

# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

**Test Report No.** : W168R-D023  
**AGR No.** : A165A-160  
**Applicant** : Samsung Electronics Co Ltd  
**Address** : 19 Chapin Rd., Building D, Pine Brook, New Jersey, 07058  
**Manufacturer** : Samsung Electronics Co Ltd  
**Address** : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-742, Rep of Korea  
**Type of Equipment** : WLAN Access Point  
**FCC ID.** : A3LWEA514I  
**IC Certification No.** : 649E-WEA514I  
**Model Name** : WEA514i  
**Serial number** : N/A  
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## SUMMARY

The equipment complies with the regulation; *FCC PART 15 SUBPART E Section 15.407 and IC RSS-Gen Issue 4 Nov 2014 and RSS-247 Issue 1 May 2015*

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

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### Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
W168R-D023	August 17, 2016	Initial Issue	All

## 1. VERIFICATION OF COMPLIANCE

Applicant : Samsung Electronics Co Ltd  
 Address : 19 Chapin Rd., Building D, Pine Brook, New Jersey, 07058  
 Contact Person : Chan Ho Youn / General Manager  
 Telephone No. : 973-808-6362  
 FCC ID : A3LWEA514I  
 IC Certification No. : 649E-WEA514I  
 Model Name : WEA514i  
 Serial Number : N/A  
 Date : August 17, 2016

EQUIPMENT CLASS	FCC : Unlicensed National Information infrastructure(UNII) IC : Low Power License-Exempt Radio-communication Device
E.U.T. DESCRIPTION	WLAN Access Point
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART E Section 15.407, RSS-Gen Issue 4 Nov 2014, RSS-247 Issue 1 May 2015
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC&IC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

## 2. TEST SUMMARY

### 2.1 Test items and results

SECTION		TEST ITEMS	RESULTS
15.407(a)	RSS-247, 6.6	26 dB Bandwidth & 99 % Occupied Bandwidth	PASS
15.407(e)	RSS-247, 6.2.4.1	6 dB Bandwidth	PASS
15.407(a)	RSS-247, 6.2	Maximum Conducted Output Power	Met the Limit / PASS
15.407(a)	RSS-247, 6.2	Peak Power Spectral Density	Met the Limit / PASS
15.407(a)	-	Peak Excursion	Met the Limit / PASS
15.407(g)	-	Frequency Stability	Met the Limit / PASS
15.407(b)	RSS-247, 6.2	Undesirable Emissions	Met the Limit / PASS
-	RSS-GEN, 5, 7.1.2	Receiver Spurious Emissions	PASS
15.205, 15.407(b)	RSS-GEN, 8.9,8.10	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Met the Limit / PASS
15.207	RSS GEN, 8.8	AC Conducted Emissions 150 kHz-30 MHz	Met the Limit / PASS

### 2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

### 2.3 Related Submittal(s) / Grant(s)

Original submittal only

### 2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in FCC PART 15 SUBPART E Section 15.407, IC RSS-Gen Issue 4 Nov 2014 and RSS-247 Issue 1 May 2015

### 2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at a distance of 3 m from EUT to the antenna.

## 2.6 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea.

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-4112/ C-4617/ G-666/ T-1842

IC (Industry Canada) – Registration No. Site# 3736A-3

-. Site Accreditation:

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

### 3. GENERAL INFORMATION

#### 3.1 Product Description

The Samsung Electronics Co Ltd, Model WEA514i (referred to as the EUT in this report) is a WLAN Access Point. Product specification information described herein was obtained from product data sheet or user’s manual.

DEVICE TYPE	WLAN Access Point	
OPERATING FREQUENCY	WLAN 2.4 GHz	2 412 MHz ~ 2 462 MHz (802.11b/g/n(HT20))
	5 150 MHz ~ 5 250 MHz Band	5 180 MHz ~ 5 240 MHz (802.11a/n(HT20)/ac(VHT20))
		5 190 MHz ~ 5 230 MHz (802.11n(HT40)/ac(VHT40))
		5 210 MHz (802.11ac(VHT80))
	5 250 MHz ~ 5 350 MHz Band	5 260 MHz ~ 5 320 MHz 802.11a/n(HT20)/ac(VHT20))
		5 270 MHz ~ 5 310 MHz (802.11n(HT40)/ac(VHT40))
		5 290 MHz (802.11ac(VHT80))
	5 470 MHz ~ 5 725 MHz Band	5 500 MHz ~ 5 700 MHz 802.11a/n(HT20)/ac(VHT20))
		5 510 MHz ~ 5 670 MHz (802.11n(HT40)/ac(VHT40))
		5 530 MHz (802.11ac(VHT80))
	5 725 MHz ~ 5 850 MHz Band	5 745 MHz ~ 5 825 MHz (802.11a/n(HT20)/ac(VHT20))
		5 755 MHz ~ 5 795 MHz (802.11n(HT40)/ac(VHT40))
5 775 MHz (802.11ac(VHT80))		
MODULATION TYPE	WLAN 2.4 G	DSSS Modulation(DBPSK/DQPSK/CCK) OFDM Modulation(BPSK/QPSK/16QAM/64QAM)
	WLAN 5 G	OFDM Modulation(BPSK/QPSK/16QAM/64QAM)
ANTENNA TYPE	PIFA Antenna	
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	40 MHz	

**Antenna Gain**

-.UNII 1

Service Port	Antenna Gain	802.11a/n/ac	Ant 0	5.06
			Ant 1	5.38
			Ant 2	4.99
			Ant 3	5.59
	Directional Antenna Gain	802.11a/n/ac	Ant 0 + 1	8.23
			Ant 0 + 2	8.04
			Ant 0 + 3	8.34
			Ant 1 + 2	8.20
			Ant 1 + 3	8.50
			Ant 2 + 3	8.31
			Ant 0 + 1 + 2	9.92
			Ant 0 + 1 + 3	10.12
			Ant 0 + 2 + 3	9.99
			Ant 1 + 2 + 3	10.10
			Ant 0 + 1 + 2 + 3	11.28

-UNII 2A

Service Port	Antenna Gain	802.11a/n/ac	Ant 0	4.68
			Ant 1	5.36
			Ant 2	5.01
			Ant 3	5.94
	Directional Antenna Gain	802.11a/n/ac	Ant 0 + 1	8.04
			Ant 0 + 2	7.86
			Ant 0 + 3	8.37
			Ant 1 + 2	8.20
			Ant 1 + 3	8.67
			Ant 2 + 3	8.51
			Ant 0 + 1 + 2	9.80
			Ant 0 + 1 + 3	10.13
			Ant 0 + 2 + 3	10.01
			Ant 1 + 2 + 3	10.22
			Ant 0 + 1 + 2 + 3	11.29

-UNII 2C

Service Port	Antenna Gain	802.11a/n/ac	Ant 0	5.08
			Ant 1	5.33
			Ant 2	4.59
			Ant 3	5.32
	Directional Antenna Gain	802.11a/n/ac	Ant 0 + 1	8.22
			Ant 0 + 2	7.85
			Ant 0 + 3	8.21
			Ant 1 + 2	7.99
			Ant 1 + 3	8.34
			Ant 2 + 3	7.98
			Ant 0 + 1 + 2	9.78
			Ant 0 + 1 + 3	10.02
			Ant 0 + 2 + 3	9.78
			Ant 1 + 2 + 3	9.86
			Ant 0 + 1 + 2 + 3	11.11

-UNII 3

Service Port	Antenna Gain	802.11a/n/ac	Ant 0	4.64
			Ant 1	4.49
			Ant 2	4.00
			Ant 3	4.19
	Directional Antenna Gain	802.11a/n/ac	Ant 0 + 1	7.58
			Ant 0 + 2	7.34
			Ant 0 + 3	7.43
			Ant 1 + 2	7.26
			Ant 1 + 3	7.35
			Ant 2 + 3	7.11
			Ant 0 + 1 + 2	9.16
			Ant 0 + 1 + 3	9.22
			Ant 0 + 2 + 3	9.06
			Ant 1 + 2 + 3	9.00
			Ant 0 + 1 + 2 + 3	10.36

**MAX. RF OUTPUT POWER**

-. Service Port

Band	Mode	Ant 0 (dBm)	Ant 1 (dBm)	Ant 2 (dBm)	Ant 3 (dBm)	Ant 0+1+2+3 (dBm)
UNII1	802.11a	6.91	6.55	5.82	5.15	12.18
	802.11n(HT20)	8.67	7.55	7.71	6.76	13.60
	802.11n(HT40)	9.46	9.45	9.40	8.67	15.28
	802.11ac(VHT20)	8.76	7.89	7.50	6.67	13.70
	802.11ac(VHT40)	10.22	9.77	9.65	8.70	15.64
	802.11ac(VHT80)	9.61	9.18	8.76	7.79	14.91
UNII2A	802.11a	11.92	10.90	11.82	10.99	17.43
	802.11n(HT20)	12.33	11.18	11.89	10.36	17.50
	802.11n(HT40)	11.07	10.77	11.24	10.01	16.81
	802.11ac(VHT20)	11.69	11.19	11.50	10.68	17.30
	802.11ac(VHT40)	11.66	11.01	11.40	10.17	17.12
	802.11ac(VHT80)	9.59	11.65	11.73	10.65	17.01
UNII2C	802.11a	10.31	9.82	10.03	8.78	15.79
	802.11n(HT20)	12.02	11.57	12.06	10.67	17.47
	802.11n(HT40)	11.61	11.38	11.33	11.29	17.17
	802.11ac(VHT20)	10.74	10.51	10.58	9.56	16.31
	802.11ac(VHT40)	11.90	11.39	11.63	10.49	17.32
	802.11ac(VHT80)	6.50	7.10	7.50	5.88	12.81
UNII3	802.11a	14.69	13.36	13.96	12.30	19.68
	802.11n(HT20)	13.24	12.89	13.04	12.30	18.90
	802.11n(HT40)	15.17	14.74	14.56	13.80	20.62
	802.11ac(VHT20)	14.36	13.32	13.35	12.43	19.44
	802.11ac(VHT40)	17.72	18.33	18.24	17.97	24.09
	802.11ac(VHT80)	7.10	14.61	14.55	13.80	20.56

**3.2 Alternative type(s)/model(s); also covered by this test report.**

-. None

**4. EUT MODIFICATIONS**

-. None

## 5. SYSTEM TEST CONFIGURATION

### 5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	Samsung Electronics Co Ltd	WDS-A504I	N/A

### 5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	Description	Connected to
WEA514i	Samsung Electronics Co Ltd	WLAN Access Point (EUT)	Notebook PC
ProBooks 4540s	H.P	Notebook PC	EUT
H508	IPTIME	HUB	EUT

### 5.3 Mode of operation during the test

- Service Port

UNII 1

Modulation	DATA RATE	OUTPUT POWER			
		Ant 0	Ant 1	Ant 2	Ant 3
802.11 a	6 Mbps	6.91	6.55	5.82	5.15
	9 Mbps	6.61	6.23	5.74	4.97
	12 Mbps	6.44	5.73	5.35	4.55
	18 Mbps	5.94	5.30	5.08	4.45
	24 Mbps	5.51	5.20	4.77	4.14
	36 Mbps	5.09	4.76	4.31	3.90
	48 Mbps	4.99	4.31	4.13	3.53
	54 Mbps	4.52	4.21	4.02	3.29
HT 20	6.5 Mbps	8.67	7.55	7.71	6.76
	13 Mbps	8.24	6.95	7.24	6.22
	19.5 Mbps	7.49	6.37	6.91	5.72
	26 Mbps	7.44	6.21	6.63	5.26
	39 Mbps	7.35	5.63	6.26	4.89
	52 Mbps	6.75	5.30	6.14	4.78
	58.5 Mbps	6.69	4.88	5.71	4.58
	65 Mbps	6.32	4.75	5.51	4.34
HT 40	13.5 Mbps	9.46	9.45	9.40	8.67
	27 Mbps	9.18	9.05	9.36	8.12
	40.5 Mbps	8.68	8.16	8.63	7.83
	54 Mbps	8.47	7.84	8.44	7.21
	81 Mbps	8.26	7.63	7.96	6.62
	108 Mbps	7.60	7.19	7.42	6.30
	121.5 Mbps	7.57	6.63	6.78	6.02
	135 Mbps	7.37	6.44	6.61	5.76

VHT20	6.5 Mbps	8.76	7.89	7.50	6.67
	13 Mbps	8.58	7.47	7.37	6.13
	19.5 Mbps	8.31	6.79	7.24	5.84
	26 Mbps	7.93	6.17	7.01	5.55
	39 Mbps	7.27	5.57	6.96	5.39
	52 Mbps	6.70	5.46	6.43	5.13
	58.5 Mbps	6.18	5.07	6.41	4.75
	65 Mbps	5.91	4.75	5.92	4.58
	78 Mbps	5.52	4.49	5.85	4.16
VHT40	13.5 Mbps	10.22	9.77	9.65	8.70
	27 Mbps	9.55	9.35	9.63	8.57
	40.5 Mbps	9.53	8.80	9.01	8.33
	54 Mbps	8.79	8.54	8.19	7.69
	81 Mbps	8.51	7.69	7.63	7.34
	108 Mbps	8.10	7.08	6.88	6.82
	121.5 Mbps	7.34	6.46	6.78	6.69
	135 Mbps	7.03	5.92	6.68	6.06
	162 Mbps	6.56	5.70	6.54	5.84
	180 Mbps	6.13	5.51	6.49	5.58
VHT80	29.3 Mbps	9.61	9.18	8.76	7.79
	58.5 Mbps	9.43	8.29	8.16	7.42
	87.8 Mbps	8.53	7.69	8.12	6.81
	117 Mbps	7.81	7.40	7.66	6.28
	175.5 Mbps	7.49	6.87	7.49	5.96
	234 Mbps	6.78	6.40	6.85	5.79
	263.3 Mbps	6.71	6.03	6.33	5.36
	292.5 Mbps	6.67	5.47	6.09	4.87
	351 Mbps	6.28	5.21	5.88	4.56
	390 Mbps	6.06	5.02	5.34	4.15

The worst case data rate for each modulation is determined 6 Mbps(Ant.0,1,2,3) for IEEE 802.11a, 6.5 Mbps(Ant.0,1,2,3) for HT20, 13.5 Mbps(Ant.0,1,2,3) for HT40, 6.5 Mbps(Ant.0,1,2,3) for VHT20, 13.5 Mbps(Ant.0,1,2,3) for VHT40, 29.3 Mbps(Ant.0,1,2,3) for VHT80

- To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XY” axis.

