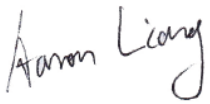
RF TEST REPORT

Report No.: Q200102S012-FCC-R2

Supersede Report No.: N/A

Applicant	ZTE Corporation
Product Name	3G Smart Feature Phone
Model No.	Z2317
Serial No.	N/A
Test Standard	FCC Part 15.247, ANSI C63.10: 2013
Test Date	Sep 02 to 09, 2019
Issue Date	Jan. 21, 2020
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐
	
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:

BUREAU VERITAS (SHENZHEN) CONSUMER PRODUCTS SERVICES CO., LTD

Zone A, Floor 1, Building 2 Wan Ye Long Technology Park

South Side of Zhoushi Road, Bao'an District, Shenzhen, Guangdong China 518108

Phone: +86 0755 2601 4629801 Email: China@siemic.com.cn

This page has been left blank intentionally.

CONTENTS

1. Report Revision History

Report No.	Report Version	Description	Issue Date
Q200102S012-FCC-R2	NONE	Original	Jan. 21, 2020

2. Customer information

Applicant Name	ZTE Corporation
Applicant Add	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R. China
Manufacturer	ZTE Corporation
Manufacturer Add	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R. China

3. Test site information

Lab performing tests	BUREAU VERITAS (SHENZHEN) CONSUMER PRODUCTS SERVICES CO., LTD
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:	3G Smart Feature Phone
Main Model:	Z2317
Serial Model:	N/A
Date EUT received:	Aug 28, 2019
Test Date(s):	Sep 02 to 09, 2019
Equipment Category：	DTS
Antenna Gain:	GSM850: -1dBi PCS1900: -1.5dBi UMTS-FDD Band V: -1dBi UMTS-FDD Band II: -1.5dBi WIFI: 0dBi Bluetooth/BLE: 0dBi
Antenna Type:	PIFA 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: 19.40 dBm 802.11g: 22.94 dBm 802.11n(20M): 23.24 dBm 802.11n(40M): 21.88 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 1: Model: TPA-97050050U01 Input: AC100-240V~50/60Hz,0.15A Output: DC 5.0V, 500mA Adapter 2: Model: 50.069MX03 Input: AC100-240V~50/60Hz,0.2A Output: DC 5.0V, 500mA Battery : Model: 5C1001 Spec: 3.7V, 1000mAh/3.7Wh Limited charge voltage: 4.2
Trade Name :	ZTE
FCC ID:	SRQ-ZTEZ2317

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

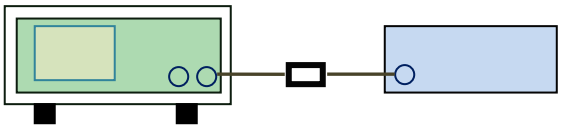
The EUT has 2 antennas:
A permanently attached PIFA antenna for Bluetooth/BLE/WIF/GPS, the gain is 0dBi for Bluetooth/BLE, the gain is 0dBi for WIFI.
A permanently attached PIFA antenna for GSM/PCS/UMTS, the gain is -1.12dBi for GSM850, -1dBi for PCS1900, -1dBi for UMTS-FDD Band V, -1.5dBi for UMTS-FDD Band II.

The antenna meets up with the ANTENNA REQUIREMENT.

Result: Compliance.

6.2 DTS (6 dB&20 dB) Channel Bandwidth

Temperature	25°C
Relative Humidity	57%
Atmospheric Pressure	1024mbar
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 v05r02, 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

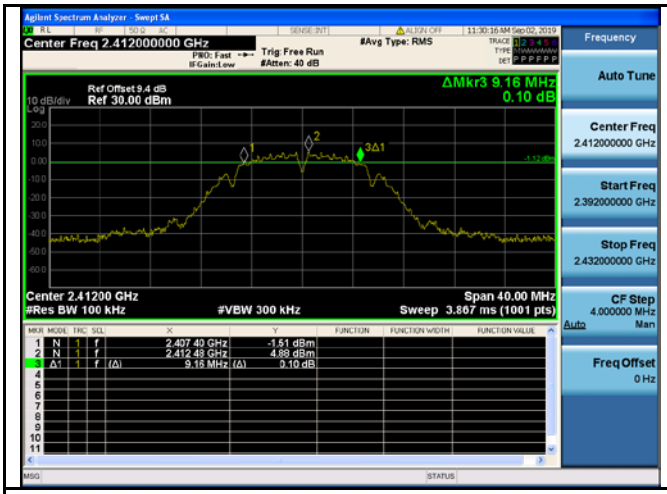
Measurement result

Test mode	CH	Freq (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
802.11b	Low	2412	9.16	≥ 0.5
	Mid	2437	9.20	≥ 0.5
	High	2462	9.20	≥ 0.5
802.11g	Low	2412	16.44	≥ 0.5
	Mid	2437	16.44	≥ 0.5
	High	2462	16.44	≥ 0.5
802.11n (20M)	Low	2412	17.68	≥ 0.5
	Mid	2437	17.68	≥ 0.5
	High	2462	17.68	≥ 0.5
802.11n (40M)	Low	2422	36.48	≥ 0.5
	Mid	2437	36.48	≥ 0.5
	High	2452	36.48	≥ 0.5

Test mode	CH	Freq (MHz)	20dB Bandwidth (MHz)
802.11b	Low	2412	16.98
	Mid	2437	16.60
	High	2462	16.60
802.11g	Low	2412	19.06
	Mid	2437	19.48
	High	2462	19.37
802.11n (20M)	Low	2412	19.48
	Mid	2437	19.47
	High	2462	19.48
802.11n (40M)	Low	2422	38.98
	Mid	2437	39.45
	High	2452	39.63

