

Radio Testing of the

Nivelco Process Control Co.
PiloTREK W-200
Model: WD3

In accordance with FCC Part 15 Subpart C
§15.256 and ISED RSS-211



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Nivelco Process Control Co.
h-1043 Budapest,
Dugonics u. 11.
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Date: March 2026

Document Number: 721017699 Issue 01 | Version Number: 01

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Authorized Signatory	Ferdinand S. Custodio	03/30/2026	

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 Part 15 Subpart C §15.256 and ISED RSS-211.



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REPORT ON Radio Testing of the
Nivelco Process Control Co.
Model: WD3
Industrial non-contact 80 GHz microwave level transmitter

TEST REPORT NUMBER 721017699

TEST REPORT DATE March 2026

PREPARED FOR Nivelco Process Control Co.
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DATED March 30, 2026



Revision History

721017699 Nivelco Process Control Co. Model WD3					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
03/30/2026	—	Initial Release			Ferdinand S. Custodio

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SECTION 1

REPORT SUMMARY

Radio Testing of the
Nivelco Process Control Co.
Model: WD3



Frame Time

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Nivelco Process Control Co. Industrial non-contact 80 GHz microwave level transmitter Model: WD3 to the requirements of FCC Part 15 Subpart C §15.256 and ISSED RSS-211.

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	Nivelco Process Control Co.
EUT	Industrial non-contact 80 GHz microwave level transmitter
Model Name	WD3
FCC ID	S7W-W200
IC Number	35045-W200
Serial Number(s)	Z105343
Number of Samples Tested	1
Test Specification/Issue/Date	• FCC Part 15 Subpart C §15.256 (October 1, 2024) • ISSED RSS-211 (Issue 1 March 2015) • ISSED RSS-Gen (Issue 5 April 2018)
Start of Test	January 12, 2026
Finish of Test	March 24, 2026
Name of Engineer(s)	Joe Salvador
Related Document(s)	ANSI C63.10-2020. American National Standard of Procedures for Compliance testing of Unlicensed Wireless Devices.



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC Part 15 Subpart C §15.256 and ISSED RSS-211 with cross-reference to the corresponding ISSED RSS standard are shown below:

Section	§15.256 Spec Clause	RSS-211	Test Description	Result	Comments/Base Standard
2.1	§15.256(g)(2)(ii)	Clause 5.2(b)	Transmitter Maximum Peak EIRP	Compliant	N/A
2.2	§15.256(g)	Clause 5.2(b)	Transmitter Maximum Average EIRP	Compliant	N/A
2.3	§15.256(h) and §15.209	RSS-Gen Clause 8.9	Transmitter Unwanted Emissions	Compliant	N/A
2.4	§15.256(i)(B)	Clause 5.2(a)	Antenna Beamwidth	Compliant	N/A
2.5	§15.256(j)	Clause 5.2(c)	Antenna Side Lobe Gain	Compliant	N/A



1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) is a Nivelco Process Control Co. PiloTREK W-200 Model : WD3 Industrial non-contact 80 GHz microwave level transmitter.

1.3.2 EUT General Description

EUT Description	Industrial non-contact 80 GHz microwave level transmitter
Trade Name	PiloTREK W-200
Model Name	WD3
Rated Voltage	12 – 36VDC (PiloTREK W-200 Stand-alone)
Mode Verified	80GHz radar
Capability	80GHz radar, Bluetooth
Frequency Range	77-81GHz
Primary Unit (EUT)	☐ Production ☒ Pre-Production ☐ Engineering
PRF	1Hz
Frame Time	1000 ms
Duty Cycle	0.022%
Transmission Mode	SISO (1x1)
Dimensions	Approx. 213 mm x 149 mm x 100 mm (8.4" x 5.9" x 3.9")
Weight	42 kg (4.4 lb)
Antenna Type	3" Antenna
Antenna Manufacturer	NIVELCO
TX Antenna Gain	33.2 dBi (Declared by the Manufacturer)
RX Antenna Gain	33.2 dBi (Declared by the Manufacturer)

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
Default	The PiloTREK W-200 is an FMCW radar that was provided as a plug-and-play unit. Once power is applied, the PiloTREK W-200 radar starts transmitting continuously with 1 FMCW sweep per second. The duration of an FMCW sweep is ~220 μ s (218.4 μ s).

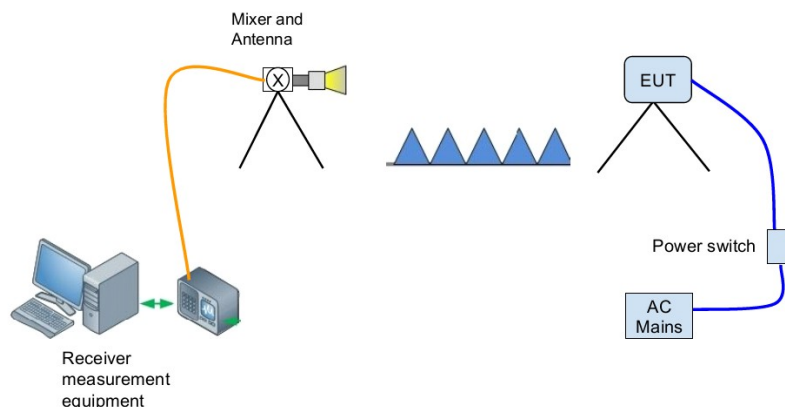
1.4.2 EUT Exercise Software

None

1.4.3 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Description
Nivelco	Harness cable and power switch	NIPOWER PPK-421-1 No:X020285

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: Z105343		
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 C63.10-2020, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

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 C63.10-2020. 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 (ISED) 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

TEST DETAILS

Radio Testing of the
Nivelco Process Control Co.
Model: WD3

2.1 TRANSMITTER MAXIMUM PEAK EIRP

2.1.1 Specification Reference

FCC 47 CFR Part 15, Clause 15.256(g)(2)(ii)
RSS-211 Clause 5.2(b)

2.1.2 Standard Applicable

(ii) The EIRP in 50 MHz is computed from the maximum power level measured with a peak detector in a 50-MHz bandwidth centered on the frequency at which the maximum average power level is realized and this 50 MHz bandwidth must be contained within the authorized operating bandwidth. For a RBW less than 50 MHz, the peak EIRP limit (in dBm) is reduced by $20 \log(\text{RBW}/50)$ dB where RBW is the resolution bandwidth in megahertz. The RBW shall not be lower than 1 MHz or greater than 50 MHz. The video bandwidth of the measurement instrument shall not be less than the RBW. If the RBW is greater than 3 MHz, the application for certification filed shall contain a detailed description of the test procedure, calibration of the test setup, and the instrumentation employed in the testing.

Frequency Band (GHz)	Average Emission Limit (EIRP in dBm/MHz) as Measured Boresight	Peak Emission Limit (EIRP in dBm Measured in 50 MHz) as Measured Boresight
5.65-8.50	-33	+7
24.05-29.00	-14	+26
75-85	-3	+34

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

Feb 02, 2026 / JS

2.1.4 Equipment Under Test and Modification State

Serial No: Z105343 / Default Test Configuration

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 Location

Test performed at TÜV SÜD America Inc. Mira Mesa facility

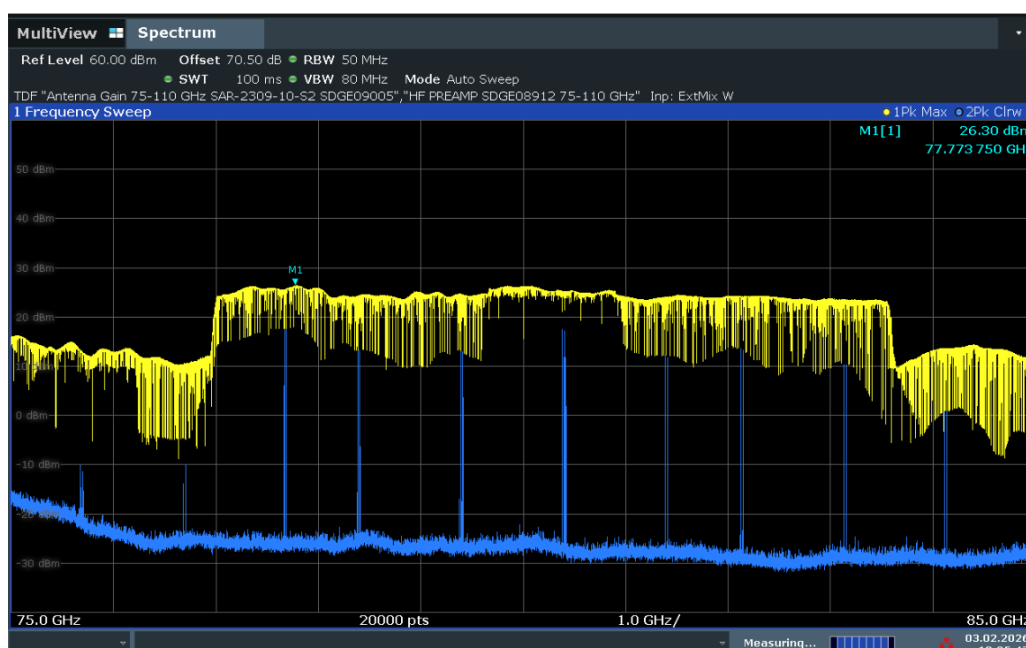
Ambient Temperature	22.7 °C
Relative Humidity	43.2 %
ATM Pressure	100.6 kPa

2.1.7 Additional Observations

- This is a radiated test. The spectrum was searched from 75GHz to 85GHz.
- This test was measured at a 1 meter distance.
- The FMCW chirps correction factor was calculated using the formula:
-

$$CF_{\text{chirp}} = 5 \times \log \left(1 + K \times \left(\frac{\text{Span}}{t \times \text{RBW}^2} \right)^2 \right)$$

- Guidance for calculating the correction factor is from Application Note 1EF107-1E Rohde & Schwarz Peak and Mean Power measurements on wideband FMCW radar signals.
- Guidance is based on 1MHz RBW/3MHz VBW since measurement uses 50MHz RBW/80MHz VBW, correction factor per Fig. 5 of the Application Note is utilized.



