FCC PART 15E TEST REPORT FOR CERTIFICATION
On Behalf of

Acer Incorporated

Halo Smart Speaker

Model Number: HSP3100G

FCC ID: HLZSP3100

Prepared for:	Acer Incorporated
	8F, 88, Sec 1, Hsin Tai Wu Rd, Hsichih, Taipei Hsien, 221, Taiwan
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
Tel: 86-769-83081888-808	

Report Number:	ESTE-R2009035
Date of Test:	Jun. 15~Sep. 02, 2020
Date of Report:	Sep. 04, 2020

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Description Page

EST Technology Co., Ltd.

Applicant: **Address:**	Acer Incorporated 8F, 88, Sec 1, Hsin Tai Wu Rd, Hsichih, Taipei Hsien, 221, Taiwan
Manufacturer: **Address:**	Acer Incorporated 8F, 88, Sec 1, Hsin Tai Wu Rd, Hsichih, Taipei Hsien, 221, Taiwan
E.U.T:	Halo Smart Speaker
Model Number:	HSP3100G
Power Supply:	DC 16V From Adapter Input AC 100-240V~50/60Hz
Trade Name:	acer or ACER Serial No.: ------
Date of Receipt:	Jun. 15, 2020 Date of Test: Jun. 15~Sep. 02, 2020
Test Specification:	FCC Part 15 Subpart E 15.407 ANSI C63.10:2013 FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 FCC KDB 662911 D01 Multiple Transmitter Output v02r01
Test Result:	The device described above is tested by EST Technology Co., Ltd. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart E requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd. **Date:** Sep. 04, 2020

Prepared by:	Reviewed by:	Approved by:
Ring Yang	Seven Wang	
Ring Yang / Assistant	Seven Wang / Engineer	Iceman Hu / Manager

Other Aspects:
None.

Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested

This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

FCC ID	:	HLZSP3100
Product Name	:	Halo Smart Speaker
Model Number	:	HSP3100G
Software Version	:	1.44.0.0.12
Hardware Version	:	VER-03
Operation frequency	:	U-NII-1: 5150 MHz~5250 MHz U-NII-2A: 5250 MHz~5350 MHz U-NII-2C: 5470MHz~5600MHz&5650MHz~5725MHz U-NII-3: 5725 MHz~5850 MHz
Number of channel	:	U-NII-1: IEEE 802.11a / n HT20 / ac VHT20: 4 Channels; IEEE 802.11n HT40 / ac VHT40: 2 Channels; IEEE 802.11ac VHT80: 1 Channel. U-NII-2A: IEEE 802.11a / n HT20 / ac VHT20: 4 Channels; IEEE 802.11n HT40 / ac VHT40: 2 Channels; IEEE 802.11ac VHT80: 1 Channel. U-NII-2C: IEEE 802.11a / n HT20 / ac VHT20: 8 Channels; IEEE 802.11n HT40 / ac VHT40: 3 Channels; IEEE 802.11ac VHT80: 1 Channel. U-NII-3: IEEE 802.11a / n HT20 / ac VHT20: 5 Channels; IEEE 802.11n HT40 / ac VHT40: 2 Channels; IEEE 802.11ac VHT80: 1 Channel.
Modulation	:	OFDM(QPSK, BPSK, 16-QAM, 64-QAM,256-QAM)
Transmit Data Rate	:	IEEE 802.11a: 54, 48, 36, 24, 18, 12, 9, 6Mbps; IEEE 802.11n: up 150Mbps; IEEE 802.11ac: up to 433.3Mbps;
Channels Spacing	:	IEEE 802.11a: 20MHz; IEEE 802.11n HT20: 20MHz; IEEE 802.11n HT40: 40MHz; IEEE 802.11ac VHT20: 20MHz; IEEE 802.11ac VHT40: 40MHz; IEEE 802.11ac VHT80: 80MHz;
Transmit Power	:	IEEE 802.11a: 12.53dBm IEEE 802.11n HT20: 14.38dBm IEEE 802.11n HT40: 15.34dBm IEEE 802.11ac VHT20: 15.20dBm IEEE 802.11ac VHT40: 16.07dBm IEEE 802.11ac VHT80: 17.62dBm
Sample Type	:	Prototype production

Note:

For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

1.2. The antenna information for EUT

Ant No.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Internal	N/A	3.4
2	N/A	N/A	Internal	N/A	2.8

Remark:

(1) The EUT can work as CDD mode in IEEE 802.11n and IEEE 802.11ac,and can operate with one spatial stream.
According to KDB 662911 F 2) f) (ii):
Directional gain=$10\times\log[(10^{3.4/20}+10^{2.8/20})^2/2]$=6.12dBi＞6dBi
So,the output power limit and power spectral density should be reduced.
For output Power：
U-NII-1 Limit is 24dBm-(6.12dBi-6dBi)=23.88dBm
U-NII-2A&U-NII-2C Limit is 24dBm-(6.12dBi-6dBi)=23.88dBm
U-NII-3 Limit is 30dBm-(6.12dBi-6dBi)=29.88dBm
For power spectral density:
U-NII-1 Limit is 11dBm/MHz-(6.12dBi-6dBi)=10.88dBm/MHz
U-NII-2A&U-NII-2C Limit is 11dBm/MHz-(6.12dBi-6dBi)=10.88dBm/MHz
U-NII-3 Limit is 30dBm/500KHz-(6.12dBi-6dBi)=29.88dBm/500KHz

(2) After pre-test all antenna configurations,the worst case configuration as list below.

ANT No. / TX Mode	SISO Configuration	MIMO Configuration
IEEE 802.11a	ANT 1 and ANT 2	/
IEEE 802.11n HT20	/	ANT1+ANT2
IEEE 802.11n HT40	/	ANT1+ANT2
IEEE 802.11ac VHT20	/	ANT1+ANT2
IEEE 802.11ac VHT40	/	ANT1+ANT2
IEEE 802.11ac VHT80	/	ANT1+ANT2

2. SUMMARY OF TEST

2.1. Summary of test result

Report Section	Description of Test Item	FCC Standard Section	Results
3	6dB Bandwidth &26dB Bandwidth & 99% Occupied Bandwidth	15.407(a) 15.407(e)	PASS
4	Maximum Conducted Output Power	15.407(a)	PASS
5	Peak Power Spectral Density	15.407(a)	PASS
6	Unwanted Emissions and Band Edge	15.205 15.209 15.407(b)	PASS
7	Frequency Stability	15.407(g)	PASS
8	AC Power Line Conducted Emissions	15.207 15.407(b)(6)	PASS
9	Antenna Requirement	15.203	PASS

Note:

(1) "N/A" denotes test is not applicable in this test report

2.2. Test Facilities

EMC Lab : Certificated by CNAS, CHINA
Registration No.: L5288
This Certificate is valid until: November 12, 2023

Certificated by FCC, USA
Designation Number: CN1215
This Certificate is valid until: January 31, 2022

Certificated by A2LA, USA
Registration No.: 4366.01
This Certificate is valid until: January 31, 2022

Certificated by Industry Canada
CAB identifier No.: CN0035
This Certificate is valid until: January 31, 2022

Certificated by VCCI, Japan
Registration No.:C-14103; T-20073; R-13663;
R-20103; G-20097
Date of registration: Apr. 20, 2020
This Certificate is valid until: Apr. 19, 2023

Certificated by TUV Rheinland, Germany
Registration No.: UA 50413872 0001
Date of registration: July 31, 2018

Certificated by Intertek
Registration No.: 2011-RTL-L2-64
Date of registration: November 08, 2018

Name of Firm : EST Technology Co., Ltd.

Site Location : Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China

2.3. Measurement uncertainty for EST Technology Co., Ltd.

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.54dB
Uncertainty for Radiation Emission test (30MHz-1GHz)	3.62
Uncertainty for Radiation Emission test (1GHz to 18GHz)	4.86
Uncertainty for spurious emissions test (18GHz to 40GHz)	4.67
Uncertainty for radio frequency	7×10-8
Uncertainty for conducted RF Power	0.20dB
Uncertainty for Power density test	0.26dB
Temperature	±0.6℃
Humidity	±4.0 %
Volatage DC	±1.0%
Volatage (AC, <10KHz)	±1.5%

Note:

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

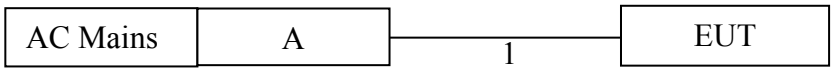
2.4. Assistant equipment used for test

Item	Equipment	Brand	Model Name/Type No.	FCC ID	Series No.
A	Adapter	DYS	DYS824-160150W-K	-	-

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	1.6m	DC Cable

2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 (or 1.5) meter high above ground.



AC 120V/60Hz&
AC 240V/60Hz

(EUT: Halo Smart Speaker)

2.6. Test Mode

Pre-scan has been combined all possible modulations and date rates to determine the worst case test mode,the worst case test mode was selected for the final test as listed below.

Test Item	Test Mode	Channel	Modulation	Data rate
6dB Bandwidth	IEEE 802.11a	149/157/165	OFDM	6Mbps
	IEEE 802.11n HT20	149/157/165	OFDM	MCS0
	IEEE 802.11n HT40	151/159	OFDM	MCS0
	IEEE 802.11ac VHT20	149/157/165	OFDM	MCS0
	IEEE 802.11ac VHT40	151/159	OFDM	MCS0
	IEEE 802.11ac VHT80	155	OFDM	MCS0
26dB Bandwidth	IEEE 802.11a	36/40/48/52/60/64/100/116/140	OFDM	6Mbps
	IEEE 802.11n HT20	36/40/48/52/60/64/100/116/140	OFDM	MCS0
	IEEE 802.11n HT40	38/46/54/62/102/114/134	OFDM	MCS0
	IEEE 802.11ac VHT20	36/40/48/52/60/64/100/116/140	OFDM	MCS0
	IEEE 802.11ac VHT40	38/46/54/62/102/114/134	OFDM	MCS0
	IEEE 802.11ac VHT80	42/58/106	OFDM	MCS0
99% Occupied Bandwidth	IEEE 802.11a	36/40/48/52/60/64/100/116/140/ 149/157/165	OFDM	6Mbps
	IEEE 802.11n HT20	36/40/48/52/60/64/100/116/140/ 149/157/165	OFDM	MCS0
	IEEE 802.11n HT40	38/46/54/62/102/114/134/151/159	OFDM	MCS0
	IEEE 802.11ac VHT20	36/40/48/52/60/64/100/116/140/ 149/157/165	OFDM	MCS0
	IEEE 802.11ac VHT40	38/46/54/62/102/114/134/151/ 159	OFDM	MCS0
	IEEE 802.11ac VHT80	42/58/106/155	OFDM	MCS0
Maximum Conducted Output Power	IEEE 802.11a	36/40/48/52/60/64/100/116/140/ 149/157/165	OFDM	6Mbps
	IEEE 802.11n HT20	36/40/48/52/60/64/100/116/140/ 149/157/165	OFDM	MCS0
	IEEE 802.11n HT40	38/46/54/62/102/114/134/151/159	OFDM	MCS0
	IEEE 802.11ac VHT20	36/40/48/52/60/64/100/116/140/ 149/157/165	OFDM	MCS0
	IEEE 802.11ac VHT40	38/46/54/62/102/114/134/151/ 159	OFDM	MCS0
	IEEE 802.11ac VHT80	42/58/106/155	OFDM	MCS0

Peak Power Spectral Density	IEEE 802.11a	36/40/48/52/60/64/100/116/140/ 149/157/165	OFDM	6Mbps
	IEEE 802.11n HT20	36/40/48/52/60/64/100/116/140/ 149/157/165	OFDM	MCS0
	IEEE 802.11n HT40	38/46/54/62/102/114/134/151/159	OFDM	MCS0
	IEEE 802.11ac VHT20	36/40/48/52/60/64/100/116/140/ 149/157/165	OFDM	MCS0
	IEEE 802.11ac VHT40	38/46/54/62/102/114/134/151/159	OFDM	MCS0
	IEEE 802.11ac VHT80	42/58/106/155	OFDM	MCS0
Unwanted Emissions and Band Edge(Above 1GHz)	IEEE 802.11a	36/40/48/52/60/64/100/116/140/ 149/157/165	OFDM	6Mbps
	IEEE 802.11n HT20	36/40/48/52/60/64/100/116/140/ 149/157/165	OFDM	MCS0
	IEEE 802.11n HT40	38/46/54/62/102/114/134/151/159	OFDM	MCS0
	IEEE 802.11ac VHT20	36/40/48/52/60/64/100/116/140/ 149/157/165	OFDM	MCS0
	IEEE 802.11ac VHT40	38/46/54/62/102/114/134/151/159	OFDM	MCS0
	IEEE 802.11ac VHT80	42/58/106/155	OFDM	MCS0
Unwanted Emissions Below 1GHz	IEEE 802.11a	100	OFDM	6Mbps
Frequency Stability	Unmodulation	36/64/100/149	N/A	N/A
AC Power Line Conducted Emissions	IEEE 802.11a	100	OFDM	6Mbps

Note:

1. In radiated measurement,the EUT had been pre-scan on the positioned of each 3 axis(X,Y,Z), the worst case was found when positioned on **X-plane.**

2.7. Channel List

Band	Mode	Channel	Frequency (MHz)
U-NII-1	IEEE 802.11a & n HT20 & ac VHT20	36	5180
		40	5200
		44	5220
		48	5240
	IEEE 802.11n HT40 & ac VHT40	38	5190
		46	5230
	IEEE 802.11ac VHT80	42	5210
U-NII-2A	IEEE 802.11a & n HT20 & ac VHT20	52	5260
		56	5280
		60	5300
		64	5320
	IEEE 802.11n HT40 & ac VHT40	54	5270
		62	5310
	IEEE 802.11ac VHT80	58	5290
U-NII-2C	IEEE 802.11a & n HT20 & ac VHT20	100	5500
		104	5520
		108	5540
		112	5560
		116	5580
		132	5660
		136	5680
		140	5700
	IEEE 802.11n HT40 & ac VHT40	102	5510
		110	5550
		134	5670
	IEEE 802.11ac VHT80	106	5530
U-NII-3	IEEE 802.11a & n HT20 & ac VHT20	149	5745
		153	5765
		157	5785
		161	5805
		165	5825
	IEEE 802.11n HT40 & ac VHT40	151	5755
		159	5795
	IEEE 802.11ac VHT80	155	5775

2.8. Power Setting of Test Software

Software Name	CMD		
U-NII-1			
Frequency(MHz)	5180	5200	5240
IEEE 802.11a Setting	50	50	50
IEEE 802.11n HT20 Setting	30	30	30
IEEE 802.11ac VHT20 Setting	30	30	30
Frequency(MHz)	5190	5230	
IEEE 802.11n HT40 Setting	40	40	
IEEE 802.11ac VHT40 Setting	40	40	
Frequency(MHz)	5210		
IEEE 802.11ac VHT80 Setting	40		
U-NII-2A			
Frequency(MHz)	5260	5300	5320
IEEE 802.11a Setting	50	50	50
IEEE 802.11n HT20 Setting	50	50	50
IEEE 802.11ac VHT20 Setting	50	50	50
Frequency(MHz)	5270	5310	
IEEE 802.11n HT40 Setting	55	55	
IEEE 802.11ac VHT40 Setting	55	55	
Frequency(MHz)	5290		
IEEE 802.11ac VHT80 Setting	60		
U-NII-2C			
Frequency(MHz)	5500	5580	5700
IEEE 802.11a Setting	50	50	50
IEEE 802.11n HT20 Setting	50	50	50
IEEE 802.11ac VHT20 Setting	50	50	50
Frequency(MHz)	5510	5670	
IEEE 802.11n HT40 Setting	55	55	
IEEE 802.11ac VHT40 Setting	55	55	
Frequency(MHz)	5530		
IEEE 802.11ac VHT80 Setting	60		
U-NII-3			
Frequency(MHz)	5745	5785	5825
IEEE 802.11a Setting	50	50	50
IEEE 802.11n HT20 Setting	50	50	50
IEEE 802.11ac VHT20 Setting	50	50	50
Frequency(MHz)	5755	5795	
IEEE 802.11n HT40 Setting	55	55	
IEEE 802.11ac VHT40 Setting	55	55	
Frequency(MHz)	5775		
IEEE 802.11ac VHT80 Setting	60		

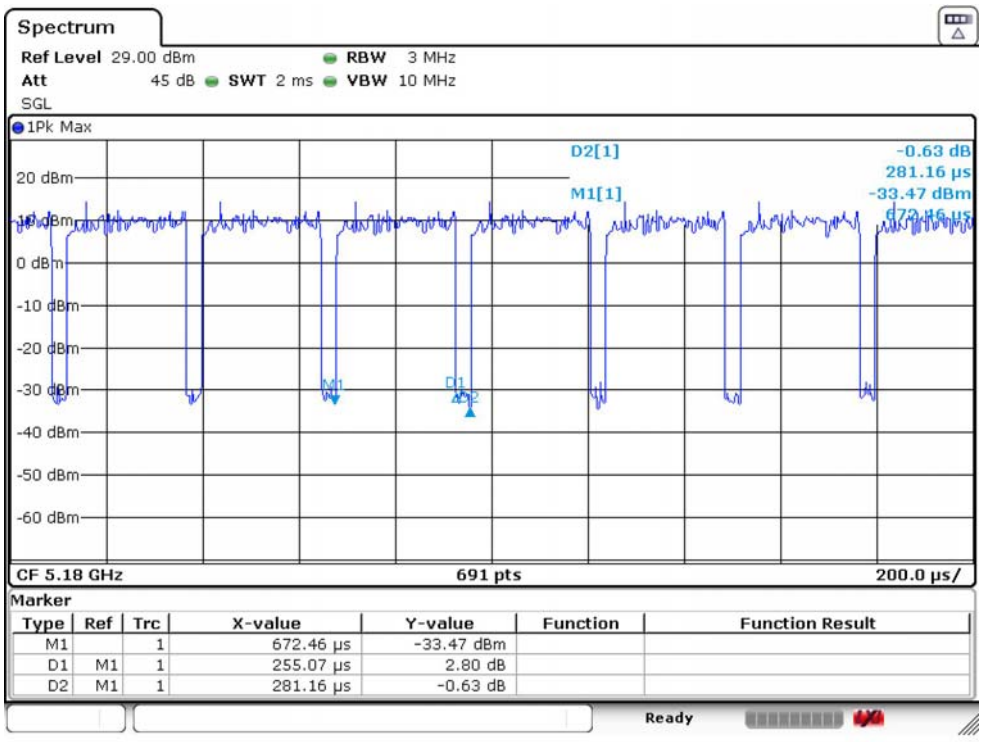
2.9. Duty Cycle of Test Signal

Temperature	27.5℃	Relative Humidity		43%	Test Voltage		120V/60Hz
Mode	Frequency (MHz)	On time (ms)	Total Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T (Hz)	VBW Setting (Hz)
IEEE 802.11a	5180	0.25507	0.28116	90.72	0.42	3920	3920
IEEE 802.11n HT20	5180	0.23188	0.25942	89.38	0.49	4313	4313
IEEE 802.11ac VHT20	5180	0.20580	0.23333	88.20	0.55	4859	4859
IEEE 802.11n HT40	5190	0.13333	0.16087	82.88	0.82	7500	7500
IEEE 802.11ac VHT40	5190	0.09565	0.13333	71.74	1.44	10455	10455
IEEE 802.11ac VHT80	5210	0.06812	0.10435	65.28	1.85	14680	14680

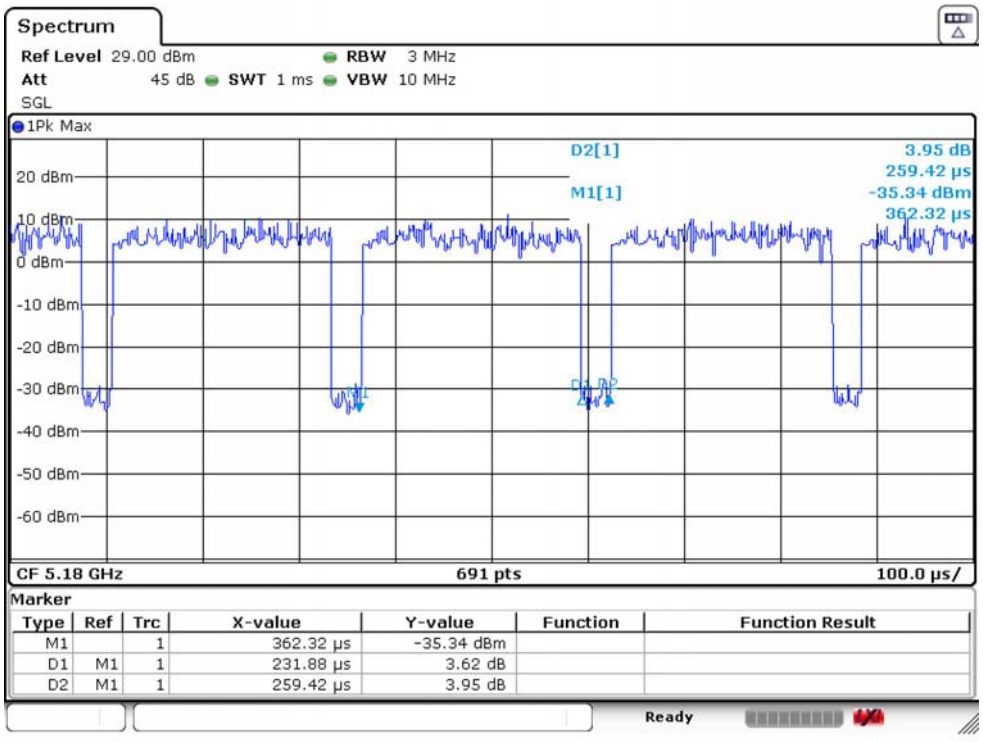
Note:

1. Duty Cycle=On Time/Total Time×100%.
2. Duty Factor=10×Log(1/Duty Cycle).
3. If duty cycle <98 %, the conducted average output power and average power spectral density should be add duty factor.
4. If duty cycle≥98 %,the EUT is consider to be transmitting continuously,the conducted average output power and average power spectral density no need to add duty factor.
5. The on-time time is transmission duration(T).
6. The VBW Setting is use for RMS measurement in unwanted emissions and band edge(Above 1GHz) test.

