FCC RADIO TEST REPORT

FCC ID: 2AT5P-XXAB

Product: Circuit Controller

Trade Name: X2intelli

Model Name: XXAB002

Serial Model: XXAB003, XXAB004, XXAB005, XXAB006, XXAB007, XXAB008, XXAB009, XXAB010, XXAB011

Report No.: UNIA19072422FR-01

Prepared for

Xiuxiang Smart(Shenzhen) Co., Ltd.

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Prepared by

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TEST RESULT CERTIFICATION

Applicant's name..... :	Xiuxiang Smart(Shenzhen) Co., Ltd.
Address..... :	401-411,Building 5A, Tusincere Park, No. 333, Longfei Rd., Huanggekeng Community, Longcheng Street, Longgang District, Shenzhen, China
Manufacture's Name..... :	Xiuxiang Smart(Shenzhen) Co., Ltd.
Address..... :	401-411,Building 5A, Tusincere Park, No. 333, Longfei Rd., Huanggekeng Community, Longcheng Street, Longgang District, Shenzhen, China

Product description

Product name..... :	Circuit Controller
Trade Mark..... :	X2intelli
Model and/or type reference . :	XXAB002,XXAB003, XXAB004, XXAB005, XXAB006, XXAB007, XXAB008, XXAB009, XXAB010, XXAB011
Standards..... :	FCC Rules and Regulations Part 15 Subpart C Section 15.249 ANSI C63.10: 2013

This device described above has been tested by Shenzhen United Testing Technology Co., Ltd., 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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Date of Test..... :	
Date (s) of performance of tests..... :	Jul. 22 ~ 29, 2019
Date of Issue..... :	Jul. 30, 2019
Test Result..... :	Pass

Prepared by: Kahn Yang/Editor

Reviewer: Sherwin Qian/Supervisor

Approved & Authorized Signer: Liuze/Manager

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1. TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

DESCRIPTION OF TEST	RESULT
CONDUCTED EMISSIONS TEST	COMPLIANT
RADIATED EMISSION TEST	COMPLIANT
BAND EDGE	COMPLIANT
OCCUPIED BANDWIDTH MEASUREMENT	COMPLIANT
ANTENNA REQUIREMENT	COMPLIANT

1.2 TEST FACILITY

Test Firm : Shenzhen United Testing Technology Co., Ltd.

Address : 2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

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

CNAS-LAB Code: L6494

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of testing Laboratories.

Designation Number: CN1227

Test Firm Registration Number: 674885

The 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.

1.3 MEASUREMENT UNCERTAINTY

Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	=	4.06dB, k=2

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Circuit Controller
Trade Mark	X2intelli
Model Name	XXAB002
Serial Model	XXAB003, XXAB004, XXAB005, XXAB006, XXAB007, XXAB008, XXAB009, XXAB010, XXAB011
Model Difference	All models have same circuits diagram, PCB Layout, construction and rated power,only different is the model
FCC ID	2AT5P-XXAB
Antenna Type	Internal Antenna
Antenna Gain	0dBi
Frequency Range	2401-2482MHz
Number of Channels	82CH
Modulation Type	GFSK
Power Source	AC 100-240V 50/60Hz

Table for auxiliary equipment:

Equipment Description	Manufacturer	Model	Serial number
Notebook	Lenovo	Lenovo G475	GB14477457

2.2 Carrier Frequency of Channels

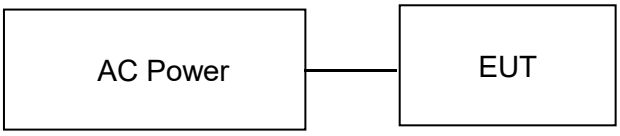
Channel List							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	**2401**	21	2422	42	2443	63	2464
01	2402	22	2423	43	2444	64	2465
02	2403	23	2424	44	2445	65	2466
03	2404	24	2425	45	2446	66	2467
04	2405	25	2426	46	2447	67	2468
05	2406	26	2427	47	2448	68	2469
06	2407	27	2428	48	2449	69	2470
07	2408	28	2429	49	2450	70	2471
08	2409	29	2430	50	2451	71	2472
09	2410	30	2431	51	2452	72	2473
10	2411	31	2432	52	2453	73	2474
11	2412	32	2433	53	2454	74	2475
12	2413	33	2434	54	2455	75	2476
13	2414	34	2435	55	2456	76	2477
14	2415	35	2436	56	2457	77	2478
15	2416	36	2437	57	2458	78	2479
16	2417	37	2438	58	2459	79	2480
17	2418	38	2439	59	2460	80	2481
18	2419	39	2440	60	2461	**81**	**2482**
19	2420	**40**	**2441**	61	2462		
20	2421	41	2442	62	2463		

2.3 Operation of EUT during testing

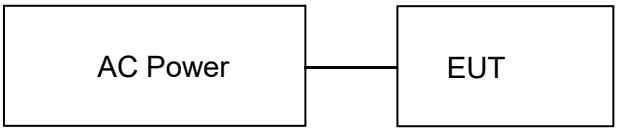
Operating Mode
The mode is used: Transmitting mode
Low Channel: 2401MHz
Middle Channel: 2441MHz
High Channel: 2482MHz

2.4 DESCRIPTION OF TEST SETUP

Operation of EUT during Conducted testing:



Operation of EUT during Radiation testing:



2.5 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
CONDUCTED EMISSIONS TEST					
1	AMN	Schwarzbeck	NNLK8121	8121370	2019.9.9
2	AMN	ETS	3810/2	00020199	2019.9.9
3	EMI TEST RECEIVER	Rohde&Schwarz	ESCI	101210	2019.9.9
4	AAN	TESEQ	T8-Cat6	38888	2019.9.9
RADIATED EMISSION TEST					
1	Horn Antenna	Sunol	DRH-118	A101415	2019.9.29
2	BicoNILog Antenna	Sunol	JB1 Antenna	A090215	2019.9.29
3	PREAMP	HP	8449B	3008A00160	2019.9.9
4	PREAMP	HP	8447D	2944A07999	2019.9.9
5	EMI TEST RECEIVER	Rohde&Schwarz	ESR3	101891	2019.9.9
6	VECTOR Signal Generator	Rohde&Schwarz	SMU200A	101521	2019.9.28
7	Signal Generator	Agilent	E4421B	MY4335105	2019.9.28
8	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2019.9.28
9	MXA Signal Analyzer	Agilent	N9020A	MY51110104	2019.9.9
10	ANT Tower&Turn table Controller	Champro	EM 1000	60764	2019.9.28
11	Anechoic Chamber	Taihe Maorui	9m*6m*6m	966A0001	2019.9.9
12	Shielding Room	Taihe Maorui	6.4m*4m*3m	643A0001	2019.9.9
13	RF Power sensor	DARE	RPR3006W	15I00041SNO88	2019.9.14
14	RF Power sensor	DARE	RPR3006W	15I00041SNO89	2019.9.14
15	RF power divider	Anritsu	K241B	992289	2019.9.28
16	Wideband radio communication tester	Rohde&Schwarz	CMW500	154987	2019.9.28
17	Biconical antenna	Schwarzbeck	VHA 9103	91032360	2019.9.8
18	Biconical antenna	Schwarzbeck	VHA 9103	91032361	2019.9.8
19	Broadband Hybrid Antennas	Schwarzbeck	VULB9163	VULB9163#958	2019.9.8
20	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1680	2020.1.12
21	Active Receive Loop Antenna	Schwarzbeck	FMZB 1919B	00023	2019.11.02
22	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170651	2020.3.14
23	Microwave Broadband Preamplifier	Schwarzbeck	BBV 9721	100472	2019.10.24
24	Active Loop Antenna	Com-Power	AL-130R	10160009	2019.9.8
25	Power Meter	KEYSIGHT	N1911A	MY50520168	2019.9.8
26	Frequency Meter	VICTOR	VC2000	997406086	2019.9.8
27	DC Power Source	HYELEC	HY5020E	055161818	2019.9.8
Test software					
1	E3	Audix	6.101223a	N/A	N/A

3. CONDUCTED EMISSIONS TEST

3.1 Conducted Power Line Emission Limit

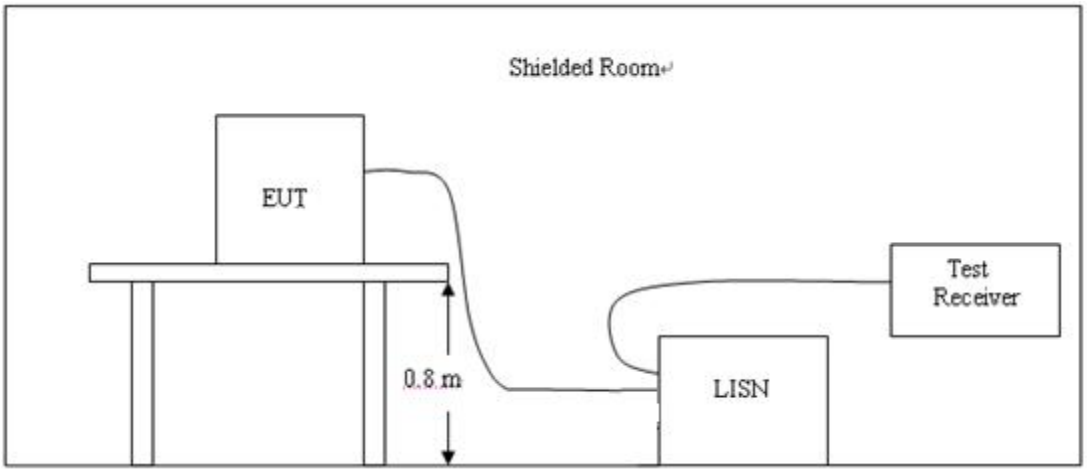
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

Frequency (MHz)	Maximum RF Line Voltage(dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15~0.50	79	66	66~56*	56~46*
0.50~5.00	73	60	56	46
5.00~30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

3.2 Test Setup



3.3 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.
2, Support equipment, if needed, was placed as per ANSI C63.10.
3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4, If a EUT received DC power from the USB Port of Notebook PC, the PC's 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.

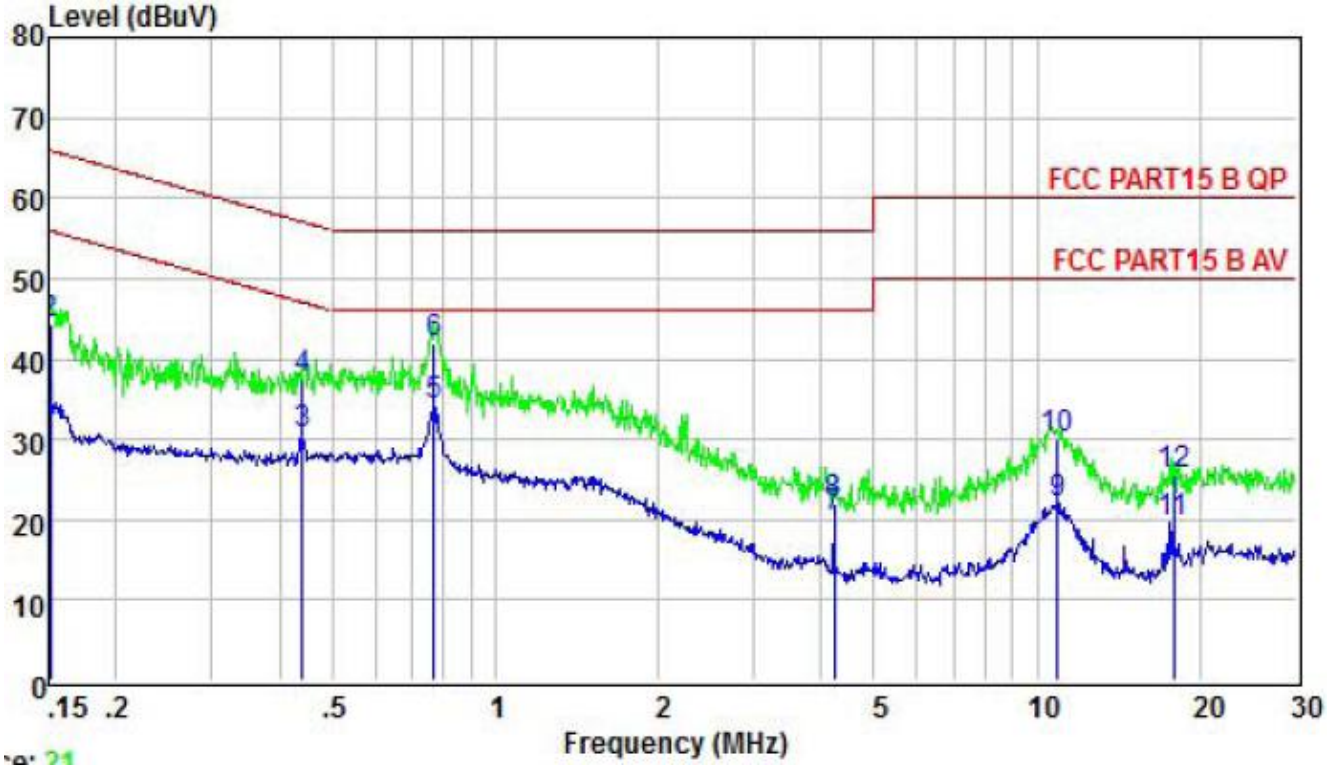
3.4 Test Result

Pass

Remark:

1. All modes were tested at AC 120V and 240V, only the worst result of AC 120V was reported.
2. All modes of Low, Middle, and High channel were tested, only the worst result of High Channel was reported as below:

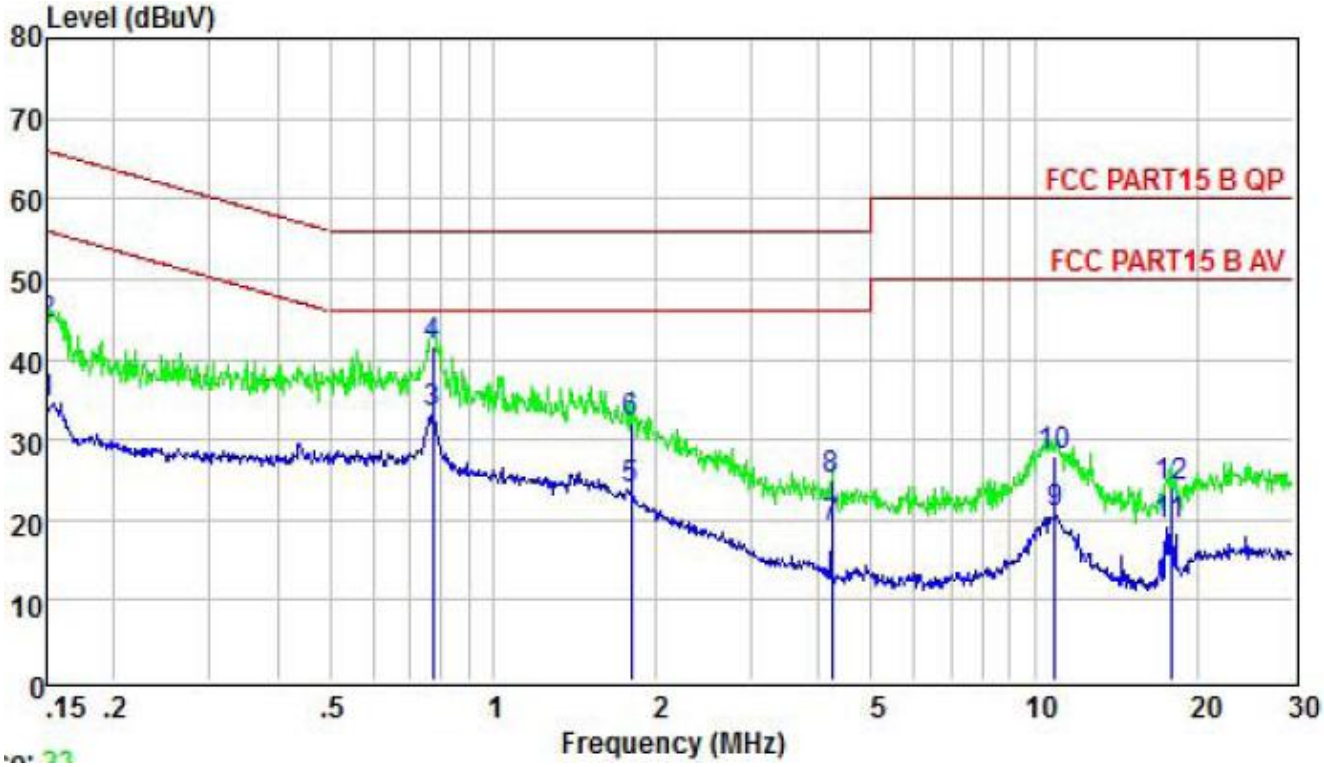
Temperature:	25℃	Relative Humidity:	49%
Test Date:	Jul. 24, 2019	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Line
Test Mode:	Transmitting mode of GFSK 2401MHz		



	Freq	Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dB	
1	0.151	33.47	9.70	0.24	55.96	-22.49	Average
2	0.151	44.29	9.70	0.24	65.96	-21.67	QP
3	0.442	30.59	9.59	0.25	47.02	-16.43	Average
4	0.442	37.49	9.59	0.25	57.02	-19.53	QP
5	0.771	34.32	9.60	0.26	46.00	-11.68	Average
6	0.771	41.90	9.60	0.26	56.00	-14.10	QP
7	4.224	20.15	9.63	0.30	46.00	-25.85	Average
8	4.224	22.12	9.63	0.30	56.00	-33.88	QP
9	10.905	21.92	9.70	0.40	50.00	-28.08	Average
10	10.905	30.00	9.70	0.40	60.00	-30.00	QP
11	17.849	19.75	9.73	0.47	50.00	-30.25	Average
12	17.849	25.69	9.73	0.47	60.00	-34.31	QP

Remark: Factor = Insertion Loss + Cable Loss, Result = Reading + Factor, Margin = Result – Limit.

Temperature:	25℃	Relative Humidity:	49%
Test Date:	Jul. 24, 2019	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Neutral
Test Mode:	Transmitting mode of GFSK 2401MHz		



	Freq	Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dB	
1	0.150	34.58	9.45	0.24	56.00	-21.42	Average
2	0.150	44.19	9.45	0.24	66.00	-21.81	QP
3	0.775	33.26	9.60	0.26	46.00	-12.74	Average
4	0.775	41.60	9.60	0.26	56.00	-14.40	QP
5	1.800	23.93	9.57	0.27	46.00	-22.07	Average
6	1.800	32.00	9.57	0.27	56.00	-24.00	QP
7	4.224	19.02	9.65	0.30	46.00	-26.98	Average
8	4.224	24.98	9.65	0.30	56.00	-31.02	QP
9	10.905	20.76	9.70	0.40	50.00	-29.24	Average
10	10.905	28.00	9.70	0.40	60.00	-32.00	QP
11	17.849	19.35	9.77	0.47	50.00	-30.65	Average
12	17.849	24.00	9.77	0.47	60.00	-36.00	QP

Remark: Factor = Insertion Loss + Cable Loss, Result = Reading + Factor, Margin = Result – Limit.

