

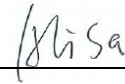
TEST REPORT

FCC Rules Part 15.249

Report Reference No.....: MTEB22120166-R

FCC ID..... : 2ABKU- M001

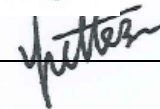
Compiled by
(position+printed name+signature)..: File administrators Alisa Luo



Supervised by
(position+printed name+signature)..: Test Engineer Sunny Deng



Approved by
(position+printed name+signature)..: Manager Yvette Zhou



Date of issue.....: **December 22,2022**

Representative Laboratory Name : Shenzhen Most Technology Service Co., Ltd.

Address: No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park,
Nanshan, Shenzhen, Guangdong, China.

Applicant's name: Shenzhen Carpo Technology Co., Ltd.

Address: Building A, Hengbang Industrial park, Lou Village, Gongming Street
Guangming Dist, Shenzhen, China

Test specification/ Standard: FCC Rules Part 15.249

TRF Originator.....: Shenzhen Most Technology Service Co., Ltd.

Shenzhen Most Technology Service Co., Ltd. All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen Most Technology Service Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen Most Technology Service Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test item description: 2.4G wireless mouse

Trade Mark: N/A

Manufacturer: **Shenzhen Carpo Technology Co., Ltd.**

Model/Type reference.....: M001

Listed Models: V805

Modulation Type: FSK

Operation Frequency.....: From 2408MHz ~ 2474MHz

Hardware Version.....: V1.0

Software Version: V1.0

Rating: DC3.7V by Battery
DC5V(by USB)

Result.....: **PASS**

TEST REPORT

Equipment under Test : 2.4G wireless mouse

Model /Type : M001

Listed Models : V805

Remark : Only the model names are different

Applicant : **Shenzhen Carpo Technology Co., Ltd.**

Address : Building A, Hengbang Industrial park, Lou Village, Gongming Street Guangming Dist, Shenzhen, China

Manufacturer : **Shenzhen Carpo Technology Co., Ltd.**

Address : Building A, Hengbang Industrial park, Lou Village, Gongming Street Guangming Dist, Shenzhen, China

Test Result:	PASS
---------------------	-------------

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

<u>1.</u>	<u>REVISION HISTORY</u>	<u>4</u>
<u>2.</u>	<u>TEST STANDARDS</u>	<u>5</u>
<u>3.</u>	<u>SUMMARY</u>	<u>6</u>
3.1.	General Remarks	6
3.2.	Product Description	6
3.3.	Equipment Under Test	6
3.4.	Short description of the Equipment under Test (EUT)	6
3.5.	EUT operation mode	7
3.6.	Block Diagram of Test Setup	7
3.7.	Test Item (Equipment Under Test) Description*	7
3.8.	Auxiliary Equipment (AE) Description	7
3.9	Antenna Information*	7
3.10.	EUT configuration	8
3.11.	Modifications	8
<u>4.</u>	<u>TEST ENVIRONMENT</u>	<u>9</u>
4.1.	Address of the test laboratory	9
4.2.	Environmental conditions	9
4.3.	Test Description	10
4.4.	Statement of the measurement uncertainty	10
4.5.	Equipments Used during the Test	11
<u>5.</u>	<u>TEST CONDITIONS AND RESULTS.....</u>	<u>12</u>
5.1.	AC Power Conducted Emission	12
5.2.	Radiated Emission.....	15
5.3.	Band Edge Compliance of RF Emission	23
5.4.	20dB Bandwidth	25
5.5.	Antenna Requirement.....	27
<u>6.</u>	<u>TEST SETUP PHOTOS OF THE EUT</u>	<u>28</u>
<u>7.</u>	<u>EXTERNAL AND INTERNAL PHOTOS OF THE EUT</u>	<u>29</u>

1. Revision History

Revision	Issue Date	Revisions	Revised By
00	2022.12.22	Initial Issue	Alisa Luo

2. TEST STANDARDS

The tests were performed according to following standards:

The tests were performed according to following standards:

[FCC Rules Part 15.249](#): Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz..

[ANSI C63.10:2013](#) : American National Standard for Testing Unlicensed Wireless Devices

3. SUMMARY

3.1. General Remarks

Date of receipt of test sample	:	2022.12.12
Testing commenced on	:	2022.12.13
Testing concluded on	:	2022.12.22

3.2. Product Description

Product Name:	2.4G wireless mouse
Model/Type reference:	M001
Power Supply:	DC3.7V by Battery DC5V(by USB)
Testing sample ID:	MT22120170
2.4G	
Modulation:	FSK
Operation frequency:	2408MHz ~ 2474MHz
Channel number:	34
Channel separation:	2MHz
Antenna type:	PCB Antenna
Antenna gain:	-1.66dBi

3.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	<input type="radio"/> 230V / 50 Hz	<input type="radio"/> 120V / 60Hz
		<input type="radio"/> 12 V DC	<input type="radio"/> 24 V DC
		<input checked="" type="radio"/> Other (specified in blank below)	

DC3.7V by Battery
DC5V(by USB)

3.4. Short description of the Equipment under Test (EUT)

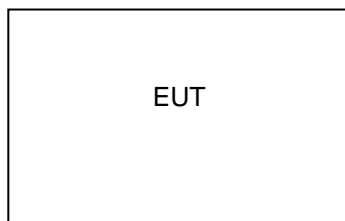
This is a 2.4G wireless mouse For more details, refer to the user's manual of the EUT.

3.5. EUT operation mode

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing .There are 34 channels provided to the EUT. Channel 01/17/34 was selected to test.

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2408	2	2410	3	2412
4	2414	5	2416	6	2418
7	2420	8	2422	9	2424
10	2426	11	2428	12	2430
13	2432	14	2434	15	2436
16	2438	17	2440	18	2442
19	2444	20	2446	21	2448
22	2450	23	2452	24	2454
25	2456	26	2458	27	2460
28	2462	29	2464	30	2466
31	2468	32	2470	33	2472
34	2474				

3.6. Block Diagram of Test Setup



3.7. Test Item (Equipment Under Test) Description*

Short designation	EUT Name	EUT Description	Serial number	Hardware status	Software status
EUT A	/	/	/	/	/
EUT B	/	/	/	/	/

*: declared by the applicant. According to customers information EUTs A and B are the same devices.

