

Radio Testing of the

Fortem Technologies, Inc.

Radar Model: R40

In accordance with FCC Title 47 Chapter I Subchapter D Part 90

Fortem Technologies, Inc.
1855 W 500 N,
Lindon, UT 84042,
USA



America

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Date: June 2025

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RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Authorized Signatory	Ferdinand S. Custodio	June 19, 2025	

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

EXECUTIVE SUMMARY

A sample of this product was tested and found to be in compliance with FCC Title 47 Chapter I Subchapter D Part 90



A2LA Cert. No. 2955.13

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REPORT ON	Radio Testing of the Fortem Technologies, Inc. Model R40 Radar
TEST REPORT NUMBER	721010899B
TEST REPORT DATE	June 2025
PREPARED FOR	Fortem Technologies, Inc. 1855 W 500 N, Lindon, UT 84042, USA
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PREPARED BY	 _____ Joe Salvador Name Authorized Signatory Title: Wireless Test Engineer
APPROVED BY	 _____ Ferdinand S. Custodio Name Authorized Signatory Title: Senior EMC Test Engineer / Wireless Team Lead
DATED	_____ June 19, 2025



Revision History

721010899B Fortem Technologies, Inc. Model R40 Radar					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
06/19/2025	—	Initial Release			Ferdinand S. Custodio



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SECTION 1

1 REPORT SUMMARY

Radio Testing of the
Fortem Technologies, Inc.
TrueView R40 Radar



1.1 Introduction

The information contained in this report is intended to show verification of the Fortem Technologies, Inc. TrueView R40 Radar to the requirements of FCC Title 47 Chapter I Subchapter D Part 90.

Objective	To perform Radio testing to determine the Equipment Under Test's (EUT's) compliance with the test specification, for the series of tests carried out.
Manufacturer	Fortem Technologies, Inc.
EUT	Radar
Trade Name	TrueView R40 Radar
Model Name	R40
FCC ID	2APIM-FTR04V001
IC Number	N/A
Serial Number(s)	X00400007
Number of Samples Tested	1
Test Specification/Issue/Date	FCC Title 47 Chapter I Subchapter D Part 90 Private Land Mobile Radio Services (October 1, 2018).
Start of Test	June 02, 2025
Finish of Test	June 06, 2025
Name of Engineer(s)	Joe Salvador
Related Document(s)	• ANSI C63.26-2015. American National Standard for Compliance Testing of Transmitters Used in Licensed radio Services. • R40_FCC-CE EMC_Testing_Procedures_20250523.docx

1.2 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC Title 47 Chapter I Subchapter D Part 90 are shown below:

Part 2	Part 90	Test Description	Result	Comments/ Base Standard
§2.1046	§90.205(r) and (s)	RF Power Output	Compliant	N/A
§2.1051	§90.210(n)	Unwanted Emissions (Emission Mask)	Compliant	N/A
§2.1053	§90.210(n)(3)	Field Strength of Radiated Spurious Emissions	Compliant	N/A
§2.1049		Occupied Bandwidth	Compliant	N/A
§2.1047		Audio Low Pass Filter (Voice Input)	N/A	N/A
§2.10479		Audio Frequency Response	N/A	N/A
§2.1047		Modulation Limiting	N/A	N/A
§2.1055	§90.213	Frequency Stability (Temperature Variation)	Compliant	N/A
§2.1055	§90.213	Frequency Stability (Voltage Variation)	Compliant	N/A

N/A

The EUT does not employ an audio input

1.3 Product Information

1.3.1 Technical Description

The Equipment Under Test (EUT) is a Fortem Technologies, Inc. TrueView R40 Radar. The EUT is a small, compact, powerful radar detection system providing tracking capabilities that monitor a marked or defined airspace and reports all airborne activity within that space.

1.3.2 EUT General Description

EUT Description	Radar
Model Name	TrueView R40 Radar
Model Number	R40
Serial Number	X00400007
Software Version	TrueView_5.0.91_r40_build-2505192242.fortem
Input Voltage	24VDC (AC/DC Adapter)
Operating Voltage Range	23VDC to 36VDC
Rated RF Power	56.43 dBm EIRP
Mode Verified	16.2GHz to 16.7GHz (radio location)
Capability	15.4GHz to 15.7GHz (radio navigation) and 16.2GHz to 16.7GHz (radio location)
Operating Temperature	-40°C to 55°C
Primary Unit (EUT)	☒ Production ☐ Pre-Production ☐ Engineering
Emission Designator	89M0QXN
Antenna Type	Phased Array
Antenna Model	N/A
Antenna gain	15 dBi
Modulation	FMCW

1.4 EUT Test configuration

1.4.1 Test Configuration Description

Test Configuration	Description
Default	EUT is configured by the support laptop through the ethernet port. The EUT was configured to transmit in either full radar swept mode or in single CW mode, depending on the test. The EUT was also configured to transmit in the frequencies at the extreme low, mid-range, and high ends of the allotted band through Python scripts and with the GUI using a web browser.

1.4.2 EUT Exercise Software

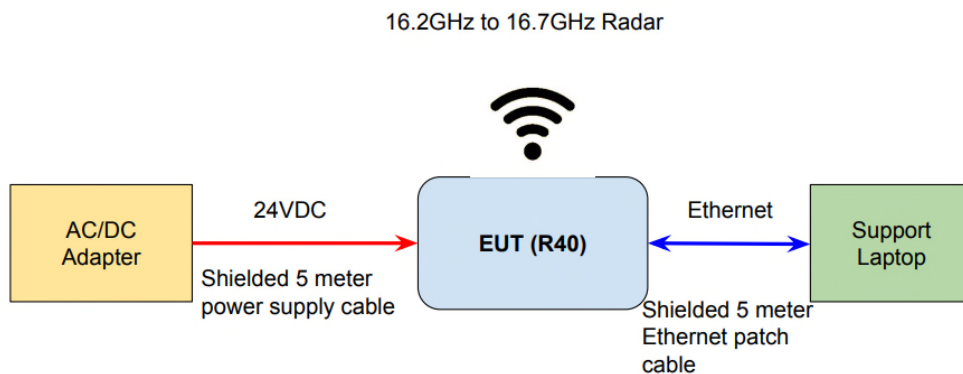
Web browser GUI (integrated with the EUT) and Python 3.7.

1.4.3 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Description
HP	Support Laptop	Model: Zbook Intel Core I7-6700HQ
MEAN WELL ENTERPRISES	EUT AC/DC Adapter	Part No. HEP-320-24. 100-240VAC, 50/60Hz, +24Vdc, 13.34A. Modified with CnLinko connector added to DC side cable and Neutrik connector added to AC side cable.
NETGEAR	Gigabit Switch	ProSafe 5 Port – GS105v5
-	Ethernet Patch Cable	FPN: 220-0327, shielded, 5m, RJ45 to 8-pin ODU AMC.
-	DC power supply end cable*	FPN: 220-0317. Shielded, 635mm, 6-pin ODU AMC to 3-pin DH-20 Series.
-	DC power supply long cable*	FPN: 220-0403. AC power cable, 3C, 12AWG, Neutrik female to NEMA 5-15P.

* Note: Above "long" and "end" power cables connect to each other in series.

1.4.4 Simplified Test Configuration Diagram



1.5 Deviations from the Standard

No deviations from the applicable test standards or test plan were made during testing.

1.6 Modification Record

Description of Modification	Modification Fitted By	Date Modification Fitted
Serial Number: X00400007		
None	—	—

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test (if relevant) are recorded on the appropriate test pages.

1.7 Test Methodology

All measurements contained in this report were conducted with ANSI C63.26-2015. American National Standard for Compliance Testing of Transmitters Used in Licensed radio Services.

For conducted and radiated emissions, the equipment under test (EUT) was configured to measure its highest possible emission level. This level was based on the maximized cable configuration from exploratory testing per ANSI C63.26-2015. The test modes were adapted according to the Operating Instructions provided by the manufacturer/client.

1.8 Test Facility Location

1.8.1 TÜV SÜD America Inc. (Mira Mesa)

10040 Mesa Rim Road, San Diego, CA 92121-2912 (32.901268,-117.177681). Phone: 858 678 1400
FAX: 858 546 0364

1.8.2 TÜV SÜD America Inc. (Rancho Bernardo)

16936 Via Del Campo, San Diego, CA 92127-1708 (33.018644,-117.092409). Phone: 858 678 1400
Fax: 858 546 0364.

1.9 Test Facility Registration

1.9.1 FCC – Designation No.: US1146

TÜV SÜD America Inc. (San Diego), is an accredited test facility with the site description report on file and has met all the requirements specified in §2.948 of the FCC rules. The acceptance letter from the FCC is maintained in our files and the Designation is US1146

1.9.2 Innovation, Science and Economic Development Canada (IC) Registration No.: 3067A-1 & 22806-1

The 10m Semi-anechoic chamber of TÜV SÜD America Inc. (San Diego Rancho Bernardo) has been registered by Certification and Engineering Bureau of Innovation, Science and Economic Development Canada for radio equipment testing with Registration No. 3067A-1.

The 3m Semi-anechoic chamber of TÜV SÜD America Inc. (San Diego Mira Mesa) has been registered by Certification and Engineering Bureau of Innovation, Science and Economic Development Canada for radio equipment testing with Registration No. 22806-1.

1.9.3 BSMI – Laboratory Code: SL2-IN-E-028R (US0102)

TÜV Product Service Inc. (San Diego) is a recognized EMC testing laboratory by the BSMI under the MRA (Mutual Recognition Arrangement) with the United States. Accreditation includes CNS 13438 up to 6GHz.

1.9.4 NCC (National Communications Commission - US0102)

TÜV SÜD America Inc. (San Diego) is listed as a Foreign Recognized Telecommunication Equipment Testing Laboratory and is accredited to ISO/IEC 17025 (A2LA Certificate No.2955.13) which under APEC TEL MRA Phase 1 was designated as a Conformity Assessment Body competent to perform testing of equipment subject to the Technical Regulations covered under its scope of accreditation including RTTE01, PLMN01 and PLMN08 for TTE type of testing and LP002 for Low-Power RF Device type of testing.

1.9.5 VCCI – Registration No. A-0412 and A-0413

TÜV SÜD America Inc. (San Diego) is a VCCI registered measurement facility which includes radiated field strength measurement, radiated field strength measurement above 1GHz, mains port interference measurement and telecommunication port interference measurement.

1.9.6 RRA – Identification No. US0102

TÜV SÜD America Inc. (San Diego) is National Radio Research Agency (RRA) recognized laboratory under Phase I of the APEC Tel MRA.

1.9.7 OFCA – U.S. Identification No. US0102

TÜV SÜD America Inc. (San Diego) is recognized by Office of the Communications Authority (OFCA) under Appendix B, Phase I of the APEC Tel MRA.

SECTION 2

2 TEST DETAILS

Radio Testing of the
Fortem Technologies, Inc.
R40 Radar

2.1 RF Power Output

2.1.1 Specification Reference

FCC 47 CFR Part 90, Clause 90.205 (r) and (s)

2.1.2 Standard Applicable

(r) All other frequency bands. Requested transmitter power will be considered and authorized on a case by case basis.

(s) The output power shall not exceed by more than 20 percent either the output power shown in the Radio Equipment List [available in accordance with §90.203(a)(1)] for transmitters included in this list or when not so listed, the manufacturer's rated output power for the particular transmitter specifically listed on the authorization.

2.1.3 Equipment Under Test and Modification State

Serial No: X00400007 / Default Test Configuration

2.1.4 Date of Test/Initial of test personnel who performed the test

June 07, 2025 / JS

2.1.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Mira Mesa facility

Ambient Temperature	25.0 °C
Relative Humidity	49.4 %
ATM Pressure	99.0 kPa

2.1.7 Additional Observations

- This is a radiated test utilizing a spectrum analyzer.
- Test guidance is per Section 5.2.7 of ANSI C63.26-2015. The formula (d) was used to convert the measured field strength level to an equivalent power level for reporting:

$$EIRP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8$$

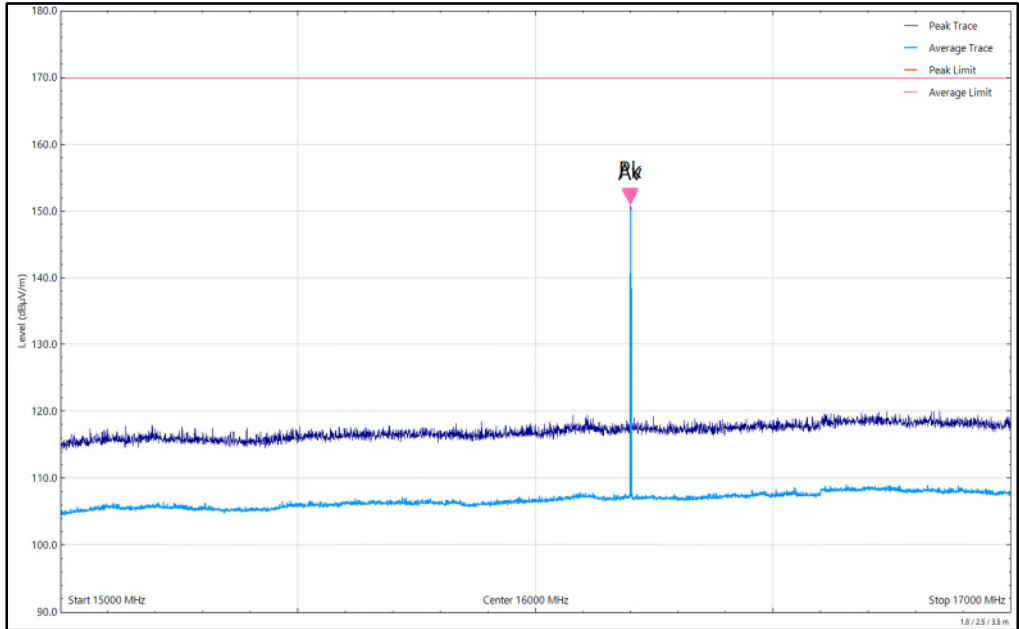
where D is the measurement distance (in the far field region) in meter

- The EUT was switched to CW mode for this test.
- The actual limit for this test is not to exceed by more than 20% of the manufacturer's rated output power. The limit used during verifications will be ignored (greyed out on the test plots presented).

2.1.8 Summary of Test Results

Frequency (MHz)	Peak (dBµV/m @ 3 meters)	Average (dBµV/m @ 3 meters)	Peak EIRP (dBm)	Average EIRP (dBm)
16200.00	150.87	150.64	55.64	55.41
16450.00	149.28	149.03	54.05	53.80
16700.00	149.78	149.52	54.55	54.29
Manufacturer's rated output power = 56.43 dBm EIRP (EUT complies = <20% of rated power)				

2.1.9 Low Channel Test Results



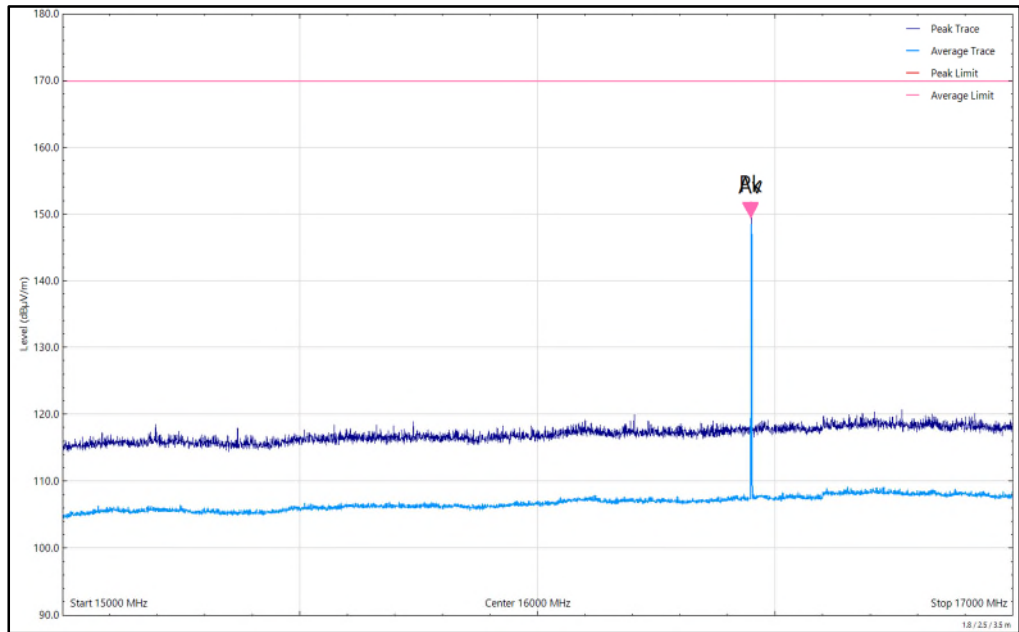
Peak (Field Strength @ 3 meters)

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Pol
16200.025	150.87	170.00	-19.13	Peak	2	205	Horizontal

Average (Field Strength @ 3 meters)

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Pol
16200.025	150.64	170.00	-19.36	Average	2	205	Horizontal

2.1.10 Mid Channel Test Results



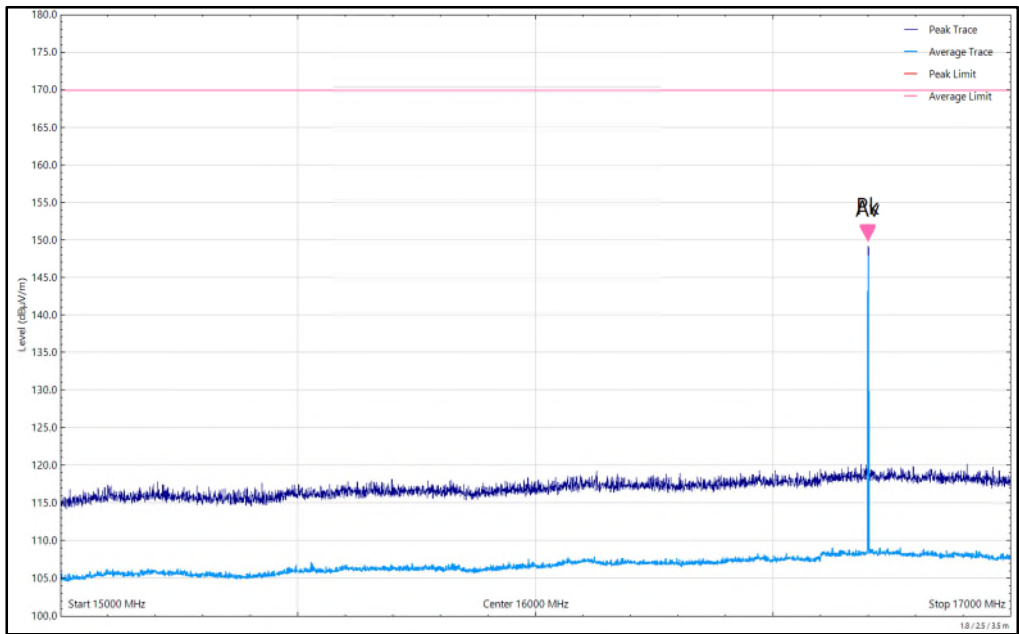
Peak (Field Strength @ 3 meters)

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Pol
16450.010	149.28	170.00	-20.72	Peak	1	182	Horizontal

Average (Field Strength @ 3 meters)

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Pol
16450.010	149.03	170.00	-20.97	Average	1	182	Horizontal

2.1.11 High Channel Test Results



Peak (Field Strength @ 3 meters)

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Pol
16700.000	149.78	170.00	-20.22	Peak	3	182	Horizontal

Average (Field Strength @ 3 meters)

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Pol
16700.000	149.52	170.00	-20.48	Average	3	182	Horizontal

2.2 Unwanted Emissions (Emission Mask)

2.2.1 Specification Reference

FCC 47 CFR Part 90, Clause 90.210 (n)

2.2.2 Standard Applicable

(n) *Other frequency bands.* Transmitters designed for operation under this part on frequencies other than listed in this section must meet the emission mask requirements of Emission Mask B. Equipment operating under this part on frequencies allocated to but shared with the Federal Government, must meet the applicable Federal Government technical standards.