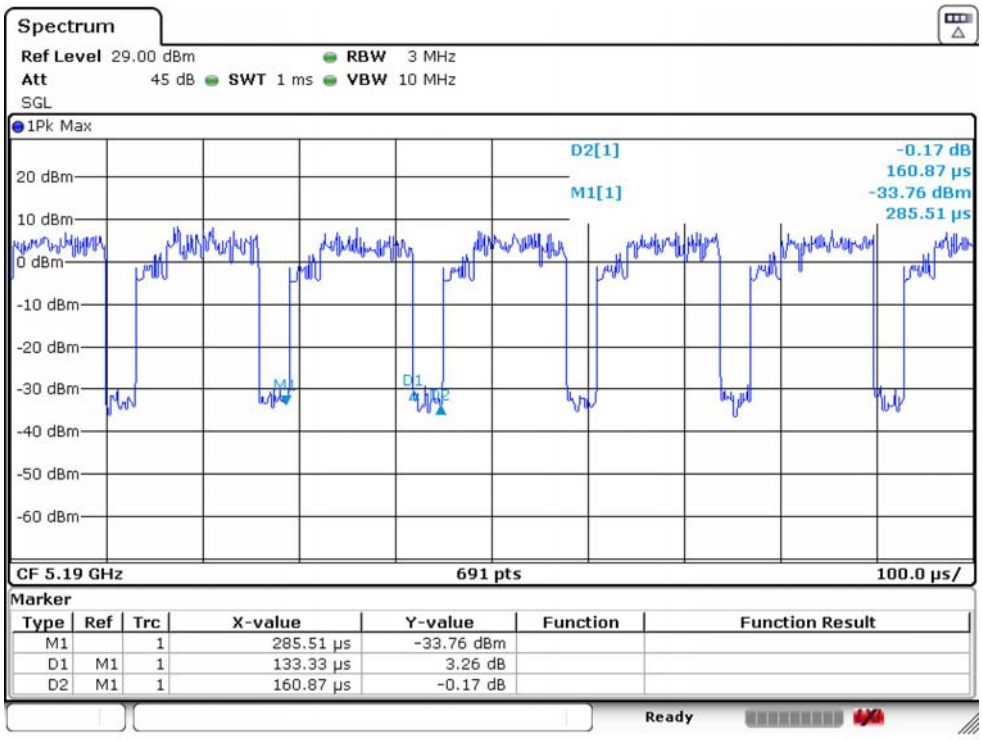
IEEE 802.11a 5180MHz



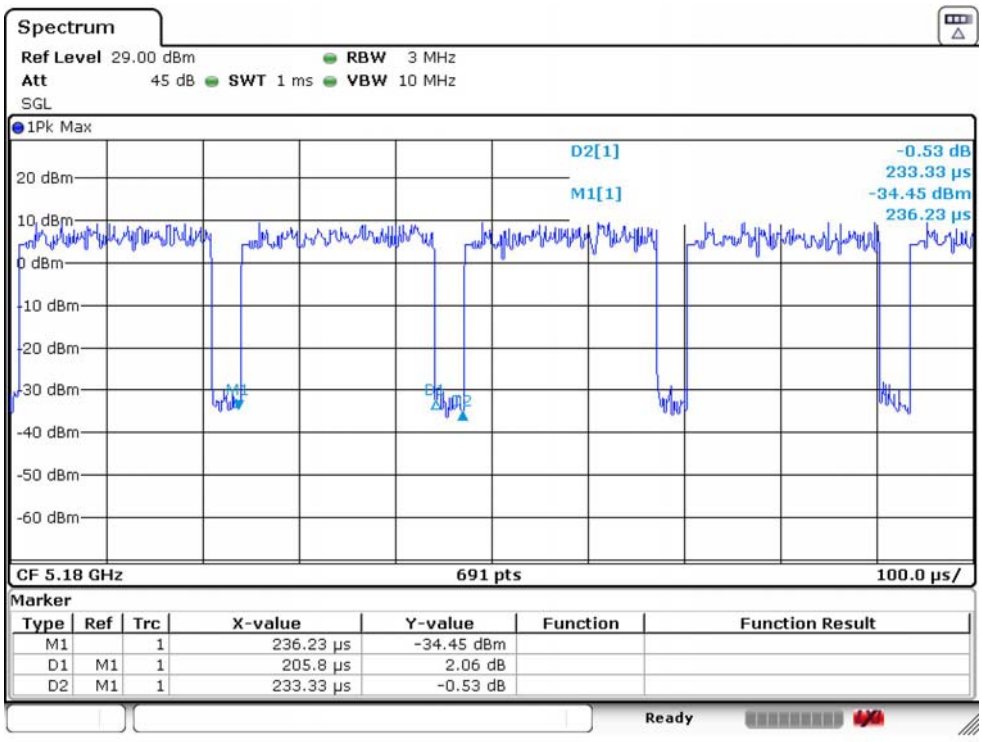
IEEE 802.11n HT20 5180MHz



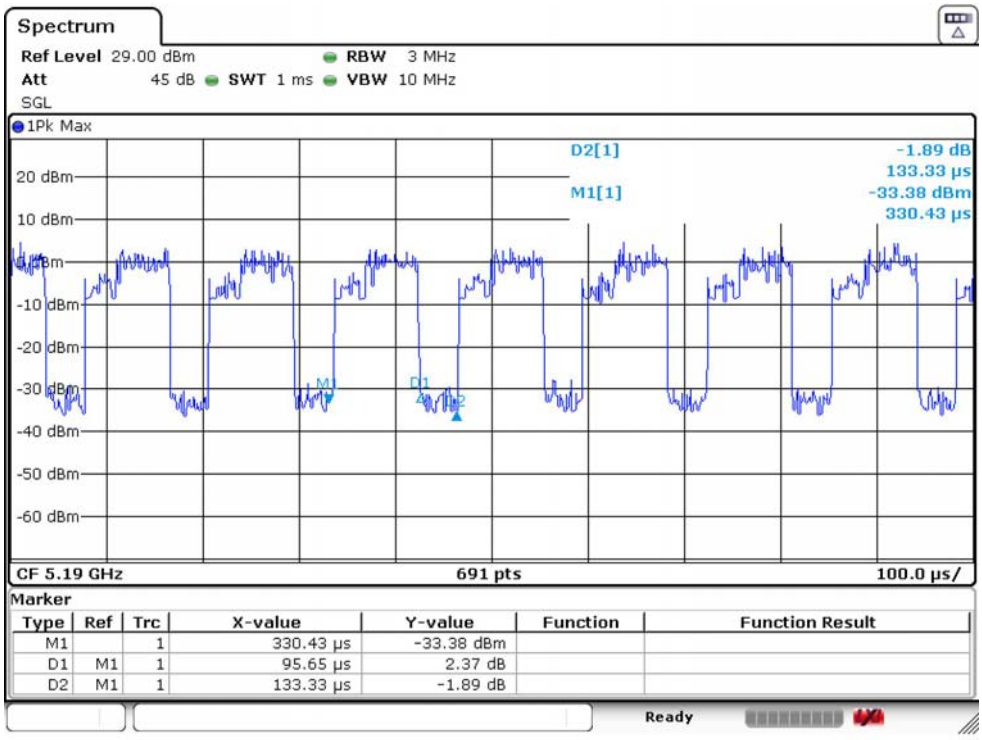
IEEE 802.11n HT40 5190MHz



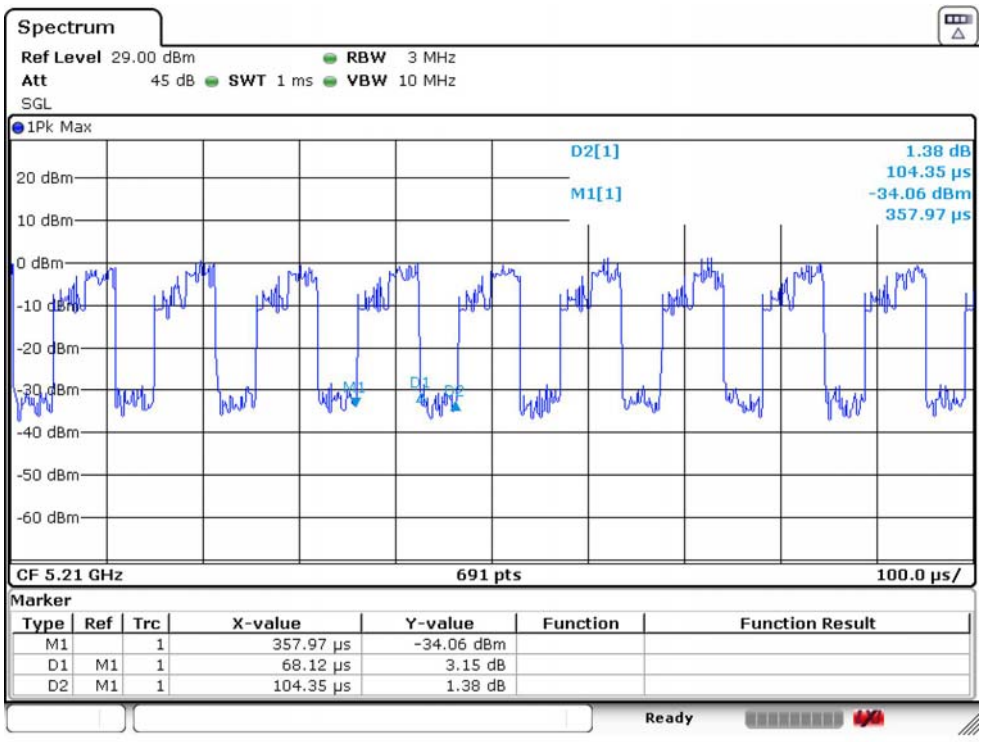
IEEE 802.11ac VHT20 5180MHz



IEEE 802.11ac VHT40 5190MHz



IEEE 802.11ac VHT80 5210MHz



2.10. Test Equipment List

For AC power conducted emissions test						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESHS30	EST-E001	LISAI	June 13,20	1 Year
Artificial Mains Network	Rohde & Schwarz	ENV216	EST-E002	LISAI	June 13,20	1 Year
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	EST-E078	LISAI	June 13,20	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A

For radiated emissions test(9KHz-30MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	LISAI	June 13,20	1 Year
Active Loop Antenna	SCHWAREBECK	FMZB 1519B	EST-E054	LISAI	June 13,20	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
9kHz-30MHz Cable	N/A	EST-001	N/A	N/A	N/A	N/A

For radiated emissions test(30MHz-1000MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	LISAI	June 13,20	1 Year
Bilog Antenna	Teseq	CBL 6111D	EST-E034	LISAI	June 13,20	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
30-1000MHz Cable	N/A	EST-002	N/A	N/A	N/A	N/A

For radiated emissions test(Above 1000MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
Horn Antenna	SCHWARZBECK	BBHA 9120 D	EST-E031	LISAI	June 13,20	1 Year
Signal Amplifier	SCHWARZBECK	BBV9718	EST-E032	LISAI	June 13,20	1 Year
Spectrum Analyzer	Rohde &Schwarz	FSV40	EST-E069	LISAI	June 13,20	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
Above 1GHz Cable	N/A	EST-003	N/A	N/A	N/A	N/A

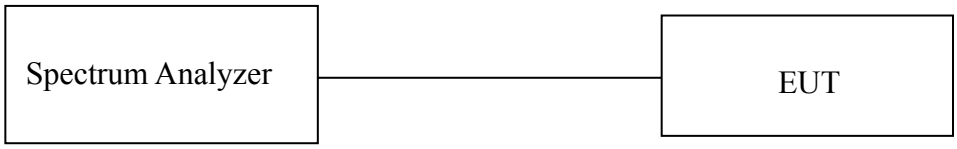
For connect EUT antenna terminal test						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
TS 8997	Rohde &Schwarz	/	/	/	/	/
Open Switch and Control Unit	Rohde &Schwarz	OSP-B157WB	EST-E036	LISAI	June 13,20	1Year
Signal and Spectrum Analyzer	Rohde &Schwarz	FSV	EST-E037	LISAI	June 13,20	1 Year
Signal Generator	Rohde &Schwarz	SMB100A	EST-E038	LISAI	June 13,20	1 Year
Vector Signal Generator	Rohde &Schwarz	SMBV100A	EST-E039	LISAI	June 13,20	1Year
Test Software	Rohde &Schwarz	WMS32	V10.50.00	N/A	N/A	N/A
Temperature controller	Terchy	MHQ	EST-E101	LISAI	June 13,20	1 Year

3. 6DB BANDWIDTH &26DB BANDWIDTH & 99% OCCUPIED BANDWIDTH

3.1. Limit

Band	Frequency (MHz)	Test Item	Limit
U-NII-1	5150-5250	26dB Bandwidth&99% Occupied Bandwidth	N/A
U-NII-2A	5250-5350	26dB Bandwidth&99% Occupied Bandwidth	N/A
U-NII-2C	5470-5600 & 5650-5725	26dB Bandwidth&99% Occupied Bandwidth	N/A
U-NII-3	5725-5850	6dB Bandwidth&99% Occupied Bandwidth	6dB Bandwidth≥500KHz

3.2. Test Setup



3.3. Spectrum Analyzer Setting

6dB Bandwidth	
Spectrum Parameters	Setting
RBW	100KHz
VBW	300KHz
Span	40MHz(20MHz Bandwidth mode) 60MHz(40MHz Bandwidth mode) 120MHz(80MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

26dB Bandwidth	
Spectrum Parameters	Setting
RBW	approximately 1% of the emission bandwidth
VBW	＞RBW
Span	40MHz(20MHz Bandwidth mode) 60MHz(40MHz Bandwidth mode) 120MHz(80MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

99% Occupied Bandwidth	
Spectrum Parameters	Setting
RBW	1% to 5% of the OBW
VBW	approximately three times the RBW
Span	between 1.5 times and 5.0 times the OBW
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

3.4. Test Procedure

For 26dB Bandwidth Measurement :

a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
b. Spectrum analyzer setting parameters in accordance with section 3.3.
c. Set the EUT transmit continuously with maximum output power.
d. Allow trace to stabilize, measure the maximum width of the emission that is 26 dB down from the peak of the emission.Compare this with the RBW setting of the instrument. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
e. Repeat above procedures until all modes and channels were measured.
f. Record the results in the test report.

For 6dB Bandwidth Measurement :

a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
b. Spectrum analyzer setting parameters in accordance with section 3.3.
c. Set the EUT transmit continuously with maximum output power.
d. Allow trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
e. Repeat above procedures until all modes and channels were measured.
f. Record the results in the test report.

For 99% Occupied Bandwidth Measurement :

a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
b. Spectrum analyzer setting parameters in accordance with section 3.3.
c. Set the EUT transmit continuously with maximum output power.
d. Allow trace to stabilize, use the 99% power bandwidth function to measure bandwidth.
e. Repeat above procedures until all modes and channels were measured.
f. Record the results in the test report.

