TEST REPORT

Product	:	Fall Warner with Pedometer Function
Trade mark	:	MED LINKET®
Model/Type reference	:	FA101
Serial number	:	N/A
FCC ID	:	2ADMM-FA101
Report number	:	EESZG07140017-1
Date of issue	:	Nov. 18, 2014
Test standards	:	47 CFR FCC Part 15.247: 2013
Test result	:	PASS

Prepared for:

Shenzhen Med-link Electronics Tech Co., Ltd.
Building 2, HuaFu Industrial, HuaWang Road, DaLang, LongHua District, 518109 Shenzhen City, P.R.China

Prepared by:

Centre Testing International (Shenzhen) Corporation
Hongwei Industrial Zone, 70 Area, Bao'an District, Shenzhen, Guangdong, China
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Tested by: Reviewed by:

Approved by: Louisa Lu Date: Nov. 18, 2014

Louisa Lu
Lab supervisor

Check No.: 1702033169

1. Test Summary

Test Item	Test Requirement	Result
Antenna Requirement	FCC Part 15.203/15.247 (c)	PASS
AC Power Line Conducted Emission	FCC Part 15.207	PASS
Conducted Peak Output Power	FCC Part 15.247 (b)(1)	PASS
20dB Occupy Bandwidth	FCC Part 15.247 (a)(1)	PASS
Carrier Frequencies Separation	FCC Part 15.247 (a)(1)	PASS
Hopping Channel Number	FCC Part 15.247 (b)	PASS
Dwell Time	FCC Part 15.247 (a)(1)	PASS
Pseudorandom Frequency Hopping Sequence	FCC Part 15.247(b)(4) &TCB Exclusion List (7 July 2002)	PASS
Band-edge for RF Conducted Emissions	FCC Part 15.247(d)	PASS
RF Conducted Spurious Emissions	FCC Part 15.247(d)	PASS
Radiated Spurious/ Bandage emissions	FCC 15.205/15.209	PASS

2. Contents

3. General Information

3.1 Client Information

Applicant:	Shenzhen Med-link Electronics Tech Co., Ltd.
Address of Applicant:	Building 2, HuaFu Industrial, HuaWang Road, DaLang, LongHua District, 518109 Shenzhen City, P.R.China
Manufacturer:	Shenzhen Med-link Electronics Tech Co., Ltd.
Address of Manufacturer:	Building 2, HuaFu Industrial, HuaWang Road, DaLang, LongHua District, 518109 Shenzhen City, P.R.China

3.2 General Description of EUT

Product:	Fall Warner with Pedometer Function
Model/Type reference:	FA101
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	2.1
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Sample Type:	Portable production
Antenna Type:	Integral
Antenna Gain:	0dBi
Ratings:	Charging input: DC5V, 1A lithium Battery: DC3.7V, 380mAh, IPX0, Class III
Test Voltage:	DC 3.7V
Sample Received Date:	Jul. 18, 2014
Sample tested Date:	Jul. 18, 2014 to Nov. 18, 2014

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

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

Channel	Frequency
The Lowest channel	2402MHz
The Middle channel	2441MHz
The Highest channel	2480MHz

3.3 Test Environment

Operating Environment:	
Temperature:	22.0°C
Humidity:	52% RH
Atmospheric Pressure:	101kPa

3.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Remark
Notebook	DELL	Vostro 3400	FCC DOC
Mouse	L.Selectron	M004	FCC DOC

3.5 Test Location

Centre Testing International (Shenzhen) Corporation
Hongwei Industrial Zone, 70 Area, Bao'an District, Shenzhen, Guangdong, China
TEL: +86-755-3368 3668
FAX: +86-755-3368 3385
No tests were sub-contracted.

3.6 Test Facility

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

CNAS-Lab Code: L1910
Centre Testing International (Shenzhen) Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories. .

A2LA-Lab Cert. No. 3061.01
Centre Testing International (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 756231
Centre Testing International (Shenzhen) Co., Ltd. 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 756231.

IC-Registration No.: 7408A
The 3m Alternate Test Site of Centre Testing International (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408A.

IC-Registration No.: 7408B
The 10m Alternate Test Site of Centre Testing International (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408B.

NEMKO-Aut. No.: ELA503
Centre Testing International (Shenzhen) Co., Ltd. has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10.

VCCI
The Radiation 3 &10 meters site of Centre Testing International (Shenzhen) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-4096.

Main Ports Conducted Interference Measurement of Centre Testing International (Shenzhen) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-4563.

Telecommunication Ports Conducted Disturbance Measurement of Centre Testing International (Shenzhen) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-2146.

Radiated Emission from 1GHz to 6GHz VCCI Registration No. is G-758.

3.7 Deviation from Standards

None

3.8 Abnormalities from Standard Conditions

None

3.9 Other Information Requested by the Customer

None

3.10 Equipment List

Equipment	Manufacturer	Model	Serial No.	Due Date
3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	07/12/2016
Spectrum Analyzer	Agilent	E4443A	MY45300910	01/15/2015
Receiver	R&S	ESCI	100435	07/19/2015
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	618	06/25/2015
Multi device Controller	ETS-LINGREN	2090	00057230	N/A
Horn Antenna	ETS-LINGREN	3117	00057407	07/19/2015
Microwave Preamplifier	Agilent	8449B	3008A02425	03/19/2015
Spectrum Analyzer	R&S	FSP40	100416	07/06/2015
Receiver	R&S	ESCI	100009	07/19/2015
LISN	R&S	ENV216	100098	07/19/2015

4. Test results and Measurement Data

4.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203 /247(c)

15.203 requirement:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:
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.

EUT Antenna:
The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.

4.2 Conducted Emissions

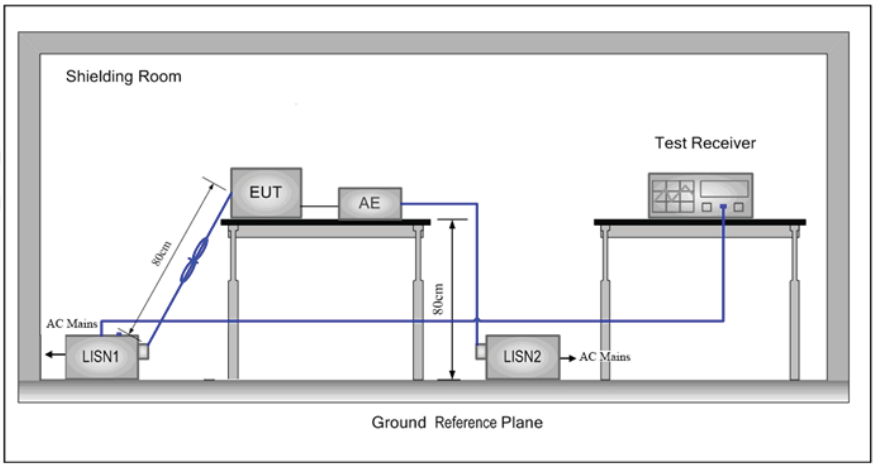
Standard requirement:	47 CFR Part 15C Section 15.207
Test Method:	ANSI C63.10: 2009 ANSI C63.4: 2009
Test Frequency Range:	150kHz to 30MHz

Limit:

Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56*	56 to 46*
0,50 to 5	56	46
5 to 30	60	50

* Decreases with the logarithm of the frequency.

Test Setup:



Test Procedure:

1. The mains terminal disturbance voltage test was conducted in a shielded room.

2. The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

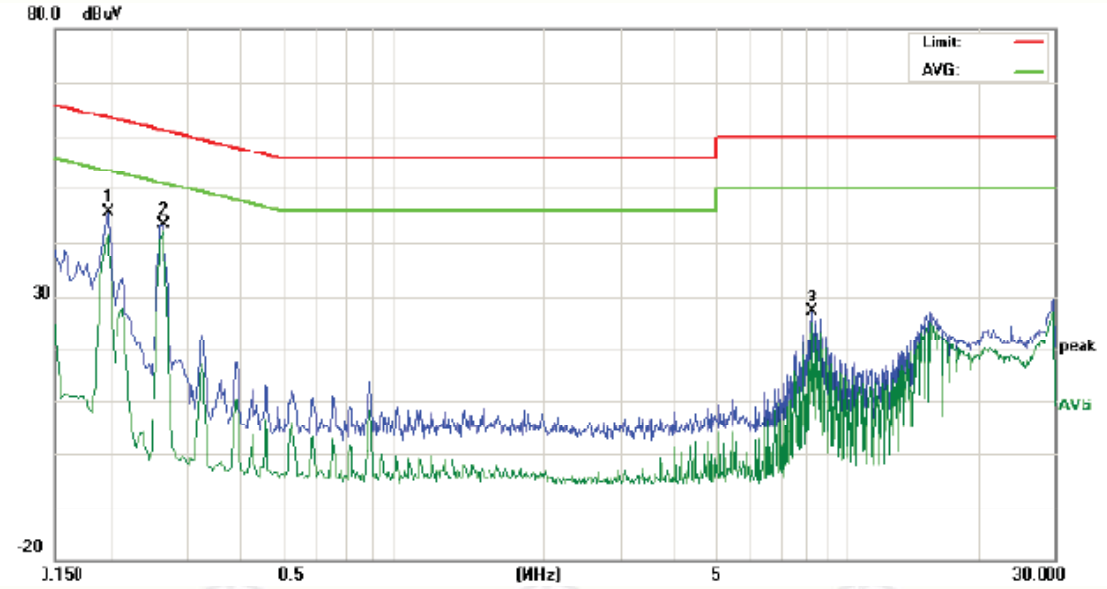
4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment were at least 0.8 m from the LISN 2.

5. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2009 on conducted measurement.

Measurement Data:

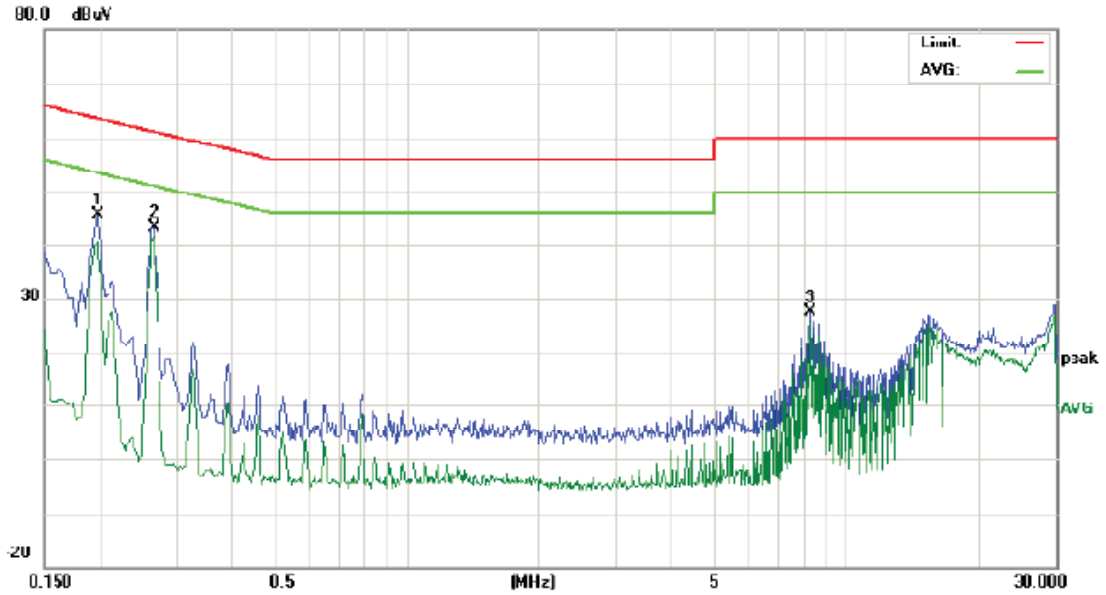
Product	:	Fall Warner with Pedometer Function	**Model/Type reference**	:	FA101
Power	:	DC 5V	**Temperature**	:	22℃
Mode	:	Keeping TX + Charging	**Humidity**	:	52%

L:



No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.1980	35.93	34.58	30.35	9.80	45.73	44.38	40.15	63.69	53.69	-19.31	-13.54	P	
2	0.2660	33.64	32.24	31.94	9.80	43.44	42.04	41.74	61.24	51.24	-19.20	-9.50	P	
3	8.2860	17.07	16.40	15.15	10.00	27.07	26.40	25.15	60.00	50.00	-33.60	-24.85	P	

N:

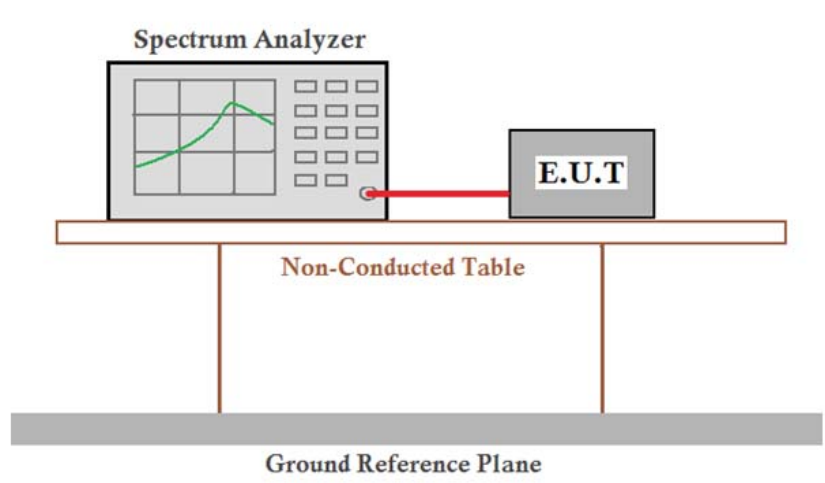


No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.1980	35.95	34.57	30.33	9.80	45.75	44.37	40.13	63.69	53.69	-19.32	-13.56	P	
2	0.2660	33.57	32.19	31.86	9.80	43.37	41.99	41.66	61.24	51.24	-19.25	-9.58	P	
3	8.2820	17.63	16.38	15.82	10.00	27.63	26.38	25.82	60.00	50.00	-33.62	-24.18	P	

4.3 Conducted Peak Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (b)(1)
Test Method:	ANSI C63.10:2009
Limit:	21dBm
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type.

