

# TEST REPORT

Product Name: LCD Digital Signage Advertising Display  
FCC ID: 2AYBQWDAF-T1  
Trademark: N/A  
Model Number: WDAF-T1, WDAF-N1, WDAW-T1, WDAW-N1, WDAF-T2, WDAF-N2, WDAW-T2, WDAW-N2, WDOF-T1, WDOF-N1, WDOF-T2, WDOF-N2, WDOF-T1, WDOF-N1, WDOF-T2, WDOF-N2, WDAF-N1PB, WDAF-N1HS  
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Sample Received Date: Nov. 03, 2020  
Sample tested Date: Nov. 03, 2020 to Nov. 15, 2020  
Issue Date: Nov. 15, 2020  
Report No.: CTB201105007RFX  
Test Standards: FCC Part15.247  
ANSI C63.10:2013  
Test Results: PASS  
Remark: This is WIFI-2.4GHz band radio test report.

Compiled by:

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Reviewed by:

Bin Mei

Approved by:

Rita Xiao / Director

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*(Note: N/A means not applicable)*

## 1. VERSION

Report No.	Issue Date	Description	Approved
CTB201105007RFX	Nov. 15, 2020	Original	Valid

## 2. TEST SUMMARY

The Product has been tested according to the following specifications:

Test Item	Test Requirement	Test method	Result
<b>AC Power Line Conducted Emission</b>	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS
<b>Radiated Spurious emissions</b>	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS
<b>Band edge and RF Conducted Spurious Emissions</b>	47 CFR Part 15 Subpart C Section 15.247(d)/15.205(a)	ANSI C63.10-2013	PASS
<b>Conducted Peak Output Power</b>	47 CFR Part 15 Subpart C Section 15.247 (b)(3)	ANSI C63.10-2013	PASS
<b>6dB Occupied Bandwidth</b>	47 CFR Part 15 Subpart C Section 15.247 (a)(2)	ANSI C63.10-2013	PASS
<b>Power Spectral Density</b>	47 CFR Part 15 Subpart C Section 15.247 (e)	ANSI C63.10-2013/ KDB 558074 D01v04	PASS
<b>Antenna Requirement</b>	47 CFR Part 15 Subpart C Section 15.203/15.247 (c)	ANSI C63.10-2013	PASS
<b>RF Exposure Evaluation</b>	47 CFR Part 15 Subpart C Section 15.247 (i)/1.1310/2.1093	KDB447498D01v06	PASS

Remark:

Test according to ANSI C63.4-2014 & ANSI C63.10-2013.

### 3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

Item	Uncertainty
Occupancy bandwidth	$U=\pm 54.3\text{Hz}$
Conducted output power Above 1G	$U=\pm 1.0\text{dB}$
Conducted output power below 1G	$U=\pm 0.9\text{dB}$
Power Spectral Density , Conduction	$U=\pm 1.0\text{dB}$
Conduction spurious emissions	$U=\pm 2.8\text{dB}$
Out of band emission	$U=\pm 54\text{Hz}$
3m chamber Radiated spurious emission(30MHz-1GHz)	$U=\pm 4.3\text{dB}$
3m chamber Radiated spurious emission(1GHz-18GHz)	$U=\pm 4.5\text{dB}$
humidity uncertainty	$U=\pm 5.3\%$
Temperature uncertainty	$U=\pm 0.59^{\circ}\text{C}$
Supply voltages	$U=\pm 3\%$
Time	$U=\pm 5\%$

## 4. PRODUCT INFORMATION AND TEST SETUP

### 4.1 Product Information

Model(s):	WDAF-T1, WDAF-N1, WDAW-T1, WDAW-N1, WDAF-T2, WDAF-N2, WDAW-T2, WDAW-N2, WDOF-T1, WDOF-N1, WDOF-T1, WDOF-N1, WDOF-T2, WDOF-N2, WDOF-T2, WDOF-N2, WDAF-N1PB, WDAF-N1HS
Model Description:	All model's the function, software and electric circuit are the same, only with the product size and model named different. Test sample model: WDAF-T1
Wi-Fi Specification:	IEEE 802.11b/g/n
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	WiFi: IEEE 802.11b/g/n 20: 2412-24762MHz/ 11 channel WiFi: IEEE 802.11n 40: 2422-24752MHz/ 7 channel
Max. RF output power:	WiFi (2.4G) : 7.564dBm
Type of Modulation:	WiFi: DSSS, OFDM
Antenna installation:	WiFi: External Antenna
Antenna Gain:	WiFi (2.4G) : 1dBi
Ratings:	INPUT: AC 100-240V, 50/60Hz OUTPUT:DC12V, 6.0A

### 4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

### 4.3 Support Equipment

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note

**Notes:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

### 4.4 Channel List

CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)
1	2412	2	2417	3	2422	4	2427
5	2432	6	2437	7	2442	8	2447
9	2452	10	2457	11	2462		

### 4.5 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test mode	Low channel	Middle channel	High channel
Transmitting(802.11b/g/n20)	2412MHz	2437MHz	2462MHz
Transmitting(802.11n40)	2422MHz	2437MHz	2452MHz

NOTE: DutyCycle>98%.

### 4.6 Test Environment

Humidity(%):	55
Atmospheric Pressure(kPa):	101.1
Normal Voltage(AC):	120
Normal Temperature(°C)	25
Low Temperature(°C)	0
High Temperature(°C)	40



## 5. TEST FACILITY AND TEST INSTRUMENT USED

### 5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Street, Baoan District, Shenzhen China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

### 5.2 Test Instrument Used

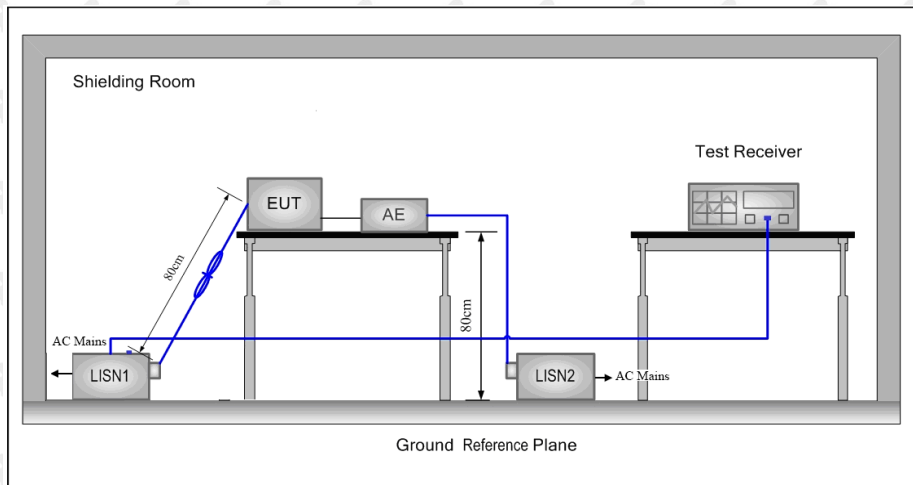
Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	Oct. 17, 2020	Oct. 16, 2021
2	Power Sensor	Agilent	U2021XA	MY56120032	Nov. 02, 2020	Nov. 01, 2021
3	Power Sensor	Agilent	U2021XA	MY56120034	Nov. 02, 2020	Nov. 01, 2021
4	Communication test set	R&S	CMW500	118735	Nov. 02, 2020	Nov. 01, 2021
5	Spectrum Analyzer	R&S	FSP40	100550	Nov. 02, 2020	Nov. 01, 2021
6	Signal Generator	Agilent	N5181A	MY49060920	Nov. 02, 2020	Nov. 01, 2021
7	Signal Generator	Agilent	N5182A	MY47420195	Nov. 02, 2020	Nov. 01, 2021
8	Communication test set	R&S	CMU200	119978	Nov. 02, 2020	Nov. 01, 2021
9	band rejection filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	Nov. 02, 2020	Nov. 01, 2021
10	band rejection filter	Shenxiang	MSF5150-5850MS-1155	20181015001	Nov. 02, 2020	Nov. 01, 2021
11	band rejection filter	Xingbo	XBLBQ-DZA120	190821-1-1	Nov. 02, 2020	Nov. 01, 2021
12	BT&WI-FI Automatic test software	Microwave	MTS8310	Ver. 2.0.0.0	\	\
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	Nov. 02, 2020	Nov. 01, 2021
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	Nov. 02, 2020	Nov. 01, 2021

15	234G Automatic test software	Microwave	MTS8200	Ver. 2.0.0.0	\	\
16	966 chamber	C.R.T.	966 Room	966	Nov. 10, 2020	Nov. 09, 2021
17	Receiver	R&S	ESPI	100362	Nov. 02, 2020	Nov. 01, 2021
18	Amplifier	HP	8447E	2945A02747	Nov. 03, 2020	Nov. 02, 2021
19	Amplifier	Agilent	8449B	3008A01838	Nov. 03, 2020	Nov. 02, 2021
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	869	Nov. 02, 2020	Nov. 01, 2021
21	Horn Antenna	Schwarzbeck	BBHA9120D	1911	Nov. 02, 2020	Nov. 01, 2021
22	Software	Fala	EZ-EMC	FA-03A2 RE	\	\
23	3-Loop Antenna	Daze	ZN30401	17014	Nov. 02, 2020	Nov. 01, 2021
24	loop antenna	ZHINAN	ZN30900A	/	Nov. 02, 2020	Nov. 01, 2021
25	Horn antenna	A/H/System	SAS-574	588	Nov. 02, 2020	Nov. 01, 2021
26	Amplifier	AEROFLEX	/	S/N/ 097	Nov. 02, 2020	Nov. 01, 2021