3.5. Test Result

Temperature	27.5℃	Relative Humidity		43%		Test Voltage	120V/60 Hz
26dB Bandwidth&99% Occupied Bandwidth							
AND	Test Mode	Fre (MHz)	26dB Bandwidth (MHz)		99% Occupied Bandwidth（MHz）		Calculate Power Limit (W)	Calculate Power Limit (dBm)
			Ant 1	Ant 2	Ant 1	Ant 2		
U-NII-1	IEEE 802.11a	5180	21.766	/	16.787	/		
		5200	21.360	/	16.787	/		
		5240	21.534	/	16.787	/		
	IEEE 802.11n HT20	5180	21.823	21.708	18.003	18.061		
		5200	21.766	21.823	18.061	18.061		
		5240	21.823	21.650	18.003	18.061		
	IEEE 802.11ac VHT20	5180	21.766	21.881	17.945	18.003		
		5200	21.650	21.823	17.945	18.003		
		5240	21.592	21.592	17.945	18.003		
	IEEE 802.11n HT40	5190	40.203	40.116	36.816	36.932		
		5230	40.203	40.116	36.932	36.932		
	IEEE 802.11ac VHT40	5190	40.637	40.116	37.048	37.048		
		5230	40.897	39.942	37.048	36.932		
	IEEE 802.11ac VHT80	5210	82.140	87.000	75.890	75.890		
U-NII-2A	IEEE 802.11a	5260	21.418	/	16.729	/	0.2500	23.98
		5300	21.302	/	16.729	/	0.2500	23.98
		5320	21.360	/	16.729	/	0.2500	23.98
	IEEE 802.11n HT20	5260	21.650	21.765	18.003	18.061	0.2500	23.98
		5300	21.650	21.766	18.061	18.061	0.2500	23.98
		5320	21.592	21.708	18.003	18.003	0.2500	23.98
	IEEE 802.11ac VHT20	5260	21.592	21.708	18.003	18.003	0.2500	23.98
		5300	21.534	21.881	17.945	17.945	0.2500	23.98
		5320	21.766	21.766	17.945	18.003	0.2500	23.98
	IEEE 802.11n HT40	5270	40.289	40.029	36.816	36.932	0.2500	23.98
		5310	40.463	39.942	36.816	36.932	0.2500	23.98
	IEEE 802.11ac VHT40	5270	40.897	40.116	37.048	36.932	0.2500	23.98
		5310	40.897	40.029	37.048	36.932	0.2500	23.98
	IEEE 802.11ac VHT80	5290	82.320	83.180	76.064	75.716	0.2500	23.98

Temperature	27.5℃	Relative Humidity		43%		Test Voltage	120V/60 Hz
26dB Bandwidth&99% Occupied Bandwidth							
AND	Test Mode	Fre (MHz)	26dB Bandwidth (MHz)		99% Occupied Bandwidth （MHz）		Calculate Power Limit (W)	Calculate Power Limit (dBm)
			Ant 1	Ant 2	Ant 1	Ant 2		
U-NII-2C	IEEE 802.11a	5500	21.418	/	16.729	/	0.2500	23.98
		5580	21.418	/	16.671	/	0.2500	23.98
		5700	21.302	/	16.787	/	0.2500	23.98
	IEEE 802.11n HT20	5500	21.823	21.708	18.003	18.003	0.2500	23.98
		5580	21.476	21.766	17.945	18.119	0.2500	23.98
		5700	21.708	21.650	18.003	18.177	0.2500	23.98
	IEEE 802.11ac VHT20	5500	21.418	21.650	18.003	18.003	0.2500	23.98
		5580	21.650	21.534	18.003	18.119	0.2500	23.98
		5700	21.534	21.592	17.945	18.061	0.2500	23.98
	IEEE 802.11n HT40	5510	40.029	40.116	36.816	36.932	0.2500	23.98
		5670	40.116	40.116	36.816	36.932	0.2500	23.98
	IEEE 802.11ac VHT40	5510	40.289	40.116	37.048	36.932	0.2500	23.98
		5670	40.376	40.203	37.048	36.932	0.2500	23.98
	IEEE 802.11ac VHT80	5530	81.620	82.140	75.890	75.890	0.2500	23.98

Temperature	27.5℃	Relative Humidity		43%		Test Voltage	120V/60Hz
6dB Bandwidth&99% Occupied Bandwidth							
BAND	Test Mode	Fre (MHz)	6dB Bandwidth (MHz)		99% Occupied Bandwidth （MHz）		6dB BW Min Limit (MHz)	Result
			Ant 1	Ant 2	Ant 1	Ant 2		
U-NII-3	IEEE 802.11a	5745	16.412	/	16.729	/	0.5	PASS
		5785	16.420	/	16.787	/	0.5	PASS
		5825	16.408	/	16.787	/	0.5	PASS
	IEEE 802.11n HT20	5745	17.736	17.724	18.061	18.061	0.5	PASS
		5785	17.720	17.740	17.945	18.061	0.5	PASS
		5825	17.728	17.760	18.061	18.061	0.5	PASS
	IEEE 802.11ac VHT20	5745	17.744	17.724	18.003	18.061	0.5	PASS
		5785	17.740	17.740	18.003	18.003	0.5	PASS
		5825	17.728	17.724	18.061	18.061	0.5	PASS
	IEEE 802.11n HT40	5755	36.490	36.480	36.816	36.480	0.5	PASS
		5795	36.480	36.470	36.816	36.470	0.5	PASS
	IEEE 802.11ac VHT40	5755	36.480	36.425	37.048	37.048	0.5	PASS
		5795	36.450	36.455	36.932	36.932	0.5	PASS
	IEEE 802.11ac VHT80	5775	76.400	76.380	75.890	75.890	0.5	PASS

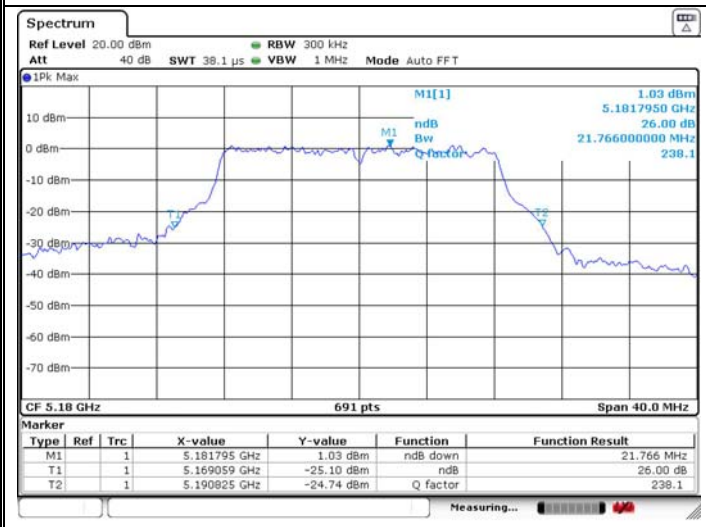
Note :

For Band U-NII-2A and U-NII-2C,the maximum conducted output power limit is 250mw or 11+10×Log B, which is lesser,where B is the 26dB Bandwidth in MHz.So in this section,the maximum conducted output power limit can calculate with 26dB Bandwidth.

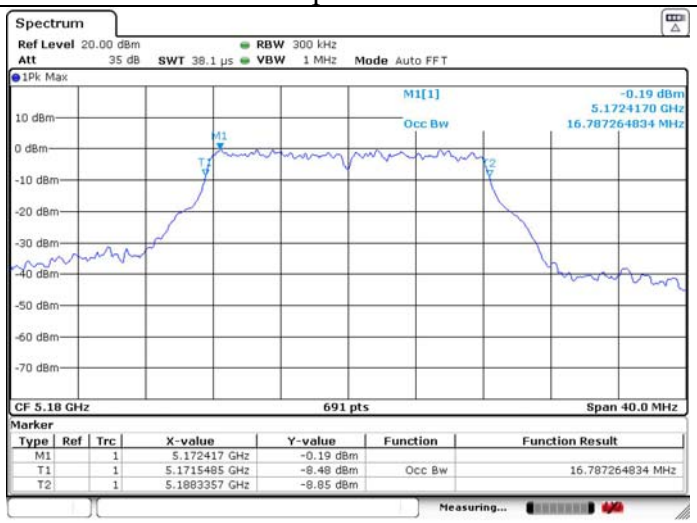
3.6. Test Result

U-NII-1 IEEE 802.11a 5180MHz_Ant 1

26dB Bandwidth

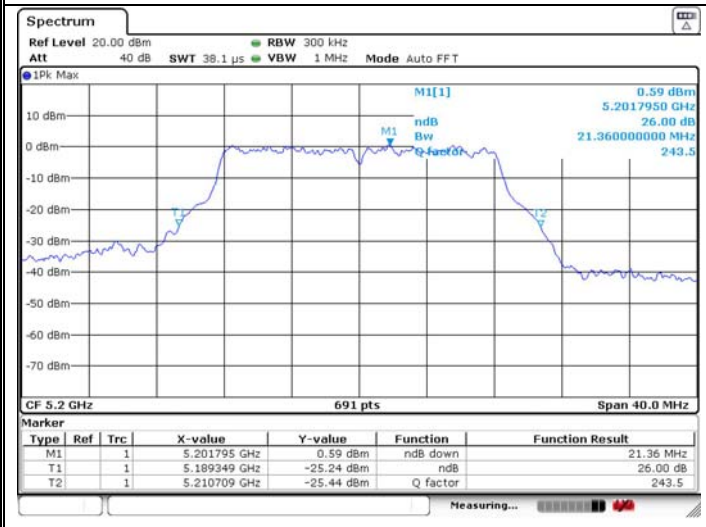


99% Occupied Bandwidth

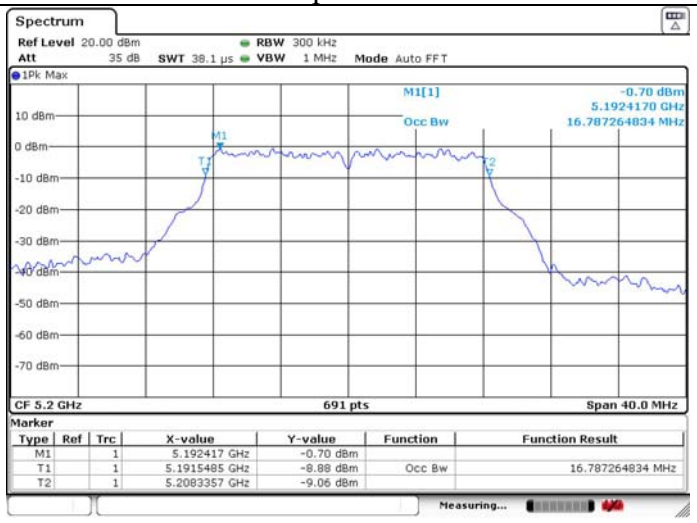


U-NII-1 IEEE 802.11a 5200MHz_Ant 1

26dB Bandwidth

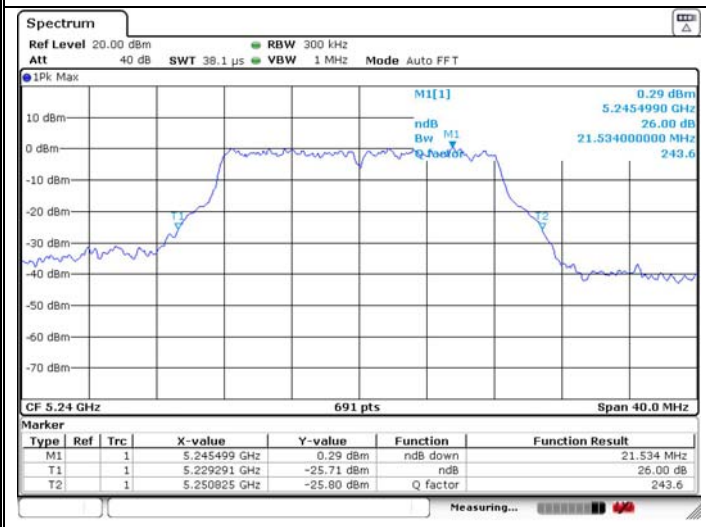


99% Occupied Bandwidth

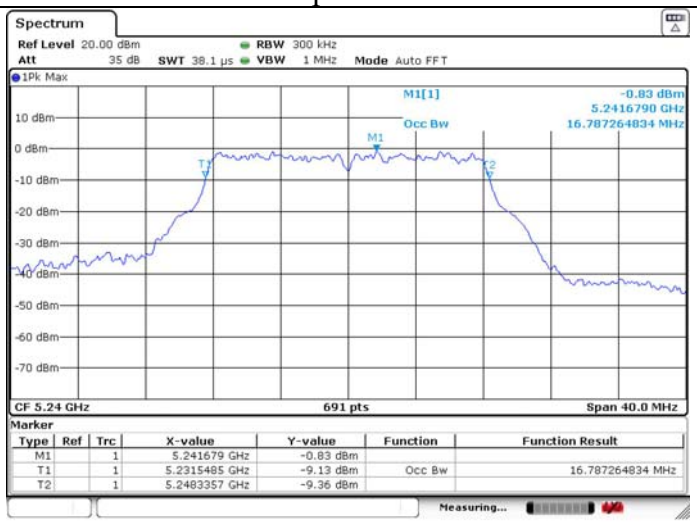


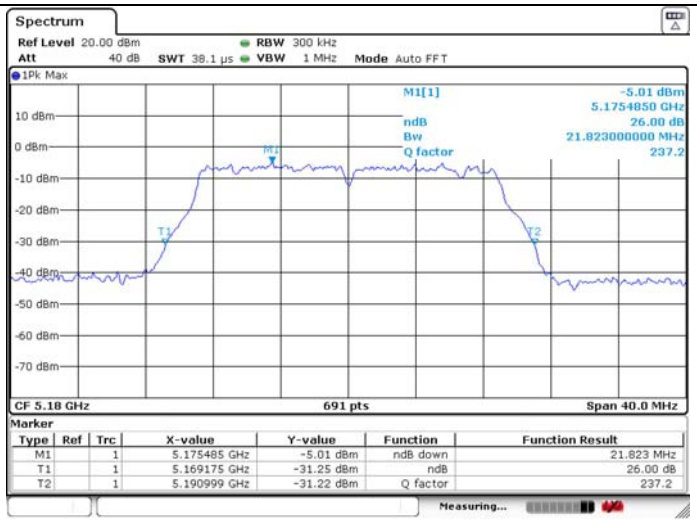
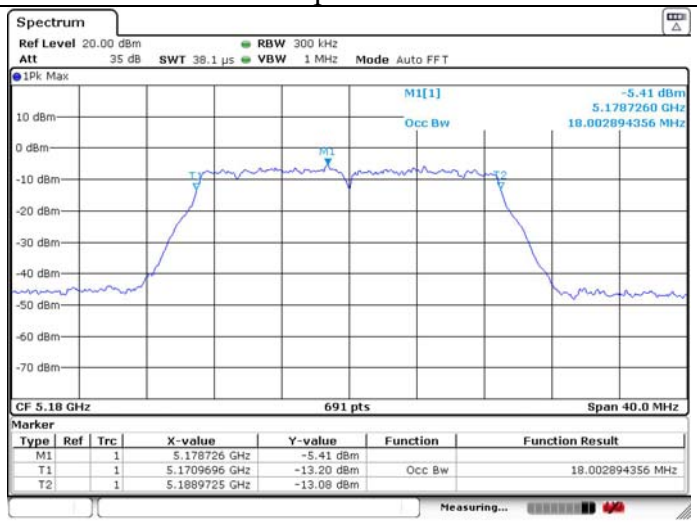
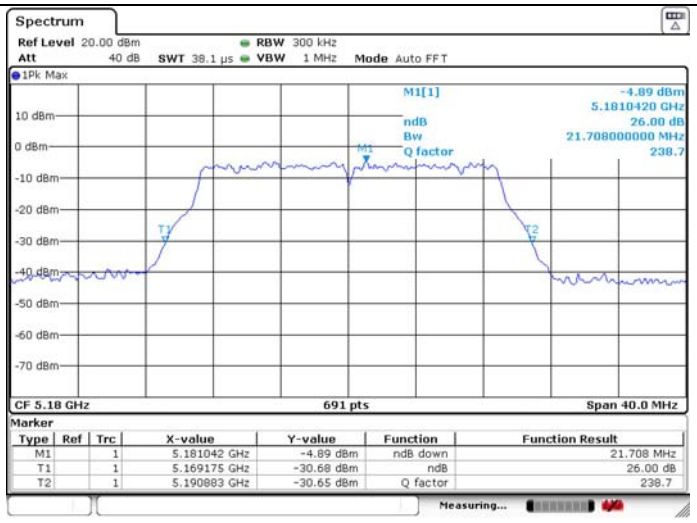
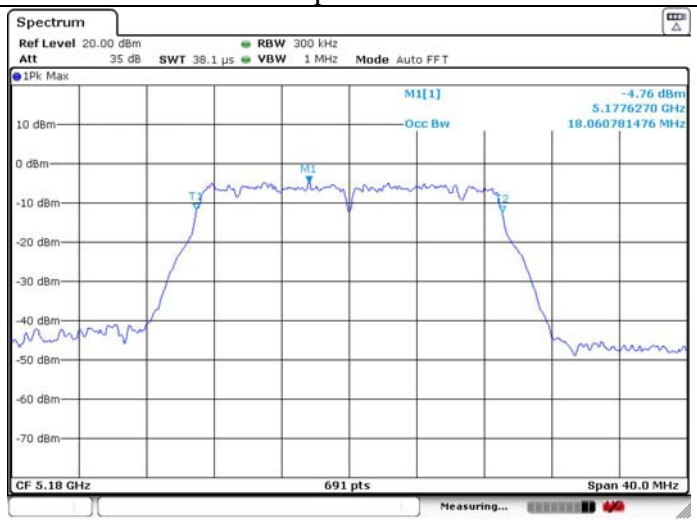
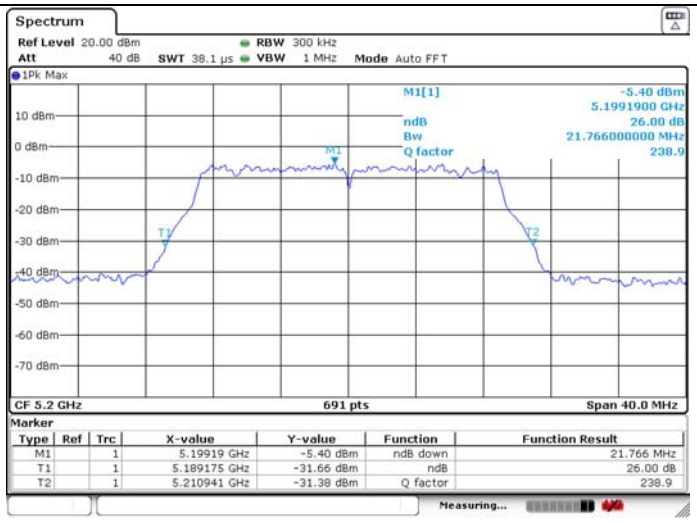
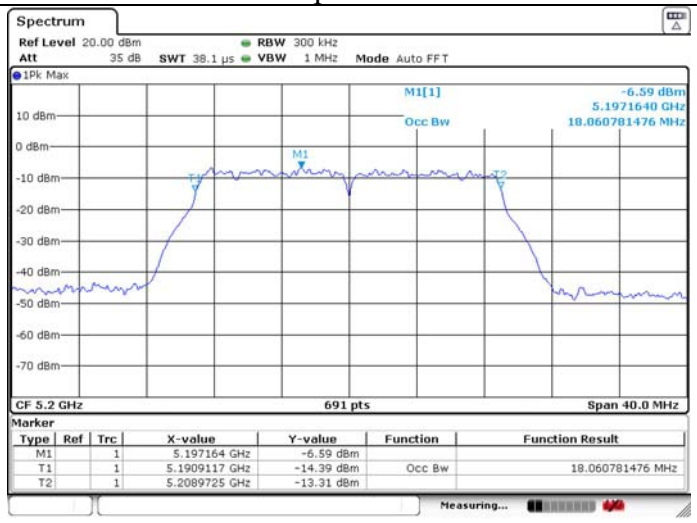
U-NII-1 IEEE 802.11a 5240MHz_Ant 1

