FCC PART 15E TEST REPORT FOR CERTIFICATION
On Behalf of

EXPRESS LUCK INDUSTRIAL (SHENZHEN) LIMITED

IEEE 802.11b/g/n/a 2T2R USB WiFi Module Integrated BT 2.1+EDR/4.2/5.0

Model Number: EL.MT7638BUN-WF

FCC ID: 2AWY6-ELMT7638BUN

Prepared for:	EXPRESS LUCK INDUSTRIAL (SHENZHEN) LIMITED
	Floorl, Workshop1, NO.88, South Bantong Road, Xikeng Community,
	Yuanshan Street, Longgang District, Shenzhen, GuangDong, China
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
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Report Number:	ESTE-R2109057
Date of Test:	Aug. 09~Sep. 03, 2021
Date of Report:	Sep. 06, 2021

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Description Page

EST Technology Co., Ltd.

Applicant: **Address:**	EXPRESS LUCK INDUSTRIAL (SHENZHEN) LIMITED Floorl, Workshop1, NO.88, South Bantong Road, Xikeng Community, Yuanshan Street, Longgang District, Shenzhen, GuangDong, China
Manufacturer: **Address:**	EXPRESS LUCK INDUSTRIAL (SHENZHEN) LIMITED Floorl, Workshop1, NO.88, South Bantong Road, Xikeng Community, Yuanshan Street, Longgang District, Shenzhen, GuangDong, China
E.U.T:	IEEE 802.11b/g/n/a 2T2R USB WiFi Module Integrated BT 2.1+EDR/4.2/5.0
Model Number:	EL.MT7638BUN-WF
Power Supply:	DC 3.3V
Trade Name:	------ Serial No.: ------
Date of Receipt:	Aug. 09, 2021 Date of Test: Aug. 09~Sep. 03, 2021
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. 06, 2021

Prepared by:	Reviewed by:	Approved by:
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	:	2AWY6-ELMT7638BUN
Product Name	:	IEEE 802.11b/g/n/a 2T2R USB WiFi Module Integrated BT 2.1+EDR/4.2/5.0
Model Number	:	EL.MT7638BUN-WF
Software Version	:	N/A
Hardware Version	:	EL.MT7638BUN-WF
Operation frequency	:	U-NII-1: 5150 MHz~5250 MHz U-NII-2A: 5250 MHz~5350 MHz U-NII-2C: 5470 MHz~5725 MHz U-NII-3: 5725 MHz~5850 MHz
Number of channel	:	U-NII-1: IEEE 802.11a / n HT20 : 4 Channels; IEEE 802.11n HT40 : 2 Channels U-NII-2A: IEEE 802.11a / n HT20: 4 Channels; IEEE 802.11n HT40: 2 Channels; U-NII-2C: IEEE 802.11a / n HT20: 11 Channels; IEEE 802.11n HT40: 5 Channels; U-NII-3: IEEE 802.11a / n HT20: 5 Channels; IEEE 802.11n HT40: 2 Channels;
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	:	U-NII-1	IEEE 802.11a: 11.64dBm IEEE 802.11n HT20: 11.65dBm IEEE 802.11n HT40: 11.17dBm
		U-NII-2A	IEEE 802.11a: 12.59dBm IEEE 802.11n HT20: 12.17dBm IEEE 802.11n HT40: 12.12dBm
		U-NII-2C	IEEE 802.11a: 12.51dBm IEEE 802.11n HT20: 12.42dBm IEEE 802.11n HT40: 12.85dBm
		U-NII-3	IEEE 802.11a: 12.60dBm IEEE 802.11n HT20: 12.84dBm IEEE 802.11n HT40: 12.86dBm
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	-	-	external	-	3.47
2	-	-	external	-	3.47

Remark:

(1) The EUT can work as CDD mode in IEEE 802.11n and IEEE 802.11a,and can operate with one spatial stream.
According to KDB 662911 F 2) f) (i):
Directional gain=3.47dBi+10×log(2/1)dB=6.48dBi＞6dBi
So,the output power limit and power spectral density should be reduced.

(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 ANT2	/
IEEE 802.11n HT20	/	ANT1+ANT2
IEEE 802.11n HT40	/	ANT1+ANT2
IEEE 802.11ac VHT20	/	/
IEEE 802.11ac VHT40	/	/
IEEE 802.11ac VHT80	/	/

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)(9)	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	1.08dB
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.

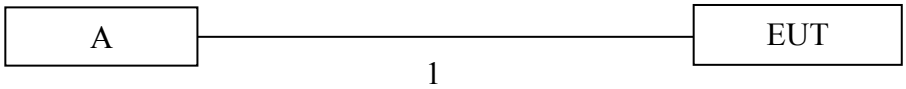
2.4. Assistant equipment used for test

Item	Equipment	Brand	Model Name/Type No.	FCC ID	Series No.
A	PC	-	E485	-	-

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	0.2m	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.



DC 3.3V

(EUT: IEEE 802.11b/g/n/a 2T2R USB WiFi Module Integrated BT 2.1+EDR/4.2/5.0)

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
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
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
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
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
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
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

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
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
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	36	5180
		40	5200
		44	5220
		48	5240
	IEEE 802.11n HT40	38	5190
		46	5230
U-NII-2A	IEEE 802.11a & n HT20	52	5260
		56	5280
		60	5300
		64	5320
	IEEE 802.11n HT40	54	5270
		62	5310
U-NII-2C	IEEE 802.11a & n HT20	100	5500
		104	5520
		108	5540
		112	5560
		116	5580
		120	5600
		124	5620
		128	5640
		132	5660
		136	5680
		140	5700
	IEEE 802.11n HT40	102	5510
		110	5550
		118	5590
		126	5630
		134	5670
U-NII-3	IEEE 802.11a & n HT20	149	5745
		153	5765
		157	5785
		161	5805
		165	5825
	IEEE 802.11n HT40	151	5755
		159	5795

2.8. Power Setting of Test Software

Software Name	QAS_TooL_Dbg		
U-NII-1			
Frequency(MHz)	5180	5200	5240
IEEE 802.11a Setting	Default	Default	Default
IEEE 802.11n HT20 Setting	Default	Default	Default
Frequency(MHz)	5190	5230	
IEEE 802.11n HT40 Setting	Default	Default	
U-NII-2A			
Frequency(MHz)	5260	5300	5320
IEEE 802.11a Setting	Default	Default	Default
IEEE 802.11n HT20 Setting	Default	Default	Default
Frequency(MHz)	5270	5310	
IEEE 802.11n HT40 Setting	Default	Default	
U-NII-2C			
Frequency(MHz)	5500	5580	5700
IEEE 802.11a Setting	Default	Default	Default
IEEE 802.11n HT20 Setting	Default	Default	Default
Frequency(MHz)	5510	5670	5670
IEEE 802.11n HT40 Setting	Default	Default	Default
U-NII-3			
Frequency(MHz)	5745	5785	5825
IEEE 802.11a Setting	Default	Default	Default
IEEE 802.11n HT20 Setting	Default	Default	Default
Frequency(MHz)	5755	5795	
IEEE 802.11n HT40 Setting	Default	Default	

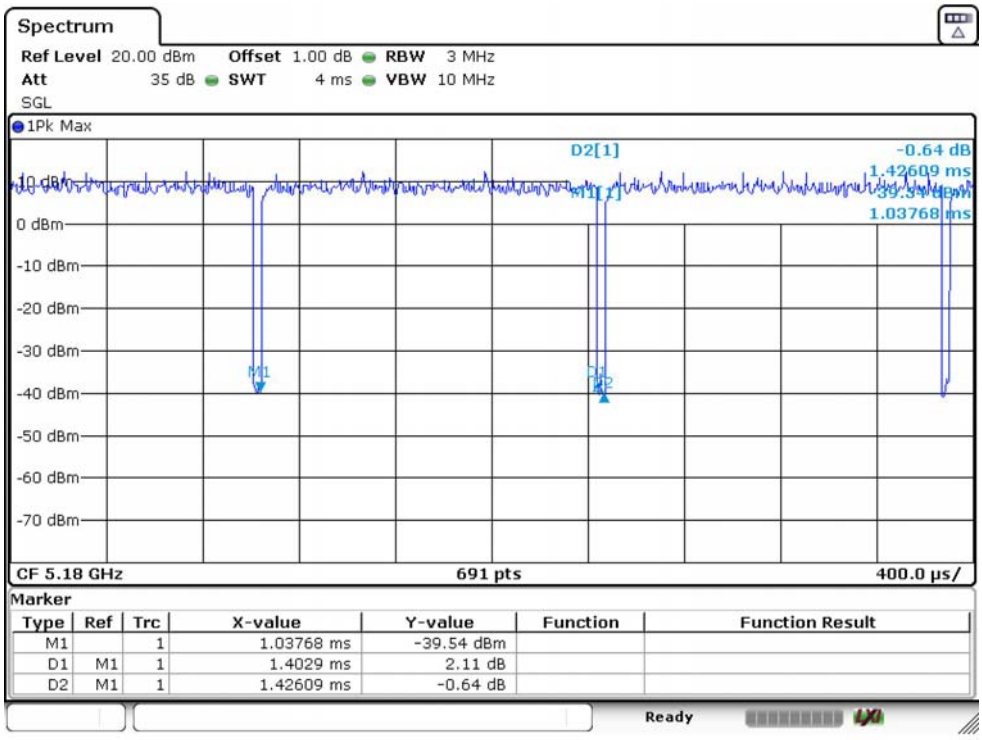
2.9. Duty Cycle of Test Signal

Temperature	24.9℃	Relative Humidity		62%	Test Voltage		DC 3.3V
Mode	Frequency (MHz)	On time (ms)	Total Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T (Hz)	VBW Setting (dB)
IEEE 802.11a	5180	1.40290	1.42609	98.37	0.00	10	1952
IEEE 802.11n HT20	5180	1.31014	1.33333	98.26	0.00	10	1952
IEEE 802.11n HT40	5180	0.65652	0.68261	96.18	0.17	1523	1952

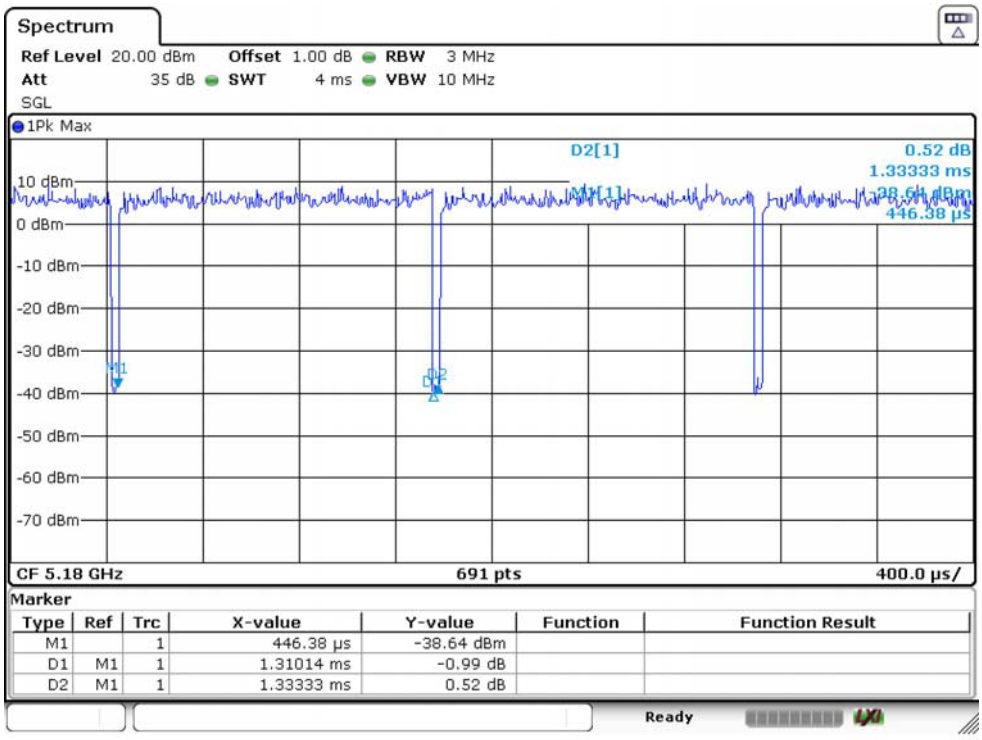
Note:

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.

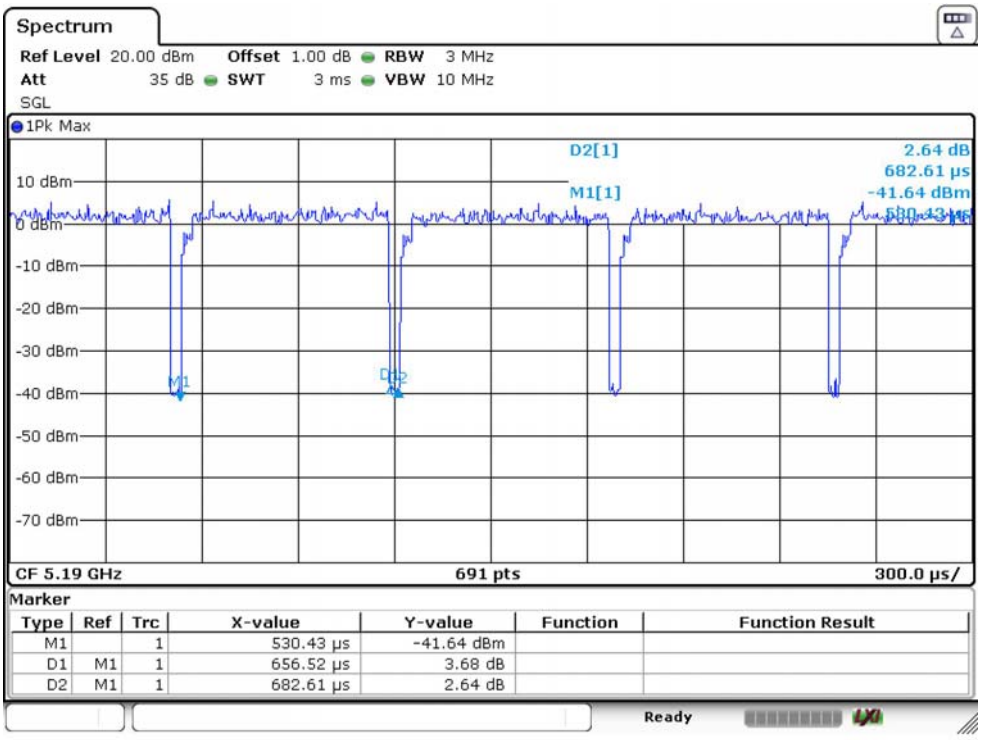
IEEE 802.11a 5180MHz



IEEE 802.11n HT20 5180MHz



IEEE 802.11n HT40 5190MHz



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 13,21	1 Year
Artificial Mains Network	Rohde & Schwarz	ENV216	EST-E002	LISAI	June 13,21	1 Year
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	EST-E078	LISAI	June 13,21	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 13,21	1 Year
Active Loop Antenna	SCHWAREBECK	FMZB 1519B	EST-E054	LISAI	June 13,21	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 13,21	1 Year
Bilog Antenna	Teseq	CBL 6111D	EST-E034	LISAI	June 13,21	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 13,21	1 Year
Signal Amplifier	SCHWARZBECK	BBV9718	EST-E032	LISAI	June 13,21	1 Year
Spectrum Analyzer	Rohde &Schwarz	FSV40	EST-E069	LISAI	July 19,21	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

