



Product Name: Remote Control Bulb	Report No: FCC022022-1002RF1
Product Model: YL-QP-APP-01	Security Classification: Open
Version: V1.0	Total Page: 83

TIRT Testing Report

Prepared By:	Checked By:	Approved By:	
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RF TEST REPORT

FCC ID: 2AZRW-YLLEDQAP

According to

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

ANSI C63.10:2013

Equipment : Remote Control Bulb
Model No. : YL-QP-APP-01
Trademark : /
Product No. : 20220310003198
Applicant : Dong Guan Ya Li Electric Appliance Co., Ltd.
THE FIVE STREET JINQIANLING JITIGANG HUANGJIANG
TOWN,DONGGUAN CITY, GUANGDONG 523000 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: 2022.03.09-2022.04.29
- Receipt date: 2022.03.09

Lab: Beijing TIRT Technology Service Co.,Ltd Shenzhen
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History of this test report

Original Report Issue Date: 2022.05.25

- ☒ No additional attachment
- ☐ Additional attachments were issued following record

Attachment No.	Issue Date	Description

1. General Information

1.1 Applicant

Dong Guan Ya Li Electric Appliance Co., Ltd.

THE FIVE STREET JINQIANLING JITIGANG HUANGJIANG TOWN,DONGGUAN CITY,
GUANGDONG 523000 CHINA

1.2 Manufacturer

Dong Guan Ya Li Electric Appliance Co., Ltd.

THE FIVE STREET JINQIANLING JITIGANG HUANGJIANG TOWN,DONGGUAN CITY,
GUANGDONG 523000 CHINA

1.3 Factory

Dong Guan Ya Li Electric Appliance Co., Ltd.

THE FIVE STREET JINQIANLING JITIGANG HUANGJIANG TOWN,DONGGUAN CITY,
GUANGDONG 523000 CHINA

1.4 Basic Description of Equipment Under Test

Items	Description	
Equipment Name	Remote Control Bulb	
Model Number	YL-QP-APP-01	
Trademark	/	
Power Supply	Input:120Vac,60Hz	
Operating Temperature	-40~105℃	
EUT Stage	☐ Product Unit	☒ Final-Sample
Operating Band	2400~2483.5MHz	☒ IEEE 802.11b
		☒ IEEE 802.11g
		☒ IEEE 802.11n(20MHz)
		☒ IEEE 802.11n(40MHz)
Product Type	IEEE 802.11b: WLAN (1TX, 1RX) IEEE 802.11g: WLAN (1TX, 1RX) IEEE 802.11n: WLAN (1TX, 1RX)	
Nominal Bandwidth	20MHz / 40MHz	
Modulation	IEEE 802.11b: DSSS (DBPSK, DQPSK, CCK) IEEE 802.11g: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11n: OFDM (BPSK / QPSK / 16QAM / 64QAM)	
Data Rate (Mbps)	IEEE 802.11b mode : DSSS (1/2/5.5/11) IEEE 802.11g mode : OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n (20MHz) mode(MCS0~MCS7) IEEE 802.11n (40MHz) mode(MCS0~MCS7)	

Eleven channels are provided for 802.11b, 802.11g, 802.11n (20MHz):

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400MHz ~ 2483.5 MHz	01	2412MHz	07	2442MHz
	02	2417MHz	08	2447MHz
	03	2422MHz	09	2452MHz
	04	2427MHz	10	2457MHz
	05	2432MHz	11	2462MHz
	06	2437MHz	/	/

Seven channels are provided for 802.11n (40MHz):

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400MHz ~ 2483.5 MHz	03	2422 MHz	07	2442MHz
	04	2427MHz	08	2447MHz
	05	2432MHz	09	2452MHz
	06	2437MHz	/	/

1.5 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	PCB	N/A	1.9

1.6 Transmit Operating Mode

Transmit Operating Mode				Transmit Multiple Antennas			
☒	Operating mode 1 (single antenna)			☒	1TX		
☐	Operating mode 2 (multiple antenna, no beam forming)			☐	2TX	☐	3TX
☐	Operating mode 3 (multiple antenna, with beam forming)			☐	2TX	☐	3TX
☒	802.11b	Operating mode	☒ 1TX	☐ 2TX	☐ 3TX		
☒	802.11g	Operating mode	☒ 1TX	☐ 2TX	☐ 3TX		
☒	802.11n(20MHz)	Operating mode	☒ 1TX	☐ 2TX	☐ 3TX		
☒	802.11n(40MHz)	Operating mode	☒ 1TX	☐ 2TX	☐ 3TX		

Note:

802.11b, 1Mbps~11Mbps: 1TX1RX.

802.11g, 6Mbps~54Mbps: 1TX1RX.

802.11n20MHz/40MHz, MCS0~ MCS7: 1TX1RX.

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
Conducted Band Edge	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 antenna arrangement for WiFi which was permanently attached and the antenna gain is 1.9 dBi, Impedance is 50Ω fulfill the requirement of this section. Please refer to the product photos.
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	EMC01264 5SE	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 Mode

Frequency Range : 2400~2483.5 MHz				
Test Items	Mode	Data Rate	Channel	Antenna
AC Power Conducted Emission	802.11n(20MHz)	MCS0	06	1
Radiated Emission and Band Edge Measurement	802.11b	1 Mbps	01/06/11	1
	802.11g	6Mbps	01/06/11	1
	802.11n(20MHz)	MCS0	01/06/11	1
	802.11n(40MHz)	MCS0	03/06/09	1
Conducted Band Edge	802.11b	1 Mbps	01/06/11	1
	802.11g	6Mbps	01/06/11	1

	802.11n(20MHz)	MCS0	01/06/11	1
	802.11n(40MHz)	MCS0	03/06/09	1
6dB Bandwidth	802.11b	1 Mbps	01/06/11	1
	802.11g	6Mbps	01/06/11	1
	802.11n(20MHz)	MCS0	01/06/11	1
	802.11n(40MHz)	MCS0	03/06/09	1
Conducted Power	802.11b	1 Mbps	01/06/11	1
	802.11g	6Mbps	01/06/11	1
	802.11n(20MHz)	MCS0	01/06/11	1
	802.11n(40MHz)	MCS0	03/06/09	1
Power Spectral Density	802.11b	1 Mbps	01/06/11	1
	802.11g	6Mbps	01/06/11	1
	802.11n(20MHz)	MCS0	01/06/11	1
	802.11n(40MHz)	MCS0	03/06/09	1

2.5 Test Condition

Applicable to	Environmental conditions	Input Power	Tested by
AC Power Conducted Emission	24.6°C, 56 % RH	120Vac, 60Hz	Stone Tang
Radiated Emission and Band Edge Measurement	24.2°C, 55 % RH	120Vac, 60Hz	Stone Tang
Conducted Band Edge	24.6°C, 56 % RH	120Vac, 60Hz	Stone Tang
6dB Bandwidth	24.6°C, 56 % RH	120Vac, 60Hz	Stone Tang
Conducted Power	24.6°C, 56 % RH	120Vac, 60Hz	Stone Tang
Power Spectral Density	24.6°C, 56 % RH	120Vac, 60Hz	Stone Tang

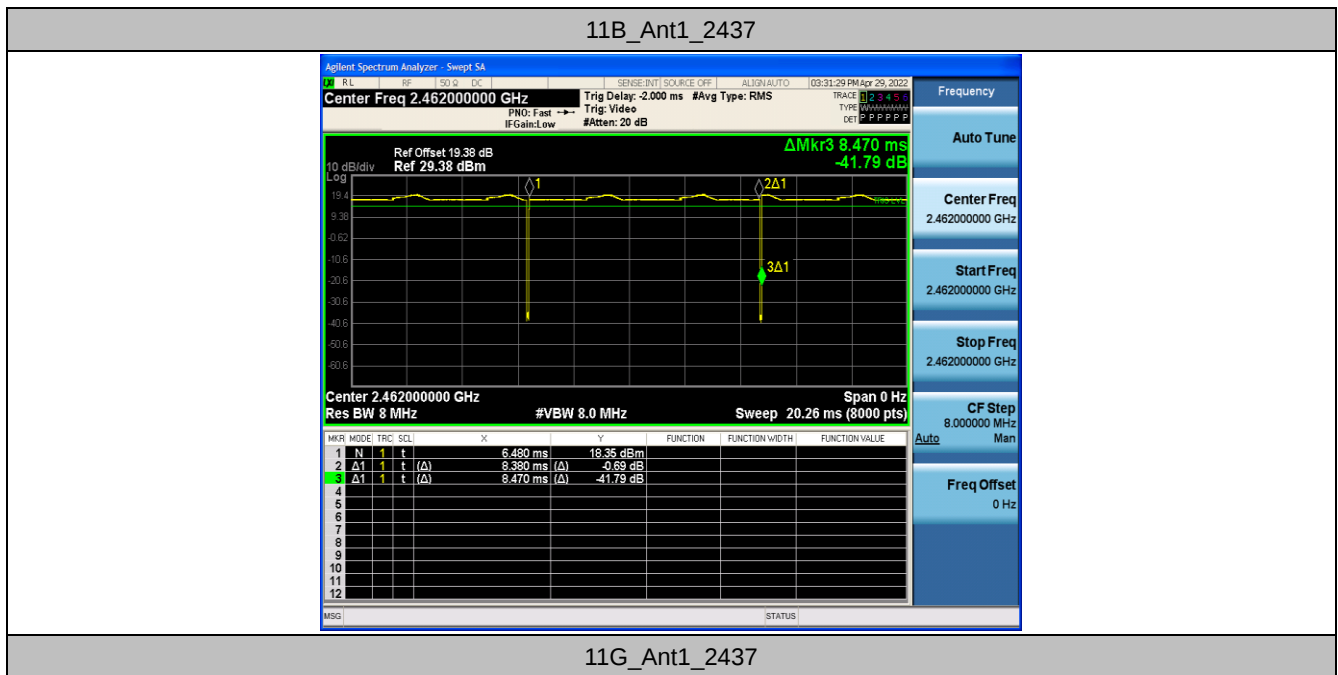
2.6 Duty Cycle of Test Signal

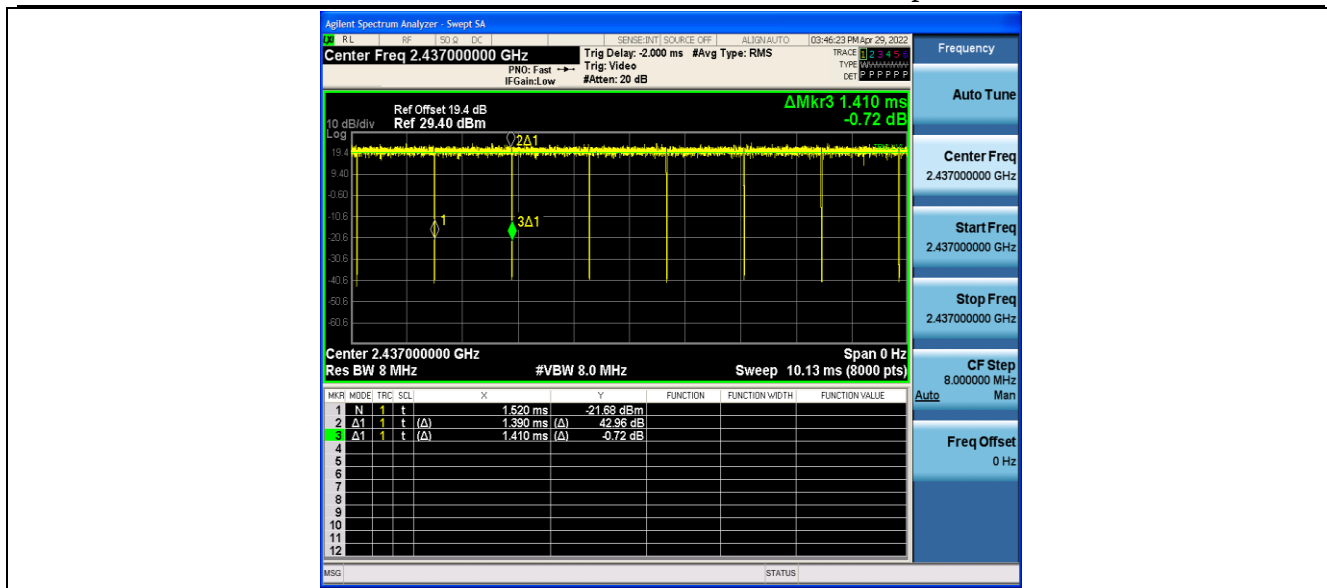
If duty cycle is $\geq 98\%$, duty factor is not required.

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

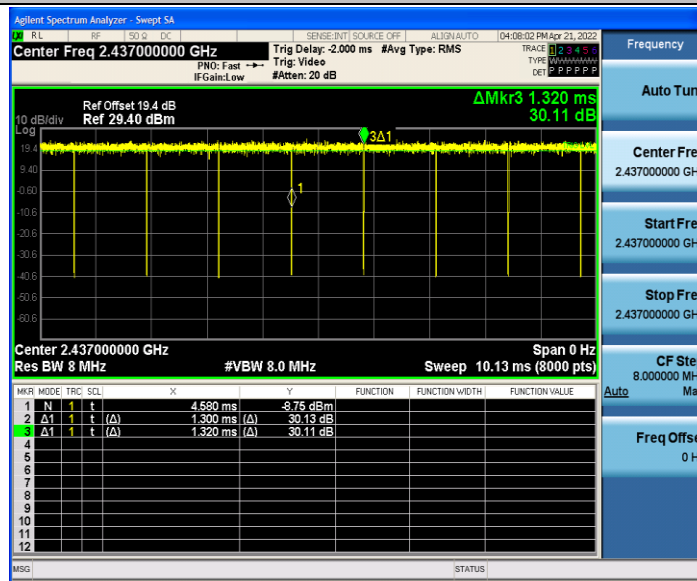
So all the duty factor of other test mode shall be considered.

TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Duty Factor
11B	Ant1	2437	8.38	8.47	98.94	--
11G	Ant1	2437	1.39	1.41	98.58	--
11N20SISO	Ant1	2437	1.30	1.32	98.48	--
11N40SISO	Ant1	2437	0.64	0.65	98.46	--

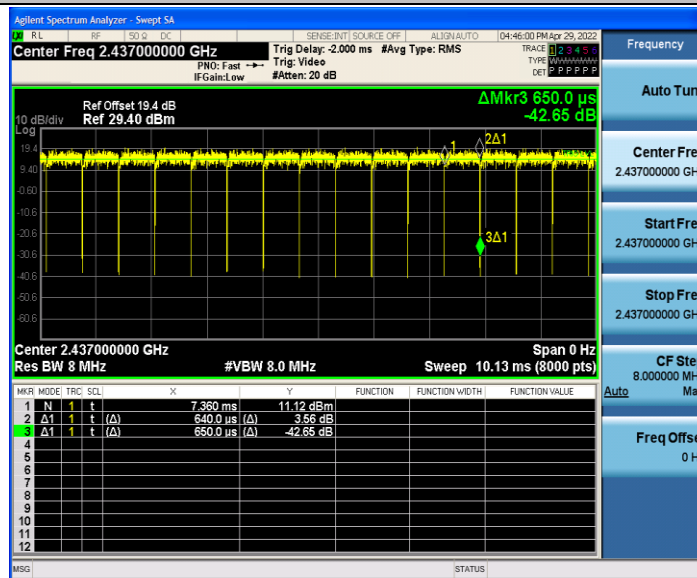




11N20SISO_Ant1_2437



11N40SISO_Ant1_2437



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	± 3.25 dB
Conduction Emissions(150kHz~30MHz)	± 3.1 dB
Spurious emissions, radiated (9KHz~30MHz)	± 4.2 dB
Spurious emissions, radiated (30MHz~1GHz)	± 4.6 dB
Spurious emissions, radiated (1GHz ~ 18GHz)	± 4.9 dB
Humidity	$\pm 4.6\%$
Temperature	$\pm 0.7^{\circ}\text{C}$
Time	$\pm 1.25\%$

