FCC RADIO TEST REPORT

FCC ID: 2ARPGTC-1

Product： Tilted controller

Trade Name： N/A

Model Name： TC-1

Serial Model： N/A

Report No.： UNIA2018083003FR-01

Prepared for

SHENZHEN SHANGYUE TECH COMPANY LIMITID

114D, Unit 2, Building 5, ShanYuHaiYuan, Shaodi Rd, ChiWan, NanShan District, Shenzhen, China

Prepared by

Shenzhen United Testing Technology Co., Ltd.

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TEST RESULT CERTIFICATION

Applicant's name .....: SHENZHEN SHANGYUE TECH COMPANY LIMITID

Address .....: 114D, Unit 2, Building 5, ShanYuHaiYuan, Shaodi Rd, ChiWan, NanShan District, Shenzhen, China

Manufacture's Name.....: SHENZHEN SHANGYUE TECH COMPANY LIMITID

Address .....: 114D, Unit 2, Building 5, ShanYuHaiYuan, Shaodi Rd, ChiWan, NanShan District, Shenzhen, China

Product description

Product name.....: Tilted controller

Trade Mark .....: N/A

Model and/or type reference : TC-1

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.....: Oct. 22, 2018 ~ Nov. 06, 2018

Date of Issue .....: Nov. 06, 2018

Test Result.....: Pass

Prepared by: Kahn.Yang

Kahn yang/Editor

Reviewer: Sherwin Qian

Sherwin Qian/Supervisor

Approved & Authorized Signer: liuze

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	Tilted controller
Trade Mark	N/A
Model Name	TC-1
Serial No.	N/A
Model Difference	N/A
FCC ID	2ARPGTC-1
Antenna Type	PCB Antenna
Antenna Gain	1dBi
Operation frequency	2401MHz~2480MHz
Number of Channels	80CH
Modulation Type	GFSK
Battery	DC 3.7V, 250mAh
Power Source	DC 3.7V from Battery or DC 5V from adapter with AC 120(240)V/60Hz
Adapter Model	M/N: HW-050100C2W Input: AC 100-240V, 50/60Hz, 0.2A Output: DC 5V, 1.0A

Table for auxiliary equipment:

Equipment Description	Manufacturer	Model	Calibration Due Date
Adapter	Hangjia	HW-050100C2W	N/A

2.2 Carrier Frequency of Channels

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

2.3 Operation of EUT during testing

Operating Mode
The mode is used: Transmitting mode
Low Channel: 2401MHz
Middle Channel: 2440MHz
High Channel: 2480MHz

2.4 DESCRIPTION OF TEST SETUP

Operation of EUT during Conducted testing:

Operation of EUT during Radiation and Above1GHz 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	2019.3.14
14	RF Power sensor	DARE	RPR3006W	15I00041SNO89	2019.3.14
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	2019.1.12
21	Active Receive Loop Antenna	Schwarzbeck	FMZB 1919B	00023	2019.9.8
22	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170651	2019.03.14
23	Microwave Broadband Preamplifier	Schwarzbeck	BBV 9721	100472	2019.9.8
24	Active Loop Antenna	Com-Power	AL-130R	10160009	2019.05.10
25	Power Meter	KEYSIGHT	N1911A	MY50520168	2019.05.10
26	Frequency Meter	VICTOR	VC2000	997406086	2019.05.10
27	DC Power Source	HYELEC	HY5020E	055161818	2019.05.10

3 CONDUCTED EMISSIONS TEST

3.1 Conducted Power Line Emission Limit

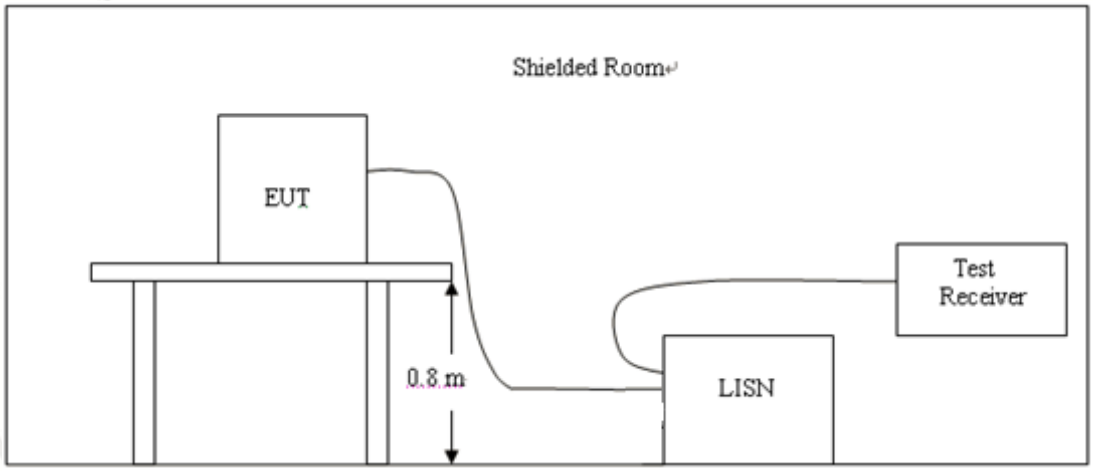
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

