TEST REPORT

Product	:	2.4GWireless microphone
Trade mark	:	YOGA / Yo-tronics
Model/Type reference	:	YT-WM2400
Serial Number	:	N/A
Report Number	:	EED32L003131
FCC ID	:	2AUY3Y52601715
Date of Issue	:	Jan. 07, 2020
Test Standards	:	47 CFR Part 15 Subpart C
Test result	:	PASS

Prepared for:

Yo-tronics Technology Co., Ltd
4F, No.21, Alley 10, Lane 321, Xinmin Rd, Neihu District, Taipei ,Taiwan

Prepared by:

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Compiled by: Smile Zhong — Smile Zhong

Reviewed by: Ware Xin — Ware Xin

Approved by: Sam Chuang — Sam Chuang

Date: Jan. 07, 2020

Check No.:3096330252

2 Version

Version No.	Date	Description
00	Jan. 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)(3)	ANSI C63.10-2013	PASS
6dB Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.247 (a)(2)	ANSI C63.10-2013	PASS
Power Spectral Density	47 CFR Part 15 Subpart C Section 15.247 (e)	ANSI C63.10-2013	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	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
Restricted bands around fundamental frequency (Radiated Emission)	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.

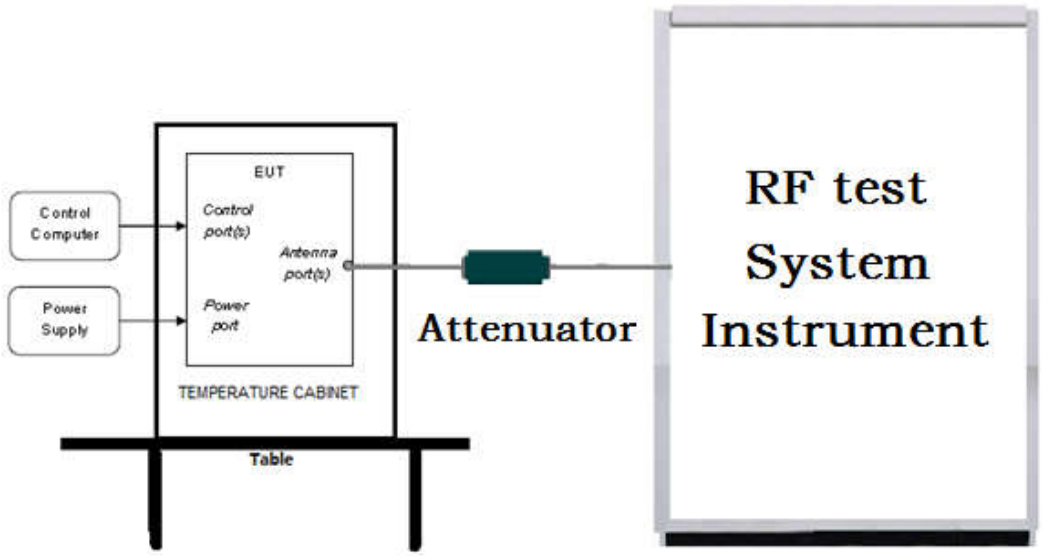
The tested sample(s) and the sample information are provided by the client.

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:

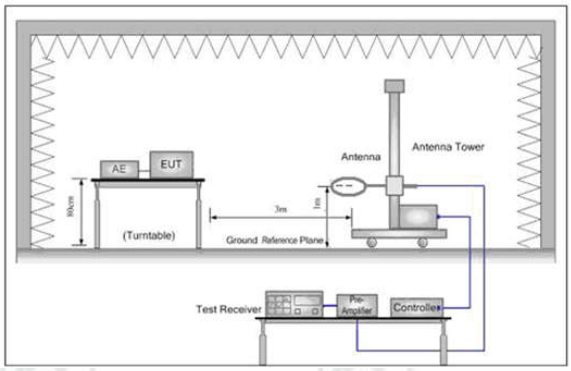


Figure 1. Below 30MHz

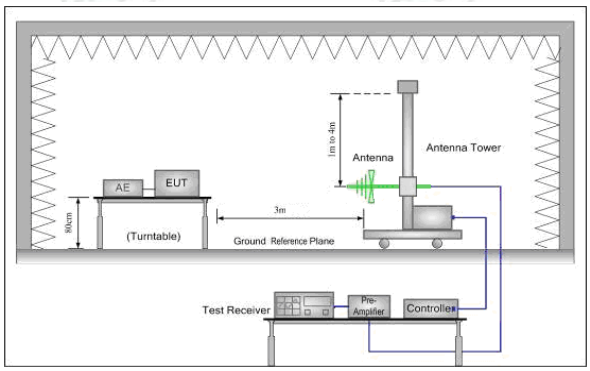


Figure 2. 30MHz to 1GHz

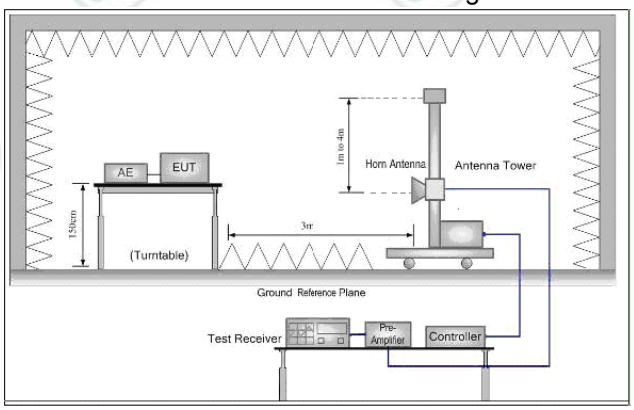
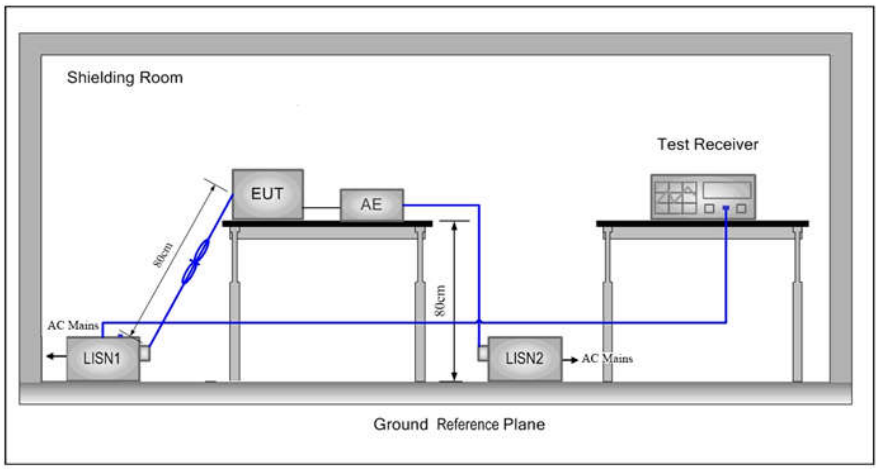


Figure 3. Above 1GHz

5.1.3 For Conducted Emissions test setup

Conducted Emissions setup



5.2 Test Environment

Operating Environment:	
Temperature:	23.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010mbar

5.3 Test Condition

Test Mode	Tx	RF Channel		
		Low(L)	Middle(M)	High(H)
GFSK	2407MHz ~2477 MHz	Channel 1	Channel 18	Channel 36
		2407MHz	2441MHz	2477MHz

6 General Information

6.1 Client Information

Applicant:	Yo-tronics Technology Co., Ltd
Address of Applicant:	4F, No.21, Alley 10, Lane 321, Xinmin Rd, Neihu District,Taipei ,Taiwan
Manufacturer:	KADA INTERNATIONAL LTD.,
Address of Manufacturer:	No.141, In Tai Road, In Tai Inadustiral Park, Da Lang Sub District, Long Hua New District, Shenzhen, Guangdong, China
Factory:	KADA INTERNATIONAL LTD.,
Address of Factory:	No.141, In Tai Road, In Tai Inadustiral Park, Da Lang Sub District, Long Hua New District, Shenzhen, Guangdong, China