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:	+86-0755-27087573

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

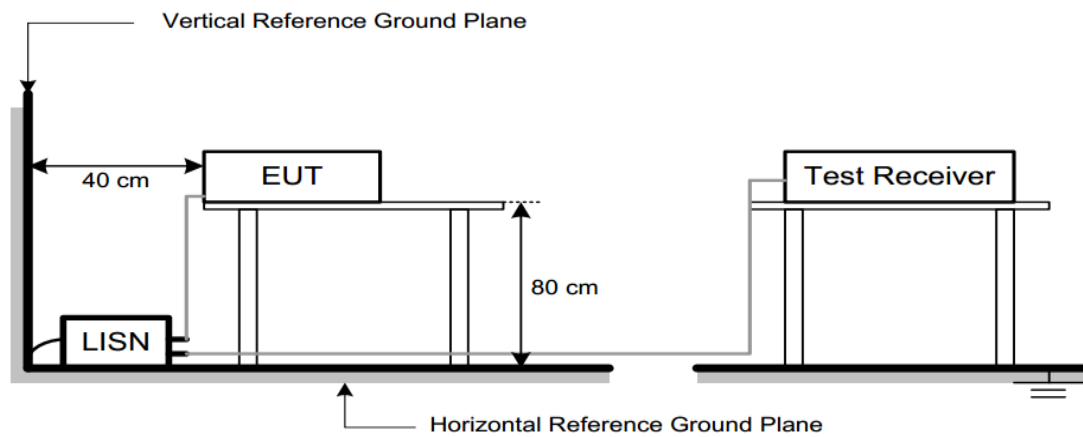
Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Record PC	Lenovo	M4500T	NA
2	Control PC	Lenovo	M4500T	NA

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	

- 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.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

3.1.4 Test Setup



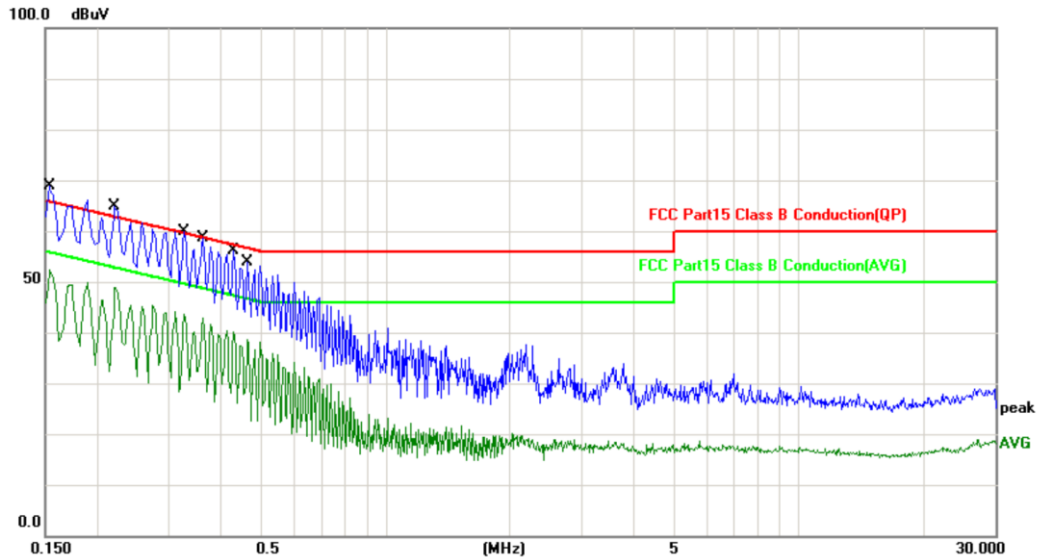
3.1.5 Test Result

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: 11B	Test Channel:6
--------------	----------------	----------------

Line



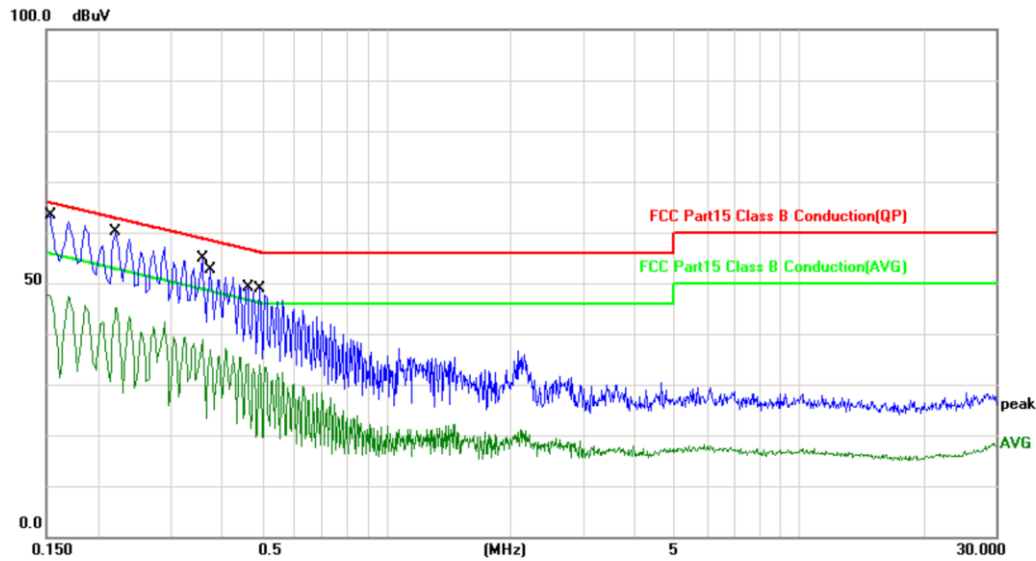
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1540	42.84	19.50	62.34	65.78	-3.44	QP	
2		0.1540	29.25	19.50	48.75	55.78	-7.03	AVG	
3	*	0.2220	40.11	19.53	59.64	62.74	-3.10	QP	
4		0.2220	27.01	19.53	46.54	52.74	-6.20	AVG	
5		0.3260	35.92	19.52	55.44	59.55	-4.11	QP	
6		0.3260	22.18	19.52	41.70	49.55	-7.85	AVG	
7		0.3620	31.92	19.52	51.44	58.68	-7.24	QP	
8		0.3620	18.30	19.52	37.82	48.68	-10.86	AVG	
9		0.4300	29.16	19.53	48.69	57.25	-8.56	QP	
10		0.4300	15.53	19.53	35.06	47.25	-12.19	AVG	
11		0.4660	24.59	19.53	44.12	56.58	-12.46	QP	
12		0.4660	11.51	19.53	31.04	46.58	-15.54	AVG	

150kHz~30MHz

Test mode: 11B

Test Channel:6

Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1540	39.00	19.70	58.70	65.78	-7.08	QP	
2		0.1540	25.20	19.70	44.90	55.78	-10.88	AVG	
3		0.2220	35.39	19.70	55.09	62.74	-7.65	QP	
4		0.2220	21.59	19.70	41.29	52.74	-11.45	AVG	
5		0.3580	28.75	19.70	48.45	58.77	-10.32	QP	
6		0.3580	15.34	19.70	35.04	48.77	-13.73	AVG	
7		0.3740	28.84	19.70	48.54	58.41	-9.87	QP	
8		0.3740	16.42	19.70	36.12	48.41	-12.29	AVG	
9		0.4620	21.70	19.73	41.43	56.66	-15.23	QP	
10		0.4620	9.55	19.73	29.28	46.66	-17.38	AVG	
11		0.4940	23.36	19.74	43.10	56.10	-13.00	QP	
12		0.4940	10.38	19.74	30.12	46.10	-15.98	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	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
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 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

Note: (1) Emission level $\text{dB}\mu\text{V} = 20 \log$ Emission level $\mu\text{V/m}$

(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	Record PC	Lenovo	M4500T	NA
2	Control PC	Lenovo	M4500T	NA

3.2.3 Test Procedure

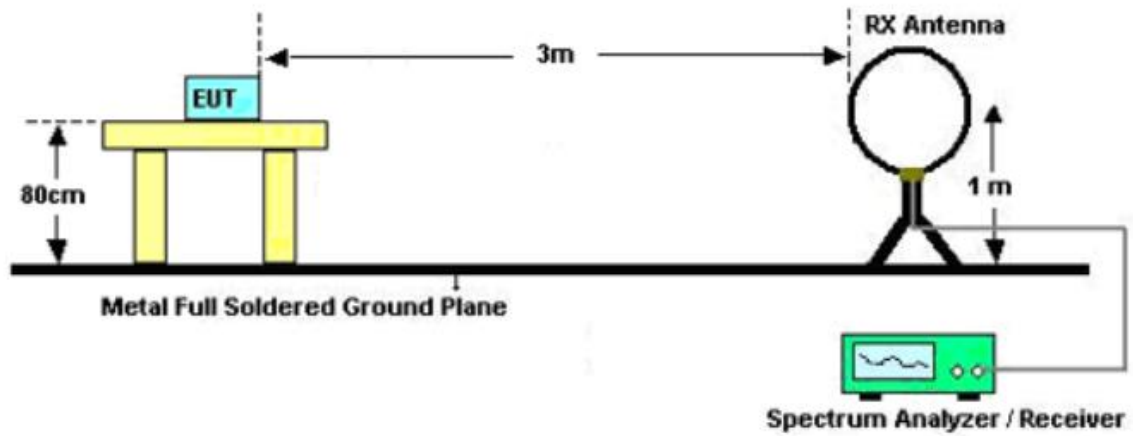
Test Method	
☐ Conducted Measurement	☒ Radiated Measurement
Test Channels	
☒ Lowest, Middle and Highest Channel	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ☒ : Test ☐ : No Test	

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)

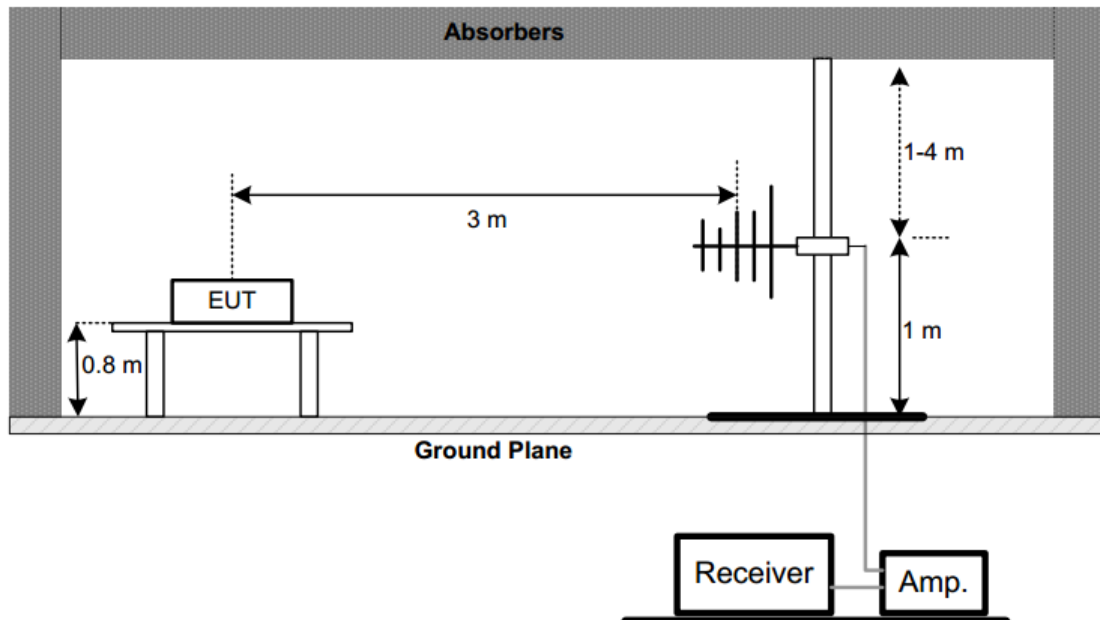
- b) The measuring distance of 3 m or 1.5m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- c) The height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

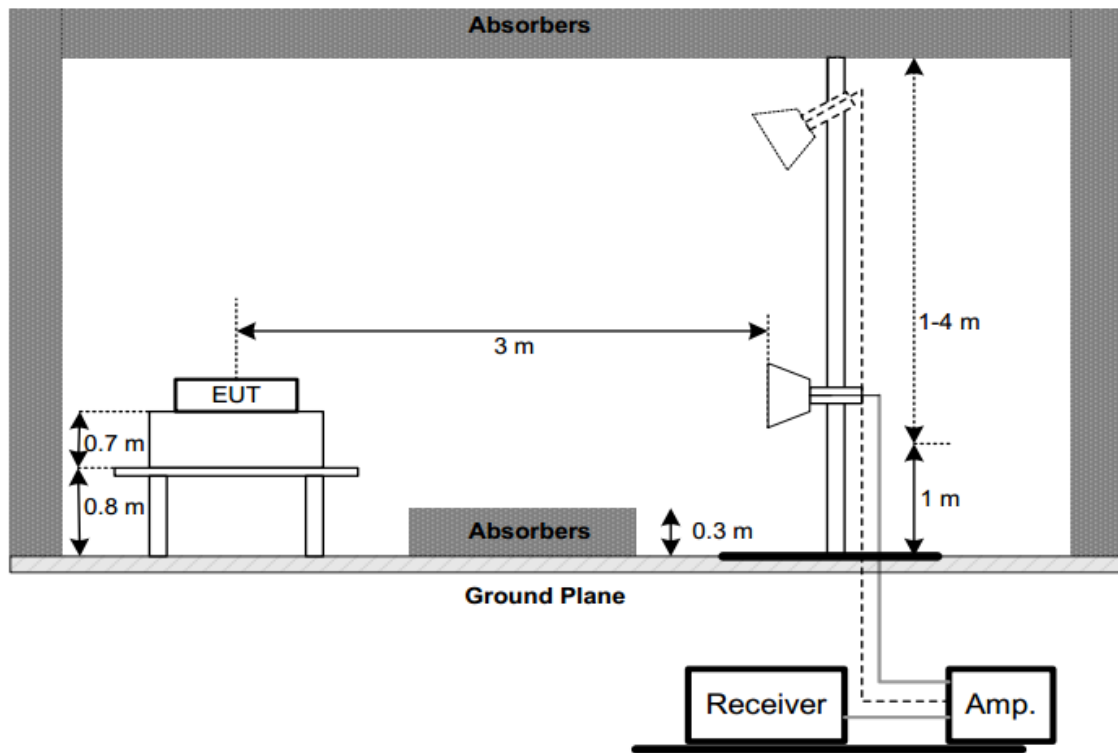
(A) Radiated Emission Test Set-Up Frequency Below 30 MHz



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



(C) 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.