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 placed on 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.

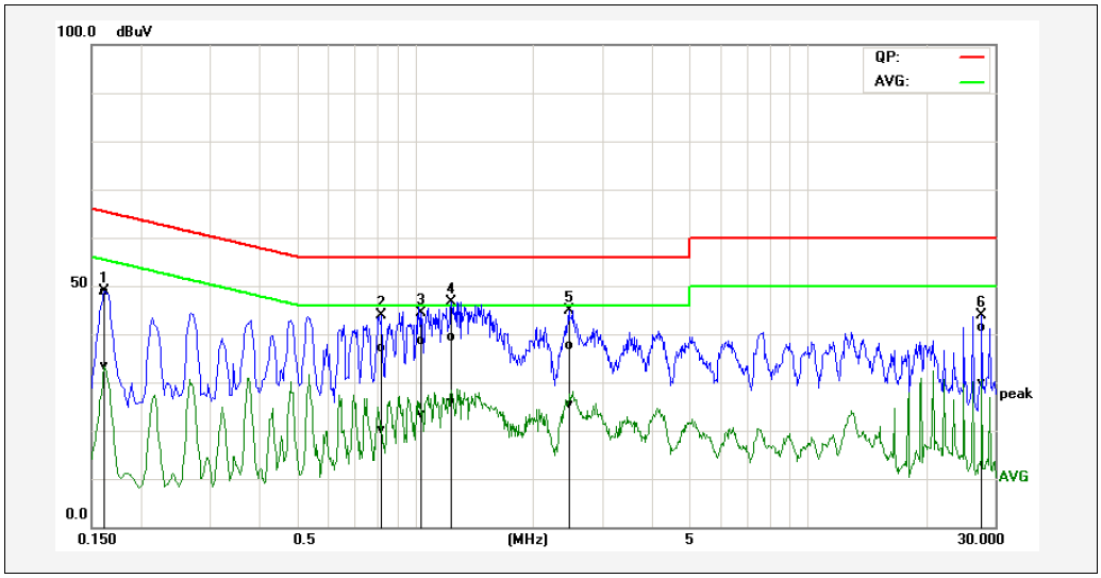
3.4 Test Result

PASS

Remark:

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

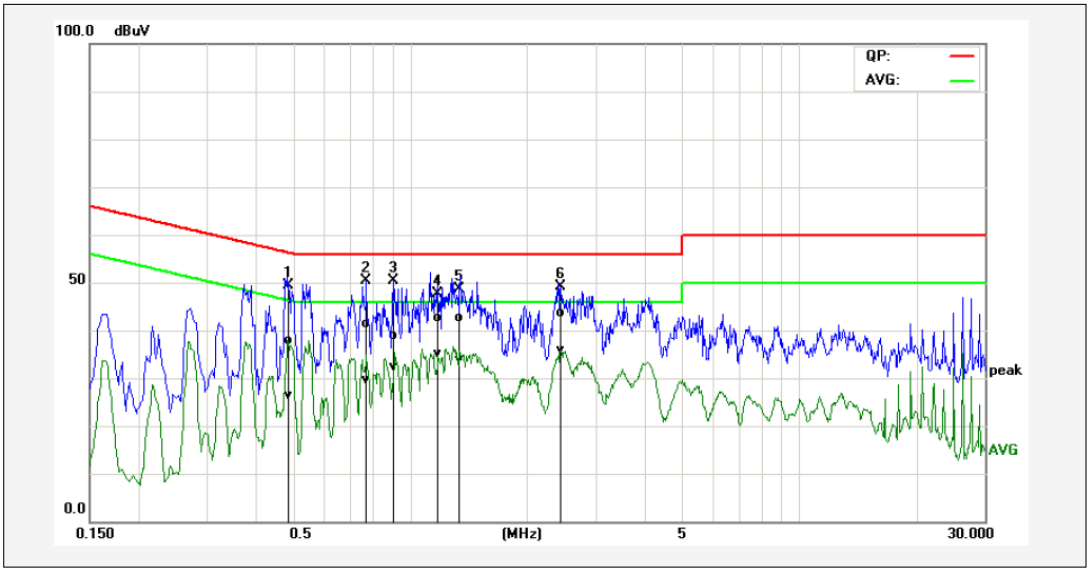
Temperature:	26℃	Relative Humidity:	48%
Test Date:	Oct. 24, 2018	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Line
Test Mode:	Transmitting mode of 2401MHz		



