RF TEST REPORT

Report No.: Q190826S004-FCC-R2

Supersede Report No.: N/A

Applicant	Cedar Kingdom Corporation Limited
Product Name	Mobile Phone
Model No.	V505c
Serial No.	N/A
Test Standard	FCC Part 15.247, ANSI C63.10: 2013
Test Date	Sep 2 to 25, 2019
Issue Date	Sep 27, 2019
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐
Aaron Liang	David Huang
Aaron Liang Test Engineer	David Huang Checked By
This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only	

Issued by:

SIEMIC (SHENZHEN-CHINA) LABORATORIES

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Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.

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Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

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1. Report Revision History

Report No.	Report Version	Description	Issue Date
Q190826S004-FCC-R2	NONE	Original	Sep 27, 2019

2. Customer information

Applicant Name	Cedar Kingdom Corporation Limited
Applicant Add	Flat/Rm 05, 14/F, Lucky Centre, 165-171 Wanchai Road, Wanchai, Hong Kong
Manufacturer	Cedar Kingdom Corporation Limited
Manufacturer Add	Flat/Rm 05, 14/F, Lucky Centre, 165-171 Wanchai Road, Wanchai, Hong Kong

3. Test site information

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao'an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	535293
IC Test Site No.	4842E-1
Test Software	Radiated Emission Program-To Shenzhen v2.0

4. Equipment under Test (EUT) Information

Description of EUT:	Mobile Phone
Main Model:	V505c
Serial Model:	N/A
Date EUT received:	Aug 28, 2019
Test Date(s):	Sep 2 to 25, 2019
Equipment Category :	DTS
Antenna Gain:	GSM850: -0.7dBi PCS1900: 0.4dBi UMTS-FDD Band V: 0.4dBi UMTS-FDD Band II: -0.6dBi WIFI: 0.8dBi Bluetooth/BLE: 0.9dBi
Antenna Type:	FPC Antenna
Type of Modulation:	GSM / GPRS: GMSK EGPRS: GMSK UMTS-FDD: QPSK 802.11b/g/n: DSSS, OFDM Bluetooth: GFSK, π /4DQPSK, 8DPSK BLE: GFSK GPS:BPSK
RF Operating Frequency (ies):	GSM850 TX: 824.2 ~ 848.8 MHz; RX: 869.2 ~ 893.8 MHz PCS1900 TX: 1850.2 ~ 1909.8 MHz; RX: 1930.2 ~ 1989.8 MHz UMTS-FDD Band V TX: 826.4 ~ 846.6 MHz; RX: 871.4 ~ 891.6 MHz UMTS-FDD Band II TX:1852.4 ~ 1907.6 MHz; RX: 1932.4 ~ 1987.6 MHz WIFI: 802.11b/g/n(20M): 2412-2462 MHz WIFI: 802.11n(40M): 2422-2452 MHz Bluetooth& BLE: 2402-2480 MHz

	GPS: 1575.42 MHz
Max. Output Power:	802.11b: 8.33 dBm 802.11g: 8.32 dBm 802.11n(20M): 8.33 dBm 802.11n(40M): 8.18 dBm
Number of Channels:	GSM 850: 124CH PCS1900: 299CH UMTS-FDD Band V: 102CH UMTS-FDD Band II: 277CH WIFI :802.11b/g/n(20M): 11CH WIFI :802.11n(40M): 7CH Bluetooth: 79CH BLE: 40CH GPS:1CH
Port:	Please refer to the user's manual
Input Power:	Adapter : Model: V505c Input: AC100-240V~50/60Hz,150mA Output: DC 5.0V, 1A Battery : Model: S13 Spec: 3.8V, 2500mAh/9.50Wh Limited charge voltage: 4.35V
Trade Name :	VIRZO
FCC ID:	2AKQUVZCKV505C

5. Test Summary

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.247 (a)(2)	DTS (6 dB&20 dB) CHANNEL BANDWIDTH	Compliance
§15.247(b)(3)	Conducted Maximum Output Power	Compliance
§15.247(e)	Power Spectral Density	Compliance
§15.247(d)	Band-Edge & Unwanted Emissions into Restricted Frequency Bands	Compliance
§15.207 (a),	AC Power Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Emissions & Unwanted Emissions into Restricted Frequency Bands	Compliance

Measurement Uncertainty

Emissions		
Test Item	**Description**	**Uncertainty**
Band-Edge & Unwanted Emissions into Restricted Frequency Bands and Radiated Emissions & Unwanted Emissions into Restricted Frequency Bands	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
-	-	-

6. Measurements, Examination And Derived Results

6.1 Antenna Requirement

Applicable Standard

According to § 15.203, 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 shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited.
The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.

b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.
And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

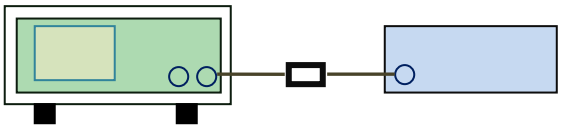
The EUT has 2 antennas:
A permanently attached FPC antenna for Bluetooth/BLE/WIF/GPS, the gain is 0.9dBi for Bluetooth/BLE, the gain is 0.8dBi for WIFI.
A permanently attached FPC antenna for GSM/PCS/UMTS, the gain is -0.7dBi for GSM850, 0.4dBi for PCS1900, 0.4dBi for UMTS-FDD Band V, -0.6dBi for UMTS-FDD Band II.

The antenna meets up with the ANTENNA REQUIREMENT.

Result: Compliance.

6.2 DTS (6 dB&20 dB) Channel Bandwidth

Temperature	26oC
Relative Humidity	73%
Atmospheric Pressure	1019mbar
Test date :	Sep 2, 2019
Tested By :	Aaron Liang

Spec	Item	Requirement	Applicable
§ 15.247(a)(2)	a)	6dB BW≥ 500kHz;	☑
RSS Gen(4.6.1)	b)	99% BW: For FCC reference only; required by IC.	☑
Test Setup			
Test Procedure	558074 D01 DTS MEAS Guidance v03r03, 8.1 DTS bandwidth 6dB bandwidth a) Set RBW = 100 kHz. b) Set the video bandwidth (VBW) ≥ 3 × RBW. c) Detector = Peak. d) Trace mode = max hold. e) Sweep = auto couple. f) Allow the trace to stabilize. g) Measure the maximum width of the emission that is constrained by the freq uencies associated with the two outermost amplitude points (upper and lower fr equencies) that are attenuated by 6 dB relative to the maximum level measure d in the fundamental emission. 20dB bandwidth C63.10 Occupied Bandwidth (OBW=20dB bandwidth) 1. Set RBW = 1%-5% OBW. 2. Set the video bandwidth (VBW) ≥ 3 x RBW. 3. Set the span range between 2 times and 5 times of the OBW. 4. Sweep time=Auto, Detector=PK, Trace=Max hold. 5. Once the reference level is established, the equipment is conditioned with t ypical modulating signals to produce the worst-		

	case (i.e., the widest) bandwidth. Unless otherwise specified for an unlicensed wireless device, measure the bandwidth at the 20 dB levels with respect to the reference level.
Remark	
Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Measurement result

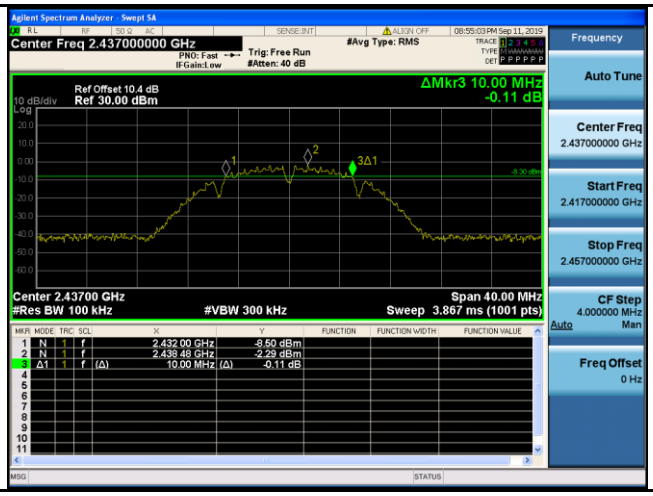
Test mode	CH	Freq (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
802.11b	Low	2412	10.04	≥ 0.5
	Mid	2437	10.00	≥ 0.5
	High	2462	10.04	≥ 0.5
802.11g	Low	2412	16.64	≥ 0.5
	Mid	2437	16.64	≥ 0.5
	High	2462	16.68	≥ 0.5
802.11n (20M)	Low	2412	17.84	≥ 0.5
	Mid	2437	17.88	≥ 0.5
	High	2462	17.84	≥ 0.5
802.11n (40M)	Low	2422	36.64	≥ 0.5
	Mid	2437	36.48	≥ 0.5
	High	2452	36.56	≥ 0.5

Test mode	CH	Freq (MHz)	99% Bandwidth (MHz)
802.11b	Low	2412	14.697
	Mid	2437	14.622
	High	2462	14.599
802.11g	Low	2412	17.259
	Mid	2437	17.132
	High	2462	17.193
802.11n (20M)	Low	2412	17.957
	Mid	2437	17.928
	High	2462	17.983
802.11n (40M)	Low	2422	36.340
	Mid	2437	36.359
	High	2452	36.428