(b) Emission Mask B. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.

(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log (P)$ dB.

2.2.3 Equipment Under Test and Modification State

Serial No: X00400007 / Test Configuration A

2.2.4 Date of Test/Initial of test personnel who performed the test

June 07, 2025 / JS

2.2.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	25.0 °C
Relative Humidity	49.4 %
ATM Pressure	99.0 kPa

2.2.7 Additional Observations

- This is a relative radiated measurement.
- EUT is on full radar swept mode for this test.
- §87.139(a)(3) is covered under Section 2.3 of this test report.
- The emission mask was applied per the manufacturer's recommendations to NTIA Redbook, Section 5.5, using the Group A or Criteria A radars definitions. See the example below.

2.2.8 Channel Emission Masks

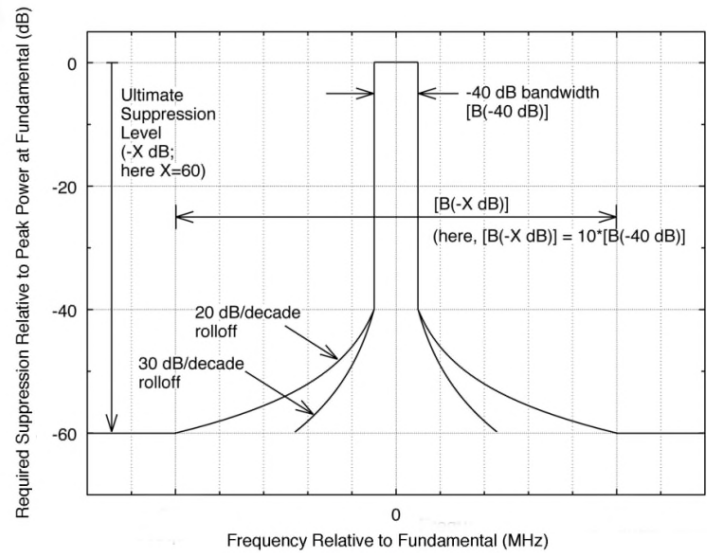
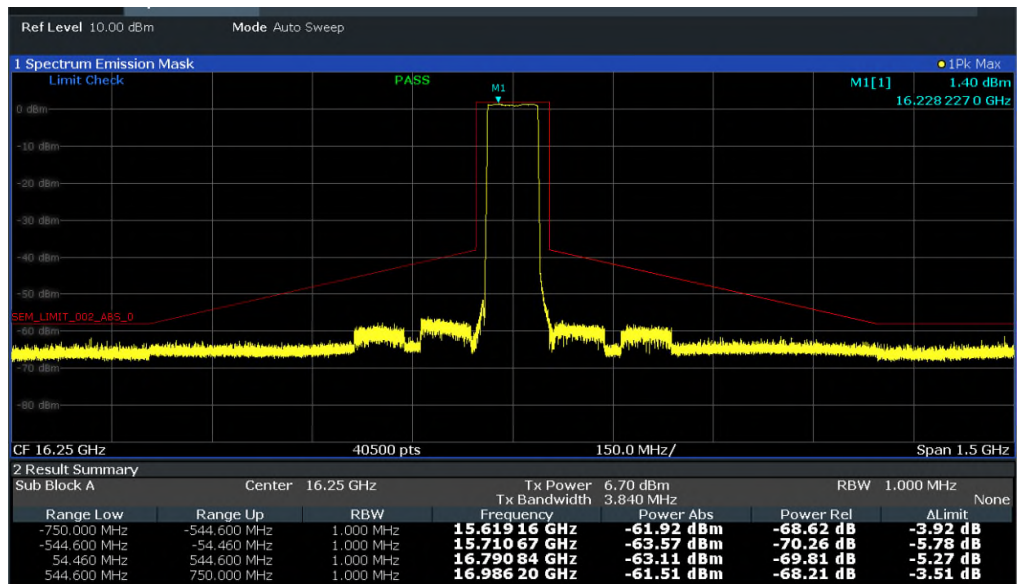
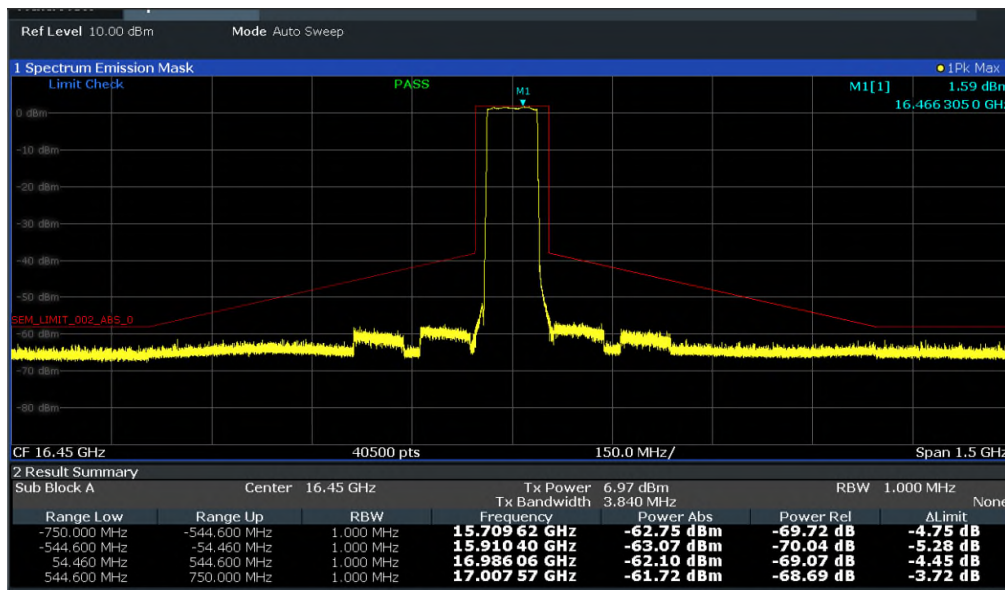


Figure 5.5.3.1a
The RSEC Emission mask.

2.2.9 Test Result Plots



Low Channel



Mid Channel



High Channel

2.3 Field Strength of Radiated Spurious Emissions

2.3.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1053(a) and (b)

2.3.2 Standard Applicable

(a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of §2.1049, as appropriate.

(b) The measurements specified in paragraph (a) of this section shall be made for the following equipment:

- (1) Those in which the spurious emissions are required to be 60 dB or more below the mean power of the transmitter.
- (2) All equipment operating on frequencies higher than 25 MHz.
- (3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.
- (4) Other types of equipment as required, when deemed necessary by the Commission.

FCC 47 CFR Part 90, Clause 90.210 (n)(3)

(n) *Other frequency bands.* Transmitters designed for operation under this part on frequencies other than listed in this section must meet the emission mask requirements of Emission Mask B. Equipment operating under this part on frequencies allocated to but shared with the Federal Government, must meet the applicable Federal Government technical standards.

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log (P)$ dB.

2.3.3 Equipment Under Test and Modification State

Serial No: X00400007 / Default Test Configuration

2.3.4 Date of Test/Initial of test personnel who performed the test

June 05 and 07, 2025 / JS

2.3.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Mira Mesa facility

Ambient Temperature	25.0 – 25.8 °C
Relative Humidity	48.3 - 49.4 %
ATM Pressure	99.0 – 99.9 kPa

2.3.7 Additional Observations

- This is a radiated test. The spectrum was searched from 30MHz to 100GHz.
- Only the worst-case transmit mode presented.
- In-band measurements are covered under Section 2.2 of this test report.
- Measurements below 40GHz were done using EMX automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.3.8 for sample computation.
- Measurement above 40GHz are done using harmonic mixers. Corresponding TDF (Transducer Factor) are programmed for each range.
- Tests distance and frequency ranges performed are summarized below:

Frequency Range	Test Distance
30 MHz to 1GHz	3 meters
1 GHz to 18 GHz	3 meters
18 GHz to 26.5 GHz	3 meters
26 GHz to 40 GHz	3 meters
40 GHz to 60 GHz	3 meters
60 GHz to 75 GHz	1 meter
75 GHz to 100 GHz	1 meter

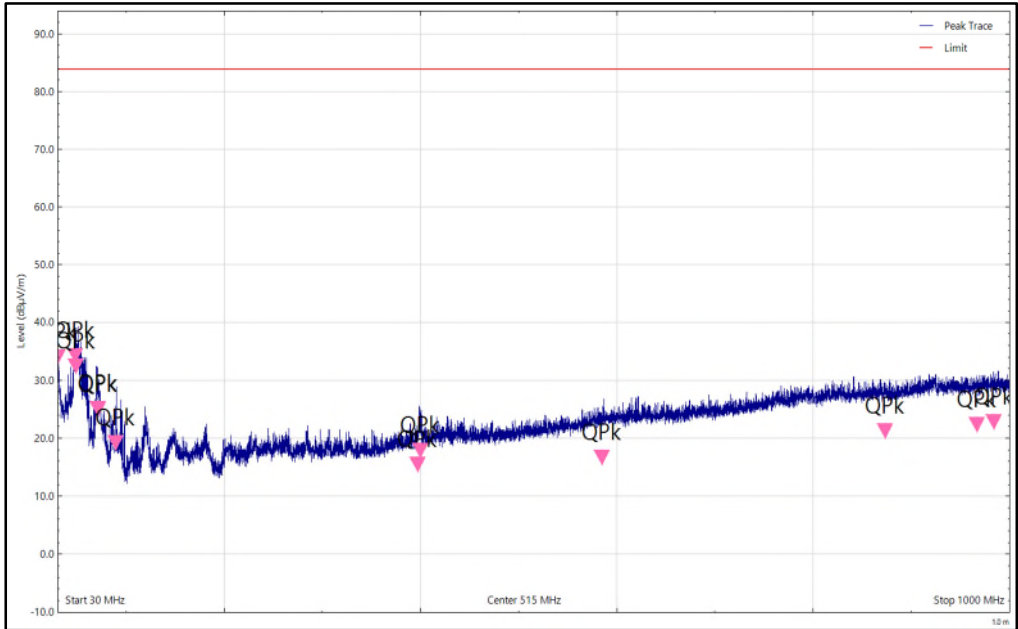
2.3.8 Sample Computation (Radiated Emission)

Measuring equipment raw measurement (dbμV) @ 30 MHz			24.4
Correction Factor (dB)	Asset# 1066 (cable)	0.3	-12.6
	Asset# 1172 (cable)	0.3	
	Asset# 1016 (preamplifier)	-30.7	
	Asset# 1175(cable)	0.3	
	Asset# 1002 (antenna)	17.2	
Reported QuasiPeak Final Measurement (dbμV/m) @ 30MHz			11.8

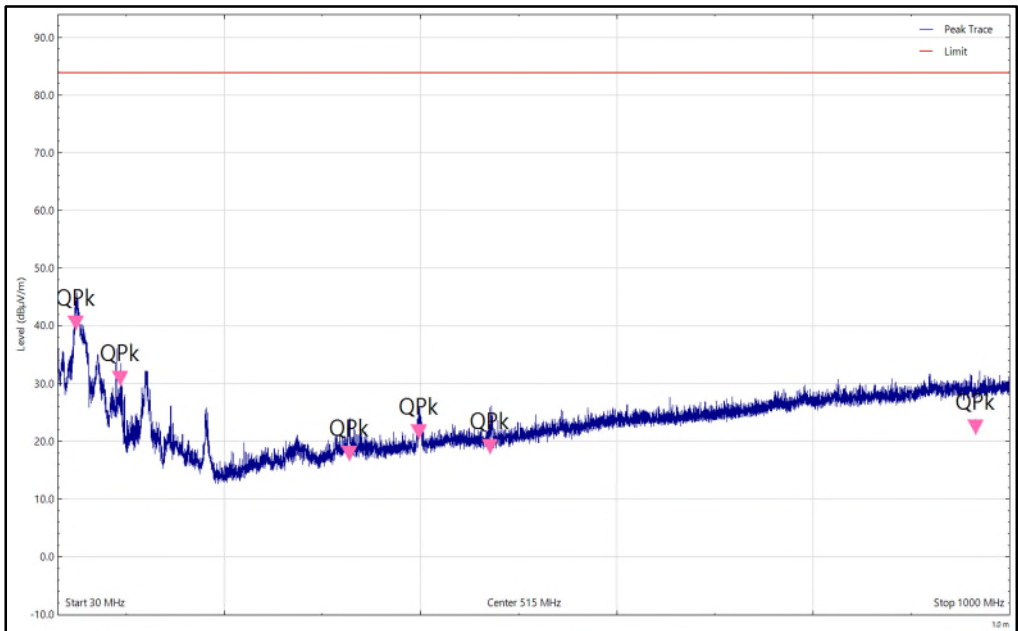
2.3.9 Test Results

Compliant. See attached plots.

2.3.10 Below 1GHz Radiated Emission Test (Worst Case Channel)



30 MHz to 1 GHz, Horizontal

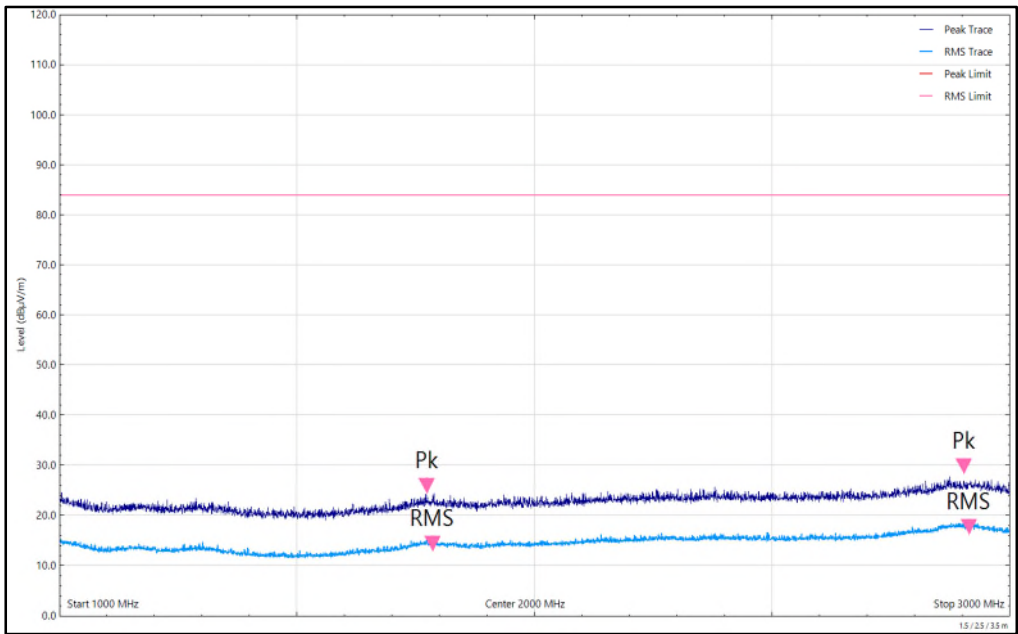


30 MHz to 1 GHz, Vertical

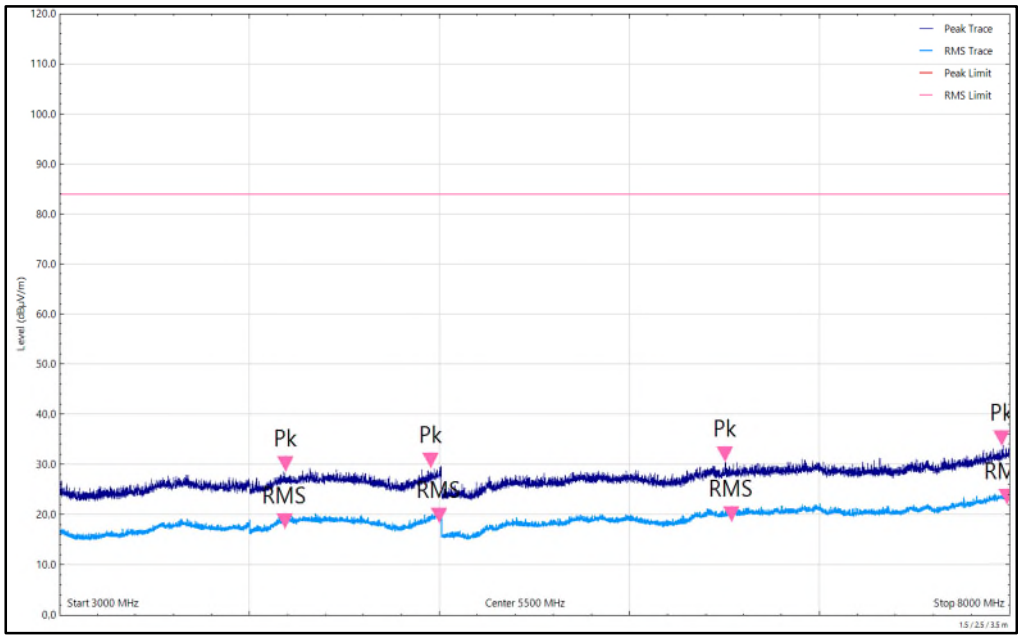
Quasi-Peak Data

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Pol
30.112	32.35	84.00	-51.65	Q-Peak	353	128	Horizontal
48.491	32.57	84.00	-51.43	Q-Peak	52	147	Horizontal
48.607	30.86	66.02	-35.16	Q-Peak	12	132	Horizontal
49.201	38.85	84.00	-45.15	Q-Peak	168	100	Vertical
71.673	23.42	84.00	-60.58	Q-Peak	323	201	Horizontal
71.707	23.54	66.02	-42.48	Q-Peak	181	223	Horizontal
89.485	17.58	66.02	-48.44	Q-Peak	109	132	Horizontal
94.055	29.20	84.00	-54.80	Q-Peak	316	328	Vertical
327.755	16.32	84.00	-67.68	Q-Peak	10	100	Vertical
397.000	13.86	84.00	-70.14	Q-Peak	89	123	Horizontal
398.340	20.02	84.00	-63.98	Q-Peak	230	123	Vertical
399.556	16.30	66.02	-49.72	Q-Peak	36	102	Horizontal
471.013	17.43	84.00	-66.57	Q-Peak	191	117	Vertical
584.855	15.08	84.00	-68.92	Q-Peak	26	309	Horizontal
873.376	19.61	66.02	-46.41	Q-Peak	345	100	Horizontal
965.535	20.79	84.00	-63.21	Q-Peak	162	133	Vertical
967.104	20.77	66.02	-45.25	Q-Peak	175	100	Horizontal
984.455	21.20	84.00	-62.80	Q-Peak	195	100	Horizontal

