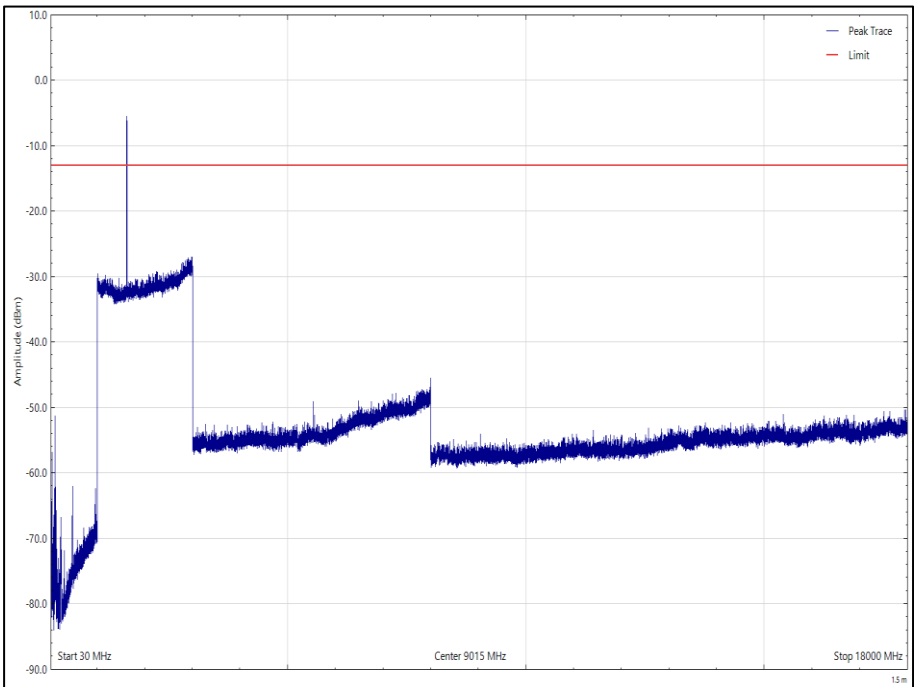


Figure 13 - 1621.04167 MHz - 30 MHz to 18GHz, Vertical, Z Orientation



Frequency (MHz)	Level (dBm)	Polarisation	Orientation
*			

Table 25 - 1625.9583 MHz, 30 MHz to 18 GHz

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

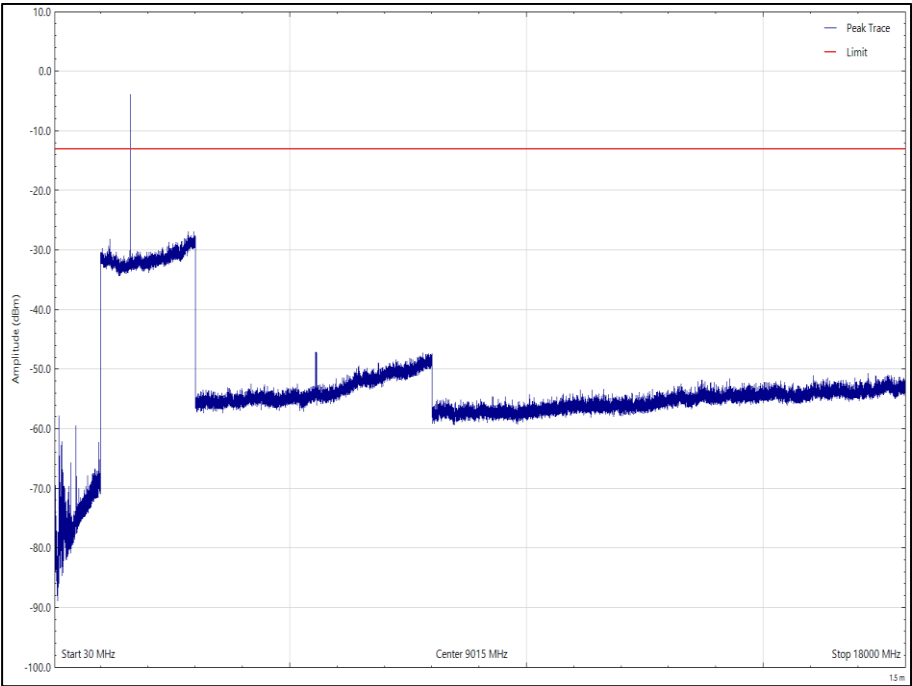