UNII 2A

Modulation	DATA RATE	OUTPUT POWER			
		Ant 0	Ant 1	Ant 2	Ant 3
802.11 a	6 Mbps	11.92	10.90	11.82	10.99
	9 Mbps	10.91	10.33	11.71	9.92
	12 Mbps	9.92	9.56	10.80	9.15
	18 Mbps	9.68	9.37	10.14	8.59
	24 Mbps	8.97	8.90	9.22	8.06
	36 Mbps	8.53	8.30	8.78	7.78
	48 Mbps	8.07	7.57	8.33	7.37
	54 Mbps	7.65	7.14	7.83	7.22
HT 20	6.5 Mbps	12.33	11.18	11.89	10.36
	13 Mbps	11.93	10.31	11.09	9.72
	19.5 Mbps	10.86	9.59	10.86	8.97
	26 Mbps	10.46	8.92	10.43	8.60
	39 Mbps	9.91	8.67	9.72	7.77
	52 Mbps	9.06	8.32	9.22	7.57
	58.5 Mbps	8.97	7.99	8.59	7.25
	65 Mbps	8.23	7.33	8.04	6.78
HT 40	13.5 Mbps	11.07	10.77	11.24	10.01
	27 Mbps	10.75	10.03	11.11	9.26
	40.5 Mbps	10.68	9.37	10.46	9.08
	54 Mbps	10.59	8.50	9.42	8.67
	81 Mbps	9.53	8.20	8.94	8.19
	108 Mbps	9.44	7.89	8.60	7.57
	121.5 Mbps	9.24	7.23	8.18	7.32
	135 Mbps	8.75	6.76	8.02	6.89

VHT20	6.5 Mbps	11.69	11.19	11.50	10.68
	13 Mbps	11.22	10.68	10.96	9.80
	19.5 Mbps	11.04	10.53	10.54	9.08
	26 Mbps	10.94	10.02	10.16	8.73
	39 Mbps	10.41	9.25	9.70	8.06
	52 Mbps	10.31	8.43	8.79	7.32
	58.5 Mbps	9.31	7.72	7.97	6.67
	65 Mbps	9.07	7.05	7.86	6.02
	78 Mbps	11.22	10.68	10.96	9.80
VHT40	13.5 Mbps	11.66	11.01	11.40	10.17
	27 Mbps	11.28	10.44	11.23	9.51
	40.5 Mbps	10.74	9.83	11.04	8.61
	54 Mbps	10.47	9.30	10.32	7.82
	81 Mbps	10.10	9.18	10.27	7.32
	108 Mbps	9.30	8.61	9.32	6.74
	121.5 Mbps	8.55	8.16	8.85	6.33
	135 Mbps	8.48	7.91	8.16	6.02
	162 Mbps	7.65	7.75	8.12	5.82
	180 Mbps	7.60	7.63	7.43	5.34
VHT80	29.3 Mbps	9.59	11.65	11.73	10.65
	58.5 Mbps	8.90	10.95	11.12	10.01
	87.8 Mbps	8.51	9.88	10.17	9.89
	117 Mbps	7.95	9.36	9.26	9.27
	175.5 Mbps	7.86	8.46	8.42	8.58
	234 Mbps	7.62	7.76	7.74	8.21
	263.3 Mbps	7.11	7.31	7.37	7.94
	292.5 Mbps	7.02	7.00	7.35	7.43
	351 Mbps	6.39	6.69	6.99	6.88
	390 Mbps	5.86	6.35	6.71	6.65

The worst case data rate for each modulation is determined 6 Mbps(Ant.0,1,2,3) for IEEE 802.11a, 6.5 Mbps(Ant.0,1,2,3) for HT20, 13.5 Mbps(Ant.0,1,2,3) for HT40, 6.5 Mbps(Ant.0,1,2,3) for VHT20, 13.5 Mbps(Ant.0,1,2,3) for VHT40, 29.3 Mbps(Ant.0,1,2,3) for VHT80

- To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and the worst case is "XY" axis.

UNII 2C

Modulation	DATA RATE	OUTPUT POWER			
		Ant 0	Ant 1	Ant 2	Ant 3
802.11 a	6 Mbps	10.31	9.82	10.03	8.78
	9 Mbps	10.20	9.46	9.24	8.01
	12 Mbps	9.64	9.18	8.69	7.68
	18 Mbps	8.99	8.97	8.27	7.04
	24 Mbps	8.90	8.85	7.98	6.55
	36 Mbps	8.22	8.26	7.58	6.26
	48 Mbps	7.57	7.55	7.34	5.69
	54 Mbps	7.10	7.14	6.81	5.48
HT 20	6.5 Mbps	12.02	11.57	12.06	10.67
	13 Mbps	11.97	11.12	11.24	10.09
	19.5 Mbps	10.80	10.29	10.17	9.17
	26 Mbps	10.39	9.43	9.21	8.55
	39 Mbps	9.51	8.94	8.30	7.96
	52 Mbps	8.76	8.51	7.64	7.68
	58.5 Mbps	8.00	8.26	6.90	7.44
	65 Mbps	7.47	8.08	6.63	6.95
HT 40	13.5 Mbps	11.61	11.38	11.33	11.29
	27 Mbps	11.49	10.94	10.91	11.04
	40.5 Mbps	10.70	10.69	10.08	10.62
	54 Mbps	9.94	9.69	9.67	9.78
	81 Mbps	9.13	9.03	9.35	9.19
	108 Mbps	8.62	8.82	8.63	8.97
	121.5 Mbps	7.91	8.58	8.09	8.29
	135 Mbps	7.82	7.96	7.97	7.86

VHT20	6.5 Mbps	10.74	10.51	10.58	9.56
	13 Mbps	10.23	9.99	9.67	9.01
	19.5 Mbps	10.02	9.73	9.00	8.64
	26 Mbps	9.12	8.87	8.13	8.26
	39 Mbps	8.74	8.17	7.97	7.47
	52 Mbps	8.09	7.74	7.75	6.93
	58.5 Mbps	7.90	7.01	7.69	6.65
	65 Mbps	7.19	6.79	7.09	6.49
	78 Mbps	6.67	6.16	6.96	5.90
VHT40	13.5 Mbps	11.90	11.39	11.63	10.49
	27 Mbps	11.69	11.18	11.03	9.78
	40.5 Mbps	11.53	10.36	10.96	9.35
	54 Mbps	10.88	9.35	10.76	8.89
	81 Mbps	10.06	8.47	10.39	8.61
	108 Mbps	9.77	8.10	9.88	8.13
	121.5 Mbps	9.37	7.64	9.50	7.94
	135 Mbps	9.12	7.05	9.24	7.35
	162 Mbps	8.60	6.43	8.65	6.89
	180 Mbps	8.46	5.89	8.40	6.39
VHT80	29.3 Mbps	6.50	7.10	7.50	5.88
	58.5 Mbps	6.41	6.70	7.19	5.53
	87.8 Mbps	5.78	6.37	7.11	5.06
	117 Mbps	5.60	6.24	6.94	4.70
	175.5 Mbps	5.05	5.83	6.64	4.57
	234 Mbps	4.77	5.40	6.16	4.39
	263.3 Mbps	4.48	5.15	5.90	4.00
	292.5 Mbps	4.44	4.88	5.43	3.74
	351 Mbps	4.25	4.40	5.24	3.37
	390 Mbps	4.08	4.12	4.73	3.20

The worst case data rate for each modulation is determined 6 Mbps(Ant.0,1,2,3) for IEEE 802.11a, 6.5 Mbps(Ant.0,1,2,3) for HT20, 13.5 Mbps(Ant.0,1,2,3) for HT40, 6.5 Mbps(Ant.0,1,2,3) for VHT20, 13.5 Mbps(Ant.0,1,2,3) for VHT40, 29.3 Mbps(Ant.0,1,2,3) for VHT80

- To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and the worst case is "XY" axis.

UNII 3

Modulation	DATA RATE	OUTPUT POWER			
		Ant 0	Ant 1	Ant 2	Ant 3
802.11 a	6 Mbps	14.69	13.36	13.96	12.30
	9 Mbps	14.28	12.53	12.57	11.11
	12 Mbps	13.47	12.38	12.50	10.97
	18 Mbps	13.05	11.45	12.31	10.60
	24 Mbps	12.03	11.23	12.09	10.41
	36 Mbps	11.54	10.48	11.17	9.57
	48 Mbps	11.52	9.78	10.10	9.09
	54 Mbps	11.39	9.11	9.47	8.62
HT 20	6.5 Mbps	13.24	12.89	13.04	12.30
	13 Mbps	13.00	11.68	12.96	11.70
	19.5 Mbps	12.76	11.48	12.81	10.53
	26 Mbps	11.83	11.27	11.64	9.96
	39 Mbps	11.34	10.24	11.32	9.31
	52 Mbps	10.43	9.43	10.62	9.02
	58.5 Mbps	9.84	8.59	10.39	8.75
	65 Mbps	9.77	7.75	10.15	8.17
HT 40	13.5 Mbps	15.17	14.74	14.56	13.80
	27 Mbps	13.76	14.48	14.32	13.38
	40.5 Mbps	13.30	13.98	14.03	13.00
	54 Mbps	12.78	13.32	13.96	12.28
	81 Mbps	12.71	12.46	13.67	12.07
	108 Mbps	11.96	12.24	12.49	11.57
	121.5 Mbps	11.44	11.78	11.81	10.97
	135 Mbps	11.36	11.07	10.98	10.42

VHT20	6.5 Mbps	14.36	13.32	13.35	12.43
	13 Mbps	13.71	13.11	12.28	11.60
	19.5 Mbps	12.99	12.67	11.63	11.31
	26 Mbps	12.51	12.35	11.50	10.22
	39 Mbps	11.40	11.57	11.31	9.47
	52 Mbps	10.56	11.02	10.99	8.92
	58.5 Mbps	10.03	10.48	9.91	8.66
	65 Mbps	9.84	10.14	9.89	7.86
	78 Mbps	9.63	9.22	9.47	7.32
VHT40	13.5 Mbps	17.72	18.33	18.24	17.97
	27 Mbps	16.84	17.80	17.08	17.74
	40.5 Mbps	16.20	17.17	15.51	16.90
	54 Mbps	14.61	16.57	14.74	15.56
	81 Mbps	13.61	15.76	13.77	14.52
	108 Mbps	12.66	15.32	12.99	13.24
	121.5 Mbps	11.66	14.44	12.75	12.29
	135 Mbps	11.58	14.14	12.14	11.24
	162 Mbps	10.82	13.77	11.42	10.23
	180 Mbps	10.43	13.55	10.67	9.76
VHT80	29.3 Mbps	7.10	14.61	14.55	13.80
	58.5 Mbps	6.68	14.42	14.03	13.54
	87.8 Mbps	6.31	13.04	13.43	12.86
	117 Mbps	5.76	12.28	12.88	12.66
	175.5 Mbps	5.50	11.42	12.25	11.49
	234 Mbps	5.20	10.71	11.41	10.62
	263.3 Mbps	5.14	9.91	11.36	10.51
	292.5 Mbps	4.72	9.24	10.24	9.66
	351 Mbps	4.30	8.44	9.51	9.03
	390 Mbps	4.01	7.74	8.95	8.55

The worst case data rate for each modulation is determined 6 Mbps(Ant.0,1,2,3) for IEEE 802.11a, 6.5 Mbps(Ant.0,1,2,3) for HT20, 13.5 Mbps(Ant.0,1,2,3) for HT40, 6.5 Mbps(Ant.0,1,2,3) for VHT20, 13.5 Mbps(Ant.0,1,2,3) for VHT40, 29.3 Mbps(Ant.0,1,2,3) for VHT80

- To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and the worst case is "XY" axis.

