Shenzhen CTL Testing Technology Co., Ltd.
Tel: +86-755-89486194 E-mail: ctl@ctl-lab.com

TEST REPORT

FCC PART 15 SUBPART C 15.247

Report Reference No. ..... :	**CTL2310183051-WF**	
Compiled by: (position+printed name+signature)	Happy Guo (File administrators)	
Tested by: (position+printed name+signature)	Wuqiang Wu (Test Engineer)	
Approved by: (position+printed name+signature)	Ivan Xie (Manager)	

Product Name ..... :	RFID Reader Module
Model/Type reference ..... :	EC-UHF-A-6
List Model(s)..... :	EC-UHF-D-2, EC-UHF-D-4, EC-UHF-D-8
Trade Mark..... :	EC-LINK
FCC ID..... :	**2A83H-ECUHFA6**
Applicant's name ..... :	**EC-LINK Automation (Shenzhen) Co. Ltd.**
Address of applicant ..... :	Room 2206, Block B, Shixia Xintian Century Business Center, Futian District, Shenzhen City, China
Test Firm..... :	**Shenzhen CTL Testing Technology Co., Ltd.**
Address of Test Firm ..... :	Zone A, 1st Floor, Warehouse 2, Baisha Logistics Company, No. 3011 Shahe West Road, Nanshan District, Shenzhen
Test specification..... :	
Standard ..... :	**47 CFR FCC Part 15 Subpart C 15.247**
TRF Originator ..... :	Shenzhen CTL Testing Technology Co., Ltd.
Master TRF..... :	Dated 2011-01
Date of receipt of test item ..... :	Nov. 21, 2023
Date of Test Date..... :	Nov. 21, 2023-Dec. 26, 2023
Date of Issue ..... :	Dec. 27, 2023
Result..... :	**Pass**

TEST REPORT

Test Report No.:	CTL2310183051-WF	Dec. 27, 2023 Date of issue

Equipment under Test	:	RFID Reader Module
Sample No.	:	CTL2310183051
Model /Type	:	EC-UHF-A-6
Listed Models	:	EC-UHF-D-2, EC-UHF-D-4, EC-UHF-D-8
Applicant	:	**EC-LINK Automation (Shenzhen) Co. Ltd.**
Address	:	Room 2206, Block B, Shixia Xintian Century Business Center, Futian District, Shenzhen City, China
Manufacturer	:	**EC-LINK Automation (Shenzhen) Co. Ltd.**
Address	:	Room 2206, Block B, Shixia Xintian Century Business Center, Futian District, Shenzhen City, China

Test result	Pass *

* In the configuration tested, the EUT complied with the standards specified page 5.

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

** Modified History **

Revisions	Description	Issued Data	Report No.	Remark
Version 1.0	Initial Test Report Release	2023-12-27	CTL2310183051-WF	Tracy Qi

Table of Contents **Page**

1. SUMMARY

1.1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

ANSI C63.10:2013: American National Standard for Testing Unlicensed Wireless Devices

558074 D01 15.247 Meas Guidance v05r02: Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spreda Spectrum System, and Hybrid System Devices Operating Under Section 15.247 of the FCC Rules

1.2. Test Description

FCC PART 15 Subpart C		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(1)(i)	20dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious Emission and Band Edge	PASS
FCC Part 15.247(b)(2)	Maximum Peak Output Power	PASS
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(a)(1)	Frequency Separation	PASS
FCC Part 15.247(a)(1)(i)	Number of hopping frequency	PASS
FCC Part 15.247(a)(1)(i)	Time of Occupancy	PASS

Note: The measurement uncertainty is not included in the test result.

1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Zone A, 1st Floor, Warehouse 2, Baisha Logistics Company, No. 3011 Shahe West Road, Nanshan District, Shenzhen

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.10 and CISPR 32/EN 55032 requirements.

1.3.2 Laboratoryaccreditation

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L7497

Shenzhen CTL Testing Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No. 4343.01

Shenzhen CTL Testing Technology Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: 9618B

CAB identifier: CN0041

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements with Registration No.: 9618B on Jan.22, 2019.

FCC-Registration No.: 399832

Designation No.: CN1216

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 399832, December 08, 2017.

1.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4“Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)

Radiated Emission9KHz~30MHz	±3.40dB	(1)
Radiated Emission30~1000MHz	±4.10dB	(1)
Radiated Emission Above 1GHz	±4.32dB	(1)
Conducted Disturbance0.15~30MHz	±3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2. GENERAL INFORMATION

2.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2. General Description of EUT

Product Name:	RFID Reader Module
Model/Type reference:	EC-UHF-A-6
Power supply:	Modular power supply. Support 3.6-5.5 V powers
Hardware version:	V1.0
Software version:	V1.0
UHF RFID	
Operation frequency	902.75-927.25 MHz
Modulation Type	ASK
Channel number:	50
Channel separation:	0.5MHz
Antenna type:	External Antenna
MIMO:	Not support
Antenna gain:	-28.41dBi

Note1: For more details, please refer to the user's manual of the EUT.

Note 2: Note 2: There are six antenna connectors (ANT1, ANT2, ANT3, ANT4, ANT5 and ANT6) on the PCB board of the RFID module which can be connected up to three external UHF antennas to achieve long reader range. The power level setting is same for all the three antenna connectors. For the test, we have used ANT1 and other antenna connectors were terminated with 50ohm terminators.

2.3. Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. The Applicant provides communication tools software(MainWindow.exe) to control the EUT for staying in continuous transmitting and receiving mode for testing. There are 50 channels of EUT, and the test carried out at the lowest channel, middle channel and highest channel.

Operation Frequency:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	**902.75**	21	912.75	41	922.75
02	903.25	22	913.25	42	923.25
03	903.75	23	913.75	43	923.75
04	904.25	24	914.25	44	924.25
05	904.75	25	914.75	45	924.75
06	905.25	**26**	**915.25**	46	925.25
07	905.75	27	915.75	47	925.75
08	906.25	28	916.25	48	926.25
09	906.75	29	916.75	49	926.75
10	907.25	30	917.25	**50**	**927.25**
11	907.75	31	917.75		
12	908.25	32	918.25	--	--

13	908.75	33	918.75	--	--
14	909.25	34	919.25	--	--
15	909.75	35	919.75	--	--
16	910.25	36	920.25	--	--
17	910.75	37	920.75	--	--
18	911.25	38	921.25	--	--
19	911.75	39	921.75	--	--
20	912.25	40	922.25	--	--

Test Frequency:

No.	Test Channel	Test Frequency
1	01	902.75 MHz
2	26	915.25 MHz
3	50	927.25 MHz

2.4. Power setting during the test:

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power Parameters:

Test Software Version	MainWindow.exe		
Channel	Low channel	Mid channel	High channel
Power Level	default	default	default

2.5. Special Accessories

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Technical Parameters	Certificate	Provided by
Adapter	HONOR	HW-050200C2	Input: 100-240V~ 50/60Hz 0.5A Max Output:5V⎓2A	CE/FCC	manufacturer
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/

2.6. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ESH2-Z5	860014/010	2023/05/04	2024/05/03
Double cone logarithmic antenna	Schwarzbeck	VULB 9168	824	2023/02/13	2026/02/12
Horn Antenna	Ocean Microwave	OBH100400	26999002	2021/12/22	2024/12/21
EMI Test Receiver	R&S	ESCI	1166.5950.03	2023/05/04	2024/05/03
Spectrum Analyzer	Agilent	E4407B	MY41440676	2023/05/05	2024/05/04
Spectrum Analyzer	Agilent	N9020A	US46220290	2023/05/05	2024/05/04
Spectrum Analyzer	Keysight	N9020A	MY53420874	2023/05/05	2024/05/04
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2021/12/23	2024/12/22
Active Loop Antenna	Da Ze	ZN30900A	/	2021/05/13	2024/05/12
Amplifier	Agilent	8449B	3008A02306	2023/05/04	2024/05/03
Amplifier	Agilent	8447D	2944A10176	2023/05/04	2024/05/03
Amplifier	Brief&Smart	LNA-4018	2104197	2023/05/05	2024/05/04
Temperature/Humidity Meter	Ji Yu	MC501	/	2023/05/09	2024/05/08
Power Sensor	Agilent	U2021XA	MY55130004	2023/05/05	2024/05/04
Power Sensor	Agilent	U2021XA	MY55130006	2023/05/05	2024/05/04
Power Sensor	Agilent	U2021XA	MY54510008	2023/05/05	2024/05/04
Power Sensor	Agilent	U2021XA	MY55060003	2023/05/05	2024/05/04
Spectrum Analyzer	RS	FSP	1164.4391.38	2023/05/05	2024/05/04
RF Cable	Megalon	RF-A303	N/A	2023/05/05	2024/05/04
RF Control Unit	Tonsecnd	JS0806-2	20J8060323	2023/05/05	2024/05/04

Test Software	
Name of Software	Version
JS1120-3	2.6.880341
EZ_EMC(Below 1GHz)	V1.1.4.2
EZ_EMC((Above 1GHz)	V1.1.4.2

The calibration interval was one year

2.7. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.8. Modifications

No modifications were implemented to meet testing criteria.

3. TEST CONDITIONS AND RESULTS

3.1. Conducted Emissions Test

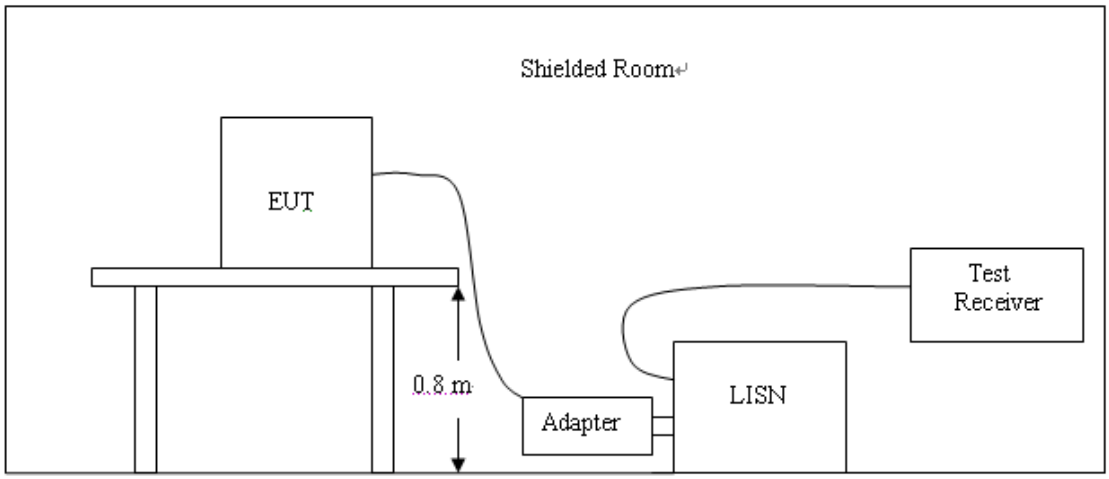
LIMIT

According to FCC CFR Title 47 Part 15 Subpart C Section 15.207 and RSS Gen 8.8, AC Power Line Conducted Emissions Limits for Licence-Exempt Radio Apparatus as below:

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

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION



TEST PROCEDURE

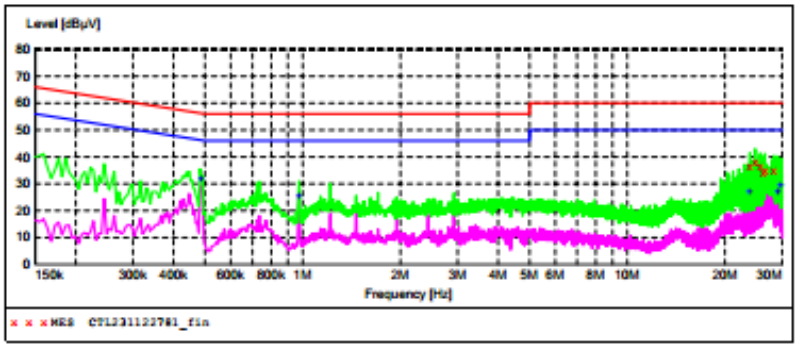
1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST RESULTS

Remark:
1. All modes were tested; only the worst result of antenna 1 test mode 1 was reported as below:
2. Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:

Test Mode	1	Line:	L

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL231122781_fin"

11/27/2023 2:11PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
23.887500	36.50	10.7	60	23.5	QP	L1	GND
24.778500	38.00	10.6	60	22.0	QP	L1	GND
25.678500	36.80	10.5	60	23.2	QP	L1	GND
26.268000	34.20	10.5	60	25.8	QP	L1	GND
26.578500	35.10	10.4	60	24.9	QP	L1	GND
28.365000	35.10	10.2	60	24.9	QP	L1	GND

