



TEST REPORT

Product Name: Portable reader
FCC ID: VUJ-AT909
Trademark: N/A
Model Number: AT909
Prepared For: ATID Co., Ltd
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Sample Received Date: Jan. 21, 2025
Sample tested Date: Jan. 21, 2025 to Apr. 15, 2025
Issue Date: Apr. 15, 2025
Report No.: CTB25012101303RF03
Test Standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247
ANSI C63.10:2013
Test Results: PASS
Remark: This is WIFI-2.4GHz band radio test report.
Compiled by: Reviewed by: Approved by:

Zhou Kui

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Bin Mei / Director

Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. 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. "*" indicates the testing items were fulfilled by subcontracted lab. "#" indicates the items are not in CNAS accreditation scope.

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(NOTE: N/A MEANS NOT APPLICABLE)	



1. VERSION

Report No.	Issue Date	Description	Approved
CTB25012101303RF03	Apr. 15, 2025	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 D05v02	PASS
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203/15.247 (b)	/	PASS
RF Exposure Evaluation	47 CFR Part 15 Subpart C Section 15.247 (i)/1.1310/2.1091	KDB447498D01v06	PASS

Remark:

Test according to 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(9KHz-30MHz)	$U=\pm 4.8\text{dB}$
3m camber Radiated spurious emission(30MHz-1GHz)	$U=\pm 4.3\text{dB}$
3m chamber Radiated spurious emission(1GHz-18GHz)	$U=\pm 4.5\text{dB}$
3m chamber Radiated spurious emission(18GHz-40GHz)	$U=\pm 3.4\text{dB}$
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):	AT909
Model Description:	N/A
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: 2412-2462MHz/ 11 channel IEEE 802.11n 40: 2422-2452MHz/ 7 channel
Max. RF output power:	WiFi (2.4G): 20.882dBm
Type of Modulation:	WiFi: DSSS, OFDM
Antenna installation:	WiFi: Internal antenna
Antenna Gain:	WiFi (2.4G): 1.74dBi
Ratings:	DC 5V charging from adapter DC 3.8V by 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
1	Adapter	JYIN	JY-05100C	/	AE

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%.

Test mode	Rate
802.11b	11M
802.11g	54M
802.11/n20	65M
802.11/n40	65M

4.6 Test Environment

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Normal Voltage(DC):	3.8V
Normal Temperature(°C)	23
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 1&2F., Building A, No. 26, Xinghe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, 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

No.	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	A.14.16	2025/6/28
2	Power Sensor	Agilent	U2021XA	MY56120032	/	2025/6/28
3	Power Sensor	Agilent	U2021XA	MY56120034	/	2025/6/28
4	Communication test set	R&S	CMW500	108058	V3.5.80	2025/6/28
5	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	A.14.16	2025/6/28
6	Signal Generator	Agilent	N5181A	MY50140365	A.01.60	2025/6/28
7	Vector signal generator	Agilent	N5182A	MY47420195	A.01.87	2025/6/28
8	Communication test set	Agilent	E5515C	MY50102567	B.19.07 (E1962B)	2025/6/28
9	2.4 GHz Filter	Shenxiang	MSF2400-24 83.5MS-1154	20181015001	/	2025/6/30
10	5 GHz Filter	Shenxiang	MSF5150-58 50MS-1155	20181015001	/	2025/6/30
11	Filter	Xingbo	XBLBQ-DZA 120	190821-1-1	/	2025/6/30
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	/	2025/6/28
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	/	2025/6/28
15	234G Automatic test software	Microwave	MTS8200	Ver. 2.0.0.0	/	/
16	966 chamber	C.R.T.	966	/	/	2027/6/21
17	Receiver	R&S	ESPI	100362	RF_ATTEN_7 (104489/003)	2025/6/28
18	Amplifier	HP	8447E	2945A02747	/	2025/6/28
19	Amplifier	Agilent	8449B	3008A01838	/	2025/6/28
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	/	2025/6/28
21	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA9120D	01911	/	2025/6/28

22	EMI test software	Fala	EZ-EMC	FA-03A2 RE	/	/
23	Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-224	/	2025/6/28
24	loop antenna	ZHINAN	ZN30900A	GTS534	/	/
25	40G Horn antenna	A/H/System	SAS-574	588	/	2025/6/28
26	Amplifier	AEROFLEX	Aeroflex	097	/	2025/6/28
27	Power Metter	KEYSIGHT	N1912AP	N/A	A.05.00	2025/6/28

Continuous disturbance						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	843 Shield Room	C/ R/ T	843	/	/	2027/6/21
2	AMN	ROHDE&SCHWARZ	ESH3-Z5	831551852	/	2025/6/30
3	Pulse limiter	ROHDE&SCHWARZ	ESH3Z2	357881052	/	2025/6/28
4	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100428	V4.42.SP3	2025/6/30
5	Coaxial cable	ZDECL	Z302S	18091904	/	2025/6/30
6	ISN	Schwarzbeck	NTFM8158	183	/	2025/6/30
7	Voltage sensor	Schwarzbeck	TK 9420	01189	/	2025/10/25
8	EZ-EMC	Frad	EMC-con3A1.1	/	/	/
9	Current Probe	FCC	F-52B	199453	/	2025/5/27
10	Communication test set	R&S	CMW500	108058	B.19.07 (E1962B)	2025/6/28
11	Communication test set	Agilent	E5515C	MY50102567	V3.5.80	2025/6/28

Radiated emission(No.1 Chamber)						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	966 Chamber	C/ R/ T	966	/	/	2027/6/21
2	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	01911	/	2025/7/06
3	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	/	2025/6/29
4	Amplifier	Agilent	8449B	3008A01838	/	2025/6/30
5	Amplifier	HP	8447E	2945A02747	/	2025/6/28
6	loop antenna	Schwarzbeck	FMZB 1519B	1519B-224	/	2025/6/29
7	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESPI	100362	RF_ATTEN_7 (104489/003)	2025/6/28
8	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	A.14.16	2025/6/28
9	Coaxial cable	ETS	RFC-SNS-100-NMS-80	/	/	2025/6/28
10	Coaxial cable	ETS	RFC-SN-100-NMS-20	/	/	2025/6/28

11	Coaxial cable	ETS	RFC-SNS-100-SMS-20	/	/	2025/6/28
12	Coaxial cable	ETS	RFC-NNS-100-NMS-300	/	/	2025/6/28
13	EMI test software	Frad	EZ-EMC	Ver/ FA-03A2 RE	/	/
14	Communication test set	R&S	CMW500	108058	B.19.07 (E1962B)	2025/6/28
15	Communication test set	Agilent	E5515C	MY50102567	V3.5.80	2025/6/28

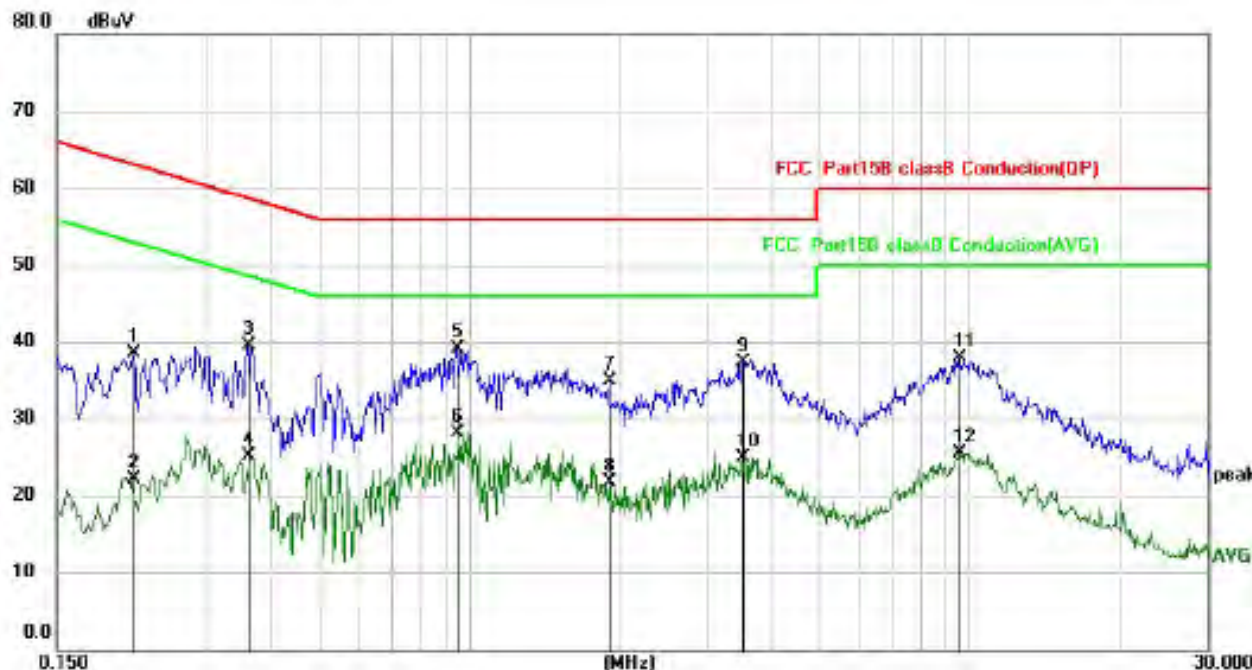
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.

