

# RF TEST REPORT



Report No.: FCC\_RF\_SL14122201-RUC-033A1\_UNII Rev 1.0  
Supersede Report No.: FCC\_RF\_SL14122201-RUC-033A1\_UNII

Applicant	:	Ruckus Wireless, Inc.
Product Name	:	Access Point
Model No.	:	C500
Test Standard	:	47 CFR 15.407
Test Method	:	ANSI C63.10:2013 789033 D02 General UNII Test Procedures New Rules v01
FCC ID	:	S9GC500
IC ID	:	5912A-C500
Dates of test	:	02/09/2015 to 03/18/2015
Issue Date	:	08/03/2015
Test Result	:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Equipment complied with the specification <input checked="" type="checkbox"/>		
Equipment did not comply with the specification <input type="checkbox"/>		

This Test Report is Issued Under the Authority of:	
<b>Ricky Wang</b>	<b>David Zhang</b>
Test Engineer	Engineer Reviewer
This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only	

Issued By:  
SIEMIC Laboratories  
775 Montague Expressway, Milpitas, 95035 CA



775 Montague Expressway, Milpitas, CA 95035, USA • Phone: (+1) 408 526 1188 • Facsimile (+1) 408 526 1088

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## Laboratory Introduction

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



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

### Accreditations for Conformity Assessment

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC, RF/Wireless, Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless, Telecom
Taiwan	BSMI, NCC, NIST	EMC, RF, Telecom, Safety
Hong Kong	OFTA, NIST	RF/Wireless, Telecom
Australia	NATA, NIST	EMC, RF, Telecom, Safety
Korea	KCC/RRA, NIST	EMI, EMS, RF, Telecom, Safety
Japan	VCCI, JATE, TELEC, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	Safety, EMC, RF/Wireless, Telecom
Europe	A2LA, NIST	EMC, RF, Telecom, Safety
Israel	MOC, NIST	EMC, RF, Telecom, Safety

### Accreditations for Product Certifications

Country	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC, RF, Telecom
Canada	IC FCB, NIST	EMC, RF, Telecom
Singapore	iDA, NIST	EMC, RF, Telecom
EU	NB	EMC & R&TTE Directive
Japan	MIC (RCB 208)	RF, Telecom
Hong Kong	OFTA (US002)	RF, Telecom

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## 1 Report Revision History

Report No.	Report Version	Description	Issue Date
FCC_RF_SL14122201-RUC-033A1_UNII	None	Original	03/19/2015
FCC_RF_SL14122201-RUC-033A1_UNII Rev 1.0	Rev 1.0	Updated EUT information	08/03/2015

## 2 Executive Summary

The purpose of this test program was to demonstrate compliance of following product

Company: Ruckus Wireless, Inc.  
Product: Access Point  
Model: C500

against the current Stipulated Standards. The specified model product stated above has demonstrated compliance with the Stipulated Standard listed on 1<sup>st</sup> page.

## 3 Customer information

Applicant Name	:	Ruckus Wireless, Inc.
Applicant Address	:	350 West Java Drive, Sunnyvale, California 94089 U.S.A
Manufacturer Name	:	Ruckus Wireless, Inc.
Manufacturer Address	:	350 West Java Drive, Sunnyvale, California 94089 U.S.A

## 4 Test site information

Lab performing tests	SIEMIC Laboratories
Lab Address	775 Montague Expressway, Milpitas, CA 95035
FCC Test Site No.	881796
IC Test Site No.	4842D-2
VCCI Test Site No.	A0133

## 5 Modification

Index	Item	Description	Note
-	-	-	-

## 6 EUT Information

### 6.1 EUT Description

Product Name	:	Access Point
Model No.	:	C500
Trade Name	:	Ruckus
Serial No.	:	471406000039
Host Model No.	:	N/A
Input Power	:	12VDC
Power Adapter Manu/Model	:	N/A
Power Adapter SN	:	N/A
Date of EUT received	:	02/09/2015
Equipment Class/ Category	:	DTS, UNII
Clock Frequencies	:	N/A
Port/Connectors	:	PoE, Ethernet

### 6.2 Radio Description

Radio Type	802.11b	802.11g	802.11a	802.11n-HT20	802.11n-HT40	802.11ac
Operating Frequency	2412-2462MHz	2412-2462MHz	5180-5320MHz 5500-5720MHz 5745-5825MHz	2412-2462MHz 5180-5320MHz 5500-5720MHz 5745-5825MHz	2422-2452MHz 5190-5310MHz 5510-5710MHz 5755-5795MHz	5210MHz, 5290MHz, 5530MHz, 5690MHz, 5775MHz
Modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)
Channel Spacing	5MHz	5MHz	20MHz	5MHz(2.4GHz), 20MHz (5GHz)	40MHz	80MHz
Number of Channels	11	11	20	11(2.4GH) 20 (5GHz)	9(2.4GH) 10(5GHz)	5
Antenna Type	Internal Omni PCB Antennas					
Antenna Gain (Peak)	0 dBi (2.4GHz), 1 dBi (5 GHz)					
Antenna Connector Type	U.FL					
Note	N/A					

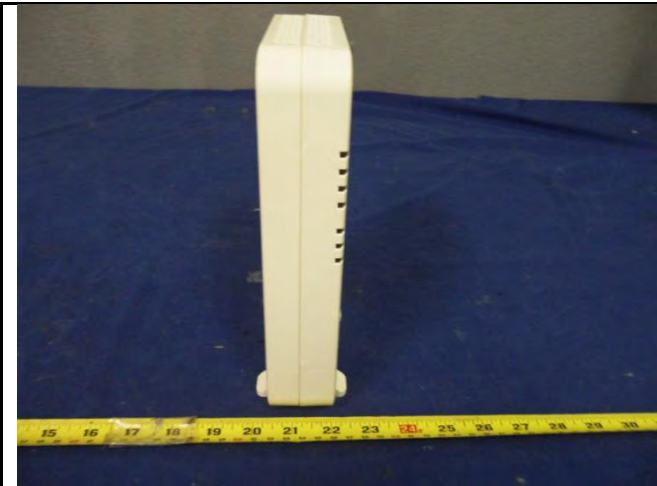
#### EUT Configurations:

Product Hardware version	705-60400-001
Product Software version	812-72404-003
Radio Hardware version	705-60400-001
Radio Software version	812-72404-004
Test Software version	117-11310-001
DFS version	100.1.0.9

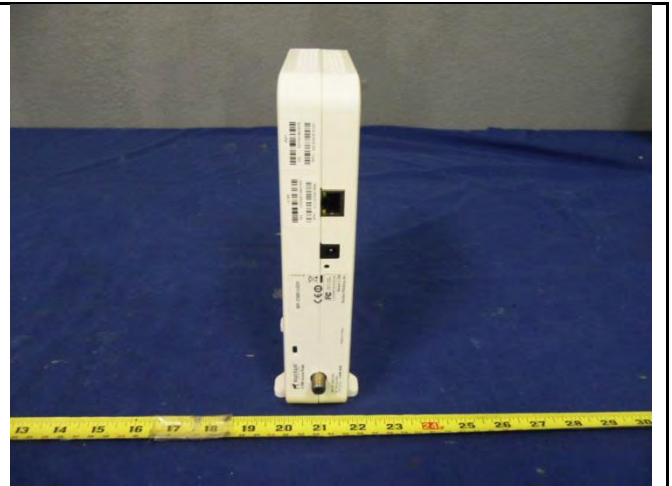
**EUT Power level setting**

Band	Mode	Frequency	Power Setting
5250-5350	802.11a	5260	18.5
		5280	18.5
		5320	18.5
	802.11n-HT20	5260	19
		5280	19
		5320	19
	802.11n-HT40	5270	21
		5310	21
	802.11ac	5290	21
5470-5725	802.11a	5500	20
		5580	20
		5700	21
	802.11n-HT20	5500	20
		5580	21
		5700	21
	802.11n-HT40	5510	22
		5550	22
		5670	22
802.11ac	5530	22	
Cross Band	802.11a	5720	21
	802.11n-HT20	5720	21
	802.11n-HT40	5710	22
	802.11ac	5690	22

**6.3 EUT Photos - External**



**Front View**



**Rear View**



**Right Side View**



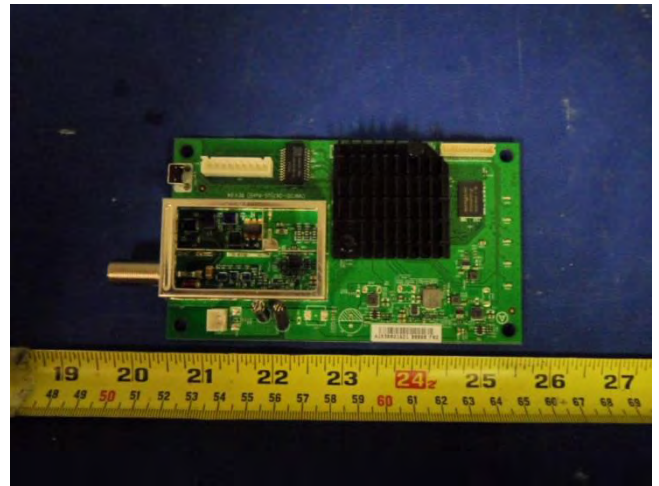
**Left Side View**



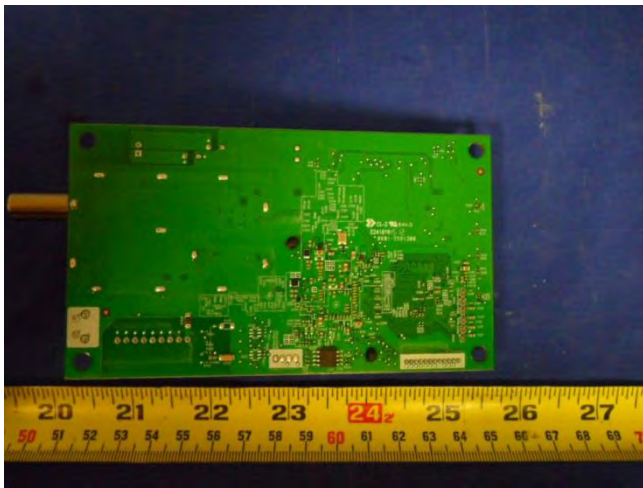
**6.4 EUT Photos - Interna**



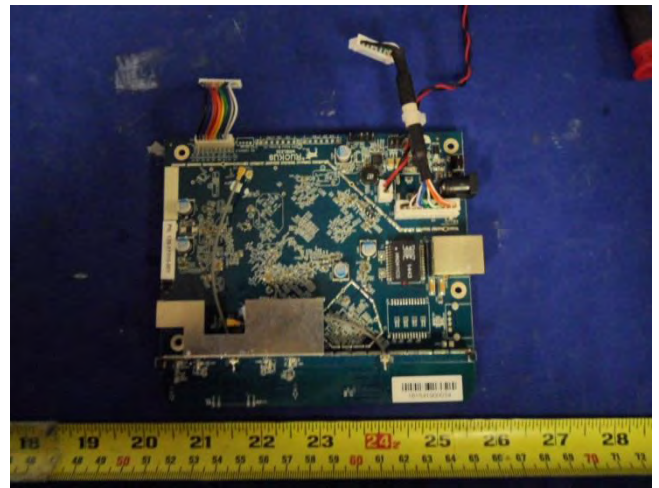
**EUT Case off View**



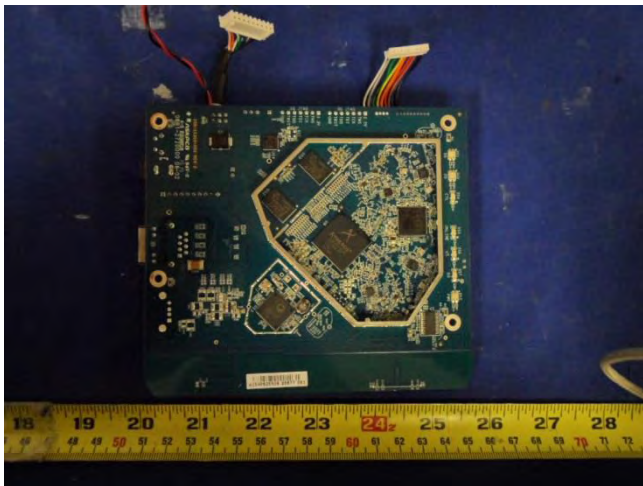
**Modem Board Top View**



**Modem Board Bottom View**

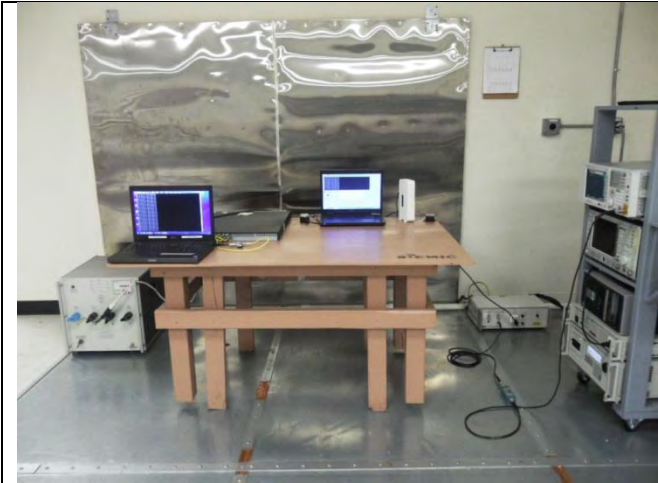


**Main Board Top View**

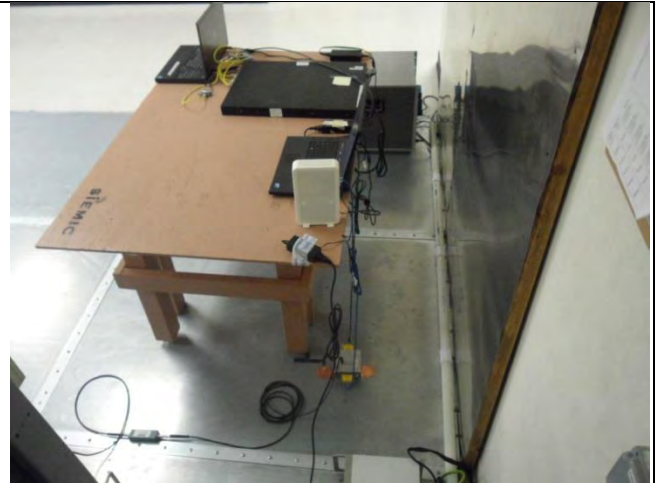


**Main Board Bottom View**

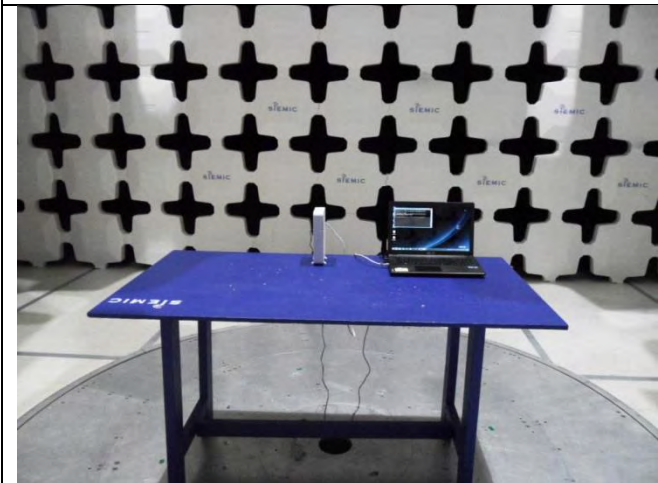
**6.5 EUT Test Setup Photos**



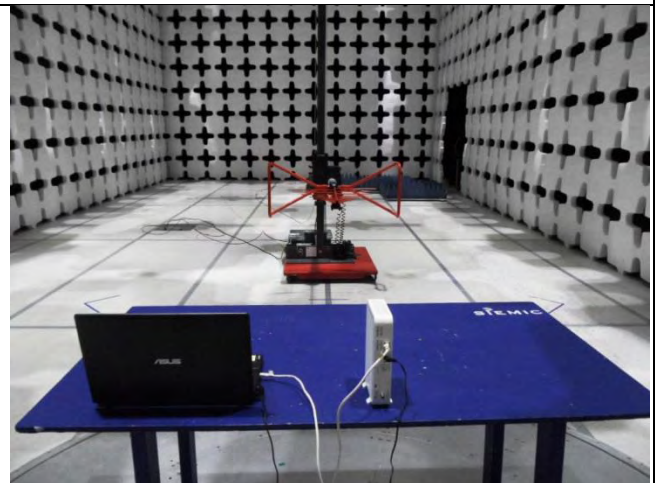
**AC Line Conducted Emissions – Front View**