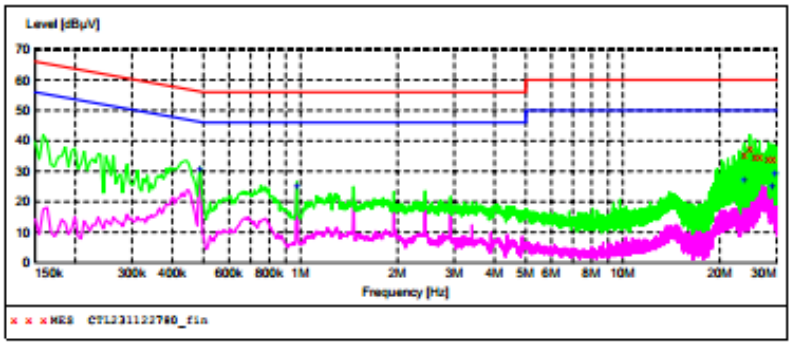
MEASUREMENT RESULT: "CTL231122781_fin2"

11/27/2023 2:11PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.487500	31.50	10.0	46	14.7	AV	L1	GND
0.973500	25.50	10.1	46	20.5	AV	L1	GND
23.856000	26.90	10.7	50	23.1	AV	L1	GND
29.224500	27.00	10.2	50	23.0	AV	L1	GND
29.710500	29.20	10.1	50	20.8	AV	L1	GND

Test Mode	1	Line:	N

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL231122780_fin"

11/27/2023 2:08PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
23.883000	35.70	10.7	60	24.3	QP	N	GND
24.783000	37.30	10.6	60	22.7	QP	N	GND
25.674000	34.70	10.5	60	25.3	QP	N	GND
26.574000	34.80	10.4	60	25.2	QP	N	GND
28.365000	33.80	10.2	60	26.2	QP	N	GND
29.260500	34.10	10.2	60	25.9	QP	N	GND

MEASUREMENT RESULT: "CTL231122780_fin2"

11/27/2023 2:08PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.487500	30.80	10.0	46	15.4	AV	N	GND
0.973500	24.90	10.1	46	21.1	AV	N	GND
23.856000	26.90	10.7	50	23.1	AV	N	GND
29.220000	24.90	10.2	50	25.1	AV	N	GND
29.710500	29.10	10.1	50	20.9	AV	N	GND

Remark: Level(dBuV)=Reading(dBuV) + Factor(dB)
Margin=Limit(dBuV/m)- Level(dBuV/m)

3.2. Radiated Emissions and Band Edge

Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

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)

For intentional device, according to RSS-Gen section 8.9, the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

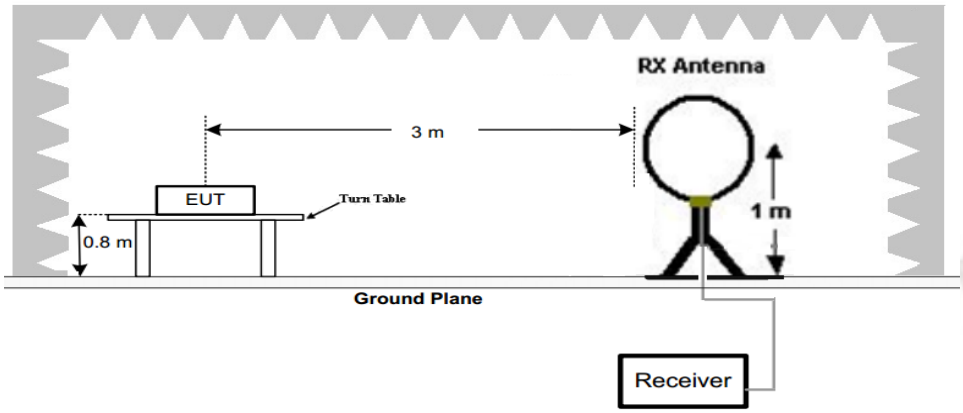
In addition, radiated emissions which fall in the restricted bands, as defined in RSS-Gen section 8.10, must also comply with the radiated emission limits specified inRSS-Gen section 8.9

Radiated emission limits

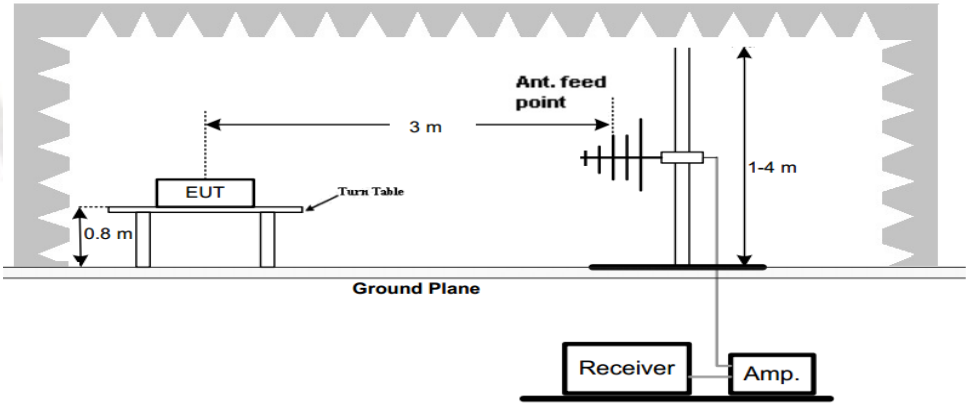
Frequency(MHz)	Distance(Meters)	Radiated(dBμV/m)	Radiated(μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

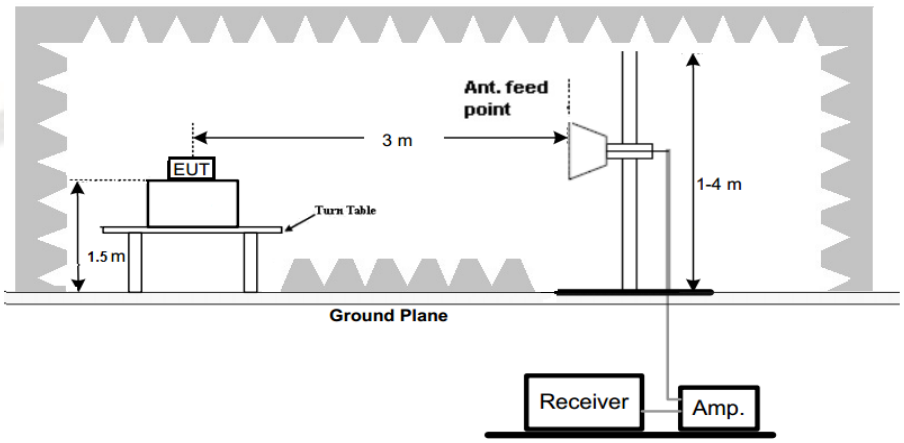
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



Test Procedure

1. Below 1GHz measurement the EUT is placed on a turntablewhich is 0.8m above ground plane, and above 1GHz measurementEUT was placed on alow permittivity and low loss tangent turn table which is 1.5m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 9KHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Bilog Antenna	3
1GHz-18GHz	Horn Antenna	3
18GHz-25GHz	Horn Anternna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

TEST RESULTS

Remark:
1. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and The emission levels from 9kHz to 30MHz are attenuated 20dB below the limit and not recorded in report.
2. For 30MHz to 1GHz measurement all modes were tested; only the worst result of antenna 1 test mode 1 was reported as below.

For 30MHz-1GHz

Test mode:	1	Polarization:	Horizontal

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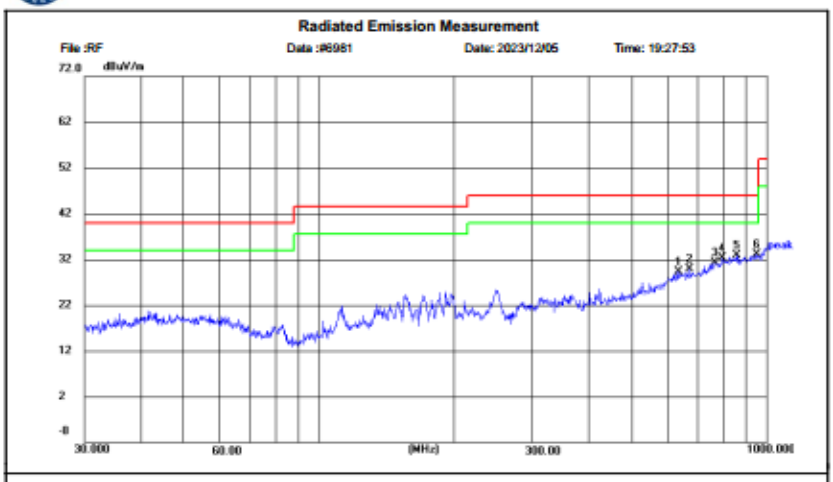

Site LAB Chamber 2
Limit: FCC Part15 RE-Class C_30-1000MHz
EUT: /
M/N: EC-UHF-A-6
Mode: 902.75MHz
Note: EC-LINK Automation (Shenzhen) Co. Ltd.

Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	636.1340	7.34	22.03	29.37	46.00	16.63	peak	100	135	P	
2	670.4892	7.94	22.00	29.94	46.00	16.06	peak	100	279	P	
3	766.0571	7.13	24.20	31.33	46.00	14.67	peak	100	351	P	
4	796.1829	7.36	24.88	32.24	46.00	13.76	peak	100	306	P	
5	857.0246	7.26	25.63	32.89	46.00	13.11	peak	100	243	P	
6	948.7609	6.72	26.34	33.06	46.00	12.94	peak	100	109	P	

Test mode:	1	Polarization:	Vertical

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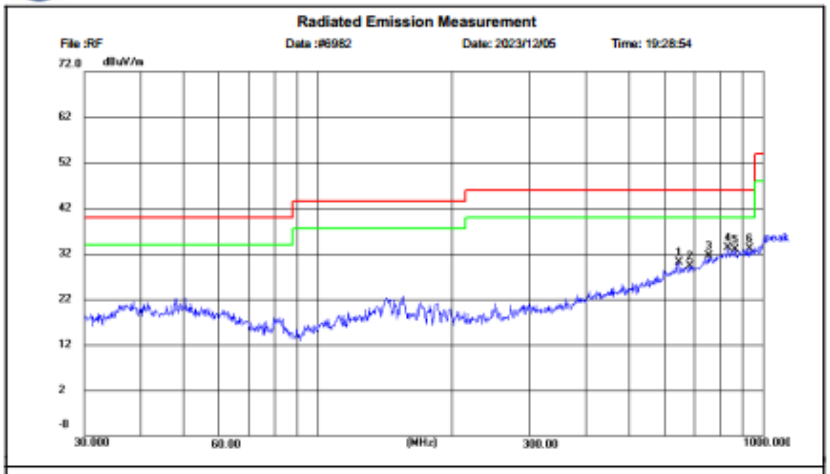


Site LAB Chamber 2
Limit: FCC Part15 RE-Class C_30-1000MHz
EUT: /
M/N: EC-UHF-A-6
Mode: 902.75MHz
Note: EC-LINK Automation (Shenzhen) Co. Ltd.

Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	645.1195	8.15	21.97	30.12	46.00	15.88	peak	100	18	P	
2	684.7454	7.21	22.12	29.33	46.00	16.67	peak	100	1	P	
3	755.3873	7.66	23.93	31.59	46.00	14.41	peak	100	179	P	
4	833.3171	8.04	25.20	33.24	46.00	12.76	peak	100	189	P	
5	866.0879	7.27	25.57	32.84	46.00	13.16	peak	100	89	P	
6	932.2715	6.71	26.32	33.03	46.00	12.97	peak	100	45	P	

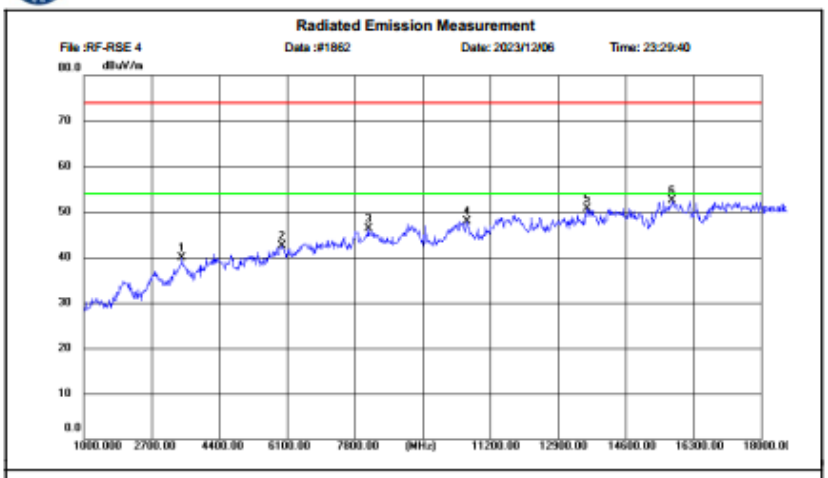
Remark: Level(dBuV/m)=Reading(dBuV)+Factor(dB/m)
Margin= Limit(dBuV/m)- Level(dBuV/m)