Frequency	Peak EIRP @ 50MHz RBW (dBm)	Peak Power Correction (dB)	Corrected Level (EIRP)	Limit (dBm)	Result
80 GHz	26.30	0.0	26.30	34	Passed

2.2 TRANSMITTER MAXIMUM AVERAGE EIRP

2.2.1 Specification Reference

FCC 47 CFR Part 15, Clause 15.256(g)(2)(i)
RSS-211 Clause 5.2(b)

2.2.2 Standard Applicable

(i) The EIRP in 1 MHz is computed from the maximum power level measured within any 1-MHz bandwidth using a power averaging detector.

2.2.3 Equipment Under Test and Modification State

Serial No: Z105343/ Default Test Configuration

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

Feb 02, 2026 / JS

2.2.5 Test Equipment Used

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

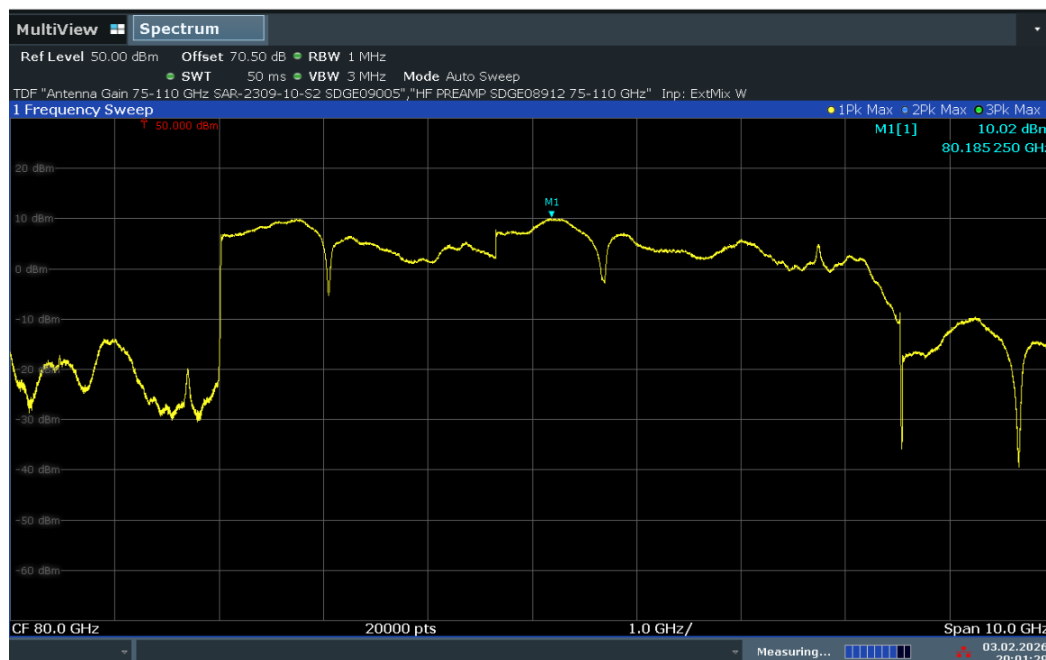
2.2.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Mira Mesa facility

Ambient Temperature	22.7 °C
Relative Humidity	43.2 %
ATM Pressure	100.6 kPa

2.2.7 Additional Observations

- This is a radiated test. The spectrum was searched from 75GHz to 85GHz.
- Offset of 70.5 dB corresponds to free space loss at 80GHz.
- The entire fundamental bandwidth was swept to determine the max peak power level



Frequency (GHz)	Average Factor (dB)	Peak detector (dBm)	Average EIRP (dBm)	Limit (dBm)	Result
80	-39.24	10.02	-29.22	-3	Pass

Dwell Time (TD) = Frequency sweep time (Ts)/ Chirp Bandwidth (F)
 = .000218sec (Ts)/18.32 MHz (F)
 = .000119sec (TD)

Average Factor = $10 \cdot \log [(TD)/\text{cycle time}]$
 = $10 \cdot \log [(.000119\text{sec})/ 1\text{sec}]$
 = -39.24 dB

Average EIRP = Average Factor + Peak @ 1MHz RBW
 = -39.24dB + (10.02 dBm)
 = -30.93dBm



2.3 TRANSMITTER UNWANTED EMISSIONS

2.3.1 Specification Reference

FCC 47 CFR Part 15, Clause 15.256(h)
RSS-Gen Clause 8.9

2.3.2 Standard Applicable

(h) Unwanted emissions limits. Unwanted emissions from LPR devices shall not exceed the general emission limit in § 15.209 of this chapter.

2.3.3 Equipment Under Test and Modification State

Serial No: Z105343/ Default Test Configuration

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

Feb 02, 2026 / 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 Location

Test performed at TÜV SÜD America Inc. Mira Mesa facility

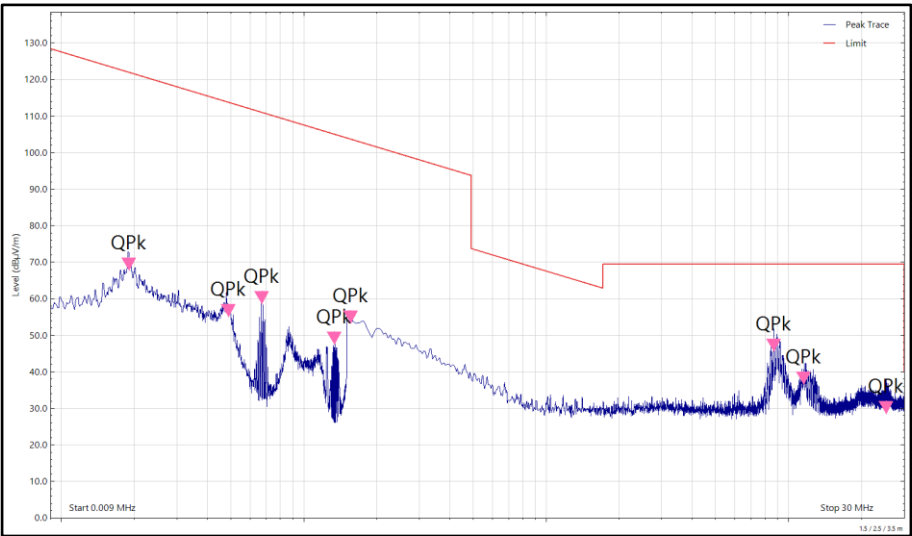
Ambient Temperature	22.7 °C
Relative Humidity	43.2 %
ATM Pressure	100.6 kPa

2.3.7 Additional Observations

- This is a radiated test. The spectrum was searched from 9kHz to 200GHz.
- Measurements below 40GHz were done using EmX automated software. Reported level is the actual level with all the correction factors factored in.
- Measurement above 40GHz were done using harmonic mixers. Corresponding TDF (Transducer Factor) are programmed for each range.
- The spectrum was not searched from 75GHz to 85GHz for spurious emissions. See section 2.1 for this frequency range.
- Tests distances and frequency ranges performed are summarized below:

Frequency Range	Test Distance
9 kHz to 30 MHz	3 meters
30 MHz to 1GHz	3 meters
1 GHz to 18 GHz	3 meters
18 GHz to 26 GHz	3 meters
26 GHz to 40 GHz	3 meters
40 GHz to 60 GHz	1 meter
60 GHz to 75 GHz	1 meter
75 GHz to 110 GHz	1 meter
110 GHz to 140 GHz	1 meter
140 GHz to 200 GHz	0.5 meter

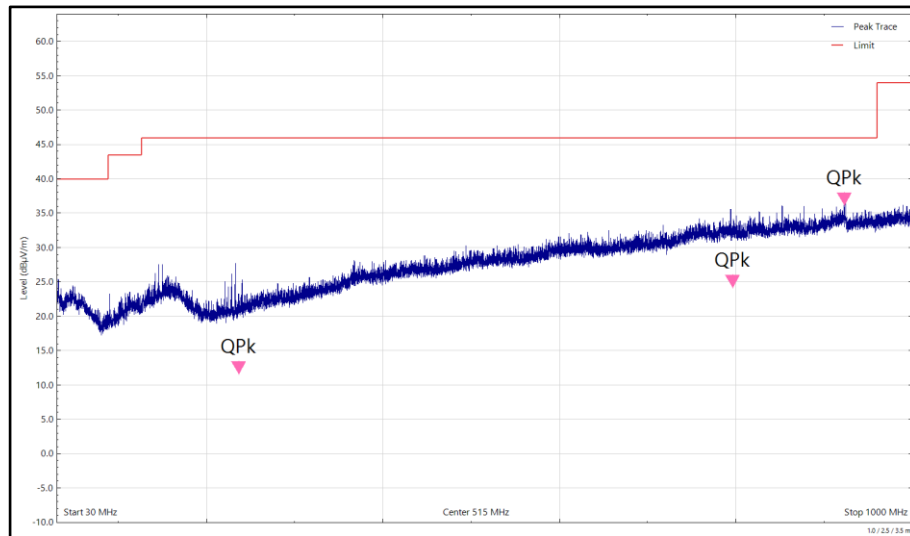
2.3.8 Below 30MHz Radiated Emission Test



