FCC TEST REPORT

Test report
On Behalf of
Maxell Corporation of America
For
Jelleez Bluetooth Earbuds

Model No.: #1207

FCC ID: WKA-1207

Prepared for :	**Maxell Corporation of America** **3 Garret Mountain Plaza, Woodland Park, New Jersey 07424, United States**
Prepared By :	**Shenzhen HUAK Testing Technology Co., Ltd.** **1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China**
Date of Test:	**Jal. 31, 2019 ~ Aug. 08, 2019**
Date of Report:	**Aug. 08, 2019**
Report Number:	**HK1907311856-E**

TEST RESULT CERTIFICATION

Applicant's name.....:	Maxell Corporation of America
Address .....:	3 Garret Mountain Plaza, Woodland Park, New Jersey 07424, United States
Manufacture's Name .....:	Boluo County Quancheng Electronic co.,Ltd
Address .....:	Fuxing Ind, Futian Town, Boluo City,Huizhou, Guangdong province, China
Product description	
Trade Mark:	Maxell
Product name.....:	Jelleez Bluetooth Earbuds
Model and/or type reference .:	#1207
Standards.....:	FCC Rules and Regulations Part 15 Subpart C Section 15.249 ANSI C63.10: 2013

Date of Test.....:	
Date (s) of performance of tests.....:	**Jul. 31, 2019 ~ Aug. 08, 2019**
Date of Issue.....:	**Aug. 08, 2019**
Test Result.....:	**Pass**

Testing Engineer : Gary Qian

(Gary Qian)

Technical Manager : Eden Hu

(Eden Hu)

Authorized Signatory : Jason Zhou

(Jason Zhou)

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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 HUAK Testing Technology Co., Ltd.

Address 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China

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	Jelleez Bluetooth Earbuds
Model Name	#1207
Serial No	N/A
Model Difference	N/A
Antenna Type	PCB Antenna
Antenna Gain	0 dBi
BT Operation frequency	2402-2480MHz
Number of Channels	79CH
Modulation Type	GFSK, π/4DQPSK, 8DPSK
Power Source	DC 5V by Adapter AC 120V/60Hz DC 3.7V battery
Power Rating	DC 5V by Adapter AC 120V/60Hz DC 3.7V battery

2.1.1 Carrier Frequency of Channels

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

2.2 Operation of EUT during testing

Operating Mode

Preliminary tests were performed in each mode and packet length of BT, and found worst case as bellow, finally test were conducted at those mode and recorded in this report.

Test Items	Worst case
CONDUCTED EMISSIONS TEST	DH5 Middle channel
RADIATED EMISSION TEST	DH5 Middle channel
BAND EDGE	DH5
OCCUPIED BANDWIDTH MEASUREMENT	DH5/2DH5/3DH5
ANTENNA REQUIREMENT	DH5/2DH5/3DH5 Middle channel

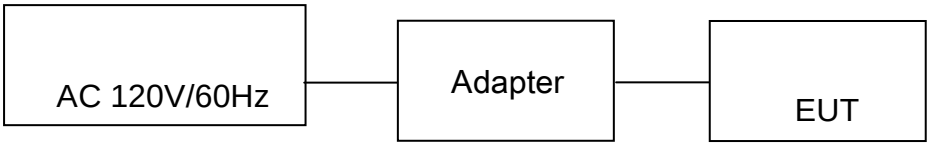
The mode is used: **Transmitting mode**

Low Channel: 2402MHz
Middle Channel: 2441MHz
High Channel: 2480MHz

2.3 DESCRIPTION OF TEST SETUP

Operation of EUT during Conducted testing:

Operation of EUT during Radiation and Above1GHz Radiation testing:



● Adapter information

Model: HW-DJ133-45
Input: 100-240V~, 50/60Hz, 0.5A
Output: 5VDC, 1A

2.4 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Dec. 28, 2018	1 Year
2.	Receiver	R&S	ESCI 7	HKE-010	Dec. 28, 2018	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 28, 2018	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Dec. 28, 2018	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2018	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 28, 2018	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Dec. 28, 2018	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 28, 2018	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 28, 2018	1 Year
10.	Horn Antenna	Schewarzbeck	9120D	HKE-013	Dec. 28, 2018	1 Year
11.	Pre-amplifier	EMCI	EMC051845 SE	HKE-015	Dec. 28, 2018	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Dec. 28, 2018	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JS1120-B Version	HKE-083	Dec. 28, 2018	N/A
14.	Power Sensor	Agilent	E9300A	HKE-086	Dec. 28, 2018	1 Year
15.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2018	1 Year
16.	Signal generator	Agilent	N5182A	HKE-029	Dec. 28, 2018	1 Year
17.	Signal Generator	Agilent	83630A	HKE-028	Dec. 28, 2018	1 Year
18.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 28, 2018	3 Year

3. CONDUCTED EMISSIONS TEST

3.1 Conducted Power Line Emission Limit

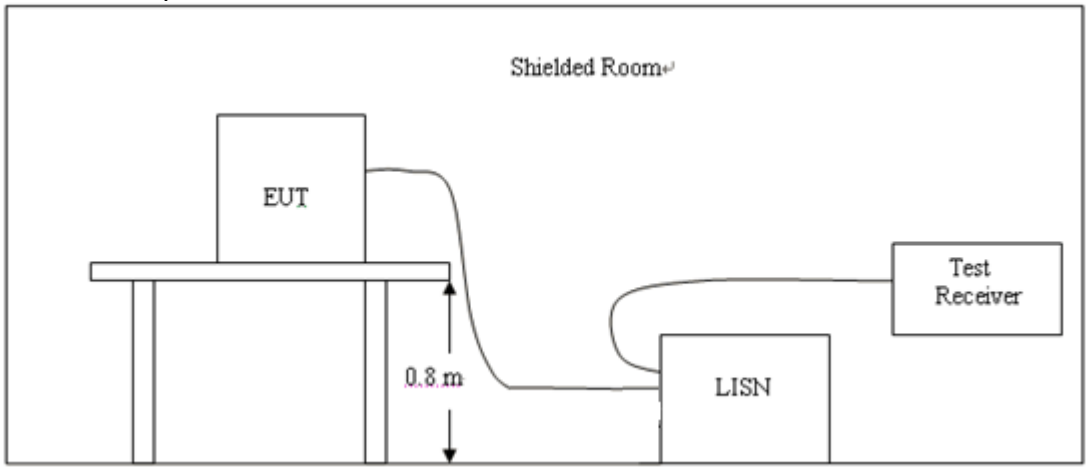
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

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.

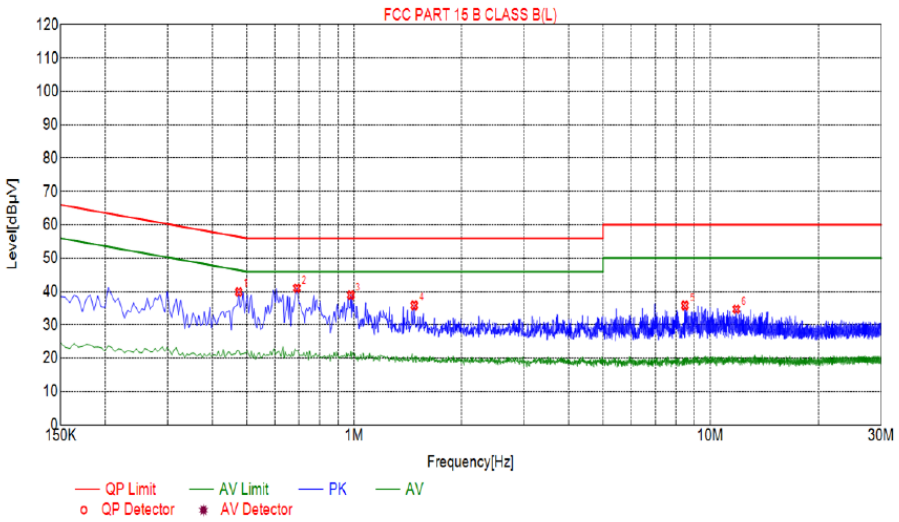
3.4 Test Result

PASS

All the test modes completed for test.

EUT：	Jelleez Bluetooth Earbuds	Model Name ：	#1207
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2019-07-31
Test Mode ：	DH5 Middle channel	Polarization：	Line
Test Power ：	DC 5V by adapter AC 120V/60Hz		

Test Graph

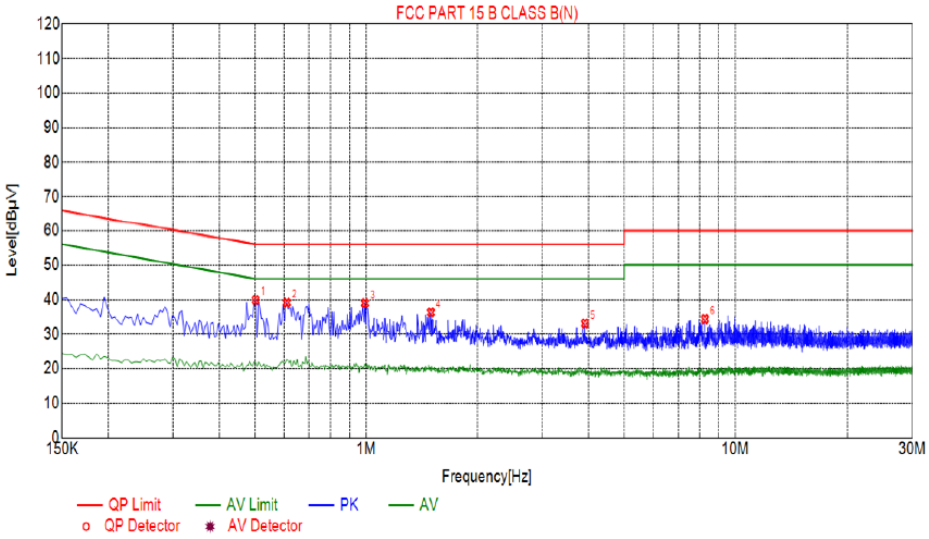


Suspected List

NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.4740	39.90	10.04	56.44	16.54	PK
2	0.6900	41.06	10.05	56.00	14.94	PK
3	0.9780	38.94	10.06	56.00	17.06	PK
4	1.4730	35.87	10.10	56.00	20.13	PK
5	8.4885	35.84	10.13	60.00	24.16	PK
6	11.8320	34.74	9.99	60.00	25.26	PK

EUT：	Jelleez Bluetooth Earbuds	Model Name ：	#1207
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2019-07-31
Test Mode ：	DH5 Middle channel	Polarization：	Neutral
Test Power ：	DC 5V by adapter AC 120V/60Hz		

Test Graph



Suspected List

NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.5010	39.87	10.04	56.00	16.13	PK
2	0.6090	39.12	10.05	56.00	16.88	PK
3	0.9915	38.97	10.06	56.00	17.03	PK
4	1.4955	36.29	10.10	56.00	19.71	PK
5	3.9165	33.07	10.25	56.00	22.93	PK
6	8.2725	34.37	10.14	60.00	25.63	PK

4 RADIATED EMISSION TEST

4.1 Radiation Limit

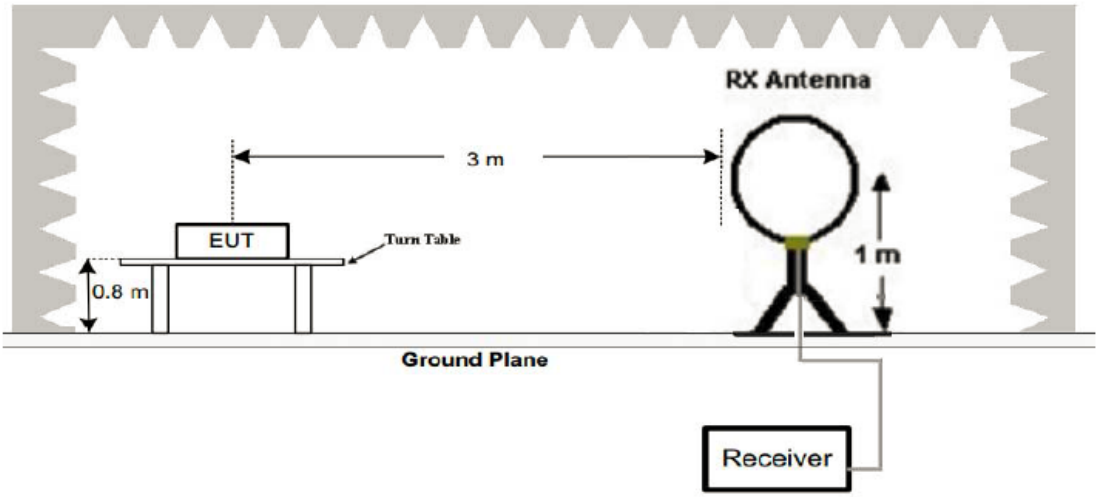
For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values：