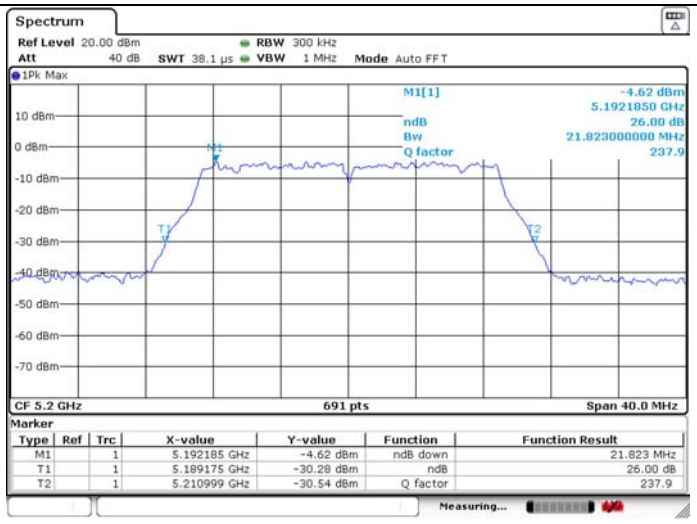
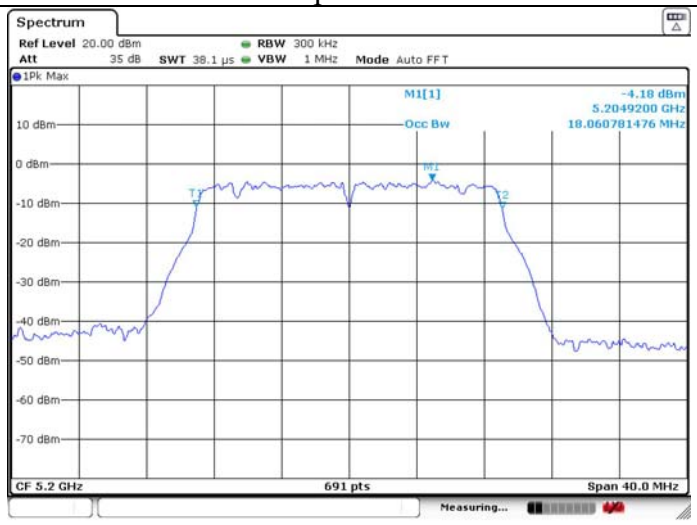
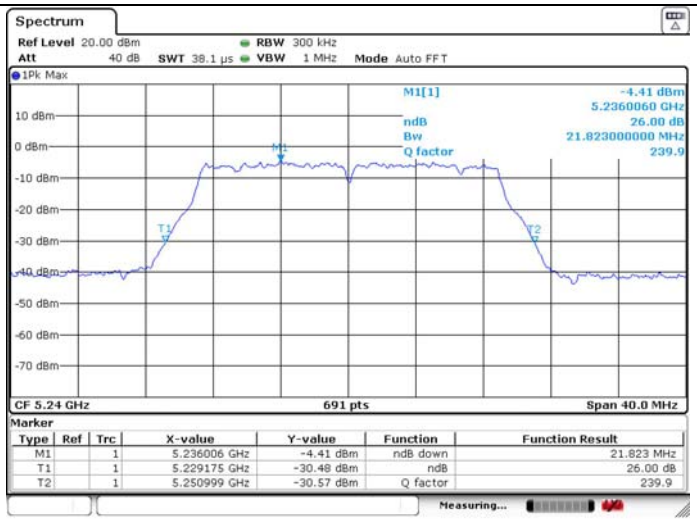
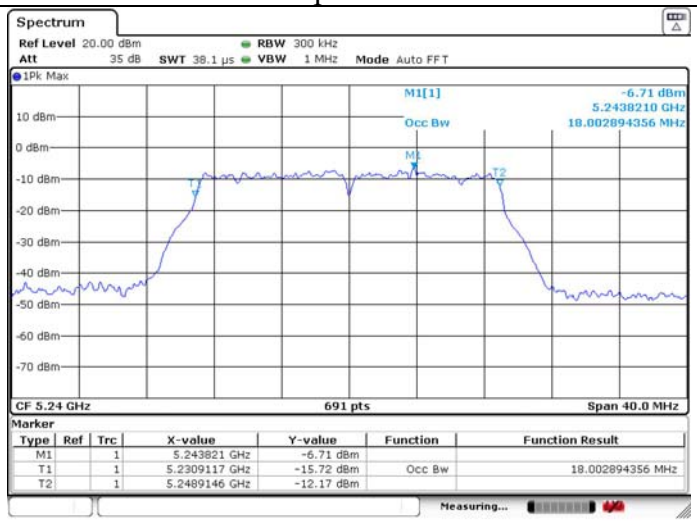
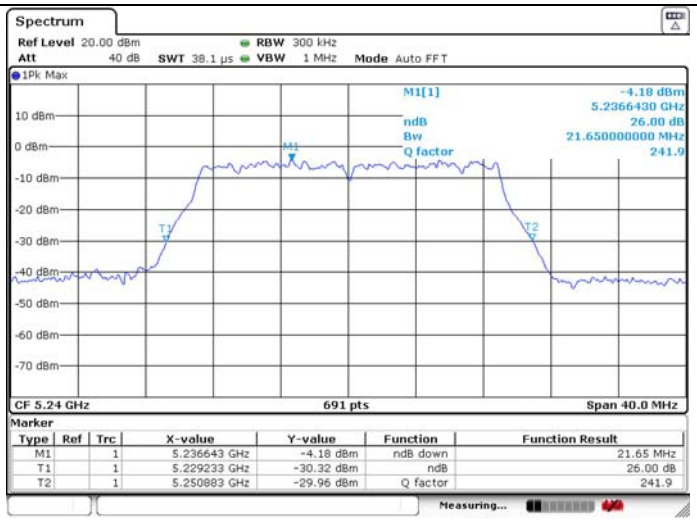
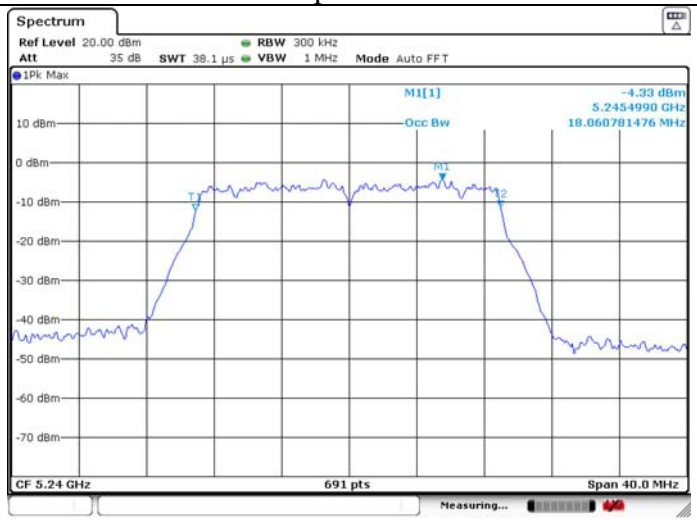
26dB Bandwidth

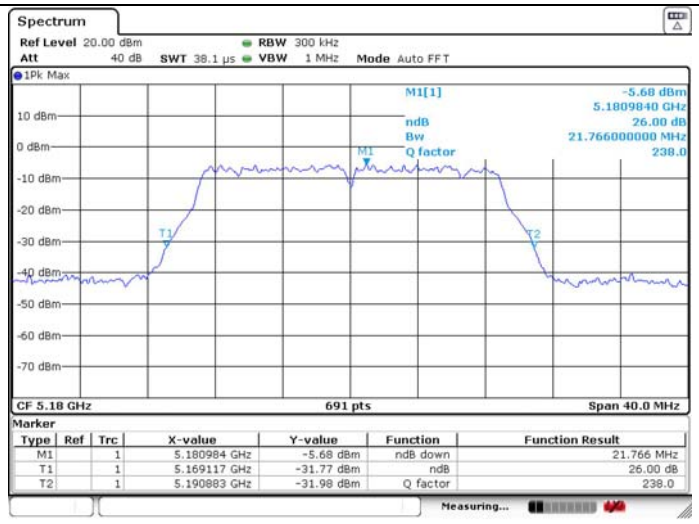
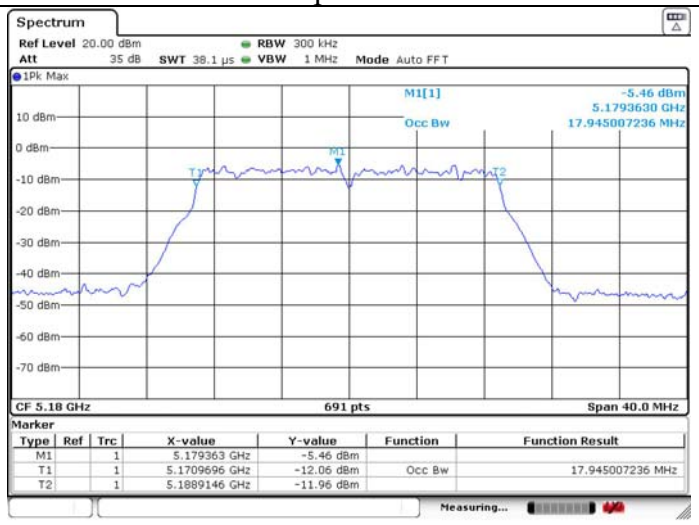


99% Occupied Bandwidth



U-NII-1 IEEE 802.11n HT20 5180MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-1 IEEE 802.11n HT20 5180MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-1 IEEE 802.11n HT20 5200MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	

U-NII-1 IEEE 802.11n HT20 5200MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-1 IEEE 802.11n HT20 5240MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-1 IEEE 802.11n HT20 5240MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth
	

U-NII-1 IEEE 802.11ac VHT20 5180MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	
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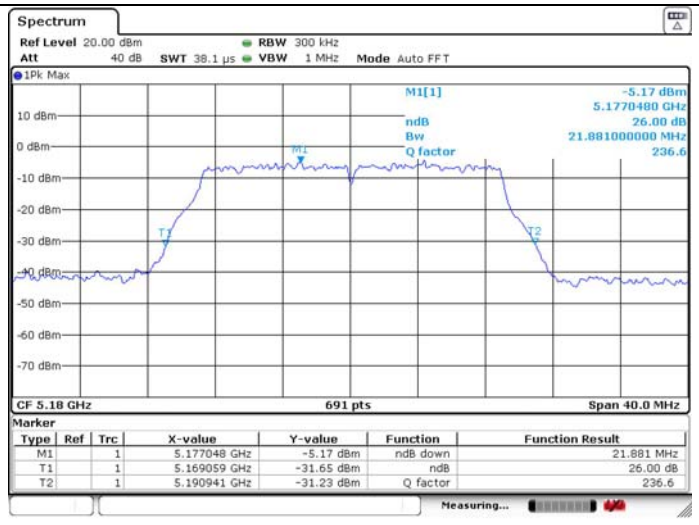
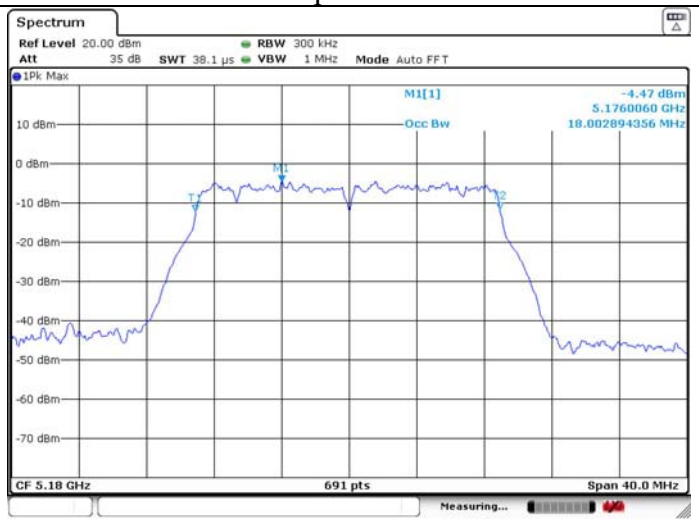
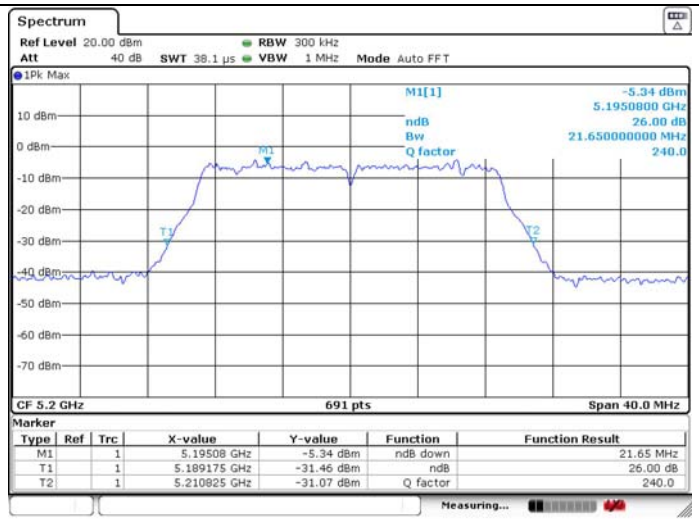
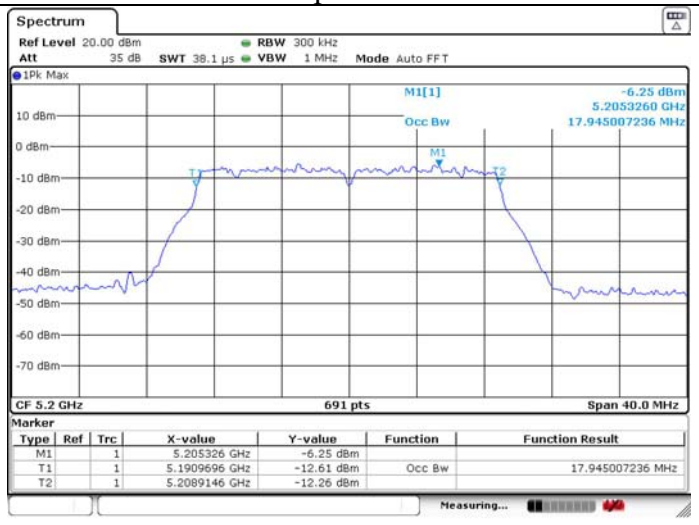
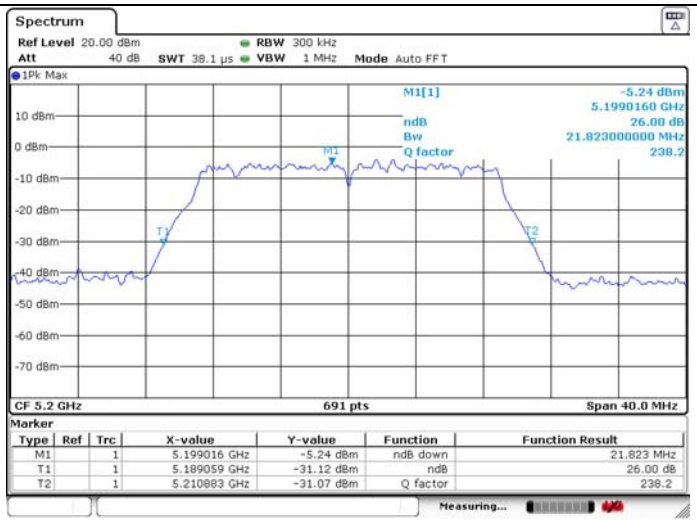
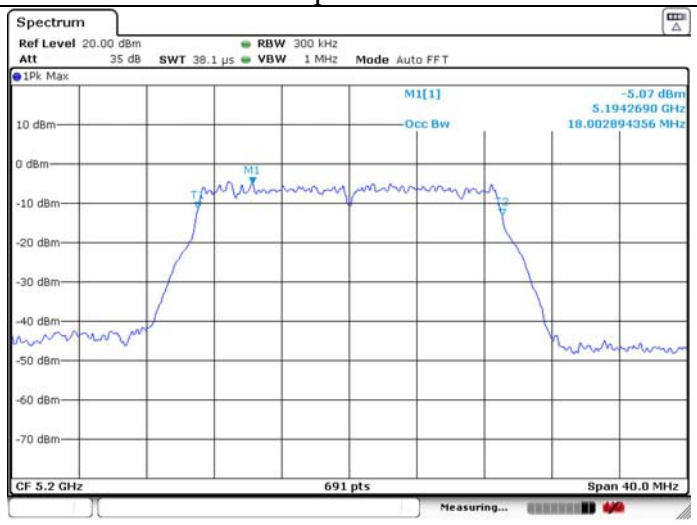
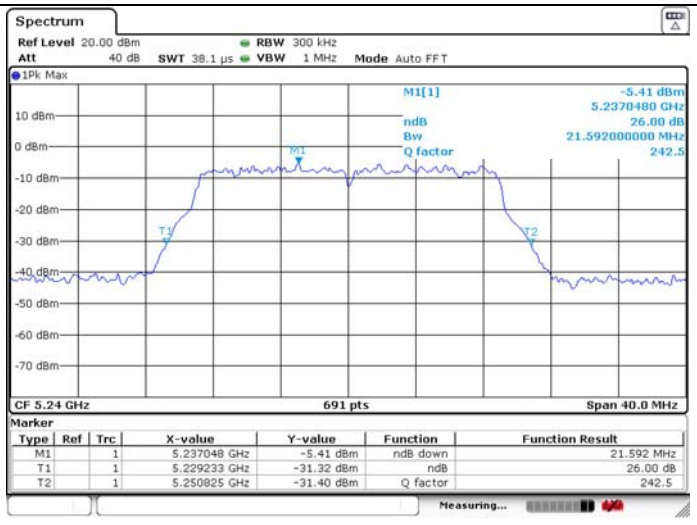
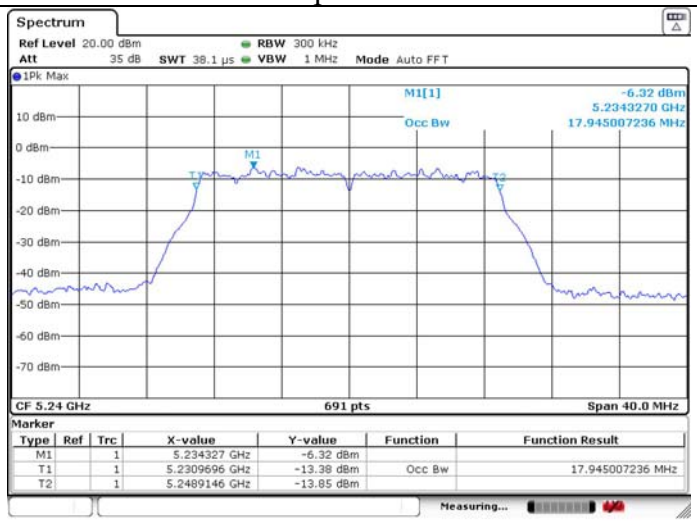
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-1 IEEE 802.11ac VHT20 5200MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	