Port	Mode	Operating Mode	Operating Ant.
Service	802.11a/n(HT20)/n(HT40) /ac(HT40)/ac(VHT40) /ac(VHT80)	SISO	Ant 0
			Ant 1
			Ant 2
			Ant 3
		MIMO	Ant 0+1
			Ant 0+2
			Ant 0+3
			Ant 1+2
			Ant 1+3
			Ant 2+3
			Ant 0+1+2
			Ant 0+1+3
			Ant 0+2+3
			Ant 1+2+3
			Ant 0+1+2+3

Note 1: This EUT is supported the AC adapter and POE. Because worst case is AC adapter, so we attached only the results for AC adapter.

Note 2: In case of radiation test, we have done all test case. Worst case is Ant 0+1+2+3 for Service. So, we attached the results of only worst case.

## 5.4 Configuration of Test System

**Line Conducted Test:** The EUT was connected to LAN and the power of POE was connected to Notebook PC. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions.

**Radiated Emission Test:** Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meter open area test site. The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

## 5.5 Antenna Requirement

For intentional device, according to section 15.203 and RSS-Gen Issue 4 November 2014 Section 8.3, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

**Antenna Construction:**

The transmitter antenna of the EUT is WLAN PIFA antenna, so no consideration of replacement by the user.

## 6. PRELIMINARY TEST

### 6.1 AC Power line Conducted Emissions Tests

During Preliminary Test, the following operating mode was investigated.

Operation Mode	The Worse operating condition (Please check one only)
Transmitting Mode	X

### 6.2 General Radiated Emissions Tests

During Preliminary Test, the following operating mode was investigated.

Operation Mode	The Worse operating condition (Please check one only)
Transmitting Mode	X

## 7. MINIMUM 26 dB BANDWIDTH & 99 % OCCUPIED BANDWIDTH

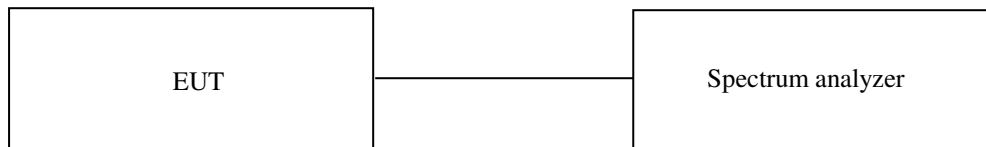
### 7.1 Operating environment

Temperature : 24 °C

Relative humidity : 47 % R.H.

### 7.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, and peak detection was used. The 26 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 26 dB.



### 7.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ - FSV30	Rohde & Schwarz	Signal Analyzer	101199	May. 04, 2016 (1Y)

All test equipment used is calibrated on a regular basis.

**7.4 Test data for Service Port**

**7.4.1 Test data for 802.11a RLAN Mode**

**7.4.1.1 Test data for Antenna 0**

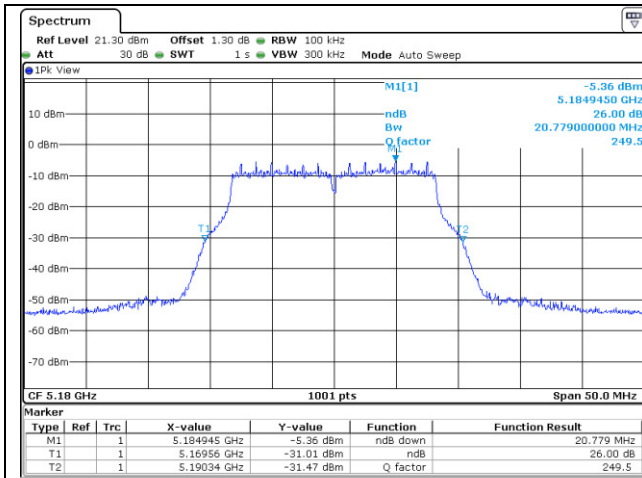
-. Test Date : June 14, 2016

-. Test Result : Pass

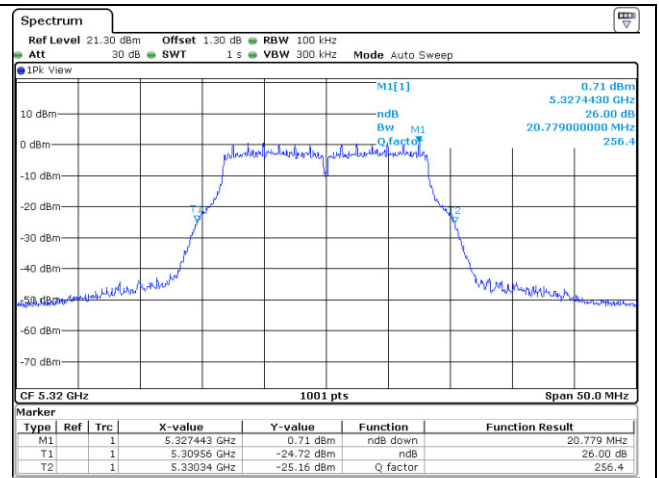
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5 150 ~ 5 250	Low	5 180	20.78	16.53
	Middle	5 220	20.73	16.58
	High	5 240	20.78	16.58
5 250 ~ 5 350	Low	5 260	20.68	16.58
	Middle	5 300	20.58	16.58
	High	5 320	20.78	16.58
5 470 ~ 5 725	Low	5 500	20.73	16.53
	Middle	5 560	20.63	16.53
	High	5 720	20.88	16.53
5 725 ~ 5 850	Low	5 745	20.68	16.53
	Middle	5 785	20.73	16.58
	High	5 825	20.63	16.58



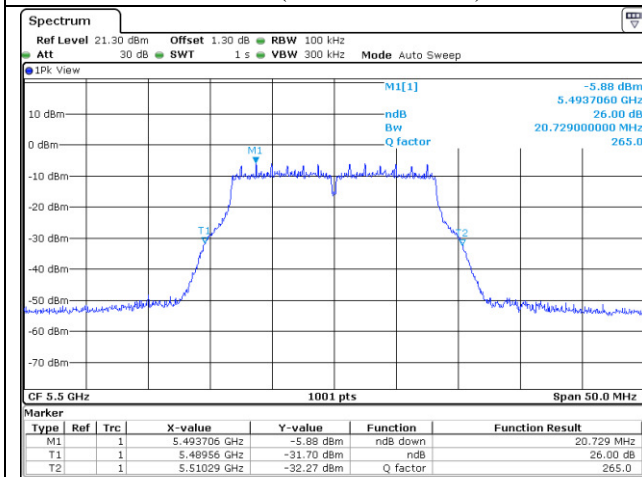
**Tested by: Min-Gu, Ji / Project Engineer**



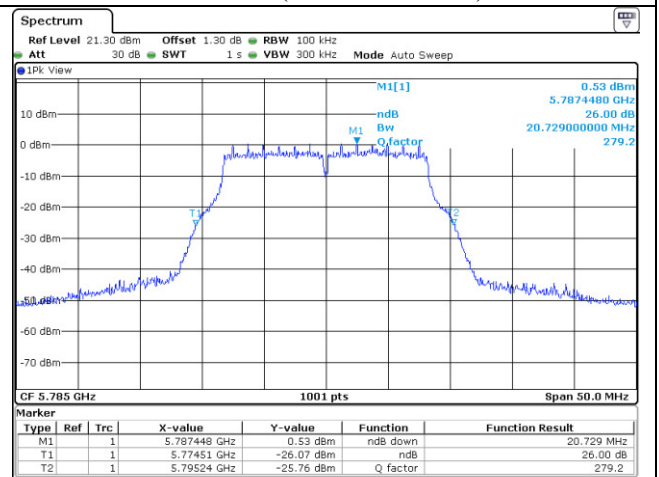
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

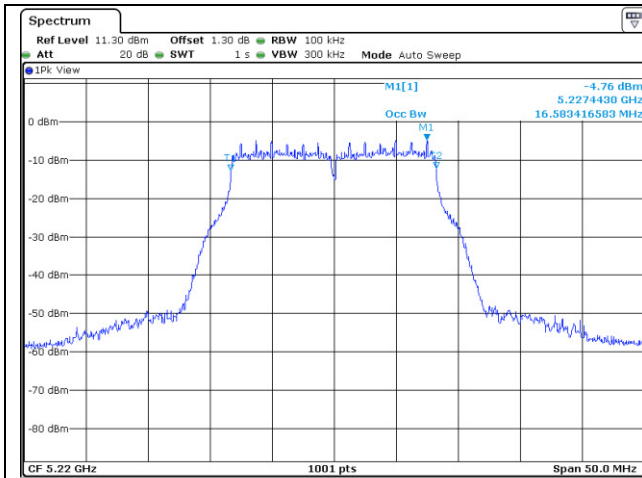


U-NII-2C (26 dB Bandwidth)

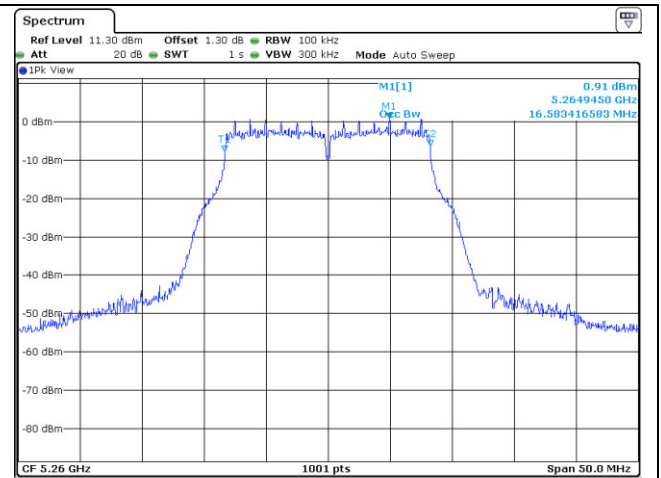


U-NII-3 (26 dB Bandwidth)

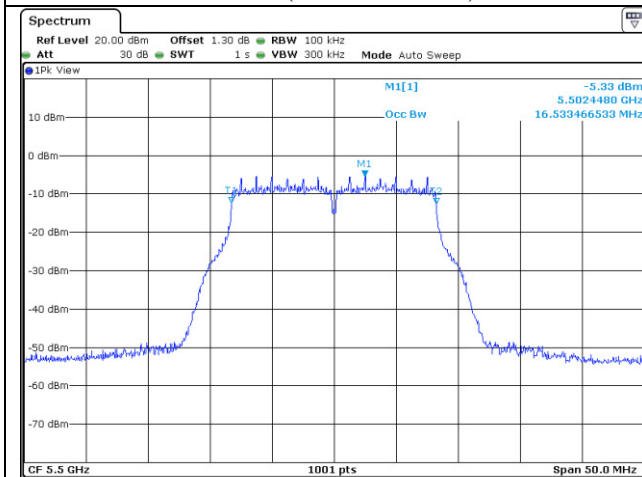
Note: In order to simplify the report, attached plots were only the most wide channel.



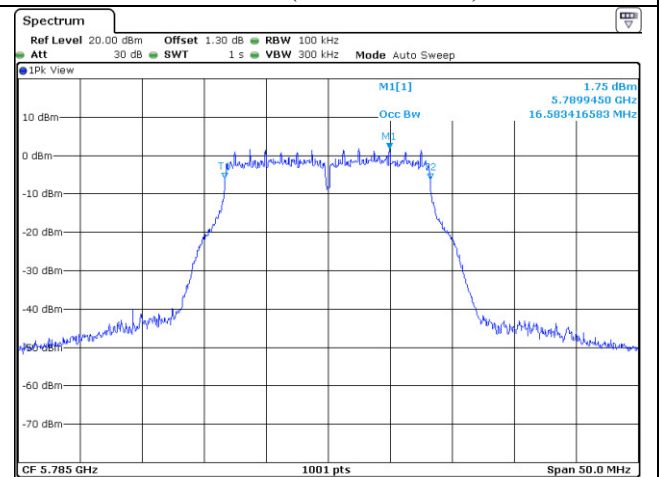
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

