

Radio Testing of the

Masimo Masimo Wireless Charger

In accordance with

47CFR15.205, 47CFR15.207, 47CFR15.209
and RSS-216 Issue 2 January 2016

Masimo
52 Discovery
Irvine, CA 92618



Product Service

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Date: June 2022

Document Number: 72180289D Issue 01 | Version Number: 01

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Authorized Signatory	Omar Castillo	June 20, 2022	

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

EXECUTIVE SUMMARY

The EUT in general was confirmed to be in compliance with 47CFR15.205 ,47CFR15.207, 47CFR15.209 and RSS-216 Issue 2 January 2016.



A2LA Cert. No. 2955.13

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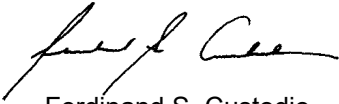
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REPORT ON	Radio Testing of the Masimo Masimo Wireless Charger
TEST REPORT NUMBER	72180289D
TEST REPORT DATE	June 2022
PREPARED FOR	Masimo 52 Discovery Irvine, CA 92618
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APPROVED BY	 Omar Castillo Name Authorized Signatory Title: Senior EMC/Wireless Test Engineer
DATED	June 10, 2022



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Revision History

72180289D Masimo Masimo Wireless Charger					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
06/20/2022	—	Initial Release			Omar Castillo

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SECTION 1

REPORT SUMMARY

Radio Testing of the
Masimo
Masimo Wireless Charger



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Masimo Wireless Charger to the requirements of 47CFR15.205 and Innovation, Science and Economic Development Canada RSS-Gen.

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	Masimo
Model Name	Masimo Wireless Charger
Model Number(s)	28671
Serial Number(s)	N/A
Number of Samples Tested	1
FCC ID	VKF-MASIW1CG
IC Number	7362A-MASIW1CG
Highest Frequency Generated or Used	190kHz
Test Specification/Issue/Date	• 47CFR15.205, 47CFR15.207 and 47CFR15.209 (October 1, 2021) • RSS-216 Issue 2 January 2016 Wireless Power Transfer Devices • ICES-001 Issue 5 July 2020 Industrial, Scientific and Medical (ISM) Equipment • RSS-Gen Issue 5 April 2018 General Requirements for Compliance of Radio Apparatus
Start of Test	May 26, 2022
Finish of Test	June 11, 2022
Name of Engineer(s)	Ferdinand Custodio
Related Document(s)	None. Supporting documents for EUT certification are separate exhibits.

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with 47CFR15.205, 47CFR15.207 and 47CFR15.209 with cross-reference to Innovation, Science and Economic Development Canada RSS-216 Issue 2 January 2016 is shown below:

Part 15	RSS-Gen	Test Description	Result	Comments/ Base Standard
§15.207(a)	Clause 8.8	Conducted Limits	Compliant	RSS-216 and ICES-001
§15.209(a)	Clause 8.9	Radiated Emission Limits	Compliant	RSS-216 and ICES-001
§15.215(c)	Clause 6.7	Transmitter 20 dB Bandwidth	For Reference Only	

There are no emissions observed associated with the WPT operation, only the fundamental and during radiated emissions verification only. The EUT as a whole is verified against the general limits of §15.207/209 and RSS-Gen to address the modulation on the power transfer frequency for transmitting intelligent communication.

1.3 PRODUCT INFORMATION

1.3.1 EUT General Description

The Equipment Under Test (EUT) was a Masimo Wireless Charger as shown in the photograph below. The EUT is a 190kHz wireless charger designed to charge the manufacturer's W1 Wrist Worn Device.



EUT



1.3.1 EUT General Description

EUT Description	Masimo Wireless Charger
Model Number(s)	28671
Rated Voltage	5VDC via USB
Primary Unit (EUT)	☐ Production ☒ Pre-Production ☐ Engineering
WPT Classification (RSS-216)	☐ Type 1 (Interference-causing Equipment) ☐ Type 2 (Category II) ☒ Type 3 (Category I)
Frequency (Capability)	190 kHz Inductive
Mode Verified	190 kHz Inductive
Size	33.64 mm diameter x 9.42 mm height
Weight	31g with ferrite

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
Default	EUT is continuously charging a depleted (<15% charge level) W1 Wrist Worn Device (Watch)

