FCC Part 15C Test Report

FCC ID: 2AQ7Y-D05

Product Name:	wireless presenter
Trademark:	N/A
Model Name :	D05
Prepared For : Address :	Shenzhen Qixun Space Technology Co.,Ltd Room 701, Jin Yucheng Building No.2, Bulong Road No.592, Bantian Street, Longgang District, Shenzhen, Guangdong Province, China
Prepared By : Address :	Shenzhen BCTC Testing Co., Ltd. BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China
Test Date:	Aug. 25, 2018 – Sep. 07, 2018
Date of Report :	Sep. 07, 2018
Report No.:	BCTC-FY180704225E

TEST RESULT CERTIFICATION

Applicant's name ..... :	Shenzhen Qixun Space Technology Co.,Ltd
Address ..... :	Room 701, Jin Yucheng Building No.2, Bulong Road No.592, Bantian Street, Longgang District, Shenzhen, Guangdong Province, China
Manufacture's Name..... :	Shenzhen Qixun Space Technology Co.,Ltd
Address ..... :	Room 701, Jin Yucheng Building No.2, Bulong Road No.592, Bantian Street, Longgang District, Shenzhen, Guangdong Province, China
Product description	
Product name ..... :	wireless presenter
Trademark ..... :	N/A
Model and/or type reference :	D05
Standards ..... :	FCC Part15.247 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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Table of Contents **Page**

1 . SUMMARY OF TEST RESULTS 5
1.1 TEST FACILITY 6
1.2 MEASUREMENT UNCERTAINTY 6
2 . GENERAL INFORMATION 7
2.1 GENERAL DESCRIPTION OF EUT 7
2.2 DESCRIPTION OF TEST MODES 8
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED 8
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE) 9
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS 10
3 . EMC EMISSION TEST 11
3.1 CONDUCTED EMISSION MEASUREMENT 11
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS 11
3.1.2 TEST PROCEDURE 11
3.1.3 DEVIATION FROM TEST STANDARD 11
3.1.4 TEST SETUP 12
3.1.5 EUT OPERATING CONDITIONS 12
3.1.6 TEST RESULTS 12
3.2 RADIATED EMISSION MEASUREMENT 13
3.2.1 RADIATED EMISSION LIMITS 13
3.2.2 TEST PROCEDURE 14
3.2.3 DEVIATION FROM TEST STANDARD 14
3.2.4 TEST SETUP 14
3.2.5 EUT OPERATING CONDITIONS 15
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ) 16
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ) 17
3.3 RADIATED BAND EMISSION MEASUREMENT 20
3.3.1 TEST REQUIREMENT: 20
3.3.2 TEST PROCEDURE 20
3.3.3 DEVIATION FROM TEST STANDARD 21
3.3.4 TEST SETUP 21
3.3.5 EUT OPERATING CONDITIONS 21
4 . POWER SPECTRAL DENSITY TEST 23
4.1 APPLIED PROCEDURES / LIMIT 23
4.1.1 TEST PROCEDURE 23

Table of Contents **Page**

4.1.2 DEVIATION FROM STANDARD 23
4.1.3 TEST SETUP 23
4.1.4 EUT OPERATION CONDITIONS 23
4.1.5 TEST RESULTS 24

5 . BANDWIDTH TEST 26

5.1 APPLIED PROCEDURES / LIMIT 26
5.1.1 TEST PROCEDURE 26
5.1.2 DEVIATION FROM STANDARD 26
5.1.3 TEST SETUP 26
5.1.4 EUT OPERATION CONDITIONS 26
5.1.5 TEST RESULTS 27

6 . PEAK OUTPUT POWER TEST 29

6.1 APPLIED PROCEDURES / LIMIT 29

6.1.1 TEST PROCEDURE 29
6.1.2 DEVIATION FROM STANDARD 29
6.1.3 TEST SETUP 29
6.1.4 EUT OPERATION CONDITIONS 29
6.1.5 TEST RESULTS 30

7 . 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE 31
7.1 APPLICABLE STANDARD 31
7.2 TEST PROCEDURE 31
7.3 DEVIATION FROM STANDARD 31
7.4 TEST SETUP 31
7.5 EUT OPERATION CONDITIONS 31

8 . ANTENNA REQUIREMENT 34

8.1 STANDARD REQUIREMENT 34

8.2 EUT ANTENNA 34

9 . EUT TEST PHOTO 35

10 . EUT PHOTO 36
APPENDIX-PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

RSS-247 Issue 2: February 2017 FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
RSS-GEN 8.8 RSS-247 3.1 FCC Part15.207	Conducted Emission	N/A	
RSS-247 5.2 (a) RSS-GEN 6.6 FCC Part 15.247 (a)(2)	6dB Bandwidth	PASS	
RSS-247 5.4 (b) FCC Part 15.247 (b)	Peak Output Power	PASS	
RSS-247 5.5 FCC Part 15.247 (d) FCC Part 15.209	Radiated Spurious Emission	PASS	
RSS-247 5.2 (b) FCC Part 15.247 (e)	Power Spectral Density	PASS	
RSS-247 5.5 FCC Part 15.205	Restricted Band of Operation	PASS	
RSS-Gen.6.7 FCC Part 15.203	Band Edge (Out of Band Emissions)	PASS	
RSS-GEN 8.8 RSS-247 3.1 FCC Part15.207	Antenna Requirement	PASS	

NOTE:

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

1.1 TEST FACILITY

Shenzhen BCTC Testing Co., Ltd.
Add.: BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 712850
IC Registered No.: 23583

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	wireless presenter
Trade Name	N/A
Model Name	D05
Model Difference	N/A
Product Description	The EUT is a wireless presenter Operation Frequency: 2407-2463 MHz Modulation Type: GFSK Number Of Channel 3CH Antenna Designation: Please see Note 3. 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.
Ratings	N/A
Adapter	DC 1.5V Battery
Connecting I/O Port(s)	Please refer to the User's Manual
Hardware Version:	N/A
Software Version:	N/A

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	2407	02	2433	03	2463

3.

Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Gain (dBi)	NOTE
1	N/A	N/A	PCB Antenna	0	

2.2 DESCRIPTION OF TEST MODES

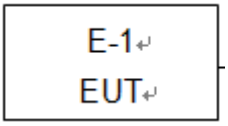
For Conducted & Radiated Emission	
Final Test Mode	Description
Mode 1	CH01
Mode 2	CH02
Mode 3	CH03
Mode 4	Link Mode

Note:

(1) 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 Spurious Emission



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	wireless presenter	N/A	D05	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	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4407B	MY45108040	2018.06.20	2019.06.20
2	Test Receiver (9kHz-6GHz)	R&S	ESPI	101396	2018.06.19	2019.06.19
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB 9168	VULB91 68-438	2018.06.23	2019.06.23
4	Horn Antenna (1GHz-18GHz)	SCHWARZBECK	BBHA9120D	1201	2018.06.23	2019.06.23
5	Horn Antenna (14GHz-40GHz)	SCHWARZBECK	BBHA 9170	9170-181	2018.08.06	2019.08.05
6	Amplifier (9KHz-6GHz)	SCHWARZBECK	BBV9744	9744-0037	2018.06.20	2019.06.20
7	Amplifier (1GHz-18GHz)	SCHWARZBECK	BBV9718	9718-309	2018.06.20	2019.06.20
8	Amplifier (18GHz-40GHz)	SCHWARZBECK	BBV 9721	9721-205	2018.08.06	2019.08.05
9	Loop Antenna (9KHz-30MHz)	SCHWARZBECK	FMZB1519B	00014	2018.06.23	2019.06.23
10	RF cables1 (9kHz-1GHz)	R&S	R203	R20X	2018.08.06	2019.08.05
11	RF cables2 (1GHz-40GHz)	R&S	R204	R21X	2018.08.06	2019.08.05
12	Antenna connector	Florida RF Labs	N/A	RF 01#	2018.08.06	2019.08.05
13	Power Metter	ANRITSU	ML2487A	6K00001568	2018.08.06	2019.08.05
14	Power Sensor (AV)	ANRITSU	ML2491A	030989	2018.08.06	2019.08.05
15	Signal Analyzer 9kHz-26.5GHz	Agilent	N9010A	MY48030494	2018.08.06	2019.08.05
16	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	2018.08.06	2019.08.05
17	D.C. Power Supply	LongWei	PS-305D	010964729	2018.08.06	2019.08.05

Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Test Receiver	R&S	ESCI	1166.5950K03-1011 65-ha	2018.06.19	2019.06.19
2	LISN	SCHWARZBECK	NSLK8127	8127739	2018.06.19	2019.06.19
3	LISN	R&S	NSLK8126	8126487	2018.08.06	2019.08.05
4	RF cables	R&S	R204	R20X	2018.08.06	2019.08.05
5	Attenuator	R&S	ESH3-Z2	143206	2018.08.06	2019.08.05

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

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

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	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.

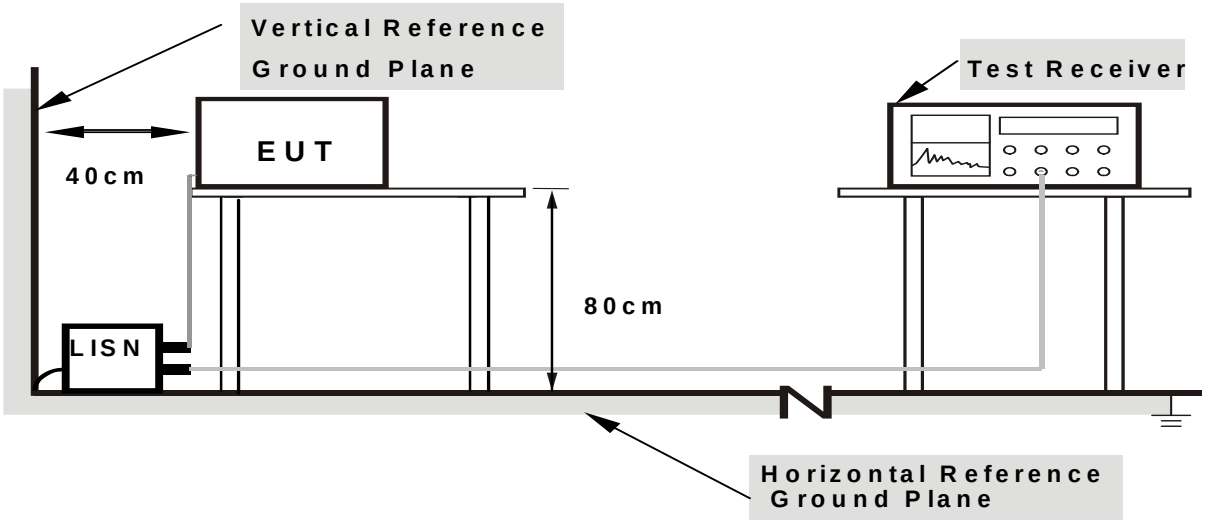
d. LISN at least 80 cm from nearest part of EUT chassis.

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

NOTE: This EUT is powered by the DC battery only, this test item is not applicable.

3.2 RADIATED EMISSION MEASUREMENT

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

20dBc in any 100 kHz bandwidth outside the operating frequency band. 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)	Limit (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:

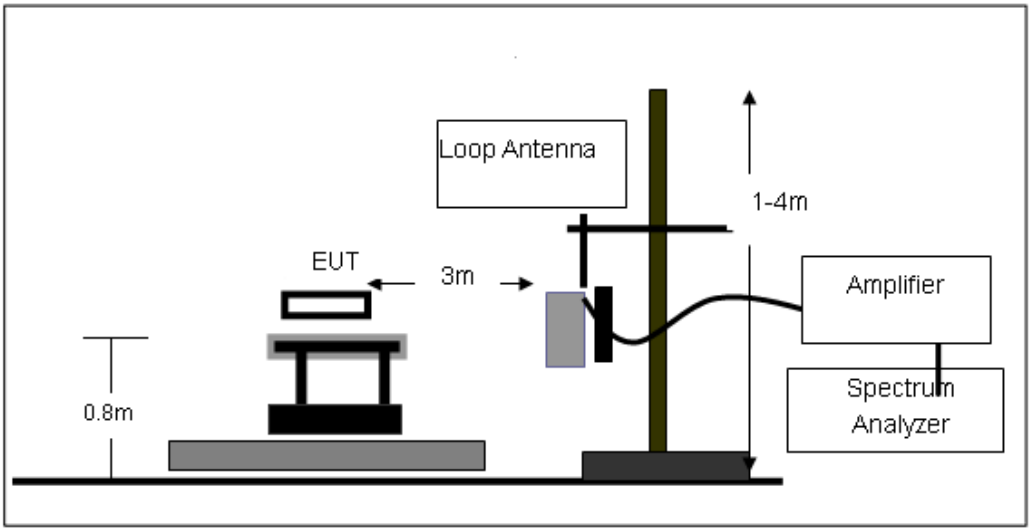
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

