FCC TEST REPORT

For

J-Tech Digital INC

Wireless Video & Audio Transmitter & Receiver Kit

Test Model: JTECH-WEX-200M

Additional Model No.: Please Refer to Page 06

Prepared for	:	J-Tech Digital INC
Address	:	12855 Capricorn ST, Stafford, TX 77477, United States
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	1F., Xingyuan Industrial Park, Tongda Road, Bao'an Blvd., Bao'an District, Shenzhen, Guangdong, China
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Web	:	www.LCS-cert.com
Mail	:	webmaster@LCS-cert.com
Date of receipt of test sample	:	December 07, 2016
Number of tested samples	:	1
Serial number	:	Prototype
Date of Test	:	December 07, 2016~December 15, 2016
Date of Report	:	December 15, 2016

FCC TEST REPORT
FCC CFR 47 PART 15 E(15.407): 2015

Report Reference No.	**:**	**LCS1612070770E**
Date of Issue	:	December 15, 2016
Testing Laboratory Name..... :		**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address	:	1F., Xingyuan Industrial Park, Tongda Road, Bao'an Blvd., Bao'an District, Shenzhen, Guangdong, China
Testing Location/ Procedure	:	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name ..... :		**J-Tech Digital INC**
Address	:	12855 Capricorn ST, Stafford, TX 77477, United States
Test Specification		
Standard.....	:	FCC CFR 47 PART 15 E(15.407): 2015
Test Report Form No. ..... :		LCSEMC-1.0
TRF Originator	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF	:	Dated 2011-03

EUT Description. ..... :		**Wireless Video & Audio Transmitter & Receiver Kit**
Trade Mark.....	:	J-Tech Digital
Model/ Type reference	:	JTECH-WEX-200M
Ratings	:	Input: 5.0⎓3.0A
Result	:	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Ada Liang/ Administrators	Glin Lu/ Technique principal	Gavin Liang/ Manager

FCC -- TEST REPORT

Test Report No. : LCS1612070770E	December 15, 2016 Date of issue

EUT.....	: Wireless Video & Audio Transmitter & Receiver Kit
Type / Model.....	: JTECH-WEX-200M
Applicant.....	**: J-Tech Digital INC**
Address.....	: 12855 Capricorn ST, Stafford, TX 77477, United States
Telephone.....	:
Fax.....	:
Manufacturer.....	**: J-Tech Digital INC**
Address.....	: 12855 Capricorn ST, Stafford, TX 77477, United States
Telephone.....	:
Fax.....	:
Factory.....	**: J-Tech Digital INC**
Address.....	: 12855 Capricorn ST, Stafford, TX 77477, United States
Telephone.....	:
Fax.....	:

Test Result:	**Positive**

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Revision	Issue Date	Revisions	Revised By
00	2016-12-15	Initial Issue	Gavin Liang

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	Wireless Video & Audio Transmitter & Receiver Kit
Model Number	:	JTECH-WEX-200M, JTECH-WEX-VGA-200M, JTECH-WEX-SDI-200M, JTECH-WEX-200M4K, JTECH-WEX-N200M, JTECH-WEX-N200M4K
Model Declaration	:	PCB board, structure and internal of these model(s) are the same, So no additional models were tested.
Test Model	:	JTECH-WEX-200M
Power Supply	:	Input: 5.0⎓3.0A
Frequency Range	:	5180.00-5240.00MHz/5745.00-5825.00MHz
Channel Number	:	9 Channels for 20MHz Bandwidth 4 channels for 40MHz Bandwidth
Modulation Technology	:	802.11a/n: OFDM
Data Rates	:	1Gb/s
Antenna Type And Gain	:	External Antenna, 5.0dBi(Max.)

1.2. Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	Certificate
Mass Power Electronic Limited	AC ADAPTER	NBS24J050300HU	--	--

1.3. External I/O Port

I/O Port Description	Quantity	Cable
DC Port	1	N/A
HDMI Port	1	N/A
IR OUT Port	1	1.0m

1.4. Description of Test Facility

CNAS Registration Number. is L4595.
FCC Registration Number. is 899208.
Industry Canada Registration Number. is 9642A-1.
VCCI Registration Number. is C-4260 and R-3804.
ESMD Registration Number. is ARCB0108.
UL Registration Number. is 100571-492.
TUV SUD Registration Number. is SCN1081.
TUV RH Registration Number. is UA 50296516-001

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

1.5. Statement of The Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.6. Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
Radiation Uncertainty	:	9KHz~30MHz	±3.10dB	(1)
		30MHz~200MHz	±2.96dB	(1)
		200MHz~1000MHz	±3.10dB	(1)
		1GHz~26.5GHz	±3.80dB	(1)
		26.5GHz~40GHz	±3.90dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	±1.63dB	(1)
Power disturbance	:	30MHz~300MHz	±1.60dB	(1)

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.7. Description Of Test Modes

The EUT has been tested under operating condition.

This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.

Worst-Case data rates were utilized from preliminary testing of the Chipset, worst-case data rates used during the testing are as follows:
OFDM : 1Gb/s, OFDM.

Antenna & Bandwidth

Antenna	Single (Port.1)			Two (Port.1 + Port.2)		
Bandwidth Mode	20MHz	40MHz	80MHz	20MHz	40MHz	80MHz
OFDM	☐	☐	☐	☑	☑	☐

Channel & Frequency:

Frequency Band	Channel No.	Frequency(MHz)	Channel No.	Frequency(MHz)
5180~5240MHz	36	5180	44	5220
	38	5190	46	5230
	44	5220	48	5240
	42	5210	/	/
For 802.11a/n(HT20), Channel 36, 40 and 48 were tested. For 802.11n(HT40), Channel 38 and 46 were tested.				
5745~5825MHz	149	5745	155	5775
	151	5755	159	5795
	153	5765	161	5805
	157	5785	165	5825
For 802.11a/n(HT20), Channel 149, 157 and 165 were tested. For 802.11n(HT40), Channel 151 and 159 were tested.				

2. TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Shenzhen LCS Compliance Testing Laboratory Ltd..

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to FCC's request, Test Procedure 789033 D02 General UNII Test Procedures New Rules v01r03 and KDB 6622911 are required to be used for this kind of FCC 15.407 UII device.

According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.205, 15.207, 15.209 and 15.407 under the FCC Rules Part 15 Subpart E

2.3. General Test Procedures

2.3.1 Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2 Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.3 of ANSI C63.10-2013

3. SYSTEM TEST CONFIGURATION

3.1. Justification

The system was configured for testing in a continuous transmit condition.

3.2. EUT Exercise Software

N/A

3.3. Special Accessories

N/A

3.4. Block Diagram/Schematics

Please refer to the related document

3.5. Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

3.6. Test Setup

Please refer to the test setup photo.

4. SUMMARY OF TEST RESULTS

Applied Standard: FCC Part 15 Subpart E		
FCC Rules	Description of Test	Result
§15.407(a)	Maximum Conducted Output Power	Compliant
§15.407(a)	Power Spectral Density	Compliant
§15.407(e)	6dB Bandwidth	Compliant
§15.407(b)	Radiated Emissions	Compliant
§15.407(b)	Band edge Emissions	Compliant
§15.407(g)	Frequency Stability	Note
§15.207(a)	Line Conducted Emissions	Compliant
§15.203	Antenna Requirements	Compliant
§2.1093	RF Exposure	Compliant

Note: “N/A” is not applicable.

5. TEST RESULT

5.1. Frequency Stability

Note: The customer declared frequency stability is better than 20ppm which ensures that the signal remains in the allocated bands under all operational conditions stated in the user manual.

5.2. On Time and Duty Cycle

5.2.1. Standard Applicable

None; for reporting purpose only.

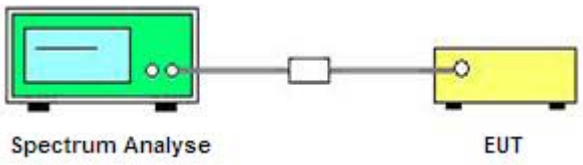
5.2.2. Measuring Instruments and Setting

Please refer to section 6 of equipments list in this report. The following table is the setting of the spectrum analyse.

5.2.3. Test Procedures

1. Set the centre frequency of the spectrum analyse to the transmiting frequency;
2. Set the span=0MHz, RBW=8MHz, VBW=50MHz, Sweep time=5ms;
3. Detector = peak;
4. Trace mode = Single hold.

5.2.4. Test Setup Layout

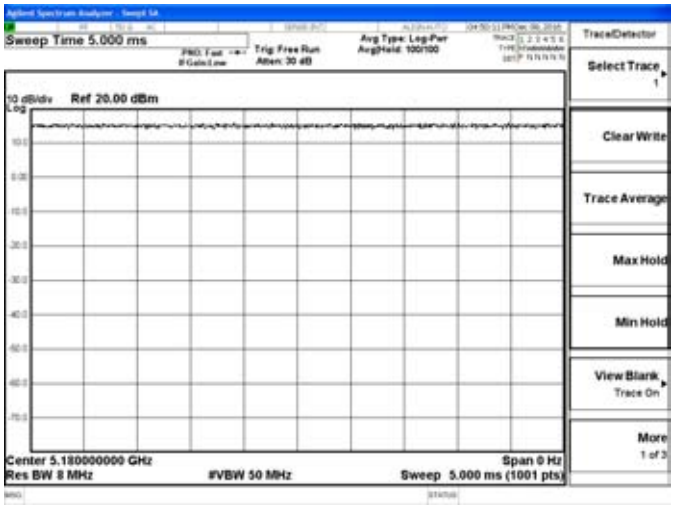
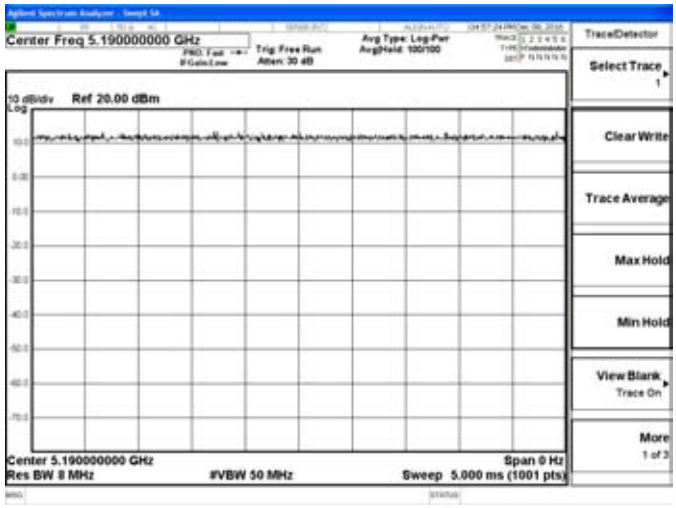
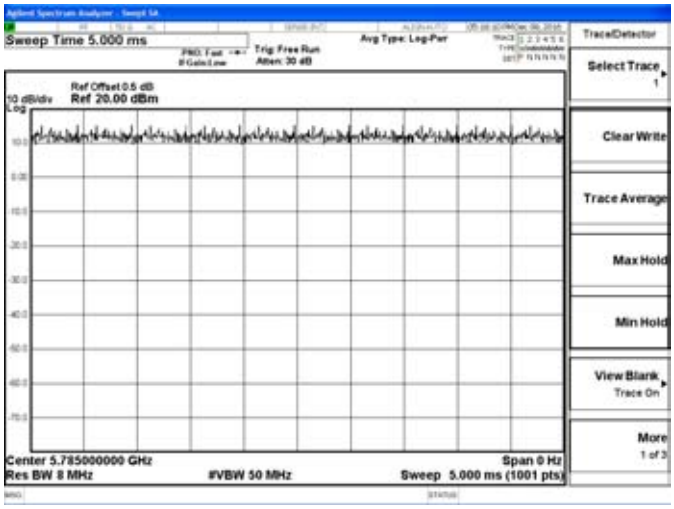
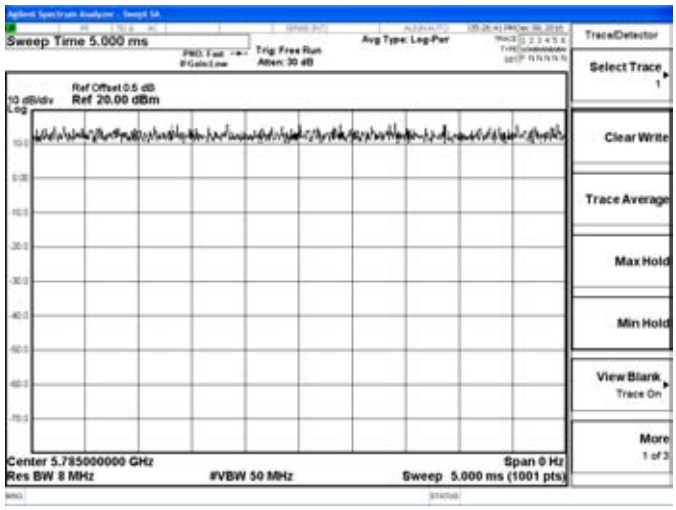
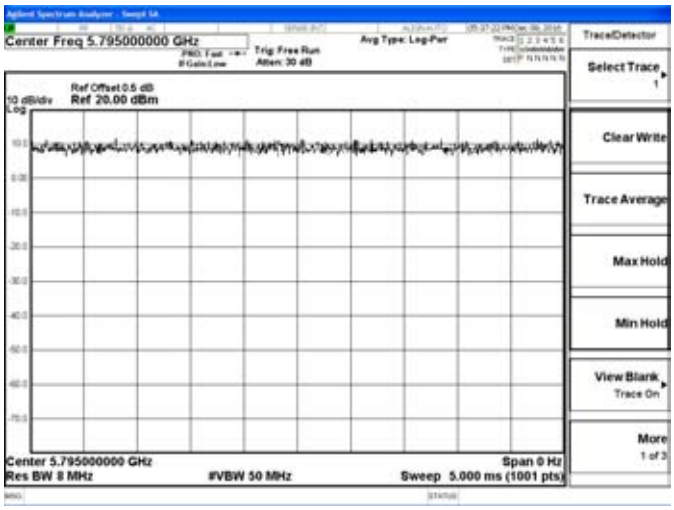


5.2.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

5.2.6. Test result

Mode	On Time B (ms)	Period (ms)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW(KHz)
802.11a-5.2GHz	5	5	1	100	0	0.253
802.11n20-5.2GHz	5	5	1	100	0	0.253
802.11n40-5.2GHz	5	5	1	100	0	0.253
802.11a-5.8GHz	5	5	1	100	0	0.253
802.11n20-5.8GHz	5	5	1	100	0	0.253
802.11n40-5.8GHz	5	5	1	100	0	0.253
Note: Duty Cycle Correction Factor=10log(1/Duty cycle)						

Test plot of On Time and Duty Cycle	
	
a-5180MHz	n20-5180MHz
	
n40-5190MHz	a-5785MHz
	
n20-5785MHz	N40-5755MHz

5.3. Maximum Conducted Output Power Measurement

5.3.1. Standard Applicable

For 5725~5850MHz

According to §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. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to §15.407(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.

According to §15.407(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.

According to §15.407(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. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

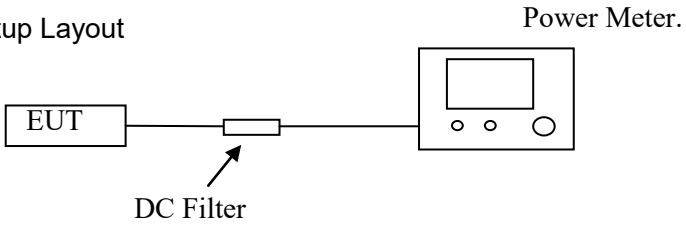
5.3.2. Measuring Instruments and Setting

Please refer to section 6 of equipments list in this report. The following table is the setting of the power meter.

5.3.3. Test Procedures

The transmitter output (antenna port) was connected to the power meter.

5.3.4. Test Setup Layout



5.3.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

5.3.6. Test Result of Maximum Conducted Output Power

Temperature	25℃	Humidty	60%
Test Engineer	Kyle Yin	Configurations	802.11a/n

Test Mode	Channel	Frequency (MHz)	AVG Conducted Power(dBm)		Duty Cycle Factor (dB)	Sum Power (dBm)	Max. Limit (dBm)	Result
			Chain0	Chain1				
802.11a	36	5180	23.33	23.38	0	/	30.00	Complies
	44	5220	22.89	22.42	0	/	30.00	Complies
	48	5240	22.76	23.02	0	/	30.00	Complies
802.11n (HT20)	36	5180	18.75	17.85	0	21.33	27.99	Complies
	44	5220	19.98	18.64	0	22.37	27.99	Complies
	48	5240	18.52	21.93	0	23.56	27.99	Complies
802.11n (HT40)	38	5190	20.17	17.92	0	22.20	27.99	Complies
	46	5230	18.90	20.17	0	22.59	27.99	Complies

Test Mode	Channel	Frequency (MHz)	AVG Conducted Power(dBm)		Duty Cycle Factor (dB)	Sum Power (dBm)	Max. Limit (dBm)	Result
			Chain0	Chain1				
802.11a	149	5745	21.63	21.78	0	/	30.00	Complies
	157	5785	20.41	21.68	0	/	30.00	Complies
	165	5825	20.61	20.98	0	/	30.00	Complies
802.11n (HT20)	149	5745	21.41	20.41	0	23.95	27.99	Complies
	157	5785	20.39	20.26	0	23.34	27.99	Complies
	165	5825	20.45	20.65	0	23.56	27.99	Complies
802.11n (HT40)	151	5755	21.06	19.92	0	23.54	27.99	Complies
	159	5795	20.32	19.88	0	23.12	27.99	Complies

Note:

1, As Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi =5.00dBi+3.01dBi=8.01dBi>6dBi, so limit=30.00-(8.01-6.00)=27.99dBm.

2, Sum Power= AVG Conducted Power+ Duty Cycle Correction Factor

5.4. Power Spectral Density Measurement

5.4.1. Standard Applicable

According to §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. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to §15.407(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.