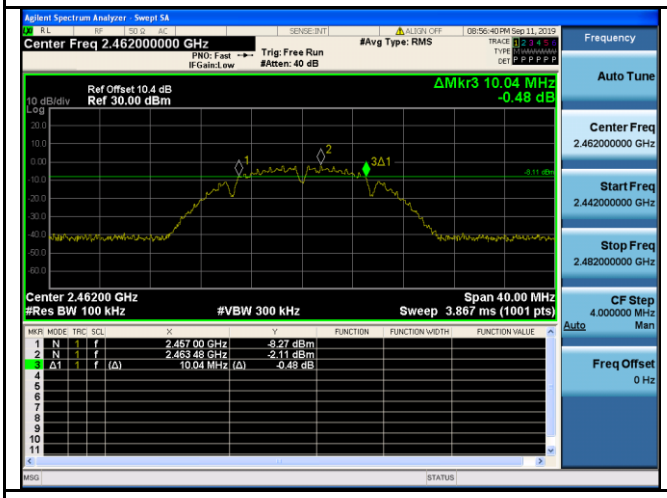
Test Plots

6dB Bandwidth measurement result

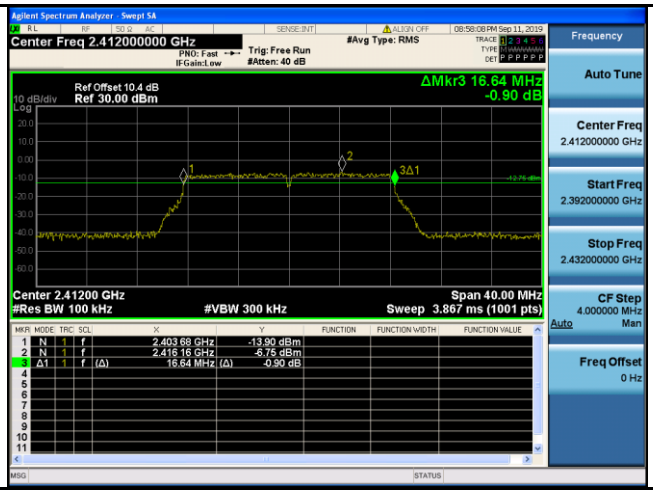
802.11b 6dB Bandwidth - Low CH 2412



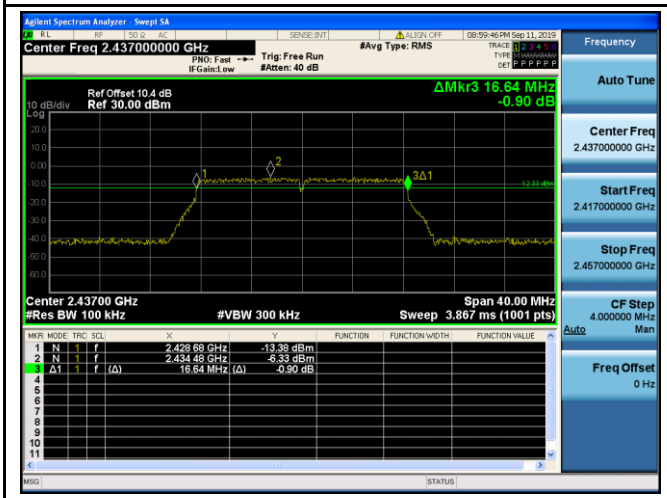
802.11b 6dB Bandwidth - Mid CH 2437



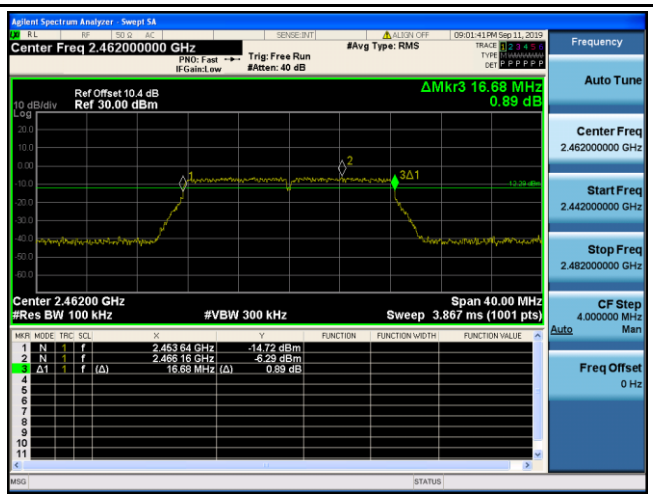
802.11b 6dB Bandwidth - High CH 2462



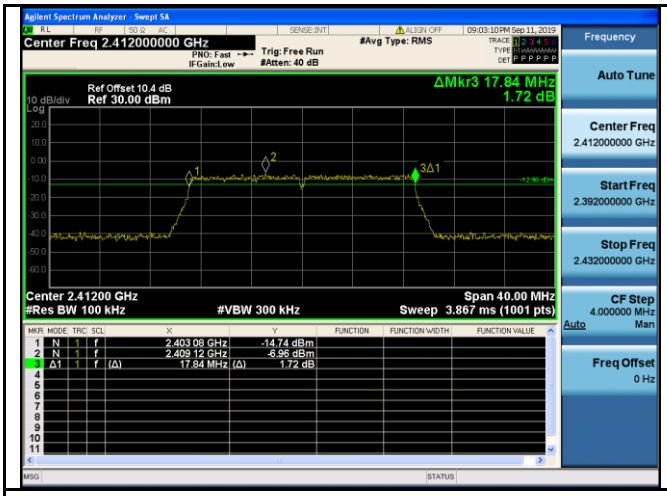
802.11g 6dB Bandwidth - Low CH 2412



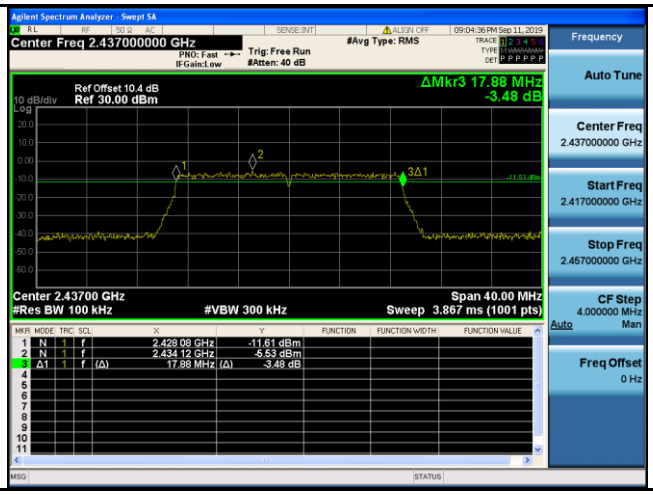
802.11g 6dB Bandwidth - Mid CH 2437



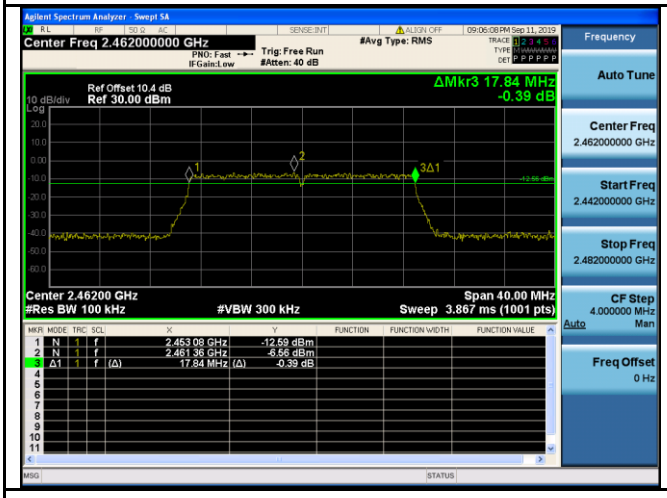
802.11g 6dB Bandwidth - High CH 2462



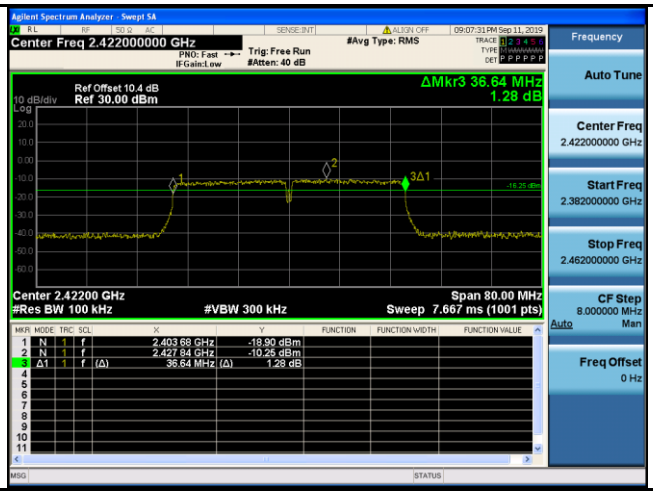
802.11n20 6dB Bandwidth - Low CH 2412



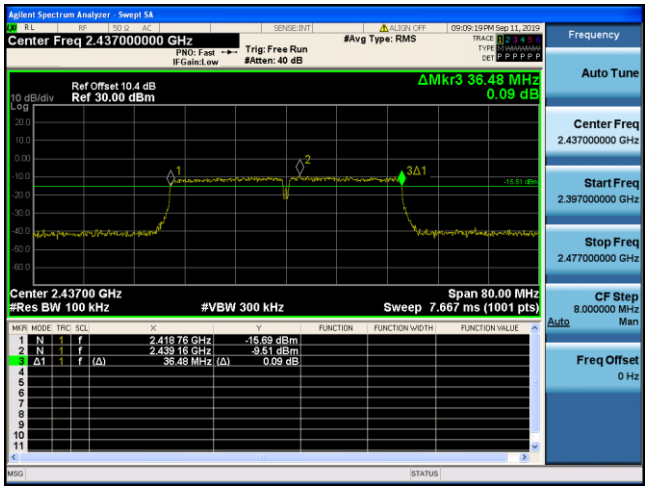
802.11n20 6dB Bandwidth - Mid CH 2437



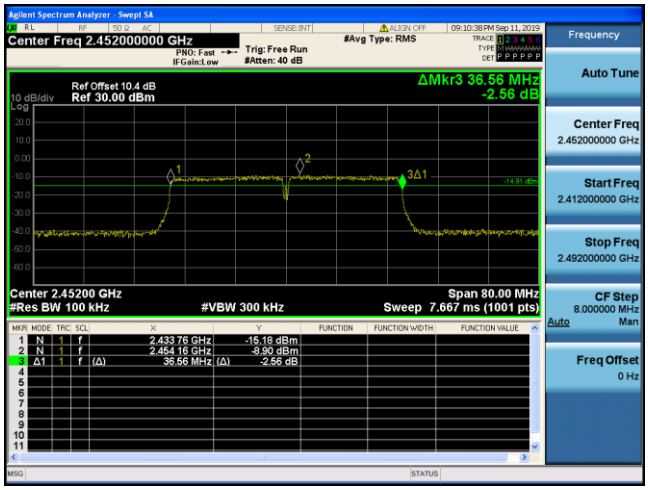
802.11n20 6dB Bandwidth - High CH 2462



802.11n40 6dB Bandwidth - Low CH 2422

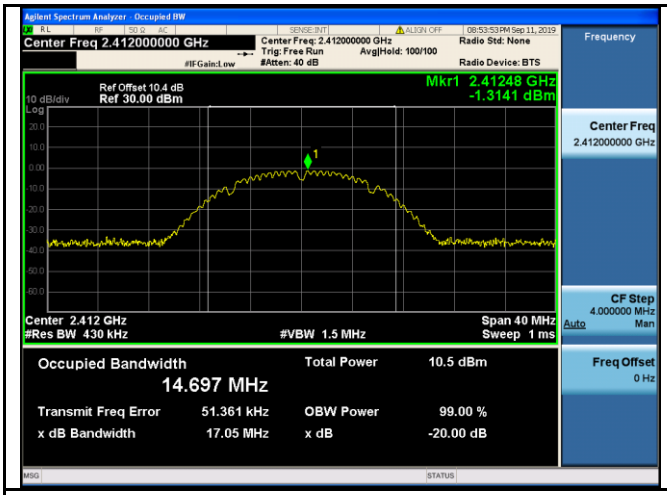


802.11n40 6dB Bandwidth - Mid CH 2437

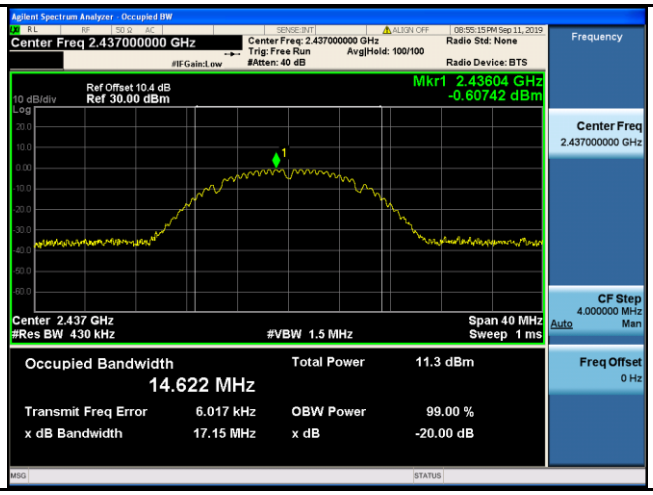


802.11n40 6dB Bandwidth - High CH 2452

99% Bandwidth measurement result

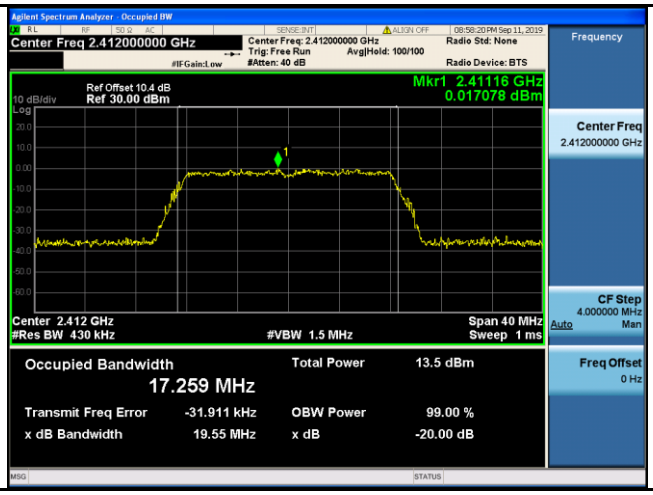


802.11b 99% Bandwidth - Low CH 2412

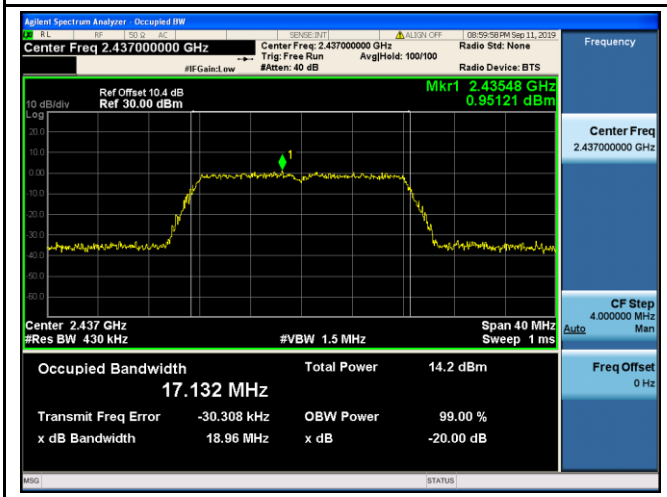


802.11b 99% Bandwidth - Mid CH 2437

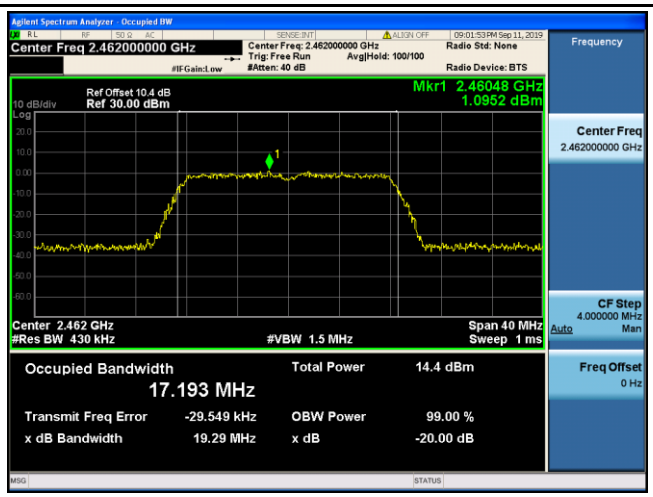
802.11b 99% Bandwidth - High CH 2462



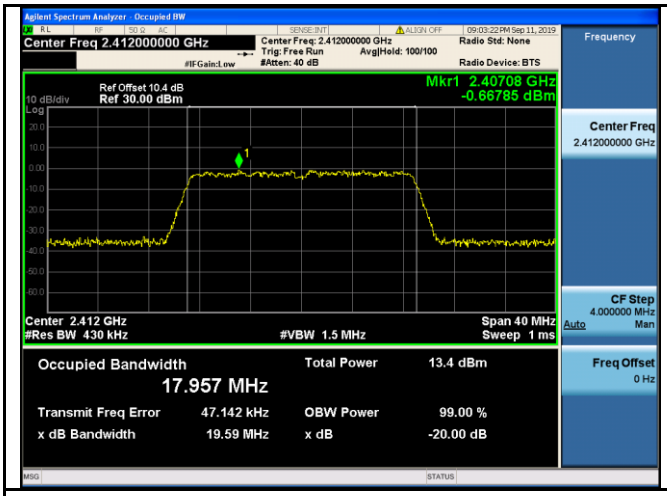
802.11g 99% Bandwidth - Low CH 2412



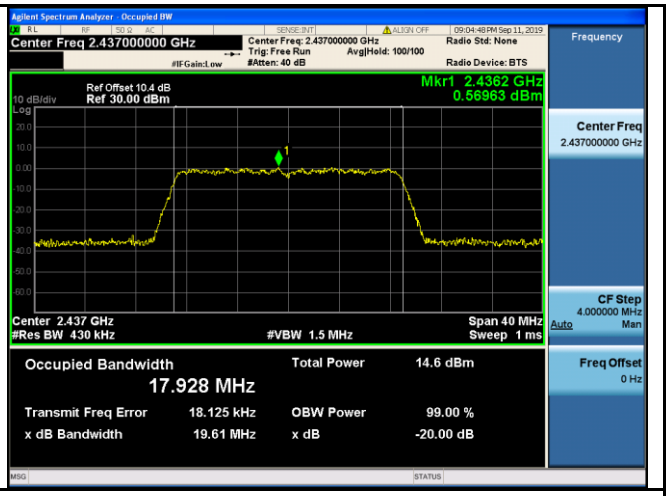
802.11g 99% Bandwidth - Mid CH 2437



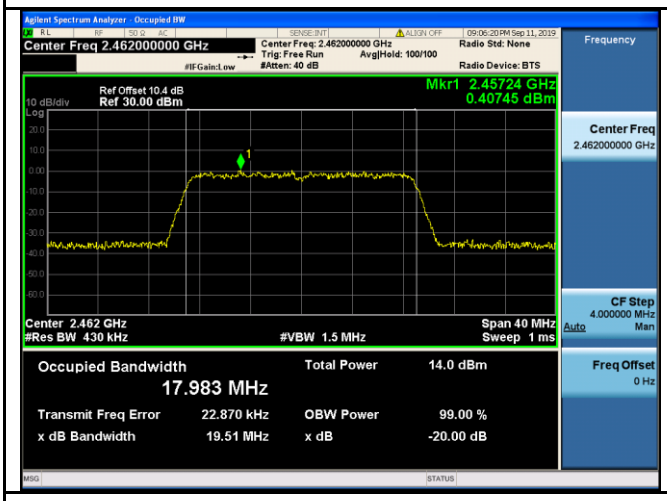
802.11g 99% Bandwidth - High CH 2462



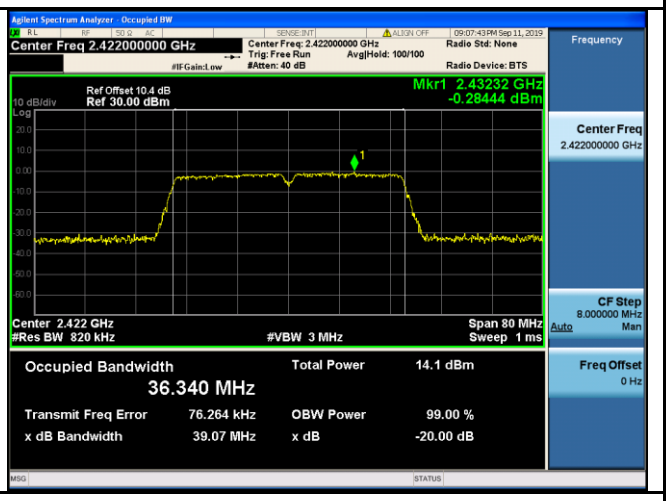
802.11n20 99% Bandwidth - Low CH 2412



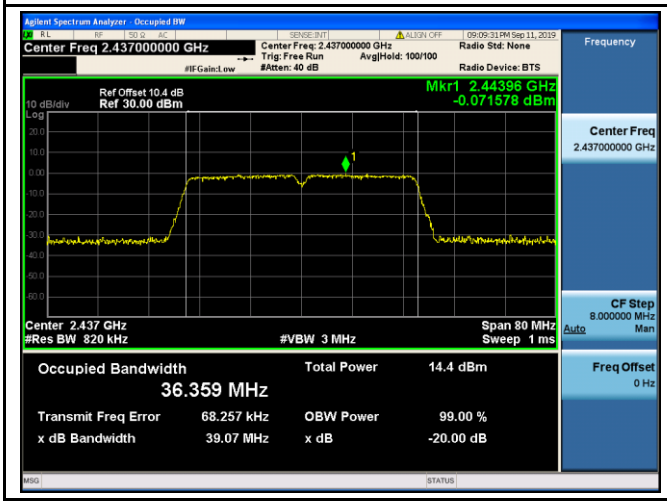
802.11n20 99% Bandwidth - Mid CH 2437



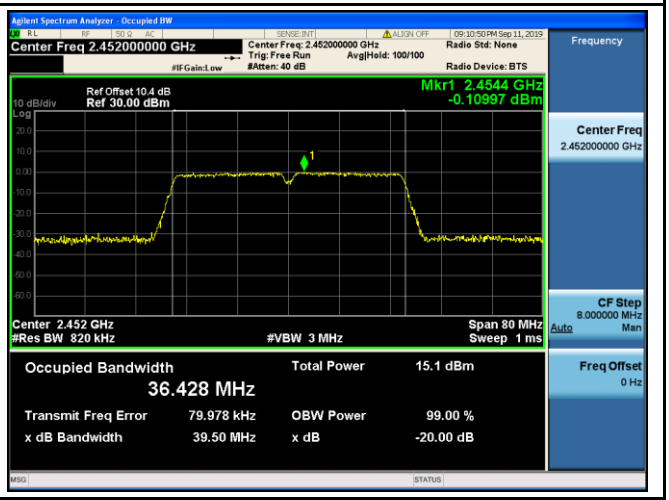
802.11n20 99% Bandwidth - High CH 2462



802.11n40 99% Bandwidth - Low CH 2422



802.11n40 99% Bandwidth - Mid CH 2437

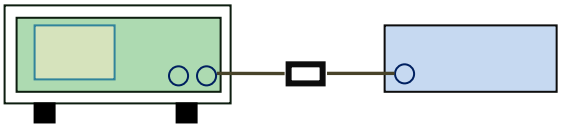


802.11n40 99% Bandwidth - High CH 2452

6.3 Maximum Output Power

Temperature	26°C
Relative Humidity	73%
Atmospheric Pressure	1019mbar
Test date :	Sep 2, 2019
Tested By :	Aaron Liang

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(b)(3),RSS210(A8.4)	a)	FHSS in 2400-2483.5MHz with ≥ 75 channels: ≤ 1 Watt	☐
	b)	FHSS in 5725-5850MHz: ≤ 1 Watt	☐
	c)	For all other FHSS in the 2400-2483.5MHz band: ≤ 0.125 Watt.	☐
	d)	FHSS in 902-928MHz with ≥ 50 channels: ≤ 1 Watt	☐
	e)	FHSS in 902-928MHz with ≥ 25 & <50 channels: ≤ 0.25 Watt	☐
	f)	DTS in 902-928MHz, 2400-2483.5MHz: ≤ 1 Watt	☑
Test Setup	 Spectrum Analyzer EUT		
Test Procedure	558074 D01 DTS MEAS Guidance v03r03, 9.1.2 Integrated band power method Maximum output power measurement procedure - a) Set span to at least 1.5 times the OBW. - b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz. - c) Set VBW ≥ 3 x RBW. - d) Number of points in sweep ≥ 2 × span / RBW. (This gives bin-to-bin spacing ≤ RBW/2, so that narrowband signals are not lost between frequency bins.) - e) Sweep time = auto. - f) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode. - g) If transmit duty cycle < 98 %, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at maximum		

	power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 %, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run”. - h) Trace average at least 100 traces in power averaging (i.e., RMS) mode. - i) Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
Remark	
Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Output Power measurement result