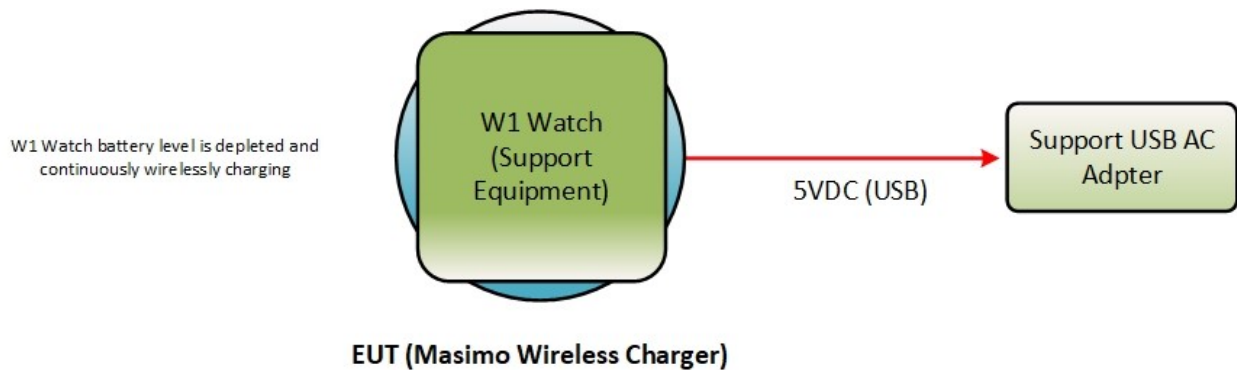
1.4.2 EUT Exercise Software

None

1.4.3 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Description
GlobTek, Inc.	Support USB AC Adapter (representative only)	Model: GTM41078-0605-USB P/N WR9QA1200USBNMEDRVW Output: 5V@1.2A
Lenovo	Support Laptop for E/H Field Analyzer	Model: Thinkpad T440S Serial Number: PC-03BBGR

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 Modifications	Modification Fitted By	Date Modification Fitted
Serial Number: N/A		
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 C63.10-2013, 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 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 LP0002 for Low-Power RF Device type of testing.

1.9.5 VCCI – Registration No. A-0280 and A-0281

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
Masimo
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2.1 CONDUCTED LIMITS (AC CONDUCTED EMISSIONS VERIFICATIONS)

2.1.1 Specification Reference

Part 15 Subpart C §15.207(a) and RSS-Gen Clause 8.8

2.1.2 Standard Applicable

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

**Decreases with the logarithm of the frequency.*

2.1.3 Equipment Under Test and Modification State

Serial No: N/A / Default Test Configuration

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

June 03, 2022 / FSC

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	21.9 °C
Relative Humidity	45.0 %
ATM Pressure	100.3 kPa



2.1.7 Additional Observation

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 2.1.8 for sample computation.

2.1.8 Sample Computation (Conducted Emission – Quasi Peak)

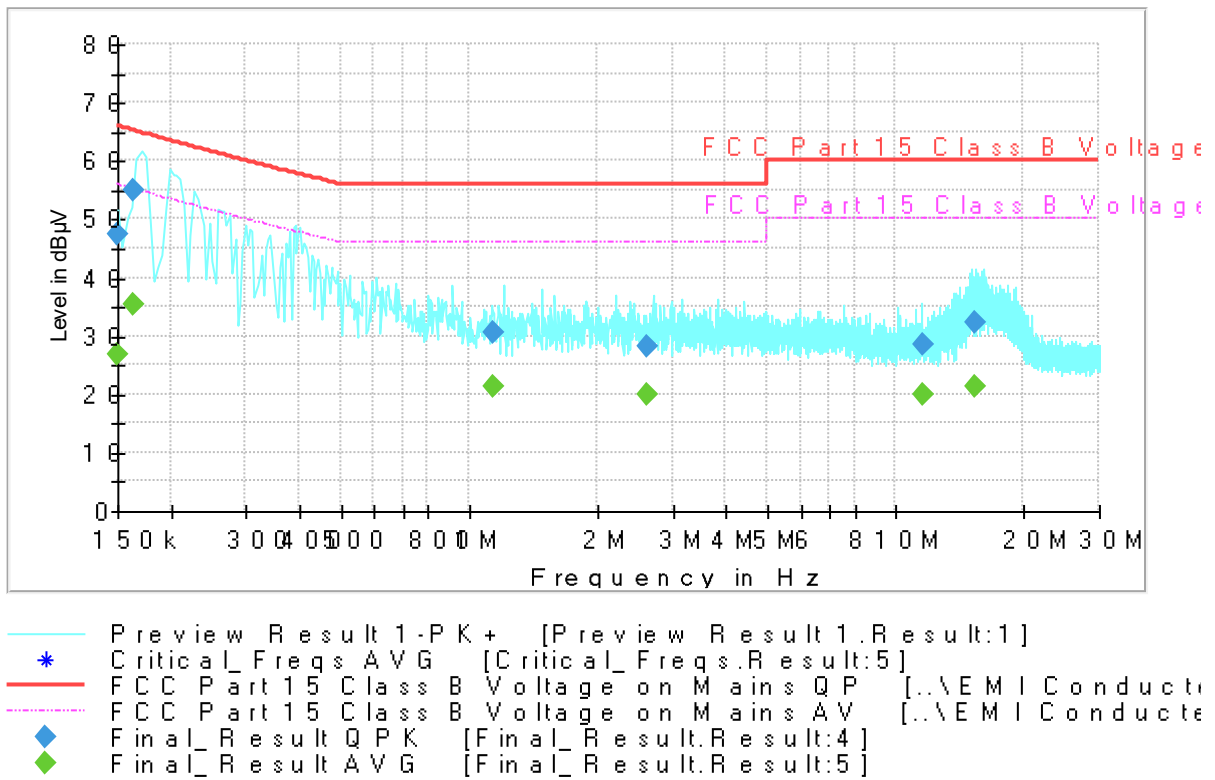
Measuring equipment raw measurement (dbμV) @ 150kHz			5.5
Correction Factor (dB)	Asset# 8607 (20 dB attenuator)	19.9	20.7
	Asset# 1177 (cable)	0.15	
	Asset# 1176 (cable)	0.35	
	Asset# 7568 (LISN)	0.30	
Reported QuasiPeak Final Measurement (dbμV) @ 150kHz			26.2

