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Report On

Application for Grant of Equipment Authorization of the
Inseego Corp.

MD8000 Wireless Module

FCC CFR 47 Part 2, 22, 24 and 27: 2018

RSS-132 Issue 3 January 2013

RSS-133 Issue 6 January 2018

RSS-139 Issue 3 July 2015

RSS-199 Issue 3 December 2016

RSS-130 Issue 2 February 2019

Report No. 72154465B

December 2019



REPORT ON	Radio Testing of the Inseego Corp. MD8000 Wireless Module
TEST REPORT NUMBER	72154465B
PREPARED FOR	Inseego Corp. 9605 Scranton Road, Suite 300 San Diego, CA 92121 USA
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DATED	<u>December 20, 2019</u>



Revision History

72154465B Inseego Corp. MD8000 Wireless Module					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
12/20/2019	-	Initial Release			Ferdinand S. Custodio

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SECTION 1

REPORT SUMMARY

Radio Testing of the
Inseego Corp.
MD8000 Wireless Module

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Inseego Corp. MD8000 Wireless Module to the requirements of the following:

- FCC CFR 47 Part 2, 22, 24 and 27: 2018
- RSS-Gen Issue 5 April 2018
- RSS-132 Issue 3 January 2013
- RSS-133 Issue 6 January 2018
- RSS-139 Issue 3 July 2015
- RSS-130 Issue 2 February 2019
- RSS-199 Issue 3 December 2016

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	Inseego Corp.
Product Marketing Name	MD8000
Model Number(s)	MD8000
FCC ID Number	PKRISGMD8000
IC Number	3229A-MD8000
Serial Number(s)	FG090719C00033
Number of Samples Tested	1
Test Specification/Issue/Date	• FCC CFR 47 Part 2, 22, 24 and 27 (October 1, 2018) • RSS-132 Issue 3 January 2013 – Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz • RSS-133 Issue 6 January 2018 – 2 GHz Personal Communications Services • RSS-139 Issue 3 July 2015 – Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz • RSS-130 Issue 2 February 2019 – Equipment Operating in the Frequency Bands 617-652 MHz, 663-698 MHz, 698-756 MHz and 777-787 MHz • RSS-199 Issue 3 December 2016 – Broadband Radio Service (BRS) Equipment Operating in the Band 2500–2690 MHz • RSS-Gen Issue 5: April 2018 - General Requirements for Compliance of Radio Apparatus • ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
Start of Test	November 21, 2019
Finish of Test	November 21, 2019



Name of Engineer(s)

Alex Chang

Related Document(s)

- TÜV SUD America Radio Test Report ref. no. 72152860C Inseego MIFI8000_FCC Part 22 24 27_CA Report.pdf
- 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 FCC CFR 47 Part 2, 22, 24 and 27: 2018 with cross-reference to the corresponding ISSED RSS standard is shown below.

Section	FCC Part Sections(s)	RSS Section(s)	Test Description	Result
-	2.1046	-	Transmitter Conducted Output Power	Compliant**
-	2.1046 22.913(a)(5) 24.232(c) 27.50(c)(10) 27.50(b)(10) 27.50 (h)(2)	RSS-132 (5.4) RSS-133 (6.4) RSS-139 (6.5) RSS-130 (4.6) RSS-199 (4.4)	Effective Radiated Power and Effective Isotropic Radiated Power	Compliant**
-	27.50 (b)(10)	RSS-133 (6.4) RSS-139 (6.5) RSS-130 (4.6)	Peak-Average Ratio	Compliant**
-	2.1049 24.238(b) 27.53(h)(3)	RSS-Gen (6.7)	Occupied Bandwidth	Compliant**
-	2.1051 24.238(a)(b) 27.53(h)(1)(3) 27.53(c)(2)(5)	RSS-133 (6.5) RSS-139 (6.6) RSS-130 (4.7)	Band Edge	Compliant**
-	2.1051 22.917(a) 24.238(a)(b) 27.53(h)(1)(3) 27.53(m)(4)(6) 27.53(g) 27.53(c)(2)(4)(5)(f)	RSS-132 (5.5) RSS-133 (6.5) RSS-139 (6.6) RSS-130 (4.7) RSS-199 (4.5)	Conducted Spurious Emissions	Compliant**
2.1	2.1053 22.917(a) 24.238(a) 27.53(h) 27.53(m) 27.53(g) 27.53(c)	RSS-132 (5.5) RSS-133 (6.5) RSS-139 (6.6) RSS-130 (4.7) RSS-199 (4.5)	Field Strength of Spurious Radiation	Compliant
-	2.1055 24.235 27.54	RSS-133 (6.3) RSS-139 (6.4) RSS-130 (4.5)	Frequency Stability	Compliant**
-	-	RSS-Gen 7.4	Receiver Spurious Emissions	N/A*

N/A*: Not required as per RSS-GEN 5.2. EUT is not a Stand-Alone receiver.

** The module was previously tested in a host under model number MIFI8000. All the conducted measurement for Carrier Aggregation evaluation was from the host and covered under test report 72152860C Inseego MIFI8000_FCC Part 22 24 27_CA Report.pdf issued on October 24, 2019.