Test Setup:



Remark: Offset the High-Frequency cable loss 0.5dB in the spectrum analyzer.

Test Procedure:

1. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.

2. Set to the maximum power setting and enable the EUT transmit continuously.

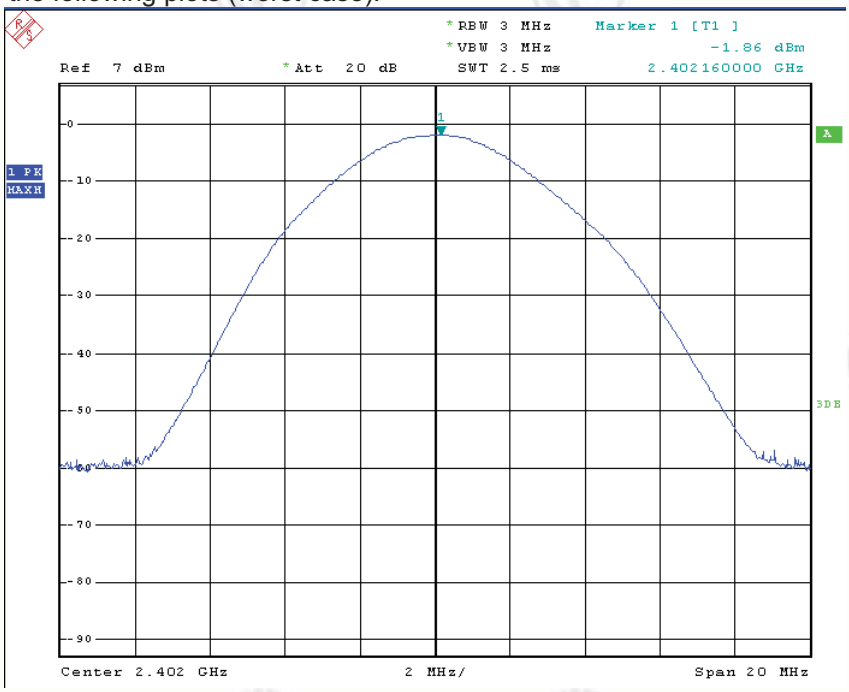
3. Measure the conducted output power with cable loss and record the results in the test report.

4. Measure and record the results in the test report.

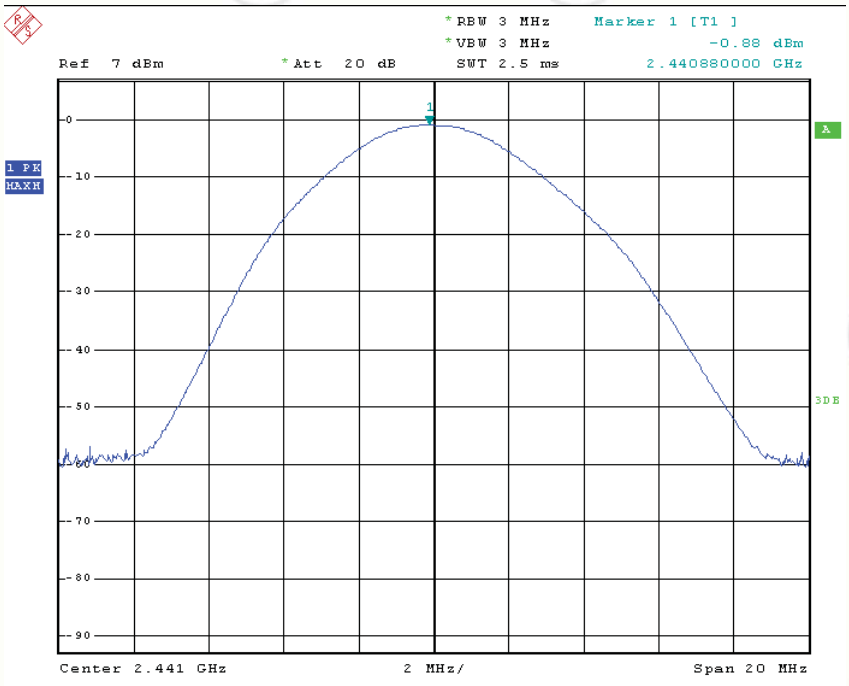
Measurement Data:

Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)	Result
2402	-1.86	21	Pass
2441	-0.88	21	Pass
2480	-1.99	21	Pass

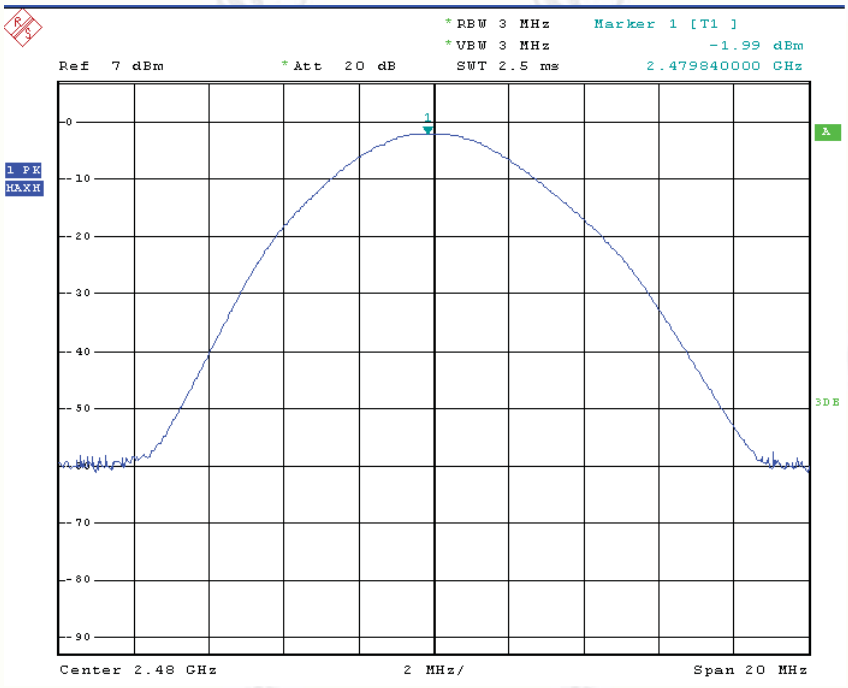
Please see the following plots (worst case):



2402MHz



2441MHz

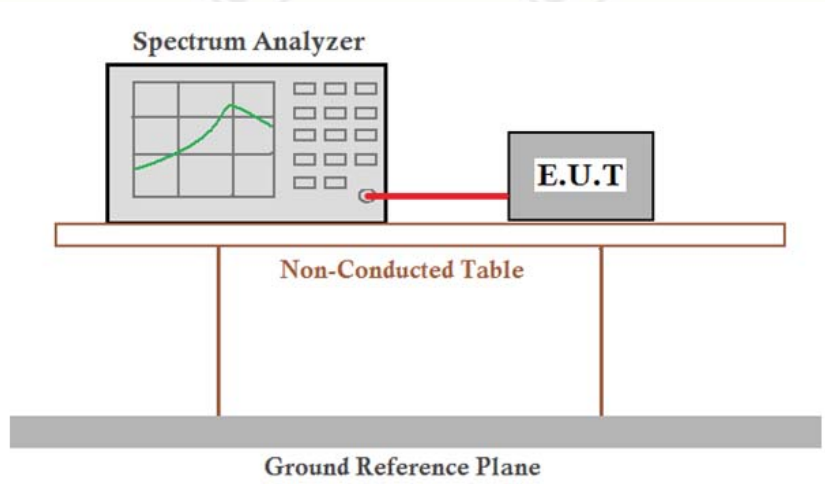

RBW 3 MHz
VBW 3 MHz
SWT 2.5 ms
Marker 1 [T1]
-1.99 dBm
2.479840000 GHz
Ref 7 dBm
Att 20 dB
1 PK
MAXH
A
3DB
0
10
20
30
40
50
70
80
90
Center 2.48 GHz
2 MHz/
Span 20 MHz

2480MHz

4.4 20dB Occupy Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2009
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type.

Test Setup:



Test Procedure:
1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.

2. Set to the maximum power setting and enable the EUT transmit continuously.

3. Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; RBW ≥ 1% of the 20 dB bandwidth; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.

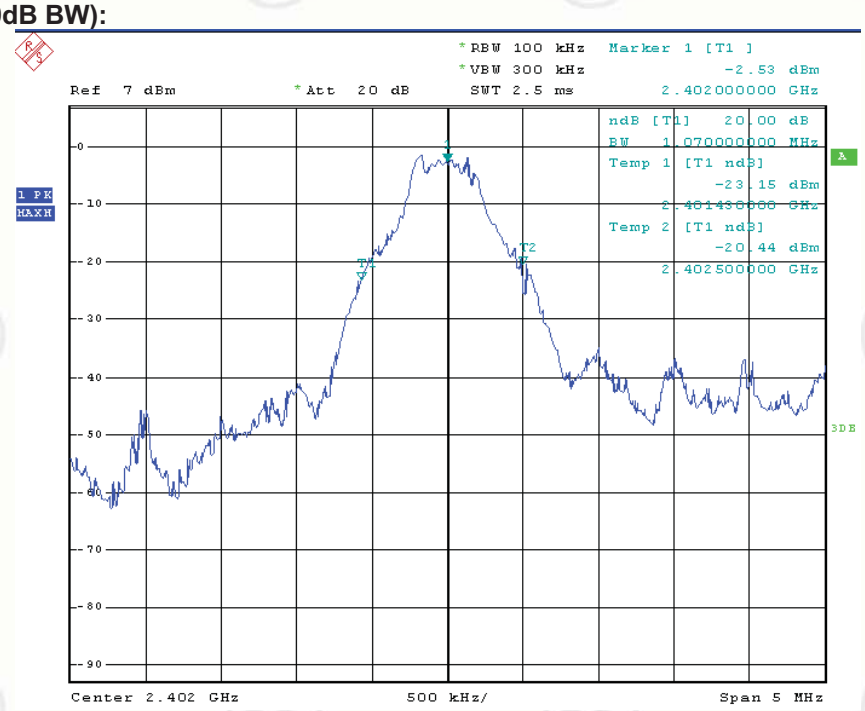
4. Measure and record the results in the test report.