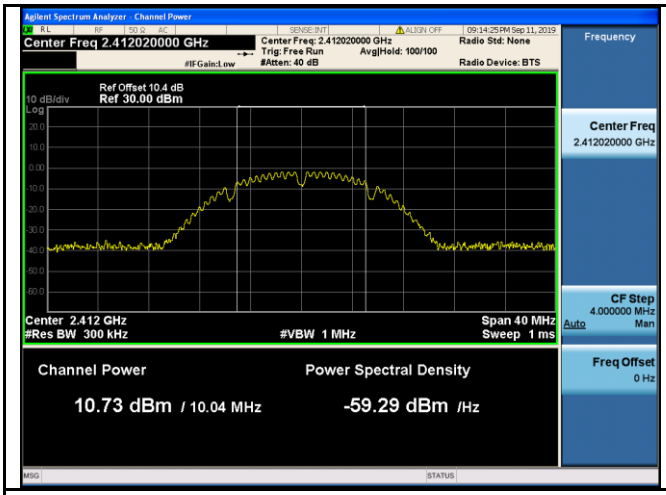
Type	Test mode	CH	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (mW)	Limit (mW)	Result
Output power	802.11b	Low	2412	10.73	11.83	1000	Pass
		Mid	2437	11.72	14.859	1000	Pass
		High	2462	12.02	15.922	1000	Pass
	802.11g	Low	2412	13.64	23.121	1000	Pass
		Mid	2437	14.08	25.586	1000	Pass
		High	2462	13.77	23.823	1000	Pass
	802.11n (20M)	Low	2412	13.13	20.559	1000	Pass
		Mid	2437	13.92	24.66	1000	Pass
		High	2462	13.69	23.388	1000	Pass
	802.11n (40M)	Low	2422	13.79	23.933	1000	Pass
		Mid	2437	13.80	23.988	1000	Pass
		High	2452	14.03	25.293	1000	Pass

Average Output power (FOR REFERENCE)

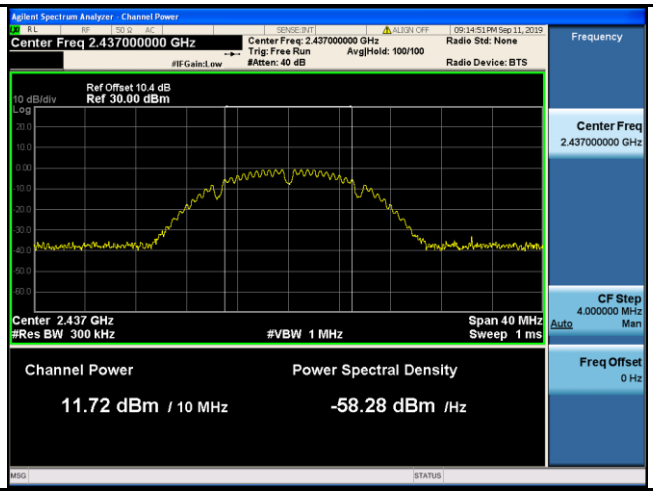
Test mode	CH	Frequency (MHz)	Average Power (dBm)
802.11b	Low	2412	7.35
	Mid	2437	8.18
	High	2462	8.33
802.11g	Low	2412	7.46
	Mid	2437	8.18
	High	2462	8.32
802.11n (20M)	Low	2412	7.16
	Mid	2437	8.33
	High	2462	7.8
802.11n (40M)	Low	2422	7.2
	Mid	2437	7.52
	High	2452	8.18

Test Plots

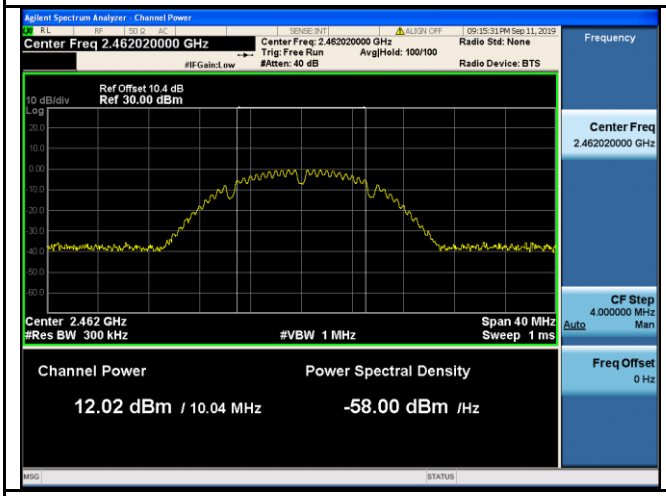
Maximum Output Power



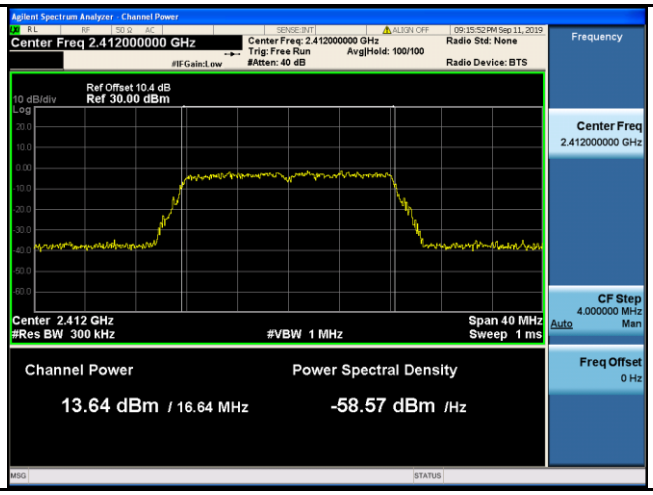
802.11b - Maximum Output Power - Low CH 2412



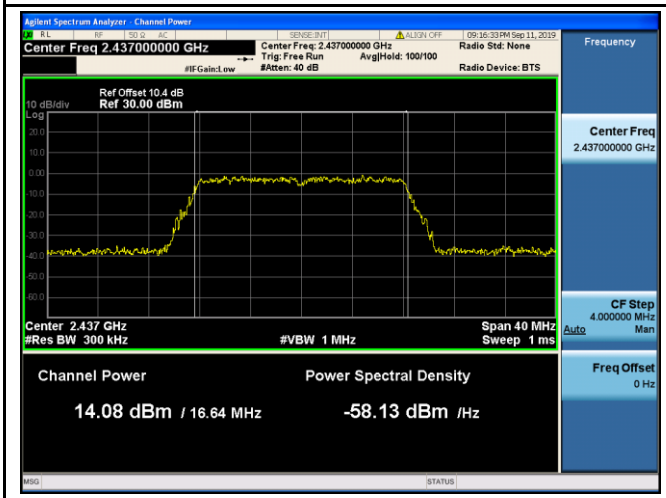
802.11b - Maximum Output Power - Mid CH 2437



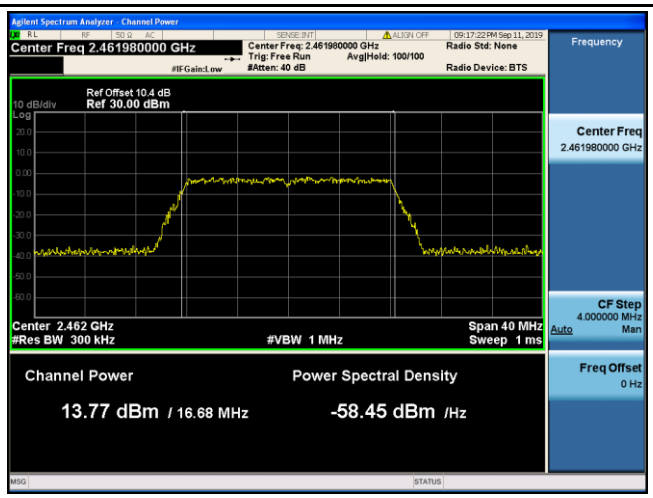
802.11b - Maximum Output Power - High CH 2462



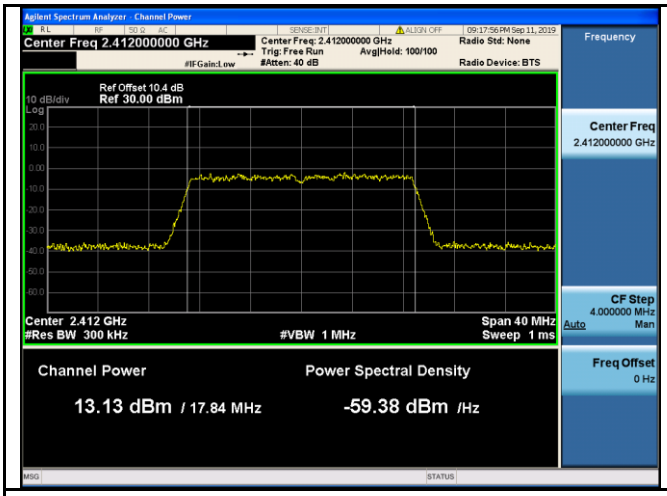
802.11g - Maximum Output Power - Low CH 2412



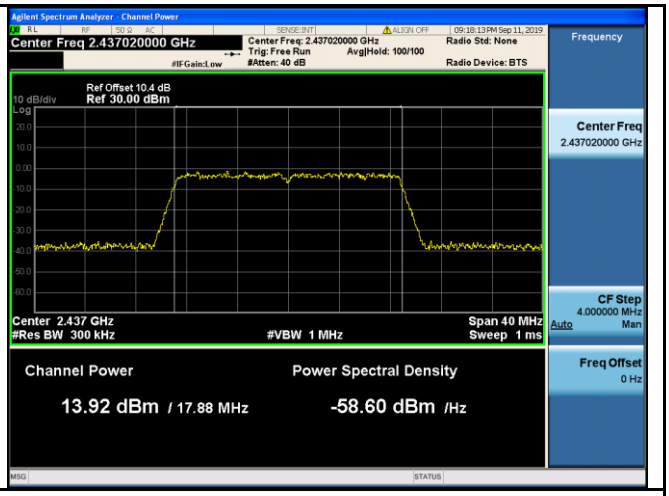
802.11g - Maximum Output Power - Mid CH 2437



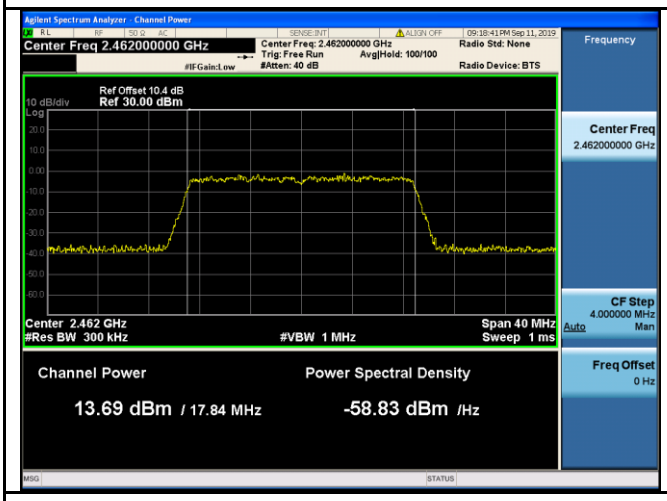
802.11g - Maximum Output Power - High CH 2462



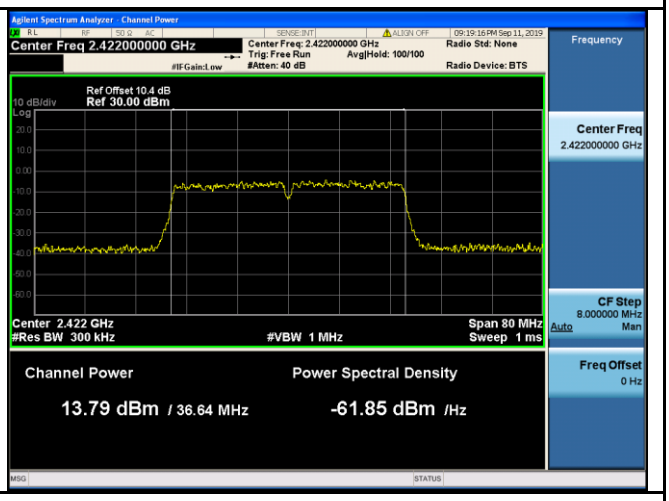
802.11n20 - Maximum Output Power - Low CH 2412



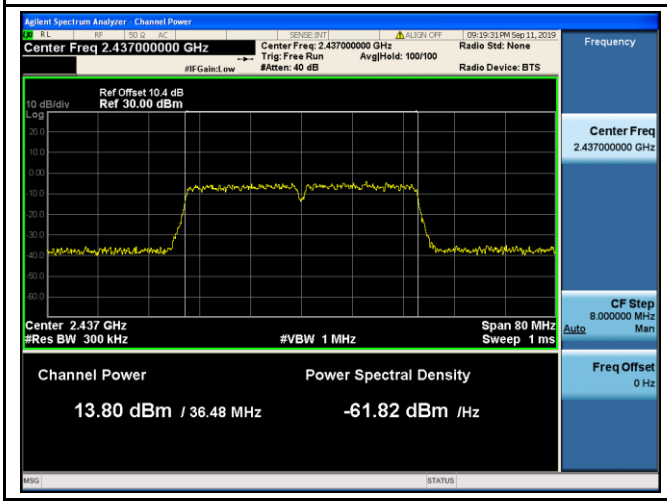
802.11n20 - Maximum Output Power - Mid CH 2437



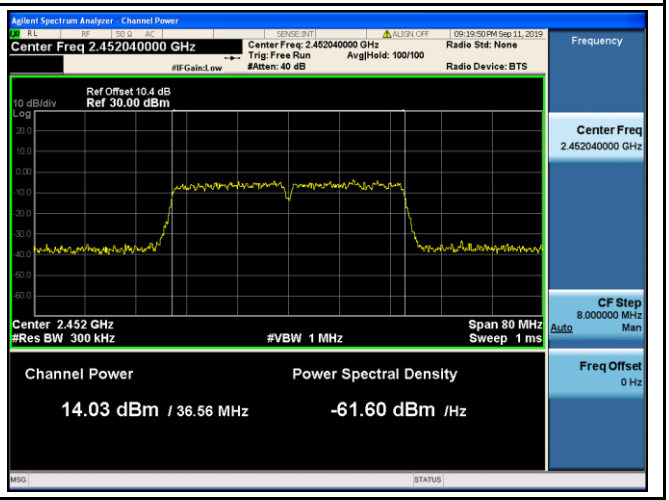
802.11n20 - Maximum Output Power - High CH 2462



802.11n40 - Maximum Output Power - Low CH 2422



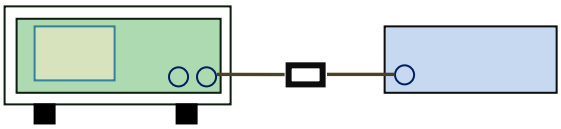
802.11n40 - Maximum Output Power - Mid CH 2437



802.11n40 - Maximum Output Power - High CH 2452

6.4 Power Spectral Density

Temperature	24°C
Relative Humidity	66%
Atmospheric Pressure	1013mbar
Test date :	Sep 11, 2019
Tested By :	Aaron Liang

Spec	Item	Requirement	Applicable
§15.247(e)	a)	The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.	☑
Test Setup			
Test Procedure	558074 D01 DTS MEAS Guidance v03r03, 10.2 power spectral density method power spectral density measurement procedure - a) Set analyzer center frequency to DTS channel center frequency. - b) Set the span to 1.5 times the DTS bandwidth. - c) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz. - d) Set the VBW ≥ 3 × RBW. - e) Detector = peak. - f) Sweep time = auto couple. - g) Trace mode = max hold. - h) Allow trace to fully stabilize. - i) Use the peak marker function to determine the maximum amplitude level within the RBW. - j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.		
Remark			
Result	☑ Pass ☐ Fail		

Test Data ☑ Yes ☐ N/A

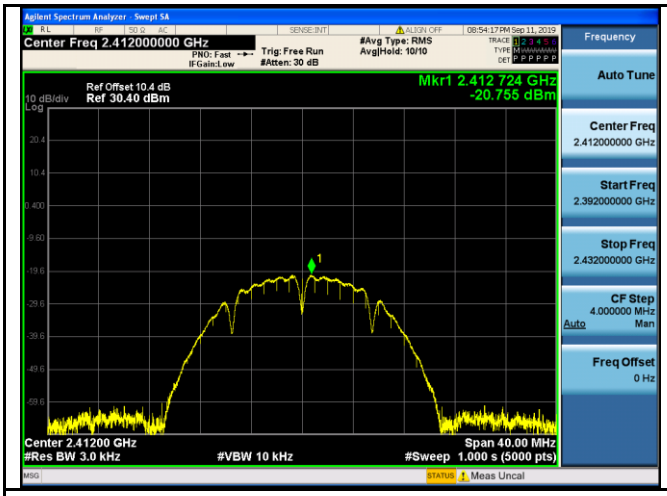
Test Plot ☑ Yes (See below) ☐ N/A

Power Spectral Density measurement result

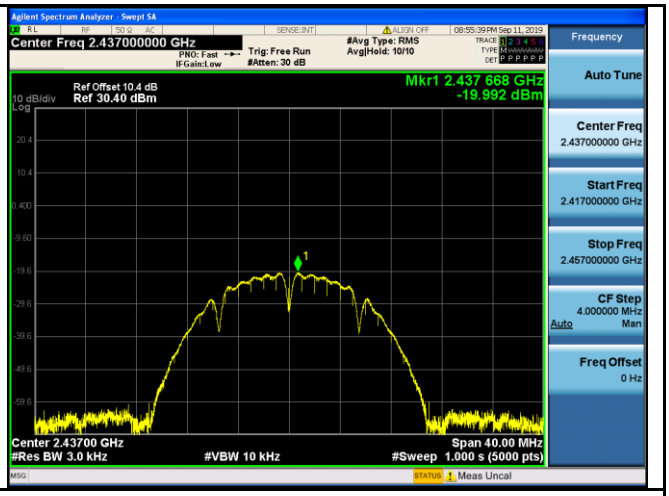
Type	Test mode	CH	Freq (MHz)	PSD (dBm)	Limit (dBm)	Result
PSD	802.11b	Low	2412	-20.755	8	Pass
		Mid	2437	-19.992	8	Pass
		High	2462	-19.739	8	Pass
	802.11g	Low	2412	-18.091	8	Pass
		Mid	2437	-17.497	8	Pass
		High	2462	-17.315	8	Pass
	802.11n (20M)	Low	2412	-18.359	8	Pass
		Mid	2437	-17.324	8	Pass
		High	2462	-17.475	8	Pass
	802.11n (40M)	Low	2422	-20.303	8	Pass
		Mid	2437	-18.935	8	Pass
		High	2452	-19.593	8	Pass