**AC Line Conducted Emissions – Rear View**



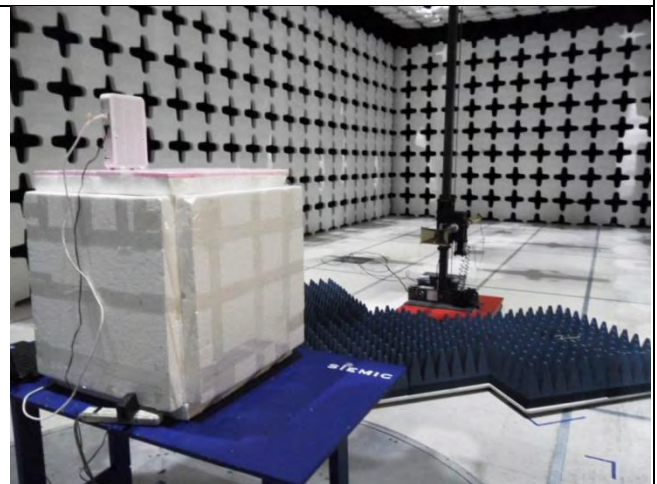
**Radiated Emissions (<1GHz) – Front View**



**Radiated Emissions (<1GHz) – Rear View**



**Radiated Emissions (>1GHz) – Front View**



**Radiated Emissions (>1GHz) – Rear View**

## 7 Supporting Equipment/Software and cabling Description

### 7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	PP01L Latitude E5440	F1WPF12	Dell	-

### 7.2 Cabling Description

Name	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
RJ45	EUT	RJ45	Laptop	RJ45	1	Unshielded	-

### 7.3 Test Software Description

Test Item	Software	Description
RF Testing	Command Line in windows	Set the EUT to transmit continuously in diferent test modes and channels

## 8 Test Summary

Test Item	Test standard		Test Method/Procedure	Pass / Fail
Restricted Band of Operation	FCC	15.205	ANSI C63.10:2013 789033 D02 General UNII Test Procedures New Rules v01	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
AC Conducted Emissions Voltage	FCC	15.207(a)	ANSI C63.10:2013	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A

Test Item	Test standard		Test Method/Procedure	Pass / Fail
26 & 6 dB Emission Bandwidth	FCC	15.407 (a) (2)	789033 D02 General UNII Test Procedures New Rules v01	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Maximum conducted Output Power	FCC	15.407 (a) (2)	789033 D02 General UNII Test Procedures New Rules v01	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Power reduction (Antenna Gain > 6 dBi)	FCC	15.407 (a) (2)	-	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
Band Edge and Radiated Spurious Emissions	FCC	15.407(b)(2), 15.407(b)(6)	ANSI C63.10:2013 789033 D02 General UNII Test Procedures New Rules v01	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Power Spectral Density	FCC	15.407 (a) (2)	789033 D02 General UNII Test Procedures New Rules v01	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Frequency Stability	FCC	15.407 (g)	-	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
Transmit Power Control (TPC)	FCC	15.407 (h)(1)	-	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
User Manual	FCC	-	-	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A

Remark	<ol style="list-style-type: none"> <li>All measurement uncertainties are not taken into consideration for all presented test result.</li> <li>The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual.</li> </ol>
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## 9 Measurement Uncertainty

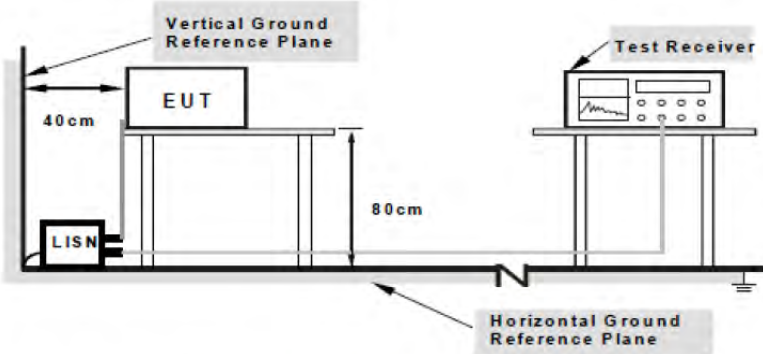
Emissions			
Test Item	Frequency Range	Description	Uncertainty
Band Edge and Radiated Spurious Emissions	30MHz – 1GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
Band Edge and Radiated Spurious Emissions	1GHz – 40GHz	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)	+4.3dB/-4.1dB

## 10 Measurements, Examination and Derived Results

### 10.1 Conducted Emissions

#### Conducted Emission Limit

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

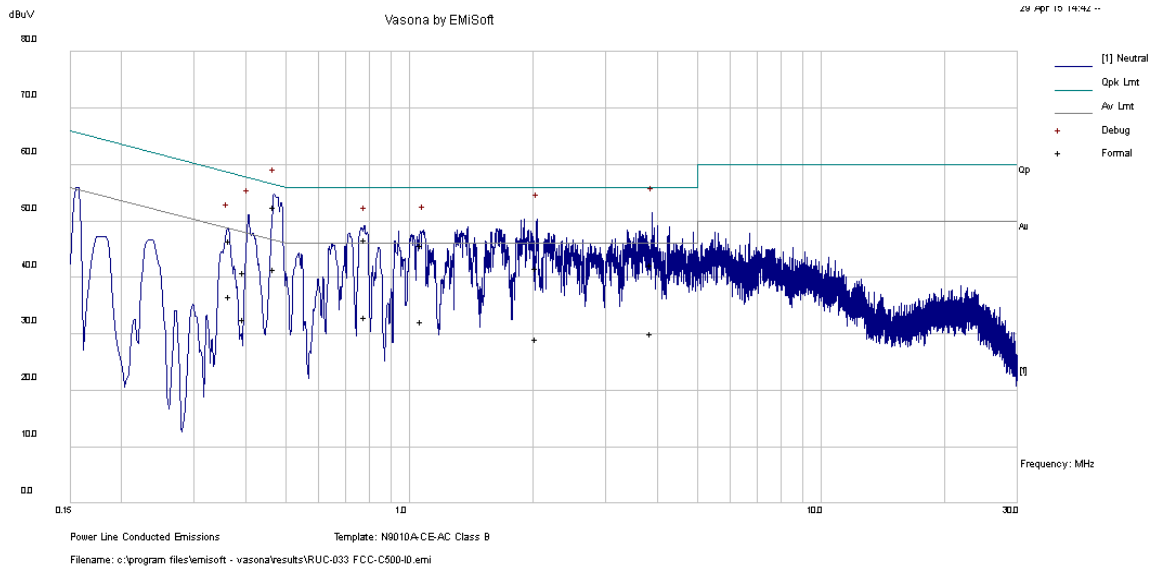
Spec	Item	Requirement	Applicable
47CFR§15.207	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, 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 frequency ranges.	<input checked="" type="checkbox"/>
Test Setup	 <p>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.</p>		
Procedure	<ul style="list-style-type: none"> <li>- 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, as shown in Annex B.</li> <li>- The power supply for the EUT was fed through a 50<math>\Omega</math>/50<math>\mu</math>H EUT LISN, connected to filtered mains.</li> <li>- The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.</li> <li>- All other supporting equipment was powered separately from another main supply.</li> </ul>		
Remark	EUT tested with AC 120V 60Hz		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data     Yes                       N/A

Test Plot     Yes (See below)               N/A

### Conducted Emission Test Results

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	21	Result:	<input checked="" type="checkbox"/> Pass  <input type="checkbox"/> Fail
	Humidity (%):	42		
	Atmospheric(mbar):	1021		
Mains Power:	120Vac, 60Hz			
Tested by:	Oswaldo Casorla			
Test Date:	04/29/2015			
Remarks	Line			

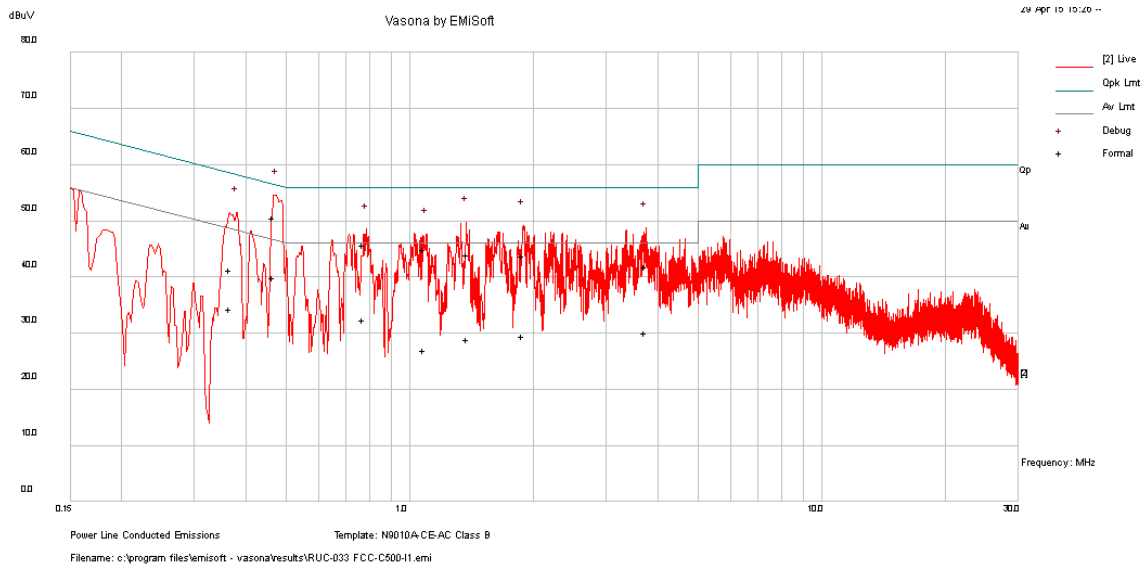


Line Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
0.47	41.84	10.01	0.73	52.59	Quasi Peak	Neutral	56.53	-3.94	Pass
3.87	31.10	10.03	1.07	42.20	Quasi Peak	Neutral	56.00	-13.80	Pass
2.04	30.72	10.02	0.95	41.69	Quasi Peak	Neutral	56.00	-14.31	Pass
0.40	30.11	10.01	0.73	40.84	Quasi Peak	Neutral	57.91	-17.07	Pass
1.07	34.94	10.02	0.79	45.75	Quasi Peak	Neutral	56.00	-10.25	Pass
0.78	35.97	10.01	0.76	46.75	Quasi Peak	Neutral	56.00	-9.26	Pass
0.47	30.68	10.01	0.73	41.42	Average	Neutral	46.53	-5.11	Pass
3.87	19.08	10.03	1.07	30.18	Average	Neutral	46.00	-15.82	Pass
2.04	18.24	10.02	0.95	29.21	Average	Neutral	46.00	-16.79	Pass
0.40	21.87	10.01	0.73	32.60	Average	Neutral	47.91	-15.31	Pass
1.07	21.37	10.02	0.79	32.18	Average	Neutral	46.00	-13.82	Pass
0.78	22.14	10.01	0.76	32.92	Average	Neutral	46	-13.08	Pass

### Conducted Emission Test Results

Test specification:	Conducted Emissions			Result:	<input checked="" type="checkbox"/> Pass  <input type="checkbox"/> Fail
Environmental Conditions:	Temp(°C):	21			
	Humidity (%):	42			
	Atmospheric(mbar):	1021			
Mains Power:	120Vac, 60Hz				
Tested by:	Oswaldo Casorla				
Test Date:	04/29/2015				
Remarks	Neutral				



Neutral Plot at 120Vac, 60Hz


Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
0.47	39.91	10.01	0.73	50.65	Quasi Peak	Live	56.55	-5.90	Pass
1.38	33.15	10.02	0.85	44.02	Quasi Peak	Live	56.00	-11.98	Pass
0.37	30.49	10.01	0.72	41.22	Quasi Peak	Live	58.57	-17.35	Pass
1.88	32.85	10.02	0.93	43.81	Quasi Peak	Live	56.00	-12.19	Pass
3.74	30.82	10.03	1.05	41.91	Quasi Peak	Live	56.00	-14.09	Pass
0.77	34.92	10.01	0.76	45.69	Quasi Peak	Live	56.00	-10.31	Pass
0.47	29.28	10.01	0.73	40.02	Average	Live	46.55	-6.53	Pass
1.38	18.04	10.02	0.85	28.90	Average	Live	46.00	-17.10	Pass
0.37	23.56	10.01	0.72	34.29	Average	Live	48.57	-14.28	Pass
1.88	18.64	10.02	0.93	29.59	Average	Live	46.00	-16.41	Pass
3.74	19.03	10.03	1.05	30.12	Average	Live	46.00	-15.88	Pass
0.77	21.61	10.01	0.76	32.38	Average	Live	46	-13.62	Pass

Note: The results above show only the worst case.



**10.2 26 dB Bandwidth**

**Requirement(s):**

Spec	Item	Requirement	Applicable
§ 15.407	-	26 dB Emission BW: Report only for reference.	<input checked="" type="checkbox"/>
	a) (2)	26 dB Emission BW: Report only for power limit calculation.	<input type="checkbox"/>
Test Setup			
Test Procedure	789033 D02 General UNII Test Procedures New Rules v01  <u>26dB Emission bandwidth measurement procedure (Other than 5.725-5.85 GHz)</u> <ul style="list-style-type: none"> <li>- Allow the trace to stabilize.</li> <li>- Use the spectrum analyzer built-in measurement function to determine the 26dB BW.               <ul style="list-style-type: none"> <li>o Set RBW = around 1% of emission bandwidth</li> <li>o Set VBW &gt; RBW</li> <li>o Detector = Peak</li> <li>o Trace mode = max hold</li> </ul> </li> <li>- Capture the plot.</li> <li>- Repeat above steps for different test channel and other modulation type.</li> </ul>		
Test Date	02/26/2015	Environmental condition	Temperature 23°C Relative Humidity 42% Atmospheric Pressure 1021mbar
Remark	N/A		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

