

TEST REPORT

Product : Smart Gateway
Trade mark : N/A
Model/Type reference : COSHIP-G2000
Serial Number : N/A
Report Number : EED32O81142005
FCC ID : 2AL2OG2000
Date of Issue : Sep. 28, 2022
Test Standards : 47 CFR Part 15 Subpart C
Test result : PASS

Prepared for:

SHENZHEN COSHIP ELECTRONICS CO., LTD.

**Unit 27, building1, Xunmei Technology Plaza, No.8Keyuan
Road, Nanshan District, Shenzhen, China**

Prepared by:

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Sep. 28, 2022

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Check No.: 6254290722



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3 Version

Version No.	Date	Description
00	Sep. 28, 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	PASS
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.

5 General Information

5.1 Client Information

Applicant:	SHENZHEN COSHIP ELECTRONICS CO., LTD.
Address of Applicant:	Unit 27, building1, Xunmei Technology Plaza, No.8Keyuan Road, Nanshan District, Shenzhen, China
Manufacturer:	SHENZHEN COSHIP ELECTRONICS CO., LTD.
Address of Manufacturer:	Unit 27,building1,XunmeiTechnologyPlaza,No.8KeyuanRoad, NanshanDistrict,Shenzhen,China
Factory:	Nantong Coship Electronics Co.,Ltd.
Address of Factory:	No.188, Xincheng Road, chongchuan District, Nantong, Chin

5.2 General Description of EUT

Product Name:	Smart Gateway	
Model No.:	COSHIP-G2000	
Trade mark:	N/A	
Product Type:	Fix Location	
Operation Frequency:	TX:903.9MHz~905.3MHz RX:923.3MHz~927.5MHz	
Modulation Type:	LORA	
Transfer Bandwidth:	☒ 500kHz	
Number of Channel:	9	
Antenna Type:	external antenna	
Antenna Gain:	1dBi	
Power Supply:	Adapter:	model: KL-WA120100-B input: 100-240V~50/60Hz,0.6A output: 12.0V,1.0A
Test Voltage:	AC 110V	
Sample Received Date:	Aug. 12, 2022	
Sample tested Date:	Aug. 12, 2022 to Sep. 07, 2022	

Operation Frequency each of channel of TX:	
Channel	Frequency
1	903.9MHz
2	904.1MHz
3	904.3MHz
4	904.5MHz
5	904.7MHz
6	904.9MHz
7	905.1MHz
8	905.3MHz
9	904.6MHz

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)	903.9MHz
The middle channel (CH5)	904.7MHz
The highest channel (CH8)	905.3MHz

5.3 Test Configuration

EUT Test Software Settings:				
Software:		SecureCRTPortable		
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
Mode a	LORA	500kHz	CH1	903.9MHz
Mode b	LORA	500kHz	CH5	904.7MHz
Mode c	LORA	500kHz	CH8	905.3MHz

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.

1) support equipment

Description	Manufacturer	Model No.	Certification	Supplied by
Netbook	ASUSTek	/	FCC&CE	CTI
Netbook	HP	/	FCC&CE	CTI
Router	ZTE	/	FCC&CE	CTI
Mouse	HP	/	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	07-29-2022	07-28-2023
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	12-22-2021	12-21-2022
high-low temperature test chamber	Dong Guang Qin Zhuo	LK-80GA	QZ20150611879	12-24-2021	12-23-2022
Temperature/Humidity Indicator	biaozhi	HM10	1804186	06-16-2022	06-15-2023
BT&WI-FI Automatic test software	JS Tonscend	JS1120-3	2.6.77.0518	---	---

Conducted disturbance Test					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Receiver	R&S	ESCI	100435	05-04-2022	05-05-2023
Temperature/Humidity Indicator	Defu	TH128	/	---	---
LISN	R&S	ENV216	100098	03-01-2022	02-28-2023
Barometer	changchun	DYM3	1188	---	---

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
Multi device Controller	maturo	NCD/070/10711112	---	---	---
Horn Antenna	ETS-LINGREN	BBHA 9120D	9120D-1869	04/15/2021	04/14/2024
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04/17/2021	04/16/2024
Microwave Preamplifier	Agilent	8449B	3008A02425	06/20/2022	06/19/2023

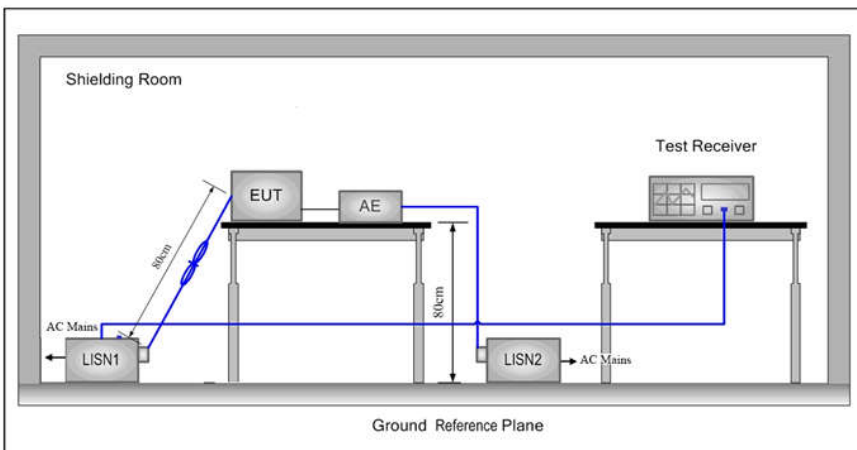
3M full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. Date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
RSE Automatic test software	JS Tonscend	JS36-RSE	10166	---	---
Receiver	Keysight	N9038A	MY57290136	03-01-2022	02-28-2023
Spectrum Analyzer	Keysight	N9020B	MY57111112	02-23-2022	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

