TEST REPORT

Product	:	Wireless Digital Video Monitoring System
Trade mark	:	N/A
Model/Type reference	:	DXR-8 PRO, DXR8PPZ-A
Serial Number	:	N/A
Report Number	:	EED32M00082301
FCC ID	:	2AAAM-DXR8PPZ-ABU
Date of Issue	:	Jul. 07, 2020
Test Standards	:	47 CFR Part 15 Subpart C
Test result	:	PASS

Prepared for:

STANDARD MERIT INDUSTRIAL LIMITED
2/A Harrison Court Stage 6,
10 Man Wan Road, Kowloon, Hong Kong

Prepared by:

Centre Testing International Group Co., Ltd.
Hongwei Industrial Zone, Bao'an 70 District,
Shenzhen, Guangdong, China
TEL: +86-755-3368 3668
FAX: +86-755-3368 3385

Compiled by: Sunlight Sun — Sunlight Sun

Reviewed by: Ware Xin — Ware Xin

Approved by: Sam Chuang — Sam Chuang

Date: Jul. 07, 2020

Check No: 3320284899

2 Version

Version No.	Date	Description
00	Jul. 07, 2020	Original

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203/15.247 (c)	ANSI C63.10-2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS
Conducted Peak Output Power	47 CFR Part 15 Subpart C Section 15.247 (b)(1)	ANSI C63.10-2013	PASS
20dB Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Carrier Frequencies Separation	47 CFR Part 15 Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Hopping Channel Number	47 CFR Part 15 Subpart C Section 15.247 (b)	ANSI C63.10-2013	PASS
Dwell Time	47 CFR Part 15 Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Pseudorandom Frequency Hopping Sequence	47 CFR Part 15 Subpart C Section 15.247(b)(4)&TCB Exclusion List (7 July 2002)	ANSI C63.10-2013	PASS
RF Conducted Spurious Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
Radiated Spurious emissions	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS
Duty Cycle	ANSI C63.10-2013	ANSI C63.10-2013	PASS

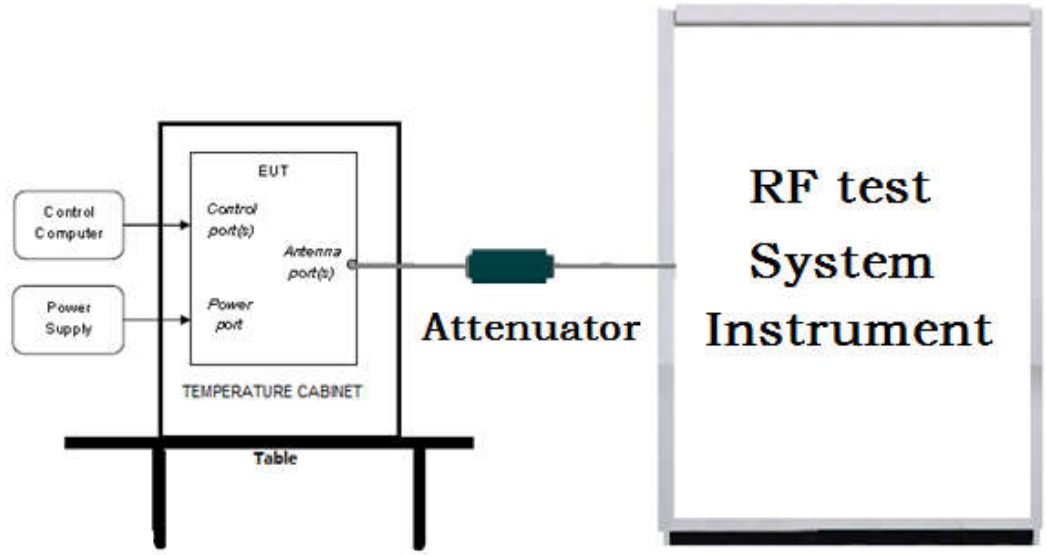
Remark:
Test according to ANSI C63.4-2014 & ANSI C63.10-2013.
The tested samples and the sample information are provided by the client.
Model No.: DXR-8 PRO, DXR8PPZ-A
Only the model DXR-8 PRO was tested, DXR-8 PRO is the system model of the product that of which consist of one camera unit and one monitor unit with the model DXRBPPZ-A. The model DXR-8 PRO is represent the coverage of one Camera unit and one Monitor with the Model DXR8PPZ- A. For DXR8PPZ-A is the model represent the individual Camera/Monitor unit only

4 Content

5 Test Requirement

5.1 Test setup

5.1.1 For Conducted test setup



5.1.2 For Radiated Emissions test setup

Radiated Emissions setup:

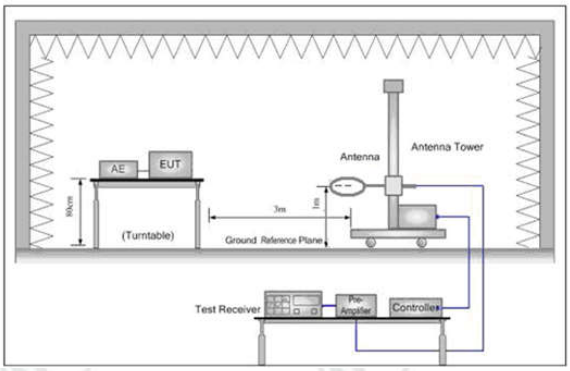


Figure 1. Below 30MHz

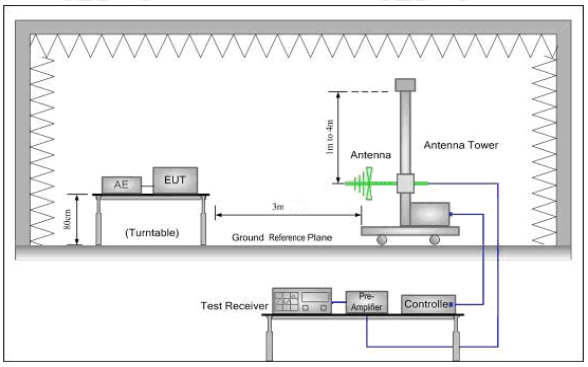


Figure 2. 30MHz to 1GHz

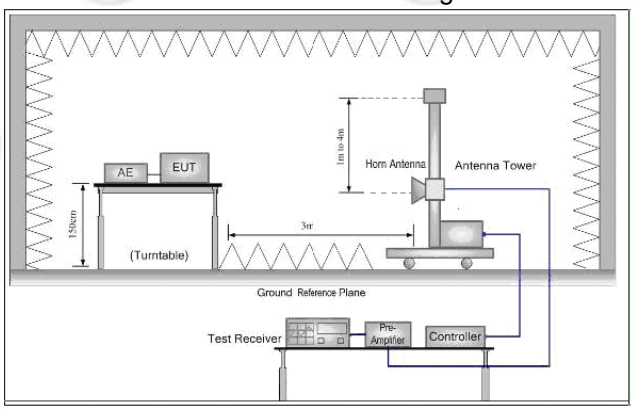
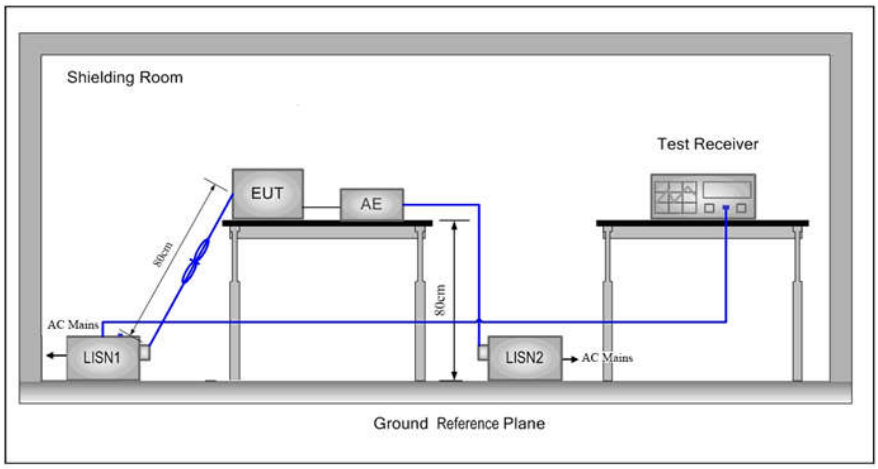


Figure 3. Above 1GHz

5.1.3 For Conducted Emissions test setup

Conducted Emissions setup



5.2 Test Environment

Operating Environment:	
Temperature:	23°C
Humidity:	54% RH
Atmospheric Pressure:	1010mbar

5.3 Test Condition

Test Mode	Tx	RF Channel		
		Low(L)	Middle(M)	High(H)
GFSK	2410MHz ~2477 MHz	Channel 1	Channel 10	Channel 20
		2410MHz	2441.5MHz	2477MHz
TX mode: The EUT transmitted the continuous modulation test signal at the specific channel(s).				

6 General Information

6.1 Client Information

Applicant:	STANDARD MERIT INDUSTRIAL LIMITED
Address of Applicant:	2/A Harrison Court Stage 6, 10 Man Wan Road, Kowloon, Hong Kong
Manufacturer:	Foshan Shunde Alford Electronics Co., Ltd
Address of Manufacturer:	Xinjian Industrial Park, Daliang, Shunde, Foshan City, Guangdong Province, China

6.2 General Description of EUT

Product Name:	Wireless Digital Video Monitoring System	
Model No.(EUT):	DXR-8 PRO, DXR8PPZ-A	
Test Model No:	DXR-8 PRO	
Trade mark:	N/A	
EUT Supports Radios application:	2410MHz - 2477MHz	
Power Supply:	AC adapter 1	Model: BI12T-059100-BdU Input:100-240V~50/60Hz 0.5A Output: DC 5.9V⎓1A
	AC adapter 2	Model: BLJ05K059100P-U Input:100-240V~50/60Hz 0.2A Output: 5.9V⎓1000mA
Sample Received Date:	Apr.13, 2020	
Sample tested Date:	Apr.13, 2020 to May 22, 2020	

6.3 Product Specification subjective to this standard

Operation Frequency:	2410MHz - 2477MHz
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK
Number of Channel:	20
Hopping Channel Type:	Adaptive Frequency Hopping systems
Test Power Grade:	Defualt
Test Software of EUT:	Defualt
Antenna Type:	Dipole Antenna
Antenna Gain:	0 dBi
Test Voltage:	DC 5.9V

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2410MHz	6	2427.5MHz	11	2445MHz	16	2462.5MHz
2	2413.5MHz	7	2431MHz	12	2448.5MHz	17	2466MHz
3	2417MHz	8	2434.5MHz	13	2452MHz	18	2469.5MHz
4	2420.5MHz	9	2438MHz	14	2455.5MHz	19	2473MHz
5	2424MHz	10	2441.5MHz	15	2459MHz	20	2477MHz

6.4 Description of Support Units

The EUT has been tested independently.

