RADIO TEST REPORT

Report No.: STS2203084W04

Issued for

Intracom Asia Co., Ltd

4F., No.77, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 221,Taiwan

Product Name:	Success Wireless Optical Mouse
Brand Name:	manhattan
Model Name:	179416
Series Model:	179393, 179409, 179294, 179379, 179386
FCC ID:	2ADQY-179416DGL
Test Standard:	FCC Part 15.249

Shenzhen STS Test Services Co., Ltd.
A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ
Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China
TEL: +86-755 3688 6288 FAX: +86-755 3688 6277 E-mail:sts@stsapp.com

TEST RESULT CERTIFICATION

Applicant's Name ..... :	Intracom Asia Co., Ltd
Address ..... :	4F., No.77, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 221,Taiwan
Manufacture's Name ..... :	Intracom Asia Co., Ltd
Address ..... :	4F., No.77, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 221,Taiwan

Product Description

Product Name ..... :	Success Wireless Optical Mouse
Brand Name ..... :	manhattan
Model Name ..... :	179416
Series Model ..... :	179393, 179409, 179294, 179379, 179386
Test Standards ..... :	FCC Part15.249
Test Procedure ..... :	ANSI C63.10-2013

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
This report shall not be reproduced except in full, without the written approval of STS, this document only be altered or revised by STS, personal only, and shall be noted in the revision of the document.

Date of Test ..... :	
Date of receipt of test item ..... :	11 Mar. 2022
Date of performance of tests .. :	11 Mar. 2022 ~ 29 Mar. 2022
Date of Issue ..... :	29 Mar. 2022
Test Result..... :	**Pass**

Testing Engineer : Chris Chen
(Chris Chen)

Technical Manager : Sean She
(Sean she)

Authorized Signatory : Bovey Yang
(Bovey Yang)

Table of Contents **Page**

Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	29 Mar. 2022	STS2203084W04	ALL	Initial Issue

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part 15.249 , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	Pass	
15.203	Antenna Requirement	Pass	
15.249	Radiated Spurious Emission	Pass	
15.249	Radiated Band Edge Emission	Pass	
15.249	Field Strength of fundamental	Pass	
15.215(c)	20dB Bandwidth	Pass	

NOTE:

(1) 'N/A' denotes test is not applicable in this Test Report.

(2) All tests are according to ANSI C63.10-2013.

1.1 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD
Add. : A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China
FCC test Firm Registration Number: 625569
IC test Firm Registration Number: 12108A
A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**, where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**, providing a level of confidence of approximately **95** %.

No.	Item	Uncertainty
1	RF output power, conducted	±0.87dB
2	Unwanted Emissions, conducted	±2.895dB
3	All emissions, radiated 9K-30MHz	±3.80dB
4	All emissions, radiated 30M-1GHz	±4.09dB
5	All emissions, radiated 1G-6GHz	±4.92dB
6	All emissions, radiated>6G	±5.49dB
7	Conducted Emission (9KHz-30MHz)	±2.73dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Success Wireless Optical Mouse
Trade Name	manhattan
Model Name	179416
Series Model	179393, 179409, 179294, 179379, 179386
Model Difference	Only the model name is different
Product Description	The EUT is a Success Wireless Optical Mouse Operation Frequency: 2402~2480MHz Modulation Type: GFSK Antenna Designation: Please refer to the Note 3. Antenna Gain(Peak): 0dBi Based on the application, features, or specification exhibited in User Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User Manual.
Channel List	Please refer to the Note 2.
Rating	Input: DC 5V, 20mA
Hardware version number	V7.0
Software version number	V69
Connecting I/O Port(s)	Please refer to the Note 1.

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User Manual.

2.

Channel List							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402	11	2422	21	2442	31	2462
2	2404	12	2424	22	2444	32	2464
3	2406	13	2426	23	2446	33	2466
4	2408	14	2428	24	2448	34	2468
5	2410	15	2430	25	2450	35	2470
6	2412	16	2432	26	2452	36	2472
7	2414	17	2434	27	2454	37	2474
8	2416	18	2436	28	2456	38	2476
9	2418	19	2438	29	2458	39	2478
10	2420	20	2440	30	2460	40	2480

3. Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	manhattan	179416	PCB	N/A	0dBi	Antenna

Note: The antenna information refer the manufacturer provide report, applicable only to the tested sample identified in the report.

2.2 DESCRIPTION OF THE TEST MODES

For conducted test items and radiated spurious emissions
Each of these EUT operation mode(s) or test configuration mode(s) mentioned below was evaluated respectively.

Pretest Mode	Description	Data/Modulation
Mode 1	TX Low channel	GFSK
Mode 2	TX Mid channel	GFSK
Mode 3	TX High channel	GFSK

Note:

(1) All above mode have been measurement, only worst data was reported.

(2) We have be tested for all avaiable U.S. voltage and frequencies(For 120V,50/60Hz and 240V, 50/60Hz) for which the device is capable of operation, and the worst case of 120V,50/60Hz is shown in the report.

For AC Conducted Emission

Test Case	
AC Conducted Emission	Mode 4 : Keeping TX

2.3 TEST SOFTWARE AND POWER LEVEL

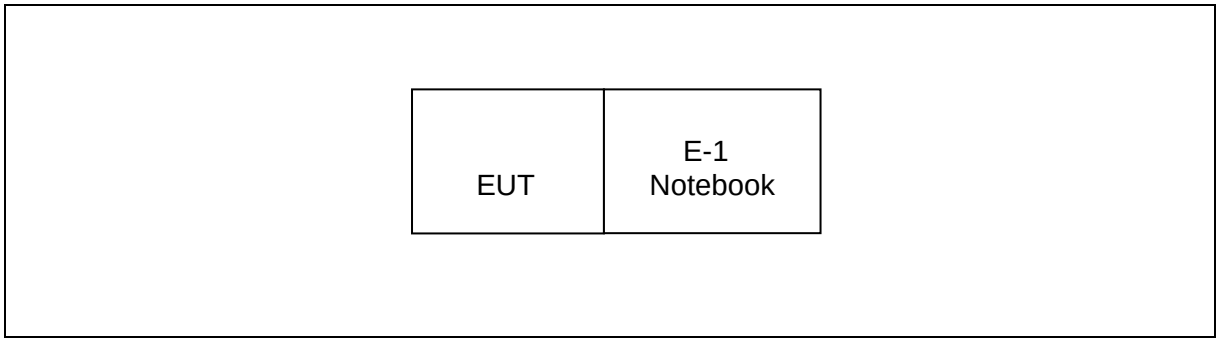
During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

RF Function	Type	Mode Or Modulation type	ANT Gain(dBi)	Power Class	Software For Testing
Other SRD	2.4G	GFSK	0	7	SE67T_Test_v161

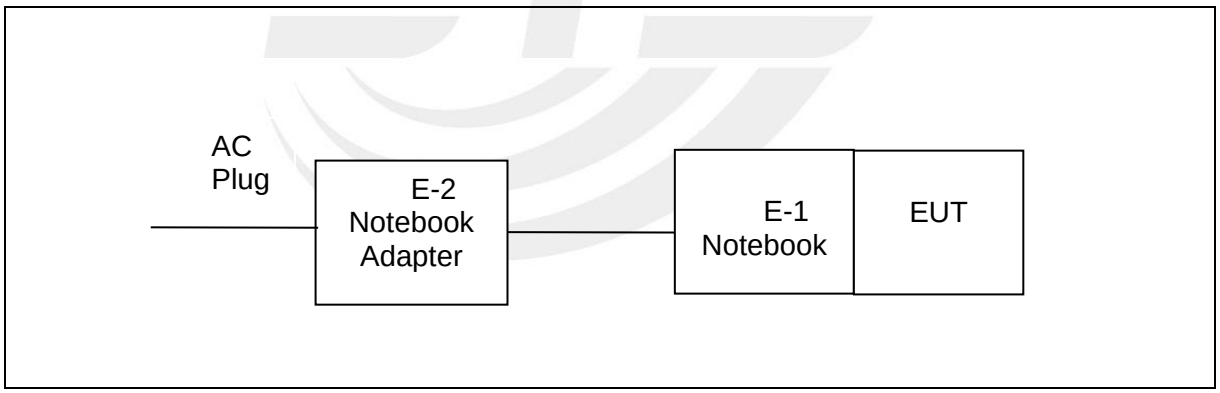
2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters.

