FCC TEST REPORT

FCC ID: 2ARE7-91805

On Behalf of

ShenZhenShi NewStone Technology co., Ltd

transmitter

Model No.: 91805G-VT

Prepared for	:	ShenZhenShi NewStone Technology co., Ltd
Address	:	B2 blvd, YuHong Industrial Park, No.20, XingYe West Road, ShaJing Town, Shenzhen, China

Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
Address	:	Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

Report Number	:	A1906095-C01-R02
Date of Receipt	:	June 20, 2019
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Date of Report	:	July 03, 2019
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TEST REPORT DECLARATION

Applicant	:	ShenZhenShi NewStone Technology co., Ltd
Manufacturer	:	ShenZhenShi NewStone Technology co., Ltd
EUT Description	:	transmitter
		(A) Model No. : 91805G-VT
		(B) Trademark : N/A

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.10:2013

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the RSS-247 limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

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

Tested by (name + signature).....…..:	Ella Liang Project Engineer	Ella Liang
Approved by (name + signature)…....:	Simple Guan Project Manager	
Date of issue…… ……..:	July 03, 2019	

Revision History

Revision	Issue Date	Revisions	Revised By
V0	July 03, 2019	Initial released Issue	Simple Guan

1. General Information

1.1. Description of Device (EUT)

EUT Name	:	transmitter
Model No.	:	91805G-VT
DIFF	:	N/A
Trade Name	:	N/A
Power supply	:	DC 1.5V*4 by AA Battery
Operation frequency	:	2405MHz-2476MHz, 2478MHz (2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2478MHz (MHz))
Modulation	:	GFSK
Channel No.	:	73CH
Antenna Type	:	Internal Antenna, Maximum Gain is 2dBi
Software version	:	V1.0
Hardware version	:	V1.0

1.2. Accessories of Device (EUT)

Accessories1 : /

Manufacturer : /

Model : /

Ratings : /

1.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or DOC
1	N/A	N/A	N/A	N/A	N/A

1.4. Block Diagram of connection between EUT and simulators

EUT

1.5. Test Mode Description

Test mode:

Mode	Channel	Frequency (MHz)
GFSK	CH1	2405
	CH37	2441
	CH73	2478

Note:

1. The test was used to control EUT work in Continuous TX mode, and select test channel, wireless mode
2. The EUT has been tested as an independent unit. And Continual Transmitting in maximum power.
3. New battery is used during all tests.
4. For the relevant Conducted Measurement, the temporary antenna connector is used during the measurement. Antenna Connector Impedance: 50Ω , Cable Loss: 1.0 dB

1.6. Test Conditions

Temperature range	21-25℃
Humidity range	40-75%
Pressure range	86-106kPa

1.7. Test Facility

Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District,
518103, Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293961

July 25, 2017 Certificated by IC
Registration Number: 12135A

1.8. Measurement Uncertainty

(95% confidence levels, k=2)

Item	**Uncertainty**
Uncertainty for Power point Conducted Emissions Test	2.74dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB(Polarize: V)
	2.57dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.16dB(Polarize: H)
	4.13dB(Polarize: V)
Uncertainty for radio frequency	5.4×10-8
Uncertainty for conducted RF Power	0.37dB
Uncertainty for temperature	0.2℃
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

2. Summary of test

2.1. Summary of test result

Test Item	Standards Paragraph	Result
Maximum Peak Output Power	FCC Part 15: 15.247(b)(1) ANSI C63.10 :2013	P
Bandwidth	FCC Part 15: 15.215 ANSI C63.10 :2013	P
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1) ANSI C63.10 :2013	P
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.10 :2013	P
Dwell Time	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.10 :2013	P
Radiated Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.10 :2013	P
Band Edge Compliance	FCC Part 15: 15.247(d) ANSI C63.10 :2013	P
Power Line Conducted Emissions	FCC Part 15: 15.207 ANSI C63.10 :2013	P
Antenna requirement	FCC Part 15: 15.203	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.

2.2. Test Equipment

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	N/A	2018.09.21	1Year
Spectrum analyzer	ROHDE&SCHWARZ	FSU	1166.1660.26	2018.09.21	1Year
Receiver	ROHDE&SCHWARZ	ESR	1316.3003K03-102082-Wa	2018.09.21	1Year
Receiver	R&S	ESCI	101165	2018.09.21	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2018.04.13	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2018.04.13	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00059	2018.09.26	2Year
Cable	Resenberger	N/A	No.1	2018.09.21	1Year
Cable	Resenberger	N/A	No.2	2018.09.21	1Year
Cable	Resenberger	N/A	No.3	2018.09.21	1Year
Pre-amplifier	HP	HP8347A	2834A00455	2018.09.21	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2018.09.21	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2018.09.21	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2018.09.21	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2018.09.21	1 Year
Horn Antenna	A-INFOMW	LB-180100-KF	J211020657	2018.09.21	2 Year
Preamplifier	SKET	LNPA_1840-50	SK2018101801	2018.09.21	1 Year
Power Meter	Agilent	E9300A	MY41496625	2018.09.21	1 Year
Temp. & Humid. Chamber	Weihuang	WHTH-1000-40-880	100631	2018.9.11	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	20140927-6	2018.09.11	1 Year

3. Maximum Peak Output power

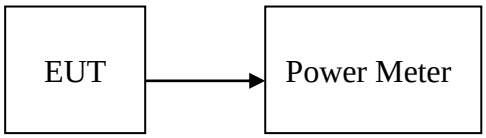
3.1. Limit

Please refer section15.247.
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 RF Power Meter is set to the peak power detection.

3.3. Test Setup



3.4. Test Result

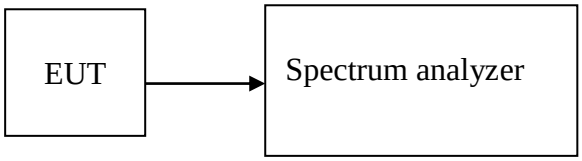
EUT: transmitter M/N: 91805G-VT					
Mode	Freq (MHz)	PK Output Power (dBm)	PK Output Power (mW)	Limit (dBm)	Result
GFSK	2405	6.555	4.524	30	Pass
	2441	6.007	3.987	30	Pass
	2478	7.351	5.434	30	Pass
Conclusion: PASS					

