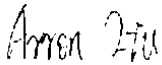


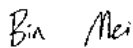
TEST REPORT

Product Name: Vital sign monitoring using mmwave RADAR
FCC ID: 2A2DT-KY-11
Trademark: QingLei
Model Number: KY-11, KY
Prepared For: Beijing Qinglei Technology Co., Ltd
Address: Room 504, 36 Chuangye Middle Road, Haidian District, Beijing, China
Manufacturer: Beijing Zhizao Space Technology Co., Ltd
Address: Room101, west side of the first floor, block F, Zhizao street, Zhongguancun, 45 Chengfu Road, Haidian District, Beijing, China
Prepared By: Shenzhen CTB Testing Technology Co., Ltd.
Address: Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Street, Baoan District, Shenzhen, China
Sample Received Date: Apr. 22, 2021
Sample tested Date: Apr. 22, 2021 to Apr. 27, 2021
Issue Date: Apr. 27, 2021
Report No.: CTB210423019RFX
Test Standards: FCC Part15.247
ANSI C63.10:2013
Test Results: PASS
Remark: This is WIFI-2.4GHz band radio test report.

Compiled by:

Arron Liu

Reviewed by:

Bin Mei

Approved by:

Rita Xiao / Director

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

TABLE OF CONTENT

Test Report Declaration	Page
1. VERSION	4
2. TEST SUMMARY	5
3. MEASUREMENT UNCERTAINTY	6
4. PRODUCT INFORMATION AND TEST SETUP	7
4.1 Product Information	7
4.2 Test Setup Configuration	7
4.3 Support Equipment	8
4.4 Channel List	9
4.5 Test Mode	9
4.6 Test Environment	9
5. TEST FACILITY AND TEST INSTRUMENT USED	10
5.1 Test Facility	10
5.2 Test Instrument Used	10
6. AC POWER LINE CONDUCTED EMISSION	12
6.1 Block Diagram Of Test Setup	12
6.2 Limit	12
6.3 Test procedure	12
6.4 Test Result	14
7. RADIATED SPURIOUS EMISSION	16
7.1 Block Diagram Of Test Setup	16
7.2 Limit	16
7.3 Test procedure	17
7.4 Test Result	18
8. BAND EDGE AND RF CONDUCTED SPURIOUS EMISSIONS	35
8.1 Block Diagram Of Test Setup	35
8.2 Limit	35
8.3 Test procedure	35
8.4 Test Result	36
9. CONDUCTED OUTPUT POWER	36
9.1 Block Diagram Of Test Setup	42
9.2 Limit	42
9.3 Test procedure	42
9.4 Test Result	43
10. 6DB OCCUPIED BANDWIDTH	47
10.1 Block Diagram Of Test Setup	47
10.2 Limit	47
10.3 Test procedure	47
10.4 Test Result	48
11. POWER SPECTRAL DENSITY	52
11.1 Block Diagram Of Test Setup	52
11.2 Limit	52
11.3 Test procedure	52

11.4	Test Result	53
12.	ANTENNA REQUIREMENT	57
13.	EUT PHOTOGRAPHS	58
14.	EUT TEST SETUP PHOTOGRAPHS	59

(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
CTB210423019RFX	Apr. 27, 2021	Original	Valid

2. TEST SUMMARY

The Product has been tested according to the following specifications:

Test Item	Test Requirement	Test method	Result
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS
Radiated Spurious emissions	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS
Band edge and RF Conducted Spurious Emissions	47 CFR Part 15 Subpart C Section 15.247(d)/15.205(a)	ANSI C63.10-2013	PASS
Conducted Peak Output Power	47 CFR Part 15 Subpart C Section 15.247 (b)(3)	ANSI C63.10-2013	PASS
6dB Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.247 (a)(2)	ANSI C63.10-2013	PASS
Power Spectral Density	47 CFR Part 15 Subpart C Section 15.247 (e)	ANSI C63.10-2013/ KDB 558074 D01v04	PASS
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203/15.247 (c)	ANSI C63.10-2013	PASS
RF Exposure Evaluation	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 camber 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):	KY-11, KY
Model Description:	All the model are the same circuit and RF module, only for model name. Test sample model: KY-11
Wi-Fi Specification:	IEEE 802.11b/g/n
Hardware Version:	KY_ST_H7_WIFI_OTA
Software Version:	KY_V3.1
Operation Frequency:	WiFi: IEEE 802.11b/g/n 20: 2412-2462MHz/ 11 channel
Max. RF output power:	WiFi (2.4G) : 7.529dBm
Type of Modulation:	WiFi: DSSS, OFDM
Antenna installation:	WiFi: PCB Antenna
Antenna Gain:	WiFi (2.4G) : 1.0dBi
Ratings:	DC 5V, charging from adapter DC3.7V from battery

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

NOTE: DutyCycle>98%.

4.6 Test Environment

Humidity(%):	55
Atmospheric Pressure(kPa):	101.1
Normal Voltage(DC):	3.7
Normal Temperature(°C)	25
Low Temperature(°C)	0
High Temperature(°C)	50

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

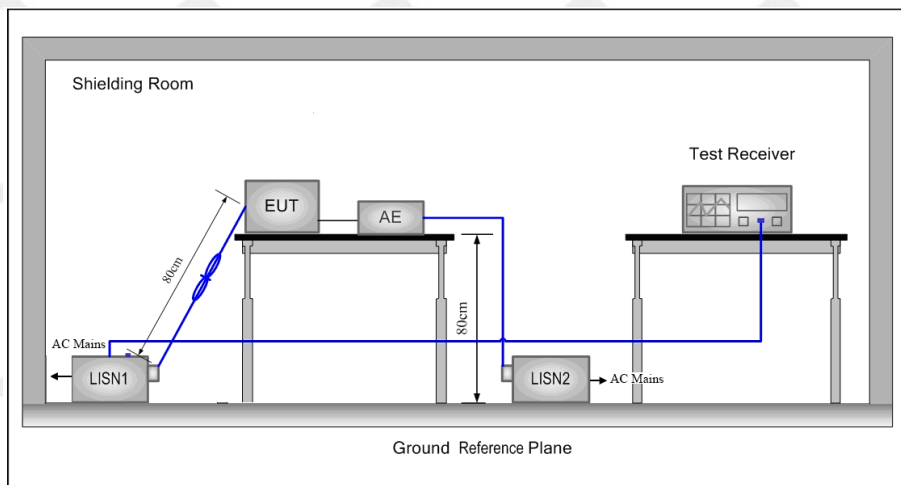
Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	Sep. 28, 2020	Sep. 28, 2021
2	Power Sensor	Agilent	U2021XA	MY56120032	Sep. 28, 2020	Sep. 28, 2021
3	Power Sensor	Agilent	U2021XA	MY56120034	Sep. 28, 2020	Sep. 28, 2021
4	Communication test set	R&S	CMW500	108058	Sep. 28, 2020	Sep. 28, 2021
5	Spectrum Analyzer	R&S	FSP40	100550	Sep. 28, 2020	Sep. 28, 2021
6	Signal Generator	Agilent	N5181A	MY49060920	Sep. 28, 2020	Sep. 28, 2021
7	Signal Generator	Agilent	N5182A	MY47420195	Sep. 28, 2020	Sep. 28, 2021
8	Communication test set	Agilent	E5515C	MY50102567	Oct. 10, 2020	Oct. 10, 2021
9	band rejection filter	Shenxiang	MSF2400-24 83.5MS-1154	20181015001	Sep. 28, 2020	Sep. 28, 2021
10	band rejection filter	Shenxiang	MSF5150-58 50MS-1155	20181015001	Sep. 28, 2020	Sep. 28, 2021
11	band rejection filter	Xingbo	XBLBQ-DZA 120	190821-1-1	Sep. 28, 2020	Sep. 28, 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	Sep. 28, 2020	Sep. 28, 2021
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	Sep. 28, 2020	Sep. 28, 2021
15	234G Automatic test software	Microwave	MTS8200	Ver. 2.0.0.0	\	\
16	966 chamber	C.R.T.	966 Room	966	Nov. 9, 2019	Nov. 08, 2022
17	Receiver	R&S	ESPI	100362	Sep. 28, 2020	Sep. 28, 2021

18	Amplifier	HP	8447E	2945A02747	Sep. 28, 2020	Sep. 28, 2021
19	Amplifier	Agilent	8449B	3008A01838	Sep. 28, 2020	Sep. 28, 2021
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	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	Sep. 28, 2020	Sep. 28, 2021
24	loop antenna	ZHINAN	ZN30900A	/	Sep. 28, 2020	Sep. 28, 2021
25	Horn antenna	A/H/System	SAS-574	588	Sep. 28, 2020	Sep. 28, 2021
26	Amplifier	AEROFLEX	/	S/N/ 097	Sep. 28, 2020	Sep. 28, 2021

Conducted emissions Test						
27	Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
28	AMN	ROHDE&SC HWARZ	ESH3-Z5	100318	Sep. 28, 2020	Sep. 28, 2021
29	Pulse limiter	ROHDE&SC HWARZ	ESH3Z2	357881052	Sep. 28, 2020	Sep. 28, 2021
30	EMI TEST RECEIVER	ROHDE&SC HWARZ	ESCS30	834115/006	Sep. 28, 2020	Sep. 28, 2021
31	Coaxial cable	ZDECL	Z302S	18091804	Sep. 28, 2020	Sep. 28, 2021
32	ISN	TESEQ	NTFM8158	183	Sep. 28, 2020	Sep. 28, 2021
33	EMI TEST RECEIVER	ROHDE&SC HWARZ	ESCI	100428/003	Sep. 28, 2020	Sep. 28, 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 (dBμV)			
	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 $50\Omega/50\mu\text{H} + 5\Omega$ 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

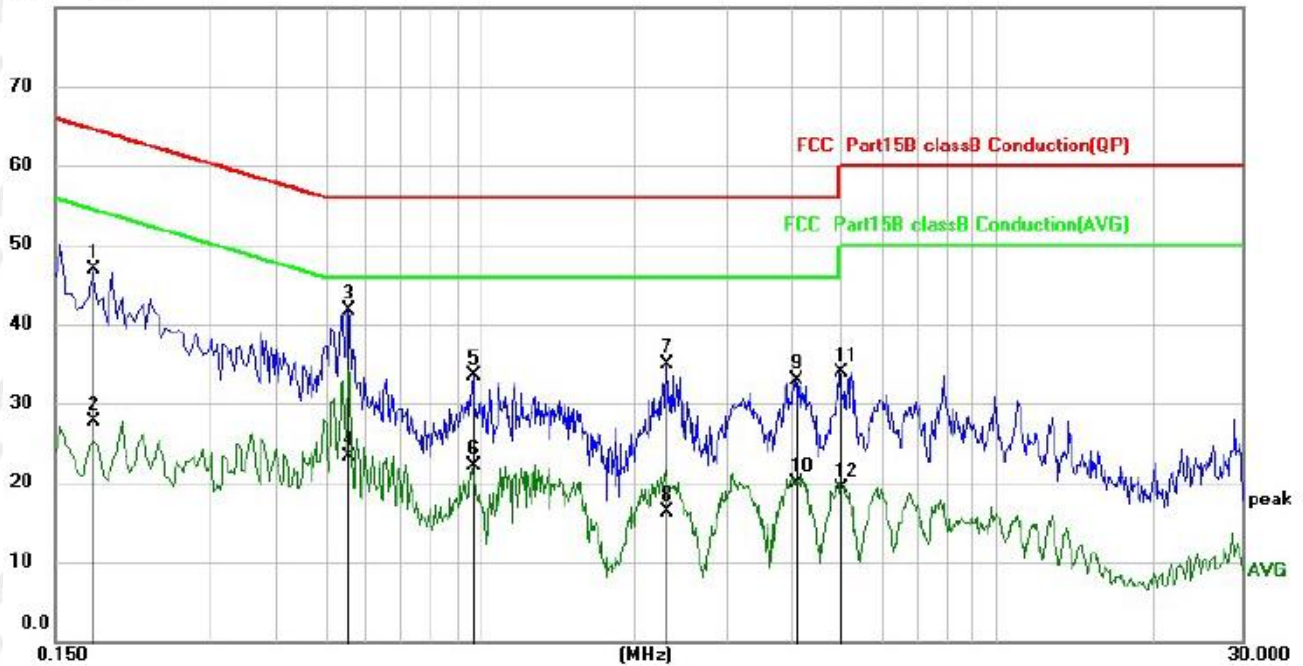
between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0,8 m from the LISN 2.