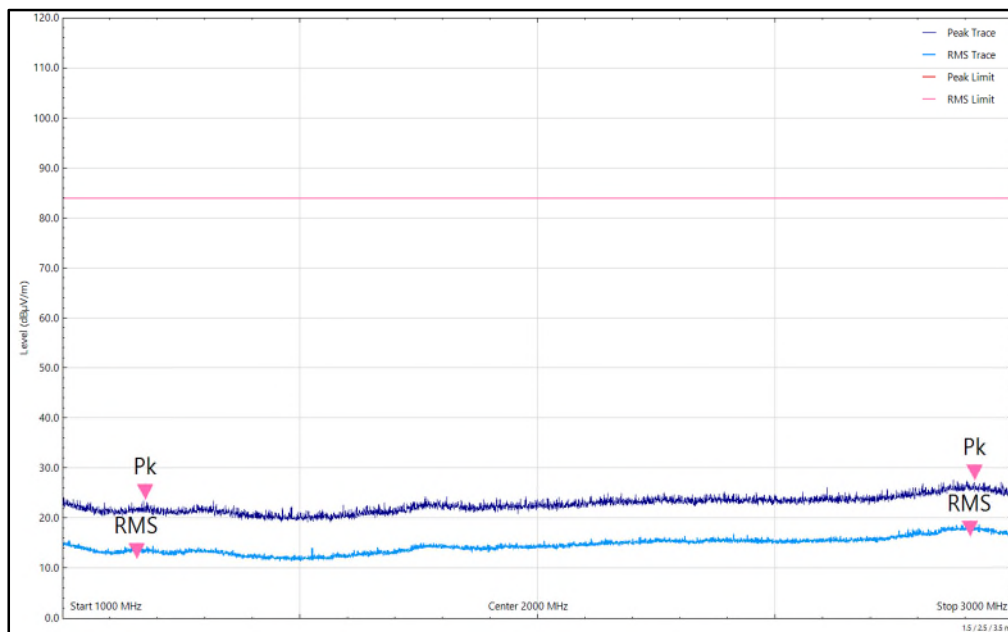
2.3.11 1GHz to 8GHz Radiated Emission Test (Worst Case Channel)



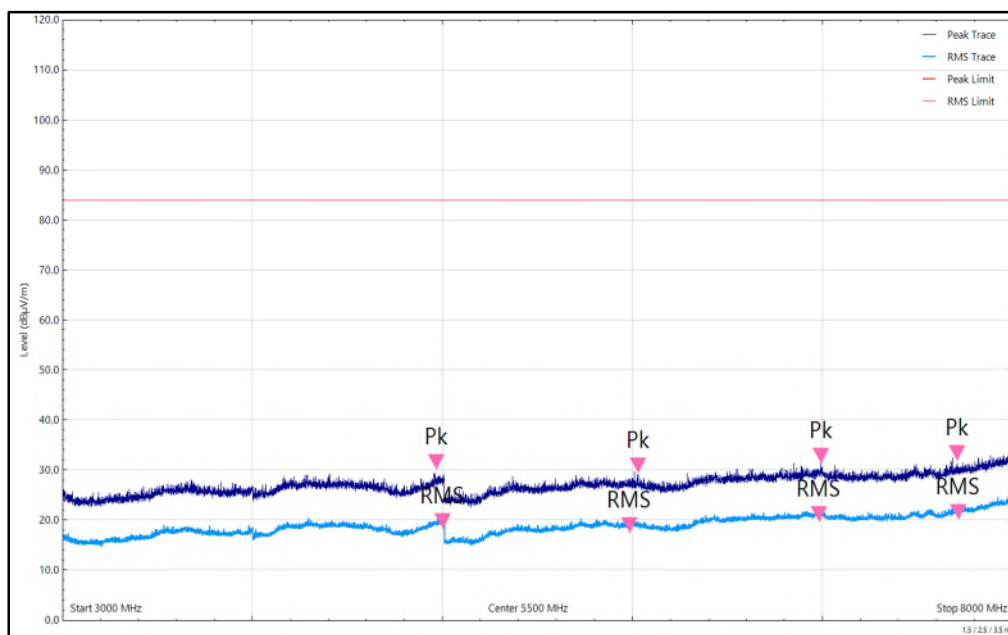
1 GHz to 3 GHz, Horizontal



3 GHz to 8 GHz, Horizontal



1 GHz to 3 GHz, Vertical

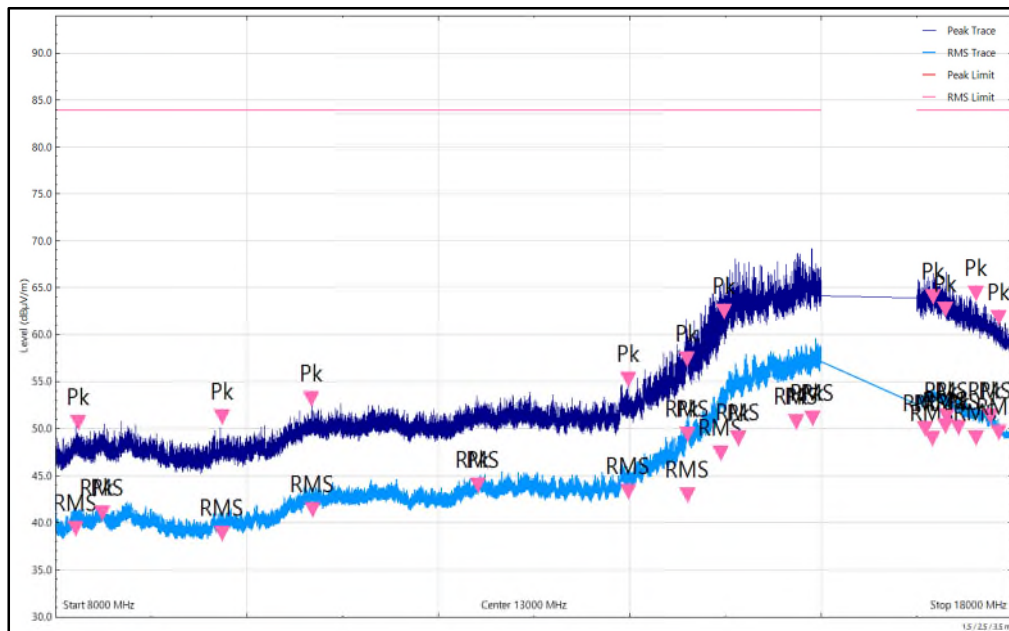


3 GHz to 8 GHz, Vertical

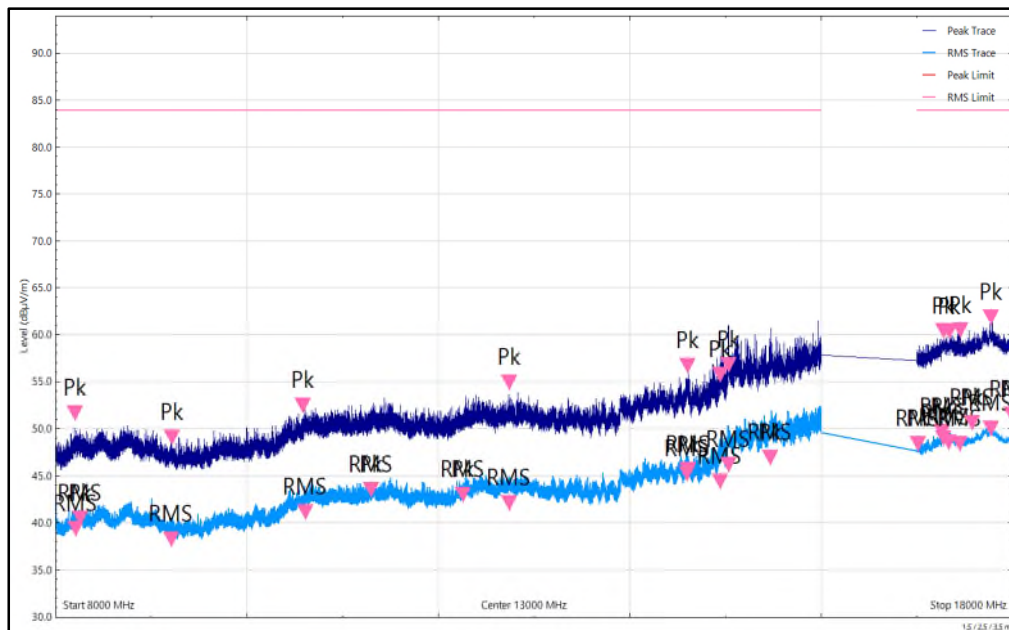
Peak and RMS Data

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
1157.273	11.61	84.00	-72.39	RMS	327	102	Vertical
1174.895	23.41	84.00	-60.59	Peak	327	102	Vertical
1774.024	24.11	84.00	-59.89	Peak	297	102	Horizontal
1785.913	12.50	84.00	-71.50	RMS	297	102	Horizontal
2905.381	27.98	84.00	-56.02	Peak	26	127	Horizontal
2911.262	15.99	84.00	-68.01	RMS	101	141	Vertical
2915.031	15.92	84.00	-68.08	RMS	26	127	Horizontal
2921.122	27.30	84.00	-56.70	Peak	101	141	Vertical
4188.301	16.89	84.00	-67.11	RMS	61	102	Horizontal
4189.769	28.18	84.00	-55.82	Peak	61	102	Horizontal
4953.643	28.96	84.00	-55.04	Peak	343	102	Horizontal
4968.776	29.73	84.00	-54.27	Peak	180	414	Vertical
4999.378	17.91	84.00	-66.09	RMS	343	102	Horizontal
5001.573	17.92	84.00	-66.08	RMS	180	414	Vertical
5986.084	17.17	84.00	-66.83	RMS	324	103	Vertical
6031.888	29.02	84.00	-54.98	Peak	324	103	Vertical
6502.951	30.15	84.00	-53.85	Peak	333	102	Horizontal
6537.636	18.23	84.00	-65.77	RMS	333	102	Horizontal
6984.850	19.41	84.00	-64.59	RMS	323	102	Vertical
6992.542	31.02	84.00	-52.98	Peak	323	102	Vertical
7709.654	31.51	84.00	-52.49	Peak	185	102	Vertical
7717.836	19.76	84.00	-64.24	RMS	185	102	Vertical
7962.021	33.41	84.00	-50.59	Peak	313	103	Horizontal
7987.755	21.73	84.00	-62.27	RMS	313	103	Horizontal

2.3.12 8GHz to 18GHz Radiated Emission Test (Worst Case Channel)



8 GHz to 18 GHz, Horizontal



8 GHz to 18 GHz, Vertical

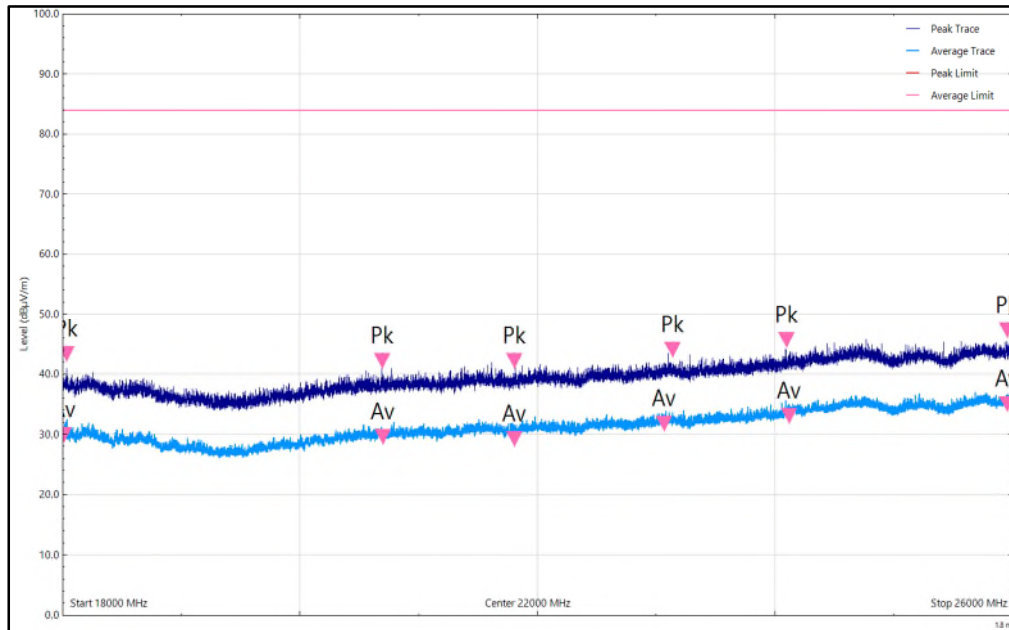
*** Test Note:** Test were performed to the upper and lower edge of the emission mask.
The fundamental in band frequency range was omitted for the purpose of this test.