Radiated Spurious Emission Test



Conducted Emission Test



2.5 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note
N/A	N/A	N/A	N/A	N/A	N/A

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note
E-2	Notebook Adapter	LENOVO	ADLX45DLC3A	N/A	N/A
E-1	Notebook	LENOVO	ThinkPad E470	N/A	N/A

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2021.09.30	2022.09.29
Signal Analyzer	R&S	FSV 40-N	101823	2021.09.30	2022.09.29
Active loop Antenna	ZHINAN	ZN30900C	16035	2021.04.11	2023.04.10
Bilog Antenna	TESEQ	CBL6111D	34678	2020.10.12	2022.10.11
Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	2021.10.11	2023.10.10
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	J211020657	2020.10.12	2022.10.11
Pre-Amplifier(0.1M-3 GHz)	EM	EM330	060665	2021.10.08	2022.10.07
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2021.09.30	2022.09.29
Pre-Amplifier (18G-40GHz)	SKET	LNPA-1840-50	SK2018101801	2021.09.28	2022.09.27
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2021.09.30	2022.09.29
LISN	R&S	ENV216	101242	2021.09.30	2022.09.29
LISN	EMCO	3810/2NM	23625	2021.09.30	2022.09.29
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 CE)			

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Power Sensor	Keysight	U2021XA	MY55520005	2021.09.30	2022.09.29
			MY55520006	2021.09.30	2022.09.29
			MY56120038	2021.09.30	2022.09.29
			MY56280002	2021.09.30	2022.09.29
Signal Analyzer	Agilent	N9020A	MY51110105	2022.03.01	2023.02.28
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 15.249 limit in the table below has to be followed.

FREQUENCY (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

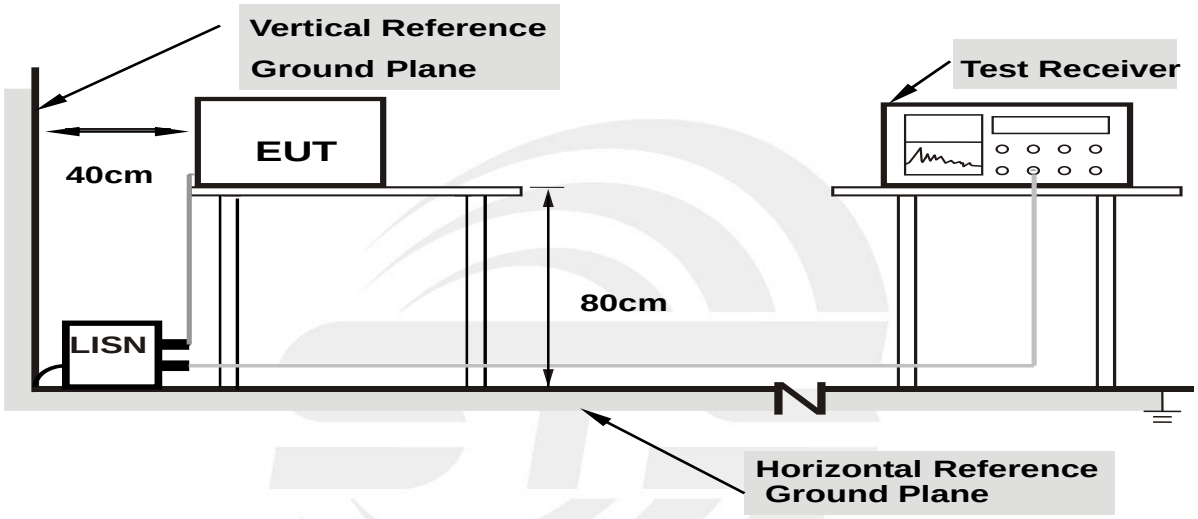
The following table is the setting of the receiver

Receiver Parameters	**Setting**
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

a. The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.4 EUT OPERATING CONDITIONS

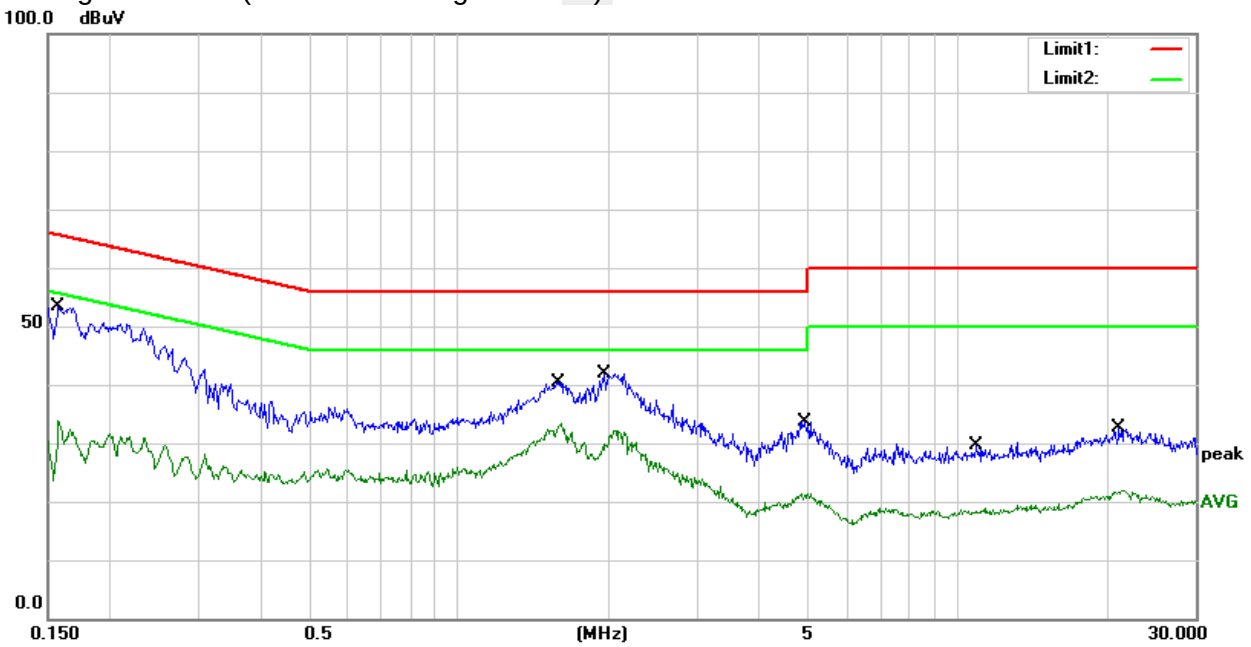
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.1.5 TEST RESULT

Temperature:	26.1(C)	Relative Humidity:	60%RH
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 4		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1580	33.06	20.31	53.37	65.57	-12.20	QP
2	0.1580	13.57	20.31	33.88	55.57	-21.69	AVG
3	1.5780	20.10	20.35	40.45	56.00	-15.55	QP
4	1.5780	13.08	20.35	33.43	46.00	-12.57	AVG
5	1.9660	21.55	20.39	41.94	56.00	-14.06	QP
6	1.9660	11.86	20.39	32.25	46.00	-13.75	AVG
7	4.8900	13.08	20.53	33.61	56.00	-22.39	QP
8	4.8900	0.85	20.53	21.38	46.00	-24.62	AVG
9	10.9100	8.47	21.04	29.51	60.00	-30.49	QP
10	10.9100	-1.59	21.04	19.45	50.00	-30.55	AVG
11	21.1140	9.69	22.87	32.56	60.00	-27.44	QP
12	21.1140	-0.90	22.87	21.97	50.00	-28.03	AVG