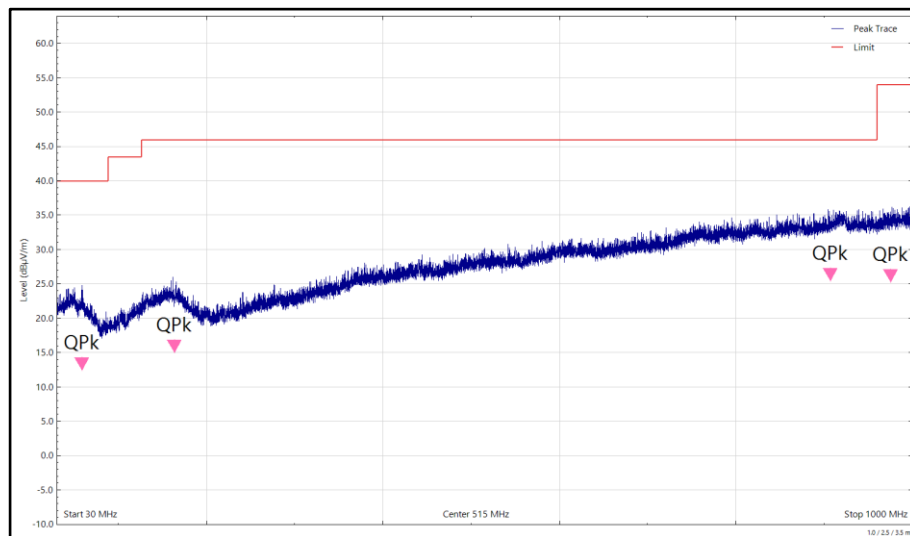
Quasi-Peak Data

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
0.019	67.33	122.00	-54.67	Q-Peak	296	100	Horizontal
0.049	54.59	113.80	-59.21	Q-Peak	0	100	Horizontal
0.067	58.23	111.10	-52.87	Q-Peak	235	100	Horizontal
0.134	47.06	105.00	-57.94	Q-Peak	81	100	Horizontal
0.156	52.90	103.70	-50.80	Q-Peak	308	100	Horizontal
8.689	45.18	69.50	-24.32	Q-Peak	86	100	Horizontal
11.584	36.08	69.50	-33.42	Q-Peak	350	100	Horizontal
25.369	28.07	69.50	-41.43	Q-Peak	349	100	Horizontal

2.3.9 Below 1GHz Radiated Emission Test



30 MHz to 1 GHz, Horizontal

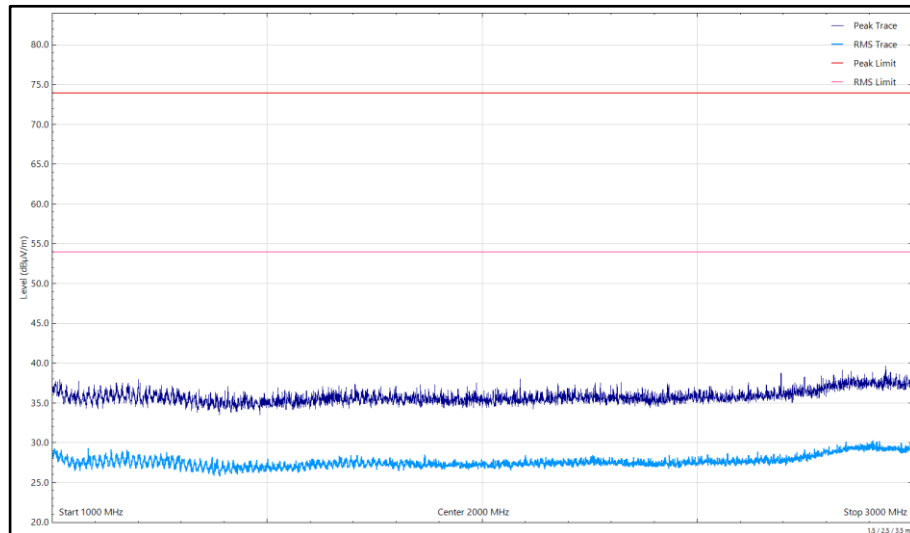


30 MHz to 1 GHz, Vertical

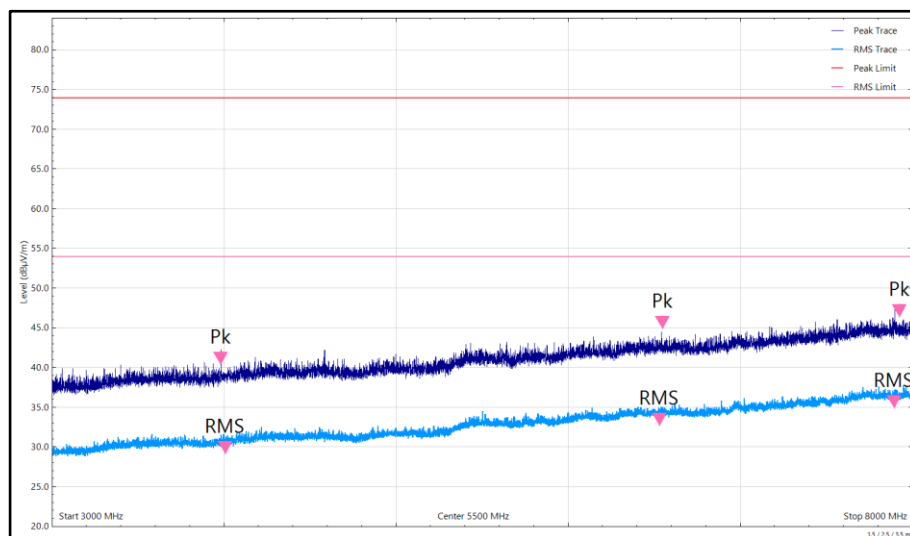
Quasi-Peak Data

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
58.667	12.18	40.00	-27.82	Q-Peak	350	382	Vertical
163.363	14.77	46.00	-31.23	Q-Peak	299	126	Vertical
236.678	11.31	46.00	-34.69	Q-Peak	350	245	Horizontal
796.350	23.95	46.00	-22.05	Q-Peak	246	367	Horizontal
907.684	25.21	46.00	-20.79	Q-Peak	224	112	Vertical
923.101	35.92	46.00	-10.08	Q-Peak	218	130	Horizontal
975.829	25.07	54.00	-28.93	Q-Peak	10	100	Vertical

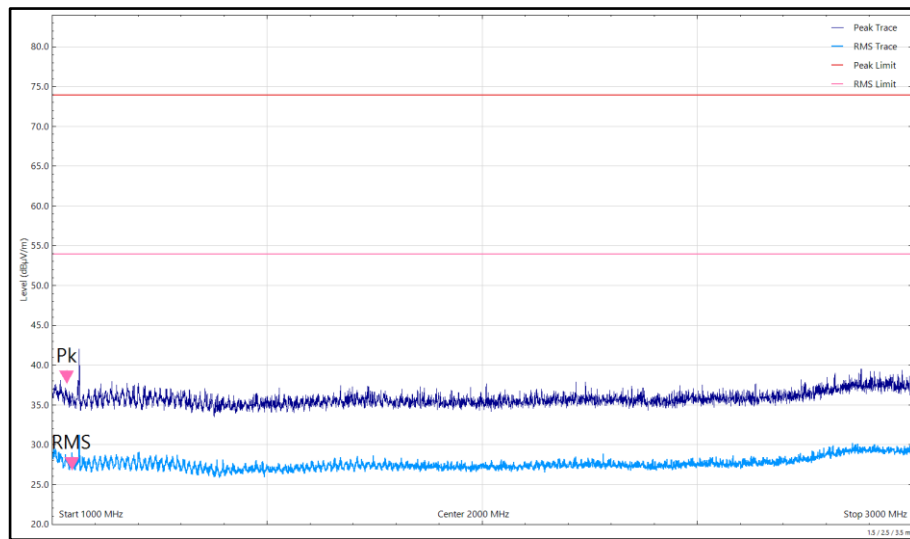
2.3.10 1GHz to 8GHz Radiated Emission Test