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1*	0.1620	40.44	24.85	8.49	48.93	33.34	65.36	55.36	-16.43	-22.02	Pass
2P	0.8242	27.21	10.09	9.99	37.20	20.08	56.00	46.00	-18.80	-25.92	Pass
3P	1.0439	28.68	13.39	10.03	38.71	23.42	56.00	46.00	-17.29	-22.58	Pass
4P	1.2345	29.43	15.81	10.02	39.45	25.83	56.00	46.00	-16.55	-20.17	Pass
5P	2.4844	27.62	15.39	10.09	37.71	25.48	56.00	46.00	-18.29	-20.52	Pass
6P	27.7332	30.64	19.15	10.73	41.37	29.88	60.00	50.00	-18.63	-20.12	Pass

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

Temperature:	26℃	Relative Humidity:	48%
Test Date:	Oct. 24, 2018	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Neutral
Test Mode:	Transmitting mode of 2401MHz		



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1P	0.4907	27.98	16.45	9.95	37.93	26.40	56.16	46.16	-18.23	-19.76	Pass
2P	0.7716	31.52	19.67	9.97	41.49	29.64	56.00	46.00	-14.51	-16.36	Pass
3P	0.9103	28.80	22.26	10.00	38.80	32.26	56.00	46.00	-17.20	-13.74	Pass
4P	1.1865	32.52	25.11	10.02	42.54	35.13	56.00	46.00	-13.46	-10.87	Pass
5P	1.3235	32.51	23.91	10.05	42.56	33.96	56.00	46.00	-13.44	-12.04	Pass
6*	2.4518	33.62	25.68	10.08	43.70	35.76	56.00	46.00	-12.30	-10.24	Pass

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

4 RADIATED EMISSION TEST

4.1 Radiation Limit

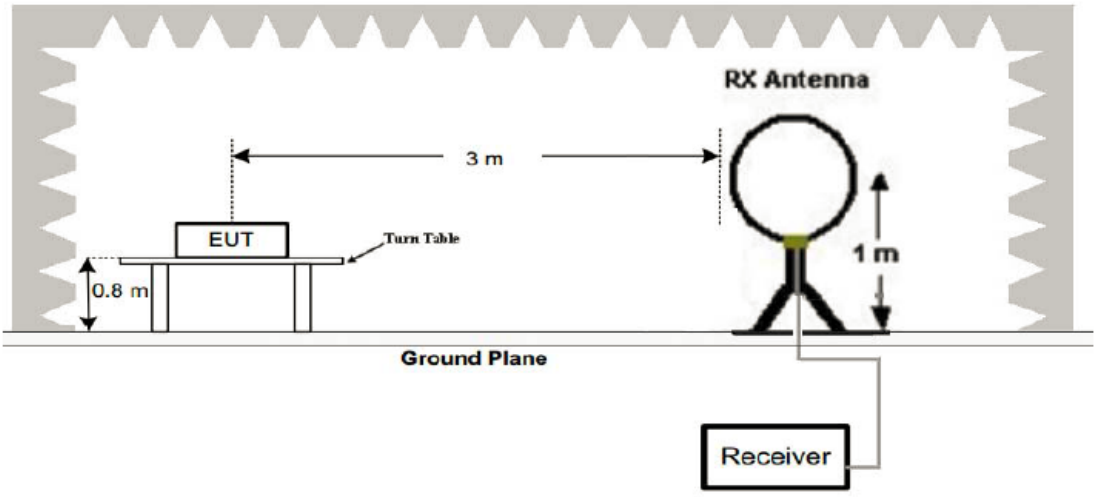
For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values：

