CENTRE OF TESTING SERVICE
INTERNATIONAL

OPERATE ACCORDING TO ISO/IEC 17025

FCC ID/IC
TEST REPORT

TEST REPORT NUMBER : CGZ3170406-00509-EFI

CENTRE OF TESTING SERVICE CO., LTD.
A101，No.65，Zhuji Highway,Tianhe District，Guangzhou, China

TEST REPORT For FCC ID/IC
47 CFR PART 15 OCT, 2016
RSS-247 Issue 2

Report Reference No.	CGZ3170406-00509-EFI
Date of issue	05 July 2017
**Testing Laboratory Name ..... **	**CENTRE OF TESTING SERVICE CO., LTD.**
Address	A101，No.65，Zhuji Highway,Tianhe District，Guangzhou, China
Testing location/ procedure	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
**Applicant's name ..... **	Rigado, Inc.
Address	3950 Fariview Industrial Dr SE, Suite 100, Salem, OR USA, 97302
**Test specification ..... **	
Standard	**RSS-247 Issue 2; RSS-Gen Issue 4** **47 CFR PART 15 OCT, 2016; ANSI C63.10:2013**
**Test Report Form No. ..... **	CTSEMC-1.0
TRF Originator	CENTRE OF TESTING SERVICE CO., LTD.
Master TRF	Dated 2009-01

**Test item description..... **	QCA6234
Trade Mark.....	Rigado
Manufacturer.....	Rigado, Inc.
Model/Type reference.....	QCA6234
Ratings.....	DC 3.6V
Operating Frequency	5150 GHz ~ 5250GHz;5725 GHz ~ 5825GHz
Result	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Kate zhang / Fileadministrators	Duke yang / Technique principal	Vincent yao / Manager

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FCC ID/IC -- T E S T R E P O R T

Test Report No. : CGZ3170406-00509-EFI	05 July 2017 Date of issue

Type / Model.....	QCA6234
EUT.....	QCA6234
Applicant.....	Rigado, Inc.
Address.....	3950 Fariview Industrial Dr SE, Suite 100, Salem, OR USA, 97302
Telephone.....	+1-971-208-9857
Fax.....	+1-971-208-9869
Contact.....	Cam Nichols
Manufacturer.....	Rigado, Inc.
Address.....	3950 Fariview Industrial Dr SE, Suite 100, Salem, OR USA, 97302
Telephone.....	+1-971-208-9857
Fax.....	+1-971-208-9869
Contact.....	Cam Nichols
Factory.....	Rigado, Inc.
Address.....	3950 Fariview Industrial Dr SE, Suite 100, Salem, OR USA, 97302
Telephone.....	+1-971-208-9857
Fax.....	+1-971-208-9869
Contact.....	Cam Nichols

Test Result according to the standards on page 1: **PASSED**

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.

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1.0 TEST STANDARDS

The tests were performed according to following standards:

- ■ **47 CFR PART 15 OCT, 2016**
- ■ **RSS-247 Issue 2**
- ■ **RSS-Gen Issue 4**
- ■ **ANSI C63.10:2013**

2.0 SUMMARY

2.1 GENERAL REMARKS

Date of receipt of test sample	13 April 2017
Testing commenced on	13 April ~05 July 2017
Testing concluded on	05 July 2017

2.2 FINAL ASSESSMENT

The FCC/IC requirements pertaining to the technical standards and tested operation modes are

■ - fulfilled.

□ - **not** fulfilled.

The equipment under test

■ - fulfils the FCC ID/IC requirements cited on page 1.

□ - **does not** fulfil the FCC ID/IC requirements cited on page 1.

3.0 EQUIPMENT UNDER TEST

3.1 Power supply system utilised

Power supply voltage : ■ DC 3.6V by Jig, Jig DC 5V Power supply by Adapter

3.2 Short description of the Equipment under Test (EUT)

Number of tested samples: **1**
Serial number: Prototype

3.3 EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

□ TX- Y position

□ TX- Z position

■ TX- X position (Worst case)

Mode	Available channel	Tested channel	Modulation	Date rate(Mbps)
802.11a/n20	36,40,44,48,149,153,157,161,165	36,48, 149, 165	OFDM	6/6.5
802.11n40	38,46,151,159	38,46, 151,159	OFDM	13.5

Note:Operation mode 1 TX -X position of EUT is the radiated test worst case; so only these test results be recorded in the test report.

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3.4 EUT configuration

3.4.1. Description of configuration (EUT)

Description	:	QCA6234
Model Number	:	QCA6234
Output Power	:	IEEE 802.11a20:14.21Bm: IEEE802.11n(20):14.04dBm; IEEE 802.11n(40):12.54dBm;
Modulation	:	BPSK, QPSK, 16QAM, 64QAM, 128QAM, 256QAM,OFDM
Number of channels	:	13
Hardware Version	:	N/A
Software Version	:	N/A
Antenna Designation	:	Fixed Antenna
Antenna	:	PCB Antenna with 0dBi

3.4.2. Table of Carrier Frequencys

Frequency Band	Channel Number	Frequency	Frequency Band	Channel Number	Frequency
5.150 GHz ~ 5.250GHz	36	5180 MHz	5.725 GHz ~ 5.850GHz	149	5745 MHz
	38	5190 MHz		151	5755 MHz
	40	5200 MHz		153	5765 MHz
	44	5220 MHz		157	5785 MHz
	46	5230 MHz		159	5795 MHz
	48	5240 MHz		161	5805 MHz
				165	5825MHz

Note: For 20MHZ bandwidth system use Channel 36,40,44,48,149,153,157,161,165;
For 40MHZ bandwidth system use Channel 38,46,151,159;

3.4.3. Tested Supporting System Details

N/A

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3.5 Test Equipment List

Radiated Emission Test Site					
Name of Equipment	**Manufacturer**	**Model Number**	**Serial Number**	**Last Calibration**	**Due Calibration**
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 3, 2016	July 2, 2017
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 3, 2016	July 2, 2017
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 3, 2016	July 2, 2017
RF Cable	SCHWARZBECK	AK9515E	96221	July 3, 2016	July 2, 2017
3m Anechoic Chamber	CHENGYU	966	PTS-001	July 3, 2016	July 2, 2017
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A
Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	July 3, 2016	July 2, 2017
Spectrum analyzer	Agilent	E4407B	MY46185649	July 3, 2016	July 2, 2017
Power Sensor	Agilent	U2021XA	MY55050474	July 3, 2016	July 2, 2017
Horn Antenna (1G-18GHz)	SCHWARZBECK	BBHA9120D	9120D-1246	July 3, 2016	July 2, 2017
Horn Ant (18G-40GHz)	Schwarzbeck	BBHA 9170	9170-181	June 3, 2016	June 2, 2017

Conducted Emission Test Site					
Name of Equipment	**Manufacturer**	**Model Number**	**Serial Number**	**Last Calibration**	**Due Calibration**
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 3, 2016	July 2, 2017
Artificial Mains Network	Narda	L2-16B	000WX31025	July 3, 2016	July 2, 2017
Artificial Mains Network (AUX)	Narda	L2-16B	000WX31026	July 3, 2016	July 2, 2017
RF Cable	SCHWARZBECK	AK9515E	96222	July 3, 2016	July 2, 2017
Shielded Room	CHENGYU	843	PTS-002	July 3, 2016	July 2, 2017

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4.0 TEST ENVIRONMENT

4.1 Address of the test laboratory

A101，No.65，Zhuji Highway,Tianhe District，Guangzhou, China

Tel：+86-20-85543113 (32 lines) Fax：+86-20-38780406

4.2 Test facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L3394

CENTRE OF TESTING SERVICE CO., LTD has been assessed and proved to be in compliance with CNAS-CL01: 2006 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

IC-Registration No.: 8374A

The 3m Alternate Test Site of CENTRE OF TESTING SERVICE CO., LTD has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 8374A on May 22, 2014.

FCC-Registration No.: 971995

CENTRE OF TESTING SERVICE CO., LTD, EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration No.791995, July 13,2012.

4.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35 ° C
Humidity:	25~75 %
Atmospheric pressure:	86~106 kPa

4.4 Definitions of symbols used in this test report

■ - The black square indicates that the listed condition, standard or equipment is applicable for this report.
□ - The empty square indicates that the listed condition, standard or equipment is **not** applicable for this report.

4.5 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 CTS 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.

4.6 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conduction disturbance	150kHz~30MHz	±1.22dB	(1)
Power disturbance	30MHz~300MHz	±1.38dB	(1)
Radiation emission (3m)	30MHz~300MHz	±3.14dB	(1)
	300MHz~1000MHz	±3.18dB	(1)
	1GHz~26.5GHz	±3.54dB	(1)

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

5.0 Summary of standards and results

5.1.Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

IC RULES	DESCRIPTION OF TEST	RESULT
FCC Part §15.407 RSS-247 Section 6.2	6dB Bandwidth	Compliant
RSS-GEN	Emission Bandwidth	Compliant
FCC Part §15.407 RSS-247 Section 6.2	Maximum conducted output power	Compliant
FCC Part §15.407 RSS-247 Section 6.2	Conducted Spurious Emission	Compliant
FCC Part §15.407 RSS-247 Section 6.2	Maximum Conducted Output Power Density	Compliant
FCC Part §15.209 RSS-GEN	Radiated Emission	Compliant
FCC Part §15.407 RSS-GEN	Band Edges	Compliant
FCC Part §15.207 RSS-GEN	Line Conduction Emission	Compliant

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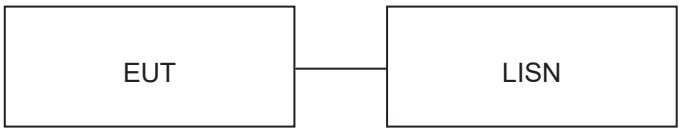
6.0 Power Line Conducted Emission Test

6.1.Test Equipment

Conducted Disturbance					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESHS10	842884/012	2016/11
2	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z5	832479/025	2016/11
3	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z5	832479/026	2016/11
4	Pulse Limiter	ROHDE & SCHWARZ	ESHSZ2	100301	2016/11
5	EMI Test Software	EZ-EMC	Farad	N/A	N/A

6.2. Block Diagram of Test Setup



(EUT: QCA6234*)*

6.3. Power Line Conducted Emission Test Limits

Standard: FCC Part 15 : 15.207,ANSI C63.10-2013

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

6.4.Test Procedure

The Adapter Power connected to the power mains through a line impedance stabilization network (L.I.S.N.#2). This provides a 50 ohm coupling impedance for the EUT. Please refer the block diagram of the test setup and photographs. The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.#1). Power on the PC and let it work normally, we use a keyboard test soft ware, let EUT working in test mode, then test it. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC Part 15C on Conducted Emission Test.

6.5. Power Line Conducted Emission Test Results

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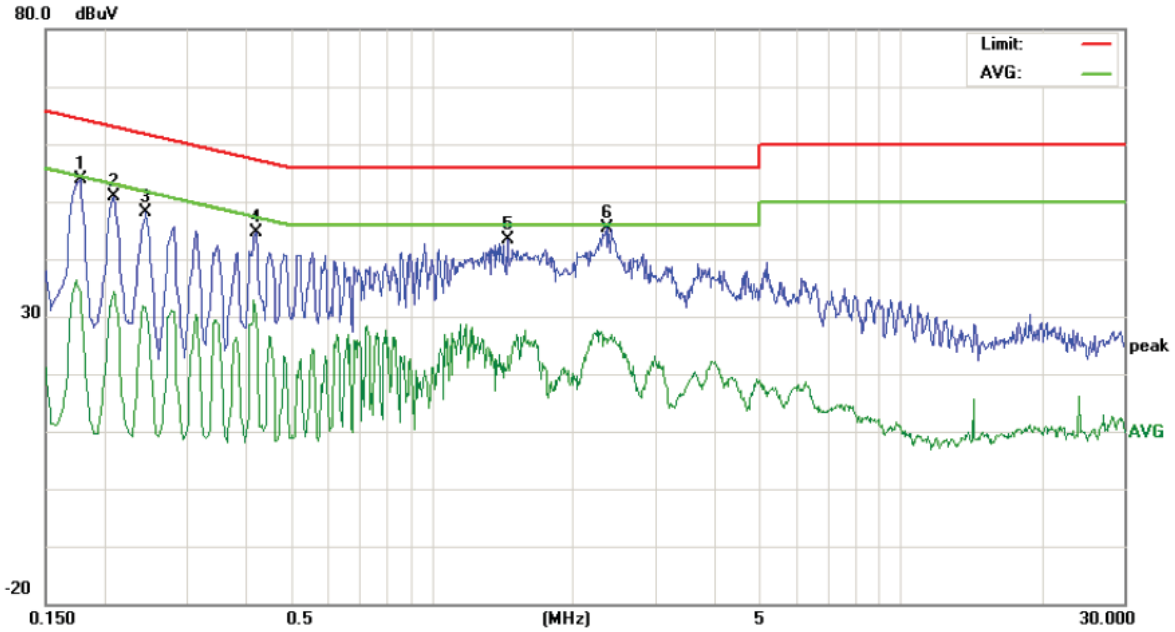
Test point	L	Result:	■ - passed
Operation mode	TX		□ - not passed
Remarks:			



No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1780	43.57		23.92	10.19	53.76		34.11	64.57	54.57	-10.81	-20.46	P	
2	0.2100	40.62		24.05	10.23	50.85		34.28	63.20	53.20	-12.35	-18.92	P	
3	0.2460	37.96		21.13	10.27	48.23		31.40	61.89	51.89	-13.66	-20.49	P	
4	0.4220	34.21		19.38	10.35	44.56		29.73	57.41	47.41	-12.85	-17.68	P	
5	1.4540	32.90		10.89	10.38	43.28		21.27	56.00	46.00	-12.72	-24.73	P	
6	2.3620	34.97		15.75	10.37	45.34		26.12	56.00	46.00	-10.66	-19.88	P	

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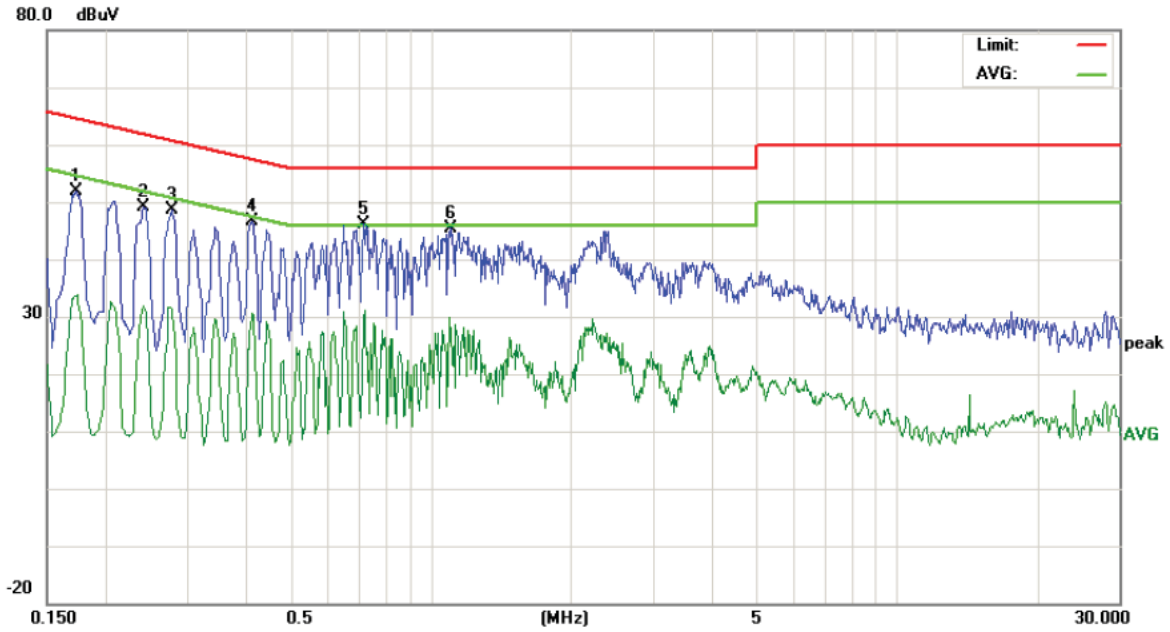
Test point: Operation mode Remarks:	N TX	Result:	■ - passed □ - not passed



No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1731	41.61		23.49	10.19	51.80		33.68	64.81	54.81	-13.01	-21.13	P	
2	0.2420	38.75		21.52	10.26	49.01		31.78	62.02	52.02	-13.01	-20.24	P	
3	0.2779	38.42		21.18	10.28	48.70		31.46	60.88	50.88	-12.18	-19.42	P	
4	0.4140	36.31		20.40	10.34	46.65		30.74	57.57	47.57	-10.92	-16.83	P	
5	0.7180	35.71		19.39	10.34	46.05		29.73	56.00	46.00	-9.95	-16.27	P	
6	1.1060	34.97		17.81	10.37	45.34		28.18	56.00	46.00	-10.66	-17.82	P	

Note:Level=Reading+Factor. Margin= Level - Limit

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7.0 MAXIMUM CONDUCTED OUTPUT POWER

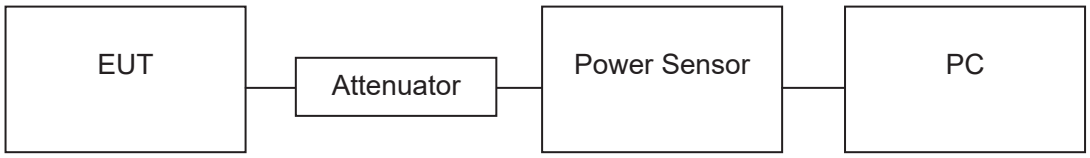
7.1 MEASUREMENT PROCEDURE

For average power test:

1. Connect EUT RF output port to power sensor through an RF attenuator.
2. Connect the power sensor to the PC.
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Record the maximum power from the software.

Note： The EUT was tested according to ANSI C63.10 for compliance to RSS-247 and FCC Part §15.407 requirements.

7.2 TEST CONFIGURATION



7.3 LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT FOR 802.11A20 MODULATION			
Frequency (MHz)	**Average Power (dBm)**	**Applicable Limits (dBm)**	**Pass or Fail**
5180	14.21	24	Pass
5240	14.18	24	Pass
5745	12.15	30	Pass
5825	12.06	30	Pass

LIMITS AND MEASUREMENT RESULT FOR 802.11N20 MODULATION			
Frequency (MHz)	**Average Power (dBm)**	**Applicable Limits (dBm)**	**Pass or Fail**
5180	14.04	24	Pass
5240	13.89	24	Pass
5745	11.85	30	Pass
5825	12.04	30	Pass

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LIMITS AND MEASUREMENT RESULT FOR 802.11N40 MODULATION			
Frequency (MHz)	**Average Power (dBm)**	**Applicable Limits (dBm)**	**Pass or Fail**
5190	12.54	24	Pass
5230	12.15	24	Pass
5755	10.33	30	Pass
5795	10.19	30	Pass

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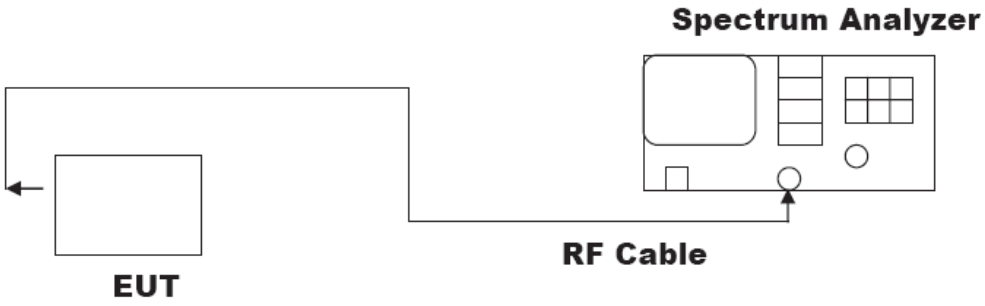
8.0 6dB BANDWIDTH

8.1 MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on operation frequency individually.
3. Set RBW = 100kHz.
4. Set the VBW ≥3*RBW. Detector = Peak. Trace mode = max hold.
5. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.

Note: The EUT was tested according to ANSI C63.10 for compliance to RSS-247 and FCC Part §15.407 requirements.