Peak and RMS Data

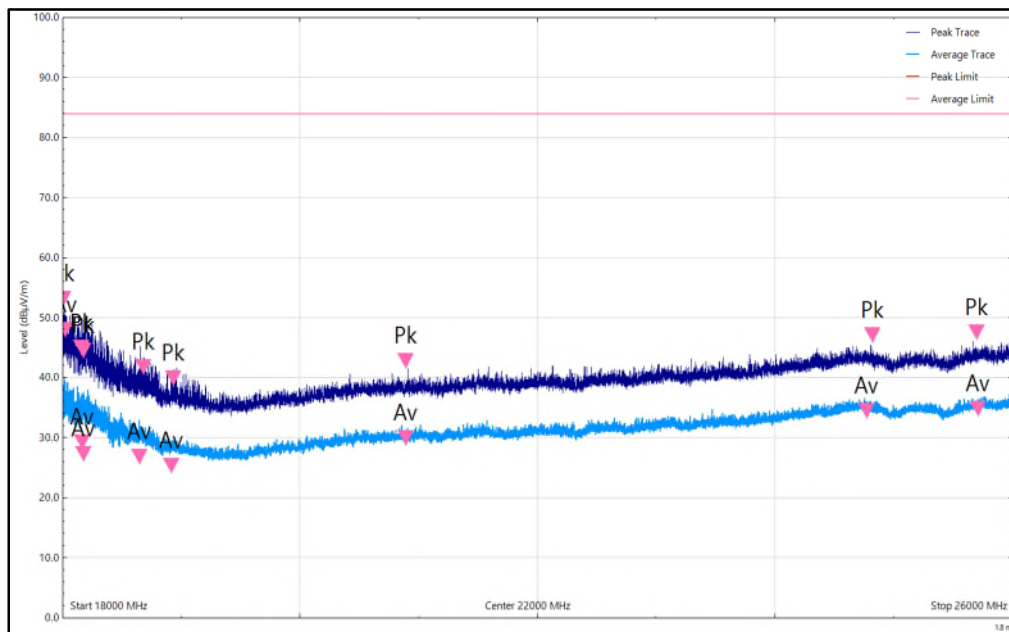
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
8205.920	50.66	84.00	-33.34	Peak	183	102	Vertical
8211.864	38.40	84.00	-45.60	RMS	183	102	Vertical
8216.573	38.37	84.00	-45.63	RMS	126	102	Horizontal
8238.671	49.68	84.00	-34.32	Peak	126	102	Horizontal
8259.110	39.53	84.00	-44.47	Peak	121	176	Vertical
8259.110	39.52	84.00	-44.48	RMS	121	176	Vertical
8493.191	39.99	84.00	-44.01	RMS	238	102	Horizontal
8493.191	39.99	84.00	-44.01	Peak	238	102	Horizontal
9217.570	37.27	84.00	-46.73	RMS	323	102	Vertical
9219.528	48.10	84.00	-35.90	Peak	323	102	Vertical
9742.451	50.20	84.00	-33.80	Peak	221	102	Horizontal
9742.661	37.90	84.00	-46.10	RMS	221	102	Horizontal
10591.448	51.50	84.00	-32.50	Peak	343	102	Vertical
10618.790	40.16	84.00	-43.84	RMS	343	102	Vertical
10677.213	52.14	84.00	-31.86	Peak	327	102	Horizontal
10687.703	40.40	84.00	-43.60	RMS	327	102	Horizontal
11301.001	42.57	84.00	-41.43	Peak	323	214	Vertical
11301.001	42.56	84.00	-41.44	RMS	323	214	Vertical
12259.337	42.00	84.00	-42.00	Peak	314	102	Vertical
12259.337	42.04	84.00	-41.96	RMS	314	102	Vertical
12421.053	42.96	84.00	-41.04	Peak	195	300	Horizontal
12421.053	42.95	84.00	-41.05	RMS	195	300	Horizontal
12742.094	41.16	84.00	-42.84	RMS	333	158	Vertical
12744.892	53.97	84.00	-30.03	Peak	333	158	Vertical
13989.455	54.26	84.00	-29.74	Peak	37	389	Horizontal
13989.804	42.32	84.00	-41.68	RMS	37	389	Horizontal
14599.668	56.38	84.00	-27.62	Peak	345	103	Horizontal
14600.794	44.24	84.00	-39.76	RMS	45	167	Vertical
14605.962	41.96	84.00	-42.04	RMS	345	103	Horizontal
14606.409	48.37	84.00	-35.63	RMS	284	155	Horizontal
14606.409	48.35	84.00	-35.65	Peak	284	155	Horizontal
14607.297	55.73	84.00	-28.27	Peak	45	167	Vertical
14615.829	44.65	84.00	-39.35	RMS	54	103	Vertical
14615.829	44.63	84.00	-39.37	Peak	54	103	Vertical
14949.837	54.72	84.00	-29.28	Peak	60	102	Vertical
14950.481	43.42	84.00	-40.58	RMS	60	102	Vertical
14954.705	46.40	84.00	-37.60	RMS	66	102	Horizontal
14986.977	61.49	84.00	-22.51	Peak	66	102	Horizontal
15035.510	45.17	84.00	-38.83	RMS	61	102	Vertical
15035.510	55.81	84.00	-28.19	Peak	61	102	Vertical
15137.223	47.98	84.00	-36.02	RMS	33	102	Horizontal
15137.223	47.97	84.00	-36.03	Peak	33	102	Horizontal
15475.880	45.92	84.00	-38.08	RMS	44	103	Vertical
15475.880	45.91	84.00	-38.09	Peak	44	103	Vertical
15747.817	49.73	84.00	-34.27	RMS	47	103	Horizontal
15747.817	49.72	84.00	-34.28	Peak	47	103	Horizontal
15911.984	50.10	84.00	-33.90	RMS	306	102	Horizontal
15911.984	50.11	84.00	-33.89	Peak	306	102	Horizontal
17016.928	47.41	84.00	-36.59	RMS	48	102	Vertical
17016.928	47.41	84.00	-36.59	Peak	48	102	Vertical
17093.589	48.95	84.00	-35.05	Peak	343	102	Horizontal
17093.589	48.98	84.00	-35.02	RMS	343	102	Horizontal
17169.431	47.93	84.00	-36.07	RMS	349	102	Horizontal
17173.816	63.00	84.00	-21.00	Peak	349	102	Horizontal
17271.921	48.67	84.00	-35.33	RMS	45	102	Vertical
17271.921	48.68	84.00	-35.32	Peak	45	102	Vertical
17280.400	59.42	84.00	-24.58	Peak	337	400	Vertical
17280.680	48.04	84.00	-35.96	RMS	337	400	Vertical
17301.414	49.24	84.00	-34.76	RMS	333	103	Horizontal
17303.512	61.73	84.00	-22.27	Peak	333	103	Horizontal
17318.351	50.33	84.00	-33.67	RMS	333	143	Horizontal

17318.351	50.31	84.00	-33.69	Peak	333	143	Horizontal
17337.462	47.60	84.00	-36.40	RMS	70	103	Vertical
17344.355	59.36	84.00	-24.64	Peak	70	103	Vertical
17442.107	49.11	84.00	-34.89	Peak	341	103	Horizontal
17442.107	49.09	84.00	-34.91	RMS	341	103	Horizontal
17453.271	47.45	84.00	-36.55	RMS	220	102	Vertical
17458.156	59.45	84.00	-24.55	Peak	220	102	Vertical
17581.182	49.61	84.00	-34.39	Peak	255	102	Vertical
17581.182	49.63	84.00	-34.37	RMS	255	102	Vertical
17622.440	63.41	84.00	-20.59	Peak	334	160	Horizontal
17623.618	48.00	84.00	-36.00	RMS	334	160	Horizontal
17771.909	50.31	84.00	-33.69	Peak	343	103	Horizontal
17771.909	50.32	84.00	-33.68	RMS	343	103	Horizontal
17781.584	49.08	84.00	-34.92	RMS	323	276	Vertical
17782.043	60.91	84.00	-23.09	Peak	323	276	Vertical
17859.254	60.79	84.00	-23.21	Peak	321	102	Horizontal
17863.390	48.58	84.00	-35.42	RMS	321	102	Horizontal
17994.385	50.56	84.00	-33.44	Peak	86	129	Vertical
17994.385	50.54	84.00	-33.46	RMS	86	129	Vertical

2.3.13 18GHz to 26GHz Radiated Emission Test (Low Channel)



18 GHz to 26 GHz, Horizontal

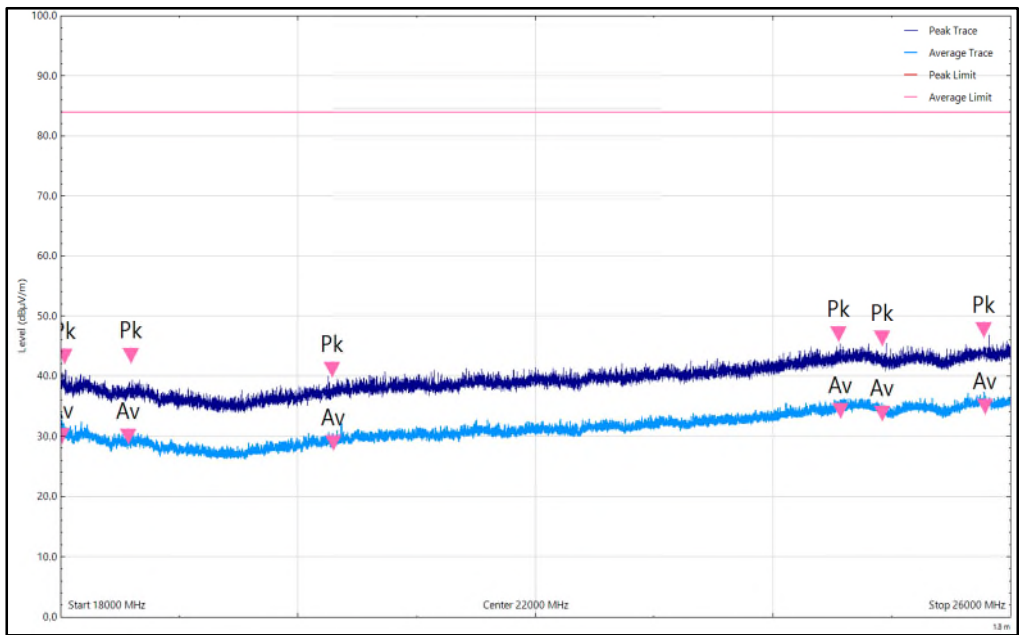


18 GHz to 26 GHz, Vertical

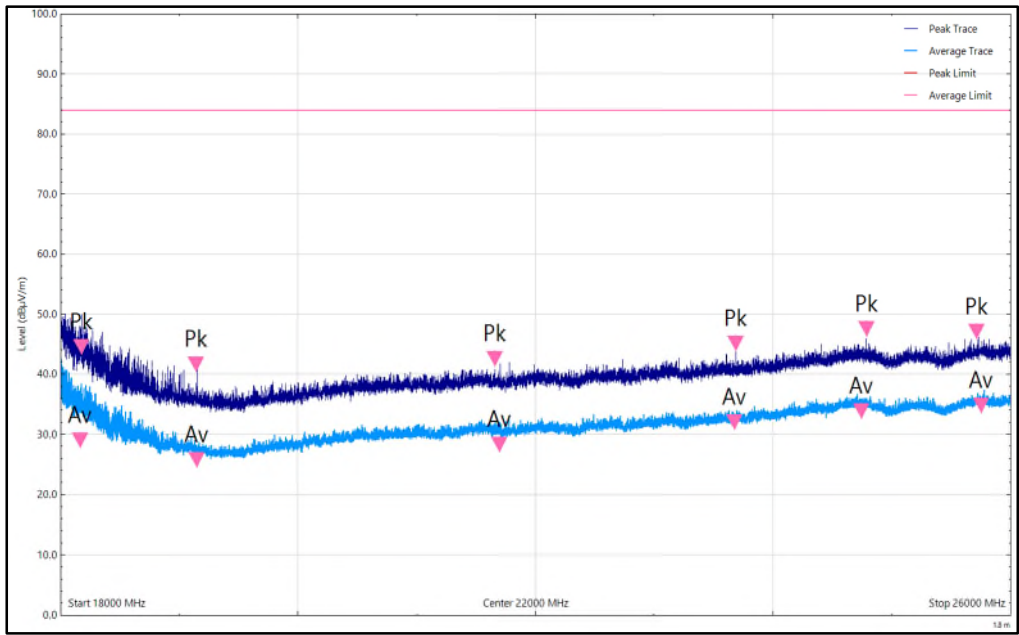
Peak and RMS Data

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
18005.616	51.57	82.23	-30.66	Peak	9	100	Vertical
18011.607	28.33	84.00	-55.67	Average	46	160	Horizontal
18023.904	46.36	82.23	-35.87	Average	9	100	Vertical
18036.893	41.81	84.00	-42.19	Peak	46	160	Horizontal
18161.308	43.45	84.00	-40.55	Peak	331	102	Vertical
18168.581	27.65	84.00	-56.35	Average	331	102	Vertical
18175.863	42.91	82.23	-39.32	Peak	340	102	Vertical
18180.499	25.74	82.23	-56.49	Average	340	102	Vertical
18648.045	25.23	84.00	-58.77	Average	341	102	Vertical
18683.609	40.12	84.00	-43.88	Peak	341	102	Vertical
18917.339	23.79	84.00	-60.21	Average	8	103	Vertical
18934.922	38.37	84.00	-45.63	Peak	8	103	Vertical
20696.836	40.63	84.00	-43.37	Peak	322	102	Horizontal
20700.353	27.99	84.00	-56.01	Average	322	102	Horizontal
20891.953	28.39	84.00	-55.61	Average	109	102	Vertical
20893.551	41.27	84.00	-42.73	Peak	109	102	Vertical
21806.602	27.66	84.00	-56.34	Average	333	163	Horizontal
21807.881	40.66	84.00	-43.34	Peak	333	163	Horizontal
23068.493	30.21	84.00	-53.79	Average	272	102	Horizontal
23140.501	42.48	84.00	-41.52	Peak	272	102	Horizontal
24098.830	44.16	84.00	-39.84	Peak	211	102	Horizontal
24124.165	31.52	84.00	-52.48	Average	211	102	Horizontal
24775.130	32.91	84.00	-51.09	Average	123	111	Vertical
24823.162	45.52	84.00	-38.48	Peak	123	111	Vertical
25700.966	45.97	84.00	-38.03	Peak	92	103	Vertical
25712.074	33.29	84.00	-50.71	Average	92	103	Vertical
25957.292	33.43	84.00	-50.57	Average	282	102	Horizontal
25957.372	45.76	84.00	-38.24	Peak	282	102	Horizontal

2.3.14 18GHz to 26GHz Radiated Emission Test (Mid Channel)



18 GHz to 26 GHz, Horizontal

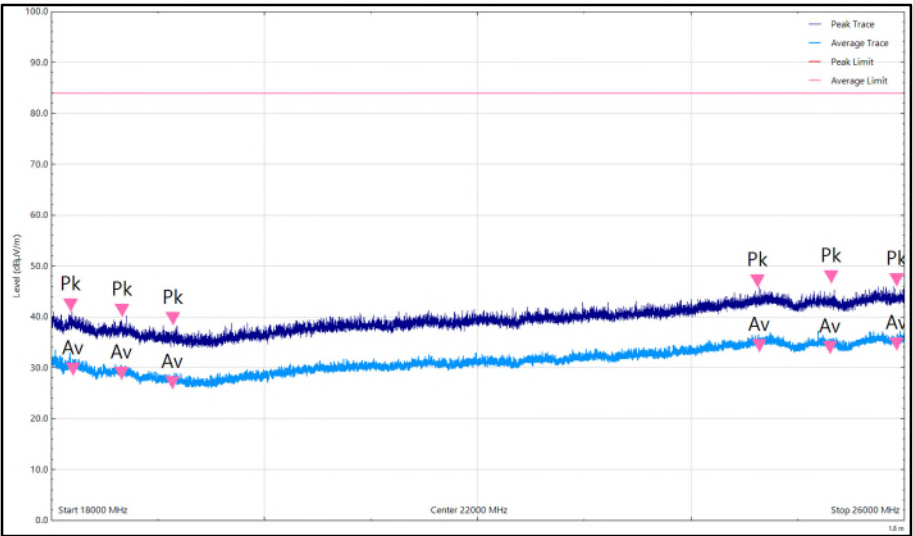


18 GHz to 26 GHz, Vertical

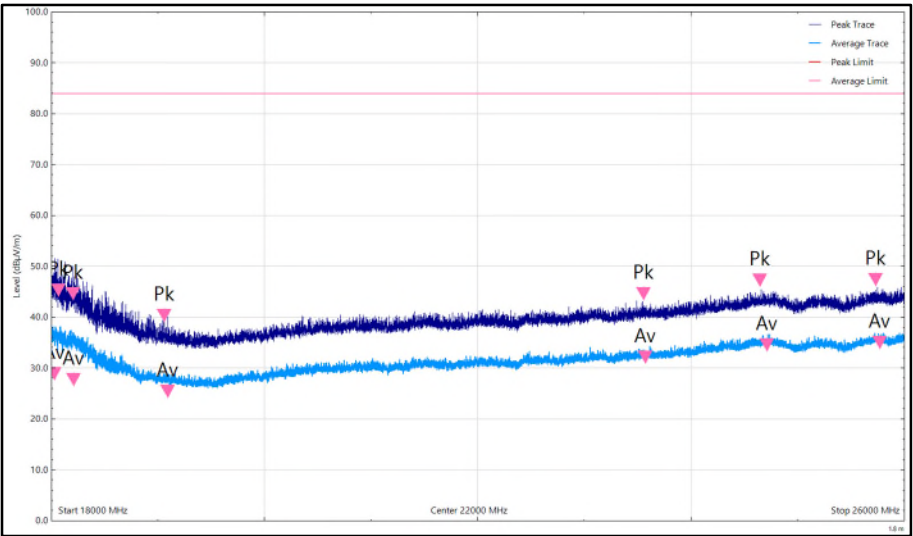
Peak and RMS Data

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
18014.192	28.50	84.00	-55.50	Average	333	102	Horizontal
18033.325	41.69	84.00	-42.31	Peak	333	102	Horizontal
18169.666	27.44	84.00	-56.56	Average	333	102	Vertical
18176.219	42.93	84.00	-41.07	Peak	333	102	Vertical
18570.832	28.40	84.00	-55.60	Average	325	162	Horizontal
18594.328	41.78	84.00	-42.22	Peak	325	162	Horizontal
19144.289	40.02	84.00	-43.98	Peak	349	158	Vertical
19149.484	24.19	84.00	-59.81	Average	349	158	Vertical
20291.413	39.44	84.00	-44.56	Peak	342	102	Horizontal
20301.163	27.33	84.00	-56.67	Average	342	102	Horizontal
21660.718	40.96	84.00	-43.04	Peak	340	146	Vertical
21699.320	26.71	84.00	-57.29	Average	340	146	Vertical
23675.229	30.48	84.00	-53.52	Average	323	103	Vertical
23690.814	43.55	84.00	-40.45	Peak	323	103	Vertical
24554.670	45.34	84.00	-38.66	Peak	31	103	Horizontal
24571.373	32.68	84.00	-51.32	Average	31	103	Horizontal
24749.712	32.29	84.00	-51.71	Average	345	102	Vertical
24791.431	45.94	84.00	-38.06	Peak	345	102	Vertical
24922.130	44.64	84.00	-39.36	Peak	33	111	Horizontal
24922.930	32.16	84.00	-51.84	Average	33	111	Horizontal
25715.344	45.54	84.00	-38.46	Peak	38	102	Vertical
25757.782	33.25	84.00	-50.75	Average	38	102	Vertical
25779.860	46.12	84.00	-37.88	Peak	37	102	Horizontal
25787.612	33.30	84.00	-50.70	Average	37	102	Horizontal

2.3.15 18GHz to 26GHz Radiated Emission Test (High Channel)