6.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd

Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China

Telephone: +86 (0) 755 33683668 Fax:+86 (0) 755 33683385

No tests were sub-contracted.

FCC Designation No.: CN1164

6.6 Deviation from Standards

None.

6.7 Abnormalities from Standard Conditions

None.

6.8 Other Information Requested by the Customer

None.

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

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.3dB (30MHz-1GHz)
		4.5dB (1GHz-12.75GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

7 Equipment List

RF test system					
Equipment	**Manufacturer**	**Mode No.**	**Serial Number**	**Cal. Date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
Spectrum Analyzer	Keysight	N9010A	MY54510339	02-17-2020	02-16-2021
Signal Generator	Keysight	N5182B	MY53051549	02-17-2020	02-16-2021
Temperature/ Humidity Indicator	biaozhi	HM10	1804186	07-26-2019	07-25-2020
High-pass filter	Sinoscite	FL3CX03WG18N M12-0398-002	---	---	---
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	---	---
DC Power	Keysight	E3642A	MY56376072	02-17-2020	02-16-2021
PC-1	Lenovo	R4960d	---	---	---
BT&WI-FI Automatic control	R&S	OSP120	101374	02-17-2020	02-16-2021
RF control unit	JS Tonscend	JS0806-2	158060006	02-17-2020	02-16-2021
BT&WI-FI Automatic test software	JS Tonscend	JS1120-3	---	---	---

Conducted disturbance Test					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
Receiver	R&S	ESCI	100435	05-20-2019 04-28-2020	05-19-2020 04-27-2021
Temperature/ Humidity Indicator	Defu	TH128	/	06-14-2019	06-13-2020
LISN	R&S	ENV216	100098	03-05-2020	03-04-2021
Barometer	changchun	DYM3	1188	06-20-2019	06-19-2020

3M Semi/full-anechoic Chamber					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
3M Chamber & Accessory Equipment	TDK	SAC-3	---	05-24-2019	05-23-2022
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-618	07-26-2019	07-25-2020
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04-25-2018	04-24-2021
Receiver	R&S	ESCI7	100938-003	10-21-2019	10-20-2020
Multi device Controller	maturo	NCD/070/10711112	---	---	---
Temperature/ Humidity Indicator	Shanghai qixiang	HM10	1804298	07-26-2019	07-25-2020
Cable line	Fulai(7M)	SF106	5219/6A	---	---
Cable line	Fulai(6M)	SF106	5220/6A	---	---
Cable line	Fulai(3M)	SF106	5216/6A	---	---
Cable line	Fulai(3M)	SF106	5217/6A	---	---

3M full-anechoic Chamber					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
RSE Automatic test software	JS Tonscend	JS36-RSE	10166	06-19-2019	06-18-2020
Receiver	Keysight	N9038A	MY57290136	03-05-2020	03-04-2021
Spectrum Analyzer	Keysight	N9020B	MY57111112	03-05-2020	03-04-2021
Spectrum Analyzer	Keysight	N9030B	MY57140871	03-05-2020	03-04-2021
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-1148	04-25-2018	04-24-2021
Horn Antenna	Schwarzbeck	BBHA 9170	9170-832	04-25-2018	04-24-2021
Horn Antenna	ETS-LINDGREN	3117	00057407	07-10-2018	07-09-2021
Preamplifier	EMCI	EMC184055SE	980596	05-22-2019 05-20-2020	05-21-2020 05-19-2021
Preamplifier	EMCI	EMC001330	980563	05-08-2019 04-22-2020	05-07-2020 04-21-2021
Preamplifier	JS Tonscend	980380	EMC051845 SE	01-09-2020	01-08-2021
Temperature/ Humidity Indicator	biaozhi	GM1360	EE1186631	04-30-2019 04-27-2020	04-29-2020 04-26-2021
Fully Anechoic Chamber	TDK	FAC-3	---	01-17-2018	01-16-2021
Filter bank	JS Tonscend	JS0806-F	188060094	04-10-2018	04-09-2021
Cable line	Times	SFT205-NMSM-2.50M	394812-0001	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0002	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0003	---	---
Cable line	Times	SFT205-NMSM-2.50M	393495-0001	---	---
Cable line	Times	EMC104-NMNM-1000	SN160710	---	---
Cable line	Times	SFT205-NMSM-3.00M	394813-0001	---	---
Cable line	Times	SFT205-NMNM-1.50M	381964-0001	---	---
Cable line	Times	SFT205-NMSM-7.00M	394815-0001	---	---
Cable line	Times	HF160-KMKM-3.00M	393493-0001	---	---

8 Radio Technical Requirements Specification

Reference documents for testing:

No.	Identity	Document Title
1	FCC Part15C	Subpart C-Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicesed Wireless Devices

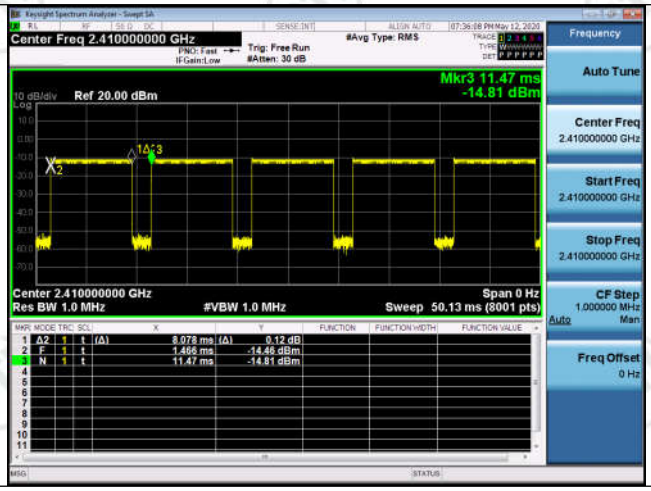
Test Results List:

Test requirement	Test method	Test item	Verdict	Note
Part15C Section 15.247 (a)(1)	ANSI 63.10	20dB Occupied Bandwidth	PASS	Appendix A)
Part15C Section 15.247 (a)(1)	ANSI 63.10	Carrier Frequencies Separation	PASS	Appendix B)
Part15C Section 15.247 (a)(1)	ANSI 63.10	Dwell Time	PASS	Appendix C)
Part15C Section 15.247 (b)	ANSI 63.10	Hopping Channel Number	PASS	Appendix D)
Part15C Section 15.247 (b)(1)	ANSI 63.10	Conducted Peak Output Power	PASS	Appendix E)
Part15C Section 15.247(d)	ANSI 63.10	Band-edge for RF Conducted Emissions	PASS	Appendix F)
Part15C Section 15.247(d)	ANSI 63.10	RF Conducted Spurious Emissions	PASS	Appendix G)
Part15C Section 15.247 (a)(1)	ANSI 63.10	Pseudorandom Frequency Hopping Sequence	PASS	Appendix H)
Part15C Section 15.203/15.247 (c)	ANSI 63.10	Antenna Requirement	PASS	Appendix I)
Part15C Section 15.207	ANSI 63.10	AC Power Line Conducted Emission	N/A	Appendix J)
Part15C Section 15.205/15.209	ANSI 63.10	Restricted bands around fundamental frequency (Radiated) Emission)	PASS	Appendix K)
Part15C Section 15.205/15.209	ANSI 63.10	Radiated Spurious Emissions	PASS	Appendix L)

Duty Cycle

Duty Cycle			
Configuration	TX ON(ms)	TX ALL(ms)	Duty Cycle(%)
GFSK	8.078	10.004	80.75%

GFSK



Appendix A): 20dB Occupied Bandwidth

Test Limit

According to §15.247(a) (1),

20 dB Bandwidth : For reporting purposes only.

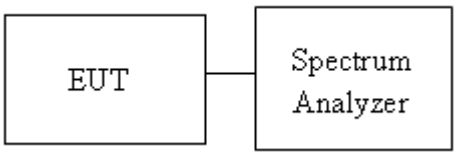
Occupied Bandwidth(99%) : For reporting purposes only.

Test Procedure

Test method Refer as Section 8.1 and ANSI C63.10: 2013 clause 7.8.7,

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW =100kHz, VBW = 300kHz and Detector = Peak, to measurement 20dB Bandwidth.
4. SA set RBW = 1% ~ 5% OBW, VBW = three times the RBW and Detector = Peak, to measurement 99% Bandwidth.
5. Measure and record the result of 20 dB Bandwidth and 99% Bandwidth. in the test report.
6.

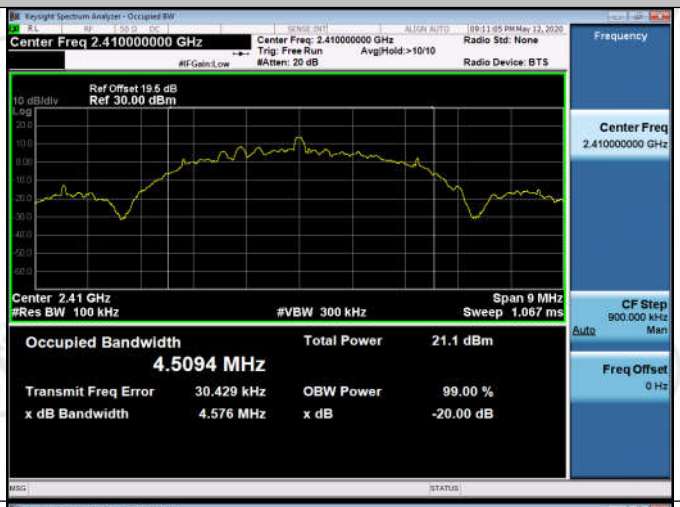
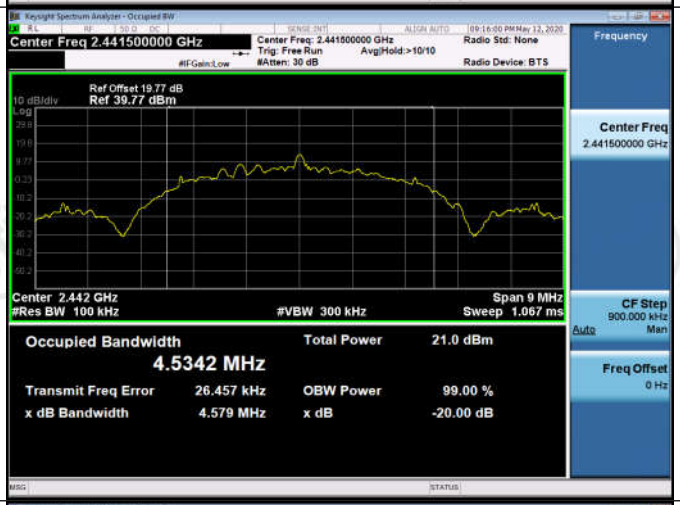
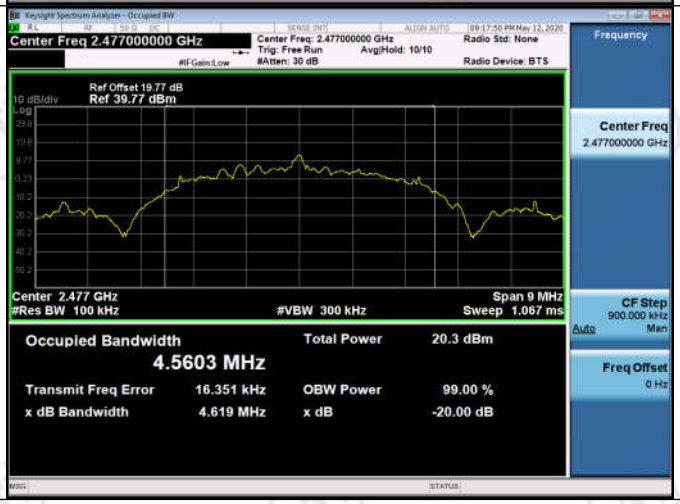
Test Setup