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

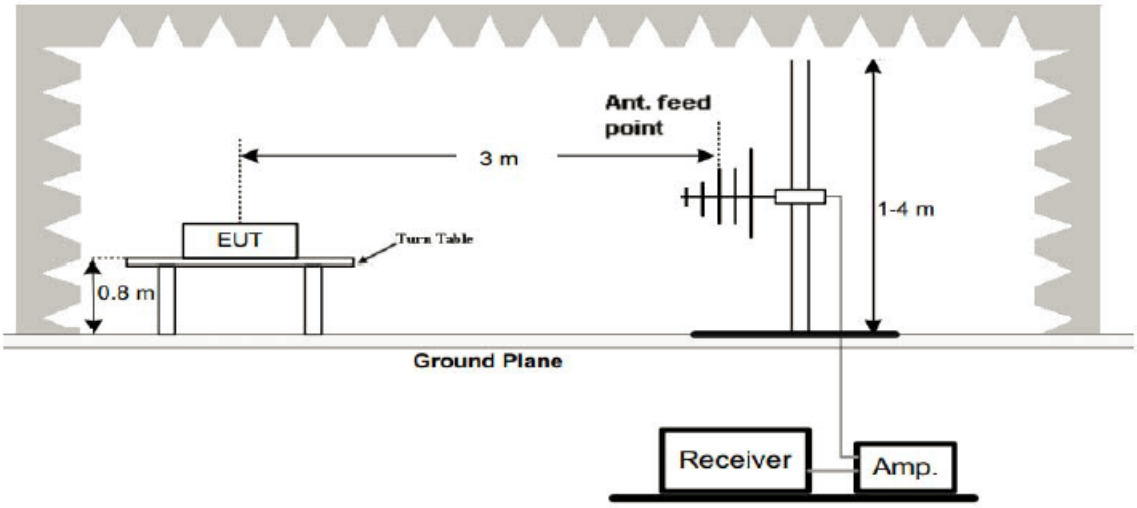
For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

4.2 Test Setup

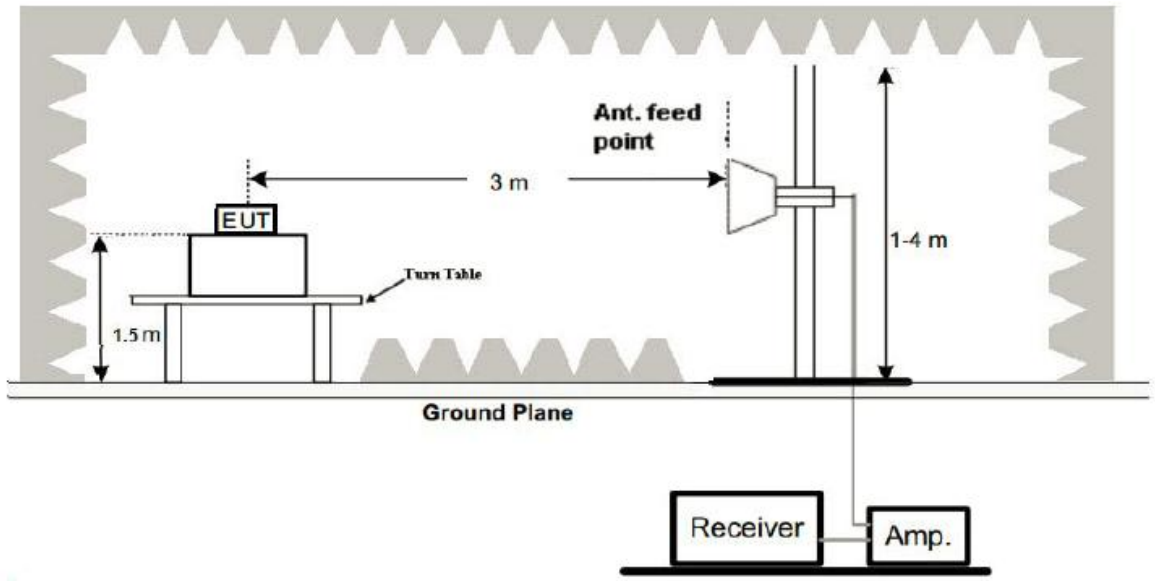
（1）Radiated Emission Test-Up Frequency Below 30MHz



（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.

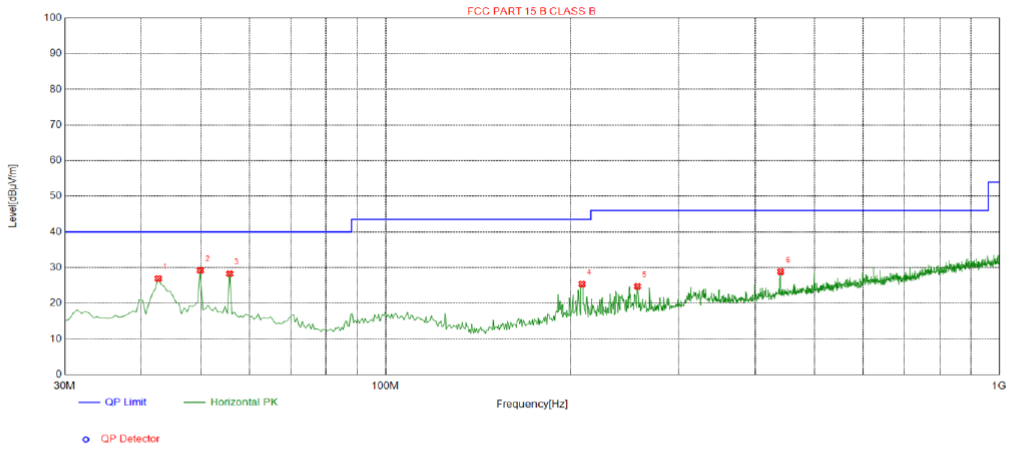
4.4 Test Result

PASS
All the test modes completed for test. The worst case of Radiated Emission is CH 2441; the test data of this mode was reported.

Below 1GHz Test Results:

EUT :	Jelleez Bluetooth Earbuds	Model Name :	#1207
Temperature :	24 ℃	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2019-07-31
Test Mode :	DH5 Middle channel	Polarization :	H
Test Power :	DC 5V by adapter AC 120V/60Hz		

Test Graph



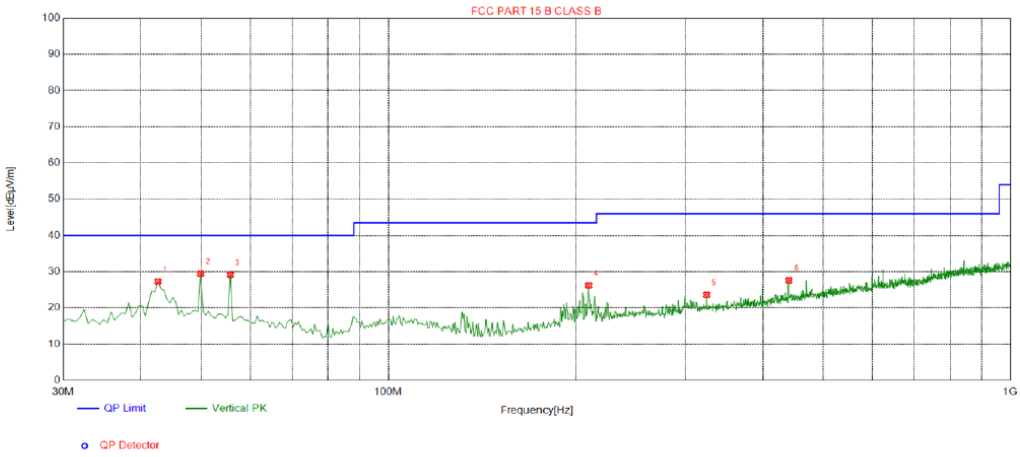
Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	42.6100	26.94	-14.08	40.00	13.06	100	246	Horizontal
2	49.8850	29.21	-13.65	40.00	10.79	100	19	Horizontal
3	55.7050	28.27	-14.51	40.00	11.73	100	360	Horizontal
4	208.965	25.41	-14.83	43.50	18.09	100	110	Horizontal
5	257.465	24.73	-13.49	46.00	21.27	100	323	Horizontal
6	440.310	28.87	-9.41	46.00	17.13	100	201	Horizontal

Final Data List

EUT：	Jelleez Bluetooth Earbuds	Model Name ：	#1207
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2019-07-31
Test Mode ：	DH5 Middle channel	Polarization：	V
Test Power ：	DC 5V by adapter AC 120V/60Hz		

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	42.6100	27.30	-14.08	40.00	12.70	100	208	Vertical
2	49.8850	29.43	-13.65	40.00	10.57	100	348	Vertical
3	55.7050	29.13	-14.51	40.00	10.87	100	181	Vertical
4	209.935	26.20	-14.80	43.50	17.30	100	107	Vertical
5	324.880	23.60	-11.85	46.00	22.40	100	290	Vertical
6	440.310	27.58	-9.41	46.00	18.42	100	266	Vertical

Final Data List

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.

GFSK

2402MHz

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402	106.35	-5.84	100.51	114	-13.49	peak
2402	81.52	-5.84	75.68	94	-18.32	AVG
4804	62.18	-3.64	58.54	74	-15.46	peak
4804	43.27	-3.64	39.63	54	-14.37	AVG
7206	56.32	-0.95	55.37	74	-18.63	peak
7206	40.35	-0.95	39.4	54	-14.6	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402	107.57	-5.84	101.73	114	-12.27	peak
2402	84.26	-5.84	78.42	94	-15.58	AVG
4804	62.13	-3.64	58.49	74	-15.51	peak
4804	42.19	-3.64	38.55	54	-15.45	AVG
7206	53.16	-0.95	52.21	74	-21.79	peak
7206	38.43	-0.95	37.48	54	-16.52	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

GFSK

2440MHz

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2440	106.92	-5.71	101.21	114	-12.79	peak
2440	81.65	-5.71	75.94	94	-18.06	AVG
4880	62.09	-3.51	58.58	74	-15.42	peak
4880	41.71	-3.51	38.2	54	-15.8	AVG
7320	56.92	-0.82	56.1	74	-17.9	peak
7320	40.67	-0.82	39.85	54	-14.15	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2440	107.35	-5.71	101.64	114	-12.36	peak
2440	80.64	-5.71	74.93	94	-19.07	AVG
4880	59.62	-3.51	56.11	74	-17.89	peak
4880	41.37	-3.51	37.86	54	-16.14	AVG
7320	57.28	-0.82	56.46	74	-17.54	peak
7320	39.63	-0.82	38.81	54	-15.19	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

GFSK

2480MHz

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	106.17	-5.65	100.52	114	-13.48	peak
2480	81.46	-5.65	75.81	94	-18.19	AVG
4960	57.19	-3.43	53.76	74	-20.24	peak
4960	44.28	-3.43	40.85	54	-13.15	AVG
7440	56.43	-0.75	55.68	74	-18.32	peak
7440	39.84	-0.75	39.09	54	-14.91	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	104.32	-5.65	98.67	114	-15.33	peak
2480	79.68	-5.65	74.03	94	-19.97	AVG
4960	53.46	-3.43	50.03	74	-23.97	peak
4960	42.82	-3.43	39.39	54	-14.61	AVG
7440	56.38	-0.75	55.63	74	-18.37	peak
7440	40.59	-0.75	39.84	54	-14.16	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