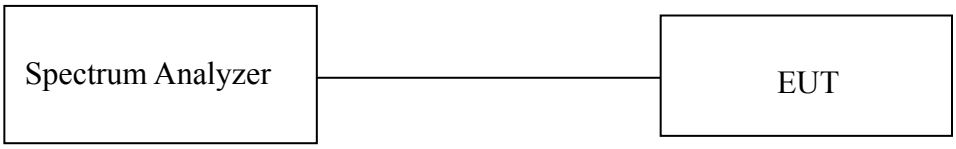
For connect EUT antenna terminal test						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
TS 8997	Rohde &Schwarz	/	/	/	/	/
Open Switch and Control Unit	Rohde &Schwarz	OSP-B157WB	EST-E036	LISAI	June 13,21	1Year
Signal and Spectrum Analyzer	Rohde &Schwarz	FSV	EST-E037	LISAI	June 13,21	1 Year
Signal Generator	Rohde &Schwarz	SMB100A	EST-E038	LISAI	June 13,21	1 Year
Vector Signal Generator	Rohde &Schwarz	SMBV100A	EST-E039	LISAI	June 13,21	1Year
Test Software	Rohde &Schwarz	WMS32	V10.50.00	N/A	N/A	N/A
Temperature controller	Terchy	MHQ	EST-E101	LISAI	June 13,21	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	5470-5725	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	24.9℃	Relative Humidity			62%		Test Voltage	DC 3.3V
26dB Bandwidth&99% Occupied Bandwidth								
AND	Test Mode	Fre (MHz)	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Output Power Limit (W)	Output Power Limit (dBm)	Calculate Power Limit (W)	Calculate Power Limit (dBm)
U-NII-1	IEEE 802.11a	5180	20.145	16.787	0.2500	23.98	0.2500	23.98
		5200	20.145	16.729	0.2500	23.98	0.2500	23.98
		5240	20.203	16.787	0.2500	23.98	0.2500	23.98
	IEEE 802.11n HT20	5180	20.434	17.713	0.2500	23.98	0.2500	23.98
		5200	20.376	17.713	0.2500	23.98	0.2500	23.98
		5240	20.434	17.713	0.2500	23.98	0.2500	23.98
	IEEE 802.11n HT40	5190	40.463	36.353	0.2500	23.98	0.2500	23.98
		5230	40.897	36.469	0.2500	23.98	0.2500	23.98
U-NII-2A	IEEE 802.11a	5260	20.145	16.845	0.2500	23.98	0.2500	23.98
		5300	20.260	16.729	0.2500	23.98	0.2500	23.98
		5320	20.087	16.845	0.2500	23.98	0.2500	23.98
	IEEE 802.11n HT20	5260	20.434	17.713	0.2500	23.98	0.2500	23.98
		5300	20.376	17.713	0.2500	23.98	0.2500	23.98
		5320	20.376	17.771	0.2500	23.98	0.2500	23.98
	IEEE 802.11n HT40	5270	40.897	36.353	0.2500	23.98	0.2500	23.98
		5310	40.637	36.353	0.2500	23.98	0.2500	23.98

Temperature	24.7℃	Relative Humidity			62%	Test Voltage	DC 3.3V
26dB Bandwidth&99% Occupied Bandwidth							
AND	Test Mode	Fre (MHz)	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Output Power Limit (W)	Output Power Limit (dBm)	Calculate Power Limit (W)	Calculate Power Limit (dBm)
U-NII-2C	IEEE 802.11a	5500	20.260	16.845	0.2500	23.98	0.2500	23.98
		5580	20.260	16.845	0.2500	23.98	0.2500	23.98
		5700	20.203	16.787	0.2500	23.98	0.2500	23.98
	IEEE 802.11n HT20	5500	20.492	17.656	0.2500	23.98	0.2500	23.98
		5580	20.260	17.713	0.2500	23.98	0.2500	23.98
		5700	20.376	17.781	0.2500	23.98	0.2500	23.98
	IEEE 802.11n HT40	5510	40.637	36.469	0.2500	0.2500	23.98	23.98
		5590	40.724	36.353	0.2500	0.2500	23.98	23.98
		5670	40.810	36.469	0.2500	0.2500	23.98	23.98

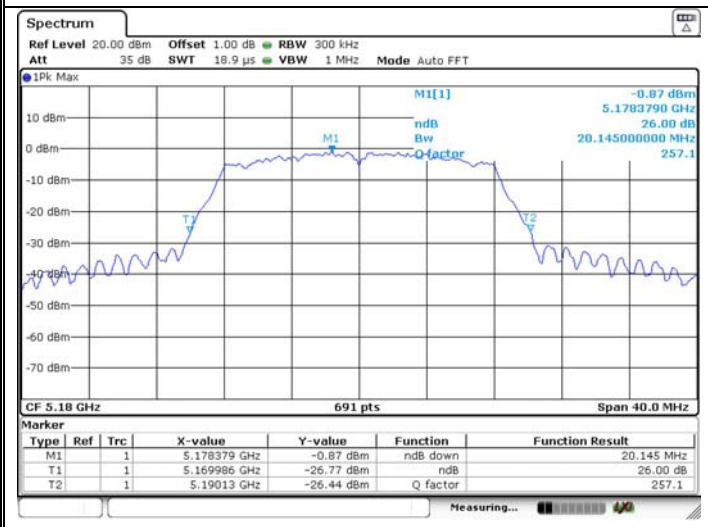
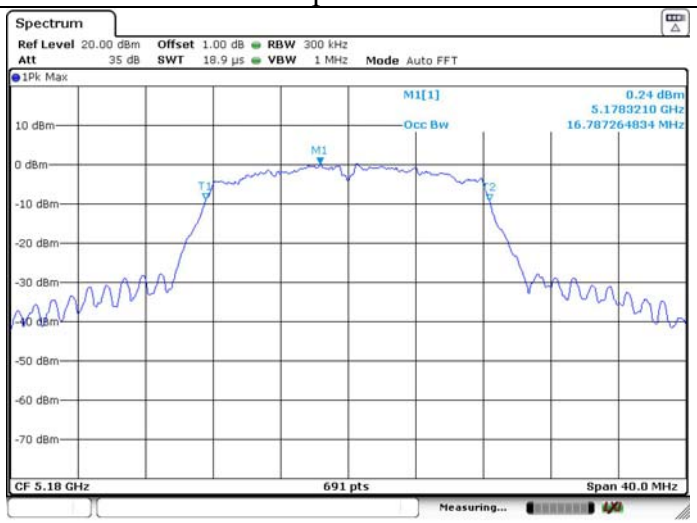
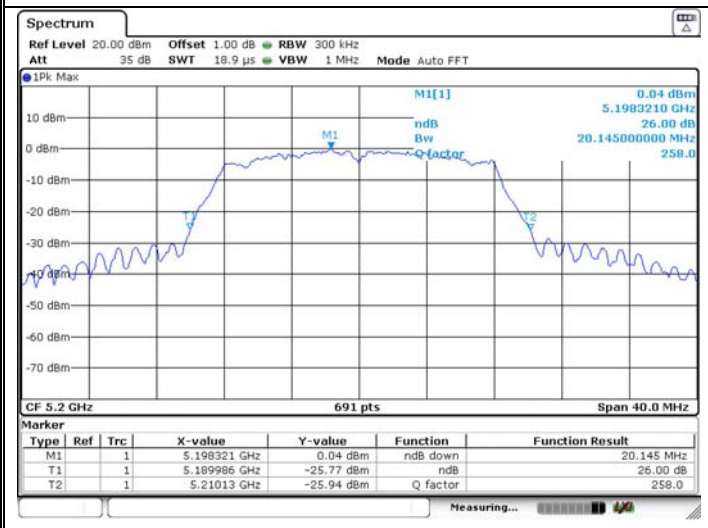
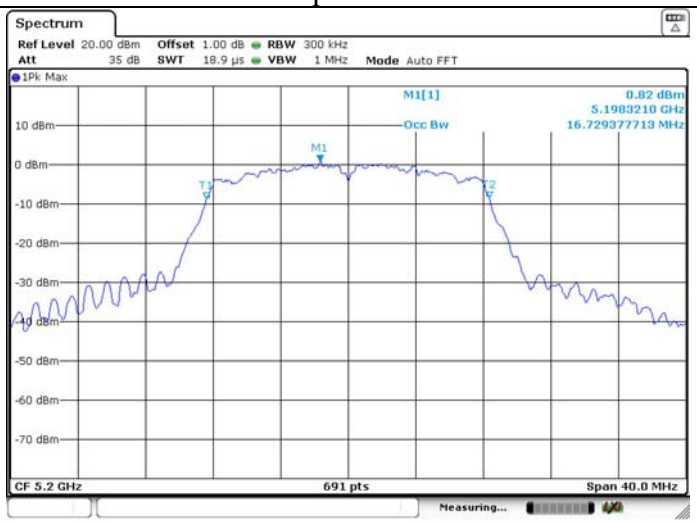
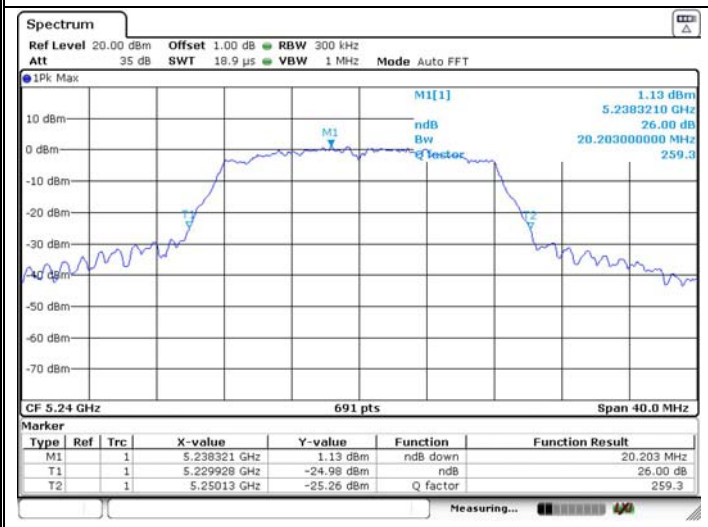
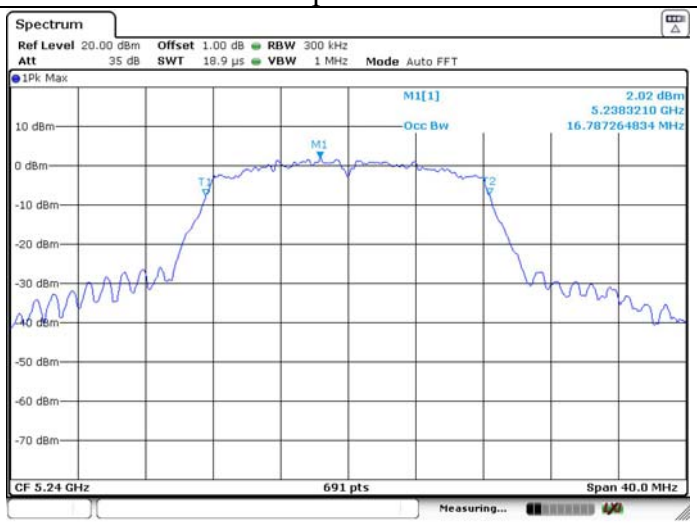
Temperature	24.7℃	Relative Humidity	62%	Test Voltage	DC 3.3V
6dB Bandwidth&99% Occupied Bandwidth					
BAND	Test Mode	Fre (MHz)	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	6dB BW Min Limit (MHz)	Result
U-NII-3	IEEE 802.11a	5745	15.123	16.845	0.5	PASS
		5785	15.119	16.845	0.5	PASS
		5825	15.119	16.845	0.5	PASS
	IEEE 802.11n HT20	5745	16.306	17.713	0.5	PASS
		5785	16.302	17.713	0.5	PASS
		5825	16.278	17.656	0.5	PASS
	IEEE 802.11n HT40	5755	35.125	36.237	0.5	PASS
		5795	35.117	36.469	0.5	PASS