For 1GHz to 10GHz

Antenna 1

Test Frequency (MHz)	902.75	Polarization:	Horizontal

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part15 RE-Class C_Above 1GHz_PK
EUT:
M/N: EC-UHF-A-6
Mode: 902.75MHz TX
Note: EC-LINK Automation (Shenzhen) Co. Ltd.
1#

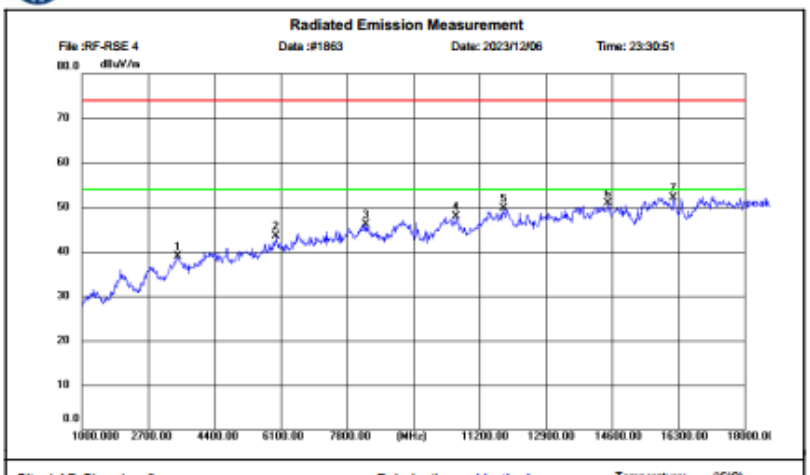
Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	3477.750	52.20	-12.24	39.96	74.00	34.04	peak	150	360	P	
2	5966.125	49.10	-6.53	42.57	74.00	31.43	peak	150	360	P	
3	8152.750	49.43	-3.17	46.26	74.00	27.74	peak	150	360	P	
4	10632.625	48.95	-0.95	48.00	74.00	26.00	peak	150	360	P	
5	13645.875	49.38	1.28	50.66	74.00	23.34	peak	150	360	P	
6	15783.625	49.45	2.97	52.42	74.00	21.58	peak	150	360	P	

Test Frequency (MHz)	902.75	Polarization:	Vertical

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part15 RE-Class C_Above 1GHz_PK
EUT:
M/N: EC-UHF-A-6
Mode: 902.75MHz TX
Note: EC-LINK Automation (Shenzhen) Co. Ltd.
1#

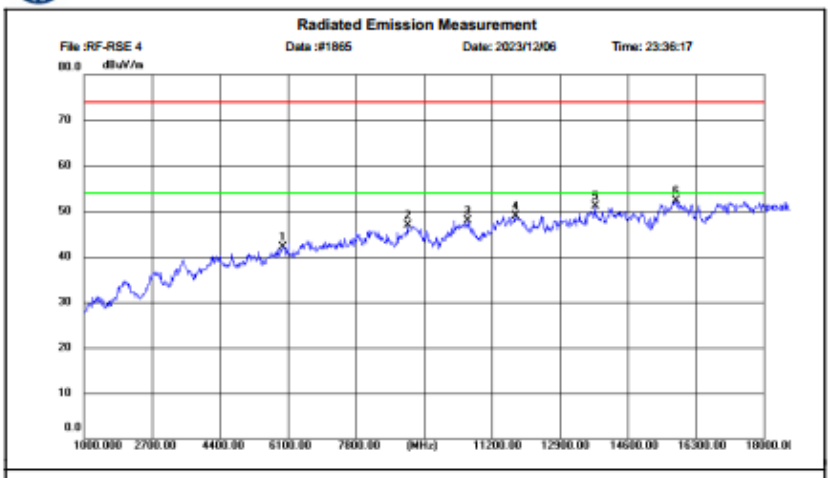
Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	3454.375	51.24	-12.34	38.90	74.00	35.10	peak	150	0	P	
2	5974.625	50.06	-6.50	43.56	74.00	30.44	peak	150	0	P	
3	8307.875	49.09	-2.90	46.19	74.00	27.81	peak	150	0	P	
4	10617.750	49.75	-1.77	47.98	74.00	26.02	peak	150	0	P	
5	11843.875	49.21	0.57	49.78	74.00	24.22	peak	150	0	P	
6	14506.500	49.43	1.55	50.98	74.00	23.02	peak	150	0	P	
7	16193.750	48.98	3.12	52.10	74.00	21.90	peak	150	0	P	

Test Frequency (MHz)	915.25	Polarization:	Horizontal

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part15 RE-Class C_Above 1GHz_PK
EUT:
M/N: EC-UHF-A-6
Mode: 915.25MHz TX
Note: EC-LINK Automation (Shenzhen) Co. Ltd.
1#

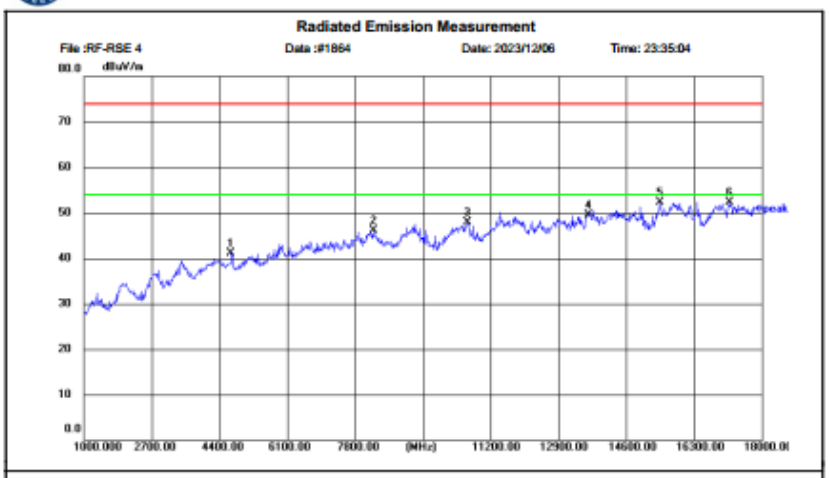
Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	5966.125	48.59	-6.53	42.06	74.00	31.94	peak	150	0	P	
2	9102.625	47.98	-1.08	46.90	74.00	27.10	peak	150	0	P	
3	10619.875	48.79	-0.95	47.84	74.00	26.16	peak	150	0	P	
4	11799.250	48.39	0.60	48.99	74.00	25.01	peak	150	0	P	
5	13788.250	49.77	1.33	51.10	74.00	22.90	peak	150	0	P	
6	15807.000	49.23	3.04	52.27	74.00	21.73	peak	150	0	P	

Test Frequency (MHz)	915.25	Polarization:	Vertical

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part15 RE-Class C_Above 1GHz_PK
EUT:
M/N: EC-UHF-A-6
Mode: 915.25MHz TX
Note: EC-LINK Automation (Shenzhen) Co. Ltd.
1#

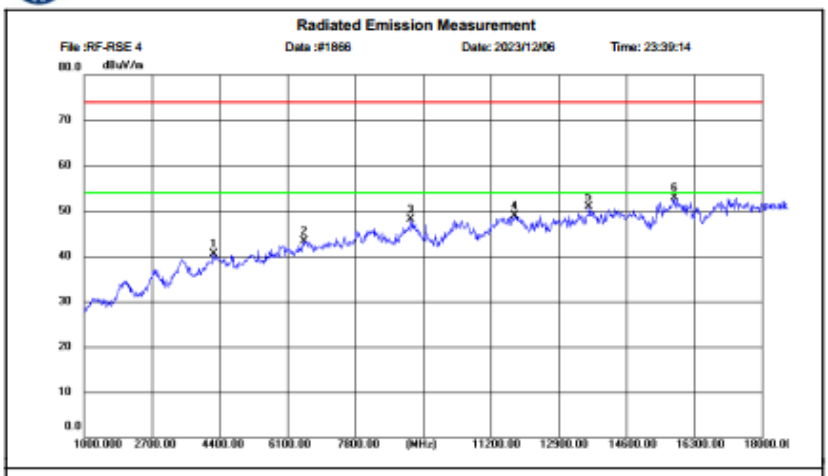
Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4697.500	50.12	-8.92	41.20	74.00	32.80	peak	150	360	P	
2	8269.625	49.00	-2.94	46.06	74.00	27.94	peak	150	360	P	
3	10632.625	49.49	-1.62	47.87	74.00	26.13	peak	150	360	P	
4	13662.875	48.19	1.29	49.48	74.00	24.52	peak	150	360	P	
5	15450.000	50.03	2.28	52.31	74.00	21.69	peak	150	360	P	
6	17203.125	47.92	4.41	52.33	74.00	21.67	peak	150	360	P	

Test Frequency (MHz)	927.25	Polarization:	Horizontal

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part15 RE-Class C_Above 1GHz_PK
EUT:
M/N: EC-UHF-A-6
Mode: 927.25MHz TX
Note: EC-LINK Automation (Shenzhen) Co. Ltd.
1#

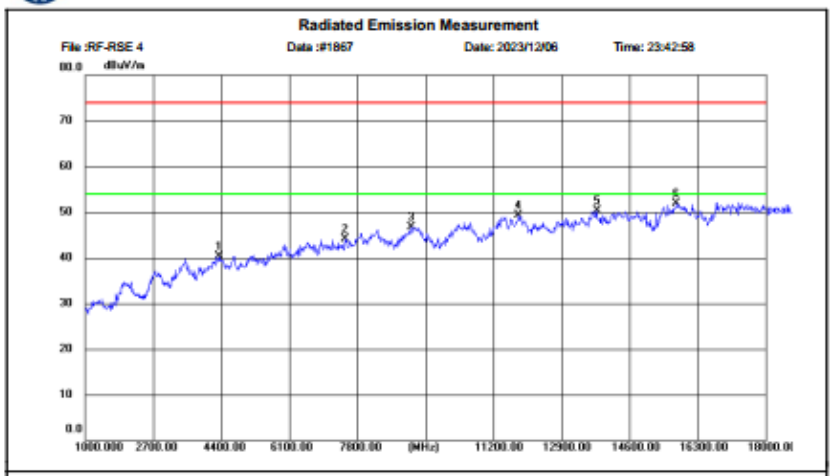
Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4249.125	50.44	-10.02	40.42	74.00	33.58	peak	150	360	P	
2	6531.375	48.30	-5.01	43.29	74.00	30.71	peak	150	360	P	
3	9200.375	49.15	-1.14	48.01	74.00	25.99	peak	150	360	P	
4	11797.125	48.22	0.60	48.82	74.00	25.18	peak	150	360	P	
5	13871.375	49.70	1.30	51.00	74.00	23.00	peak	150	360	P	
6	15815.500	49.80	3.08	52.88	74.00	21.12	peak	150	360	P	

Test Frequency (MHz)	927.25	Polarization:	Vertical

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part15 RE-Class C_Above 1GHz_PK
EUT:
M/N: EC-UHF-A-6
Mode: 927.25MHz TX
Note: EC-LINK Automation (Shenzhen) Co. Ltd.
1#

Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4359.625	49.94	-9.63	40.31	74.00	33.69	peak	150	0	P	
2	7494.000	47.91	-3.85	44.06	74.00	29.94	peak	150	0	P	
3	9155.750	47.91	-1.11	46.80	74.00	27.20	peak	150	0	P	
4	11839.625	48.79	0.57	49.36	74.00	24.64	peak	150	0	P	
5	13788.250	48.92	1.33	50.25	74.00	23.75	peak	150	0	P	
6	15785.750	48.90	2.98	51.88	74.00	22.12	peak	150	0	P	

REMARKS: 1. Margin value = Limit value- Emission level.
2. RBW1MHz VBW3MHz Peak detector is for PK value;RBW 1MHz VBW10Hz Peakdetector is for AV value.

3.3. Maximum Conducted Output Power

Limit

The Maximum Peak Output Power limit is 30dBm.

Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power Meter.