6.2 General Description of EUT

Product Name:	2.4GWireless microphone	
Model No.(EUT):	YT-WM2400	
Trade Mark:	YOGA / Yo-tronics	
EUT Supports Radios application:	2407-2477MHz (2407MHz/2441MHz/2477MHz)	
Power Supply:	Battery	Model:523450, DC3.7V/1000mAh
Sample Received Date:	Oct. 28, 2019	
Sample tested Date:	Oct. 28, 2019 to Jan. 06, 2020	

6.3 Product Specification subjective to this standard

Operation Frequency:	2407MHz to 2477MHz
Channel Numbers:	36
Type of Modulation:	GFSK
Test Power Grade:	Default
Test Software of EUT:	Default
Antenna Type and Gain:	Type: PCB Antenna Gain:2.96dBi
Test Voltage:	DC 3.7V

Operation Frequency each of channel					
Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2407MHz	13	2431MHz	25	2455MHz
2	2409MHz	14	2433MHz	26	2457MHz
3	2411MHz	15	2435MHz	27	2459MHz
4	2413MHz	16	2437MHz	28	2461MHz
5	2415MHz	17	2439MHz	29	2463MHz
6	2417MHz	18	2441MHz	30	2465MHz
7	2419MHz	19	2443MHz	31	2467MHz
8	2421MHz	20	2445MHz	32	2469MHz
9	2423MHz	21	2447MHz	33	2471MHz
10	2425MHz	22	2449MHz	34	2473MHz
11	2427MHz	23	2451MHz	35	2475MHz
12	2429MHz	24	2453MHz	36	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	03-01-2019	02-29-2020
Signal Generator	Keysight	N5182B	MY53051549	03-01-2019	02-29-2020
Temperature/ Humidity Indicator	biaozhi	HM10	1804186	07-26-2019	07-25-2020
High-pass filter	Sinoscite	FL3CX03WG18N M12-0398-002	---	01-09-2019	01-08-2020
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	01-09-2019	01-08-2020
DC Power	Keysight	E3642A	MY56376072	03-01-2019	02-29-2020
PC-1	Lenovo	R4960d	---	03-01-2019	02-29-2020
BT&WI-FI Automatic control	R&S	OSP120	101374	03-01-2019	02-29-2020
RF control unit	JS Tonscend	JS0806-2	158060006	03-01-2019	02-29-2020
BT&WI-FI Automatic test software	JS Tonscend	JS1120-3	---	03-01-2019	02-29-2020

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	05-19-2020
Temperature/ Humidity Indicator	Defu	TH128	/	06-14-2019	06-13-2020
LISN	R&S	ENV216	100098	05-08-2019	05-07-2020
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	---	01-09-2019	01-08-2020
Temperature/ Humidity Indicator	Shanghai qixiang	HM10	1804298	07-26-2019	07-25-2020
Cable line	Fulai(7M)	SF106	5219/6A	01-09-2019	01-08-2020
Cable line	Fulai(6M)	SF106	5220/6A	01-09-2019	01-08-2020
Cable line	Fulai(3M)	SF106	5216/6A	01-09-2019	01-08-2020
Cable line	Fulai(3M)	SF106	5217/6A	01-09-2019	01-08-2020

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	03-27-2019	03-26-2020
Spectrum Analyzer	Keysight	N9020B	MY57111112	03-27-2019	03-26-2020
Spectrum Analyzer	Keysight	N9030B	MY57140871	03-27-2019	03-26-2020
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	05-21-2020
Preamplifier	EMCI	EMC001330	980563	05-08-2019	05-07-2020
Preamplifier	JS Tonscend	980380	EMC051845 SE	01-16-2019	01-15-2020
Temperature/ Humidity Indicator	biaozhi	GM1360	EE1186631	04-30-2019	04-29-2020
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	01-09-2019	01-08-2020
Cable line	Times	SFT205-NMSM-2.50M	394812-0002	01-09-2019	01-08-2020
Cable line	Times	SFT205-NMSM-2.50M	394812-0003	01-09-2019	01-08-2020
Cable line	Times	SFT205-NMSM-2.50M	393495-0001	01-09-2019	01-08-2020
Cable line	Times	EMC104-NMNM-1000	SN160710	01-09-2019	01-08-2020
Cable line	Times	SFT205-NMSM-3.00M	394813-0001	01-09-2019	01-08-2020
Cable line	Times	SFT205-NMNM-1.50M	381964-0001	01-09-2019	01-08-2020
Cable line	Times	SFT205-NMSM-7.00M	394815-0001	01-09-2019	01-08-2020
Cable line	Times	HF160-KMKM-3.00M	393493-0001	01-09-2019	01-08-2020

8 Radio Technical Requirements Specification

Reference documents for testing:

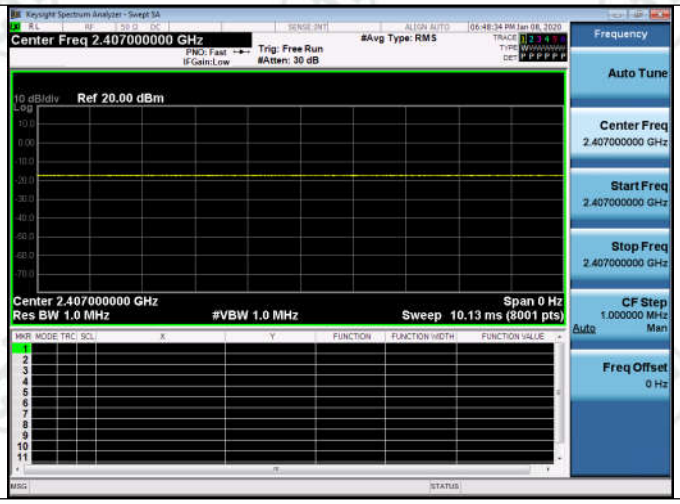
No.	Identity	Document Title
1	FCC Part15C (2015)	Subpart C-Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicesed Wireless Devices

Test Results List:

Test Requirement	Test method	Test item	Verdict	Note
Part15C Section 15.247 (b)(3)	ANSI 63.10	Conducted Peak Output Power	PASS	Appendix A)
Part15C Section 15.247 (a)(2)	ANSI 63.10	6dB Occupied Bandwidth	PASS	Appendix B)
Part15C Section 15.247(d)	ANSI 63.10	Band-edge for RF Conducted Emissions	PASS	Appendix C)
Part15C Section 15.247(d)	ANSI 63.10	RF Conducted Spurious Emissions	PASS	Appendix D)
Part15C Section 15.247 (e)	ANSI 63.10	Power Spectral Density	PASS	Appendix E)
Part15C Section 15.203/15.247 (c)	ANSI 63.10	Antenna Requirement	PASS	Appendix F)
Part15C Section 15.207	ANSI 63.10	AC Power Line Conducted Emission	PASS	Appendix G)
Part15C Section 15.205/15.209	ANSI 63.10	Restricted bands around fundamental frequency (Radiated Emission)	PASS	Appendix H)
Part15C Section 15.205/15.209	ANSI 63.10	Radiated Spurious Emissions	PASS	Appendix I)

EUT DUTY CYCLE

Duty Cycle		
TX ON(ms)	TX ALL(ms)	Duty Cycle(%)
1.000	1.000	100%



Appendix A): 6dB Occupied Bandwidth

Test Limit

According to §15.247(a)(2) and RSS-247 section 5.2(a)

6 dB Bandwidth：

Limit	Shall be at least 500kHz

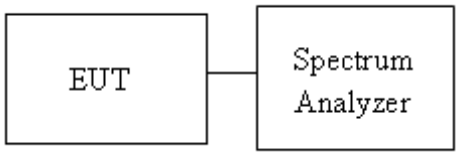
Occupied Bandwidth(99%)： For reporting purposes only.