Measurement Data:
The test data of worst case are below:
GFSK:

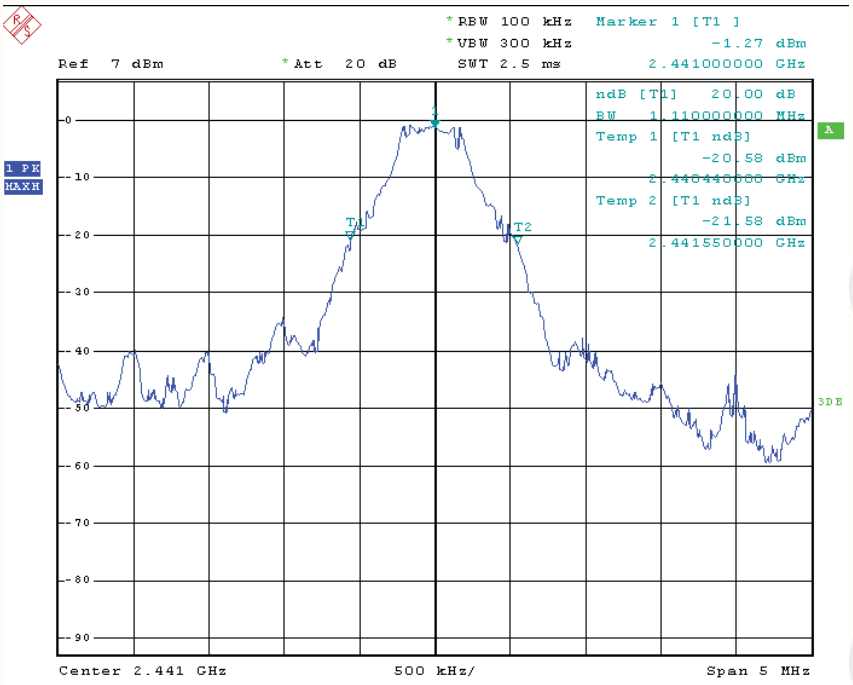
Frequency (MHz)	20dB BW (MHz)
2402	1.07
2441	1.11
2480	1.09

Please see the following plots (worst case):

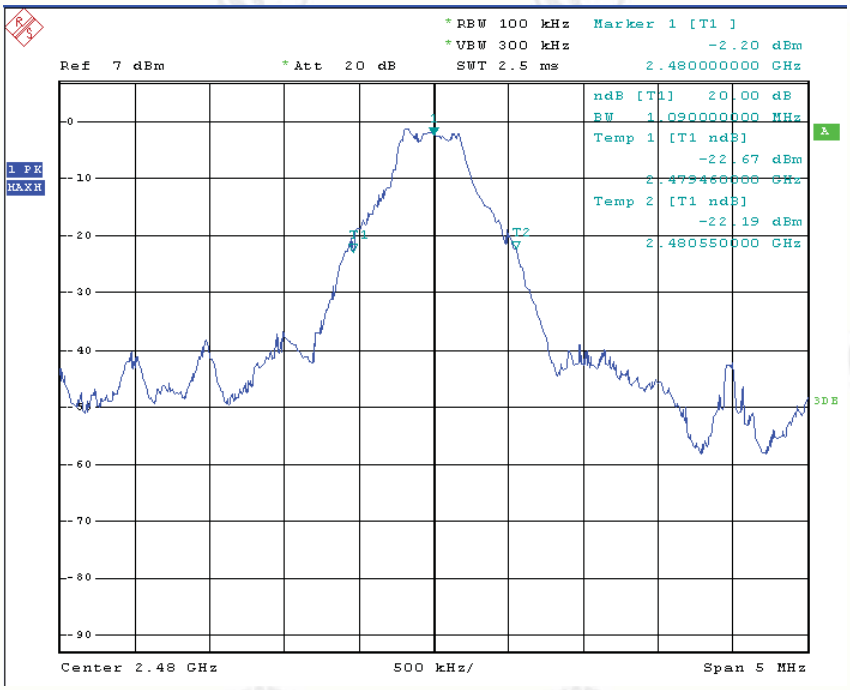
GFSK (20dB BW):



2402 MHz



2441 MHz

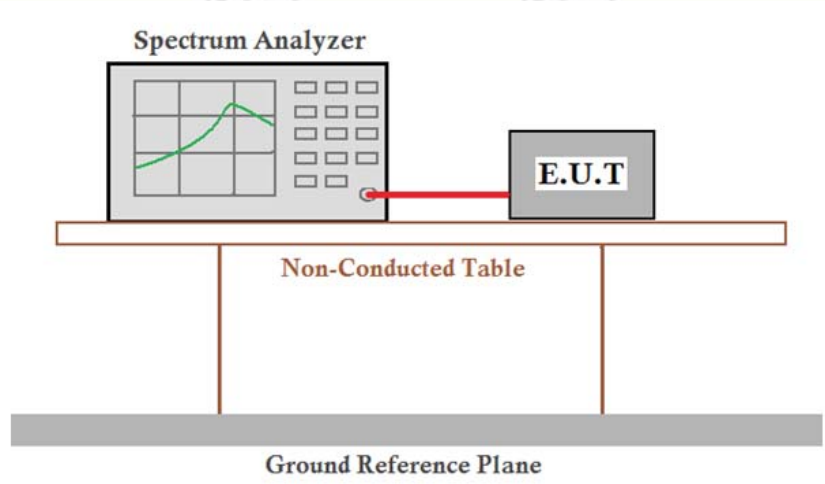

RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
Marker 1 [T1]
-2.20 dBm
2.480000000 GHz
Ref 7 dBm
Att 20 dB
ndB [T1] 20.00 dB
BW 1.090000000 MHz
Temp 1 [T1 ndB]
-22.67 dBm
2.479460000 GHz
Temp 2 [T1 ndB]
-22.19 dBm
2.480550000 GHz
1 PK
MAXH
T1
T2
3DB
Center 2.48 GHz
500 kHz/
Span 5 MHz

2480 MHz

4.5 Carrier Frequencies Separation

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2009
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type.

Test Setup:



Test Procedure:
1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.

2. Set to the maximum power setting and enable the EUT transmit continuously.

3. Enable the EUT hopping function.

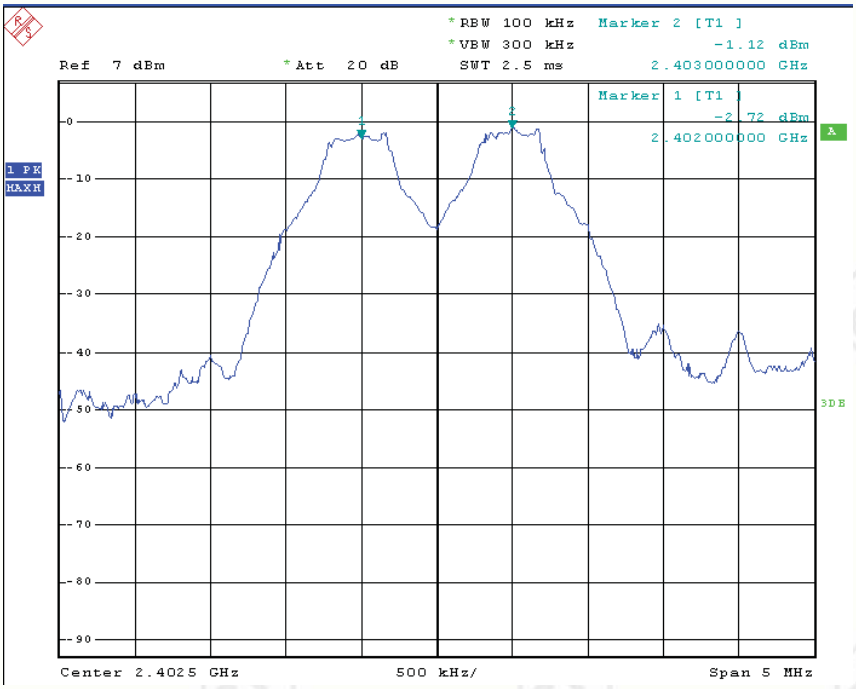
4. Use the following spectrum analyzer settings: Span = wide enough to capture the peaks of two adjacent channels; RBW ≥ 1% of the span; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.

5. Measure and record the results in the test report.

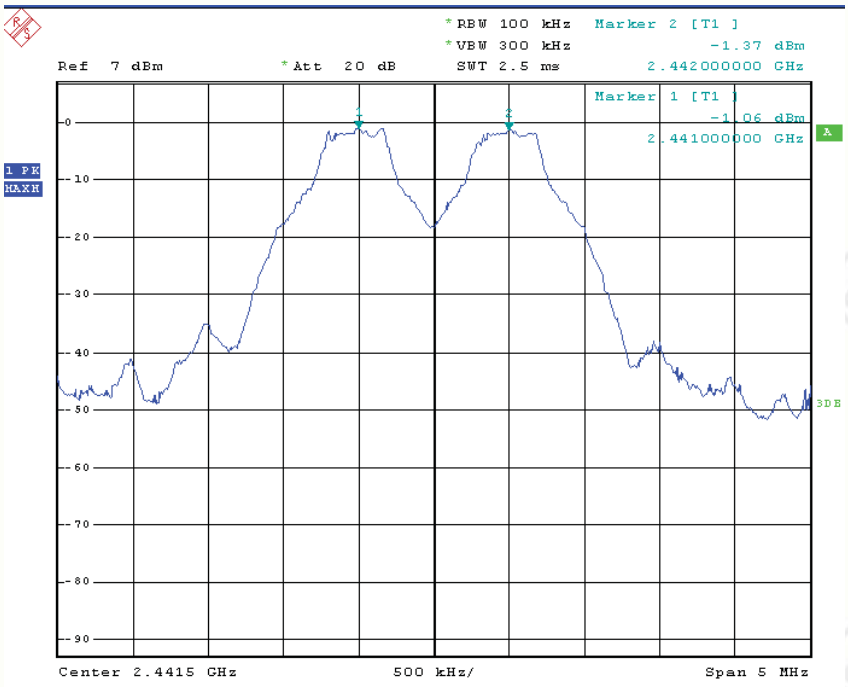
Measurement Data:
Carrier Frequency Separation: 1 MHz

Please see the following plots (worst case):

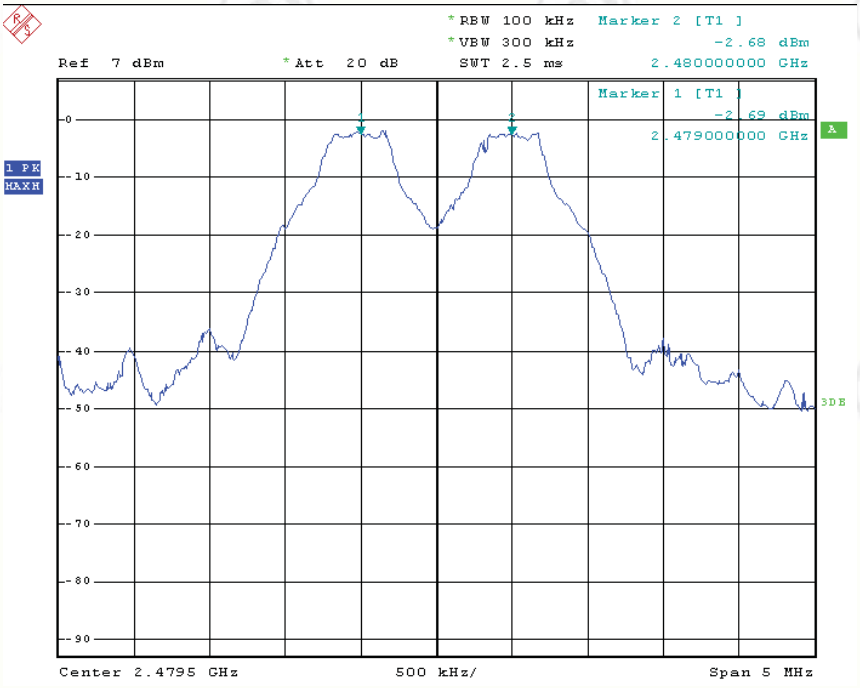
GFSK:



Low channel



Middle channel

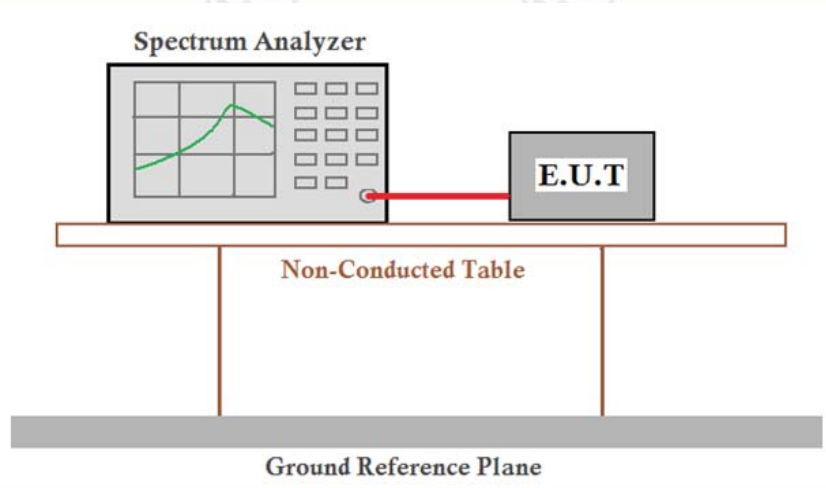


High channel

4.6 Hopping Channel Number

Test Requirement:	47 CFR Part 15C Section 15.247 (b)
Test Method:	ANSI C63.10:2009
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type.

Test Setup:



Test Procedure:
1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.

2. Set to the maximum power setting and enable the EUT transmit continuously.

3. Enable the EUT hopping function.

4. Use the following spectrum analyzer settings: Span = the frequency band of operation; RBW ≥ 1% of the span; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.

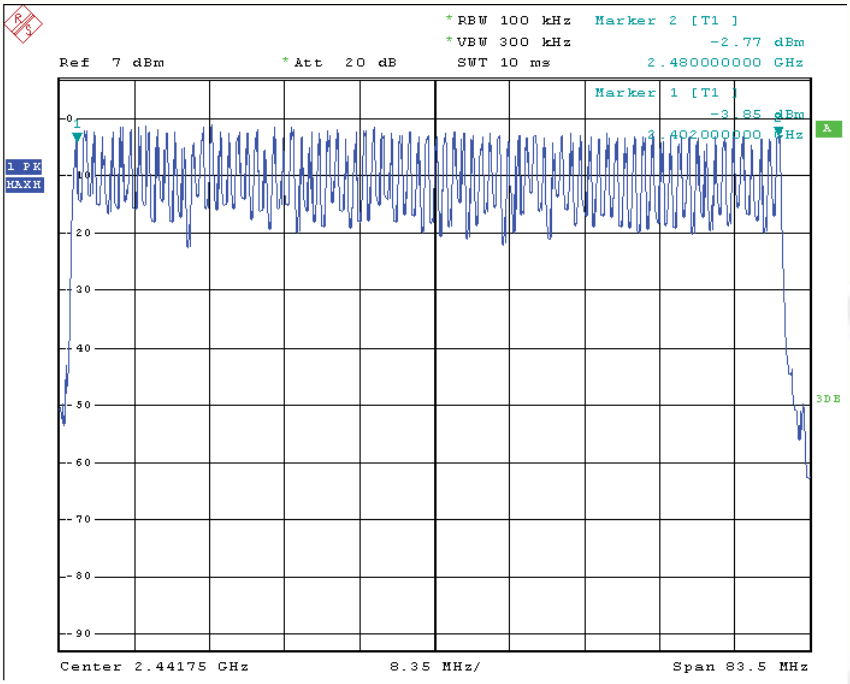
5. The number of hopping frequency used is defined as the number of total channel.