Test Plots

6dB Bandwidth measurement result

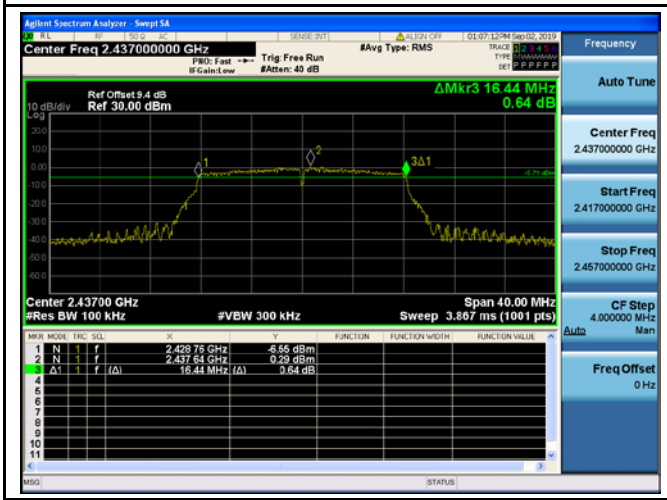


802.11b 6dB Bandwidth - Low CH 2412

802.11b 6dB Bandwidth - Mid CH 2437

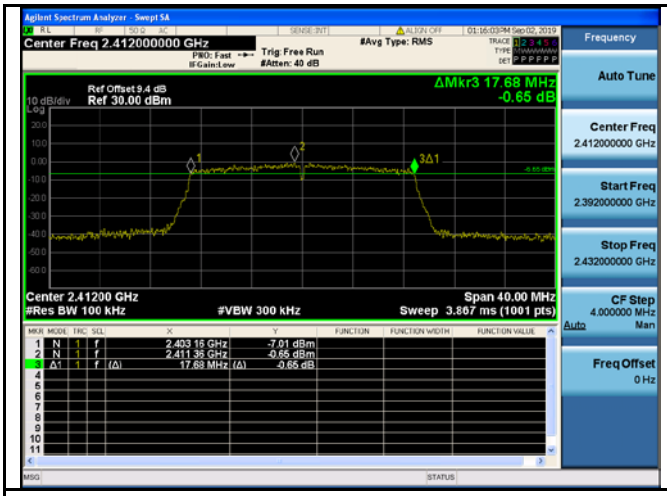
802.11b 6dB Bandwidth - High CH 2462

802.11g 6dB Bandwidth - Low CH 2412

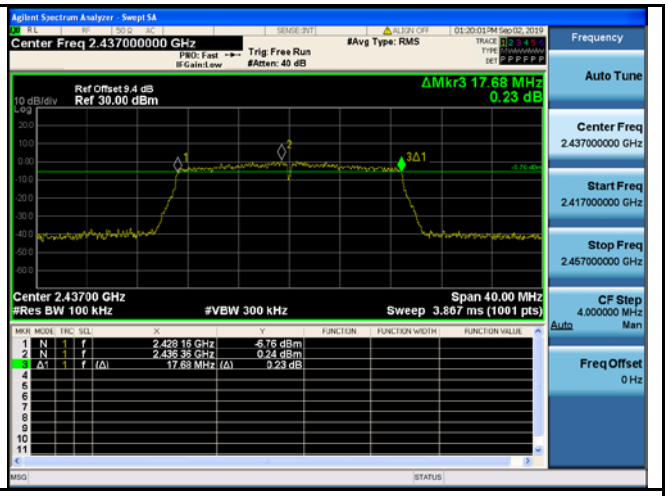


802.11g 6dB Bandwidth - Mid CH 2437

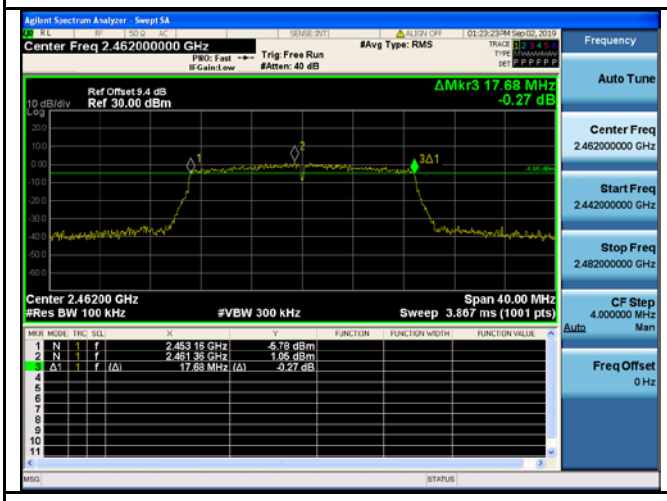
802.11g 6dB Bandwidth - High CH 2462



802.11n20 6dB Bandwidth - Low CH 2412

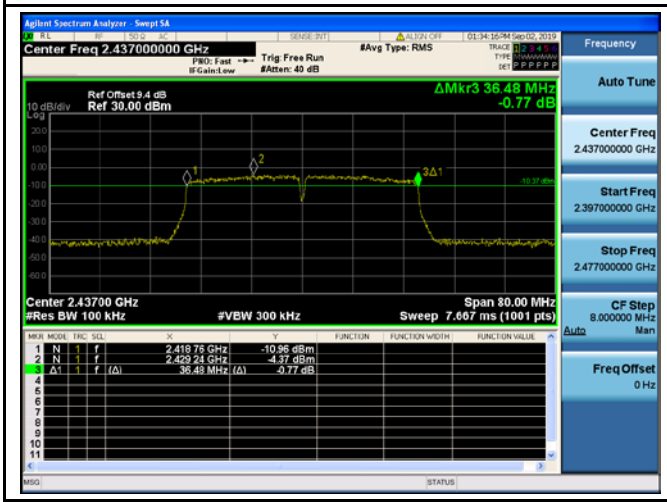


802.11n20 6dB Bandwidth - Mid CH 2437



802.11n20 6dB Bandwidth - High CH 2462

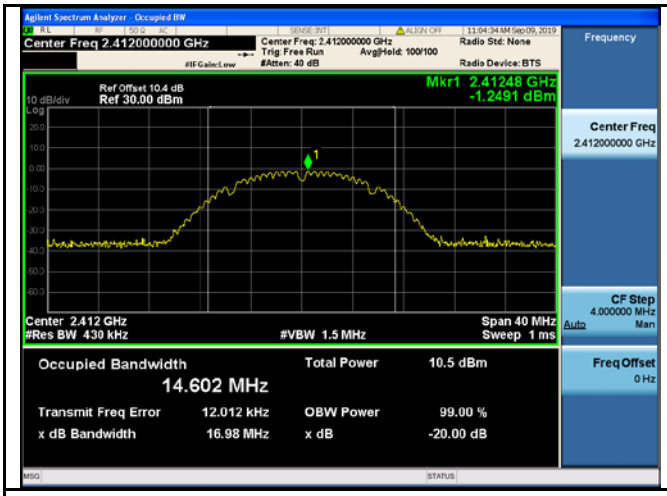
802.11n40 6dB Bandwidth - Low CH 2422



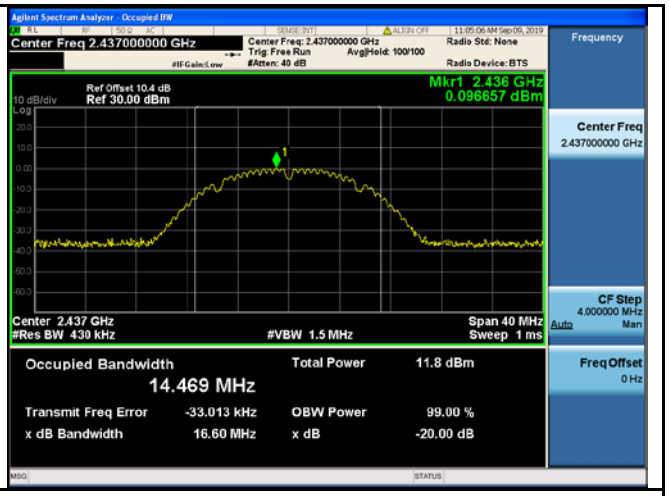
802.11n40 6dB Bandwidth - Mid CH 2437

802.11n40 6dB Bandwidth - High CH 2452

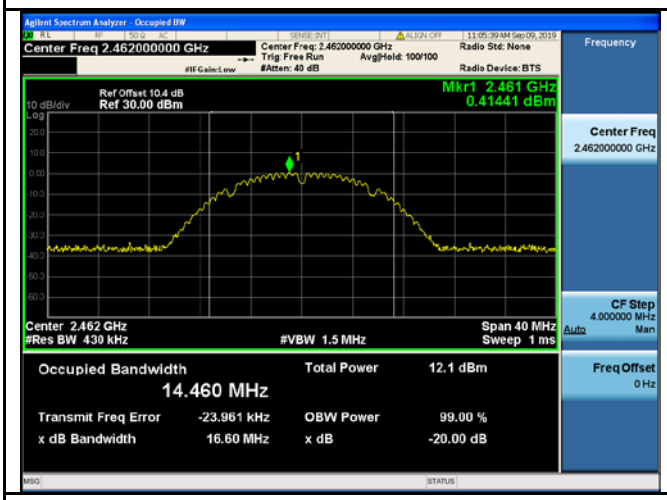
20 dB Bandwidth measurement result



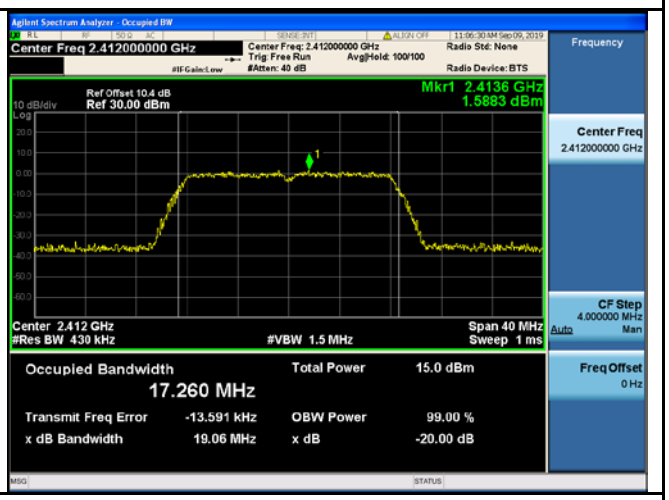
802.11b 20dB Bandwidth - Low CH 2412



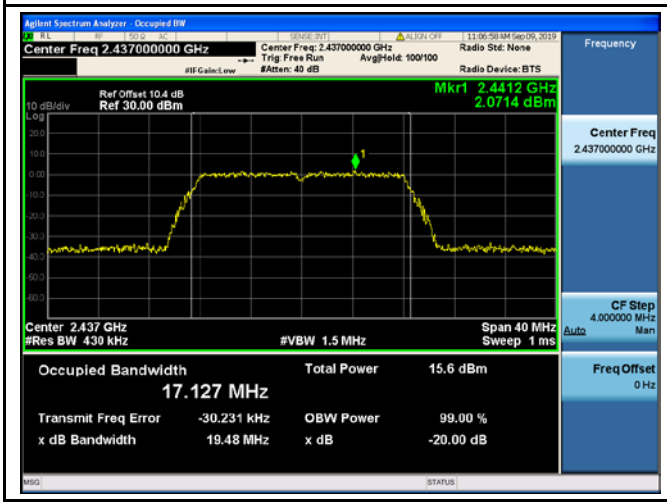
802.11b 20dB Bandwidth - Mid CH 2437



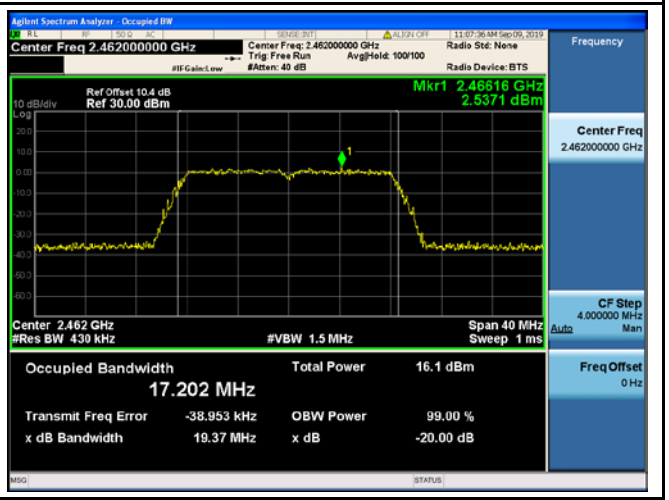
802.11b 20dB Bandwidth - High CH 2462



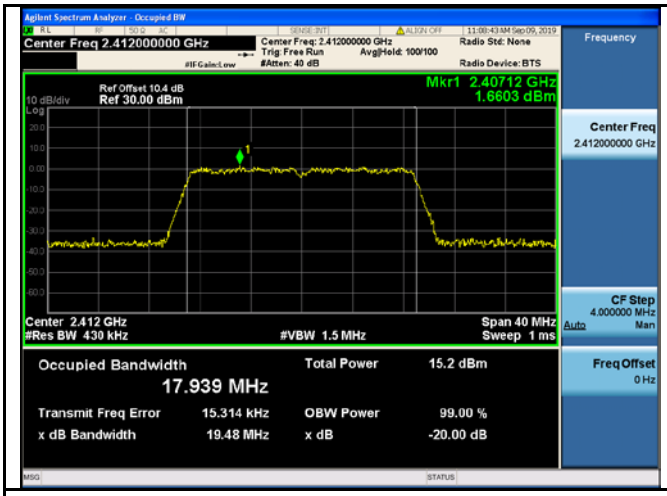
802.11g 20dB Bandwidth - Low CH 2412



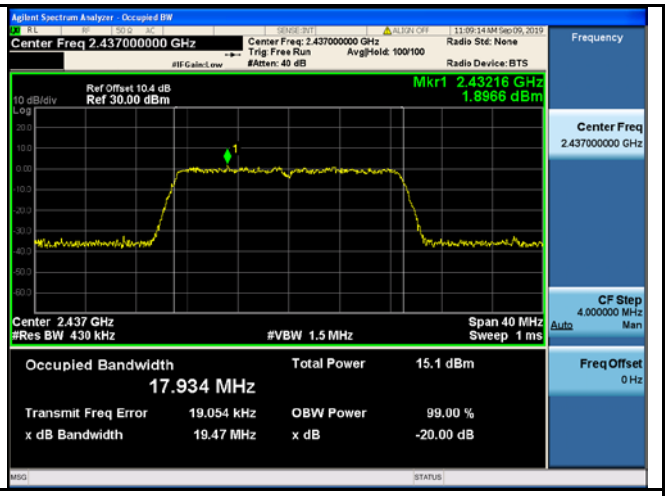
802.11g 20dB Bandwidth - Mid CH 2437



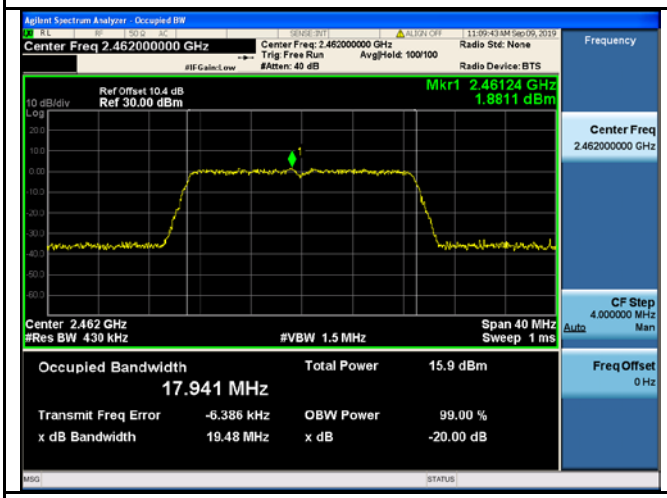
802.11g 20dB Bandwidth - High CH 2462



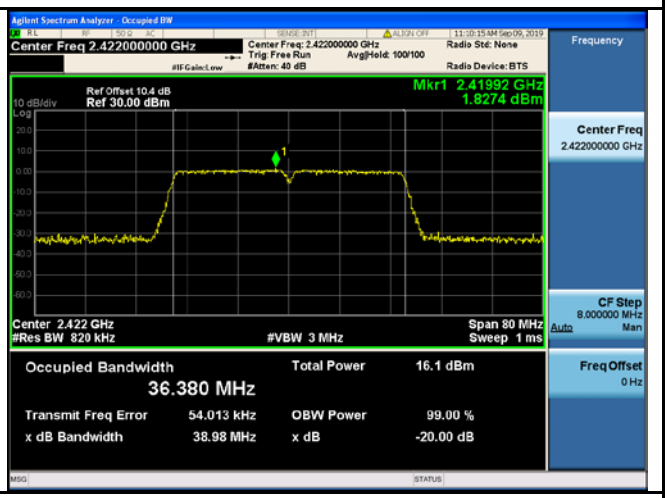
802.11n20 20dB Bandwidth - Low CH 2412



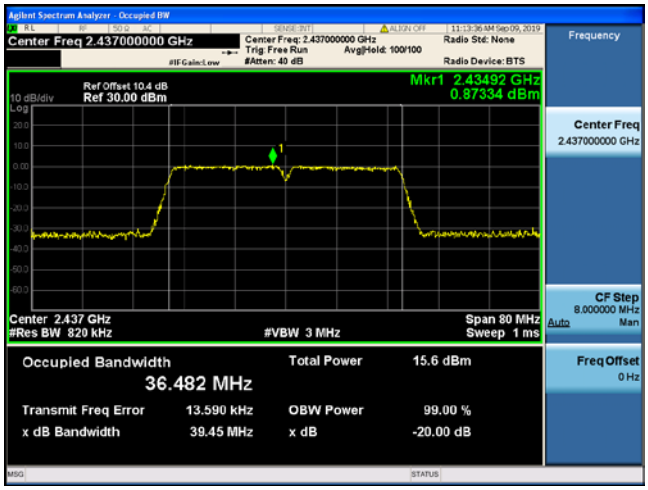
802.11n20 20dB Bandwidth - Mid CH 2437



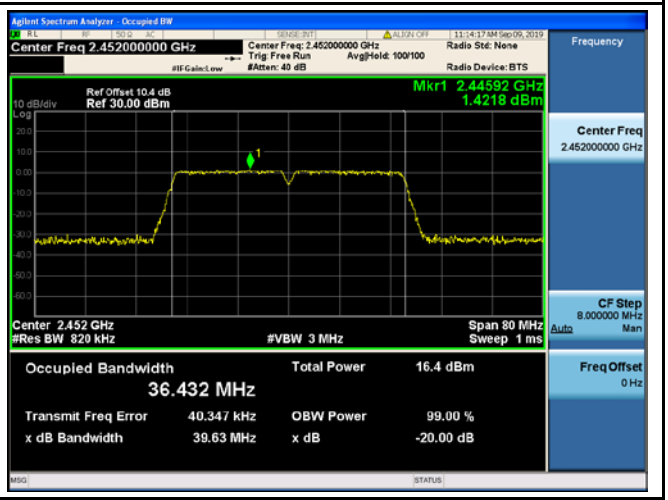
802.11n20 20dB Bandwidth - High CH 2462



802.11n40 20dB Bandwidth - Low CH 2422



802.11n40 20dB Bandwidth - Mid CH 2437

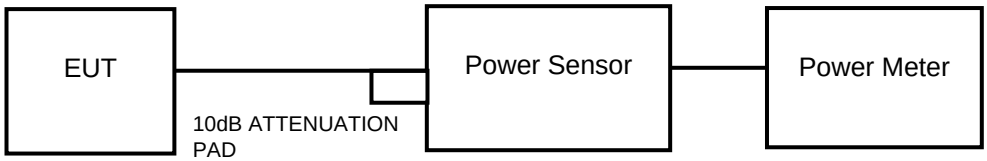


802.11n40 20dB Bandwidth - High CH 2452

6.3 Maximum Output Power

Temperature	25°C
Relative Humidity	57%
Atmospheric Pressure	1024mbar
Test date :	Sep. 11, 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			
Test Procedure	558074 D01 DTS MEAS Guidance v05r02, 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

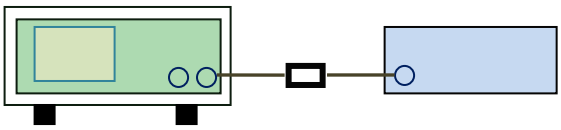
Type	Test mode	CH	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (mW)	Limit (mW)	Result
Output power	802.11b	Low	2412	18.99	79.25	1000	Pass
		Mid	2437	18.59	72.277	1000	Pass
		High	2462	19.40	87.096	1000	Pass
	802.11g	Low	2412	22.90	194.984	1000	Pass
		Mid	2437	22.73	187.499	1000	Pass
		High	2462	22.94	196.789	1000	Pass
	802.11n (20M)	Low	2412	22.56	180.302	1000	Pass
		Mid	2437	23.15	206.538	1000	Pass
		High	2462	23.24	210.863	1000	Pass
	802.11n (40M)	Low	2422	21.54	142.561	1000	Pass
		Mid	2437	21.60	144.544	1000	Pass
		High	2452	21.88	154.17	1000	Pass

Average Output power (FOR REFERENCE)

Test mode	CH	Frequency (MHz)	Average Power (dBm)
802.11b	Low	2412	16.36
	Mid	2437	16.29
	High	2462	16.69
802.11g	Low	2412	15.70
	Mid	2437	15.71
	High	2462	15.95
802.11n (20M)	Low	2412	15.10
	Mid	2437	15.44
	High	2462	15.81
802.11n (40M)	Low	2422	14.24
	Mid	2437	14.37
	High	2452	14.31

6.4 Power Spectral Density

Temperature	25°C
Relative Humidity	57%
Atmospheric Pressure	1024mbar
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 v05r02, 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