1.3 PRODUCT INFORMATION

1.3.1 EUT General Description

The Equipment Under Test (EUT) was a Inseego Corp. MD8000 Wireless Module. The EUT is a Wireless Module supporting 2G/3G/4G Technologies. The EUT comes with a USB Port.

1.3.2 Technical Description

EUT Description	Wireless Module
Product Marketing Name	MD8000
Model Number(s)	MD8000
Rated Voltage	Input 5VdB (External Power) (Note: USB Cable and AC Wall adapter were only provided and used in support of testing to power up the device. They are not used when integrated into host devices)
Mode Verified	UL Carrier Aggregation: CA_2A-13A, CA_4A-13A, CA_13A-66A, CA_2A-5A, CA_2A-12A, CA_4A-5A, CA_4A-7A, CA_4A-12A, CA_5A-66A, CA_12A-66A, CA_5B, CA_7C, CA_38C, CA_66B, CA_66C
Capability	WCDMA Band 2, 4, 5, LTE Band 2, 4, 5, 7, 12, 13, 14, 17, 25, 26, 30, 38, 40, 41, 42, 48, 66
Primary Unit (EUT)	☒ Production ☐ Pre-Production ☐ Engineering

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
Default	Radiated test setup / case spurious emissions. The EUT is mounted on a mini ground plane for the ease of testing and powered via AC Adaptor. The Antenna port is terminated by the call box. Only Band 7 CA-7C was being evaluated in this test report as worst case band configuration.

1.4.2 EUT Exercise Software

EUT is controlled by a CMW 500 Wideband Radio Communication Tester. There is no other test software used during verification.

1.4.3 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Description
Inseego Corp.	USB Cable	Type A to Type C USB Cable. M/N: NOV7000USB
Inseego Corp.	External AC-DC Power Adapter	Model: SSW-2783, PN: 40123126.01 Input: 100-240VAC, 50/60Hz, 0.5A Output: 5VDC, max. 2A

1.4.4 Mode of Operation for Inter-Band Carrier Aggregation

The Test frequencies for E-UTRA PCell and SCell for CA inter-band operation during the test is set according to 3GPP TS 36.508 Version 15.3.0 Release 15 as follows:

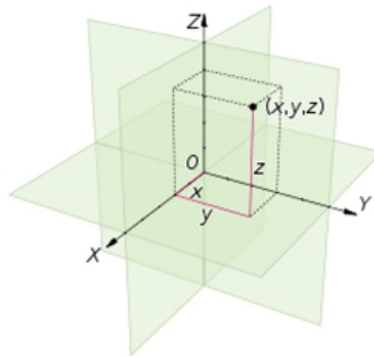
E-UTRA CA Configuration CA_7C							
Range	CC Combinations / N _{RB_agg}	CC1			CC2		
		BW (RB)	N _{UL}	Frequency of Uplink (MHz)	BW (RB)	N _{UL}	Frequency of Uplink (MHz)
Low	50+100	50	20805	2505.5	100	20949	2519.9
		100	20805	2510	50	20994	2524.4
	75+50	75	20825	2507.5	50	20945	2519.5
	75+75	75	20825	2507.5	50	20975	2522.5
	75+100	75	20828	2507.8	100	20999	2524.9
		100	20850	2510	75	21021	2527.1
	100+100	100	20850	2510	75	21048	2529.8
Low	50+100	50	21006	2525.6	100	21150	2540
		100	21051	2530.1	50	21195	2544.5
	75+50	75	21051	2530.1	50	21171	2542.1
	75+75	75	21025	2527.5	50	21175	2542.5
	75+100	75	21003	2525.3	100	21174	2542.4
		100	21026	2527.6	75	21197	2544.7
	100+100	100	21001	2525.1	75	21199	2544.9
Low	50+100	50	21206	2545.6	100	21350	2560
		100	21251	2550.1	50	21395	2564.5
	75+50	75	21277	2552.7	50	21397	2564.7
	75+75	75	21225	2547.5	50	21375	2562.5
	75+100	75	21179	2542.9	100	21350	2560
		100	21201	2545.1	75	21372	2562.2
	100+100	100	21152	2540.2	75	21350	2560

1.4.5 Worst Case Configuration

Worst-case configuration used in this test report as per output power measurements:

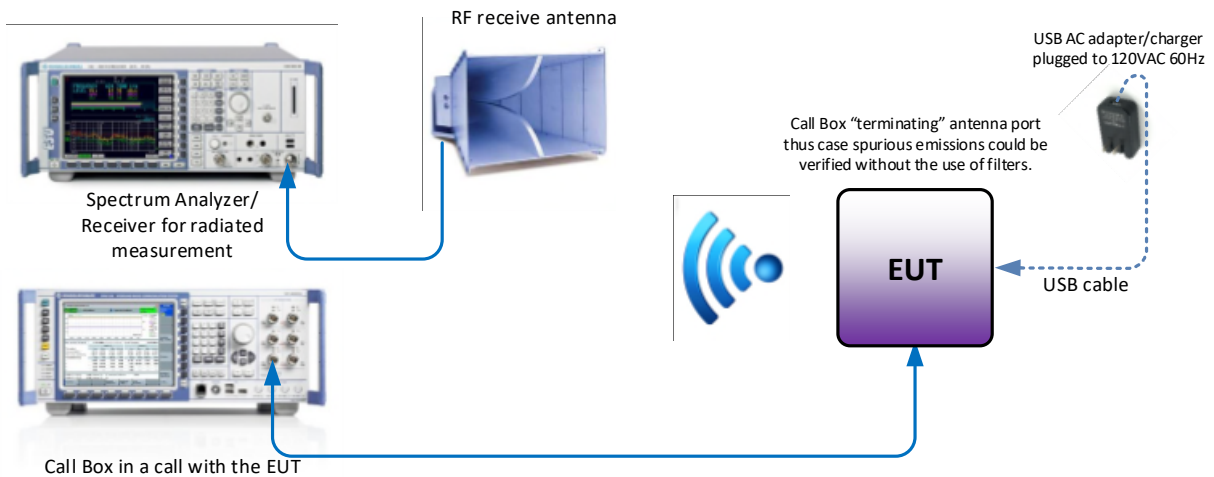
Band	Channel BW	Frequency (MHz)	Modulation	RB Size/Offset
CA_7C	10 + 10 MHz	1750 + 2565	QPSK	1/99 & 1/0

For radiated measurements X, Y, and Z orientations were verified. The verification was determined “X” as worst case configuration.

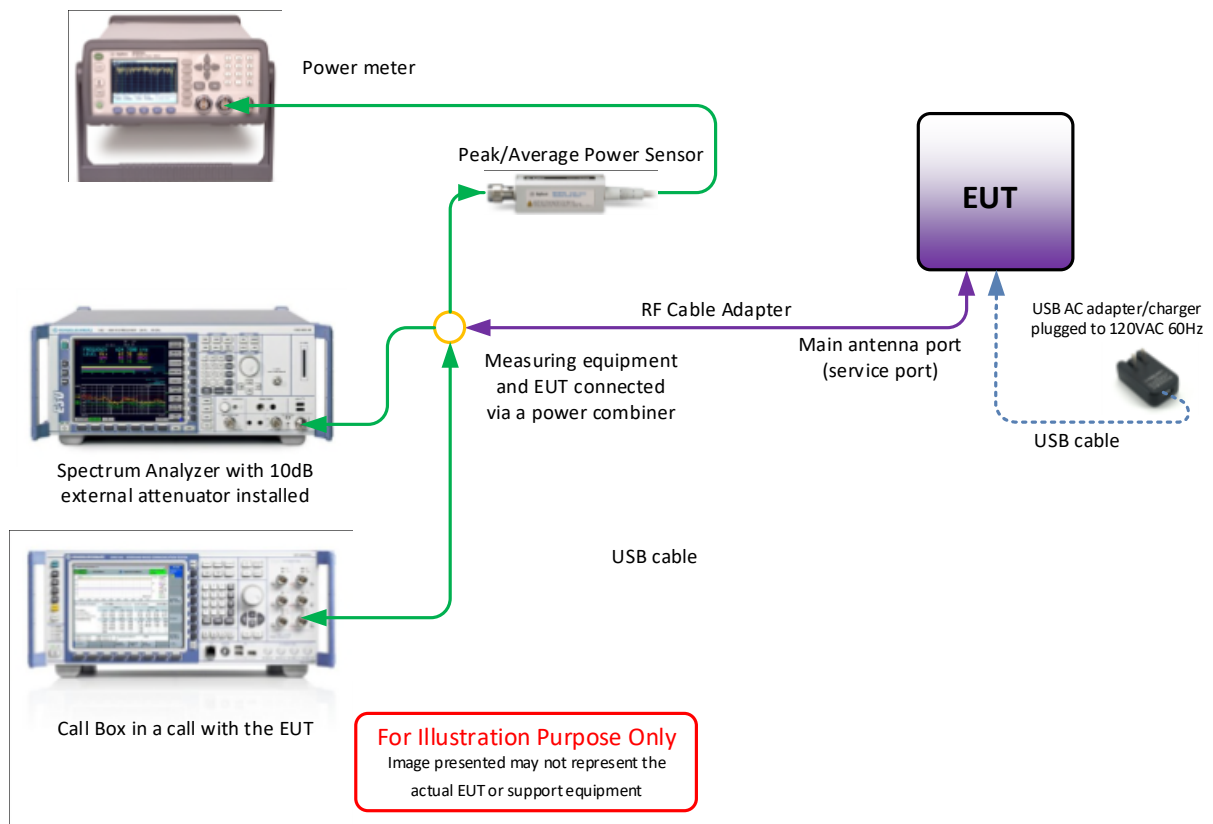


1.4.6 Simplified Test Configuration Diagram

Radiated Test Configuration/Conducted Emissions Test Configuration



Conducted (Antenna Port) Test Configuration





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: FG090719C00033		
None	—	—

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

1.7 TEST METHODOLOGY

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

For radiated emissions, the equipment under test (EUT) was configured to measure its highest possible emission level. 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-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
Inseego Corp.
MD8000 Wireless Module

