



FCC TEST REPORT

FCC ID: 2AH4J-LOCK420

On Behalf of

Consumer 2.0

Rently Smart Bolt Elite

Model No.: LOCK420-8Z, LOCK420-4Z

Prepared for : Consumer 2.0
Address : 6300 Wilshire Blvd Suite 620, Los Angeles, CA 90048, United States

Prepared By : Shenzhen PSI Testing Co., Ltd.
Address : 1-2/F., Building 5, Yudafu Industrial Park, No.10, Xingye West Road, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China

Report Number : psi2503155-C01-R12
Date of Receipt : Dec. 24, 2024
Date of Test : Dec. 24, 2024-Mar. 17, 2025
Date of Report : Mar. 17, 2025
Version Number : V0

TABLE OF CONTENTS

<u>Description</u>	<u>Page</u>
1. Summary Of Standards And Results	6
1.1. Description of Standards and Results	6
2. General Information	7
2.1. Description of Device (EUT)	7
2.2. Accessories of Device (EUT)	8
2.3. Tested Supporting System Details	8
2.4. Block Diagram of connection between EUT and simulators.....	8
2.5. Test Mode Description	8
2.6. Software test version and power setting information	9
2.7. Test Conditions.....	10
2.8. Test Facility	10
2.9. Measurement Uncertainty	10
2.10. Test Equipment List.....	11
3. Maximum Peak Output Power	12
3.1. Limit.....	12
3.2. Test Procedure	12
3.3. Test Setup	12
3.4. Test Result	12
4. Bandwidth	13
4.1. Test Setup	13
4.2. Test Procedure	13
4.3. Test Result	13
5. CONDUCT BAND EDGE AND SPURIOUS EMISSIONS MEASUREMENT	15
5.1. Test Setup	15
5.2. Test Procedure	15
5.3. Test Result	16
6. POWER SPECTRAL DENSITY	19
6.1. Test Setup	19
6.2. Test Procedure	19
6.3. Test Result	19
7. Radiated Emissions	21
7.1. Limit.....	21
7.2. Block Diagram of Test setup	24
7.3. Test Procedure	25
7.4. Test Results.....	25
8. Band Edge Test.....	36
8.1. Block Diagram of Test Setup.....	36
8.2. Test Limit	36
8.3. Test Procedure	36
8.4. Test Results.....	37
9. Power Line Conducted Emissions	39
9.1. Block Diagram of Test Setup.....	39

9.2. Limit.....	39
9.3. Test Procedure	39
9.4. Test Results.....	40
10. ANTENNA REQUIREMENTS	45
10.1. Limit.....	45
10.2. Result	45
11. Photos of test setup	46
12. Photos of EUT	46



TEST REPORT DECLARATION

Applicant : Consumer 2.0
Address : 6300 Wilshire Blvd Suite 620, Los Angeles, CA 90048, United States
Manufacturer : Consumer 2.0
Address : 6300 Wilshire Blvd Suite 620, Los Angeles, CA 90048, United States
EUT Description : Rently Smart Bolt Elite
(A) Model No. : LOCK420-8Z, LOCK420-4Z
(B) Trademark : N/A

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247

ANSI C63.10:2013

Test Result: PASS

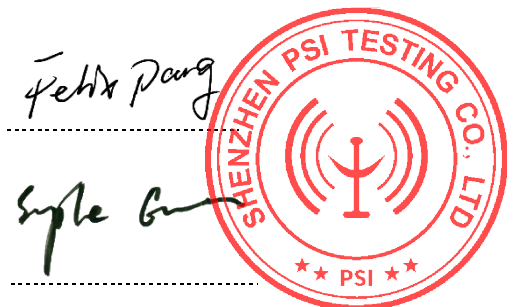
The device described above is tested by Shenzhen PSI Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen PSI Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC Part15&RSS 247 requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen PSI Testing Co., Ltd.

Tested by (name + signature).....: Felix Pang
Test Engineer

Approved by (name + signature).....: Simple Guan
Project Manager

Date of issue.....: Mar. 17, 2025



Revision History

Revision	Issue Date	Revisions	Revised By
V0	Mar. 17, 2025	Initial released Issue	Felix Pang



1. Summary Of Standards And Results

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Test Items	Test Requirement	Result
Conduct Emission	FCC part 15.207	P
Radiated Spurious Emissions	FCC part 15.205/15.209	P
Conducted Spurious Emission	FCC part 15. 247(d)	P
Band edge	FCC part 15.247(d)	P
6dB Bandwidth	FCC part 15.247 (a)(2)	P
Maximum Peak Output Power	FCC part 15.247 (b)(3)	P
Power Spectral Density	FCC part 15.247 (e)	P
Antenna Requirement	FCC part 15.203/15.247 (c)	P
Note: 1. P is an abbreviation for Pass. 2. F is an abbreviation for Fail. 3. N/A is an abbreviation for Not Applicable. 4. Conclusion determination rules of this report: Unless there are clear provisions on measurement uncertainty in the standard or customer requirements, decision by actual test data without considering measurement uncertainty. 5. Measurement method usage KDB 558074 D01 15.247 Meas Guidance v05r02.		

2. General Information

2.1. Description of Device (EUT)

Product Name	: Rently Smart Bolt Elite
Model No.	: LOCK420-8Z, LOCK420-4Z
Diff	: LOCK420-8Z is tested model, other models are derivative models .The models are identical in circuit, only different on the model names and battery capacity and size
Power supply	: Input: DC 5V via adapter, DC 6V powered by battery
Radio Technology	: RF ID
Operation frequency	: 912MH, 920MHz
Channel No.	: 2 channels
Modulation	: DSSS OQPSK
Antenna Type	: PCB antenna, Maximum Gain is 1dBi.
PMN	: N/A
HVIN	: N/A
Software version	: V1.0
Hardware version/FVIN	: V1.0
Note	: Antenna information is provided by applicant. Testing lab is not responsible for the accuracy of the information.

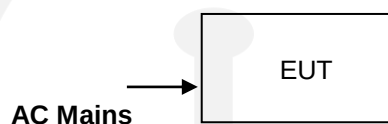
2.2. Accessories of Device (EUT)

Accessories : N/A
 Manufacturer : N/A
 Model : N/A
 Rating : N/A

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number
1	AC/DC ADAPTER	HUAWEI	HW-050450C00	AE
2	N/A	N/A	N/A	N/A

2.4. Block Diagram of connection between EUT and simulators



2.5. Test Mode Description

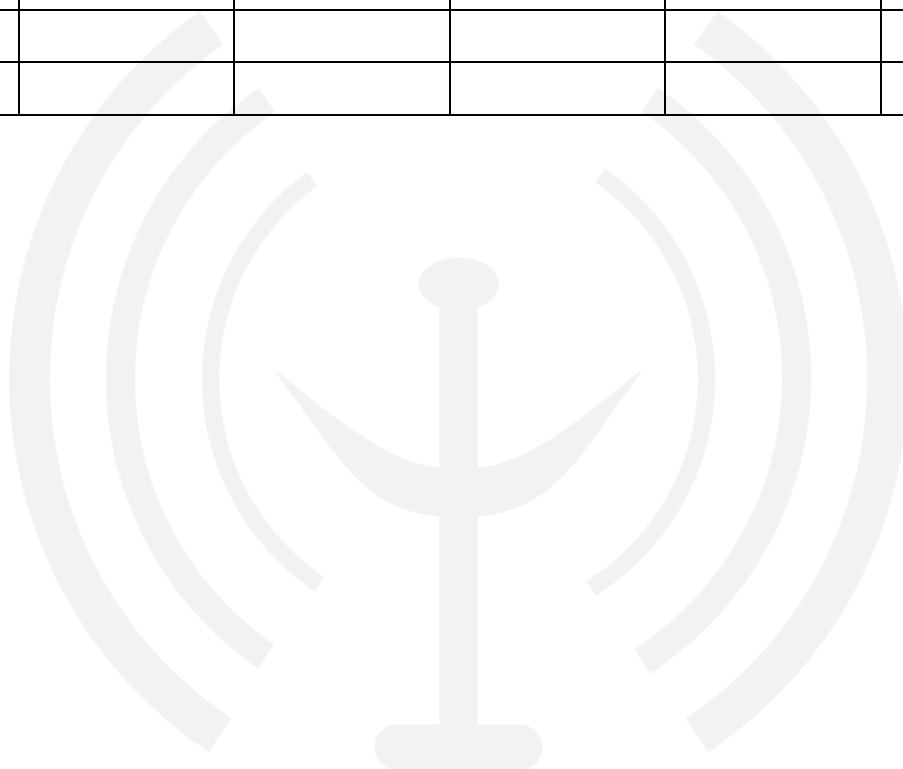
Transmitting mode	Keep the EUT in continuously transmitting mode.
-------------------	---

The test software used to control EUT work in Continuous TX mode, and select test channel, wireless mode

2.6. Software test version and power setting information

Software testing version	ATK_XCOM-3.0
Mode	< 0 dBm
Power level setup by client	

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	912	01	920		



2.7. Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	26℃
Humidity range:	25-75%	54%
Pressure range:	86-106kPa	101kPa

2.8. Test Facility

Shenzhen PSI Testing Co., Ltd.

1-2/F., Building 5, Yudafu Industrial Park, No.10, Xingye West Road, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China

September 13, 2023 File on Federal Communication Commission
Registration Number: 916281

September 21, 2023 Certificated by IC
Registration Number: 31123
CAB identifier: CN0158

2.9. Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power Line Conducted Emissions Test	2.17dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	2.74dB(Polarize: V)
	2.76dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 18GHz)	4.29dB(Polarize: V)
	4.82dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (18GHz to 40GHz)	4.31dB(Polarize: V)
	4.30dB(Polarize: H)
Uncertainty for radio frequency	48.24KHz
Uncertainty for conducted RF Power	0.41dB
Uncertainty for Power Spectral Density	0.39 dB
Occupied-Bandwidth	968Hz
Conducted-Spurious Emission	1.26dB