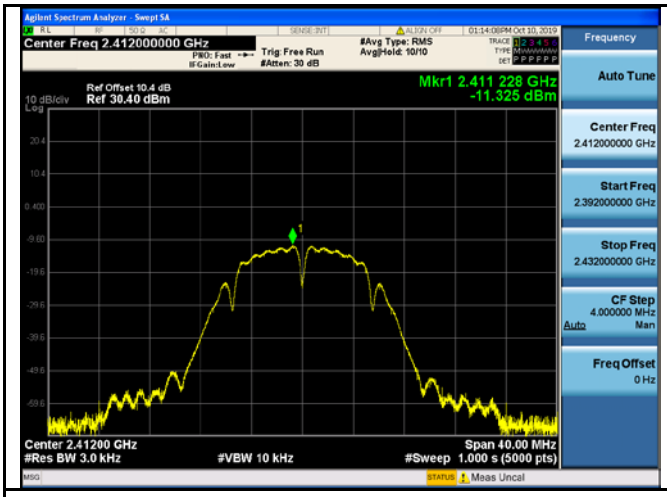
Test Plot ☑ Yes (See below) ☐ N/A

Power Spectral Density measurement result

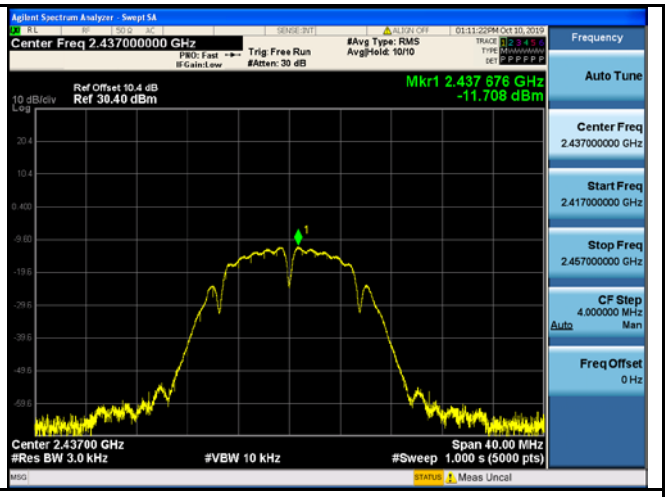
Type	Test mode	CH	Freq (MHz)	PSD (dBm)	Limit (dBm)	Result
PSD	802.11b	Low	2412	-11.325	8	Pass
		Mid	2437	-11.708	8	Pass
		High	2462	-10.979	8	Pass
	802.11g	Low	2412	-8.826	8	Pass
		Mid	2437	-9.251	8	Pass
		High	2462	-9.048	8	Pass
	802.11n (20M)	Low	2412	-8.915	8	Pass
		Mid	2437	-9.037	8	Pass
		High	2462	-8.277	8	Pass
	802.11n (40M)	Low	2422	-13.099	8	Pass
		Mid	2437	-13.284	8	Pass
		High	2452	-12.756	8	Pass

Test Plots

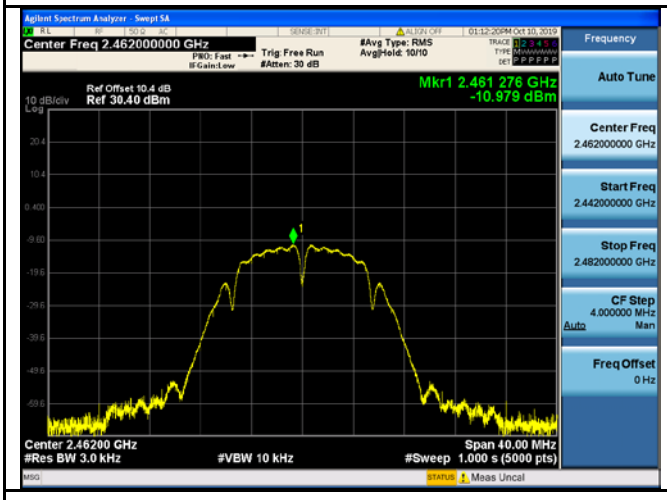
Power Spectral Density measurement result



PSD - Low CH 2412 - 802.11b

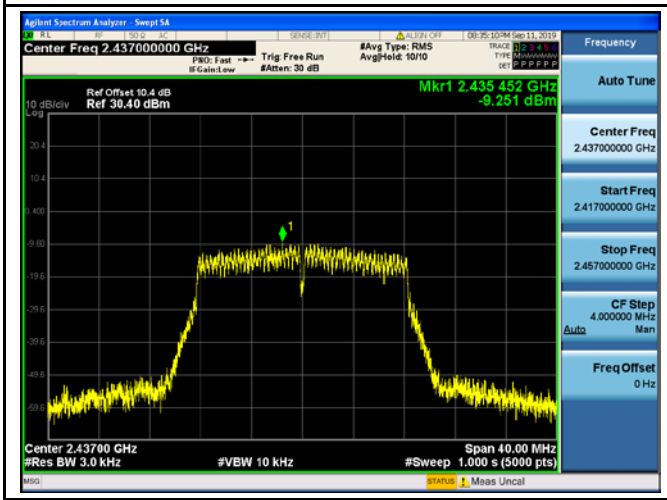


PSD - Mid CH 2437 – 802.11b

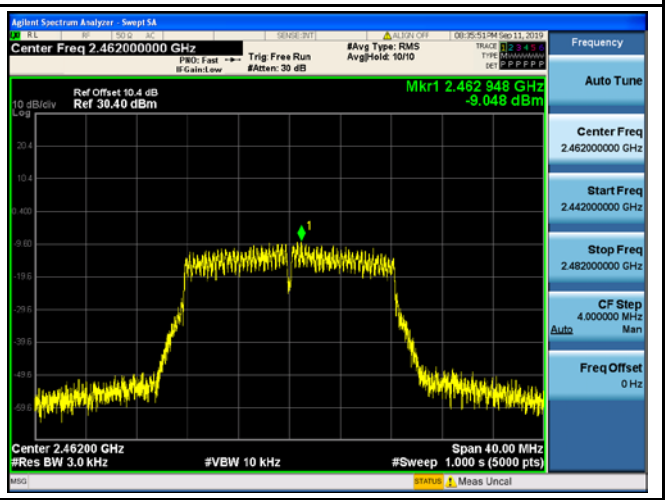


PSD - High CH 2462 - 802.11b

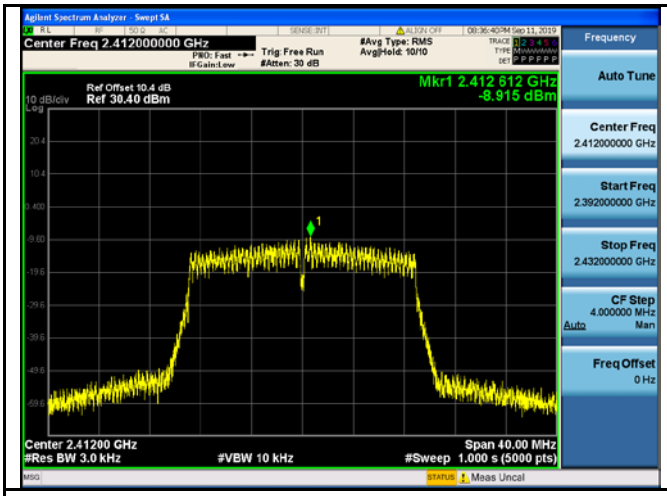
PSD - Low CH 2412 -802.11g



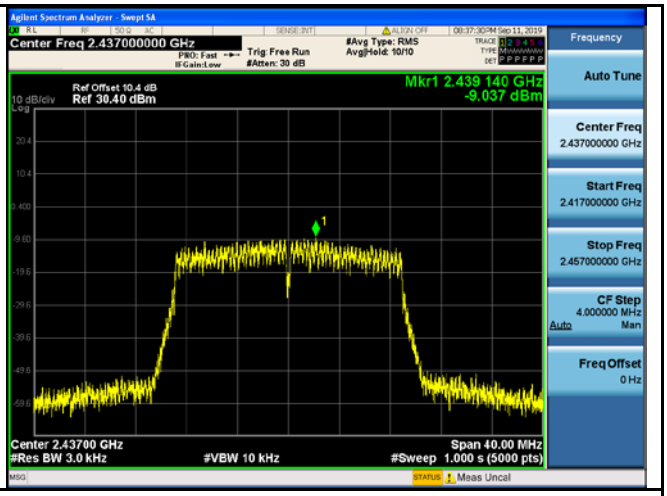
PSD - Mid CH 2437 – 802.11g



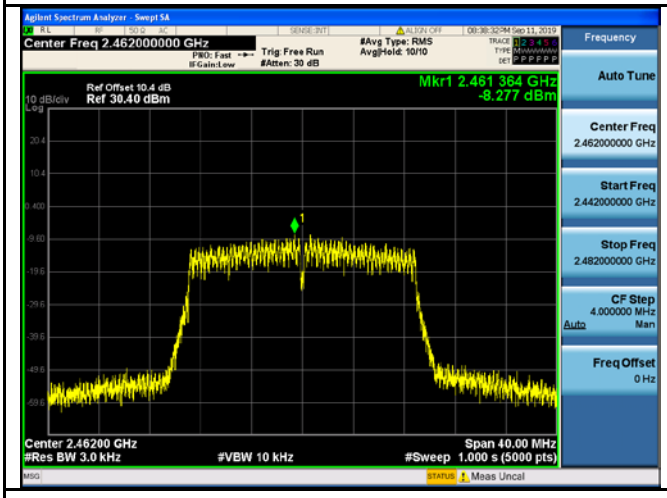
PSD - High CH 2462 - 802.11g



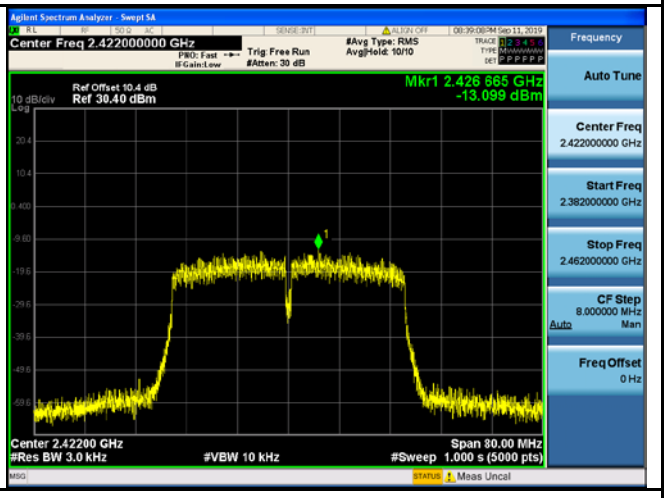
PSD - Low CH 2412 - 802.11n20



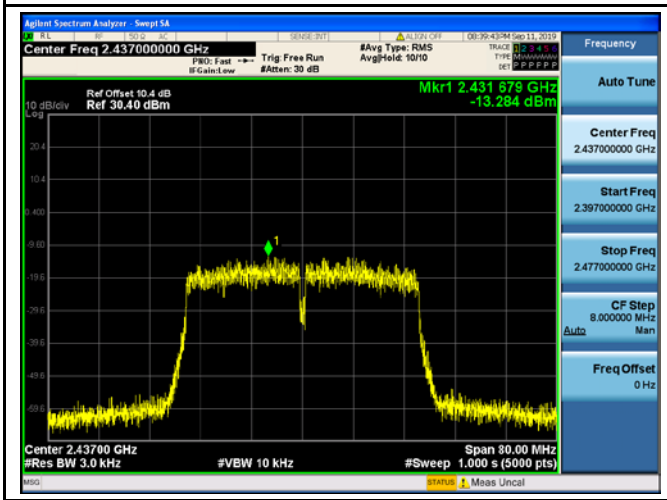
PSD - Mid CH 2437 – 802.11n20



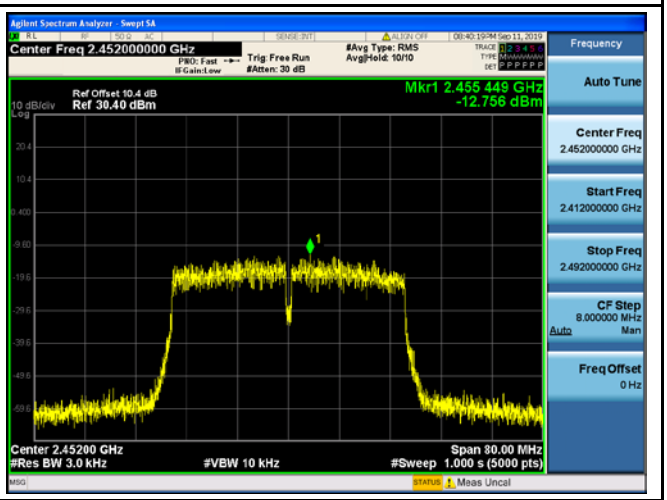
PSD - High CH 2472 - 802.11n20



PSD - Low CH 2422 - 802.11n40



PSD - Mid CH 2437 – 802.11n40

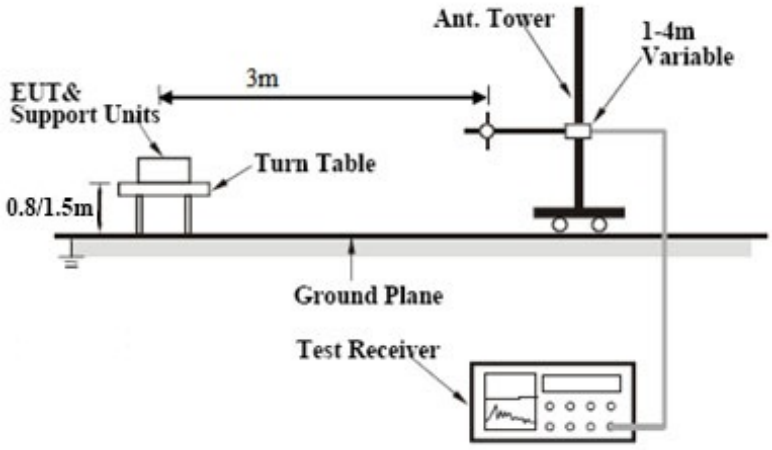


PSD - High CH 2452 - 802.11n40

6.5 Band-Edge & Unwanted Emissions into Restricted Frequency Bands

Temperature	27°C
Relative Humidity	58%
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.		