8.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



8.3 LIMITS AND MEASUREMENT RESULTS

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LIMITS AND MEASUREMENT RESULT FOR 802.11A20 MODULATION			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
>500KHZ	5745MHz	16.28	PASS
	5825MHz	15.76	PASS

LIMITS AND MEASUREMENT RESULT FOR 802.11N20/40 MODULATION			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
>500KHZ	5745MHz	16.94	PASS
	5825MHz	16.71	PASS
	5755MHz	32.58	PASS
	5795MHz	33.78	PASS

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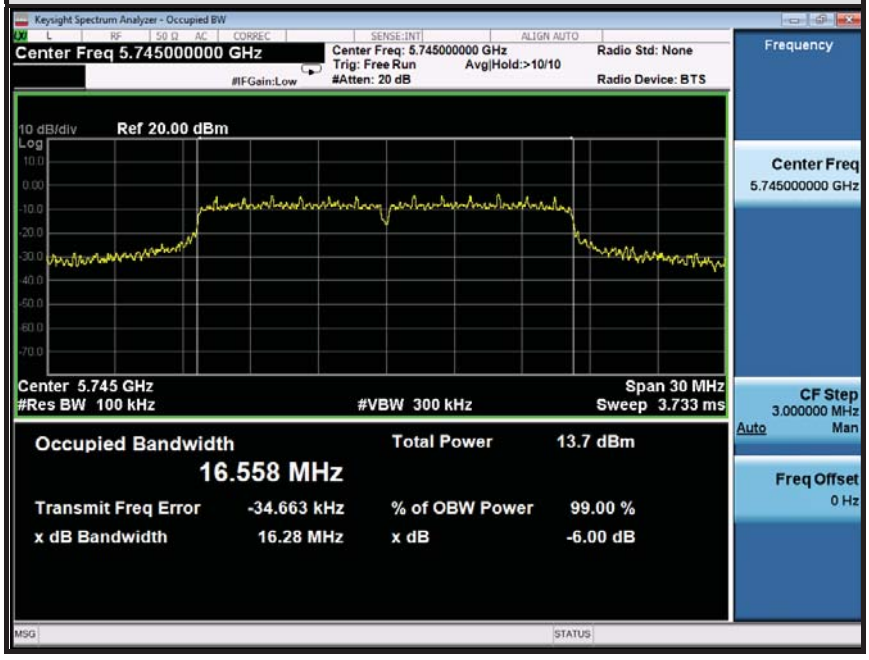
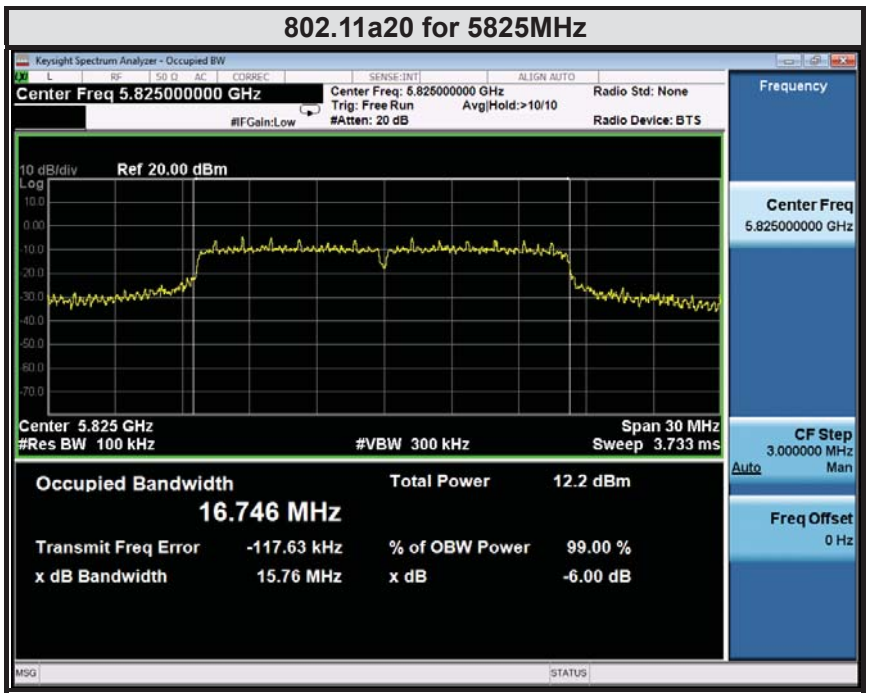
Test Plot

802.11a20 for 5745MHz



802.11a20 for 5825MHz



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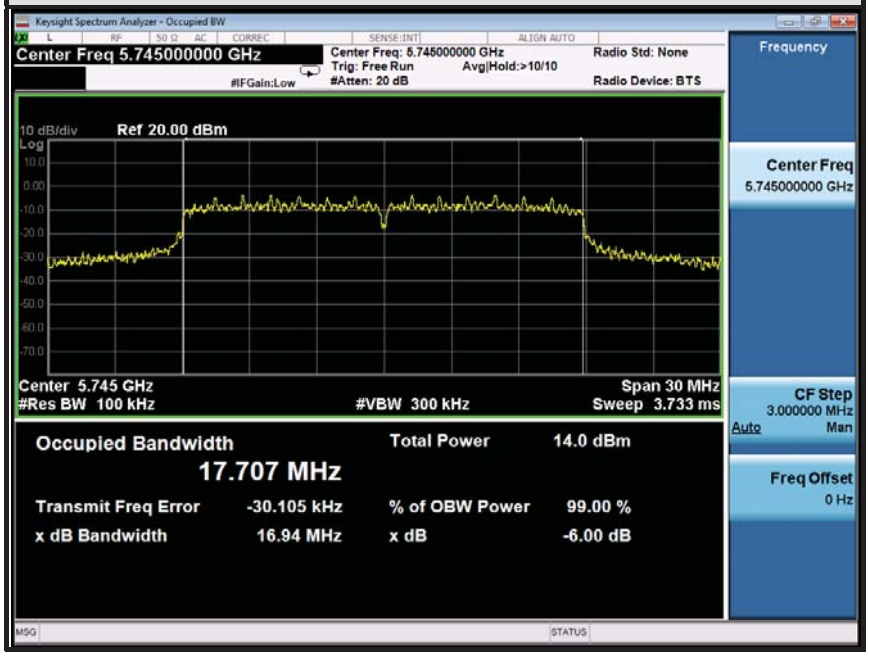
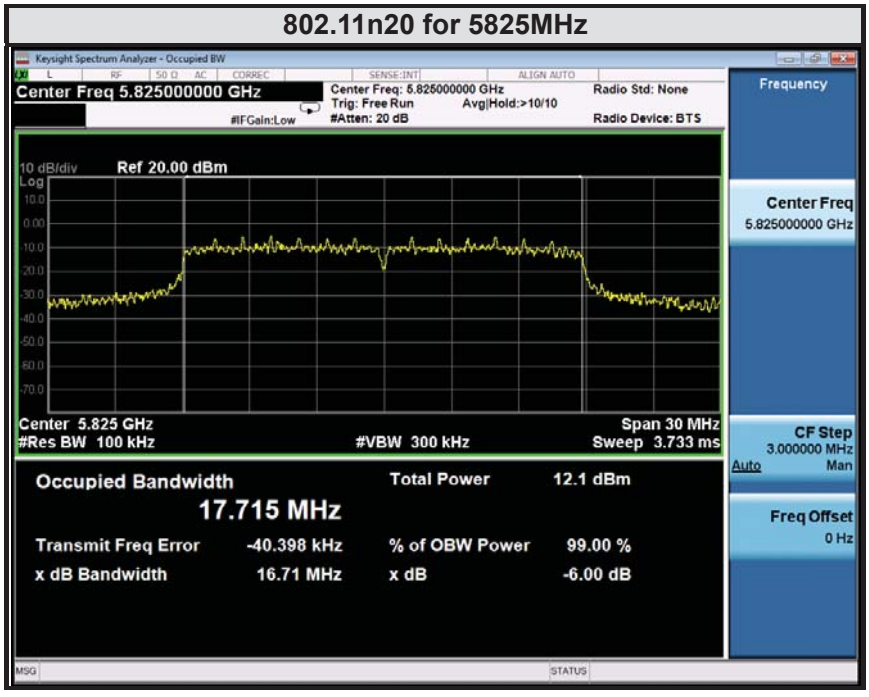
802.11n20 for 5745MHz



802.11n20 for 5825MHz



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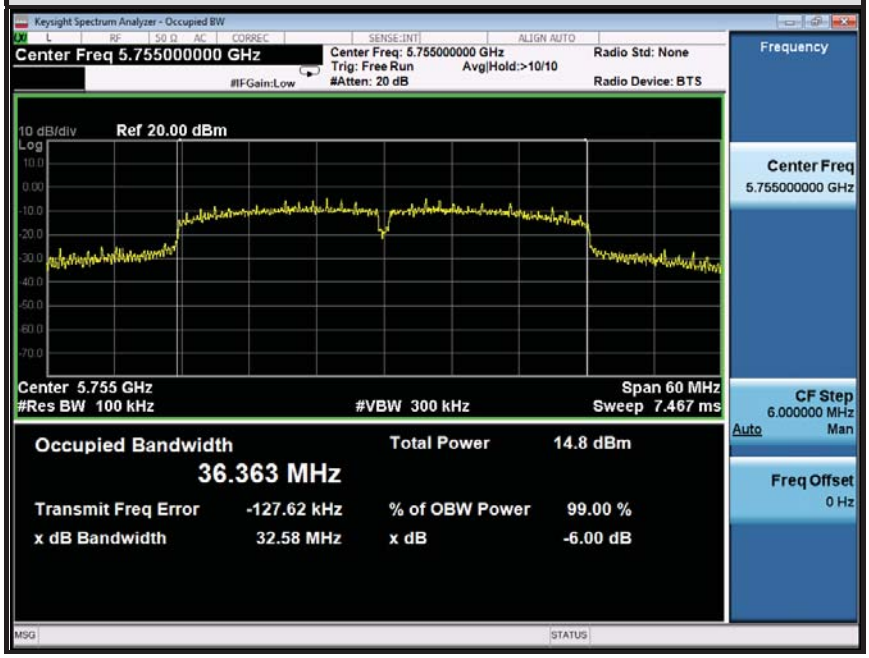
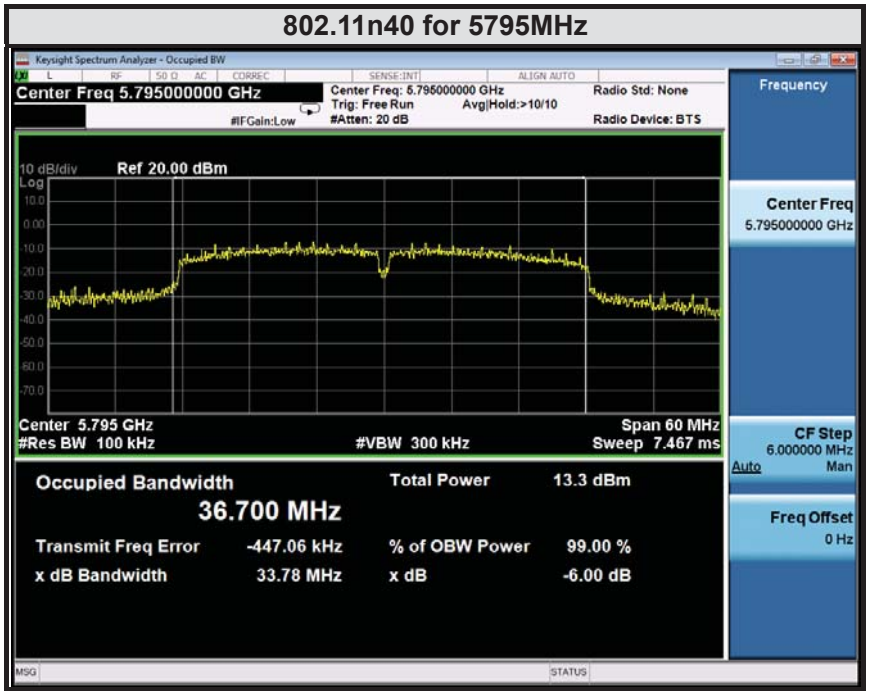
802.11n40 for 5755MHz



802.11n40 for 5795MHz



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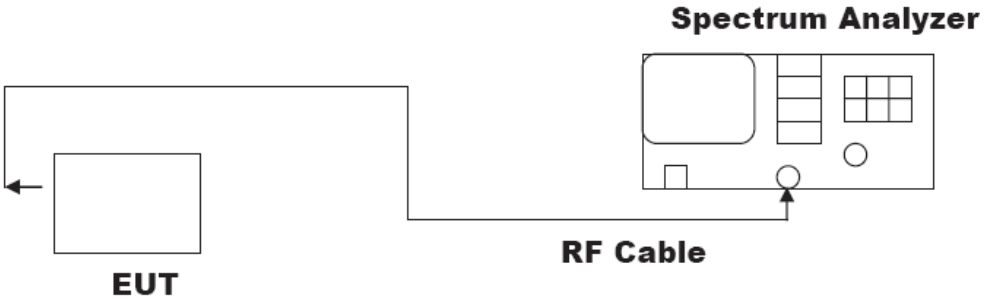
9.0 EMISSION BANDWIDTH

9.1 MEASUREMENT PROCEDURE

a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Note: The EUT was tested according to RSS-GEN and KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

9.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



9.3 LIMITS AND MEASUREMENT RESULTS

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LIMITS AND MEASUREMENT RESULT FOR 802.11A20 MODULATION			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
N/A	5180MHz	22.55	PASS
	5240MHz	22.45	PASS

LIMITS AND MEASUREMENT RESULT FOR 802.11N20/40 MODULATION			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
N/A	5180MHz	22.90	PASS
	5240MHz	22.11	PASS
	5190MHz	43.97	PASS
	5230MHz	43.44	PASS

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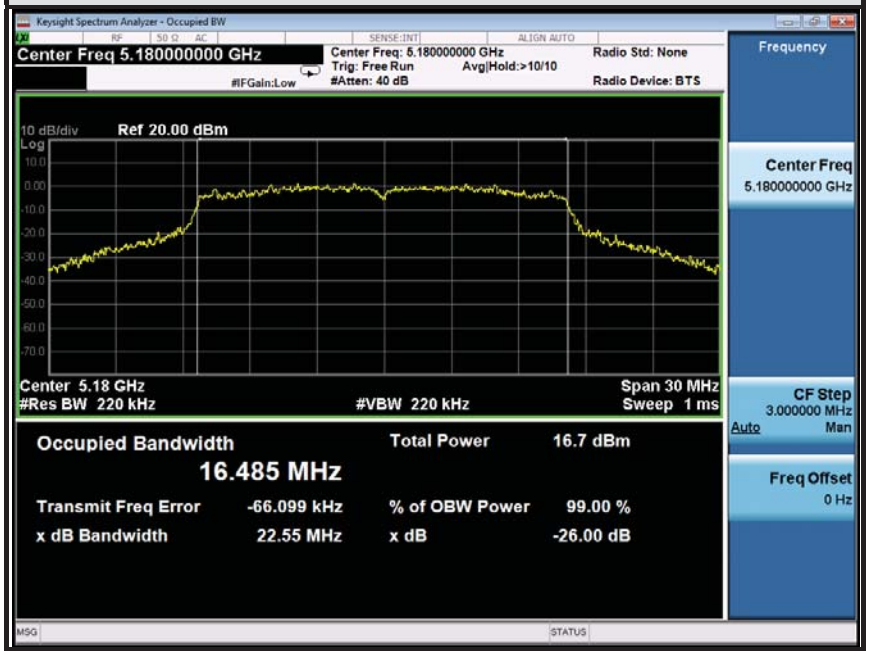
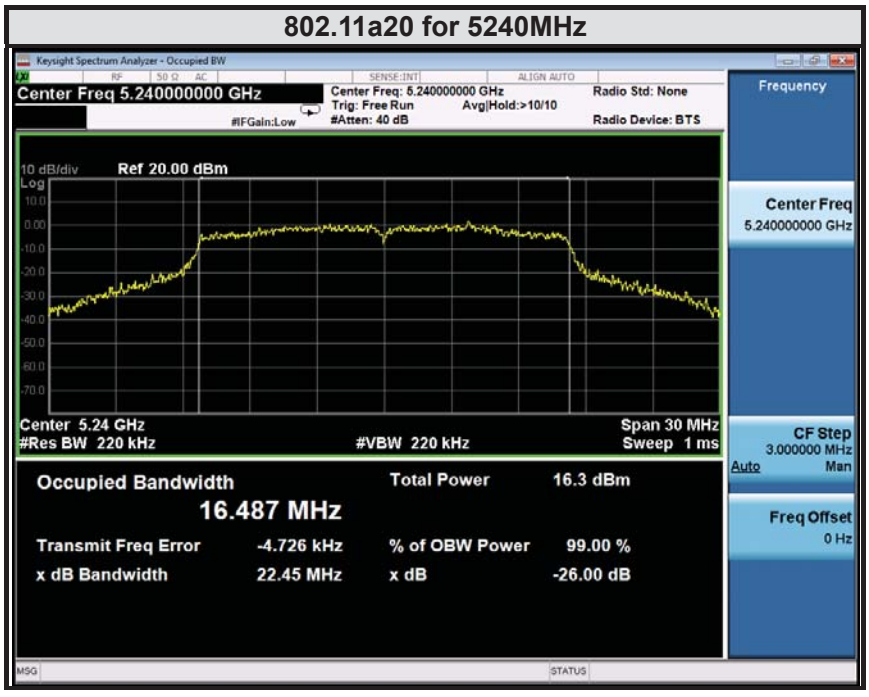
Test Plot

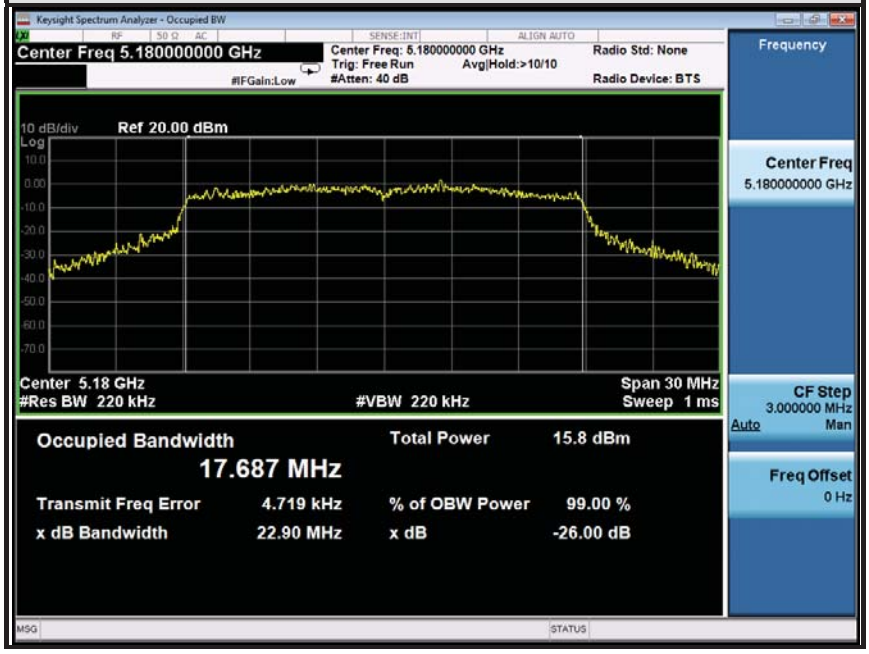
802.11a20 for 5180MHz



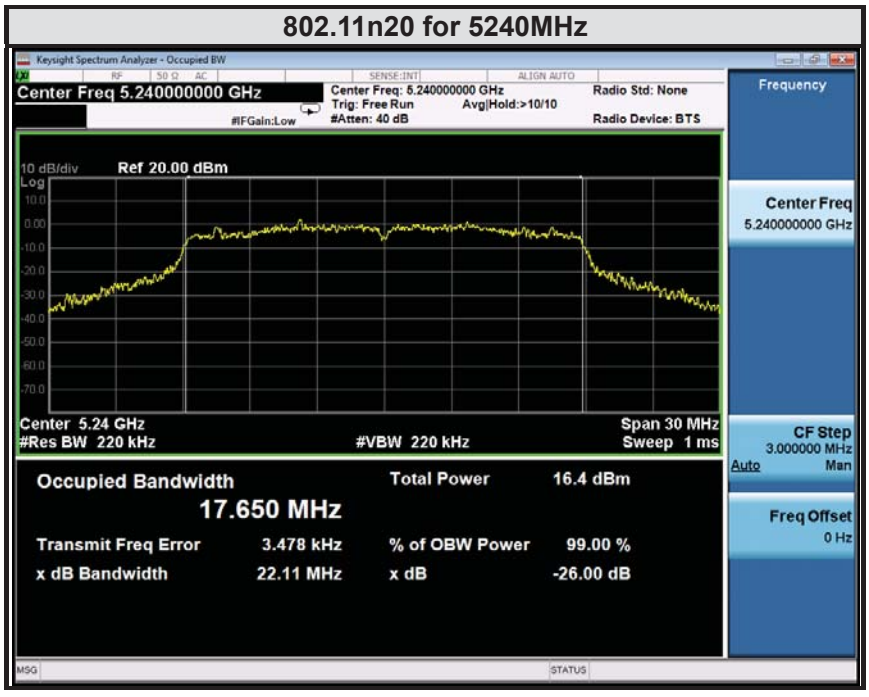
802.11a20 for 5240MHz



802.11n20 for 5180MHz



802.11n20 for 5240MHz



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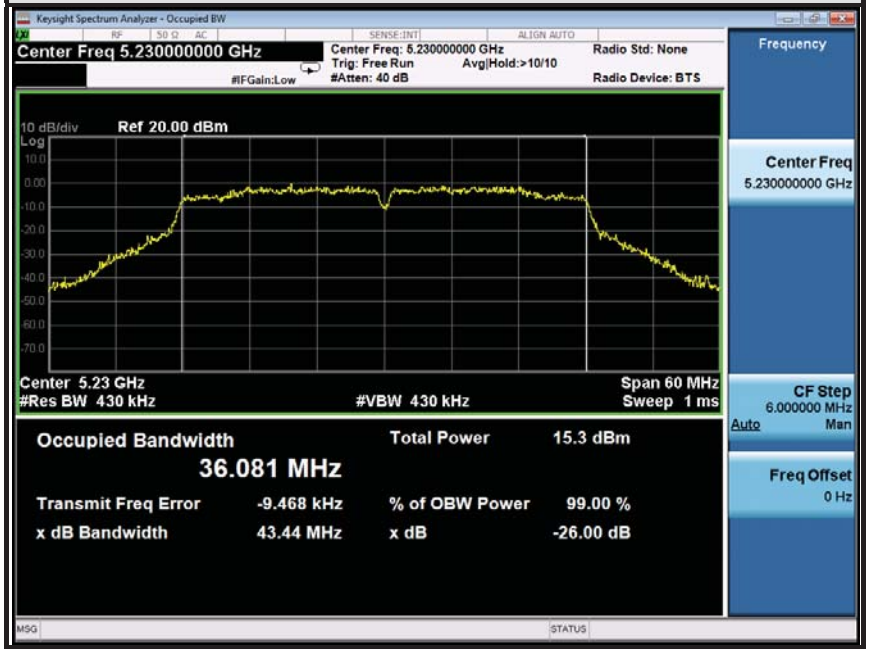
802.11n40 for 5190MHz

802.11n40 for 5230MHz



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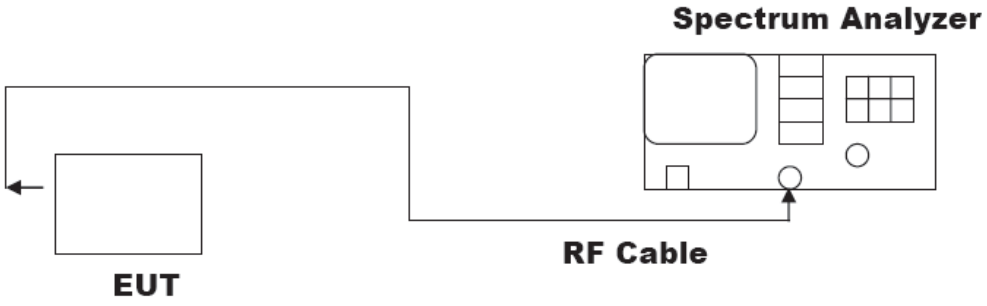
10.0 MAXIMUM CONDUCTED OUTPUT PEAK POWER SPECTRAL DENSITY

10.1 MEASUREMENT PROCEDURE

The EUT was tested according to ANSI C63.10 for compliance to RSS-247 and FCC Part §15.407 requirements.