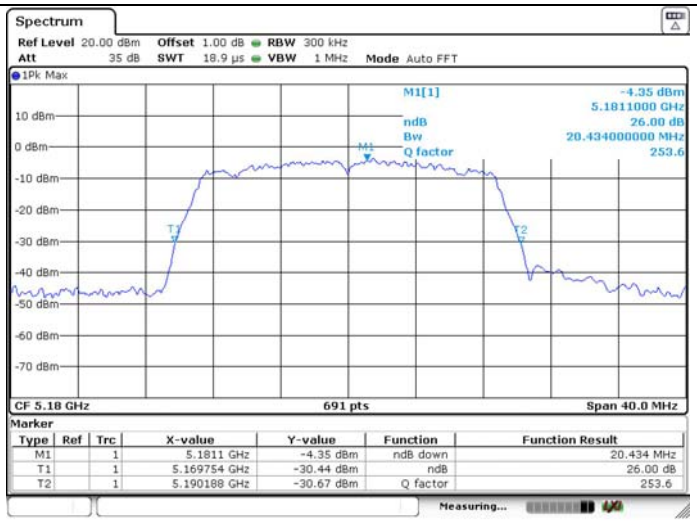
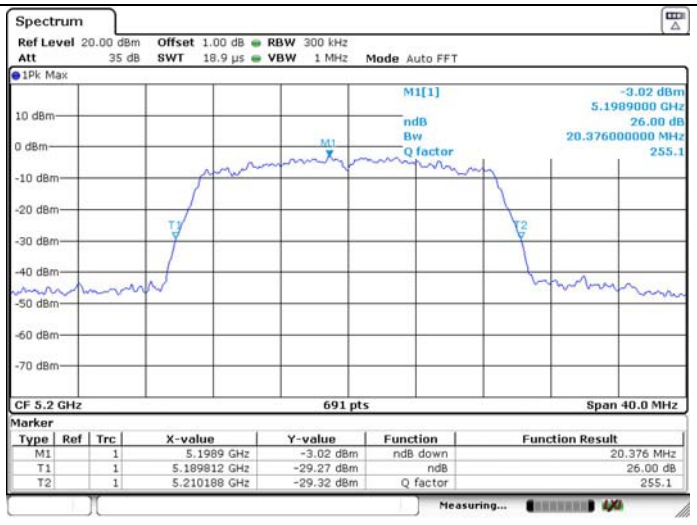
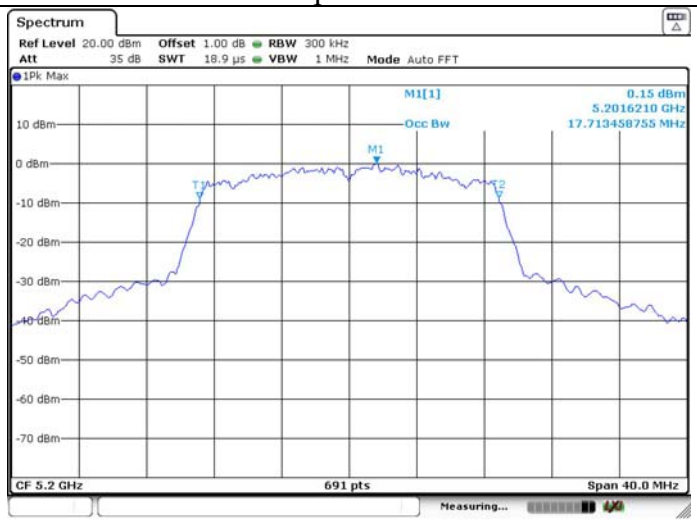
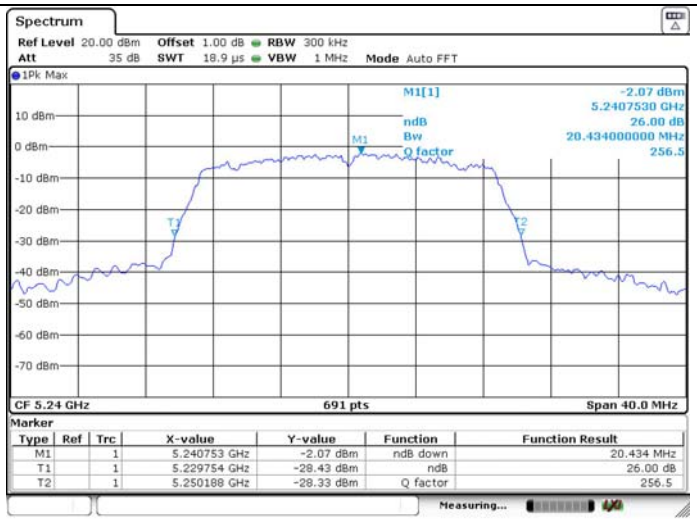
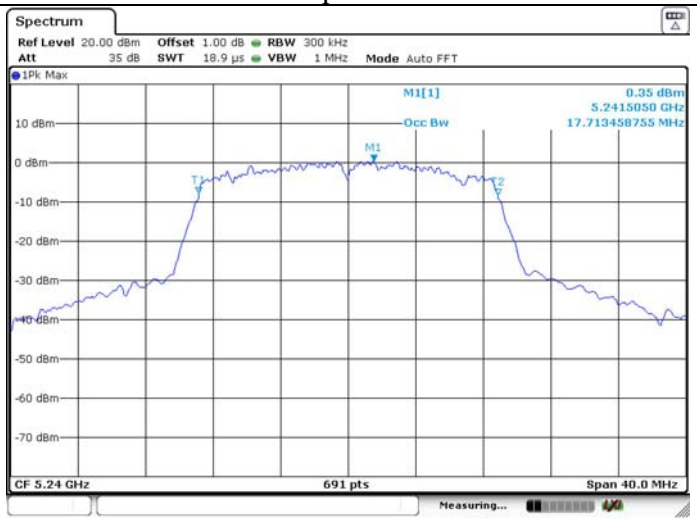
Note :

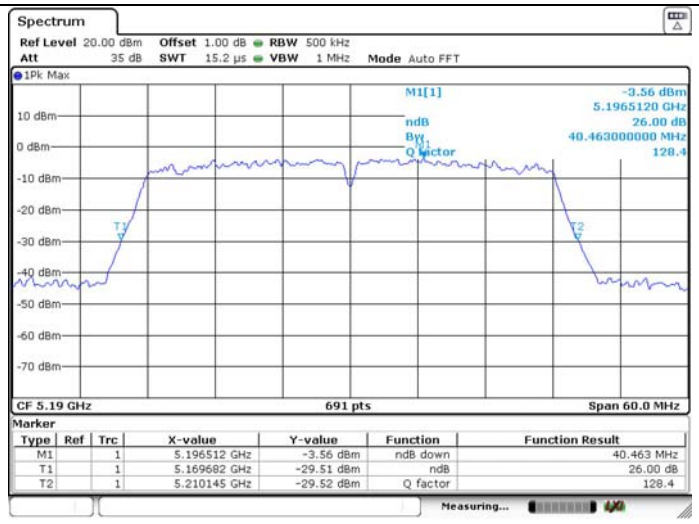
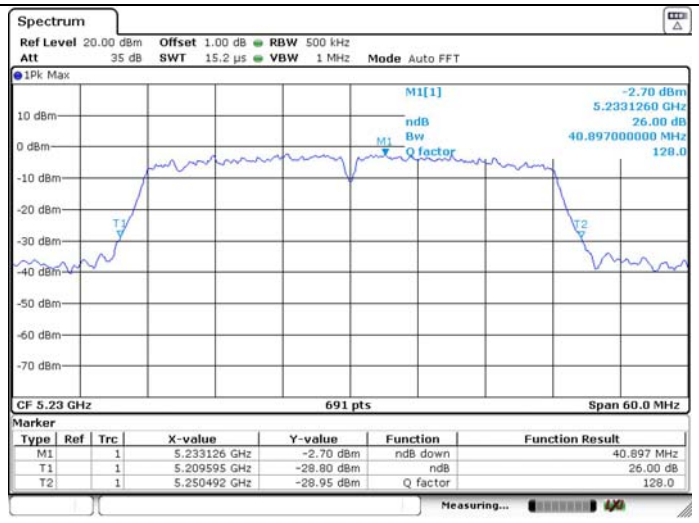
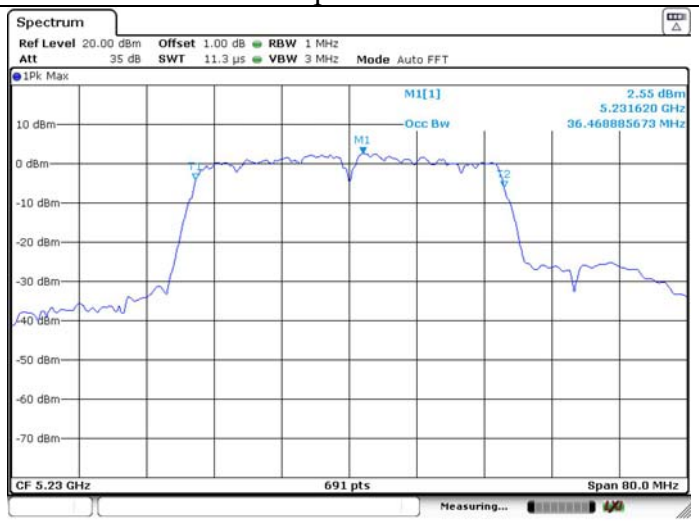
1:For Band U-NII-2A and U-NII-2C,the maximum conducted output power limit is 250mw or 11+10×Log B, which is lesser,where B is the 26dB Bandwidth in MHz.So in this section,the maximum conducted output power limit can calculate with 26dB Bandwidth.

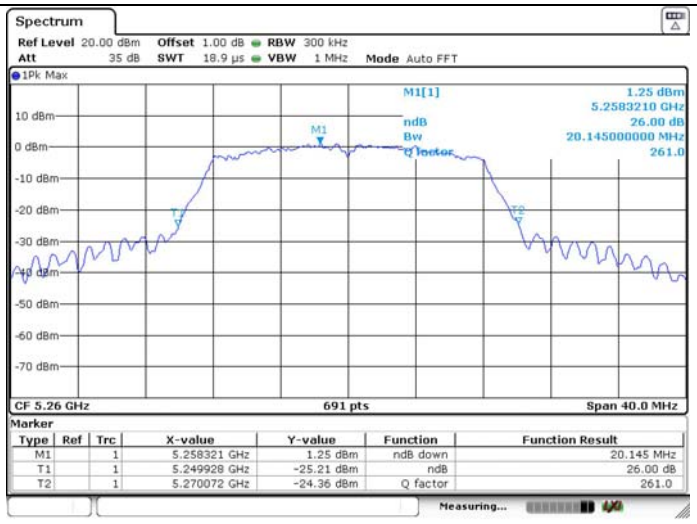
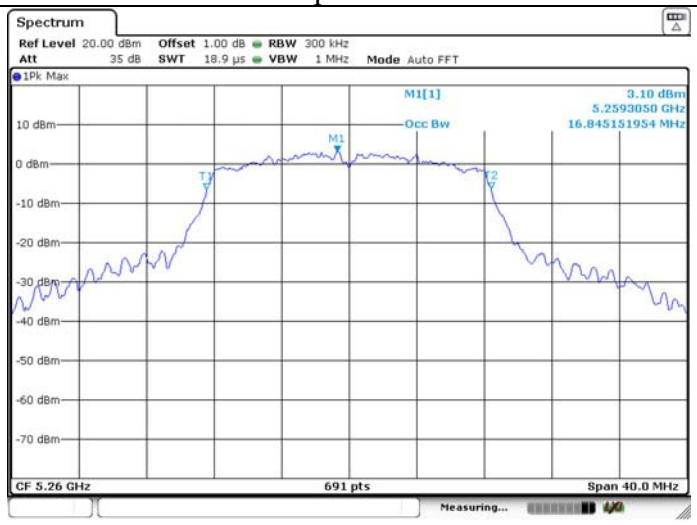
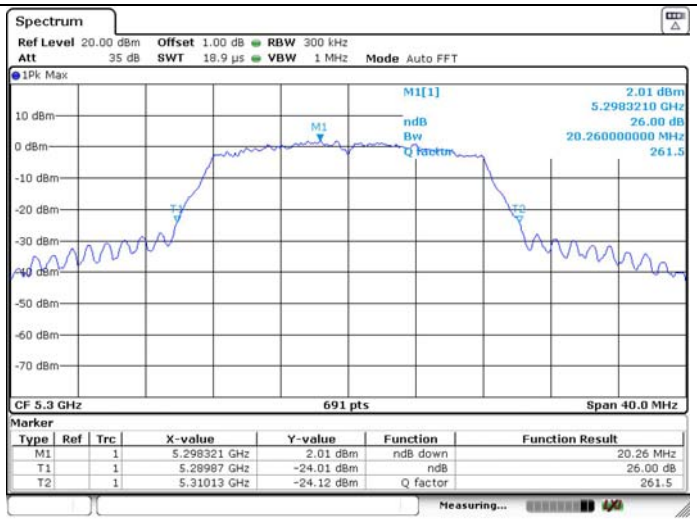
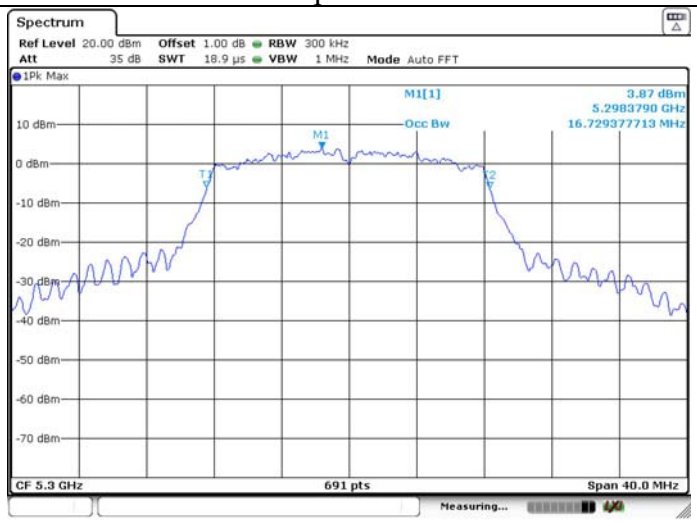
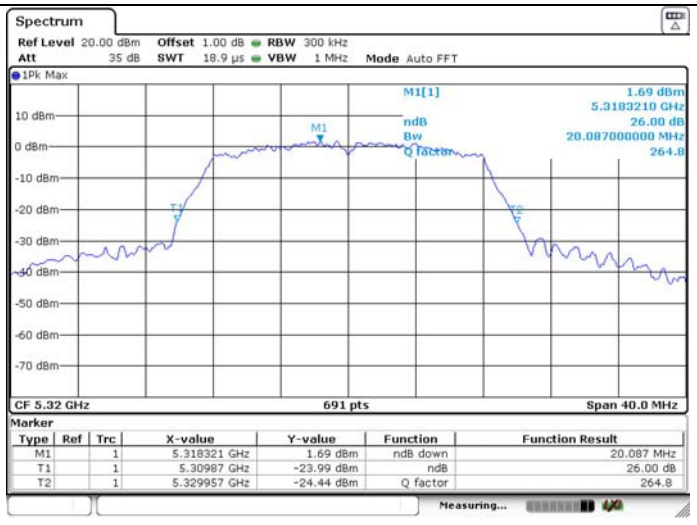
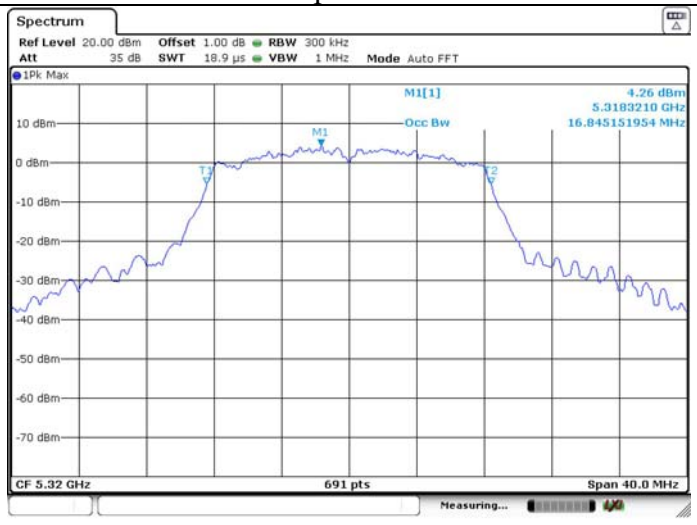
2:All antenna are all tested , ANT1 only worse case is reported