π/4DQPSK

2402MHz

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402	107.35	-5.84	101.51	114	-12.49	peak
2402	80.46	-5.84	74.62	94	-19.38	AVG
4804	63.12	-3.64	59.48	74	-14.52	peak
4804	41.56	-3.64	37.92	54	-16.08	AVG
7206	57.28	-0.95	56.33	74	-17.67	peak
7206	39.84	-0.95	38.89	54	-15.11	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402	106.58	-5.84	100.74	114	-13.26	peak
2402	81.29	-5.84	75.45	94	-18.55	AVG
4804	63.71	-3.64	60.07	74	-13.93	peak
4804	43.12	-3.64	39.48	54	-14.52	AVG
7206	56.37	-0.95	55.42	74	-18.58	peak
7206	39.26	-0.95	38.31	54	-15.69	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

π/4DQPSK

2440MHz

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2440	105.43	-5.71	99.72	114	-14.28	peak
2440	80.35	-5.71	74.64	94	-19.36	AVG
4880	61.46	-3.51	57.95	74	-16.05	peak
4880	40.52	-3.51	37.01	54	-16.99	AVG
7320	57.28	-0.82	56.46	74	-17.54	peak
7320	39.75	-0.82	38.93	54	-15.07	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2440	106.13	-5.71	100.42	114	-13.58	peak
2440	81.49	-5.71	75.78	94	-18.22	AVG
4880	61.28	-3.51	57.77	74	-16.23	peak
4880	39.78	-3.51	36.27	54	-17.73	AVG
7320	56.18	-0.82	55.36	74	-18.64	peak
7320	40.06	-0.82	39.24	54	-14.76	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

π/4DQPSK

2480MHz

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	106.34	-5.65	100.69	114	-13.31	peak
2480	80.67	-5.65	75.02	94	-18.98	AVG
4960	56.94	-3.43	53.51	74	-20.49	peak
4960	43.16	-3.43	39.73	54	-14.27	AVG
7440	57.19	-0.75	56.44	74	-17.56	peak
7440	41.06	-0.75	40.31	54	-13.69	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	106.31	-5.65	100.66	114	-13.34	peak
2480	81.07	-5.65	75.42	94	-18.58	AVG
4960	54.32	-3.43	50.89	74	-23.11	peak
4960	43.78	-3.43	40.35	54	-13.65	AVG
7440	55.92	-0.75	55.17	74	-18.83	peak
7440	40.21	-0.75	39.46	54	-14.54	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

8DPSK

2402MHz

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402	105.92	-5.84	100.08	114	-13.92	peak
2402	80.46	-5.84	74.62	94	-19.38	AVG
4804	61.79	-3.64	58.15	74	-15.85	peak
4804	44.18	-3.64	40.54	54	-13.46	AVG
7206	57.94	-0.95	56.99	74	-17.01	peak
7206	41.08	-0.95	40.13	54	-13.87	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402	104.38	-5.84	98.54	114	-15.46	peak
2402	81.67	-5.84	75.83	94	-18.17	AVG
4804	61.28	-3.64	57.64	74	-16.36	peak
4804	43.52	-3.64	39.88	54	-14.12	AVG
7206	54.76	-0.95	53.81	74	-20.19	peak
7206	39.82	-0.95	38.87	54	-15.13	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

8DPSK

2440MHz

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2440	105.81	-5.71	100.1	114	-13.9	peak
2440	80.64	-5.71	74.93	94	-19.07	AVG
4880	63.75	-3.51	60.24	74	-13.76	peak
4880	43.28	-3.51	39.77	54	-14.23	AVG
7320	57.94	-0.82	57.12	74	-16.88	peak
7320	40.19	-0.82	39.37	54	-14.63	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2440	104.97	-5.71	99.26	114	-14.74	peak
2440	81.39	-5.71	75.68	94	-18.32	AVG
4880	58.16	-3.51	54.65	74	-19.35	peak
4880	43.18	-3.51	39.67	54	-14.33	AVG
7320	56.84	-0.82	56.02	74	-17.98	peak
7320	38.64	-0.82	37.82	54	-16.18	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

8DPSK

2480MHz

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	108.35	-5.65	102.7	114	-11.3	peak
2480	82.49	-5.65	76.84	94	-17.16	AVG
4960	56.38	-3.43	52.95	74	-21.05	peak
4960	45.72	-3.43	42.29	54	-11.71	AVG
7440	55.26	-0.75	54.51	74	-19.49	peak
7440	40.17	-0.75	39.42	54	-14.58	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	105.68	-5.65	100.03	114	-13.97	peak
2480	81.46	-5.65	75.81	94	-18.19	AVG
4960	54.26	-3.43	50.83	74	-23.17	peak
4960	43.09	-3.43	39.66	54	-14.34	AVG
7440	57.18	-0.75	56.43	74	-17.57	peak
7440	41.36	-0.75	40.61	54	-13.39	AVG
–	–	–	–	74	–	–
–	–	–	–	54	–	–
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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)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

GFSK
2402MHz
Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2310	52.86	-5.81	47.05	74	-26.95	peak
2310	43.15	-5.81	37.34	54	-16.66	AVG
2390	51.39	-5.84	45.55	74	-28.45	peak
2390	43.28	-5.84	37.44	54	-16.56	AVG
2400	52.03	-5.95	46.08	74	-27.92	peak
2400	43.19	-5.95	37.24	54	-16.76	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2310	52.17	-5.81	46.36	74	-27.64	peak
2310	41.92	-5.81	36.11	54	-17.89	AVG
2390	51.84	-5.84	46	74	-28	peak
2390	42.31	-5.84	36.47	54	-17.53	AVG
2400	50.49	-5.95	44.54	74	-29.46	peak
2400	42.73	-5.95	36.78	54	-17.22	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

GFSK
2480MHz
Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
2483.50	52.46	-5.81	46.65	74	-27.35	peak
2483.50	41.68	-5.81	35.87	54	-18.13	AVG
2500.00	51.27	-6.06	45.21	74	-28.79	peak
2500.00	40.52	-6.06	34.46	54	-19.54	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
2483.50	52.47	-5.81	46.66	74	-27.34	peak
2483.50	41.39	-5.81	35.58	54	-18.42	AVG
2500.00	51.68	-6.06	45.62	74	-28.38	peak
2500.00	42.13	-6.06	36.07	54	-17.93	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

π/4DQPSK
2402MHz
Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2310	52.64	-5.81	46.83	74	-27.17	peak
2310	43.15	-5.81	37.34	54	-16.66	AVG
2390	51.29	-5.84	45.45	74	-28.55	peak
2390	42.68	-5.84	36.84	54	-17.16	AVG
2400	52.17	-5.95	46.22	74	-27.78	peak
2400	40.35	-5.95	34.4	54	-19.6	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2310	52.18	-5.81	46.37	74	-27.63	peak
2310	41.93	-5.81	36.12	54	-17.88	AVG
2390	51.65	-5.84	45.81	74	-28.19	peak
2390	40.72	-5.84	34.88	54	-19.12	AVG
2400	51.37	-5.95	45.42	74	-28.58	peak
2400	39.83	-5.95	33.88	54	-20.12	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

π/4DQPSK
2480MHz
Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.50	51.27	-5.81	45.46	74	-28.54	peak
2483.50	39.64	-5.81	33.83	54	-20.17	AVG
2500.00	52.03	-6.06	45.97	74	-28.03	peak
2500.00	40.35	-6.06	34.29	54	-19.71	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.50	52.14	-5.81	46.33	74	-27.67	peak
2483.50	41.33	-5.81	35.52	54	-18.48	AVG
2500.00	51.49	-6.06	45.43	74	-28.57	peak
2500.00	40.12	-6.06	34.06	54	-19.94	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

8DPSK
2402MHz
Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2310	52.16	-5.81	46.35	74	-27.65	peak
2310	41.58	-5.81	35.77	54	-18.23	AVG
2390	51.69	-5.84	45.85	74	-28.15	peak
2390	40.53	-5.84	34.69	54	-19.31	AVG
2400	52.08	-5.95	46.13	74	-27.87	peak
2400	40.29	-5.95	34.34	54	-19.66	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2310	51.49	-5.81	45.68	74	-28.32	peak
2310	39.82	-5.81	34.01	54	-19.99	AVG
2390	52.15	-5.84	46.31	74	-27.69	peak
2390	40.24	-5.84	34.4	54	-19.6	AVG
2400	51.62	-5.95	45.67	74	-28.33	peak
2400	39.83	-5.95	33.88	54	-20.12	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

8DPSK
2480MHz
Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.50	51.68	-5.81	45.87	74	-28.13	peak
2483.50	40.64	-5.81	34.83	54	-19.17	AVG
2500.00	50.39	-6.06	44.33	74	-29.67	peak
2500.00	39.86	-6.06	33.8	54	-20.2	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

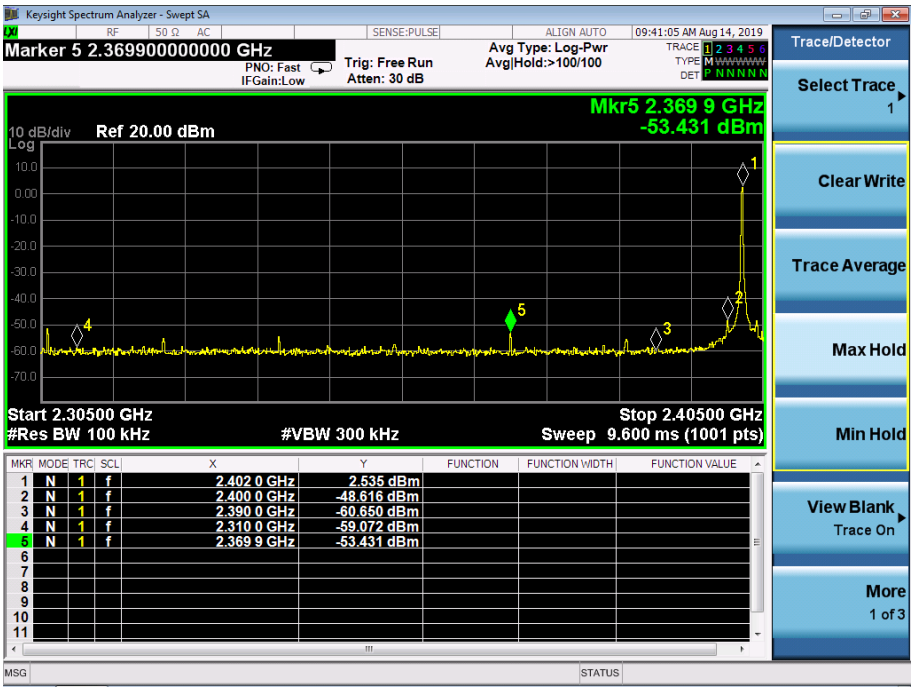
Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.50	51.83	-5.81	46.02	74	-27.98	peak
2483.50	40.52	-5.81	34.71	54	-19.29	AVG
2500.00	50.68	-6.06	44.62	74	-29.38	peak
2500.00	39.71	-6.06	33.65	54	-20.35	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

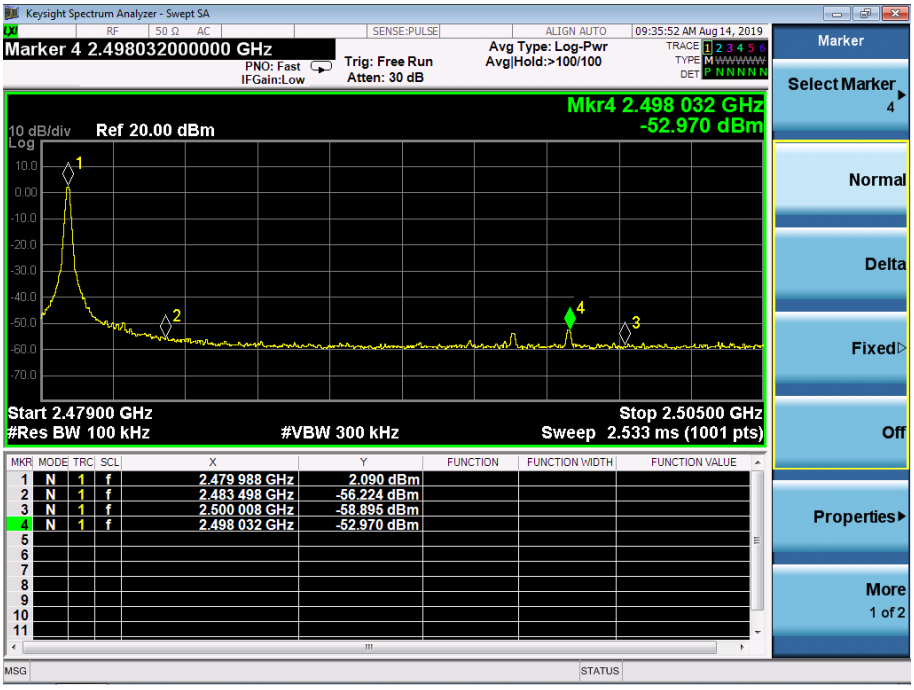
for conducted band-edge ,The hopping and non- hopping mode are all tested, only reported the worst case non- hopping mode.