6. Record the measurement data derived from spectrum analyzer.

Measurement Data:
Number of Hopping Frequency is 79, with frequency space = 1MHz.

Please see the following plots (worst case):

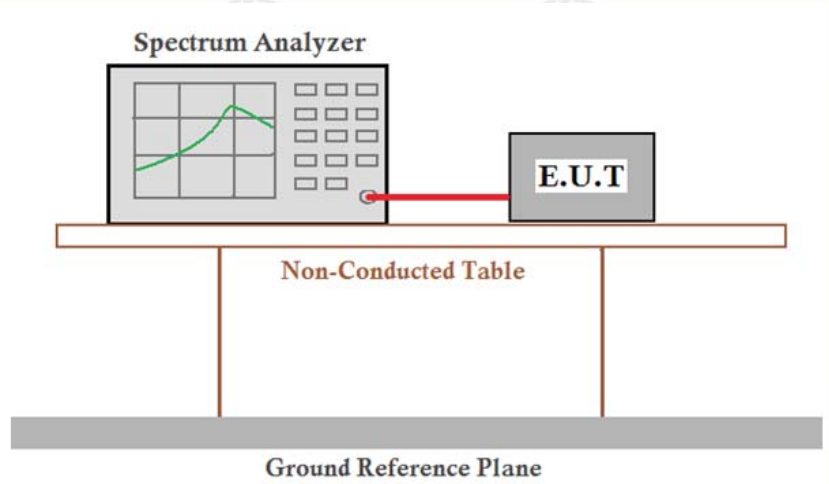
GFSK:



4.7 Dwell Time

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2009
Test Mode:	Hopping transmitting with all kind of modulation and all kind of data type.
Limit:	≤0.4 Second

Test Setup:



Test Procedure:

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.

2. Set to the maximum power setting and enable the EUT transmit continuously.

3. Enable the EUT hopping function.

4. Use the following spectrum analyzer settings: Span = zero span, centred on a hopping channel; RBW = 1 MHz; VBW ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.

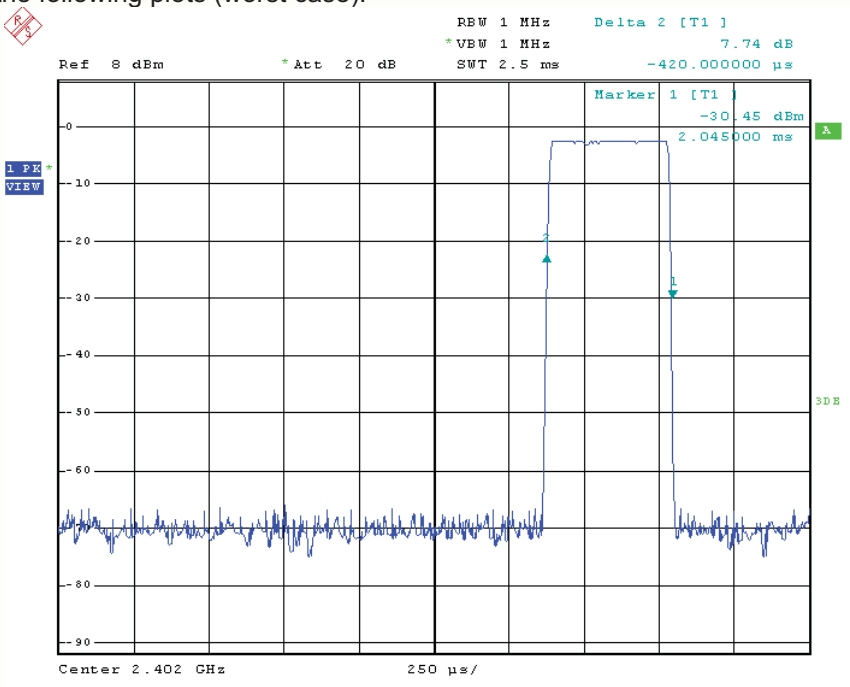
5. Measure and record the results in the test report.

Measurement Data:
The test data of worst case (GFSK mode) are below:

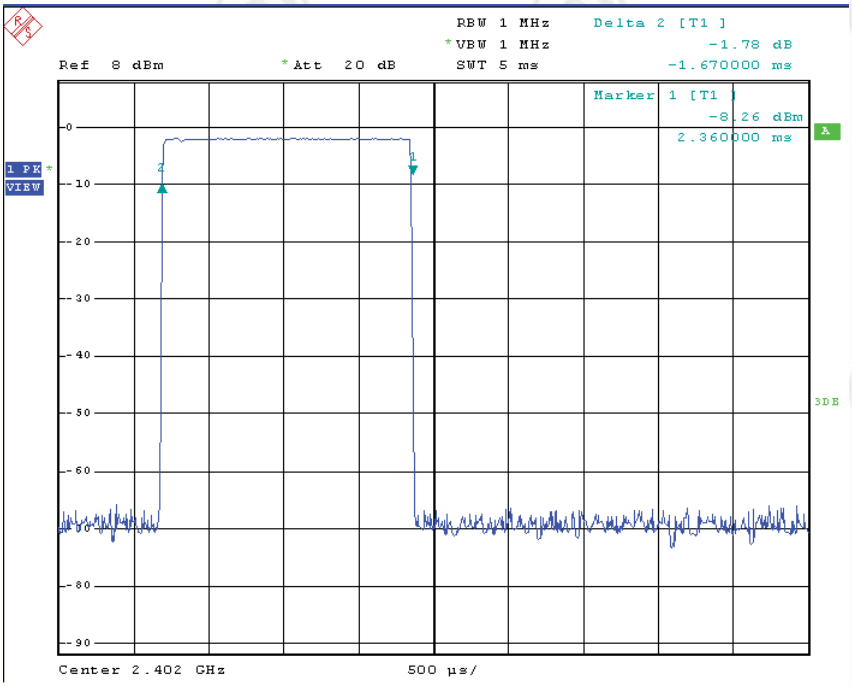
Frequency (MHz)	Pulse Wide(ms)		Dwell Time (ms)	Limit (s)	Result (Pass / Fail)
2402	DH1	0.42	134.40	0.4	Pass
	DH3	1.67	267.20		
	DH5	2.93	312.54		
2441	DH1	0.42	134.40	0.4	Pass
	DH3	1.68	268.80		
	DH5	2.94	313.61		
2480	DH1	0.42	134.40	0.4	Pass
	DH3	1.68	268.80		
	DH5	2.93	312.54		

Remark:
DH1 Packet permit maximum 1600 / 79 /2 = 10.12 hops per second in each channel (1 time slot RX, 1 time slot TX). So, total hops is 10.12 x 31.6 = 320
DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots RX, 1 time slot TX). So, total hops is 5.06 x 31.6 = 160
DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). So, total hops is 3.37 x 31.6 = 106.67

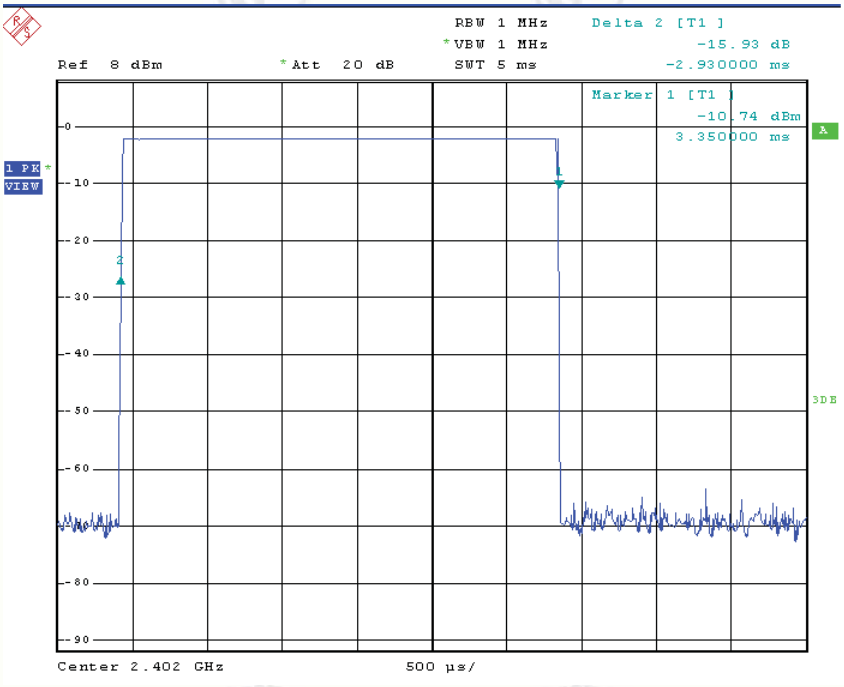
Please see the following plots (worst case):



