Product Name: Wireless Microphone	**Report No: FCC022022-1560RF0**
Product Model: WM200.WM200PLUS. WM200PRO.WM900. L1.L2.L3.L4.L5.L6.L7.L8.L9 Y1.Y2.Y3.Y4.Y5.Y6.Y7.Y8.Y9 X1.X2.X3.X4.X5.X6.X7.X8.X9	**Security Classification: Open**
Version: V1.0	**Total Page: 49**

TIRT Testing Report

Prepared By:	Checked By:	Approved By:	
Stone Tang	Randy Lv	Daniel Chen	
Stone Tang	Randy LV	Daniel chen	

RF TEST REPORT

FCC ID: 2A4RK-WM200

According to

47 CFR FCC Part 15, Subpart C(Section 15.247)

ANSI C63.10:2013

Equipment	:	Wireless Microphone
Model No.	:	WM200.WM200PLUS. WM200PRO.WM900. L1.L2.L3.L4.L5.L6.L7.L8.L9 Y1.Y2.Y3.Y4.Y5.Y6.Y7.Y8.Y9 X1.X2.X3.X4.X5.X6.X7.X8.X9
Trademark	:	FULAIM
Product No.	:	20220408004792
Applicant	:	Fuzhou Huiqixin Technology Co. , Ltd. Room 906,zone A,floor 9,yunzuo-3 building,no. 528 xihong road,gulou district, Fuzhou city, Fujian province, China

- The test result referred exclusively to the presented test model /sample.
- Without written approval of TIRT Inc. the test report shall not reproduced except in full.
- Test Date: 2022.03.17-2022.04.07

Lab: Beijing TIRT Technology Service Co.,Ltd Shenzhen
Add: 101, 3 # Factory Building, Gongjin Electronics Shatin Community, Kengzi Street, Pingshan District, Shenzhen, China
TEL: +86-13911306535

Table of Contents

History of this test report

Original Report Issue Date: 2022.05.07

● No additional attachment

○ Additional attachments were issued following record

Attachment No.	Issue Date	Description

1. General Information

1.1 Applicant

Fuzhou Huiqixin Technology Co. , Ltd.

Room 906,zone A,floor 9,yunzuo-3 building,no. 528 xihong road,gulou district, Fuzhou city, Fujian province, China

1.2 Manufacturer

Fuzhou Huiqixin Technology Co. , Ltd.

Room 906,zone A,floor 9,yunzuo-3 building,no. 528 xihong road,gulou district, Fuzhou city, Fujian province, China

1.3 Factory

/

/

1.4 Basic Description of Equipment Under Test

Items	Description	
Equipment Name	Wireless Microphone	
Model Number	WM200.WM200PLUS.WM200PRO.WM900. L1.L2.L3.L4.L5.L6.L7.L8.L9 Y1.Y2.Y3.Y4.Y5.Y6.Y7.Y8.Y9 X1.X2.X3.X4.X5.X6.X7.X8.X9	
Model Differences	All the models are packaging configuration difference and appearance difference. The main test model is WM200.	
Trademark	FULAIM	
Power Supply	Input: 5V DC Rated current: 45mA	
	Battery Model: 502525 Battery Capacity: 300 mAh Rated voltage: 3.7V	
Operating Temperature	-10~55℃	
EUT Stage	○ Product Unit	●Final-Sample
Modulation Type	GFSK	
Frequency Range	2400-2483 MHz	
Data Rate	1 Mbps	
Number of Operated Channel	40	

40 channels are provided for EUT

Channel No.	Frequency（MHz）	Channel No.	Frequency
0	2402	20	2442
1	2404	21	2444
2	2406	22	2446
3	2408	23	2448
4	2410	24	2450
5	2412	25	2452
6	2414	26	2454
7	2416	27	2456
8	2418	28	2458
9	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

1.5 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain（dBi）
1	N/A	N/A	PCB	N/A	1.54

2. Summary of Test Results

2.1 Summary of Test Items

47 CFR FCC Part 15, Subpart C (Section 15.247)			
Test item	FCC Clause	Results	Remarks
AC Power Conducted Emission	15.207	Pass	Meet the requirement of the limit
Radiated Emission and Band Edge Measurement	15.205/15.209 /15.247(d)	Pass	Meet the requirement of the limit
Spurious Emission at Antenna Port	15.247(d)	Pass	Meet the requirement of the limit
6dB Bandwidth	15.247(a)(2)	Pass	Meet the requirement of the limit
Conducted Power	15.247(b)	Pass	Meet the requirement of the limit
Power Spectral Density	15.247(e)	Pass	Meet the requirement of the limit
Antenna Requirements	15.203	Compliance	The EUT has one internal PCB antenna arrangement which was permanently attached, fulfill the requirement of this section. Please refer to EUT photos for detail.
Note: NA denotes Not Applicable in this part			

2.2 Application of Standard

47 CFR FCC Part 15, Subpart C (Section 15.247)

KDB 558074 D01 DTS Meas Guidance v04

ANSI C63.10:2013

2.3 Test Instruments

No.	Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Receiver	Rohde&Schwarz	ESCI	1166.5950.03	2022/11/16
2	AMN	Rohde&Schwarz	ENV216	3560.6550.05	2022/11/09
3	AMN	Schwarzbeck	NSLK8127	#829	2022/11/09
4	ECSI RF IN RF Cable	Rohde&Schwarz	RP-X1	\	2022/11/18
5	ECSI RF IN RF Cable	Rohde&Schwarz	Sapre sm	\	2022/11/09
6	EMI Receiver	Rohde&Schwarz	ESR7	102013	2022/11/09
7	Spectrum analyzer	Rohde&Schwarz	FSV30	103741	2022/11/09
8	Spectrum analyzer	KEYSIGHT	N9010A-44	MY51440158	2022/11/09
9	Integral Antenna	Schwarzbeck	VULB 9163	VULB 9163-361	2022/11/09
10	Integral Antenna	Schwarzbeck	BBHA 9120D	BBHA 9120D 1201	2022/11/09
11	Integral Antenna	Schwarzbeck	BBHA 9170	9170#685	2022/11/09
12	Preamplifier	CD Systems Inc	PAP-03036-30	85060000	2022/11/09
13	Preamplifier	Schwarzbeck	BBV9721	9721-019	2022/11/09
14	Preamplifier	emci	EMC012645SE	980417	2022/11/09
15	ECSI RF IN RF Cable	Rohde&Schwarz	AP-X1	\	2022/11/09
16	Spectrum Analyzer	Agilent	N9010A	MY52221119	2022/11/09
17	Power Collection Unit	Tonscend	JS0806-2	188060134	2022/09/12
18	Tonscend Test System	Tonscend	2.6.77.0518	NA	NA
19	Temp&Humidity Recorder	Anymetre	JR900	NA	2022/11/03

2.4 Test Channel

Frequency Range : 2402-2480 MHz			
Test Items	Data Rate	Channel	Antenna
AC Power Conducted Emission	1Mbps	-	-
Radiated Emission and Band Edge Measurement	1 Mbps	0/19/39	1
Spurious Emission at Antenna Port	1 Mbps	0/19/39	1
6dB Bandwidth	1 Mbps	0/19/39	1
Conducted Power	1 Mbps	0/19/39	1
Power Spectral Density	1 Mbps	0/19/39	1

2.5 Test Condition

Applicable to	Environmental conditions	Input Power	Tested by
AC Power Conducted Emission	24.6°C, 56 % RH	3.7V DC	Stone Tang
Radiated Emission and Band Edge Measurement	24.2°C, 55 % RH	3.7V DC	Stone Tang
Spurious Emission at Antenna Port	24.6°C, 56 % RH	3.7V DC	Stone Tang
6dB Bandwidth	24.6°C, 56 % RH	3.7V DC	Stone Tang
Conducted Power	24.6°C, 56 % RH	3.7V DC	Stone Tang
Power Spectral Density	24.6°C, 56 % RH	3.7V DC	Stone Tang

The applicant declare the operating environment of EUT as below:

Normal conditions: 3.7V DC ,15~35°C

Extreme conditions:3.5V DC~4.2V DC, -10°C ~55°C

2.6 Duty Cycle of Test Signal

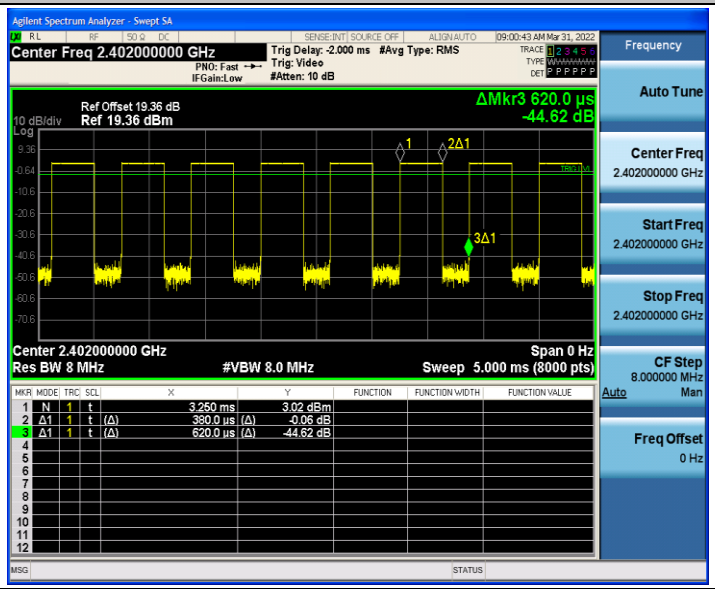
If duty cycle is ⩾ 98 %, duty factor is not required.

If duty cycle is < 98 %, duty factor shall be considered.

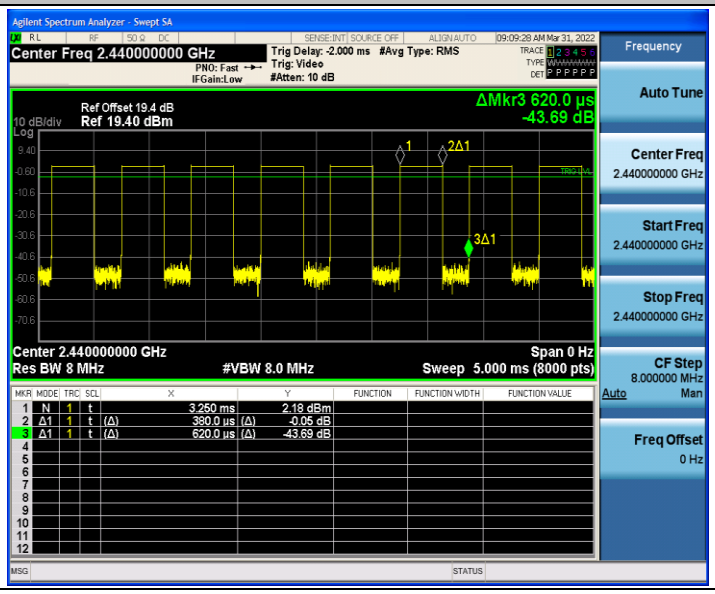
So all the duty factor of other test mode shall be considered.

TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Duty Factor
1M	Ant1	2402	0.39	0.62	61.29	2.13
		2440	0.39	0.62	61.29	2.13
		2480	0.39	0.62	61.29	2.13

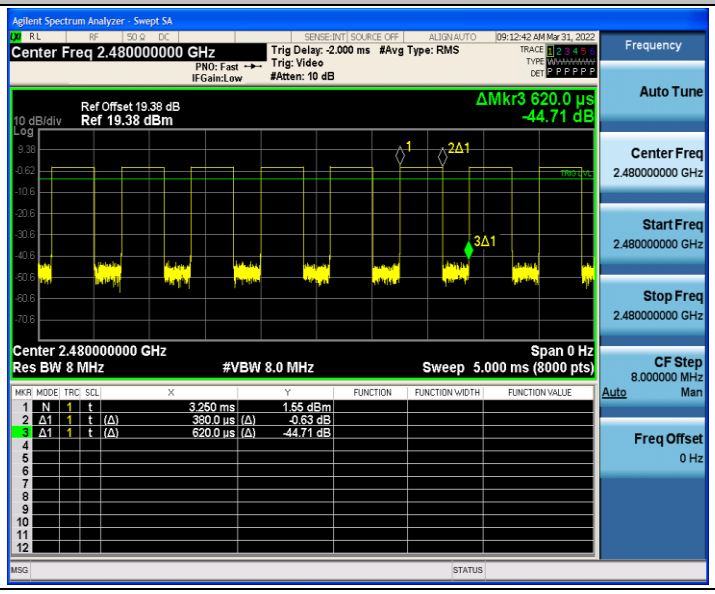
1M_Ant1_2402



1M_Ant1_2440



1M_Ant1_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig Delay: -2.000 ms
Trig: Video
#Avg Type: RMS
#Atten: 10 dB
09:12:42 AM Mar 31, 2022
Ref Offset 19.38 dB
10 dB/div
Ref 19.38 dBm
ΔMkr3 620.0 µs
-44.71 dB
Center 2.480000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Span 0 Hz
Sweep 5.000 ms (8000 pts)
1 N 1 t 3.250 ms 1.55 dBm
2 Δ1 1 t (Δ) 380.0 µs (Δ) -0.63 dB
3 Δ1 1 t (Δ) 620.0 µs (Δ) -44.71 dB
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.480000000 GHz
Stop Freq
2.480000000 GHz
CF Step
8.000000 MHz
Auto
Man
Freq Offset
0 Hz

2.7 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT.
This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Uncertainty	
Parameter	Uncertainty
Occupied Channel Bandwidth	±142.12 KHz
RF power conducted	±0.74 dB
RF power radiated	±3.25dB
Spurious emissions, conducted	±1.78dB
Spurious emissions, radiated (9KHz～30MHz)	±4.2dB
Spurious emissions, radiated (30MHz～1GHz)	±4.6dB
Spurious emissions, radiated (1GHz ~ 18GHz)	±4.9dB
Conduction Emissions(150kHz~30MHz)	±3.1 dB
Humidity	±4.6%
Temperature	±0.7°C
Time	±1.25%

2.8 Test Location

Company:	Beijing TIRT Technology Service Co.,Ltd Shenzhen
Address:	101, 3 # Factory Building, Gongjin Electronics Shatin Community, Kengzi Street, Pingshan District, Shenzhen, China
CNAS Registration Number:	CNAS L14158
A2LA Registration Number	6049.01
Telephone:	+86 -13911306535

2.9 Deviation from Standards

None

2.10 Abnormalities from Standard Conditions

None

3. Test Procedure And Results

3.1 AC Power Line Conducted Emission

3.1.1 Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

3.1.2 Test Peripherals

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Type-C Cable	NA	NA	0.5m,No Shielding
2	Adaptor	HUAWEI	HW-100400C00	NA
3	Record PC	Lenovo	M4500T	NA
4	Control PC	Lenovo	M4500T	NA

3.1.3 Test Procedure

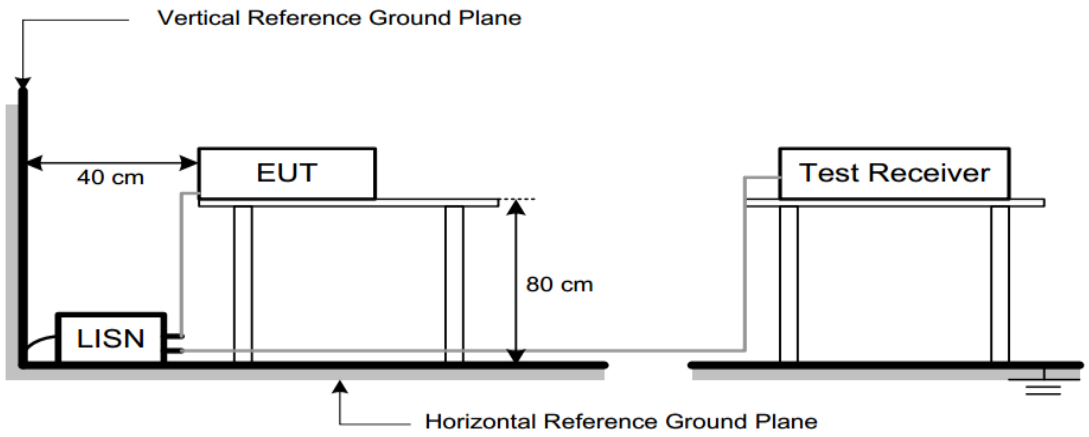
Test Method	
●Conducted Measurement	○Radiated Measurement
Test Channels	
○Lowest, Middle and Highest Channel	○Lowest and Highest Channel
Environmental conditions	
●Normal	○Normal and Extreme
Note:●:Test ○:No Test	

a) The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b) Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c) The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

3.1.4 Test Setup

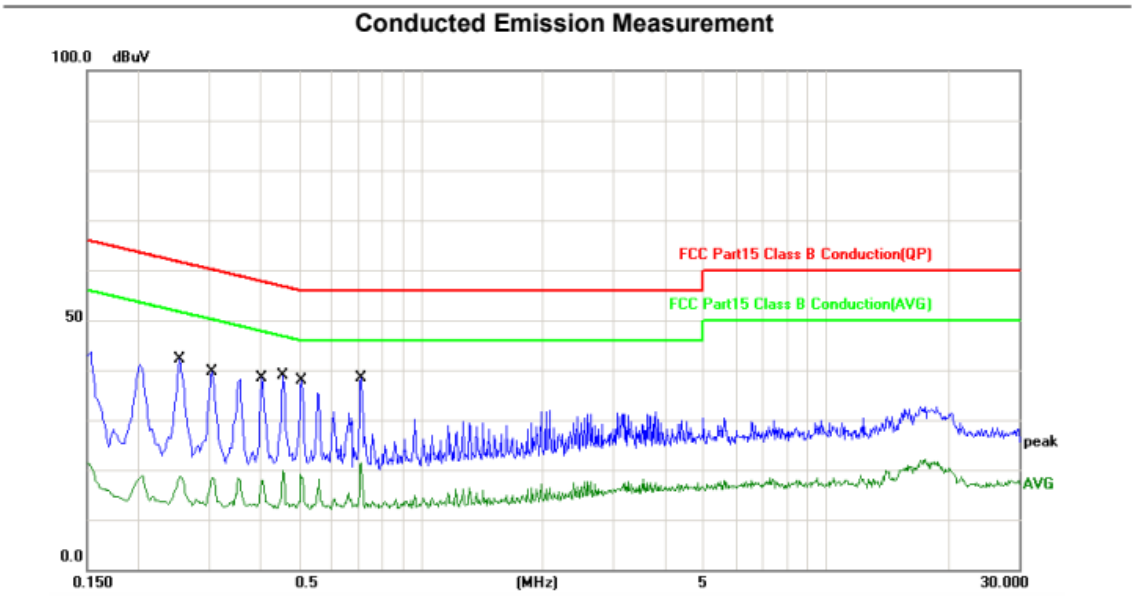


3.1.5 Test Result

Note:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Measurement = Reading + Correct Factor.
3. Over = Measurement - Limit

150kHz~30MHz	Test mode: 1M	Test Channel:19

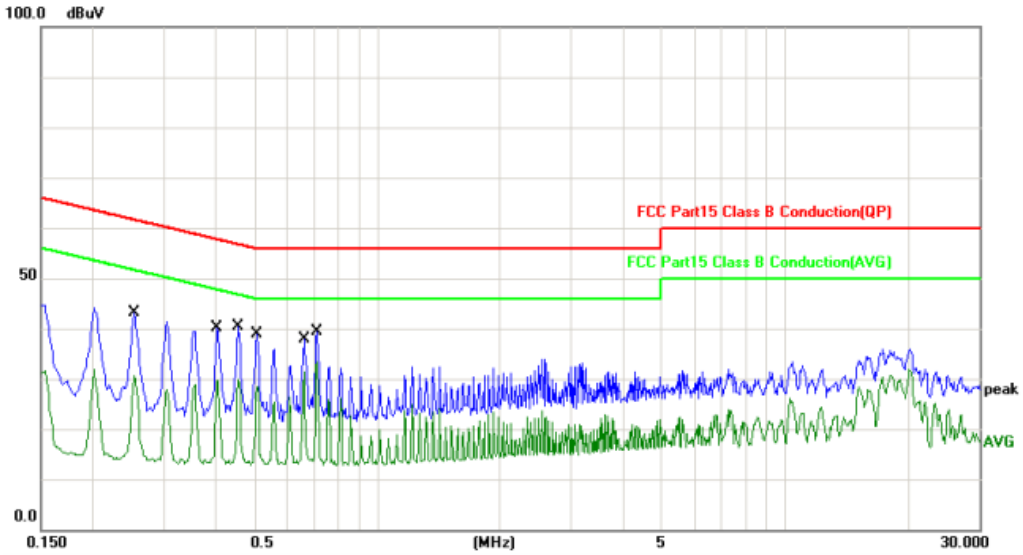


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2540	4.59	19.53	24.12	61.63	-37.51	QP	
2		0.2540	-6.22	19.53	13.31	51.63	-38.32	AVG	
3		0.3060	6.04	19.52	25.56	60.08	-34.52	QP	
4		0.3060	-6.55	19.52	12.97	50.08	-37.11	AVG	
5		0.4060	1.27	19.53	20.80	57.73	-36.93	QP	
6		0.4060	-6.80	19.53	12.73	47.73	-35.00	AVG	
7		0.4580	2.39	19.53	21.92	56.73	-34.81	QP	
8		0.4580	-6.82	19.53	12.71	46.73	-34.02	AVG	
9		0.5100	3.02	19.53	22.55	56.00	-33.45	QP	
10		0.5100	-6.91	19.53	12.62	46.00	-33.38	AVG	
11	*	0.7140	9.76	19.56	29.32	56.00	-26.68	QP	
12		0.7140	-6.24	19.56	13.32	46.00	-32.68	AVG	

150kHz~30MHz	Test mode: 1M	Test Channel:19

Neutral

Conducted Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2540	20.11	19.69	39.80	61.63	-21.83	QP	
2		0.2540	2.76	19.69	22.45	51.63	-29.18	AVG	
3		0.4060	16.12	19.72	35.84	57.73	-21.89	QP	
4		0.4060	2.50	19.72	22.22	47.73	-25.51	AVG	
5		0.4580	16.43	19.73	36.16	56.73	-20.57	QP	
6		0.4580	3.99	19.73	23.72	46.73	-23.01	AVG	
7		0.5100	15.49	19.74	35.23	56.00	-20.77	QP	
8		0.5100	3.66	19.74	23.40	46.00	-22.60	AVG	
9		0.6620	10.35	19.78	30.13	56.00	-25.87	QP	
10		0.6620	3.02	19.78	22.80	46.00	-23.20	AVG	
11		0.7140	18.36	19.79	38.15	56.00	-17.85	QP	
12	*	0.7140	8.97	19.79	28.76	46.00	-17.24	AVG	