**Equipment Setting**

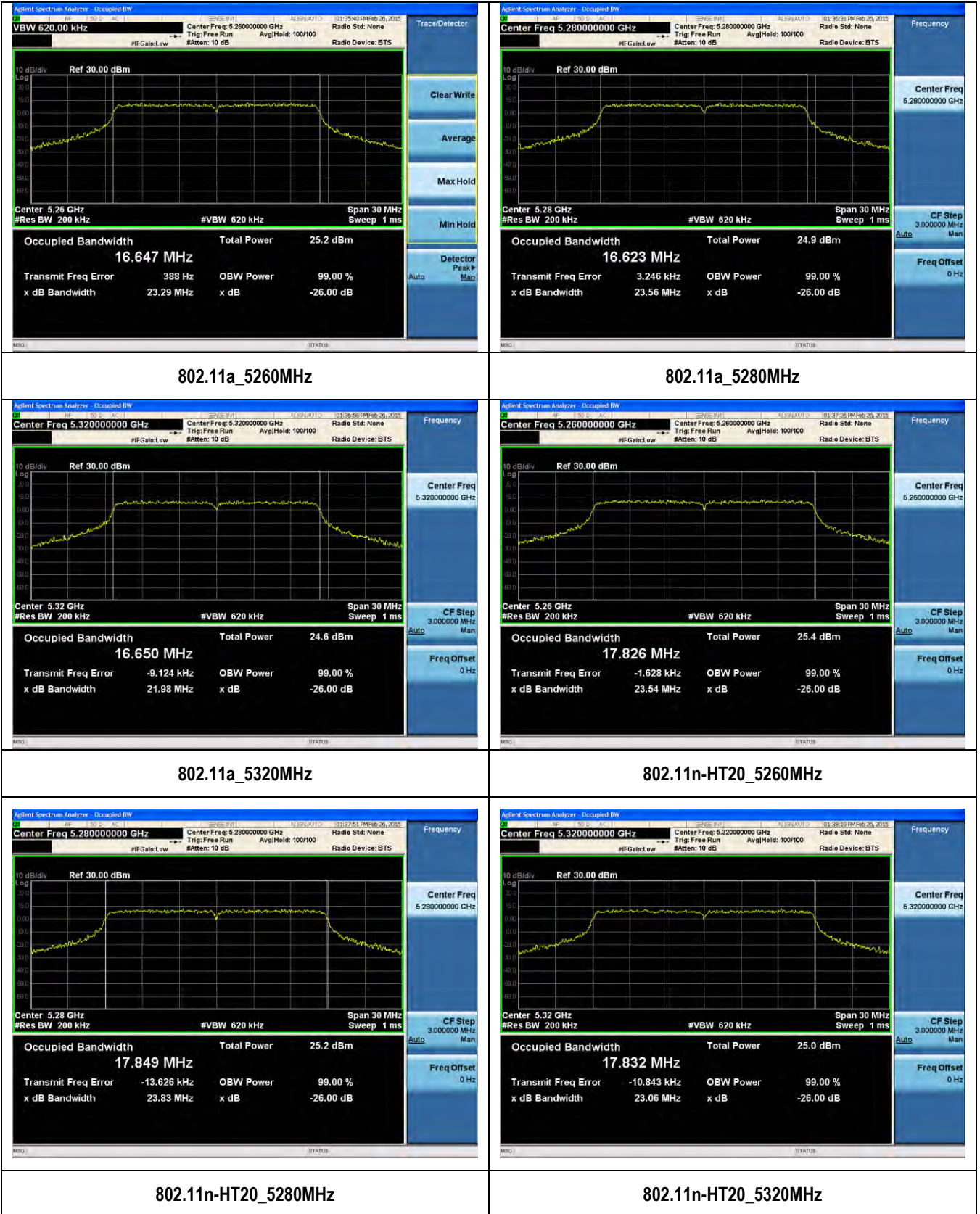
TEST	RBW	VBW	SPAN	Detector	SWEEP	Trace	NOTES
26 dB Emission Bandwidth	1% of 26 dB EBW	>RBW	>EBW	PK	Auto	Maxhold	-

**Test Data**     Yes       N/A  
**Test Plot**     Yes       N/A

**26dB Bandwidth measurement result**

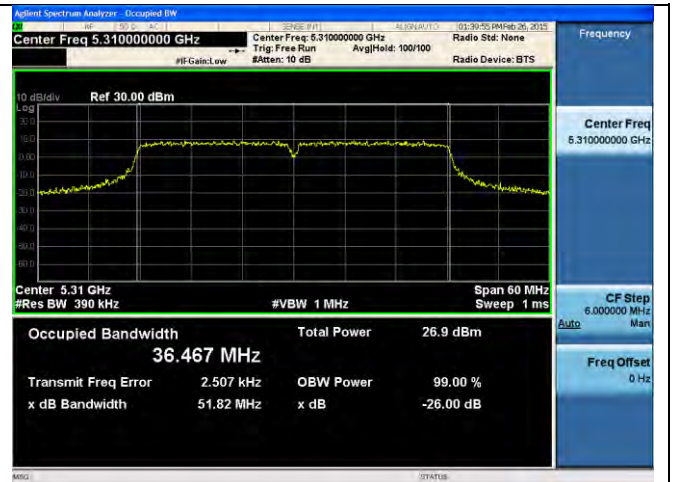
Band	Test mode	Frequency (MHz)	CH	Result (MHz)	Limit (MHz)
5250-5350	802.11a	5260	Low	23.29	-
		5280	Mid	23.56	-
		5320	High	21.98	-
	802.11n-HT20	5260	Low	23.54	-
		5280	Mid	23.83	-
		5320	High	23.06	-
	802.11n-HT40	5270	Low	54.05	-
		5310	High	51.82	-
	802.11ac	5290	Mid	105.80	-
5470-5725	802.11a	5500	Low	22.81	-
		5580	Mid	22.37	-
		5700	High	23.14	-
	802.11n-HT20	5500	Low	23.68	-
		5580	Mid	22.56	-
		5700	High	26.10	-
	802.11n-HT40	5510	Low	50.42	-
		5550	Mid	48.95	-
		5670	High	56.02	-
	802.11ac	5530	Low	100.20	-
Cross band	802.11a	5720	High	23.44	-
	802.11n-HT20	5720	High	25.64	-
	802.11n-HT40	5710	High	47.98	-
	802.11ac	5690	High	112.40	-

**26dB Bandwidth Test Plots**

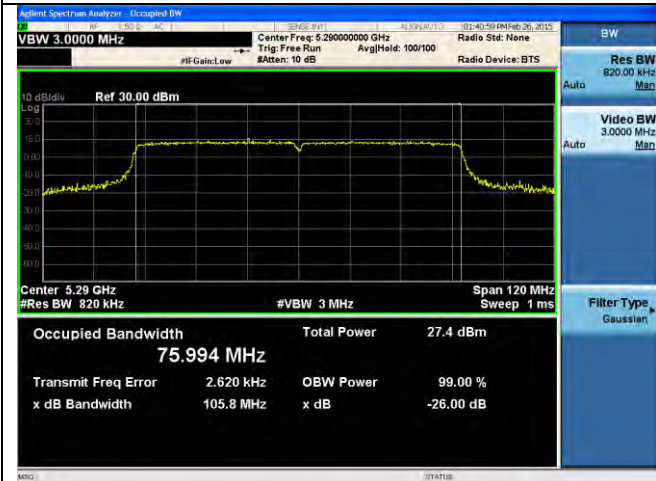




802.11n-HT40\_5270MHz



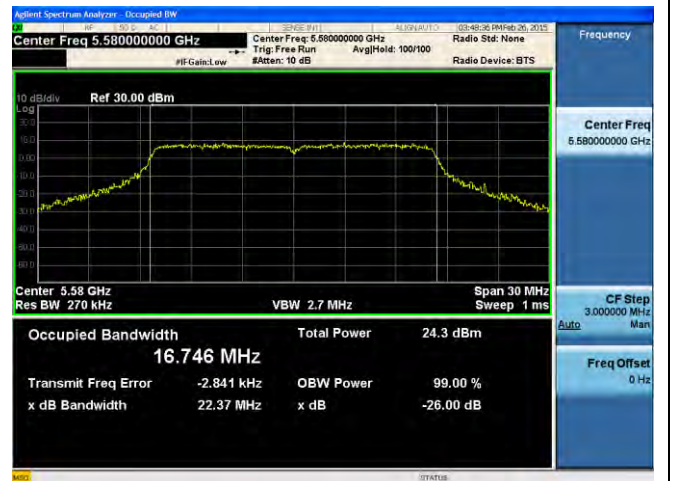
802.11n-HT40\_5310MHz



802.11ac\_5290MHz



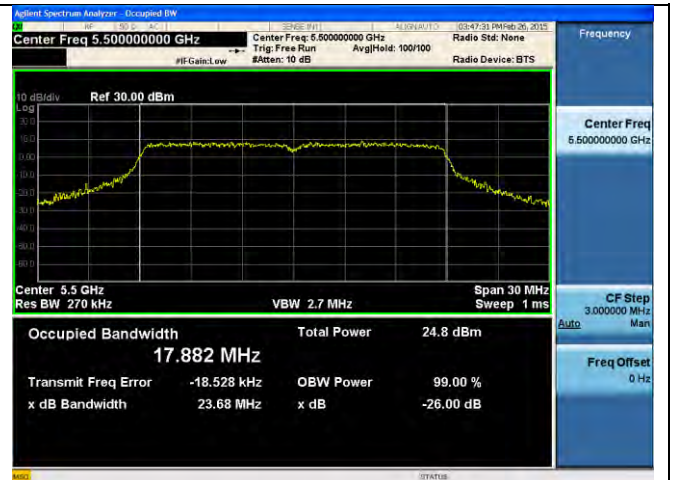
802.11a\_5500MHz



802.11a\_5580MHz



802.11a\_5700MHz



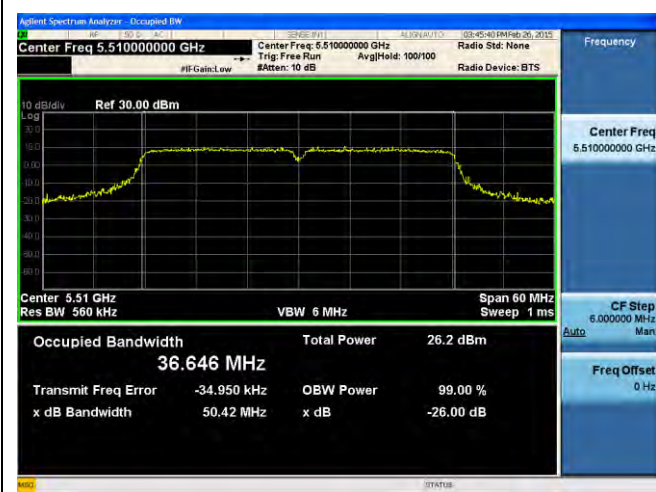
802.11n-HT20\_5500MHz



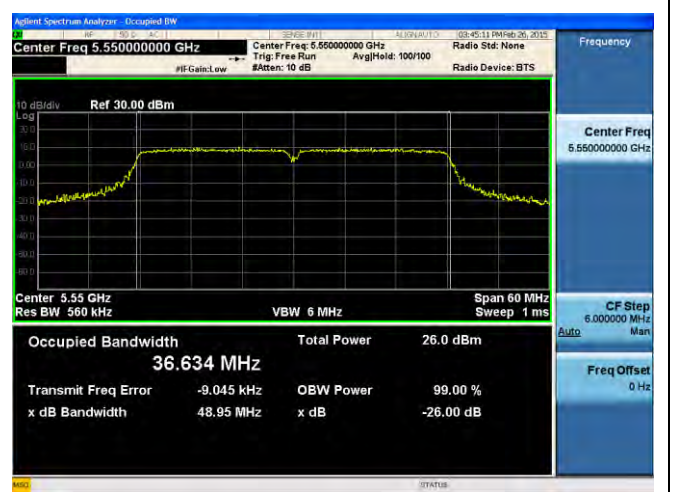
802.11n-HT20\_5580MHz



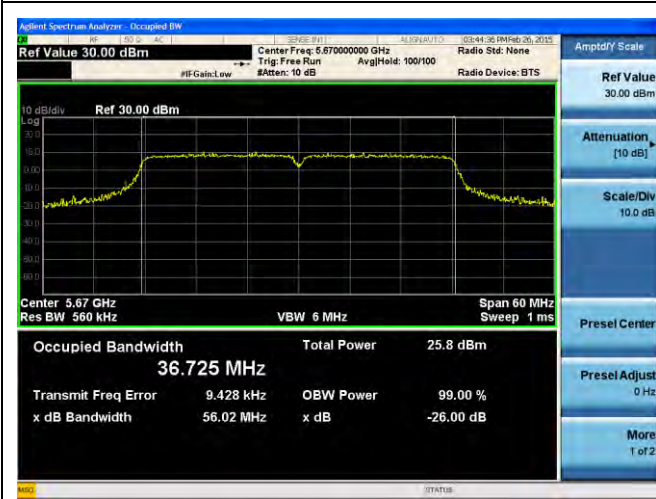
802.11n-HT20\_5700MHz



802.11n-HT40\_5510MHz



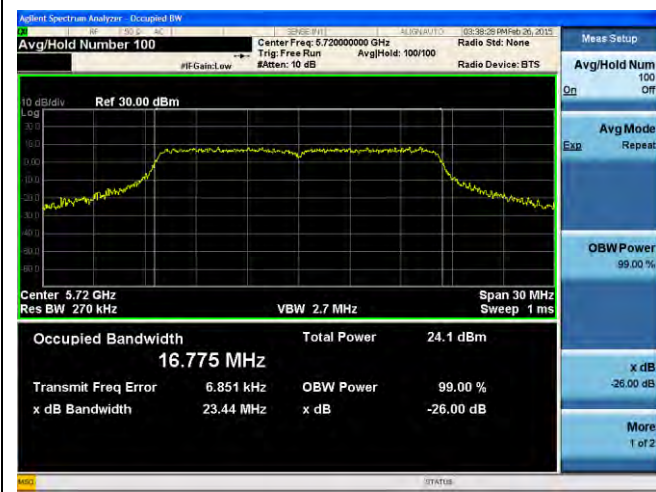
802.11n-HT40\_5550MHz



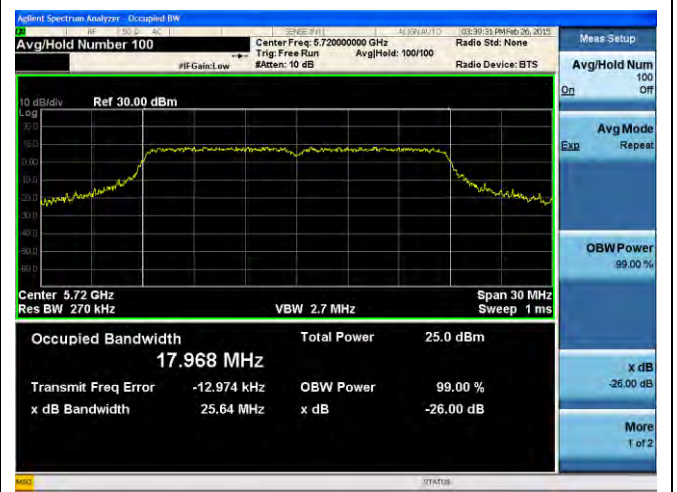
802.11n-NT40\_5670MHz



802.11ac\_5530MHz



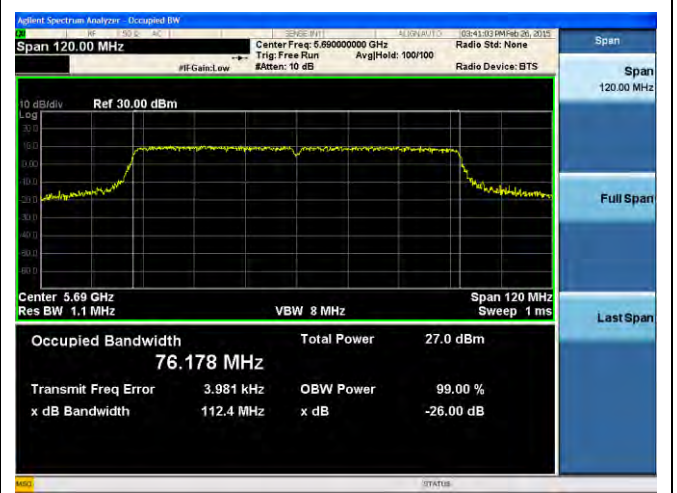
802.11a\_CROSS BAND\_5720MHz



802.11n-NT20\_CROSS BAND\_5720MHz




802.11n-NT40\_CROSS BAND\_5710MHz



802.11ac\_CROSS BAND\_5690MHz

### 10.3 Peak Output Power

**Requirement(s):**

Spec	Item	Requirement	Applicable
§ 15.407	a)(1)(i)	For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).	<input type="checkbox"/>
	a)(1)(ii)	For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.	<input type="checkbox"/>
	a)(1)(iii)	For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.	<input type="checkbox"/>
	a)(1)(iv)	For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.	<input type="checkbox"/>
	a)(2)	For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz.	<input checked="" type="checkbox"/>
	a)(3)	For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.	<input type="checkbox"/>
Test Setup			
Test Procedure	<p>789033 D02 General UNII Test Procedures New Rules v01</p> <p><u>Measurement using a Power Meter (PM)</u> Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.</p> <ul style="list-style-type: none"> <li>- Connect EUT's RF output power to power meter</li> <li>- Set EUT to be continuous transmission mode</li> <li>- Measurement the average output power using power meter and record the result</li> <li>- Repeat above steps for different test channel and other modulation type.</li> </ul>		
Test Date	02/26/2015	Environmental condition	Temperature 23°C Relative Humidity 44% Atmospheric Pressure 1021mbar
Remark	<p>Per KDB 662911 D01 Multiple Transmitter Output v02r01, For 5Ghz band, peak antenna gain = 1 dBi, directional gain = 3 dB, total gain = 4 dBi For the Cross band channels, the output power of full bandwidth is compared to the power limit in 5.5G and 5.8G as the worst case.</p>		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

