TEST REPORT

Product	:	WM1110
Trade mark	:	Seeed Studio
Model/Type reference	:	WM1110-A,WM1110-S
Serial Number	:	N/A
Report Number	:	EED32O80763104
FCC ID	:	Z4T-WM1110
Date of Issue	:	Jun. 29, 2022
Test Standards	:	47 CFR Part 15 Subpart C
Test result	:	PASS

Prepared for:

Seeed Technology Co., Ltd.
9F, G3 Building, TCL International E City, Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong Province, P.R.C

Prepared by:

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Date of issue: Jun. 29, 2022

Check No.:4728300522

CENTRE TESTING INTERNATIONAL GROUP CO.,LTD. CTI Report Seal

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3 Version

Version No.	Date	Description
00	Jun. 29, 2022	Original

4 Test Summary

Test Item	Test Requirement	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203/15.247 (c)	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	NA
DTS Bandwidth	47 CFR Part 15 Subpart C Section 15.247 (a)(2)	PASS
Maximum Conducted Output Power	47 CFR Part 15 Subpart C Section 15.247 (b)(3)	PASS
Maximum Power Spectral Density	47 CFR Part 15 Subpart C Section 15.247 (e)	PASS
Band Edge Measurements	47 CFR Part 15 Subpart C Section 15.247(d)	PASS
Conducted Spurious Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	PASS
Radiated Spurious Emission & Restricted bands	47 CFR Part 15 Subpart C Section 15.205/15.209	PASS

Remark:
Company Name and Address shown on Report, the sample(s) and sample Information were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified.
Model No.:WM1110-A,WM1110-S
Only the model WM1110-S was tested, Their electrical circuit design, layout, components used and internal wiring are identical, the difference is whether it contains an authentication chip or not.
WM1110-S has two different models of encryption chips,WM1110-S will use either of these two encryption chips and the other parts will be exactly the same.

5 General Information

5.1 Client Information

Applicant:	Seeed Technology Co., Ltd.
Address of Applicant:	9F,G3 Building,TCL International E City, Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong Province, P.R.C
Manufacturer:	SeeedTechnology Co., Ltd.
Address of Manufacturer:	9F,G3 Building,TCLInternational E City, Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong Province, P.R.C
Factory:	Shenzhen Xinxian Technology Co, Limited
Address of Factory:	F5, Building B17, Hengfeng Industrial City, No.739 Zhoushi Rd, Baoan District, Shenzhen,Guangdong, P.R.C.F5, Building B17, Hengfeng Industrial City, No.739 Zhoushi Rd,Baoan District, Shenzhen, Guangdong, P.R.C.

5.2 General Description of EUT

Product Name:	WM1110
Model No.:	WM1110-A, WM1110-S
Test Model No.:	WM1110-S
Trade mark:	Seeed Studio
Product Type:	Portable
Operation Frequency:	902MHz~928MHz
Modulation Type:	LORA Chirp Spread Spectrum
Transfer Bandwidth:	☒ 500kHz ☒ 1523.4kHz
Number of Channel:	8
Antenna Type:	Spring Antenna
Antenna Gain:	3.17 dBi
Power Supply:	DC 3.3V
Test Voltage:	DC 3.3V
Sample Received Date:	May 30, 2022
Sample tested Date:	May 30, 2022 to Jun. 22, 2022

Operation Frequency each of channel of TX:	
Channel	Frequency
1	903MHz
2	904.6MHz
3	906.2MHz
4	907.8MHz
5	909.4MHz
6	911MHz
7	912.6MHz
8	914.2MHz

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel (CH1)	903MHz
The middle channel (CH4)	907.8MHz
The highest channel (CH8)	914.2MHz

5.3 Test Configuration

EUT Test Software Settings:				
Software:	Putty			
EUT Power Grade:	Power level is built-in set parameters and cannot be changed and selected			
Use test software to set the lowest frequency, the middle frequency and the highest frequency keep transmitting of the EUT.				
Test Mode	Modulation	Bandwidth	Channel	Frequency(MHz)
Mode a	LORA	500kHz	CH0	903
Mode b	LORA	500kHz	CH4	907.8
Mode c	LORA	500kHz	CH8	914.2
Mode d	LORA	1523.4kHz	CH0	903
Mode e	LORA	1523.4kHz	CH4	907.8
Mode f	LORA	1523.4kHz	CH8	914.2

5.4 Test Environment

Operating Environment:		
Radiated Spurious Emissions:		
	Temperature:	22~25.0 °C
	Humidity:	50~55 % RH
	Atmospheric Pressure:	1010mbar
RF Conducted:		
	Temperature:	22~25.0 °C
	Humidity:	50~55 % RH
	Atmospheric Pressure:	1010mbar

5.5 Description of Support Units

The EUT has been tested with associated equipment below.

support equipment

Description	Manufacturer	Model No.	Certification	Supplied by
Netbook	DELL	Latitude 3490	FCC&CE	CTI

5.6 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd
Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China
Telephone: +86 (0) 755 33683668 Fax:+86 (0) 755 33683385
No tests were sub-contracted.
FCC Designation No.: CN1164

5.7 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-40GHz)
3	Radiated Spurious emission test	3.3dB (9kHz-30MHz)
		4.3dB (30MHz-1GHz)
		4.5dB (1GHz-18GHz)
		3.4dB (18GHz-40GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

6 Equipment List

RF test system					
Equipment	**Manufacturer**	**Mode No.**	**Serial Number**	**Cal. Date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
Spectrum Analyzer	Keysight	N9010A	MY54510339	12-24-2021	12-23-2022
Signal Generator	Keysight	N5182B	MY53051549	12-24-2021	12-23-2022
Spectrum Analyzer	R&S	FSV40	101200	08-26-2021	08-25-2022
Signal Generator	Agilent	N5181A	MY46240094	12-24-2021	12-23-2022
DC Power	Keysight	E3642A	MY56376072	12-24-2021	12-23-2022
Power unit	R&S	OSP120	101374	12-24-2021	12-23-2022
RF control unit	JS Tonscend	JS0806-2	158060006	12-24-2021	12-23-2022
Communication test set	R&S	CMW500	120765	08-04-2021	08-03-2022
high-low temperature test chamber	Dong Guang Qin Zhuo	LK-80GA	QZ20150611879	12-24-2021	12-23-2022
Temperature/ Humidity Indicator	biaozhi	HM10	1804186	06-24-2021 06-16-2022	06-23-2022 06-15-2023
BT&WI-FI Automatic test software	JS Tonscend	JS1120-3	2.6.77.0518	---	---

3M Semi-anechoic Chamber (2)- Radiated disturbance Test					
Equipment	Manufacturer	Model	Serial No.	Cal. Date	Due Date
3M Chamber & Accessory Equipment	TDK	SAC-3	---	05/22/2022	05/21/2025
Receiver	R&S	ESCI7	100938-003	10/14/2021	10/13/2022
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	9163-618	05/22/2022	05/21/2023
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04-15-2021	04-14-2024
Multi device Controller	maturo	NCD/070/10711112	---	---	---
Horn Antenna	ETS-LINGREN	BBHA 9120D	9120D-1869	04/15/2021	04/14/2024
Microwave Preamplifier	Agilent	8449B	3008A02425	06/23/2021 06/20/2022	06/22/2022 06/19/2023