GFSK

2402MHz

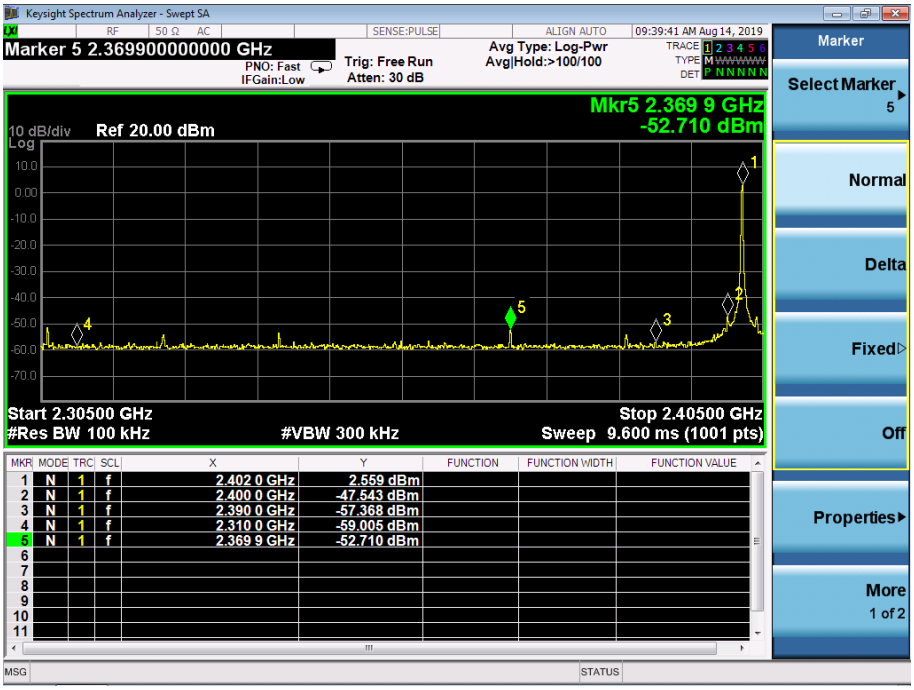


2480MHz

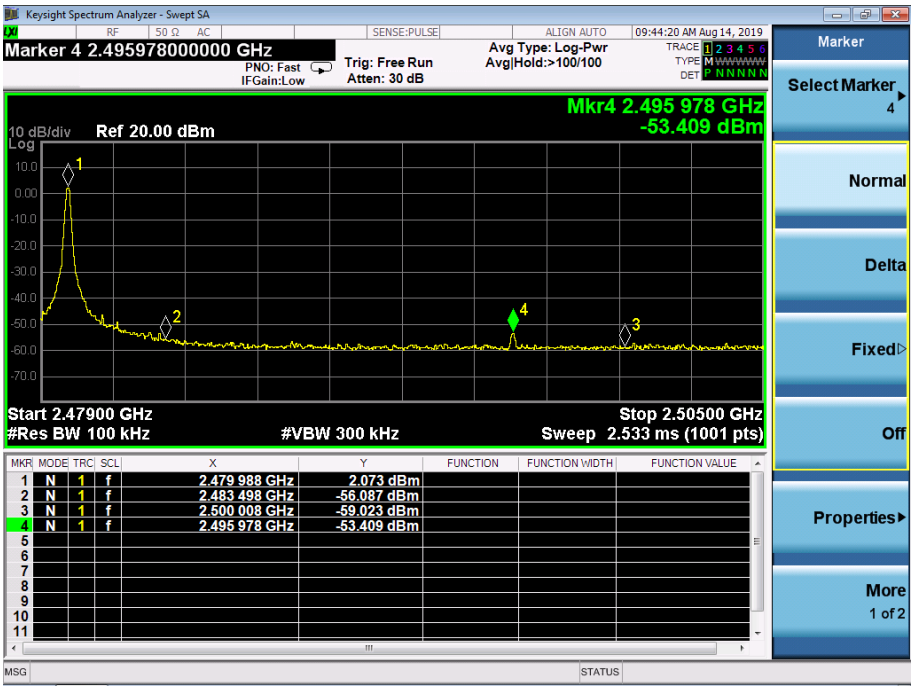


π/4DQPSK

2402MHz

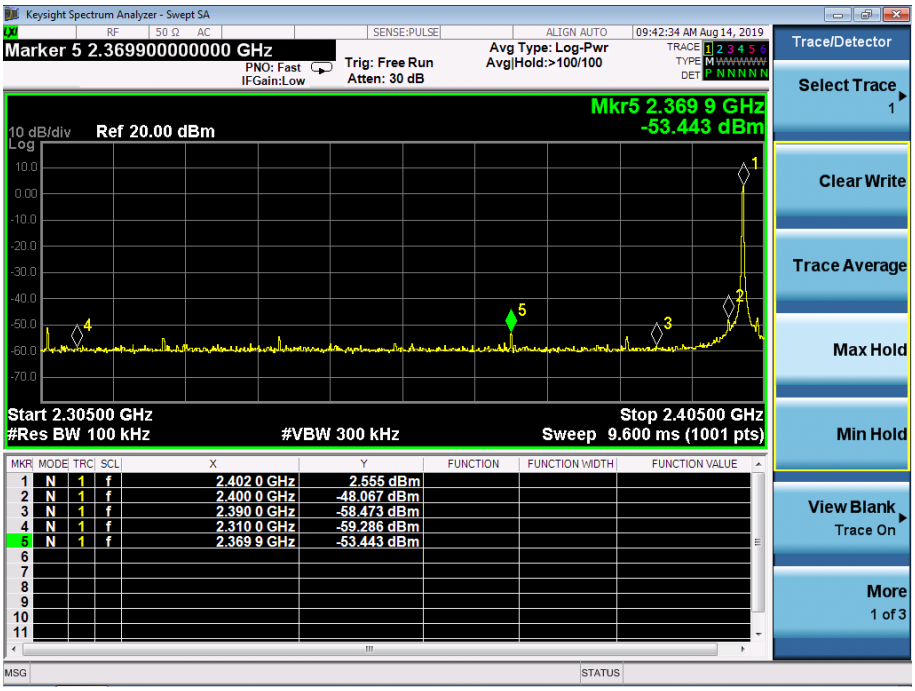


2480MHz

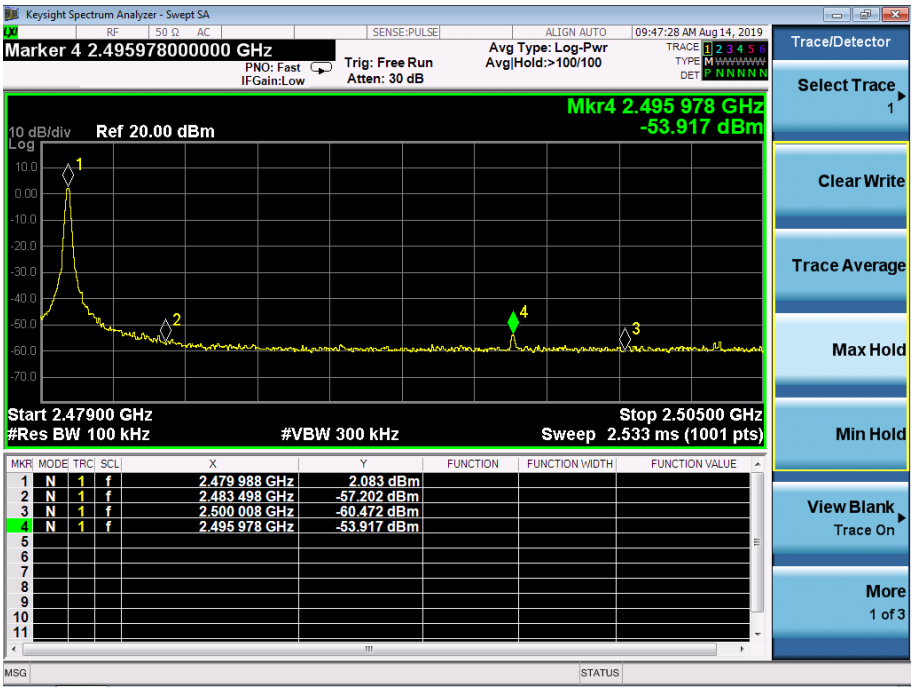


8DPSK

2402MHz



2480MHz



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= 100 KHz, Span=2MHz.
4. The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector.

6.3 Measurement Equipment Used

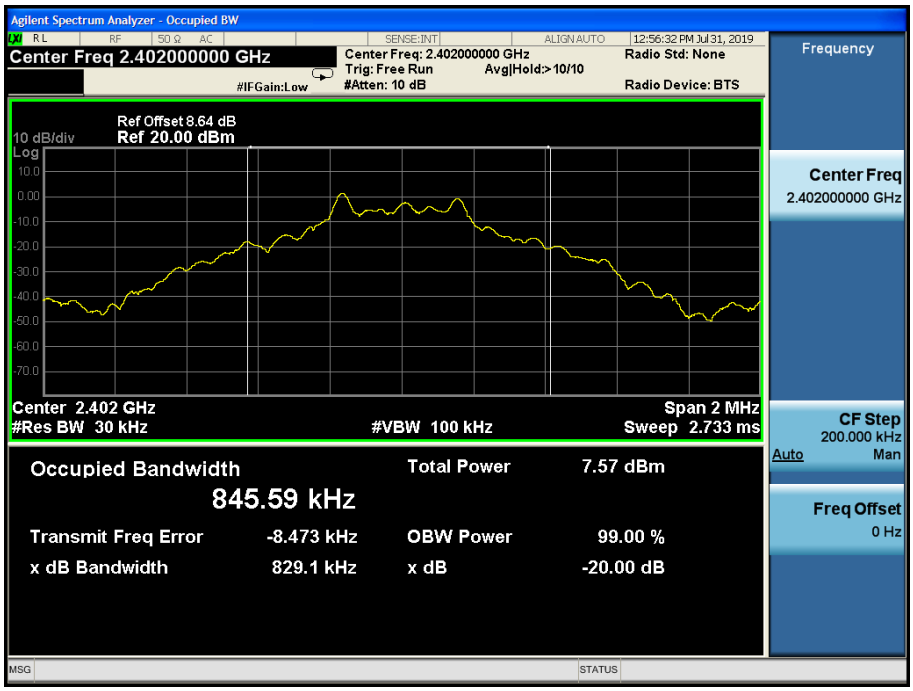
Same as Radiated Emission Measurement

6.4 Test Result

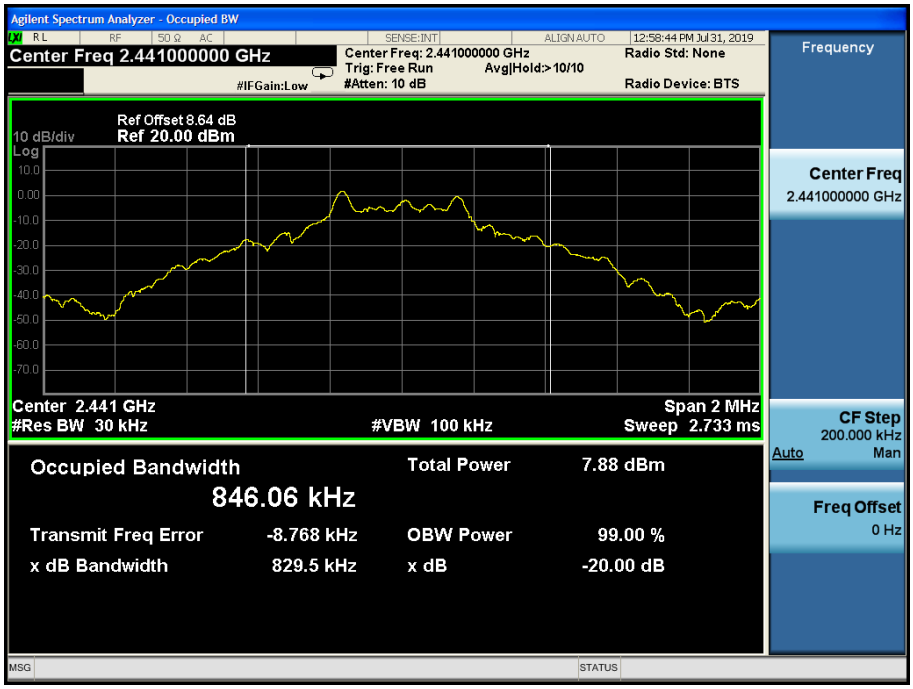
PASS

Modulation Type	Frequency	20dB Bandwidth (MHz)	Result
GFSK	2402 MHz	0.829	**PASS**
	2441 MHz	0.830	**PASS**
	2480 MHz	0.829	**PASS**

