TEST REPORT

Applicant:	ADX LABS, INC
Address of Applicant:	120 South 6th Street, Suite 1000/10th Floor, Minneapolis, Minnesota, 55402 United States
Manufacturer:	ADX LABS, INC
Address of Manufacturer:	120 South 6th Street, Suite 1000/10th Floor, Minneapolis, Minnesota, 55402 United States

Equipment Under Test (EUT)

Product Name:	Bluetooth Speaker
Model No.:	MINI 2
Trade Mark:	MYMY
FCC ID:	2AWHJ-MINI2
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.249
Date of sample receipt:	Sep. 17, 2020
Date of Test:	Sep. 18, 2020 - Sep. 29, 2020
Date of report issued:	Oct. 13, 2020
Test Result :	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	*Oct. 13, 2020*	*Original*

Prepared By: ***Date:*** *Oct. 13, 2020*

Project Engineer

Check By: ***Date:*** *Oct. 13, 2020*

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Field strength of the fundamental signal	15.249 (a)	Pass
Spurious emissions	15.249 (a) (d)/15.209	Pass
Band edge	15.249 (d)/15.205	Pass
20dB Occupied Bandwidth	15.215 (c)	Pass

Pass: The EUT complies with the essential requirements in the standard.

Remark：Test according to ANSI C63.10:2013.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 General Description of EUT

Product Name:	Bluetooth Speaker
Model No.:	MINI 2
Test Model No.:	MINI 2
Serial No.:	N/A
Hardware Version:	V1.1
Software Version:	V1.0
Test sample(s) ID:	GTS202009000194-01
Sample(s) Status	Engineered sample
Operation Frequency:	2402MHz~2480MHz
Channel numbers:	79
Channel separation:	1MHz
Modulation type:	GFSK, π/4-DQPSK, 8-DPSK
Antenna Type:	PCB Antenna
Antenna gain:	-0.59 dBi(declare by applicant)
Power supply:	DC 5V by Adapter AC 120V/50Hz DC 3.7V battery

Operation Frequency each of channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402 MHz	21	2422 MHz	41	2442 MHz	61	2462 MHz
2	2403 MHz	22	2423 MHz	42	2443 MHz	62	2463 MHz
3	2404 MHz	23	2424 MHz	43	2444 MHz	63	2464 MHz
4	2405 MHz	24	2425 MHz	44	2445 MHz	64	2465 MHz
5	2406 MHz	25	2426 MHz	45	2446 MHz	65	2466 MHz
6	2407 MHz	26	2427 MHz	46	2447 MHz	66	2467 MHz
7	2408 MHz	27	2428 MHz	47	2448 MHz	67	2468MHz
8	2409 MHz	28	2429 MHz	48	2449 MHz	68	2469 MHz
9	2410 MHz	29	2430 MHz	49	2450 MHz	69	2470 MHz
10	2411 MHz	30	2431MHz	50	2451 MHz	70	2471 MHz
11	2412 MHz	31	2432 MHz	51	2452 MHz	71	2472 MHz
12	2413 MHz	32	2433 MHz	52	2453 MHz	72	2473 MHz
13	2414 MHz	33	2434 MHz	53	2454 MHz	73	2474 MHz
14	2415 MHz	34	2435 MHz	54	2455 MHz	74	2475 MHz
15	2416 MHz	35	2436 MHz	55	2456 MHz	75	2476 MHz
16	2417 MHz	36	2437 MHz	56	2457 MHz	76	2477 MHz
17	2418 MHz	37	2438 MHz	57	2458 MHz	77	2478 MHz
18	2419 MHz	38	2439 MHz	58	2459 MHz	78	2479 MHz
19	2420 MHz	39	2440 MHz	59	2460 MHz	79	2480 MHz
20	2421 MHz	40	2441 MHz	60	2461 MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2441MHz
The Highest channel	2480MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, the dutycycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

Pre-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

Axis	X	Y	Z
Field Strength(dBuV/m)	91.23	94.80	90.25

Final Test Mode:

The EUT was tested in GFSK, π/4-DQPSK modulation, and found the GFSK modulation is the worst case.
According to ANSI C63.10 standards, the test results are both the "worst case" and "worst setup":
Y axis (see the test setup photo)

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
/	/	/	/

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Test Facility

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

● **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 381383.

● **IC —Registration No.: 9079A**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

5.8 Additional Instructions

Test Software	Special test command provided by manufacturer
Power level setup	Default

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 02 2020	July. 01 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 25 2020	June. 24 2021
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 25 2020	June. 24 2021
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 25 2020	June. 24 2021
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 25 2020	June. 24 2021
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 25 2020	June. 24 2021
9	Coaxial Cable	GTS	N/A	GTS211	June. 25 2020	June. 24 2021
10	Coaxial cable	GTS	N/A	GTS210	June. 25 2020	June. 24 2021
11	Coaxial Cable	GTS	N/A	GTS212	June. 25 2020	June. 24 2021
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 25 2020	June. 24 2021
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 25 2020	June. 24 2021
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 25 2020	June. 24 2021
15	Band filter	Amindeon	82346	GTS219	June. 25 2020	June. 24 2021
16	Power Meter	Anritsu	ML2495A	GTS540	June. 25 2020	June. 24 2021
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 25 2020	June. 24 2021
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 25 2020	June. 24 2021
19	Splitter	Agilent	11636B	GTS237	June. 25 2020	June. 24 2021
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 25 2020	June. 24 2021
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 19 2019	Oct. 18 2020
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 19 2019	Oct. 18 2020
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 19 2019	Oct. 18 2020
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 25 2020	June. 24 2021

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 25 2020	June. 24 2021
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 25 2020	June. 24 2021
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 25 2020	June. 24 2021
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 25 2020	June. 24 2021
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 25 2020	June. 24 2021

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 25 2020	June. 24 2021
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 25 2020	June. 24 2021
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 25 2020	June. 24 2021
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 25 2020	June. 24 2021
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 25 2020	June. 24 2021
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 25 2020	June. 24 2021
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 25 2020	June. 24 2021

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 25 2020	June. 24 2021
2	Barometer	ChangChun	DYM3	GTS255	June. 25 2020	June. 24 2021