Test Configuration

Test Results

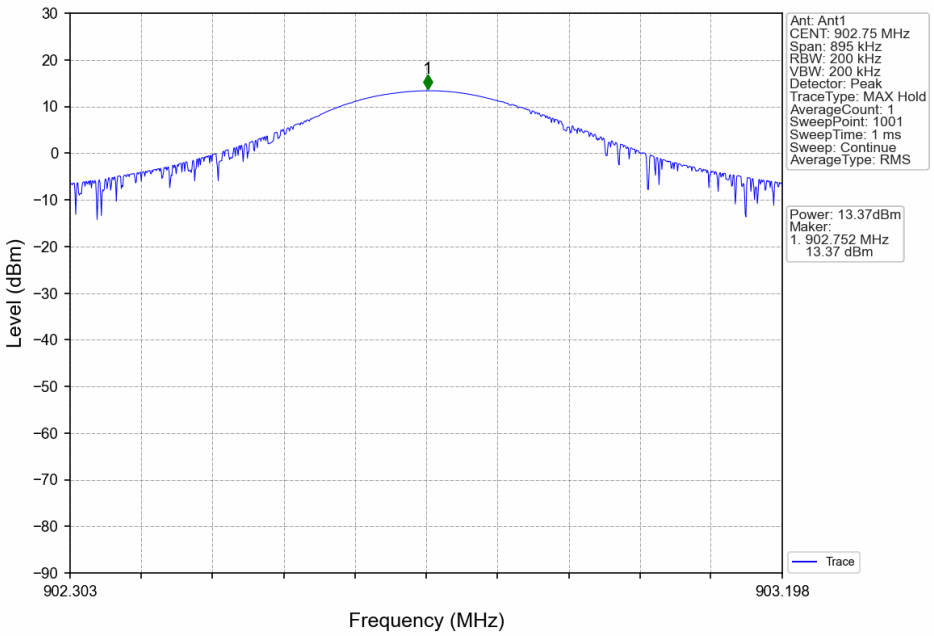
Antenna 1

Channel Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power Limit (dBm)	Result
902.75	13.37	30	PASS
915.25	12.85	30	PASS
927.25	12.41	30	PASS

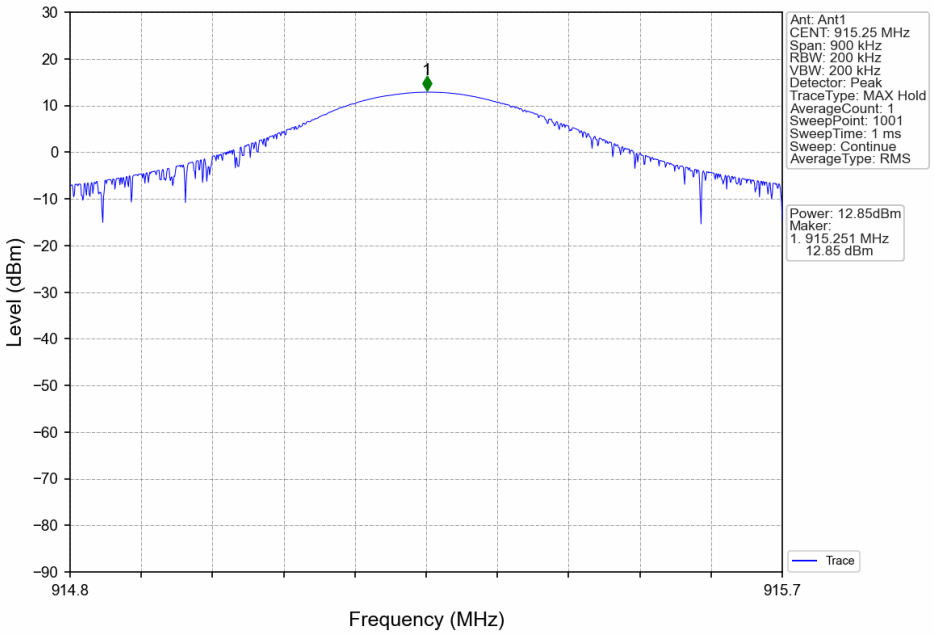
Test Graphs

Antenna 1

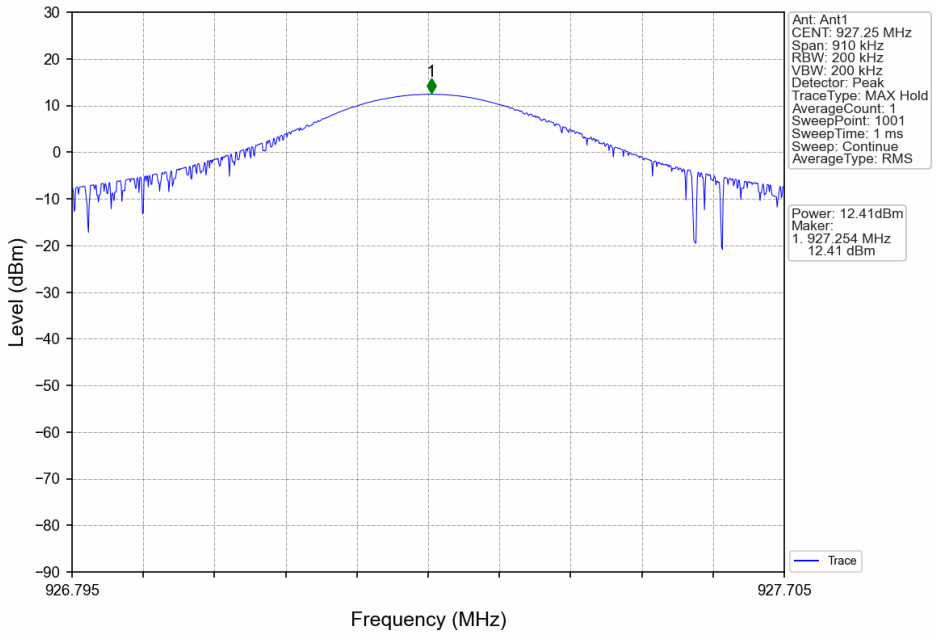
902.75MHz



915.25MHz



927.25MHz


Ant: Ant1
CENT: 927.25 MHz
Span: 910 kHz
RBW: 200 kHz
VBW: 200 kHz
Detector: Peak
TraceType: MAX Hold
AverageCount: 1
SweepPoint: 1001
SweepTime: 1 ms
Sweep: Continue
AverageType: RMS
Power: 12.41dBm
Maker:
1. 927.254 MHz
12.41 dBm
Trace
Level (dBm)
Frequency (MHz)
926.795
927.705
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90

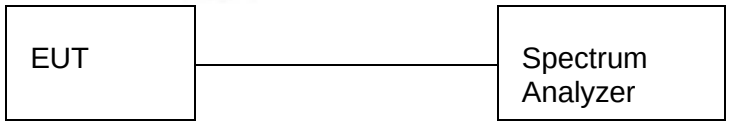
3.4. 20dB Bandwidth

Test Procedure

According to ANSI C63.10: 2013. Use the following spectrum analyzer settings: Span = approximately 2 to 3 times the 20dB bandwidth, centered on a hopping channelRBW ≧ 1% of the 20dB bandwidth, VBW ≧ RBW, Sweep = auto, Detector function = peak, Trace = max holdThe EUT should be transmitting at its maximum data rate. Allow the trace to stabilize.

Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation..

Test Configuration



Test Results

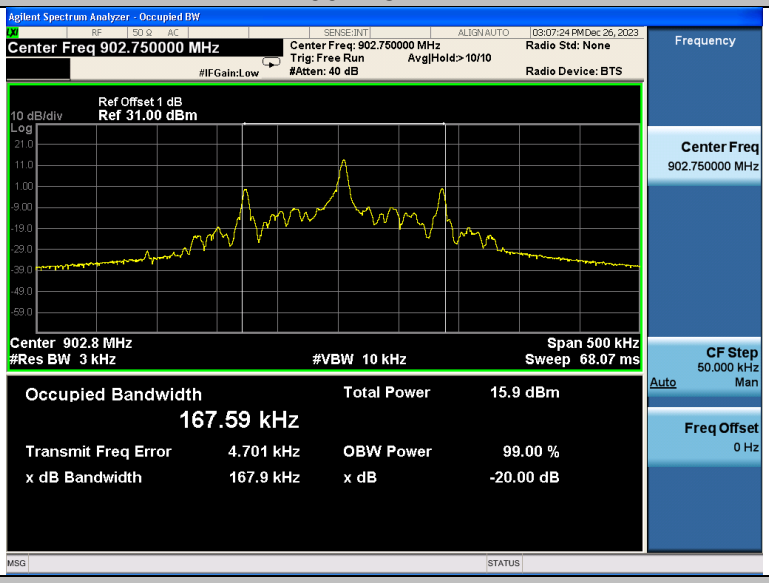
Antenna 1

Channel Frequency (MHz)	20dB Bandwidth (KHz)	Limit (KHz)	Result
902.75	167.9	/	PASS
915.25	167.8	/	PASS
927.25	168.0	/	PASS

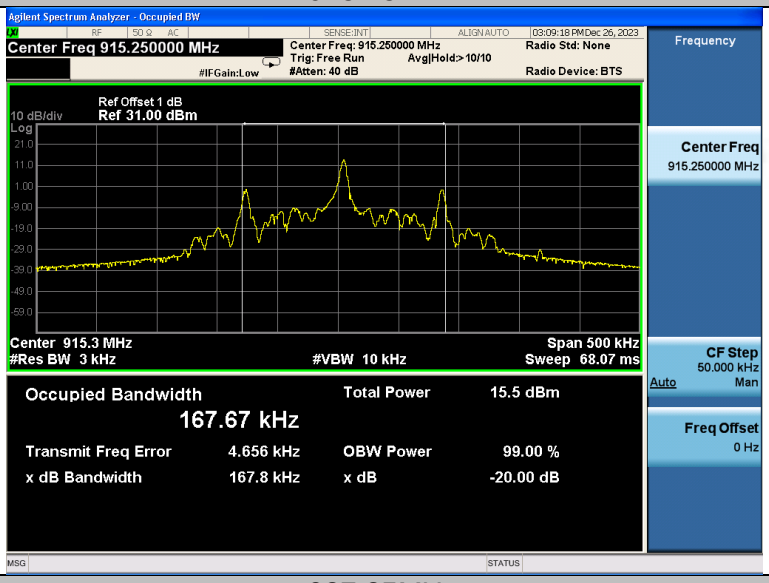
Test Graphs

Antenna 1

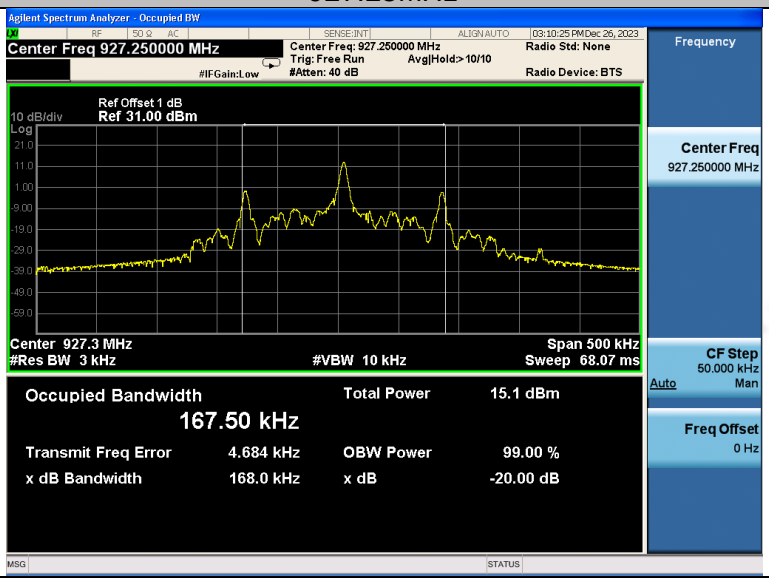
902.75MHz



915.25MHz



927.25MHz



3.5. Frequency Separation

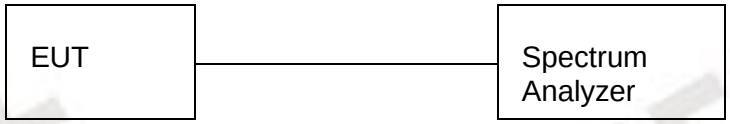
Limit

Per 15.247 (a)(1) At least 25 KHz or 20 dB bandwidth of the hopping Channel, whichever is greater.