Test Procedure

Test method Refer as KDB 558074 D01

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 6 dB Bandwidth.
4. SA set RBW = 30kHz, VBW = 100kHz and Detector = Peak, to measurement 99% Bandwidth.
5. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

Test Setup



Test Result

6db down:

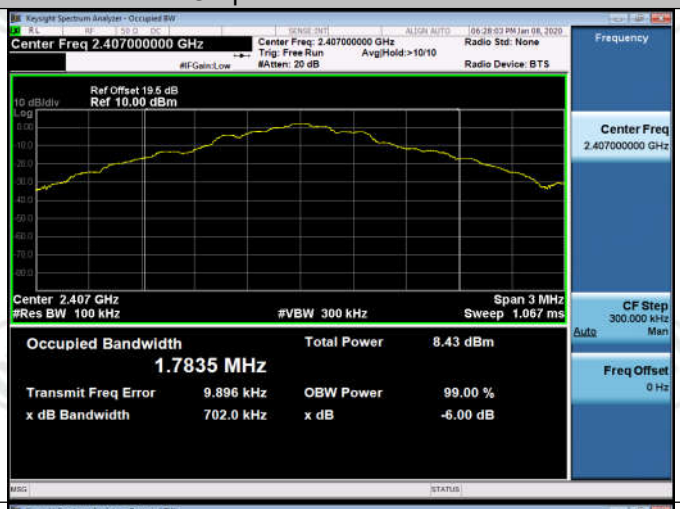
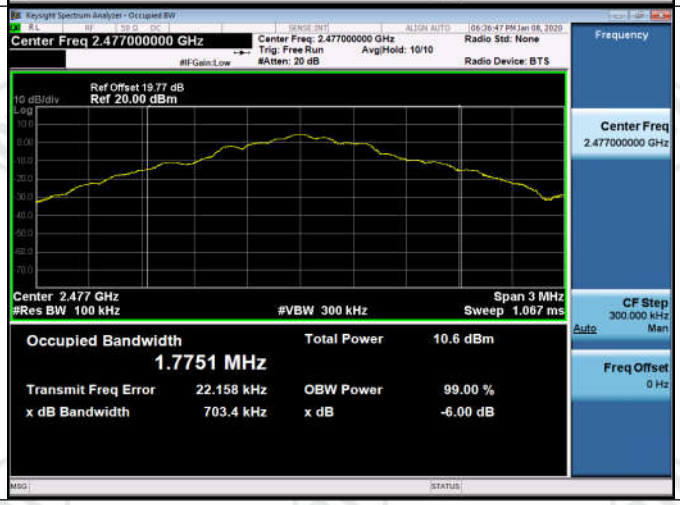
Channel	6dB Bandwidth [MHz]	Verdict
LCH	0.7020	PASS
MCH	0.6876	PASS
HCH	0.7034	PASS

99%OBW

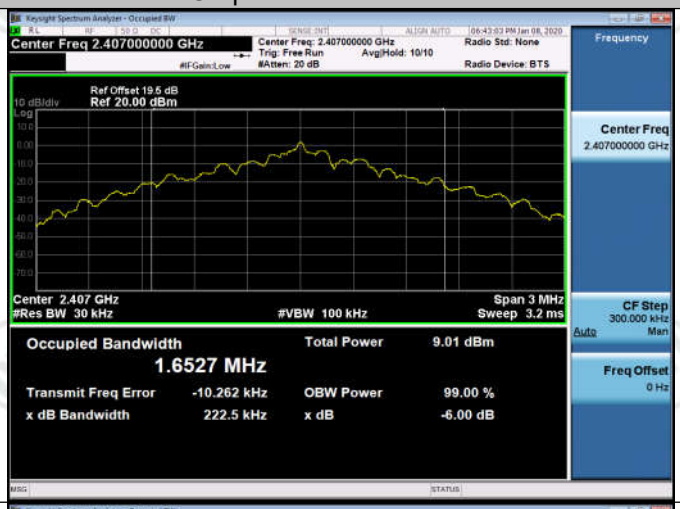
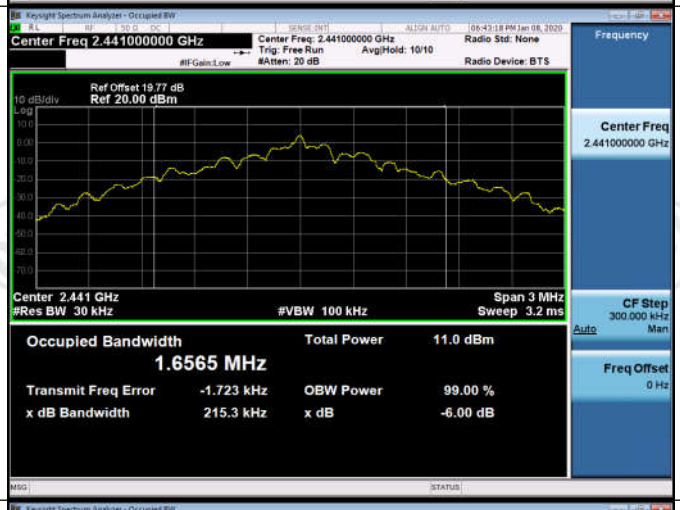
Channel	99% OBW[MHz]	Verdict
LCH	1.6527	PASS
MCH	1.6565	PASS
HCH	1.6429	PASS

Test Graphs

6db down：

Graphs		
LCH		
MCH		
HCH		

99%OBW:

Graphs		
LCH		
MCH		
HCH		

Appendix B): Conducted Peak Output Power

Test Limit

According to §15.247(b) and RSS-247 section 5.4(d)

Peak output power:

For systems using digital modulation in the 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt(30 dBm), base on the use of antennas with directional gain not exceed 6 dBi If transmitting antennas of directional gain greater than 6dBi are used the peak output power the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

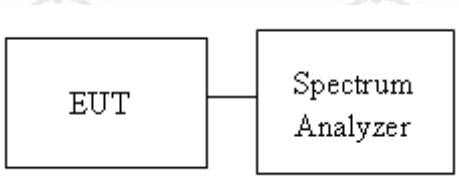
Limit	☒ Antenna not exceed 6 dBi：30dBm ☐ Antenna with DG greater than 6 dBi [Limit = 30 – (DG – 6)] ☐ Point-to-point operation

Test Procedure

Test method Refer as KDB 558074 D01 .

1. The EUT RF output connected to the power meter by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Peak output power and Average output power. in the test report.

Test Setup



Test Result

Channel	Conduct Peak Power[dBm]	Verdict
LCH	2.292	PASS
MCH	4.228	PASS
HCH	4.432	PASS

Test Graphs

Graphs		
LCH		
MCH		
HCH		

Appendix C): Band-edge for RF Conducted Emissions

Test Limit

According to §15.247(d) and RSS-247 section 5.5

In any 100 kHz bandwidth outside the authorized frequency band,

Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

Test Procedure

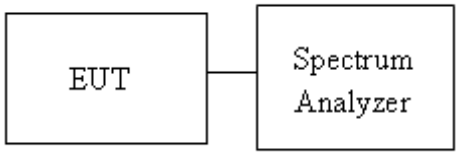
Test method Refer as KDB 558074 D01.

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. In any 100 kHz bandwidth outside the authorized frequency band, shall be attenuated at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when conducted power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Test Setup



Result Table

Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
LCH	2.365	-47.804	-17.64	PASS
HCH	4.627	-43.417	-15.37	PASS

Test Graphs

Graphs			
LCH			
HCH			

Appendix D): RF Conducted Spurious Emissions

Test Limit

According to §15.247(d) and RSS-247 section 5.5

In any 100 kHz bandwidth outside the authorized frequency band,

Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

Test Procedure

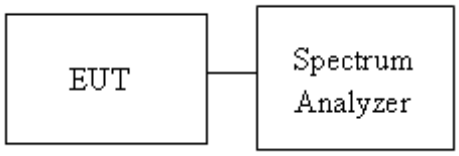
Test method Refer as KDB 558074 D01.

