FCC Part 15C Test Report

FCC ID: 2AGHAQ9

Product Name:	Bluetooth Headset With Car Charger
Trademark:	ZEiRO
Model Name :	Q9 Q8, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, QXX(XX REPRSENTS 00~99)
Prepared For : Address :	Shenzhen ABC Industrial Co., Ltd. Rm 526, Block C, Huafeng Headquarters Bldg, Xixiang Avenue No.288, Bao'an, Shenzhen, China
Prepared By : Address :	Shenzhen BCTC Technology Co., Ltd. No.101,Yousong Road,Longhua New District, Shenzhen,China
Test Date:	May 14–May 23, 2016
Date of Report :	May 27, 2016
Report No.:	BCTC-160505582E

TEST RESULT CERTIFICATION

Applicant's name	:	Shenzhen ABC Industrial Co., Ltd.
Address	:	Rm 526, Block C, Huafeng Headquarters Bldg, Xixiang Avenue No.288, Bao'an, Shenzhen, China
Manufacture's Name	:	Shenzhen ABC Industrial Co., Ltd.
Address	:	Rm 526, Block C, Huafeng Headquarters Bldg, Xixiang Avenue No.288, Bao'an, Shenzhen, China
Product description		
Product name	:	Bluetooth Headset With Car Charger
		ZEiRO
Model and/or type reference	:	Q9 Q8, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, QXX(XX REPRSENTS 00~99)
Standards	:	FCC Part15.249
		ANSI C63.10-2013

This device described above has been tested by BCTC, 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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Testing Engineer	:	Eric Yang
Reviewer (Supervisor)	:	Jade Yang
Approved & Authorized Signer(Manager):	:	Carson Zhang

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.249) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	
15.249	Radiated Spurious Emission	PASS	
15.249	Bandwidth	PASS	
15.205	Band Edge Emission	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

1.1 TEST FACILITY

Shenzhen BCTC Technology Co., Ltd.
Add. : No.101,Yousong Road,Longhua New District, Shenzhen,China
FCC Registered No.: 187086

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ± U** , where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2** , providing a level of confidence of approximately **95** %。

No.	Item	Uncertainty
1	Conducted Emission Test	±1.38dB
2	RF power,conducted	±0.16dB
3	Spurious emissions,conducted	±0.21dB
4	All emissions,radiated(<1G)	±4.68dB
5	All emissions,radiated(>1G)	±4.89dB
6	Temperature	±0.5°C
7	Humidity	±2%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Bluetooth Headset With Car Charger
Trade Name	ZEiRO
Model Name	Q9 Q8, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, QXX(XX REPRSENTS 00~99)
Model Difference	The product's different for model number and outlook color.
Product Description	The EUT is a Bluetooth Headset With Car Charger Operation Frequency: 2402~2480 MHz Modulation Type: GFSK,PI/4 DPSK,8DPSK Bit Rate of Transmitter 1/2/3Mbps Number Of Channel 79 CH Antenna type: internal antenna Antenna Gain (dBi) 0.5dBi Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.
Channel List	Please refer to the Note 2.
Power	DC 12V from Battery
hardware version	--
Software version	--
Serial number	--
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. **Channel List**

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2402	20	2422	61	2463
02	2403	21	2423	62	2464
~	~	~	~	~	~
9	2411	39	2422	77	2479
10	2413	40	2423	78	2480

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description	
Mode 1	CH00	GFSK,PI/4 DPSK,8DPSK
Mode 2	CH39	
Mode 3	CH78	
Mode 4	Link Mode	

For Conducted & Radiated Emission		
Final Test Mode	Description	
Mode 1	CH00	GFSK,PI/4 DPSK,8DPSK
Mode 2	CH39	
Mode 3	CH78	
Mode 4	Link Mode	

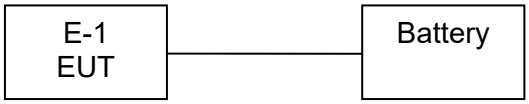
Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

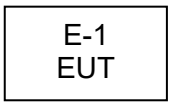
(2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Emission Test



Radiated Emission Test



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Bluetooth Headset With Car Charger	ZEiRO	Q9	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer	Agilent	E4407B	MY45109572	2015.08.25	2016.08.24
2	Test Receiver	R&S	ESPI	101396	2015.08.25	2016.08.24
3	Bilog Antenna	SCHWARZBECK	VULB9160	VULB9160-3369	2015.08.25	2016.08.24
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2015.08.25	2016.08.24
5	Spectrum Analyzer	Agilent	N9020A	MY5051041	2015.08.25	2016.08.24
6	Horn Antenna	SCHWARZBECK	9120D	9120D-1275	2015.08.25	2016.08.24
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2015.09.04	2016.09.03
8	Amplifier	SCHWARZBECK	BBV9718	9718-270	2015.08.25	2016.08.24
9	Amplifier	SCHWARZBECK	BBV9743	9743-119	2015.08.25	2016.08.24
10	Loop Antenna	ARA	PLQ930/B	1029	2015.09.04	2016.09.03
11	Power Meter	R&S	NRVS	100696	2015.08.25	2016.08.24
12	Power Sensor	R&S	URV5-Z4	0395.1619.05	2015.08.25	2016.08.24
13	RF cables	R&S	N/A	N/A	2015.08.25	2016.08.24
14	Test Receiver	Agilent	N9020A	2430521	2015.08.25	2016.08.24

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

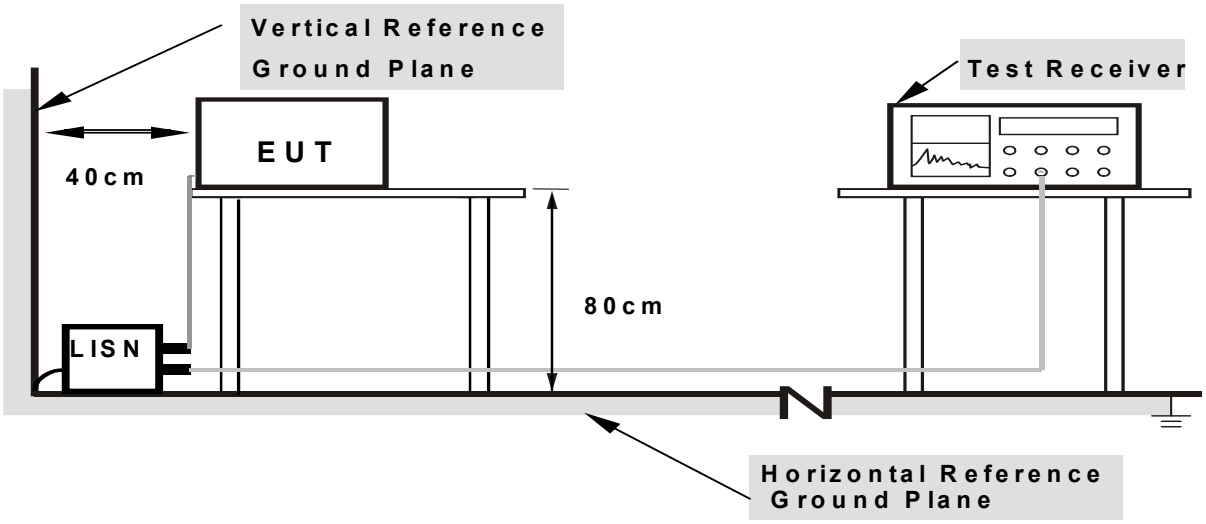
d. LISN at least 80 cm from nearest part of EUT chassis.

e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.1.6 TEST RESULTS

The EUT's power porvide by battery, no requirement for this item.

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	25GHz
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. 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.
d. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. 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.