10.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



10.3 LIMITS AND MEASUREMENT RESULT

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LIMITS AND MEASUREMENT RESULT FOR 802.11A20 MODULATION			
Frequency (MHz)	**Power density (dBm/MHz)**	**Applicable Limits (dBm/MHz)**	**Pass or Fail**
5180	8.623	11	Pass
5240	7.953	11	Pass
Frequency (MHz)	**Power density (dBm/500kHz)**	**Applicable Limits (dBm/500kHz)**	**Pass or Fail**
5745	1.979	30	Pass
5825	-0.373	30	Pass

LIMITS AND MEASUREMENT RESULT FOR 802.11N20/40 MODULATION			
Frequency (MHz)	**Power density (dBm/MHz)**	**Applicable Limits (dBm/MHz)**	**Pass or Fail**
5180	8.741	11	Pass
5190	7.499	11	Pass
5230	7.514	11	Pass
5240	8.843	11	Pass
Frequency (MHz)	**Power density (dBm/500kHz)**	**Applicable Limits (dBm/500kHz)**	**Pass or Fail**
5745	1.813	30	Pass
5755	0.733	30	Pass
5795	-0.687	30	Pass
5825	0.072	30	Pass

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Test Polt:

802.11a20 for 5180MHz

802.11a20 for 5240MHz

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802.11a20 for 5745MHz

802.11a20 for 5825MHz

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802.11n20 for 5180MHz

802.11n20 for 5240MHz

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802.11n20 for 5745MHz

802.11n20 for 5825MHz

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802.11n40 for 5190MHz

802.11n40 for 5230MHz

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802.11n40 for 5755MHz

802.11n40 for 5795MHz

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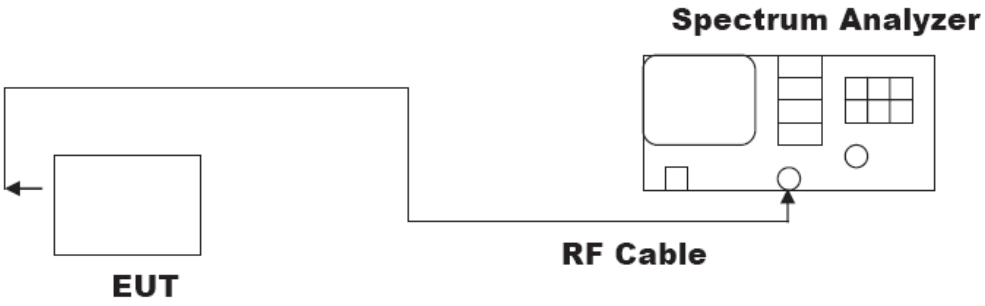
11.0 CONDUCTED SPURIOUS EMISSION

11.1 MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to ANSI C63.10 for compliance to RSS-247 and FCC Part §15.407 requirements.

11.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



11.3 LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test channel	Criteria
27dBm	5150MHz-5250MHz	PASS
17dBm within 5715-5725MHz and 5850-5860MHz 27dBm outside 5715-5860MHz	5725MHz-5825MHz	PASS

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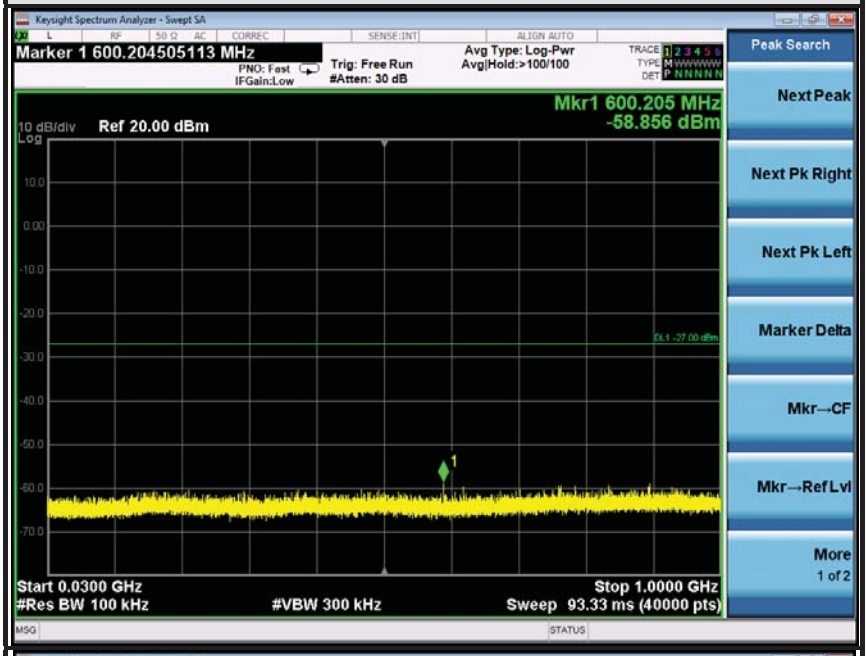
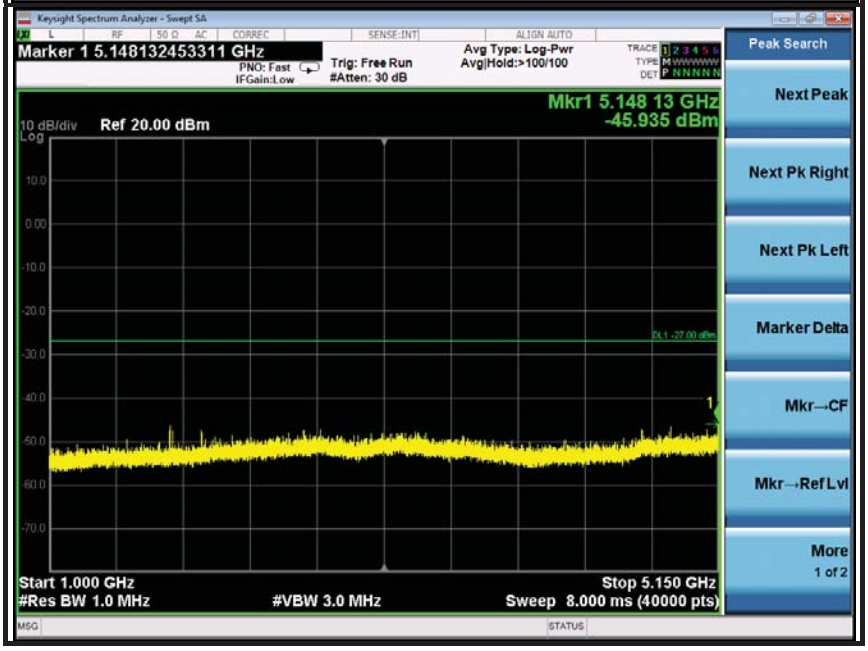
Test Polt:

802.11a20 for 5180MHz





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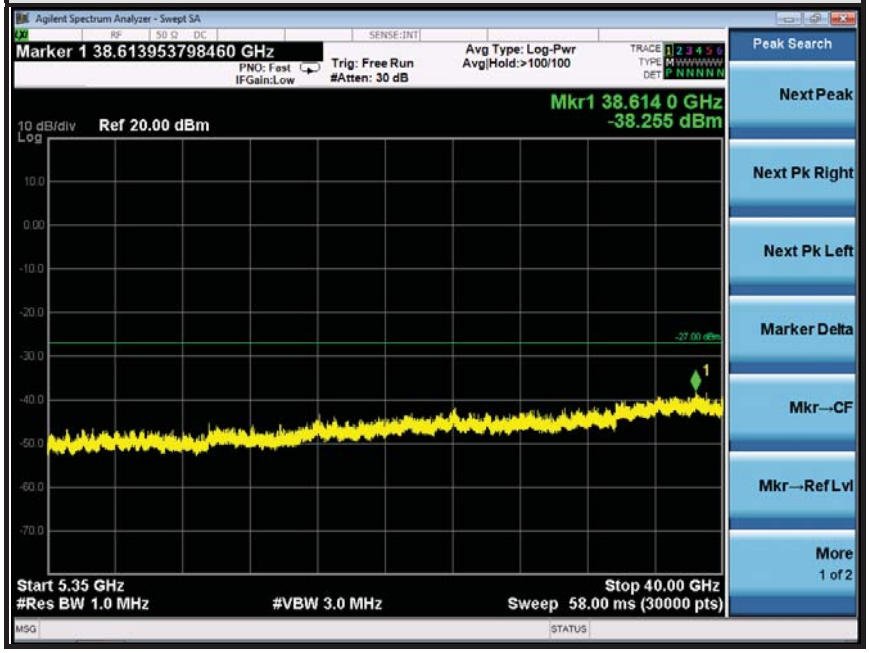
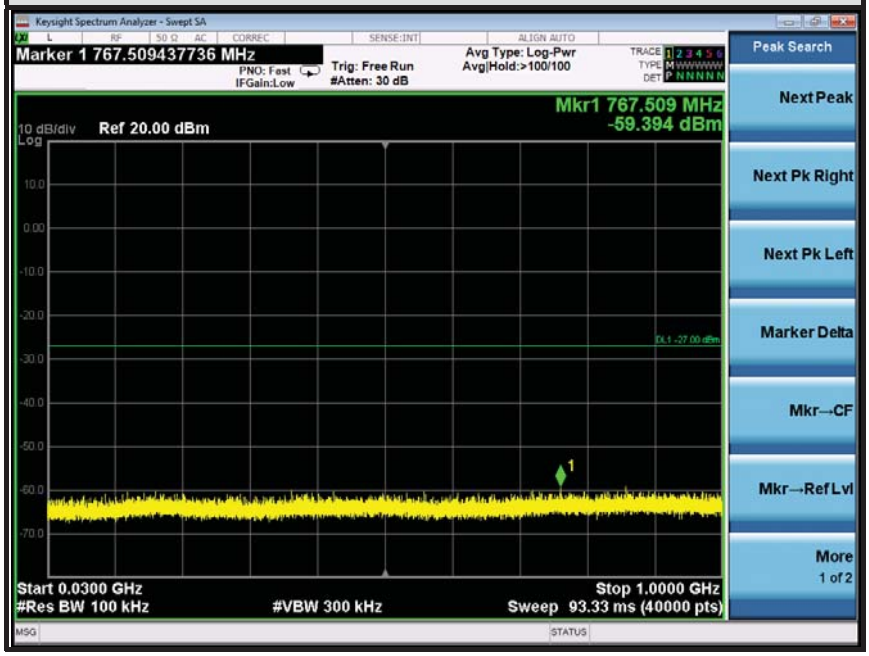
802.11a20 for 5180MHz



802.11a20 for 5240MHz



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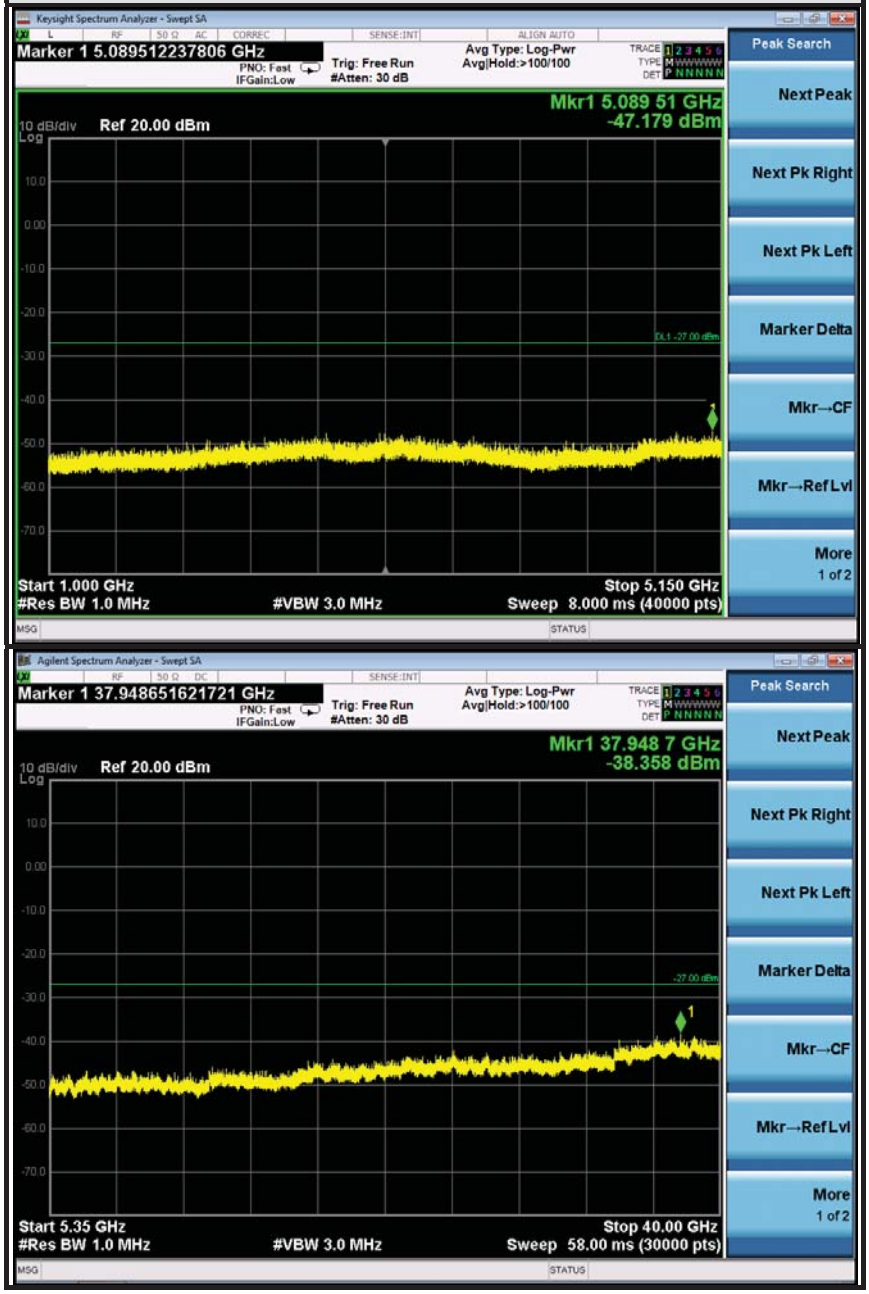
802.11a20 for 5240MHz



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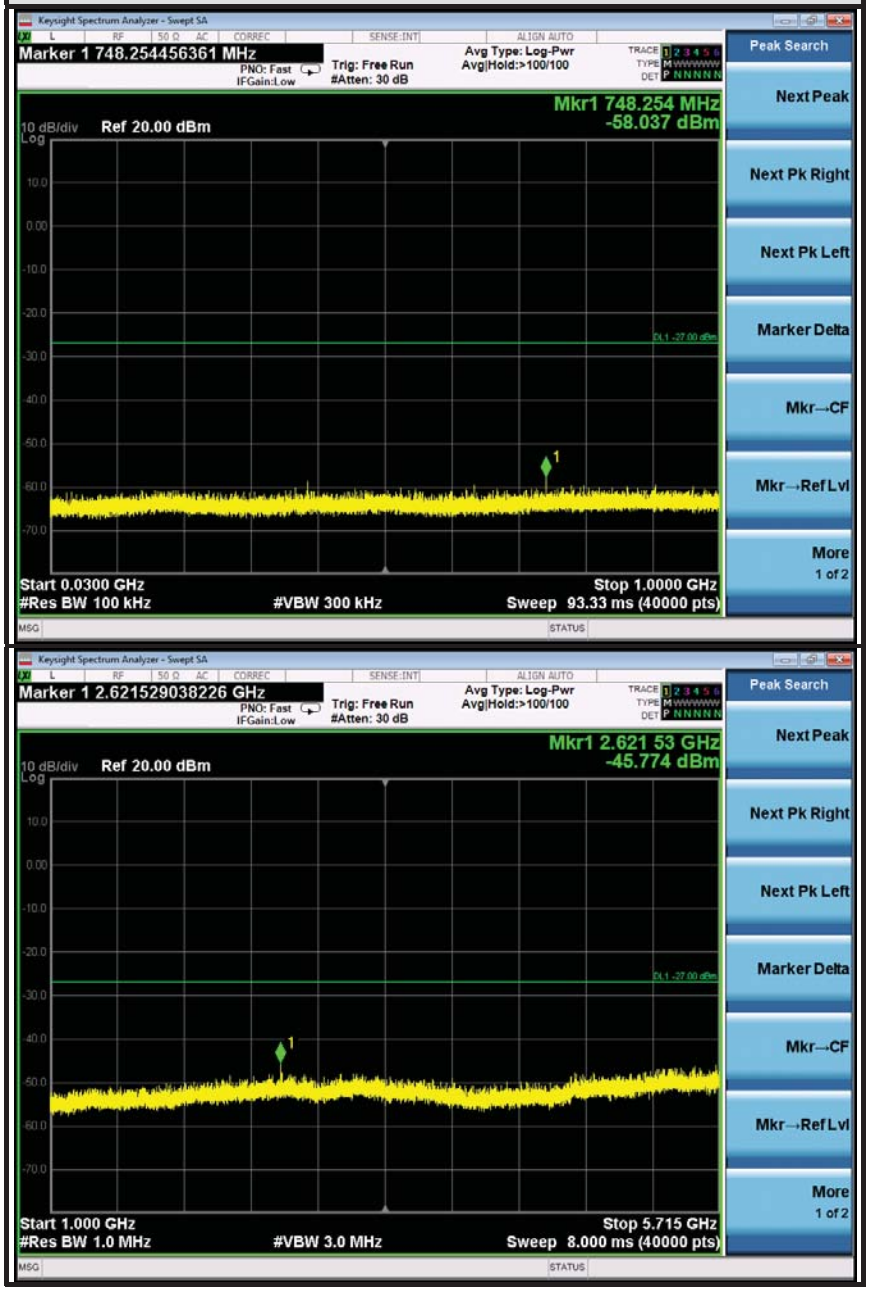
802.11a20 for 5745MHz



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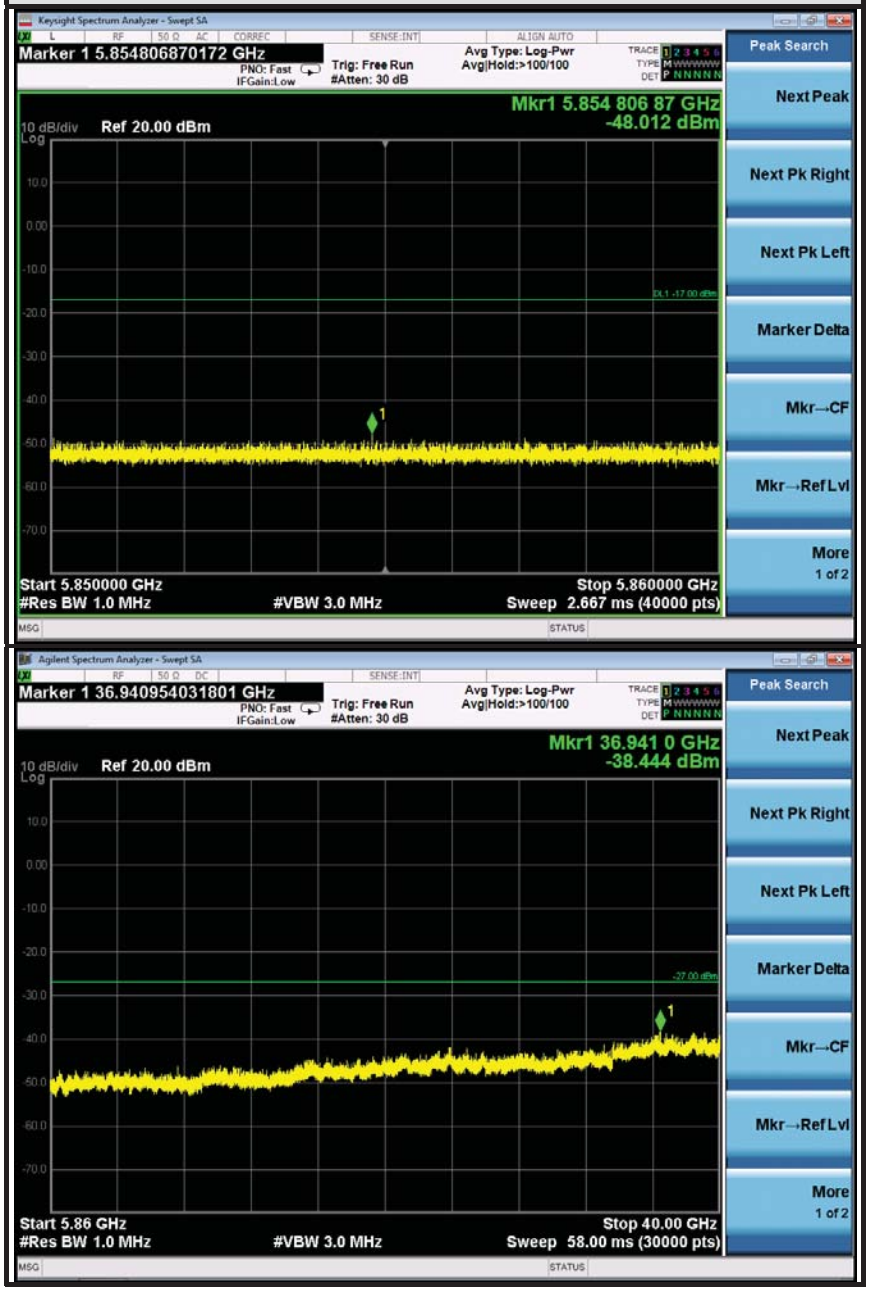
802.11a20 for 5745MHz