18 GHz to 26 GHz, Horizontal

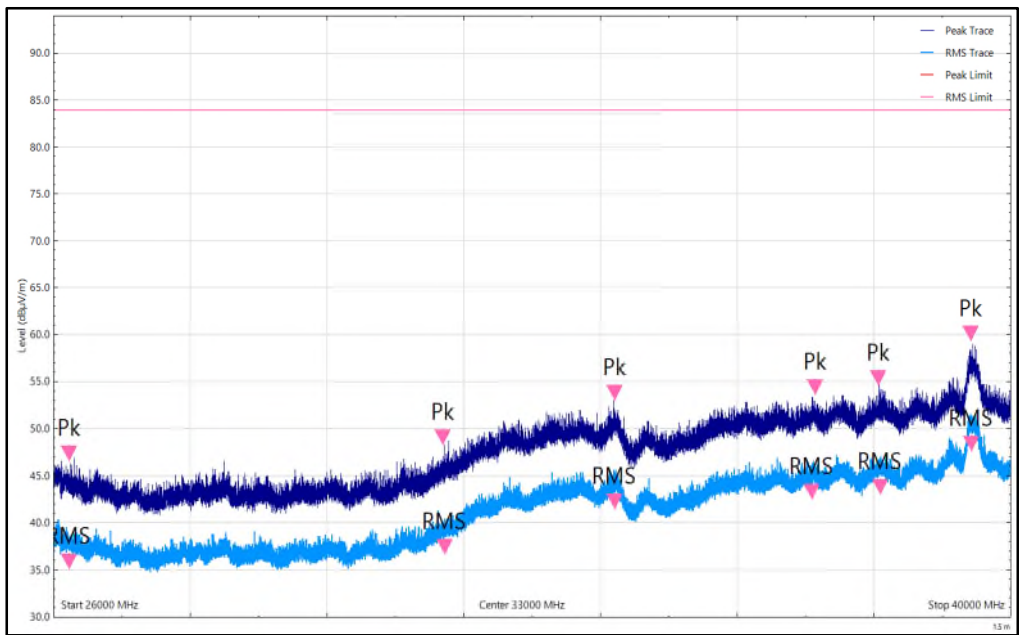


18 GHz to 26 GHz, Vertical

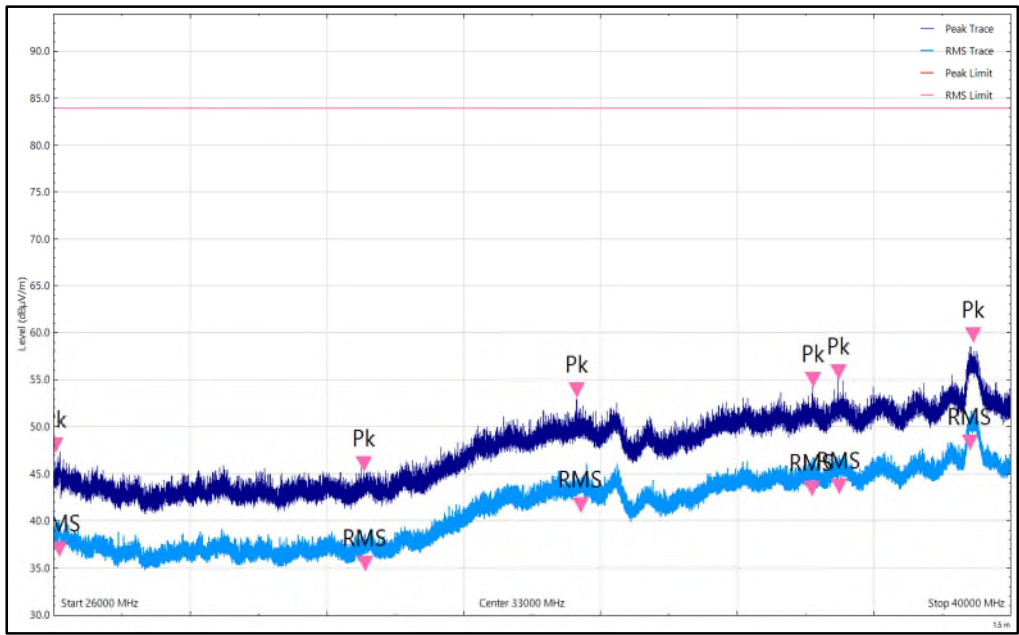
Peak and RMS Data

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
18027.815	27.30	84.00	-56.70	Average	333	103	Vertical
18065.857	43.76	84.00	-40.24	Peak	333	103	Vertical
18185.041	40.74	84.00	-43.26	Peak	27	103	Horizontal
18203.600	43.05	84.00	-40.95	Peak	340	102	Vertical
18204.062	28.17	84.00	-55.83	Average	27	103	Horizontal
18212.312	26.19	84.00	-57.81	Average	340	102	Vertical
18660.780	27.29	84.00	-56.71	Average	178	102	Horizontal
18664.776	39.69	84.00	-44.31	Peak	178	102	Horizontal
19063.572	38.82	84.00	-45.18	Peak	359	102	Vertical
19091.384	23.88	84.00	-60.12	Average	359	102	Vertical
19139.497	25.53	84.00	-58.47	Average	64	102	Horizontal
19142.614	38.06	84.00	-45.94	Peak	64	102	Horizontal
23556.302	43.12	84.00	-40.88	Peak	262	125	Vertical
23575.642	30.54	84.00	-53.46	Average	262	125	Vertical
24623.735	45.45	84.00	-38.55	Peak	307	153	Horizontal
24640.998	32.81	84.00	-51.19	Average	307	153	Horizontal
24650.309	45.76	84.00	-38.24	Peak	81	108	Vertical
24715.763	32.98	84.00	-51.02	Average	81	108	Vertical
25305.815	32.45	84.00	-51.55	Average	263	103	Horizontal
25316.284	46.31	84.00	-37.69	Peak	263	103	Horizontal
25733.867	45.85	84.00	-38.15	Peak	83	102	Vertical
25770.870	33.50	84.00	-50.50	Average	83	102	Vertical
25933.983	33.15	84.00	-50.85	Average	131	102	Horizontal
25934.142	45.73	84.00	-38.27	Peak	131	102	Horizontal

2.3.16 26GHz to 40GHz Radiated Emission Test (Low Channel)



26 GHz to 40GHz, Horizontal

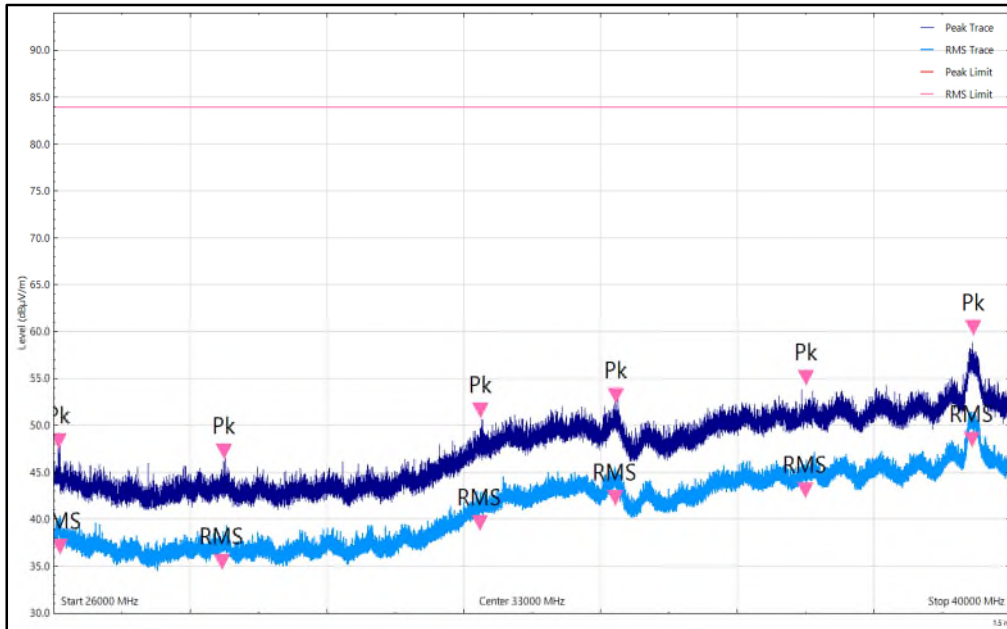


26 GHz to 40GHz, Vertical

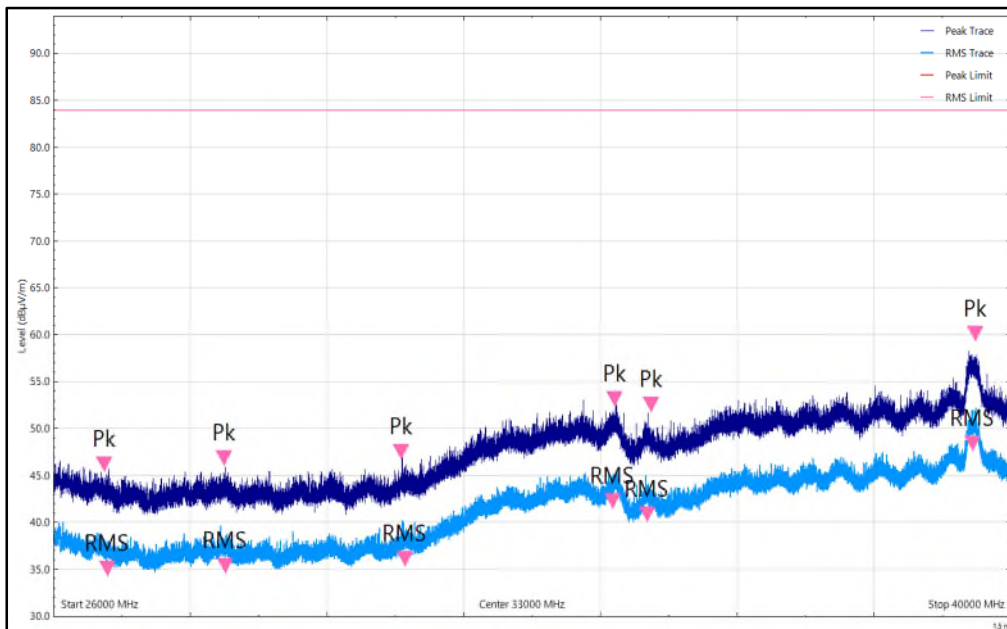
Peak and RMS Data

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
26083.770	47.47	82.00	-34.53	Peak	39	396	Vertical
26092.740	47.13	82.00	-34.87	Peak	235	370	Horizontal
26097.340	36.04	82.00	-45.96	RMS	39	396	Vertical
26098.480	36.07	82.00	-45.93	RMS	235	370	Horizontal
32619.640	39.61	82.00	-42.39	RMS	71	370	Horizontal
32635.890	39.66	82.00	-42.34	RMS	333	388	Vertical
32658.380	50.79	82.00	-31.21	Peak	71	370	Horizontal
32676.590	51.09	82.00	-30.91	Peak	333	388	Vertical
33209.260	51.50	82.00	-30.50	Peak	325	102	Horizontal
33233.030	40.16	82.00	-41.84	RMS	325	102	Horizontal
33702.240	40.76	82.00	-41.24	RMS	355	414	Vertical
33725.600	52.12	82.00	-29.88	Peak	355	414	Vertical
34203.280	41.27	82.00	-40.73	RMS	333	102	Horizontal
34250.980	53.14	82.00	-28.86	Peak	333	102	Horizontal
37597.350	42.31	82.00	-39.69	RMS	11	344	Vertical
37623.920	53.75	82.00	-28.25	Peak	11	344	Vertical
38093.780	54.46	82.00	-27.54	Peak	323	188	Horizontal
38111.270	54.74	82.00	-27.26	Peak	343	361	Vertical
38117.980	42.85	82.00	-39.15	RMS	323	188	Horizontal
38123.290	42.82	82.00	-39.18	RMS	343	361	Vertical
39422.460	47.45	82.00	-34.55	RMS	108	102	Vertical
39430.790	47.43	82.00	-34.57	RMS	185	157	Horizontal
39436.390	59.40	82.00	-22.60	Peak	185	157	Horizontal
39483.020	58.68	82.00	-23.32	Peak	108	102	Vertical

2.3.17 26GHz to 40GHz Radiated Emission Test (Mid Channel)



26 GHz to 40GHz, Horizontal

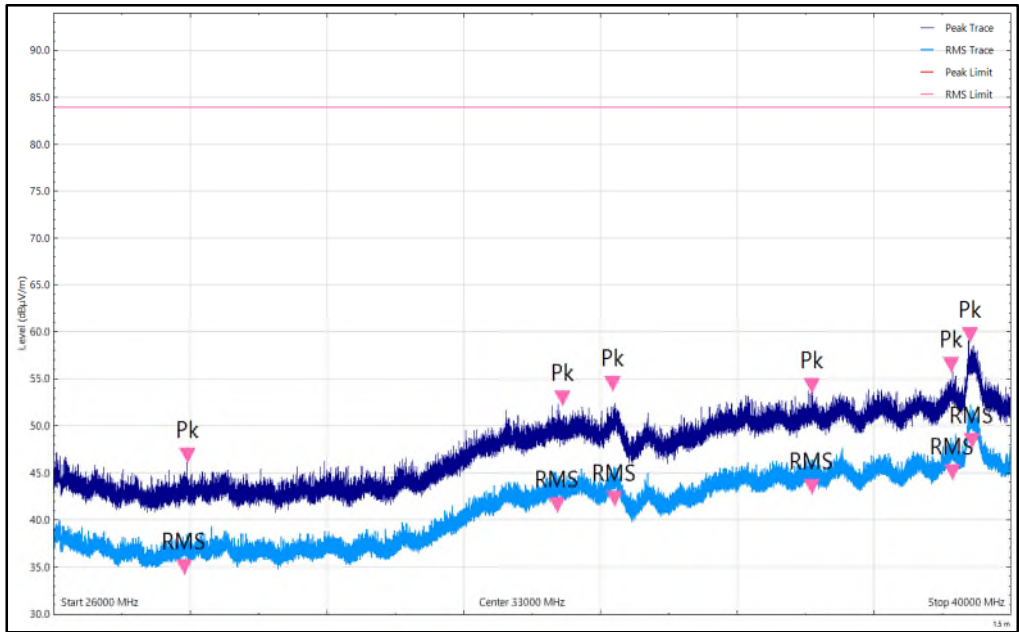


26 GHz to 40GHz, Vertical

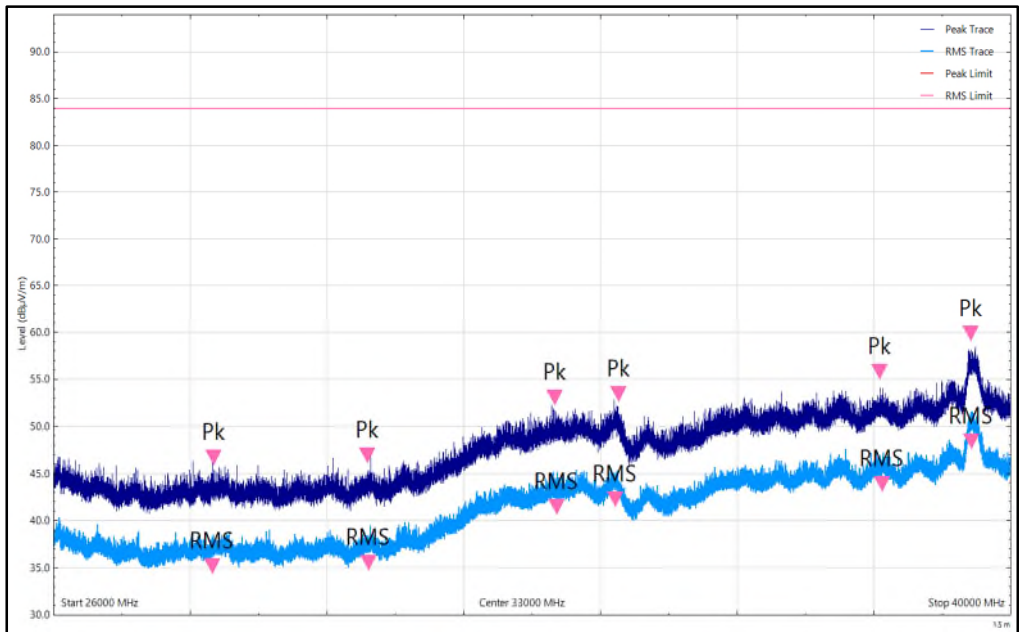
Peak and RMS Data

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
26076.530	47.37	84.00	-36.63	Peak	333	107	Horizontal
26099.890	36.13	84.00	-47.87	RMS	333	107	Horizontal
26744.180	45.24	84.00	-38.76	Peak	346	344	Vertical
26796.770	34.14	84.00	-49.86	RMS	346	344	Vertical
28468.320	34.44	84.00	-49.56	RMS	323	103	Horizontal
28502.210	45.90	84.00	-38.10	Peak	343	404	Vertical
28503.570	46.23	84.00	-37.77	Peak	323	103	Horizontal
28514.800	34.40	84.00	-49.60	RMS	343	404	Vertical
31087.550	46.56	84.00	-37.44	Peak	125	102	Vertical
31147.830	35.16	84.00	-48.84	RMS	125	102	Vertical
32240.930	38.60	84.00	-45.40	RMS	323	260	Horizontal
32248.760	50.63	84.00	-33.37	Peak	323	260	Horizontal
34189.720	41.32	84.00	-42.68	RMS	332	104	Vertical
34211.260	52.19	84.00	-31.81	Peak	332	104	Vertical
34220.510	41.28	84.00	-42.72	RMS	160	102	Horizontal
34229.880	52.17	84.00	-31.83	Peak	160	102	Horizontal
34690.050	39.87	84.00	-44.13	RMS	323	175	Vertical
34744.590	51.60	84.00	-32.40	Peak	323	175	Vertical
37005.720	42.09	84.00	-41.91	RMS	351	102	Horizontal
37010.760	54.11	84.00	-29.89	Peak	351	102	Horizontal
39443.020	47.49	84.00	-36.51	RMS	151	310	Horizontal
39454.550	47.40	84.00	-36.60	RMS	237	111	Vertical
39463.720	59.41	84.00	-24.59	Peak	151	310	Horizontal
39492.730	59.10	84.00	-24.90	Peak	237	111	Vertical

2.3.18 26GHz to 40GHz Radiated Emission Test (High Channel)



