RF TEST REPORT

Report No.: 15020210-FCC-R1
Supersede Report No.: N/A

Applicant	Beijing InHand Networks Technology Co., Ltd.
Product Name	Embedded Computer
Model No.	InBOX300
Serial No.	InBOX310、InBOX320、InBOX330、InBOX300S、InBOX310S、InBOX320S、InBOX330S
Test Standard	FCC Part 15.247: 2016, ANSI C63.10: 2013
Test Date	December 04,2015 to January 11, 2016
Issue Date	January 22, 2016
Test Result	☑ **Pass** ☐ **Fail**
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Winnie Zhang	David Huang	
Winnie Zhang **Test Engineer**	**David Huang** **Checked By**	

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Test result presented in this test report is applicable to the tested sample only

Issued by:
SIEMIC (SHENZHEN-CHINA) LABORATORIES
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

Laboratories Introduction

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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
15020210-FCC-R1	NONE	Original	January 22, 2016

2. Customer information

Applicant Name	Beijing InHand Networks Technology Co., Ltd.
Applicant Add	101,West Wing,11th Floor,No.101,Lize central Park Wangjing,Chaoyang District,Beijing,100102,China
Manufacturer	Beijing InHand Networks Technology Co., Ltd.
Manufacturer Add	101,West Wing,11th Floor,No.101,Lize central Park Wangjing,Chaoyang District,Beijing,100102,China

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	EZ_EMC

4. Equipment under Test (EUT) Information

Description of EUT:	Embedded Computer
Main Model:	InBOX300
Serial Model:	InBOX310、 InBOX320、 InBOX330、 InBOX300S、 InBOX310S、 InBOX320S、 InBOX330S
Date EUT received:	July 13, 2015
Test Date(s):	December 04,2015 to January 11, 2016
Antenna Gain:	GSM850/PCS1900:1 dBi UMTS-FDD Band V /UMTS-FDD Band II :2.5 dBi WIFI:802.11b/g/n(20M/40M): 2dBi
Type of Modulation:	GSM : GMSK UMTS-FDD: QPSK WIFI:802.11b/g/n(20M/40M): DSSS, OFDM
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 802.11n(40M):2422-2452 MHz
Max. Output Power:	22.61 dBm（802.11g）
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
Port:	Power Port、USB Port*4、Micro SD Port、ttyO6/7 Port，HDMI Port、SIM Port、Speaker Port、MIC Port、tty*2 O3、ttyO5*2、LAN Port
Input Power:	DC 9-24V
Trade Name :	Inhand
GPRS/EGPRS Multi-slot class	8/10/12

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 Non-Restricted Frequency Bands	Compliance
§15.207 (a),	AC Power Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Spurious Emissions & Unwanted Emissions into Restricted Frequency Bands	Compliance

Measurement Uncertainty

Emissions		
Test Item	**Description**	**Uncertainty**
Band Edge and Radiated Spurious Emissions	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 External antenna for WIFI, the gain is 2 dBi for WIFI.

This antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.It is a RP-SMA antenna.

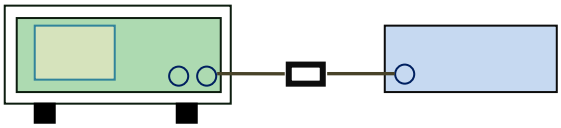
a External antenna for GSM and UMTS, the gain is 1 dBi for GSM850/ PCS1900 and 2.5 dBi for UMTS-FDD Band V/ UMTS-FDD Band Ⅱ

The antenna meets up with the ANTENNA REQUIREMENT.

Result: Compliance.

6.2 DTS (6 dB&20 dB) Channel Bandwidth

Temperature	20°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	December 04, 2015
Tested By :	Winnie Zhang

Spec	Item	Requirement	Applicable
§ 15.247(a)(2) RSS Gen(4.6.1)	a)	6dB BW≥500kHz; 20dB BW≥500kHz;	☑
	b)	99% BW: For FCC reference only; required by IC.	☑
Test Setup			
Test Procedure	558074 D01 DTS MEAS Guidance v03r05, 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 frequencies associate d with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. 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 typical modulatin g 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)	20dB Bandwidth (MHz)	Limit (MHz)
802.11b	Low	2412	10.04	16.29	≥0.5
	Mid	2437	10.09	16.30	≥0.5
	High	2462	10.11	16.25	≥0.5
802.11g	Low	2412	16.31	20.41	≥0.5
	Mid	2437	16.07	19.54	≥0.5
	High	2462	16.32	19.18	≥0.5
802.11n (20M)	Low	2412	17.6	19.80	≥0.5
	Mid	2437	17.55	19.75	≥0.5
	High	2462	17.63	19.68	≥0.5
802.11n (40M)	Low	2422	35.99	39.37	≥0.5
	Mid	2437	36.37	39.40	≥0.5
	High	2452	36.40	39.79	≥0.5

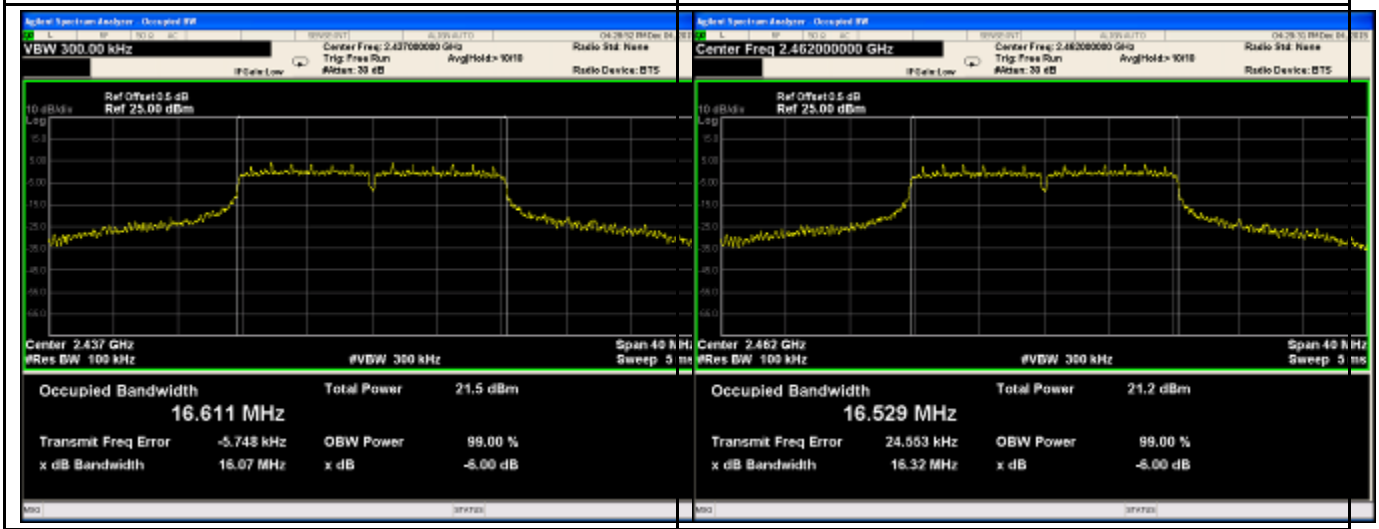
Test Plots
6dB Bandwidth measurement result

