FCC and ISED Test Report

Manufacturer: TTP PLC

Model: Velaris 200

In accordance with FCC 47 CFR Part 25, FCC 47 CFR Part 2 and ISED RSS-170 and ISED RSS-GEN, Technology: (Broadband Global Area Network)

Prepared for: TTP PLC
TTP Campus, Cambridge Road
Melbourn, SG8 6HQ

FCC ID: 2BO4Q-V200 IC: 33922-V200

COMMERCIAL-IN-CONFIDENCE

Document 75962190-20 Issue 02

SIGNATURE			
S. MM			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Steve Marshall	Senior Engineer	Authorised Signatory	24 June 2025

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD 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, FCC 47 CFR Part 2 and ISED RSS-170 and ISED RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Ahmad Javid	24 June 2025	

FCC Accreditation
492497/UK2010 Octagon House, Fareham Test Laboratory

ISED Accreditation
12669A/UK0003 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 25: 2024, FCC 47 CFR Part 2: 2023, ISED 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.

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Contents

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	16 May 2025
2	Additional information provided by TTP	24 June 2025

Table 1

1.2 Introduction

Applicant	TTP PLC
Manufacturer	Gotonomi
Model Number(s)	Velaris 200
Serial Number(s)	SN681031
Hardware Version(s)	1
Software Version(s)	1.5.8931
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 25: 2022 FCC 47 CFR Part 2: 2024 ISED RSS-170: Issue 4 (09-2022) ISED RSS-GEN: Issue 5 (04-2018) + A2 (02-2021)
Order Number	PURORDTTP23503/PUROR
Date	06-August-2024
Date of Receipt of EUT	13-September-2024
Start of Test	27-September-2024
Finish of Test	28-September-2024
Name of Engineer(s)	Ahmad Javid
Related Document(s)	ANSI C63.26 (2015)

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 ISED 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: Velaris Module - 1.6 GHz communications link							
2.1	25.202 (f)	2.1053	5.8	6.13	Radiated Spurious Emissions	Pass	ANSI C63.26 (2015)

Table 2

1.4 Application Form

Equipment Description

Technical Description: *(Please provide a brief description of the intended use of the equipment including the technologies the product supports)*	Mobile earth station satellite communication data modem L-Band, up to 200kbps		
Manufacturer:	Gotonomi		
Model:	Velaris 200		
Part Number:	V200		
Hardware Version:	1		
Software Version:	1.5.8931		
FCC ID of the product under test – see guidance here		2BO4Q-V200	
IC ID of the product under test – see guidance here		33922-V200	
Device Category	Mobile ☐	Portable ☒	Fixed ☒
Equipment is fitted with an Audio Low Pass Filter		Yes ☐	No ☐

Table 3

Intentional Radiators

Technology	BGAN
Frequency Range (MHz to MHz)	1626.5 - 1660.5
Conducted Declared Output Power (dBm)	37.5
Antenna Gain (dBi)	2.5
Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	200kHz
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	QPSK/QAM
ITU Emission Designator (see guidance here) (not mandatory for Part 15 devices)	200KX2D
Bottom Frequency (MHz)	1626.5
Middle Frequency (MHz)	1643.5
Top Frequency (MHz)	1660.5

Table 4

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	1660.5 MHz
Lowest frequency generated or used in the device or on which the device operates or tunes	26MHz
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:	24	V
Extreme upper voltage:	30	V
Extreme lower voltage:	18	V
Max current:	3	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:	Ambient	°C
Maximum temperature:	Ambient	°C

Table 10

Cable Loss

Adapter Cable Loss (Conducted sample)	0	dB

Table 11

Antenna Characteristics

Antenna connector ☐			State impedance		Ohm
Temporary antenna connector ☐			State impedance		Ohm
Integral antenna ☒	Type:	Custom	Gain	2.5	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): By instruction 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)

Manufacturer:		Part Number:	
Model:		Country of Origin:	

Table 13

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

Name: Roderick van den Bergh
Position held: Operations Manager
Date: 11/9/24

1.5 Product Information

1.5.1 Technical Description

Mobile earth station satellite communication data modem L-Band, up to 200kbps.

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:Velaris 200, Serial Number: SN681031			
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: Velaris 200 with Antenna - 1.6 GHz communications link		
Radiated Spurious Emissions	Ahmad Javid	UKAS

Table 15

Office Address:

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

2 Test Details

2.1 Radiated Spurious Emissions

2.1.1 Specification Reference

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

2.1.2 Equipment Under Test and Modification State

Velaris 200, S/N: SN681031 - Modification State 0

2.1.3 Date of Test

27-September-2024 to 28-September-2024

2.1.4 Test Method

A preliminary profile of 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.

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

Prescans 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 (dBuV/m) + 20log(d) - 104.8 = EIRP (dBm) where (d) is the measurement distance.
82.2 (dBuV/m) + 20log(3) – 104.8 = EIRP (dBm)
-13.0 = EIRP (dBm)