2.1.9 Test Results

Compliant. See attached plots and tables.

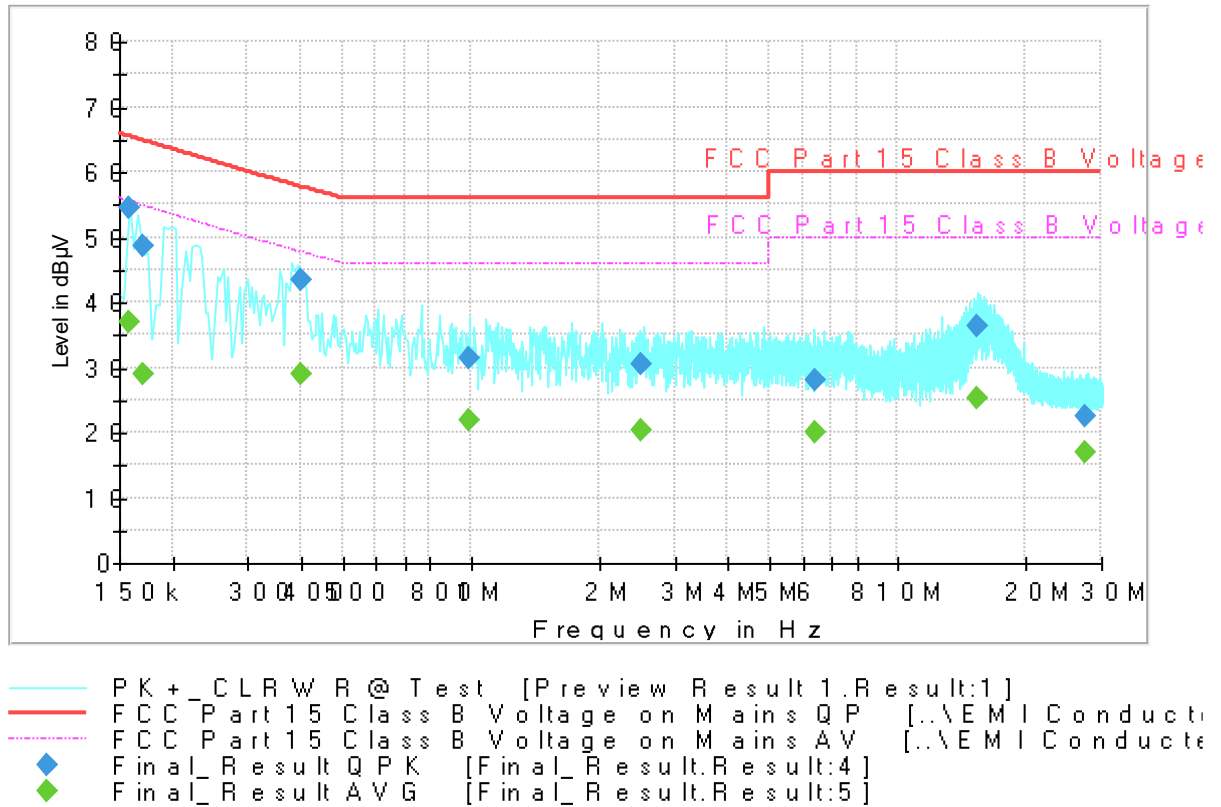
2.1.10 Representative USB AC Adapter Line 1