2.1 FIELD STRENGTH OF SPURIOUS RADIATION

2.1.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1053
FCC 47 CFR Part 22, Clause 22.917(b)
FCC 47 CFR Part 24, Clause 24.238(a)
FCC 47 CFR Part 27, Clause 27.53(h)
FCC 47 CFR Part 27, Clause 27.53(m)
FCC 47 CFR Part 27, Clause 27.53(g)
FCC 47 CFR Part 27, Clause 27.53(c)
RSS-132, Clause 5.5
RSS-133, Clause 6.5
RSS-139, Clause 6.6
RSS-130, Clause 4.7
RSS-199, Clause 4.5

2.1.2 Standard Applicable

FCC 47 CFR Part 22.917(a):

Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

FCC 47 CFR Part 24.238

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

FCC 47 CFR Part 27.53:

(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10\log_{10}(P)$ dB

FCC 47 CFR Part 27.53 (m):

(4) For mobile digital stations, the attenuation factor shall be not less than $40 + 10\log(P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10\log(P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10\log(P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

In addition, the attenuation factor shall not be less than $43 + 10\log(P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10\log(P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

FCC 47 CFR Part 27.53 (g):

For operations in the 600 MHz band and the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10\log(P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.



- (c)(2) On any frequency outside the 776–788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (c)(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed.

RSS-132, Clause 5.5:

Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

- i. In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).
- ii. After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

RSS-133, Clause 6.5.1

Equipment shall comply with the limits in (i) and (ii) below.

- (i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).
- (ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

RSS-139, Clause 6.6

- (i) In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least $43 + 10 \log_{10} p$ (watts) dB.
- (ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts) dB.



RSS-130, Clause 4.7

4.7.1 The power of any unwanted emissions in any 100 kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$ (watts), dB. However, in the 100 kHz band immediately outside the equipment's operating frequency range, a resolution bandwidth of 30 kHz may be employed.

4.7.2 In addition to the limit outlined in section 4.7.1 above, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions:

a. the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:

- i. $76 + 10 \log_{10} p$ (watts), dB, for base and fixed equipment and
- ii. $65 + 10 \log_{10} p$ (watts), dB, for mobile and portable equipment
- b. the e.i.r.p. in the band 1559-1610 MHz shall not exceed -70 dBW/MHz for wideband signal and -80 dBW for discrete emission with bandwidth less than 700 Hz.

RSS-199, Clause 4.5

For mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:

- i. $40 + 10 \log_{10} p$ from the channel edges to 5 MHz away
- ii. $43 + 10 \log_{10} p$ between 5 MHz and X MHz from the channel edges, and
- iii. $55 + 10 \log_{10} p$ at X MHz and beyond from the channel edges

In addition, the attenuation shall not be less than $43 + 10 \log_{10} p$ on all frequencies between 2490.5 MHz and 2496 MHz, and $55 + 10 \log_{10} p$ at or below 2490.5 MHz.