U-NII-1 IEEE 802.11ac VHT20 5200MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-1 IEEE 802.11ac VHT20 5240MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	
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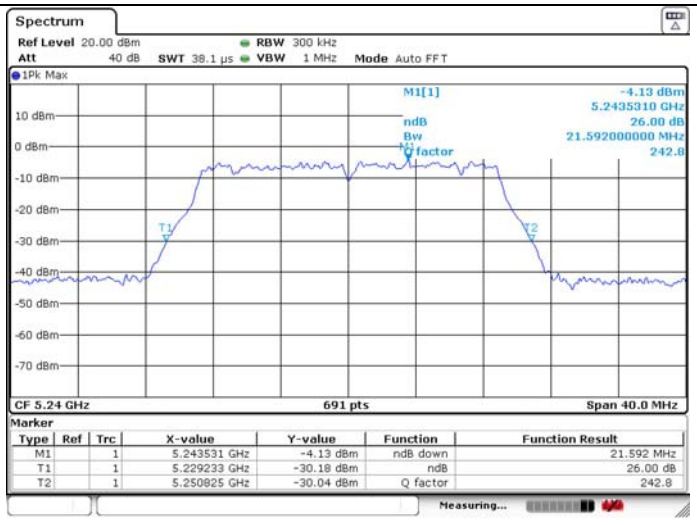
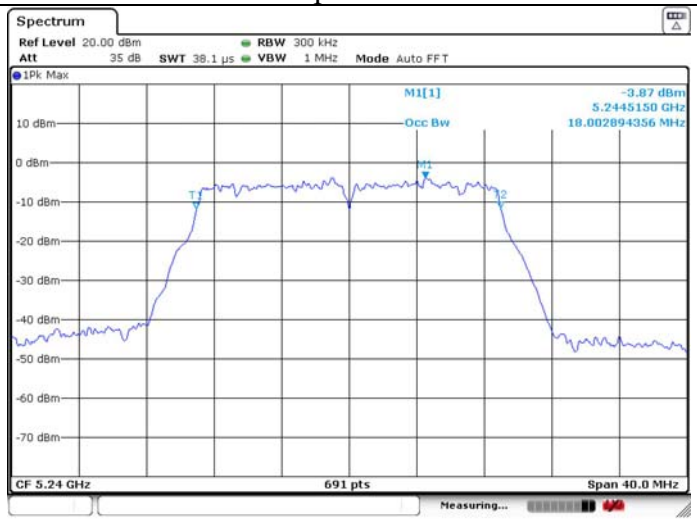
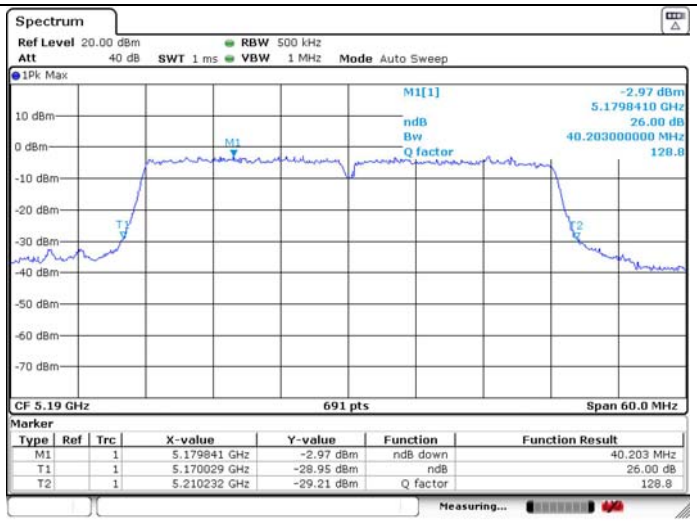
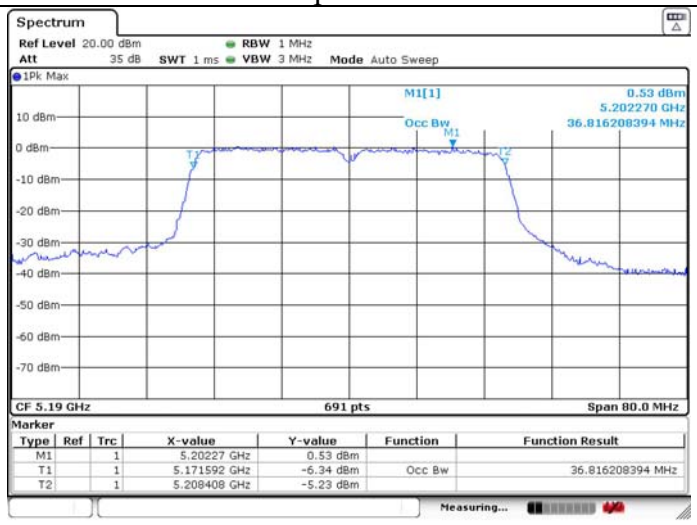
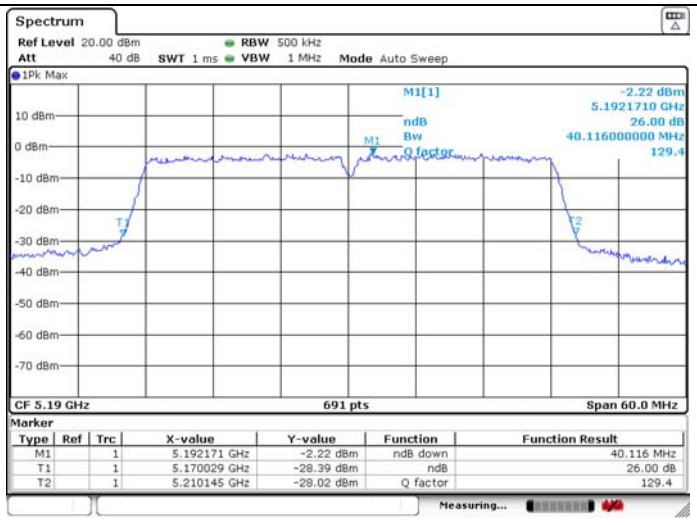
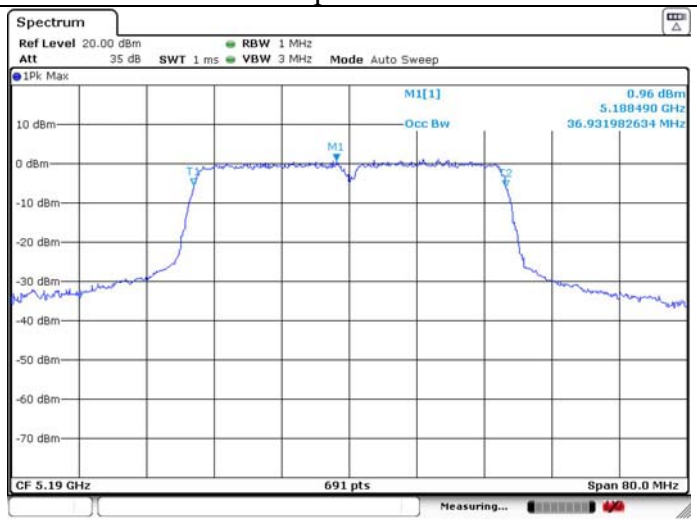
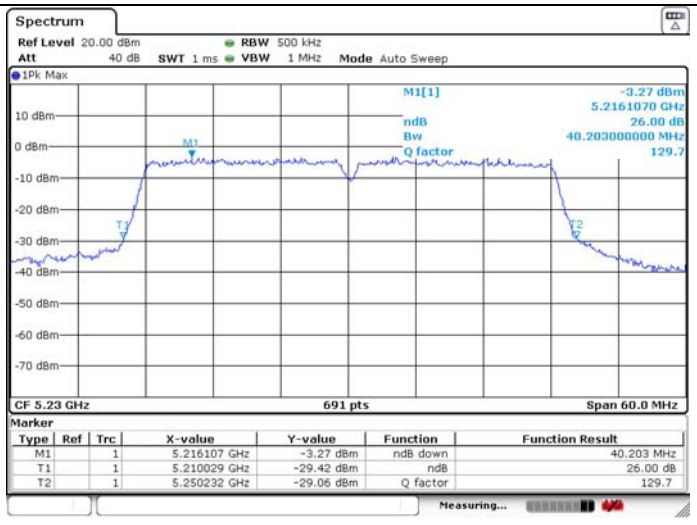
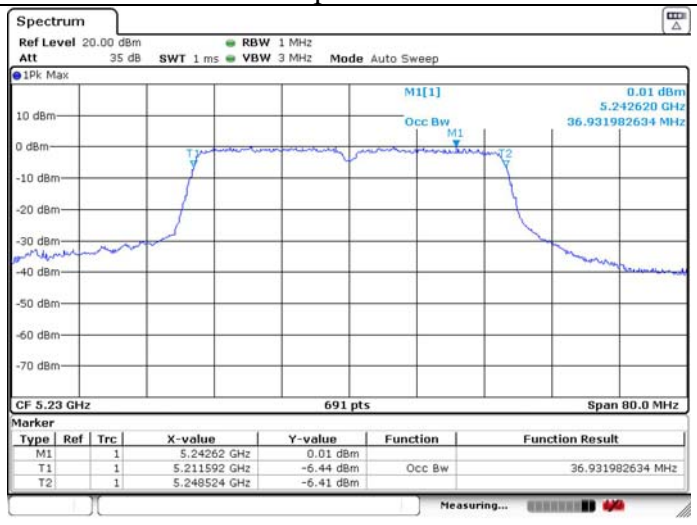
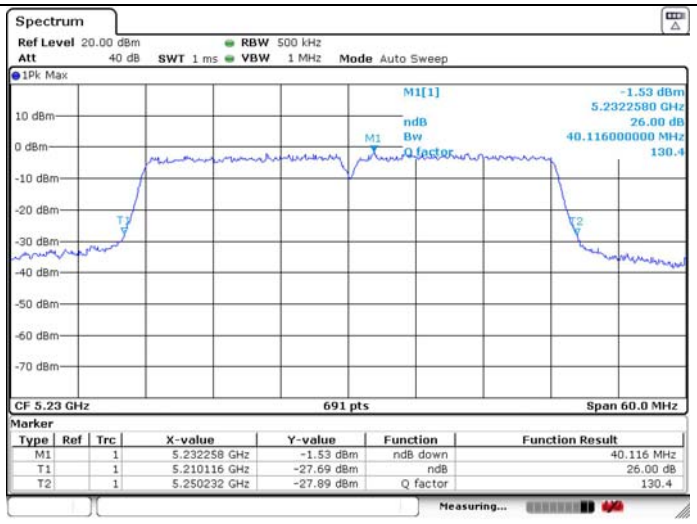
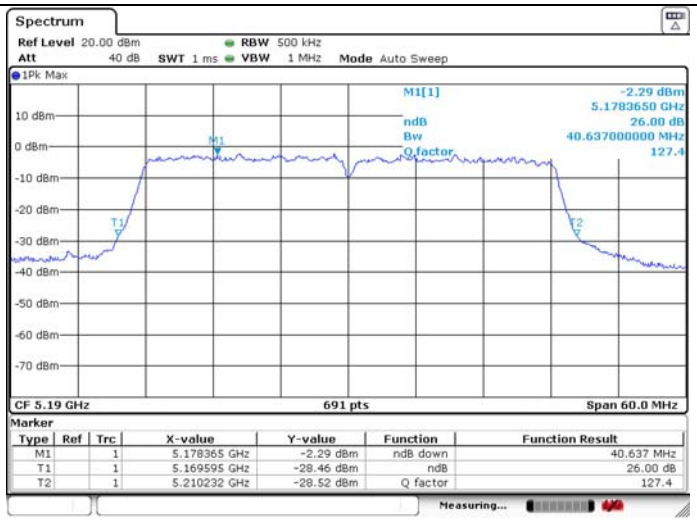
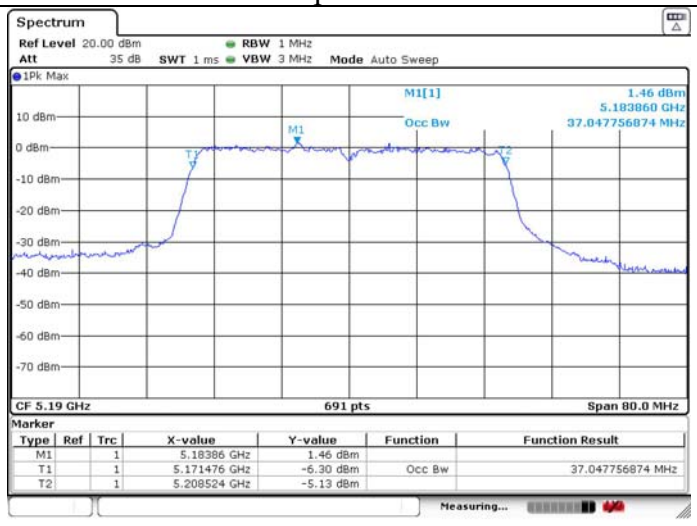
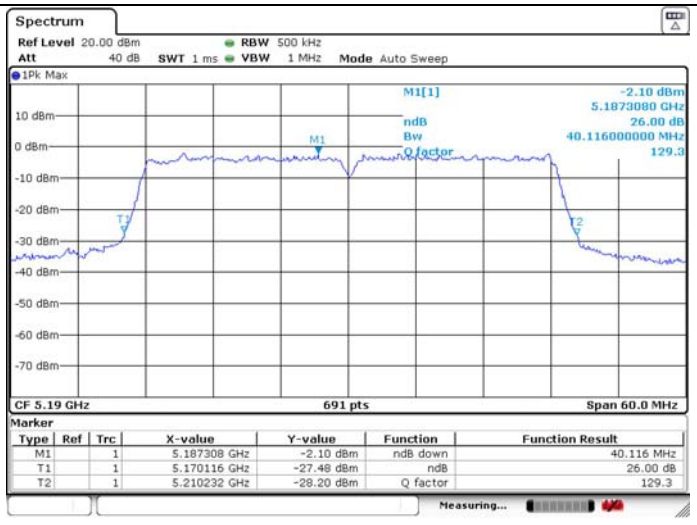
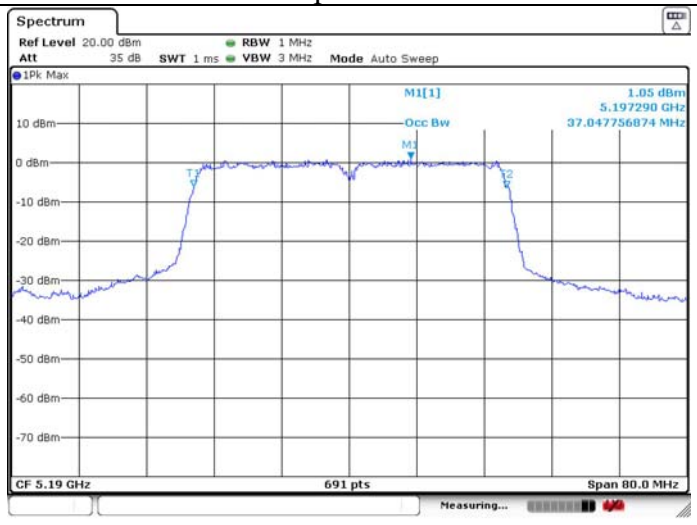
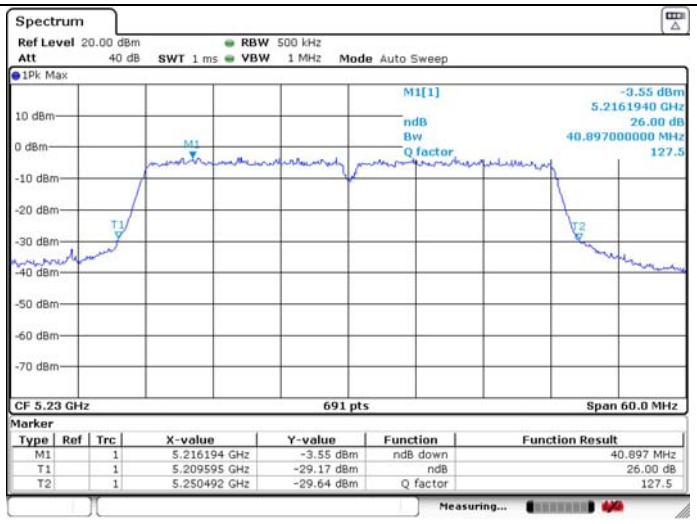
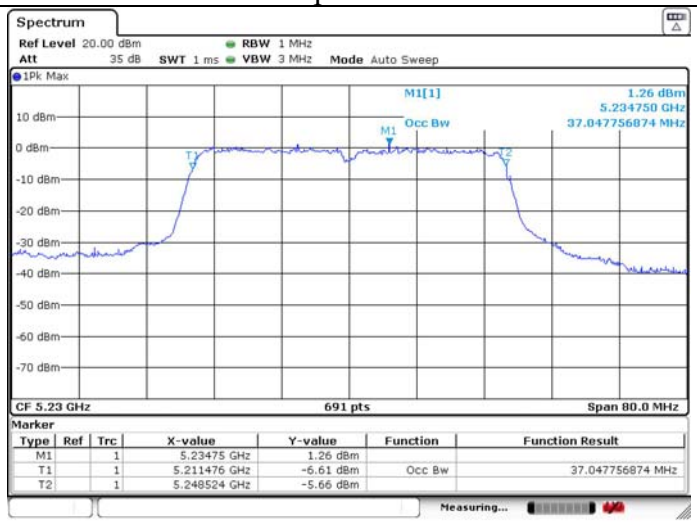
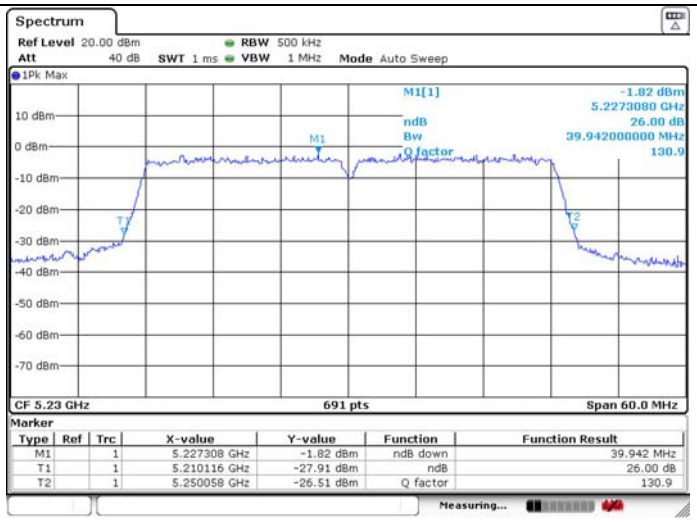
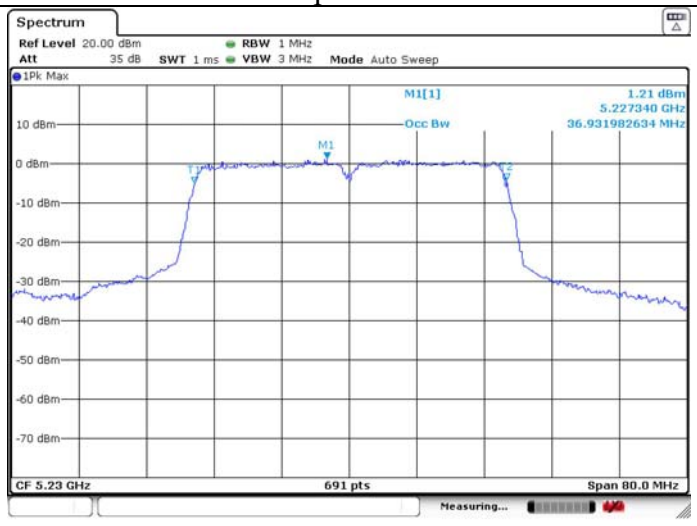
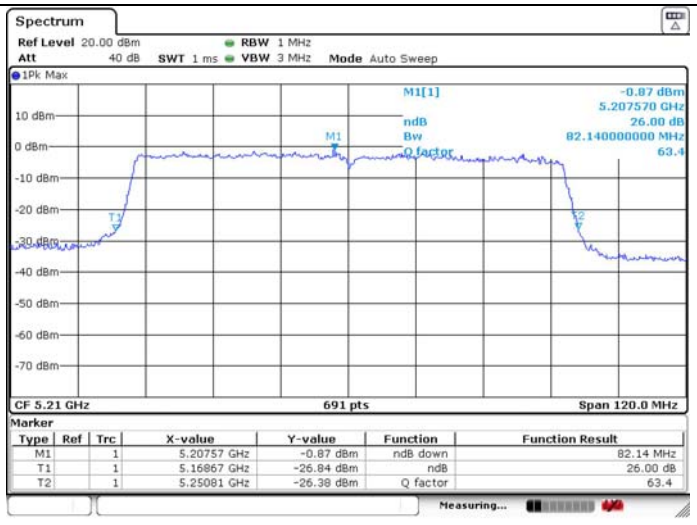
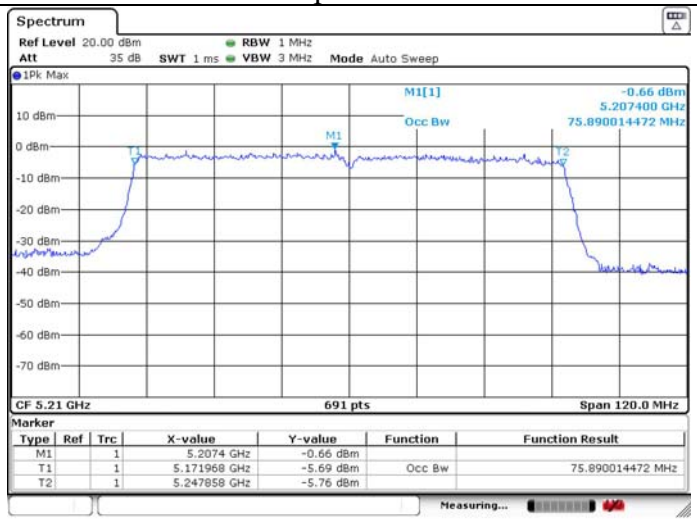
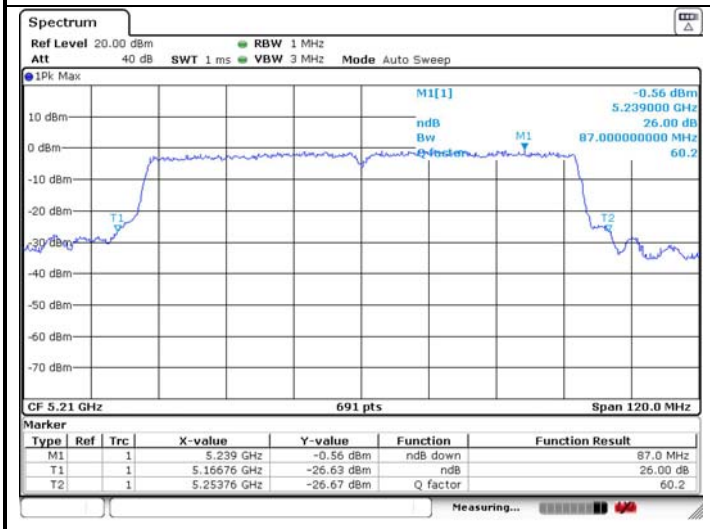
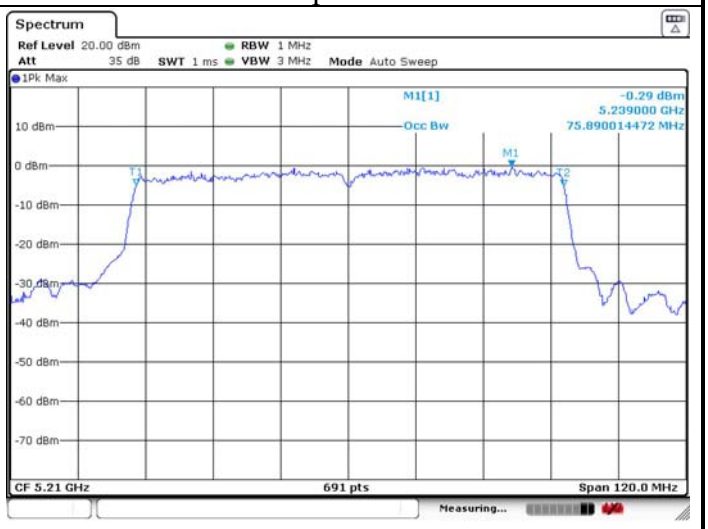
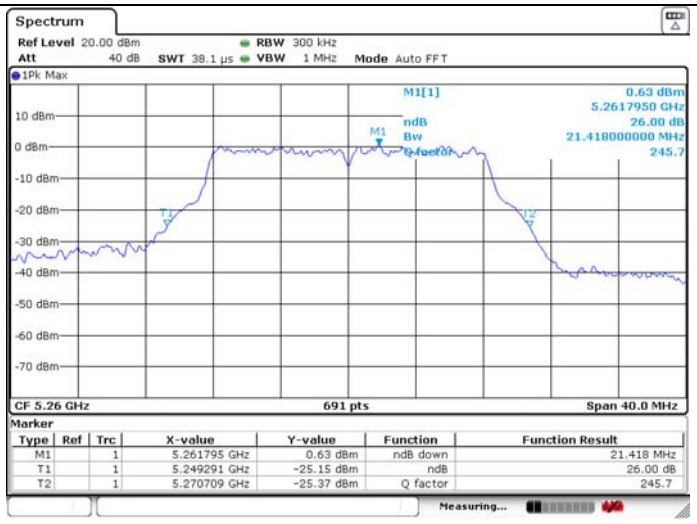
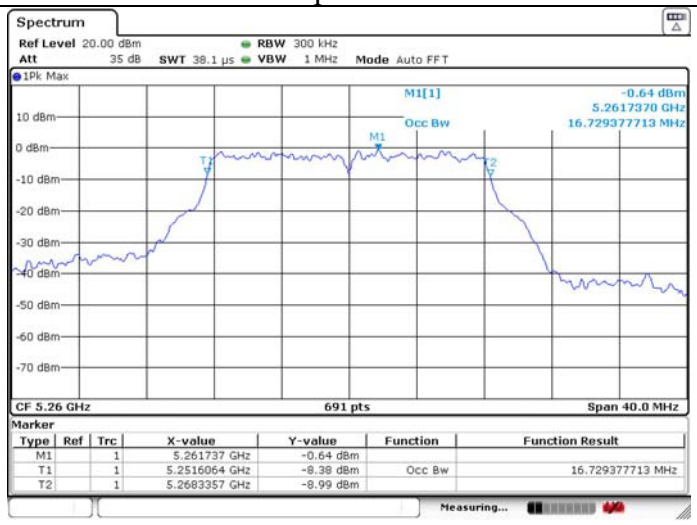
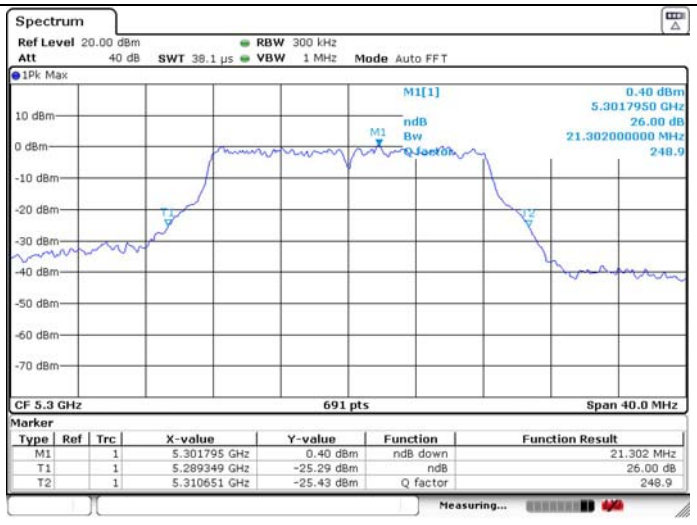
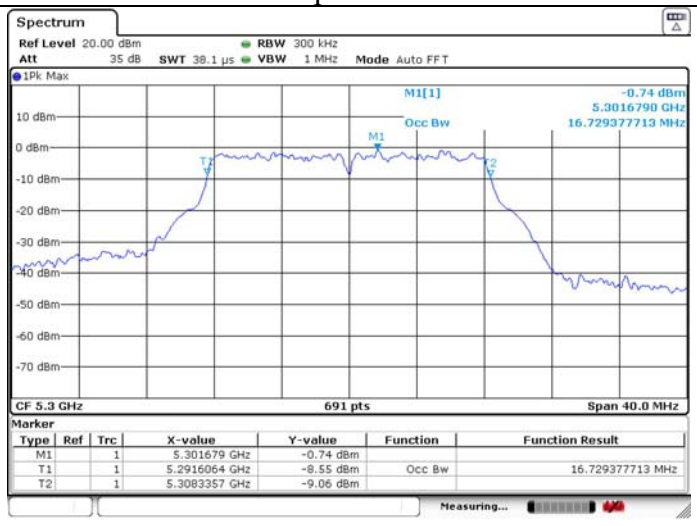
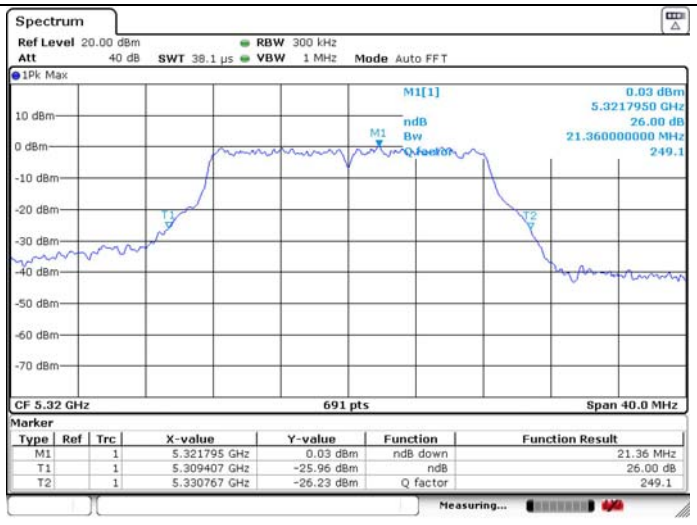
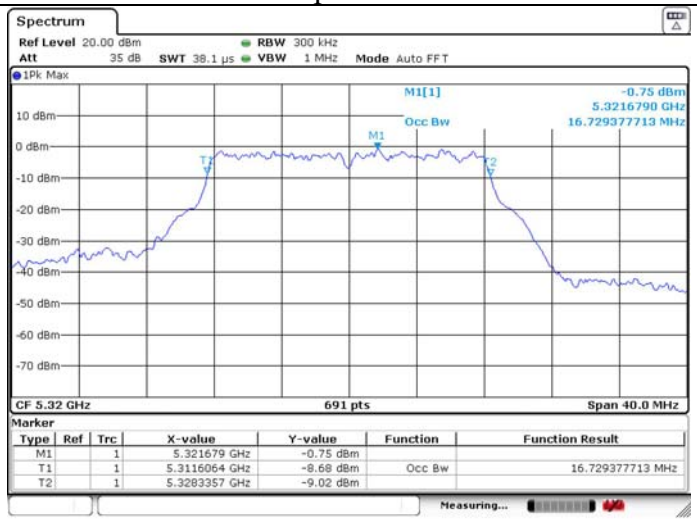
26dB Bandwidth	99% Occupied Bandwidth
	