According to §15.407(a)(1)(iv), For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

According to §15.407(a)(3), For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz(or a narrower bandwidth) band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.4.2. Measuring Instruments and Setting

Please refer to section 6 of equipments list in this report. The following table is the setting of Spectrum Analyzer.

5.4.3. Test Procedures

1). The transmitter was connected directly to a Spectrum Analyzer through a directional couple.

2). The power was monitored at the coupler port with a Spectrum Analyzer. The power level was set to the maximum level.

3). Set the RBW = 300kHz

4). Set the VBW ≥ 3*RBW

5). Span=Encompass the entire emissions bandwidth (EBW) of the signal

6). Detector = peak.

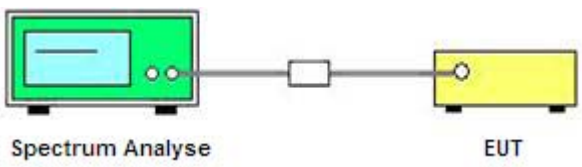
7). Sweep time = auto couple.

8). Trace mode = max hold.

9). Allow trace to fully stabilize.

10). Use the peak marker function to determine the maximum power level in any 1MHz band segment within the fundamental EBW.

5.4.4. Test Setup Layout



5.4.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

5.4.6. Test Result of Power Spectral Density

Temperature	25℃	Humidity	60%
Test Engineer	Kyle Yin	Configurations	802.11a/n

Test Mode	Channel	Frequency (MHz)	Power Density (dBm)		Duty cycle factor (dB)	Sum PSD (dBm/500kHz)	Max. Limit (dBm/500 kHz)	Result
			Chain 0	Chain 1				
802.11a	36	5180	12.661	11.224	0	/	17.00	Complies
	44	5220	12.917	11.462	0	/	17.00	Complies
	48	5240	12.021	12.982	0	/	17.00	Complies
802.11n (HT20)	36	5180	8.669	6.562	0	10.75	14.99	Complies
	44	5220	8.636	8.121	0	11.40	14.99	Complies
	48	5240	7.985	9.951	0	12.09	14.99	Complies
802.11n (HT40)	38	5190	7.021	5.097	0	9.17	14.99	Complies
	46	5230	5.558	6.589	0	9.11	14.99	Complies

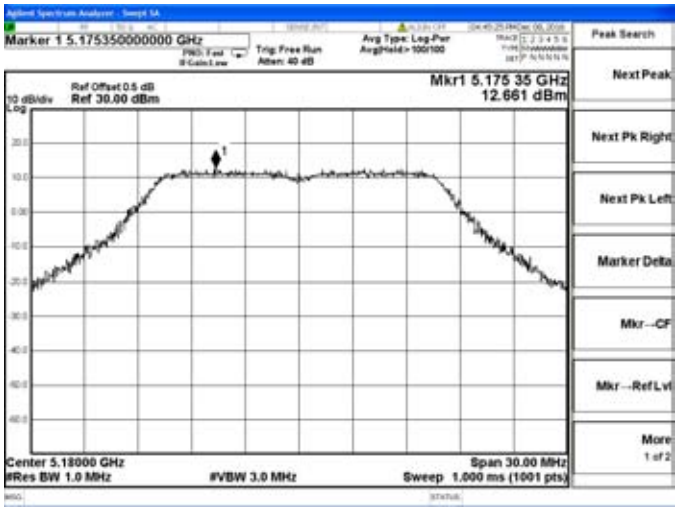
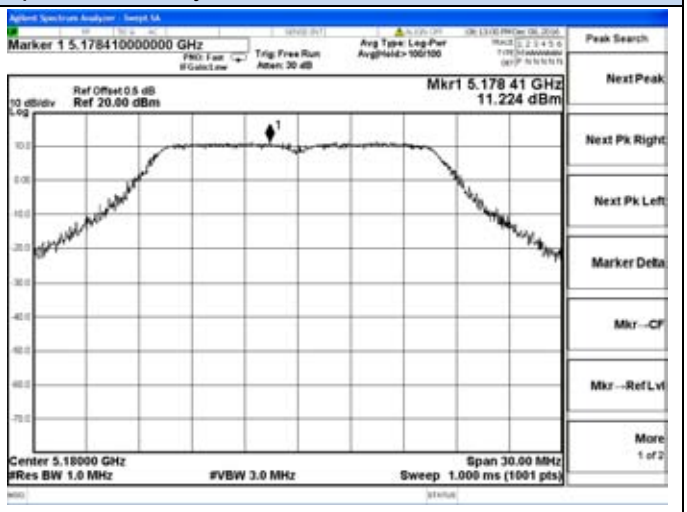
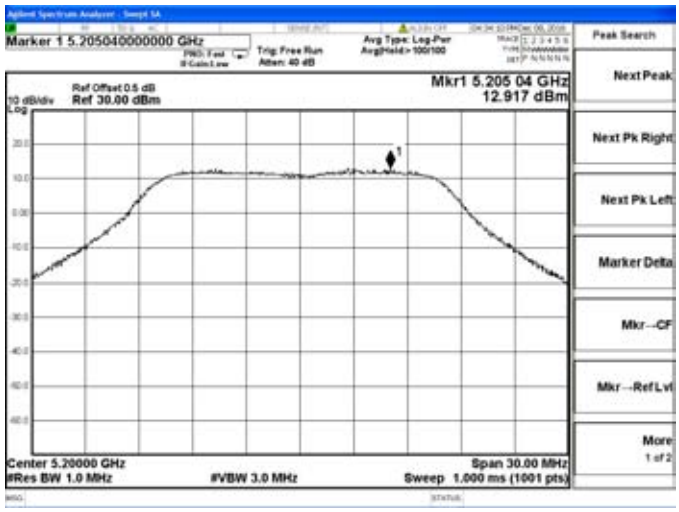
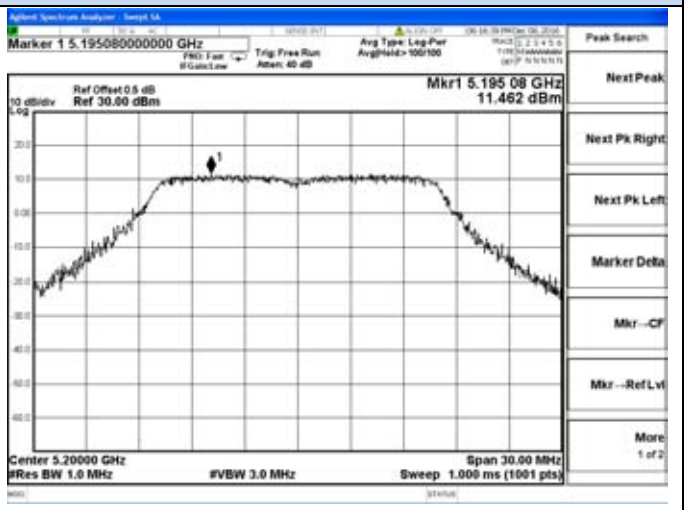
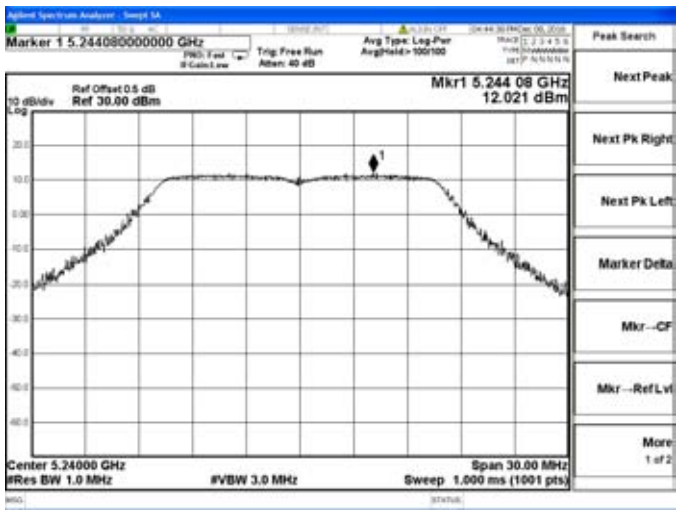
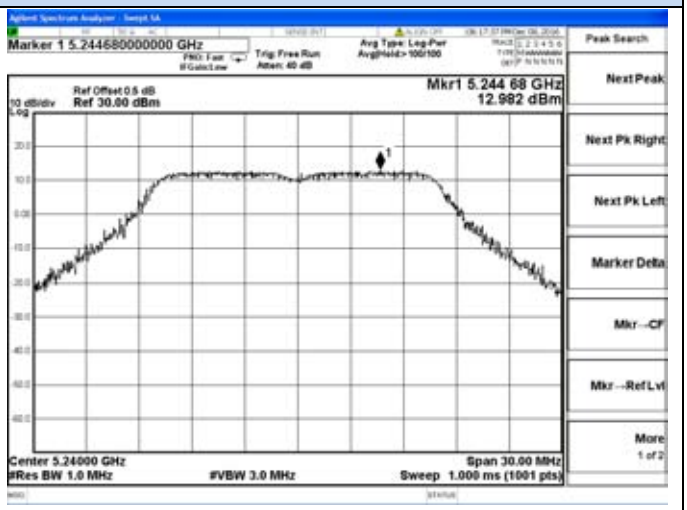
Test Mode	Channel	Frequenc (MHz)	Power Density (dBm/ 300kHz)		10log(500kHz/RBW) Factor (dB)	Duty cycle factor (dB)	Sum PSD (dBm/500kHz)		Max. Limit (dBm/500kHz)	Result
			Chain 0	Chain 1			Chain 0	Chain 1		
802.11a	149	5745	5.768	5.316	2.218	0	7.99	7.53	17.00	Complies
	157	5785	4.673	5.921	2.218	0	6.89	8.14	17.00	Complies
	165	5825	4.982	6.279	2.218	0	7.20	8.50	17.00	Complies
802.11n (HT20)	149	5745	5.024	4.734	2.218	0	10.11		14.99	Complies
	157	5785	4.642	4.451	2.218	0	9.78		14.99	Complies
	165	5825	3.973	4.741	2.218	0	9.60		14.99	Complies
802.11n (HT40)	151	5755	2.369	1.499	2.218	0	7.18		14.99	Complies
	159	5795	1.573	1.609	2.218	0	6.82		14.99	Complies

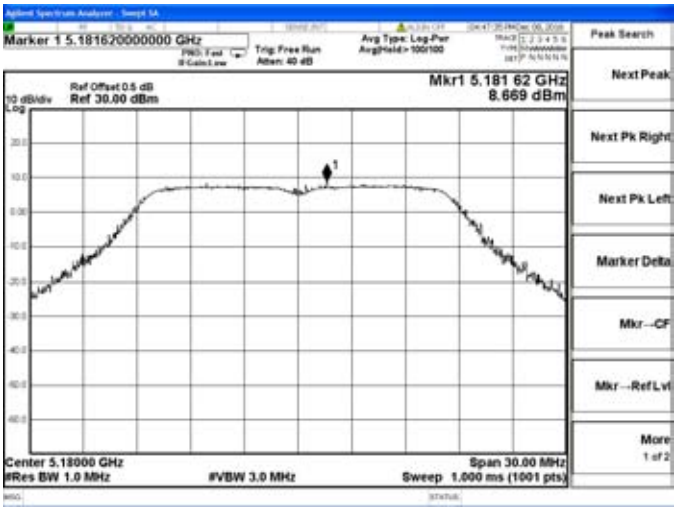
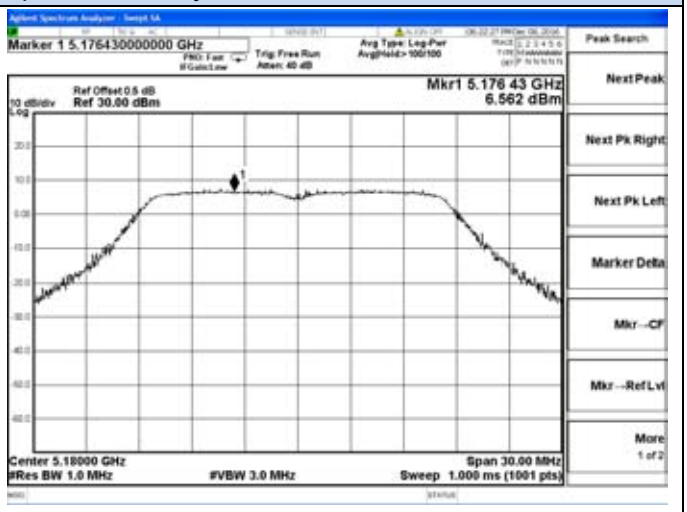
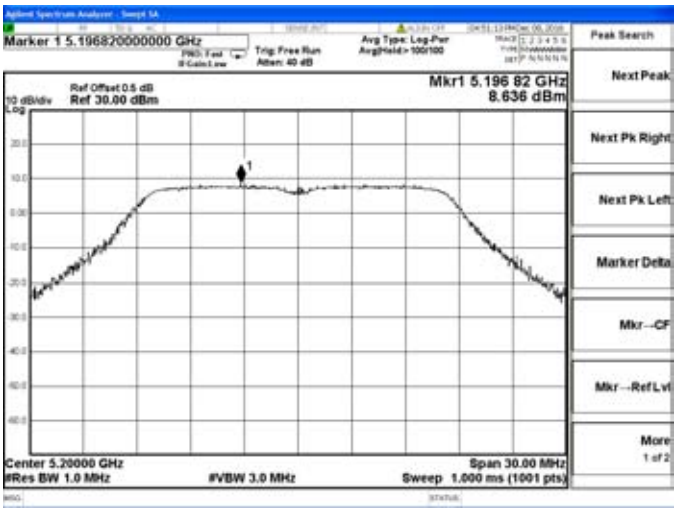
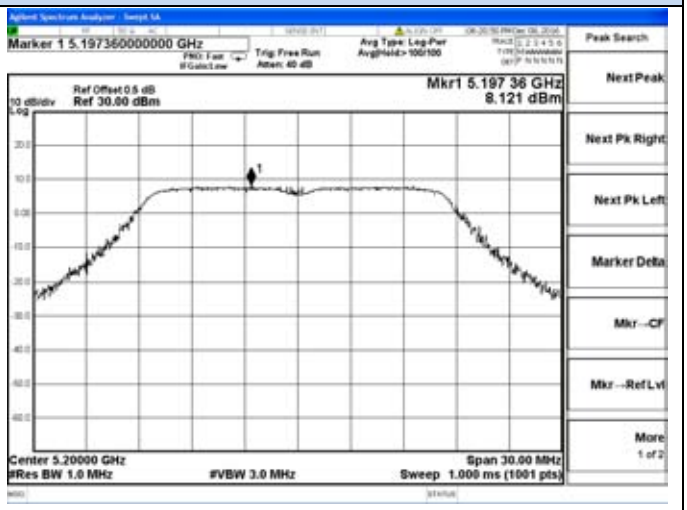
Note:

1, Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi.

then Direction gain=8.01dBi>6dBi, so limit=17-(8.01-6)=14.99dBm/500kHz.

2, Sum PSD(dBm/500kHz)= PSD(dBm/300kHz)+ 10log(500kHz/RBW) Factor+ Duty cycle factor.

