Shenzhen TCT Testing Technology Co., Ltd.

FCC ID TEST REPORT

for

Bluetooth Headset

Model: BH939

FCC ID: QQABH939

Prepared for : Shenzhen Enjoy-Tech Electronics Co.,Ltd
9/F Huarong Building, No.105 East of Qiaolian, Bantian Street,
Longgang District, Shenzhen of China.

Prepared by: Shenzhen TCT Testing Technology Co.,Ltd
1F, Building 1, Yibaolai Industrial Park, Qiaotou Village, Fuyong Town,
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Report Number：TCS1209008-1
Date of Test： October 11~22, 2012
Date of Report： October 22, 2012

Special Statement：

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

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

CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 899988

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 899988.

IC- Registration No.: IC5205A-02

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration IC No.: 5205A-01.

Test Report Conclusion

Content

1.0 **General Details**

1.1 Test Lab Details

Name : Shenzhen TCT Testing Technology Co.,Ltd

Address: 1F, Building 1, Yibaolai Industrial Park, Qiaotou Village, Fuyong Town, Baoan District, Shenzhen, Guangdong, China

Telephone: +86-0755-27363466 Fax: +86-0755-27673332

Shenzhen Timeway Technology Consulting Co., Ltd.
Site on File with the Federal Communications Commission – United Sates
Registration Number: 899988
For 3m & 10 m OATS

Site Listed with Industry Canada of Ottawa, Canada
Registration Number: IC: 5205A-01
For 3m & 10 m OATS

1.2 Applicant Details

Applicant: Shenzhen Enjoy-Tech Electronics Co.,Ltd

Address: 9/F Huarong Building, No.105 East of Qiaolian, Bantian Street, Longgang District, Shenzhen of China.

Telephone: 13249821181 Fax: 0755-89740958

1.3 Description of EUT

Product:	Bluetooth Headset
Manufacturer:	Shenzhen Enjoy-Tech Electronics Co.,Ltd
Brand Name:	N/A
Model No.:	BH939
Additional Model No.	BH1000, BH450, BH16, BH18, BH28, BH58, BH-320, N95, BH280, BH160, BH666, BH6000, MH133, MH117, SH668, S-69, SH665, SH666, LH109, E07, E08, E17, E19, E28, E29, E35, E49, E66, E68, E69, G688, H200
Additional Trade Name	N/A
Rating:	DC 3.7V (lithium battery)
Modulation Type:	GFSK, Pi/4-QDPSK, 8DPSK
Transfer Data Rate	1/2/3 Mbps
Channel number:	79
Channel spacing	1 MHz
Operation Frequency	2402~2480MHz
Antenna Designation	A PCB printed antenna and the maximum gain is 2.5dBi

1.4 **Statement: All modes above are deferent in the colour, shape, and some for market requirement only.**

1.5 Test Duration

2012-10-11 to 2012-10-22

1.7 Test Engineer

The sample tested by 

Printed name: Jack Kang

2.0	**Test Equipments**				
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2011-12-04	2012-12-03
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2011-12-04	2012-12-03
System Controller	CT	SC100	-	2012-02-17	2013-02-16
Spectrum Analyzer	Agilent	E4443A	MY46185649	2012-02-17	2013-02-16
Pre-amplifier	Agilent	8447D	83153007374	2012-02-17	2013-02-16
Pre-amplifier	Agilent	8449B	3008A01738	2012-02-17	2013-02-16
Triple-loop antenna	ROHDE&SCHWARZ	HM020	843885/002	2012-02-17	2013-02-16
Horn Antenna	ETS LINDGREN	3117	--	2012-02-17	2013-02-16

3.0 Technical Details

3.1 Summary of test results

The EUT has been tested according to the following specifications

Requirement	CFR 47 Section	Result	Notes
Power Line Conducted Emission Test	15.207(a)	PASS	Complies
20dB Channel Bandwidth	15.247 (a)(1), 15.215(c)	PASS	Complies
Maximum Peak Output Power	15.247(b)(1)	PASS	Complies
Carrier Frequency Separation	15.247 (a)(1)	PASS	Complies
Number of Hopping Channels	15.247(a)(iii)	PASS	Complies
Time of Occupancy (Dwell Time)	15.247(a)(iii)	PASS	Complies
Band age Measurement, Spurious Emission Test	15.247 (d), 15.205 (a), 15.209 (a)	PASS	Complies
Antenna Requirement	15.203	PASS	Complies
RF Exposure	15.247(b), 1.1307(b)	PASS	Complies

3.2 Test Standards

FCC Part 15:2011 Subpart C, Paragraph 15.247

4.0 EUT Modification

No modification by Shenzhen TCT Testing Technology Co., Ltd

5.0 Measurement Uncertainty（95% confidence levels, k=2)

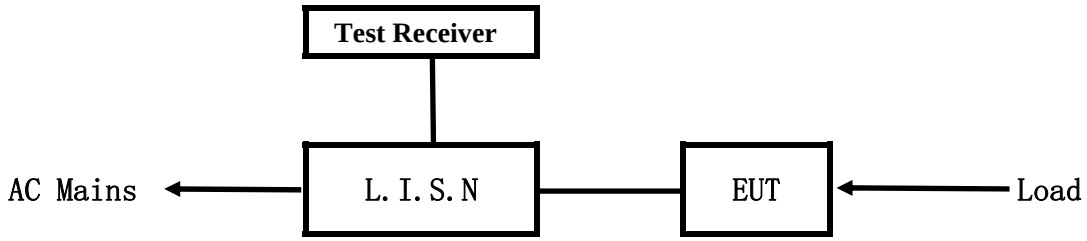
No.	Item	MU
1.	Radio Frequency	±1×10-9
2.	Temperature	±0.1℃
3.	Humidity	±1.0%
4.	RF power, conducted	±0.34dB
5.	RF power density, conducted	±1.45dB
6.	Spurious emissions, conducted	±3.70dB
7.	All emissions, radiated	±4.50dB

Note: 1) The EUT is a Bluetooth headset, which has a USB and Audio in ports. USB port is used to charge to the built-in battery, while Audio in port is for an audio line input from audio output equipment. Pre-tests indicate that the charging mode is the worst case.

2) Measurements are conducted with some modes (e.g.: GFSK, Pi/4-QDPSK, 8DPSK), but the two modes of them are submitted in the report only.

6.0 Power Line Conducted Emission Test

6.1 Schematics of the test



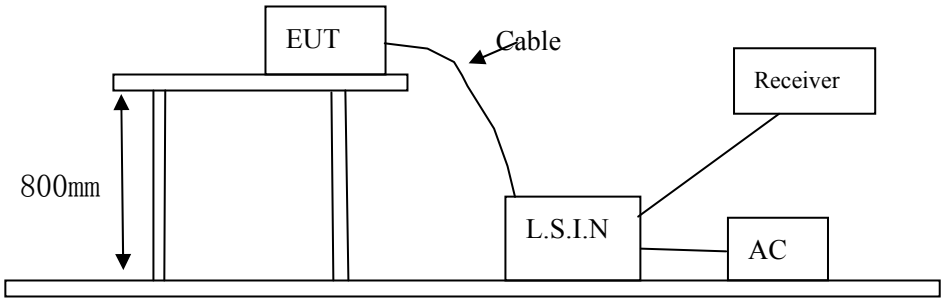
EUT: Equipment Under Test

6.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2009.The Frequency spectrum From 0.15MHz to 30MHz was investigated.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



6.3 EUT Operating Condition

Operating condition is according to ANSI C63.10 -2009

A Setup the EUT and simulators as shown on the following

B Enable AF signal and confirm EUT active to normal condition

6.4 Test Equipment

Please refer to the Section 2

6.5 Conducted Emission Limit

Frequency(MHz)	Class A Limits (dB μ V)		Class B Limits (dB μ V)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ～ 0.50	79.0	66.0	66.0～56.0*	56.0～46.0*
0.50 ～ 5.00	73.0	60.0	56.0	46.0
5.00 ～ 30.00	73.0	60.0	60.0	50.0

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The tighter limit shall apply at the transition frequencies

6.6 Photo documentation of the test set-up

Please refer to the Section 17

6.7 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 51% Atmospheric pressure: 103kPa

Frequency range: 0.15 MHz – 30 MHz

The test was carried out in the following operation mode(s):

- Charging mode

6.8 Test result

Min. limit margin 10.12 dB at 0.485 MHz

The requirements are FULFILLED

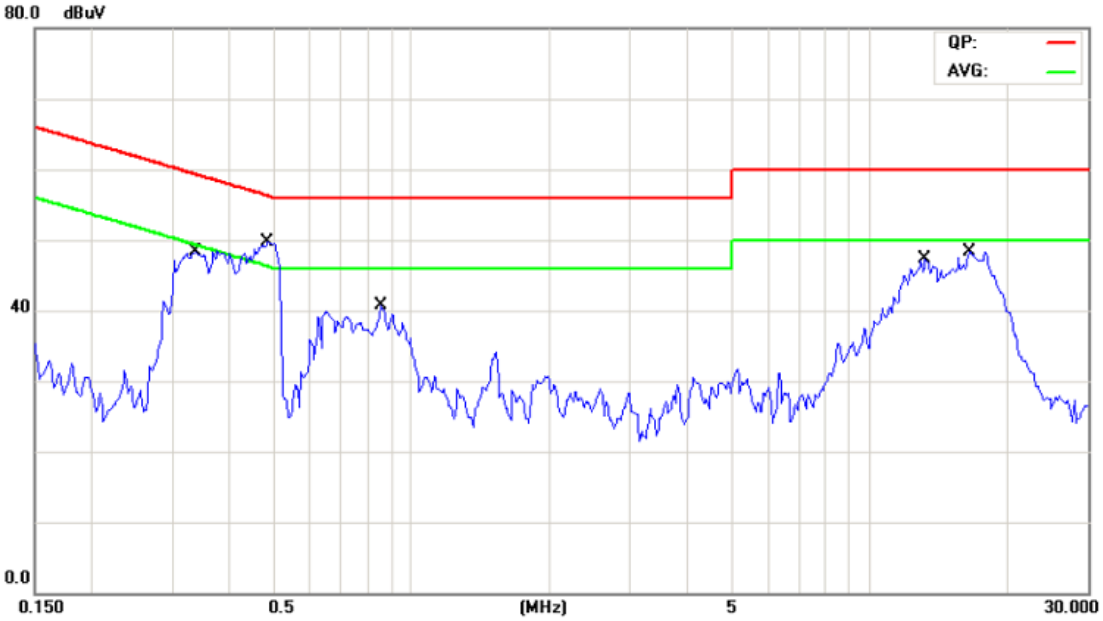
Remarks: _____

_____

A Conducted Emission on Line Terminal of the power line (150kHz to 30MHz)

EUT Description: Bluetooth Headset
Operation Mode: Charging mode
Tested By: Charlle Lai
Test date: October 15, 2012

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s

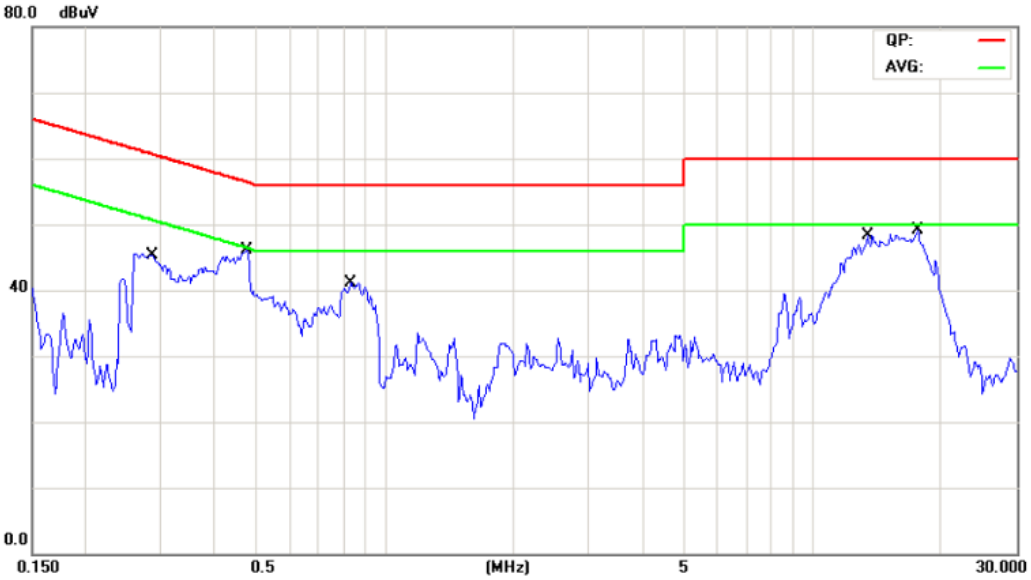


Frequency (MHz)	Reading(dB μ V)				Limit (dB μ V)	
	Line		Neutral			
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
0.337	44.18	28.32	--	--	59.26	49.26
0.485	46.12	28.43	--	--	56.24	46.24
0.853	33.40	20.88	--	--	56.00	46.00
13.226	41.76	34.96	--	--	60.00	50.00
16.507	42.26	35.71	--	--	60.00	50.00

B **Conducted Emission on Neutral Terminal of the power line (150kHz to 30MHz)**

EUT Description: Bluetooth Headset
Operation Mode: Charging mode
Tested By: Charlle Lai
Test Data: October 15, 2012

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s



Frequency (MHz)	Reading(dB μ V)				Limit (dB μ V)	
	Live		Neutral			
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
0.286	--	--	39.80	27.84	60.62	50.62
0.478	--	--	41.97	23.41	56.37	46.37
0.833	--	--	31.43	12.30	56.00	46.00
13.421	--	--	42.45	36.26	60.00	50.00
17.570	--	--	43.13	36.96	60.00	50.00

7.0 20dB Bandwidth Measurement

7.1 Test Equipment

Please refer to the Section 2

7.2 Test Specification:

Environmental conditions: Temperature 22° C Humidity: 50% Atmospheric pressure: 103kPa

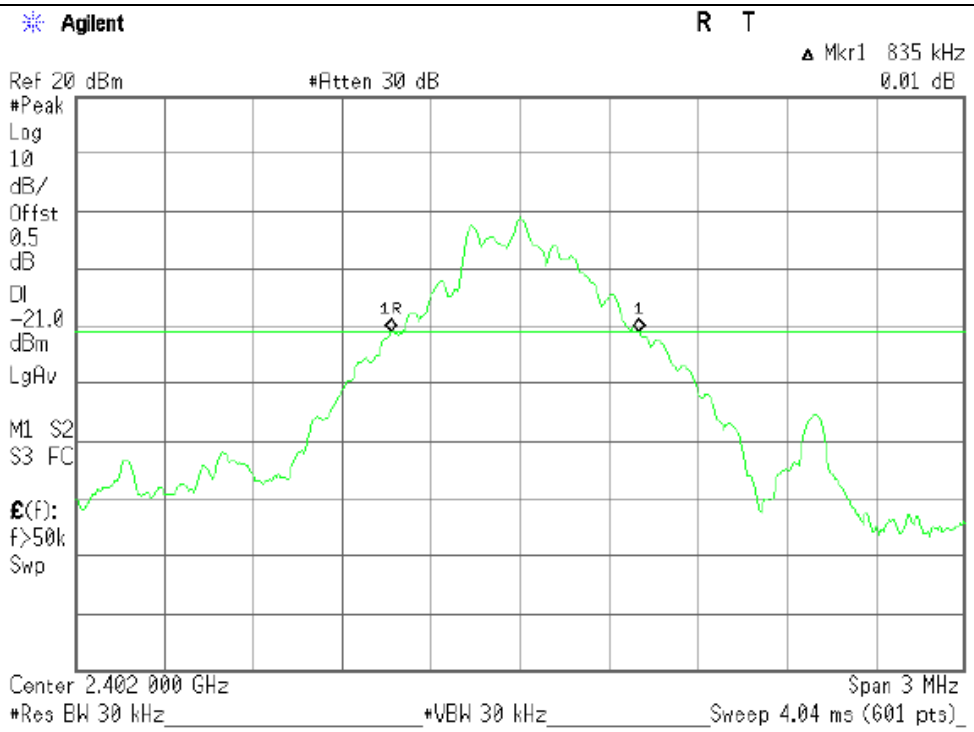
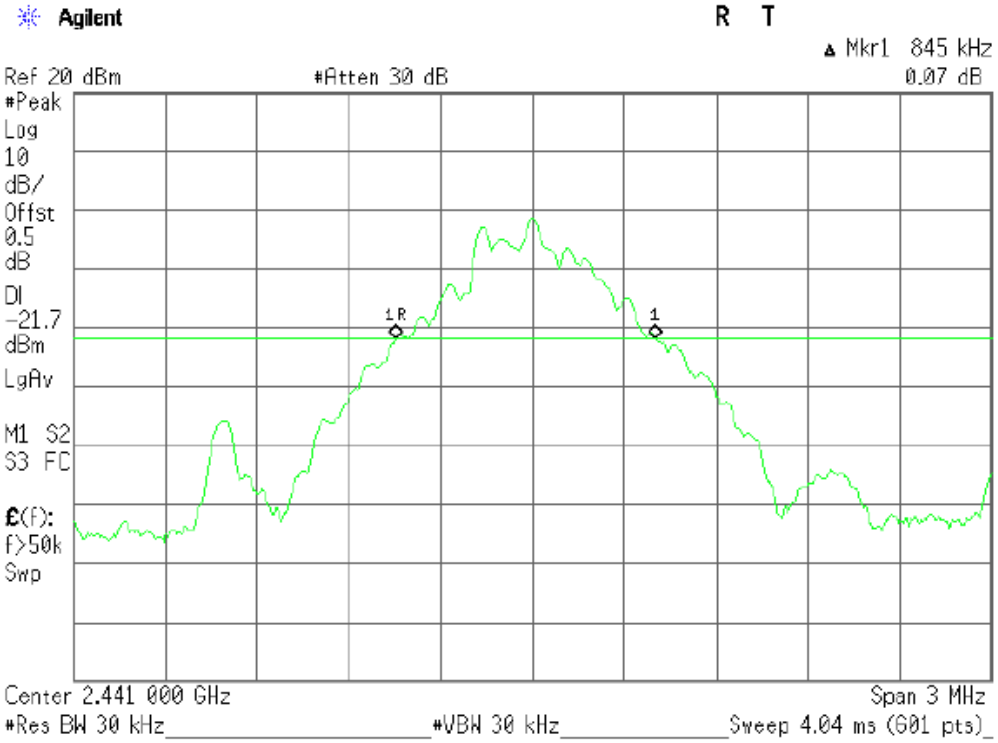
7.3 Limit