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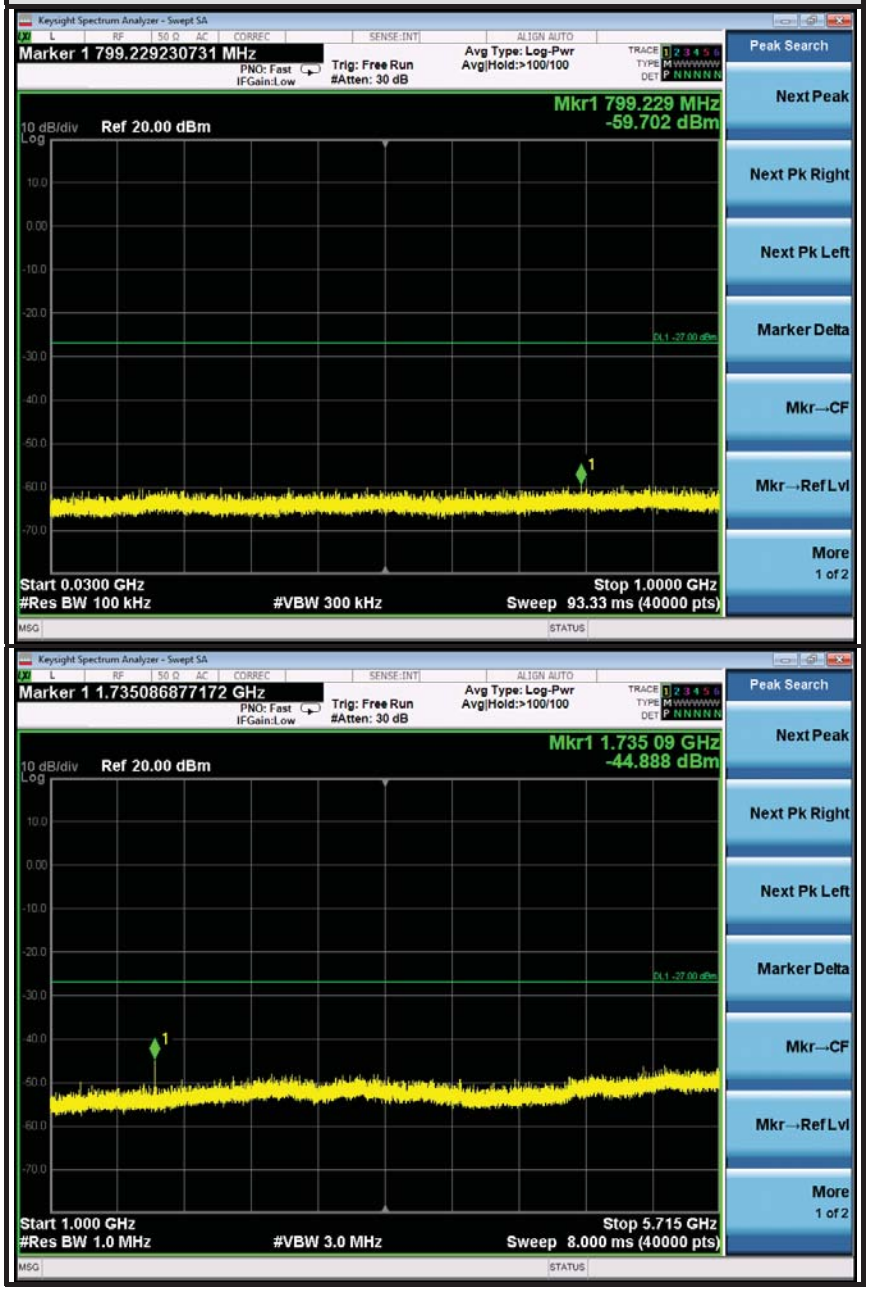
802.11a20 for 5825MHz



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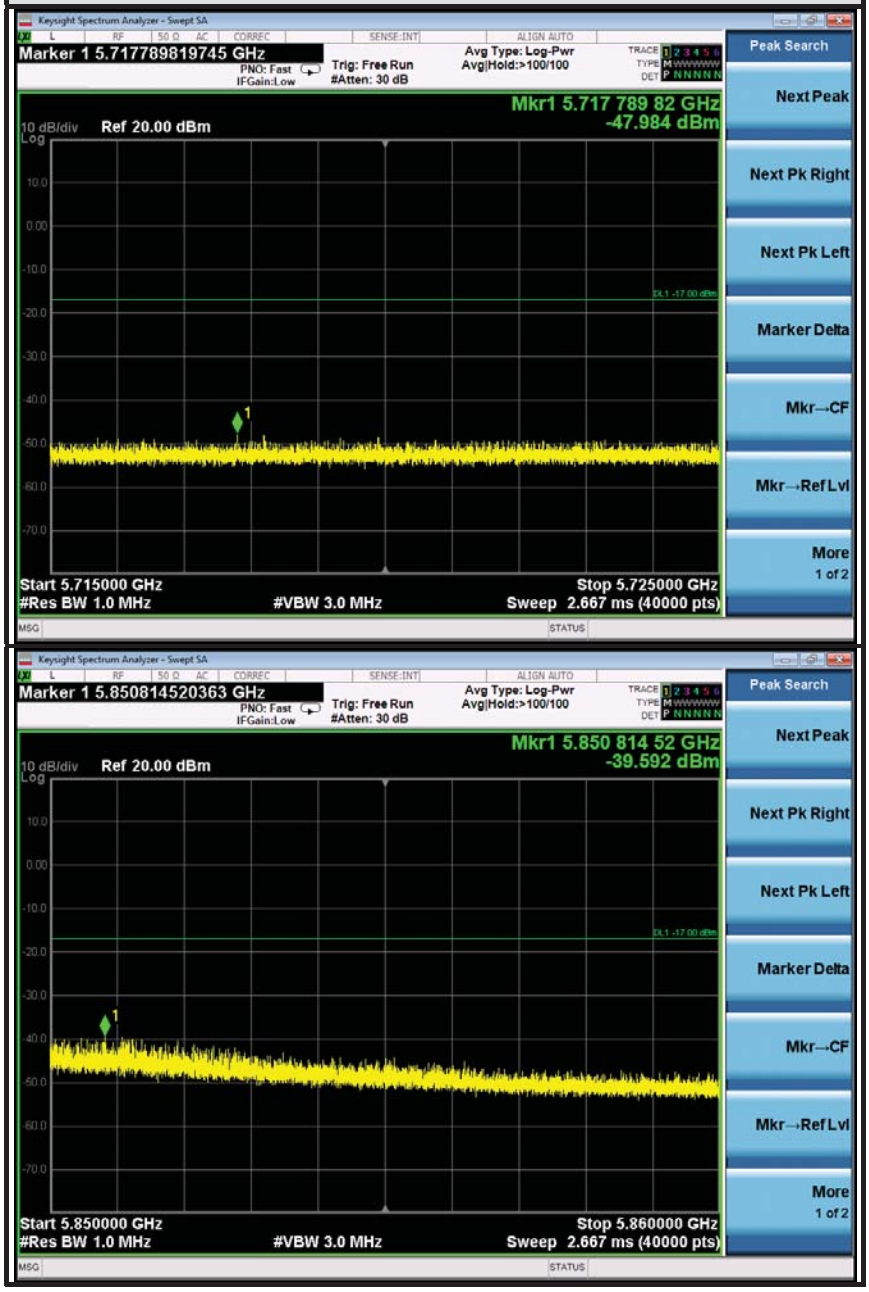
802.11a20 for 5825MHz



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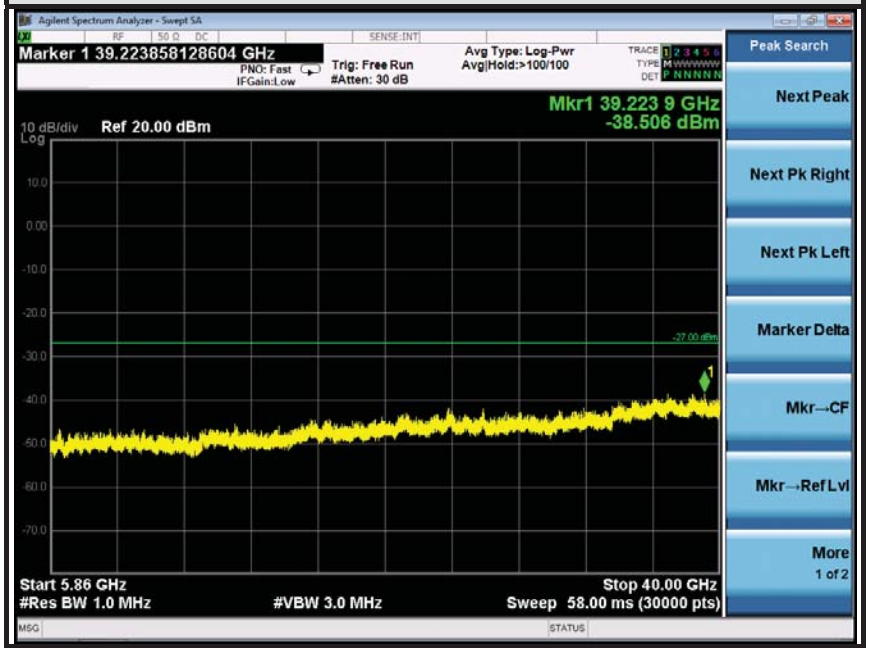
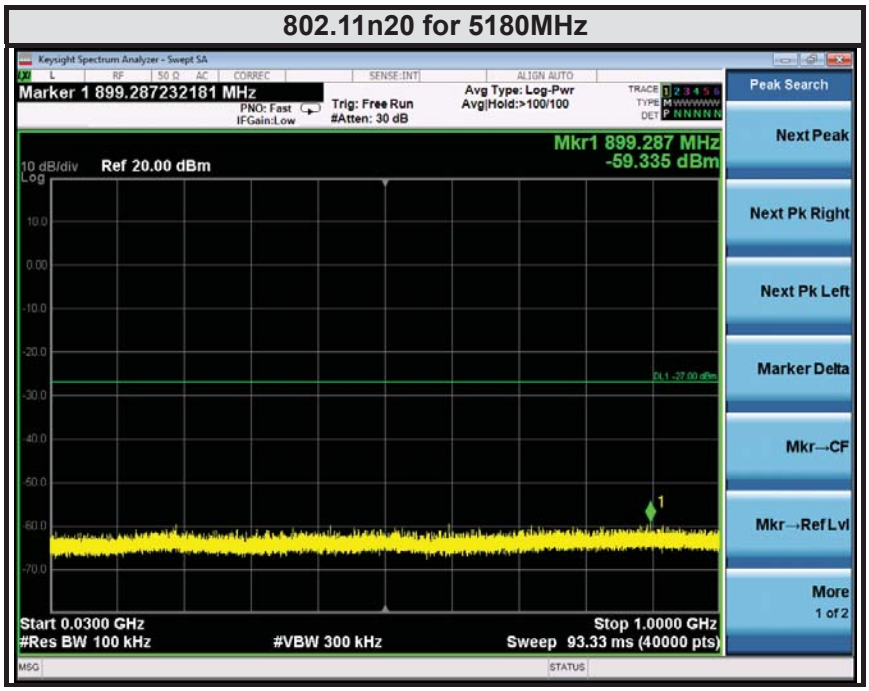
802.11a20 for 5825MHz



802.11n20 for 5180MHz



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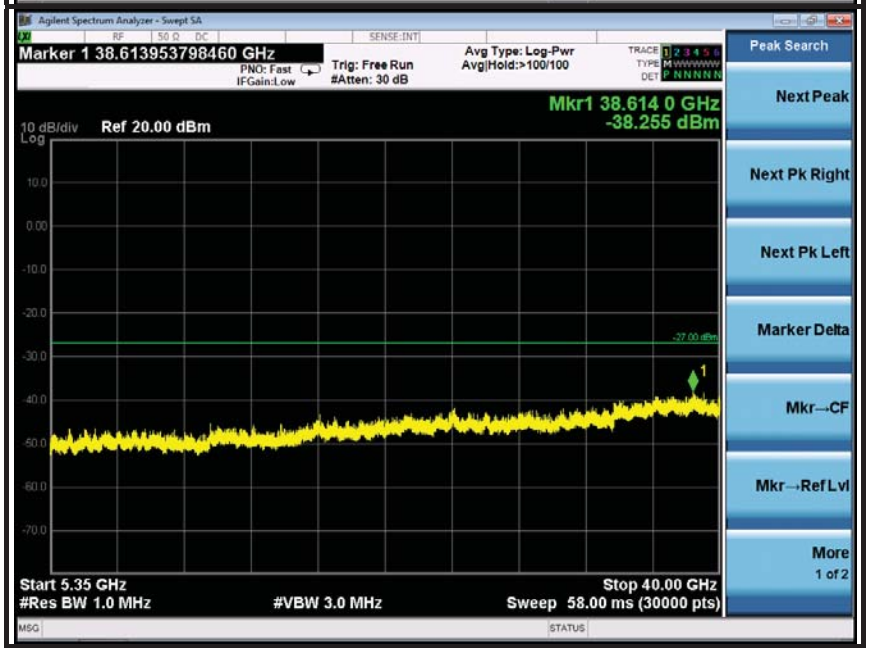
802.11n20 for 5180MHz



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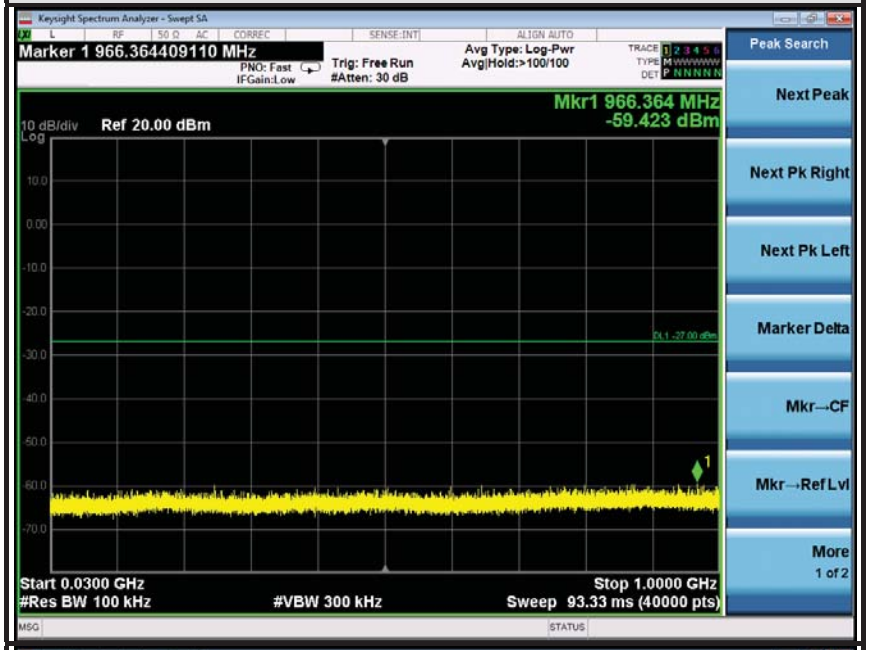
802.11n20 for 5240MHz



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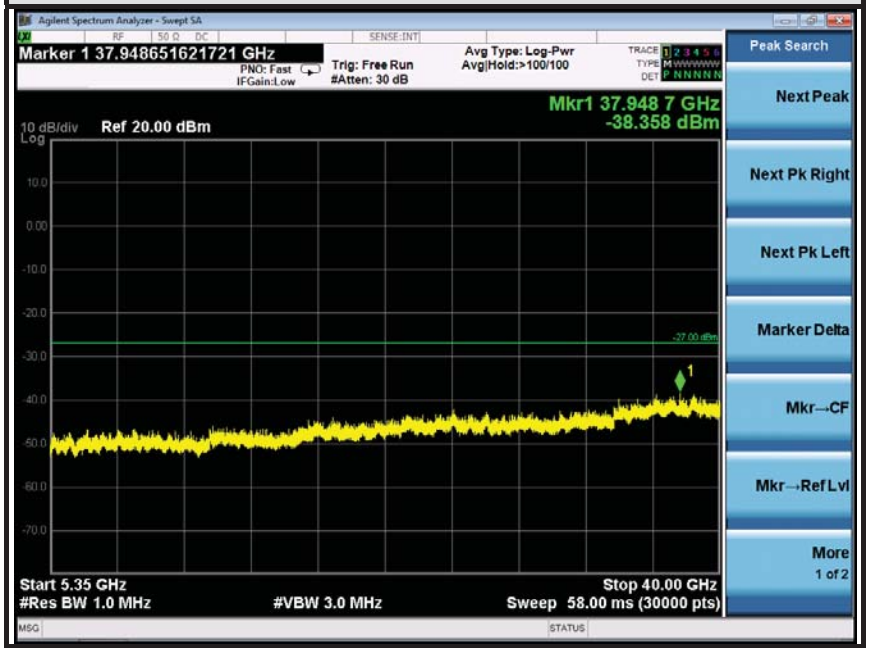
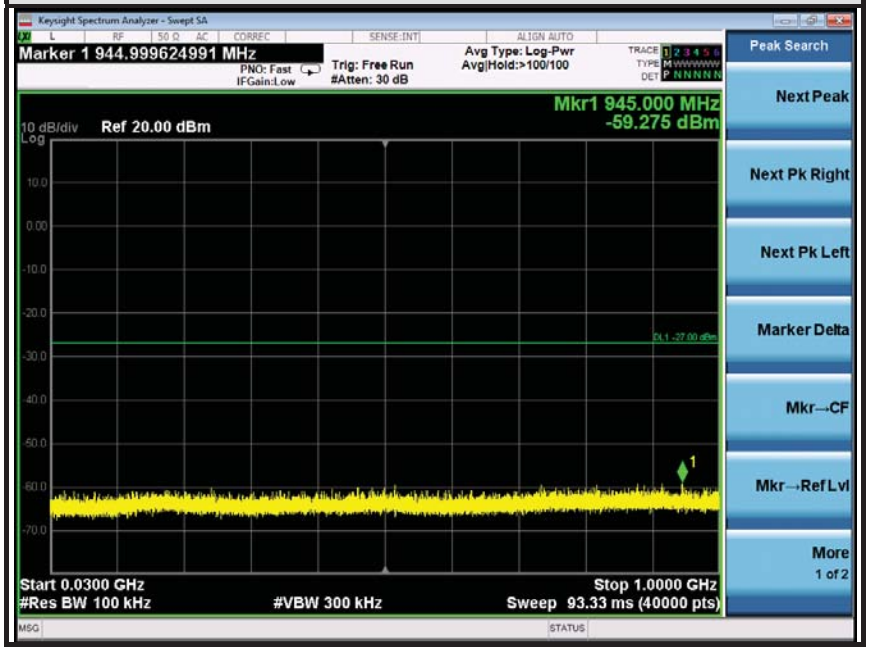
802.11n20 for 5240MHz



802.11n20 for 5745MHz



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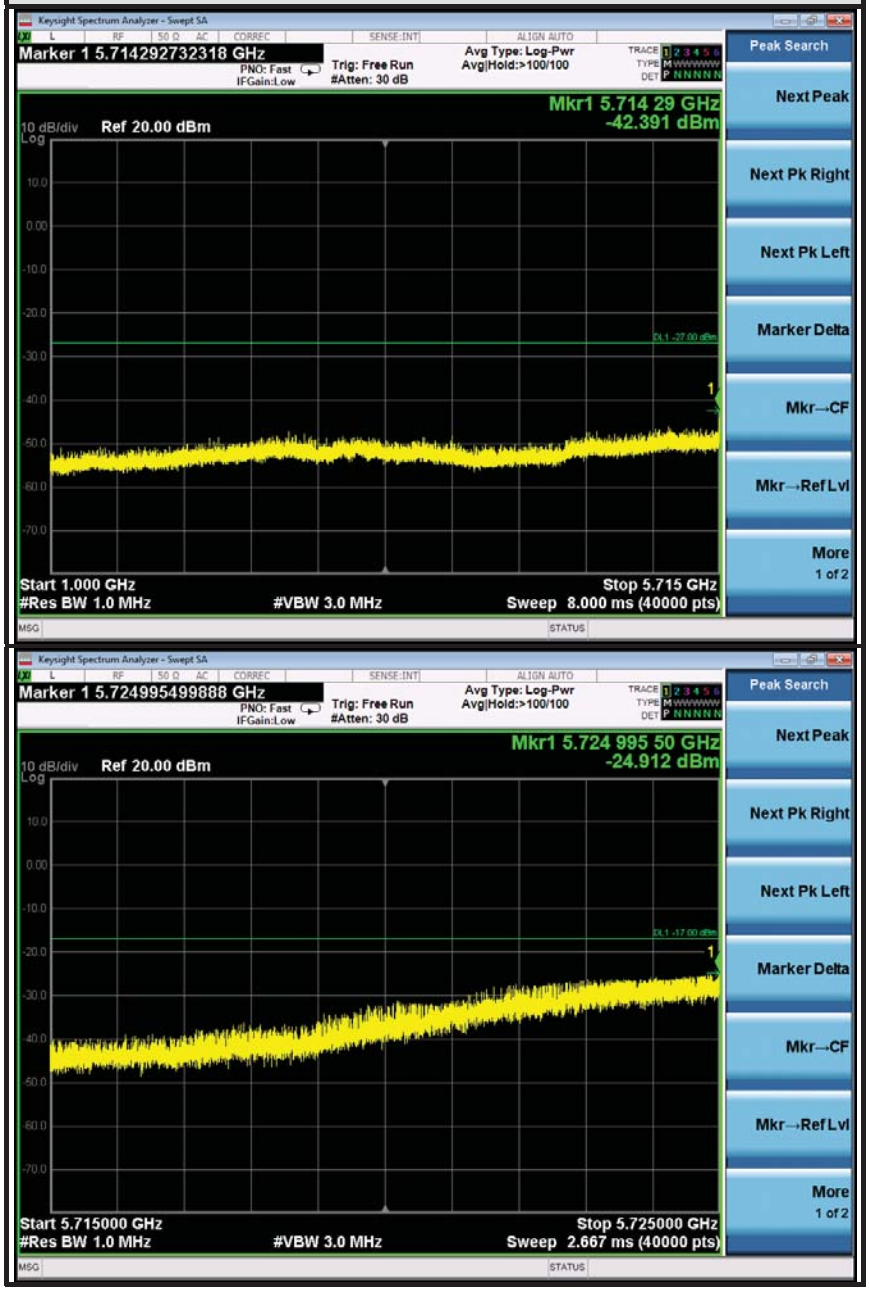
802.11n20 for 5745MHz