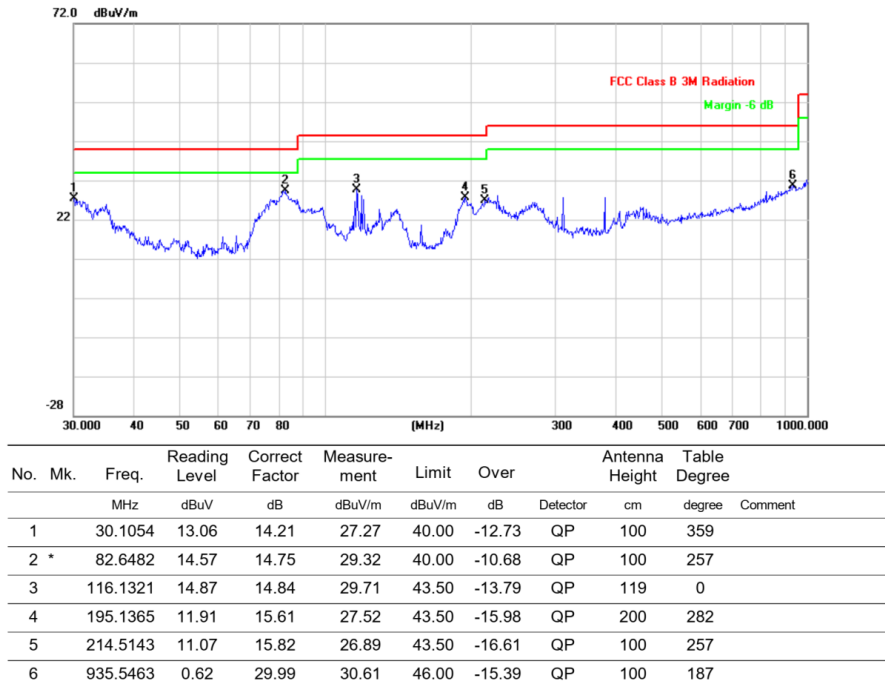
2) Radiated emission: 30MHz-1G

Note:

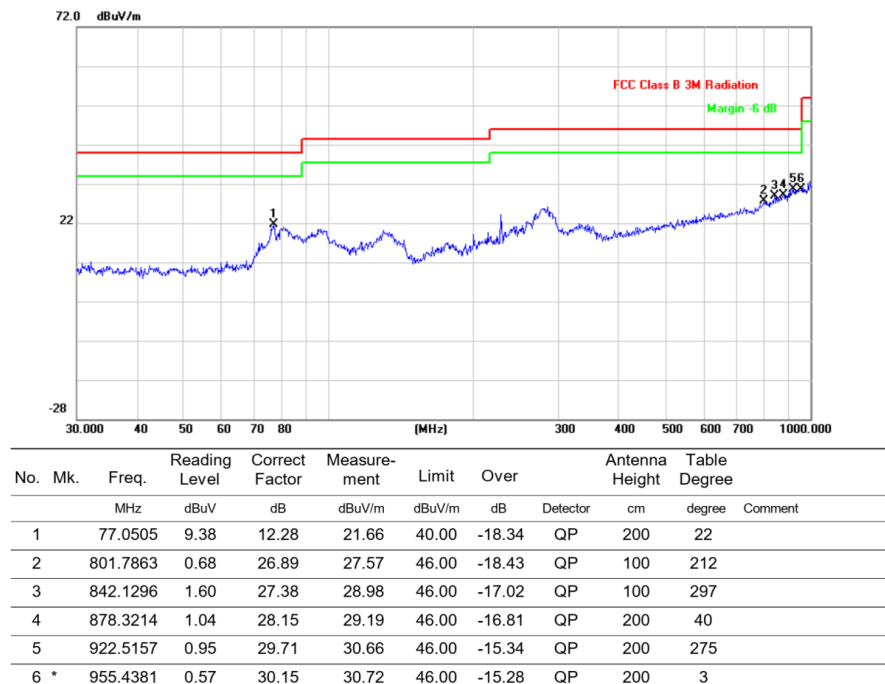
1. Measurement = Reading + Correct Factor.
2. Over = Measurement - Limit

Below 1G (30MHz~1GHz)	Test mode: 11B	Test Channel:6
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VERTICAL



HORIZONTAL



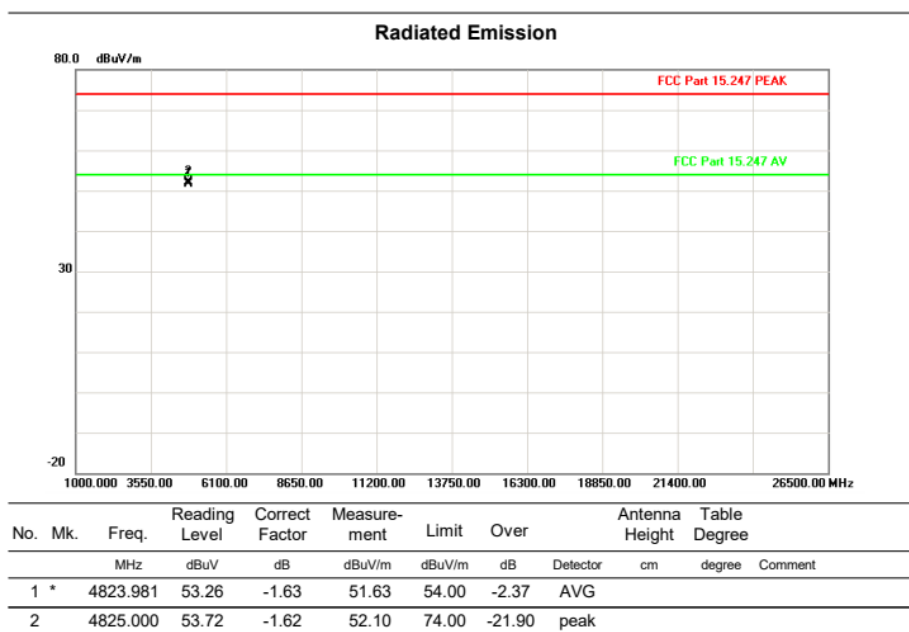
3) Radiated emission: Above 1G

Note:

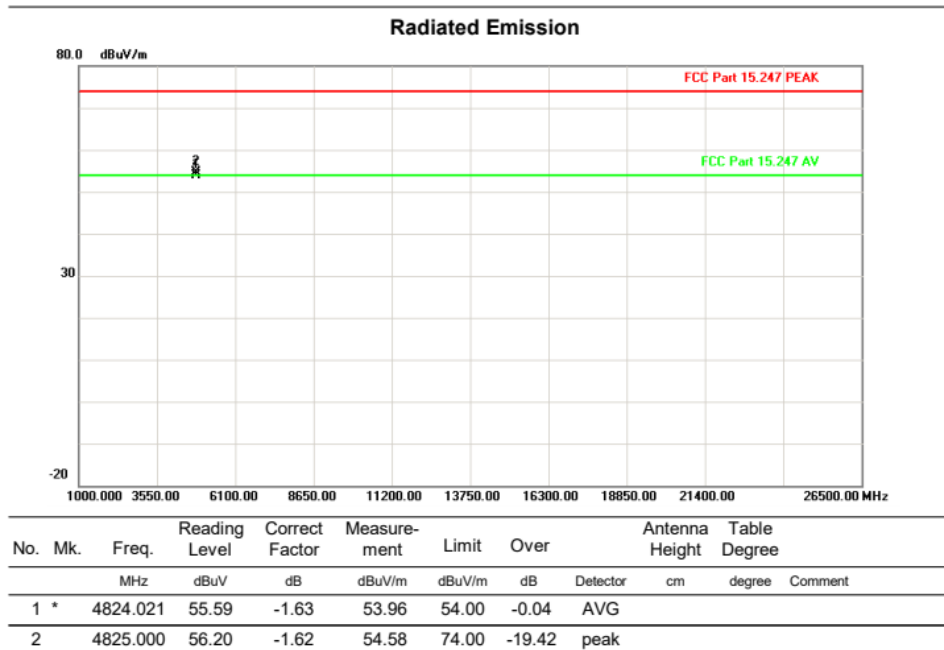
1. The frequency range scanned from 18GHz to the tenth harmonic of the highest fundamental frequency or 40GHz, whichever is lower. The emissions were below the limit by 20dBc, so we have not recorded it in the report.
2. Measurement = Reading + Correct Factor.
3. Over = Measurement – Limit.

Above 1G (1GHz~26.5GHz)	Test mode:11B	Test Channel:1
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VERTICAL



HORIZONTAL



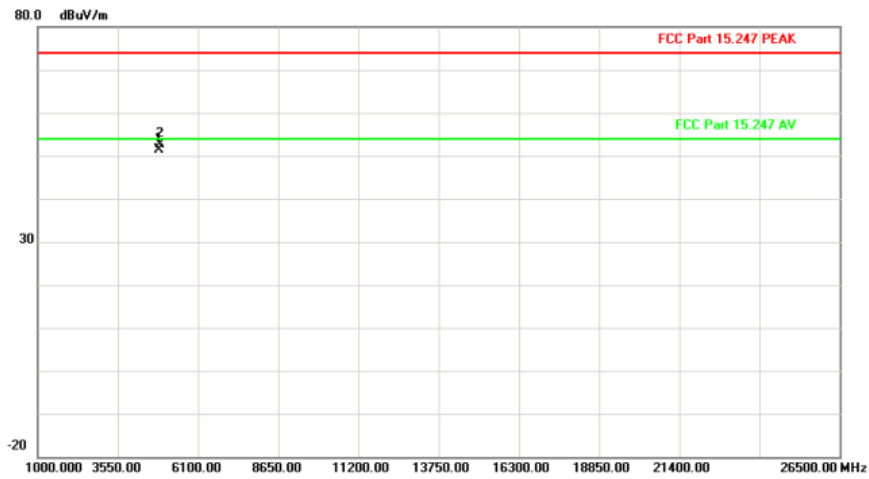
Above 1G (1GHz~26.5GHz)

Test mode: 11B

Test Channel:6

VERTICAL

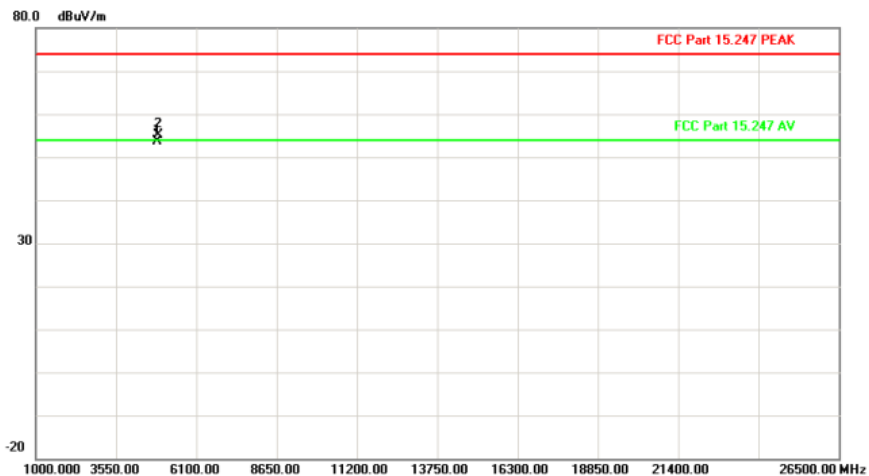
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	4874.002	52.72	-1.31	51.41	54.00	-2.59	AVG		
2		4876.000	53.82	-1.30	52.52	74.00	-21.48	peak		

HORIZONTAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	4874.002	55.05	-1.31	53.74	54.00	-0.26	AVG		
2		4876.000	56.42	-1.30	55.12	74.00	-18.88	peak		

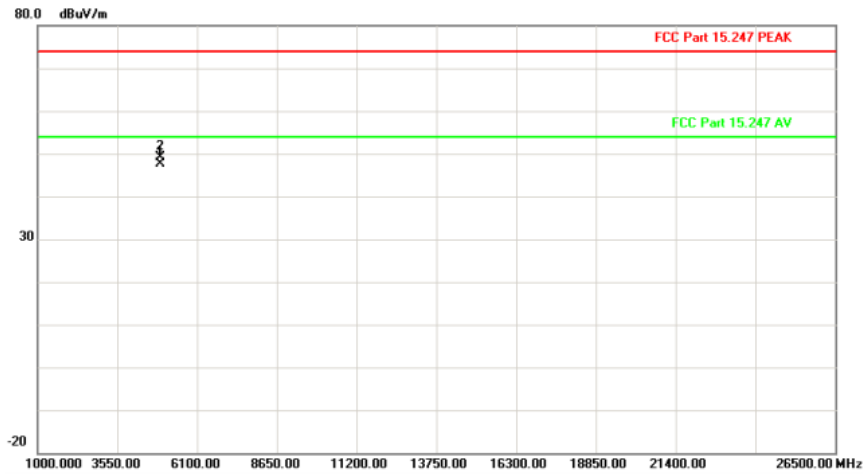
Above 1G (1GHz~26.5GHz)

Test mode: 11B

Test Channel:11

VERTICAL

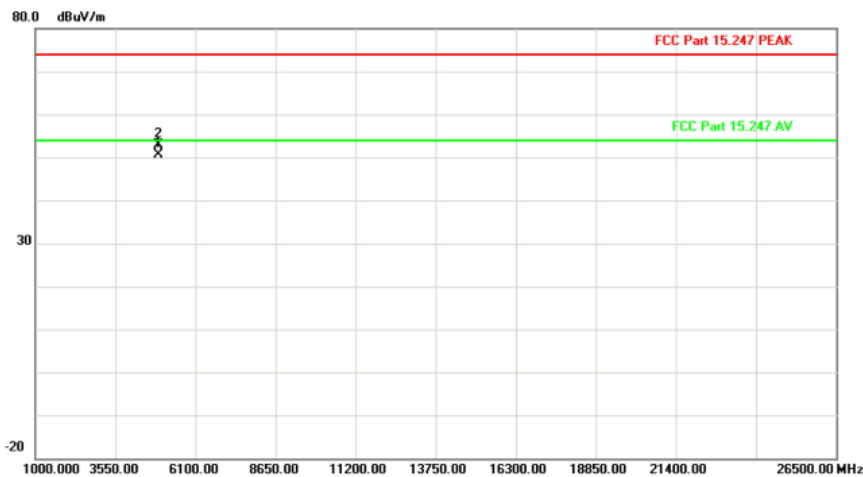
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	4924.023	48.60	-0.99	47.61	54.00	-6.39	AVG		
2		4927.000	50.13	-0.97	49.16	74.00	-24.84	peak		

HORIZONTAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	4924.003	51.53	-0.99	50.54	54.00	-3.46	AVG		
2		4927.000	53.92	-0.97	52.95	74.00	-21.05	peak		

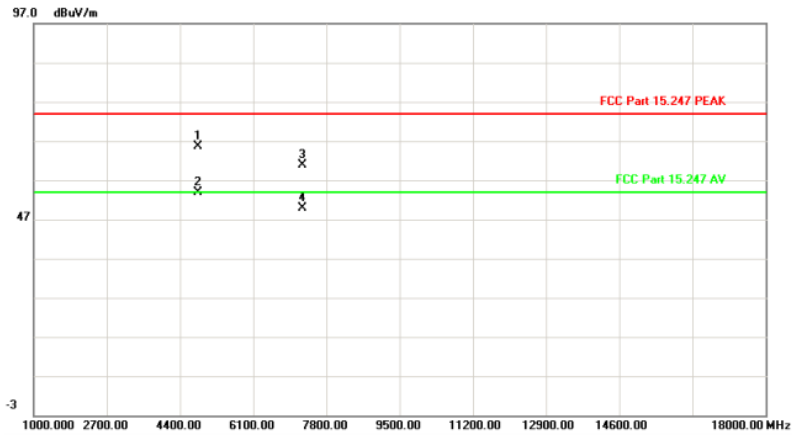
Above 1G (1GHz~26.5GHz)

Test mode: 11G

Test Channel:1

VERTICAL

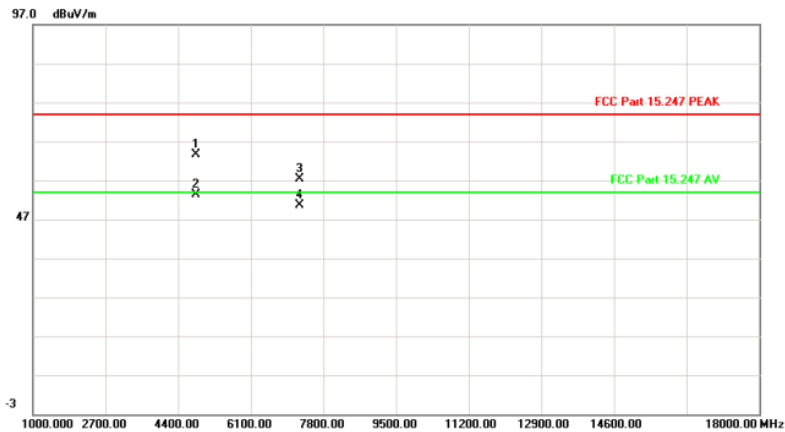
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		4825.000	67.36	-1.62	65.74	74.00	-8.26	peak		
2	*	4825.000	55.57	-1.62	53.95	54.00	-0.05	AVG		
3		7239.000	56.36	4.43	60.79	74.00	-13.21	peak		
4		7239.000	45.36	4.43	49.79	54.00	-4.21	AVG		

HORIZONTAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		4825.000	65.36	-1.62	63.74	74.00	-10.26	peak		
2	*	4825.000	55.01	-1.62	53.39	54.00	-0.61	AVG		
3		7239.000	53.04	4.43	57.47	74.00	-16.53	peak		
4		7239.000	46.31	4.43	50.74	54.00	-3.26	AVG		

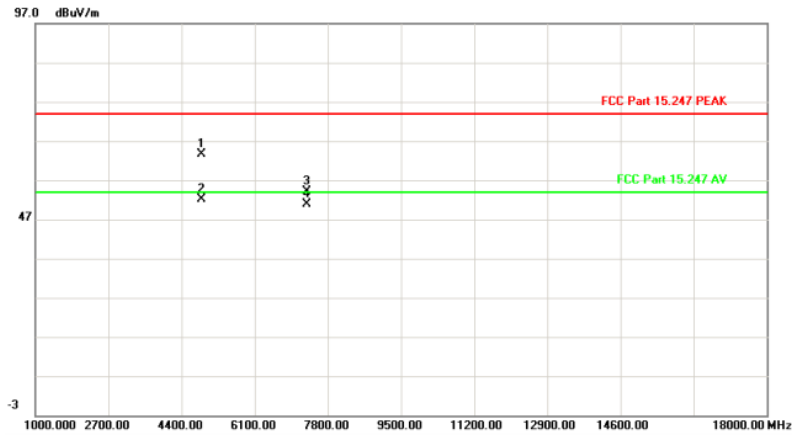
Above 1G (1GHz~26.5GHz)

