TEST REPORT

FCC ID: 2A8M4-DS05

Product	**:**	**Smark lock**
Model Name	**:**	**DS05, DS01**
Brand	**:**	**N/A**
Report No.	**:**	**NCT26016494X1-1**

Prepared for

Zhongshan Pulido Intelligent Technology Co., Ltd

No.30, Taiyu Road, Jidong Second Industrial Zone, Xiaolan Town, Zhongshan City, China

Prepared by

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1 TEST RESULT CERTIFICATION

Applicant's name	:	Zhongshan Pulido Intelligent Technology Co., Ltd
Address	:	No.30, Taiyu Road, Jidong Second Industrial Zone, Xiaolan Town, Zhongshan City, China
Manufacture's name	:	Zhongshan Pulido Intelligent Technology Co., Ltd
Address	:	No.30, Taiyu Road, Jidong Second Industrial Zone, Xiaolan Town, Zhongshan City, China
Product name	:	Smark lock
Model name	:	DS05, DS01
Standards	:	FCC CFR47 Part 15 Section 15.247
Test procedure	:	ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024
Date of test	:	Jan. 20, 2026 to Jan. 21, 2026
Date of Issue	:	Feb.05, 2026

This device described above has been tested by NCT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Prepared by:

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Reviewer:

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Approved:

Henry Wang

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2 Test Summary

Test Items	Test Requirement	Result
Conduct Emission	FCC part 15.207	N/A
Radiated Spurious Emissions	FCC part 15.205/15.209	PASS
Conducted Spurious Emission	FCC part 15. 247(d)	PASS
Band edge	FCC part 15.247(d)	PASS
6dB&99% Bandwidth	FCC part 15.247 (a)(2)	PASS
Maximum Peak Output Power	FCC part 15.247 (b)(3)	PASS
Power Spectral Density	FCC part 15.247 (e)	PASS
Antenna Requirement	FCC part 15.203/15.247 (c)	PASS

Remark:

1. “N/A” denotes test is not applicable in this Test Report.

2.1 Test Site

Site Description

EMC Lab.	:	Accredited by CNAS, 2022-09-27
		The certificate is valid until 2028.01.07
		The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2017)
		The Certificate Registration Number is L8251
		Designation Number: CN1347
		Test Firm Registration Number: 894804
		Accredited by A2LA, June 14, 2023
		The Certificate Registration Number is 6837.01
		Accredited by Industry Canada, November 09, 2018
		The Conformity Assessment Body Identifier is CN0150
		Company Number: 30806
Name of Firm	:	Shenzhen NCT Testing Technology Co., Ltd.
Site Location	:	A101,B2,Fuqiao 6th Area ,xintian Community,Fuhai Street,Baoan District,Shenzhen,China

3 General Information

3.1 General Description of E.U.T.

Product Name	:	Smark lock
Model Name	:	DS05
Sample ID	:	NCT26016494X-0001
Sample(s) Status:	:	Engineer sample
Series Model	:	DS01
Model Different.:	:	There is no difference except for the appearance, shape and model name. So all the test were performed on the model DS05.
Operating frequency	:	2402-2480MHz
Number of Channels	:	40 channels
Type of Modulation	:	GFSK
Rate	:	1M & 2M
Antenna installation	:	FPC Antenna
Antenna Gain	:	3.69 dBi
Power supply	:	DC 6V From Battery, DC 5V From Type-C for Emergency Mode
Hardware Version	:	V1.0
Software Version	:	V1.0
Remark：the Antenna gain is provided by customer from Antenna spec. and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant.		

3.2 Channel List

The EUT has been tested under its typical operating condition. Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting. Only the worst case data were reported.

The EUT has been associated with peripherals pursuant to ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation (9 KHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

The details of test channels and bandwidth were for RF conductive measurement.

Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	**2402**	14	2430	28	2458
01	2404	15	2432	29	2460
02	2406	16	2434	30	2462
03	2408	17	2436	31	2464
04	2410	18	2438	32	2466
05	2412	**19**	**2440**	33	2468
06	2414	20	2442	34	2470
07	2416	21	2444	35	2472
08	2418	22	2446	36	2474
09	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	**2480**
12	2426	26	2454		
13	2428	27	2456		

Note:

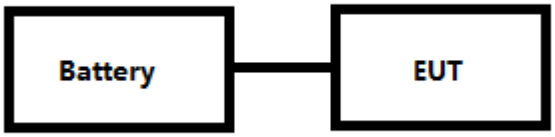
1. Test of channel was included the lowest, middle and highest frequency in highest data rate and to perform the test, then record on this report.