Full Spectrum



Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit - QPK (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	47.39	---	66.00	18.61	1000.0	9.000	L1	20.6
0.150000	---	26.76	56.00	29.24	1000.0	9.000	L1	20.6
0.163500	54.93	---	65.23	10.30	1000.0	9.000	L1	20.5
0.163500	---	35.50	55.22	19.72	1000.0	9.000	L1	20.5
1.143500	---	21.45	46.00	24.55	1000.0	9.000	L1	20.4
1.143500	30.69	---	56.00	25.31	1000.0	9.000	L1	20.4
2.631500	---	19.99	46.00	26.01	1000.0	9.000	L1	20.4
2.631500	28.13	---	56.00	27.87	1000.0	9.000	L1	20.4
11.554000	---	19.96	50.00	30.04	1000.0	9.000	L1	20.5
11.554000	28.36	---	60.00	31.64	1000.0	9.000	L1	20.5
15.401000	---	21.32	50.00	28.68	1000.0	9.000	L1	20.8
15.401000	32.28	---	60.00	27.72	1000.0	9.000	L1	20.8

2.1.11 Representative USB AC Adapter Line 2



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit - QPK (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.159000	---	36.95	55.47	18.52	1000.0	9.000	L2	20.6
0.159000	54.44	---	65.48	11.04	1000.0	9.000	L2	20.6
0.171000	---	28.83	54.81	25.98	1000.0	9.000	L2	20.5
0.171000	48.59	---	64.83	16.24	1000.0	9.000	L2	20.5
0.399000	---	28.79	47.73	18.94	1000.0	9.000	L2	20.4
0.399000	43.36	---	57.75	14.39	1000.0	9.000	L2	20.4
0.994005	---	21.74	46.00	24.26	1000.0	9.000	L2	20.4
0.994005	31.27	---	56.00	24.73	1000.0	9.000	L2	20.4
2.508983	---	20.21	46.00	25.79	1000.0	9.000	L2	20.5
2.508983	30.37	---	56.00	25.63	1000.0	9.000	L2	20.5
6.409563	---	19.98	50.00	30.02	1000.0	9.000	L2	20.5
6.409563	28.11	---	60.00	31.89	1000.0	9.000	L2	20.5
15.391473	---	25.26	50.00	24.74	1000.0	9.000	L2	20.8
15.391473	36.37	---	60.00	23.63	1000.0	9.000	L2	20.8
27.534880	---	16.97	50.00	33.03	1000.0	9.000	L2	20.8
27.534880	22.58	---	60.00	37.42	1000.0	9.000	L2	20.8

2.2 RADIATED EMISSION LIMITS (RADIATED EMISSIONS VERIFICATION)

2.2.1 Specification Reference

Part 15 Subpart C §15.209(a) and RSS-Gen Clause 8.9

2.2.2 Standard Applicable

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency of emission (MHz)	Field Strength (microvolts/meter)
0.009-0.490	2400/F(kHz) @ 300 meters
0.490-1.705	24000/F(kHz) @ 30 meters
1.705-30.0	30 @ 30 meters
30-88	100 (40.0 dBμV/m @ 3 meters)
88-216	150 (43.5 dBμV/m @ 3 meters)
216-960	200 (46.0 dBμV/m @ 3 meters)
Above 960	500 (54.0 dBμV/m @ 3 meters)

2.2.3 Equipment Under Test and Modification State

Serial No: N/A / Default Test Configuration

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

June 06, 2022 / FSC

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	23.1°C
Relative Humidity	28.3 %
ATM Pressure	100.1kPa



2.2.7 Additional Observations

- The spectrum was searched up to 30MHz covering 10x of the fundamental (190kHz).
- The EUT complies with RSS-Gen general field strength limits (only limit presented). There are no emissions observed associated with the WPT that are subject to ICES-001 limits other than the fundamental. The WPT fundamental complies with the ICES-001 limits with 24.82dB margin (64.48dBμV/m measured against 89.3dBμV/m limit).
- 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 2.2.8 for sample computation.