2.10. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware Version	Last Cal.	Cal. Interval
1.	9*6*6 anechoic chamber	SKET	9*6*6	N/A	/	2022.12.20	3 Year
2.	Test Receiver	Rohde&Schwarz	ESCI 7	101032/003	4.42 SP3	2024.12.18	1 Year
3.	L.I.S.N.#1	Rohde&Schwarz	ENV216	102282	/	2024.12.18	1 Year
4.	L.I.S.N.#2	RFT	NNB111	13835240	/	2024.12.18	1 Year
5.	Loop Antenna	Schwarz beck	FMZB 1519B	00128	/	2025.01.02	2 Year
6.	Bilog Antenna	Schwarz beck	VULB 9168	01448	/	2025.01.02	2 Year
7.	Spectrum Analyzer	Rohde&Schwarz	FSV-40N	101648	3.70	2024.12.18	1 Year
8.	Horn Antenna	Schwarz beck	BBHA 9120 D	02706	/	2025.01.02	2 Year
9.	Amplifier	SKET	LAPA_01G1 8G-45dB	SK20220329 01	/	2024.12.18	1 Year
10.	Horn Antenna	Schwarz beck	BBHA 9170	00946	/	2024.12.31	2 Year
11.	Amplifier	SKET	LNPA_0118 G-45	SK20200108 01	/	2024.12.18	1 Year
12.	RF Power Probe	Rohde&Schwarz	NRP-Z11	1138.3004.0 2-1111533-Fz	/	2024.12.18	1 Year
13.	RF Sensor Unit	Tachoy	TR1029-2	20220428P0 08	/	2024.12.18	1 Year
14.	Spectrum Analyzer	Agilent	N9020A	MY51281067	A.14.03	2024.12.18	1 Year
15.	Temp. & Humid Chamber	Auchno	9606	/	/	2024.12.18	1 Year
16.	Regulated DC Power Supply	Xinouhua	ADC120V10 A	20221125163 8		2024.12.18	1 Year
17.	Cable	SKET	Cable-RE-1	#02/#03	/	2024.12.18	1 Year
18.	Cable	SKET	Cable-RE-2	#01	/	2024.12.18	1 Year
19.	Cable	SKET	Cable-RE-3	#04	/	2024.12.18	1 Year
20.	Cable	SKET	Cable-CE-1	A-E-24	/	2024.12.18	1 Year
21.	6dB Attenuator	Schwarzbeck	DGA 9552N 6dB	CK4186	/	2024.12.18	1 Year

For Test Software Information

Item	Software Name	Manufacturer	Version
RE	EZ EMC	Farad	PSI-3A1
CE	EZ EMC	Farad	PSI-3A1
RF	RTS	TACHOY	V1.0.0

3. Maximum Peak Output Power

3.1. Limit

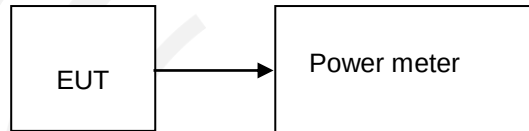
Please refer FCC part 15.247 & RSS-247.

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts, the e.i.r.p shall not exceed 4W

3.2. Test Procedure

The transmitter output is connected to the RF Power meter. The Power meter is set to the peak power detection.

3.3. Test Setup



3.4. Test Result

Condition	Antenna	Modulation	Frequency (MHz)	Max. Conducted Power(dBm)	Limit(dBm)	Result
NVNT	ANT1	DSSS OQPSK	912	8.31	30	Pass
NVNT	ANT1	DSSS OQPSK	920	8.07	30	Pass

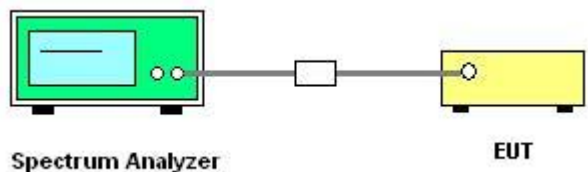
4. Bandwidth

Test Requirement : FCC CFR47 Part 15 Section 15.247

Test Method : ANSI C63.10:2013

Test Limit : Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

4.1. Test Setup



4.2. Test Procedure

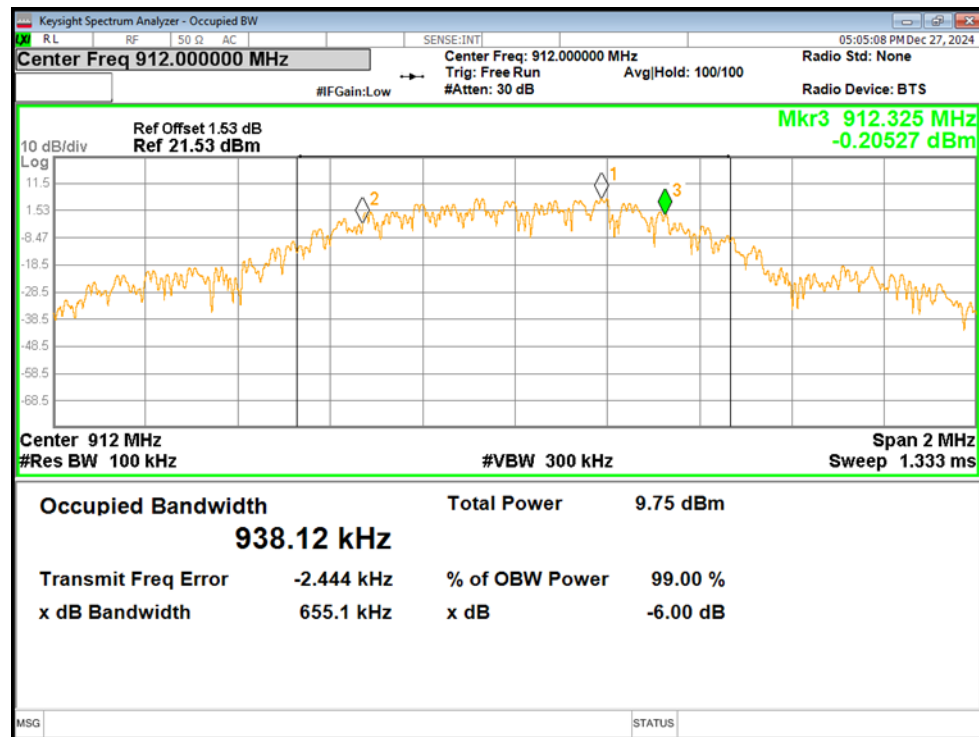
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

4.3. Test Result

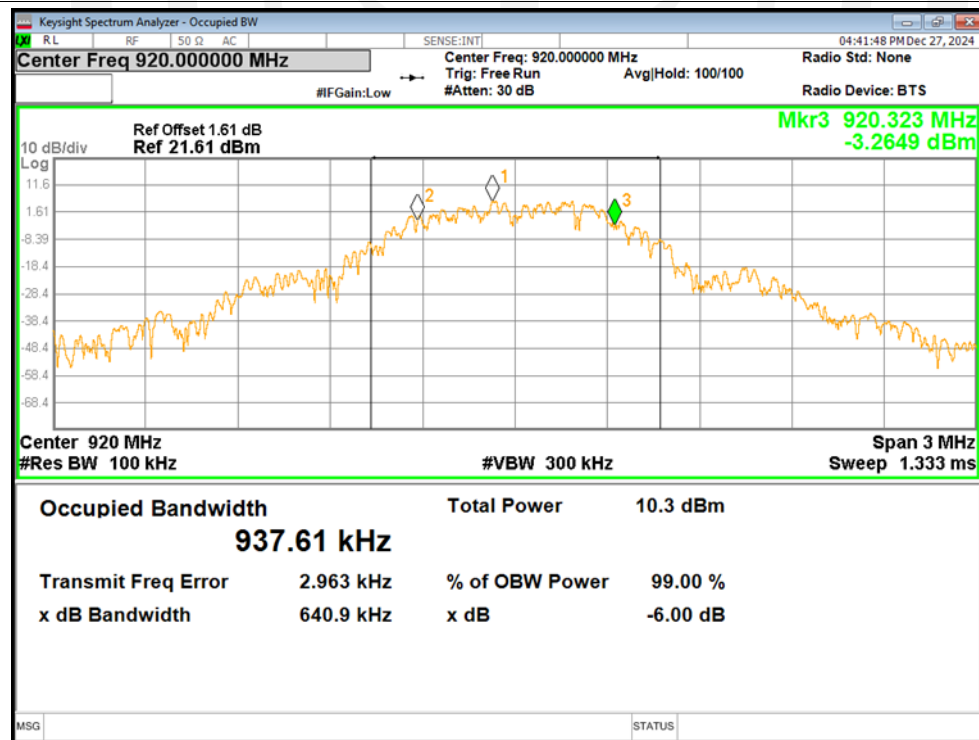
Frequency (MHz)	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
912	0.655	0.5	Pass
920	0.641	0.5	Pass

Test Graphs

-6dB Bandwidth 912MHz Ant1



-6dB Bandwidth 920MHz Ant1

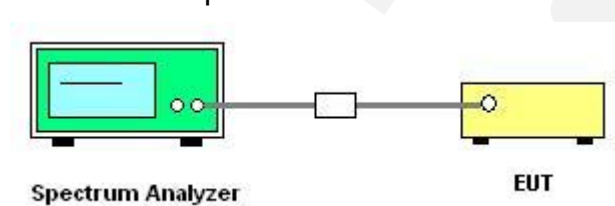


5. CONDUCT BAND EDGE AND SPURIOUS EMISSIONS

MEASUREMENT

Test Requirement	: Section 15.247(d) In addition, radiated emissions which fall in the restricted bands. as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
Test Method	: ANSI C63.10:2013
Test Limit	: Regulation 15.247 (d),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. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

5.1. Test Setup



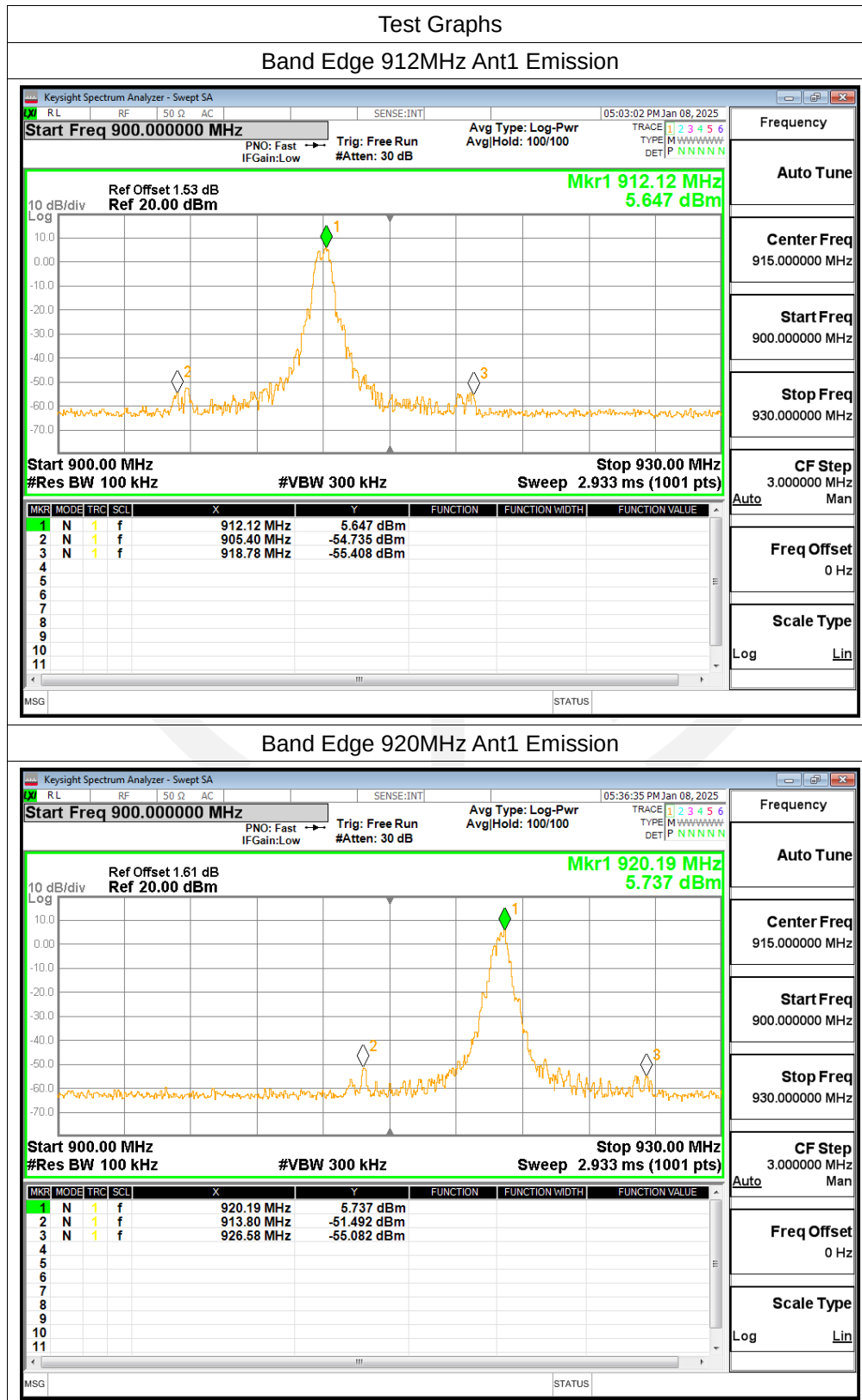
5.2. Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
 2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto
- Detector function = peak, Trace = max hold