Test Channel：

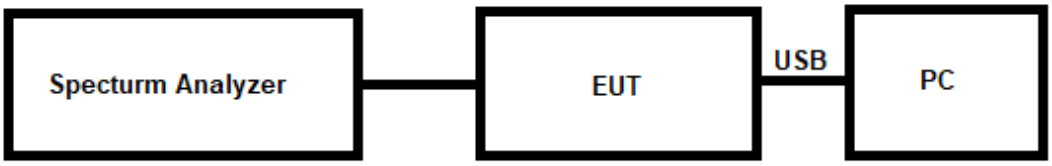
	Channel	Frequency(MHz)
Low Channel	0	2402
Mid Channel	19	2440
High Channel	39	2480

3.3 Test Setup Configuration

Radiated Emission



Conducted Emission



3.4 Test configuration

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

Test Software	beken Wi-Fi Test Tool V1.7.8.1
Power level setup	default power level

4 Equipment During Test

4.1 Equipments List

Conducted emission Test Equipment

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
944 Shielded Room	944 Room	/	EMToni	2025/1/17	2028/1/16
EMI Test Receiver	ESPI	101604	Rohde & Schwarz	2025/6/10	2026/6/09
limitator	ESH3-Z2	NA	Ronde&Schwaz	2025/6/10	2026/6/09
Attenuation	PCL-10dB	221126	HTEC	2025/6/10	2026/6/09
LISN	ENV 216	102796	Rohde & Schwarz	2025/6/10	2026/6/09
LISN	VN1-13S	004023	CRANAGE	2025/6/10	2026/6/09
Cable	RG223-1500MM	NA	RG	2025/6/10	2026/6/09

Radiated emission & Radio Frequency Test Equipment

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
966 Shielded Room	966 Room	/	EMToni	2025/1/17	2028/1/16
EMI Test Receiver	ESCI	101178	Rohde & Schwarz	2025/6/10	2026/6/09
Amplifi（30MHz-1GHz）	BBV 9743 B	00374	SCHWARZBECK	2025/6/10	2026/6/09
Bilog Antenna（30MHz-1GHz）	VULB9162	00473	SCHWARZBECK	2025/3/08	2026/3/07
Band Rejection Filter	BFCN-2450	KDT01052	CREDIT	2025/6/10	2026/6/09
Horn antenna（1GHz-18GHz）	BBHA 9120 D	02622	SCHWARZBECK	2025/3/10	2026/3/09
Pream plifier（1GHz-18GHz）	BBV 9718D	0024	SCHWARZBECK	2025/6/10	2026/6/09
Spectrum Analyze（10Hz-40GHz）	FSV 40	100952	Rohde & Schwarz	2025/6/10	2026/6/09
Pream plifier（18GHz-40GHz）	BBV 9721	0056	SCHWARZBECK	2025/6/10	2026/6/09

Double Ridge Guide Horn Antenna（18GHz-40GHz）	SAS-574	588	A.H.System	2025/3/10	2026/3/09
Loop Antenna (9KHz-30MHz)	FMZB1519B	014	SCHWARZBECK	2025/6/10	2026/6/09
Comprehensive tester	CWM500	104995	Rohde & Schwarz	2025/6/10	2026/6/09
Amplifier (9KHz-30MHz)	BBV 9745	00109	CHNWARZBECK	2025/6/10	2026/6/09
MXG Signal Analyzer	N9020A	MY50510202	Agilent	2025/6/10	2026/6/09
Power Sensor	TR1029-2	512364	Techoy	2025/6/10	2026/6/09
RF Swith	TR1029-1	512364	Techoy	2025/6/10	2026/6/09
limitator	ESH3-Z2	NA	Ronde&Schwaz	2025/3/10	2026/3/09
Attenuation	PCL-10dB	221126	HTEC	2025/6/10	2026/6/09
Cable	DA800-4000MM	NA	DA	2025/6/10	2026/6/09
Cable	DA800-11000MM	NA	DA	2025/6/10	2026/6/09

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ-EMC	Ver.EMC-CON 3A1.1+
2	EMC radiation test system	FALA	EZ-EMC	Ver.FA-03A2 RE+
3	RF test system	TACHOY	RFTest	V1.0.0
4	RF communication test system	TACHOY	RFTest	V1.0.0

4.2 Measurement Uncertainty

Parameter	Uncertainty
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10^{-6}
Bandwidth	± 1.5 x 10^{-6}
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.24dB
Radiated Emission(9KHz~30MHz)	±4.51dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB
Radiated Emission(25GHz~40GHz)	±3.38dB
Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95%	

4.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Notebook	/	X1502Z	N/A	Auxiliary

Note: (1)The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

5 Conducted Emission

Test Requirement	:	FCC CFR 47 Part 15 Section 15.207
Test Method	:	ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024
Test Result	:	PASS
Frequency Range	:	150kHz to 30MHz
Class/Severity	:	Class B