Test Plots

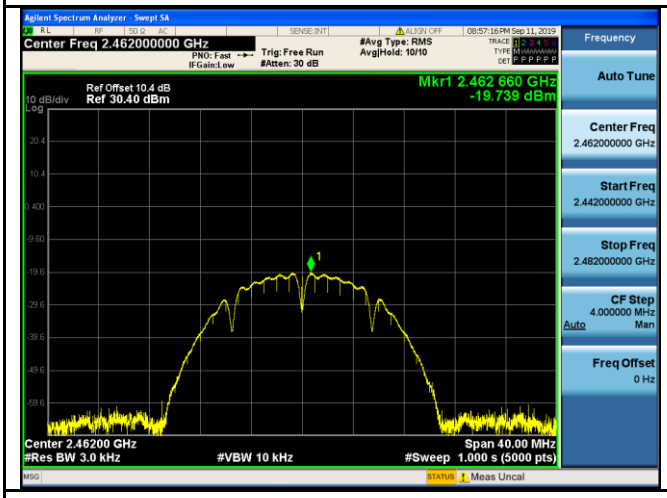
Power Spectral Density measurement result



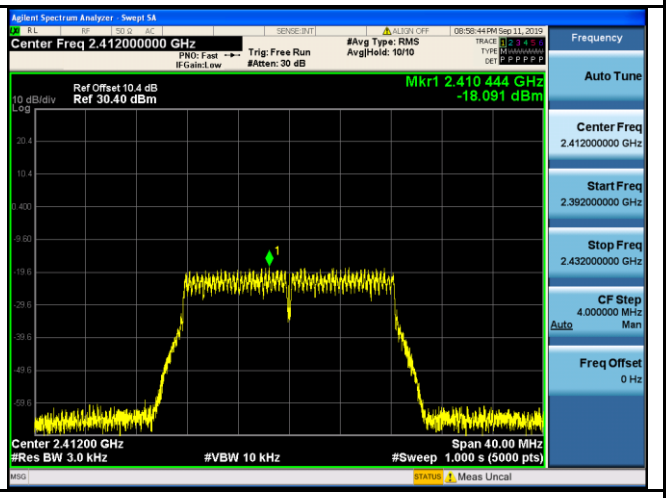
PSD - Low CH 2412 - 802.11b



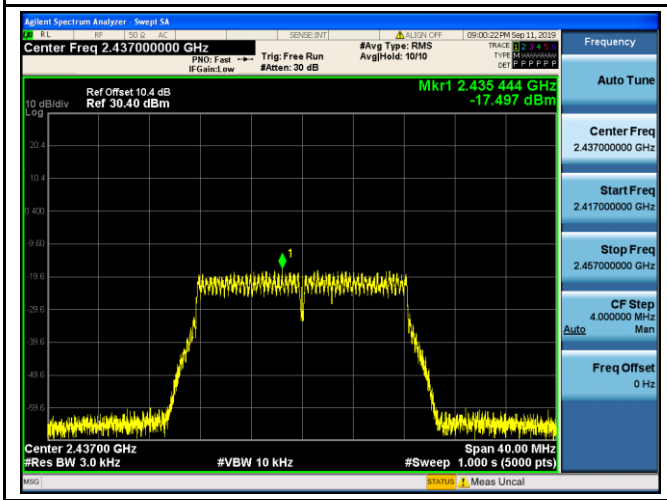
PSD - Mid CH 2437 – 802.11b



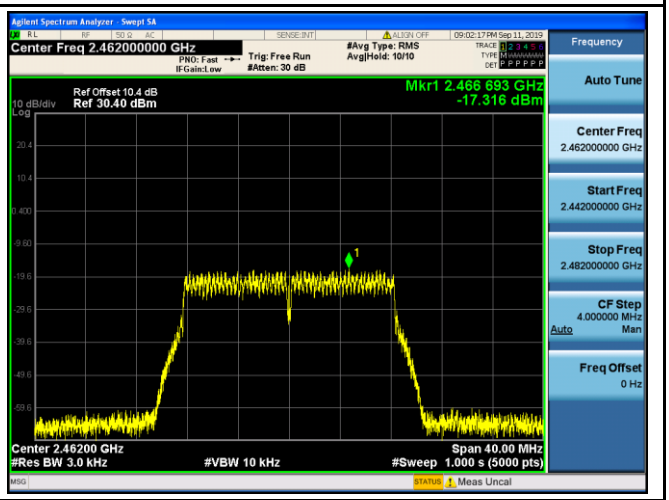
PSD - High CH 2462 - 802.11b



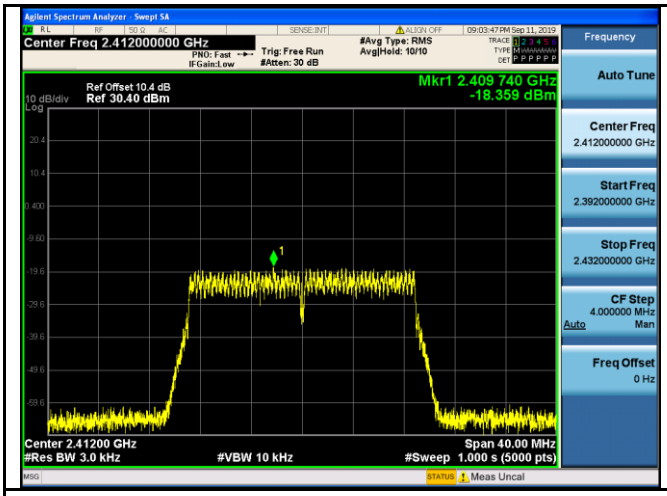
PSD - Low CH 2412 -802.11g



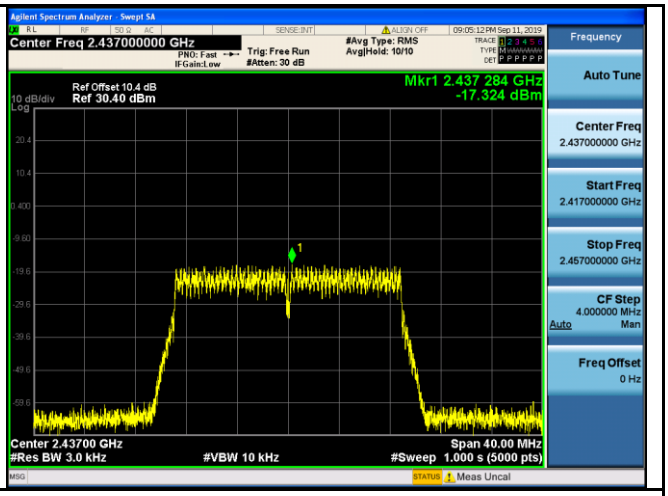
PSD - Mid CH 2437 – 802.11g



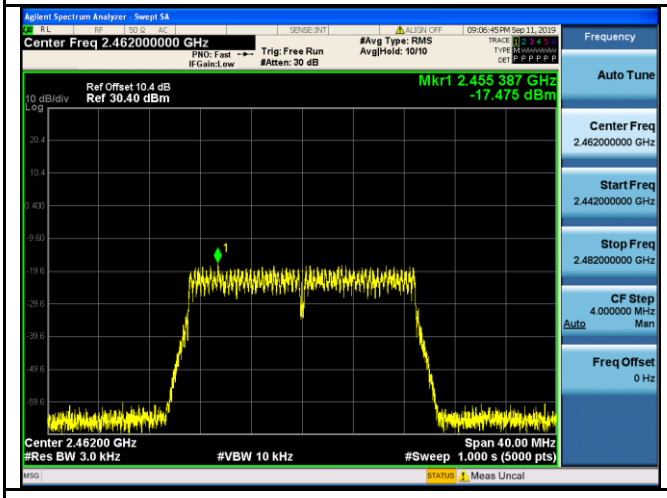
PSD - High CH 2462 - 802.11g



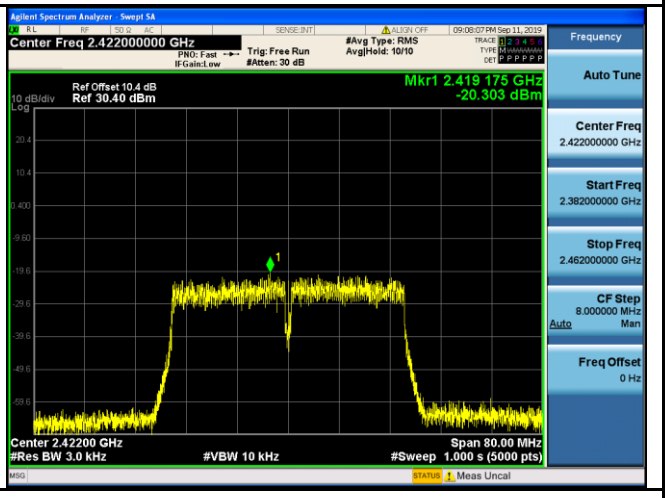
PSD - Low CH 2412 - 802.11n20



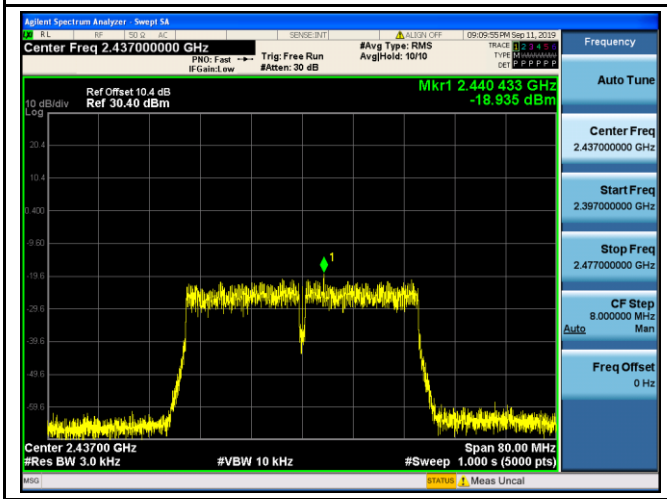
PSD - Mid CH 2437 – 802.11n20



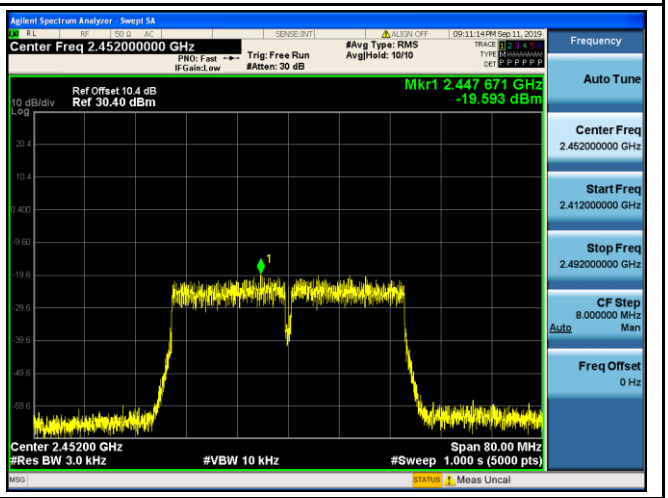
PSD - High CH 2472 - 802.11n20



PSD - Low CH 2422 - 802.11n40



PSD - Mid CH 2437 – 802.11n40

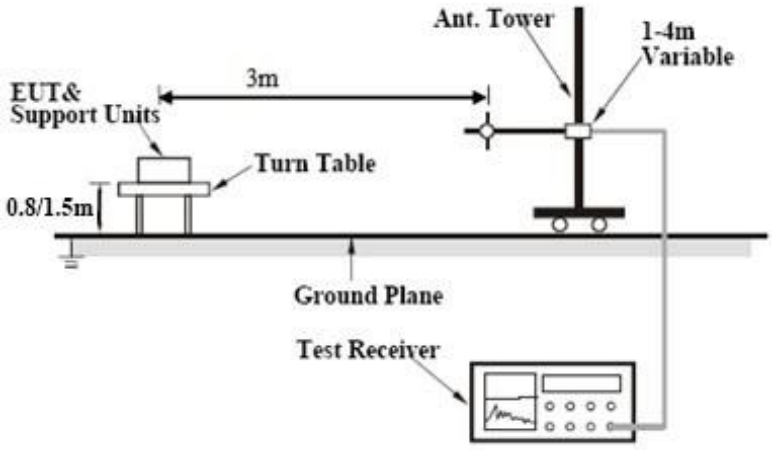


PSD - High CH 2452 - 802.11n40

6.5 Band-Edge & Unwanted Emissions into Restricted Frequency Bands

Temperature	24°C
Relative Humidity	66%
Atmospheric Pressure	1010mbar
Test date :	Sep 12, 2019
Tested By :	Aaron Liang

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(d)	a)	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.	☑
Test Setup			
Test Procedure	Radiated Method Only - 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator. - 2. Position the EUT without connection to measurement instrument. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.		

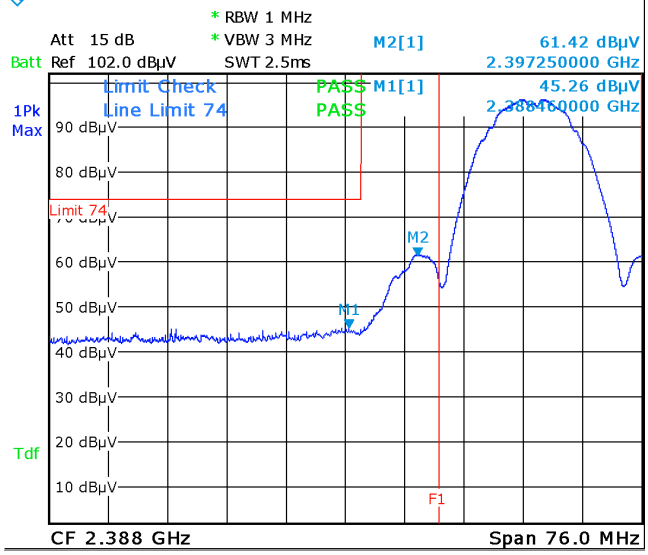
	- 3. First, set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, check the emission of EUT, if pass then set Spectrum Analyzer as below: a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz. b. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz. c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz with Peak detection for Average Measurement as below at frequency above 1GHz. - 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency. - 5. Repeat above procedures until all measured frequencies were complete.
Remark	
Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

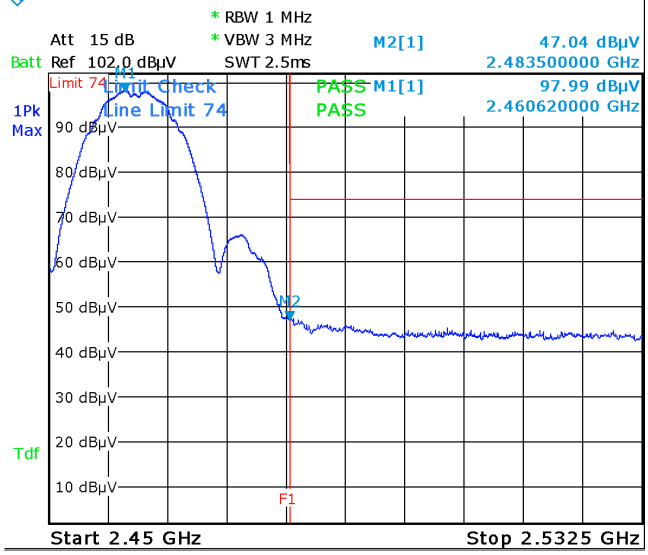
Test Plots

Unwanted emissions into restricted frequency bands measurement result



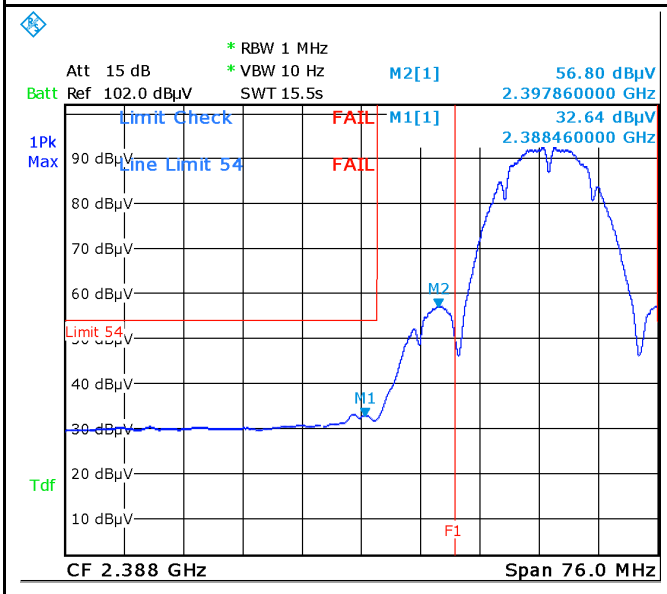
Unwanted emissions into restricted frequency bands, Left Side (Peak) - 802.11b