Figure 14 - 1625.9583 MHz - 30 MHz to 18GHz, Horizontal, X Orientation

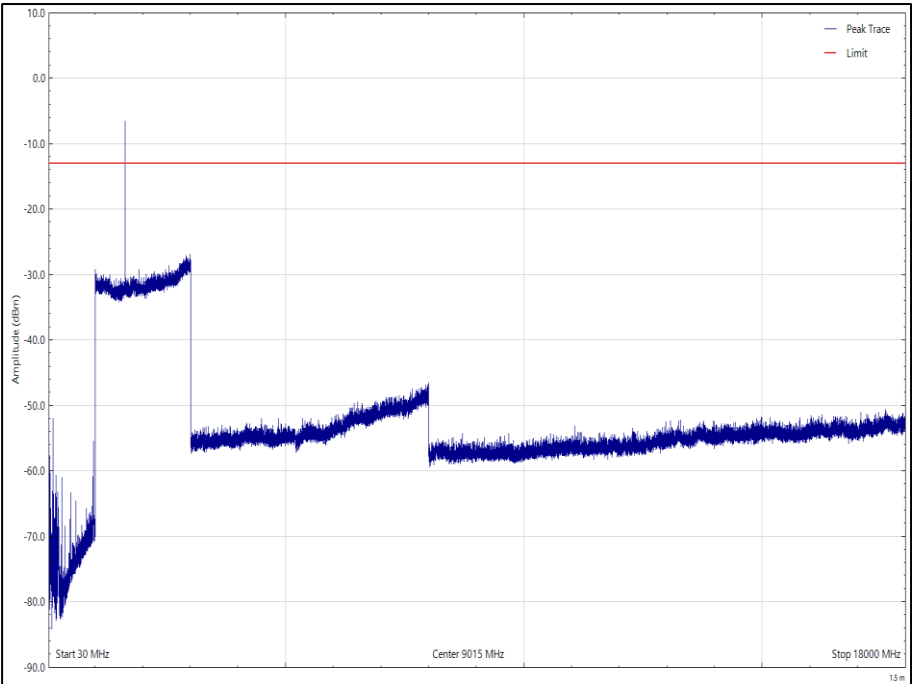


Figure 15 - 1625.9583 MHz - 30 MHz to 18GHz, Vertical, X Orientation

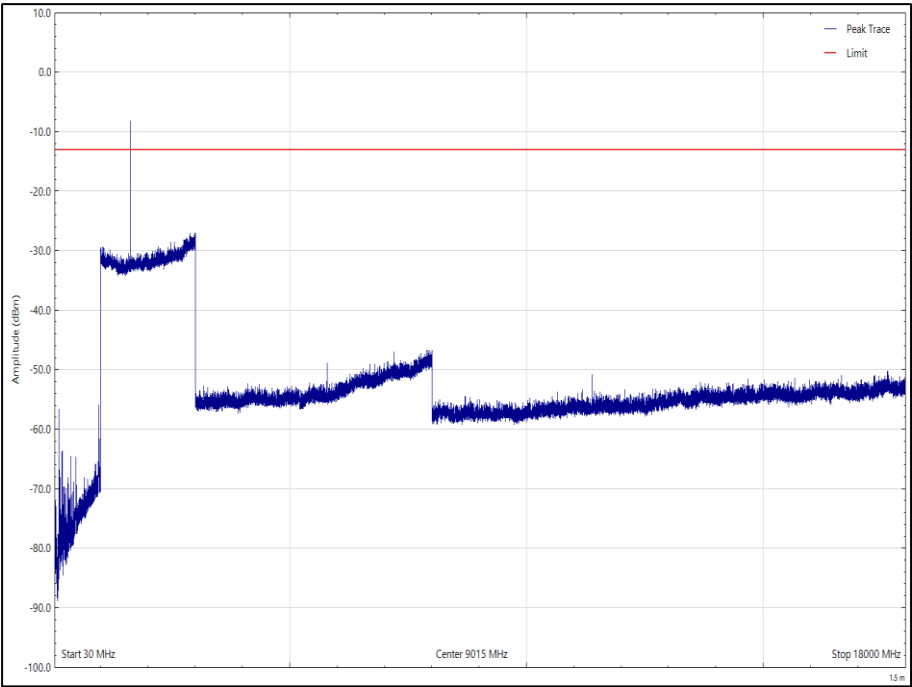


Figure 16 - 1625.9583 MHz - 30 MHz to 18GHz, Horizontal, Y Orientation