**Test Data**     Yes                       N/A  
**Test Plot**     Yes (See below)       N/A


**Output Power measurement result**

Band	Test mode	Freq (MHz)	CH	Conducted Power (dBm)			Limit (dBm)	Result
				Chain1	Chain2	Combined Power		
5250-5350	802.11a	5260	Low	18.50	18.50	21.51	24.00	Pass
		5280	Mid	18.31	18.60	21.47	24.00	Pass
		5320	High	18.05	18.65	21.37	24.00	Pass
	802.11n-HT20	5260	Low	18.98	18.95	21.98	24.00	Pass
		5280	Mid	19.00	19.04	22.03	24.00	Pass
		5320	High	18.80	19.13	21.98	24.00	Pass
	802.11n-HT40	5270	Low	20.37	20.07	23.23	24.00	Pass
		5310	Mid	20.26	20.38	23.33	24.00	Pass
	802.11ac	5290	High	20.00	20.10	23.06	24.00	Pass
5470-5725	802.11a	5500	Low	18.30	18.63	21.48	24.00	Pass
		5580	Mid	17.82	17.82	20.83	24.00	Pass
		5700	High	18.24	17.86	21.06	24.00	Pass
	802.11n-HT20	5500	Low	18.17	18.61	21.41	24.00	Pass
		5580	Mid	18.68	18.12	21.42	24.00	Pass
		5700	High	18.29	17.76	21.04	24.00	Pass
	802.11n-HT40	5510	Low	19.49	19.63	22.57	24.00	Pass
		5550	Mid	19.22	19.03	22.14	24.00	Pass
	5670	High	18.28	19.08	21.71	24.00	Pass	
802.11ac	5530	Low	19.23	19.17	22.21	24.00	Pass	
Cross Band	802.11a	5720	-	18.51	18.04	21.29	24.00	Pass
	802.11n-HT20	5720	-	18.32	18.04	21.19	24.00	Pass
	802.11n-HT40	5710	-	18.28	19.46	21.92	24.00	Pass
	802.11ac	5690	-	18.85	19.27	22.08	24.00	Pass



## 10.4 Peak Spectral Density

### Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.407	a)(1)(i)	For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.	<input type="checkbox"/>
	a)(1)(ii)	For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.	<input type="checkbox"/>
	a)(2)	For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.	<input checked="" type="checkbox"/>
	a)(3)	For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.	<input checked="" type="checkbox"/>
Test Setup			
Test Procedure	<p>789033 D02 General UNII Test Procedures New Rules v01, II.F. Method SA-1</p> <p><u>Maximum spectral density measurement procedure</u></p> <ul style="list-style-type: none"> <li>- Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.</li> <li>- Set RBW = 1 MHz</li> <li>- Set VBW <math>\geq</math> 3 MHz</li> <li>- Detector = RMS.</li> <li>- Sweep time = auto couple.</li> <li>- Trace mode = max hold.</li> <li>- Trace average at least 100 traces in power averaging</li> <li>- Use the peak marker function to determine the maximum amplitude level within the RBW.</li> </ul> <p>Apply correction to the result if different RBW is used.</p>		
Test Date	02/26/2015	Environmental condition	Temperature 22°C Relative Humidity 46% Atmospheric Pressure 1020mbar
Remark	<p>Per KDB 662911 D01 Multiple Transmitter Output v02r01,            For 5Ghz band, peak antenna gain = 1 dBi, directional gain = 3 dB, total gain = 4 dBi            For the Cross band channels, the PSD of full bandwidth is compared to the PSD limit in 5.5G and 5.8G as the worst case. For 5.8GHz band, the PSD measurement on Cross band channel is using 1MHz BW as the worst case.</p>		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

### Equipment Setting

TEST	RBW	VBW	SPAN	Detector	SWEEP	Trace	NOTES
PSD	1MHz	$\geq$ 3MHz	>EBW	RMS	Auto	Average	-

Test Data  Yes       N/A

Test Plot  Yes (See below)       N/A

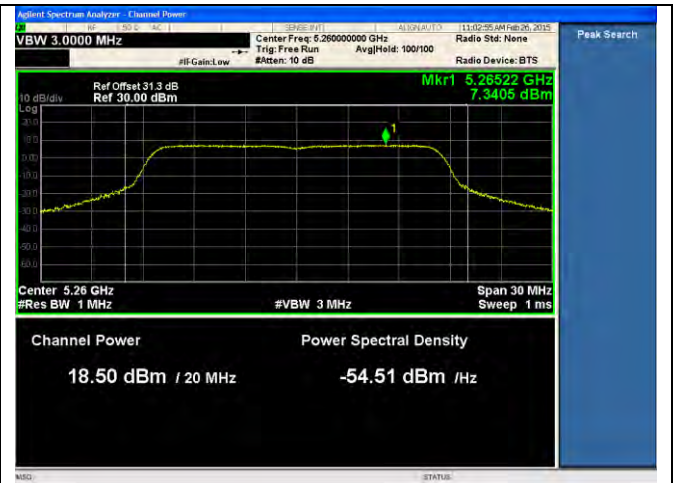
**PSD measurement result**

Band	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/MHz)			Limit (dBm/MHz)	Result
				Chain1	Chain2	Combined PSD		
5250-5350	802.11a	5260	Low	7.3704	7.3405	10.37	11	Pass
		5280	Mid	7.1551	7.4374	10.31	11	Pass
		5320	High	7.1769	7.5219	10.36	11	Pass
	802.11n-HT20	5260	Low	7.5738	7.6341	10.61	11	Pass
		5280	Mid	7.6712	7.5934	10.64	11	Pass
		5320	High	7.4779	7.5599	10.53	11	Pass
	802.11n-HT40	5270	Low	5.9187	5.6554	8.80	11	Pass
		5310	Mid	5.8694	5.9330	8.91	11	Pass
	802.11ac	5290	High	2.2991	1.3798	4.87	11	Pass
5470-5725	802.11a	5500	Low	7.3397	7.6551	10.51	11	Pass
		5580	Mid	6.7058	6.8804	9.80	11	Pass
		5700	High	7.0249	6.8901	9.97	11	Pass
	802.11n-HT20	5500	Low	6.9601	7.0697	10.03	11	Pass
		5580	Mid	7.2080	6.9788	10.11	11	Pass
		5700	High	7.0565	6.5032	9.80	11	Pass
	802.11n-HT40	5510	Low	5.1879	5.2904	8.25	11	Pass
		5550	Mid	4.7813	4.6135	7.71	11	Pass
	5670	High	3.8775	4.7112	7.32	11	Pass	
802.11ac	5530	Low	1.6234	1.8950	4.77	11	Pass	
Cross Band	802.11a	5720	-	7.4082	6.9555	10.20	11	Pass
	802.11n-HT20	5720	-	6.9299	6.6690	9.81	11	Pass
	802.11n-HT40	5710	-	3.7824	5.0153	7.45	11	Pass
	802.11ac	5690	-	1.3518	1.9095	4.65	11	Pass

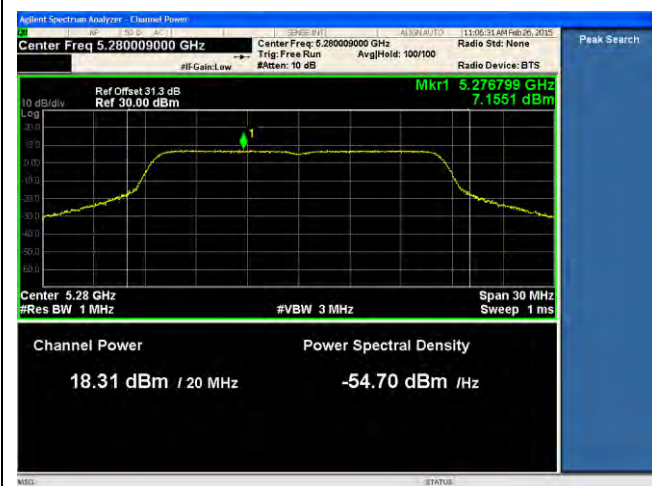
**Test Plots**



**PSD-802.11a-5260M-chain1**



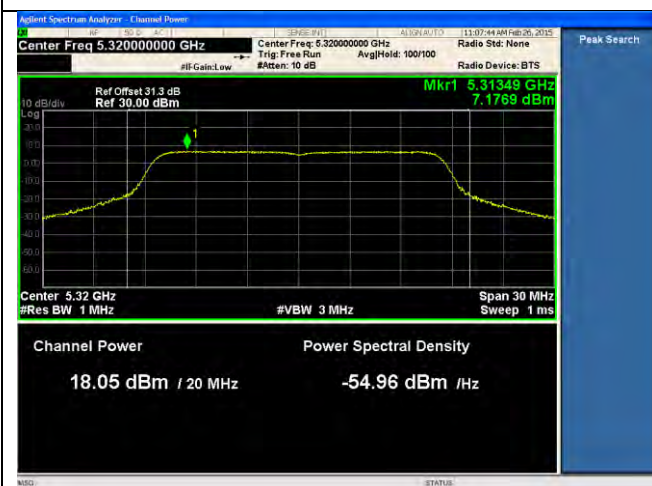
**PSD-802.11a-5260M-chain2**



**PSD-802.11a-5280M-chain1**



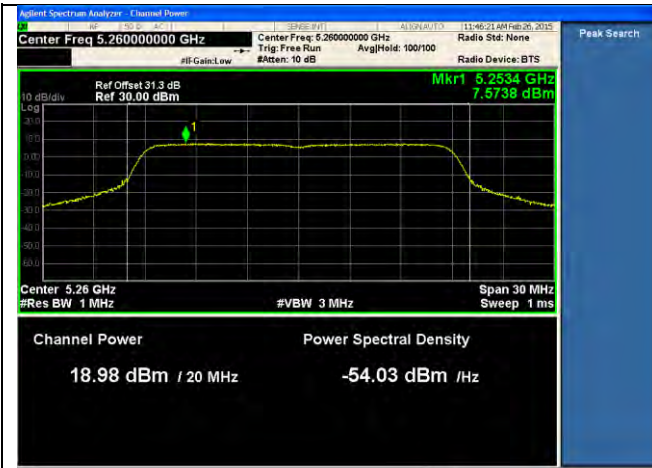
**PSD-802.11a-5280M-chain2**



**PSD-802.11a-5320M-chain1**



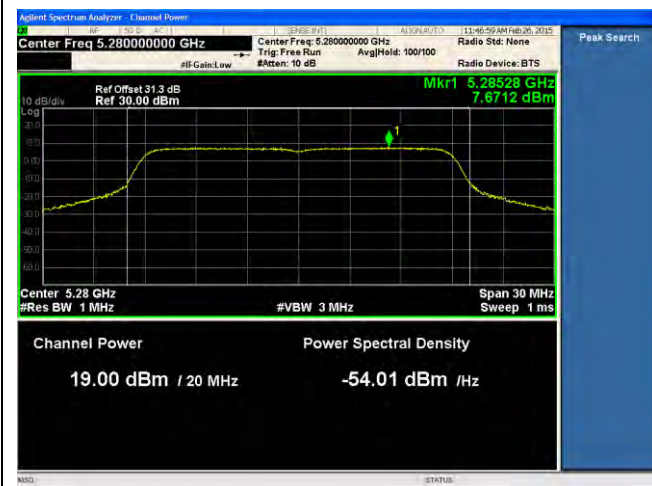
**PSD-802.11a-5320M-chain2**



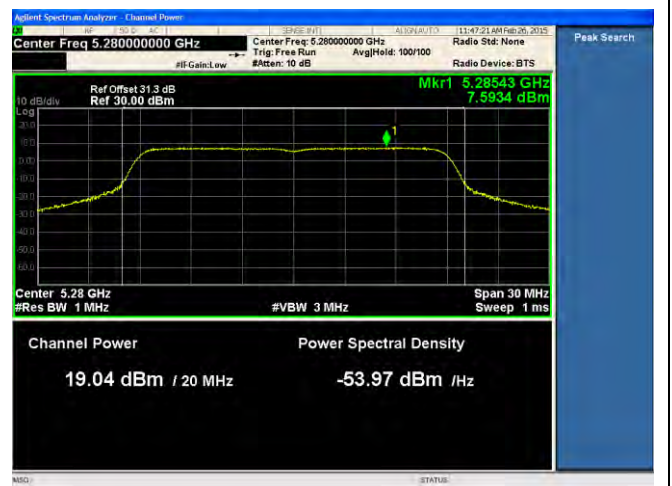
PSD-802.11n-HT20-5260M-chain1



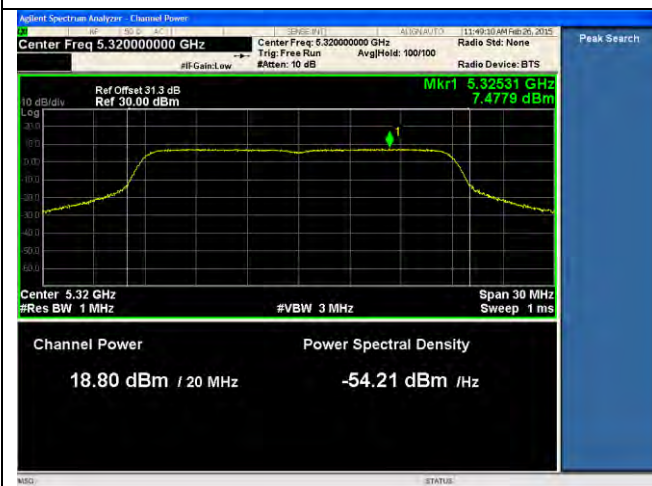
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PSD-802.11n-HT20-5280M-chain1



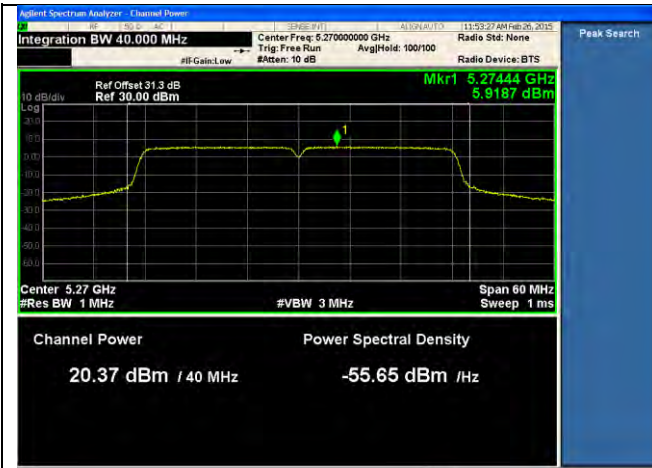
PSD-802.11n-HT20-5280M-chain2



PSD-802.11n-HT20-5320M-chain1



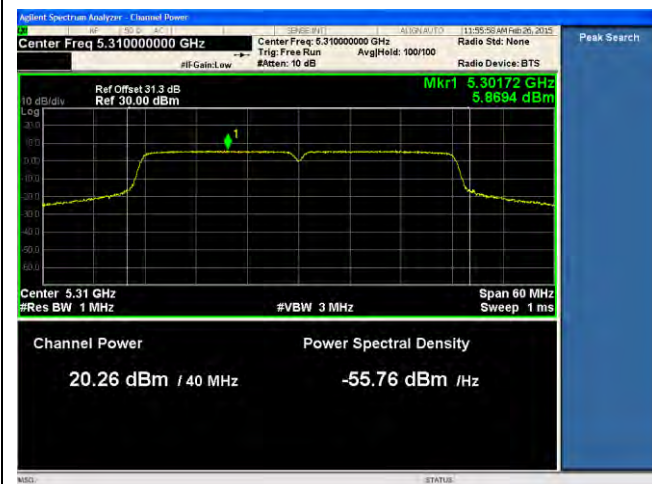
PSD-802.11n-HT20-5320M-chain2



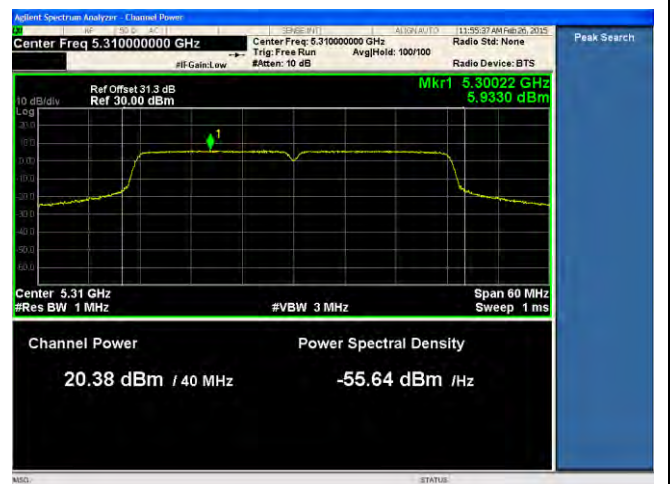
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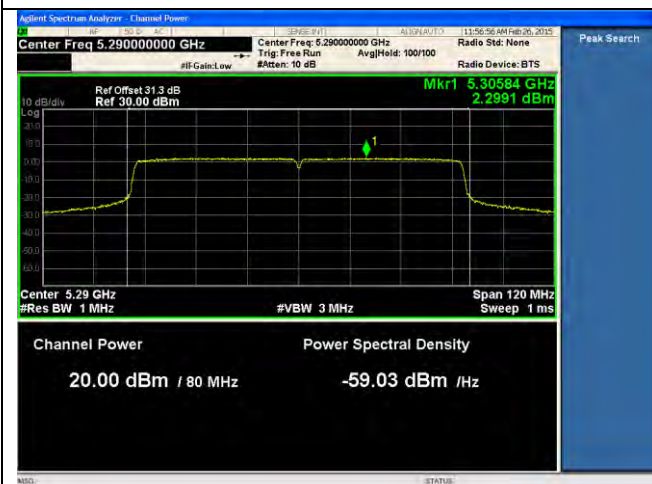
PSD-802.11n-HT40-5270M-chain2