3.8. Auxiliary Equipment (AE) Description

AE short designation	EUT Name (if available)	EUT Description	Serial number (if available)	Software (if used)
AE 1	Adapter	JMX-65W-A	/	/
AE 2	-	/	/	/

3.9 Antenna Information*

Short designation	Antenna Name	Antenna Type	Frequency Range	Serial number	Antenna Peak Gain
Antenna 1	---	PCB Antenna	2.4 – 2.5 GHz	---	-1.66dBi
Antenna 2	/	/	/	/	/

*: declared by the applicant.

3.10. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- supplied by the manufacturer

- Supplied by the lab

<input type="radio"/>	ADAPTER	M/N:	
<input type="radio"/>		Manufacturer:	

3.11. Modifications

No modifications were implemented to meet testing criteria.

4. TEST ENVIRONMENT

4.1. Address of the test laboratory

Shenzhen Most Technology Service Co., Ltd.

No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China.
The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

Test Facility

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

FCC-Registration No.: 0031192610

Shenzhen Most Technology Service 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.

A2LA-Lab Cert. No.: 6343.01

Shenzhen Most Technology Service 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.

4.2. Environmental conditions

Radiated Emission:

Temperature:	23 ° C
Humidity:	48 %
Atmospheric pressure:	950-1050mbar

Conducted testing:

Temperature:	24 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

4.3. Test Description

FCC and IC Requirements		
15.203	Antenna Requirement	PASS
15.207	AC Power Conducted Emission	PASS
15.215(c)	20dB Bandwidth	PASS
15.209	Field strength of fundamental	PASS
15.205(a), 15.209(a), 15.249(a), 15.249(c)	Radiated Spurious Emissions	PASS
15.249(d)	Band Edge Spurious	PASS

Remark:

1. The measurement uncertainty is not included in the test result.
2. NA = Not Applicable; NP = Not Performed

4.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Most Technology Service Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Most Technology Service Co., Ltd. is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10 dB	(1)
Radiated Emission	1~18GHz	4.32 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.12 dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

4.5. Equipments Used during the Test

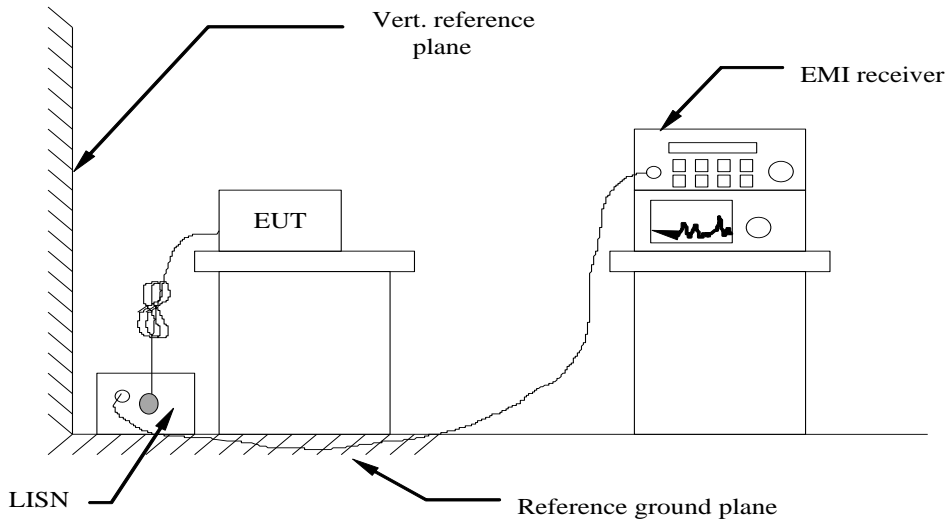
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N.	R&S	ENV216	100093	2022/04/18	1 Year
2	Three-phase artificial power network	Schwarzback Mess	NNLK8129	8129178	2022/04/18	1 Year
3.	Receiver	R&S	ESCI	100492	2022/04/06	1 Year
4	Receiver	R&S	ESPI	101202	2022/04/06	1 Year
5	Spectrum analyzer	Agilent	9020A	MT-E306	2022/04/06	1 Year
6	Bilong Antenna	Sunol Sciences	JB3	A121206	2022/03/13	1 Year
7	Horn antenna	HF Antenna	HF Antenna	MT-E158	2022/04/06	1 Year
8	Loop antenna	Beijing Daze	ZN30900B	/	2022/04/17	1 Year
9	Horn antenna	R&S	OBH100400	26999002	2022/04/17	1 Year
10	Wireless Communication Test Set	R&S	CMW500	/	2022/04/17	1 Year
11	Spectrum analyzer	R&S	FSP	100019	2022/04/16	1 Year
12	High gain antenna	Schwarzbeck	LB-180400KF	MT-E389	2022/03/13	1 Year
13	Preamplifier	Schwarzbeck	BBV 9743	MT-E390	2022/03/13	1 Year
14	Pre-amplifier	EMCI	EMC051845S E	MT-E391	2022/03/13	1 Year
15	Pre-amplifier	Agilent	83051A	MT-E392	2022/03/13	1 Year
16	High pass filter unit	Tonscend	JS0806-F	MT-E393	2022/03/13	1 Year
17	RF Cable(below1GHz)	Times	9kHz-1GHz	MT-E394	2022/03/13	1 Year
18	RF Cable(above 1GHz)	Times	1-40G	MT-E395	2022/03/13	1 Year
19	RF Cable (9KHz-40GHz)	Tonscend	170660	N/A	2022/03/13	1 Year

Note: 1. The Cal.Interval was one year.