Test plot of Power Spectral Density	
	
Chain 0-802.11a-5180MHz	Chain 1-802.11a-5180MHz
	
Chain 0-802.11a-5220MHz	Chain 1-802.11a-5220MHz
	
Chain 0-802.11a-5240MHz	Chain 1-802.11a-5240MHz

Test plot of Power Spectral Density	
	
Chain 0-802.11n20-5180MHz	Chain 1-802.11n20-5180MHz
	
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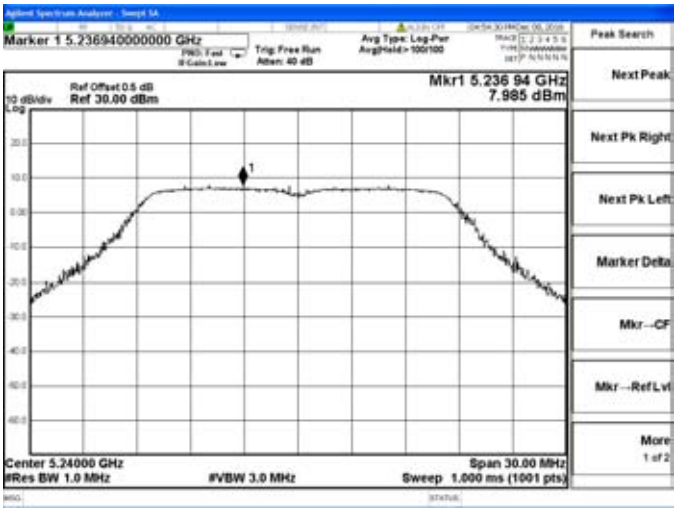
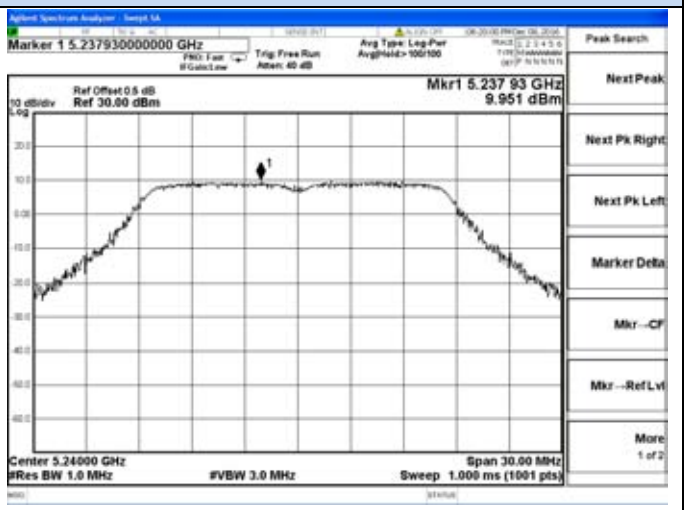
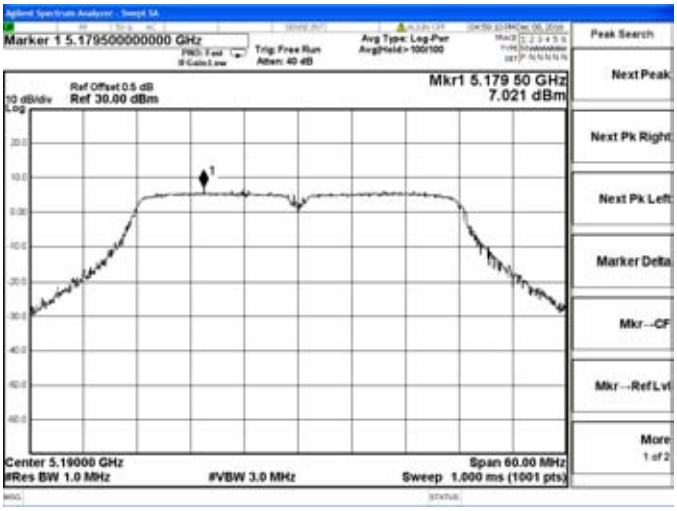
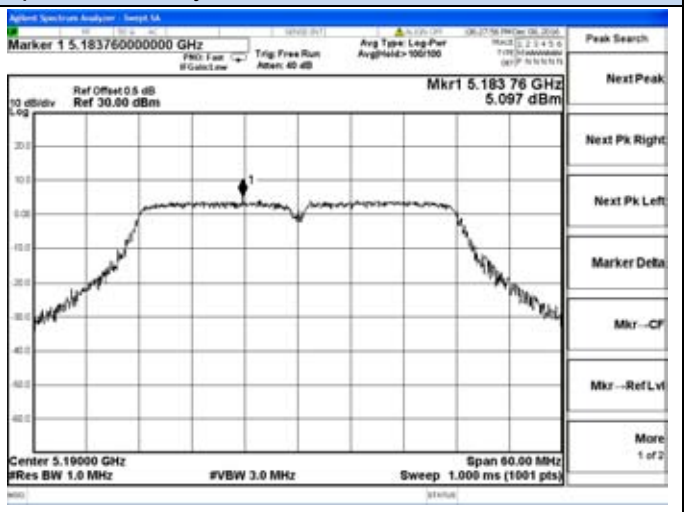
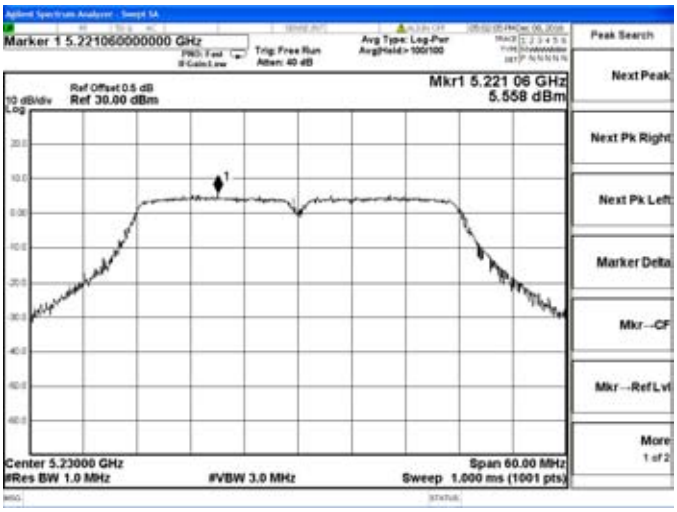
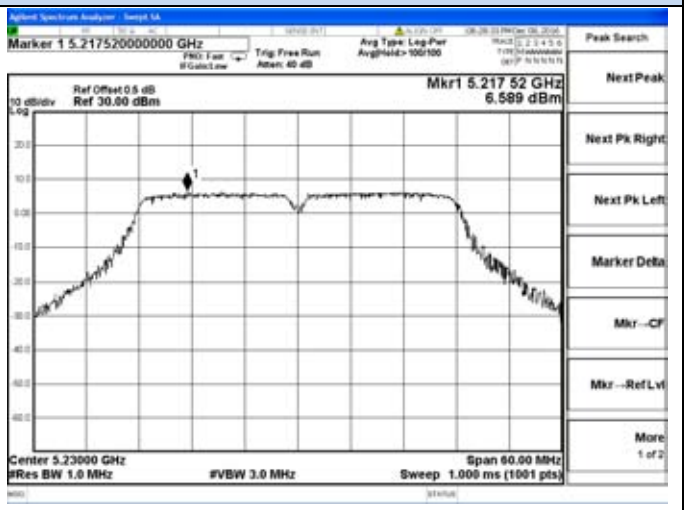
	
Chain 0-802.11n20-5240MHz	Chain 1-802.11n20-5240MHz

Test plot of Power Spectral Density	
	
Chain 0-802.11n40-5190MHz	Chain 1-802.11n40-5190MHz
	
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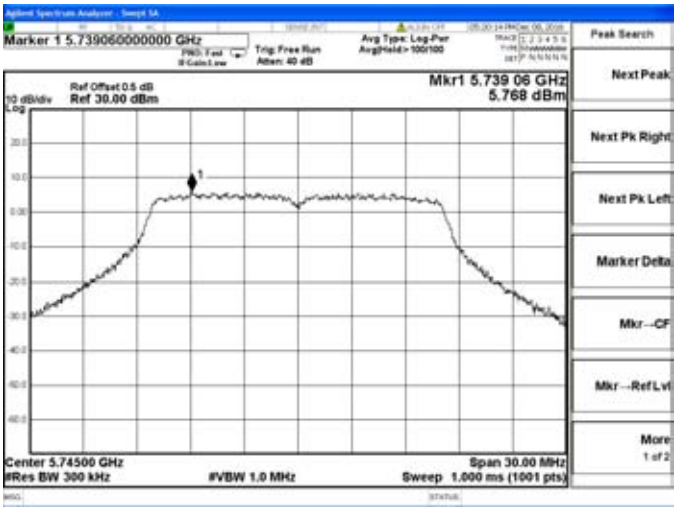
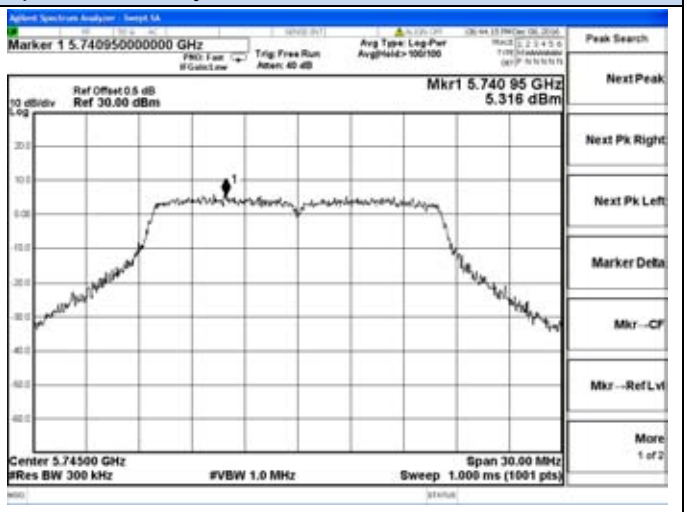
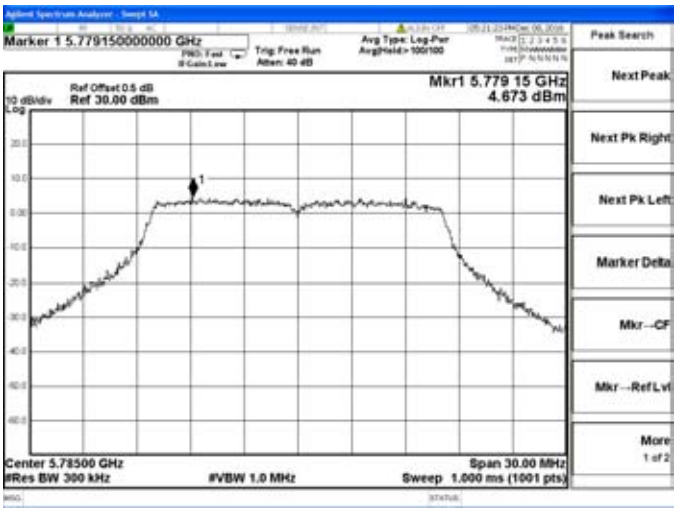
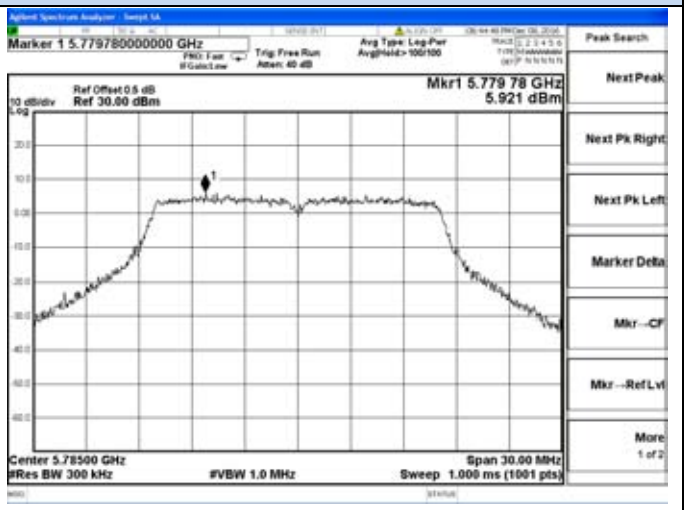
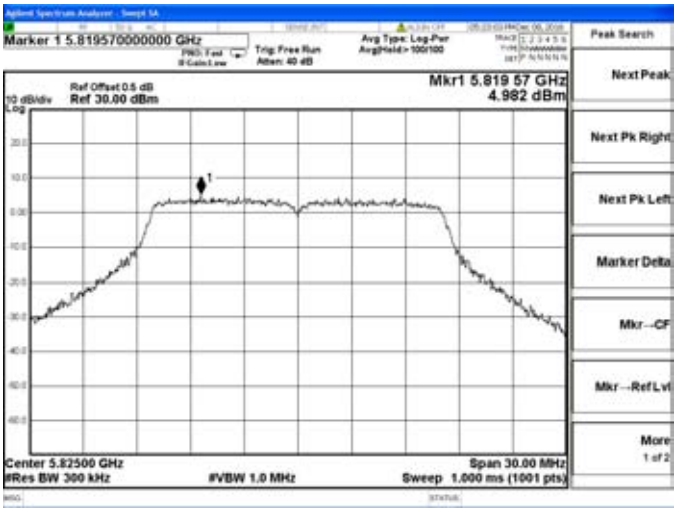
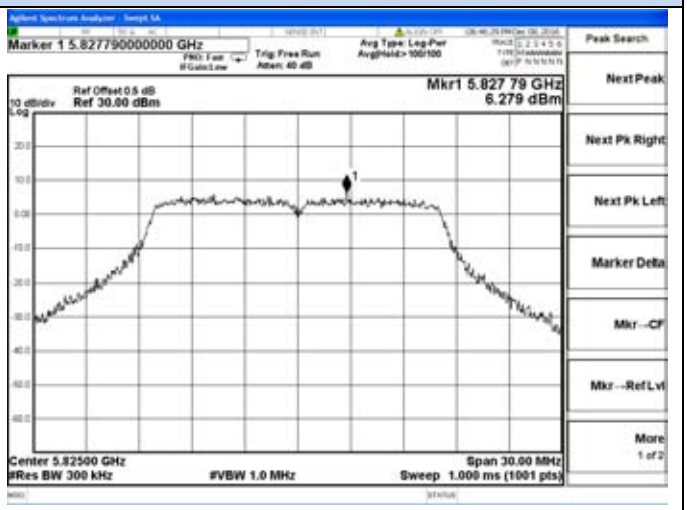
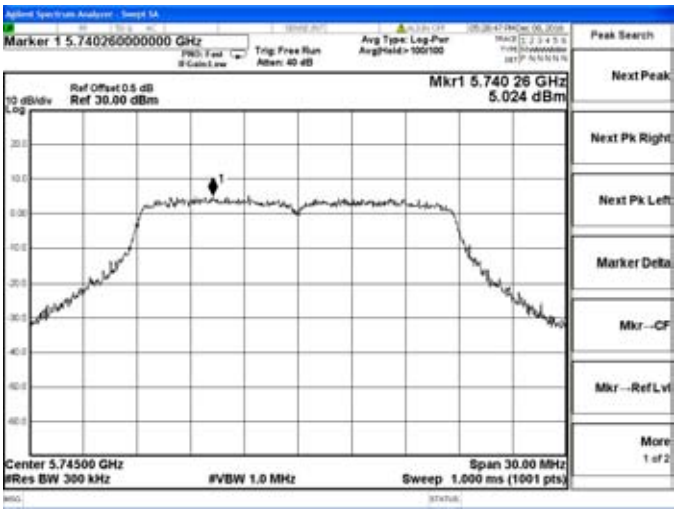
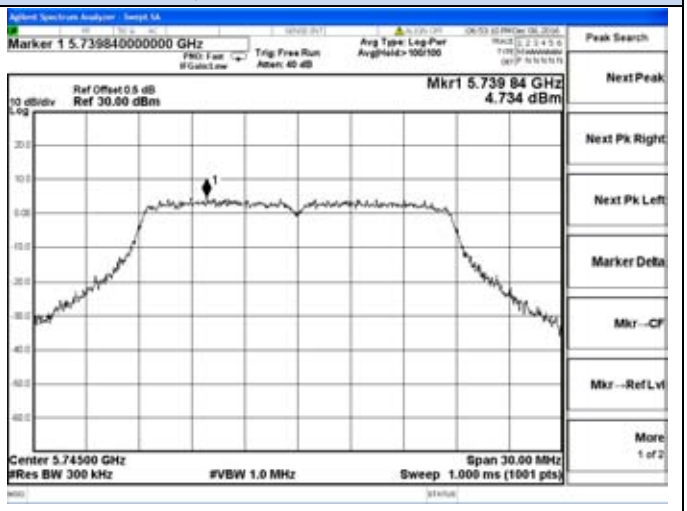
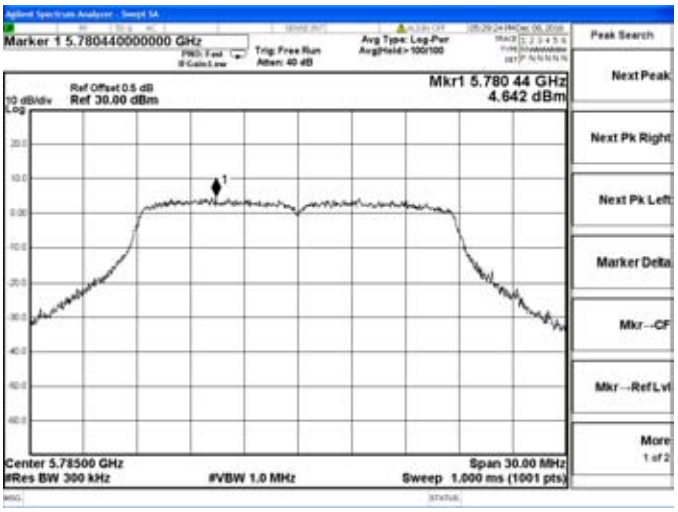
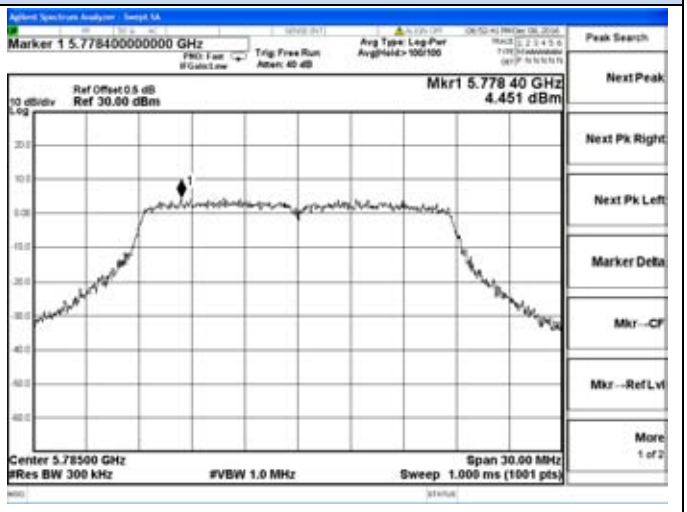
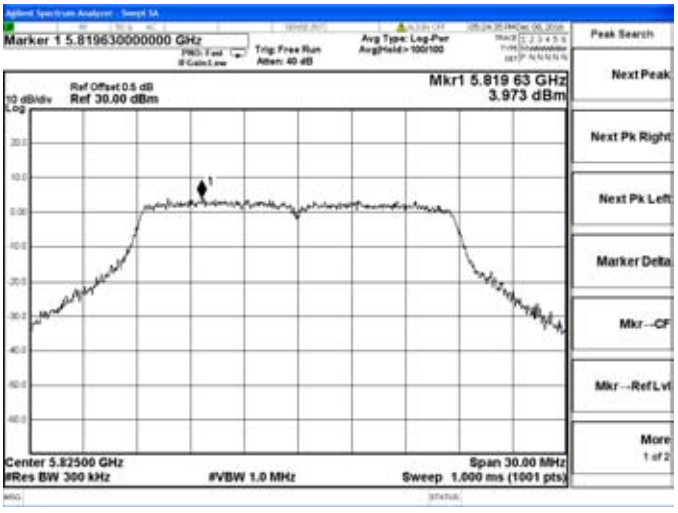
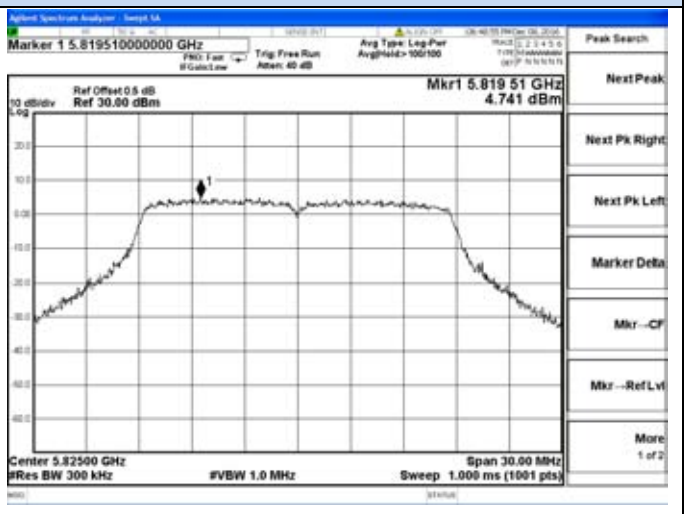
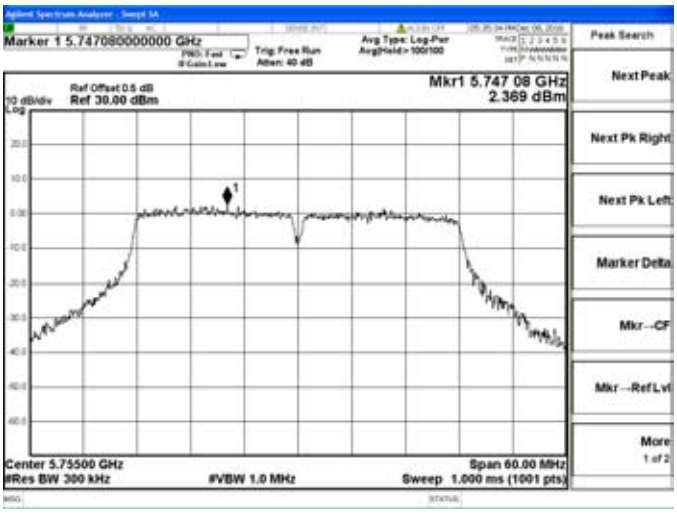
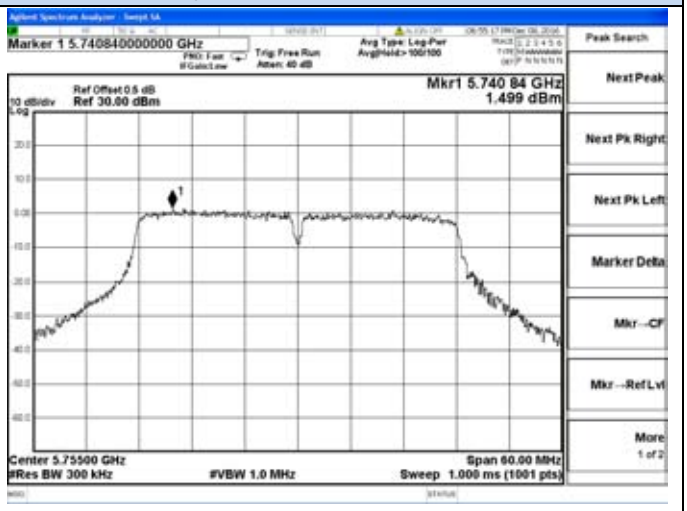
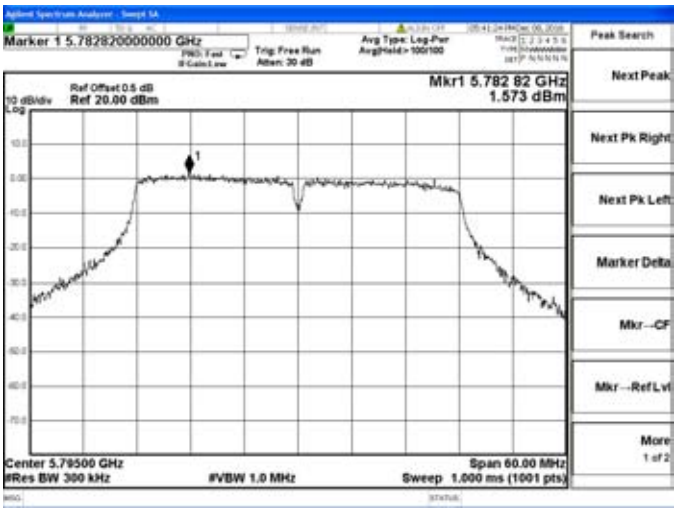
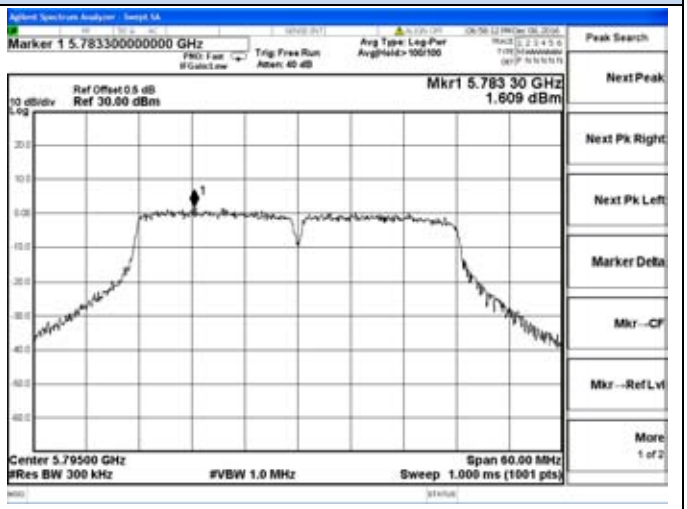
Test plot of Power Spectral Density	
	