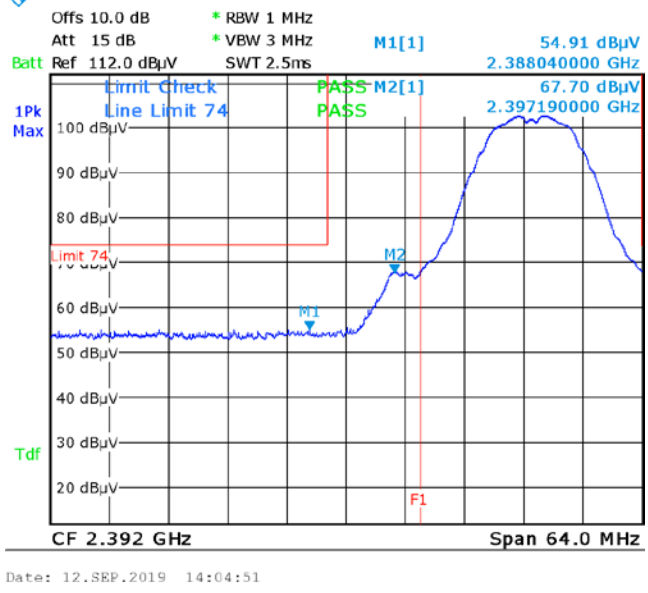
	- 3. First, set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, check the emission of EUT, if pass then set Spectrum Analyzer as below: a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 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

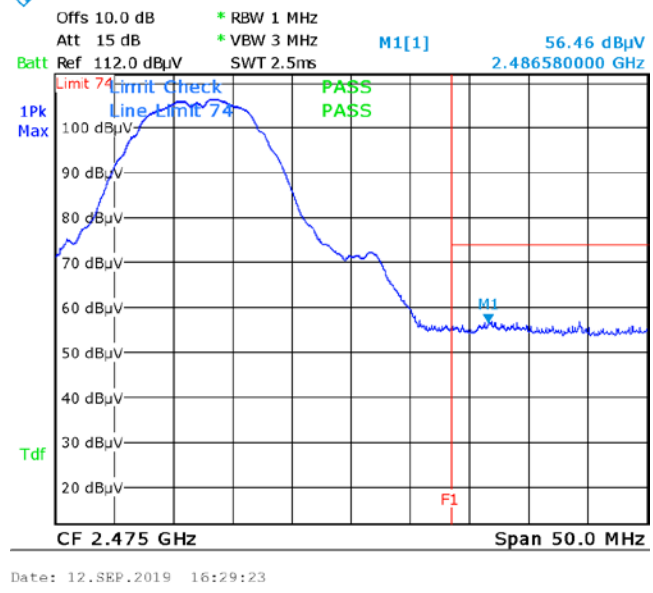
Test Plots

Unwanted emissions into restricted frequency bands measurement result



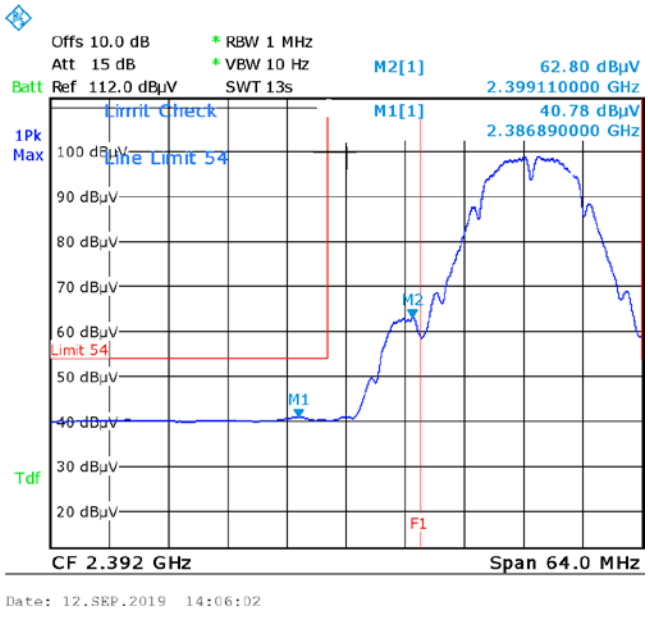
Unwanted emissions into restricted frequency bands, Left Side (Peak) - 802.11b

Note: F1 is frequency 2399.5MHz



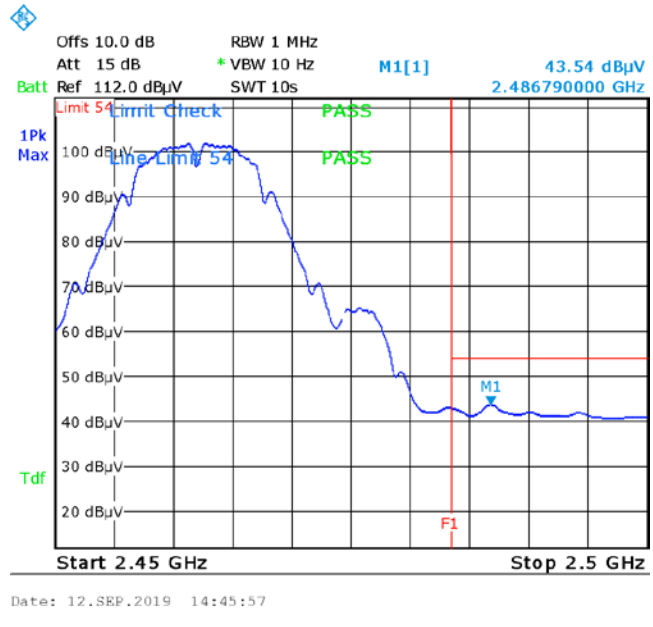
Unwanted emissions into restricted frequency bands,, Left Side (Peak) - 802.11b

Note: F1 is frequency 2397.2MHz



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

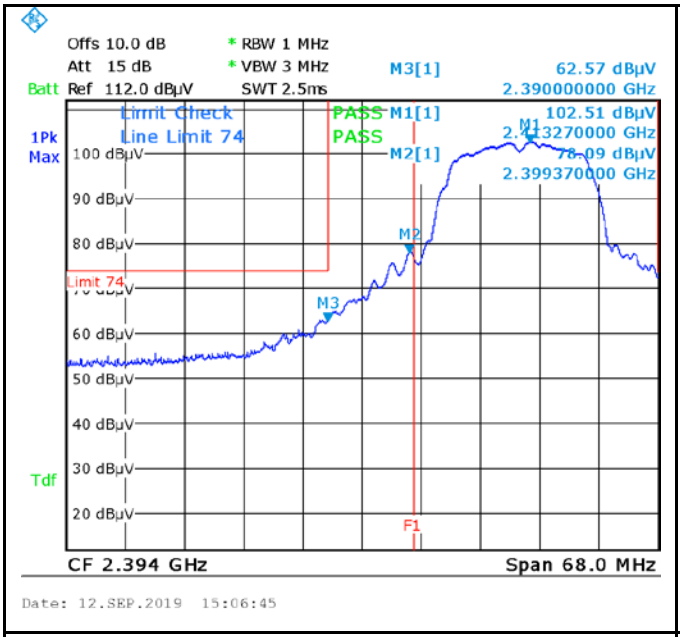
Note: F1 is frequency 2399.1MHz



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

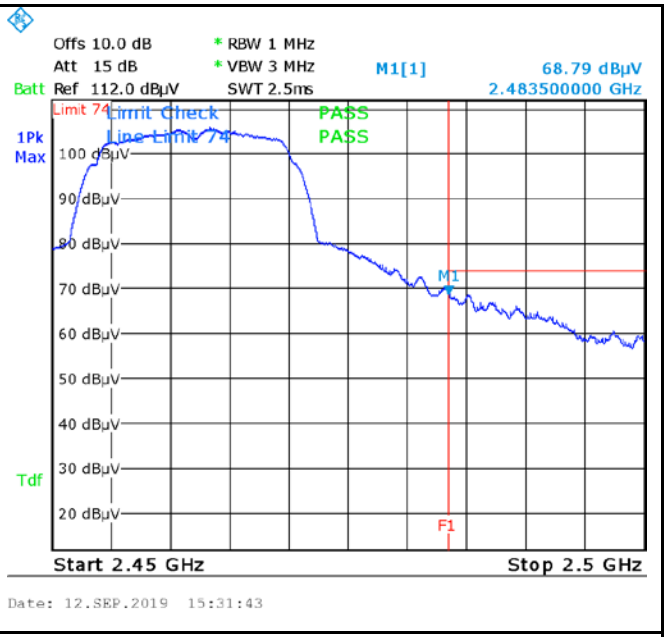
Note: F1 is frequency 2486.8MHz

Note: Both Horizontal and vertical polarities were investigated



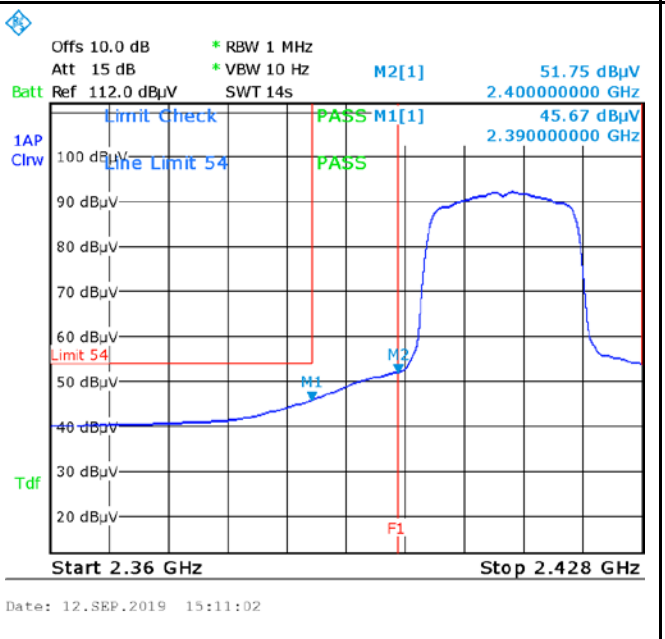
Unwanted emissions into restricted frequency bands,, Right Side (Peak) - 802.11g

Note: F1 is frequency 2486.6MHz



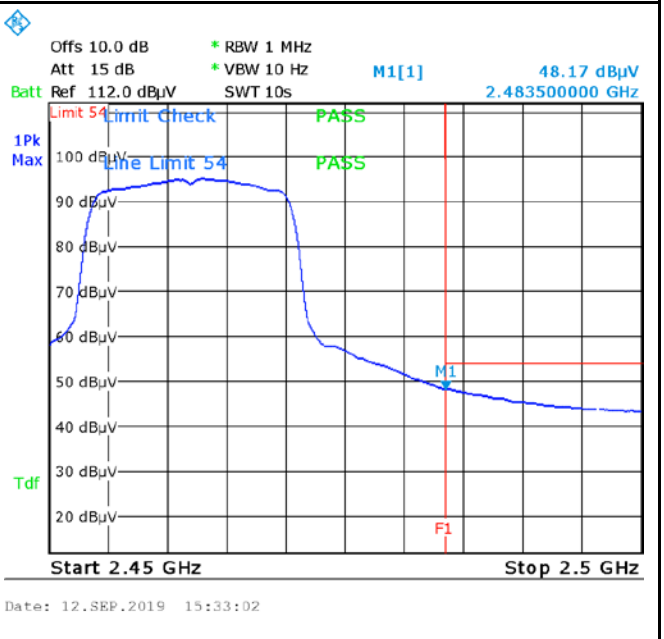
Unwanted emissions into restricted frequency bands,, Left Side (Peak) - 802.11g

Note: F1 is frequency 2399.2MHz



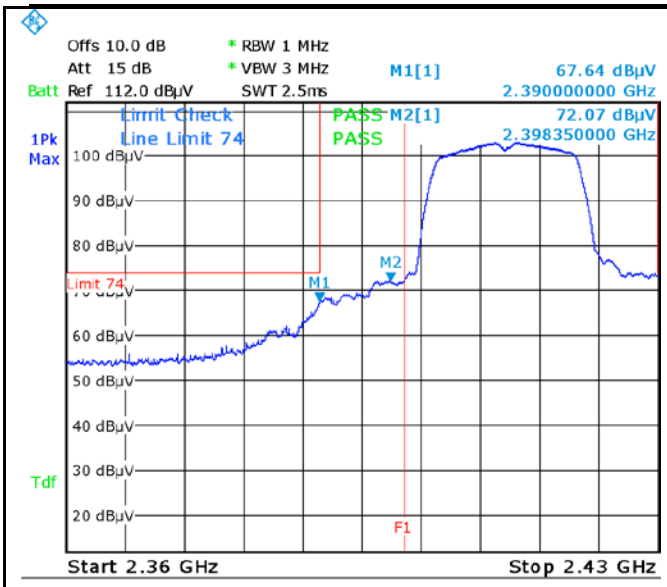
Unwanted emissions into restricted frequency bands,, Left Side (Average) - 802.11g