4. Bandwidth

4.1. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

4.2. Block Diagram of Test setup



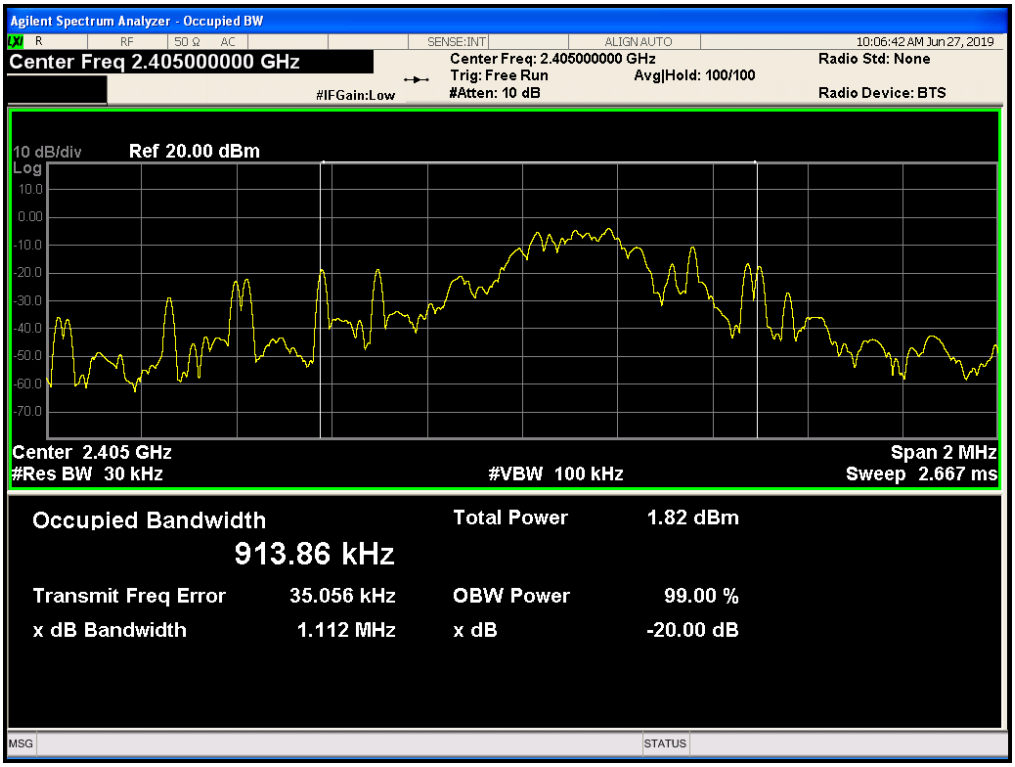
4.3. Test Procedure

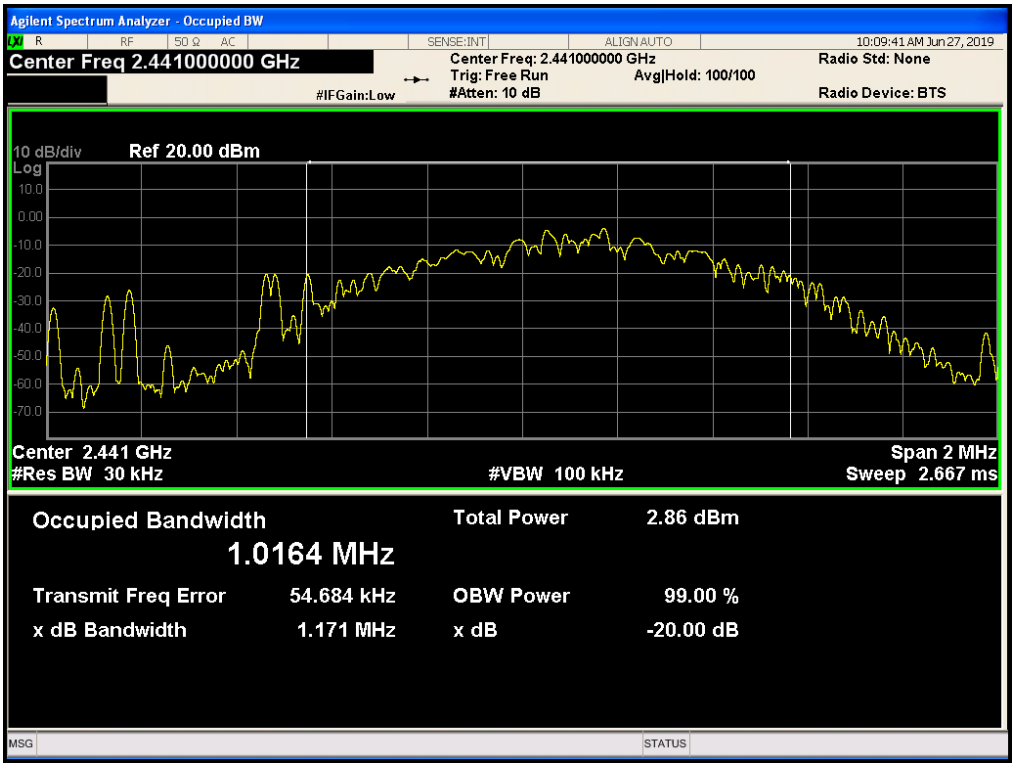
The transmitter output was coupled to a spectrum analyzer via a antenna. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

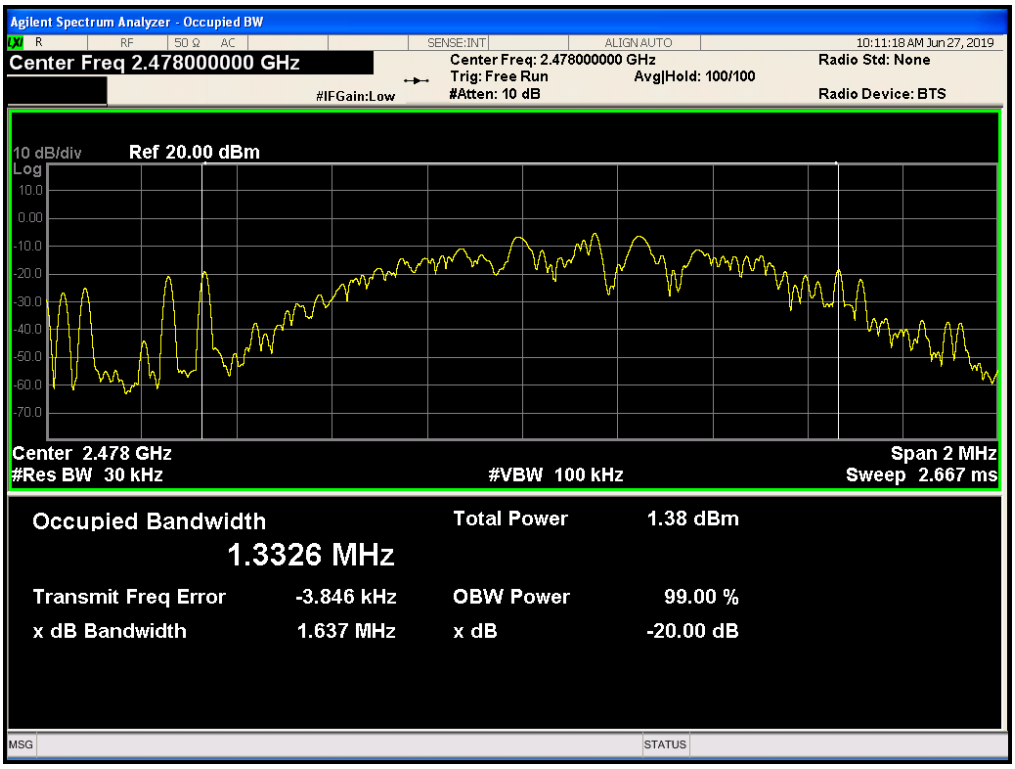
4.4. Test Result

EUT: transmitter	M/N: 91805G-VT				
Mode	Freq (MHz)	99% Bandwidth (MHz)	20dB Bandwidth (MHz)	Limit (kHz)	Conclusion
GFSK	2405	0.9139	1.1121	/	PASS
	2441	1.0164	1.1708	/	PASS
	2478	1.3326	1.6366	/	PASS

Original Test data:




Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.441000000 GHz
Center Freq: 2.441000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 10 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10:09:41 AM Jun 27, 2019
10 dB/div
Ref 20.00 dBm
Log
Center 2.441 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 2 MHz
Sweep 2.667 ms
Occupied Bandwidth
1.0164 MHz
Total Power 2.86 dBm
Transmit Freq Error 54.684 kHz
OBW Power 99.00 %
x dB Bandwidth 1.171 MHz
x dB -20.00 dB
MSG
STATUS

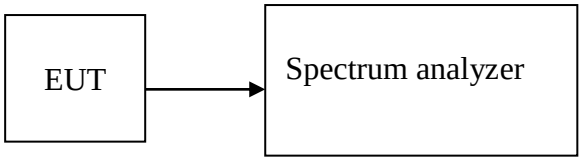

Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.478000000 GHz
Center Freq: 2.478000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 10 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10:11:18 AM Jun 27, 2019
10 dB/div
Ref 20.00 dBm
Log
Center 2.478 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 2 MHz
Sweep 2.667 ms
Occupied Bandwidth
1.3326 MHz
Total Power 1.38 dBm
Transmit Freq Error -3.846 kHz
OBW Power 99.00 %
x dB Bandwidth 1.637 MHz
x dB -20.00 dB
MSG
STATUS

5. Carrier Frequency Separation

5.1. Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW

5.2. Block Diagram of Test setup



5.3. Test Procedure

The transmitter output was coupled to a spectrum analyzer via a antenna.
The carrier frequency was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW.

5.4. Test Result

EUT: transmitter M/N: 91805G-VT				
Mode/Channel	Channel separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz) 2/3 20dB bandwidth	Conclusion
GFSK	1.146	1.1708	0.781	PASS

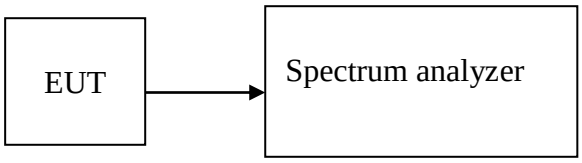
Original test data for channel separation

6. Number Of Hopping Channel

6.1. Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

6.2. Block Diagram of Test setup



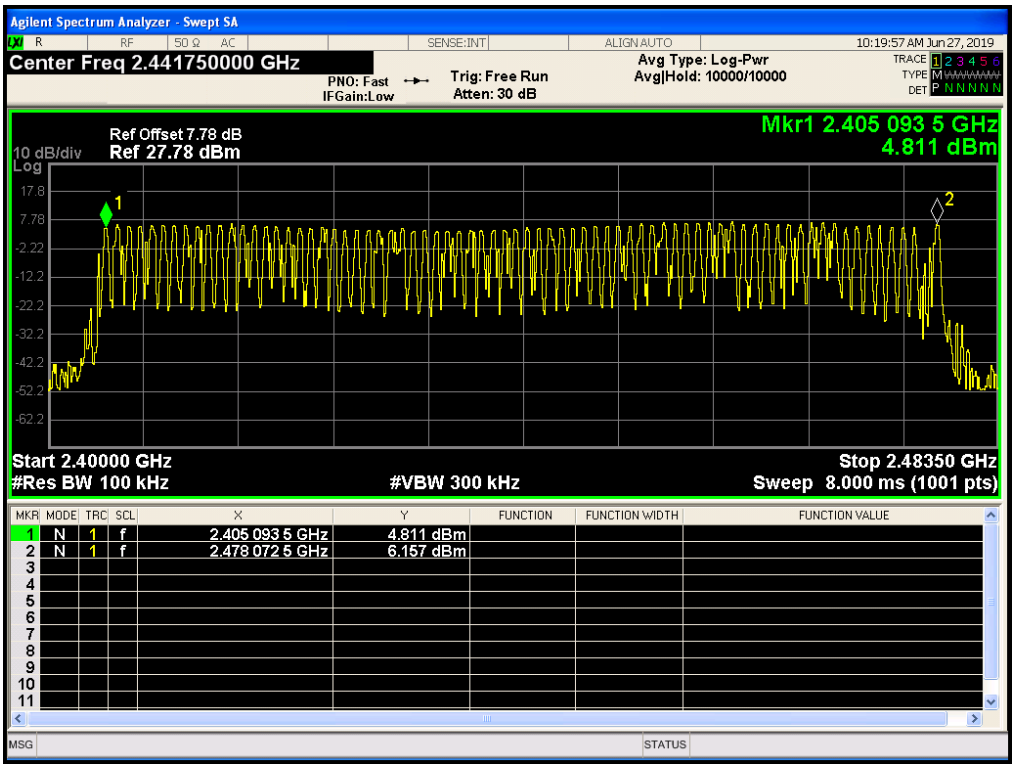
6.3. Test Procedure

The transmitter output was coupled to a spectrum analyzer via a antenna. The number of hopping channel was measured by spectrum analyzer with 100kHz RBW and 300KHz VBW.