Conducted emissions Test						
27	Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
28	AMN	ROHDE&SC HWARZ	ESH3-Z5	831551852	Nov. 02, 2020	Nov. 01, 2021
29	Pulse limiter	ROHDE&SC HWARZ	ESH3Z2	357881052	Nov. 02, 2020	Nov. 01, 2021
30	EMI TEST RECEIVER	ROHDE&SC HWARZ	ESCS30	834115/006	Nov. 02, 2020	Nov. 01, 2021
31	Coaxial cable	ZDECL	Z302S	18091904	Nov. 02, 2020	Nov. 01, 2021
32	ISN	TESEQ	NTFM8158	NTFM8158# 183	Nov. 02, 2020	Nov. 01, 2021
33	EMI TEST RECEIVER	ROHDE&SC HWARZ	ESCI	10428	Nov. 02, 2020	Nov. 01, 2021
34	Software	Fala	EZ-EMC	EMC-CON 3A1.1	\	\

## 6. AC POWER LINE CONDUCTED EMISSION

### 6.1 Block Diagram Of Test Setup



### 6.2 Limit

Frequency (MHz)	Maximum RF Line Voltage (dB $\mu$ V)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

\* Decreasing linearly with the logarithm of the frequency

### 6.3 Test procedure

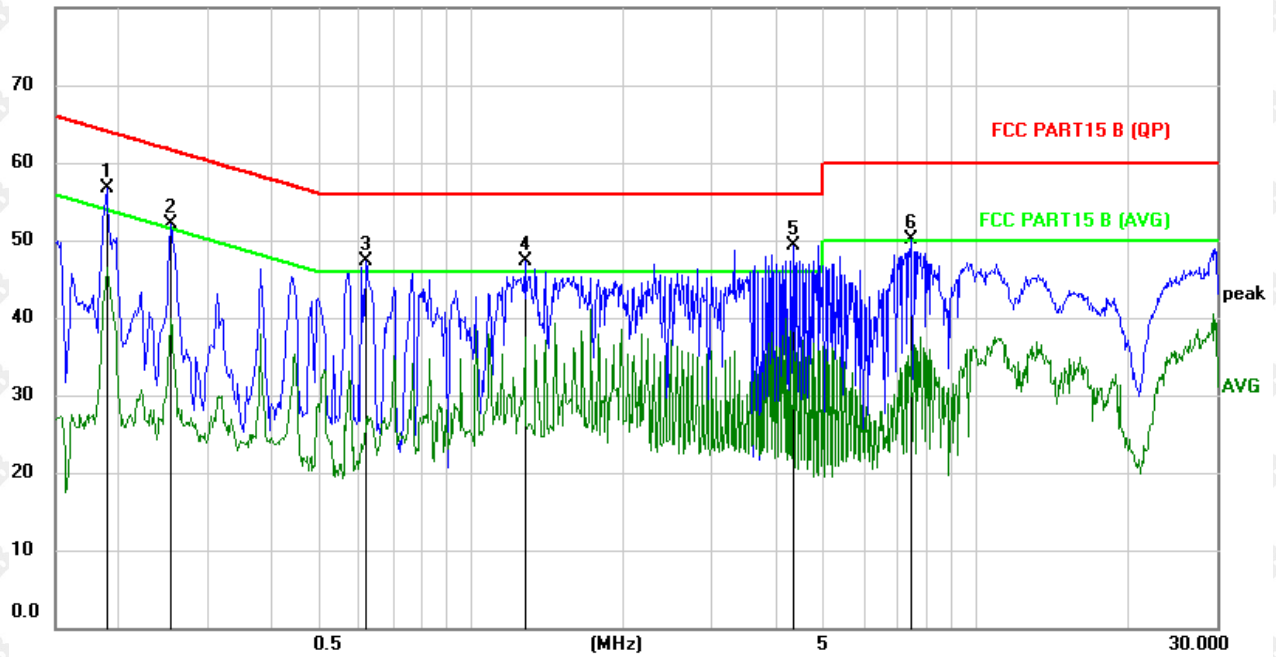
- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50 $\Omega$ /50 $\mu$ H + 5 $\Omega$  linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0,4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This

distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0,8 m from the LISN 2.

- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

### 6.4 Test Result

Test Specification: Line  
AC 120V 60Hz  
80.0 dBuV



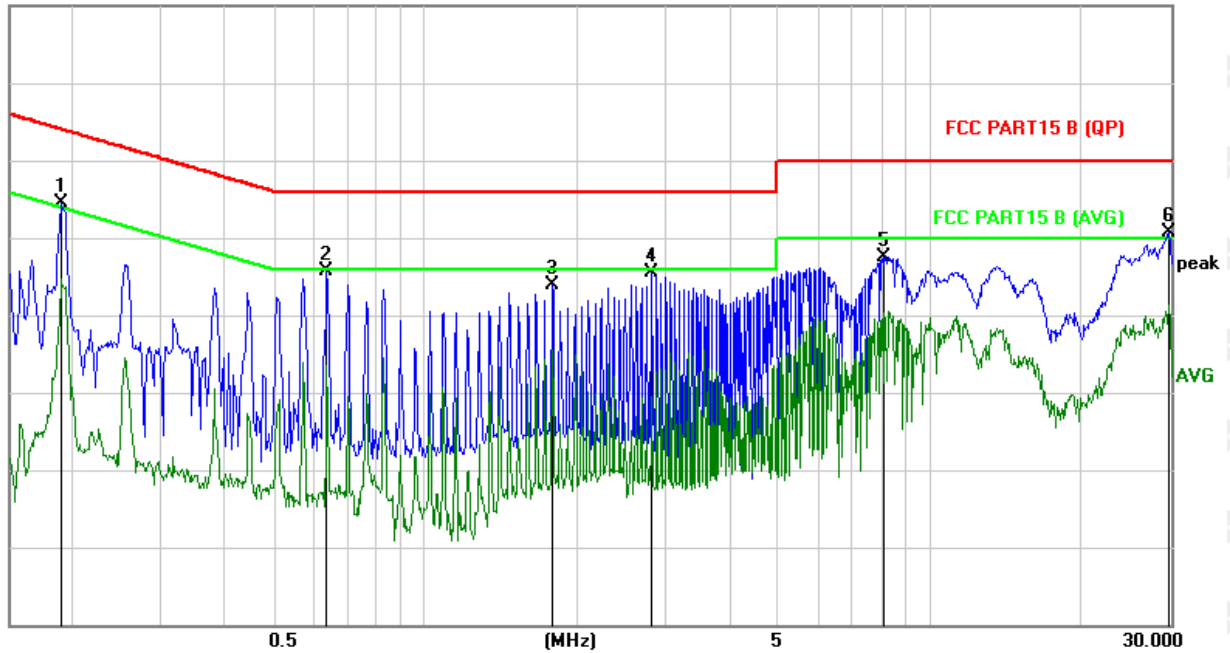
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector
1		0.1900	46.44	10.22	56.66	64.04	-7.38	peak
2		0.2540	41.95	10.18	52.13	61.63	-9.50	peak
3		0.6180	37.17	10.07	47.24	56.00	-8.76	peak
4		1.2820	36.98	10.23	47.21	56.00	-8.79	peak
5	*	4.3459	38.93	10.36	49.29	56.00	-6.71	peak
6		7.4100	39.63	10.47	50.10	60.00	-9.90	peak

Remark:

Factor = Cable loss + LISN factor, Margin = Measurement – Limit

Test Specification: Neutral  
AC 120V 60Hz

80.0 dBuV



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector
1		0.1900	44.40	10.11	54.51	64.04	-9.53	peak
2		0.6380	35.49	10.23	45.72	56.00	-10.28	peak
3		1.7900	33.81	10.13	43.94	56.00	-12.06	peak
4		2.8100	35.21	10.23	45.44	56.00	-10.56	peak
5		8.1139	36.95	10.58	47.53	60.00	-12.47	peak
6	*	29.7620	39.95	10.66	50.61	60.00	-9.39	peak

Remark:

Factor = Cable loss + LISN factor, Margin = Measurement – Limit

## 7. RADIATED SPURIOUS EMISSION

### 7.1 Block Diagram Of Test Setup

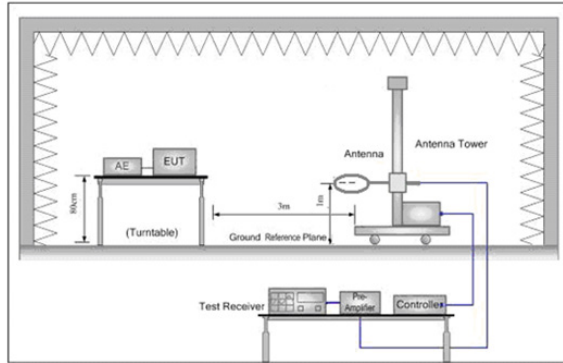


Figure 1. Below 30MHz

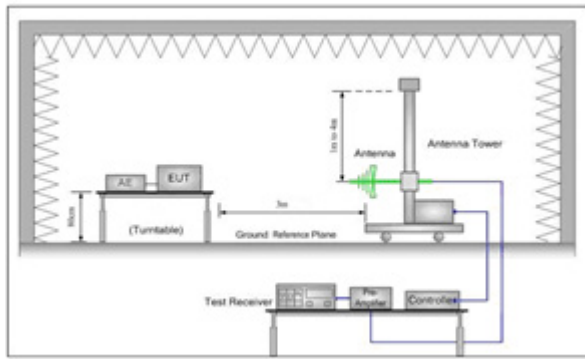


Figure 2. 30MHz to 1GHz

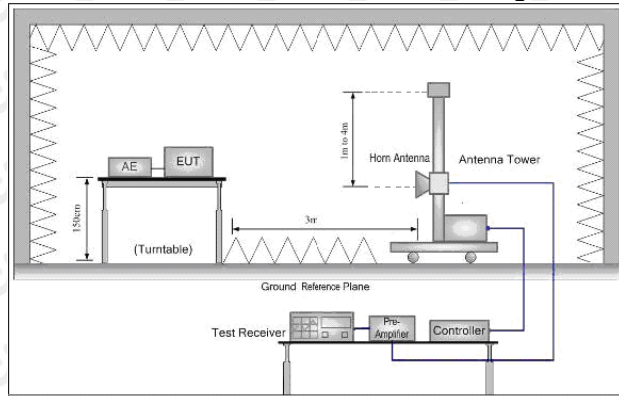


Figure 3. Above 1GHz

### 7.2 Limit

Spurious Emissions:

Frequency	Field strength (microvolt/meter)	Limit (dB $\mu$ V/m )	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F (kHz)	-	-	300
0.490MHz-1.705MHz	24000/F (kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

### 7.3 Test procedure

**Below 1GHz test procedure as below:**

- a.The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b.The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c.The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d.For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e.The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f.If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

**Above 1GHz test procedure as below:**

- g.Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter( Above 18GHz the distance is 1 meter and table is 1.5 meter).
- h.Test the EUT in the lowest channel ,the middle channel ,the Highest channel
- j.Repeat above procedures until all frequencies measured was complete.