Note: F1 is frequency 2400MHz



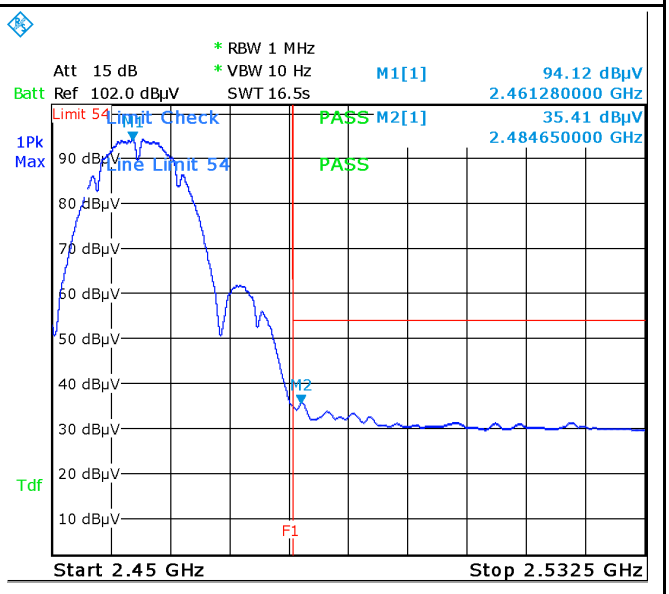
Unwanted emissions into restricted frequency bands,, Left Side (Peak) - 802.11b

Note: F1 is frequency 2483.5MHz



Unwanted emissions into restricted frequency bands,, Left Side (Average) - 802.11b

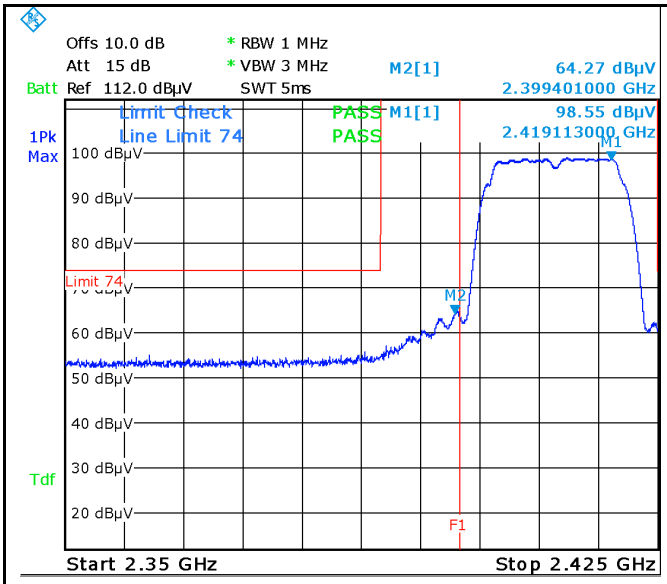
Note: F1 is frequency 2400MHz



Unwanted emissions into restricted frequency bands,, Right Side (Average) - 802.11b

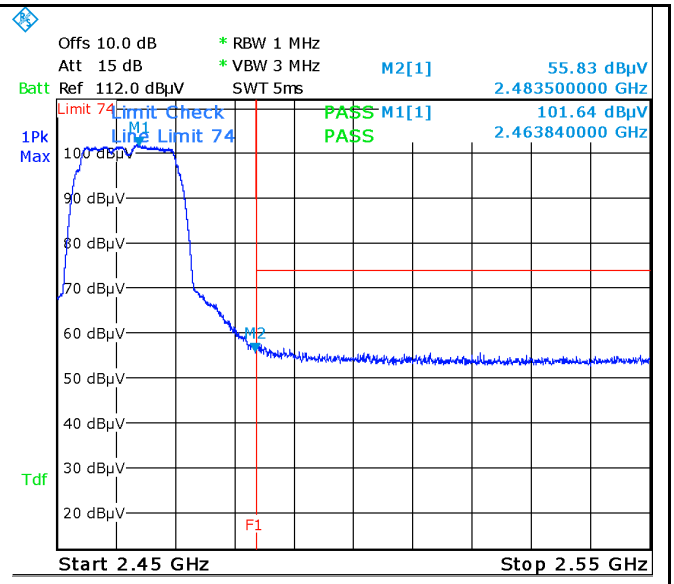
Note: F1 is frequency 2483.5MHz

Note: Both Horizontal and vertical polarities were investigated



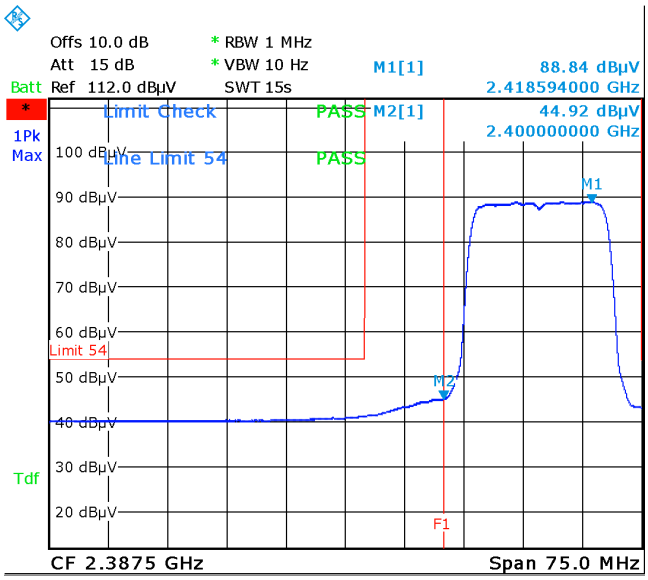
Unwanted emissions into restricted frequency bands,, Right Side (Peak) - 802.11g

Note: F1 is frequency 2400MHz



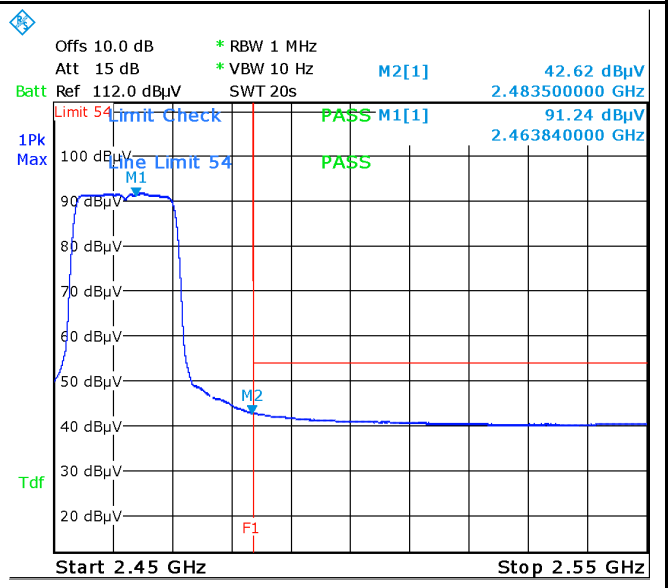
Unwanted emissions into restricted frequency bands,, Left Side (Peak) - 802.11g

Note: F1 is frequency 2483.5MHz



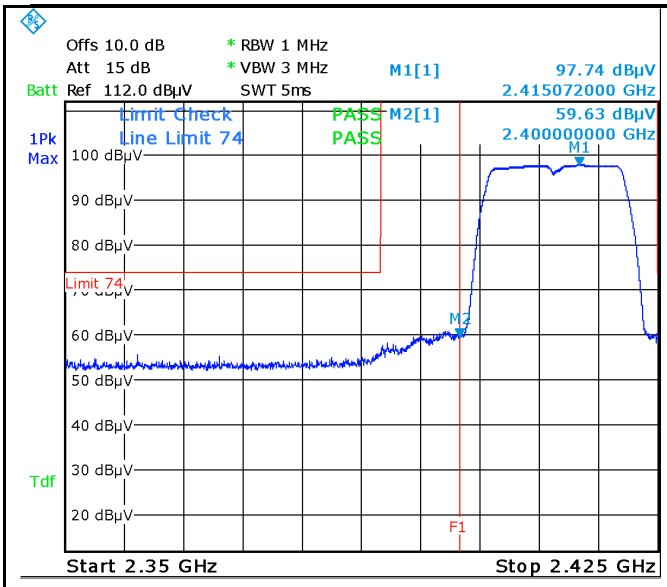
Unwanted emissions into restricted frequency bands,, Left Side (Average) - 802.11g

Note: F1 is frequency 2400MHz



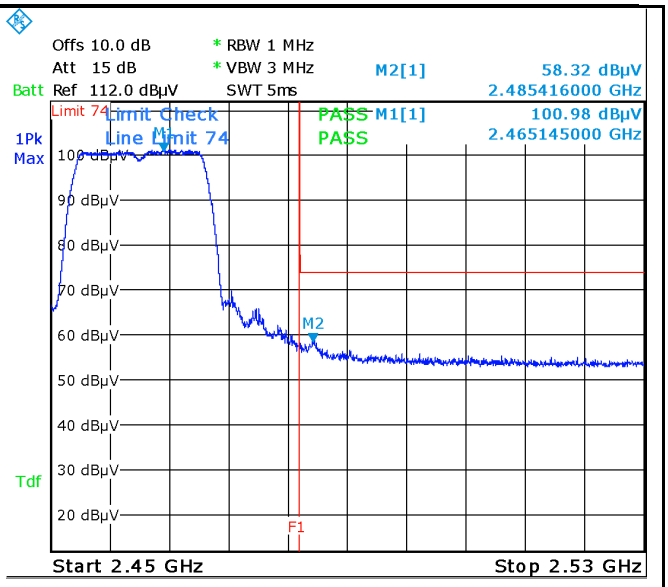
Unwanted emissions into restricted frequency bands,, Right Side (Average) - 802.11g

Note: F1 is frequency 2483.5MHz



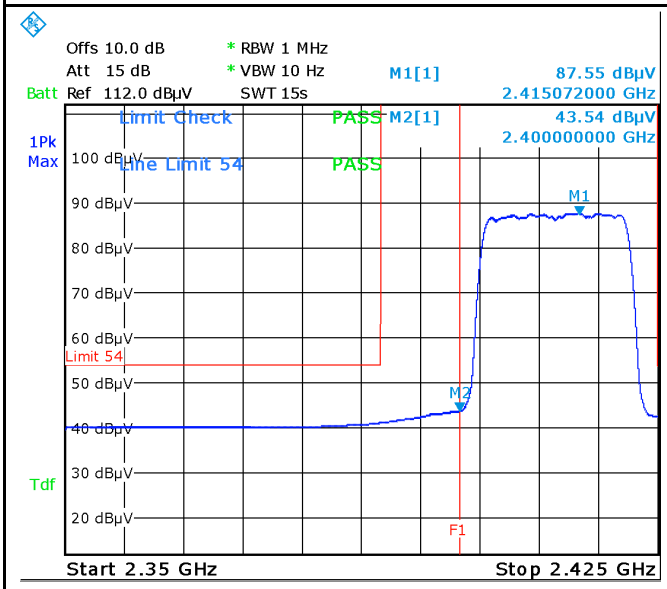
Unwanted emissions into restricted frequency bands,, Left Side (Peak) - 802.11n20

Note: F1 is frequency 2400MHz



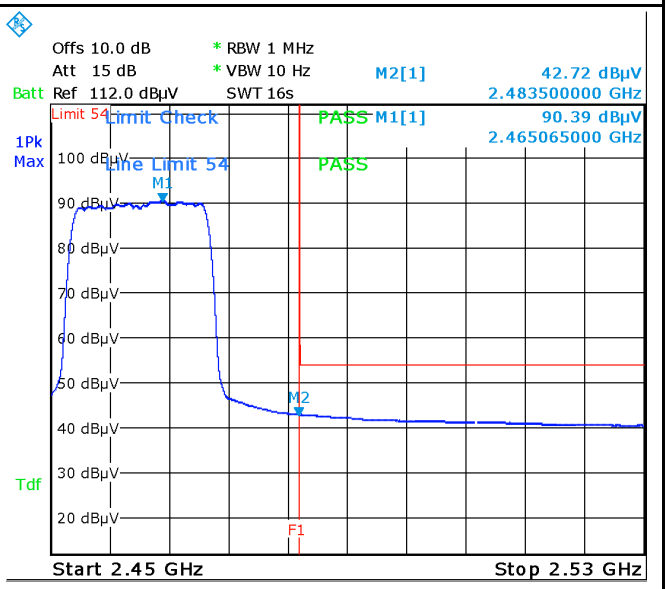
Unwanted emissions into restricted frequency bands,, Right Side (Peak) - 802.11n20

Note: F1 is frequency 2485.6MHz



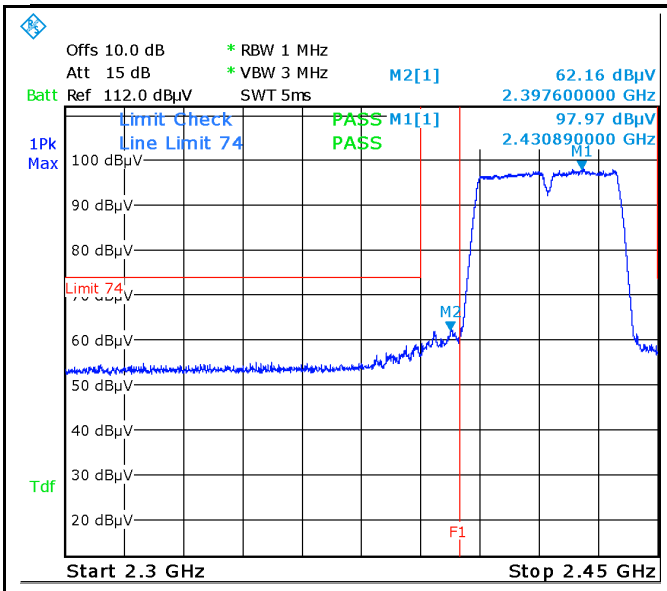
Unwanted emissions into restricted frequency bands,, Left Side (Average) - 802.11n20

Note: F1 is frequency 2400MHz



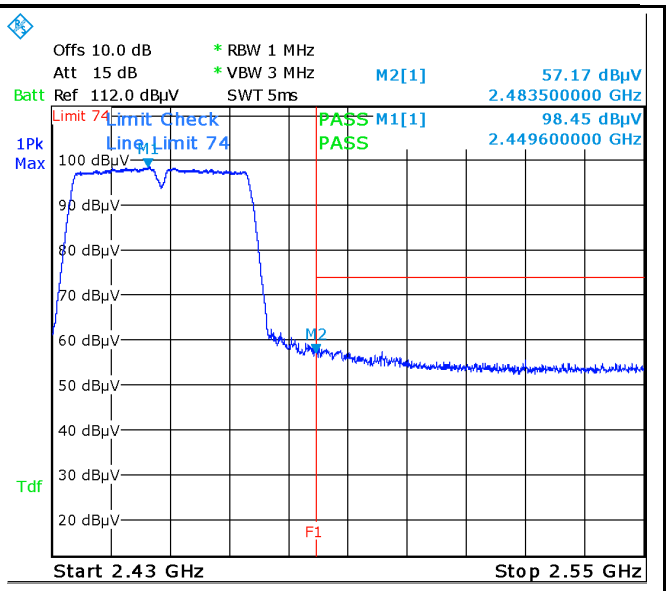
Unwanted emissions into restricted frequency bands,, Right Side (Average) - 802.11n20

Note: F1 is frequency 2483.5MHz



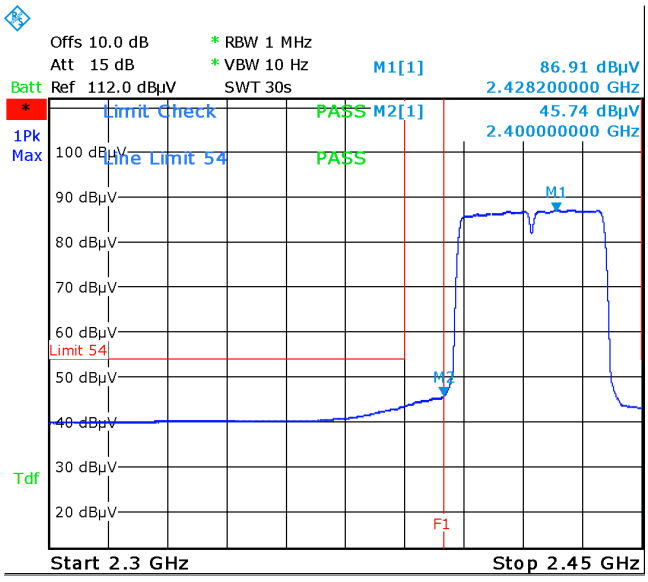
Unwanted emissions into restricted frequency bands,, Left Side (Peak) - 802.11n40

Note: F1 is frequency 2400MHz



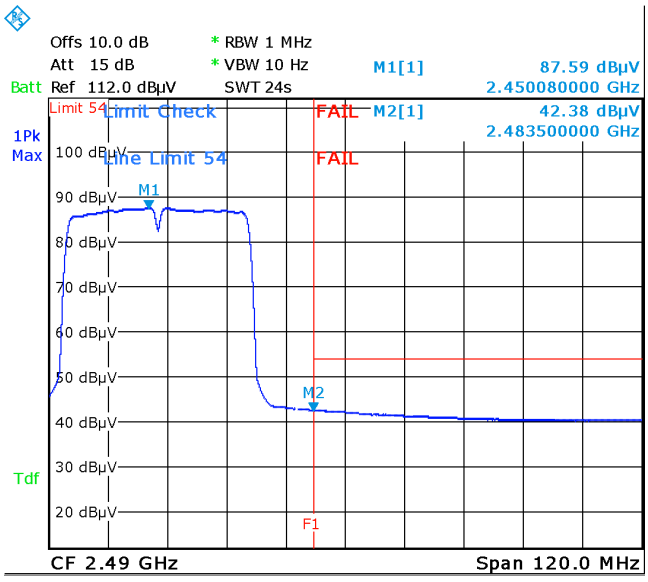
Unwanted emissions into restricted frequency bands,, Right Side (Peak) - 802.11n40