2.1.5 Example Test Setup Diagram

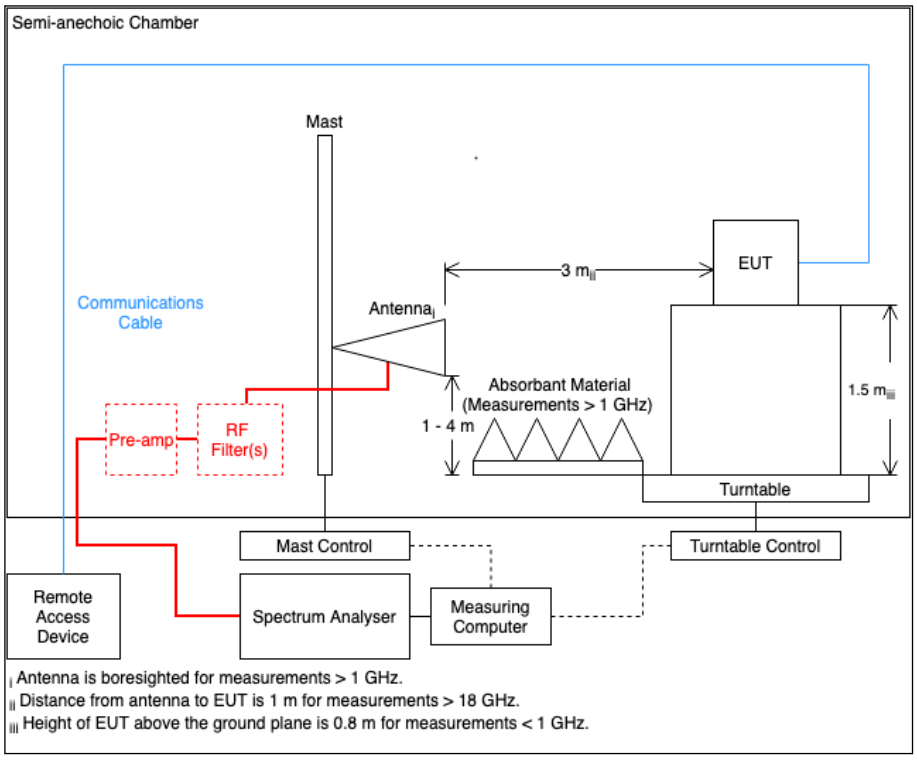

Figure 1

2.1.6 Environmental Conditions

Ambient Temperature	20.6 - 21.5 °C
Relative Humidity	46.7 - 50.6 %

2.1.7 Test Results

Velaris 200 with Antenna - 1.6 GHz communications link

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 16 - Bottom Channel Orientation X, 1626.712 MHz, 30 MHz to 18 GHz

*No emissions found within 10 dB of the limit.

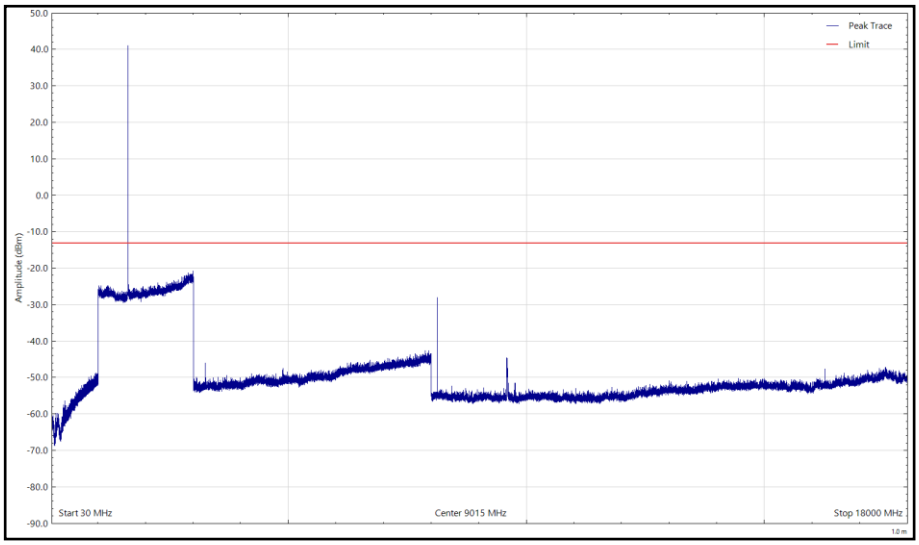

Figure 2 - Bottom Channel Orientation X, 1626.712 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

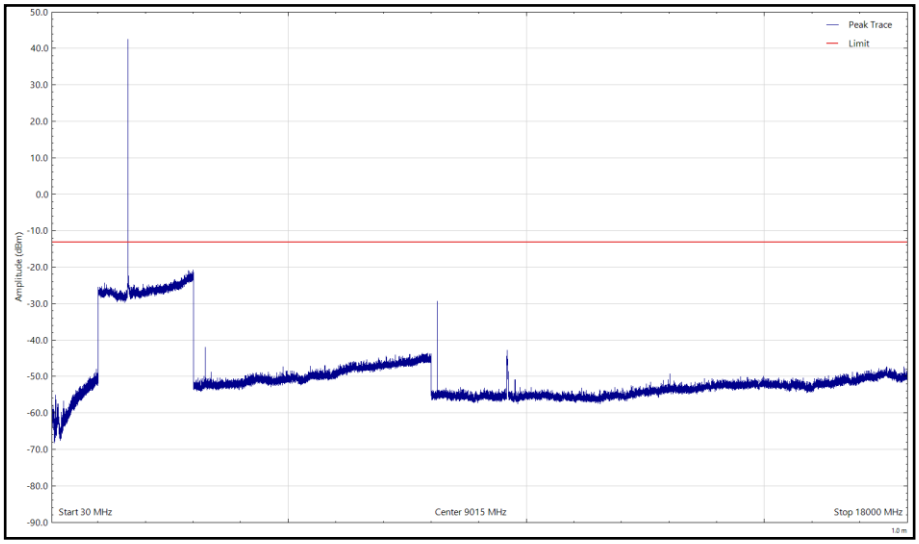

Figure 3 - Bottom Channel Orientation X, 1626.712 MHz, 30 MHz to 18 GHz, Vertical (Peak)

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 17 - Bottom Channel Orientation Y, 1626.712 MHz, 30 MHz to 18 GHz

*No emissions found within 10 dB of the limit.

