

RADIO Testing of the
Data Sciences International
Model: SoHo-X00N

In accordance with:
FCC Part 15 Subpart C §15.249 and RSS-210

Prepared for:
Data Sciences International
119 14th Street NW, Suite 100
New Brighton, MN 5512



Product Service

Choose certainty.
Add value.

COMMERCIAL-IN-CONFIDENCE

Issue Date: June 2024
Document Number: 721000439C | Issue: 02

RESPONSIBLE FOR	NAME	TITLE	DATE	SIGNATURE
Prepared By	Miguel Angel Rabago Garcia	Wireless Test Engineer	07/03/2024	
Authorized Signatory	Ferdinand S. Custodio	EMC Senior Test Engineer / Wireless Team Lead	07/03/2024	

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

EXECUTIVE SUMMARY

A sample of this product was tested and found to be in compliance with FCC Part 15 Subpart C §15.249 and RSS-210



A2LA Cert. No. 2955.13

DISCLAIMER AND COPYRIGHT

This report has been prepared by TÜV SÜD America with all reasonable skill and care. The document is confidential to the potential Client and TÜV SÜD America. No part of this document may be reproduced without the prior written approval of TÜV SÜD America. © 2019 TÜV SÜD America.

ACCREDITATION

Our A2LA Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our A2LA Accreditation.

TÜV SÜD America, Inc.
10040 Mesa Rim Road
San Diego, CA 92121-2912

TÜV SÜD America, Inc.
Rancho Bernardo Facility
16936 Via Del Campo
San Diego, CA 92127

Phone: 858 678 1400

www.tuv-sud-america.com



Contents

1	Report Summary	2
1.1	Report Modification Record.....	2
1.2	Introduction.....	2
1.3	Brief Summary of Results	3
1.4	Product Information	4
1.5	Deviations from the Standard.....	6
1.6	EUT Modification Record	7
1.7	Test Methods.....	7
1.8	Test Location.....	7
1.9	Test Facility Registration	7
	TEST DETAILS	9
2	Test Details	10
2.1	Antenna Requirements.....	10
2.2	20 dB Bandwidth and 99% Occupied Bandwidth.....	11
2.3	Field Strength Limits for Fundamental and Harmonics	18
2.4	Radiated Spurious Emissions	23
3	TEST EQUIPMENT USED.....	36
3.1	List of absolute measuring and other principal items of test equipment.	36
3.2	Measurement Uncertainty	37
4	Test Set-up Diagrams for Emissions Test.....	40
5	Accreditation, Disclaimers and Copyright.....	43



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	Initial Release	07/03/2024
2	Remove the word "Implant" from Model SoHo-X00N Implant	07/05/2024

1.2 Introduction

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	Data Sciences International 119 14th Street NW, Suite 100 New Brighton, MN 5512
Applicant Contact Information	Matt Kunz Sr. Principal Electrical Engineer mmkunz@datasci.com 509 236-0135
Model Number(s)	SoHo-X00N
Serial Number(s)	1285984, 1285980
FCC ID	MHASOHO
IC:	5681A-SOHO
Number of Sample/s Tested	2
Test Specification/Issue/Date	- FCC Part 15 Subpart C §15.249 (October 2023) - RSS-210 — Licence Exempt Radio Apparatus Category I Equipment. Issue 11 June 25, 2024. - FCC Part 15 Subpart C §15.209 (October 2023)
Start of Test	June 11, 2024
Finish of Test	June 22, 2024
Related Document(s)	- ANSI C63.10-2013. American National Standard of Procedures for Compliance testing of Unlicensed Wireless Devices. - WirelessTest_Instructions-Rev01.pdf



1.3 Brief Summary of Results

A brief summary of the tests carried out for host integration verification in accordance with FCC Part 15 Subpart C §15.249 with cross-reference to the corresponding IC RSS standard are shown below.

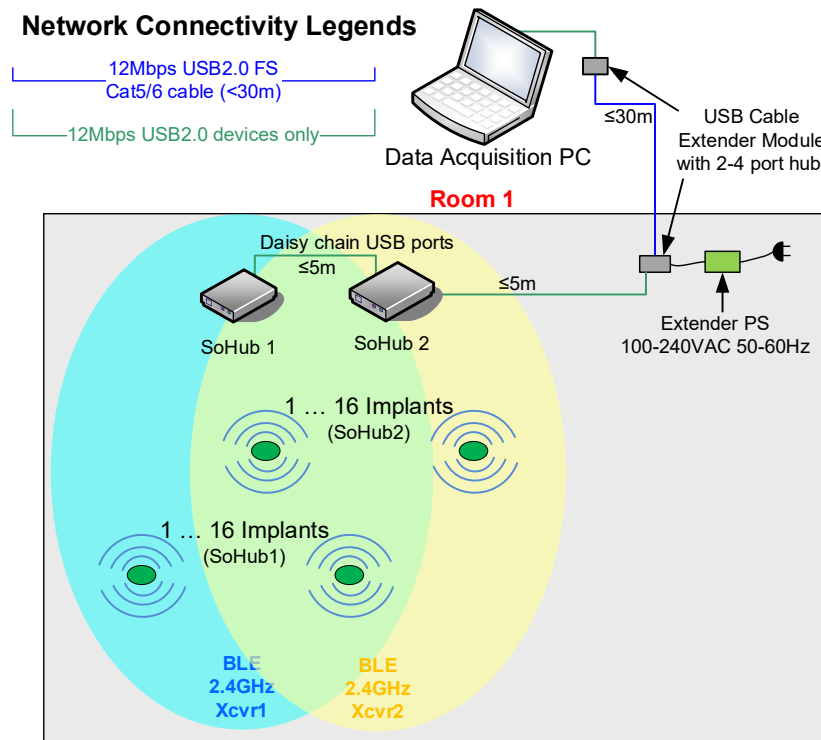
Report Section	Standard Section	Standard Spec Clause	Test Description	Result	Comments/Base Standard
-	§15.207(a)	RSS-Gen 8.8	Conducted Emissions*	N/A	EUT is Battery Powered
2.1	§15.203(d)	-	Antenna Requirements	Compliant	
2.2	§15.215(c)	RSS-Gen 6.7	20 dB Bandwidth and 99% Occupied Bandwidth	Compliant	
2.3	§15.249(a)	RSS-210 8.3	Field Strength Limits for Fundamental and Harmonics	Compliant	
2.4	§15.249(d)	RSS-210 8.3	Spurious Radiated Emissions	Compliant	

*: N/A EUT is battery powered.

1.4 Product Information

1.4.1 Technical Description

The Equipment Under Test (EUT) is an Implant for Telemetry Acquisition System for socially (group) housed animals. The platform collects physiological data from identified, autoconfigured subjects, and telemetries the high-quality digital physiological data back to acquisition computer. The platform consists of an acquisition computer with transceivers (SoHub) and implants (EUT). The cable communications between the acquisition computer and hubs are a USB link. If the cable needs to exceed 5m between the PC and first SoHub a USB extender (and power supply) is provided. The platform's telemetry protocol is Bluetooth Low Energy (BLE). The RF Network topology is a star network with up to 16 implants / hub. The EUT will have various model numbers associated with differing sensing technologies and number of channels, i.e. ECG, Pressure, Temperature, Activity, etc. but the RF technology will remain the same.



System Overview



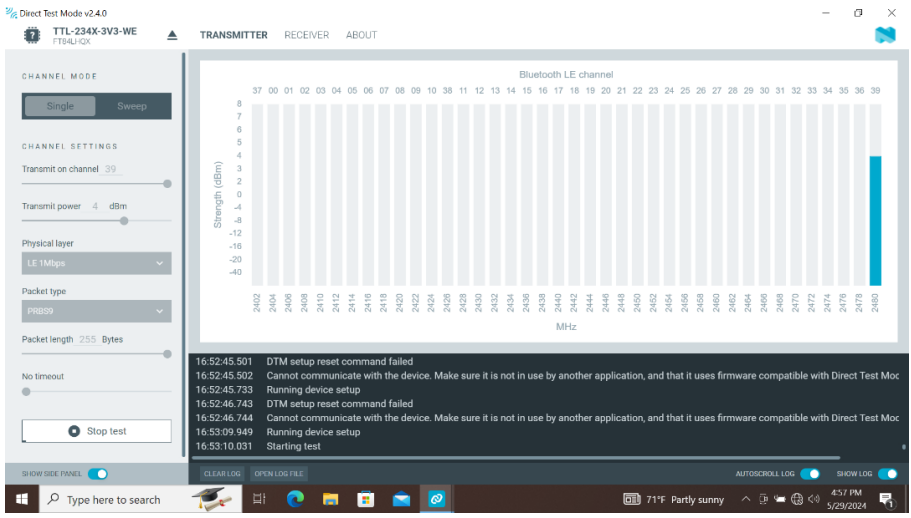
1.4.2 EUT Specification

EUT Description	Implant for Telemetry Acquisition System
Model Name	SoHo-X00N
Model Number(s)	SoHo-X00N
Test Voltage	3.6VDC Internal Battery
Mode Verified	Bluetooth LE 5.0
Modulation	GFSK
Capability	Bluetooth Low Energy (BLE 5.0)
Primary Unit (EUT)	☒ Production ☐ Pre-Production ☐ Engineering
Maximum Reported Output Power	1.0 μ W
Frequency Range	2400MHz to 2483.5MHz
Antenna Type	Inverted "F" PCB antenna.
Antenna Gain	-17.0dBi
Manufacturer	Data Science International
Antenna Model	DSI X00-MVP

1.4.3 Radiated Field Strength

Bluetooth Low Energy (LE)	Frequency Range (MHz)	Peak (dB μ V/m @ 3 m)	EIRP (dBm)
	2402-2480	80.98	-14.25

1.4.4 Test Configuration

Configuration Number	Description
Default	Radiated Test Unit: The manufacturer provided a special unit intended for Radiated Emissions testing and has special DTM (Direct Test Mode) firmware to cycle the implant between 3 different Channels
DTM	The manufacturer provided detailed instructions on how to configure the RF parameters of the EUT required for testing using Direct Test Mode V2.4.0 app per document provided by the manufacturer (WirelessTest_Instructions-Rev01.pdf). 

1.4.5 Simplified Test Configuration Diagram

See section 4 for details.

1.4.6 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Description
DSI	Magnet	Used to turn on the unit and change channels
DSI	External Battery	External battery with switch. Battery is Tadiran Lithium TL-5930 Size D 3.6V
DSI	Test Board for SoHo X00N	Model N/A S/N 1285980
Lenovo	Support PC MS Windows 10 Pro	Model 20JS0004US S/N PC-0KP3YL 17/03

1.5 Deviations from the Standard

There were no deviations made during testing from the applicable test standard or test plan.



1.6 EUT Modification Record

The table below details modifications made to the EUT during the test program. 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
0	As supplied by the manufacturer	-	-

1.7 Test Methods

All measurements contained in this report were conducted with ANSI C63.10-2013, 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 C63.10-2013. The test modes were adapted according to the Operating Instructions provided by the manufacturer/client.

1.8 Test Location

TÜV SÜD America conducted the following tests at our San Diego CA, Test Laboratory's.

Office Address:

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.

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 RADIO 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 LP0002 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
Data Sciences International
Implant for Telemetry Acquisition System



2 Test Details

2.1 Antenna Requirements

2.1.1 Specification Reference

FCC 47 CFR Part 15, Clause 15.203

2.1.2 Standard Applicable

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

2.1.3 Equipment Under Test and Modification State

Serial No: 1285984 / N/A

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

N/A

2.1.5 Test Equipment Used

N/A

2.1.6 Environmental Conditions (Rancho Bernardo)

N/A

2.1.7 Test Results

EUT uses a permanently attached integral antenna, so it is considered sufficient to comply with the provisions of section FCC 47 CFR Part 15, Clause 15.203



2.2 20 dB Bandwidth and 99% Occupied Bandwidth.

2.2.1 Specification Reference

FCC 47 CFR Part 15, Clause §15.215(c)
RSS-Gen 6.7

2.2.2 Standard Applicable

FCC 47 CFR Part 15, Clause §15.215(c)

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

RSS-Gen 6.7

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

2.2.3 Equipment Under Test and Modification State

Serial No: 1285984 / DTM Test Configuration

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

June 13 and June 22, 2024 / MARG

2.2.5 Test Equipment Used

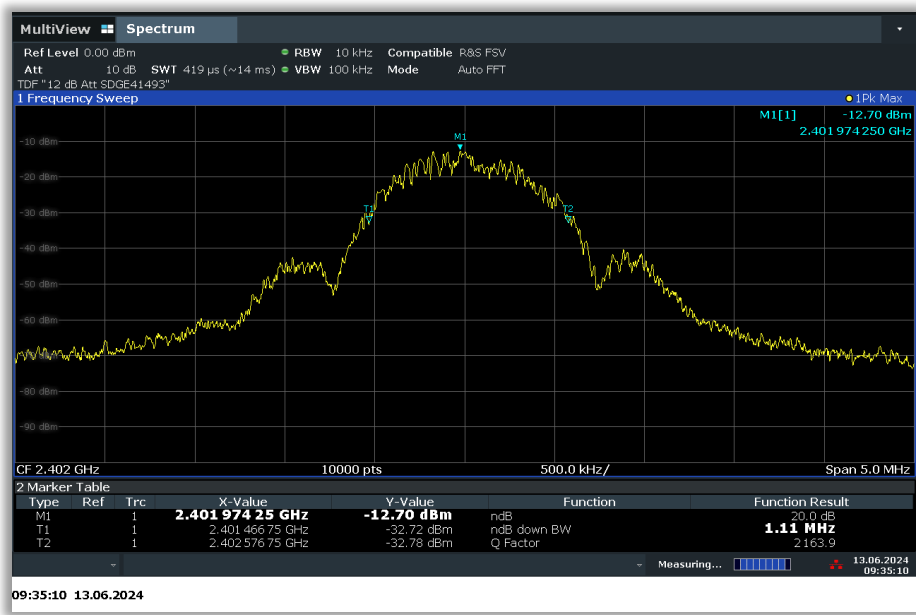
The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.6 Environmental Conditions (Mira Mesa Facility)