Test mode: 11G

Test Channel:6

VERTICAL

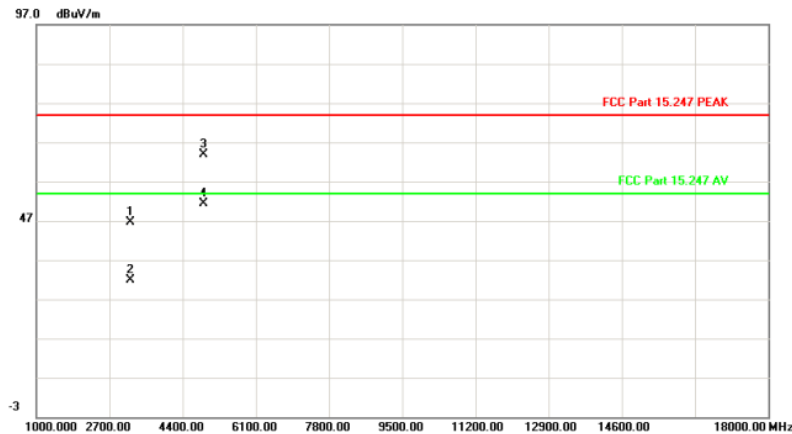
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		4859.000	65.11	-1.41	63.70	74.00	-10.30	peak		
2	*	4868.990	53.41	-1.34	52.07	54.00	-1.93	AVG		
3		7307.000	49.66	4.54	54.20	74.00	-19.80	peak		
4		7307.000	46.27	4.54	50.81	54.00	-3.19	AVG		

HORIZONTAL

Radiated Emission



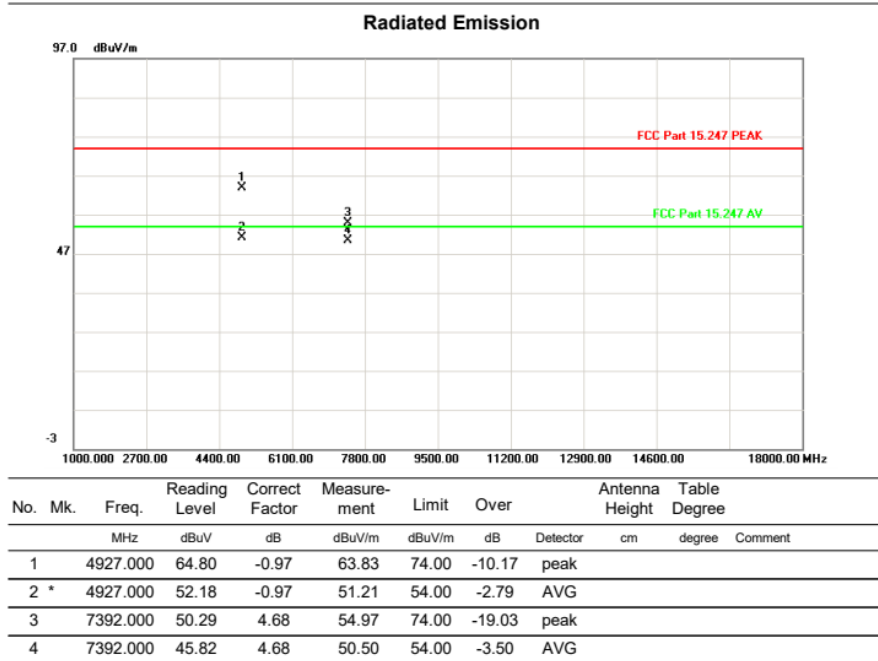
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		3193.000	55.10	-8.55	46.55	74.00	-27.45	peak		
2		3193.000	40.36	-8.55	31.81	54.00	-22.19	AVG		
3		4876.000	65.18	-1.30	63.88	74.00	-10.12	peak		
4	*	4876.000	52.64	-1.30	51.34	54.00	-2.66	AVG		

Above 1G (1GHz~26.5GHz)

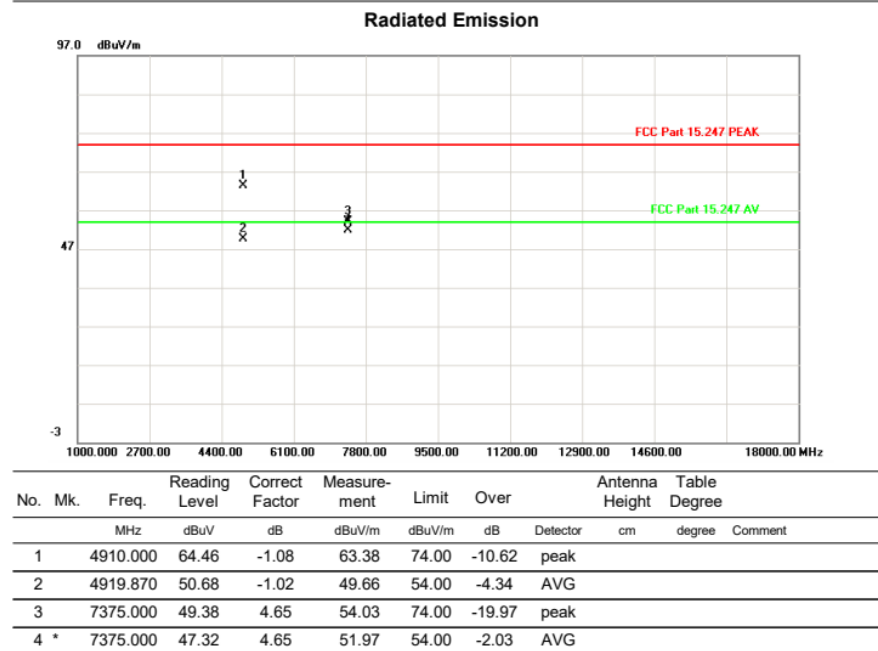
Test mode: 11G

Test Channel:11

VERTICAL



HORIZONTAL

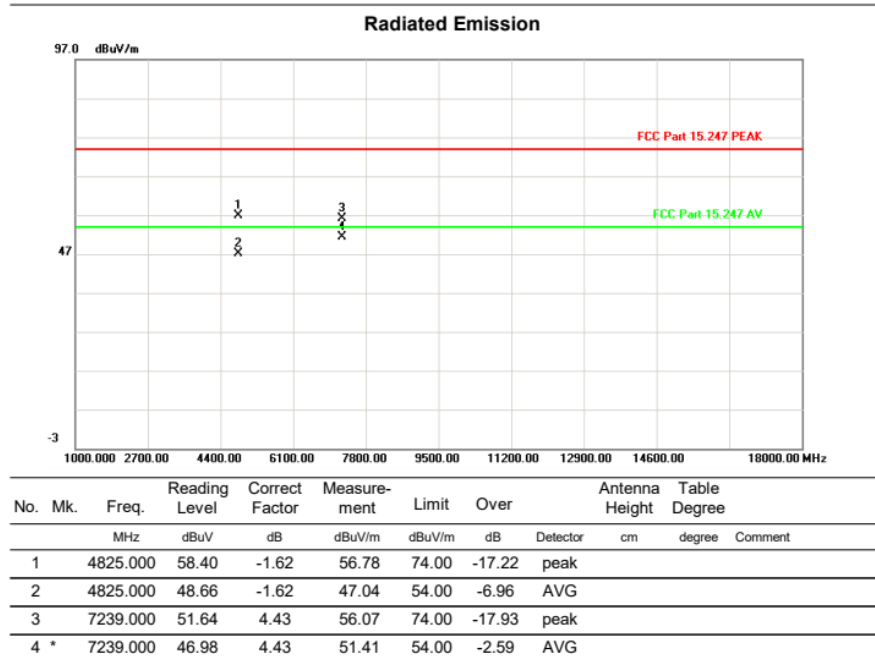


Above 1G (1GHz~26.5GHz)

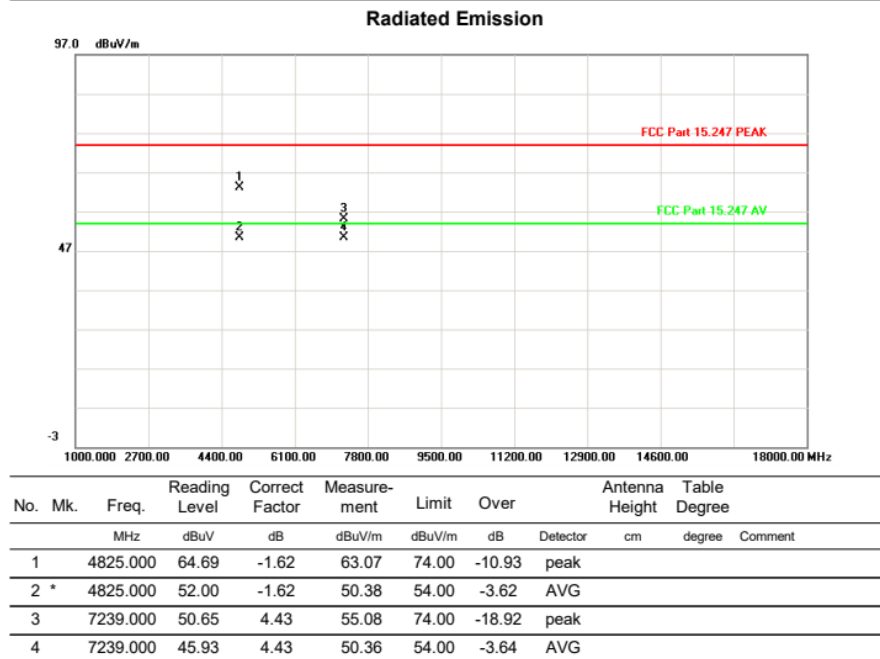
Test mode: 11N20SISO

Test Channel:1

VERTICAL



HORIZONTAL



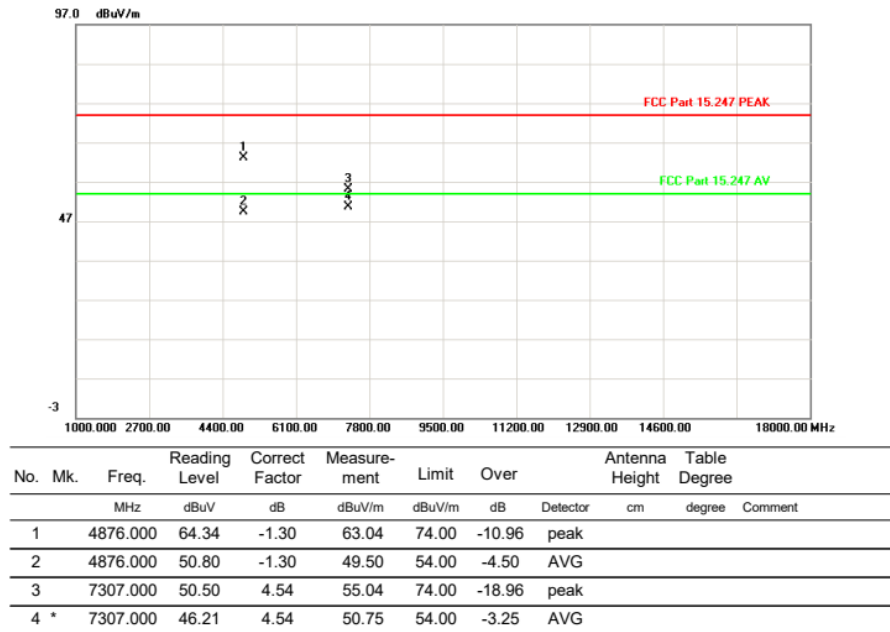
Above 1G (1GHz~26.5GHz)

Test mode: 11N20SISO

Test Channel:6

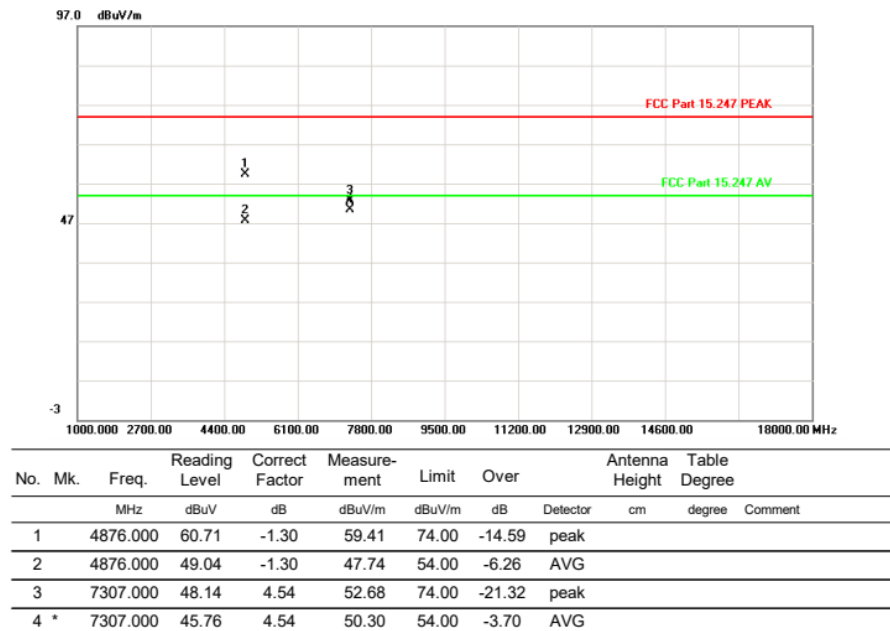
VERTICAL

Radiated Emission



HORIZONTAL

Radiated Emission



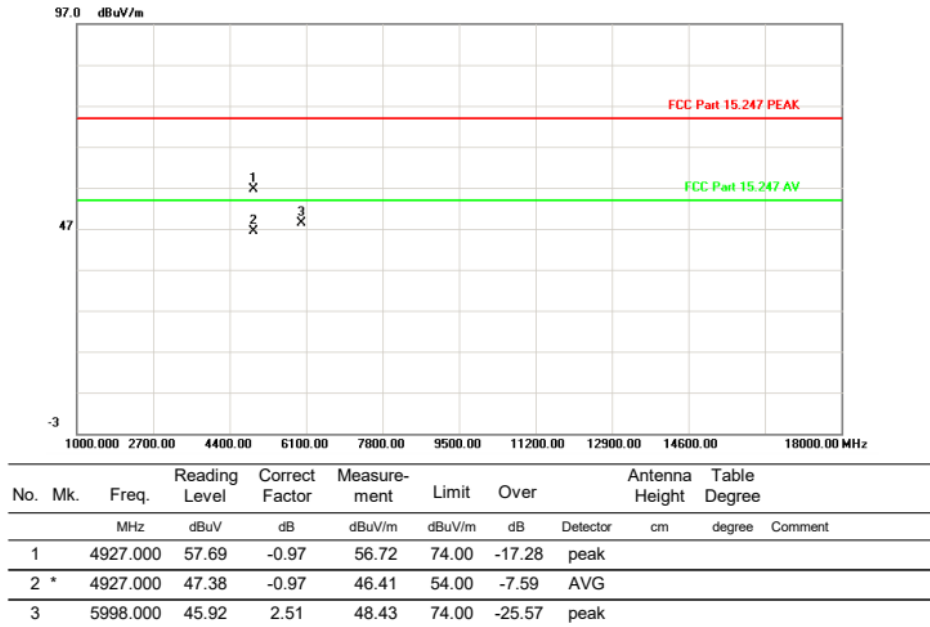
Above 1G (1GHz~26.5GHz)