5. TEST CONDITIONS AND RESULTS

5.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
- 2 Support equipment, if needed, was placed as per ANSI C63.10-2013
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
- 4 The EUT received DC5V power, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5 All support equipments received AC power from a second LISN, if any.
- 6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For unintentional device, according to RSS Gen 8.8 and § 15.207(a) Line Conducted Emission Limits is as following:

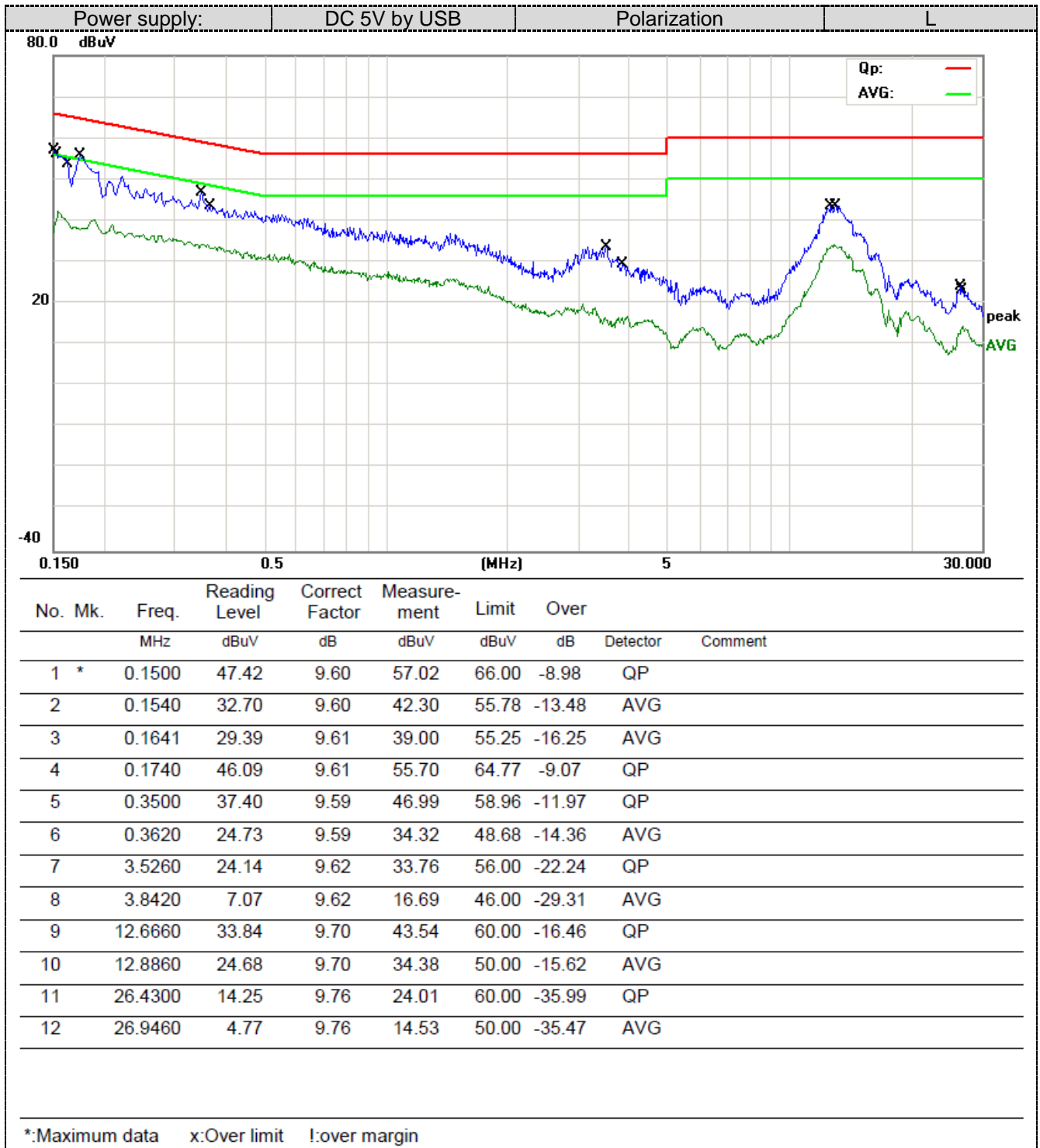
Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

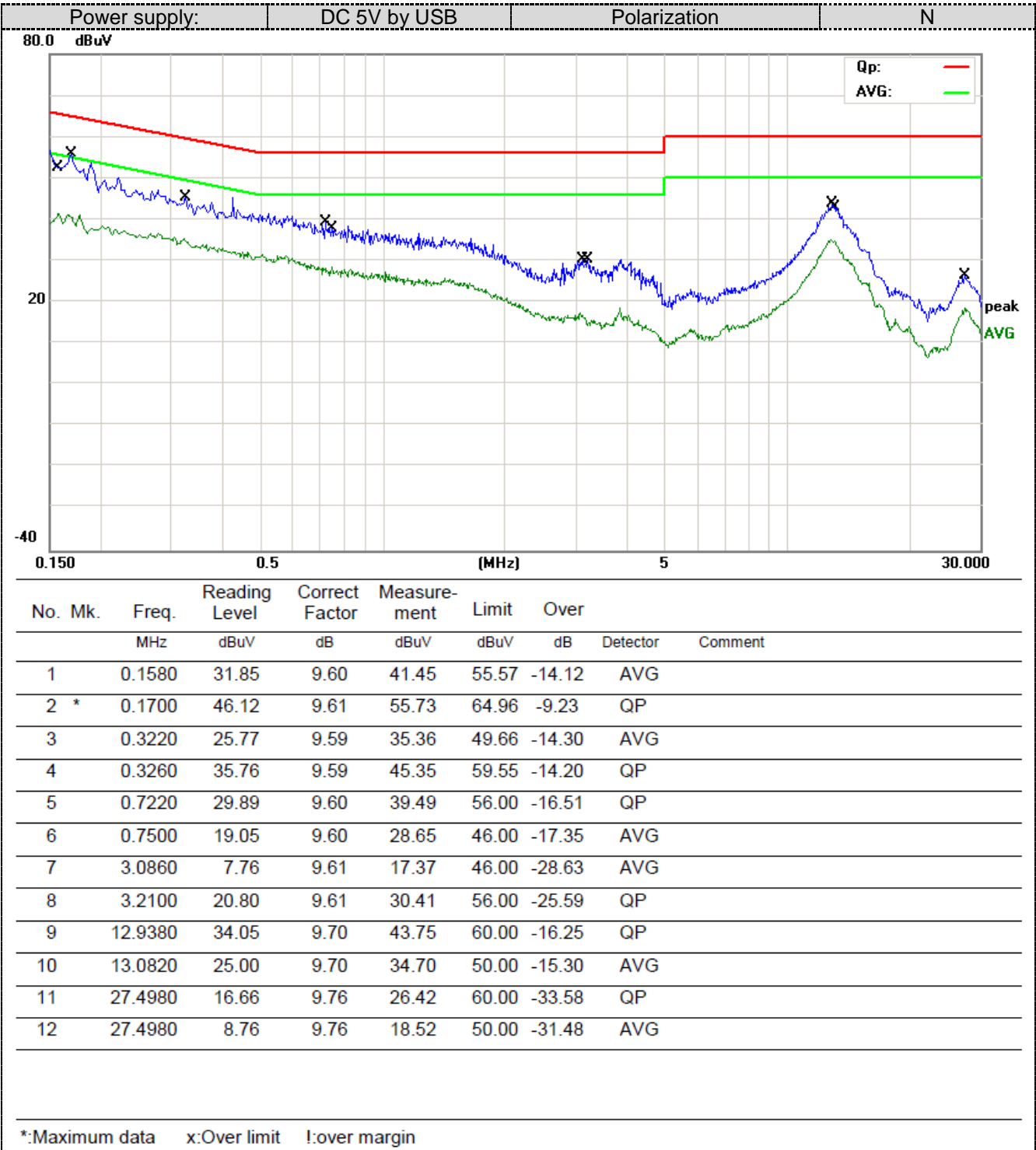
* Decreases with the logarithm of the frequency.