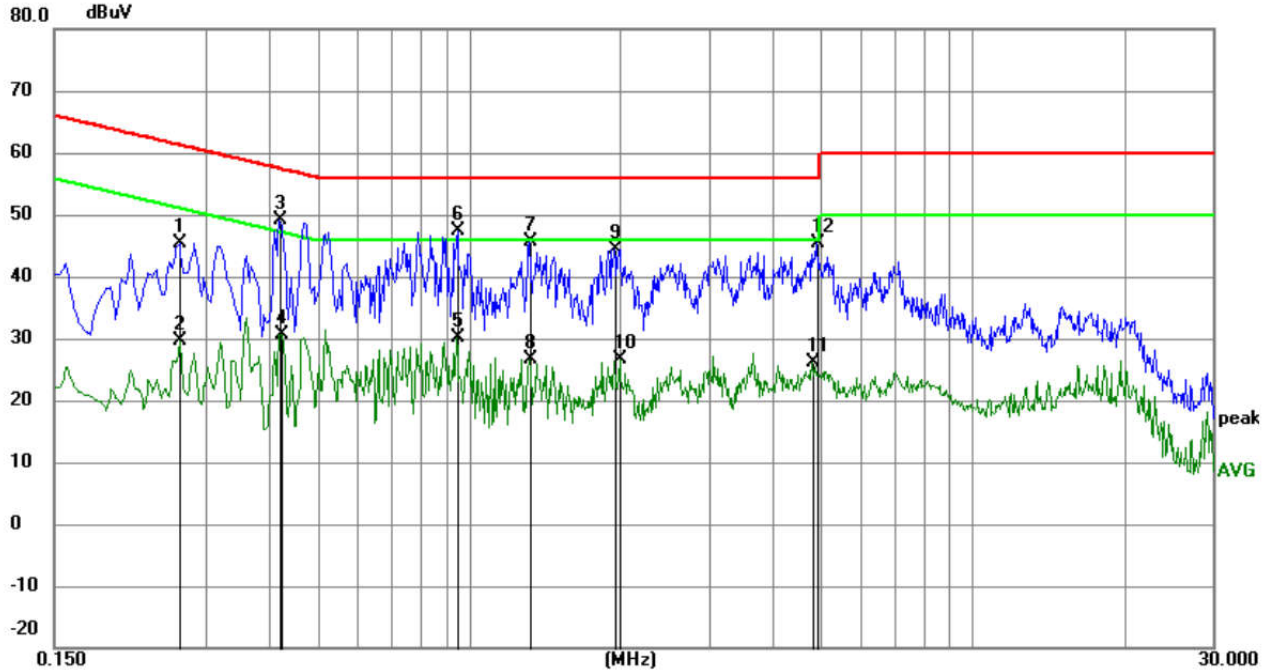
Standard requirement:	47 CFR Part 15C Section 15.203 /247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a 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 external antenna. The best case gain of the antenna is 1dBi	

7.2 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207																
Test Method:	ANSI C63.10: 2013																
Test Frequency Range:	150kHz to 30MHz																
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto																
Limit:	<table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table> * Decreases with the logarithm of the frequency.			Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)																
	Quasi-peak	Average															
0.15-0.5	66 to 56*	56 to 46*															
0.5-5	56	46															
5-30	60	50															
Test Setup:																	
Test Procedure:	1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane. 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.																
Test Mode:	All modes were tested, only the worse case lowest channel of 1Mbps for 802.11b was recorded in the report.																
Test Results:	Pass																

Measurement Data

Live line:

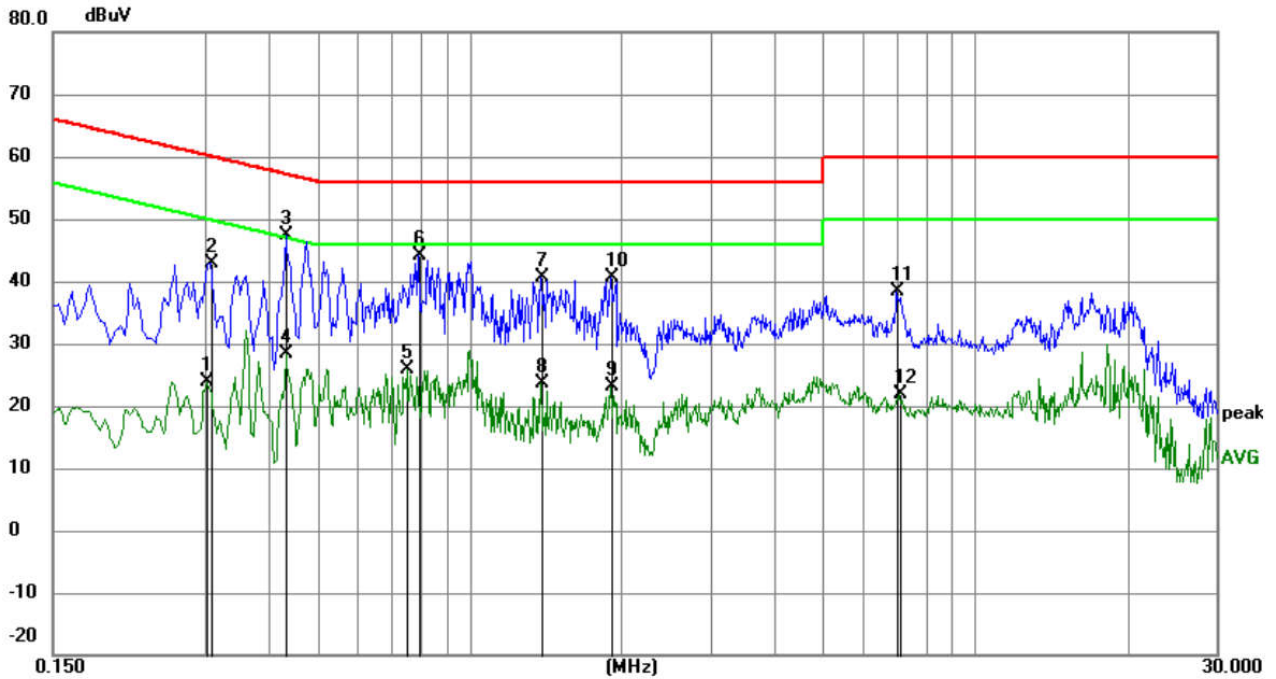


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.2670	35.38	10.00	45.38	61.21	-15.83	QP	
2		0.2670	19.64	10.00	29.64	51.21	-21.57	AVG	
3	*	0.4200	39.14	9.97	49.11	57.45	-8.34	QP	
4		0.4245	20.57	9.97	30.54	47.36	-16.82	AVG	
5		0.9465	20.35	9.84	30.19	46.00	-15.81	AVG	
6		0.9510	37.43	9.84	47.27	56.00	-8.73	QP	
7		1.3200	35.69	9.82	45.51	56.00	-10.49	QP	
8		1.3200	16.79	9.82	26.61	46.00	-19.39	AVG	
9		1.9455	34.66	9.79	44.45	56.00	-11.55	QP	
10		1.9995	16.91	9.79	26.70	46.00	-19.30	AVG	
11		4.8120	16.28	9.78	26.06	46.00	-19.94	AVG	
12		4.9020	35.62	9.78	45.40	56.00	-10.60	QP	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

Neutral line:

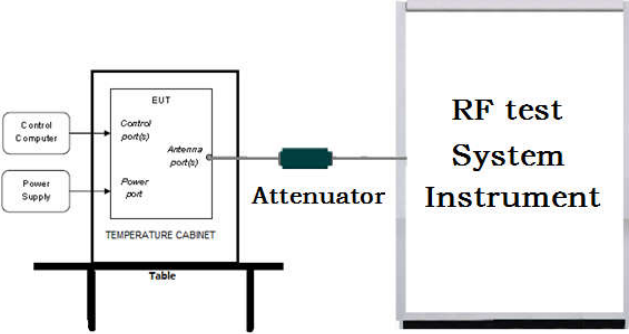


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.3030	13.77	10.07	23.84	50.16	-26.32	AVG	
2		0.3075	32.89	10.06	42.95	60.04	-17.09	QP	
3	*	0.4335	37.45	9.96	47.41	57.19	-9.78	QP	
4		0.4335	18.37	9.96	28.33	47.19	-18.86	AVG	
5		0.7529	16.04	9.86	25.90	46.00	-20.10	AVG	
6		0.7935	34.17	9.85	44.02	56.00	-11.98	QP	
7		1.3829	30.88	9.81	40.69	56.00	-15.31	QP	
8		1.3829	13.92	9.81	23.73	46.00	-22.27	AVG	
9		1.9004	13.38	9.79	23.17	46.00	-22.83	AVG	
10		1.9005	30.89	9.79	40.68	56.00	-15.32	QP	
11		7.0035	28.55	9.79	38.34	60.00	-21.66	QP	
12		7.0755	11.98	9.79	21.77	50.00	-28.23	AVG	

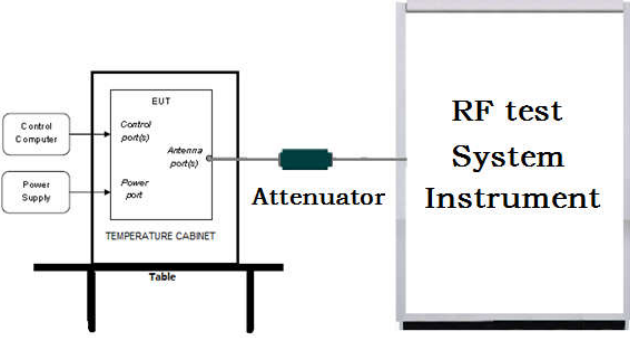
Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

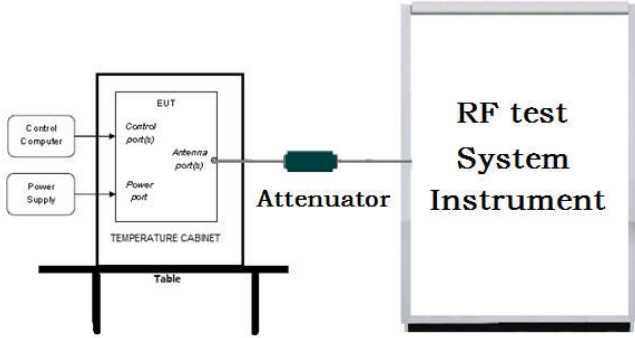
7.3 Maximum Conducted Output Power

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 $\geq$ DTS bandwidth. b) Set VBW $\geq 3 \times$ RBW. c) Set span $\geq 3 \times$ 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 Rola DTS

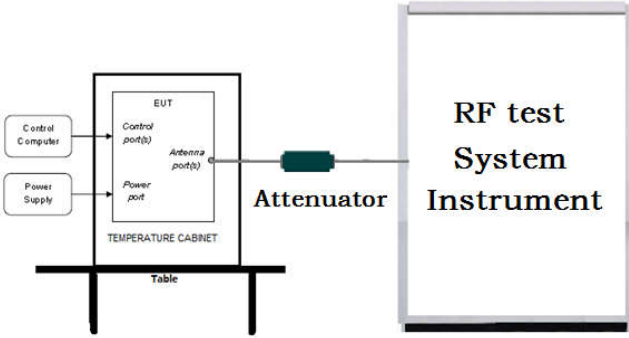
7.4 DTS Bandwidth

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 $\geq [3 \times \text{RBW}]$. 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:	$\geq 500 \text{ kHz}$
Test Mode:	Refer to clause 5.3
Test Results:	Refer to Appendix Rola DTS