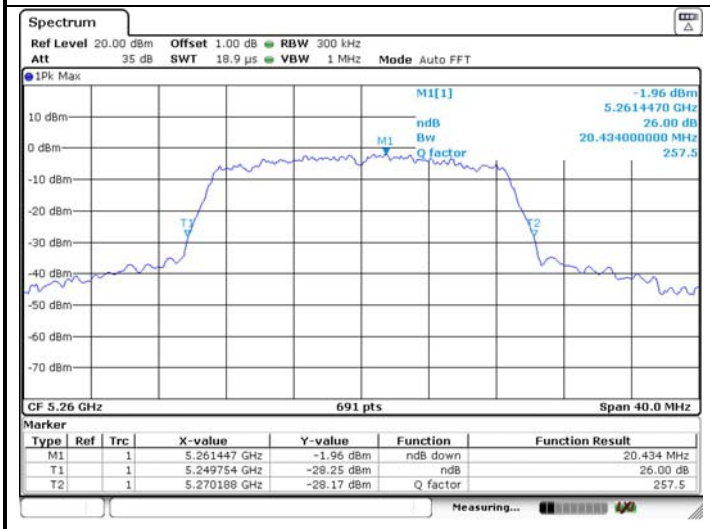
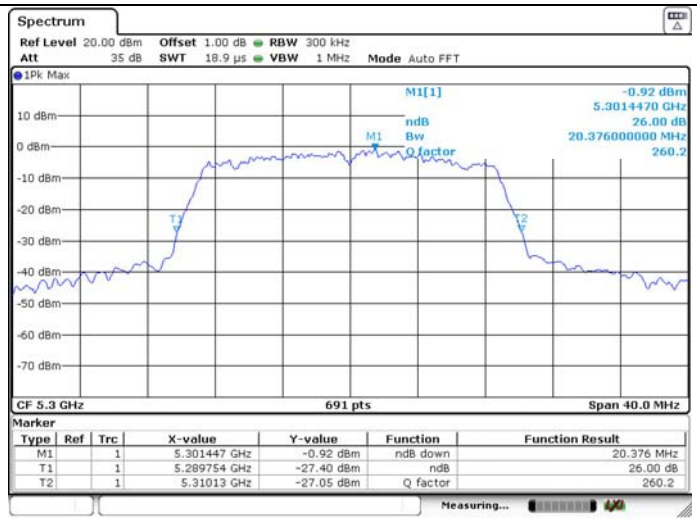
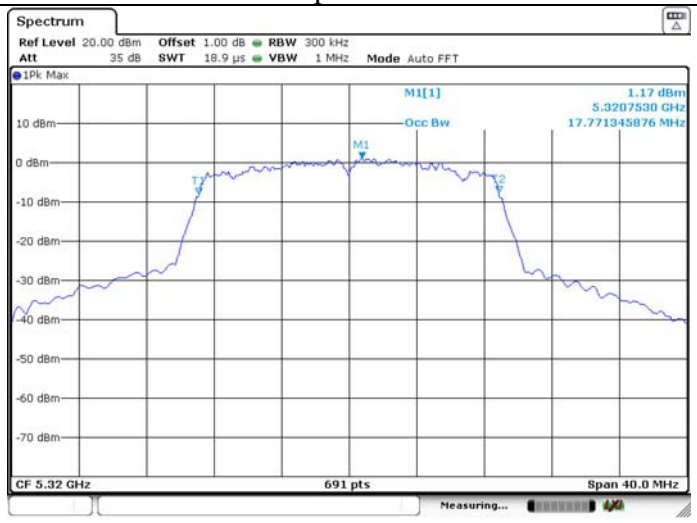
3.6. Test Result

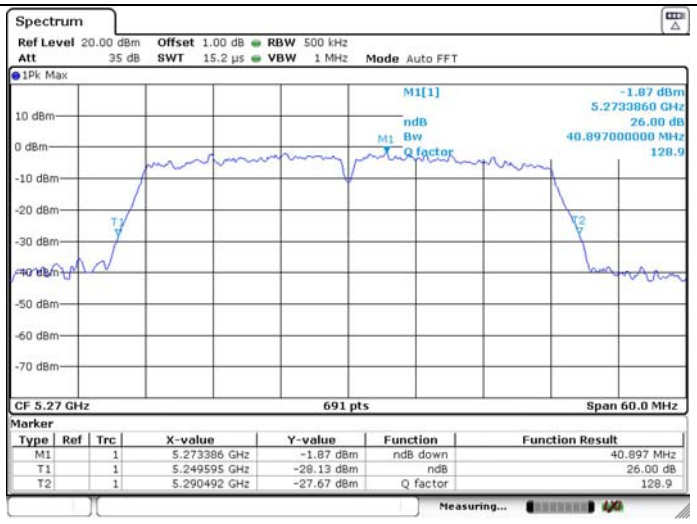
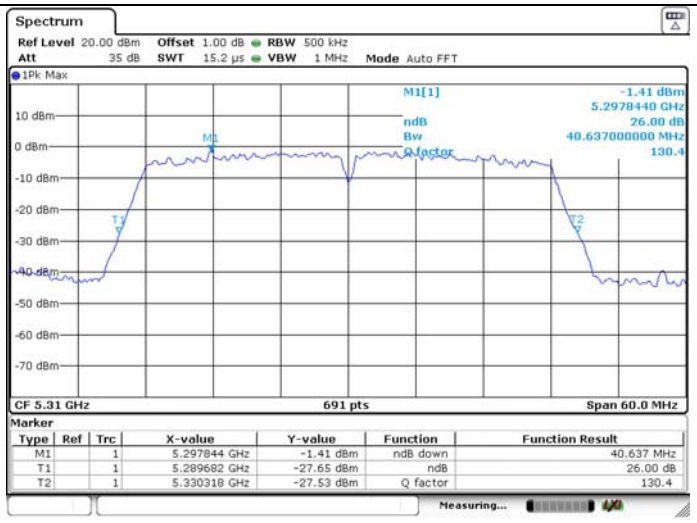
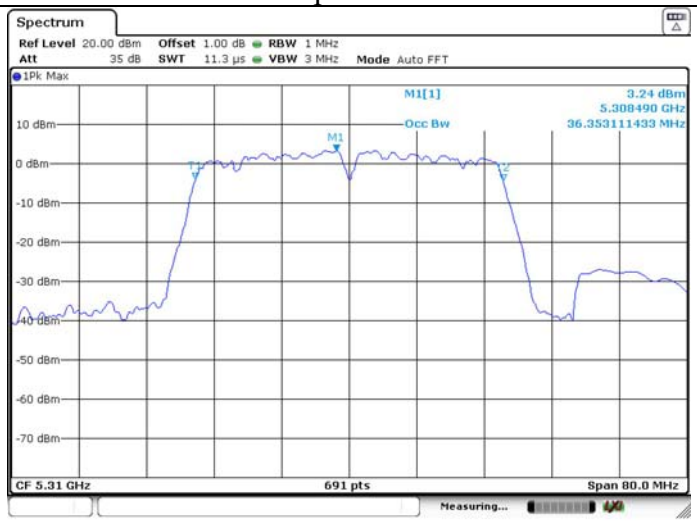
U-NII-1 IEEE 802.11a 5180MHz	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-1 IEEE 802.11a 5200MHz	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-1 IEEE 802.11a 5240MHz	
26dB Bandwidth	99% Occupied Bandwidth
	

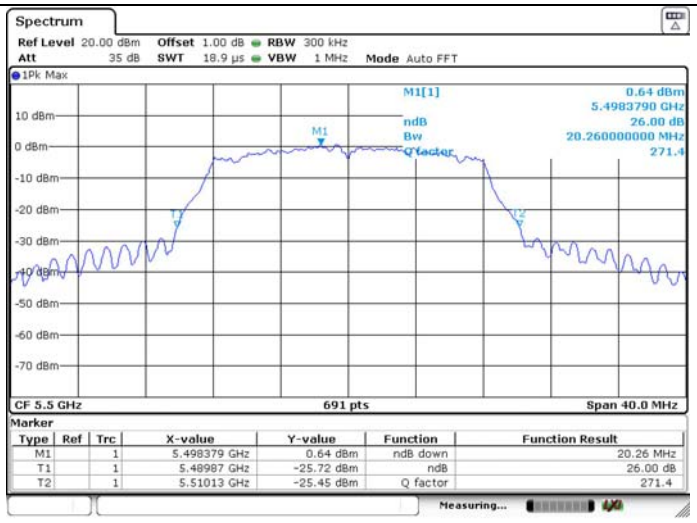
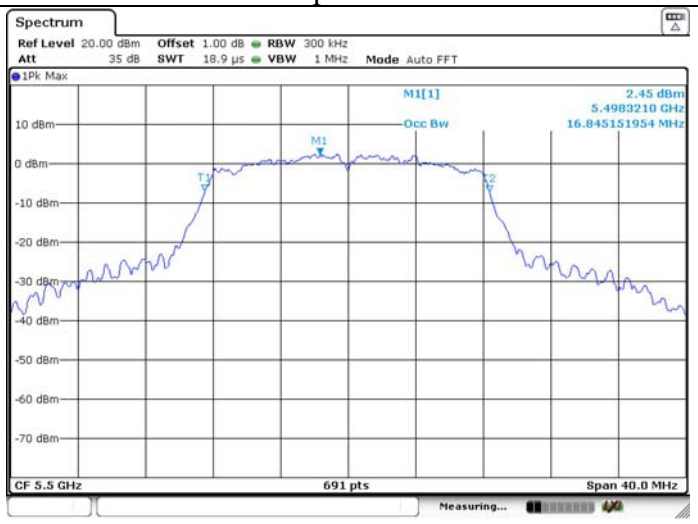
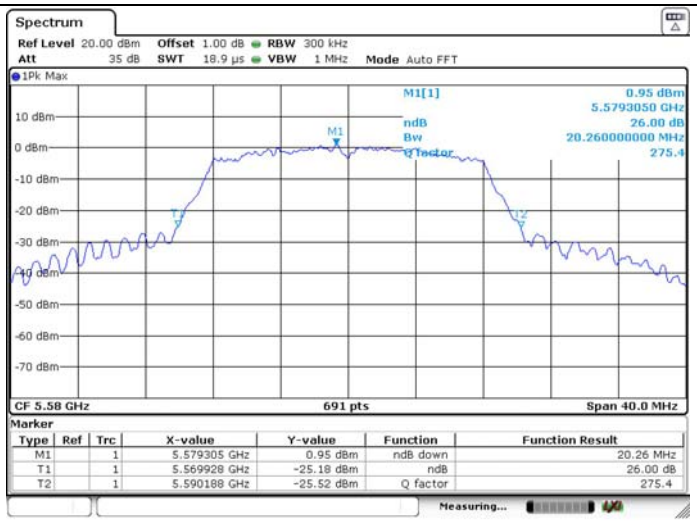
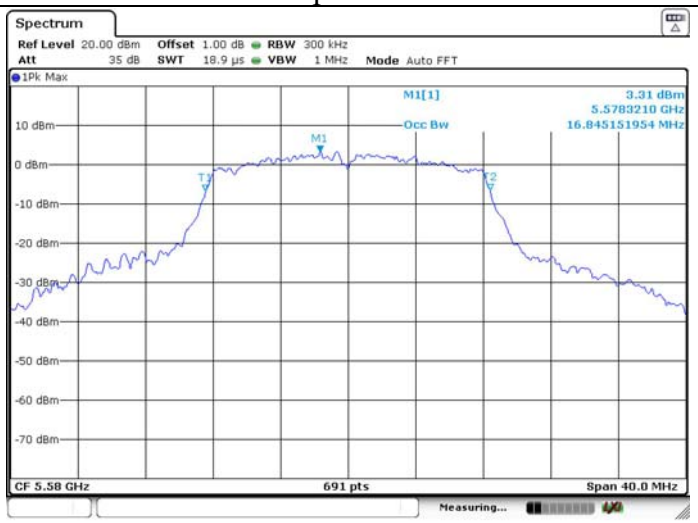
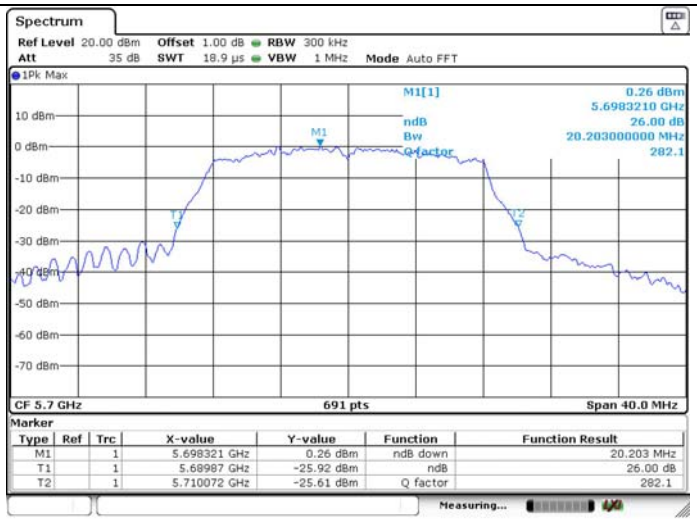
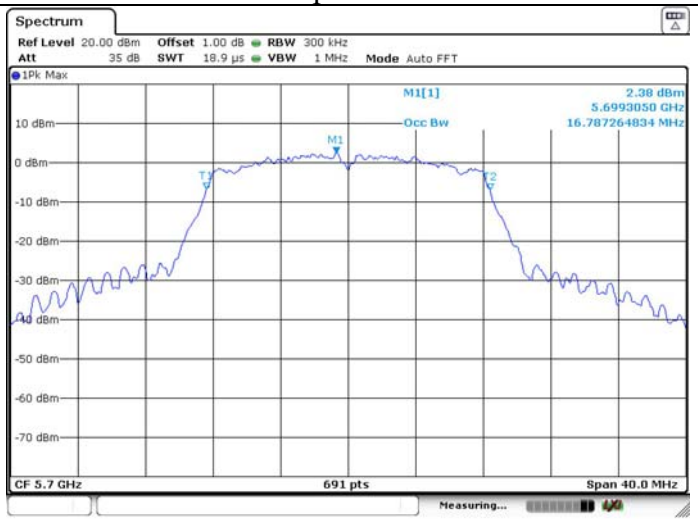
U-NII-1 IEEE 802.11n HT20 5180MHz	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-1 IEEE 802.11n HT20 5200MHz	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-1 IEEE 802.11n HT20 5240MHz	
26dB Bandwidth	99% Occupied Bandwidth
	

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

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

U-NII-2A 802.11n HT20 5260MHz	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2A 802.11n HT20 5300MHz	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2A IEEE 802.11n HT20 5320MHz	
26dB Bandwidth	99% Occupied Bandwidth
	

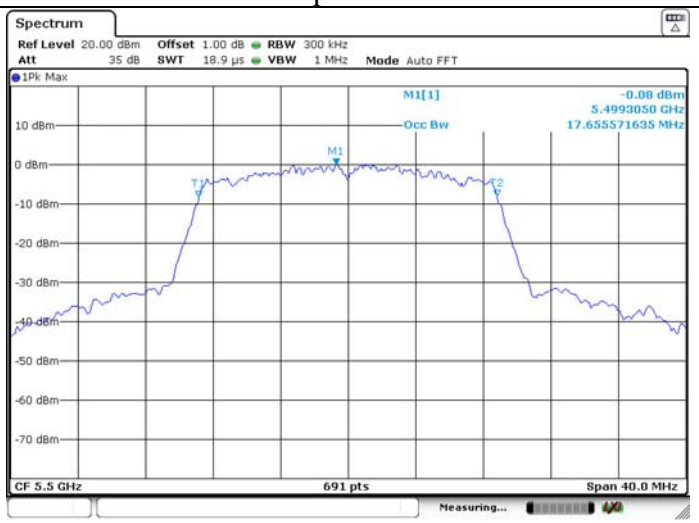
U-NII-2A IEEE 802.11n HT40 5270MHz	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2A IEEE 802.11n HT40 5310MHz	
26dB Bandwidth	99% Occupied Bandwidth
	

U-NII-2C IEEE 802.11a 5500MHz	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2C IEEE 802.11a 5580MHz	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2C IEEE 802.11a 5700MHz	
26dB Bandwidth	99% Occupied Bandwidth
	