- 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

00.0 dBuV

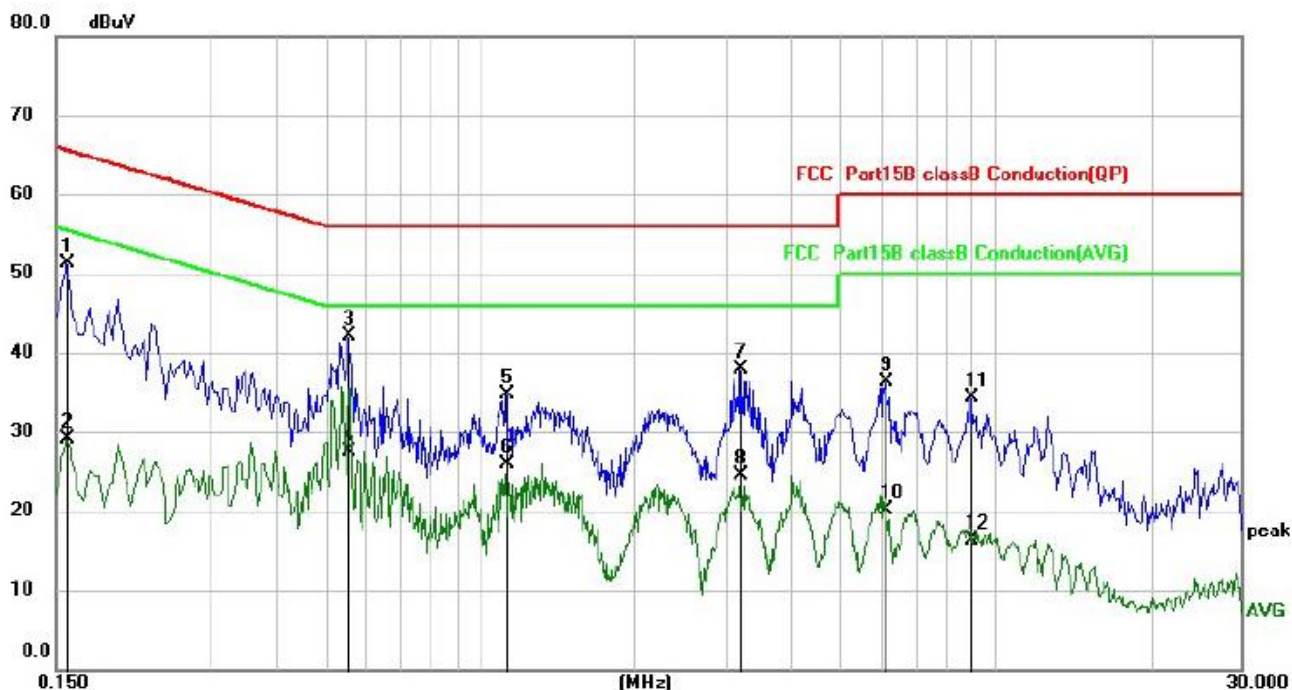


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector
1		0.1780	36.90	9.96	46.86	64.58	-17.72	QP
2		0.1780	17.82	9.96	27.78	54.58	-26.80	AVG
3	*	0.5540	31.83	9.96	41.79	56.00	-14.21	QP
4		0.5540	13.36	9.96	23.32	46.00	-22.68	AVG
5		0.9700	23.49	9.96	33.45	56.00	-22.55	QP
6		0.9700	12.16	9.96	22.12	46.00	-23.88	AVG
7		2.2900	24.80	10.03	34.83	56.00	-21.17	QP
8		2.2900	6.37	10.03	16.40	46.00	-29.60	AVG
9		4.0860	22.69	10.12	32.81	56.00	-23.19	QP
10		4.0860	9.79	10.12	19.91	46.00	-26.09	AVG
11		4.9860	23.65	10.17	33.82	56.00	-22.18	QP
12		4.9860	9.17	10.17	19.34	46.00	-26.66	AVG

Remark:

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

Test Specification: Neutral
AC 120V 60Hz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector
		MHz	dBuV	dB	dBuV	dBuV	dB	
1		0.1580	41.31	9.96	51.27	65.57	-14.30	QP
2		0.1580	19.18	9.96	29.14	55.57	-26.43	AVG
3	*	0.5540	32.13	9.96	42.09	56.00	-13.91	QP
4		0.5540	17.50	9.96	27.46	46.00	-18.54	AVG
5		1.1180	24.68	9.97	34.65	56.00	-21.35	QP
6		1.1180	15.91	9.97	25.88	46.00	-20.12	AVG
7		3.2060	27.78	10.08	37.86	56.00	-18.14	QP
8		3.2060	14.40	10.08	24.48	46.00	-21.52	AVG
9		6.1020	25.99	10.31	36.30	60.00	-23.70	QP
10		6.1020	9.86	10.31	20.17	50.00	-29.83	AVG
11		8.9300	23.61	10.67	34.28	60.00	-25.72	QP
12		8.9300	5.66	10.67	16.33	50.00	-33.67	AVG

Remark:

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

7. RADIATED SPURIOUS EMISSION

7.1 Block Diagram Of Test Setup

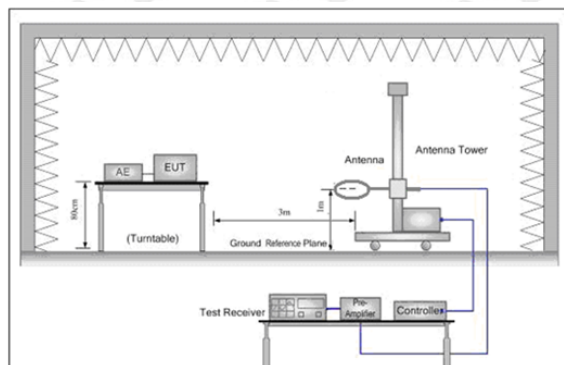


Figure 1. Below 30MHz

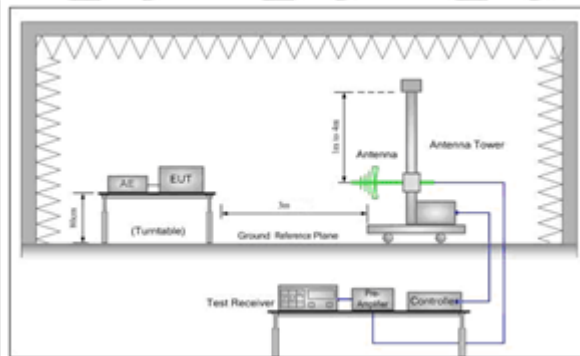


Figure 2. 30MHz to 1GHz

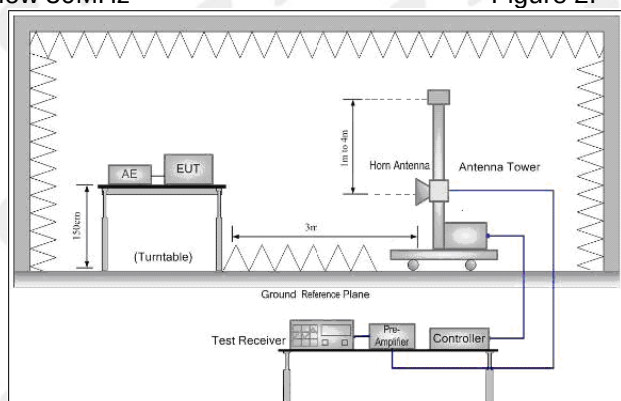


Figure 3. Above 1GHz

7.2 Limit

Spurious Emissions:

Frequency	Field strength (microvolt/meter)	Limit (dBμV/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 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:

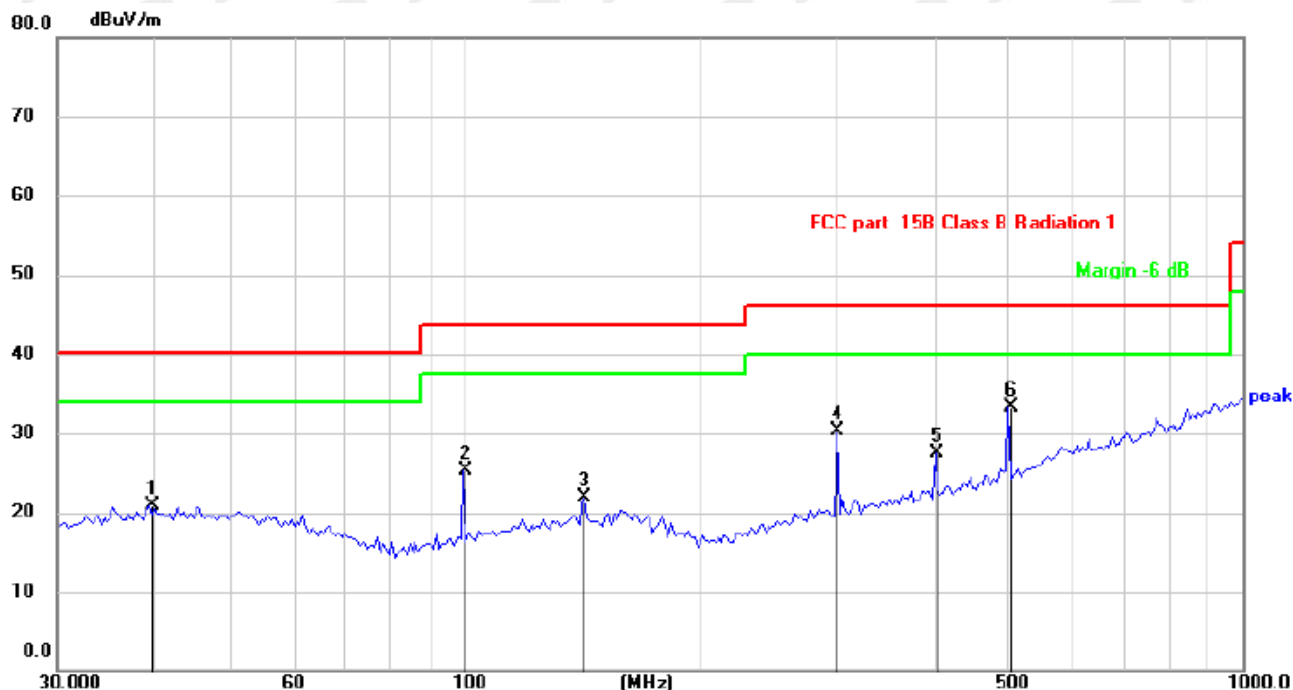
- g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
- h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel
- j. Repeat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