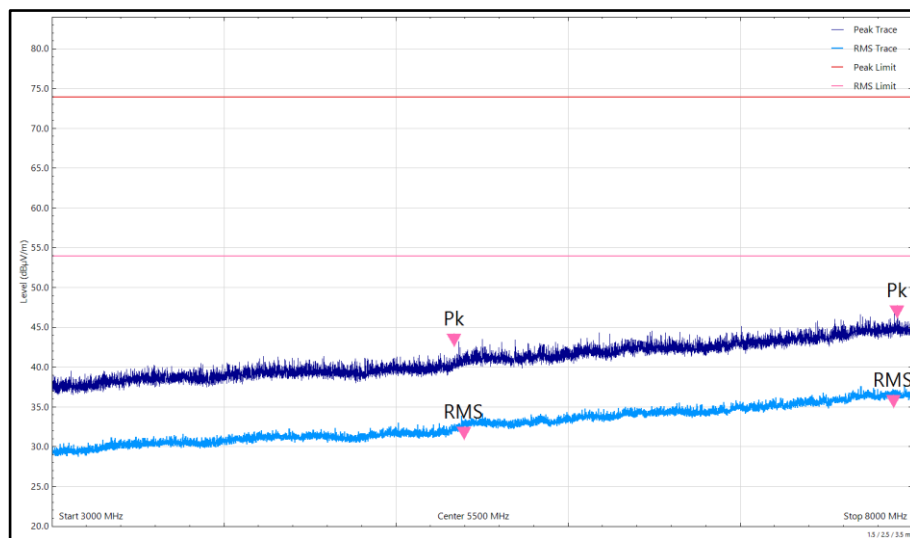
1 GHz to 3 GHz, Horizontal



3 GHz to 8 GHz, Horizontal



1 GHz to 3 GHz, Vertical

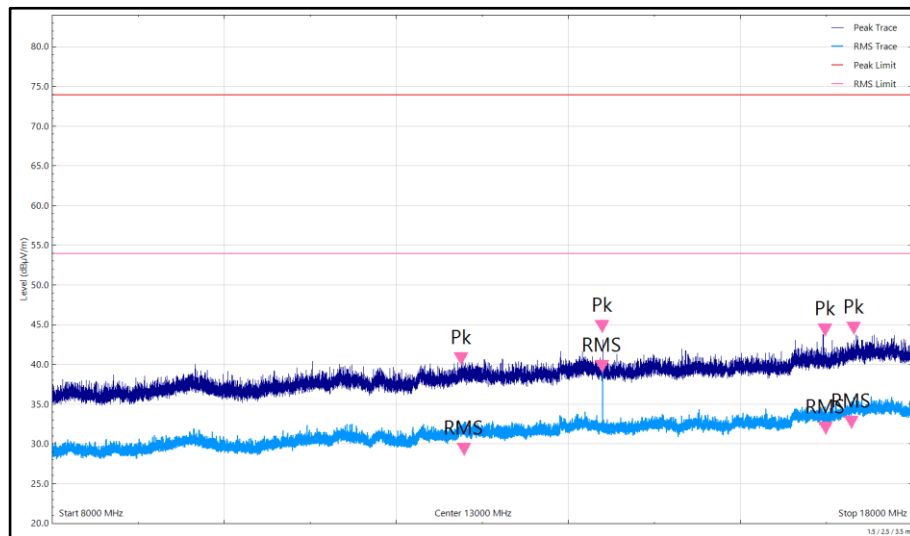


3 GHz to 8 GHz, Vertical

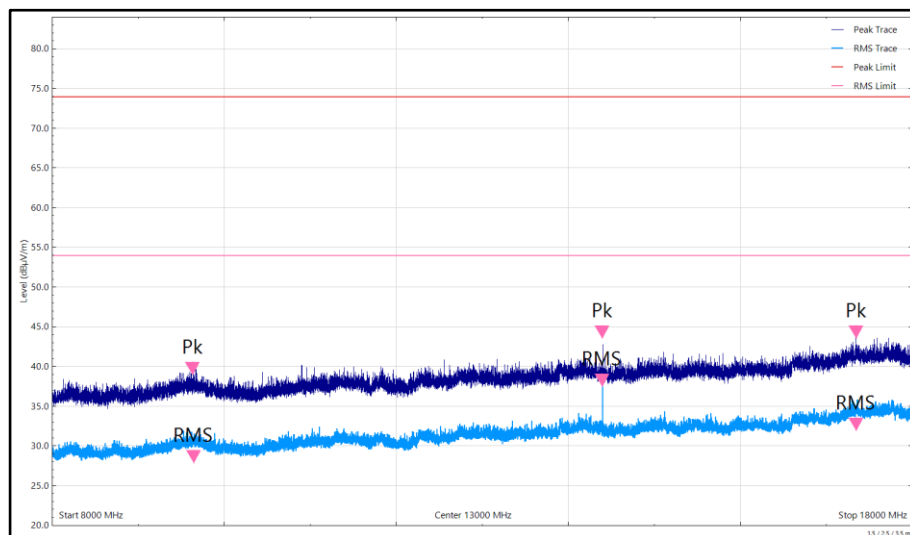
Peak and RMS Data

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
1034.329	37.50	74.00	-36.50	Peak	323	361	Vertical
1046.357	26.60	54.00	-27.40	RMS	323	361	Vertical
3981.101	40.18	74.00	-33.82	Peak	339	276	Horizontal
4008.094	28.90	54.00	-25.10	RMS	339	276	Horizontal
5339.304	42.40	74.00	-31.60	Peak	333	340	Vertical
5397.276	30.71	54.00	-23.29	RMS	333	340	Vertical
6533.542	32.49	54.00	-21.51	RMS	343	332	Horizontal
6549.696	44.70	74.00	-29.30	Peak	343	332	Horizontal
7893.941	34.67	54.00	-19.33	RMS	334	252	Vertical
7895.993	34.70	54.00	-19.30	RMS	110	247	Horizontal
7912.822	45.92	74.00	-28.08	Peak	334	252	Vertical
7925.783	46.12	74.00	-27.88	Peak	110	247	Horizontal

2.3.11 8GHz to 18GHz Radiated Emission Test



8 GHz to 18 GHz, Horizontal

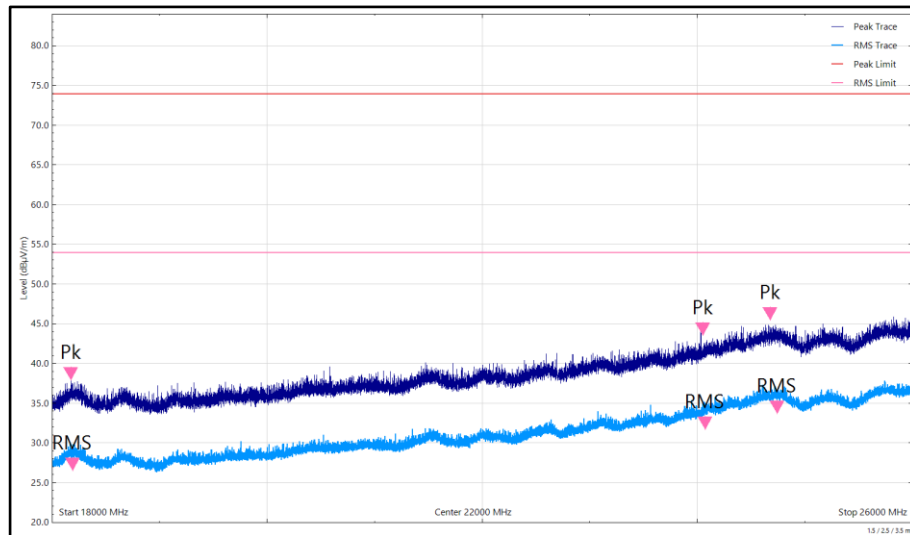


8 GHz to 18 GHz, Vertical

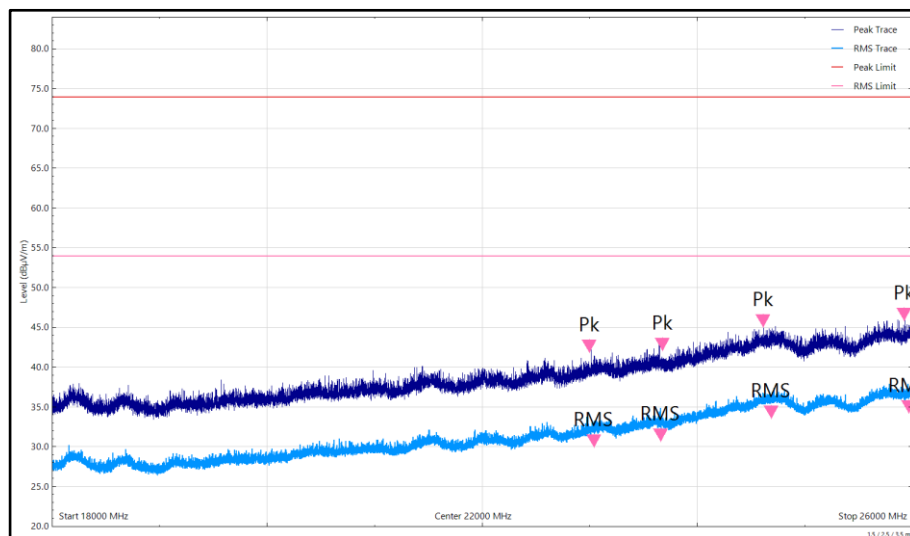
Peak and RMS Data

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
9637.430	38.75	74.00	-35.25	Peak	323	167	Vertical
9646.820	27.68	54.00	-26.32	RMS	323	167	Vertical
12758.100	39.72	74.00	-34.28	Peak	331	157	Horizontal
12792.670	28.34	54.00	-25.66	RMS	331	157	Horizontal
14399.800	38.77	54.00	-15.23	RMS	254	372	Horizontal
14399.830	37.30	54.00	-16.70	RMS	174	357	Vertical
14399.900	43.76	74.00	-30.24	Peak	254	372	Horizontal
14399.930	43.35	74.00	-30.65	Peak	174	357	Vertical
16991.870	43.37	74.00	-30.63	Peak	16	207	Horizontal
16994.370	31.02	54.00	-22.98	RMS	16	207	Horizontal
17298.750	31.76	54.00	-22.24	RMS	333	156	Horizontal
17324.420	43.57	74.00	-30.43	Peak	333	156	Horizontal
17350.590	31.73	54.00	-22.27	RMS	216	386	Vertical
17351.090	43.34	74.00	-30.66	Peak	216	386	Vertical