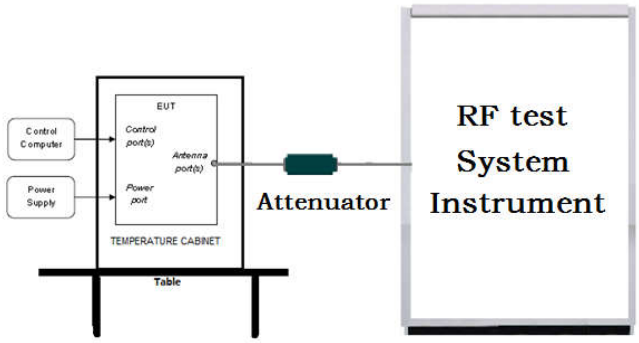
3M full-anechoic Chamber					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. Date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
RSE Automatic test software	JS Tonscend	JS36-RSE	10166	---	---
Receiver	Keysight	N9038A	MY57290136	03-01-2022	02-28-2023
Spectrum Analyzer	Keysight	N9020B	MY57111112	02-23-2022	02-22-2023
Spectrum Analyzer	Keysight	N9030B	MY57140871	02-23-2022	02-22-2023
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-1148	04-28-2021	04-27-2024
Horn Antenna	Schwarzbeck	BBHA 9170	9170-832	04-15-2021	04-14-2024
Horn Antenna	ETS-LINDGREN	3117	57407	07-04-2021	07-03-2024
Preamplifier	EMCI	EMC184055SE	980597	04-20-2022	04-19-2023
Preamplifier	EMCI	EMC001330	980563	04-01-2022	03-31-2023
Preamplifier	JS Tonscend	980380	EMC051845SE	12-24-2021	12-23-2022
Communication test set	R&S	CMW500	102898	12-24-2021	12-23-2022
Temperature/ Humidity Indicator	biaozhi	GM1360	EE1186631	04-11-2022	04-10-2023
Fully Anechoic Chamber	TDK	FAC-3	---	01-09-2021	01-08-2024
Cable line	Times	SFT205-NMSM-2.50M	394812-0001	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0002	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0003	---	---
Cable line	Times	SFT205-NMSM-2.50M	393495-0001	---	---
Cable line	Times	EMC104-NMNM-1000	SN160710	---	---
Cable line	Times	SFT205-NMSM-3.00M	394813-0001	---	---
Cable line	Times	SFT205-NMNM-1.50M	381964-0001	---	---
Cable line	Times	SFT205-NMSM-7.00M	394815-0001	---	---
Cable line	Times	HF160-KMKM-3.00M	393493-0001	---	---

7 Test results and Measurement Data

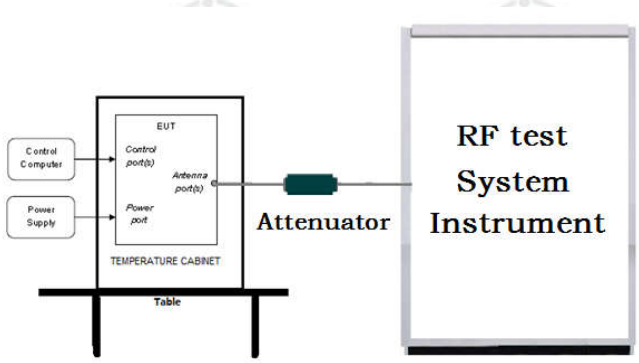
7.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203 /247(c)
15.203 requirement: 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, 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. 15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
EUT Antenna:	Please see Internal photos
The antenna is Spring antenna. The best case gain of the antenna is 3.17dBi.	

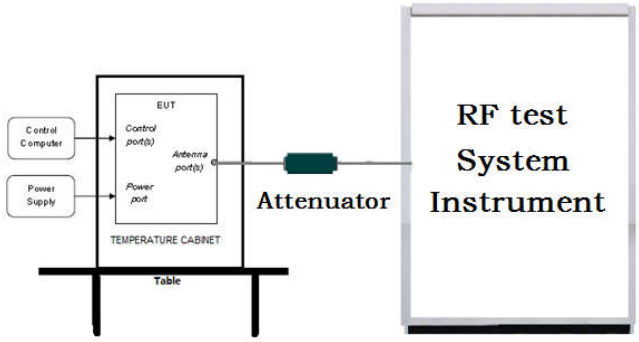
7.2 Maximum Conducted Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (b)(3)
Test Method:	ANSI C63.10 2013
Test Setup:	 Remark: Offset=Cable loss+ attenuation factor.
Test Procedure:	a) Set the RBW ⩾ DTS bandwidth. b) Set VBW ⩾ 3 × RBW. c) Set span ⩾ 3 x RBW d) Sweep time = auto couple. e) Detector = peak. f) Trace mode = max hold. g) Allow trace to fully stabilize. h) Use peak marker function to determine the peak amplitude level.
Limit:	30dBm
Test Mode:	Refer to clause 5.3
Test Results:	Refer to Appendix A

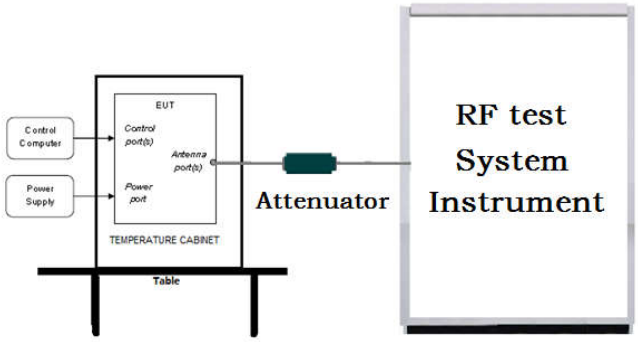
7.3 DTS Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(2)
Test Method:	ANSI C63.10 2013
Test Setup:	 Remark: Offset=Cable loss+ attenuation factor.
Test Procedure:	a) Set RBW = 100 kHz. b) Set the VBW ⩾[3 × RBW]. c) Detector = peak. d) Trace mode = max hold. e) Sweep = auto couple. f) Allow the trace to stabilize. g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
Limit:	≥ 500 kHz
Test Mode:	Refer to clause 5.3
Test Results:	Refer to Appendix A

7.4 Maximum Power Spectral Density

Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	ANSI C63.10 2013
Test Setup:	 Remark: Offset=Cable loss+ attenuation factor.
Test Procedure:	a) Set analyzer center frequency to DTS channel center frequency. b) Set the span to 1.5 times the DTS bandwidth. c) Set the RBW to 3 kHz ＜ RBW ＜ 100 kHz. d) Set the VBW ＞ [3 × RBW]. e) Detector = RMS. f) Sweep time = auto couple. g) Trace mode = average. h) Allow trace to fully stabilize. i) Use the peak marker function to determine the maximum amplitude level within the RBW. j) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.
Limit:	≤8.00dBm/3kHz
Test Mode:	Refer to clause 5.3
Test Results:	Refer to Appendix A