**7.4.1.2 Test data for Antenna 1**

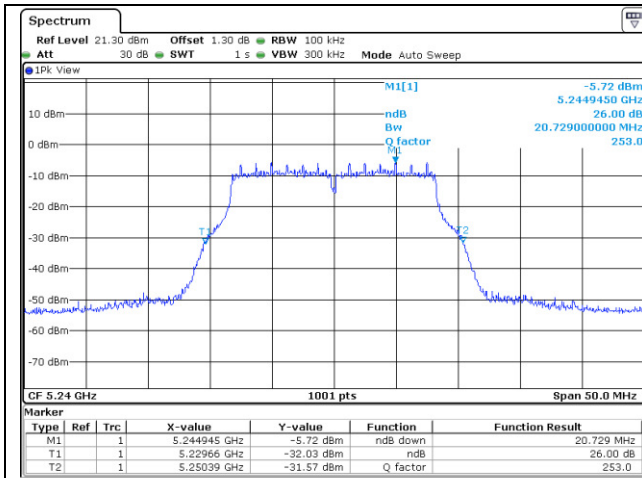
-. Test Date : June 14, 2016

-. Test Result : Pass

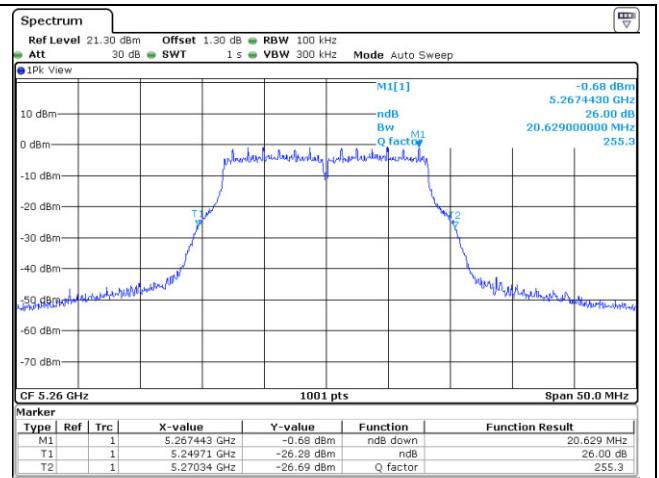
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5 150 ~ 5 250	Low	5 180	20.68	16.53
	Middle	5 220	20.58	16.53
	High	5 240	20.73	16.53
5 250 ~ 5 350	Low	5 260	20.63	16.53
	Middle	5 300	20.63	16.58
	High	5 320	20.58	16.58
5 470 ~ 5 725	Low	5 500	20.63	16.53
	Middle	5 560	20.63	16.53
	High	5 720	20.73	16.53
5 725 ~ 5 850	Low	5 745	20.63	16.58
	Middle	5 785	20.63	16.53
	High	5 825	20.28	16.43



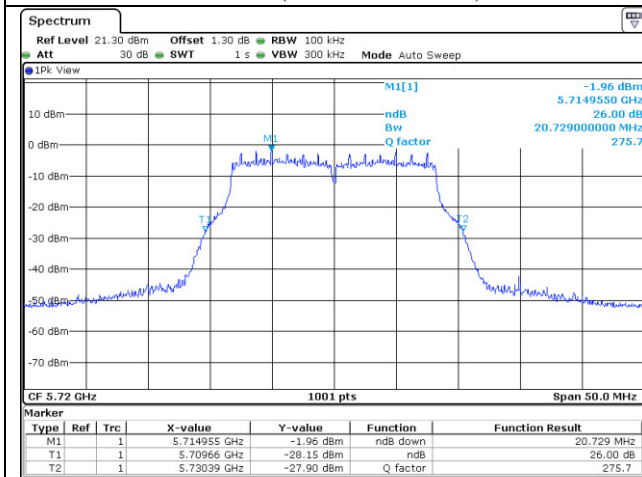
**Tested by: Min-Gu, Ji / Project Engineer**



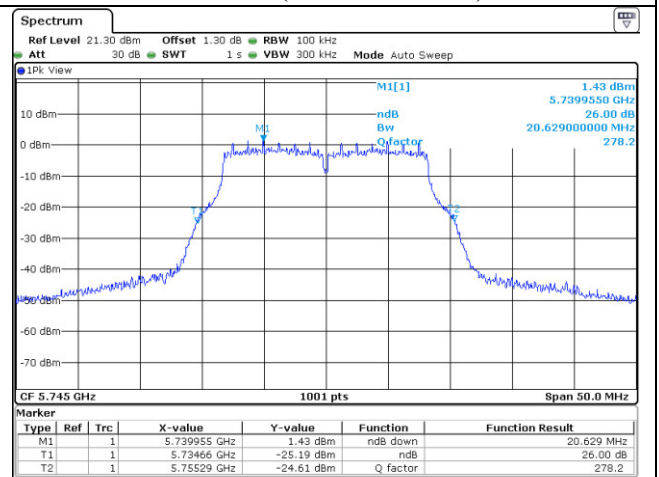
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

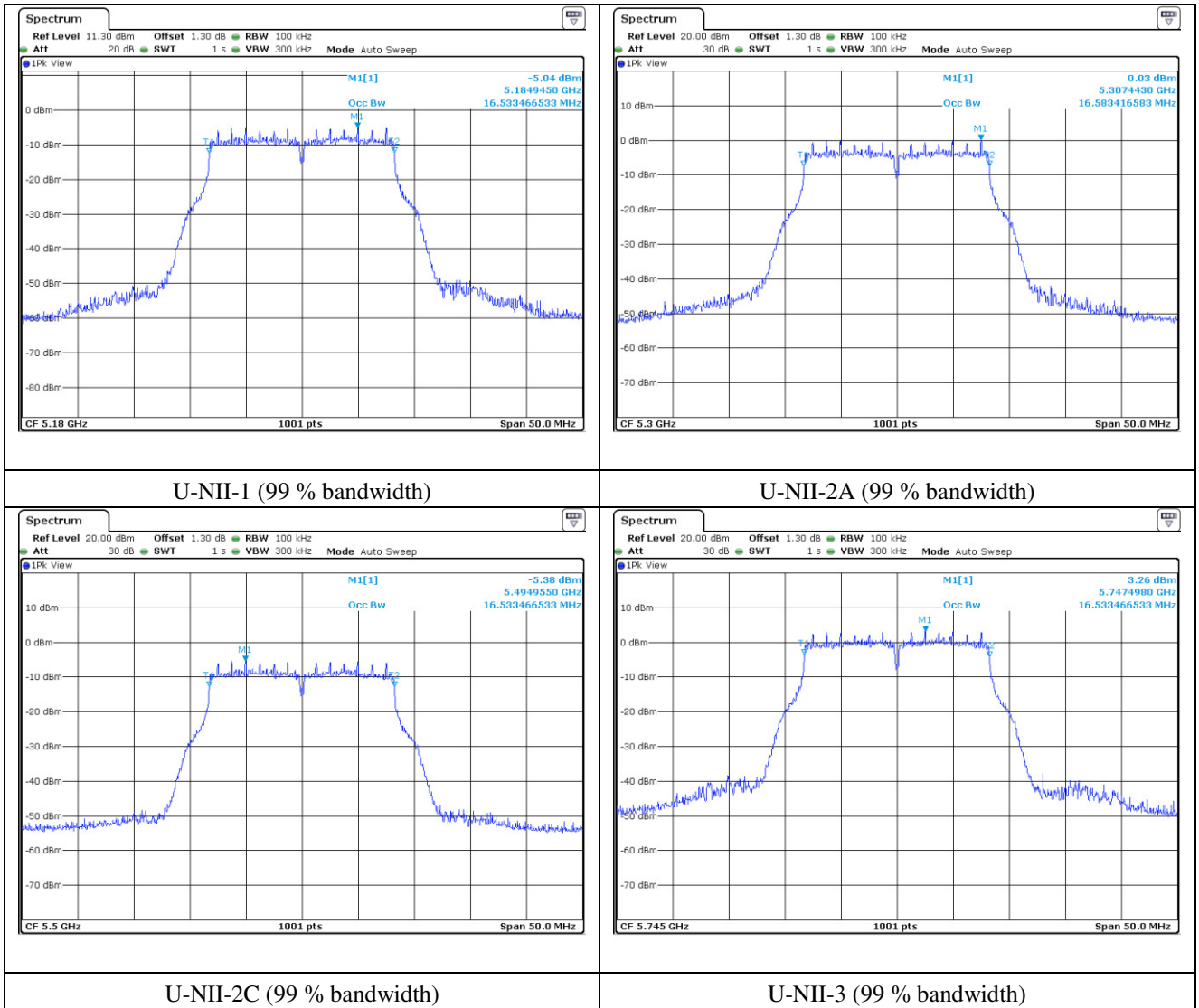


U-NII-2C (26 dB Bandwidth)



U-NII-3 (26 dB Bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.



Note: In order to simplify the report, attached plots were only the most wide channel.

**7.4.1.3 Test data for Antenna 2**

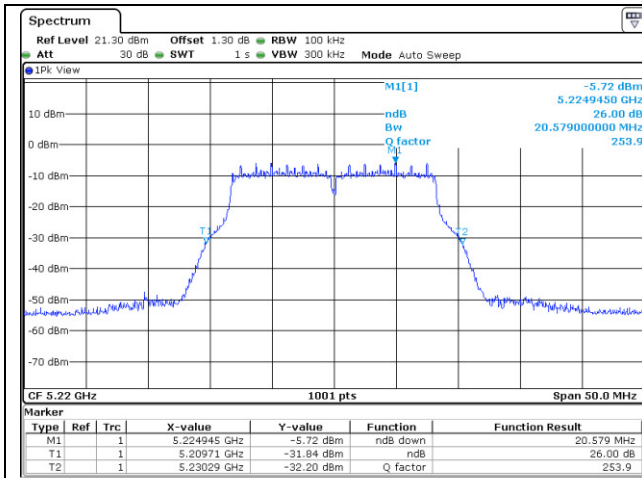
-. Test Date : June 14, 2016

-. Test Result : Pass

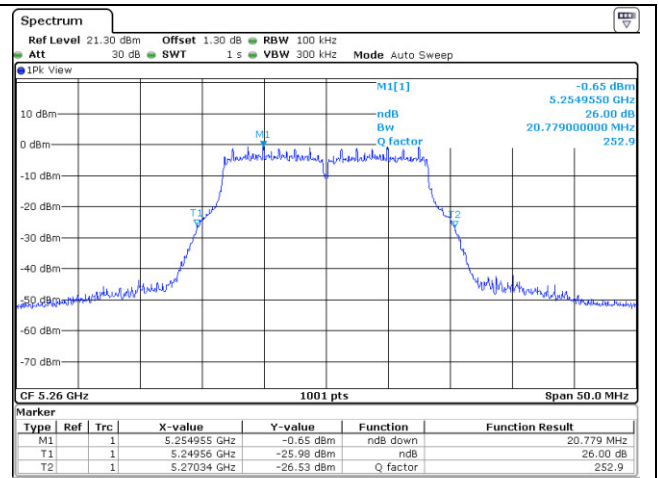
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5 150 ~ 5 250	Low	5 180	20.53	16.53
	Middle	5 220	20.58	16.48
	High	5 240	20.58	16.48
5 250 ~ 5 350	Low	5 260	20.78	16.48
	Middle	5 300	20.73	16.48
	High	5 320	20.73	16.53
5 470 ~ 5 725	Low	5 500	20.73	16.53
	Middle	5 560	20.58	16.53
	High	5 720	20.53	16.48
5 725 ~ 5 850	Low	5 745	20.48	16.48
	Middle	5 785	20.53	16.48
	High	5 825	20.48	16.43



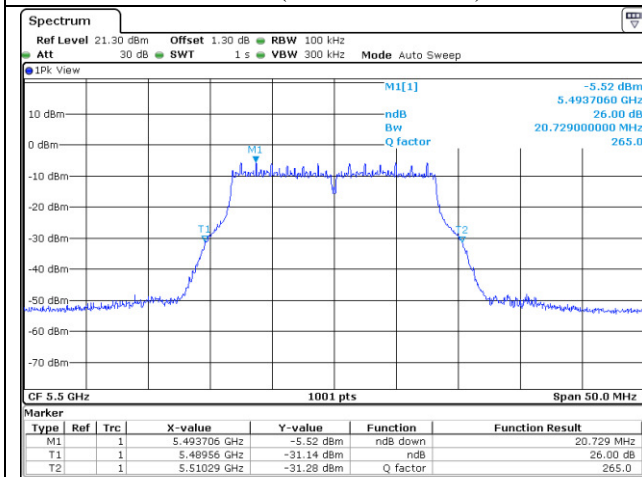
**Tested by: Min-Gu, Ji / Project Engineer**



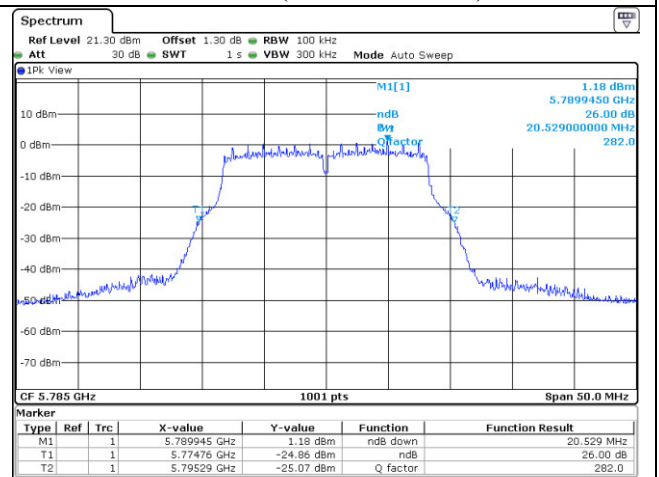
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