PSD-802.11n-HT40-5310M-chain1



PSD-802.11n-HT40-5310M-chain2



PSD-802.11ac -80M-5290M-chain1



PSD-802.11ac -80M-5290M-chain2



PSD-802.11a-5500M-chain1



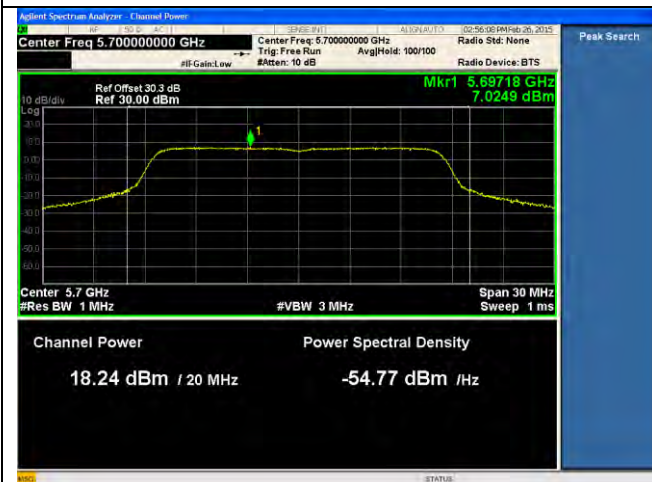
PSD-802.11a-5500M-chain2



PSD-802.11a-5580M-chain1



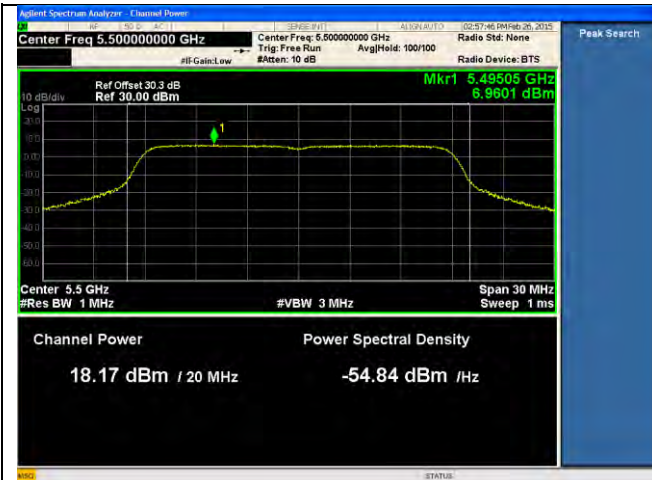
PSD-802.11a-5580M-chain2



PSD-802.11a-5700M-chain1



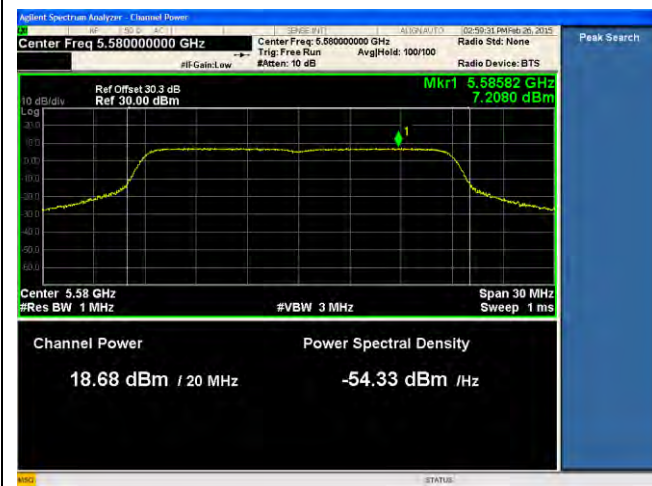
PSD-802.11a-5700M-chain2



PSD-802.11n-HT20-5500M-chain1



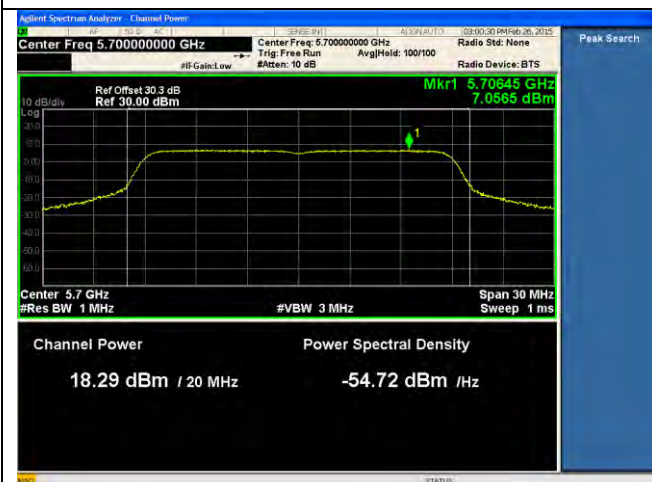
PSD-802.11n-HT20-5500M-chain2



PSD-802.11n-HT20-5580M-chain1



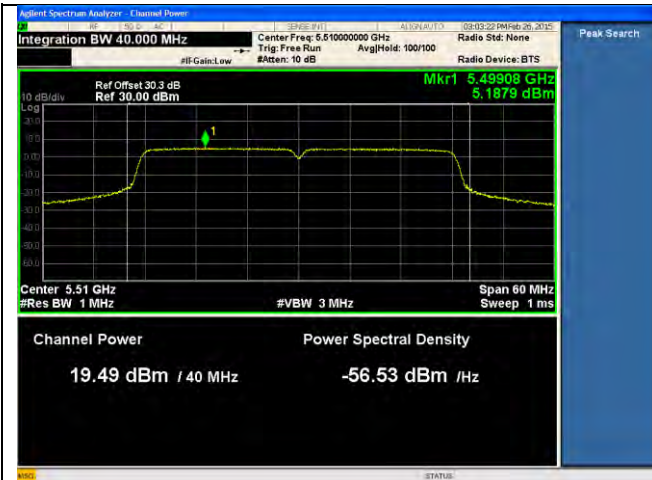
PSD-802.11n-HT20-5580M-chain2



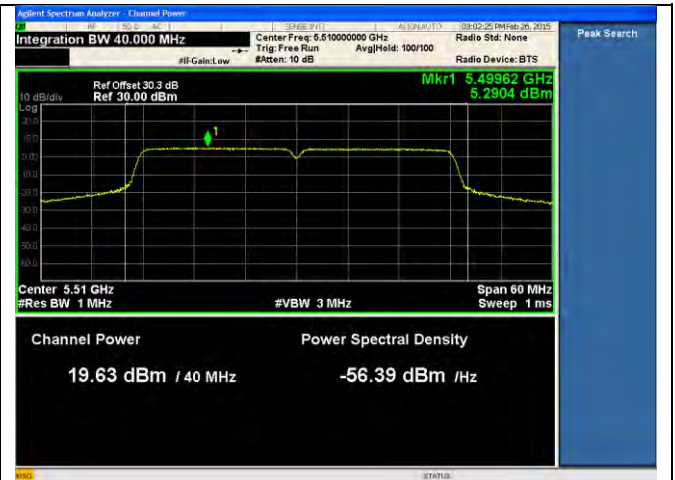
PSD-802.11n-HT20-5700M-chain1



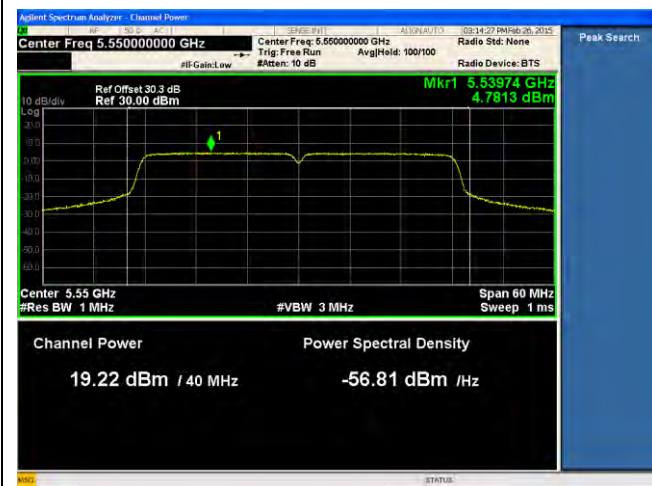
PSD-802.11n-HT20-5700M-chain2



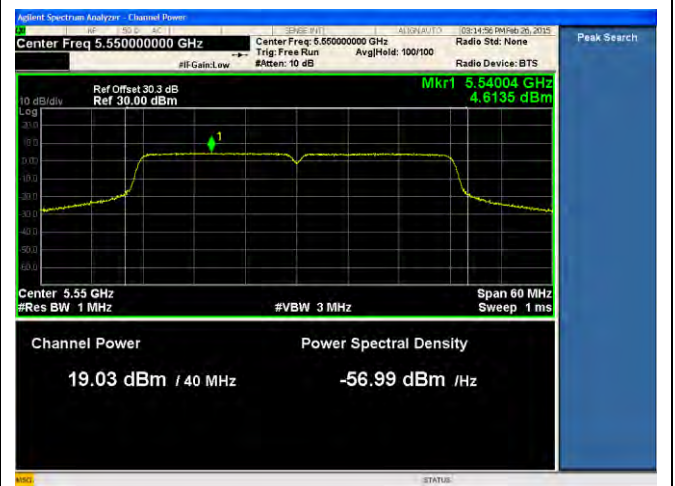
PSD-802.11n-HT40-5510M-chain1



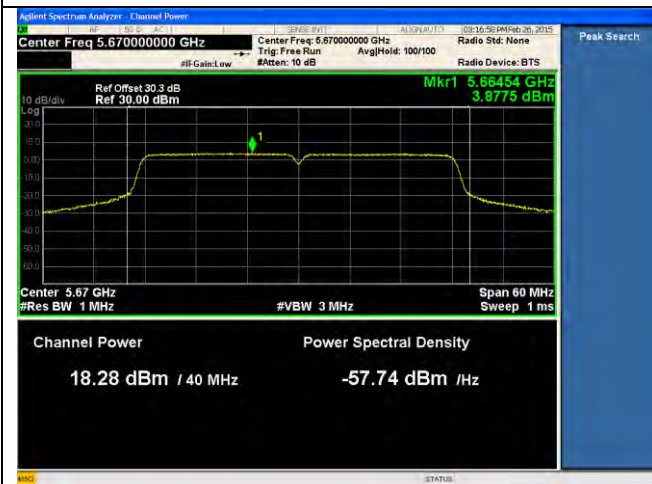
PSD-802.11n-HT40-5510M-chain2



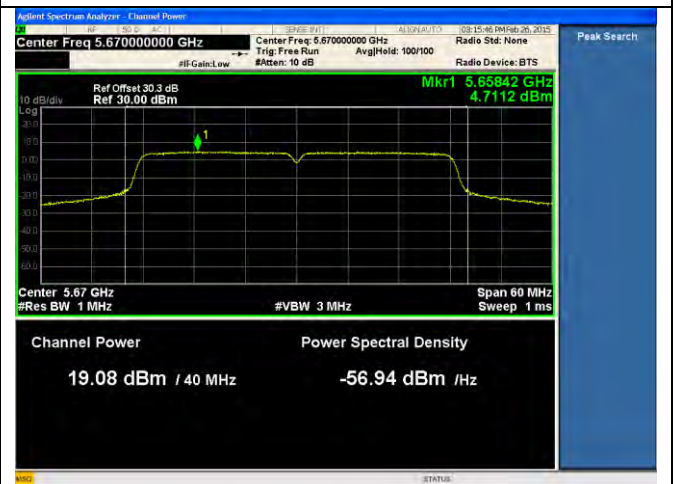
PSD-802.11n-HT40-5550M-chain1



PSD-802.11n-HT40-5550M-chain2

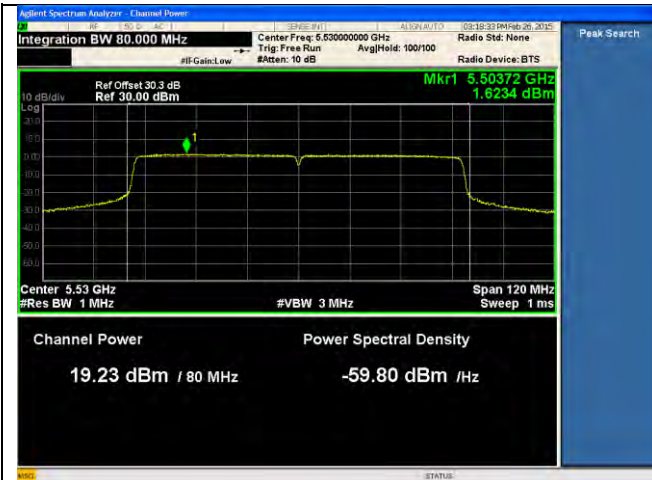


PSD-802.11n-HT40-5670M-chain1

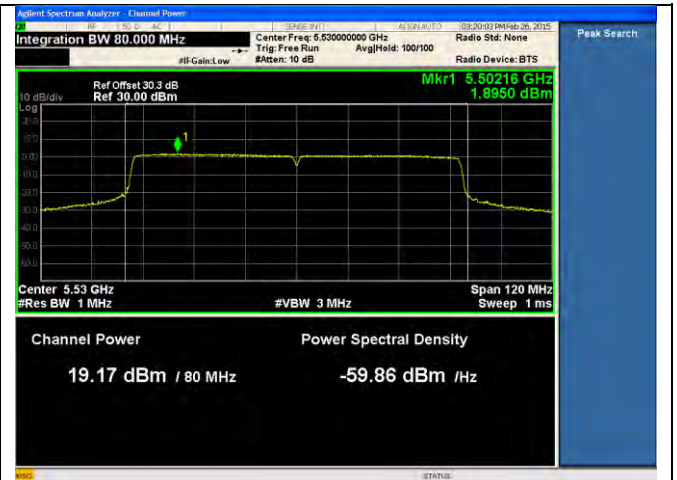


PSD-802.11n-HT40-5670M-chain2

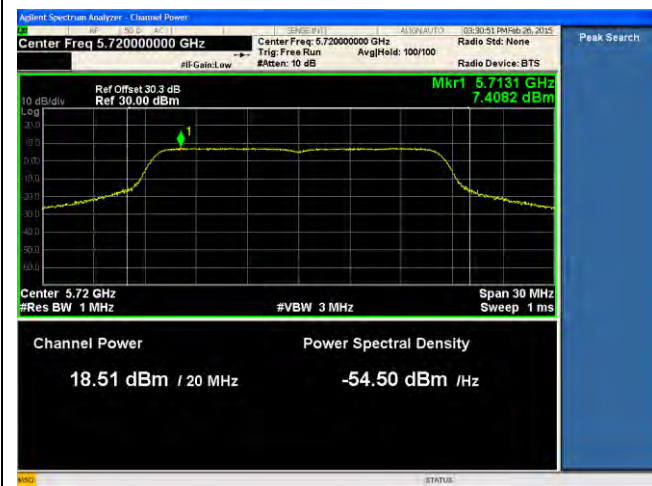




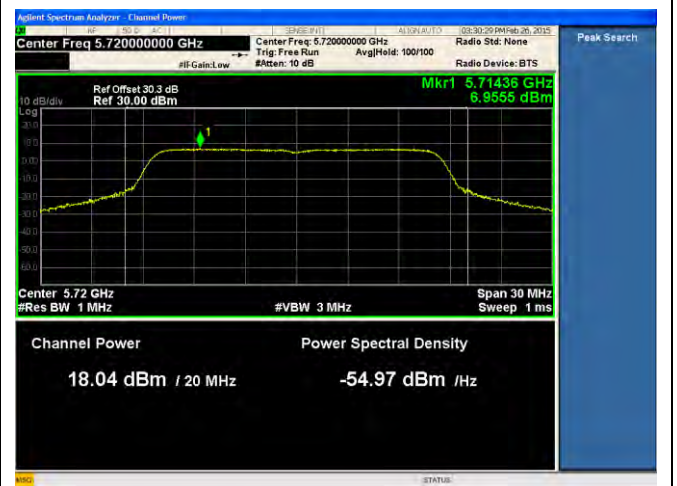
PSD-802.11ac -80M-5530M-chain1



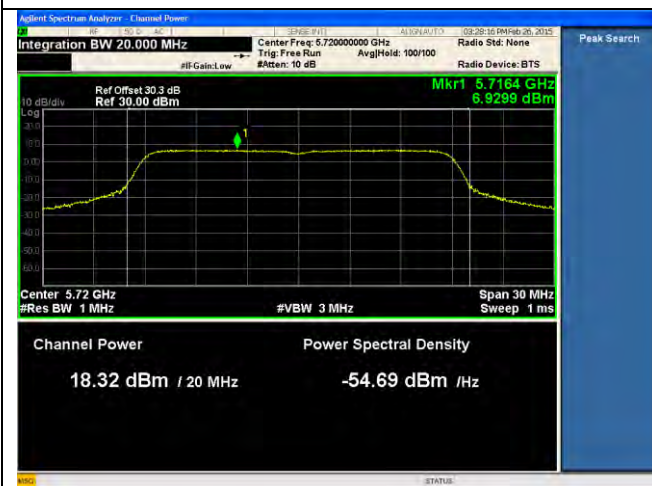
PSD-802.11ac -80M-5530M-chain2



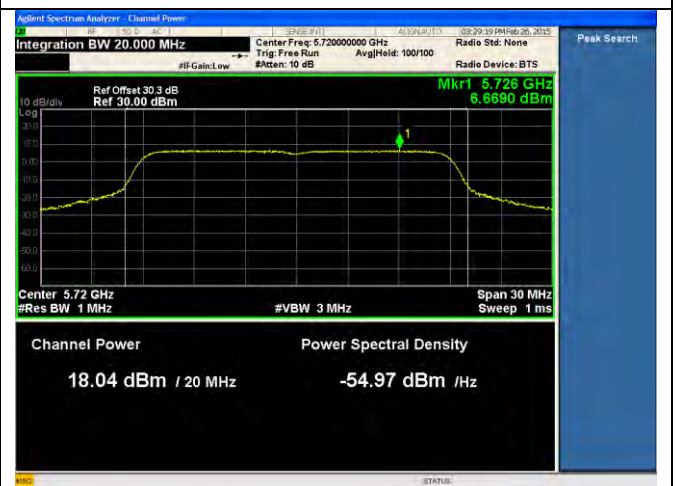
PSD-802.11a-CROSS BAND-5720M-chain1



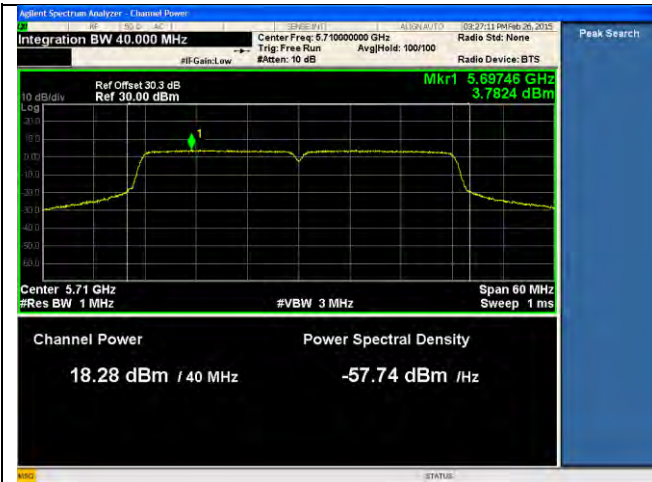
PSD-802.11a-CROSS BAND-5720M-chain2



PSD-802.11n-HT20-CROSS BAND-5720M-chain1



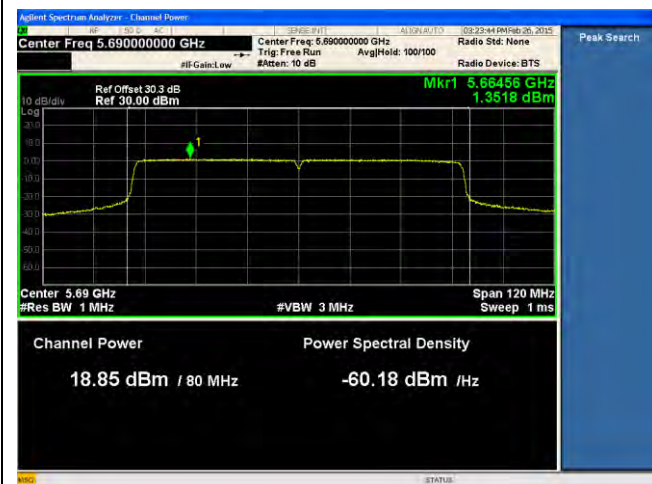
PSD-802.11n-HT20-CROSS BAND-5720M-chain2



PSD-802.11n-HT40-CROSS BAND-5710M-chain1



PSD-802.11n-HT40-CROSS BAND-5710M-chain2



PSD-802.11ac -CROSS BAND-5690M-chain1



PSD-802.11ac -CROSS BAND-5690M-chain2

### 10.5 Radiated Spurious Emissions below 1GHz

**Requirement(s):**

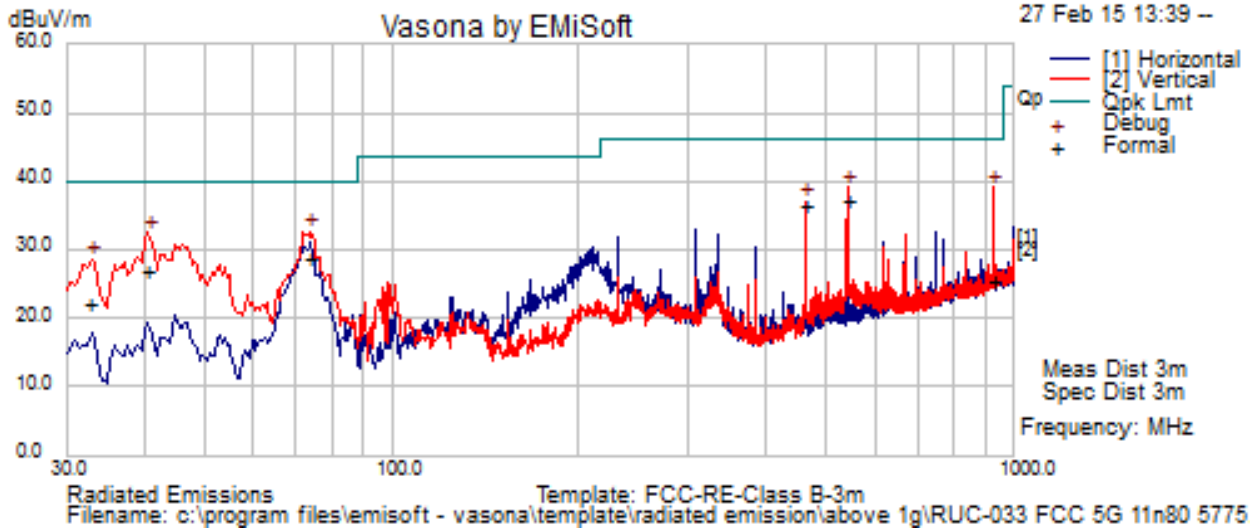
Spec	Requirement	Applicable										
47CFR§ 15.407(b) 15.209 (a)	<p>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges</p> <table border="1"> <thead> <tr> <th>Frequency range (MHz)</th> <th>Field Strength (uV/m)</th> </tr> </thead> <tbody> <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> </tbody> </table>	Frequency range (MHz)	Field Strength (uV/m)	30 – 88	100	88 – 216	150	216 960	200	Above 960	500	☒
Frequency range (MHz)	Field Strength (uV/m)											
30 – 88	100											
88 – 216	150											
216 960	200											
Above 960	500											
Test Setup												
Procedure	<ol style="list-style-type: none"> <li>1. The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>2. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:             <ol style="list-style-type: none"> <li>a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</li> <li>b. The EUT was then rotated to the direction that gave the maximum emission.</li> <li>c. Finally, the antenna height was adjusted to the height that gave the maximum emission.</li> </ol> </li> <li>3. A Quasi-peak measurement was then made for that frequency point.</li> <li>4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</li> </ol>											