802.11b 6dB Bandwidth - Low CH 2412

802.11b 6dB Bandwidth - Mid CH 2437

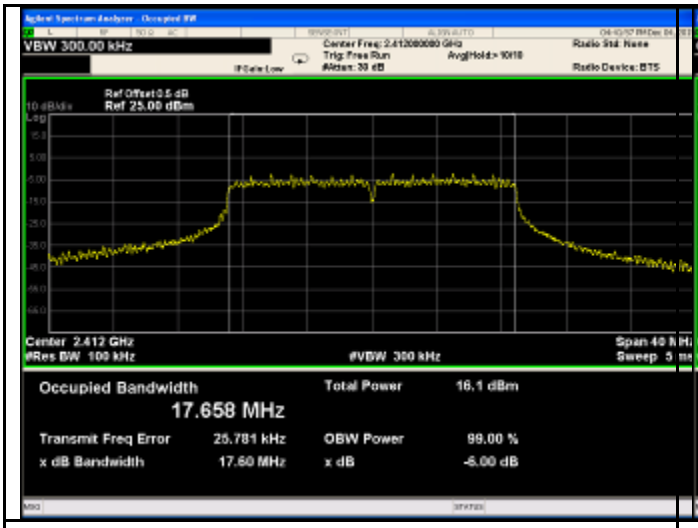
802.11b 6dB Bandwidth - High CH 2462

802.11g 6dB Bandwidth - Low CH 2412

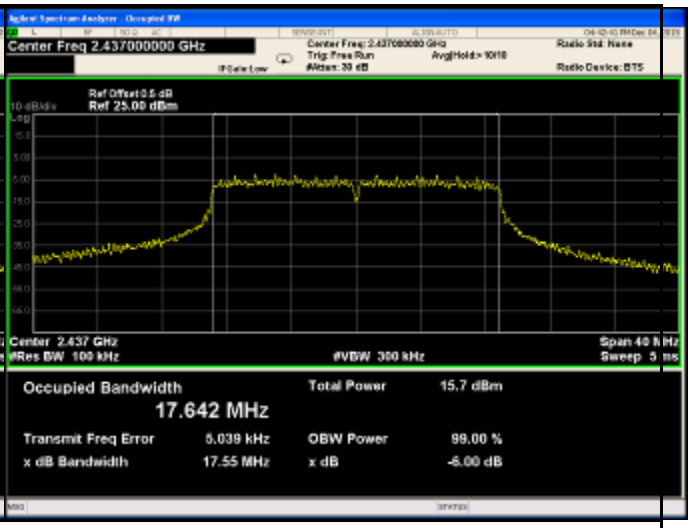


802.11g 6dB Bandwidth - Mid CH 2437

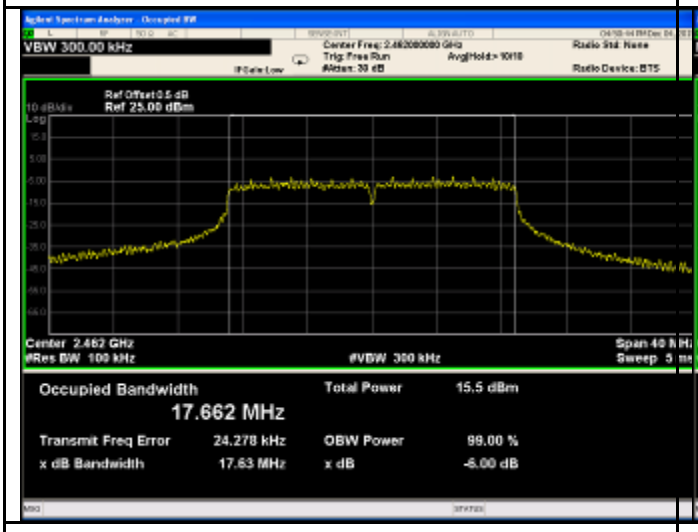
802.11g 6dB Bandwidth - High CH 2462



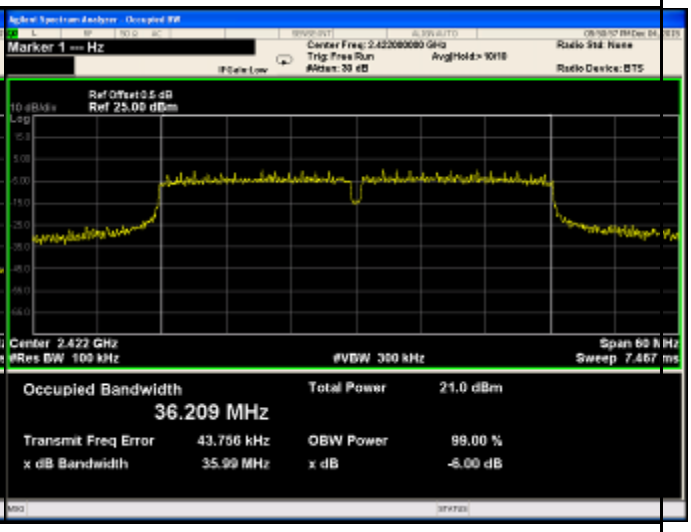
802.11n20 6dB Bandwidth - Low CH 2412



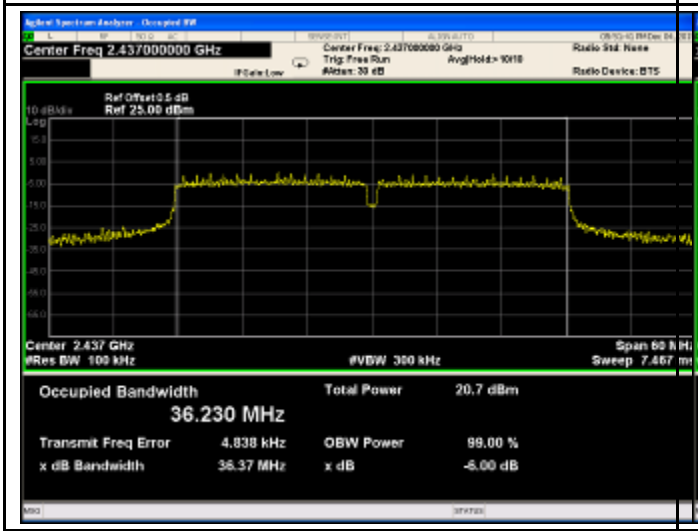
802.11n20 6dB Bandwidth - Mid CH 2437



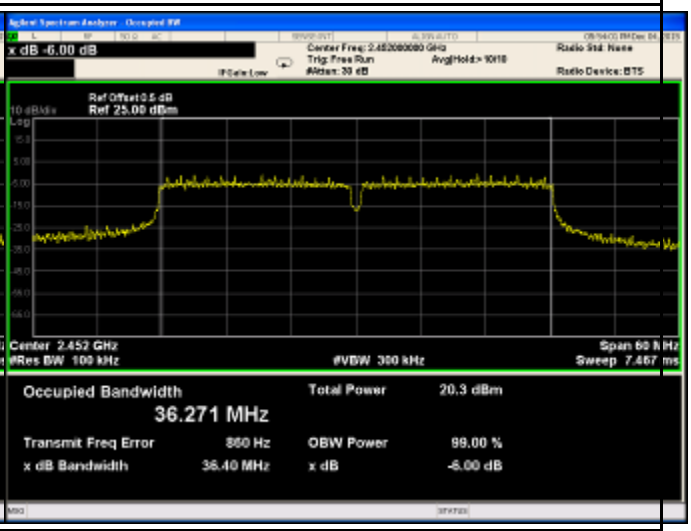
802.11n20 6dB Bandwidth - High CH 2462



802.11n40 6dB Bandwidth - Low CH 2422

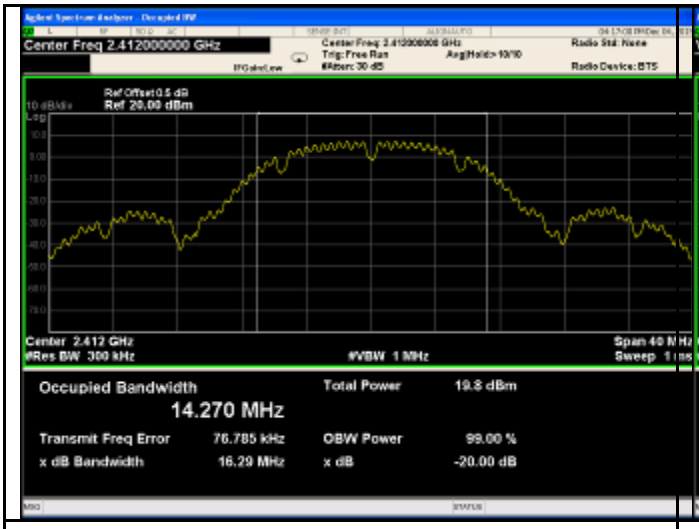


802.11n40 6dB Bandwidth - Mid CH 2437

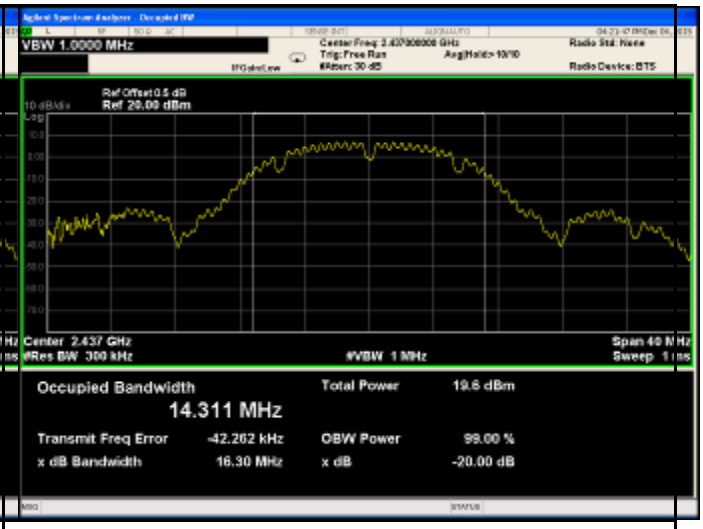


802.11n40 6dB Bandwidth - High CH 2452

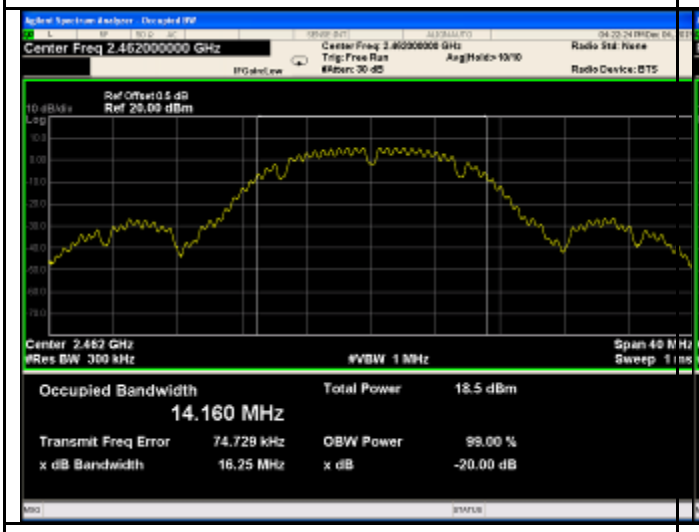
20 dB Bandwidth measurement result



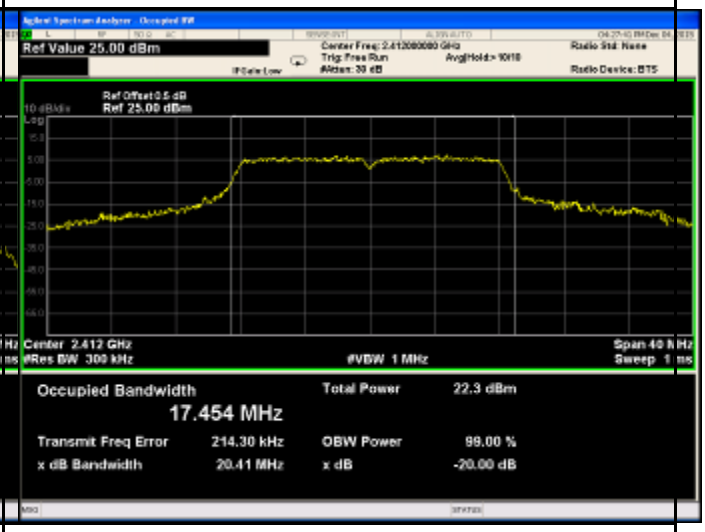
802.11b 20dB Bandwidth - Low CH 2412



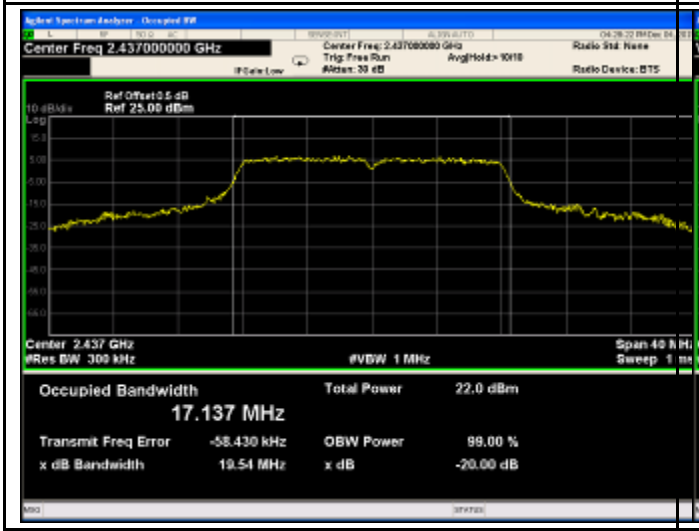
802.11b 20dB Bandwidth - Mid CH 2437



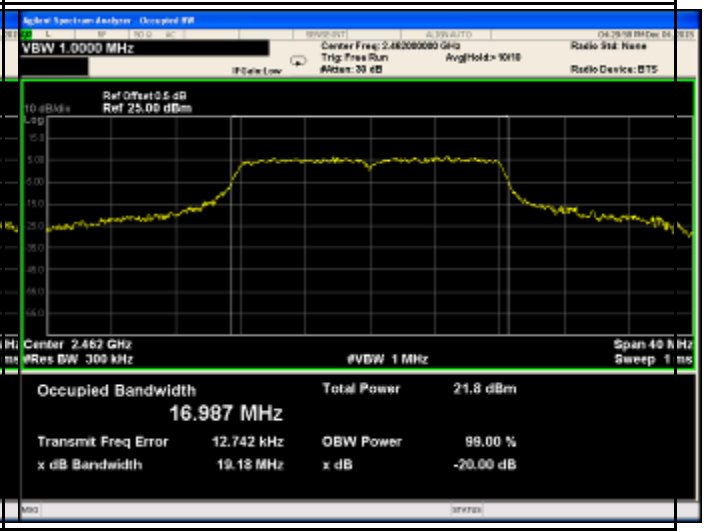
802.11b 20dB Bandwidth - High CH 2462



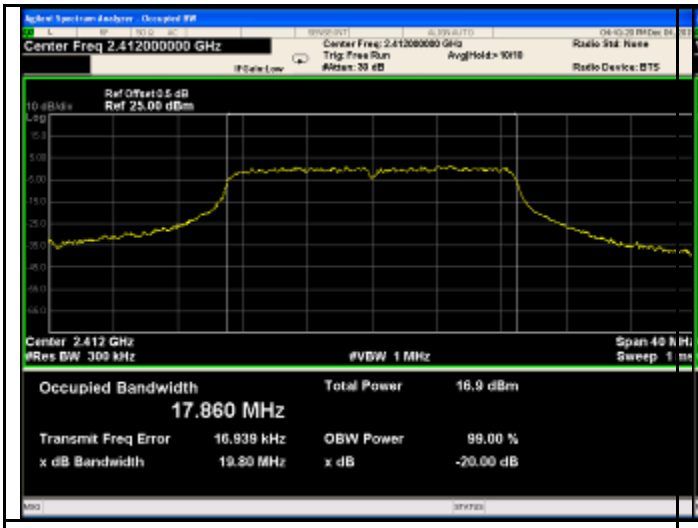
802.11g 20dB Bandwidth - Low CH 2412



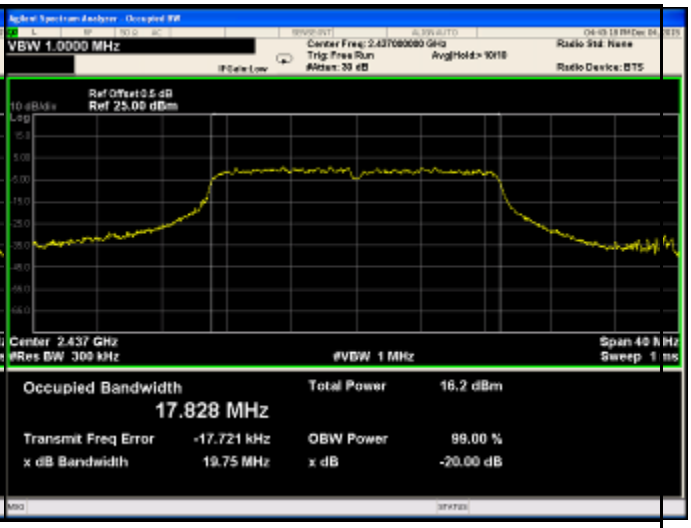
802.11g 20dB Bandwidth - Mid CH 2437



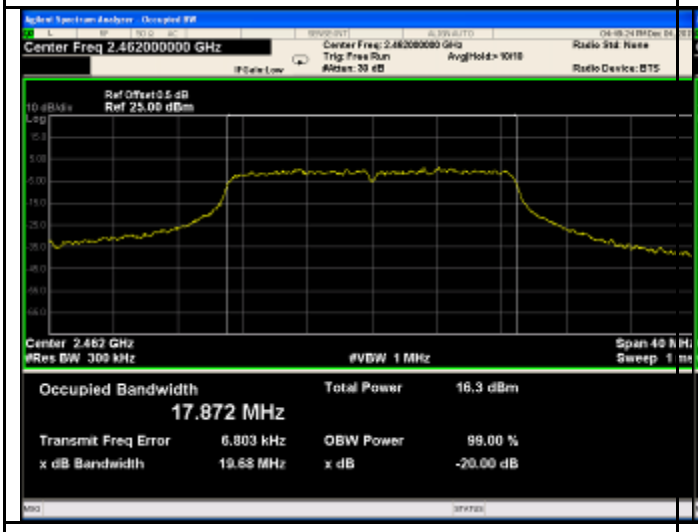
802.11g 20dB Bandwidth - High CH 2462



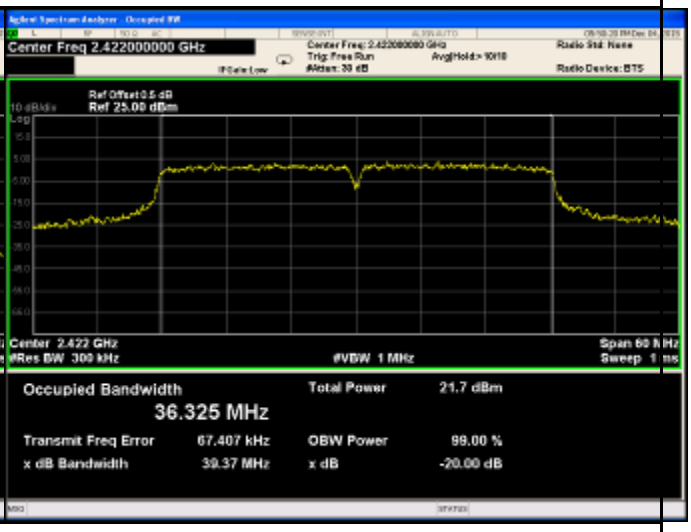
802.11n20 20dB Bandwidth - Low CH 2412



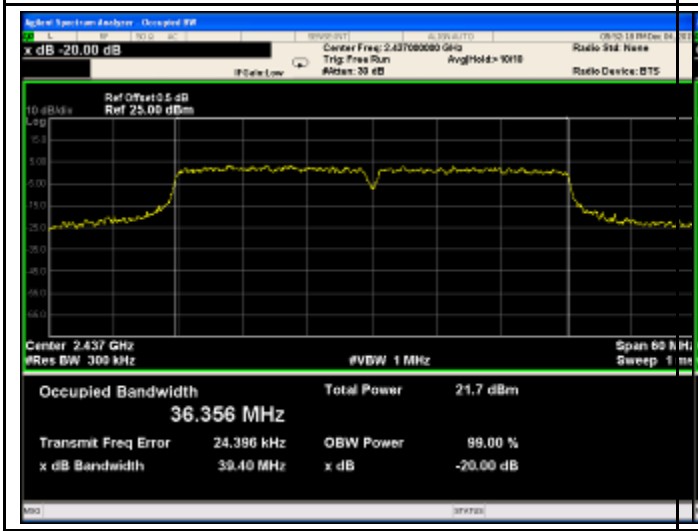
802.11n20 20dB Bandwidth - Mid CH 2437



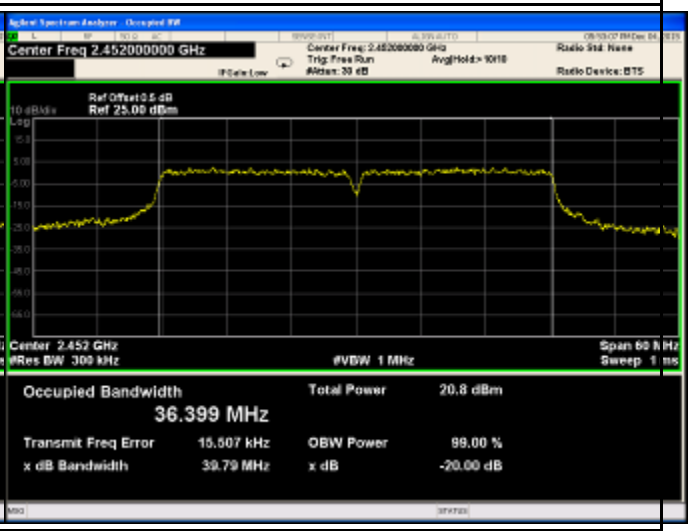
802.11n20 20dB Bandwidth - High CH 2462



802.11n40 20dB Bandwidth - Low CH 2422



802.11n40 20dB Bandwidth - Mid CH 2437

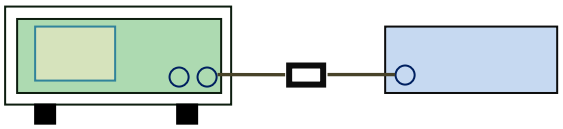


802.11n40 20dB Bandwidth - High CH 2452

6.3 Maximum Output Power

Temperature	20°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	December 14, 2015
Tested By :	Winnie Zhang

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 v03r05, 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		

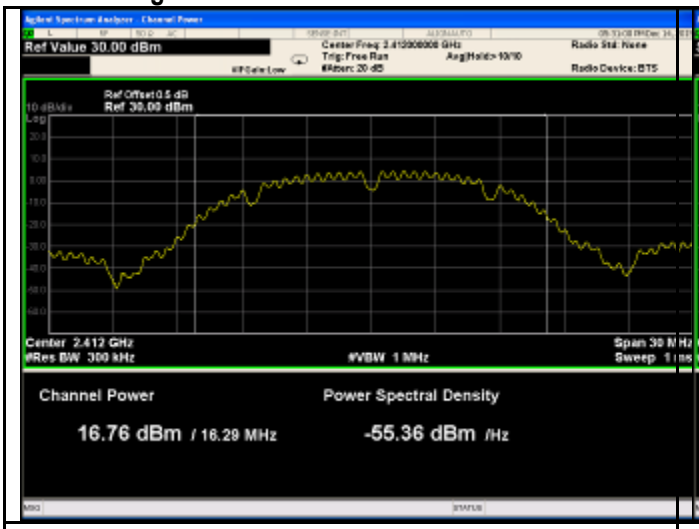
Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