6.4. Test Result

EUT: transmitter M/N: 91805G-VT			
Mode	Number of hopping channel	Limit	Conclusion
GFSK	73	>15	PASS

Original test data for hopping channel number



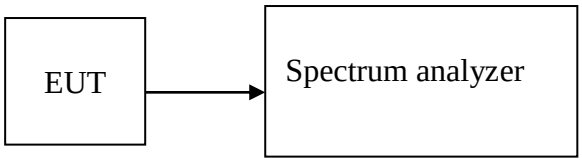
7. Dwell Time

7.1. Test limit

Please refer section15.247:

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz. The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 sec- onds multiplied by the number of hopping channel employed.

7.2. Block Diagram of Test setup



7.3. Test Procedure

(1) Place the EUT on the table and set it in transmitting mode.

(2) Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

(3) Set center frequency of spectrum analyzer = operating frequency.

(4) Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = auto.

(5) Repeat above procedures until all frequency measured was complete.

(6) The spectrums are scanned by using the spectrum analyzer (*1). And the numbers of occupied channel per Nsec (period of 0.4 seconds multiplied by the number of hopping channels employed) were counted by using the delta-marker function of spectrum analyzer and recorded as “N”.

(7) The dwell time was calculated by Ton × N.

7.4. Test Results

PASS.

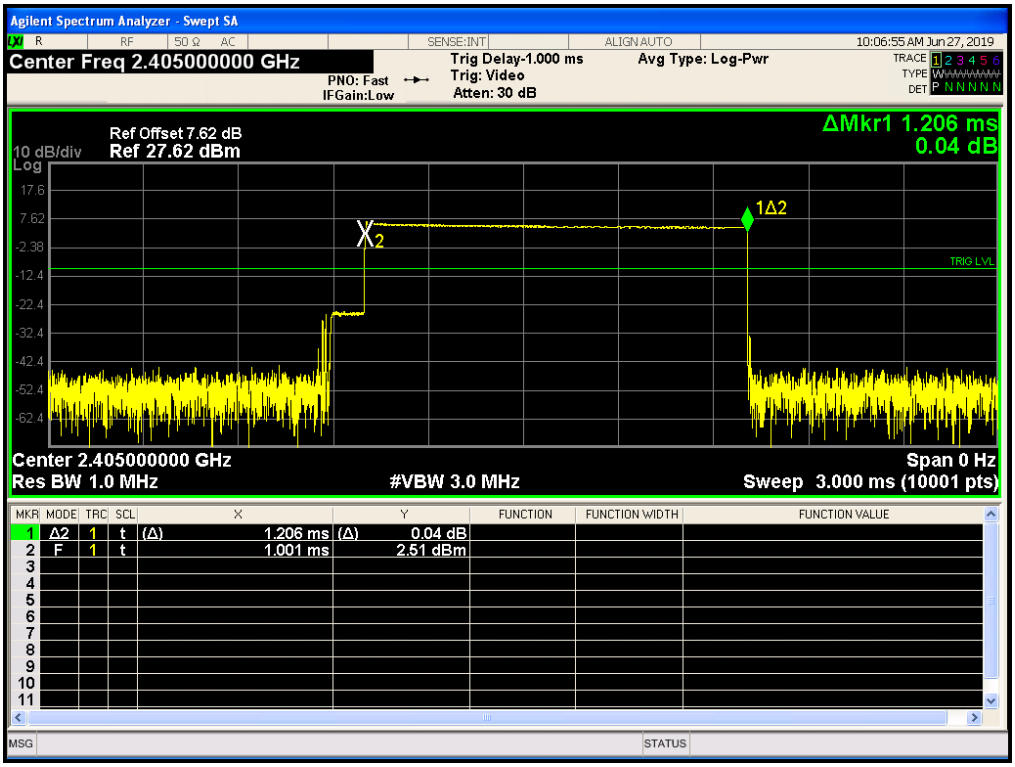
Detailed information please see the following page.

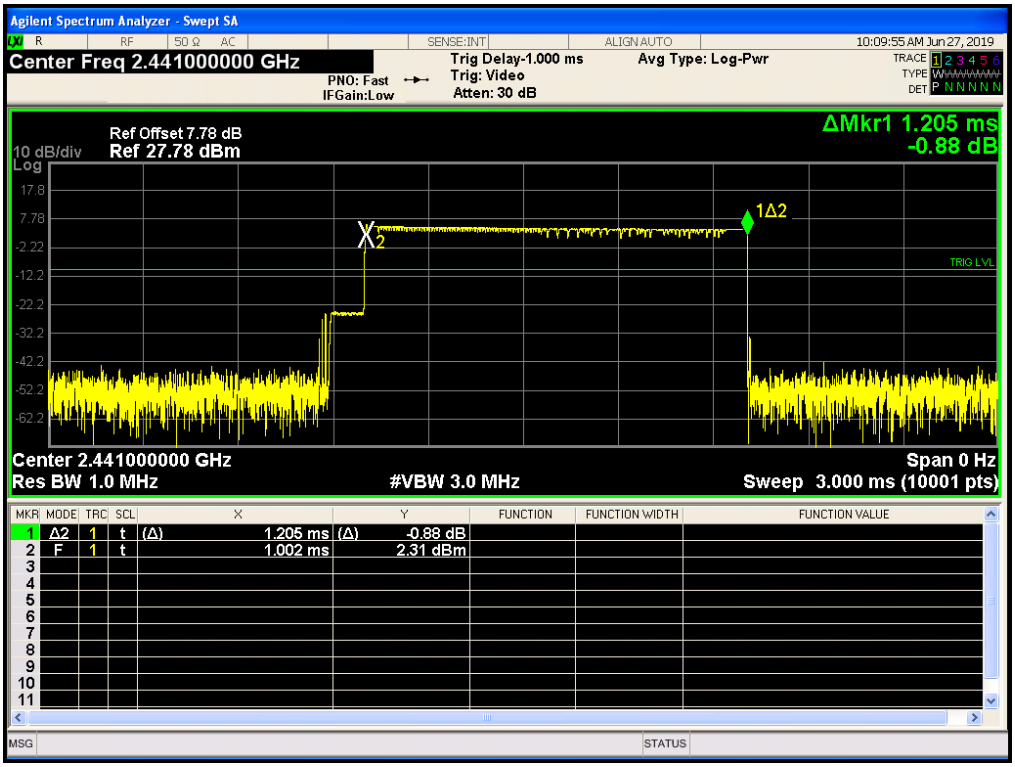
EUT: transmitter M/N: 91805G-VT					
Mode	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (ms)	Limit (ms)	Conclusion
GFSK	2405	1.206	385.92	<400	PASS
	2441	1.205	385.60	<400	PASS
	2478	1.205	385.60	<400	PASS

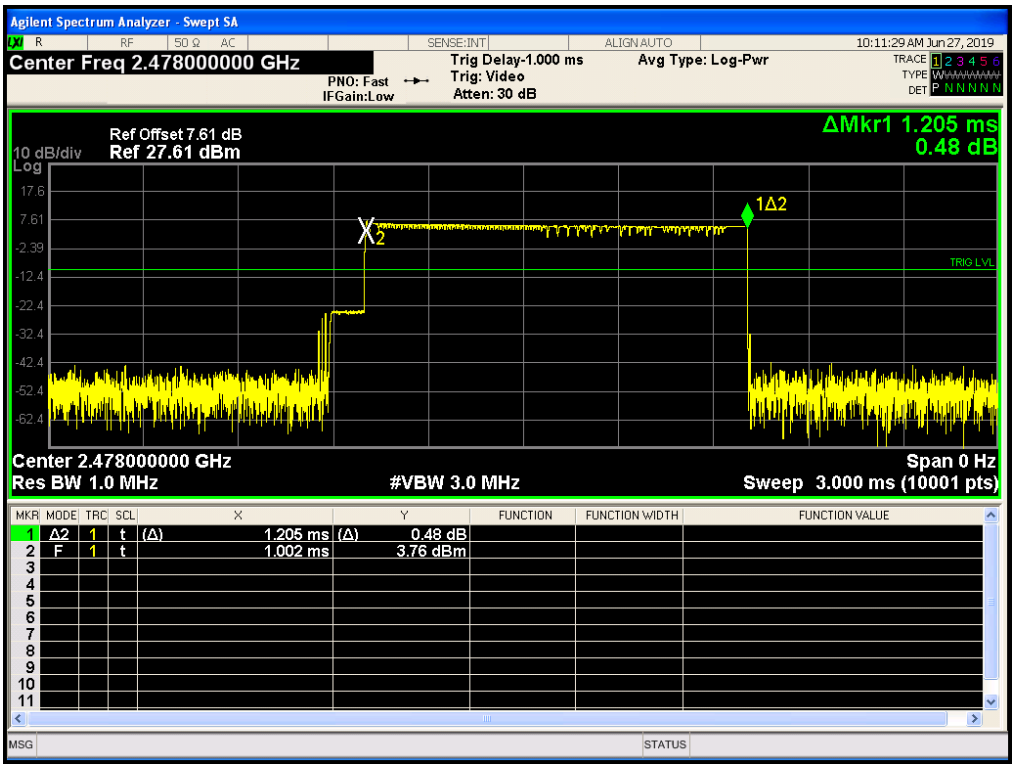
Note:

Dwell time=pulse time* (hopping times/time slot /74) * (0.4*74)

= pulse time* (1600/2/74) * (0.4*74)




Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
Trig Delay-1.000 ms
Trig: Video
Atten: 30 dB
Avg Type: Log-Pwr
PNO: Fast
IFGain:Low
10:09:55 AM Jun 27, 2019
Ref Offset 7.78 dB
10 dB/div
Ref 27.78 dBm
ΔMkr1 1.205 ms
-0.88 dB
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 3.000 ms (10001 pts)
1 Δ2 1 t (Δ) 1.205 ms (Δ) -0.88 dB
2 F 1 t 1.002 ms 2.31 dBm


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.478000000 GHz
Trig Delay-1.000 ms
Trig: Video
Atten: 30 dB
Avg Type: Log-Pwr
PNO: Fast
IFGain:Low
10:11:29 AM Jun 27, 2019
Ref Offset 7.61 dB
10 dB/div
Ref 27.61 dBm
ΔMkr1 1.205 ms
0.48 dB
Center 2.478000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 3.000 ms (10001 pts)
1 Δ2 1 t (Δ) 1.205 ms (Δ) 0.48 dB
2 F 1 t 1.002 ms 3.76 dBm

8. Radiated emissions

8.1. 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

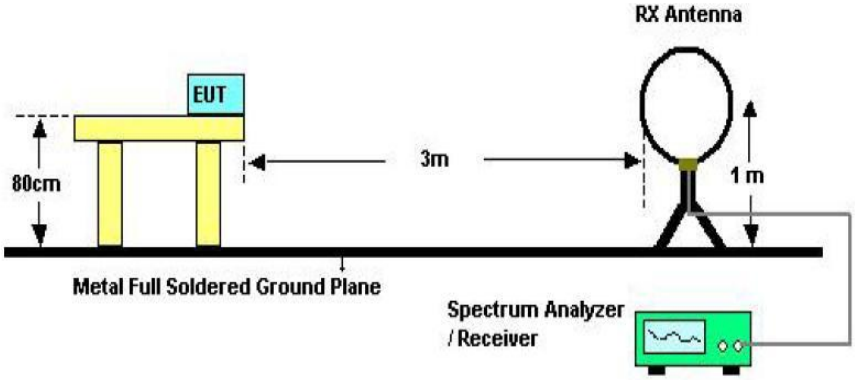
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 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])

15.209 Limit

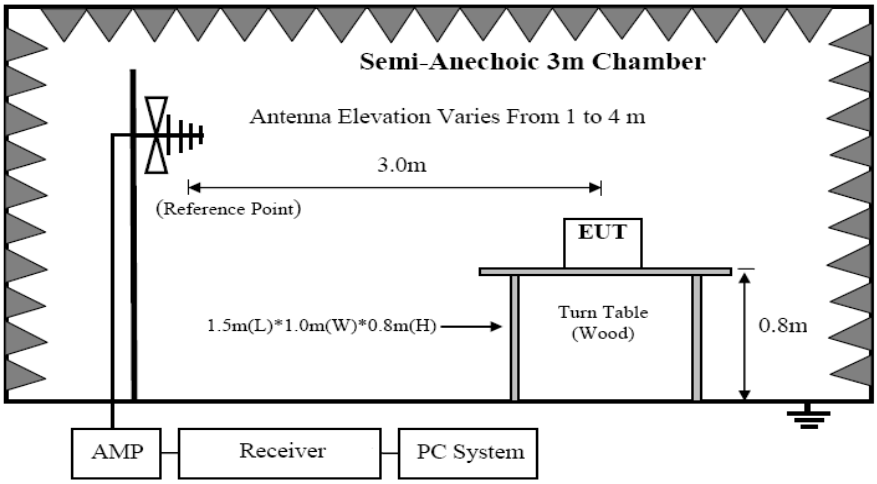
FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

8.2. Block Diagram of Test setup

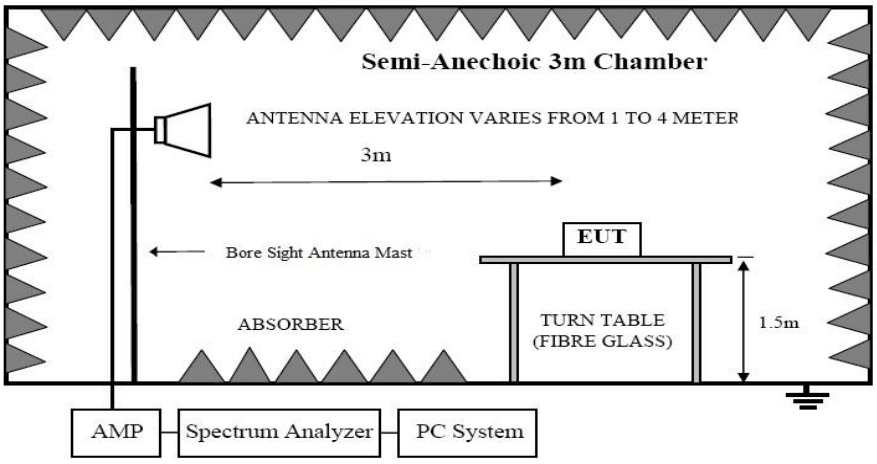
8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 30MHz



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



8.2.3 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.

8.3. Test Procedure

(1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber for below 1G test and 150 cm above the ground plane inside a anechoic chamber for above 1G test.

(2) Setup EUT and simulator as shown in section 1.4 and 6.1

(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 C63.10-2013 on Radiated Emission test.

(6) For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emission sat the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measure ment antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

(7) 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.

8.4. Test Result

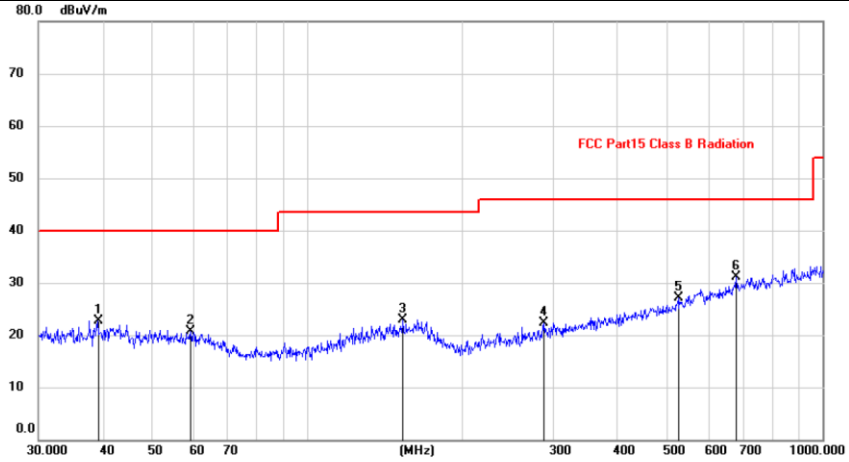
We have scanned the 10th harmonic from 9KHz to the EUT.

Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

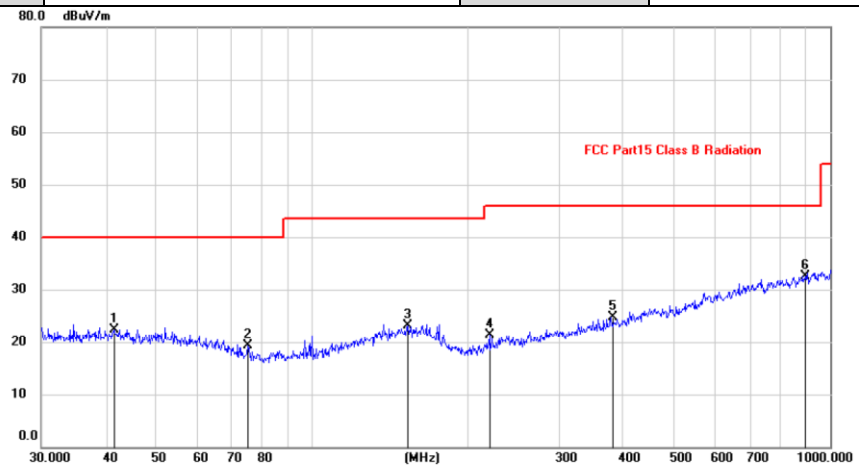
Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

From 30MHz to 1000MHz: Conclusion: PASS			
EUT Description	transmitter	**Model No.**	91804
Temperature	24℃	**Humidity**	56%
Pol	Vertical	**Test date**	2019/6/21
Test Voltage	DC 6V	**Test mode**	2478MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		39.1616	8.56	14.21	22.77	40.00	-17.23	peak			
2		59.2325	7.56	13.05	20.61	40.00	-19.39	peak			
3		153.2004	8.40	14.56	22.96	43.50	-20.54	peak			
4		287.9904	9.17	13.09	22.26	46.00	-23.74	peak			
5		524.5541	9.09	18.02	27.11	46.00	-18.89	peak			
6	*	682.3484	9.97	21.07	31.04	46.00	-14.96	peak			

Pol	Horizontal	**Test date**	2019/6/21



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		41.4215	8.28	14.11	22.39	40.00	-17.61	peak			
2		75.4464	9.24	10.15	19.39	40.00	-20.61	peak			
3		152.6641	8.48	14.55	23.03	43.50	-20.47	peak			
4		219.8449	9.91	11.30	21.21	46.00	-24.79	peak			
5		378.5843	9.37	15.36	24.73	46.00	-21.27	peak			
6	*	893.8567	9.60	22.85	32.45	46.00	-13.55	peak			

*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Notes: Above is below 1GHz test data. This report only shall the worst case mode for TX 2478MHz.