2.3.12 18GHz to 26GHz Radiated Emission Test



18 GHz to 26 GHz, Horizontal

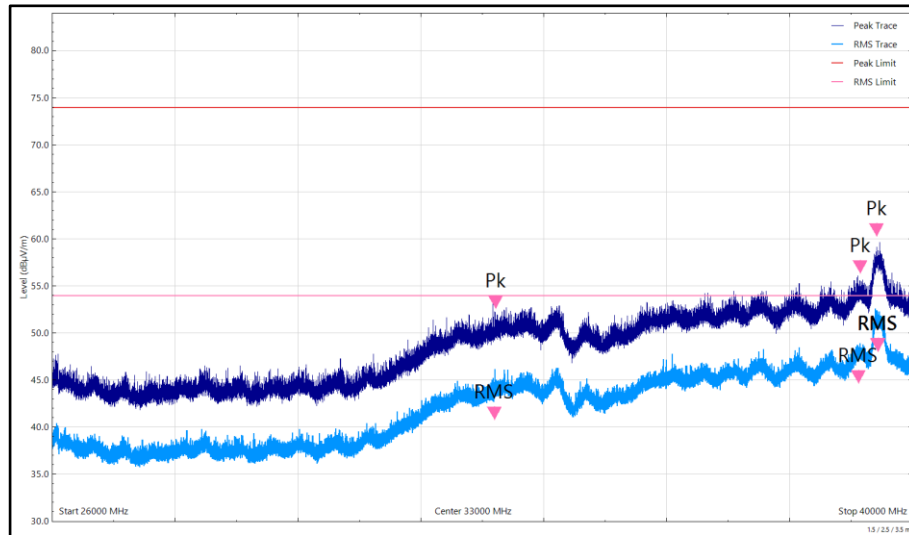


18 GHz to 26 GHz, Vertical

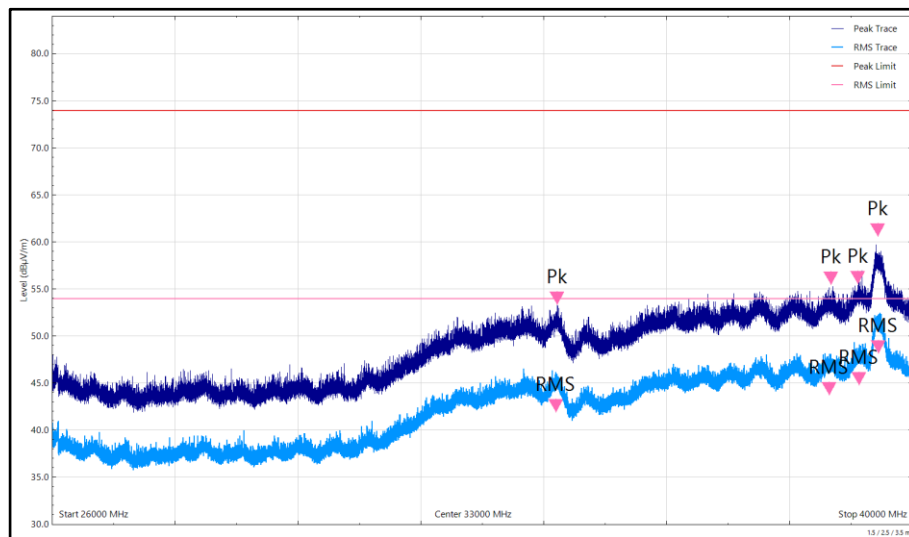
Peak and RMS Data

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
18176.868	37.75	74.00	-36.25	Peak	181	275	Horizontal
18194.850	26.31	54.00	-27.69	RMS	181	275	Horizontal
22996.395	41.64	74.00	-32.36	Peak	330	360	Vertical
23044.667	29.70	54.00	-24.30	RMS	330	360	Vertical
23664.166	30.49	54.00	-23.51	RMS	330	260	Vertical
23680.310	41.86	74.00	-32.14	Peak	330	260	Vertical
24056.439	43.36	74.00	-30.64	Peak	63	240	Horizontal
24074.341	31.48	54.00	-22.52	RMS	63	240	Horizontal
24616.116	44.84	74.00	-29.16	Peak	177	354	Vertical
24681.485	45.24	74.00	-28.76	Peak	105	150	Horizontal
24688.523	33.32	54.00	-20.68	RMS	177	354	Vertical
24745.741	33.47	54.00	-20.53	RMS	105	150	Horizontal
25923.867	45.63	74.00	-28.37	Peak	323	265	Vertical
25967.743	34.04	54.00	-19.96	RMS	323	265	Vertical

2.3.13 26GHz to 40GHz Radiated Emission Test



26 GHz to 40 GHz, Horizontal

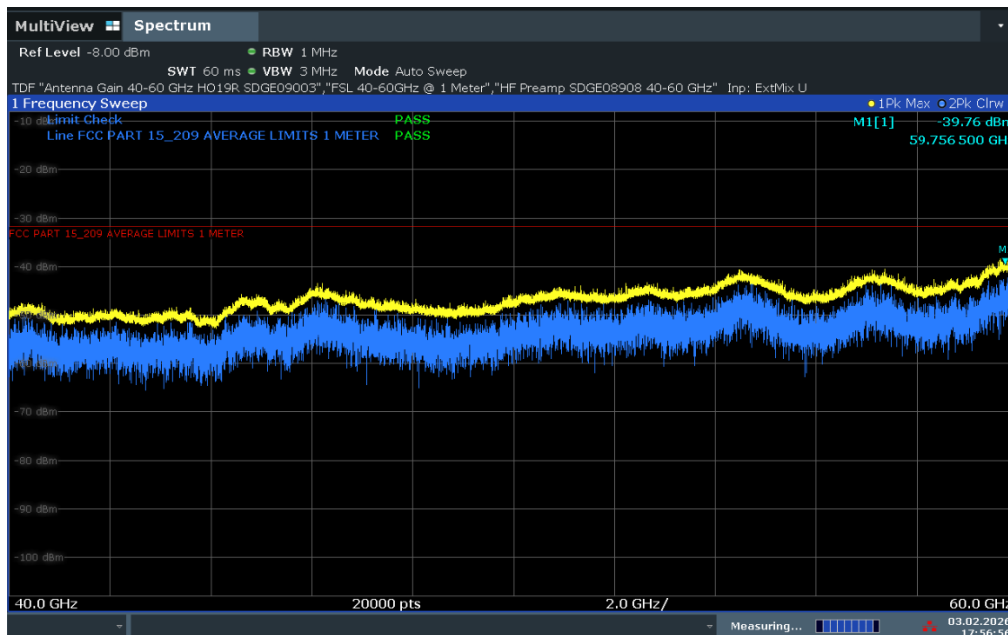


18 GHz to 26 GHz, Vertical

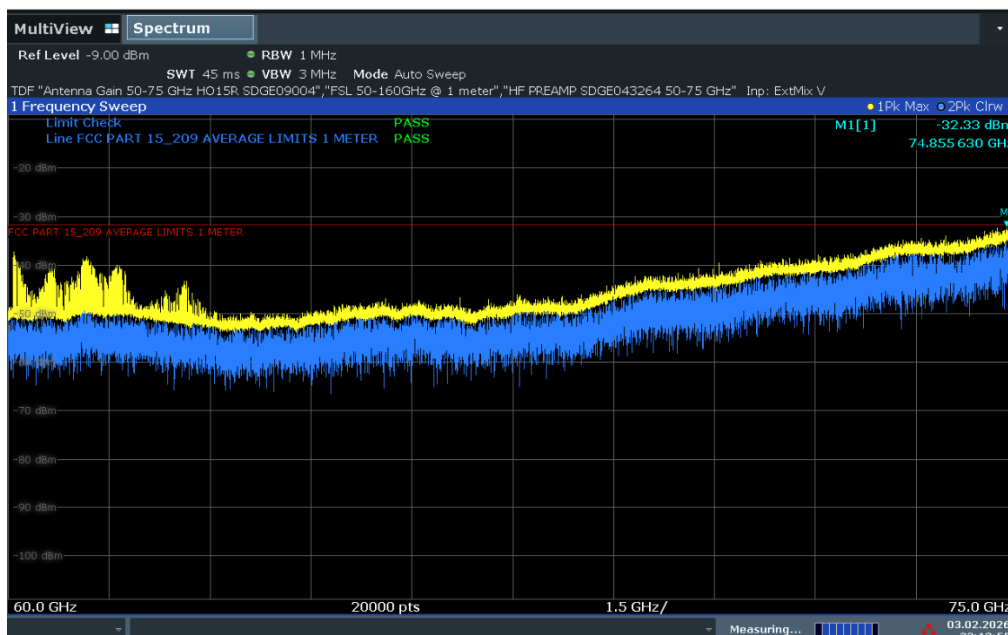
Peak and RMS Data

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
33207.490	40.65	54.00	-13.35	RMS	333	155	Horizontal
33225.390	52.46	74.00	-21.54	Peak	333	155	Horizontal
34201.080	41.75	54.00	-12.25	RMS	333	375	Vertical
34224.150	53.20	74.00	-20.80	Peak	333	375	Vertical
38647.720	43.56	54.00	-10.44	RMS	277	380	Vertical
38681.000	55.29	74.00	-18.71	Peak	277	380	Vertical
39120.140	55.39	74.00	-18.61	Peak	329	150	Vertical
39128.570	44.51	54.00	-9.49	RMS	7	353	Horizontal
39136.510	44.67	54.00	-9.33	RMS	329	150	Vertical
39155.430	56.20	74.00	-17.80	Peak	7	353	Horizontal
39424.380	60.12	74.00	-13.88	Peak	309	258	Horizontal
39441.830	60.46	74.00	-13.54	Peak	123	225	Vertical
39444.940	47.89	54.00	-6.11	RMS	309	258	Horizontal
39449.680	47.93	54.00	-6.07	RMS	166	374	Horizontal
39452.030	47.99	54.00	-6.01	RMS	123	225	Vertical