7.5 Band Edge measurements and Conducted Spurious Emission

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10 2013
Test Setup:	 Remark: Offset=Cable loss+ attenuation factor.
Test Procedure:	a) Set RBW =100KHz. b) Set VBW = 300KHz. c) Sweep time = auto couple. d) Detector = RMS. e) Trace mode = max hold. f) Allow trace to fully stabilize. g) Use peak marker function to determine the peak amplitude level.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
Test Mode:	Refer to clause 5.3
Test Results:	Refer to Appendix A

7.6 Radiated Spurious Emission & Restricted bands

<table>
<tr><td>Test Requirement:</td><td>47 CFR Part 15C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10 2013</td></tr>
<tr><td>Test Site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver Setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr>
<tr><td>0.009MHz-0.090MHz</td><td>Peak</td><td>10kHz</td><td>30kHz</td><td>Peak</td></tr>
<tr><td>0.009MHz-0.090MHz</td><td>Average</td><td>10kHz</td><td>30kHz</td><td>Average</td></tr>
<tr><td>0.090MHz-0.110MHz</td><td>Quasi-peak</td><td>10kHz</td><td>30kHz</td><td>Quasi-peak</td></tr>
<tr><td>0.110MHz-0.490MHz</td><td>Peak</td><td>10kHz</td><td>30kHz</td><td>Peak</td></tr>
<tr><td>0.110MHz-0.490MHz</td><td>Average</td><td>10kHz</td><td>30kHz</td><td>Average</td></tr>
<tr><td>0.490MHz -30MHz</td><td>Quasi-peak</td><td>10kHz</td><td>30kHz</td><td>Quasi-peak</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100 kHz</td><td>300kHz</td><td>Quasi-peak</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10kHz</td><td>Average</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Field strength (microvolt/meter)</th><th>Limit (dBuV/m)</th><th>Remark</th><th>Measurement distance (m)</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(kHz)</td><td>-</td><td>-</td><td>300</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(kHz)</td><td>-</td><td>-</td><td>30</td></tr>
<tr><td>1.705MHz-30MHz</td><td>30</td><td>-</td><td>-</td><td>30</td></tr>
<tr><td>30MHz-88MHz</td><td>100</td><td>40.0</td><td>Quasi-peak</td><td>3</td></tr>
<tr><td>88MHz-216MHz</td><td>150</td><td>43.5</td><td>Quasi-peak</td><td>3</td></tr>
<tr><td>216MHz-960MHz</td><td>200</td><td>46.0</td><td>Quasi-peak</td><td>3</td></tr>
<tr><td>960MHz-1GHz</td><td>500</td><td>54.0</td><td>Quasi-peak</td><td>3</td></tr>
<tr><td>Above 1GHz</td><td>500</td><td>54.0</td><td>Average</td><td>3</td></tr>
</table>
Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.
</td></tr>
</table>

Test Setup:	