2.1.3 Equipment Under Test and Modification State

Serial No: FG090719C00033 / Default Test Configuration

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

November 21, 2019 / AC

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. Rancho Bernardo facility

Ambient Temperature	23.4 °C
Relative Humidity	46.3 %
ATM Pressure	98.7 kPa



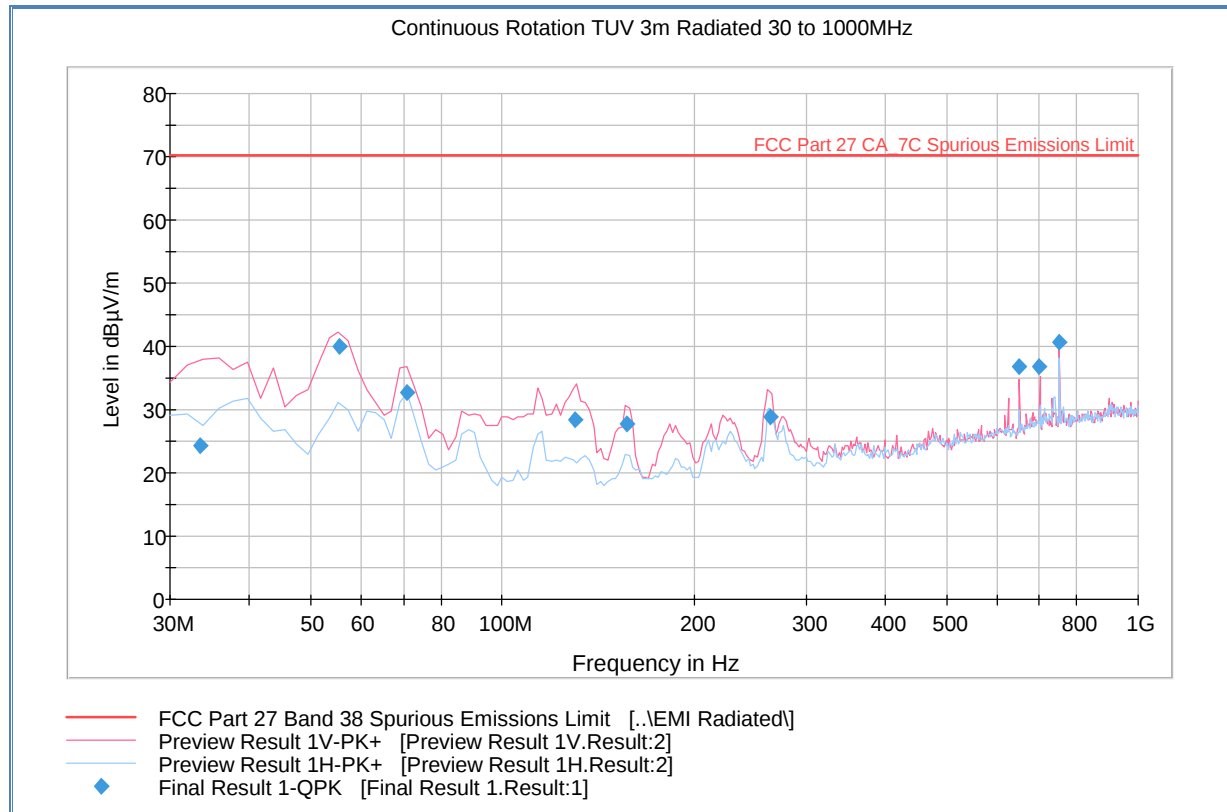
2.1.7 Additional Observations

- This is a radiated test using the direct Radiated Field Strength method of C63.26 2015.
- This is cabinet spurious emissions testing. Main antenna port was terminated during the test. Fundamental frequency measurement will be ignored for this test.
- Only the worst case carrier aggregation configuration presented in this test report.
- Only noise floor measurements observed above 18GHz.
- 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.

2.1.8 Test Results

Compliant. See attached plots.

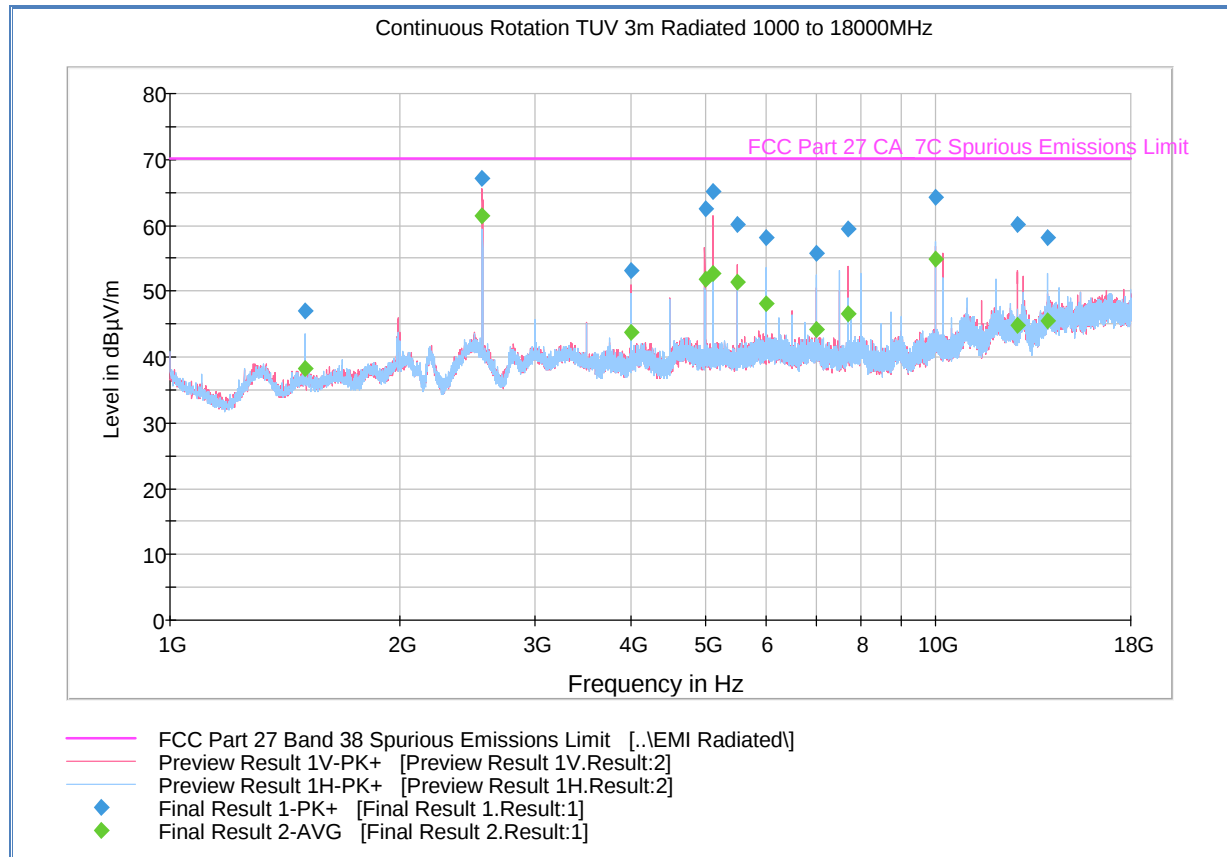
2.1.9 Radiated Emission Test Results Below 1GHz – Worst Case CA_7C



Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
33.511663	24.3	1000.0	120.000	139.0	V	227.0	-9.3	45.9	70.2
55.350541	39.9	1000.0	120.000	100.0	V	4.0	-15.8	30.3	70.2
70.701643	32.7	1000.0	120.000	110.0	V	316.0	-16.9	37.5	70.2
129.842164	28.5	1000.0	120.000	100.0	V	39.0	-14.3	41.7	70.2
157.096593	27.8	1000.0	120.000	100.0	V	14.0	-12.0	42.4	70.2
263.602645	29.0	1000.0	120.000	115.0	V	121.0	-8.2	41.2	70.2
649.980200	36.9	1000.0	120.000	100.0	V	203.0	0.8	33.3	70.2
700.001283	36.9	1000.0	120.000	100.0	V	110.0	2.6	33.3	70.2
749.982365	40.7	1000.0	120.000	100.0	V	276.0	2.9	29.5	70.2

2.1.10 Radiated Emission Test Results Above 1GHz – Worst Case CA_7C



Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1500.000000	47.0	1000.0	1000.000	153.7	H	151.0	-6.1	23.2	70.2
2559.100000	67.1	1000.0	1000.000	310.2	V	31.0	-0.4	3.1	70.2
3999.733333	53.2	1000.0	1000.000	183.5	V	-13.0	2.5	17.0	70.2
5000.133333	62.4	1000.0	1000.000	250.5	V	170.0	3.8	7.8	70.2
5119.333333	65.2	1000.0	1000.000	252.3	V	81.0	4.0	5.0	70.2
5500.100000	60.1	1000.0	1000.000	169.6	V	351.0	5.0	10.1	70.2
5999.900000	58.1	1000.0	1000.000	274.3	H	59.0	5.7	12.1	70.2
7000.066667	55.7	1000.0	1000.000	303.2	H	326.0	6.7	14.5	70.2
7678.000000	59.4	1000.0	1000.000	213.4	V	288.0	7.1	10.8	70.2
10000.000000	64.2	1000.0	1000.000	337.1	H	199.0	9.6	6.0	70.2
12795.300000	60.2	1000.0	1000.000	343.1	V	286.0	13.7	10.0	70.2
13999.866667	58.1	1000.0	1000.000	352.1	H	199.0	14.7	12.1	70.2

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1500.000000	38.3	1000.0	1000.000	153.7	H	151.0	-6.1	31.9	70.2
2559.100000	61.5	1000.0	1000.000	310.2	V	31.0	-0.4	8.7	70.2
3999.733333	43.6	1000.0	1000.000	183.5	V	-13.0	2.5	26.6	70.2
5000.133333	51.9	1000.0	1000.000	250.5	V	170.0	3.8	18.3	70.2
5119.333333	52.7	1000.0	1000.000	252.3	V	81.0	4.0	17.5	70.2
5500.100000	51.4	1000.0	1000.000	169.6	V	351.0	5.0	18.8	70.2
5999.900000	48.0	1000.0	1000.000	274.3	H	59.0	5.7	22.2	70.2
7000.066667	44.2	1000.0	1000.000	303.2	H	326.0	6.7	26.0	70.2
7678.000000	46.6	1000.0	1000.000	213.4	V	288.0	7.1	23.7	70.2
10000.000000	54.9	1000.0	1000.000	337.1	H	199.0	9.6	15.3	70.2
12795.300000	44.9	1000.0	1000.000	343.1	V	286.0	13.7	25.3	70.2
13999.866667	45.4	1000.0	1000.000	352.1	H	199.0	14.7	24.8	70.2



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 Test Setup						
1033	Bilog Antenna	3142C	00044556	EMCO	09/05/19	09/05/21
7575	Double-ridged waveguide horn antenna	3117	00155511	EMCO	06/16/18	06/16/20
1016	Pre-amplifier	PAM-0202	187	PAM	03/08/19	03/08/20
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	10/11/19	10/11/20
7620	EMI Test Receiver	ESU	100399	Rhode & Schwarz	10/18/19	10/18/20
8628	Pre-amplifier	QLJ 01182835-JO	8986002	QuinStar Technologies Inc.	03/07/19	03/07/20
40813	Wideband Radio Communication Tester	CMW500	145913-RH	Rhode & Schwarz	04/22/19	04/22/20
Miscellaneous						
7619	Temp & Humidity Sensor	iBTHX-W	15050268	Omega	06/18/19	06/18/20
—	Test Software	EMC32	V8.53	Rhode & Schwarz	N/A	