5.3. Test Result

Band Edge

Frequency (MHz)	Max Value (dBc)	Limit (dBc)	Verdict
912	-54.74	-20	Pass
920	-51.49	-20	Pass

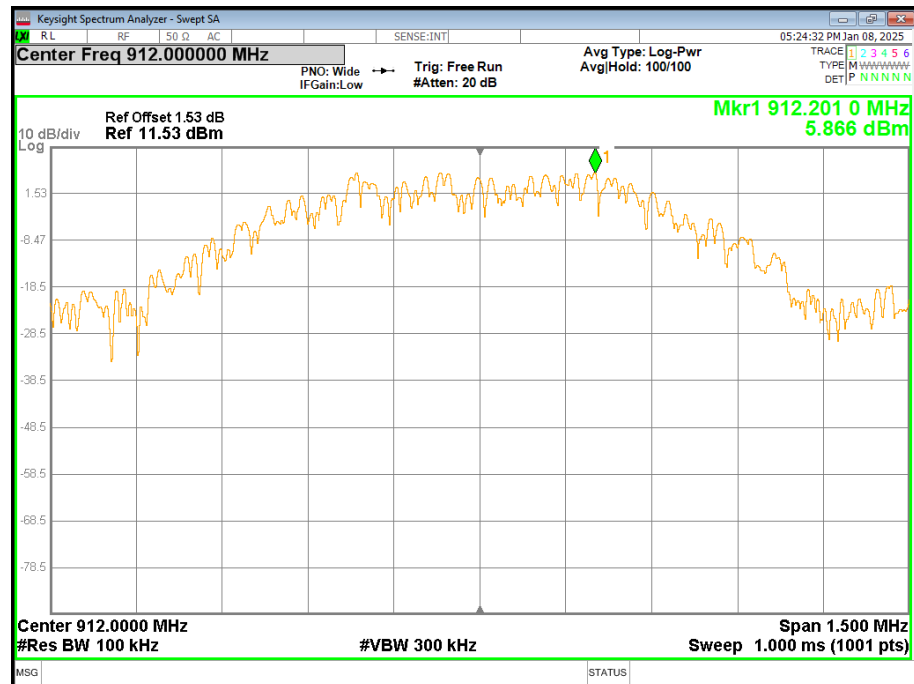


Conducted RF Spurious Emission

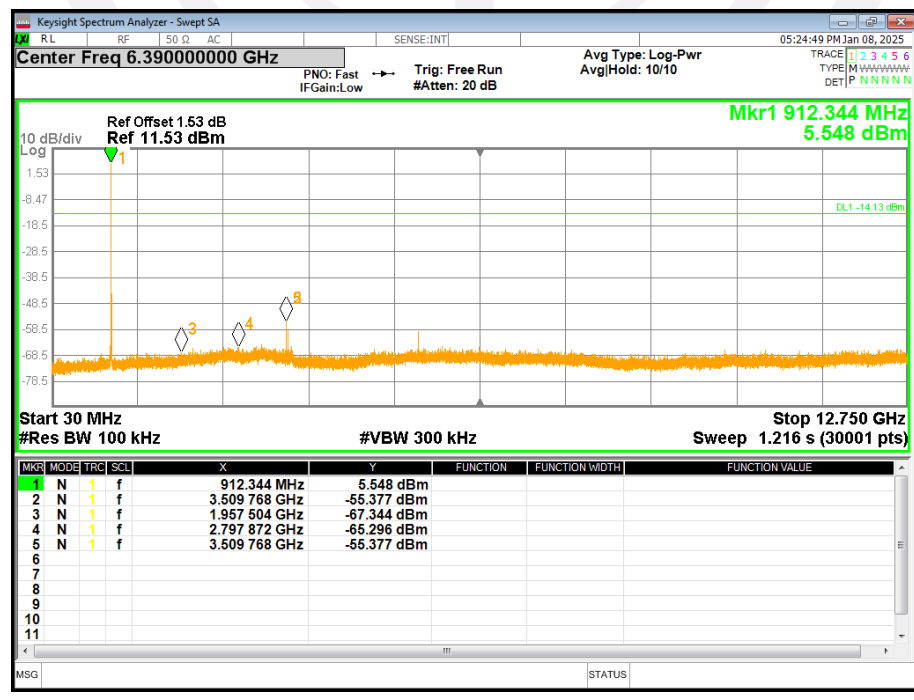
Mode	Frequency (MHz)	Max Value (dBc)	Limit (dBc)	Verdict
BLE 1M	912	-61.24	-20	Pass
BLE 1M	920	-62.86	-20	Pass

Test Graphs

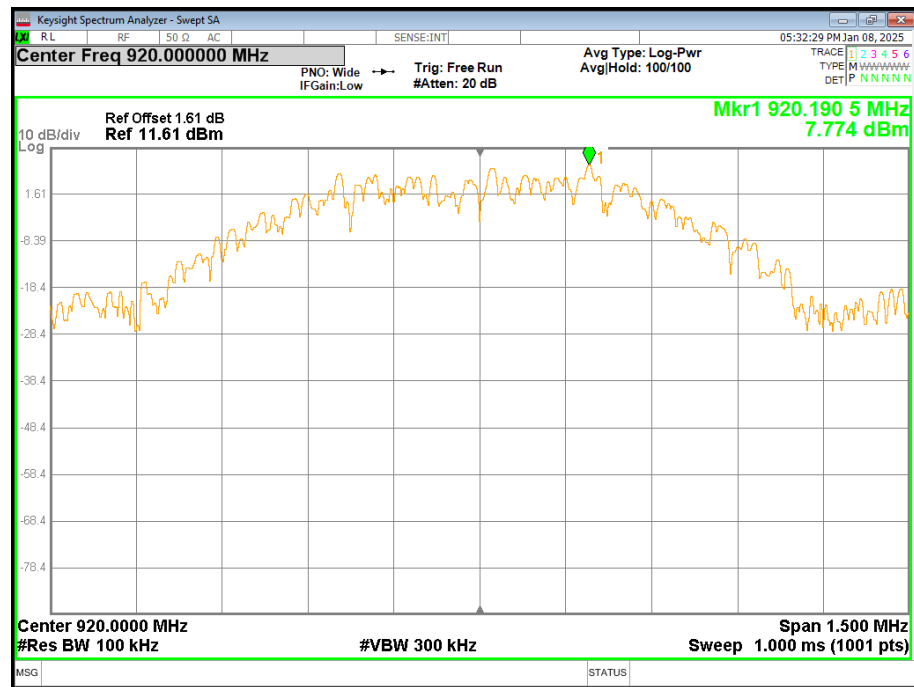
Tx. Spurious 912MHz Ant1 Ref



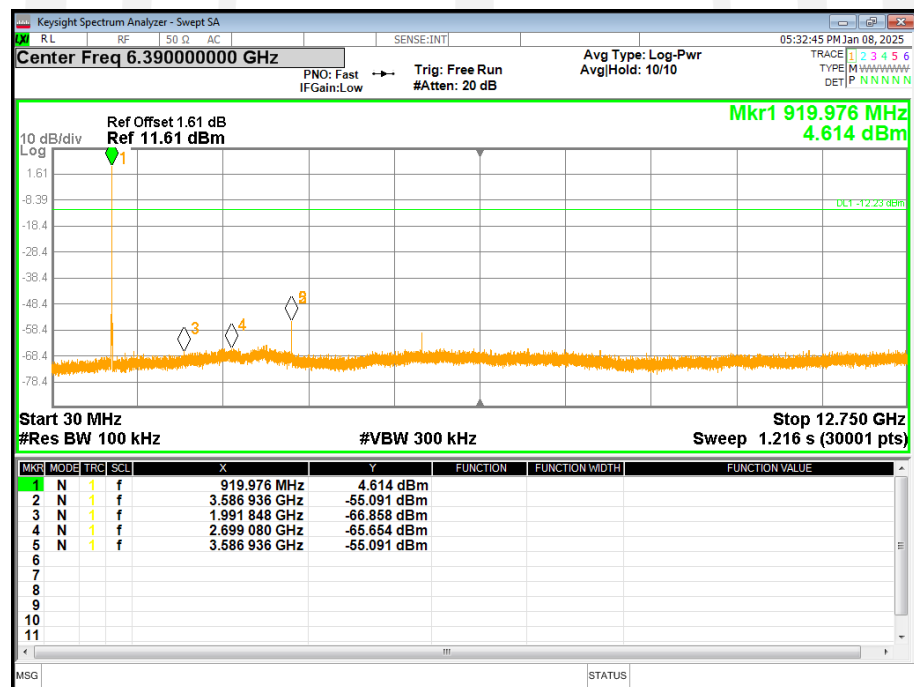
Tx. Spurious 912MHz Ant1 Emission



Tx. Spurious 920MHz Ant1 Ref



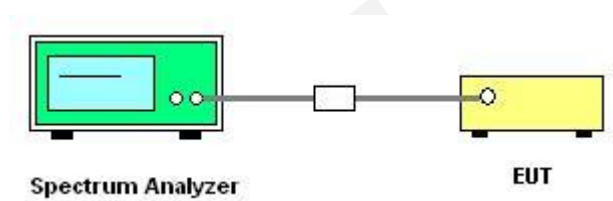
Tx. Spurious 920MHz Ant1 Emission



6. POWER SPECTRAL DENSITY

Test Requirement	: FCC CFR47 Part 15 Section 15.247
Test Method	: ANSI C63.10:2013
Test Limit	: Regulation 15.247(f) The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