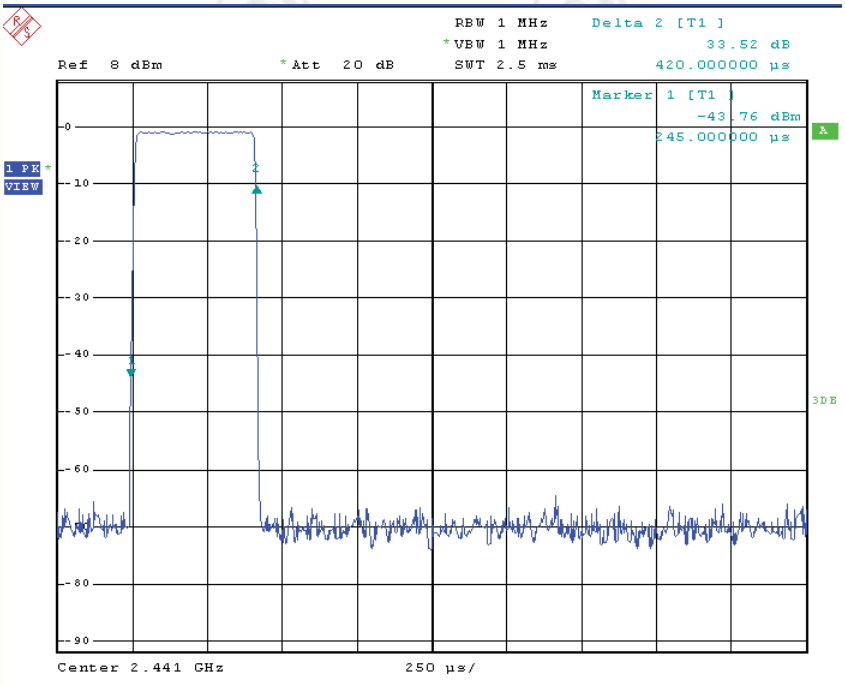
2402 MHz_DH1



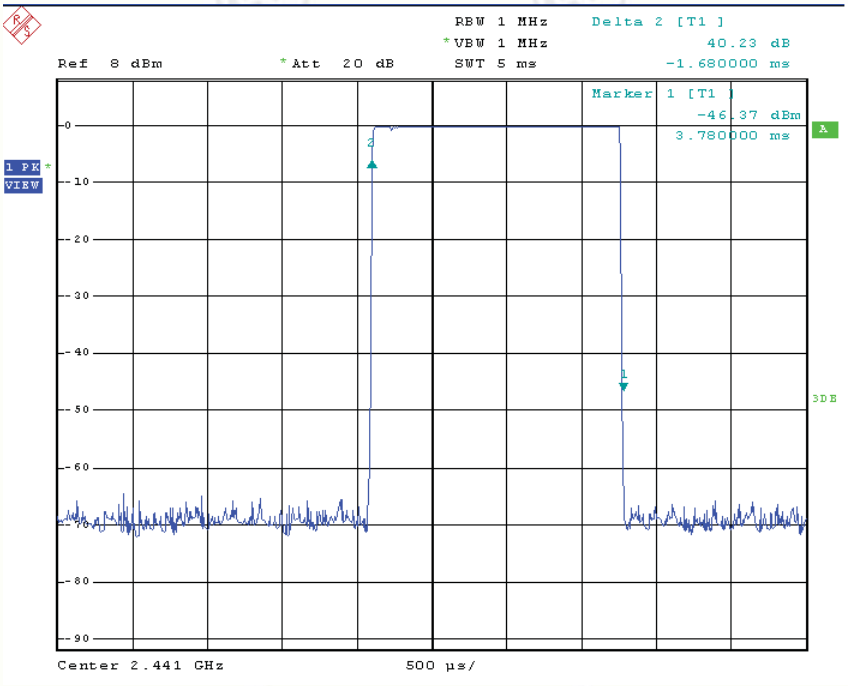
2402 MHz_DH3



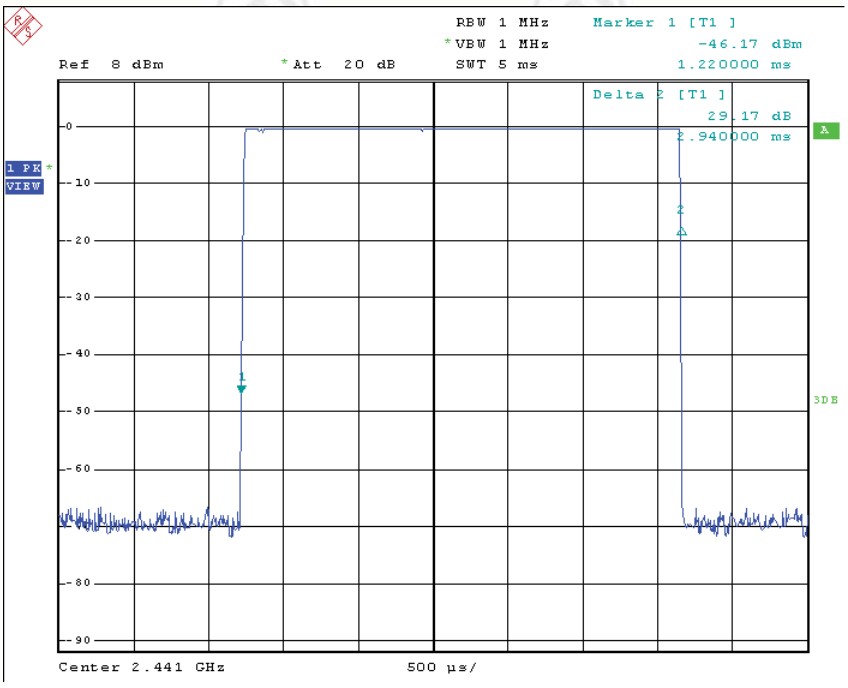
2402 MHz_DH5



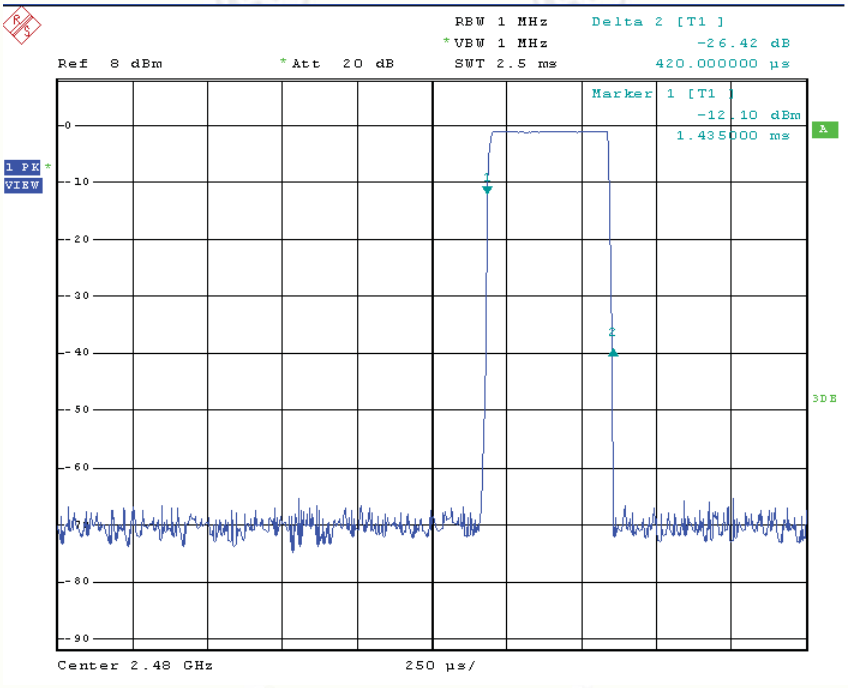
2441 MHz_DH1



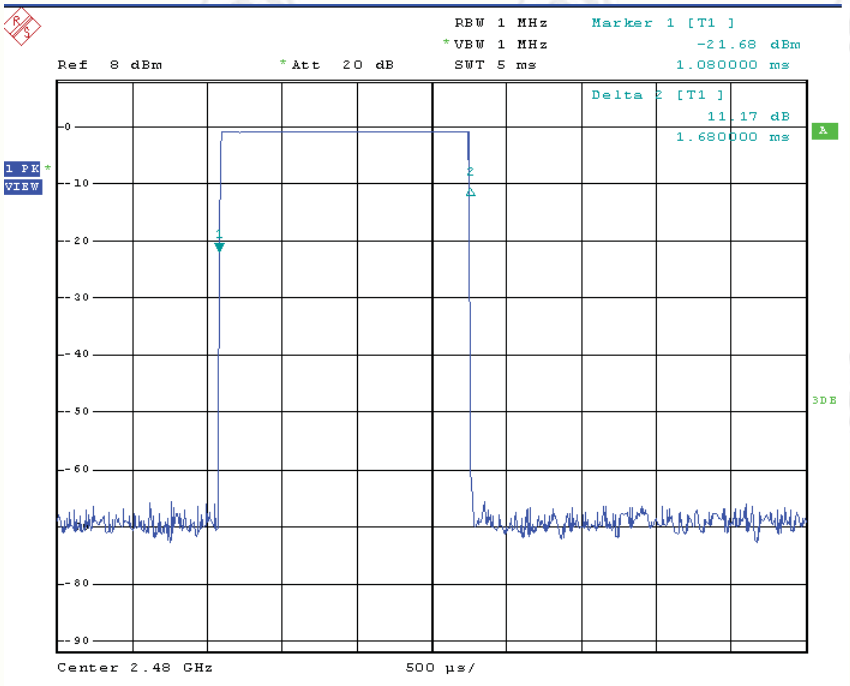
2441 MHz_DH3



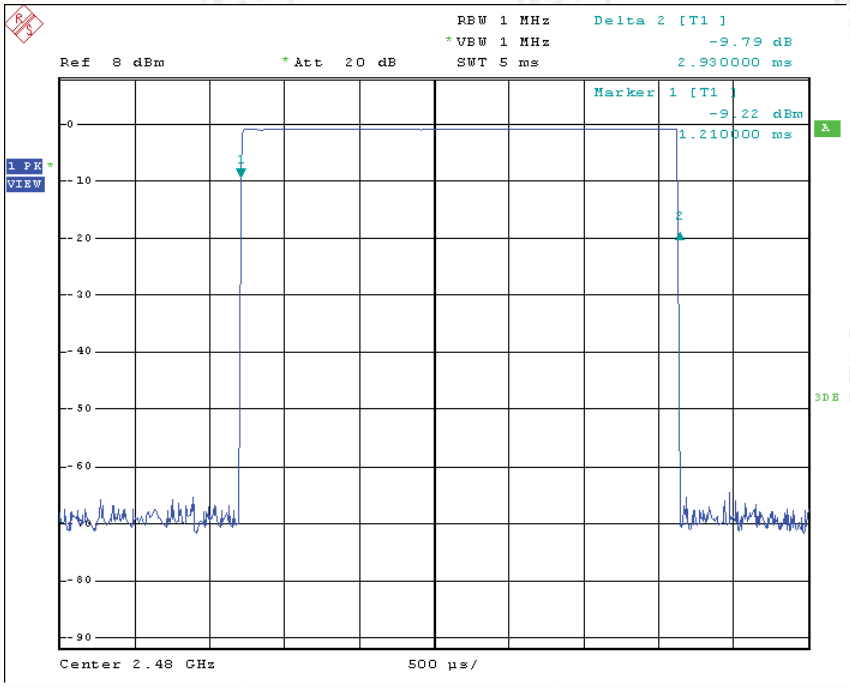
2441 MHz_DH5



2480 MHz_DH1



2480 MHz_DH3

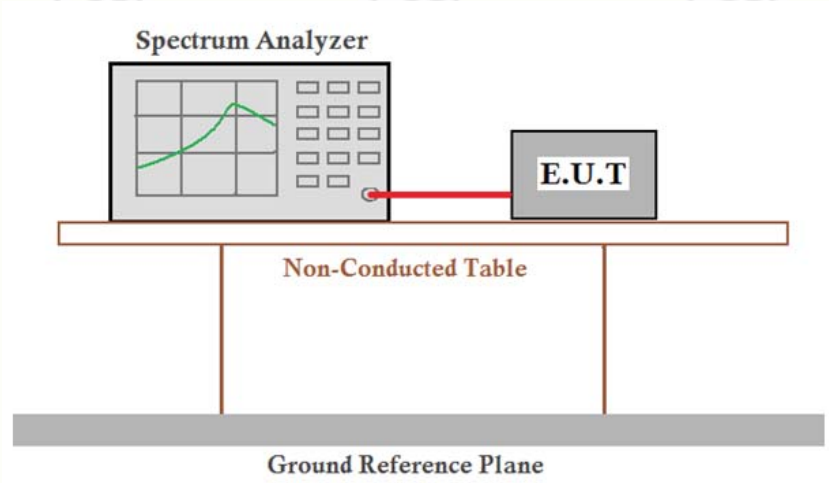


2480 MHz_DH5

4.8 Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10:2009 ANSI C63.4: 2009
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Exploratory Test Mode:	Hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type.

Test Setup:



Remark: Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.

Test Procedure:
1. Set to the maximum power setting and enable the EUT transmit continuously.

2. Set RBW = 100 kHz, VBW = 300 kHz (≥ RBW). Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

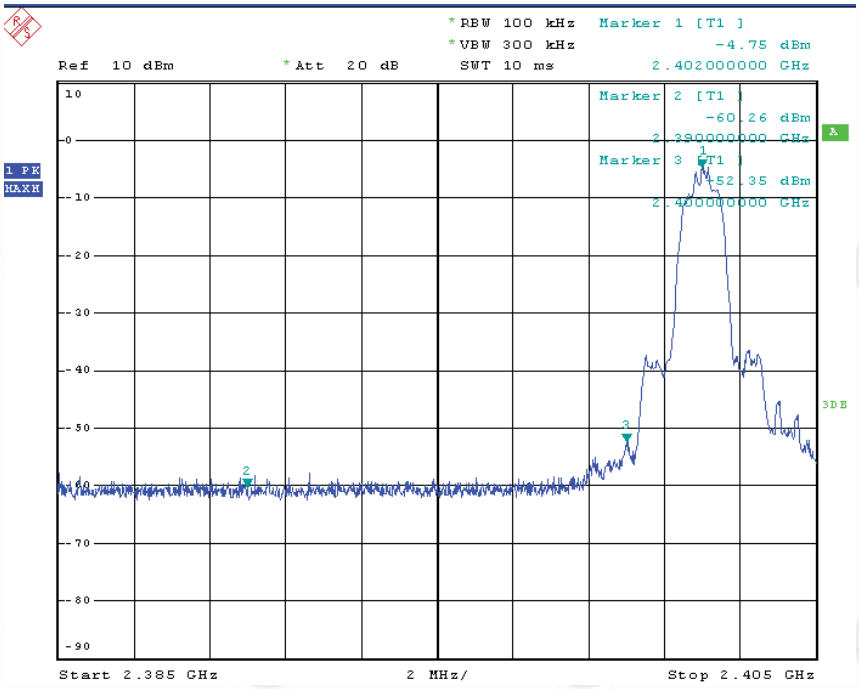
3. Enable hopping function of the EUT and then repeat step 1 and 2.

4. Measure and record the results in the test report.

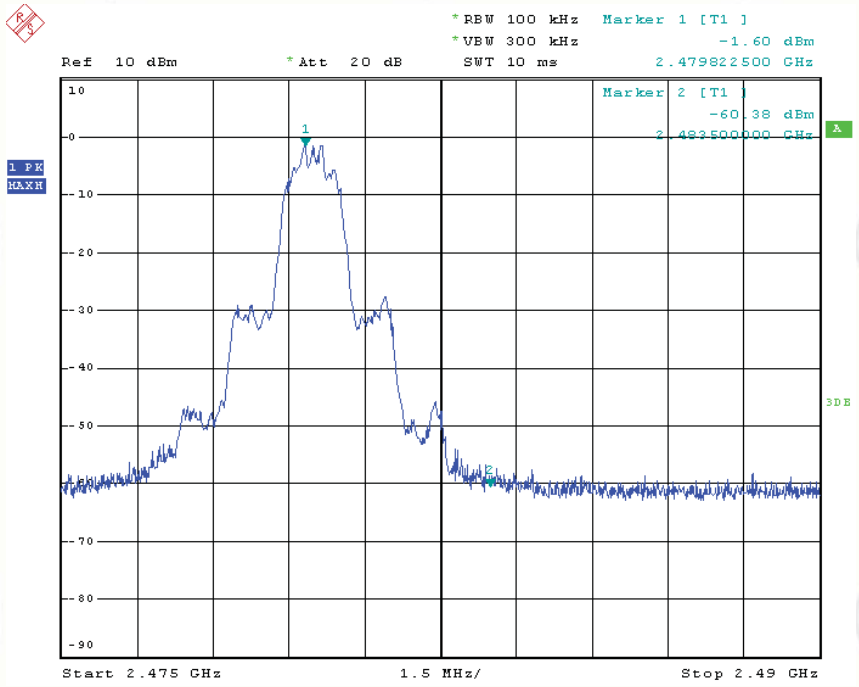
Measurement Data:
Pass.