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

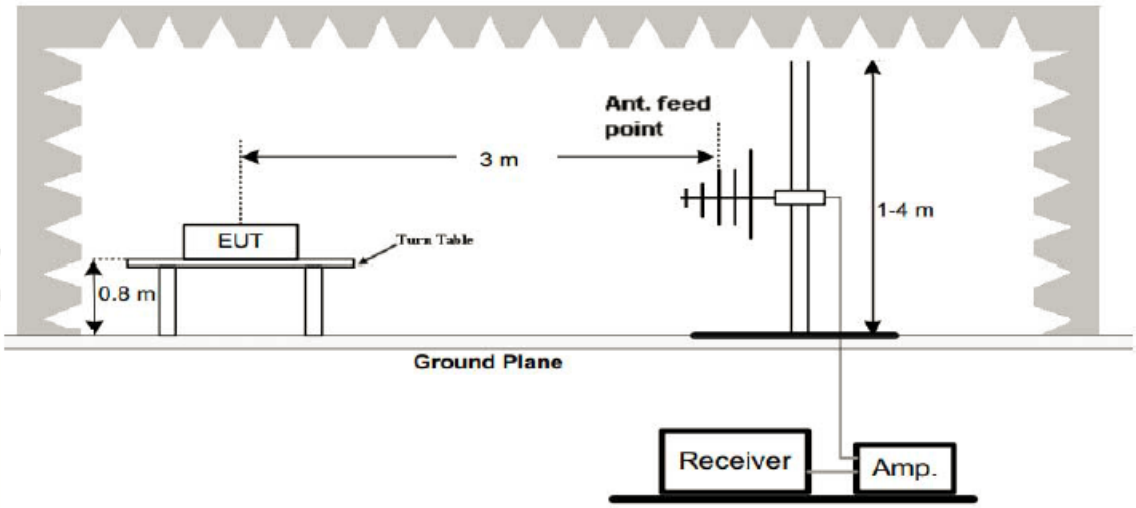
For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

4.2 Test Setup

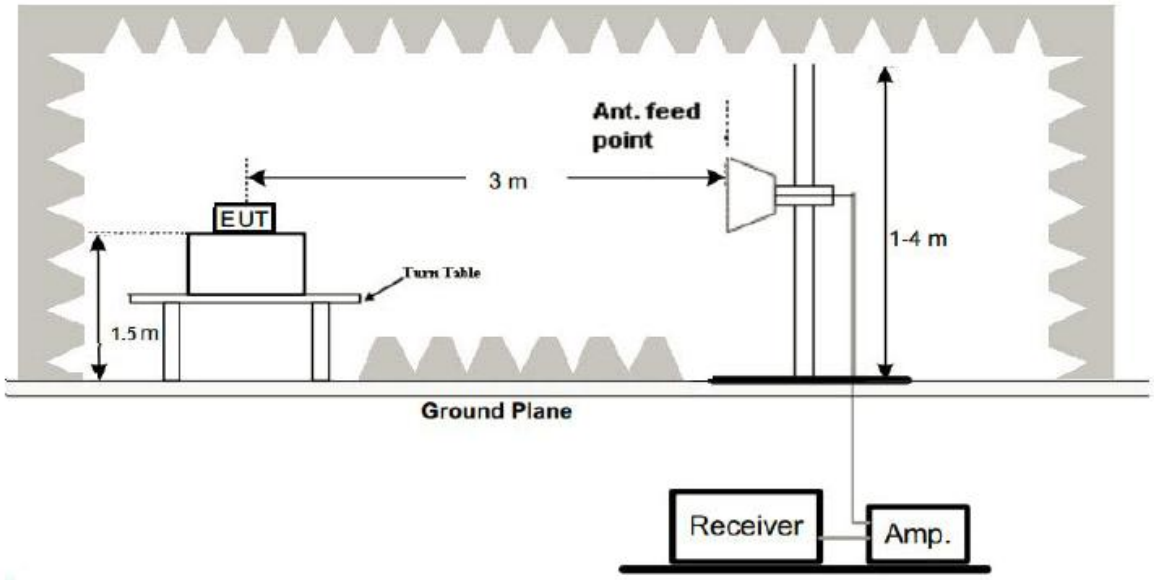
1. Radiated Emission Test-Up Frequency Below 30MHz



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).