26 GHz to 40GHz, Horizontal

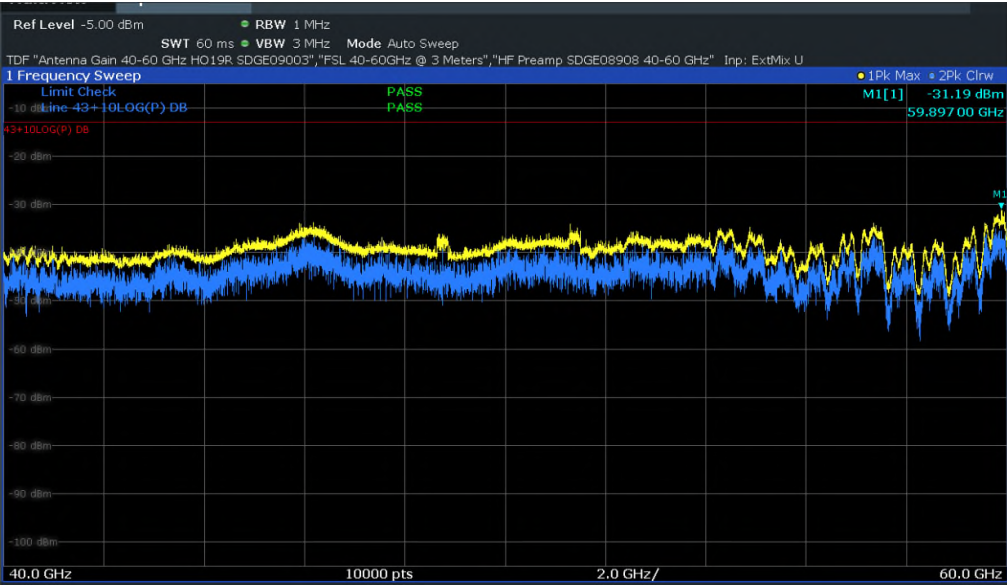


26 GHz to 40GHz, Vertical

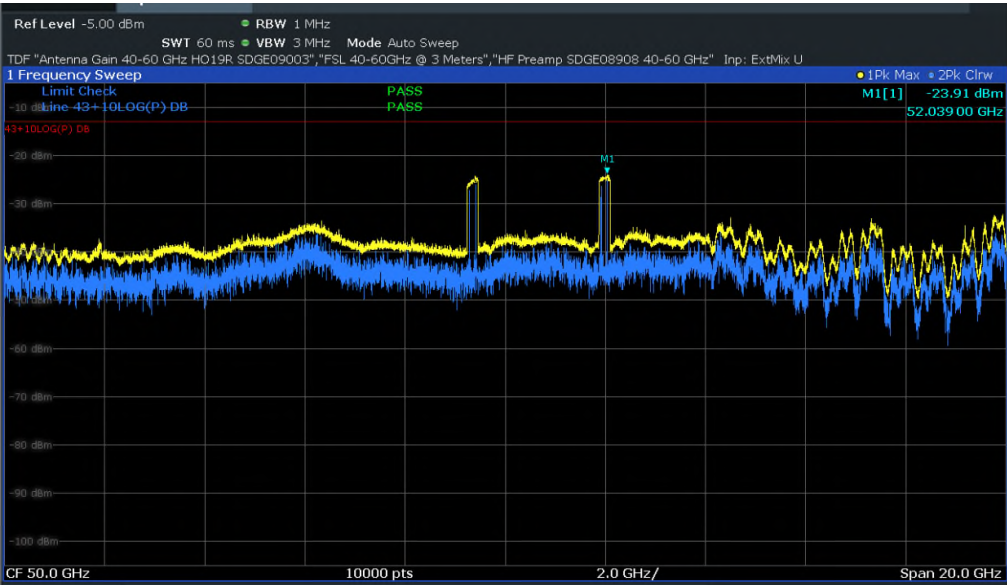
Peak and RMS

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
27917.800	34.01	84.00	-49.99	RMS	323	357	Horizontal
27962.970	45.89	84.00	-38.11	Peak	323	357	Horizontal
28332.030	34.16	84.00	-49.84	RMS	153	210	Vertical
28347.970	45.75	84.00	-38.25	Peak	153	210	Vertical
30592.540	45.95	84.00	-38.05	Peak	339	294	Vertical
30612.540	34.55	84.00	-49.45	RMS	339	294	Vertical
33335.470	52.09	84.00	-31.91	Peak	321	102	Vertical
33371.280	40.49	84.00	-43.51	RMS	321	102	Vertical
33380.440	40.59	84.00	-43.41	RMS	323	404	Horizontal
33453.170	51.94	84.00	-32.06	Peak	323	404	Horizontal
34184.030	53.46	84.00	-30.54	Peak	320	102	Horizontal
34211.450	41.30	84.00	-42.70	RMS	320	102	Horizontal
34226.350	41.27	84.00	-42.73	RMS	323	224	Vertical
34267.050	52.46	84.00	-31.54	Peak	323	224	Vertical
37102.220	42.51	84.00	-41.49	RMS	278	404	Horizontal
37104.600	53.26	84.00	-30.74	Peak	278	404	Horizontal
38089.760	54.82	84.00	-29.18	Peak	133	102	Vertical
38123.890	42.90	84.00	-41.10	RMS	133	102	Vertical
39137.560	55.48	84.00	-28.52	Peak	353	246	Horizontal
39158.400	44.09	84.00	-39.91	RMS	353	246	Horizontal
39418.870	58.70	84.00	-25.30	Peak	339	167	Horizontal
39425.720	58.91	84.00	-25.09	Peak	331	298	Vertical
39431.170	47.45	84.00	-36.55	RMS	331	298	Vertical
39443.060	47.40	84.00	-36.60	RMS	339	167	Horizontal

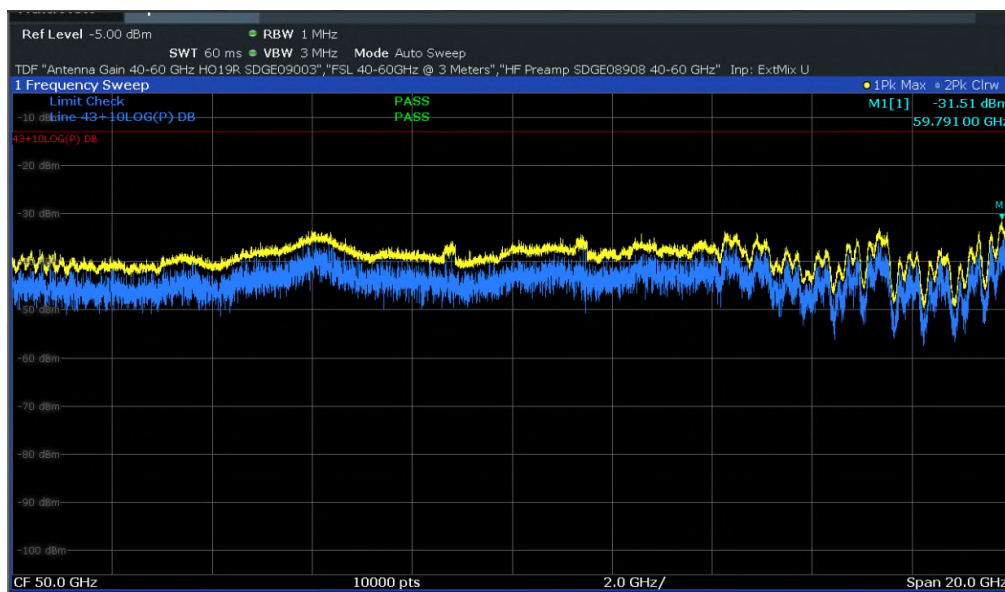
2.3.19 40GHz to 100GHz Radiated Emission Maximized Plots



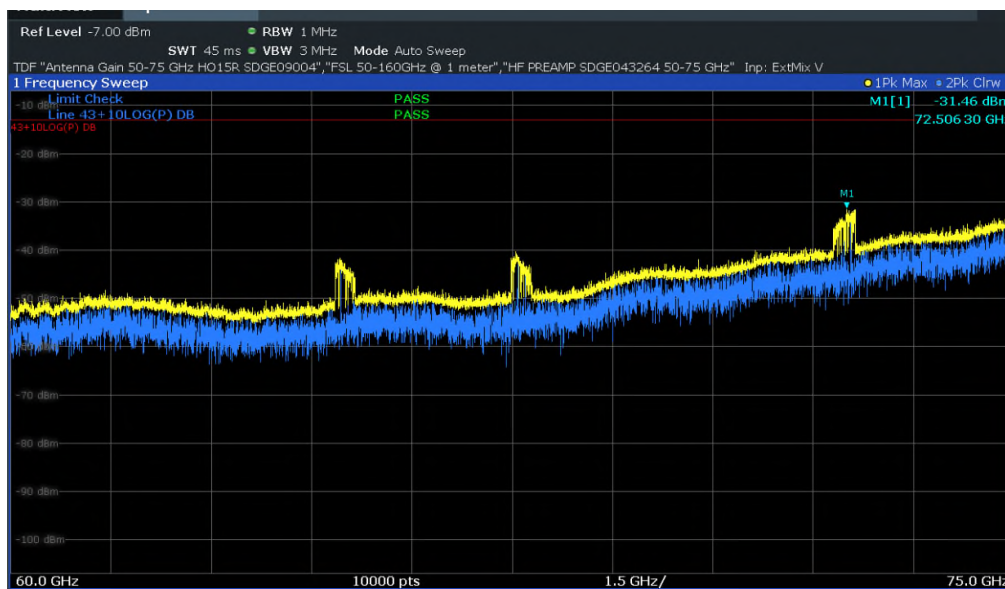
40GHz to 60GHz Plot (Low Channel)



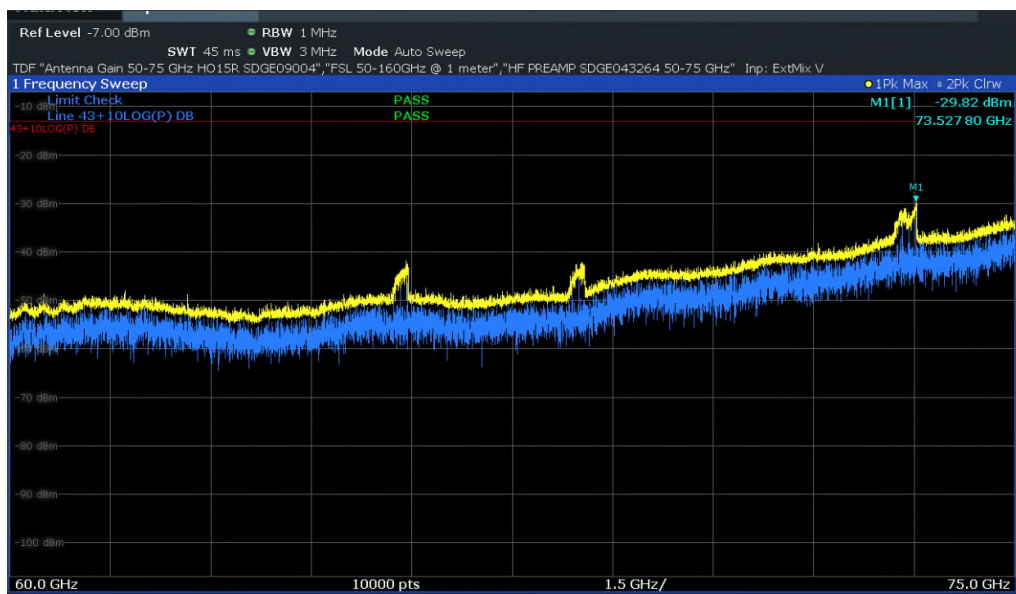
40GHz to 60GHz Plot (Middle Channel)



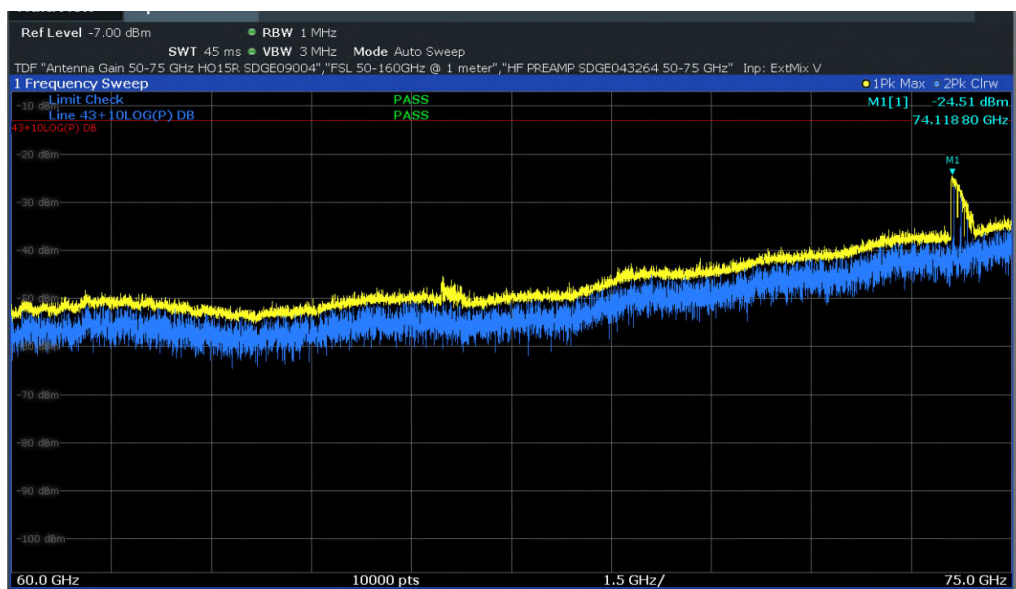
40GHz to 60GHz Plot (High Channel)



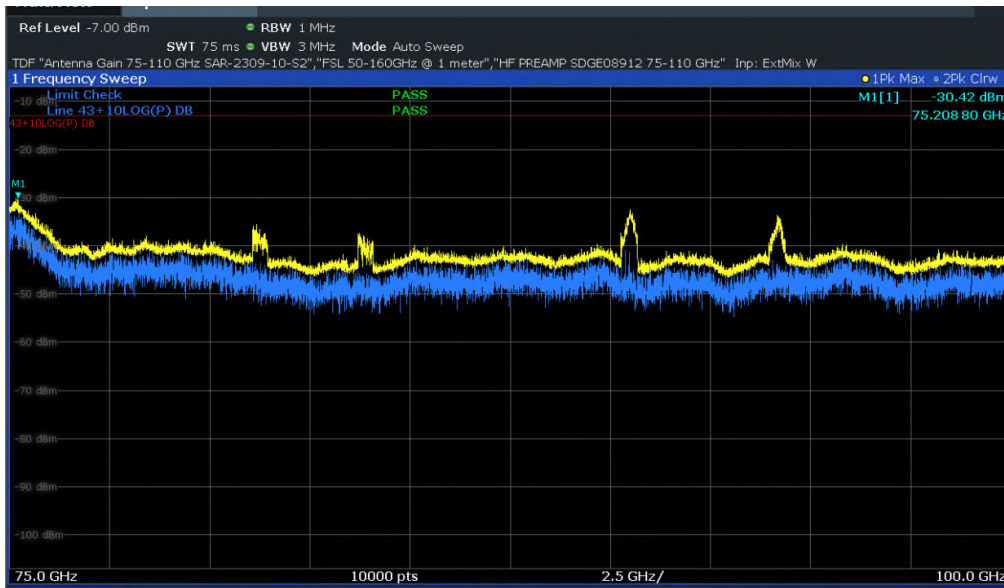
60GHz to 75GHz Plot (Low Channel)



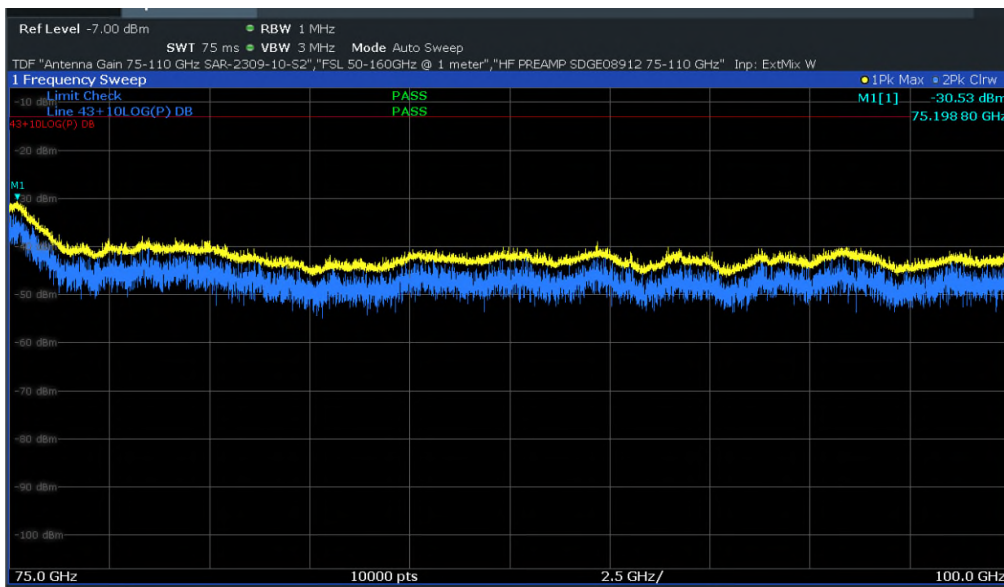
60GHz to 75GHz Plot (Middle Channel)



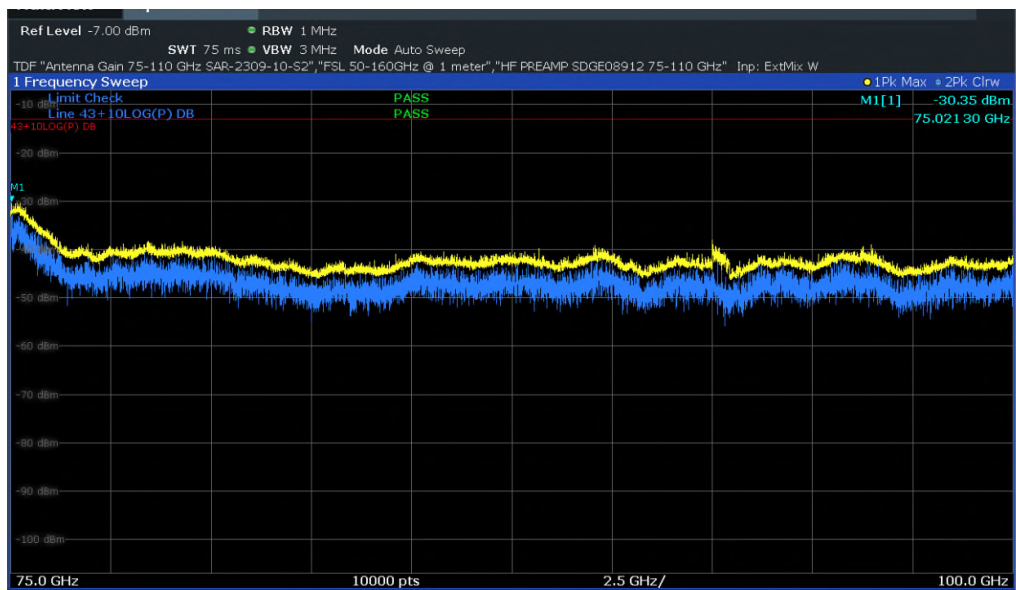
60GHz to 75GHz Plot (High Channel)