6.1. Test Setup



6.2. Test Procedure

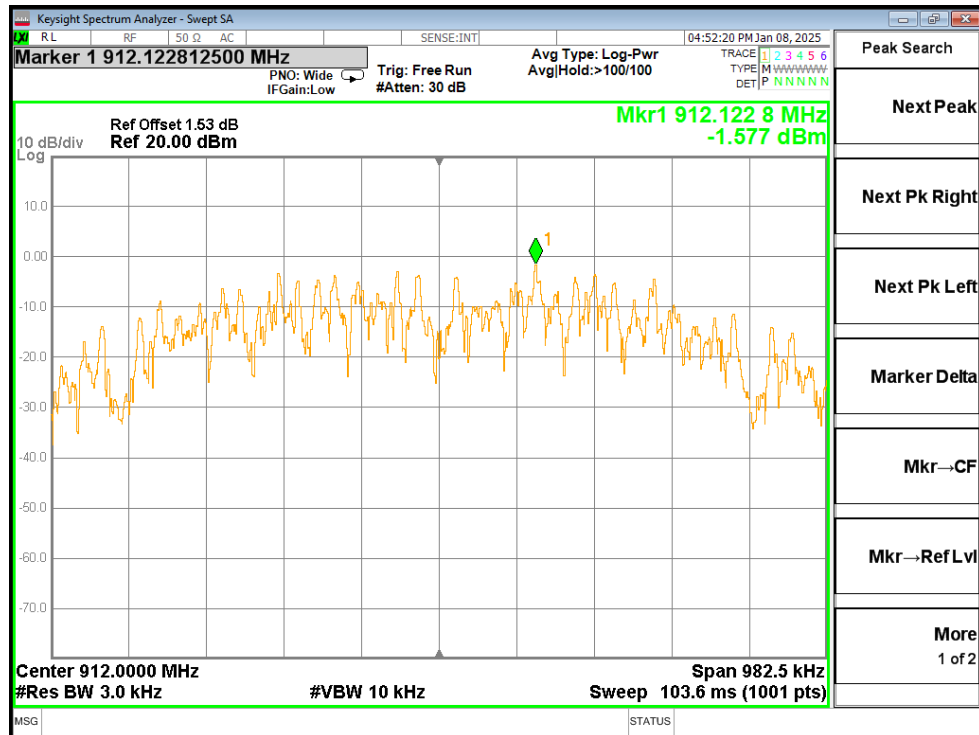
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

6.3. Test Result

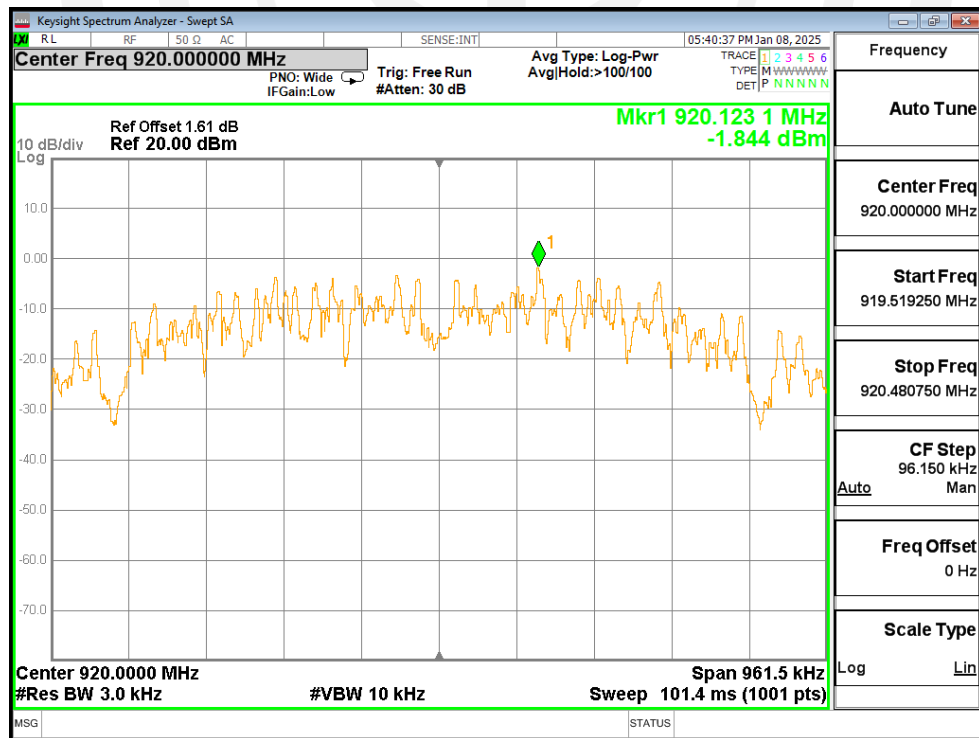
Frequency (MHz)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
912	-1.58	8	Pass
920	-1.84	8	Pass

Test Graphs

PSD 912MHz Ant1



PSD 920MHz Ant1



7. Radiated Emissions

7.1. Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

RSS-GEN Restricted frequency band

Table 7 – Restricted frequency bands^{Note 1}

MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 – 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5

8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 - 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 - 8500	
108 - 138		

Note 1: Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSS.

15.209 Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
0.009-0.490	300	$2400/\text{F}(\text{KHz})$	/
0.490-1.705	30	$24000/\text{F}(\text{KHz})$	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

Note: The peak limit is 20 dB higher than the average limit

Table 5 – General field strength limits at frequencies above 30 MHz

Frequency (MHz)	Field strength ($\mu\text{V}/\text{m}$ at 3 m)
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

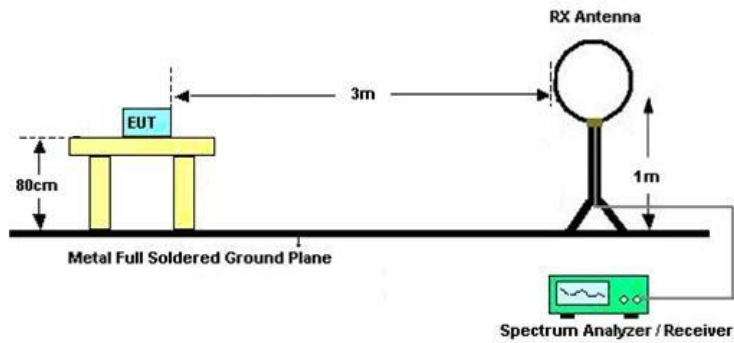
Table 6 – General field strength limits at frequencies below 30 MHz

Frequency	Magnetic field strength (H-Field) ($\mu\text{A}/\text{m}$)	Measurement distance (m)
9 - 490 kHz ^{Note 1}	$6.37/\text{F}$ (F in kHz)	300
490 - 1705 kHz	$63.7/\text{F}$ (F in kHz)	30
1.705 - 30 MHz	0.08	30

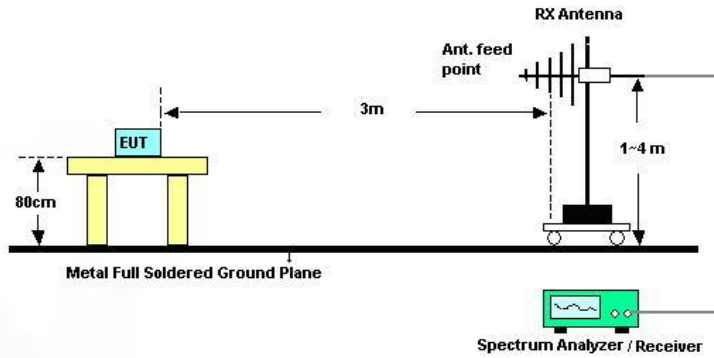
Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

7.2. Block Diagram of Test setup

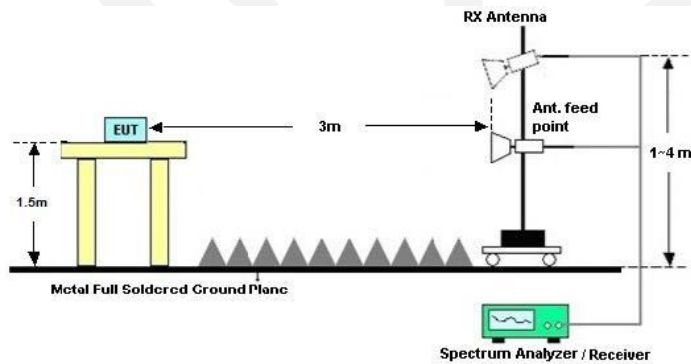
7.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 30MHz



7.2.2 In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



7.2.3 In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

7.3. Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and simulator
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
 - (a) Change work frequency or channel of device if practicable.
 - (b) Change modulation type of device if practicable.
 - (c) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- (4) Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10:2013on Radiated Emission test.
- (6) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure.

7.4. Test Results

We have scanned from 9kHz to the 10th harmonic of the EUT's highest frequency.

Detailed information please see the following page.

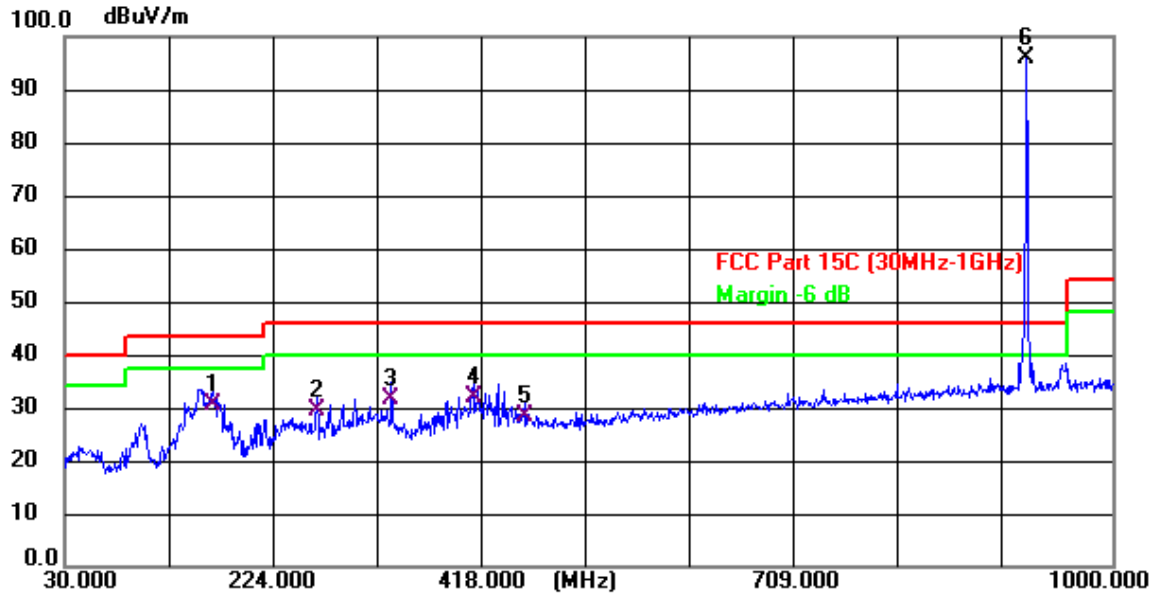
From 9KHz to 30MHz:	
Test Date : 2025.3.17	Temperature : 26℃
Test Engineer : Felix Pang	Humidity : 54%
Test Mode : DSSS OQPSKK mode	
Test Results : PASS	
Note:	The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

From 30MHz to 1000MHz:	
Test Date : 2025.3.17	Temperature : 26℃
Test Engineer : Felix Pang	Humidity : 54%
Test Mode : DSSS OQPSKK mode	
Test Results : PASS	
Note:	1. The test results are listed in next pages. 2. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out. 3. Please refer to the following test plots for the worst test mode (DSSS OQPSKK (CH01: 920MHz).