TEST RESULTS

Remark:

1. All modes were test at Low, Middle, and High channel; only the worst result of Middle Channel was reported as below:
2. Remark: Result=Reading value+Factor,and Margin=Limit- Result

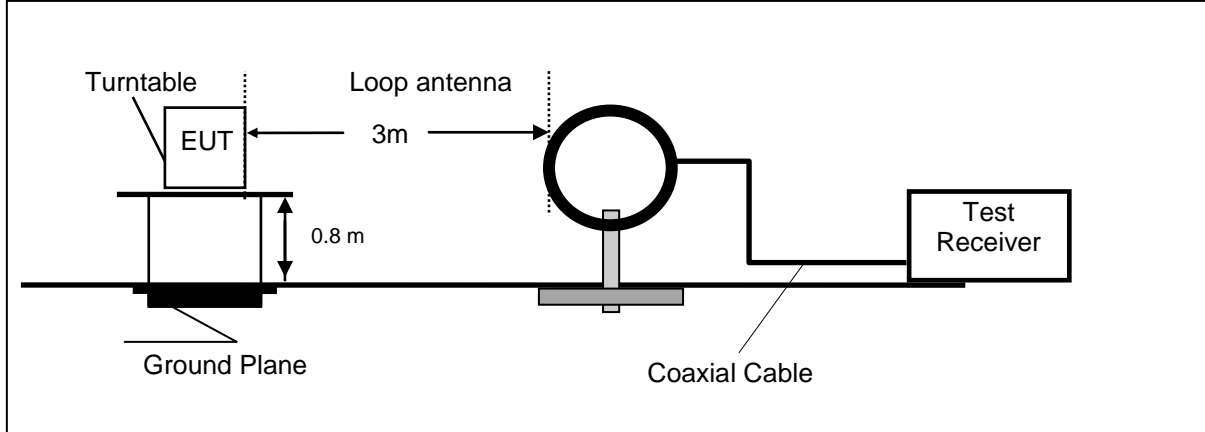




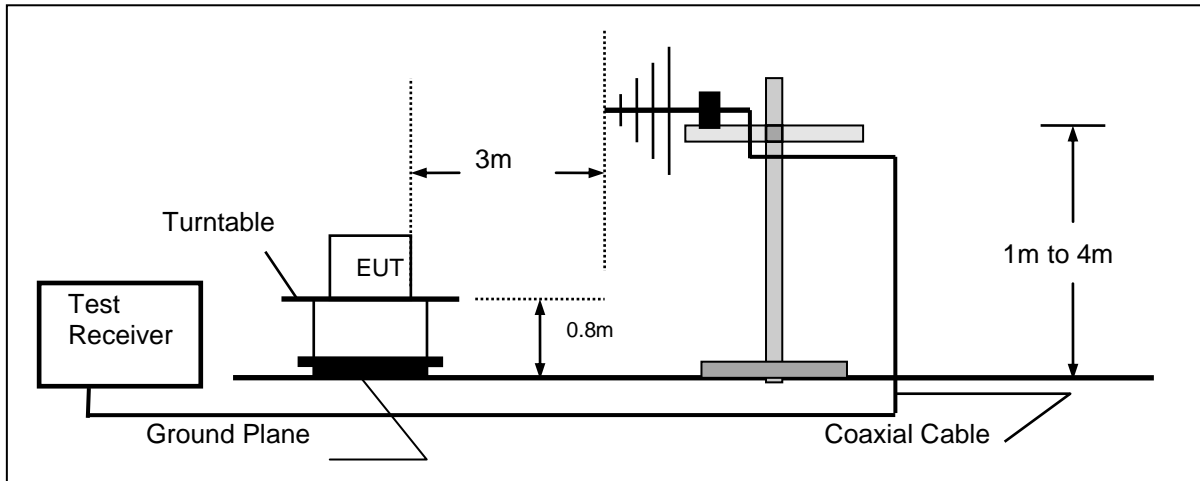
5.2. Radiated Emission

TEST CONFIGURATION

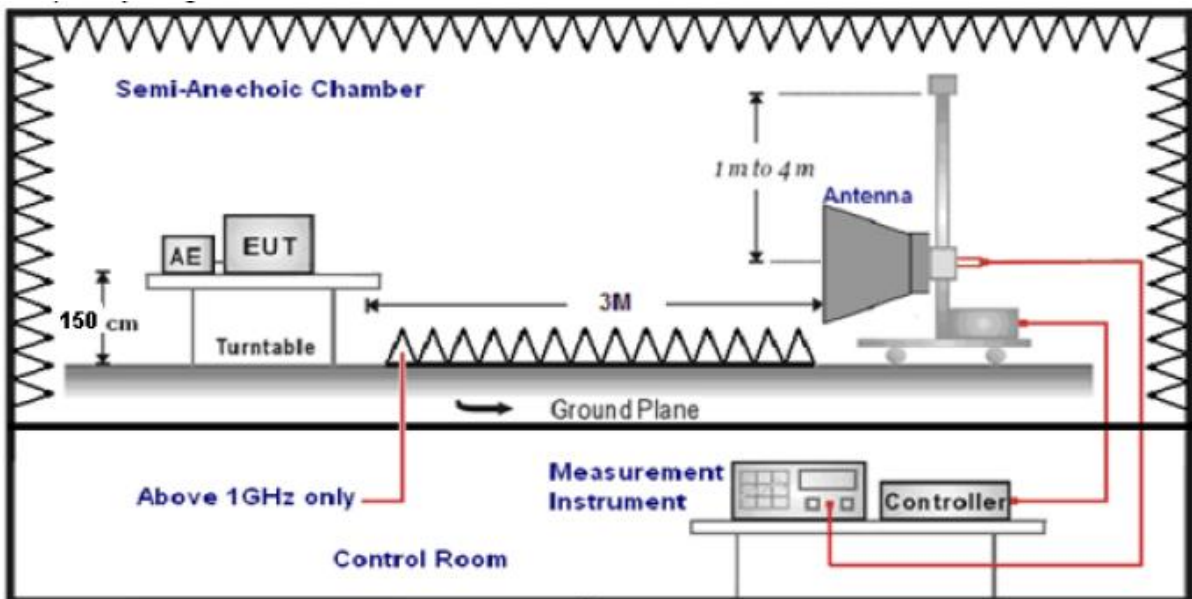
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz;the EUT was placed on a turn table which is 1.5m above ground plane when testing frequency range 1GHz – 25GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT minimum operation frequency was 32.768KHz and maximum operation frequency was 2480MHz.so radiated emission test frequency band from 9KHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Antenna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz, Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz, Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz, Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