3.2 MEASUREMENT UNCERTAINTY

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

3.2.1 Radiated Emission Measurements (Below 1GHz)

	Input Quantity (Contribution) X_i	Value	Prob. Dist.	Divisor	$u_i(x)$	$u_i(x)^2$
1	Receiver reading	0.10 dB	Normal, k=1	1.000	0.10	0.01
2	Attenuation: antenna-receiver	0.20 dB	Normal, k=2	2.000	0.10	0.01
3	Antenna factor AF	0.75 dB	Normal, k=2	2.000	0.38	0.14
4	Receiver sinewave accuracy	1.10 dB	Normal, k=2	2.000	0.55	0.30
5	Receiver pulse amplitude	1.50 dB	Rectangular	1.732	0.87	0.75
6	Receiver pulse repetition rate	1.50 dB	Rectangular	1.732	0.87	0.75
7	Noise floor proximity	0.50 dB	Rectangular	1.732	0.29	0.08
8	Mismatch: antenna-receiver	0.95 dB	U-shaped	1.414	0.67	0.45
9	AF frequency interpolation	0.30 dB	Rectangular	1.732	0.17	0.03
10	AF height deviations	0.10 dB	Rectangular	1.732	0.06	0.00
11	Directivity difference at 3 m	3.12 dB	Rectangular	1.732	1.80	3.24
12	Phase center location at 3 m	1.00 dB	Rectangular	1.732	0.58	0.33
13	Cross-polarisation	0.90 dB	Rectangular	1.732	0.52	0.27
14	Balance	0.00 dB	Rectangular	1.732	0.00	0.00
15	Site imperfections	3.91 dB	Triangular	2.449	1.60	2.55
16	Separation distance at 3 m	0.30 dB	Rectangular	1.732	0.17	0.03
17	Effect of setup table material	0.40 dB	Rectangular	1.732	0.23	0.05
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	3.00 dB	
Expanded uncertainty				Normal, k=2	6.00 dB	

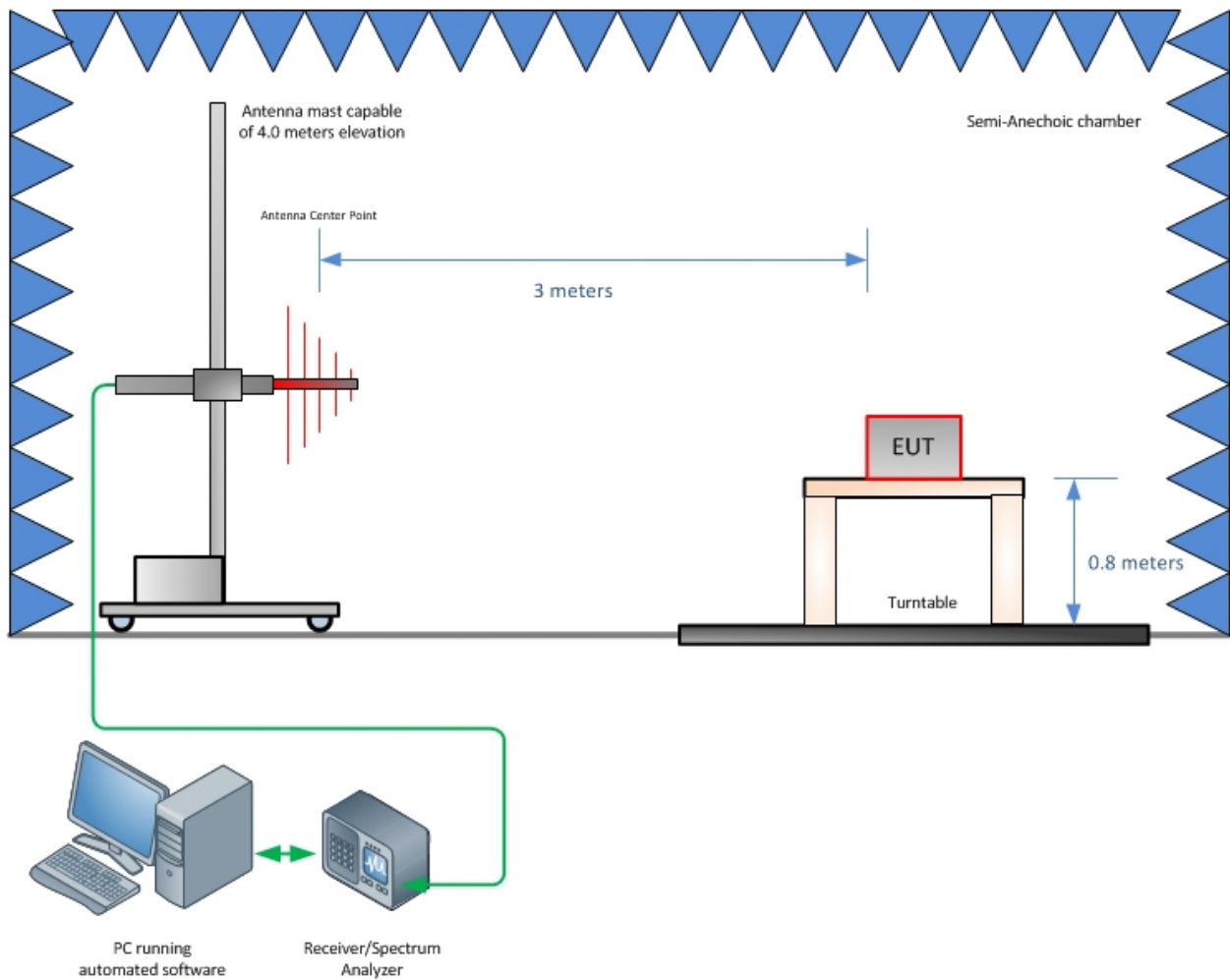
3.2.2 Radiated Emission Measurements (Above 1GHz)