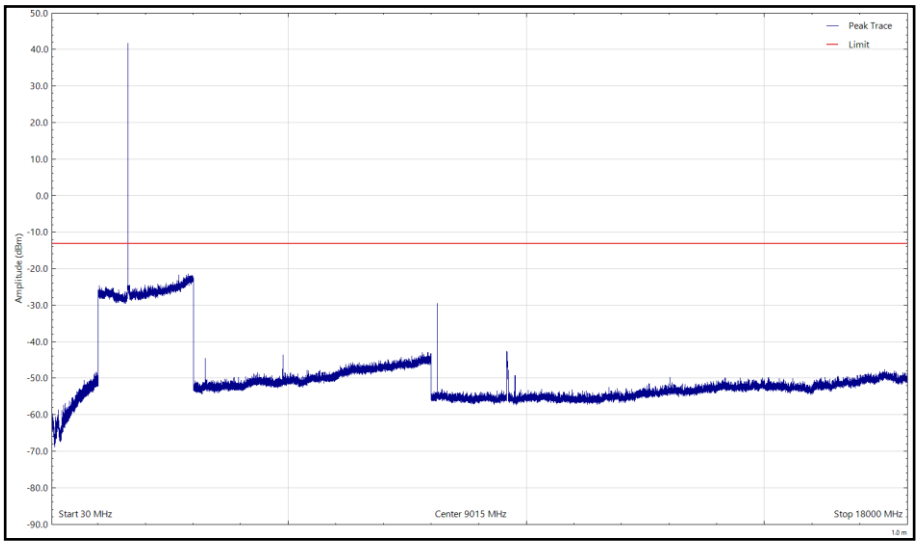

Figure 4 - Bottom Channel Orientation Y, 1626.712 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

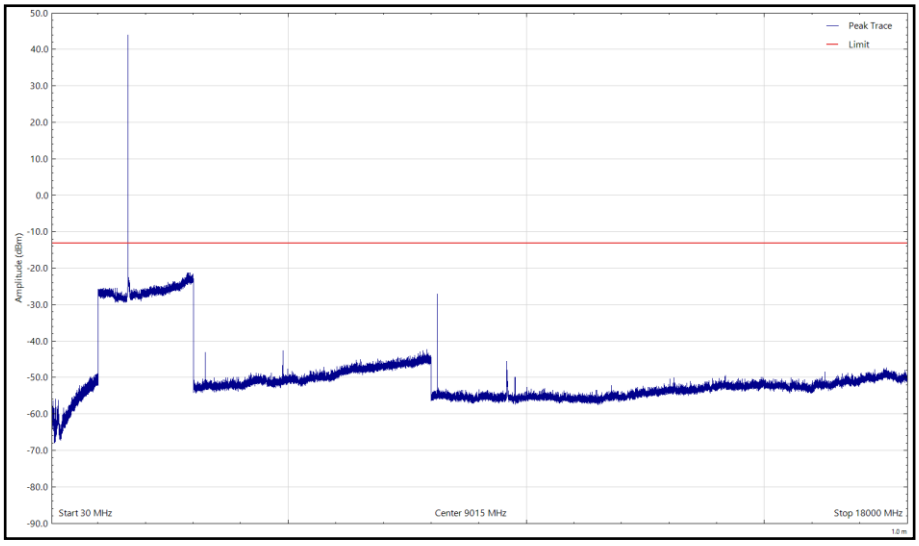

Figure 5 - Bottom Channel Orientation Y, 1626.712 MHz, 30 MHz to 18 GHz, Vertical (Peak)

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 18 - Bottom Channel Orientation Z, 1626.712 MHz, 30 MHz to 18 GHz

*No emissions found within 10 dB of the limit.

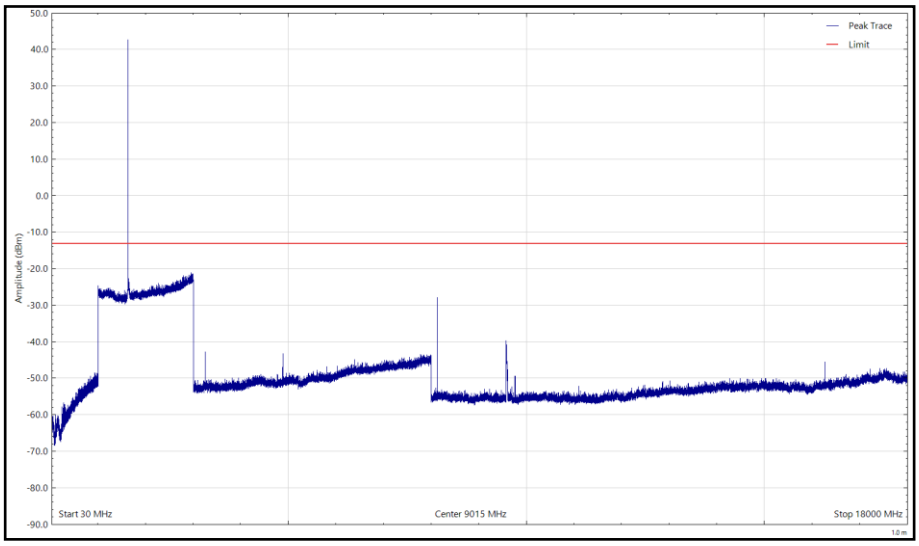

Figure 6 - Bottom Channel Orientation Z, 1626.712 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