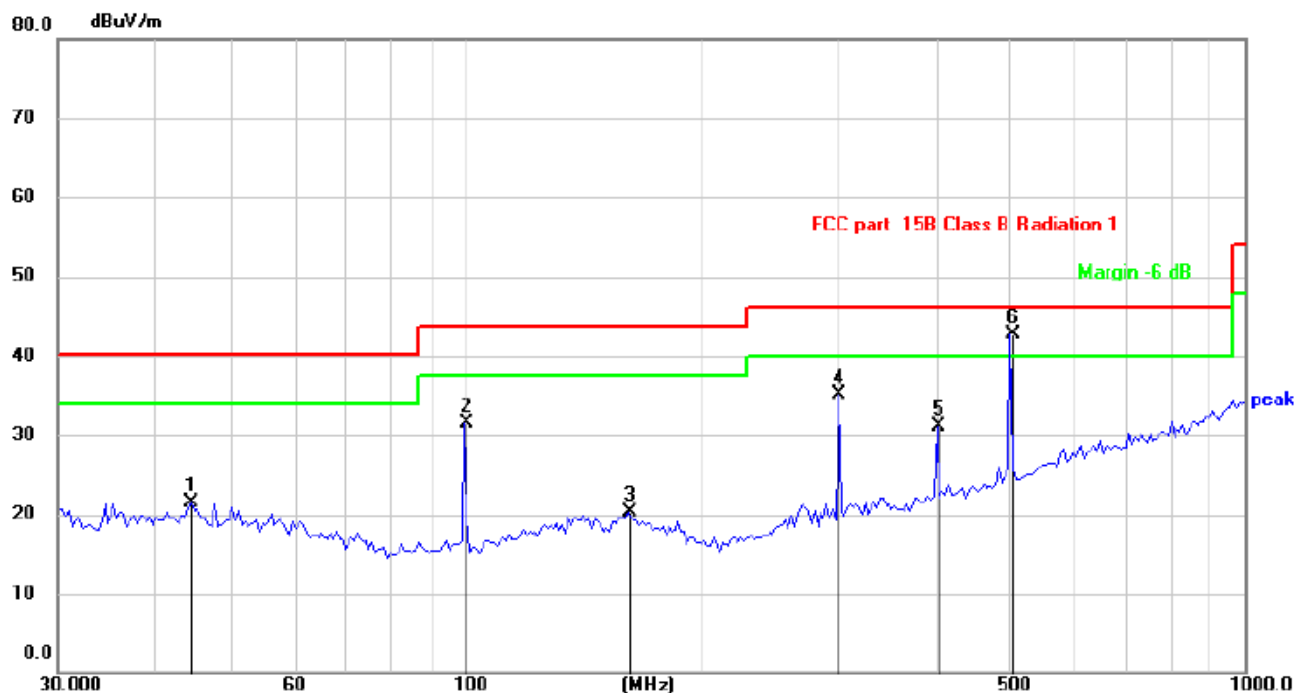
Below 1GHz Test Results:
Antenna polarity: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		39.3681	27.81	-6.84	20.97	40.00	-19.03	QP
2		99.7028	35.74	-10.41	25.33	43.50	-18.17	QP
3		142.8243	29.31	-7.48	21.83	43.50	-21.67	QP
4		300.8943	37.13	-6.79	30.34	46.00	-15.66	QP
5		401.8385	32.05	-4.62	27.43	46.00	-18.57	QP
6	*	500.3011	35.76	-2.45	33.31	46.00	-12.69	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	Over dB	Detector
1		44.5087	28.49	-6.96	21.53	40.00	-18.47	QP
2		99.7028	41.85	-10.41	31.44	43.50	-12.06	QP
3		161.4742	27.25	-6.86	20.39	43.50	-23.11	QP
4		300.8943	41.86	-6.79	35.07	46.00	-10.93	QP
5		401.8385	35.72	-4.62	31.10	46.00	-14.90	QP
6	*	500.3011	45.22	-2.45	42.77	46.00	-3.23	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	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4824	66.28	-3.64	62.64	74	-11.36	peak
4824	50.16	-3.64	46.52	54	-7.48	AVG
7236	59.14	-0.95	58.19	74	-15.81	peak
7236	45.28	-0.95	44.33	54	-9.67	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)	
4824	66.97	-3.64	63.33	74	-10.67	peak
4824	49.19	-3.64	45.55	54	-8.45	AVG
7236	57.42	-0.95	56.47	74	-17.53	peak
7236	44.45	-0.95	43.50	54	-10.50	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)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4874	66.34	-3.51	62.83	74	-11.17	peak
4874	48.03	-3.51	44.52	54	-9.48	AVG
7311	58.26	-0.82	57.44	74	-16.56	peak
7311	45.23	-0.82	44.41	54	-9.59	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	63.42	-3.51	59.91	74	-14.09	peak
4874	48.40	-3.51	44.89	54	-9.11	AVG
7311	59.28	-0.82	58.46	74	-15.54	peak
7311	44.15	-0.82	43.33	54	-10.67	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	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4924	63.20	-3.43	59.77	74	-14.23	peak
4924	46.30	-3.43	42.87	54	-11.13	AVG
7386	58.96	-0.75	58.21	74	-15.79	peak
7386	43.65	-0.75	42.90	54	-11.10	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	65.55	-3.43	62.12	74	-11.88	peak
4924	46.63	-3.43	43.20	54	-10.80	AVG
7386	58.38	-0.75	57.63	74	-16.37	peak
7386	41.65	-0.75	40.90	54	-13.10	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)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4824	65.63	-3.64	61.99	74	-12.01	peak
4824	49.94	-3.64	46.30	54	-7.70	AVG
7236	57.69	-0.95	56.74	74	-17.26	peak
7236	46.45	-0.95	45.50	54	-8.50	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)	
4824	62.68	-3.64	59.04	74	-14.96	peak
4824	48.62	-3.64	44.98	54	-9.02	AVG
7236	59.62	-0.95	58.67	74	-15.33	peak
7236	43.80	-0.95	42.85	54	-11.15	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 (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874	65.13	-3.51	61.62	74	-12.38	peak
4874	49.35	-3.51	45.84	54	-8.16	AVG
7311	58.46	-0.82	57.64	74	-16.36	peak
7311	44.05	-0.82	43.23	54	-10.77	AVG

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

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874	64.75	-3.51	61.24	74	-12.76	peak
4874	47.96	-3.51	44.45	54	-9.55	AVG
7311	56.81	-0.82	55.99	74	-18.01	peak
7311	43.05	-0.82	42.23	54	-11.77	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	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4924	64.83	-3.43	61.40	74	-12.60	peak
4924	50.08	-3.43	46.65	54	-7.35	AVG
7386	57.20	-0.75	56.45	74	-17.55	peak
7386	42.44	-0.75	41.69	54	-12.31	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	62.49	-3.43	59.06	74	-14.94	peak
4924	47.25	-3.43	43.82	54	-10.18	AVG
7386	57.66	-0.75	56.91	74	-17.09	peak
7386	42.63	-0.75	41.88	54	-12.12	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 (802.11n/H20 Mode)/2412

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4824	62.88	-3.64	59.24	74	-14.76	peak
4824	46.81	-3.64	43.17	54	-10.83	AVG
7236	57.71	-0.95	56.76	74	-17.24	peak
7236	42.64	-0.95	41.69	54	-12.31	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)	
4824	62.66	-3.64	59.02	74	-14.98	peak
4824	50.67	-3.64	47.03	54	-6.97	AVG
7236	60.19	-0.95	59.24	74	-14.76	peak
7236	44.14	-0.95	43.19	54	-10.81	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)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4874.00	65.96	-3.51	62.45	74.00	-11.55	peak
4874.00	50.53	-3.51	47.02	54.00	-6.98	AVG
7311.00	58.50	-0.82	57.68	74.00	-16.32	peak
7311.00	45.63	-0.82	44.81	54.00	-9.19	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)	
4874.00	63.78	-3.51	60.27	74.00	-13.73	peak
4874.00	46.45	-3.51	42.94	54.00	-11.06	AVG
7311.00	58.48	-0.82	57.66	74.00	-16.34	peak
7311.00	44.07	-0.82	43.25	54.00	-10.75	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	63.81	-3.43	60.38	74	-13.62	peak
4924	46.22	-3.43	42.79	54	-11.21	AVG
7386	57.44	-0.75	56.69	74	-17.31	peak
7386	43.07	-0.75	42.32	54	-11.68	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)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4924	62.87	-3.43	59.44	74	-14.56	peak
4924	46.76	-3.43	43.33	54	-10.67	AVG
7386	56.75	-0.75	56.00	74	-18.00	peak
7386	41.73	-0.75	40.98	54	-13.02	AVG

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

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)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2390	56.38	-5.81	50.57	74	-23.43	peak
2390	/	-5.81	/	54	/	AVG
2399	65.15	-5.84	59.31	74	-14.69	peak
2399	49.22	-5.84	43.38	54	-10.62	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	57.23	-5.81	51.42	74	-22.58	peak
2390	/	-5.81	/	54	/	AVG
2399	61.81	-5.84	55.97	74	-18.03	peak
2399	45.90	-5.84	40.06	54	-13.94	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	57.22	-5.65	51.57	74	-22.43	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	56.64	-5.65	50.99	74	-23.01	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)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2390	58.16	-5.81	52.35	74	-21.65	peak
2390	/	-5.81	/	54	/	AVG
2399	62.03	-5.84	56.19	74	-17.81	peak
2399	47.48	-5.84	41.64	54	-12.36	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	56.86	-5.81	51.05	74	-22.95	peak
2390	/	-5.81	/	54	/	AVG
2399	63.30	-5.84	57.46	74	-16.54	peak
2399	46.45	-5.84	40.61	54	-13.39	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	56.93	-5.65	51.28	74	-22.72	peak
2483.5	/	-5.65	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	57.65	-5.65	52.00	74	-22.00	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 (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2390	56.30	-5.81	50.49	74	-23.51	
2390	/	-5.81	/	54	/	AVG
2399	63.26	-5.84	57.42	74	-16.58	peak
2399	48.43	-5.84	42.59	54	-11.41	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2390	56.05	-5.81	50.24	74	-23.76	
2390	/	-5.81	/	54	/	AVG
2399	60.79	-5.84	54.95	74	-19.05	peak
2399	47.37	-5.84	41.53	54	-12.47	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

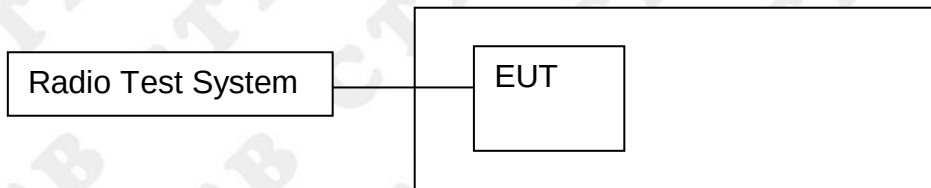
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	57.49	-5.65	51.84	74	-22.16	peak
2483.5	/	-5.65	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	56.43	-5.65	50.78	74	-23.22	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

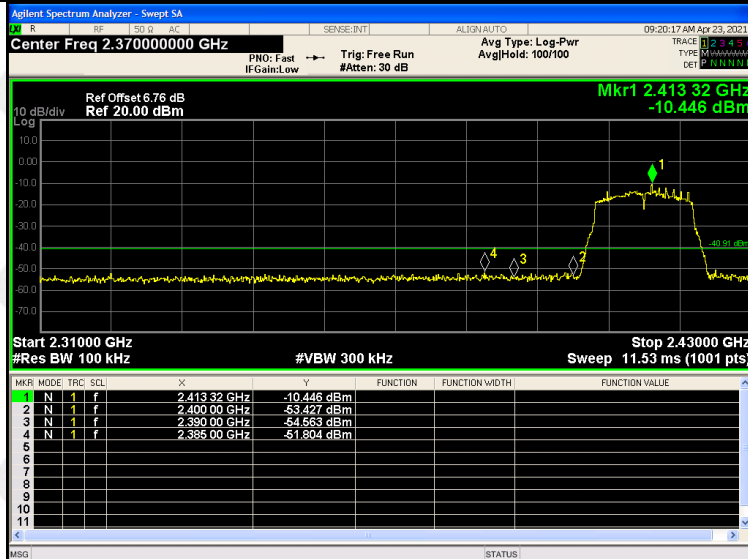
Note: Test from 30MHz to 25GHz, only worse case 30MHz to 12.75GHz is reported, no emission found above 12.75GHz.