Test Procedure

According to ANSI C63.10: 2013.
The EUT must have its hopping function enabled.
Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels
Resolution (or IF) Bandwidth (RBW) ≧ 1% of the span
Video (or Average) Bandwidth VBW ≧ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

Test Configuration



Test Results

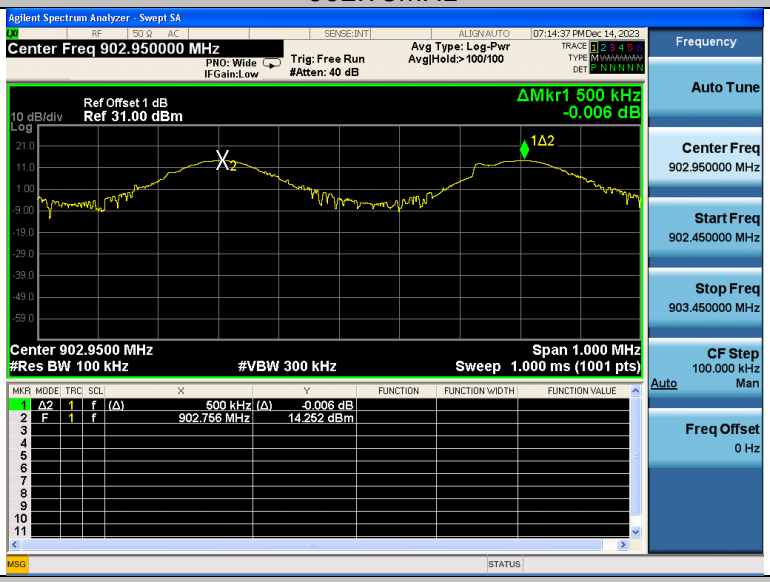
Antenna 1

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	902.75	0.500	0.025MHz or 20dB bandwidth	Pass
Middle Channel	915.25	0.500	0.025MHz or 20dB bandwidth	Pass
High Channel	927.25	0.500	0.025MHz or 20dB bandwidth	Pass

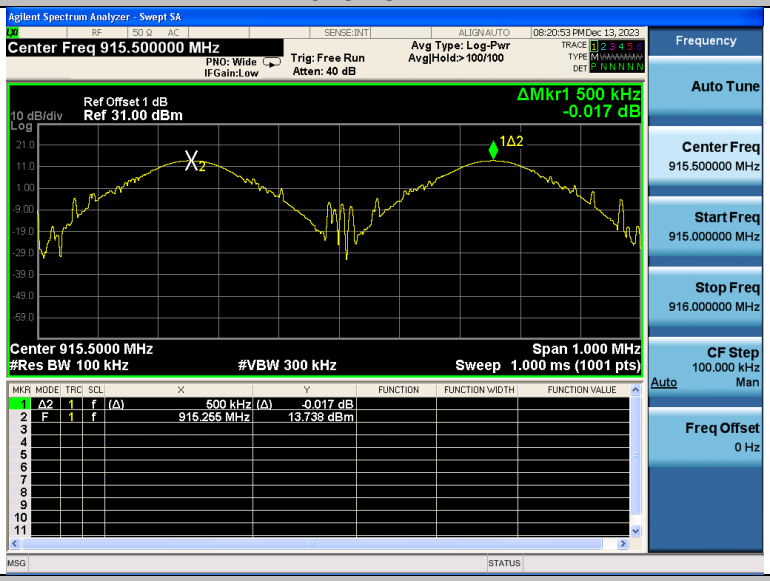
Test Graphs

Antenna 1

902.75MHz



915.25MHz



927.25MHz

3.6. Number of hopping frequency

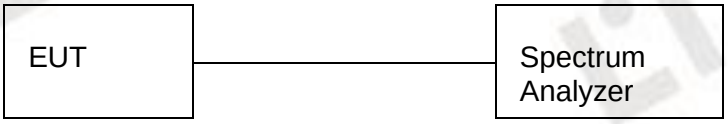
Limit

if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

Test Procedure

According to ANSI C63.10: 2013.
The EUT must have its hopping function enabled.
Use the following spectrum analyzer settings:
Span = the frequency band of operation
RBW ≧ 1% of the span
VBW ≧ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize. It may prove necessary to bread the span up to sections, in order to clearly show all of the hopping frequencies.

Test Configuration

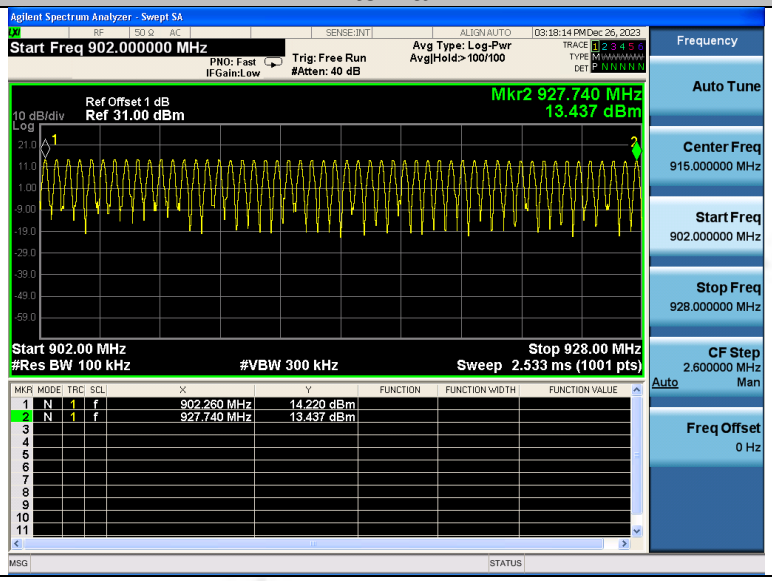


Test Results

Antenna	Hopping Channel Frequency Range (MHz)	Number of Hopping Channel	Limit
1	902-928	50	≥50

Test Graphs

Antenna 1



3.7. Time Of Occupancy(Dwell Time)

Limit

if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

Test Procedure

According to ANSI C63.10: 2013.

The EUT must have its hopping function enabled.

Use the following spectrum analyzer settings:

Span = zero span, centered on a hopping channel

RBW = 1MHz

VBW ≧ RBW

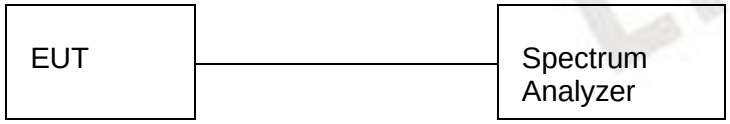
Sweep = as necessary to capture the entire dwell time per hopping channel

Detector function = peak

Trace = max hold

If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

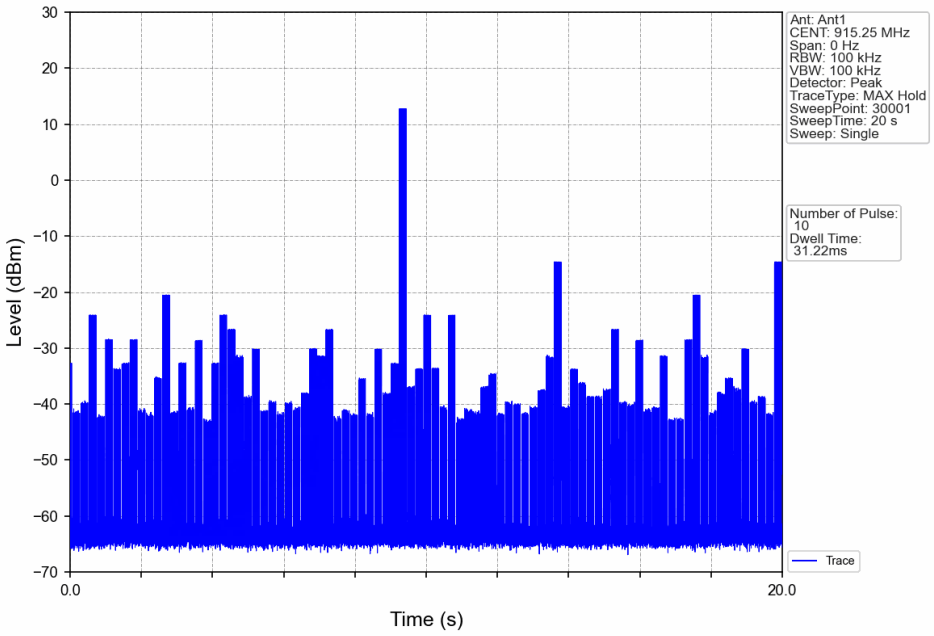
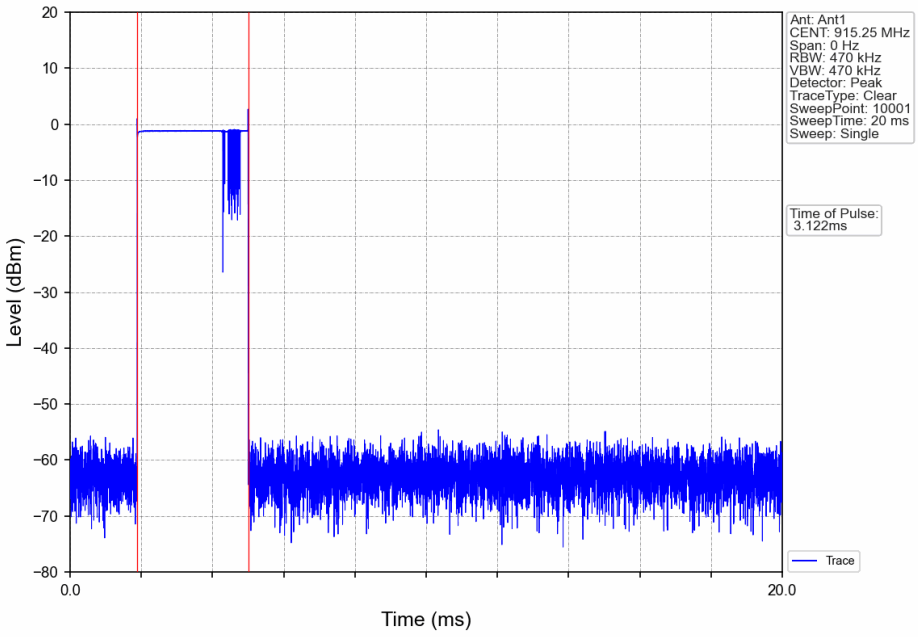
Test Configuration



Test Results

Antenna	Frequency (MHz)	No. of burst	Pulse Width (ms)	Dwell Time (ms)	Limit (ms)	Result
1	915	10	3.122	31.22	<=400	Pass

Test Graphs

Antenna 1



3.8. Spurious RF Conducted Emissions and bandedge

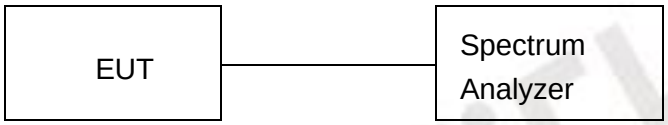
Limit

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 con-ducted or a radiated measurement, pro-vided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter com-plies 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.

Test Procedure

Connect the transmitter output to spectrum analyzer using a low loss RF cable and set the spectrum analyzer to RBW=100 kHz, VBW= 300 kHz, peak detector, and max hold. Measurements utilizing these setting are made of the in-band reference level, bandedge and out-of-band emissions.