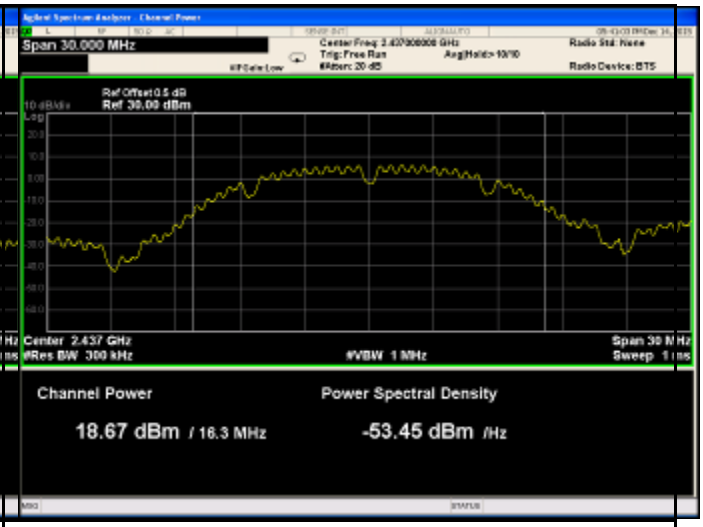
Output Power measurement result

Type	Test mode	CH	Freq (MHz)	Conducted Power (dBm)	Limit (dBm)	Result
Output power	802.11b	Low	2412	16.76	30	Pass
		Mid	2437	18.67	30	Pass
		High	2462	19.80	30	Pass
	802.11g	Low	2412	19.33	30	Pass
		Mid	2437	21.04	30	Pass
		High	2462	22.61	30	Pass
	802.11n(20M)	Low	2412	18.00	30	Pass
		Mid	2437	20.09	30	Pass
		High	2462	21.41	30	Pass
	802.11n(40M)	Low	2422	18.66	30	Pass
		Mid	2437	19.74	30	Pass
		High	2452	20.45	30	Pass

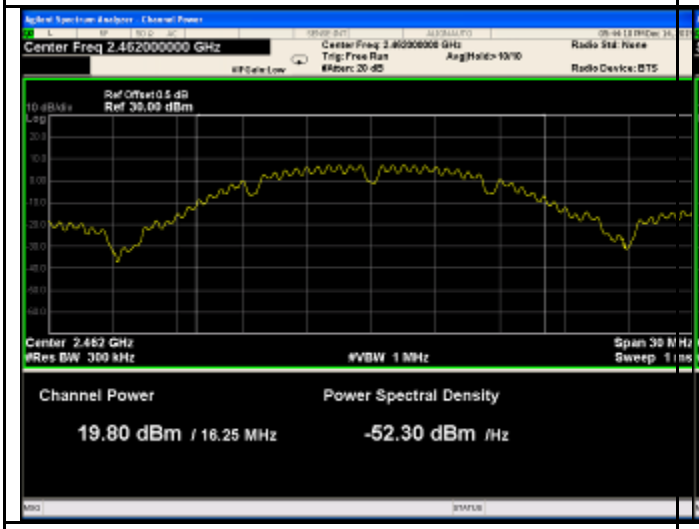
Test Plots
The Average Power



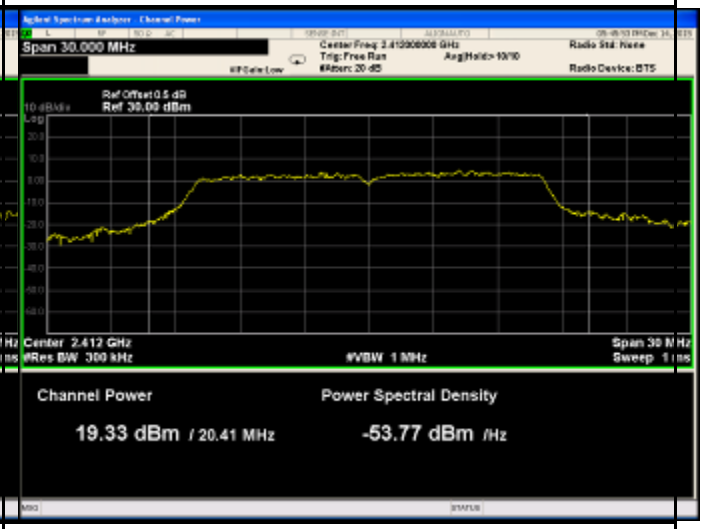
802.11b - AV Output power - Low CH 2412



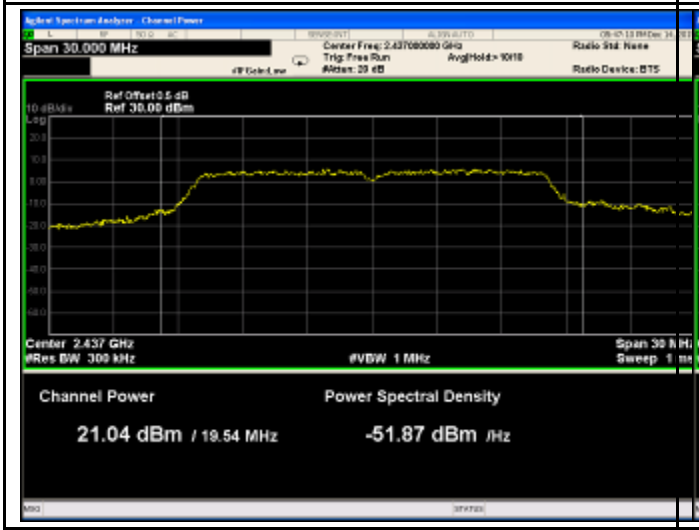
802.11b - AV Output power - Mid CH 2437



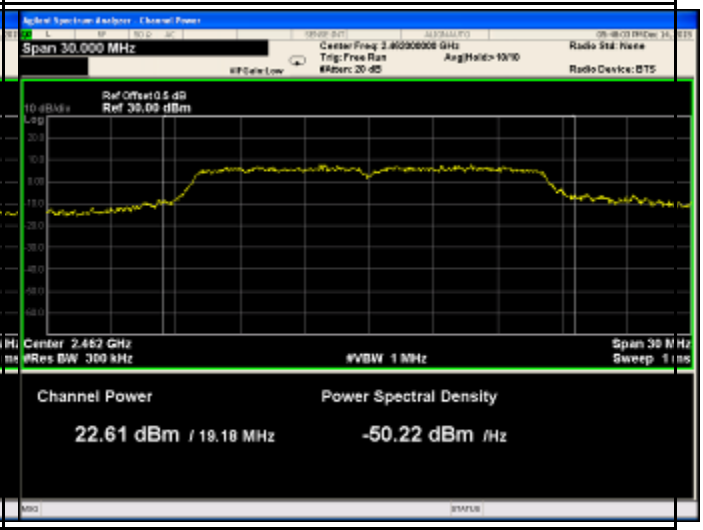
802.11b - AV Output power - High CH 2462



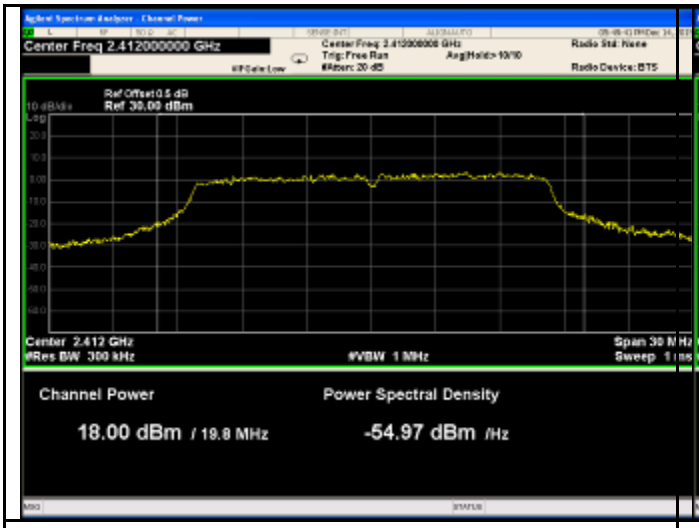
802.11g - AV Output power - Low CH 2412



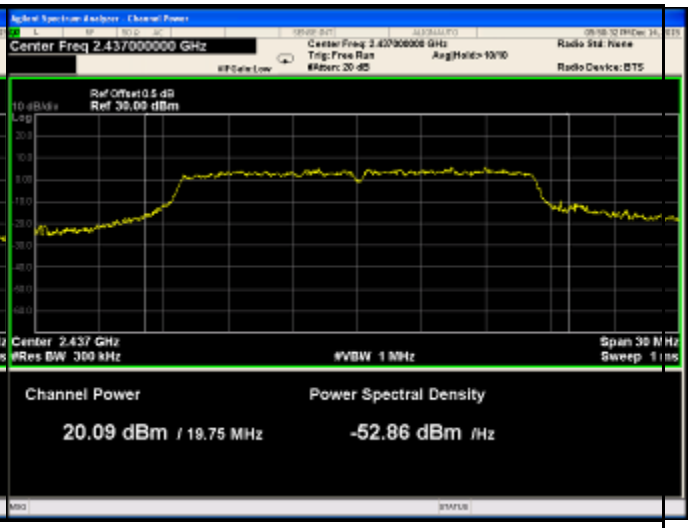
802.11g - AV Output power - Mid CH 2437



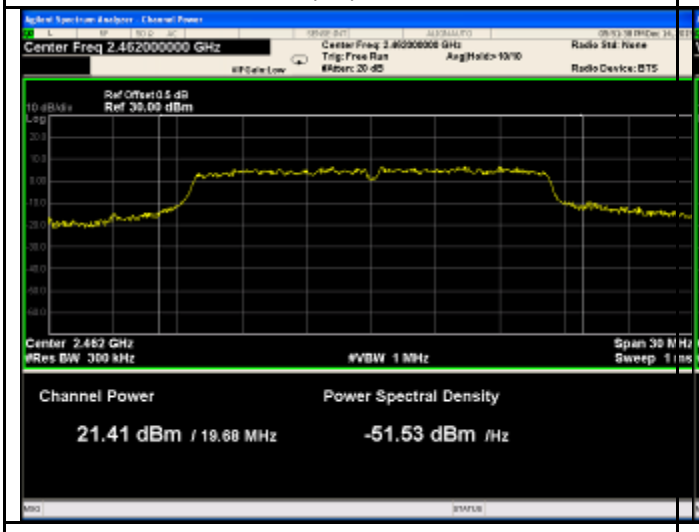
802.11g - AV Output power - High CH 2462



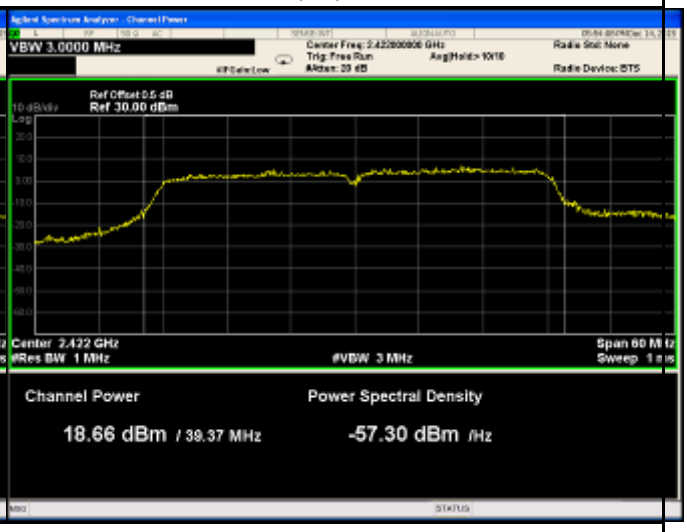
802.11n20 - AV Output power - Low CH 2412



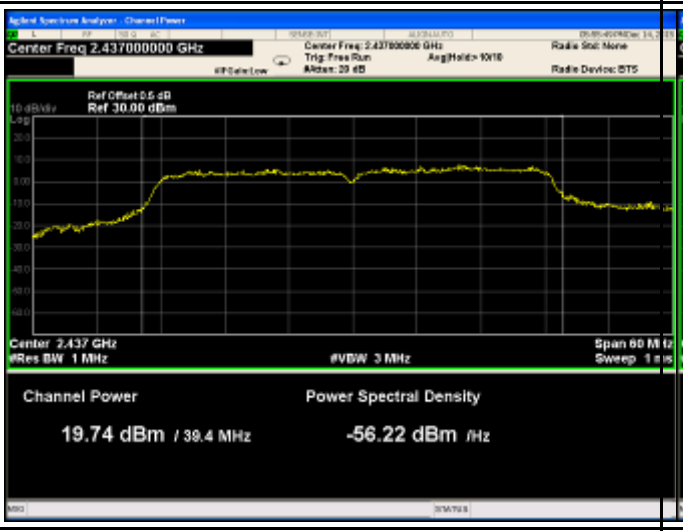
802.11n20 - AV Output power - Mid CH 2437



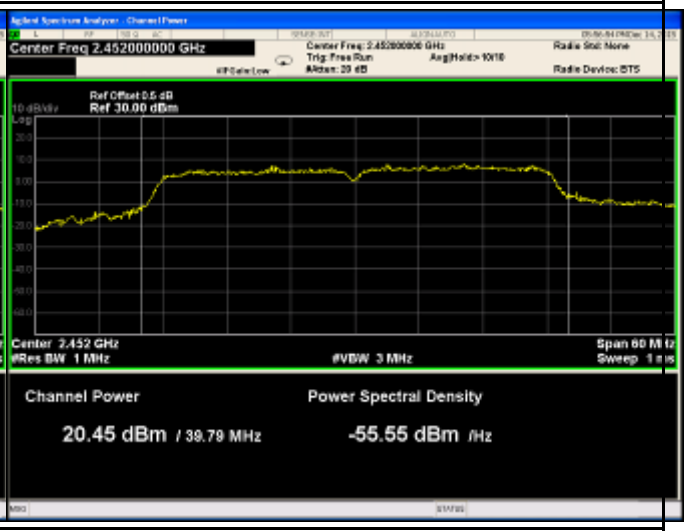
802.11n20 - AV Output power - High CH 2462



802.11n40 - AV Output power - Low CH 2422



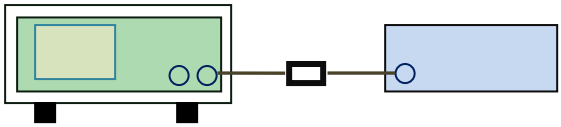
802.11n40 - AV Output power - Mid CH 2437



802.11n40 - AV Output power - High CH 2452

6.4 Power Spectral Density

Temperature	20°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	December 14, 2015
Tested By :	Winnie Zhang

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 v03r05, 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

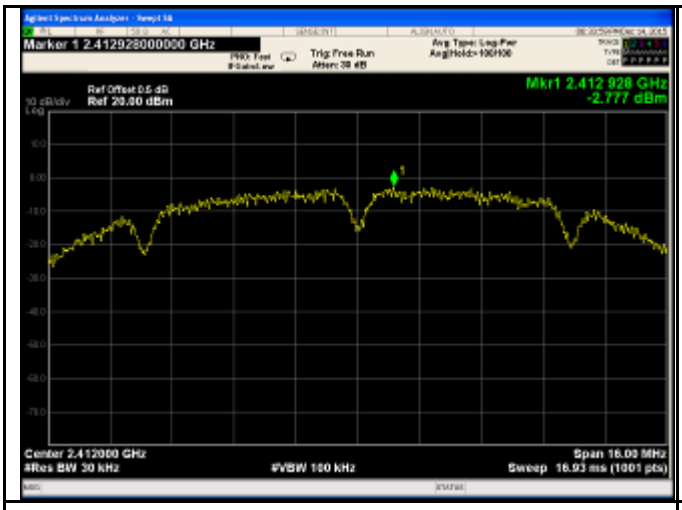
Power Spectral Density measurement result