Chain 0-802.11a-5745MHz	Chain 1-802.11a-5745MHz
	
Chain 0-802.11a-5785MHz	Chain 1-802.11a-5785MHz
	
Chain 0-802.11a-5825MHz	Chain 1-802.11a-5825MHz

Test plot of Power Spectral Density	
	
Chain 0-802.11n20-5745MHz	Chain 1-802.11n20-5745MHz
	
Chain 0-802.11n20-5785MHz	Chain 1-802.11n20-5785MHz
	
Chain 0-802.11n20-5825MHz	Chain 1-802.11n20-5825MHz

Test plot of Power Spectral Density	
	
Chain 0-802.11n40-5755MHz	Chain 1-802.11n40-5755MHz
	
Chain 0-802.11n40-5795MHz	Chain 1-802.11n40-5795MHz

5.5. 6dB & 26dB Occupied Bandwidth Measurement

5.5.1. Standard Applicable

According to §15.407(e): Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

There is no restriction limits for 26dB & 99% occupied bandwidth, report only for reference.

5.5.2. Measuring Instruments and Setting

The following table is the setting of the Spectrum Analyzer.

6dB Bandwidth Measurement (Only For 5745~5825MHz Band)	
Spectrum Parameter	Setting
Attenuation	Auto
RBW	100KHz
VBW	≥ 3 x RBW
Detector	Peak
Trace	Max Hold

26dB & 99%Bandwidth Measurement (Only For 5180~5240MHz Band)	
Spectrum Parameter	Setting
Attenuation	Auto
RBW	approximately 1% of the emission bandwidth
VBW	≥ RBW
Detector	Peak
Trace	Max Hold

5.5.3. Test Procedures

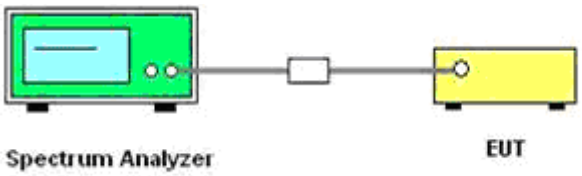
1) The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.

2) The resolution bandwidth and the video bandwidth were set according to KDB 789033 D02 General UNII Test Procedures New Rules v01r02

3) For 5745~5825MHz Band, Measured the maximum width of the emission that is 6dB down from the peak of the emission.

4) For 5180~5240MHz Band, Measured the maximum width of the emission that is 26dB down from the peak of the emission. Record the 26dB & 99% Bandwidth.

5.5.4. Test Setup Layout



5.5.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

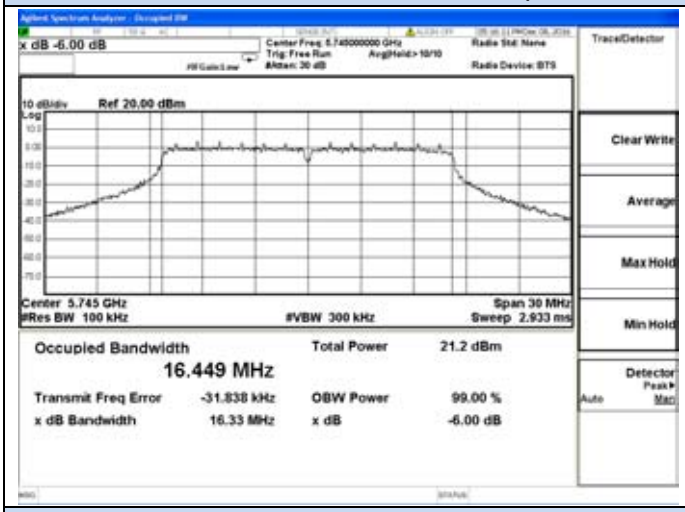
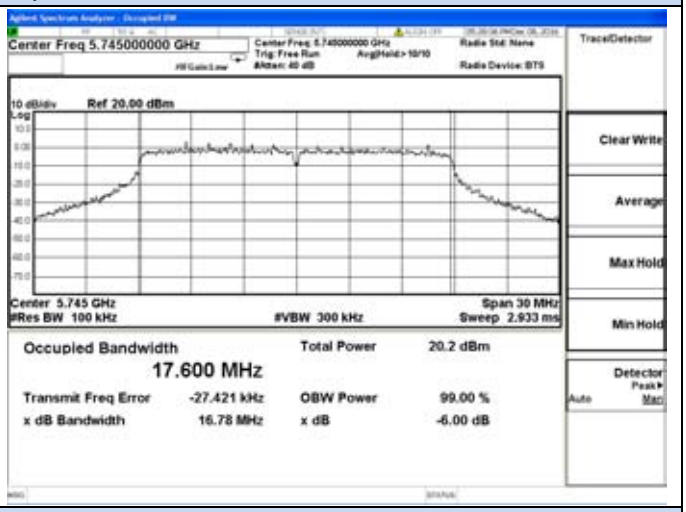
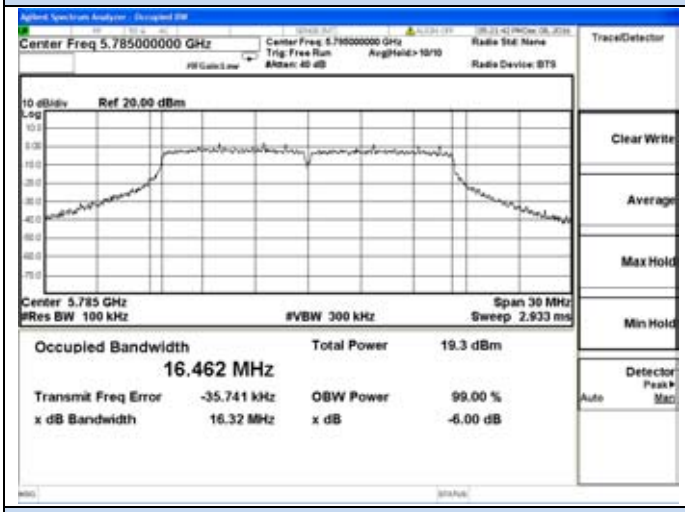
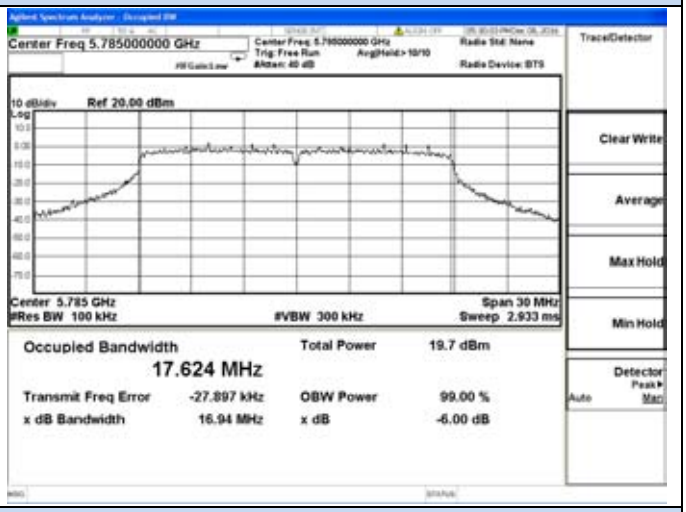
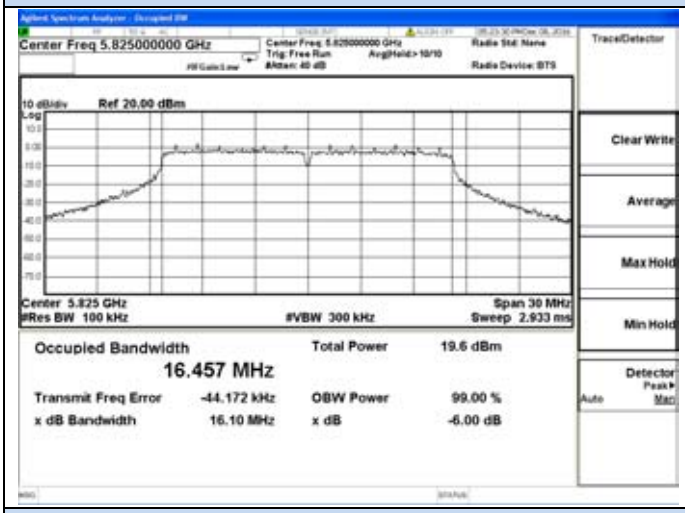
5.5.6. Test Result of 6dB & 26dB Occupied Bandwidth

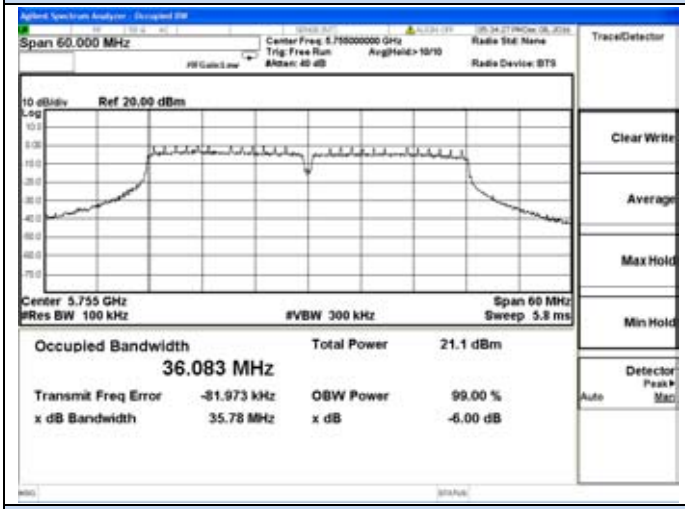
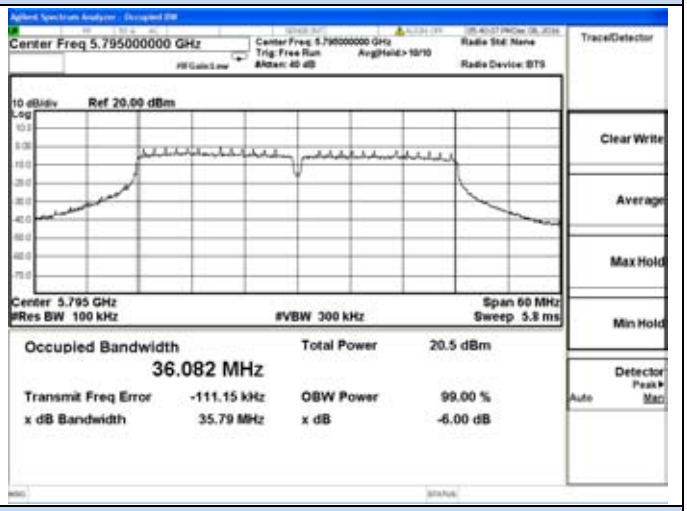
Temperature	25℃	Humidity	60%
Test Engineer	Kyle Yin	Configurations	802.11a/n

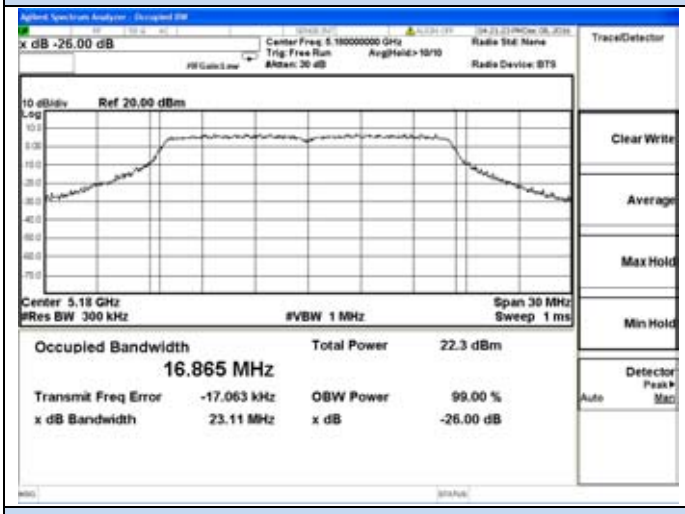
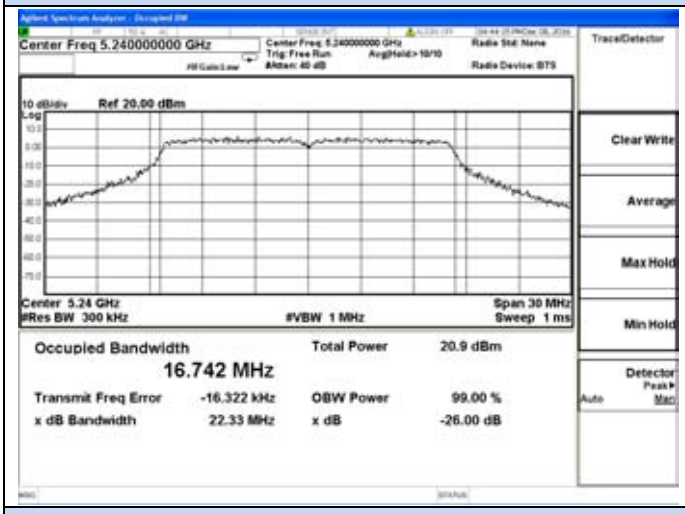
Test Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (kHz)
			Chain 0	
802.11a	149	5745	16.33	≥500
	157	5785	16.32	≥500
	165	5825	16.10	≥500
802.11n(HT20)	149	5745	16.78	≥500
	157	5785	16.94	≥500
	165	5825	17.34	≥500
802.11n(HT40)	151	5755	35.78	≥500
	159	5795	35.79	≥500