7.5 Maximum Power Spectral Density

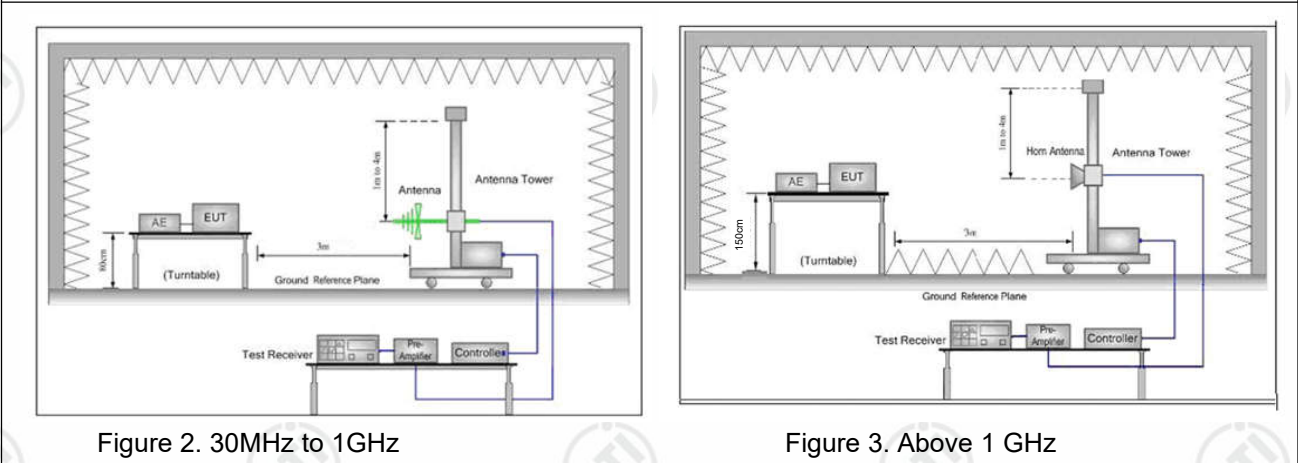
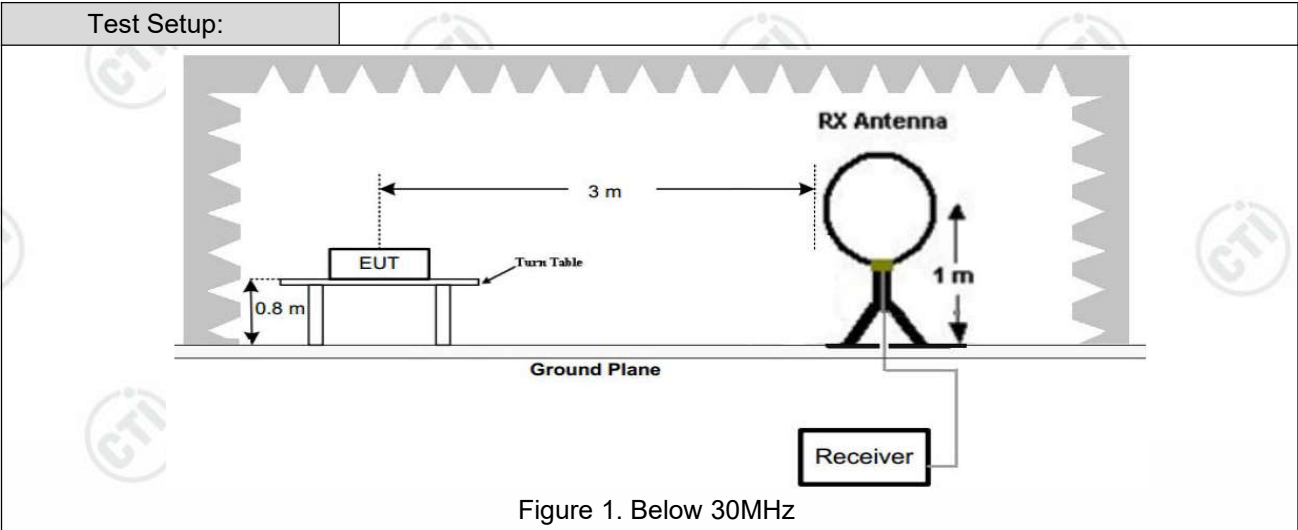
Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	ANSI C63.10 2013
Test Setup:	 Remark: Offset=Cable loss+ attenuation factor.
Test Procedure:	a) Set analyzer center frequency to DTS channel center frequency. b) Set the span to 1.5 times the DTS bandwidth. c) Set the RBW to $3 \text{ kHz} < \text{RBW} < 100 \text{ kHz}$. d) Set the VBW $> [3 \times \text{RBW}]$. 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:	$\leq 8.00 \text{ dBm}/3 \text{ kHz}$
Test Mode:	Refer to clause 5.3
Test Results:	Refer to Appendix Rola DTS

7.6 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 Rola DTS

7.7 Radiated Spurious Emission & Restricted bands

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205				
Test Method:	ANSI C63.10 2013				
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100 kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10kHz	Average
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1GHz	500	54.0	Quasi-peak	3
	Above 1GHz	500	54.0	Average	3
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.					