U-NII-1 IEEE 802.11n HT40 5190MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-1 IEEE 802.11n HT40 5190MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-1 IEEE 802.11n HT40 5230MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	

U-NII-1 IEEE 802.11n HT40 5230MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-1 IEEE 802.11ac VHT40 5190MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-1 IEEE 802.11ac VHT40 5190MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth
	

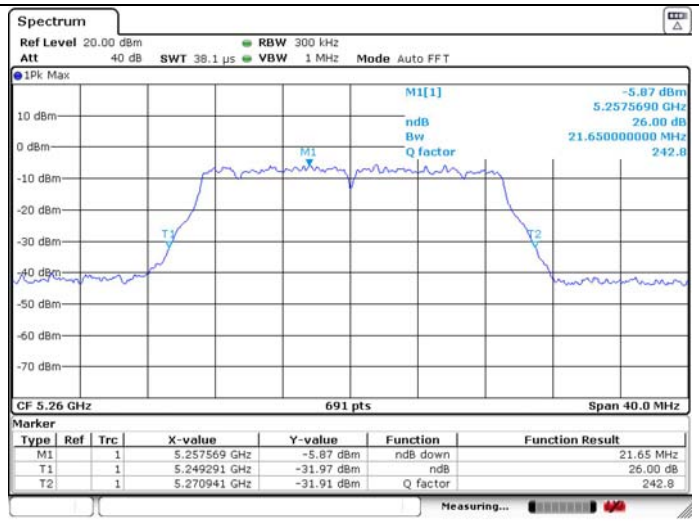
U-NII-1 IEEE 802.11ac VHT40 5230MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-1 IEEE 802.11ac VHT40 5230MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-1 IEEE 802.11ac VHT80 5210MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	

U-NII-1 IEEE 802.11ac VHT80 5210MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth
	

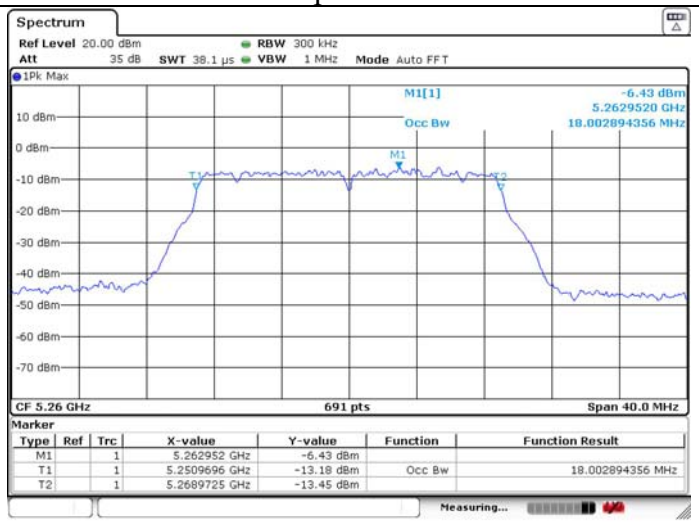
U-NII-2A IEEE 802.11a 5260MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2A IEEE 802.11a 5300MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2A IEEE 802.11a 5320MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	