U-NII-2C IEEE 802.11n HT20 5500MHz

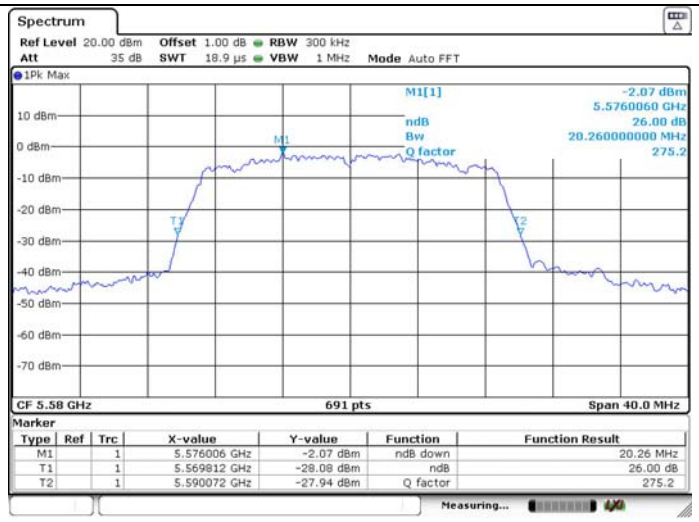
26dB Bandwidth

99% Occupied Bandwidth

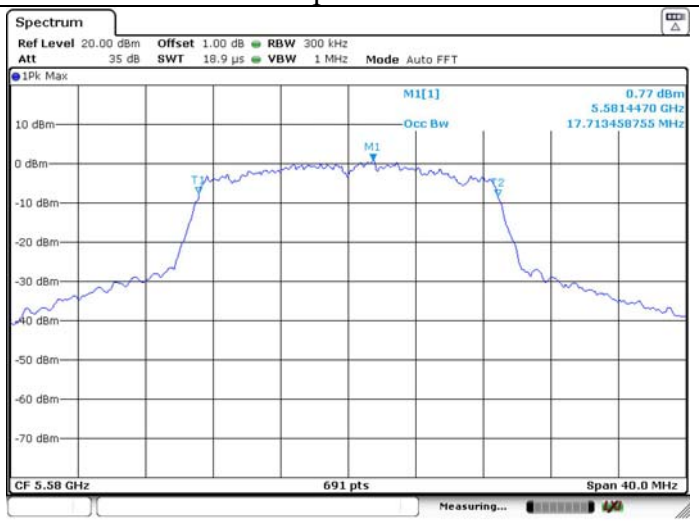


U-NII-2C IEEE 802.11n HT20 5580MHz

26dB Bandwidth



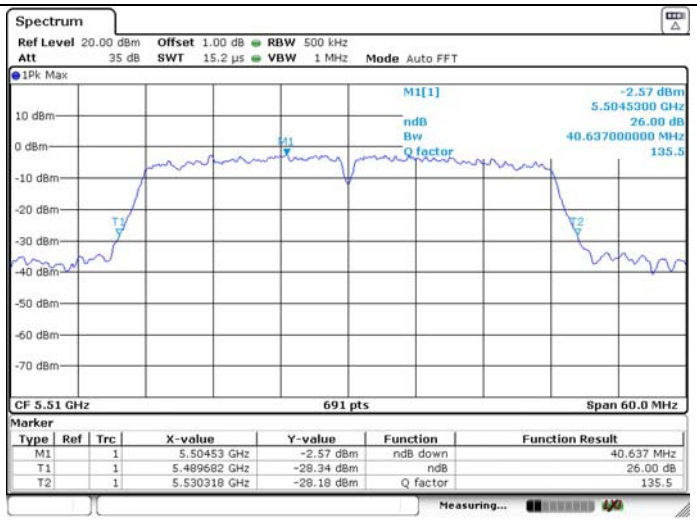
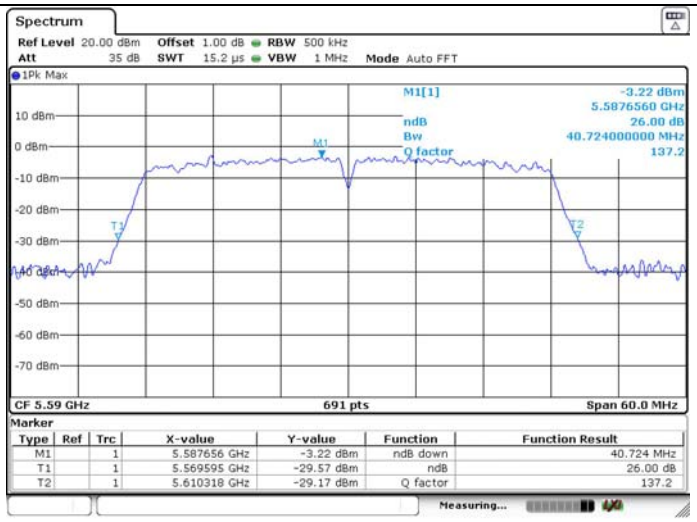
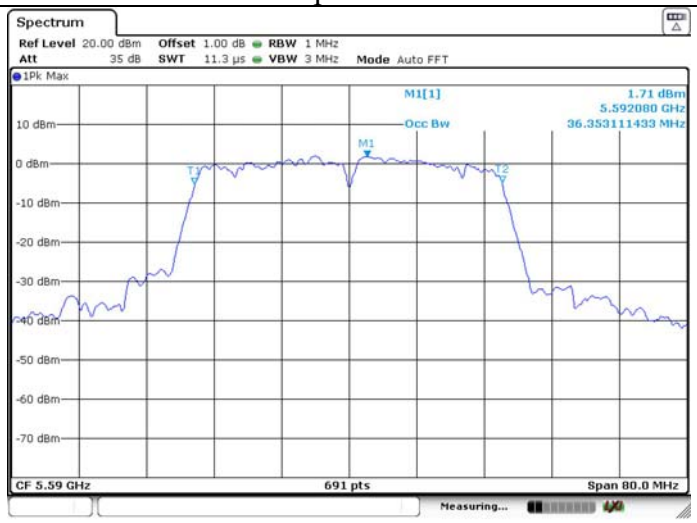
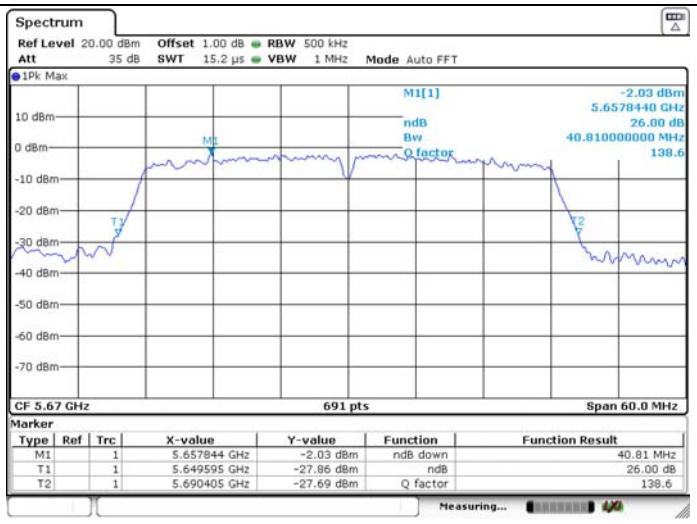
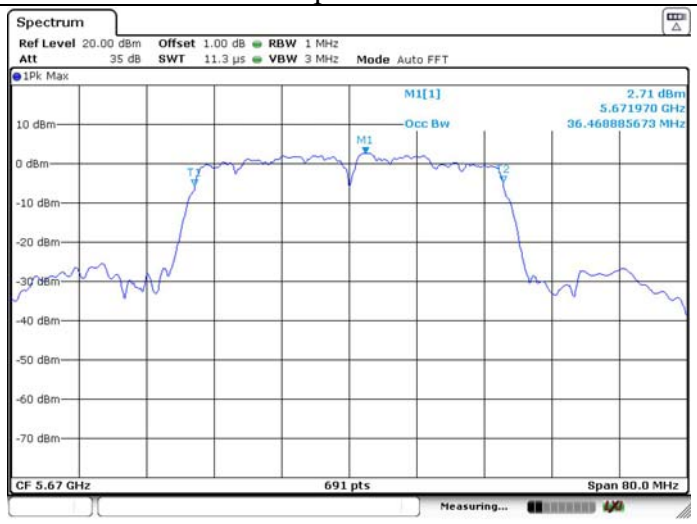
99% Occupied Bandwidth

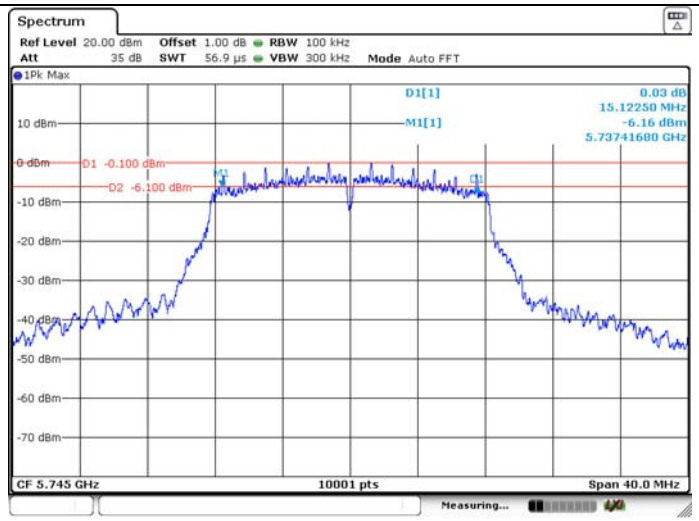
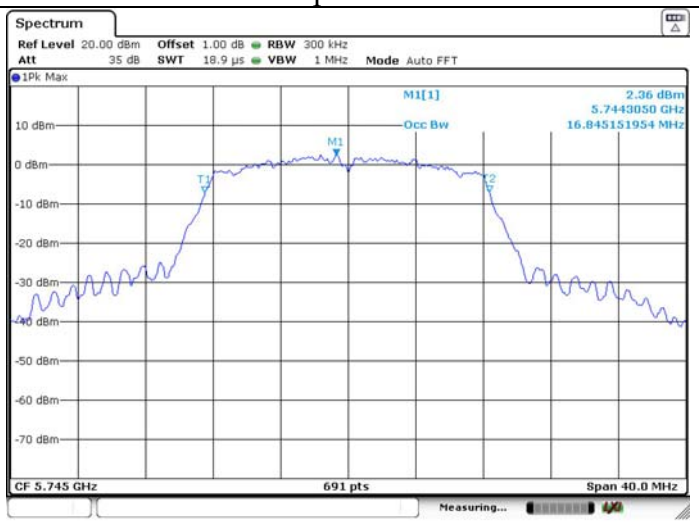
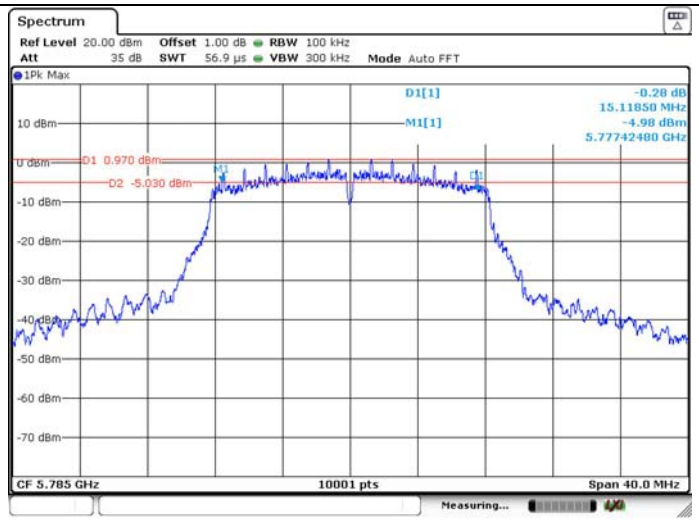
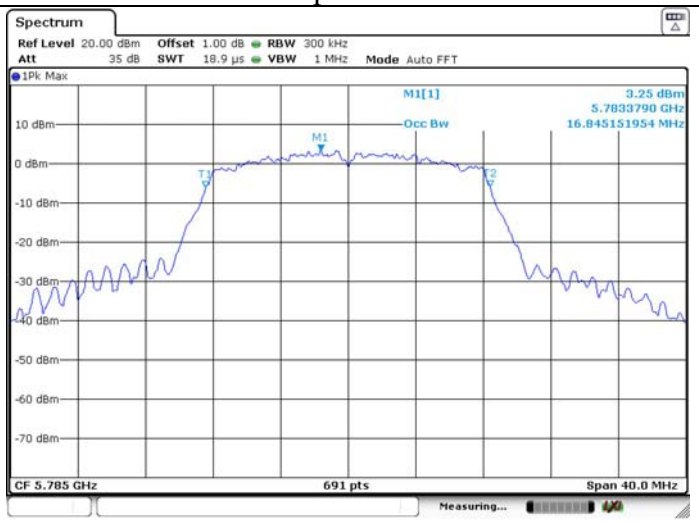
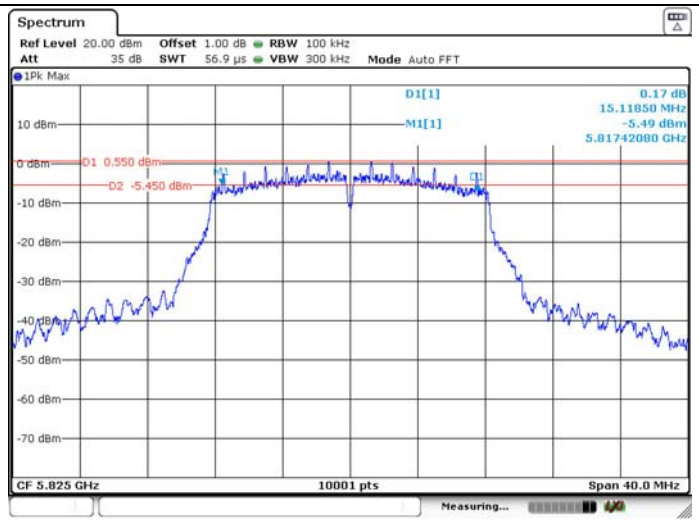
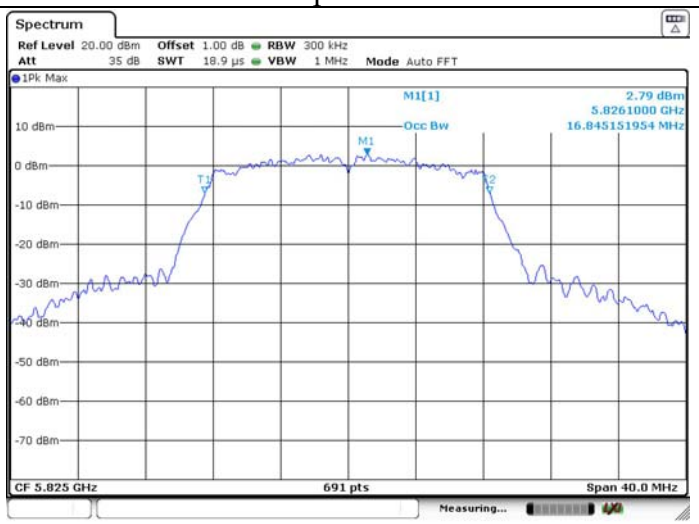