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. In any 100 kHz bandwidth outside the authorized frequency band, shall be attenuated at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when conducted power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

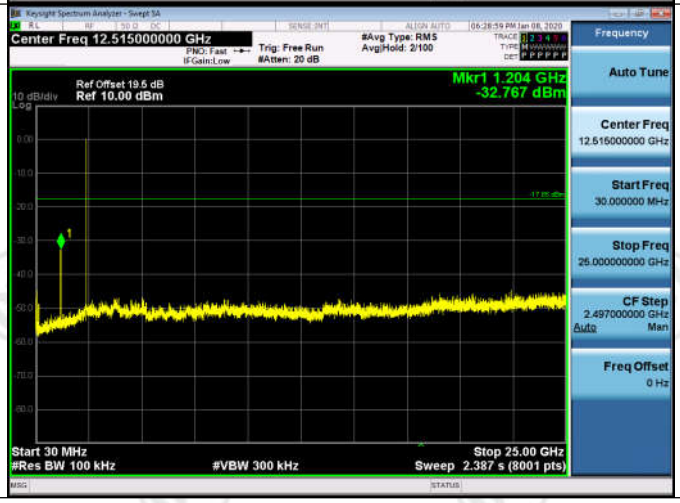
Test Setup

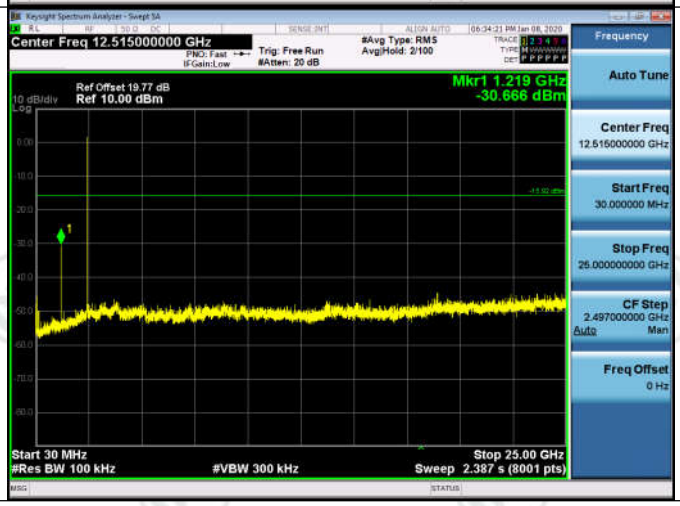


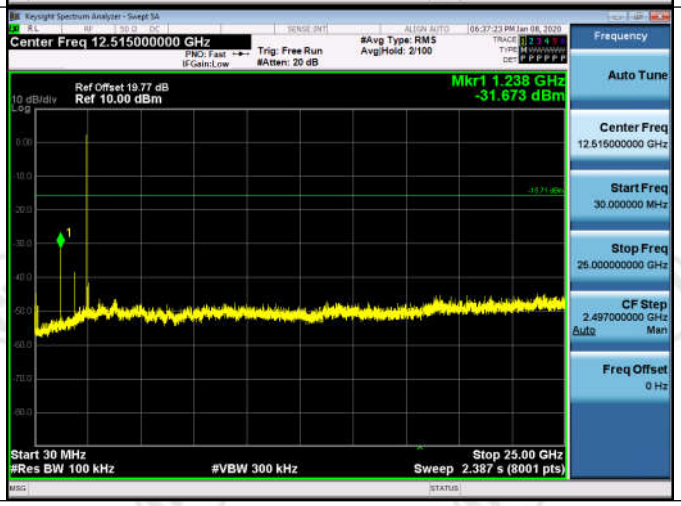
Result Table

Channel	Pref [dBm]	Puw[dBm]	Verdict
LCH	2.146	<Limit	PASS
MCH	4.08	<Limit	PASS
HCH	4.294	<Limit	PASS

Test Graphs

LCH_Graphs		
Pref/LCH		
Puw/LCH		

MCH_Graphs			
Pref/MCH			
Puw/MCH			

HCH_Graphs			
Pref/HCH			
Puw/HCH			

Appendix E): Power Spectral Density

Test Limit

According to §15.247(e) and RSS-247 section 5.2(b)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Limit	☒ Antenna not exceed 6 dBi：8dBm ☐ Antenna with DG greater than 6 dBi [Limit = 8 – (DG – 6)] ☐ Point-to-point operation：

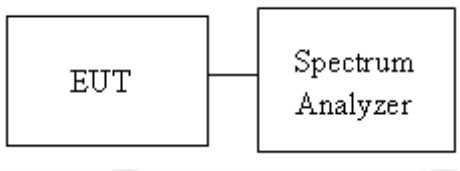
Test Procedure

Test method Refer as KDB 558074 D01.

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 3kHz, VBW = 30kHz, Span = 1.5 times DTS Bandwidth (6 dB BW), Detector = Peak, Sweep Time = Auto and Trace = Max hold.
4. The path loss and Duty Factor were compensated to the results for each measurement by SA.
5. Mark the maximum level.

Measure and record the result of power spectral density. in the test report.

Test Setup



Result Table

Channel	PSD [dBm]	Verdict
LCH	-8.970	PASS
MCH	-5.873	PASS
HCH	-6.411	PASS

Test Graphs

Graphs			
LCH			
MCH			
HCH			

Appendix F): Antenna Requirement

15.203 requirement:

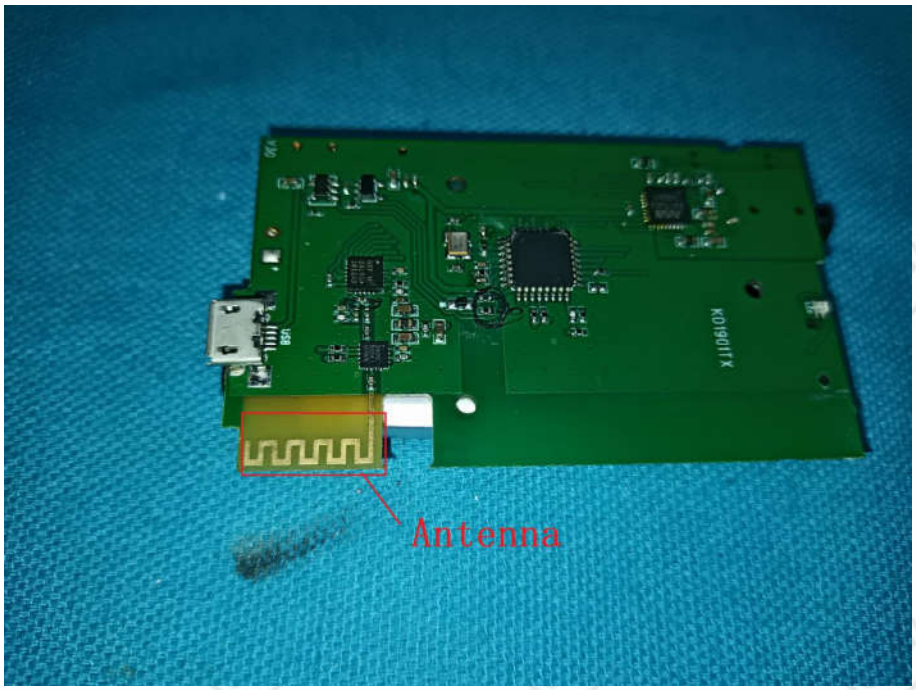
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit 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 integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.96dBi.