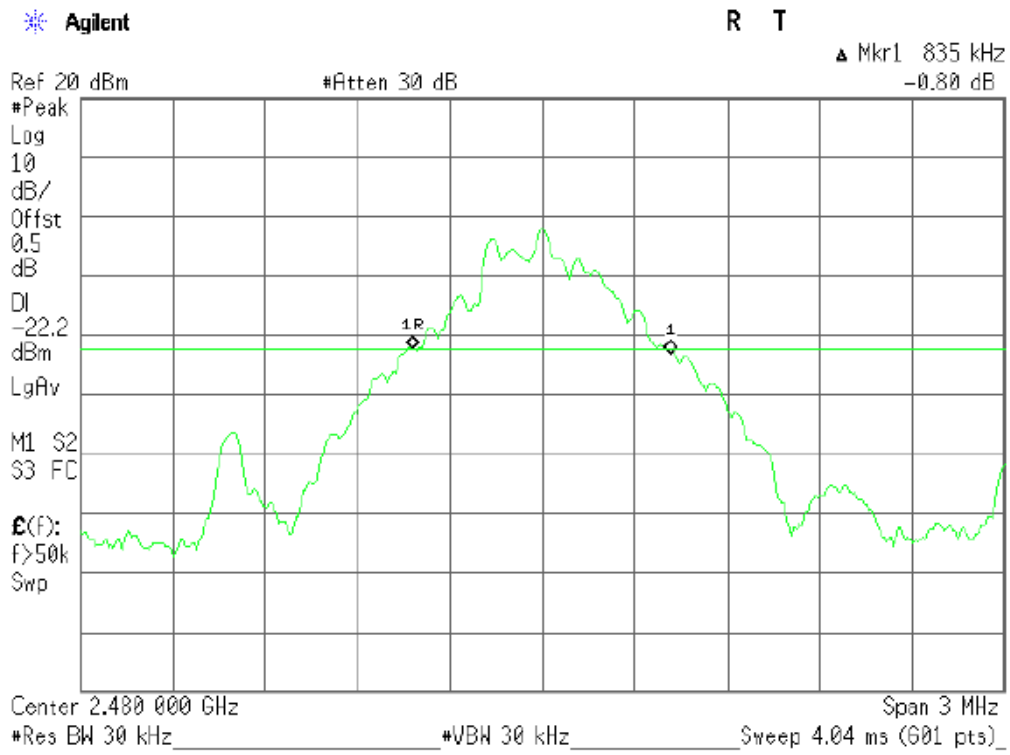
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

7.4 Test Result:

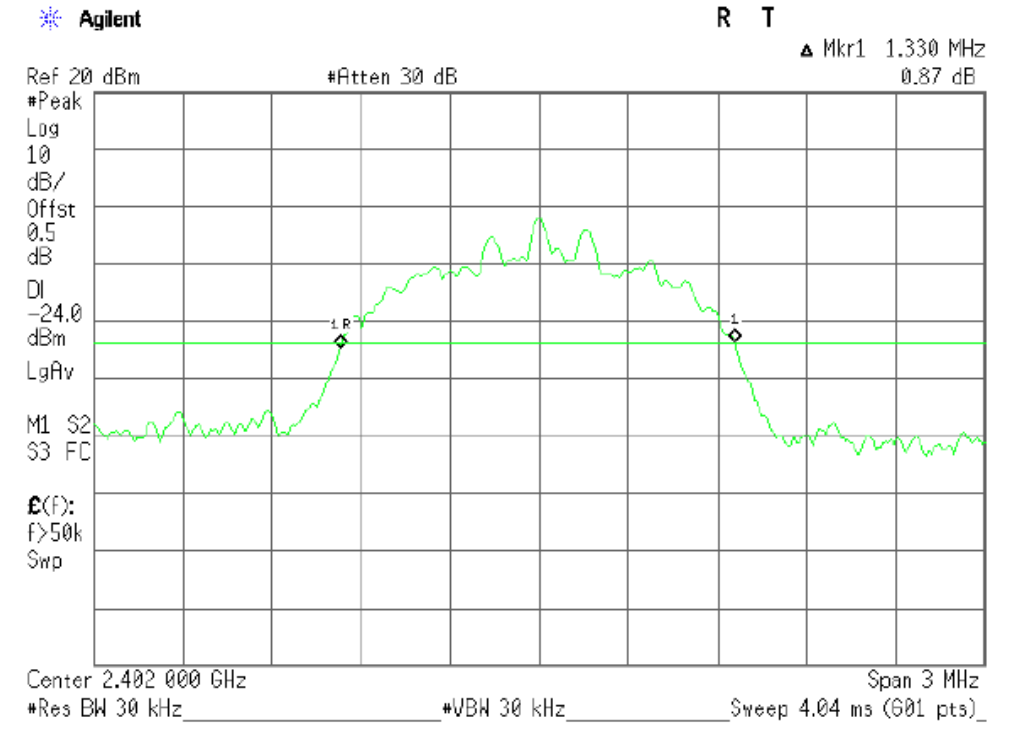
Modulation Type	Channel number	20dB Bandwidth (kHz)	Limit (kHz)	Conclusion
GFSK	(Low)	835	---	PASS
	(Middle)	845	---	PASS
	(High)	835	---	PASS
8-DPSK	(Low)	1330	---	PASS
	(Middle)	1325	---	PASS
	(High)	1305	---	PASS

Modulation: GFSK

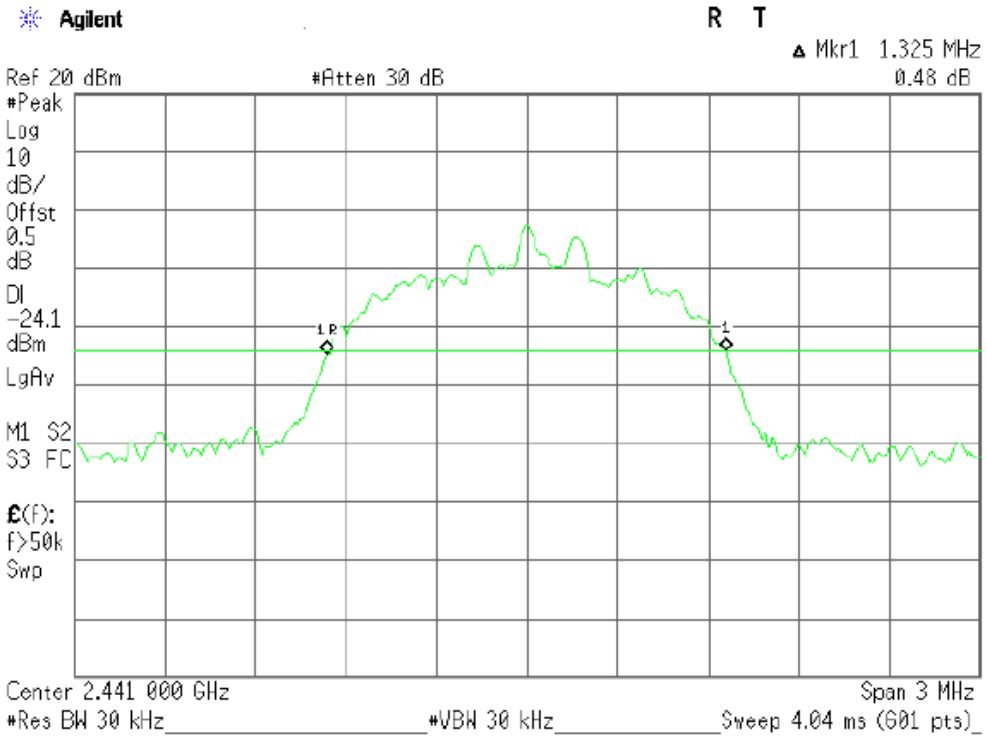
Low channel

Middle channel


High channel


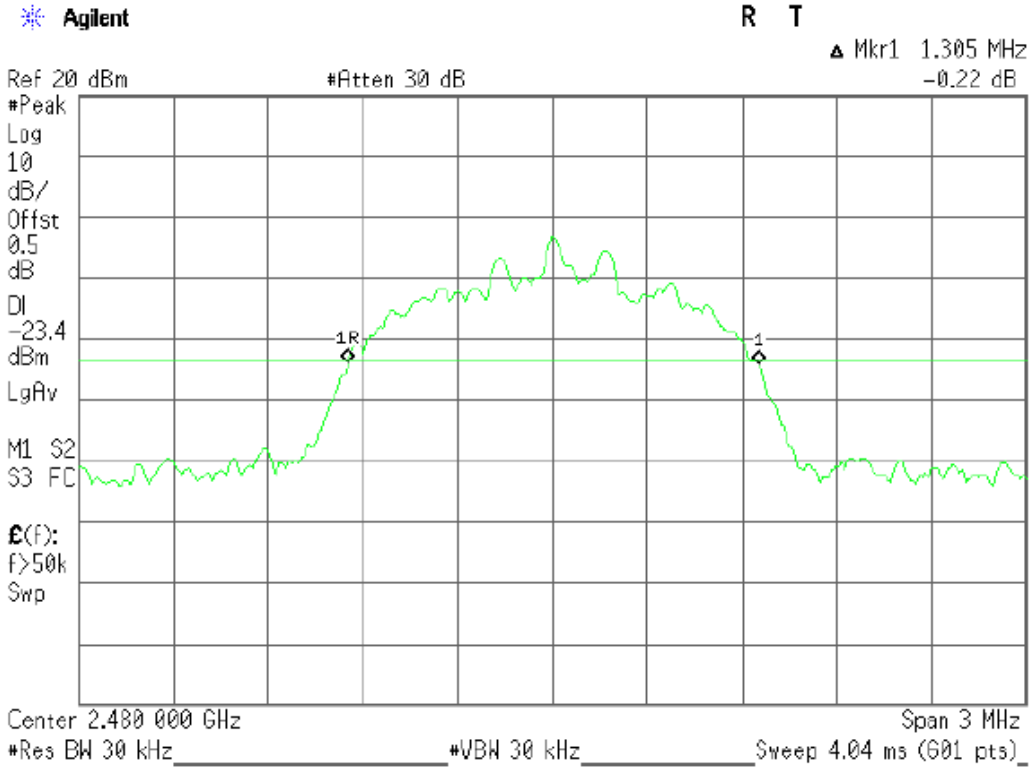
Modulation: 8-DPSK

Low channel


Middle channel



High channel



8.0 Maximum Peak Output Power

8.1 Test Equipment

Please refer to the Section 2

8.2 Test specification:

Environmental conditions: Temperature 23° C Humidity: 51% Atmospheric pressure: 103kPa

8.3 Test Procedure

1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
2. Set the spectrum analyzer as follows: Span = approximately 5 times the 20 dB bandwidth, centred on a hopping channel； RBW > the 20 dB bandwidth of the emission being measured； VBW ≥ RBW；
Sweep =auto； Detector function = peak； Trace = max hold
3. Measure the highest amplitude appearing on spectral display and record the level to calculate results.
4. Repeat above procedures until all frequencies measured were complete.

8.4 Limits

According to §15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5MHz band: 0.125 watts. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

8.5 Test Result

Modulation Type	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass/ Fail
GFSK	2402	1.92	30	Pass
	2441	1.37	30	Pass
	2480	1.23	30	Pass
Pi/4 DQPSK	2402	0.78	30	Pass
	2441	0.19	30	Pass
	2480	0.34	30	Pass
8-DPSK	2402	0.90	30	Pass
	2441	0.41	30	Pass
	2480	0.68	30	Pass

Note: Peak Power Output = Peak Power Reading + Cable loss + Attenuator

9.0 Carrier Frequency Separation

9.1 Test Equipment

Please refer to the Section 2

9.2 Test specification:

Environmental conditions: Temperature 22° C Humidity: 51% Atmospheric pressure: 103kPa

9.3 Test Procedure

1. Set the spectrum analyzer as follows: Span = wide enough to capture the peaks of two adjacent channels: Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span; Video (or Average) Bandwidth (VBW) ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold
2. Measure the separation between the peaks of the adjacent channels using the marker-delta function.
3. Repeat above procedures until all frequencies measured were complete.

9.4 Limits

According to §15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

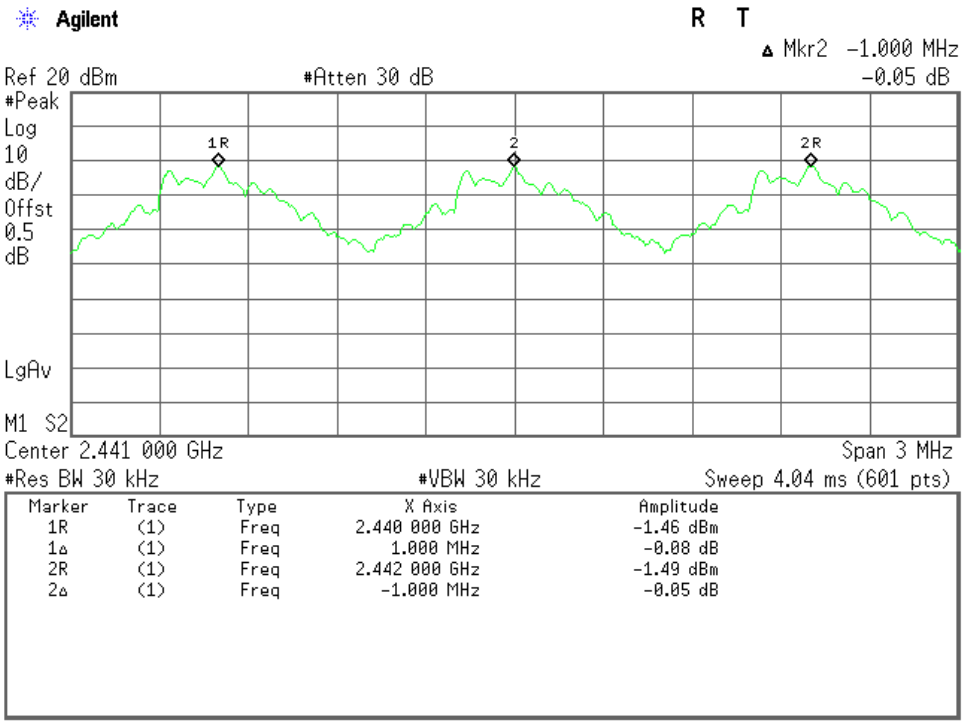
9.5 Test Result

Modulation Type	Carrier Frequency Separation	Limit	Pass/ Fail
GFSK	1.000MHz	≥ 25 kHz or two-thirds 20 dB bandwidth	Pass
8-DPSK	1.000MHz	≥ 25 kHz or two-thirds 20 dB bandwidth	Pass