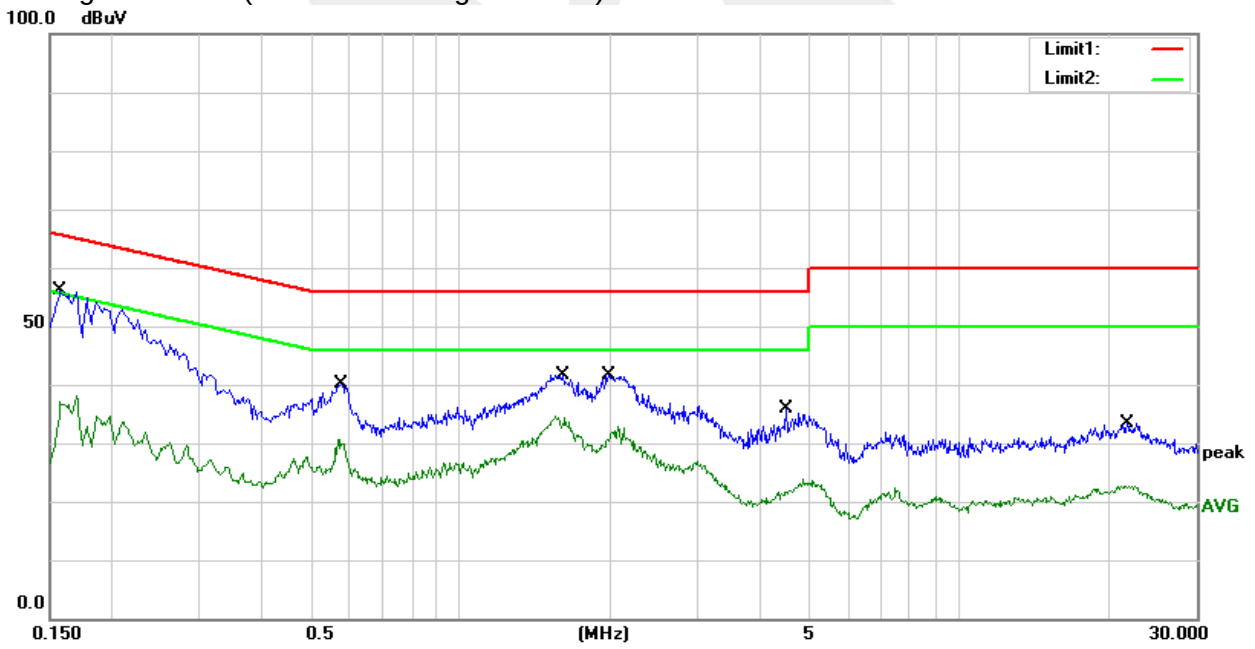
Remark:
1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result =Reading + Factor)–Limit



Temperature:	26.1(C)	Relative Humidity:	60%RH
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 4		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1580	35.78	20.31	56.09	65.57	-9.48	QP
2	0.1580	17.74	20.31	38.05	55.57	-17.52	AVG
3	0.5780	19.57	20.44	40.01	56.00	-15.99	QP
4	0.5780	10.26	20.44	30.70	46.00	-15.30	AVG
5	1.6020	21.37	20.35	41.72	56.00	-14.28	QP
6	1.6020	14.20	20.35	34.55	46.00	-11.45	AVG
7	1.9900	21.23	20.39	41.62	56.00	-14.38	QP
8	1.9900	12.41	20.39	32.80	46.00	-13.20	AVG
9	4.5060	15.27	20.53	35.80	56.00	-20.20	QP
10	4.5060	3.30	20.53	23.83	46.00	-22.17	AVG
11	21.7820	10.44	22.84	33.28	60.00	-26.72	QP
12	21.7820	-0.10	22.84	22.74	50.00	-27.26	AVG

Remark:
1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result =Reading + Factor)–Limit



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on Part 15.249 and the Part 15.209(a) limit in the table below has to be followed.

Standard FCC 15.209

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3
Above 1000	Other:74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	3

Standard FCC 15.249

Frequency of Emission (MHz)	**Field Strength of fundamental (millivolts /meter)**	**Field Strength of Harmonics (microvolts/meter)**
900~928	50	500
2400~2483.5	50	500
5725~5875	50	500
24000~242500	250	2500

Notes:

(1) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Spectrum Parameter	Setting
Detector	Peak/AV
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB (emission in restricted band)	>20BW
VB (emission in restricted band)	=3xRB

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
	90kHz~110kHz / RB 200Hz for QP
	110kHz~490kHz / RB 200Hz for PK & AV
	490kHz~30MHz / RB 9kHz for QP
	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

a. The measuring distance of 3m shall be used for measurements. The EUT was placed on the top of arotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Below 1GHz)

b. The measuring distance of 3m shall used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Above 1GHz)

c. The height of the test antenna shall vary between 1m to 4m.Both horizontal and vertical polarization Of the antenna are set to make the measurement.

d. The initial step in collecting radiated emission data is a receive peak detector mode. Pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

e. All readings are peak unless otherwise stated QP in column of Note. Peak denoted that the Peak reading compliance with the QP limits and then QP Mode measurement didn't perform (Below 1GHz)

f. All readings are Peak mode value unless otherwise stated AVG in column of Note. If the Peak mode measured value compliance with the Peak limits and lower than AVG Limits, the EUT shall be deemed to meet Peak & AVG limits and then only Peak mode was measured, but AVG mode didn't perform.(Above 1GHz)

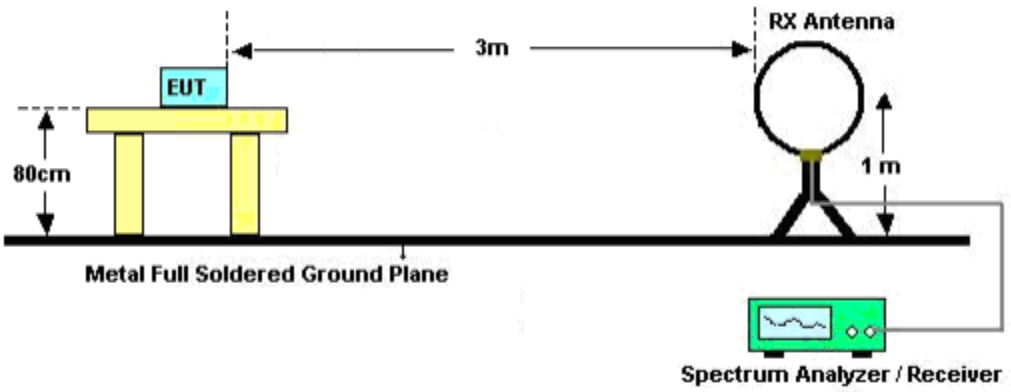
g. For the actual test configuration, please refer to the related Item –EUT Test Photos. Note: Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