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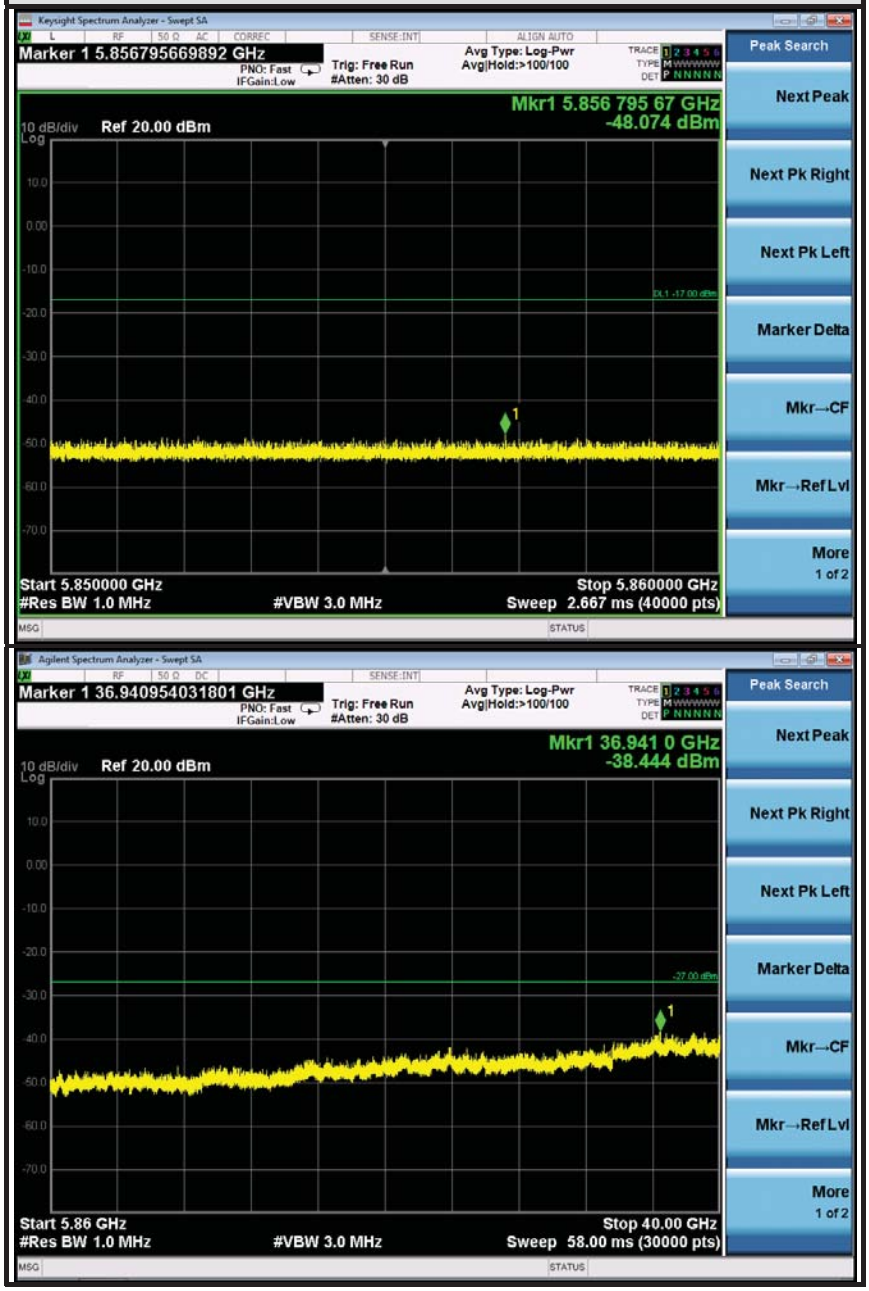
802.11n20 for 5745MHz



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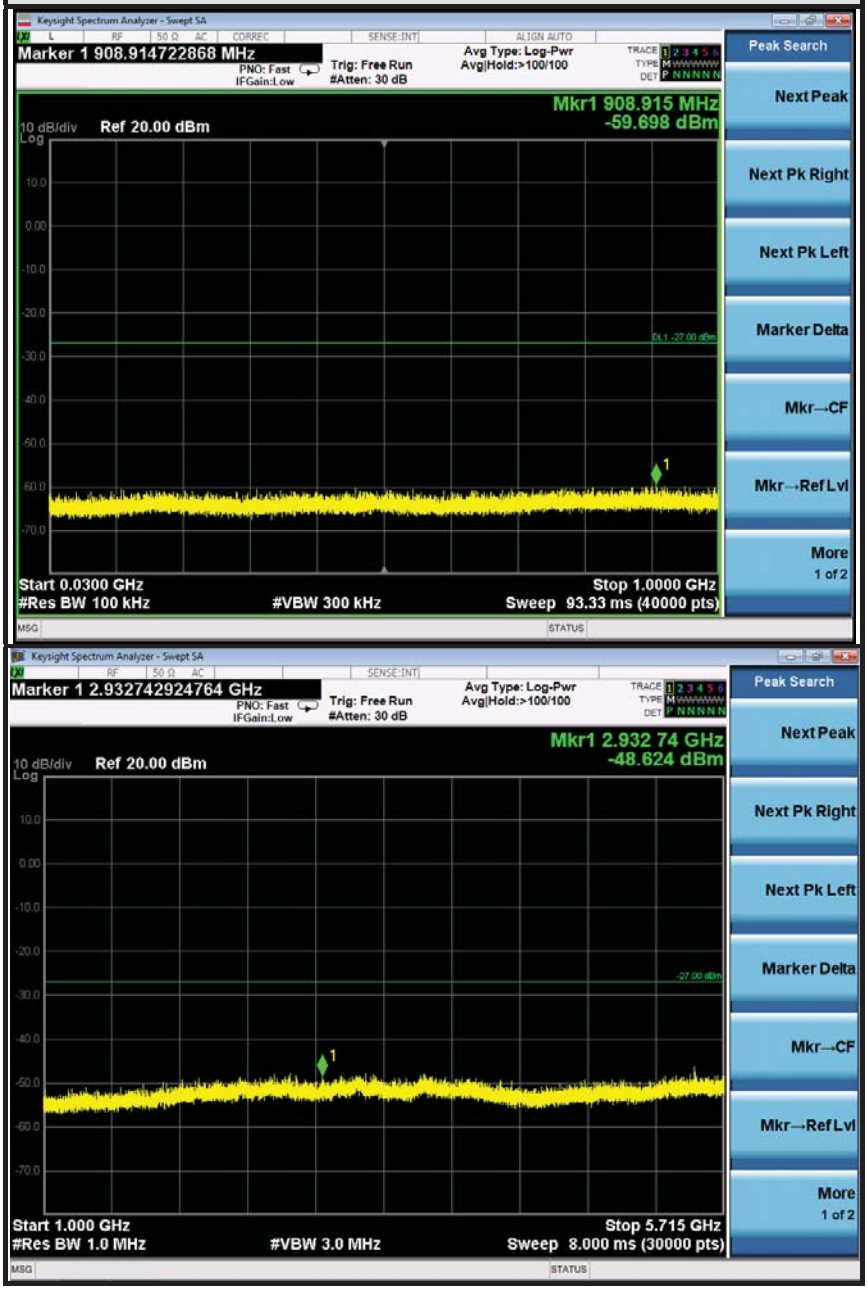
802.11n20 for 5825MHz



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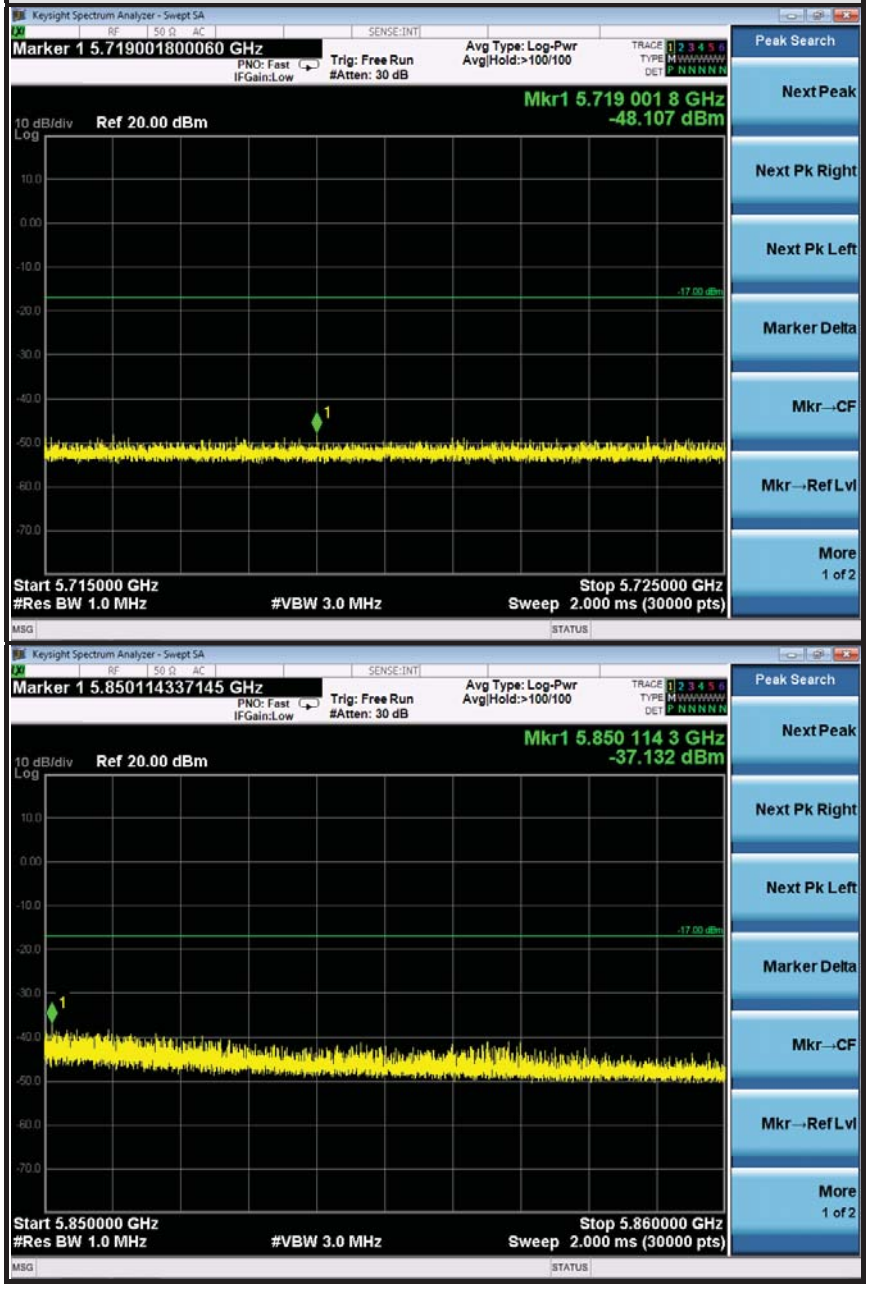
802.11n20 for 5825MHz



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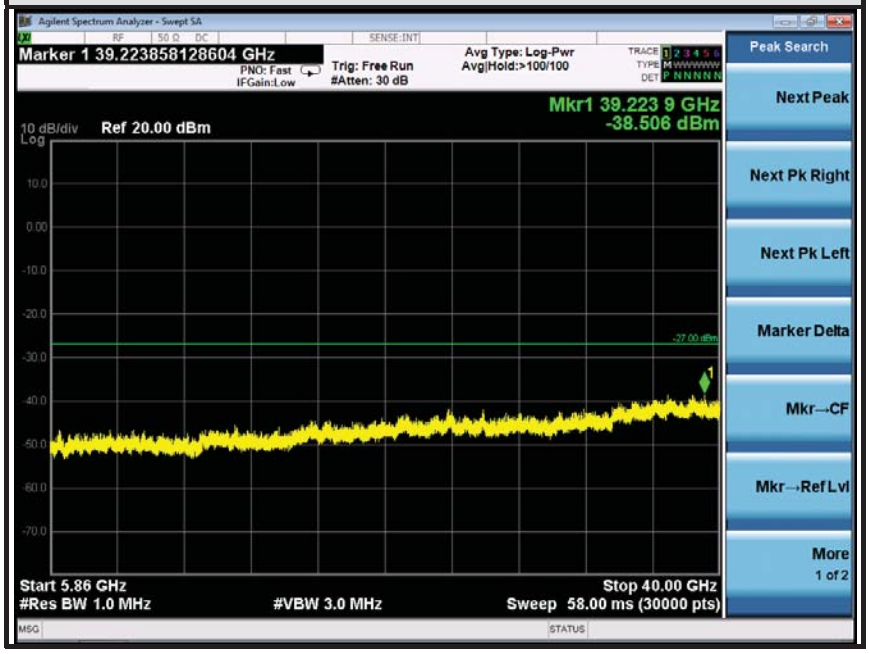
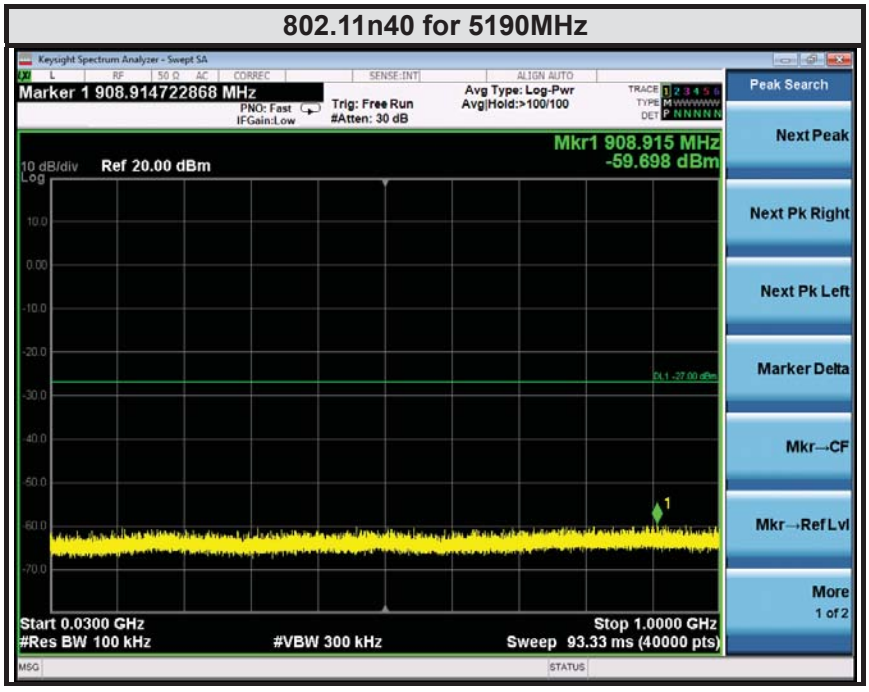
802.11n20 for 5825MHz



802.11n40 for 5190MHz



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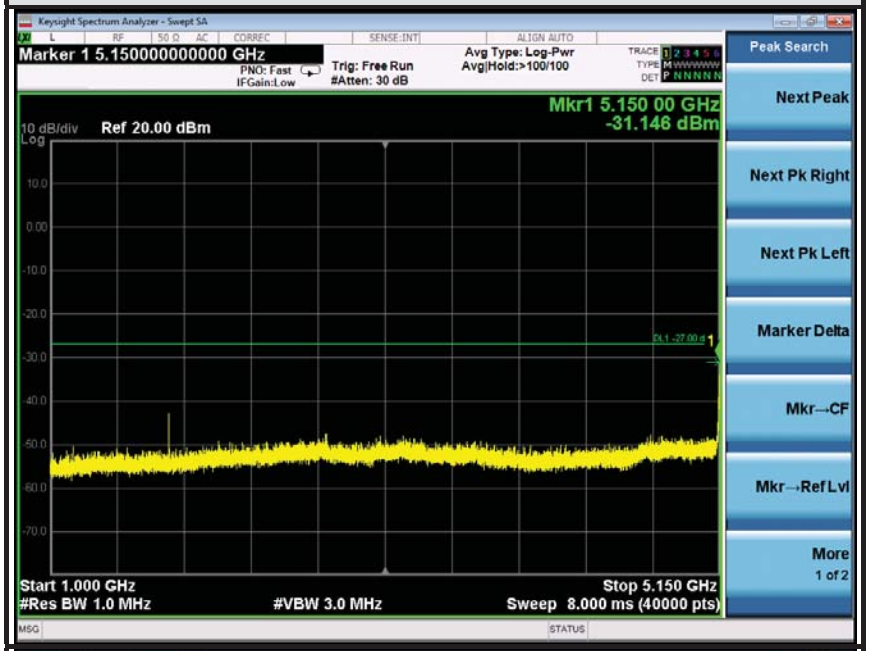
802.11n40 for 5190MHz



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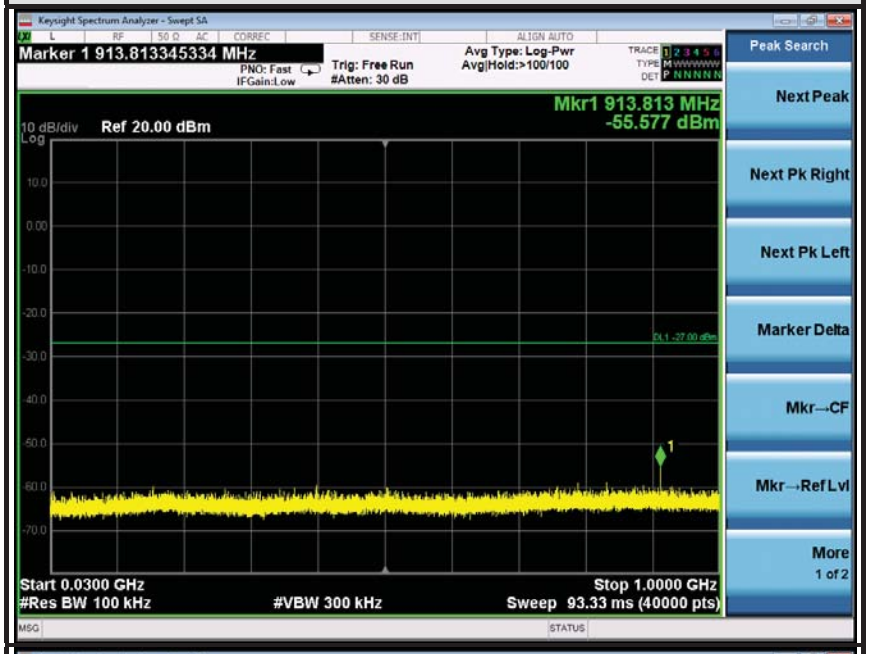
802.11n40 for 5230MHz



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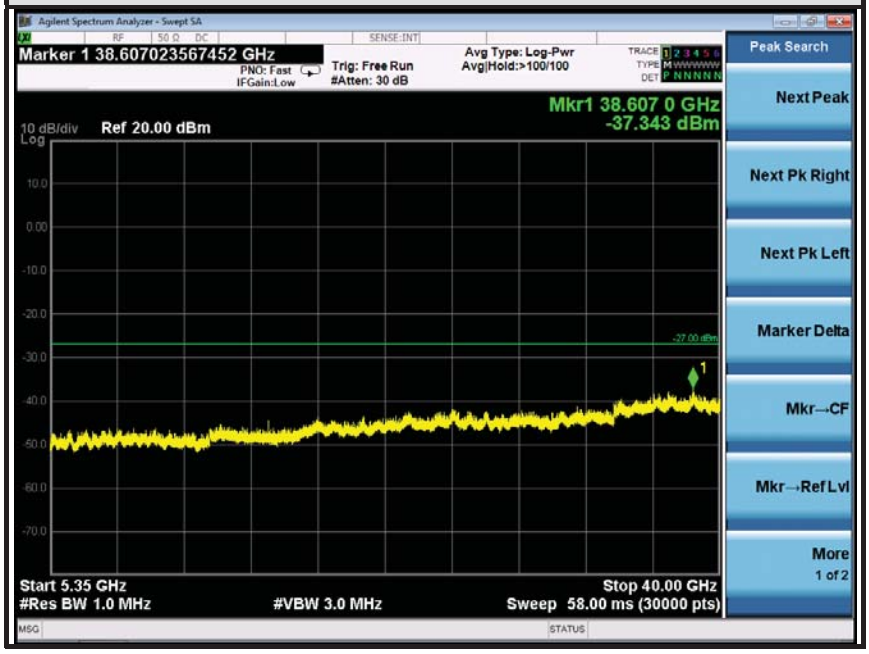
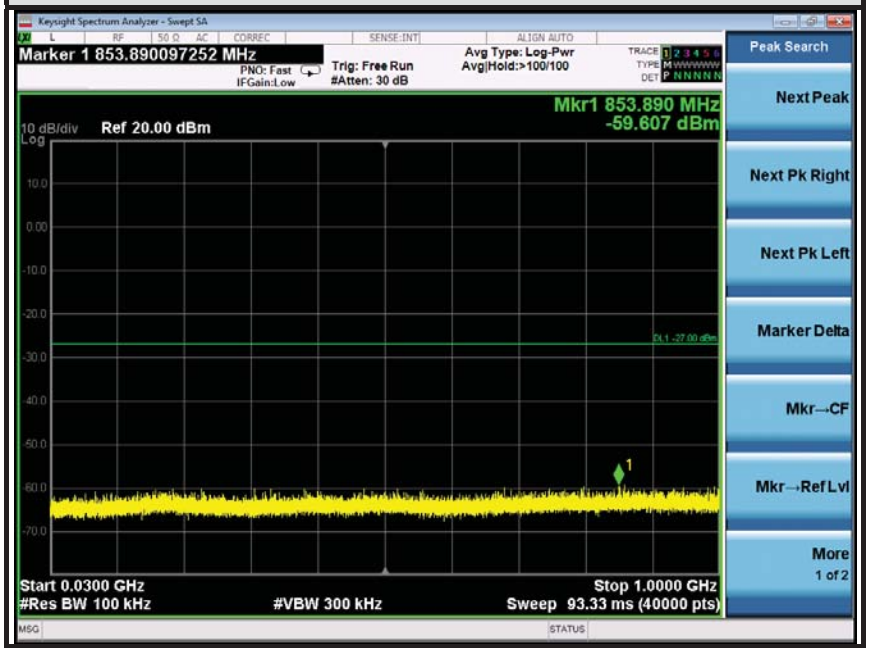
802.11n40 for 5230MHz