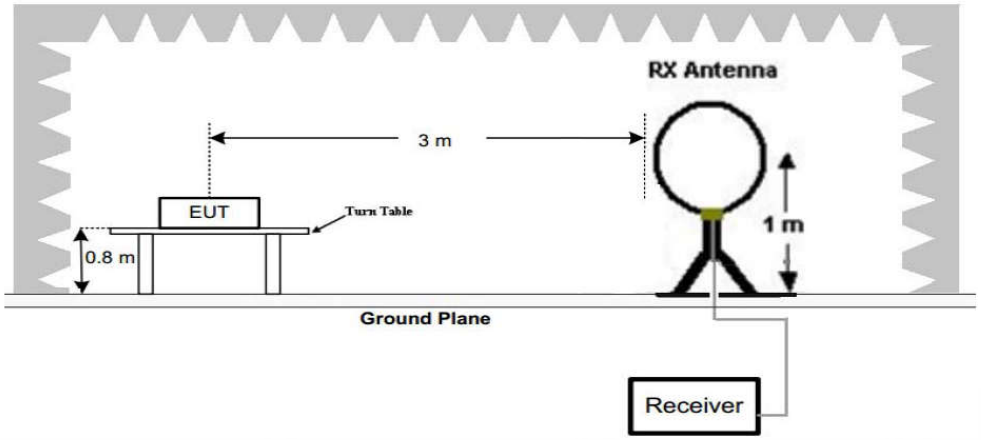


Figure 1. Below 30MHz

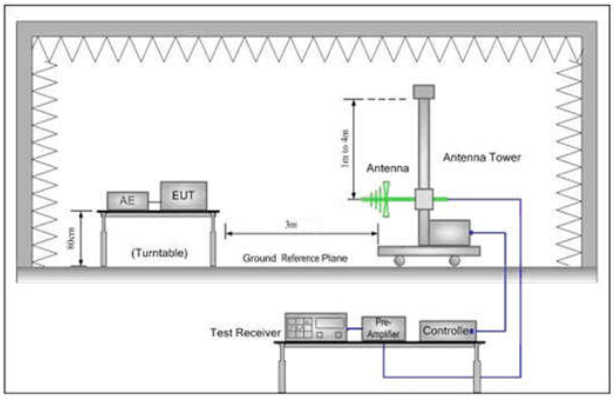


Figure 2. 30MHz to 1GHz

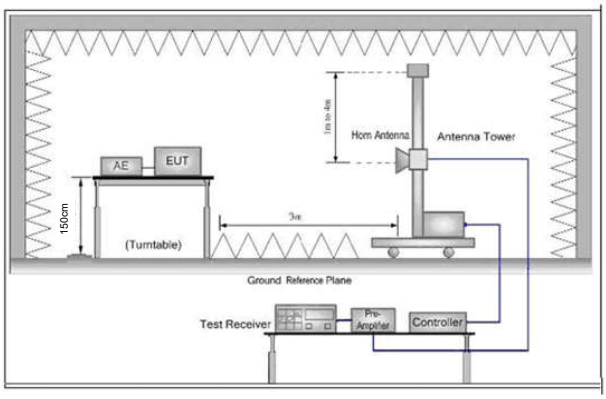


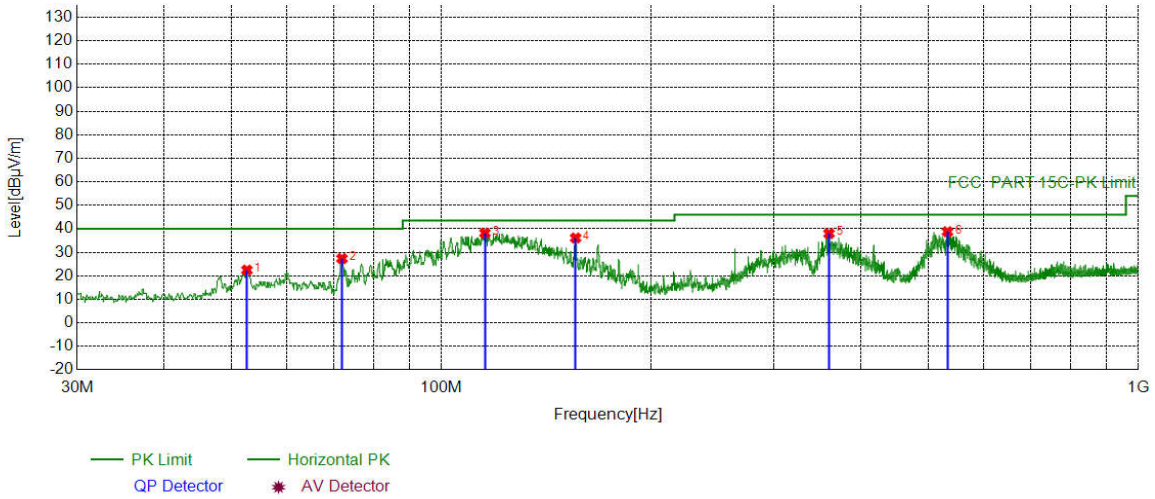
Figure 3. Above 1 GHz

Test Procedure:	a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. Note: For the radiated emission test above 1GHz: Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel (2402MHz),the middle channel (2440MHz),the Highest channel (2480MHz) h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case. i. Repeat above procedures until all frequencies measured was complete.
Test Mode:	Refer to clause 5.3
Test Results:	Pass

Radiated Spurious Emission below 1GHz:

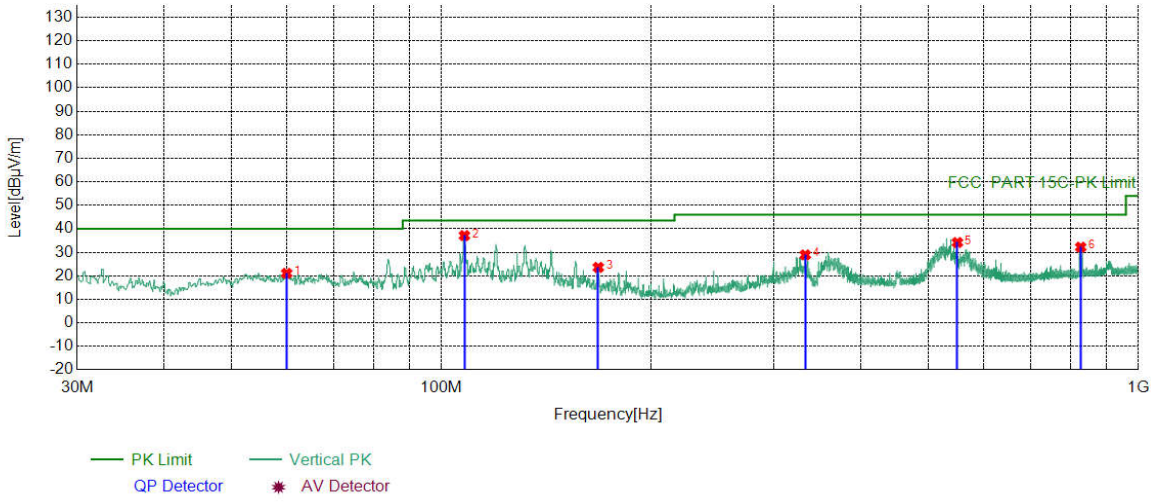
During the test, the Radiates Emission from 30MHz to 1GHz was performed in all modes, only the worst case lowest channel of LORA 500KHz was recorded in the report.

Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity	Remark
1	52.6033	-17.52	39.98	22.46	40.00	17.54	PASS	Horizontal	PK
2	72.0052	-21.15	48.49	27.34	40.00	12.66	PASS	Horizontal	PK
3	115.4655	-19.31	57.51	38.20	43.50	5.30	PASS	Horizontal	PK
4	155.8216	-21.35	57.47	36.12	43.50	7.38	PASS	Horizontal	PK
5	359.9300	-13.81	51.80	37.99	46.00	8.01	PASS	Horizontal	PK
6	532.4132	-10.20	48.97	38.77	46.00	7.23	PASS	Horizontal	PK

Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity	Remark
1	59.9760	-18.49	39.56	21.07	40.00	18.93	PASS	Vertical	PK
2	107.8988	-18.39	55.51	37.12	43.50	6.38	PASS	Vertical	PK
3	167.9478	-20.60	44.19	23.59	43.50	19.91	PASS	Vertical	PK
4	332.7673	-14.63	43.53	28.90	46.00	17.10	PASS	Vertical	PK
5	550.1660	-9.82	44.00	34.18	46.00	11.82	PASS	Vertical	PK
6	826.9347	-6.12	38.31	32.19	46.00	13.81	PASS	Vertical	PK

Radiated Spurious Emission above 1GHz:

500KHz:

Mode:			LORA Transmitting			Channel:		903 MHz	
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1622.8415	-25.92	60.49	34.57	74.00	39.43	Pass	H	PK
2	2129.2753	-23.41	61.69	38.28	74.00	35.72	Pass	H	PK
3	2708.3139	-22.24	62.50	40.26	74.00	33.74	Pass	H	PK
4	3686.9791	-20.22	57.75	37.53	74.00	36.47	Pass	H	PK
5	5229.6820	-14.87	55.24	40.37	74.00	33.63	Pass	H	PK
6	7669.4446	-11.03	54.10	43.07	74.00	30.93	Pass	H	PK
7	1600.0400	-26.11	67.08	40.97	74.00	33.03	Pass	V	PK
8	2125.6750	-23.37	62.02	38.65	74.00	35.35	Pass	V	PK
9	3196.7465	-20.64	63.07	42.43	74.00	31.57	Pass	V	PK
10	4515.0343	-17.17	57.68	40.51	74.00	33.49	Pass	V	PK
11	6139.3426	-13.35	54.77	41.42	74.00	32.58	Pass	V	PK
12	8528.7019	-10.72	56.55	45.83	74.00	28.17	Pass	V	PK

Mode:			LORA Transmitting			Channel:		907.8 MHz	
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1595.2397	-26.15	64.81	38.66	74.00	35.34	Pass	H	PK
2	2152.0768	-23.66	60.78	37.12	74.00	36.88	Pass	H	PK
3	2723.9149	-22.17	61.38	39.21	74.00	34.79	Pass	H	PK
4	4264.2176	-17.48	59.10	41.62	74.00	32.38	Pass	H	PK
5	5521.9015	-14.30	55.66	41.36	74.00	32.64	Pass	H	PK
6	7901.6601	-11.26	54.49	43.23	74.00	30.77	Pass	H	PK
7	1595.8397	-26.14	66.26	40.12	74.00	33.88	Pass	V	PK
8	2129.2753	-23.41	61.82	38.41	74.00	35.59	Pass	V	PK
9	3188.3459	-20.69	63.43	42.74	74.00	31.26	Pass	V	PK
10	4539.0359	-17.05	56.77	39.72	74.00	34.28	Pass	V	PK
11	5800.9201	-13.25	55.41	42.16	74.00	31.84	Pass	V	PK
12	8519.1013	-10.78	57.64	46.86	74.00	27.14	Pass	V	PK