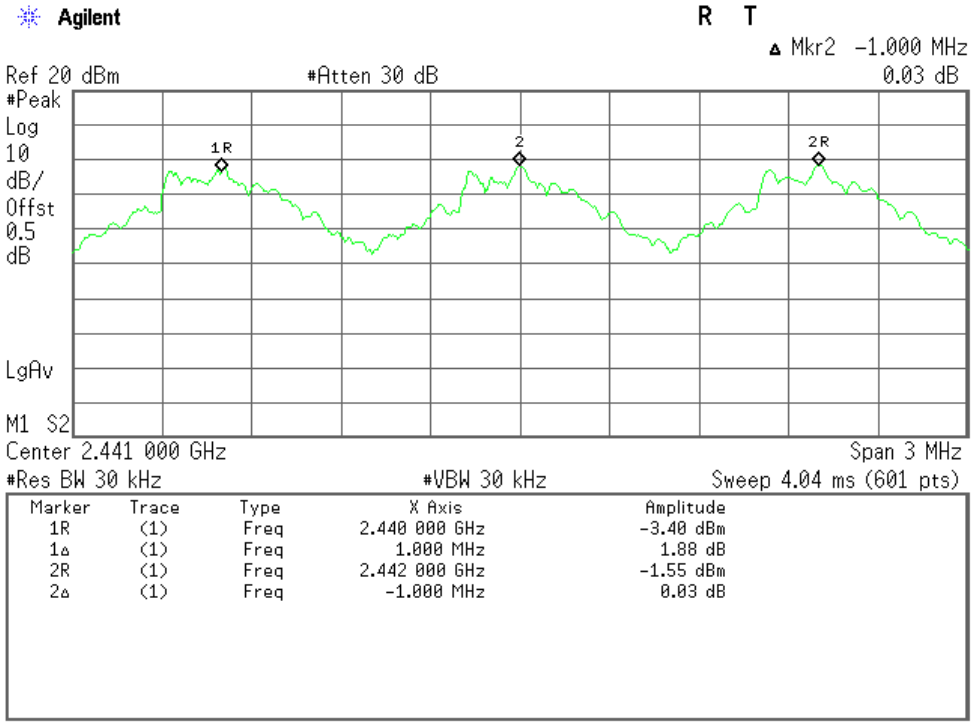
Note: Two-thirds 20 dB bandwidth: GFSK: 563 kHz; 8-DPSK: 887 kHz

Test plot

Modulation Type: GFSK



Modulation Type: 8-DPSK



10.0 Number of Hopping Channels

10.1 Test Equipment

Please refer to the Section 2

10.2 Test specification:

Environmental conditions: Temperature 22° C Humidity: 51% Atmospheric pressure: 103kPa

10.3 Test Procedure

Set the spectrum analyzer as follows: Span = the frequency band of operation; RBW ≥ 1% of the span; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold

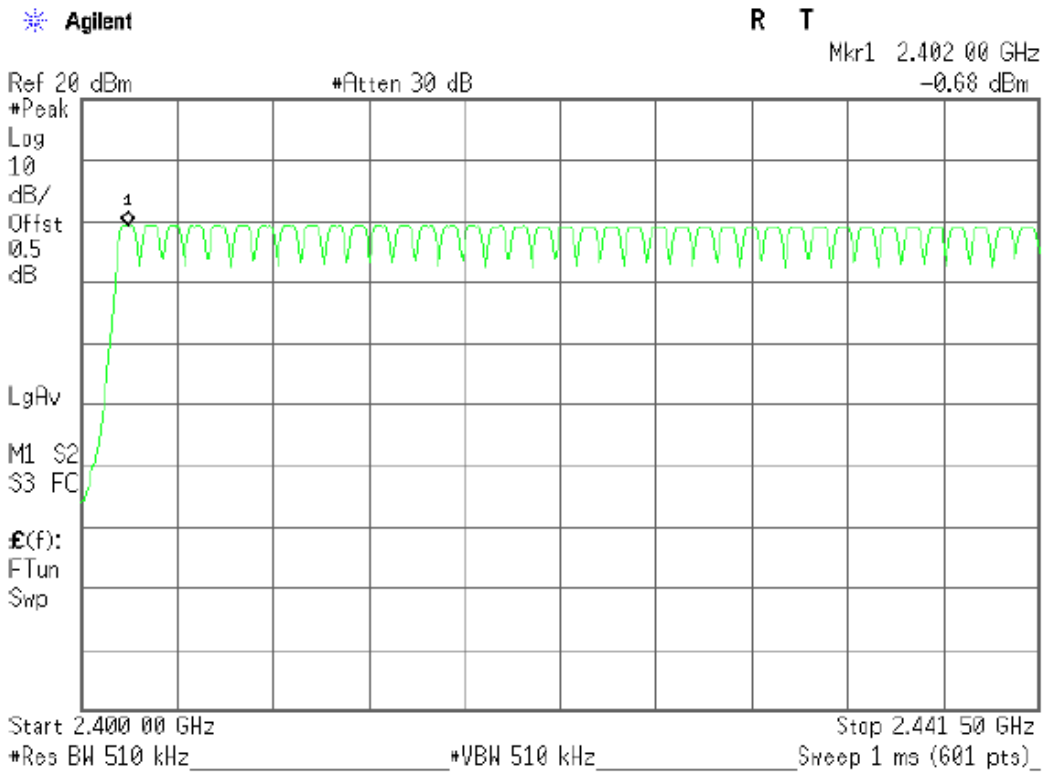
10.4 Limits

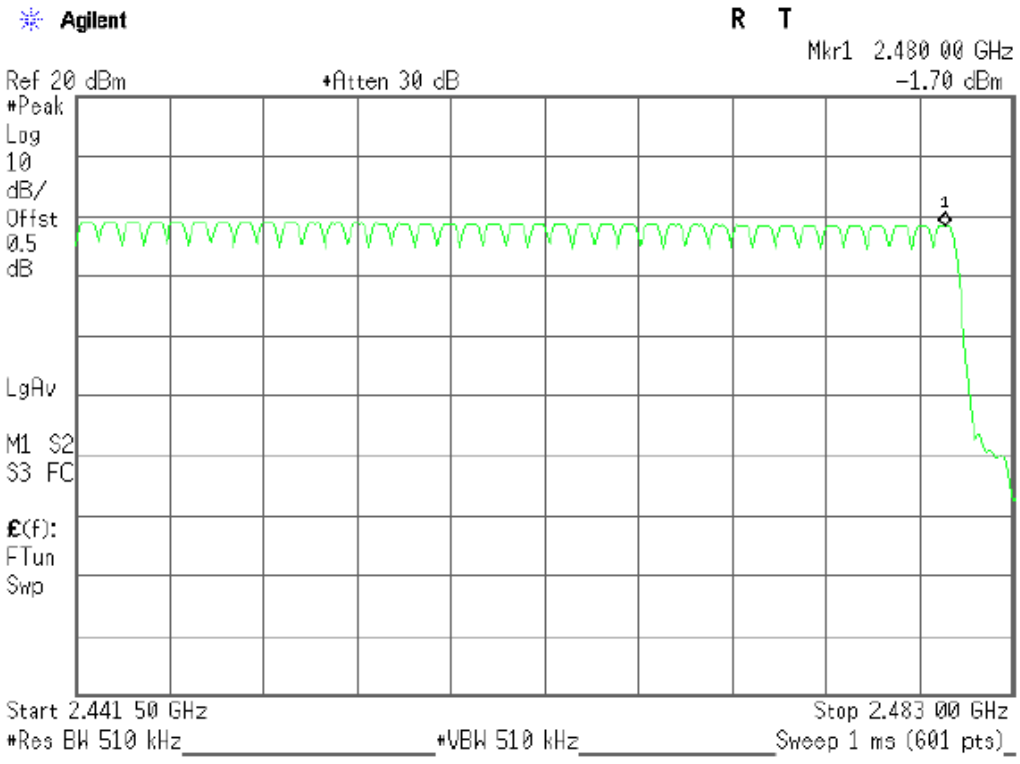
According to §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

10.5 Test Result

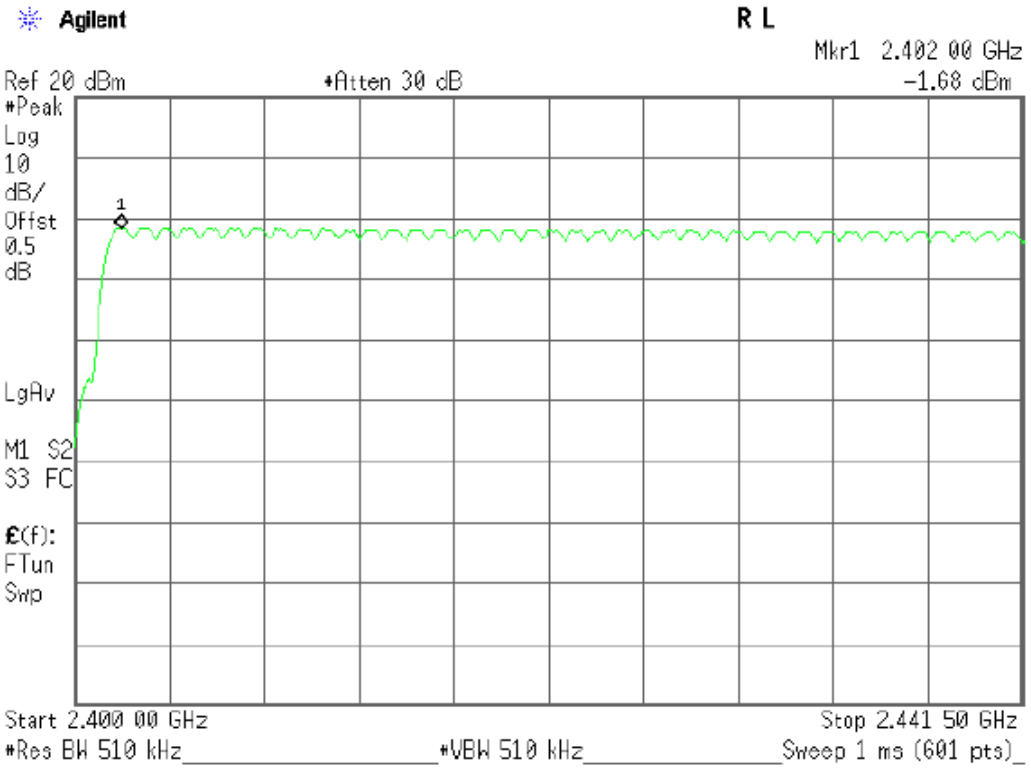
Modulation Type	Operating Frequency	Number of hopping channels	Limit	Pass/ Fail
GFSK	2402-2480MHz	79	≥ 15	Pass
8-DPSK	2402-2480MHz	79	≥ 15	Pass

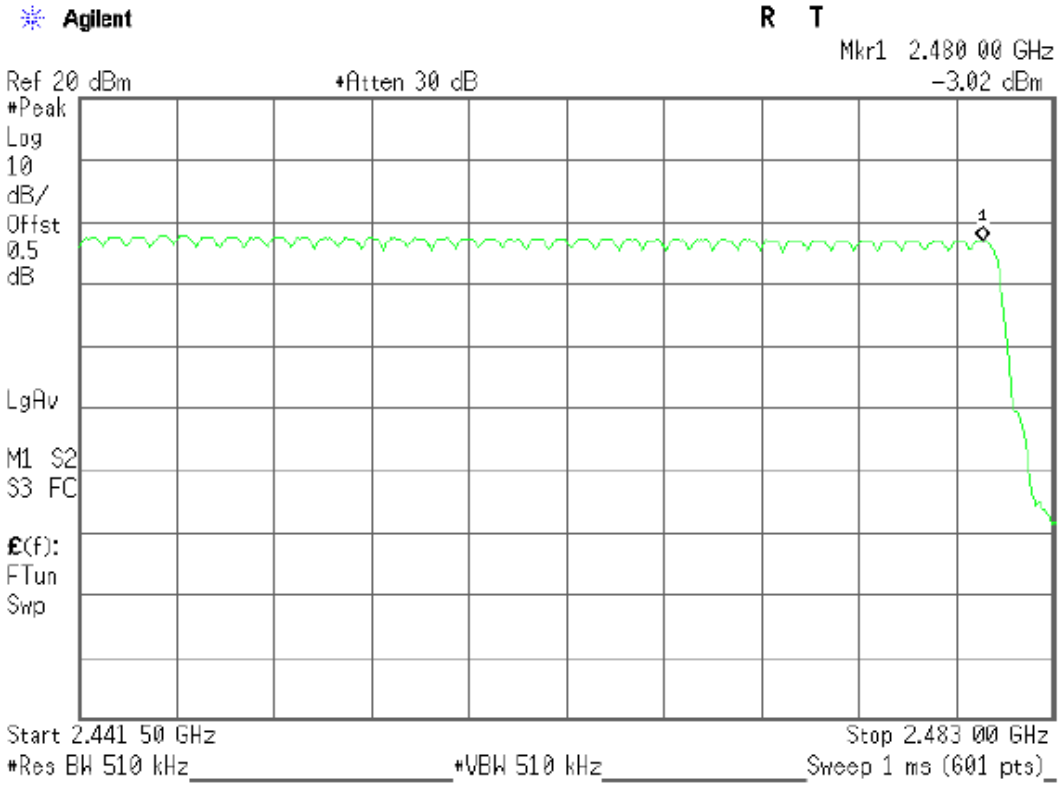
Test Plot:
Modulation Type: GFSK





Test Plot:
Modulation Type: 8-DPSK





11.0 Time of Occupancy (Dwell Time)

11.1 Test Equipment

Please refer to the Section 2

11.2 Test specification:

Environmental conditions: Temperature 22° C Humidity: 51% Atmospheric pressure: 103kPa

11.3 Test Procedure

Span = zero span, centred on a hopping channel; RBW = 1 MHz; VBW ≥ RBW; Detector function = peak;
Sweep = as necessary to capture the entire dwell time per hopping channel; Trace = max hold
Measure the dwell time using the marker-delta function.
Repeat this test for different modes of operation (e.g., data rate, modulation format, etc.), if applicable.

11.4 Limits

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed

11.5 Test Result

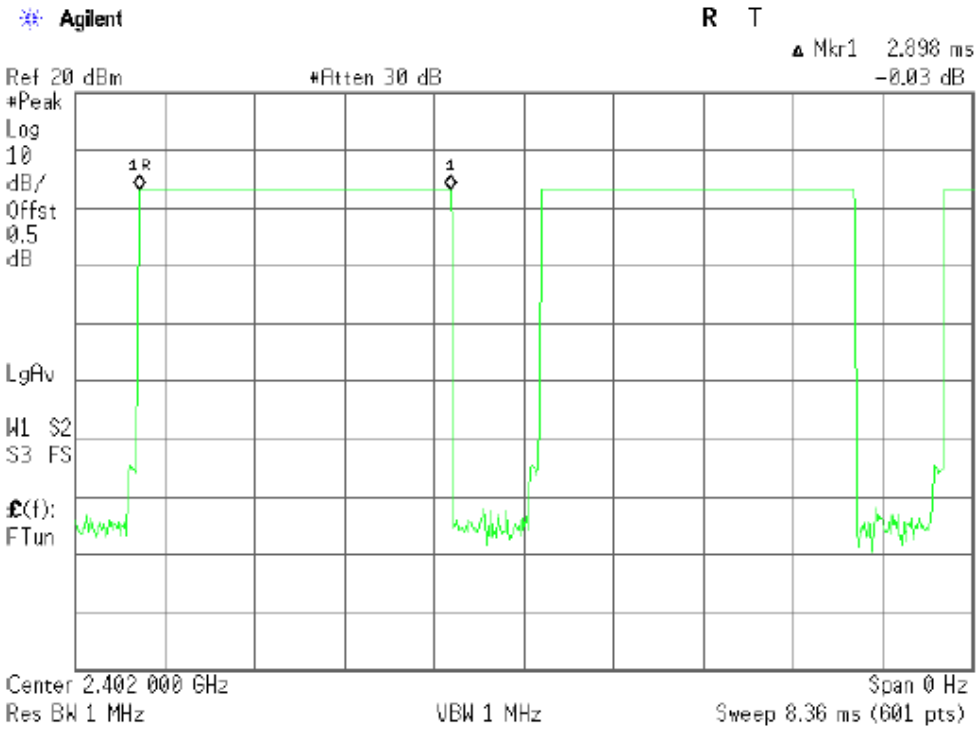
Modulation Type	Channel	Reading (ms)	Hoping Rate	Actual (s)	Limit (s)
GFSK	Low	2.898	266.667hop/s	0.309	0.4
	Middle	2.898	266.667hop/s	0.309	0.4
	High	2.898	266.667hop/s	0.309	0.4
8-DPSK	Low	2.898	266.667hop/s	0.309	0.4
	Middle	2.898	266.667hop/s	0.309	0.4
	High	2.912	266.667hop/s	0.311	0.4

Note: 1) Actual = Reading × (Hopping rate / Number of channels) × Test period

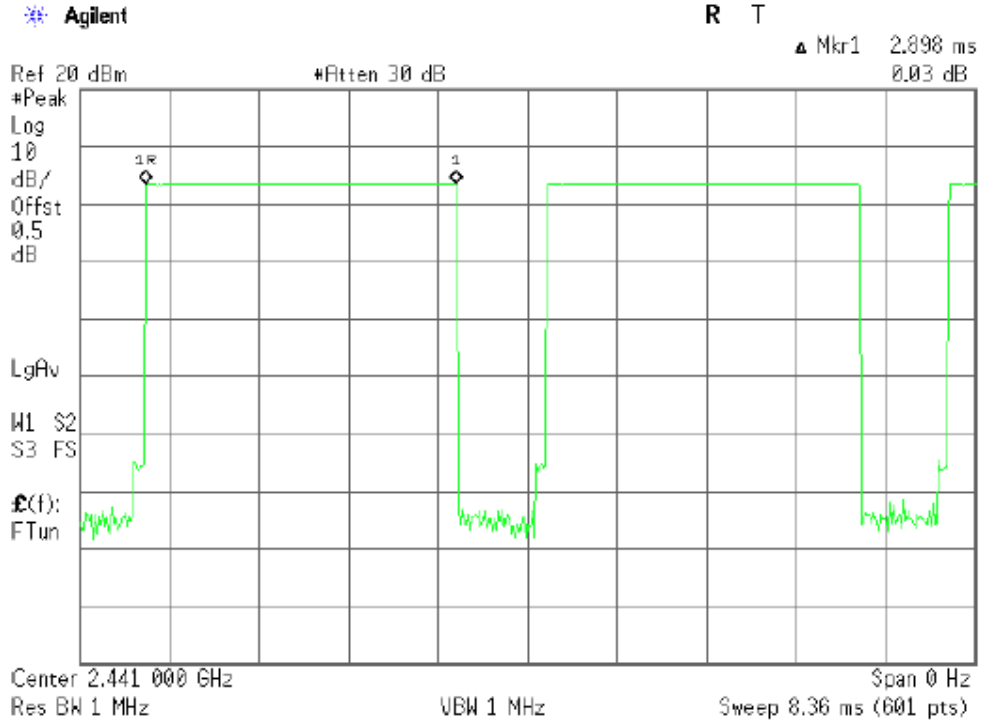
2) The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625μs with 79 channels. A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. So the EUT makes worst case 266.667 hops per second with 79 channels, and the DH5 is the worst case.