4. RADIATED EMISSION TEST

4.1 Radiation Limit

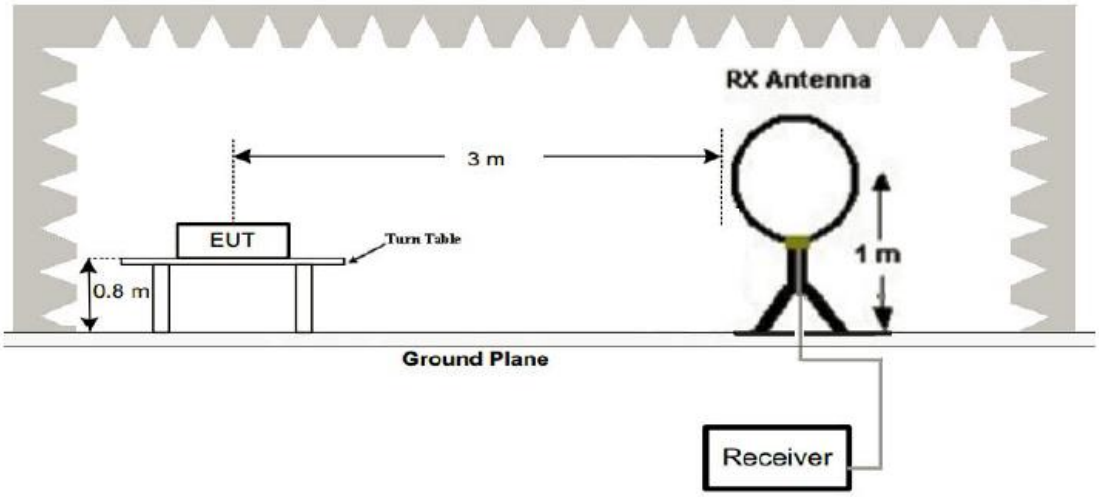
For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values：

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30-88	3	40	100
88-216	3	43.5	150
216-960	3	46	200
Above 960	3	54	500

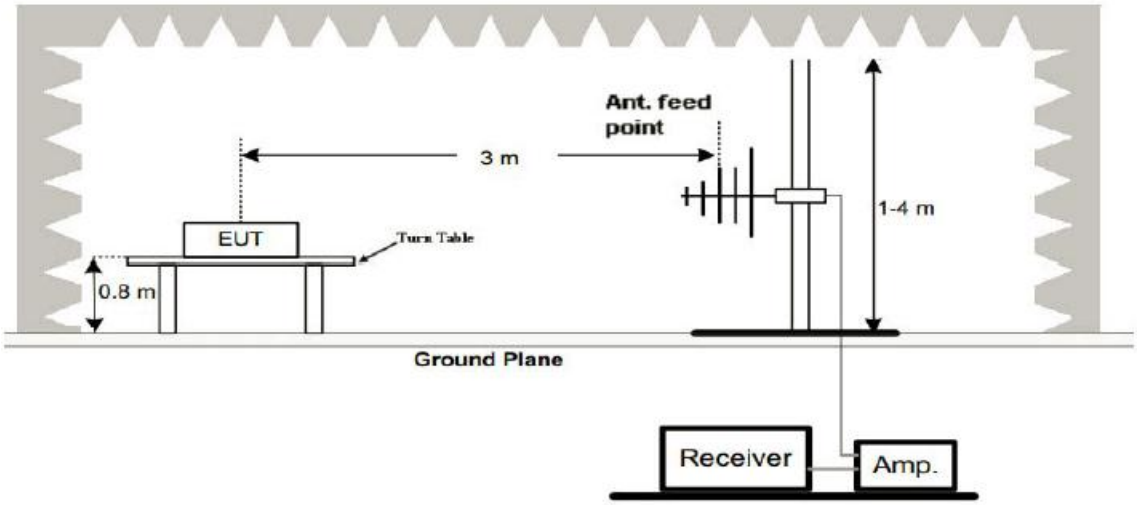
For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

4.2 Test Setup

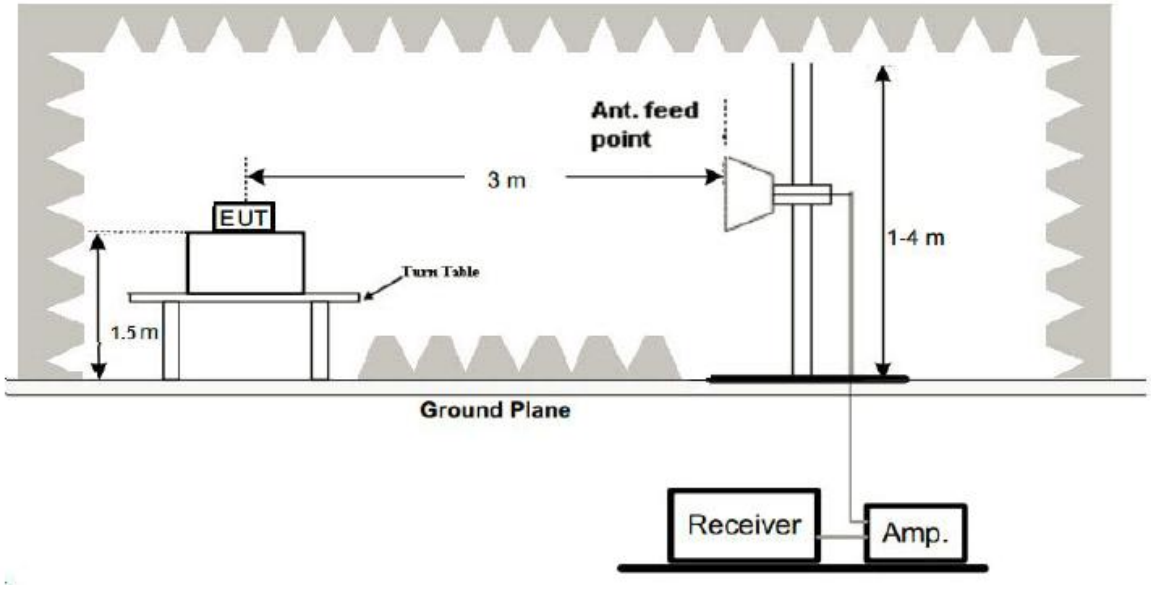
1. Radiated Emission Test-Up Frequency Below 30MHz