Model: LOCK420-8Z

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	DC 6V	Mode:	920MHz

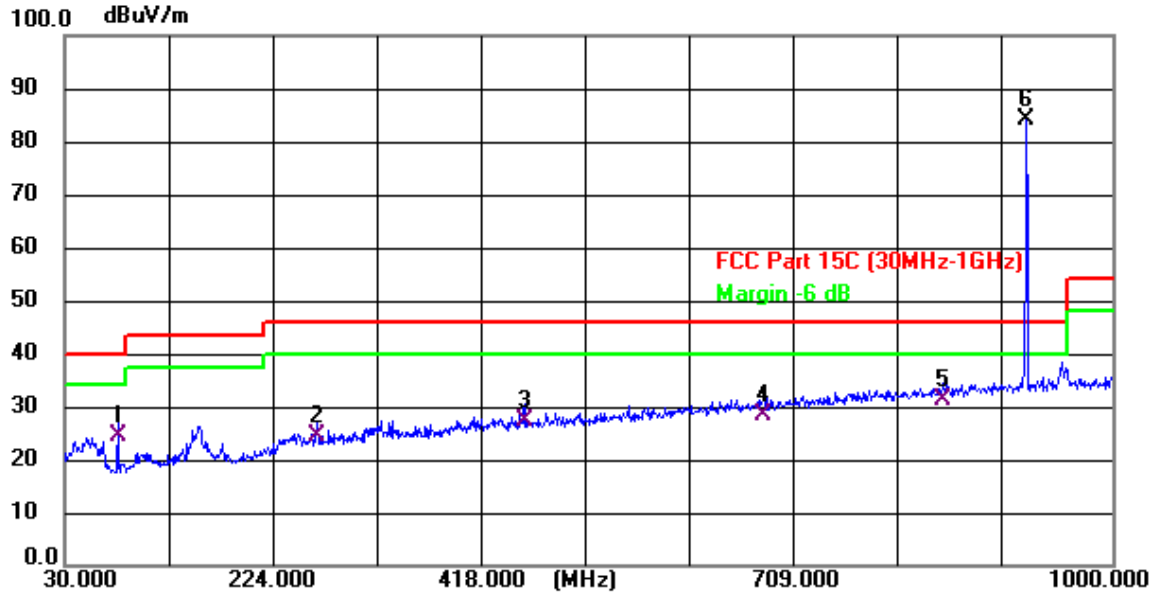


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	166.770	43.70	-13.13	30.57	43.50	-12.93	QP
2	263.770	38.27	-8.87	29.40	46.00	-16.60	QP
3	332.640	39.11	-7.40	31.71	46.00	-14.29	QP
4	408.300	37.74	-5.70	32.04	46.00	-13.96	QP
5	455.830	33.21	-4.85	28.36	46.00	-17.64	QP
6 *	920.460	93.06	2.73	95.79	N/A	N/A	peak

Remark: Emission Level = Reading + Cable Loss + ANT Factor - AMP Factor

Model: LOCK420-8Z

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Vertical
Test Voltage:	DC 6V	Mode:	920MHz

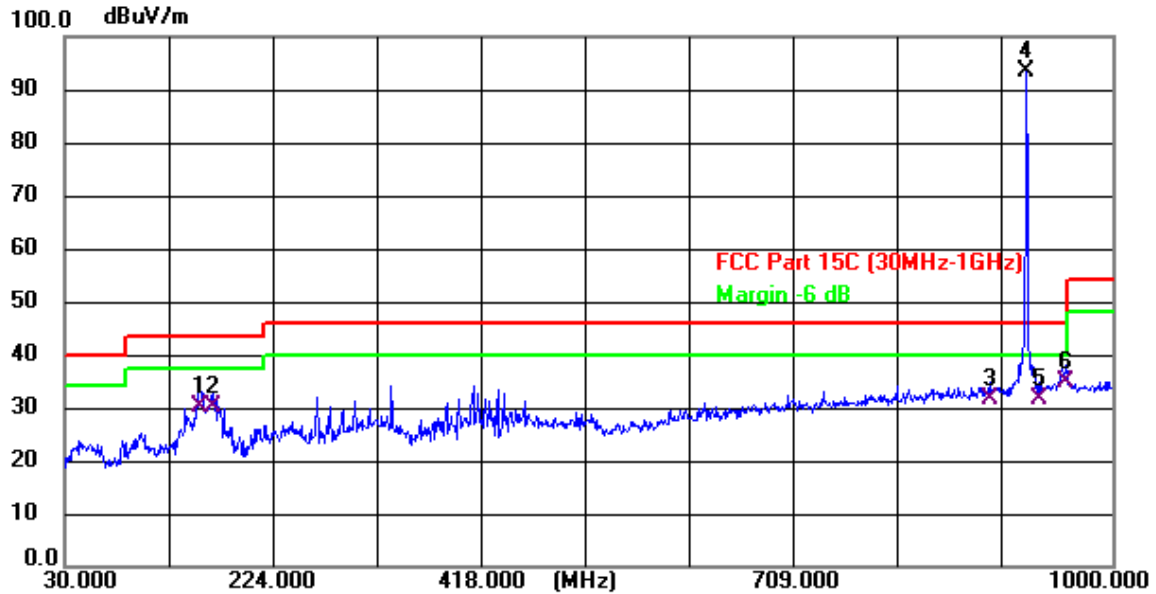


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	79.470	38.57	-14.21	24.36	40.00	-15.64	QP
2	263.770	33.34	-8.87	24.47	46.00	-21.53	QP
3	455.830	32.22	-4.85	27.37	46.00	-18.63	QP
4	676.990	29.20	-0.78	28.42	46.00	-17.58	QP
5	843.830	29.72	1.70	31.42	46.00	-14.58	QP
6 *	920.460	81.27	2.73	84.00	N/A	N/A	peak

Remark: Emission Level = Reading + Cable Loss + ANT Factor - AMP Factor

Model: LOCK420-4Z

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	DC 6V	Mode:	920MHz

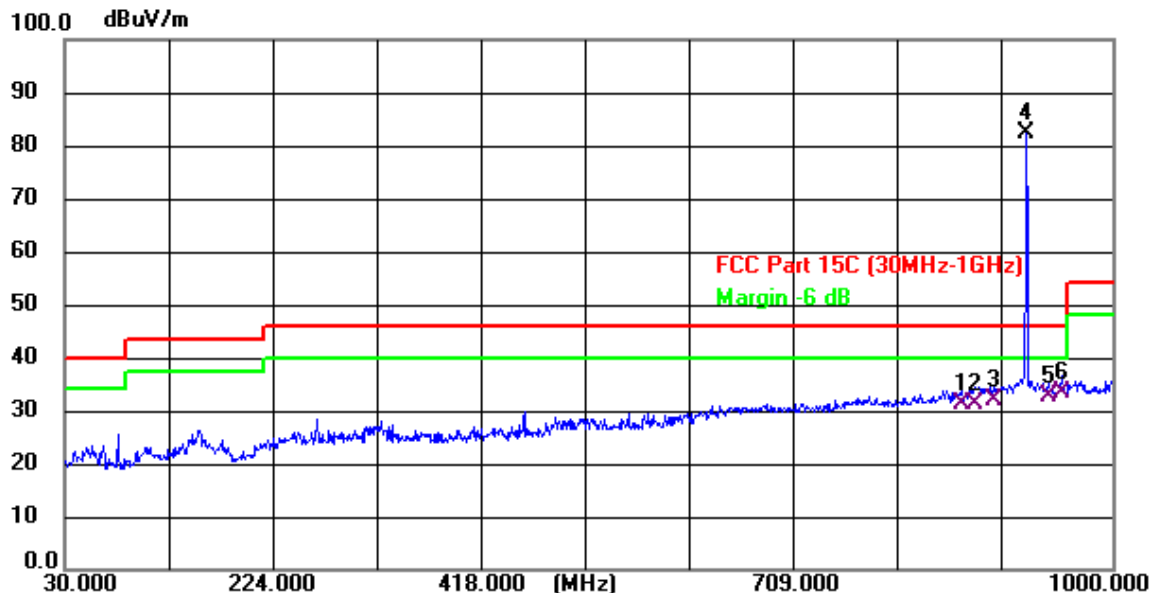


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	155.130	43.83	-13.77	30.06	43.50	-13.44	QP
2	166.770	43.20	-13.13	30.07	43.50	-13.43	QP
3	886.510	29.31	2.34	31.65	46.00	-14.35	QP
4 *	920.460	90.56	2.73	93.29	N/A	N/A	peak
5	933.070	28.85	2.86	31.71	46.00	-14.29	QP
6	957.320	31.77	3.10	34.87	46.00	-11.13	QP

Remark: Emission Level = Reading + Cable Loss + ANT Factor - AMP Factor

Model: LOCK420-4Z

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Vertical
Test Voltage:	DC 6V	Mode:	920MHz



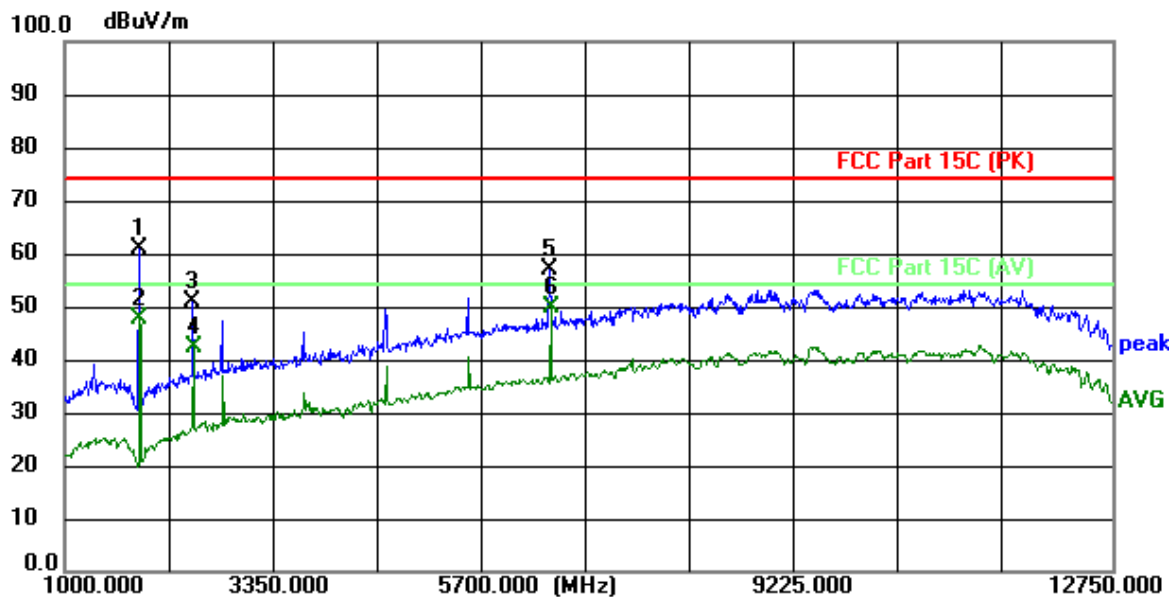
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	861.290	29.16	1.95	31.11	46.00	-14.89	QP
2	873.900	29.23	2.15	31.38	46.00	-14.62	QP
3	891.360	29.43	2.41	31.84	46.00	-14.16	QP
4 *	920.460	79.77	2.73	82.50	N/A	N/A	peak
5	940.830	29.60	2.95	32.55	46.00	-13.45	QP
6	954.410	30.46	3.08	33.54	46.00	-12.46	QP

Remark: Emission Level = Reading + Cable Loss + ANT Factor - AMP Factor

From 1GHz to 25GHz:	
Test Date : 2025.3.17	Temperature : 26℃
Test Engineer : Felix Pang	Humidity : 54%
Test Mode : DSSS OQPSKK mode	
Test Results : PASS	
Note:	1. The test results are listed in next pages. 2. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out. 3. If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out. 4. Please refer to the following test plots for the worst test mode (DSSS OQPSKK (CH01: 920MHz).