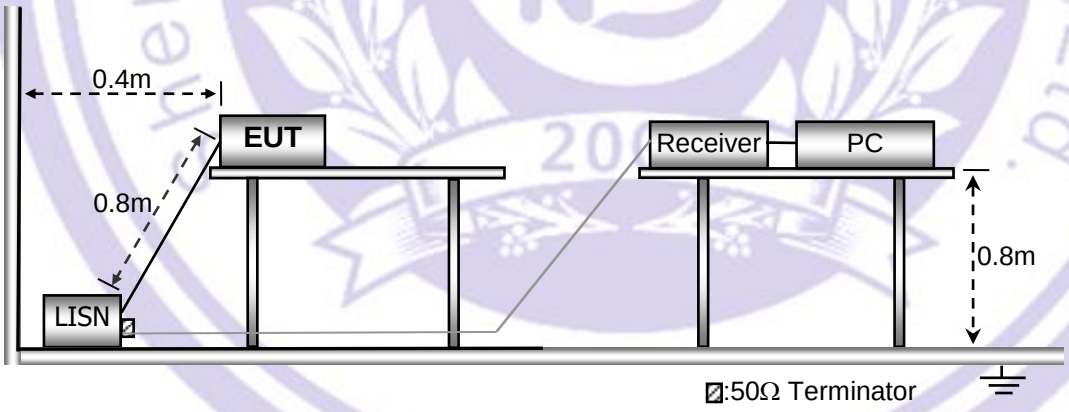
5.1 E.U.T. Operation

Operating Environment :

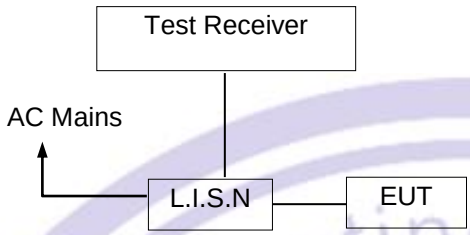
Temperature	:	25.5 °C
Humidity	:	51 % RH
Atmospheric Pressure	:	101.2kPa

5.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024.



5.3 Test SET-UP (Block Diagram of Configuration)



5.4 Measurement Procedure

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

5.5 Conducted Emission Limit

Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:

1. The lower limit shall apply at the transition frequencies

2.The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.6 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

5.7 Conducted Emission Test Result

EUT power supply by battery, so the test not applicable.

6 Radiated Spurious Emissions

Test Requirement	:	FCC CFR47 Part 15 Section 15.209 & 15.247, RSS-Gen §8.9, RSS-Gen §8.10
Test Method	:	ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024
Test Result	:	PASS
Measurement Distance	:	3m
Limit	:	See the follow table

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

6.1 EUT Operation

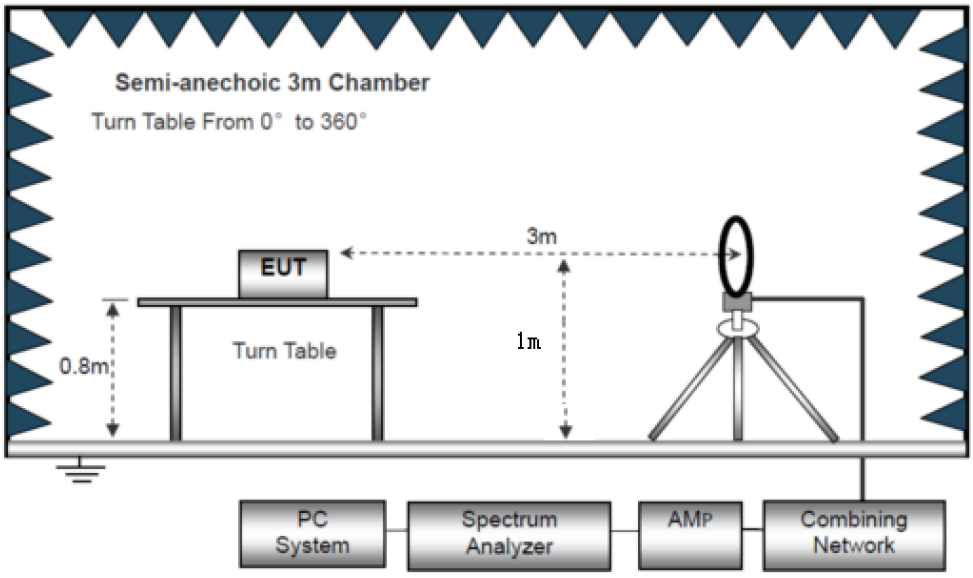
Operating Environment :