6.4 Test Result

Test Specification: Line

AC 120V 60Hz

the worst: 802.11b (low channel)

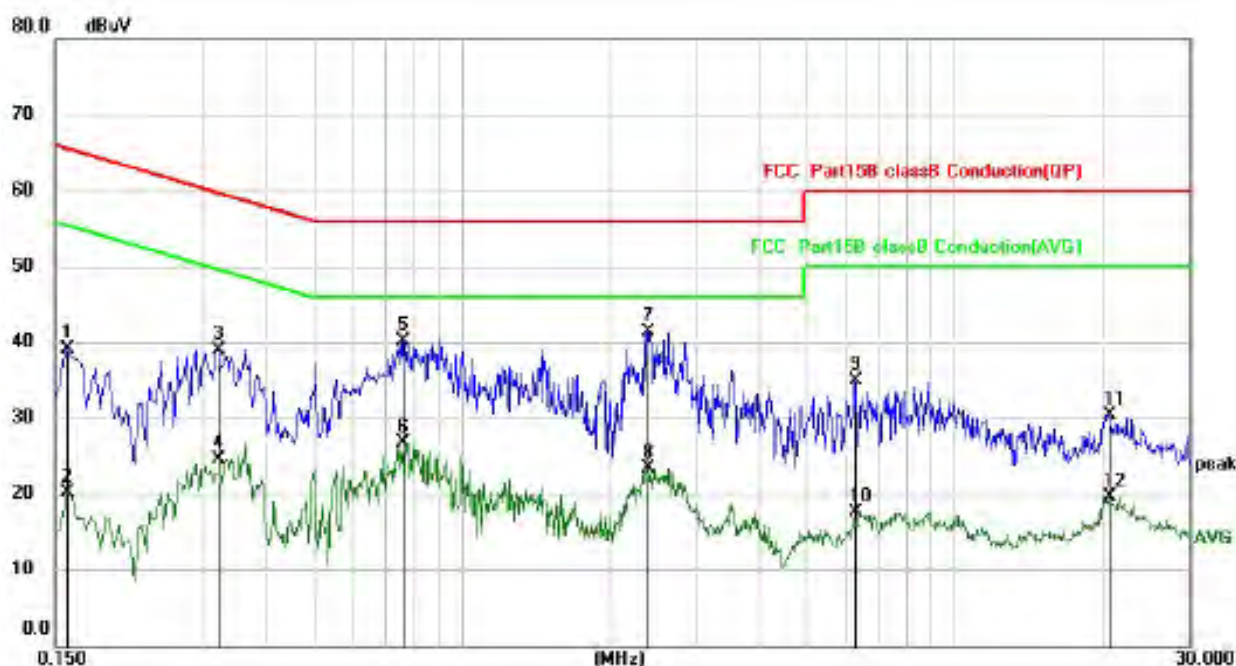


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.2139	27.77	10.70	38.47	63.05	-24.58	QP
2		0.2139	11.45	10.70	22.15	53.05	-30.90	AVG
3		0.3618	28.96	10.60	39.56	58.69	-19.13	QP
4		0.3618	14.52	10.60	25.12	48.69	-23.57	AVG
5	*	0.9457	28.12	10.91	39.03	56.00	-16.97	QP
6		0.9457	17.11	10.91	28.02	46.00	-17.98	AVG
7		1.9177	23.31	11.53	34.84	56.00	-21.16	QP
8		1.9177	10.08	11.53	21.61	46.00	-24.39	AVG
9		3.5419	25.37	11.92	37.29	56.00	-18.71	QP
10		3.5419	12.95	11.92	24.87	46.00	-21.13	AVG
11		9.5219	24.73	13.19	37.92	60.00	-22.08	QP
12		9.5219	12.39	13.19	25.58	50.00	-24.42	AVG

Remark:

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

Test Specification: Neutral
AC 120V 60Hz
the worst: 802.11b (low channel)



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1582	28.19	10.86	39.05	65.56	-26.51	QP
2		0.1582	9.28	10.86	20.14	55.56	-35.42	AVG
3		0.3220	28.35	10.62	38.97	59.66	-20.69	QP
4		0.3220	13.81	10.62	24.43	49.66	-25.23	AVG
5		0.7620	29.38	10.77	40.15	56.00	-15.85	QP
6		0.7620	15.90	10.77	26.67	46.00	-19.33	AVG
7	*	2.3940	29.69	11.67	41.36	56.00	-14.64	QP
8		2.3940	11.67	11.67	23.34	46.00	-22.66	AVG
9		6.2938	22.12	12.69	34.81	60.00	-25.19	QP
10		6.2938	4.79	12.69	17.48	50.00	-32.52	AVG
11		20.6299	16.58	13.64	30.22	60.00	-29.78	QP
12		20.6299	5.95	13.64	19.59	50.00	-30.41	AVG

Remark:

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

7. RADIATED SPURIOUS EMISSION

7.1 Block Diagram Of Test Setup

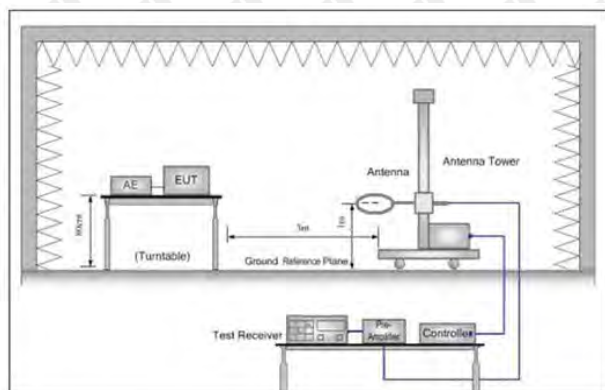


Figure 1. Below 30MHz

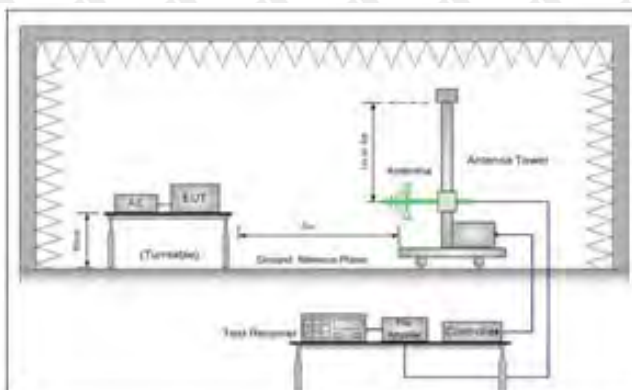


Figure 2. 30MHz to 1GHz

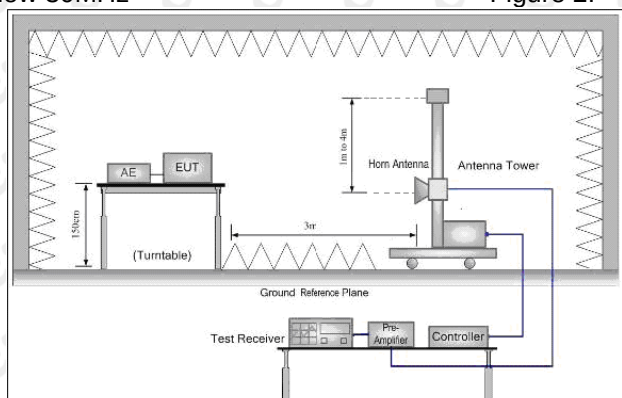


Figure 3. Above 1GHz

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:

- 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.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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:

- 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).
- Test the EUT in the lowest channel ,the middle channel ,the Highest channel
- 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	Over dB	Detector
1		50.3206	27.91	-6.64	21.27	40.00	-18.73	QP
2		113.7143	30.89	-6.50	24.39	43.50	-19.11	QP
3		160.0648	27.66	-0.84	26.82	43.50	-16.68	QP
4		217.5443	30.67	-4.47	26.20	46.00	-19.80	QP
5	*	565.6297	27.06	3.07	30.13	46.00	-15.87	QP
6		965.5421	27.23	8.72	35.95	54.00	-18.05	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		44.9006	29.38	-6.76	22.62	40.00	-17.38	QP
2		80.0806	32.10	-8.69	23.41	40.00	-16.59	QP
3		160.0648	28.48	-0.84	27.64	43.50	-15.86	QP
4		384.6055	31.92	-1.06	30.86	46.00	-15.14	QP
5	*	782.3453	27.85	7.05	34.90	46.00	-11.10	QP
6		982.6200	27.35	8.84	36.19	54.00	-17.81	QP

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

1. The margin of 9K-30MH measurement exceeds 20dB, so the test chart is not included. Test Mode: 802.11b low channel (the worst)
2. All modes have been tested, and the test results show that b-mode data is the worst, only b-mode test chart is put. Test Mode: 802.11b low channel (the worst)
3. After pre-scanning three directions, the report recorded the worst case Test Mode: 802.11b low channel (the worst)