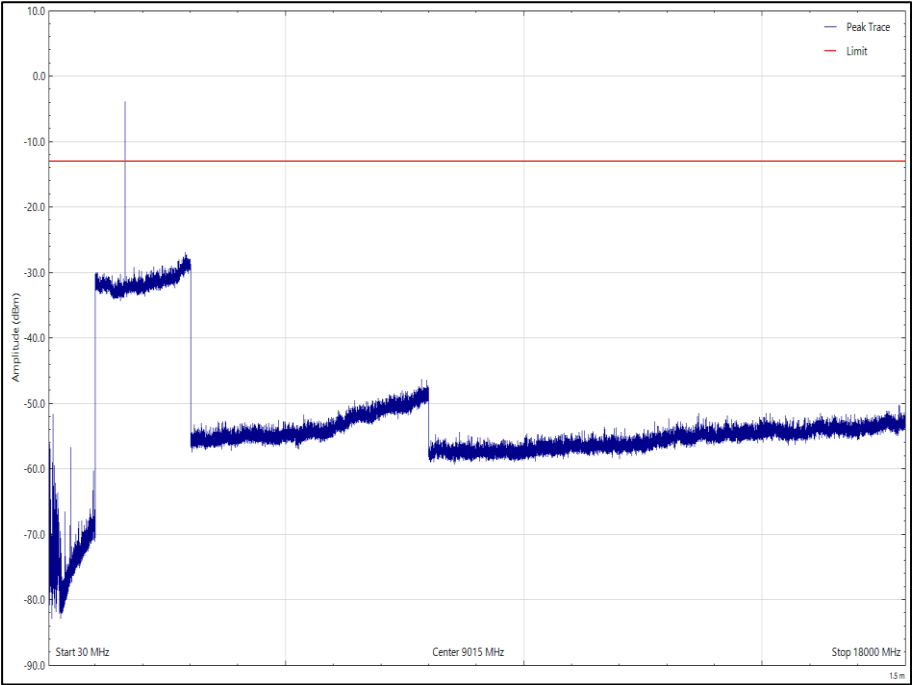


Figure 17 - 1625.9583 MHz - 30 MHz to 18GHz, Vertical, Y Orientation

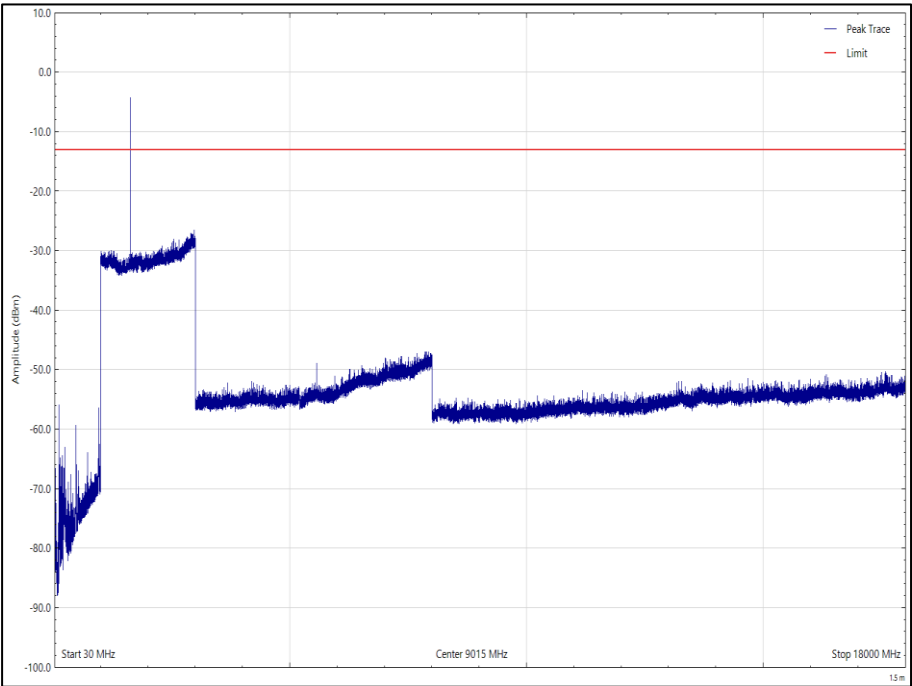


Figure 18 - 1625.9583 MHz - 30 MHz to 18GHz, Horizontal, Z Orientation

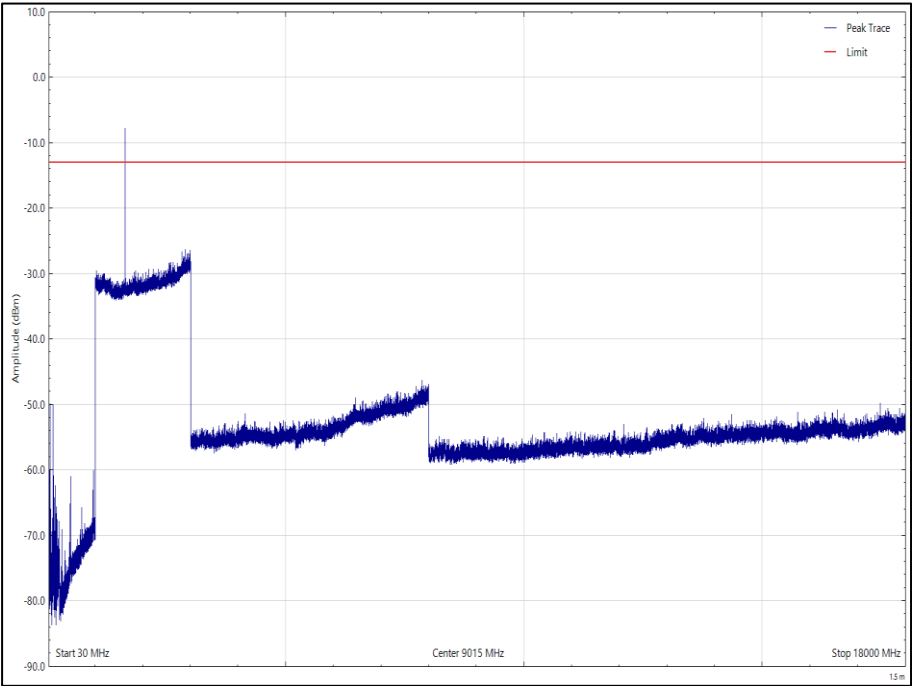


Figure 19 - 1625.9583 MHz - 30 MHz to 18GHz, Vertical, Z Orientation



FCC 47 CFR Part 2, 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:

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;

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;

$43 + 10 \log p$ (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.