Mode:			LORA Transmitting			Channel:		914.2 MHz	
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1599.4400	-26.11	65.73	39.62	74.00	34.38	Pass	H	PK
2	2129.8753	-23.42	60.77	37.35	74.00	36.65	Pass	H	PK
3	2742.5162	-22.10	61.20	39.10	74.00	34.90	Pass	H	PK
4	4254.6170	-17.58	60.43	42.85	74.00	31.15	Pass	H	PK
5	6284.5523	-13.15	55.43	42.28	74.00	31.72	Pass	H	PK
6	8743.5162	-9.88	54.80	44.92	74.00	29.08	Pass	H	PK
7	1597.6398	-26.13	66.27	40.14	74.00	33.86	Pass	V	PK
8	2143.6762	-23.57	61.24	37.67	74.00	36.33	Pass	V	PK
9	2805.5204	-21.85	59.93	38.08	74.00	35.92	Pass	V	PK
10	3986.3991	-18.91	59.36	40.45	74.00	33.55	Pass	V	PK
11	5742.1161	-13.62	56.51	42.89	74.00	31.11	Pass	V	PK
12	8102.6735	-10.82	54.02	43.20	74.00	30.80	Pass	V	PK

1523.4KHz:

Mode:			LORA Transmitting			Channel:		903MHz	
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1445.2297	-26.84	60.86	34.02	74.00	39.98	Pass	H	PK
2	2105.2737	-23.16	60.30	37.14	74.00	36.86	Pass	H	PK
3	2720.3147	-22.19	59.99	37.80	74.00	36.20	Pass	H	PK
4	3811.1874	-19.46	57.66	38.20	74.00	35.80	Pass	H	PK
5	5830.3220	-13.39	55.99	42.60	74.00	31.40	Pass	H	PK
6	8188.4792	-10.97	54.28	43.31	74.00	30.69	Pass	H	PK
7	1608.4406	-26.04	64.52	38.48	74.00	35.52	Pass	V	PK
8	2107.6738	-23.18	60.45	37.27	74.00	36.73	Pass	V	PK
9	2709.5140	-22.23	61.81	39.58	74.00	34.42	Pass	V	PK
10	3992.3995	-18.88	61.56	42.68	74.00	31.32	Pass	V	PK
11	5324.4883	-14.74	57.30	42.56	74.00	31.44	Pass	V	PK
12	7695.8464	-10.93	55.23	44.30	74.00	29.70	Pass	V	PK

Mode:			LORA Transmitting			Channel:		907.8 MHz	
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1592.8395	-26.16	63.55	37.39	74.00	36.61	Pass	H	PK
2	2414.2943	-23.65	59.89	36.24	74.00	37.76	Pass	H	PK
3	3068.3379	-21.27	59.89	38.62	74.00	35.38	Pass	H	PK
4	4251.0167	-17.61	59.02	41.41	74.00	32.59	Pass	H	PK
5	5472.0981	-14.37	56.95	42.58	74.00	31.42	Pass	H	PK
6	6937.9959	-12.08	54.65	42.57	74.00	31.43	Pass	H	PK
7	1593.4396	-26.16	67.17	41.01	74.00	32.99	Pass	V	PK
8	2116.0744	-23.27	60.99	37.72	74.00	36.28	Pass	V	PK
9	2930.9287	-21.60	59.63	38.03	74.00	35.97	Pass	V	PK
10	4403.4269	-16.76	56.88	40.12	74.00	33.88	Pass	V	PK
11	5483.4989	-14.37	55.50	41.13	74.00	32.87	Pass	V	PK
12	7790.6527	-11.48	54.55	43.07	74.00	30.93	Pass	V	PK

Mode:			LORA Transmitting			Channel:		914.2 MHz	
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1526.8351	-26.67	60.95	34.28	74.00	39.72	Pass	H	PK
2	2128.6752	-23.41	62.53	39.12	74.00	34.88	Pass	H	PK
3	2712.5142	-22.22	60.28	38.06	74.00	35.94	Pass	H	PK
4	4251.0167	-17.61	58.57	40.96	74.00	33.04	Pass	H	PK
5	5410.8941	-14.36	55.67	41.31	74.00	32.69	Pass	H	PK
6	7697.6465	-10.92	55.04	44.12	74.00	29.88	Pass	H	PK
7	1457.2305	-26.84	63.54	36.70	74.00	37.30	Pass	V	PK
8	1828.6552	-24.55	61.54	36.99	74.00	37.01	Pass	V	PK
9	2603.3069	-22.72	61.13	38.41	74.00	35.59	Pass	V	PK
10	3223.7483	-20.57	59.68	39.11	74.00	34.89	Pass	V	PK
11	4872.6582	-16.28	56.84	40.56	74.00	33.44	Pass	V	PK
12	7233.8156	-11.92	55.91	43.99	74.00	30.01	Pass	V	PK

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

   Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

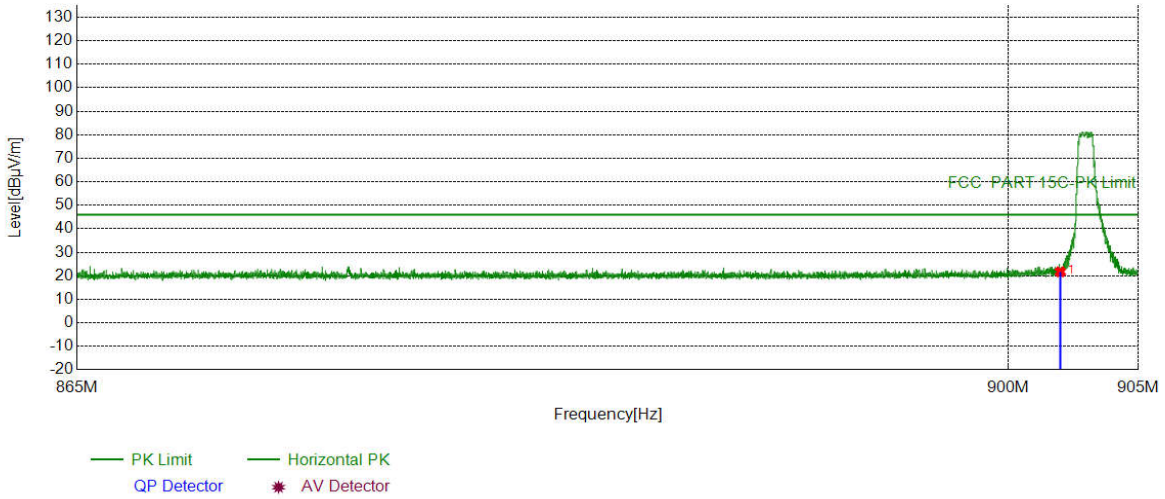
2) Scan from 9kHz to 25GHz, the disturbance above 10GHz and below 30MHz was very low. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

Restricted bands:

Test plot as follows:

Mode:		Channel:	903 MHz
Remark:	DTS BW500KHz		

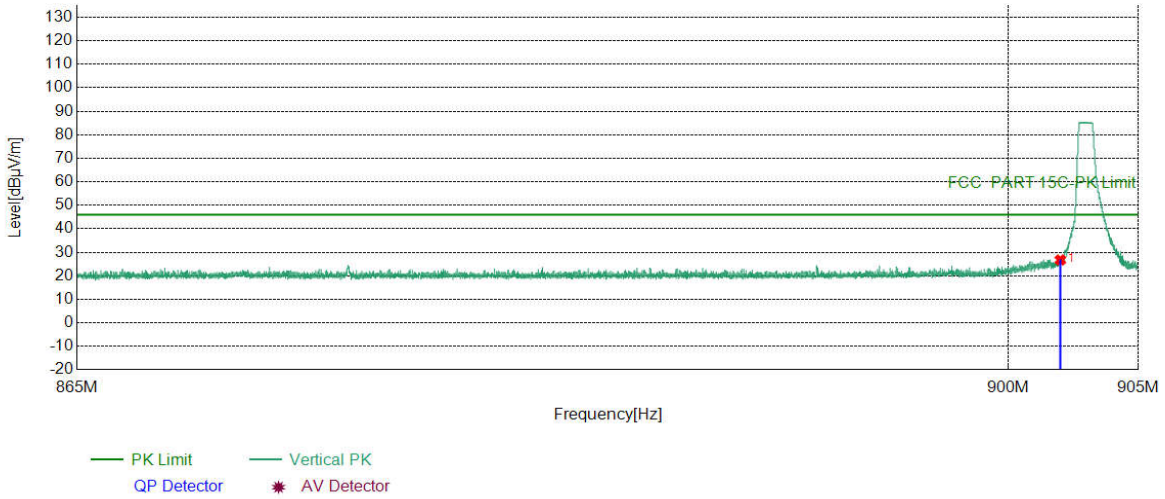
Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity	Remark
1	902.0000	-4.96	26.67	21.71	46.00	24.29	PASS	Horizontal	PK

Mode:		Channel:	903 MHz
Remark:	DTS BW500KHz		

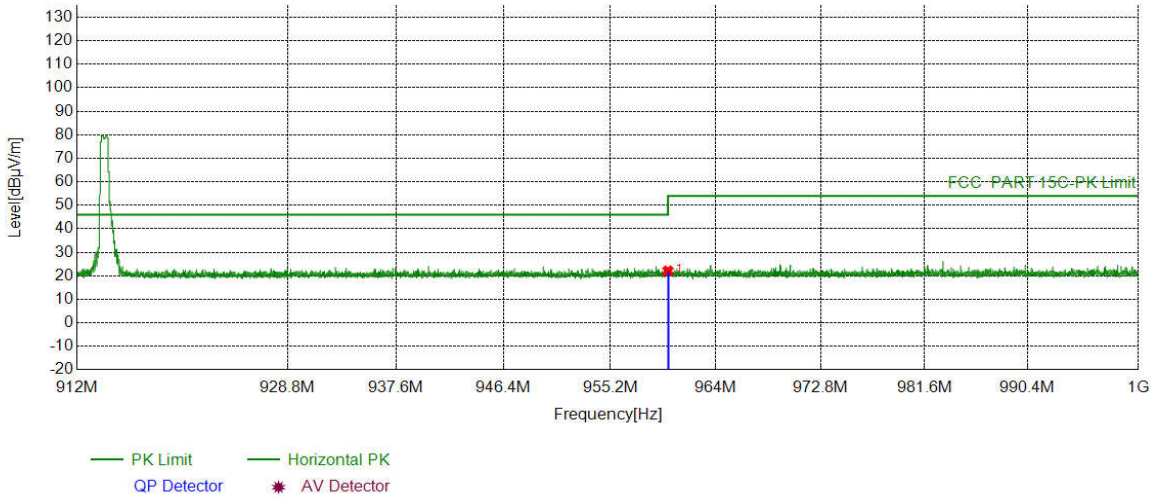
Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity	Remark
1	902.0000	-4.96	31.71	26.75	46.00	19.25	PASS	Vertical	PK

Mode:		Channel:	914.2 MHz
Remark:	DTS BW500KHz		

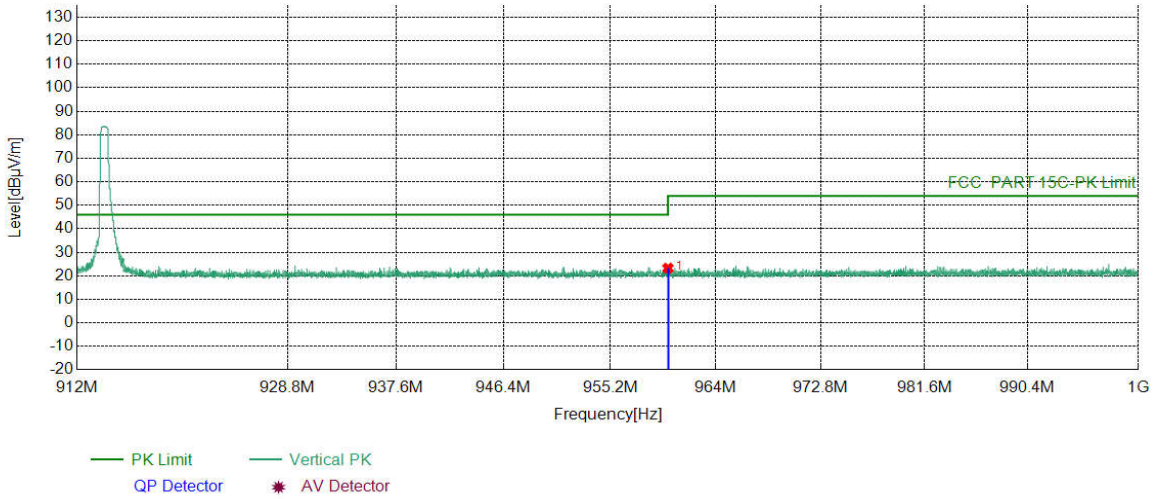
Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity	Remark
1	960.0000	-4.38	26.47	22.09	46.00	23.91	PASS	Horizontal	PK

Mode:		Channel:	914.2 MHz
Remark:	DTS BW500KHz		

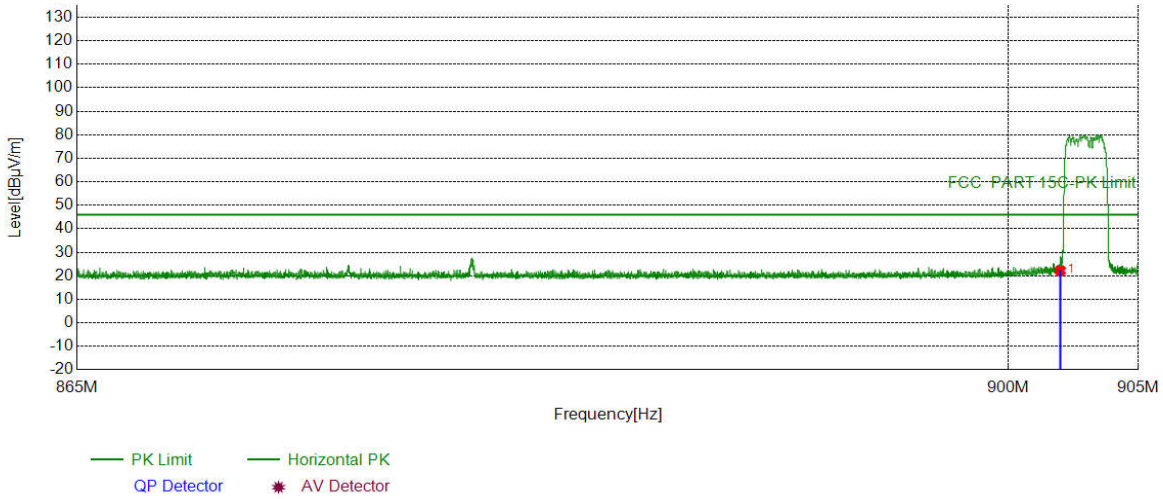
Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity	Remark
1	960.0000	-4.38	27.63	23.25	46.00	22.75	PASS	Vertical	PK