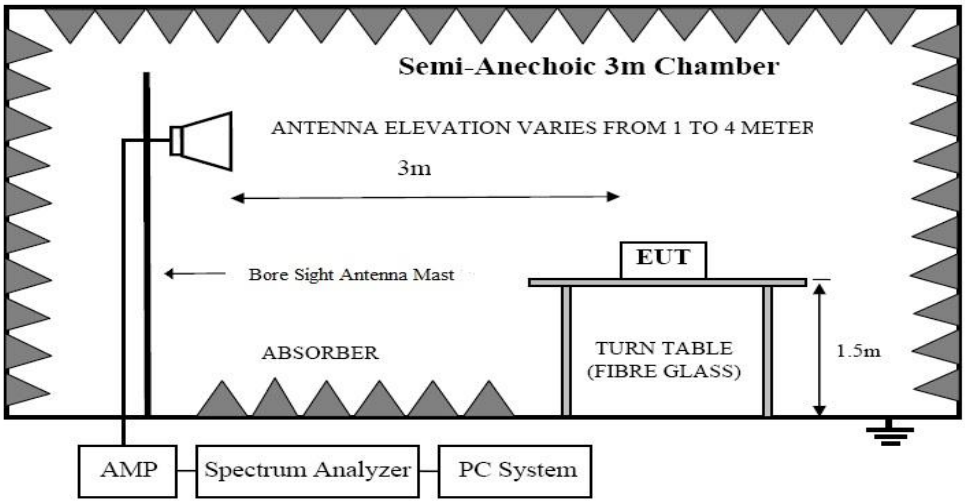
From 1G-25GHz

Test Mode: 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
4810	46.92	V	33.95	10.18	34.26	56.79	74	17.21	PK
4810	38.59	V	33.95	10.18	34.26	48.46	54	5.54	AV
7215	/	/	/	/	/	/	/	/	/
9620	/	/	/	/	/	/	/	/	/
4830	48.57	H	33.95	10.18	34.26	58.44	74	15.56	PK
4830	36.97	H	33.95	10.18	34.26	46.84	54	7.16	AV
7215	/	/	/	/	/	/	/	/	/
9620	/	/	/	/	/	/	/	/	/
Test Mode: TX Mid									
4882	46.36	V	33.93	10.2	34.29	56.20	74	17.80	PK
4882	35.09	V	33.93	10.2	34.29	44.93	54	9.07	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
4882	45.43	H	33.93	10.2	34.29	55.27	74	18.73	PK
4882	35.58	H	33.93	10.2	34.29	45.42	54	8.58	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
Test Mode: TX High									
4956	45.71	V	33.98	10.22	34.25	55.66	74	18.34	PK
4956	35.51	V	33.98	10.22	34.25	45.46	54	8.54	AV
7434	/	/	/	/	/	/	/	/	/
9912	/	/	/	/	/	/	/	/	/
4956	47.87	H	33.98	10.22	34.25	57.82	74	16.18	PK
4956	36.14	H	33.98	10.22	34.25	46.09	54	7.91	AV
7434	/	/	/	/	/	/	/	/	/
9912	/	/	/	/	/	/	/	/	/

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.

9. Band Edge Compliance

9.1. Block Diagram of Test Setup



9.2. Limit

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in RSS-GEN, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with RSS-GEN limits.

9.3. Test Procedure

Same with clause 6.3 except change investigated frequency range from 2310MHz to 2415MHz, 2475MHz to 2500MHz.

Note: 1 Spectrum Set for Non-restricted band PK measure: RBW100Khz VBW=100KHz

2 Spectrum Set for Restricted band set PK measure:: RBW 1MHz, VBW=3MHz

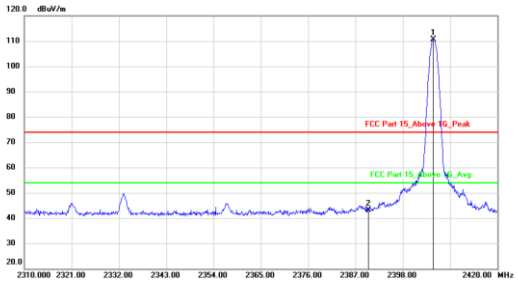
3 Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK

9.4. Test Result

No-hopping

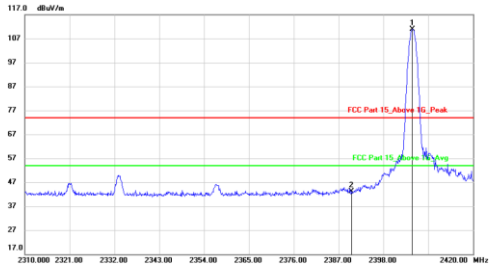
CH-L

Horizontally



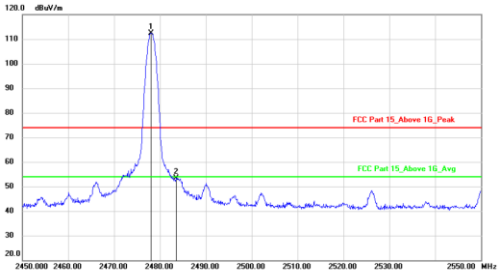
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2405.150	114.11	-3.41	110.70	74.00	36.70	peak			
2		2390.000	46.41	-3.40	43.01	74.00	-30.99	peak			

Vertically

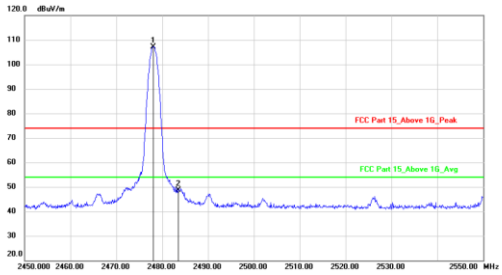


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2405.150	114.27	-3.41	110.86	74.00	36.86	peak			
2		2390.000	46.56	-3.40	43.16	74.00	-30.84	peak			

CH-H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2478.100	115.81	-3.39	112.42	74.00	38.42	peak			
2		2483.500	56.86	-3.38	53.48	74.00	-20.52	peak			

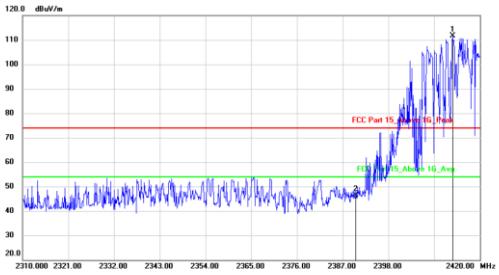


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2478.100	110.64	-3.39	107.25	74.00	33.25	peak			
2		2483.500	51.94	-3.38	48.56	74.00	-25.44	peak			

Hopping

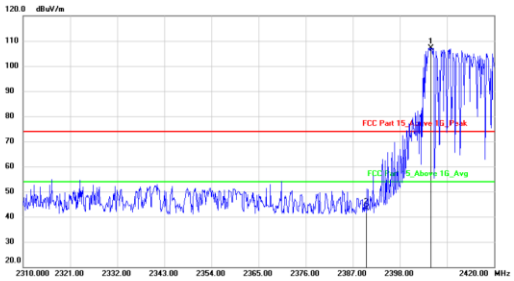
CH-L

Horizontally



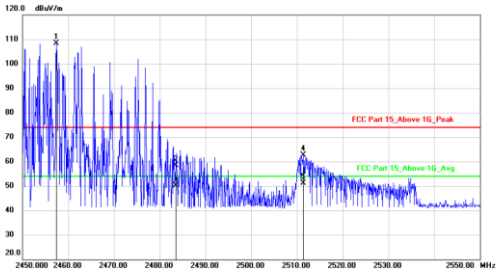
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2413.400	115.11	-3.41	111.70	74.00	37.70	peak			
2		2390.000	49.70	-3.40	46.30	74.00	-27.70	peak			

Vertically

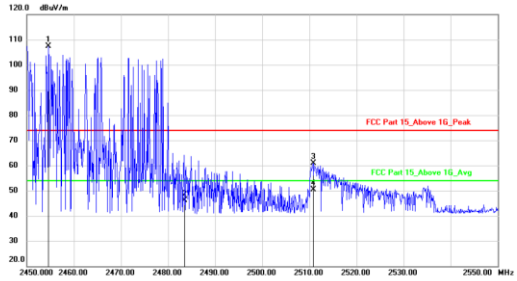


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2405.260	110.64	-3.41	107.23	74.00	33.23	peak			
2		2390.000	46.86	-3.40	43.46	74.00	-30.54	peak			