Test mode: 11N20SISO

Test Channel:11

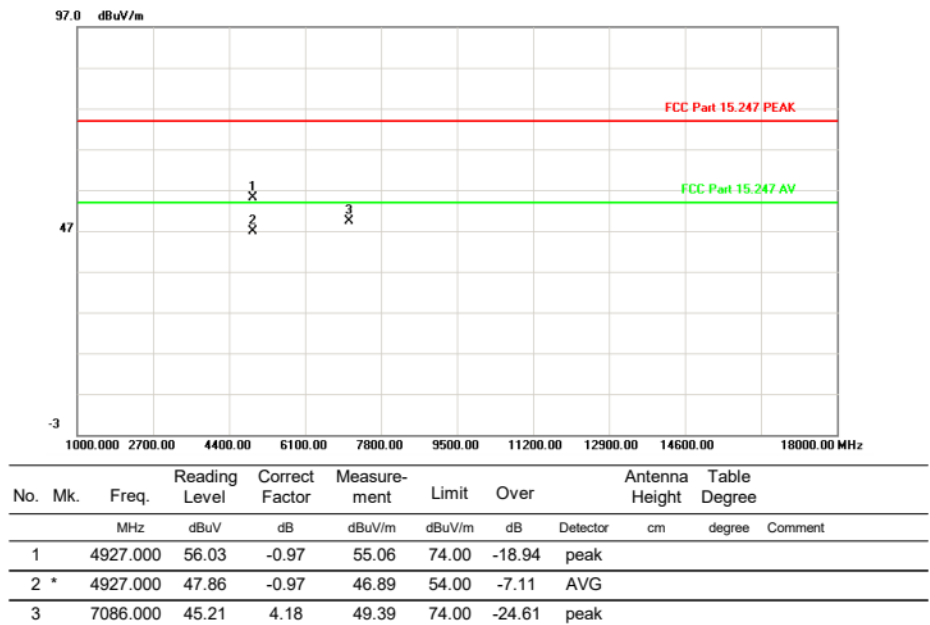
VERTICAL

Radiated Emission



HORIZONTAL

Radiated Emission



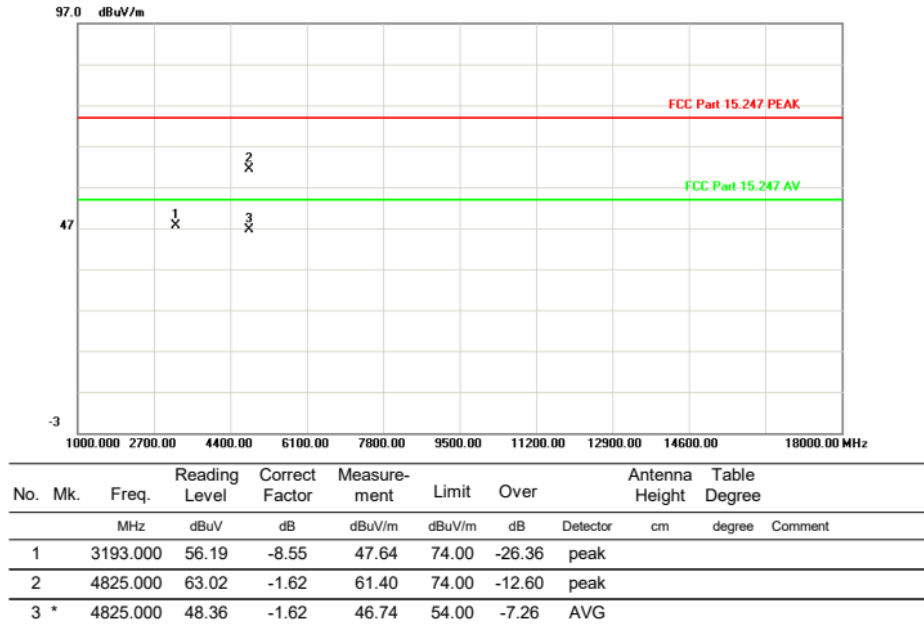
Above 1G (1GHz~26.5GHz)

Test mode: 11N40SISO

Test Channel:3

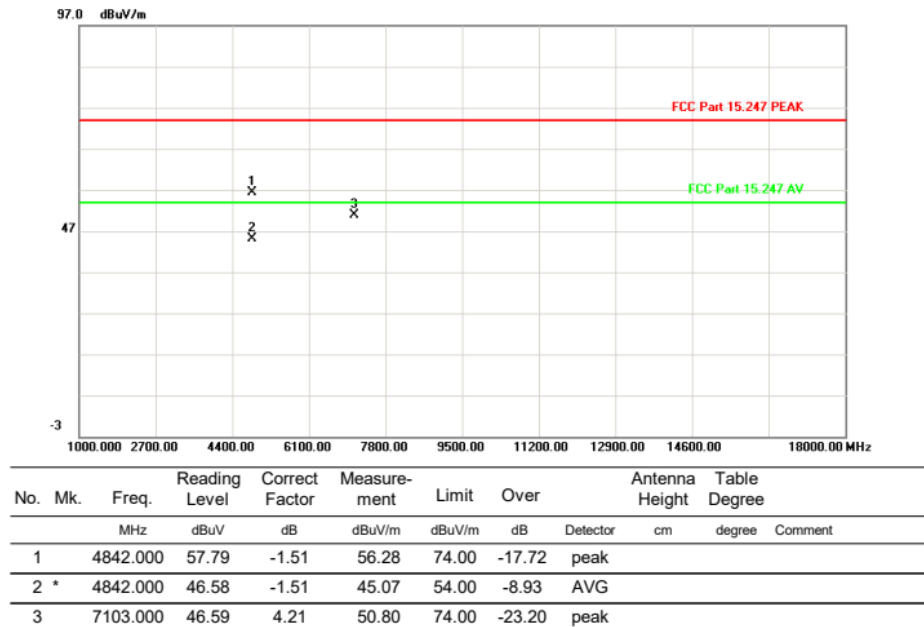
VERTICAL

Radiated Emission



HORIZONTAL

Radiated Emission

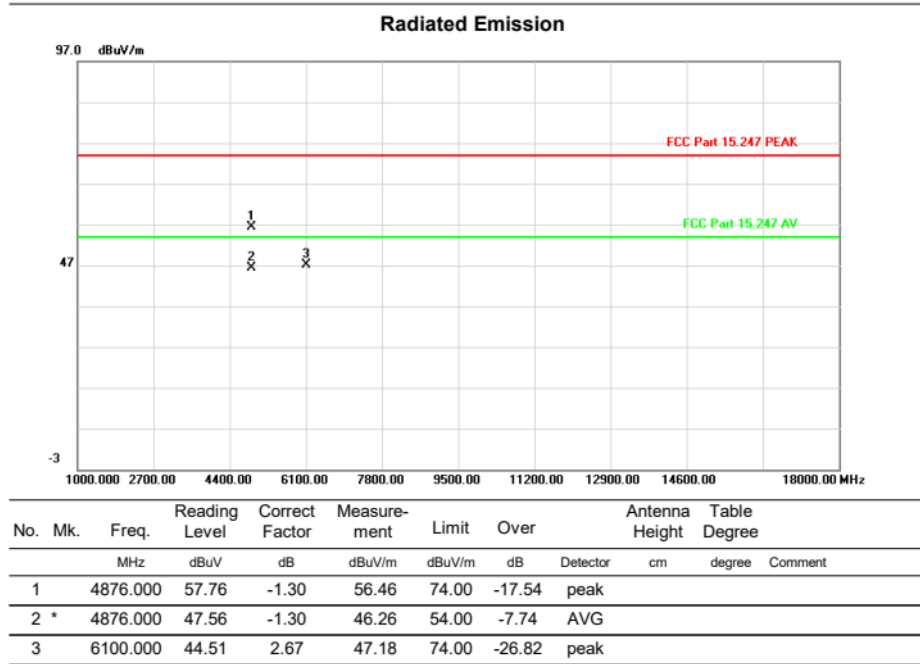


Above 1G (1GHz~26.5GHz)

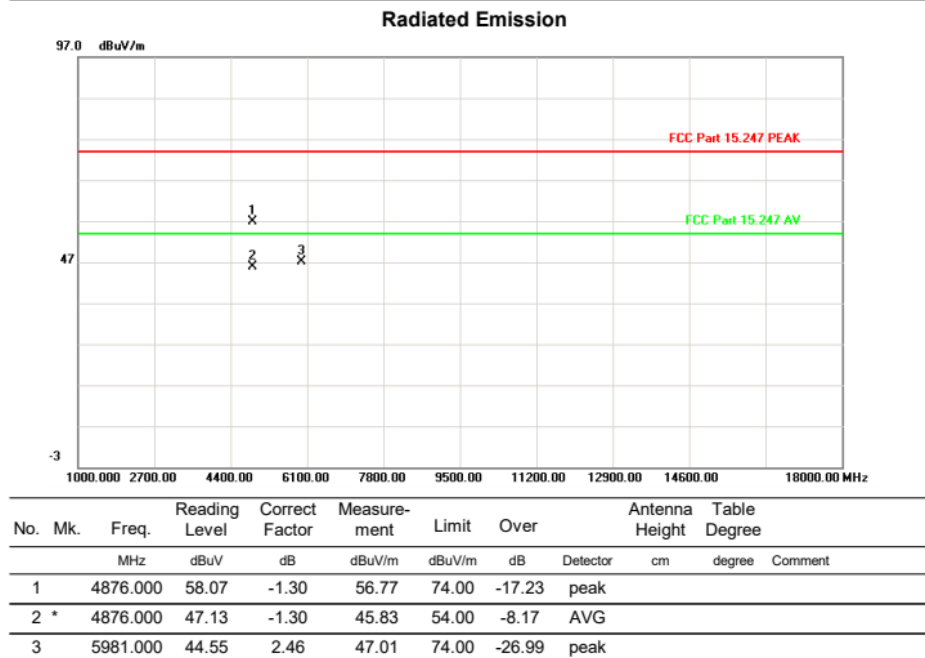
Test mode: 11N40SISO

Test Channel:6

VERTICAL



HORIZONTAL



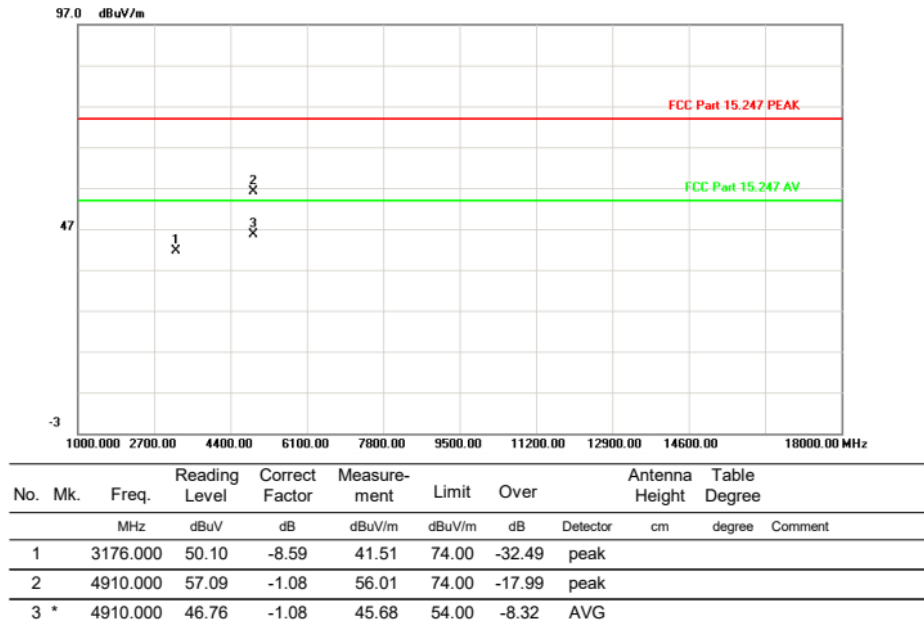
Above 1G (1GHz~26.5GHz)

Test mode: 11N40SISO

Test Channel:9

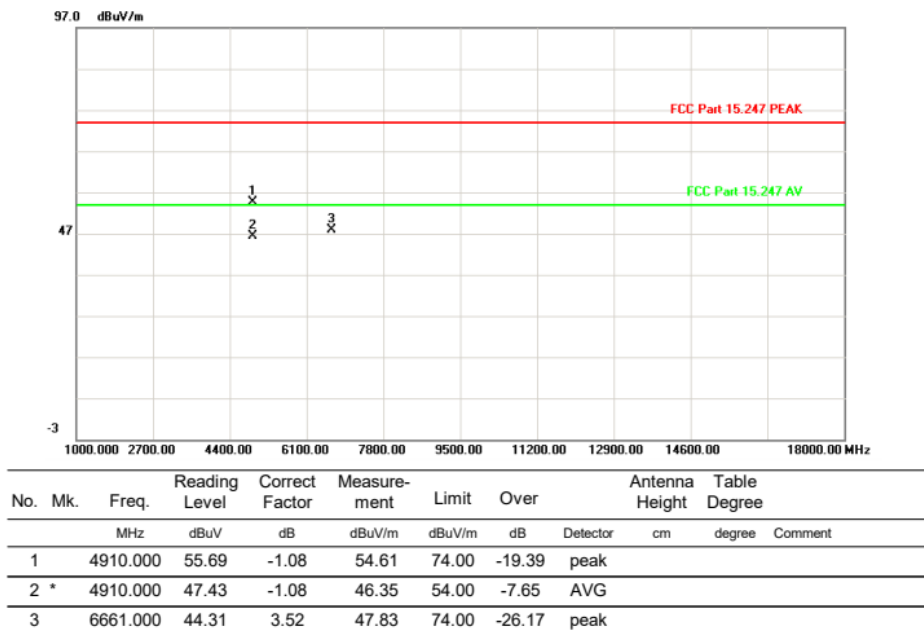
VERTICAL

Radiated Emission



HORIZONTAL

Radiated Emission



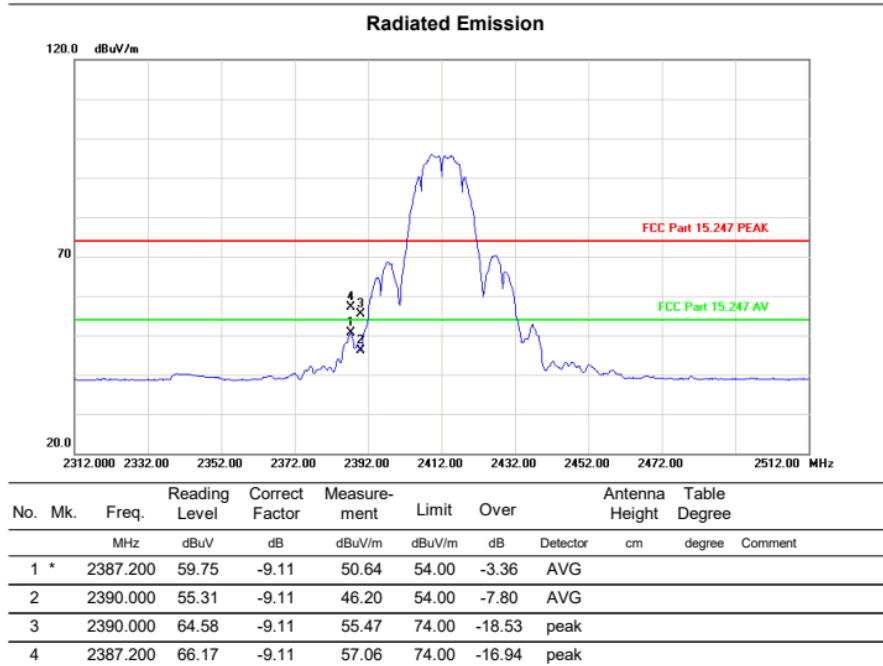
4) Radiated Band Edge

Note:

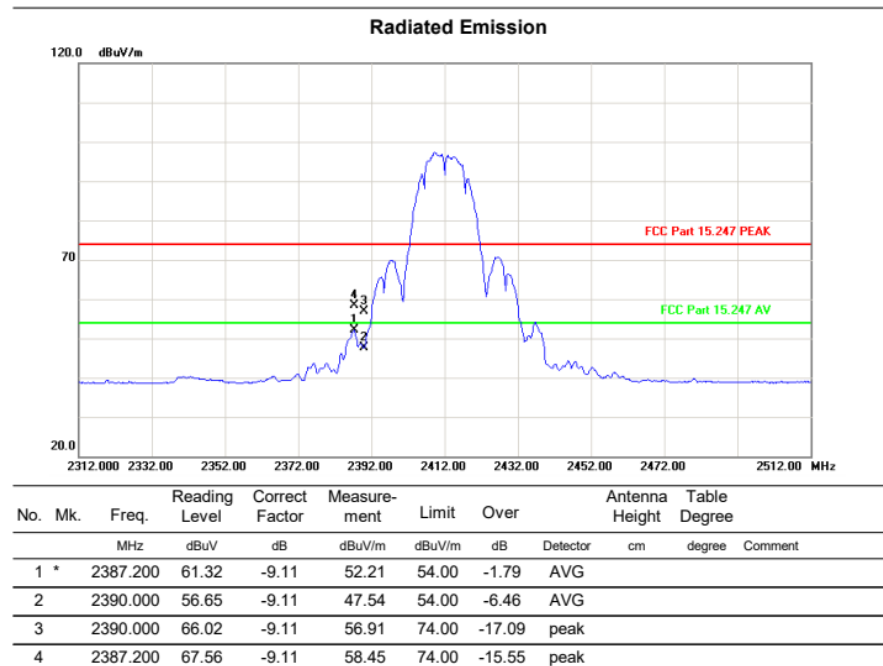
1. Measurement = Reading + Correct Factor.
2. Over = Measurement - Limit

Above 1G (1GHz~26.5GHz)	Test mode:11B	Test Channel:1
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VERTICAL



HORIZONTAL



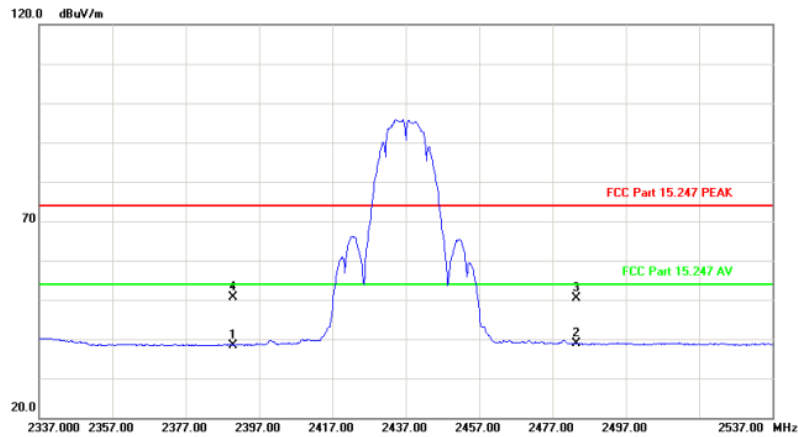
Above 1G (1GHz~26.5GHz)

Test mode: 11B

Test Channel:6

VERTICAL

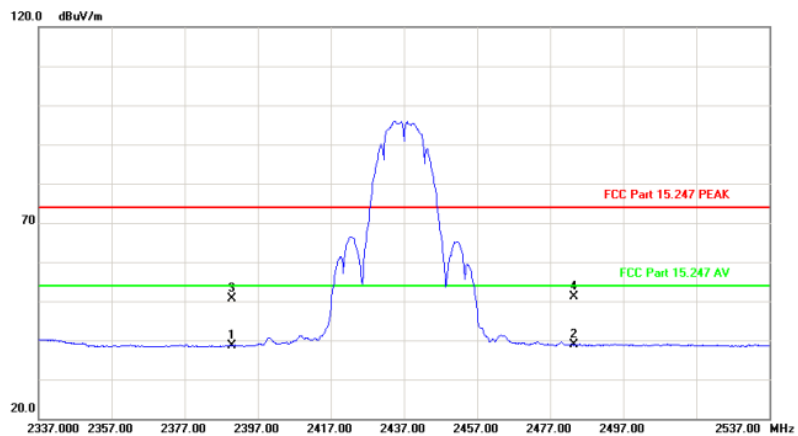
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		2390.000	47.55	-9.11	38.44	54.00	-15.56	AVG		
2 *		2483.500	47.88	-9.08	38.80	54.00	-15.20	AVG		
3		2483.500	59.46	-9.08	50.38	74.00	-23.62	peak		
4		2390.000	59.72	-9.11	50.61	74.00	-23.39	peak		

HORIZONTAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		2390.000	47.67	-9.11	38.56	54.00	-15.44	AVG		
2 *		2483.500	47.87	-9.08	38.79	54.00	-15.21	AVG		
3		2390.000	59.85	-9.11	50.74	74.00	-23.26	peak		
4		2483.500	60.10	-9.08	51.02	74.00	-22.98	peak		

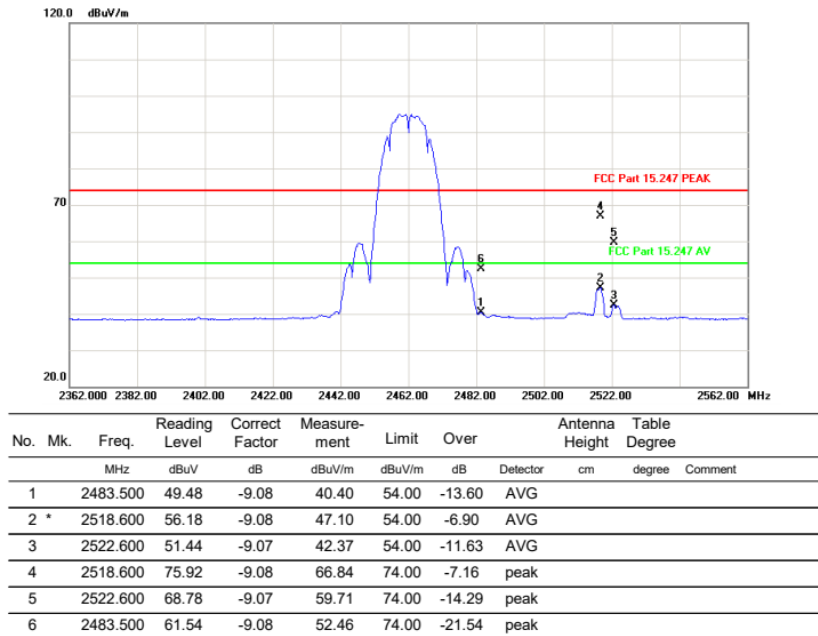
Above 1G (1GHz~26.5GHz)

Test mode: 11B

Test Channel:11

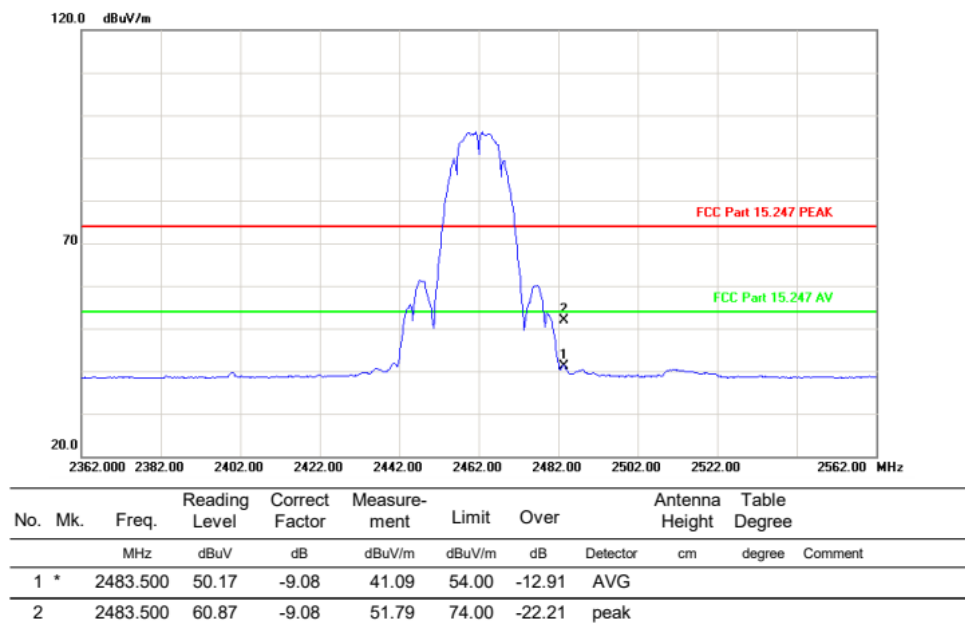
VERTICAL

Radiated Emission



HORIZONTAL

Radiated Emission



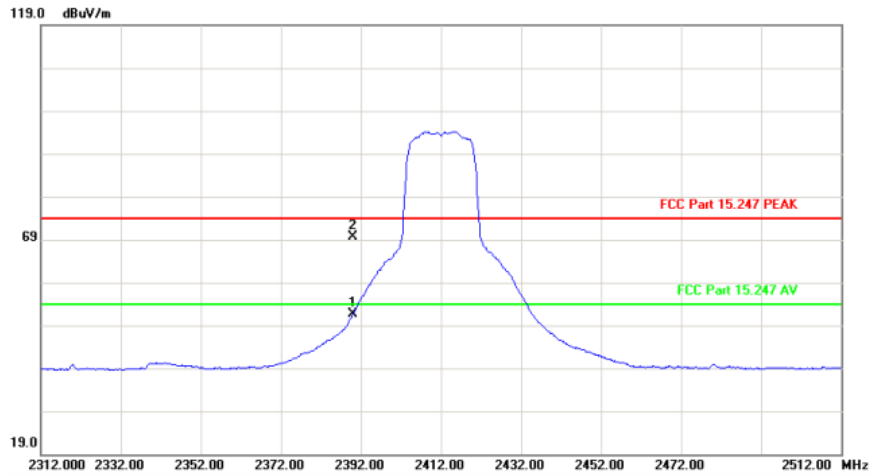
Above 1G (1GHz~26.5GHz)

Test mode: 11G

Test Channel:1

VERTICAL

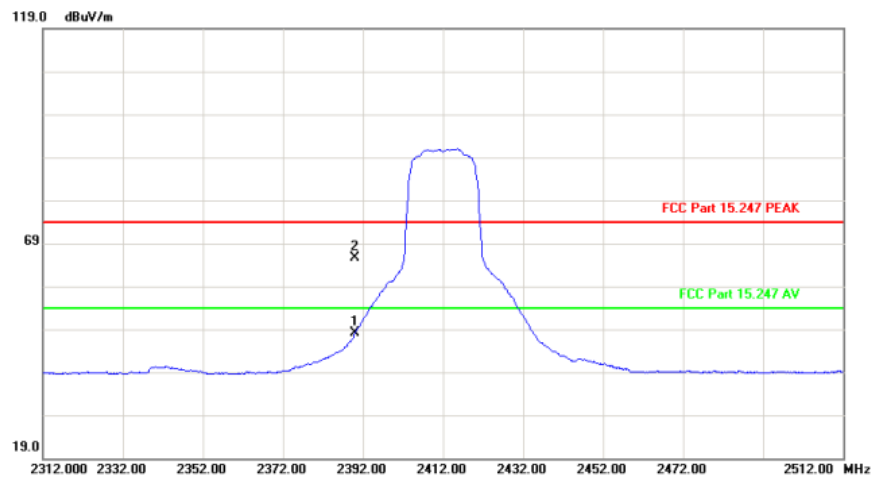
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2390.000	60.82	-9.11	51.71	54.00	-2.29	AVG		
2		2390.000	78.68	-9.11	69.57	74.00	-4.43	peak		

HORIZONTAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2390.000	57.25	-9.11	48.14	54.00	-5.86	AVG		
2		2390.000	74.75	-9.11	65.64	74.00	-8.36	peak		

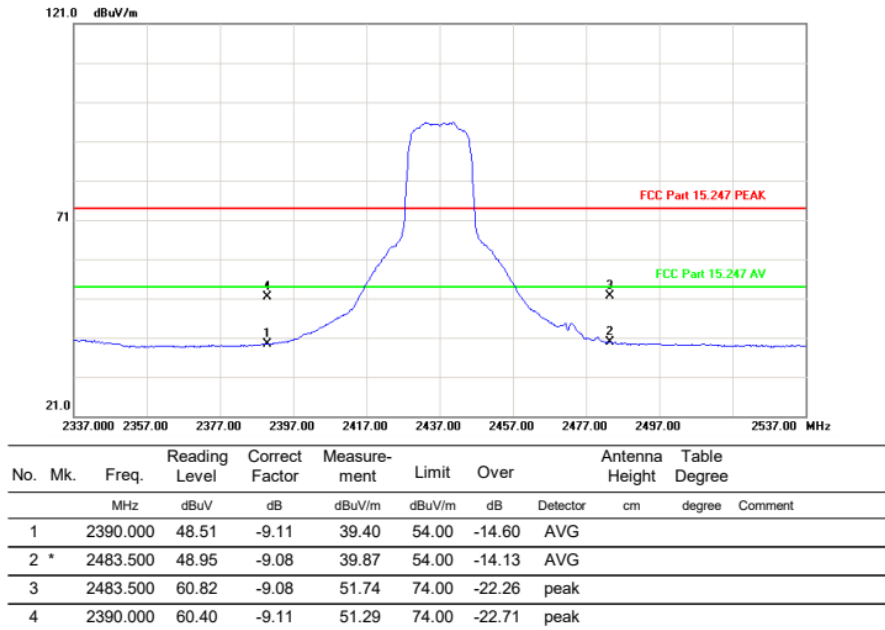
Above 1G (1GHz~26.5GHz)

Test mode: 11G

Test Channel:6

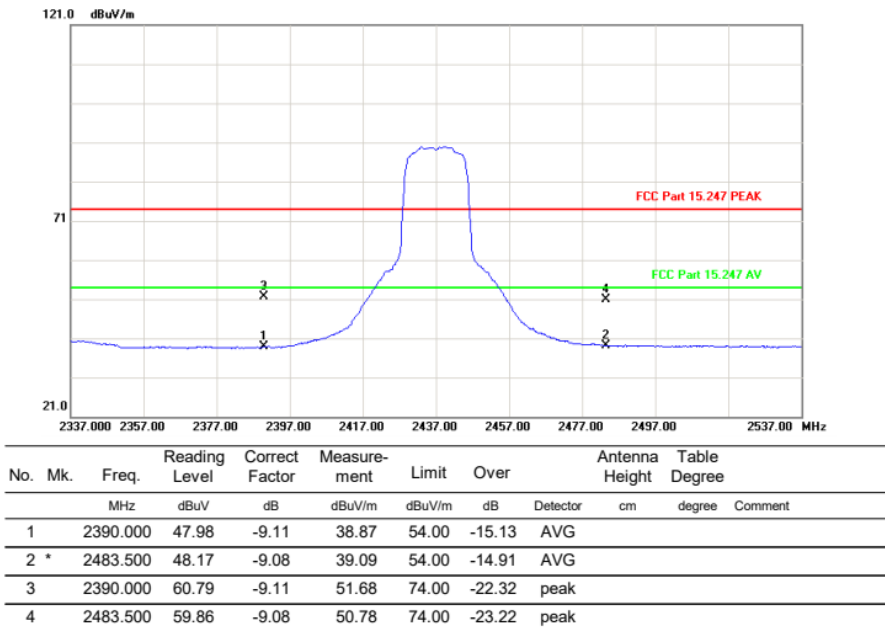
VERTICAL

Radiated Emission



HORIZONTAL

Radiated Emission



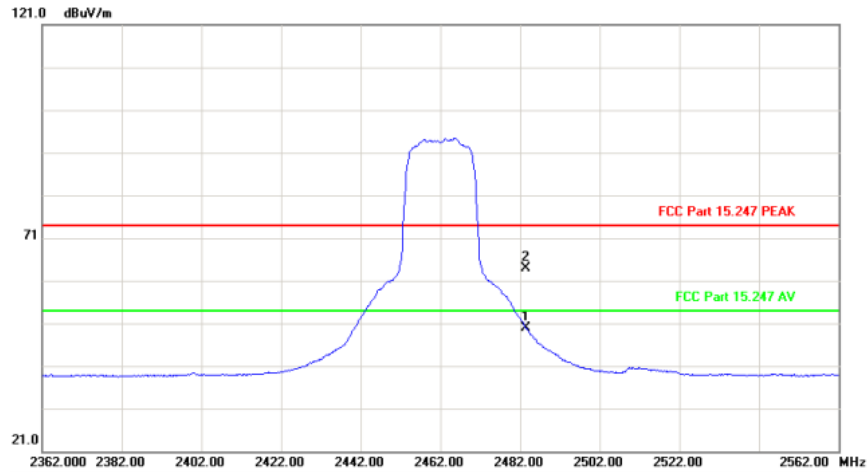
Above 1G (1GHz~26.5GHz)