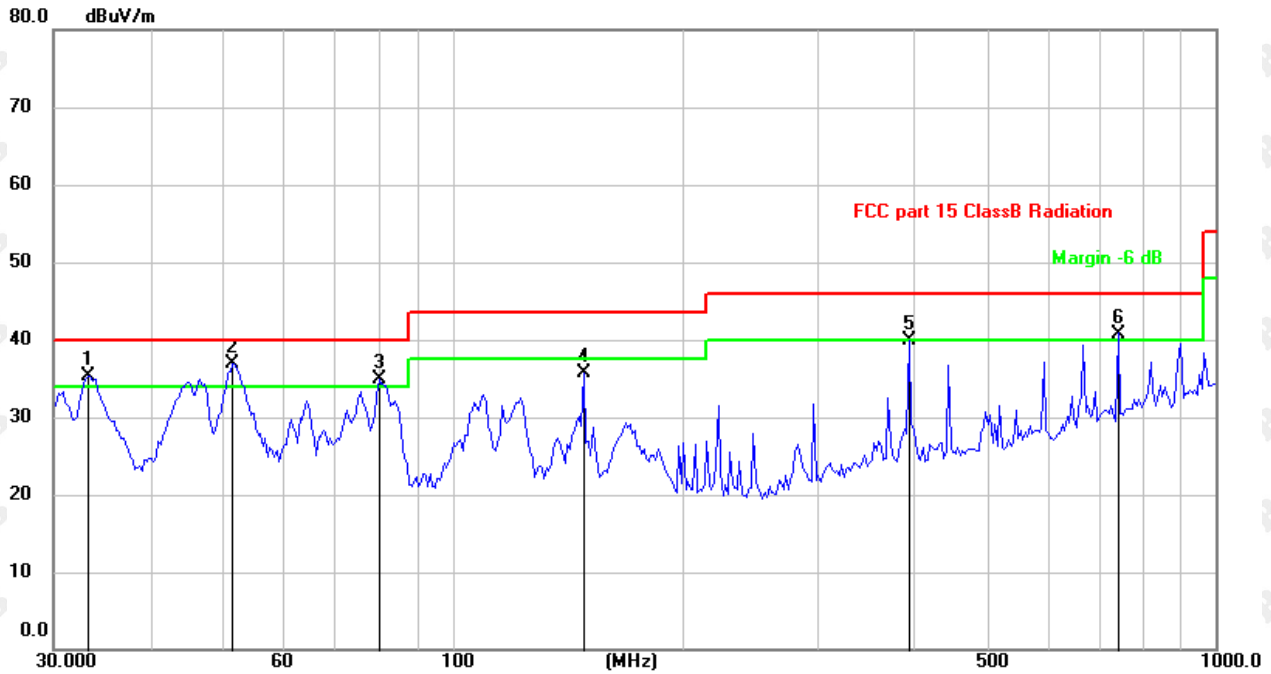
Receiver set:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30KHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30KHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30KHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30KHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30KHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120 kHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average



## 7.4 Test Result

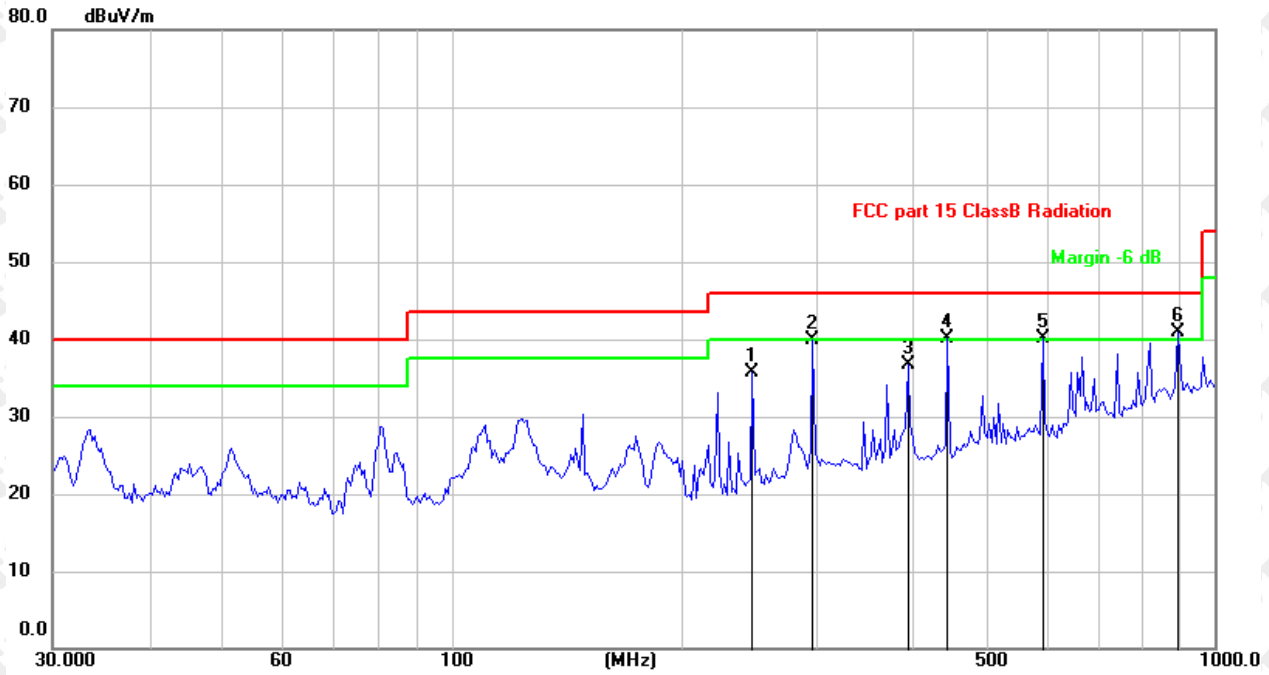
Below 1GHz Test Results:  
Antenna polarity: H



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Margin dB	Detector
1	!	33.3278	42.33	-7.00	35.33	40.00	-4.67	QP
2	*	51.4806	43.05	-6.20	36.85	40.00	-3.15	QP
3	!	80.0805	45.39	-10.44	34.95	40.00	-5.05	QP
4		148.4410	41.99	-6.34	35.65	43.50	-7.85	QP
5		396.2412	42.20	-2.24	39.96	46.00	-6.04	QP
6	!	744.8659	36.02	4.78	40.80	46.00	-5.20	QP

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit - Level

Antenna polarity: V



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Margin dB	Detector
1		247.6818	42.50	-6.85	35.65	46.00	-10.35	QP
2		297.2238	45.63	-5.72	39.91	46.00	-6.09	QP
3		396.2412	38.91	-2.24	36.67	46.00	-9.33	QP
4	!	446.4139	41.38	-1.37	40.01	46.00	-5.99	QP
5	!	595.1326	38.16	1.95	40.11	46.00	-5.89	QP
6	*	893.8564	33.95	6.89	40.84	46.00	-5.16	QP

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

## Above 1 GHz Test Results:

LOW CH1 (802.11b Mode)/2412

Horizontal:

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
4824	63.76	-3.64	60.12	74	-13.88	peak
4824	50.44	-3.64	46.80	54	-7.20	AVG
7236	59.63	-0.95	58.68	74	-15.32	peak
7236	45.50	-0.95	44.55	54	-9.45	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,  
Margin = Emission level - Limits

Vertical:

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
4824	66.77	-3.64	63.13	74	-10.87	peak
4824	48.66	-3.64	45.02	54	-8.98	AVG
7236	58.18	-0.95	57.23	74	-16.77	peak
7236	45.61	-0.95	44.66	54	-9.34	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,  
Margin = Emission level - Limits

MID CH6 (802.11b Mode)/2437

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4874	63.88	-3.51	60.37	74	-13.63	peak
4874	48.50	-3.51	44.99	54	-9.01	AVG
7311	58.68	-0.82	57.86	74	-16.14	peak
7311	45.96	-0.82	45.14	54	-8.86	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4874	63.53	-3.51	60.02	74	-13.98	peak
4874	47.46	-3.51	43.95	54	-10.05	AVG
7311	59.12	-0.82	58.30	74	-15.70	peak
7311	44.73	-0.82	43.91	54	-10.09	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

HIGH CH11 (802.11b Mode)/2462

Horizontal:

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
4924	62.18	-3.43	58.75	74	-15.25	peak
4924	48.19	-3.43	44.76	54	-9.24	AVG
7386	57.94	-0.75	57.19	74	-16.81	peak
7386	42.34	-0.75	41.59	54	-12.41	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
4924	63.90	-3.43	60.47	74	-13.53	peak
4924	48.05	-3.43	44.62	54	-9.38	AVG
7386	56.55	-0.75	55.80	74	-18.20	peak
7386	41.18	-0.75	40.43	54	-13.57	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Remark:

- (1) Measuring frequencies from 1 GHz to the 25 GHz.
- (2) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (3) Data of measurement within this frequency range shown "----" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.