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	65.80	-3.64	62.16	74	-11.84	peak
4824	48.65	-3.64	45.01	54	-8.99	AVG
7236	58.89	-0.95	57.94	74	-16.06	peak
7236	44.24	-0.95	43.29	54	-10.71	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	64.80	-3.64	61.16	74	-12.84	peak
4824	47.04	-3.64	43.40	54	-10.60	AVG
7236	57.89	-0.95	56.94	74	-17.06	peak
7236	44.27	-0.95	43.32	54	-10.68	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	65.00	-3.51	61.49	74	-12.51	peak
4874	49.68	-3.51	46.17	54	-7.83	AVG
7311	59.47	-0.82	58.65	74	-15.35	peak
7311	45.75	-0.82	44.93	54	-9.07	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	63.17	-3.51	59.66	74	-14.34	peak
4874	49.21	-3.51	45.70	54	-8.30	AVG
7311	59.21	-0.82	58.39	74	-15.61	peak
7311	42.61	-0.82	41.79	54	-12.21	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 (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4924	64.03	-3.43	60.60	74	-13.40	peak
4924	46.71	-3.43	43.28	54	-10.72	AVG
7386	59.78	-0.75	59.03	74	-14.97	peak
7386	42.87	-0.75	42.12	54	-11.88	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
4924	63.02	-3.43	59.59	74	-14.41	peak
4924	47.64	-3.43	44.21	54	-9.79	AVG
7386	57.42	-0.75	56.67	74	-17.33	peak
7386	43.09	-0.75	42.34	54	-11.66	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	65.74	-3.64	62.10	74	-11.90	peak
4824	48.74	-3.64	45.10	54	-8.90	AVG
7236	57.05	-0.95	56.10	74	-17.90	peak
7236	44.64	-0.95	43.69	54	-10.31	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	63.43	-3.64	59.79	74	-14.21	peak
4824	46.67	-3.64	43.03	54	-10.97	AVG
7236	58.01	-0.95	57.06	74	-16.94	peak
7236	45.60	-0.95	44.65	54	-9.35	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)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4874	64.31	-3.51	60.80	74	-13.20	peak
4874	47.51	-3.51	44.00	54	-10.00	AVG
7311	58.75	-0.82	57.93	74	-16.07	peak
7311	43.23	-0.82	42.41	54	-11.59	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	63.34	-3.51	59.83	74	-14.17	peak
4874	47.59	-3.51	44.08	54	-9.92	AVG
7311	57.37	-0.82	56.55	74	-17.45	peak
7311	41.21	-0.82	40.39	54	-13.61	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	64.65	-3.43	61.22	74	-12.78	peak
4924	47.49	-3.43	44.06	54	-9.94	AVG
7386	58.16	-0.75	57.41	74	-16.59	peak
7386	41.83	-0.75	41.08	54	-12.92	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	61.88	-3.43	58.45	74	-15.55	peak
4924	47.46	-3.43	44.03	54	-9.97	AVG
7386	57.65	-0.75	56.90	74	-17.10	peak
7386	41.80	-0.75	41.05	54	-12.95	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	63.14	-3.64	59.50	74	-14.50	peak
4824	47.60	-3.64	43.96	54	-10.04	AVG
7236	57.00	-0.95	56.05	74	-17.95	peak
7236	43.17	-0.95	42.22	54	-11.78	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)	
4824	65.15	-3.64	61.51	74	-12.49	peak
4824	50.46	-3.64	46.82	54	-7.18	AVG
7236	57.40	-0.95	56.45	74	-17.55	peak
7236	43.98	-0.95	43.03	54	-10.97	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	62.12	-3.51	58.61	74.00	-15.39	peak
4874.00	47.35	-3.51	43.84	54.00	-10.16	AVG
7311.00	57.12	-0.82	56.30	74.00	-17.70	peak
7311.00	43.42	-0.82	42.60	54.00	-11.40	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	64.56	-3.51	61.05	74.00	-12.95	peak
4874.00	46.34	-3.51	42.83	54.00	-11.17	AVG
7311.00	59.47	-0.82	58.65	74.00	-15.35	peak
7311.00	43.30	-0.82	42.48	54.00	-11.52	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	63.77	-3.43	60.34	74	-13.66	peak
4924	46.96	-3.43	43.53	54	-10.47	AVG
7386	56.81	-0.75	56.06	74	-17.94	peak
7386	42.96	-0.75	42.21	54	-11.79	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	63.07	-3.43	59.64	74	-14.36	peak
4924	45.26	-3.43	41.83	54	-12.17	AVG
7386	58.33	-0.75	57.58	74	-16.42	peak
7386	43.08	-0.75	42.33	54	-11.67	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)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4844	64.08	-3.63	60.45	74	-13.55	peak
4844	47.57	-3.63	43.94	54	-10.06	AVG
7266	57.55	-0.94	56.61	74	-17.39	peak
7266	46.67	-0.94	45.73	54	-8.27	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)	
4844	65.67	-3.63	62.04	74	-11.96	peak
4844	49.41	-3.63	45.78	54	-8.22	AVG
7266	59.41	-0.94	58.47	74	-15.53	peak
7266	45.73	-0.94	44.79	54	-9.21	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	62.86	-3.51	59.35	74	-14.65	peak
4874	48.30	-3.51	44.79	54	-9.21	AVG
7311	59.57	-0.82	58.75	74	-15.25	peak
7311	43.67	-0.82	42.85	54	-11.15	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	62.24	-3.51	58.73	74	-15.27	peak
4874	46.45	-3.51	42.94	54	-11.06	AVG
7311	56.71	-0.82	55.89	74	-18.11	peak
7311	43.36	-0.82	42.54	54	-11.46	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)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4904	63.09	-3.43	59.66	74	-14.34	peak
4904	48.85	-3.43	45.42	54	-8.58	AVG
7356	56.46	-0.75	55.71	74	-18.29	peak
7356	41.17	-0.75	40.42	54	-13.58	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)	
4904	63.81	-3.43	60.38	74	-13.62	peak
4904	48.12	-3.43	44.69	54	-9.31	AVG
7356	56.22	-0.75	55.47	74	-18.53	peak
7356	44.20	-0.75	43.45	54	-10.55	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
- (5) Have tested in three orientations for radiated emissions, Only The worst record is in this report

Restricted bands around fundamental frequency (Radiated)

Operation Mode:

802.11b 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	56.48	-5.81	50.67	74	-23.33	
2390	/	-5.81	/	54	/	AVG
2399	63.86	-5.84	58.02	74	-15.98	peak
2399	49.79	-5.84	43.95	54	-10.05	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	57.87	-5.81	52.06	74	-21.94	
2390	/	-5.81	/	54	/	AVG
2399	62.32	-5.84	56.48	74	-17.52	peak
2399	46.48	-5.84	40.64	54	-13.36	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

When the peak value is smaller than the AVG limit, AVG is not reflected.

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	56.10	-5.65	50.45	74	-23.55	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	57.19	-5.65	51.54	74	-22.46	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.						

When the peak value is smaller than the AVG limit, AVG is not reflected.

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	59.00	-5.81	53.19	74	-20.81	peak
2390	/	-5.81	/	54	/	AVG
2399	63.11	-5.84	57.27	74	-16.73	peak
2399	46.63	-5.84	40.79	54	-13.21	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	57.66	-5.81	51.85	74	-22.15	peak
2390	/	-5.81	/	54	/	AVG
2399	62.08	-5.84	56.24	74	-17.76	peak
2399	45.56	-5.84	39.72	54	-14.28	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

When the peak value is smaller than the AVG limit, AVG is not reflected.

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	56.64	-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						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	57.70	-5.65	52.05	74	-21.95	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.						

When the peak value is smaller than the AVG limit, AVG is not reflected.

Operation Mode: 802.11n/H20 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	57.09	-5.81	51.28	74	-22.72	peak
2390	/	-5.81	/	54	/	AVG
2399	63.45	-5.84	57.61	74	-16.39	peak
2399	48.50	-5.84	42.66	54	-11.34	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	56.71	-5.81	50.90	74	-23.10	peak
2390	/	-5.81	/	54	/	AVG
2399	61.55	-5.84	55.71	74	-18.29	peak
2399	48.06	-5.84	42.22	54	-11.78	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

When the peak value is smaller than the AVG limit, AVG is not reflected.

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	56.19	-5.65	50.54	74	-23.46	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	56.73	-5.65	51.08	74	-22.92	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.						

When the peak value is smaller than the AVG limit, AVG is not reflected.

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	57.44	-5.81	51.63	74	-22.37	peak
2390	/	-5.81	/	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)	
2390	57.74	-5.81	51.93	74	-22.07	peak
2390	/	-5.81	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

When the peak value is smaller than the AVG limit, AVG is not reflected.

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	57.83	-5.65	52.18	74	-21.82	peak
2483.5	/	-5.65	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

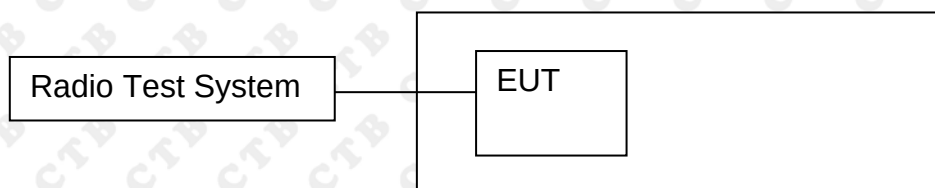
Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	57.37	-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						
Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.						

When the peak value is smaller than the AVG limit, AVG is not reflected.