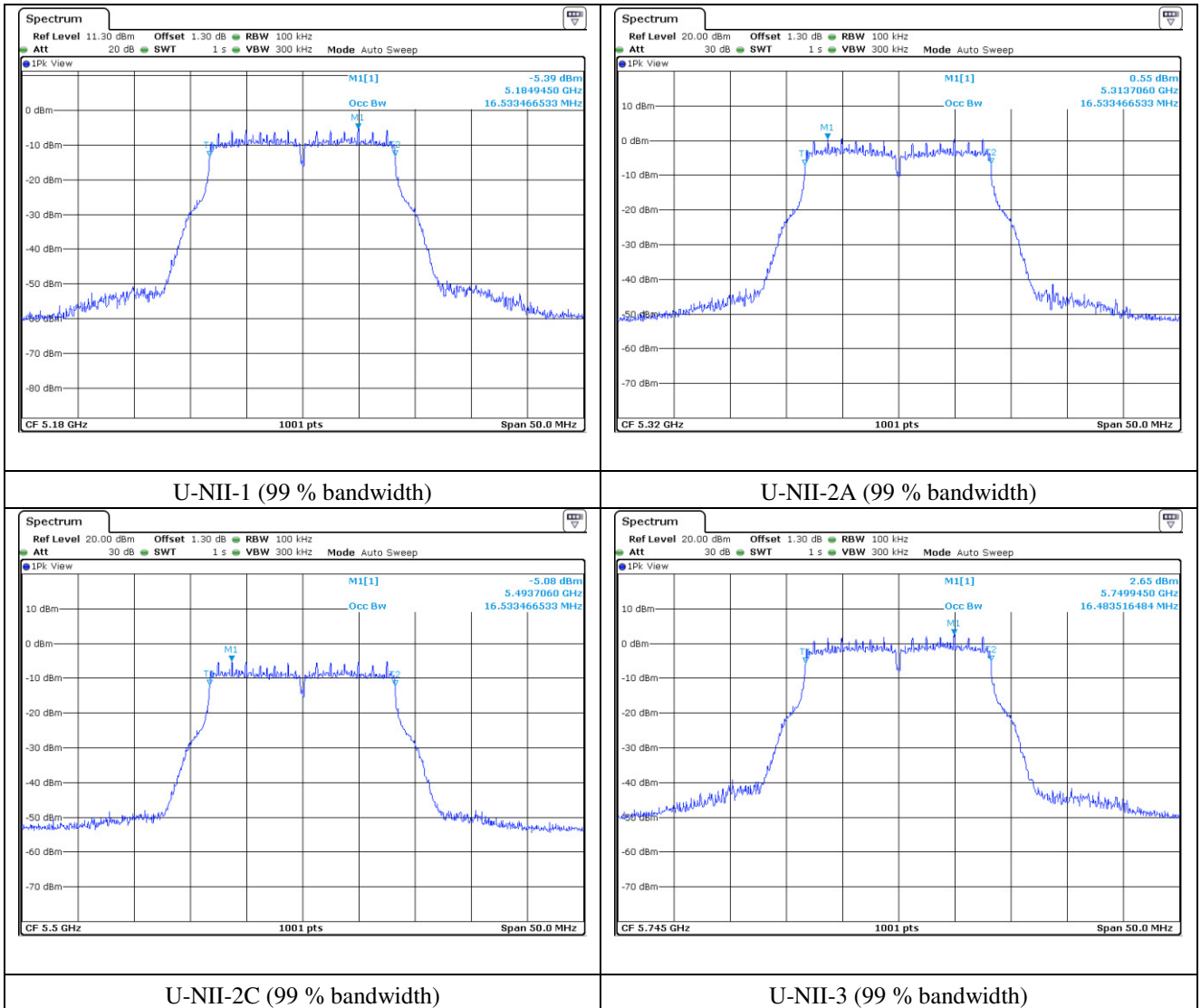


U-NII-2C (26 dB Bandwidth)



U-NII-3 (26 dB Bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.



Note: In order to simplify the report, attached plots were only the most wide channel.

**7.4.1.4 Test data for Antenna 3**

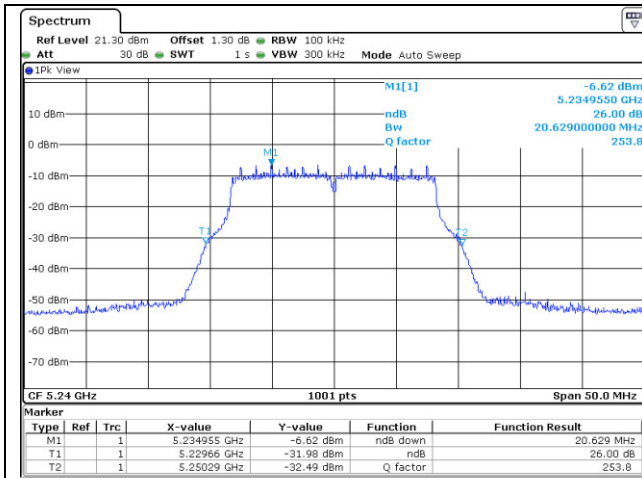
-. Test Date : June 14, 2016

-. Test Result : Pass

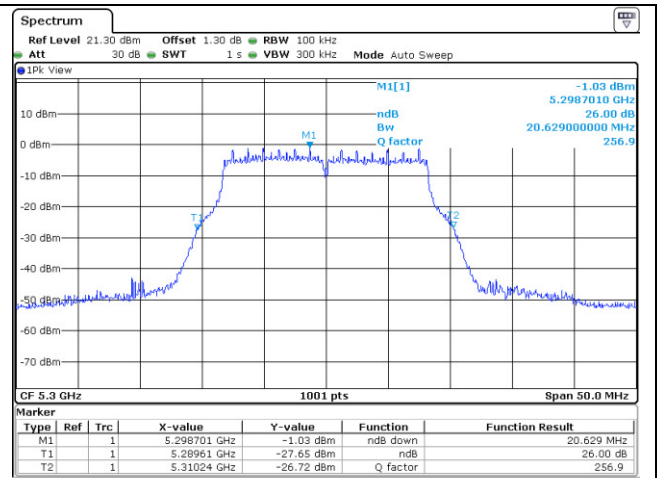
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5 150 ~ 5 250	Low	5 180	20.53	16.48
	Middle	5 220	20.53	16.48
	High	5 240	20.63	16.48
5 250 ~ 5 350	Low	5 260	20.43	16.48
	Middle	5 300	20.63	16.48
	High	5 320	20.63	16.53
5 470 ~ 5 725	Low	5 500	20.73	16.53
	Middle	5 560	20.33	16.53
	High	5 720	20.23	16.48
5 725 ~ 5 850	Low	5 745	20.38	16.48
	Middle	5 785	20.43	16.48
	High	5 825	20.18	16.58



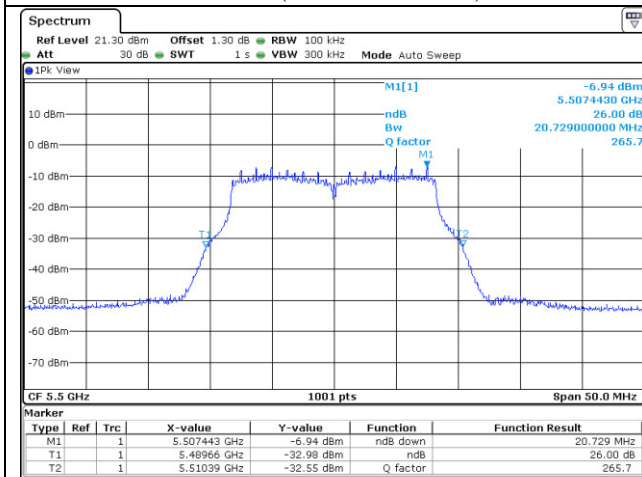
**Tested by: Min-Gu, Ji / Project Engineer**



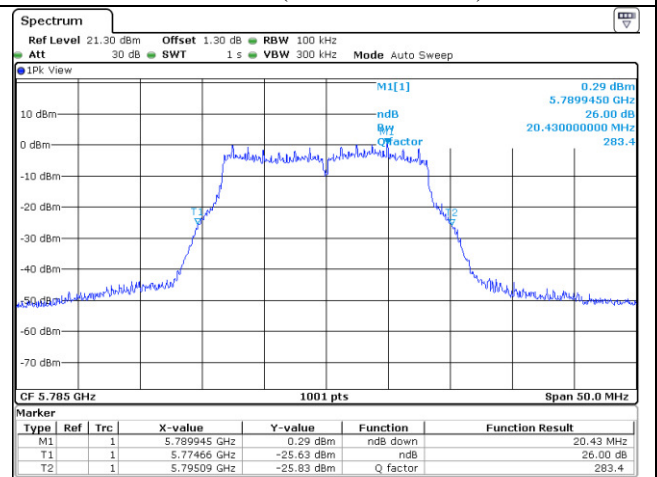
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

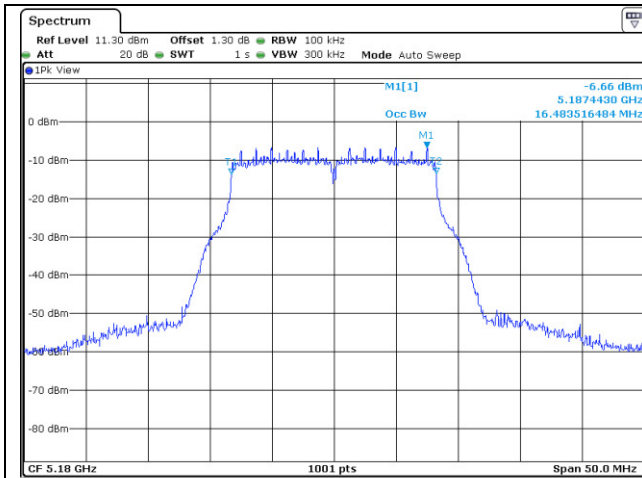


U-NII-2C (26 dB Bandwidth)

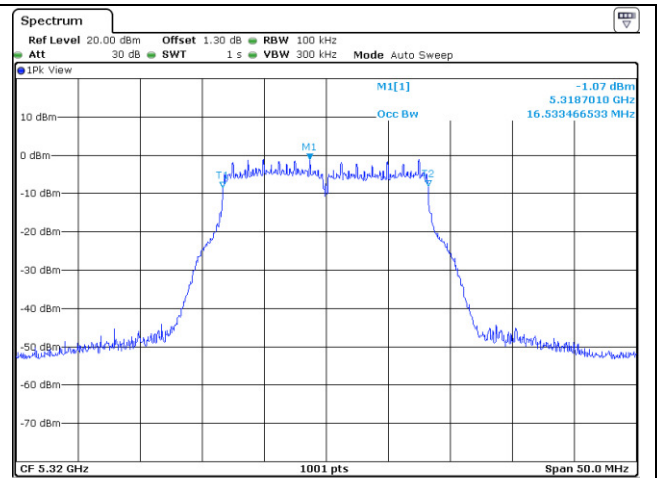


U-NII-3 (26 dB Bandwidth)

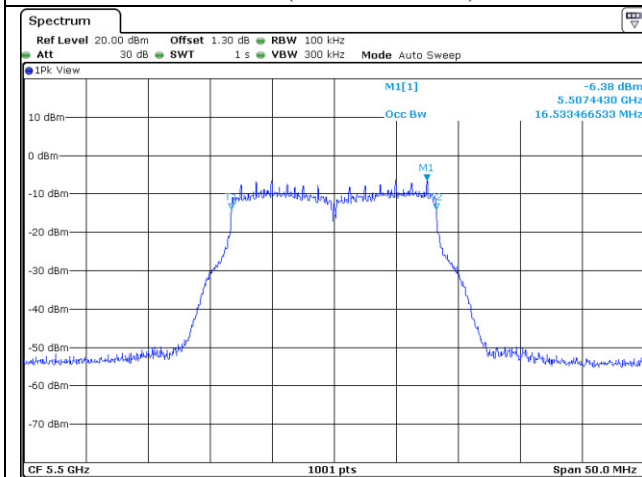
Note: In order to simplify the report, attached plots were only the most wide channel.



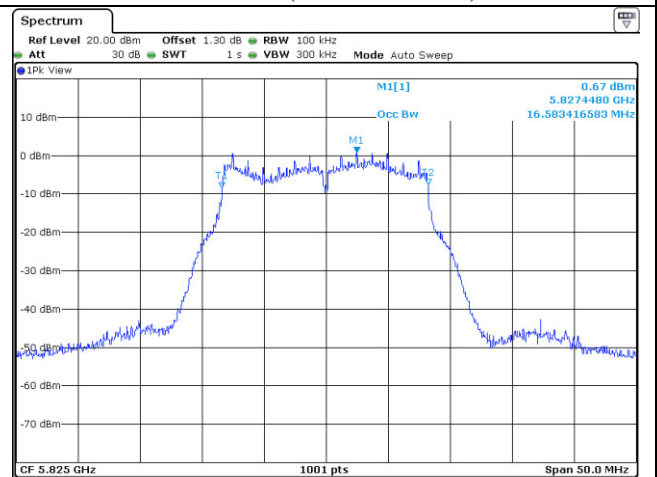
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

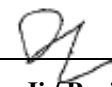
Note: In order to simplify the report, attached plots were only the most wide channel.