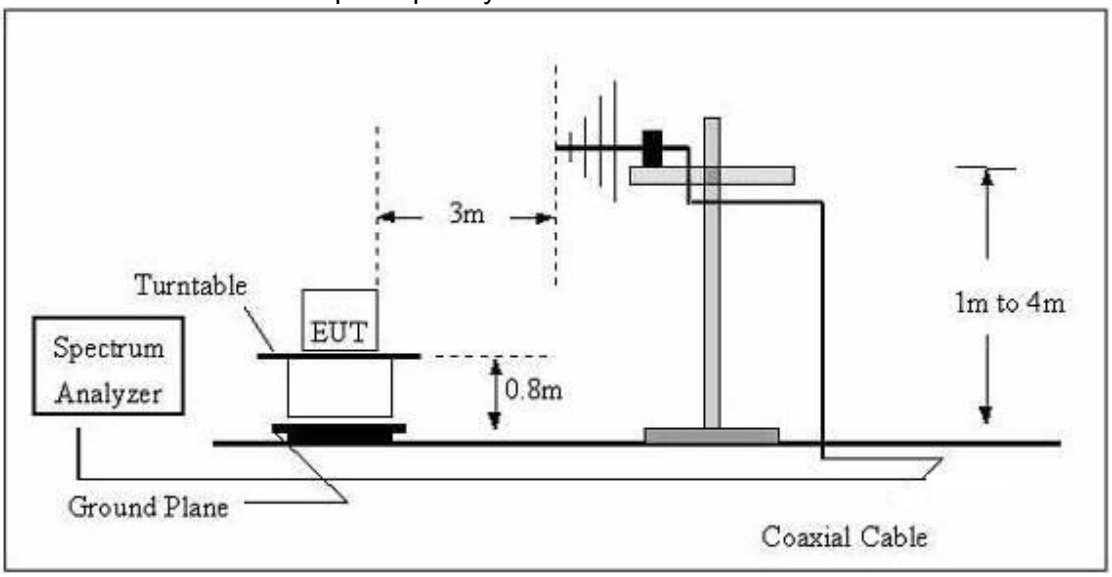
No deviation

3.2.4 TEST SETUP

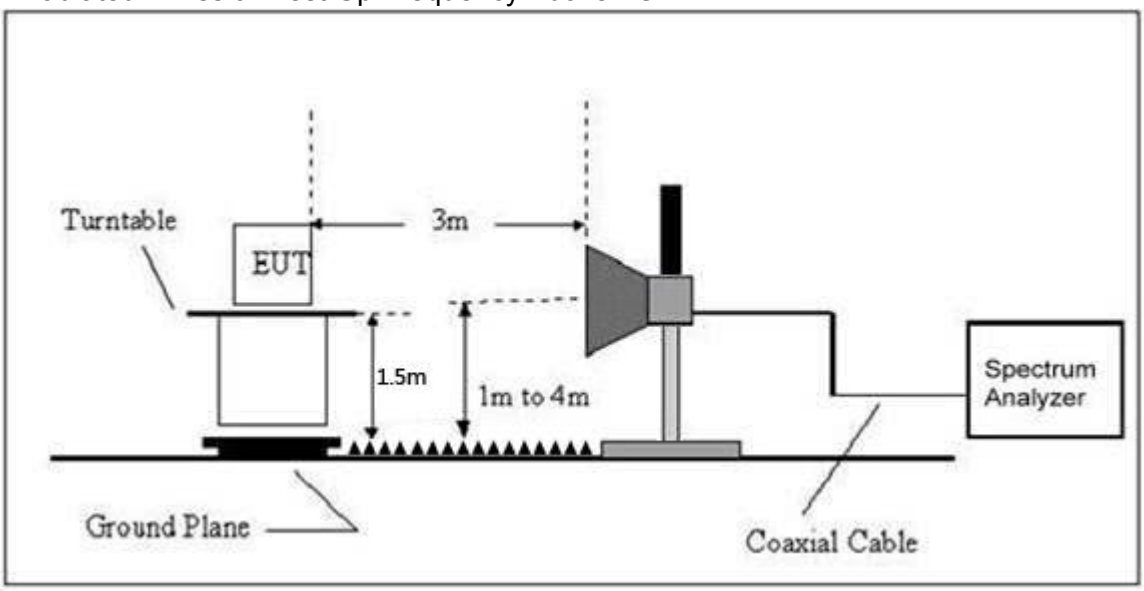
（A）Radiated Emission Test-Up Frequency Below 30MHz



（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 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage :	DC 1.5V
Test Mode :	Mode 4	Polarization :	--