LOW CH1 (802.11g Mode)/2412

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4824	66.03	-3.64	62.39	74	-11.61	peak
4824	48.84	-3.64	45.20	54	-8.80	AVG
7236	57.38	-0.95	56.43	74	-17.57	peak
7236	45.14	-0.95	44.19	54	-9.81	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4824	65.75	-3.64	62.11	74	-11.89	peak
4824	49.24	-3.64	45.60	54	-8.40	AVG
7236	59.61	-0.95	58.66	74	-15.34	peak
7236	44.81	-0.95	43.86	54	-10.14	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

MID CH6 (802.11g Mode)/2437

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4874	63.64	-3.51	60.13	74	-13.87	peak
4874	48.85	-3.51	45.34	54	-8.66	AVG
7311	60.35	-0.82	59.53	74	-14.47	peak
7311	44.30	-0.82	43.48	54	-10.52	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4874	63.26	-3.51	59.75	74	-14.25	peak
4874	47.05	-3.51	43.54	54	-10.46	AVG
7311	56.53	-0.82	55.71	74	-18.29	peak
7311	41.92	-0.82	41.10	54	-12.90	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

HIGH CH11 (802.11g Mode)/2462

Horizontal:

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
4924	64.75	-3.43	61.32	74	-12.68	peak
4924	47.41	-3.43	43.98	54	-10.02	AVG
7386	56.55	-0.75	55.80	74	-18.20	peak
7386	42.58	-0.75	41.83	54	-12.17	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
4924	63.69	-3.43	60.26	74	-13.74	peak
4924	47.88	-3.43	44.45	54	-9.55	AVG
7386	57.93	-0.75	57.18	74	-16.82	peak
7386	42.36	-0.75	41.61	54	-12.39	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Remark:

- (1) Measuring frequencies from 1 GHz to the 25 GHz.
- (2) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (3) Data of measurement within this frequency range shown “---” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to be completed.



## LOW CH1 (802.11n/H20 Mode)/2412

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4824	64.16	-3.64	60.52	74	-13.48	peak
4824	48.08	-3.64	44.44	54	-9.56	AVG
7236	56.93	-0.95	55.98	74	-18.02	peak
7236	43.35	-0.95	42.40	54	-11.60	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4824	64.54	-3.64	60.90	74	-13.10	peak
4824	46.38	-3.64	42.74	54	-11.26	AVG
7236	58.26	-0.95	57.31	74	-16.69	peak
7236	44.26	-0.95	43.31	54	-10.69	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

MID CH6 (802.11n/H20 Mode)/2437

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4874.00	64.01	-3.51	60.50	74.00	-13.50	peak
4874.00	48.06	-3.51	44.55	54.00	-9.45	AVG
7311.00	57.94	-0.82	57.12	74.00	-16.88	peak
7311.00	44.16	-0.82	43.34	54.00	-10.66	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4874.00	64.20	-3.51	60.69	74.00	-13.31	peak
4874.00	47.00	-3.51	43.49	54.00	-10.51	AVG
7311.00	59.18	-0.82	58.36	74.00	-15.64	peak
7311.00	42.19	-0.82	41.37	54.00	-12.63	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

HIGH CH11 (802.11n/H20 Mode)/2462

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4924	61.66	-3.43	58.23	74	-15.77	peak
4924	47.81	-3.43	44.38	54	-9.62	AVG
7386	57.83	-0.75	57.08	74	-16.92	peak
7386	41.97	-0.75	41.22	54	-12.78	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4924	63.58	-3.43	60.15	74	-13.85	peak
4924	47.34	-3.43	43.91	54	-10.09	AVG
7386	57.89	-0.75	57.14	74	-16.86	peak
7386	43.05	-0.75	42.30	54	-11.70	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

LOW CH3 (802.11n/H40 Mode)/2422

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4844	63.07	-3.63	59.44	74	-14.56	peak
4844	49.12	-3.63	45.49	54	-8.51	AVG
7266	58.44	-0.94	57.50	74	-16.50	peak
7266	44.00	-0.94	43.06	54	-10.94	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4844	65.58	-3.63	61.95	74	-12.05	peak
4844	49.29	-3.63	45.66	54	-8.34	AVG
7266	59.18	-0.94	58.24	74	-15.76	peak
7266	44.25	-0.94	43.31	54	-10.69	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

MID CH6 (802.11n/H40 Mode)/2437

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4874	64.40	-3.51	60.89	74	-13.11	peak
4874	48.08	-3.51	44.57	54	-9.43	AVG
7311	59.18	-0.82	58.36	74	-15.64	peak
7311	46.38	-0.82	45.56	54	-8.44	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4874	62.32	-3.51	58.81	74	-15.19	peak
4874	46.49	-3.51	42.98	54	-11.02	AVG
7311	56.65	-0.82	55.83	74	-18.17	peak
7311	43.35	-0.82	42.53	54	-11.47	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

HIGH CH9 (802.11n/H40 Mode)/2452

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4904	64.52	-3.43	61.09	74	-12.91	peak
4904	48.58	-3.43	45.15	54	-8.85	AVG
7356	57.41	-0.75	56.66	74	-17.34	peak
7356	43.69	-0.75	42.94	54	-11.06	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4904	62.12	-3.43	58.69	74	-15.31	peak
4904	46.60	-3.43	43.17	54	-10.83	AVG
7356	57.23	-0.75	56.48	74	-17.52	peak
7356	44.40	-0.75	43.65	54	-10.35	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Remark:

- (1) Measuring frequencies from 1 GHz to the 25 GHz.
- (2) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (3) Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.

### Restricted bands around fundamental frequency (Radiated)

Operation Mode:  
802.11b Mode TX CH Low (2412MHz)

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
2390	57.32	-5.81	51.51	74	-22.49	peak
2390	/	-5.81	/	54	/	AVG
2399	64.97	-5.84	59.13	74	-14.87	peak
2399	49.16	-5.84	43.32	54	-10.68	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,  
Margin = Emission level - Limits

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
2390	56.48	-5.81	50.67	74	-23.33	peak
2390	/	-5.81	/	54	/	AVG
2399	61.65	-5.84	55.81	74	-18.19	peak
2399	47.79	-5.84	41.95	54	-12.05	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,  
Margin = Emission level - Limits

Operation Mode: TX CH High (2462MHz)

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	56.04	-5.65	50.39	74	-23.61	peak
2483.5	/	-5.65	/	54	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	56.78	-5.65	51.13	74	-22.87	peak
2483.5	/	-5.65	/	54	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.



Operation Mode: 802.11g Mode TX CH Low (2412MHz)

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
2390	58.60	-5.81	52.79	74	-21.21	peak
2390	/	-5.81	/	54	/	AVG
2399	62.37	-5.84	56.53	74	-17.47	peak
2399	46.87	-5.84	41.03	54	-12.97	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,  
Margin = Emission level - Limits

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
2390	57.38	-5.81	51.57	74	-22.43	peak
2390	/	-5.81	/	54	/	AVG
2399	61.81	-5.84	55.97	74	-18.03	peak
2399	46.75	-5.84	40.91	54	-13.09	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,  
Margin = Emission level - Limits

Operation Mode: TX CH High (2462MHz)

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	56.69	-5.65	51.04	74	-22.96	peak
2483.5	/	-5.65	/	54	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,  
Margin = Emission level - Limits

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	57.93	-5.65	52.28	74	-21.72	peak
2483.5	/	-5.65	/	54	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,  
Margin = Emission level - Limits

Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.

Operation Mode: 802.11n/H20 Mode TX CH Low (2412MHz)

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
2390	56.15	-5.81	50.34	74	-23.66	peak
2390	/	-5.81	/	54	/	AVG
2399	62.58	-5.84	56.74	74	-17.26	peak
2399	47.60	-5.84	41.76	54	-12.24	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,  
Margin = Emission level - Limits

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
2390	55.82	-5.81	50.01	74	-23.99	peak
2390	/	-5.81	/	54	/	AVG
2399	59.83	-5.84	53.99	74	-20.01	peak
2399	46.99	-5.84	41.15	54	-12.85	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,  
Margin = Emission level - Limits

Operation Mode: TX CH High (2462MHz)

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
2483.5	57.37	-5.65	51.72	74	-22.28	peak
2483.5	/	-5.65	/	54	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,  
Margin = Emission level - Limits

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
2483.5	56.85	-5.65	51.20	74	-22.80	peak
2483.5	/	-5.65	/	54	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,  
Margin = Emission level - Limits

Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.

Operation Mode: 802.11n/H40 Mode TX CH Low (2422MHz)

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2390	58.17	-5.81	52.36	74	-21.64	peak
2390	/	-5.81	/	54	/	AVG
2399	63.10	-5.84	57.26	74	-16.74	peak
2399	46.01	-5.84	40.17	54	-13.83	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,  
Margin = Emission level - Limits

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2390	58.70	-5.81	52.89	74	-21.11	peak
2390	/	-5.81	/	54	/	AVG
2399	62.05	-5.84	56.21	74	-17.79	peak
2399	45.65	-5.84	39.81	54	-14.19	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,  
Margin = Emission level - Limits

Operation Mode: TX CH High (2452MHz)

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
2483.5	57.26	-5.65	51.61	74	-22.39	peak
2483.5	/	-5.65	/	54	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,  
Margin = Emission level - Limits

Vertical:

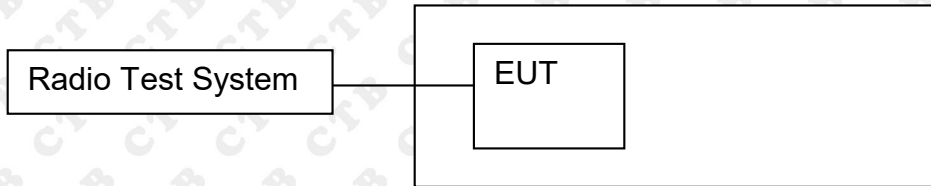
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
2483.5	56.38	-5.65	50.73	74	-23.27	peak
2483.5	/	-5.65	/	54	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,  
Margin = Emission level - Limits

Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.