Remark	The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.											
Result	☒ Pass      ☐ Fail											

**Test Data**    ☒ Yes (See below)      ☐ N/A

**Test Plot**    ☒ Yes (See below)      ☐ N/A

### Radiated Emission Test Results (Below 1GHz)

Test specification:	Radiated Emission			Result:	<input checked="" type="checkbox"/> Pass  <input type="checkbox"/> Fail
Environmental Conditions:	Temp(°C):	21			
	Humidity (%):	40			
	Atmospheric(mbar):	1019			
Mains Power:	120VAC, 60Hz				
Tested by:	Teody Manansala				
Test Date:	2/27/2015				
Remarks:	N/A				



#### 30MHz – 1000MHz at 3 meters

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
924.22	35.13	6.71	-16.39	25.46	Quasi Max	V	154.00	103.00	46.00	-20.54	Pass
538.95	54.07	4.46	-21.44	37.09	Quasi Max	V	101.00	351.00	46.00	-8.91	Pass
74.12	58.26	1.50	-31.12	28.65	Quasi Max	V	115.00	69.00	40.00	-11.35	Pass
40.52	51.87	1.07	-26.17	26.77	Quasi Max	V	118.00	33.00	40.00	-13.23	Pass
461.96	54.98	3.97	-22.72	36.23	Quasi Max	V	112.00	356.00	46.00	-9.77	Pass
32.83	42.03	1.01	-20.80	22.24	Quasi Max	V	126.00	252.00	40.00	-17.76	Pass

Note: Both horizontal and vertical polarities were investigated. The results above show only the worst case.

### 10.6 Radiated Spurious Emissions above 1GHz

**Requirement(s):**

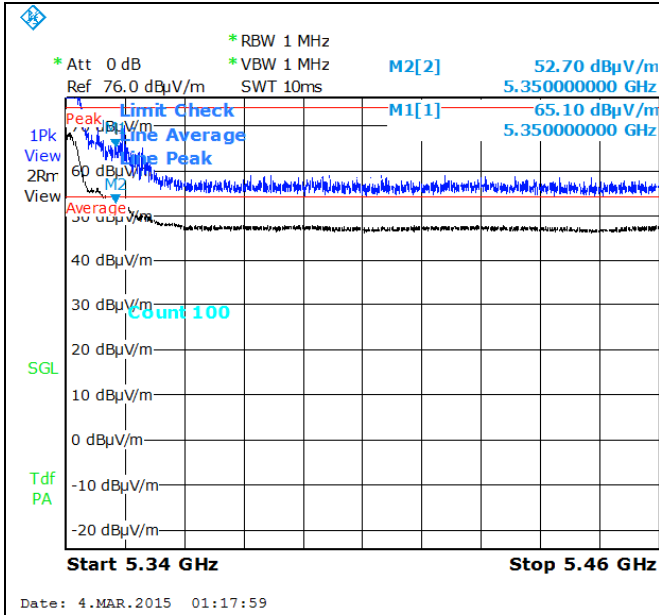
Spec	Item	Requirement	Applicable
47CFR§ 15.407(b)(2), 15.407(b)(6)	(1)	For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.	<input type="checkbox"/>
	(2)	For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.	<input checked="" type="checkbox"/>
	(3)	For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.	<input checked="" type="checkbox"/>
	(4)	For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz.	<input type="checkbox"/>
	(5)	Restricted band, emission must also comply with the radiated emission limits specified in 15.209	<input checked="" type="checkbox"/>
Test Setup			
Procedure	<ol style="list-style-type: none"> <li>The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: <ol style="list-style-type: none"> <li>Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</li> <li>The EUT was then rotated to the direction that gave the maximum emission.</li> <li>Finally, the antenna height was adjusted to the height that gave the maximum emission.</li> </ol> </li> <li>An average measurement was then made for that frequency point.</li> <li>Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</li> </ol>		
Remark	The EUT was scanned up to 40GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

**Equipment Setting**

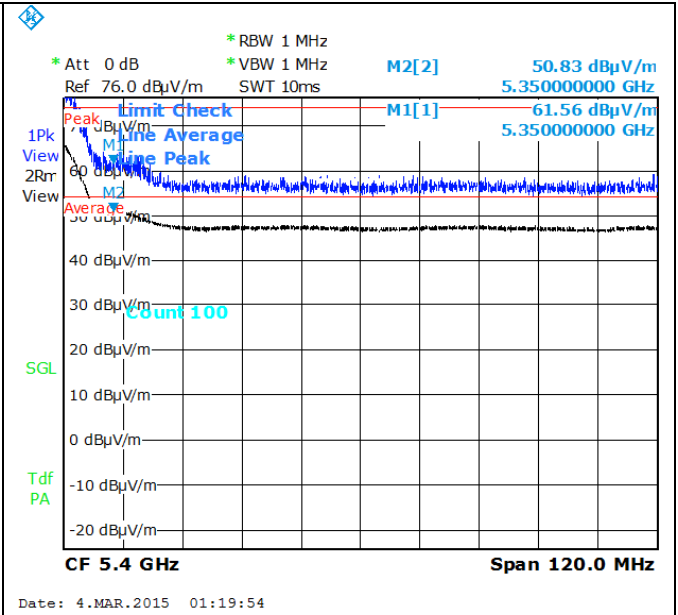
TEST	RBW	VBW	SPAN	Detector	SWEEP	Trace	NOTES
Radiated Spurious Emission	1MHz	3MHz	1GHz - 25 GHz	Peak	Auto	Max hold	PK Measurement
Radiated Spurious Emission	1MHz	10Hz	1GHz - 25 GHz	Peak	Auto	Max hold	Ave Measurement

**Test Data**     Yes (See below)       N/A  
**Test Plot**     Yes (See below)       N/A

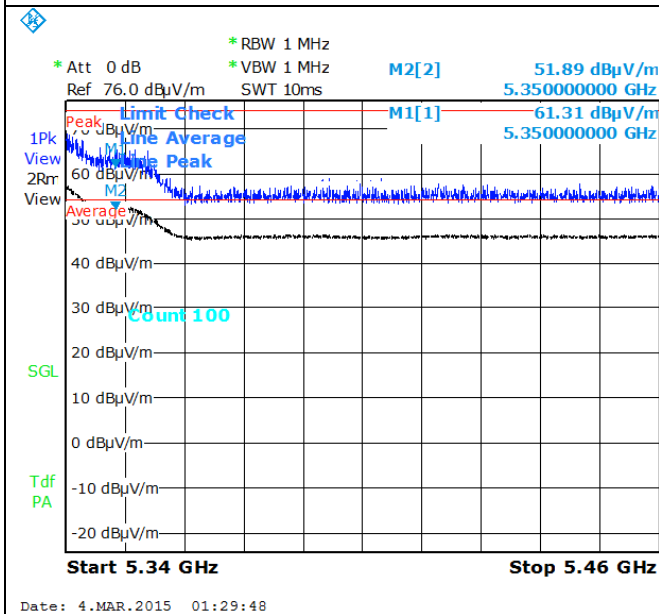
**Radiated Restricted band and Band Edge Measurement Plots:**