Note: F1 is frequency 2484.5MHz



Unwanted emissions into restricted frequency bands,, Left Side (Average) - 802.11n40

Note: F1 is frequency 2400MHz

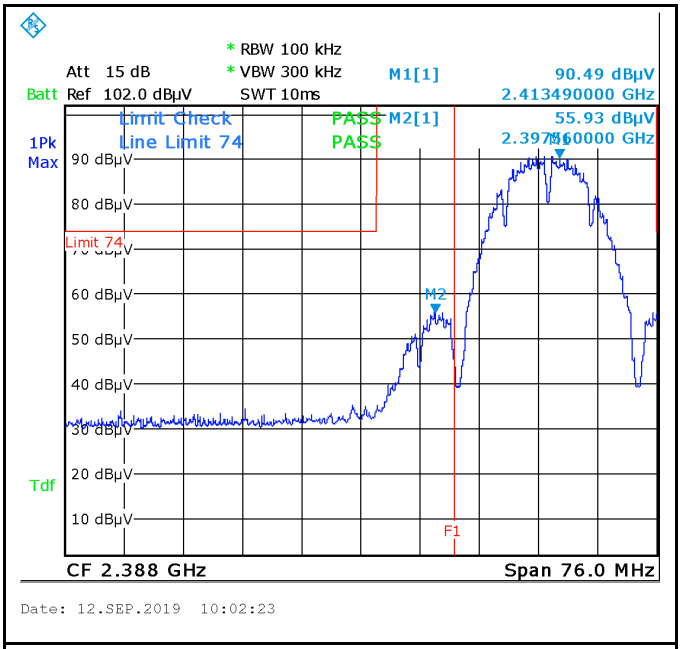


Unwanted emissions into restricted frequency bands,, Right Side (Average) - 802.11n40

Note: F1 is frequency 2483.5MHz

Note: Both Horizontal and vertical polarities were investigated

Band edge:

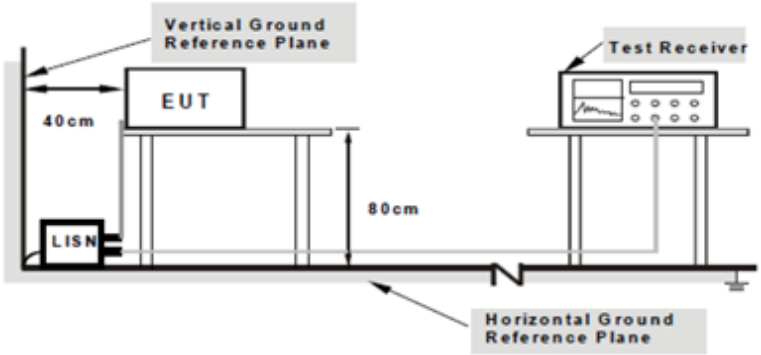


Band Edge, b mode

6.6 AC Power Line Conducted Emissions

Temperature	24°C
Relative Humidity	66%
Atmospheric Pressure	1010mbar
Test date :	Sep 12, 2019
Tested By :	Aaron Liang

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.207, RSS210 (A8.1)</td><td>a)</td><td>For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 [mu] H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequencies ranges.
<table>
<tr><th rowspan="2">Frequency ranges (MHz)</th><th colspan="2">Limit (dBμV)</th></tr>
<tr><th>QP</th><th>Average</th></tr>
<tr><td>0.15 ~ 0.5</td><td>66 – 56</td><td>56 – 46</td></tr>
<tr><td>0.5 ~ 5</td><td>56</td><td>46</td></tr>
<tr><td>5 ~ 30</td><td>60</td><td>50</td></tr>
</table></td><td>☑</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 

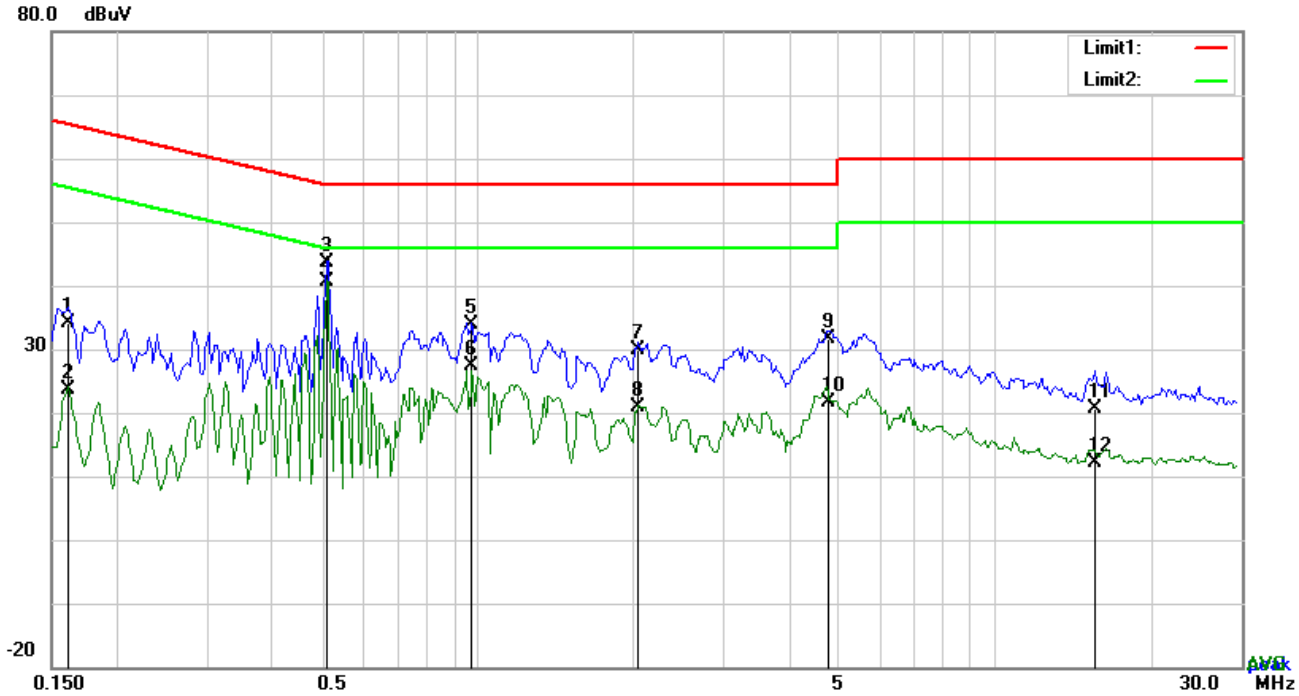
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.
2. The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains.
3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss</td></tr>
</table>

	coaxial cable. 4. All other supporting equipment were powered separately from another main supply. 5. The EUT was switched on and allowed to warm up to its normal operating condition. 6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver. 7. High peaks, relative to the limit line, The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz. 8. Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power).
Remark	
Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Test Mode:	WIFI Mode

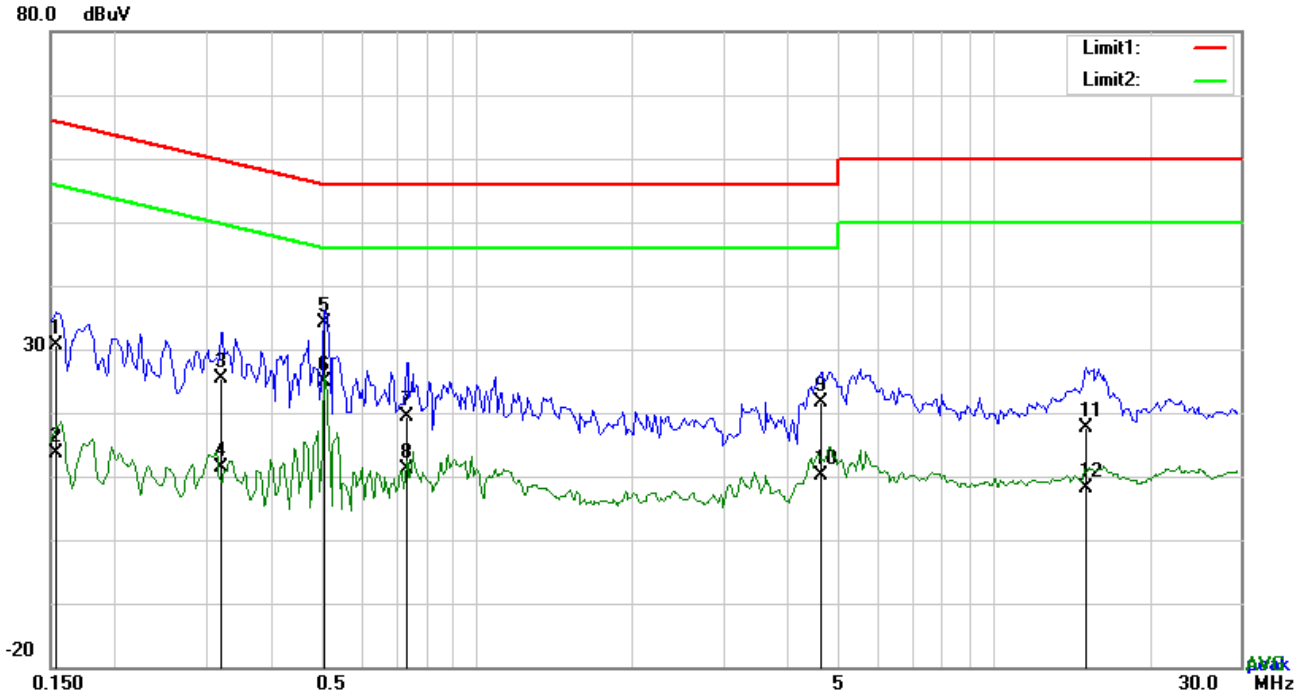


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)
1	L1	0.1617	23.89	QP	10.12	34.01	65.38	-31.37
2	L1	0.1617	13.62	AVG	10.12	23.74	55.38	-31.64
3	L1	0.5127	33.50	QP	10.10	43.60	56.00	-12.40
4	L1	0.5127	30.50	AVG	10.10	40.60	46.00	-5.40
5	L1	0.9768	23.69	QP	10.13	33.82	56.00	-22.18
6	L1	0.9768	17.34	AVG	10.13	27.47	46.00	-18.53
7	L1	2.0454	19.77	QP	10.15	29.92	56.00	-26.08
8	L1	2.0454	10.74	AVG	10.15	20.89	46.00	-25.11
9	L1	4.7784	21.33	QP	10.20	31.53	56.00	-24.47
10	L1	4.7784	11.36	AVG	10.20	21.56	46.00	-24.44
11	L1	15.5892	10.22	QP	10.34	20.56	60.00	-39.44
12	L1	15.5892	1.80	AVG	10.34	12.14	50.00	-37.86

Test Mode:	WIFI Mode



Test Data

Phase Neutral Plot at 120Vac, 60Hz

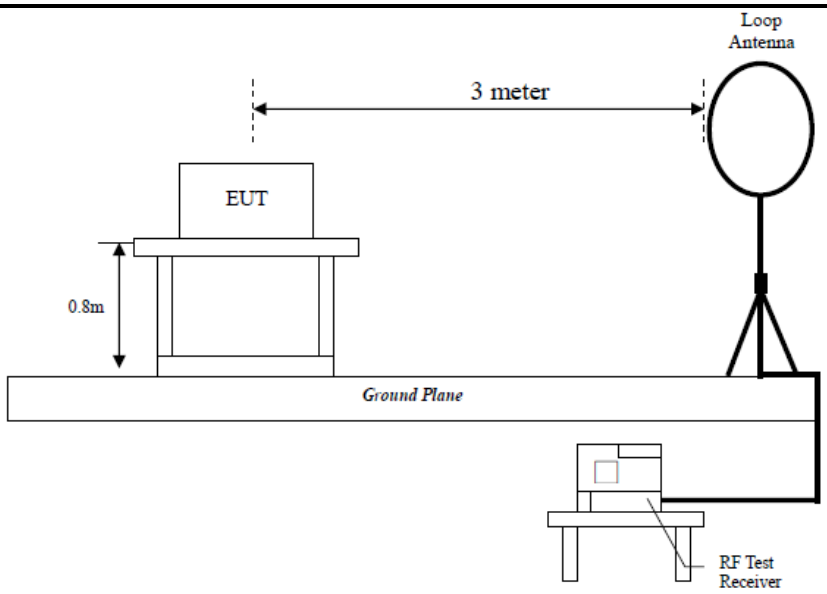
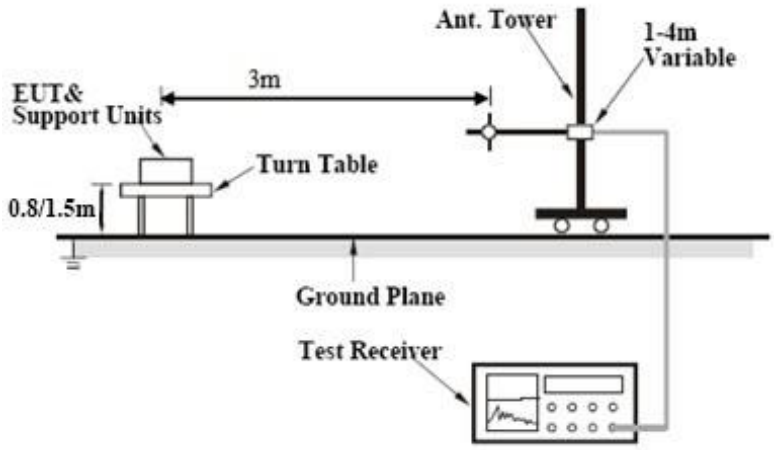
No.	P/L	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)
1	N	0.1539	20.41	QP	10.14	30.55	65.79	-35.24
2	N	0.1539	3.46	AVG	10.14	13.60	55.79	-42.19
3	N	0.3216	15.29	QP	10.13	25.42	59.67	-34.25
4	N	0.3216	1.13	AVG	10.13	11.26	49.67	-38.41
5	N	0.5088	24.05	QP	10.12	34.17	56.00	-21.83
6	N	0.5088	14.82	AVG	10.12	24.94	46.00	-21.06
7	N	0.7350	9.28	QP	10.13	19.41	56.00	-36.59
8	N	0.7350	0.90	AVG	10.13	11.03	46.00	-34.97
9	N	4.6419	11.32	QP	10.20	21.52	56.00	-34.48
10	N	4.6419	-0.13	AVG	10.20	10.07	46.00	-35.93
11	N	15.0744	7.19	QP	10.32	17.51	60.00	-42.49
12	N	15.0744	-2.12	AVG	10.32	8.20	50.00	-41.80

6.7 Radiated Spurious Emissions & Restricted Band

Temperature	24°C
Relative Humidity	66%
Atmospheric Pressure	1010mbar
Test date :	Sep 12, 2019
Tested By :	Aaron Liang

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td rowspan="3">47CFR§15.247(d), RSS210 (A8.5)</td><td>a)</td><td>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges
<table>
<tr><th>Frequency range (MHz)</th><th>Field Strength (μV/m)</th></tr>
<tr><td>0.009~0.490</td><td>2400/F(KHz)</td></tr>
<tr><td>0.490~1.705</td><td>24000/F(KHz)</td></tr>
<tr><td>1.705~30.0</td><td>30</td></tr>
<tr><td>30 – 88</td><td>100</td></tr>
<tr><td>88 – 216</td><td>150</td></tr>
<tr><td>216 960</td><td>200</td></tr>
<tr><td>Above 960</td><td>500</td></tr>
</table></td><td>☑</td></tr>
<tr><td>b)</td><td>For non-restricted band, 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 or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required
☒ 20 dB down ☐ 30 dB down</td><td>☑</td></tr>
<tr><td>c)</td><td>or restricted band, emission must also comply with the radiated emission limits specified in 15.209</td><td>☑</td></tr>
</table>

Test Setup	 
Procedure	1. The EUT was switched on and allowed to warm up to its normal operating condition. 2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: a. Vertical or horizontal polarization (whichever gave the higher emission level over a full rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maximum emission. 3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz. 4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz.