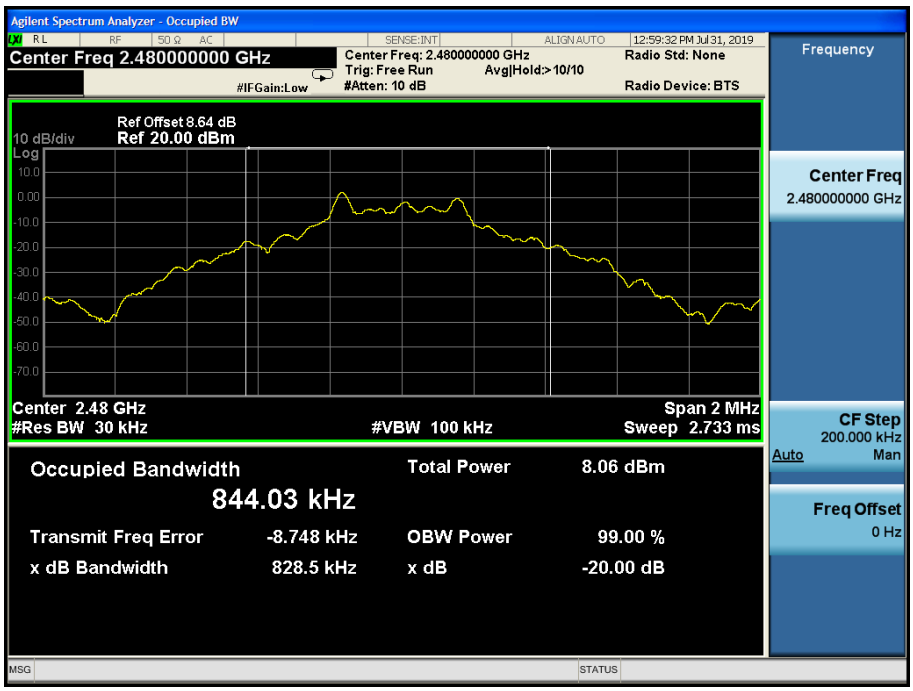
CH: 2402MHz



CH: 2441MHz



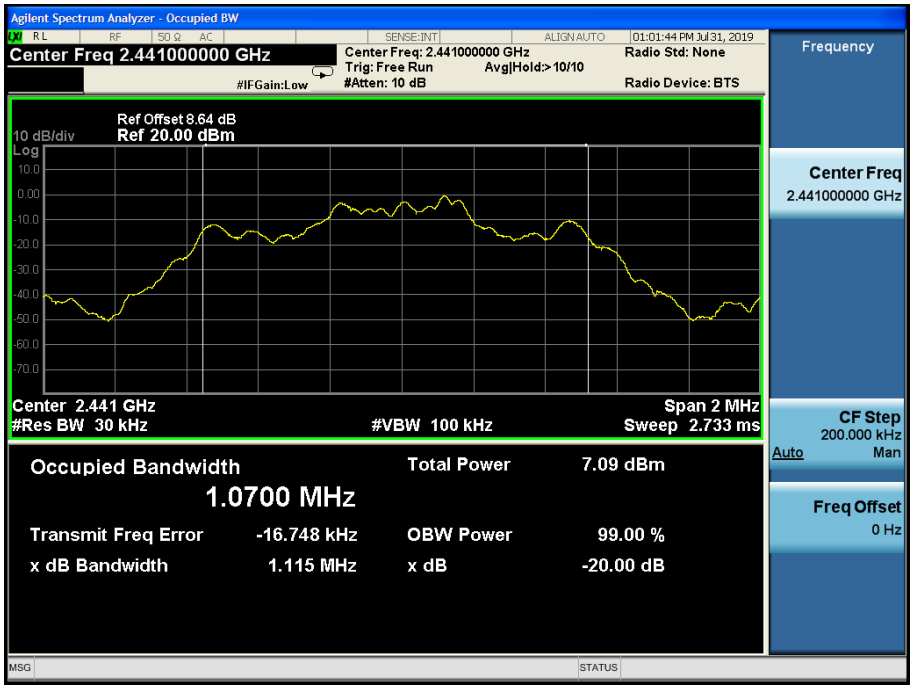
CH: 2480MHz



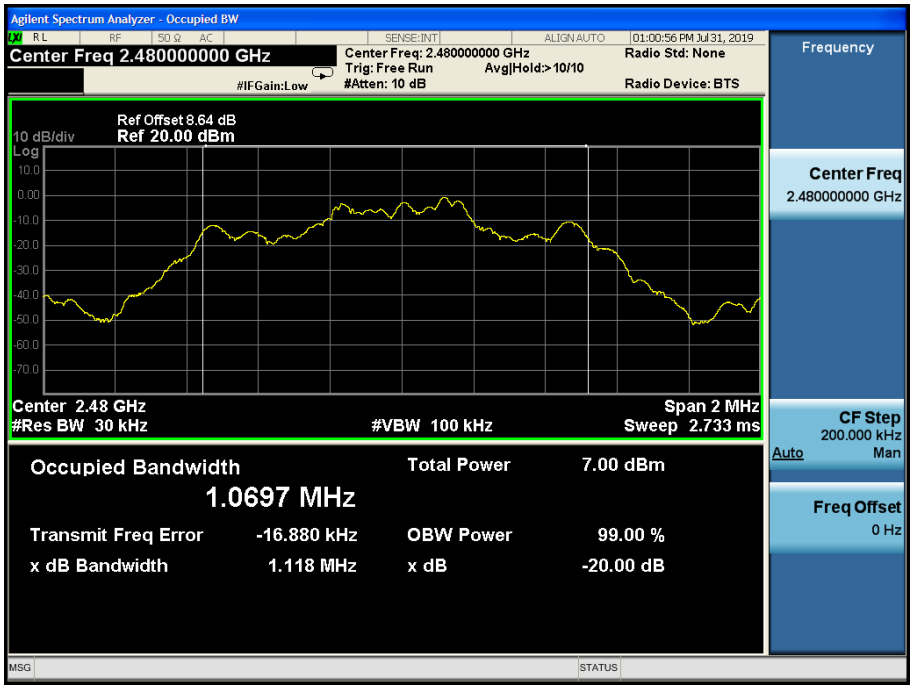
Modulation Type	Frequency	20dB Bandwidth (MHz)	Result
π /4DQPSK	2402 MHz	1.113	**PASS**
	2441 MHz	1.115	**PASS**
	2480 MHz	1.118	**PASS**

CH: 2402MHz

CH: 2441MHz

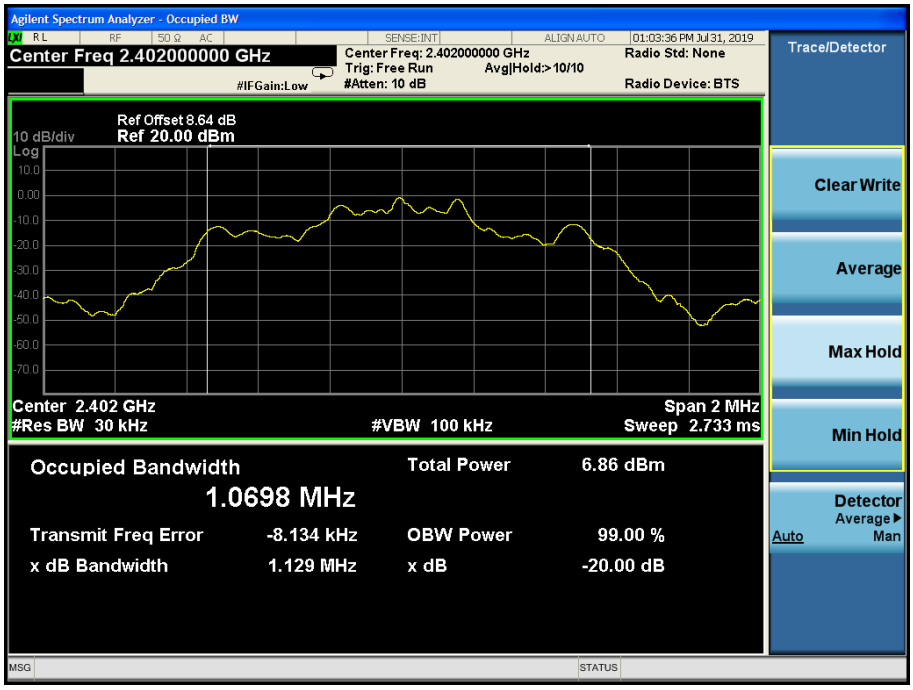


CH: 2480MHz

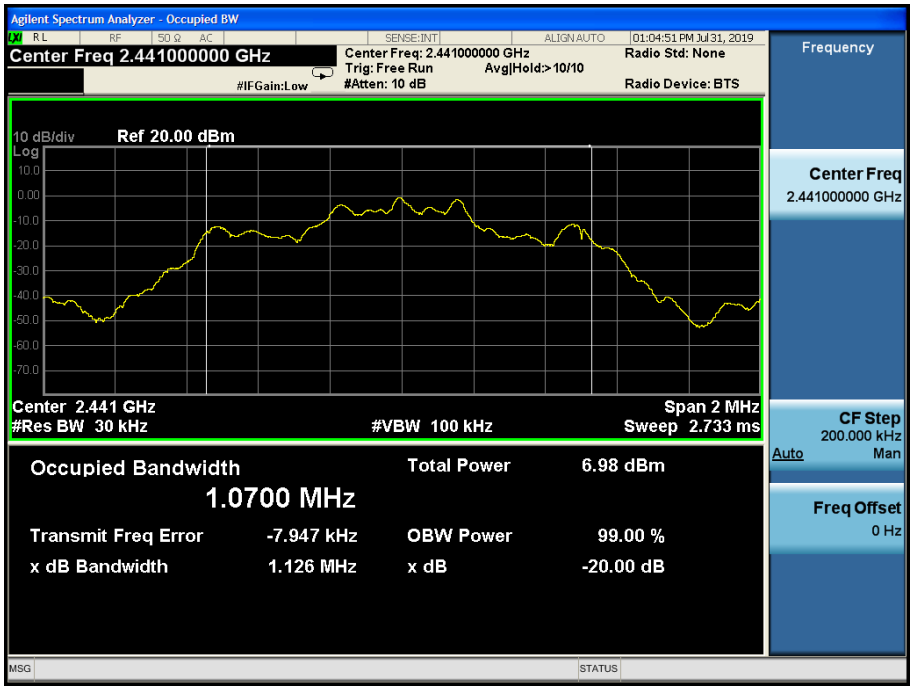


Modulation Type	Frequency	20dB Bandwidth (MHz)	Result
8DPSK	2402 MHz	1.129	**PASS**
	2441 MHz	1.126	**PASS**
	2480 MHz	1.129	**PASS**