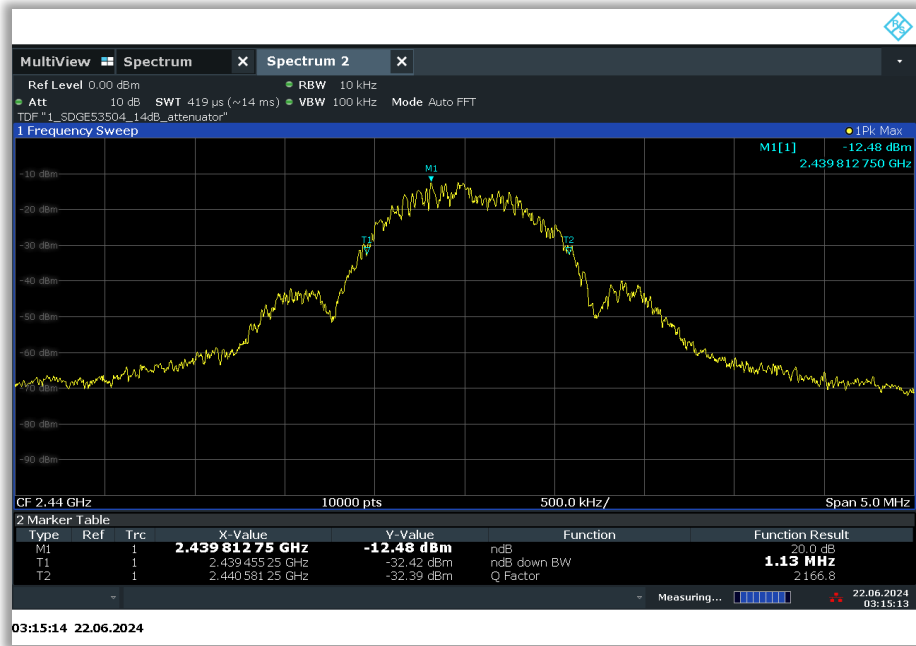
Ambient Temperature	25.2°C
Relative Humidity	47.4%
ATM Pressure	98.3kPa



2.2.7 20 dB Bandwidth Test Results



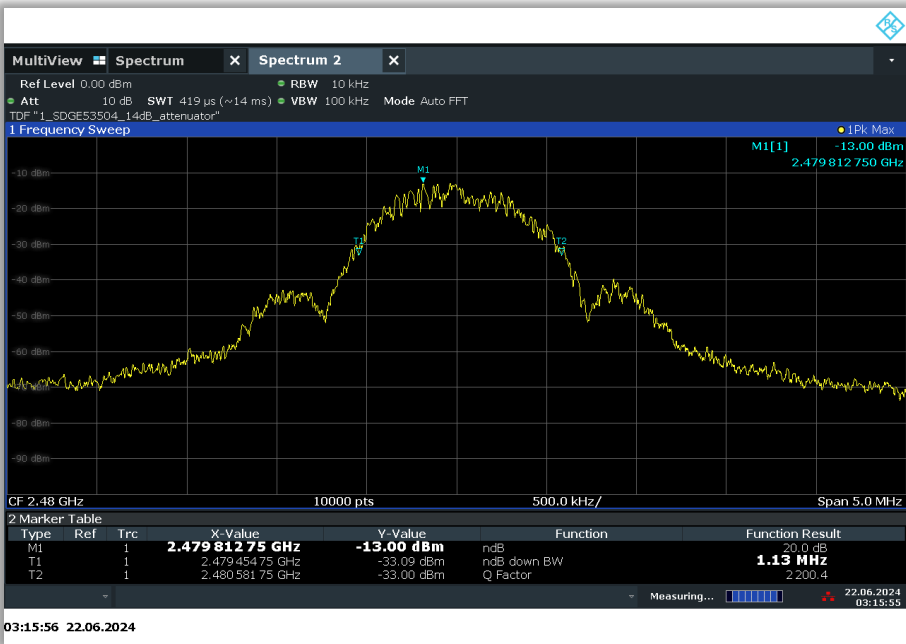
20 dB Bandwidth Low Channel 2.402 GHz 1M Data Rate



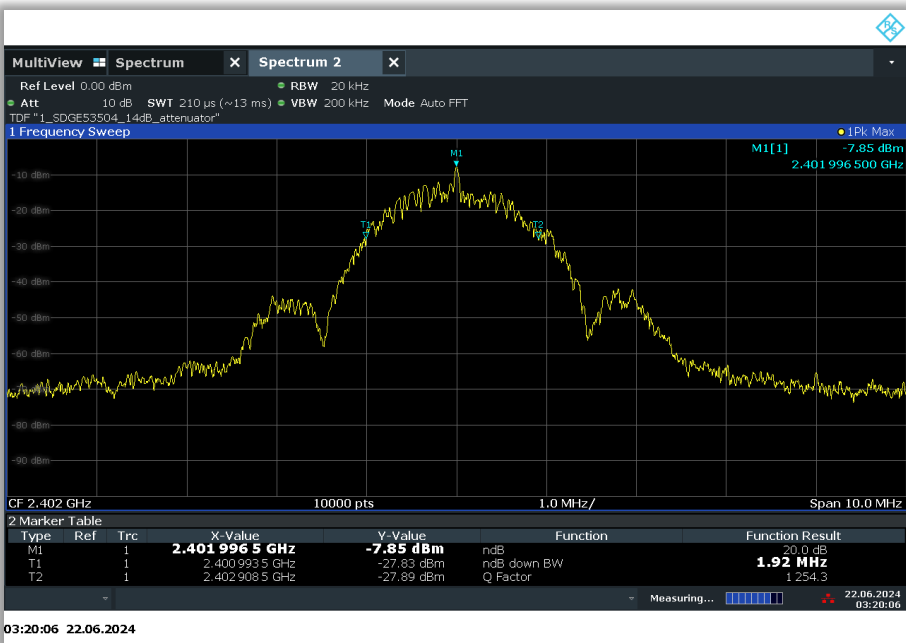
20 dB Bandwidth Middle Channel 2.440 GHz 1M Data Rate



Product Service



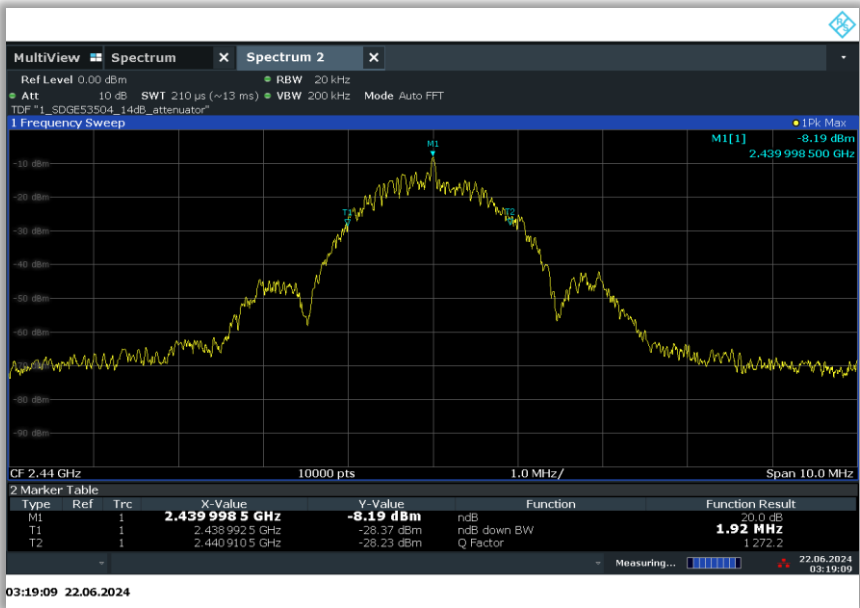
20 dB Bandwidth High Channel 2.480 GHz 1M Data Rate



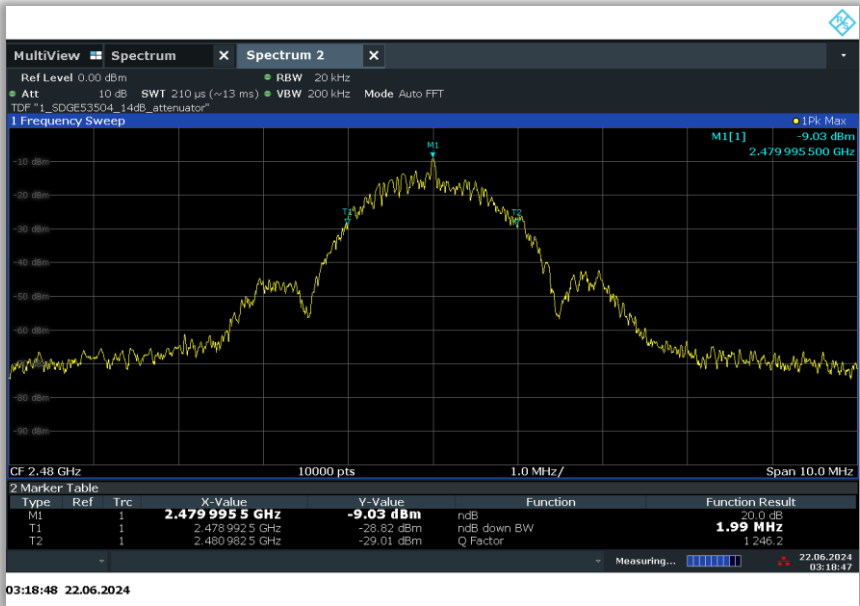
20 dB Bandwidth Low Channel 2.402 GHz 2M Data Rate



Product Service



20 dB Bandwidth Middle Channel 2.440 GHz 2M Data Rate



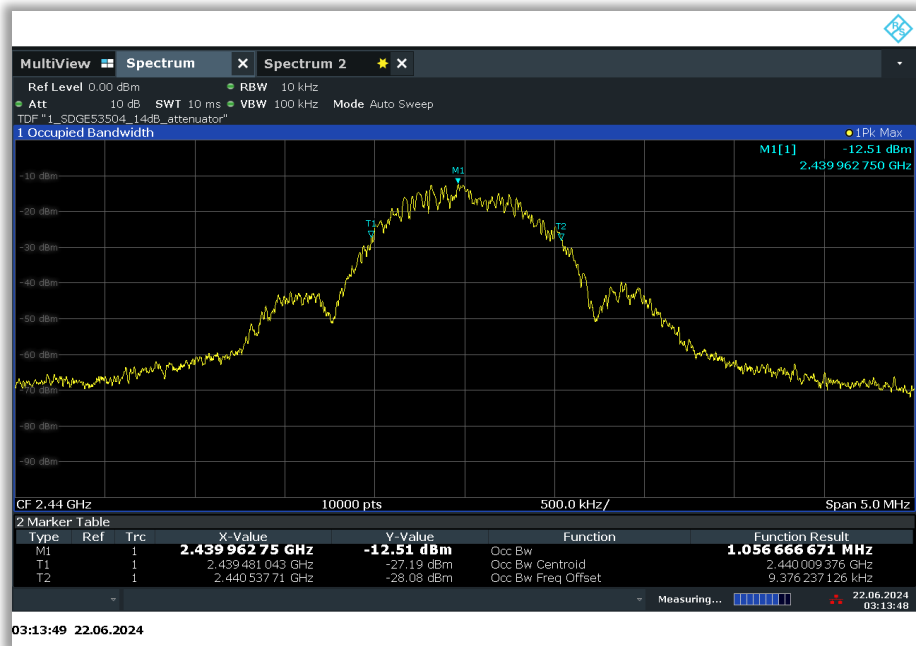
20 dB Bandwidth High Channel 2.480 GHz 2M Data Rate



2.2.8 99% Occupied Bandwidth



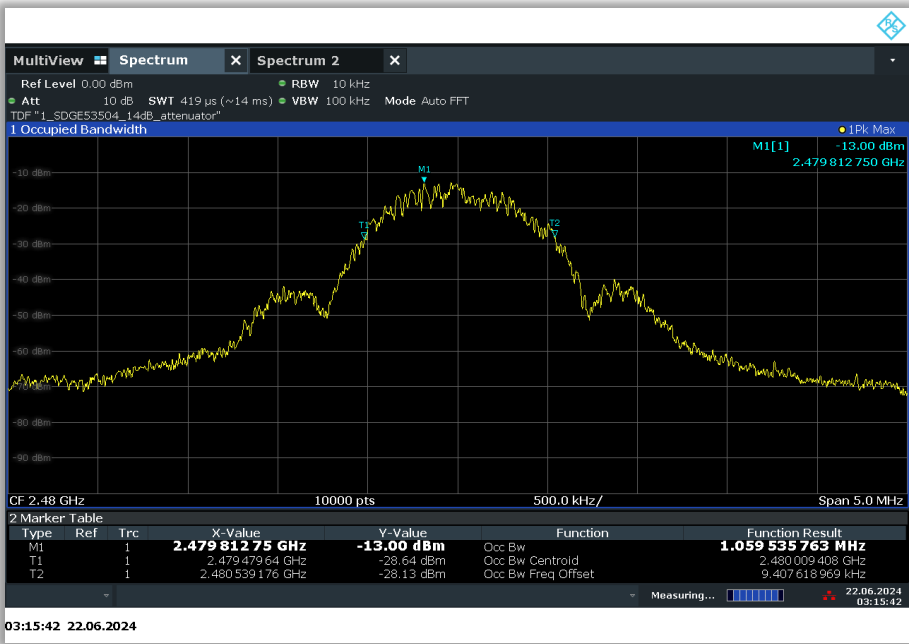
99% Occupied Bandwidth Low Channel 2.402 GHz 1M Data Rate
The measured 99% OBW is 1.0499MHz



99% Occupied Bandwidth Middle Channel 2.440 GHz 1M Data Rate
The measured 99% OBW is 1.056MHz