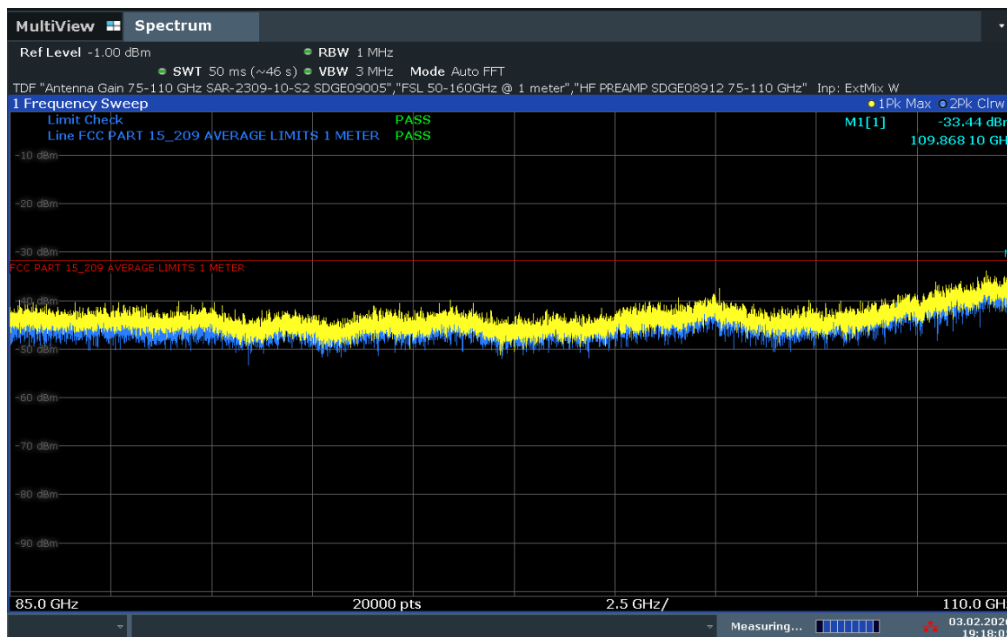
2.3.14 40GHz to 200GHz Maximized Plots



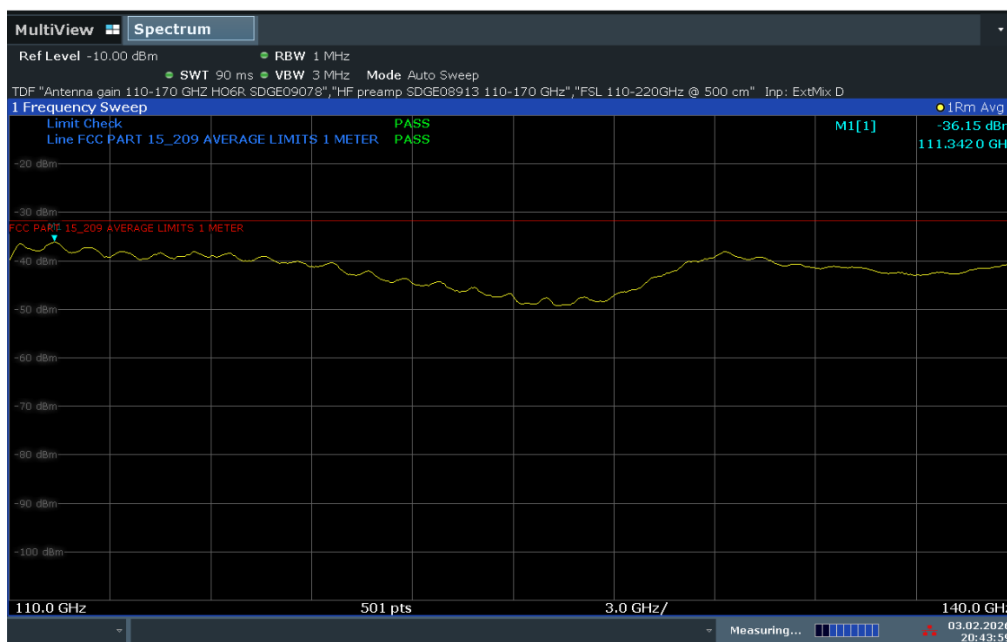
40GHz to 60GHz Plot



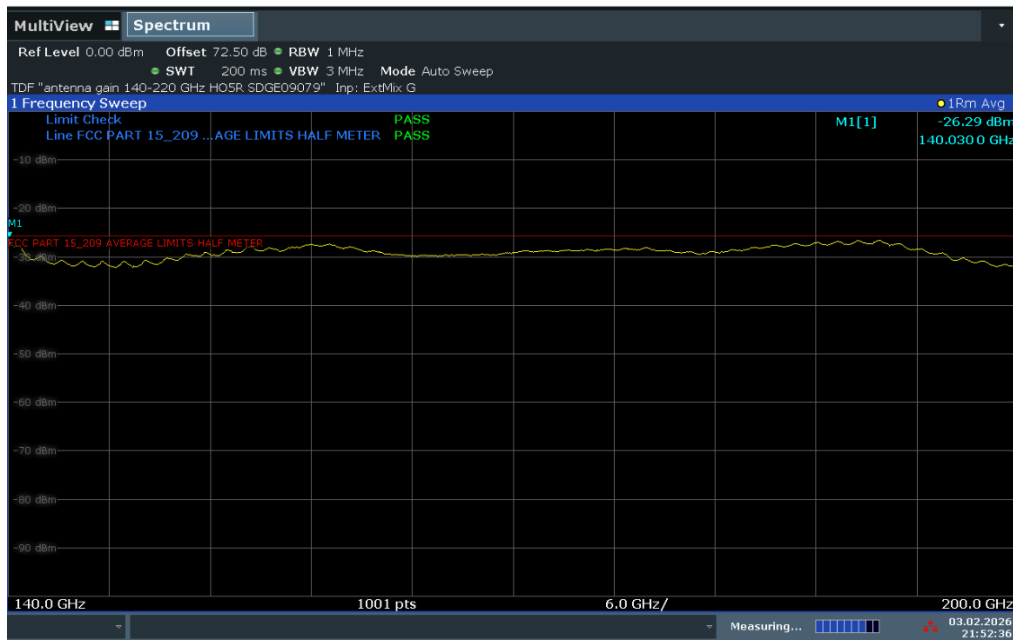
60GHz to 75GHz Plot



85GHz to 110GHz Plot



110GHz to 140GHz Plot



140GHz to 200GHz Plot

2.4 ANTENNA BEAMWIDTH

2.4.1 Specification Reference

FCC 47 CFR Part 15, Clause 15.256(i)(B)
RSS-211 Clause 5.2(a)

2.4.2 Standard Applicable

(B) LPR devices operating under the provisions of this section within the 75–85 GHz band must use an antenna with a –3 dB beamwidth no greater than 8 degrees.

2.4.3 Equipment Under Test and Modification State

Serial No: Z105343/ Default Test Configuration

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

March 23, 2026 / 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 Location

Test performed at TÜV SÜD America Inc. Mira Mesa facility

Ambient Temperature	24.0 °C
Relative Humidity	50.1 %
ATM Pressure	99.9 kPa

2.4.7 Additional Observations

- This is a radiated antenna pattern test.
- Test results from Section 2.5.8 of this test report applies.
- The half-power beamwidth of the EUT is verified as no greater than 8 degrees relative to the main beam gain.

2.5 ANTENNA SIDE LOBE GAIN

2.5.1 Specification Reference

FCC 47 CFR Part 15, Clause 15.256(j)
RSS-211 Clause 5.2(c)

2.5.2 Standard Applicable

Antenna side lobe gain. LPR devices operating under the provisions of this section must limit the side lobe antenna gain relative to the main beam gain for off-axis angles from the main beam of greater than 60 degrees to the levels provided in the following table:

Frequency Range (GHz)	Antenna side lobe gain limit relative to main beam gain
5.925 – 7.250	-22
24.05 – 29.00	-27
75 -85	-38

2.5.3 Equipment Under Test and Modification State

Serial No: Z105343/ Default Test Configuration

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

March 23, 2026 / 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 Location

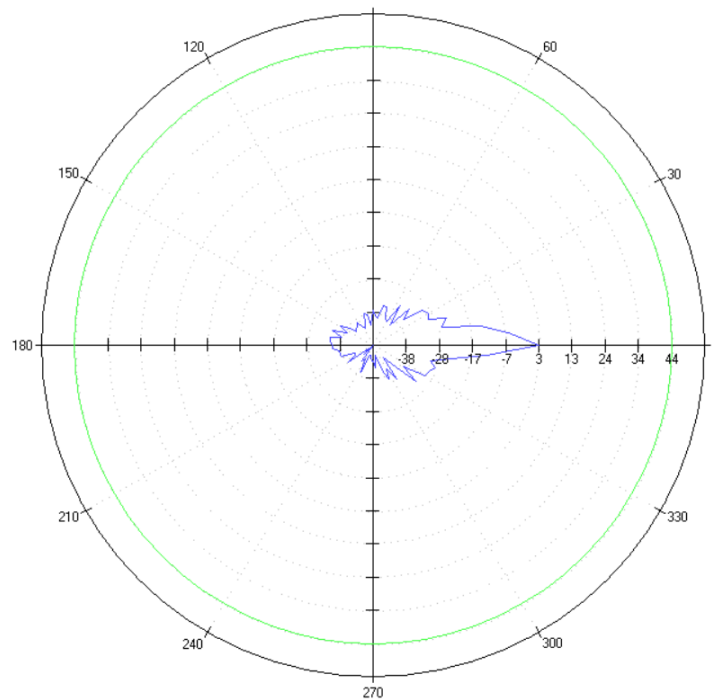
Test performed at TÜV SÜD America Inc. Mira Mesa facility

Ambient Temperature 24.0 °C
Relative Humidity 50.1 %
ATM Pressure 99.9 kPa

2.5.7 Additional Observations

- This is a radiated antenna pattern test.
- At no greater than 8°, the antenna side lobe gain relative to main beam gain is - 3dB.
- At greater than 60°, the antenna side lobe gain relative to main beam gain is - 38dB.
- Additional absorbers added to the screen room. The power cable was moved to the alternate.
- Only relevant polarity presented.