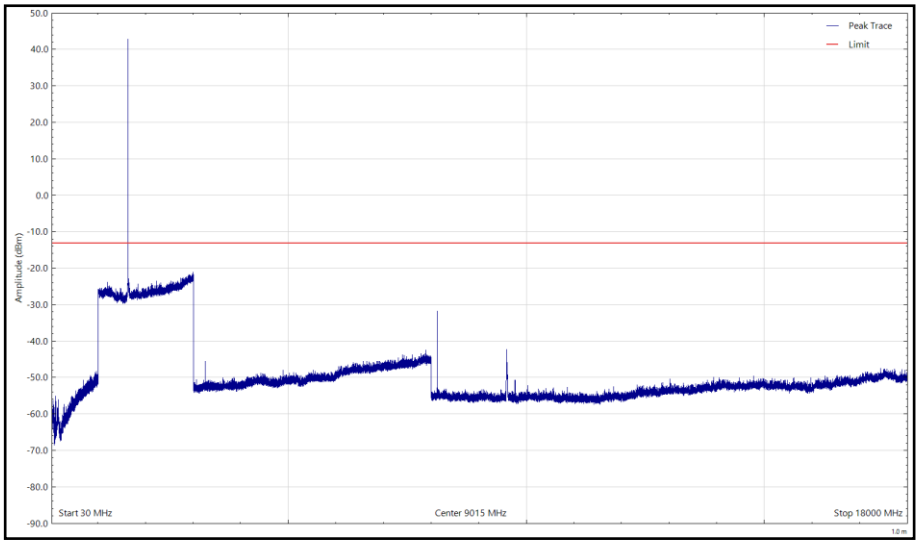

Figure 7 - Bottom Channel Orientation Z, 1626.712 MHz, 30 MHz to 18 GHz, Vertical (Peak)

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 19 - Mid Channel Orientation X, 1643.5 MHz, 30 MHz to 18 GHz

*No emissions found within 10 dB of the limit.

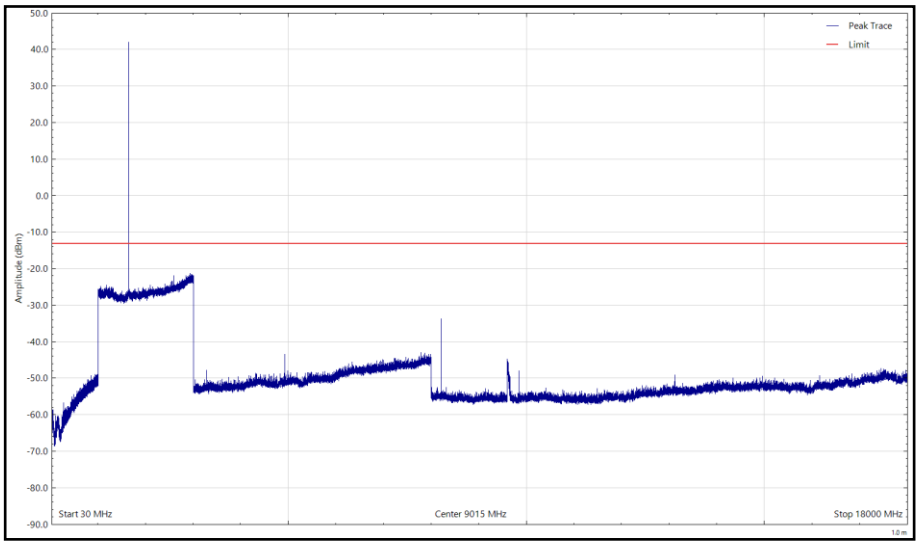

Figure 8 - Mid Channel Orientation X, 1643.5 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

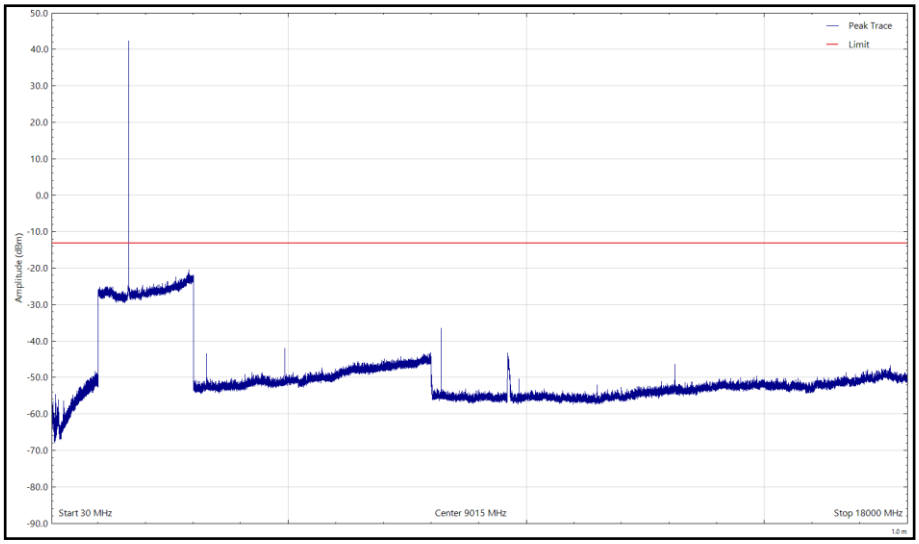

Figure 9 - Mid Channel Orientation X, 1643.5 MHz, 30 MHz to 18 GHz, Vertical (Peak)

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 20 - Mid Channel Orientation Y, 1643.5 MHz, 30 MHz to 18 GHz

*No emissions found within 10 dB of the limit.

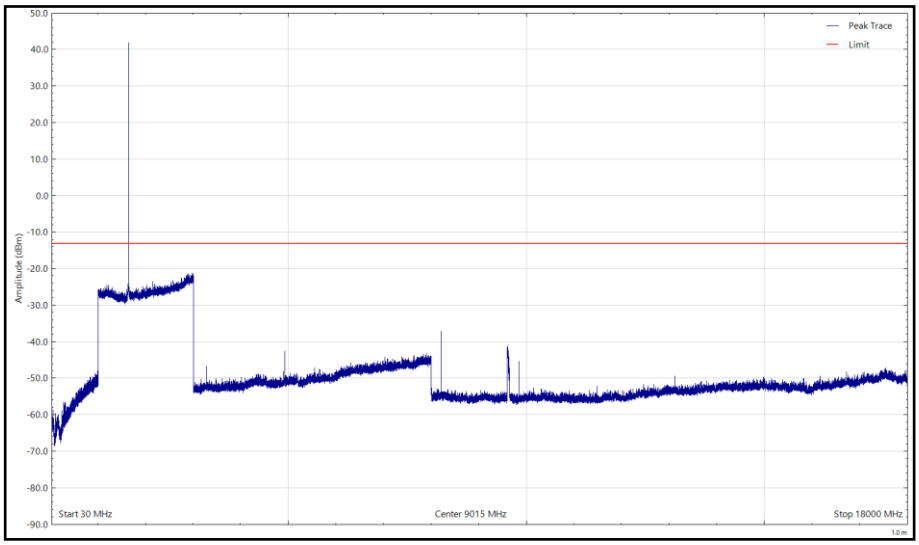

Figure 10 - Mid Channel Orientation Y, 1643.5 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