2.2.8 Sample Computation (Radiated Emission)

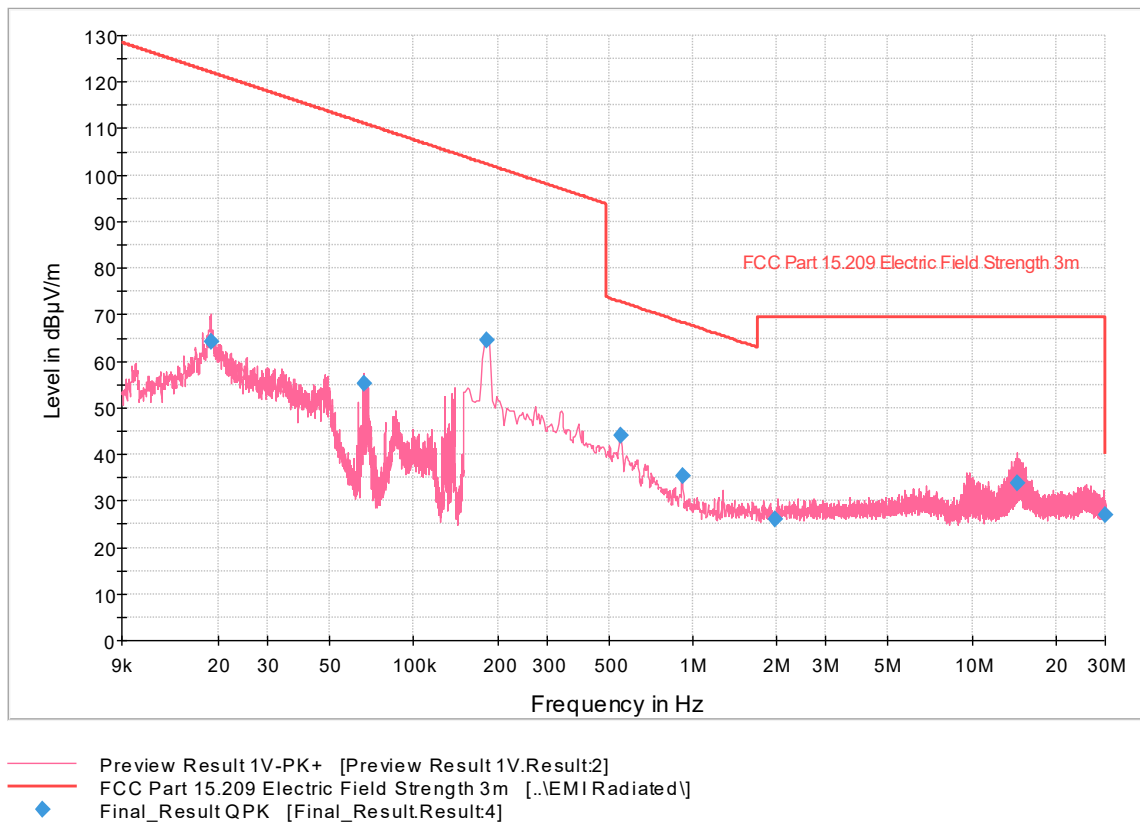
Measuring equipment raw measurement (dbμV) @ 30 MHz			24.4
Correction Factor (dB)	Asset# 1066 (cable)	0.3	-12.6
	Asset# 1172 (cable)	0.3	
	Asset# 1016 (preamplifier)	-30.7	
	Asset# 1175(cable)	0.3	
	Asset# 1002 (antenna)	17.2	
Reported QuasiPeak Final Measurement (dbμV/m) @ 30MHz			11.8

2.2.9 Test Results

Compliant. See attached plot and table.

2.2.10 Below 30MHz Radiated Emission

Full Spectrum



Quasi-Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)
0.018789	64.28	122.12	57.84	1000.0	0.200	80.0	H	352.0	22
0.066543	55.20	111.14	55.94	1000.0	0.200	80.0	H	185.0	20
0.182500	64.48	102.38	37.89	1000.0	9.000	80.0	H	88.0	20
0.550490	44.21	72.79	28.58	1000.0	9.000	80.0	H	53.0	20
0.918540	35.41	68.34	32.93	1000.0	9.000	80.0	H	53.0	20
1.970767	26.08	69.50	43.42	1000.0	9.000	80.0	H	33.0	20
14.543423	33.90	69.50	35.61	1000.0	9.000	80.0	H	263.0	22
29.983060	27.03	69.50	42.47	1000.0	9.000	80.0	H	214.0	25



2.3 TRANSMITTER 20 DB BANDWIDTH

2.3.1 Specification Reference

Part 15 Subpart C §15.215(c) and and RSS-Gen Clause 6.7

2.3.2 Standard Applicable

(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.

2.3.3 Equipment Under Test and Modification State

Serial No: N/A / Default Test Configuration

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

June 11, 2022 / FSC

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 (Mira Mesa Facility)