Test Plot: Modulation Type: GFSK

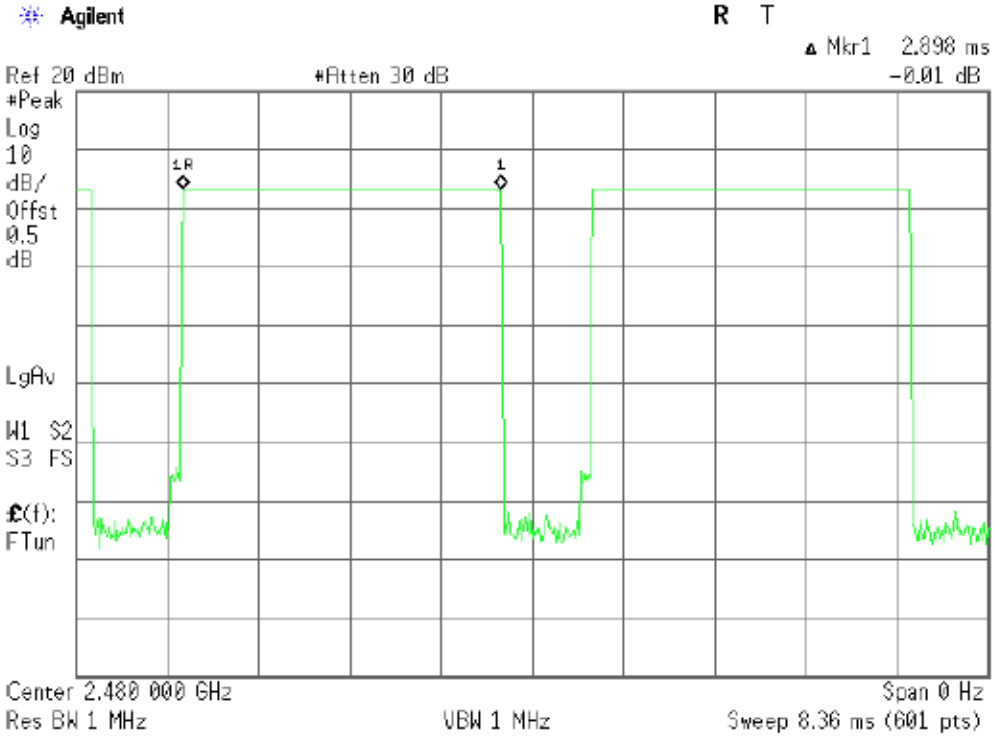
Low channel: DH5



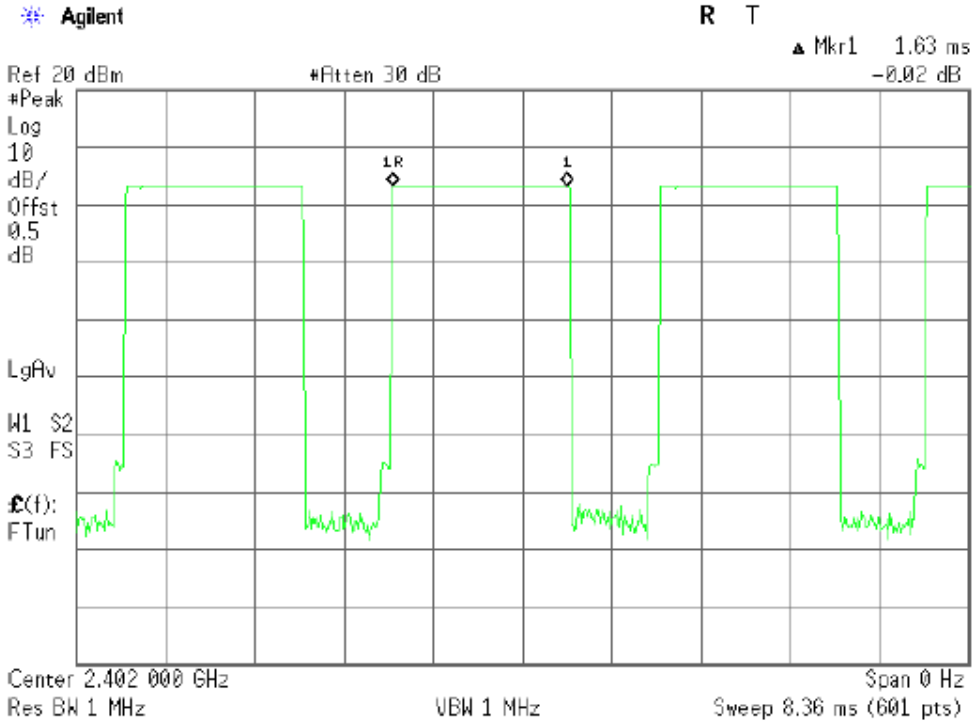
Middle channel: DH5



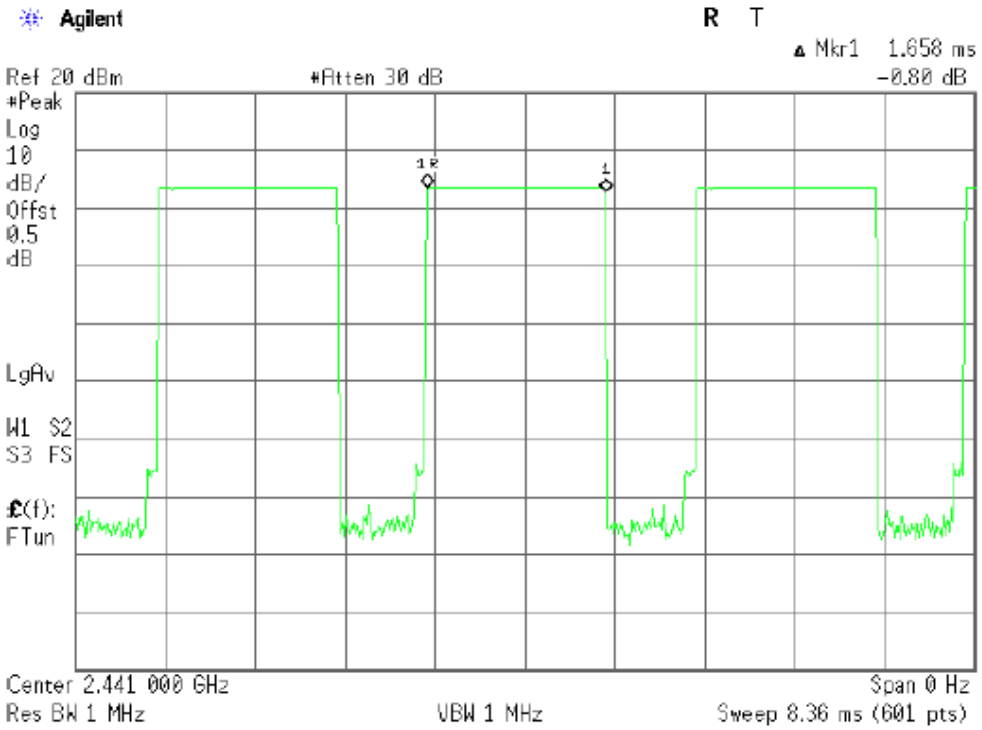
High channel: DH5



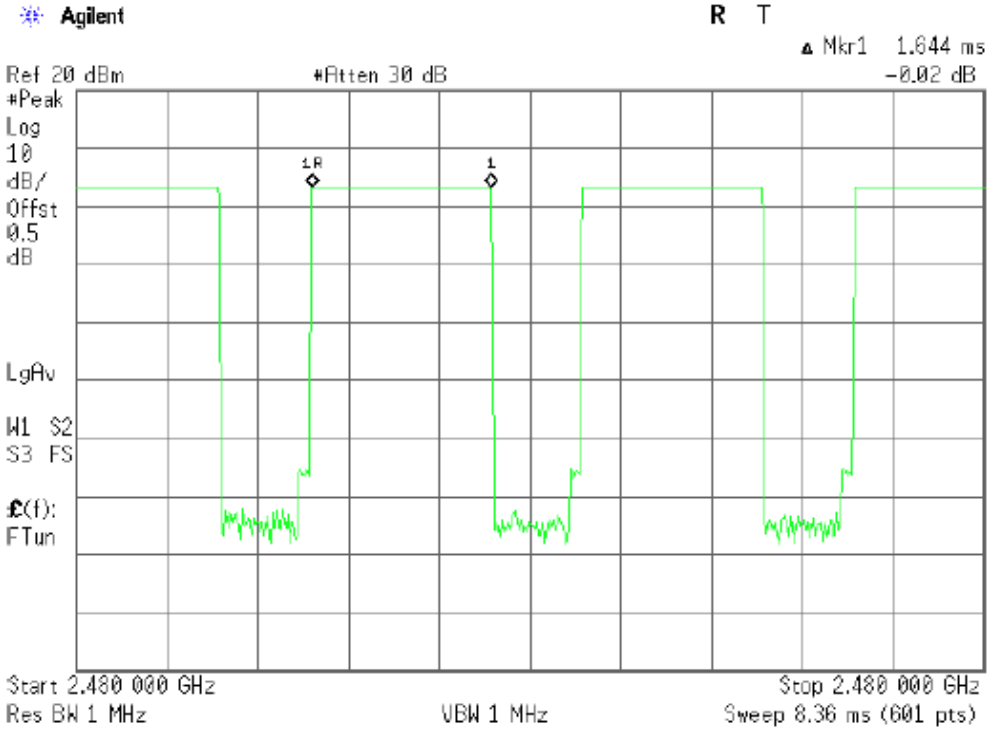
Low channel: DH3



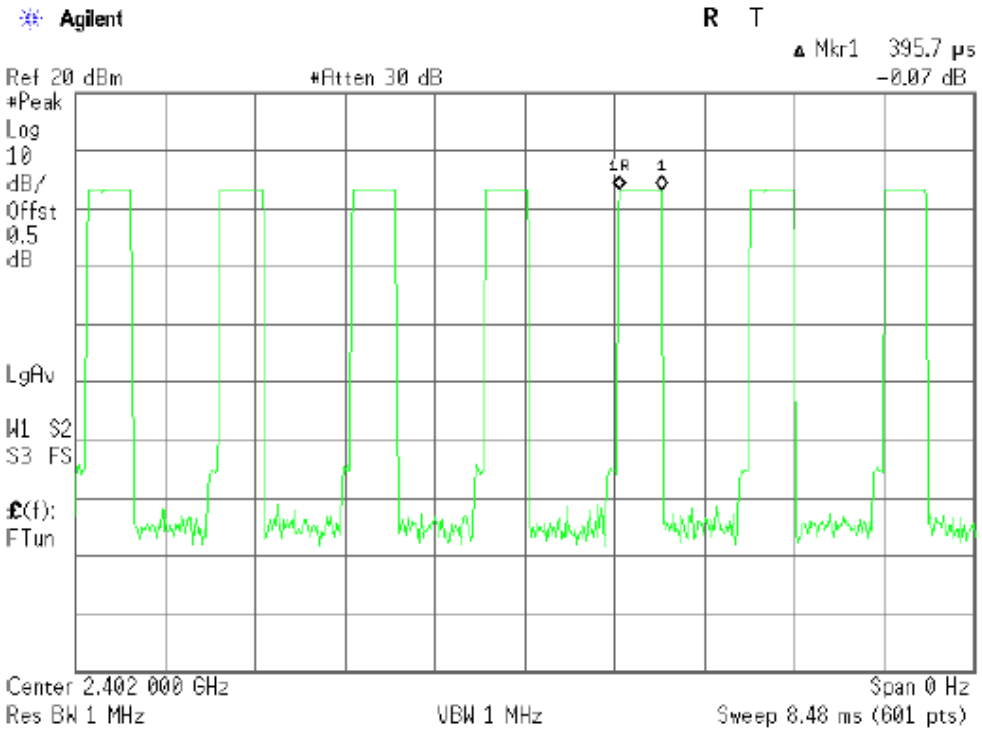
Middle channel: DH3



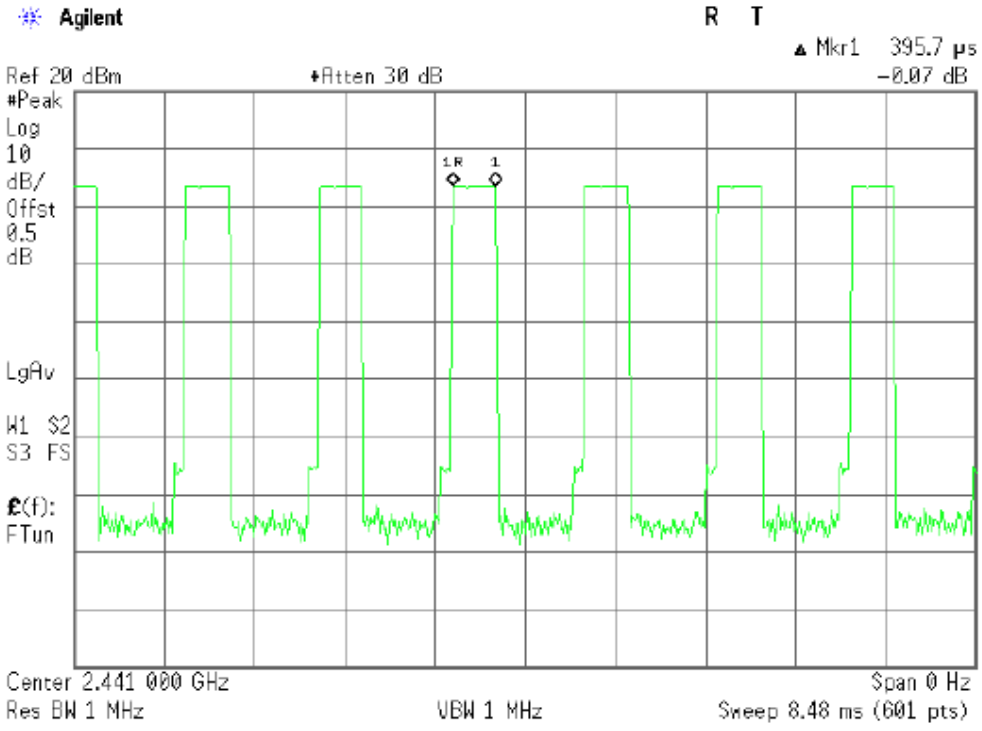
High channel: DH3



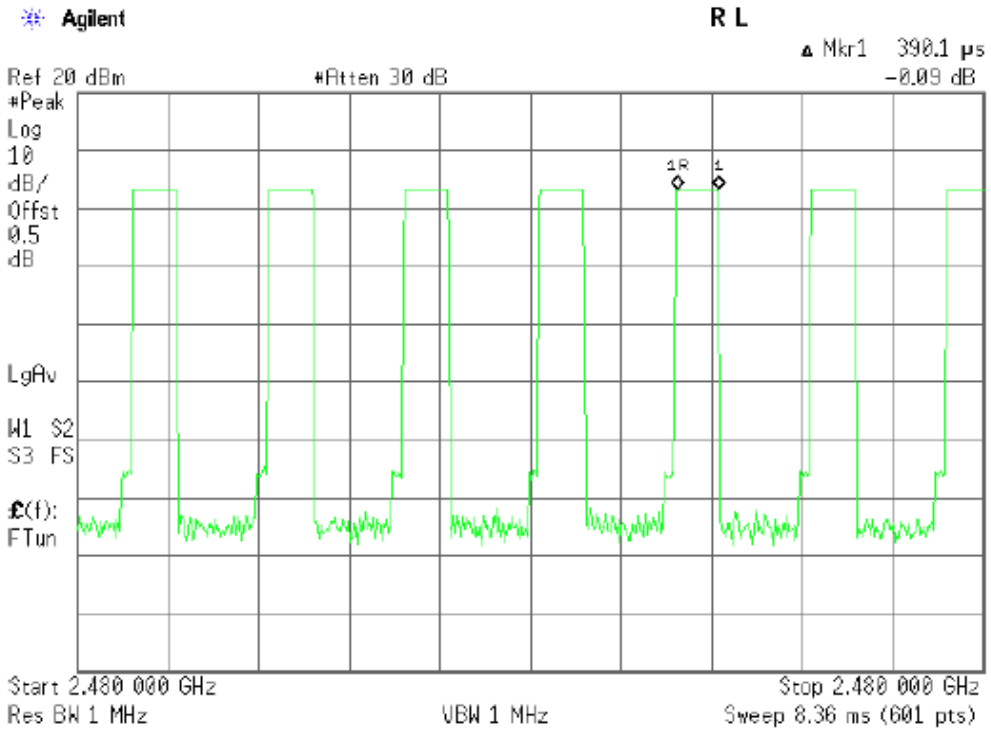
Low channel: DH1



Middle channel: DH1

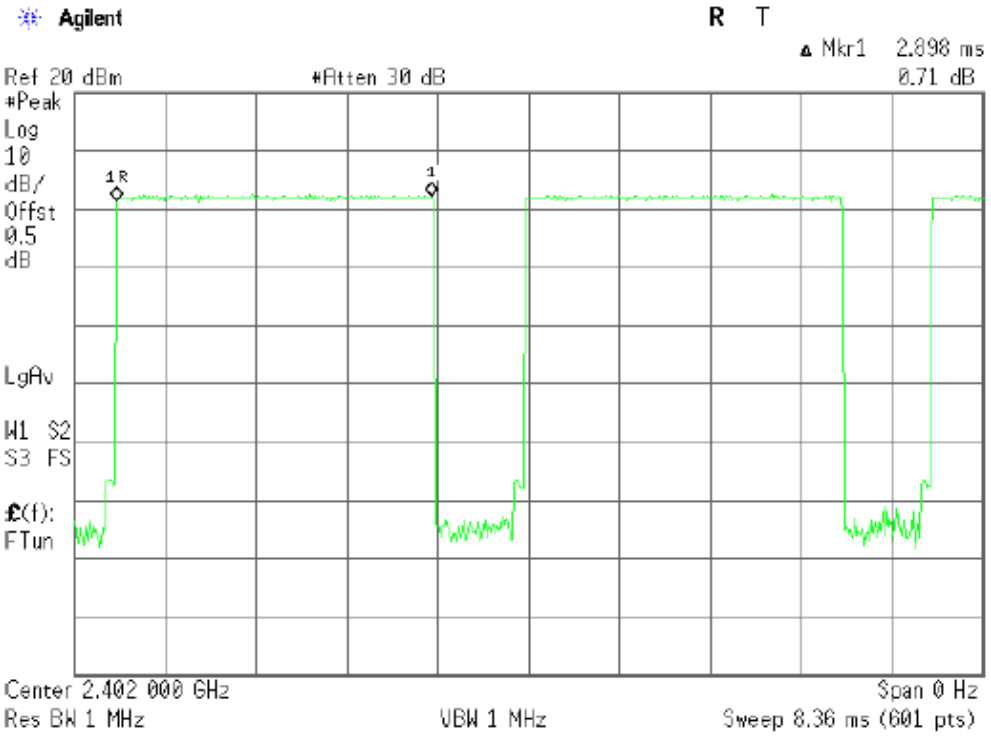


High channel: DH1

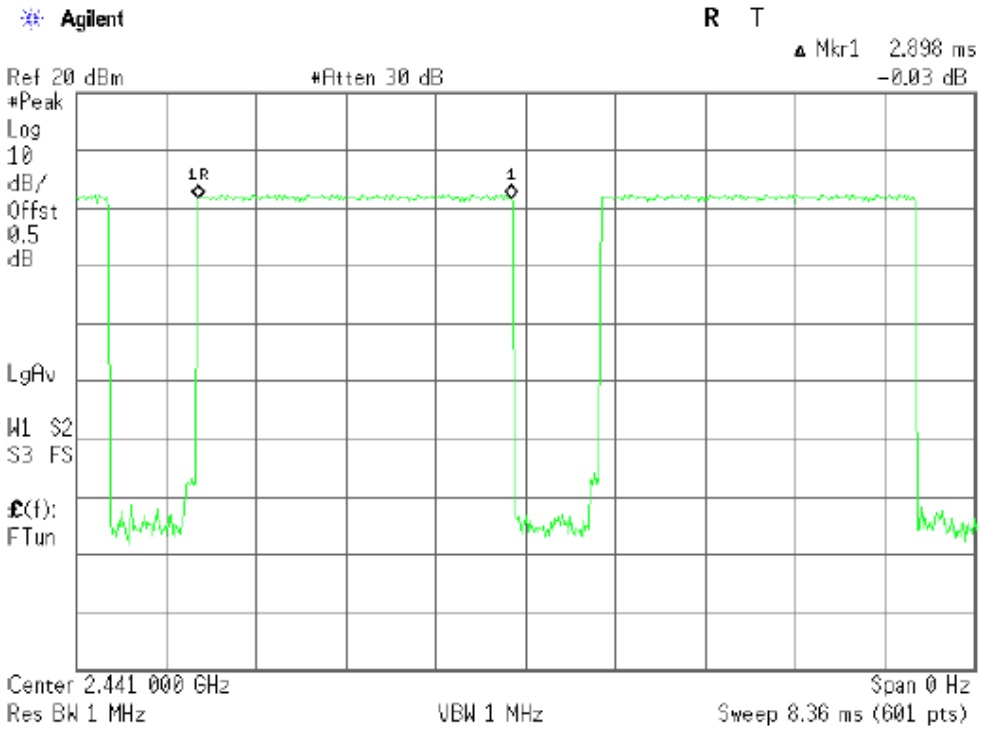


Modulation Type: 8-DPSK

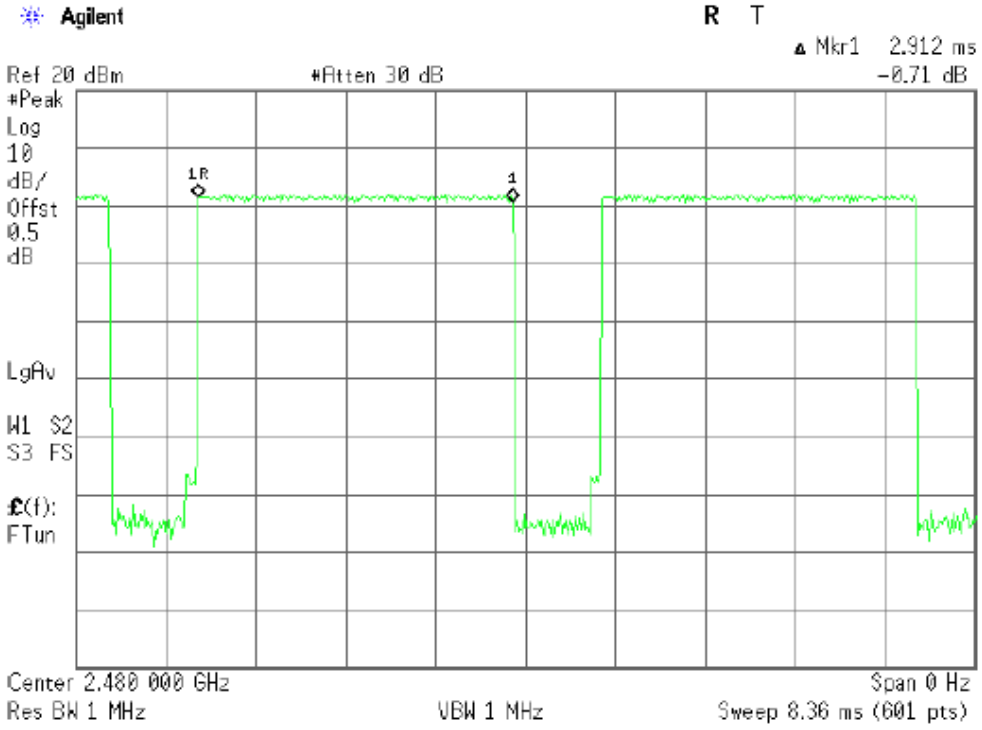
Low channel: DH5



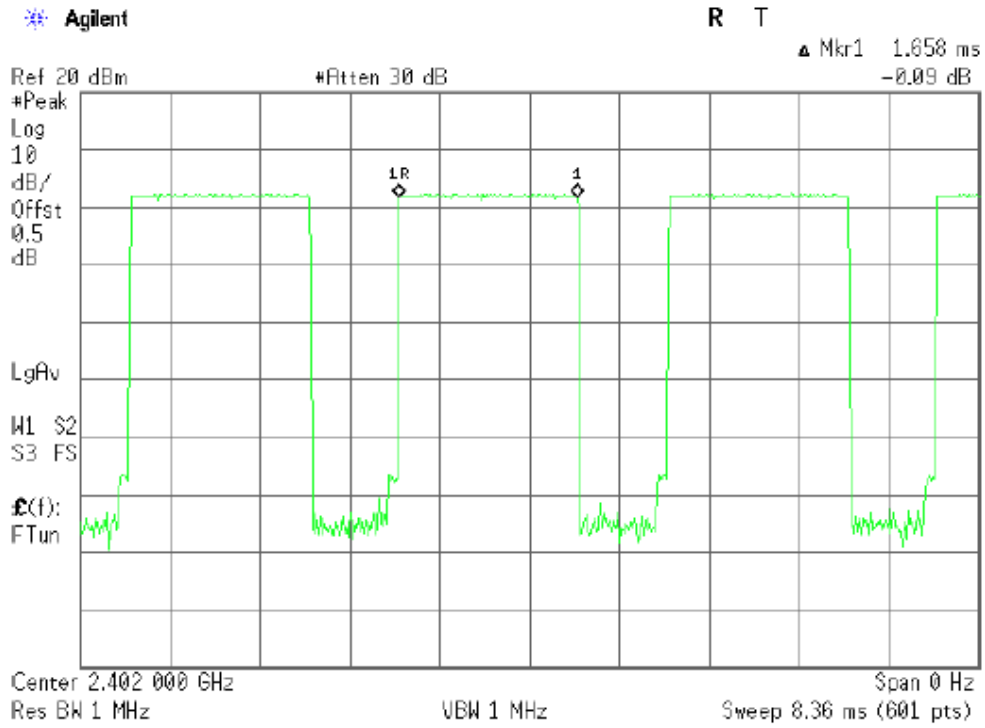
Middle channel: DH5



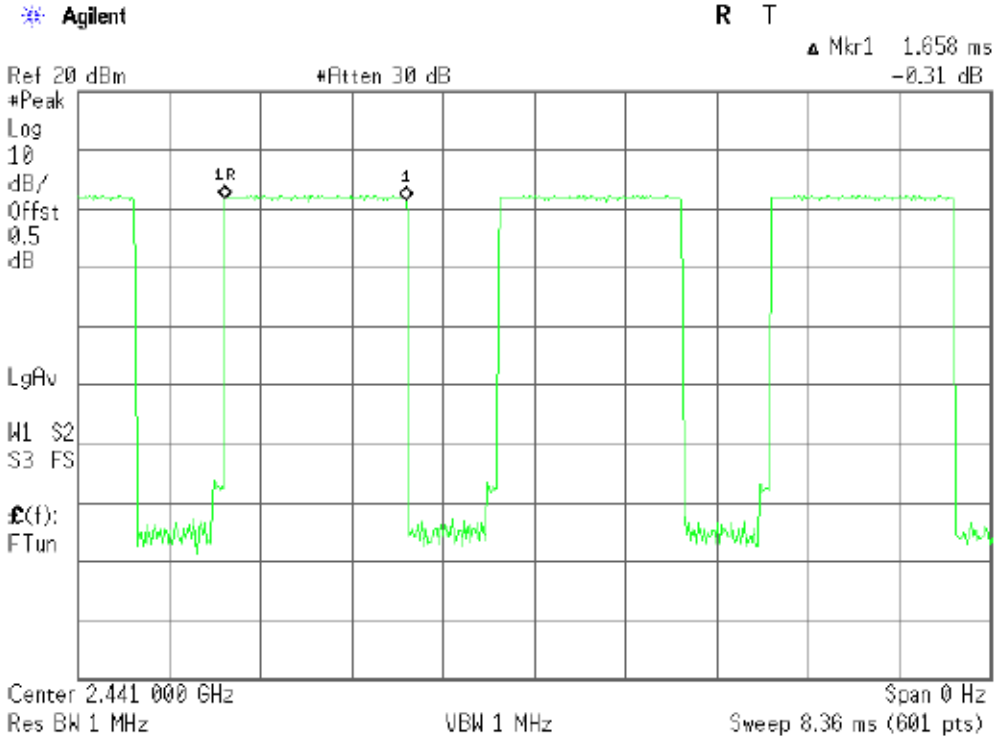
High channel: DH5



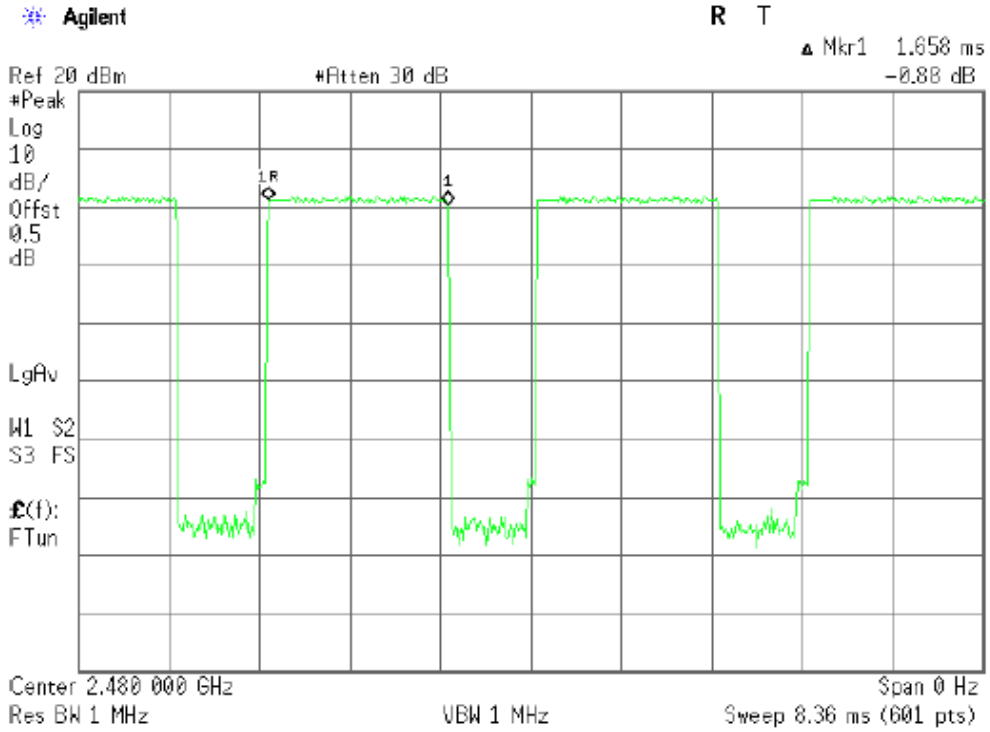
Low channel: DH3



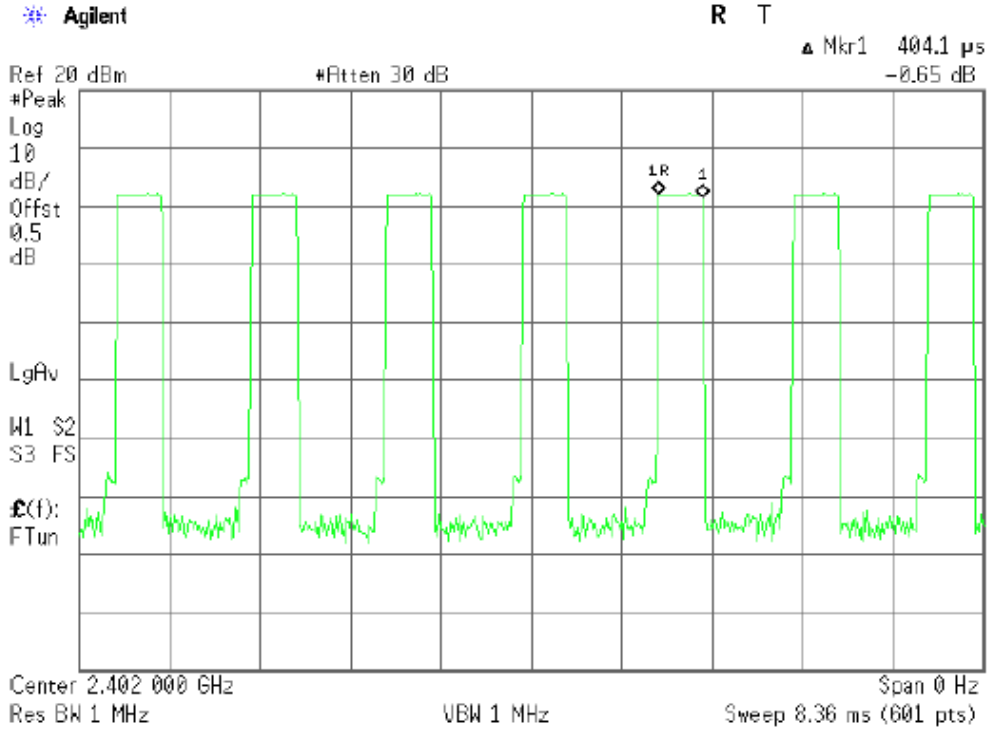
Middle channel: DH3



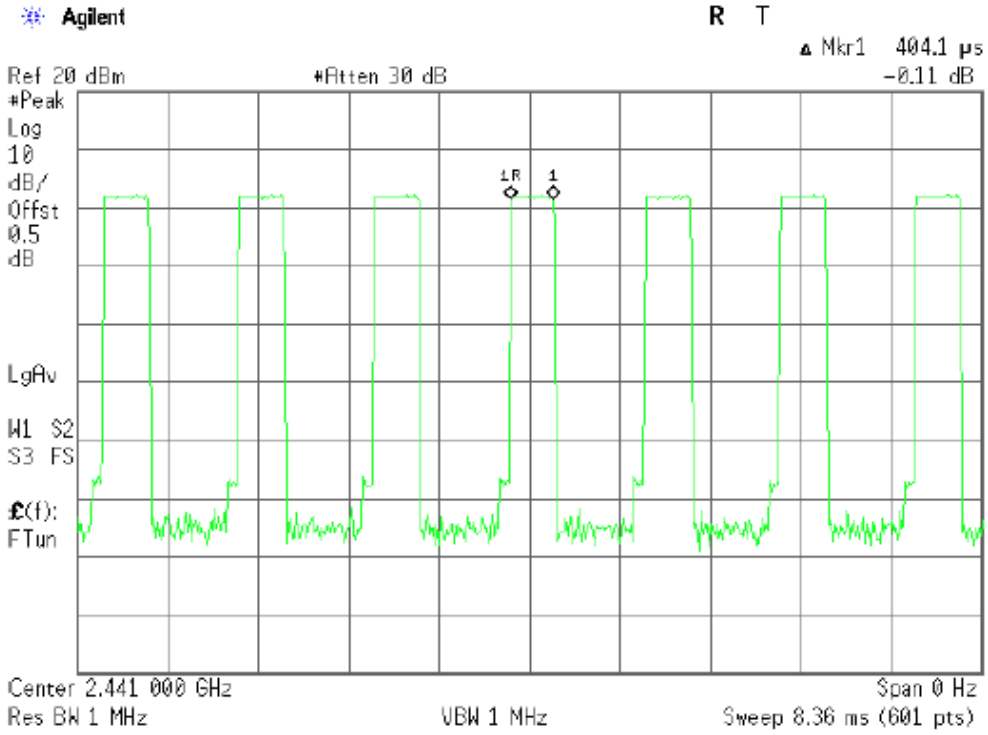