7 Test results and Measurement Data

7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. **15.247(c) (1)(i) requirement:** (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
EUT Antenna:	
The antenna is PCB antenna, the best case gain of the antenna is -0.59dBi, reference to the appendix II for details	

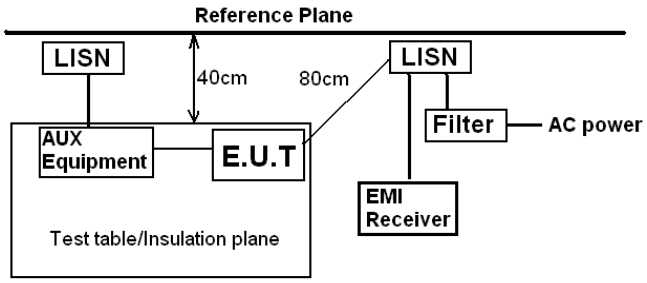
7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207&15.249
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto
Limit:	

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test setup:



Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m

Test procedure:

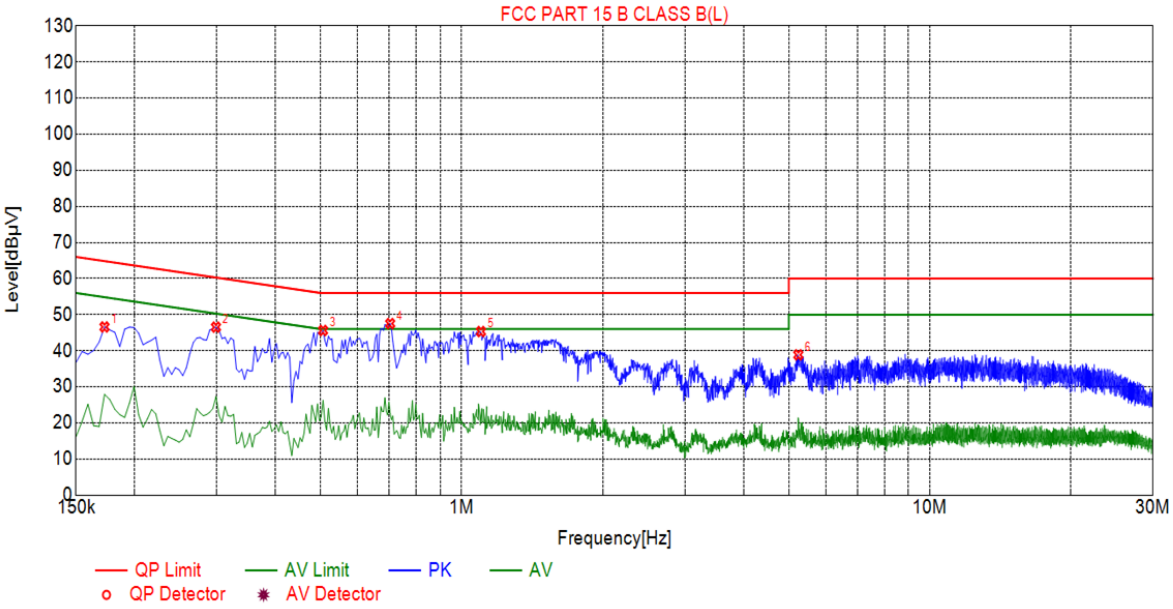
1. The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.

Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	DC 5V by Adapter AC 120V/60Hz					
Test results:	Pass					

Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

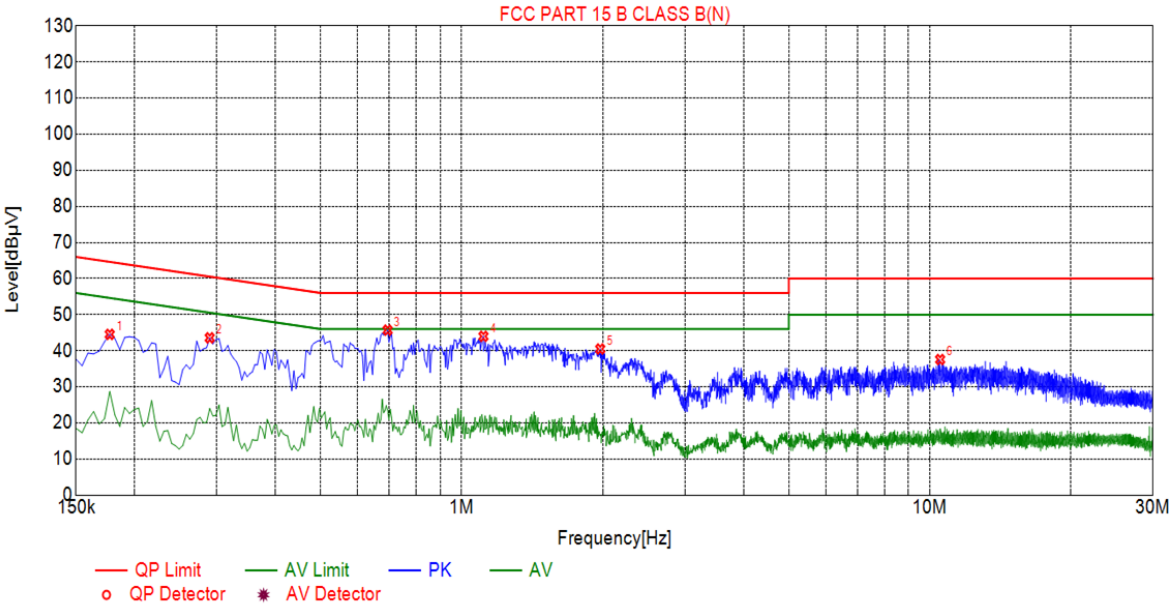
Measurement data

Line:



Suspected List								
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Type
1	0.1725	46.59	20.04	64.84	18.25	26.55	PK	L
2	0.2985	46.54	20.04	60.28	13.74	26.50	PK	L
3	0.5055	45.61	20.04	56.00	10.39	25.57	PK	L
4	0.7035	47.53	20.05	56.00	8.47	27.48	PK	L
5	1.0995	45.32	20.07	56.00	10.68	25.25	PK	L
6	5.2395	38.87	20.26	60.00	21.13	18.61	PK	L

Neutral:



Suspected List								
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Type
1	0.1770	44.54	20.05	64.63	20.09	24.49	PK	N
2	0.2895	43.58	20.03	60.54	16.96	23.55	PK	N
3	0.6945	45.71	20.05	56.00	10.29	25.66	PK	N
4	1.1130	43.99	20.08	56.00	12.01	23.91	PK	N
5	1.9770	40.49	20.14	56.00	15.51	20.35	PK	N
6	10.5270	37.56	20.04	60.00	22.44	17.52	PK	N

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss
4. *If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.*

7.3 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209
Test Method:	ANSI C63.10:2013
Test Frequency Range:	9kHz to 25GHz
Test site:	Measurement Distance: 3m

Receiver setup:

Frequency	Detector	RBW	VBW	Remark
9kHz-150kHz	Quasi-peak	200Hz	300Hz	Quasi-peak Value
150kHz-30MHz	Quasi-peak	9kHz	10kHz	Quasi-peak Value
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	Peak	1MHz	10Hz	Average Value

Limit:
(Field strength of the fundamental signal)

Frequency	Limit (dBuV/m @3m)	Remark
2400MHz-2483.5MHz	94.00	Average Value
	114.00	Peak Value

Limit:
(Spurious Emissions)

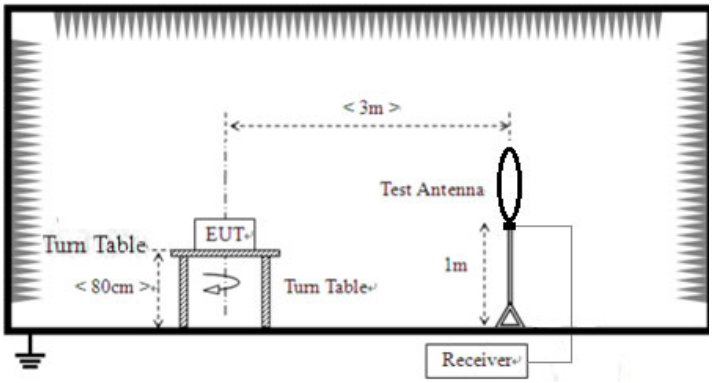
Frequency	Limit (uV/m)	Remark
0.009MHz-0.490MHz	2400/F(kHz) @300m	Quasi-peak Value
0.490MHz-1.705MHz	24000/F(kHz) @30m	Quasi-peak Value
1.705MHz-30.0MHz	30 @30m	Quasi-peak Value
30MHz-88MHz	100 @3m	Quasi-peak Value
88MHz-216MHz	150 @3m	Quasi-peak Value
216MHz-960MHz	200 @3m	Quasi-peak Value
960MHz-1GHz	500 @3m	Quasi-peak Value
Above 1GHz	500 @3m	Average Value
	5000 @3m	Peak Value

Limit:
(band edge)

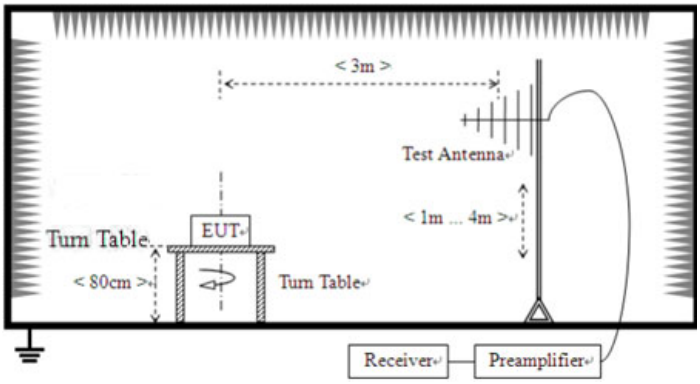
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

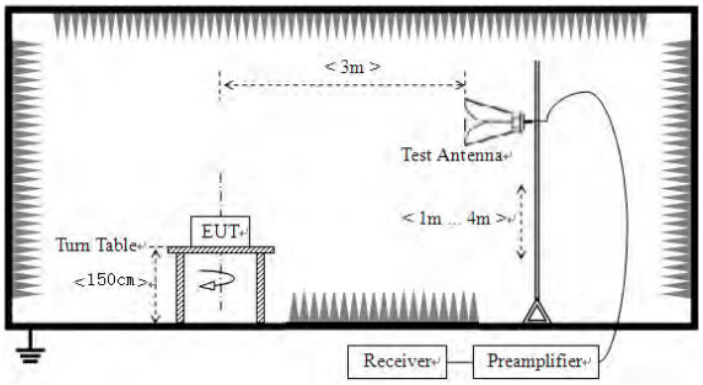
Test setup:

For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to1GHz

<table>
<tr><td></td><td colspan="6">


For radiated emissions above 1GHz


</td></tr>
<tr><td>Test Procedure:</td><td colspan="6">1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</td></tr>
<tr><td>Test Instruments:</td><td colspan="6">Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td colspan="6">Refer to section 5.2 for details</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>25 °C</td><td>Humid.:</td><td>52%</td><td>Press.:</td><td>1012mbar</td></tr>
<tr><td>Test voltage:</td><td colspan="6">DC 5V by Adapter AC 120V/60Hz</td></tr>
<tr><td>Test results:</td><td colspan="6">Pass</td></tr>
</table>

Measurement data:

7.3.1 Field Strength of The Fundamental Signal

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2402	101.56	22.55	3.25	33.45	93.91	114	-20.09	Vertical
2402	102.42	22.55	3.25	33.45	94.77	114	-19.23	Horizontal
2441	100.28	23.05	3.36	33.15	93.54	114	-20.46	Vertical
2441	101.54	23.05	3.36	33.15	94.80	114	-19.20	Horizontal
2480	100.25	23.57	3.67	33.68	93.81	114	-20.19	Vertical
2480	100.98	23.57	3.67	33.68	94.54	114	-19.46	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2402	86.25	22.55	3.25	33.45	78.60	94	-15.40	Vertical
2402	85.41	22.55	3.25	33.45	77.76	94	-16.24	Horizontal
2441	84.68	23.05	3.36	33.15	77.94	94	-16.06	Vertical
2441	83.56	23.05	3.36	33.15	76.82	94	-17.18	Horizontal
2480	84.51	23.57	3.67	33.68	78.07	94	-15.93	Vertical
2480	85.78	23.57	3.67	33.68	79.34	94	-14.66	Horizontal