8. BAND EDGE AND RF CONDUCTED SPURIOUS EMISSIONS

8.1 Block Diagram Of Test Setup



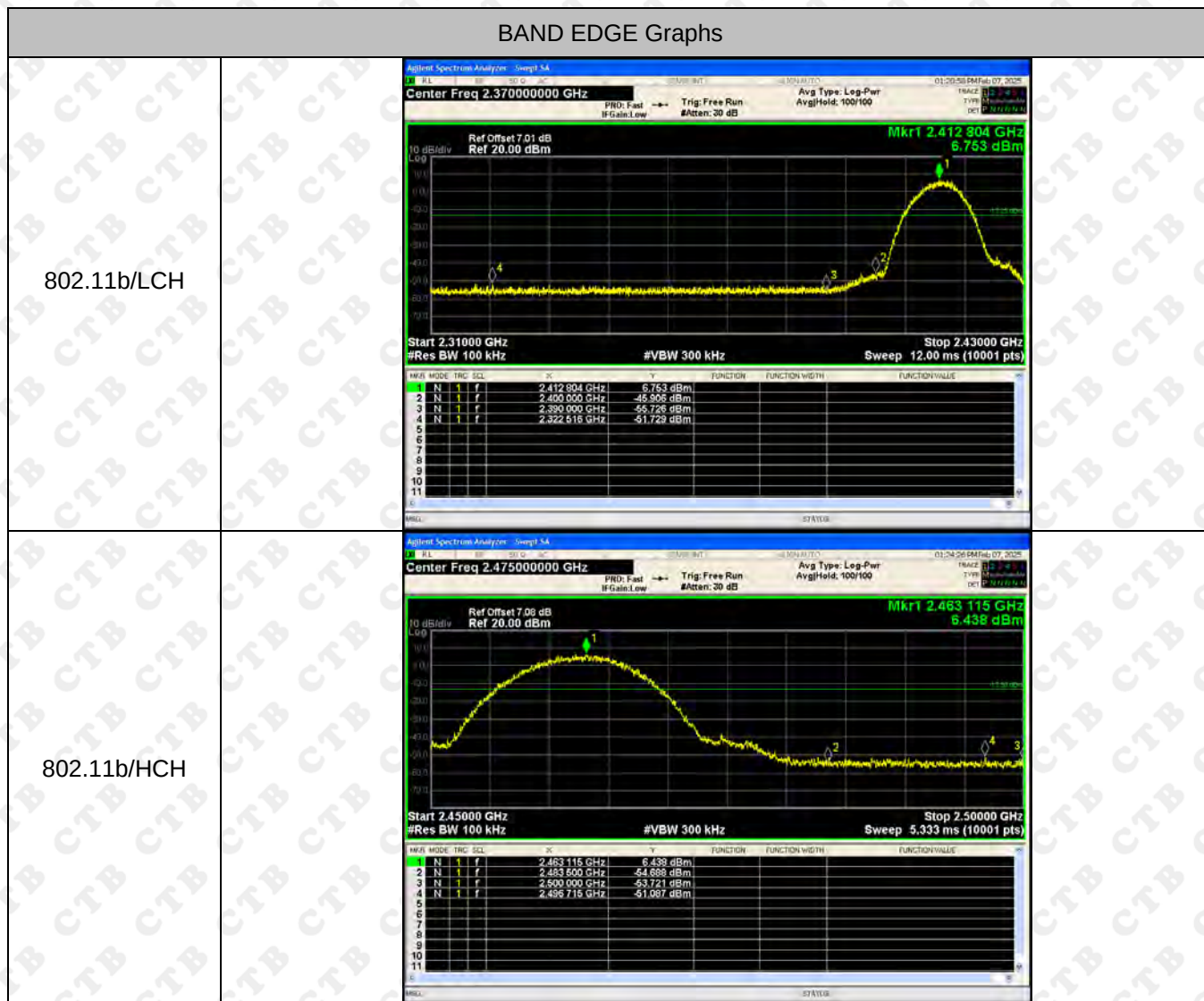
8.2 Limit

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

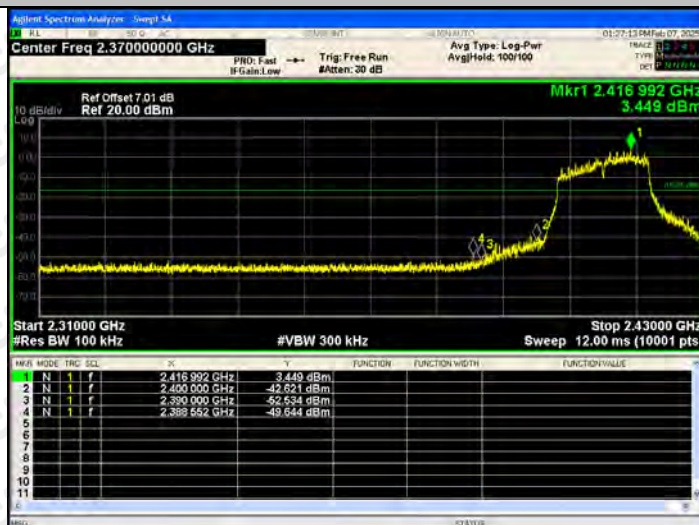
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer:
 - Below 30MHz:
 - RBW = 100kHz, VBW = 300kHz, Sweep = auto
 - Detector function = peak, Trace = max hold
 - Above 30MHz:
 - RBW = 100KHz, VBW = 300KHz, Sweep = auto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