	The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz with Peak detection for Average Measurement as below at frequency above 1GHz. 5. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.
Remark	Different RF configuration has been evaluated but not much difference was found. The data presented here is the worst case data with EUT under 802.11n – HT20-2437MHz mode.
Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Test Result:

Test Mode:	Transmitting Mode

Frequency range: 9KHz - 30MHz

Freq. (MHz)	Detection value	Factor (dB/m)	Reading (dBuV/m)	Result (dBuV/m)	Limit@3m (dBuV/m)	Margin (dB)
--	--	--	--	--	--	>20
--	--	--	--	--	--	>20

Note:

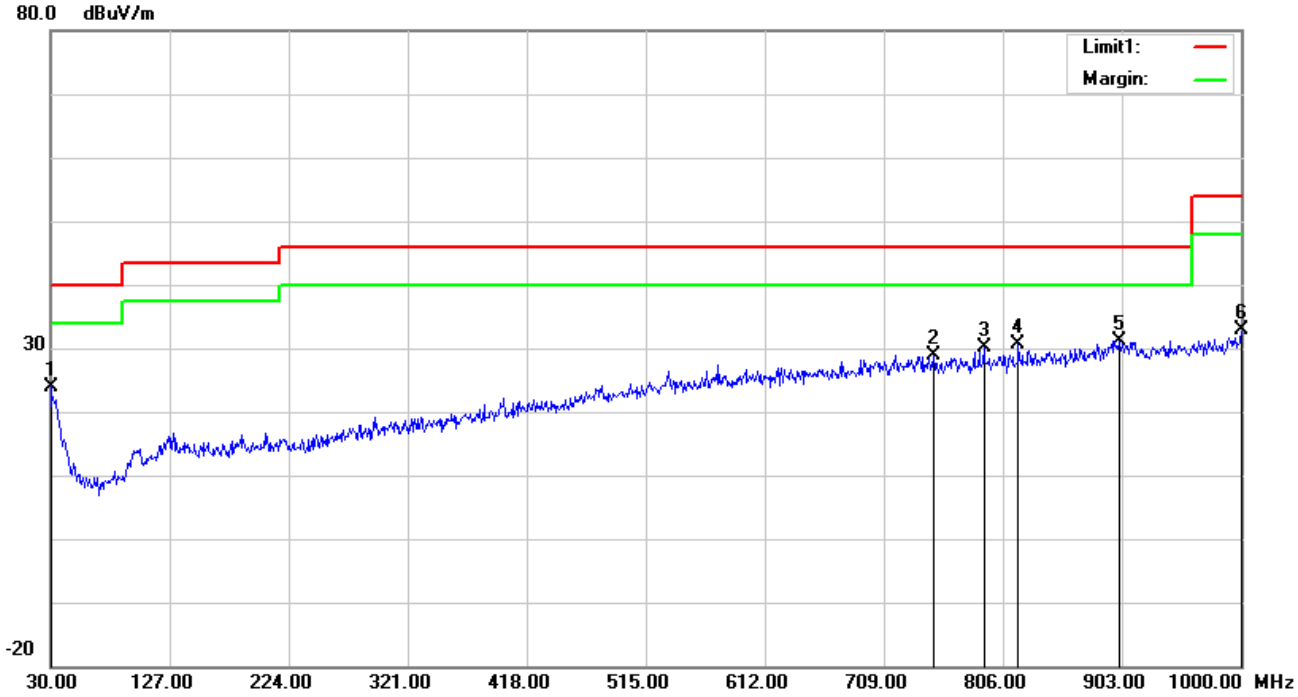
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =40 log (specific distance/test distance)(dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.

Test Mode:	Transmitting Mode

30MHz -1GHz

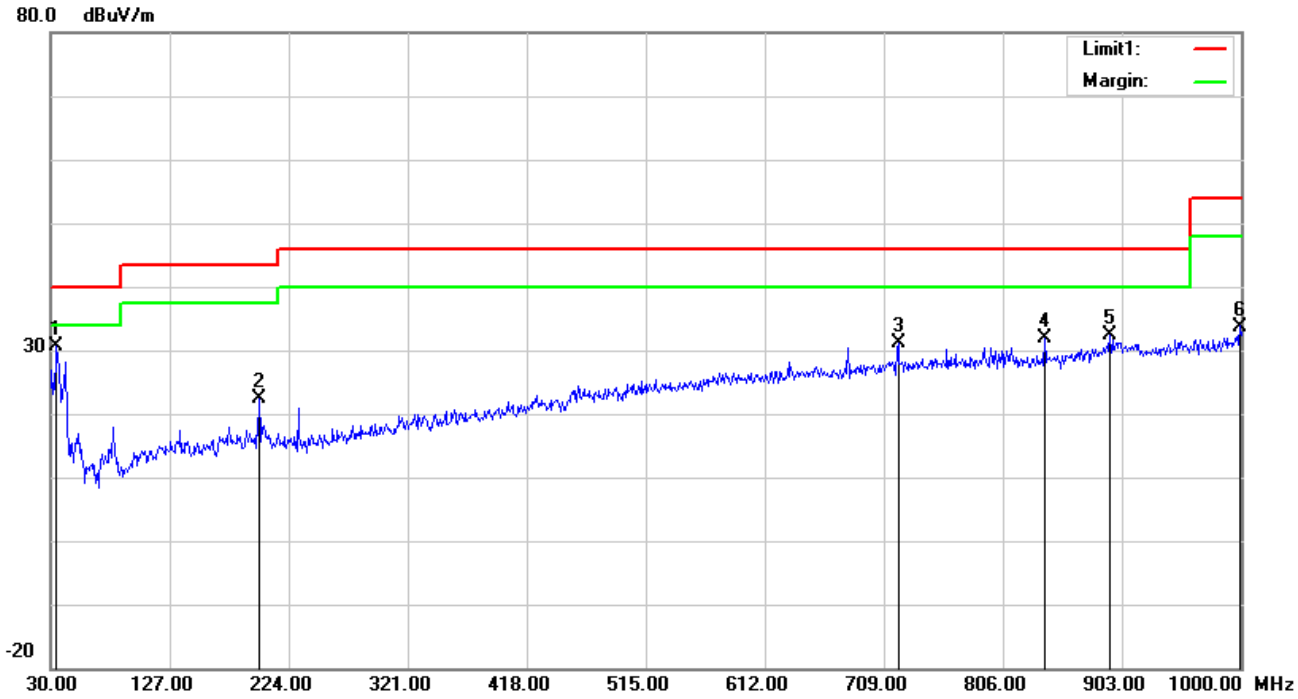


Test Data

Vertical Polarity Plot @3m

No.	P/L	Frequency	Reading	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	H	30.0000	26.05	20.10	22.28	0.13	24.00	40.00	-16.00	108	103
2	H	749.7400	25.91	21.80	21.26	2.48	28.93	46.00	-17.07	193	57
3	H	790.4800	26.77	22.11	21.17	2.54	30.25	46.00	-15.75	223	43
4	H	818.6100	27.05	22.15	21.10	2.58	30.68	46.00	-15.32	397	97
5	H	901.0600	25.58	23.88	20.88	2.65	31.23	46.00	-14.77	237	88
6	H	1000.0000	26.30	24.40	20.69	2.76	32.77	54.00	-21.23	321	56

30MHz -1GHz



Test Data

Horizontal Polarity Plot @3m

No.	P/L	Frequency	Reading	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	V	33.8800	32.01	17.62	22.26	0.15	27.52	40.00	-12.48	380	78
2	V	471.3500	24.60	18.21	21.87	2.06	23.00	46.00	-23.00	317	314
3	V	677.9600	26.72	20.62	21.41	2.39	28.32	46.00	-17.68	339	113
4	V	741.0100	26.75	21.73	21.27	2.47	29.68	46.00	-16.32	322	266
5	V	899.1200	25.79	23.86	20.88	2.65	31.42	46.00	-14.58	124	310
6	V	991.2700	25.81	24.16	20.71	2.75	32.01	54.00	-21.99	133	354

Above 1GHz

Test Mode:	Transmitting Mode

Low Channel: B Mode (2412 MHz)

ANTENNA POLARITY & test distance: HORIZONTAL at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2388.46	45.26 PK	74	-28.74	237	268	58.91	-13.65
2	2388.46	32.64 AV	54	-21.36	378	73	46.29	-13.65
3	2412	96.02 PK			151	28	109.99	-13.97
4	2412	92.41 AV			216	284	106.38	-13.97
5	4824	50.26 PK	74	-23.74	304	277	64.01	-13.75
6	4824	35.13 AV	54	-18.87	381	93	48.88	-13.75
ANTENNA POLARITY & test distance: Vertical at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2387.85	44.38 PK	74	-29.62	248	190	58.03	-13.65
2	2387.85	30.58 AV	54	-23.42	310	280	44.23	-13.65
3	2412	95.85 PK			249	228	109.82	-13.97
4	2412	92.06 AV			227	204	106.03	-13.97
5	4824	50.83 PK	74	-23.17	349	280	64.58	-13.75
6	4824	35.24 AV	54	-18.76	167	106	48.99	-13.75

Middle Channel: B Mode (2437 MHz)

ANTENNA POLARITY & test distance: HORIZONTAL at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390	40.84 PK	74	-33.16	153	127	54.49	-13.65
2	2390	27.77 AV	54	-26.23	393	9	41.42	-13.65
3	2437	95.72 PK			153	177	108.74	-13.02
4	2437	90.56 AV			181	257	103.58	-13.02
5	4874	50.92 PK	74	-23.08	350	307	64.67	-13.75
6	4874	35.24 AV	54	-18.76	265	291	48.99	-13.75
ANTENNA POLARITY & test distance: Vertical at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390	40.32 PK	74	-33.68	200	347	53.97	-13.65
2	2390	27.65 AV	54	-26.35	283	31	41.3	-13.65
3	2437	95.37 PK			133	80	108.39	-13.02
4	2437	90.43 AV			105	148	103.45	-13.02
5	4874	50.83 PK	74	-23.17	335	334	64.58	-13.75
6	4874	34.65 AV	54	-19.35	311	246	48.4	-13.75

High Channel: B Mode (2462 MHz)

ANTENNA POLARITY & test distance: HORIZONTAL at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2483.5	47.04 PK	74	-26.96	361	184	60.69	-13.65
2	2483.5	35.41 AV	54	-18.59	216	35	49.06	-13.65
3	2462	97.99 PK			189	107	111.96	-13.97
4	2462	94.12 AV			154	156	108.09	-13.97
5	4924	50.29 PK	74	-23.71	196	79	64.04	-13.75
6	4924	35.62 AV	54	-18.38	308	145	49.37	-13.75
ANTENNA POLARITY & test distance: Vertical at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2483.5	46.15 PK	74	-27.85	263	85	59.8	-13.65
2	2483.5	32.72 AV	54	-21.28	205	318	46.37	-13.65
3	2462	94.58 PK			353	44	108.55	-13.97
4	2462	90.88 AV			248	251	104.85	-13.97
5	4924	50.13 PK	74	-23.87	396	192	63.88	-13.75
6	4924	35.27 AV	54	-18.73	329	164	49.02	-13.75

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)-Preamplifier Gain.

3. Only emissions significantly above equipment noise floor are reported.

4. Margin value = Emission level – Limit value.

5. The testing has been conformed to 10*2462MHz=24,620MHz

6, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

Low Channel: G Mode (2412 MHz)

ANTENNA POLARITY & test distance: HORIZONTAL at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2399.4	64.27 PK	74	-9.73	373	97	77.92	-13.65
2	2400	44.92 AV	54	-9.08	158	24	58.57	-13.65
3	2412	98.55 PK			160	280	112.52	-13.97
4	2412	88.82 AV			377	140	102.79	-13.97
5	4824	50.46 PK	74	-23.54	168	32	64.21	-13.75
6	4824	35.39 AV	54	-18.61	186	289	49.14	-13.75
ANTENNA POLARITY & test distance: Vertical at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2400	62.86 PK	74	-11.14	383	332	76.51	-13.65
2	2400	42.56 AV	54	-11.44	312	330	56.21	-13.65
3	2412	97.12 PK			137	134	111.09	-13.97
4	2412	86.25 AV			361	254	100.22	-13.97
5	4824	50.31 PK	74	-23.69	134	111	64.06	-13.75
6	4824	35.16 AV	54	-18.84	389	341	48.91	-13.75

Middle Channel: G Mode (2437 MHz)

ANTENNA POLARITY & test distance: HORIZONTAL at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390	40.16 PK	74	-33.84	322	152	53.81	-13.65
2	2390	26.95 AV	54	-27.05	360	298	40.6	-13.65
3	2437	99.38 PK			353	100	112.4	-13.02
4	2437	89.35 AV			378	347	102.37	-13.02
5	4874	50.92 PK	74	-23.08	270	124	64.67	-13.75
6	4874	36.17 AV	54	-17.83	303	327	49.92	-13.75
ANTENNA POLARITY & test distance: Vertical at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390	39.65 PK	74	-34.35	188	165	53.3	-13.65
2	2390	26.59 AV	54	-27.41	326	335	40.24	-13.65
3	2437	98.94 PK			109	49	111.96	-13.02
4	2437	88.76 AV			300	7	101.78	-13.02
5	4874	50.83 PK	74	-23.17	295	164	64.58	-13.75
6	4874	35.92 AV	54	-18.08	141	140	49.67	-13.75

High Channel: G Mode (2462 MHz)

ANTENNA POLARITY & test distance: HORIZONTAL at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2483.5	55.83 PK	74	-18.17	294	136	69.48	-13.65
2	2483.5	42.62 AV	54	-11.38	375	243	56.27	-13.65
3	2462	101.64 PK			154	2	115.61	-13.97
4	2462	91.24 AV			210	245	105.21	-13.97
5	4924	50.49 PK	74	-23.51	143	231	64.24	-13.75
6	4924	35.72 AV	54	-18.28	325	164	49.47	-13.75
ANTENNA POLARITY & test distance: Vertical at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2483.5	54.36 PK	74	-19.64	244	26	68.01	-13.65
2	2483.5	41.28 AV	54	-12.72	391	231	54.93	-13.65
3	2462	100.84 PK			374	19	114.81	-13.97
4	2462	90.86 AV			292	292	104.83	-13.97
5	4924	50.34 PK	74	-23.66	206	204	64.09	-13.75
6	4924	35.68 AV	54	-18.32	318	72	49.43	-13.75

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)-Preamplifier Gain.

3. Only emissions significantly above equipment noise floor are reported.

4. Margin value = Emission level – Limit value.

5. The testing has been conformed to 10*2462MHz=24,620MHz

6, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

Low Channel: N20 Mode (2412 MHz)

ANTENNA POLARITY & test distance: HORIZONTAL at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2400	59.63 PK	74	-14.37	284	242	73.28	-13.65
2	2400	43.54 AV	54	-10.46	137	23	57.19	-13.65
3	2412	97.74 PK			102	100	111.71	-13.97
4	2412	87.55 AV			320	243	101.52	-13.97
5	4824	50.53 PK	74	-23.47	167	229	64.28	-13.75
6	4824	35.41 AV	54	-18.59	365	57	49.16	-13.75
ANTENNA POLARITY & test distance: Vertical at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2400	57.86 PK	74	-16.14	209	277	71.51	-13.65
2	2400	41.62 AV	54	-12.38	297	27	55.27	-13.65
3	2412	96.57 PK			277	197	110.54	-13.97
4	2412	85.92 AV			354	344	99.89	-13.97
5	4824	50.47 PK	74	-23.53	134	225	64.22	-13.75
6	4824	35.26 AV	54	-18.74	127	256	49.01	-13.75

Middle Channel: N20 Mode Mode (2437 MHz)

ANTENNA POLARITY & test distance: HORIZONTAL at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390	40.31 PK	74	-33.69	350	24	53.96	-13.65
2	2390	27.06 AV	54	-26.94	302	318	40.71	-13.65
3	2437	98.13 PK			334	62	111.15	-13.02
4	2437	88.03 AV			242	4	101.05	-13.02
5	4874	50.92 PK	74	-23.08	136	238	64.67	-13.75
6	4874	35.82 AV	54	-18.18	193	288	49.57	-13.75
ANTENNA POLARITY & test distance: Vertical at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390	39.61 PK	74	-34.39	153	23	53.26	-13.65
2	2390	26.55 AV	54	-27.45	278	123	40.2	-13.65
3	2437	97.26 PK			376	47	110.28	-13.02
4	2437	87.19 AV			192	313	100.21	-13.02
5	4874	50.86 PK	74	-23.14	117	347	64.61	-13.75
6	4874	35.63 AV	54	-18.37	171	263	49.38	-13.75

High Channel: N20 Mode (2462 MHz)

ANTENNA POLARITY & test distance: HORIZONTAL at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2483.5	58.32 PK	74	-15.68	154	3	71.97	-13.65
2	2483.5	42.72 AV	54	-11.28	272	222	56.37	-13.65
3	2462	100.98 PK			314	99	114.95	-13.97
4	2462	90.39 AV			332	252	104.36	-13.97
5	4924	50.29 PK	74	-23.71	360	122	64.04	-13.75
6	4924	35.17 AV	54	-18.83	160	86	48.92	-13.75
ANTENNA POLARITY & test distance: Vertical at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2483.5	57.63 PK	74	-16.37	154	16	71.28	-13.65
2	2483.5	41.13 AV	54	-12.87	341	262	54.78	-13.65
3	2462	98.86 PK			324	152	112.83	-13.97
4	2462	89.23 AV			345	167	103.2	-13.97
5	4924	50.16 PK	74	-23.84	269	79	63.91	-13.75
6	4924	35.06 AV	54	-18.94	242	166	48.81	-13.75

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)-Preamplifier Gain.