High channel: DH3



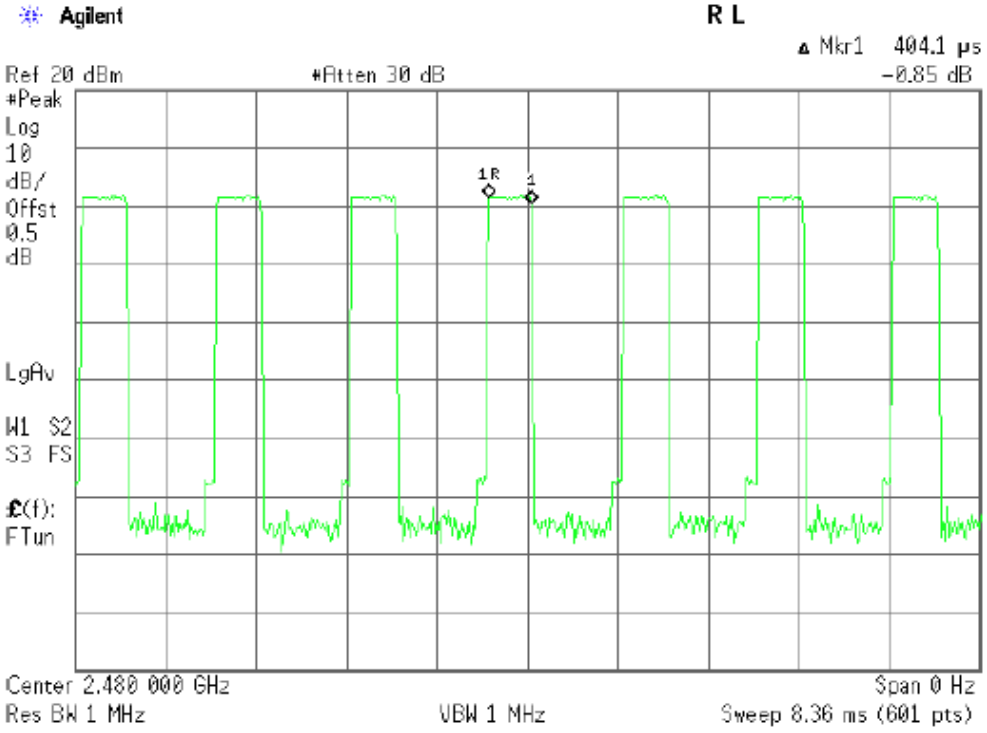
Low channel: DH1



Middle channel: DH1



High channel: DH1



12.0 Band age Measurement

12.1 Test Equipment

Please refer to the Section 2

12.2 Test specification:

Environmental conditions: Temperature 22° C Humidity: 51% Atmospheric pressure: 103kPa

12.3 Test Procedure

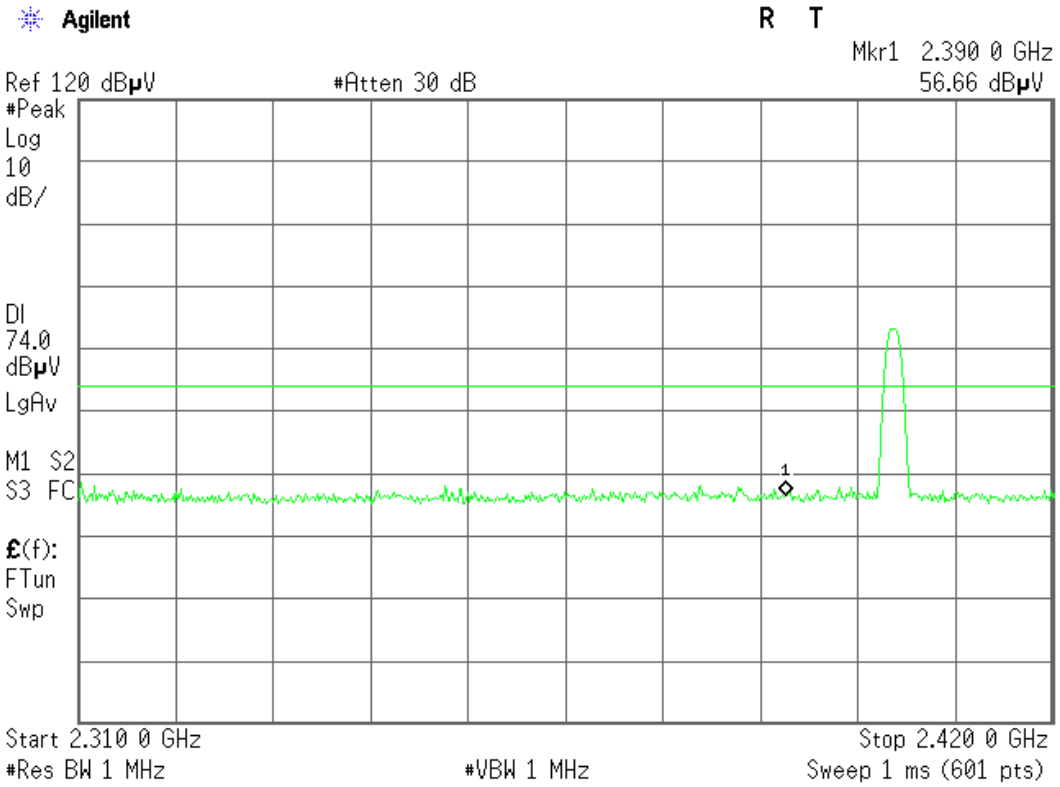
For signals allocated in the restricted bands above and below the 2.4-2.483GHz, a radiated measurement is made (Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector)

12.4 Limit

Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

Modulation Type: GFSK

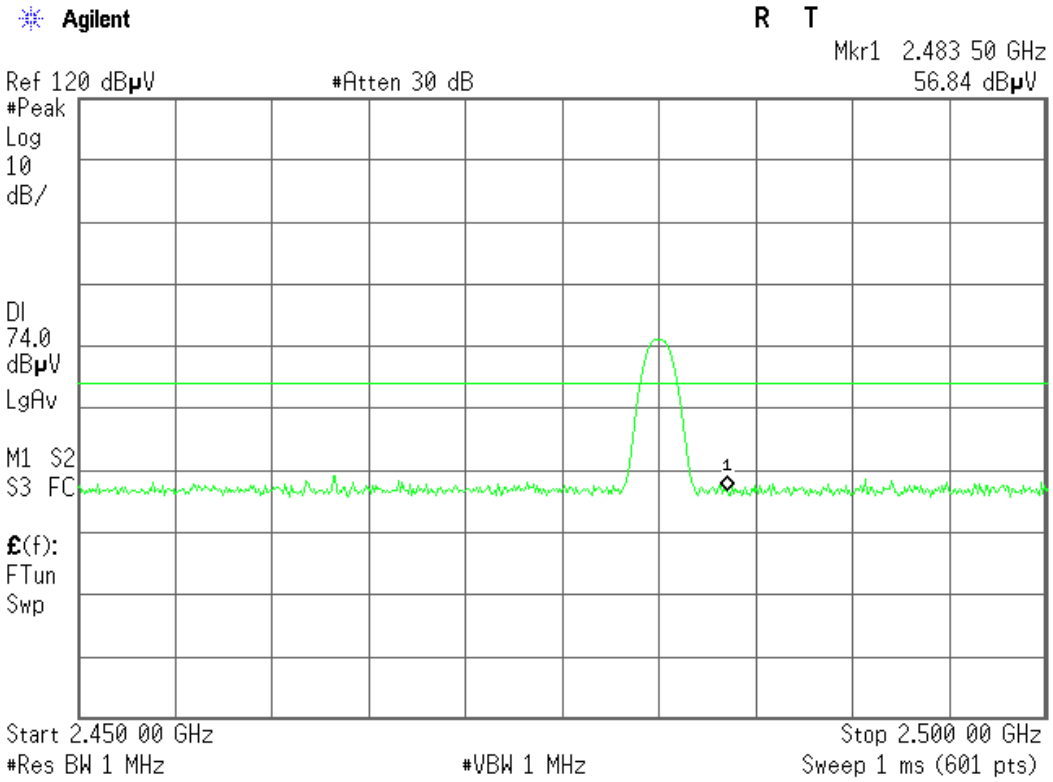
EUT operation mode: Keep transmitting in low channel



Remark: 1) The radiated measurements were made in horizontal and vertical polarity, and the horizontal is the worst case.

