

TEST REPORT

Product Name: Wireless HDMI Transmitter and Receiver
FCC ID: 2A9OZ-WL009
Trademark: N/A
Model Number: WL009, WL010, 009-BT, WL010-BT, WL002, WL003, WL004, WL080, WL081, WL082, WL083, WL084, WL085, WL086, WL087, WL088, WL089, WL090, WL091, WL092, WL093, WL094, WL095, WL096, WL097, WL098, WL099
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Sample Received Date: Nov. 30, 2022
Sample tested Date: Nov. 30, 2022 to Dec. 06, 2022
Issue Date: Dec. 06, 2022
Report No.: CTB221206003RFX
Test Standards: FCC Part15.247
ANSI C63.10:2013
Test Results: PASS
Remark: This is WIFI-2.4GHz band radio test report.
Compiled by: Reviewed by: Approved by:

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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
CTB221206003RFX	Dec.06, 2022	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 D01 v05r02	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 chamber Radiated spurious emission(9KHz-30MHz)	$U=\pm 4.8\text{dB}$
3m chamber Radiated spurious emission(30MHz-1GHz)	$U=\pm 4.3\text{dB}$
3m chamber Radiated spurious emission(1GHz-18GHz)	$U=\pm 4.5\text{dB}$
3m chamber Radiated spurious emission(1GHz-40GHz)	$U=\pm 4.8\text{dB}$
humidity uncertainty	$U=\pm 5.3\%$
Temperature uncertainty	$U=\pm 0.59^{\circ}\text{C}$
Supply voltages	$U=\pm 3\%$
Time	$U=\pm 5\%$
Conducted Emission (9KHz-30MHz)	3.2 dB

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model(s):	WL009, WL010, 009-BT, WL010-BT, WL002, WL003, WL004, WL080, WL081, WL082, WL083, WL084, WL085, WL086, WL087, WL088, WL089, WL090, WL091, WL092, WL093, WL094, WL095, WL096, WL097, WL098, WL099
Model Description:	All the model are the same circuit and RF module, only for model name. Test sample model: WL009
Wi-Fi Specification:	IEEE 802.11b/g/n
Hardware Version:	TX&RX-12-05-HDMI V5 20220704
Software Version:	ver 1.15742.36
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) : 16.721dBm
Type of Modulation:	WiFi: DSSS, OFDM
Antenna installation:	WiFi: Dipole antenna
Antenna Gain:	WiFi (2.4G) : ANT1:1.17dBi ANT2:1.17 dBi
Ratings:	DC 5V charging from adapter

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	JIYIN	JY-05100C	/	/

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.

ANT 1, ANT 2

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

MIMO(ANT 1+ANT 2)

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

EUT has two Internal Antenna with Max Antenna Gain 1.17dBi on every antenna, CDD device with two spatial streams, according to KDB662911 D01 v02r01,

Directional gain= GANT + Array Gain, where Array Gain is as follows.

1) For power spectral density(PSD) measurements,

Array Gain=10log(NANT/NSS)dB=10log(2/1)=3.01dB,

So the directional gain for PSD is 4.18dBi

2) For power measurements,

The Array gain=0 dB for NANT≤4,

So the directional gain for Power measurements is 1.17dBi

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):	5.0V
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, Xinh 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

Item	Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	2023.07.19
2	Power Sensor	Agilent	U2021XA	MY56120032	2023.07.19
3	Power Sensor	Agilent	U2021XA	MY56120034	2023.07.19
4	Communication test set	R&S	CMW500	108058	2023.07.19
5	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	2023.07.19
6	Signal Generator	Agilent	N5181A	MY50140365	2023.07.19
7	Vector signal generator	Agilent	N5182A	MY47420195	2023.07.19
8	Communication test set	Agilent	E5515C	MY50102567	2023.07.19
9	2.4 GHz Filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	2023.07.19
10	5 GHz Filter	Shenxiang	MSF5150-5850 MS-1155	20181015001	2023.07.19
11	Filter	Xingbo	XBLBQ-DZA120	190821-1-1	2023.07.19
12	BT&WI-FI Automatic test software	Microwave	MTS8000	Ver. 2.0.0.0	/
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	2023.10.30
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	2023.07.19
15	234G Automatic test software	Microwave	MTS8200	Ver. 2.0.0.0	/
16	966 chamber	C.R.T.	966	/	2024.08.11
17	Receiver	R&S	ESPI	100362	2023.07.19
18	Amplifier	HP	8447E	2945A02747	2023.07.19
19	Amplifier	Agilent	8449B	3008A01838	2023.07.19
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	2023.07.22

21	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA9120D	01911	2023.07.22
22	EMI test software	Fala	EZ-EMC	FA-03A2 RE	/
23	Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-224	2023.07.23
24	loop antenna	ZHINAN	ZN30900A	GTS534	/
25	40G Horn antenna	A/H/System	SAS-574	588	2024.10.30
26	Amplifier	AEROFLEX	Aeroflex	097	2024.10.30

Continuous disturbance					
No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	LISN	ROHDE&SCHWARZ	ESH3-Z5	100318	2023.07.19
2	Pulse limiter	ROHDE&SCHWARZ	ESH3Z2	357881052	2023.07.19
3	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100428/003	2023.07.19
4	Coaxial cable	ZDECL	Z302S-NJ-SMA J-12M	18091905	2023.07.19
5	ISN	Schwarzbeck	NTFM8158	183	2023.07.19
6	Communication test set	Agilent	E5515C	MY50102567	2023.07.19
7	Communication test set	R&S	CMW500	108058	2023.07.19
8	EZ-EMC	Frad	EMC-con3A1.1	/	/

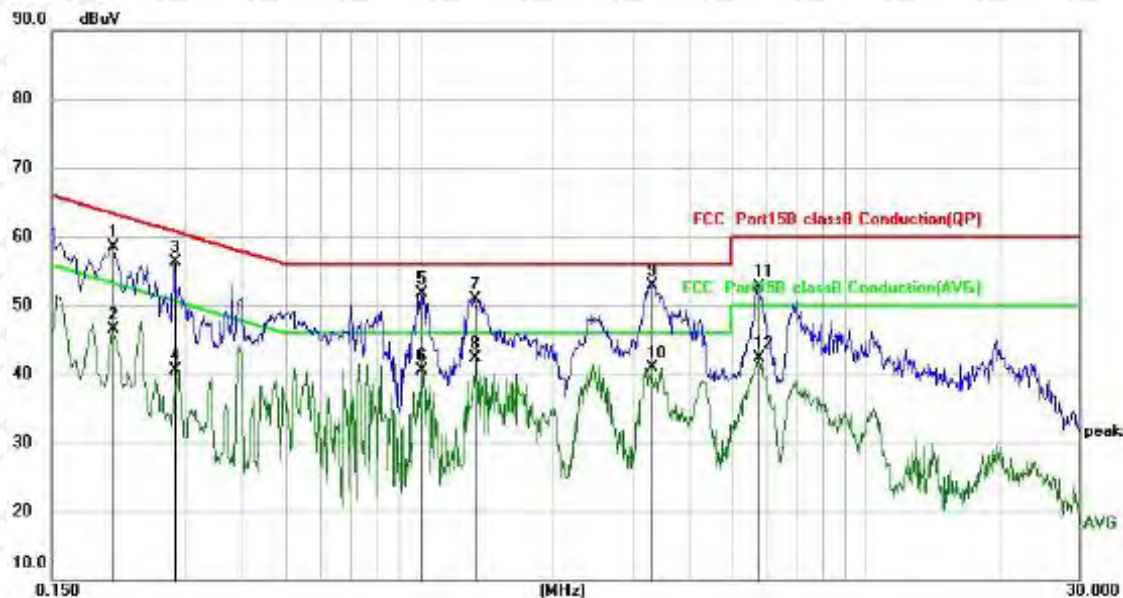
Radiated emission					
No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	01911	2023.07.22
2	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	2023.07.22
3	Amplifier	Agilent	8449B	3008A01838	2023.07.19
4	Amplifier	HP	8447E	2945A02747	2023.07.19
5	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100428/003	2023.07.19
6	Coaxial cable	ETS	RFC-SNS-100-NMS-80 NI	/	2023.07.19
7	Coaxial cable	ETS	RFC-SNS-100-NMS-20 NI	/	2023.07.19
8	Coaxial cable	ETS	RFC-SNS-100-SMS-20 NI	/	2023.07.19
9	Coaxial cable	ETS	RFC-NNS-100-NMS-300 NI	/	2023.07.19
10	Communication test set	Agilent	E5515C	MY50102567	2023.07.19
11	Communication test set	R&S	CMW500	108058	2023.07.19
12	EZ-EMC	Frad	EMC-con3A1.1	/	/

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

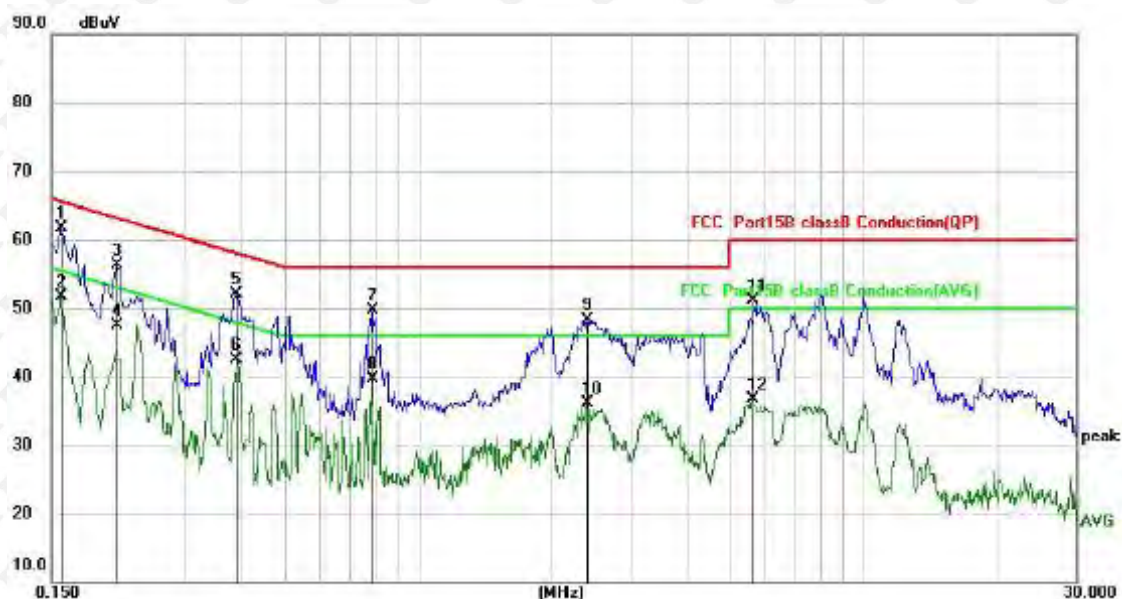
Test Specification: Line
AC 120V 60Hz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV	dBuV	dB	
1		0.2060	48.60	10.00	58.60	63.37	-4.77	QP
2		0.2060	36.41	10.00	46.41	53.37	-6.96	AVG
3		0.2819	46.33	9.99	56.32	60.76	-4.44	QP
4		0.2819	30.53	9.99	40.52	50.76	-10.24	AVG
5		1.0060	41.80	9.98	51.78	56.00	-4.22	QP
6		1.0060	30.55	9.98	40.53	46.00	-5.47	AVG
7		1.3300	40.86	10.00	50.86	56.00	-5.14	QP
8		1.3300	32.36	10.00	42.36	46.00	-3.64	AVG
9	*	3.3060	42.79	10.09	52.88	56.00	-3.12	QP
10		3.3060	30.89	10.09	40.98	46.00	-5.02	AVG
11		5.7259	42.58	10.20	52.78	60.00	-7.22	QP
12		5.7259	32.19	10.20	42.39	50.00	-7.61	AVG

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

Test Specification: Neutral
AC 120V 60Hz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	*	0.1580	51.74	10.01	61.75	65.57	-3.82	QP
2		0.1580	41.61	10.01	51.62	55.57	-3.95	AVG
3		0.2106	46.32	10.00	56.32	63.18	-6.86	QP
4		0.2106	37.45	10.00	47.45	53.18	-5.73	AVG
5		0.3899	42.18	9.98	52.16	58.07	-5.91	QP
6		0.3899	32.43	9.98	42.41	48.07	-5.66	AVG
7		0.7900	39.77	9.98	49.75	56.00	-6.25	QP
8		0.7900	29.67	9.98	39.65	46.00	-6.35	AVG
9		2.3940	38.18	10.05	48.23	56.00	-7.77	QP
10		2.3940	26.01	10.05	36.06	46.00	-9.94	AVG
11		5.6179	40.86	10.19	51.05	60.00	-8.95	QP
12		5.6179	26.58	10.19	36.77	50.00	-13.23	AVG

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

All modes have been tested, and the test results show that ANT2 b-mode data is the worst, only ANT2 b-mode test chart is put.

7. RADIATED SPURIOUS EMISSION

7.1 Block Diagram Of Test Setup



Figure 1. Below 30MHz

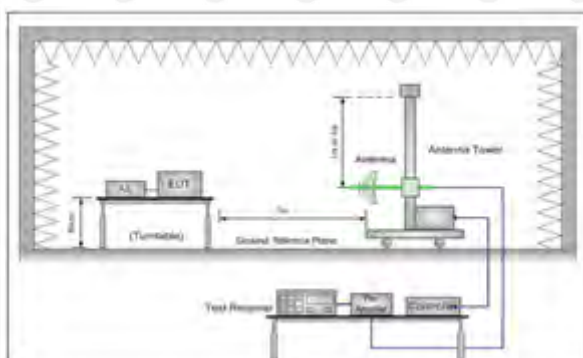


Figure 2. 30MHz to 1GHz

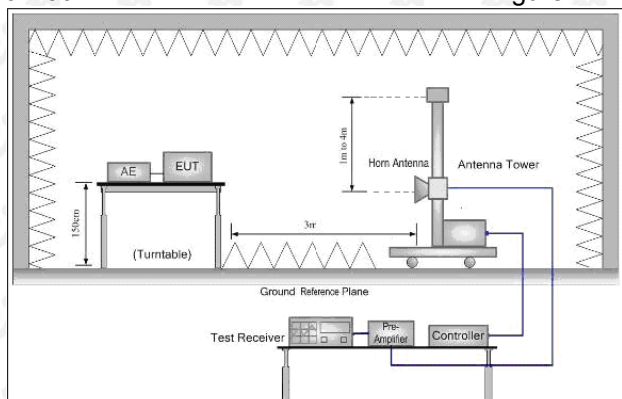


Figure 3. Above 1GHz

7.2 Limit

Spurious Emissions:

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

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

7.3 Test procedure

Below 1GHz test procedure as below:

- 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

The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.