The test data of worst case are below:

GFSK:
Hopping off mode:

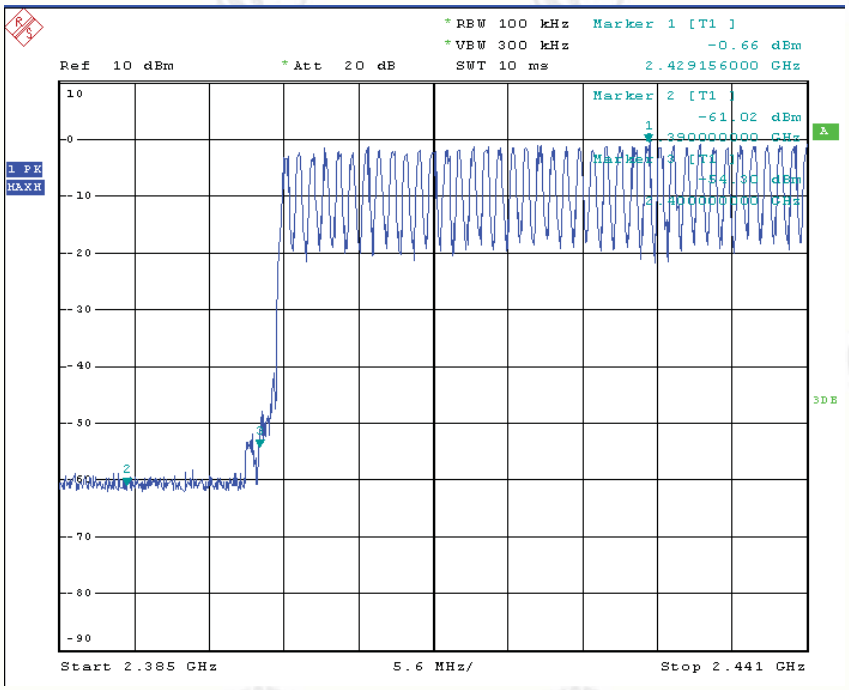


Low channel

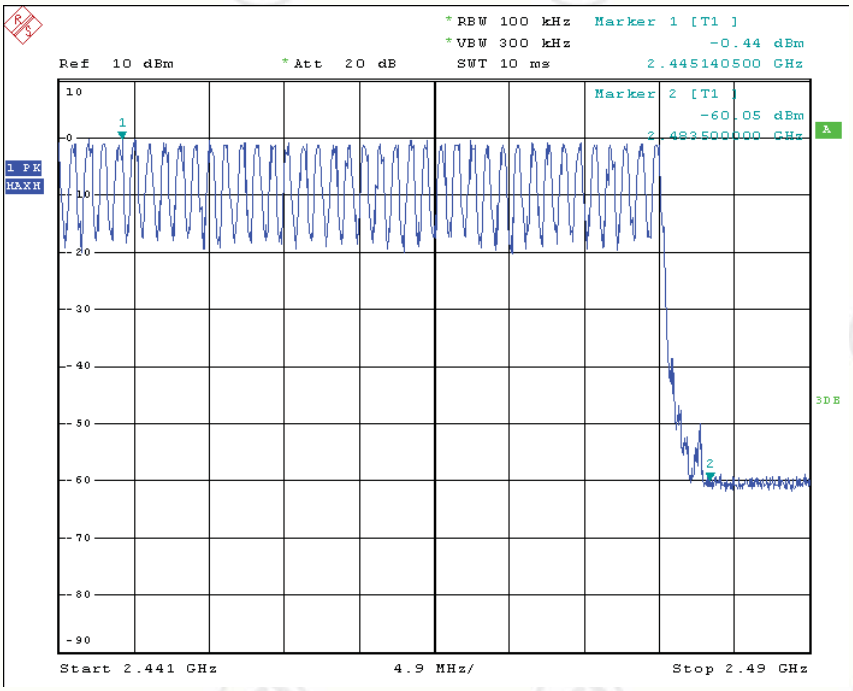


High channel

Hopping mode:



Low channel

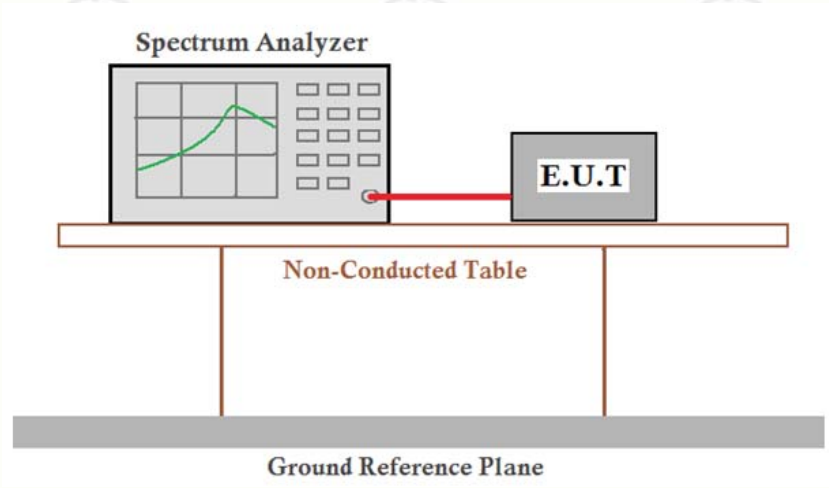


High channel

4.9 Spurious RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10:2009 ANSI C63.4: 2009
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Exploratory Test Mode:	Hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type.

Test Setup:



Remark: Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.

Test Procedure:
1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.

2. Set to the maximum power setting and enable the EUT transmit continuously.

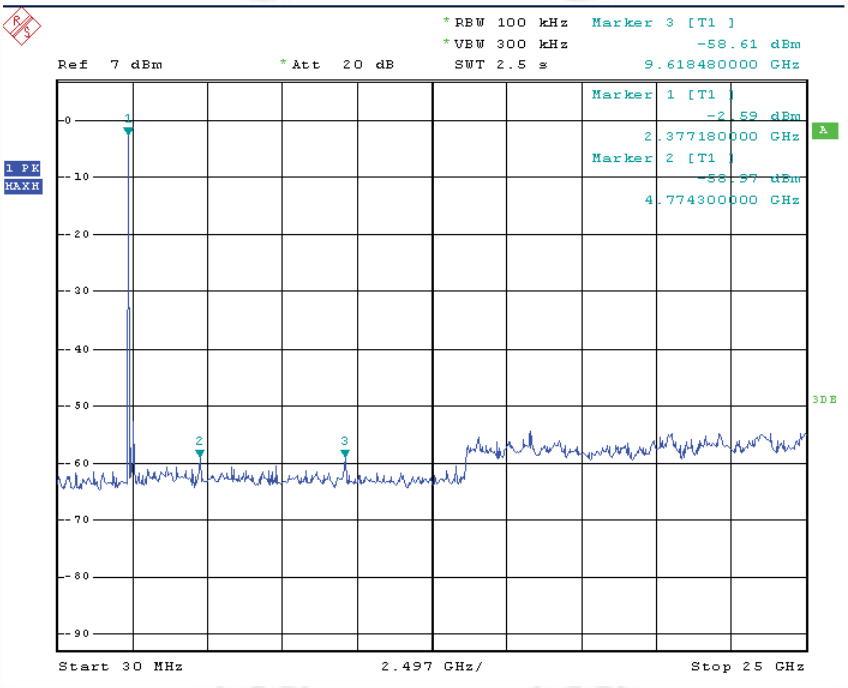
3. Set RBW = 100 kHz, VBW = 300 kHz, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

4. Measure and record the results in the test report.

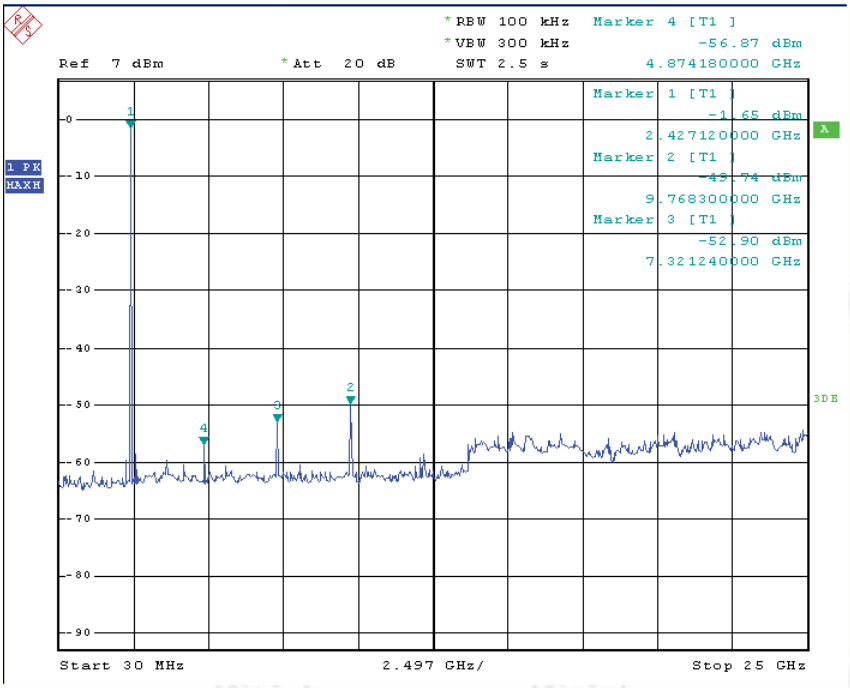
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

Measurement Data:
Pass.

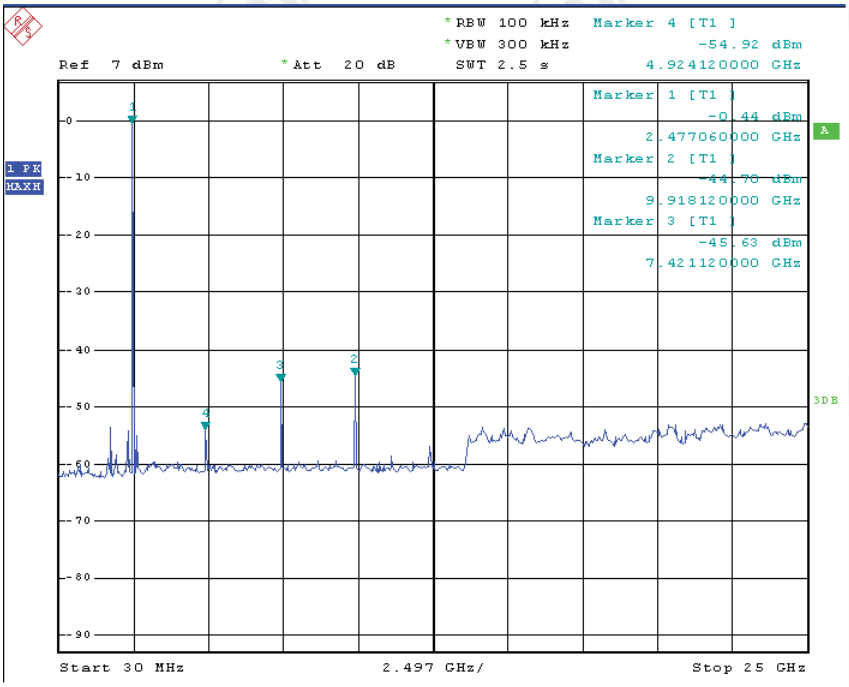
Please see the following plots (worst case, GFSK mode):



2402MHz



2441MHz


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
Marker 4 [T1]
-54.92 dBm
4.924120000 GHz
Ref 7 dBm
Att 20 dB
Marker 1 [T1]
-0.44 dBm
2.477060000 GHz
Marker 2 [T1]
-44.78 dBm
9.918120000 GHz
Marker 3 [T1]
-45.63 dBm
7.421120000 GHz
1 PK
MAXH
3DB
Start 30 MHz
2.497 GHz/
Stop 25 GHz

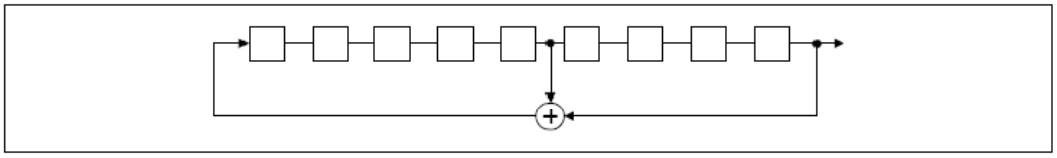
2480MHz

4.10 Pseudorandom Frequency Hopping Sequence

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)

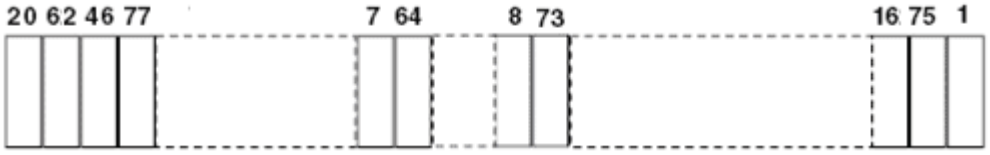
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively. Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that 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. The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

EUT Pseudorandom Frequency Hopping Sequence:
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.
• Number of shift register stages: 9
• Length of pseudo-random sequence: 2^9 -1 = 511 bits
• Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



Each frequency used equally on the average by each transmitter.
The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

The device does not have the ability to be coordinated with other FHSS systems in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitters.