Note: F1 is frequency 2400MHz



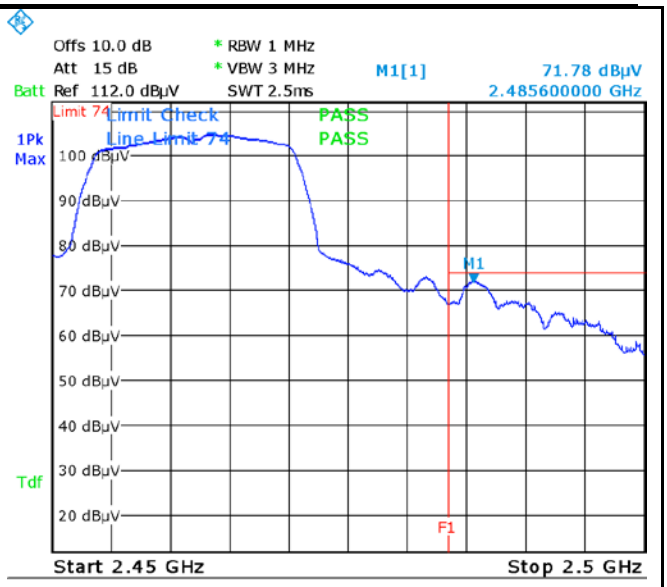
Unwanted emissions into restricted frequency bands,, Right Side (Average) - 802.11g

Note: F1 is frequency 2483.5MHz



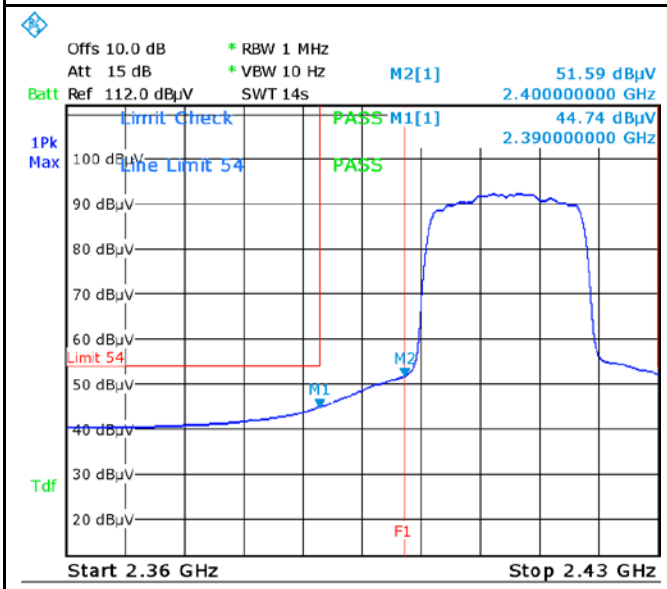
Unwanted emissions into restricted frequency bands,, Left Side (Peak) - 802.11n20

Note: F1 is frequency 2398.4MHz



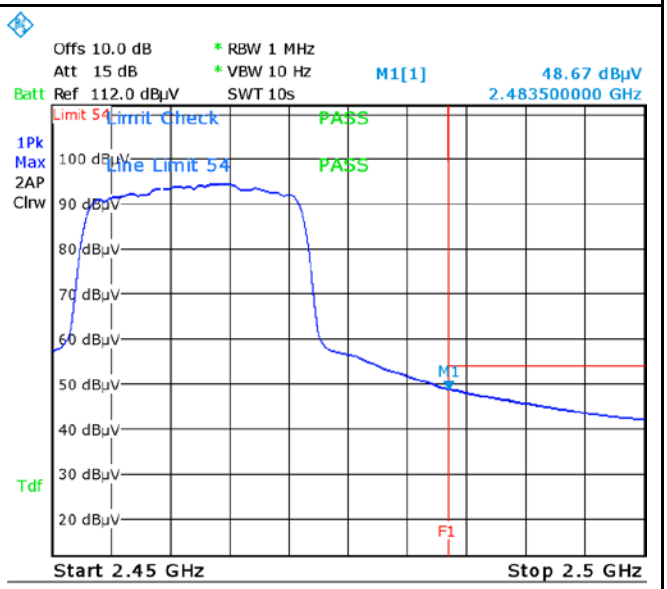
Unwanted emissions into restricted frequency bands,, Right Side (Peak) - 802.11n20

Note: F1 is frequency 2485.6MHz



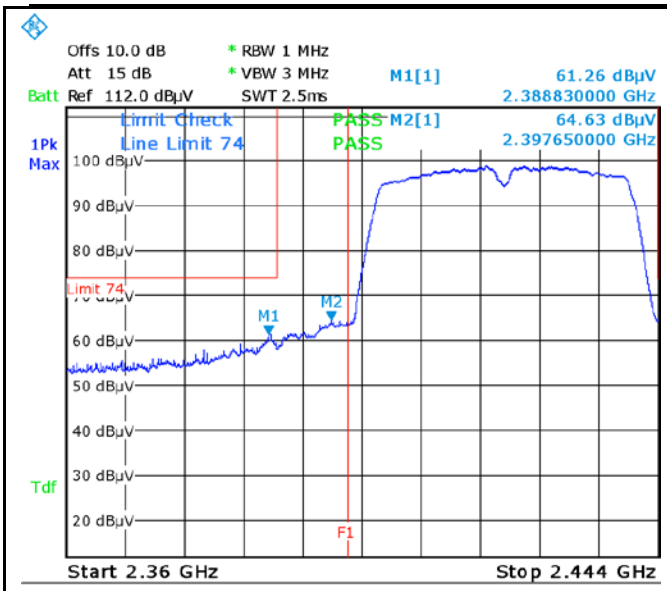
Unwanted emissions into restricted frequency bands,, Left Side (Average) - 802.11n20

Note: F1 is frequency 2390MHz



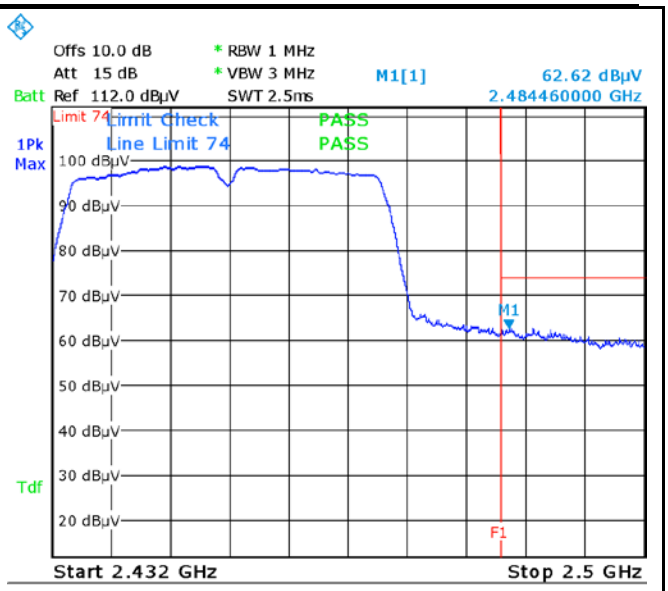
Unwanted emissions into restricted frequency bands,, Right Side (Average) - 802.11n20

Note: F1 is frequency 2483.5MHz



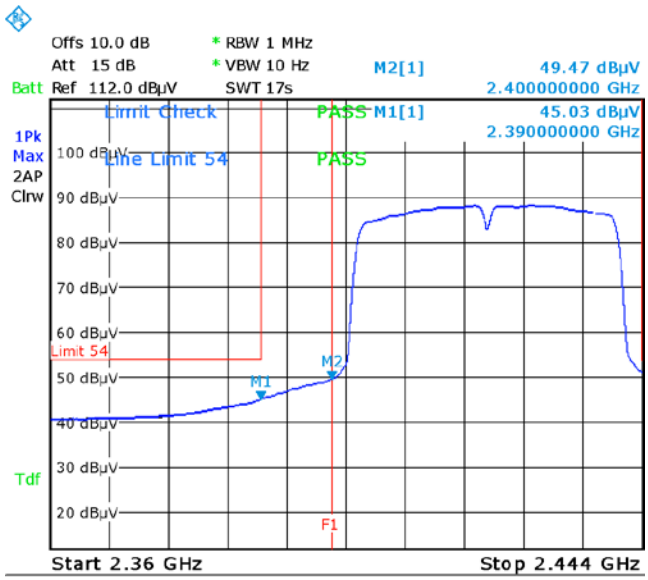
Unwanted emissions into restricted frequency bands,, Left Side (Peak) - 802.11n40

Note: F1 is frequency 2400MHz



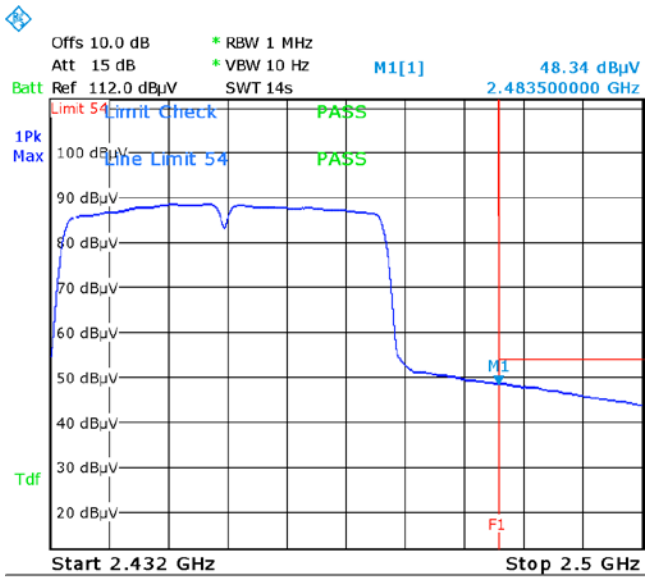
Unwanted emissions into restricted frequency bands,, Right Side (Peak) - 802.11n40

Note: F1 is frequency 2484.5MHz



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

Note: F1 is frequency 2483.5MHz



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

Note: F1 is frequency 2397.7MHz

Note: Both Horizontal and vertical polarities were investigated

6.6 AC Power Line Conducted Emissions

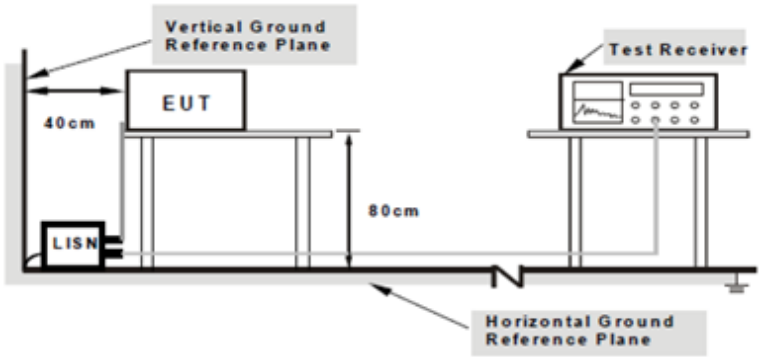
Temperature	26°C
Relative Humidity	55%
Atmospheric Pressure	1010mbar
Test date :	August 30, 2019
Tested By :	Aaron Liang

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR§15.207, RSS210 (A8.1)	a)	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.	☑

Frequency ranges (MHz)	Limit (dBμV)	
	QP	Average
0.15 ~ 0.5	66 – 56	56 – 46
0.5 ~ 5	56	46
5 ~ 30	60	50

Test Setup



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.

Procedure

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

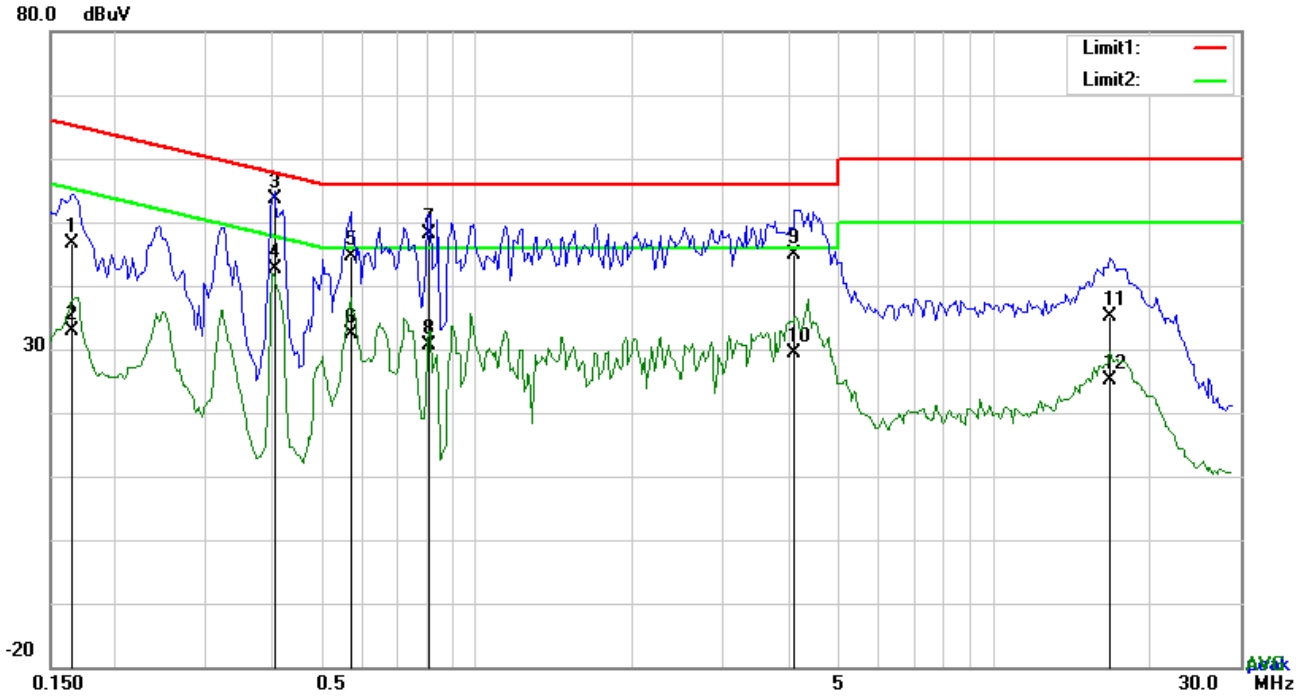
	coaxial cable. 4. All other supporting equipment were powered separately from another main supply. 5. The EUT was switched on and allowed to warm up to its normal operating condition. 6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range 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

Note: 1, The Phase Line Plot at 120Vac, 60Hz and 240Vac, 60Hz were investigated. The results below show only the worst case.