Test Result

Mode	Channel.	20dB Bandwidth [MHz]	99% OBW [MHz]	Verdict
GFSK	LCH	4.576	4.5094	PASS
GFSK	MCH	4.579	4.5342	PASS
GFSK	HCH	4.619	4.5603	PASS

Test Graph

Graphs			
GFSK/LCH			
GFSK/MCH			
GFSK/HCH			

Appendix B): Carrier Frequency Separation

Test Limit

According to §15.247(a)(1),

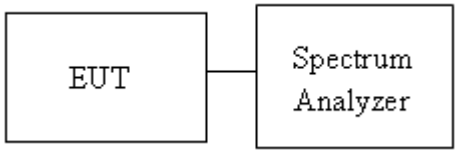
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

Limit	> two-thirds of the 20 dB bandwidth

Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. EUT RF output port connected to the SA by RF cable.
3. Set the spectrum analyzer as RBW = 130kHz, VBW = 390kHz, Sweep = auto.
   Max hold, mark 3 peaks of hopping channel and record the 3 peaks frequency

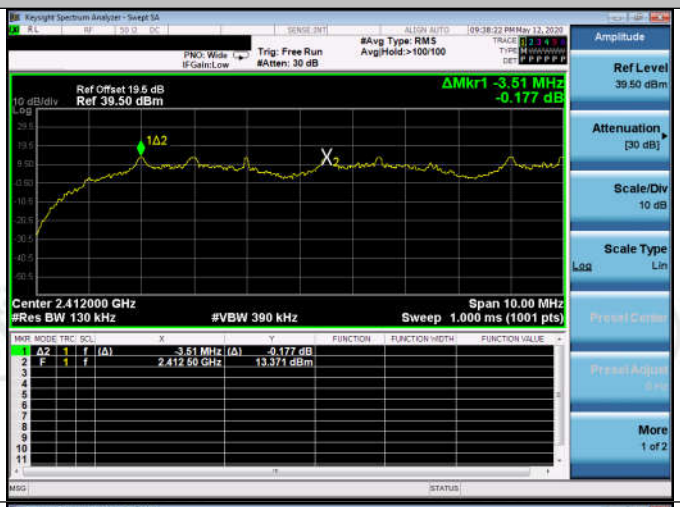
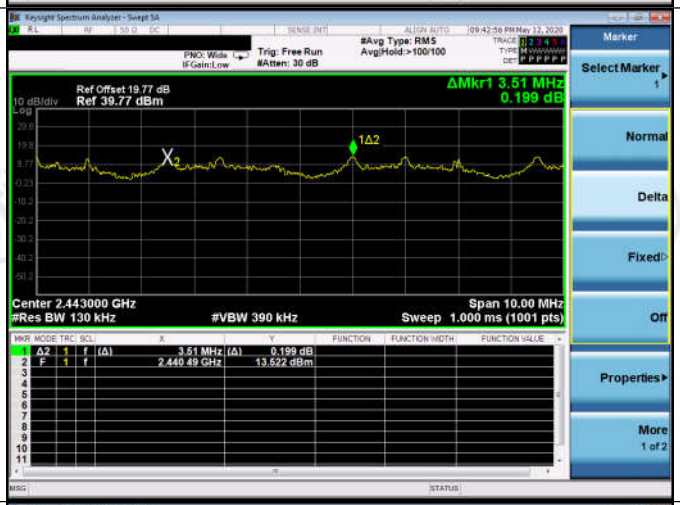
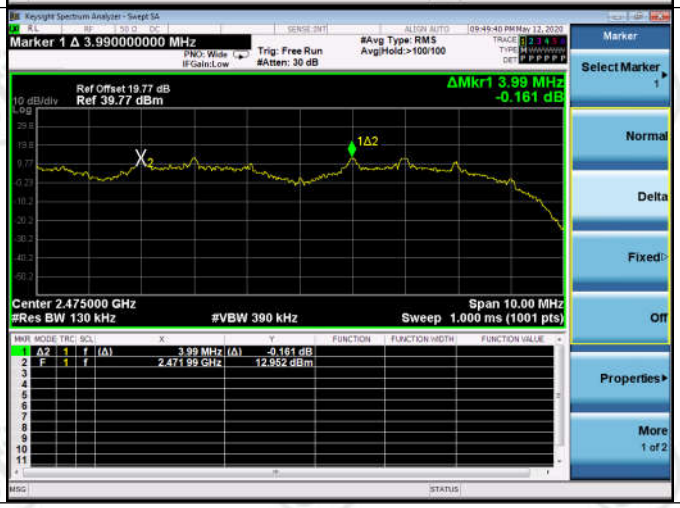
Test Setup



Result Table

Mode	Channel.	Carrier Frequency Separation [MHz]	Verdict
GFSK	LCH	3.51	PASS
GFSK	MCH	3.51	PASS
GFSK	HCH	3.99	PASS

Test Graph

Graphs			
GFSK/LCH			
GFSK/MCH			
GFSK/HCH			

Appendix C): Dwell Time

Test Limit

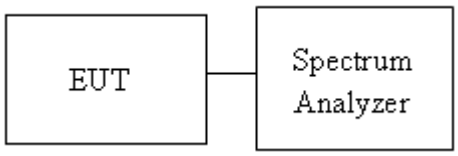
According to §15.247(a)(1)(iii),

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.

Test Procedure

1. EUT RF output port connected to the SA by RF cable.
2. Set center frequency of spectrum analyzer = operating frequency.
3. Set the spectrum analyzer as RBW=1MHz, VBW=3MHz,Sweep = auto

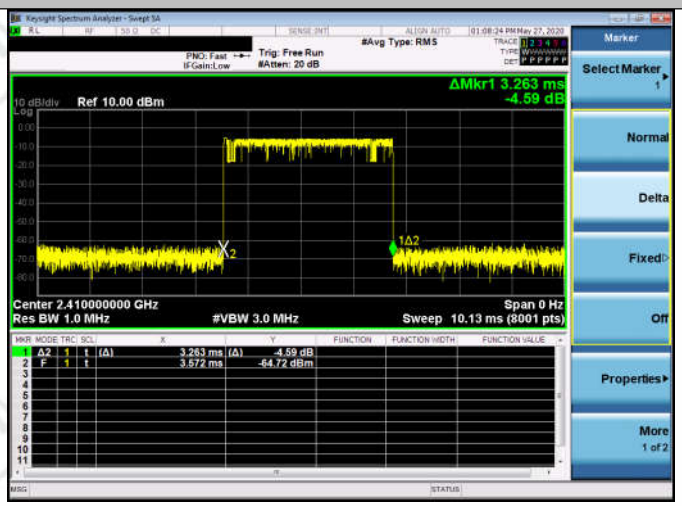
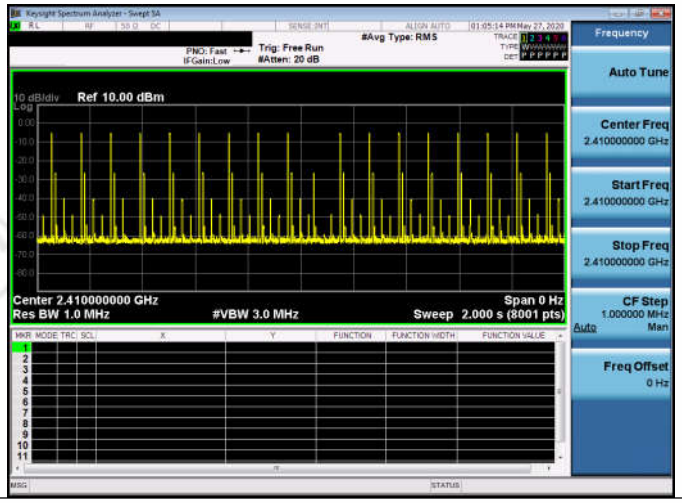
Test Setup