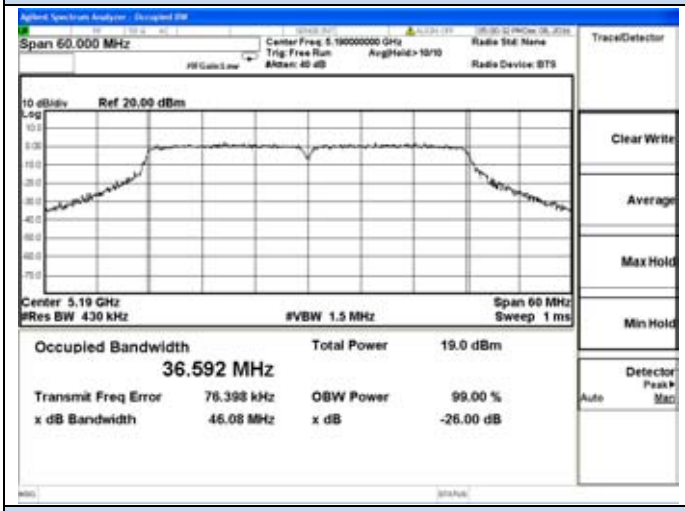
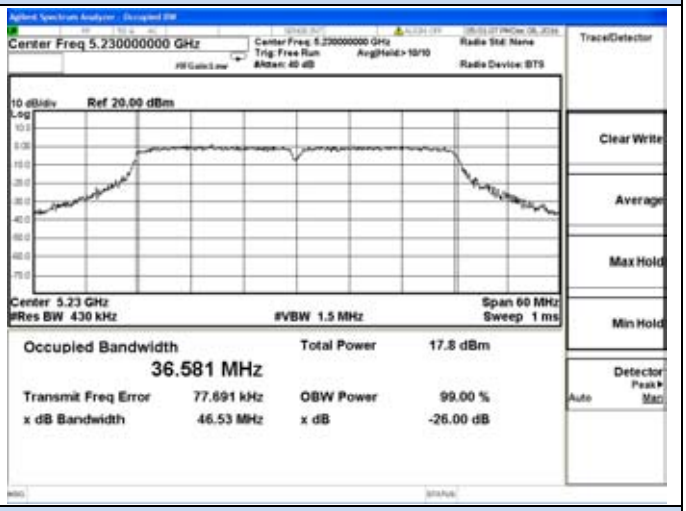
Test Mode	Channel	Frequency (MHz)	26dB BW (MHz)	99% BW (MHz)	Limit (kHz)
			Chain 0	Chain 0	
802.11a	36	5180	23.11	16.865	Non-specified
	44	5220	22.02	16.804	
	48	5240	22.33	16.742	
802.11n(HT20)	36	5180	23.99	17.845	
	44	5220	22.89	17.885	
	48	5240	23.43	17.883	
802.11n(HT40)	38	5190	46.08	36.592	
	46	5230	46.53	36.581	

Note: only recorded the worst case data in the test report.

Test plot of 6dB Occupied Bandwidth	
	
802.11a-5745MHz	802.11n20-5745MHz
	
802.11a-5785MHz	802.11n20-5785MHz
	
802.11a-5825MHz	802.11n20-5825MHz

Test plot of 6dB Occupied Bandwidth	
	
802.11n40-5755MHz	802.11n40-5795MHz

Test plot of 26dB Occupied Bandwidth	
	
802.11a-5180MHz	802.11n20-5180MHz
	
802.11a-5220MHz	802.11n20-5220MHz
	
802.11a-5240MHz	802.11n20-5240MHz

Test plot of 26dB Occupied Bandwidth	
	
802.11n40-5190MHz	802.11n40-5230MHz

5.6. Radiated Emissions Measurement

5.6.1. Standard Applicable

15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
\1\ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293.	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(\2\)
13.36-13.41			

\1\ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

\2\ Above 38.6

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 e.i.r.p. of −27 dBm/MHz (68.2dBuV/m at 3m).

For transmitters operating in the 5.725-5.85 GHz band:

All emissions shall be limited to a level of −27 dBm/MHz(68.2dBuV/m at 3m) at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz(105.2dBuV/m at 3m) at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6(110.8dBuV/m at 3m) dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz(122.2dBuV/m at 3m) at the band edge.

In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

5.6.2. Measuring Instruments and Setting

Please refer to section 6 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 100kHz for QP

5.6.3. Test Procedures

1) Sequence of testing 9 kHz to 30 MHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna height is 0.8 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 3 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height scan range is 1 meter to 2.5 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 1 meter.

--- The EUT was set into operation.

Premeasurement:

--- The antenna is moved spherical over the EUT in different polarisations of the antenna.

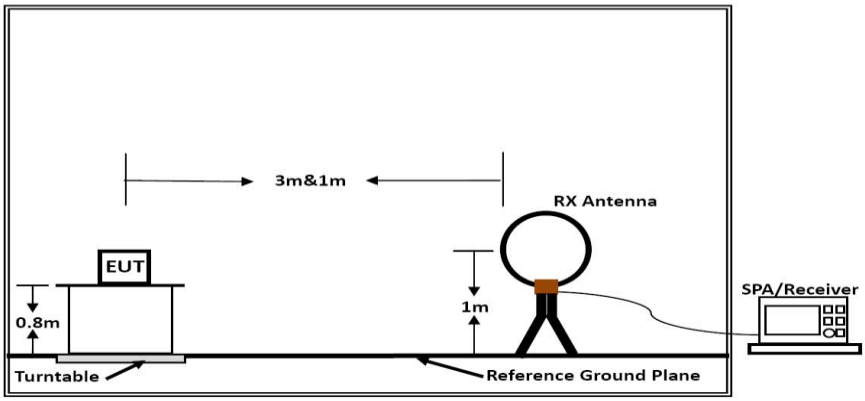
Final measurement:

--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.

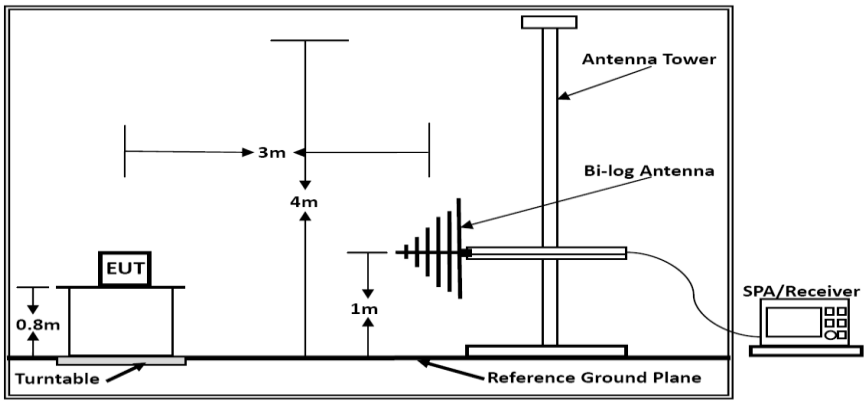
--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

5.6.4. Test Setup Layout

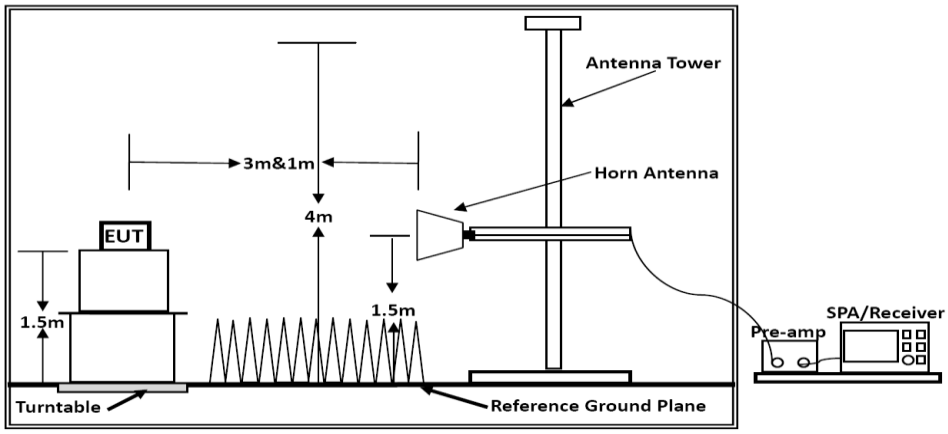
For radiated emissions below 30MHz



Below 30MHz



Below 1GHz



Above 1GHz

Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distanc [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

5.6.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

5.6.6. Results of Radiated Emissions (9kHz~30MHz)

Temperature	25℃	Humidty	60%
Test Engineer	Kyle Yin	Configurations	802.11a/n

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Over Limit (dBuV)	Remark
-	-	-	-	See Note

Note:

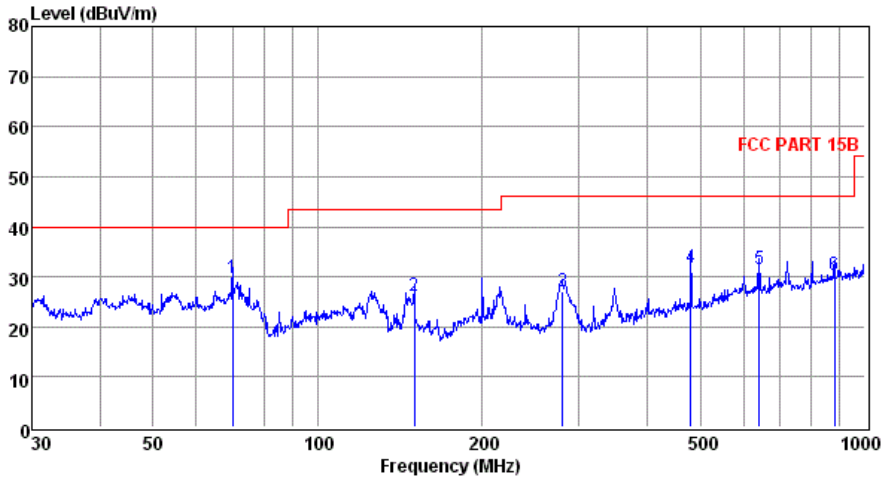
The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

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

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

5.5.7. Results of Radiated Emissions (30MHz~1GHz)

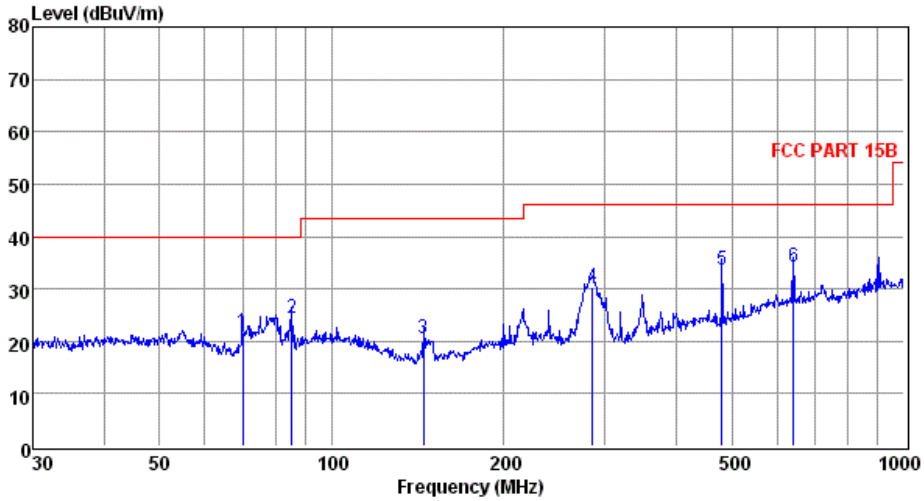
Temperature	25℃	Humidty	60%
Test Engineer	Kyle Yin	Configurations	802.11a/n



Env./Ins: 24℃/56%
pol: VERTICAL

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	69.84	20.57	0.51	8.71	29.79	40.00	-10.21	QP
2	150.01	17.14	0.86	8.26	26.26	43.50	-17.24	QP
3	280.02	13.36	1.01	12.67	27.04	46.00	-18.96	QP
4	480.53	14.47	1.31	16.08	31.86	46.00	-14.14	QP
5	640.61	11.48	1.55	18.60	31.63	46.00	-14.37	QP
6	881.41	7.46	1.84	20.90	30.20	46.00	-15.80	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that ate 20db blow the offficial limit are not reported



Env./Ins: 24℃/56%
pol: HORIZONTAL

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	69.84	12.34	0.51	8.71	21.56	40.00	-18.44	QP
2	85.00	13.57	0.47	10.31	24.35	40.00	-15.65	QP
3	144.84	11.49	0.77	8.22	20.48	43.50	-23.02	QP
4	285.98	16.64	1.00	12.79	30.43	46.00	-15.57	QP
5	480.53	16.19	1.31	16.08	33.58	46.00	-12.42	QP
6	640.61	13.93	1.55	18.60	34.08	46.00	-11.92	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that ate 20db blow the offficial limit are not reported

Note:

Pre-scan all mode and recorded the worst case results in this report (802.11a-5785MHz).
Emission level (dBuV/m) = 20 log Emission level (uV/m).
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

5.6.8. Results for Radiated Emissions (Above 1GHz)

802.11a / Channel 36

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
10.36	45.62	33.21	35.82	9.52	52.53	68.20	-15.67	Peak	Horizontal
10.36	34.74	33.21	35.82	9.52	41.65	54.00	-12.35	Average	Horizontal
10.36	46.76	32.82	35.82	9.52	53.28	68.20	-14.92	Peak	Vertical
10.36	35.25	32.82	35.82	9.52	41.77	54.00	-12.23	Average	Vertical

802.11a / Channel 44

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
10.44	45.96	33.21	35.82	9.52	52.87	68.20	-15.33	Peak	Horizontal
10.44	35.45	33.21	35.82	9.52	42.36	54.00	-11.64	Average	Horizontal
10.44	47.25	32.82	35.82	9.52	53.77	68.20	-14.43	Peak	Vertical
10.44	35.79	32.82	35.82	9.52	42.31	54.00	-11.69	Average	Vertical

802.11a / Channel 48

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
10.48	46.49	33.21	35.82	9.52	53.40	68.20	-14.80	Peak	Horizontal
10.48	35.72	33.21	35.82	9.52	42.63	54.00	-11.37	Average	Horizontal
10.48	47.67	32.82	35.82	9.52	54.19	68.20	-14.01	Peak	Vertical
10.48	36.22	32.82	35.82	9.52	42.74	54.00	-11.26	Average	Vertical

802.11n(HT20) / Channel 36

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
10.36	45.10	33.21	35.82	9.52	52.01	68.20	-16.19	Peak	Horizontal
10.36	34.31	33.21	35.82	9.52	41.22	54.00	-12.78	Average	Horizontal
10.36	46.46	32.82	35.82	9.52	52.98	68.20	-15.22	Peak	Vertical
10.36	34.84	32.82	35.82	9.52	41.36	54.00	-12.64	Average	Vertical

802.11n(HT20) / Channel 44

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
10.44	45.73	33.21	35.82	9.52	52.64	68.20	-15.56	Peak	Horizontal
10.44	34.76	33.21	35.82	9.52	41.67	54.00	-12.33	Average	Horizontal
10.44	46.93	32.82	35.82	9.52	53.45	68.20	-14.75	Peak	Vertical
10.44	35.44	32.82	35.82	9.52	41.96	54.00	-12.04	Average	Vertical

802.11n(HT20) / Channel 48

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
10.48	46.48	33.21	35.82	9.52	53.39	68.20	-14.81	Peak	Horizontal
10.48	35.49	33.21	35.82	9.52	42.40	54.00	-11.60	Average	Horizontal
10.48	47.50	32.82	35.82	9.52	54.02	68.20	-14.18	Peak	Vertical
10.48	35.80	32.82	35.82	9.52	42.32	54.00	-11.68	Average	Vertical

802.11n(HT40) / Channel 38

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
10.38	45.91	33.21	35.82	9.52	52.82	68.20	-15.38	Peak	Horizontal
10.38	35.11	33.21	35.82	9.52	42.02	54.00	-11.98	Average	Horizontal
10.38	47.02	32.82	35.82	9.52	53.54	68.20	-14.66	Peak	Vertical
10.38	35.52	32.82	35.82	9.52	42.04	54.00	-11.96	Average	Vertical

802.11n(HT40) / Channel 46

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
10.46	46.03	33.21	35.82	9.52	52.94	68.20	-15.26	Peak	Horizontal
10.46	35.57	33.21	35.82	9.52	42.48	54.00	-11.52	Average	Horizontal
10.46	47.14	32.82	35.82	9.52	53.66	68.20	-14.54	Peak	Vertical
10.46	35.69	32.82	35.82	9.52	42.21	54.00	-11.79	Average	Vertical