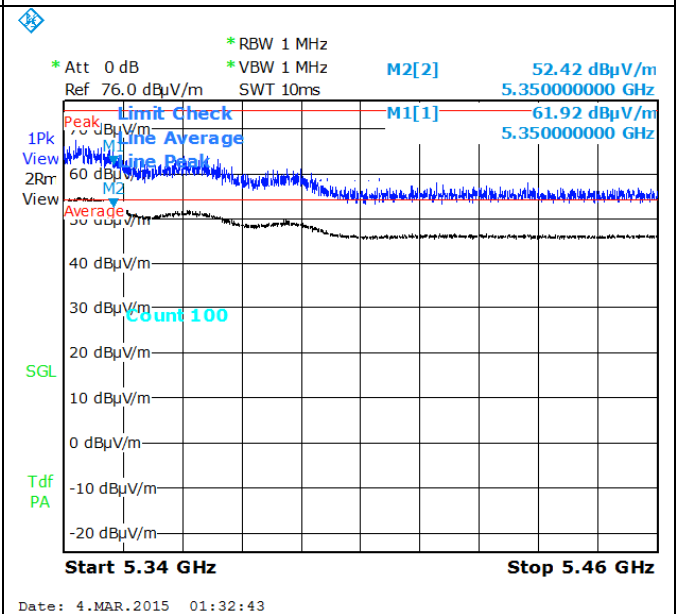
**802.11a 5320M(5350-5460MHz)**



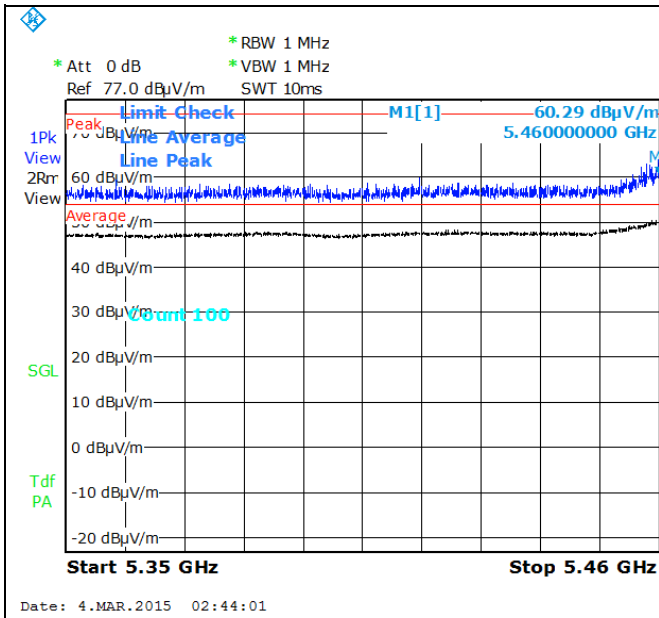
**802.11n-HT20 5320M(5350-5460MHz)**



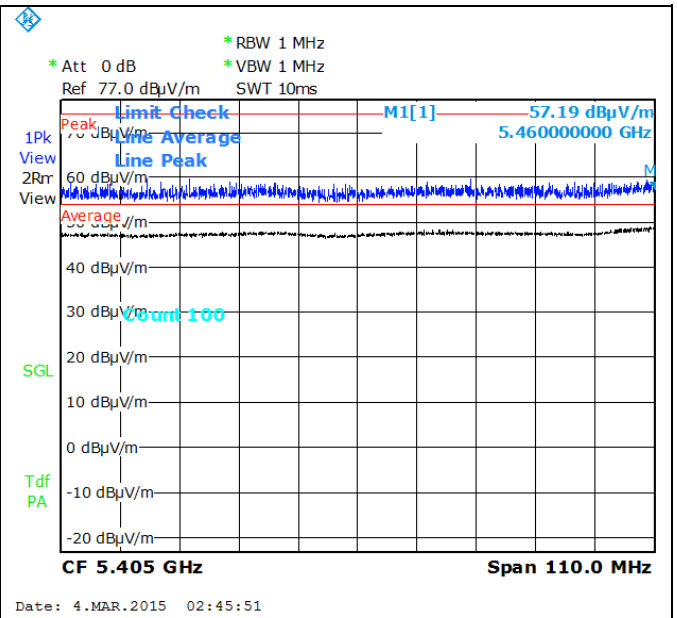
**802.11n-HT40 5310M(5350-5460MHz)**



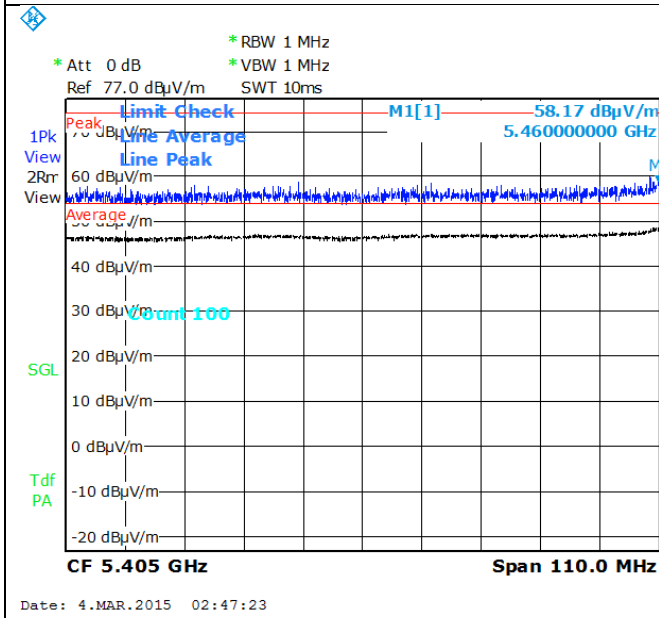
**802.11ac 5290M(5350-5460MHz)**



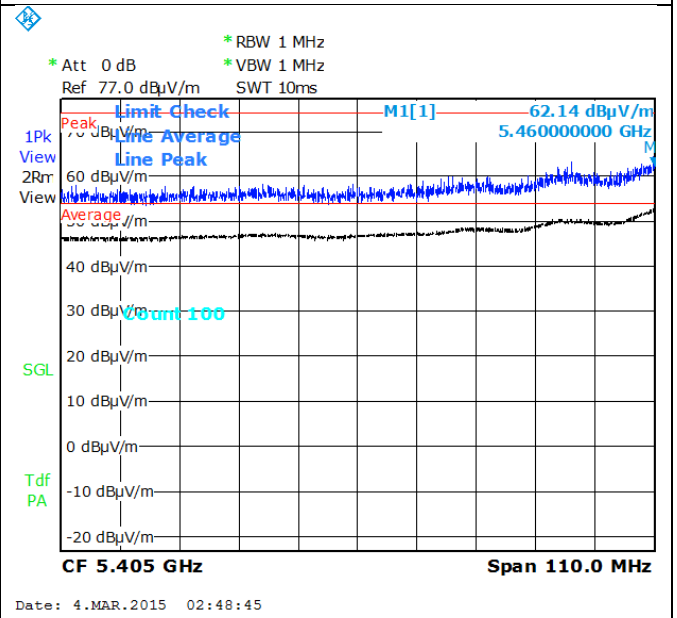
802.11a 5500M(5350-5470MHz)



802.11n-HT20 5500M(5350-5470MHz)



802.11n-HT40 5510M(5350-5470MHz)



802.11ac 5530M(5350-5470MHz)

## Radiated Emission Test Results (Above 1GHz)

### Above 1GHz-40GHz – 802.11a – 5260MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
6996.55	47.40	8.25	7.88	63.53	Peak Max	H	155.00	230.00	74.00	-10.47	Pass
14832.85	42.72	13.69	7.53	63.94	Peak Max	H	104.00	199.00	74.00	-10.06	Pass
17725.50	41.04	13.00	10.63	64.67	Peak Max	H	190.00	248.00	74.00	-9.33	Pass
6996.55	33.82	8.25	7.88	49.95	Average Max	H	155.00	230.00	54.00	-4.05	Pass
14832.85	29.68	13.69	7.53	50.91	Average Max	H	104.00	199.00	54.00	-3.09	Pass
17725.50	27.44	13.00	10.63	51.07	Average Max	H	190.00	248.00	54.00	-2.93	Pass

### Above 1GHz-40GHz – 802.11a – 5280MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
10571.34	41.99	11.00	8.48	61.48	Peak Max	V	208.00	87.00	74.00	-12.52	Pass
7028.28	42.39	8.27	7.87	58.53	Peak Max	H	130.00	16.00	74.00	-15.47	Pass
12481.46	42.71	13.01	8.37	64.08	Peak Max	V	127.00	279.00	74.00	-9.92	Pass
10571.34	28.60	11.00	8.48	48.08	Average Max	V	208.00	87.00	54.00	-5.92	Pass
7028.28	28.90	8.27	7.87	45.04	Average Max	H	130.00	16.00	54.00	-8.96	Pass
12481.46	28.92	13.01	8.37	50.30	Average Max	V	127.00	279.00	54.00	-3.70	Pass

### Above 1GHz-40GHz – 802.11a – 5320MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
10642.85	45.83	11.08	8.44	65.35	Peak Max	V	150.00	75.00	74.00	-8.65	Pass
7098.78	42.87	8.33	7.88	59.08	Peak Max	V	149.00	360.00	74.00	-14.92	Pass
14661.93	42.71	13.39	7.99	64.09	Peak Max	H	200.00	179.00	74.00	-9.91	Pass
10642.85	31.82	11.08	8.44	51.35	Average Max	V	150.00	75.00	54.00	-2.65	Pass
7098.78	29.49	8.33	7.88	45.70	Average Max	V	149.00	360.00	54.00	-8.30	Pass
14661.93	29.34	13.39	7.99	50.72	Average Max	H	200.00	179.00	54.00	-3.28	Pass

### Above 1GHz-40GHz – 802.11n-HT20– 5260MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
6997.49	47.28	8.25	7.88	63.41	Peak Max	H	122.00	133.00	74.00	-10.59	Pass
10540.90	41.20	10.97	8.50	60.67	Peak Max	V	240.00	108.00	74.00	-13.33	Pass
2022.57	44.20	3.42	11.41	59.02	Peak Max	V	215.00	18.00	74.00	-14.98	Pass
6997.49	33.83	8.25	7.88	49.96	Average Max	H	122.00	133.00	54.00	-4.04	Pass
10540.90	28.05	10.97	8.50	47.51	Average Max	V	240.00	108.00	54.00	-6.49	Pass
2022.57	30.26	3.42	11.41	45.09	Average Max	V	215.00	18.00	54.00	-8.91	Pass



**Above 1GHz-40GHz – 802.11n-HT20– 5280MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
10571.18	42.50	11.00	8.48	61.98	Peak Max	V	106.00	83.00	74.00	-12.02	Pass
2088.32	43.78	3.67	11.20	58.65	Peak Max	V	237.00	305.00	74.00	-15.35	Pass
7031.61	43.69	8.28	7.87	59.84	Peak Max	H	230.00	167.00	74.00	-14.16	Pass
10571.18	28.98	11.00	8.48	48.47	Average Max	V	106.00	83.00	54.00	-5.53	Pass
2088.32	30.73	3.67	11.20	45.60	Average Max	V	237.00	305.00	54.00	-8.40	Pass
7031.61	28.81	8.28	7.87	44.95	Average Max	H	230.00	167.00	54.00	-9.05	Pass

**Above 1GHz-40GHz – 802.11n-HT20– 5320MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
10642.67	47.57	11.08	8.44	67.10	Peak Max	V	127.00	92.00	74.00	-6.90	Pass
7100.11	42.50	8.33	7.88	58.71	Peak Max	V	101.00	198.00	74.00	-15.29	Pass
1989.39	43.37	3.32	11.40	58.09	Peak Max	H	175.00	295.00	74.00	-15.91	Pass
10642.67	33.50	11.08	8.44	53.03	Average Max	V	127.00	92.00	54.00	-0.97	Pass
7100.11	29.57	8.33	7.88	45.78	Average Max	V	101.00	198.00	54.00	-8.22	Pass
1989.39	30.18	3.32	11.40	44.89	Average Max	H	175.00	295.00	54.00	-9.11	Pass

**Above 1GHz-40GHz – 802.11n-HT40 – 5270MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
10539.79	41.34	10.97	8.50	60.80	Peak Max	V	0.00	0.00	74.00	-13.20	Pass
7028.31	42.39	8.27	7.87	58.53	Peak Max	H	290.00	179.00	74.00	-15.47	Pass
4031.53	40.45	5.86	12.09	58.39	Peak Max	V	219.00	293.00	74.00	-15.61	Pass
10539.79	27.70	10.97	8.50	47.17	Average Max	V	0.00	0.00	54.00	-6.83	Pass
7028.31	28.55	8.27	7.87	44.69	Average Max	H	290.00	179.00	54.00	-9.31	Pass
4031.53	27.02	5.86	12.09	44.97	Average Max	V	219.00	293.00	54.00	-9.03	Pass

**Above 1GHz-40GHz – 802.11n-HT40 – 5310MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
7062.96	43.00	8.30	7.88	59.18	Peak Max	V	131.00	318.00	74.00	-14.82	Pass
1989.74	42.72	3.32	11.40	57.44	Peak Max	V	273.00	71.00	74.00	-16.56	Pass
10618.33	42.11	11.05	8.46	61.62	Peak Max	V	167.00	81.00	74.00	-12.38	Pass
7062.96	29.06	8.30	7.88	45.23	Average Max	V	131.00	318.00	54.00	-8.77	Pass
1989.74	29.57	3.32	11.40	44.29	Average Max	V	273.00	71.00	54.00	-9.71	Pass
10618.33	28.78	11.05	8.46	48.29	Average Max	V	167.00	81.00	54.00	-5.71	Pass

**Above 1GHz-40GHz – 802.11ac – 5290MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
7064.38	41.86	8.30	7.88	58.03	Peak Max	H	118.00	261.00	74.00	-15.97	Pass
4133.30	40.73	5.94	11.64	58.31	Peak Max	V	113.00	109.00	74.00	-15.69	Pass
10578.25	41.19	11.01	8.48	60.68	Peak Max	V	100.00	51.00	74.00	-13.32	Pass
7064.38	29.01	8.30	7.88	45.19	Average Max	H	118.00	261.00	54.00	-8.81	Pass
4133.30	27.04	5.94	11.64	44.62	Average Max	V	113.00	109.00	54.00	-9.38	Pass
10578.25	27.79	11.01	8.48	47.28	Average Max	V	100.00	51.00	54.00	-6.72	Pass

**Above 1GHz-40GHz – 802.11a – 5500MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
4168.67	39.42	5.97	11.49	56.88	Peak Max	H	121.00	272.00	74.00	-17.12	Pass
6279.17	45.03	7.73	10.40	63.15	Peak Max	H	192.00	143.00	74.00	-10.85	Pass
14389.64	42.14	13.01	8.19	63.34	Peak Max	H	300.00	120.00	74.00	-10.66	Pass
4168.67	26.14	5.97	11.49	43.61	Average Max	H	121.00	272.00	54.00	-10.39	Pass
6279.17	31.38	7.73	10.40	49.51	Average Max	H	192.00	143.00	54.00	-4.49	Pass
14389.64	28.66	13.01	8.19	49.86	Average Max	H	300.00	120.00	54.00	-4.14	Pass