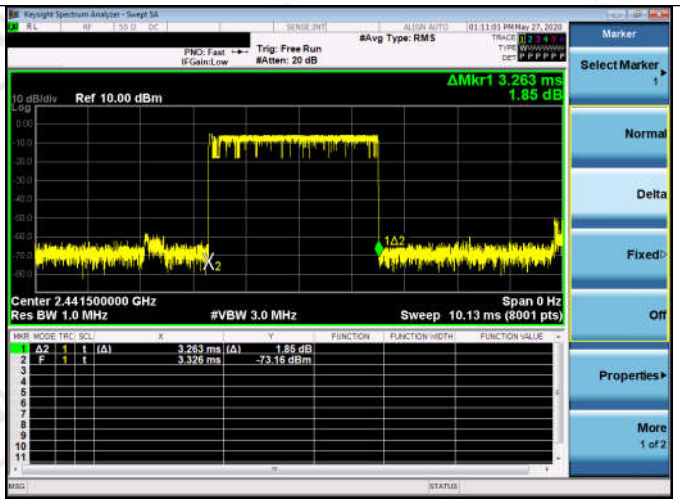
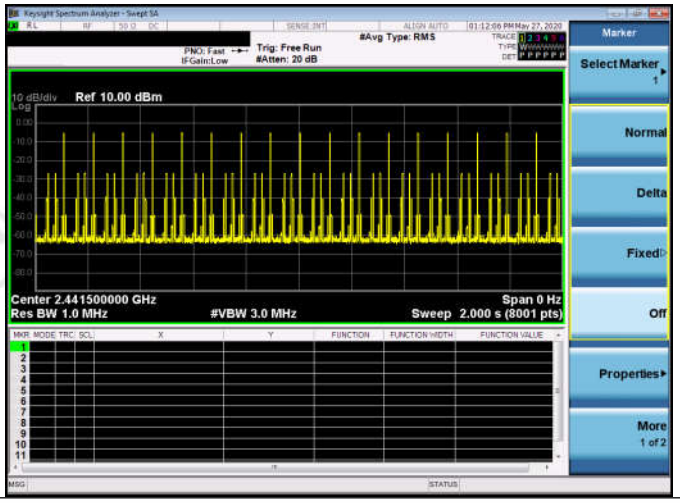


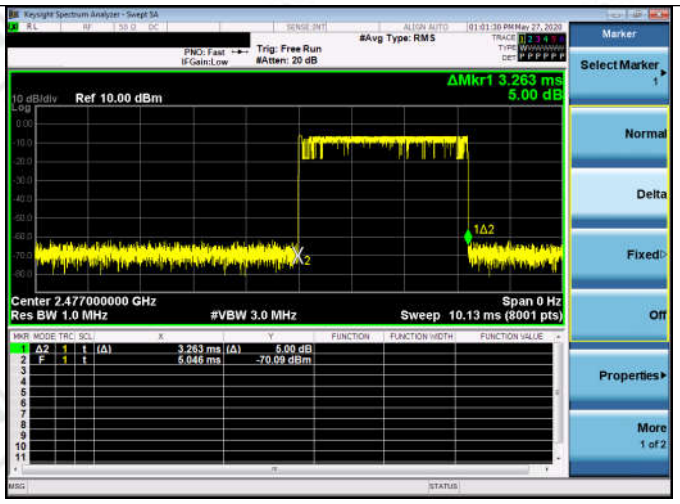
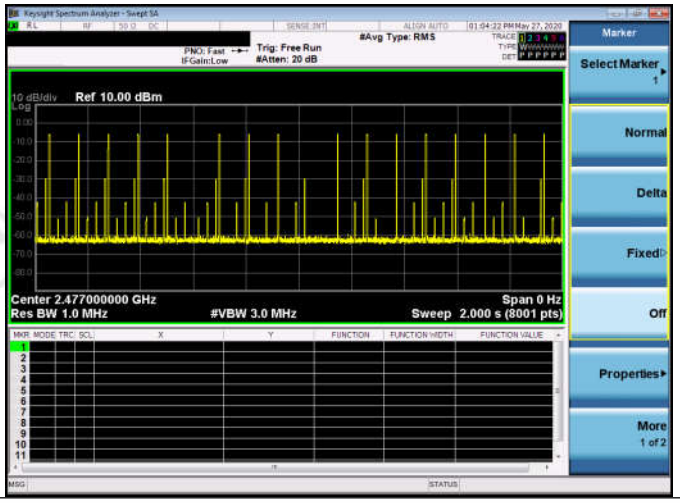
Result Table

Mode	Channel	Observe time[s]	one set of pulses[ms]	pulses within 2s	Dwell Time[s]	Verdict
GFSK	LCH	8	3.263	17	0.222	PASS
GFSK	MCH	8	3.263	17	0.222	PASS
GFSK	HCH	8	3.263	16	0.209	PASS

Test Graph

Graphs	
GFSK/LCH	 

GFSK/MCH	 Trig: Free Run #Atten: 20 dB #Avg Type: RMS ΔMkr1 3.263 ms 1.85 dB 10 dB/div Ref 10.00 dBm Center 2.441500000 GHz Res BW 1.0 MHz #VBW 3.0 MHz Span 0 Hz Sweep 10.13 ms (8001 pts) 1 Δ2 1 t (Δ) 3.263 ms (Δ) 1.85 dB 2 F 1 t 3.326 ms -73.16 dBm Marker Select Marker Normal Delta Fixed Off Properties More 1 of 2  Trig: Free Run #Atten: 20 dB #Avg Type: RMS 10 dB/div Ref 10.00 dBm Center 2.441500000 GHz Res BW 1.0 MHz #VBW 3.0 MHz Span 0 Hz Sweep 2.000 s (8001 pts) Marker Select Marker Normal Delta Fixed Off Properties More 1 of 2

GFSK/HCH	 Trig: Free Run #Atten: 20 dB #Avg Type: RMS ΔMkr1 3.263 ms 5.00 dB 10 dB/div Ref 10.00 dBm Center 2.477000000 GHz Res BW 1.0 MHz #VBW 3.0 MHz Span 0 Hz Sweep 10.13 ms (8001 pts) 1 Δ2 1 t (Δ) 3.263 ms (Δ) 5.00 dB 2 F 1 t 6.046 ms -70.09 dBm Marker Select Marker Normal Delta Fixed Off Properties More 1 of 2  Trig: Free Run #Atten: 20 dB #Avg Type: RMS 10 dB/div Ref 10.00 dBm Center 2.477000000 GHz Res BW 1.0 MHz #VBW 3.0 MHz Span 0 Hz Sweep 2.000 s (8001 pts) Marker Select Marker Normal Delta Fixed Off Properties More 1 of 2

Appendix D): Hopping Channel Number

Test Limit

According to §15.247(a)(1)(iii)

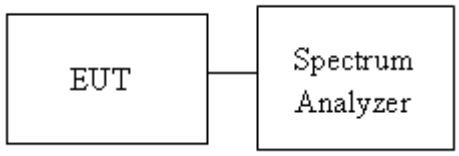
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

Test Procedure

Test method Refer as ANSI C63.10: 2013 clause 7.8.3

1. Place the EUT on the table and set it in transmitting mode.
2. EUT RF output port connected to the SA by RF cable.
3. Set spectrum analyzer Start Freq. = 2400 MHz, Stop Freq. = 2483.5 MHz, RBW =100KHz, VBW = 300KHz.
4. Max hold, view and count how many channel in the band.

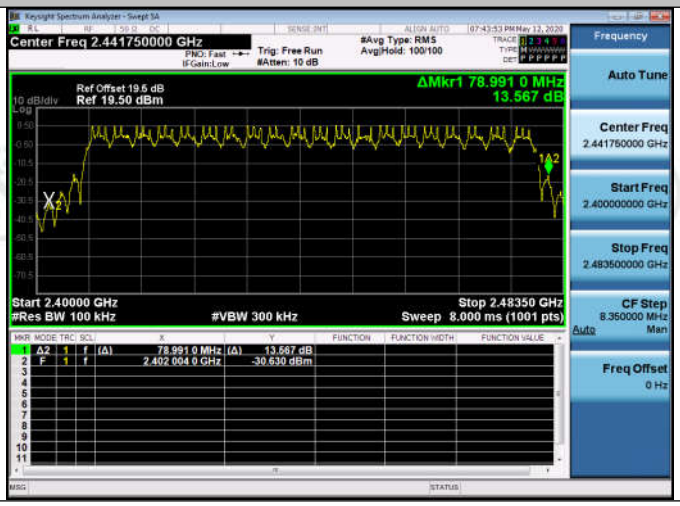
Test Setup



Result Table

Mode	Channel.	Number of Hopping Channel	Verdict
GFSK	Hop	20	PASS

Test Graph

Graphs			
GFSK/Hop			

Appendix E): Conducted Peak Output Power

Test Limit

According to §15.247(b)(1).

Peak output power :

FCC

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.

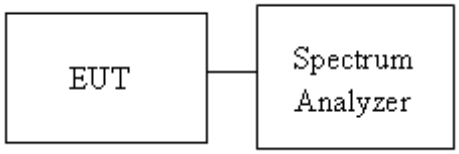
Limit	☒ Antenna not exceed 6 dBi：21dBm ☐ Antenna with DG greater than 6 dBi：21dBm [Limit = 30 – (DG – 6)]

Average output power：For reporting purposes only.

Test Procedure

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT.
3. Spectrum analyzer settings are as follows：
   a) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
   b) RBW > 20 dB bandwidth of the emission being measured.
   c) VBW ≥ RBW.
   d) Sweep: Auto.
   e) Detector function: Peak.
   f) Trace: Max hold.
   g) Allow trace to stabilize.
   h) Use the marker-to-peak function to set the marker to the peak of the emission
4. Measure and record the result in the test report.

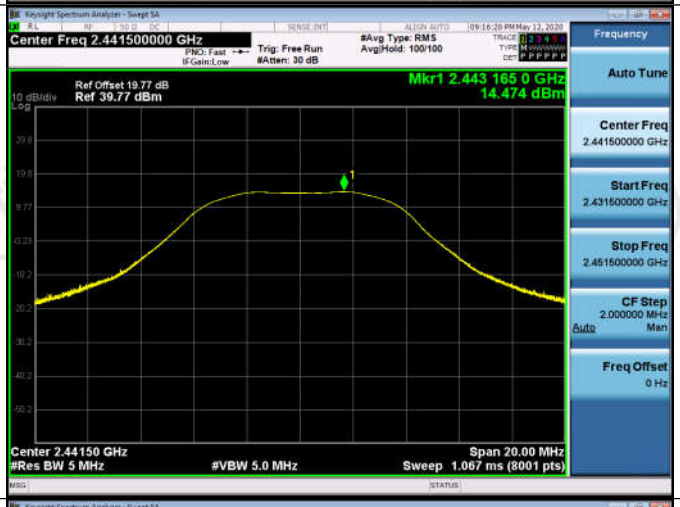
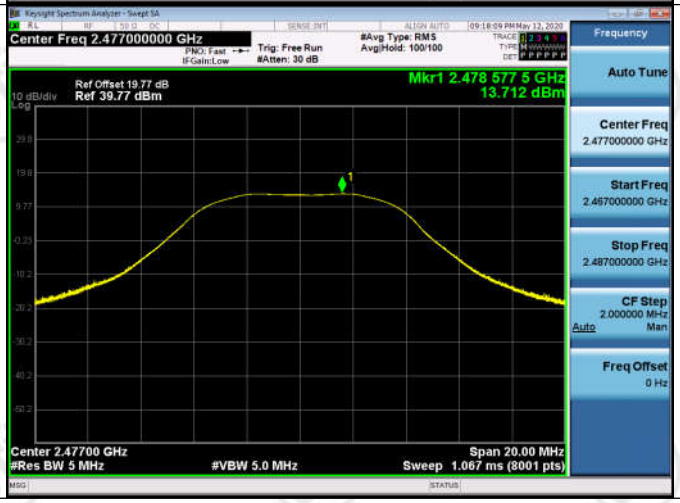
Test Setup



Result Table

Mode	Channel.	Maximum Peak Output Power [dBm]	Verdict
GFSK	LCH	14.222	PASS
GFSK	MCH	14.474	PASS
GFSK	HCH	13.712	PASS

Test Graph

Graphs		
GFSK/LCH		
GFSK/MCH		
GFSK/HCH		

Appendix F): Band-edge for RF Conducted Emissions

Test Limit

According to §15.247(d),

Limit	-20 dBc

.