CH-H



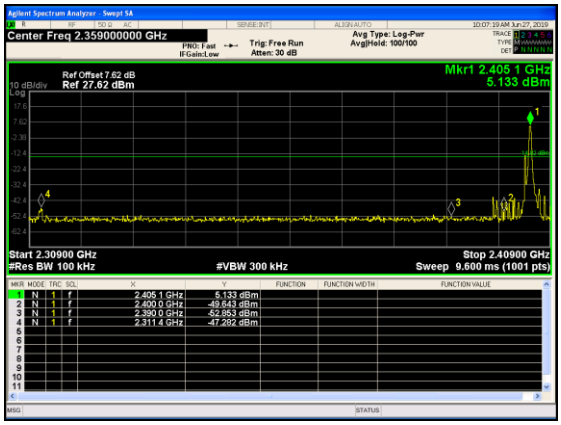
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2457.400	111.66	-3.39	108.27	74.00	34.27	peak			
2		2483.500	61.79	-3.38	58.41	74.00	-15.59	peak			
3		2483.500	53.62	-3.38	50.24	54.00	-3.76	AVG			
4		2511.400	65.93	-3.35	62.58	74.00	-11.42	peak			
5		2511.400	54.60	-3.35	51.25	54.00	-2.75	AVG			



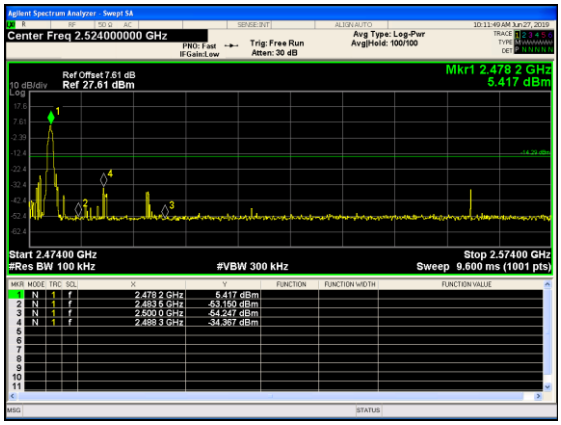
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2454.600	110.83	-3.39	107.44	74.00	33.44	peak			
2		2483.500	49.44	-3.38	46.06	74.00	-27.94	peak			
3		2510.800	64.12	-3.35	60.77	74.00	-13.23	peak			
4		2510.800	53.69	-3.35	50.34	54.00	-3.66	AVG			

No-hopping

CH-L

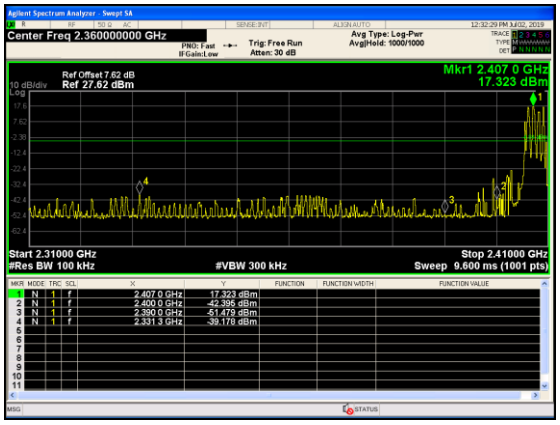


CH-H

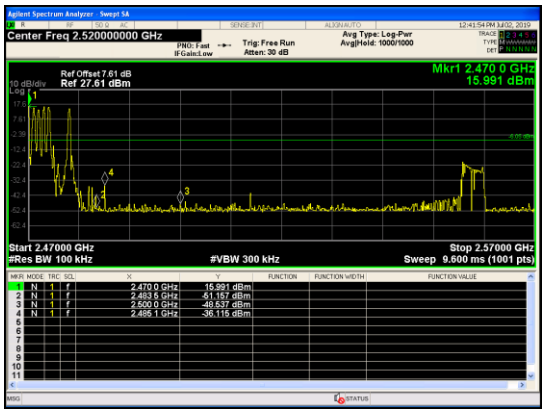


Hopping

CH-L

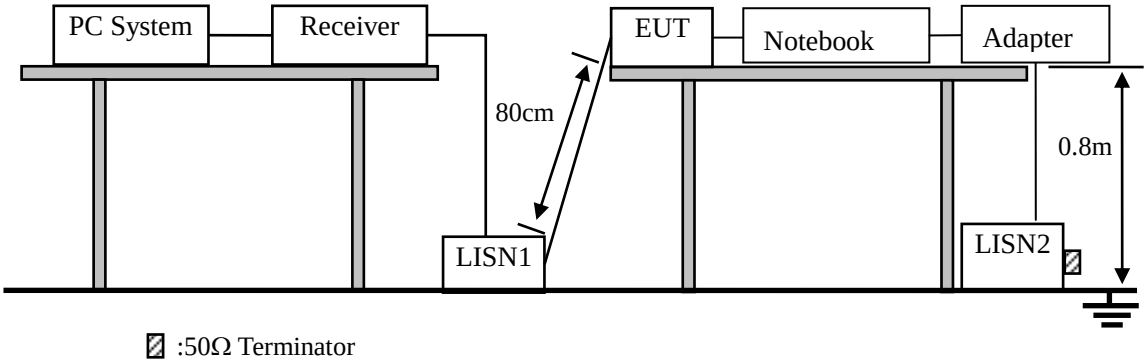


CH-H



10. Power Line Conducted Emissions

10.1. Block Diagram of Test Setup



10.2. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
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.

10.3. 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 notebook 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 C63.10-2013 on conducted Emission test.

(4) The bandwidth of test receiver is set at 10KHz.

(5) The frequency range from 150 KHz to 30MHz is checked.

10.4.Test Result

EUT power supply by battery, so this test item not applicable.

11. Antenna Requirements

11.1. Limit

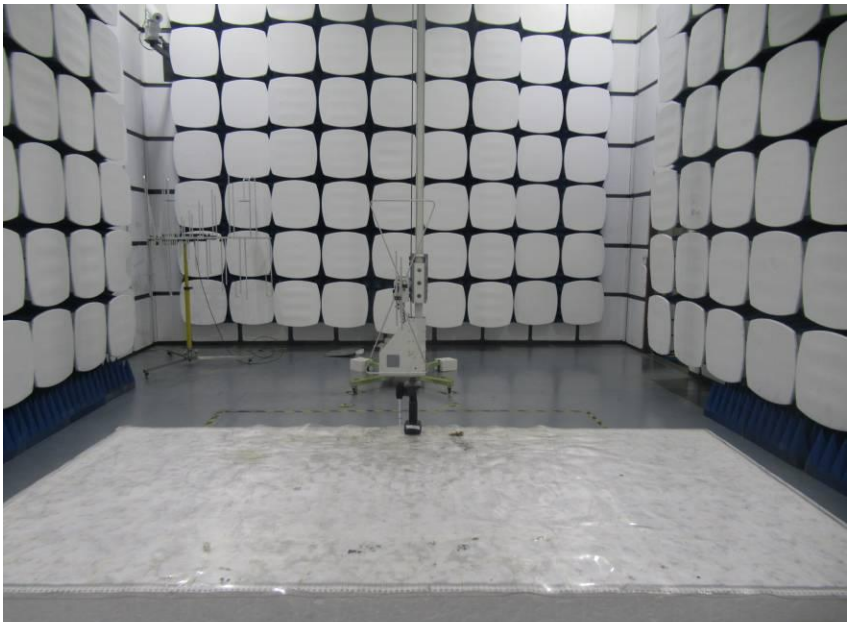
For intentional device, according to RSS GEN, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

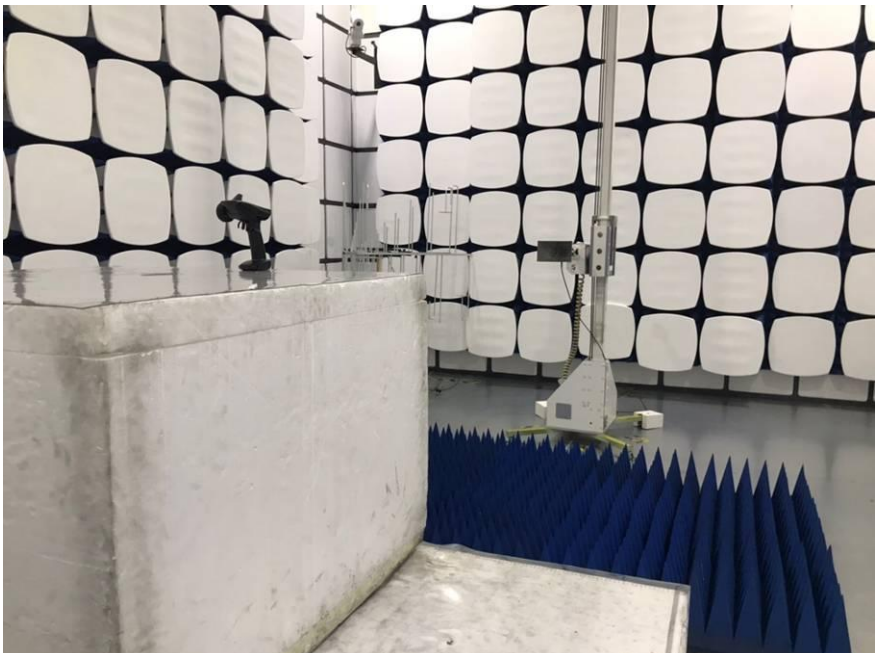
11.2. Result

EUT antenna is a internal antenna. The antenna gain of 2dBi meets the standard requirement.