75GHz to 100GHz Plot (Low Channel)



75GHz to 100GHz Plot (Middle Channel)



75GHz to 100GHz Plot (High Channel)

2.4 Occupied Bandwidth

2.4.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1049

2.4.2 Standard Applicable

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

2.4.3 Equipment Under Test and Modification State

Serial No: X00400007 / Default Test Configuration

2.4.4 Date of Test/Initial of test personnel who performed the test

June 02, 2025 / JS

2.4.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Mira Mesa facility

Ambient Temperature	25.4 °C
Relative Humidity	44.7 %
ATM Pressure	99.6 kPa

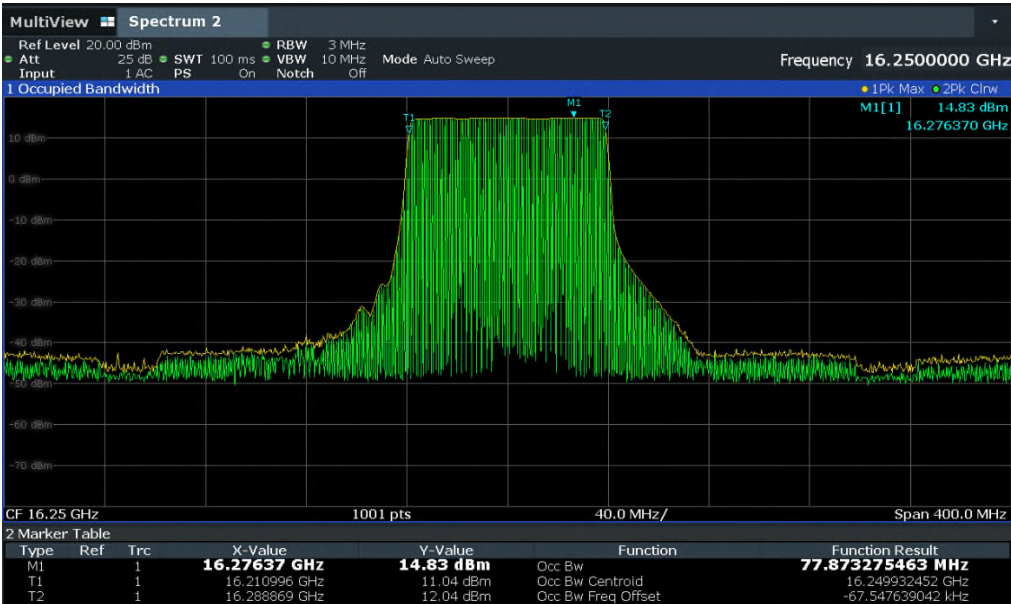
2.4.7 Additional Observations

- This is a radiated test.
- This is a radiated test utilizing a spectrum analyser.
- The attenuation for the external attenuator, adapter and cable is measured and entered as a Transducer factor (TDF).
- Occupied bandwidth measurement function of the spectrum analyser was utilized for this test.
- Span is wide enough to capture the channel transmission.
- RBW is 1% to 5% of the occupied bandwidth.
- VBW is >3 X RBW.
- Sweep is auto.
- Detector is peak.
- Trace is max hold.

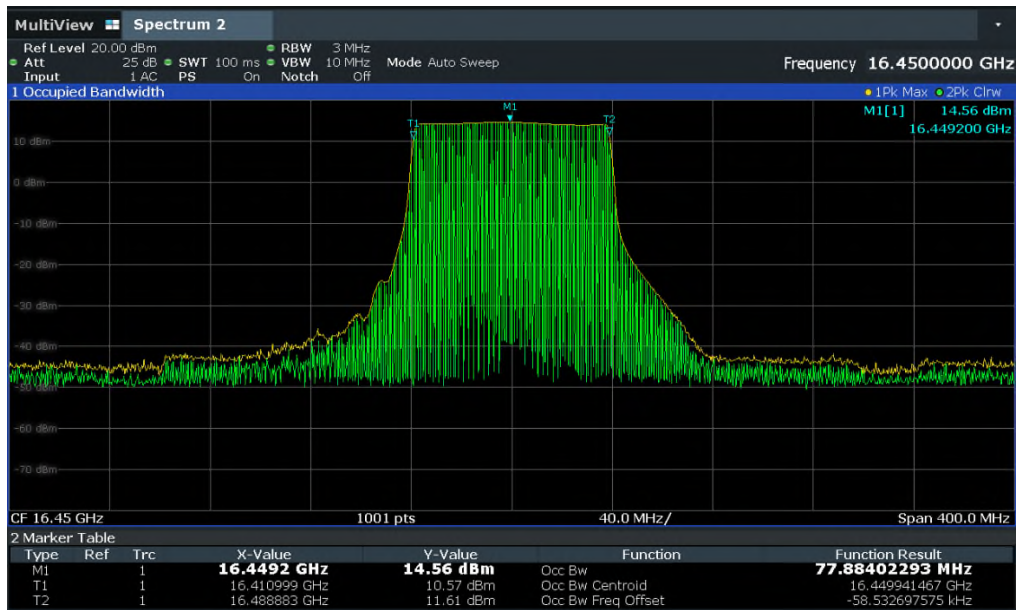
2.4.8 Test Results Table (for reference only)

Channel	Center Frequency (GHz)	99% OBW (MHz)
Low	16.25	77.87
Mid	16.45	77.88
High	16.65	77.76

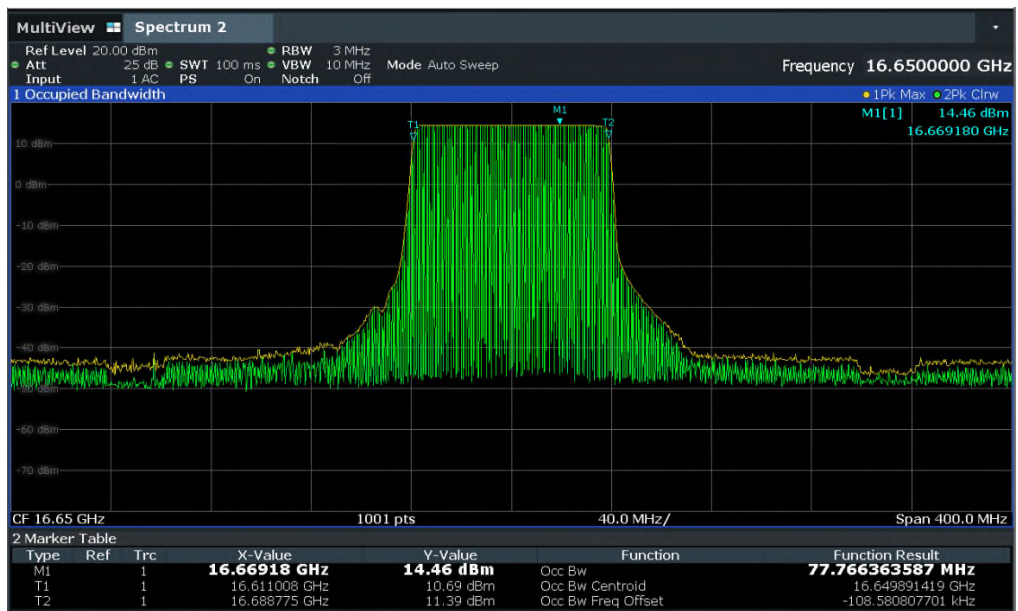
2.4.9 Test Result Plots



Center Frequency @ 16.25GHz



Center Frequency @ 16.45GHz



Center Frequency @ 16.65GHz

2.5 Frequency Stability

2.5.1 Specification Reference

FCC 47 CFR Part 90, Clause 90.213

2.5.2 Standard Applicable

(a) Unless noted elsewhere, transmitters used in the services governed by this part must have a minimum frequency stability as specified in the following table:

Frequency Range (MHz)	Fixed and base station	Mobile Stations	
		>2 watts output power	<2 watts output power
Above 2450 ¹⁰	-	-	-

¹⁰Except for DSRCS equipment in the 5850-5925 MHz band, frequency stability is to be specified in the station authorization. Frequency stability for DSRCS equipment in the 5850-5925 MHz band is specified in subpart M of this part.

2.5.3 Equipment Under Test and Modification State

Serial No: X00400007 / Default Test Configuration

2.5.4 Date of Test/Initial of test personnel who performed the test

June 03 and 04, 2025 / JS

2.5.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	24.4 – 25.6 °C
Relative Humidity	43.1 – 44.7 %
ATM Pressure	97.9 – 98.9 kPa

2.5.7 Additional Observations

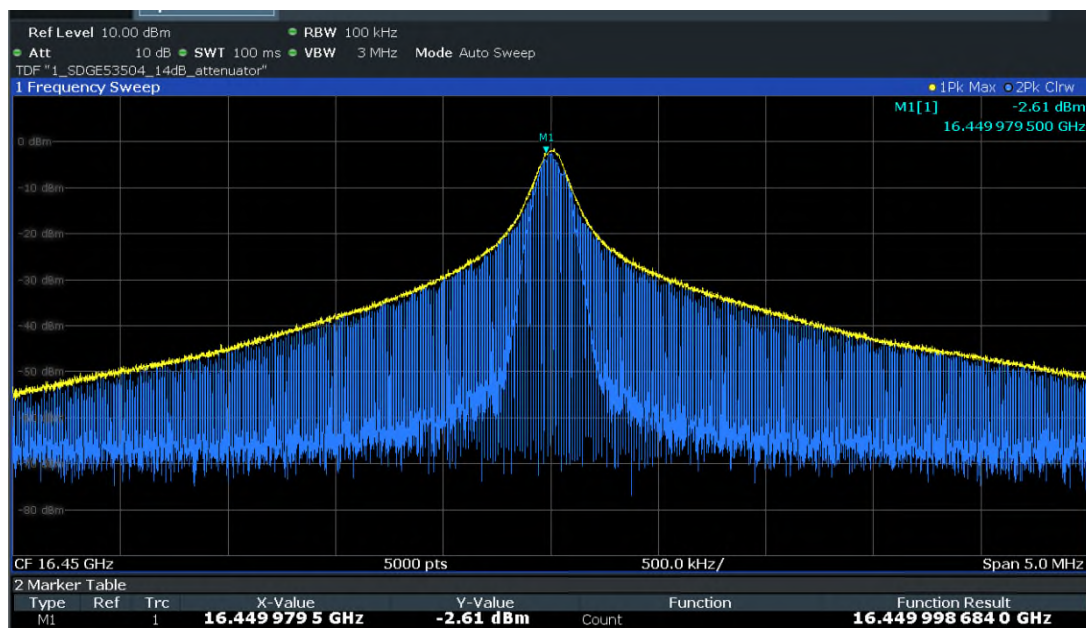
- This is a radiated test utilizing the spectrum analyser marker signal count function.
- Test Methodology is per Section 5.6 and Annex A A.2.9.7 of ANSI C63.26-2015.
- The EUT is in CW mode for this test.
- Nominal voltage was declared at 24VDC/120VAC.

2.5.8 Test Result Table

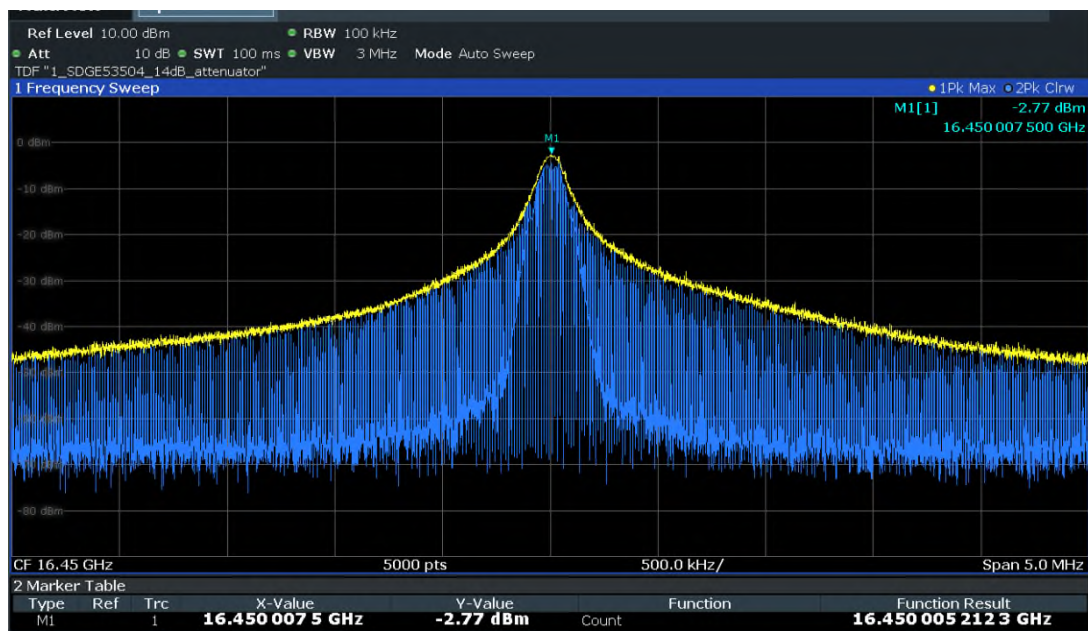
Temperature (°C)	Frequency Deviation (kHz)	ppm
50°C	1316	0.0800
40°C	1856	0.1128
30°C	2312	0.2389
20°C	0.0	0.0000
10°C	5423	0.3296
0°C	360	0.0218
-10°C	5476	0.3328
-20°C	5237	0.3183
-30°C	6502	0.3952
85% of Nominal Voltage	2715	0.1650
115% of Nominal Voltage	2363	0.1436
Nominal Voltage	0.0	0.0000

NOTE— <https://www.sitime.com/ppm-hz-calculator> was utilized to determine the ppm.

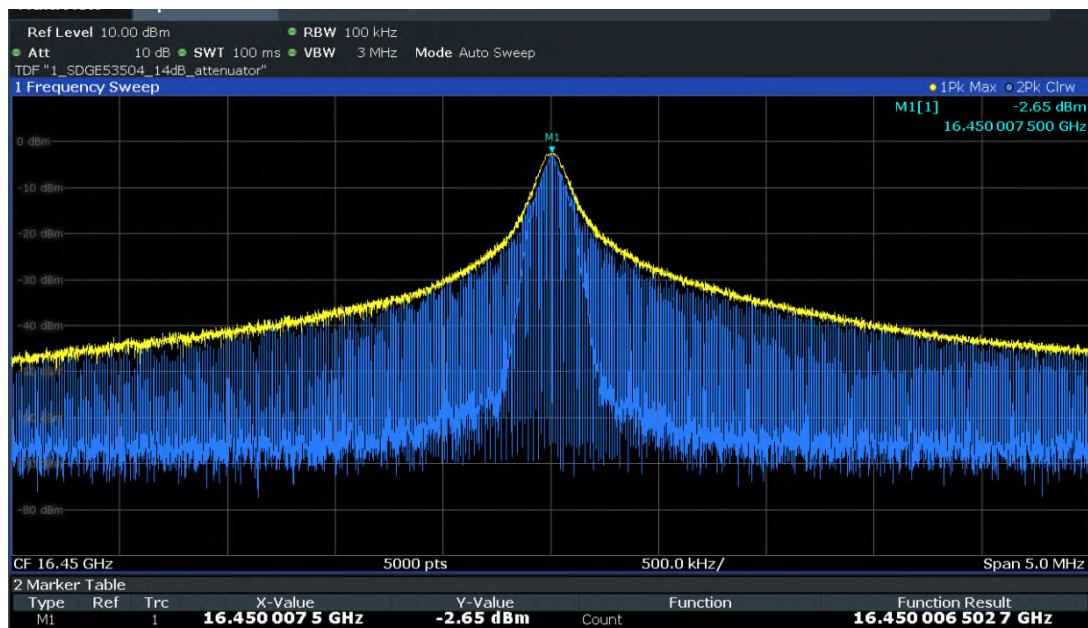
2.5.9 Sample Test Plots



Frequency Stability @ 50°C



Frequency Stability @ 20°C (Nominal Voltage)



Frequency Stability @ -30°C

SECTION 3

3 TEST EQUIPMENT USED

3.1 Test Equipment Used

List of absolute measuring and other principal items of test equipment.

ID Number (SDGE/SDRB)	Test Equipment	Type	Serial Number	Manufacturer	Cal Date	Cal Due Date
Radiated Emission						
68210	EMI Test Receiver	ESW44	103416	Rohde & Schwarz	06/27/24	06/27/25
74136	TUV SSU 010 PLC US	SSU 010	SSU001	TUV SUD UK	04/16/25	04/16/26
69562	7.5-18 GHz Double Ridge Horn Antenna	HWRD 750	00076	Schwarzbeck Mess Elektronik	11/06/24	11/06/25
69563	1-10 GHz Broad-Band Horn Antenna	BBHA 9120 B	00875	Schwarzbeck Mess Elektronik	11/06/24	11/06/25
7611	Signal/Spectrum Analyzer	FSW26	102017	Rohde & Schwarz	02/26/25	02/26/26
1002	Bilog Antenna	3142C	0058717	EMCO	12/01/23	12/01/25
46797	Preamplifier	PA-122	181925	Com Power	01/06/25	01/06/26
9001	Horn antenna (18- 26.5GHz)	HO42S	101	Custom Microwave	10/26/23	10/26/25
9002	Horn antenna (26-40 GHz)	HO28S	102	Custom Microwaves	09/26/23	09/26/25
40815	Pre-amplifier (18-40 GHz)	19D18	15G27	Spacek Labs	10/22/24	10/22/25
7637	Harmonics mixer (40- 60 GHz)	FS-Z60	100009	Rhode & Schwarz	03/19/24	03/19/26
-	Harmonics mixer (50- 75 GHz)	FS-Z75	100988	Rhode & Schwarz	10/19/23	10/19/25
7633	Harmonics mixer (75- 110 GHz)	HM-110-7	101000	Radiometer Physics	10/19/23	10/19/25
9003	Horn antenna (40-60 GHz)	HO19R	103	Custom Microwaves	Verified by 7611 and corresponding antenna/Active multiplier combination	
9004	Horn antenna (50-75 GHz)	HO15R	104	Custom Microwaves		
7628	Horn antenna (75-110 GHz)	SAR-2309-10-S2	13481-01	Sage Millimeter, Inc.	Verified by 7611 and corresponding	
8872	Direct Reading Attenuator (40-60	STA-60-19-D1	11875-01	Sage Millimeter, Inc.	Verified by 7611 and corresponding antenna/mixer combination	
8860	Direct Reading Attenuator (50-75	STA-60-15-D1	11466-01	Sage Millimeter, Inc.		
8861	Direct Reading Attenuator (75-110	STA-60-10-D1	11466-01	Sage Millimeter, Inc.		