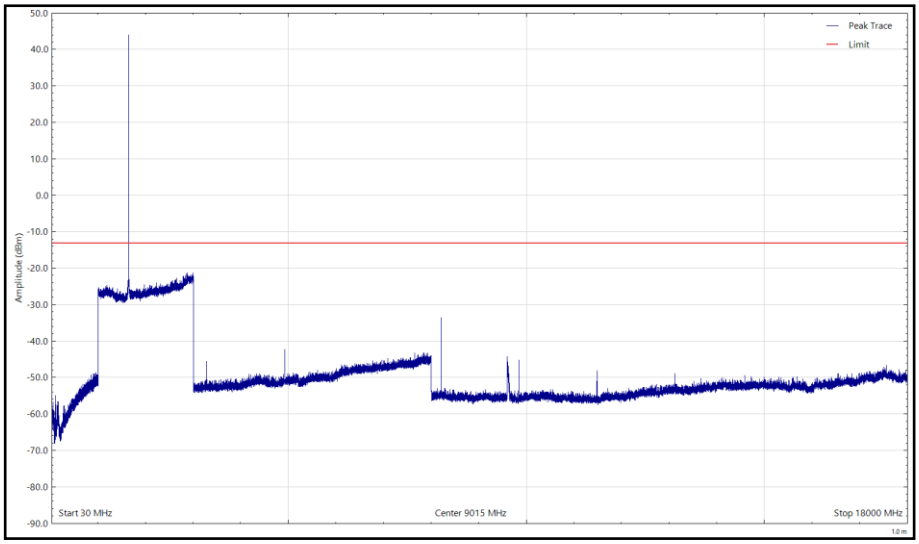

Figure 11 - Mid Channel Orientation Y, 1643.5 MHz, 30 MHz to 18 GHz, Vertical (Peak)

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 21 - Mid Channel Orientation Z, 1643.5 MHz, 30 MHz to 18 GHz

*No emissions found within 10 dB of the limit.

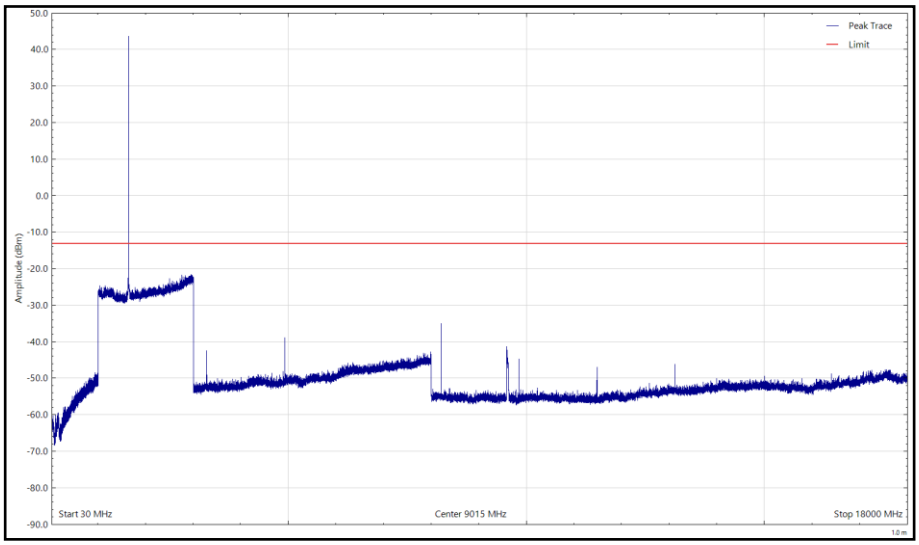

Figure 12 - Mid Channel Orientation Z, 1643.5 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

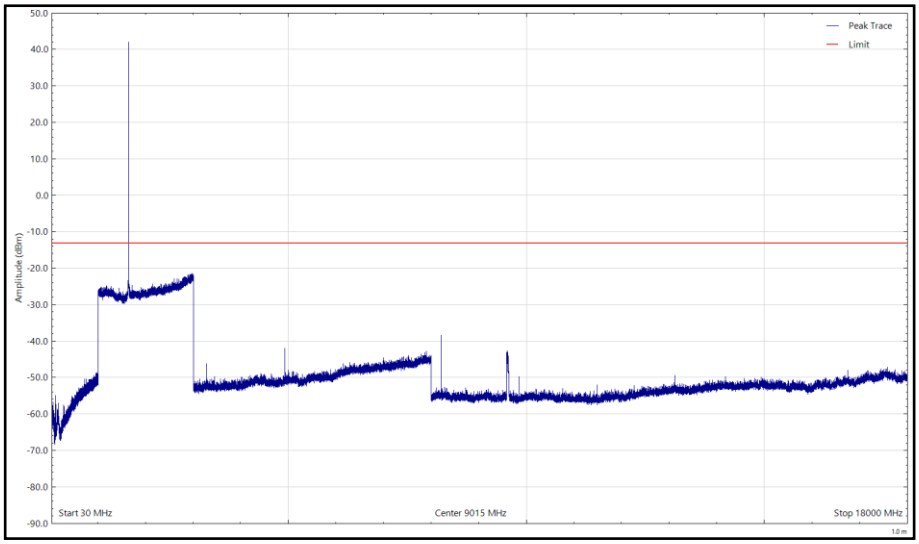

Figure 13 - Mid Channel Orientation Z, 1643.5 MHz, 30 MHz to 18 GHz, Vertical (Peak)

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 22 - Top Channel Orientation X, 1660.288 MHz, 30 MHz to 18 GHz

*No emissions found within 10 dB of the limit.