Type	Test mode	CH	Freq (MHz)	Reading (dBm)	Factor (dB)	Result (dBm)	Limit (dBm)	Result
PSD	802.11b	Low	2412	-2.777	-10.0	-12.777	8	Pass
		Mid	2437	-0.667	-10.0	-10.667	8	Pass
		High	2462	0.281	-10.0	-9.719	8	Pass
	802.11g	Low	2412	-2.722	-10.0	-12.722	8	Pass
		Mid	2437	-0.759	-10.0	-10.759	8	Pass
		High	2462	-0.583	-10.0	-10.583	8	Pass
	802.11n (20M)	Low	2412	-3.170	-10.0	-13.170	8	Pass
		Mid	2437	-1.509	-10.0	-11.509	8	Pass
		High	2462	0.315	-10.0	-9.685	8	Pass
	802.11n (40M)	Low	2422	0.559	-15.2	-14.641	8	Pass
		Mid	2437	1.500	-15.2	-13.700	8	Pass
		High	2452	2.251	-15.2	-12.949	8	Pass

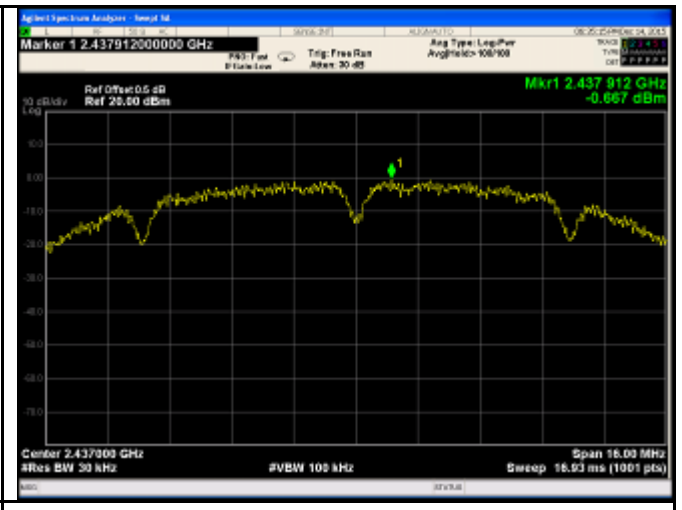
Note: Factor= 10log(3/30)dB= -10.0 dB (b, g, n20 mode);
Factor= 10log(3/100)dB= -15.2 dB (n40 mode).

Test Plots
Power Spectral Density measurement result

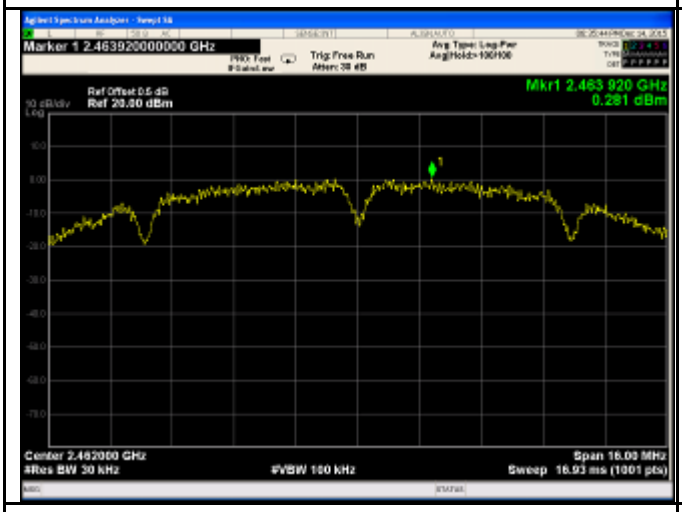
Data Rate : b mode : 1 Mbit/s;
g mode : 6 Mbit/s;
n20 mode : 7.2 Mbit/s;
n40 mode : 15 Mbit/s;



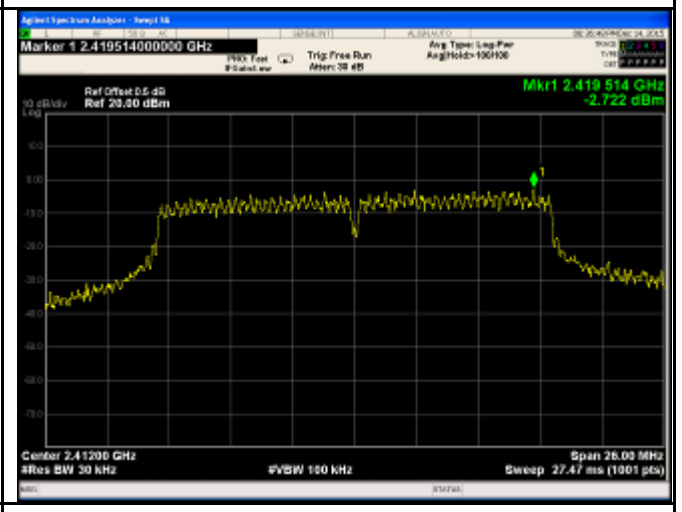
PSD - Low CH 2412 - 802.11b



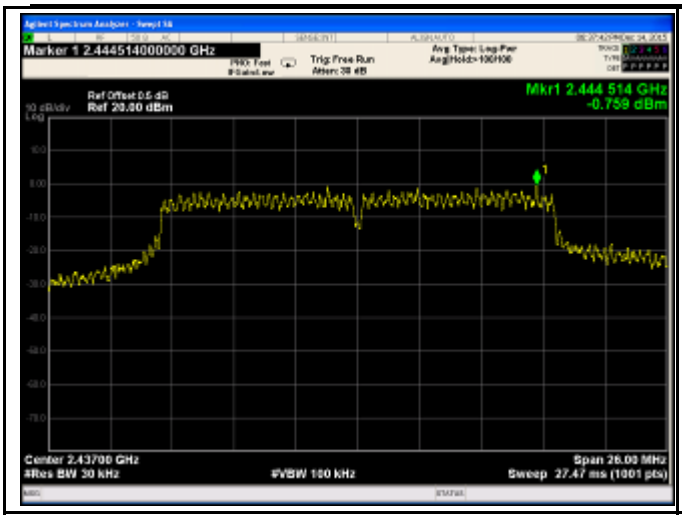
PSD - Mid CH 2437 –802.11b



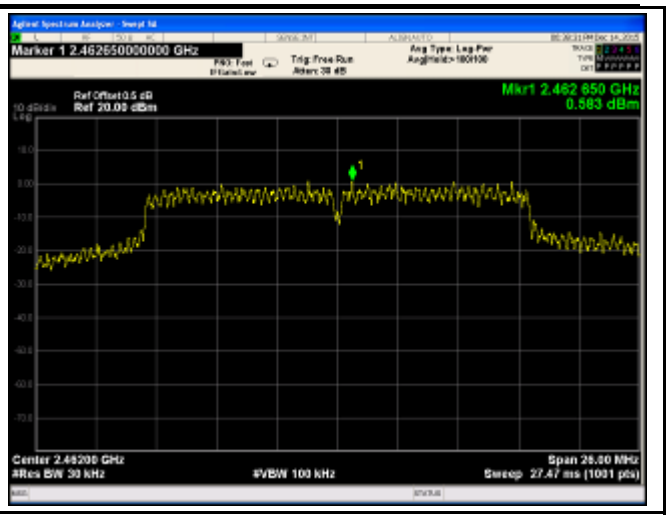
PSD - High CH 2462 - 802.11b



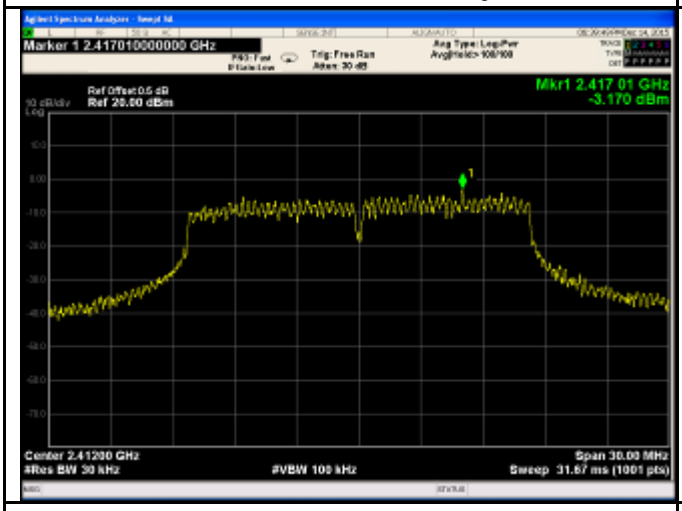
PSD - Low CH 2412 -802.11g



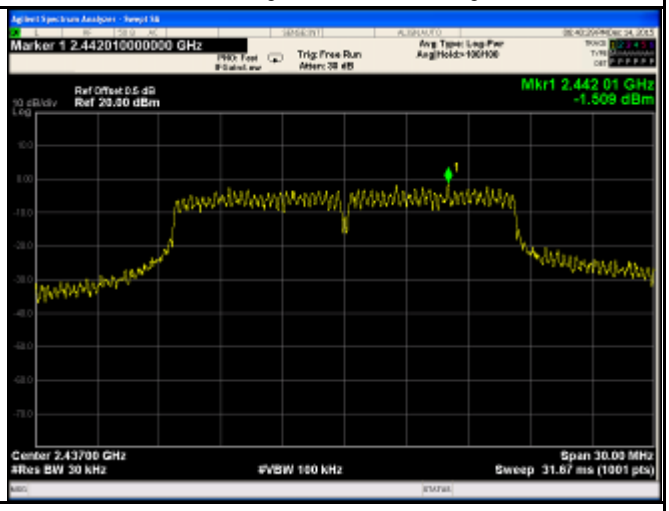
PSD - Mid CH 2437 – 802.11g



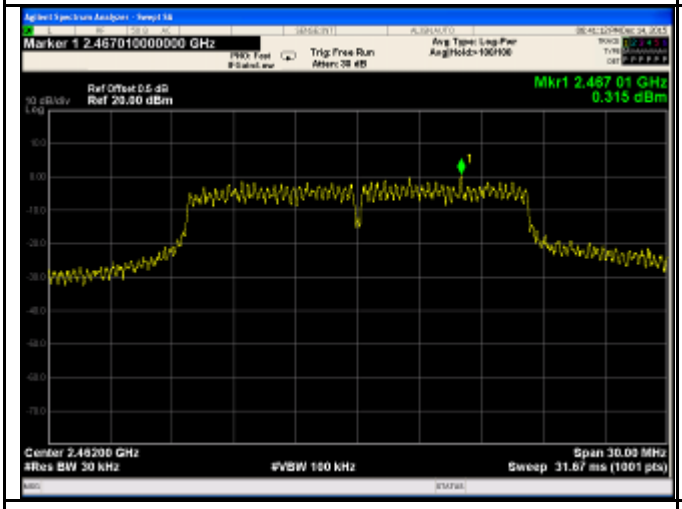
PSD - High CH 2462 - 802.11g



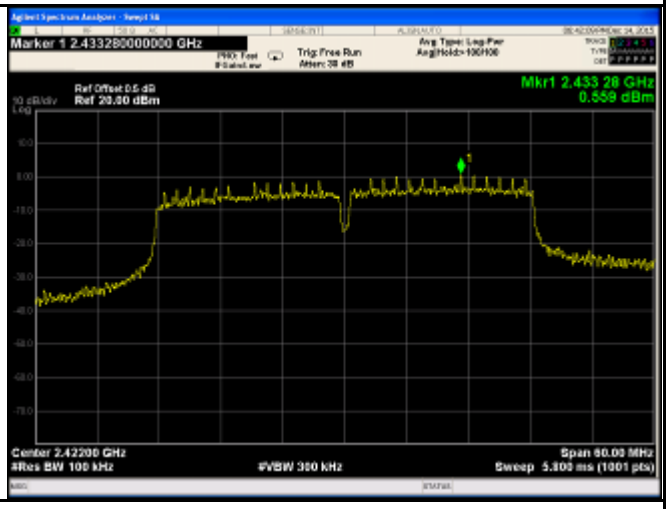
PSD - Low CH 2412 - 802.11n20



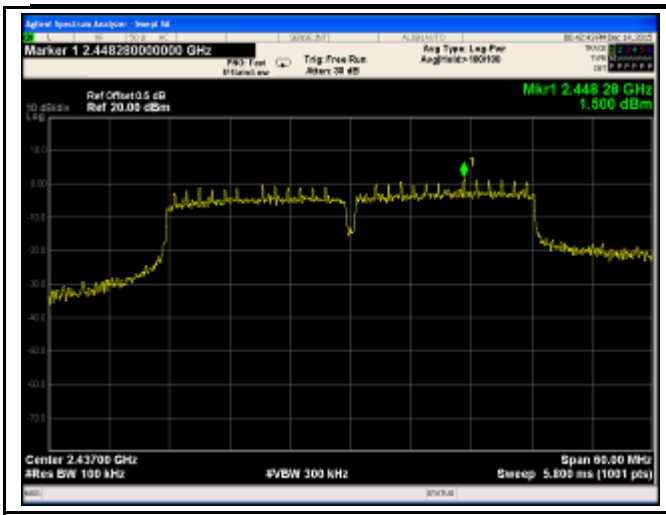
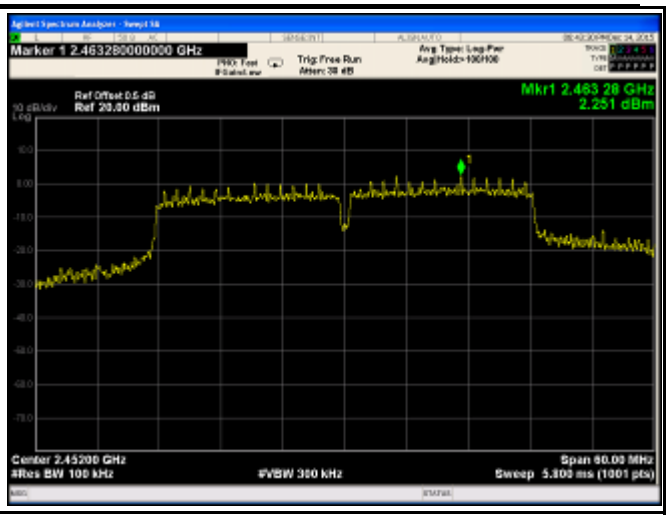
PSD - Mid CH 2437 –802.11n20



PSD - High CH 2462 - 802.11n20



PSD - Low CH 2422 - 802.11n40

	
PSD - Mid CH 2437 –802.11n40	PSD - High CH 2462 - 802.11n40

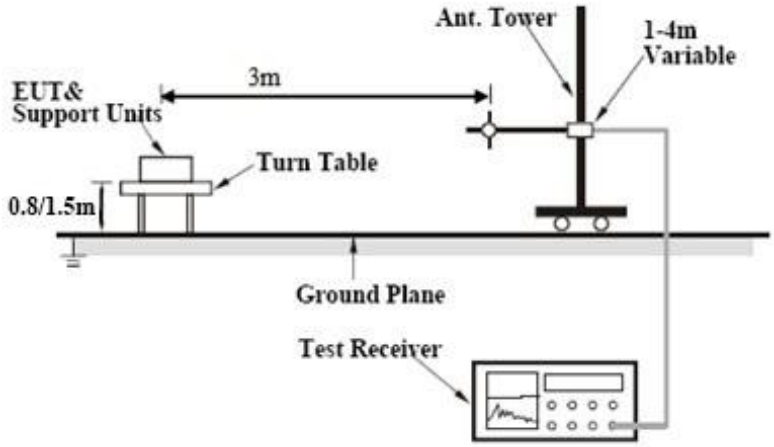
6.5 Band-Edge & Unwanted Emissions into Non-Restricted Frequency Bands