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre).
h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel

Note:

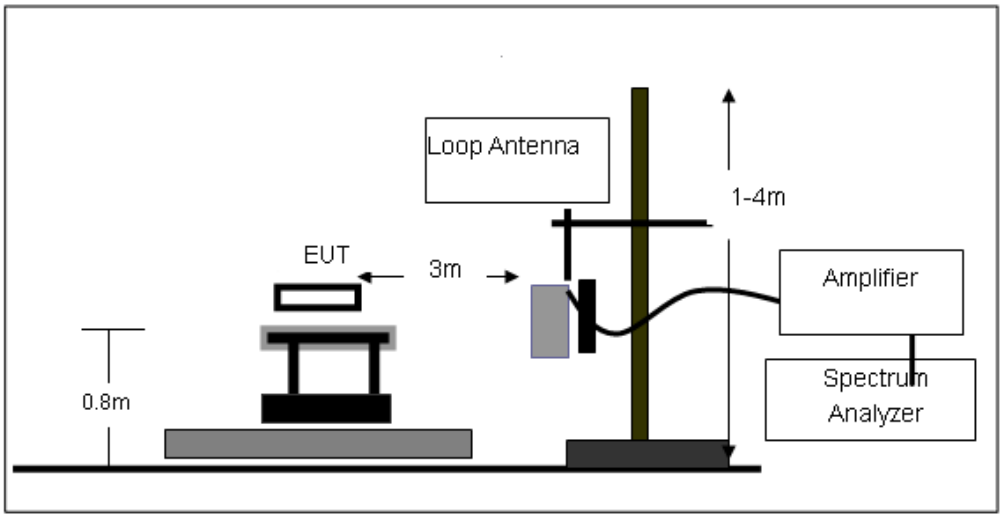
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

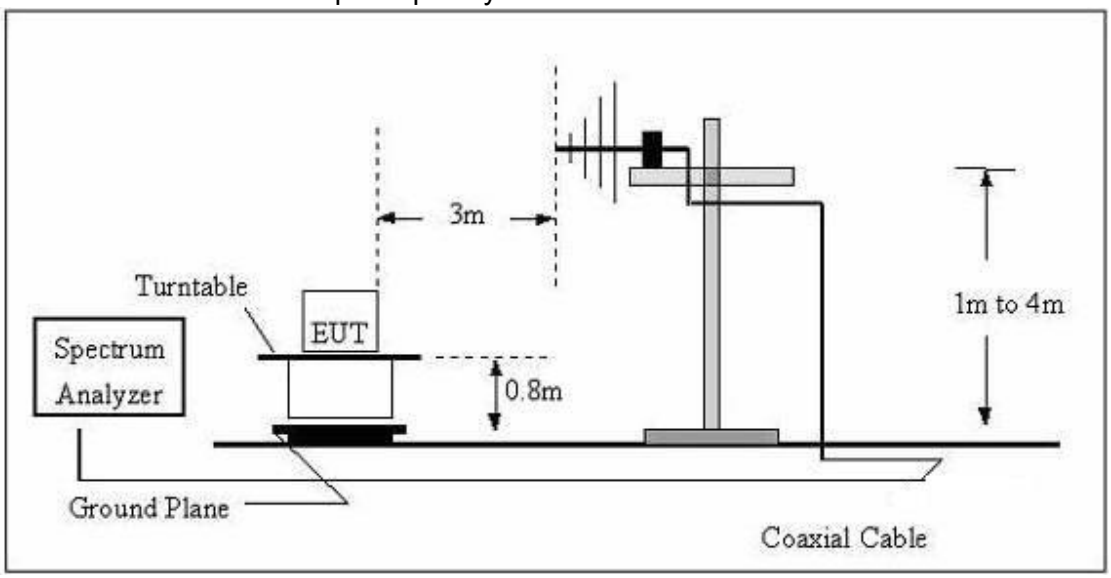
No deviation

3.2.4 TEST SETUP

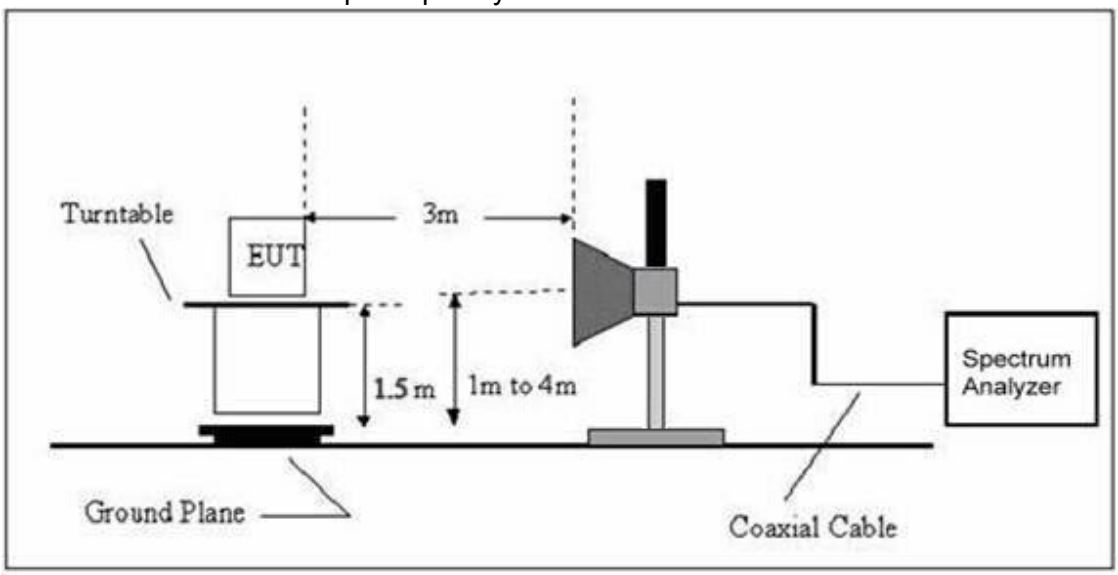
（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

Temperature：	20℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	Mode 4	Polarization :	--

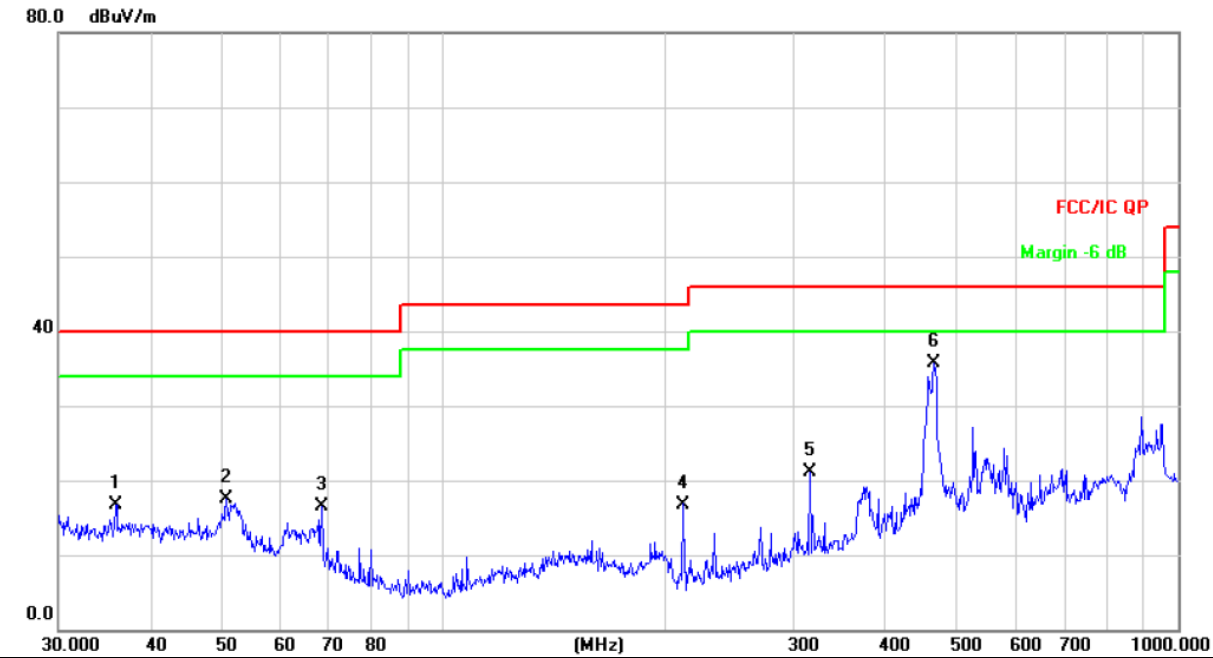
Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

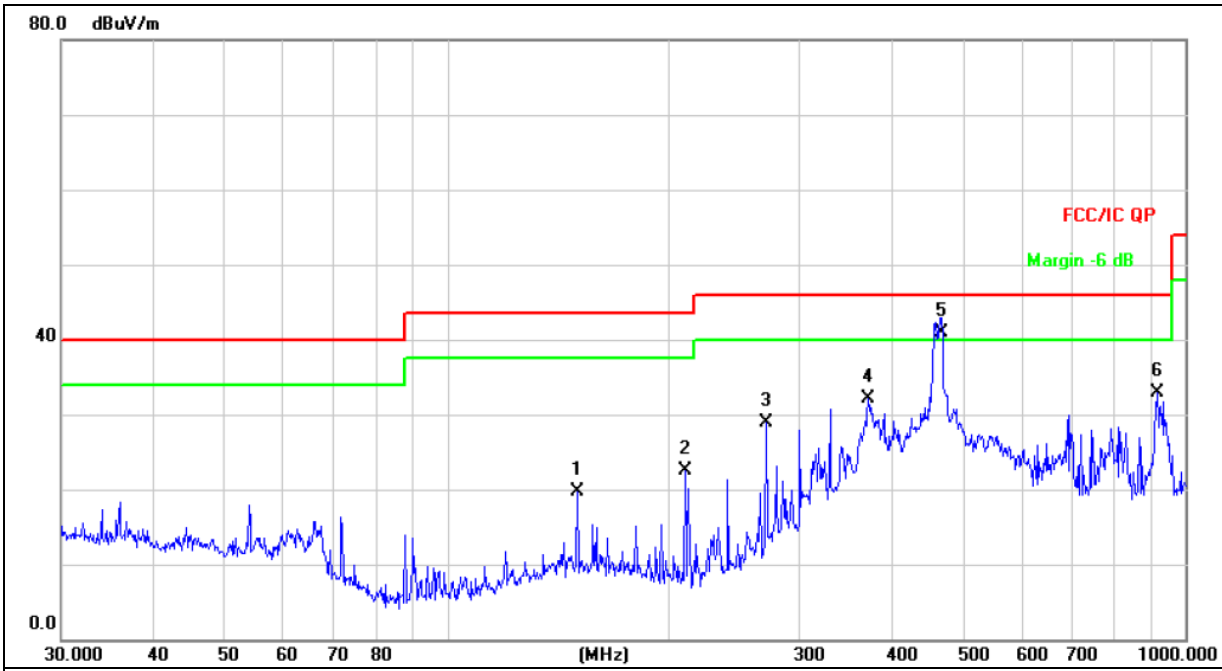
Temperature :	26℃	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC12V		
Test Mode :	Mode 4		



Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All interfaces was connected, and BT TX mode was link.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		35.8746	25.29	-8.58	16.71	40.00	-23.29	QP			
2		50.7637	27.90	-10.42	17.48	40.00	-22.52	QP			
3		68.3908	30.34	-13.89	16.45	40.00	-23.55	QP			
4		212.2695	32.65	-15.85	16.80	43.50	-26.70	QP			
5		315.4808	33.28	-12.18	21.10	46.00	-24.90	QP			
6	*	465.5994	44.33	-8.72	35.61	46.00	-10.39	QP			

Temperature :	26℃	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 12V		
Test Mode :	Mode 4		



Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All interfaces was connected, and BT TX mode was link.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		150.0108	32.57	-12.86	19.71	43.50	-23.79	QP			
2		210.0482	38.39	-15.91	22.48	43.50	-21.02	QP			
3		270.3748	42.32	-13.50	28.82	46.00	-17.18	QP			
4		372.0045	43.03	-10.88	32.15	46.00	-13.85	QP			
5	*	467.2349	49.67	-8.70	40.97	46.00	-5.03	QP			
6		916.0687	34.01	-1.17	32.84	46.00	-13.16	QP			

3.2.8 TEST RESULTS (1GHZ~25GHZ)

Temperature：	26℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Voltage ：	DC 12V

GFSK

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2402							
V	2402.00	88.26	13.85	102.11	114.00	-11.89	PK
V	2402.00	72.95	13.85	86.80	94.00	-7.20	AV
V	4804.00	39.44	19.34	58.78	74.00	-15.22	PK
V	4804.00	25.78	19.34	45.12	54.00	-8.88	AV
V	16130.00	30.00	21.89	51.89	74.00	-22.11	PK
H	2402.00	88.23	13.85	102.08	114.00	-11.92	PK
H	2402.00	73.56	13.85	87.41	94.00	-6.59	AV
H	4804.00	40.27	19.34	59.61	74.00	-14.39	PK
H	4804.00	25.66	19.34	45.00	54.00	-9.00	AV
H	16130.00	29.73	21.89	51.62	74.00	-22.38	PK
operation frequency:2441							
V	2441.00	88.76	13.94	102.70	114.00	-11.30	PK
V	2441.00	73.09	13.94	87.03	94.00	-6.97	AV
V	4882.00	40.37	19.42	59.79	74.00	-14.21	PK
V	4882.00	25.82	19.42	45.24	54.00	-8.76	AV
V	16130.00	28.24	21.89	50.13	74.00	-23.87	PK
H	2441.00	88.78	13.94	102.72	114.00	-11.28	PK
H	2441.00	73.98	13.94	87.92	94.00	-6.08	AV
H	4882.00	41.45	19.42	60.87	74.00	-13.13	PK
H	4882.00	26.55	19.42	45.97	54.00	-8.03	AV
H	16130.00	29.91	21.89	51.80	74.00	-22.20	PK
operation frequency:2480							
V	2480.00	88.81	14.02	102.83	114.00	-11.17	PK
V	2480.00	73.19	14.02	87.21	94.00	-6.79	AV
V	4960.00	41.18	19.51	60.69	74.00	-13.31	PK
V	4960.00	26.10	19.51	45.61	54.00	-8.39	AV
V	16130.00	30.13	21.89	52.02	74.00	-21.98	PK
H	2480.00	88.84	14.02	102.86	114.00	-11.14	PK
H	2480.00	73.04	14.02	87.06	94.00	-6.94	AV
H	4960.00	41.40	19.51	60.91	74.00	-13.09	PK
H	4960.00	26.13	19.51	45.64	54.00	-8.36	AV
H	16130.00	30.45	21.89	52.34	74.00	-21.66	PK

Remark:

1. Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

PI/4 DPSK

Temperature：	26℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Voltage ：	DC 12V

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2402							
V	2402.00	87.94	13.85	101.79	114.00	-12.21	PK
V	2402.00	72.69	13.85	86.54	94.00	-7.46	AV
V	4804.00	39.30	19.34	58.64	74.00	-15.36	PK
V	4804.00	25.69	19.34	45.03	54.00	-8.97	AV
V	16130.00	29.89	21.89	51.78	74.00	-22.22	PK
H	2402.00	87.91	13.85	101.76	114.00	-12.24	PK
H	2402.00	73.29	13.85	87.14	94.00	-6.86	AV
H	4804.00	40.12	19.34	59.46	74.00	-14.54	PK
H	4804.00	25.57	19.34	44.91	54.00	-9.09	AV
H	16130.00	29.62	21.89	51.51	74.00	-22.49	PK
operation frequency:2441							
V	2441.00	88.44	13.94	102.38	114.00	-11.62	PK
V	2441.00	72.83	13.94	86.77	94.00	-7.23	AV
V	4882.00	40.22	19.42	59.64	74.00	-14.36	PK
V	4882.00	25.73	19.42	45.15	54.00	-8.85	AV
V	16130.00	28.14	21.89	50.03	74.00	-23.97	PK
H	2441.00	88.46	13.94	102.40	114.00	-11.60	PK
H	2441.00	73.71	13.94	87.65	94.00	-6.35	AV
H	4882.00	41.30	19.42	60.72	74.00	-13.28	PK
H	4882.00	26.45	19.42	45.87	54.00	-8.13	AV
H	16130.00	29.80	21.89	51.69	74.00	-22.31	PK
operation frequency:2480							
V	2480.00	88.49	14.02	102.51	114.00	-11.49	PK
V	2480.00	72.93	14.02	86.95	94.00	-7.05	AV
V	4960.00	41.03	19.51	60.54	74.00	-13.46	PK
V	4960.00	26.00	19.51	45.51	54.00	-8.49	AV
V	16130.00	30.02	21.89	51.91	74.00	-22.09	PK
H	2480.00	88.52	14.02	102.54	114.00	-11.46	PK
H	2480.00	72.78	14.02	86.80	94.00	-7.20	AV
H	4960.00	41.25	19.51	60.76	74.00	-13.24	PK
H	4960.00	26.03	19.51	45.54	54.00	-8.46	AV
H	16130.00	30.34	21.89	52.23	74.00	-21.77	PK

Remark:

1. Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

8DPSK

Temperature：	26℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Voltage ：	DC 12V

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2402							
V	2402.00	87.73	13.85	101.58	114.00	-12.42	PK
V	2402.00	72.53	13.85	86.38	94.00	-7.62	AV
V	4804.00	39.21	19.34	58.55	74.00	-15.45	PK
V	4804.00	25.63	19.34	44.97	54.00	-9.03	AV
V	16130.00	29.82	21.89	51.71	74.00	-22.29	PK
H	2402.00	87.70	13.85	101.55	114.00	-12.45	PK
H	2402.00	73.12	13.85	86.97	94.00	-7.03	AV
H	4804.00	40.03	19.34	59.37	74.00	-14.63	PK
H	4804.00	25.51	19.34	44.85	54.00	-9.15	AV
H	16130.00	29.55	21.89	51.44	74.00	-22.56	PK
operation frequency:2441							
V	2441.00	88.24	13.94	102.18	114.00	-11.82	PK
V	2441.00	72.66	13.94	86.60	94.00	-7.40	AV
V	4882.00	40.13	19.42	59.55	74.00	-14.45	PK
V	4882.00	25.67	19.42	45.09	54.00	-8.91	AV
V	16130.00	28.07	21.89	49.96	74.00	-24.04	PK
H	2441.00	88.26	13.94	102.20	114.00	-11.80	PK
H	2441.00	73.54	13.94	87.48	94.00	-6.52	AV
H	4882.00	41.20	19.42	60.62	74.00	-13.38	PK
H	4882.00	26.39	19.42	45.81	54.00	-8.19	AV
H	16130.00	29.73	21.89	51.62	74.00	-22.38	PK
operation frequency:2480							
V	2480.00	88.29	14.02	102.31	114.00	-11.69	PK
V	2480.00	72.76	14.02	86.78	94.00	-7.22	AV
V	4960.00	40.93	19.51	60.44	74.00	-13.56	PK
V	4960.00	25.94	19.51	45.45	54.00	-8.55	AV
V	16130.00	29.95	21.89	51.84	74.00	-22.16	PK
H	2480.00	88.32	14.02	102.34	114.00	-11.66	PK
H	2480.00	72.61	14.02	86.63	94.00	-7.37	AV
H	4960.00	41.15	19.51	60.66	74.00	-13.34	PK
H	4960.00	25.97	19.51	45.48	54.00	-8.52	AV
H	16130.00	30.27	21.89	52.16	74.00	-21.84	PK