Test mode: 11G

Test Channel:11

VERTICAL

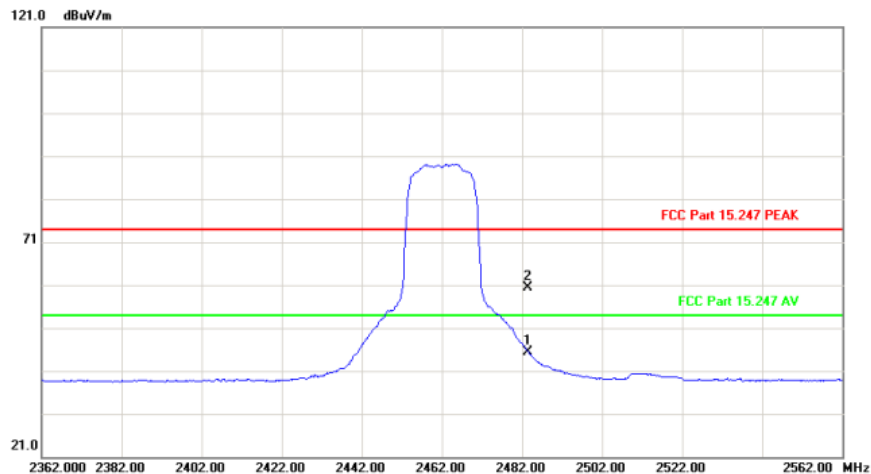
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2483.500	58.88	-9.08	49.80	54.00	-4.20	AVG		
2		2483.500	72.88	-9.08	63.80	74.00	-10.20	peak		

HORIZONTAL

Radiated Emission



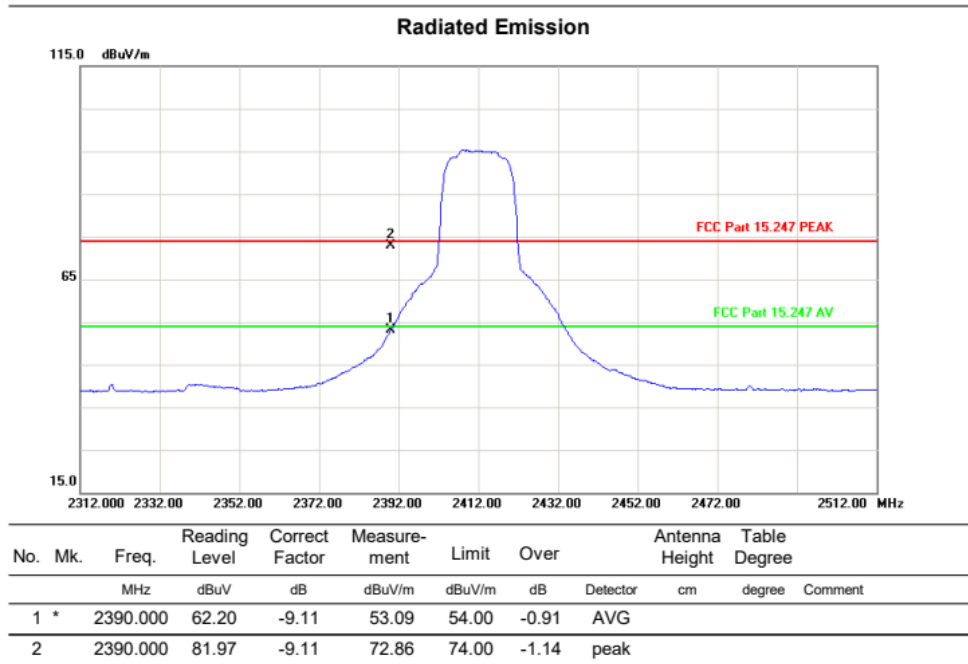
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2483.500	54.46	-9.08	45.38	54.00	-8.62	AVG		
2		2483.500	69.58	-9.08	60.50	74.00	-13.50	peak		

Above 1G (1GHz~26.5GHz)

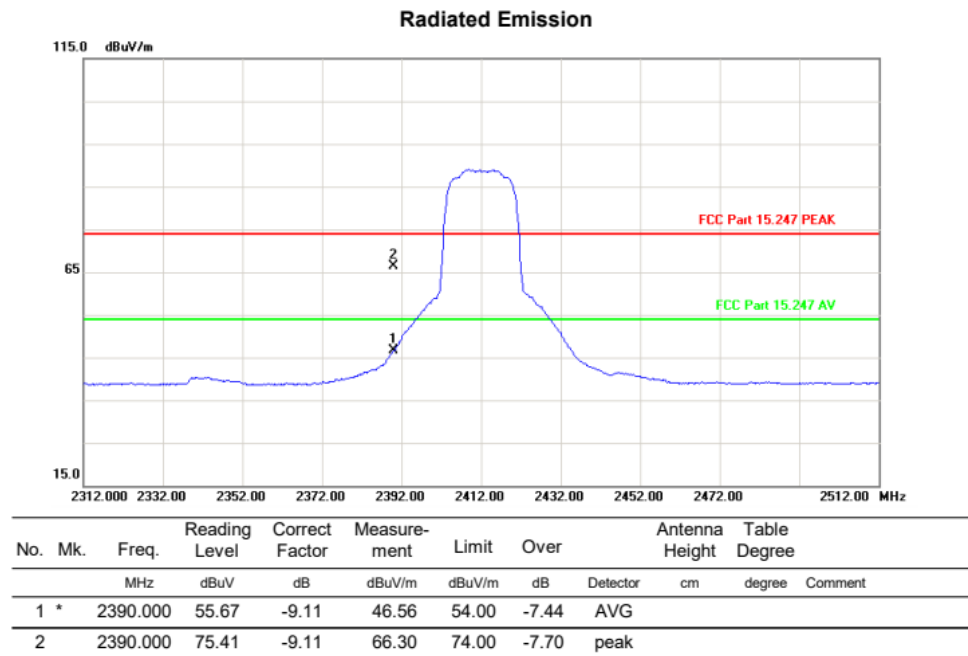
Test mode: 11N20SISO

Test Channel:1

VERTICAL



HORIZONTAL

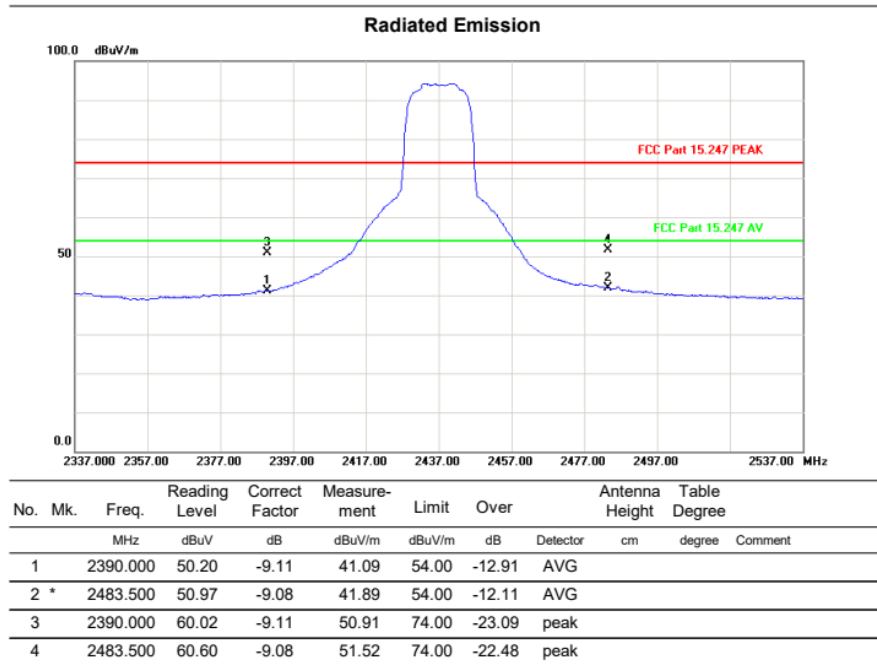


Above 1G (1GHz~26.5GHz)

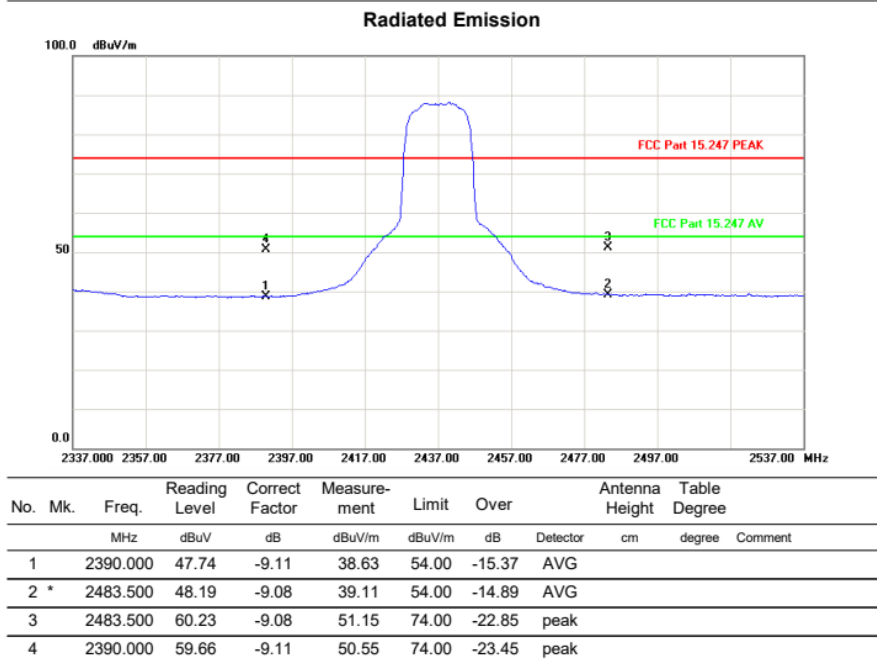
Test mode: 11N20SISO

Test Channel:6

VERTICAL



HORIZONTAL



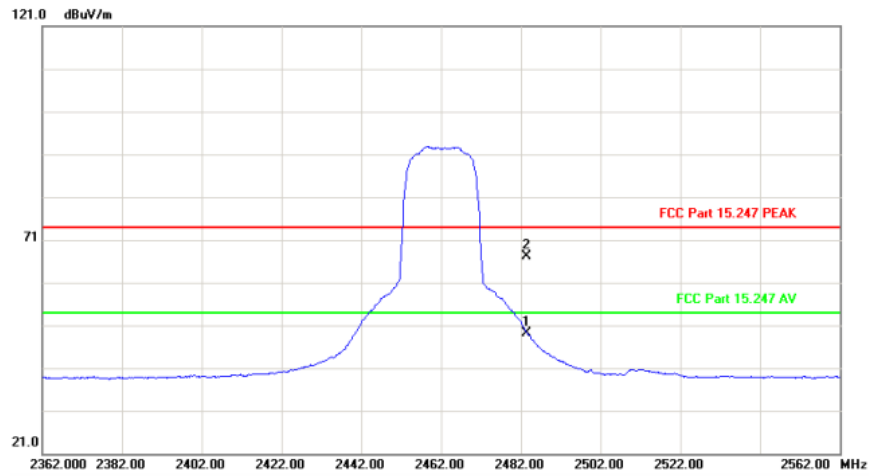
Above 1G (1GHz~26.5GHz)

Test mode: 11N20SISO

Test Channel:11

VERTICAL

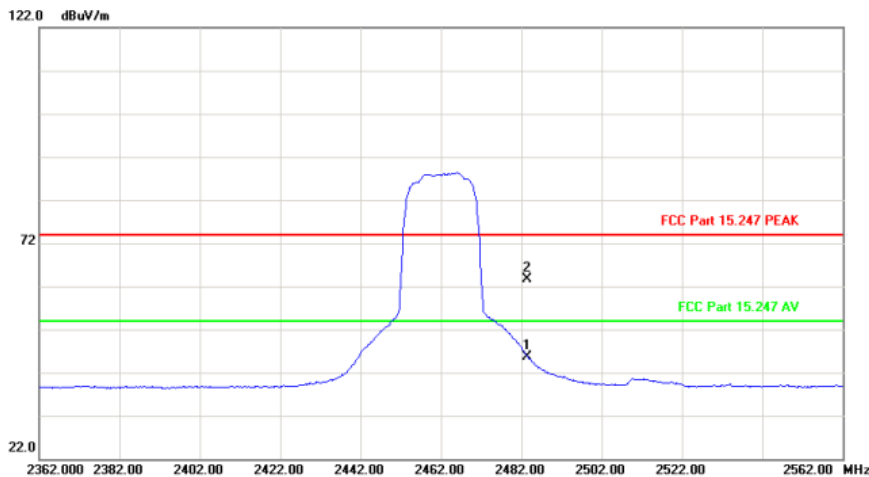
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2483.500	58.23	-9.08	49.15	54.00	-4.85	AVG		
2		2483.500	76.32	-9.08	67.24	74.00	-6.76	peak		

HORIZONTAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2483.500	54.61	-9.08	45.53	54.00	-8.47	AVG		
2		2483.500	72.70	-9.08	63.62	74.00	-10.38	peak		

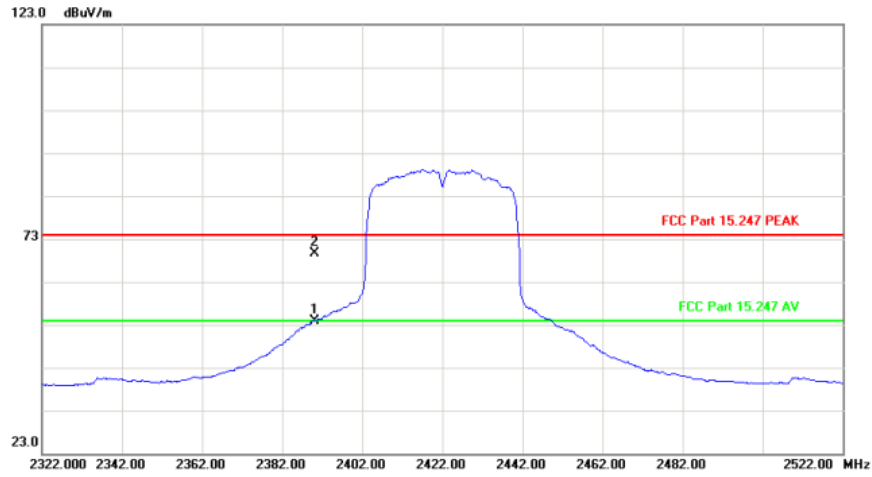
Above 1G (1GHz~26.5GHz)

Test mode: 11N40SISO

Test Channel:3

VERTICAL

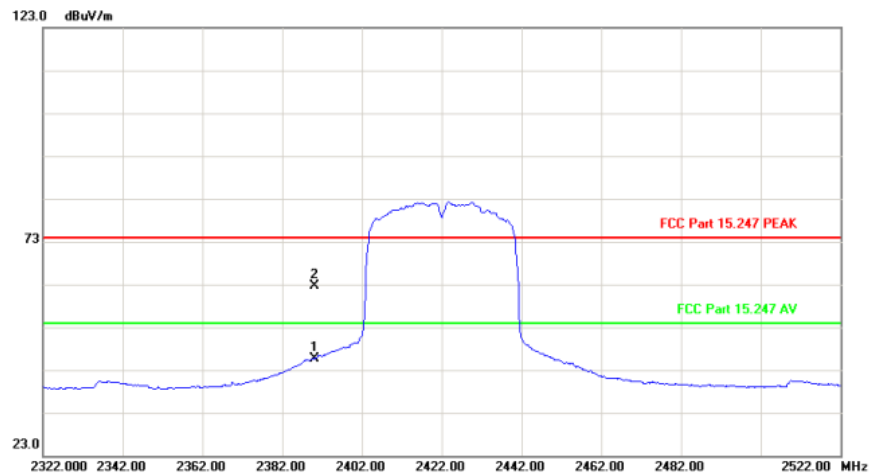
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2390.000	62.98	-9.11	53.87	54.00	-0.13	AVG		
2		2390.000	78.67	-9.11	69.56	74.00	-4.44	peak		

HORIZONTAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2390.000	54.85	-9.11	45.74	54.00	-8.26	AVG		
2		2390.000	71.77	-9.11	62.66	74.00	-11.34	peak		