$$\text{Transd} = \text{AF} + \text{CL} - \text{AG}$$

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Except when the requirements applicable to a given device state otherwise, emissions from licence-exempt transmitters shall comply with the field strength limits shown in table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission

Unwanted emissions that fall into restricted bands shall comply with the limits specified in RSS-Gen; and Unwanted emissions that do not fall within the restricted frequency bands shall comply either with the limits specified in the applicable RSS or with those specified in this RSS-Gen.

Frequency (MHz)	Distance (Meters)	Radiated (dB μ V/m)	Radiated (μ V/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

LIMITS OF RADIATED EMISSION MEASUREMENT (1GHz-25 GHz)

FREQUENCY (MHz)	(dB μ V/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

LIMITS OF FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL

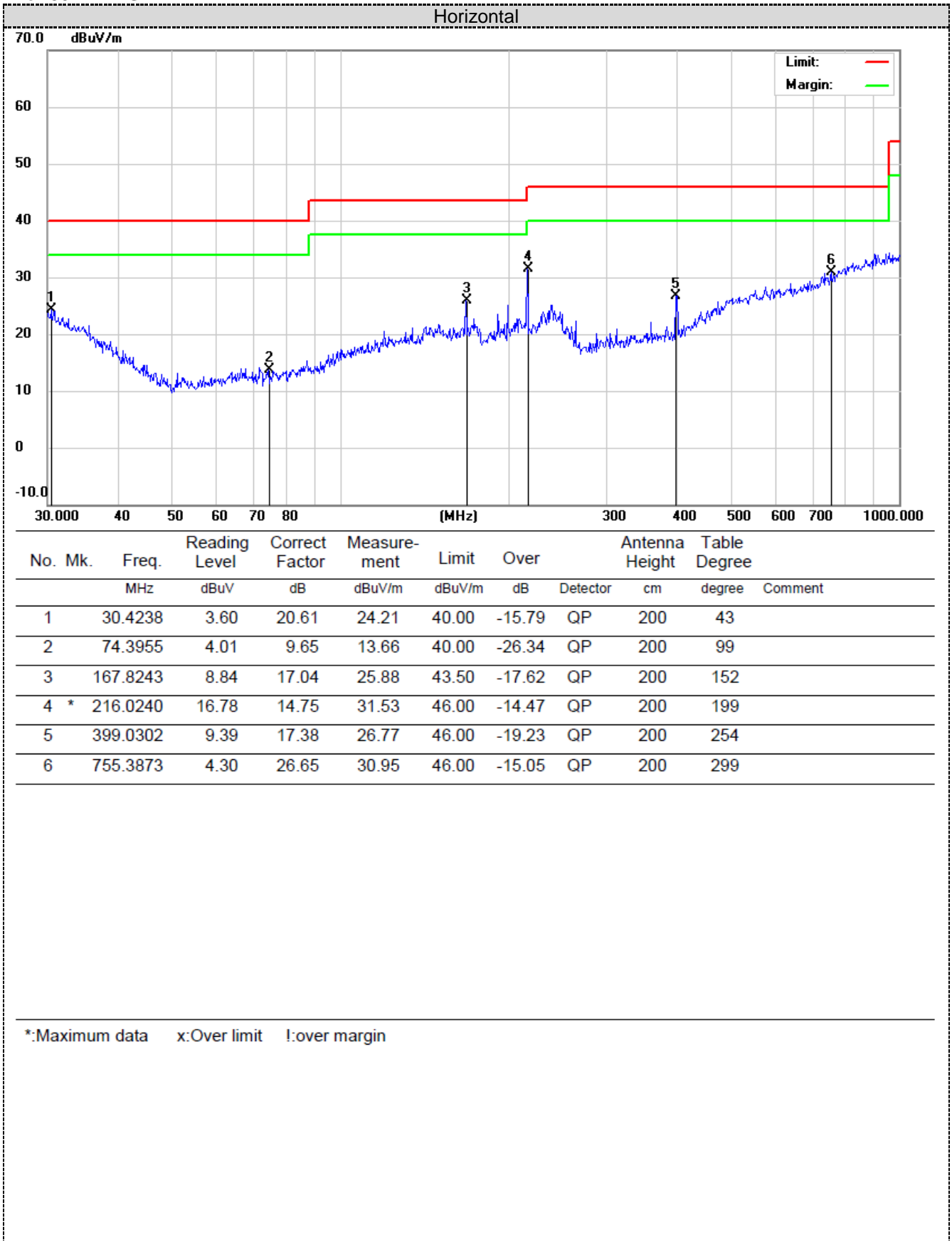
FREQUENCY (MHz)	(dB μ V/m) (at 3M)	
	PEAK	AVERAGE
2400-2483.5	114	94

TEST RESULTS

Remark:

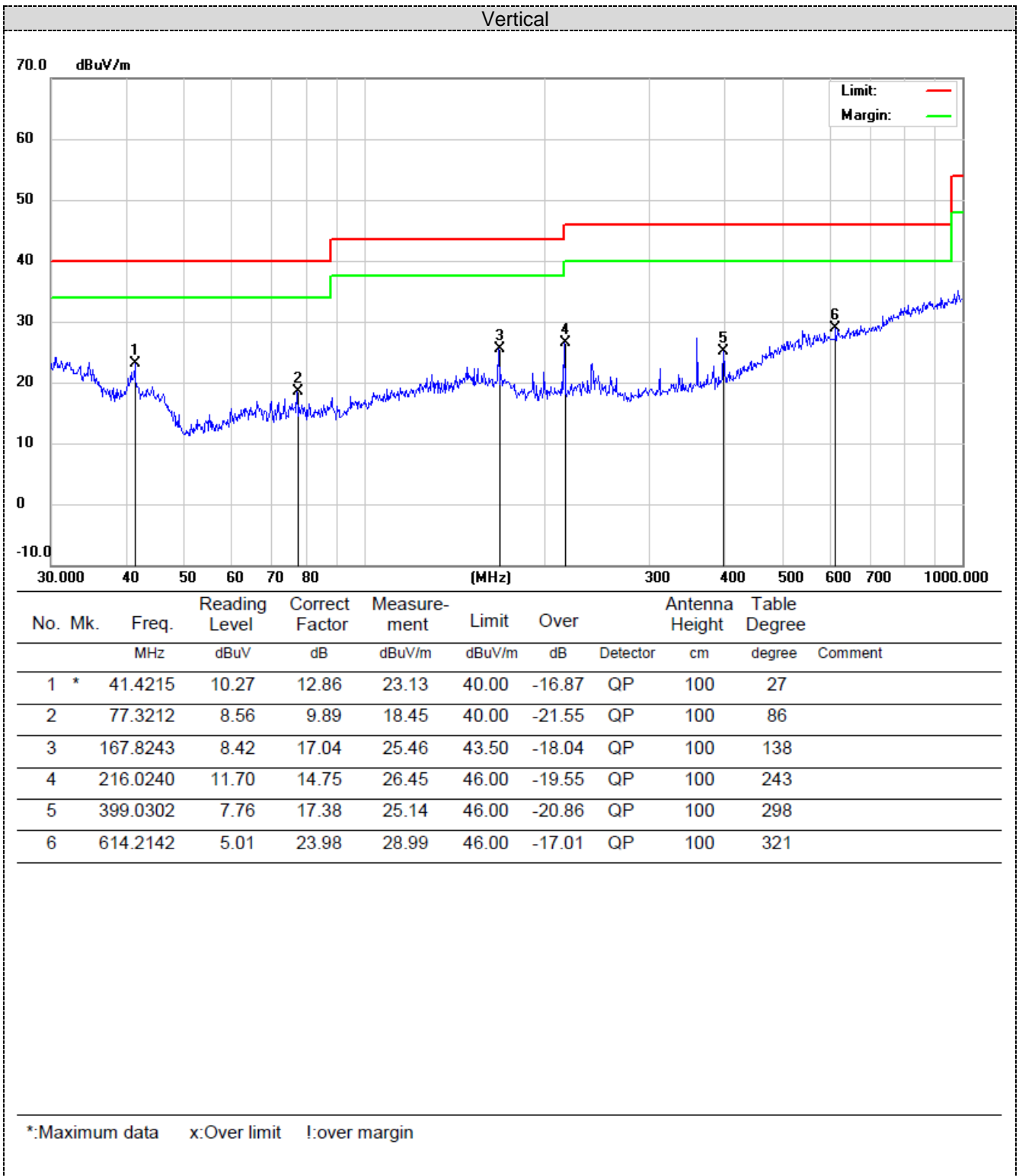
1. For below 1GHz testing recorded worst at FSK middle channel.
2. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

For 30MHz-1GHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		30.4238	3.60	20.61	24.21	40.00	-15.79	QP	200	43	
2		74.3955	4.01	9.65	13.66	40.00	-26.34	QP	200	99	
3		167.8243	8.84	17.04	25.88	43.50	-17.62	QP	200	152	
4	*	216.0240	16.78	14.75	31.53	46.00	-14.47	QP	200	199	
5		399.0302	9.39	17.38	26.77	46.00	-19.23	QP	200	254	
6		755.3873	4.30	26.65	30.95	46.00	-15.05	QP	200	299	

*:Maximum data x:Over limit !:over margin



For 1GHz to 25GHz

GFSK (above 1GHz)

Frequency(MHz):			2408		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4816.00	57.86	PK	74	16.14	55.96	31.42	6.98	36.5	1.9
4816.00	44.62	AV	54	9.38	42.72	31.42	6.98	36.5	1.9
7224.00	52.9	PK	74	21.1	42.3	37.03	8.87	35.3	10.6
7224.00	42.21	AV	54	11.79	31.61	37.03	8.87	35.3	10.6

Frequency(MHz):			2408		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4816.00	57.41	PK	74	16.59	55.51	31.42	6.98	36.5	1.9
4816.00	44.33	AV	54	9.67	42.43	31.42	6.98	36.5	1.9
7224.00	52.68	PK	74	21.32	42.08	37.03	8.87	35.3	10.6
7224.00	43.5	AV	54	10.5	32.9	37.03	8.87	35.3	10.6

Frequency(MHz):			2440		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4880.00	57.62	PK	74	16.38	55.56	30.98	7.58	36.5	2.06
4880.00	45.57	AV	54	8.43	43.51	30.98	7.58	36.5	2.06
7320.00	54.67	PK	74	19.33	43.75	37.66	8.56	35.3	10.92
7320.00	41.16	AV	54	12.84	30.24	37.66	8.56	35.3	10.92

Frequency(MHz):			2440		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4880.00	52.26	PK	74	21.74	50.2	30.98	7.58	36.5	2.06
4880.00	45.7	AV	54	8.3	43.64	30.98	7.58	36.5	2.06
7320.00	52.42	PK	74	21.58	41.5	37.66	8.56	35.3	10.92
7320.00	43.35	AV	54	10.65	32.43	37.66	8.56	35.3	10.92

Frequency(MHz):			2474		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4948.00	55.33	PK	74	18.67	52.26	31.47	7.8	36.2	3.07
4948.00	46.5	AV	54	7.5	43.43	31.47	7.8	36.2	3.07
7422.00	55.63	PK	74	18.37	43.89	38.32	8.72	35.3	11.74
7422.00	41.88	PK	54	12.12	30.14	38.32	8.72	35.3	11.74

Frequency(MHz):			2474		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4948.00	53.57	PK	74	20.43	50.5	31.47	7.8	36.2	3.07
4948.00	45.37	AV	54	8.63	42.3	31.47	7.8	36.2	3.07
7422.00	52.36	PK	74	21.64	40.62	38.32	8.72	35.3	11.74
7422.00	42.55	PK	54	11.45	30.81	38.32	8.72	35.3	11.74

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier
3. Margin value = Limit value - Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.