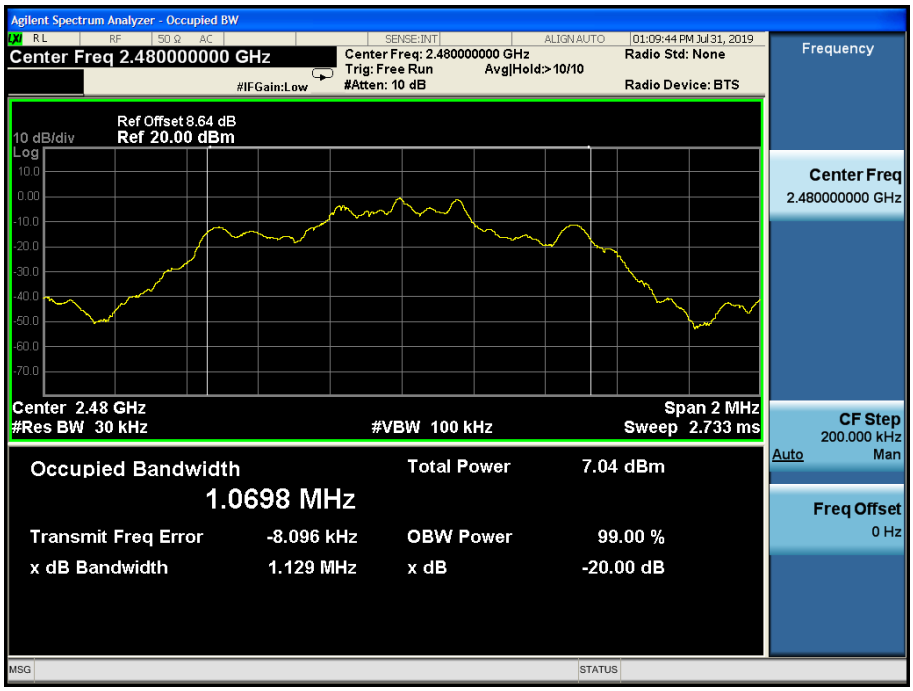
CH: 2402MHz



CH: 2441MHz



CH: 2480MHz



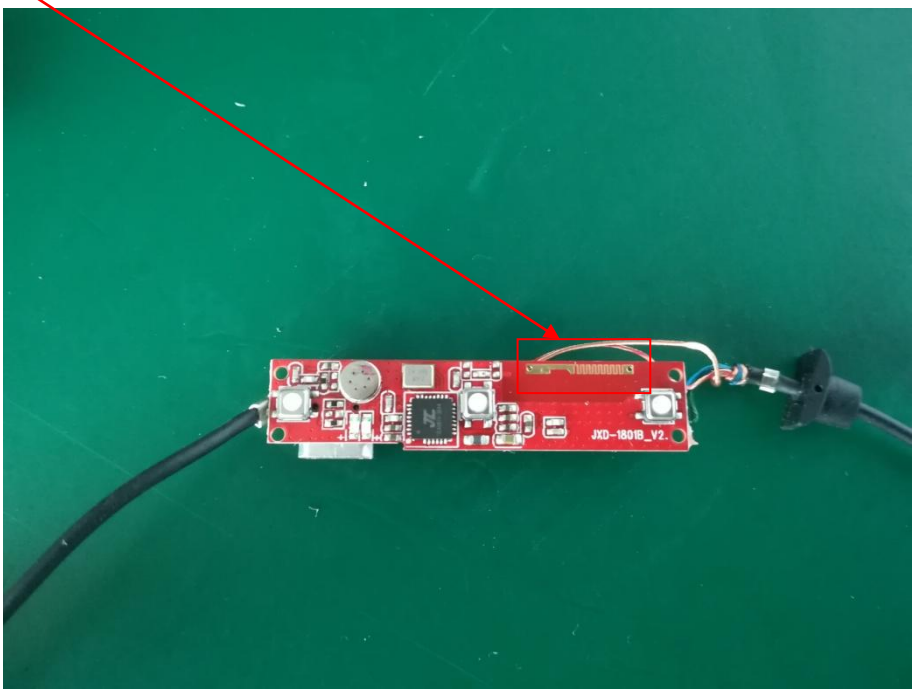
7 ANTENNA REQUIREMENT

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. And according to FCC 47 CFR Section 15.249, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance.
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