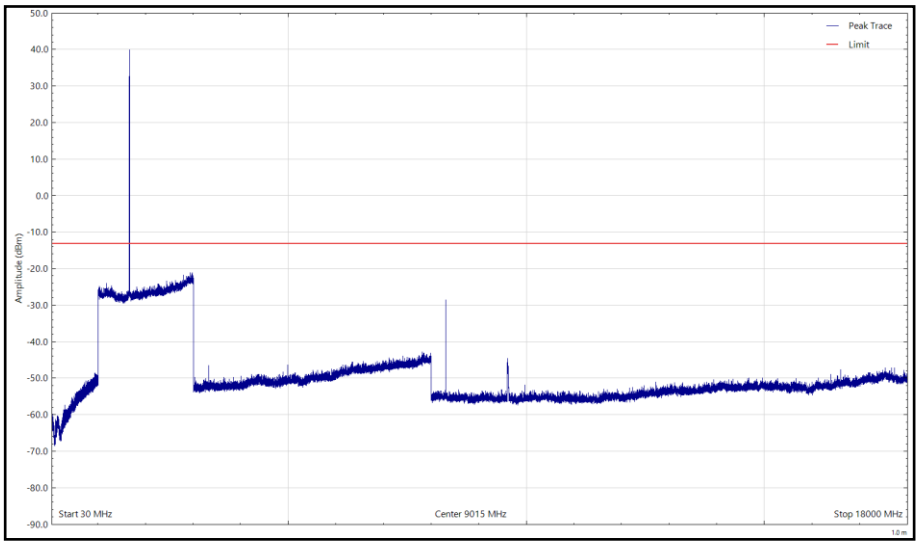

Figure 14 - Top Channel Orientation X, 1660.288 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

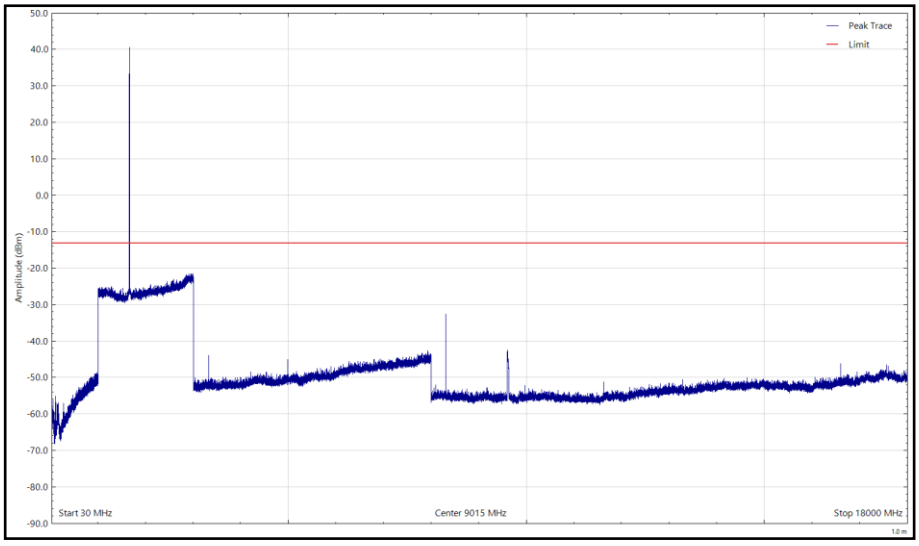

Figure 15 - Top Channel Orientation X, 1660.288 MHz, 30 MHz to 18 GHz, Vertical (Peak)

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 23 - Top Channel Orientation Y, 1660.288 MHz, 30 MHz to 18 GHz

*No emissions found within 10 dB of the limit.

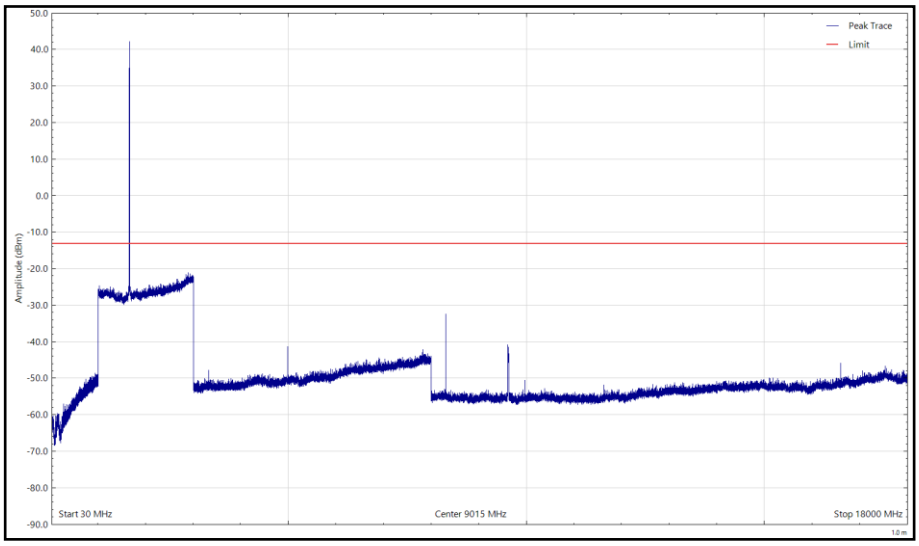

Figure 16 - Top Channel Orientation Y, 1660.288 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