Remark:

1. Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

3.3 RADIATED BAND EMISSION MEASUREMENT

3.3.1 TEST REQUIREMENT:

FCC Part15 C Section 15.209 and 15.205

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	2300MHz
Stop Frequency	2520
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

3.3.2 TEST PROCEDURE

Above 1GHz test procedure as below:

a. 1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. 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.

d. 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.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. 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.

g. Test the EUT in the lowest channel,the Highest channel

Note:

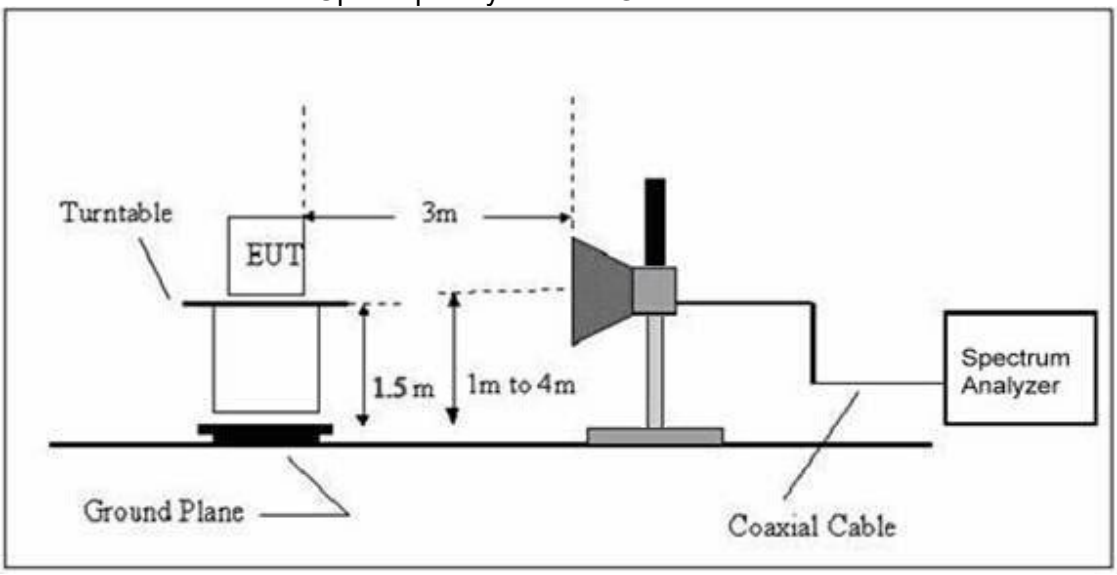
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.3.3 DEVIATION FROM TEST STANDARD

No deviation

3.3.4 TEST SETUP

Radiated Emission Test-Up Frequency Above 1GHz



3.3.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.3.6 TEST RESULT

Temperature：	26℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Voltage ：	DC 12V

GFSK

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2402							
V	2390.00	37.26	13.83	51.09	74.00	-22.91	PK
V	2390.00	25.89	13.83	39.72	54.00	-14.28	AV
V	2400.00	37.46	13.85	51.31	74.00	-22.69	PK
V	2400.00	25.46	13.85	39.31	54.00	-14.69	AV
H	2390.00	37.55	13.83	51.38	74.00	-22.62	PK
H	2390.00	25.92	13.83	39.75	54.00	-14.25	AV
H	2400.00	37.41	13.85	51.26	74.00	-22.74	PK
H	2400.00	25.86	13.85	39.71	54.00	-14.29	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2480							
V	2483.50	37.46	14.02	51.48	74.00	-22.52	PK
V	2483.50	26.14	14.02	40.16	54.00	-13.84	AV
V	2500.00	37.40	14.06	51.46	74.00	-22.54	PK
V	2500.00	25.57	14.06	39.63	54.00	-14.37	AV
H	2483.50	37.59	14.02	51.61	74.00	-22.39	PK
H	2483.50	26.17	14.02	40.19	54.00	-13.81	AV
H	2500.00	37.21	14.06	51.27	74.00	-22.73	PK
H	2500.00	26.42	14.06	40.48	54.00	-13.52	AV

Remark:

1. Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

PI/4 DPSK

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2402							
V	2390.00	37.07	13.83	50.90	74.00	-23.10	PK
V	2390.00	25.76	13.83	39.59	54.00	-14.41	AV
V	2400.00	37.28	13.85	51.13	74.00	-22.87	PK
V	2400.00	25.33	13.85	39.18	54.00	-14.82	AV
H	2390.00	37.36	13.83	51.19	74.00	-22.81	PK
H	2390.00	25.79	13.83	39.62	54.00	-14.38	AV
H	2400.00	37.23	13.85	51.08	74.00	-22.92	PK
H	2400.00	25.73	13.85	39.58	54.00	-14.42	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2480							
V	2483.50	37.28	14.02	51.30	74.00	-22.70	PK
V	2483.50	26.01	14.02	40.03	54.00	-13.97	AV
V	2500.00	37.22	14.06	51.28	74.00	-22.72	PK
V	2500.00	25.44	14.06	39.50	54.00	-14.50	AV
H	2483.50	37.40	14.02	51.42	74.00	-22.58	PK
H	2483.50	26.05	14.02	40.07	54.00	-13.93	AV
H	2500.00	37.02	14.06	51.08	74.00	-22.92	PK
H	2500.00	26.28	14.06	40.34	54.00	-13.66	AV

Remark:

1. Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

8DPSK

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2402							
V	2390.00	37.25	13.83	51.08	74.00	-22.92	PK
V	2390.00	25.89	13.83	39.72	54.00	-14.28	AV
V	2400.00	37.45	13.85	51.30	74.00	-22.70	PK
V	2400.00	25.45	13.85	39.30	54.00	-14.70	AV
H	2390.00	37.54	13.83	51.37	74.00	-22.63	PK
H	2390.00	25.92	13.83	39.75	54.00	-14.25	AV
H	2400.00	37.40	13.85	51.25	74.00	-22.75	PK
H	2400.00	25.86	13.85	39.71	54.00	-14.29	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2480							
V	2483.50	37.45	14.02	51.47	74.00	-22.53	PK
V	2483.50	26.13	14.02	40.15	54.00	-13.85	AV
V	2500.00	37.39	14.06	51.45	74.00	-22.55	PK
V	2500.00	25.56	14.06	39.62	54.00	-14.38	AV
H	2483.50	37.58	14.02	51.60	74.00	-22.40	PK
H	2483.50	26.17	14.02	40.19	54.00	-13.81	AV
H	2500.00	37.20	14.06	51.26	74.00	-22.74	PK
H	2500.00	26.41	14.06	40.47	54.00	-13.53	AV

Remark:

1. Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

4. BANDWIDTH TEST

4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.249) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.249	Bandwidth	(20dB bandwidth)	2400-2483.5	PASS

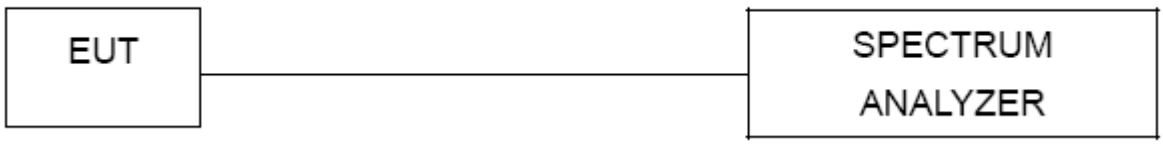
4.1.1 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