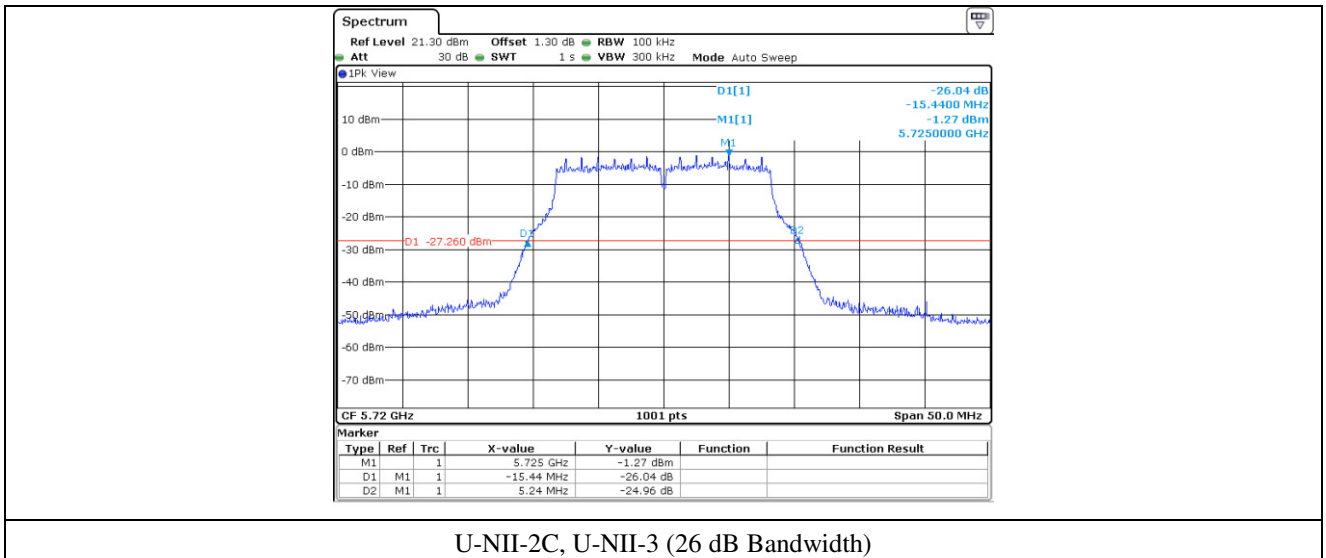
**7.4.1.5 Test data for Staddle Channel\_Antenna 0**

-. Test Date : June 14, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 470 ~ 5 725	5 720	15.44
5 725 ~ 5 850	5 720	5.24

  
**Tested by: Min-Gu, Ji / Project Engineer**



U-NII-2C, U-NII-3 (26 dB Bandwidth)

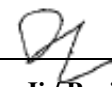
Note: In order to simplify the report, attached plots were only the most wide channel.

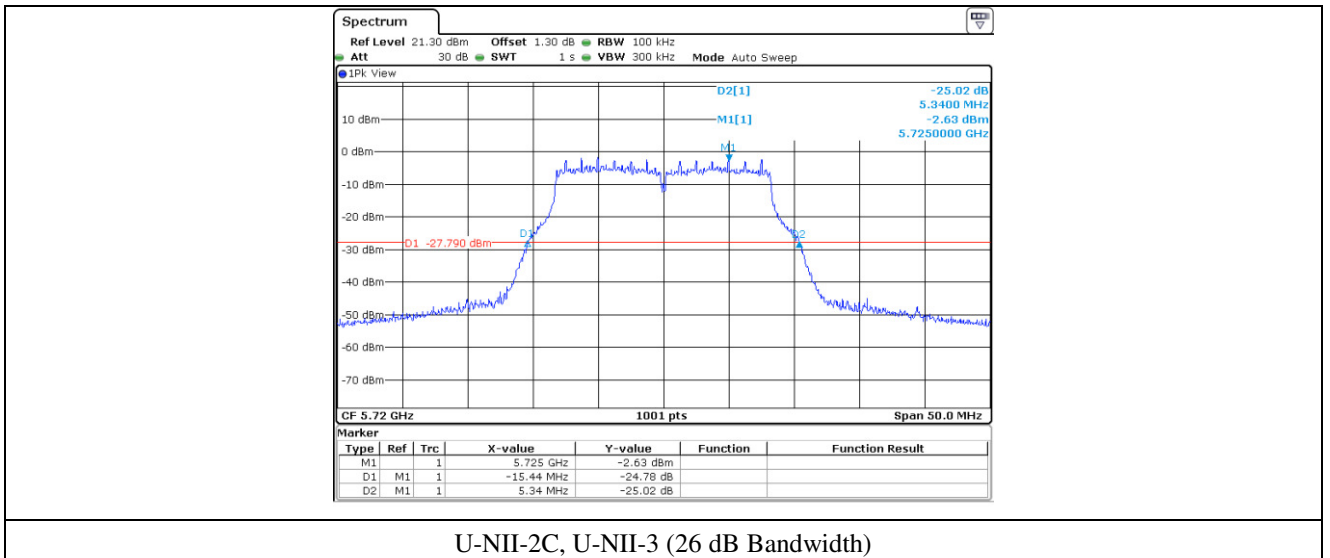
7.4.1.6 Test data for Staddle Channel\_Antenna 1

-. Test Date : June 14, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 470 ~ 5 725	5 720	15.44
5 725 ~ 5 850	5 720	5.34

  
 Tested by: Min-Gu, Ji / Project Engineer



U-NII-2C, U-NII-3 (26 dB Bandwidth)

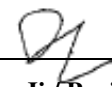
Note: In order to simplify the report, attached plots were only the most wide channel.

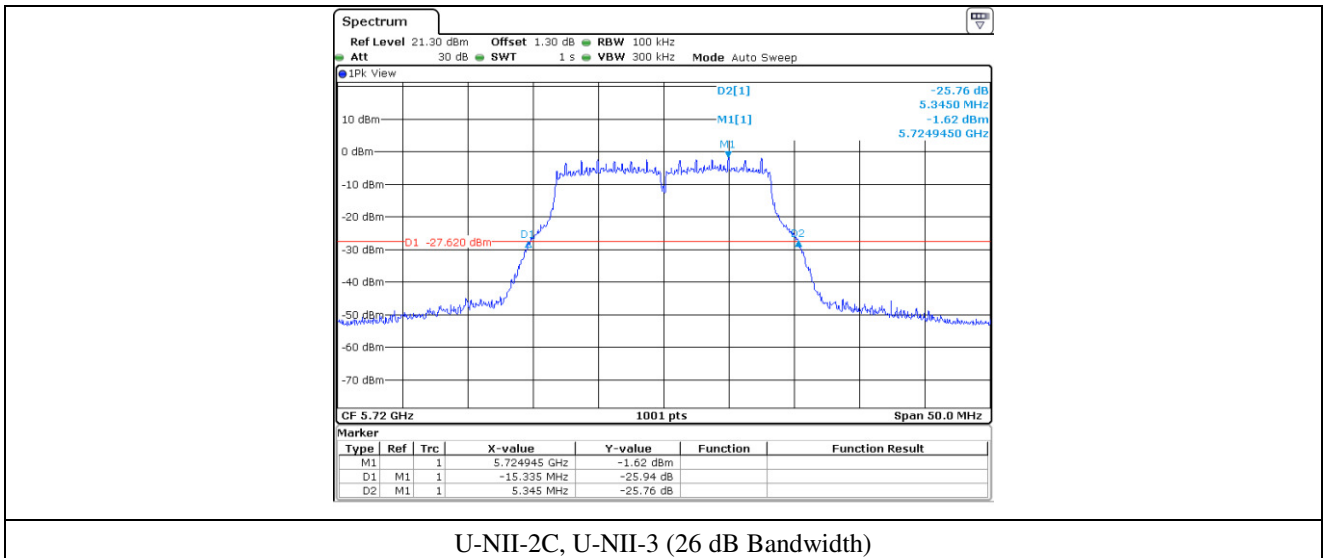
7.4.1.7 Test data for Staddle Channel\_Antenna 2

- Test Date : June 14, 2016

- Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 470 ~ 5 725	5 720	15.34
5 725 ~ 5 850	5 720	5.35

  
 Tested by: Min-Gu, Ji / Project Engineer



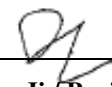
U-NII-2C, U-NII-3 (26 dB Bandwidth)

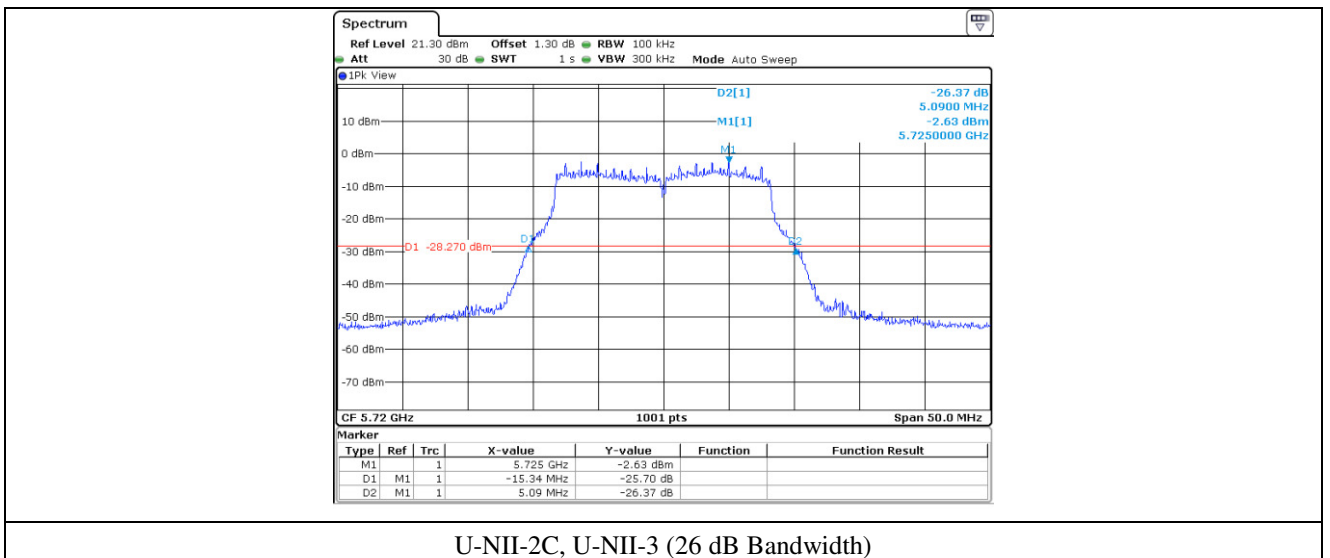
Note: In order to simplify the report, attached plots were only the most wide channel.

**7.4.1.8 Test data for Staddle Channel\_Antenna 3**

- Test Date : June 14, 2016  
 - Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 470 ~ 5 725	5 720	15.34
5 725 ~ 5 850	5 720	5.09

  
 Tested by: Min-Gu, Ji / Project Engineer



U-NII-2C, U-NII-3 (26 dB Bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

**7.4.2 Test data for 802.11n\_HT20 RLAN Mode**

**7.4.2.1 Test data for Antenna 0**

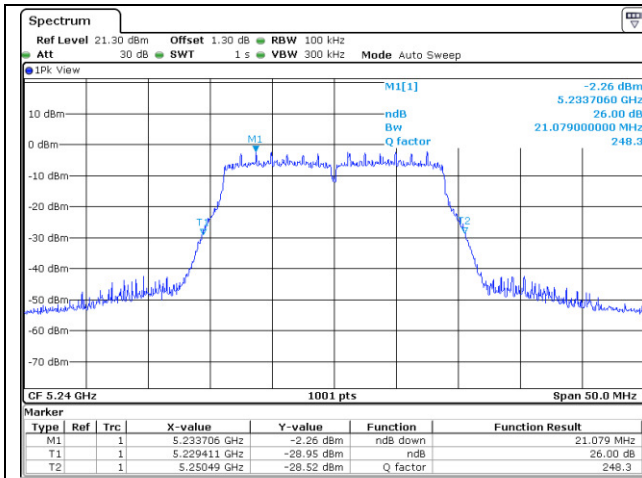
-. Test Date : June 14, 2016

-. Test Result : Pass

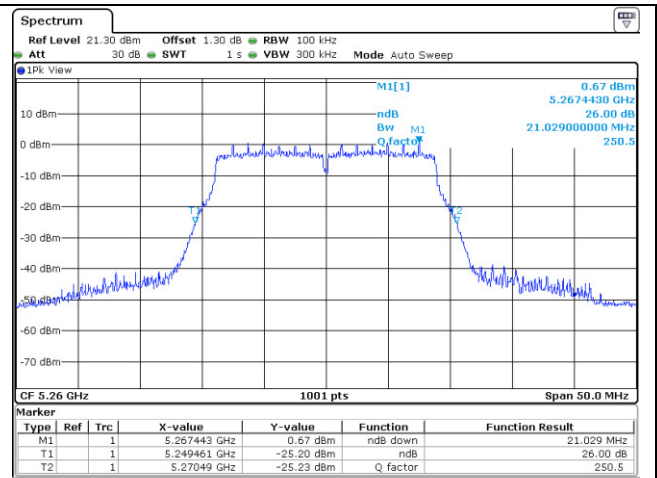
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5 150 ~ 5 250	Low	5 180	20.98	17.73
	Middle	5 220	20.93	17.73
	High	5 240	21.08	17.78
5 250 ~ 5 350	Low	5 260	21.03	17.73
	Middle	5 300	20.93	17.68
	High	5 320	20.98	17.73
5 470 ~ 5 725	Low	5 500	21.28	17.73
	Middle	5 560	21.13	17.73
	High	5 720	20.98	17.73
5 725 ~ 5 850	Low	5 745	21.03	17.78
	Middle	5 785	20.88	17.73
	High	5 825	21.08	17.73