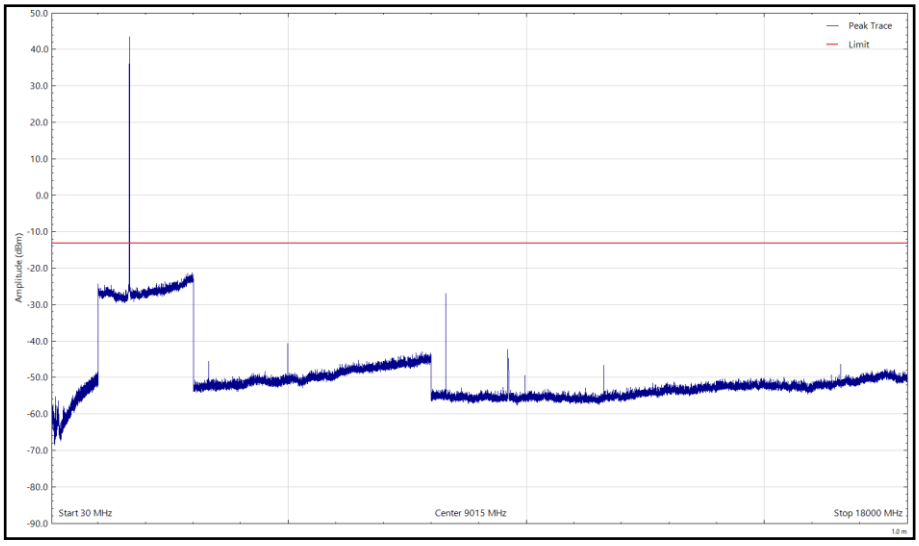

Figure 17 - Top Channel Orientation Y, 1660.288 MHz, 30 MHz to 18 GHz, Vertical (Peak)

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 24 - Top Channel Orientation Z, 1660.288 MHz, 30 MHz to 18 GHz

*No emissions found within 10 dB of the limit.

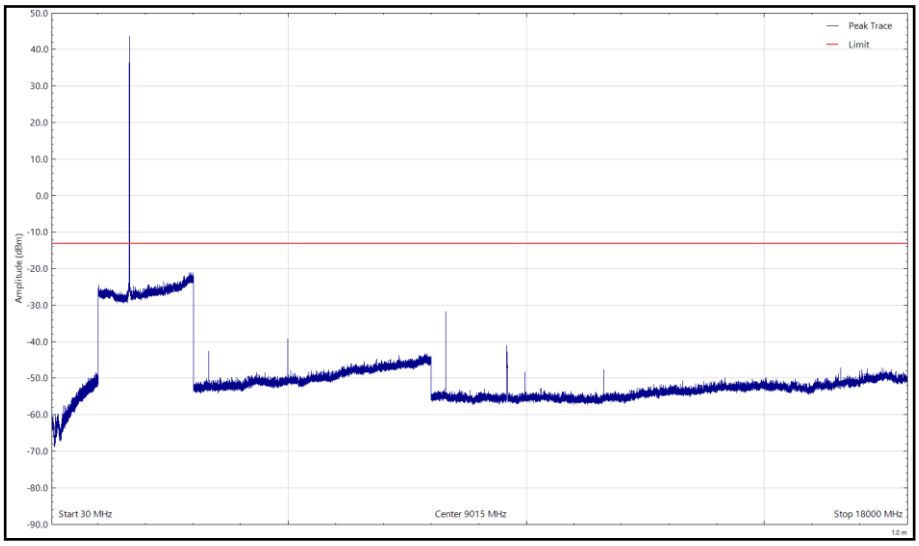

Figure 18 - Top Channel Orientation Z, 1660.288 MHz, 30 MHz to 18 GHz, Horizontal (Peak)

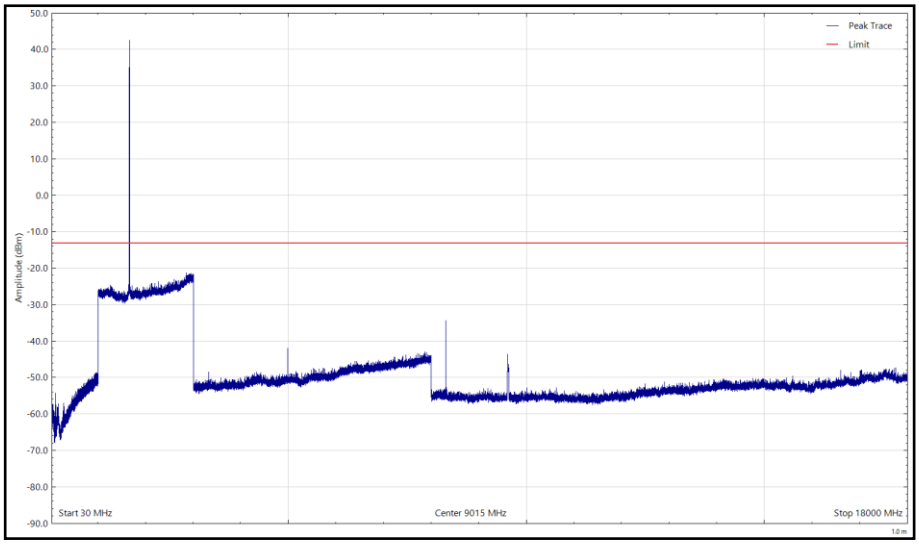

Figure 19 - Top Channel Orientation Z, 1660.288 MHz, 30 MHz to 18 GHz, Vertical (Peak)

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:

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.