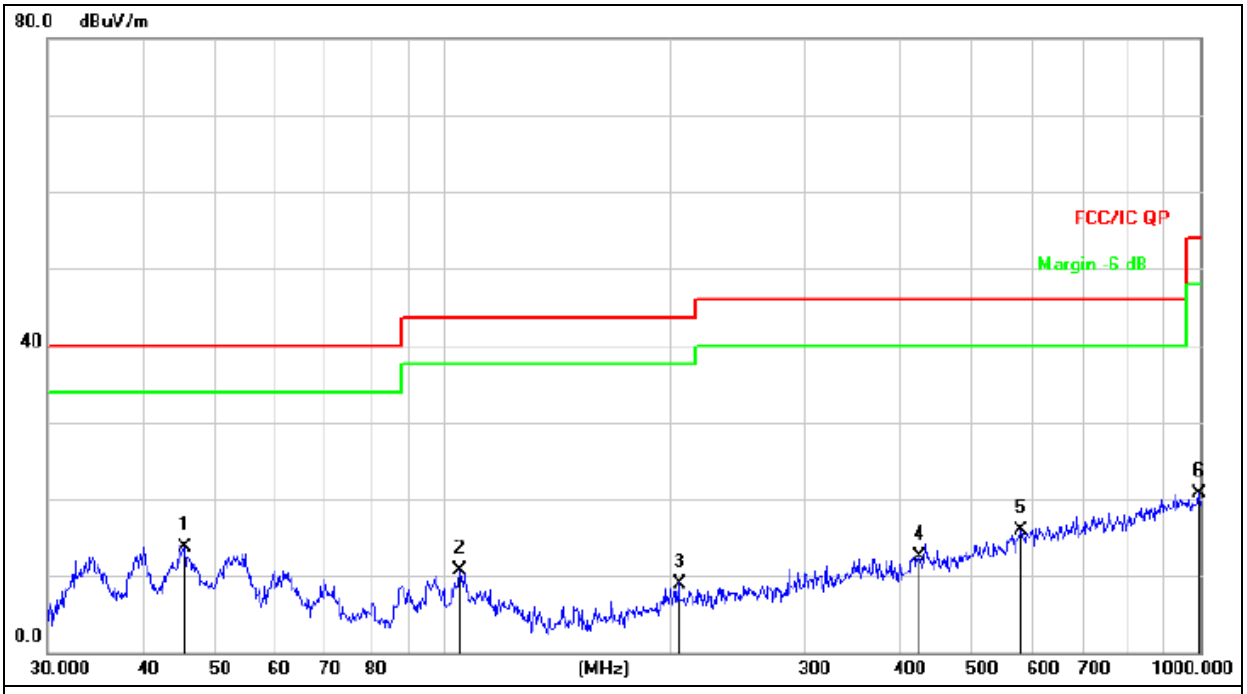
Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

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)

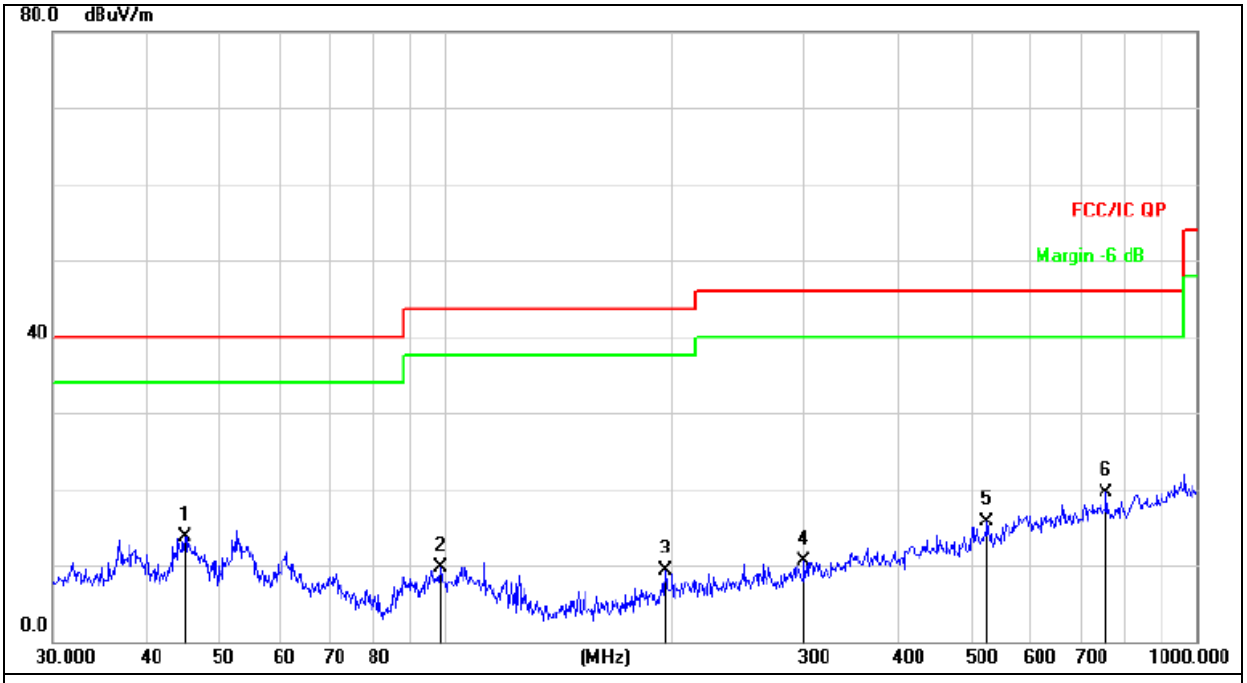
Temperature：	26℃	Relative Humidity：	54%
Pressure：	101kPa	Polarization：	Horizontal
Test Voltage ：	DC 1.5V		
Test Mode ：	Mode 4		



Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	45.5348	27.66	-14.03	13.63	40.00	-26.37	QP
2		105.2718	26.27	-15.66	10.61	43.50	-32.89	QP
3		204.9551	25.25	-16.25	9.00	43.50	-34.50	QP
4		426.5210	23.41	-10.92	12.49	46.00	-33.51	QP
5		580.7026	22.85	-6.99	15.86	46.00	-30.14	QP
6		996.4996	22.31	-1.60	20.71	54.00	-33.29	QP

Temperature：	26℃	Relative Humidity：	54%
Pressure：	101KPa	Polarization：	Vertical
Test Voltage ：	DC 1.5V		
Test Mode ：	Mode 4		



Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	44.9004	27.76	-14.05	13.71	40.00	-26.29	QP
2		98.4865	25.53	-15.83	9.70	43.50	-33.80	QP
3		195.8220	25.97	-16.61	9.36	43.50	-34.14	QP
4		300.3672	24.00	-13.45	10.55	46.00	-35.45	QP
5		526.3967	24.63	-8.93	15.70	46.00	-30.30	QP
6		758.0407	24.46	-5.01	19.45	46.00	-26.55	QP