Model: LOCK420-8Z

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	DC 6V	Mode:	920MHz

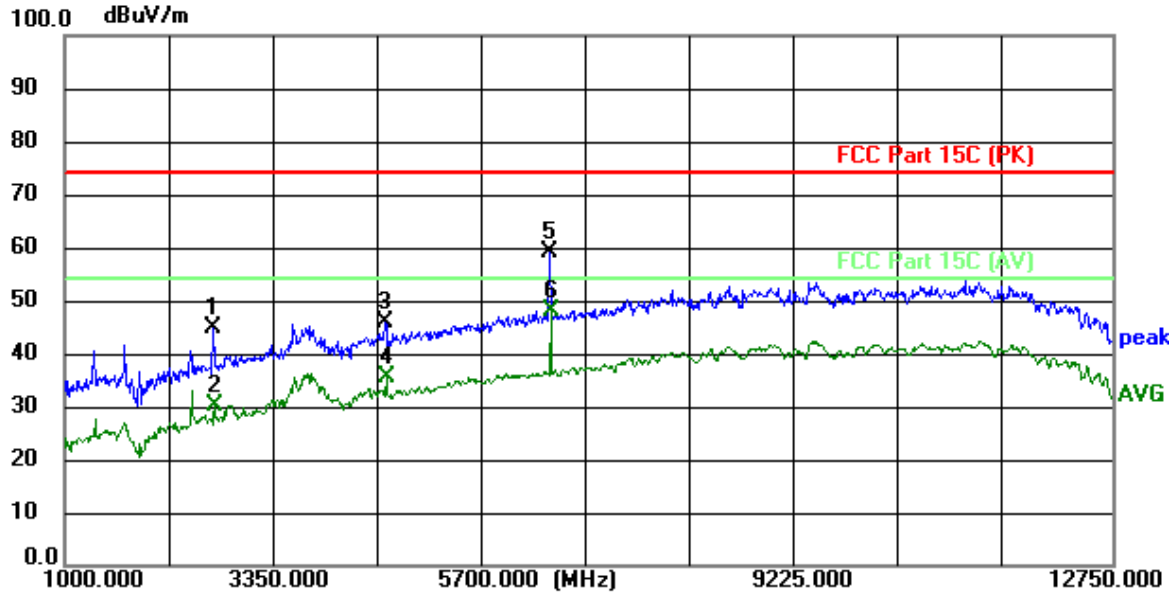


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1834.250	78.15	-17.23	60.92	74.00	-13.08	peak
2	1846.000	64.72	-17.21	47.51	54.00	-6.49	AVG
3	2433.500	66.39	-15.44	50.95	74.00	-23.05	peak
4	2445.250	57.89	-15.39	42.50	54.00	-11.50	AVG
5	6440.250	60.22	-3.10	57.12	74.00	-16.88	peak
6 *	6452.000	52.87	-3.07	49.80	54.00	-4.20	AVG

Remark: Emission Level = Reading + Cable Loss + ANT Factor - AMP Factor

Model: LOCK420-8Z

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Vertical
Test Voltage:	DC 6V	Mode:	920MHz

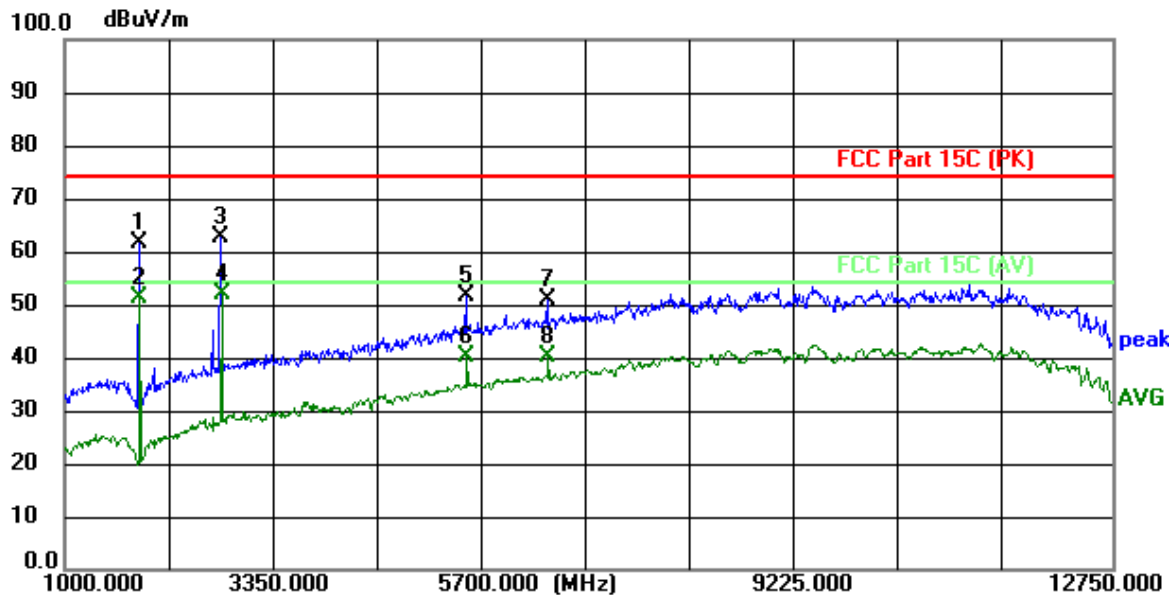


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2656.750	59.28	-14.35	44.93	74.00	-29.07	peak
2	2680.250	44.40	-14.21	30.19	54.00	-23.81	AVG
3	4595.500	54.23	-8.17	46.06	74.00	-27.94	peak
4	4607.250	43.68	-8.12	35.56	54.00	-18.44	AVG
5	6440.250	62.09	-3.10	58.99	74.00	-15.01	peak
6 *	6452.000	51.21	-3.07	48.14	54.00	-5.86	AVG

Remark: Emission Level = Reading + Cable Loss + ANT Factor - AMP Factor

Model: LOCK420-4Z

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	DC 6V	Mode:	920MHz

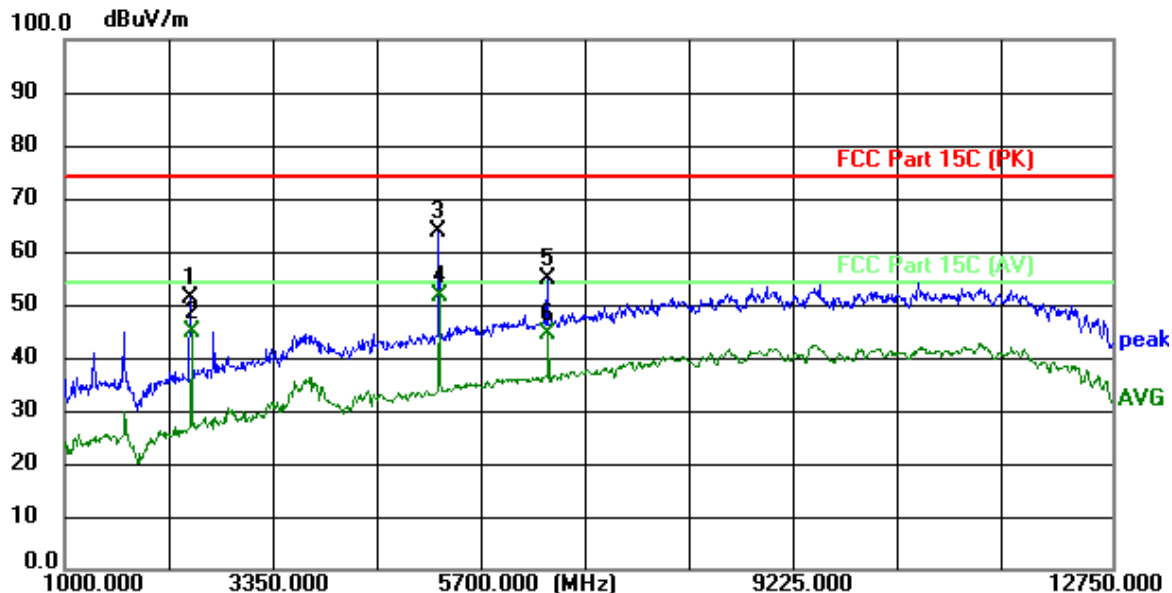


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1834.250	78.76	-17.23	61.53	74.00	-12.47	peak
2	1846.000	68.44	-17.21	51.23	54.00	-2.77	AVG
3	2750.750	76.56	-13.84	62.72	74.00	-11.28	peak
4 *	2762.500	65.87	-13.79	52.08	54.00	-1.92	AVG
5	5500.250	57.61	-5.93	51.68	74.00	-22.32	peak
6	5512.000	45.94	-5.88	40.06	54.00	-13.94	AVG
7	6416.750	54.09	-3.14	50.95	74.00	-23.05	peak
8	6428.500	43.23	-3.11	40.12	54.00	-13.88	AVG

Remark: Emission Level = Reading + Cable Loss + ANT Factor - AMP Factor

Model: LOCK420-4Z

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Vertical
Test Voltage:	DC 6V	Mode:	920MHz

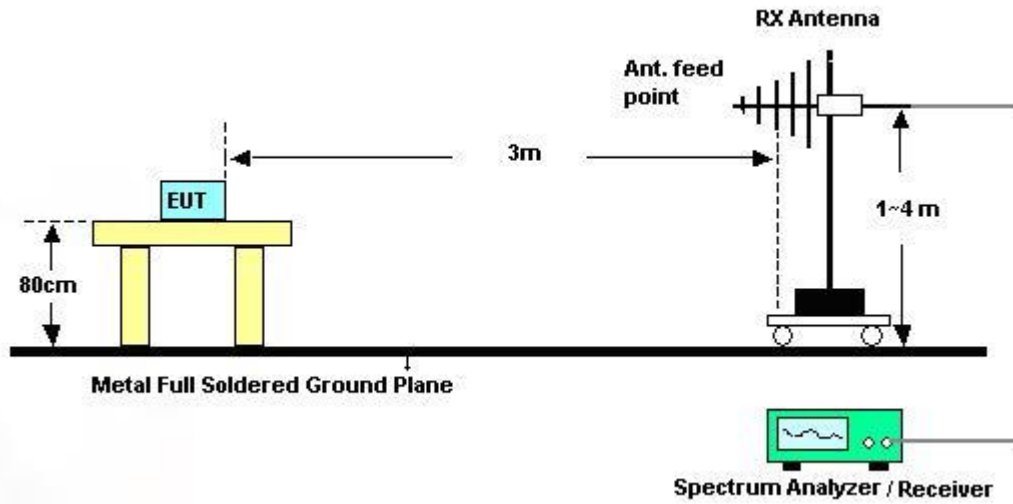


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2410.000	66.84	-15.53	51.31	74.00	-22.69	peak
2	2421.750	60.19	-15.47	44.72	54.00	-9.28	AVG
3	5194.750	70.13	-6.42	63.71	74.00	-10.29	peak
4 *	5206.500	57.97	-6.40	51.57	54.00	-2.43	AVG
5	6416.750	57.97	-3.14	54.83	74.00	-19.17	peak
6	6428.500	47.45	-3.11	44.34	54.00	-9.66	AVG

Remark: Emission Level = Reading + Cable Loss + ANT Factor - AMP Factor

8. Band Edge Test

8.1. Block Diagram of Test Setup



8.2. Test Limit

Radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Please refer section RSS-GEN&15.247.