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

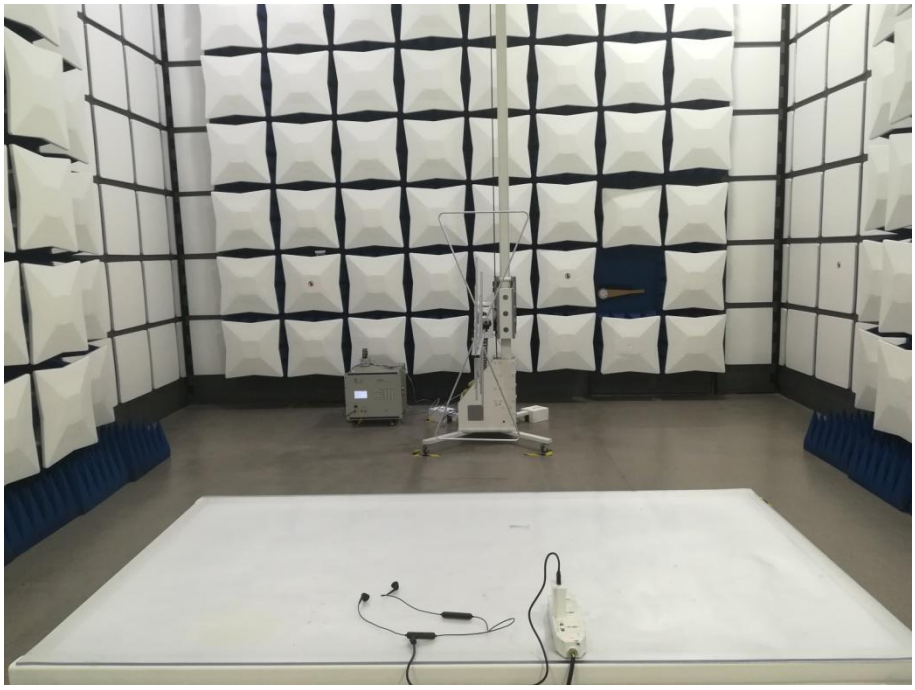
ANTENNA

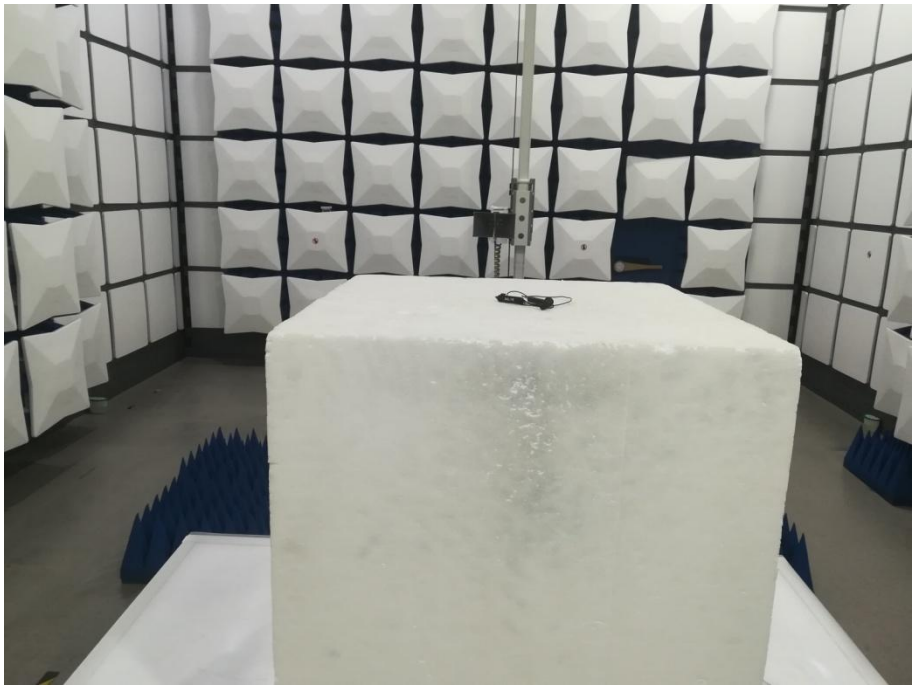


8 PHOTOGRAPH OF TEST

8.1 Radiated Emission

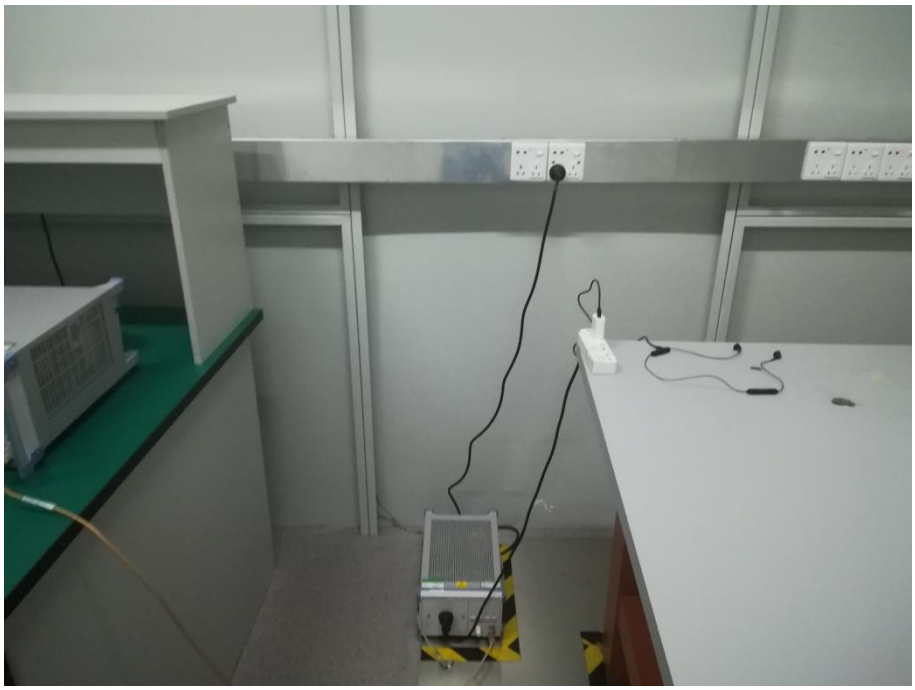
RE



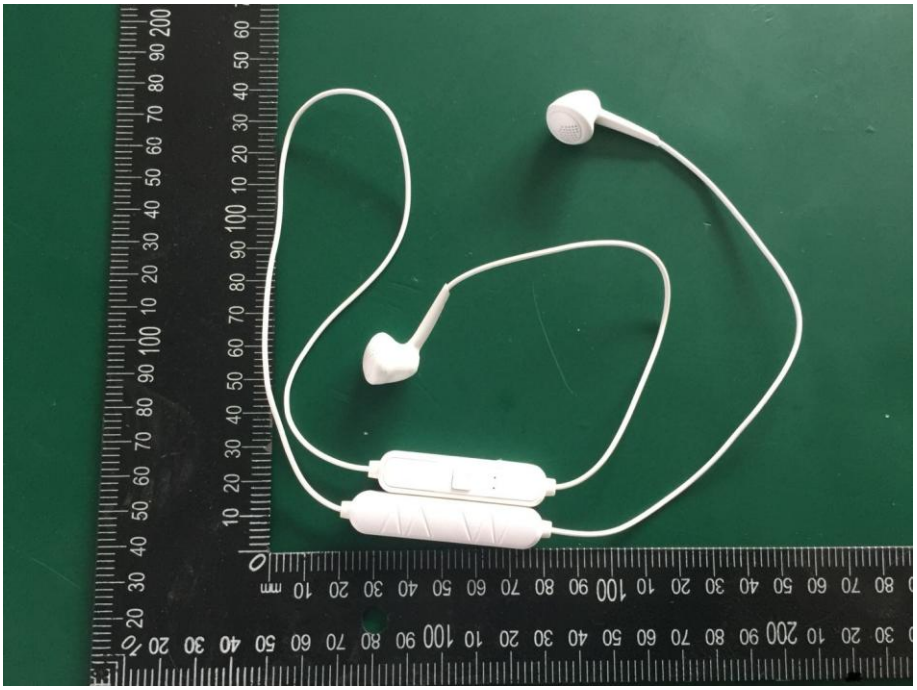


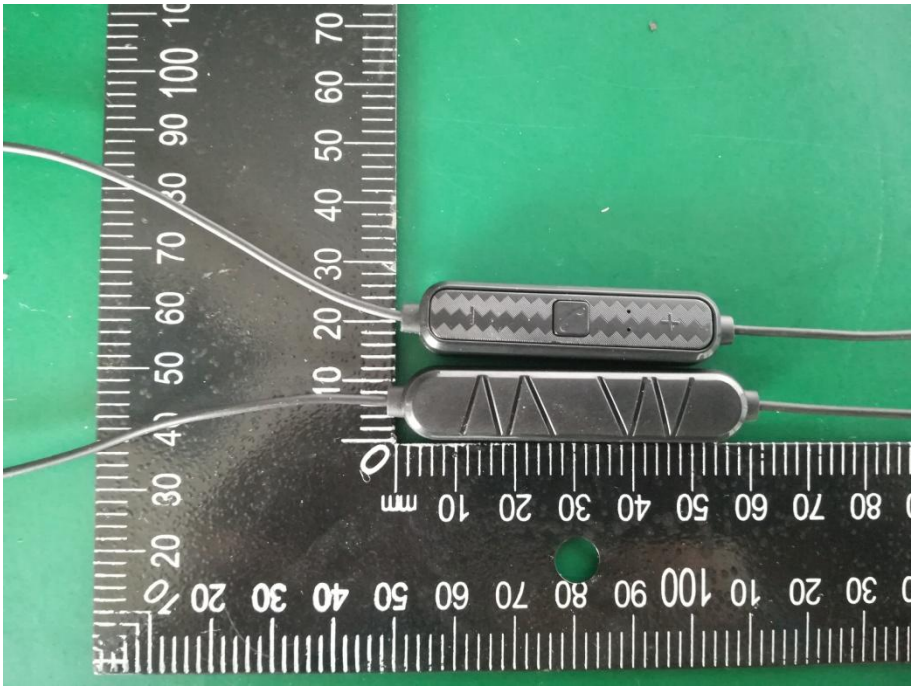
8.2 Conducted Emission

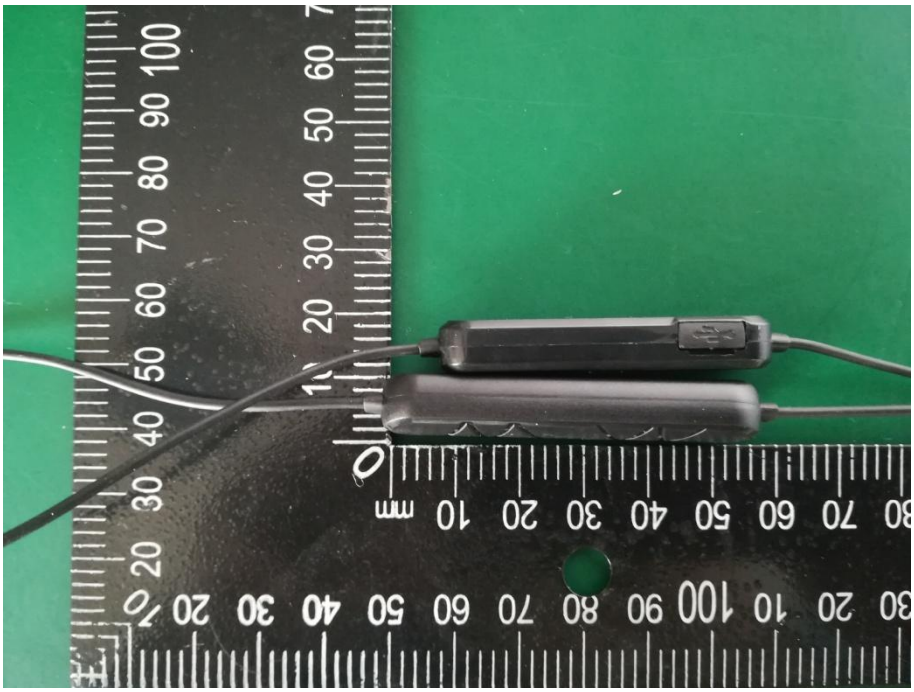
CE

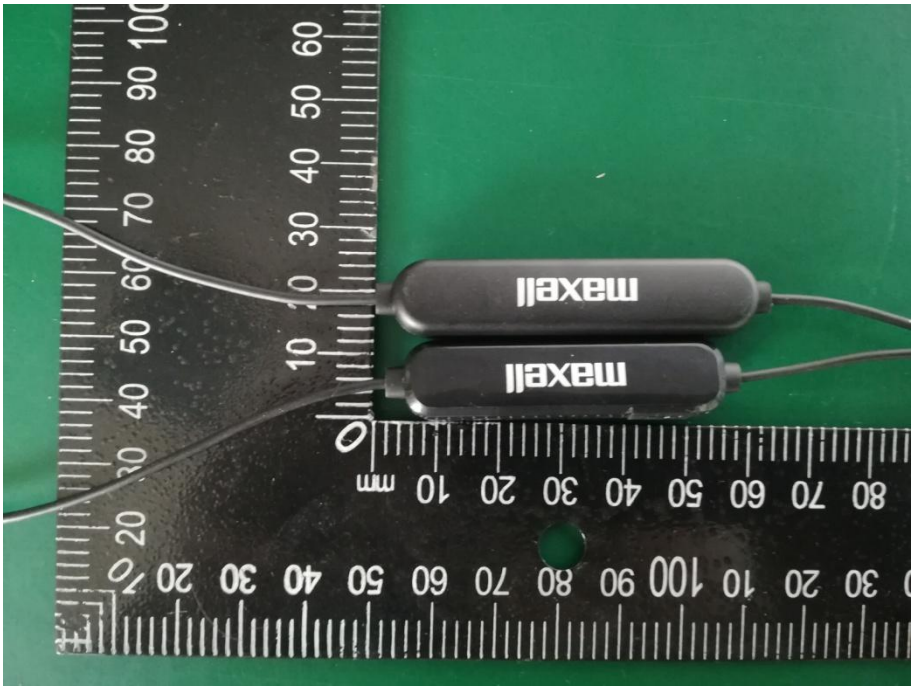


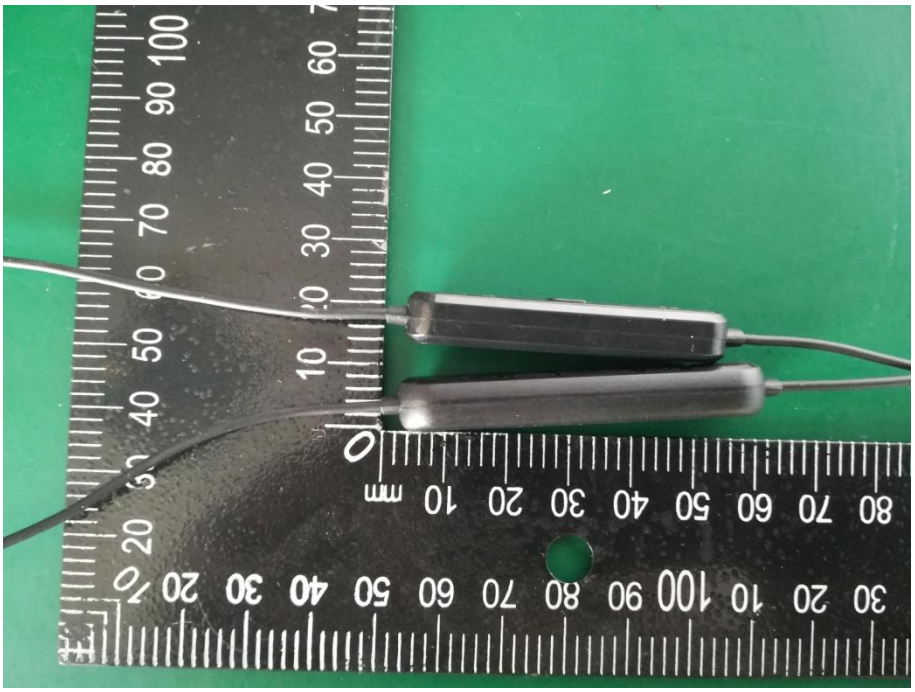