2) The maximum emission was 56.84dBuv at 2354.2 MHz, in which point an average detector is used, and the test result complied with the radiated emission limits specified in 15.209(a).

EUT operation mode: Keep transmitting in high channel

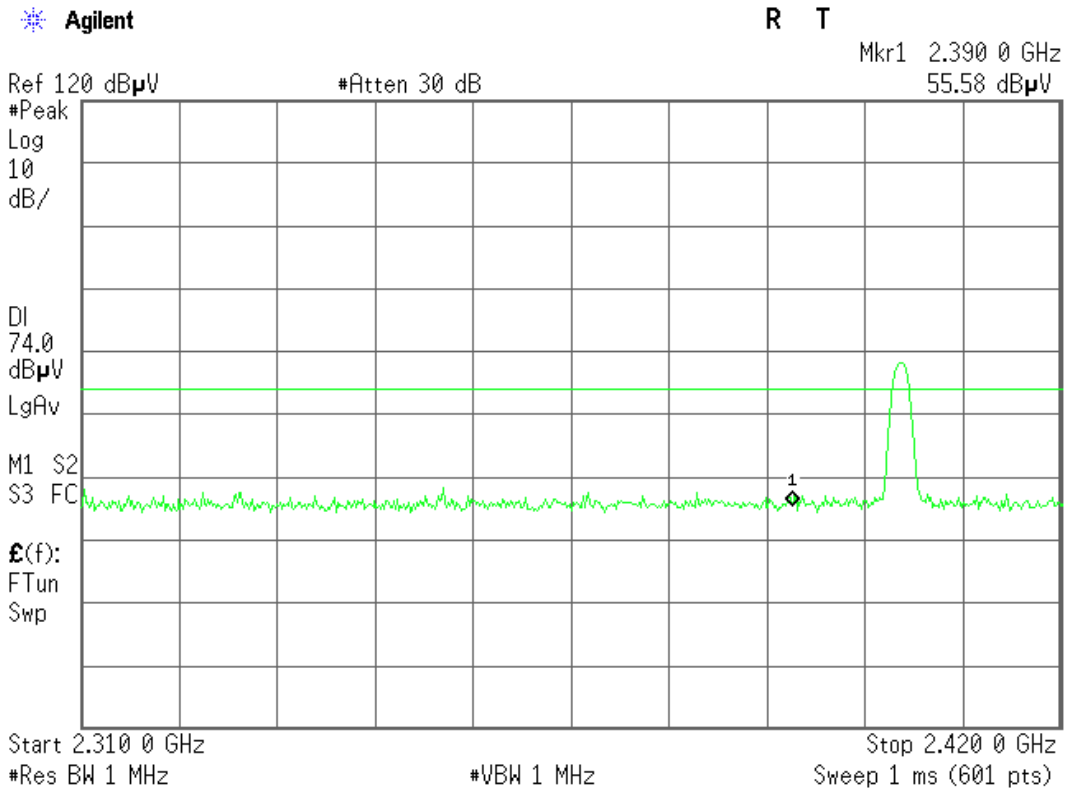


Remark: 1) The radiated measurements were made in horizontal and vertical polarity, and the horizontal is the worst case.

2) The maximum emission was 56.84dBuv at 2483.5 MHz, in which point an average detector is used, and the test result complied with the radiated emission limits specified in 15.209(a).

Modulation Type: 8-DPSK

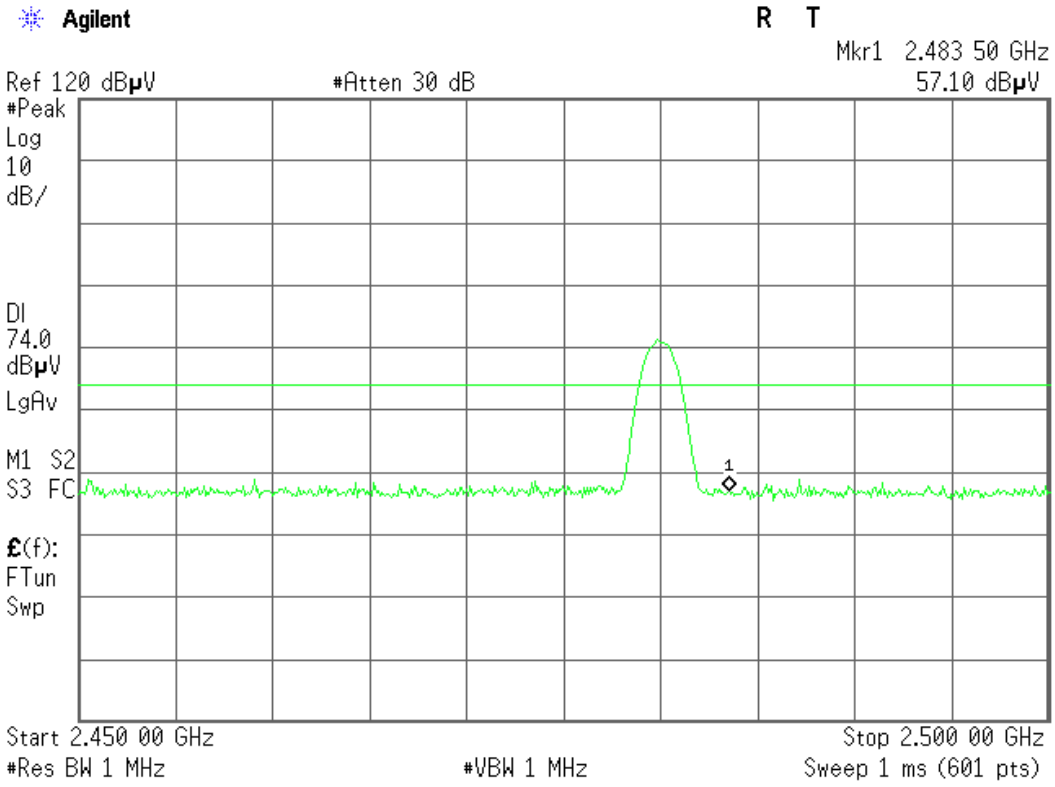
EUT operation mode: Keep transmitting in low channel



Remark: 1) The radiated measurements were made in horizontal and vertical polarity, and the horizontal is the worst case.

2) The maximum emission was 56.69dBuv at 2354.16 MHz, in which point an average detector is used, and the test result complied with the radiated emission limits specified in 15.209(a).