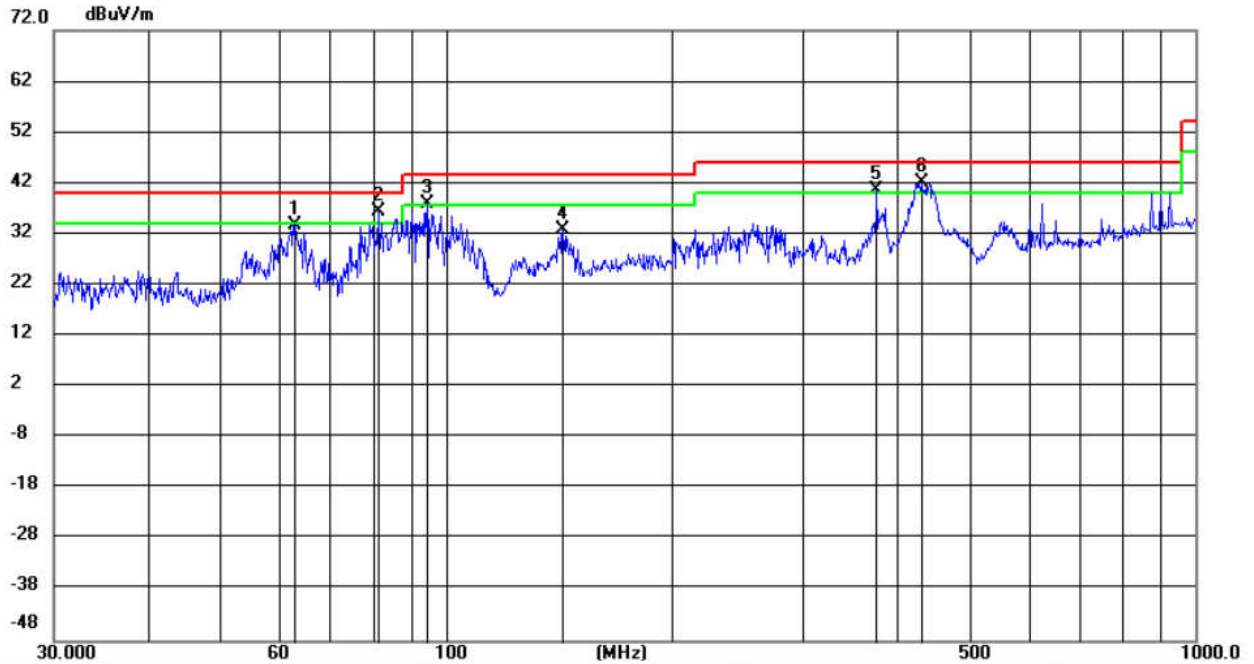


Test Procedure:	a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. 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:

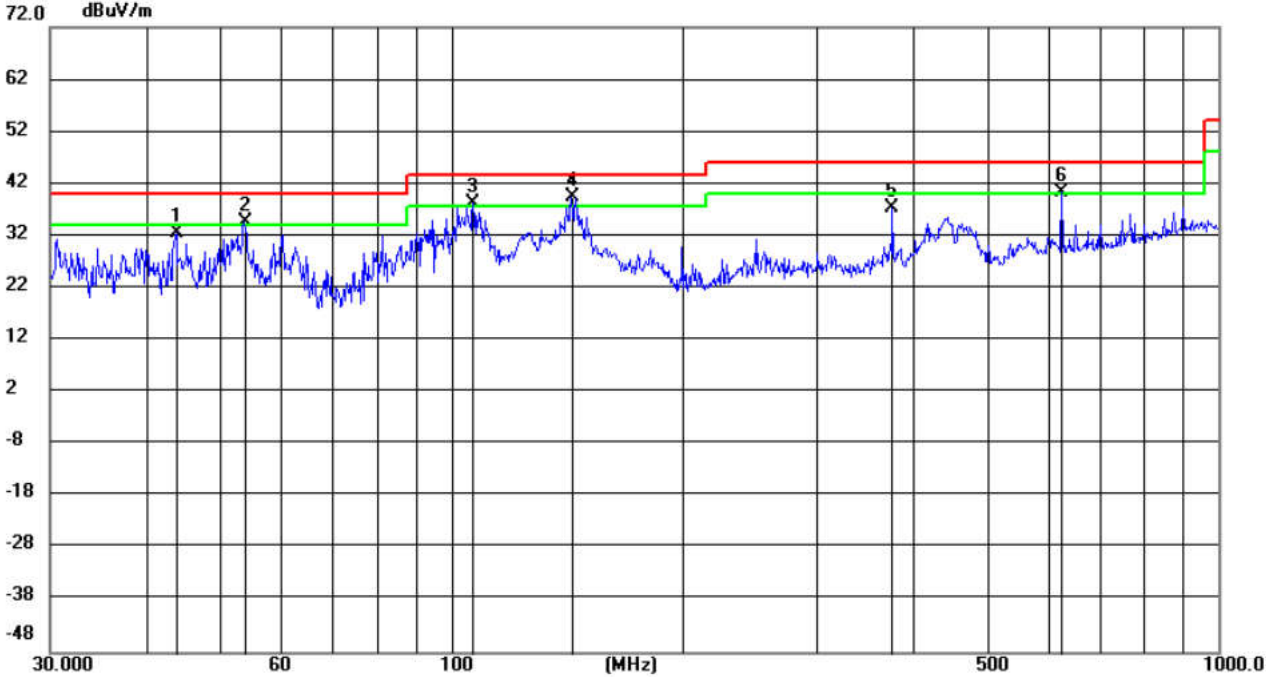
During the test, the Radiates Emission from 30MHz to 1GHz was performed in all modes, only the worst case lowest channel of LORA 500KHz was recorded in the report.

Test Graph



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		62.8707	21.33	12.57	33.90	40.00	-6.10	QP	200	356	
2	*	81.2117	26.39	10.15	36.54	40.00	-3.46	QP	200	356	
3	!	94.4283	24.56	13.29	37.85	43.50	-5.65	QP	200	1	
4		143.3260	23.40	9.45	32.85	43.50	-10.65	QP	200	356	
5	!	375.9385	21.88	18.88	40.76	46.00	-5.24	QP	100	4	
6	!	431.0315	22.03	20.06	42.09	46.00	-3.91	QP	100	4	

Test Graph



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		43.8119	18.06	14.43	32.49	40.00	-7.51	QP	100	88
2	!	53.6932	20.78	14.01	34.79	40.00	-5.21	QP	100	58
3	!	106.7587	25.12	13.09	38.21	43.50	-5.29	QP	100	356
4	*	143.3261	30.00	9.45	39.45	43.50	-4.05	QP	100	0
5		375.9385	18.54	18.88	37.42	46.00	-8.58	QP	100	356
6	!	625.0780	16.23	24.21	40.44	46.00	-5.56	QP	100	321

Radiated Spurious Emission above 1GHz:

Mode:			LORA Transmitting			Channel:		903.9 MHz	
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1375.0250	-26.78	70.67	43.89	74.00	30.11	Pass	H	PK
2	1874.8583	-24.32	62.38	38.06	74.00	35.94	Pass	H	PK
3	2566.7044	-22.75	59.58	36.83	74.00	37.17	Pass	H	PK
4	3634.7757	-20.45	59.04	38.59	74.00	35.41	Pass	H	PK
5	5423.4949	-14.36	60.41	46.05	74.00	27.95	Pass	H	PK
6	6327.7552	-13.06	54.81	41.75	74.00	32.25	Pass	H	PK
7	1250.2167	-26.64	70.59	43.95	74.00	30.05	Pass	V	PK
8	1375.0250	-26.78	71.48	44.70	74.00	29.30	Pass	V	PK
9	2532.5022	-22.77	59.19	36.42	74.00	37.58	Pass	V	PK
10	3854.9903	-19.39	60.84	41.45	74.00	32.55	Pass	V	PK
11	5423.4949	-14.36	60.73	46.37	74.00	27.63	Pass	V	PK
12	6327.1551	-13.06	54.96	41.90	74.00	32.10	Pass	V	PK

Mode:			LORA Transmitting			Channel:		904.7MHz	
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1375.0250	-26.78	70.33	43.55	74.00	30.45	Pass	H	PK
2	1874.8583	-24.32	61.38	37.06	74.00	36.94	Pass	H	PK
3	2568.5046	-22.75	61.83	39.08	74.00	34.92	Pass	H	PK
4	4253.4169	-17.59	59.42	41.83	74.00	32.17	Pass	H	PK
5	5428.2952	-14.36	59.48	45.12	74.00	28.88	Pass	H	PK
6	7065.2043	-12.00	53.51	41.51	74.00	32.49	Pass	H	PK
7	1250.2167	-26.64	70.77	44.13	74.00	29.87	Pass	V	PK
8	1375.0250	-26.78	71.97	45.19	74.00	28.81	Pass	V	PK
9	2249.8833	-24.03	61.10	37.07	74.00	36.93	Pass	V	PK
10	3233.9489	-20.55	60.74	40.19	74.00	33.81	Pass	V	PK
11	4523.4349	-17.13	61.60	44.47	74.00	29.53	Pass	V	PK
12	5428.2952	-14.36	60.53	46.17	74.00	27.83	Pass	V	PK

Mode:			LORA Transmitting			Channel:		905.3MHz	
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1375.0250	-26.78	70.48	43.70	74.00	30.30	Pass	H	PK
2	1965.4644	-23.81	62.21	38.40	74.00	35.60	Pass	H	PK
3	2839.1226	-21.79	59.57	37.78	74.00	36.22	Pass	H	PK
4	3695.9797	-20.18	60.64	40.46	74.00	33.54	Pass	H	PK
5	4526.4351	-17.11	59.65	42.54	74.00	31.46	Pass	H	PK
6	5431.2954	-14.36	59.83	45.47	74.00	28.53	Pass	H	PK
7	1250.2167	-26.64	70.82	44.18	74.00	29.82	Pass	V	PK
8	1375.0250	-26.78	71.96	45.18	74.00	28.82	Pass	V	PK
9	2567.9045	-22.75	61.12	38.37	74.00	35.63	Pass	V	PK
10	4526.4351	-17.11	63.30	46.19	74.00	27.81	Pass	V	PK
11	5431.2954	-14.36	60.42	46.06	74.00	27.94	Pass	V	PK
12	6337.3558	-13.03	55.64	42.61	74.00	31.39	Pass	V	PK

Remark:

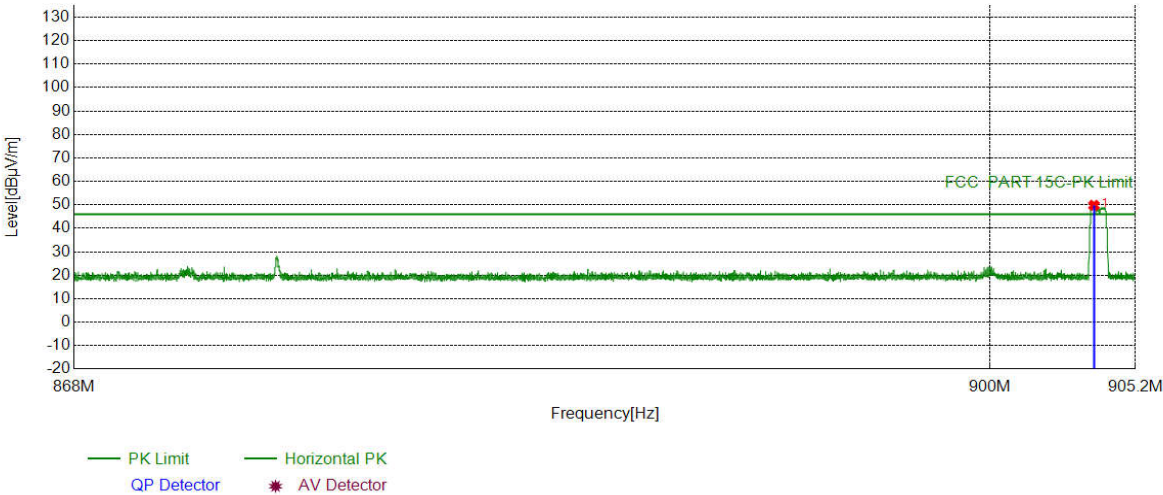
- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
- 2) Scan from 9kHz to 25GHz, the disturbance above 10GHz 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:	Lora TX	Channel:	903.9
Remark:			