4.11 Radiated Spurious/ Bandage Emission

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205
Test Method:	ANSI C63.10:2009 ANSI C63.4: 2009
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Exploratory Test Mode:	Non-hopping transmitting mode with all kind of modulation and all kind of data type. Transmitting mode, Charge + Transmitting mode.
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worse case of GFSK modulation type. Pretest the EUT at Transmitting mode and Charge + Transmitting mode, found the Charge + Transmitting mode which it is worse case. Only the worst case is recorded in the report.

Limit:

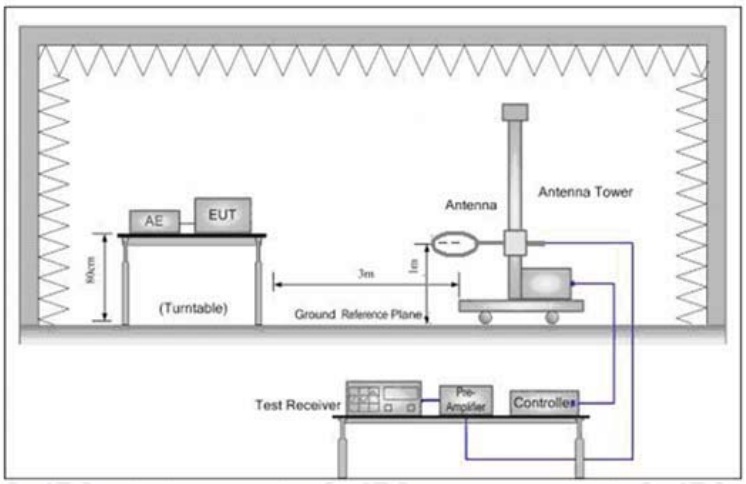
Frequency (MHz)	Field strength (μV/m)	Distance (m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note: the tighter limit applies at the band edges.

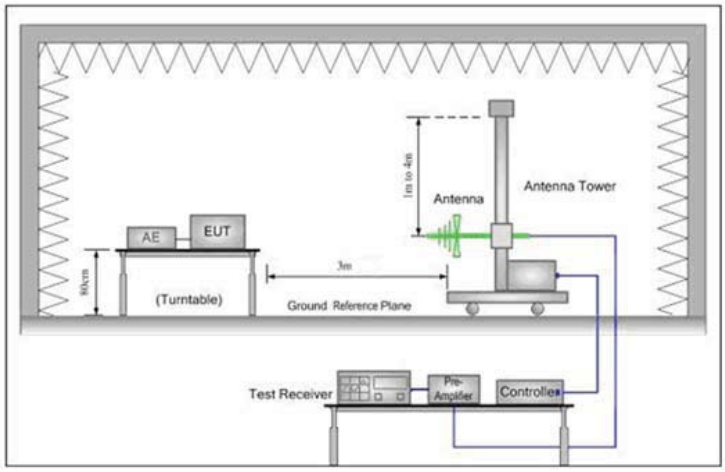
Receiver Setup:

Frequency	Detector	RBW	VBW
0.009MHz-0.090MHz	Peak	10kHz	30kHz
0.009MHz-0.090MHz	Average	10kHz	30kHz
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz
0.110MHz-0.490MHz	Peak	10kHz	30kHz
0.110MHz-0.490MHz	Average	10kHz	30kHz
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz
30MHz-1GHz	Quasi-peak	120 kHz	300kHz
Above 1GHz	Peak	1MHz	3MHz
	Peak	1MHz	10Hz

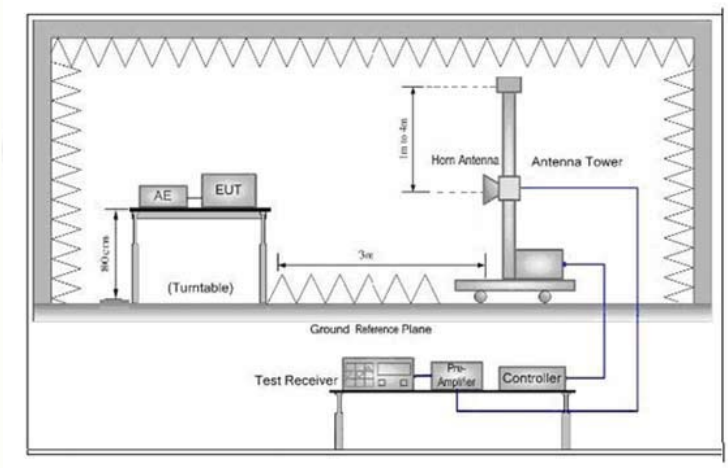
Test Setup:
Below 30MHz:



30MHz to 1GHz:



Above 1 GHz:



Test Procedure:

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.

g. Test the EUT in the lowest channel (2402MHz),the middle channel (2441MHz),the Highest channel (2480MHz)

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.

i. Repeat above procedures until all frequencies measured was complete.

Measurement Data:

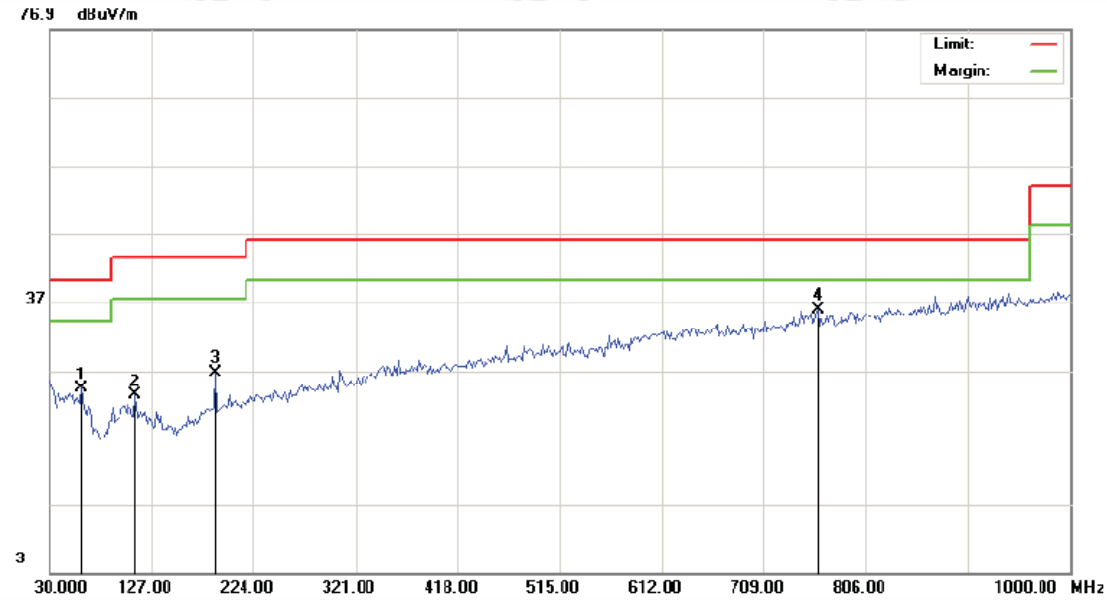
A. Below 30MHz:

No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

B. 30MHz ~1GHz:

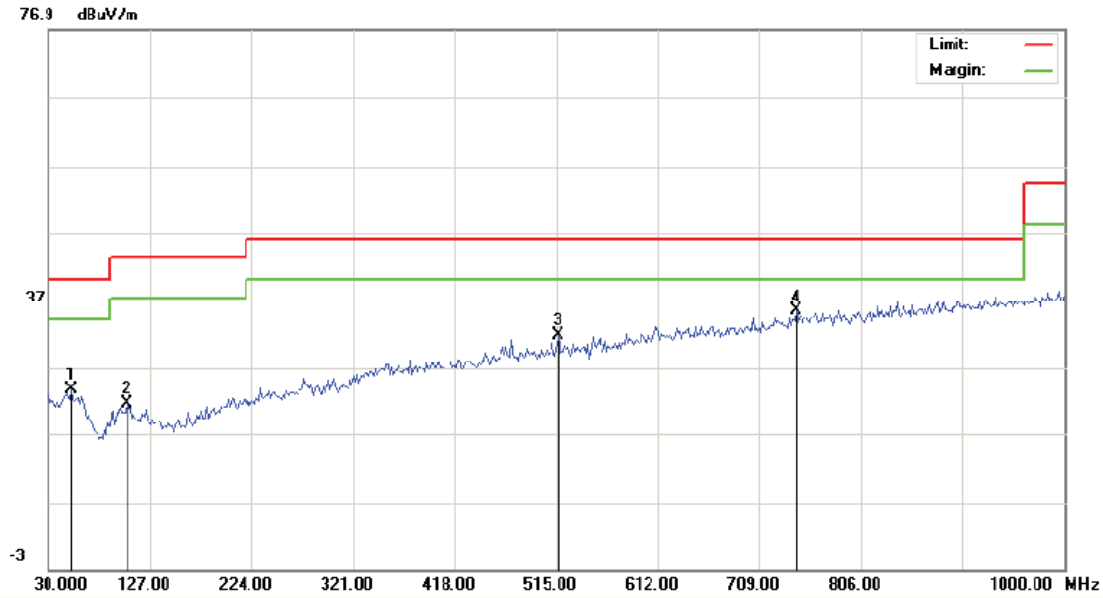
The test data of low channel, middle channel and high channel are almost same in frequency bands 30MHz to 1GHz, and the data of middle channel (GFSK mode) are chosen as representative in below:

H:



No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	60.7167	9.94			14.36	24.30			40.00		-15.70		P	
2	112.4500	10.32			12.90	23.22			43.50		-20.28		P	
3	188.4333	13.10			13.50	26.60			43.50		-16.90		P	
4	760.7333	9.55			26.24	35.79			46.00		-10.21		P	

V:



No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	51.0167	8.06			15.77	23.83			40.00		-16.17		P	
2	104.3667	8.41			13.42	21.83			43.50		-21.67		P	
3	516.6167	9.94			21.77	31.71			46.00		-14.29		P	
4	742.9500	9.43			26.00	35.43			46.00		-10.57		P	

C. Above 1GHz:

Test Results-(Measurement Distance: 3m)_Channel low_2402MHz_GFSK mode:

Frequency (MHz)	Reading Level (dBuV/m)	Correct Factor (dB)	Measurement (dBuV/m)	Limit (dBuV/m)	Detector Type	Antenna (H/V)	Result (P/F)
2390.0	33.22	1.99	35.21	74	PK	H	P
2400.0	44.13	2.01	46.14	74	PK	H	P
2402.0*	92.24	2.01	94.25	---	PK	H	P
4804.0	52.12	6.13	58.25	74	PK	H	P
4804.0	43.5	6.13	49.63	54	AV	H	P
2390.0	33.13	1.99	35.12	74	PK	V	P
2400.0	46.14	2.01	48.15	74	PK	V	P
2402.0*	93.98	2.01	95.99	---	PK	V	P
4804.0	54.39	6.13	60.52	74	PK	V	P
4804.0	45.45	6.13	51.58	54	AV	V	P

*: fundamental frequency

Remark:

1. The above tables show that the frequencies peak data are all below the average limit, so the average data of these frequencies are deems to fulfill the average limits and not reported.
2. No emission found from 18GHz to 25GHz.
3. All outside of operating frequency band and restricted band specified are below 15.209.

Test Results-(Measurement Distance: 3m)_Channel middle_2441MHz_GFSK mode:

Frequency (MHz)	Reading Level (dBuV/m)	Correct Factor (dB)	Measurement (dBuV/m)	Limit (dBuV/m)	Detector Type	Antenna (H/V)	Result (P/F)
2441.0*	96.45	2.11	98.56	---	PK	H	P
4882.0	53.94	6.18	60.12	74	PK	H	P
4882.0	43.83	6.18	50.01	54	AV	H	P
2441.0*	95.87	2.11	97.98	---	PK	V	P
4882.0	53.45	6.18	59.63	74	PK	V	P
4882.0	45.81	6.18	51.99	54	AV	V	P

*: fundamental frequency

Remark:

1. The above tables show that the frequencies peak data are all below the average limit, so the average data of these frequencies are deems to fulfill the average limits and not reported.
2. No emission found from 18GHz to 25GHz.
3. All outside of operating frequency band and restricted band specified are below 15.209.