3.2.3 DEVIATION FROM TEST STANDARD

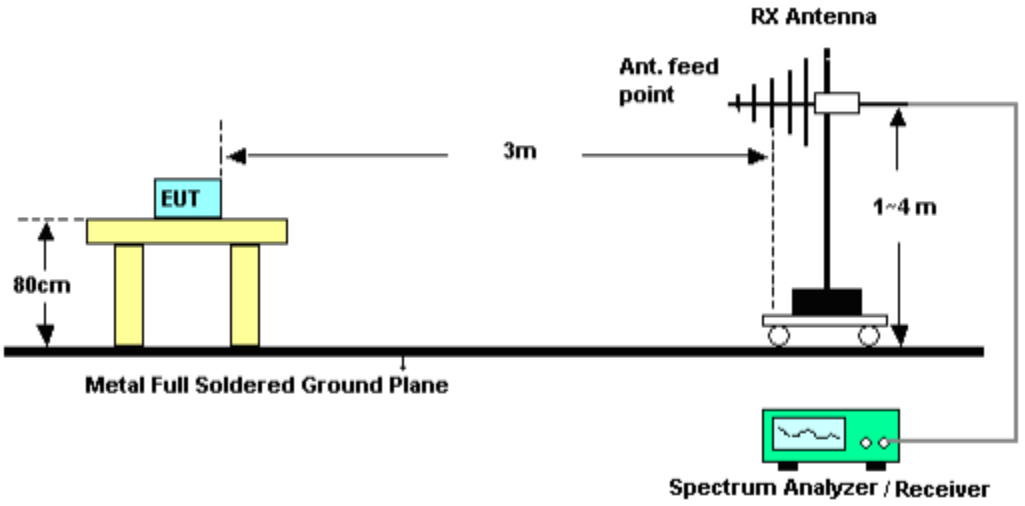
No deviation

3.2.4 TEST SETUP

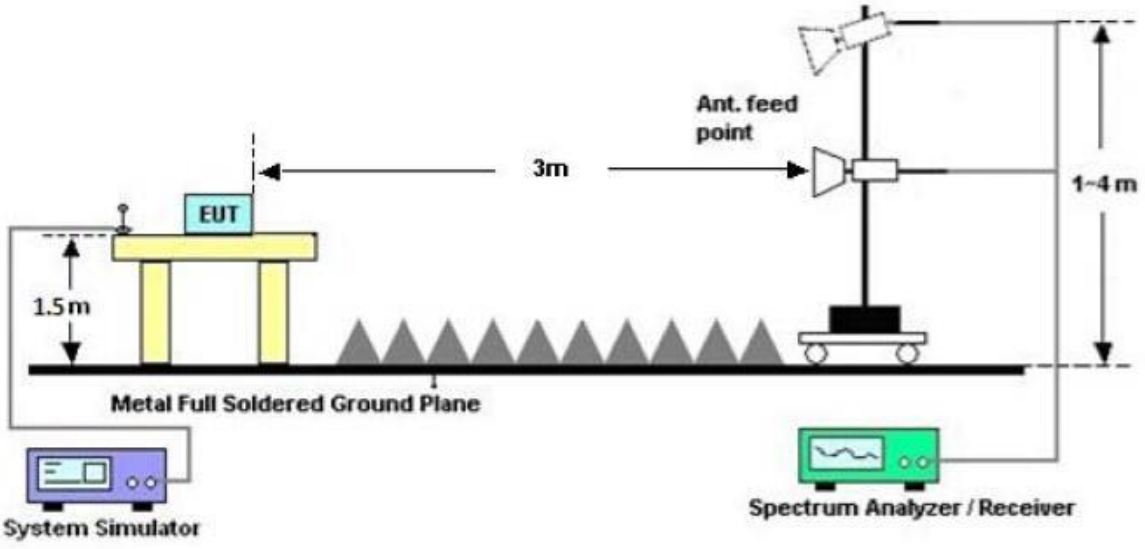
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 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:
Margin=PL-PK L or AL- AV L; Margin only shown the worst case.
Where
PR = Peak Reading
AR = Average Reading
PL = Peak Level
AL = Average Level
AF = Antenna Factor
PK L = Peak Limit
AV L = AV Limit
For example

Frequency	PR	AR	AF	PL	AL	PK L	AV L	Margin
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
2178	40.23	30.31	9.83	50.06	40.14	74.00	54.00	-13.86

3.2.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

Below 30 MHz

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 5V	Polarization:	---
Test Mode:	TX Mode		

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =40 log (specific distance/test distance)(dB);

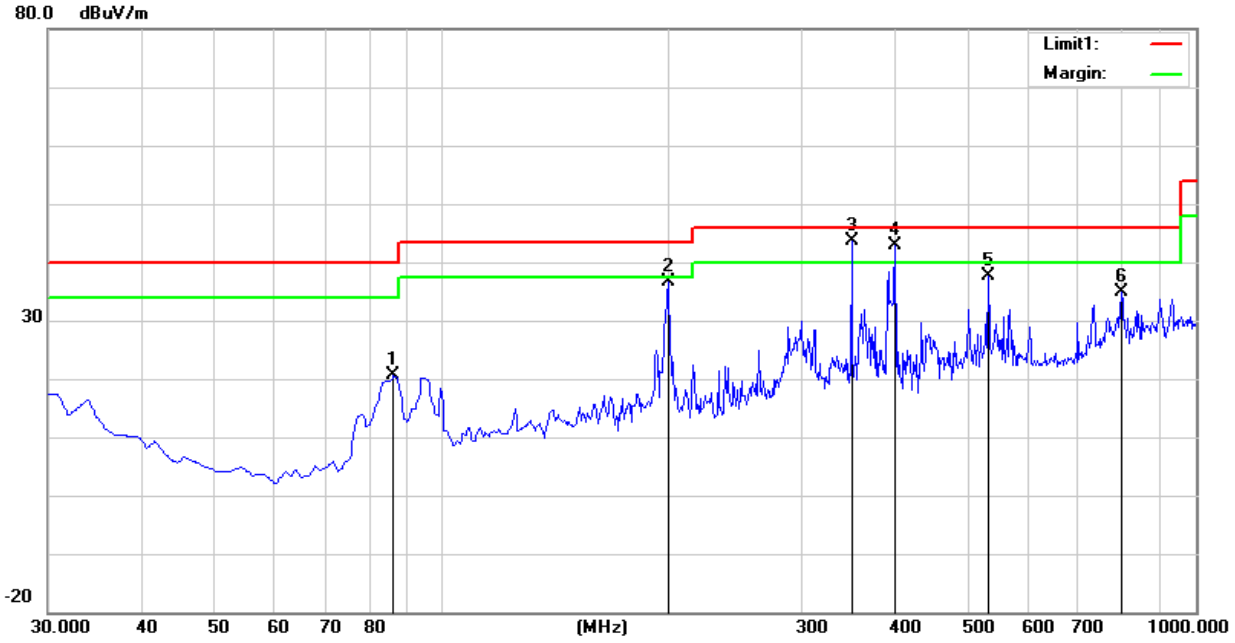
Limit line = specific limits(dBuv) + distance extrapolation factor.

Between 30MHz – 1000 MHz Radiation Spurious

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 5V	Phase:	Horizontal
Test Mode:	Mode 1/2/3 (Mode 3 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	86.2600	42.53	-21.96	20.57	40.00	-19.43	QP
2	199.7500	57.84	-21.11	36.73	43.50	-6.77	QP
3	350.1000	56.59	-13.06	43.53	46.00	-2.47	QP
4	399.5700	54.00	-11.16	42.84	46.00	-3.16	QP
5	531.4900	44.94	-7.37	37.57	46.00	-8.43	QP
6	796.3000	36.95	-2.02	34.93	46.00	-11.07	QP

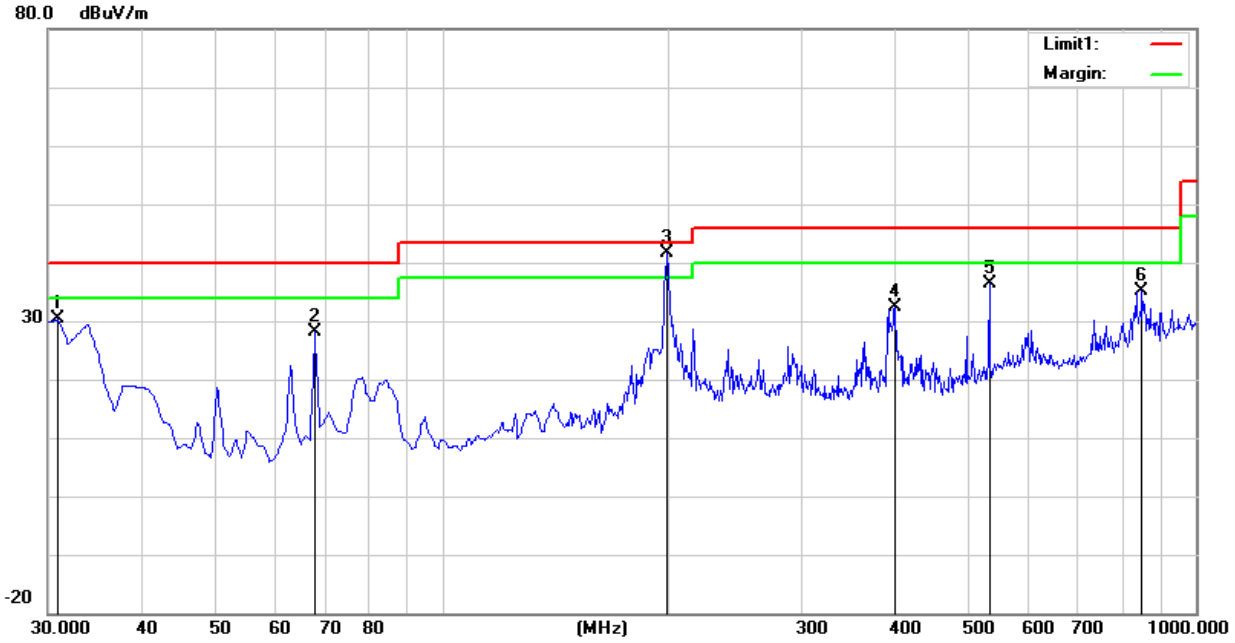
Remark:
1. Margin = Result (Result =Reading + Factor)–Limit



Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 5V	Phase:	Vertical
Test Mode:	Mode 1/2/3 (Mode 3 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.9700	43.69	-13.35	30.34	40.00	-9.66	QP
2	67.8300	53.41	-25.28	28.13	40.00	-11.87	QP
3	198.7800	62.80	-21.12	41.68	43.50	-1.82	QP
4	399.5700	43.59	-11.16	32.43	46.00	-13.57	QP
5	532.4600	43.61	-7.31	36.30	46.00	-9.70	QP
6	849.6500	35.97	-0.73	35.24	46.00	-10.76	QP