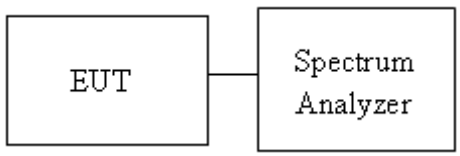
Test Procedure

1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.

2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.

3. The Band Edge at 2.4GHz and 2.4835GHz are investigated with normal hopping mode.

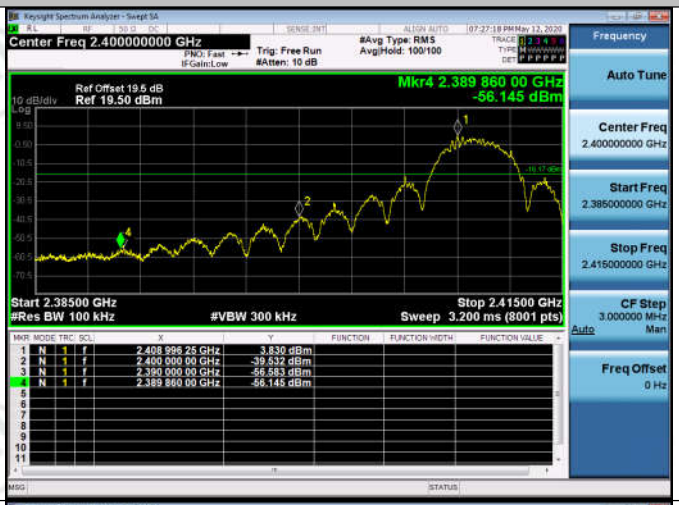
Test Setup



Result Table

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	3.830	Off	-56.145	-16.17	PASS
			9.535	On	-52.534	-10.47	PASS
GFSK	HCH	2480	8.443	Off	-30.914	-11.56	PASS
			9.357	On	-30.433	-10.64	PASS

Test Graph

Graphs		
GFSK/LCH/No Hop		
GFSK/LCH/Hop		

GFSK/HCH/No Hop		
GFSK/HCH/Hop		

Appendix G): RF Conducted Spurious Emissions

Test Limit

According to §15.247(d),

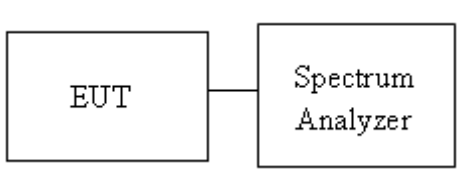
Limit	-20 dBc

Test Procedure

1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.

2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.

Test Setup

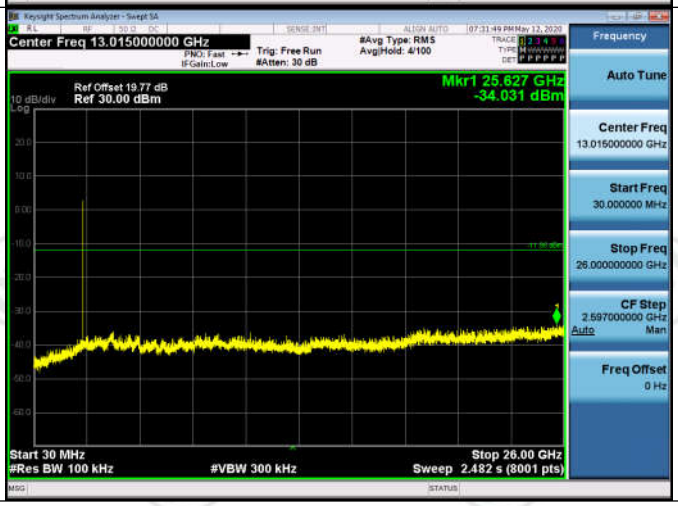


Result Table

Mode	Channel	Pref [dBm]	Puw[dBm]	Verdict
GFSK	LCH	9.178	<Limit	PASS
GFSK	MCH	8.053	<Limit	PASS
GFSK	HCH	9.055	<Limit	PASS

Test Graph

GFSK_LCH_Graphs		
Pref		
Puw		

GFSK_MCH_Graphs		
Pref		
Puw		

GFSK_HCH_Graphs		
Pref		
Puw		

Appendix H): Pseudorandom Frequency Hopping Sequence

Test Requirement:	47 CFR Part 15**C Section 15.247 (a)(1) requirement:**
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	
Hopping Mechanism VA-IH006BU family use adaptive frequency hopping. There are at 20 radio non-overlap channels (above 20dBc) in the 2.4GHz ISM band. The channel transmission bandwidth is about 3.5MHz. We can allocate 20 non-overlap channels between 2410MHz to 2477MHz. Like AFH of Bluetooth, VA-IH006BU provide smart channel selection algorithm to avoid radio interference from other 2.4GHz devices. The system will generate a pseudorandom ordered list base on: 1) A 8 bit factory ID(8 bit) 2) A 6 bit set number ID(6 bit)	

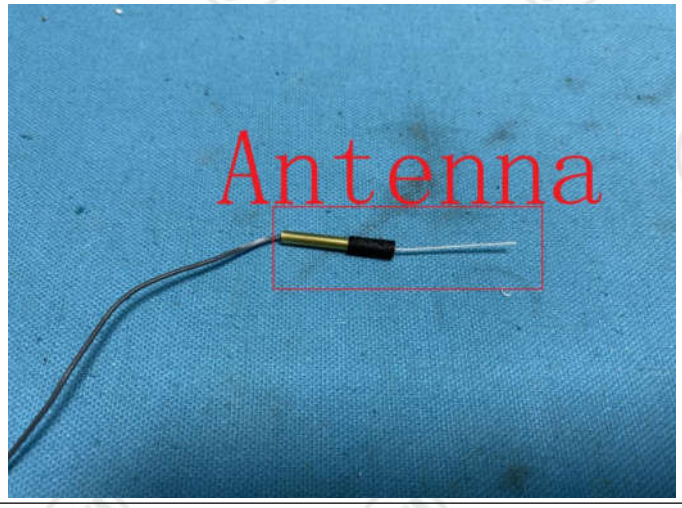
Appendix I): Antenna Requirement

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 External antenna and no consideration of replacement. The best case gain of the antenna is 0 dBi.

Appendix J): AC Power Line Conducted Emission

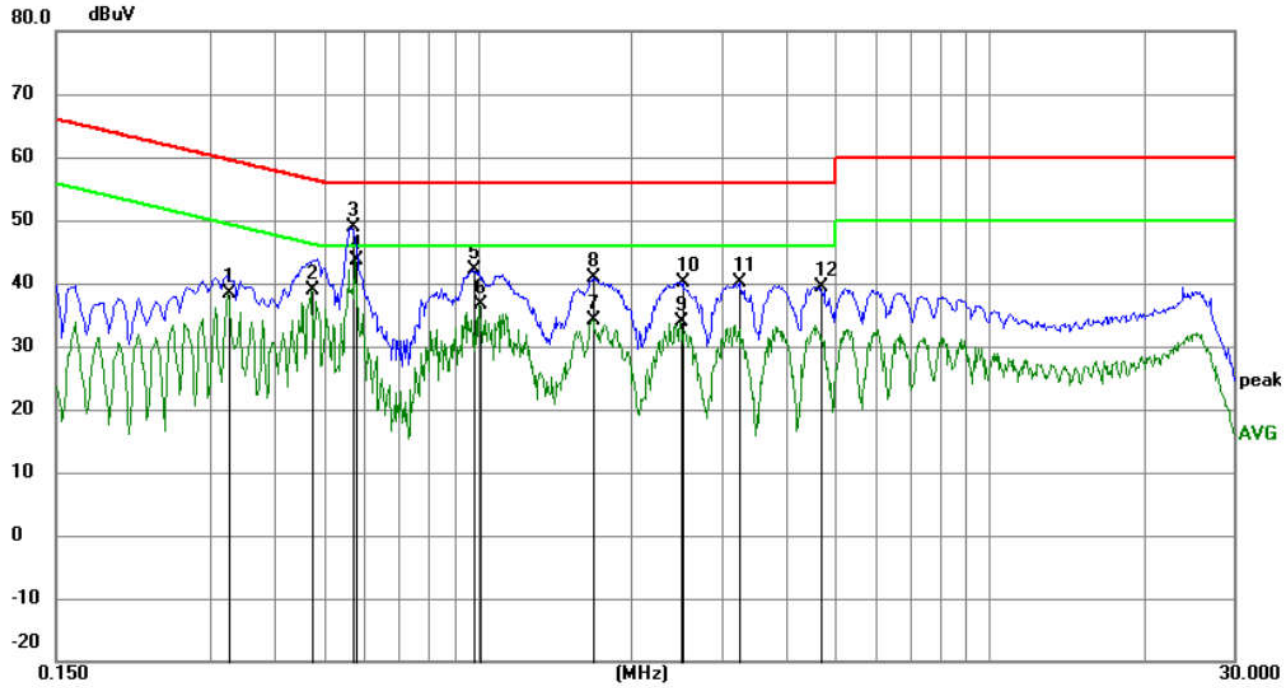
<table>
<tr><td>Test Procedure:</td><td>Test frequency range :150KHz-30MHz
1)The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. 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 was 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 on conducted measurement.</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBμV)</th></tr>
<tr><th>Quasi-peak</th><th>Average</th></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
* The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.
NOTE : The lower limit is applicable at the transition frequency</td></tr>
</table>