7.4 Test Result

After pre-scanning three directions, the report recorded the worst case

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	*	147.9214	45.91	-5.47	40.44	43.50	-3.06	QP
2	!	215.6454	46.89	-9.07	37.82	43.50	-5.68	QP
3	!	298.2681	47.80	-5.55	42.25	46.00	-3.75	QP
4		446.4139	41.23	-1.40	39.83	46.00	-6.17	QP
5	!	596.1771	39.73	2.36	42.09	46.00	-3.91	QP
6	!	948.7608	33.26	7.63	40.89	46.00	-5.11	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		56.3947	37.35	-7.21	30.14	40.00	-9.86	QP
2	!	85.8983	46.32	-10.32	36.00	40.00	-4.00	QP
3	*	147.9214	45.72	-5.47	40.25	43.50	-3.25	QP
4		298.2681	43.72	-5.55	38.17	46.00	-7.83	QP
5	!	446.4139	41.72	-1.40	40.32	46.00	-5.68	QP
6	!	596.1771	40.25	2.36	42.61	46.00	-3.39	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.

2. All modes have been tested, and the test results show that ANT2 b-mode data is the worst, only ANT2 b-mode test chart is put.

Above 1 GHz Test Results:

ANT2 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	64.85	-3.64	61.21	74	-12.79	peak
4824	48.66	-3.64	45.02	54	-8.98	AVG
7236	56.72	-0.95	55.77	74	-18.23	peak
7236	44.49	-0.95	43.54	54	-10.46	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	67.30	-3.64	63.66	74	-10.34	peak
4824	47.83	-3.64	44.19	54	-9.81	AVG
7236	58.66	-0.95	57.71	74	-16.29	peak
7236	43.94	-0.95	42.99	54	-11.01	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

ANT2 MID CH6 (802.11b Mode)/2437

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detection Type
4874	64.05	-3.51	60.54	74	-13.46	peak
4874	49.41	-3.51	45.90	54	-8.10	AVG
7311	57.96	-0.82	57.14	74	-16.86	peak
7311	45.79	-0.82	44.97	54	-9.03	AVG

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

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detection Type
4874	64.75	-3.51	61.24	74	-12.76	peak
4874	47.56	-3.51	44.05	54	-9.95	AVG
7311	58.40	-0.82	57.58	74	-16.42	peak
7311	42.70	-0.82	41.88	54	-12.12	AVG

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

ANT2 HIGH CH11 (802.11b Mode)/2462

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detected Type
4924	62.44	-3.43	59.01	74	-14.99	peak
4924	48.53	-3.43	45.10	54	-8.90	AVG
7386	57.62	-0.75	56.87	74	-17.13	peak
7386	42.31	-0.75	41.56	54	-12.44	AVG
Remark: Factor = Antenna Factor + Cable Loss - Pre-amplifier. Emission level Margin = Emission level - Limits						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detected Type
4924	62.65	-3.43	59.22	74	-14.78	peak
4924	46.01	-3.43	42.58	54	-11.42	AVG
7386	58.26	-0.75	57.51	74	-16.49	peak
7386	41.82	-0.75	41.07	54	-12.93	AVG
Remark: Factor = Antenna Factor + Cable Loss - Pre-amplifier. Emission level Margin = Emission level - Limits						

Remark:

- (1). Measuring frequencies from 9KHz to the 25 GHz. The test range is 9K ~10 times the main wave, and other spurious below the limit of 20dB will not be reflected in the report
- (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.

ANT2 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	65.92	-3.64	62.28	74	-11.72	peak
4824	49.36	-3.64	45.72	54	-8.28	AVG
7236	57.56	-0.95	56.61	74	-17.39	peak
7236	46.92	-0.95	45.97	54	-8.03	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	63.15	-3.64	59.51	74	-14.49	peak
4824	48.27	-3.64	44.63	54	-9.37	AVG
7236	58.26	-0.95	57.31	74	-16.69	peak
7236	42.75	-0.95	41.80	54	-12.20	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

ANT2 MID CH6 (802.11g Mode)/2437

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detect Type
4874	63.78	-3.51	60.27	74	-13.73	peak
4874	47.68	-3.51	44.17	54	-9.83	AVG
7311	58.38	-0.82	57.56	74	-16.44	peak
7311	45.04	-0.82	44.22	54	-9.78	AVG
Remark: Factor = Antenna Factor + Cable Loss - Pre-amplifier. Emission level Margin = Emission level - Limits						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detect Type
4874	63.84	-3.51	60.33	74	-13.67	peak
4874	47.74	-3.51	44.23	54	-9.77	AVG
7311	57.13	-0.82	56.31	74	-17.69	peak
7311	43.07	-0.82	42.25	54	-11.75	AVG
Remark: Factor = Antenna Factor + Cable Loss - Pre-amplifier. Emission level Margin = Emission level - Limits						

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4924	63.73	-3.43	60.30	74	-13.70	peak
4924	48.53	-3.43	45.10	54	-8.90	AVG
7386	56.21	-0.75	55.46	74	-18.54	peak
7386	42.19	-0.75	41.44	54	-12.56	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

ANT2 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	63.56	-3.43	60.13	74	-13.87	peak
4924	47.45	-3.43	44.02	54	-9.98	AVG
7386	58.67	-0.75	57.92	74	-16.08	peak
7386	42.86	-0.75	42.11	54	-11.89	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

Vertical:

Remark	:
(1). Measuring frequencies from 9KHz to the 25 GHz. The test range is 9K ~10 times the main wave, and other spurious below the limit of 20dB will not be reflected in the report	
(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.	

Above 1GHz ANT1+ANT2 :

LOW CH1 (802.11n/H20 Mode)/2412

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4824	64.84	-3.64	61.20	74	-12.80	peak
4824	48.73	-3.64	45.09	54	-8.91	AVG
7236	59.63	-0.95	58.68	74	-15.32	peak
7236	44.77	-0.95	43.82	54	-10.18	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Meter Reading + Factor Margin = Emission level - Limits						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4824	64.44	-3.64	60.80	74	-13.20	peak
4824	51.13	-3.64	47.49	54	-6.51	AVG
7236	58.15	-0.95	57.20	74	-16.80	peak
7236	46.67	-0.95	45.72	54	-8.28	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

ANT1+ANT2 MID CH6 (802.11n/H20 Mode)/2437

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detecto Type
4874.00	64.24	-3.51	60.73	74.00	-13.27	peak
4874.00	47.19	-3.51	43.68	54.00	-10.32	AVG
7311.00	56.57	-0.82	55.75	74.00	-18.25	peak
7311.00	45.05	-0.82	44.23	54.00	-9.77	AVG
Remark: Factor = Antenna Factor + Cable Loss - Pre-amplifier. Emission le Margin = Emission level - Limits						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detecto Type
4874.00	62.18	-3.51	58.67	74.00	-15.33	peak
4874.00	47.55	-3.51	44.04	54.00	-9.96	AVG
7311.00	58.30	-0.82	57.48	74.00	-16.52	peak
7311.00	44.10	-0.82	43.28	54.00	-10.72	AVG
Remark: Factor = Antenna Factor + Cable Loss - Pre-amplifier. Emission le Margin = Emission level - Limits						

ANT1+ANT2 HIGH CH11 (802.11n/H20 Mode)/2462

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	ingFactor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector T
4924	61.65	-3.43	58.22	74	-15.78	peak
4924	47.20	-3.43	43.77	54	-10.23	AVG
7386	57.95	-0.75	57.20	74	-16.80	peak
7386	41.64	-0.75	40.89	54	-13.11	AVG
Remark: Factor = Antenna Factor + Cable Loss - Pre-amplifier. Emission level Margin = Emission level - Limits						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	ingFactor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector T
4924	65.07	-3.43	61.64	74	-12.36	peak
4924	46.15	-3.43	42.72	54	-11.28	AVG
7386	56.11	-0.75	55.36	74	-18.64	peak
7386	41.82	-0.75	41.07	54	-12.93	AVG
Remark: Factor = Antenna Factor + Cable Loss - Pre-amplifier. Emission level Margin = Emission level - Limits						

ANT1+ANT2 LOW CH3 (802.11n/H40 Mode)/2422

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4844	63.07	-3.63	59.44	74	-14.56	peak
4844	49.54	-3.63	45.91	54	-8.09	AVG
7266	60.31	-0.94	59.37	74	-14.63	peak
7266	44.47	-0.94	43.53	54	-10.47	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Meter Reading + Factor Margin = Emission level - Limits						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4844	65.10	-3.63	61.47	74	-12.53	peak
4844	47.75	-3.63	44.12	54	-9.88	AVG
7266	59.53	-0.94	58.59	74	-15.41	peak
7266	45.68	-0.94	44.74	54	-9.26	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

ANT1+ANT2 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	63.51	-3.51	60.00	74	-14.00	peak
4874	47.31	-3.51	43.80	54	-10.20	AVG
7311	60.68	-0.82	59.86	74	-14.14	peak
7311	45.23	-0.82	44.41	54	-9.59	AVG
Remark: Factor = Antenna Factor + Cable Loss - Pre-amplifier. Emission level Margin = Emission level - Limits						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4874	62.27	-3.51	58.76	74	-15.24	peak
4874	46.45	-3.51	42.94	54	-11.06	AVG
7311	56.68	-0.82	55.86	74	-18.14	peak
7311	43.33	-0.82	42.51	54	-11.49	AVG
Remark: Factor = Antenna Factor + Cable Loss - Pre-amplifier. Emission level Margin = Emission level - Limits						

ANT1+ANT2 HIGH CH9 (802.11n/H40 Mode)/2452

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4904	62.24	-3.43	58.81	74	-15.19	peak
4904	47.31	-3.43	43.88	54	-10.12	AVG
7356	57.96	-0.75	57.21	74	-16.79	peak
7356	41.28	-0.75	40.53	54	-13.47	AVG

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

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4904	61.91	-3.43	58.48	74	-15.52	peak
4904	45.71	-3.43	42.28	54	-11.72	AVG
7356	57.75	-0.75	57.00	74	-17.00	peak
7356	44.26	-0.75	43.51	54	-10.49	AVG

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

Remark:

- (1). Measuring frequencies from 9KHz to the 25 GHz. The test range is 9K ~10 times the main wave, and other spurious below the limit of 20dB will not be reflected in the report
- (2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (3) Data of measurement within this frequency range shown “---” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.

Restricted bands around fundamental frequency (Radiated)

Operation Mode:

ANT 2 802.11b 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	56.39	-5.81	50.58	74	-23.42	peak
2390	/	-5.81	/	54	/	AVG
2399	65.14	-5.84	59.30	74	-14.70	peak
2399	49.07	-5.84	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	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	62.66	-5.84	56.82	74	-17.18	peak
2399	46.54	-5.84	40.70	54	-13.30	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: ANT2 802.11b 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	57.48	-5.65	51.83	74	-22.17	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	55.82	-5.65	50.17	74	-23.83	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: ANT2 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	58.41	-5.81	52.60	74	-21.40	peak
2390	/	-5.81	/	54	/	AVG
2399	62.34	-5.84	56.50	74	-17.50	peak
2399	46.03	-5.84	40.19	54	-13.81	AVG

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

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2390	57.69	-5.81	51.88	74	-22.12	peak
2390	/	-5.81	/	54	/	AVG
2399	63.26	-5.84	57.42	74	-16.58	peak
2399	46.15	-5.84	40.31	54	-13.69	AVG

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

Operation Mode: ANT2 802.11g 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	57.02	-5.65	51.37	74	-22.63	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	56.60	-5.65	50.95	74	-23.05	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: ANT1+ANT2 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	56.94	-5.81	51.13	74	-22.87	peak
2390	/	-5.81	/	54	/	AVG
2399	62.62	-5.84	56.78	74	-17.22	peak
2399	48.76	-5.84	42.92	54	-11.08	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	56.40	-5.81	50.59	74	-23.41	peak
2390	/	-5.81	/	54	/	AVG
2399	60.05	-5.84	54.21	74	-19.79	peak
2399	47.84	-5.84	42.00	54	-12.00	AVG

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

Operation Mode: ANT1+ANT2 802.11n/H20 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	56.74	-5.65	51.09	74	-22.91	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	56.71	-5.65	51.06	74	-22.94	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: ANT1+ANT2 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	57.71	-5.81	51.90	74	-22.10	peak
2390	/	-5.81	/	54	/	AVG
2399	62.40	-5.84	56.56	74	-17.44	peak
2399	46.79	-5.84	40.95	54	-13.05	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	57.91	-5.81	52.10	74	-21.90	peak
2390	/	-5.81	/	54	/	AVG
2399	62.06	-5.84	56.22	74	-17.78	peak
2399	45.32	-5.84	39.48	54	-14.52	AVG

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

Operation Mode: ANT1+ANT2 802.11n/H40 Mode TX CH High (2452MHz)

Horizontal

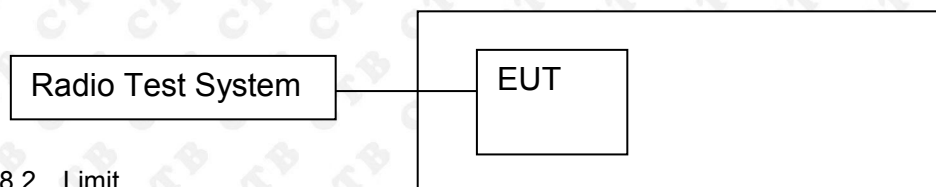
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	57.05	-5.65	51.40	74	-22.60	peak
2483.5	/	-5.65	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	56.87	-5.65	51.22	74	-22.78	peak
2483.5	/	-5.65	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						
Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.						