## 8. BAND EDGE AND RF CONDUCTED SPURIOUS EMISSIONS

### 8.1 Block Diagram Of Test Setup



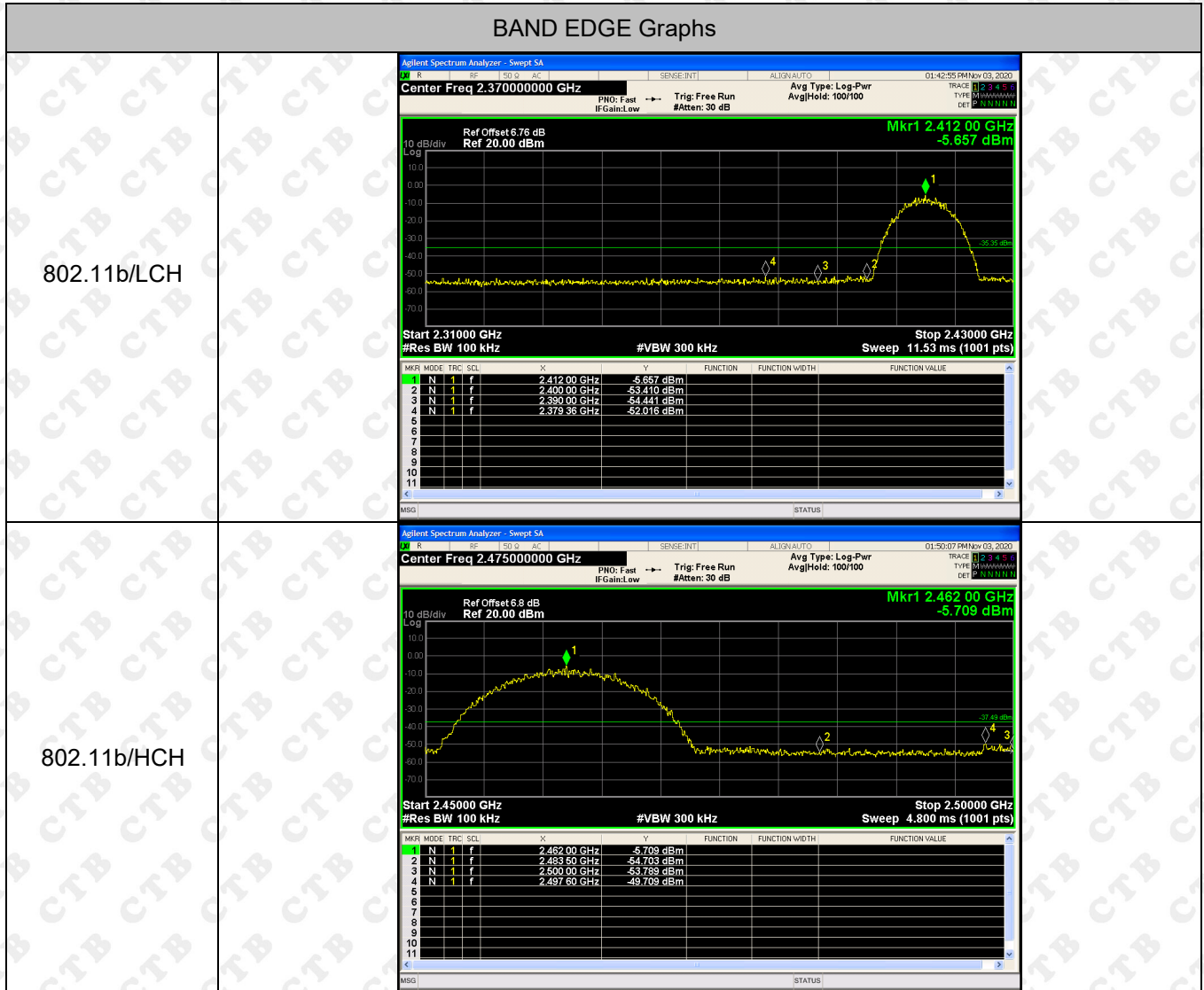
### 8.2 Limit

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 conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### 8.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer:  
Below 30MHz:  
RBW = 100kHz, VBW = 300kHz, Sweep = auto  
Detector function = peak, Trace = max hold  
Above 30MHz:  
RBW = 100KHz, VBW = 300KHz, Sweep = auto  
Detector function = peak, Trace = max hold