Temperature	20°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	January 11, 2015
Tested By :	Winnie Zhang

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

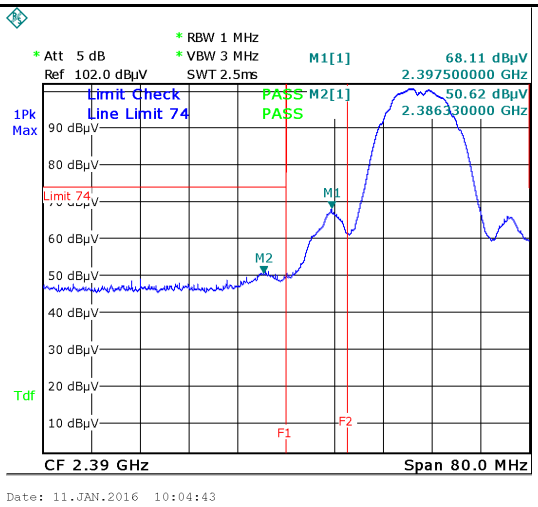
☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

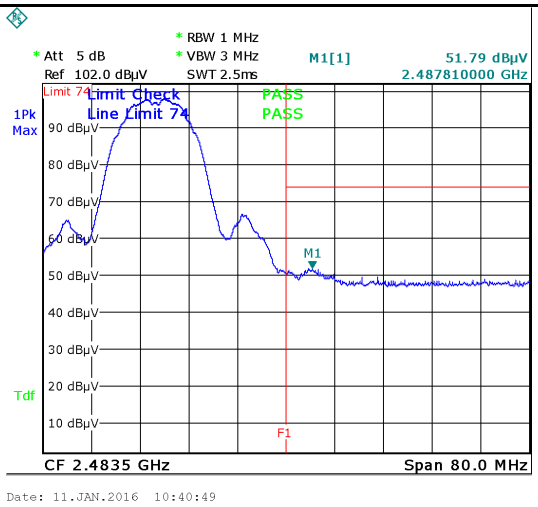
Data Rate : b mode : 1 Mbit/s;
g mode : 6 Mbit/s;
n20 mode : 7.2 Mbit/s;
n40 mode : 15 Mbit/s;

Test Plots
Band Edge measurement result



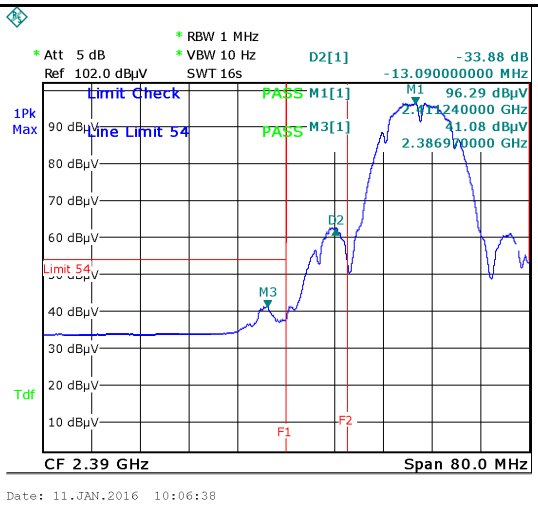
Band Edge, Left Side (Peak) – 802.11b

Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz



Band Edge, Right Side (Peak) – 802.11b

Note: F1 is frequency 2483.5MHz

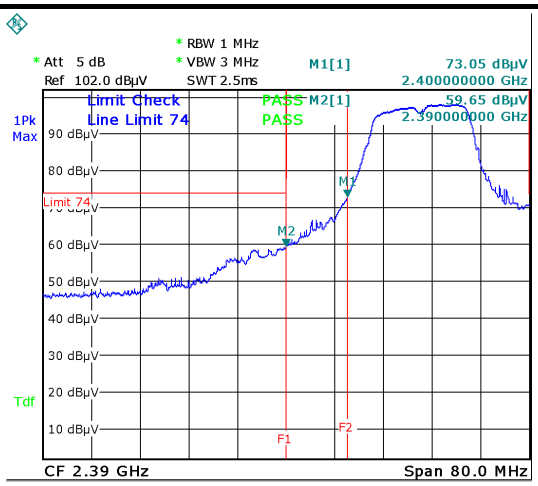


Band Edge, Left Side (Average) - 802.11b

Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz

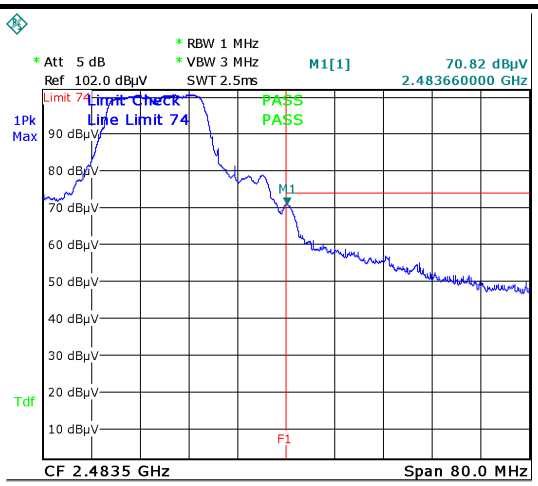
Note: (no need if PK value less than the AV limit)

Band Edge, Right Side (Average) - 802.11b



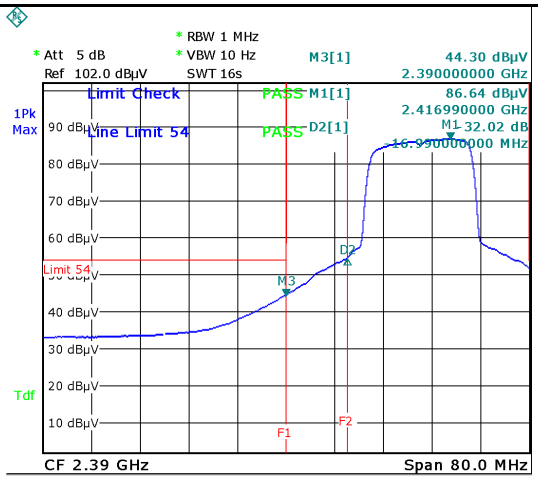
Band Edge, Left Side (Peak) - 802.11g

Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz



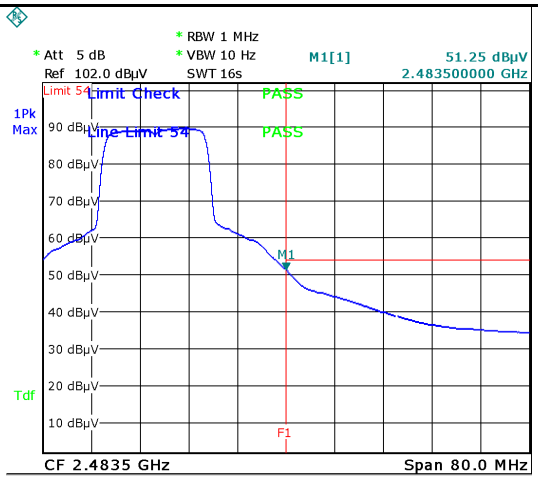
Band Edge, Right Side (Peak) - 802.11g

Note: F1 is frequency 2483.5MHz



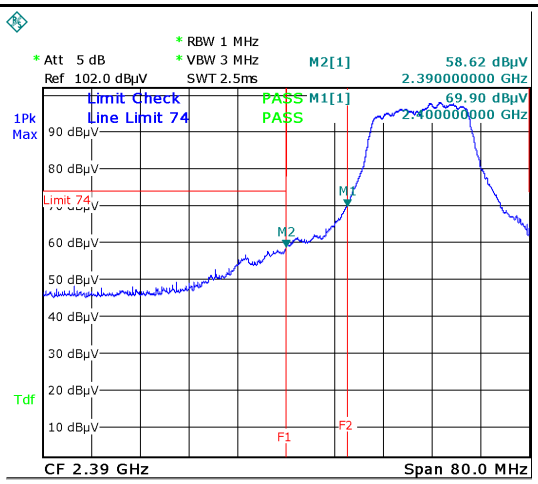
Band Edge, Left Side (Average) - 802.11g

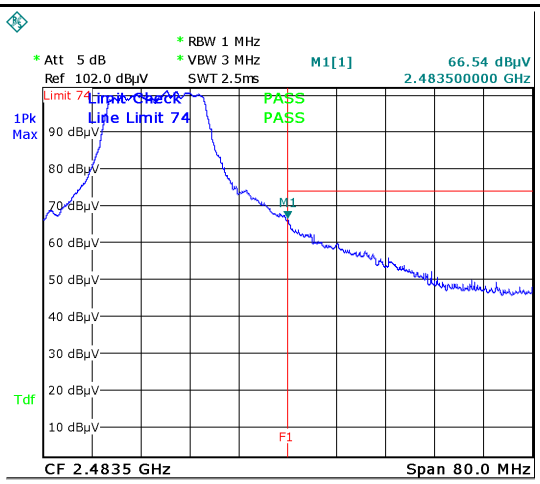
Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz



Band Edge, Right Side (Average) - 802.11g

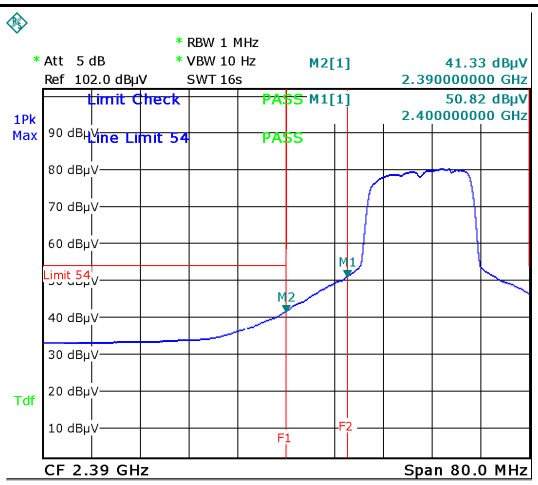
Note: F1 is frequency 2483.5MHz





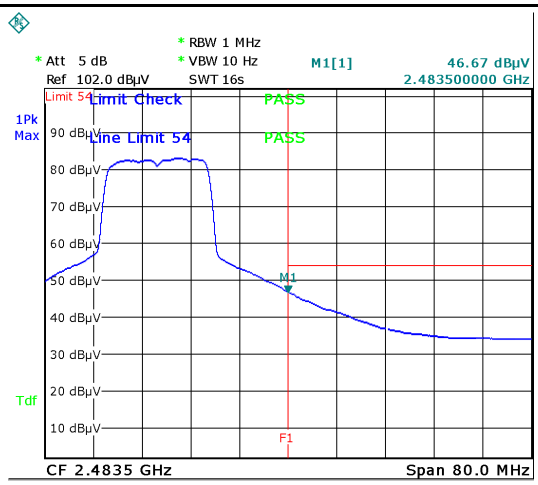
Band Edge, Left Side (Peak) - 802.11n20

Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz



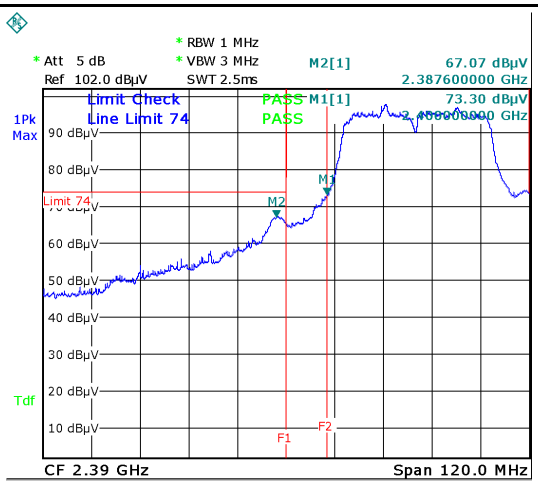
Band Edge, Right Side (Peak) - 802.11n20

Note: F1 is frequency 2483.5MHz



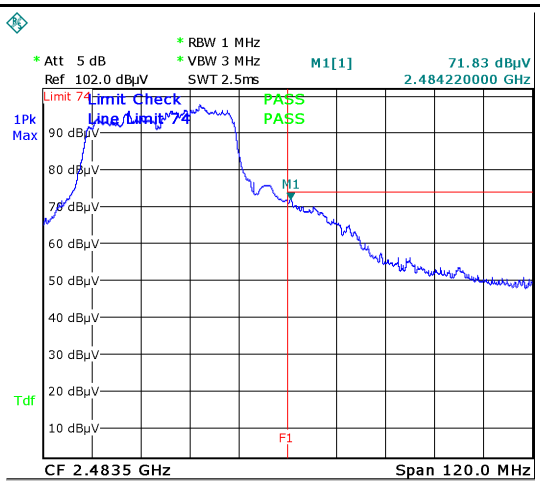
Band Edge, Left Side (Average) - 802.11n20

Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz



Band Edge, Right Side (Average) - 802.11n20

Note: F1 is frequency 2483.5MHz

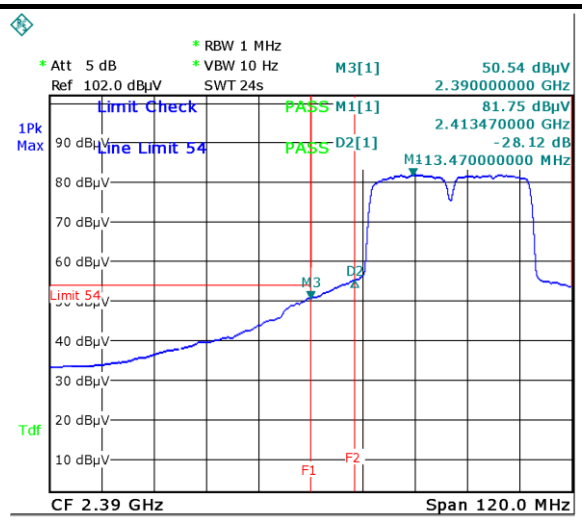


Band Edge, Left Side (Peak) - 802.11n40

Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz

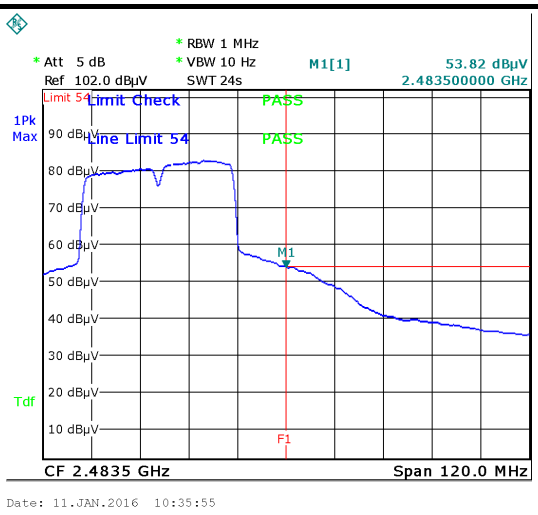
Band Edge, Right Side (Peak) - 802.11n40