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

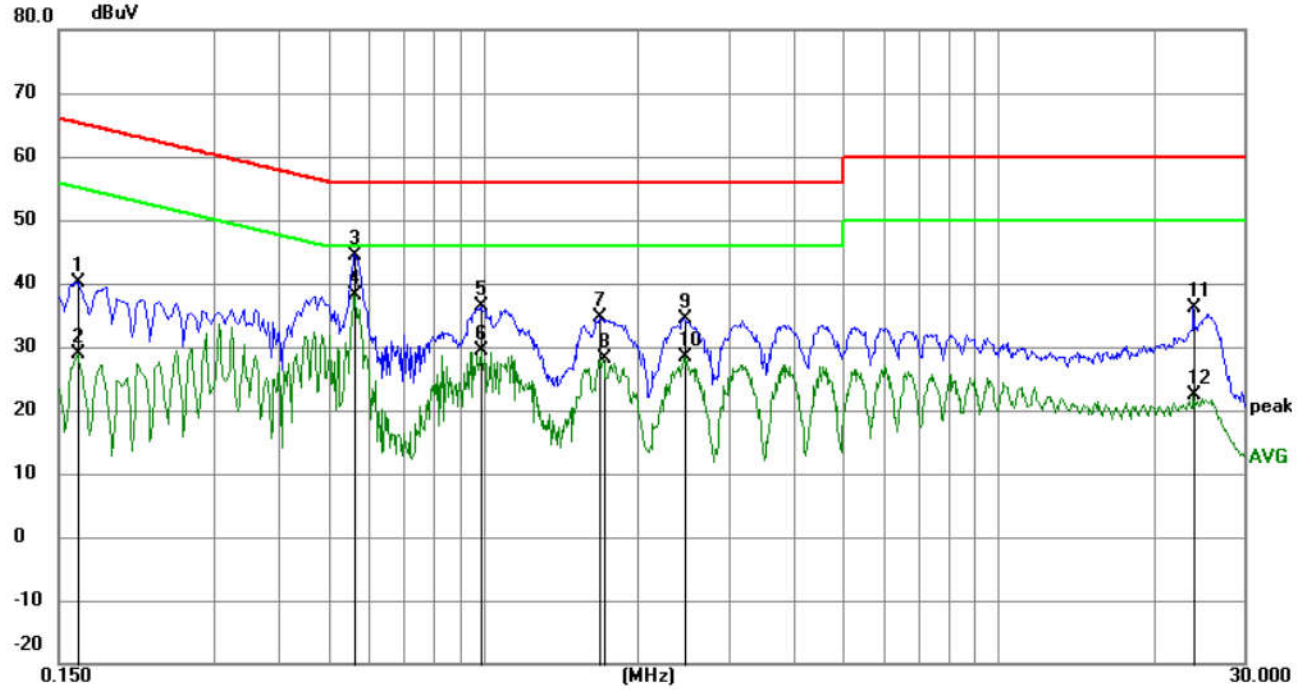
Product	:	Wireless Digital Video Monitoring System	**Model/Type reference**	:	DXR-Pro
Temperature	:	24℃	**Humidity**	:	52%

Live line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3255	28.41	10.04	38.45	49.57	-11.12	AVG	
2		0.4740	28.86	10.01	38.87	46.44	-7.57	AVG	
3		0.5685	38.77	10.00	48.77	56.00	-7.23	QP	
4	*	0.5775	33.70	10.00	43.70	46.00	-2.30	AVG	
5		0.9825	32.42	9.74	42.16	56.00	-13.84	QP	
6		1.0095	26.97	9.74	36.71	46.00	-9.29	AVG	
7		1.6800	24.29	9.77	34.06	46.00	-11.94	AVG	
8		1.6845	31.18	9.77	40.95	56.00	-15.05	QP	
9		2.4900	23.98	9.79	33.77	46.00	-12.23	AVG	
10		2.5170	30.41	9.79	40.20	56.00	-15.80	QP	
11		3.2415	30.43	9.78	40.21	56.00	-15.79	QP	
12		4.6905	29.67	9.77	39.44	56.00	-16.56	QP	

Neutral line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1635	30.28	9.87	40.15	65.28	-25.13	QP	
2		0.1635	19.03	9.87	28.90	55.28	-26.38	AVG	
3		0.5639	34.49	10.01	44.50	56.00	-11.50	QP	
4	*	0.5639	28.10	10.01	38.11	46.00	-7.89	AVG	
5		0.9915	26.74	9.74	36.48	56.00	-19.52	QP	
6		0.9915	19.64	9.74	29.38	46.00	-16.62	AVG	
7		1.6845	24.77	9.77	34.54	56.00	-21.46	QP	
8		1.7115	18.37	9.78	28.15	46.00	-17.85	AVG	
9		2.4539	24.47	9.79	34.26	56.00	-21.74	QP	
10		2.4539	18.64	9.79	28.43	46.00	-17.57	AVG	
11		24.0000	26.23	9.93	36.16	60.00	-23.84	QP	
12		24.0000	12.48	9.93	22.41	50.00	-27.59	AVG	

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

Appendix K): Restricted bands around fundamental frequency (Radiated)

Receiver Setup:

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

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 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. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel

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 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
h. b. Test the EUT in the lowest channel , the Highest channel
i. 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.
j. Repeat above procedures until all frequencies measured was complete.

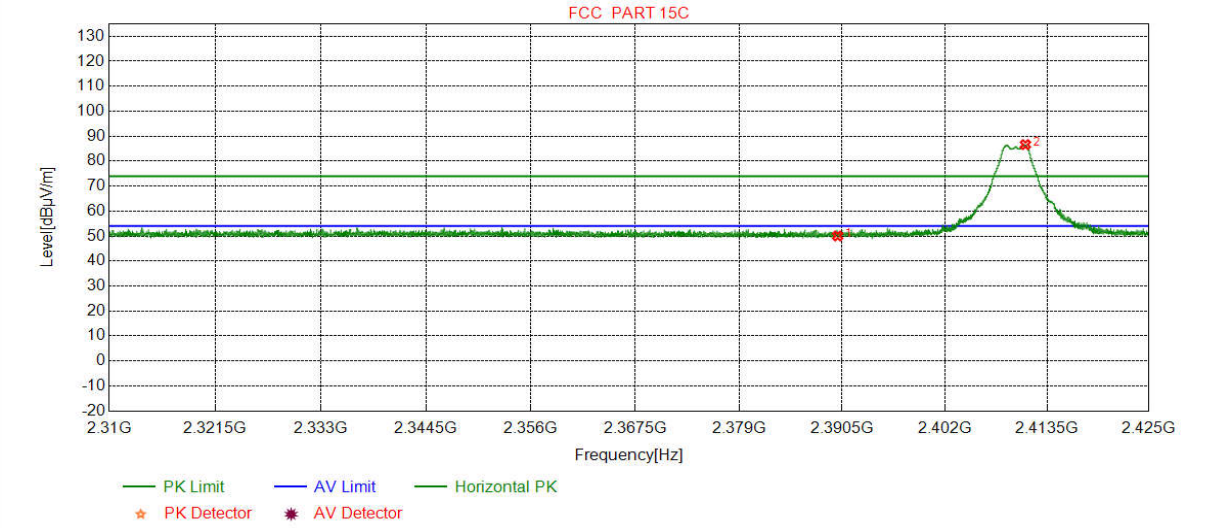
Limit:

Frequency	Limit (dBμV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

Test plot as follows:

Mode:	GFSK	Channel:	2410
Remark:	PK		

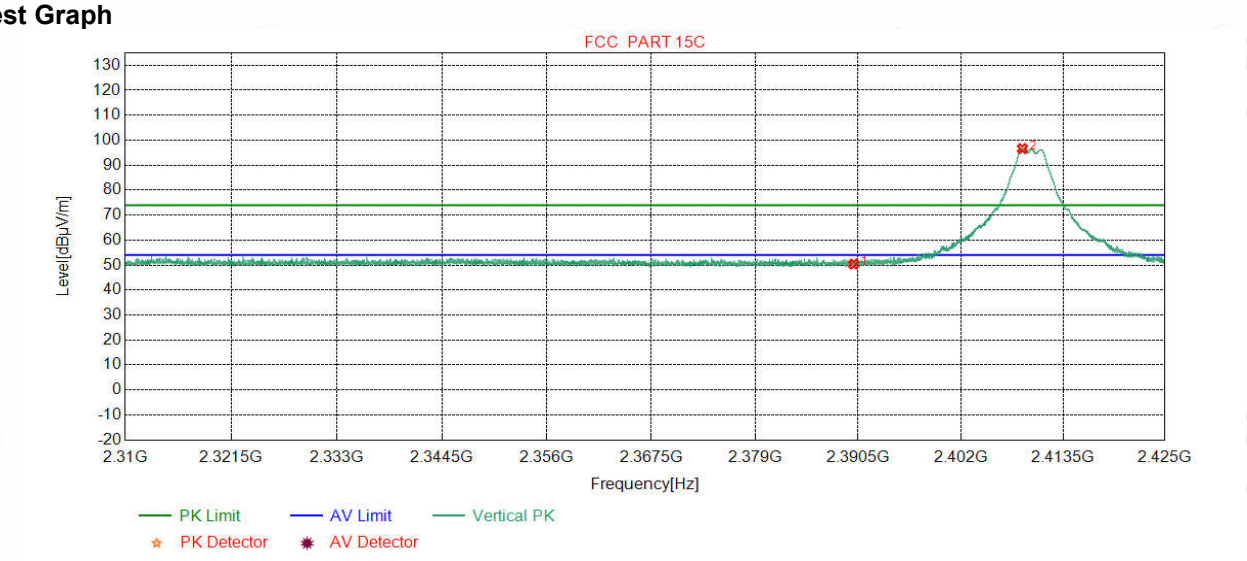
Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-43.12	47.54	50.04	74.00	23.96	Pass	Horizontal
2	2411.0611	32.28	13.35	-43.12	84.11	86.62	74.00	-12.62	Pass	Horizontal