Ambient Temperature	27.8°C
Relative Humidity	29.7%
ATM Pressure	100.1kPa

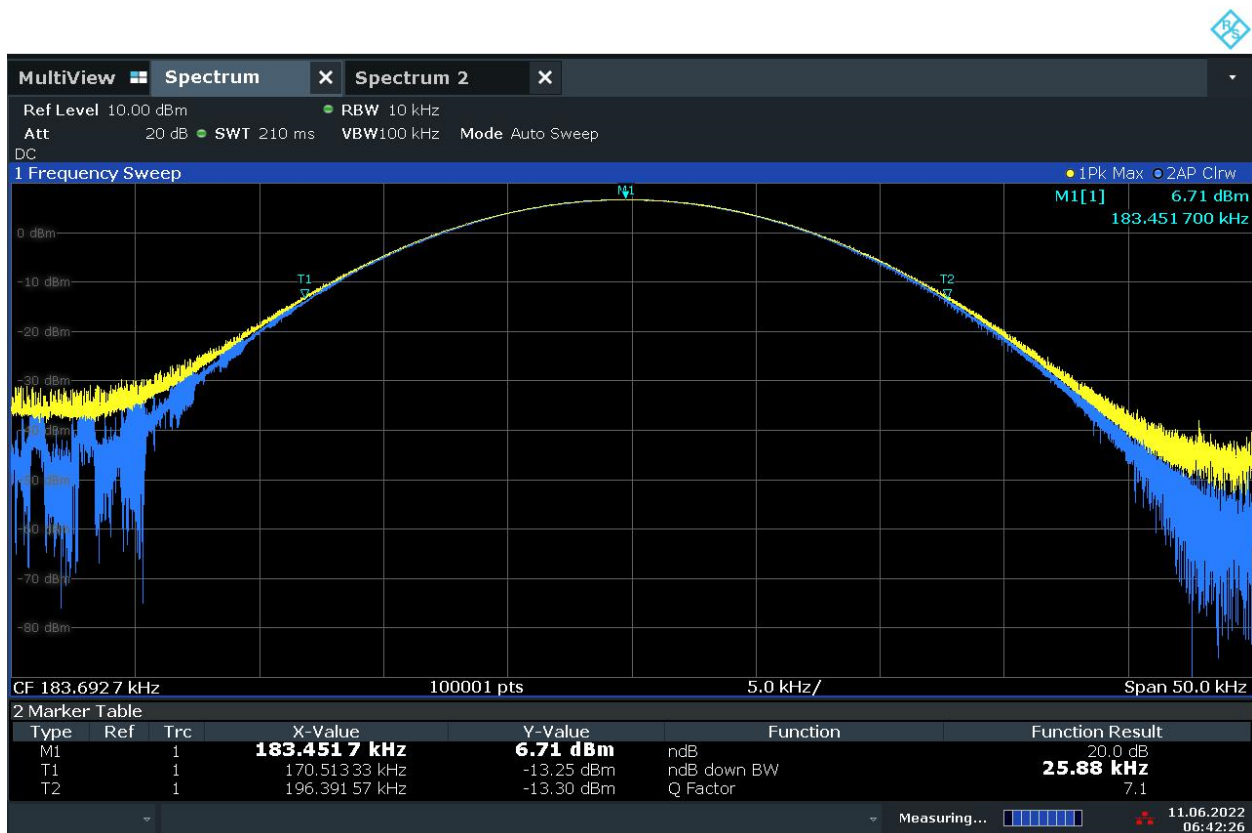
2.3.7 Additional Observations

- 20dB data presented is for reference only as the EUT does not operate under §§ 15.217 through 15.257 and in subpart E of Part 15.
- Standard RBW for band is used (10kHz, Spectrum Analyzer limitation) as 1% to 5% RBW rule for OBW measurement is not practical at the measurement frequency.

2.3.8 Test Results

Frequency	20dB Bandwidth	99% OBW
190 kHz	25.88 kHz	22.02 kHz

2.3.9 Test Result Plots



06:42:26 11.06.2022

20dB Bandwidth



06:41:36 11.06.2022

99% Occupied Bandwidth



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
AC Conducted Emissions						
1049	EMI Test Receiver	ESU40	100133	Rohde & Schwarz	10/01/21	10/01/22
7567	LISN	FCC-LISN-50-25-2-10	120304	Fischer Custom Comm.	03/28/22	03/28/23
8870	Bi-Directional Attenuator	34-20-34	BP8030	MCE / Weinschel	02/28/22	02/28/23
Radiated Emissions						
6628	Loop Antenna	HFH 2 –Z2	880 458/25	Rohde & Schwarz	5/22/20	06/22/22
Miscellaneous						
7619	Barometer/ Temperature/Humidity Transmitter	iBTHX-W	15250268	Omega	05/27/22	05/27/23
	Test Software	EMC32	V10.50.40	Rohde & Schwarz	N/A	