Remark:
1. Margin = Result (Result =Reading + Factor)–Limit



Above 1G Radiation Spurious

Low channel

PK

Frequency	Meter Reading	Detector	Amplifier	Loss	Antenna Factor	Orrected Factor	Corrected Amplitude	FCC Part 15.249/15.209/205		RX Antenna
								Limit	Margin	Polar
(MHz)	(dBμV/m)	(PK/QP/AV)	（dB）	（dB）	（dB/m）	（dB）	(dBμV/m)	(dBμV/m)	(dB)	(H/V)
4804.07	61.06	PK	50.33	8.84	31.22	-10.27	50.79	74	-23.21	H
4804.07	60.36	PK	50.33	8.84	31.22	-10.27	50.09	74	-23.91	V
7206.08	57.99	PK	55.48	9.31	34.05	-12.12	45.87	74	-28.13	H
7206.08	56.62	PK	55.48	9.31	34.05	-12.12	44.50	74	-29.50	V
9607.92	61.47	PK	59.13	9.89	36.99	-12.25	49.22	74	-24.78	H
9607.92	60.43	PK	59.13	9.89	36.99	-12.25	48.18	74	-25.82	V

AV

Frequency	PK Reading	Duty cycle factor	AV Reading	Orrected Factor	Corrected Amplitude	FCC Part 15.249/15.209/205		RX Antenna
						Limit	Margin	Polar
(MHz)	(dBμV/m)	(dB)	(dBμV/m)	（dB）	(dBμV/m)	(dBμV/m)	(dB)	(H/V)
4804.07	61.06	0	61.06	-10.27	50.79	54.00	-3.21	H
4804.07	60.36	0	60.36	-10.27	50.09	54.00	-3.91	V
7206.08	57.99	0	57.99	-12.12	45.87	54.00	-8.13	H
7206.08	56.62	0	56.62	-12.12	44.50	54.00	-9.50	V
9607.92	61.47	0	61.47	-12.25	49.22	54.00	-4.78	H
9607.92	60.43	0	60.43	-12.25	48.18	54.00	-5.82	V

AV = Peak +20Log10(duty cycle factor) =PK+0

Mid channel

PK

Frequency	Meter Reading	Detector	Amplifier	Loss	Antenna Factor	Orrected Factor	Corrected Amplitude	FCC Part 15.249/15.209/205		RX Antenna
								Limit	Margin	Polar
(MHz)	(dBμV/m)	(PK/QP/AV)	（dB）	（dB）	（dB/m）	（dB）	(dBμV/m)	(dBμV/m)	(dB)	(H/V)
4882.09	61.24	PK	50.33	8.84	31.22	-10.27	50.97	74	-23.03	H
4882.09	60.51	PK	50.33	8.84	31.22	-10.27	50.24	74	-23.76	V
7323.11	58.03	PK	55.48	9.31	34.05	-12.12	45.91	74	-28.09	H
7323.11	56.85	PK	55.48	9.31	34.05	-12.12	44.73	74	-29.27	V
9764.04	61.30	PK	59.13	9.89	36.99	-12.25	49.05	74	-24.95	H
9764.04	60.53	PK	59.13	9.89	36.99	-12.25	48.28	74	-25.72	V

AV

Frequency	PK Reading	Duty cycle factor	AV Reading	Orrected Factor	Corrected Amplitude	FCC Part 15.249/15.209/205		RX Antenna
						Limit	Margin	Polar
(MHz)	(dBμV/m)	(dB)	(dBμV/m)	（dB）	(dBμV/m)	(dBμV/m)	(dB)	(H/V)
4882.09	61.24	0	61.24	-10.27	50.97	54.00	-3.03	H
4882.09	60.51	0	60.51	-10.27	50.24	54.00	-3.76	V
7323.11	58.03	0	58.03	-12.12	45.91	54.00	-8.09	H
7323.11	56.85	0	56.85	-12.12	44.73	54.00	-9.27	V
9764.04	61.30	0	61.30	-12.25	49.05	54.00	-4.95	H
9764.04	60.53	0	60.53	-12.25	48.28	54.00	-5.72	V

AV = Peak +20Log10(duty cycle factor) =PK+0

High channel

PK

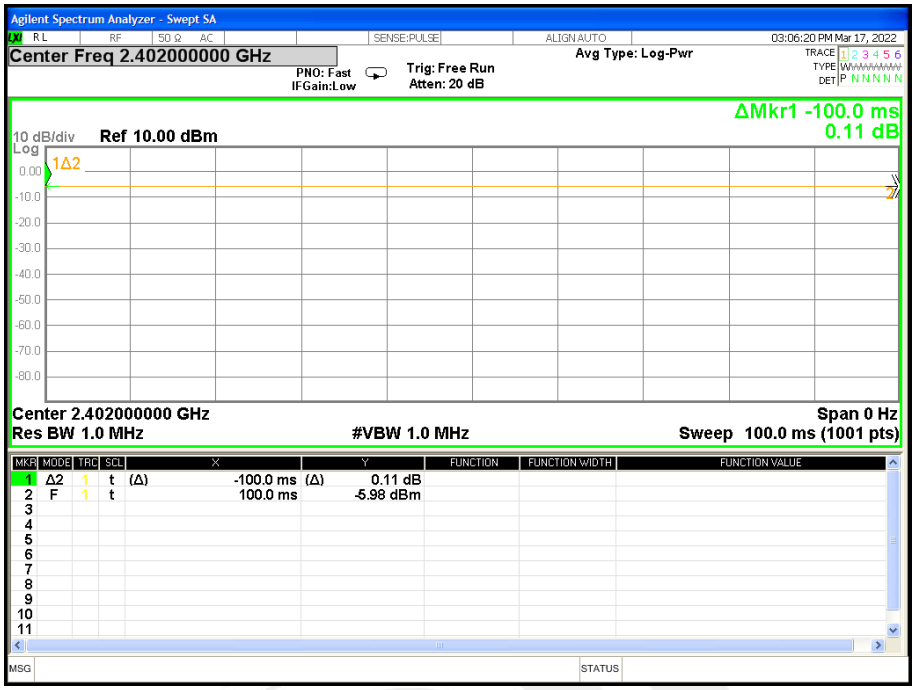
Frequency	Meter Reading	Detector	Amplifier	Loss	Antenna Factor	Orrected Factor	Corrected Amplitude	FCC Part 15.249/15.209/205		RX Antenna
								Limit	Margin	Polar
(MHz)	(dBμV/m)	(PK/QP/AV)	（dB）	（dB）	（dB/m）	（dB）	(dBμV/m)	(dBμV/m)	(dB)	(H/V)
4960.18	61.06	PK	50.33	8.84	31.22	-10.27	50.79	74	-23.21	H
4960.18	60.29	PK	50.33	8.84	31.22	-10.27	50.02	74	-23.98	V
7440.03	58.17	PK	55.48	9.31	34.05	-12.12	46.05	74	-27.95	H
7440.03	56.85	PK	55.48	9.31	34.05	-12.12	44.73	74	-29.27	V
9920.07	61.49	PK	59.13	9.89	36.99	-12.25	49.24	74	-24.76	H
9920.07	60.12	PK	59.13	9.89	36.99	-12.25	47.87	74	-26.13	V

AV

Frequency	PK Reading	Duty cycle factor	AV Reading	Orrected Factor	Corrected Amplitude	FCC Part 15.249/15.209/205		RX Antenna
						Limit	Margin	Polar
(MHz)	(dBμV/m)	(dB)	(dBμV/m)	（dB）	(dBμV/m)	(dBμV/m)	(dB)	(H/V)
4960.18	61.06	0	61.06	-10.27	50.79	54.00	-3.21	H
4960.18	60.29	0	60.29	-10.27	50.02	54.00	-3.98	V
7440.03	58.17	0	58.17	-12.12	46.05	54.00	-7.95	H
7440.03	56.85	0	56.85	-12.12	44.73	54.00	-9.27	V
9920.07	61.49	0	61.49	-12.25	49.24	54.00	-4.76	H
9920.07	60.12	0	60.12	-12.25	47.87	54.00	-6.13	V