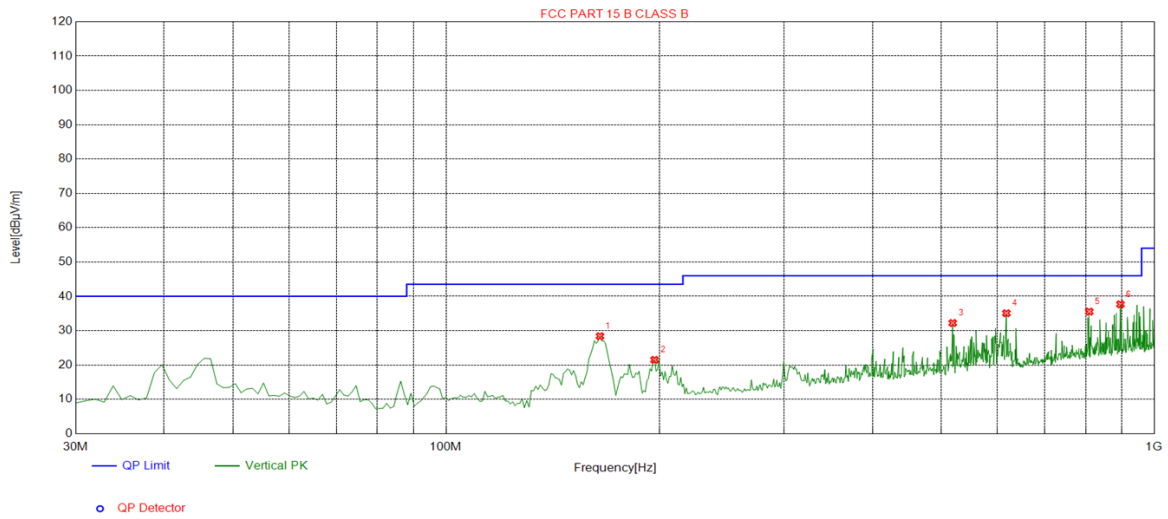
7.3.2 Spurious emissions

- Below 30MHz

  The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o), the test result no need to reported.

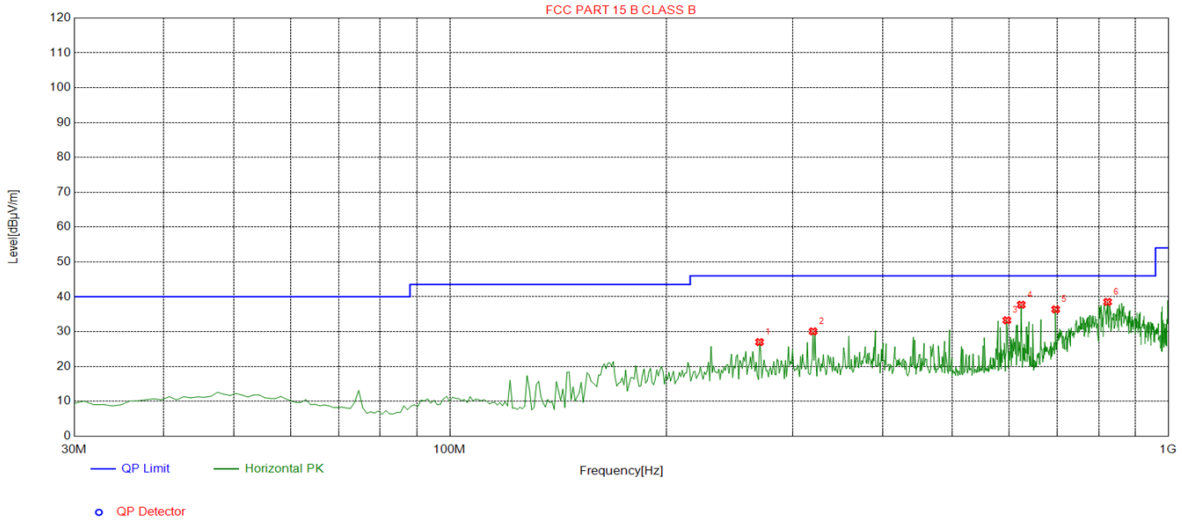
- Below 1GHz

Horizontal:



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	164.9650	-17.76	46.15	28.39	43.50	15.11	100	162	Vertical
2	197.0070	-15.34	36.84	21.50	43.50	22.00	100	207	Vertical
3	519.3694	-7.75	39.98	32.23	46.00	13.77	100	332	Vertical
4	618.4084	-5.53	40.62	35.09	46.00	10.91	100	54	Vertical
5	809.6897	-2.96	38.51	35.55	46.00	10.45	100	149	Vertical
6	896.1061	-1.82	39.50	37.68	46.00	8.32	100	329	Vertical

Vertical:



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	269.8298	-13.66	40.66	27.00	46.00	19.00	100	186	Horizontal
2	320.3203	-12.08	42.15	30.07	46.00	15.93	100	34	Horizontal
3	596.0761	-6.37	39.63	33.26	46.00	12.74	100	37	Horizontal
4	624.2342	-5.50	43.22	37.72	46.00	8.28	100	28	Horizontal
5	697.0571	-5.10	41.48	36.38	46.00	9.62	100	256	Horizontal
6	823.2833	-2.61	41.14	38.53	46.00	7.47	100	99	Horizontal

■ Above 1GHz

Test channel:	Lowest channel

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804	56.45	21.52	3.52	33.12	48.37	74	-25.63	Vertical
7026	61.24	23.65	4.56	33.08	56.37	74	-17.63	Vertical
9608	58.56	25.58	6.15	33.57	56.72	74	-17.28	Vertical
12010	46.25	27.68	6.98	33.26	47.65	74	-26.35	Vertical
14412	*	*	*	*	*	74	*	Vertical
4804	56.87	21.52	3.52	33.12	48.79	74	-25.21	Horizontal
7026	55.45	23.65	4.56	33.08	50.58	74	-23.42	Horizontal
9608	52.41	25.58	6.15	33.57	50.57	74	-23.43	Horizontal
12010	54.23	27.68	6.98	33.26	55.63	74	-18.37	Horizontal
14412	*	*	*	*	*	74	*	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804	41.21	21.52	3.52	33.12	33.13	54	-20.87	Vertical
7026	41.52	23.65	4.56	33.08	36.65	54	-17.35	Vertical
9608	42.15	25.58	6.15	33.57	40.31	54	-13.69	Vertical
12010	38.98	27.68	6.98	33.26	40.38	54	-13.62	Vertical
14412	*	*	*	*	*	54	*	Vertical
4804	39.87	21.52	3.52	33.12	31.79	54	-22.21	Horizontal
7026	40.21	23.65	4.56	33.08	35.34	54	-18.66	Horizontal
9608	32.21	25.58	6.15	33.57	30.37	54	-23.63	Horizontal
12010	33.56	27.68	6.98	33.26	34.96	54	-19.04	Horizontal
14412	*	*	*	*	*	54	*	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
3. *"*", means this data is the too weak instrument of signal is unable to test.*