8.4 Test Result

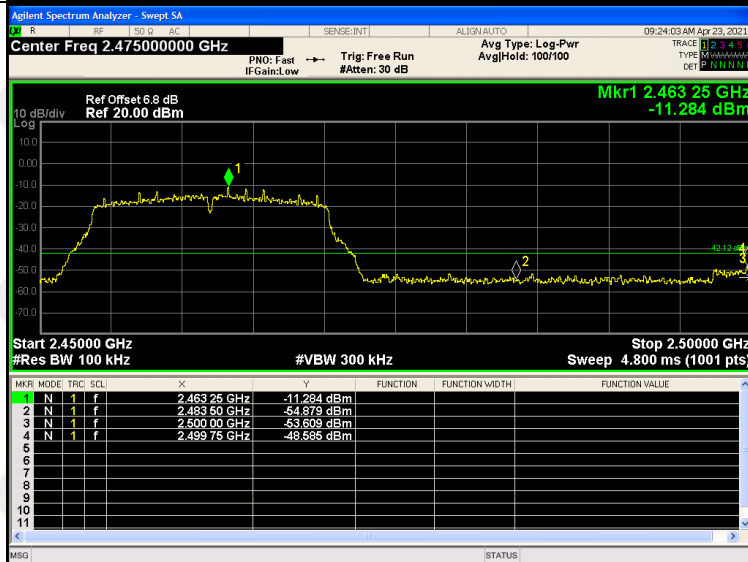


BAND EDGE Graphs

802.11g/LCH

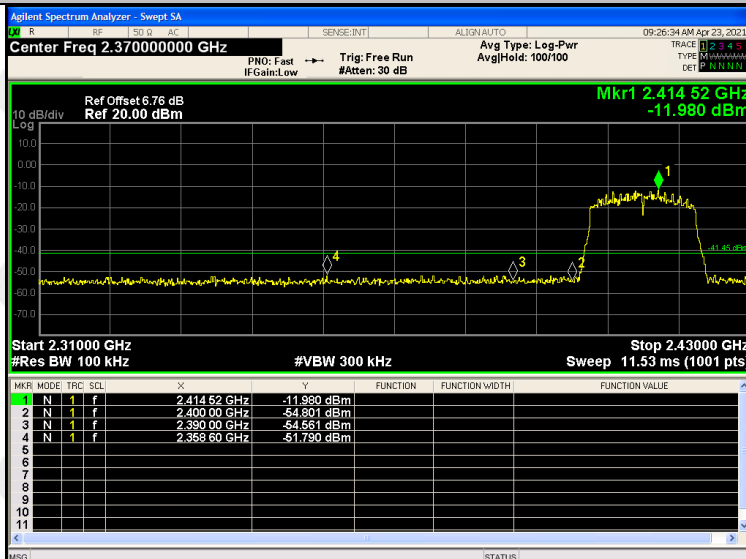


802.11g/HCH

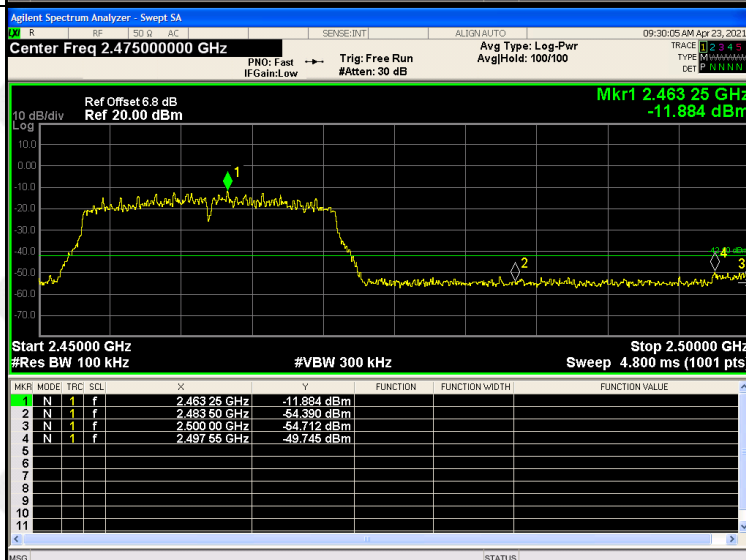


BAND EDGE Graphs

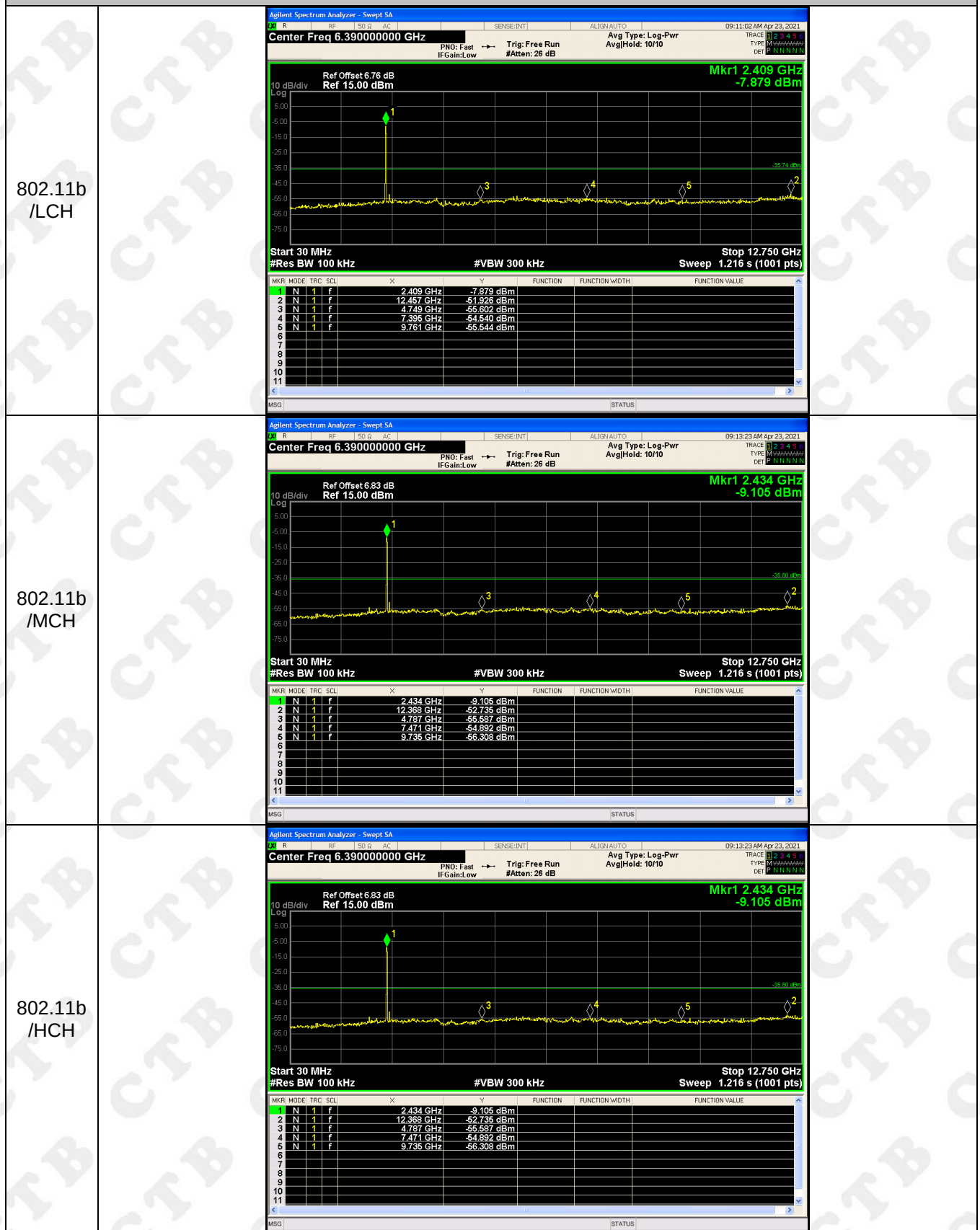
802.11n(HT20)/L
CH



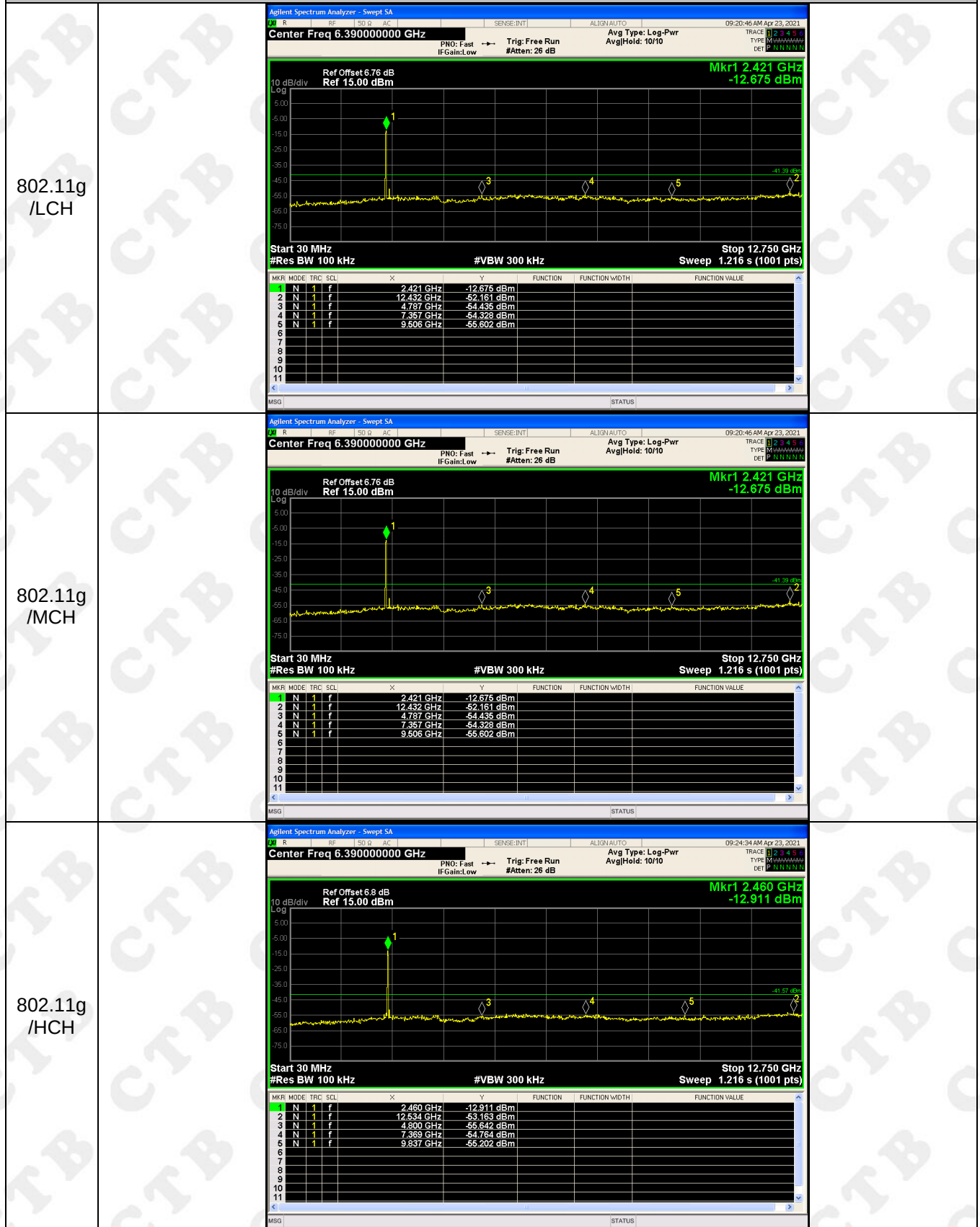
802.11n(HT20)/H
CH



RF Conducted Spurious Emissions Graphs



RF Conducted Spurious Emissions Graphs

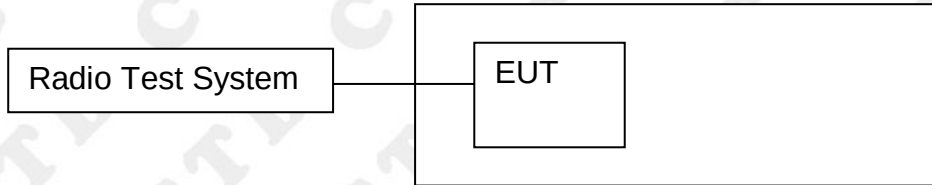


RF Conducted Spurious Emissions Graphs

802.11n (HT20)/ LCH	Agilent Spectrum Analyzer - Swept SA Center Freq 6.390000000 GHz Ref Offset 6.76 dB Ref 15.00 dBm Mkr1 2.409 GHz -12.193 dBm Start 30 MHz #Res BW 100 kHz #VBW 300 kHz Stop 12.750 GHz Sweep 1.216 s (1001 pts) <table><thead><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr></thead><tbody><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.409 GHz</td><td>-12.193 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>12.534 GHz</td><td>-52.321 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>f</td><td>4.787 GHz</td><td>-55.019 dBm</td><td></td><td></td><td></td></tr><tr><td>4</td><td>N</td><td>1</td><td>f</td><td>7.115 GHz</td><td>-54.881 dBm</td><td></td><td></td><td></td></tr><tr><td>5</td><td>N</td><td>1</td><td>f</td><td>9.545 GHz</td><td>-55.508 dBm</td><td></td><td></td><td></td></tr></tbody></table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.409 GHz	-12.193 dBm				2	N	1	f	12.534 GHz	-52.321 dBm				3	N	1	f	4.787 GHz	-55.019 dBm				4	N	1	f	7.115 GHz	-54.881 dBm				5	N	1	f	9.545 GHz	-55.508 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																																															
1	N	1	f	2.409 GHz	-12.193 dBm																																																		
2	N	1	f	12.534 GHz	-52.321 dBm																																																		
3	N	1	f	4.787 GHz	-55.019 dBm																																																		
4	N	1	f	7.115 GHz	-54.881 dBm																																																		
5	N	1	f	9.545 GHz	-55.508 dBm																																																		
802.11 n(HT20) /MCH	Agilent Spectrum Analyzer - Swept SA Center Freq 6.390000000 GHz Ref Offset 6.83 dB Ref 15.00 dBm Mkr1 2.434 GHz -11.589 dBm Start 30 MHz #Res BW 100 kHz #VBW 300 kHz Stop 12.750 GHz Sweep 1.216 s (1001 pts) <table><thead><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr></thead><tbody><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.434 GHz</td><td>-11.589 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>12.343 GHz</td><td>-52.059 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>f</td><td>5.042 GHz</td><td>-54.604 dBm</td><td></td><td></td><td></td></tr><tr><td>4</td><td>N</td><td>1</td><td>f</td><td>7.115 GHz</td><td>-54.885 dBm</td><td></td><td></td><td></td></tr><tr><td>5</td><td>N</td><td>1</td><td>f</td><td>9.621 GHz</td><td>-55.790 dBm</td><td></td><td></td><td></td></tr></tbody></table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.434 GHz	-11.589 dBm				2	N	1	f	12.343 GHz	-52.059 dBm				3	N	1	f	5.042 GHz	-54.604 dBm				4	N	1	f	7.115 GHz	-54.885 dBm				5	N	1	f	9.621 GHz	-55.790 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																																															