8.4 Test Result



BAND EDGE Graphs

802.11g/LCH



802.11g/HCH

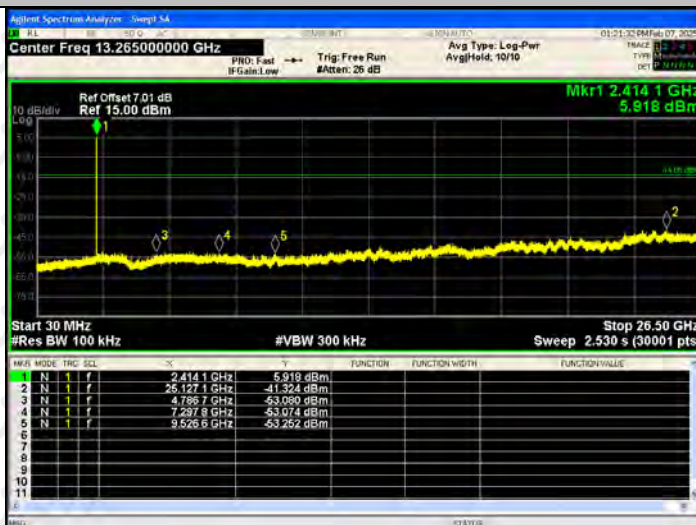




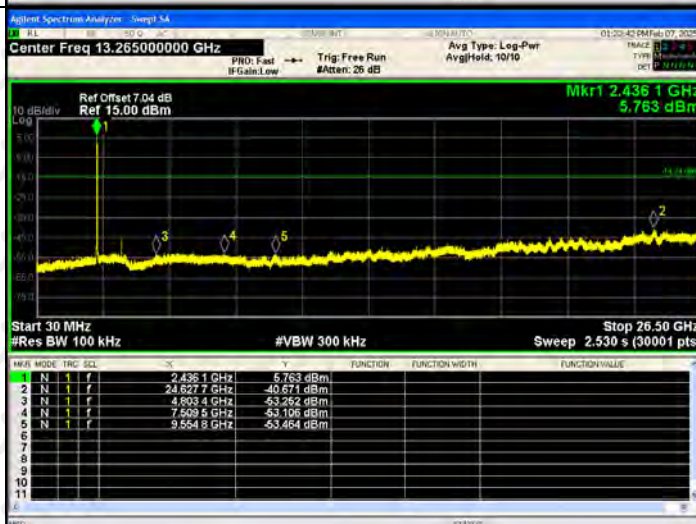


RF Conducted Spurious Emissions Graphs

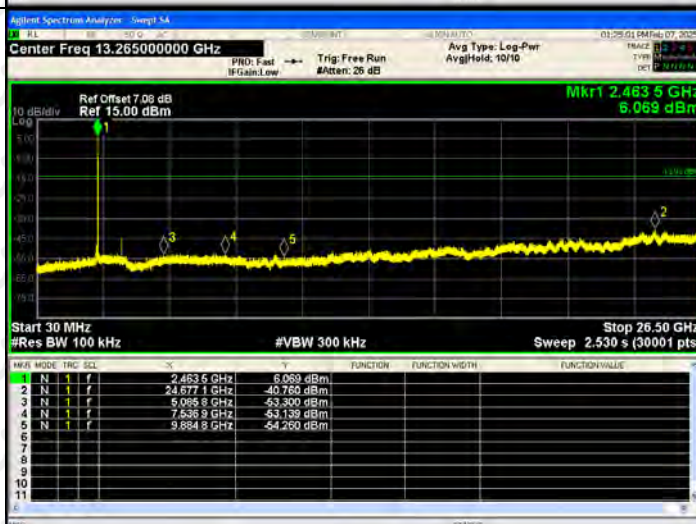
802.11b/LCH



802.11b/MCH

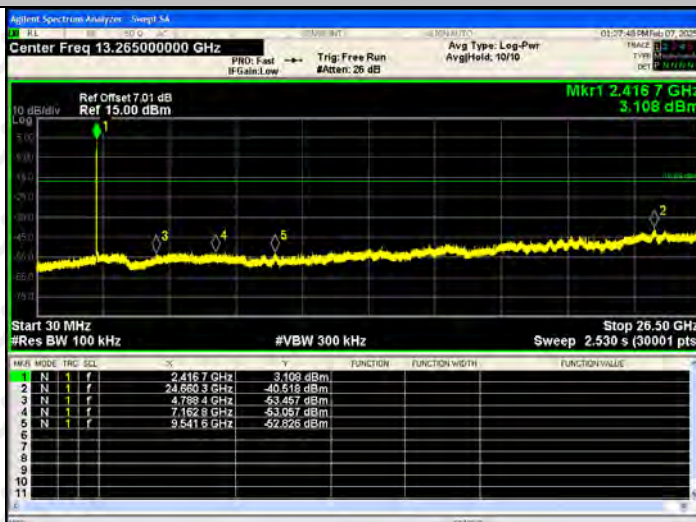


802.11b/HCH

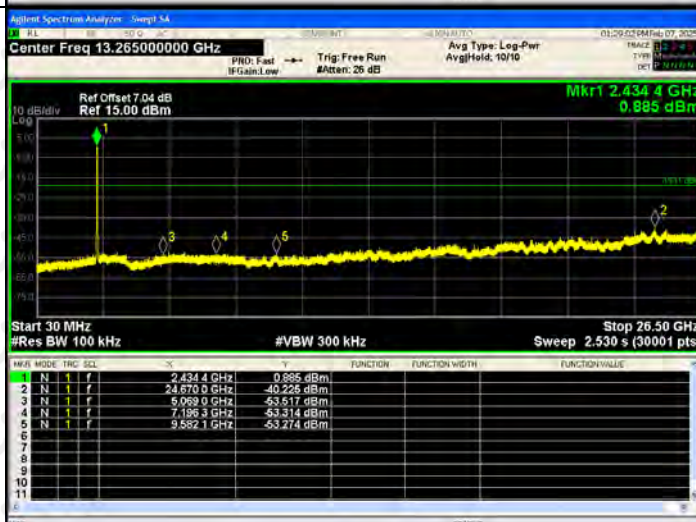


RF Conducted Spurious Emissions Graphs

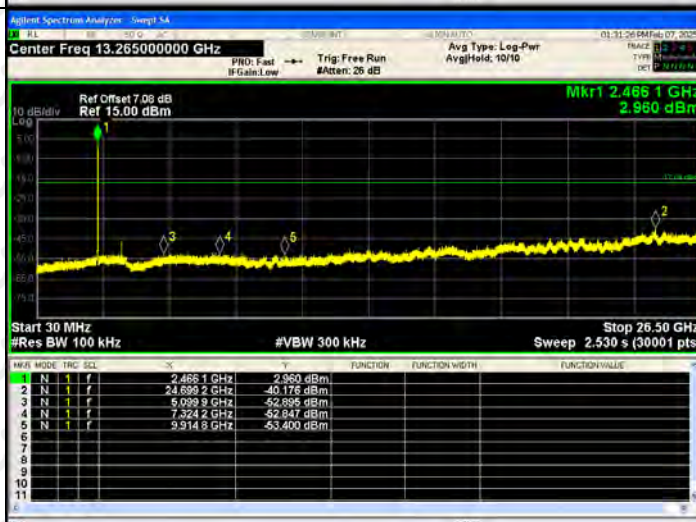
802.11g/LCH



802.11g/MCH

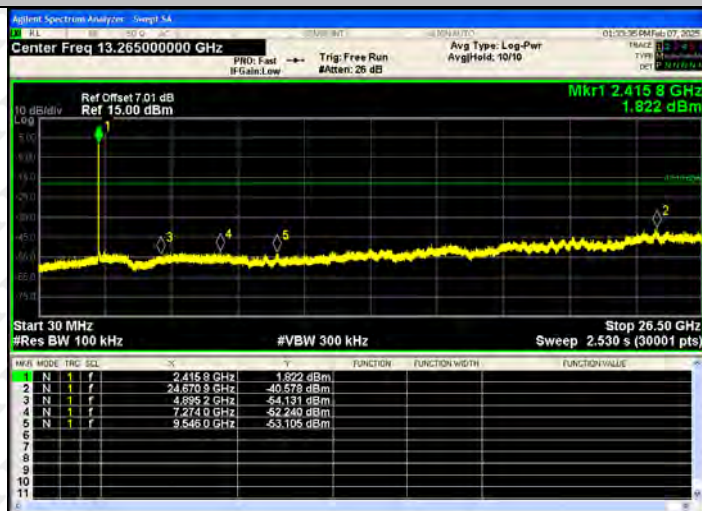


802.11g/HCH



RF Conducted Spurious Emissions Graphs

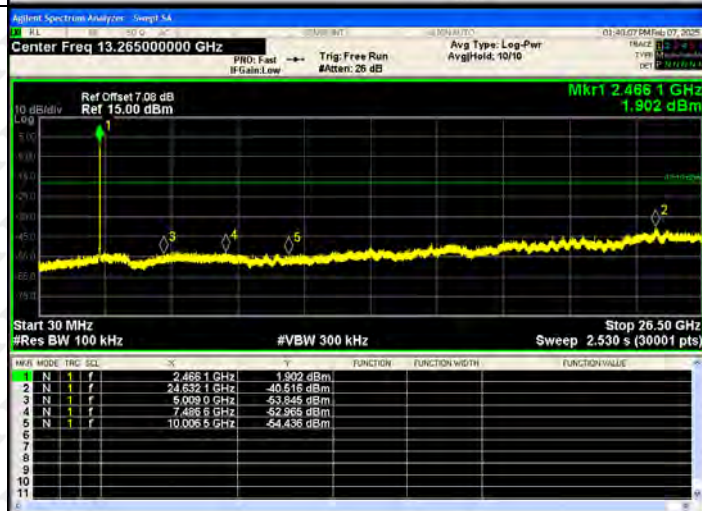
802.11n(HT20)/LCH



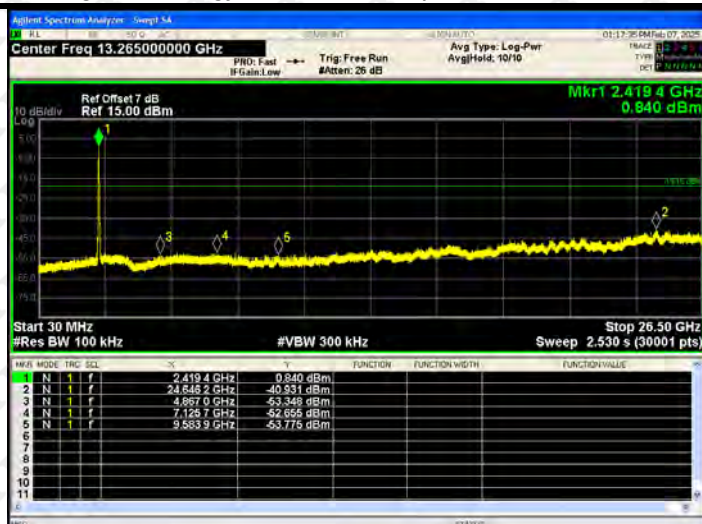
802.11 n(HT20)/MCH



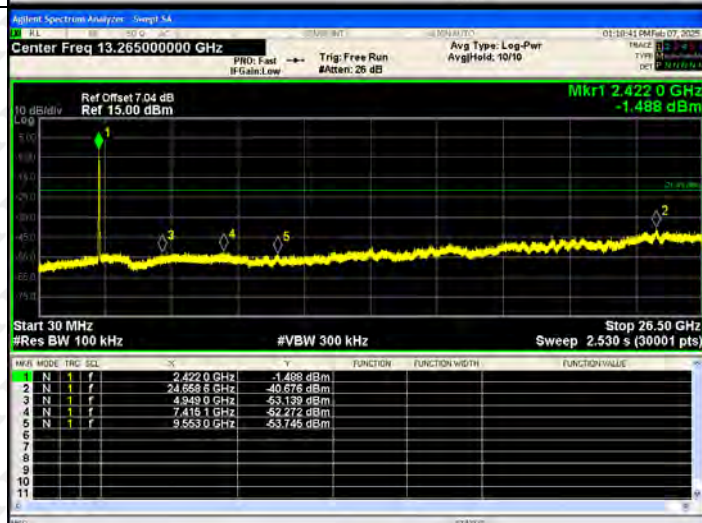
802.11 n(HT20)/HCH



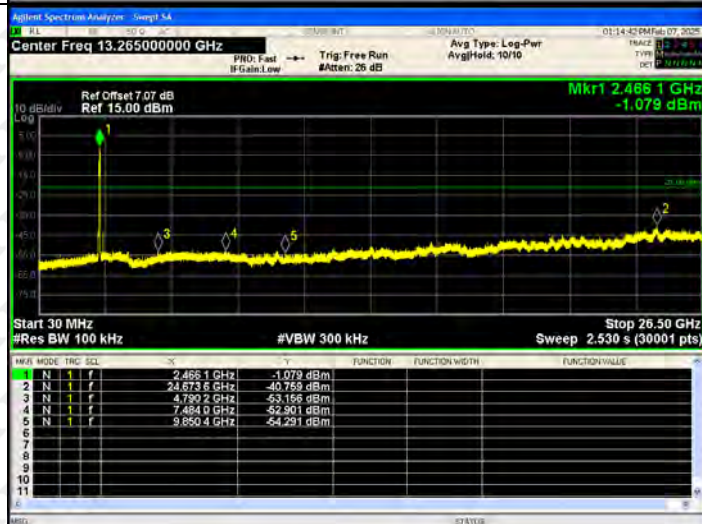
802.11n(HT40)/LCH



802.11 n(HT40)/MCH



802.11 n(HT40)/HCH



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)	Maximum Conducted Output Power	1 watt or 30dBm	2400-2483.5	PASS

9.3 Test procedure

1. The EUT was directly connected to the Power meter

For Duty cycle:

Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

- A diode detector and an oscilloscope that together have a sufficiently short response time to permit accurate measurements of the ON and OFF times of the transmitted signal.
- The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:
 - Set the center frequency of the instrument to the center frequency of the transmission.
 - Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value.
 - Set $VBW \geq RBW$. Set detector = peak or average.
 - The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if $T \leq 16.7 \mu s$.)