3.2 MEASUREMENT UNCERTAINTY

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

3.2.1 AC Conducted Emissions

	Input Quantity (Contribution) Xi	Value	Prob. Dist.	Divisor	ui(x)	ui(x)2
1	Receiver reading	0.10 dB	Normal, k=1	1.000	0.10	0.01
2	LISN-receiver attenuation	0.10 dB	Normal, k=2	2.000	0.05	0.00
3	LISN voltage division factor	0.30 dB	Normal, k=2	2.000	0.15	0.02
4	Receiver sinewave accuracy	0.36 dB	Normal, k=2	2.000	0.18	0.03
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	0.00 dB	Rectangular	1.732	0.00	0.00
8	AMN VDF frequency interpolation	0.10 dB	Rectangular	1.732	0.06	0.00
9	Mismatch	0.07 dB	U-shaped	1.414	0.05	0.00
10	LISN impedance	2.65 dB	Triangular	2.449	1.08	1.17
11	Effect of mains disturbance	0.00 dB			0.00	0.00
12	Effect of the environment					
Combined standard uncertainty				Normal	1.66 dB	
Expanded uncertainty				Normal, k=2	3.31 dB	

3.2.2 Radiated Emission Measurements (Below 30MHz)

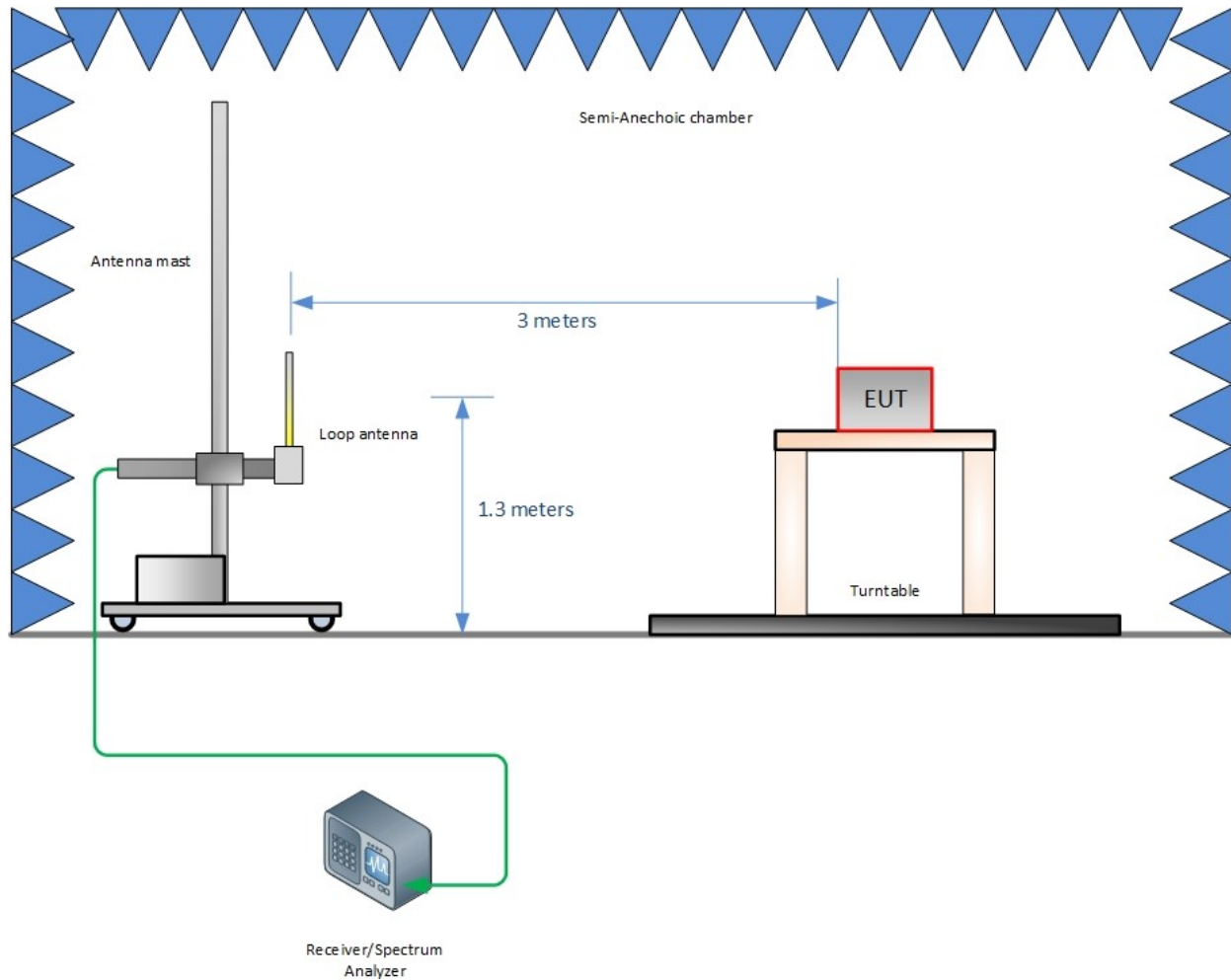
	Input Quantity (Contribution) Xi	Value	Prob. Dist.	Divisor	ui(x)	ui(x)2
1	Receiver reading	0.10 dB	Normal, k=1	1.000	0.10	0.01
2	Attenuation: antenna-receiver	0.20 dB	Normal, k=2	2.000	0.10	0.01
3	Antenna factor AF	0.44 dB	Normal, k=2	2.000	0.22	0.05
4	Receiver sinewave accuracy	0.15 dB	Normal, k=2	2.000	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 10 m	3.12 dB	Rectangular	1.732	1.80	3.24
12	Phase center location at 10 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 10 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 10 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	