1	N	1	f	2.434 GHz	-11.589 dBm																																																		
2	N	1	f	12.343 GHz	-52.059 dBm																																																		
3	N	1	f	5.042 GHz	-54.604 dBm																																																		
4	N	1	f	7.115 GHz	-54.885 dBm																																																		
5	N	1	f	9.621 GHz	-55.790 dBm																																																		
802.11 n(HT20) /HCH	Agilent Spectrum Analyzer - Swept SA Center Freq 6.390000000 GHz Ref Offset 6.8 dB Ref 15.00 dBm Mkr1 2.460 GHz -13.492 dBm Start 30 MHz #Res BW 100 kHz #VBW 300 kHz Stop 12.750 GHz Sweep 1.216 s (1001 pts) <table><thead><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr></thead><tbody><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.460 GHz</td><td>-13.492 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>12.419 GHz</td><td>-51.240 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>f</td><td>5.118 GHz</td><td>-54.920 dBm</td><td></td><td></td><td></td></tr><tr><td>4</td><td>N</td><td>1</td><td>f</td><td>7.420 GHz</td><td>-54.118 dBm</td><td></td><td></td><td></td></tr><tr><td>5</td><td>N</td><td>1</td><td>f</td><td>9.824 GHz</td><td>-55.864 dBm</td><td></td><td></td><td></td></tr></tbody></table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.460 GHz	-13.492 dBm				2	N	1	f	12.419 GHz	-51.240 dBm				3	N	1	f	5.118 GHz	-54.920 dBm				4	N	1	f	7.420 GHz	-54.118 dBm				5	N	1	f	9.824 GHz	-55.864 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																																															
1	N	1	f	2.460 GHz	-13.492 dBm																																																		
2	N	1	f	12.419 GHz	-51.240 dBm																																																		
3	N	1	f	5.118 GHz	-54.920 dBm																																																		
4	N	1	f	7.420 GHz	-54.118 dBm																																																		
5	N	1	f	9.824 GHz	-55.864 dBm																																																		

9. COUDUCTED OUTPUT POWER

9.1 Block Diagram Of Test Setup



9.2 Limit

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

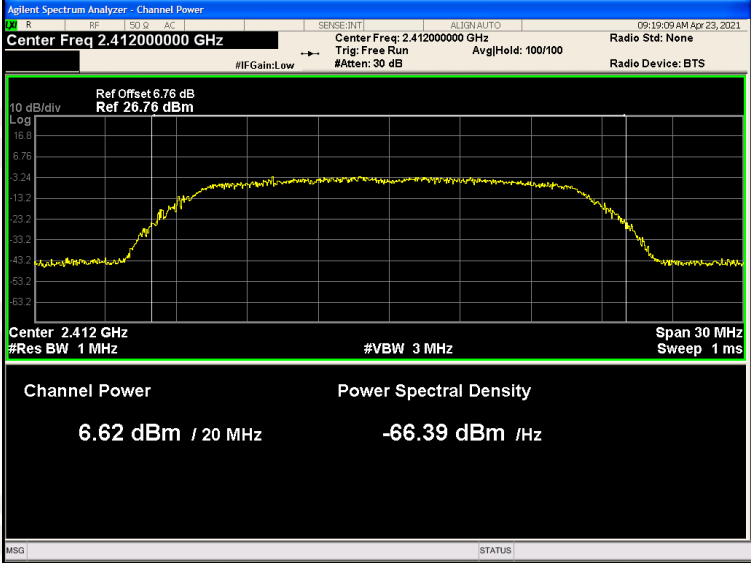
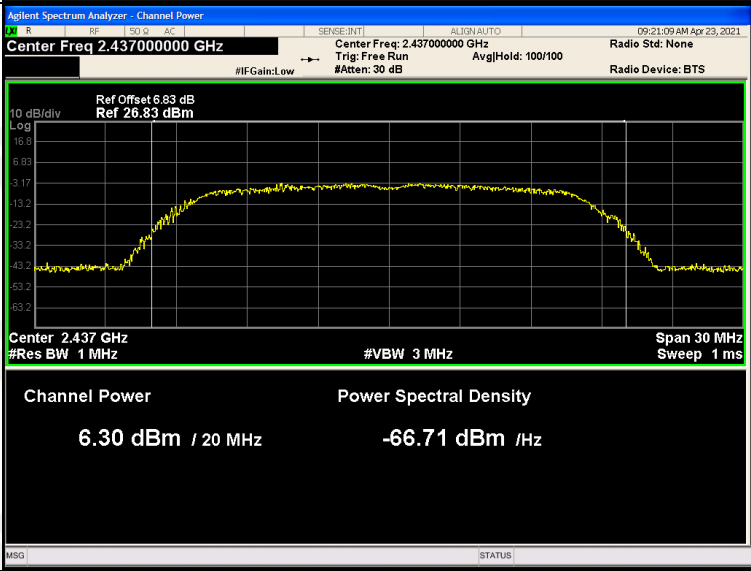
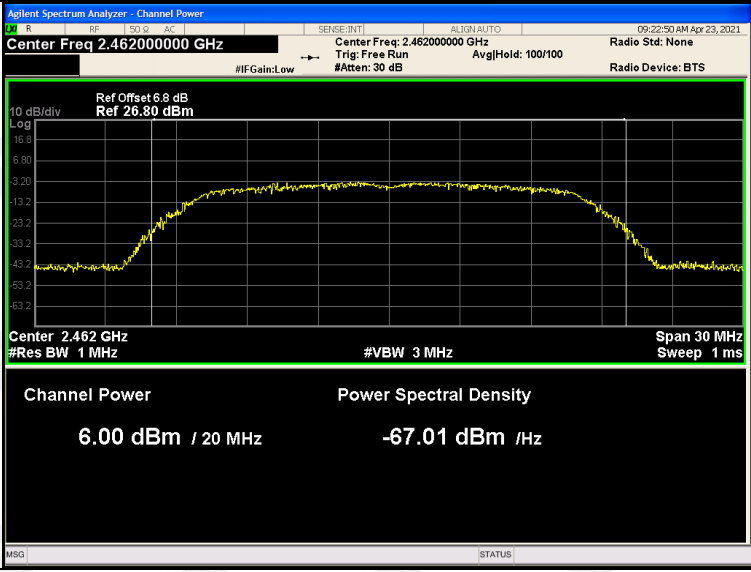
9.3 Test procedure

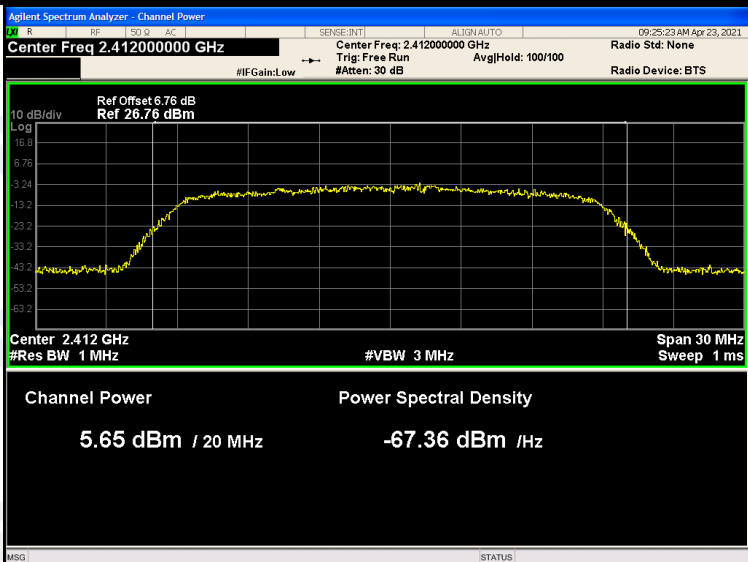
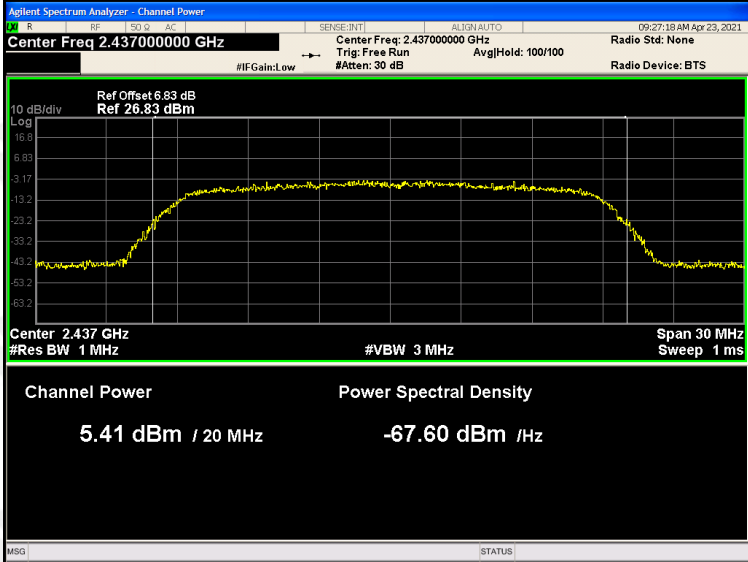
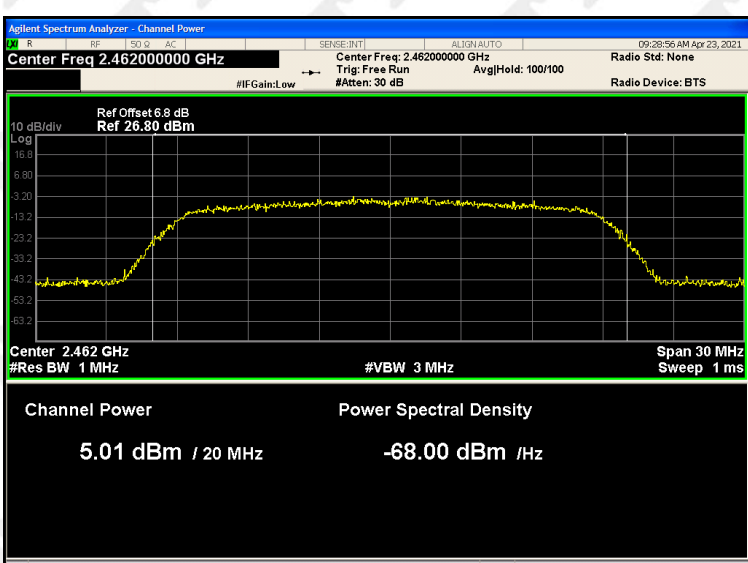
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1MHz. VBW = 3MHz. Sweep = auto; Detector Function = Peak. Channel power function is used
3. Keep the EUT in transmitting at lowest, middle and highest channel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