Note: F1 is frequency 2483.5MHz



Band Edge, Left Side (Average) - 802.11n40

Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz



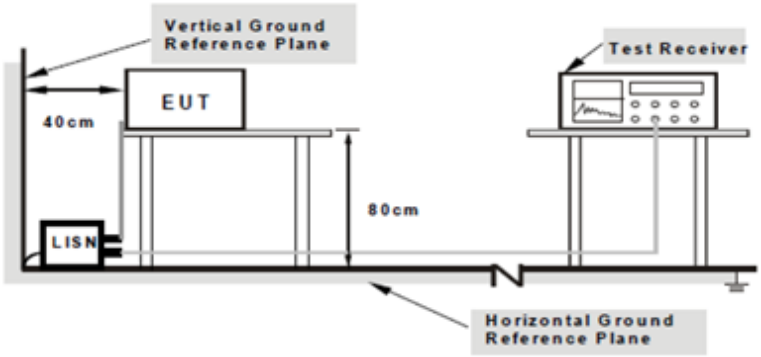
Band Edge, Right Side (Average) - 802.11n40

Note: F1 is frequency 2483.5MHz

6.6 AC Power Line Conducted Emissions

Temperature	27.9°C
Relative Humidity	61%
Atmospheric Pressure	1019mbar
Test date :	December 22, 2015
Tested By :	Winnie Zhang

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 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).</td></tr>
<tr><td>Remark</td><td colspan="3"></td></tr>
<tr><td>Result</td><td colspan="3">☑ Pass ☐ Fail</td></tr>
</table>

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Data sample

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Comment
		(MHz)	(dBuV)	QP	(dB}	(dBuV)	(dBuV)	(dB)	

P/L=Phase Line or Neutral

Frequency (MHz) = Emission frequency in MHz

Reading (dBμV) = Receiver Reading Value

Detector=Quasi Peak Detector or Average Detector

Corrected (dB) = cable loss+ Insertion loss of LISN+ Insertion loss of transient limiter (The transient limiter included 10dB attenuation)

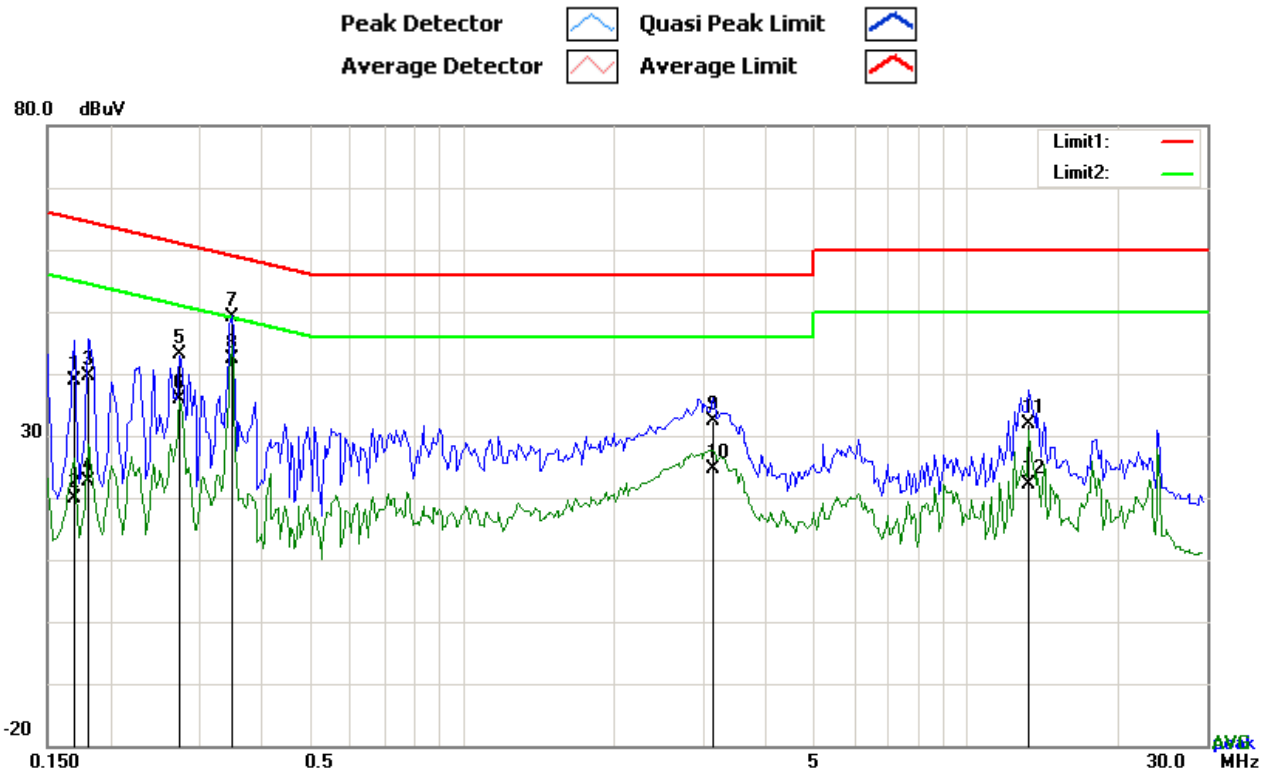
Result (dBμV) = Reading Value + Corrected Value

Limit (dBμV) = Limit stated in sandard

Calculation Formula:

Margin (dB) = Result (dBμV) – limit (dBμV)

Test Mode:	Transmitting Mode

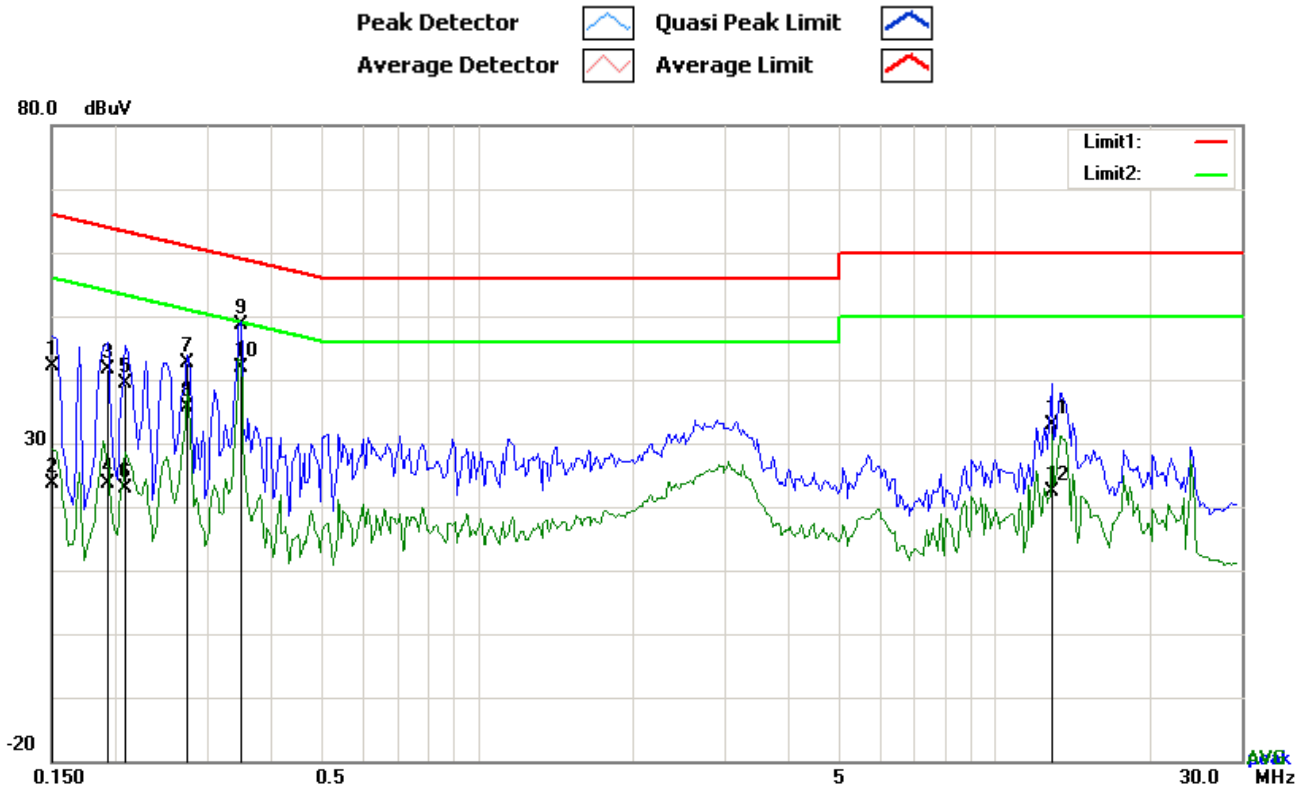


Test Data

Phase Line Plot at 240Vac, 50Hz

No.	P/L	Frequency (MHz)	Reading (dBuV)	Detector	Corrected (dB}	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
1	L1	0.1695	28.82	QP	10.03	38.85	64.98	-26.13	
2	L1	0.1695	9.93	AVG	10.03	19.96	54.98	-35.02	
3	L1	0.1812	29.54	QP	10.03	39.57	64.43	-24.86	
4	L1	0.1812	12.60	AVG	10.03	22.63	54.43	-31.80	
5	L1	0.2748	33.06	QP	10.03	43.09	60.97	-17.88	
6	L1	0.2748	25.87	AVG	10.03	35.90	50.97	-15.07	
7	L1	0.3489	39.11	QP	10.03	49.14	58.99	-9.85	
8	L1	0.3489	32.28	AVG	10.03	42.31	48.99	-6.68	
9	L1	3.1404	22.32	QP	10.06	32.38	56.00	-23.62	
10	L1	3.1404	14.46	AVG	10.06	24.52	46.00	-21.48	
11	L1	13.3272	21.59	QP	10.20	31.79	60.00	-28.21	
12	L1	13.3272	12.04	AVG	10.20	22.24	50.00	-27.76	

Test Mode:	Transmitting Mode

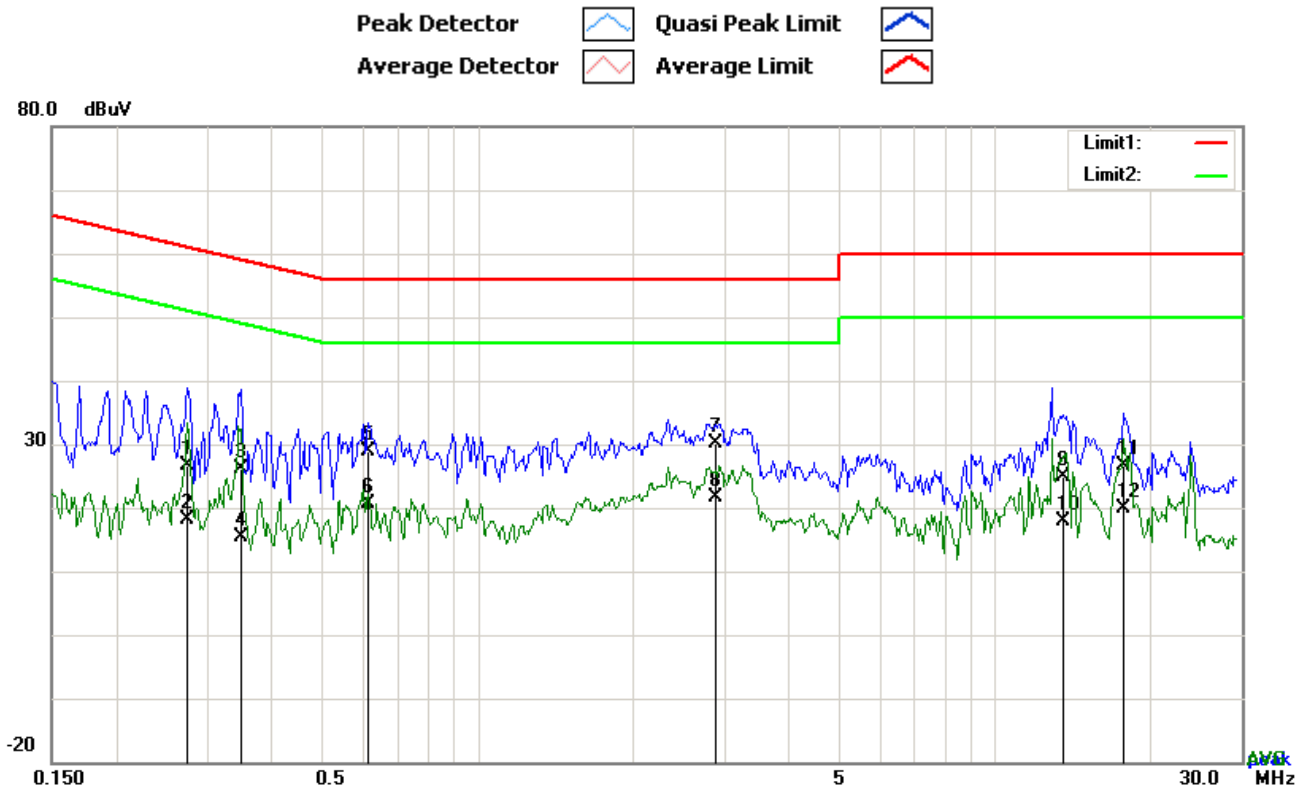


Test Data

Phase Neutral Plot at 240Vac, 50Hz

No.	P/L	Frequency (MHz)	Reading (dBuV)	Detector	Corrected (dB}	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
1	N	0.1500	32.06	QP	10.02	42.08	66.00	-23.92	
2	N	0.1500	13.64	AVG	10.02	23.66	56.00	-32.34	
3	N	0.1929	31.57	QP	10.02	41.59	63.91	-22.32	
4	N	0.1929	13.67	AVG	10.02	23.69	53.91	-30.22	
5	N	0.2085	29.35	QP	10.02	39.37	63.26	-23.89	
6	N	0.2085	12.77	AVG	10.02	22.79	53.26	-30.47	
7	N	0.2748	32.73	QP	10.02	42.75	60.97	-18.22	
8	N	0.2748	25.51	AVG	10.02	35.53	50.97	-15.44	
9	N	0.3489	38.68	QP	10.02	48.70	58.99	-10.29	
10	N	0.3489	31.91	AVG	10.02	41.93	48.99	-7.06	
11	N	12.8943	22.80	QP	10.17	32.97	60.00	-27.03	
12	N	12.8943	12.18	AVG	10.17	22.35	50.00	-27.65	

Test Mode:	Transmitting Mode



Test Data

Phase Line Plot at 120Vac, 50Hz

No.	P/L	Frequency (MHz)	Reading (dBuV)	Detector	Corrected (dB}	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
1	L	0.2748	16.51	QP	10.02	26.53	60.97	-34.44	
2	L	0.2748	8.08	AVG	10.02	18.10	50.97	-32.87	
3	L	0.3489	16.14	QP	10.02	26.16	58.99	-32.83	
4	L	0.3489	5.30	AVG	10.02	15.32	48.99	-33.67	
5	L	0.6141	18.93	QP	10.02	28.95	56.00	-27.05	
6	L	0.6141	10.67	AVG	10.02	20.69	46.00	-25.31	
7	L	2.8845	20.18	QP	10.05	30.23	56.00	-25.77	
8	L	2.8845	11.56	AVG	10.05	21.61	46.00	-24.39	
9	L	13.5509	14.68	QP	10.18	24.86	60.00	-35.14	
10	L	13.5509	7.60	AVG	10.18	17.78	50.00	-32.22	
11	L	17.6952	16.34	QP	10.23	26.57	60.00	-33.43	
12	L	17.6952	9.64	AVG	10.23	19.87	50.00	-30.13	