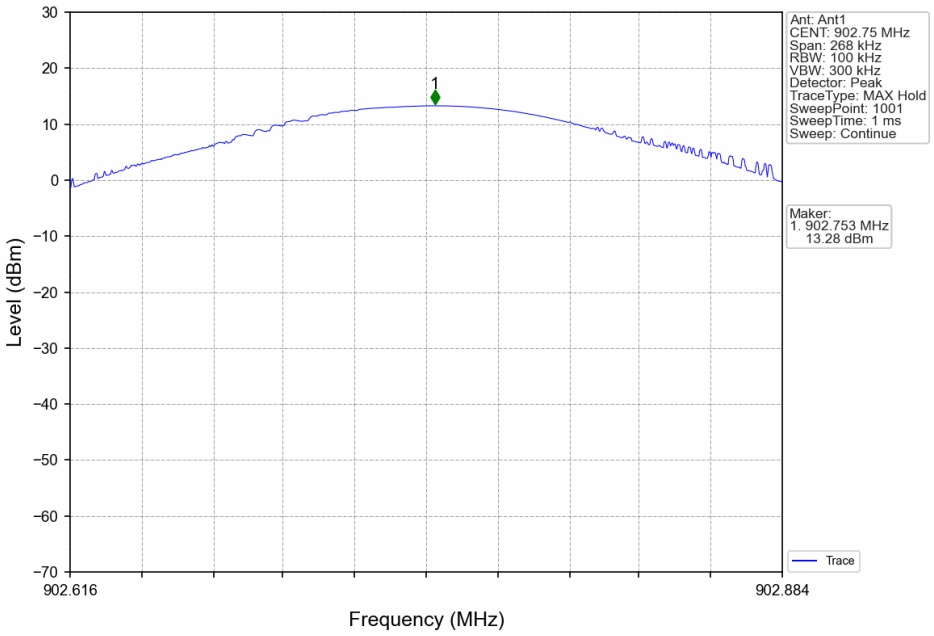
Test Configuration

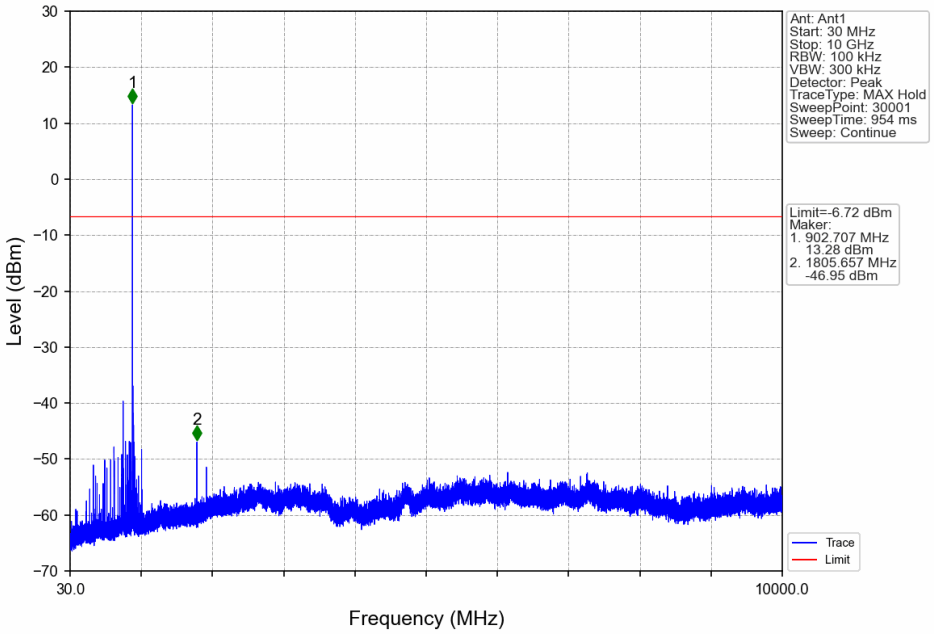


Test Results

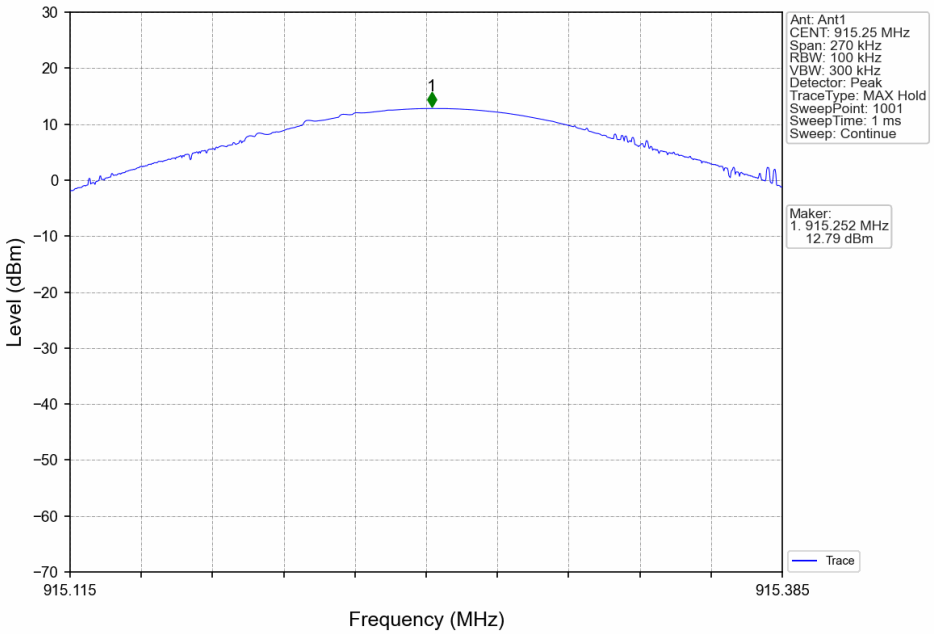
Antenna 1

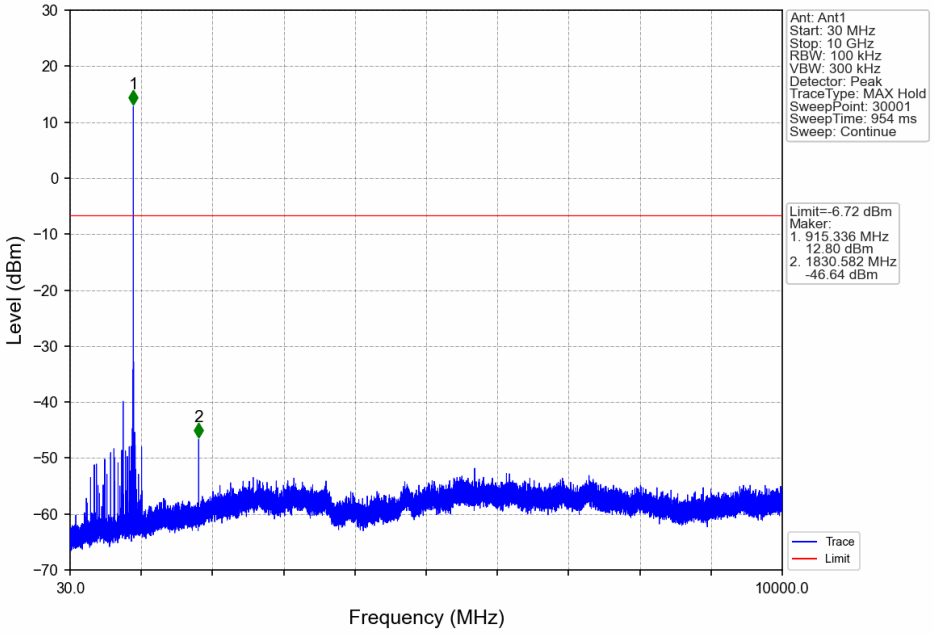
902.75MHz



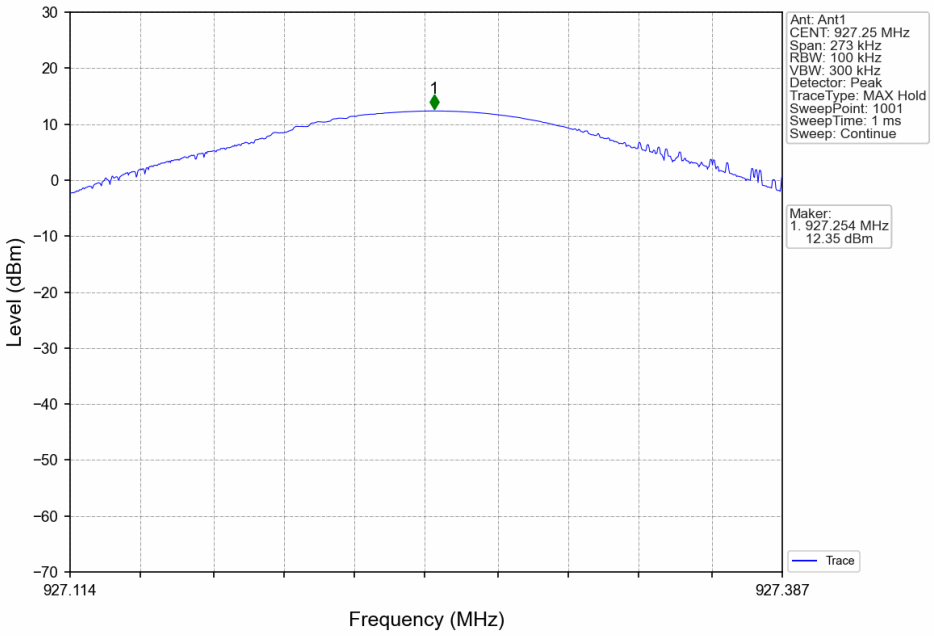


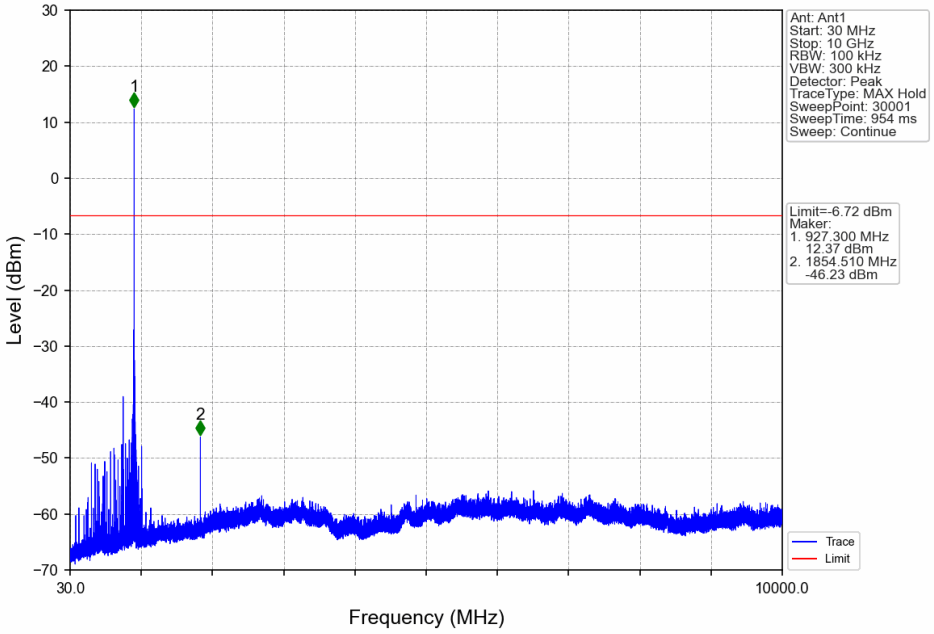
915.25MHz


Ant: Ant1
CENT: 915.25 MHz
Span: 270 kHz
RBW: 100 kHz
VBW: 300 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 1001
SweepTime: 1 ms
Sweep: Continue
Maker:
1. 915.252 MHz
12.79 dBm
Trace
Level (dBm)
Frequency (MHz)
915.115
915.385


Ant: Ant1
Start: 30 MHz
Stop: 10 GHz
RBW: 100 kHz
VBW: 300 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 30001
SweepTime: 954 ms
Sweep: Continue
Limit=-6.72 dBm
Maker:
1. 915.336 MHz
12.80 dBm
2. 1830.582 MHz
-46.64 dBm
Trace
Limit
Level (dBm)
Frequency (MHz)
30.0
10000.0

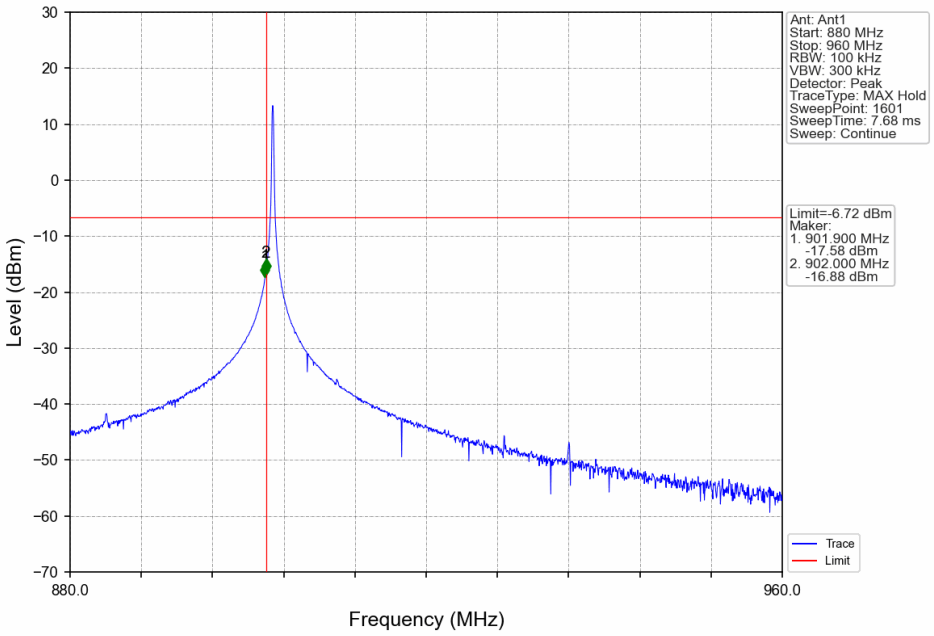
927.25MHz


Ant: Ant1
CENT: 927.25 MHz
Span: 273 kHz
RBW: 100 kHz
VBW: 300 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 1001
SweepTime: 1 ms
Sweep: Continue
Maker:
1. 927.254 MHz
12.35 dBm
Trace
Level (dBm)
Frequency (MHz)
927.114
927.387

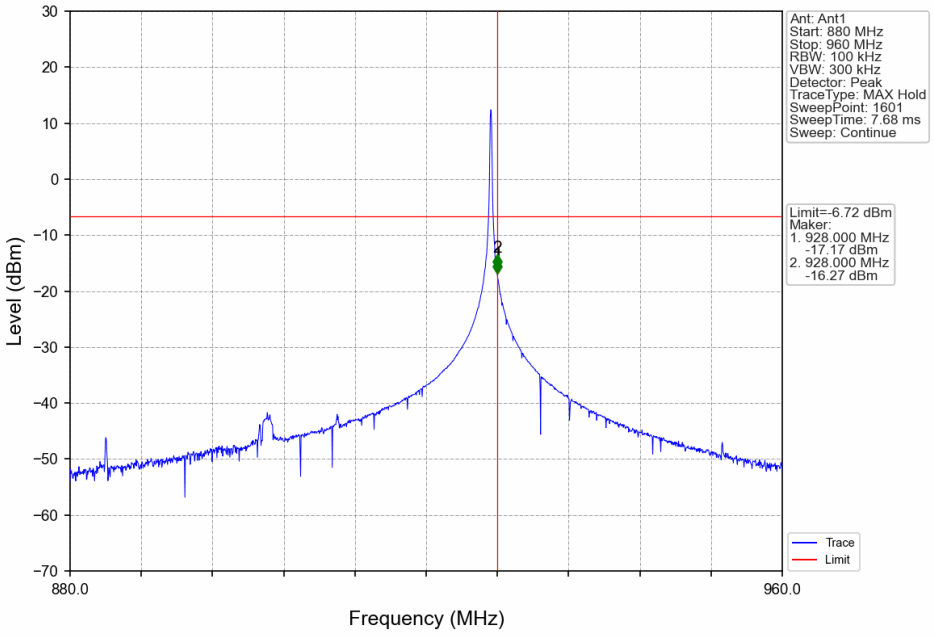

Ant: Ant1
Start: 30 MHz
Stop: 10 GHz
RBW: 100 kHz
VBW: 300 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 30001
SweepTime: 954 ms
Sweep: Continue
Limit=-6.72 dBm
Maker:
1. 927.300 MHz
12.37 dBm
2. 1854.510 MHz
-46.23 dBm
Trace
Limit
Level (dBm)
Frequency (MHz)
30.0
10000.0