9.4 Test Result

Mode	Channel.	Peak Output Power [dBm]	Limit[dBm]	Verdict
802.11b	LCH	7.529	30	PASS
	MCH	7.221	30	PASS
	HCH	7.489	30	PASS
802.11g	LCH	6.621	30	PASS
	MCH	6.295	30	PASS
	HCH	5.997	30	PASS
802.11n(HT20)	LCH	5.65	30	PASS
	MCH	5.414	30	PASS
	HCH	5.014	30	PASS

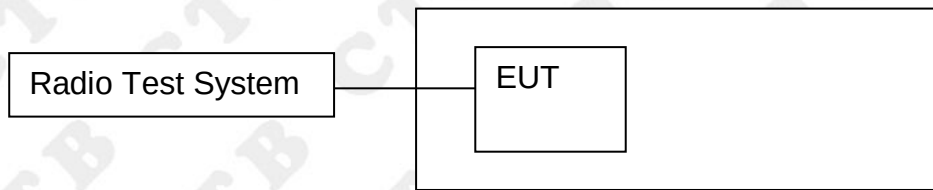
Mode	Channel.	Maximum Output Power [dBm]
802.11b	LCH	Agilent Spectrum Analyzer - Channel Power Center Freq: 2.412000000 GHz Channel Power: 7.53 dBm / 20 MHz Power Spectral Density: -65.48 dBm / Hz
	MCH	Agilent Spectrum Analyzer - Channel Power Center Freq: 2.412000000 GHz Channel Power: 7.53 dBm / 20 MHz Power Spectral Density: -65.48 dBm / Hz
	HCH	Agilent Spectrum Analyzer - Channel Power Center Freq: 2.462000000 GHz Channel Power: 7.49 dBm / 20 MHz Power Spectral Density: -65.52 dBm / Hz

	LCH	 Agilent Spectrum Analyzer - Channel Power Center Freq: 2.412000000 GHz Channel Power: 6.62 dBm / 20 MHz Power Spectral Density: -66.39 dBm / Hz	
802.11g	MCH	 Agilent Spectrum Analyzer - Channel Power Center Freq: 2.437000000 GHz Channel Power: 6.30 dBm / 20 MHz Power Spectral Density: -66.71 dBm / Hz	
	HCH	 Agilent Spectrum Analyzer - Channel Power Center Freq: 2.462000000 GHz Channel Power: 6.00 dBm / 20 MHz Power Spectral Density: -67.01 dBm / Hz	

802.11n(HT20)	LCH	 Agilent Spectrum Analyzer - Channel Power Center Freq: 2.412000000 GHz Ref Offset: 6.76 dB Ref: 26.76 dBm Channel Power: 5.65 dBm / 20 MHz Power Spectral Density: -67.36 dBm / Hz
	MCH	 Agilent Spectrum Analyzer - Channel Power Center Freq: 2.437000000 GHz Ref Offset: 6.83 dB Ref: 26.83 dBm Channel Power: 5.41 dBm / 20 MHz Power Spectral Density: -67.60 dBm / Hz
	HCH	 Agilent Spectrum Analyzer - Channel Power Center Freq: 2.462000000 GHz Ref Offset: 6.8 dB Ref: 26.80 dBm Channel Power: 5.01 dBm / 20 MHz Power Spectral Density: -68.00 dBm / Hz

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	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

10.3 Test procedure

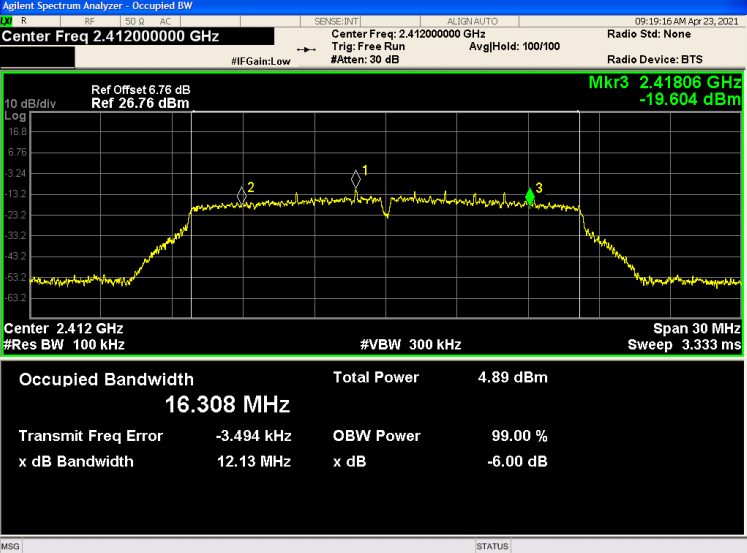
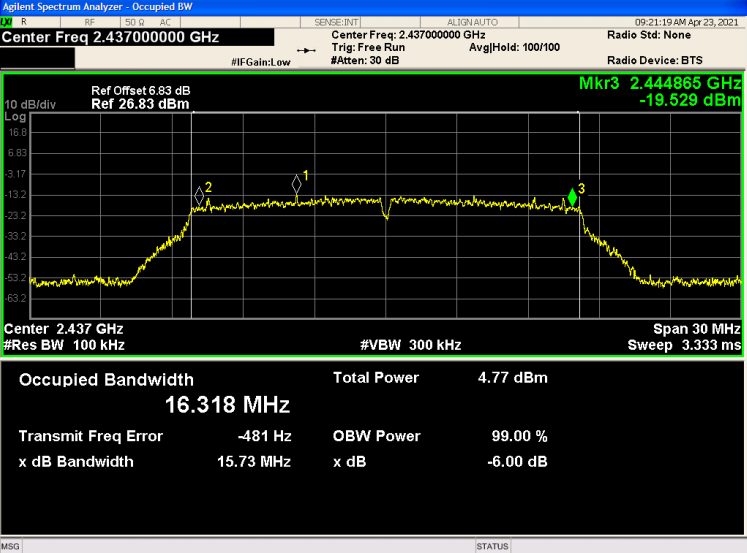
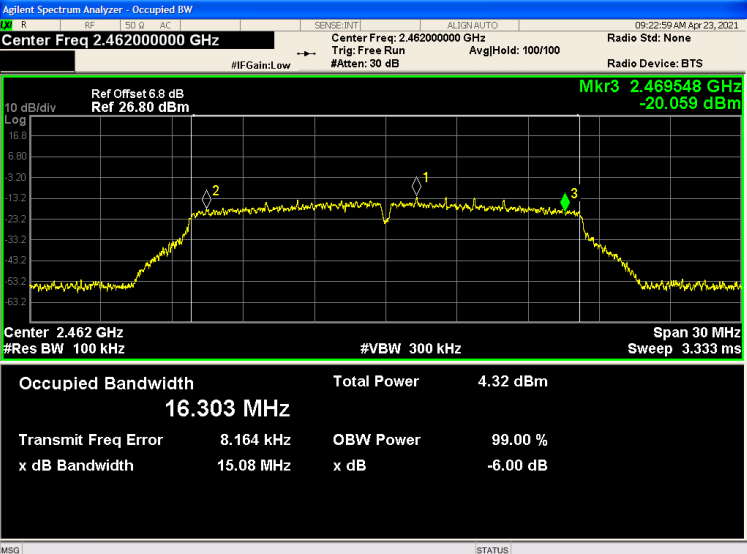
1. Rem1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times \text{RBW}$.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost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

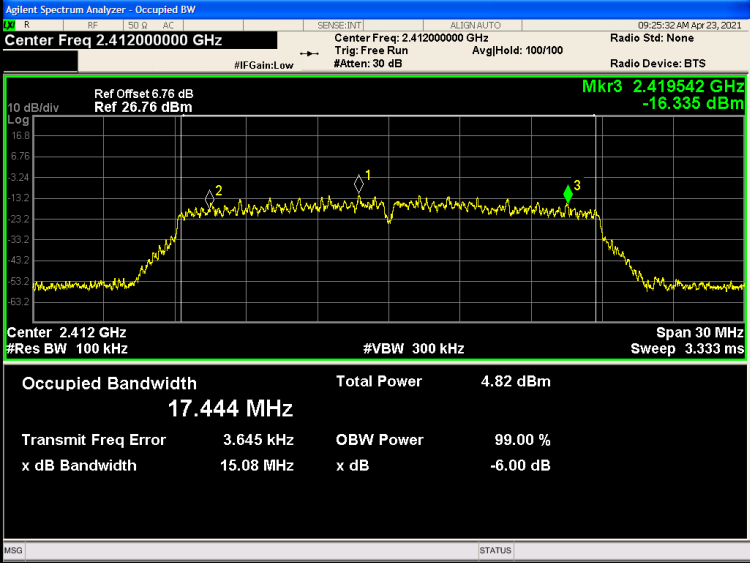
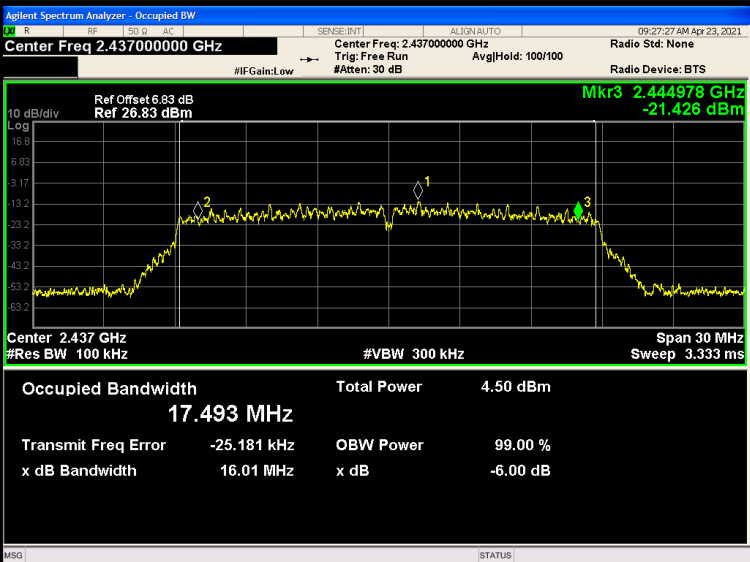
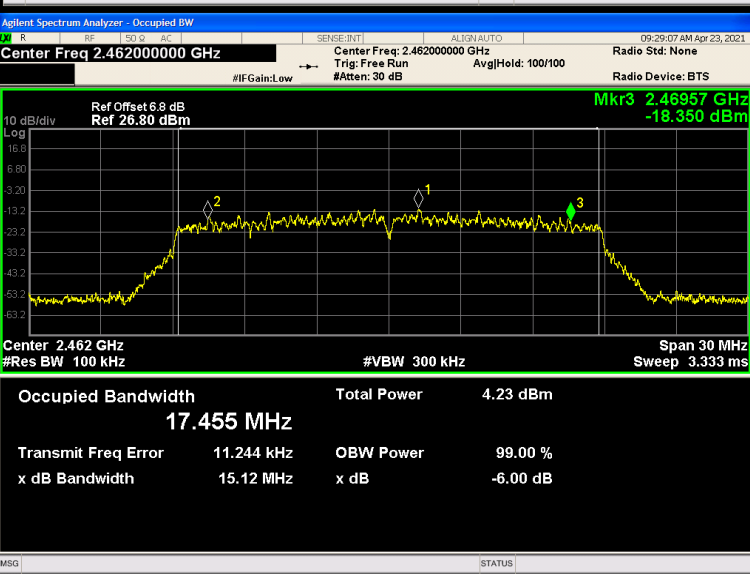
10.4 Test Result

Test Mode	Frequency	6dB Bandwidth (MHz)	Limit(kHz)	Result
802.11b	LCH	8.804	500	PASS
	MCH	9.042	500	PASS
	HCH	9.072	500	PASS
802.11g	LCH	12.127	500	PASS
	MCH	15.73	500	PASS
	HCH	15.081	500	PASS
802.11n(HT20)	LCH	15.077	500	PASS
	MCH	16.007	500	PASS
	HCH	15.117	500	PASS