3.2.8 TEST RESULTS (1GHz~25GHz)

GFSK

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel:2407MHz									
V	4814.00	52.15	39.55	7.57	25.45	45.62	74.00	-28.38	PK
V	4814.00	43.28	39.55	7.57	25.45	36.75	54.00	-17.25	AV
V	7221.00	52.79	38.33	7.35	24.78	46.59	74.00	-27.41	PK
V	7221.00	43.77	38.33	7.35	24.78	37.57	54.00	-16.43	AV
V	15454.20	53.59	35.23	6.42	26.47	51.25	74.00	-22.75	PK
H	4814.00	54.33	35.23	6.42	26.47	51.99	74.00	-22.01	PK
H	4814.00	43.95	39.55	7.57	25.45	37.42	54.00	-16.58	AV
H	7221.00	51.06	39.55	7.57	25.45	44.53	74.00	-29.47	PK
H	7221.00	43.24	38.33	7.35	24.78	37.04	54.00	-16.96	AV
H	15454.20	52.68	35.23	6.42	26.47	50.34	74.00	-23.66	PK

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Middle Channel:2433MHz									
V	4866.00	53.88	38.89	7.57	25.45	48.01	74.00	-25.99	PK
V	4866.00	43.94	38.89	7.57	25.45	38.07	54.00	-15.93	AV
V	7299.00	52.37	38.78	7.35	24.78	45.72	74.00	-28.28	PK
V	7299.00	43.01	38.78	7.35	24.78	36.36	54.00	-17.64	AV
V	15454.08	52.71	38.89	7.57	25.45	46.84	74.00	-27.16	PK
H	4866.00	51.18	35.89	6.42	26.47	48.18	74.00	-25.82	PK
H	4866.00	43.66	38.89	7.57	25.45	37.79	54.00	-16.21	AV
H	7299.00	51.50	38.89	7.57	25.45	45.63	74.00	-28.37	PK
H	7299.00	43.24	38.78	7.35	24.78	36.59	54.00	-17.41	AV
H	15454.08	52.89	38.89	7.57	25.45	47.02	74.00	-26.98	PK

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
High Channel: 2463MHz									
V	4926.00	50.13	38.75	7.46	25.45	44.29	74.00	-29.71	PK
V	4926.00	43.84	38.75	7.46	25.45	38.00	54.00	-16.00	AV
V	7389.00	53.62	38.65	7.22	24.78	46.97	74.00	-27.03	PK
V	7389.00	43.55	38.65	7.22	24.78	36.90	54.00	-17.10	AV
V	15450.10	53.77	38.89	7.57	25.45	47.90	74.00	-26.10	PK
H	4926.00	52.81	35.58	6.35	26.47	50.05	74.00	-23.95	PK
H	4926.00	43.83	38.75	7.46	25.45	37.99	54.00	-16.01	AV
H	7389.00	53.05	38.75	7.46	25.45	47.21	74.00	-26.79	PK
H	7389.00	43.86	38.65	7.22	24.78	37.21	54.00	-16.79	AV
H	15450.10	54.10	38.89	7.57	25.45	48.23	74.00	-25.77	PK

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,

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)	Limit (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:

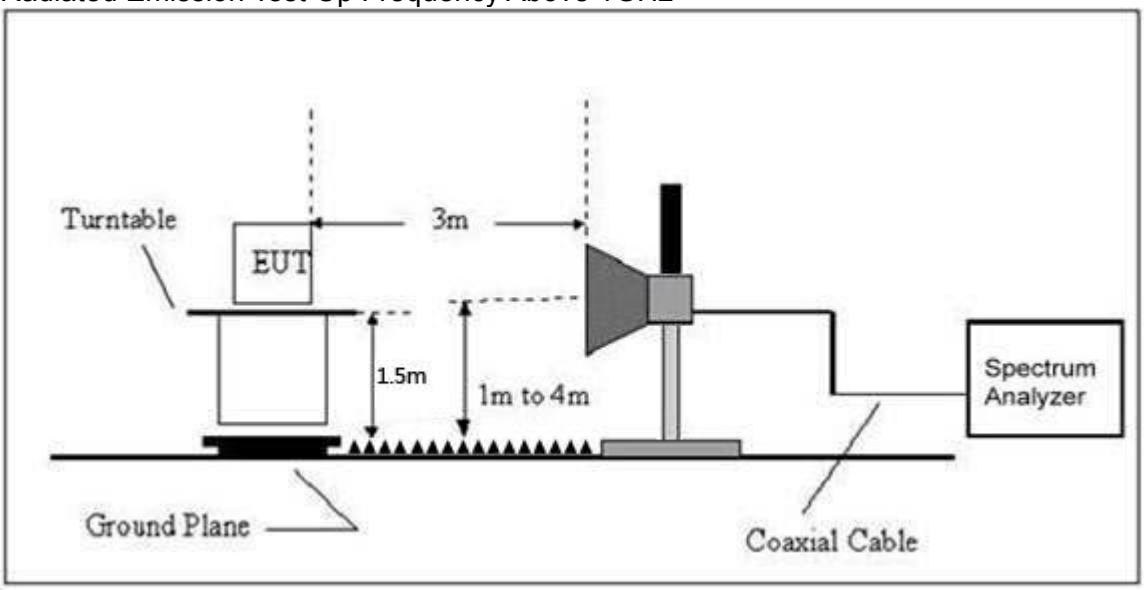
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

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

	Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission evel (dBuV/m)	Limits (dBuV/m)		Result
							PK	PK	AV	
GFSK	Low Channel 2407MHz									
	H	2390.00	63.27	38.06	7.42	20.15	52.78	74.00	54.00	PASS
	H	2400.00	54.28	38.06	7.42	20.15	43.79	74.00	54.00	PASS
	V	2390.00	61.35	38.06	7.42	20.15	50.86	74.00	54.00	PASS
	V	2400.00	53.35	38.06	7.42	20.15	42.86	74.00	54.00	PASS
	High Channel 2463MHz									
	H	2483.50	61.13	38.17	7.45	20.54	50.95	74.00	54.00	PASS
	H	2485.50	53.96	38.17	7.45	20.54	43.78	74.00	54.00	PASS
	V	2483.50	60.98	38.20	7.45	20.54	50.77	74.00	54.00	PASS
	V	2485.50	50.93	38.20	7.45	20.54	40.72	74.00	54.00	PASS

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit
2. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

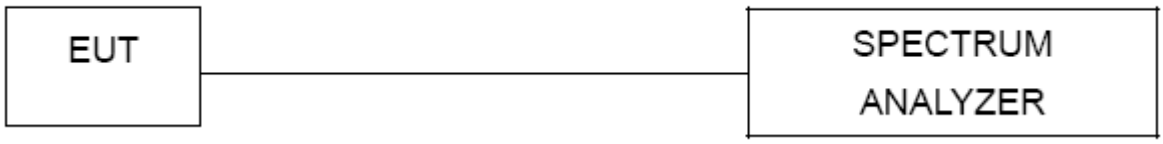
4.1.1 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