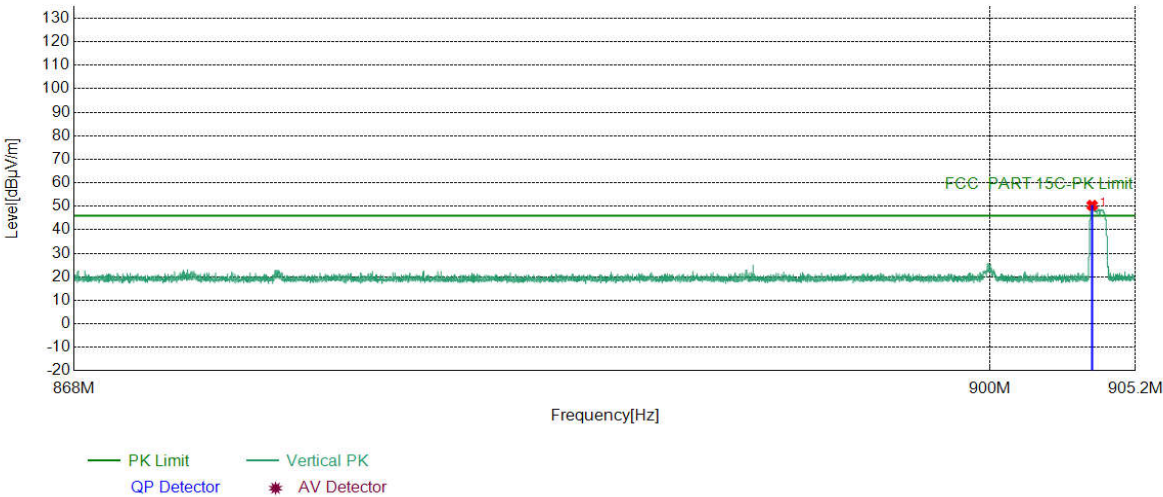
Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	903.7230	-4.95	54.76	49.81	46.00	-3.81	FAIL	Horizontal	PK

Mode:	Lora TX	Channel:	903.9
Remark:			

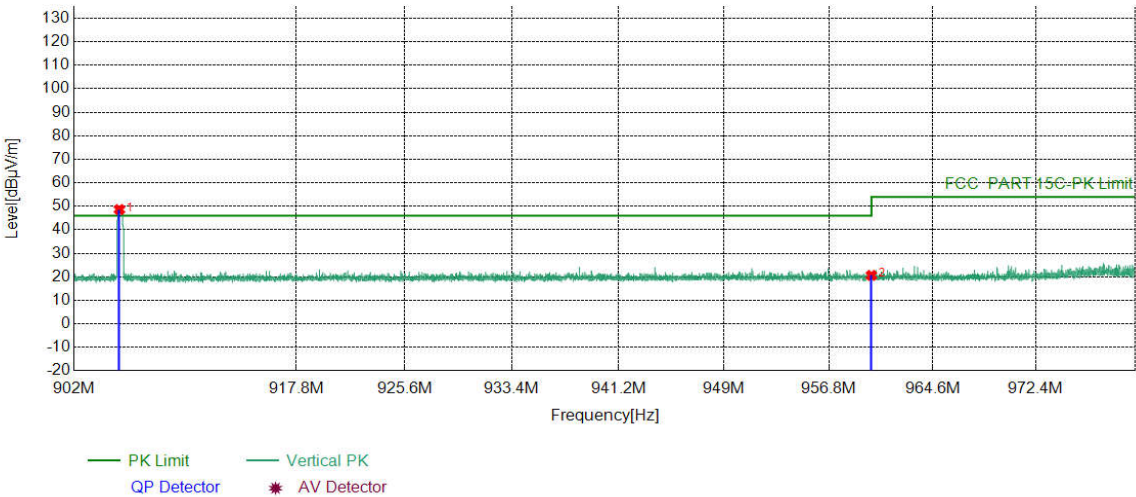
Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	903.6598	-4.95	55.35	50.40	46.00	-4.40	FAIL	Vertical	PK

Mode:	Lora TX	Channel:	905.3
Remark:			

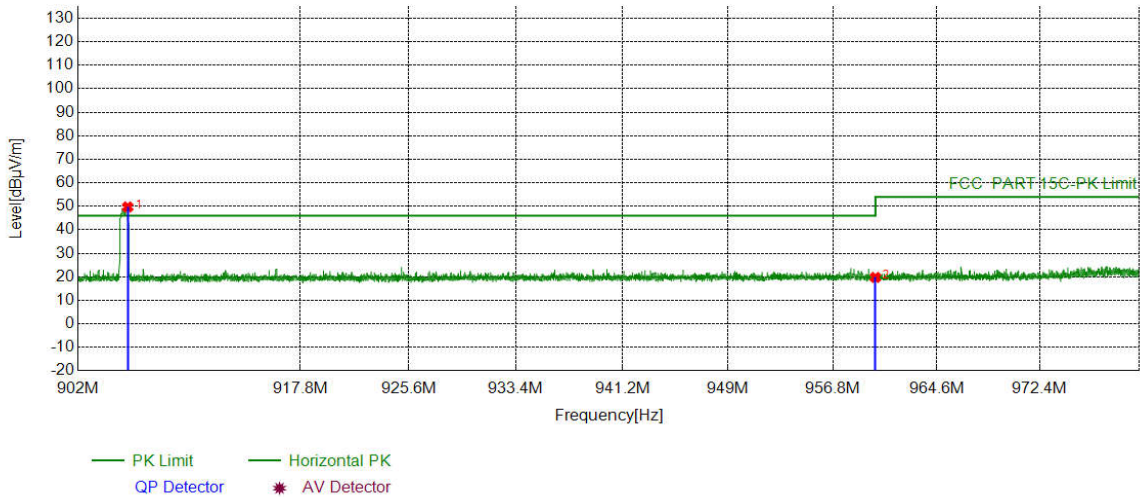
Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	905.2061	-4.94	53.57	48.63	46.00	-2.63	FAIL	Vertical	PK
2	960.0000	-4.37	24.97	20.60	54.00	33.40	PASS	Vertical	PK

Mode:	Lora TX	Channel:	905.3
Remark:			