12. Test setup photo

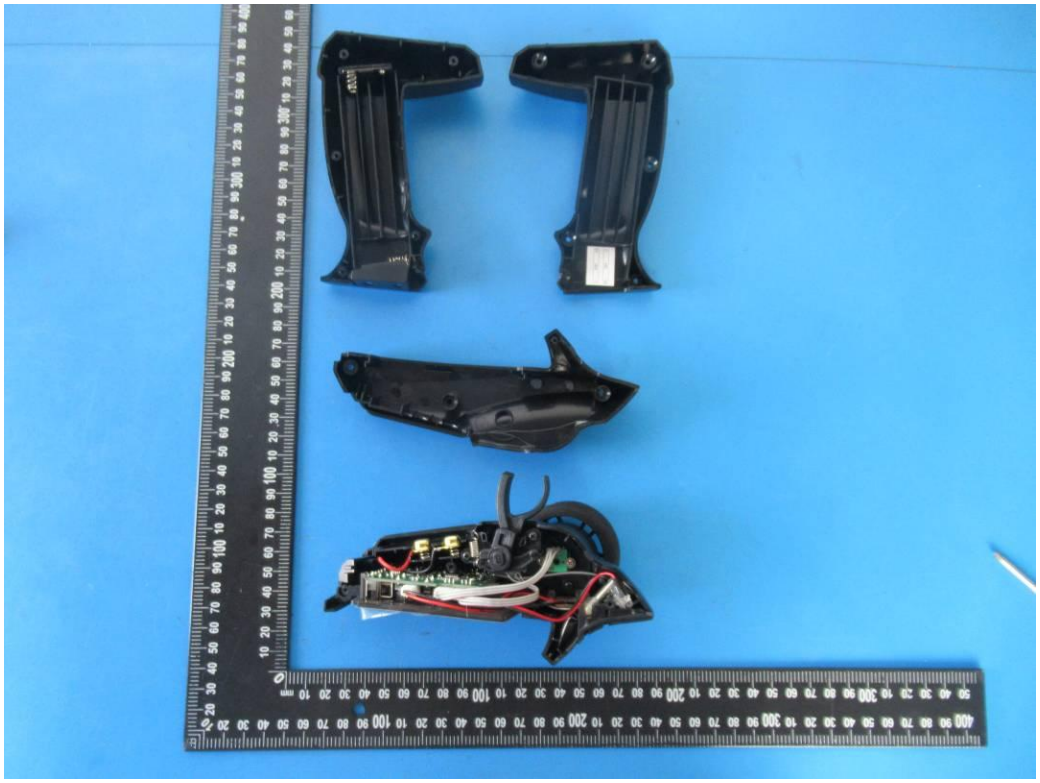
12.1. Photos of Radiated emission

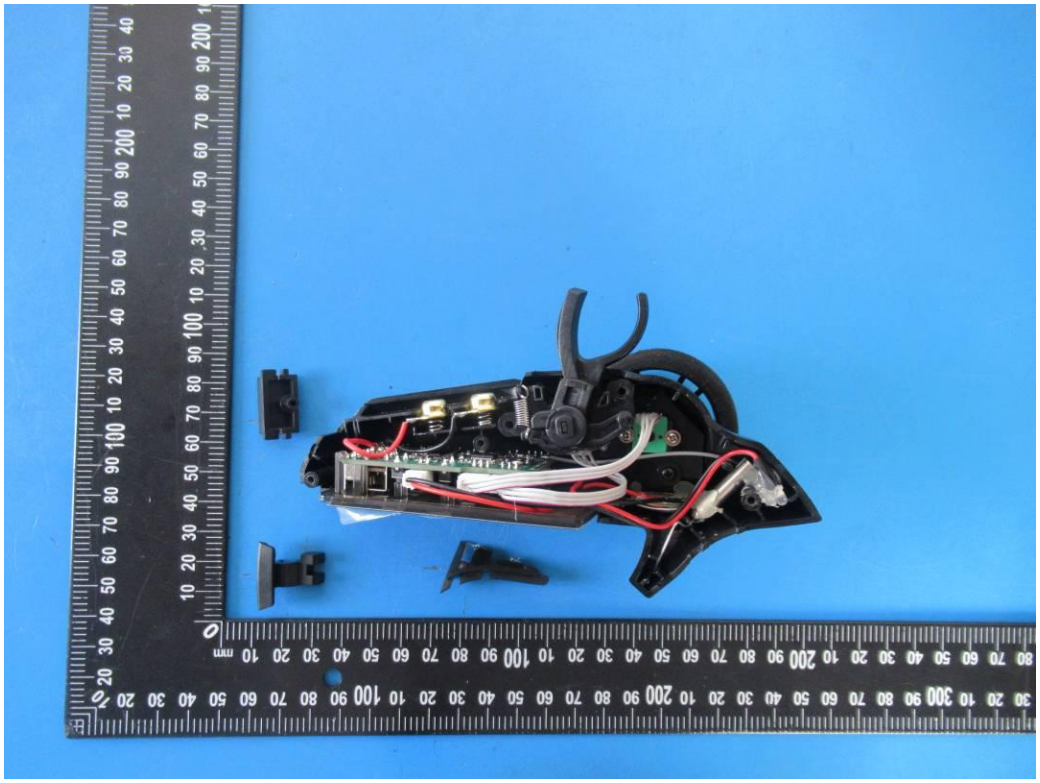


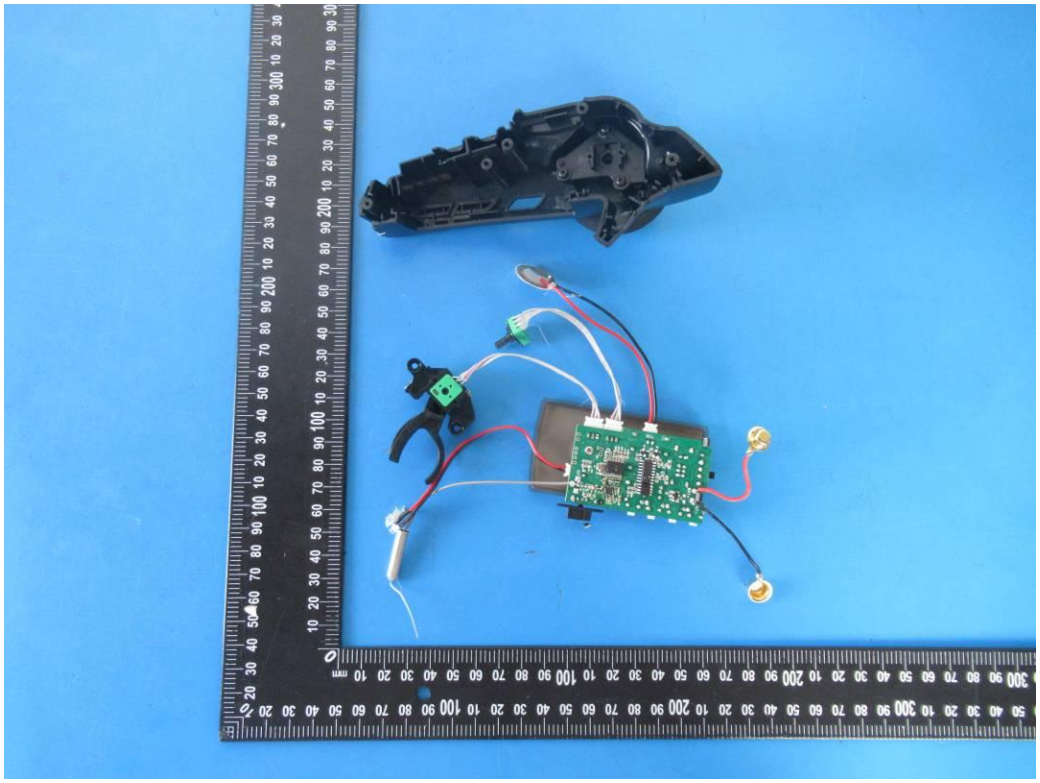


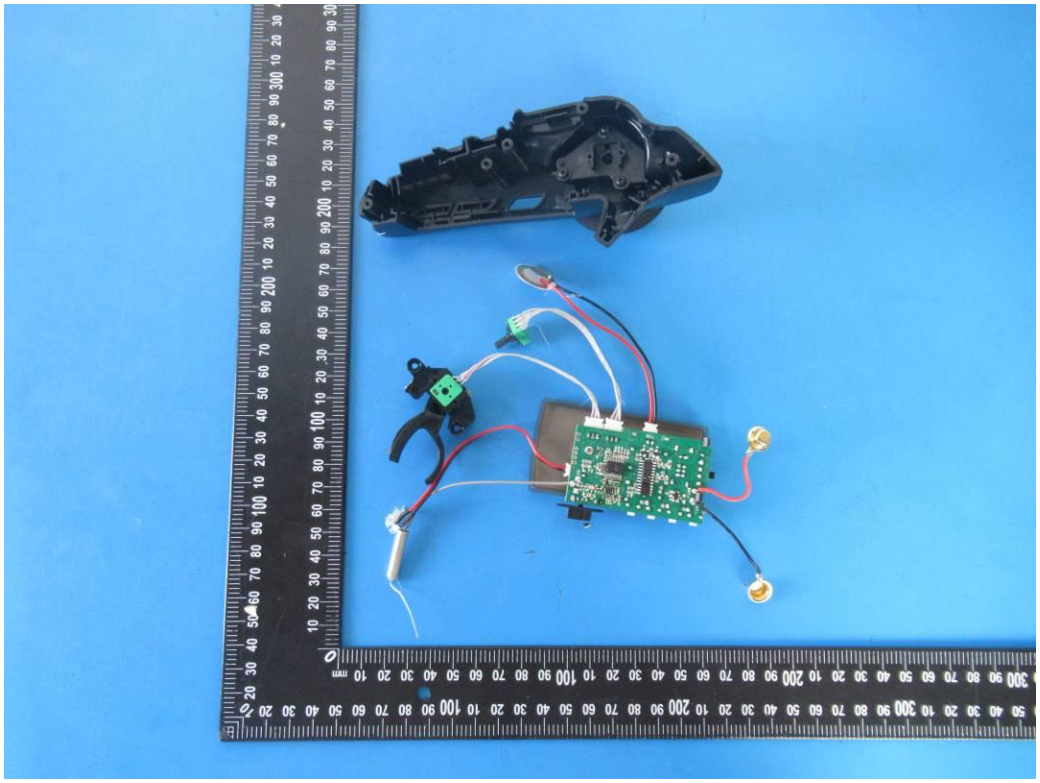