Appendix G): AC Power Line Conducted Emission

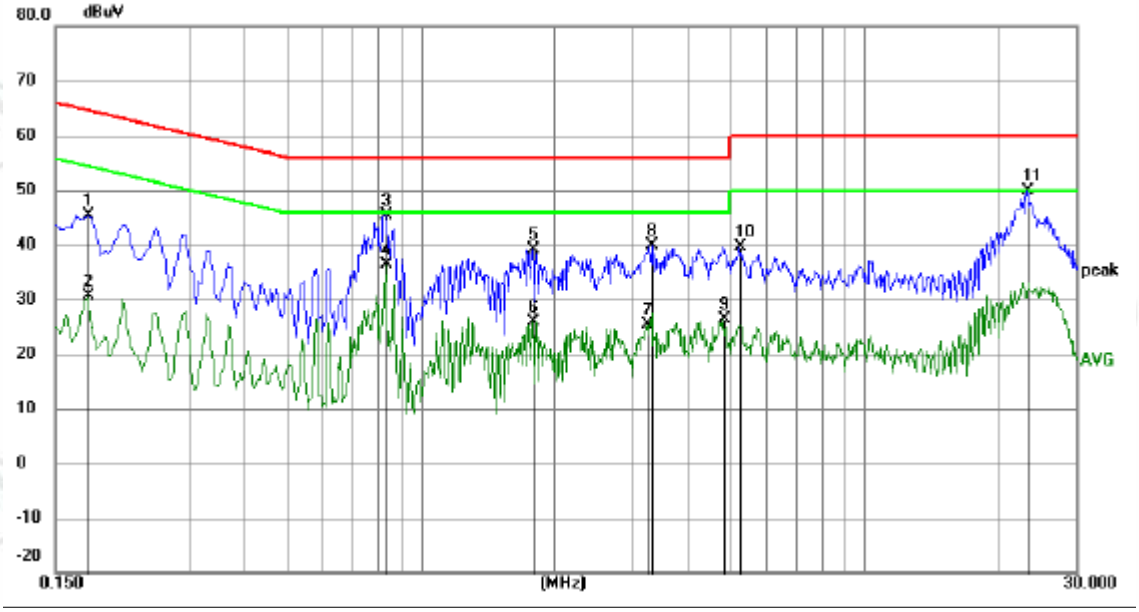
<table>
<tr><td>Test Procedure:</td><td>Test frequency range :150KHz-30MHz
1)The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. 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.

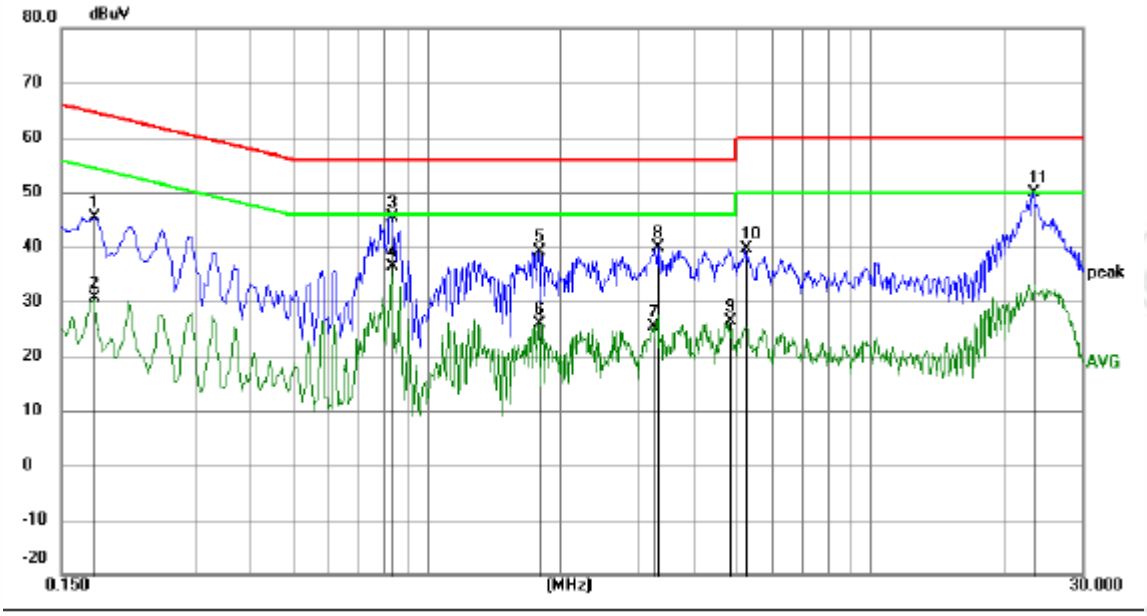
Product	:	2.4GWireless microphone	**Model/Type reference**	:	YT-WM2400
Temperature	:	24℃	**Humidity**	:	52%

Live line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1770	35.42	10.00	45.42	64.63	-19.21	QP	
2		0.1770	20.75	10.00	30.75	54.63	-23.88	AVG	
3		0.8340	35.57	9.91	45.48	56.00	-10.52	QP	
4	*	0.8340	26.42	9.91	36.33	46.00	-9.67	AVG	
5		1.7835	29.39	9.85	39.24	56.00	-16.76	QP	
6		1.7835	16.11	9.85	25.96	46.00	-20.04	AVG	
7		3.2415	15.52	9.83	25.35	46.00	-20.65	AVG	
8		3.3180	30.16	9.83	39.99	56.00	-16.01	QP	
9		4.8075	16.57	9.83	26.40	46.00	-19.60	AVG	
10		5.2215	29.78	9.83	39.61	60.00	-20.39	QP	
11		23.1450	39.88	9.95	49.83	60.00	-10.17	QP	

Neutral line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1770	35.42	10.00	45.42	64.63	-19.21	QP	
2		0.1770	20.75	10.00	30.75	54.63	-23.88	AVG	
3		0.8340	35.57	9.91	45.48	56.00	-10.52	QP	
4	*	0.8340	26.42	9.91	36.33	46.00	-9.67	AVG	
5		1.7835	29.39	9.85	39.24	56.00	-16.76	QP	
6		1.7835	16.11	9.85	25.96	46.00	-20.04	AVG	
7		3.2415	15.52	9.83	25.35	46.00	-20.65	AVG	
8		3.3180	30.16	9.83	39.99	56.00	-16.01	QP	
9		4.8075	16.57	9.83	26.40	46.00	-19.60	AVG	
10		5.2215	29.78	9.83	39.61	60.00	-20.39	QP	
11		23.1450	39.88	9.95	49.83	60.00	-10.17	QP	

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 H): 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 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. 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.

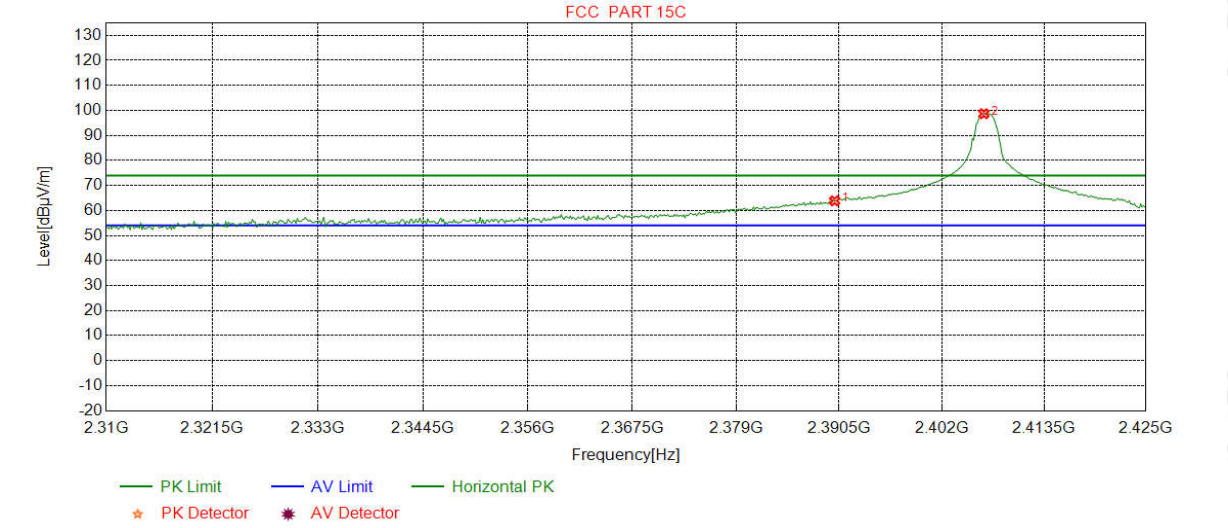
Limit:

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:	2407
Remark:	PK		

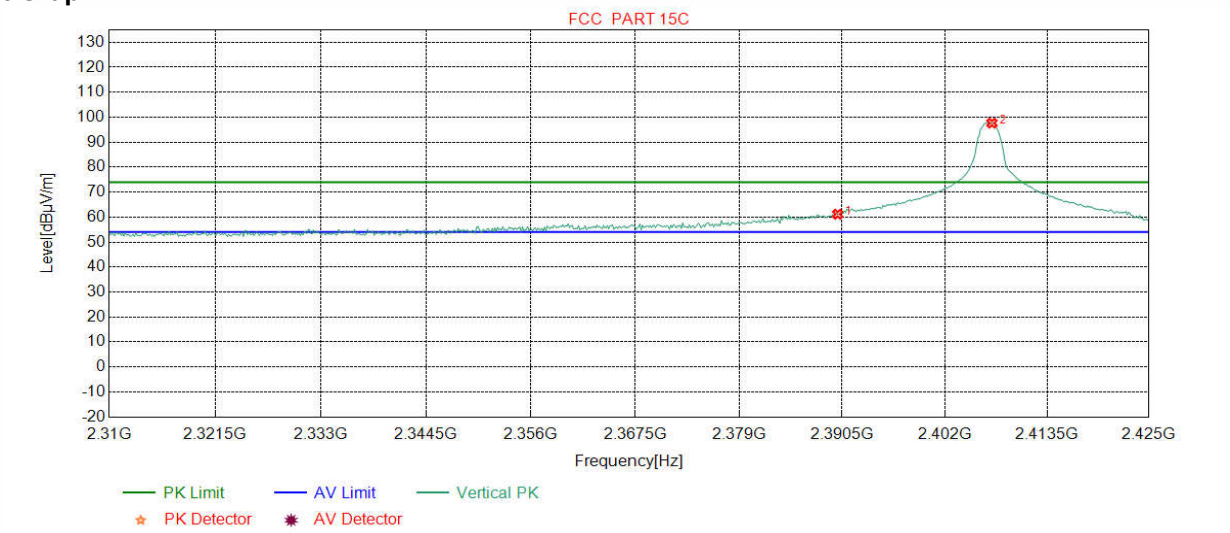
Test Graph



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	-42.44	60.67	63.85	74.00	10.15	Pass	Horizontal
2	2406.7209	32.27	13.33	-42.43	95.51	98.68	74.00	-24.68	Pass	Horizontal

Mode:	GFSK	Channel:	2407
Remark:	PK		

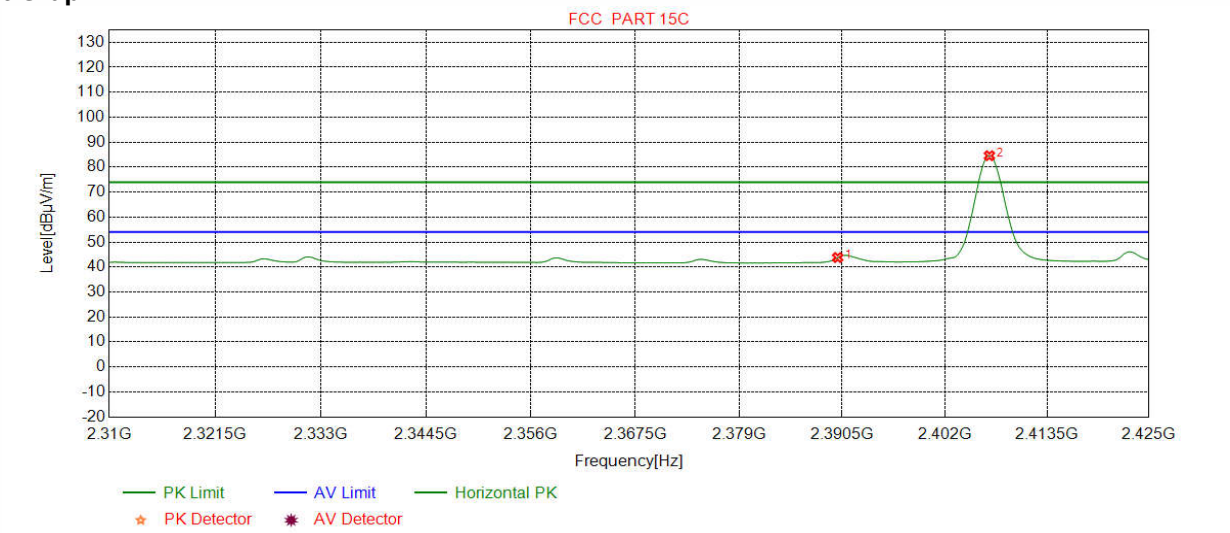
Test Graph



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	-42.44	57.96	61.14	74.00	12.86	Pass	Vertical
2	2407.2966	32.27	13.33	-42.43	94.47	97.64	74.00	-23.64	Pass	Vertical

Mode:	GFSK	Channel:	2407
Remark:	AV		

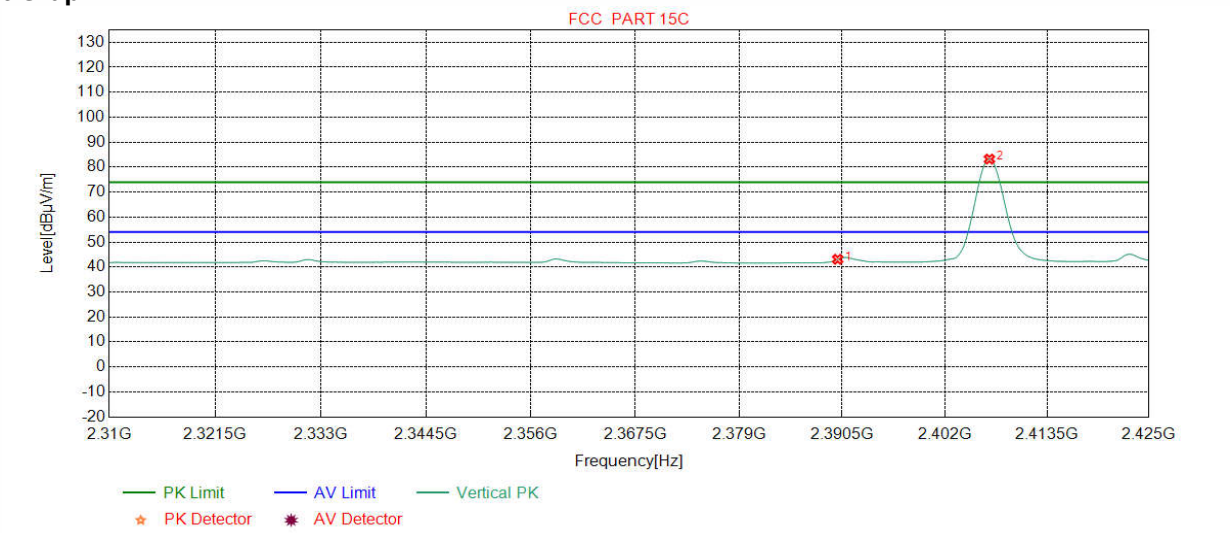
Test Graph



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	2390.0000	32.25	13.37	-42.44	40.62	43.80	54.00	10.20	Pass	Horizontal
2	2407.0088	32.27	13.33	-42.43	81.41	84.58	54.00	-30.58	Pass	Horizontal