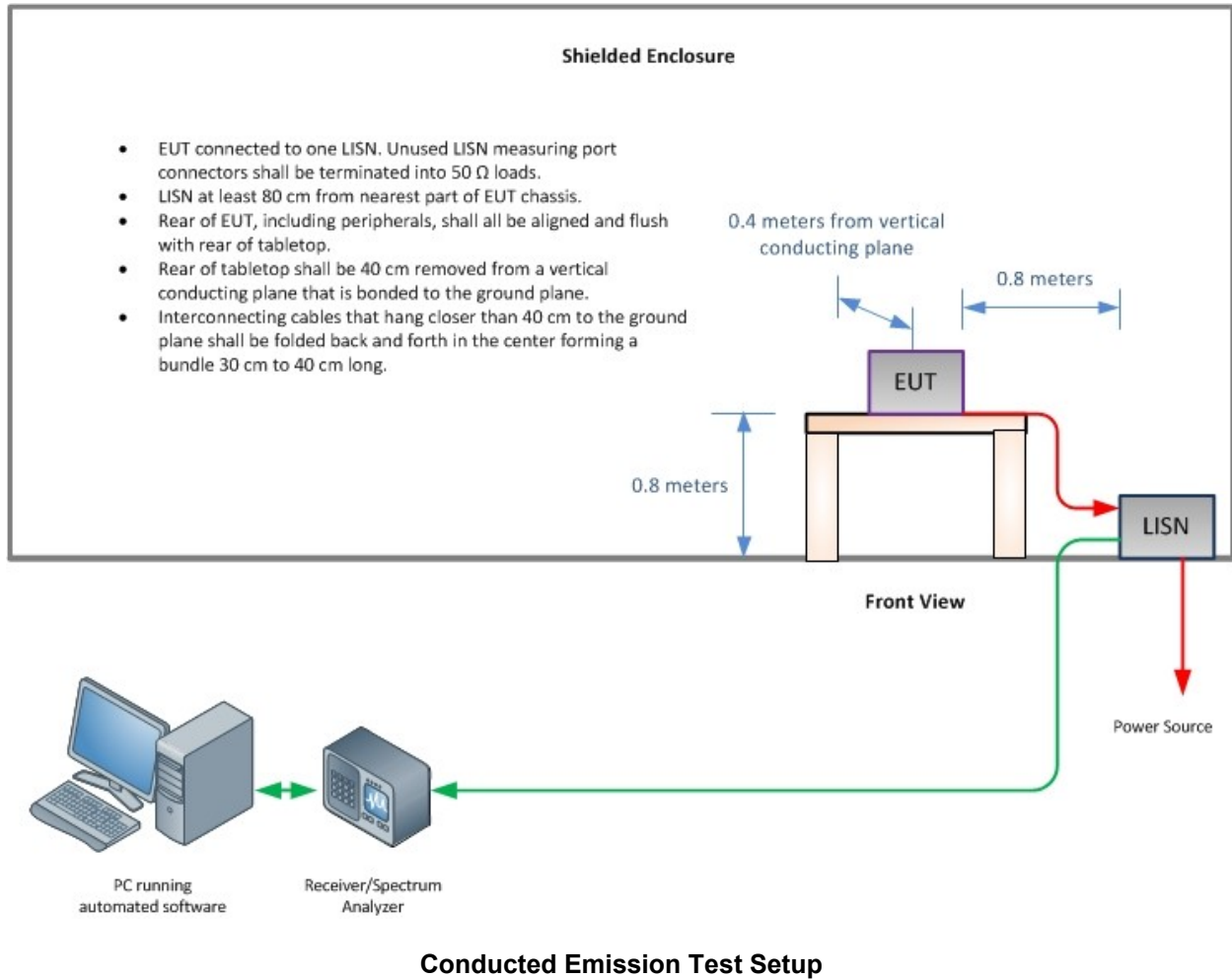
SECTION 4

DIAGRAM OF TEST SETUP

4.1 TEST SETUP DIAGRAM



Radiated Emission Test Setup (Below 30MHz)





SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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