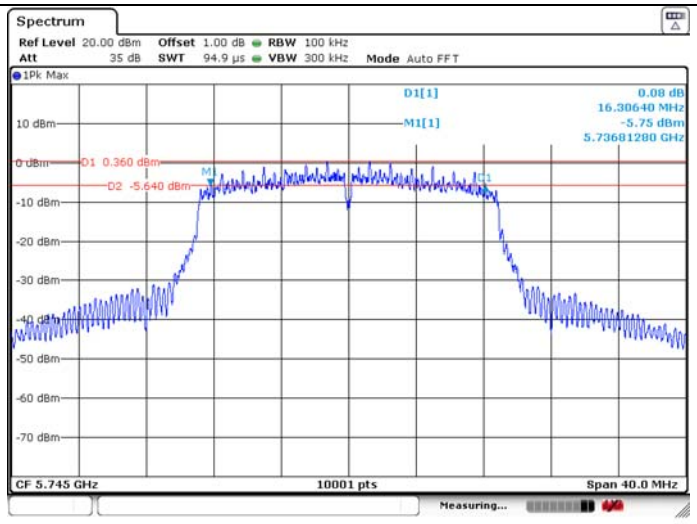
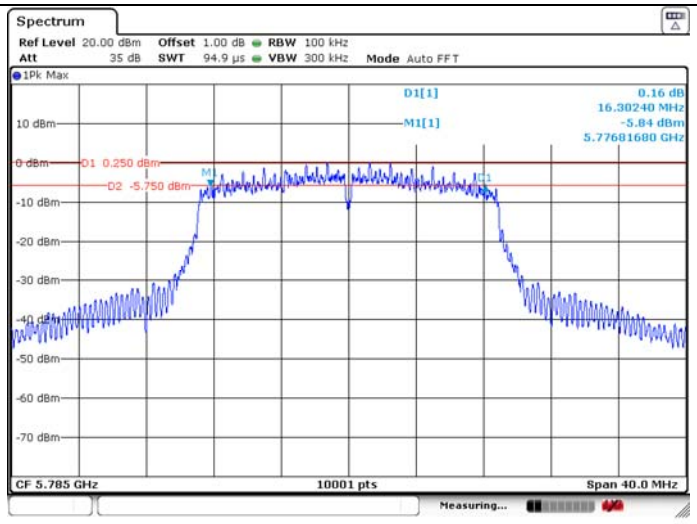
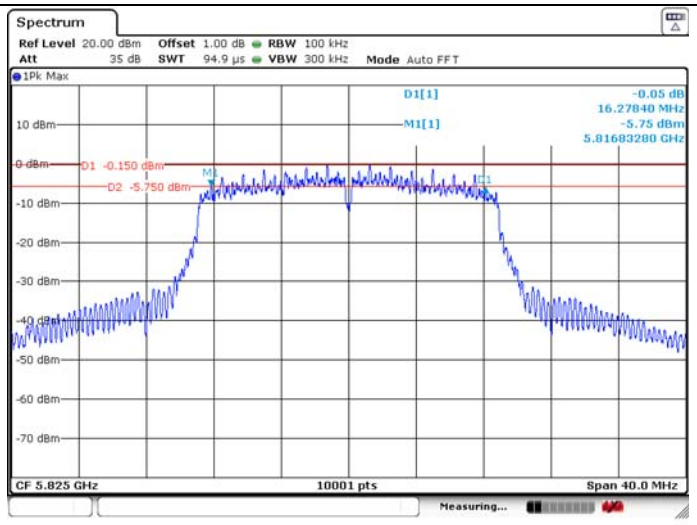
U-NII-2C IEEE 802.11n HT20 5700MHz

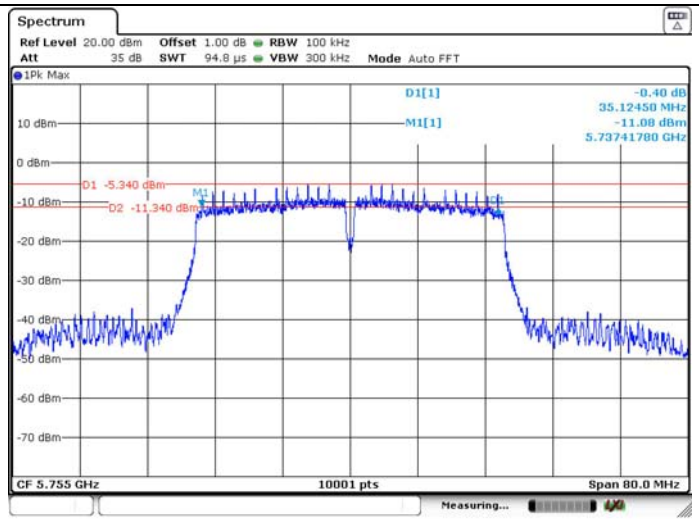
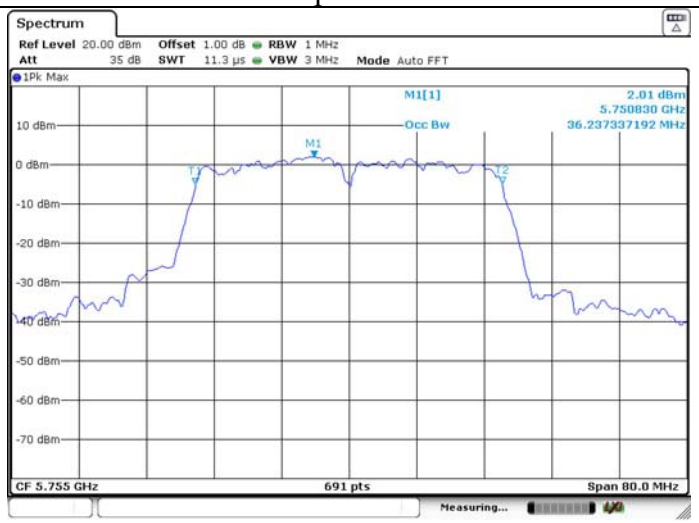
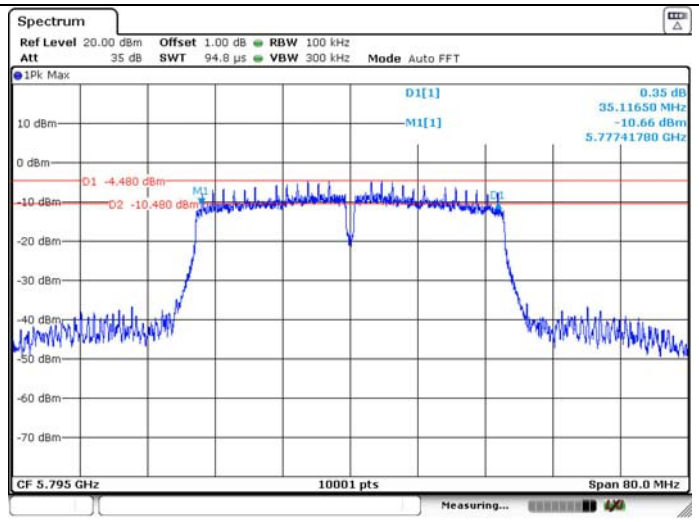
26dB Bandwidth

99% Occupied Bandwidth

U-NII-2C IEEE 802.11n HT40 5510MHz	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2C IEEE 802.11n HT40 5590MHz	
26dB Bandwidth	99% Occupied Bandwidth
	
U-NII-2C IEEE 802.11n HT40 5670MHz	
26dB Bandwidth	99% Occupied Bandwidth
	

U-NII-3 IEEE 802.11a 5745MHz	
6dB Bandwidth	99% Occupied Bandwidth
	
U-NII-3 IEEE 802.11a 5785MHz	
6dB Bandwidth	99% Occupied Bandwidth
	
U-NII-3 IEEE 802.11a 5825MHz	
6dB Bandwidth	99% Occupied Bandwidth
	

U-NII-3 IEEE 802.11n HT20 5745MHz	
6dB Bandwidth	99% Occupied Bandwidth
	
U-NII-3 IEEE 802.11n HT20 5785MHz	
6dB Bandwidth	99% Occupied Bandwidth
	
U-NII-3 IEEE 802.11n HT20 5825MHz	
6dB Bandwidth	99% Occupied Bandwidth
	

U-NII-3 IEEE 802.11n HT40 5755MHz	
6dB Bandwidth	99% Occupied Bandwidth
	
U-NII-3 IEEE 802.11n HT40 5795MHz	
6dB Bandwidth	99% Occupied Bandwidth
	

Note : All modulations are all tested ,only ANT1 worse case is reported.

4. MAXIMUM CONDUCTED OUTPUT POWER

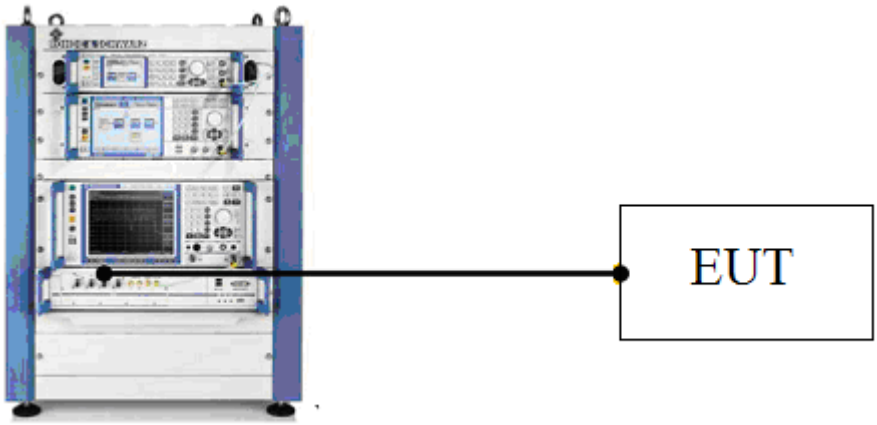
4.1. Limit

Band	EUT Type	Limit
U-NII-1	Outdoor Access Point	1W(30dBm) (Max. e.i.r.p≦125mW at any elevation angle above 30 degrees as measured from the horizon)
	Indoor Access Point	1W(30dBm)
	Fixed point-to-point Access Point	1W(30dBm)
	Mobile and Portable Client Device	250mW(23.98dBm)
U-NII-2A	All Device	250mW(23.98dBm) or 11dBm+10 log B,Which is lesser. (B is 26dB Bandwidth in MHz)
U-NII-2C	All Device	250mW(23.98dBm) or 11dBm+10 log B,Which is lesser. (B is 26dB Bandwidth in MHz)
U-NII-3	All Device	1W(30dBm)

Note:

For the Band U-NII-2A and U-NII-2C,the maximum conducted output power limit calculate result refer to section 3.5.

4.2. Test Setup



4.3. Test Procedure

a. Connect EUT antenna terminal to the OSP-B157WB with RF cable.
b. Set the EUT transmit continuously with maximum output power.
c. Through the test software in TS8897 to control a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.
d. Repeat above procedures until all modes and channels were measured.
e. Record the results in the test report.

4.4. Test Result

Temperature	24.9℃	Relative Humidity			62%	Test Voltage	DC 3.3V	
BAND	Test Mode	Fre (MHz)	Conducted AVG Output Power (dBm)		Total Conducted Output Power (W)	Total Conducted Output Power (dBm)	Limit (dBm)	Result
			Ant 1	Ant 2				
U-NII-1	IEEE 802.11a	5180	10.82	10.18	0.0121	10.82	23.50	PASS
		5200	11.28	10.32	0.0134	11.28	23.50	PASS
		5240	11.49	11.64	0.0146	11.64	23.50	PASS
	IEEE 802.11n HT20	5180	7.55	7.81	0.01172	10.69	23.50	PASS
		5200	7.36	8.76	0.01295	11.12	23.50	PASS
		5240	7.97	9.22	0.01463	11.65	23.50	PASS
	IEEE 802.11n HT40	5190	7.34	8.05	0.01181	10.72	23.50	PASS
		5230	7.64	8.62	0.01308	11.17	23.50	PASS
U-NII-2A	IEEE 802.11a	5260	11.49	11.90	0.01548	11.90	23.50	PASS
		5300	11.57	12.09	0.01618	12.09	23.50	PASS
		5320	11.74	12.59	0.01817	12.59	23.50	PASS
	IEEE 802.11n HT20	5260	8.29	7.62	0.01253	10.98	23.50	PASS
		5300	8.36	9.05	0.01489	11.73	23.50	PASS
		5320	8.64	9.63	0.01648	12.17	23.50	PASS
	IEEE 802.11n HT40	5270	8.26	9.28	0.01516	11.81	23.50	PASS
		5310	8.47	9.66	0.01628	12.12	23.50	PASS

BAND	Test Mode	Fre (MHz)	Conducted AVG Output Power (dBm)		Total Conducted Output Power (W)	Total Conducted Output Power (dBm)	Limit (dBm)	Result
			Ant 1	Ant 2				
U-NII-2C	IEEE 802.11a	5500	11.47	11.89	0.01546	11.89	23.50	PASS
		5580	11.62	12.51	0.01784	12.51	23.50	PASS
		5700	11.95	11.25	0.01567	11.95	23.50	PASS
	IEEE 802.11n HT20	5500	8.96	9.18	0.01614	12.08	23.50	PASS
		5580	9.04	9.75	0.01746	12.42	23.50	PASS
		5700	9.41	8.51	0.01582	11.99	23.50	PASS
	IEEE 802.11n HT40	5510	8.68	9.36	0.01601	12.04	23.50	PASS
		5590	8.65	9.36	0.01596	12.03	23.50	PASS
		5670	9.52	10.14	0.01926	12.85	23.50	PASS
U-NII-3	IEEE 802.11a	5745	11.91	11.35	0.01551	11.91	29.54	PASS
		5785	12.60	12.21	0.01819	12.60	29.54	PASS
		5825	11.90	11.56	0.01549	11.90	29.54	PASS
	IEEE 802.11n HT20	5745	9.47	8.74	0.01633	12.13	29.54	PASS
		5785	10.08	9.57	0.01925	12.84	29.54	PASS
		5825	9.49	8.82	0.01651	12.18	29.54	PASS
	IEEE 802.11n HT40	5755	9.69	9.16	0.01754	12.44	29.54	PASS
		5795	10.04	9.65	0.01932	12.86	29.54	PASS

5. PEAK POWER SPECTRAL DENSITY

5.1. Limit

Band	EUT Type	Limit
U-NII-1	Outdoor Access Point	17dBm/MHz
	Indoor Access Point	17dBm/MHz
	Fixed point-to-point Access Point	17dBm/MHz
	Mobile and Portable Client Device	11dBm/MHz
U-NII-2A	All Device	11dBm/MHz
U-NII-2C	All Device	11dBm/MHz
U-NII-3	All Device	30dBm/500KHz

5.2. Test Setup

5.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	1MHz(For U-NII-1&U-NII-2A&U-NII-2C) 500KHz(For U-NII-3)
VBW	3MHz(For U-NII-1&U-NII-2A&U-NII-2C) 2MHz(For U-NII-3)
Span	encompass the entire 26 dB EBW or 99% OBW of the signal
Sweep Time	Auto
Number of Sweep Point	≥2×SPAN/RBW
Detector	RMS(power averaging)
Trace Average	≥100 traces

5.4. Test Procedure

a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
b. Spectrum analyzer setting parameters in accordance with section 5.3.
c. Set the EUT transmit continuously with maximum output power.
d. Allow trace to stabilize, use the marker-to-peak function to set the marker to the average of the emission.
e. If the duty cycle of test siganl＜98%,the result=max measured value+10×log(1/duty cycle);
If the duty cycle of test siganl≥98%,the esult=max measured value.
f. Repeat above procedures until all modes and channels were measured.
g. Record the results in the test report.