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

4.4 Test Result

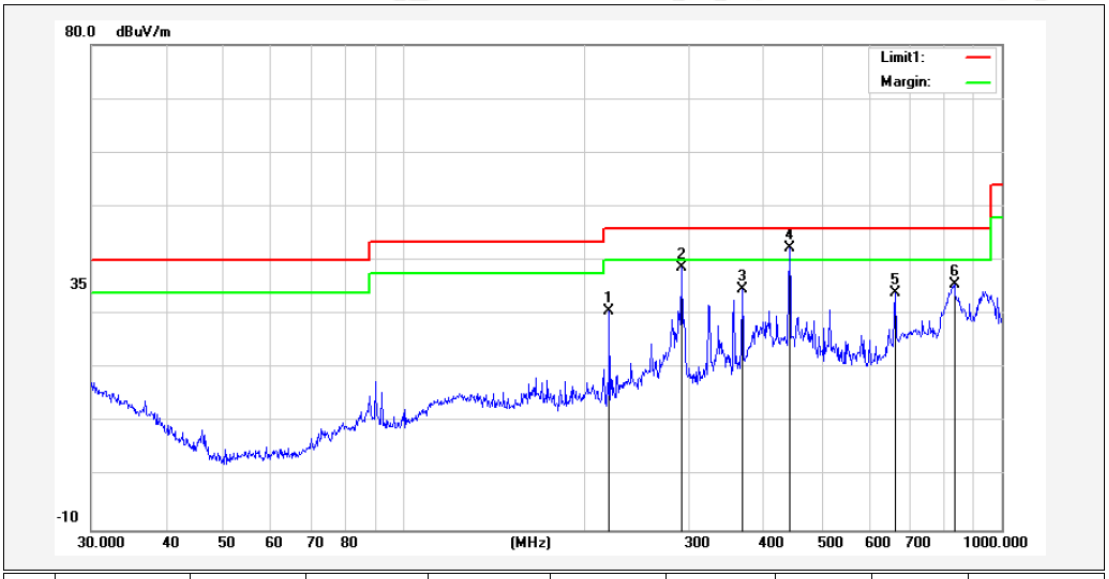
PASS

Remark:

1. All modes were tested, only the worst result of the Low channel 2401MHz 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:

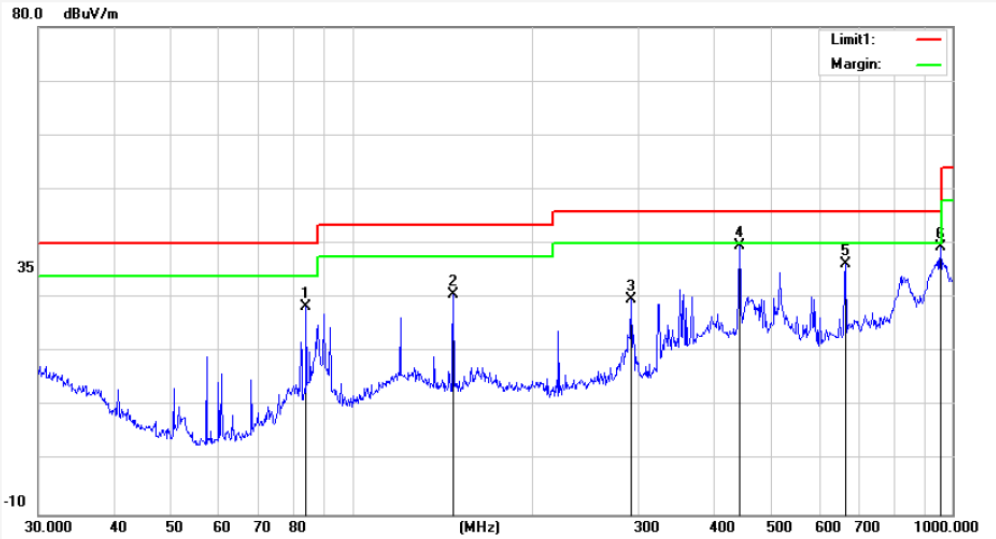
Temperature:	22℃	Relative Humidity:	48%
Test Date:	Oct. 24, 2018	Pressure:	1010hPa
Test Voltage:	DC 3.7V from Battery	Polarization:	Horizontal
Test Mode:	Transmitting mode of 2401MHz		



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	220.6171	45.32	-14.61	30.71	46.00	-15.29			peak
2	291.0360	51.28	-12.48	38.80	46.00	-7.20			peak
3	368.1116	46.11	-11.37	34.74	46.00	-11.26			peak
4*	441.7426	52.05	-9.79	42.26	46.00	-3.74			peak
5	663.4729	39.47	-5.42	34.05	46.00	-11.95			peak
6	833.3171	38.92	-3.45	35.47	46.00	-10.53			peak