13. Photos of EUT

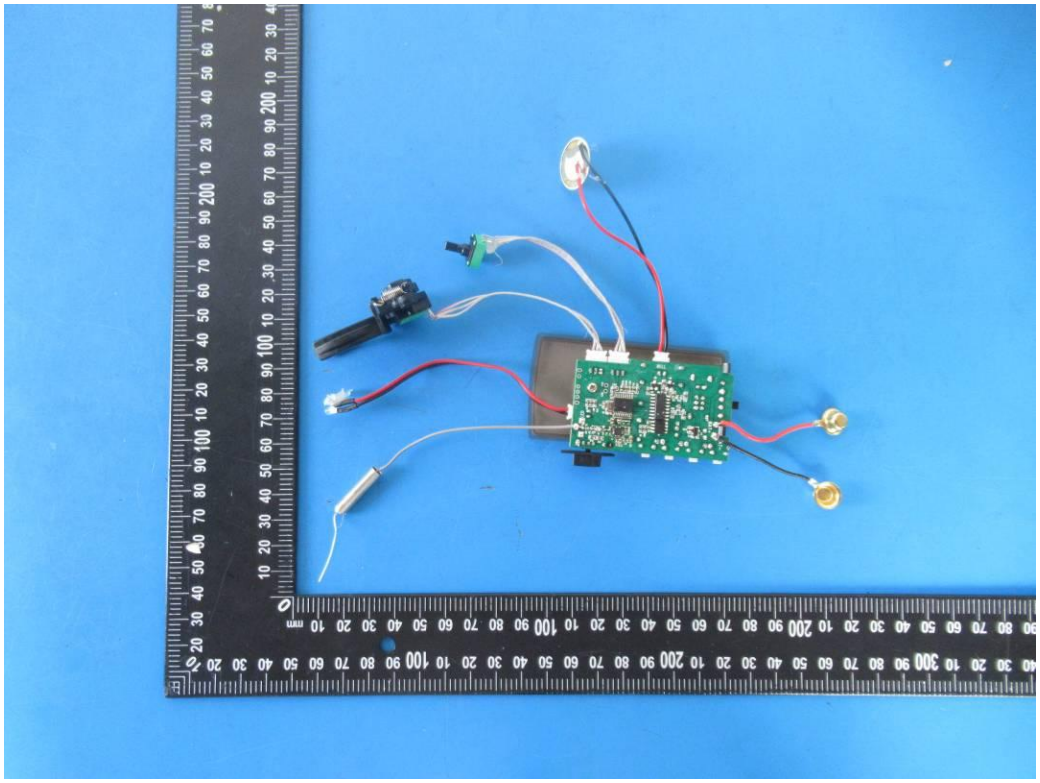
201905

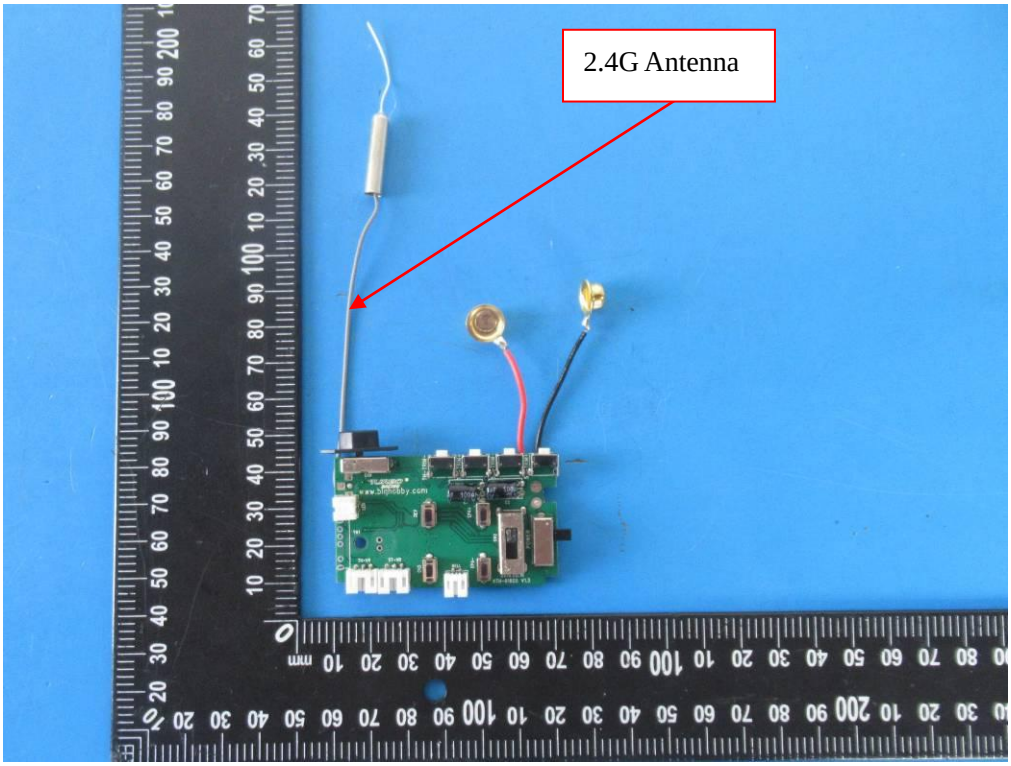


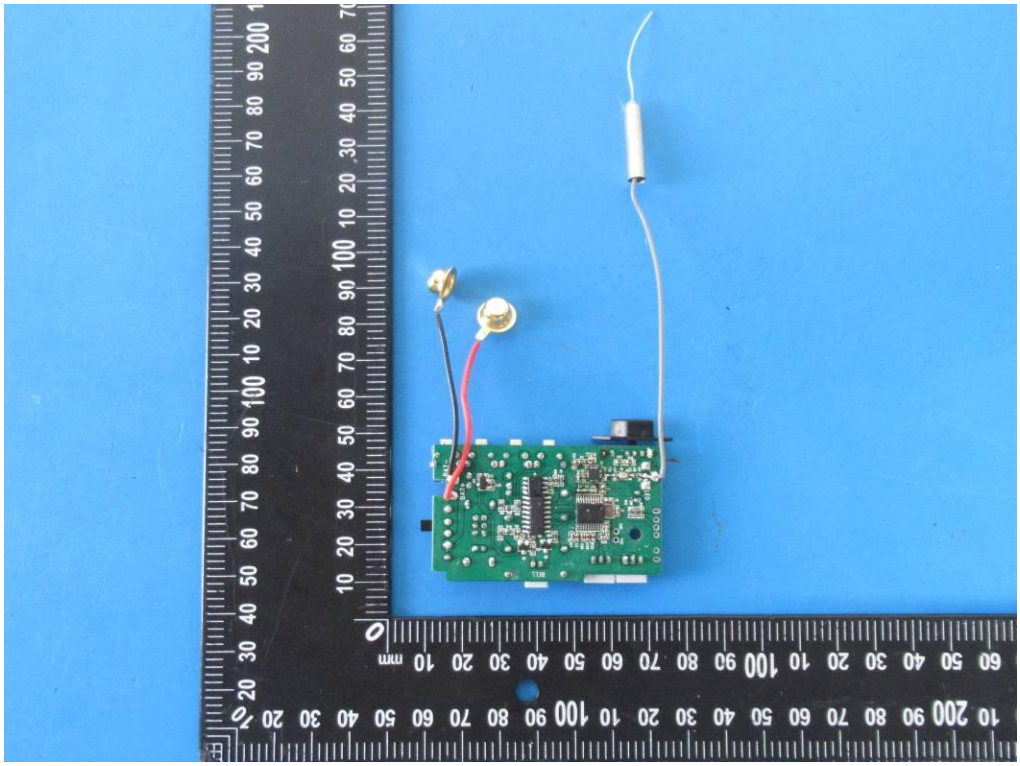









2.4G Antenna



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