Test Mode:	WIFI Mode

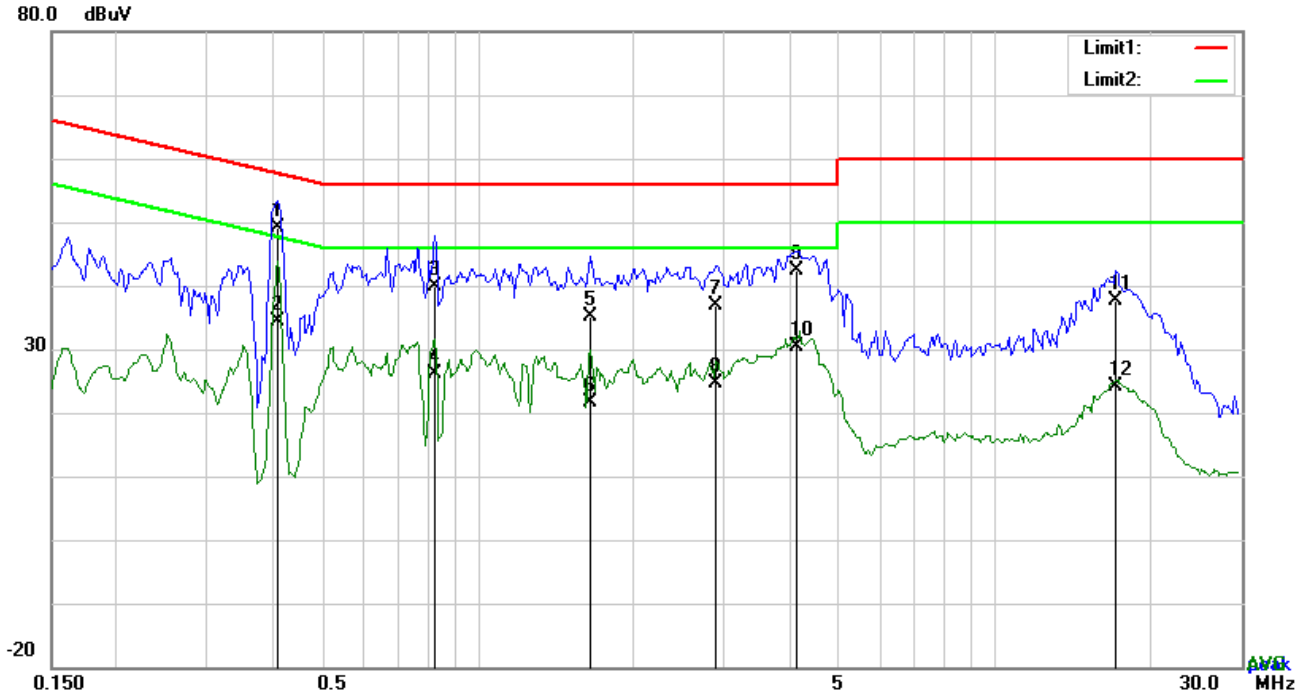


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)
1	L1	0.1656	36.60	QP	10.12	46.72	65.18	-18.46
2	L1	0.1656	22.76	AVG	10.12	32.88	55.18	-22.30
3	L1	0.4074	43.43	QP	10.10	53.53	57.70	-4.17
4	L1	0.4074	32.62	AVG	10.10	42.72	47.70	-4.98
5	L1	0.5712	34.52	QP	10.10	44.62	56.00	-11.38
6	L1	0.5712	22.17	AVG	10.10	32.27	46.00	-13.73
7	L1	0.8130	38.06	QP	10.12	48.18	56.00	-7.82
8	L1	0.8130	20.61	AVG	10.12	30.73	46.00	-15.27
9	L1	4.1310	34.65	QP	10.18	44.83	56.00	-11.17
10	L1	4.1310	19.32	AVG	10.18	29.50	46.00	-16.50
11	L1	16.7787	24.77	QP	10.35	35.12	60.00	-24.88
12	L1	16.7787	14.83	AVG	10.35	25.18	50.00	-24.82

Test Mode:	WIFI Mode



Test Data

Phase Neutral Plot at 120Vac, 60Hz

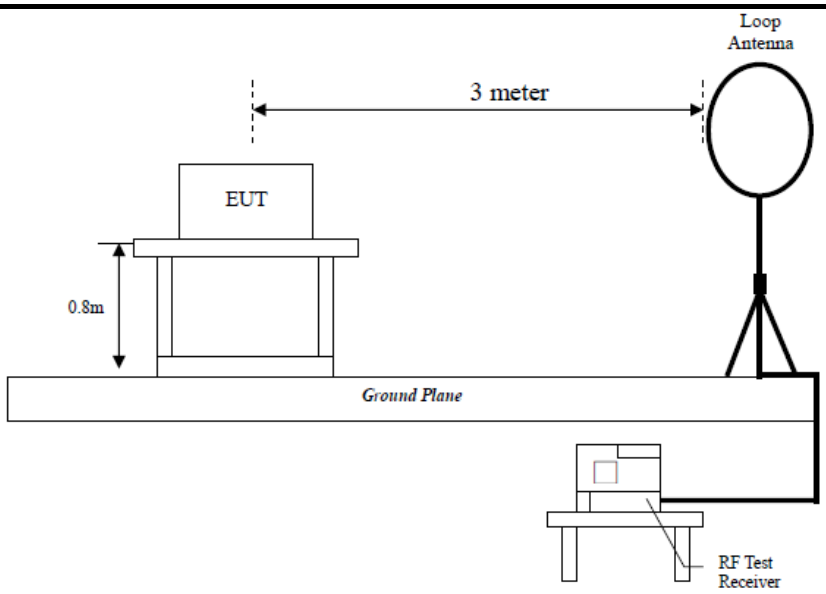
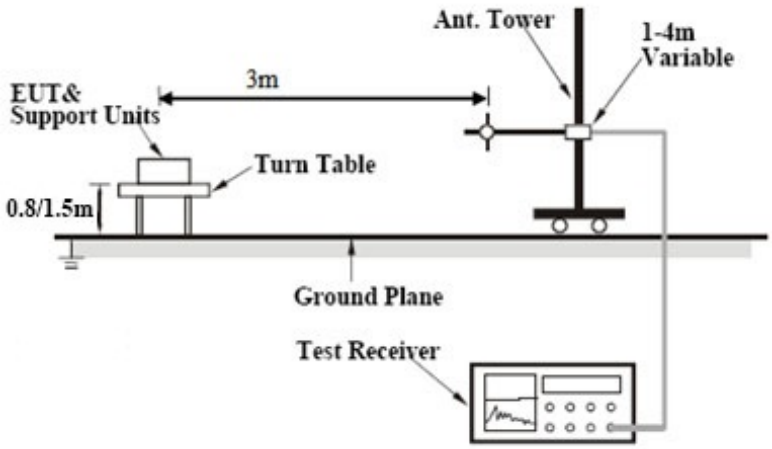
No.	P/L	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)
1	N	0.4113	39.11	QP	10.12	49.23	57.62	-8.39
2	N	0.4113	24.25	AVG	10.12	34.37	47.62	-13.25
3	N	0.8286	29.83	QP	10.14	39.97	56.00	-16.03
4	N	0.8286	16.11	AVG	10.14	26.25	46.00	-19.75
5	N	1.6554	25.09	QP	10.16	35.25	56.00	-20.75
6	N	1.6554	11.45	AVG	10.16	21.61	46.00	-24.39
7	N	2.8956	26.79	QP	10.18	36.97	56.00	-19.03
8	N	2.8956	14.55	AVG	10.18	24.73	46.00	-21.27
9	N	4.1388	32.30	QP	10.20	42.50	56.00	-13.50
10	N	4.1388	20.13	AVG	10.20	30.33	46.00	-15.67
11	N	17.1492	27.35	QP	10.34	37.69	60.00	-22.31
12	N	17.1492	13.87	AVG	10.34	24.21	50.00	-25.79

6.7 Radiated Spurious Emissions & Restricted Band

Temperature	26°C
Relative Humidity	55%
Atmospheric Pressure	1010mbar
Test date :	September 09, 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:

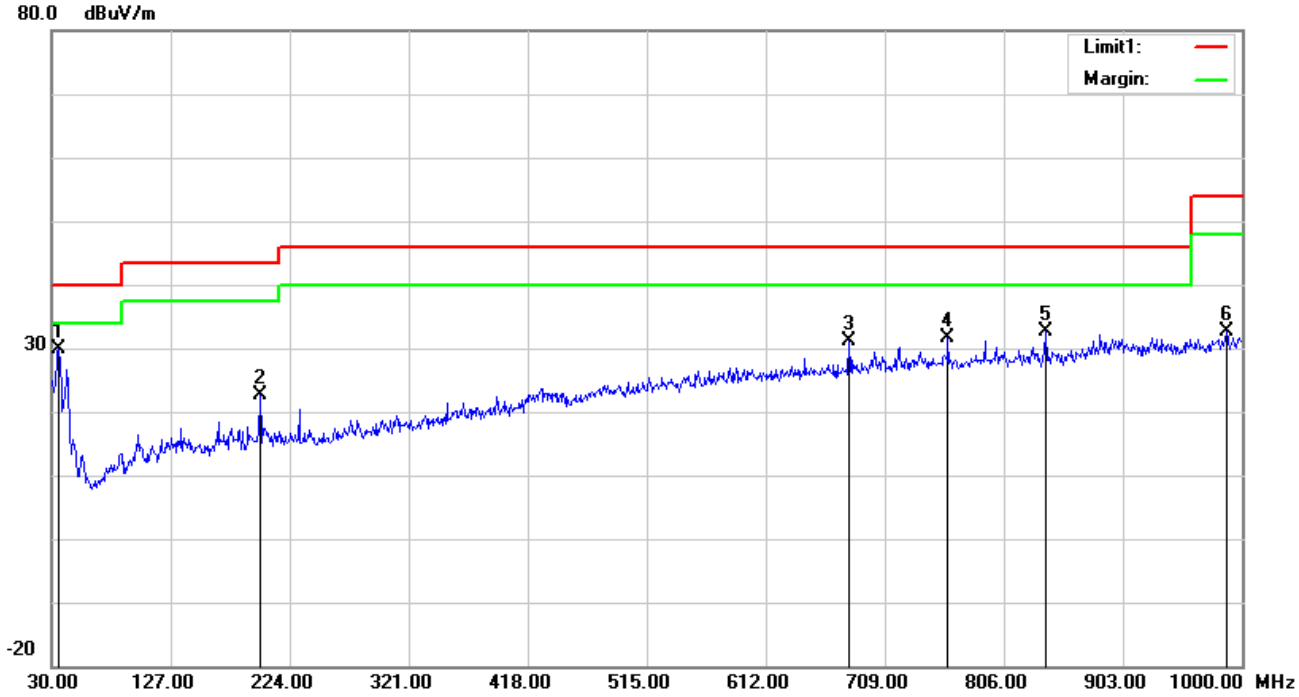
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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

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

Test Mode:	Transmitting Mode

30MHz -1GHz

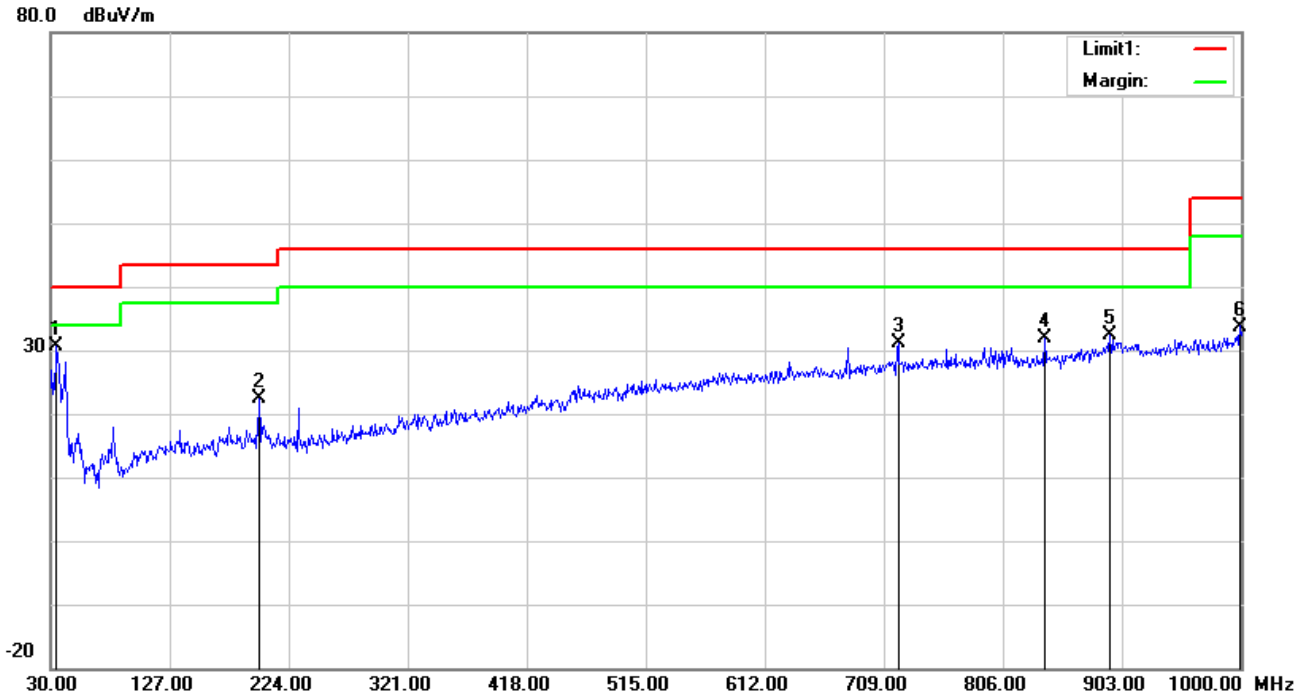


Test Data

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	35.8200	35.88	16.21	22.25	0.16	30.00	40.00	-10.00	100	194
2	H	199.7500	31.88	11.50	22.38	1.55	22.55	43.50	-20.95	100	38
3	H	679.9000	29.35	20.70	21.40	2.39	31.04	46.00	-14.96	100	316
4	H	760.4100	28.56	21.80	21.23	2.50	31.63	46.00	-14.37	100	87
5	H	839.9500	28.97	22.22	21.04	2.60	32.75	46.00	-13.25	100	236
6	H	987.3900	26.59	24.05	20.71	2.74	32.67	54.00	-21.33	100	324