8. BAND EDGE AND RF CONDUCTED SPURIOUS EMISSIONS

8.1 Block Diagram Of Test Setup



8.2 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

8.3 Test procedure

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

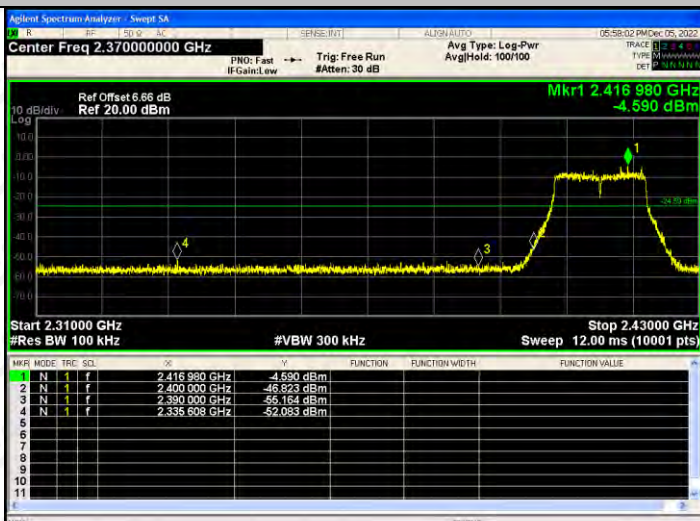
8.4 Test Result

ANT1:

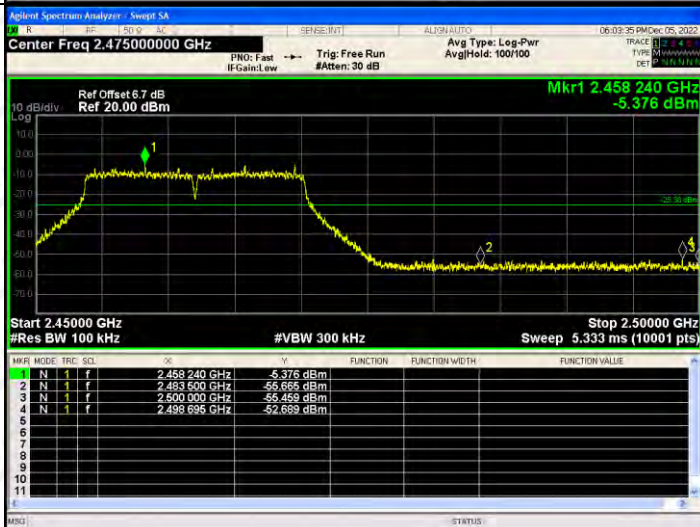


BAND EDGE Graphs

802.11g/LCH

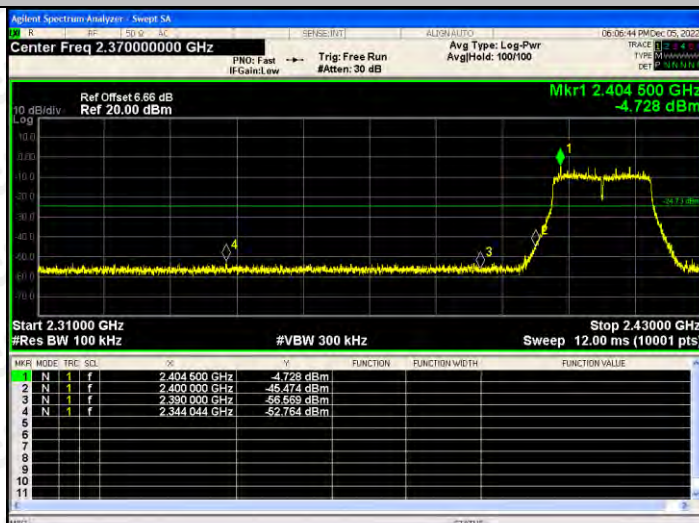


802.11g/HCH

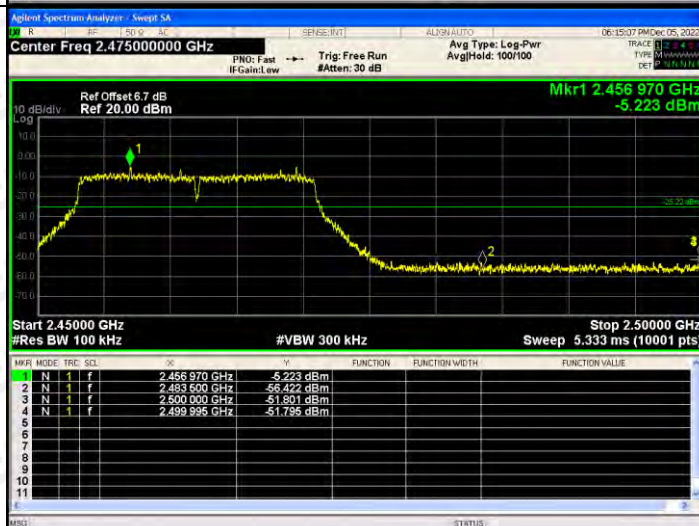


BAND EDGE Graphs

802.11n(HT20)/L
CH

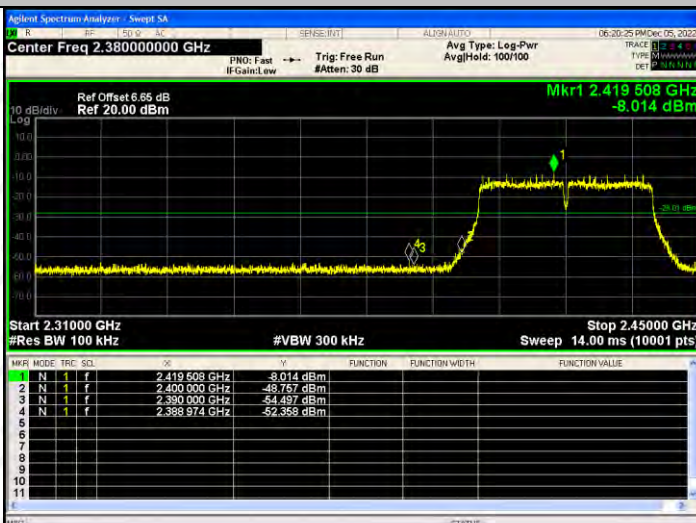


802.11n(HT20)/H
CH

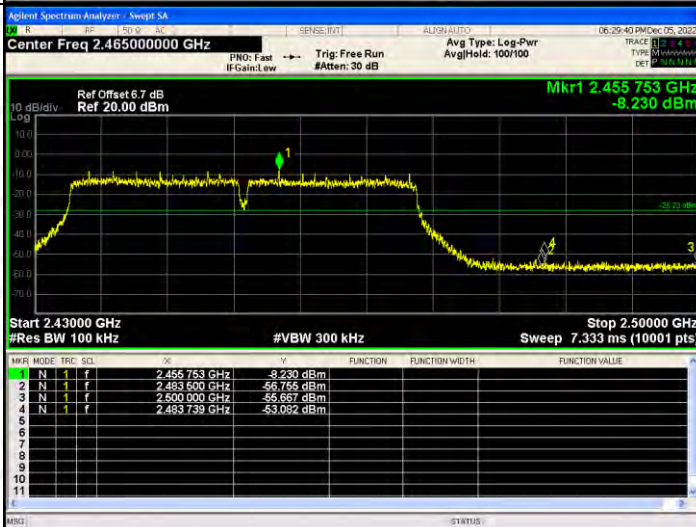


BAND EDGE Graphs

802.11n(HT40)/L
CH



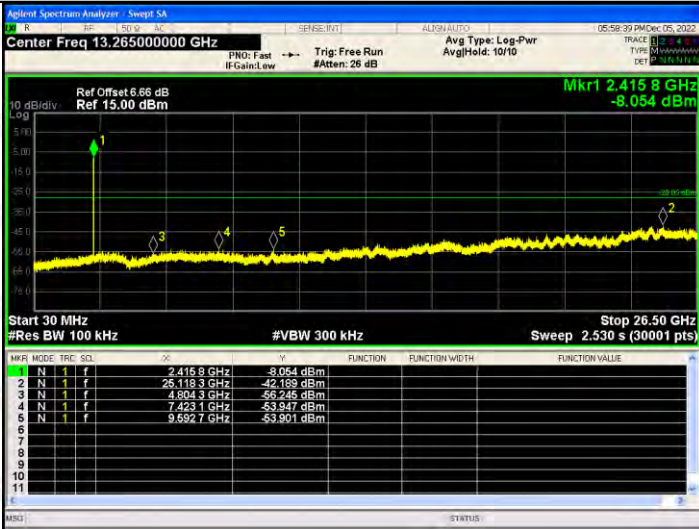
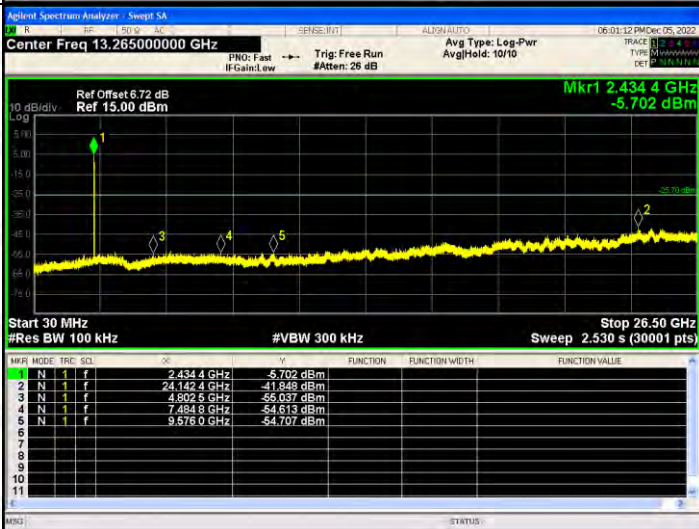
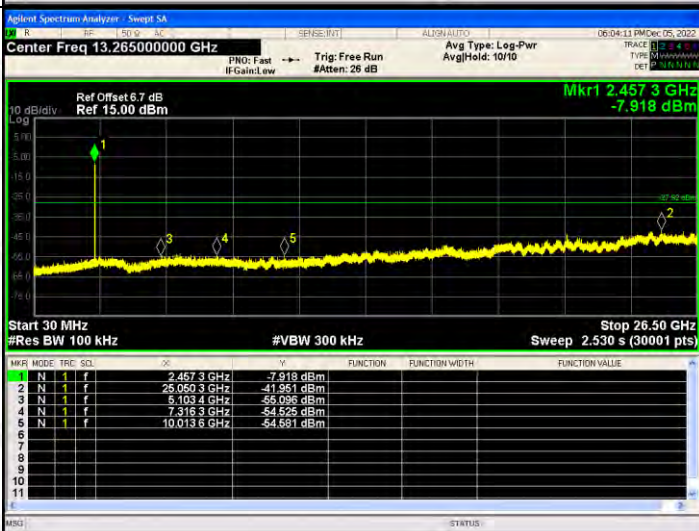
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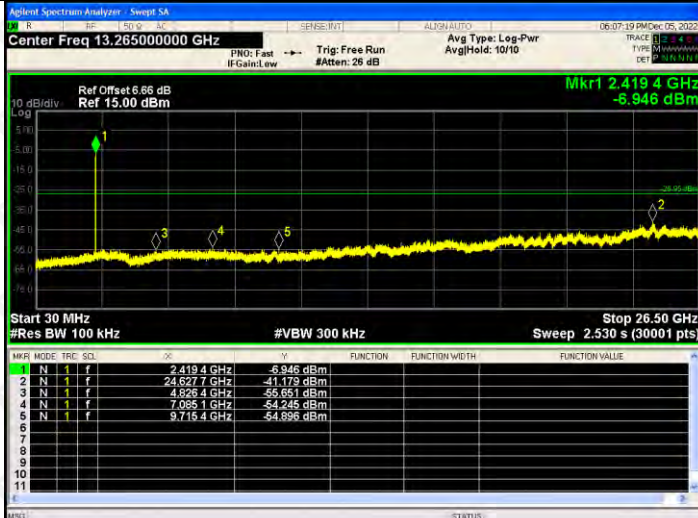
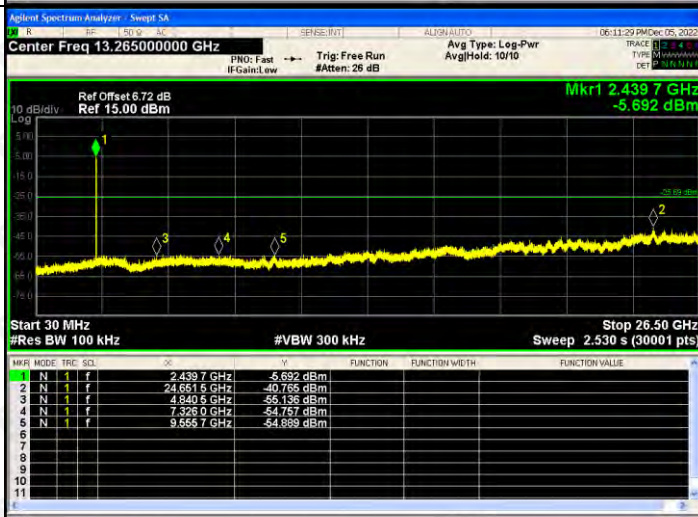
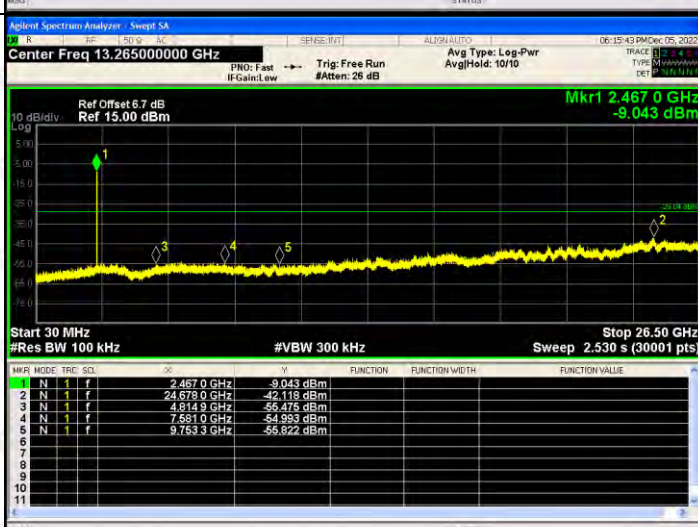
RF Conducted Spurious Emissions Graphs