Temperature	:	24 °C
Humidity	:	56 % RH
Atmospheric Pressure	:	101kPa

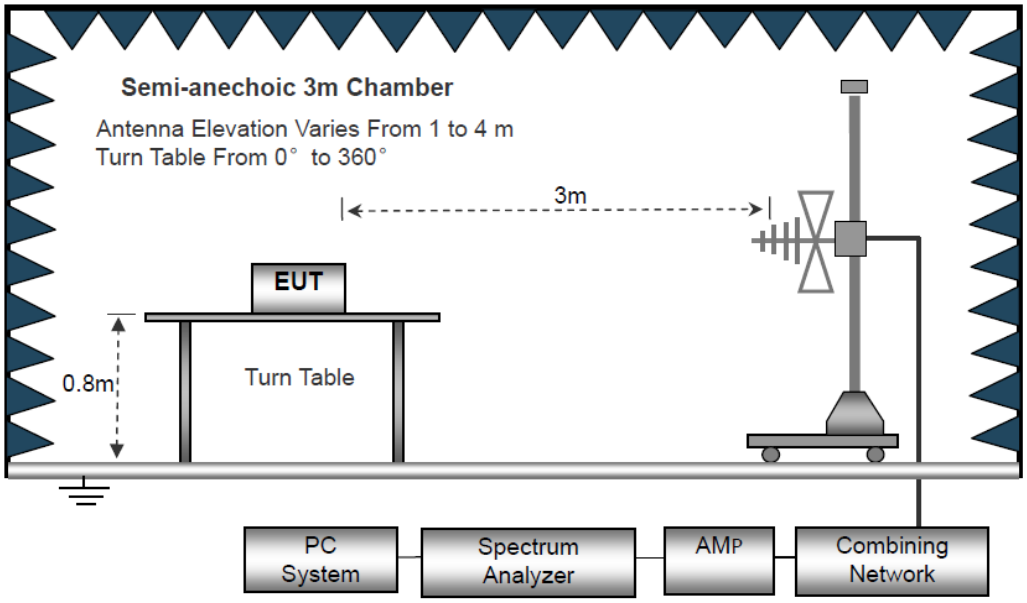
6.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

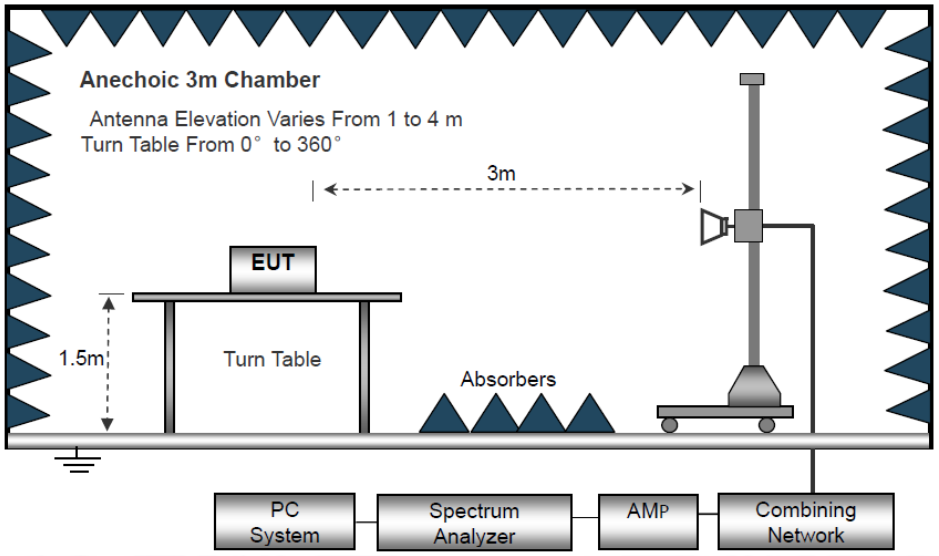
The test setup for emission measurement below 30MHz



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz



6.3 Spectrum Analyzer Setup

	Frequency	Detector	RBW	VBW	Remark
Receiver Setup	Below 30MHz	--	10kHz	10kHz	--
	30MHz ~ 1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value

6.4 Test Procedure

1. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024.

2. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane. And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.

3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (From 1m to 4m) and turntable (from 0 degree to 360 degree) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.

5. Set to the maximum power setting and enable the EUT transmit continuously.

6. Final measurement (Above 1GHz): The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1MHz. The measurement will be performed in horizontal and vertical polarization of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 degree to 360 degree in order to have the antenna inside the cone of radiation.

7. Test Procedure of measurement (For Above 1GHz):

1) Monitor the frequency range at horizontal polarization and move the antenna over all sides of the EUT(if necessary move the EUT to another orthogonal axis).

2) Change the antenna polarization and repeat 1) with vertical polarization.

3) Make a hardcopy of the spectrum.

4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.

5) Change the analyser mode to Clear/ Write and found the cone of emission.

6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3m and the antenna will be still inside the cone of emission.

7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarization and azimuth and the peak and average detector, which causes the maximum emission.

8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.

9)For cases where the test frequency exceeds 1GHz, an external band-stop filter should be connected in series between the receiving antenna and the input end of the test receiver.

10)The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

For Average Measurement:

VBW=10Hz, when duty cycle is no less than 98 percent.