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	34.8500	35.66	17.00	22.25	0.15	30.56	40.00	-9.44	100	162
2	V	199.7500	31.69	11.50	22.38	1.55	22.36	43.50	-21.14	100	240
3	V	720.6400	28.41	21.58	21.32	2.44	31.11	46.00	-14.89	100	39
4	V	839.9500	28.12	22.22	21.04	2.60	31.90	46.00	-14.10	100	256
5	V	893.3000	26.98	23.61	20.90	2.64	32.33	46.00	-13.67	100	34
6	V	999.0300	27.31	24.37	20.69	2.76	33.75	54.00	-20.25	100	71

Above 1GHz

Test Mode:	Transmitting Mode

Low Channel: N20 Mode (Worst Case) (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	4824	49.35 PK	74	-24.65	358	326	63.1	-13.75
2	4824	32.61 AV	54	-21.39	124	242	46.36	-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	4824	53.75 PK	74	-20.25	232	33	67.5	-13.75
2	4824	42.51 AV	54	-11.49	195	125	56.26	-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*2412MHz=24,120MHz

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

Middle Channel: N20 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	4874	54.25 PK	74	-19.75	295	338	68	-13.75
2	4874	43.06 AV	54	-10.94	254	40	56.81	-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	4874	54.51 PK	74	-19.49	351	216	68.26	-13.75
2	4874	43.38 AV	54	-10.62	203	200	57.13	-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*2437MHz=24,370MHz

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

High Channel: N20 Mode (Worst Case) (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	4924	52.77 PK	74	-21.23	200	344	66.52	-13.75
2	4924	39.22 AV	54	-14.78	194	49	52.97	-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	4924	53.26 PK	74	-20.74	371	223	67.01	-13.75
2	4924	39.38 AV	54	-14.62	289	141	53.13	-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.

6.8 ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

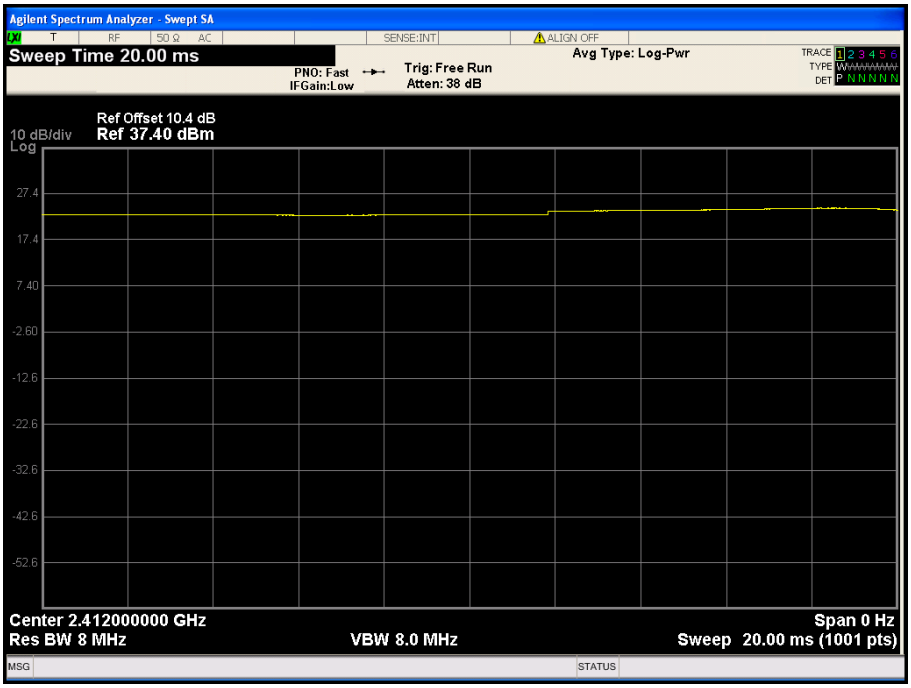
Test Result

Mode	Channel(Mhz)	Duty Cycle (%)	1/B Minimum VBW(Hz)
802.11 b/g/n20	2412	100	10
802.11 b/g/n20	2437	100	10
802.11 b/g/n20	2462	100	10

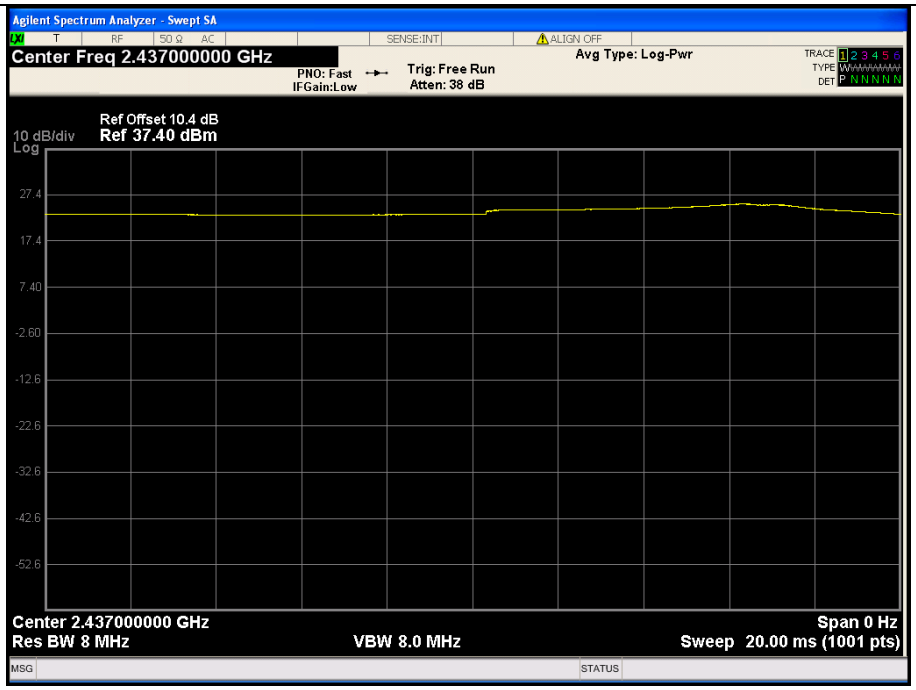
Mode	Channel(Mhz)	Duty Cycle (%)	1/B Minimum VBW(Hz)
802.11 n40	2422	100	10
802.11 n40	2437	100	10
802.11 n40	2452	100	10