4.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

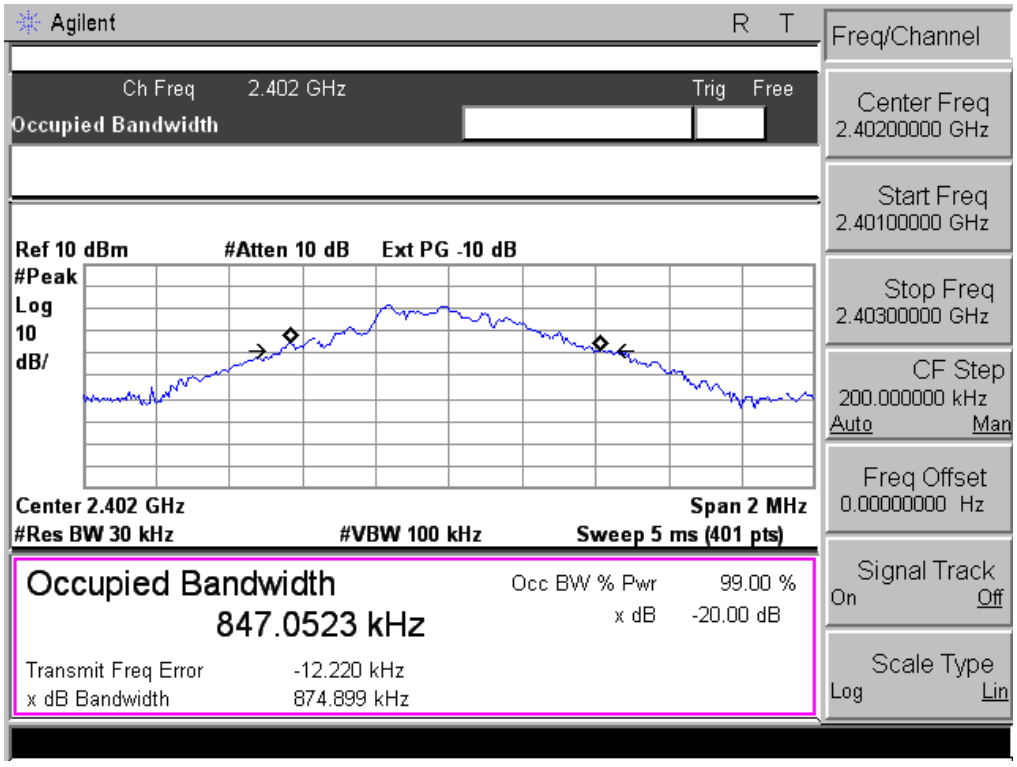
4.1.5 TEST RESULTS

Temperature :	25℃	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX Mode		

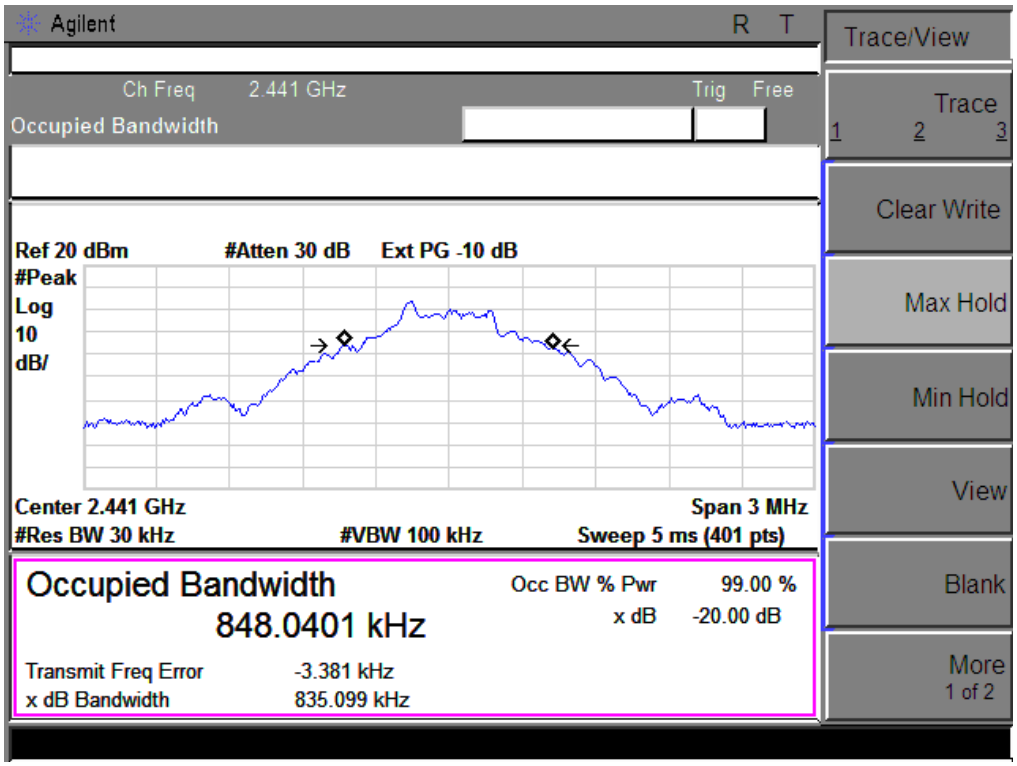
	Frequency (MHz)	20dB bandwidth (MHz)	Result
GFSK	2402	0.875	Pass
	2441	0.835	Pass
	2480	0.833	Pass
PI/4 DPSK	2402	1.120	Pass
	2441	1.130	Pass
	2480	1.130	Pass
8DPSK	2402	1.169	Pass
	2441	1.170	Pass
	2480	1.172	Pass