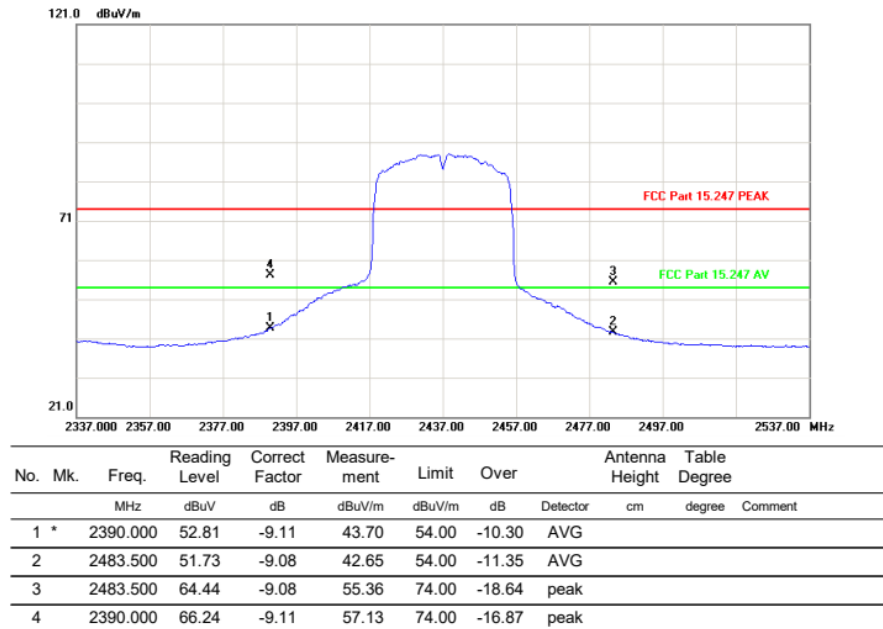
Above 1G (1GHz~26.5GHz)

Test mode: 11N40SISO

Test Channel:6

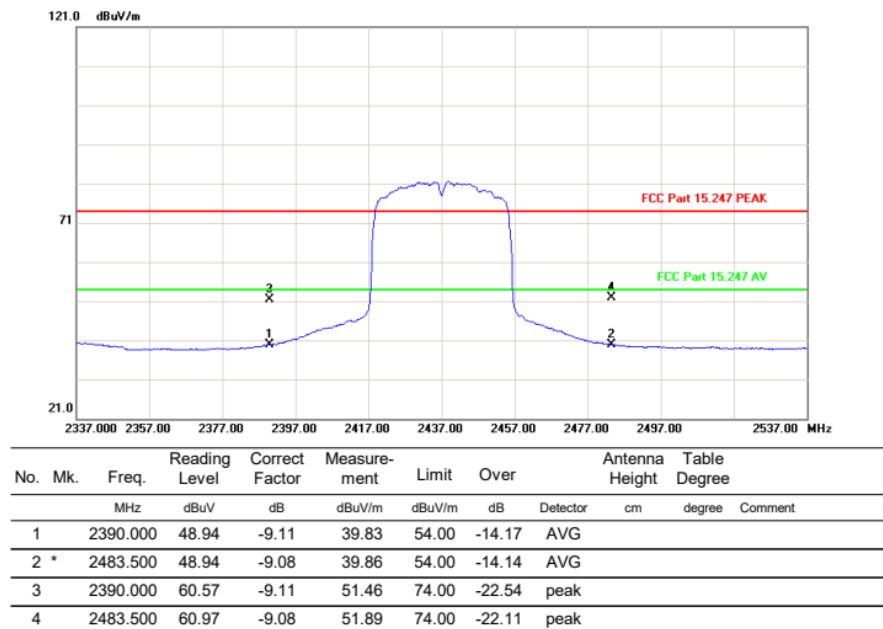
VERTICAL

Radiated Emission



HORIZONTAL

Radiated Emission

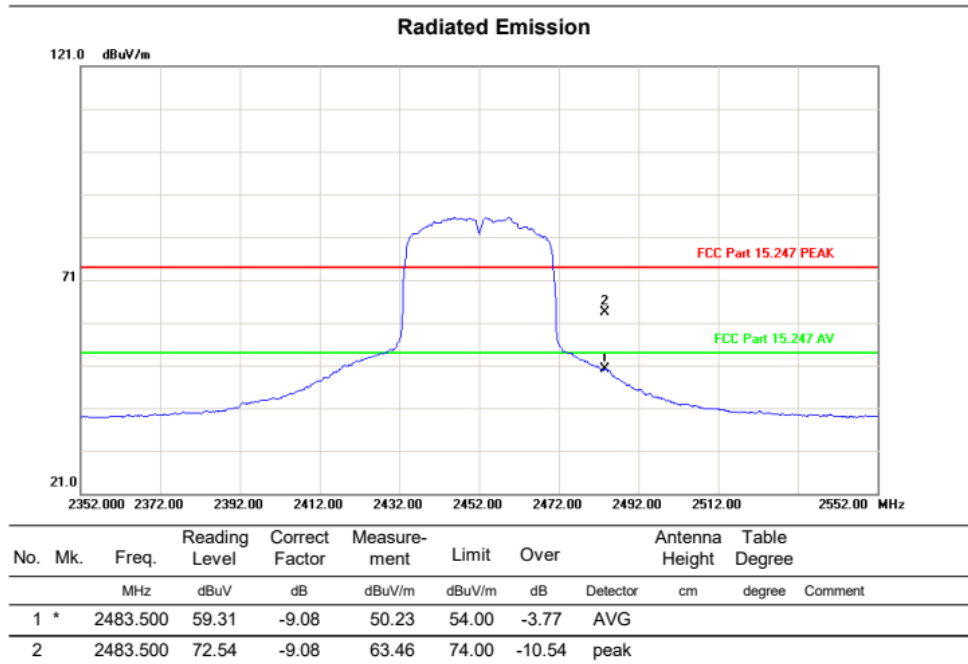


Above 1G (1GHz~26.5GHz)

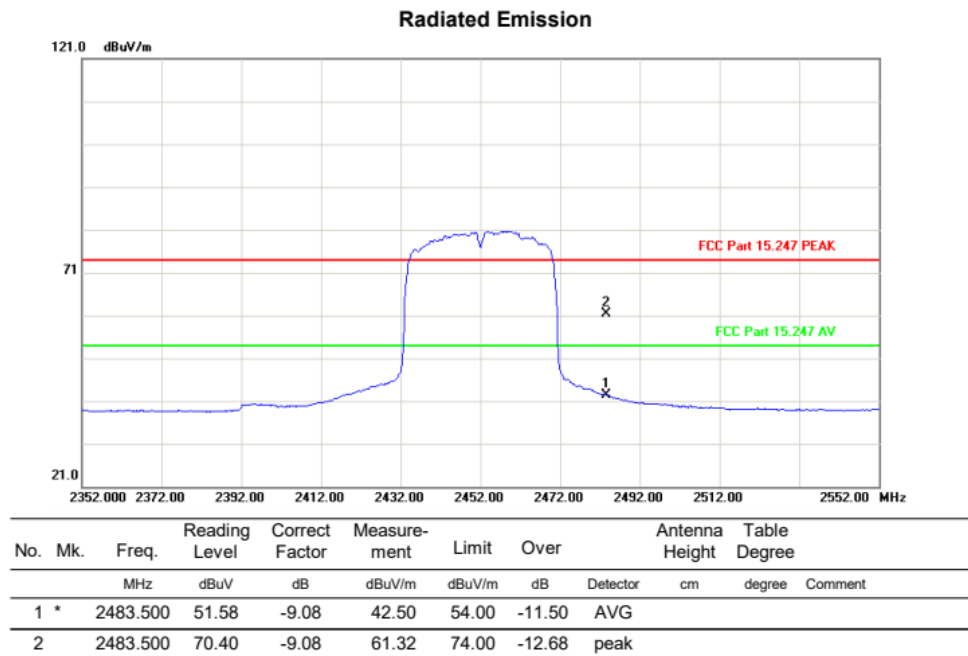
Test mode: 11N40SISO

Test Channel:9

VERTICAL



HORIZONTAL



3.3 Conducted Band Edge

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	Record PC	Lenovo	M4500T	NA
2	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	

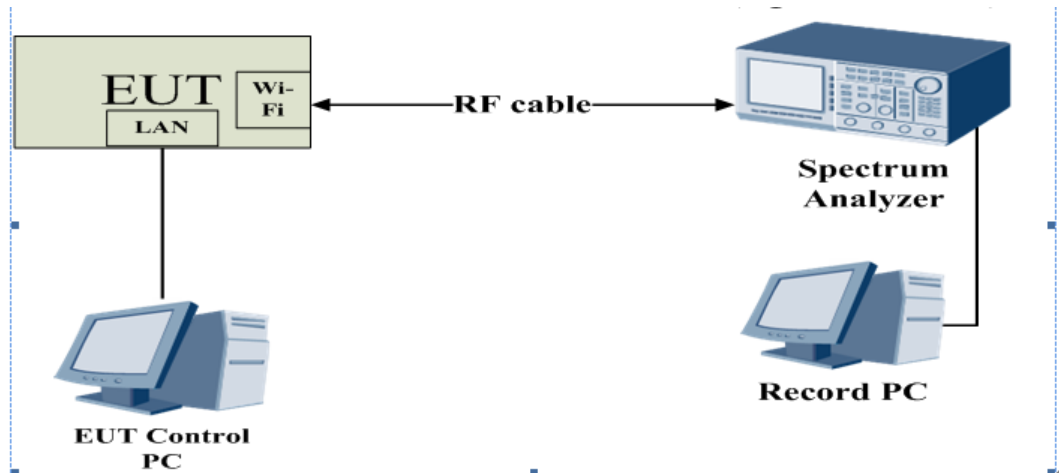
a) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

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
N dB down	20
Trace Mode	Max Hold
Sweep Time	Auto Couple

- c) Allow trace to full stabilize.
- d) Use the peak marker function to determine the maximum power level in any 100kHz band segment within the fundamental EBW.

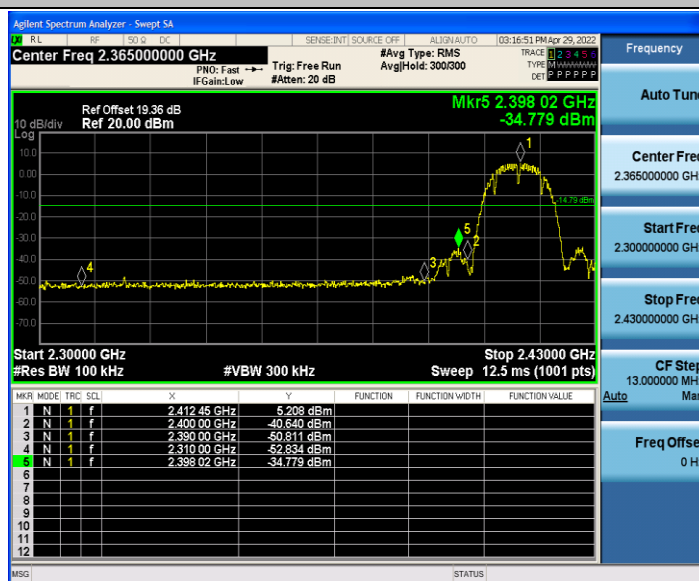
3.3.4 Test Setup



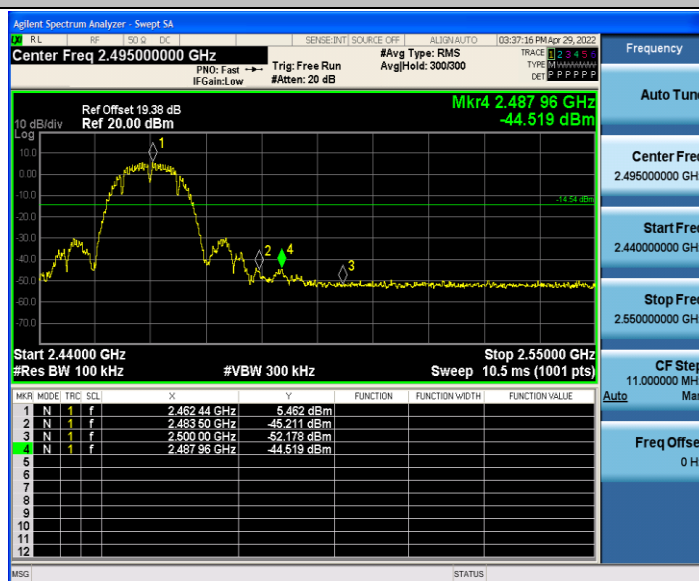
3.3.5 The Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	5.21	-34.78	≤-14.79	PASS
		High	2462	5.46	-44.52	≤-14.54	PASS
11G	Ant1	Low	2412	9.00	-16.12	≤-11.01	PASS
		High	2462	7.91	-29.46	≤-12.09	PASS
11N20SISO	Ant1	Low	2412	11.33	-16.58	≤-8.67	PASS
		High	2462	9.79	-29.31	≤-10.21	PASS
11N40SISO	Ant1	Low	2422	3.50	-23.41	≤-16.5	PASS
		High	2452	2.84	-27.49	≤-17.17	PASS

11B_Ant1_Low_2412



11B_Ant1_High_2462



11G_Ant1_Low_2412



11G_Ant1_High_2462



11N20SISO_Ant1_Low_2412



11N20SISO_Ant1_High_2462



11N40SISO_Ant1_Low_2422



11N40SISO_Ant1_High_2452



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	Record PC	Lenovo	M4500T	NA
2	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:

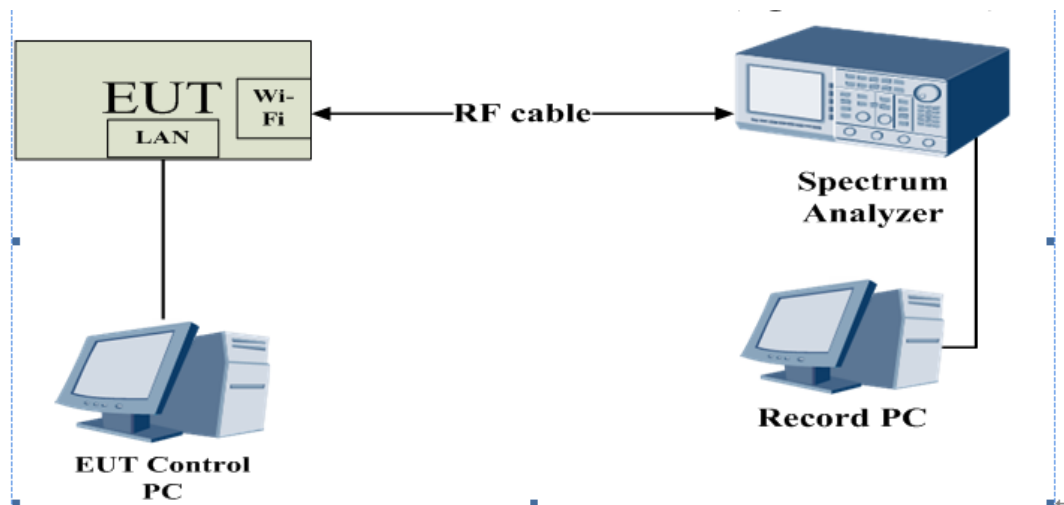
Centre Frequency	The centre frequency of the channel under test
RBW	100kHz
VBW	300kHz
Frequency span	2x Nominal Channel Bandwidth
Detector Mode	Peak
Trace Mode	Max Hold
Sweep Time	Auto Couple

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
11B	Ant1	2412	11.080	2406.920	2418.000	0.5	PASS
		2437	12.000	2430.960	2442.960	0.5	PASS
		2462	11.040	2455.960	2467.000	0.5	PASS
11G	Ant1	2412	14.200	2404.400	2418.600	0.5	PASS
		2437	13.360	2430.240	2443.600	0.5	PASS
		2462	14.560	2454.440	2469.000	0.5	PASS
11N20SISO	Ant1	2412	15.040	2404.440	2419.480	0.5	PASS
		2437	15.120	2429.400	2444.520	0.5	PASS
		2462	15.080	2454.440	2469.520	0.5	PASS
11N40SISO	Ant1	2422	31.280	2406.960	2438.240	0.5	PASS
		2437	34.960	2419.480	2454.440	0.5	PASS
		2452	31.360	2436.880	2468.240	0.5	PASS

11B_Ant1_2412



11B_Ant1_2437



11B_Ant1_2462