2.5.8 Test Results



Degrees	Gain (dB)	Degrees	Gain (dB)	Degrees	Gain (dB)	Degrees	Gain (dB)	Degrees	Gain (dB)
0	0	70	-38.87	145	-42.75	220	-49.74	295	-39.65
5	-9.17	75	-38.85	150	-39.57	225	-47.48	300	-42.90
8	-18.46	80	-42.78	155	-42.55	230	-51.38	305	-38.44
10	-17.82	85	-42.30	160	-38.10	235	-45.32	310	-46.24
15	-29.50	90	-40.70	165	-41.36	240	-46.50	315	-42.80
20	-27.16	95	-45.12	170	-38.09	245	-42.28	320	-33.98
25	-32.69	100	-41.67	175	-38.15	250	-48.09	325	-39.87
30	-31.50	105	-41.15	180	-38.79	255	-47.75	330	-32.74
35	-32.73	110	-44.41	185	-38.83	260	-45.88	335	-32.04
40	-39.01	115	-45.55	190	-40.90	265	-46.44	340	-30.90
45	-35.47	120	-44.87	195	-40.09	270	-46.62	345	-32.90
50	-43.01	125	-42.68	200	-41.00	275	-44.52	350	-27.00
55	-36.62	130	-43.90	205	-45.32	280	-46.52	352	-24.57
60	-42.83	135	-44.01	210	-44.87	285	-48.26	355	-15.85
65	-42.22	140	-44.63	215	-42.17	290	-43.23	360	0



SECTION 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	06/29/25	06/29/26
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	12/16/25	12/16/27
69563	1-10 GHz Broad-Band Horn Antenna	BBHA 9120 B	00875	Schwarzbeck Mess Elektronik	12/16/25	12/16/27
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
6628	Loop Antenna	HFH2- Z2335.4711.52	FNr.800.458/2 5	Schwarzbeck	07/02/24	07/02/26
9001	Horn antenna (18- 26.5GHz)	HO42S	101	Custom Microwave	09/16/25	09/16/27
9003	Horn antenna (26-40 GHz)	HO28S	102	Custom Microwaves	09/16/25	09/16/27
40815	Pre-amplifier (18-40 GHz)	SLKKa-30-6	15G27	Spacek Labs	11/03/25	11/03/26
7637	Harmonics mixer (40- 60 GHz)	FS-Z60	100009	Rhode & Schwarz	03/19/24	03/19/26
51288	Harmonics mixer (50- 75 GHz)	FS-Z75	100988	Rhode & Schwarz	10/10/25	10/10/27
7633	Harmonics mixer (75- 110 GHz)	HM-110-7	101000	Radiometer Physics	10/02/25	10/02/27
7634	Harmonics mixer (110-170 GHz)	HM-170	0062	Radiometer Physics	10/02/25	10/02/27
7635	Harmonics mixer (170-220 GHz)	HM-220	020022	Radiometer Physics	10/02/25	10/02/27
7632	Harmonics mixer (220-325 GHz)	HM-325	020075	Radiometer Physics	10/02/25	10/02/27
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		
9079	Horn antenna (140- 220 GHz)	HO5R	HO5R	Custom Microwaves		
9078	Horn antenna (110- 170 GHz)	HO6R	HO6R	Custom Microwaves		
7628	Horn antenna (75-110 GHz)	SAR-2309-10-S2	13481-01	Sage Millimeter, Inc.	Verified by 7611 and corresponding antenna/Active multiplier combination	
9082	Horn antenna (140- 220 GHz)	HO5R	N/A	Custom Microwaves		
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.		
8920	Active Multiplier (90-140 GHz)	AMC-08-RFH00	58	Millitech, Inc.		
8909	Active Multiplier (140-220 GHz)	MCA-05-150096	13	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 (9 kHz to 30 MHz)

<i>Radiated Measurement 9kHz - 30 MHz 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	0.20 dB	Normal, k=2	2.000	0.10	0.01	
3	Antenna factor AF	0.44 dB	Normal, k=2	2.000	0.22	0.05	
4	Receiver sinewave accuracy	0.15 dB	Normal, k=2	2.000	0.08	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	0.00 dB	Triangular	2.449	0.00	0.00	
16	Separation distance at 3 m	0.30 dB	Rectangular	1.732	0.17	0.03	
17	Effect of setup table material	0.00 dB	Rectangular	1.732	0.00	0.00	
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	2.45 dB		
Expanded uncertainty				Normal, k=2	4.91 dB		

3.2.2 Radiated Emission Measurements (30 MHz to 1GHz)

<i>Radiated Measurement 30 - 1000 MHz at a distance of 3 m</i>					
Input Quantity (Contribution) X_i	Value	Prob. Dist.	Divisor	$u_i(x)$	$u_i(x)^2$
Receiver reading	0.10 dB	Normal, k=1	1.000	0.10	0.01
Attenuation: antenna-receiver	0.20 dB	Normal, k=2	2.000	0.10	0.01
Antenna factor AF	0.58 dB	Normal, k=2	2.000	0.29	0.08
Receiver sinewave accuracy	0.15 dB	Normal, k=2	2.000	0.08	0.01
Receiver pulse amplitude	1.50 dB	Rectangular	1.732	0.87	0.75
Receiver pulse repetition rate	1.50 dB	Rectangular	1.732	0.87	0.75
Noise floor proximity	0.50 dB	Rectangular	1.732	0.29	0.08
Mismatch: antenna-receiver	0.95 dB	U-shaped	1.414	0.67	0.45
AF frequency interpolation	0.30 dB	Rectangular	1.732	0.17	0.03
AF height deviations	0.10 dB	Rectangular	1.732	0.06	0.00
Directivity difference at 3 m	3.12 dB	Rectangular	1.732	1.80	3.24
Phase center location at 3 m	1.00 dB	Rectangular	1.732	0.58	0.33
Cross-polarisation	0.90 dB	Rectangular	1.732	0.52	0.27
Balance	0.00 dB	Rectangular	1.732	0.00	0.00
Site imperfections	3.99 dB	Triangular	2.449	1.63	2.65
Separation distance at 3 m	0.30 dB	Rectangular	1.732	0.17	0.03
Effect of setup table material	0.57 dB	Rectangular	1.732	0.33	0.11
Table height at 3 m	0.10 dB	Normal, k=2	2.000	0.05	0.00
Near-field effects	0.00 dB	Triangular	2.449	0.00	0.00
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		

3.2.3 Radiated Emission Measurements (Above 1GHz)

<i>Radiated Measurement (1 GHz-40 GHz) at a distance of 3 m</i>						
Input Quantity (Contribution) X_i	Value	Prob. Dist.	Divisor	$u_i(x)$	$u_i(x)^2$	
Receiver reading	0.10 dB	Normal, k=1	1.000	0.10	0.01	
Attenuation: antenna-receiver	0.30 dB	Normal, k=2	2.000	0.15	0.02	
Preamplifier Gain	0.20 dB	Normal, k=2	2.000	0.10	0.01	
Antenna factor AF	0.47 dB	Normal, k=2	2.000	0.24	0.06	
Sinewave accuracy	0.15 dB	Normal, k=2	2.000	0.08	0.01	
Instability of preamp gain	1.21 dB	Rectangular	1.732	0.70	0.49	
Noise floor proximity	0.70 dB	Rectangular	1.732	0.40	0.16	
Mismatch: antenna-preamplifier	1.41 dB	U-shaped	1.414	1.00	0.99	
Mismatch: preamplifier-receiver	1.30 dB	U-shaped	1.414	0.92	0.85	
AF frequency interpolation	0.30 dB	Rectangular	1.732	0.17	0.03	
Directivity difference at 3 m	1.50 dB	Rectangular	1.732	0.87	0.75	
Phase center location at 3 m	0.30 dB	Rectangular	1.732	0.17	0.03	
Cross-polarisation	0.90 dB	Rectangular	1.732	0.52	0.27	
Site imperfections VSWR (Method 2)	5.53 dB	Triangular	2.000	4.89	1.13	
Effect of setup table material	1.57 dB	Rectangular	1.732	0.91	0.82	
Separation distance at 3 m	0.30 dB	Rectangular	1.732	0.17	0.03	
Table height at 3 m	0.00 dB	Normal, k=2	2.000	0.00	0.00	
Combined standard uncertainty			Normal	2.38 dB		
Expanded uncertainty			Normal, k=2	4.76 dB		

3.2.4 Radiated Emission Measurements (Above 40GHz)

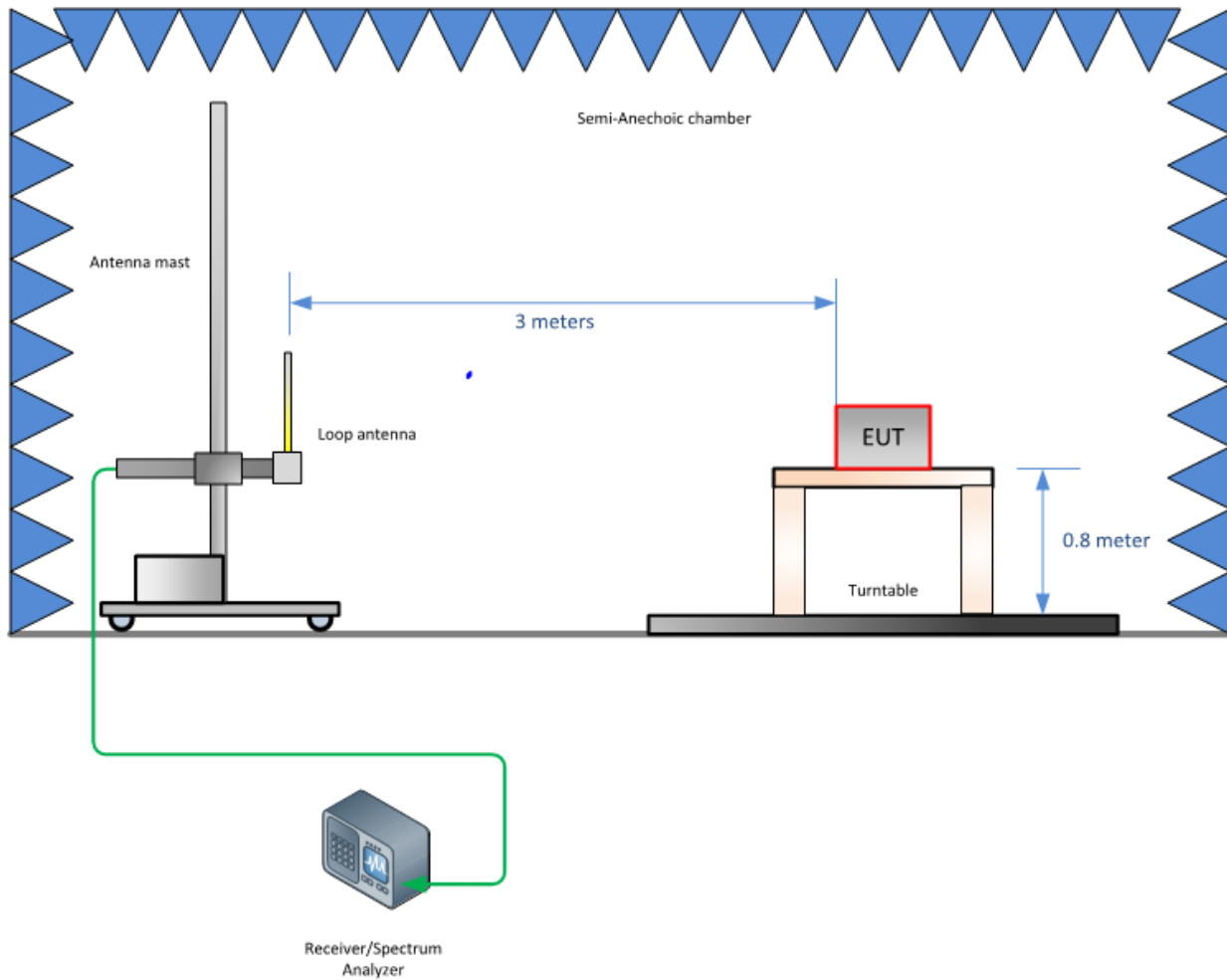
<i>Radiated Measurement (above 40 GHz) at a distance of 3 m</i>						
	Input Quantity (Contribution) X_i	Value	Prob. Dist.	Divisor	$u_i(x)$	$u_i(x)^2$
1	Receiver reading	0.10 dB	Normal, k=1	1.000	0.10	0.01
2	Attenuation: antenna-receiver	0.30 dB	Normal, k=2	2.000	0.15	0.02
3	Preamplifier Gain	0.50 dB	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		