5.5. Test Result

Temperature		24.9℃	Relative Humidity		62%	Test Voltage	DC5V	
BAND	Test Mode	Fre (MHz)	Power Density (dBm/MHz)		Duty Factor (dB)	Total Power Density (dBm/MHz)	Limit (dBm/MHz)	Result
			Ant 1	Ant 2				
U-NII-1	IEEE 802.11a	5180	0.58	0.09	0.00	0.58	10.52	PASS
		5200	1.01	0.31	0.00	1.01	10.52	PASS
		5240	1.96	1.24	0.00	1.96	10.52	PASS
	IEEE 802.11n HT20	5180	-2.66	-2.92	0.00	0.22	10.52	PASS
		5200	-2.07	-2.48	0.00	0.74	10.52	PASS
		5240	-1.08	-1.59	0.00	1.68	10.52	PASS
	IEEE 802.11n HT40	5190	-6.58	-5.46	0.17	-2.80	10.52	PASS
		5230	-5.47	-4.24	0.17	-1.63	10.52	PASS
U-NII-2A	IEEE 802.11a	5260	1.85	1.02	0.00	1.85	10.52	PASS
		5300	2.72	1.57	0.00	2.72	10.52	PASS
		5320	2.83	2.16	0.00	2.83	10.52	PASS
	IEEE 802.11n HT20	5260	-0.98	-2.14	0.00	1.49	10.52	PASS
		5300	-0.13	-1.20	0.00	2.38	10.52	PASS
		5320	-0.06	-0.65	0.00	2.67	10.52	PASS
	IEEE 802.11n HT40	5270	-5.63	-4.00	0.17	-1.56	10.52	PASS
		5310	-4.59	-3.35	0.17	-0.75	10.52	PASS

BAND	Test Mode	Fre (MHz)	Power Density (dBm/MHz)		Duty Factor (dB)	Total Power Density (dBm/MHz)	Limit (dBm/MHz)	Result
			Ant 1	Ant 2				
U-NII-3C	IEEE 802.11a	5500	1.66	1.72	0.00	1.72	10.52	PASS
		5580	1.75	1.58	0.00	1.75	10.52	PASS
		5700	1.08	2.09	0.00	2.09	10.52	PASS
	IEEE 802.11n HT20	5500	-1.22	-0.76	0.00	2.03	10.52	PASS
		5580	-0.81	-0.81	0.00	2.20	10.52	PASS
		5700	-1.46	-0.49	0.00	2.06	10.52	PASS
	IEEE 802.11n HT40	5510	-4.21	-4.38	0.17	-1.11	10.52	PASS
		5590	-4.52	-4.49	0.17	-1.33	10.52	PASS
		5670	-4.40	-3.97	0.17	-1.00	10.52	PASS

BAND	Test Mode	Fre (MHz)	Power Density (dBm/500KHz)		Duty Factor (dB)	Total Power Density (dBm/500KHz)	Limit (dBm/500KHz)	Result
			Ant 1	Ant 2				
U-NII-3	IEEE 802.11a	5745	-1.13	-0.75	0.00	-0.75	29.52	PASS
		5785	-0.13	-0.31	0.00	-0.13	29.52	PASS
		5825	-0.78	-0.29	0.00	-0.29	29.52	PASS
	IEEE 802.11n HT20	5745	-3.79	-2.87	0.00	-0.30	29.52	PASS
		5785	-2.51	-2.27	0.00	0.62	29.52	PASS
		5825	-3.22	-2.76	0.00	0.03	29.52	PASS
	IEEE 802.11n HT40	5755	-6.19	-6.79	0.17	-3.30	29.52	PASS
		5795	-5.76	-6.05	0.17	-2.72	29.52	PASS

U-NII-1 IEEE 802.11a 5180MHz	
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	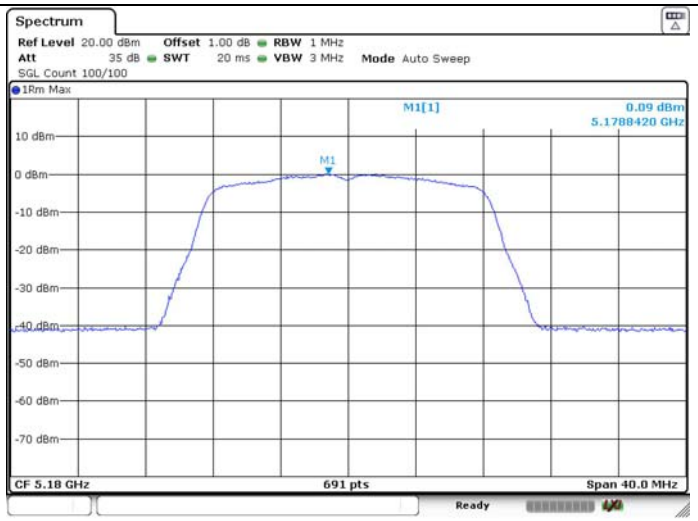
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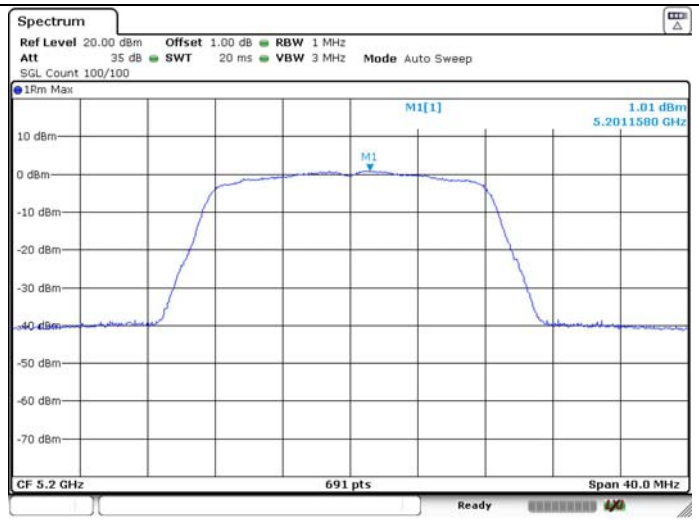	
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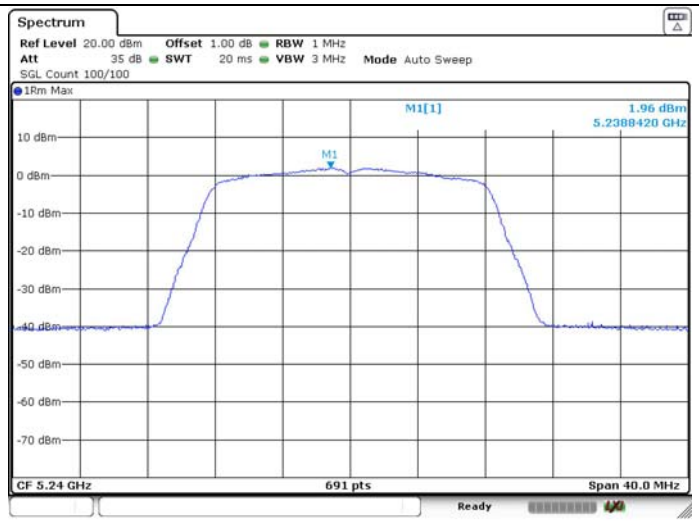	

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	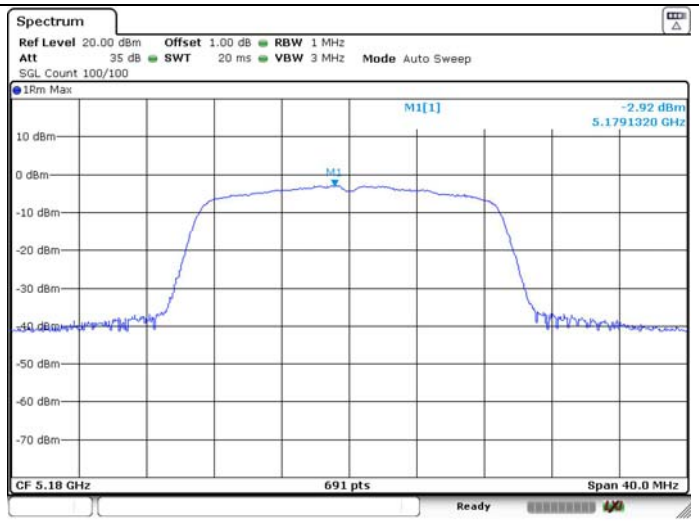
U-NII-1 IEEE 802.11n HT20 5200MHz	
ANT 1	**ANT 2**
	
U-NII-1 IEEE 802.11n HT20 5240MHz	
ANT 1	**ANT 2**
	

U-NII-1 IEEE 802.11n HT40 5190MHz	
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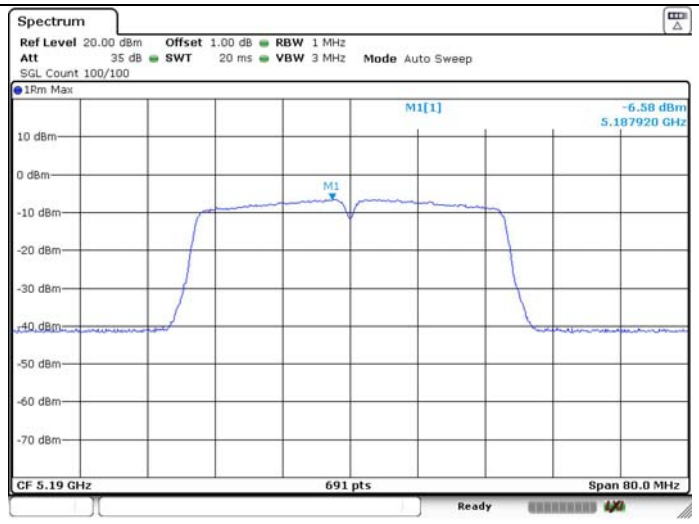	
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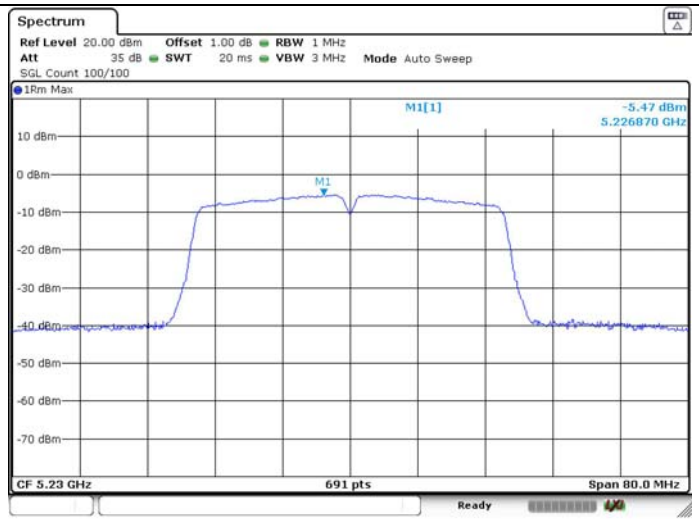	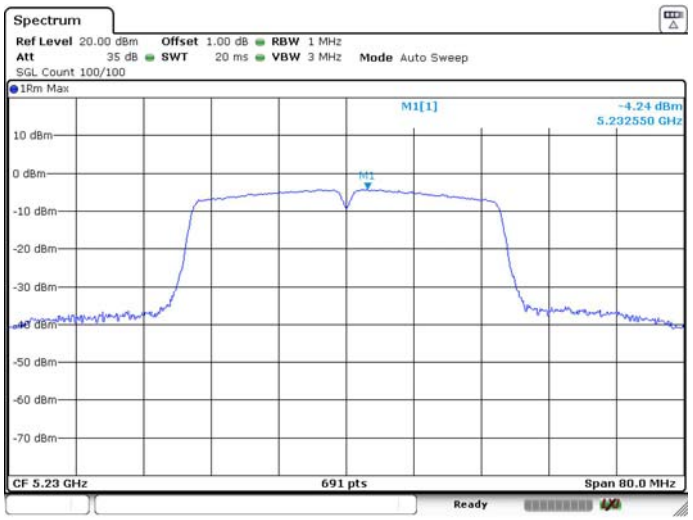

U-NII-2A IEEE 802.11a 5260MHz	
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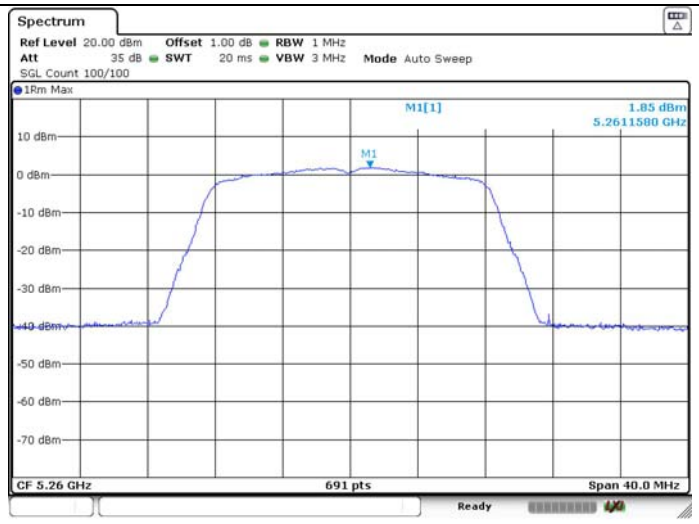	
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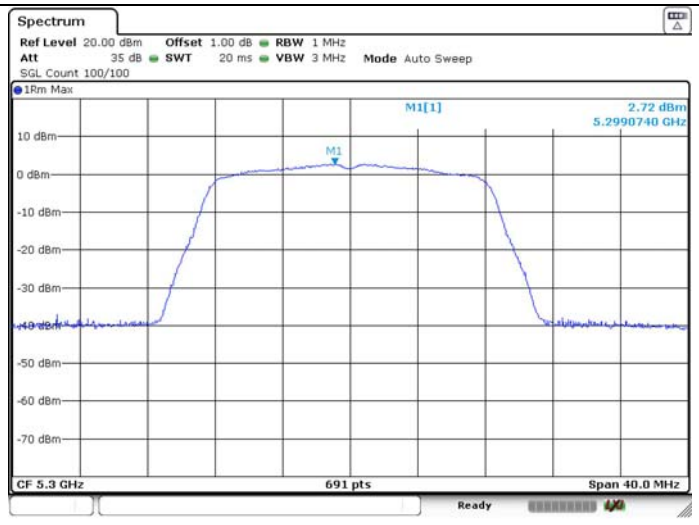	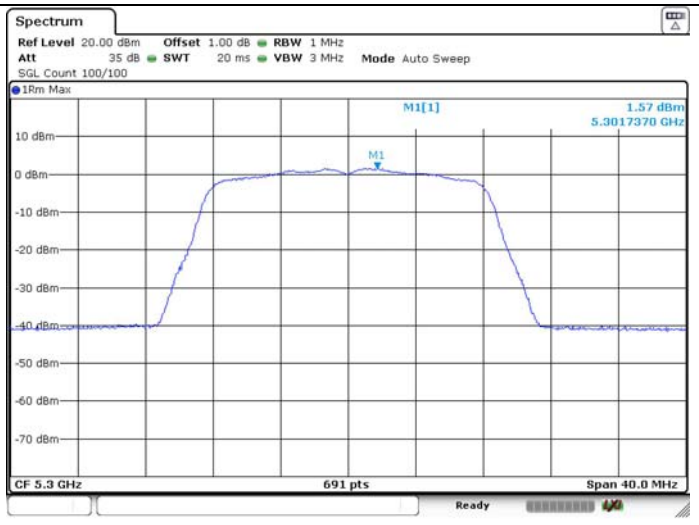
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ANT 1	**ANT 2**
	