802.11b /LCH	Agilent Spectrum Analyzer - Swept SA Center Freq 13.265000000 GHz Ref Offset 6.68 dB Ref 15.00 dBm Mkr1 2.414 1 GHz -2.790 dBm Start 30 MHz #Res BW 100 kHz #VBW 300 kHz Stop 26.50 GHz Sweep 2.530 s (30001 pts) <table><thead><tr><th>MNR</th><th>MODE</th><th>TRF</th><th>SQL</th><th>F</th><th>P</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>2.414 1 GHz</td><td>-2.790 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>24.576 5 GHz</td><td>-41.798 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>f</td><td>4.874 5 GHz</td><td>-55.142 dBm</td><td></td><td></td><td></td></tr><tr><td>4</td><td>N</td><td>1</td><td>f</td><td>7.079 0 GHz</td><td>-54.708 dBm</td><td></td><td></td><td></td></tr><tr><td>5</td><td>N</td><td>1</td><td>f</td><td>9.576 8 GHz</td><td>-55.104 dBm</td><td></td><td></td><td></td></tr><tr><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>	MNR	MODE	TRF	SQL	F	P	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.414 1 GHz	-2.790 dBm				2	N	1	f	24.576 5 GHz	-41.798 dBm				3	N	1	f	4.874 5 GHz	-55.142 dBm				4	N	1	f	7.079 0 GHz	-54.708 dBm				5	N	1	f	9.576 8 GHz	-55.104 dBm				6									7									8									9									10									11								
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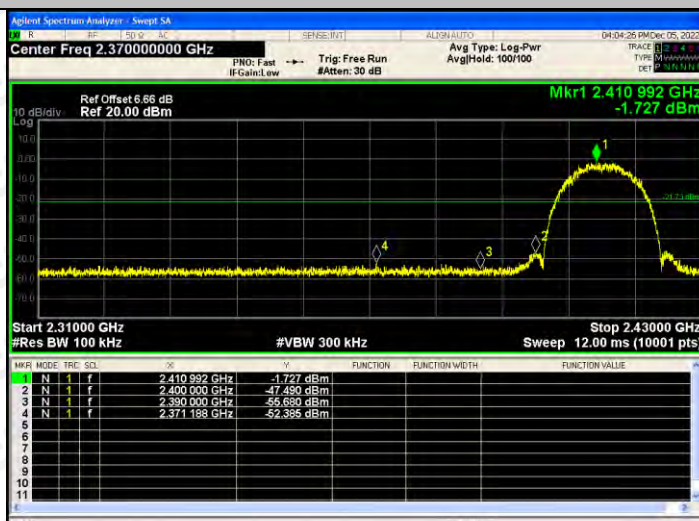
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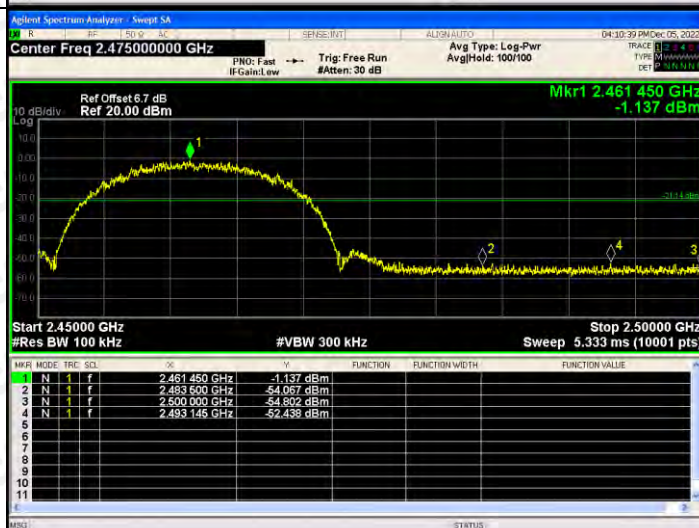
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BAND EDGE Graphs

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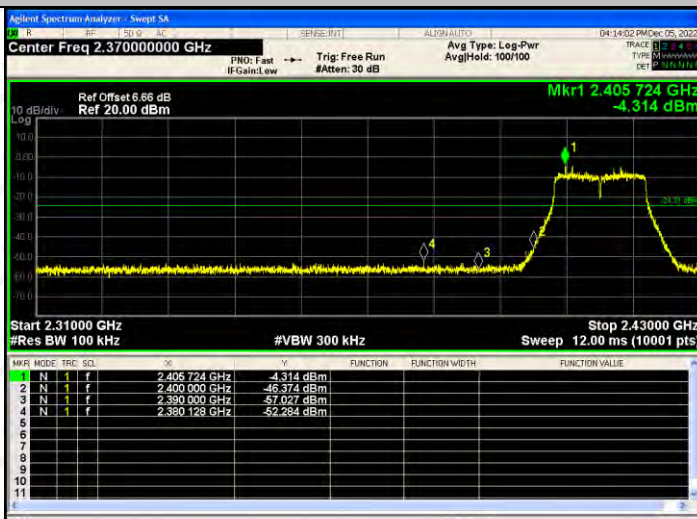


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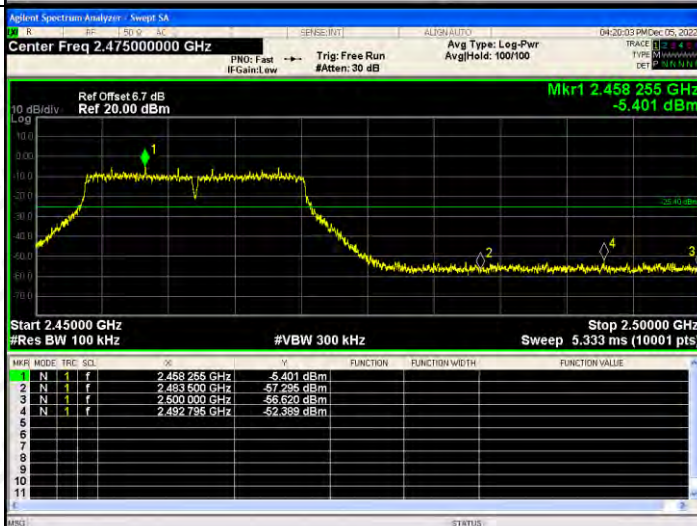


BAND EDGE Graphs

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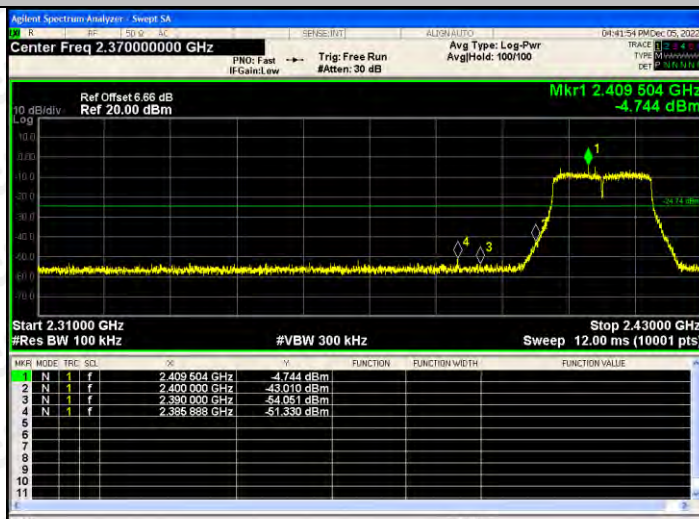


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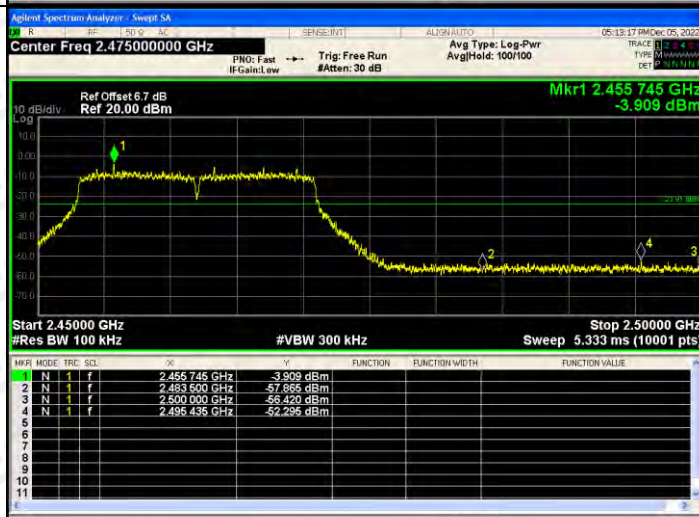


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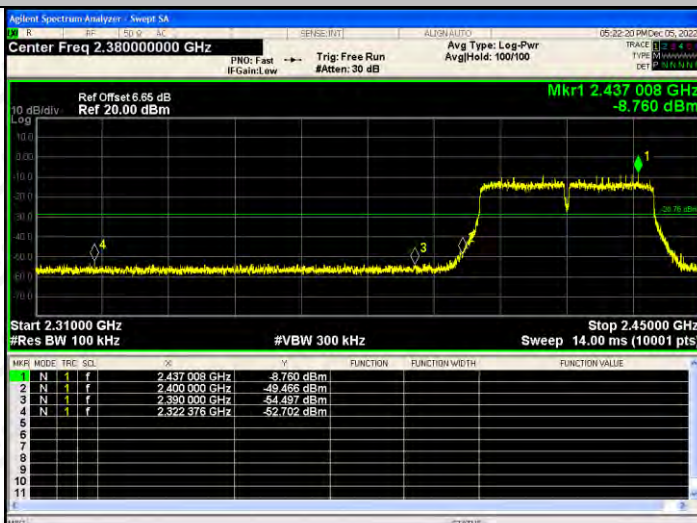


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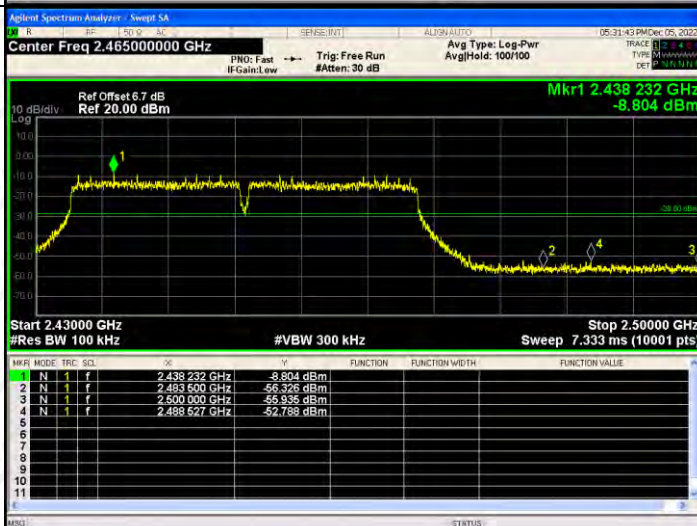