Product Service



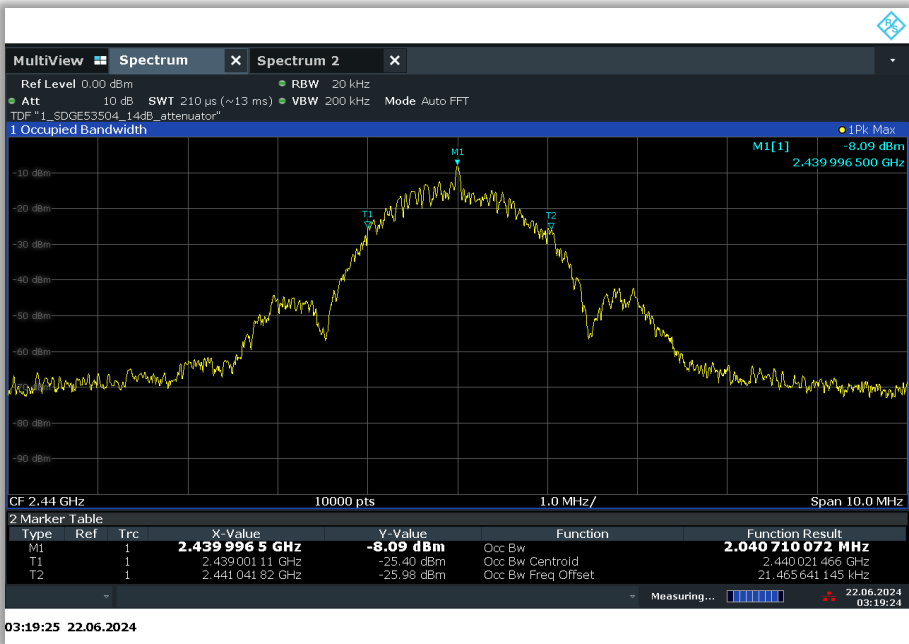
99% Occupied Bandwidth High Channel 2.480 GHz 1M Data Rate
The measured 99% OBW is 1.59MHz



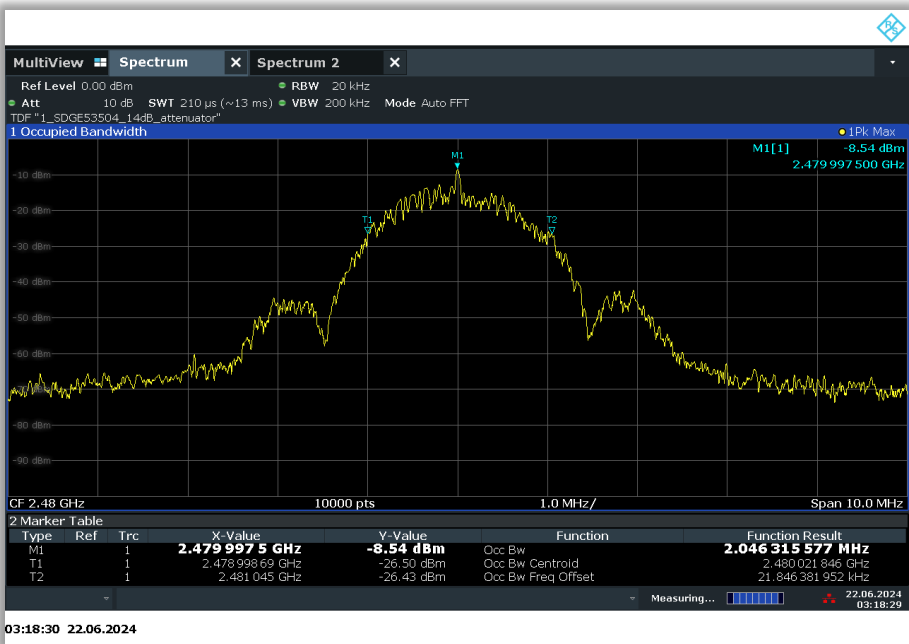
99% Occupied Bandwidth Low Channel 2.402 GHz 2M Data Rate
The measured 99% OBW is 2.037MHz



Product Service



99% Occupied Bandwidth Middle Channel 2.440 GHz 2M Data Rate
The measured 99% OBW is 2.040MHz



99% Occupied Bandwidth High Channel 2.480 GHz 2M Data Rate
The measured 99% OBW is 2.046MHz



2.3 Field Strength Limits for Fundamental and Harmonics

2.3.1 Specification Reference

FCC 47 Chapter I Subchapter A Part 15 Subpart C §15.249(a) and RSS-210 A.1.2 (a)

2.3.2 Standard Applicable

FCC 47 Chapter I Subchapter A Part 15 Subpart C §15.249(a):

(a) The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency (MHz)	Field strength of fundamental (mv/m)	Field strength of harmonics (µv/m)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

RSS-210 A.1.2 (a):

The field strength of emissions from momentarily operated intentional radiators shall not exceed the limits in table A1, based on the average value of the measured emissions. The requirements of the “Pulsed operation” section of RSS-Gen apply for averaging pulsed emissions and limiting peak emissions

Fundamental frequency (MHz) excluding restricted frequency bands specified in RSS-GEN	Field strength of fundamental (mv/m at 3m)
70-130	1,250
130-174	1,250 to 3,750*
174-260**	3,750
260-470**	3,750 to 12,500*
Above 470	12,500

* Linear interpolation with frequency, f, in MHz

For 130-174 MHz: Field Strength (µV/m) = (56.82 x f)-6136

For 260-470 MHz: Field Strength (µV/m) = (41.67 x f)-7083

** Frequency bands 225-328.6 MHz and 335.4-399.9 MHz are designated for the exclusive use of the Government of Canada. Manufacturers should be aware of possible harmful interference and degradation of their licence-exempt radio equipment in these frequency bands.

2.3.3 Equipment Under Test and Modification State

Serial No: 1285984 / Default Test Configuration

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

June 12, 2024 / MARG

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 (Rancho Bernardo Facility)

Ambient Temperature 24.1 °C
Relative Humidity 56.1 %
ATM Pressure 98. kPa

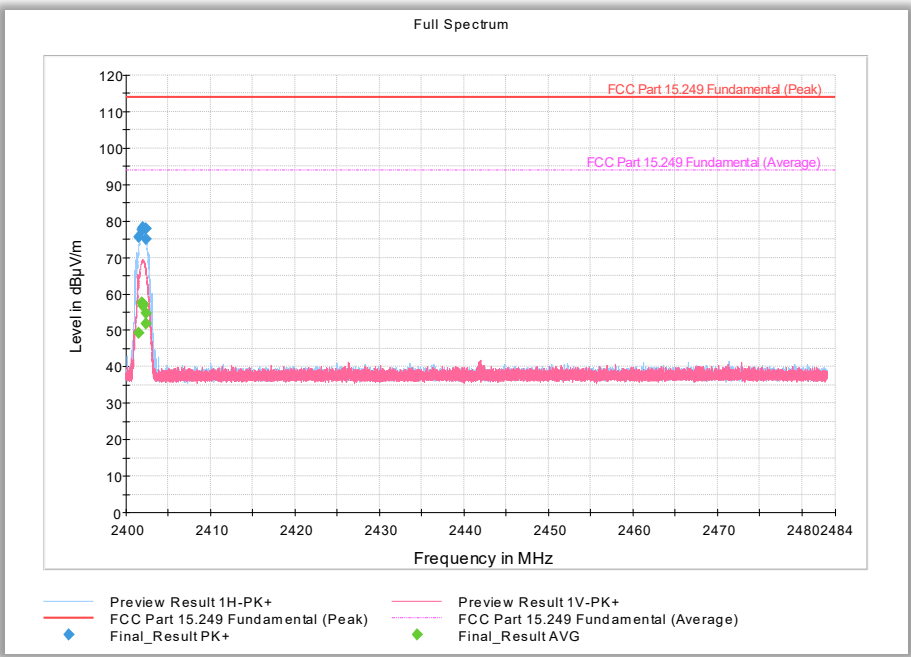
2.3.7 Additional Observations

- This is a radiated test.
- Measurement was done using EMC32 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.
- Fundamental only presented. Harmonics (if any will be evaluated under Section 2.4 of this test report

2.3.8 Sample Computation (Radiated Emission)

Measuring equipment raw measurement (dBµV) @ 30 MHz			-0.8
Correction Factor (dB/m)	Asset# 1066 (cable)	18.1	12.6
	Asset# 1172 (cable)	0.3	
	Asset# 1175(cable)	0.3	
	Asset# 1002 (antenna)	17.2	
Reported QuasiPeak Final Measurement (dbµV/m) @ 30MHz			11.8

2.3.9 Low Channel Fundamental Test Results



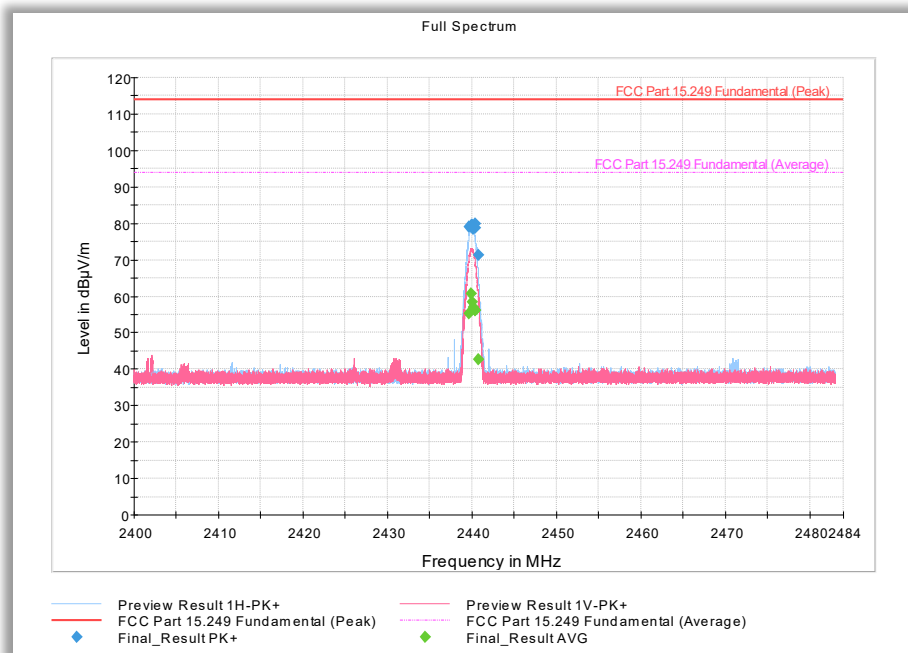
Peak Results

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2401.431967	75.64	113.97	38.33	1000.0	1000.000	180.0	H	275.0	-0.8
2401.893133	77.55	113.97	36.42	1000.0	1000.000	228.0	H	213.0	-0.8
2401.975400	78.23	113.97	35.74	1000.0	1000.000	202.0	H	241.0	-0.8
<u>2402.003067</u>	<u>78.32</u>	<u>113.97</u>	<u>35.65</u>	<u>1000.0</u>	<u>1000.000</u>	<u>200.0</u>	<u>H</u>	<u>230.0</u>	<u>-0.8</u>
2402.022867	77.74	113.97	36.23	1000.0	1000.000	177.0	H	291.0	-0.8
2402.310900	74.91	113.97	39.06	1000.0	1000.000	332.0	H	200.0	-0.8
2402.331867	77.99	113.97	35.98	1000.0	1000.000	225.0	H	217.0	-0.8

Average Results

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2401.431967	49.34	93.97	44.63	1000.0	1000.000	180.0	H	275.0	-0.8
2401.893133	57.63	93.97	36.34	1000.0	1000.000	228.0	H	213.0	-0.8
2401.975400	57.25	93.97	36.72	1000.0	1000.000	202.0	H	241.0	-0.8
<u>2402.003067</u>	<u>57.36</u>	<u>93.97</u>	<u>36.61</u>	<u>1000.0</u>	<u>1000.000</u>	<u>200.0</u>	<u>H</u>	<u>230.0</u>	<u>-0.8</u>
2402.022867	56.77	93.97	37.20	1000.0	1000.000	177.0	H	291.0	-0.8
2402.310900	51.92	93.97	42.05	1000.0	1000.000	332.0	H	200.0	-0.8
2402.331867	54.58	93.97	39.39	1000.0	1000.000	225.0	H	217.0	-0.8

2.3.10 Middle Channel Fundamental Test Results



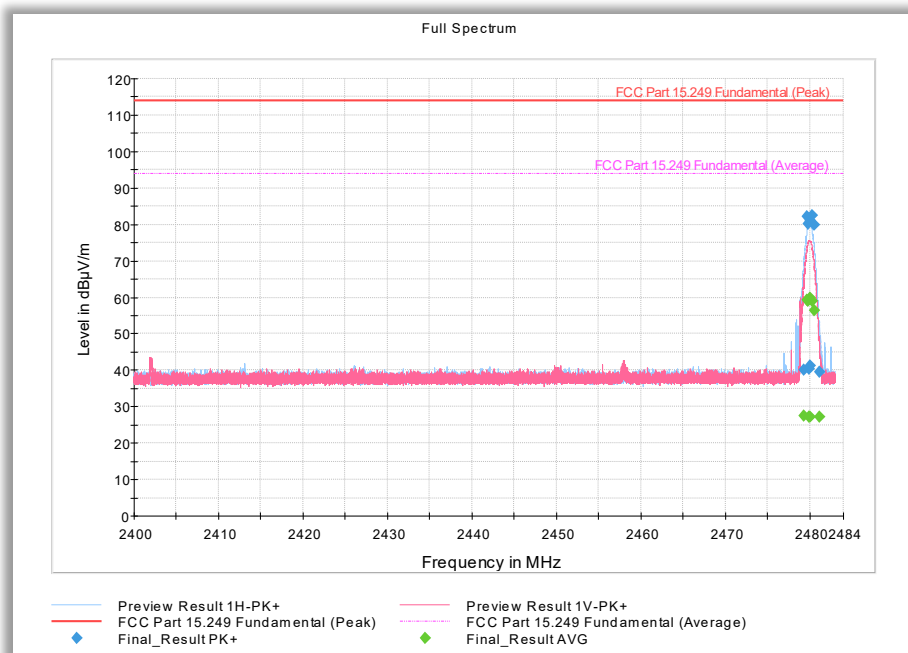
Peak Final Results

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2439.617067	79.11	113.97	34.86	1000.0	1000.000	400.0	H	133.0	-0.5
2439.892267	79.39	113.97	34.58	1000.0	1000.000	399.0	H	116.0	-0.5
<u>2440.000467</u>	<u>79.53</u>	<u>113.97</u>	<u>34.44</u>	<u>1000.0</u>	<u>1000.000</u>	<u>400.0</u>	<u>H</u>	<u>134.0</u>	<u>-0.5</u>
2440.174033	78.54	113.97	35.43	1000.0	1000.000	395.0	H	94.0	-0.5
2440.368000	79.99	113.97	33.98	1000.0	1000.000	130.0	H	291.0	-0.5
2440.397700	78.72	113.97	35.25	1000.0	1000.000	404.0	H	135.0	-0.5
2440.817367	71.29	113.97	42.68	1000.0	1000.000	127.0	H	142.0	-0.5