Test Mode:	Transmitting Mode

Test Data

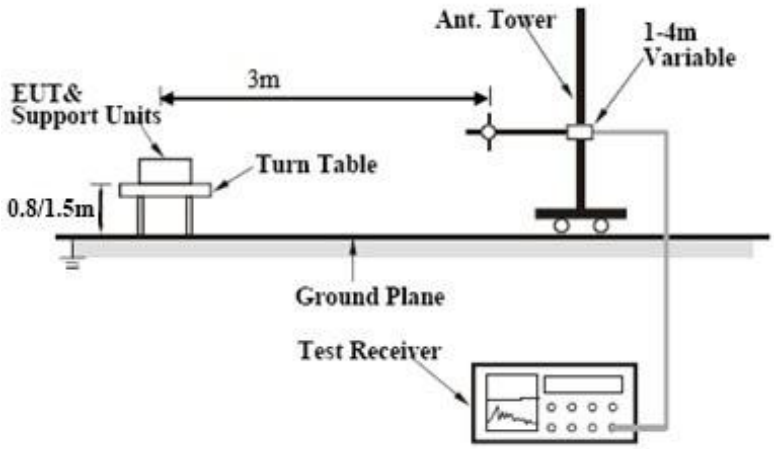
Phase Neutral Plot at 120Vac, 50Hz

No.	P/L	Frequency (MHz)	Reading (dBuV)	Detector	Corrected (dB}	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
1	N	0.2748	19.20	QP	10.02	29.22	60.97	-31.75	
2	N	0.2748	12.46	AVG	10.02	22.48	50.97	-28.49	
3	N	0.3489	18.16	QP	10.02	28.18	58.99	-30.81	
4	N	0.3489	11.16	AVG	10.02	21.18	48.99	-27.81	
5	N	2.9112	20.23	QP	10.05	30.28	56.00	-25.72	
6	N	2.9112	13.04	AVG	10.05	23.09	46.00	-22.91	
7	N	5.6988	17.30	QP	10.08	27.38	60.00	-32.62	
8	N	5.6988	6.47	AVG	10.08	16.55	50.00	-33.45	
9	N	13.4080	17.58	QP	10.18	27.76	60.00	-32.24	
10	N	13.4080	9.05	AVG	10.18	19.23	50.00	-30.77	
11	N	23.9781	13.27	QP	10.32	23.59	60.00	-36.41	
12	N	23.9781	8.45	AVG	10.32	18.77	50.00	-31.23	

6.7 Radiated Spurious Emissions

Temperature	26°C
Relative Humidity	60%
Atmospheric Pressure	1019mbar
Test date :	January 04, 2016
Tested By :	Winnie Zhang

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>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>
<tr><td>Test Setup</td><td colspan="3"> 
</td></tr>
<tr><td>Procedure</td><td colspan="3">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.</td></tr>
</table>

	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

Data sample

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree	Comment
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	( )	

P/L=Vertical or Horizontal of Receiver antenna

Frequency (MHz) = Emission frequency in MHz

Reading (dBμV/m) = Receiver Reading Value

Detector= Peak Detector or Quasi Peak Detector

Corrected (dB) = Antenna factor + cable loss- antenna gain

Result (dBμV/m) = Reading Value + Corrected Value

Limit (dBμV/m) = Limit stated in standard

Height (cm) = Height of Receiver antenna

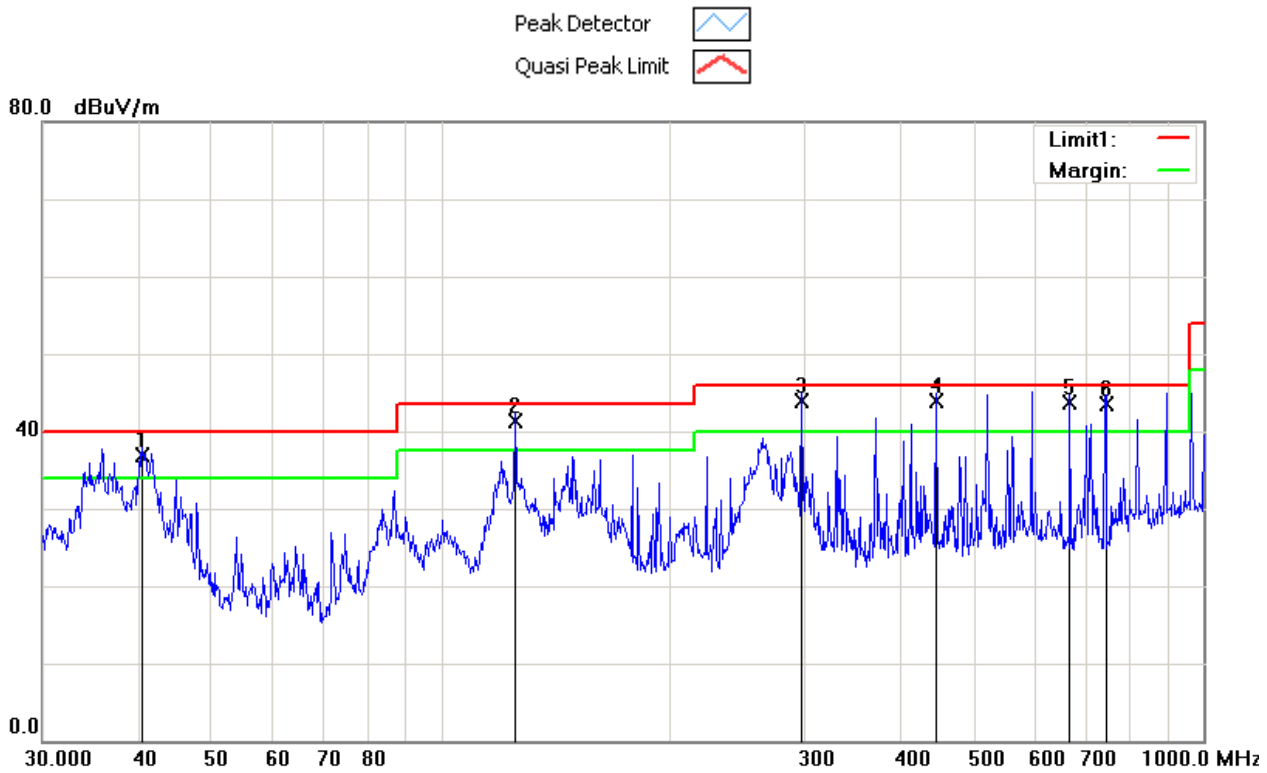
Degree = Turn table degree

Calculation Formula:

Margin (dB) = Result (dBμV/m) – limit (dBμV/m)

Test Mode:	Transmitting Mode

(Below 1GHz)



Test Data

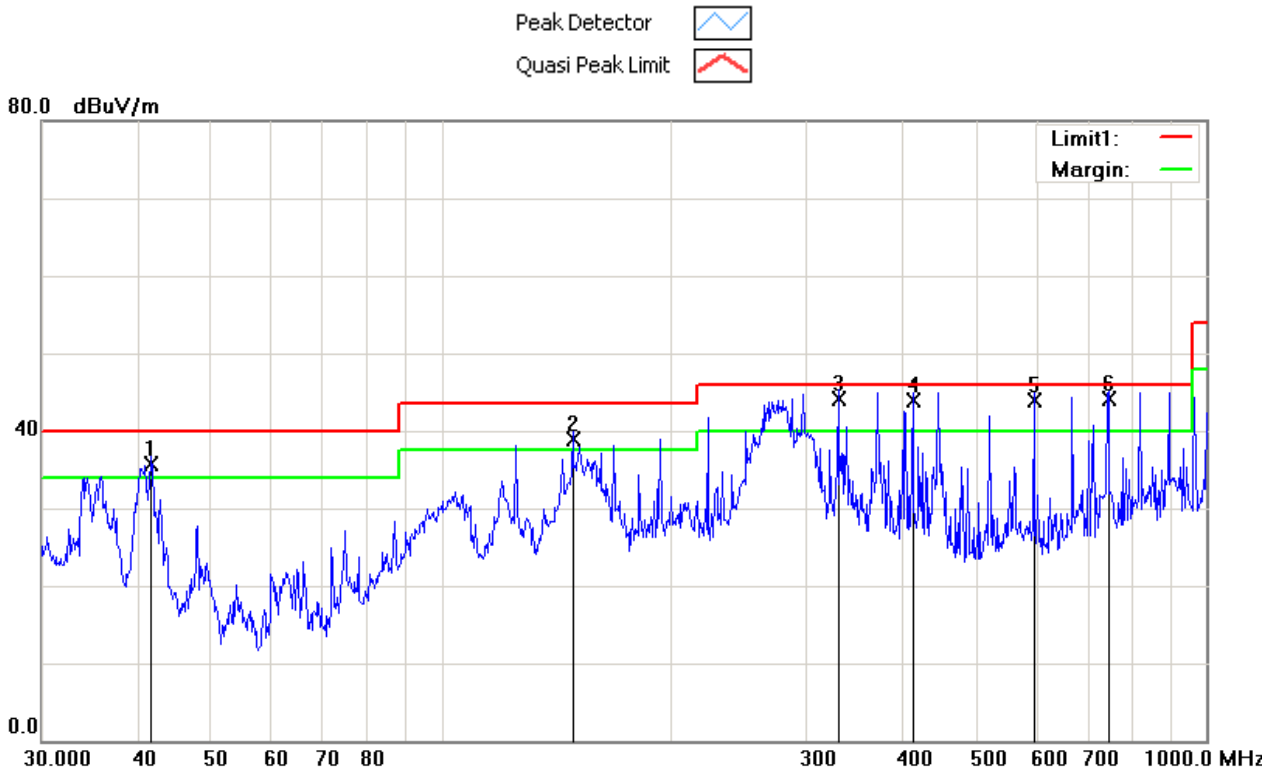
Vertical Polarity Plot @3m

No.	P/L	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree ( )	Comment
1	V	40.5591	44.79	QP	-7.96	36.83	40.00	-3.17	100	32	
2	V	125.0066	48.86	QP	-7.62	41.24	43.50	-2.26	100	14	
3	V	297.2241	50.83	QP	-7.02	43.81	46.00	-2.19	100	200	
4	V	446.4141	47.10	QP	-3.17	43.93	46.00	-2.07	100	35	
5	V	668.1423	42.61	QP	1.02	43.63	46.00	-2.37	100	54	
6	V	744.8661	41.29	QP	2.31	43.60	46.00	-2.40	100	127	

Note: The data above 1 GHz which below 20 dB to the limit was not recorded.

Test Mode:	Transmitting Mode

(Below 1GHz)



Test Data

Horizontal Polarity Plot @3m

No.	P/L	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree ( )	Comment
1	H	41.7130	44.53	QP	-8.73	35.80	40.00	-4.20	100	316	
2	H	148.4410	47.26	QP	-8.42	38.84	43.50	-4.66	100	119	
3	H	330.1949	50.24	QP	-6.04	44.20	46.00	-1.80	100	116	
4	H	413.2706	47.82	QP	-3.97	43.85	46.00	-2.15	100	247	
5	H	595.1329	44.01	QP	-0.07	43.94	46.00	-2.06	100	302	
6	H	744.8661	41.82	QP	2.31	44.13	46.00	-1.87	100	207	

Note: The data above 1 GHz which below 20 dB to the limit was not recorded.

Above 1GHz

Test Mode:	Transmitting Mode

Low Channel (2412 MHz)

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4824	38.62	AV	V	34	6.86	31.72	47.76	54	-6.24
4824	38.49	AV	H	33.8	6.86	31.72	47.43	54	-6.57
4824	46.55	PK	V	34	6.86	31.72	55.69	74	-18.31
4824	46.38	PK	H	33.8	6.86	31.72	55.32	74	-18.68

Middle Channel (2437 MHz)

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4874	38.57	AV	V	33.6	6.82	31.82	47.17	54	-6.83
4874	38.43	AV	H	33.8	6.82	31.82	47.23	54	-6.77
4874	46.51	PK	V	33.6	6.82	31.82	55.11	74	-18.89
4874	46.35	PK	H	33.8	6.82	31.82	55.15	74	-18.85

High Channel (2462 MHz)

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4924	38.74	AV	V	34.6	6.76	31.92	48.18	54	-5.82
4924	38.49	AV	H	34.7	6.76	31.92	48.03	54	-5.97
4924	46.53	PK	V	34.6	6.76	31.92	55.97	74	-18.03
4924	46.37	PK	H	34.7	6.76	31.92	55.91	74	-18.09

Note:

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

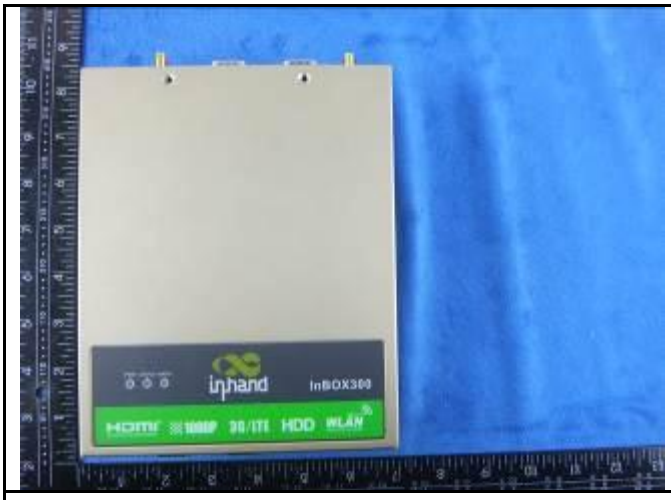
2, All other emissions more than 30 dB below the limit

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions					
EMI test receiver	ESCS30	8471241027	09/17/2015	09/16/2016	☑
Line Impedance Stabilization Network	LI-125A	191106	09/25/2015	09/24/2016	☑
Line Impedance Stabilization Network	LI-125A	191107	09/25/2015	09/24/2016	☑
LISN	ISN T800	34373	09/25/2015	09/24/2016	☑
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/24/2015	09/23/2016	☑
Transient Limiter	LIT-153	531118	09/01/2015	08/31/2016	☑
RF conducted test					
Agilent ESA-E SERIES SPECTRUM ANALYZER	E4407B	MY45108319	09/17/2015	09/16/2016	☑
Power Splitter	1#	1#	09/01/2015	08/31/2016	☑
DC Power Supply	E3640A	MY40004013	09/17/2015	09/16/2016	☑
Radiated Emissions					
EMI test receiver	ESL6	100262	09/17/2015	09/16/2016	☑
Positioning Controller	UC3000	MF780208282	11/19/2015	11/18/2016	☑
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/01/2015	08/31/2016	☑
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/25/2015	03/24/2016	☑
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/21/2015	09/20/2016	☑
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/24/2015	09/23/2016	☑
Universal Radio Communication Tester	CMU200	121393	09/25/2015	09/24/2016	☑

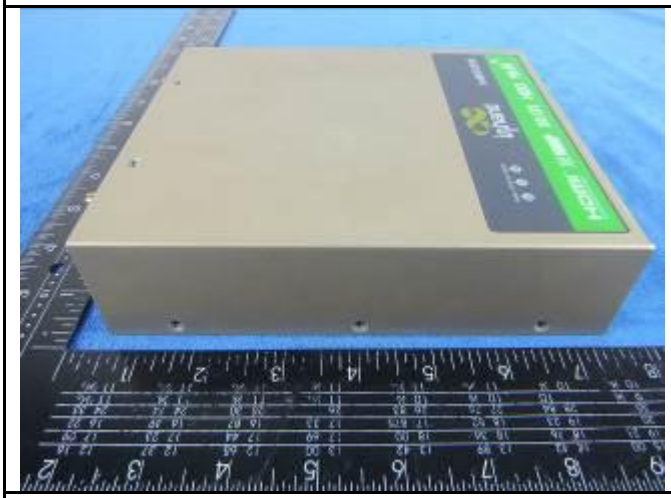
Annex B. EUT and Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