2.1.8 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
True RMS Multimeter	Fluke	179	4007	12	17-Nov-2024
1 metre K-Type Cable	Florida Labs	KMS-180SP-39.4-KMS	4519	12	01-Feb-2025
Test Receiver	Rohde & Schwarz	ESW44	5084	12	04-Nov-2024
Emissions Software	TUV SUD	EmX V3.5.1	5125	-	Software
3m Semi-Anechoic Chamber	Rainford	RF Chamber 11	5136	36	24-Nov-2024
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
Antenna (DRG, 1 GHz to 10.5 GHz)	Schwarzbeck	BBHA9120B	5215	12	14-Jul-2025
Antenna (DRG, 7.5 GHz to 18 GHz)	Schwarzbeck	HWRD750	5216	12	14-Jul-2025
3 GHz High pass filter	Wainwright	WHKX12-2580-3000-18000-80SS	5220	12	03-Apr-2025
Pre-Amplifier (1 GHz to 26.5 GHz)	Agilent Technologies	8449B	5445	12	23-May-2025
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	13-May-2025
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5518	12	18-Apr-2025
7 GHz High pass Filter	Wainwright	WHKX12-5850-6800-18000-80SS	5550	12	30-May-2025
Pre-Amplifier (8 GHz to 18 GHz)	Wright Technologies	APS06-0061	5595	12	26-Oct-2024
TRILOG Super Broadband Test Antenna	Schwarzbeck	VULB 9168	5942	24	24-May-2026
Cable (N to N 8m)	Junkosha	MWX221-08000NMSNMS/B	6330	6	17-Feb-2025
Spectrum Analyser	Anritsu	MT8821C	6542	12	28-Jun-2025

Table 25

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment

3 Photographs

3.1 Test Setup Photographs

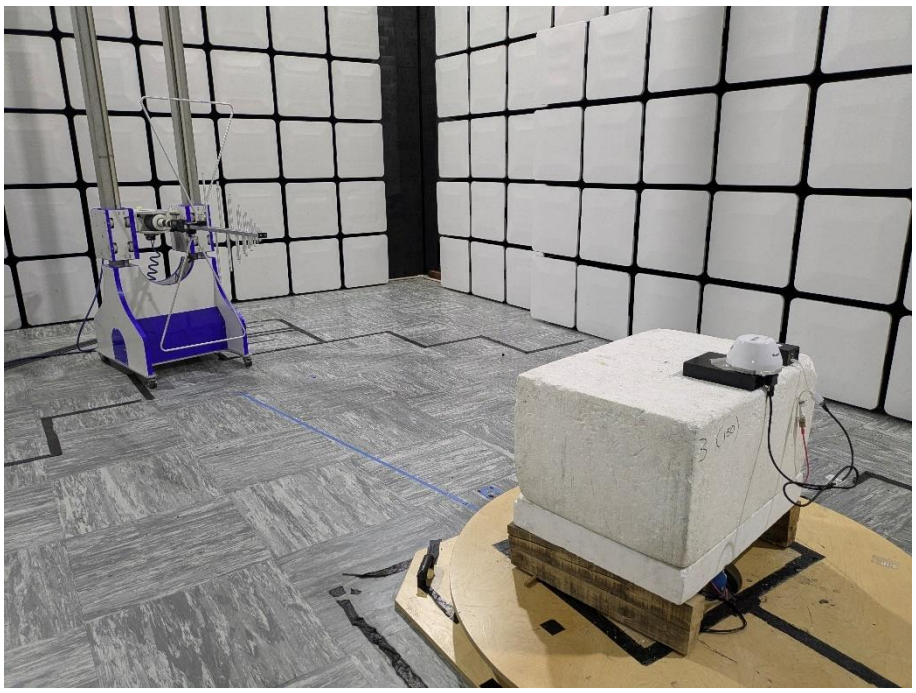

Figure 20 - Radiated Emissions, 30 MHz to 1 GHz

Figure 21 - Radiated Emissions, 1 GHz to 8 GHz

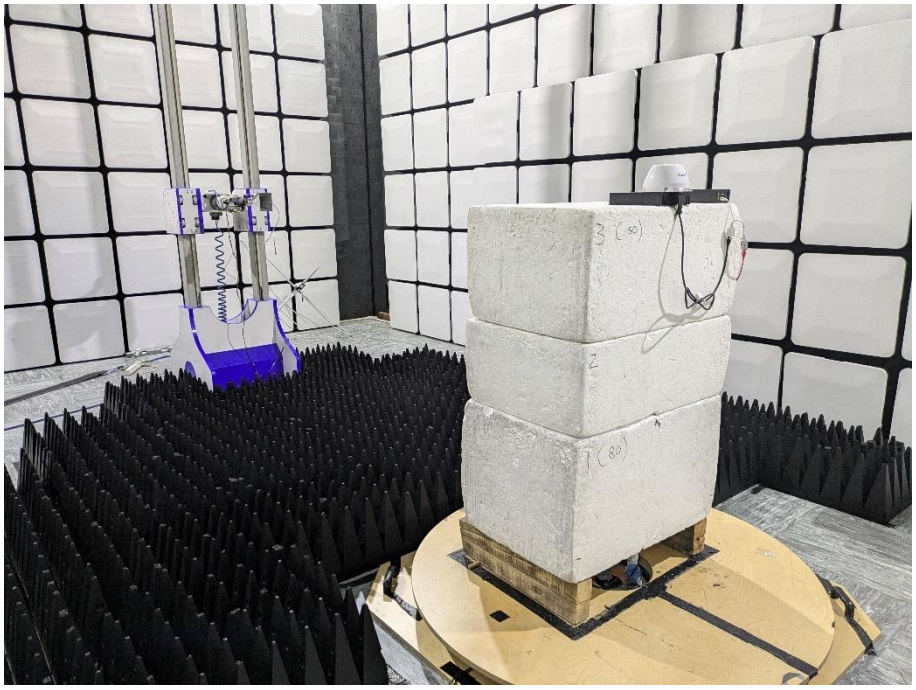

Figure 22 - Radiated Emissions, 8 GHz to 18 GHz

Figure 23 - Radiated Emissions, X-Plane

Figure 24 - Radiated Emissions, Y-Plane

Figure 25 - Radiated Emissions, Z-Plane

4 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Radiated Spurious Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 18 GHz: ± 6.3 dB

Table 26

Measurement Uncertainty Decision Rule – Accuracy Method

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.