Mode:		Channel:	903 MHz
Remark:	DTS BW1523.4KHz		

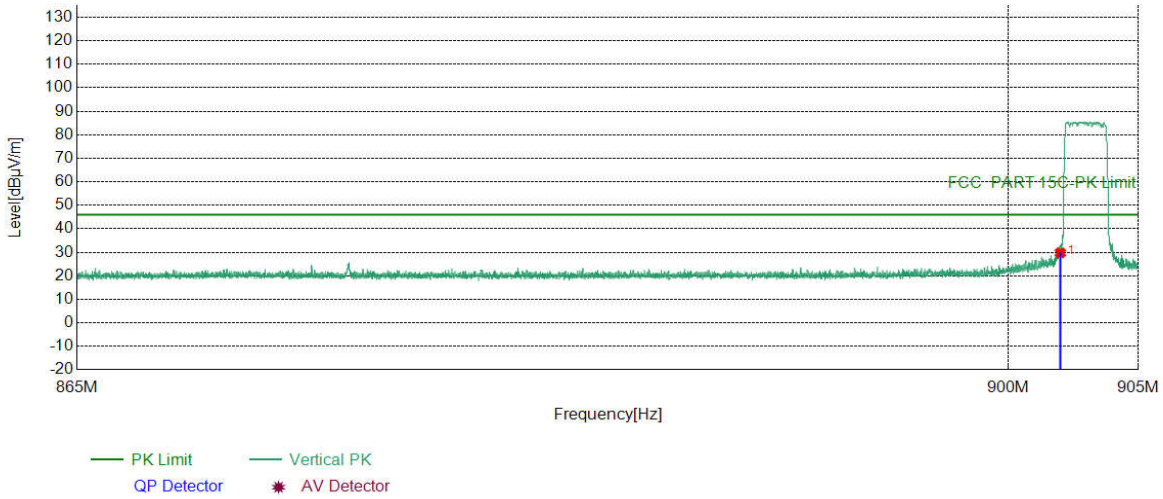
Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity	Remark
1	902.0000	-4.96	27.17	22.21	46.00	23.79	PASS	Horizontal	PK

Mode:		Channel:	903 MHz
Remark:	DTS BW1523.4KHz		

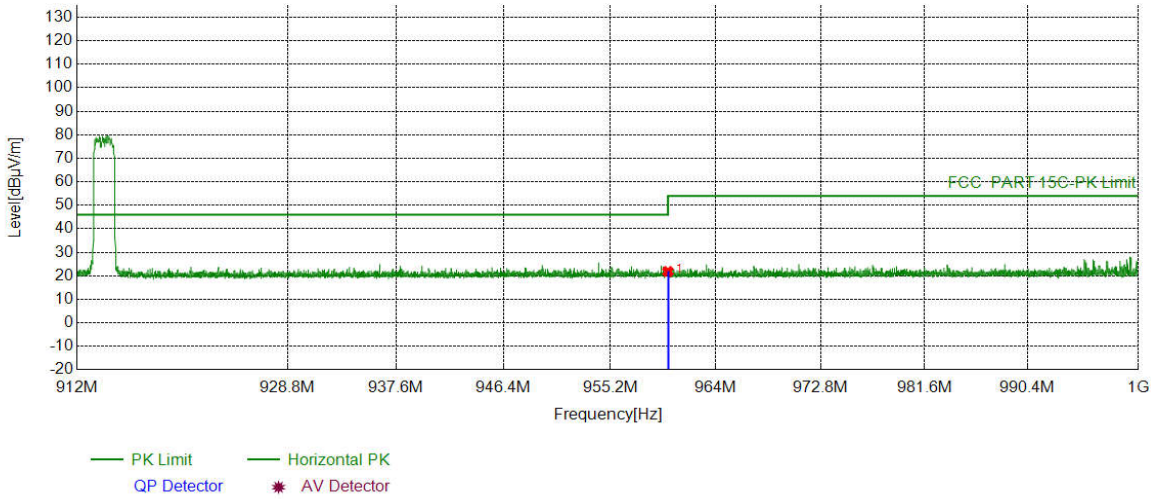
Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity	Remark
1	902.0000	-4.96	34.74	29.78	46.00	16.22	PASS	Vertical	PK

Mode:		Channel:	914.2 MHz
Remark:	DTS BW1523.4KHz		

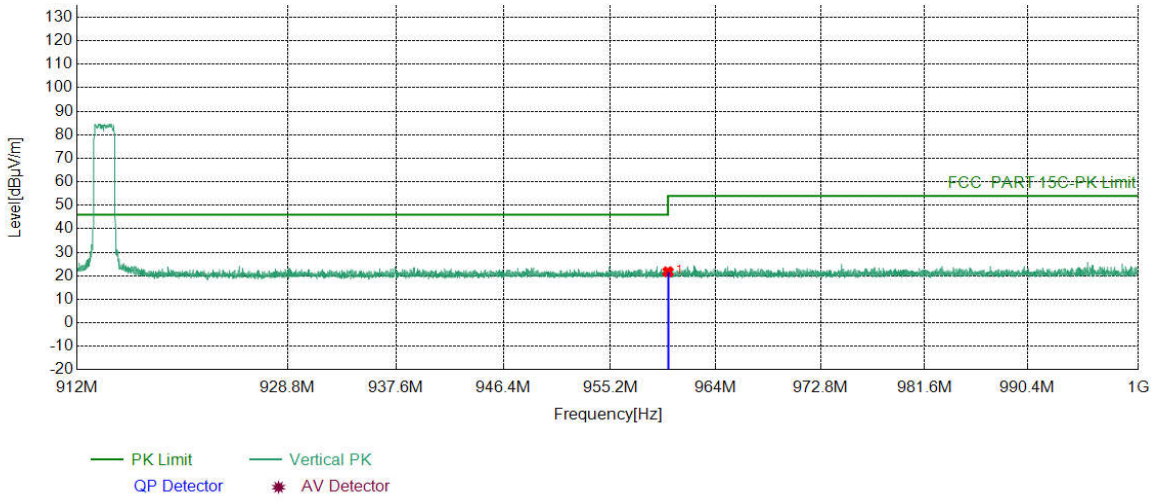
Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity	Remark
1	960.0000	-4.38	26.22	21.84	46.00	24.16	PASS	Horizontal	PK