AV = Peak +20Log10(duty cycle factor) =PK+0

Duty cycle



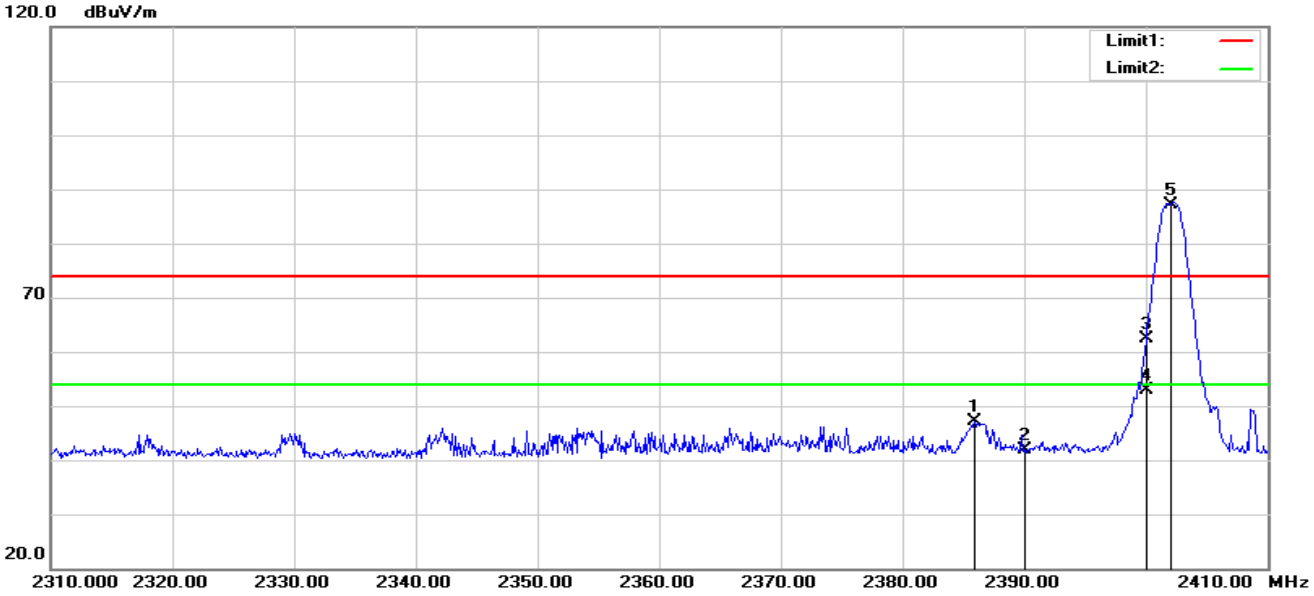
Ton(us)	Tp(us)	Duty cycle
100	100	0.00

Note: Duty Factor=20*LOG10(1/(Ton/Tp))

(Radiation Band edge**)**

Low channel

Horizontal

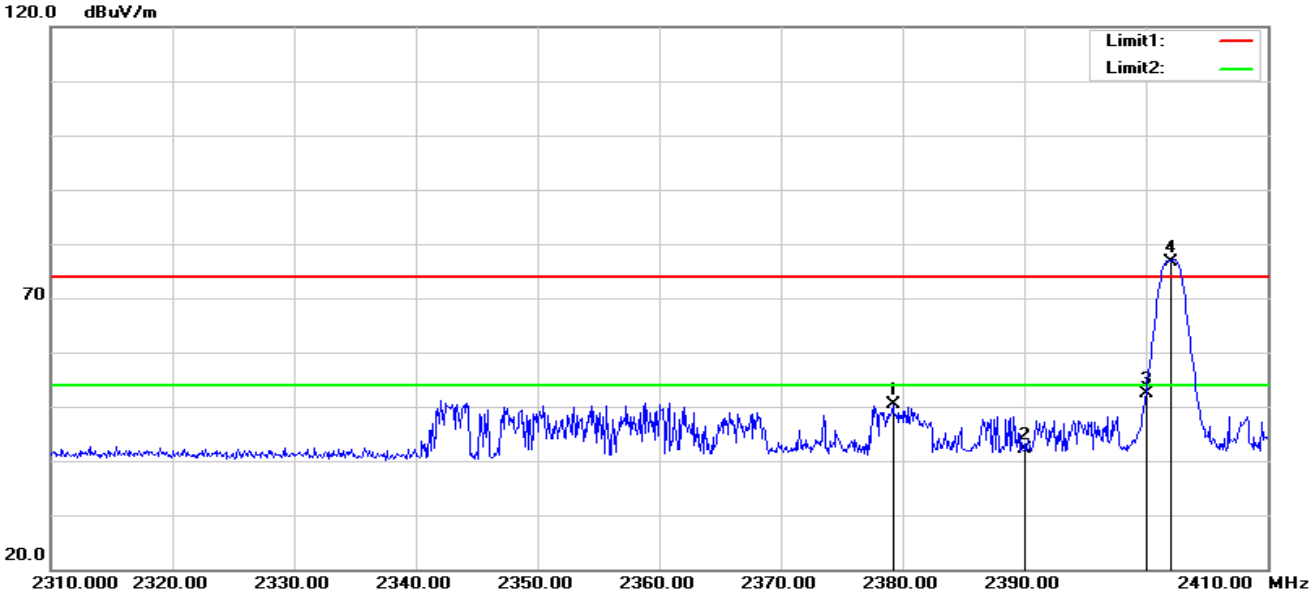


No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2385.900	42.88	4.28	47.16	74.00	-26.84	peak
2	2390.000	37.52	4.34	41.86	74.00	-32.14	peak
3	2400.000	57.91	4.49	62.40	74.00	-11.60	peak
4	2400.000	48.35	4.49	52.84	54.00	-1.16	AVG

Fundamental Frequency

No.	Frequency	Reading	Correct	Duty cycle	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
5	2402.000	82.67	4.49	-	87.16	114.00	-26.84	peak
6	2402.000	82.67	4.49	0	87.16	94.00	-6.84	AVG

Vertical



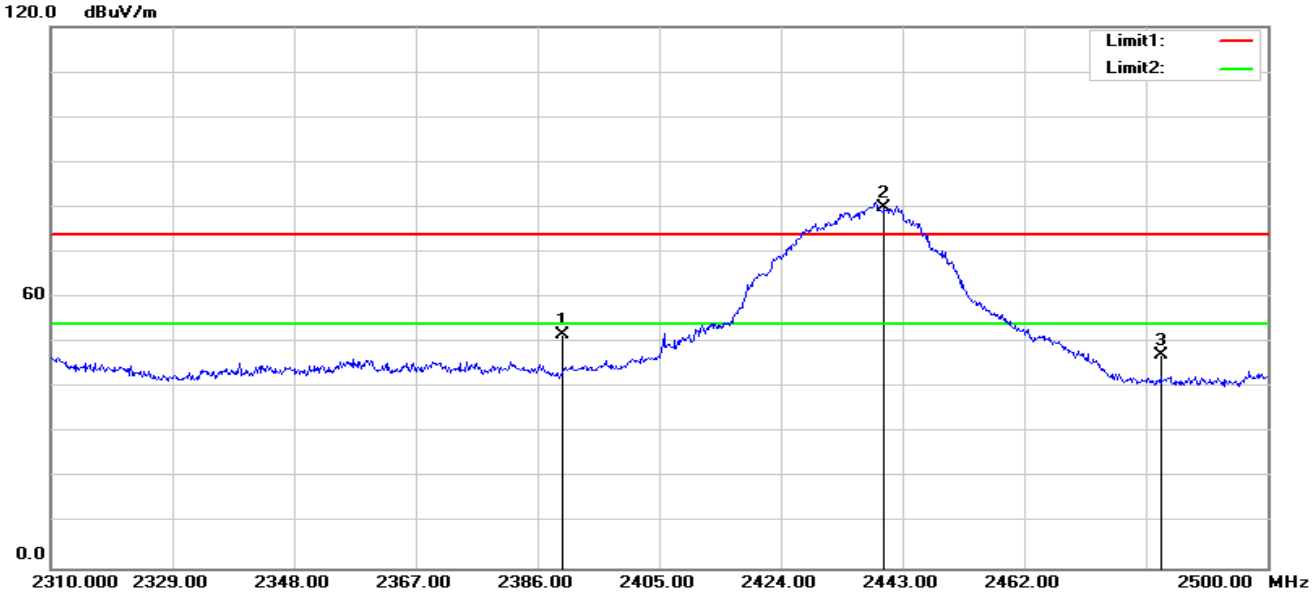
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2379.200	46.10	4.18	50.28	74.00	-23.72	peak
2	2390.000	37.69	4.34	42.03	74.00	-31.97	peak
3	2400.000	47.91	4.49	52.40	74.00	-21.60	peak

Fundamental Frequency

No.	Frequency	Reading	Correct	Duty cycle	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
4	2402.000	72.25	4.49	-	76.74	114.00	-37.26	peak
5	2402.000	72.25	4.49	0	76.74	94.00	-17.26	AVG