Mode:	GFSK	Channel:	2407
Remark:	AV		

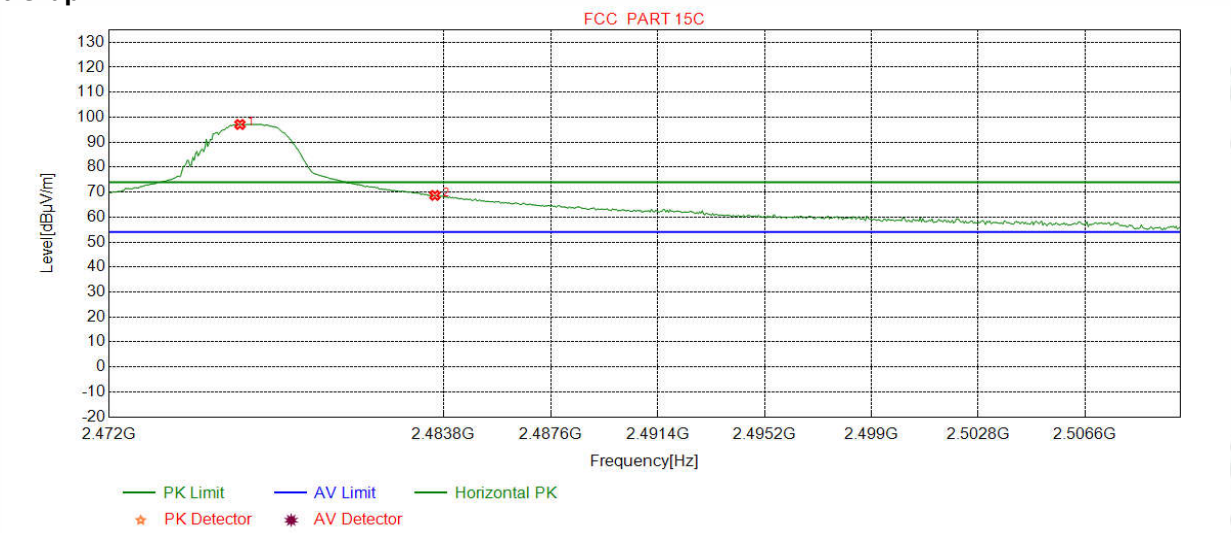
Test Graph



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	2390.0000	32.25	13.37	-42.44	39.93	43.11	54.00	10.89	Pass	Vertical
2	2407.0088	32.27	13.33	-42.43	80.05	83.22	54.00	-29.22	Pass	Vertical

Mode:	GFSK	Channel:	2477
Remark:	PK		

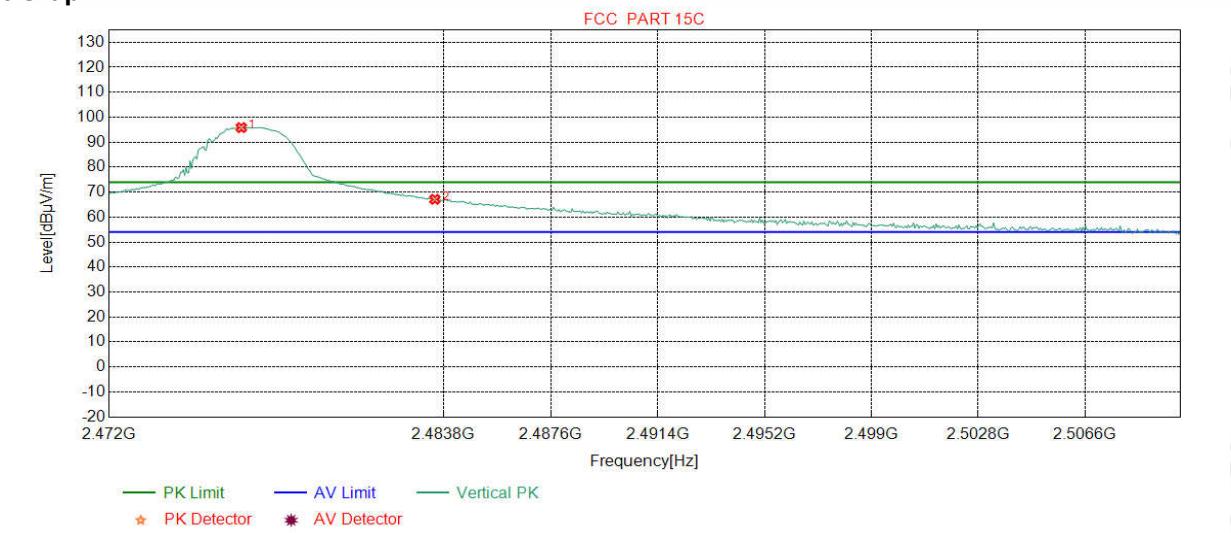
Test Graph



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	2476.6133	32.37	13.41	-42.41	93.72	97.09	74.00	-23.09	Pass	Horizontal
2	2483.5000	32.38	13.38	-42.40	65.32	68.68	74.00	5.32	Pass	Horizontal

Mode:	GFSK	Channel:	2477
Remark:	PK		

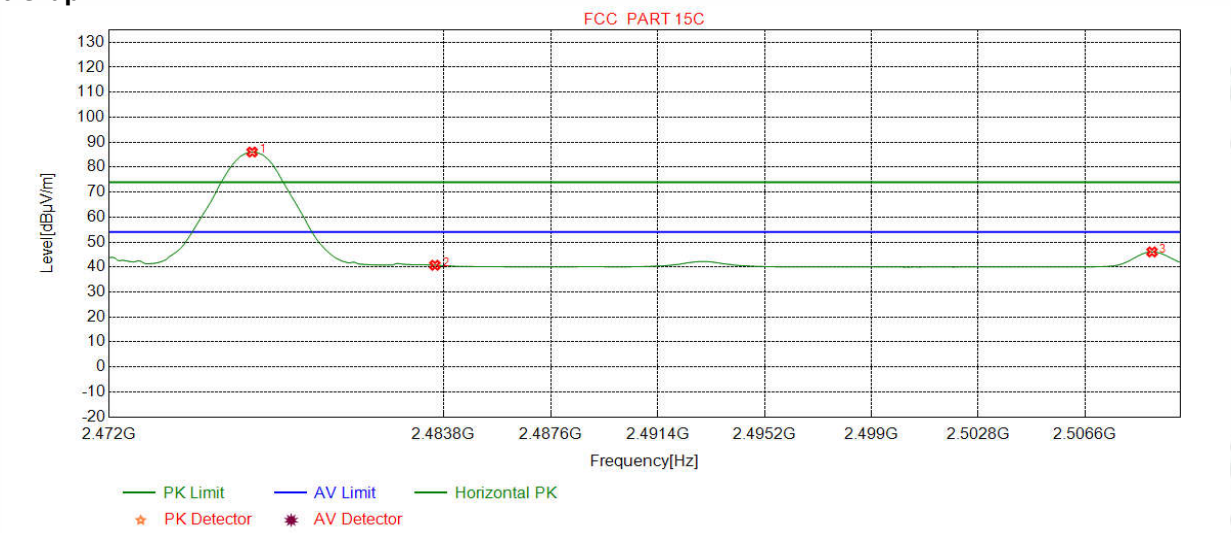
Test Graph



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	2476.6608	32.37	13.41	-42.41	92.46	95.83	74.00	-21.83	Pass	Vertical
2	2483.5000	32.38	13.38	-42.40	63.76	67.12	74.00	6.88	Pass	Vertical