2. Radiated Emission Test-Up Frequency 30MHz~1GHz



3. Radiated Emission Test-Up Frequency Above 1GHz



4.3 Test Procedure

1. Below 1GHz measurement the EUT is placed on turntable which is 0.8m above ground plane. And above 1GHz measurement EUT was placed on low permittivity and low tangent turn table which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The test frequency range from 9KHz to 25GHz per FCC PART 15.33(a).
8. 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

Note:
For battery operated equipment, the equipment tests shall be performed using a new battery.

4.4 Test Result

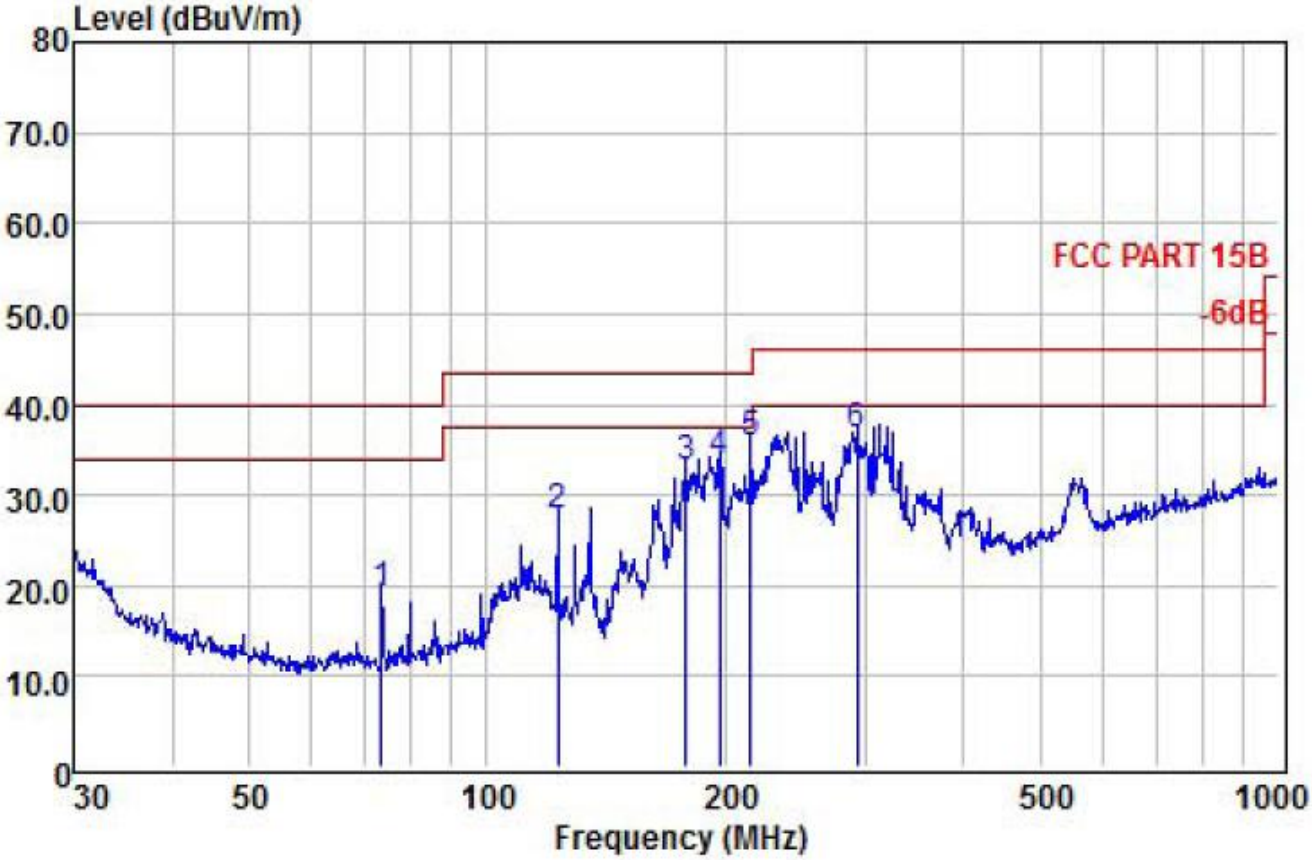
PASS

Remark:

1. All the test modes completed for test. The worst case of Radiated Emission is High channel, the test data of this mode was reported.
2. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “Z axis” position was the worst, and test data recorded in this report.
3. Radiated emission test from 9KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9KHz to 30MHz and not recorded in this report.

Below 1GHz Test Results:

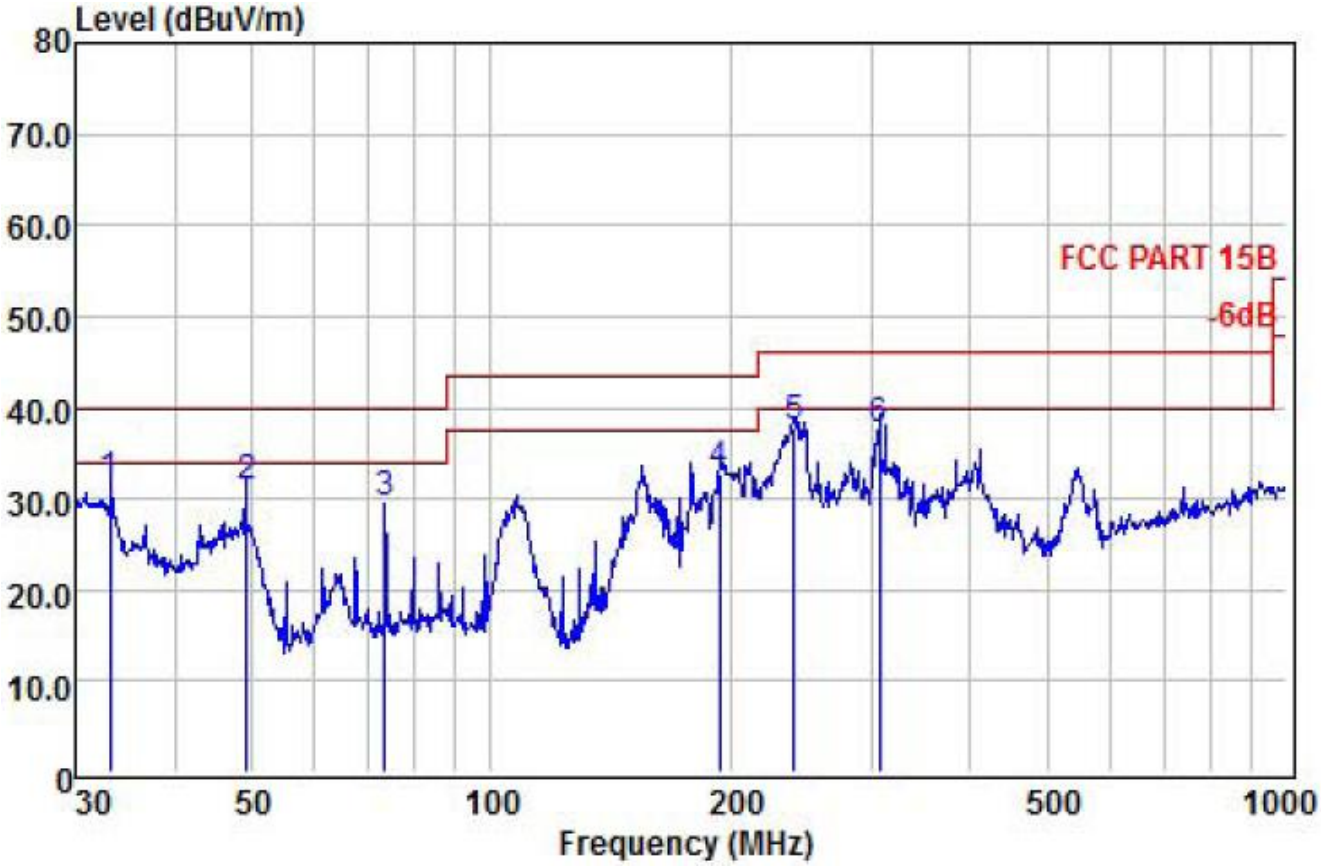
Temperature:	23℃	Relative Humidity:	49%
Test Date:	Jul. 24, 2019	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Polarization:	Horizontal
Test Mode:	Transmitting mode of GFSK 2480MHz		



	Freq	Read Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	73.617	11.28	7.75	0.14	19.17	40.00	-20.83	QP
2	122.834	18.91	8.50	0.21	27.62	43.50	-15.88	QP
3	178.133	22.49	10.25	0.24	32.98	43.50	-10.52	QP
4	196.510	22.42	11.00	0.30	33.72	43.50	-9.78	QP
5	215.268	23.41	11.90	0.38	35.69	43.50	-7.81	QP
6	293.084	22.43	13.60	0.62	36.65	46.00	-9.35	QP

Remark: Absolute Level = Reading Level + Factor, Margin = Absolute Level – Limit
Factor = Ant. Factor + Cable Loss

Temperature:	23℃	Relative Humidity:	49%
Test Date:	Jul. 24, 2019	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Polarization:	Vertical
Test Mode:	Transmitting mode of GFSK 2480MHz		



	Freq	Read Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	33.211	14.24	16.91	0.27	31.42	40.00	-8.58	QP
2	49.187	21.86	9.13	0.12	31.11	40.00	-8.89	QP
3	73.617	21.52	7.68	0.14	29.34	40.00	-10.66	QP
4	193.773	21.99	10.44	0.29	32.72	43.50	-10.78	QP
5	239.987	24.73	12.62	0.40	37.75	46.00	-8.25	QP
6	307.831	22.72	14.02	0.66	37.40	46.00	-8.60	QP

Remark: Absolute Level = Reading Level + Factor, Margin = Absolute Level – Limit
Factor = Ant. Factor + Cable Loss

Remark：
(1) Measuring frequencies from 9 KHz to the 1 GHz, Radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor.
(2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

Above 1 GHz Test Results :
CH Low (2401MHz)

Horizontal

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2401	111.52	-5.84	105.68	114	-8.32	PK
2401	83.46	-5.84	77.62	94	-16.38	AV
4802	62.56	-3.64	58.92	74	-15.08	PK
4802	52.29	-3.64	48.65	54	-5.35	AV
7203	59.87	-0.95	58.92	74	-15.08	PK
7203	48.45	-0.95	47.5	54	-6.5	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Vertical

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2401	111.27	-5.84	105.43	114	-8.57	PK
2401	81.56	-5.84	75.72	94	-18.28	AV
4802	61.38	-3.64	57.74	74	-16.26	PK
4802	52.29	-3.64	48.65	54	-5.35	AV
7203	57.72	-0.95	56.77	74	-17.23	PK
7203	47.86	-0.95	46.91	54	-7.09	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

CH Middle (2441MHz)

Horizontal

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2441	112.98	-5.71	107.27	114	-6.73	PK
2441	80.09	-5.71	74.38	94	-19.62	AV
4882	60.54	-3.51	57.03	74	-16.97	PK
4882	50.65	-3.51	47.14	54	-6.86	AV
7323	57.83	-0.82	57.01	74	-16.99	PK
7323	47.61	-0.82	46.79	54	-7.21	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Vertical

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2441	111.12	-5.71	105.41	114	-8.59	PK
2441	83.29	-5.71	77.58	94	-16.42	AV
4882	60.86	-3.51	57.35	74	-16.65	PK
4882	50.16	-3.51	46.65	54	-7.35	AV
7323	57.43	-0.82	56.61	74	-17.39	PK
7323	46.83	-0.82	46.01	54	-7.99	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

CH High (2482MHz)

Horizontal

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2482	107.58	-5.65	101.93	114	-12.07	PK
2482	79.64	-5.65	73.99	94	-20.01	AV
4964	62.28	-3.44	58.84	74	-15.16	PK
4964	48.83	-3.44	45.39	54	-8.61	AV
7446	58.82	-0.77	58.05	74	-15.95	PK
7446	46.68	-0.77	45.91	54	-8.09	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Vertical

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2482	105.39	-5.65	99.74	114	-14.26	PK
2482	78.75	-5.65	73.1	94	-20.9	AV
4966	59.98	-3.44	56.54	74	-17.46	PK
4966	48.87	-3.44	45.43	54	-8.57	AV
7449	57.32	-0.77	56.55	74	-17.45	PK
7449	46.29	-0.77	45.52	54	-8.48	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Remark:
(1) Measuring frequencies from 1 GHz to the 25 GHz.
(2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.
(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(4) Data of measurement within this frequency range shown “--- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.
(7)All modes of operation were investigated and the worst-case emissions are reported.