8.3. Test Procedure

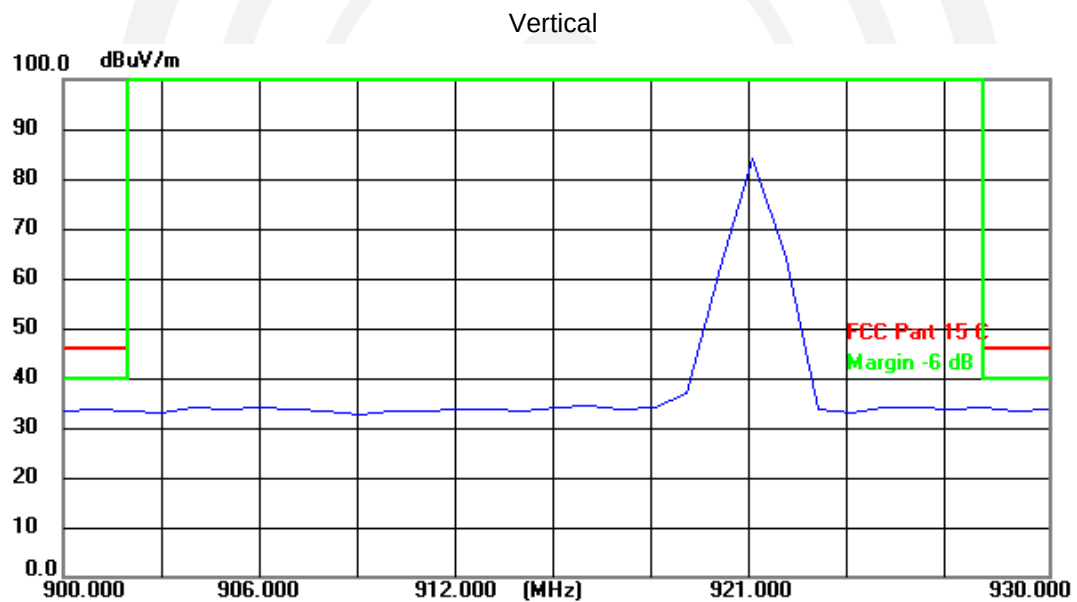
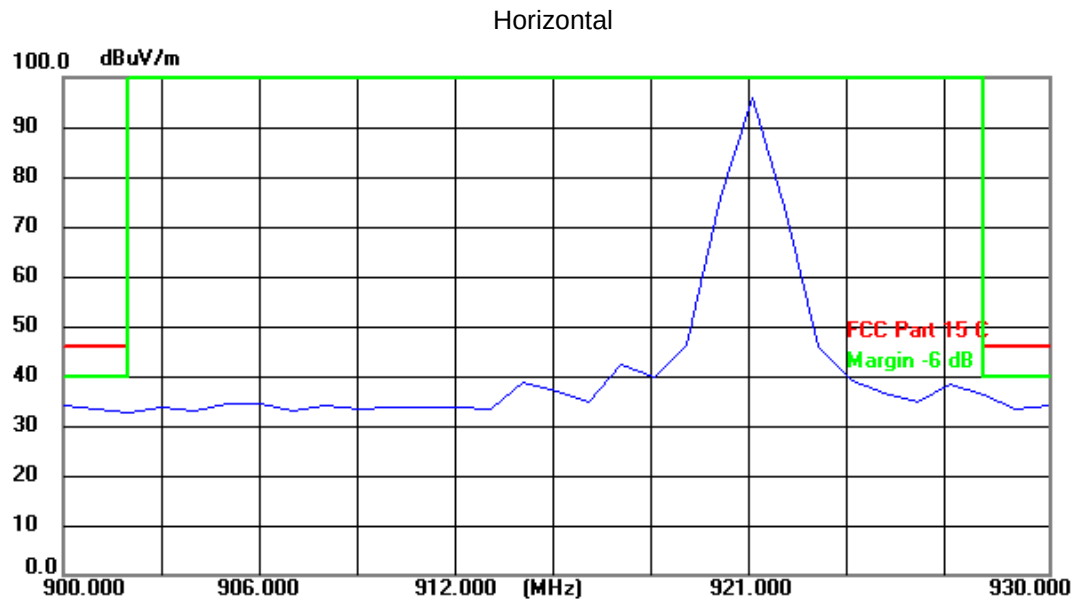
Refer to ANSI C 63.10, Clause 6.10.

All restriction band and non- restriction band have been tested, only worse case is reported.

8.4. Test Results

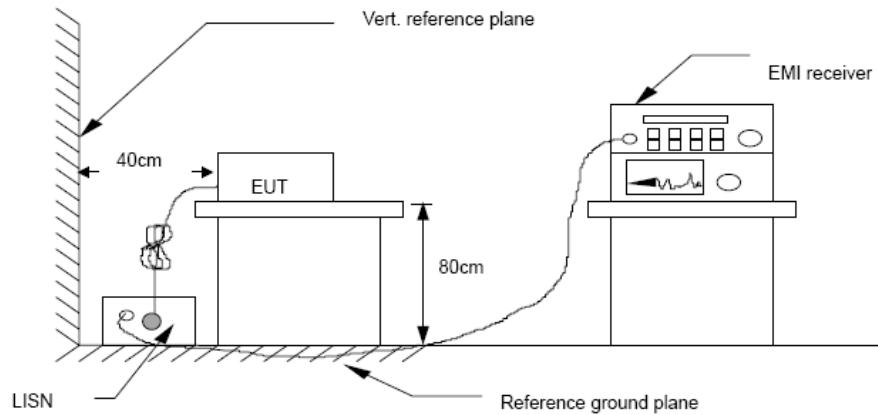
Test Date	: 2025.1.04	Temperature	: 26°C
Test Engineer	: Felix Pang	Humidity	: 54%
Test Results	: PASS		

Frequency Range : 902MHz~928MHz								
No.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	902.0	H	10.54	28.09	3663	46	-7.37	QP
2	928.0	H	9.45	28.36	37.81	46	-9.19	QP
3	902.0	V	10.54	28.09	33.63	46	-9.37	QP
4	928.0	V	9.54	28.36	34.9	46	-11.1	QP
Note: 1. Means other frequency and mode comply with standard requirements and at least have 20dB margin. 2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain. Result=Reading + Correct Factor. Margin= Result-Limit. 3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out. 4. All the modulation modes were tested the data of the worst mode (DSSS OQPSKK (CH01: 920MHz) are recorded in the following pages and the others modulation methods do not exceed the limits.								



9. Power Line Conducted Emissions

9.1. Block Diagram of Test Setup



9.2. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

9.3. Test Procedure

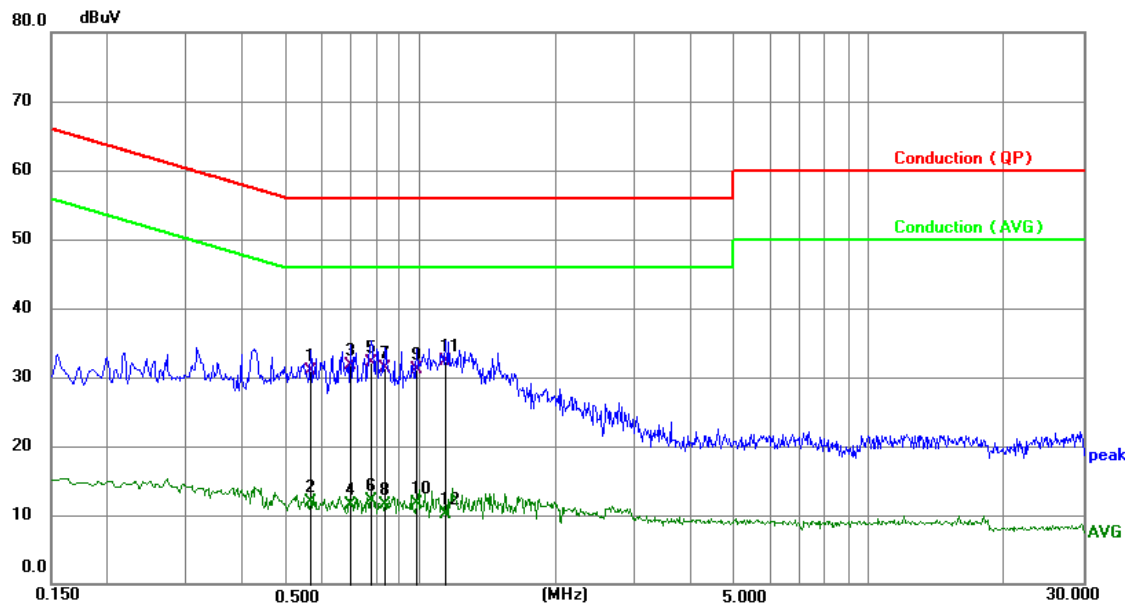
- (1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
- (2) Setup the EUT and simulator as shown in 10.1
- (3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N2), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10:2013on conducted Emission test.
- (4) The bandwidth of test receiver is set at 10KHz.
- (5) The frequency range from 150 KHz to 30MHz is checked.

9.4. Test Results

Test Date	: 2025.1.04	Temperature	: 24℃
Test Engineer	: Felix Pang	Humidity	: 56%
Test Mode	: DSSS OQPSKK mode		
Test Results	: PASS		
Note:	1. The test results are listed in next pages. 2. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out. 3. If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out. 5. Conducted emission at both 120V & 240V is assessed, and emission at 120V represents the worst case. All the modulation modes were tested the data of the worst mode (DSSS OQPSKK (CH01: 920MHz) are recorded in the following pages and the others modulation methods do not exceed the limits.		