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

Temperature:	22℃	Relative Humidity:	48%
Test Date:	Oct. 24, 2018	Pressure:	1010hPa
Test Voltage:	DC 3.7V from Battery	Polarization:	Vertical
Test Mode:	Transmitting mode of 2401MHz		



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	83.8156	47.29	-18.89	28.40	40.00	-11.60			peak
2	147.4036	44.11	-13.48	30.63	43.50	-12.87			peak
3	291.0360	42.14	-12.48	29.66	46.00	-16.34			peak
4*	441.7426	49.45	-9.79	39.66	46.00	-6.34			peak
5	663.4729	41.56	-5.42	36.14	46.00	-9.86			peak
6	955.4381	40.77	-1.48	39.29	46.00	-6.71			peak

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

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	111.64	-5.84	105.80	114	-8.20	PK
2401	82.16	-5.84	76.32	94	-17.68	AV
4802	62.31	-3.64	58.67	74	-15.33	PK
4802	49.85	-3.64	46.21	54	-7.79	AV
7203	58.35	-0.95	57.40	74	-16.60	PK
7203	46.69	-0.95	45.74	54	-8.26	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	111.12	-5.84	105.28	114	-8.72	PK
2401	82.59	-5.84	76.75	94	-17.25	AV
4802	60.67	-3.64	57.03	74	-16.97	PK
4802	51.12	-3.64	47.48	54	-6.52	AV
7203	57.66	-0.95	56.71	74	-17.29	PK
7203	47.36	-0.95	46.41	54	-7.59	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

CH Middle (2440MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2440	110.23	-5.71	104.52	114	-9.48	PK
2440	80.78	-5.71	75.07	94	-18.93	AV
4880	60.35	-3.51	56.84	74	-17.16	PK
4880	50.21	-3.51	46.70	54	-7.30	AV
7320	55.49	-0.82	54.67	74	-19.33	PK
7320	46.23	-0.82	45.41	54	-8.59	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
2440	110.54	-5.71	104.83	114	-9.17	PK
2440	81.27	-5.71	75.56	94	-18.44	AV
4880	60.36	-3.51	56.85	74	-17.15	PK
4880	51.21	-3.51	47.70	54	-6.30	AV
7320	55.78	-0.82	54.96	74	-19.04	PK
7320	46.53	-0.82	45.71	54	-8.29	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

CH High (2480MHz)
Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	110.63	-5.65	104.98	114	-9.02	PK
2480	82.09	-5.65	76.44	94	-17.56	AV
4960	61.35	-3.43	57.92	74	-16.08	PK
4960	50.03	-3.43	46.60	54	-7.40	AV
7440	56.23	-0.75	55.48	74	-18.52	PK
7440	45.85	-0.75	45.10	54	-8.90	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
2480	110.52	-5.65	104.87	114	-9.13	PK
2480	81.23	-5.65	75.58	94	-18.42	AV
4960	59.96	-3.43	56.53	74	-17.47	PK
4960	49.98	-3.43	46.55	54	-7.45	AV
7440	54.86	-0.75	54.11	74	-19.89	PK
7440	46.03	-0.75	45.28	54	-8.72	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 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 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 100KHz and VBM to 300KHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz 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	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2310	55.96	-5.81	50.15	74	-23.85	PK
2310	/	-5.81	/	54	/	AV
2390	56.15	-5.84	50.31	74	-23.69	PK
2390	/	-5.84	/	54	/	AV
2400	57.04	-5.84	51.20	74	-22.80	PK
2400	/	-5.84	/	54	/	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2310	55.68	-5.81	49.87	74	-24.13	PK
2310	/	-5.81	/	54	/	AV
2390	55.87	-5.84	50.03	74	-23.97	PK
2390	/	-5.84	/	54	/	AV
2400	56.82	-5.84	50.98	74	-23.02	PK
2400	/	-5.84	/	54	/	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High (2480MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2483.5	57.34	-5.65	51.69	74	-22.31	PK
2483.5	/	-5.65	/	54	/	AV
2500	56.45	-5.72	50.73	74	-23.27	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	56.12	-5.65	50.47	74	-23.53	PK
2483.5	/	-5.65	/	54	/	AV
2500	57.26	-5.72	51.54	74	-22.46	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=2MHz.
4. The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector.