9.4 Test Result

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
802.11b	LCH	20.823	30	PASS
	MCH	20.882	30	PASS
	HCH	20.781	30	PASS
802.11g	LCH	19.567	30	PASS
	MCH	19.847	30	PASS
	HCH	19.528	30	PASS
802.11n(HT20)	LCH	18.967	30	PASS
	MCH	19.254	30	PASS
	HCH	18.817	30	PASS
802.11n(HT40)	LCH	18.059	30	PASS
	MCH	17.454	30	PASS
	HCH	17.511	30	PASS

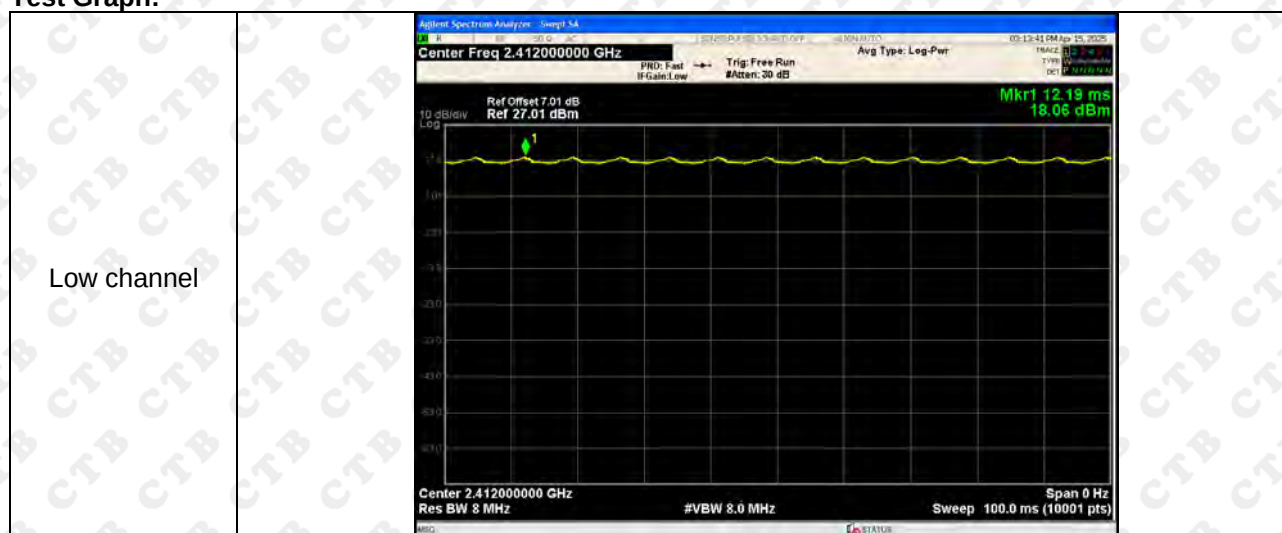
Duty Cycle

Mode	Channel.	Duty Cycle(%)	Correction Factor (dB)
802.11b	LCH	100	0
802.11g	LCH	100	0
802.11n(HT20)	LCH	100	0
802.11n(HT40)	LCH	100	0

Duty Cycle

802.11b:

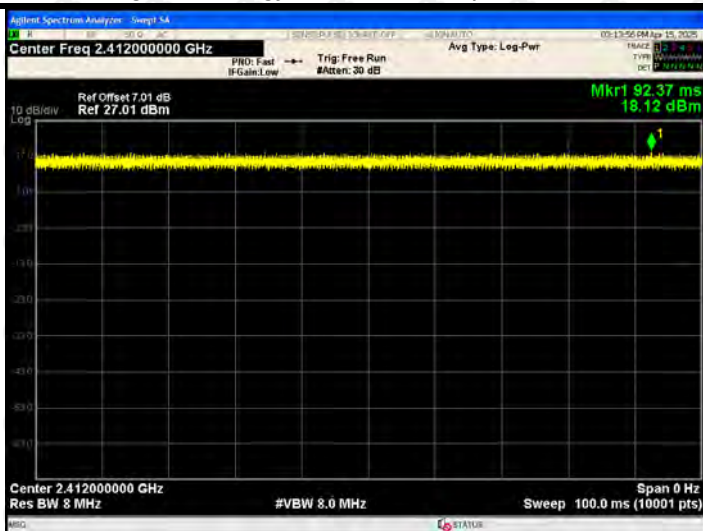
Test Graph:



802.11g:

Test Graph:

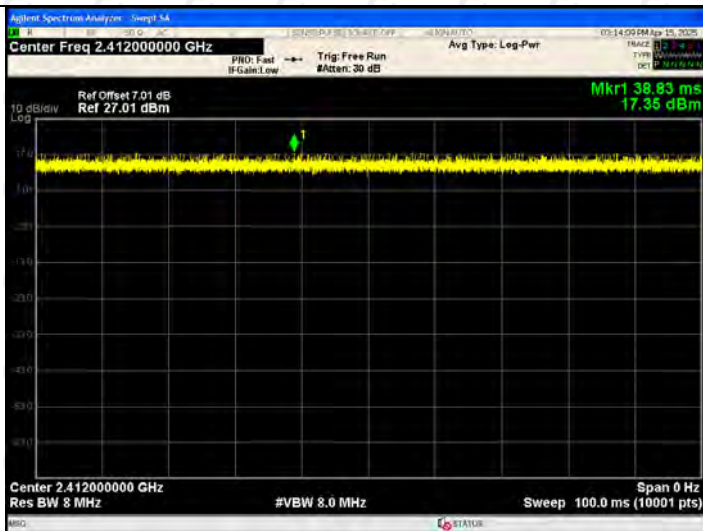
Low channel



802.11n(HT20):

Test Graph:

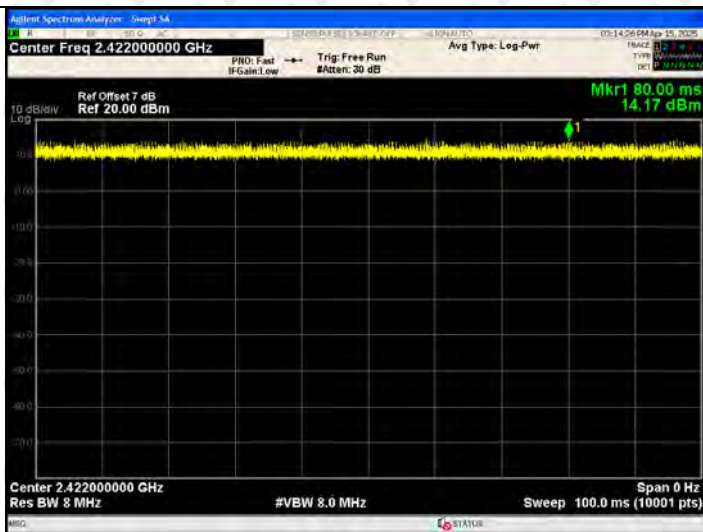
Low channel



802.11n(HT40):

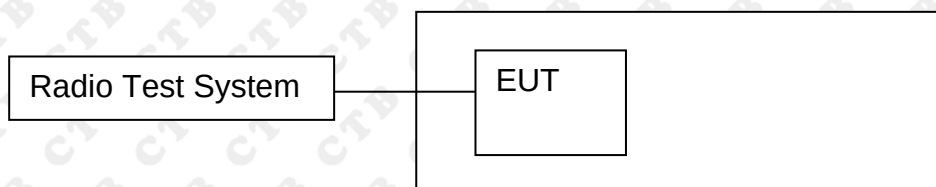
Test Graph:

Low channel



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

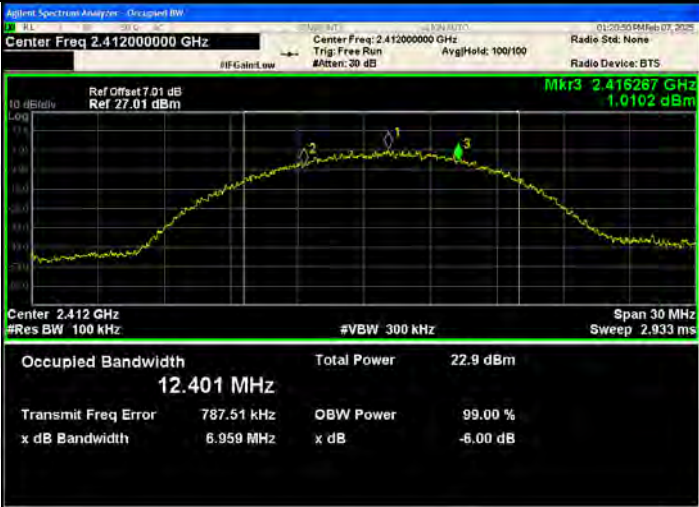
10.3 Test procedure

1. Rem1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ 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	6.959	500	PASS
	MCH	9.199	500	PASS
	HCH	6.62	500	PASS
802.11g	LCH	10.718	500	PASS
	MCH	16.42	500	PASS
	HCH	14.108	500	PASS
802.11n(HT20)	LCH	12.594	500	PASS
	MCH	17.234	500	PASS
	HCH	13.841	500	PASS
802.11n(HT40)	LCH	15.039	500	PASS
	MCH	29.512	500	PASS
	HCH	29.488	500	PASS

Test Graph:

Graphs	
802.11b /LCH	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.41200000 GHz</p> <p>Center Freq: 2.412000000 GHz Trig: Free Run #atten: 30 dB</p> <p>Ref Offset 7.01 dB Ref 27.01 dBm</p> <p>Mkr3 2.416287 GHz 1.0102 dBm</p> <p>Center 2.412 GHz #Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 30 MHz Sweep 2.933 ms</p> <p>Occupied Bandwidth 12.401 MHz</p> <p>Total Power 22.9 dBm</p> <p>Transmit Freq Error 787.51 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 6.959 MHz</p> <p>x dB -6.00 dB</p>
802.11b /MCH	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.43700000 GHz</p> <p>Center Freq: 2.437000000 GHz Trig: Free Run #atten: 30 dB</p> <p>Ref Offset 7.04 dB Ref 27.04 dBm</p> <p>Mkr3 2.441365 GHz 0.77364 dBm</p> <p>Center 2.437 GHz #Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 30 MHz Sweep 2.933 ms</p> <p>Occupied Bandwidth 13.431 MHz</p> <p>Total Power 22.7 dBm</p> <p>Transmit Freq Error -244.41 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 9.199 MHz</p> <p>x dB -6.00 dB</p>
802.11b/HCH	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.46200000 GHz</p> <p>Center Freq: 2.462000000 GHz Trig: Free Run #atten: 30 dB</p> <p>Ref Offset 7.08 dB Ref 27.08 dBm</p> <p>Mkr3 2.465758 GHz 1.0908 dBm</p> <p>Center 2.462 GHz #Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 30 MHz Sweep 2.933 ms</p> <p>Occupied Bandwidth 12.409 MHz</p> <p>Total Power 22.6 dBm</p> <p>Transmit Freq Error 445.97 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 6.620 MHz</p> <p>x dB -6.00 dB</p>