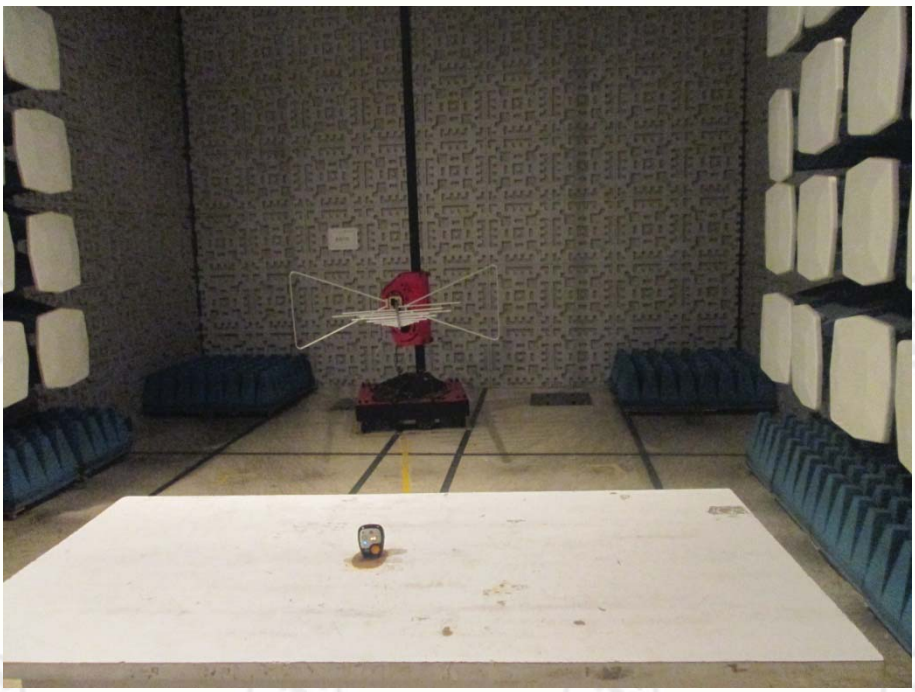
Test Results-(Measurement Distance: 3m)_Channel high_2480MHz_GFSK mode:

Frequency (MHz)	Reading Level (dBuV/m)	Correct Factor (dB)	Measurement (dBuV/m)	Limit (dBuV/m)	Detector Type	Antenna (H/V)	Result (P/F)
2480.0*	93.05	2.18	95.23	---	PK	H	P
2483.5	43.50	2.18	45.68	74	PK	H	P
4960.0	53.68	6.21	59.89	74	PK	H	P
4960.0	45.80	6.21	52.01	54	AV	H	P
2480.0*	94.38	2.18	96.56	---	PK	V	P
2483.5	42.84	2.18	45.02	74	PK	V	P
4960.0	52.75	6.21	58.96	74	PK	V	P
4960.0	43.45	6.21	49.66	54	AV	V	P

*: fundamental frequency

Remark:
1. The above tables show that the frequencies peak data are all below the average limit, so the average data of these frequencies are deems to fulfill the average limits and not reported.
2. No emission found from 18GHz to 25GHz.
3. All outside of operating frequency band and restricted band specified are below 15.209.

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP



TEST SETUP OF RADIATED EMISSION (30MHz-1GHz)

TEST SETUP OF RADIATED EMISSION (above 1GHz)

TEST SETUP OF CONDUCTED EMISSION

APPENDIX 2 EXTERNAL PHOTOGRAPHS OF PRODUCT

Fig.1- General View

Fig.2- General View

APPENDIX 3 INTERNAL PHOTOGRAPHS OF PRODUCT

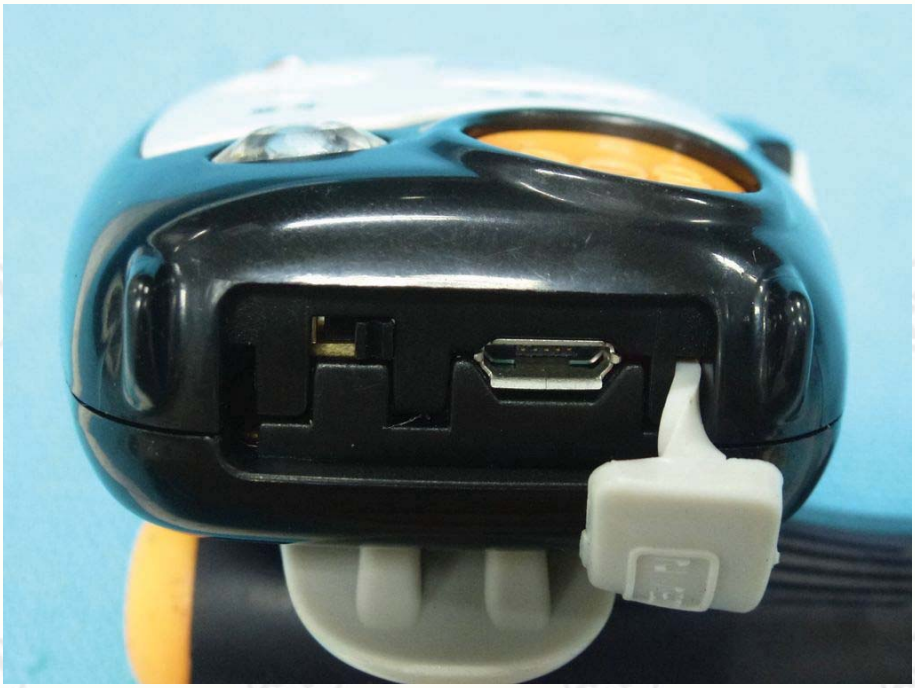


Fig.1- USB Charging Port View

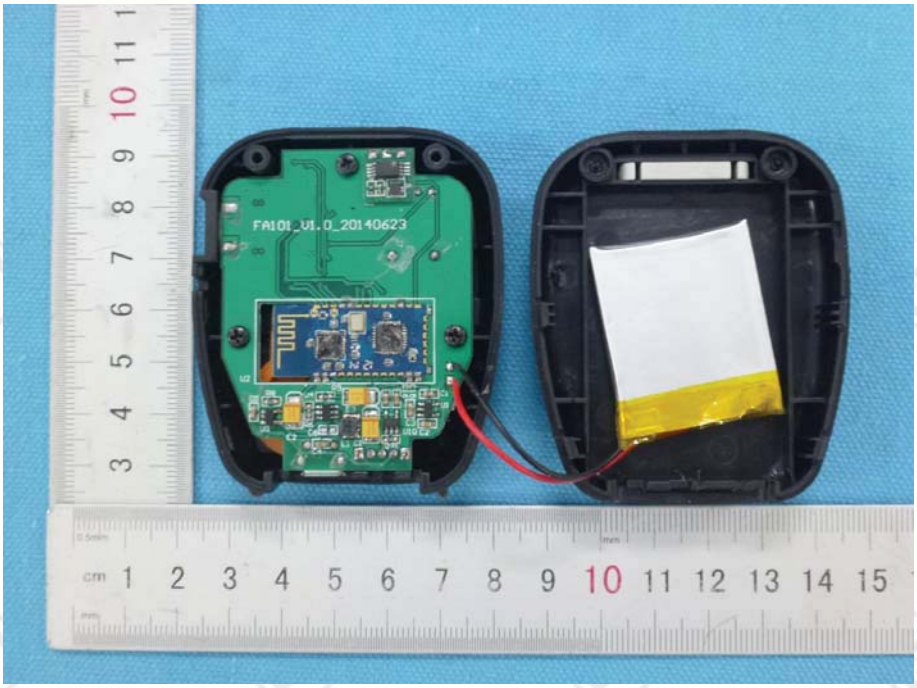


Fig.2- Inner View

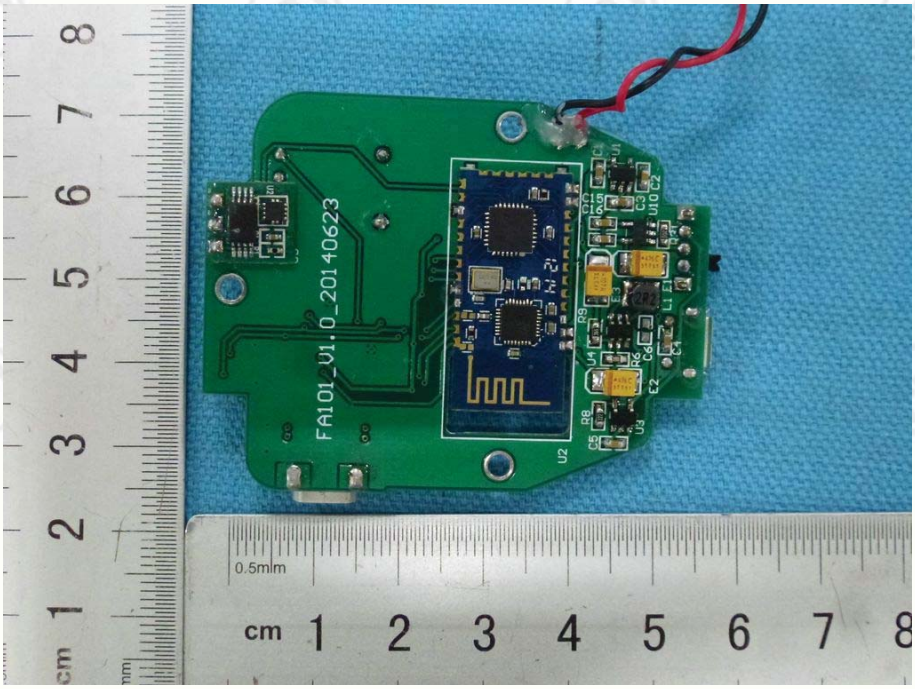


Fig.3- PCB View

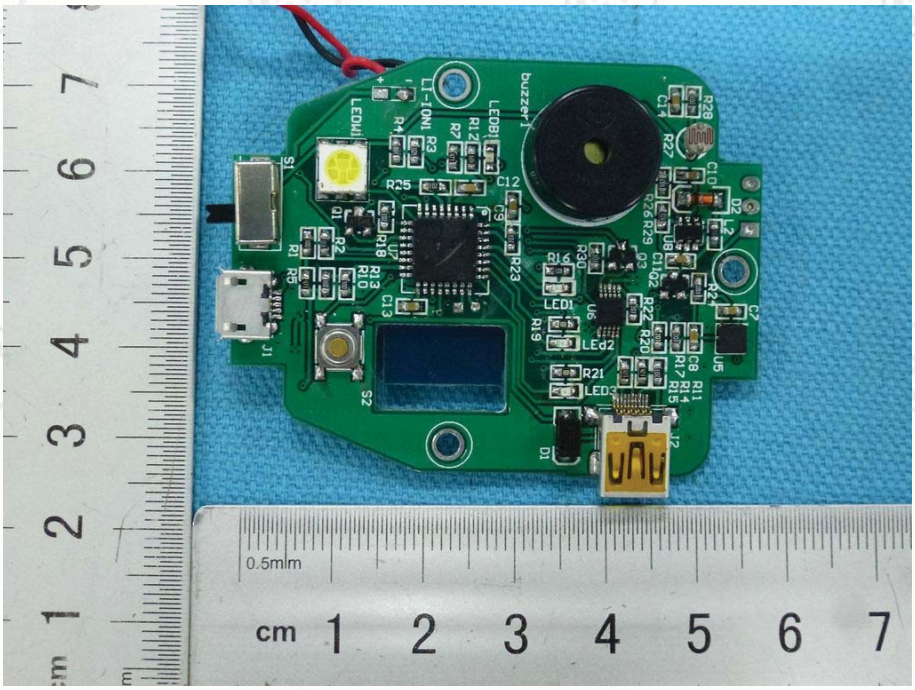


Fig.4- PCB View

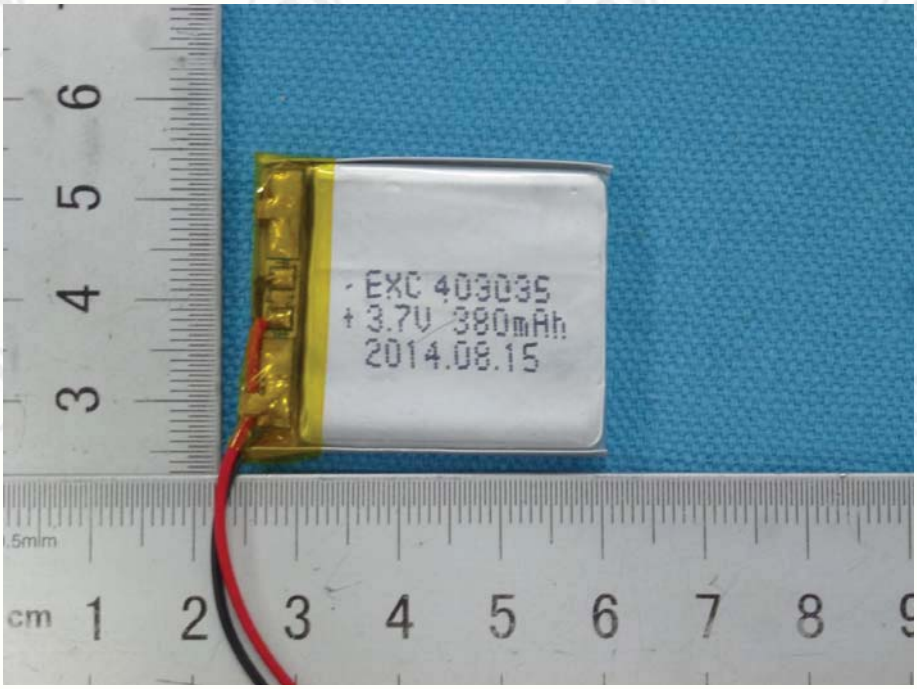


Fig.5- Battery View

*** End of Report ***