Test channel:	Middle channel

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4882	54.69	21.78	3.58	33.27	46.78	74	-27.22	Vertical
7323	52.32	24.15	4.57	33.87	47.17	74	-26.83	Vertical
9766	49.88	26.04	6.24	33.19	48.97	74	-25.03	Vertical
12205	45.65	27.98	7.18	33.68	47.13	74	-26.87	Vertical
14646	*	*	*	*	*	74	*	Vertical
4882	48.21	21.78	3.58	33.27	40.30	74	-33.70	Horizontal
7323	51.24	24.15	4.57	33.87	46.09	74	-27.91	Horizontal
9764	55.23	26.04	6.24	33.19	54.32	74	-19.68	Horizontal
12205	53.21	27.98	7.18	33.68	54.69	74	-19.31	Horizontal
14646	*	*	*	*	*	74	*	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4882	41.25	21.78	3.58	33.27	33.34	54	-20.66	Vertical
7323	38.45	24.15	4.57	33.87	33.30	54	-20.70	Vertical
9764	39.54	26.04	6.24	33.19	38.63	54	-15.37	Vertical
12205	36.25	27.98	7.18	33.68	37.73	54	-16.27	Vertical
14646	*	*	*	*	*	54	*	Vertical
4882	36.45	21.78	3.58	33.27	28.54	54	-25.46	Horizontal
7323	37.45	24.15	4.57	33.87	32.30	54	-21.70	Horizontal
9764	38.12	26.04	6.24	33.19	37.21	54	-16.79	Horizontal
12205	32.56	27.98	7.18	33.68	34.04	54	-19.96	Horizontal
14646	*	*	*	*	*	54	*	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
3. *"*", means this data is the too weak instrument of signal is unable to test.*

Test channel:	Highest channel

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4960	55.69	22.56	4.17	33.75	48.67	74	-25.33	Vertical
7440	53.62	24.78	5.36	33.17	50.59	74	-23.41	Vertical
9920	50.11	27.14	6.97	33.62	50.60	74	-23.40	Vertical
12400	45.37	28.16	7.65	33.58	47.60	74	-26.40	Vertical
14880	*	*	*	*	*	74	*	Vertical
4960	58.84	22.56	4.17	33.75	51.82	74	-22.18	Horizontal
7440	54.15	24.78	5.36	33.17	51.12	74	-22.88	Horizontal
9920	50.33	27.14	6.97	33.62	50.82	74	-23.18	Horizontal
12400	47.16	28.16	7.65	33.58	49.39	74	-24.61	Horizontal
14880	*	*	*	*	*	74	*	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4960	45.56	22.56	4.17	33.75	38.54	54	-15.46	Vertical
7440	39.26	24.78	5.36	33.17	36.23	54	-17.77	Vertical
9920	36.89	27.14	6.97	33.62	37.38	54	-16.62	Vertical
12400	29.87	28.16	7.65	33.58	32.10	54	-21.90	Vertical
14880	*	*	*	*	*	54	*	Vertical
4960	44.25	22.56	4.17	33.75	37.23	54	-16.77	Horizontal
7440	41.26	24.78	5.36	33.17	38.23	54	-15.77	Horizontal
9920	36.45	27.14	6.97	33.62	36.94	54	-17.06	Horizontal
12400	31.25	28.16	7.65	33.58	33.48	54	-20.52	Horizontal
14880	*	*	*	*	*	54	*	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
3. *"*", means this data is the too weak instrument of signal is unable to test.*

7.3.3 Bandedge emissions

All of the restriction bands were tested, and only the data of worst case was exhibited.

Test channel:	Lowest channel

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310	54.21	21.25	3.26	33.14	45.58	74	-28.42	Horizontal
2400	53.45	21.75	3.54	33.42	45.32	74	-28.68	Horizontal
2310	55.21	21.25	3.26	33.14	46.58	74	-27.42	Vertical
2400	54.68	21.75	3.54	33.42	46.55	74	-27.45	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310	35.56	21.25	3.26	33.14	26.93	54	-27.07	Horizontal
2400	36.48	21.75	3.54	33.42	28.35	54	-25.65	Horizontal
2310	37.02	21.25	3.26	33.14	28.39	54	-25.61	Vertical
2400	37.56	21.75	3.54	33.42	29.43	54	-24.57	Vertical

Test channel:	Highest channel

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.5	55.21	22.12	3.65	33.54	47.44	74	-26.56	Horizontal
2500	52.21	22.35	3.98	33.27	45.27	74	-28.73	Horizontal
2483.5	53.12	22.12	3.65	33.54	45.35	74	-28.65	Vertical
2500	54.12	22.35	3.98	33.27	47.18	74	-26.82	Vertical

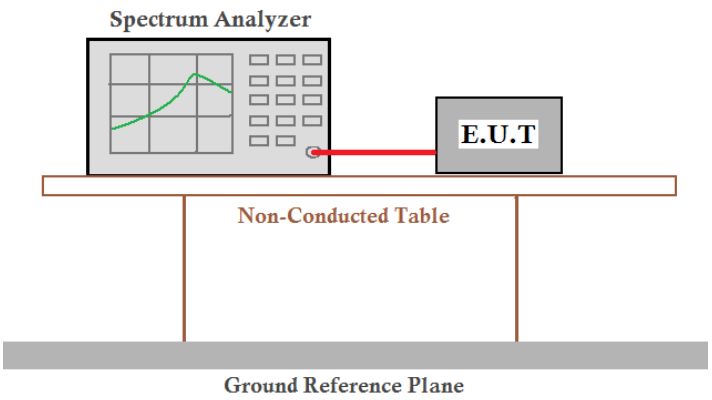
Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.5	39.45	22.12	3.65	33.54	31.68	54	-22.32	Horizontal
2500	36.78	22.35	3.98	33.27	29.84	54	-24.16	Horizontal
2483.5	38.24	22.12	3.65	33.54	30.47	54	-23.53	Vertical
2500	36.45	22.35	3.98	33.27	29.51	54	-24.49	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*