Band edge measurements

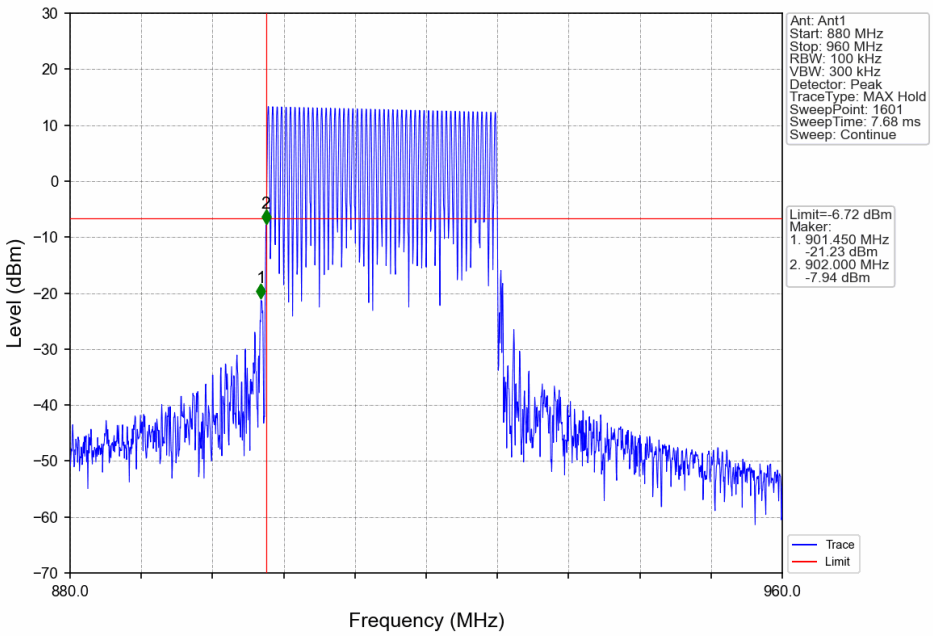
Ant1_Low_902.75MHz



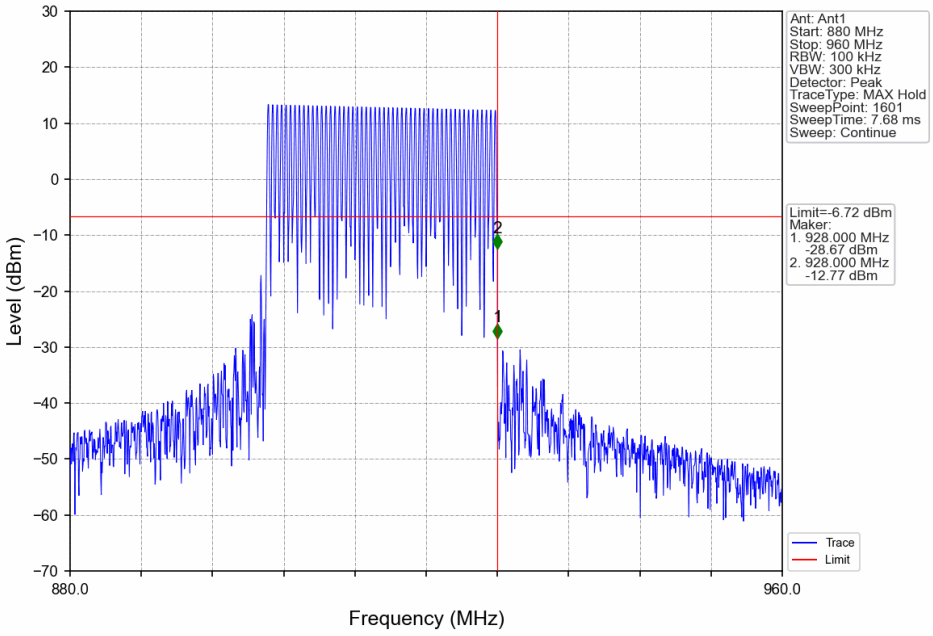
Ant1_High_927.25MHz



Ant1_Low_Hopping



Ant1_ High _Hopping



3.9. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203:

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

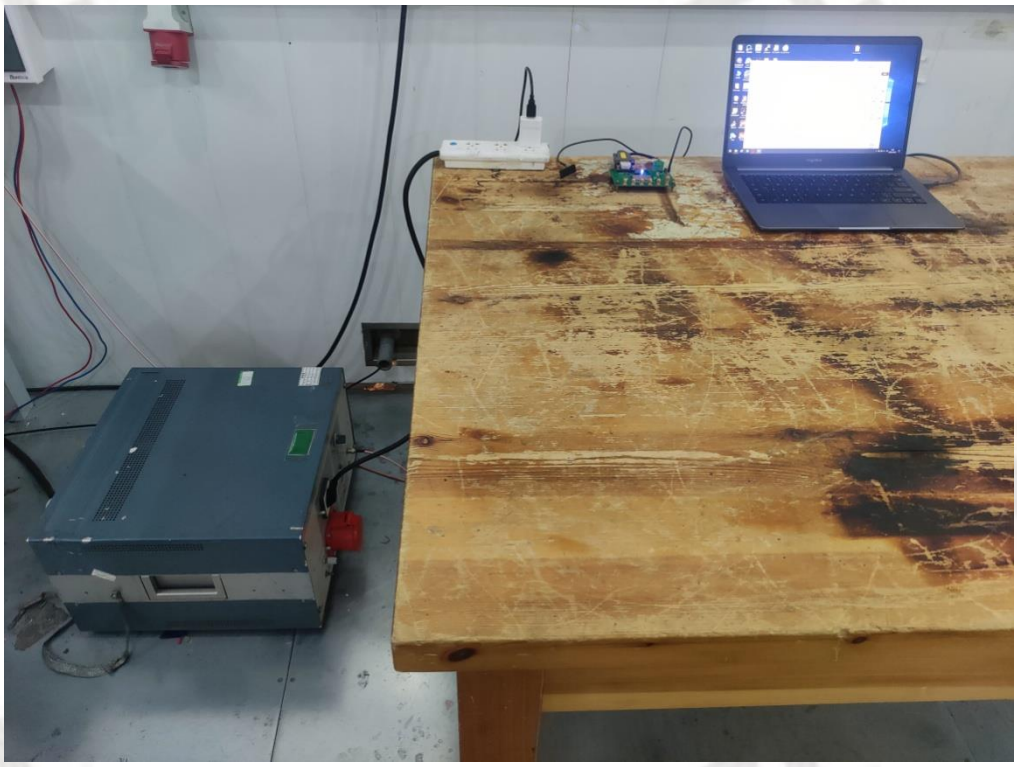
FCC CFR Title 47 Part 15 Subpart C Section 15.247(b)(4):

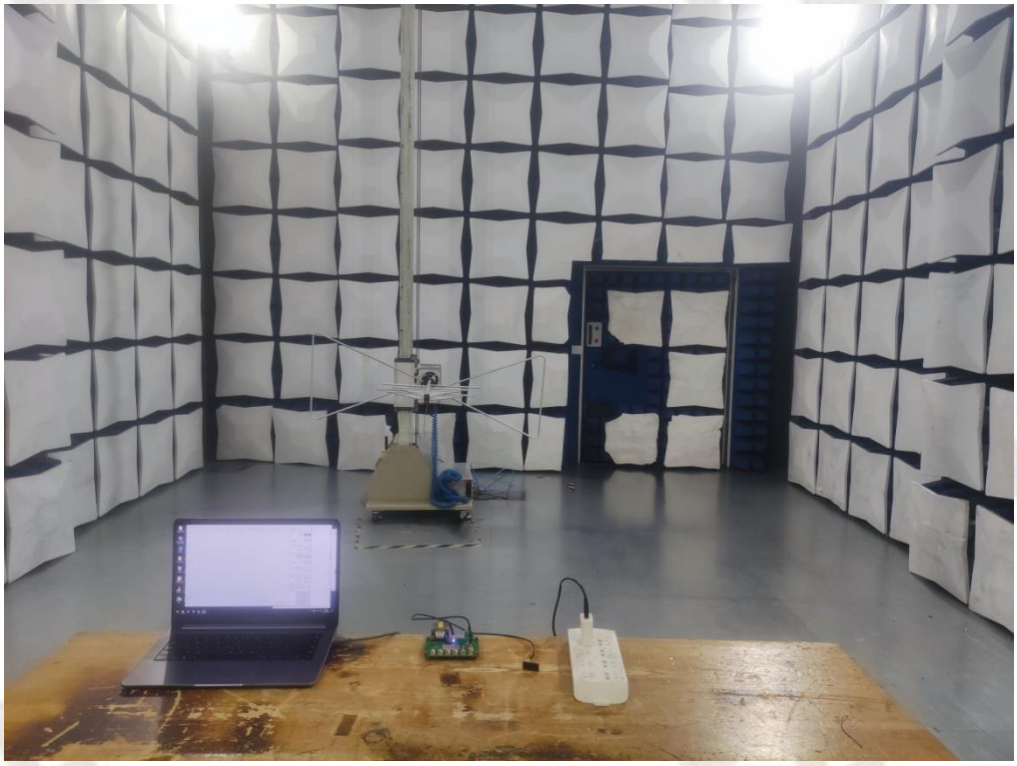
The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output 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.

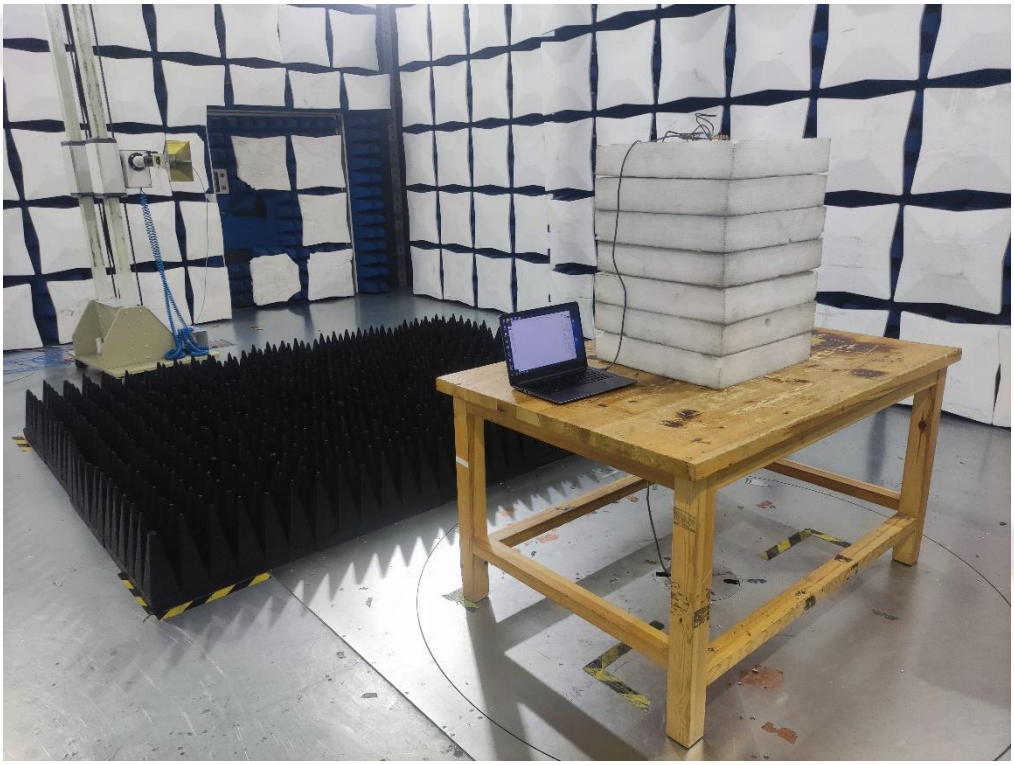
Test Result:

The maximum antenna gain is -28.41dBi.