VBW≥1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

6.5 Summary of Test Results

Test Frequency: 9KHz-30MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	>20

Note:

The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

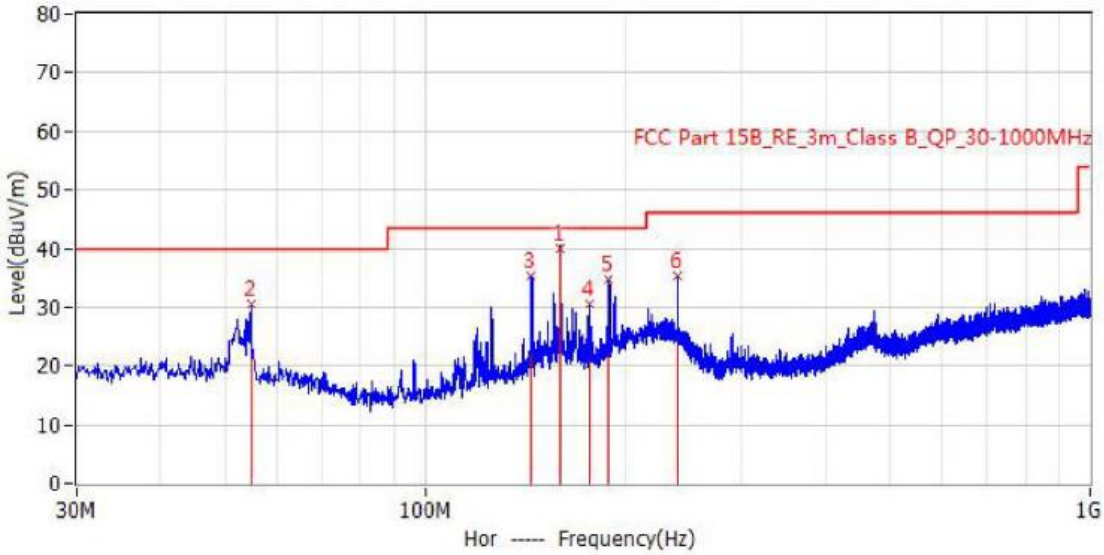
Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

Test Frequency: 30MHz ~ 1GHz

Pass.

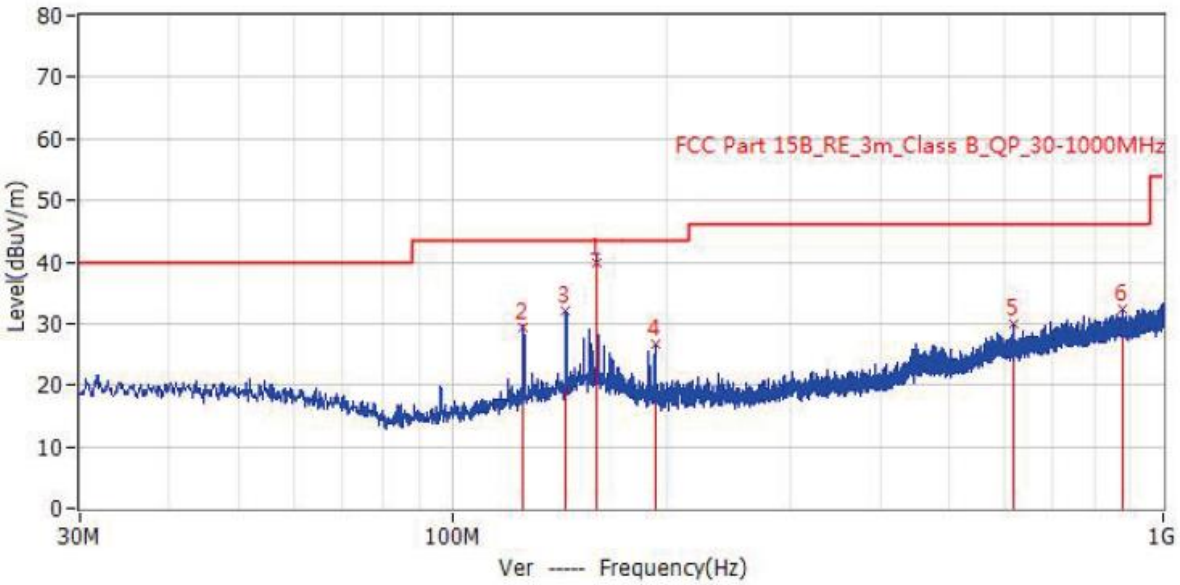
Please refer to the following test plots for the worst test mode (GFSK 2M, Lowest Channel).

Temperature:	24℃	Relative Humidity:	56%
Pressure:	101kPa	Polarization:	Horizontal
Test Voltage:	DC 6V From Battery		



No.	Frequency	Limit dBuV/m	Level dBuV/m	Margin dB	Factor dB/m	Detector	Height cm	Height cm	Angle deg
!1	160.004MHz	43.5	40.2	-3.3	21.7	QP	Hor	200.0	218.0
2*	54.735MHz	40.0	30.5	-9.5	21.4	PK	Hor	200.0	130.0
3*	144.703MHz	43.5	35.3	-8.2	21.2	PK	Hor	200.0	173.0
4*	176.349MHz	43.5	30.5	-13.0	20.4	PK	Hor	200.0	106.0
5*	189.323MHz	43.5	34.7	-8.8	18.6	PK	Hor	200.0	171.0
6*	240.005MHz	46.0	35.3	-10.7	19.2	PK	Hor	200.0	171.0

Temperature:	24℃	Relative Humidity:	56%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	DC 6V From Battery		