U-NII-2A 802.11n HT20 5260MHz_Ant 1

26dB Bandwidth

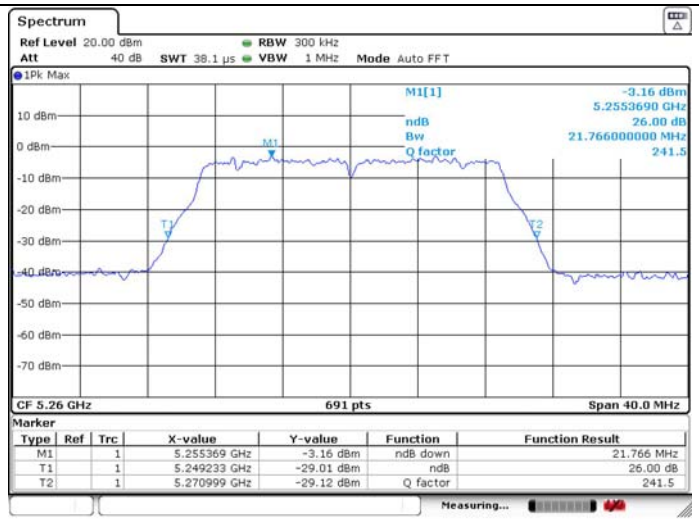


99% Occupied Bandwidth

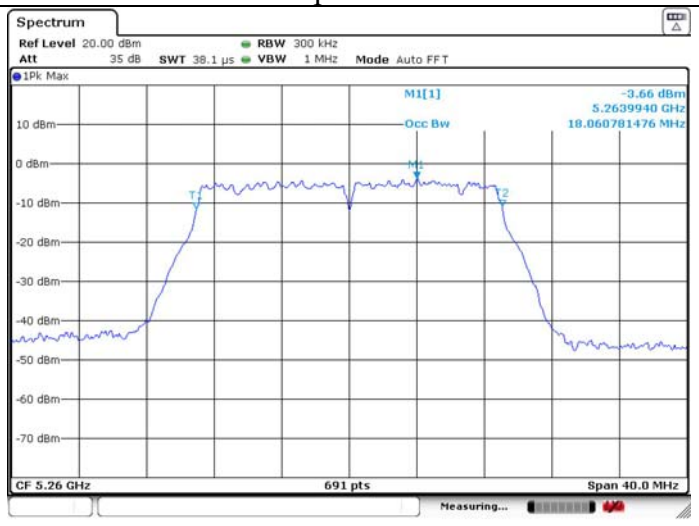


U-NII-2A 802.11n HT20 5260MHz_Ant 2

26dB Bandwidth

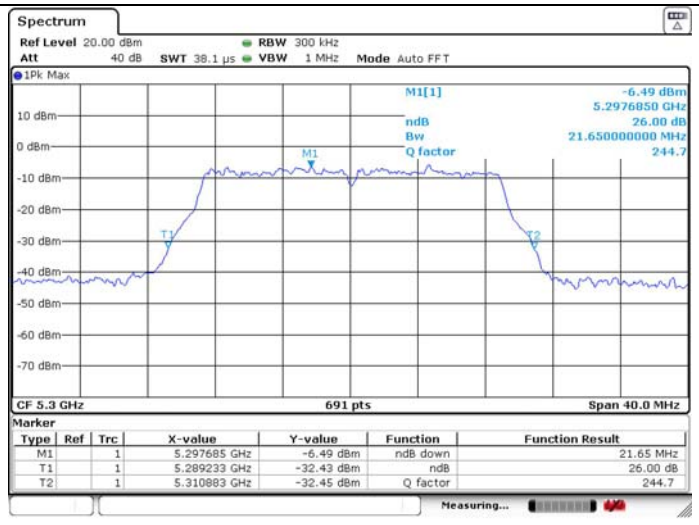


99% Occupied Bandwidth

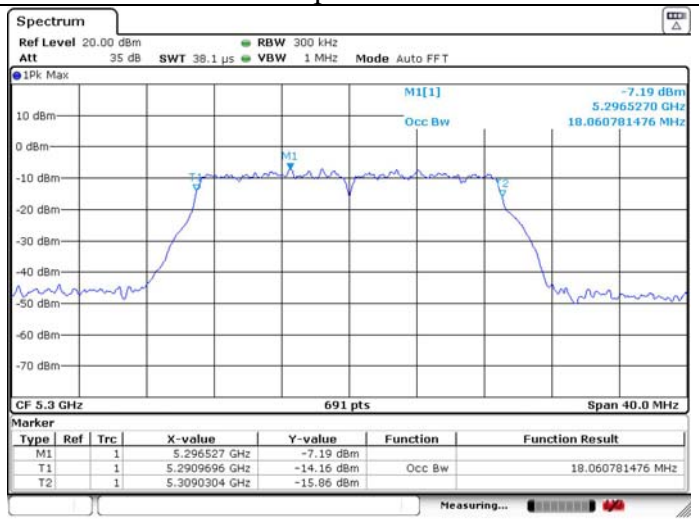


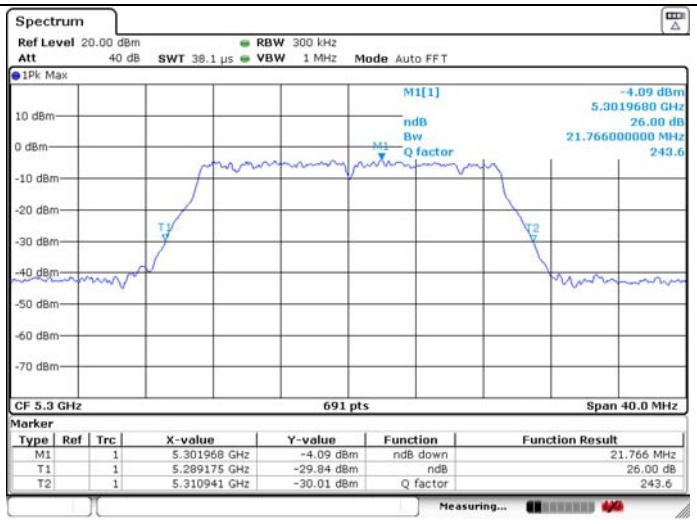
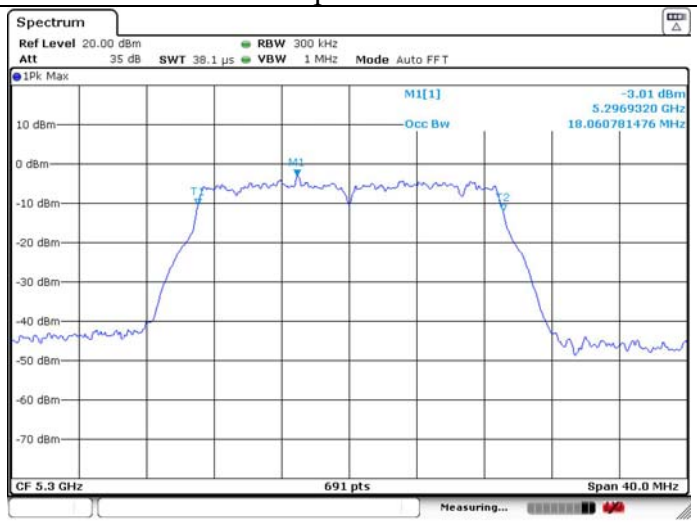
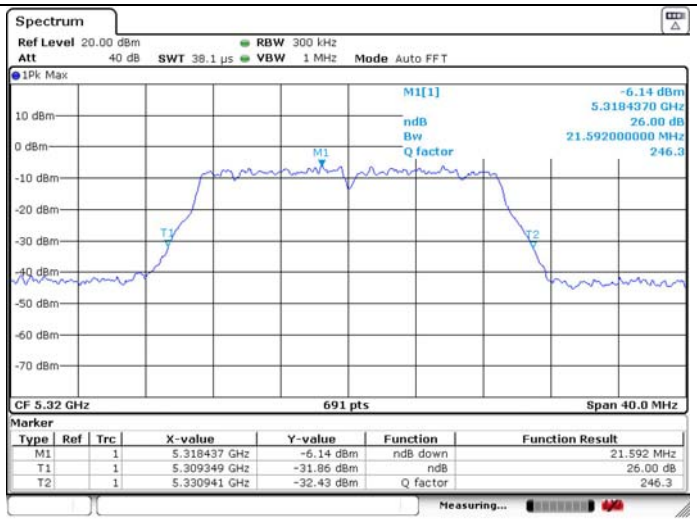
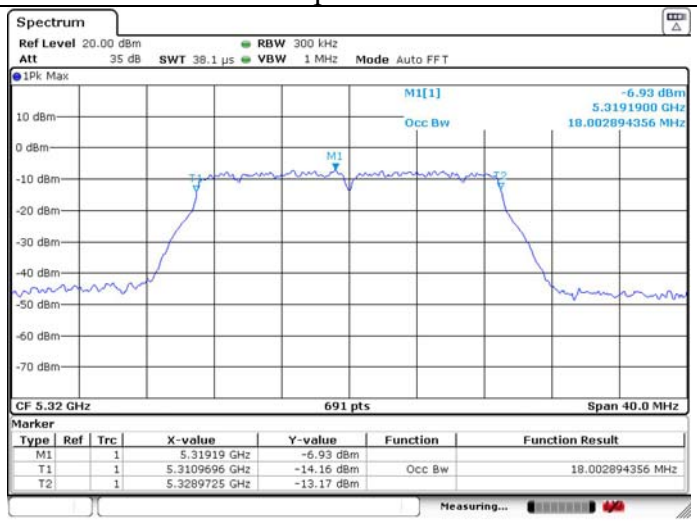
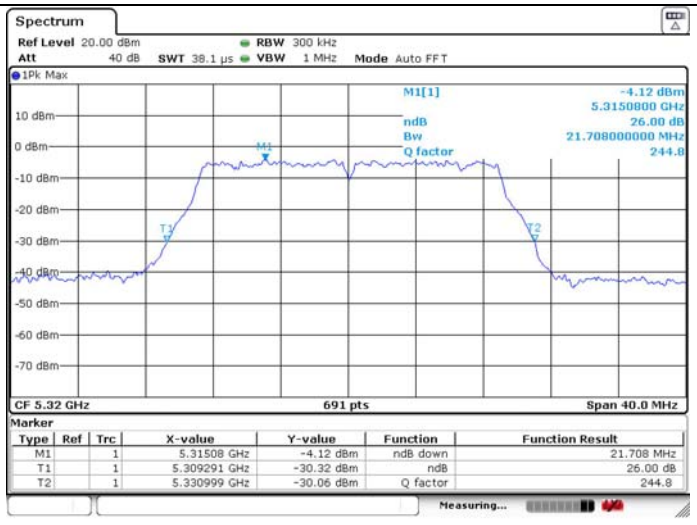
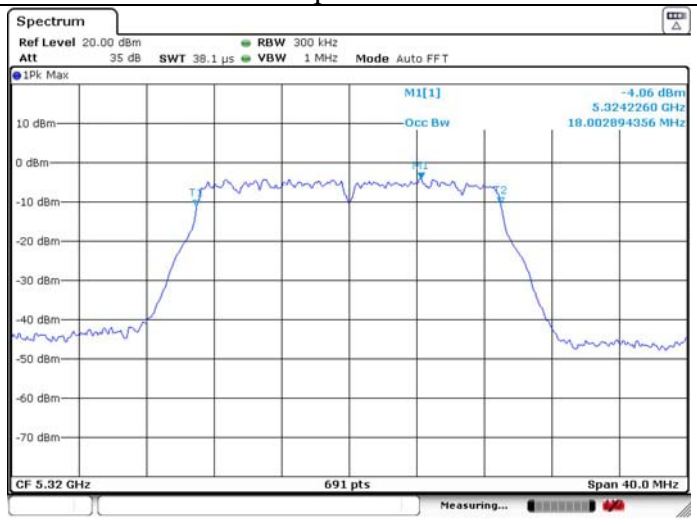
U-NII-2A 802.11n HT20 5300MHz_Ant 1

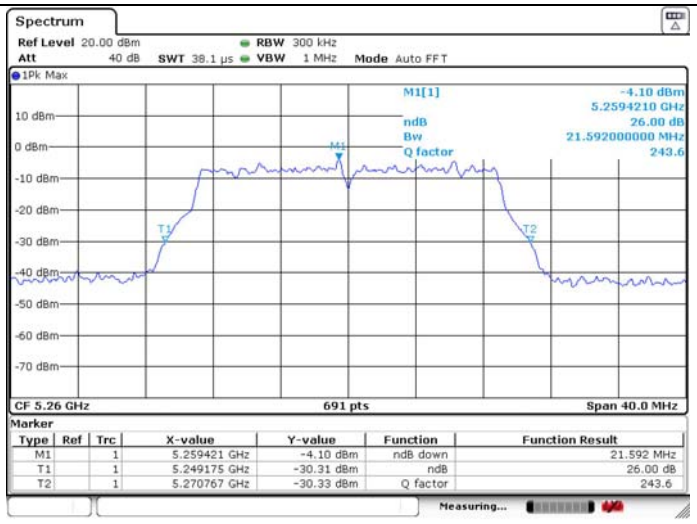
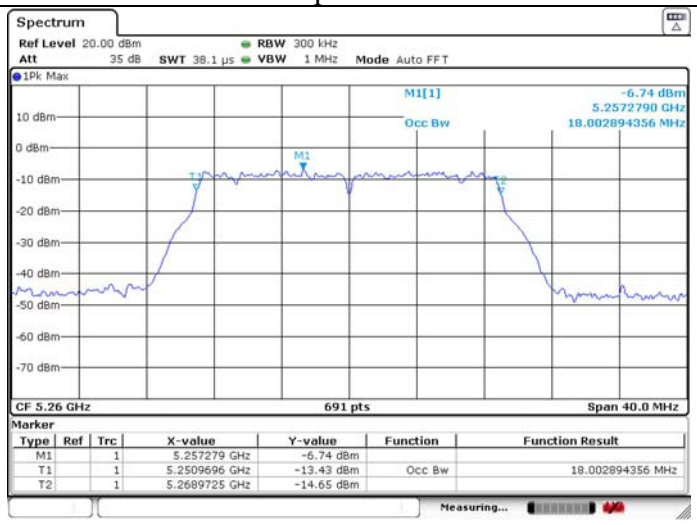
26dB Bandwidth



99% Occupied Bandwidth



U-NII-2A IEEE 802.11n HT20 5300MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2A IEEE 802.11n HT20 5320MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2A IEEE 802.11n HT20 5320MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth
	

U-NII-2A IEEE 802.11ac VHT20 5260MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	
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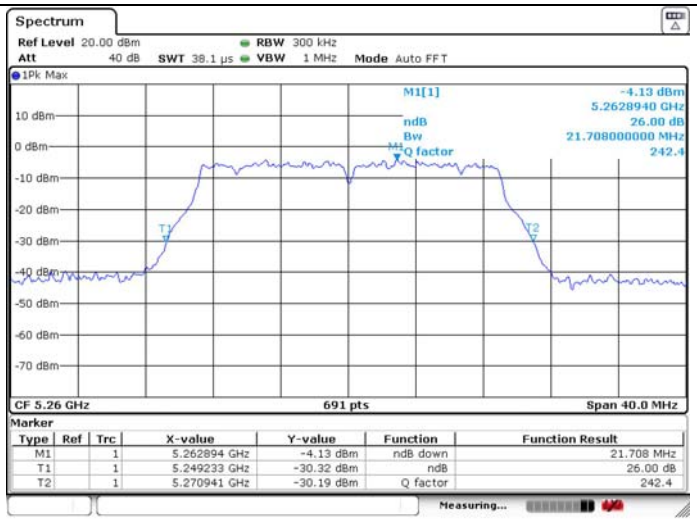
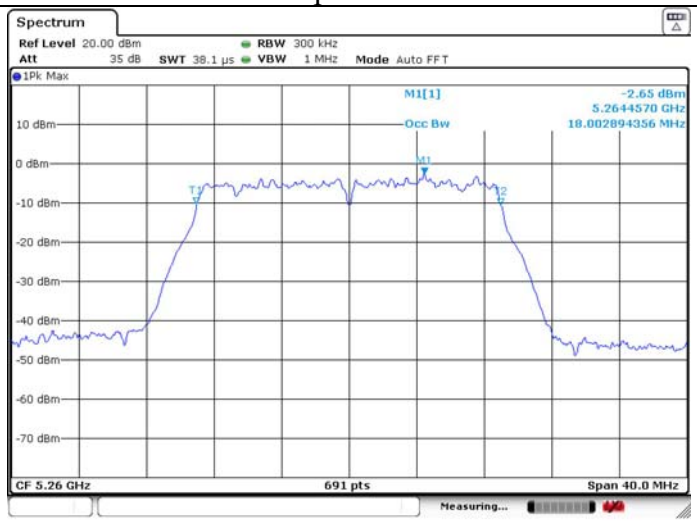
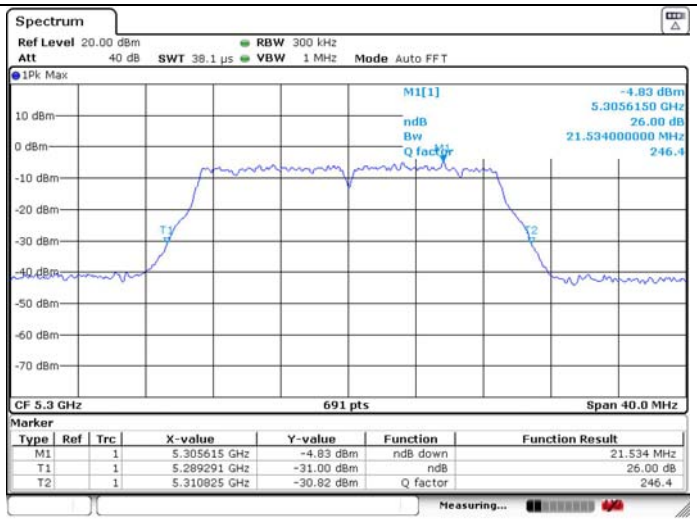
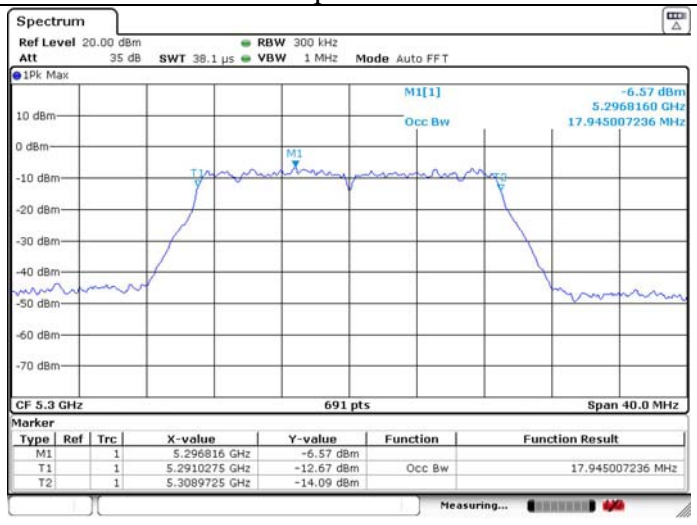
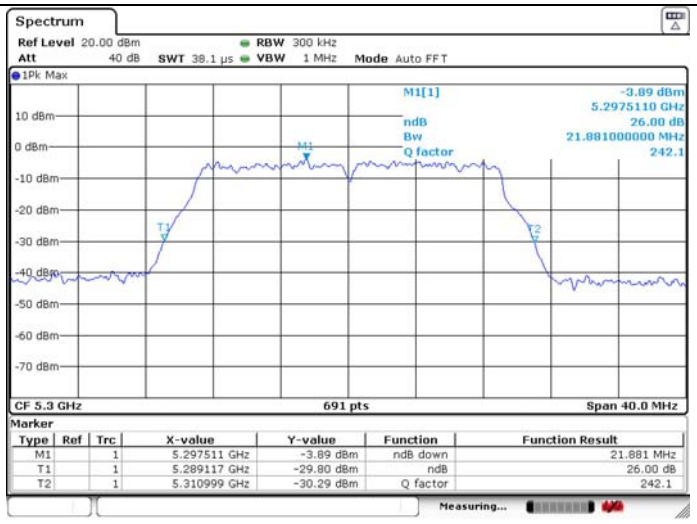
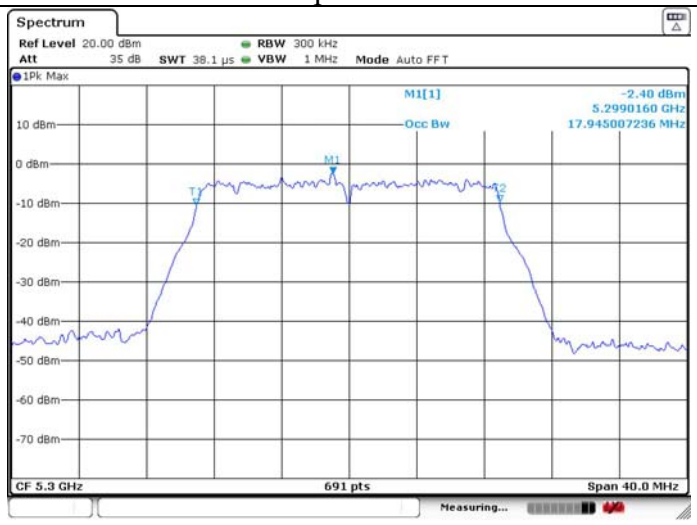
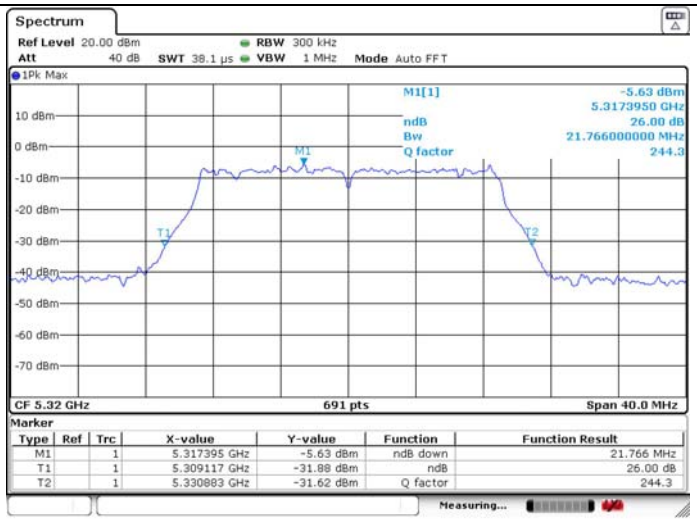
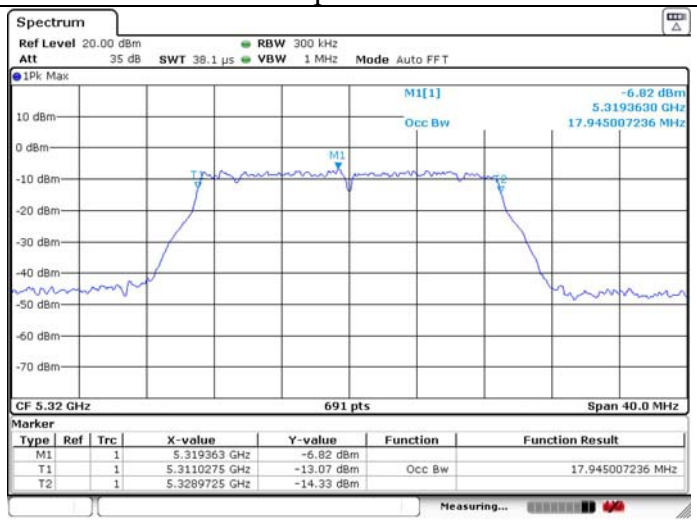
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2A IEEE 802.11ac VHT20 5300MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	