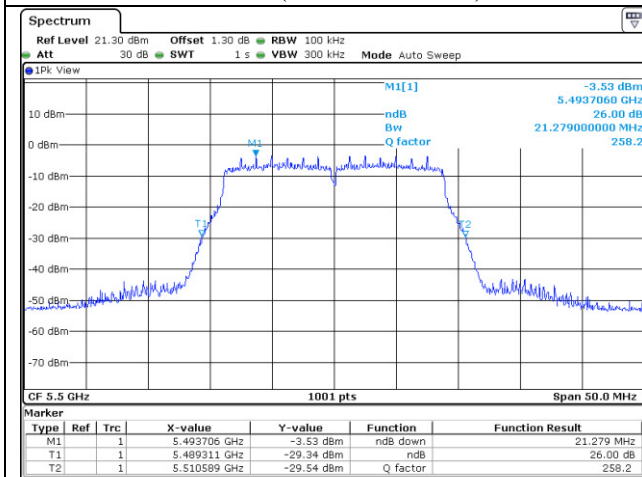
**Tested by: Min-Gu, Ji / Project Engineer**



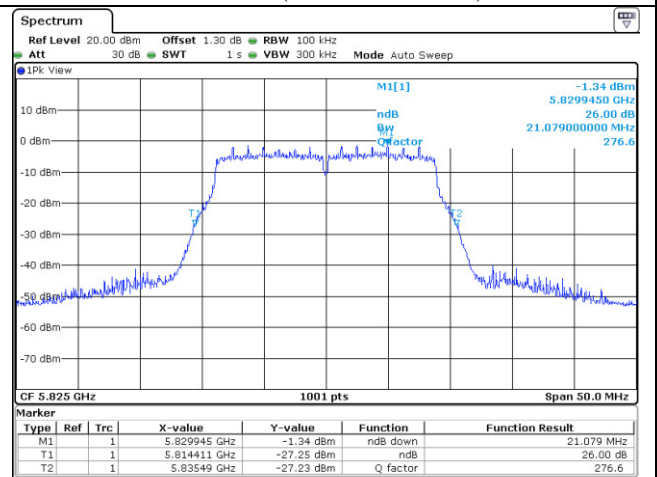
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

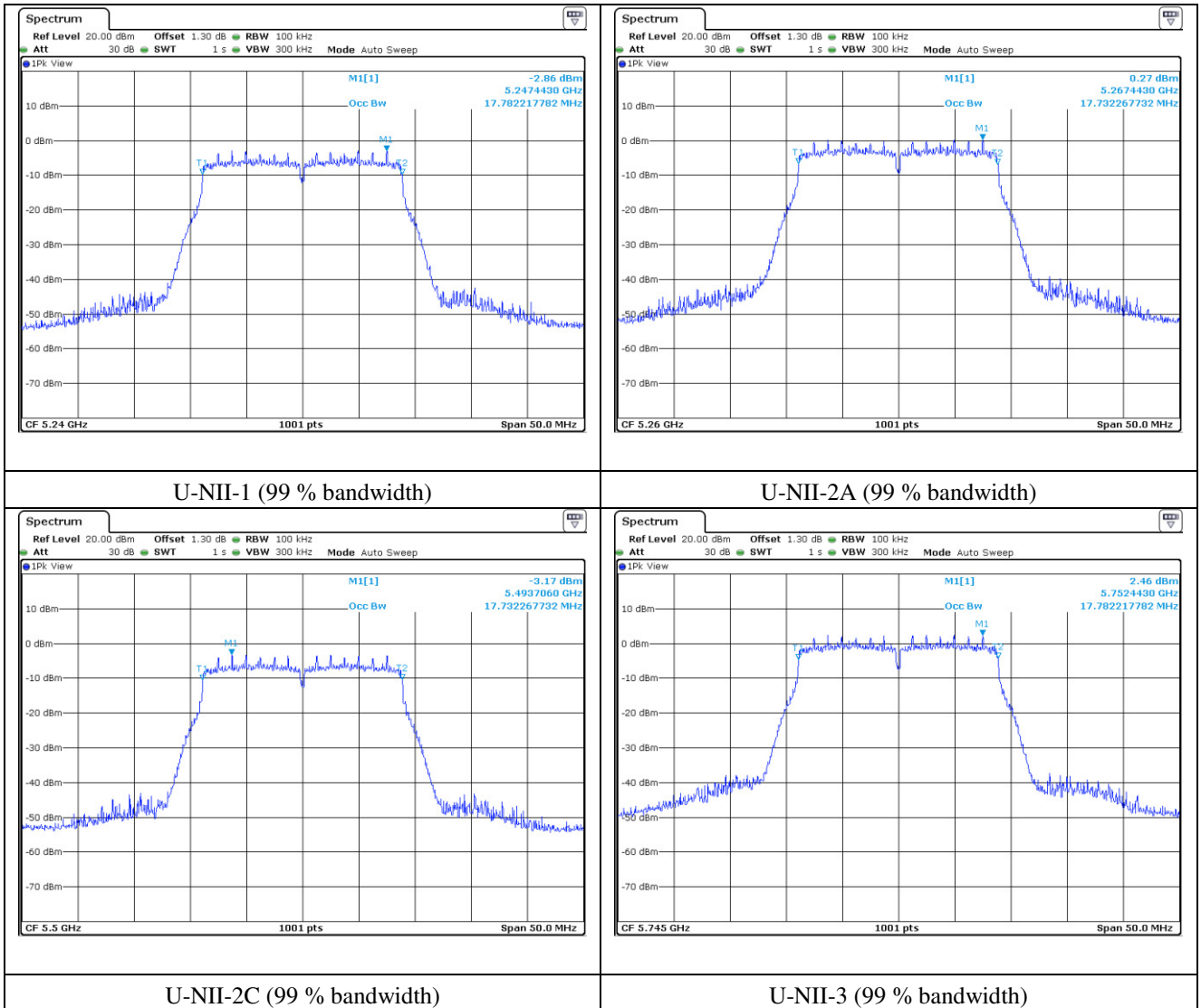


U-NII-2C (26 dB Bandwidth)



U-NII-3 (26 dB Bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.



Note: In order to simplify the report, attached plots were only the most wide channel.

**7.4.2.2 Test data for Antenna 1**

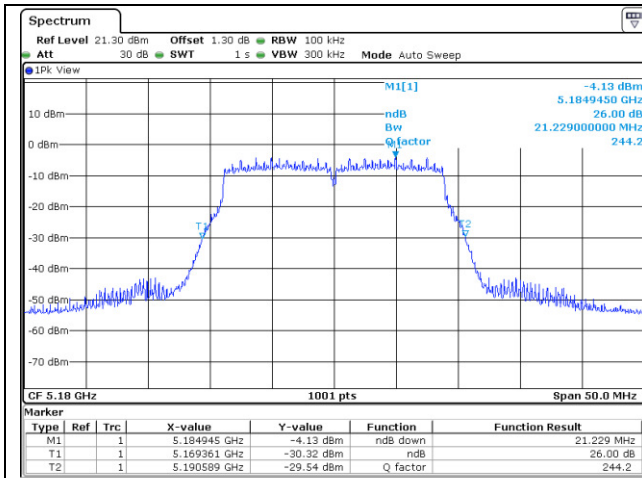
-. Test Date : June 14, 2016

-. Test Result : Pass

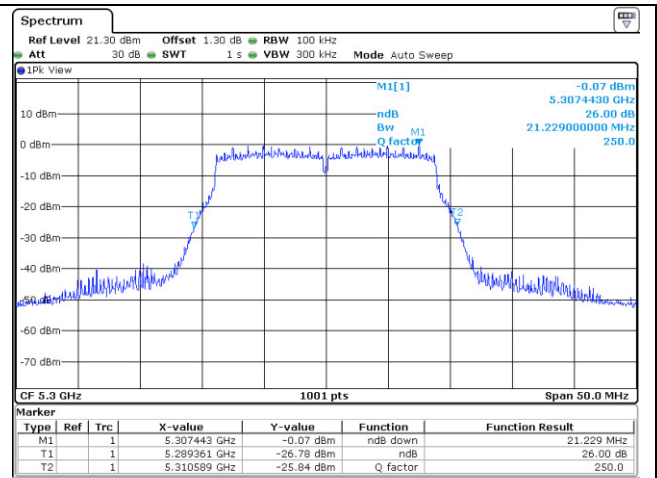
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5 150 ~ 5 250	Low	5 180	21.23	17.73
	Middle	5 220	20.98	17.73
	High	5 240	21.23	17.73
5 250 ~ 5 350	Low	5 260	21.03	17.73
	Middle	5 300	21.23	17.78
	High	5 320	21.23	17.73
5 470 ~ 5 725	Low	5 500	21.03	17.73
	Middle	5 560	21.03	17.73
	High	5 720	21.18	17.73
5 725 ~ 5 850	Low	5 745	21.08	17.73
	Middle	5 785	21.13	17.73
	High	5 825	20.78	17.68



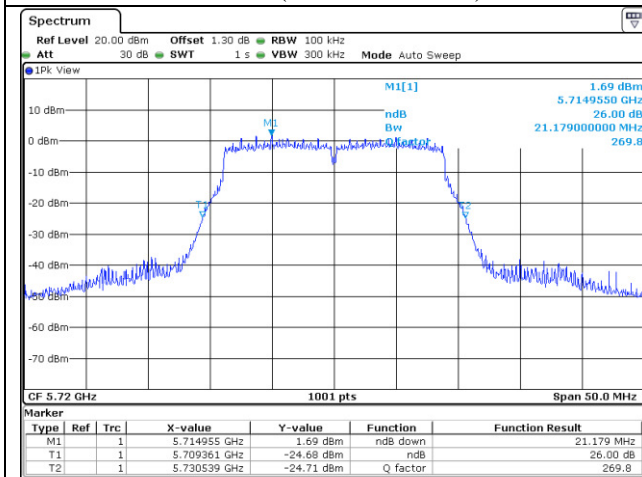
**Tested by: Min-Gu, Ji / Project Engineer**



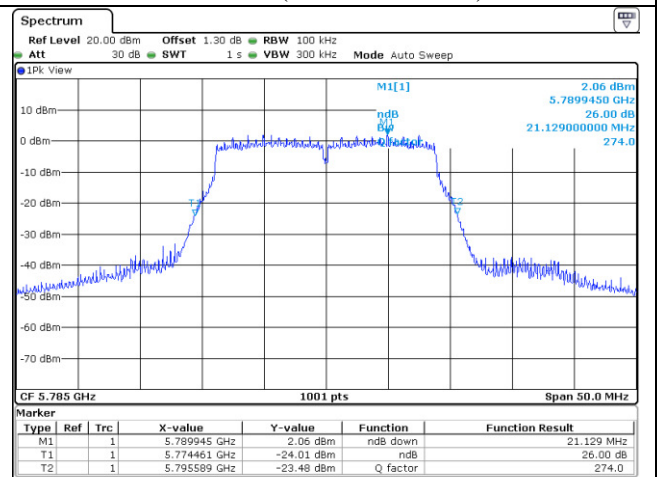
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