ISED RSS-170, Limit Clause 5.8

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

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 occupied bandwidth or necessary bandwidth, whichever is greater;

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 occupied bandwidth or necessary bandwidth, whichever is greater;

$43 + 10 \log p$ (watts) in any 4 kHz band, the centre frequency of which is offset from the channel frequency by more than 250% of the occupied bandwidth or necessary bandwidth, whichever is greater.



2.2.8 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 Expires
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
3m Semi-Anechoic Chamber	Rainford	RF Chamber 5	1545	36	23-Apr-2027
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygrometer	Rotronic	Hygropalm 0	3028	12	12-Aug-2025
True RMS Multimeter	Fluke	179	4007	12	10-Dec-2025
Mast Controller	Maturo GmbH	NCD	4810	-	TU
Tilt Antenna Mast	Maturo GmbH	TAM 4.0-P	4811	-	TU
Antenna (DRG, 1 GHz to 10.5 GHz)	Schwarzbeck	BBHA9120B	4848	12	14-Jul-2025
Emissions Software	TUV SUD	EmX V3.5.1	5125	-	Software
Pre-amplifier (30 dB, 1GHz to 18GHz)	Schwarzbeck	BBV 9718 C	5261	12	17-Apr-2026
Cable (K-Type to K-Type, 1 m)	Junkosha	MWX241-01000KMSKMS/A	5511	12	06-Jun-2025
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5517	12	23-May-2025
EMI Test Receiver	Rohde & Schwarz	ESW44	5527	12	26-Jul-2025
3 GHz High pass Filter	Wainwright	WHKX12-2580-3000-18000-80SS	5547	12	29-May-2025
7 GHz High pass Filter	Wainwright	WHKX12-5850-6800-18000-80SS	5549	12	15-Aug-2025
Pre-Amplifier (8 GHz to 18 GHz)	Wright Technologies	APS06-0061	5596	12	28-Oct-2025
Antenna (DRG, 7.5 GHz to 18 GHz)	Schwarzbeck	HWRD750	5610	12	13-Oct-2025
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9168	6635	24	13-Jun-2025
Cable (N-Type to N-Type, 8 m)	Scott Cables	SCB800-A-NMNM-08.00M	6719	6	06-Jun-2025