**Above 1GHz-40GHz – 802.11a – 5580MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
1034.91	44.97	2.46	9.62	57.05	Peak Max	V	134.00	220.00	74.00	-16.95	Pass
3996.36	40.38	5.83	12.22	58.43	Peak Max	V	124.00	170.00	74.00	-15.57	Pass
9825.01	41.23	11.65	8.12	61.00	Peak Max	H	136.00	267.00	74.00	-13.00	Pass
1034.91	32.09	2.46	9.62	44.17	Average Max	V	134.00	220.00	54.00	-9.83	Pass
3996.36	26.76	5.83	12.22	44.80	Average Max	V	124.00	170.00	54.00	-9.20	Pass
9825.01	28.16	11.65	8.12	47.93	Average Max	H	136.00	267.00	54.00	-6.07	Pass

**Above 1GHz-40GHz – 802.11a – 5700MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
1001.93	46.15	2.44	9.67	58.27	Peak Max	V	237.00	341.00	74.00	-15.73	Pass
6176.65	45.37	7.42	10.64	63.44	Peak Max	V	100.00	49.00	74.00	-10.56	Pass
2021.96	43.66	3.42	11.41	58.48	Peak Max	H	282.00	111.00	74.00	-15.52	Pass
1001.93	32.88	2.44	9.67	44.99	Average Max	V	237.00	341.00	54.00	-9.01	Pass
6176.65	31.99	7.42	10.64	50.06	Average Max	V	100.00	49.00	54.00	-3.94	Pass
2021.96	30.21	3.42	11.41	45.04	Average Max	H	282.00	111.00	54.00	-8.96	Pass

**Above 1GHz-40GHz – 802.11n-HT20– 5500MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
2055.77	43.93	3.55	11.30	58.78	Peak Max	V	122.00	346.00	74.00	-15.22	Pass
6349.65	45.57	7.93	10.24	63.74	Peak Max	V	106.00	156.00	74.00	-10.26	Pass
14728.04	42.48	13.51	7.81	63.80	Peak Max	V	215.00	266.00	74.00	-10.20	Pass
2055.77	30.11	3.55	11.30	44.96	Average Max	V	122.00	346.00	54.00	-9.04	Pass
6349.65	31.79	7.93	10.24	49.96	Average Max	V	106.00	156.00	54.00	-4.04	Pass
14728.04	29.23	13.51	7.81	50.55	Average Max	V	215.00	266.00	54.00	-3.45	Pass

**Above 1GHz-40GHz – 802.11n-HT20– 5580MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
2125.45	43.50	3.81	11.08	58.40	Peak Max	V	167.00	302.00	74.00	-15.60	Pass
4132.61	40.59	5.94	11.65	58.18	Peak Max	H	286.00	173.00	74.00	-15.82	Pass
6177.28	45.11	7.42	10.64	63.17	Peak Max	H	112.00	350.00	74.00	-10.83	Pass
2125.45	29.92	3.81	11.08	44.81	Average Max	V	167.00	302.00	54.00	-9.19	Pass
4132.61	26.99	5.94	11.65	44.58	Average Max	H	286.00	173.00	54.00	-9.42	Pass
6177.28	31.82	7.42	10.64	49.89	Average Max	H	112.00	350.00	54.00	-4.11	Pass

**Above 1GHz-40GHz – 802.11n-HT20– 5700MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
1987.47	44.05	3.32	11.38	58.75	Peak Max	V	246.00	88.00	74.00	-15.25	Pass
6110.51	43.82	7.22	10.80	61.84	Peak Max	V	285.00	325.00	74.00	-12.16	Pass
14014.69	43.42	12.70	7.39	63.51	Peak Max	V	100.00	136.00	74.00	-10.49	Pass
1987.47	29.89	3.32	11.38	44.59	Average Max	V	246.00	88.00	54.00	-9.41	Pass
6110.51	30.28	7.22	10.80	48.30	Average Max	V	285.00	325.00	54.00	-5.70	Pass
14014.69	29.96	12.70	7.39	50.04	Average Max	V	100.00	136.00	54.00	-3.96	Pass

**Above 1GHz-40GHz – 802.11n-HT40 – 5510MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
1989.88	43.50	3.32	11.40	58.22	Peak Max	H	203.00	61.00	74.00	-15.78	Pass
11018.99	41.38	11.51	8.24	61.12	Peak Max	V	204.00	74.00	74.00	-12.88	Pass
6211.79	44.44	7.53	10.56	62.53	Peak Max	V	101.00	137.00	74.00	-11.47	Pass
1989.88	29.67	3.32	11.40	44.38	Average Max	H	203.00	61.00	54.00	-9.62	Pass
11018.99	28.04	11.51	8.24	47.78	Average Max	V	204.00	74.00	54.00	-6.22	Pass
6211.79	31.49	7.53	10.56	49.58	Average Max	V	101.00	137.00	54.00	-4.42	Pass

**Above 1GHz-40GHz – 802.11n-HT40 – 5590MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
4101.41	40.21	5.92	11.78	57.90	Peak Max	V	149.00	256.00	74.00	-16.10	Pass
6248.24	45.42	7.63	10.47	63.52	Peak Max	V	166.00	218.00	74.00	-10.48	Pass
11100.62	41.51	11.62	8.19	61.32	Peak Max	V	212.00	343.00	74.00	-12.68	Pass
4101.41	26.82	5.92	11.78	44.52	Average Max	V	149.00	256.00	54.00	-9.48	Pass
6248.24	31.69	7.63	10.47	49.79	Average Max	V	166.00	218.00	54.00	-4.21	Pass
11100.62	28.39	11.62	8.19	48.20	Average Max	V	212.00	343.00	54.00	-5.80	Pass

**Above 1GHz-40GHz – 802.11n-HT40 – 5670MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
4132.27	39.82	5.94	11.65	57.41	Peak Max	H	122.00	225.00	74.00	-16.59	Pass
6076.80	44.33	7.12	10.88	62.33	Peak Max	V	141.00	296.00	74.00	-11.67	Pass
11341.33	40.33	11.95	8.07	60.35	Peak Max	H	102.00	164.00	74.00	-13.65	Pass
4132.27	26.44	5.94	11.65	44.04	Average Max	H	122.00	225.00	54.00	-9.96	Pass
6076.80	30.90	7.12	10.88	48.90	Average Max	V	141.00	296.00	54.00	-5.10	Pass
11341.33	27.67	11.95	8.07	47.69	Average Max	H	102.00	164.00	54.00	-6.31	Pass

**Above 1GHz-40GHz – 802.11ac – 5530MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
6213.98	45.00	7.53	10.55	63.08	Peak Max	V	139.00	167.00	74.00	-10.92	Pass
4068.04	39.59	5.89	11.93	57.41	Peak Max	V	231.00	35.00	74.00	-16.59	Pass
11061.78	41.64	11.57	8.21	61.42	Peak Max	H	101.00	326.00	74.00	-12.58	Pass
6213.98	31.58	7.53	10.55	49.67	Average Max	V	139.00	167.00	54.00	-4.33	Pass
4068.04	26.62	5.89	11.93	44.44	Average Max	V	231.00	35.00	54.00	-9.56	Pass
11061.78	28.21	11.57	8.21	47.99	Average Max	H	101.00	326.00	54.00	-6.01	Pass

**Above 1GHz-40GHz – 802.11ac – 5610MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
11220.53	41.39	11.78	8.13	61.31	Peak Max	V	194.00	309.00	74.00	-12.69	Pass
2123.42	43.10	3.80	11.09	57.99	Peak Max	V	211.00	349.00	74.00	-16.01	Pass
6246.28	44.88	7.63	10.48	62.98	Peak Max	V	108.00	161.00	74.00	-11.02	Pass
11220.53	28.14	11.78	8.13	48.06	Average Max	V	194.00	309.00	54.00	-5.94	Pass
2123.42	29.76	3.80	11.09	44.66	Average Max	V	211.00	349.00	54.00	-9.34	Pass
6246.28	31.75	7.63	10.48	49.85	Average Max	V	108.00	161.00	54.00	-4.15	Pass

**Above 1GHz-40GHz – 802.11a – 5720MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
6142.59	44.53	7.32	10.72	62.57	Peak Max	H	257.00	275.00	74.00	-11.43	Pass
1035.84	44.83	2.46	9.62	56.92	Peak Max	V	185.00	119.00	74.00	-17.08	Pass
17625.22	39.97	13.00	10.53	63.50	Peak Max	V	101.00	183.00	74.00	-10.50	Pass
6142.59	31.21	7.32	10.72	49.25	Average Max	H	257.00	275.00	54.00	-4.75	Pass
1035.84	31.69	2.46	9.62	43.77	Average Max	V	185.00	119.00	54.00	-10.23	Pass
17625.22	26.73	13.00	10.53	50.26	Average Max	V	101.00	183.00	54.00	-3.74	Pass

**Above 1GHz-40GHz – 802.11n-HT20 – 5720MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
11438.56	41.70	12.08	8.02	61.80	Peak Max	H	102.00	152.00	74.00	-12.20	Pass
2054.67	44.06	3.54	11.30	58.91	Peak Max	H	221.00	354.00	74.00	-15.09	Pass
6279.25	44.20	7.73	10.40	62.32	Peak Max	H	278.00	178.00	74.00	-11.68	Pass
11438.56	28.43	12.08	8.02	48.54	Average Max	H	102.00	152.00	54.00	-5.46	Pass
2054.67	30.60	3.54	11.30	45.44	Average Max	H	221.00	354.00	54.00	-8.56	Pass
6279.25	31.27	7.73	10.40	49.40	Average Max	H	278.00	178.00	54.00	-4.60	Pass

**Above 1GHz-40GHz – 802.11n-HT40 – 5710MHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
11440.95	41.03	12.08	8.02	61.14	Peak Max	V	100.00	0.00	74.00	-12.86	Pass
6245.09	45.01	7.63	10.48	63.12	Peak Max	H	190.00	255.00	74.00	-10.88	Pass
2056.35	43.39	3.55	11.30	58.24	Peak Max	H	174.00	93.00	74.00	-15.76	Pass
11440.95	27.98	12.08	8.02	48.09	Average Max	V	100.00	0.00	54.00	-5.91	Pass
6245.09	31.82	7.63	10.48	49.92	Average Max	H	190.00	255.00	54.00	-4.08	Pass
2056.35	30.16	3.55	11.30	45.01	Average Max	H	174.00	93.00	54.00	-8.99	Pass

















**Above 1GHz-40GHz – 802.11ac – 5690MHz**








Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
11381.85	41.02	12.00	8.05	61.07	Peak Max	H	249.00	45.00	74.00	-12.93	Pass
4102.14	40.21	5.92	11.78	57.90	Peak Max	H	143.00	332.00	74.00	-16.10	Pass
6316.24	44.62	7.84	10.31	62.77	Peak Max	V	101.00	360.00	74.00	-11.23	Pass
11381.85	27.70	12.00	8.05	47.76	Average Max	H	249.00	45.00	54.00	-6.24	Pass
4102.14	26.98	5.92	11.78	44.68	Average Max	H	143.00	332.00	54.00	-9.32	Pass
6316.24	31.56	7.84	10.31	49.71	Average Max	V	101.00	360.00	54.00	-4.29	Pass

**Annex A. TEST INSTRUMENT**

Instrument	Model	Serial #	Cal Cycle	Cal Due	In use
<b>Conducted Emissions</b>					
Spectrum Analyzer	N9010A	MY50210206	1 Year	08/13/2015	<input checked="" type="checkbox"/>
Signal Analyzer	FSIQ7	825555/013	1 Year	05/28/2016	<input type="checkbox"/>
V-LISN (150 kHz – 30 MHz)	NNLK 8129	8129-190	1 Year	08/11/2015	<input checked="" type="checkbox"/>
LISN (9 kHz – 30 MHz)	MN2050B	1018	1 Year	07/31/2015	<input checked="" type="checkbox"/>
TLISN	ISN T800	30814	1 Year	08/08/2015	<input type="checkbox"/>
Hygro Hermograph	ST-50	HE01-000092	1 Year	05/25/2016	<input checked="" type="checkbox"/>
<b>Radiated Emissions</b>					
R & S Receiver	ESL6	100178	1 Year	05/27/2016	<input checked="" type="checkbox"/>
EMI Test Receiver	ESIB 40	100179	1 Year	05/24/2016	<input checked="" type="checkbox"/>
Antenna - Biconlog (30 MHz – 2 GHz)	JB1	A030702	1 Year	08/12/2015	<input checked="" type="checkbox"/>
DoubleRidged Waveguide Horn Antenna (1-18 GHz)	3115	10SL0059	1 Year	08/11/2015	<input checked="" type="checkbox"/>
Horn Antenna (18-40 GHz)	AH-840	101013	1 Year	08/11/2015	<input checked="" type="checkbox"/>
RF Pre-Amplifier	LPA-6-30	11140711	1 Year	02/19/2016	<input checked="" type="checkbox"/>
Microwave Preamplifier (18-40 GHz)	PA-840	181251	1 Year	02/19/2016	<input checked="" type="checkbox"/>
10 Meters SAC	10M	N/A	1 Year	09/05/2015	<input checked="" type="checkbox"/>
Hygro Hermograph	ST-50	HE01-000092	1 Year	05/25/2016	<input checked="" type="checkbox"/>
<b>RF Conducted Measurement</b>					
Spectrum Analyzer	N9010A	MY50210206	1 Year	8/13/2015	<input checked="" type="checkbox"/>
Spectrum Analyzer	E4407B	US88441016	1 Year	03/30/2015	<input checked="" type="checkbox"/>
R & S Receiver	ESIB 40	100179	1 Year	05/24/2016	<input checked="" type="checkbox"/>
Hygro Hermograph	ST-50	HE01-000092	1 Year	05/25/2016	<input checked="" type="checkbox"/>

## Annex B. SIEMIC Accreditation

Accreditations	Document	Scope / Remark
ISO 17025 (A2LA)		Please see the documents for the detailed scope
ISO Guide 65 (A2LA)		Please see the documents for the detailed scope
TCB Designation		A1, A2, A3, A4, B1, B2, B3, B4, C
FCC DoC Accreditation		FCC Declaration of Conformity Accreditation
FCC Site Registration		3 meter site
FCC Site Registration		10 meter site
IC Site Registration		3 meter site
IC Site Registration		10 meter site
EU NB		<b>Radio &amp; Telecommunications Terminal Equipment:</b> EN45001 – EN ISO/IEC 17025
		<b>Electromagnetic Compatibility:</b> EN45001 – EN ISO/IEC 17025
Singapore iDA CB(Certification Body)	 	Phase I, Phase II
Vietnam MIC CAB Accreditation		Please see the document for the detailed scope
Hong Kong OFCA		<b>(Phase II)</b> OFCA Foreign Certification Body for Radio and Telecom
		<b>(Phase I)</b> Conformity Assessment Body for Radio and Telecom
Industry Canada CAB		<b>Radio:</b> Scope A – All Radio Standard Specification in Category I
		<b>Telecom:</b> CS-03 Part I, II, V, VI, VII, VIII

Japan Recognized Certification Body Designation		<p><b>Radio:</b> A1. Terminal equipment for purpose of calling</p> <p><b>Telecom:</b> B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law</p>
Korea CAB Accreditation		<p><b>EMI:</b> KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI</p> <p><b>EMS:</b> KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS</p>
		<p><b>Radio:</b> RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68</p> <p><b>Telecom:</b> President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4</p>
Taiwan NCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		R-3083: Radiation 3 meter site
		C-3421: Main Ports Conducted Interference Measurement T-1597: Telecommunication Ports Conducted Interference Measurement
Australia CAB Recognition		<p><b>EMC:</b> AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4</p>
		<p><b>Radio communications:</b> AS/NZS 4281, AS/NZS 4268, AS/NZS 4280.1, AS/NZS 4280.2, AS/NZS 4295, AS/NZS 4582, AS/NZS 4583, AS/NZS 4769.1, AS/NZS 4769.2, AS/NZS 4770, AS/NZS 4771</p> <p><b>Telecommunications:</b> AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF S004:06 AS/ACIF S006:01, AS/ACIF S016:01, AS/ACIF S031:01, AS/ACIF S038:01, AS/ACIF S040:01, AS/ACIF S041:05, AS/ACIF S043.2:06, AS/ACIF S60950.1</p>
Australia NATA Recognition		AS/ACIF S002, AS/ACIF S003, AS/ACIF S004, AS/ACIF S006, AS/ACIF S016, AS/ACIF S031, AS/ACIF S038, AS/ACIF S040, AS/ACIF S041, AS/ACIF S043.2