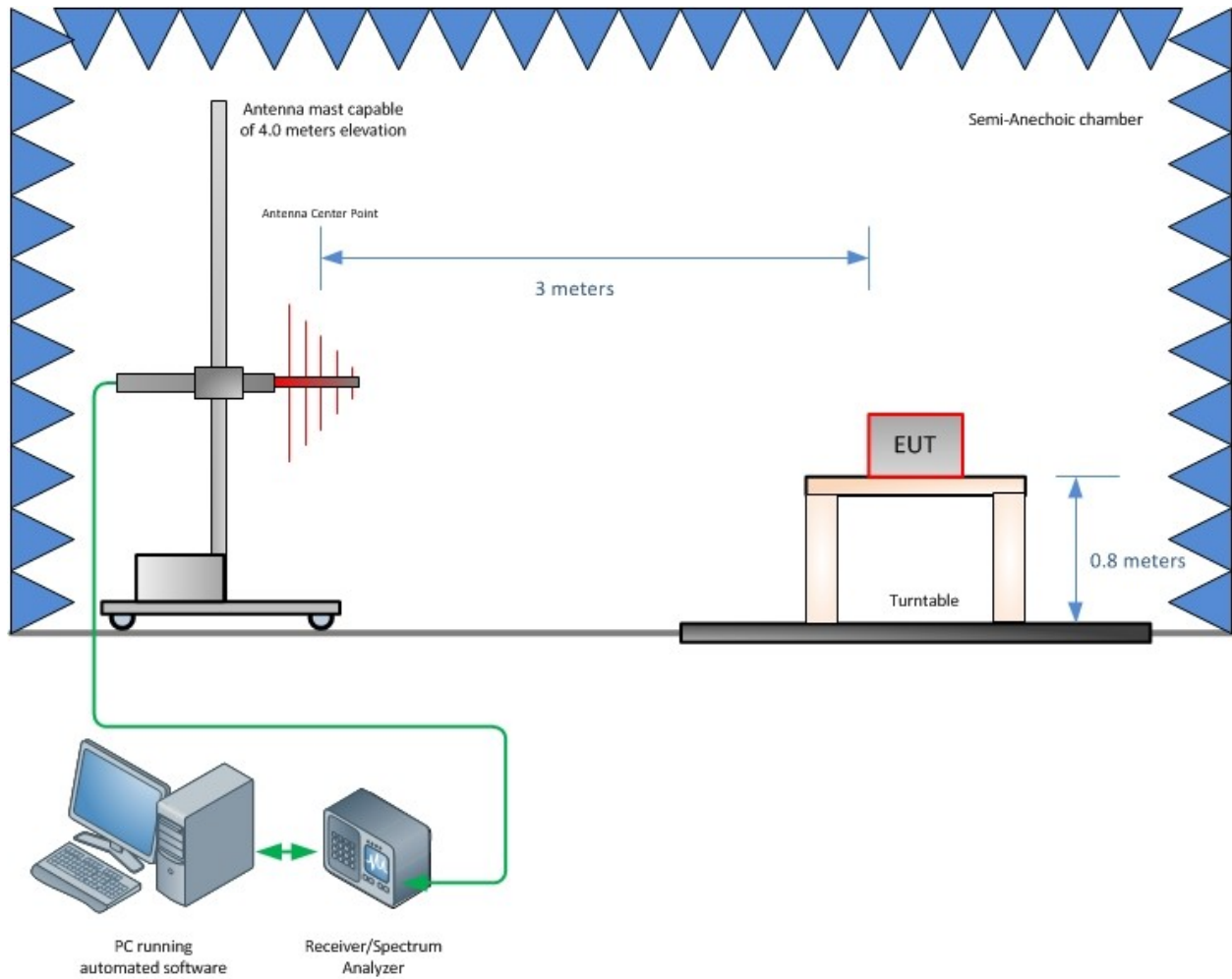


SECTION 4

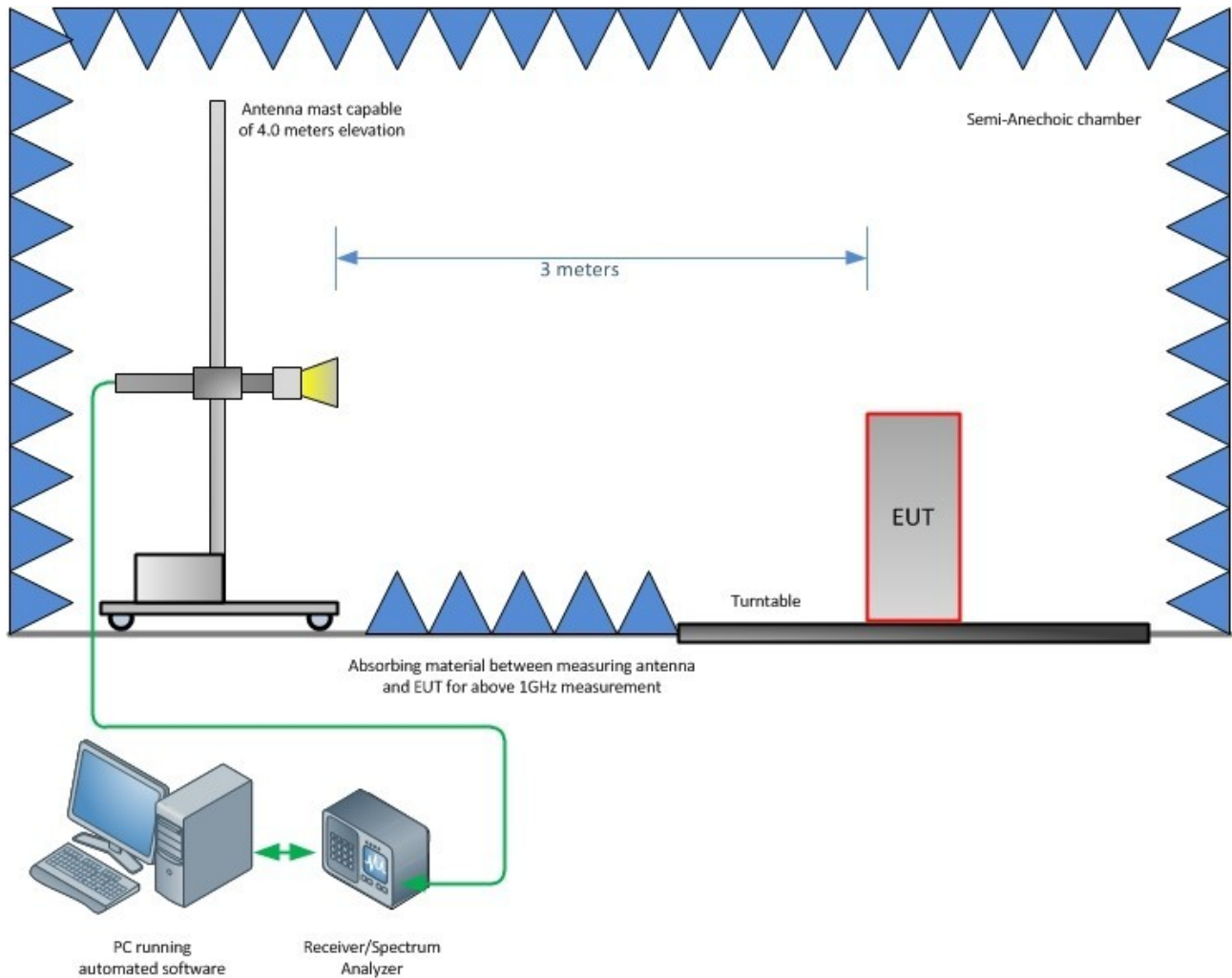
Diagram of Test Setup

4.1 TEST SETUP DIAGRAM





Radiated Emission Test Setup (Below 1GHz)



Radiated Emission Test Setup (Above 1GHz)



SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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