GFSK

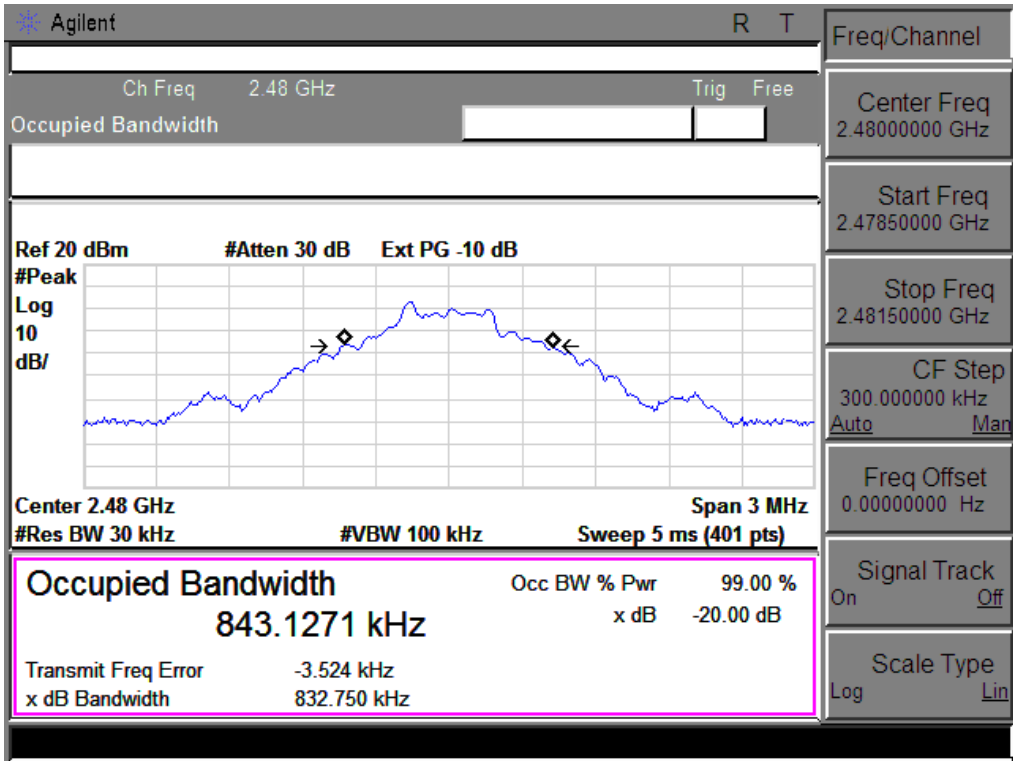
TX 2402



TX 2441

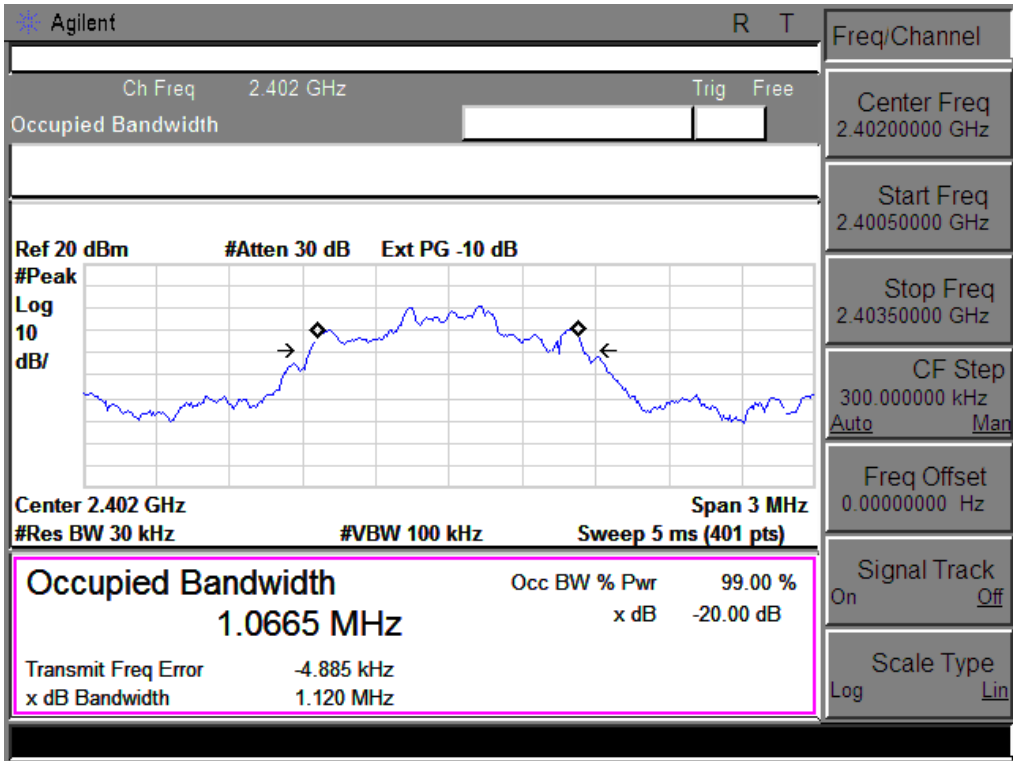


TX 2480

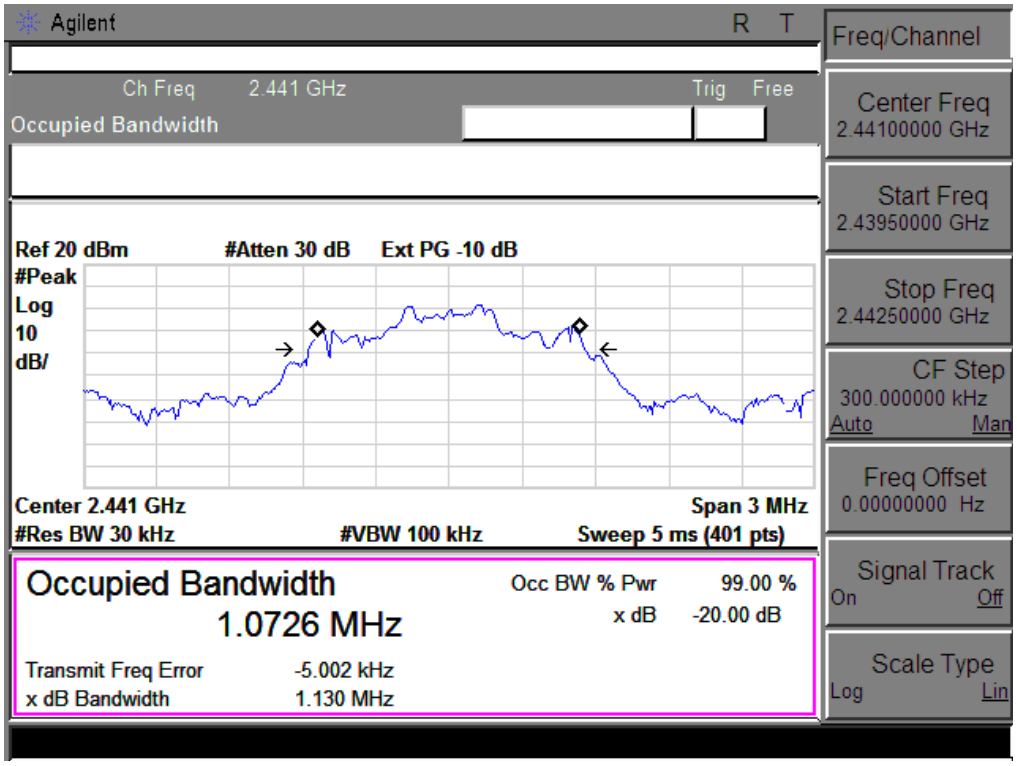


PI/4 DPSK

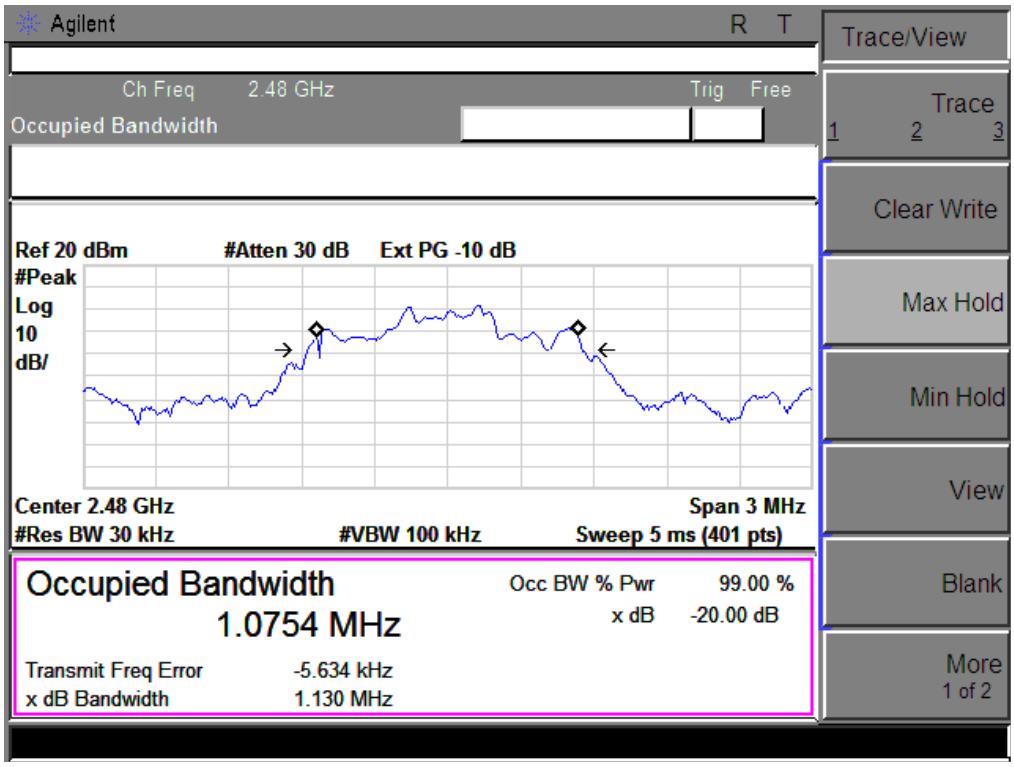
TX 2402



TX 2441

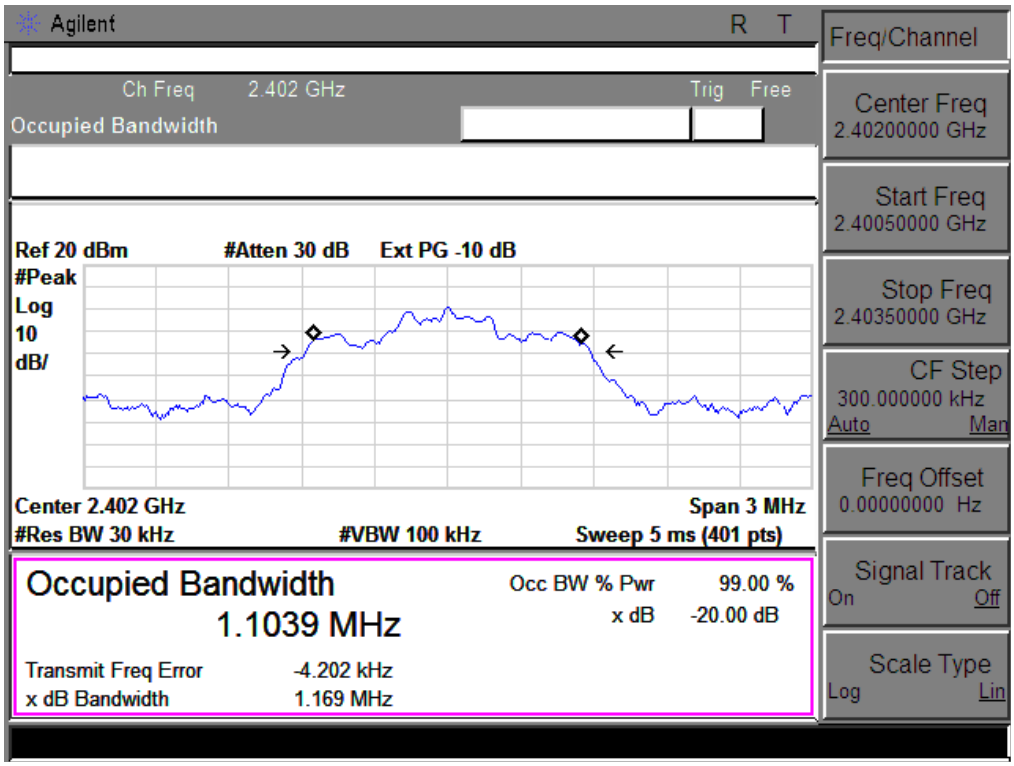


TX 2480

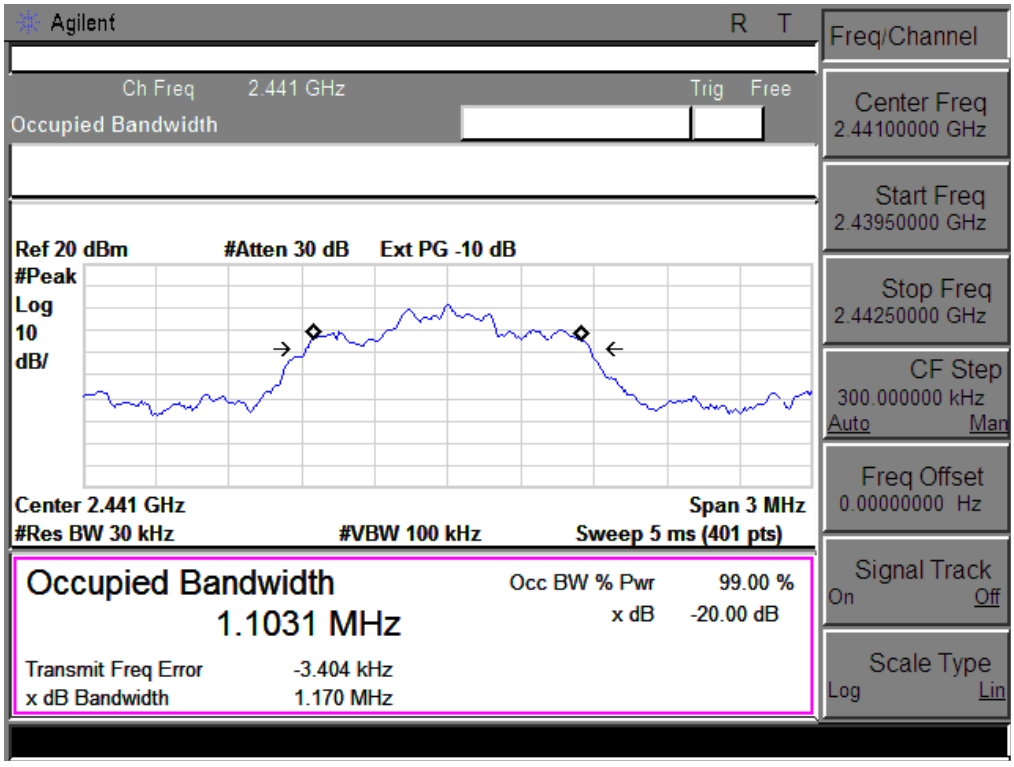

Agilent
R T
Trace/View
Ch Freq 2.48 GHz
Trig Free
Occupied Bandwidth
Trace
1 2 3
Clear Write
Ref 20 dBm
#Atten 30 dB
Ext PG -10 dB
#Peak
Log
10
dB/
Max Hold
Min Hold
View
Center 2.48 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 5 ms (401 pts)
Occupied Bandwidth
1.0754 MHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Blank
Transmit Freq Error -5.634 kHz
x dB Bandwidth 1.130 MHz