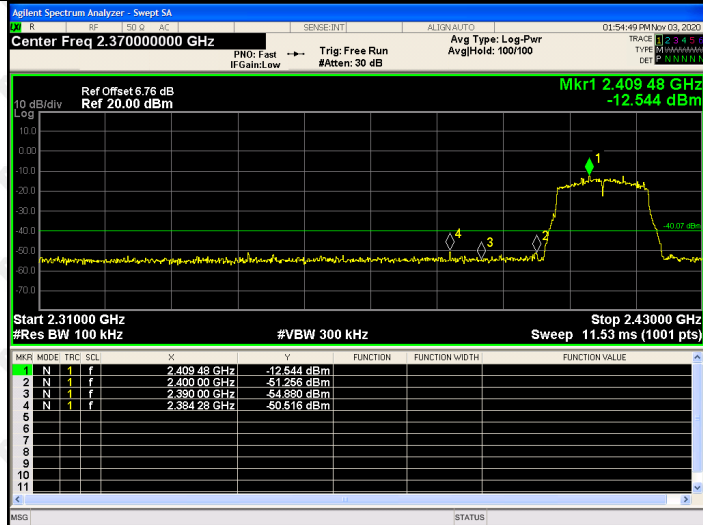
### 8.4 Test Result



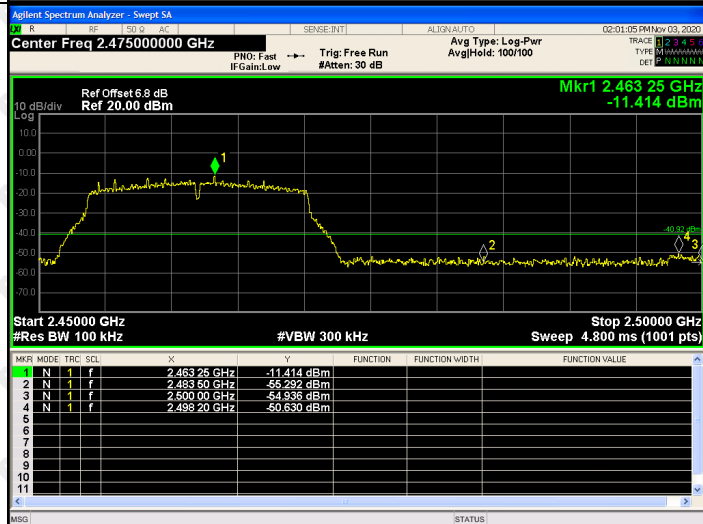


BAND EDGE Graphs

802.11g/LCH

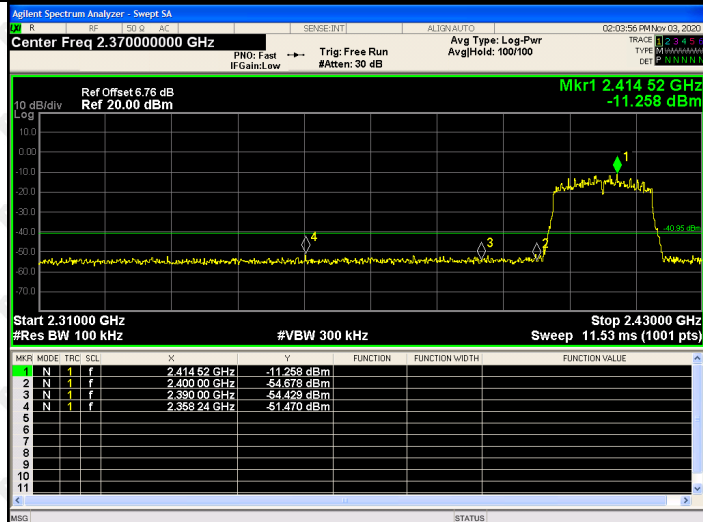


802.11g/HCH

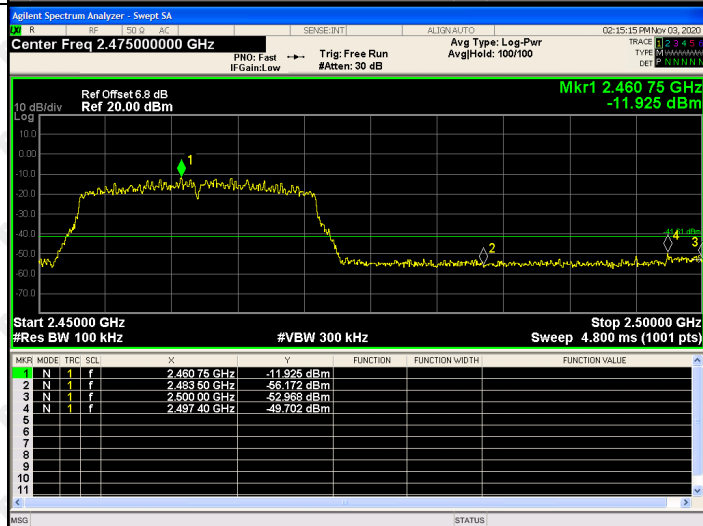


BAND EDGE Graphs

802.11n(HT20)/L  
CH

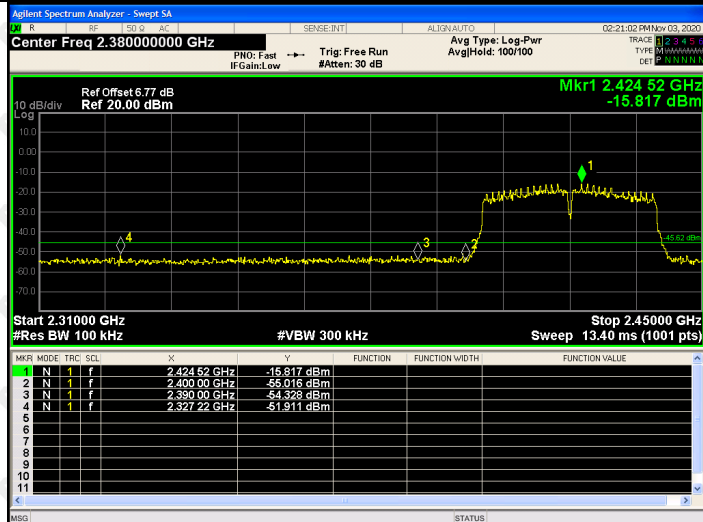


802.11n(HT20)/H  
CH

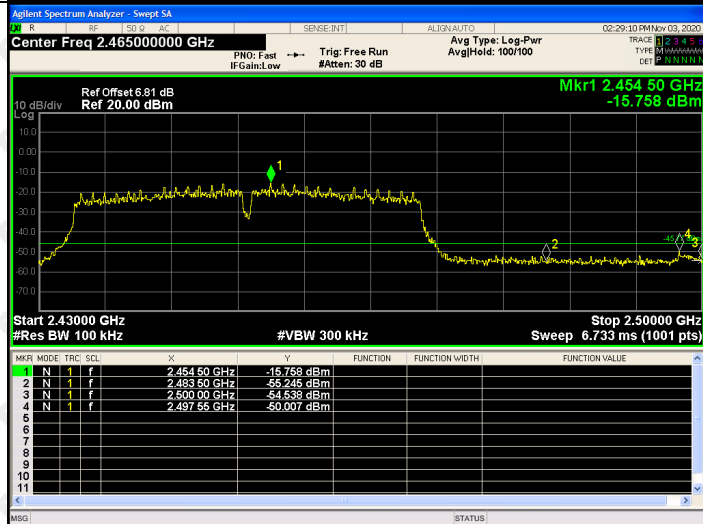


## BAND EDGE Graphs

802.11n(HT40)/L  
CH



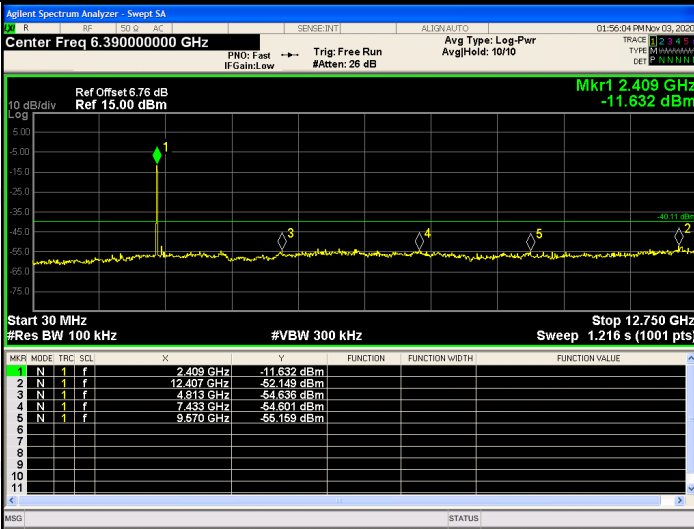
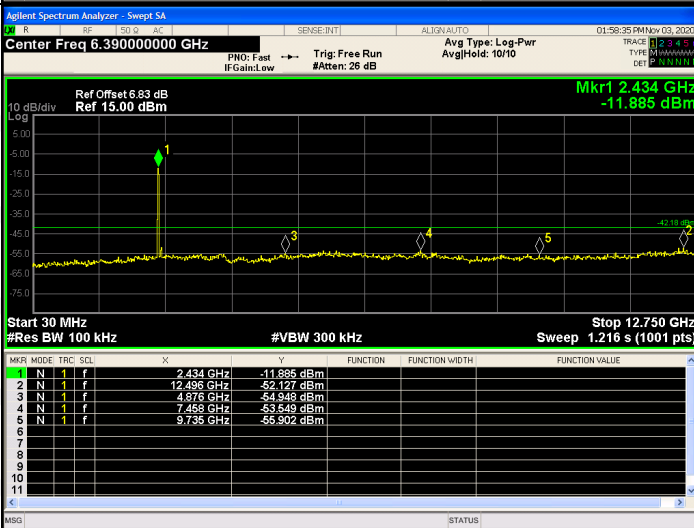
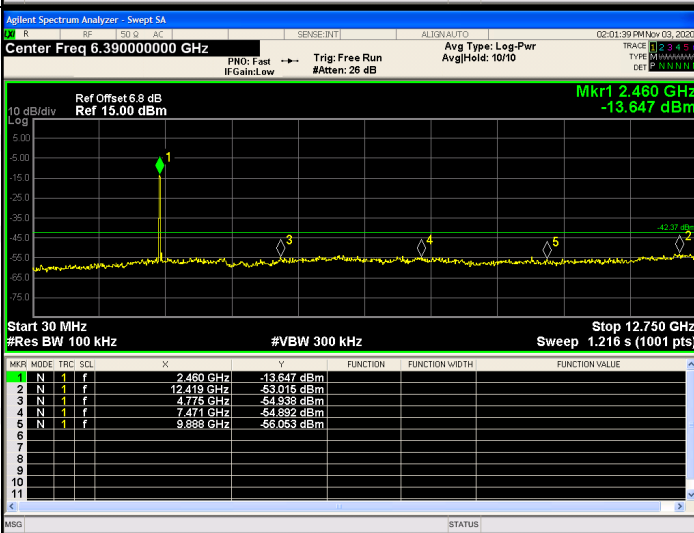
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RF Conducted Spurious Emissions Graphs

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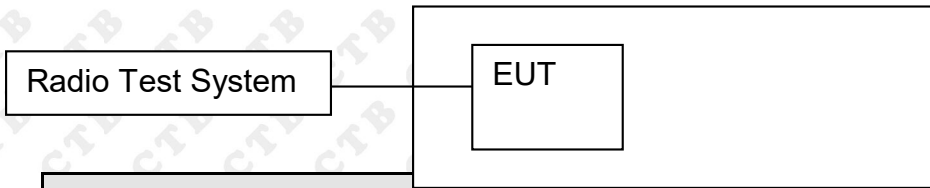
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RF Conducted Spurious Emissions Graphs

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## 9. COUDUCTED OUTPUT POWER

### 9.1 Block Diagram Of Test Setup



FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

### 9.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1MHz. VBW = 3MHz. Sweep = auto; Detector Function = Peak. Channel power function is used
3. Keep the EUT in transmitting at lowest, middle and highest channel individually. Record the max value.

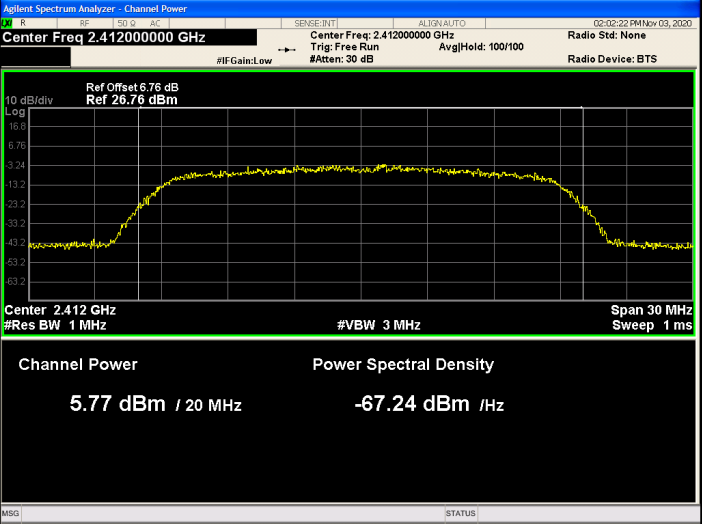
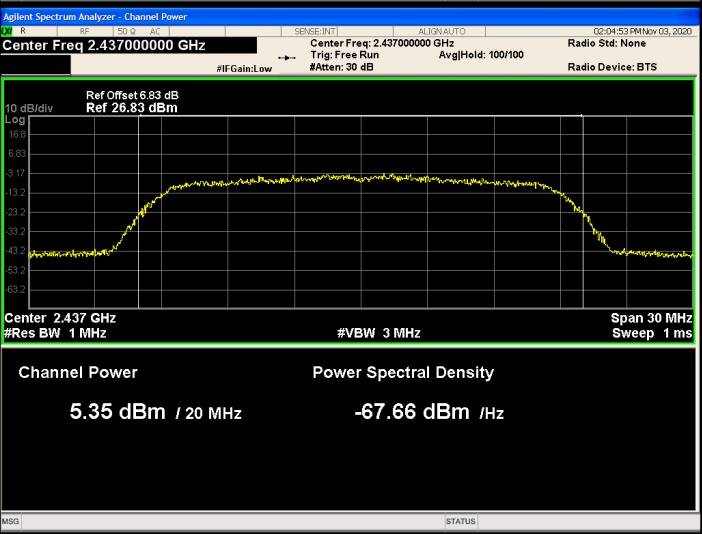
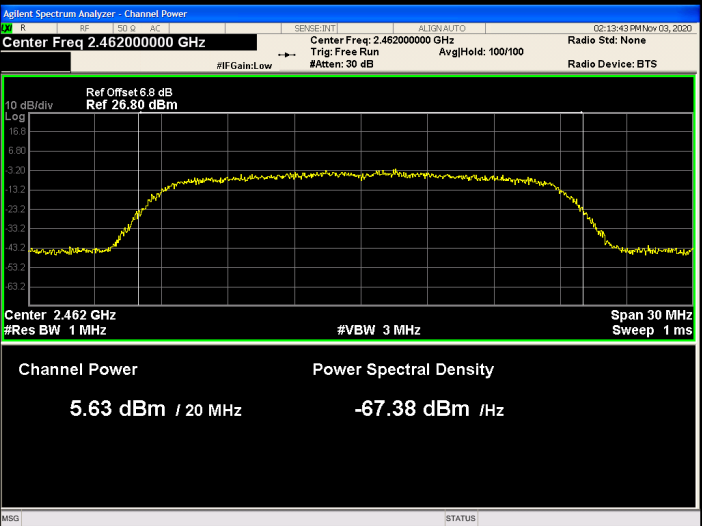