8919	Direct Reading Attenuator (90-140	STA-60-08-D1	12605-01	Sage Millimeter, Inc.	Verified by 7611 and corresponding antenna/mixer combination	
8909	Direct Reading Attenuator (140-220	STA-60-05-D1	12020-01	Sage Millimeter, Inc.		
8873	Active Multiplier (40-60 GHz)	AMC-19-RFH00	124	Millitech, Inc.		
8914	Active Multiplier (50-75 GHz)	AMC-15-RFH00	283	Millitech, Inc.		
8915	Active Multiplier (75-110 GHz)	AMC-10-RFH00	606	Millitech, Inc.		
Miscellaneous						
6805	Environmental Chamber	ESL-4CA	18021	Espec	04/10/25	04/10/26
-	Test Software	EMC32	V10.60.20	Rohde & Schwarz	N/A	
-	Test Software	EMX	V3.5.2	TUV SUD UK	N/A	

3.2 Measurement Uncertainty

Calculation of Measurement Uncertainty per CISPR 16-4-2:2011 with Corr. 1

3.2.1 Radiated Measurements (Below 1GHz)

	Input Quantity (Contribution) X_i	Value	Prob. Dist.	Divisor	$u_i(x)$	$u_i(x)^2$
1	Receiver reading	0.10 dB	Normal, k=1	1.000	0.10	0.01
2	Attenuation: antenna-receiver	0.20 dB	Normal, k=2	2.000	0.10	0.01
3	Antenna factor AF	0.58 dB	Normal, k=2	2.000	0.38	0.08
4	Receiver sinewave accuracy	0.15 dB	Normal, k=2	2.000	0.23	0.01
5	Receiver pulse amplitude	1.50 dB	Rectangular	1.732	0.87	0.75
6	Receiver pulse repetition rate	1.50 dB	Rectangular	1.732	0.87	0.75
7	Noise floor proximity	0.50 dB	Rectangular	1.732	0.29	0.08
8	Mismatch: antenna-receiver	0.95 dB	U-shaped	1.414	0.67	0.45
9	AF frequency interpolation	0.30 dB	Rectangular	1.732	0.17	0.03
10	AF height deviations	0.10 dB	Rectangular	1.732	0.06	0.00
11	Directivity difference at 3 m	3.12 dB	Rectangular	1.732	1.80	3.24
12	Phase center location at 3 m	1.00 dB	Rectangular	1.732	0.58	0.33
13	Cross-polarisation	0.90 dB	Rectangular	1.732	0.52	0.27
14	Balance	0.00 dB	Rectangular	1.732	0.00	0.00
15	Site imperfections	3.99 dB	Triangular	2.449	1.54	2.65
16	Separation distance at 3 m	0.30 dB	Rectangular	1.732	0.17	0.03
17	Effect of setup table material	0.57 dB	Rectangular	1.732	0.44	0.11
18	Table height at 3 m	0.10 dB	Normal, k=2	2.000	0.05	0.00
19	Near-field effects	0.00 dB	Triangular	2.449	0.00	0.00
20	Effect of ambient noise on OATS	0.00 dB				0.00
Combined standard uncertainty			Normal	2.97 dB		
Expanded uncertainty			Normal, k=2	5.94 dB		

3.2.2 Radiated Emission Measurements (Above 1GHz)

	Input Quantity (Contribution) X_i	Value	Prob. Dist.	Divisor	$u_i(x)$	$u_i(x)^2$
1	Receiver reading	0.10 dB	Normal, k=1	1.000	0.10	0.01
2	Attenuation: antenna-receiver	0.30 dB	Normal, k=2	2.000	0.15	0.02
3	Preamplifier Gain	0.20 dB	Normal, k=2	2.000	0.10	0.01
4	Antenna factor AF	0.47 dB	Normal, k=2	2.000	0.24	0.06
5	Sinewave accuracy	0.15 dB	Normal, k=2	2.000	0.08	0.01
6	Instability of preamp gain	1.21 dB	Rectangular	1.732	0.70	0.49
7	Noise floor proximity	0.70 dB	Rectangular	1.732	0.40	0.16
8	Mismatch: antenna-preamplifier	1.41 dB	U-shaped	1.414	1.00	0.99
9	Mismatch: preamplifier-receiver	1.30 dB	U-shaped	1.414	0.92	0.85
10	AF frequency interpolation	0.30 dB	Rectangular	1.732	0.17	0.03
11	Directivity difference at 3 m	1.50 dB	Rectangular	1.732	0.87	0.75
12	Phase center location at 3 m	0.30 dB	Rectangular	1.732	0.17	0.03
13	Cross-polarisation	0.90 dB	Rectangular	1.732	0.52	0.27
14	Site imperfections VSWR (Method 2)	5.03 dB	Triangular	2.000	4.89	1.03
15	Effect of setup table material	0.81 dB	Rectangular	1.732	1.41	0.81
16	Separation distance at 3 m	0.30 dB	Rectangular	1.732	0.17	0.03
17	Table height at 3 m	0.00 dB	Normal, k=2	2.000	0.00	0.00
Combined standard uncertainty			Normal	2.35 dB		
Expanded uncertainty			Normal, k=2	4.71 dB		

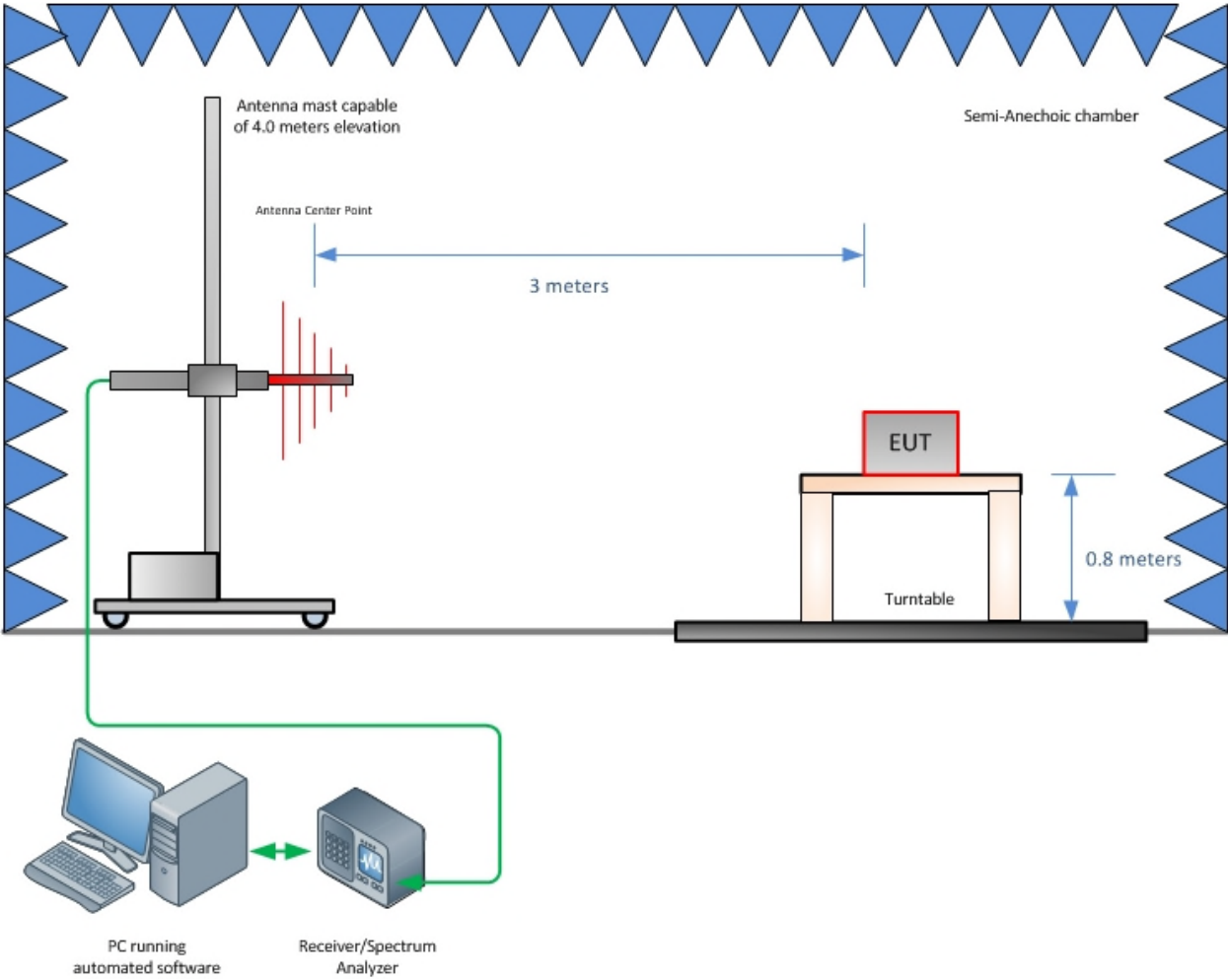
3.2.3 Radiated Emission Measurements (Above 40GHz)

<i>Radiated Measurement (above 40 GHz) at a distance of 3 m</i>						
	Input Quantity (Contribution) X_i	Value	Prob. Dist.	Divisor	$u_i(x)$	$u_i(x)^2$
1	Receiver reading	0.10 dB	Normal, k=1	1.000	0.10	0.01
2	Attenuation: antenna-receiver	0.30 dB	Normal, k=2	2.000	0.15	0.02
3	Preamplifier Gain	0.50 dB	Normal, k=2	2.000	0.25	0.06
4	Antenna Gain	0.75 dB	Normal, k=2	2.000	0.38	0.14
5	Sinewave accuracy	0.15 dB	Normal, k=2	2.000	0.08	0.01
6	Mixer Operation	1.21 dB	Rectangular	1.732	0.70	0.49
7	Instability of preamp gain	1.21 dB	Rectangular	1.732	0.70	0.49
8	Noise floor proximity	0.70 dB	Rectangular	1.732	0.40	0.16
9	Mismatch: antenna-preamplifier	1.41 dB	U-shaped	1.414	1.00	0.99
10	Mismatch: preamplifier-receiver	1.30 dB	U-shaped	1.414	0.92	0.85
11	AF frequency interpolation	0.30 dB	Rectangular	1.732	0.17	0.03
12	Cross-polarisation	0.90 dB	Rectangular	1.732	0.52	0.27
Combined standard uncertainty				Normal	1.88 dB	
Expanded uncertainty				Normal, k=2	3.75 dB	

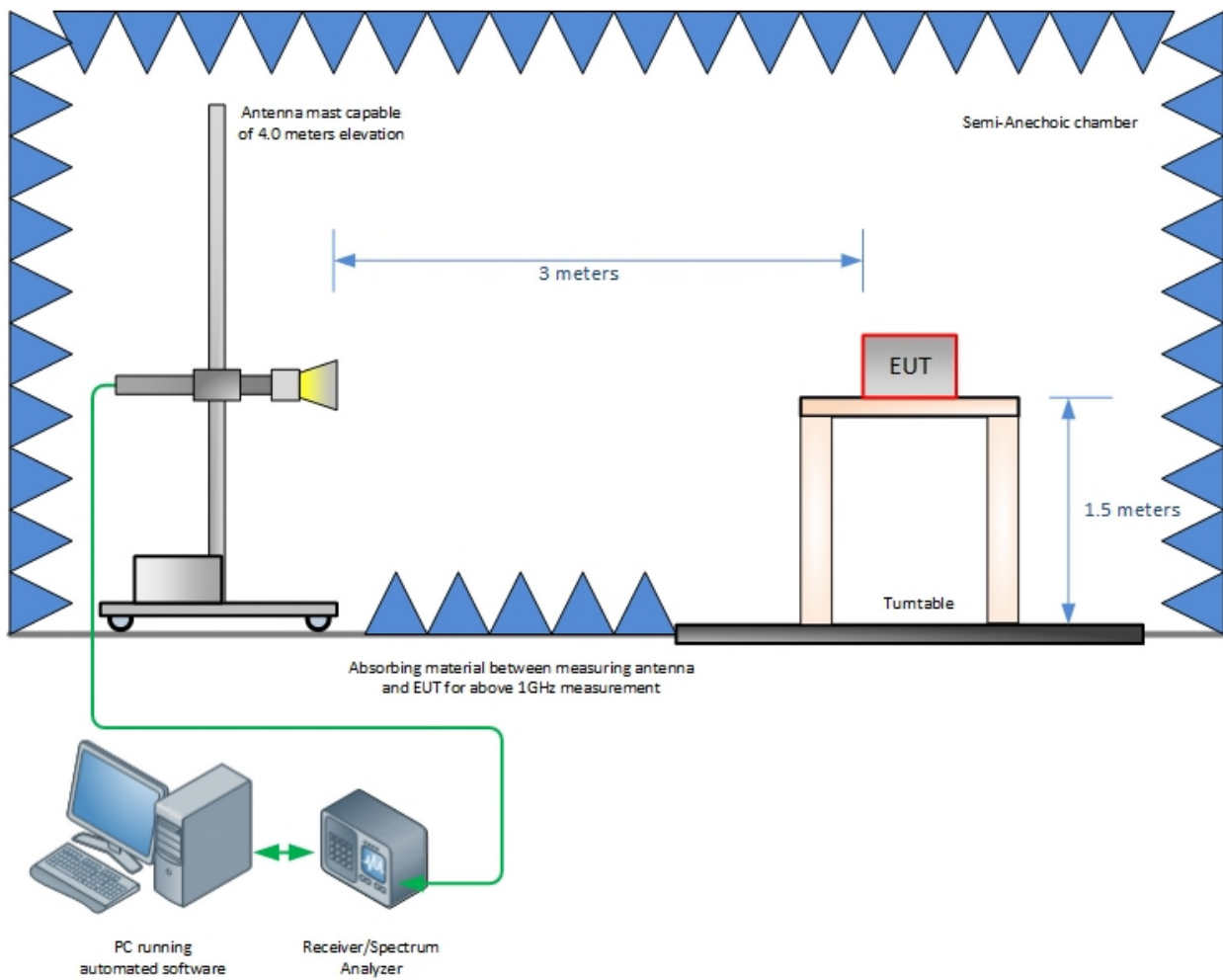
SECTION 4

4 Diagram of Test Setup

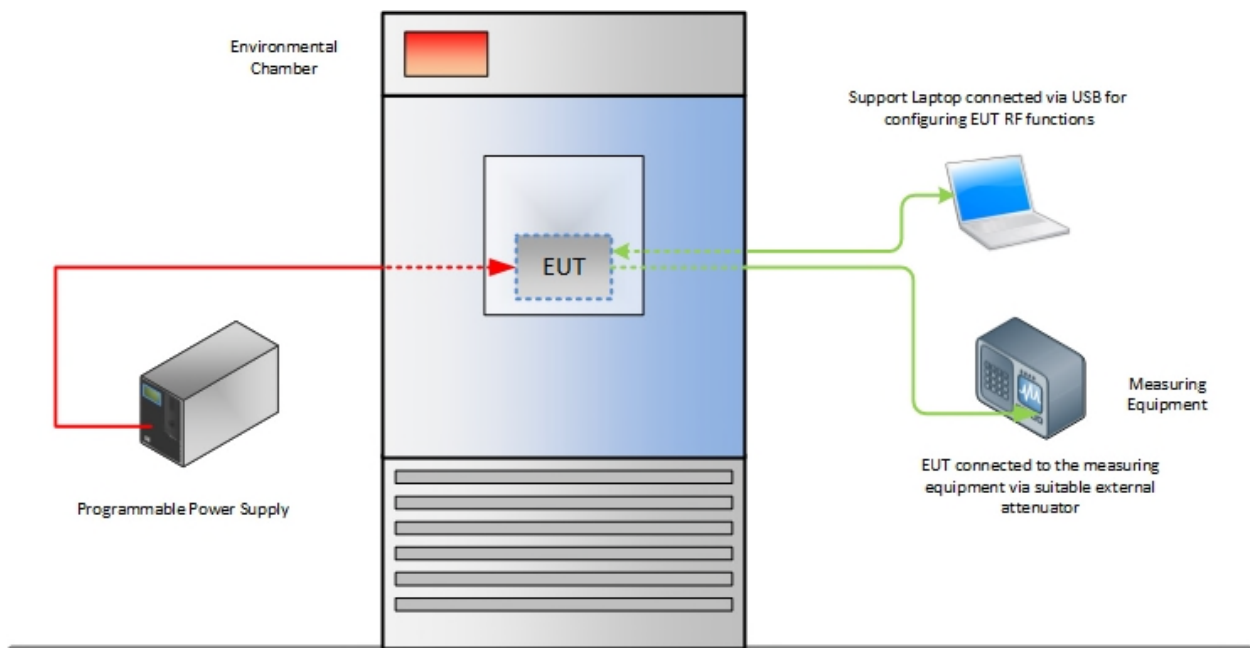
4.1 Test Setup Diagram



Radiated Emission Test Setup (Below 1GHz)



Radiated Emission Test Setup (Above 1GHz)



Frequency Stability Test Configuration

SECTION 5

5 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 Accreditation, Disclaimers and Copyright

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