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 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.
Note: Power Spectral Density(dBm)=Reading+Cable Loss

4.1.5 TEST RESULTS

Temperature：	26℃	Relative Humidtity：	54%
Pressure：	101kPa	Test Voltage ：	DC 1.5V
Test Mode ：	GFSK		

Frequency	Power Spectral Density(dBm)	Limit (dBm)	Result
2407 MHz	-12.953	8	PASS
2433 MHz	-13.031	8	PASS
2463 MHz	-13.684	8	PASS

CH01

CH02

Agilent Spectrum Analyzer - Swept SA
Marker 1 2.432886000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
10:12:47 PM Sep 05, 2018
Mkr1 2.432 886 GHz
-13.031 dBm
10 dB/div
Ref 0.00 dBm
Log
Center 2.433000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 3.000 MHz
Sweep 316.3 ms (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

CH03

Agilent Spectrum Analyzer - Swept SA
Marker 1 2.462886000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
10:14:16 PM Sep 05, 2018
Mkr1 2.462 886 GHz
-13.684 dBm
10 dB/div
Ref 0.00 dBm
Log
Center 2.463000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 3.000 MHz
Sweep 316.3 ms (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

5. BANDWIDTH TEST

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS

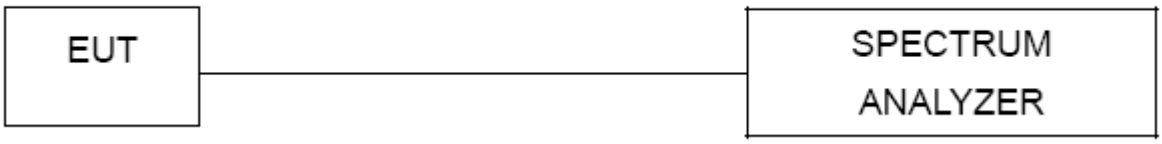
5.1.1 TEST PROCEDURE

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.

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



5.1.4 EUT OPERATION CONDITIONS

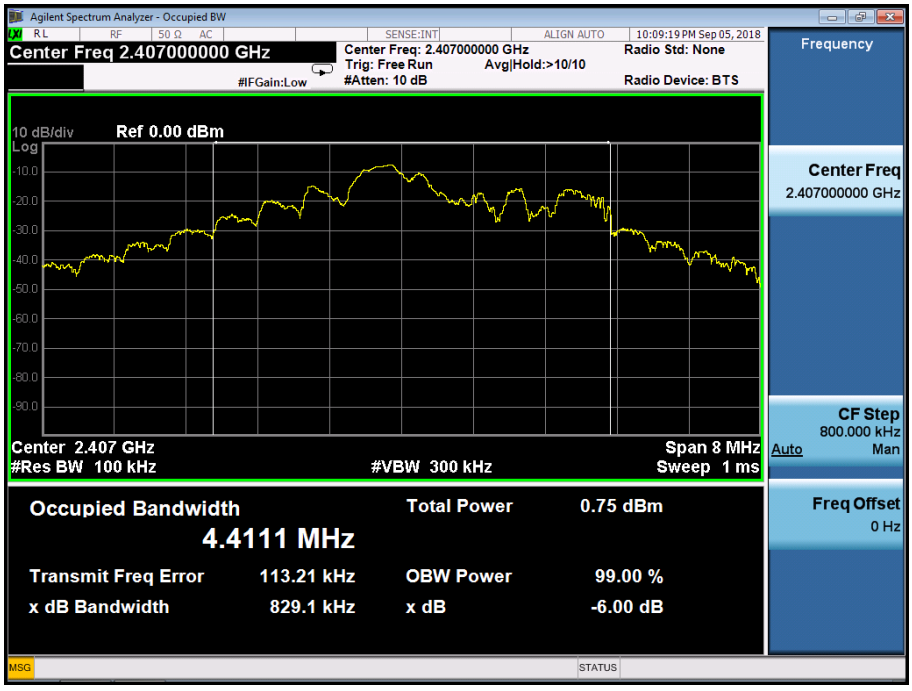
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.5 TEST RESULTS

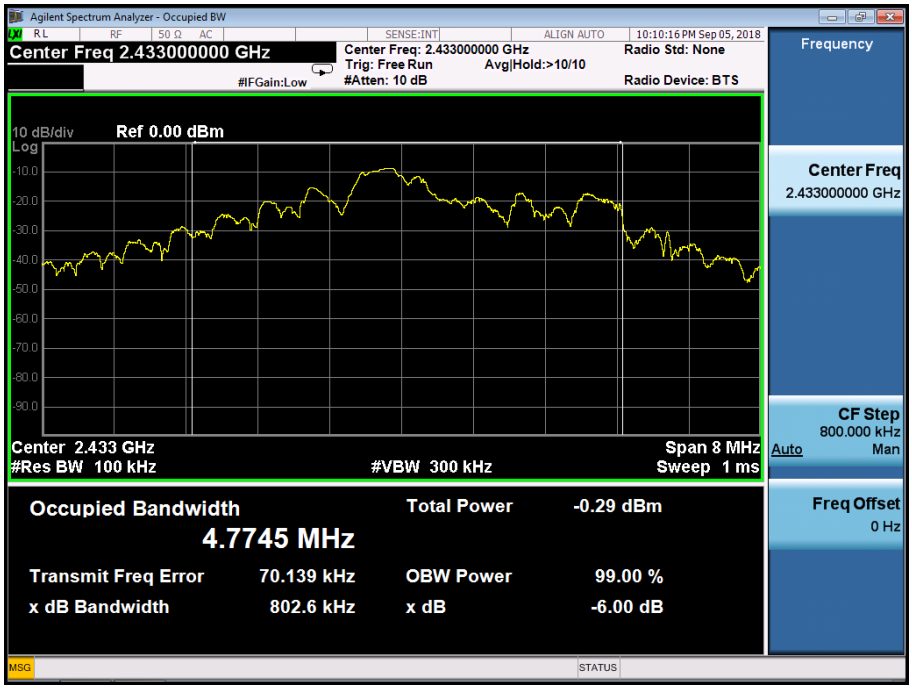
Temperature：	26℃	Relative Humidtity：	54%
Pressure：	101kPa	Test Voltage ：	DC 1.5V
Test Mode ：	GFSK		

Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
2407	0.829	500	Pass
2433	0.803	500	Pass
2463	0.849	500	Pass

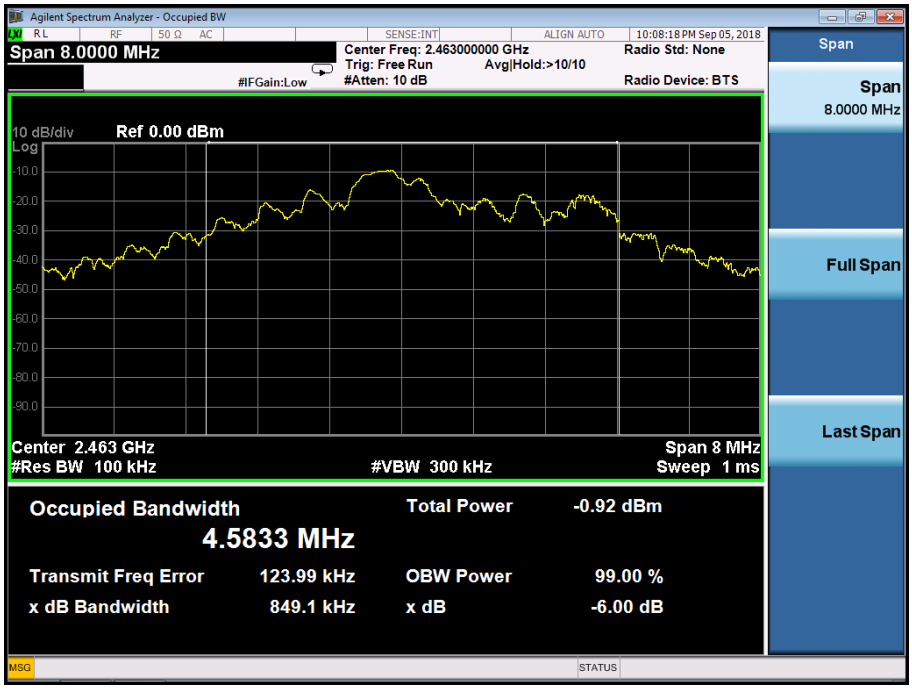
CH01



CH02


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.433000000 GHz
Center Freq: 2.433000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10:10:16 PM Sep 05, 2018
Frequency
Center Freq
2.433000000 GHz
10 dB/div
Ref 0.00 dBm
Center 2.433 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 8 MHz
Sweep 1 ms
CF Step
800.000 kHz
Auto
Man
Occupied Bandwidth
4.7745 MHz
Total Power
-0.29 dBm
Freq Offset
0 Hz
Transmit Freq Error
70.139 kHz
OBW Power
99.00 %
x dB Bandwidth
802.6 kHz
x dB
-6.00 dB
MSG
STATUS

CH03


Agilent Spectrum Analyzer - Occupied BW
Span 8.0000 MHz
Center Freq: 2.463000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10:08:18 PM Sep 05, 2018
Span
Span
8.0000 MHz
10 dB/div
Ref 0.00 dBm
Full Span
Last Span
Center 2.463 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 8 MHz
Sweep 1 ms
Occupied Bandwidth
4.5833 MHz
Total Power
-0.92 dBm
Transmit Freq Error
123.99 kHz
OBW Power
99.00 %
x dB Bandwidth
849.1 kHz
x dB
-6.00 dB
MSG
STATUS

6. PEAK OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

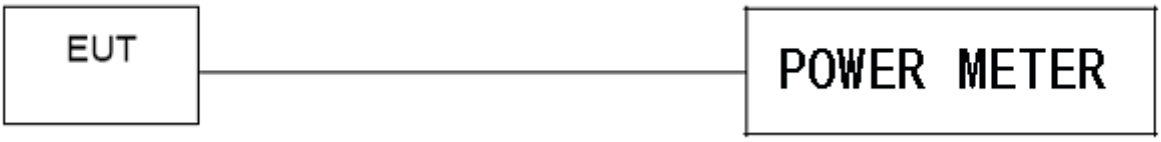
6.1.1 TEST PROCEDURE

a. The EUT was directly connected to the Power meter

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.5 TEST RESULTS

Temperature：	26℃	Relative Humidity：	54%
Pressure：	101kPa	Test Voltage ：	DC 1.5V

	Frequency	Maximum Conducted Output Power(PK)	LIMIT
	(MHz)	(dBm)	dBm
GFSK	2407	-7.556	30
	2433	-8.626	30
	2463	-9.455	30

7. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

7.1 APPLICABLE STANDARD

in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in§15.205(a), must also comply with the radiated emission limits specified in15.209(a).

7.2 TEST PROCEDURE

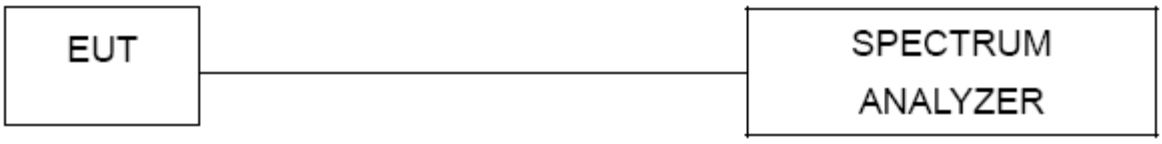
Using the following spectrum analyzer setting:

a) Set the RBW = 100KHz.
b) Set the VBW = 300KHz.
c) Sweep time = auto couple.
d) Detector function = peak.
e) Trace mode = max hold.
f) Allow trace to fully stabilize.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