3.2 Radiated Emission and Band Edge

3.2.1 Limit

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequency (MHz)	Distance Meters(m)	Field Strength Limit	
		μV/m	dB(μV)/m
0.009 – 0.49	300	2400/F(kHz)	-
0.490 – 1.705	30	24000/F(kHz)	-
1.705 – 30	30	30	-
30~88	3	100	40.0
88~216	3	150	43.5
216~960	3	200	46.0
960~1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Note: (1) Emission level dBμV = 20 log Emission level μV/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3.2.2 Test Peripherals

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Type-C Cable	NA	NA	0.5m,No Shielding
2	Adaptor	HUAWEI	HW-100400C00	NA
3	Record PC	Lenovo	M4500T	NA
4	Control PC	Lenovo	M4500T	NA

3.2.3 Test Procedure

Test Method	
○Conducted Measurement	●Radiated Measurement
Test Channels	
●Lowest, Middle and Highest Channel	○ Lowest and Highest Channel
Environmental conditions	
●Normal	○Normal and Extreme
Note:●:Test ○:No Test	

a) The measuring distance of 3 m shall be used for measurements. The EUT was placed on the

top of a rotating 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 1 GHz)

b) The measuring distance of 3 m or 1.5m shall be 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 equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. 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 find the maximum reading (used Bore sight function).

e) The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

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

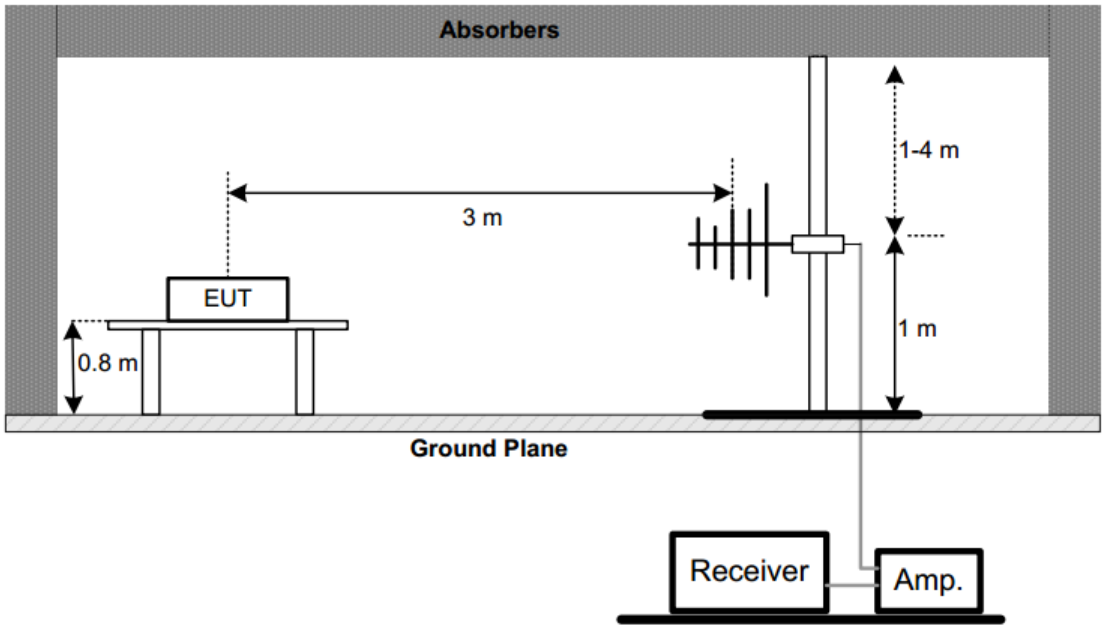
g) All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn‘t perform. (below 1 GHz)

h) 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 both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn‘t perform. (above 1 GHz)

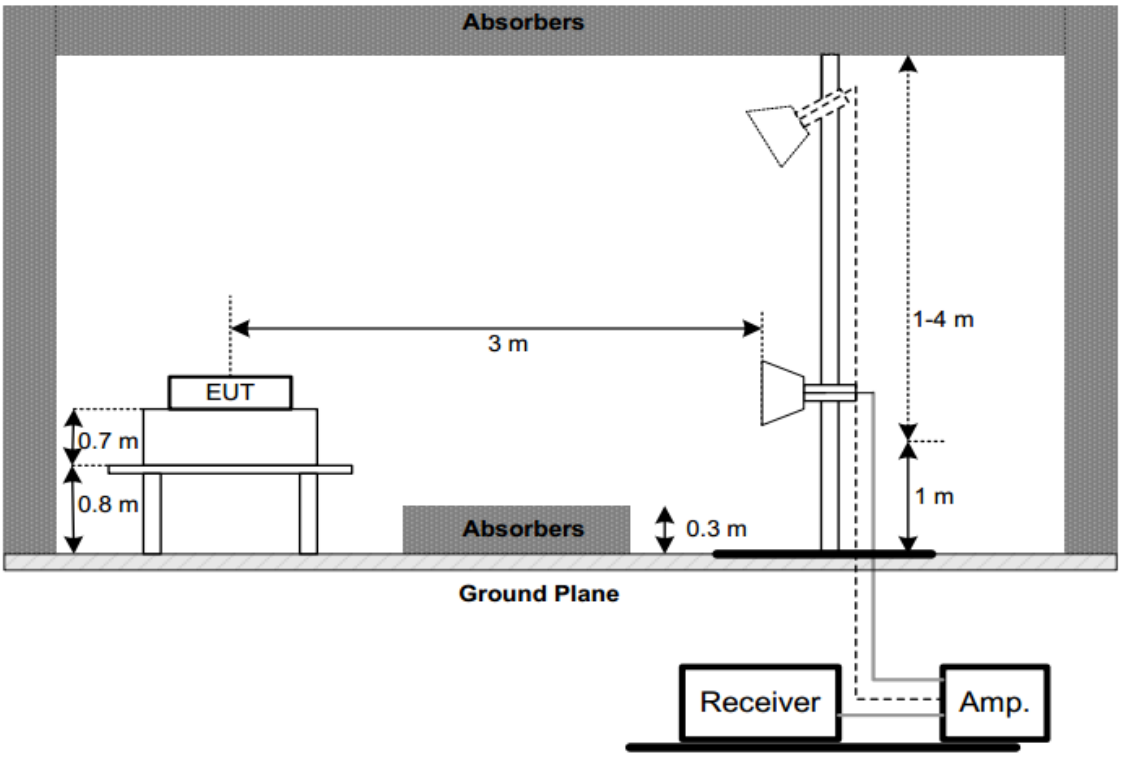
i) For the actual test configuration, please refer to the related Item -EUT Test Photos.

3.2.4 Test Setup

(A) Radiated Emission Test Set-Up Frequency 30 MHz-1000 MHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



3.2.5 Test Result

1) Radiated emission: 9KHz-30MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

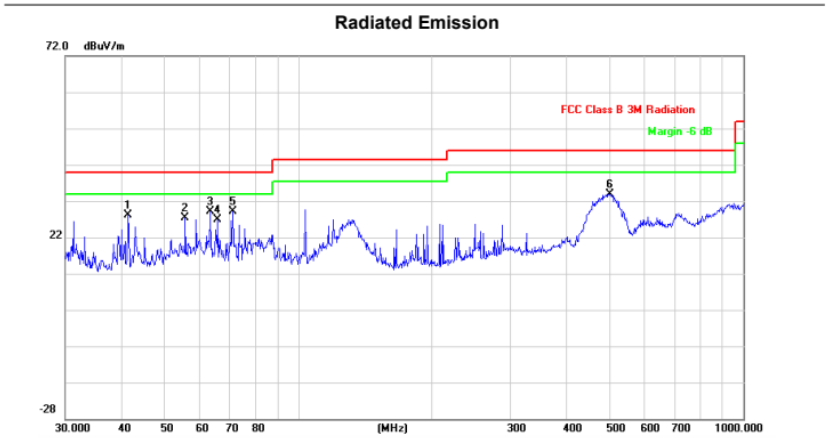
2) Radiated emission: 30MHz-1G

Note:

1. Measurement = Reading + Correct Factor.
2. Over = Measurement - Limit

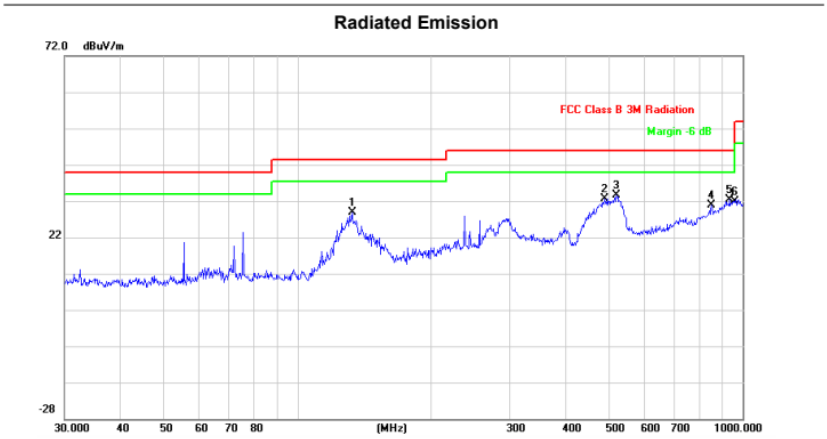
Below 1G (30MHz~1GHz)	Test mode: 1M	Test Channel:19

VERTICAL



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		41.5670	13.54	14.57	28.11	40.00	-11.89	QP	100	65	
2		55.8047	12.75	14.63	27.38	40.00	-12.62	QP	100	329	
3	*	63.5356	14.44	14.66	29.10	40.00	-10.90	QP	100	65	
4		66.0342	12.10	14.67	26.77	40.00	-13.23	QP	200	264	
5		71.3300	14.35	14.70	29.05	40.00	-10.95	QP	100	267	
6		501.1790	12.54	21.46	34.00	46.00	-12.00	QP	100	187	

HORIZONTAL



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		132.6850	15.90	12.90	28.80	43.50	-14.70	QP	200	358	
2		490.7447	11.50	21.15	32.65	46.00	-13.35	QP	200	44	
3	*	520.8882	12.20	21.53	33.73	46.00	-12.27	QP	200	41	
4		851.0353	3.44	27.51	30.95	46.00	-15.05	QP	99	322	
5		935.5463	2.44	29.99	32.43	46.00	-13.57	QP	99	107	
6		958.7943	1.71	30.16	31.87	46.00	-14.13	QP	99	90	

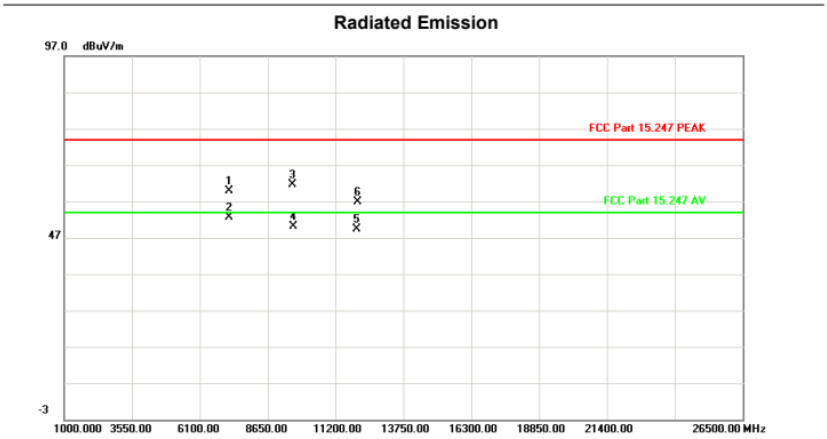
3) Radiated emission: Above 1G

Note:

1. Measurement = Reading + Correct Factor.
2. Over = Measurement - Limit

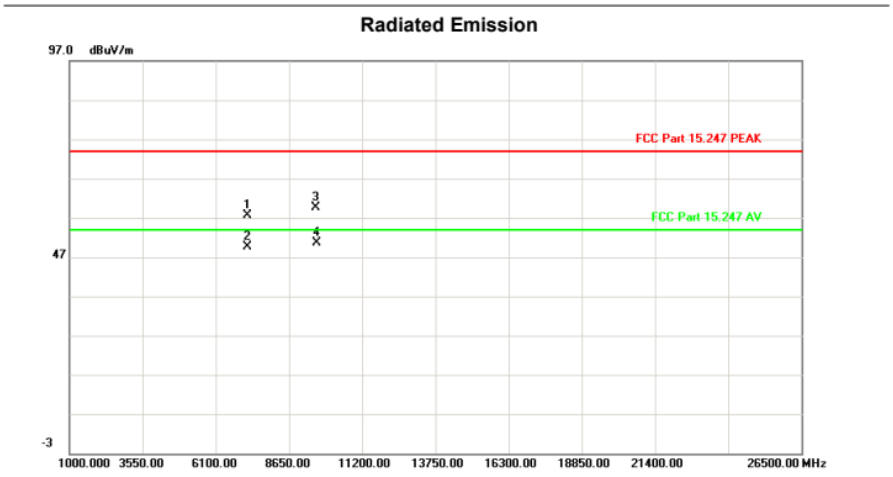
Above 1G (1GHz~26.5GHz)	Test mode: 1M	Test Channel:0

VERTICAL



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		7196.500	55.41	4.36	59.77	74.00	-14.23	peak	174	109	
2	*	7206.171	48.26	4.37	52.63	54.00	-1.37	AVG	158	207	
3		9593.500	53.55	8.19	61.74	74.00	-12.26	peak	143	159	
4		9607.590	42.00	8.22	50.22	54.00	-3.78	AVG	137	43	
5		12009.210	40.03	9.28	49.31	54.00	-4.69	AVG	133	127	
6		12016.000	47.65	9.30	56.95	74.00	-17.05	peak	173	169	

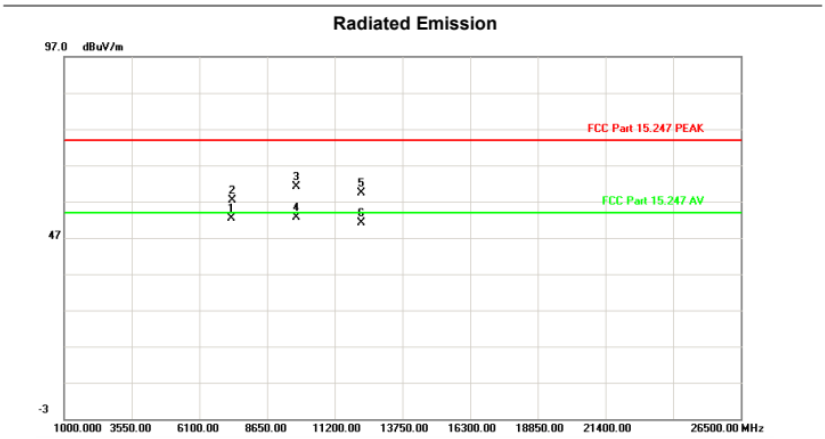
HORIZONTAL



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		7196.500	53.30	4.36	57.66	74.00	-16.34	peak	144	209	
2		7206.150	45.32	4.37	49.69	54.00	-4.31	AVG	150	243	
3		9593.500	51.54	8.19	59.73	74.00	-14.27	peak	139	253	
4	*	9608.780	42.39	8.22	50.61	54.00	-3.39	AVG	137	143	

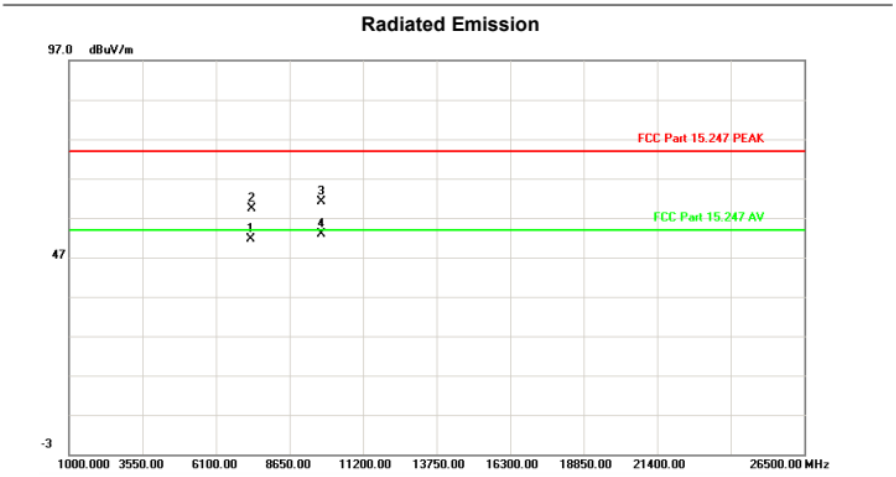
Above 1G (1GHz~26.5GHz)	Test mode: 1M	Test Channel:19

VERTICAL



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		7320.104	47.94	4.56	52.50	54.00	-1.50	AVG	146	138	
2		7324.000	52.70	4.56	57.26	74.00	-16.74	peak	134	143	
3		9746.500	52.61	8.48	61.09	74.00	-12.91	peak	137	26	
4	*	9759.490	44.05	8.50	52.55	54.00	-1.45	AVG	187	34	
5		12194.500	49.58	9.78	59.36	74.00	-14.64	peak	166	67	
6		12199.415	41.27	9.80	51.07	54.00	-2.93	AVG	129	179	

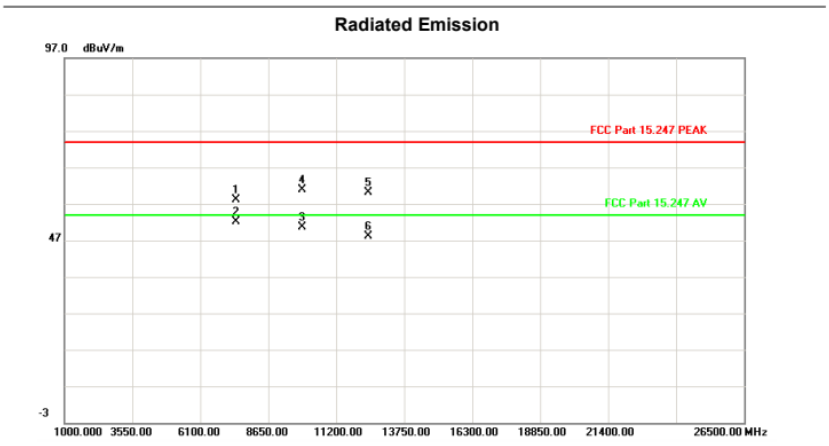
HORIZONTAL



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		7320.064	46.95	4.56	51.51	54.00	-2.49	AVG	148	127	
2		7324.000	54.82	4.56	59.38	74.00	-14.62	peak	153	48	
3		9746.500	52.61	8.48	61.09	74.00	-12.91	peak	159	308	
4	*	9759.490	44.49	8.50	52.99	54.00	-1.01	AVG	172	108	

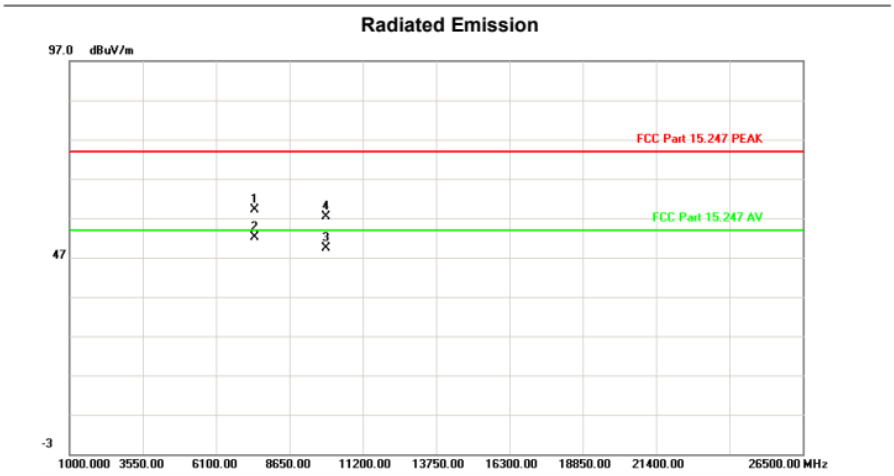
Above 1G (1GHz~26.5GHz)	Test mode: 1M	Test Channel:39

VERTICAL



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		7426.000	53.47	4.73	58.20	74.00	-15.80	peak	153	34	
2	*	7440.086	47.27	4.75	52.02	54.00	-1.98	AVG	123	284	
3		9919.466	41.92	8.80	50.72	54.00	-3.28	AVG	164	216	
4		9925.000	52.02	8.81	60.83	74.00	-13.17	peak	144	143	
5		12398.500	49.84	10.33	60.17	74.00	-13.83	peak	142	174	
6		12398.500	37.69	10.33	48.02	54.00	-5.98	AVG	181	32	

HORIZONTAL



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		7426.000	54.36	4.73	59.09	74.00	-14.91	peak	139	54	
2	*	7440.090	47.47	4.75	52.22	54.00	-1.78	AVG	148	163	
3		9919.545	40.54	8.80	49.34	54.00	-4.66	AVG	142	218	
4		9925.000	48.69	8.81	57.50	74.00	-16.50	peak	187	80	

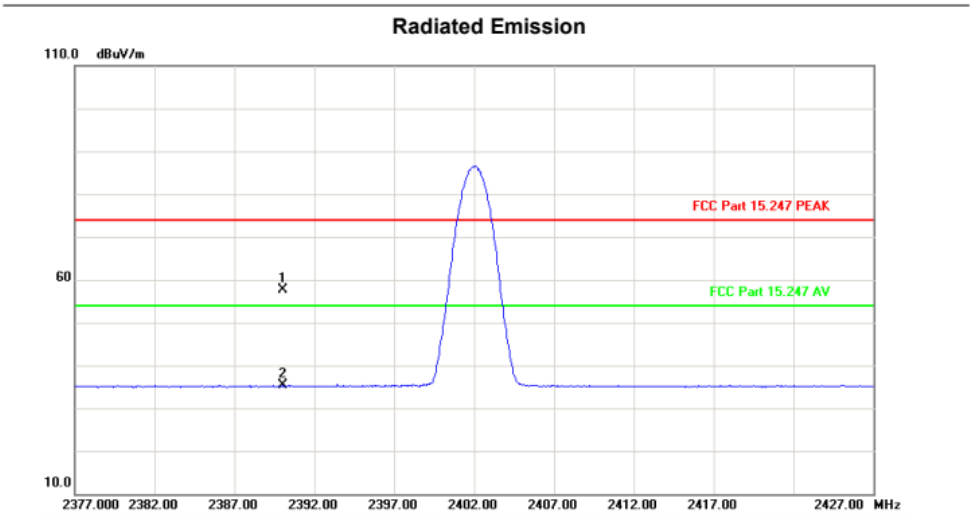
4) Band Edge

Note:

1. Measurement = Reading + Correct Factor.
2. Over = Measurement - Limit

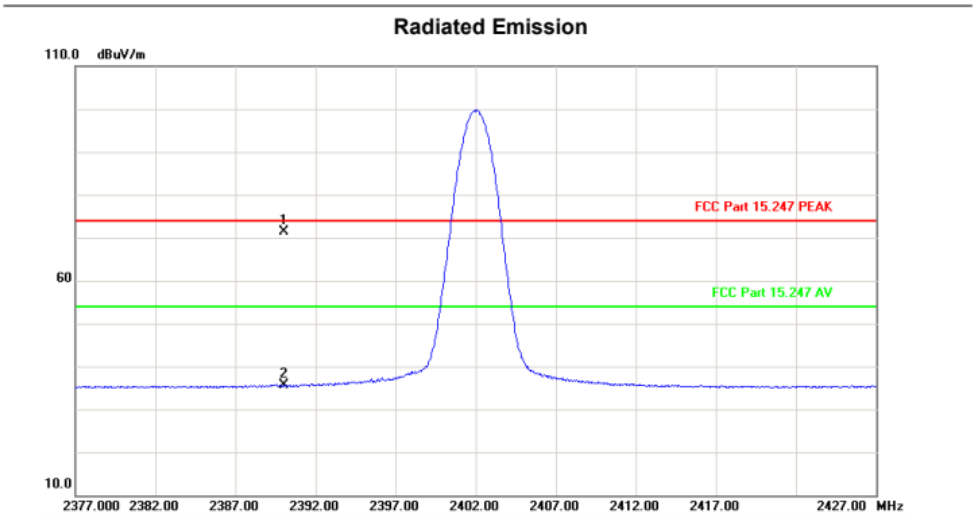
Above 1G (1GHz~26.5GHz)	Test mode: 1M	Test Channel:0

VERTICAL



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2390.000	66.69	-9.11	57.58	74.00	-16.42	peak	137	35	
2		2390.000	44.38	-9.11	35.27	54.00	-18.73	AVG	148	147	

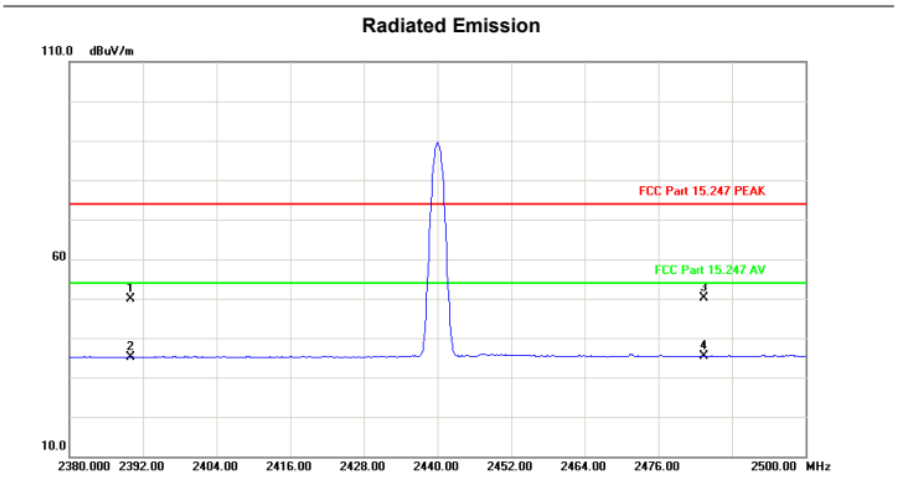
HORIZONTAL



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2390.000	80.61	-9.11	71.50	74.00	-2.50	peak	182	254	
2		2390.000	44.74	-9.11	35.63	54.00	-18.37	AVG	167	18	

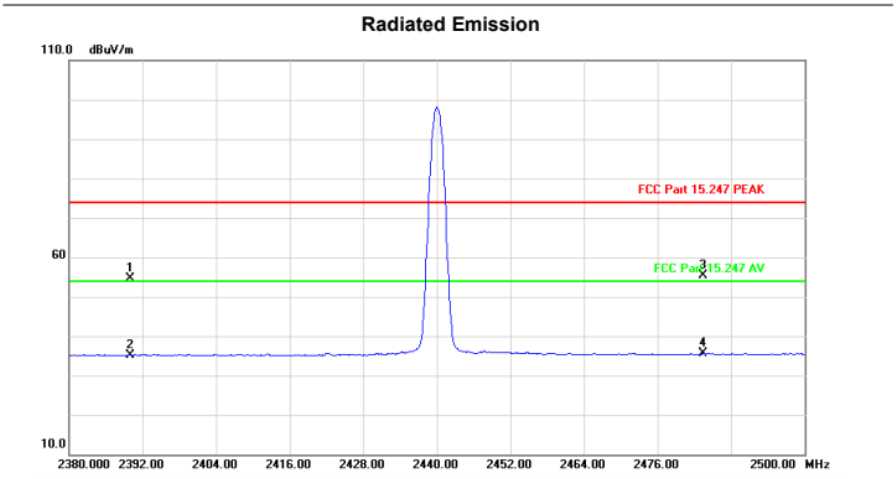
Above 1G (1GHz~26.5GHz)	Test mode: 1M	Test Channel:19

VERTICAL



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2390.000	58.88	-9.11	49.77	74.00	-24.23	peak	148	174	
2		2390.000	44.32	-9.11	35.21	54.00	-18.79	AVG	161	43	
3		2483.500	59.12	-9.08	50.04	74.00	-23.96	peak	145	97	
4	*	2483.500	44.53	-9.08	35.45	54.00	-18.55	AVG	137	241	

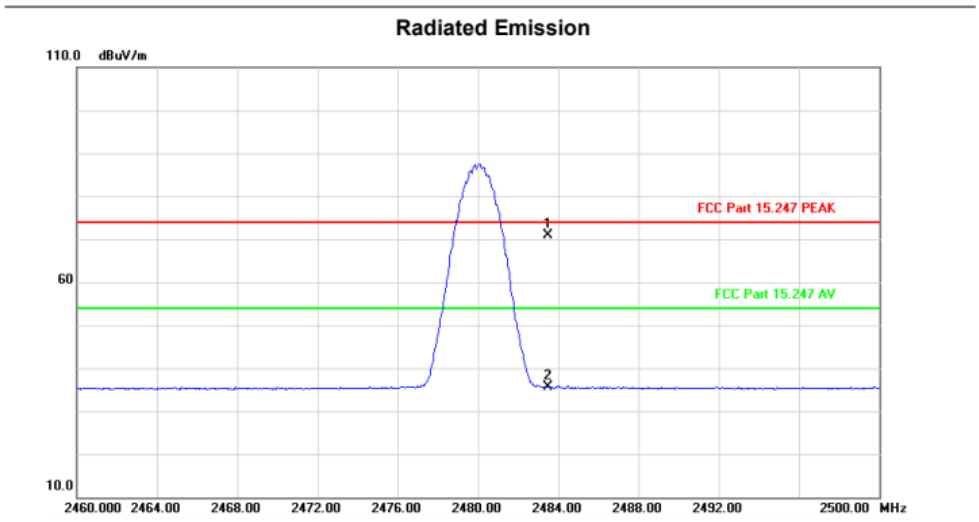
HORIZONTAL



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2390.000	63.81	-9.11	54.70	74.00	-19.30	peak	153	240	
2		2390.000	44.36	-9.11	35.25	54.00	-18.75	AVG	142	43	
3		2483.500	64.36	-9.08	55.28	74.00	-18.72	peak	163	138	
4	*	2483.500	44.65	-9.08	35.57	54.00	-18.43	AVG	179	72	

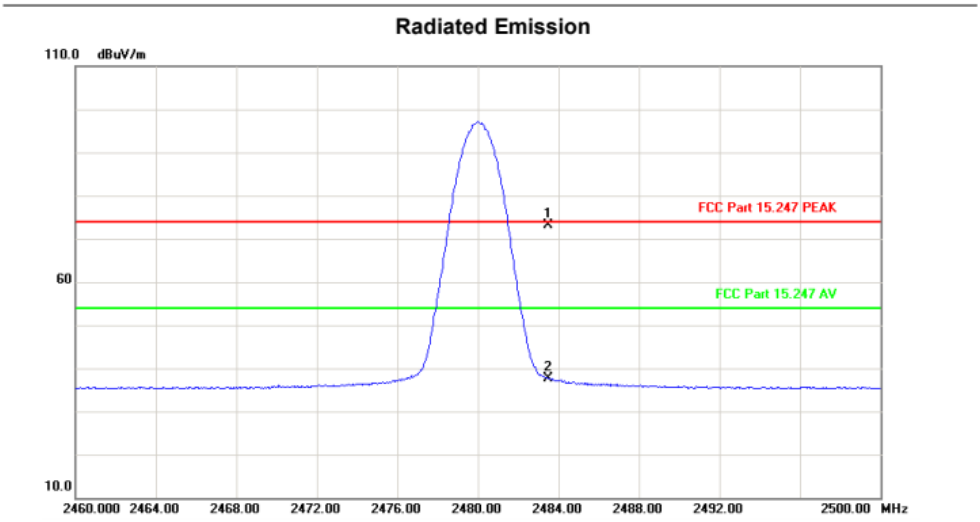
Above 1G (1GHz~26.5GHz)	Test mode: 1M	Test Channel:39

VERTICAL



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2483.500	80.02	-9.08	70.94	74.00	-3.06	peak	134	301	
2		2483.500	44.78	-9.08	35.70	54.00	-18.30	AVG	191	154	

HORIZONTAL



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2483.500	82.10	-9.08	73.02	74.00	-0.98	peak	160	173	
2		2483.500	46.80	-9.08	37.72	54.00	-16.28	AVG	171	210	

3.3 Spurious Emission at Antenna Port

3.3.1 Limit

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 Output Power limits. If the transmitter complies with the Output 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 Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

3.3.2 Test Peripherals

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Type-C Cable	NA	NA	0.5m,No Shielding
2	Adaptor	HUAWEI	HW-100400C00	NA
3	Record PC	Lenovo	M4500T	NA
4	Control PC	Lenovo	M4500T	NA

3.3.3 Test Procedure

Test Method	
●Conducted Measurement	○Radiated Measurement
Test Channels	
● Lowest, Middle and Highest Channel	○ Lowest and Highest Channel
Environmental conditions	
●Normal	○Normal and Extreme
Note:●:Test ○:No Test	

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

b) Spectrum Setting as below:

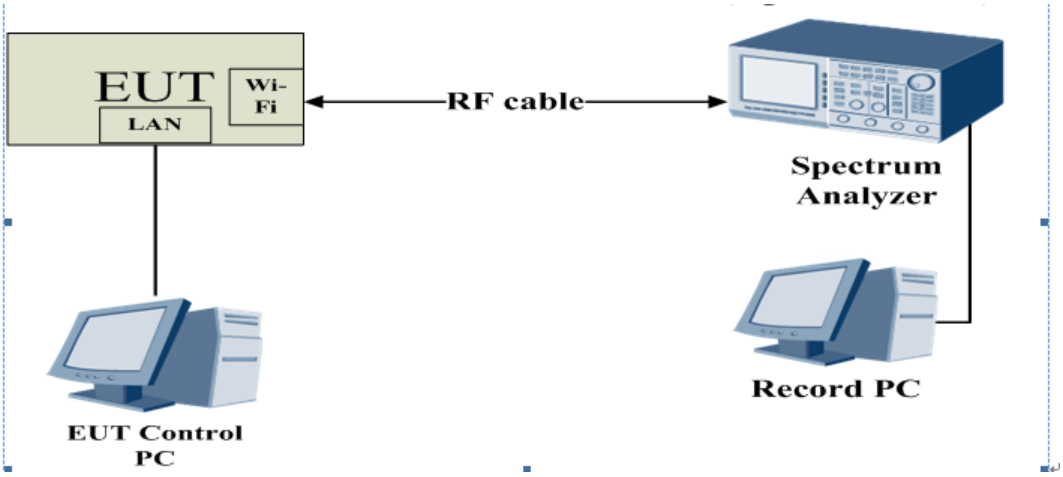
Centre Frequency	The centre frequency of the channel under test
RBW	100 kHz
VBW	300 kHz
Frequency span	2 x Nominal Channel Bandwidth
Detector Mode	Peak
Trace Mode	Max Hold

Sweep Time	Auto Couple

Allow trace to full stabilize.

c) Use the peak marker function to determine the maximum power level in any 100kHz band segment within the fundamental EBW.