6.3 Measurement Equipment Used

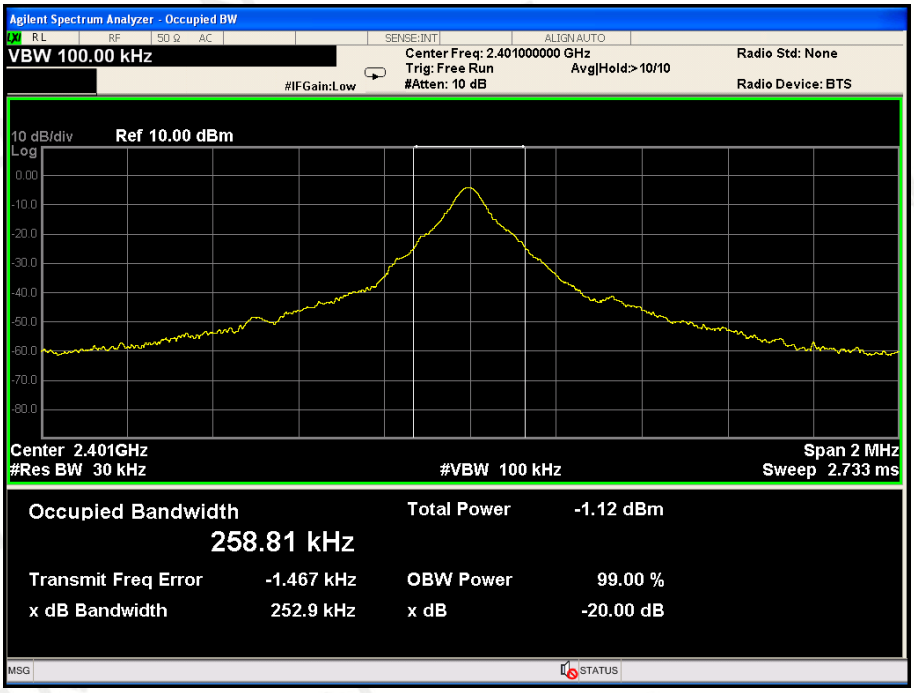
Same as Radiated Emission Measurement

6.4 Test Result

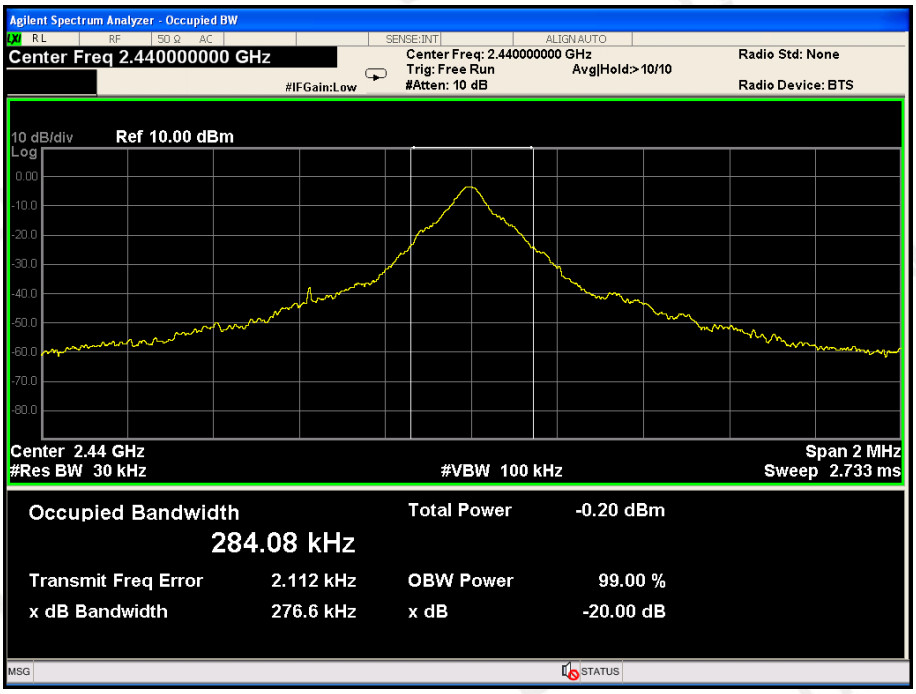
PASS

Frequency (MHz)	20dB Bandwidth (MHz)	Result
2401	0.2529	PASS
2440	0.2766	PASS
2480	0.2815	PASS