Average Final Results

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2439.617067	55.14	93.97	38.83	1000.0	1000.000	400.0	H	133.0	-0.5
2439.892267	60.80	93.97	33.17	1000.0	1000.000	399.0	H	116.0	-0.5
<u>2440.000467</u>	<u>58.56</u>	<u>93.97</u>	<u>35.41</u>	<u>1000.0</u>	<u>1000.000</u>	<u>400.0</u>	<u>H</u>	<u>134.0</u>	<u>-0.5</u>
2440.174033	56.94	93.97	37.03	1000.0	1000.000	395.0	H	94.0	-0.5
2440.368000	56.14	93.97	37.83	1000.0	1000.000	130.0	H	291.0	-0.5
2440.397700	56.19	93.97	37.78	1000.0	1000.000	404.0	H	135.0	-0.5
2440.817367	42.58	93.97	51.39	1000.0	1000.000	127.0	H	142.0	-0.5

2.3.11 High Channel Fundamental Test Results





Peak Final Results

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2479.329067	40.15	113.97	73.82	1000.0	1000.000	251.0	H	247.0	-0.3
2479.702567	82.13	113.97	31.84	1000.0	1000.000	211.0	H	83.0	-0.3
2479.853567	80.30	113.97	33.67	1000.0	1000.000	390.0	H	46.0	-0.3
2479.981567	40.45	113.97	73.52	1000.0	1000.000	363.0	H	274.0	-0.3
2480.009233	41.25	113.97	72.72	1000.0	1000.000	397.0	H	234.0	-0.3
<u>2480.073733</u>	<u>80.98</u>	<u>113.97</u>	<u>32.99</u>	<u>1000.0</u>	<u>1000.000</u>	<u>143.0</u>	<u>H</u>	<u>40.0</u>	<u>-0.3</u>
2480.316033	82.35	113.97	31.62	1000.0	1000.000	270.0	H	83.0	-0.3
2480.521800	79.88	113.97	34.09	1000.0	1000.000	309.0	H	83.0	-0.3
2481.200933	39.54	113.97	74.43	1000.0	1000.000	404.0	H	274.0	-0.3

Average Final Results

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2479.329067	27.48	93.97	66.49	1000.0	1000.000	251.0	H	247.0	-0.3
2479.702567	59.14	93.97	34.83	1000.0	1000.000	211.0	H	83.0	-0.3
2479.853567	59.02	93.97	34.95	1000.0	1000.000	390.0	H	46.0	-0.3
2479.981567	27.20	93.97	66.77	1000.0	1000.000	363.0	H	274.0	-0.3
2480.009233	27.25	93.97	66.72	1000.0	1000.000	397.0	H	234.0	-0.3
<u>2480.073733</u>	<u>59.96</u>	<u>93.97</u>	<u>34.01</u>	<u>1000.0</u>	<u>1000.000</u>	<u>143.0</u>	<u>H</u>	<u>40.0</u>	<u>-0.3</u>
2480.316033	59.09	93.97	34.88	1000.0	1000.000	270.0	H	83.0	-0.3
2480.521800	56.44	93.97	37.53	1000.0	1000.000	309.0	H	83.0	-0.3
2481.200933	27.24	93.97	66.73	1000.0	1000.000	404.0	H	274.0	-0.3



2.4 Radiated Spurious Emissions

2.4.1 Specification Reference

FCC 47 Chapter I Subchapter A Part 15 Subpart C §15.249(d)
RSS-210 A.1.2 (b)

2.4.2 Standard Applicable

FCC 47 Chapter I Subchapter A Part 15 Subpart C §15.249(d):

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation

RSS-210 A.1.2 (b):

Unwanted emissions shall be 10 times below the fundamental emissions field strength limits in table A1 or comply with the limits specified in RSS-Gen, whichever is less stringent.

2.4.3 Equipment Under Test and Modification State

Serial No: 1285984 / Default Test Configuration

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

June 11 and June 12, 2024 / MARG

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 (Rancho Bernardo Facility)

Ambient Temperature	25.4 - 25.7 °C
Relative Humidity	51.8 - 54.0 %
ATM Pressure	98.7 - 99.3 kPa

2.4.7 Additional Observations

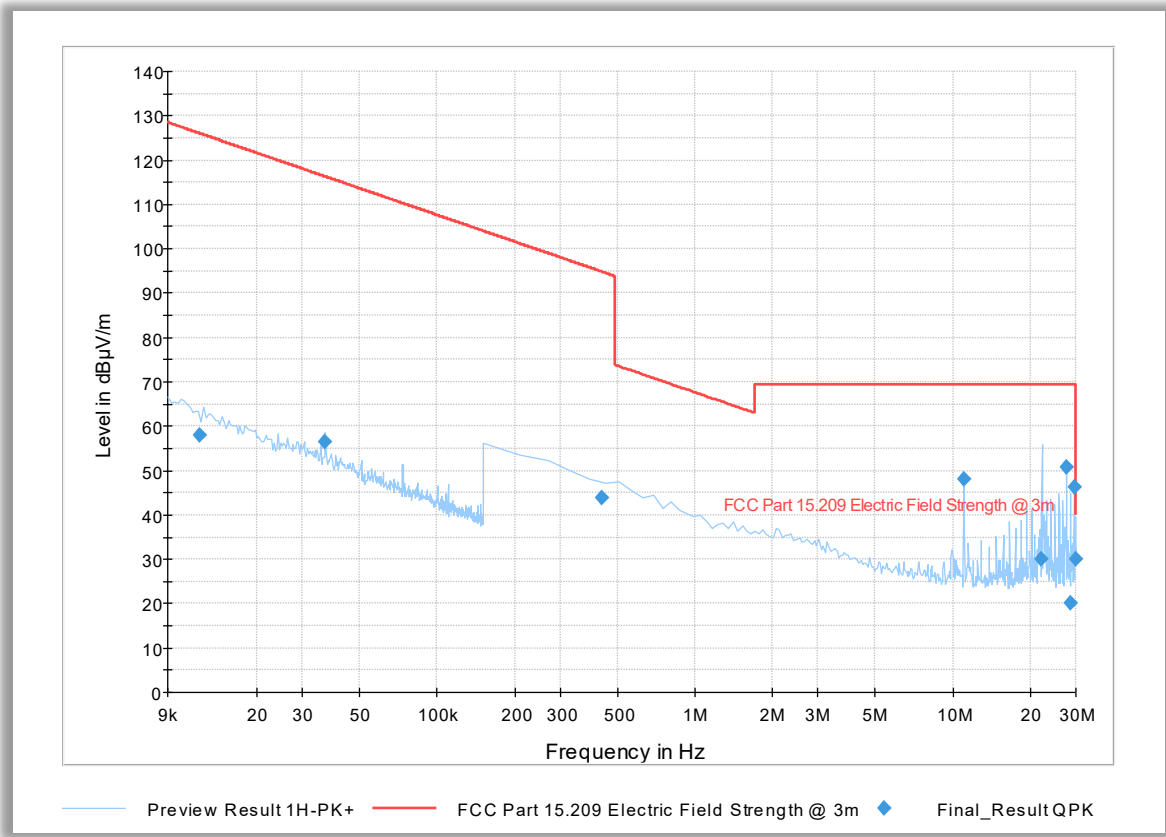
- This is a radiated test. The spectrum was searched from 9kHz to the 10th harmonic.
- There are no emissions found that do not comply to the restricted bands defined in FCC Part 15 Subpart C, 15.205 or Part 15.247(d).
- Only the worst-case data rate presented.
- Measurement was done using EMC32 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.4.8 for sample computation.

2.4.8 Sample Computation (Radiated Emission)

Measuring equipment raw measurement (dbμV) @ 30 MHz			-0.8
Correction Factor (dB/m)	Asset# 1066 (cable)	18.1	12.6
	Asset# 1172 (cable)	0.3	
	Asset# 1175(cable)	0.3	
	Asset# 1002 (antenna)	17.2	
Reported QuasiPeak Final Measurement (dbμV/m) @ 30MHz			11.8



2.4.9 9kHz to 30MHz Low Channel Radiated Emissions Test

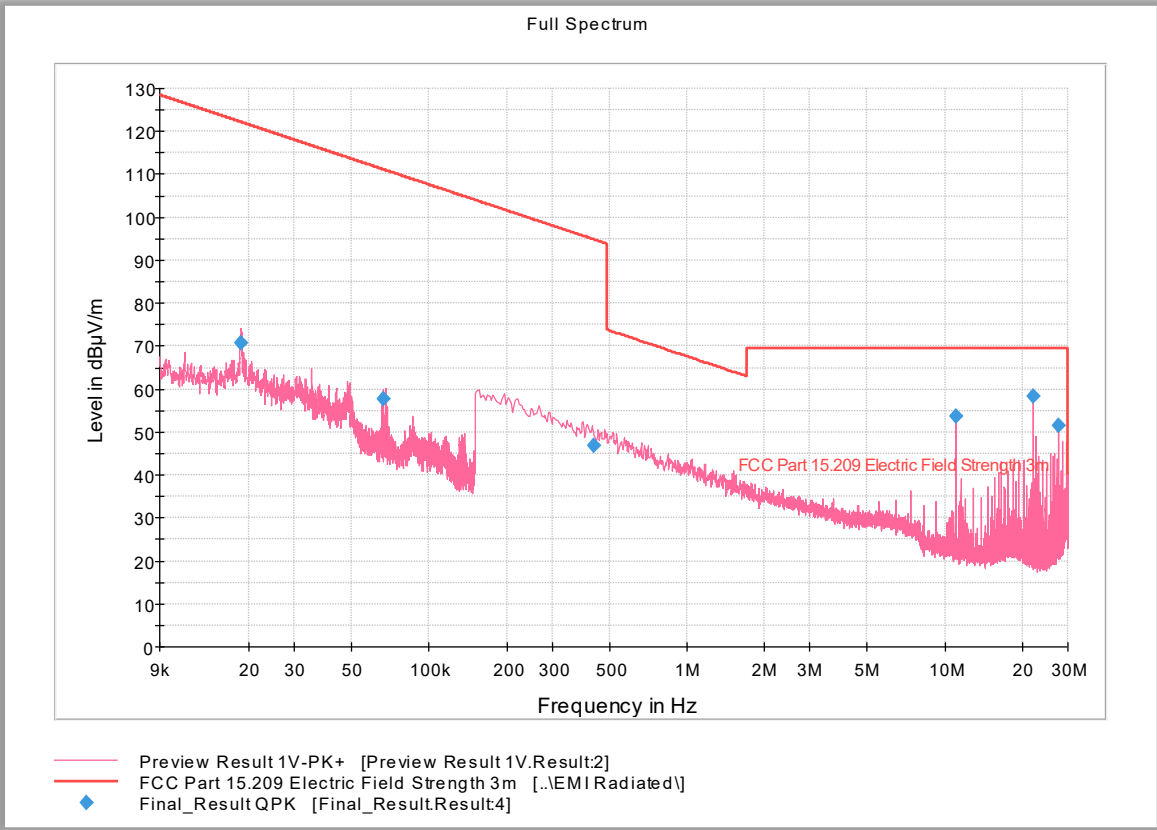


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB/m)
0.012031	57.88	125.99	68.11	1000.0	0.200	H	326.0	15.8
0.036731	56.33	116.30	59.96	1000.0	0.200	H	92.0	15.4
0.433098	43.74	94.87	51.13	1000.0	9.000	H	7.0	14.2
11.060174	48.17	69.54	21.38	1000.0	9.000	H	356.0	15.6
22.149627	30.15	69.54	39.39	1000.0	9.000	H	337.0	15.4
27.650034	50.74	69.54	18.80	1000.0	9.000	H	0.0	14.4
28.629148	20.05	69.54	49.49	1000.0	9.000	H	11.0	14.3
29.494443	46.26	69.54	23.28	1000.0	9.000	H	11.0	14.2
29.999000	30.18	69.54	39.36	1000.0	9.000	H	310.0	14.1