802.11n40 for 5755MHz



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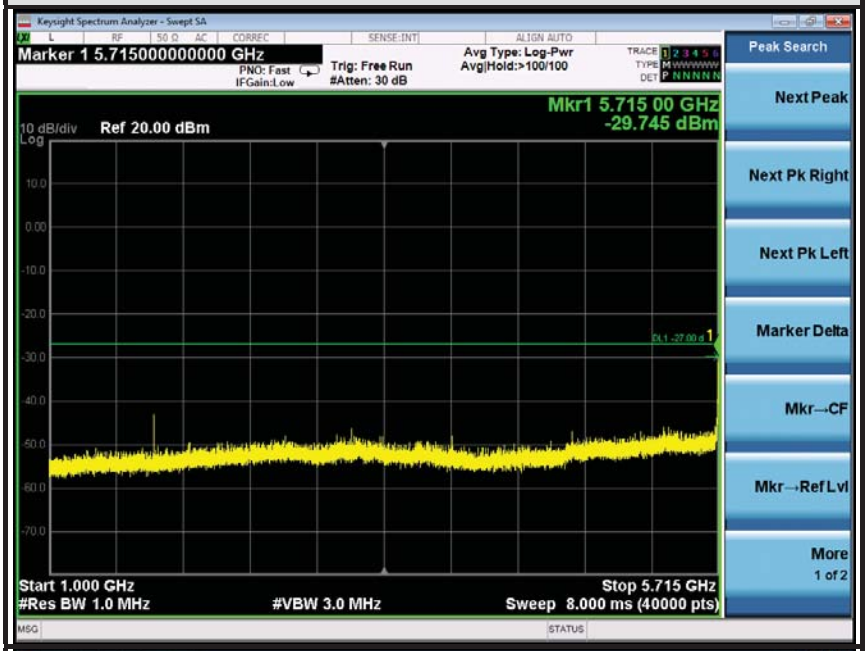
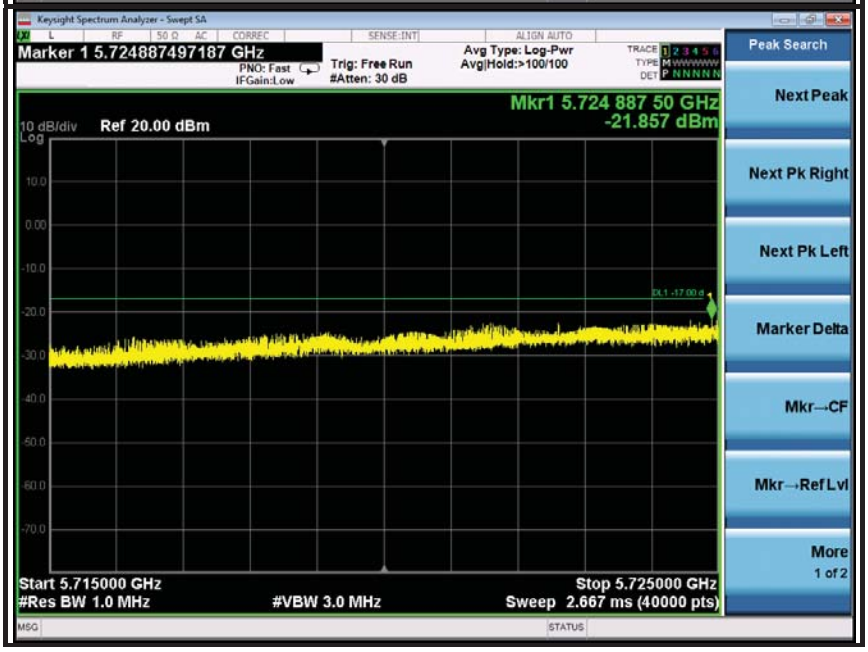
802.11n40 for 5755MHz





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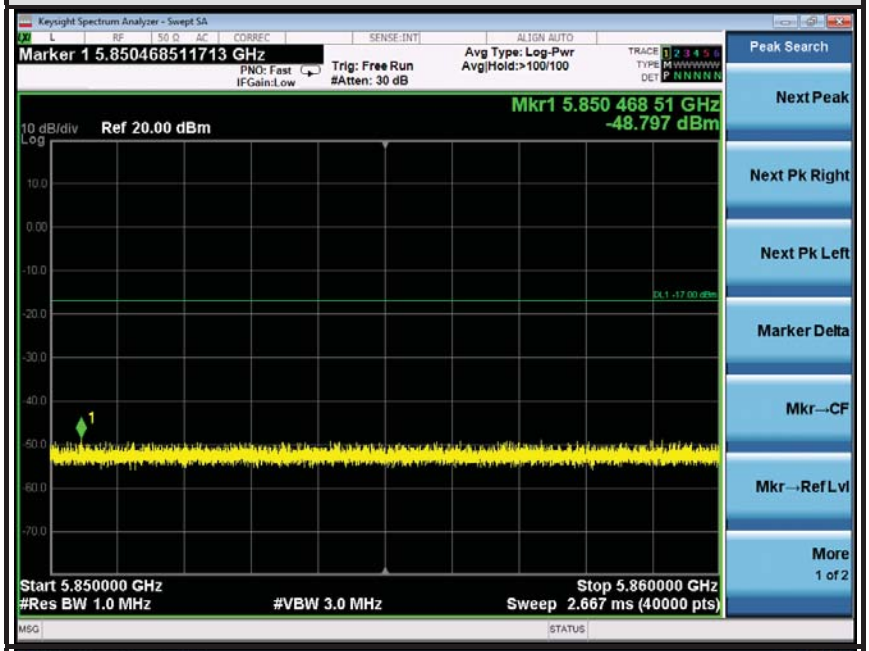
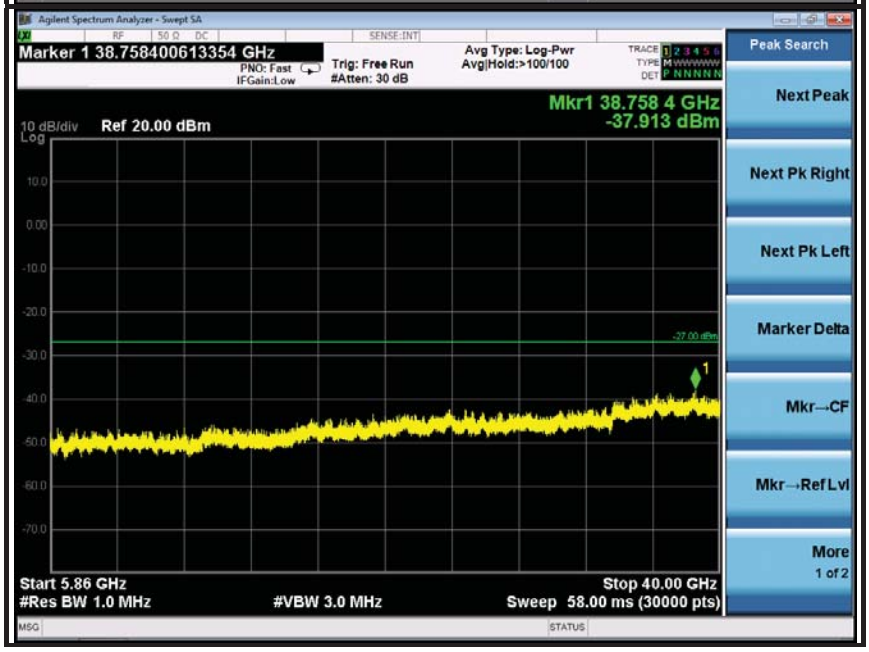
802.11n40 for 5755MHz





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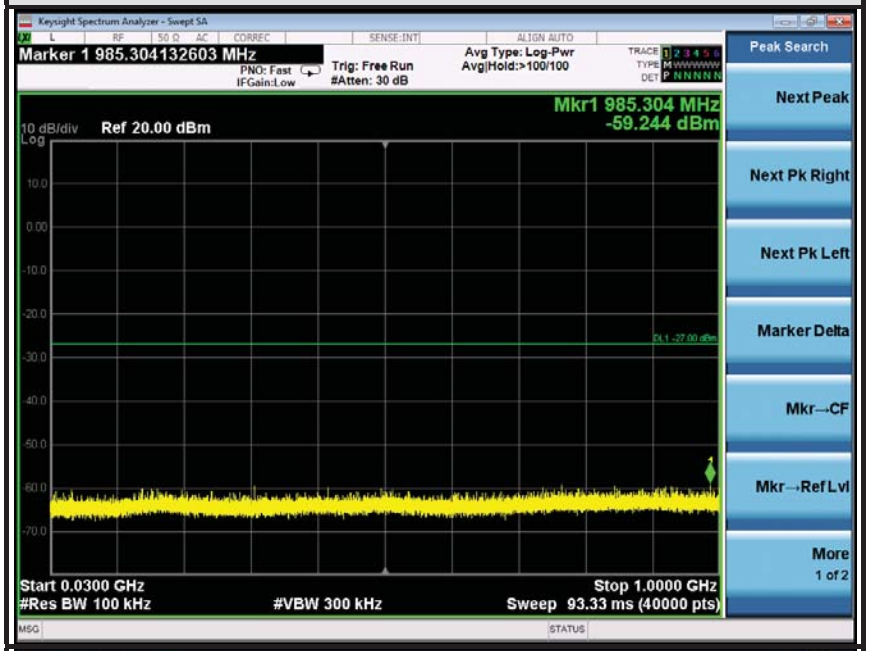
802.11n40 for 5795MHz



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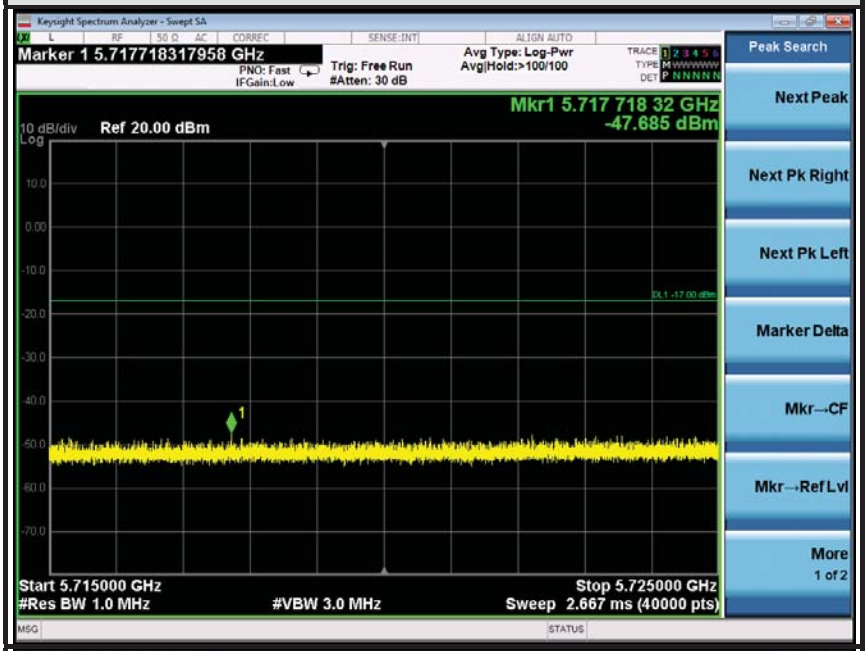
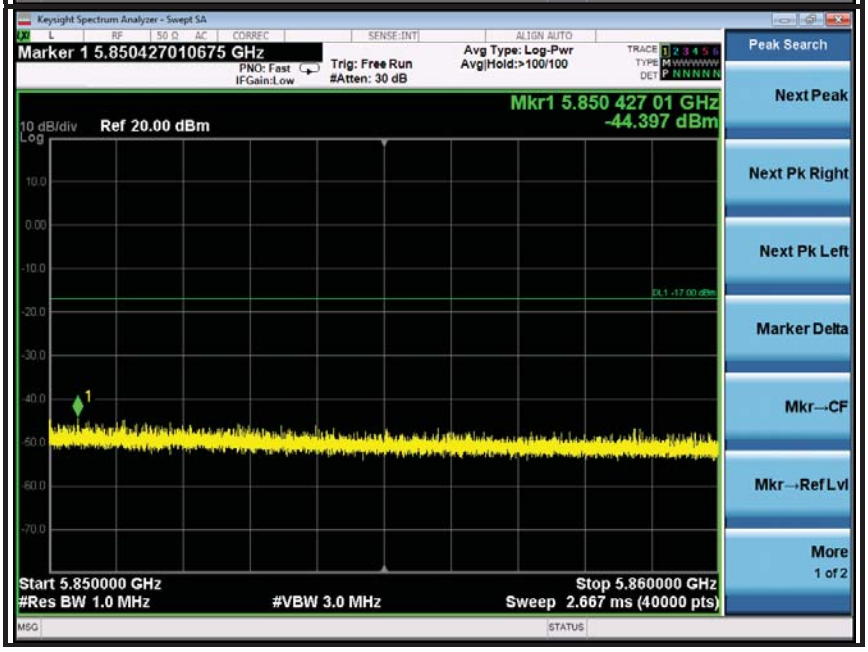
802.11n40 for 5795MHz





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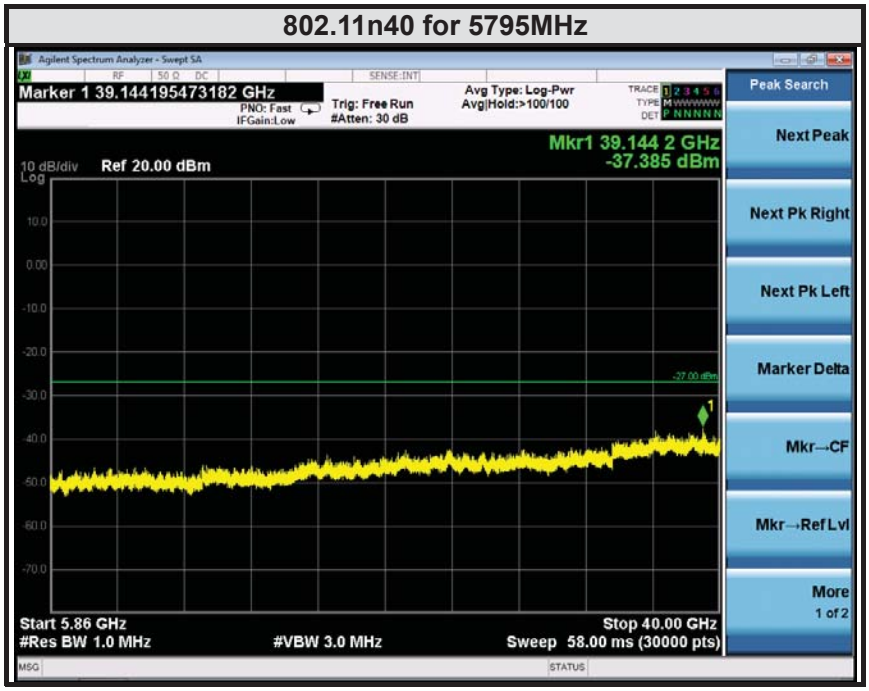
802.11n40 for 5795MHz



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12.0 RADIATED EMISSION

12.1 MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this cas

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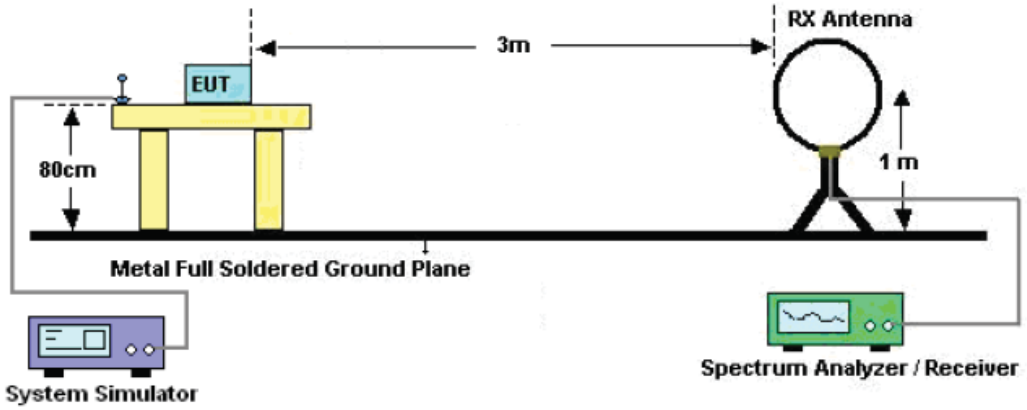
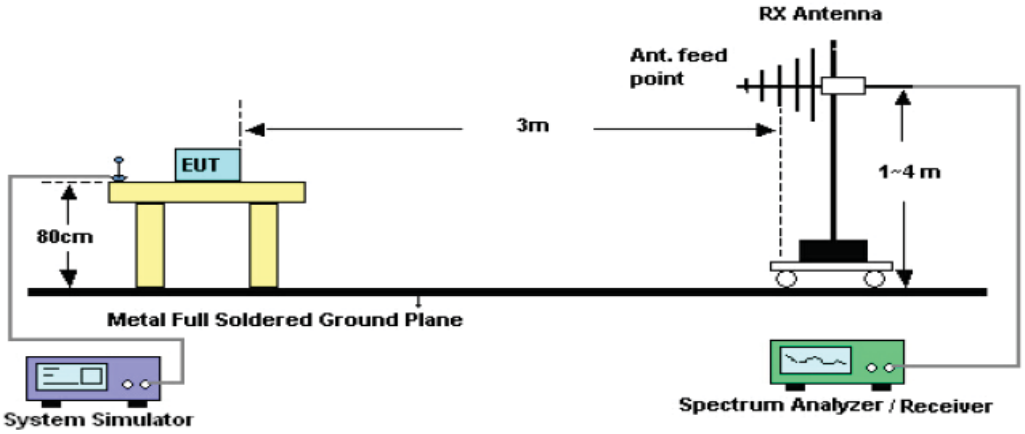
12.2 TEST SETUP

Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz

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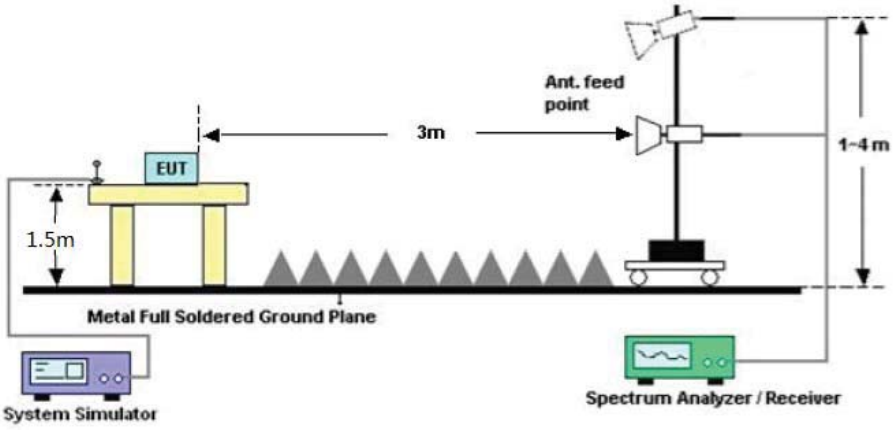

12.3 LIMITS AND MEASUREMENT RESULT

RSS-GEN Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (micorvolts/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

Note: All modes were tested For restricted band radiated emission, the test records reported below are the worst result compared to other modes.

12.4 TEST RESULT

Test Mode:	TX –X Position Mode	Result:	■ - passed
Frequency range:	9KHz~30MHz		□ - not passed

No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
Remark: The test result reading value is to low, margin all > 20dB of the limit.							