5. BAND EDGE

5.1 Limits

FCC PART 15.247 Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

5.2 Test Procedure

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW to 1MHz and VBM to 3MHz to measure the peak field strength and set RBW to 1MHz and VBW to 10kHz to measure the average radiated field strength. The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW to 100 KHz and VBW to 300 KHz, to measure the conducted peak band edge.

5.3 Test Result

PASS

Radiated Band Edge Test:

Operation Mode: TX CH Low (2401MHz)

Horizontal

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2310	54.65	-5.81	48.84	74	-25.16	PK
2310	/	-5.81	/	54	/	AV
2390	54.57	-5.84	48.73	74	-25.27	PK
2390	/	-5.84	/	54	/	AV
2400	54.66	-5.84	48.82	74	-25.18	PK
2400	/	-5.84	/	54	/	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2310	54.27	-5.81	48.46	74	-25.54	PK
2310	/	-5.81	/	54	/	AV
2390	54.18	-5.84	48.34	74	-25.66	PK
2390	/	-5.84	/	54	/	AV
2400	54.32	-5.84	48.48	74	-25.52	PK
2400	/	-5.84	/	54	/	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High (2482MHz)

Horizontal

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2483.5	54.29	-5.65	48.64	74	-25.36	PK
2483.5	/	-5.65	/	54	/	AV
2500	54.18	-5.72	48.46	74	-25.54	PK
2500	/	-5.72	/	54	/	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2483.5	54.57	-5.65	48.92	74	-25.08	PK
2483.5	/	-5.65	/	54	/	AV
2500	54.16	-5.72	48.44	74	-25.56	PK
2500	/	-5.72	/	54	/	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

6. OCCUPIED BANDWIDTH MEASUREMENT

6.1 Test Setup

Same as Radiated Emission Measurement

6.2 Test Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation.
3. Based on ANSI C63.10 section 6.9.2: RBW=30KHz, VBW=100KHz, Span=3MHz.
4. The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector.

6.3 Measurement Equipment Used

Same as Radiated Emission Measurement

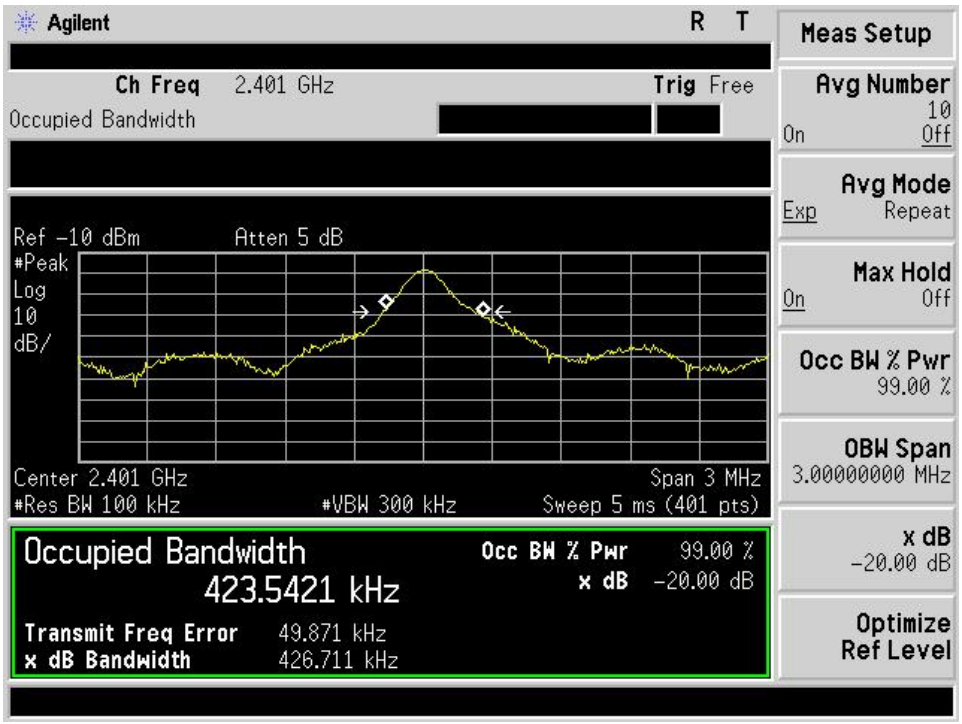
6.4 Test Result

PASS

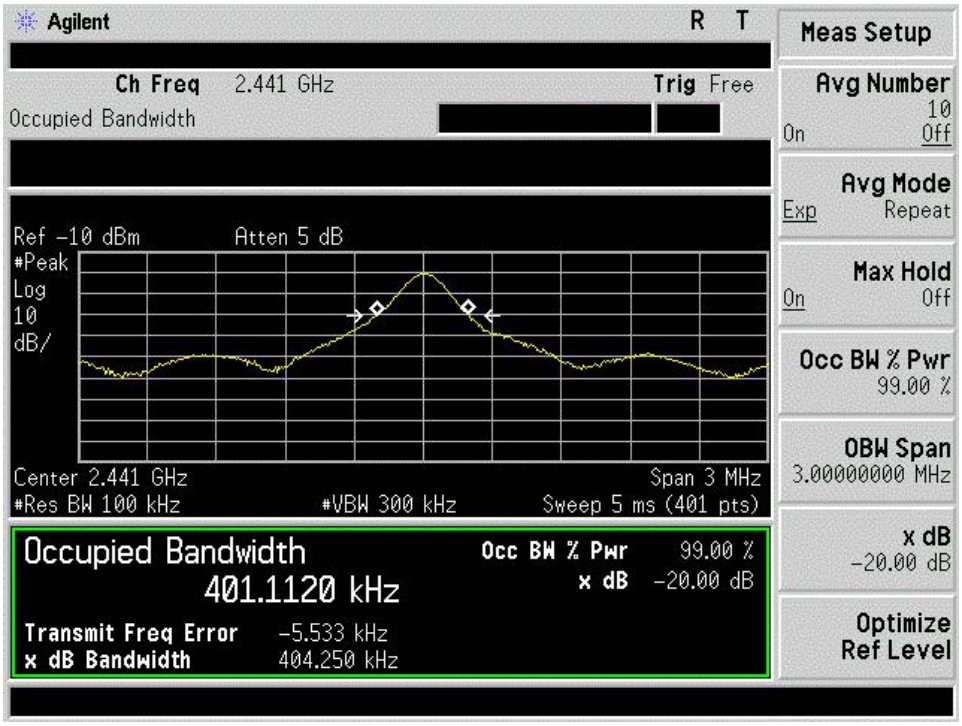
GFSK Modulation:

Frequency (MHz)	20dB Bandwidth (MHz)	Result
2401	0.427	PASS
2441	0.401	PASS
2482	0.408	PASS

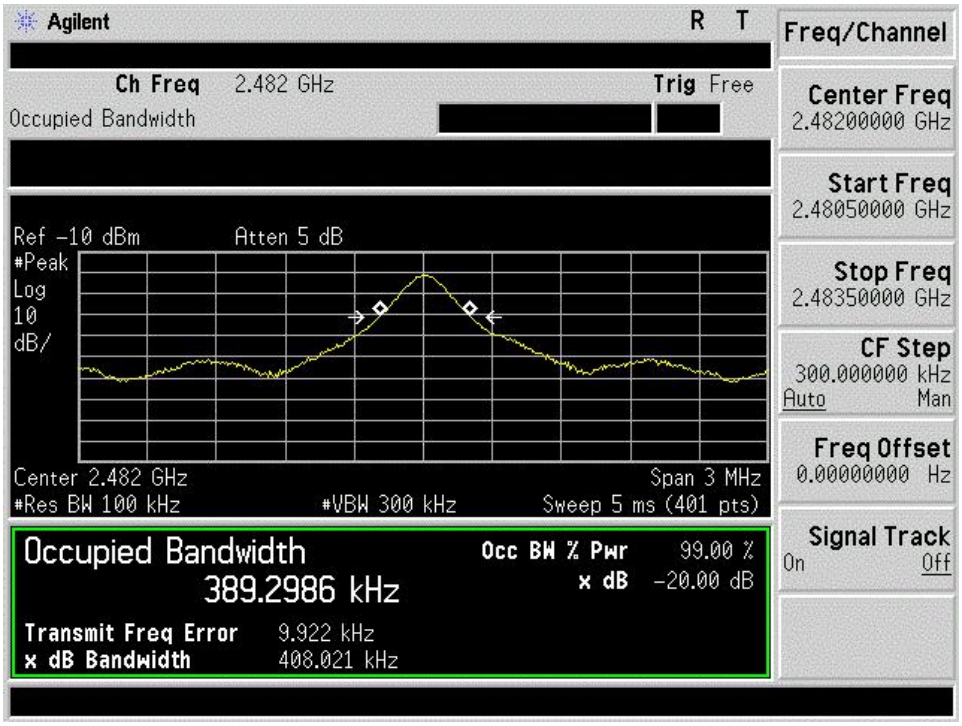
CH: 2401MHz



CH: 2441MHz



CH: 2482MHz

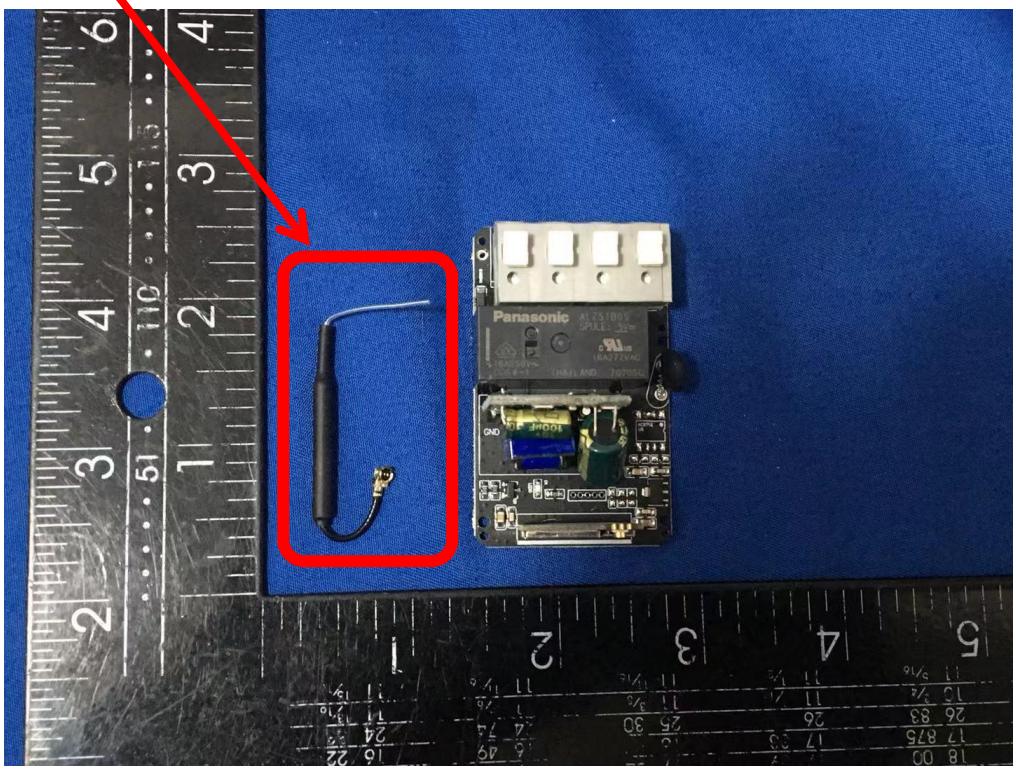


7. ANTENNA REQUIREMENT

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.

Antenna Connected Construction
The antenna used in this product is an Internal Antenna, The directional gains of antenna used for transmitting is 0dBi.

ANTENNA:



8. PHOTOGRAPH OF TEST

Radiated Emission
(Below 1G)

Radiated Emission
(Above 1G)

Conducted Emission

End of Report