Mode:		Channel:	914.2 MHz
Remark:	DTS BW1523.4KHz		

Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity	Remark
1	960.0000	-4.38	26.10	21.72	46.00	24.28	PASS	Vertical	PK

Note:
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading -Correct Factor

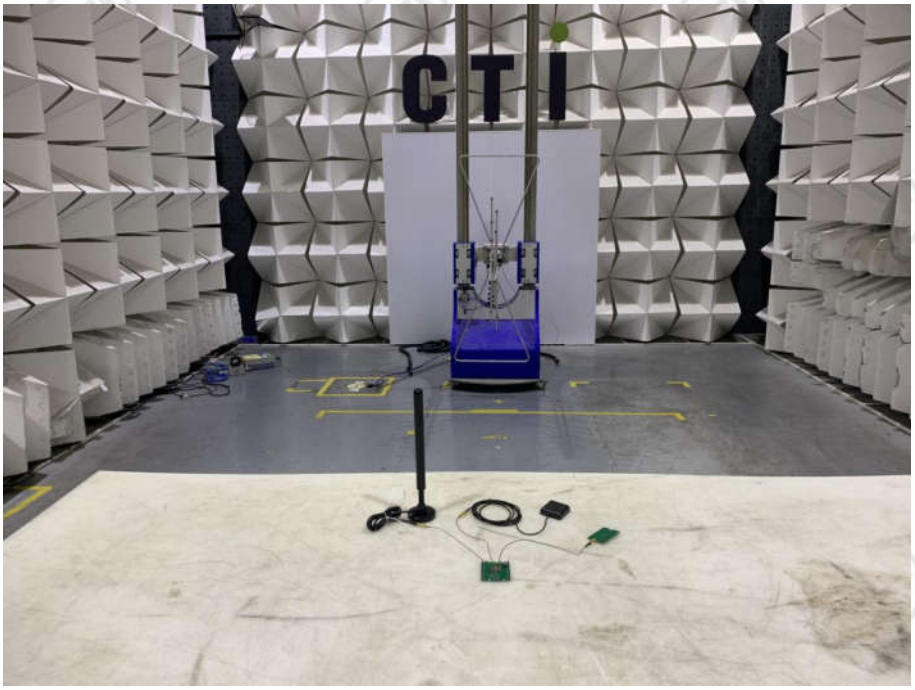
Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

8 Appendix A

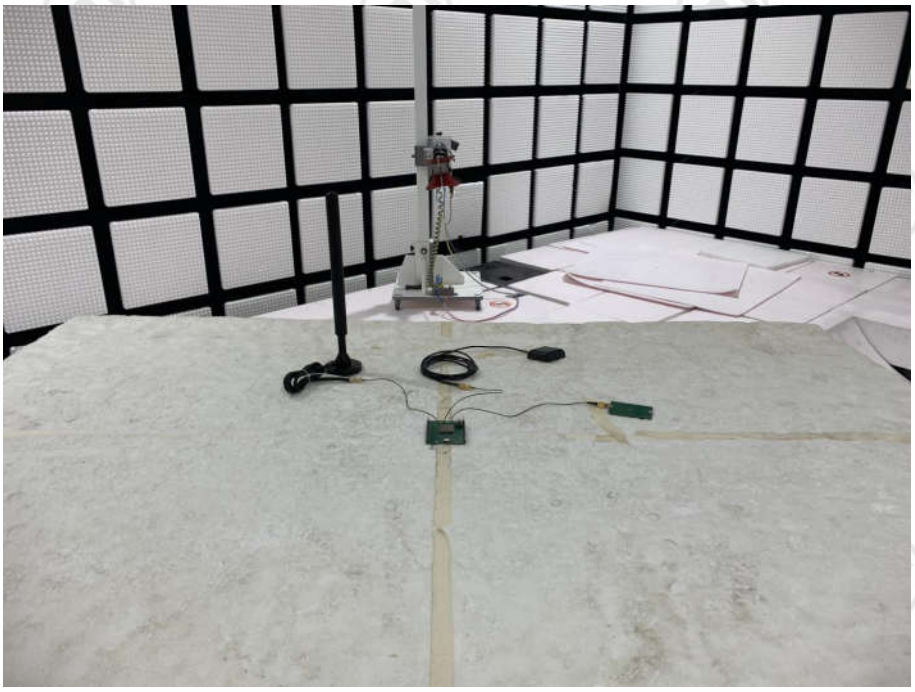
Refer to Appendix: Bluetooth LE of EED32O80763104

9 PHOTOGRAPHS OF TEST SETUP

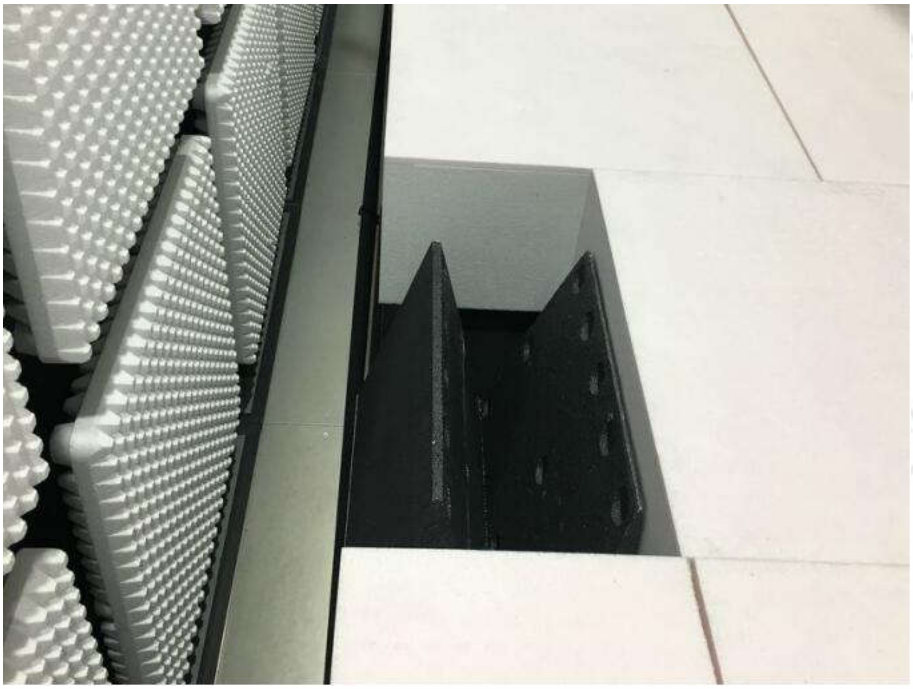
Test model No.: WM1110-S



Radiated spurious emission Test Setup-1(Below 1GHz)



Radiated spurious emission Test Setup-2(Above 1GHz)



Radiated spurious emission Test Setup-3(Above 1GHz)
There are absorbing materials under the ground.

10 PHOTOGRAPHS OF EUT Constructional Details

Refer to Report No. EED32O80763101 for EUT external and internal photos.

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CTI, this report can't be reproduced except in full.

*** End of Report ***