BAND EDGE Graphs

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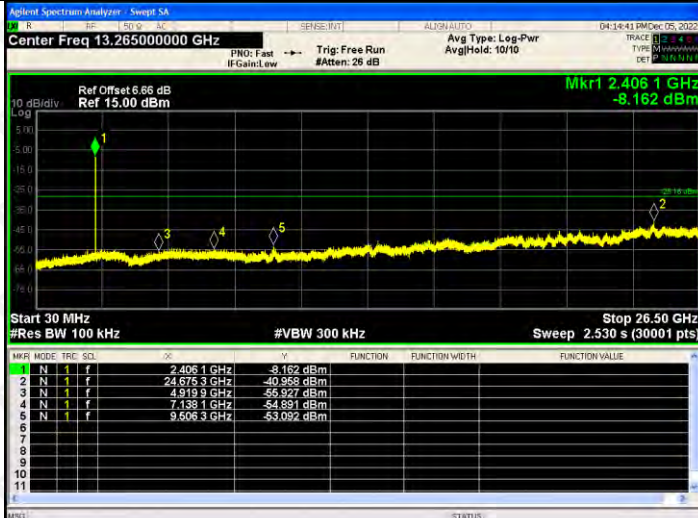
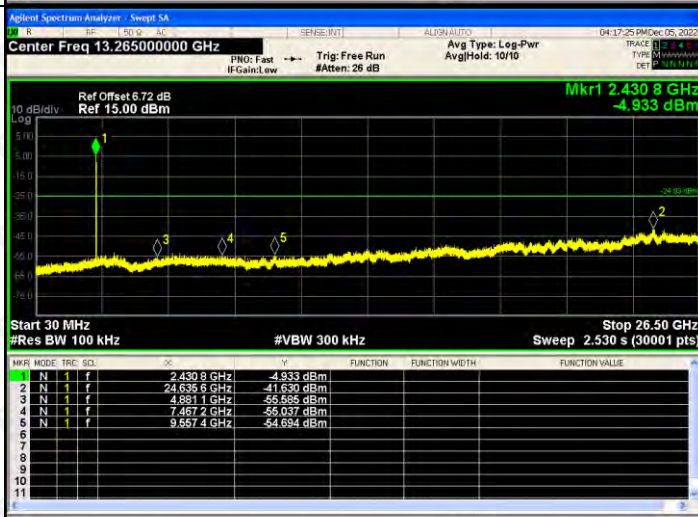
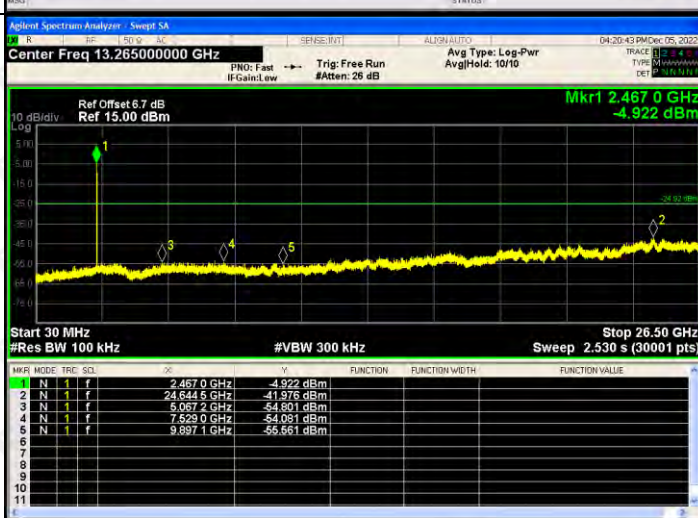
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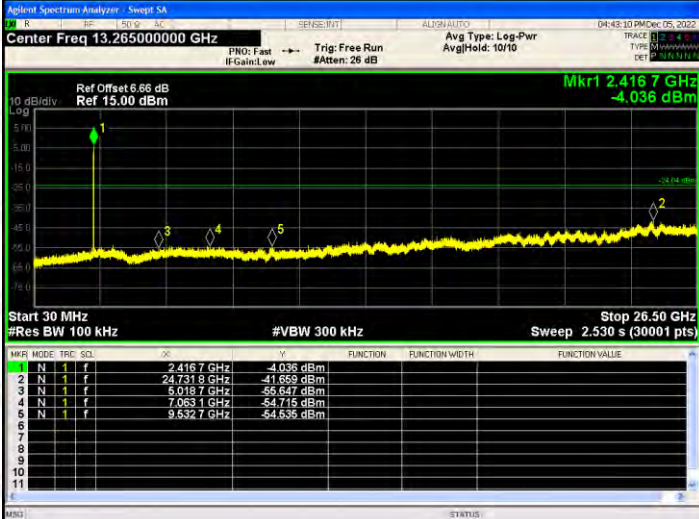
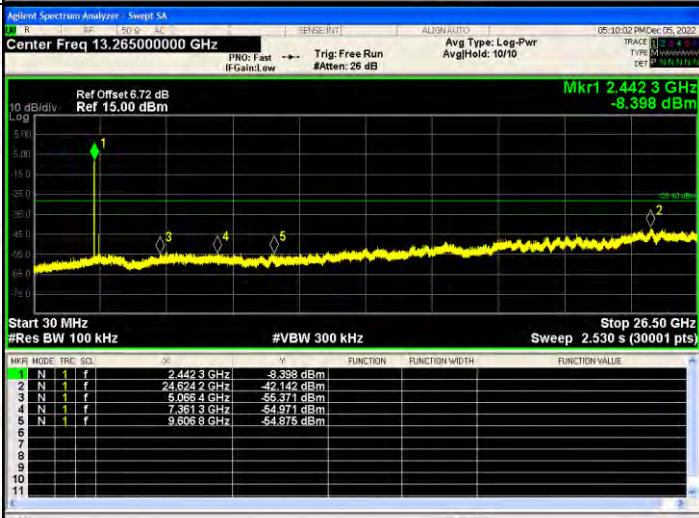
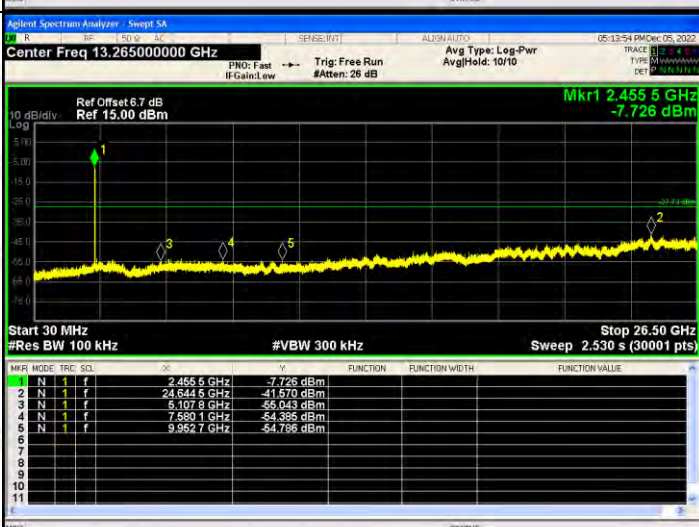
RF Conducted Spurious Emissions Graphs

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RF Conducted Spurious Emissions Graphs

802.11g /LCH	 <table><tr><th>CH</th><th>Freq</th><th>Power</th></tr><tr><td>1</td><td>2.4061 GHz</td><td>-8.162 dBm</td></tr><tr><td>2</td><td>2.4753 GHz</td><td>-40.958 dBm</td></tr><tr><td>3</td><td>4.9199 GHz</td><td>-55.927 dBm</td></tr><tr><td>4</td><td>7.4381 GHz</td><td>-54.881 dBm</td></tr><tr><td>5</td><td>9.5083 GHz</td><td>-53.052 dBm</td></tr></table>	CH	Freq	Power	1	2.4061 GHz	-8.162 dBm	2	2.4753 GHz	-40.958 dBm	3	4.9199 GHz	-55.927 dBm	4	7.4381 GHz	-54.881 dBm	5	9.5083 GHz	-53.052 dBm
CH	Freq	Power																	
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2	2.4753 GHz	-40.958 dBm																	
3	4.9199 GHz	-55.927 dBm																	
4	7.4381 GHz	-54.881 dBm																	
5	9.5083 GHz	-53.052 dBm																	
802.11g /MCH	 <table><tr><th>CH</th><th>Freq</th><th>Power</th></tr><tr><td>1</td><td>2.4308 GHz</td><td>-4.933 dBm</td></tr><tr><td>2</td><td>2.4636 GHz</td><td>-41.630 dBm</td></tr><tr><td>3</td><td>4.8811 GHz</td><td>-55.585 dBm</td></tr><tr><td>4</td><td>7.4872 GHz</td><td>-55.037 dBm</td></tr><tr><td>5</td><td>9.5574 GHz</td><td>-54.694 dBm</td></tr></table>	CH	Freq	Power	1	2.4308 GHz	-4.933 dBm	2	2.4636 GHz	-41.630 dBm	3	4.8811 GHz	-55.585 dBm	4	7.4872 GHz	-55.037 dBm	5	9.5574 GHz	-54.694 dBm
CH	Freq	Power																	
1	2.4308 GHz	-4.933 dBm																	
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5	9.5574 GHz	-54.694 dBm																	
802.11g /HCH	 <table><tr><th>CH</th><th>Freq</th><th>Power</th></tr><tr><td>1</td><td>2.4670 GHz</td><td>-4.922 dBm</td></tr><tr><td>2</td><td>2.4844 GHz</td><td>-41.976 dBm</td></tr><tr><td>3</td><td>5.0672 GHz</td><td>-54.801 dBm</td></tr><tr><td>4</td><td>7.5290 GHz</td><td>-54.091 dBm</td></tr><tr><td>5</td><td>9.5971 GHz</td><td>-55.561 dBm</td></tr></table>	CH	Freq	Power	1	2.4670 GHz	-4.922 dBm	2	2.4844 GHz	-41.976 dBm	3	5.0672 GHz	-54.801 dBm	4	7.5290 GHz	-54.091 dBm	5	9.5971 GHz	-55.561 dBm
CH	Freq	Power																	
1	2.4670 GHz	-4.922 dBm																	
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4	7.5290 GHz	-54.091 dBm																	
5	9.5971 GHz	-55.561 dBm																	

RF Conducted Spurious Emissions Graphs

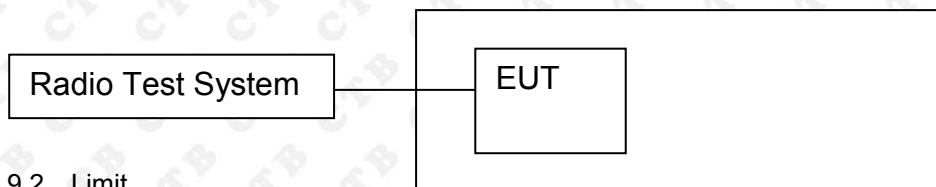
802.11n (HT20)/ LCH		
802.11 n(HT20)/ MCH		
802.11 n(HT20)/ HCH		

RF Conducted Spurious Emissions Graphs



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

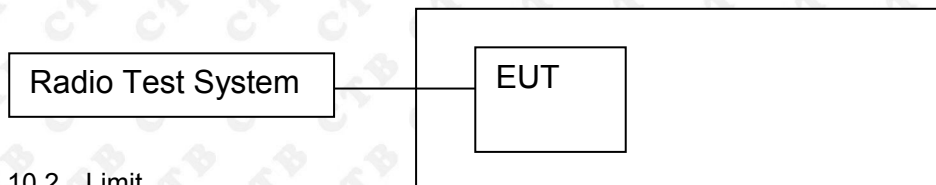
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1MHz. VBW = 3MHz. Sweep = auto; Detector Function = Peak. Channel power function is used
3. Keep the EUT in transmitting at lowest, middle and highest channel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

9.4 Test Result

Mode	Channel.	Maximum Output Power [dBm] ant 1	Maximum Output Power [dBm] ant 2	Total Power Conducted Output Power(PK)	Limit[dBm]
802.11b	LCH	14.288	14.372	/	30
	MCH	14.412	14.111	/	30
	HCH	14.232	14.748	/	30
802.11g	LCH	13.701	13.812	/	30
	MCH	13.642	13.44	/	30
	HCH	13.347	13.324	/	30
802.11n(HT20)	LCH	13.802	13.617	16.721	30
	MCH	13.586	13.302	16.457	30
	HCH	13.369	13.815	16.608	30
802.11n(HT40)	LCH	12.799	12.249	15.543	30
	MCH	12.709	12.643	15.686	30
	HCH	12.796	12.225	15.530	30

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

ANT1:

Test Mode	Frequency	6dB Bandwidth (MHz)	Limit(kHz)	Result
802.11b	LCH	10.301	500	PASS
	MCH	10.697	500	PASS
	HCH	10.544	500	PASS
802.11g	LCH	16.363	500	PASS
	MCH	16.352	500	PASS
	HCH	16.395	500	PASS
802.11n(HT20)	LCH	17.004	500	PASS
	MCH	17.11	500	PASS
	HCH	17.556	500	PASS
802.11n(HT40)	LCH	35.583	500	PASS
	MCH	35.358	500	PASS
	HCH	35.902	500	PASS

ANT2:

Test Mode	Frequency	6dB Bandwidth (MHz)	Limit(kHz)	Result
802.11b	LCH	10.362	500	PASS
	MCH	10.21	500	PASS
	HCH	9.973	500	PASS
802.11g	LCH	16.323	500	PASS
	MCH	16.373	500	PASS
	HCH	16.338	500	PASS
802.11n(HT20)	LCH	17.591	500	PASS
	MCH	17.375	500	PASS
	HCH	17.582	500	PASS
802.11n(HT40)	LCH	35.431	500	PASS
	MCH	35.377	500	PASS
	HCH	35.49	500	PASS

ANT1:

Test Graph:

Graphs

802.11b /LCH



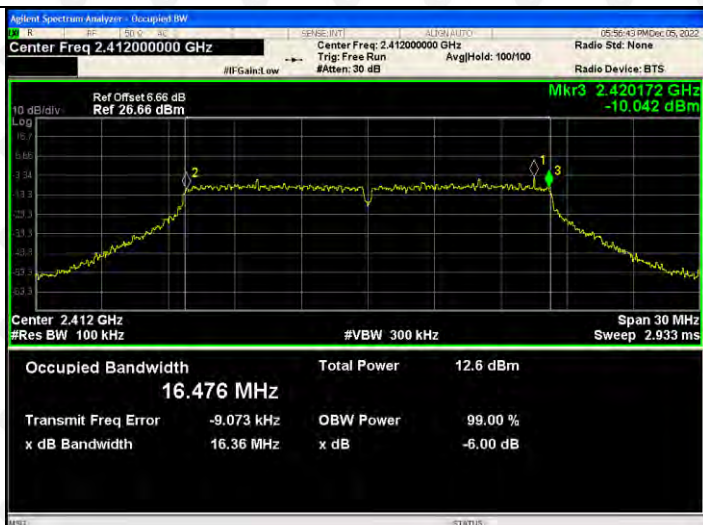
802.11b /MCH



802.11b/HCH



802.11g/LCH

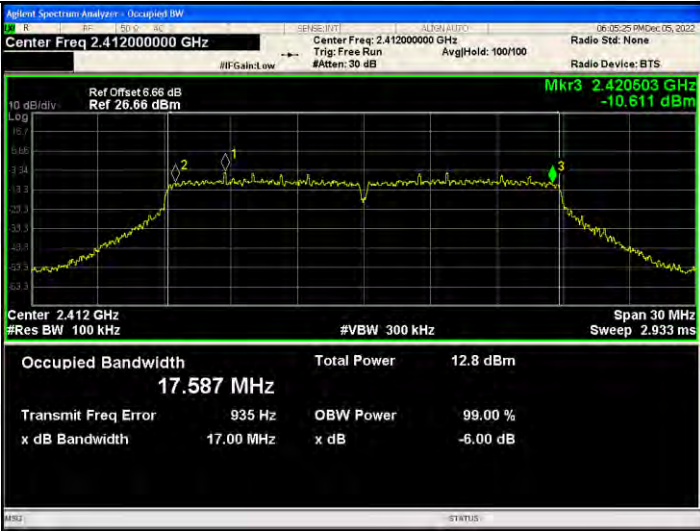
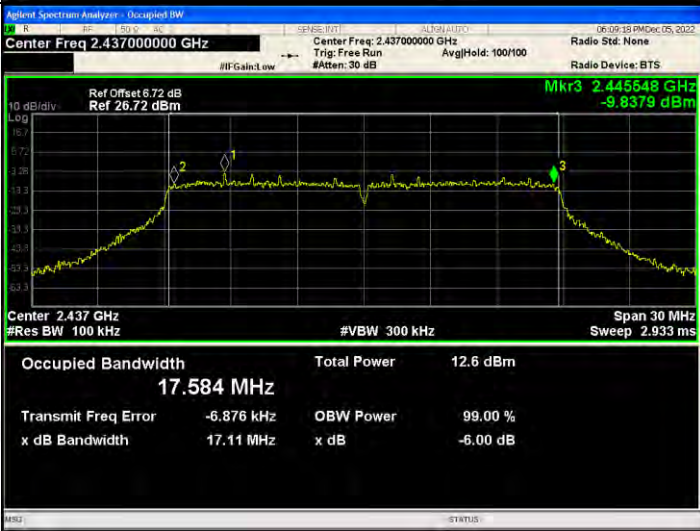