3. Only emissions significantly above equipment noise floor are reported.

4. Margin value = Emission level – Limit value.

5. The testing has been conformed to 10*2462MHz=24,620MHz

6, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

Low Channel: N40 Mode (Worst Case) (2422 MHz)

ANTENNA POLARITY & test distance: HORIZONTAL at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2397.6	62.16 PK	74	-11.84	182	157	75.81	-13.65
2	2400	45.74 AV	54	-8.26	117	356	59.39	-13.65
3	2422	97.97 PK			315	18	111.94	-13.97
4	2422	86.91 AV			389	30	100.88	-13.97
5	4844	49.82 PK	74	-24.18	378	28	63.57	-13.75
6	4844	34.73 AV	54	-19.27	109	68	48.48	-13.75
ANTENNA POLARITY & test distance: Vertical at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2400	61.83 PK	74	-12.17	164	244	75.48	-13.65
2	2400	44.86 AV	54	-9.14	293	72	58.51	-13.65
3	2422	96.38 PK			112	19	110.35	-13.97
4	2422	84.92 AV			308	348	98.89	-13.97
5	4844	49.75 PK	74	-24.25	312	234	63.5	-13.75
6	4844	34.61 AV	54	-19.39	121	286	48.36	-13.75

Middle Channel: N40 Mode Mode (Worst Case) (2437 MHz)

ANTENNA POLARITY & test distance: HORIZONTAL at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390	39.84 PK	74	-34.16	193	299	53.49	-13.65
2	2390	26.44 AV	54	-27.56	109	13	40.09	-13.65
3	2437	97.26 PK			176	71	110.28	-13.02
4	2437	86.87 AV			186	300	99.89	-13.02
5	4874	50.84 PK	74	-23.16	330	224	64.59	-13.75
6	4874	35.76 AV	54	-18.24	366	89	49.51	-13.75
ANTENNA POLARITY & test distance: Vertical at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390	40.52 PK	74	-33.48	126	330	54.17	-13.65
2	2390	26.97 AV	54	-27.03	267	196	40.62	-13.65
3	2437	97.31 PK			185	319	110.33	-13.02
4	2437	86.52 AV			303	69	99.54	-13.02
5	4874	50.92 PK	74	-23.08	342	266	64.67	-13.75
6	4874	36.13 AV	54	-17.87	210	87	49.88	-13.75

High Channel: N40 Mode (Worst Case) (2452 MHz)

ANTENNA POLARITY & test distance: HORIZONTAL at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2483.5	57.17 PK	74	-16.83	248	288	70.82	-13.65
2	2483.5	42.38 AV	54	-11.62	277	159	56.03	-13.65
3	2452	98.45 PK			357	38	112.42	-13.97
4	2452	87.59 AV			345	233	101.56	-13.97
5	4904	51.42 PK	74	-22.58	208	226	65.17	-13.75
6	4904	36.38 AV	54	-17.62	332	287	50.13	-13.75
ANTENNA POLARITY & test distance: Vertical at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2483.5	56.12 PK	74	-17.88	376	185	69.77	-13.65
2	2483.5	41.42 AV	54	-12.58	190	89	55.07	-13.65
3	2452	97.37 PK			304	360	111.34	-13.97
4	2452	85.96 AV			306	235	99.93	-13.97
5	4904	51.31 PK	74	-22.69	116	260	65.06	-13.75
6	4904	36.27 AV	54	-17.73	111	79	50.02	-13.75

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)-Preamplifier Gain.

3. Only emissions significantly above equipment noise floor are reported.

4. Margin value = Emission level – Limit value.

5. The testing has been conformed to 10*2462MHz=24,620MHz

6, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

Annex A. TEST INSTRUMENT

RE& RSE

Frequency Range Below 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESL6	1300.5001K06-100262-eQ	Apr. 04, 19	Apr. 03, 20
Bilog Antenna	Sunol Sciences	JB6	A110712	Apr. 08, 19	Apr. 07, 20
Active Antenna	CMO-POWER	AL-130	121031	Mar. 27, 19	Mar. 26, 20
Signal Amplifier	HP	8447E	443008	Mar. 28, 19	Mar. 27, 20
3m Semi-anechoic Chamber	SAEMC	9m*6m*6m	N/A	Oct. 18,18	Oct. 17,21
Test Software	EZ-EMC	ICP-03A1	N/A	N/A	N/A

RE& RSE

Frequency Range Above 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Spectrum	Agilent	E4446A	MY46180622	8-May-19	7-May-20
MXA signal analyzer	Agilent	N9020A	MY49100060	Mar. 28, 19	Mar. 27, 20
Horn Antenna	COM-POWER	HAH-118	71259	Mar. 22, 19	Mar. 21, 20
Horn Antenna	COM-POWER	HAH-118	71283	Mar. 20, 19	Mar. 19, 20
SHF-EHF Horn	Schwarzbeck	BBHA9170	BBHA9170147	Jun. 30, 19	Jun. 29, 20
SHF-EHF Horn	Schwarzbeck	BBHA9170	BBHA9170242	Jun. 30, 19	Jun. 29, 20

AMPLIFIER	EM Electornic Corporation	EM01G26G	60613	Mar. 28, 19	Mar. 27, 20
AMPLIFIER	Emc Instruments Corporation	Emc012645	980077	Jan. 04, 19	Jan. 03,20
3m Semi-anechoic	SAEMC	9m*6m*6m	N/A	Oct. 18,18	Oct. 17,21
Test Software	EZ-EMC	ICP-03A1	N/A	N/A	N/A

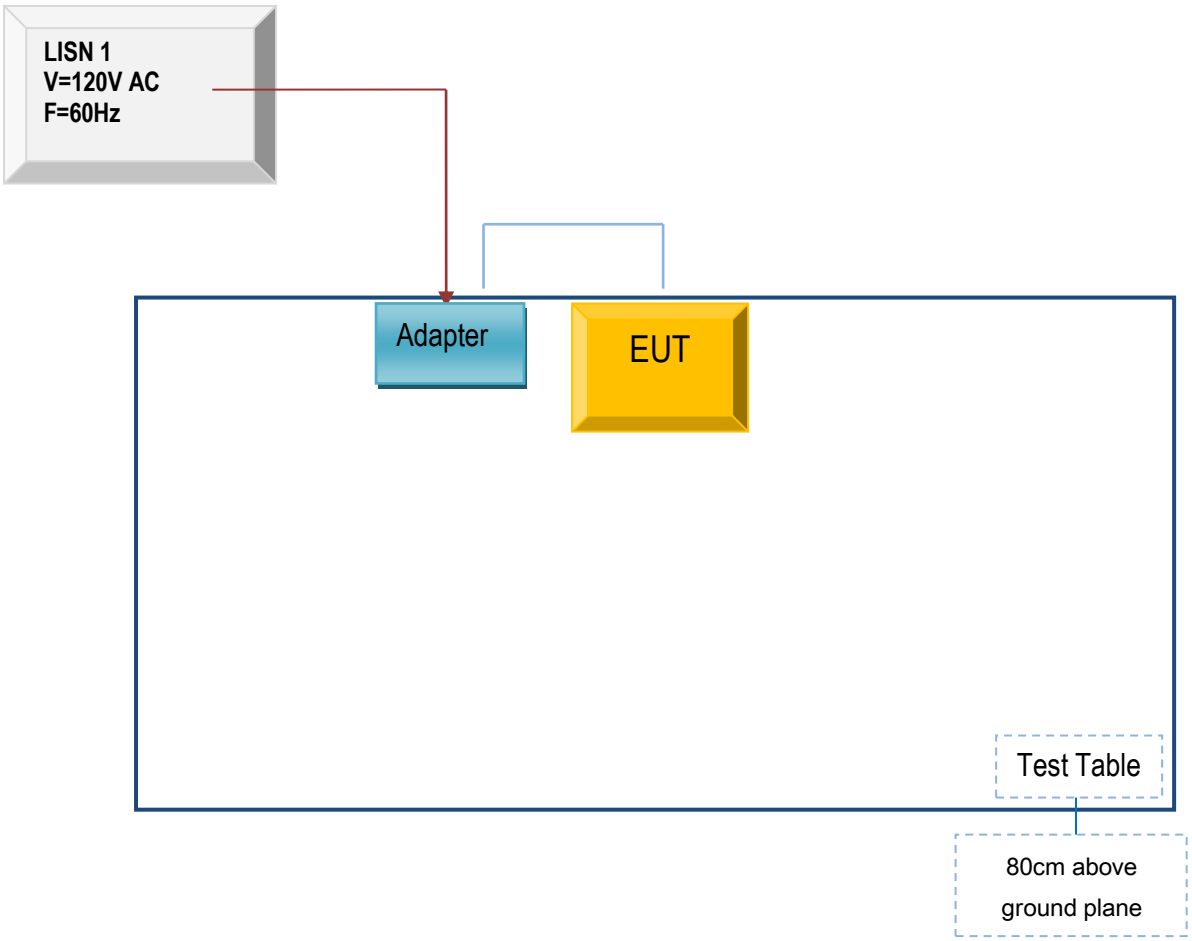
Antenna Port Conducted RF measurement

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Wireless Connectivity	R&S	CMW270	1201.0002K75	Nov. 29, 18	Nov. 28, 19
MXA VEXTOR SIGNAL	Agilent	n5182a	MY50140530	Mar. 28,19	Mar. 27,20
MXA signal analyzer	Agilent	n9020a	MY49100060	Mar. 28,19	Mar. 27,20
RF Control Unit	Tonscend	JS0806-2	188060112	Mar. 28,19	Mar. 27,20
Signal Generation	Agilent	E4421B	US40051152	Nov. 29, 18	Nov. 28, 19
DC Power Supply	Agilent	E3640A	MY40004013	Mar. 28,19	Mar. 27,20
Programmable Temperature &	Hongjin	HYC-TH-225DH	DG-180746	Mar. 28,19	Mar. 27,20
Test System	Tonscend	JS 1120-3	N/A	N/A	N/A
Power Splitter	Weinschel	1580-1	TL177	Mar. 20,19	Mar. 19,20
Universal Radio Communication	ROHDE&SCHWARZ	CMU200	112012	Mar. 28,19	Mar. 27,20
Universal Radio Communication	ROHDE&SCHWARZ	CMU200	121393	Mar. 28,19	Mar. 27,20
Wireless Communication Test Set	ROHDE&SCHWARZ	CMW500	1201.0002K500-155842-Gd	Aug. 06, 19	Aug. 05, 20

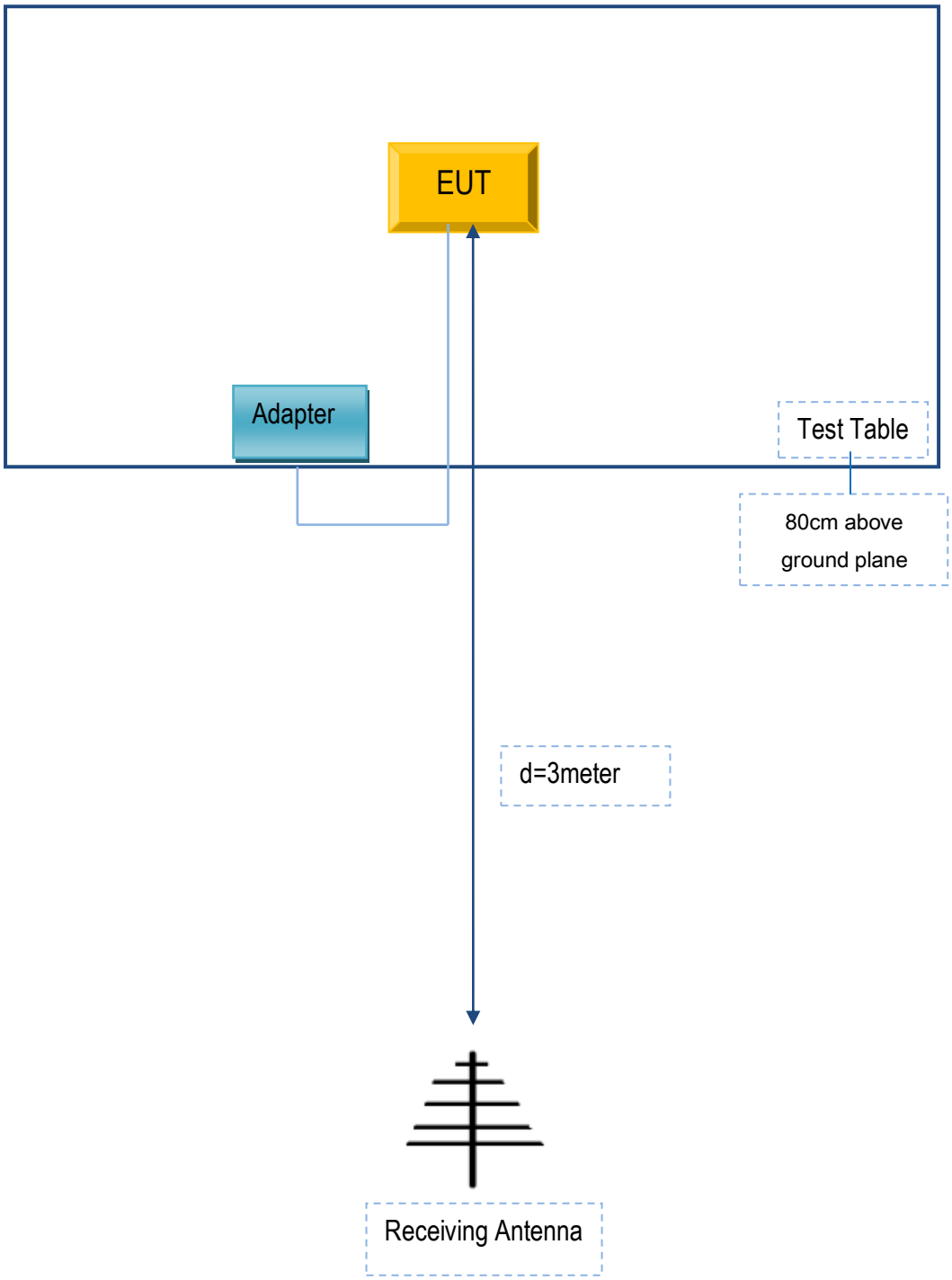
Annex B. TEST SETUP AND SUPPORTING EQUIPMENT

Annex B.i. TEST SET UP BLOCK

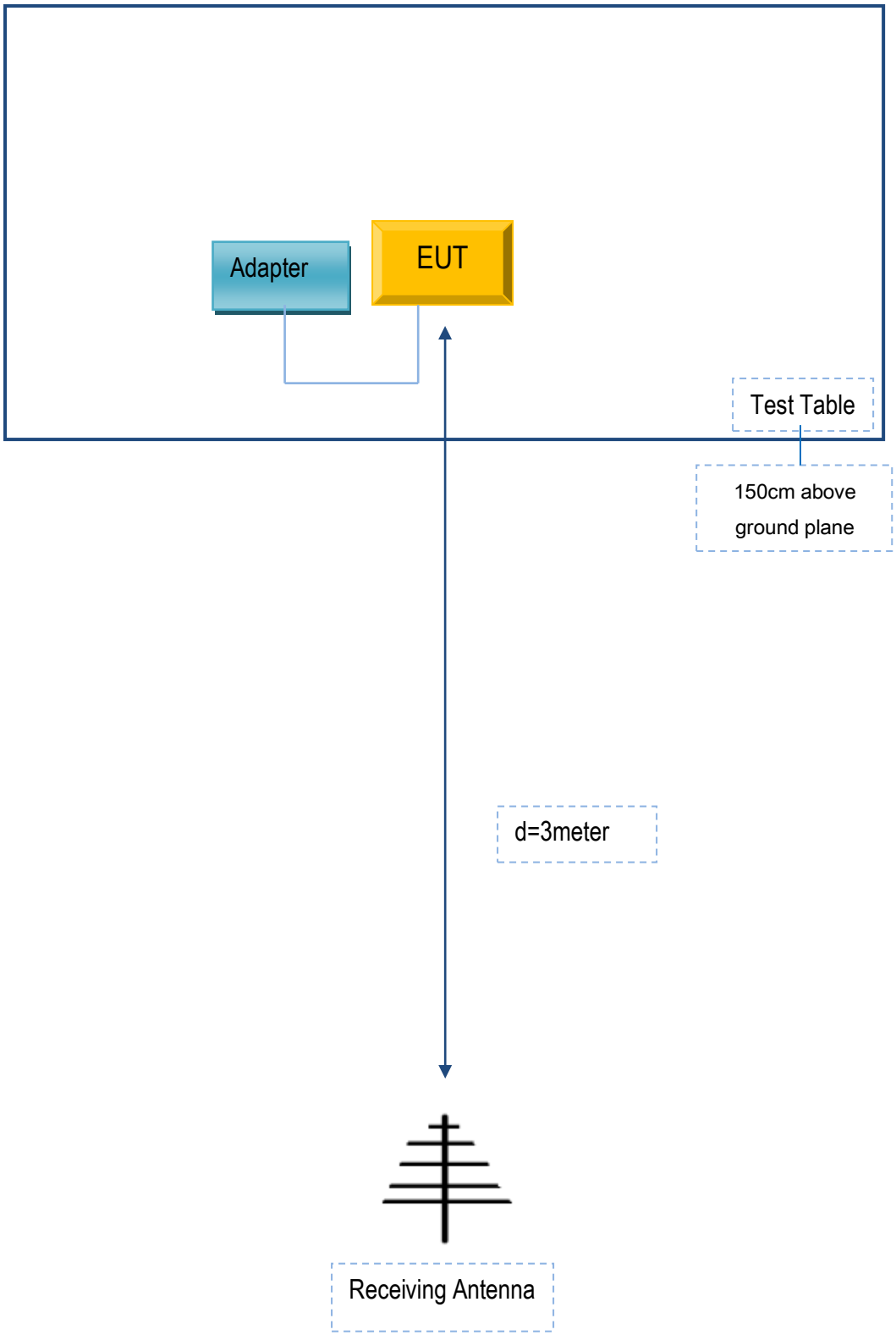
Block Configuration Diagram for AC Line Conducted Emissions



Block Configuration Diagram for Radiated Emissions （Below 1GHz）.



Block Configuration Diagram for Radiated Emissions （Above 1GHz）.



Annex C. il. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Supporting Equipment:

Manufacturer	Equipment Description	Model	Serial No
N/A	N/A	N/A	N/A

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
N/A	N/A	N/A	N/A	N/A

Annex C. User Manual / Block Diagram / Schematics / Partlist/ DECLARATION OF SIMILARITY

Please see the attachment