More
1 of 2

8DPSK

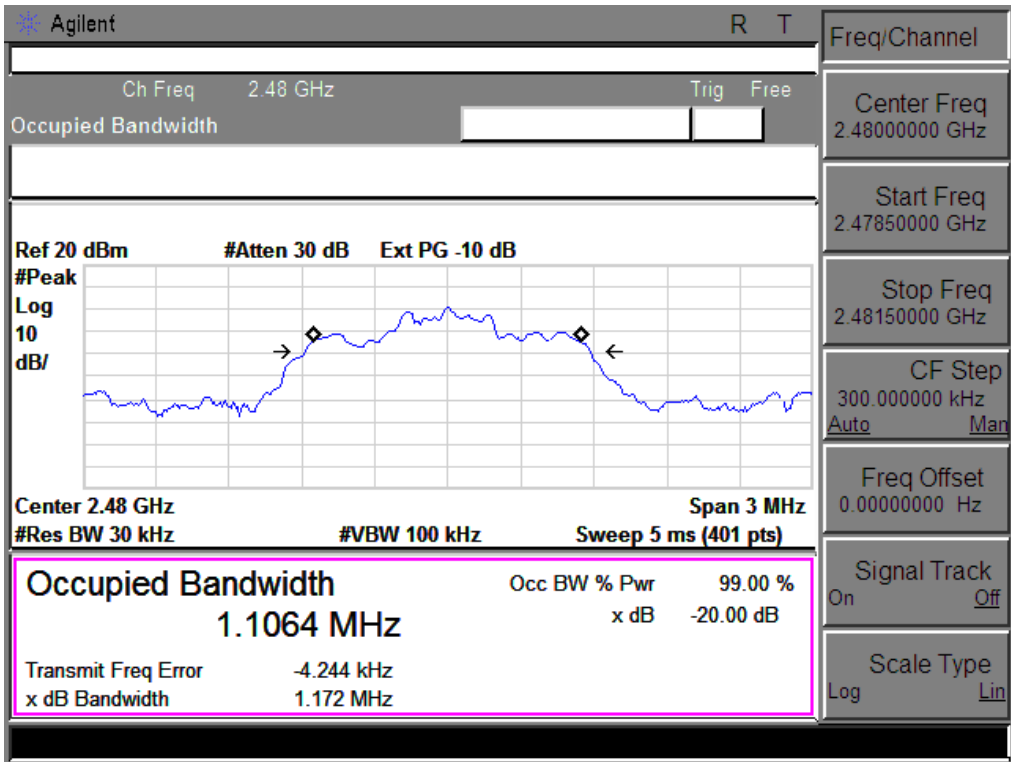
TX 2402



TX 2441



TX 2480


Agilent
R T
Freq/Channel
Ch Freq 2.48 GHz
Trig Free
Occupied Bandwidth
Center Freq
2.48000000 GHz
Start Freq
2.47850000 GHz
Stop Freq
2.48150000 GHz
CF Step
300.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Scale Type
Log Lin
Ref 20 dBm
#Atten 30 dB
Ext PG -10 dB
#Peak
Log
10
dB/
Center 2.48 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 5 ms (401 pts)
Occupied Bandwidth
1.1064 MHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -4.244 kHz
x dB Bandwidth 1.172 MHz

5. ANTENNA REQUIREMENT

5.1 STANDARD REQUIREMENT

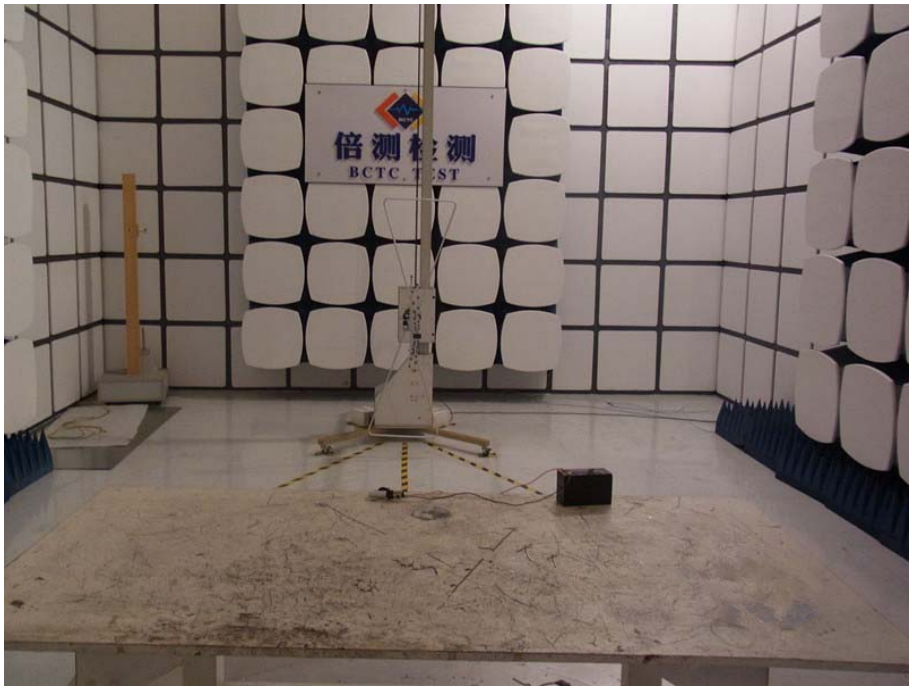
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