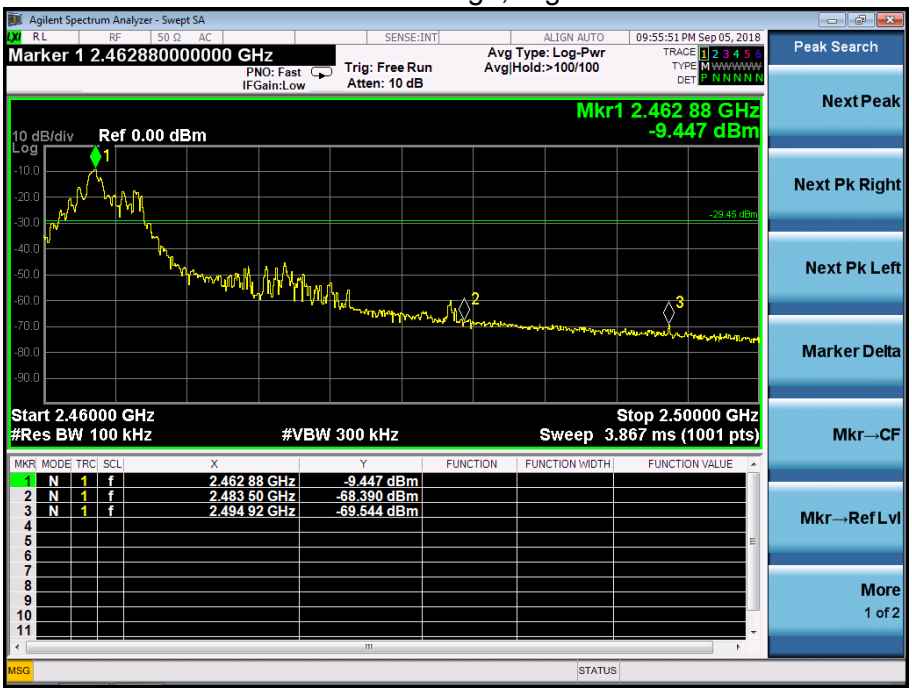
7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.6 TEST RESULTS

GFSK: Band Edge, Left Side

GFSK: Band Edge, Right Side

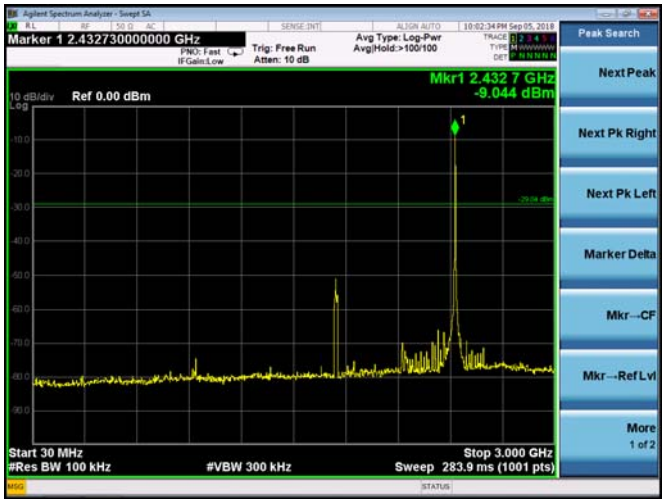


CONDUCTED EMISSION MEASUREMENT

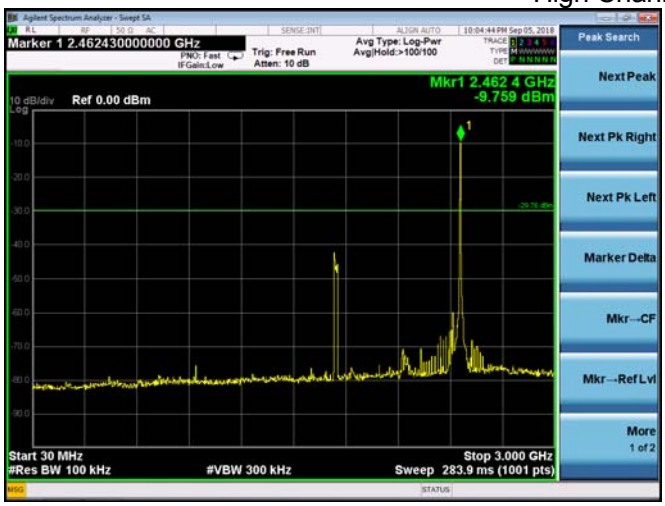
GFSK

Low Channel 2407MHz

Middle Channel 2433MHz



High Channel 2463MHz



8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

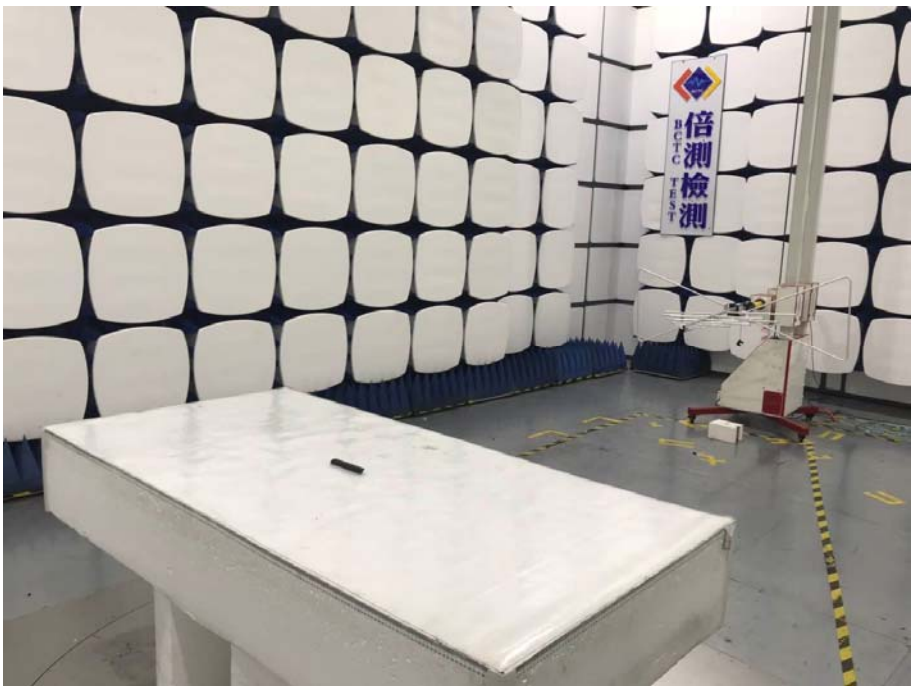
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

8.2 EUT ANTENNA

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

9. EUT TEST PHOTO

Radiated Measurement Photos



10. EUT PHOTO

※※※※※ **END OF REPORT** ※※※※※