U-NII-2A IEEE 802.11ac VHT20 5300MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2A IEEE 802.11ac VHT20 5320MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	
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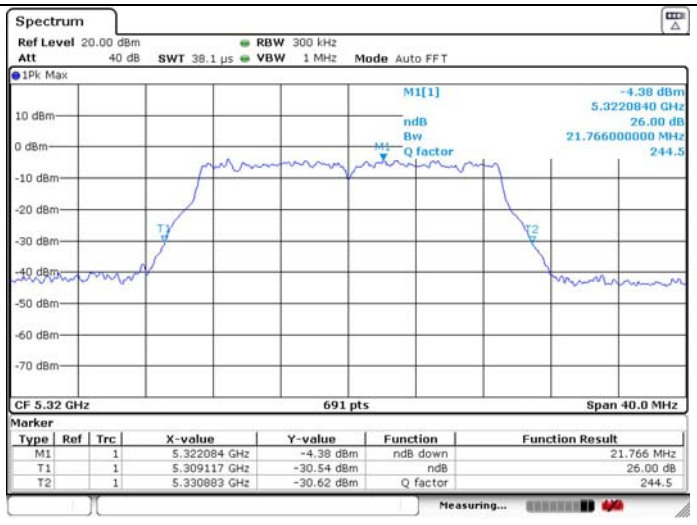
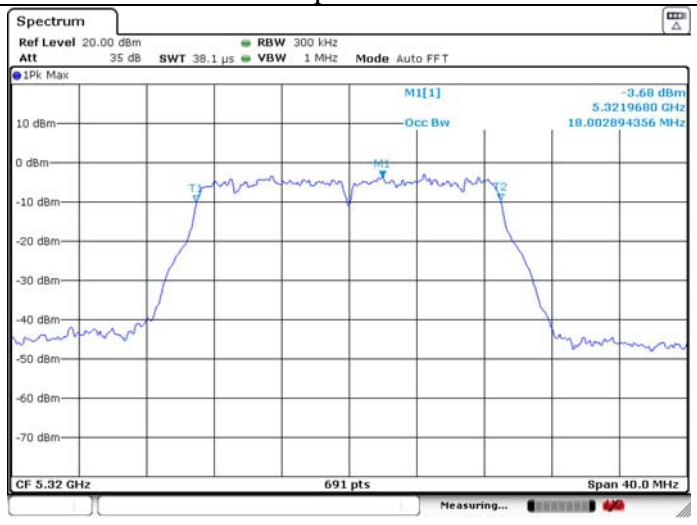
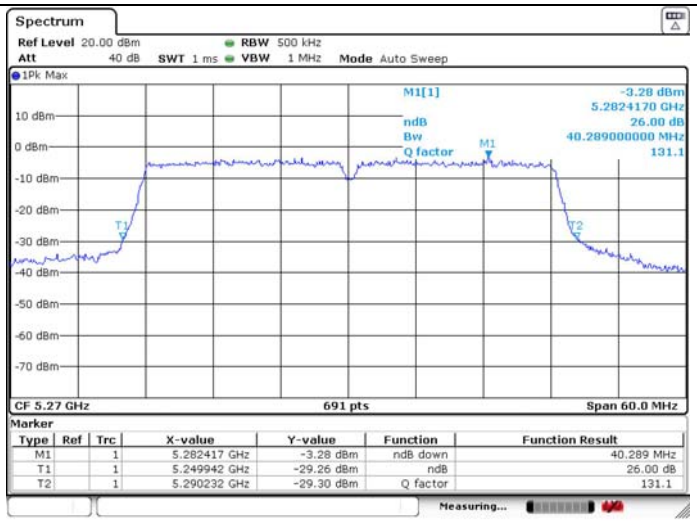
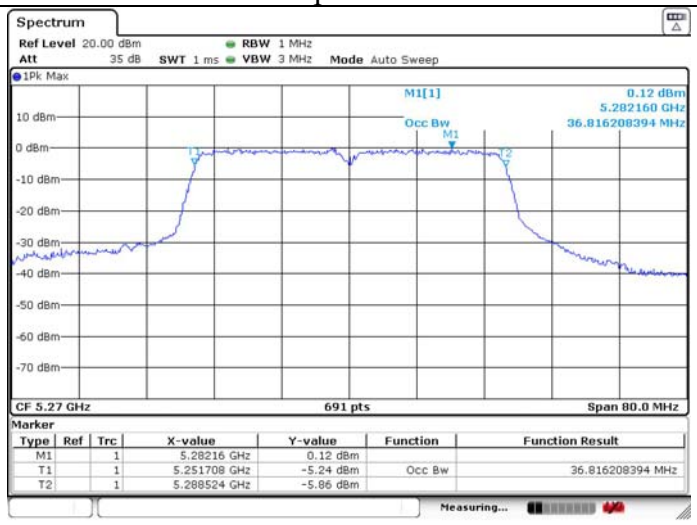
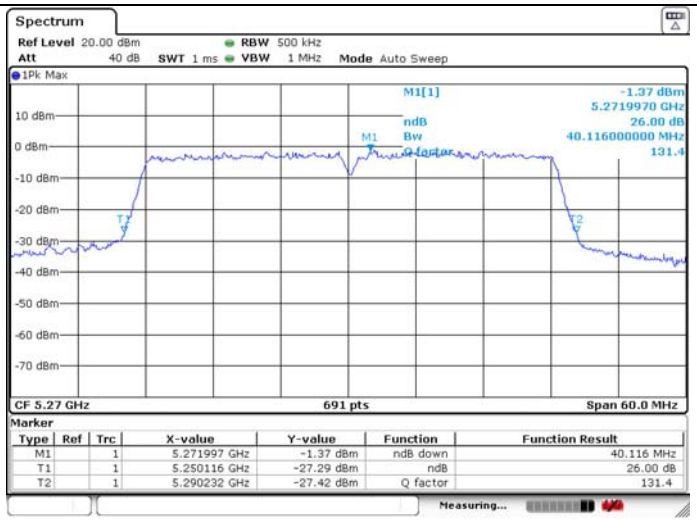
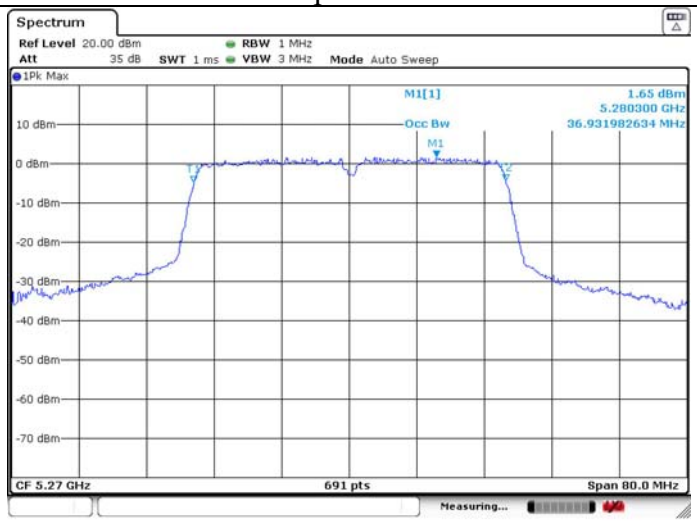
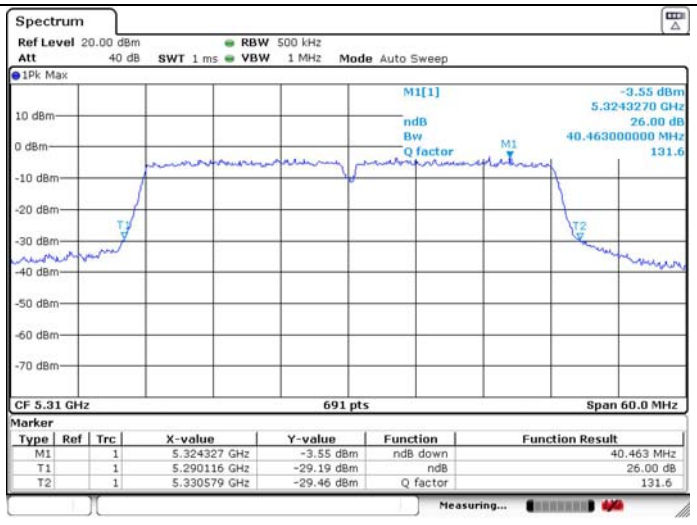
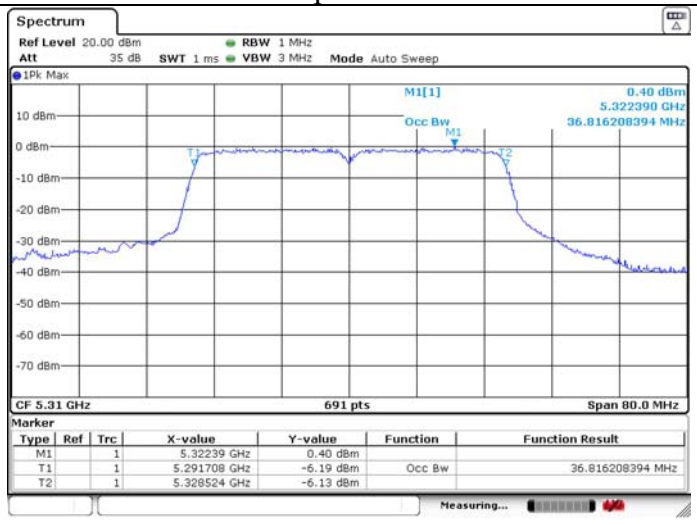
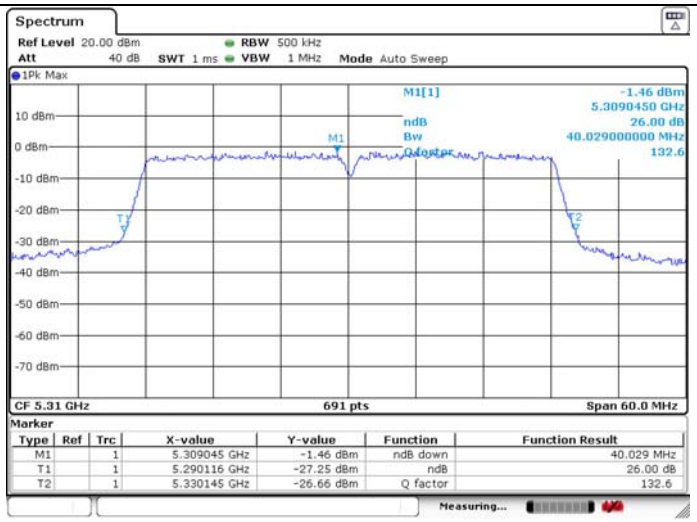
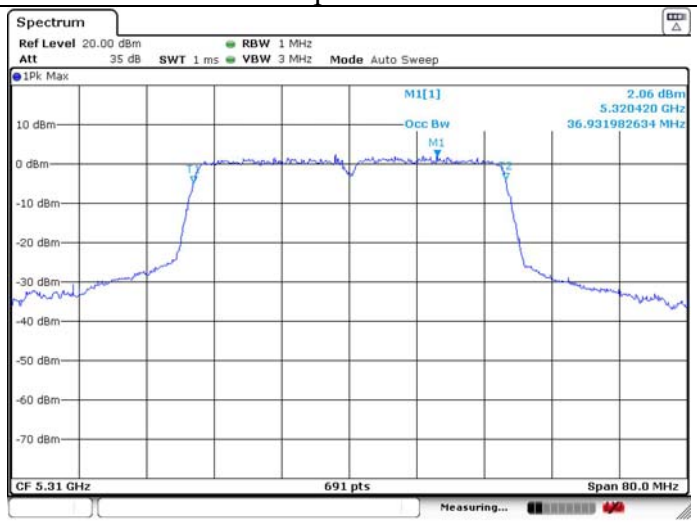
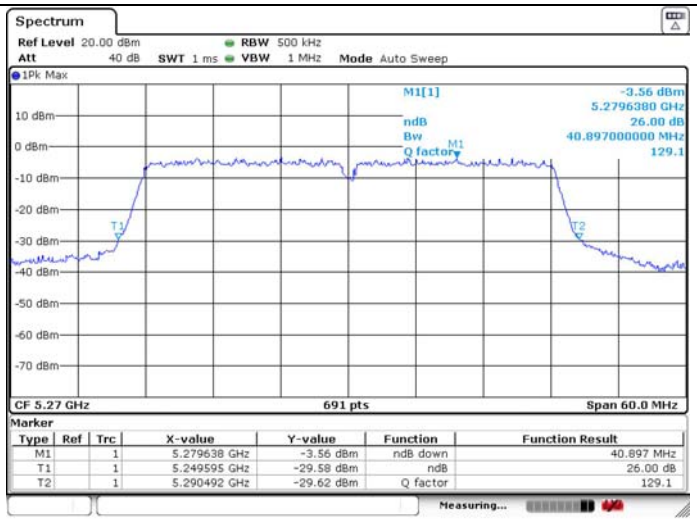
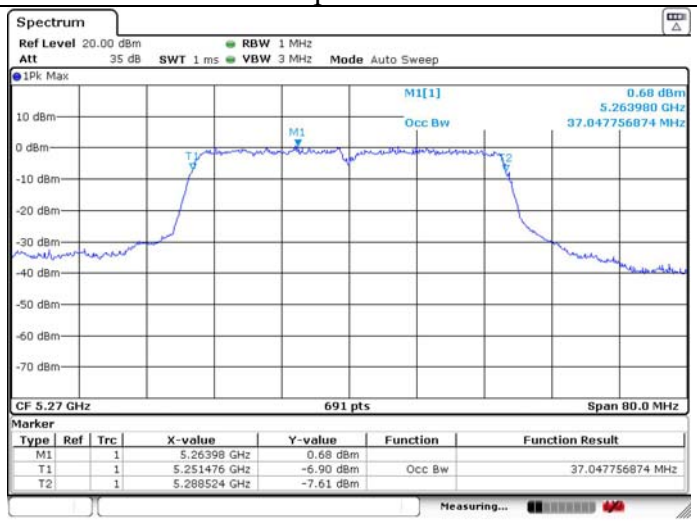
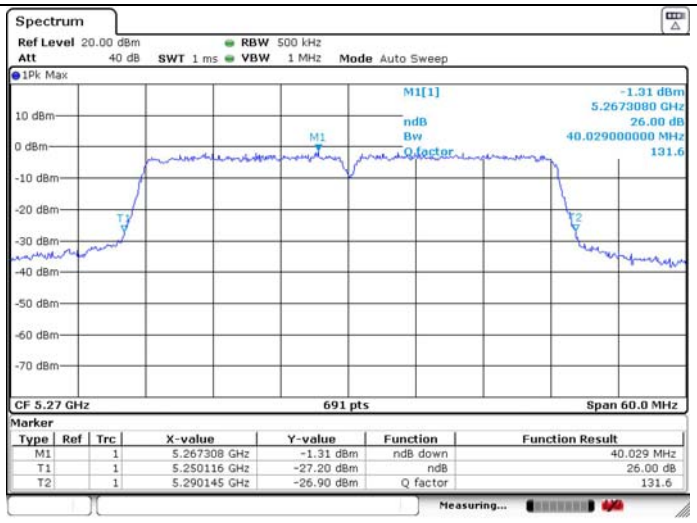
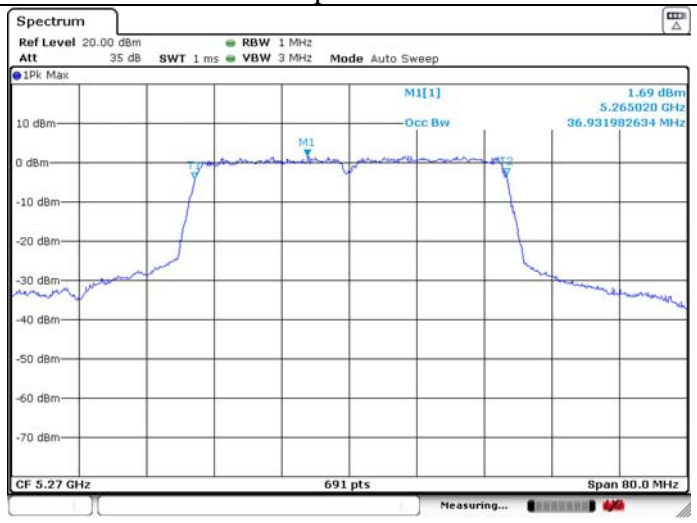
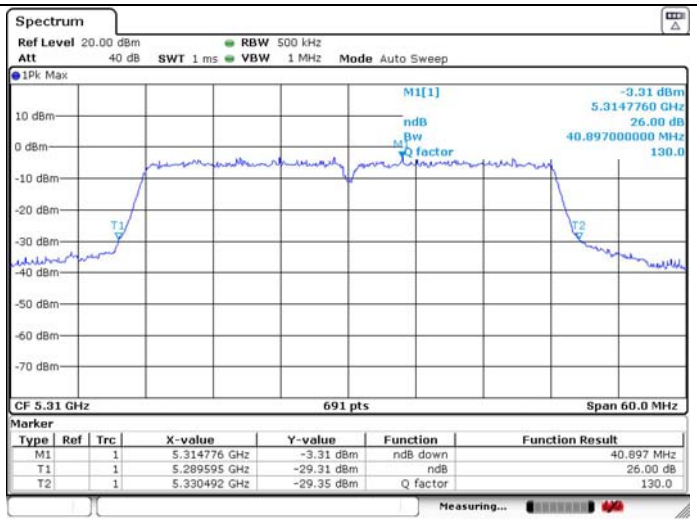
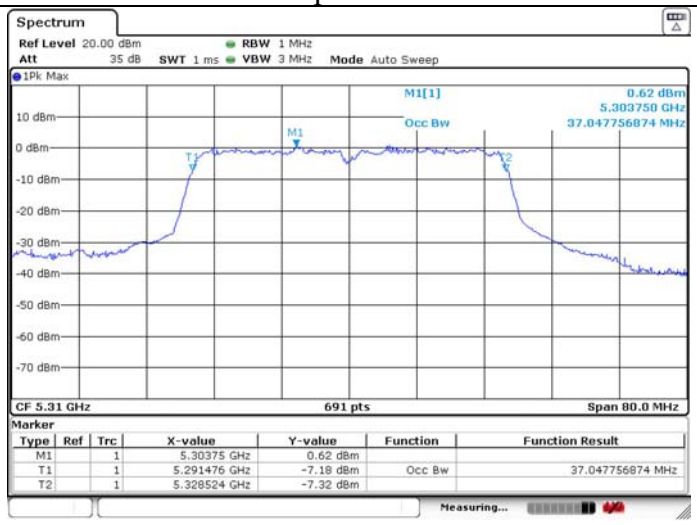
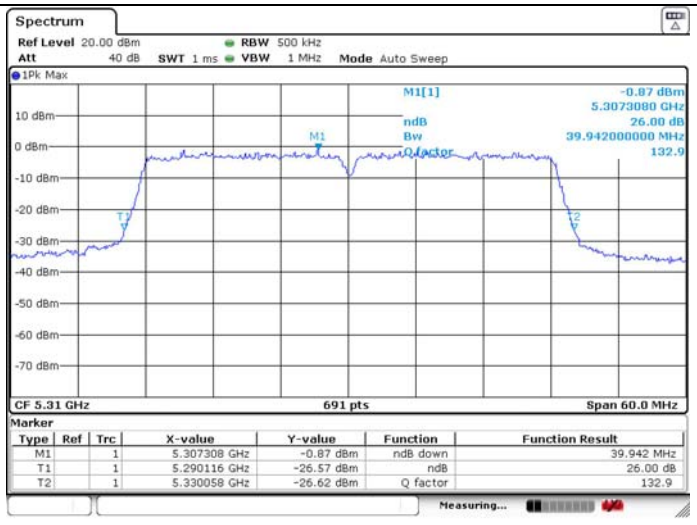
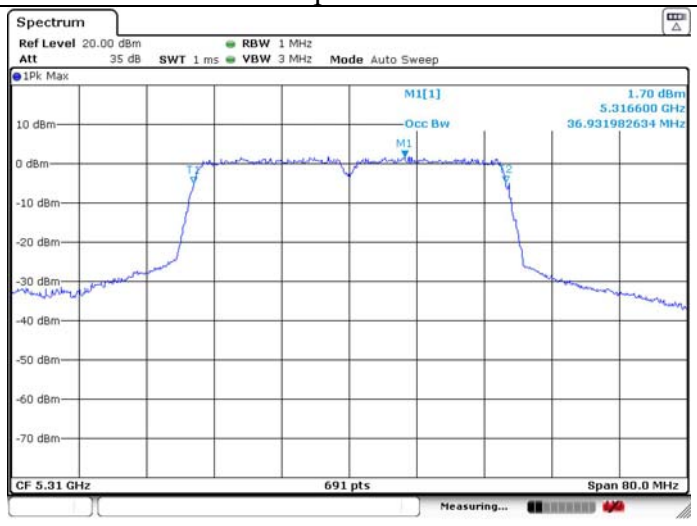
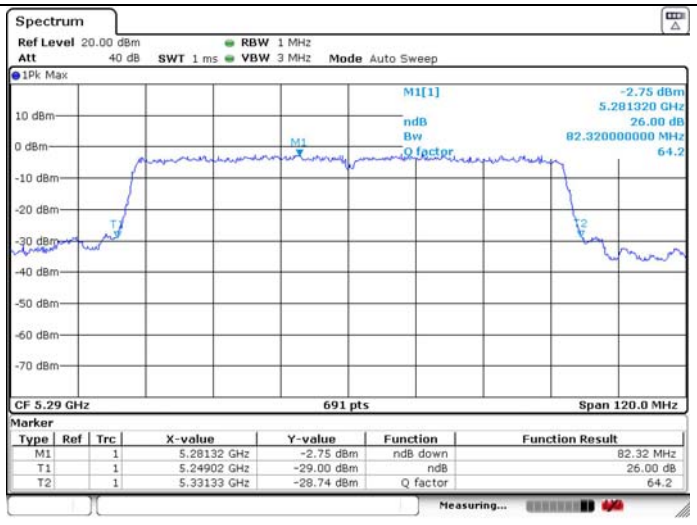
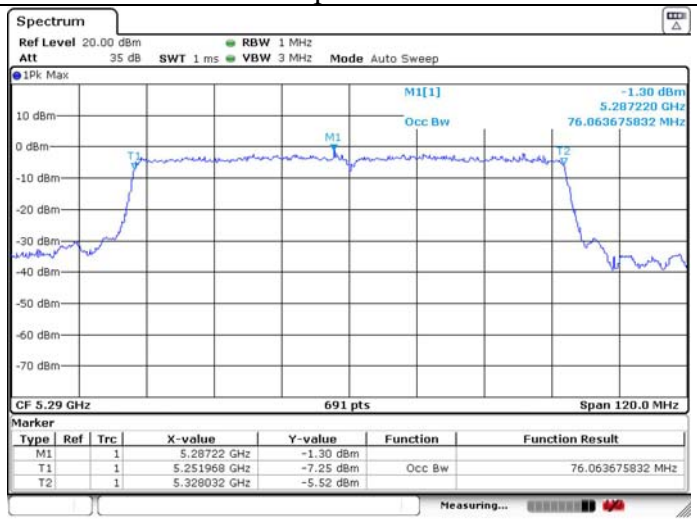
26dB Bandwidth	99% Occupied Bandwidth
	

U-NII-2A IEEE 802.11n HT40 5270MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2A IEEE 802.11n HT40 5270MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2A IEEE 802.11n HT40 5310MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	

U-NII-2A IEEE 802.11n HT40 5310MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2A IEEE 802.11ac VHT40 5270MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2A IEEE 802.11ac VHT40 5270MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth
	

U-NII-2A IEEE 802.11ac VHT40 5310MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2A IEEE 802.11ac VHT40 5310MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2A IEEE 802.11ac VHT80 5290MHz_Ant 1	
26dB Bandwidth	99% Occupied Bandwidth
	

U-NII-2A IEEE 802.11ac VHT80 5290MHz_Ant 2	
26dB Bandwidth	99% Occupied Bandwidth