EUT

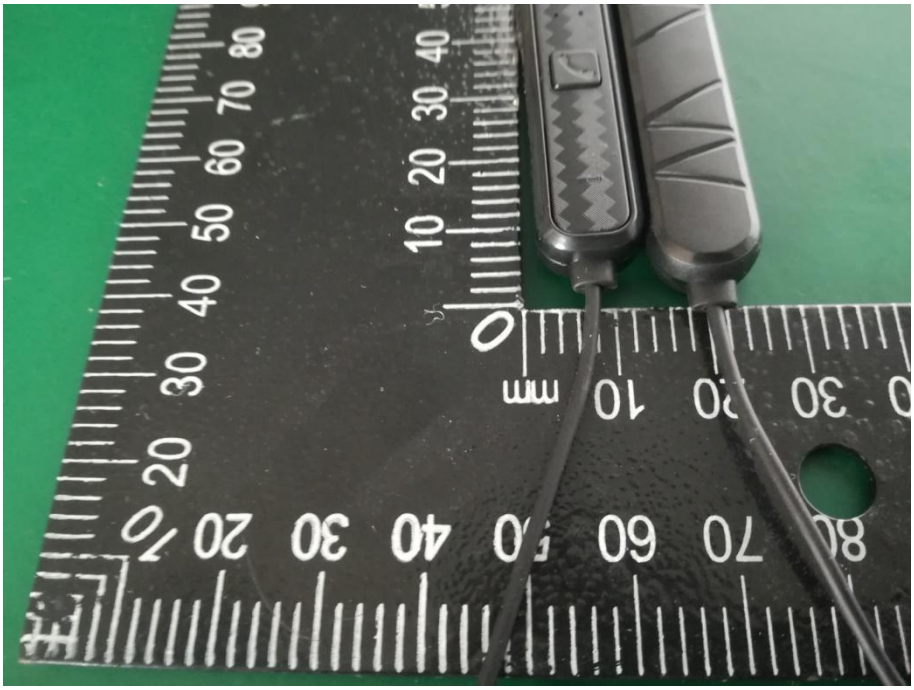




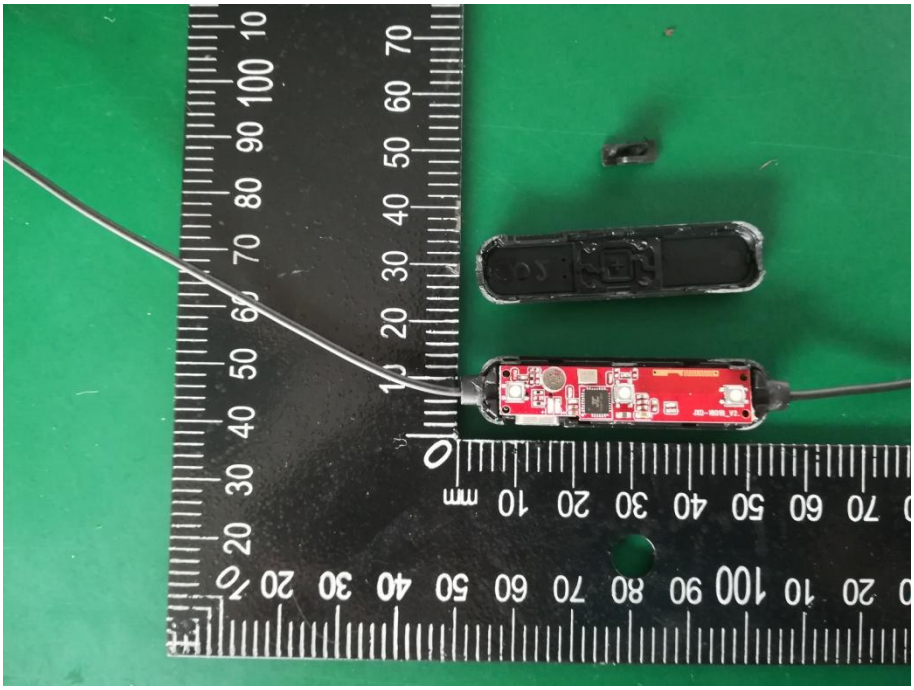


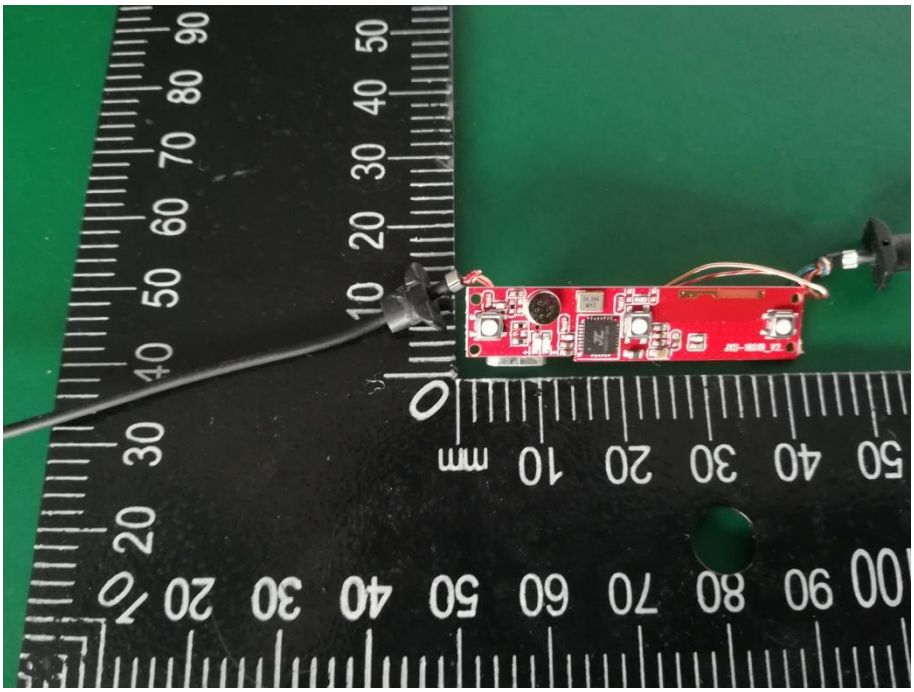

maxell
maxell

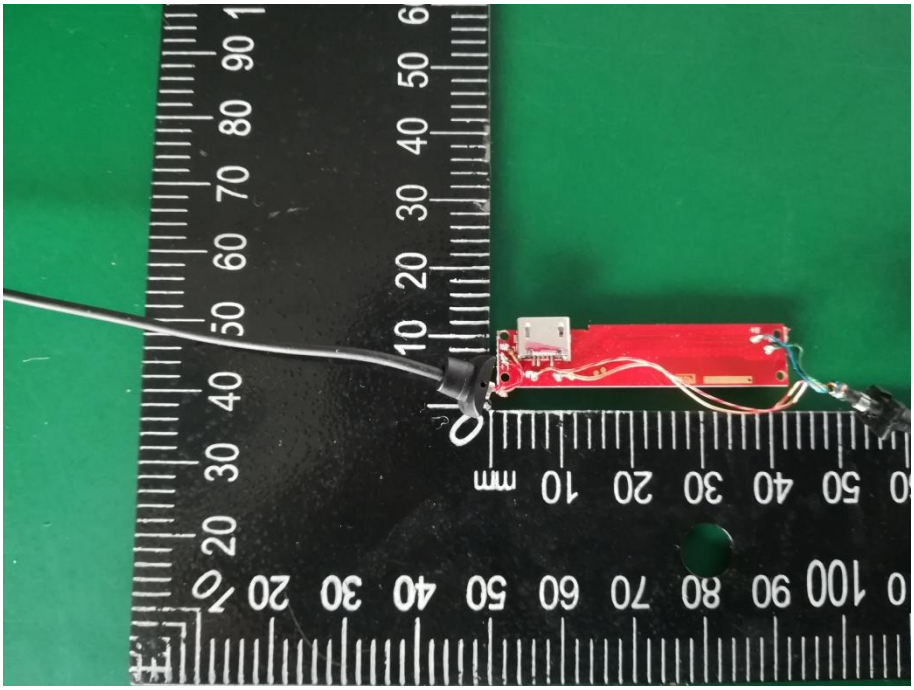


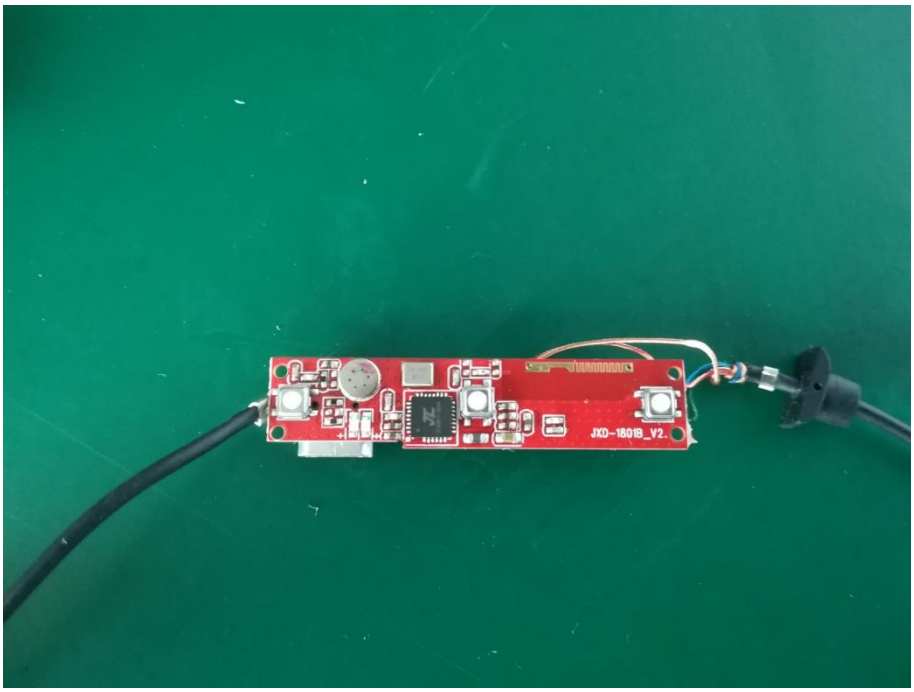


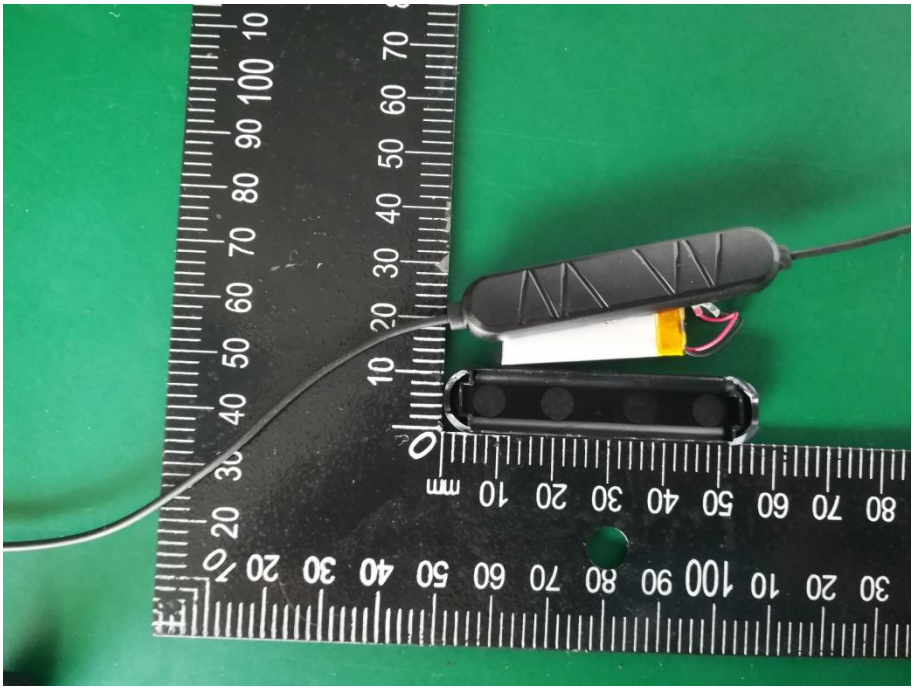

maxell
maxell

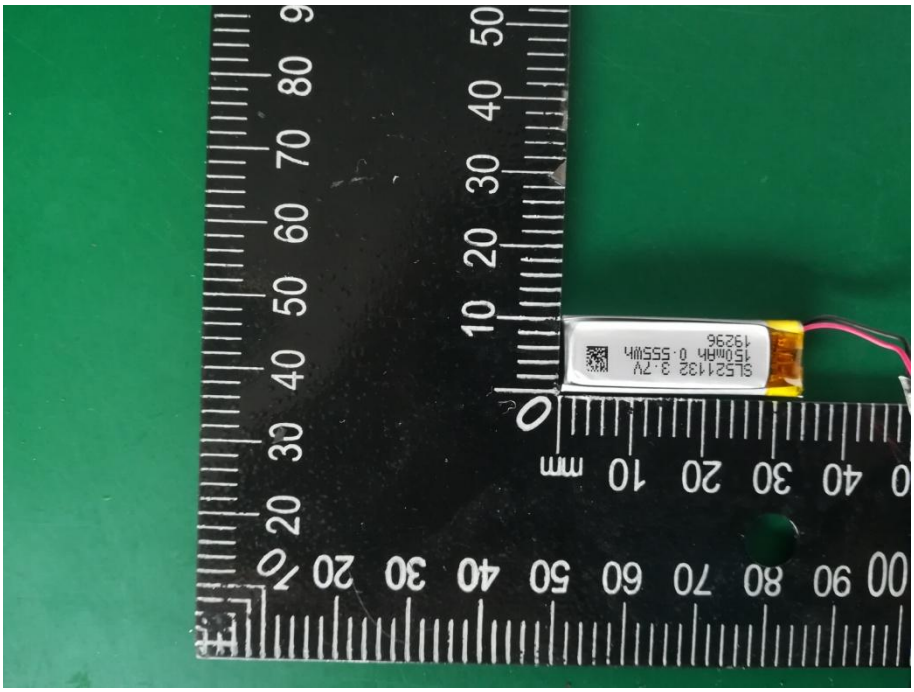


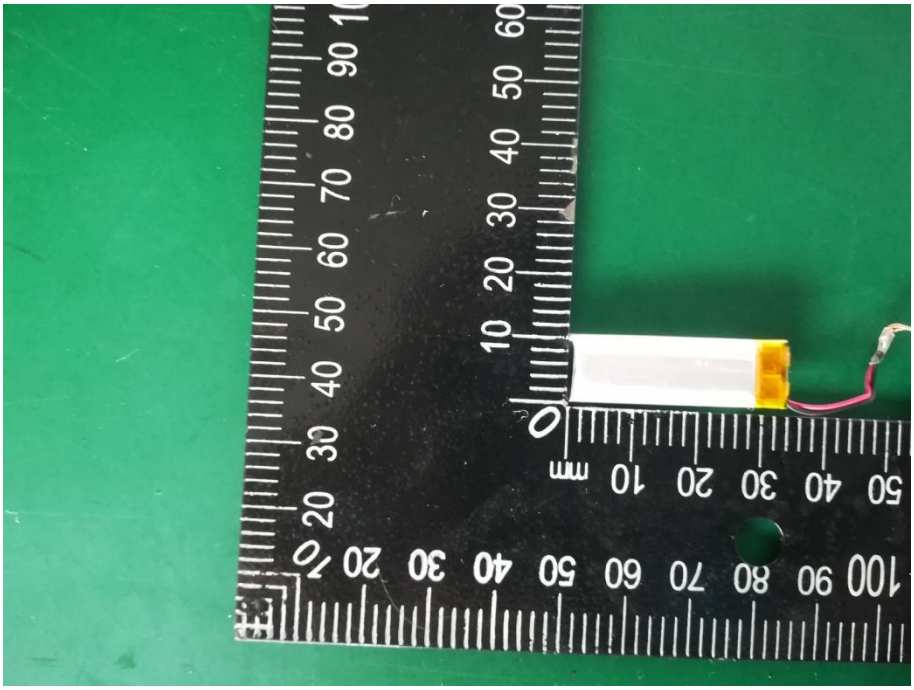





JXD-1801B_V2.




SL521132 3.7V
150mAh 0.555Wh
19296



--The end of report--