	Input Quantity (Contribution) X_i	Value	Prob. Dist.	Divisor	$u_i(x)$	$u_i(x)^2$
1	Receiver reading	0.10 dB	Normal, k=1	1.000	0.10	0.01
2	Attenuation: antenna-receiver	0.30 dB	Normal, k=2	2.000	0.15	0.02
3	Preamplifier Gain	0.20 dB	Normal, k=2	2.000	0.10	0.01
4	Antenna factor AF	0.37 dB	Normal, k=2	2.000	0.19	0.03
5	Sinewave accuracy	0.57 dB	Normal, k=2	2.000	0.29	0.08
6	Instability of preamp gain	1.21 dB	Rectangular	1.732	0.70	0.49
7	Noise floor proximity	0.70 dB	Rectangular	1.732	0.40	0.16
8	Mismatch: antenna-preamplifier	1.41 dB	U-shaped	1.414	1.00	0.99
9	Mismatch: preamplifier-receiver	1.30 dB	U-shaped	1.414	0.92	0.85
10	AF frequency interpolation	0.30 dB	Rectangular	1.732	0.17	0.03
11	Directivity difference at 3 m	1.50 dB	Rectangular	1.732	0.87	0.75
12	Phase center location at 3 m	0.30 dB	Rectangular	1.732	0.17	0.03
13	Cross-polarisation	0.90 dB	Rectangular	1.732	0.52	0.27
14	Site imperfections VSWR (Method 2)	5.30 dB	Triangular	2.449	2.16	4.68
15	Effect of setup table material	1.15 dB	Rectangular	1.732	0.66	0.44
16	Separation distance at 3 m	0.30 dB	Rectangular	1.732	0.17	0.03
17	Table height at 3 m	0.00 dB	Normal, k=2	2.000	0.00	0.00
Combined standard uncertainty			Normal	2.98 dB		
Expanded uncertainty			Normal, k=2	5.96 dB		

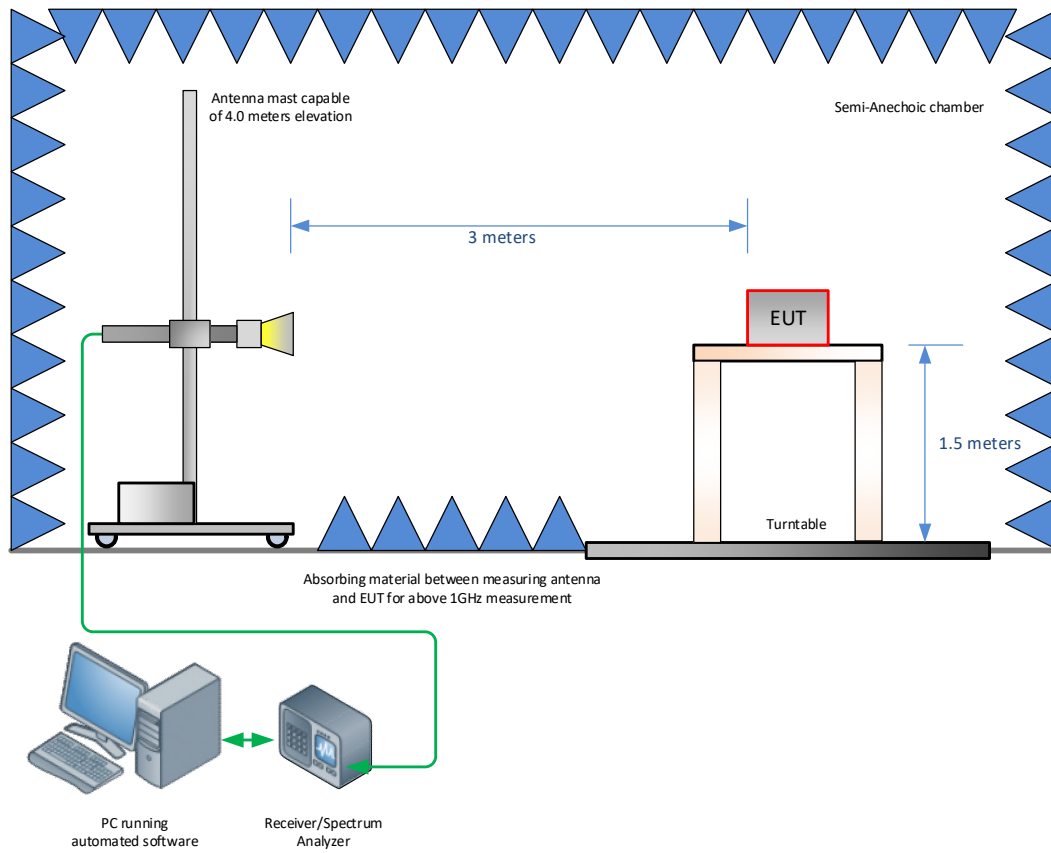
SECTION 4

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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