Mid channel

Horizontal

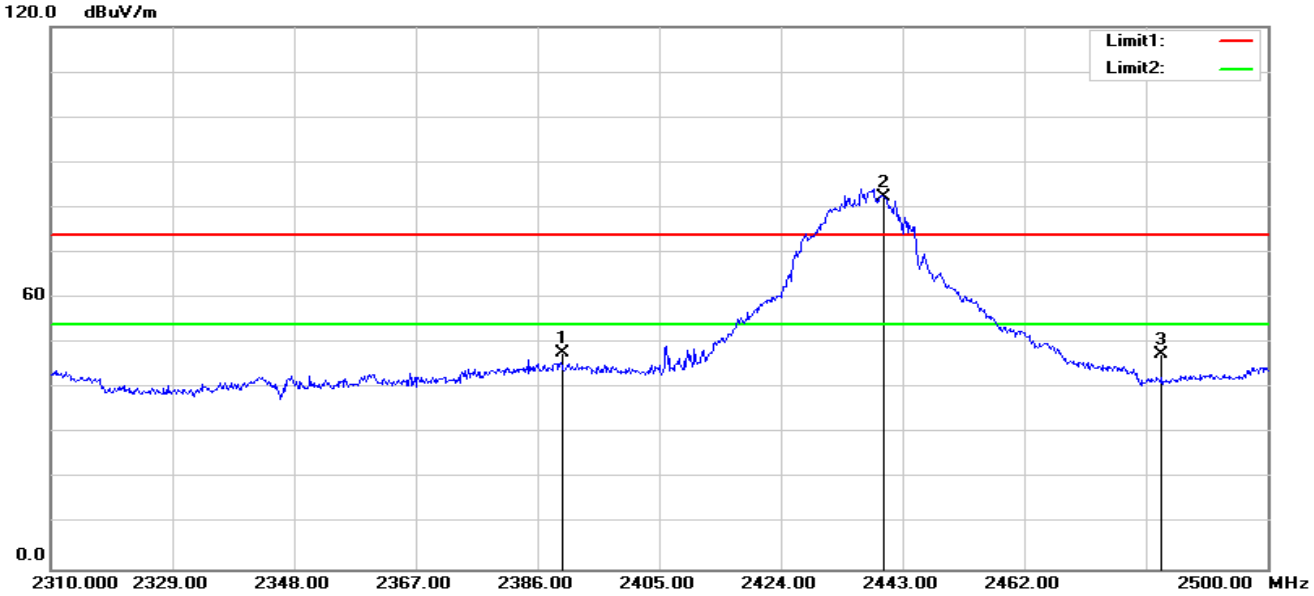


No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2390.000	47.44	4.34	51.78	74.00	-22.22	peak
3	2483.500	42.54	4.60	47.14	74.00	-26.86	peak

Fundamental Frequency

No.	Frequency	Reading	Correct	Duty cycle	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
2	2440.000	75.32	4.49	-	79.81	114.00	-34.19	peak
4	2440.000	75.32	4.49	0	79.81	-14.19	94.00	AVG

Vertical



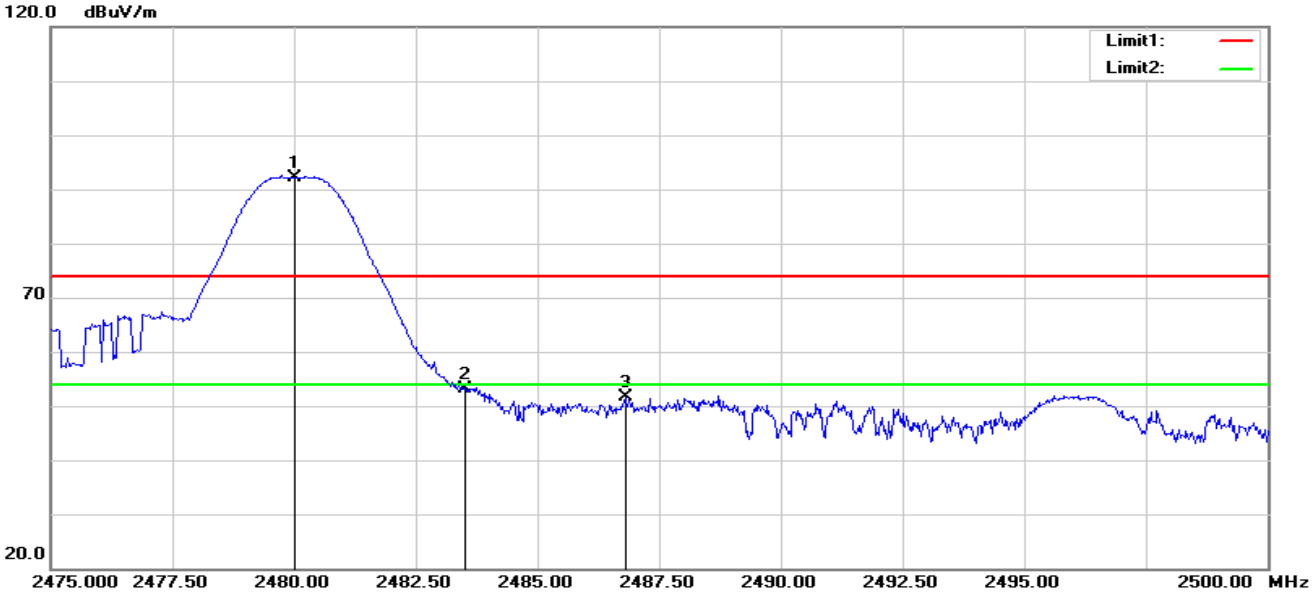
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2390.000	43.49	4.34	47.83	74.00	-26.17	peak
3	2483.500	42.87	4.60	47.47	74.00	-26.53	peak

Fundamental Frequency

No.	Frequency	Reading	Correct	Duty cycle	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
2	2402.000	77.85	4.49	-	82.34	114.00	-31.66	peak
4	2402.000	77.85	4.49	0	82.34	94.00	-11.66	AVG

High channel

Horizontal

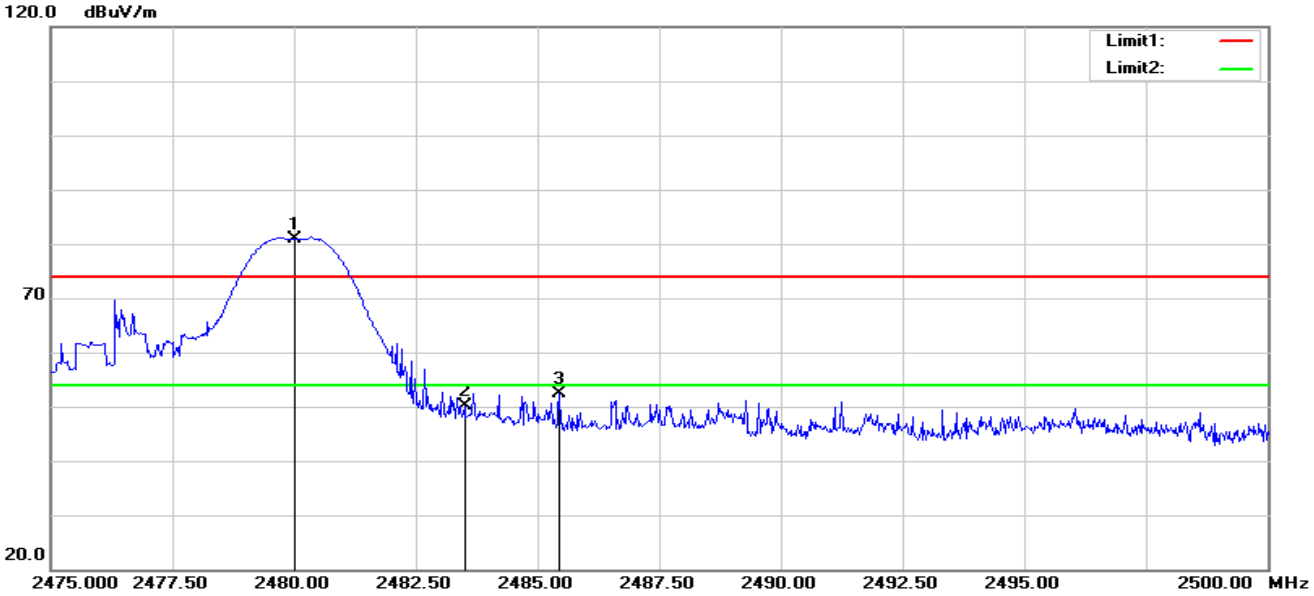


No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
2	2483.500	48.43	4.60	53.03	74.00	-20.97	peak
3	2486.800	47.07	4.62	51.69	74.00	-22.31	peak