No.	Frequency	Limit dBuV/m	Level dBuV/m	Margin dB	Factor dB/m	Detector	Height cm	Height cm	Angle deg
1	159.992MHz	43.5	40.0	-3.5	21.7	QP	Ver	100.0	0.0
2*	126.030MHz	43.5	29.5	-14.0	20.2	PK	Ver	100.0	0.0
3*	144.703MHz	43.5	32.0	-11.5	21.2	PK	Ver	100.0	310.0
4*	192.960MHz	43.5	26.8	-16.7	18.4	PK	Ver	100.0	310.0
5*	616.971MHz	46.0	29.9	-16.1	27.5	PK	Ver	100.0	38.0
6*	875.476MHz	46.0	32.4	-13.6	30.7	PK	Ver	100.0	222.0

Test Frequency 1GHz-18GHz:

Temperature:	24°C	Relative Humidity:	56%
Pressure:	101kPa	Test Voltage:	DC 6V From Battery

Test Mode: GFSK 1Mbps TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4804	43.94	V	33.95	10.18	34.26	53.81	74	-20.19	PK
4804	37.90	V	33.95	10.18	34.26	47.77	54	-6.23	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4804	44.69	H	33.95	10.18	34.26	54.56	74	-19.44	PK
4804	34.27	H	33.95	10.18	34.26	44.14	54	-9.86	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: GFSK 1Mbps TX Mid									
4880	42.97	V	33.93	10.2	34.29	52.81	74	-21.19	PK
4880	36.67	V	33.93	10.2	34.29	46.51	54	-7.49	AV
7320	/	/	/	/	/	/	/	/	/
9760	/	/	/	/	/	/	/	/	/
4880	46.62	H	33.93	10.2	34.29	56.46	74	-17.54	PK
4880	35.39	H	33.93	10.2	34.29	45.23	54	-8.77	AV
7320	/	/	/	/	/	/	/	/	/
9760	/	/	/	/	/	/	/	/	/
Test Mode: GFSK 1Mbps TX High									
4960	45.20	V	33.98	10.22	34.25	55.15	74	-18.85	PK
4960	34.06	V	33.98	10.22	34.25	44.01	54	-9.99	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	42.42	H	33.98	10.22	34.25	52.37	74	-21.63	PK

4960	34.81	H	33.98	10.22	34.25	44.76	54	-9.24	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/

Note:

1, Result = Read level + Antenna factor + cable loss-Amp factor

2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

Test Mode: GFSK 2Mbps TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4804	42.54	V	33.95	10.18	34.26	52.41	74	-21.59	PK
4804	35.23	V	33.95	10.18	34.26	45.10	54	-8.90	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4804	45.38	H	33.95	10.18	34.26	55.25	74	-18.75	PK
4804	35.16	H	33.95	10.18	34.26	45.03	54	-8.97	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: GFSK 2Mbps TX Mid									
4880	41.18	V	33.93	10.2	34.29	51.02	74	-22.98	PK
4880	35.57	V	33.93	10.2	34.29	45.41	54	-8.59	AV
7320	/	/	/	/	/	/	/	/	/
9760	/	/	/	/	/	/	/	/	/
4880	43.36	H	33.93	10.2	34.29	53.20	74	-20.80	PK
4880	35.60	H	33.93	10.2	34.29	45.44	54	-8.56	AV
7320	/	/	/	/	/	/	/	/	/
9760	/	/	/	/	/	/	/	/	/
Test Mode: GFSK 2Mbps TX High									
4960	43.78	V	33.98	10.22	34.25	53.73	74	-20.27	PK
4960	35.80	V	33.98	10.22	34.25	45.75	54	-8.25	AV
7440	/	/	/	/	/	/	/	/	/

9920	/	/	/	/	/	/	/	/	/
4960	42.82	H	33.98	10.22	34.25	52.77	74	-21.23	PK
4960	34.39	H	33.98	10.22	34.25	44.34	54	-9.66	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/

Note:

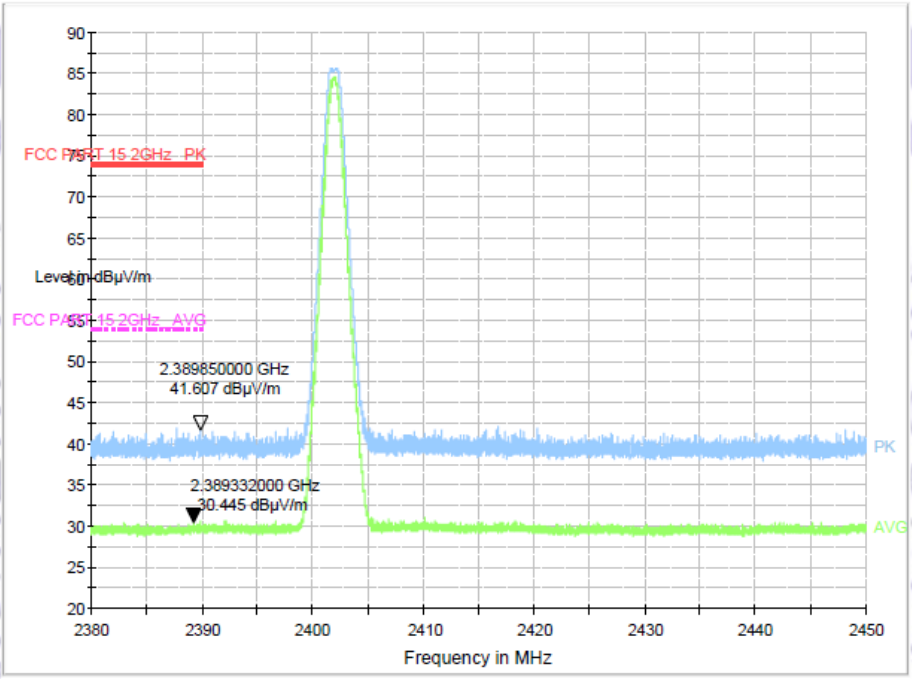
1, Result = Read level + Antenna factor + cable loss-Amp factor

2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

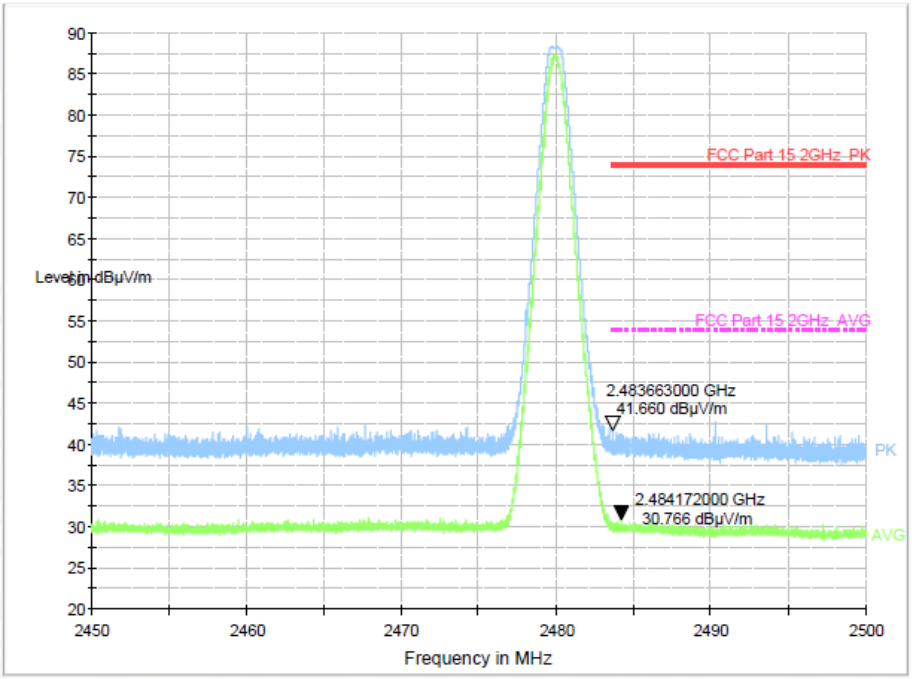
Shenzhen NCT Testing Technology Co., Ltd. 2008

Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

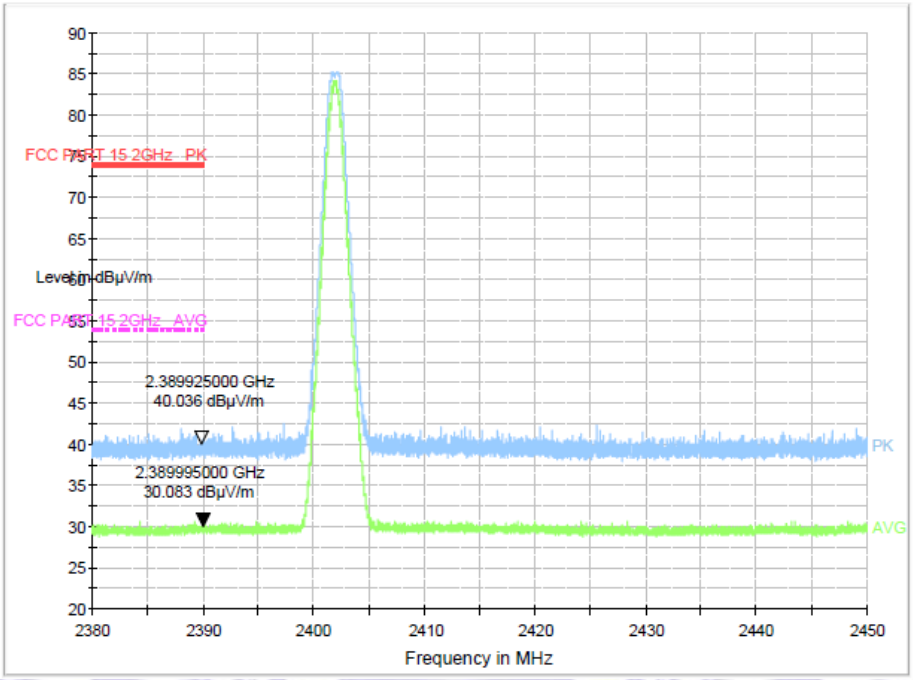
Temperature:	24.1℃	Relative Humidity:	56%
Pressure:	101kPa	Mode	GFSK(1M) Low Channel
Test Voltage:	DC 6V From Battery		