802.11g/LCH

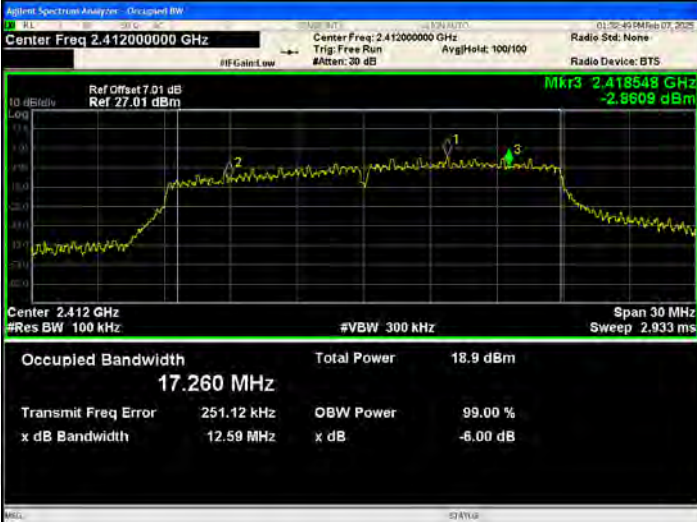
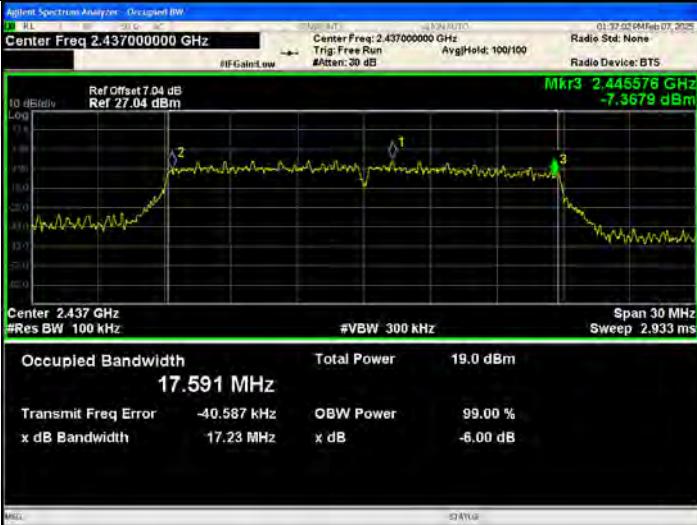


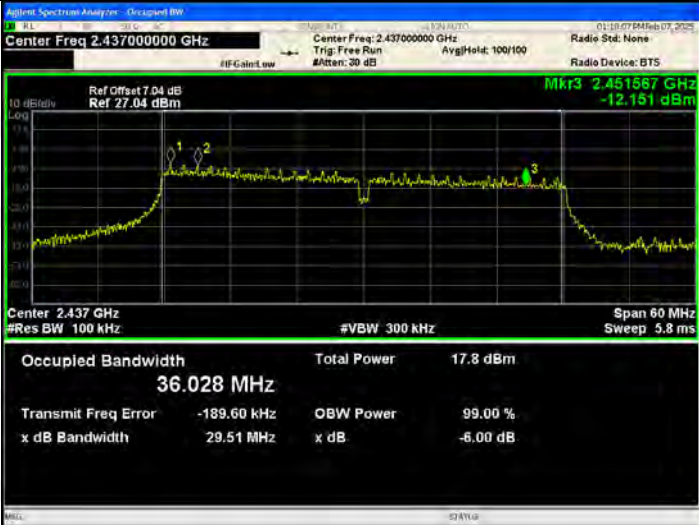
802.11g/MCH



802.11g/HCH

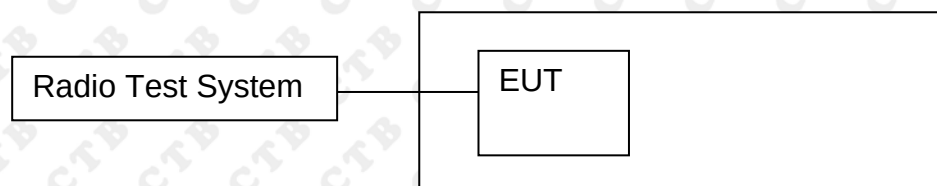


<p>802.11n(HT20)/LC H</p>	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.412000000 GHz</p> <p>Ref Offset 7.01 dB Ref 27.01 dBm</p> <p>Mkr3 2.418548 GHz -2.9609 dBm</p> <p>Center 2.412 GHz #Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 30 MHz Sweep 2.933 ms</p> <p>Occupied Bandwidth 17.260 MHz</p> <p>Total Power 18.9 dBm</p> <p>Transmit Freq Error 251.12 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 12.59 MHz</p> <p>x dB -6.00 dB</p>
<p>802.11n(HT20)/MC H</p>	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.437000000 GHz</p> <p>Ref Offset 7.04 dB Ref 27.04 dBm</p> <p>Mkr3 2.445576 GHz -7.3679 dBm</p> <p>Center 2.437 GHz #Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 30 MHz Sweep 2.933 ms</p> <p>Occupied Bandwidth 17.591 MHz</p> <p>Total Power 19.0 dBm</p> <p>Transmit Freq Error -40.587 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 17.23 MHz</p> <p>x dB -6.00 dB</p>
<p>802.11n(HT20)/HC H</p>	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.462000000 GHz</p> <p>Ref Offset 7.06 dB Ref 27.06 dBm</p> <p>Mkr3 2.468029 GHz -4.3716 dBm</p> <p>Center 2.462 GHz #Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 30 MHz Sweep 2.933 ms</p> <p>Occupied Bandwidth 17.355 MHz</p> <p>Total Power 18.5 dBm</p> <p>Transmit Freq Error 108.41 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 13.84 MHz</p> <p>x dB -6.00 dB</p>

<p>802.11n(HT40)/LC H</p>	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.42200000 GHz</p> <p>Ref Offset 7 dB Ref 27.00 dBm</p> <p>Mkr3 2.429547 GHz -5.8121 dBm</p> <p>Center 2.422 GHz #Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 60 MHz Sweep 5.8 ms</p> <p>Occupied Bandwidth 35.086 MHz</p> <p>Total Power 18.2 dBm</p> <p>Transmit Freq Error 27.775 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 15.04 MHz</p> <p>x dB -6.00 dB</p>
<p>802.11n(HT40)/MC H</p>	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.43700000 GHz</p> <p>Ref Offset 7.04 dB Ref 27.04 dBm</p> <p>Mkr3 2.451567 GHz -12.151 dBm</p> <p>Center 2.437 GHz #Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 60 MHz Sweep 5.8 ms</p> <p>Occupied Bandwidth 36.028 MHz</p> <p>Total Power 17.3 dBm</p> <p>Transmit Freq Error -189.60 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 29.51 MHz</p> <p>x dB -6.00 dB</p>
<p>802.11n(HT40)/HC H</p>	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.45200000 GHz</p> <p>Ref Offset 7.07 dB Ref 27.07 dBm</p> <p>Mkr3 2.468935 GHz -3.0293 dBm</p> <p>Center 2.452 GHz #Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 60 MHz Sweep 5.8 ms</p> <p>Occupied Bandwidth 35.956 MHz</p> <p>Total Power 17.3 dBm</p> <p>Transmit Freq Error 191.13 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 29.49 MHz</p> <p>x dB -6.00 dB</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