Test plots

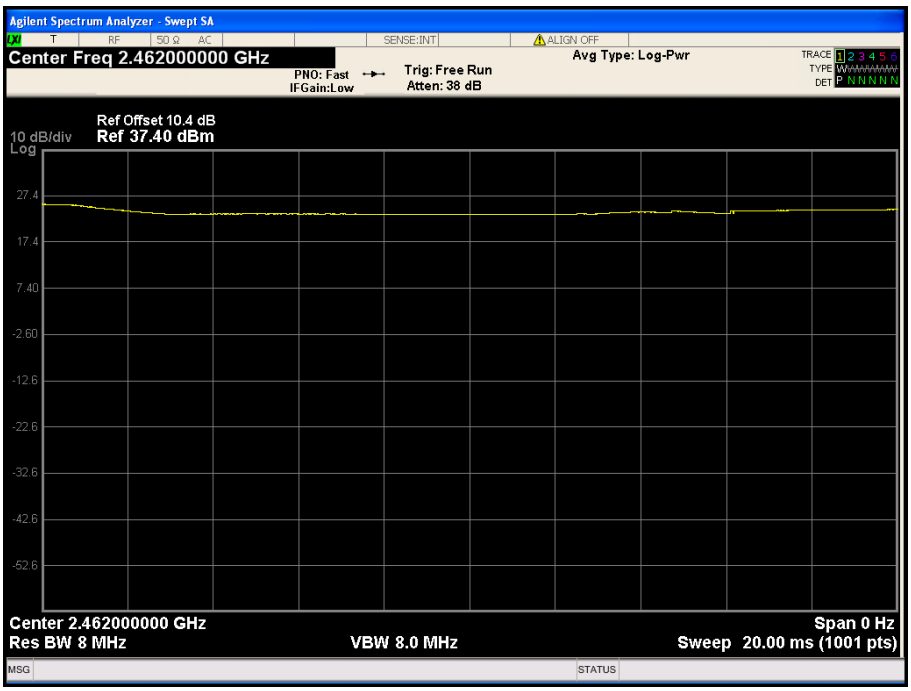
802.11 b/g/n20



2412MHz

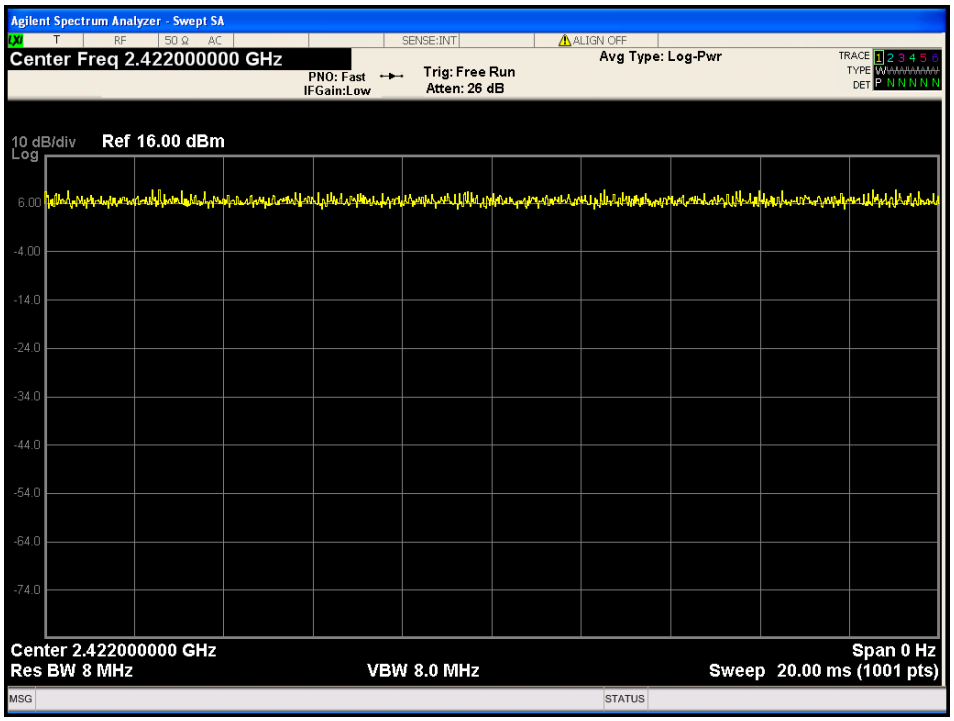


2437 Mhz

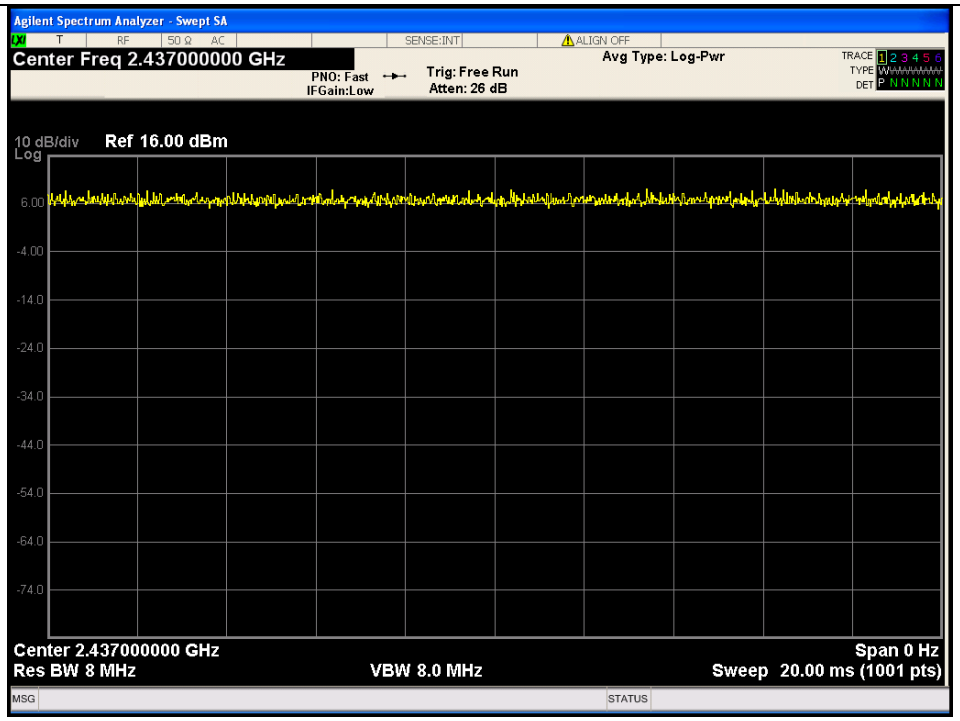


2462Mhz

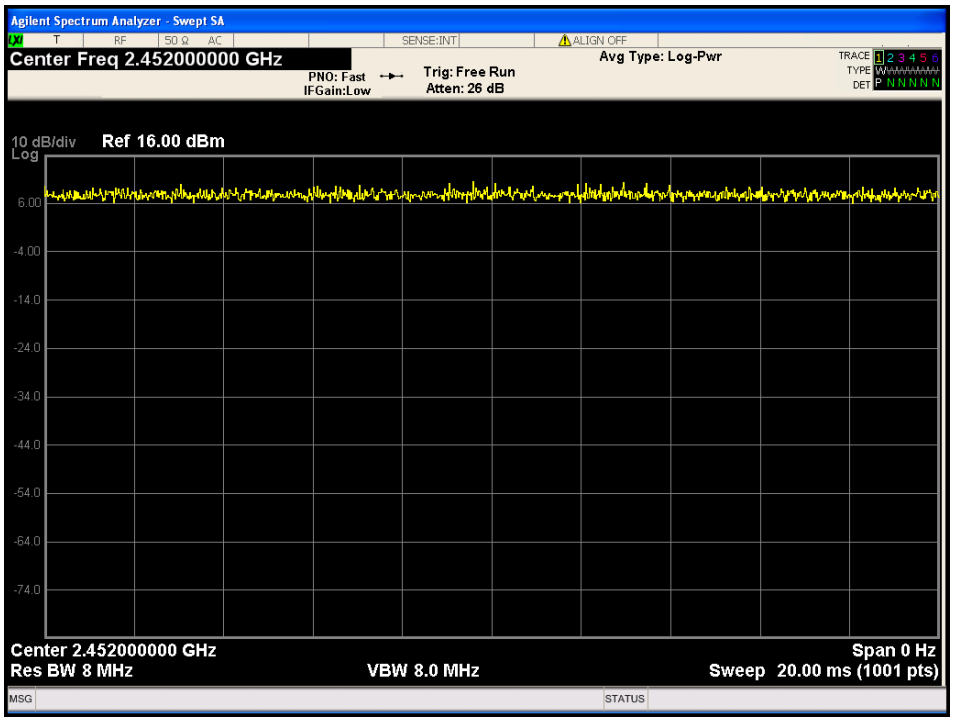
802.11 n40



2422MHz



2437 Mhz



2452Mhz

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

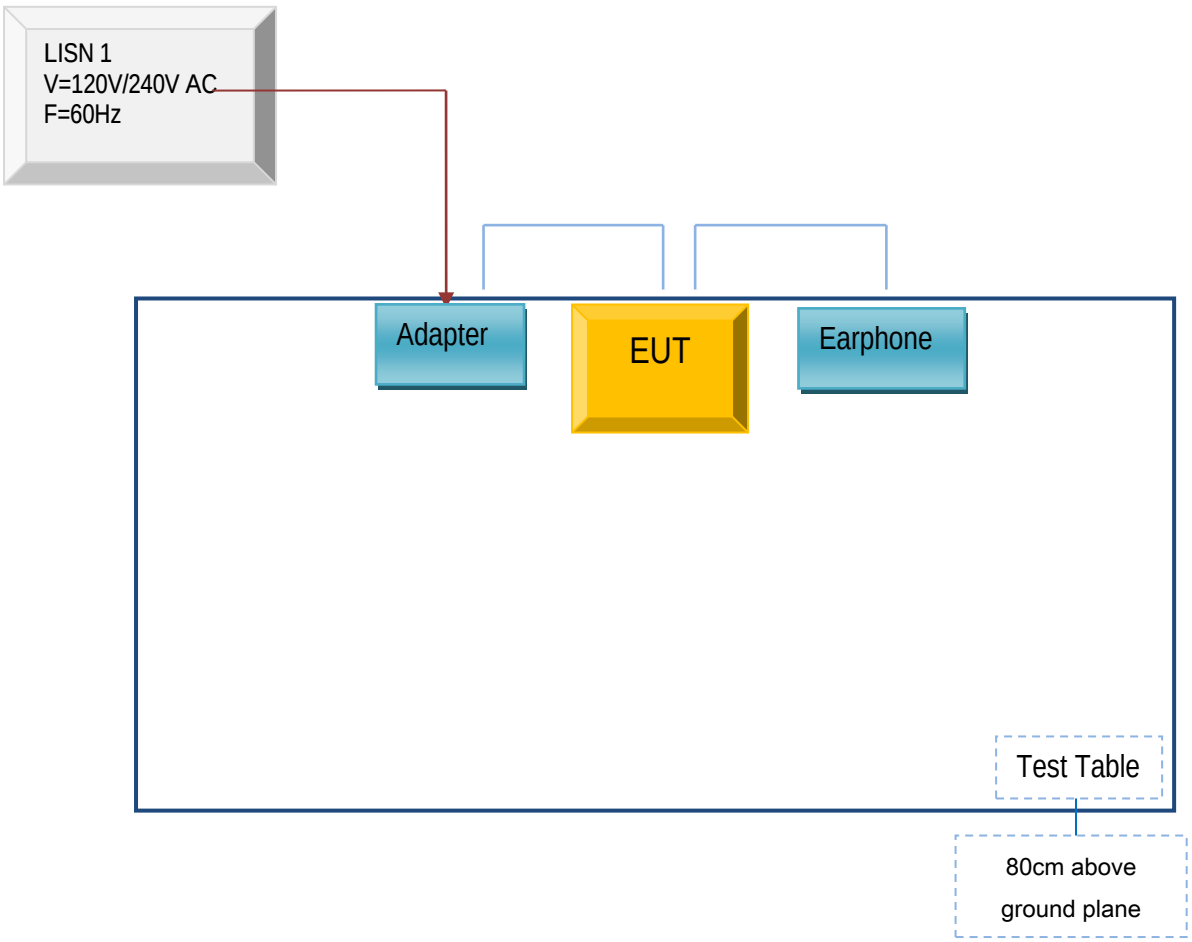
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Wireless Connectivity	R&S	CMW270	1201.0002K75	Nov. 29, 18	Nov. 28, 19
MXA VEXTOR SIGNAL	Agilent	n5182a	MY50140530	Mar. 28,19	Mar. 27,20
MXA signal analyzer	Agilent	n9020a	MY49100060	Mar. 28,19	Mar. 27,20
RF Control Unit	Tonscend	JS0806-2	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

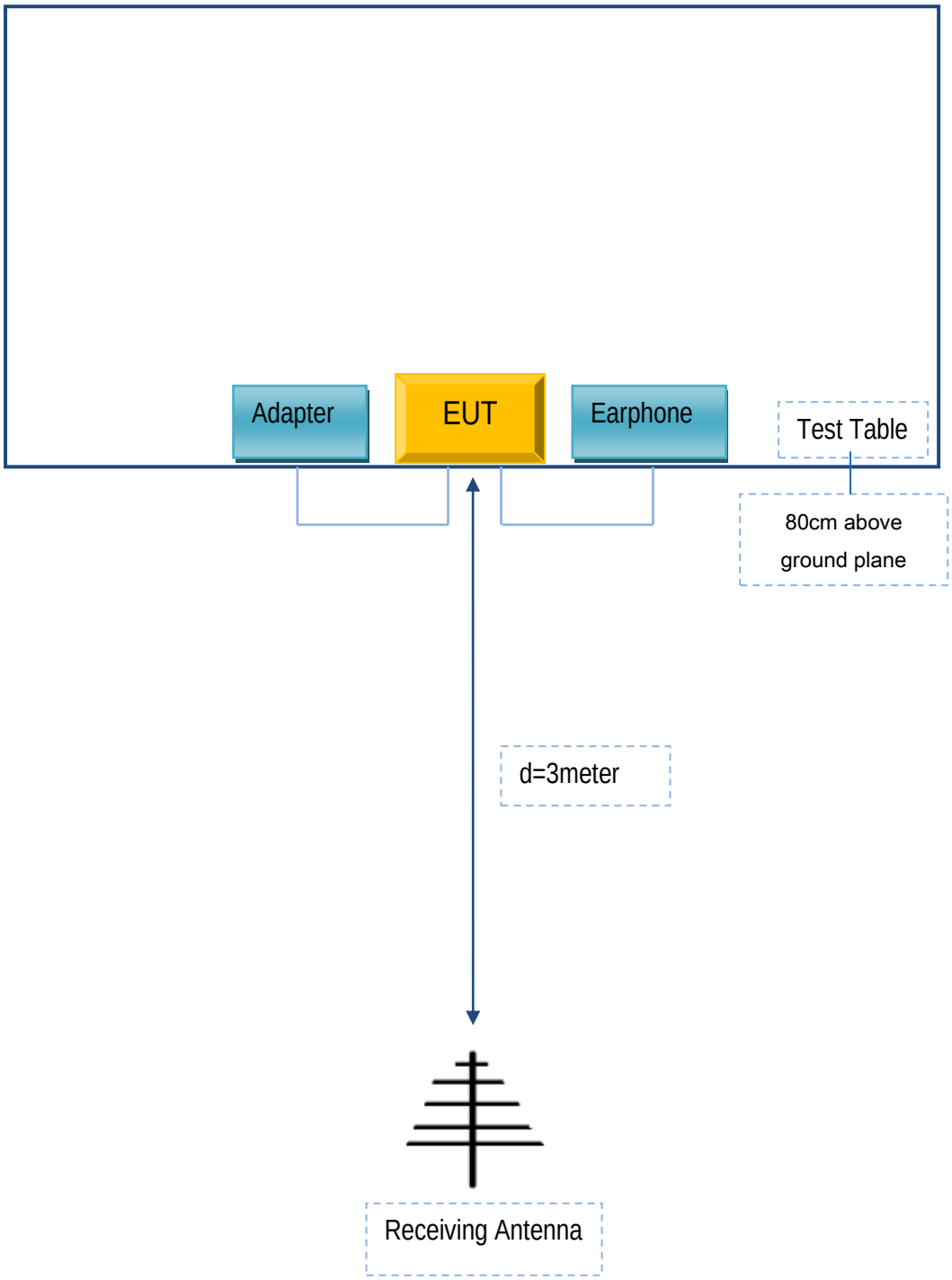
Annex B. TEST SETUP AND SUPPORTING EQUIPMENT

Annex B.i. TEST SET UP BLOCK

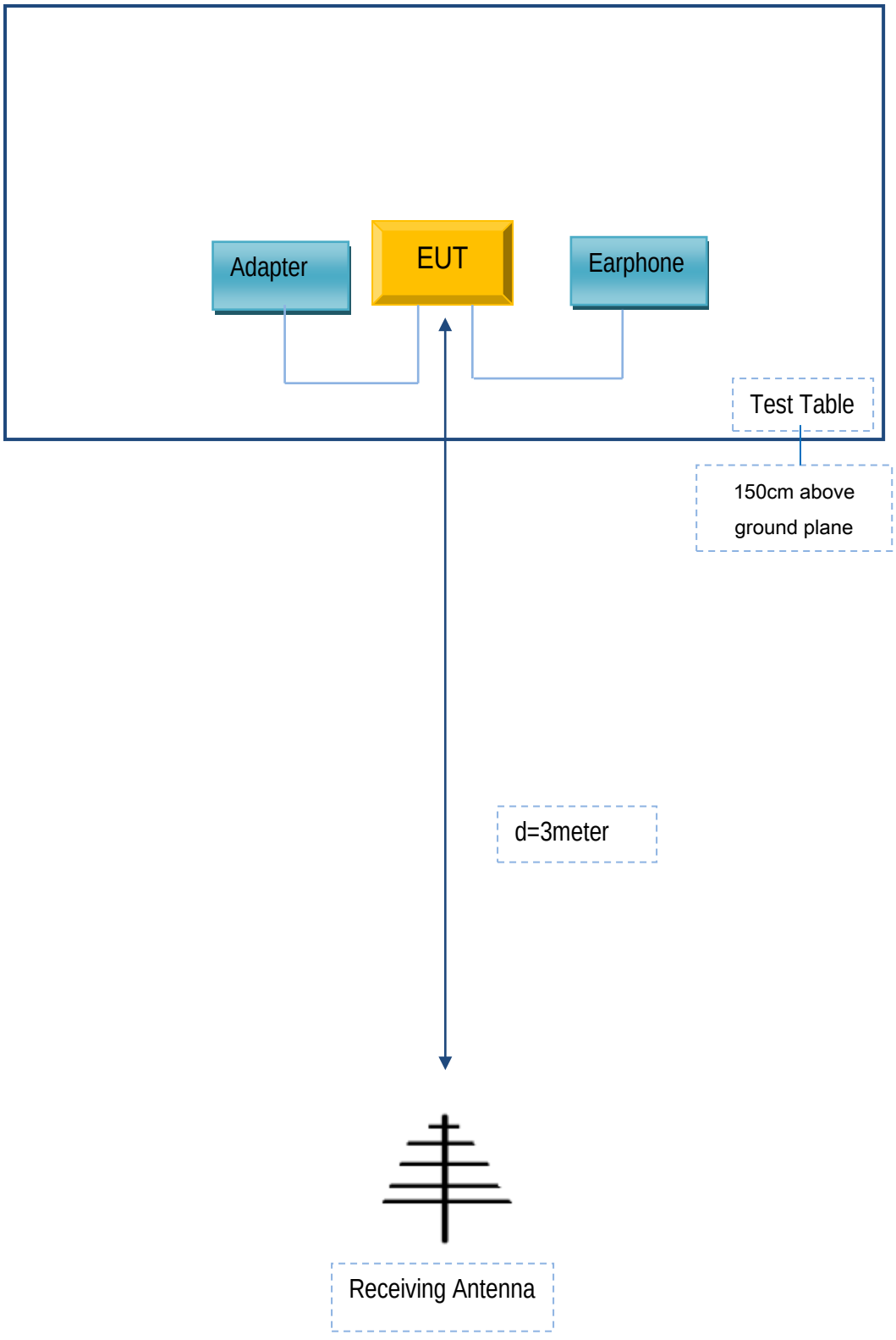
Block Configuration Diagram for AC Line Conducted Emissions



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