Table 26

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

3 Photographs

3.1 Test Setup Photographs



Figure 20 – 30MHz to 1GHz Setup

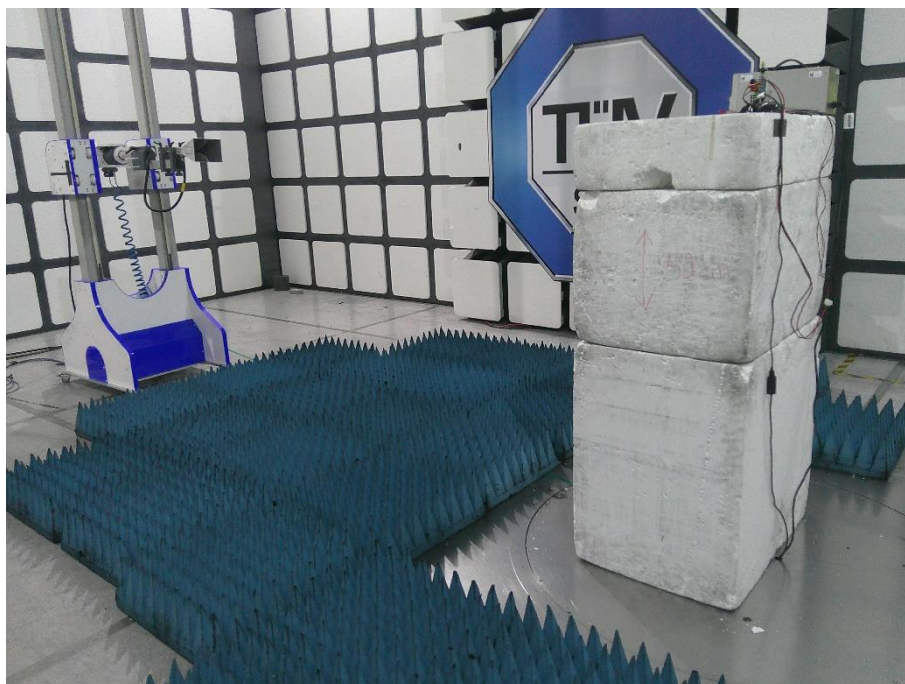


Figure 21 – 1GHz to 18GHz Setup

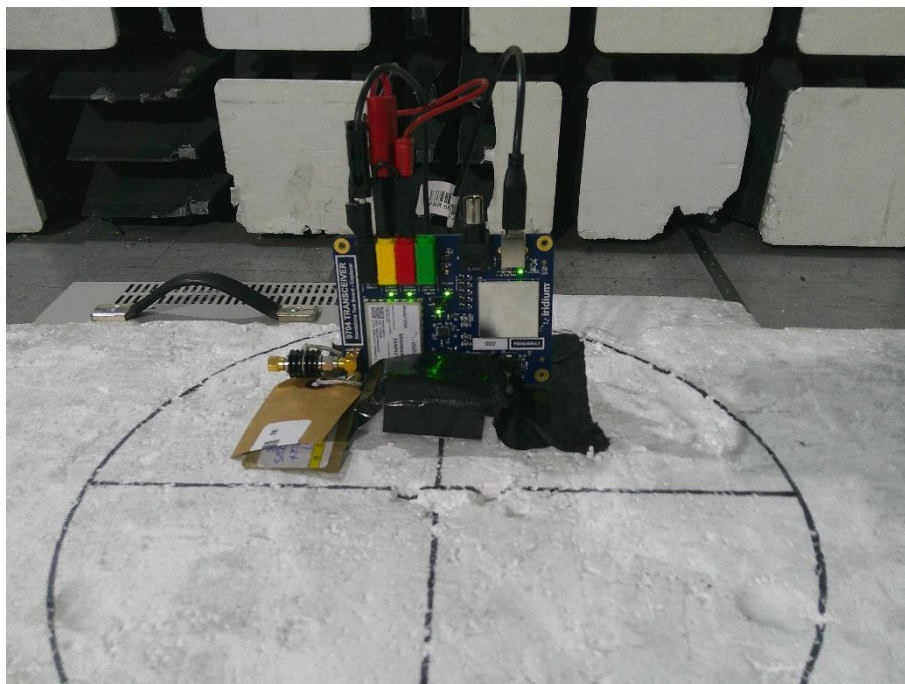


Figure 22 – X Orientation

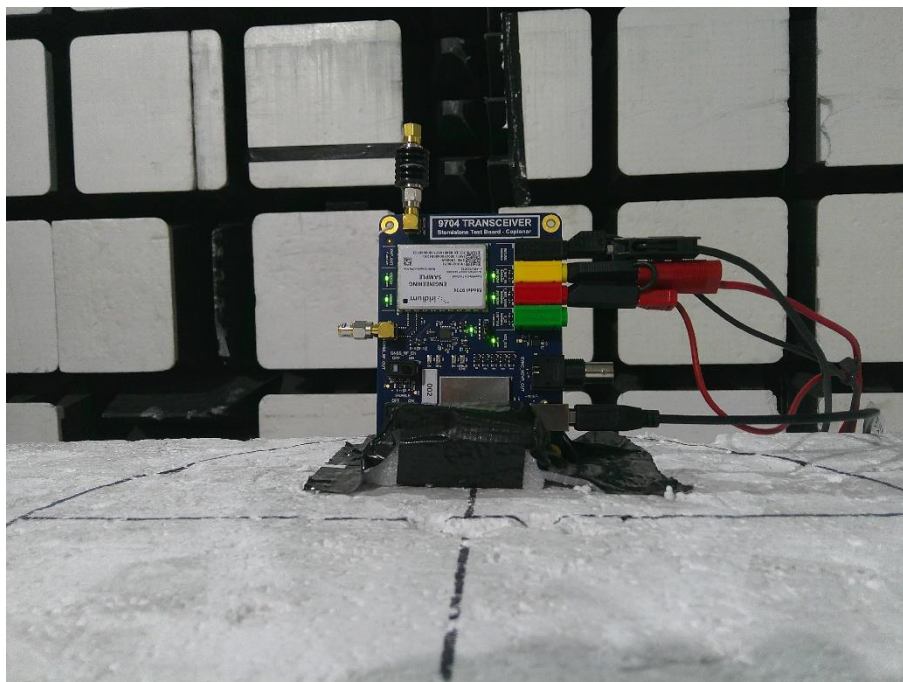


Figure 23 – Y Orientation

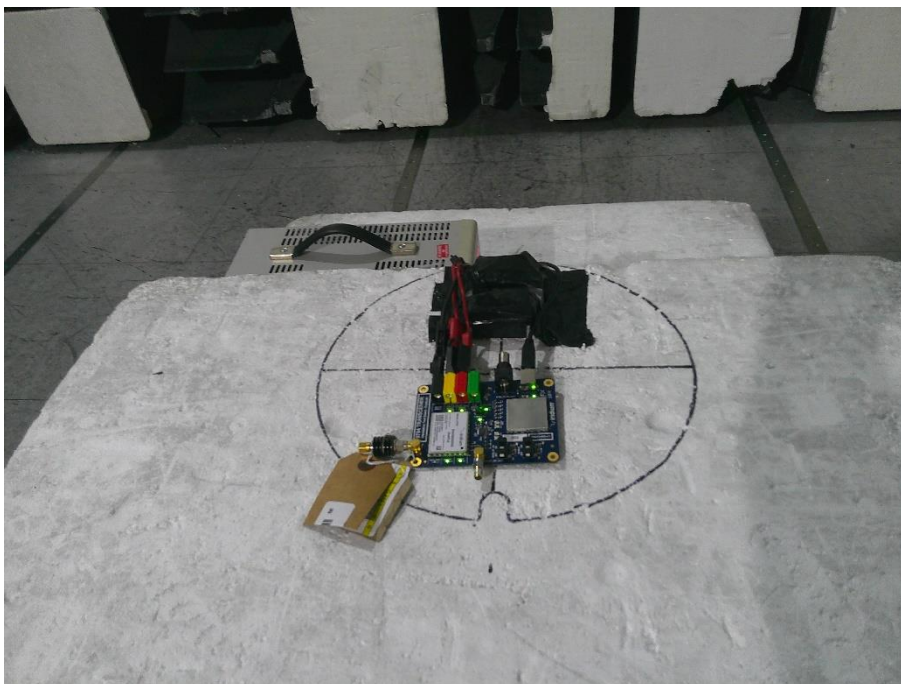


Figure 24 – Z Orientation



4 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Equivalent Isotropic Radiated Power	Conducted: ± 3.2 dB Radiated: ± 6.3 dB (1 GHz to 18 GHz)
Radiated Spurious Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 18 GHz: ± 6.3 dB

Table 27

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115:2021, Clause 4.4.3 (Procedure 2). The measurement results are directly compared with the test limit to determine conformance with the requirements of the standard.

Risk: The uncertainty of measurement about the measured result is negligible with regard to the final pass/fail decision. The measurement result can be directly compared with the test limit to determine conformance with the requirement (compare IEC Guide 115). The level of risk to falsely accept and falsely reject items is further described in ILAC-G8.