2.4.10 9kHz to 30MHz Middle Channel Radiated Emissions Test

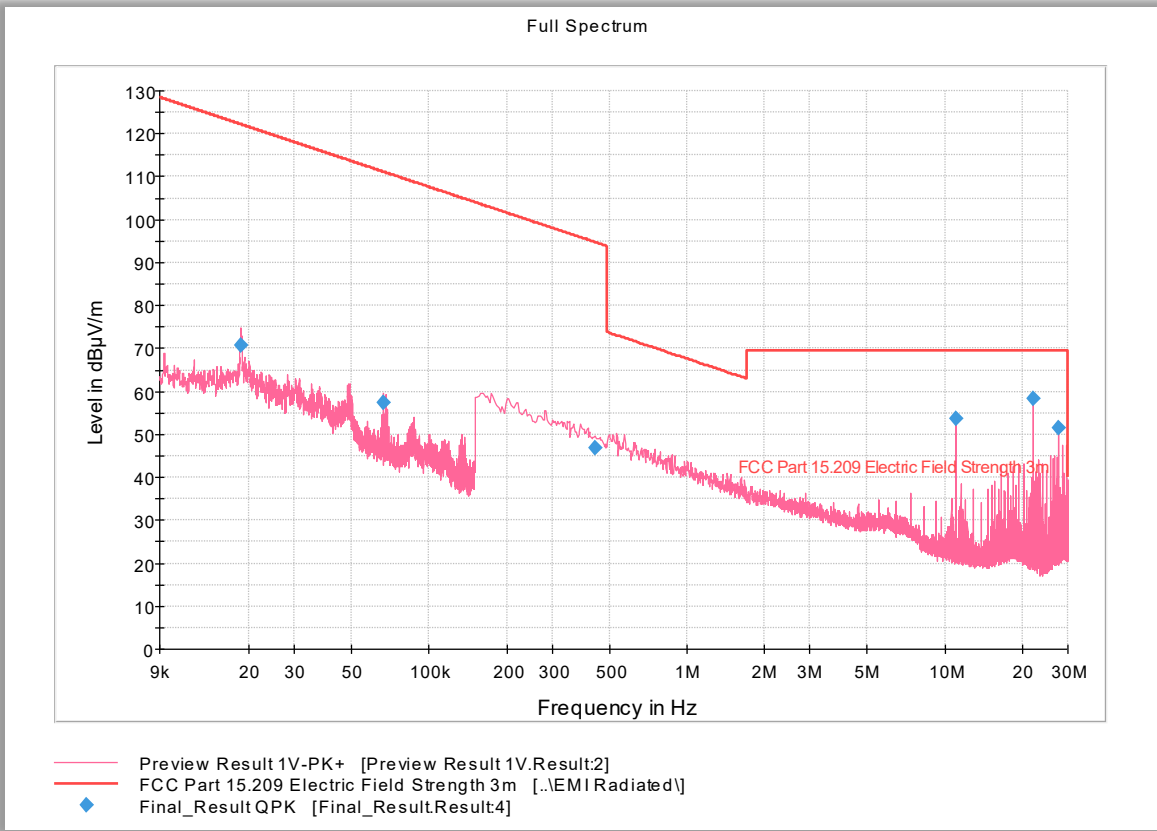


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB/m)
0.018678	70.79	122.17	51.38	1000.0	0.200	H	331.0	15
0.066631	57.71	111.13	53.42	1000.0	0.200	H	331.0	14
0.434655	46.81	94.84	48.03	1000.0	9.000	H	7.0	14
11.059874	53.73	69.50	15.77	1000.0	9.000	H	293.0	15
22.119997	58.41	69.50	11.09	1000.0	9.000	H	299.0	14
27.650551	51.52	69.50	17.98	1000.0	9.000	H	16.0	13



2.4.11 9kHz to 30MHz High Channel Radiated Emissions Test

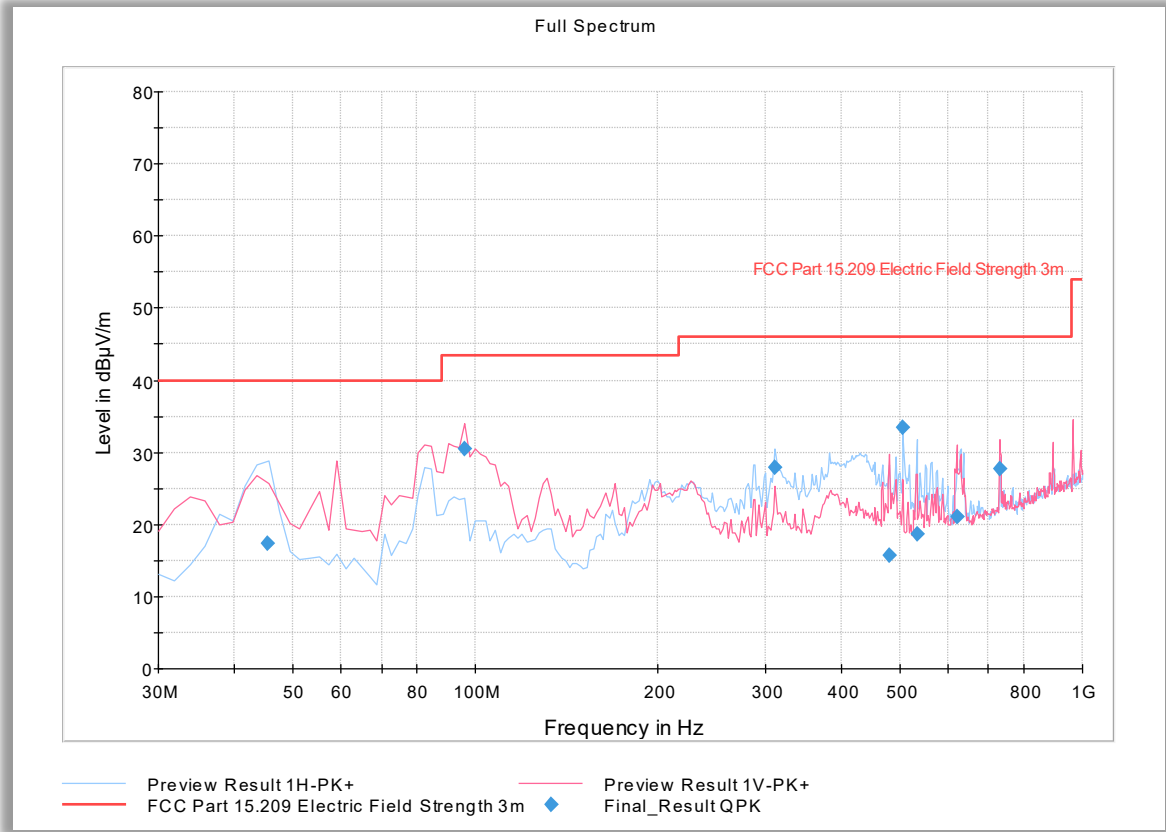


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB/m)
0.018662	70.70	122.18	51.48	1000.0	0.200	H	16.0	15
0.066665	57.55	111.12	53.57	1000.0	0.200	H	207.0	14
0.437655	46.81	94.78	47.97	1000.0	9.000	H	262.0	14
11.059874	53.69	69.50	15.81	1000.0	9.000	H	281.0	15
22.119997	58.31	69.50	11.19	1000.0	9.000	H	33.0	14
27.650556	51.57	69.50	17.93	1000.0	9.000	H	16.0	13



2.4.12 30MHz to 1GHz Low Channel Radiated Emissions Test

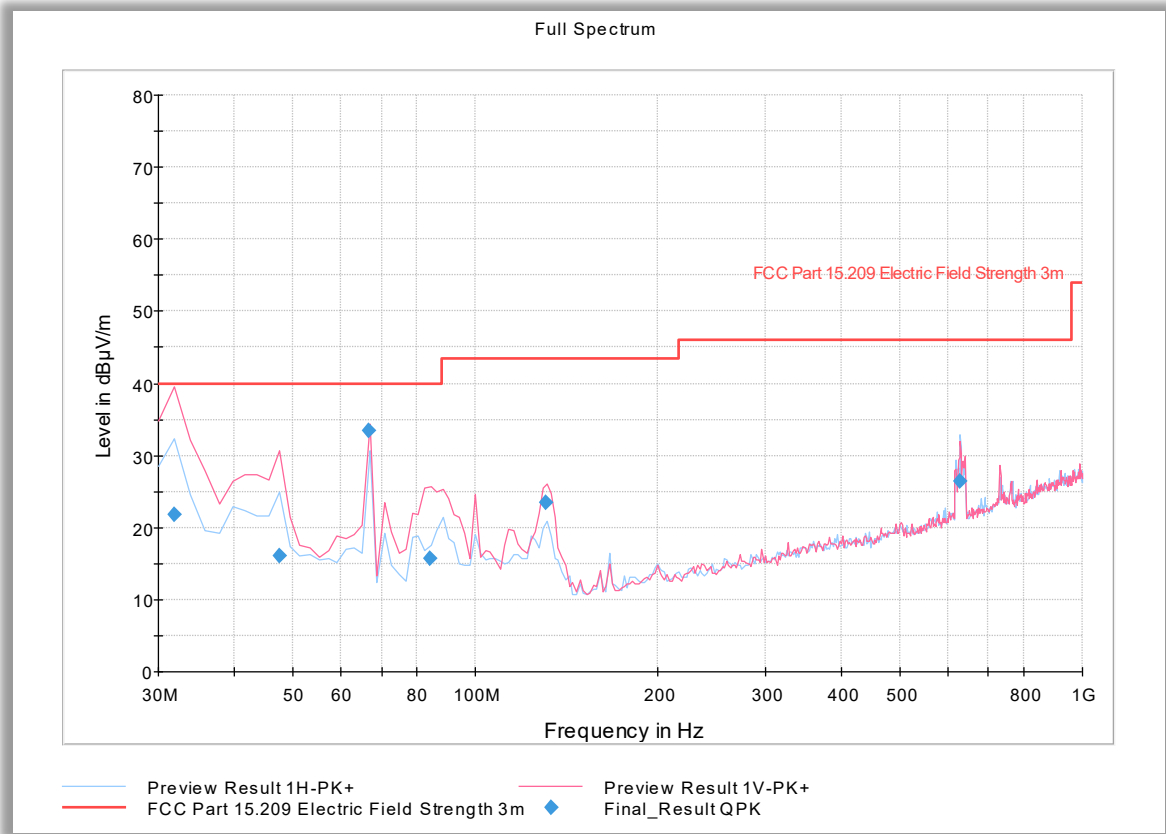


Quasi-Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
45.431102	17.28	40.00	22.72	1000.0	120.000	410.0	H	8.0	-11.3
95.852184	30.46	43.50	13.04	1000.0	120.000	108.0	V	109.0	-11.3
311.503728	27.82	46.00	18.18	1000.0	120.000	155.0	H	350.0	-8.5
480.901964	15.77	46.00	30.23	1000.0	120.000	100.0	V	102.0	-4.2
506.252505	33.36	46.00	12.64	1000.0	120.000	100.0	H	255.0	-3.9
533.266934	18.70	46.00	27.30	1000.0	120.000	103.0	H	277.0	-3.7
621.061884	20.98	46.00	25.02	1000.0	120.000	391.0	V	175.0	-2.0
729.959599	27.71	46.00	18.29	1000.0	120.000	406.0	V	221.0	0.6



2.4.13 30MHz to 1GHz Middle Channel Radiated Emissions Test

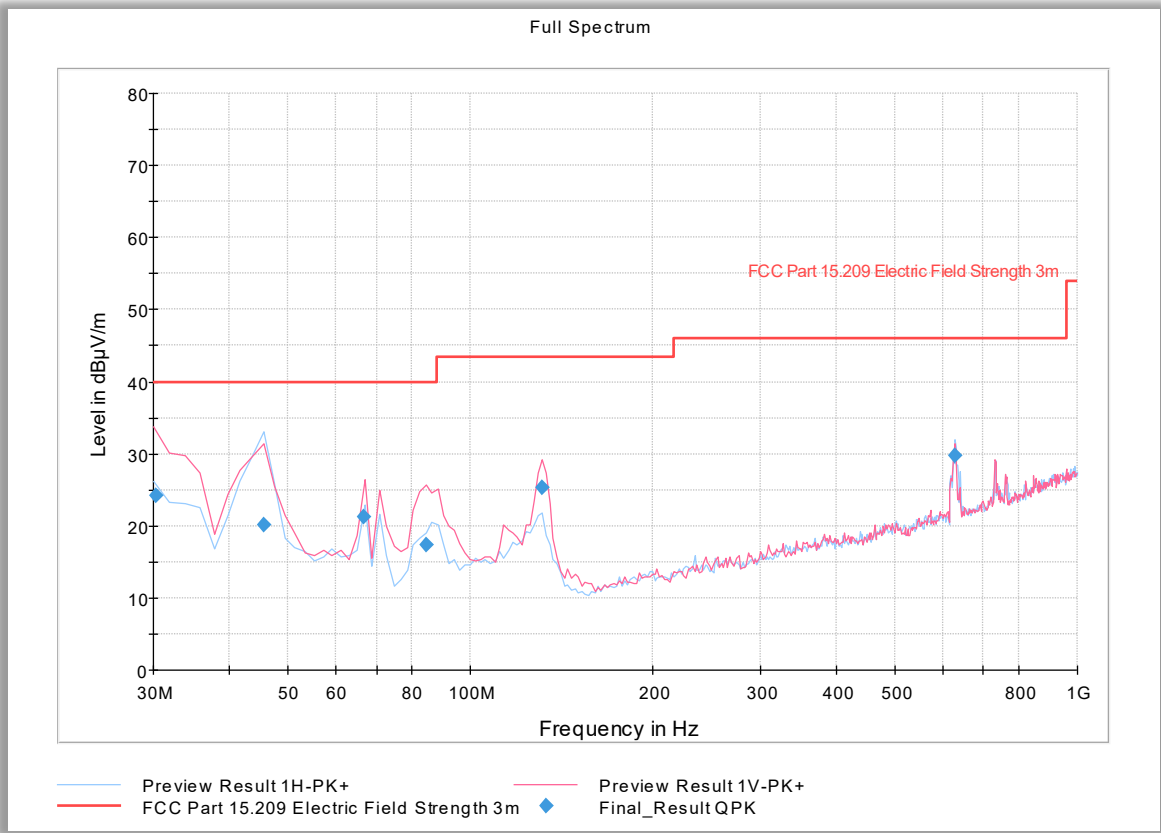


Quasi-Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
31.903888	21.86	40.00	18.14	1000.0	120.000	103.0	V	176.0	-15.8
47.494990	16.11	40.00	23.89	1000.0	120.000	119.0	V	22.0	-11.0
66.773868	33.36	40.00	6.64	1000.0	120.000	101.0	V	180.0	-15.3
84.188858	15.62	40.00	24.38	1000.0	120.000	137.0	V	352.0	-15.2
130.722164	23.52	43.50	19.98	1000.0	120.000	104.0	V	127.0	-13.9
628.997435	26.37	46.00	19.63	1000.0	120.000	103.0	H	78.0	-1.8