7.4 20dB Occupy Bandwidth

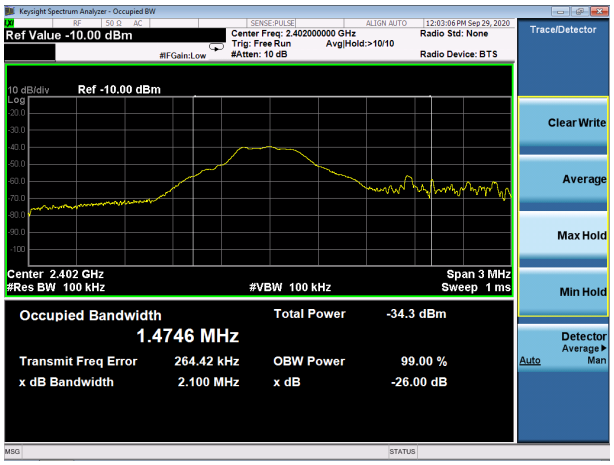
Test Requirement:	FCC Part15 C Section 15.249/15.215
Test Method:	ANSI C63.10:2013
Limit:	Operation Frequency range 2400MHz~2483.5MHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

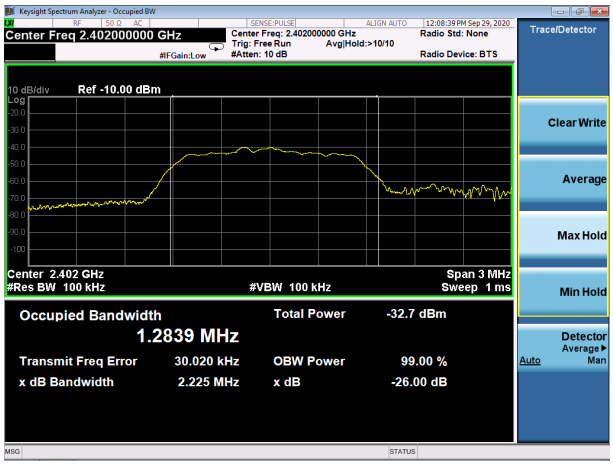
Test channel		20dB bandwidth(MHz)	Result
GFSK	Lowest	1.4746	Pass
	Middle	1.6786	Pass
	Highest	1.0353	Pass
π/4-DQPSK	Lowest	1.2839	Pass
	Middle	1.2269	Pass
	Highest	1.2470	Pass
8-DPSK	Lowest	1.2109	Pass
	Middle	1.8871	Pass
	Highest	1.2161	Pass

Test plot as follows:

GFSK



π/4-DQPSK



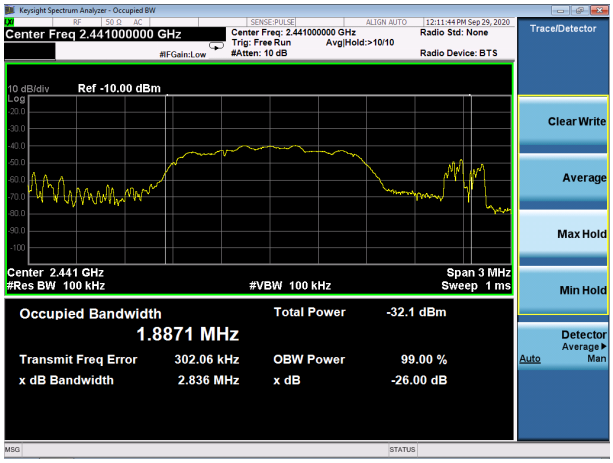
Lowest channel

Middle channel

Highest channel

8-DPSK

Lowest channel



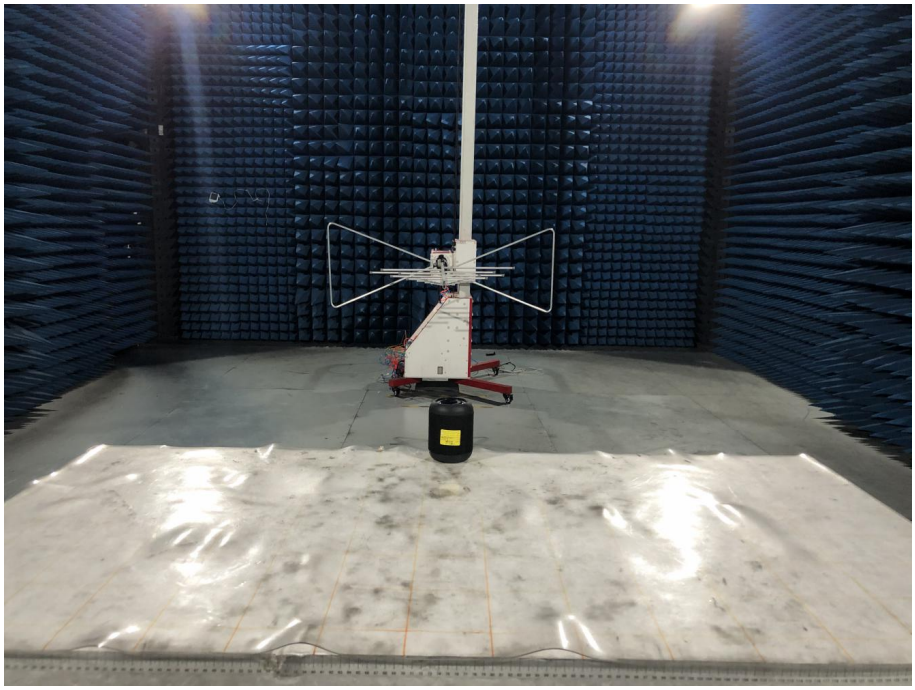
Middle channel

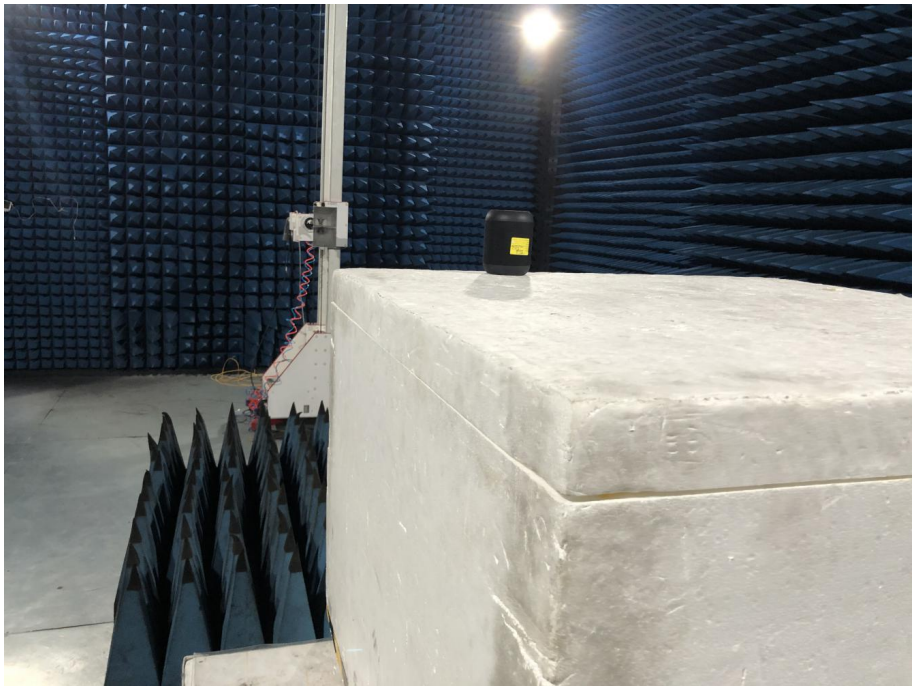
Highest channel

8 Test Setup Photo

CE

RE





9 EUT Constructional Details

Photo 1

Photo 2