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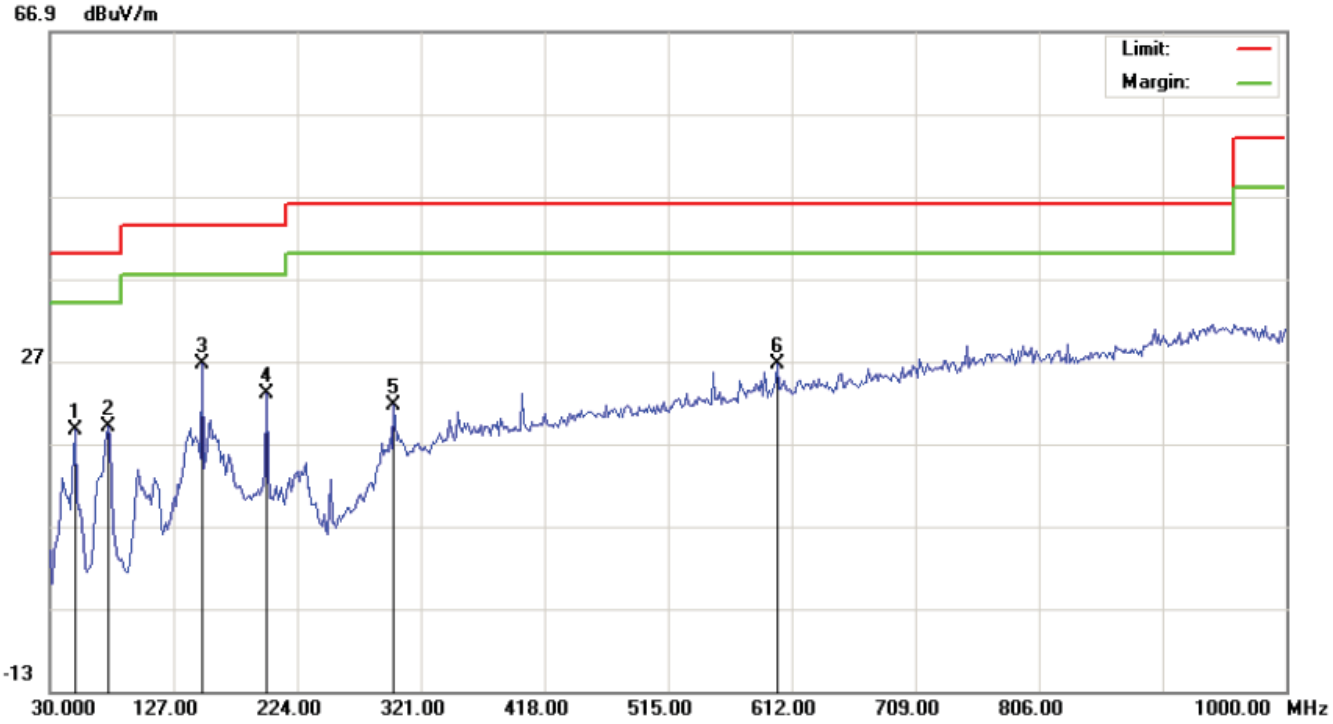
RADIATED EMISSION BELOW 1GHZ

EUT	QCA6234	**Model Name**	QCA6234
Temperature	25° C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11a20 5180MHz	**Antenna**	Horizontal



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No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		49.4000	7.30	11.28	18.58	40.00	-21.42	peak			
2		75.2667	13.94	5.12	19.06	40.00	-20.94	peak			
3	*	149.6333	13.79	12.85	26.64	43.50	-16.86	peak			
4		199.7500	11.02	11.99	23.01	43.50	-20.49	peak			
5		299.9833	6.13	15.41	21.54	46.00	-24.46	peak			
6		600.6833	2.78	23.73	26.51	46.00	-19.49	peak			

RESULT: PASS

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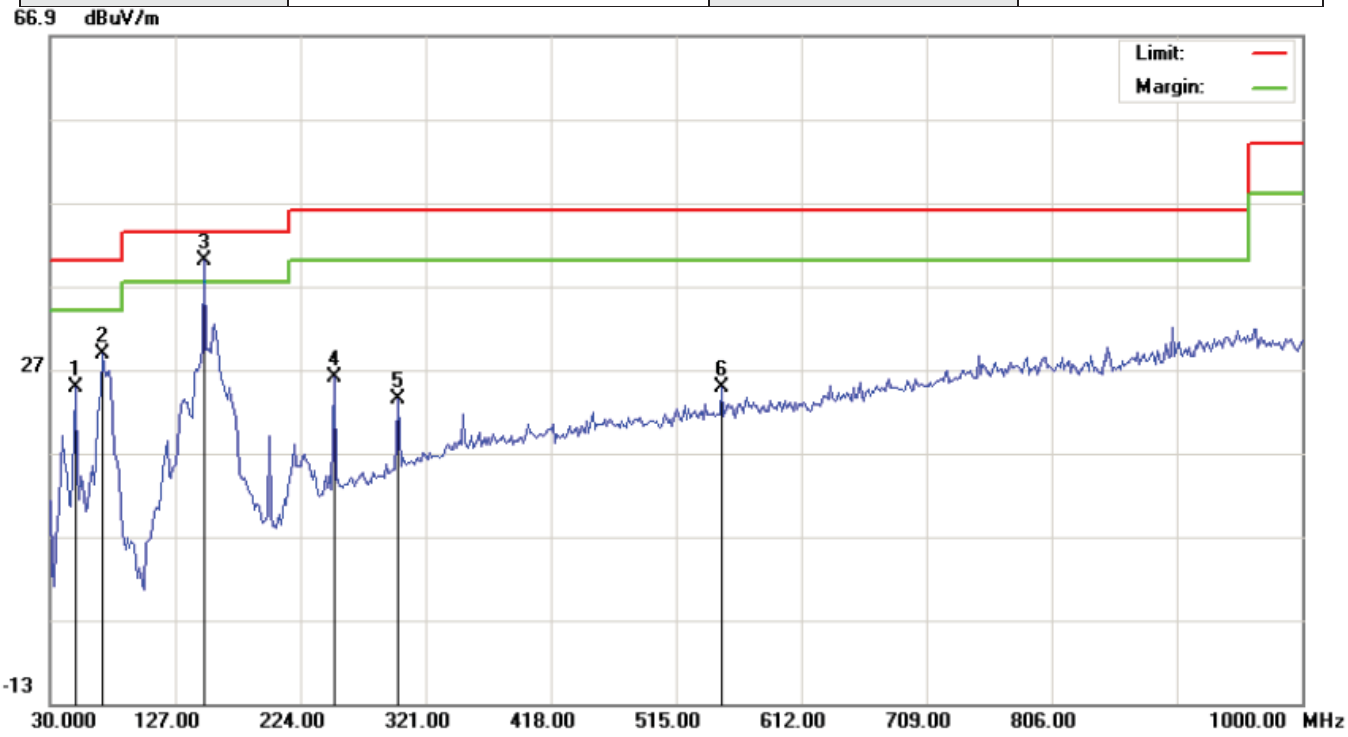
EUT	QCA6234	Model Name	QCA6234
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5180MHz	Antenna	Vertical



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		49.4000	16.61	8.28	24.89	40.00	-15.11	peak			
2		70.4167	24.61	4.16	28.77	40.00	-11.23	peak			
3	*	149.6333	24.72	15.26	39.98	43.50	-3.52	peak			
4		249.8667	12.07	13.89	25.96	46.00	-20.04	peak			
5		299.9833	7.96	15.41	23.37	46.00	-22.63	peak			
6		550.5667	2.30	22.48	24.78	46.00	-21.22	peak			

RESULT: PASS

Note: All test channels had been tested. The 802.11a20 at 5180MHz is the worst case and recorded in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Level.

The “Factor” value can be calculated automatically by software of measurement system.

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RADIATED EMISSION ABOVE 1GHZ

EUT	QCA6234	Model Name	QCA6234
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5180MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10360.120	43.98	9.14	53.12	74	-20.88	peak
10360.120	36.67	9.14	45.81	54	-8.19	AVG
15540.180	41.54	10.22	51.76	74	-22.24	peak
15540.180	35.39	10.22	45.61	54	-8.39	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10360.120	42.72	9.14	51.86	74	-22.14	peak
10360.120	36.05	9.14	45.19	54	-8.81	AVG
15540.180	40.39	10.22	50.61	74	-23.39	peak
15540.180	34.05	10.22	44.27	54	-9.73	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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EUT	QCA6234	Model Name	QCA6234
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5240MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10480.120	41.81	9.27	51.08	74	-22.92	peak
10480.120	36.42	9.27	45.69	54	-8.31	AVG
15720.180	39.89	10.38	50.27	74	-23.73	peak
15720.180	34.42	10.38	44.8	54	-9.2	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10480.120	41.52	9.27	50.79	74	-23.21	peak
10480.120	35.81	9.27	45.08	54	-8.92	AVG
15720.180	38.42	10.38	48.8	74	-25.2	peak
15720.180	33.56	10.38	43.94	54	-10.06	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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EUT	QCA6234	Model Name	QCA6234
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5745MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
11490.120	41.78	9.42	51.2	74	-22.8	peak
11490.120	35.42	9.42	44.84	54	-9.16	AVG
17235.180	39.39	10.51	49.9	74	-24.1	peak
17235.180	35.04	10.51	45.55	54	-8.45	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
11490.120	40.75	9.42	50.17	74	-23.83	peak
11490.120	34.69	9.42	44.11	54	-9.89	AVG
17235.180	39.01	10.51	49.52	74	-24.48	peak
17235.180	34.76	10.51	45.27	54	-8.73	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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EUT	QCA6234	Model Name	QCA6234
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5825MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
11650.120	42.78	9.62	52.4	74	-21.6	peak
11650.120	35.94	9.62	45.56	54	-8.44	AVG
17475.180	37.75	10.75	48.5	74	-25.5	peak
17475.180	32.78	10.75	43.53	54	-10.47	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
11650.120	39.79	9.62	49.41	74	-24.59	peak
11650.120	34.35	9.62	43.97	54	-10.03	AVG
17475.180	36.94	10.75	47.69	74	-26.31	peak
17475.180	30.45	10.75	41.2	54	-12.8	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Note: All the case had been tested. The 802.11a modulation is the worst case and recorded in the test report. Other frequencies radiation emission from 1GHz to 40GHz at least have 20dB margin and not recorded in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Level.

The “Factor” value can be calculated automatically by software of measurement system.

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13. BAND EDGE EMISSION

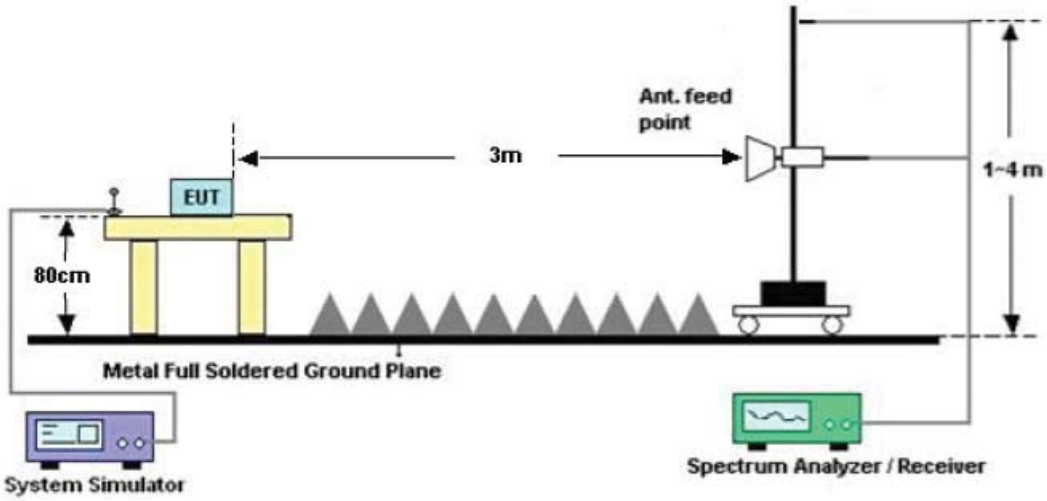
13.1 MEASUREMENT PROCEDURE

1. The EUT operates at transmitting mode. The operate channel is tested to verify the largest transmission and spurious emissions power at the continuous transmission mode.
2. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission: (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz ; VBW=1/on time(1KHz) / Sweep=AUTO
3. Other procedures refer to clause 11.2.

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level
2. The factor had been edited in the “Input Correction” of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB(μV) to represent the Amplitude. Use the F dB(μV/m) to represent the Field Strength. So A=F.
3. Only the data of band edge emission at the restricted band 4.5GHz-5.15GHz record in the report. Other restricted band 5.35GHz-5.46GHz and 7.25GHz-7.77GHz were considered as ambient noise. No recording in the test report.

13.2. TEST SET-UP



13.3 TEST RESULT

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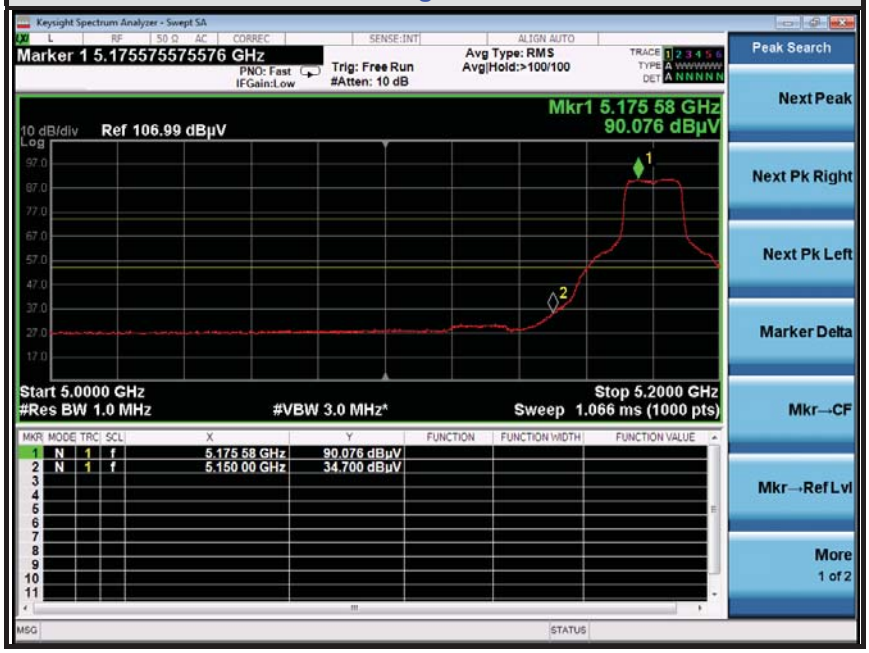
Test Plot:

802.11a20 5180MHz / Horizontal

PK Value

Average Value



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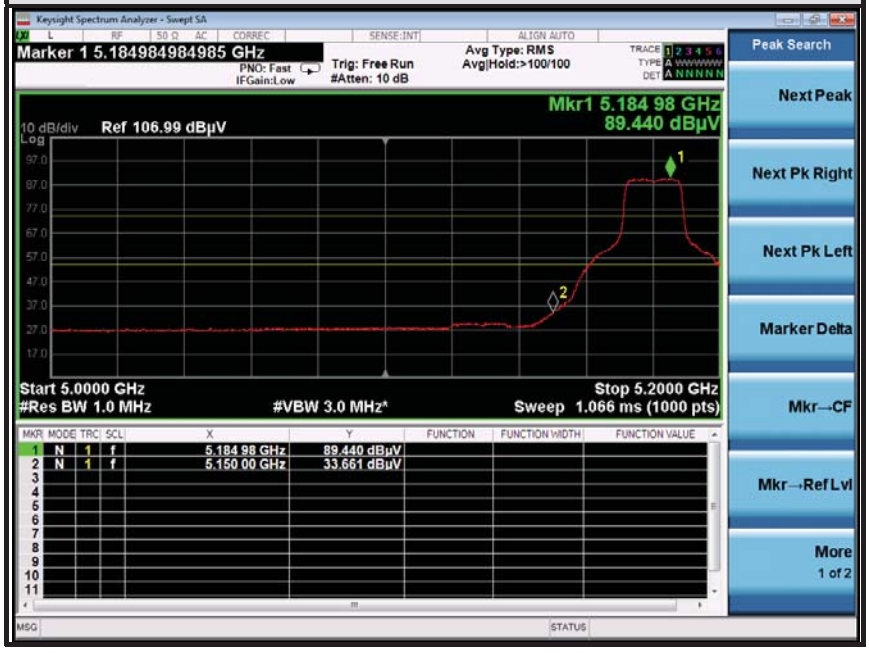
802.11a20 5180MHz / Vertical
PK Value

Average Value



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802.11n20 5180MHz / Horizontal

PK Value

Average Value

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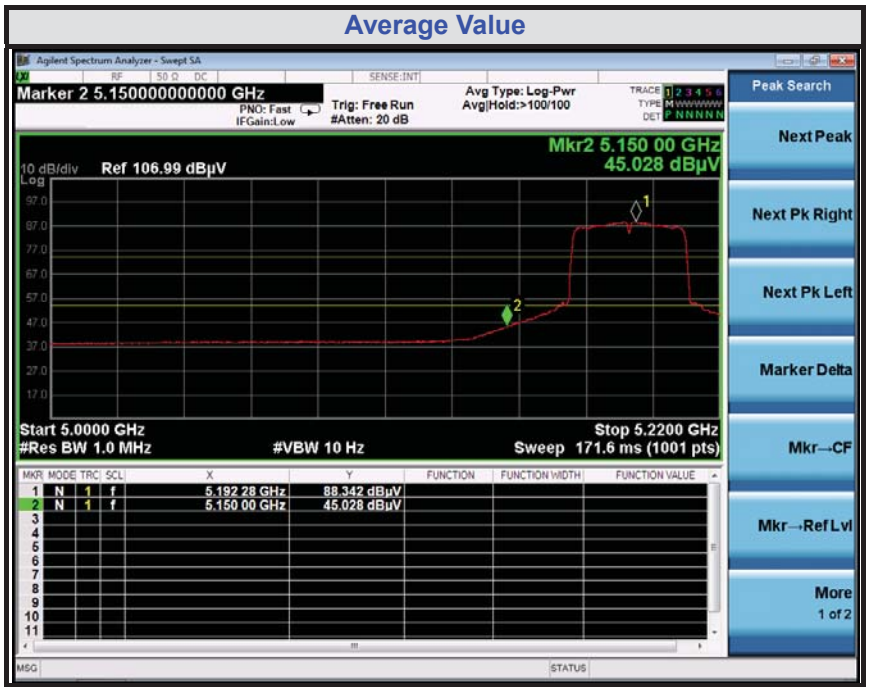
802.11n20 5180MHz / Vertical

PK Value

Average Value



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802.11n40 5190MHz / Horizontal

PK Value

Average Value

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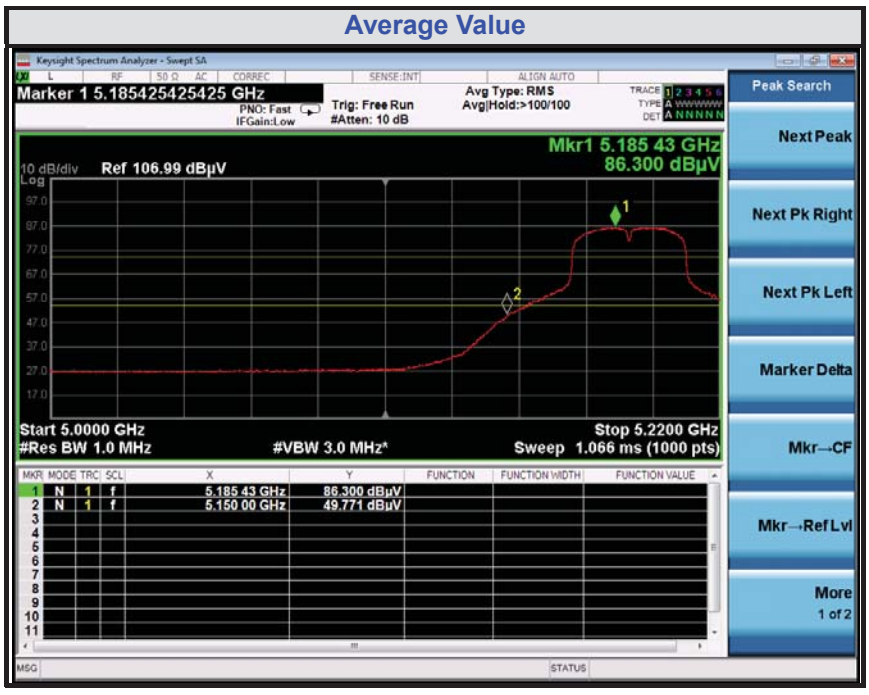
802.11n40 5190MHz / Vertical

PK Value

Average Value



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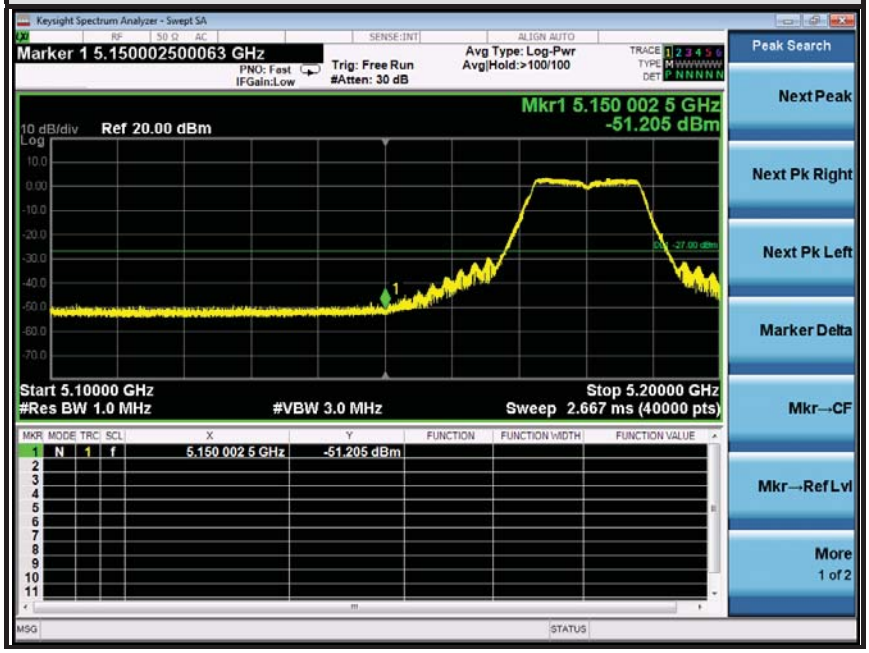
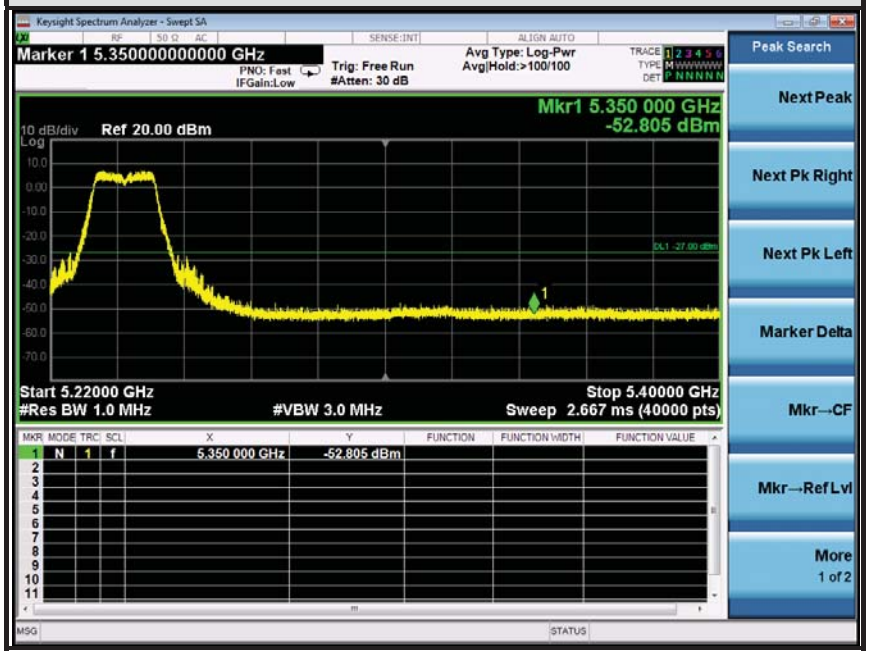
Band edge Emission Outside of Operated Band