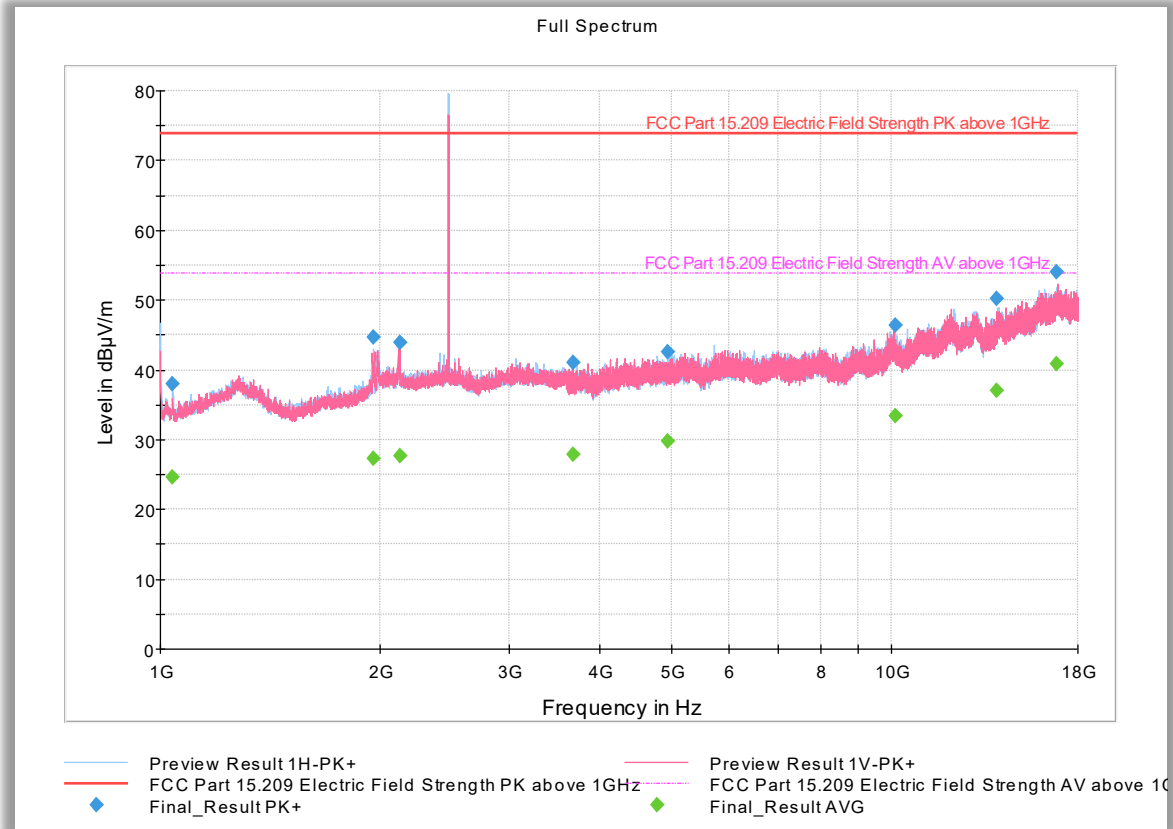
2.4.14 30MHz to 1GHz High Channel Radiated Emissions Test



Quasi-Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
30.300000	24.25	40.00	15.75	1000.0	120.000	103.0	V	258.0	-15.7
45.591102	20.23	40.00	19.77	1000.0	120.000	205.0	H	3.0	-11.2
66.733868	21.24	40.00	18.76	1000.0	120.000	100.0	V	221.0	-15.3
84.708858	17.42	40.00	22.58	1000.0	120.000	110.0	V	19.0	-15.0
130.962164	25.24	43.50	18.26	1000.0	120.000	104.0	V	59.0	-13.9
628.997435	29.78	46.00	16.22	1000.0	120.000	109.0	H	123.0	-1.8

2.4.15 1GHz to 18GHz Low Channel Radiated Emissions Test



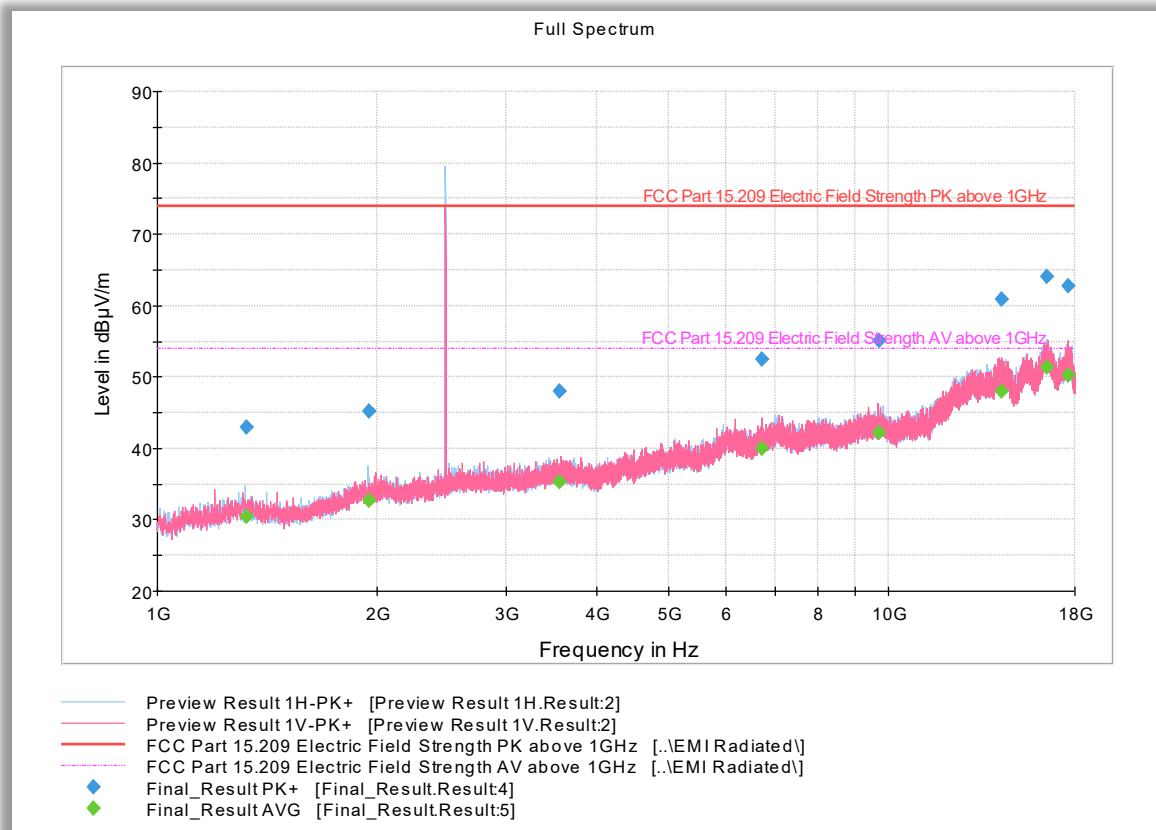
Peak Data

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1039.833333	37.98	73.90	35.92	1000.0	1000.000	159.0	H	358.0	-8.0
1954.100000	44.72	73.90	29.18	1000.0	1000.000	250.0	H	192.0	-2.6
2126.033333	43.99	73.90	29.91	1000.0	1000.000	351.0	V	-3.0	-1.7
3674.033333	41.14	73.90	32.76	1000.0	1000.000	208.0	V	55.0	2.3
4940.600000	42.51	73.90	31.39	1000.0	1000.000	136.0	H	260.0	4.7
10115.100000	46.46	73.90	27.44	1000.0	1000.000	179.0	H	205.0	12.5
13961.666667	50.18	73.90	23.72	1000.0	1000.000	323.0	V	20.0	17.0
16866.033333	54.00	73.90	19.90	1000.0	1000.000	102.0	V	331.0	22.2

Average Data

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1039.833333	24.66	53.90	29.24	1000.0	1000.000	159.0	H	358.0	-8.0
1954.100000	27.28	53.90	26.62	1000.0	1000.000	250.0	H	192.0	-2.6
2126.033333	27.69	53.90	26.21	1000.0	1000.000	351.0	V	-3.0	-1.7
3674.033333	27.85	53.90	26.05	1000.0	1000.000	208.0	V	55.0	2.3
4940.600000	29.81	53.90	24.09	1000.0	1000.000	136.0	H	260.0	4.7
10115.100000	33.48	53.90	20.42	1000.0	1000.000	179.0	H	205.0	12.5
13961.666667	37.12	53.90	16.78	1000.0	1000.000	323.0	V	20.0	17.0
16866.033333	40.78	53.90	13.12	1000.0	1000.000	102.0	V	331.0	22.2

2.4.16 1GHz to 18GHz Middle Channel Radiated Emissions Test



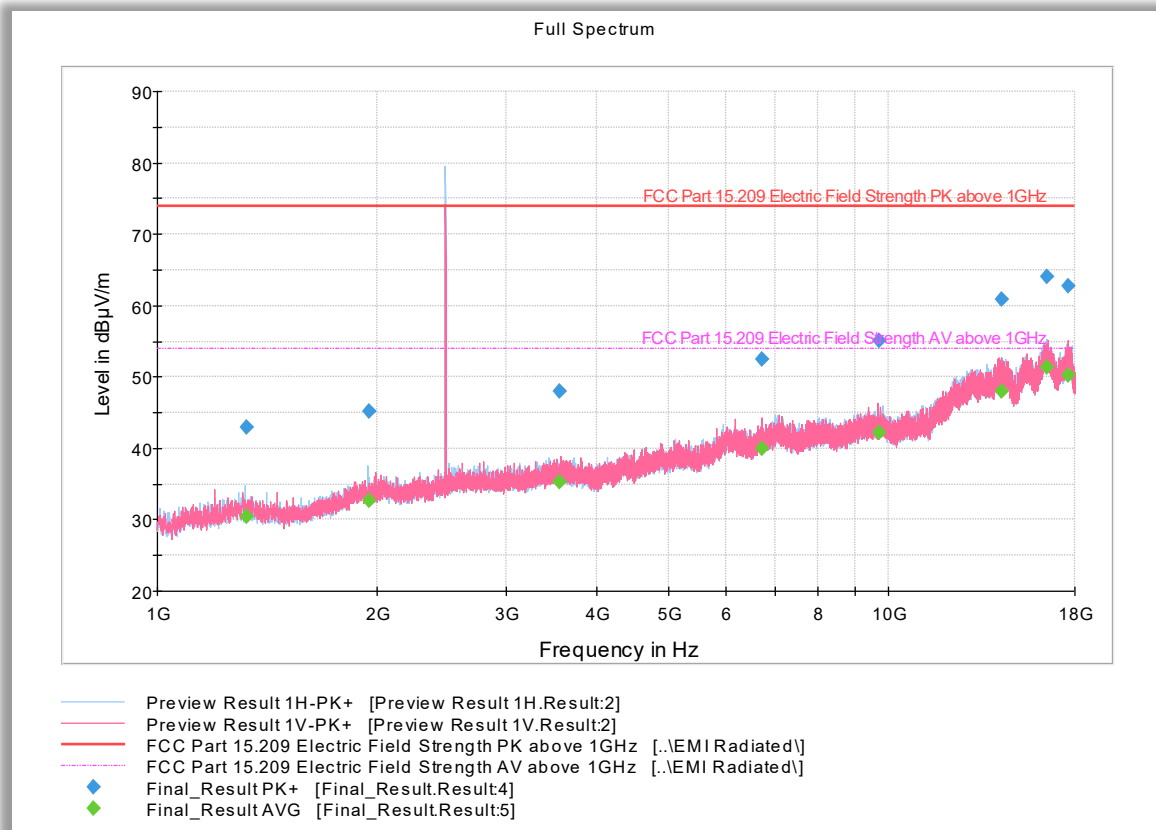
Peak Data

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1325.800000	42.93	73.90	30.97	1000.0	1000.00	121.0	H	331.0	1
1949.633333	45.19	73.90	28.71	1000.0	1000.00	365.0	H	193.0	4
3553.266667	47.92	73.90	25.98	1000.0	1000.00	183.0	V	182.0	6
6706.666667	52.44	73.90	21.46	1000.0	1000.00	203.0	V	158.0	10
9699.100000	55.06	73.90	18.84	1000.0	1000.00	365.0	V	318.0	12
14280.833333	60.82	73.90	13.08	1000.0	1000.00	121.0	V	203.0	18
16508.966667	64.08	73.90	9.82	1000.0	1000.00	363.0	H	134.0	21
17624.833333	62.76	73.90	11.14	1000.0	1000.00	283.0	V	20.0	23

Average Data

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1325.800000	30.41	53.90	23.49	1000.0	1000.00	121.0	H	331.0	1
1949.633333	32.68	53.90	21.22	1000.0	1000.00	365.0	H	193.0	4
3553.266667	35.27	53.90	18.63	1000.0	1000.00	183.0	V	182.0	6
6706.666667	39.96	53.90	13.94	1000.0	1000.00	203.0	V	158.0	10
9699.100000	42.25	53.90	11.65	1000.0	1000.00	365.0	V	318.0	12
14280.833333	47.97	53.90	5.93	1000.0	1000.00	121.0	V	203.0	18
16508.966667	51.35	53.90	2.55	1000.0	1000.00	363.0	H	134.0	21
17624.833333	50.18	53.90	3.72	1000.0	1000.00	283.0	V	20.0	23