Fundamental & Harmonics Radiated Emission Data

Frequency(MHz):			2408		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2408.00	85.47	PK	114	28.53	92.36	27.56	4.55	37.68	-6.89
2408.00	79.74	AV	94	14.26	86.63	27.56	4.55	37.68	-6.89
4816.00	52.29	PK	74	21.71	50.39	31.42	6.98	36.5	1.9
4816.00	42.67	AV	54	11.33	40.77	31.42	6.98	36.5	1.9

Frequency(MHz):			2408		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2408.00	81.31	PK	114	32.69	88.2	27.56	4.55	37.68	-6.89
2408.00	77.21	AV	94	16.79	84.1	27.56	4.55	37.68	-6.89
4816.00	55.98	PK	74	18.02	54.08	31.42	6.98	36.5	1.9
4816.00	43.6	AV	54	10.4	41.7	31.42	6.98	36.5	1.9

Frequency(MHz):			2440		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2440.00	87	PK	114	27	93.76	27.62	4.68	37.68	-6.76
2440.00	76.79	AV	94	17.21	83.55	27.62	4.68	37.68	-6.76
4880.00	53.37	PK	74	20.63	51.31	30.98	7.58	36.5	2.06
4880.00	45.89	AV	54	8.11	43.83	30.98	7.58	36.5	2.06

Frequency(MHz):			2440		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2440.00	84.17	PK	114	29.83	90.93	27.62	4.68	37.68	-6.76
2440.00	76.74	AV	94	17.26	83.5	27.62	4.68	37.68	-6.76
4880.00	52.26	PK	74	21.74	50.2	30.98	7.58	36.5	2.06
4880.00	45.7	AV	54	8.3	43.64	30.98	7.58	36.5	2.06

Frequency(MHz):			2474		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2474.00	86.76	PK	114	27.24	93.28	28.05	4.72	37.68	-6.52
2474.00	75.89	AV	94	18.11	82.41	28.05	4.72	37.68	-6.52
4948.00	55.33	PK	74	18.67	52.26	31.47	7.8	36.2	3.07
4948.00	46.5	AV	54	7.5	43.43	31.47	7.8	36.2	3.07

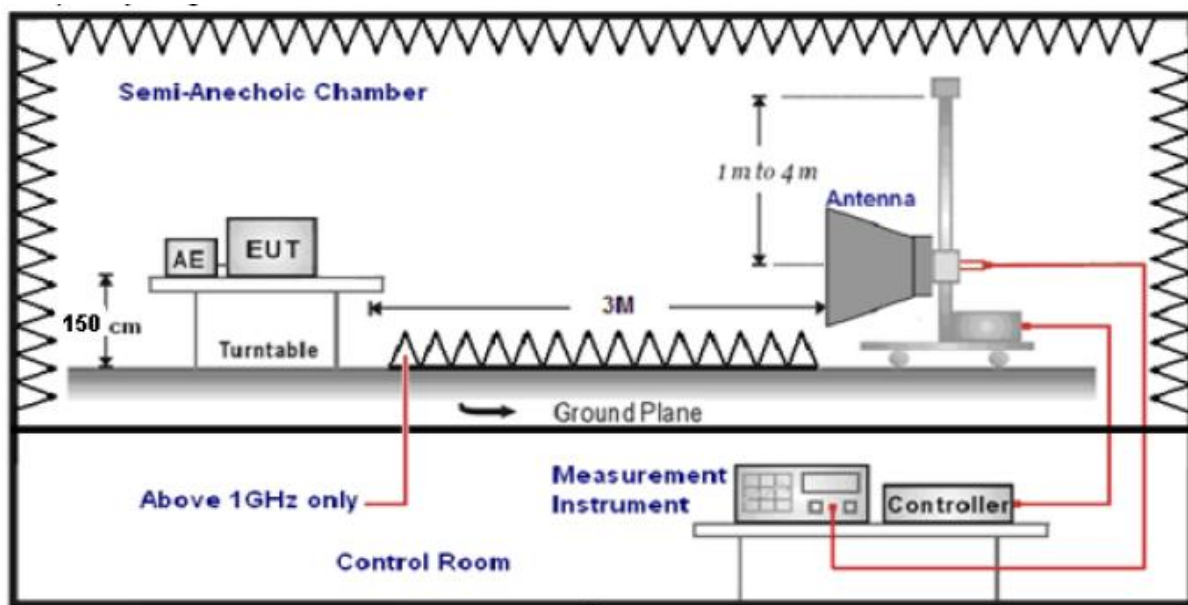
Frequency(MHz):			2474		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2474.00	86.85	PK	114	27.15	93.37	28.05	4.72	37.68	-6.52
2474.00	78.4	AV	94	15.6	84.92	28.05	4.72	37.68	-6.52
4948.00	53.57	PK	74	20.43	50.5	31.47	7.8	36.2	3.07
4948.00	45.37	AV	54	8.63	42.3	31.47	7.8	36.2	3.07

5.3. Band Edge Compliance of RF Emission

TEST REQUIREMENT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was placed on a turn table which is 1.5m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed..
5. The distance between test antenna and EUT was 3 meter:
6. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

LIMIT

Below -20dB of the highest emission level in operating band.
Radiated emissions 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 RESULTS**Results of Band Edges Test (Radiated)**

O-QPSK

Frequency(MHz):			2405		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	56.34	PK	74	17.66	61.75	27.49	3.32	36.22	-5.41
2390.00	38.7	AV	54	15.3	44.11	27.49	3.32	36.22	-5.41
Frequency(MHz):			2405		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	58.07	PK	74	15.93	63.48	27.49	3.32	36.22	-5.41
2390.00	41.83	AV	54	12.17	47.24	27.49	3.32	36.22	-5.41
Frequency(MHz):			2480		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	57.33	PK	74	16.67	62.84	27.45	3.38	36.34	-5.51
2483.50	42.03	AV	54	11.97	47.54	27.45	3.38	36.34	-5.51
Frequency(MHz):			2480		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	56.01	PK	74	17.99	61.52	27.45	3.38	36.34	-5.51
2483.50	38.67	AV	54	15.33	44.18	27.45	3.38	36.34	-5.51

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)- Pre-amplifier
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.