Model: LOCK420-8Z

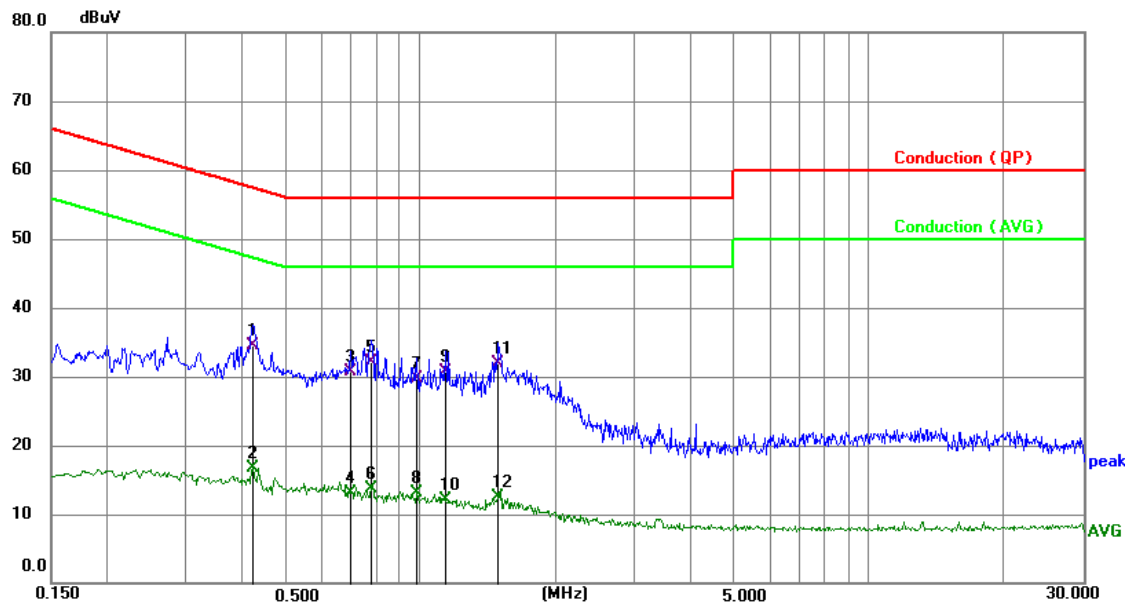
Channel:	Low channel	Phase :	L
----------	-------------	---------	---



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.5685	20.93	10.03	30.96	56.00	-25.04	QP
2	0.5685	1.91	10.03	11.94	46.00	-34.06	AVG
3	0.6990	21.73	10.04	31.77	56.00	-24.23	QP
4	0.6990	1.50	10.04	11.54	46.00	-34.46	AVG
5	0.7753	22.16	10.04	32.20	56.00	-23.80	QP
6	0.7753	2.08	10.04	12.12	46.00	-33.88	AVG
7	0.8340	21.20	10.05	31.25	56.00	-24.75	QP
8	0.8340	1.51	10.05	11.56	46.00	-34.44	AVG
9	0.9825	21.08	10.06	31.14	56.00	-24.86	QP
10	0.9825	1.61	10.06	11.67	46.00	-34.33	AVG
11 *	1.1400	22.19	10.06	32.25	56.00	-23.75	QP
12	1.1400	0.13	10.06	10.19	46.00	-35.81	AVG

Model: LOCK420-8Z

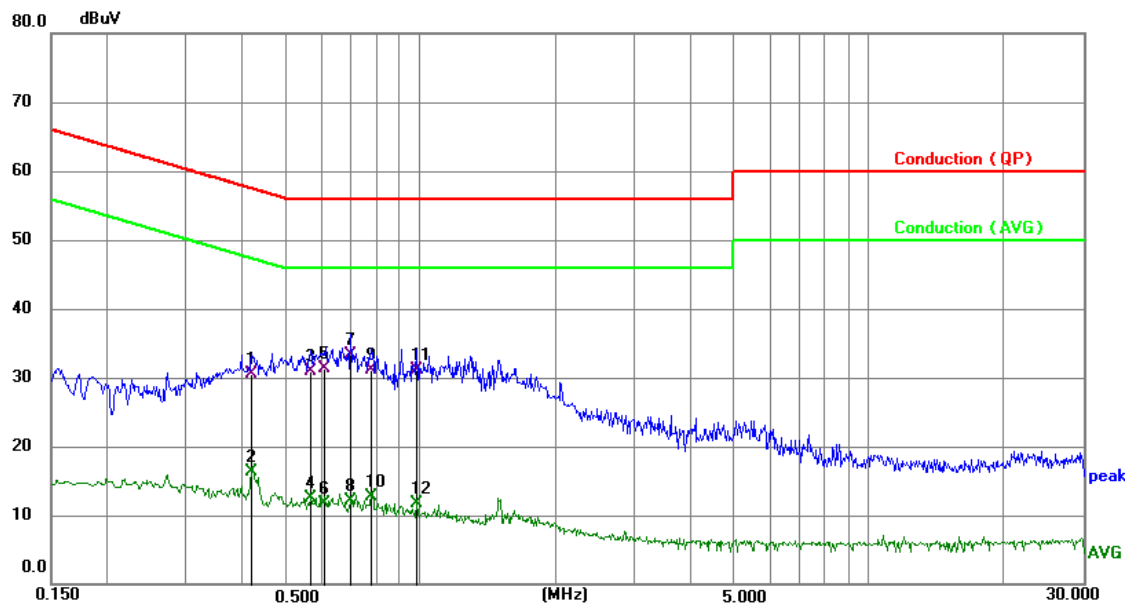
Channel:	Low channel	Phase :	N
----------	-------------	---------	---



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1 *	0.4200	24.51	9.99	34.50	57.45	-22.95	QP
2	0.4200	6.64	9.99	16.63	47.45	-30.82	AVG
3	0.6990	20.73	10.04	30.77	56.00	-25.23	QP
4	0.6990	3.00	10.04	13.04	46.00	-32.96	AVG
5	0.7752	22.16	10.04	32.20	56.00	-23.80	QP
6	0.7752	3.58	10.04	13.62	46.00	-32.38	AVG
7	0.9825	19.58	10.06	29.64	56.00	-26.36	QP
8	0.9825	3.11	10.06	13.17	46.00	-32.83	AVG
9	1.1400	20.69	10.06	30.75	56.00	-25.25	QP
10	1.1400	2.13	10.06	12.19	46.00	-33.81	AVG
11	1.4910	21.88	10.07	31.95	56.00	-24.05	QP
12	1.4910	2.37	10.07	12.44	46.00	-33.56	AVG

Model: LOCK420-4Z

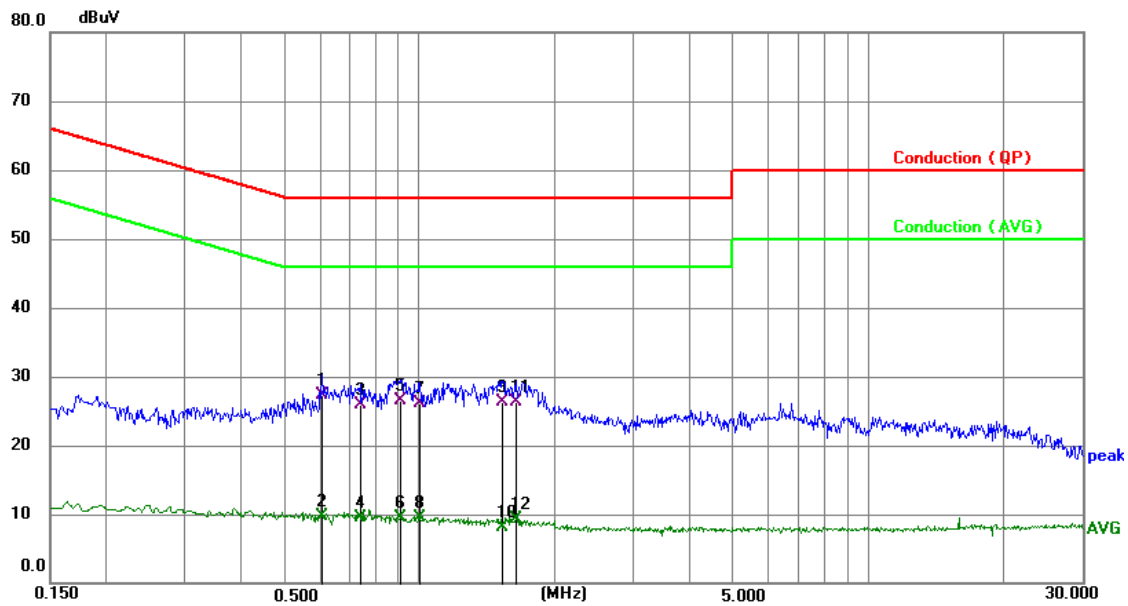
Channel:	Low channel	Phase :	L
----------	-------------	---------	---



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.4192	20.43	9.99	30.42	57.46	-27.04	QP
2	0.4192	6.31	9.99	16.30	47.46	-31.16	AVG
3	0.5685	20.93	10.03	30.96	56.00	-25.04	QP
4	0.5685	2.41	10.03	12.44	46.00	-33.56	AVG
5	0.6134	21.22	10.03	31.25	56.00	-24.75	QP
6	0.6134	1.74	10.03	11.77	46.00	-34.23	AVG
7 *	0.6990	23.23	10.04	33.27	56.00	-22.73	QP
8	0.6990	2.00	10.04	12.04	46.00	-33.96	AVG
9	0.7752	21.16	10.04	31.20	56.00	-24.80	QP
10	0.7752	2.58	10.04	12.62	46.00	-33.38	AVG
11	0.9825	21.08	10.06	31.14	56.00	-24.86	QP
12	0.9825	1.61	10.06	11.67	46.00	-34.33	AVG

Model: LOCK420-4Z

Channel:	Low channel	Phase :	N
----------	-------------	---------	---



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1 *	0.6045	17.25	10.03	27.28	56.00	-28.72	QP
2	0.6045	-0.40	10.03	9.63	46.00	-36.37	AVG
3	0.7350	15.86	10.04	25.90	56.00	-30.10	QP
4	0.7350	-0.60	10.04	9.44	46.00	-36.56	AVG
5	0.9060	16.45	10.05	26.50	56.00	-29.50	QP
6	0.9060	-0.55	10.05	9.50	46.00	-36.50	AVG
7	1.0003	16.05	10.06	26.11	56.00	-29.89	QP
8	1.0003	-0.61	10.06	9.45	46.00	-36.55	AVG
9	1.5315	16.23	10.06	26.29	56.00	-29.71	QP
10	1.5315	-1.86	10.06	8.20	46.00	-37.80	AVG
11	1.6440	16.22	10.06	26.28	56.00	-29.72	QP
12	1.6440	-0.77	10.06	9.29	46.00	-36.71	AVG

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Measurement Level = Reading level + Correct Factor

10. ANTENNA REQUIREMENTS

10.1.Limit

For intentional device, according to FCC 47 CFR Section 15.203 and RSS-GEN, 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

10.2.Result

The EUT antenna is PCB antenna. It complies with the standard requirement.



11. Photos of test setup

Reference to the **appendix I Test Setup Photo** for details.

12. Photos of EUT

Reference to the **appendix II external photos** and **appendix III internal photos** for details.

----- END OF REPORT-----