802.11a / Channel 149

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
11.490	47.05	33.92	36.09	10.26	55.14	68.20	-13.06	Peak	Horizontal
11.490	36.31	33.92	36.09	10.26	44.40	54.00	-9.60	Average	Horizontal
11.490	48.01	33.99	35.99	10.26	56.27	68.20	-11.93	Peak	Vertical
11.490	36.73	33.99	35.99	10.26	44.99	54.00	-9.01	Average	Vertical

802.11a / Channel 157

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
11.570	46.70	33.92	36.09	10.26	54.79	68.20	-13.41	Peak	Horizontal
11.570	35.69	33.92	36.09	10.26	43.78	54.00	-10.22	Average	Horizontal
11.570	47.84	33.99	35.99	10.26	56.10	68.20	-12.10	Peak	Vertical
11.570	36.36	33.99	35.99	10.26	44.62	54.00	-9.38	Average	Vertical

802.11a / Channel 165

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
11.650	46.38	33.92	36.09	10.26	54.47	68.20	-13.73	Peak	Horizontal
11.650	35.69	33.92	36.09	10.26	43.78	54.00	-10.22	Average	Horizontal
11.650	47.45	33.99	35.99	10.26	55.71	68.20	-12.49	Peak	Vertical
11.650	35.87	33.99	35.99	10.26	44.13	54.00	-9.87	Average	Vertical

802.11n(HT20) / Channel 149

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
11.490	46.91	33.92	36.09	10.26	55.00	68.20	-13.20	Peak	Horizontal
11.490	36.21	33.92	36.09	10.26	44.30	54.00	-9.70	Average	Horizontal
11.490	48.08	33.99	35.99	10.26	56.34	68.20	-11.86	Peak	Vertical
11.490	36.81	33.99	35.99	10.26	45.07	54.00	-8.93	Average	Vertical

802.11n(HT20) / Channel 157

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
11.570	46.89	33.92	36.09	10.26	54.98	68.20	-13.22	Peak	Horizontal
11.570	36.47	33.92	36.09	10.26	44.56	54.00	-9.44	Average	Horizontal
11.570	47.99	33.99	35.99	10.26	56.25	68.20	-11.95	Peak	Vertical
11.570	36.70	33.99	35.99	10.26	44.96	54.00	-9.04	Average	Vertical

802.11n(HT20) / Channel 165

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
11.650	46.52	33.92	36.09	10.26	54.61	68.20	-13.59	Peak	Horizontal
11.650	35.98	33.92	36.09	10.26	44.07	54.00	-9.93	Average	Horizontal
11.650	47.63	33.99	35.99	10.26	55.89	68.20	-12.31	Peak	Vertical
11.650	36.07	33.99	35.99	10.26	44.33	54.00	-9.67	Average	Vertical

802.11n(HT40) / Channel 151

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
11.510	49.86	33.92	36.09	10.26	57.95	68.20	-10.25	Peak	Horizontal
11.510	39.04	33.92	36.09	10.26	47.13	54.00	-6.87	Average	Horizontal
11.510	50.91	33.99	35.99	10.26	59.17	68.20	-9.03	Peak	Vertical
11.510	39.41	33.99	35.99	10.26	47.67	54.00	-6.33	Average	Vertical

802.11n(HT40) / Channel 159

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
11.590	49.69	33.92	36.09	10.26	57.78	68.20	-10.42	Peak	Horizontal
11.590	38.68	33.92	36.09	10.26	46.77	54.00	-7.23	Average	Horizontal
11.590	50.51	33.99	35.99	10.26	58.77	68.20	-9.43	Peak	Vertical
11.590	39.19	33.99	35.99	10.26	47.45	54.00	-6.55	Average	Vertical

Notes:

1). Measuring frequencies from 9k~40GHz, No emission found between lowest internal used/generated frequency to 30MHz.
2). Radiated emissions measured in frequency range from 9k~40GHz were made with an instrument using Peak detector mode.
3). Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5.6.9. Results for Band Edge Emissions

(Conducted)

802.11a								
Channel	Freq. MHz	Reading Level dBm		Antenna Gain dBi	Sum Measured E dBuV/m	Limit dBuV/m	Margin dB	Remark
		Chain 0	Chain 1					
5180	5150.0000	-40.24	-34.81	5.00	65.39	68.20	-2.81	Peak
	5350.0000	-54.28	-44.82	5.00	55.38	68.20	-12.82	Peak
5240	5150.0000	-54.39	-45.83	5.00	54.37	68.20	-13.83	Peak
	5350.0000	-40.18	-33.39	5.00	66.81	68.20	-1.39	Peak

802.11n20								
Channel	Freq. MHz	Reading Level dBm		Antenna Gain dBi	Sum Measured E dBuV/m	Limit dBuV/m	Margin dB	Remark
		Chain 0	Chain 1					
5180	5150.0000	-38.41	-38.98	5.00	64.52	68.20	-3.68	Peak
	5350.0000	-54.20	-55.80	5.00	48.28	68.20	-19.92	Peak
5240	5150.0000	-54.31	-55.16	5.00	48.50	68.20	-19.70	Peak
	5350.0000	-40.34	-35.81	5.00	65.70	68.20	-2.50	Peak

802.11n40								
Channel	Freq. MHz	Reading Level dBm		Antenna Gain dBi	Sum Measured E dBuV/m	Limit dBuV/m	Margin dB	Remark
		Chain 0	Chain 1					
5190	5150.0000	-35.89	-37.98	5.00	66.40	68.20	-1.80	Peak
	5350.0000	-44.71	-45.29	5.00	58.22	68.20	-9.98	Peak
5230	5150.0000	-44.19	-45.80	5.00	58.29	68.20	-9.91	Peak
	5350.0000	-40.20	-36.14	5.00	65.50	68.20	-2.70	Peak

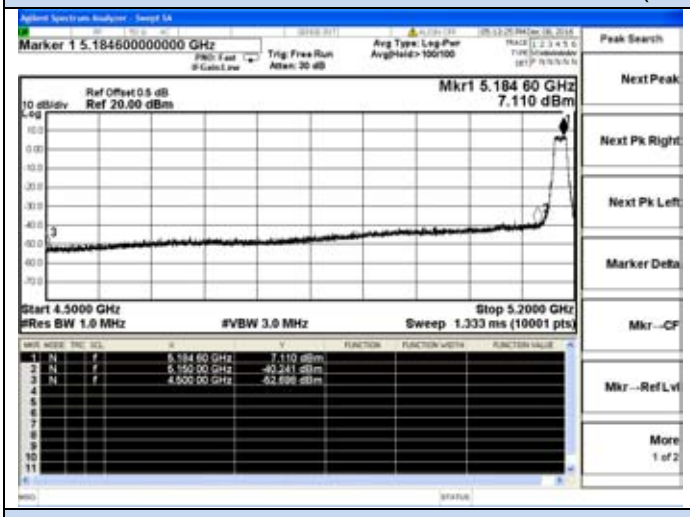
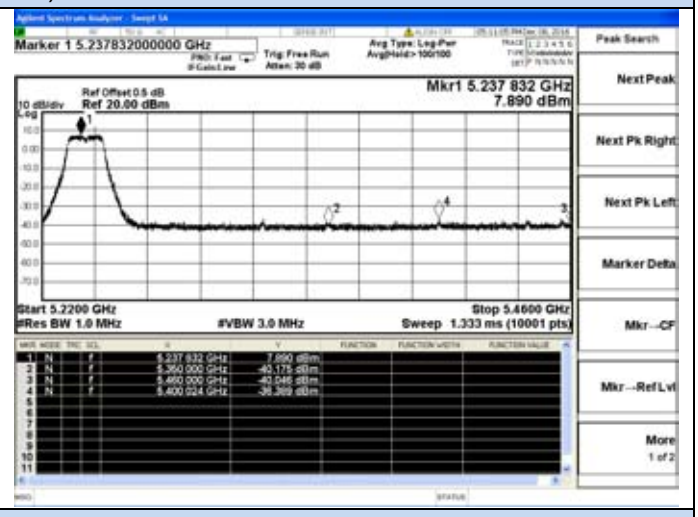
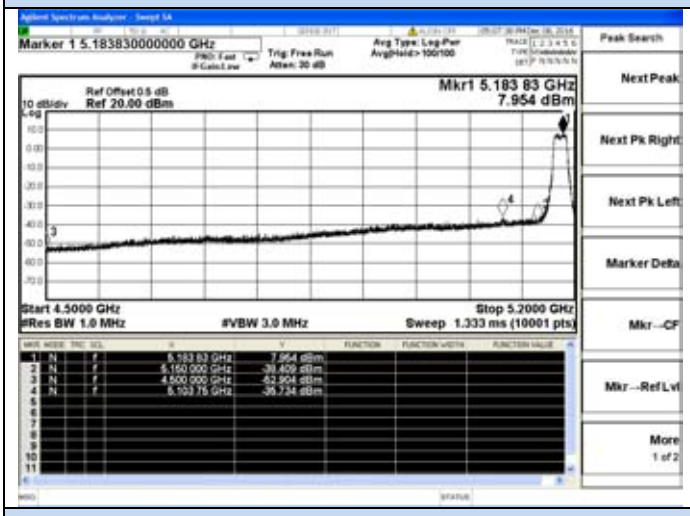
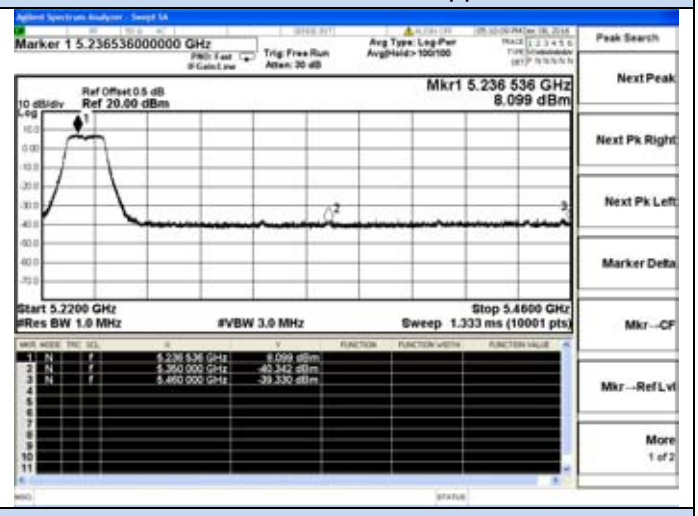
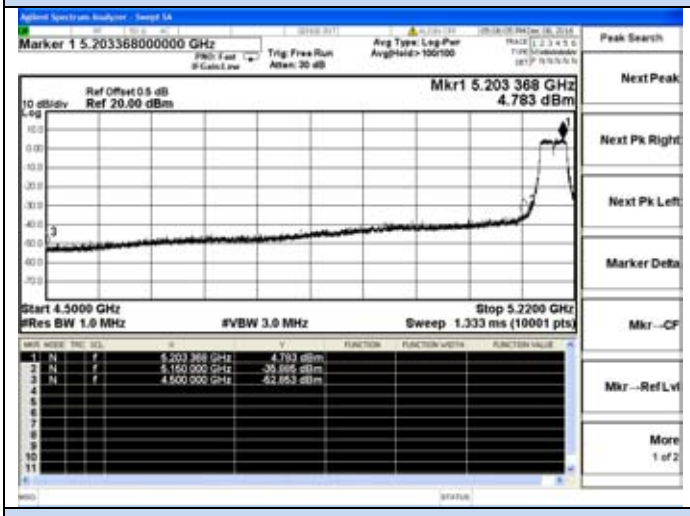
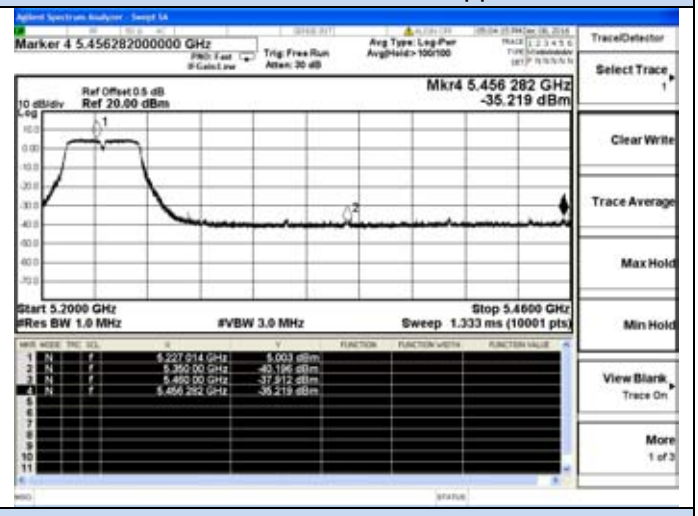
802.11a								
Channel	Freq. MHz	Reading Level dBm		Antenna Gain dBi	Sum Measured E dBuV/m	Limit dBuV/m	Margin dB	Remark
		Chain 0	Chain 1					
5745	5650.0000	-36.42	-36.24	5.00	63.96	68.20	-4.24	Peak
	5700.0000	-34.64	-33.09	5.00	67.11	105.20	-38.09	Peak
	5720.0000	-33.14	-35.38	5.00	67.06	110.80	-43.74	Peak
	5725.0000	-33.50	-33.47	5.00	66.73	122.20	-55.47	Peak
5825	5850.0000	-41.02	-35.96	5.00	64.24	122.20	-57.96	Peak
	5855.0000	-39.65	-36.95	5.00	63.25	110.80	-47.55	Peak
	5875.0000	-42.62	-38.03	5.00	62.17	105.20	-43.03	Peak
	5925.0000	-46.16	-39.66	5.00	60.54	68.20	-7.66	Peak

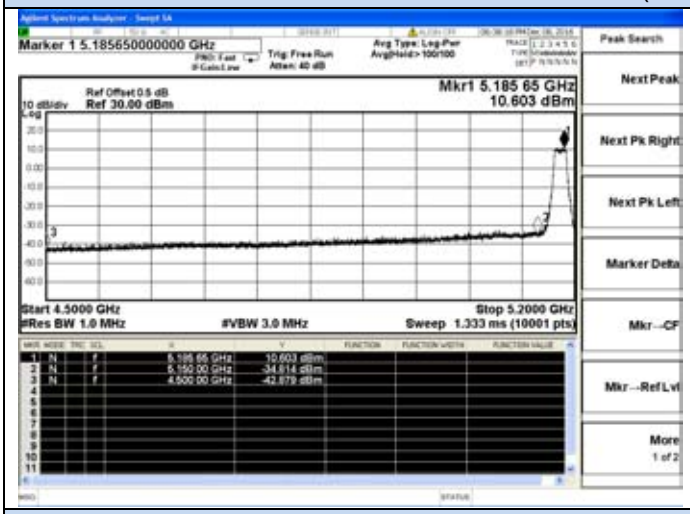
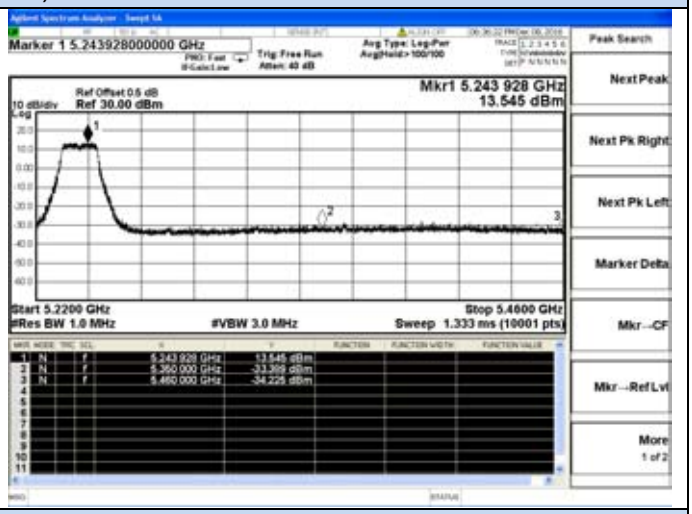
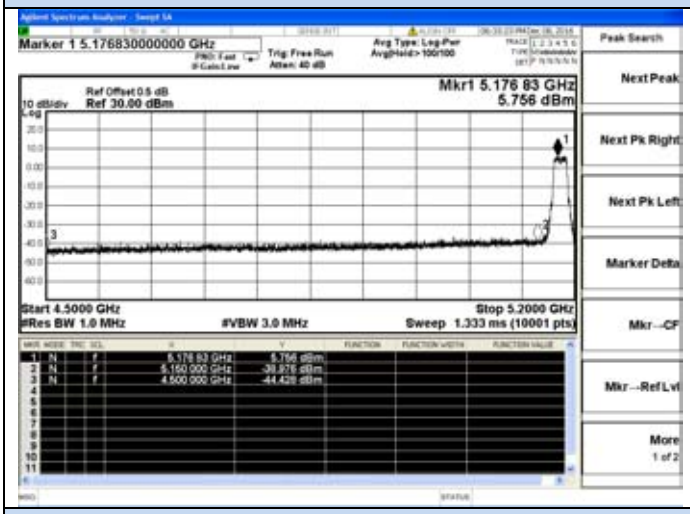
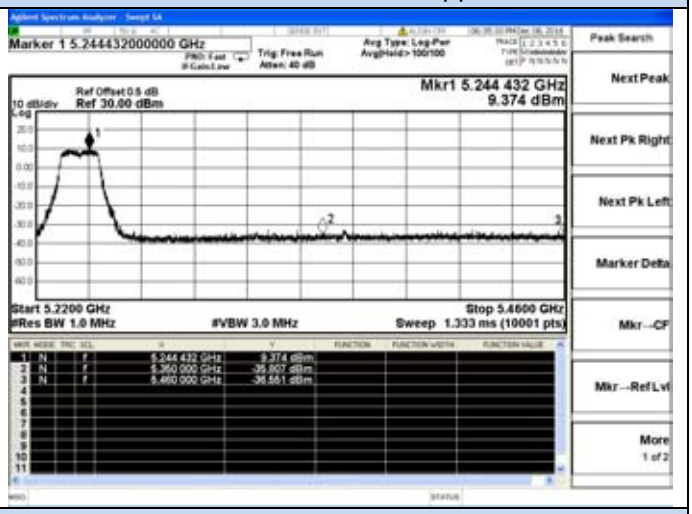
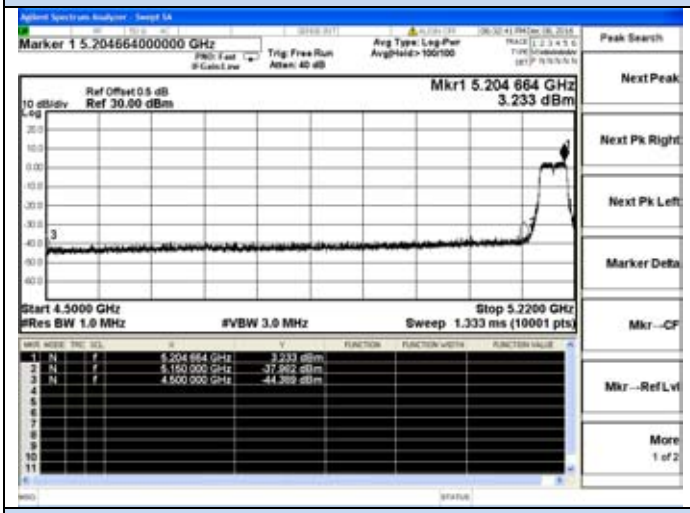
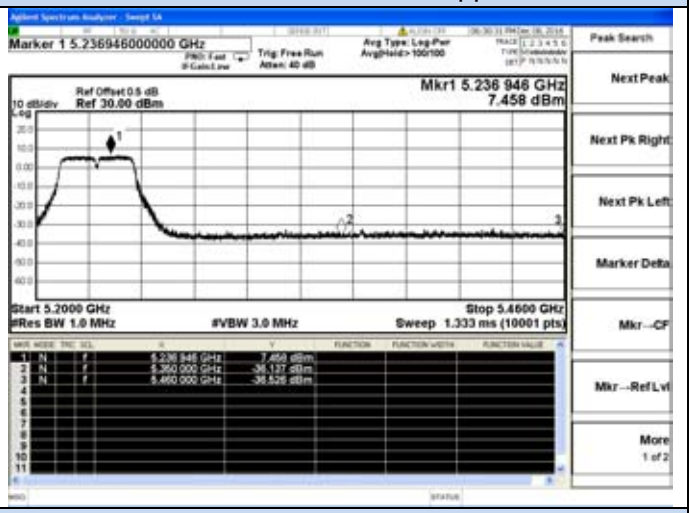
802.11n20								
Channel	Freq. MHz	Reading Level dBm		Antenna Gain dBi	Sum Measured E dBuV/m	Limit dBuV/m	Margin dB	Remark
		Chain 0	Chain 1					
5745	5650.0000	-37.04	-37.54	5.00	65.93	68.20	-2.27	Peak
	5700.0000	-36.52	-37.31	5.00	66.31	105.20	-38.89	Peak
	5720.0000	-33.82	-35.08	5.00	68.81	110.80	-41.99	Peak
	5725.0000	-34.23	-34.47	5.00	68.86	122.20	-53.34	Peak
5825	5850.0000	-40.37	-37.15	5.00	64.74	122.20	-57.46	Peak
	5855.0000	-41.62	-38.80	5.00	63.23	110.80	-47.57	Peak
	5875.0000	-44.19	-39.14	5.00	62.24	105.20	-42.96	Peak
	5925.0000	-46.73	-39.27	5.00	61.65	68.20	-6.55	Peak