## 9.4 Test Result

Mode	Channel.	Maximum Output Power [dBm]	Limit[dBm]	Verdict
802.11b	LCH	7.564	30	PASS
	MCH	7.056	30	PASS
	HCH	7.413	30	PASS
802.11g	LCH	6.566	30	PASS
	MCH	6.271	30	PASS
	HCH	6.385	30	PASS
802.11n(HT20)	LCH	5.768	30	PASS
	MCH	5.355	30	PASS
	HCH	5.627	30	PASS
802.11n(HT40)	LCH	3.69	30	PASS
	MCH	3.835	30	PASS
	HCH	3.724	30	PASS

Mode	Channel.	Maximum Output Power [dBm]
	LCH	<p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.412000000 GHz</p> <p>Ref Offset: 6.76 dB, Ref: 26.76 dBm</p> <p>Channel Power: 7.56 dBm / 20 MHz</p> <p>Power Spectral Density: -65.45 dBm /Hz</p>
802.11b	MCH	<p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.437000000 GHz</p> <p>Ref Offset: 6.83 dB, Ref: 26.83 dBm</p> <p>Channel Power: 7.06 dBm / 20 MHz</p> <p>Power Spectral Density: -65.95 dBm /Hz</p>
	HCH	<p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.462000000 GHz</p> <p>Ref Offset: 6.8 dB, Ref: 26.80 dBm</p> <p>Channel Power: 7.41 dBm / 20 MHz</p> <p>Power Spectral Density: -65.60 dBm /Hz</p>

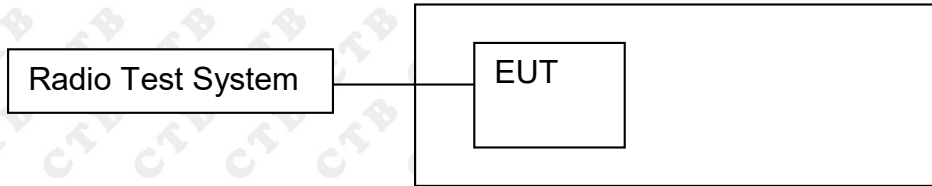
	LCH	<p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.412000000 GHz</p> <p>Channel Power: 6.57 dBm / 20 MHz</p> <p>Power Spectral Density: -66.44 dBm / Hz</p>
802.11g	MCH	<p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.437000000 GHz</p> <p>Channel Power: 6.27 dBm / 20 MHz</p> <p>Power Spectral Density: -66.74 dBm / Hz</p>
	HCH	<p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.462000000 GHz</p> <p>Channel Power: 6.39 dBm / 20 MHz</p> <p>Power Spectral Density: -66.63 dBm / Hz</p>

	LCH	 <p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.412000000 GHz</p> <p>Channel Power: 5.77 dBm / 20 MHz</p> <p>Power Spectral Density: -67.24 dBm / Hz</p>
802.11n(HT20)	MCH	 <p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.437000000 GHz</p> <p>Channel Power: 5.35 dBm / 20 MHz</p> <p>Power Spectral Density: -67.66 dBm / Hz</p>
	HCH	 <p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.462000000 GHz</p> <p>Channel Power: 5.63 dBm / 20 MHz</p> <p>Power Spectral Density: -67.38 dBm / Hz</p>

	LCH	<p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.422000000 GHz</p> <p>Ref Offset: 6.77 dB Ref: 26.77 dBm</p> <p>Channel Power: 3.69 dBm / 40 MHz</p> <p>Power Spectral Density: -72.33 dBm / Hz</p>
802.11n(HT40)	MCH	<p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.437000000 GHz</p> <p>Ref Offset: 6.83 dB Ref: 26.83 dBm</p> <p>Channel Power: 3.83 dBm / 40 MHz</p> <p>Power Spectral Density: -72.19 dBm / Hz</p>
	HCH	<p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.452000000 GHz</p> <p>Ref Offset: 6.81 dB Ref: 26.81 dBm</p> <p>Channel Power: 3.72 dBm / 40 MHz</p> <p>Power Spectral Density: -72.30 dBm / Hz</p>

## 10. 6DB OCCUPIED BANDWIDTH

### 10.1 Block Diagram Of Test Setup



### 10.2 Limit

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS

### 10.3 Test procedure

1. Rem1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

## 10.4 Test Result

Test Mode	Frequency	6dB Bandwidth (MHz)	Limit(kHz)	Result
802.11b	LCH	7.874	500	<b>PASS</b>
	MCH	8.324	500	<b>PASS</b>
	HCH	7.691	500	<b>PASS</b>
802.11g	LCH	15.098	500	<b>PASS</b>
	MCH	15.2	500	<b>PASS</b>
	HCH	15.055	500	<b>PASS</b>
802.11n(HT20)	LCH	15.105	500	<b>PASS</b>
	MCH	15.122	500	<b>PASS</b>
	HCH	15.031	500	<b>PASS</b>
802.11n(HT40)	LCH	35.069	500	<b>PASS</b>
	MCH	35.047	500	<b>PASS</b>
	HCH	35.06	500	<b>PASS</b>

Test Graph:





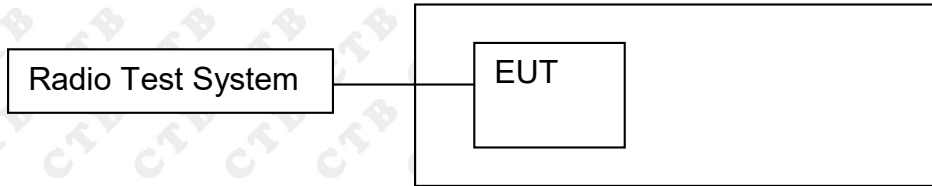
<p>802.11g/LCH</p>	<p>Agilent Spectrum Analyzer - Occupied BW          Center Freq: 2.41200000 GHz          Ref Offset: 6.76 dB          Ref: 26.76 dBm          Mkr3: 2.419546 GHz          -15.992 dBm          Center: 2.412 GHz          #Res BW: 100 kHz          #VBW: 300 kHz          Span: 30 MHz          Sweep: 3.333 ms          Occupied Bandwidth: 16.316 MHz          Total Power: 5.02 dBm          Transmit Freq Error: -3.031 kHz          OBW Power: 99.00 %          x dB Bandwidth: 15.10 MHz          x dB: -6.00 dB</p>	
<p>802.11g/MCH</p>	<p>Agilent Spectrum Analyzer - Occupied BW          Center Freq: 2.43700000 GHz          Ref Offset: 6.83 dB          Ref: 26.83 dBm          Mkr3: 2.444606 GHz          -20.483 dBm          Center: 2.437 GHz          #Res BW: 100 kHz          #VBW: 300 kHz          Span: 30 MHz          Sweep: 3.333 ms          Occupied Bandwidth: 16.312 MHz          Total Power: 4.59 dBm          Transmit Freq Error: 6.359 kHz          OBW Power: 99.00 %          x dB Bandwidth: 15.20 MHz          x dB: -6.00 dB</p>	
<p>802.11g/HCH</p>	<p>Agilent Spectrum Analyzer - Occupied BW          Center Freq: 2.46200000 GHz          Ref Offset: 6.8 dB          Ref: 26.80 dBm          Mkr3: 2.469543 GHz          -19.028 dBm          Center: 2.462 GHz          #Res BW: 100 kHz          #VBW: 300 kHz          Span: 30 MHz          Sweep: 3.333 ms          Occupied Bandwidth: 16.298 MHz          Total Power: 4.74 dBm          Transmit Freq Error: 15.435 kHz          OBW Power: 99.00 %          x dB Bandwidth: 15.06 MHz          x dB: -6.00 dB</p>	

<p>802.11n(HT20)/LC H</p>	<p>Agilent Spectrum Analyzer - Occupied BW Center Freq 2.41200000 GHz Center Freq: 2.412000000 GHz Trig: Free Run Avg/Hold: 100/100 Radio Std: None Radio Device: BTS</p> <p>Ref Offset 6.76 dB Ref 26.76 dBm Mkr3 2.419536 GHz -15.938 dBm</p> <p>Center 2.412 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 3.333 ms</p> <p>Occupied Bandwidth 17.480 MHz Total Power 4.85 dBm Transmit Freq Error -16.075 kHz OBW Power 99.00 % x dB Bandwidth 15.10 MHz x dB -6.00 dB</p>	
<p>802.11n(HT20)/MC H</p>	<p>Agilent Spectrum Analyzer - Occupied BW Center Freq 2.437000000 GHz Center Freq: 2.437000000 GHz Trig: Free Run Avg/Hold: 100/100 Radio Std: None Radio Device: BTS</p> <p>Ref Offset 6.83 dB Ref 26.83 dBm Mkr3 2.444561 GHz -17.820 dBm</p> <p>Center 2.437 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 3.333 ms</p> <p>Occupied Bandwidth 17.473 MHz Total Power 4.49 dBm Transmit Freq Error 104 Hz OBW Power 99.00 % x dB Bandwidth 15.12 MHz x dB -6.00 dB</p>	
<p>802.11n(HT20)/HC H</p>	<p>Agilent Spectrum Analyzer - Occupied BW Center Freq 2.462000000 GHz Center Freq: 2.462000000 GHz Trig: Free Run Avg/Hold: 100/100 Radio Std: None Radio Device: BTS</p> <p>Ref Offset 6.8 dB Ref 26.80 dBm Mkr3 2.469525 GHz -17.314 dBm</p> <p>Center 2.462 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 3.333 ms</p> <p>Occupied Bandwidth 17.476 MHz Total Power 4.96 dBm Transmit Freq Error 9.801 kHz OBW Power 99.00 % x dB Bandwidth 15.03 MHz x dB -6.00 dB</p>	

<p>802.11n(HT40)/LC H</p>		
<p>802.11n(HT40)/MC H</p>		
<p>802.11n(HT40)/HC H</p>		