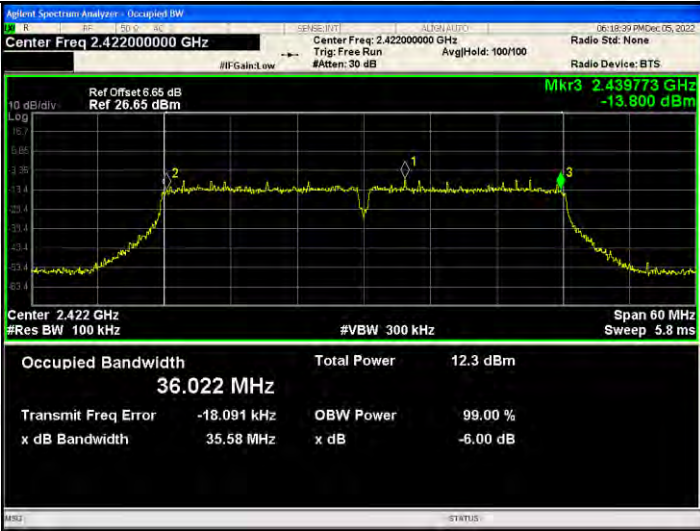
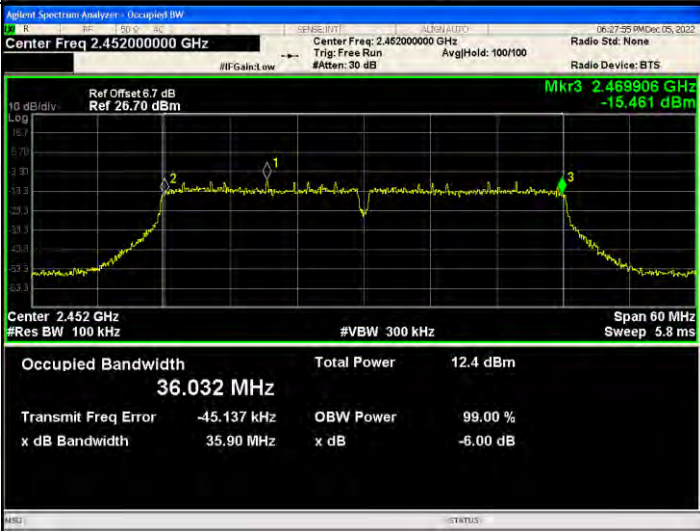
802.11g/MCH



802.11g/HCH



802.11n(HT20)/LC H	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.41200000 GHz Ref Offset 6.66 dB Ref 26.66 dBm Mkr3 2.420603 GHz -10.611 dBm Center 2.412 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth 17.587 MHz Total Power 12.8 dBm Transmit Freq Error 935 Hz OBW Power 99.00 % x dB Bandwidth 17.00 MHz x dB -6.00 dB
802.11n(HT20)/MC H	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.43700000 GHz Ref Offset 6.72 dB Ref 26.72 dBm Mkr3 2.445648 GHz -9.8379 dBm Center 2.437 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth 17.584 MHz Total Power 12.6 dBm Transmit Freq Error -6.876 kHz OBW Power 99.00 % x dB Bandwidth 17.11 MHz x dB -6.00 dB
802.11n(HT20)/HC H	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.46200000 GHz Ref Offset 6.7 dB Ref 26.70 dBm Mkr3 2.470772 GHz -11.066 dBm Center 2.462 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth 17.623 MHz Total Power 12.2 dBm Transmit Freq Error -5.965 kHz OBW Power 99.00 % x dB Bandwidth 17.56 MHz x dB -6.00 dB

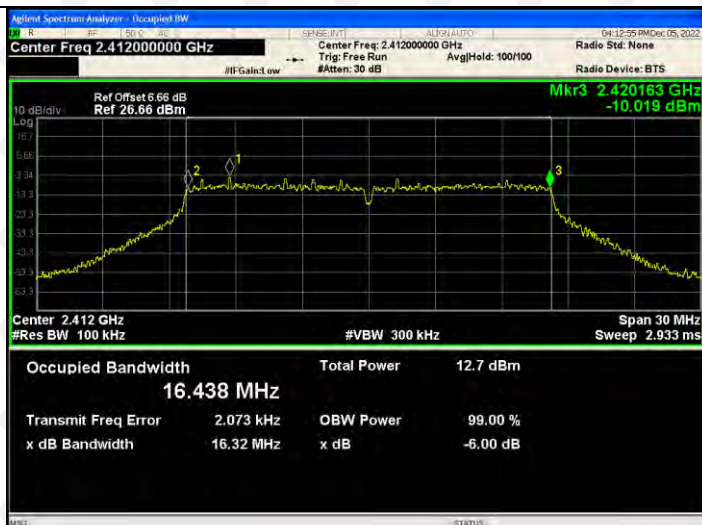
802.11n(HT40)/LC H		
802.11n(HT40)/MC H		
802.11n(HT40)/HC H		

ANT2:

Test Graph:



802.11g/LCH

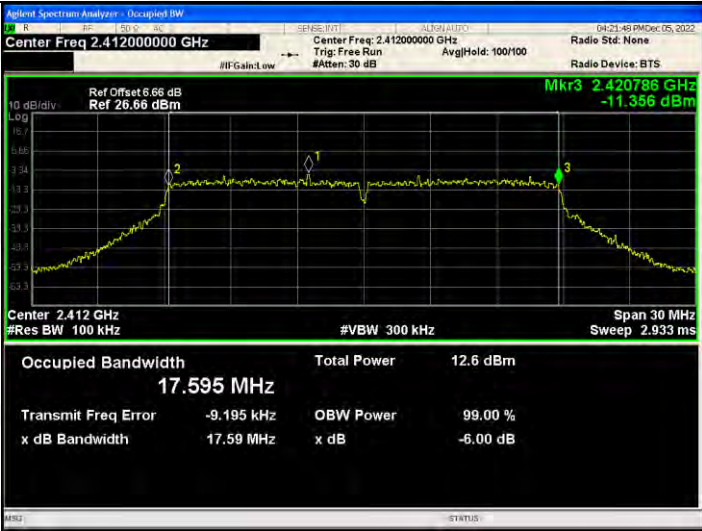
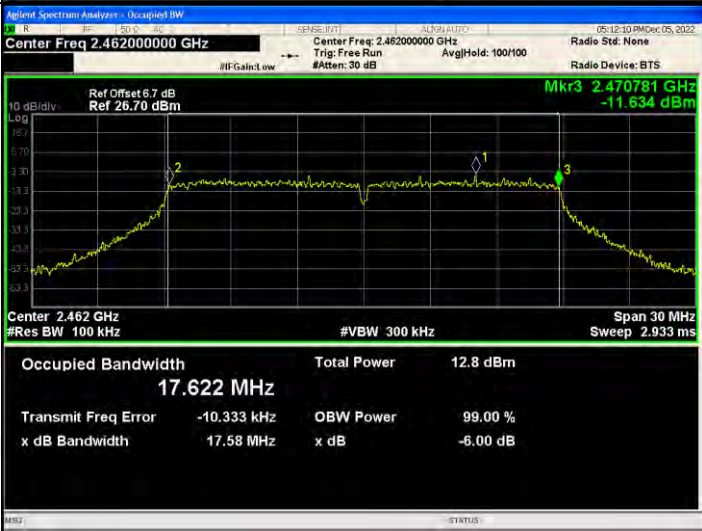


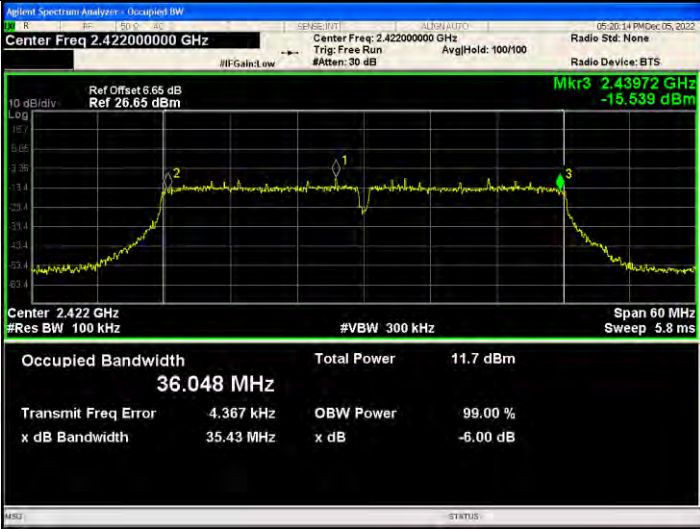
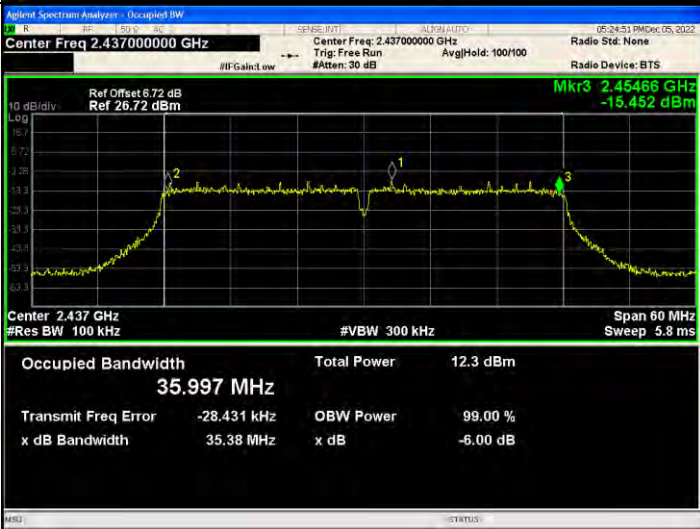
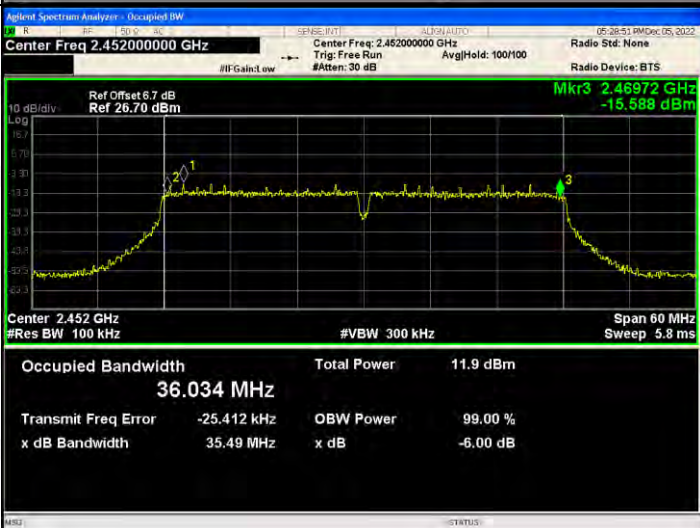
802.11g/MCH



802.11g/HCH

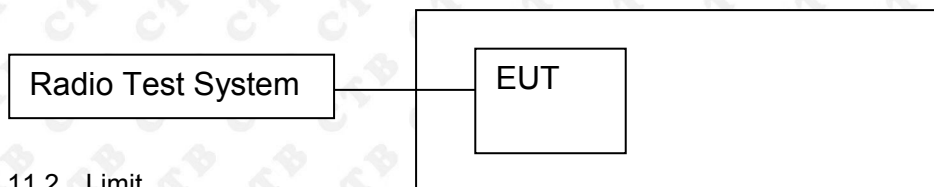


802.11n(HT20)/LC H	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.41200000 GHz Ref Offset 6.66 dB Ref 26.66 dBm Mkr3 2.420786 GHz -11.356 dBm Center 2.412 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth 17.595 MHz Total Power 12.6 dBm Transmit Freq Error -9.195 kHz OBW Power 99.00 % x dB Bandwidth 17.59 MHz x dB -6.00 dB
802.11n(HT20)/MC H	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.43700000 GHz Ref Offset 6.72 dB Ref 26.72 dBm Mkr3 2.445667 GHz -13.920 dBm Center 2.437 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth 17.628 MHz Total Power 12.0 dBm Transmit Freq Error -20.273 kHz OBW Power 99.00 % x dB Bandwidth 17.38 MHz x dB -6.00 dB
802.11n(HT20)/HC H	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.46200000 GHz Ref Offset 6.7 dB Ref 26.70 dBm Mkr3 2.470781 GHz -11.634 dBm Center 2.462 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth 17.622 MHz Total Power 12.8 dBm Transmit Freq Error -10.333 kHz OBW Power 99.00 % x dB Bandwidth 17.58 MHz x dB -6.00 dB