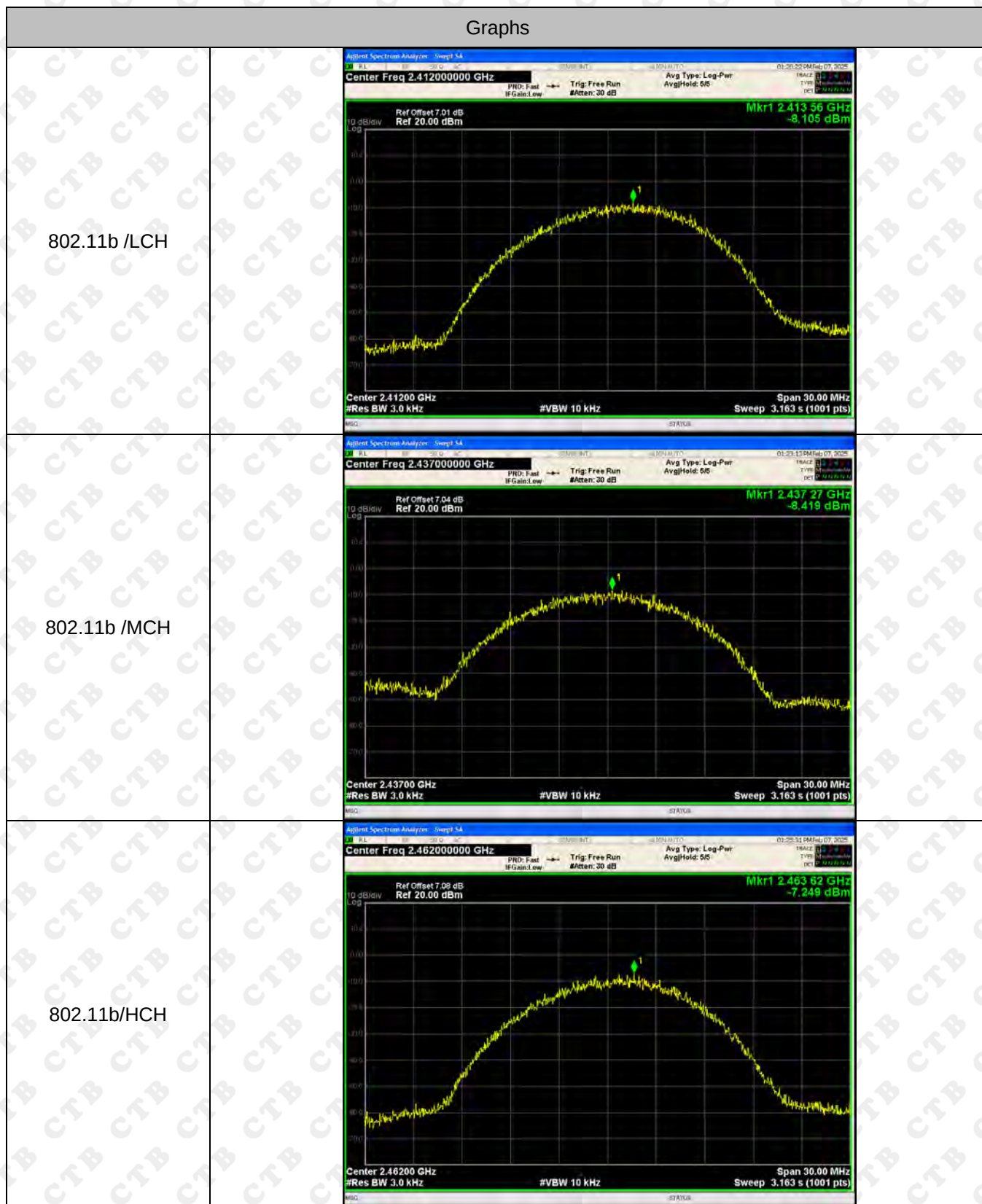
11.3 Test procedure

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	-8.105	8	PASS
	MCH	-8.419	8	PASS
	HCH	-7.249	8	PASS
802.11g	LCH	-12.018	8	PASS
	MCH	-13.067	8	PASS
	HCH	-12.16	8	PASS
802.11n(H T20)	LCH	-12.213	8	PASS
	MCH	-14.096	8	PASS
	HCH	-11.946	8	PASS
802.11n(H T40)	LCH	-14.276	8	PASS
	MCH	-15.763	8	PASS
	HCH	-14.805	8	PASS

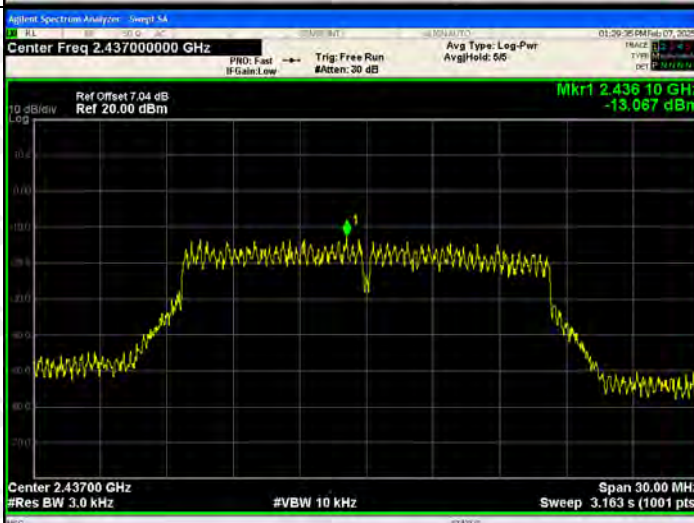
Test Graph



802.11g/LCH



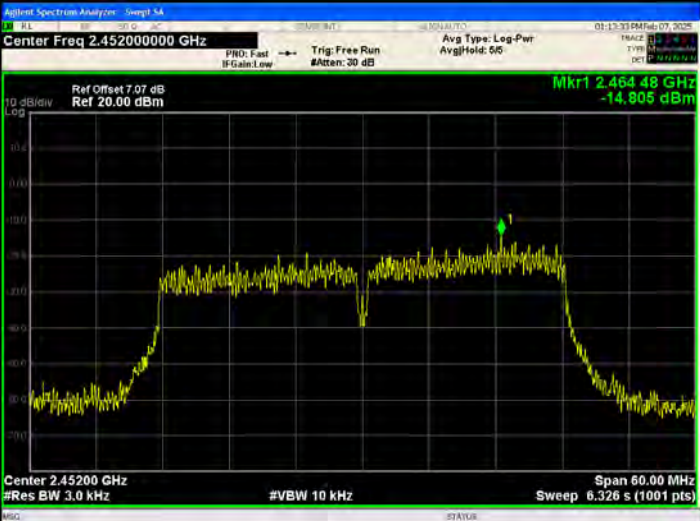
802.11g/MCH



802.11g/HCH



<p>802.11n(HT20)/LCH</p>	 <p>Agilent Spectrum Analyzer - Sweep 54 Center Freq 2.41200000 GHz Ref Offset 7.01 dB Ref 20.00 dBm Mkr1 2.414 46 GHz -12.213 dBm Center 2.41200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz Sweep 3.163 s (1001 pts)</p>
<p>802.11n(HT20)/MCH</p>	 <p>Agilent Spectrum Analyzer - Sweep 54 Center Freq 2.43700000 GHz Ref Offset 7.04 dB Ref 20.00 dBm Mkr1 2.439 79 GHz -14.096 dBm Center 2.43700 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz Sweep 3.163 s (1001 pts)</p>
<p>802.11n(HT20)/HCH</p>	 <p>Agilent Spectrum Analyzer - Sweep 54 Center Freq 2.46200000 GHz Ref Offset 7.08 dB Ref 20.00 dBm Mkr1 2.465 69 GHz -11.946 dBm Center 2.46200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz Sweep 3.163 s (1001 pts)</p>

<p>802.11n(HT40)/LCH</p>	 <p>Agilent Spectrum Analyzer - Sweep 54</p> <p>Center Freq 2.42200000 GHz</p> <p>Ref Offset 7 dB Ref 20.00 dBm</p> <p>Mkr1 2.41948 GHz -14.276 dBm</p> <p>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)/MCH</p>	 <p>Agilent Spectrum Analyzer - Sweep 54</p> <p>Center Freq 2.43700000 GHz</p> <p>Ref Offset 7.04 dB Ref 20.00 dBm</p> <p>Mkr1 2.41954 GHz -15.763 dBm</p> <p>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)/HCH</p>	 <p>Agilent Spectrum Analyzer - Sweep 54</p> <p>Center Freq 2.45200000 GHz</p> <p>Ref Offset 7.07 dB Ref 20.00 dBm</p> <p>Mkr1 2.45448 GHz -14.905 dBm</p> <p>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 Internal antenna and no consideration of replacement. The best case gain of the antenna is 1.74dBi.

13. EUT TEST SETUP PHOTOGRAPHS

Radiated Emissions

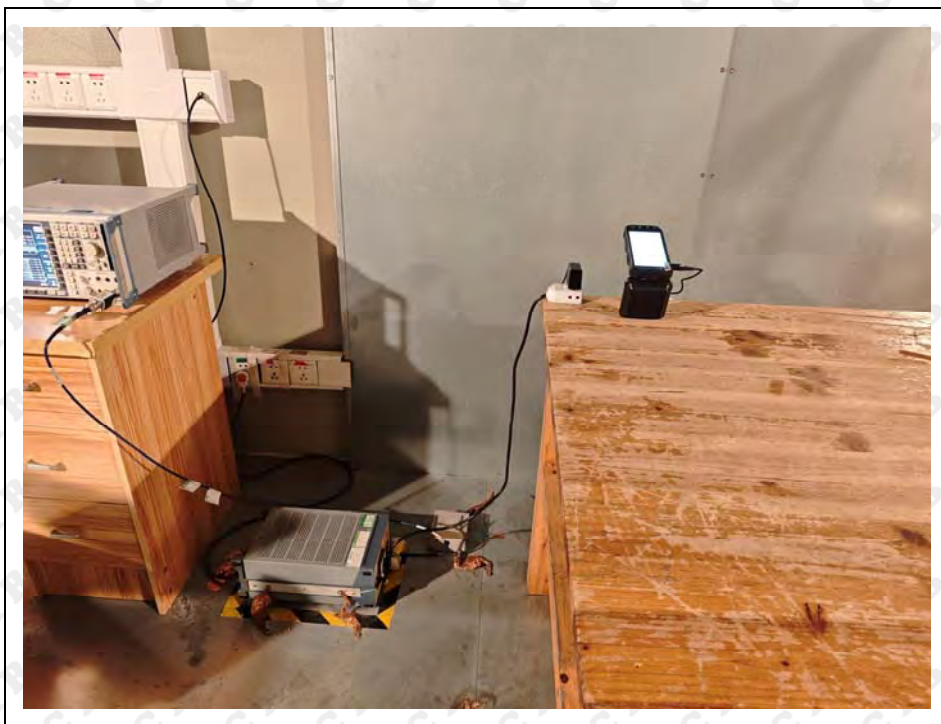
Below 1G



Above 1G



Conducted emission



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