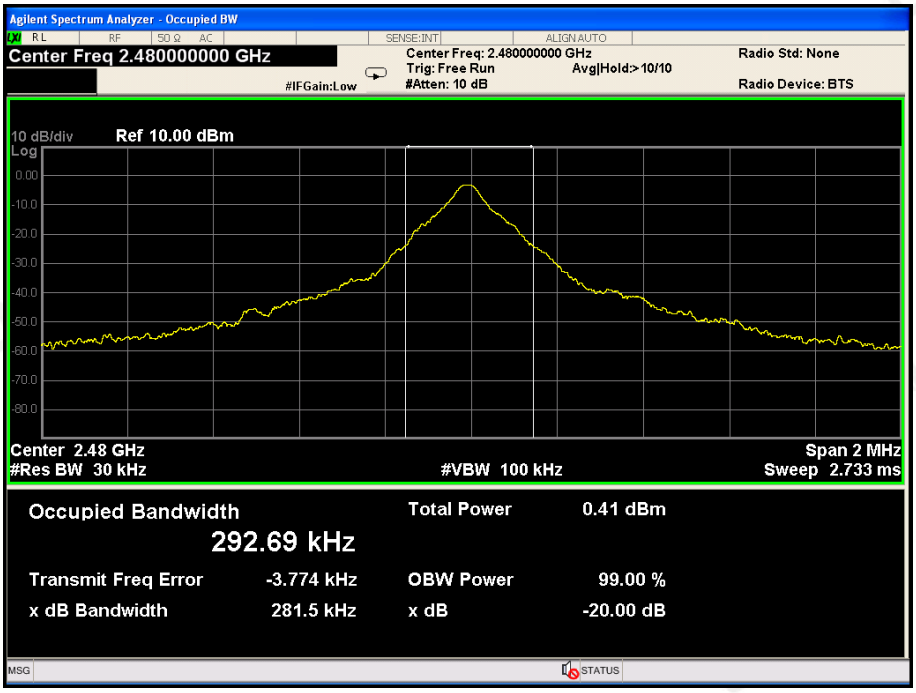
CH: 2401MHz



CH: 2440MHz



CH: 2480MHz

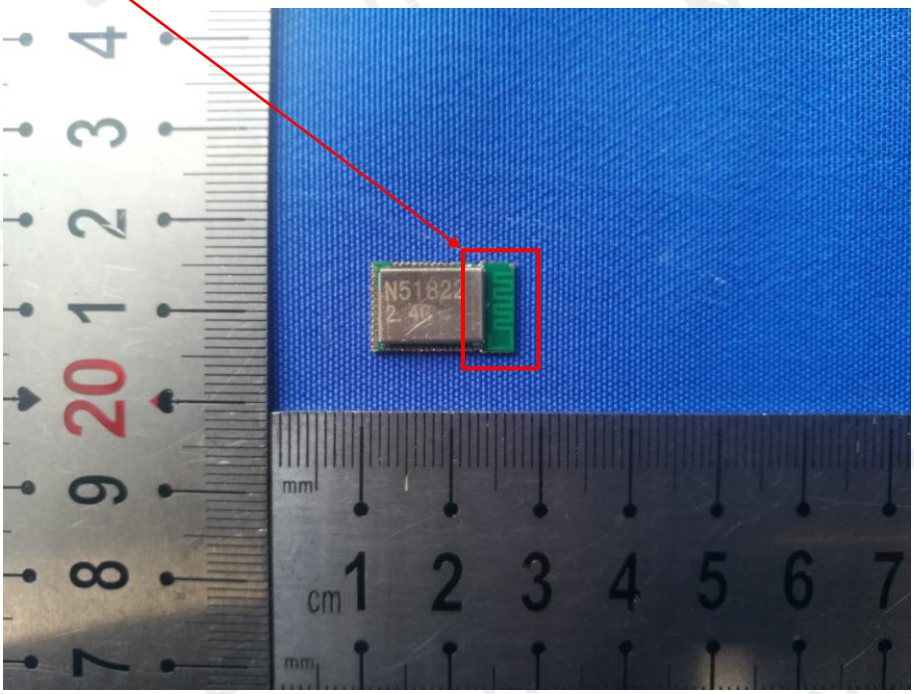


7 ANTENNA REQUIREMENT

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 a PCB Antenna. The directional gains of antenna used for transmitting is 1dBi.

ANTENNA:



8 PHOTOGRAPH OF TEST

8.1 Radiated Emission

8.2 Conducted Emission

End of Report