802.11n(HT40)/LC H	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.42200000 GHz Ref Offset 6.65 dB Ref 26.65 dBm Mkr3 2.43972 GHz -15.539 dBm Center 2.422 GHz #Res BW 100 kHz #VBW 300 kHz Span 60 MHz Sweep 5.8 ms Occupied Bandwidth 36.048 MHz Total Power 11.7 dBm Transmit Freq Error 4.367 kHz OBW Power 99.00 % x dB Bandwidth 35.43 MHz x dB -6.00 dB
802.11n(HT40)/MC H	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.43700000 GHz Ref Offset 6.72 dB Ref 26.72 dBm Mkr3 2.45466 GHz -15.452 dBm Center 2.437 GHz #Res BW 100 kHz #VBW 300 kHz Span 60 MHz Sweep 5.8 ms Occupied Bandwidth 35.997 MHz Total Power 12.3 dBm Transmit Freq Error -28.431 kHz OBW Power 99.00 % x dB Bandwidth 35.38 MHz x dB -6.00 dB
802.11n(HT40)/HC H	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.45200000 GHz Ref Offset 6.7 dB Ref 26.70 dBm Mkr3 2.46972 GHz -15.588 dBm Center 2.452 GHz #Res BW 100 kHz #VBW 300 kHz Span 60 MHz Sweep 5.8 ms Occupied Bandwidth 36.034 MHz Total Power 11.9 dBm Transmit Freq Error -25.412 kHz OBW Power 99.00 % x dB Bandwidth 35.49 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] ANT 1	Power Spectral Density [dBm /3KHz] ANT 2	Power Spectral Density [dBm /3KHz] Total	Limit(dBm)
802.11b	LCH	-15.416	-15.211	/	8
	MCH	-15.036	-15.763	/	8
	HCH	-15.409	-14.646	/	8
802.11g	LCH	-18.542	-18.585	/	8
	MCH	-18.78	-18.661	/	8
	HCH	-19.099	-18.147	/	8
802.11n(H T20)	LCH	-18.499	-19.258	-15.852	8
	MCH	-19.555	-18.404	-15.931	8
	HCH	-18.959	-19.087	-16.012	8
802.11n(H T40)	LCH	-22.731	-23.239	-19.967	8
	MCH	-22.858	-22.754	-19.795	8
	HCH	-22.465	-23.262	-19.835	8

ANT1: Test Graph

Graphs

802.11b /LCH



802.11b /MCH



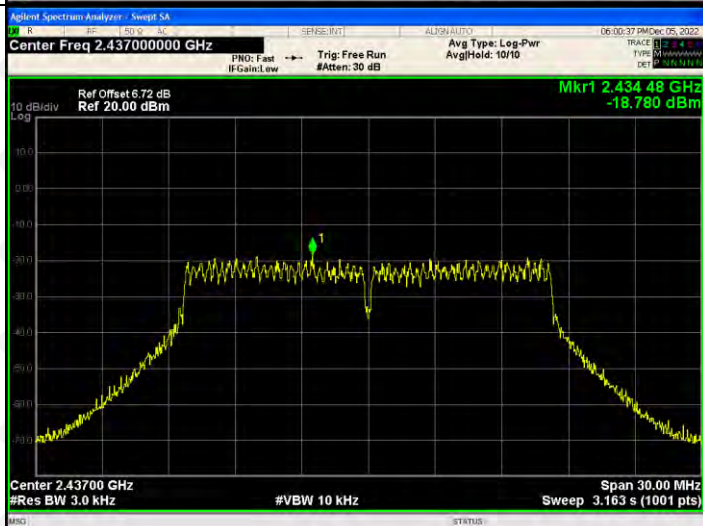
802.11b/HCH



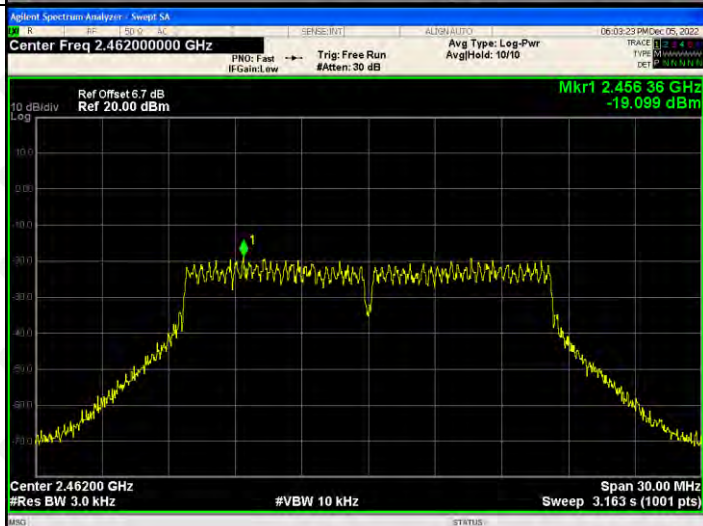
802.11g/LCH

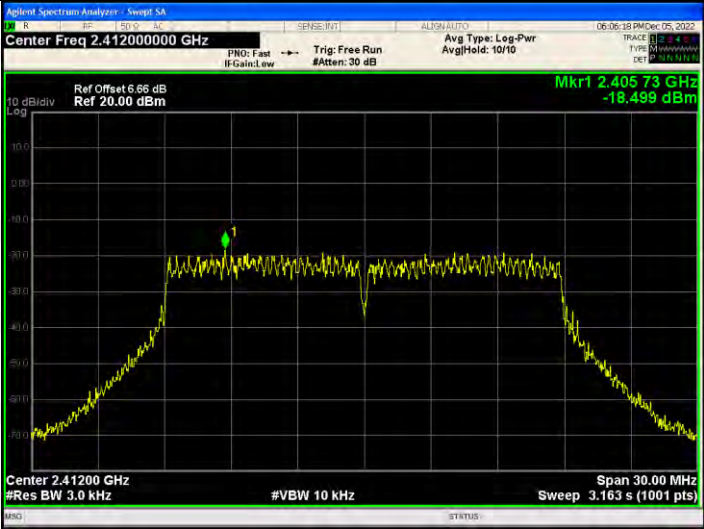


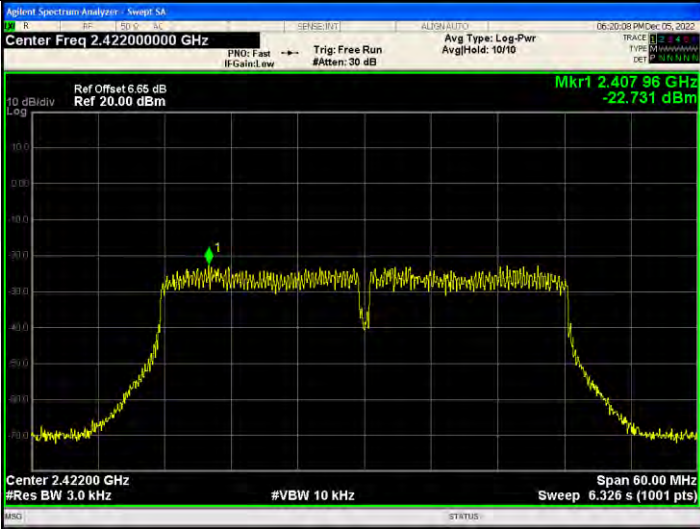
802.11g/MCH



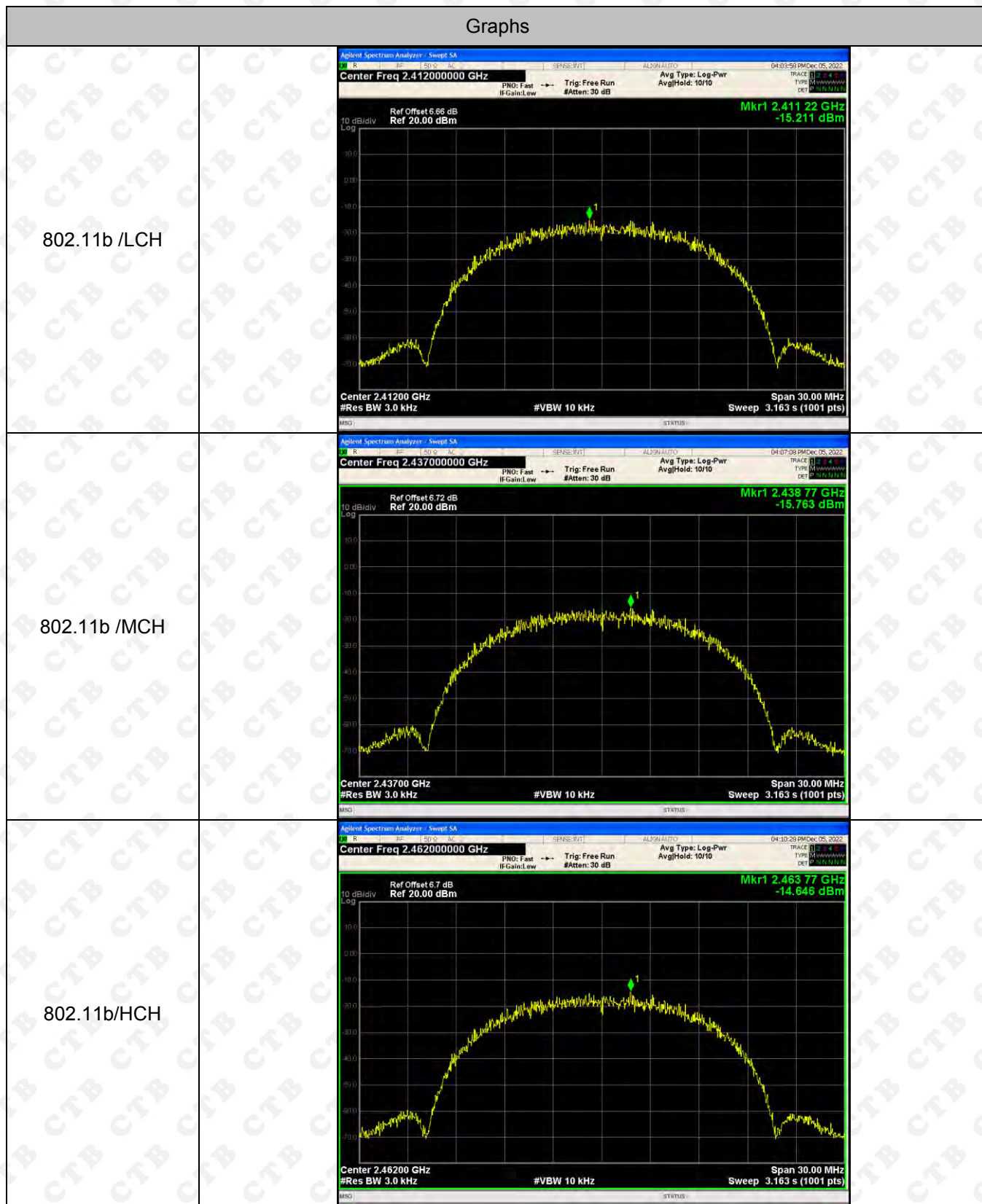
802.11g/HCH



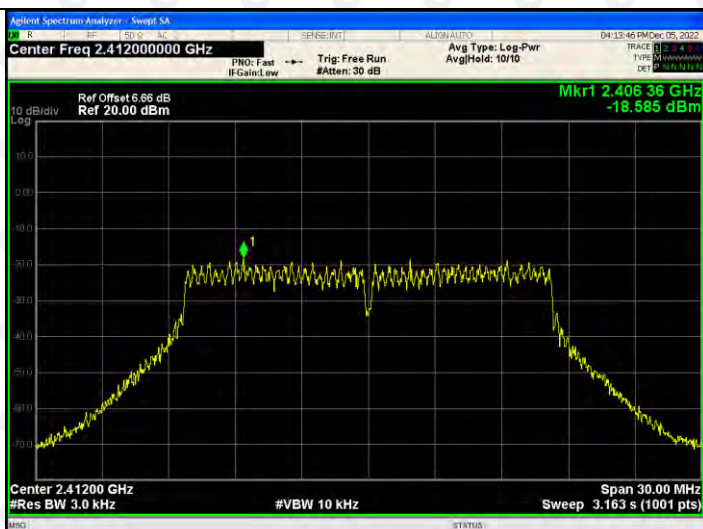
802.11n(HT20)/LC H	 Agilent Spectrum Analyzer - Swept SA Center Freq 2.41200000 GHz Ref Offset 6.86 dB Ref 20.00 dBm Mkr1 2.40573 GHz -18.499 dBm Center 2.41200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz Sweep 3.163 s (1001 pts)
802.11n(HT20)/MC H	 Agilent Spectrum Analyzer - Swept SA Center Freq 2.43700000 GHz Ref Offset 6.72 dB Ref 20.00 dBm Mkr1 2.43139 GHz -19.555 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 6.7 dB Ref 20.00 dBm Mkr1 2.46512 GHz -18.959 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(HT40)/LC H	
802.11n(HT40)/MC H	
802.11n(HT40)/HC H	