U-NII-2A IEEE 802.11n HT20 5260MHz	
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	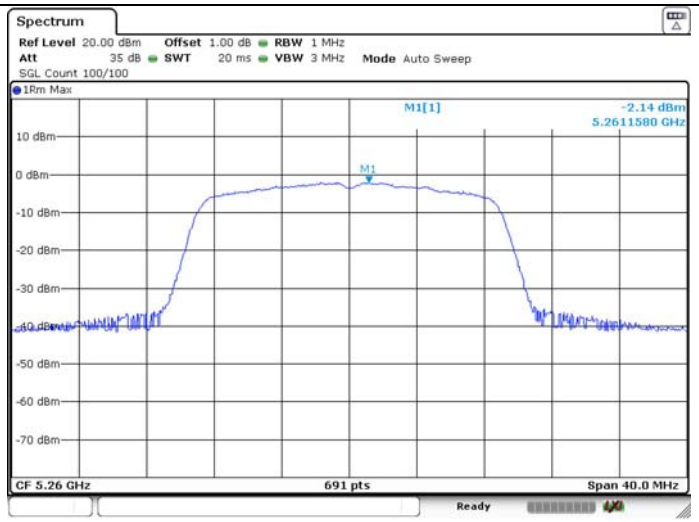
U-NII-2A IEEE 802.11n HT20 5300MHz	
ANT 1	**ANT 2**
	
U-NII-2A IEEE 802.11n HT20 5320MHz	
ANT 1	**ANT 2**
	

U-NII-2A IEEE 802.11n HT40 5270MHz	
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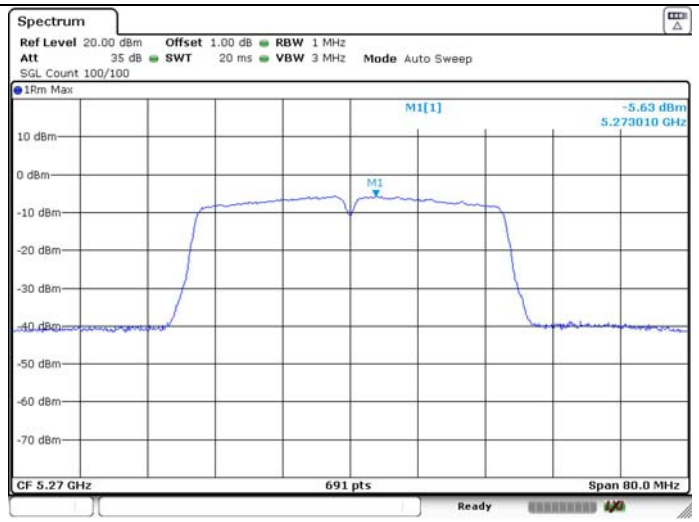	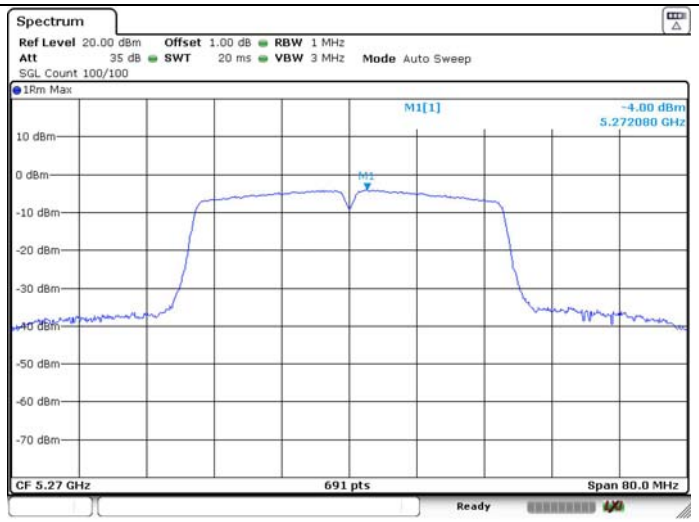
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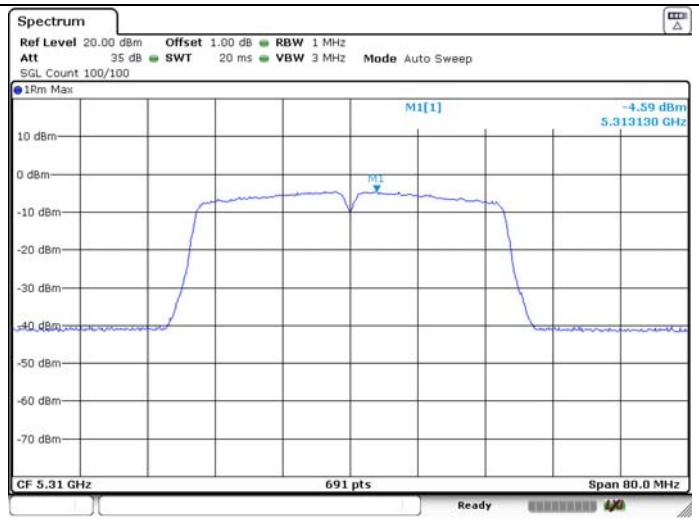	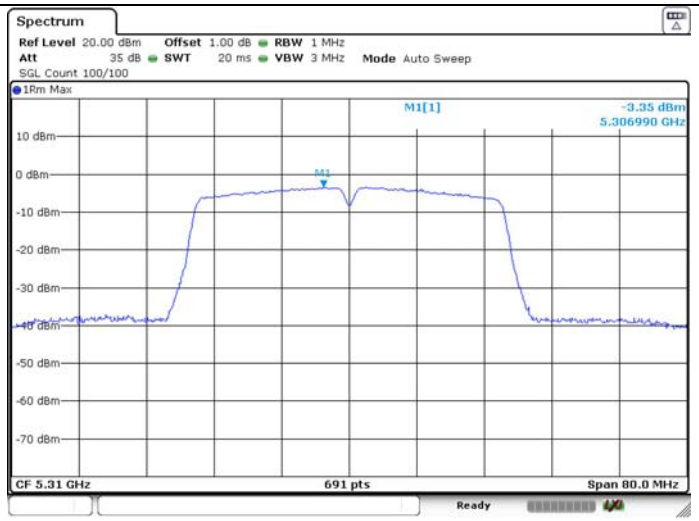

U-NII-2C 802.11a IEEE 5500MHz	
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U-NII-2C IEEE 802.11a 5580MHz	
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	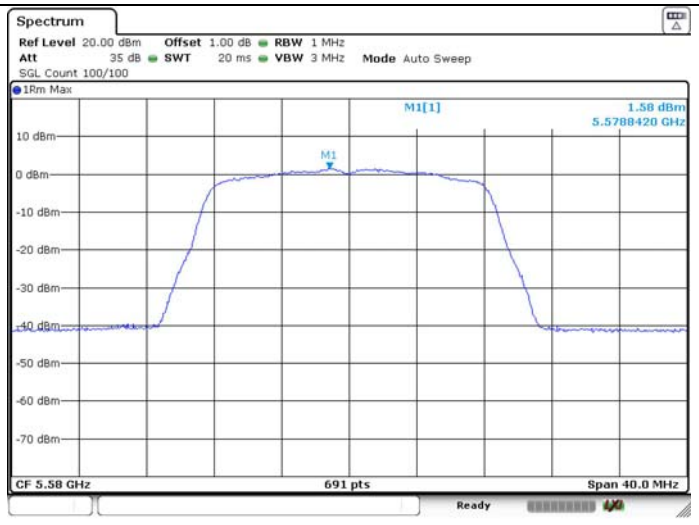
U-NII-2C IEEE 802.11a 5700MHz	
ANT 1	**ANT 2**
	

U-NII-2C IEEE 802.11n HT20 5500MHz	
ANT 1	**ANT 2**
	
U-NII-2C IEEE 802.11n HT20 5580MHz	
ANT 1	**ANT 2**
	
U-NII-2C IEEE 802.11n HT20 5700MHz	
ANT 1	**ANT 2**
	

U-NII-2C IEEE 802.11n HT40 5510MHz	
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	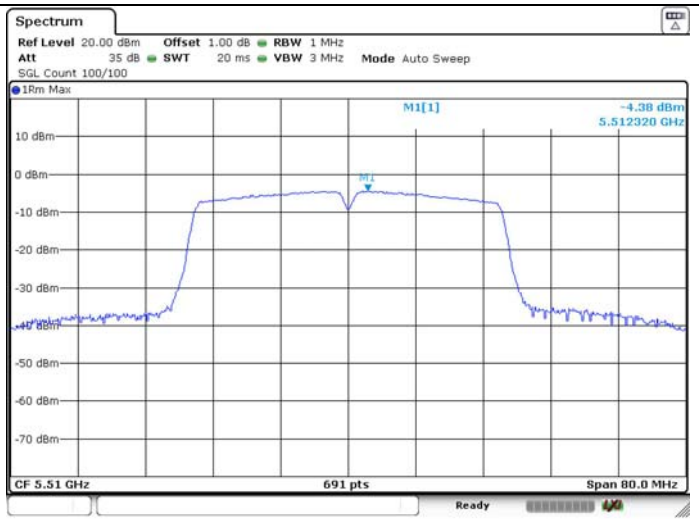
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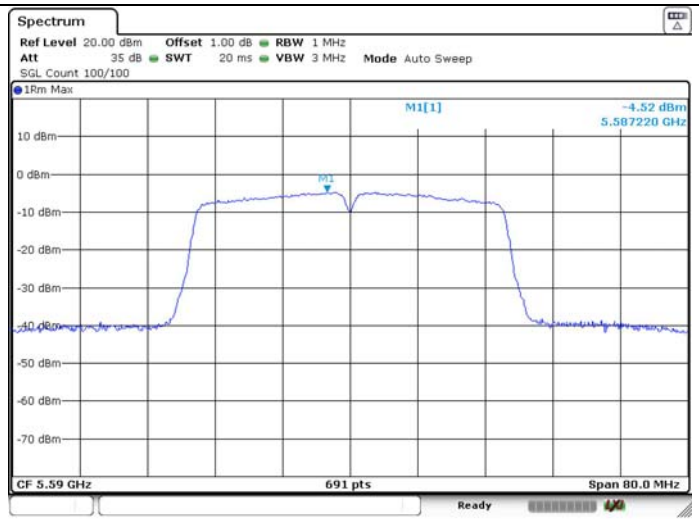	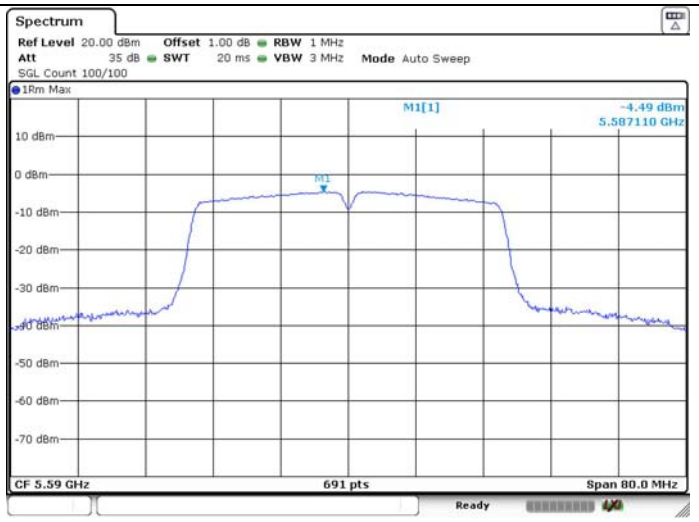
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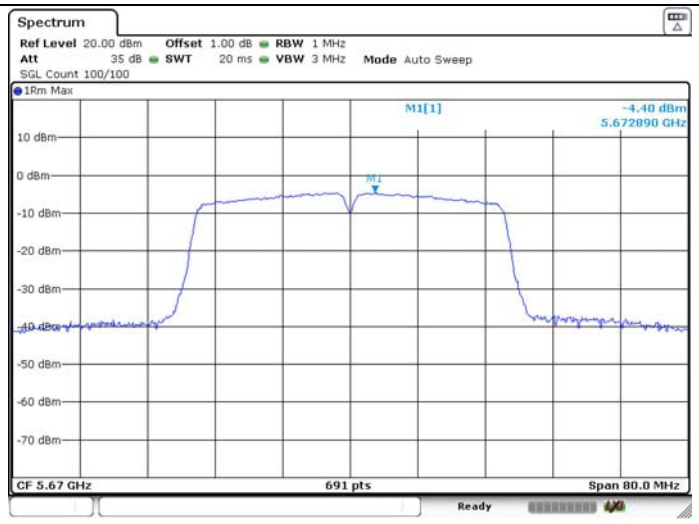	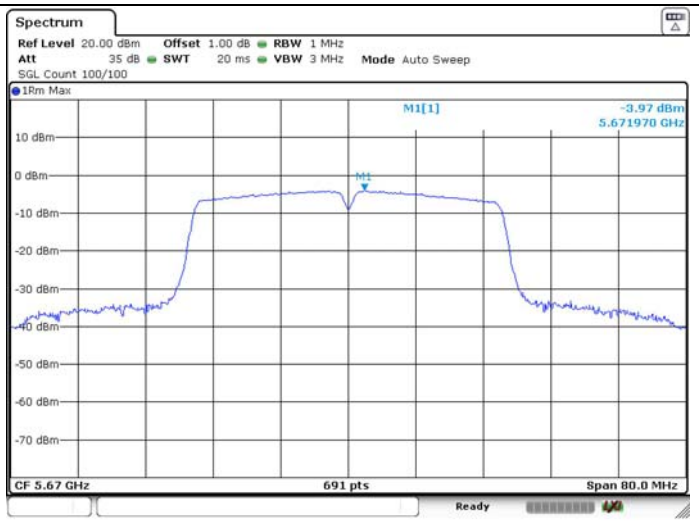

U-NII-3 IEEE 802.11a 5745MHz	
ANT 1	**ANT 2**
	
U-NII-3 IEEE 802.11a 5785MHz	
ANT 1	**ANT 2**
	
U-NII-3 IEEE 802.11a 5825MHz	
ANT 1	**ANT 2**