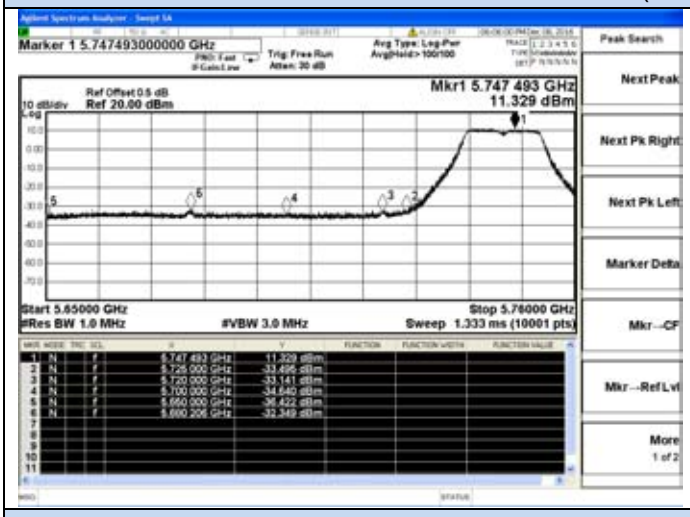
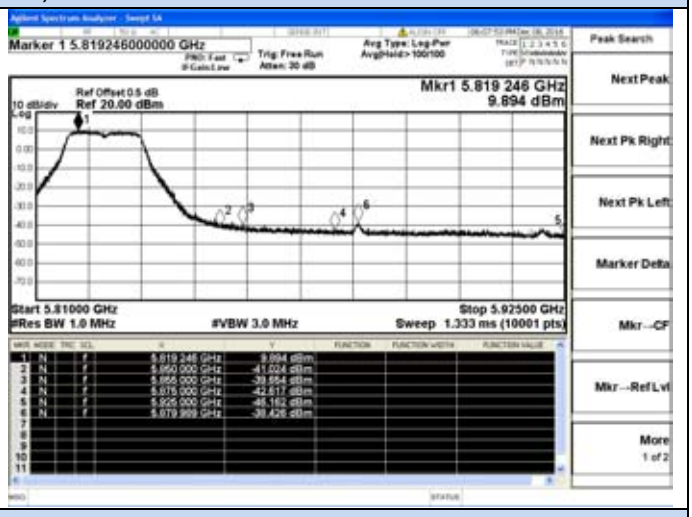
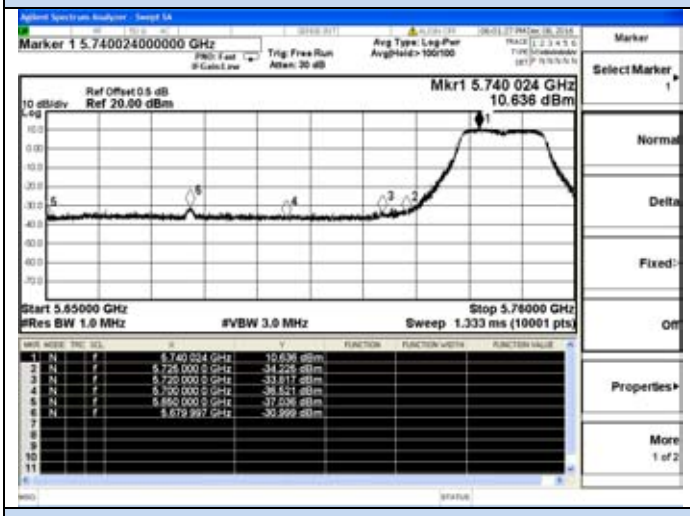
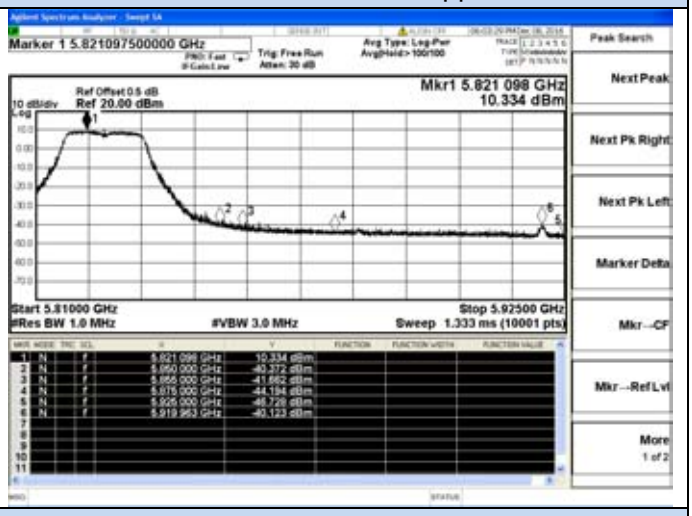
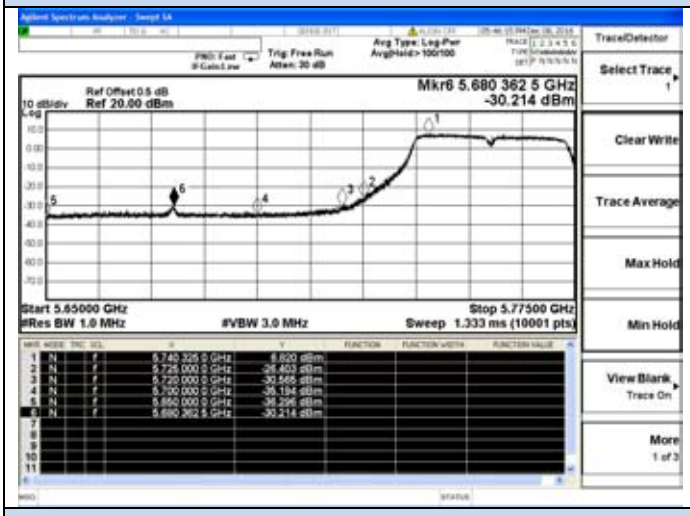
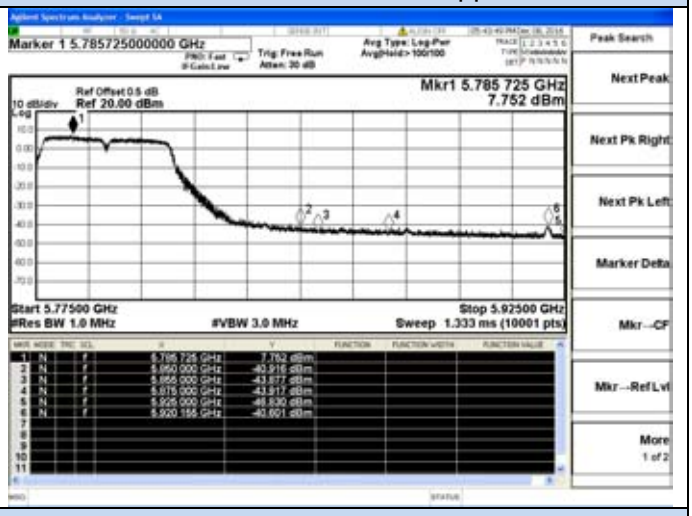
802.11n40								
Channel	Freq. MHz	Reading Level dBm		Antenna Gain dBi	Sum Measured E dBuV/m	Limit dBuV/m	Margin dB	Remark
		Chain 0	Chain 1					
5755	5650.0000	-36.30	-36.51	5.00	66.81	68.20	-1.39	Peak
	5700.0000	-35.19	-36.04	5.00	67.62	105.20	-37.58	Peak
	5720.0000	-30.57	-33.96	5.00	71.27	110.80	-39.53	Peak
	5725.0000	-26.40	-28.19	5.00	76.01	122.20	-46.19	Peak
5795	5850.0000	-40.92	-38.50	5.00	63.67	122.20	-58.53	Peak
	5855.0000	-43.88	-39.39	5.00	62.13	110.80	-48.67	Peak
	5875.0000	-43.92	-38.45	5.00	62.83	105.20	-42.37	Peak
	5925.0000	-46.83	-40.72	5.00	60.43	68.20	-7.77	Peak

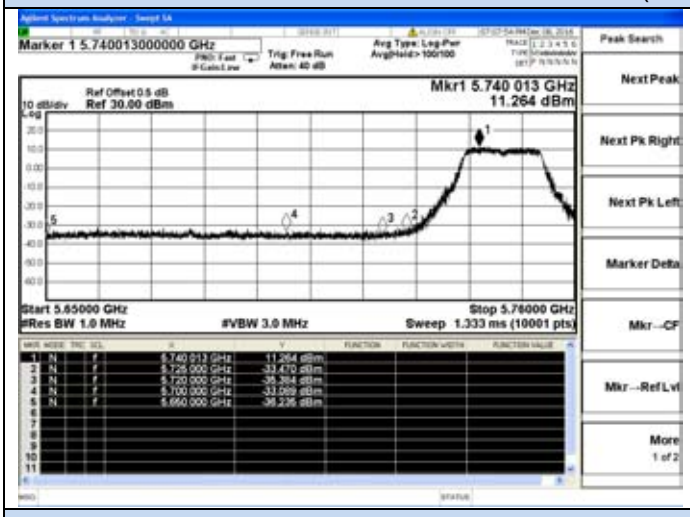
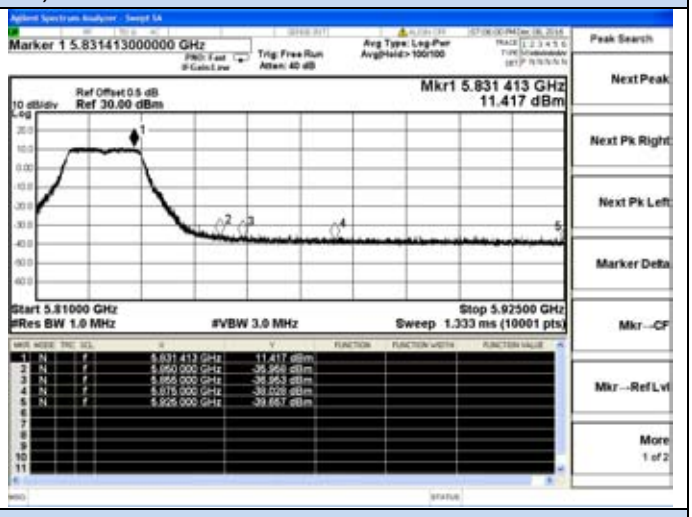
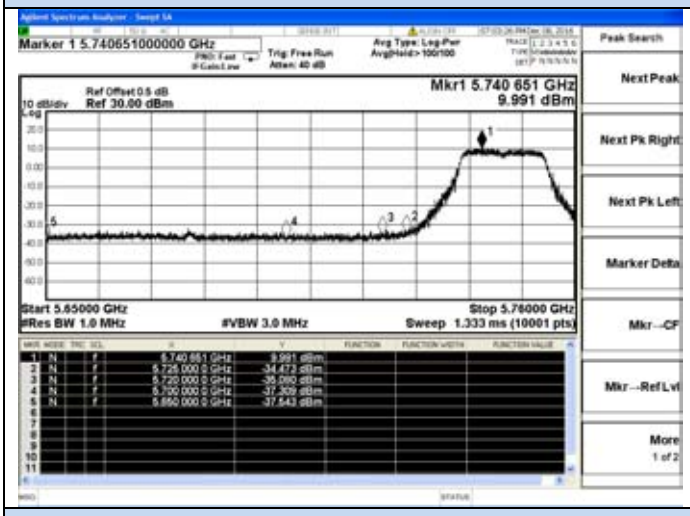
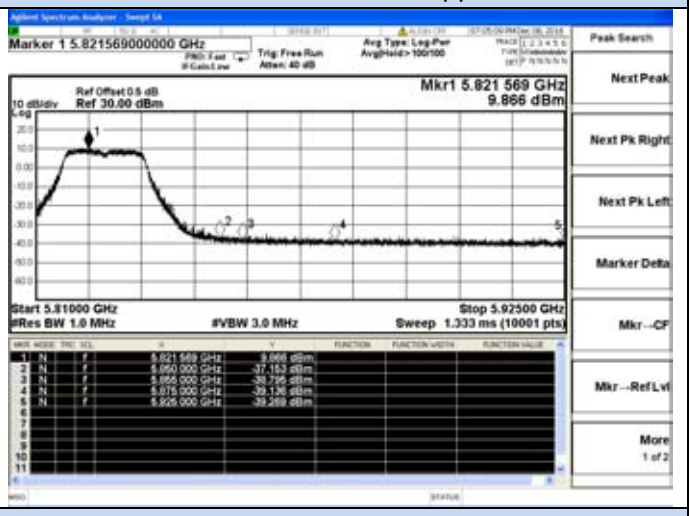
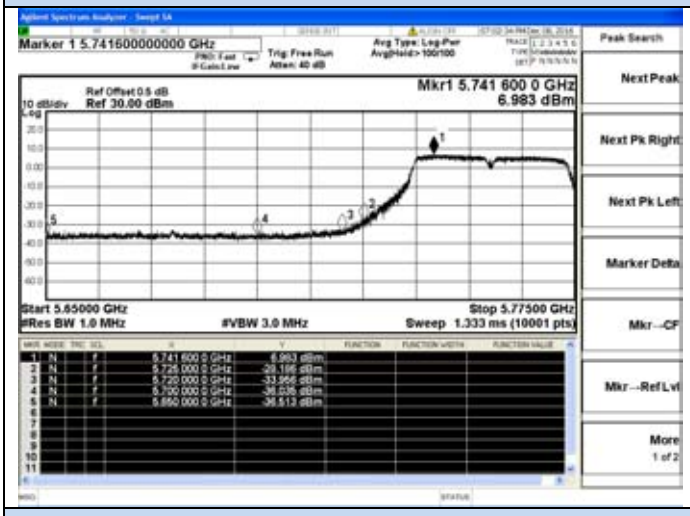
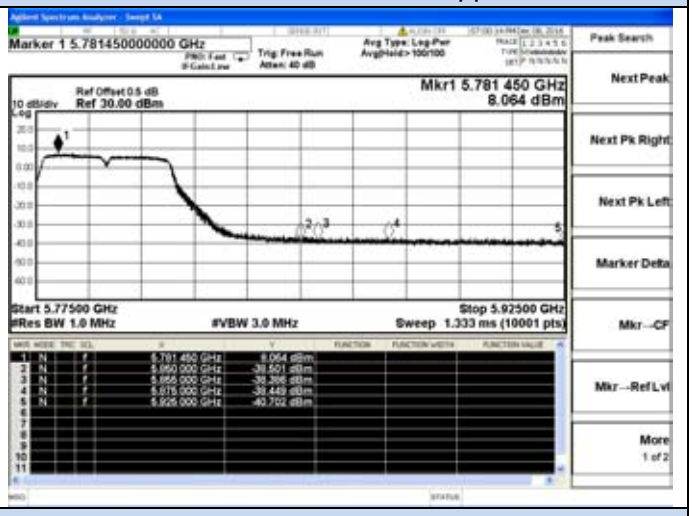
Note:

1). All modes have been tested and we only record the worst test result;
2). Measured E=Reading Level+Antenna Gain+95.2
3). For 802.11a mode, only the higher value of transmitter chain was used to determined the worst case, For 802.11n mode, both the value of transmitter china 0 & 1 was used to calculate to determine the worst case.