Mode:	GFSK	Channel:	2410
Remark:	PK		

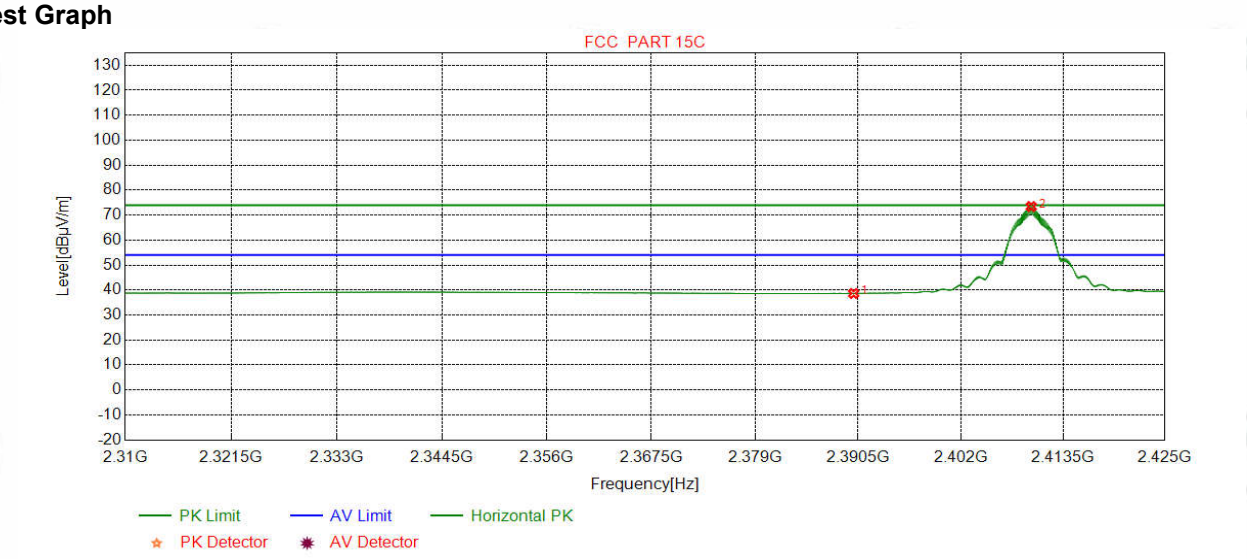
Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Preamp gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-43.12	47.88	50.38	74.00	23.62	Pass	Vertical
2	2408.9219	32.27	13.34	-43.11	94.14	96.64	74.00	-22.64	Pass	Vertical

Mode:	GFSK	Channel:	2410
Remark:	AV		

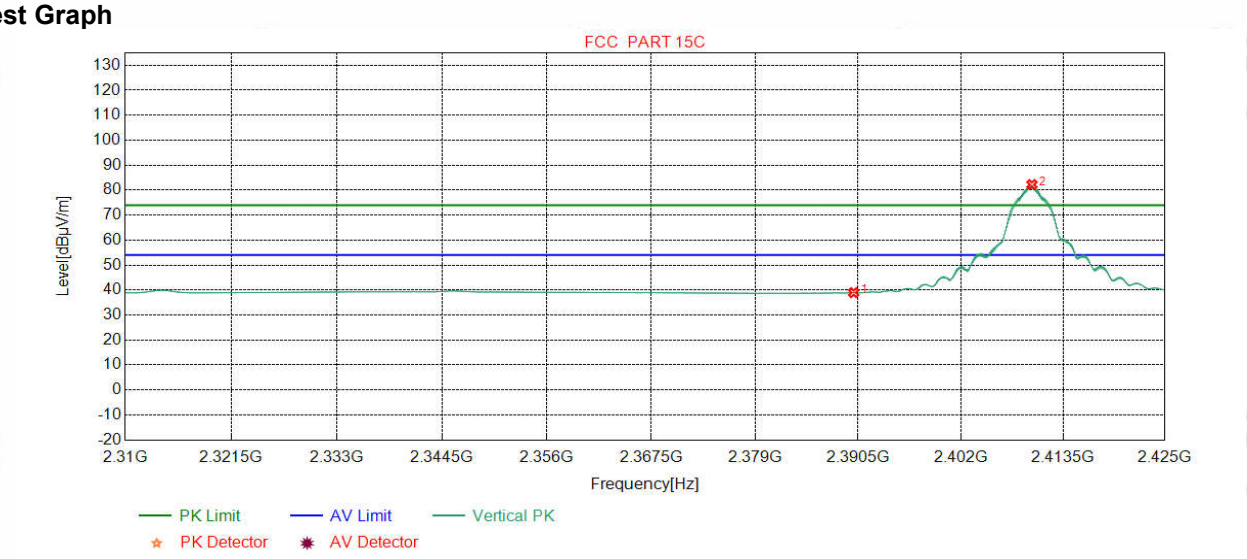
Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Preamp gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-43.12	36.13	38.63	54.00	15.37	Pass	Horizontal
2	2409.9187	32.27	13.35	-43.12	70.93	73.43	54.00	-19.43	Pass	Horizontal

Mode:	GFSK	Channel:	2410
Remark:	AV		

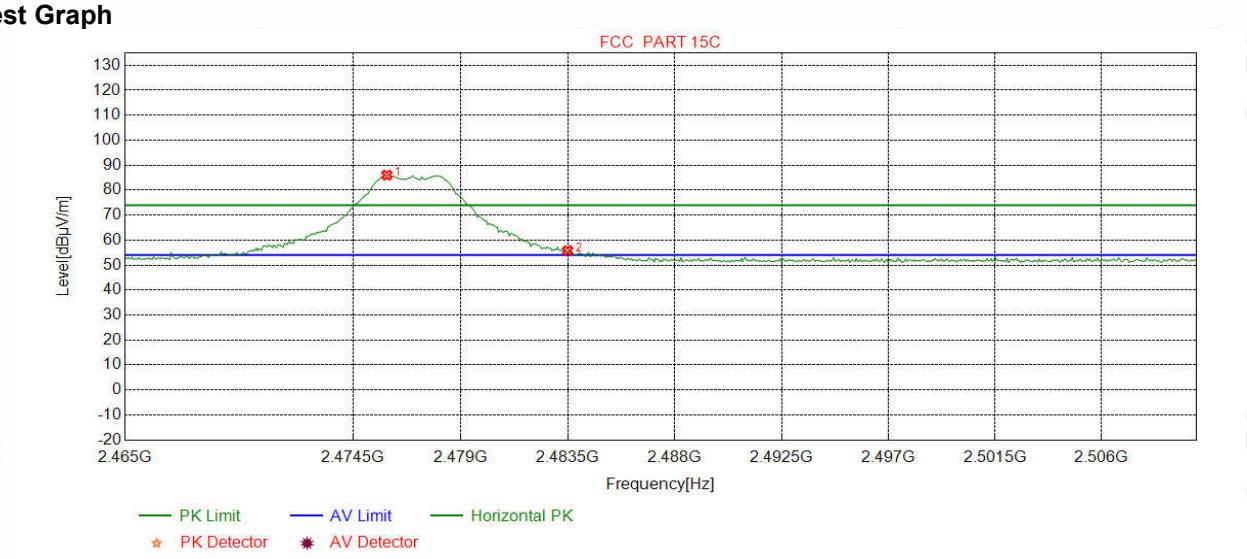
Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Preamp gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-43.12	36.46	38.96	54.00	15.04	Pass	Vertical
2	2409.9953	32.27	13.35	-43.12	79.73	82.23	54.00	-28.23	Pass	Vertical

Mode:	GFSK	Channel:	2477
Remark:	PK		

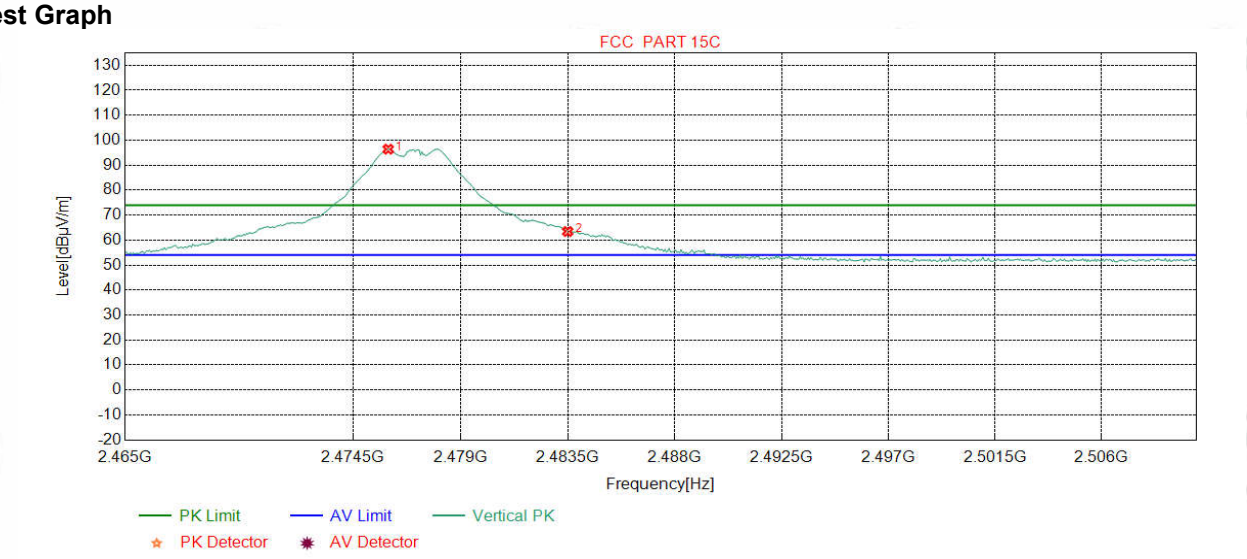
Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Preamp gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2475.9262	32.37	13.41	-43.11	83.34	86.01	74.00	-12.01	Pass	Horizontal
2	2483.5000	32.38	13.38	-43.11	53.14	55.79	74.00	18.21	Pass	Horizontal