3.3.4 Test Setup

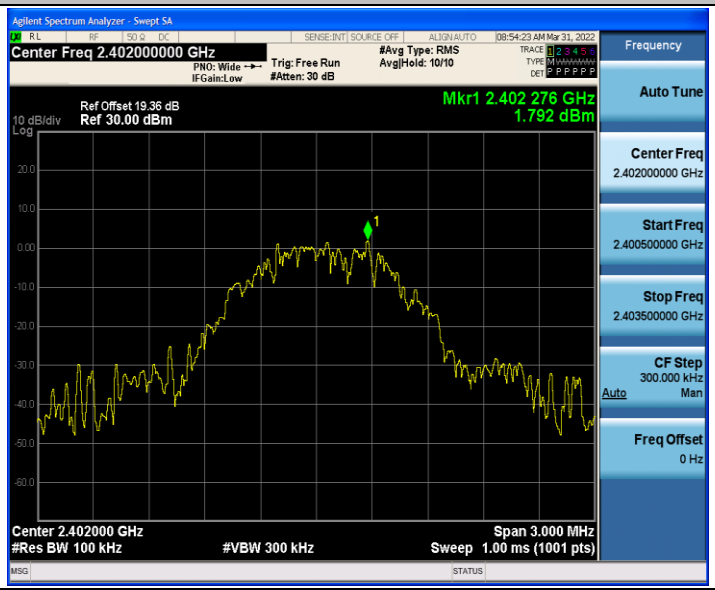


3.3.5 The Result

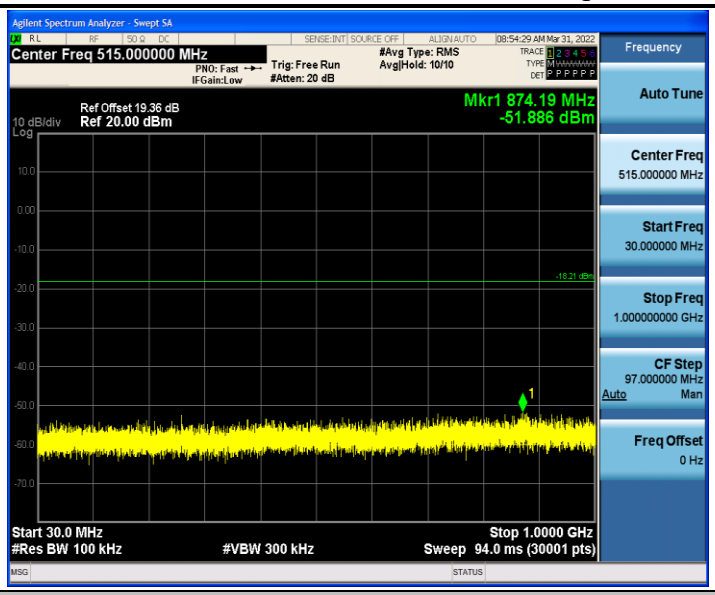
3.3.5.1. Conducted Spurious Emission

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
1M	Ant1	2402	Reference	1.79	1.79	---	PASS
			30~1000	1.79	-51.89	≤-18.21	PASS
			1000~26500	1.79	-42.18	≤-18.21	PASS
		2440	Reference	0.87	0.87	---	PASS
			30~1000	0.87	-51.89	≤-19.13	PASS
			1000~26500	0.87	-41.22	≤-19.13	PASS
		2480	Reference	0.02	0.02	---	PASS
			30~1000	0.02	-52.46	≤-19.98	PASS
			1000~26500	0.02	-41.41	≤-19.98	PASS