802.11a20 / Test Plot of Bandwidth for 5180MHz



Band edge Emission Outside of Operated Band

802.11a20 / Test Plot of Bandwidth for 5240MHz



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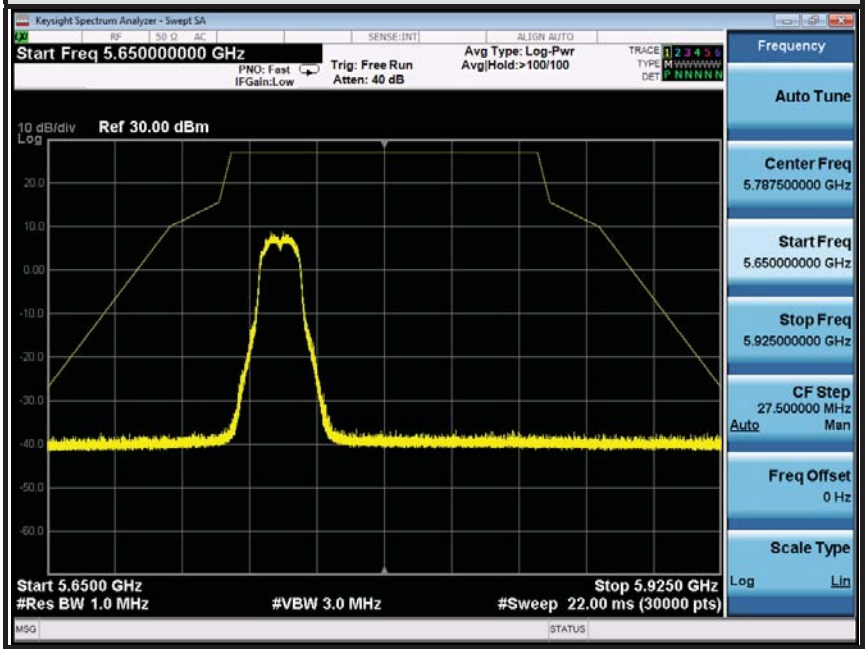
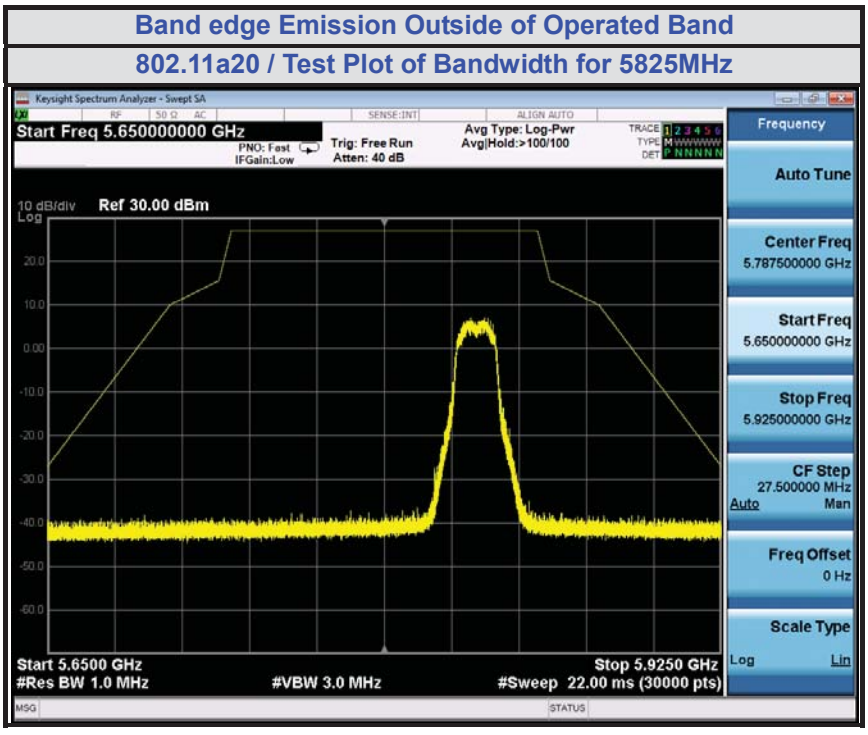
Band edge Emission Outside of Operated Band

802.11a20 / Test Plot of Bandwidth for 5745MHz



Band edge Emission Outside of Operated Band

802.11a20 / Test Plot of Bandwidth for 5825MHz



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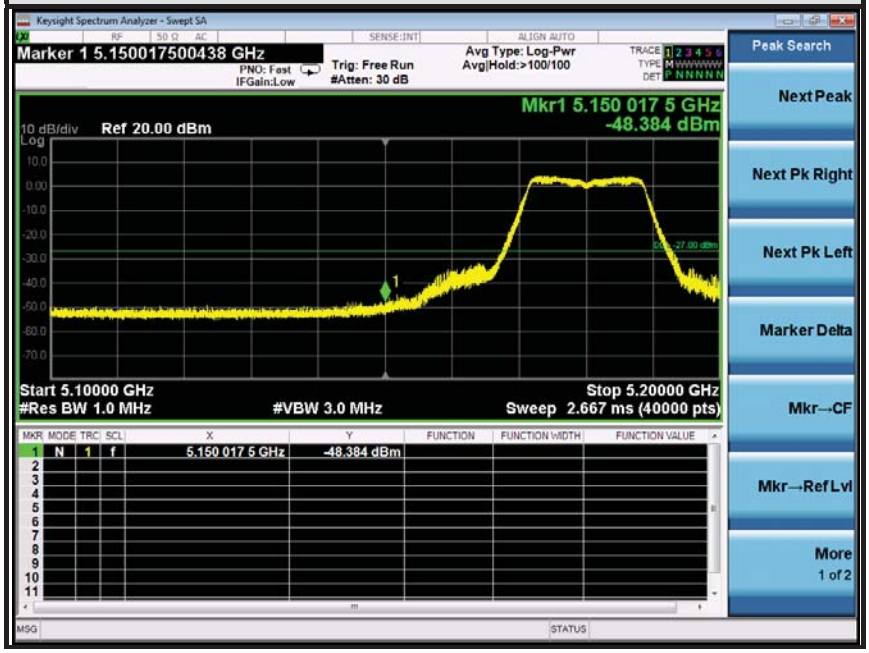
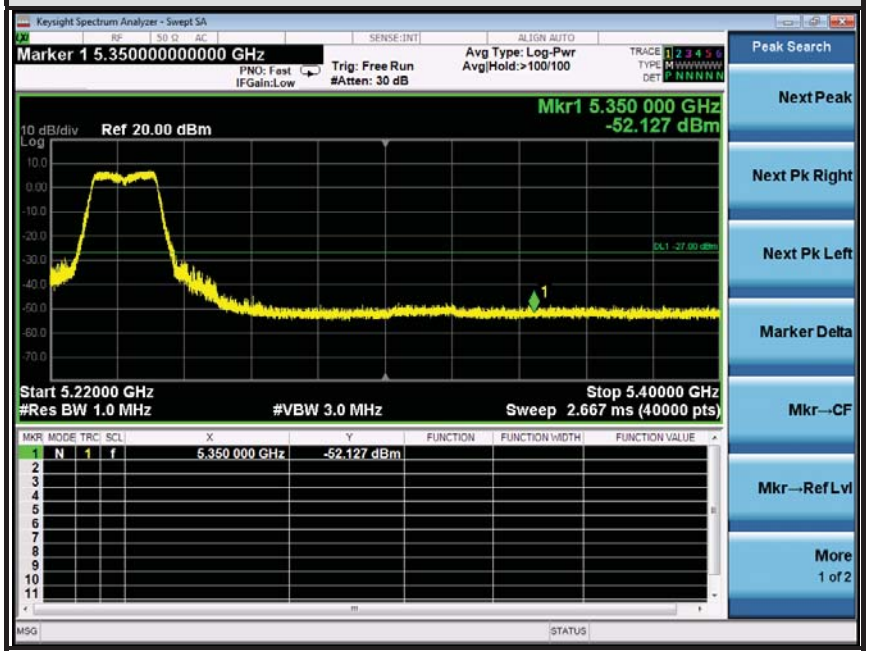
Band edge Emission Outside of Operated Band

802.11n20 / Test Plot of Bandwidth for 5180MHz



Band edge Emission Outside of Operated Band

802.11n20 / Test Plot of Bandwidth for 5240MHz



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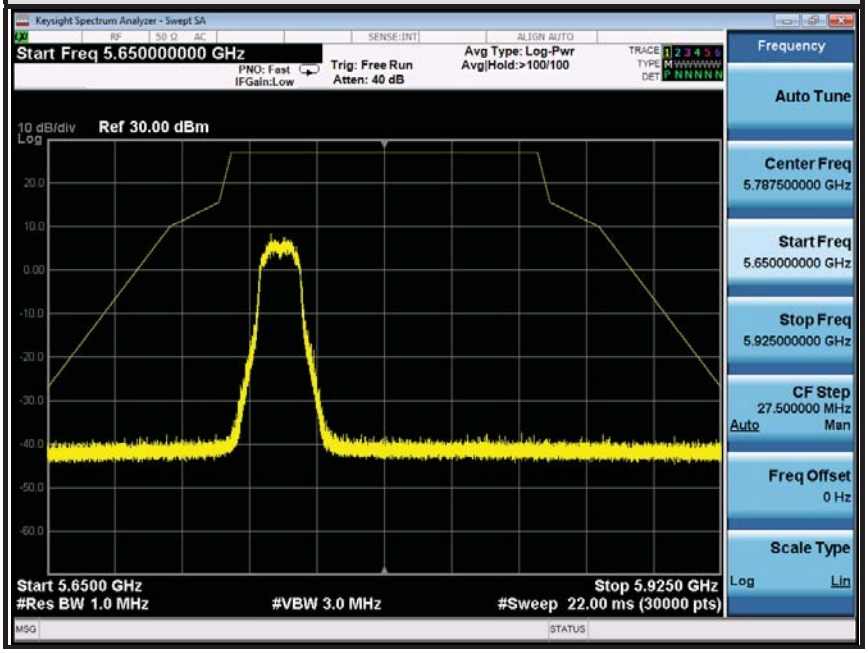
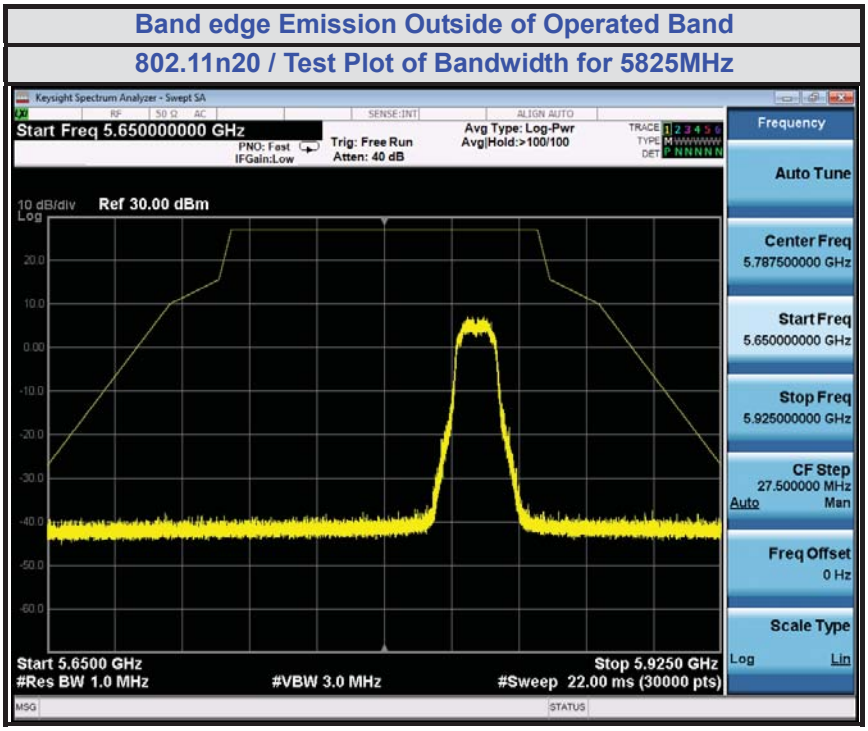
Band edge Emission Outside of Operated Band

802.11n20 / Test Plot of Bandwidth for 5745MHz



Band edge Emission Outside of Operated Band

802.11n20 / Test Plot of Bandwidth for 5825MHz



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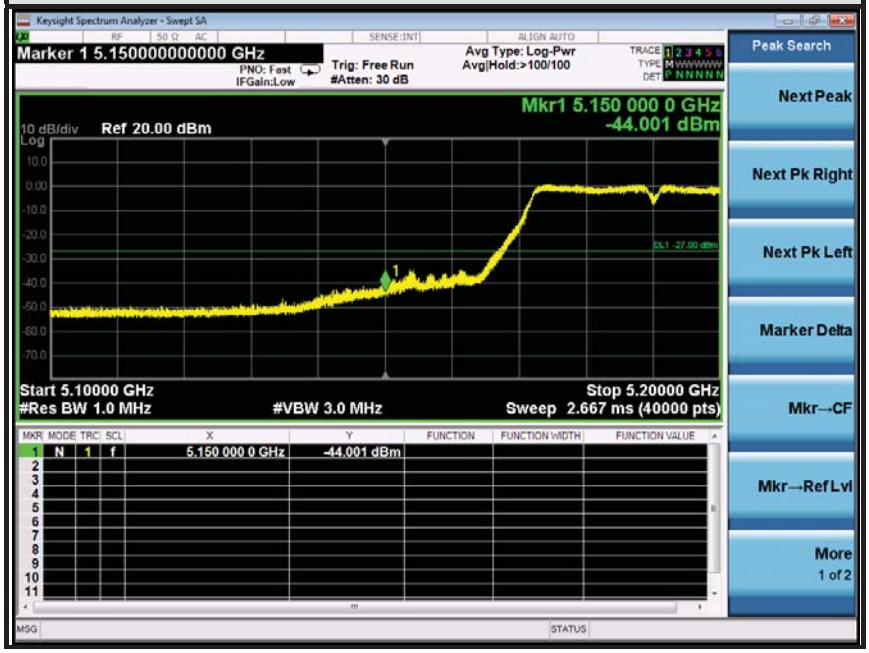
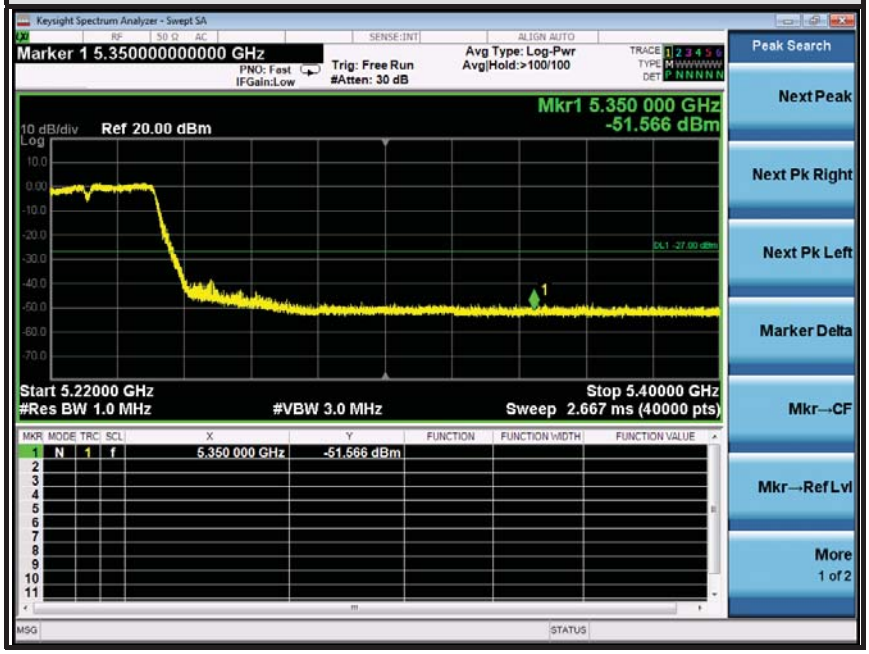
Band edge Emission Outside of Operated Band

802.11n40 / Test Plot of Bandwidth for 5190MHz



Band edge Emission Outside of Operated Band

802.11n40 / Test Plot of Bandwidth for 5230MHz



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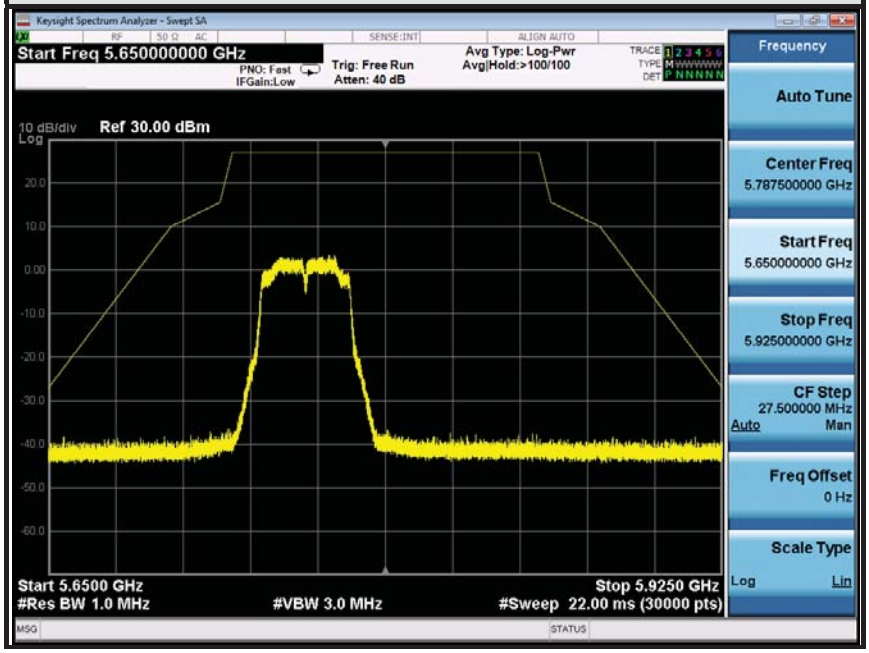
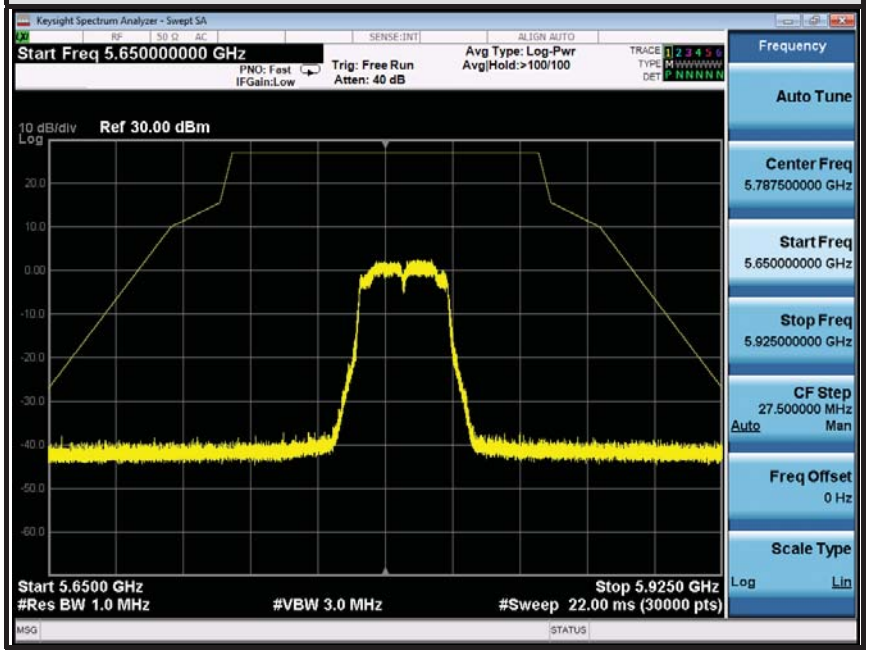
Band edge Emission Outside of Operated Band

802.11n40 / Test Plot of Bandwidth for 5755MHz



Band edge Emission Outside of Operated Band

802.11n40 / Test Plot of Bandwidth for 5795MHz



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14.0 Antenna Requirements

14.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 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.
And according to FCC 47 CFR Section 15.407 , if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

14.2 Antenna Construction and Directional Gain

Antenna type:PCB antenna
Antenna Gain: 0dBi

15.0 Deviation to test specifications

The following identical model(s):

N/A

Belong to the tested device:

Product description: **QCA6234**
Model name: **QCA6234**

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