## 11. POWER SPECTRAL DENSITY

### 11.1 Block Diagram Of Test Setup



### 11.2 Limit

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

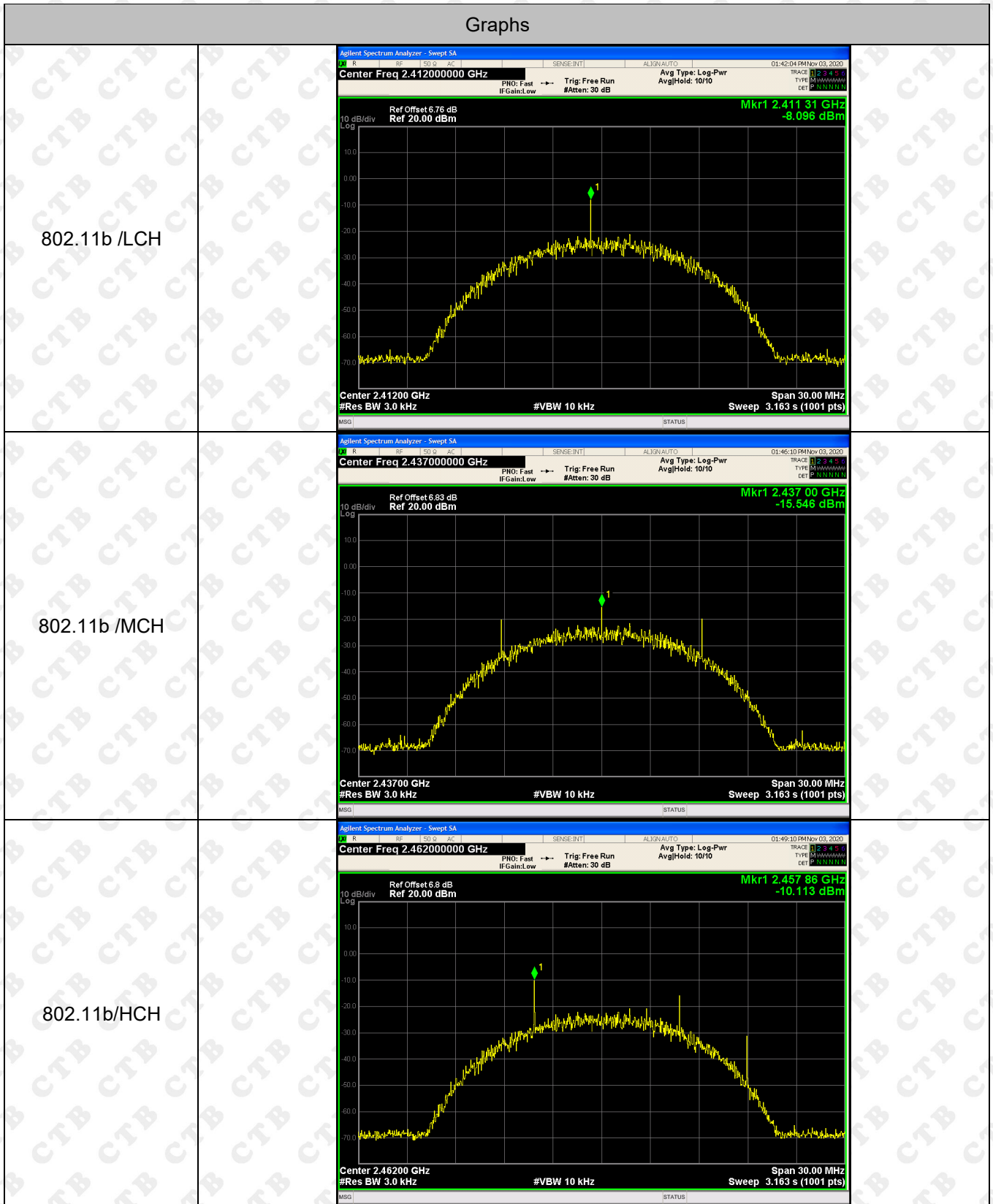
### 11.3 Test procedure

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
4. Set the VBW  $\geq 3 \times \text{RBW}$ .
5. Detector = Peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

## 11.4 Test Result

Mode	Channel.	Power Spectral Density [dBm /3KHz]	Limit(8 dBm (in any 3KHz))	Verdict
802.11b	LCH	-8.096	8	PASS
	MCH	-15.546	8	PASS
	HCH	-10.113	8	PASS
802.11g	LCH	-26.905	8	PASS
	MCH	-26.928	8	PASS
	HCH	-27.053	8	PASS
802.11n(H T20)	LCH	-27.685	8	PASS
	MCH	-27.318	8	PASS
	HCH	-26.966	8	PASS
802.11n(H T40)	LCH	-32.436	8	PASS
	MCH	-32.021	8	PASS
	HCH	-32.149	8	PASS

### Test Graph



<p>802.11g/LCH</p>		
<p>802.11g/MCH</p>		
<p>802.11g/HCH</p>		

<p>802.11n(HT20)/LC H</p>		
<p>802.11n(HT20)/MC H</p>		
<p>802.11n(HT20)/HC H</p>		



<p>802.11n(HT40)/LC H</p>	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.42200000 GHz Ref Offset: 6.77 dB Ref 20.00 dBm Mkr1 2.417 02 GHz -32.436 dBm Center 2.42200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 60.00 MHz Sweep 6.326 s (1001 pts)</p>	
<p>802.11n(HT40)/MC H</p>	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.43700000 GHz Ref Offset: 6.83 dB Ref 20.00 dBm Mkr1 2.440 72 GHz -32.021 dBm Center 2.43700 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 60.00 MHz Sweep 6.326 s (1001 pts)</p>	
<p>802.11n(HT40)/HC H</p>	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.45200000 GHz Ref Offset: 6.81 dB Ref 20.00 dBm Mkr1 2.449 48 GHz -32.149 dBm Center 2.45200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 60.00 MHz Sweep 6.326 s (1001 pts)</p>	

## 12. ANTENNA REQUIREMENT

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

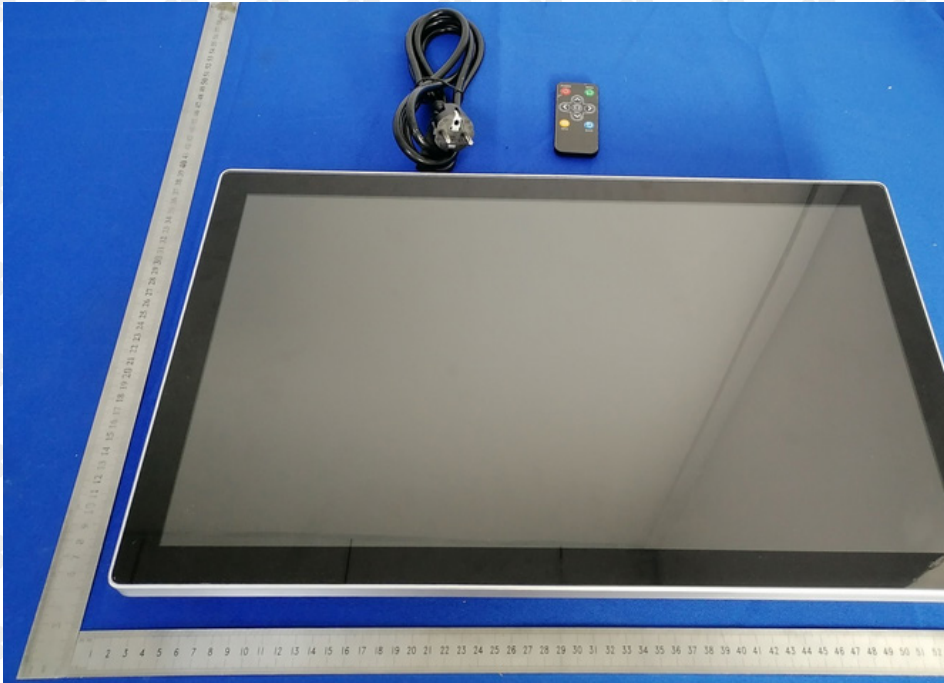
The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **EUT Antenna:**

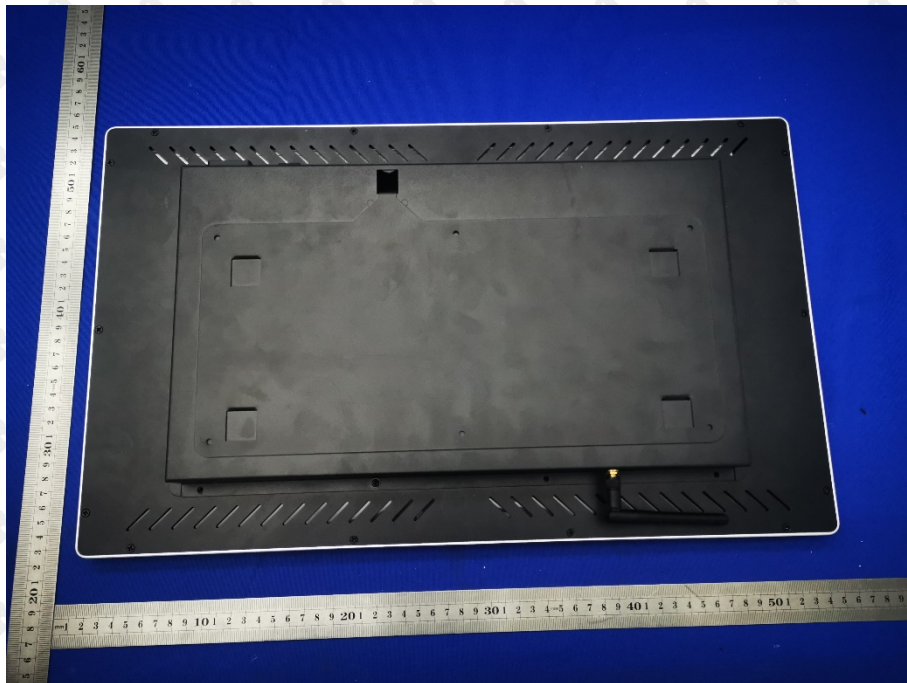
The antenna is External Antenna and no consideration of replacement. The best case gain of the antenna is 1.0dBi.

### 13. EUT PHOTOGRAPHS

EUT Photo 1



EUT Photo 2



## 14. EUT TEST SETUP PHOTOGRAPHS

### Radiated Emission

Below 1G



Above 1G



Conducted Emission



\*\*\*\*\* END OF REPORT \*\*\*\*\*