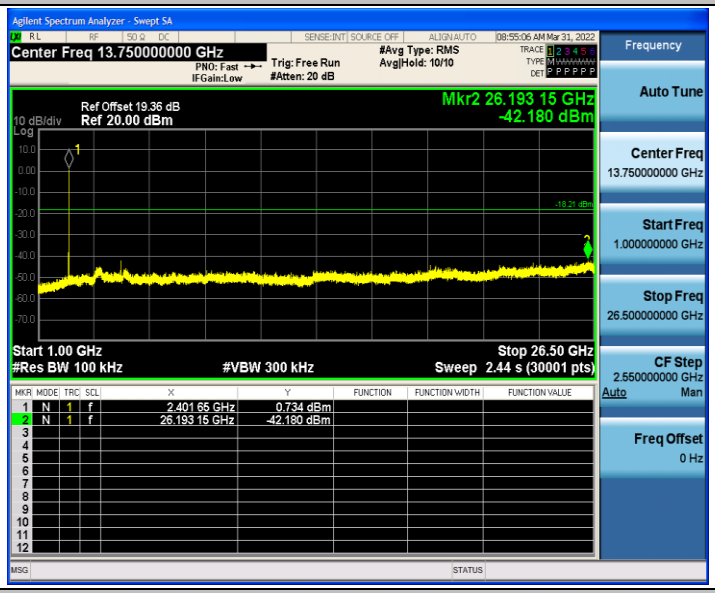
1M_Ant1_2402_0~Reference



1M_Ant1_2402_30~1000

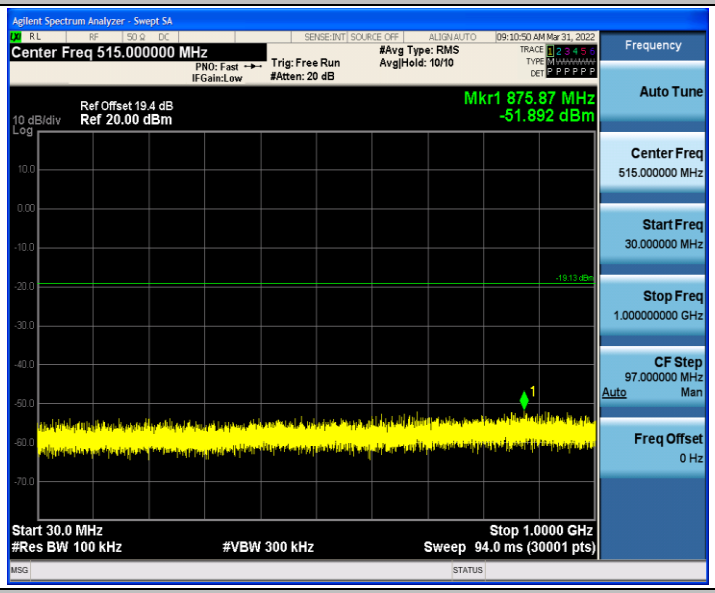


1M_Ant1_2402_1000~26500

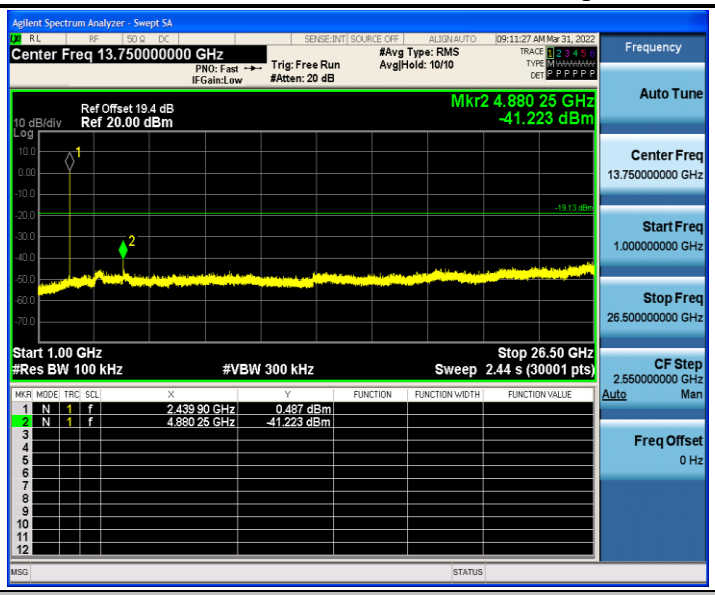


1M_Ant1_2440_0~Reference

1M_Ant1_2440_30~1000

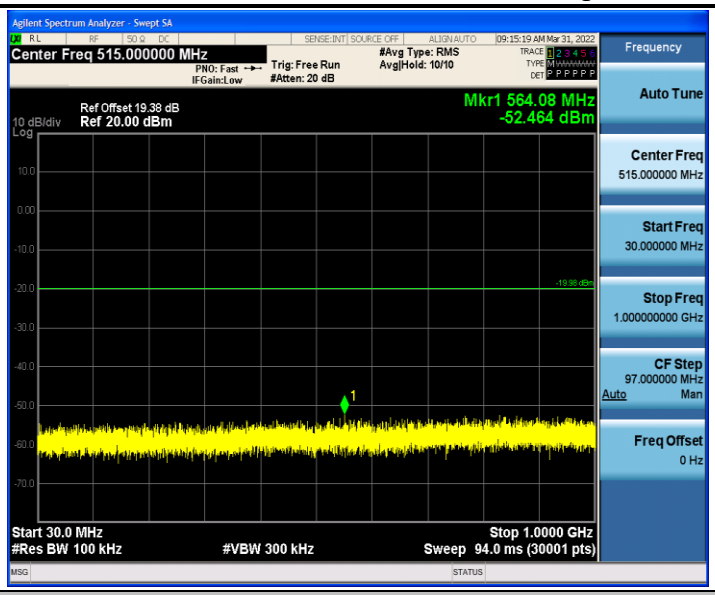


1M_Ant1_2440_1000~26500

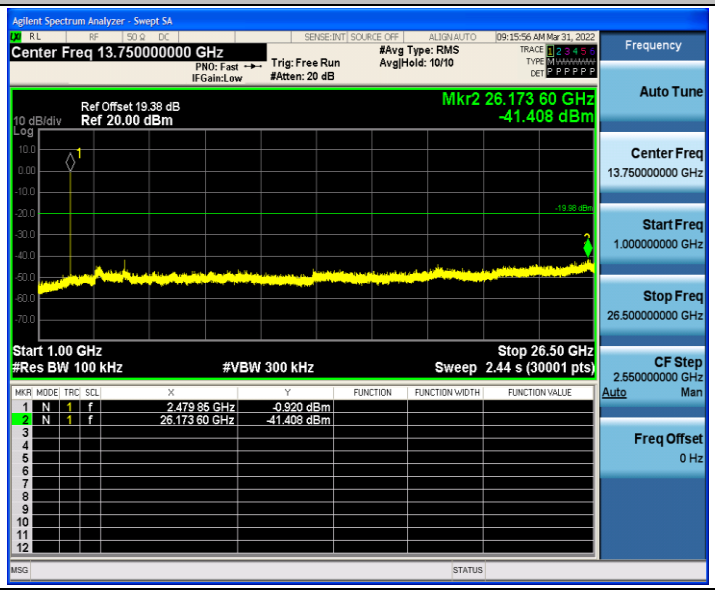


1M_Ant1_2480_0~Reference

1M_Ant1_2480_30~1000



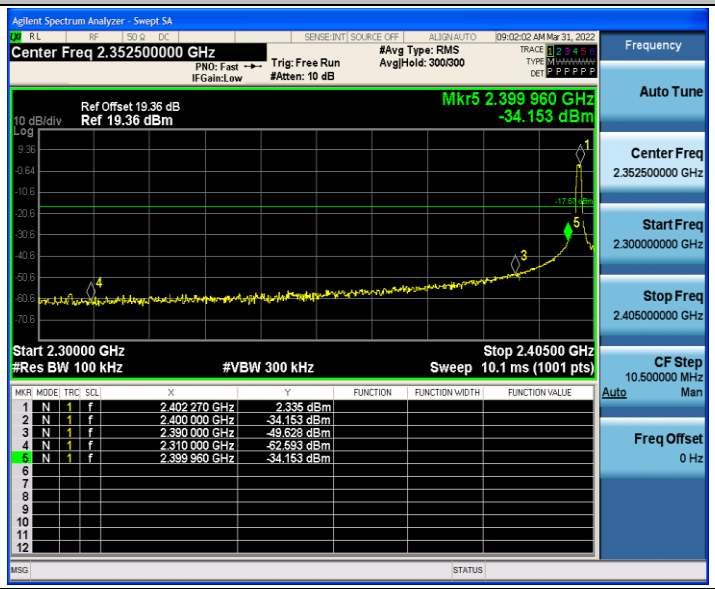
1M_Ant1_2480_1000~26500



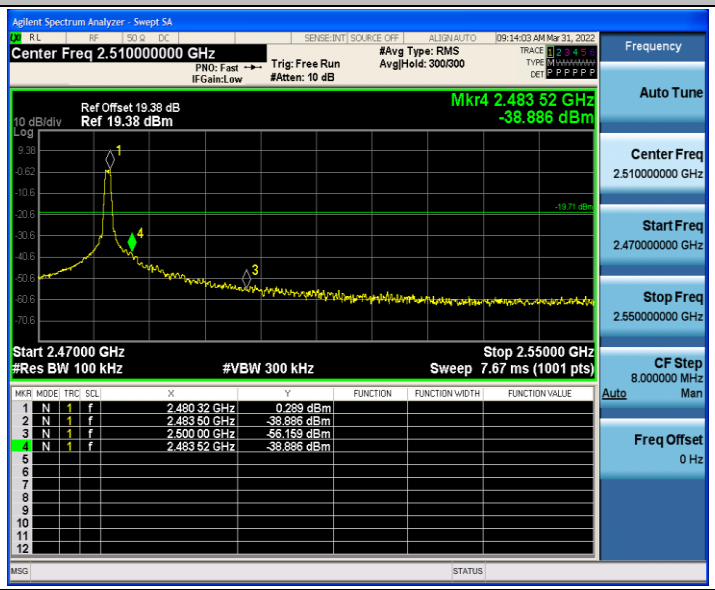
3.3.5.2. Band edge measurements

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
1M	Ant1	Low	2402	2.34	-34.15	≤-17.67	PASS
		High	2480	0.29	-38.89	≤-19.71	PASS

1M_Ant1_Low_2402



1M_Ant1_High_2480



3.4 6dB Bandwidth

3.4.1 Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

3.4.2 Test Peripherals

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Type-C Cable	NA	NA	0.5m,No Shielding
2	Adaptor	HUAWEI	HW-100400C00	NA
3	Record PC	Lenovo	M4500T	NA
4	Control PC	Lenovo	M4500T	NA

3.4.3 Test Procedure

Test Method	
●Conducted Measurement	○Radiated Measurement
Test Channels	
●Lowest, Middle and Highest Channel	○ Lowest and Highest Channel
Environmental conditions	
●Normal	○Normal and Extreme
Note:●:Test ○:No Test	

a) The EUT shall be connected to the spectrum analyser, and the spectrum analyser is set as follow:

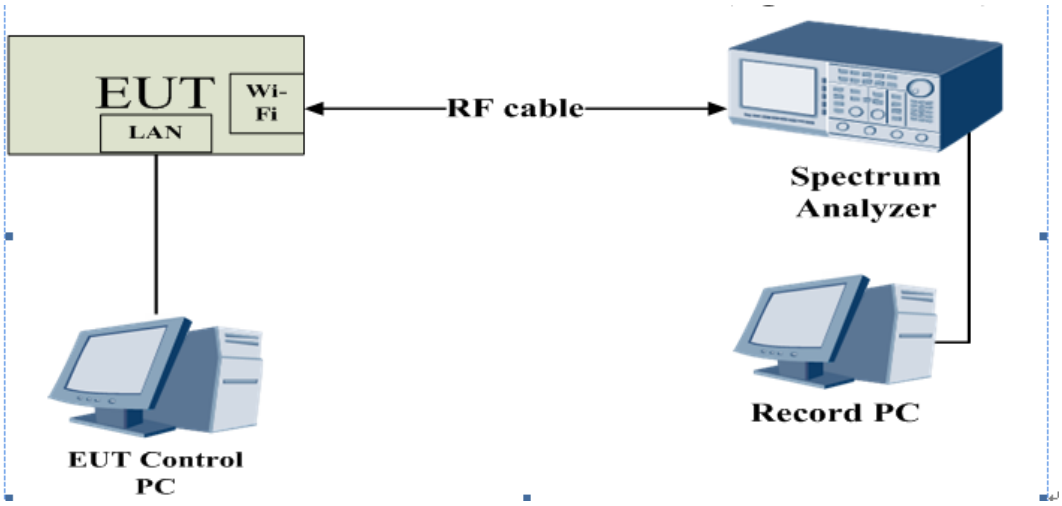
Centre Frequency	The centre frequency of the channel under test
RBW	100kHz
VBW	300kHz
Frequency span	2x Nominal Channel Bandwidth
Detector Mode	Peak
Trace Mode	Max Hold
Sweep Time	Auto Couple

b) Wait for the trace to stabilize then find the peak value of the trace and place the analyser marker on this peak.

c) Use the -6dB bandwidth function of the spectrum analyser to measure the 6dB Bandwidth of the EUT. This value shall be recorded.

d) Make sure that the power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals left and right from the power envelope being taken into account by this measurement.

3.4.4 Test Setup

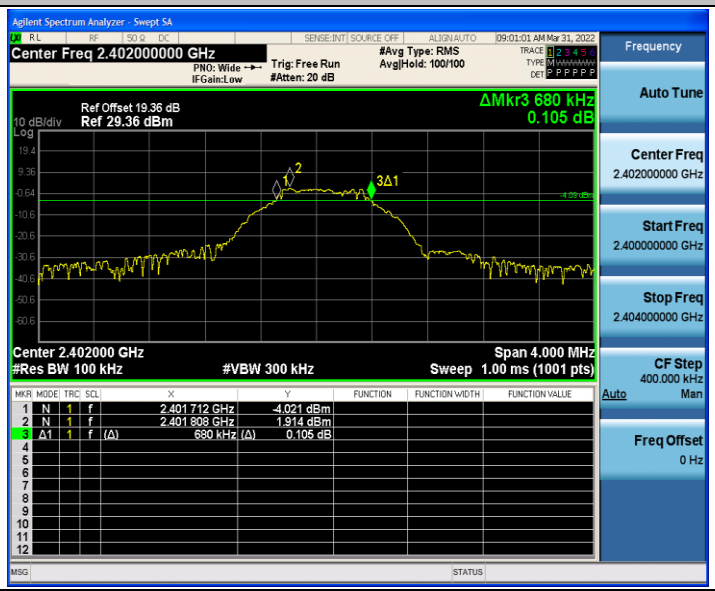


3.4.5 Test Result

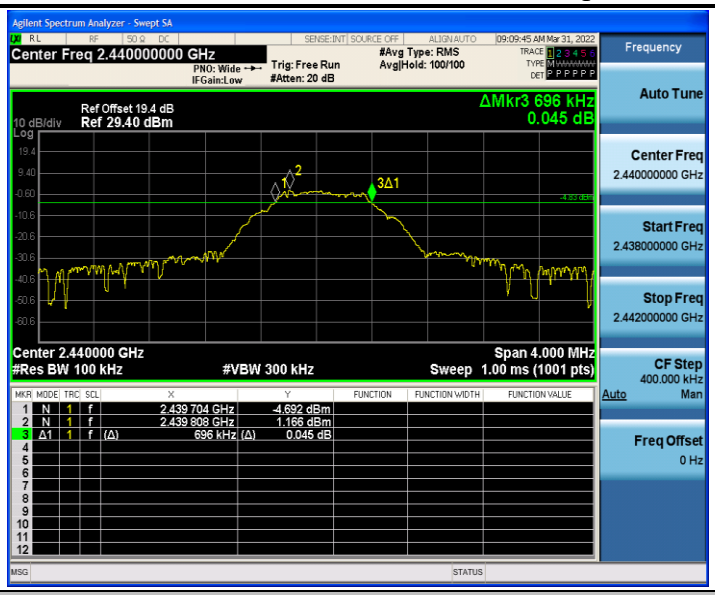
6dB Bandwidth

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
1M	Ant1	2402	0.680	2401.712	2402.392	0.5	PASS
		2440	0.696	2439.704	2440.400	0.5	PASS
		2480	0.704	2479.700	2480.404	0.5	PASS

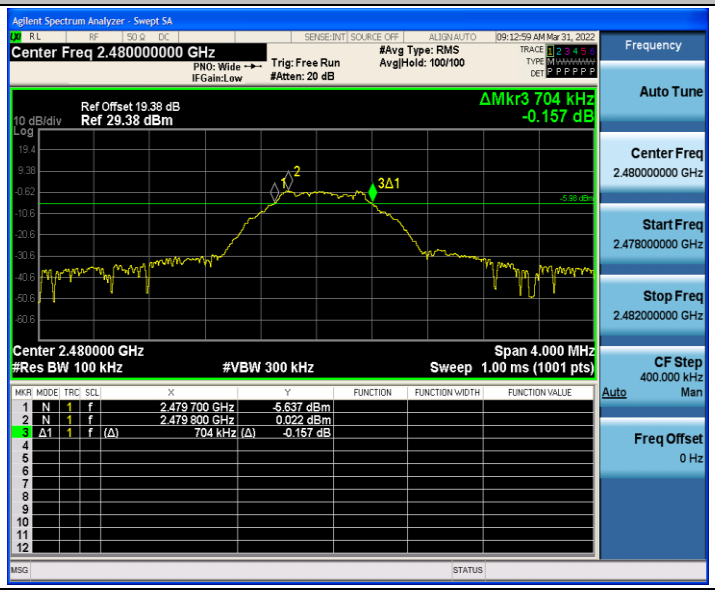
1M_Ant1_2402



1M_Ant1_2440


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.440000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Avg|Hold: 100/100
09:09:45 AM Mar 31, 2022
Frequency
Ref Offset 19.4 dB
10 dB/div
Ref 29.40 dBm
ΔMkr3 696 kHz
0.045 dB
Center 2.440000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 4.000 MHz
Sweep 1.00 ms (1001 pts)
1 N 1 f 2.439 704 GHz -4.692 dBm
2 N 1 f 2.439 808 GHz 1.166 dBm
3 Δ1 1 f (Δ) 696 kHz (Δ) 0.045 dB
Auto Tune
Center Freq
2.440000000 GHz
Start Freq
2.438000000 GHz
Stop Freq
2.442000000 GHz
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz

1M_Ant1_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Avg|Hold: 100/100
09:12:59 AM Mar 31, 2022
Frequency
Ref Offset 19.38 dB
10 dB/div
Ref 29.38 dBm
ΔMkr3 704 kHz
-0.157 dB
Center 2.480000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 4.000 MHz
Sweep 1.00 ms (1001 pts)
1 N 1 f 2.479 700 GHz -5.637 dBm
2 N 1 f 2.479 800 GHz 0.022 dBm
3 Δ1 1 f (Δ) 704 kHz (Δ) -0.157 dB
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.478000000 GHz
Stop Freq
2.482000000 GHz
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz

Occupied Channel Bandwidth

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
1M	Ant1	2402	1.0439	2401.530	2402.574	---	---
		2440	1.0427	2439.531	2440.574	---	---
		2480	1.0367	2479.536	2480.573	---	---

1M_Ant1_2402

1M_Ant1_2440

1M_Ant1_2480


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#IFGain:Low
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
09:13:18 AM Mar 31, 2022
Ref Offset 19.38 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.480036 GHz
-2.5154 dBm
Center 2.48 GHz
#Res BW 43 kHz
#VBW 130 kHz
Span 4 MHz
Sweep 2.067 ms
Occupied Bandwidth
1.0367 MHz
Total Power 7.36 dBm
Transmit Freq Error 54.563 kHz
OBW Power 99.00 %
x dB Bandwidth 1.323 MHz
x dB -26.00 dB
Frequency
Center Freq
2.480000000 GHz
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

3.5 Conducted Output Power

3.5.1 Limit

For systems using digital modulation in the 2400~2483.5MHz, The Maximum output Power shall not exceed 1W(30dBm)

3.5.2 Test Peripherals

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Type-C Cable	NA	NA	0.5m,No Shielding
2	Adaptor	HUAWEI	HW-100400C00	NA
3	Record PC	Lenovo	M4500T	NA
4	Control PC	Lenovo	M4500T	NA

3.5.3 Test Procedure

Test Method	
●Conducted Measurement	○Radiated Measurement
Test Channels	
●Lowest, Middle and Highest Channel	○ Lowest and Highest Channel
Environmental conditions	
●Normal	○Normal and Extreme
Note:●:Test ○:No Test	

a) The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.

b) The maximum output power was performed in accordance with method 11.9.2.3 of ANSI C63.10.

3.5.4 Test Setup

3.5.5 Table of Parameters of Text Software Setting

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.

For Power Setting value

Test Software Version	Command		
Frequency (MHz)	2402	2440	2480
BLE(1M)	Default	Default	Default

3.5.6 The Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
1M	Ant1	2402	3.53	≤30	PASS
		2440	2.88	≤30	PASS
		2480	1.59	≤30	PASS

Note：The Duty Cycle Factor is compensated in the result.

3.6 Power Spectral Density

3.6.1 Limit

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

3.6.2 Test Peripherals

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Type-C Cable	NA	NA	0.5m,No Shielding
2	Adaptor	HUAWEI	HW-100400C00	NA
3	Record PC	Lenovo	M4500T	NA
4	Control PC	Lenovo	M4500T	NA

3.6.3 Test Procedure

Test Method	
●Conducted Measurement	○Radiated Measurement
Test Channels	
●Lowest, Middle and Highest Channel	○ Lowest and Highest Channel
Environmental conditions	
●Normal	○Normal and Extreme
Note:●:Test ○:No Test	

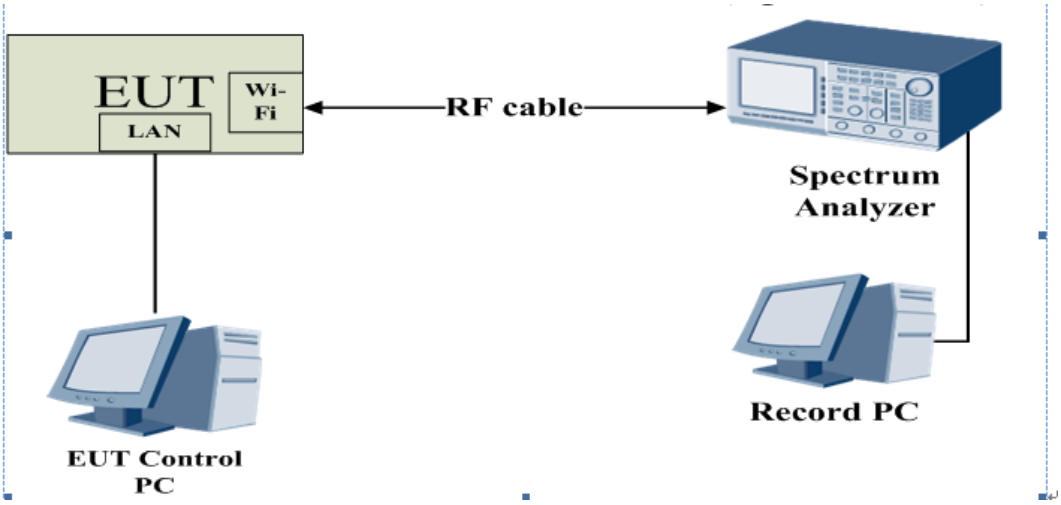
a) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below. Spectrum analyser settings as following:

RBW	3 kHz
VBW	10 kHz
Detector Mode	Peak
Trace Mode	Max Hold
Sweep Time	Auto

b) Wait for the trace to stabilize. Use the peak marker function to determine the maximum amplitude level within the RBW.

c) The value defined in step b shall be compared to the limits and be recorded .

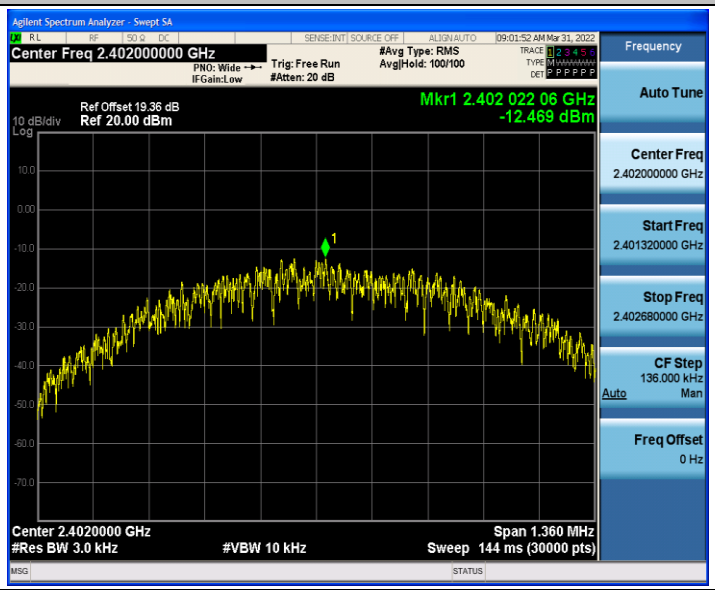
3.6.4 Test Setup



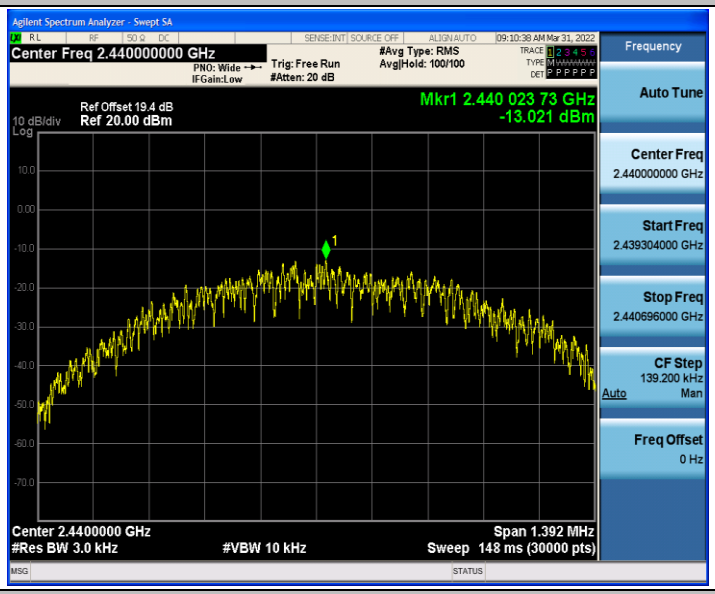
3.6.5 The Result

TestMode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
1M	Ant1	2402	-12.47	≤8.00	PASS
		2440	-13.02	≤8.00	PASS
		2480	-14.25	≤8.00	PASS

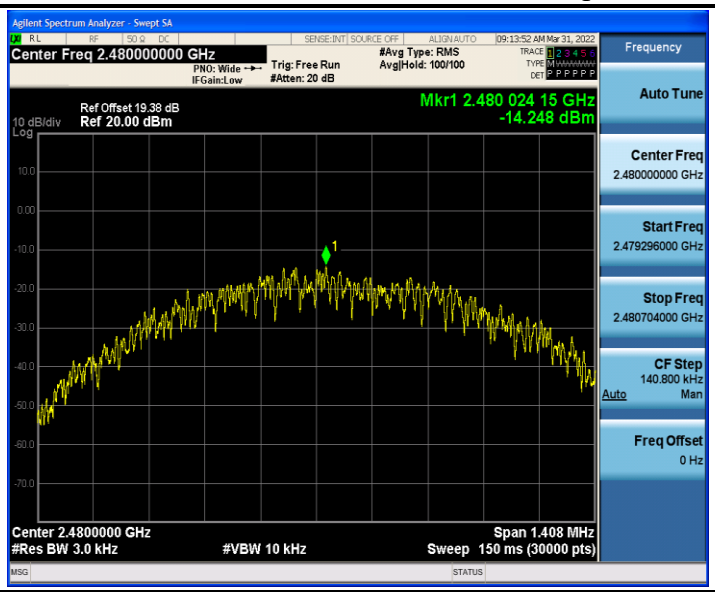
1M_Ant1_2402



1M_Ant1_2440



1M_Ant1_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Avg|Hold: 100/100
09:13:52 AM Mar 31, 2022
Ref Offset 19.38 dB
10 dB/div
Ref 20.00 dBm
Mkr1 2.480 024 15 GHz
-14.248 dBm
Center 2.4800000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 1.408 MHz
Sweep 150 ms (30000 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.479296000 GHz
Stop Freq
2.480704000 GHz
CF Step
140.800 kHz
Auto
Man
Freq Offset
0 Hz

4. Photographs of EUT

See the Appendix of External Photographs and Internal Photographs.

5. Photographs of Radiated Test Set-up

See the Appendix of Radiated Test setup Photographs.

（END OF REPORT）