Mode:	GFSK	Channel:	2477
Remark:	AV		

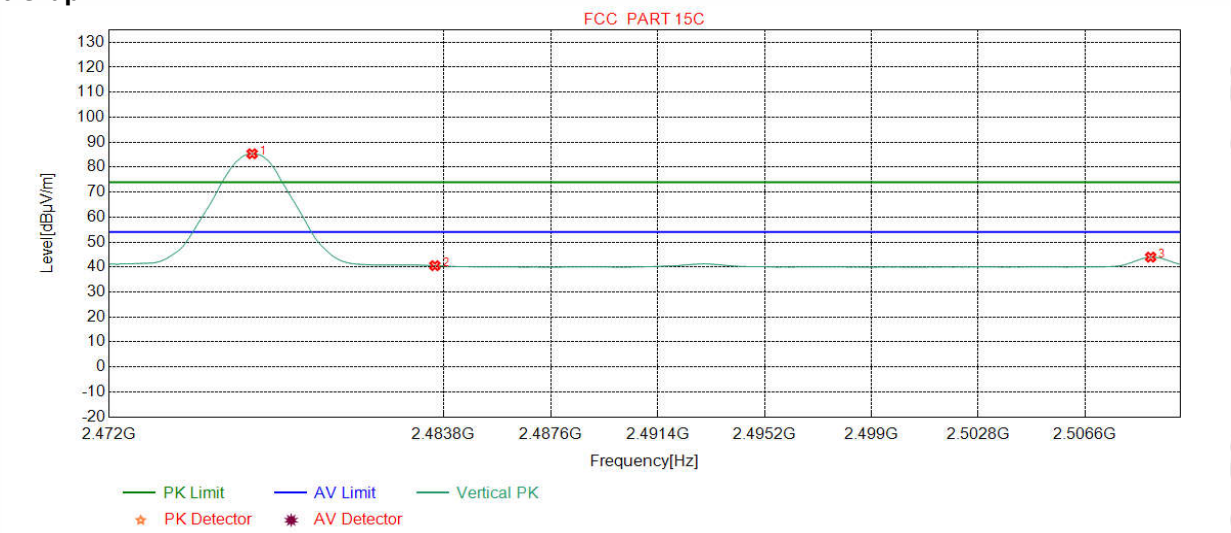
Test Graph



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	2477.0413	32.37	13.41	-42.41	82.67	86.04	54.00	-32.04	Pass	Horizontal
2	2483.5000	32.38	13.38	-42.40	37.36	40.72	54.00	13.28	Pass	Horizontal
3	2509.0013	32.41	13.39	-42.38	42.64	46.06	54.00	7.94	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	2477.0413	32.37	13.41	-42.41	82.00	85.37	54.00	-31.37	Pass	Vertical
2	2483.5000	32.38	13.38	-42.40	37.18	40.54	54.00	13.46	Pass	Vertical
3	2508.9537	32.41	13.39	-42.38	40.55	43.97	54.00	10.03	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 I): 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 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	
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	52.7003	12.77	0.82	-32.10	30.26	11.75	40.00	28.25	Pass	H	PK
2	104.9885	10.95	1.20	-32.06	32.43	12.52	43.50	30.98	Pass	H	PK
3	208.8859	11.13	1.71	-31.94	39.96	20.86	43.50	22.64	Pass	H	PK
4	325.0065	13.75	2.14	-31.79	36.67	20.77	46.00	25.23	Pass	H	PK
5	584.9925	18.70	2.91	-31.95	30.75	20.41	46.00	25.59	Pass	H	PK
6	872.5293	21.77	3.54	-31.72	30.82	24.41	46.00	21.59	Pass	H	PK
7	54.3494	12.50	0.83	-32.08	37.61	18.86	40.00	21.14	Pass	V	PK
8	110.0330	10.89	1.24	-32.07	38.49	18.55	43.50	24.95	Pass	V	PK
9	130.0170	7.70	1.33	-32.02	41.43	18.44	43.50	25.06	Pass	V	PK
10	208.8859	11.13	1.71	-31.94	42.10	23.00	43.50	20.50	Pass	V	PK
11	274.2704	12.69	1.97	-31.90	42.81	25.57	46.00	20.43	Pass	V	PK
12	411.4421	15.58	2.42	-31.83	38.71	24.88	46.00	21.12	Pass	V	PK

Transmitter Emission above 1GHz

Mode:			GFSK					Channel:		2407	
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	1691.8692	29.67	3.19	-42.68	51.18	41.36	74.00	32.64	Pass	H	PK
2	2840.5841	32.94	4.23	-42.20	51.24	46.21	74.00	27.79	Pass	H	PK
3	3611.0407	33.49	4.34	-41.59	51.95	48.19	74.00	25.81	Pass	H	PK
4	4814.1209	34.50	4.58	-40.65	51.26	49.69	74.00	24.31	Pass	H	PK
5	7430.2954	36.53	5.85	-40.83	49.65	51.20	74.00	22.80	Pass	H	PK
6	9220.4147	37.66	6.51	-40.77	49.15	52.55	74.00	21.45	Pass	H	PK
7	2702.1702	32.72	4.12	-42.28	52.69	47.25	74.00	26.75	Pass	V	PK
8	3610.0407	33.49	4.34	-41.59	50.83	47.07	74.00	26.93	Pass	V	PK
9	4814.1209	34.50	4.58	-40.65	55.81	54.24	74.00	19.76	Pass	V	PK
10	5584.1723	35.13	5.11	-40.71	50.12	49.65	74.00	24.35	Pass	V	PK
11	6251.2167	35.85	5.35	-41.14	49.42	49.48	74.00	24.52	Pass	V	PK
12	8526.3684	36.66	6.40	-40.57	49.23	51.72	74.00	22.28	Pass	V	PK
13	4814.0909	34.50	4.58	-40.65	51.73	50.16	54.00	3.84	Pass	V	AV

Mode:			GFSK					Channel:		2441	
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	1642.0642	29.34	3.13	-42.80	50.70	40.37	74.00	33.63	Pass	H	PK
2	2032.9033	31.75	3.53	-42.60	51.05	43.73	74.00	30.27	Pass	H	PK
3	3491.0327	33.40	4.48	-41.83	50.95	47.00	74.00	27.00	Pass	H	PK
4	4882.1255	34.50	4.81	-40.60	51.64	50.35	74.00	23.65	Pass	H	PK
5	6353.2235	35.87	5.45	-41.16	49.92	50.08	74.00	23.92	Pass	H	PK
6	7656.3104	36.54	6.16	-40.84	49.01	50.87	74.00	23.13	Pass	H	PK
7	1504.4504	28.43	2.99	-42.68	51.38	40.12	74.00	33.88	Pass	V	PK
8	3018.0012	33.21	4.89	-42.11	50.33	46.32	74.00	27.68	Pass	V	PK
9	3828.0552	33.66	4.36	-41.13	49.40	46.29	74.00	27.71	Pass	V	PK
10	4882.1255	34.50	4.81	-40.60	56.01	54.72	74.00	19.28	Pass	V	PK
11	6847.2565	36.04	5.50	-41.19	49.74	50.09	74.00	23.91	Pass	V	PK
12	8502.3668	36.61	6.48	-40.56	49.37	51.90	74.00	22.10	Pass	V	PK
13	4882.0555	34.50	4.81	-40.60	52.01	50.72	54.00	3.28	Pass	V	AV

Mode:			GFSK					Channel:		2477	
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	1709.0709	29.78	3.21	-42.67	50.87	41.19	74.00	32.81	Pass	H	PK
2	4051.0701	33.87	4.33	-40.79	50.08	47.49	74.00	26.51	Pass	H	PK
3	5012.1341	34.51	4.83	-40.50	51.12	49.96	74.00	24.04	Pass	H	PK
4	6475.2317	35.90	5.49	-41.19	49.62	49.82	74.00	24.18	Pass	H	PK
5	7648.3099	36.54	6.15	-40.84	48.85	50.70	74.00	23.30	Pass	H	PK
6	9017.4012	37.70	6.38	-40.69	49.21	52.60	74.00	21.40	Pass	H	PK
7	1907.4907	31.09	3.42	-42.66	51.81	43.66	74.00	30.34	Pass	V	PK
8	4954.1303	34.50	4.82	-40.54	56.04	54.82	74.00	19.18	Pass	V	PK
9	6030.2020	35.81	5.26	-41.10	49.97	49.94	74.00	24.06	Pass	V	PK
10	7491.2994	36.59	5.94	-40.78	49.04	50.79	74.00	23.21	Pass	V	PK
11	9152.4102	37.67	6.45	-40.74	49.29	52.67	74.00	21.33	Pass	V	PK
12	11297.5532	38.78	7.34	-41.28	48.59	53.43	74.00	20.57	Pass	V	PK
13	4954.0003	34.50	4.82	-40.54	51.93	50.71	54.00	3.29	Pass	V	AV

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*

3) 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.