Mode:	GFSK	Channel:	2477
Remark:	PK		

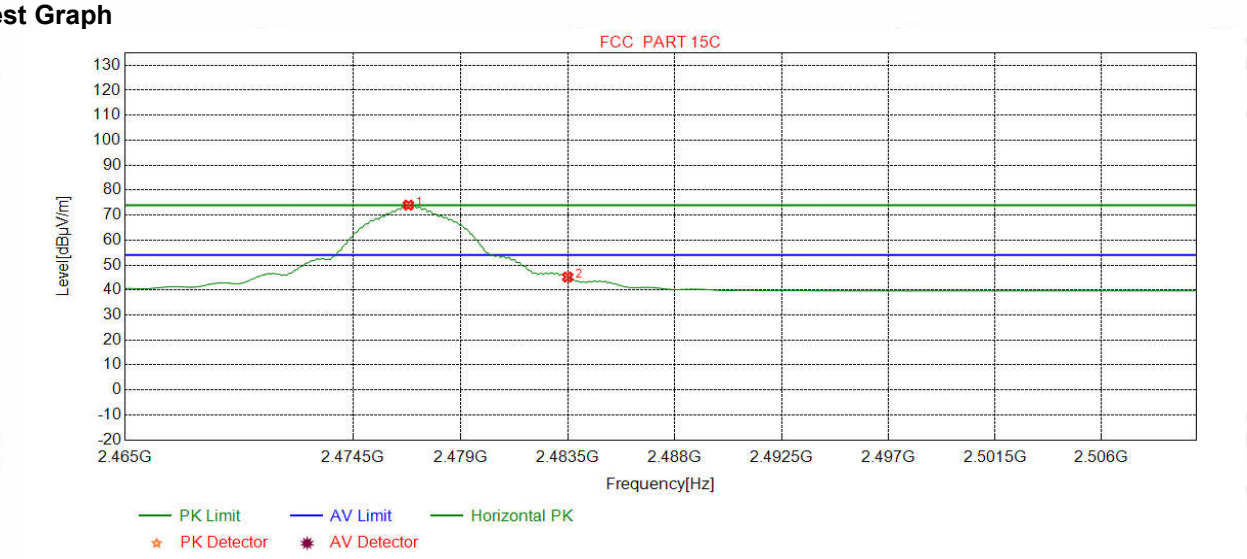
Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Preamp gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2475.9825	32.37	13.41	-43.11	93.73	96.40	74.00	-22.40	Pass	Vertical
2	2483.5000	32.38	13.38	-43.11	60.78	63.43	74.00	10.57	Pass	Vertical

Mode:	GFSK	Channel:	2477
Remark:	AV		

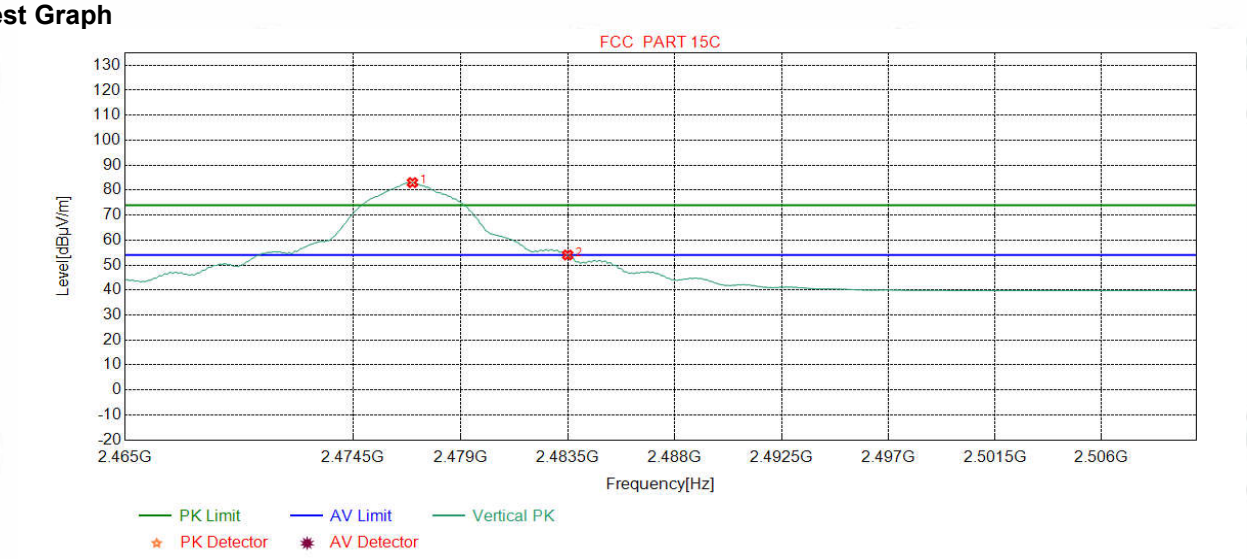
Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Preamp gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2476.8273	32.37	13.41	-43.11	71.31	73.98	54.00	-19.98	Pass	Horizontal
2	2483.5000	32.38	13.38	-43.11	42.54	45.19	54.00	8.81	Pass	Horizontal

Mode:	GFSK	Channel:	2477
Remark:	AV		

Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2476.9962	32.37	13.41	-43.11	80.35	83.02	54.00	-29.02	Pass	Vertical
2	2483.5000	32.38	13.38	-43.11	51.36	53.86	54.00	0.14	Pass	Vertical

Note:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading -Correct Factor

Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

Appendix L): Radiated Spurious Emissions

Receiver Setup:

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

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 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel
i. 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.
j. Repeat above procedures until all frequencies measured was complete.

Limit:

Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Radiated Spurious Emissions test Data:

Radiated Emission below 1GHz

Mode:		GFSK				Channel:		2441.5		
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity
1	129.0469	7.84	1.33	-32.02	39.55	16.70	43.50	26.80	Pass	H
2	240.0260	11.94	1.84	-31.90	39.12	21.00	46.00	25.00	Pass	H
3	319.9620	13.64	2.12	-31.83	39.25	23.18	46.00	22.82	Pass	H
4	439.9630	16.04	2.48	-31.88	40.09	26.73	46.00	19.27	Pass	H
5	519.9960	17.40	2.73	-31.93	38.19	26.39	46.00	19.61	Pass	H
6	600.0290	19.00	2.96	-31.50	39.18	29.64	46.00	16.36	Pass	H
7	129.4349	7.78	1.33	-32.02	38.53	15.62	43.50	27.88	Pass	V
8	240.0260	11.94	1.84	-31.90	39.10	20.98	46.00	25.02	Pass	V
9	319.9620	13.64	2.12	-31.83	38.72	22.65	46.00	23.35	Pass	V
10	439.9630	16.04	2.48	-31.88	39.24	25.88	46.00	20.12	Pass	V
11	600.0290	19.00	2.96	-31.50	39.10	29.56	46.00	16.44	Pass	V
12	812.5773	21.05	3.43	-31.99	35.14	27.63	46.00	18.37	Pass	V

Transmitter Emission above 1GHz

Mode:			GFSK				Channel:		2410		
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1080.0080	27.98	2.54	-43.02	62.44	49.94	74.00	24.06	Pass	H	PK
2	1296.0296	28.20	2.74	-42.79	59.17	47.32	74.00	26.68	Pass	H	PK
3	3198.0132	33.28	4.65	-43.10	49.83	44.66	74.00	29.34	Pass	H	PK
4	4818.1212	34.50	4.59	-42.80	64.42	60.71	74.00	13.29	Pass	H	PK
5	7570.3047	36.57	5.95	-42.11	49.78	50.19	74.00	23.81	Pass	H	PK
6	9212.4142	37.66	6.48	-42.05	49.42	51.51	74.00	22.49	Pass	H	PK
7	4818.1203	34.50	4.59	-42.80	53.37	49.66	54.00	4.34	Pass	H	AV
8	1079.8080	27.98	2.54	-43.02	58.13	45.63	74.00	28.37	Pass	V	PK
9	1319.6320	28.22	2.78	-42.77	55.54	43.77	74.00	30.23	Pass	V	PK
10	3024.0016	33.21	4.88	-43.10	51.81	46.80	74.00	27.20	Pass	V	PK
11	4822.1215	34.50	4.60	-42.80	57.46	53.76	74.00	20.24	Pass	V	PK
12	6453.2302	35.89	5.52	-42.51	49.88	48.78	74.00	25.22	Pass	V	PK
13	9180.4120	37.66	6.44	-42.03	49.20	51.27	74.00	22.73	Pass	V	PK

Mode:			GFSK				Channel:		2441.5		
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1079.8080	27.98	2.54	-43.02	61.77	49.27	74.00	24.73	Pass	H	PK
2	1295.8296	28.20	2.74	-42.79	58.87	47.02	74.00	26.98	Pass	H	PK
3	3951.0634	33.76	4.34	-43.01	50.58	45.67	74.00	28.33	Pass	H	PK
4	4881.1254	34.50	4.80	-42.80	65.50	62.00	74.00	12.00	Pass	H	PK
5	6088.2059	35.82	5.25	-42.59	49.81	48.29	74.00	25.71	Pass	H	PK
6	9161.4108	37.67	6.45	-42.04	49.65	51.73	74.00	22.27	Pass	H	PK
7	4881.1251	34.50	4.80	-42.80	54.25	50.75	54.00	3.25	Pass	H	AV
8	1080.4080	27.98	2.54	-43.01	57.09	44.60	74.00	29.40	Pass	V	PK
9	1319.8320	28.22	2.78	-42.77	55.29	43.52	74.00	30.48	Pass	V	PK
10	1924.6925	31.20	3.42	-43.01	53.49	45.10	74.00	28.90	Pass	V	PK
11	4881.1254	34.50	4.80	-42.80	57.58	54.08	74.00	19.92	Pass	V	PK
12	7614.3076	36.55	6.11	-42.11	49.18	49.73	74.00	24.27	Pass	V	PK
13	9282.4188	37.64	6.63	-42.06	50.15	52.36	74.00	21.64	Pass	V	PK
14	4881.1262	34.50	4.80	-42.80	46.11	42.61	54.00	11.39	Pass	V	AV

Mode:			GFSK				Channel:		2477		
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Preamp gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1080.2080	27.98	2.54	-43.02	61.98	49.48	74.00	24.52	Pass	H	PK
2	1296.0296	28.20	2.74	-42.79	59.65	47.80	74.00	26.20	Pass	H	PK
3	4012.0675	33.82	4.33	-43.00	50.60	45.75	74.00	28.25	Pass	H	PK
4	4956.1304	34.50	4.82	-42.80	66.34	62.86	74.00	11.14	Pass	H	PK
5	6910.2607	36.06	5.87	-42.25	49.99	49.67	74.00	24.33	Pass	H	PK
6	9296.4198	37.64	6.64	-42.06	49.32	51.54	74.00	22.46	Pass	H	PK
7	4956.1300	34.50	4.82	-42.80	53.77	50.29	54.00	3.71	Pass	H	AV
8	1080.2080	27.98	2.54	-43.02	56.61	44.11	74.00	29.89	Pass	V	PK
9	1319.8320	28.22	2.78	-42.77	55.77	44.00	74.00	30.00	Pass	V	PK
10	3940.0627	33.75	4.34	-43.01	50.10	45.18	74.00	28.82	Pass	V	PK
11	4952.1301	34.50	4.82	-42.80	56.19	52.71	74.00	21.29	Pass	V	PK
12	6971.2648	36.09	5.75	-42.21	49.35	48.98	74.00	25.02	Pass	V	PK
13	9289.4193	37.64	6.63	-42.05	49.63	51.85	74.00	22.15	Pass	V	PK

Note:
1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading -Correct Factor
Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor
2) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.