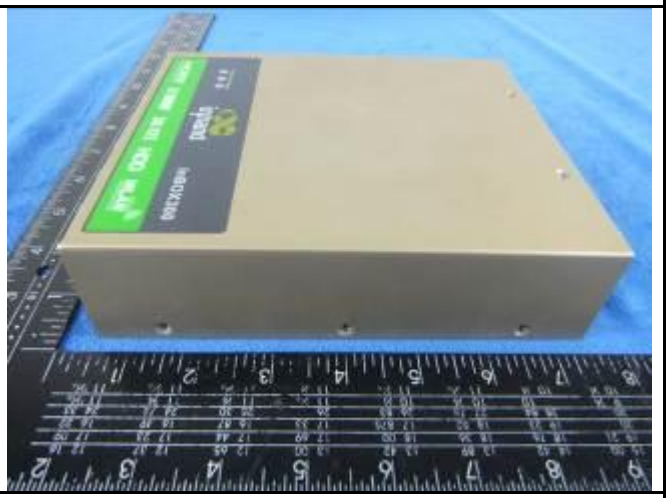


EUT – Top View

EUT – Bottom View



EUT – Left View



EUT – Right View

EUT - Front View

EUT - Rear View

Antenna

Antenna Port

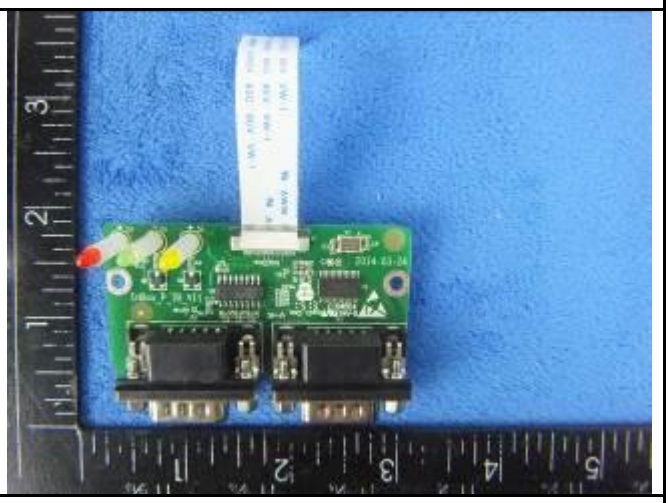
Antenna Port

Annex B.ii. Photograph: EUT Internal Photo

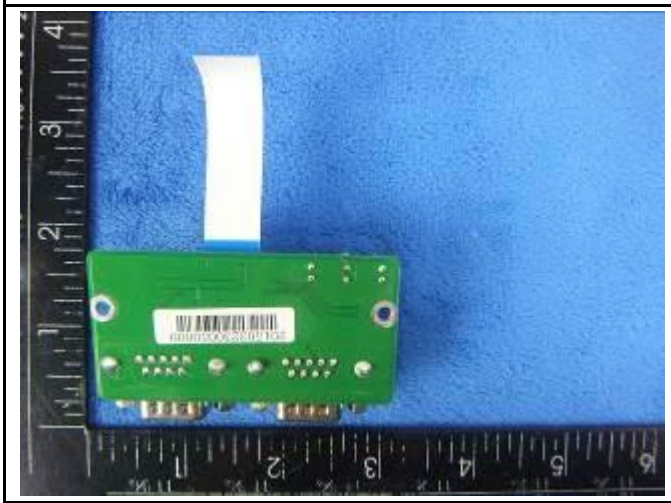
EUT – Uncover Front View 1

EUT – PCB 1 Front View

EUT – PCB 1 Rear View

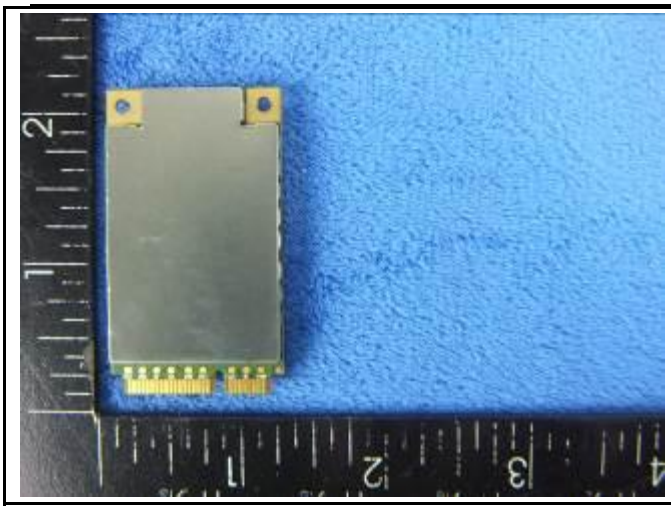


EUT – PCB 2 Front View



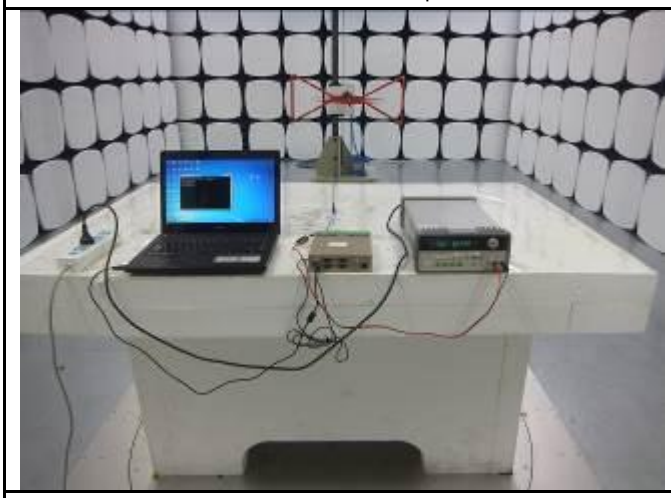
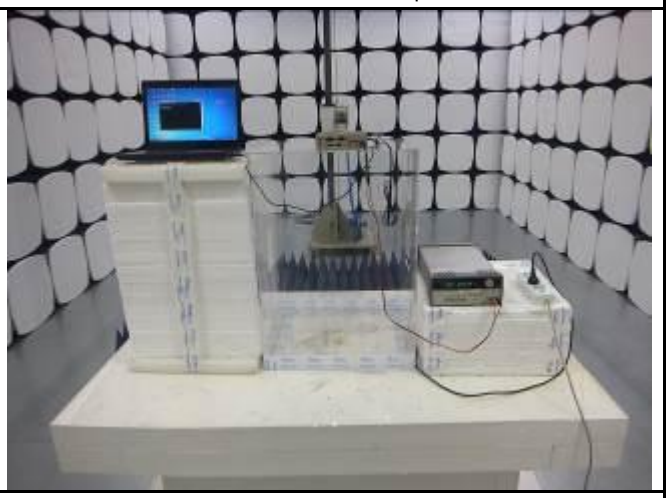
EUT – PCB 2 Rear View

EUT – PCB 3 Front View



EUT – PCB 3 Rear View

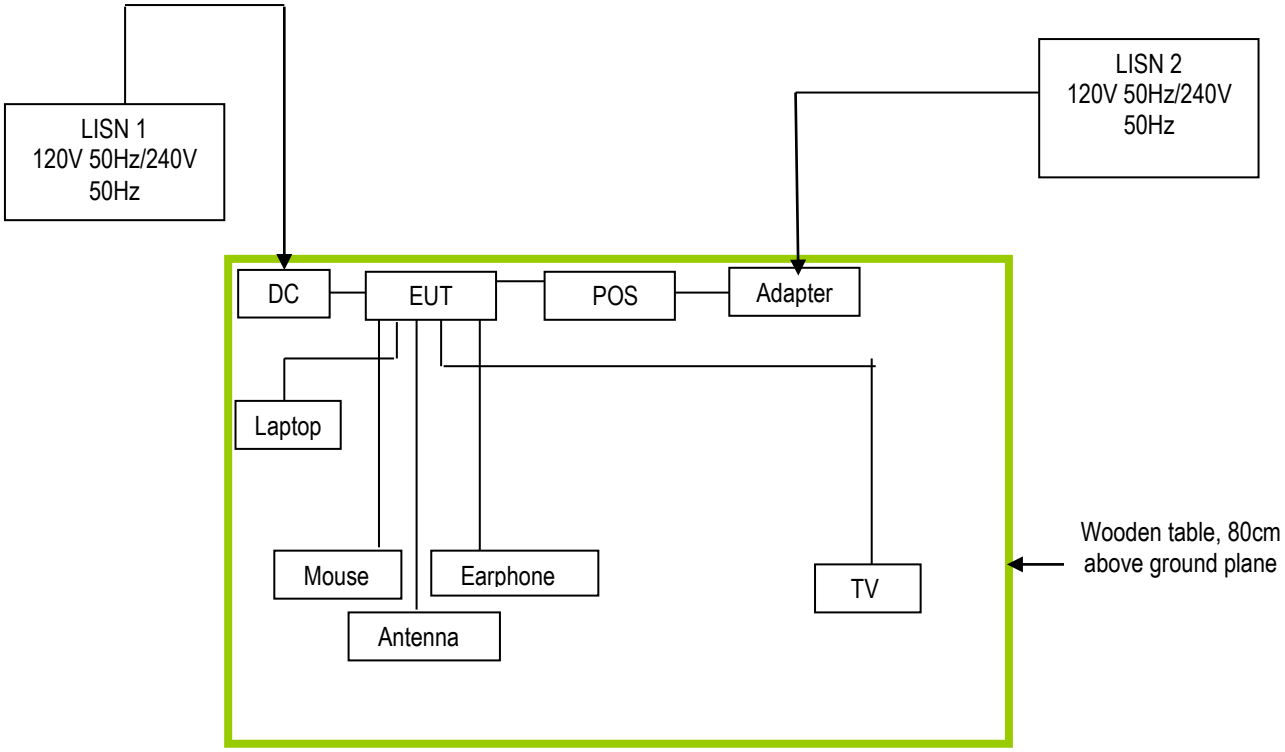
Annex B.iii. Photograph: Test Setup Photo

	
Conducted Emissions Test Setup – Front View	Conducted Emissions Test Setup – Rear View
	
Radiated Spurious Emissions Test Setup Below 1GHz	Radiated Spurious Emissions Test Setup Above 1GHz

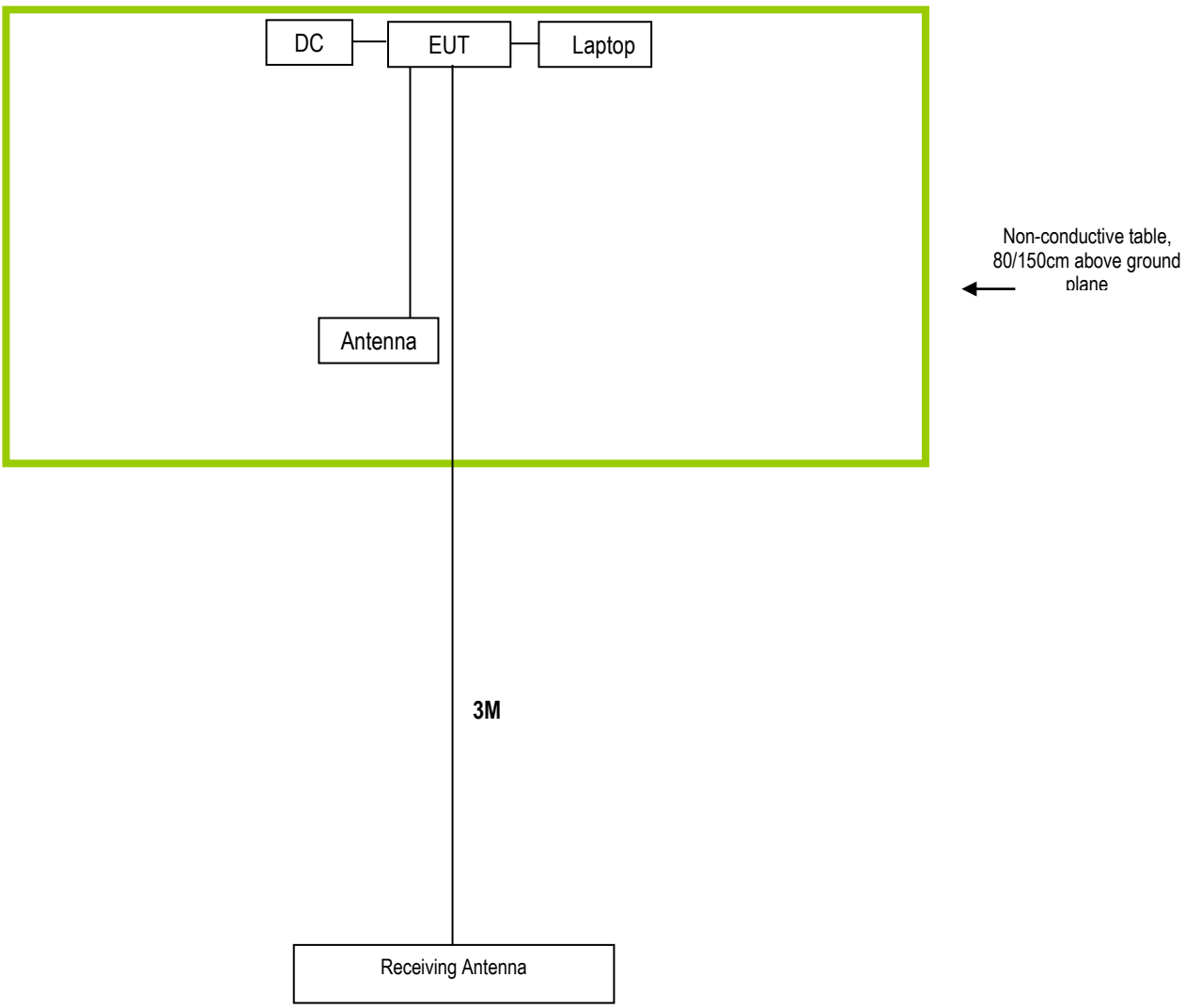
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

Block Configuration Diagram for Conducted Emissions



Block Configuration Diagram for Radiated Emissions



Annex C. il. SUPPORTING EQUIPMENT DESCRIPTION

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

Manufacturer	Equipment Description	Model	Calibration Date	Calibration Due Date
Lenovo	Lenovo Laptop	E40& 0579A52	N/A	N/A
HongXun	POS	8210	N/A	N/A
Sennheiser	Earphone	MX80	N/A	N/A
DELL	Mouse	E100	N/A	N/A
Mi	Adapter	DX-13250	N/A	N/A
BK PRECISION	DC Power Supply	1786B	N/A	N/A
Skyworth	TV	32X3	N/A	N/A

Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see attachment

Annex E. DECLARATION OF SIMILARITY

Beijing InHand Networks Technology Co., Ltd

To: SIEMIC (SHENZHEN-CHINA) LABORATORIES
Zone A, Floor 1, Building 2
Wan Ye Long Technology Park
South Side of Zhoushi Road, Bao' an District
Shenzhen, Guangdong, CHINA 518108

Dear Sir,

For our business issue and marketing requirement, we would like to list different models numbers reports, as following:

Model No.: InBOX300 InBOX310 InBOX320 InBOX330
InBOX300S InBOX310S InBOX320S InBOX330S

The eight models are basically the same in appearance, hardware, PCB layout but they have different number of interfaces: USB, Serial port and different software functions. The software does not affect the RF parameters of the device.

Thank you!

Signature: 

Printed name/title:Biao Wang/ EMC engineer
Address: 101,West Wing,11th Floor,No.101,Lize central Park Wangjing,Chaoyang District,Beijing,100102,China