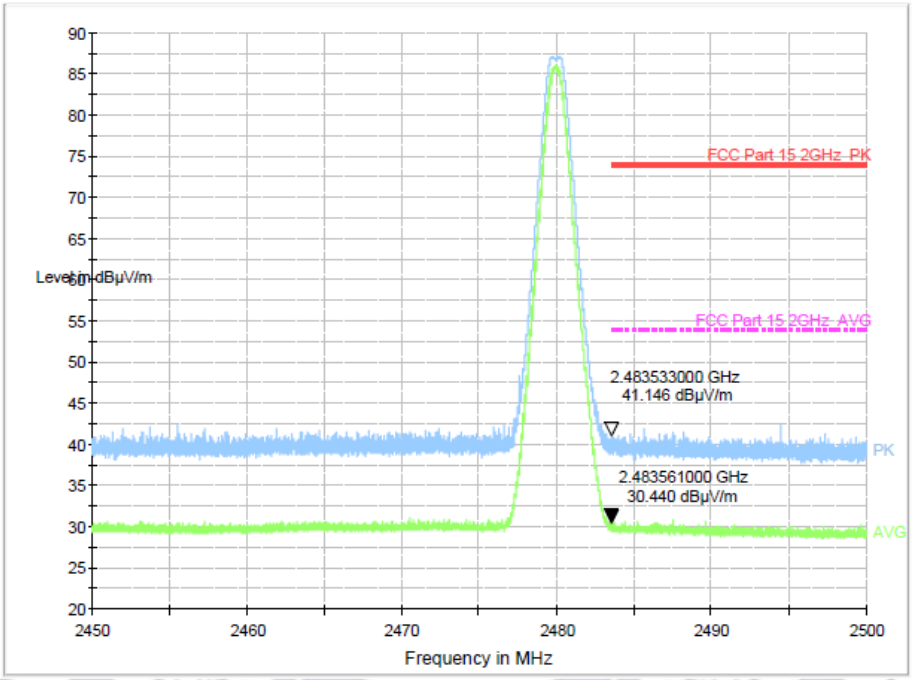
Temperature:	24.1°C	Relative Humidity:	56%
Pressure:	101kPa	Mode	GFSK(1M) High Channel
Test Voltage:	DC 6V From Battery		



Temperature:	24.1°C	Relative Humidity:	56%
Pressure:	101kPa	Mode	GFSK(2M) Low Channel
Test Voltage:	DC 6V From Battery		



Temperature:	24.1°C	Relative Humidity:	56%
Pressure:	101kPa	Mode	GFSK(2M) High Channel
Test Voltage:	DC 6V From Battery		



7 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)). RSS-247 § 6.6
Test Method	:	ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024
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)). RSS-247 § 6.6: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

7.1 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

7.2 Test Setup Blocking

EUT — spectrum analyzer

7.3 Test Result

Please see the Appendix BLE data

8 6dB Bandwidth Measurement

Test Requirement	:	FCC CFR47 Part 15 Section 15.247, RSS-247
Test Method	:	ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024
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.

8.1 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

8.2 Test Setup Blocking

EUT — spectrum analyzer

8.3 Test Result

Please see the Appendix BLE data

9 Maximum Peak Output Power

Test Requirement	:	FCC CFR47 Part 15 Section 15.247, RSS-247 § 6.3.2
Test Method	:	ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024
Test Limit	:	Regulation 15.247 (b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. RSS-247 § 6.3.2 For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

9.1 Test Procedure

1. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Measure the conducted output power and record the results in the test report.

9.2 Test Setup Blocking

EUT — spectrum analyzer

9.3 Test Result

Please see the Appendix BLE data

10 Power Spectral density

Test Requirement	:	FCC CFR47 Part 15 Section 15.247,RSS-247 § 6.3.1 (b)
Test Method	:	ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024
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. RSS-247 § 6.3.1 (b) The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of section 5.4(d), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

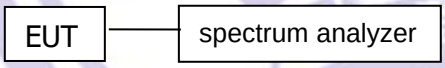
10.1 Test Procedure

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.

10.2 Test Setup Blocking



10.3 Test Result

Please see the Appendix BLE data

11 Antenna Application

11.1 Antenna Requirement

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(c) (1)(i) requirement:

Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

According to RSS-GEN section 6.8

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

11.2 Result

The antenna is FPC antenna, the Max gain of the antennas is 3.69 dBi, reference to the attachment for details.

12 Test Setup Photos and EUT Photos

Please see the attachment for details.

******THE END REPORT******