EUT operation mode: Keep transmitting in high channel



Remark: 1) The radiated measurements were made in horizontal and vertical polarity, and the horizontal is the worst case.

2) The maximum emission was 57.10dBuv at 2483.5 MHz, in which point an average detector is used, and the test result complied with the radiated emission limits specified in 15.209(a).

13.0 Spurious Emission Test

13.1 Radiated emissions

13.1.1 Test Method and test Procedure:

(1) The EUT was tested according to ANSI C63.10 –2009.

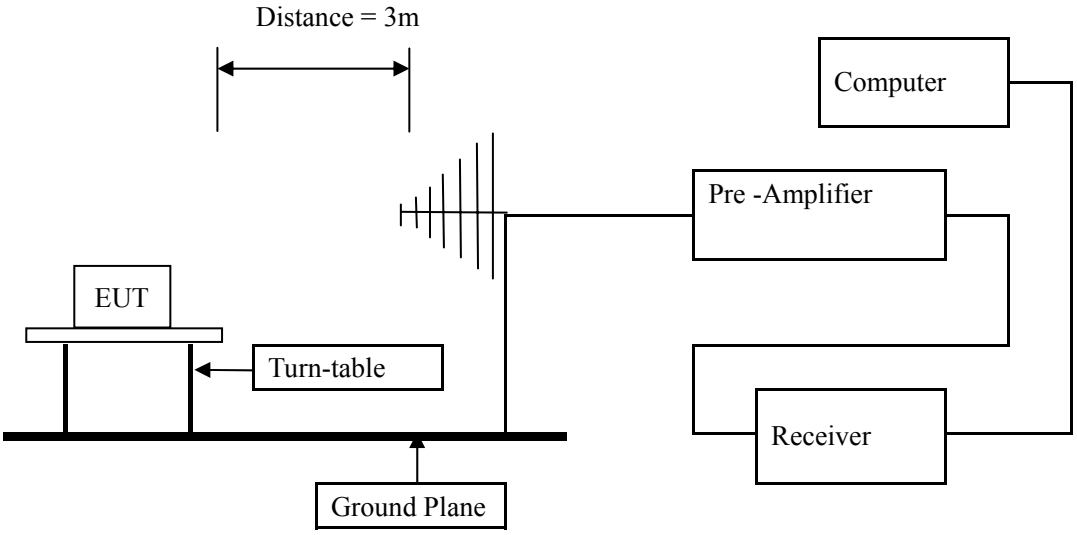
(2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2009.

(3) The frequency spectrum from 30 MHz to 25 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. All readings are above 1 GHz, peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.

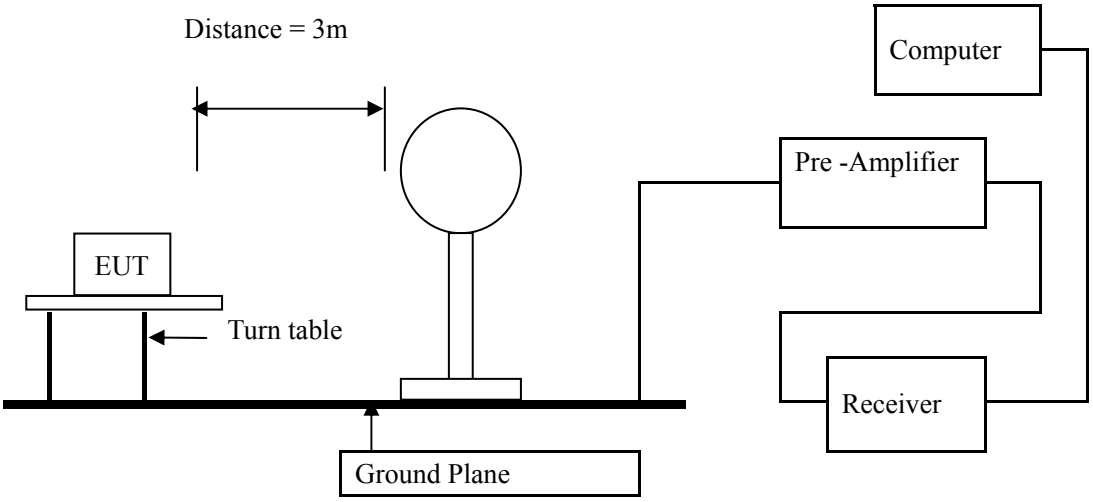
(4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.

(5) The antenna polarization: Vertical polarization and Horizontal polarization.

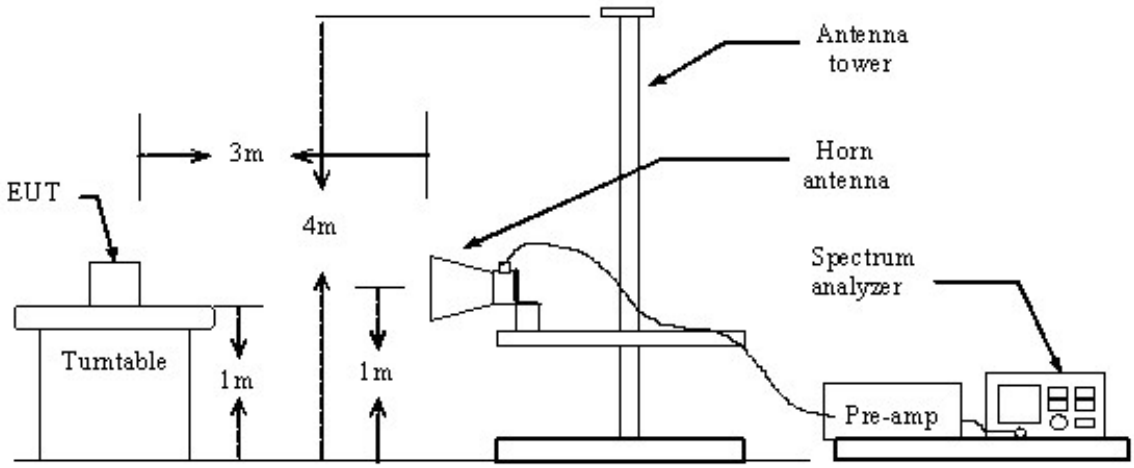
Block diagram of Test setup



Block diagram of Test setup for frequency below 30MHz



Block diagram of Test setup for frequency above 1GHz



13.1.2 EUT Operating Condition

Operating condition is according to ANSI C63.10 -2009

13.1.3 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequencies in restricted band are complied to limit on Paragraph 15.209.

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
0.009-0.490	3	20log 2400/F (kHz) + 80
0.490-1.705	3	20log 24000/F (kHz) + 40
1.705-30	3	20log 30 + 40
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. In the Above Table, the tighter limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT

4. This is a handhold device. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.

5. All scanning using PK detector. And the final emission level was get using QP detector for frequency range from 30-1000MHz.As to 1G-25G, the final emission level got using PK and AV detector.

6. If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula Ld1 = Ld2 * (d2/d1)

13.1.4 Photo documentation of the test set-up

Please refer to the Section 16

13.1.5 Test Equipment:

Please refer to the Section 2

13.1.6 Test specification:

Environmental conditions: Temperature 23° C Humidity: 50% Atmospheric pressure: 103kPa

13.1.7 Test result

A Radiated Emission (9 kHz----30 MHz)

Note: 1) Emission Level=Reading+ Cable loss+ Antenna factor-Amp factor
2) The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

Result: Pass

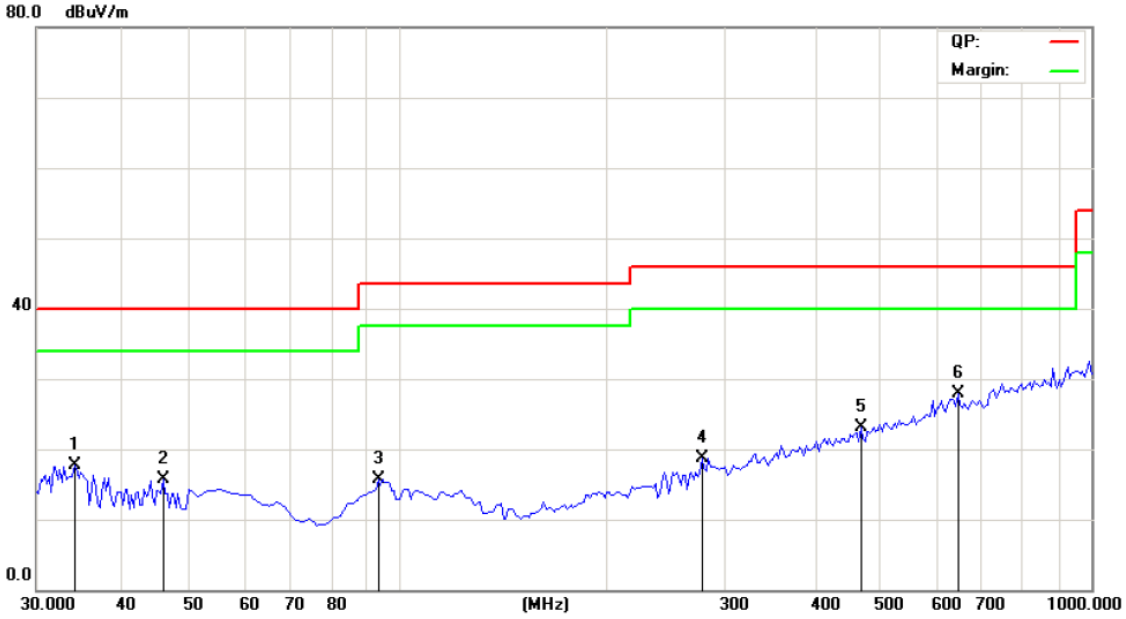
Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
--	--	V	--
--	--	H	--
--	--	V	--
--	--	H	--

B. **General Radiated Emissions Data**

Radiated Emission In Horizontal (30MHz----1000MHz)

Please refer to following diagram for individual

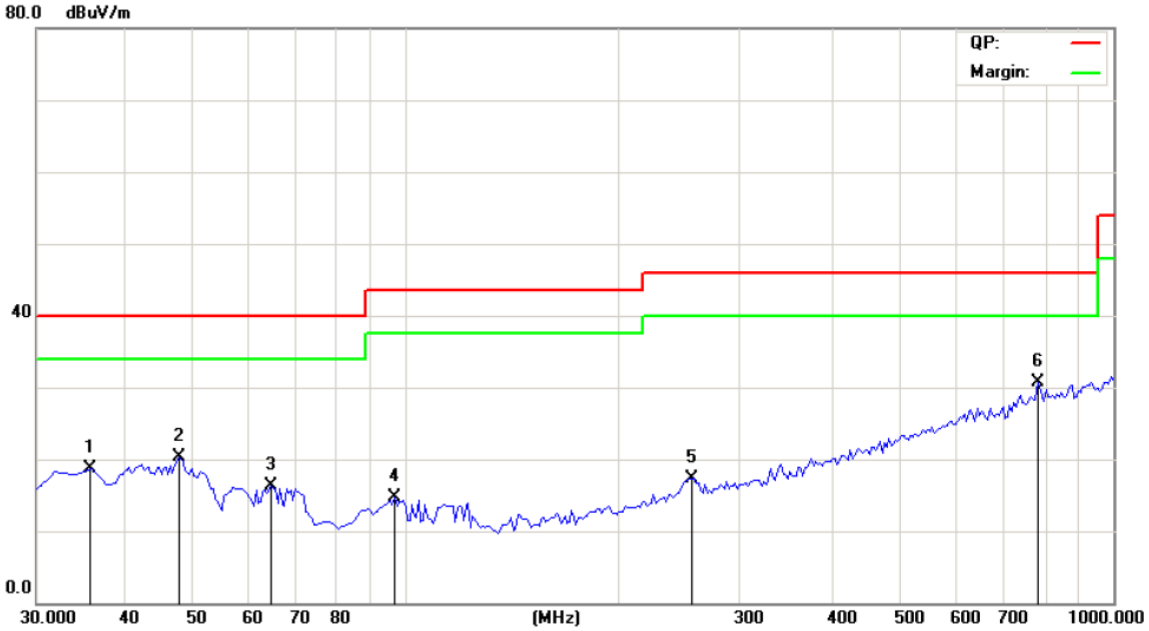
High channel: 2480 MHz



Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
34.044	17.79	H	40.00
45.733	15.65	H	40.00
94.148	15.76	H	43.50
274.929	18.73	H	46.00
467.374	23.01	H	46.00
642.324	27.81	H	46.00

Radiated Emission In Vertical (30MHz----1000MHz)

Please refer to following diagram for individual
High channel: 2480 MHz



Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
35.831	18.76	V	40.00
47.702	20.30	V	40.00
64.531	16.39	V	40.00
96.323	14.67	V	43.50
255.491	17.40	V	46.00
786.172	30.70	V	46.00

Note: Measurements were conducted in all three channels (high, middle, low), and the worst case (high channel) was submitted only.

C Fundamental & Harmonics Radiated Emission Data (1000MHz-25000MHz)

Modulation Type: GFSK

Low channel: 2402 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1301.60	H	50.31	---	-4.20	46.11	---	74.00	54.00	-7.89
4804.00	H	52.42	---	-3.94	48.48	---	74.00	54.00	-5.52
5600.00	H	49.57	---	-2.83	46.74	---	74.00	54.00	-7.26
7206.00	H	47.15	---	0.52	47.67	---	74.00	54.00	-6.33
16814.00	H	41.24	---	6.73	47.97	---	74.00	54.00	-6.03
24020.00	H	39.93	---	8.11	48.04	---	74.00	54.00	-5.96
1308.10	V	51.28	---	-4.25	47.03	---	74.00	54.00	-6.97
4804.00	V	51.85	---	-3.94	47.91	---	74.00	54.00	-6.09
5624.60	V	49.23	---	-2.87	46.36	---	74.00	54.00	-7.64
7206.00	V	44.11	---	0.52	44.63	---	74.00	54.00	-9.37
16814.00	V	39.05	---	6.73	45.78	---	74.00	54.00	-8.22
24020.00	V	41.71	---	8.11	49.82	---	74.00	54.00	-4.18

Notes: 1. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3. Average test would be performed if the peak readings were greater than the average limit.

4. Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5. Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6. Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

Middle channel: 2441 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1301.80	H	50.26	---	-4.20	46.06	---	74.00	54.00	-7.94
4882.00	H	51.74	---	-3.98	47.76	---	74.00	54.00	-6.24
5600.00	H	50.01	---	-2.83	47.18	---	74.00	54.00	-6.82
7323.00	H	46.93	---	0.57	47.50	---	74.00	54.00	-6.50
17087.00	H	43.18	---	6.79	49.97	---	74.00	54.00	-4.03
24410.00	H	41.38	---	8.16	49.54	---	74.00	54.00	-4.46
1308.20	V	50.26	---	-4.25	46.01	---	74.00	54.00	-7.99
4804.00	V	51.48	---	-3.98	47.50	---	74.00	54.00	-6.50
5624.60	V	49.37	---	-2.87	46.50	---	74.00	54.00	-7.50
7206.00	V	46.18	---	0.57	46.75	---	74.00	54.00	-7.25
17087.00	V	40.48	---	6.79	47.27	---	74.00	54.00	-6.73
24410.00	V	39.95	---	8.16	48.11	---	74.00	54.00	-5.89

Notes: 1. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3. Average test would be performed if the peak result were greater than the average limit.

4. Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5. Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6. Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

High channel: 2480 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1301.8	H	50.32	---	-4.20	46.12	---	74.00	54.00	-7.88
4960.00	H	51.62	---	-3.98	47.64	---	74.00	54.00	-6.36
5600.00	H	50.93	---	-2.83	48.10	---	74.00	54.00	-5.90
7440.00	H	47.27	---	0.57	47.84	---	74.00	54.00	-6.16
17360.00	H	41.64	---	6.79	48.43	---	74.00	54.00	-5.57
24800.00	H	40.11	---	8.16	48.27	---	74.00	54.00	-5.73
1308.20	V	49.93	---	-4.25	45.68	---	74.00	54.00	-8.32
4804.00	V	49.36	---	-3.98	45.38	---	74.00	54.00	-8.62
5624.60	V	48.66	---	-2.87	45.79	---	74.00	54.00	-8.21
7440.00	V	47.89	---	0.57	48.46	---	74.00	54.00	-5.54
17360.00	V	40.24	---	6.79	47.03	---	74.00	54.00	-6.97
24800.00	V	39.81	---	8.16	47.97	---	74.00	54.00	-6.03

Notes: 1. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3. Average test would be performed if the peak result were greater than the average limit.

4. Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5. Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6. Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

D Fundamental & Harmonics Radiated Emission Data (1000MHz-25000MHz)

Modulation Type: 8-DPSK

Low channel: 2402 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1301.60	H	50.42	---	-4.20	46.22	---	74.00	54.00	-7.78
4804.00	H	53.12	---	-3.94	49.18	---	74.00	54.00	-4.82
5600.00	H	50.13	---	-2.83	47.30	---	74.00	54.00	-6.70
7206.00	H	47.21	---	0.52	47.73	---	74.00	54.00	-6.27
16814.00	H	41.68	---	6.73	48.41	---	74.00	54.00	-5.59
24020.00	H	40.65	---	8.11	48.76	---	74.00	54.00	-5.24
1308.10	V	52.06	---	-4.25	47.81	---	74.00	54.00	-6.19
4804.00	V	52.43	---	-3.94	48.49	---	74.00	54.00	-5.51
5624.60	V	48.93	---	-2.87	46.06	---	74.00	54.00	-7.94
7206.00	V	44.12	---	0.52	44.64	---	74.00	54.00	-9.36
16814.00	V	40.51	---	6.73	47.24	---	74.00	54.00	-6.76
24020.00	V	42.38	---	8.11	50.49	---	74.00	54.00	-3.51

Notes: 1. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3. Average test would be performed if the peak readings were greater than the average limit.

4. Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5. Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6. Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

Middle channel: 2441 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1301.80	H	50.09	---	-4.20	45.89	---	74.00	54.00	-8.11
4882.00	H	52.66	---	-3.98	48.68	---	74.00	54.00	-5.32
5600.00	H	51.75	---	-2.83	48.92	---	74.00	54.00	-5.08
7323.00	H	47.83	---	0.57	48.40	---	74.00	54.00	-5.60
17087.00	H	43.23	---	6.79	50.02	---	74.00	54.00	-3.98
24410.00	H	41.04	---	8.16	49.20	---	74.00	54.00	-4.80
1308.20	V	50.26	---	-4.25	46.01	---	74.00	54.00	-7.99
4804.00	V	52.23	---	-3.98	48.25	---	74.00	54.00	-5.75
5624.60	V	49.52	---	-2.87	46.65	---	74.00	54.00	-7.35
7206.00	V	46.41	---	0.57	46.98	---	74.00	54.00	-7.02
17087.00	V	42.94	---	6.79	49.73	---	74.00	54.00	-4.27
24410.00	V	42.05	---	8.16	50.21	---	74.00	54.00	-3.79

Notes: 1. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3. Average test would be performed if the peak result were greater than the average limit.

4. Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5. Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6. Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

High channel: 2480 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1301.8	H	51.23	---	-4.20	47.03	---	74.00	54.00	-6.97
4960.00	H	52.47	---	-3.98	48.49	---	74.00	54.00	-5.51
5600.00	H	52.17	---	-2.83	49.34	---	74.00	54.00	-4.66
7440.00	H	48.64	---	0.57	49.21	---	74.00	54.00	-4.79
17360.00	H	42.42	---	6.79	49.21	---	74.00	54.00	-4.79
24800.00	H	41.05	---	8.16	49.21	---	74.00	54.00	-4.79
1308.20	V	50.73	---	-4.25	46.48	---	74.00	54.00	-7.52
4804.00	V	51.28	---	-3.98	47.30	---	74.00	54.00	-6.70
5624.60	V	49.73	---	-2.87	46.86	---	74.00	54.00	-7.14
7440.00	V	48.66	---	0.57	49.23	---	74.00	54.00	-4.77
17360.00	V	41.92	---	6.79	48.71	---	74.00	54.00	-5.29
24800.00	V	41.83	---	8.16	49.99	---	74.00	54.00	-4.01

Notes: 1. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3. Average test would be performed if the peak result were greater than the average limit.

4. Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5. Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6. Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

14.0 Antenna Requirement

14.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

14.2 Antenna Specification

According to the manufacturer declared, the EUT has a PCB printed antenna; the directional gain of antenna is 2.5 dBi, and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

15.0 Maximum Permissible Exposure

Applicable Standard
According to §1.1307(b)(5), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline. This is a Portable device.

Remark: 1. The maximum output power is 1.92 dBm (1.556mW) at 2402MHz,(with 1.79 numeric antenna gain.)
2. DXX device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.
3. For mobile or fixed location transmitters, no SAR consideration applied. The minimum separation generally be used is at least 20cm, even if the calculation indicate that the MPE distance would be lesser.

Calculation

Given $E = \sqrt{\frac{30 \times P \times G}{d}}$ & $S = \frac{E^2}{3770}$

Where *E = Field Strength in Volts / meter*
P = Power in Watts
G=Numeric antenna gain
d=Distance in meters
S=Power Density in milliwatts / square centimeter

Maximum Permissible Exposure
EUT output power=1.556mW
Numeric Antenna gain=1.79
Substituting the MPE safe distance using d=20cm into above equation.
Yields:
*S=0.000199*P*G*
Where *P=Power in mW*
G=Numeric antenna gain
S=Power density in mW/cm^2

→ *Power density=0.00055426mW/cm^2*

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm^2 even if the calculation indicates that the power density would be larger.)

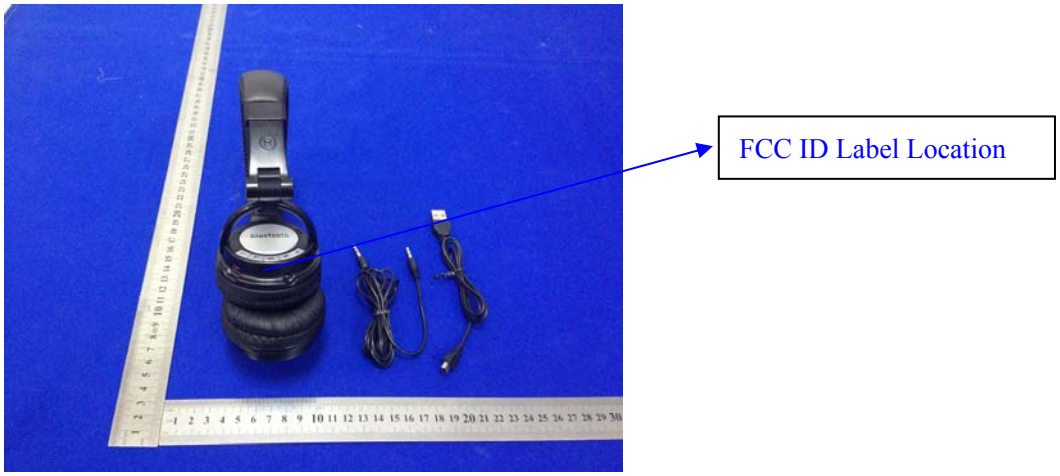
16.0 FCC ID Label

FCC ID: QQABH939

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

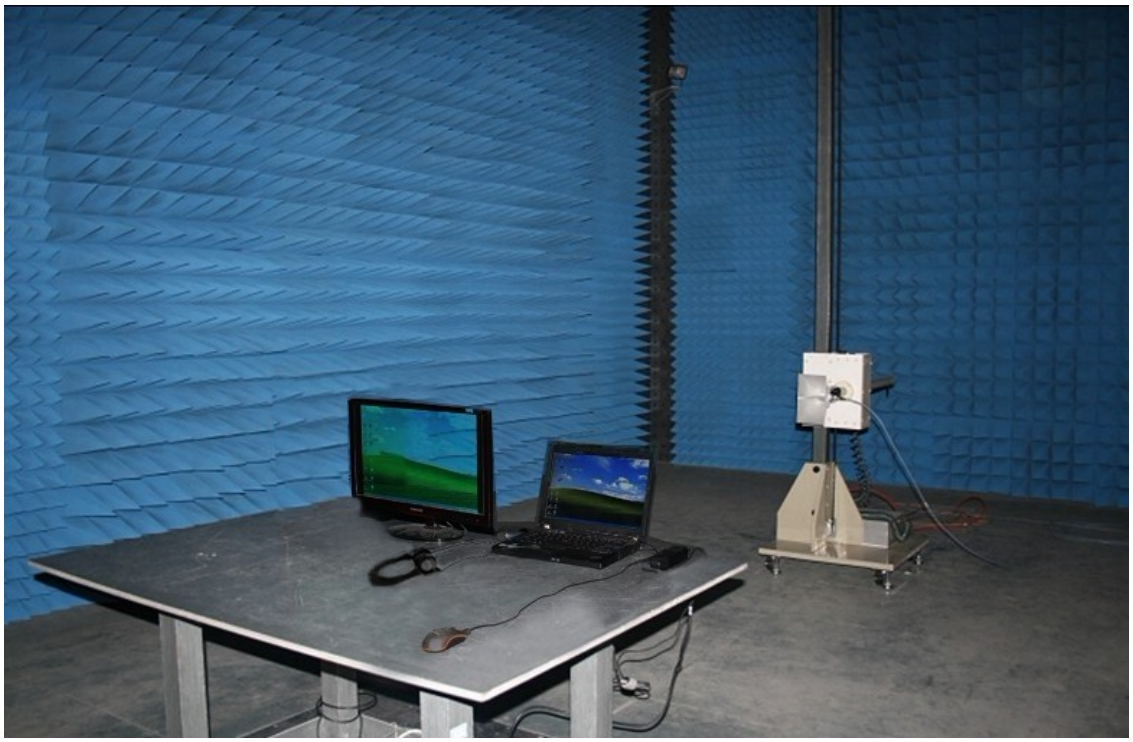
Mark Location:



17.0 Photos of testing

17.1 Conducted test View

17.2 Radiated emission test view

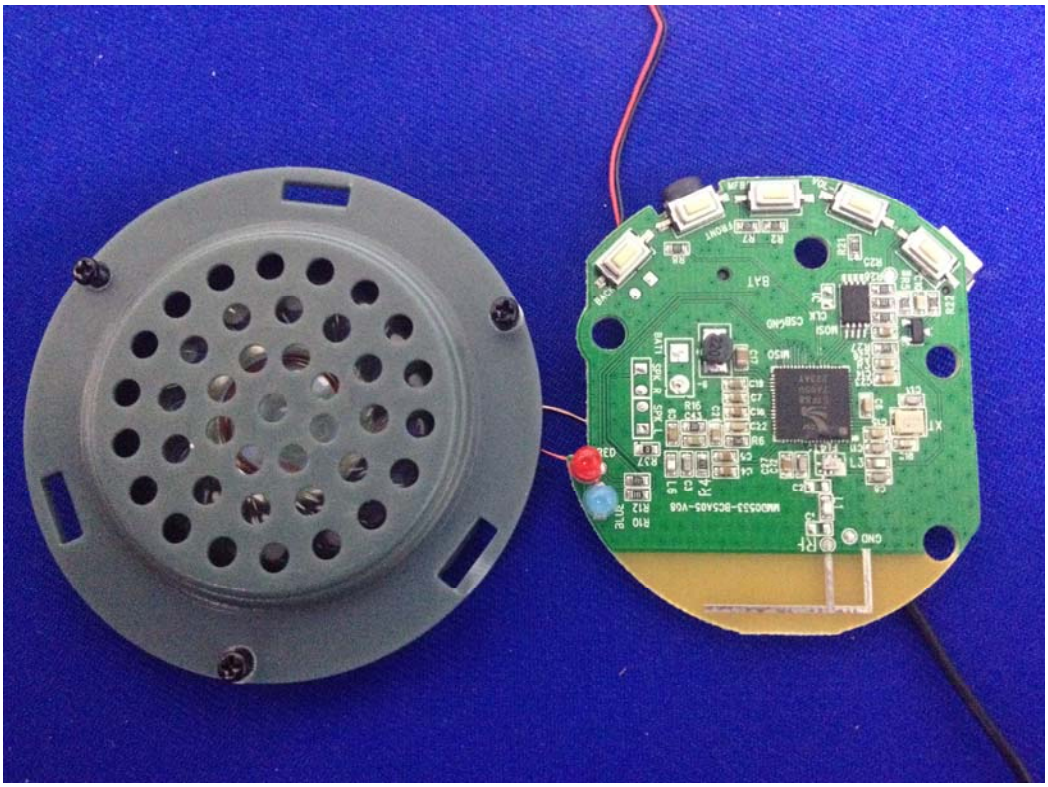


18.0 Photos for the EUT

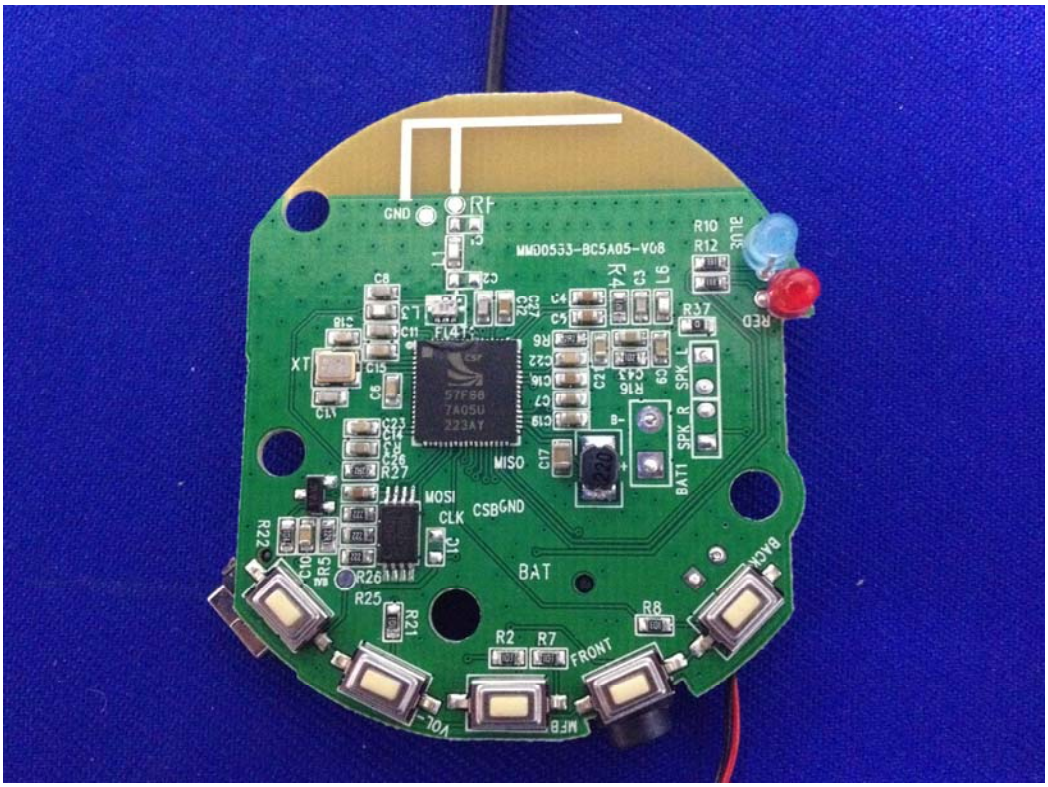
Outside View of the EUT

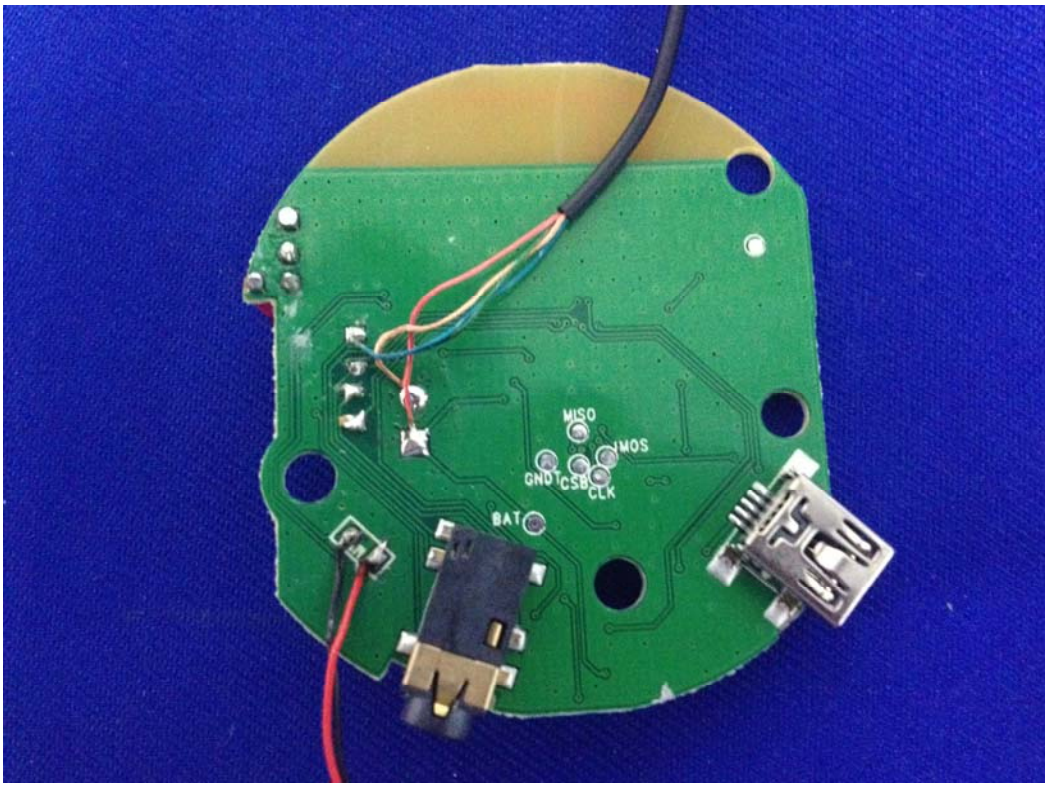
Outside View of the EUT

Inside View of the EUT



Inside View of the EUT





--End of the report--