5.4. 20dB Bandwidth

Limit

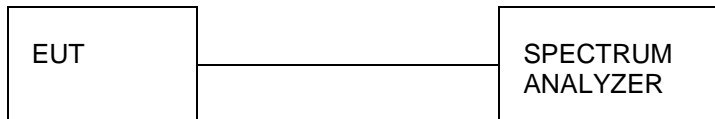
For frequency hopping systems operating in the 2400MHz-2483.5MHz no limit for 20dB bandwidth.

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30 KHz RBW and 100 KHz VBW.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

Test Configuration



Test Results

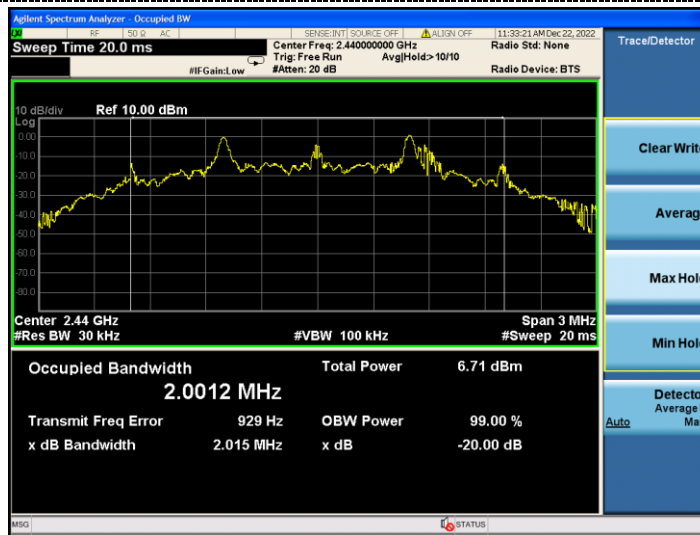
Modulation	Channel	20dB bandwidth (MHz)	Result
FSK	CH01	2.053	Pass
	CH17	2.015	
	CH34	2.034	

Test plot as follows:

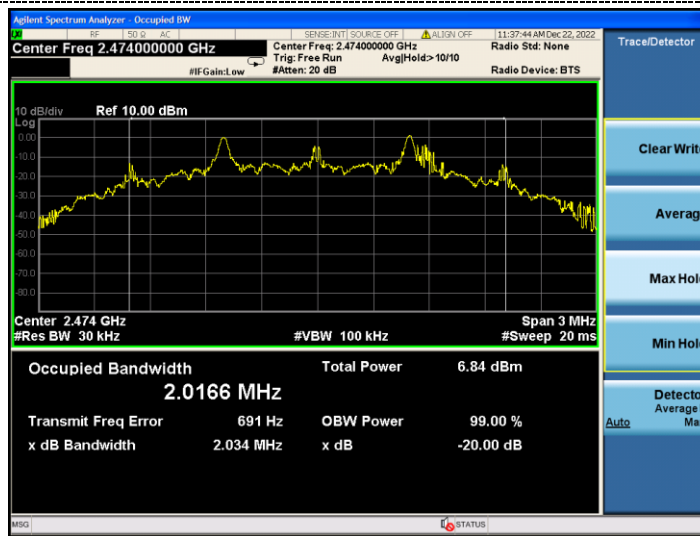
O-QPSK



CH01



CH14



CH34

5.5. Antenna Requirement

Standard Applicable

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

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

Refer to statement below for compliance

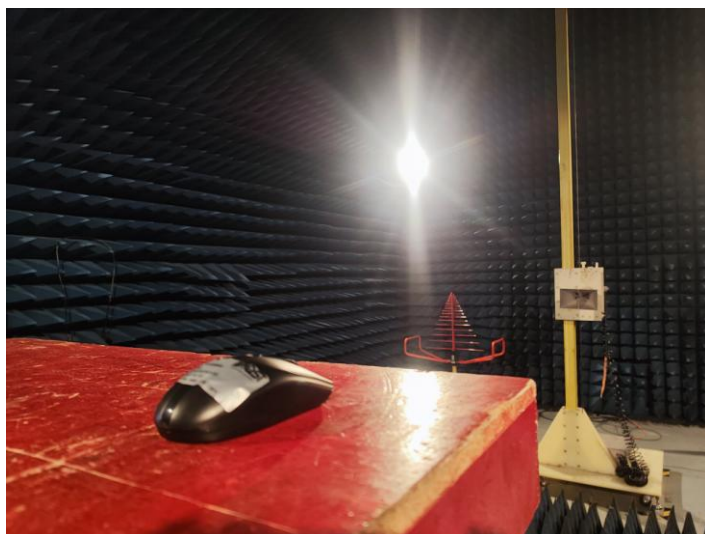
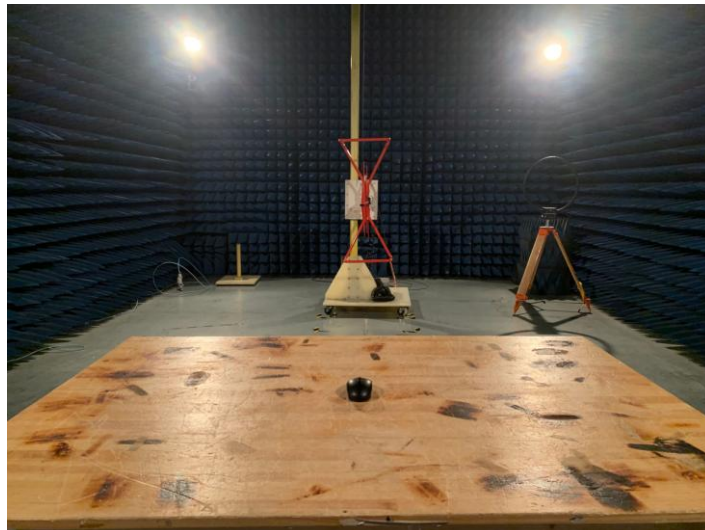
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The directional gains of antenna used for transmitting is -1.66dBi, and the antenna is PCB Antenna connect to PCB board and no consideration of replacement. Please see EUT photo for details.

Results: Compliance.

6. Test Setup Photos of the EUT



7. External and Internal Photos of the EUT

See related photo report.

.....**End of Report**.....