Test Graph:

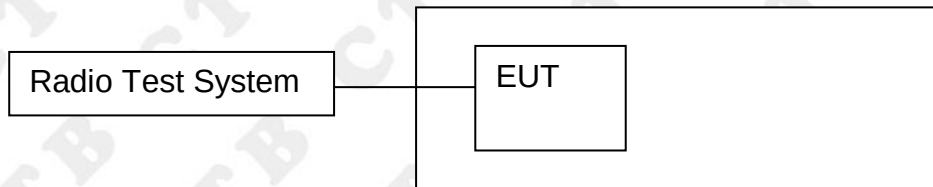


802.11g/LCH	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.41200000 GHz Ref Offset 6.76 dB Ref 26.76 dBm Center 2.412 GHz #Res BW 100 kHz Occupied Bandwidth 16.308 MHz Total Power 4.89 dBm Transmit Freq Error -3.494 kHz OBW Power 99.00 % x dB Bandwidth 12.13 MHz x dB -6.00 dB
802.11g/MCH	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.437000000 GHz Ref Offset 6.83 dB Ref 26.83 dBm Center 2.437 GHz #Res BW 100 kHz Occupied Bandwidth 16.318 MHz Total Power 4.77 dBm Transmit Freq Error -481 Hz OBW Power 99.00 % x dB Bandwidth 15.73 MHz x dB -6.00 dB
802.11g/HCH	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.462000000 GHz Ref Offset 6.8 dB Ref 26.80 dBm Center 2.462 GHz #Res BW 100 kHz Occupied Bandwidth 16.303 MHz Total Power 4.32 dBm Transmit Freq Error 8.164 kHz OBW Power 99.00 % x dB Bandwidth 15.08 MHz x dB -6.00 dB

802.11n(HT20)/LC H	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.41200000 GHz Ref Offset 6.76 dB Ref 26.76 dBm Mkr3 2.419542 GHz -16.335 dBm Center 2.412 GHz #Res BW 100 kHz Span 30 MHz Sweep 3.333 ms Occupied Bandwidth 17.444 MHz Total Power 4.82 dBm Transmit Freq Error 3.645 kHz OBW Power 99.00 % x dB Bandwidth 15.08 MHz x dB -6.00 dB
802.11n(HT20)/MC H	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.43700000 GHz Ref Offset 6.93 dB Ref 26.83 dBm Mkr3 2.444978 GHz -21.426 dBm Center 2.437 GHz #Res BW 100 kHz Span 30 MHz Sweep 3.333 ms Occupied Bandwidth 17.493 MHz Total Power 4.50 dBm Transmit Freq Error -25.181 kHz OBW Power 99.00 % x dB Bandwidth 16.01 MHz x dB -6.00 dB
802.11n(HT20)/HC H	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.46200000 GHz Ref Offset 6.8 dB Ref 26.80 dBm Mkr3 2.46957 GHz -18.350 dBm Center 2.462 GHz #Res BW 100 kHz Span 30 MHz Sweep 3.333 ms Occupied Bandwidth 17.455 MHz Total Power 4.23 dBm Transmit Freq Error 11.244 kHz OBW Power 99.00 % x dB Bandwidth 15.12 MHz x dB -6.00 dB

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

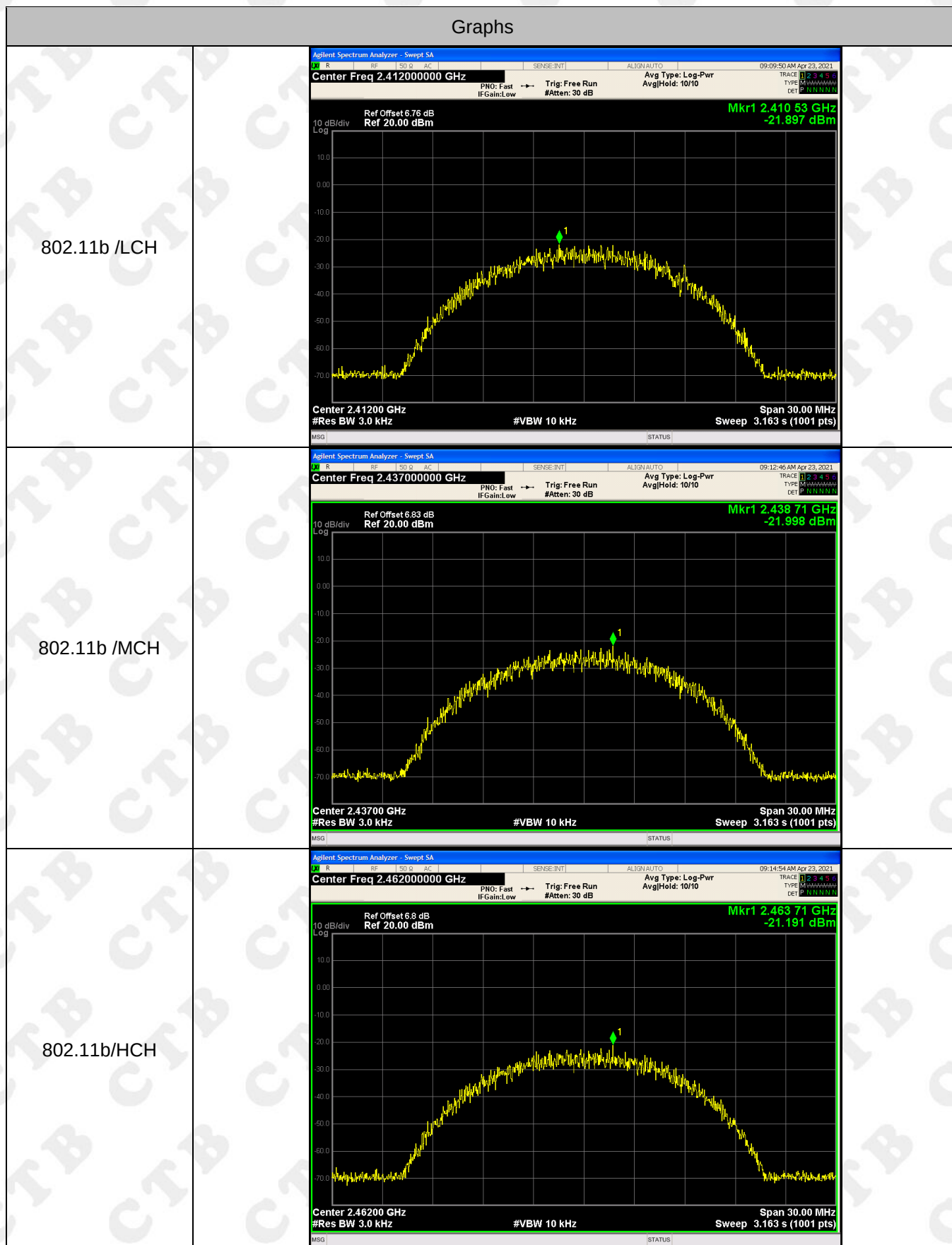
11.3 Test procedure

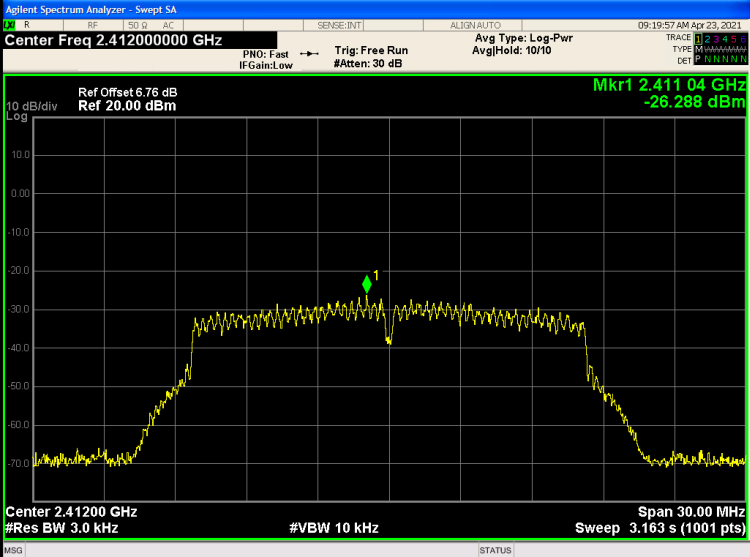
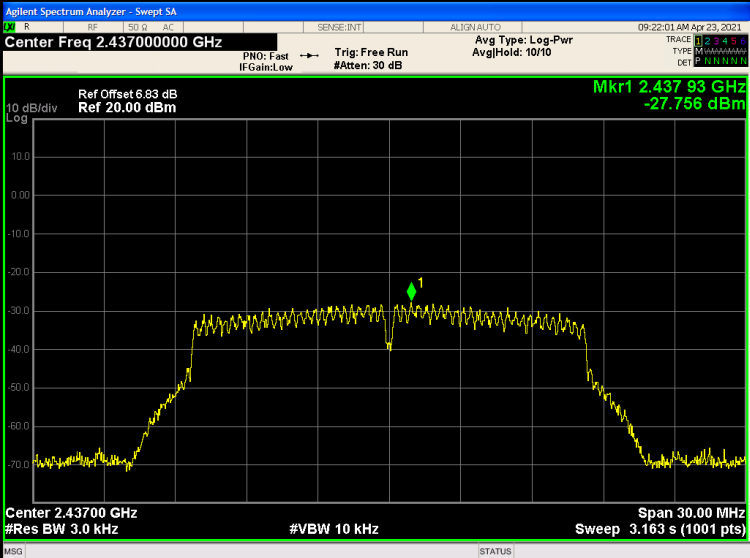
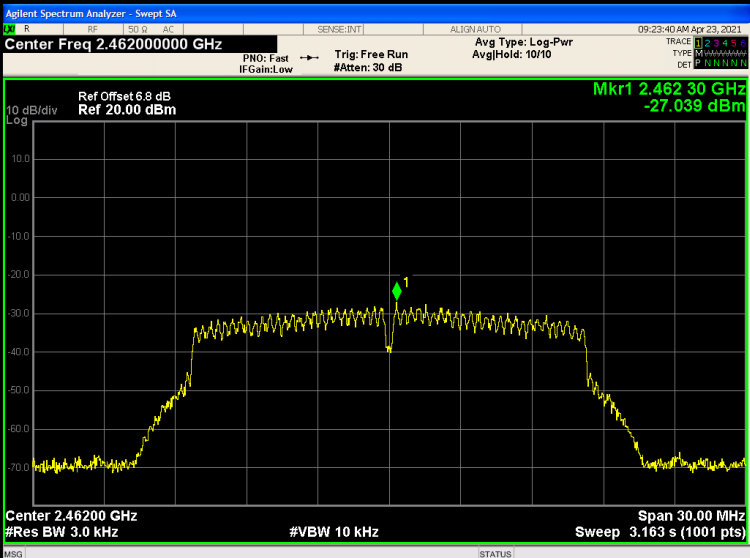
1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
4. Set the VBW $\geq 3 \times \text{RBW}$.
5. Detector = PEAK.
6. Sweep time = auto couple.
7. Trace mode = max hold.
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.