Test plot of Band Edge and Restricted band Emissions (Chain 0)	
	
802.11a-5180MHz-Lower	802.11a-5240MHz-Upper
	
802.11n20-5180MHz-Lower	802.11n20-5240MHz-Upper
	
802.11n40-5190MHz-Lower	802.11n40-5230MHz-Upper

Test plot of Band Edge and Restricted band Emissions (Chain 1)	
	
802.11a-5180MHz-Lower	802.11a-5240MHz-Upper
	
802.11n20-5180MHz-Lower	802.11n20-5240MHz-Upper
	
802.11n40-5190MHz-Lower	802.11n40-5230MHz-Upper

Test plot of Band Edge and Restricted band Emissions (Chain 0)	
	
802.11a-5745MHz-Lower	802.11a-5825MHz-Upper
	
802.11n20-5745MHz-Lower	802.11n20-5825MHz-Upper
	
802.11n40-5755MHz-Lower	802.11n40-5795MHz-Upper

Test plot of Band Edge and Restricted band Emissions (Chain 1)	
	
802.11a-5745MHz-Lower	802.11a-5825MHz-Upper
	
802.11n20-5745MHz-Lower	802.11n20-5825MHz-Upper
	
802.11n40-5755MHz-Lower	802.11n40-5795MHz-Upper

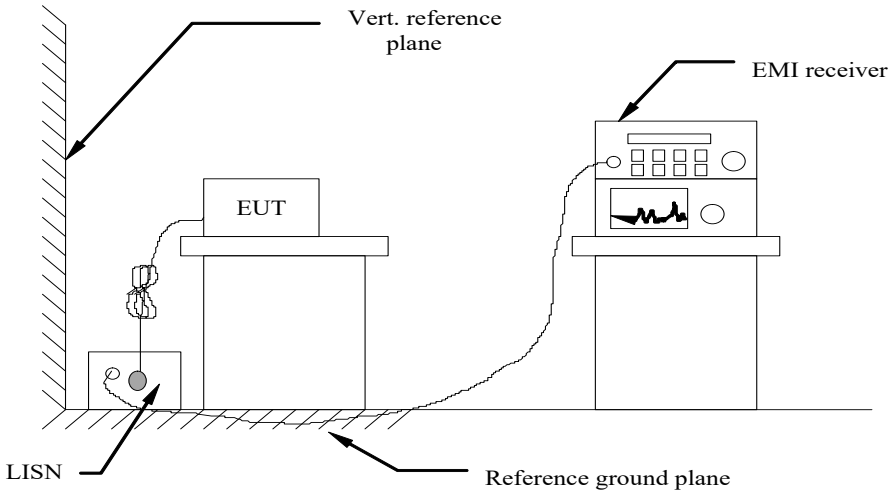
5.7. Power line conducted emissions

5.7.1 Standard Applicable

According to §15.207 (a): For an intentional radiator which 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 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

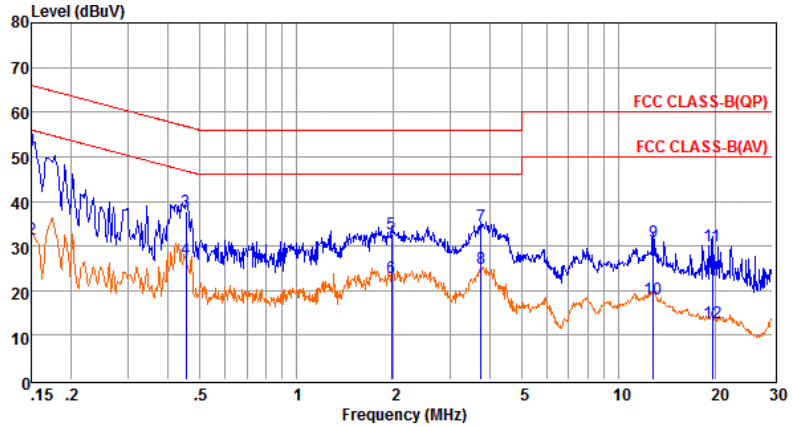
5.7.2 Block Diagram of Test Setup



5.7.3 Test Results

PASS.

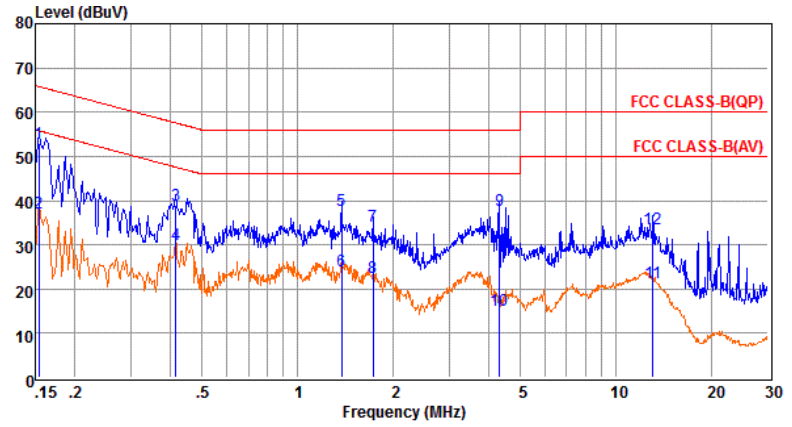
Test result for AC 120V/60Hz



Env. Ins: 24*/56%
Pol: LINE

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB
1	0.15	31.97	9.57	0.02	10.00	51.56	66.00	-14.44	QP
2	0.15	11.82	9.57	0.02	10.00	31.41	55.99	-24.58	Average
3	0.45	18.05	9.62	0.04	10.00	37.71	56.80	-19.09	QP
4	0.45	7.39	9.62	0.04	10.00	27.05	46.80	-19.75	Average
5	1.97	12.93	9.64	0.05	10.00	32.62	56.00	-23.38	QP
6	1.97	3.14	9.64	0.05	10.00	22.83	46.00	-23.17	Average
7	3.74	14.79	9.65	0.06	10.00	34.50	56.00	-21.50	QP
8	3.74	5.20	9.65	0.06	10.00	24.91	46.00	-21.09	Average
9	12.78	11.16	9.70	0.09	10.00	30.95	60.00	-29.05	QP
10	12.78	-1.56	9.70	0.09	10.00	18.23	50.00	-31.77	Average
11	19.53	10.09	9.76	0.12	10.00	29.97	60.00	-30.03	QP
12	19.53	-7.15	9.76	0.12	10.00	12.73	50.00	-37.27	Average

Remarks: 1. Measured = Reading +Cable Loss +Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

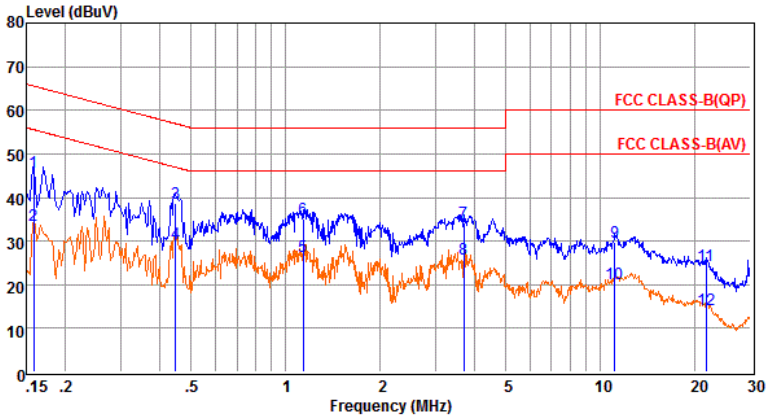


Env. Ins: 24*/56%
Pol: LINE

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB
1	0.15	33.46	9.58	0.02	10.00	53.06	65.78	-12.72	QP
2	0.15	17.44	9.58	0.02	10.00	37.04	55.77	-18.73	Average
3	0.41	19.26	9.62	0.04	10.00	38.92	57.55	-18.63	QP
4	0.41	10.50	9.62	0.04	10.00	30.16	47.55	-17.39	Average
5	1.37	18.04	9.63	0.05	10.00	37.72	56.00	-18.28	QP
6	1.37	4.42	9.63	0.05	10.00	24.10	46.00	-21.90	Average
7	1.73	14.57	9.64	0.05	10.00	34.26	56.00	-21.74	QP
8	1.73	2.94	9.64	0.05	10.00	22.63	46.00	-23.37	Average
9	4.31	17.93	9.65	0.06	10.00	37.64	56.00	-18.36	QP
10	4.32	-4.50	9.65	0.06	10.00	15.21	46.00	-30.79	Average
11	13.06	1.68	9.70	0.09	10.00	21.47	50.00	-28.53	Average
12	13.06	13.68	9.70	0.09	10.00	33.47	60.00	-26.53	e

Remarks: 1. Measured = Reading +Cable Loss +Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

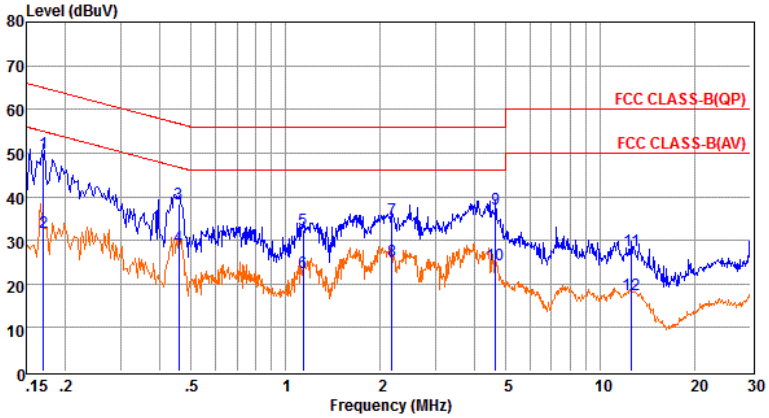
Test result for AC 240V/50Hz



Env. Ins: 24*/56%
Pol: LINE

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB
1	0.16	26.25	9.58	0.02	10.00	45.85	65.56	-19.71	QP
2	0.16	14.08	9.58	0.02	10.00	33.68	55.55	-21.87	Average
3	0.45	19.01	9.62	0.04	10.00	38.67	56.93	-18.26	QP
4	0.45	9.72	9.62	0.04	10.00	29.38	46.93	-17.55	Average
5	1.14	6.78	9.63	0.05	10.00	26.46	46.00	-19.54	Average
6	1.14	15.46	9.63	0.05	10.00	35.14	56.00	-20.86	QP
7	3.68	14.35	9.65	0.06	10.00	34.06	56.00	-21.94	QP
8	3.68	6.17	9.65	0.06	10.00	25.88	46.00	-20.12	Average
9	11.14	10.06	9.70	0.09	10.00	29.85	60.00	-30.15	QP
10	11.14	0.54	9.70	0.09	10.00	20.33	50.00	-29.67	Average
11	21.71	4.47	9.72	0.12	10.00	24.31	60.00	-35.69	QP
12	21.72	-5.50	9.72	0.12	10.00	14.34	50.00	-35.66	Average

Remarks: 1. Measured = Reading +Cable Loss +Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.



Env. Ins: 24*/56%
Pol: NEUTRAL

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB
1	0.17	30.31	9.65	0.02	10.00	49.98	64.94	-14.96	QP
2	0.17	12.13	9.65	0.02	10.00	31.80	54.94	-23.14	Average
3	0.46	18.56	9.62	0.04	10.00	38.22	56.71	-18.49	QP
4	0.46	8.79	9.62	0.04	10.00	28.45	46.71	-18.26	Average
5	1.14	12.67	9.63	0.05	10.00	32.35	56.00	-23.65	QP
6	1.14	2.83	9.63	0.05	10.00	22.51	46.00	-23.49	Average
7	2.18	15.04	9.63	0.05	10.00	34.72	56.00	-21.28	QP
8	2.18	5.53	9.63	0.05	10.00	25.21	46.00	-20.79	Average
9	4.65	17.44	9.66	0.06	10.00	37.16	56.00	-18.84	QP
10	4.65	4.66	9.66	0.06	10.00	24.38	46.00	-21.62	Average
11	12.58	7.94	9.73	0.09	10.00	27.76	60.00	-32.24	QP
12	12.58	-2.32	9.73	0.09	10.00	17.50	50.00	-32.50	Average

Remarks: 1. Measured = Reading +Cable Loss +Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

Note: Pre-scan all modes and recorded the worst case(TX at 802.11a 5.785GHz) result in this report.

5.8. Antenna Requirements

5.8.1 Standard Applicable

According to antenna requirement of §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 re-placed by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

And according to §15.247(4)(1), system operating in the 2400-2483.5MHz bands that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

5.8.2 Antenna Connected Construction

5.8.2.1. Standard Applicable

According to § 15.203 & RSS-Gen, 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.

5.8.2.2. Antenna Connector Construction

The directional gains of antenna used for transmitting is 5.0dBi, and the antenna is an External Antenna connect to the R-SMA antenna connect port and no consideration of replacement. Please see EUT photo for details.

5.8.2.3. Results: Compliance.

6. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacture	Model No.	Serial No.	Characteristics	Cal Due Date
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Jun 17, 2017
Signal analyzer	Agilent	E4448A(External mixers to 40GHz)	US44300469	9kHz~40GHz	Jul 15, 2017
LISN	MESS Tec	NNB-2/16Z	99079	9KHz-30MHz	Jun 17, 2017
LISN	EMCO	3819/2NM	9703-1839	9KHz-30MHz	Jun 17, 2017
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9KHz-30MHz	Jun 17, 2017
ISN	SCHAFFNE	ISN ST08	21653	9KHz-30MHz	Jun 17, 2017
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30M-18GHz	Jun 17, 2017
Amplifier	SCHAFFNE	COA9231A	18667	9kHz-2GHzz	Apr 17, 2017
Amplifier	Agilent	8449B	3008A021	1GHz-26.5GHz	Apr 17, 2017
Amplifier	MITEQ	AMF-6F-260400	9121372	26.5GHz-40GHz	Apr 17, 2017
Loop Antenna	R&S	HFH2-Z2	860004/00	9k-30MHz	Apr 17, 2017
By-log Antenna	SCHWARZB	VULB9163	9163-470	30MHz-1GHz	Apr 17, 2017
Horn Antenna	EMCO	3115	6741	1GHz-18GHz	Apr 17, 2017
Horn Antenna	SCHWARZB	BBHA9170	BBHA9170	15GHz-40GHz	Apr 17, 2017
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz-1GHz	Jun 17, 2017
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-H	1GHz-40GHz	Jun 17, 2017
Power Meter	R&S	NRVS	100444	DC-40GHz	Jun 17, 2017
Power Sensor	R&S	NRV-Z51	100458	DC-30GHz	Jun 17, 2017
Power Sensor	R&S	NRV-Z32	10057	30MHz-6GHz	Jun 17, 2017
AC Power Source	HPC	HPA-500E	HPA-9100	AC 0~300V	Jun 17, 2017
DC power Soure	GW	GPC-6030D	C671845	DC 1V-60V	Jun 17, 2017
Temp. and Humidigy Chamber	Giant Force	GTH-225-20-S	MAB0103-00	N/A	Jun 17, 2017
RF CABLE-1m	JYE Bao	RG142	CB034-1m	20MHz-7GHz	Jun 17, 2017
RF CABLE-2m	JYE Bao	RG142	CB035-2m	20MHz-1GHz	Jun 17, 2017
Signal Generator	R&S	SMR40	10016	10MHz~40GHz	Jul 15, 2017
Universal Radio Communication Tester	R&S	CMU200	112012	N/A	Oct 26, 2017
Wideband Radia Communication Tester	R&S	CMW500	1201.0002K50	N/A	Nov 18, 2017
MXG Vector Signal Generator	Agilent	N5182A	MY47071151	250KHz~6GHz	Oct 26, 2017
MXG Vector Signal Generator	Agilent	E4438C	MY42081396	250KHz~6GHz	Oct 26, 2017
PSG Analog Signal Generator	Agilent	N8257D	MY46520521	250KHz~20GHz	Nov 18, 2017
MXA Signal Analyzer	Agilent	N9020A	MY50510140	10Hz~26.5GHz	Oct 26, 2017
DC Power Supply	Agilent	E3642A	/	0-8V,5A/0-20V,2	May 19, 2017
RF Control Unit	Tonscend	JS0806-1	/	/	Nov 18, 2017
LTE Test Software	Tonscend	JS1120-1	/	Version: 2.5.7.0	N/A
X-series USB Peak and Average Power Sensor Agilent	Agilent	U2021XA	MY54080022	/	Oct 26, 2017

4 Ch.Simultaneous Sampling 14 Bits 2 MS/s	Agilent	U2531A	MY54080016	/	Oct 26, 2017
Test Software	Ascentest	AT890-SW	20141230	Version:	N/A
Splitter/Combiner(Qty: 2)	Mini-Circuits	ZAPD-50W 4.2-6.0 GHz	NN256400424	/	Oct 26, 2017
Splitter/Combine(Qty: 2)	MCLI	PS3-7	4463/4464	/	Oct 26, 2017
ATT (Qty: 1)	Mini-Circuits	VAT-30+	30912	/	Oct 26, 2017

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