Fundamental Frequency

No.	Frequency	Reading	Correct	Duty cycle	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.000	87.64	4.60	-	92.24	114.00	-21.76	peak
4	2480.000	87.64	4.60	0	92.24	94.00	-1.76	AVG

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
2	2483.500	45.46	4.60	50.06	74.00	-23.94	peak
3	2485.450	47.73	4.61	52.34	74.00	-21.66	peak

Fundamental Frequency

No.	Frequency	Reading	Correct	Duty cycle	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.000	76.18	4.60	-	80.78	114.00	-33.22	peak
4	2480.000	76.18	4.60	0	80.78	94.00	-13.22	AVG

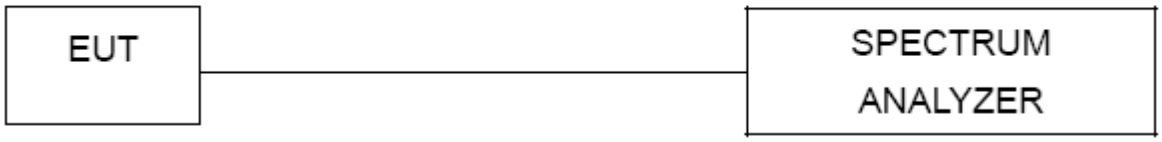
4. BANDWIDTH TEST

4.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

b. Spectrum Setting : RBW= 1% to 5% OBW, VBW≧RBW, Sweep time = Auto.

4.2 TEST SETUP



4.3 EUT OPERATION CONDITIONS

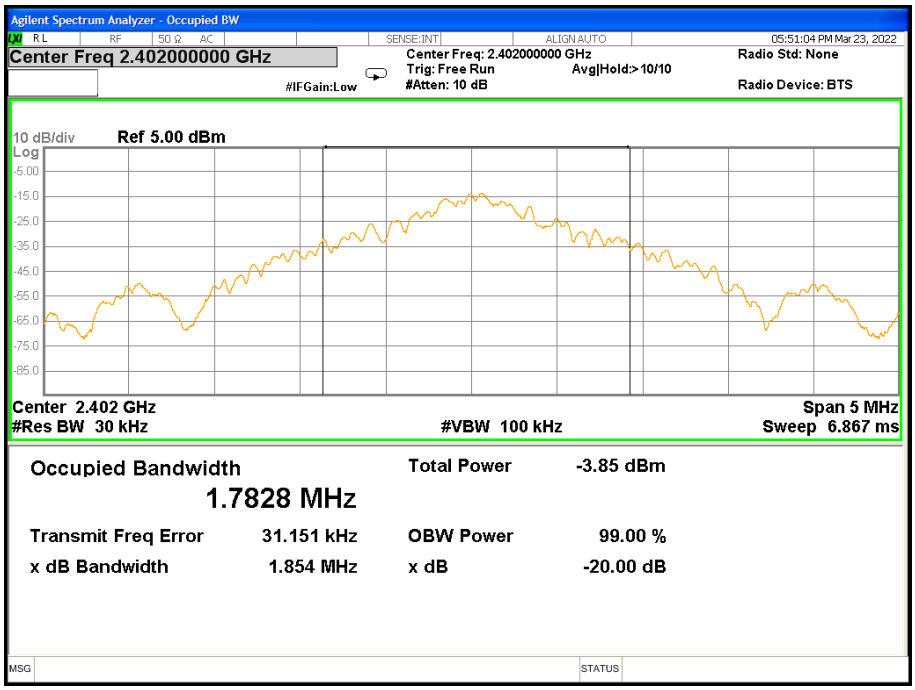
TX mode.

4.4 TEST RESULTS

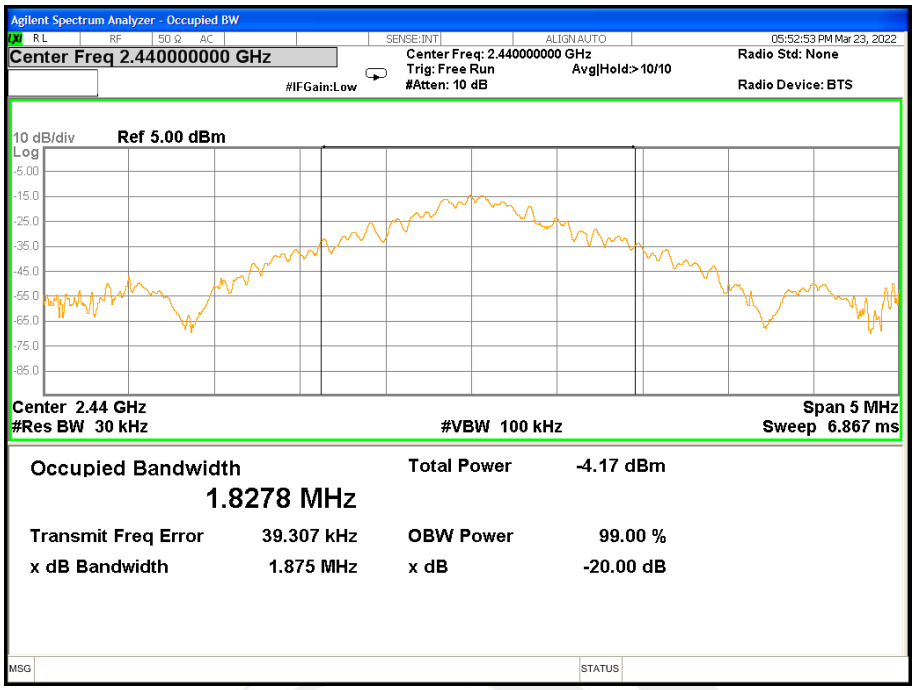
Temperature:	25 ℃	Relative Humidity:	50%
Test Voltage:	DC 5V		

Test Channel	Frequency(MHz)	20 dB Bandwidth(MHz)	99% Bandwidth(MHz)
CH01	2402	1.854	1.7828
CH20	2440	1.875	1.8278
CH40	2480	1.885	1.8517

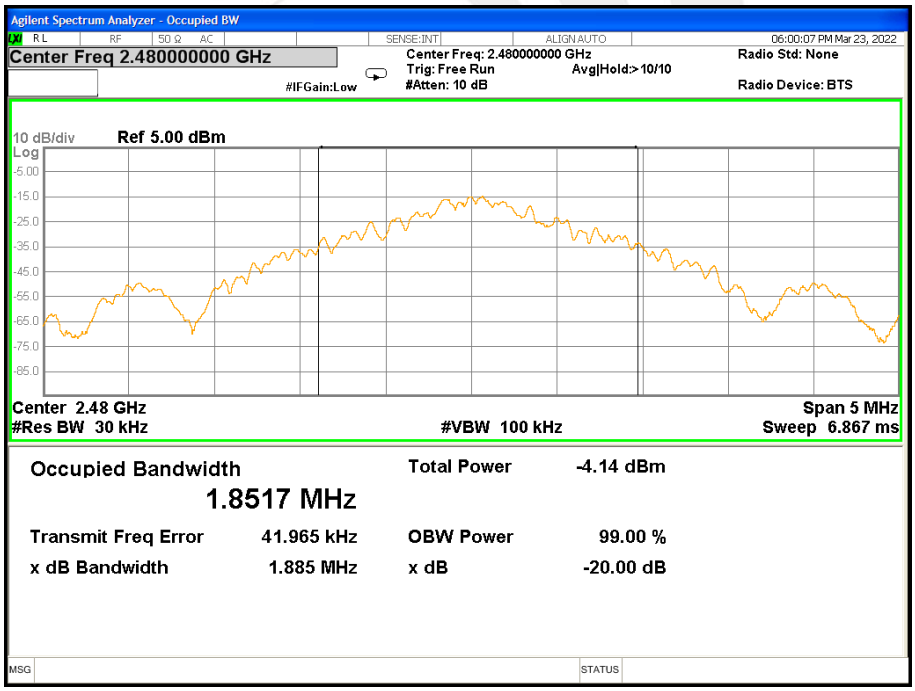
Low Channel



Mid Channel



High Channel



5. ANTENNA REQUIREMENT

5.1 STANDARD REQUIREMENT

According to the FCC Part 15 Paragraph 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.

5.2 EUT ANTENNA

The EUT antenna is PCB Antenna.It conforms to the standard requirements.

APPENDIX- PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

※※※※※END OF THE REPORT※※※※※