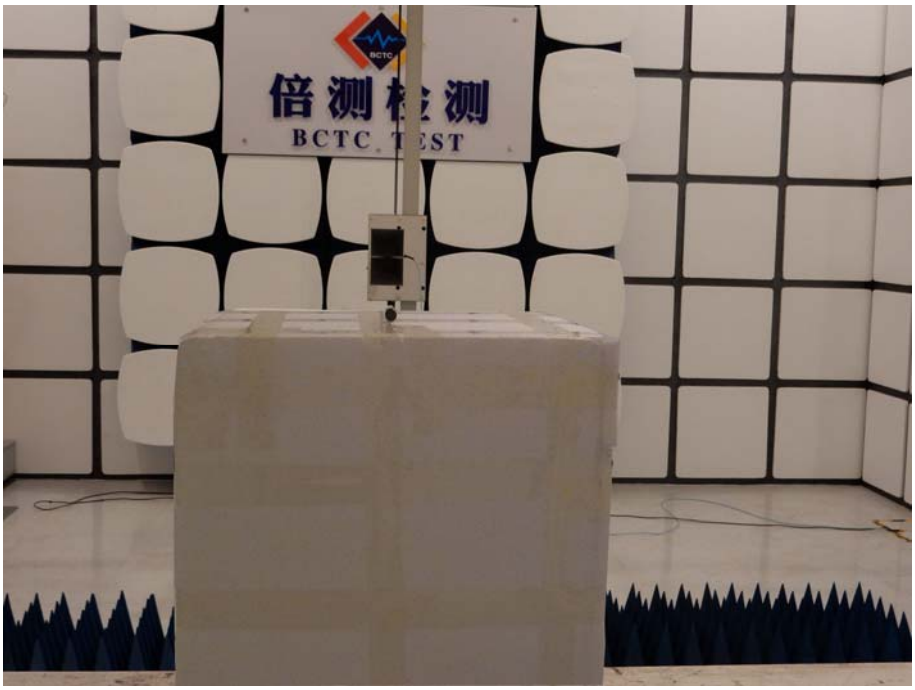
5.2 EUT ANTENNA

The EUT antenna is internal antenna,. It comply with the standard requirement.

6. TEST SEUUP PHOTO

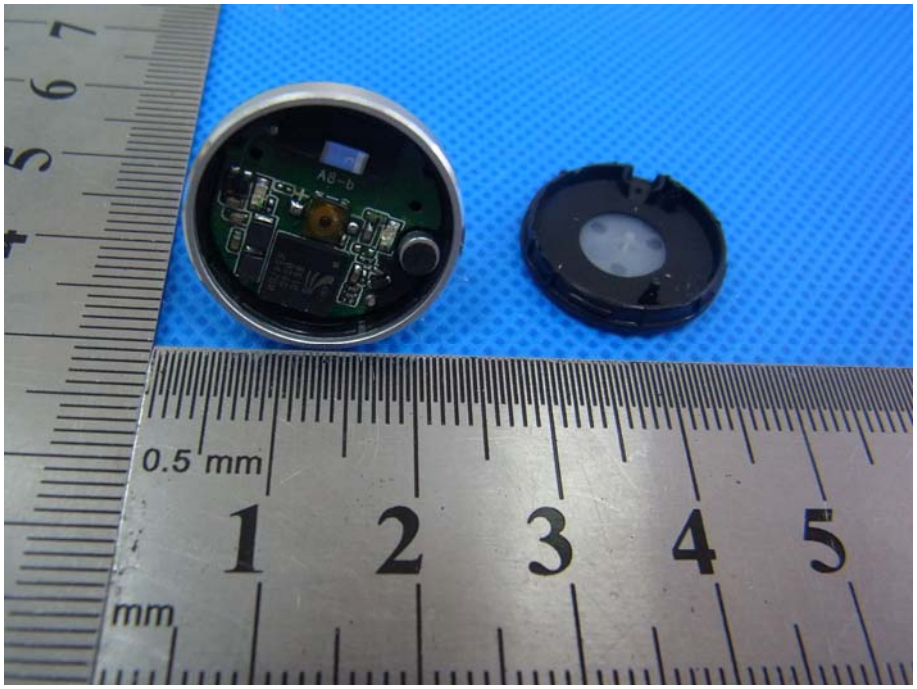
Radiated Measurement Photos

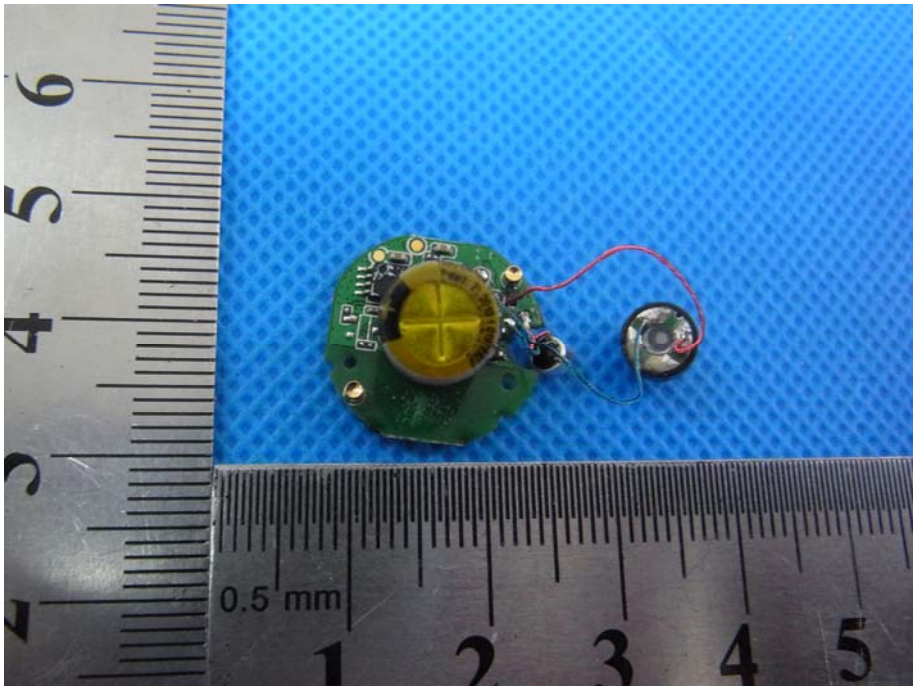


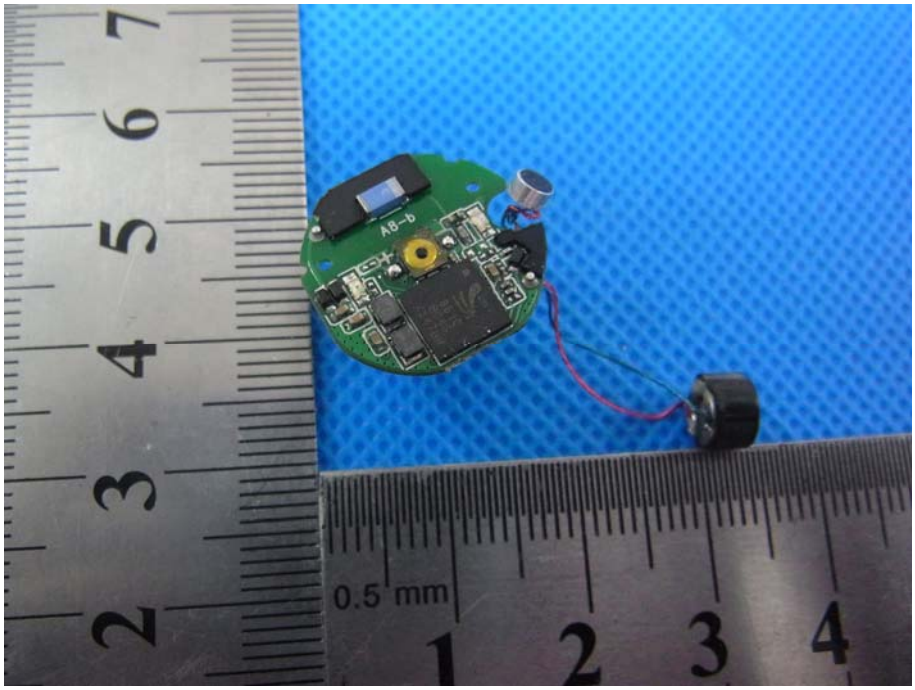


7. EUT PHOTO


0.5 mm
1 2 3 4 5 6 7 8 9
mm


0.5 mm
1 2 3 4 5
mm





※ ※ ※ ※ ※ END OF REPORT ※ ※ ※ ※ ※