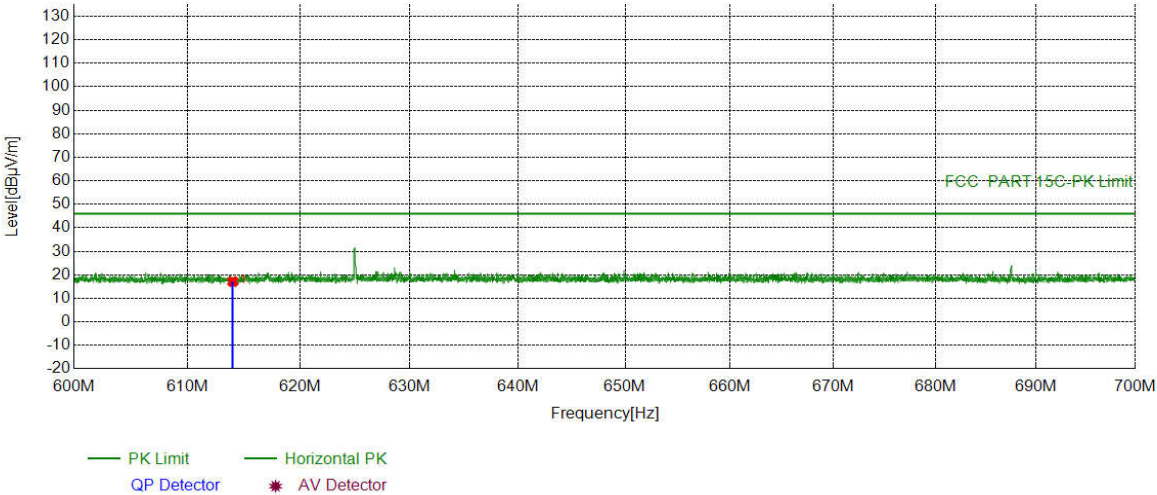
Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	905.5104	-4.93	54.66	49.73	46.00	-3.73	FAIL	Horizontal	PK
2	960.0000	-4.37	24.12	19.75	54.00	34.25	PASS	Horizontal	PK

Mode:	Lora TX	Channel:	903.9
Remark:			

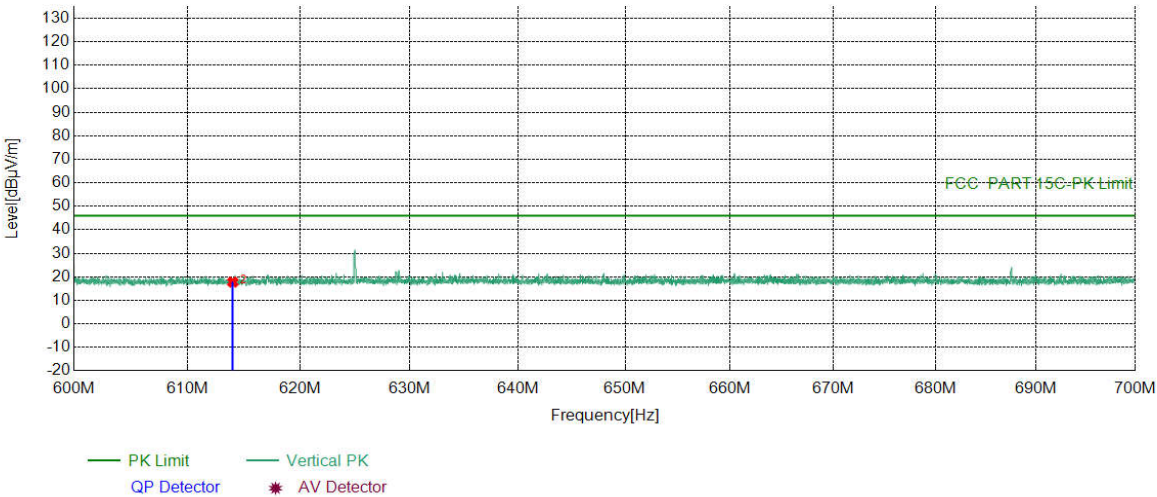
Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	614.0000	-8.48	25.59	17.11	46.00	28.89	PASS	Horizontal	PK

Mode:	Lora TX	Channel:	903.9
Remark:			

Test Graph



Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	460.0000	-8.64	33.86	25.22	46.00	20.78	PASS	Vertical	PK
2	614.0000	-8.48	26.24	17.76	46.00	28.24	PASS	Vertical	PK

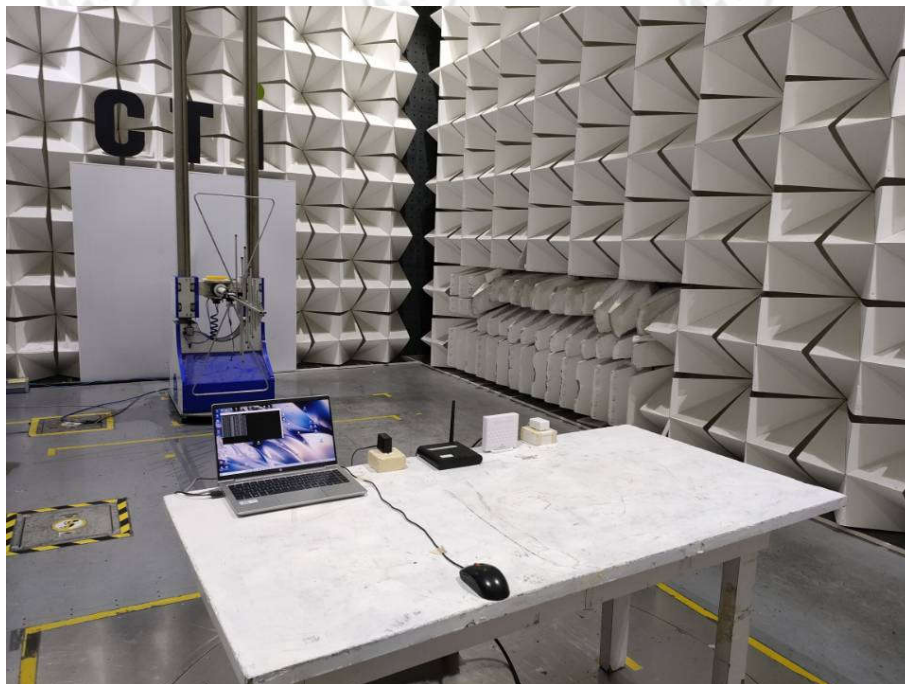
Note:
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading -Correct Factor
Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

8 Appendix A

Refer to Appendix: Bluetooth LE of EED32081142005

9 PHOTOGRAPHS OF TEST SETUP

Test model No.: COSHIP-G2000



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.



Conducted Emissions Test Setup

10 PHOTOGRAPHS OF EUT Constructional Details

Refer to Report No. EED32O81142001 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 ***