2.4.17 1GHz to 18GHz High Channel Radiated Emissions Test



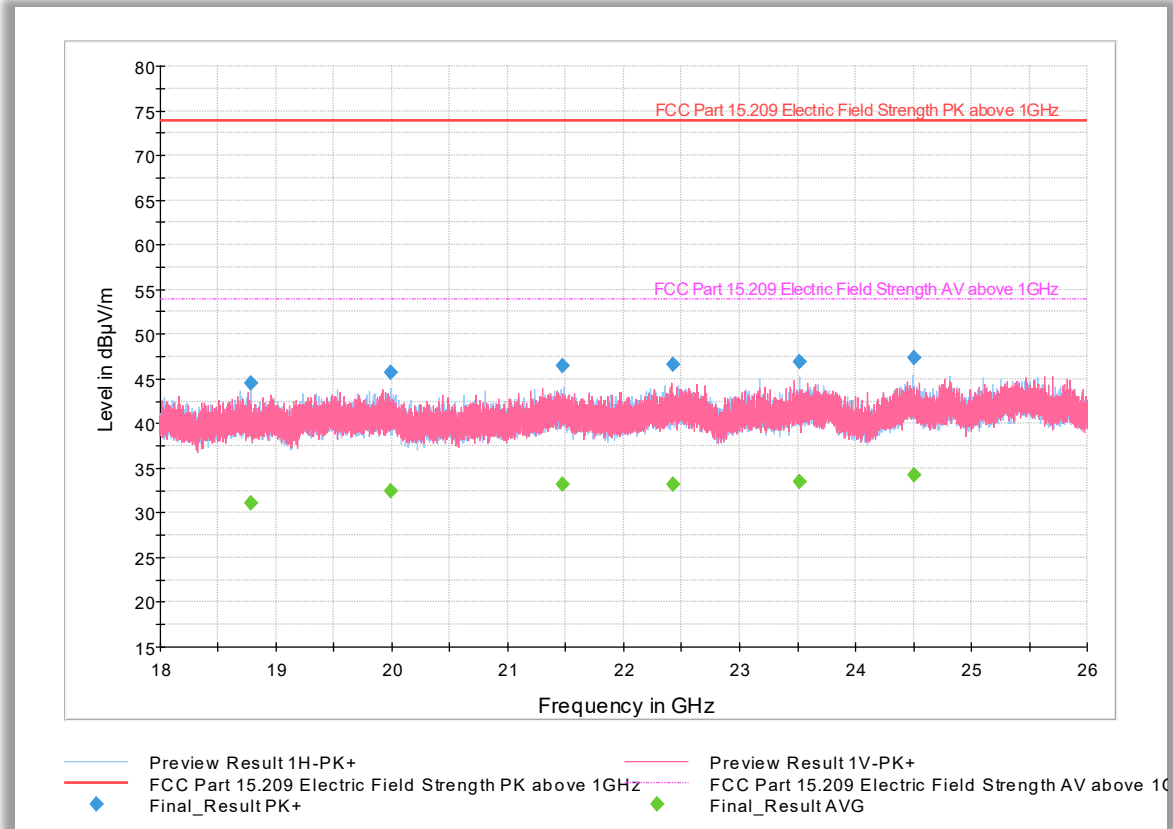
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1325.800000	42.93	73.90	30.97	1000.0	1000.000	121.0	H	331.0	1
1949.633333	45.19	73.90	28.71	1000.0	1000.000	365.0	H	193.0	4
3553.266667	47.92	73.90	25.98	1000.0	1000.000	183.0	V	182.0	6
6706.666667	52.44	73.90	21.46	1000.0	1000.000	203.0	V	158.0	10
9699.100000	55.06	73.90	18.84	1000.0	1000.000	365.0	V	318.0	12
14280.833333	60.82	73.90	13.08	1000.0	1000.000	121.0	V	203.0	18
16508.966667	64.08	73.90	9.82	1000.0	1000.000	363.0	H	134.0	21
17624.833333	62.76	73.90	11.14	1000.0	1000.000	283.0	V	20.0	23

Average Data

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1325.800000	30.41	53.90	23.49	1000.0	1000.000	121.0	H	331.0	1
1949.633333	32.68	53.90	21.22	1000.0	1000.000	365.0	H	193.0	4
3553.266667	35.27	53.90	18.63	1000.0	1000.000	183.0	V	182.0	6
6706.666667	39.96	53.90	13.94	1000.0	1000.000	203.0	V	158.0	10
9699.100000	42.25	53.90	11.65	1000.0	1000.000	365.0	V	318.0	12
14280.833333	47.97	53.90	5.93	1000.0	1000.000	121.0	V	203.0	18
16508.966667	51.35	53.90	2.55	1000.0	1000.000	363.0	H	134.0	21
17624.833333	50.18	53.90	3.72	1000.0	1000.000	283.0	V	20.0	23

2.4.18 18GHz to 26GHz Low Channel Radiated Emissions Test



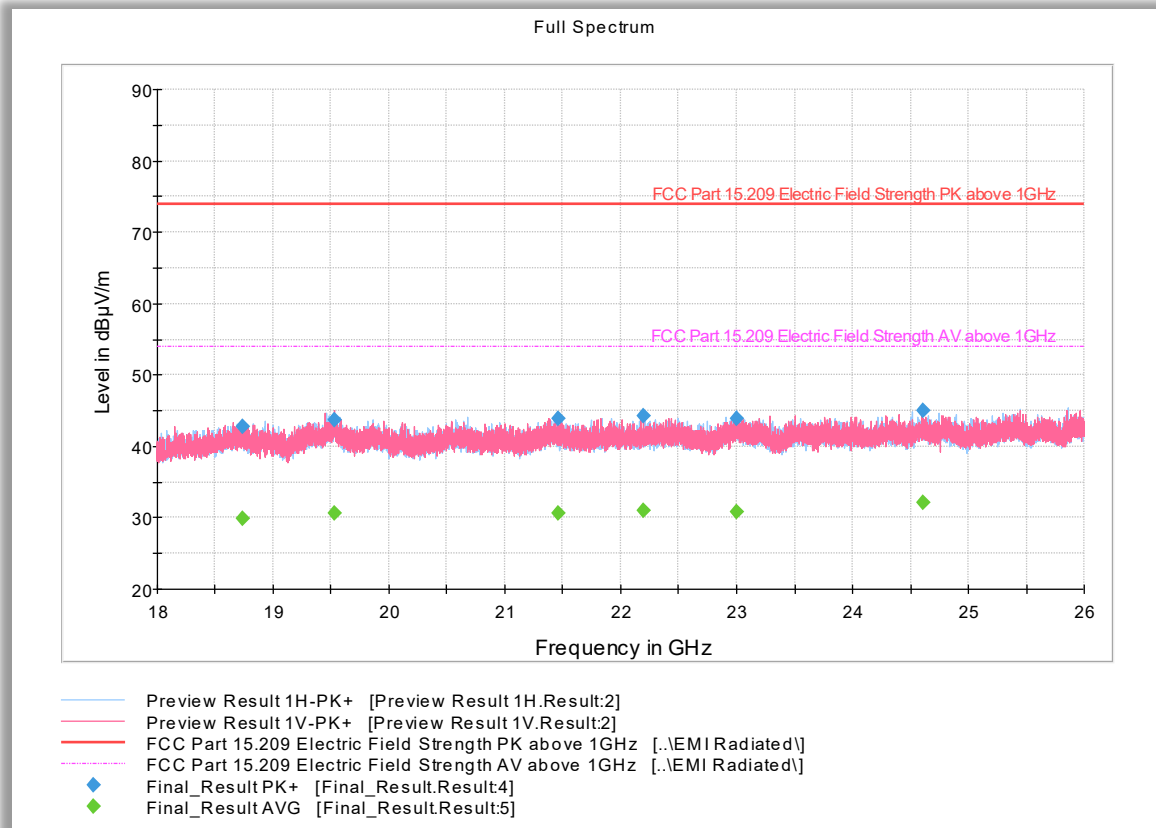
Peak Data

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
18781.666667	44.50	73.90	29.40	1000.0	1000.000	149.0	H	0.0	-4.9
19986.733333	45.76	73.90	28.14	1000.0	1000.000	151.0	H	354.0	-5.1
21475.266667	46.51	73.90	27.39	1000.0	1000.000	154.0	H	4.0	-3.7
22420.600000	46.63	73.90	27.27	1000.0	1000.000	145.0	V	-4.0	-3.1
23513.800000	46.86	73.90	27.04	1000.0	1000.000	137.0	H	104.0	-2.5
24502.333333	47.41	73.90	26.49	1000.0	1000.000	137.0	H	10.0	-1.5

Average Data

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
18781.666667	31.12	53.90	22.78	1000.0	1000.000	149.0	H	0.0	-4.9
19986.733333	32.39	53.90	21.51	1000.0	1000.000	151.0	H	354.0	-5.1
21475.266667	33.22	53.90	20.68	1000.0	1000.000	154.0	H	4.0	-3.7
22420.600000	33.19	53.90	20.71	1000.0	1000.000	145.0	V	-4.0	-3.1
23513.800000	33.49	53.90	20.41	1000.0	1000.000	137.0	H	104.0	-2.5
24502.333333	34.20	53.90	19.70	1000.0	1000.000	137.0	H	10.0	-1.5

2.4.19 18GHz to 26GHz Middle Channel Radiated Emissions Test



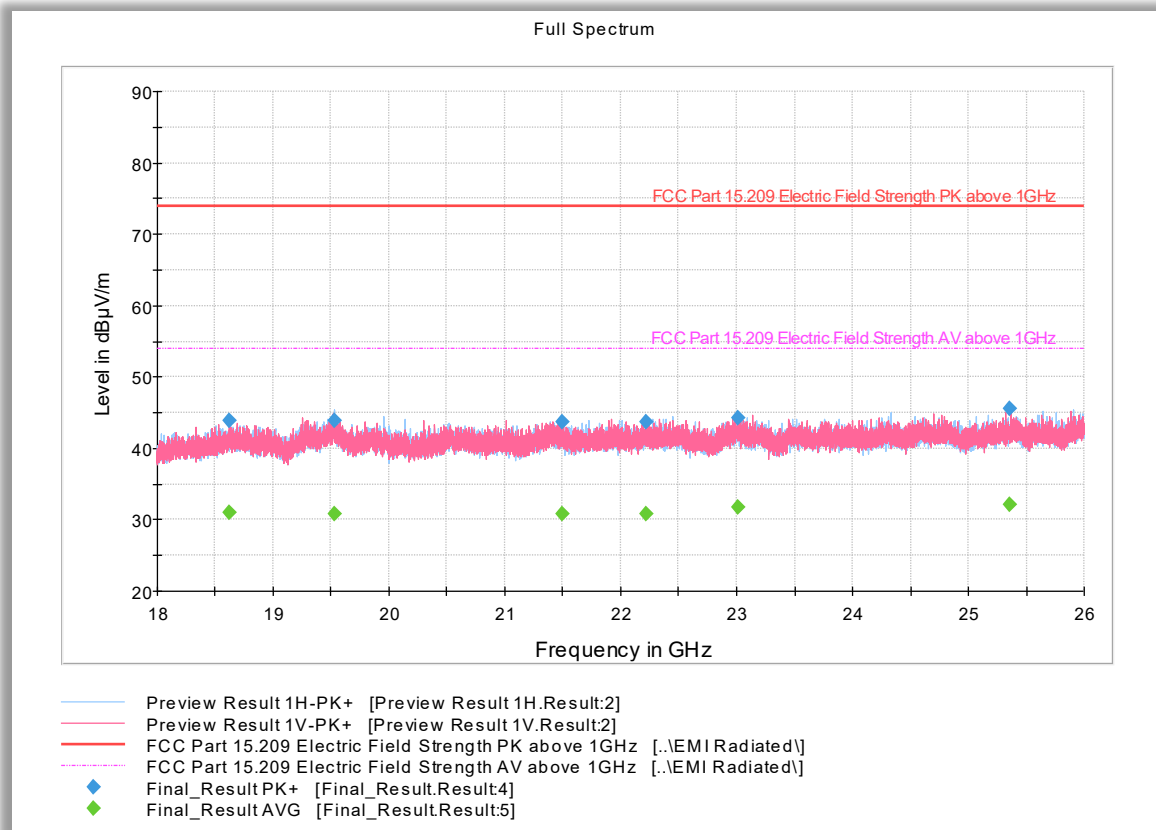
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr (dB)
18730.986000	42.76	73.90	31.14	1000.0	1000.0	202.0	H	201.0	-5
19526.740000	43.66	73.90	30.24	1000.0	1000.0	138.0	V	175.0	-5
21461.097000	43.82	73.90	30.08	1000.0	1000.0	212.0	H	277.0	-4
22198.609500	44.30	73.90	29.60	1000.0	1000.0	137.0	V	268.0	-3
23004.047500	43.89	73.90	30.01	1000.0	1000.0	213.0	H	87.0	-3
24606.371000	44.98	73.90	28.92	1000.0	1000.0	203.0	H	338.0	-2

Average Data

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr (dB)
18730.986000	29.95	53.90	23.95	1000.0	1000.00	202.0	H	201.0	-5
19526.740000	30.72	53.90	23.18	1000.0	1000.00	138.0	V	175.0	-5
21461.097000	30.70	53.90	23.20	1000.0	1000.00	212.0	H	277.0	-4
22198.609500	31.06	53.90	22.84	1000.0	1000.00	137.0	V	268.0	-3
23004.047500	30.78	53.90	23.12	1000.0	1000.00	213.0	H	87.0	-3
24606.371000	32.06	53.90	21.84	1000.0	1000.00	203.0	H	338.0	-2

2.4.20 18GHz to 26GHz High Channel Radiated Emissions Test



Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
18618.402500	43.91	73.90	29.99	1000.0	1000.000	162.0	V	159.0	-4
19528.651500	43.89	73.90	30.01	1000.0	1000.000	189.0	H	8.0	-5
21496.214500	43.77	73.90	30.13	1000.0	1000.000	213.0	H	31.0	-4
22219.990000	43.64	73.90	30.26	1000.0	1000.000	213.0	H	149.0	-3
23011.931000	44.34	73.90	29.56	1000.0	1000.000	213.0	H	62.0	-3
25360.365500	45.63	73.90	28.27	1000.0	1000.000	162.0	H	341.0	-1

Average Data

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
18618.402500	30.93	53.90	22.97	1000.0	1000.000	162.0	V	159.0	-4
19528.651500	30.86	53.90	23.04	1000.0	1000.000	189.0	H	8.0	-5
21496.214500	30.80	53.90	23.10	1000.0	1000.000	213.0	H	31.0	-4
22219.990000	30.83	53.90	23.07	1000.0	1000.000	213.0	H	149.0	-3
23011.931000	31.74	53.90	22.16	1000.0	1000.000	213.0	H	62.0	-3
25360.365500	32.09	53.90	21.81	1000.0	1000.000	162.0	H	341.0	-1