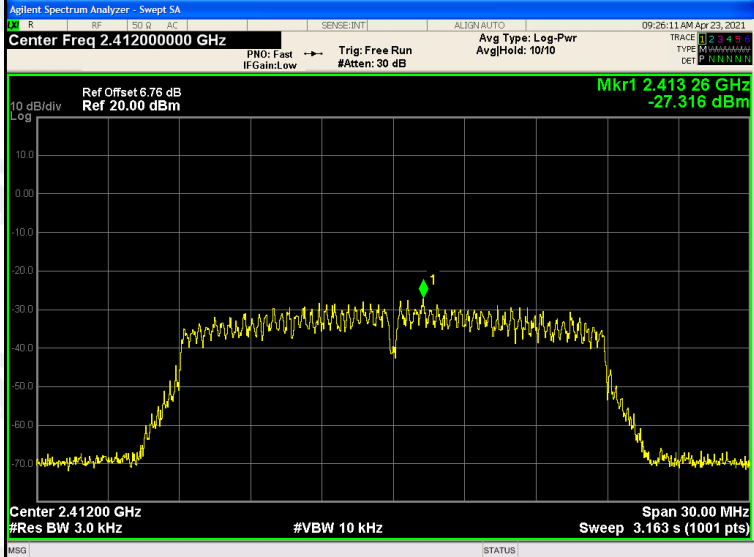
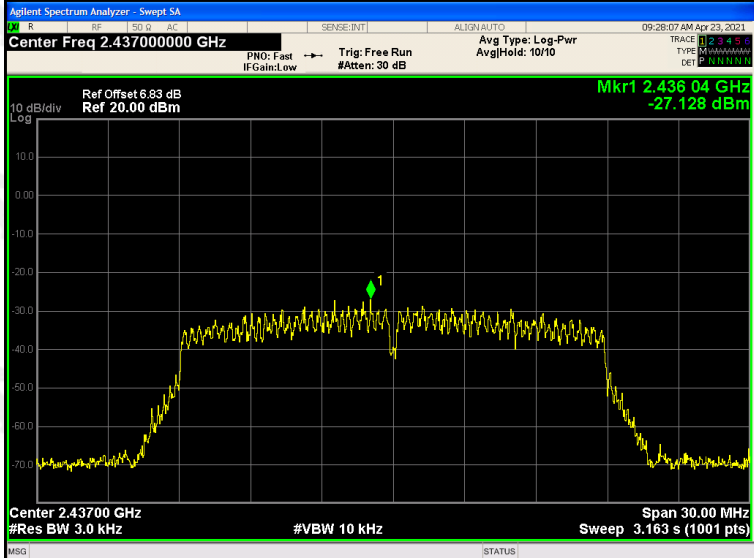
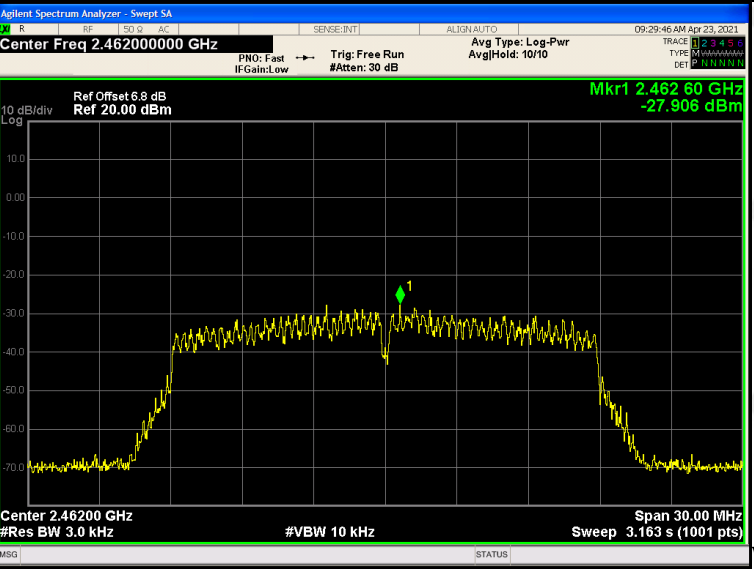
11.4 Test Result

Mode	Channel.	Power Spectral Density [dBm /3KHz]	Limit(8 dBm (in any 3KHz))	Verdict
802.11b	LCH	-21.897	8	PASS
	MCH	-21.998	8	PASS
	HCH	-21.191	8	PASS
802.11g	LCH	-26.288	8	PASS
	MCH	-27.756	8	PASS
	HCH	-27.039	8	PASS
802.11n(H T20)	LCH	-27.316	8	PASS
	MCH	-27.128	8	PASS
	HCH	-27.906	8	PASS

Test Graph



802.11g/LCH	 Agilent Spectrum Analyzer - Swept SA Center Freq 2.41200000 GHz Ref Offset 6.76 dB Ref 20.00 dBm Mkr1 2.411 04 GHz -26.288 dBm Center 2.41200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz Sweep 3.163 s (1001 pts)
802.11g/MCH	 Agilent Spectrum Analyzer - Swept SA Center Freq 2.43700000 GHz Ref Offset 6.83 dB Ref 20.00 dBm Mkr1 2.437 93 GHz -27.756 dBm Center 2.43700 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz Sweep 3.163 s (1001 pts)
802.11g/HCH	 Agilent Spectrum Analyzer - Swept SA Center Freq 2.46200000 GHz Ref Offset 6.8 dB Ref 20.00 dBm Mkr1 2.462 30 GHz -27.039 dBm Center 2.46200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz Sweep 3.163 s (1001 pts)

802.11n(HT20)/LC H	 Agilent Spectrum Analyzer - Swept SA Center Freq 2.41200000 GHz Ref Offset 6.76 dB Ref 20.00 dBm Mkr1 2.413 26 GHz -27.316 dBm Center 2.41200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz Sweep 3.163 s (1001 pts)
802.11n(HT20)/MC H	 Agilent Spectrum Analyzer - Swept SA Center Freq 2.43700000 GHz Ref Offset 6.83 dB Ref 20.00 dBm Mkr1 2.436 04 GHz -27.128 dBm Center 2.43700 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz Sweep 3.163 s (1001 pts)
802.11n(HT20)/HC H	 Agilent Spectrum Analyzer - Swept SA Center Freq 2.46200000 GHz Ref Offset 6.8 dB Ref 20.00 dBm Mkr1 2.462 60 GHz -27.906 dBm Center 2.46200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz Sweep 3.163 s (1001 pts)

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

13. EUT PHOTOGRAPHS

EUT Photo 1



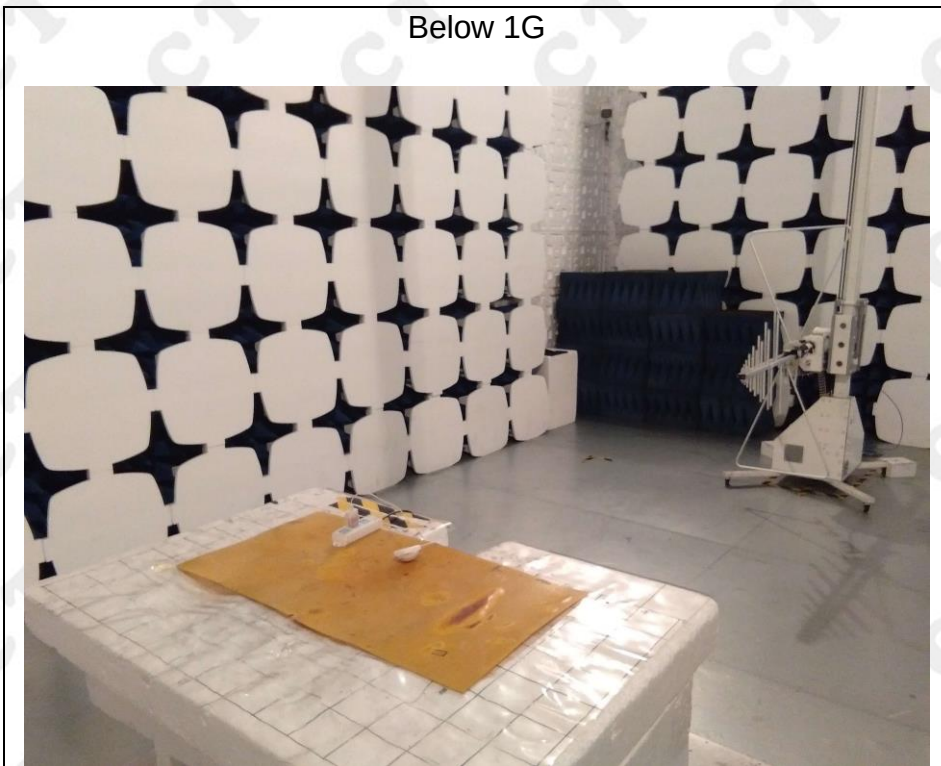
EUT Photo 2



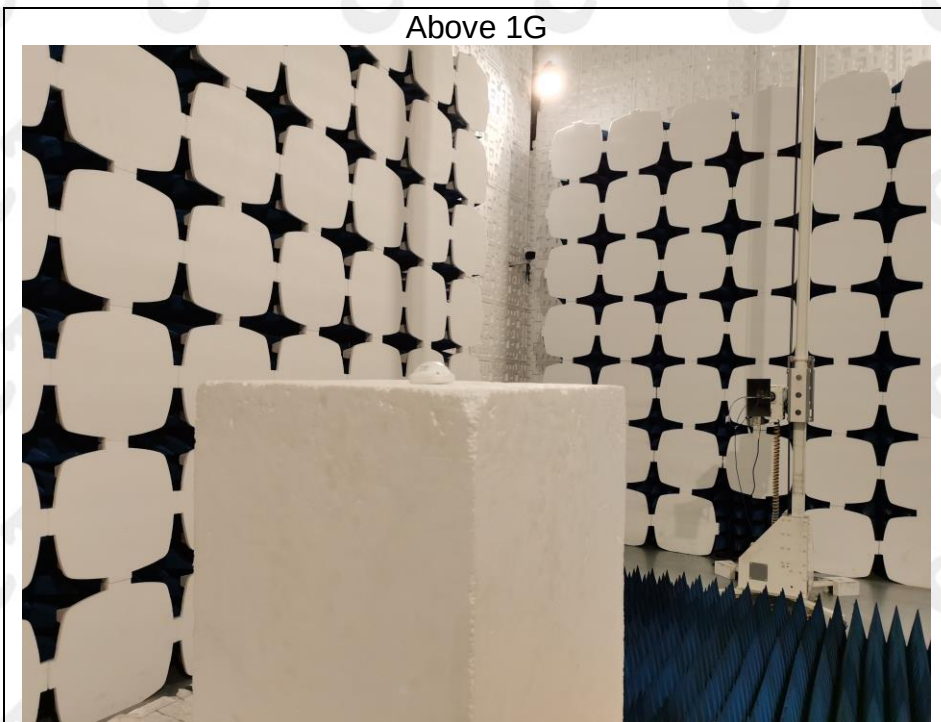
14. EUT TEST SETUP PHOTOGRAPHS

Radiated Emission

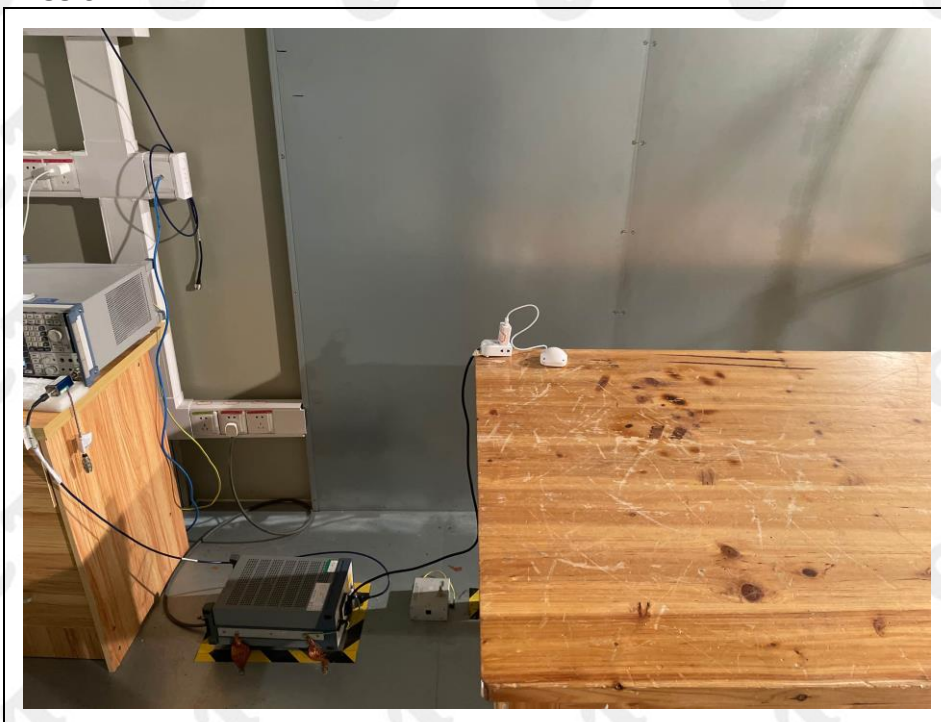
Below 1G



Above 1G



Conducted Emission



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