4. Test Setup Photos of the EUT

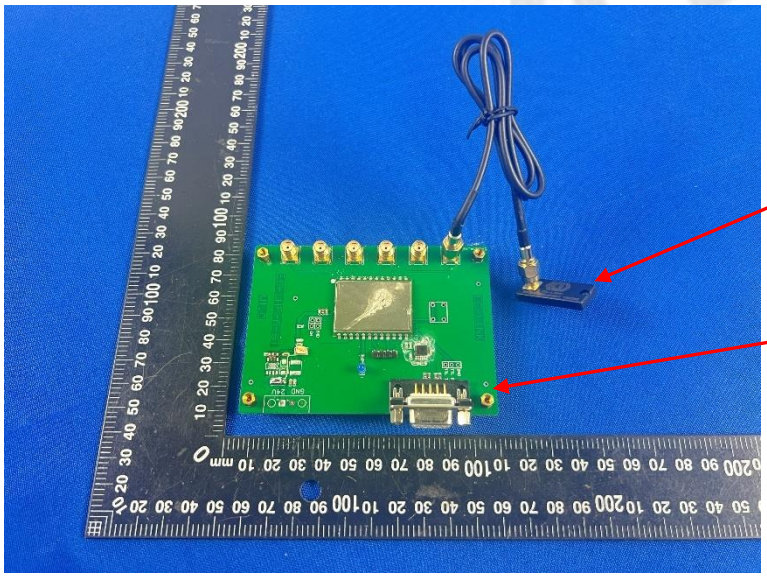


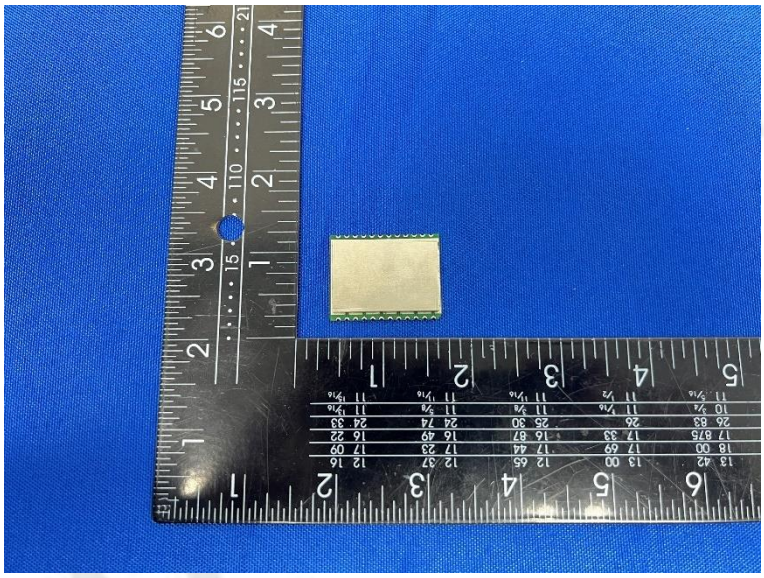


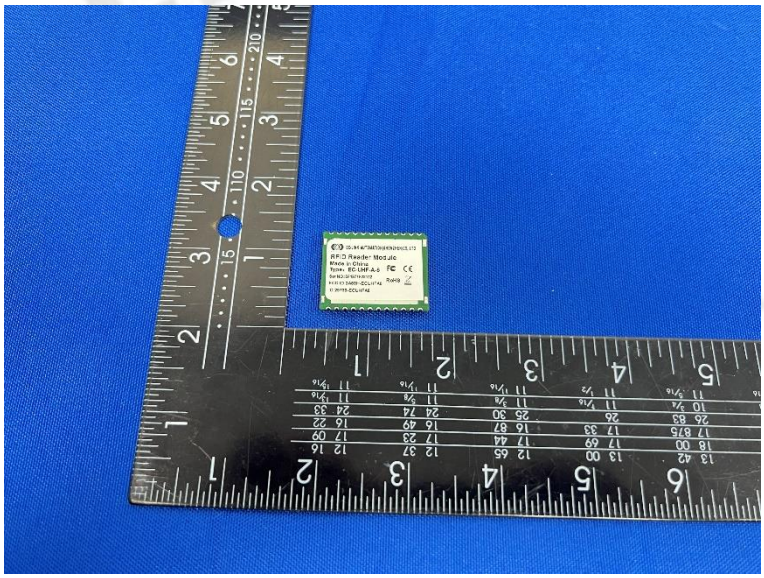


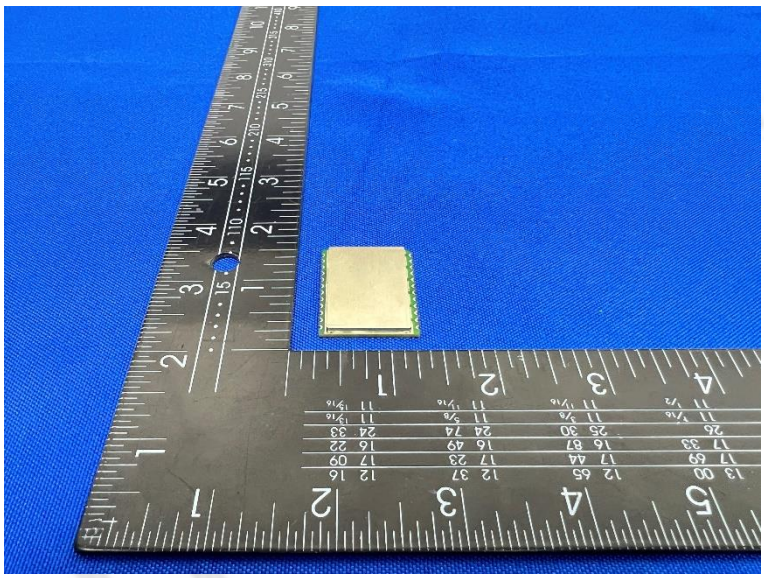
5. Photos of the EUT

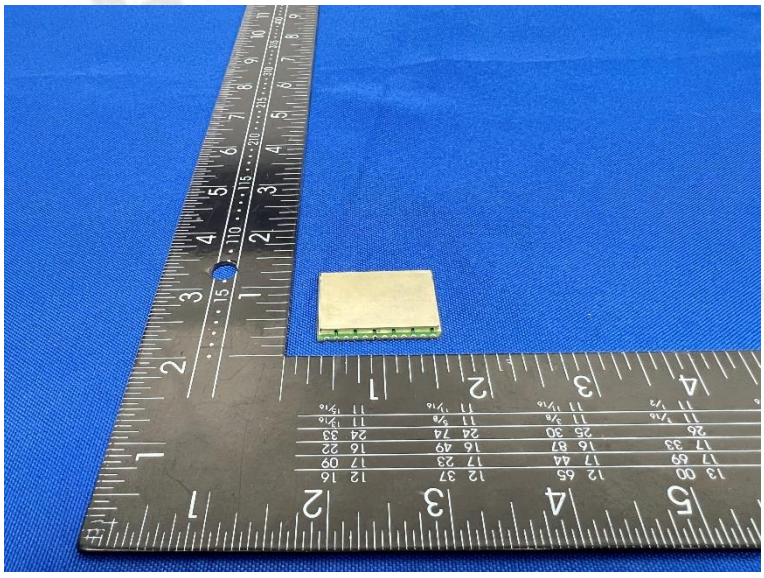
External Photos of EUT

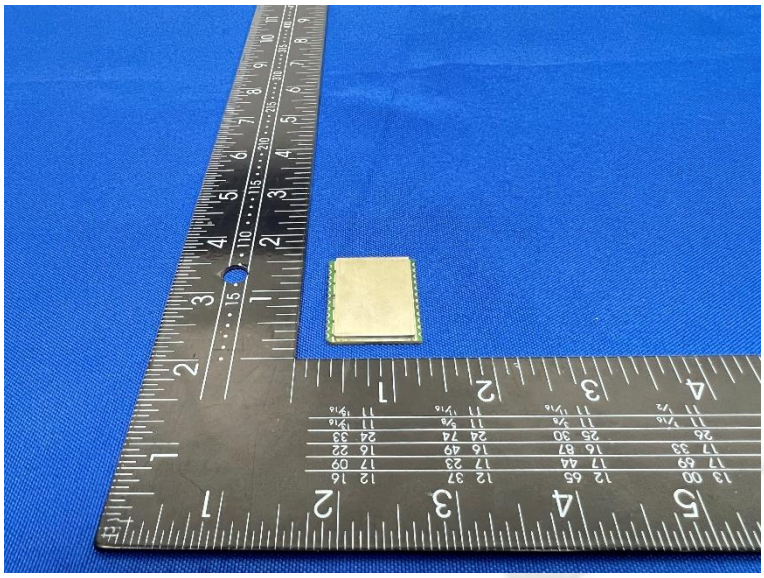


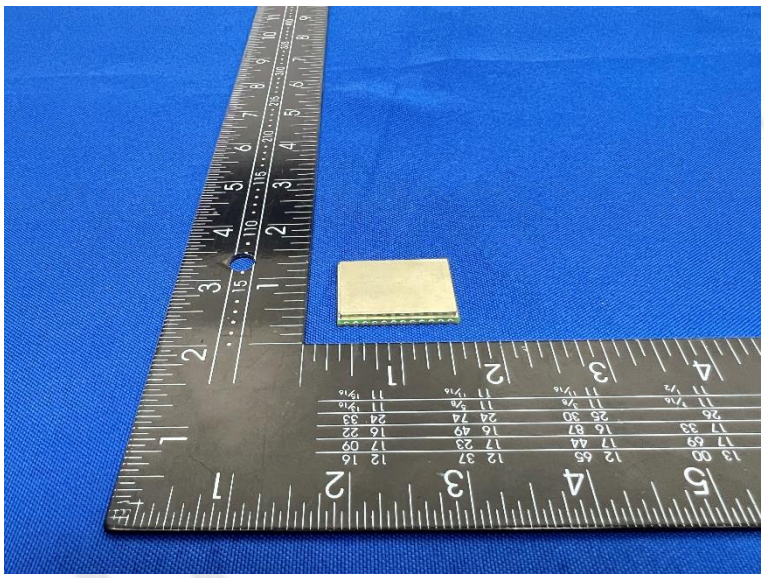




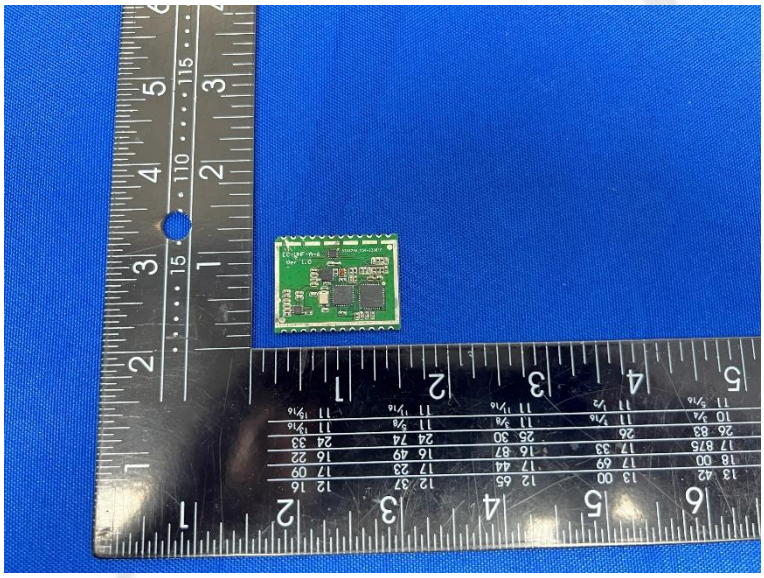


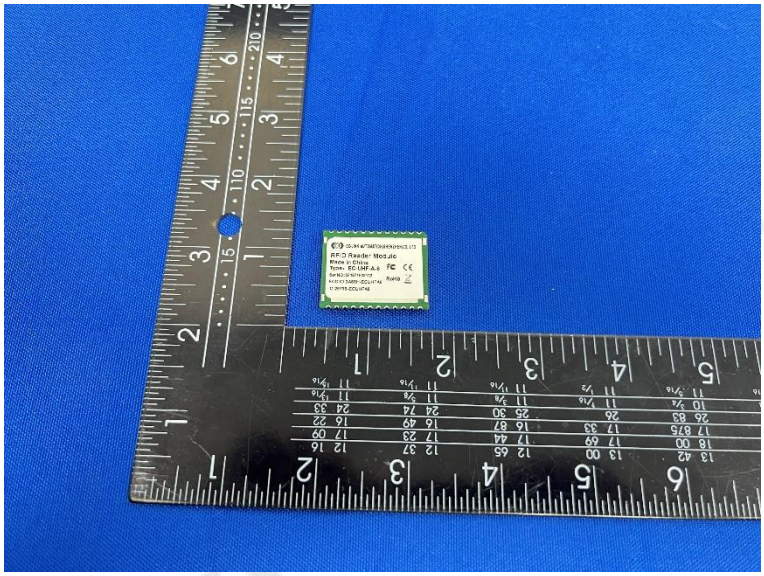






Internal Photos of EUT





************************End of Report*************************