3 TEST EQUIPMENT USED

Test Equipment Used

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

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						
07575	1-18 GHz Horn Antenna	3117	00205418	ETS-Lindgren Inc.	01/05/23	01/05/25
7620	EMI Test Receiver	ESU40	8100399	Rohde & Schwarz	08/23/23	08/23/24
1002	BiConiLog Antenna	3142c	00058717	ETS-Lindgren Inc.	12/01/23	12/01/25
46797	0.5 to 22GHz Preamplifier	PA-122	181925	Com Power	01/05/24	01/05/25
1040	EMI Test Receiver	ESIB40	100292	Rohde & Schwarz	10/02/23	10/02/24
51235	RF Pre-Amp (9kHz to 1GHz)	310	412802	Sonoma	08/21/23	08/21/24
1049	EMI Test Receiver	ESU40	100133	Rohde & Schwarz	04/01/24	04/01/25
07640	Loop Antenna	AL-130R	121086	Com-Power Corp	08/08/22	08/08/25
08628	Pre-Amplifier	QLJ-01182835-JO	8986002	Qinstar	02/19/24	02/19/25
64249	Trilog Broadband Antenna	VULB 9162	00660.3105	Schwarzbeck	12/04/23	12/04/25
40815	18GHz to 40Gz LNA	SLKka-30-6	19D18	SPACEK LABS	09/06/23	09/06/24
09001	18/26 GHz Antenna	HO42S	101	Custom Microwave, Inc	10/26/23	10/26/25
20 dB Bandwidth and 99% Occupied Bandwidth						
07611	Signal & Spectrum Analyzer	FSW	102017	Rhode & Schwarz	02/16/24	02/16/25
51317	RF Cable	UFA147A	504489-B	UtilFlex	01/11/24	01/11/25
Miscellaneous						
7619	Temp & Humidity Sensor	iBTHX-W	15050268	Omega	06/15/23	06/15/24
	Test Software	EMC32	V10.6.20	Rohde & Schwarz	N/A	

3.2 Measurement Uncertainty

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

3.2.1 Radiated Measurements (9kHz to 30MHz)

	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-polarization	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	

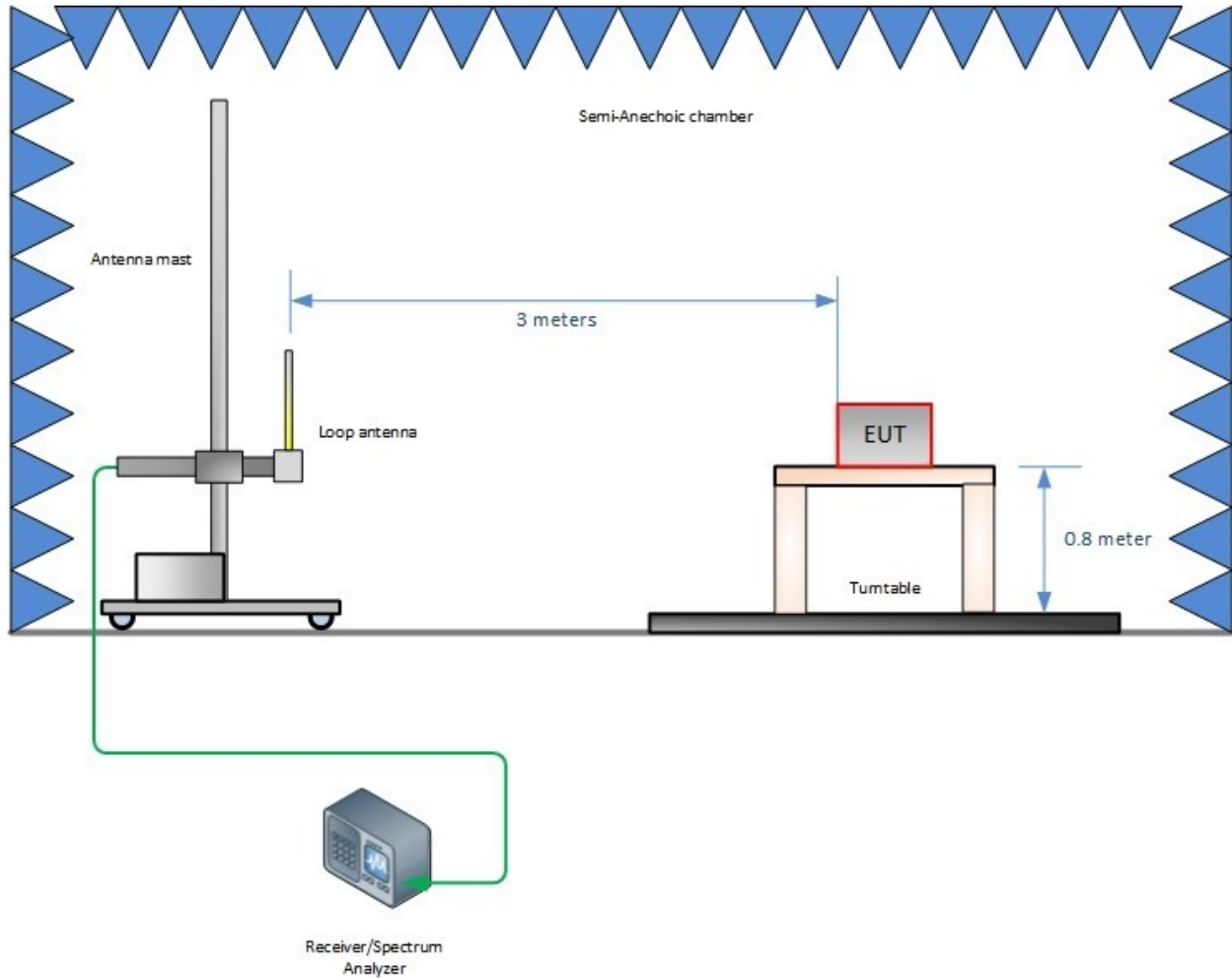
3.2.2 Radiated Measurements (30MHz to 1GHz)

<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		

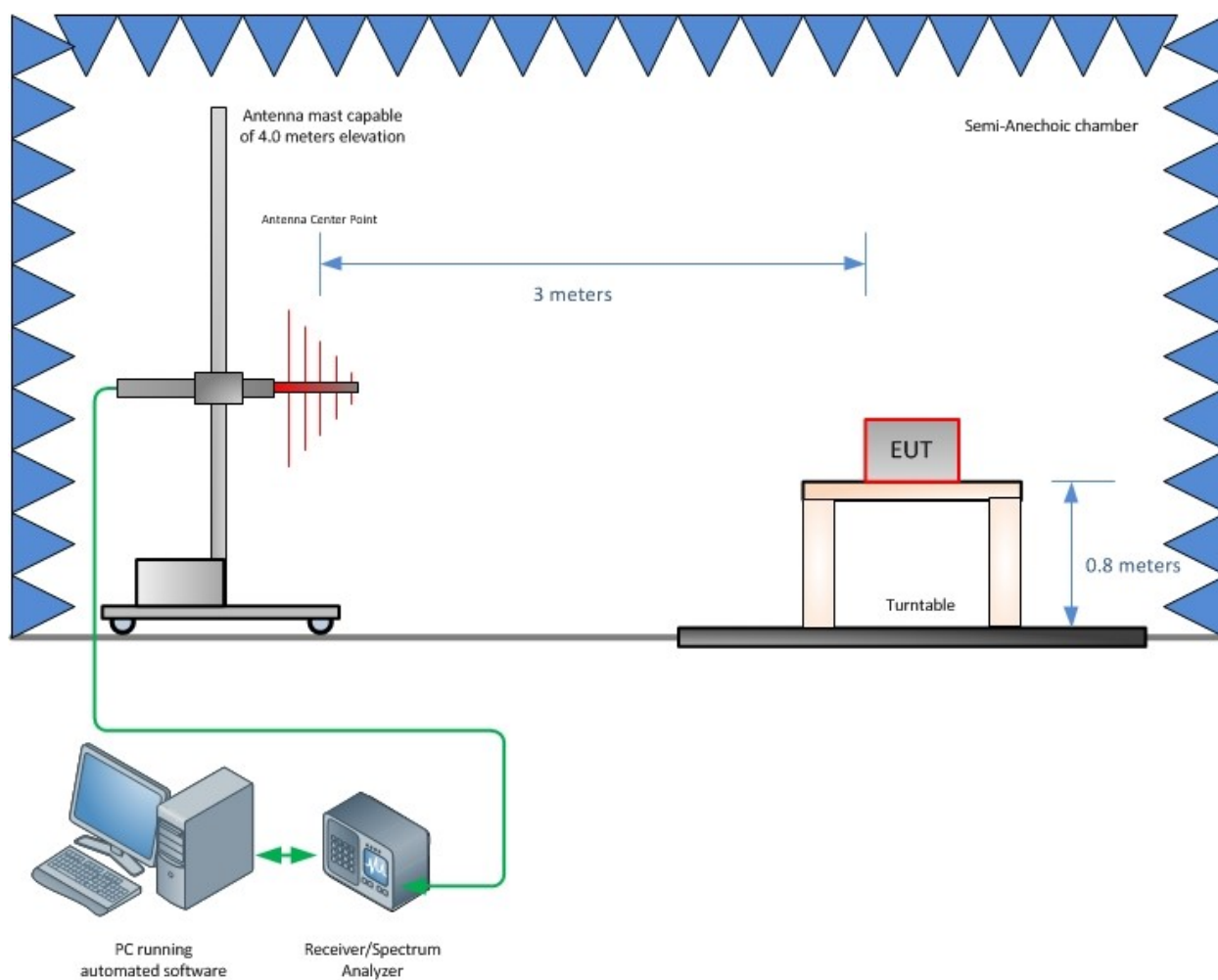
3.2.3 Radiated Emission Measurements (Above 1GHz)

<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	

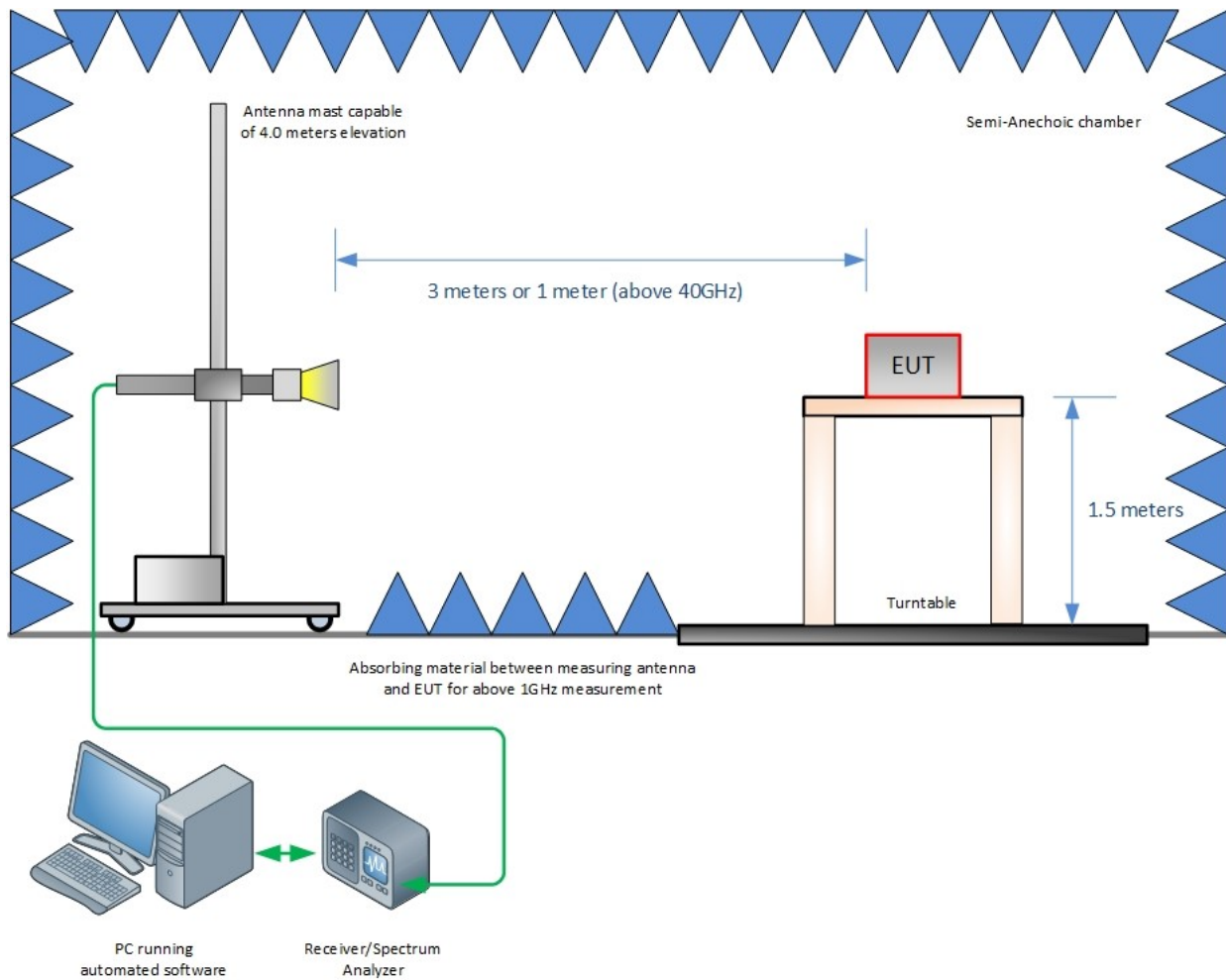
4 Test Set-up Diagrams for Emissions Test



Radiated Emission Test Setup (Below 30MHz)



Radiated Emission Test Setup (30MHz to 1GHz)



Radiated Emission Test Setup (Above 1GHz)



5 Accreditation, Disclaimers and Copyright

TÜV SÜD America Inc.'s reports apply only to the specific sample tested under stated test conditions. It is the manufacturer's responsibility to assure the continued compliance of production units of this model. TÜV SÜD America, Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD America, Inc.'s issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and TÜV SÜD America, Inc., extracts from the test report shall not be reproduced, except in full without TÜV SÜD America, Inc.'s written approval.

This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the federal government.

TÜV SÜD America, Inc. and its professional staff hold government and professional organization certifications for AAMI, ACIL, AEA, ANSI, IEEE, A2LA, NIST and VCCI.



A2LA Cert. No. 2955.13