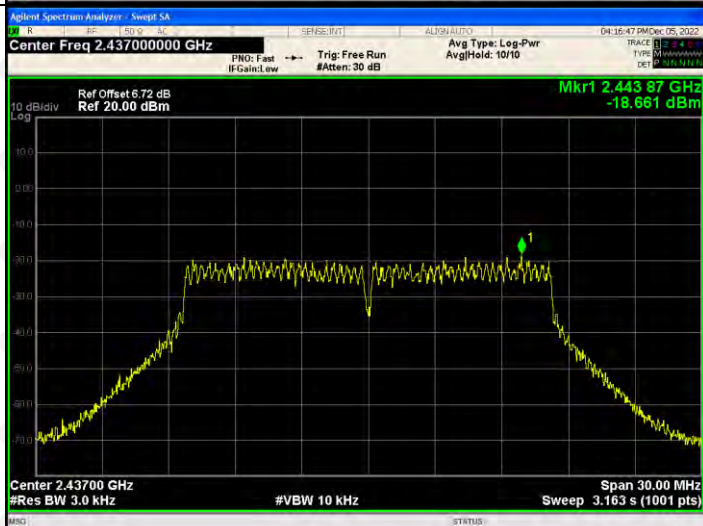
ANT 2: Test Graph



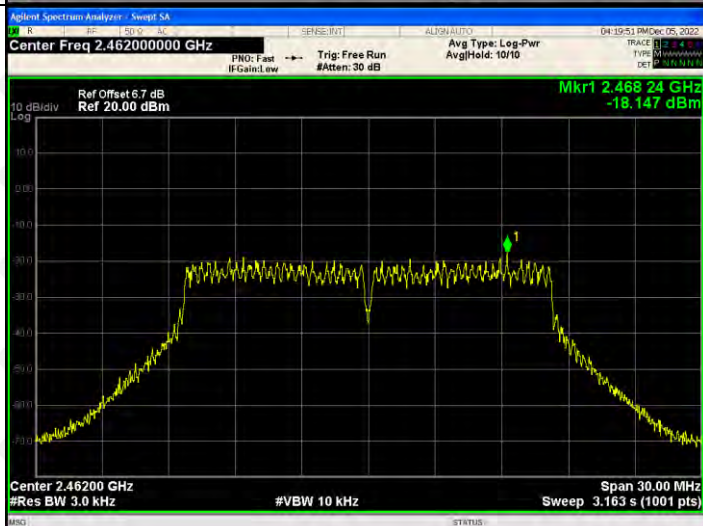
802.11g/LCH

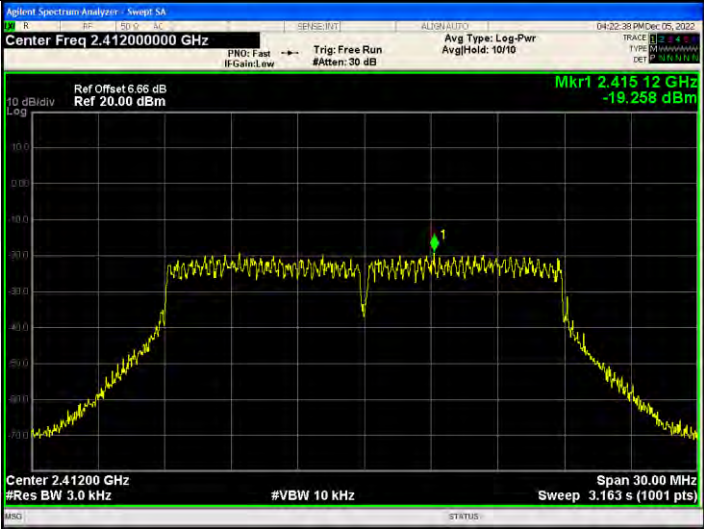
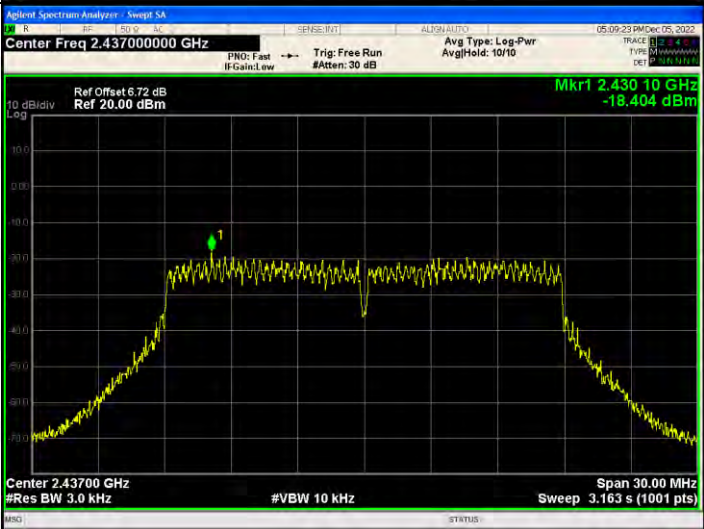


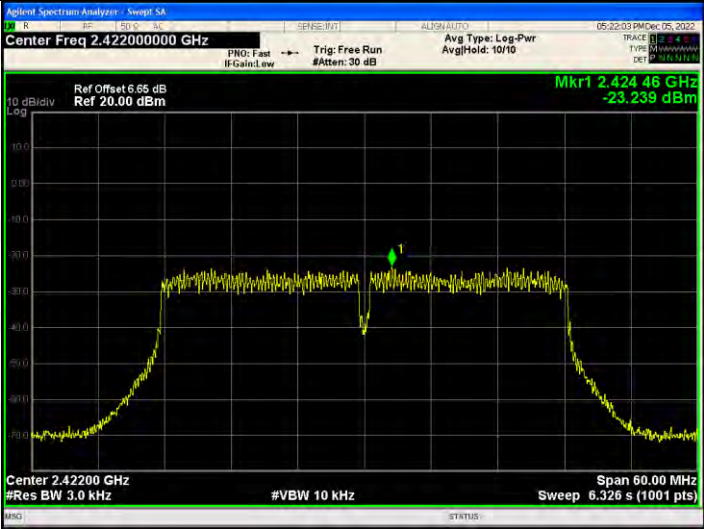
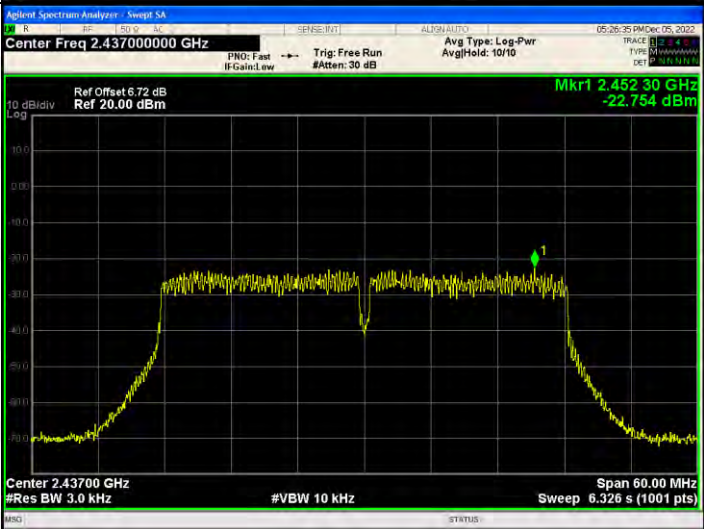
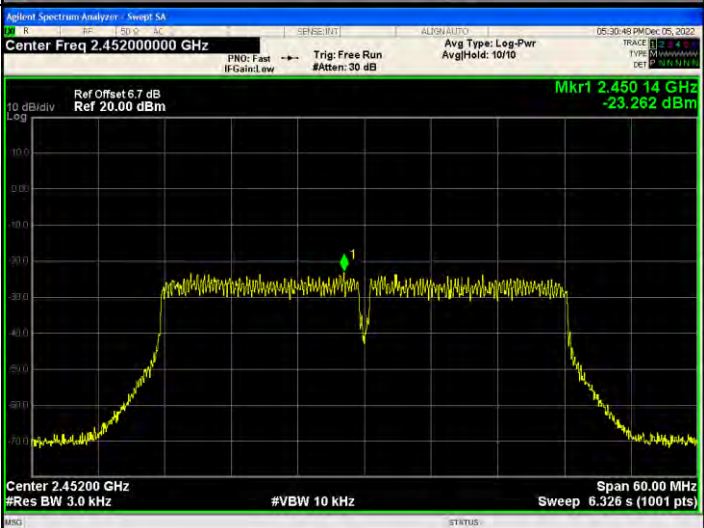
802.11g/MCH



802.11g/HCH



802.11n(HT20)/LC H	 Agilent Spectrum Analyzer - Sweep SA Center Freq 2.41200000 GHz Ref Offset 6.86 dB Ref 20.00 dBm Mkr1 2.41512 GHz -19.258 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 - Sweep SA Center Freq 2.43700000 GHz Ref Offset 6.72 dB Ref 20.00 dBm Mkr1 2.43010 GHz -18.404 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 - Sweep SA Center Freq 2.46200000 GHz Ref Offset 6.7 dB Ref 20.00 dBm Mkr1 2.45609 GHz -19.087 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(HT40)/LC H	 Agilent Spectrum Analyzer - Sweep SA Center Freq 2.422000000 GHz Ref Offset 6.55 dB Ref 20.00 dBm Mkr1 2.42446 GHz -23.239 dBm Center 2.42200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 60.00 MHz Sweep 6.326 s (1001 pts)
802.11n(HT40)/MC H	 Agilent Spectrum Analyzer - Sweep SA Center Freq 2.437000000 GHz Ref Offset 6.72 dB Ref 20.00 dBm Mkr1 2.45230 GHz -22.754 dBm Center 2.43700 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 60.00 MHz Sweep 6.326 s (1001 pts)
802.11n(HT40)/HC H	 Agilent Spectrum Analyzer - Sweep SA Center Freq 2.452000000 GHz Ref Offset 6.7 dB Ref 20.00 dBm Mkr1 2.45014 GHz -23.262 dBm Center 2.45200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 60.00 MHz Sweep 6.326 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 Dipole antenna and no consideration of replacement. The best case gain of the antenna is ANT1:1.17dBi, ANT2:1.17 dBi.

13. EUT PHOTOGRAPHS

External Photos EUT Photo 1

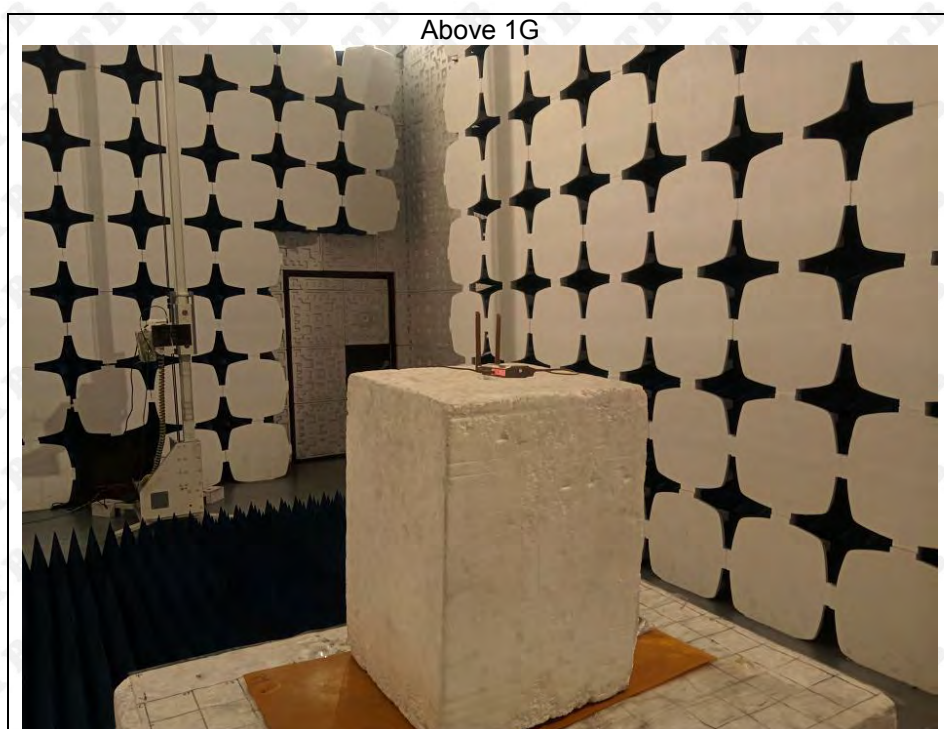
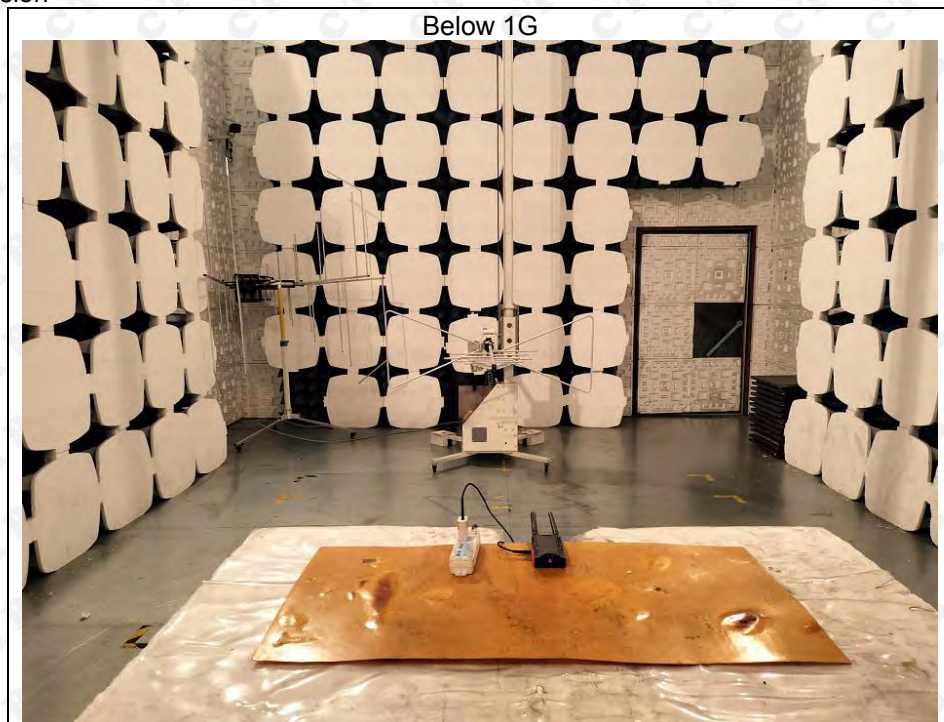


EUT Photo 2



14. EUT TEST SETUP PHOTOGRAPHS

Radiated Emission



Conducted Emission



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