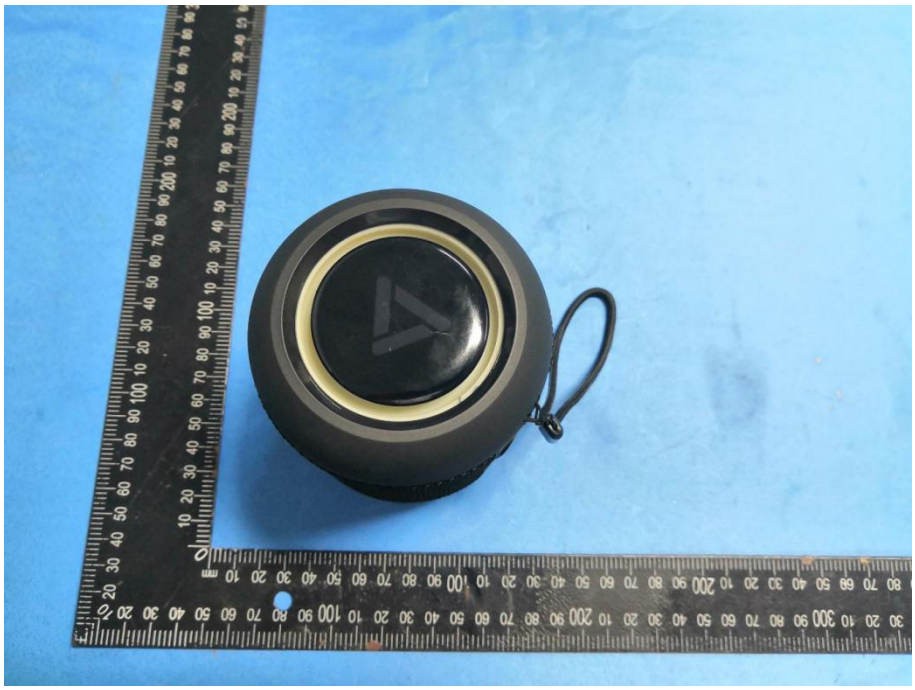


Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

Photo 9

Photo 10

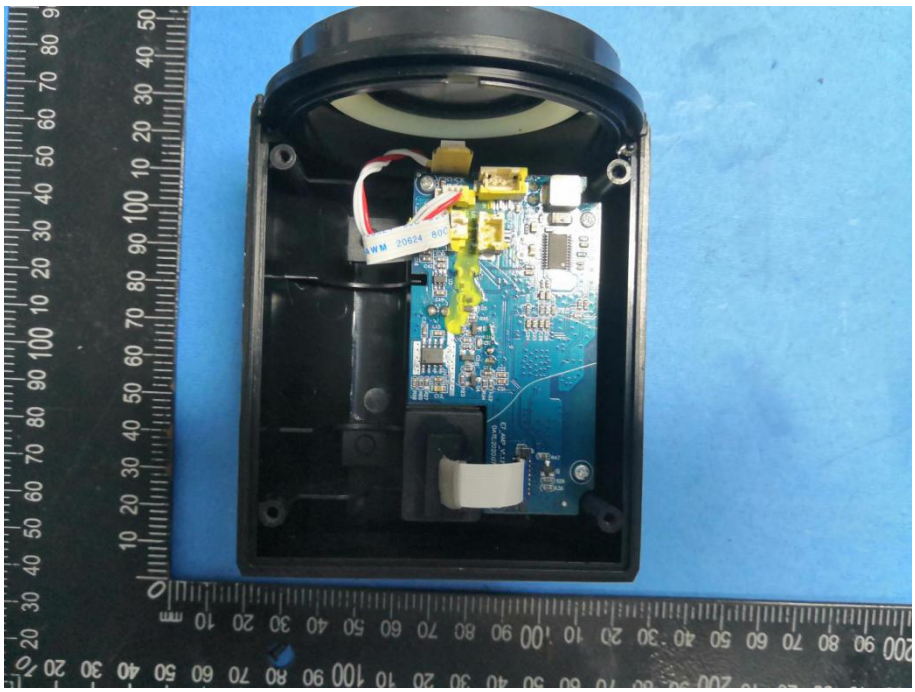


Photo 11

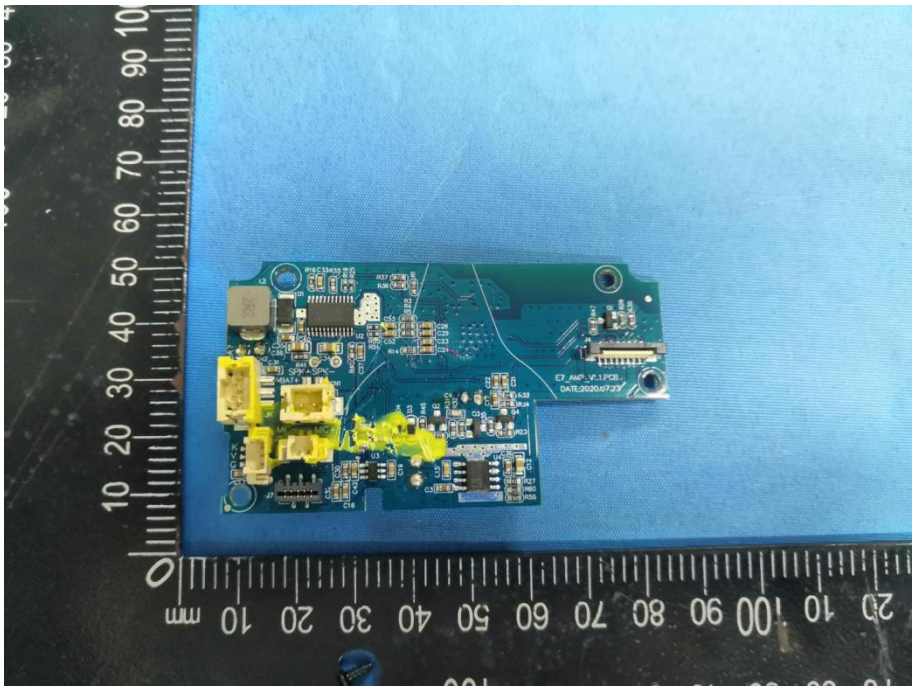


Photo 12

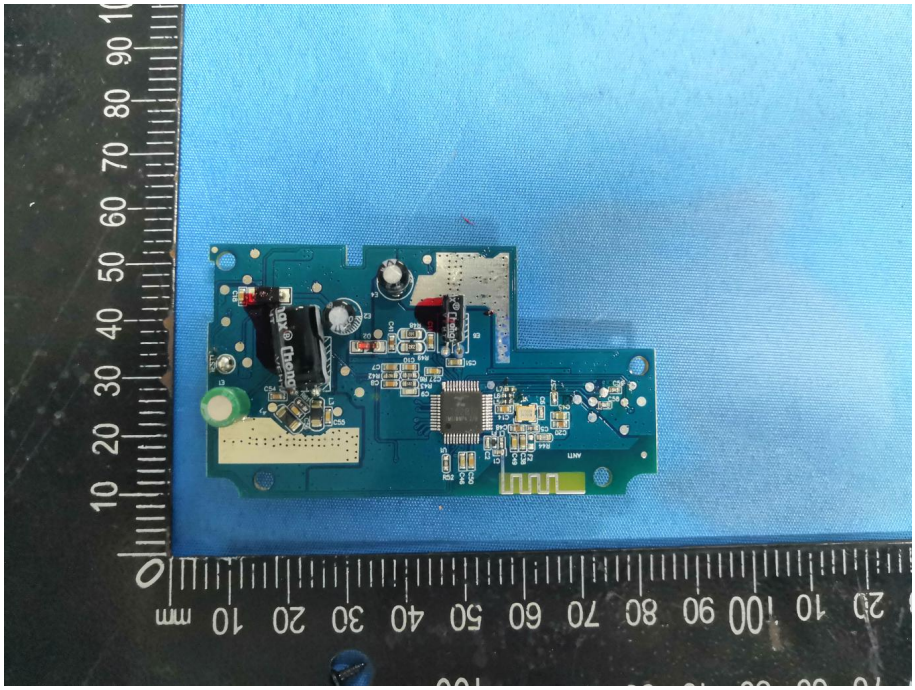
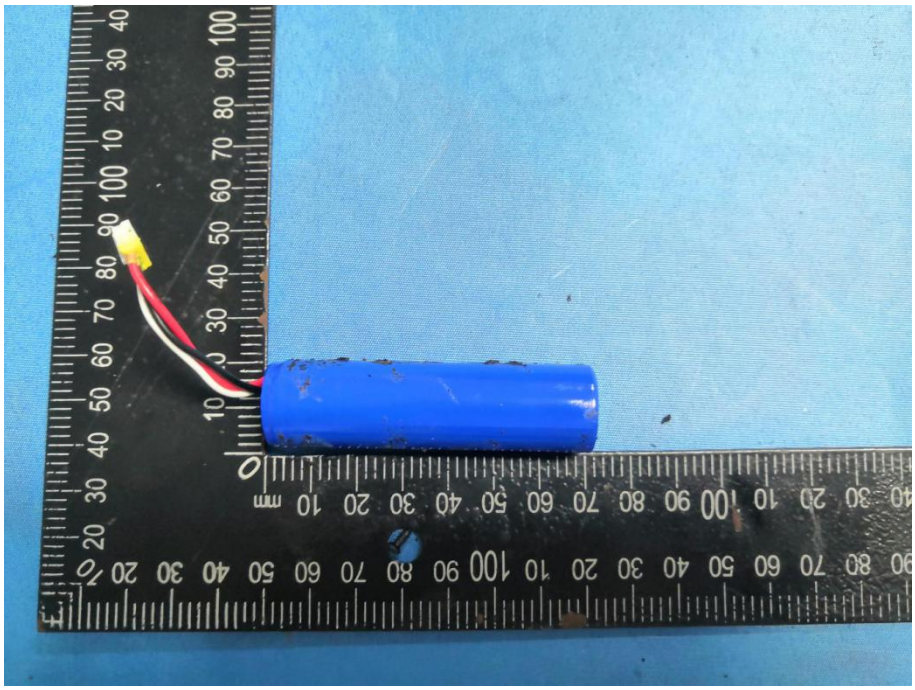


Photo 13



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