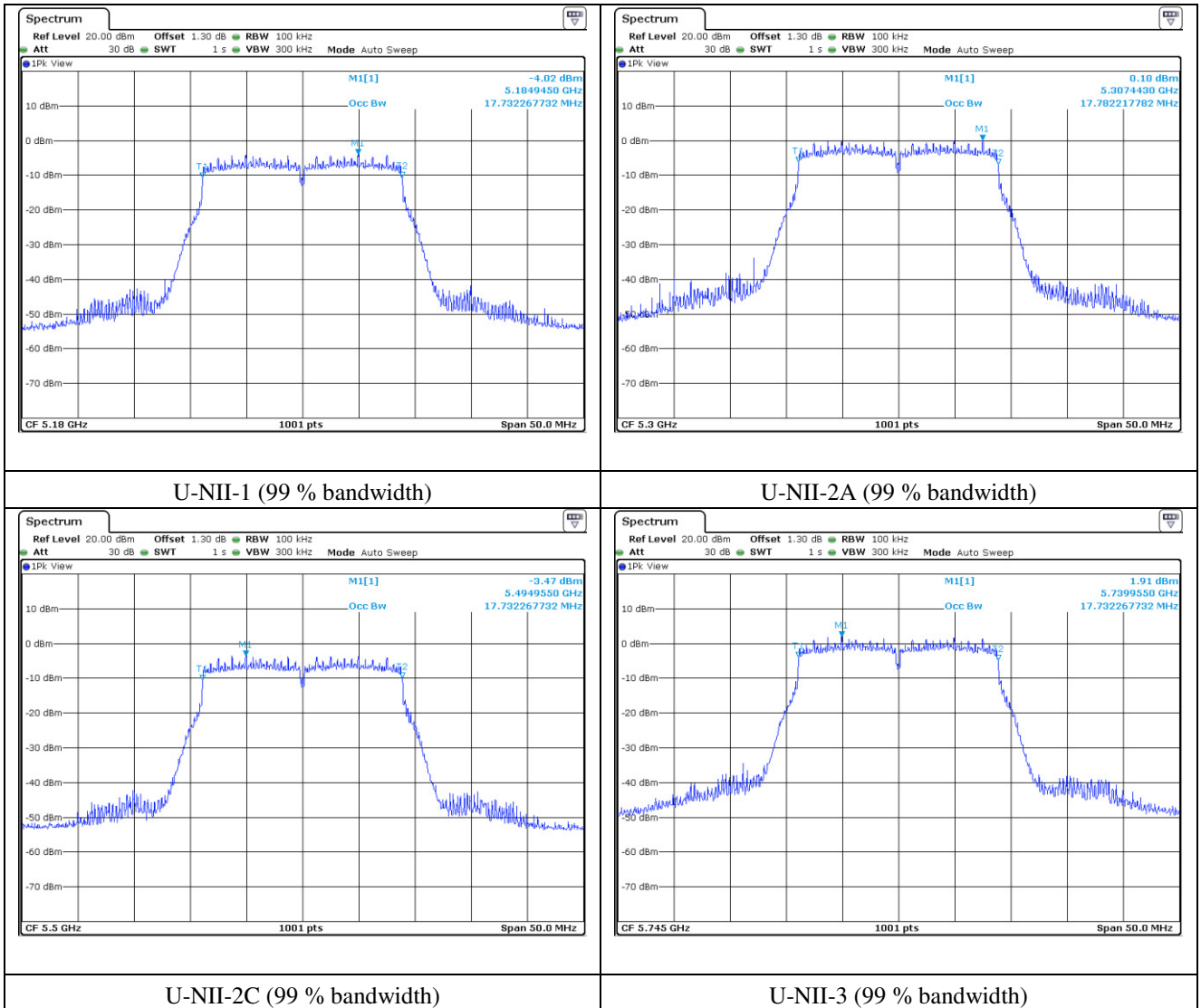


U-NII-2C (26 dB Bandwidth)



U-NII-3 (26 dB Bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.



Note: In order to simplify the report, attached plots were only the most wide channel.

**7.4.2.3 Test data for Antenna 2**

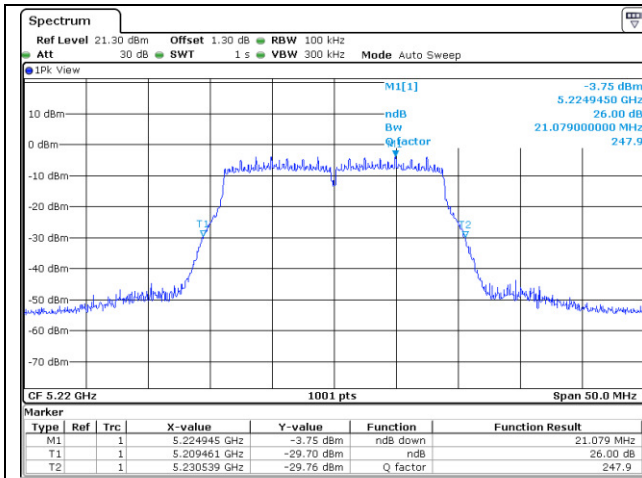
-. Test Date : June 14, 2016

-. Test Result : Pass

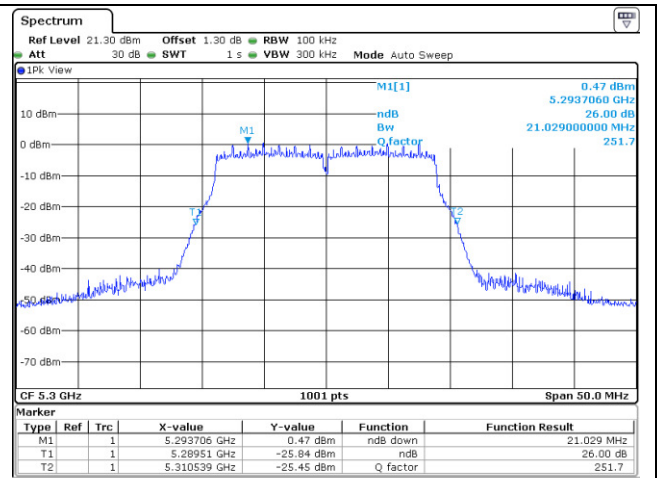
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5 150 ~ 5 250	Low	5 180	20.93	17.73
	Middle	5 220	21.08	17.68
	High	5 240	21.03	17.68
5 250 ~ 5 350	Low	5 260	20.98	17.68
	Middle	5 300	21.03	17.68
	High	5 320	20.93	17.68
5 470 ~ 5 725	Low	5 500	21.13	17.73
	Middle	5 560	20.83	17.68
	High	5 720	20.88	17.68
5 725 ~ 5 850	Low	5 745	20.88	17.68
	Middle	5 785	21.03	17.68
	High	5 825	20.88	17.68



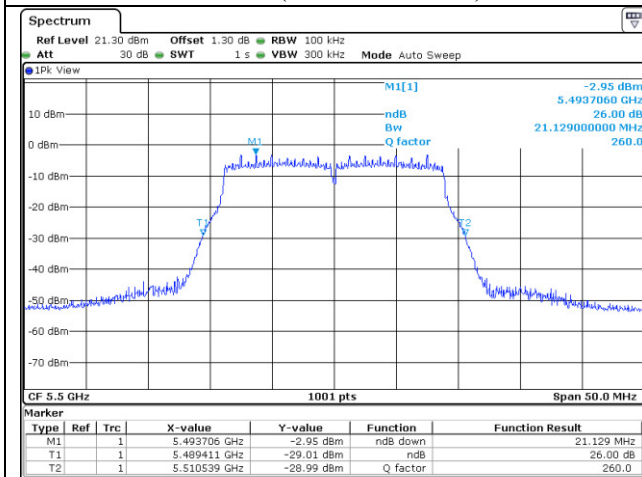
**Tested by: Min-Gu, Ji / Project Engineer**



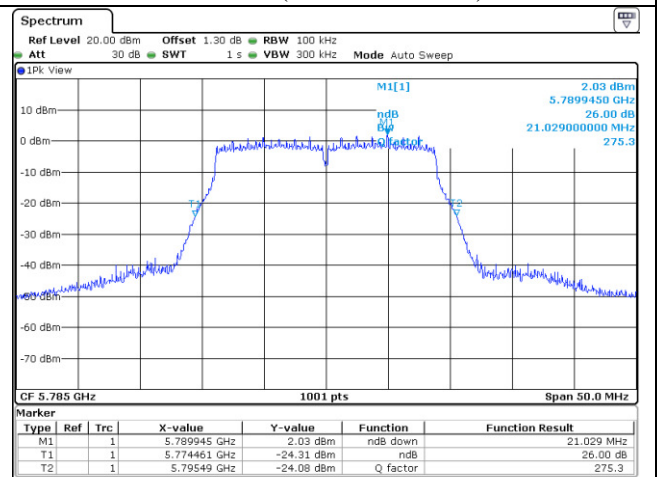
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

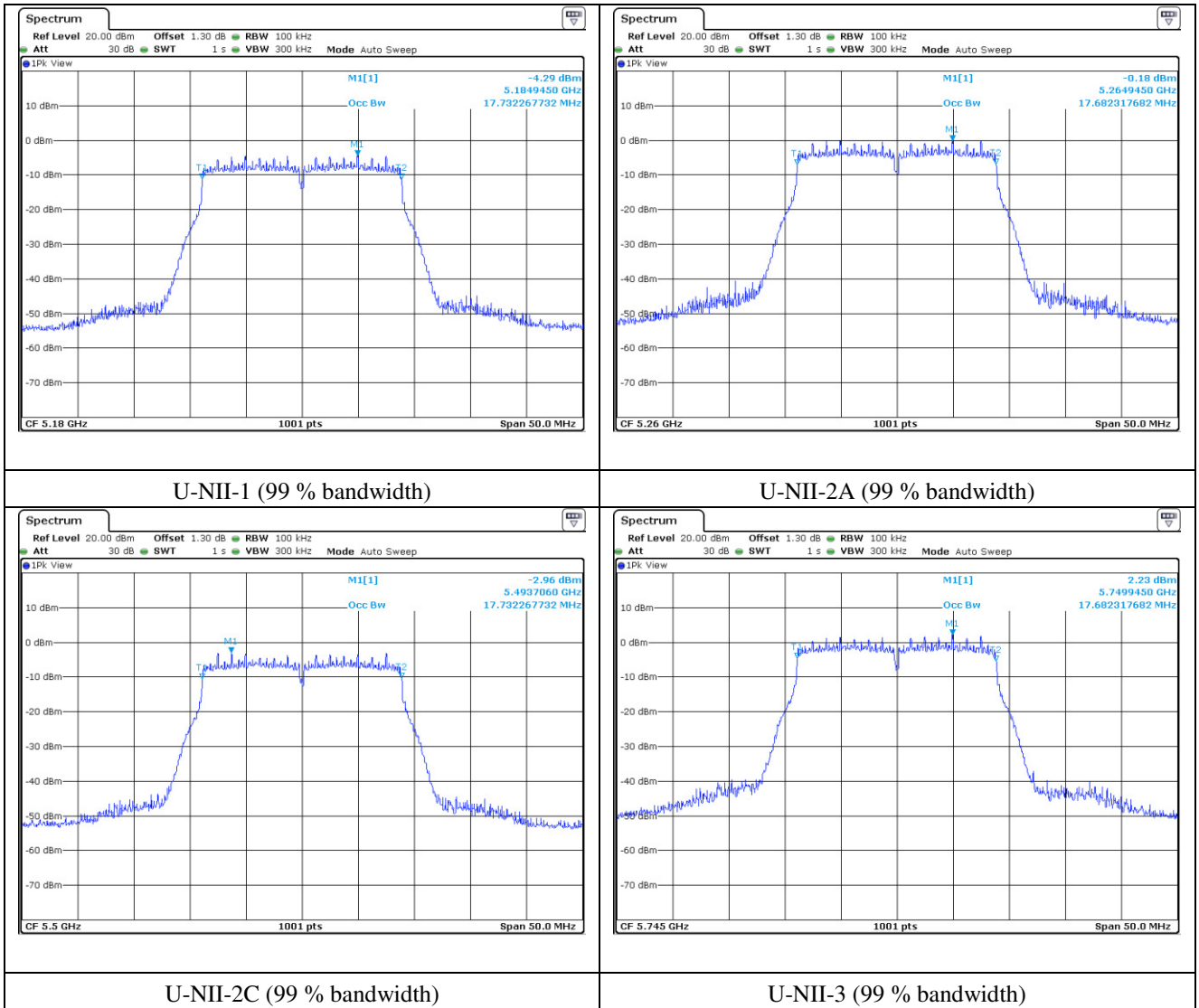


U-NII-2C (26 dB Bandwidth)



U-NII-3 (26 dB Bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.



Note: In order to simplify the report, attached plots were only the most wide channel.

**7.4.2.4 Test data for Antenna 3**

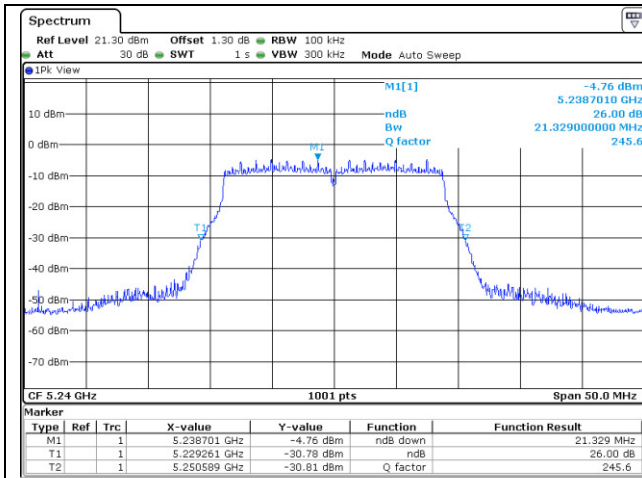
-. Test Date : June 14, 2016

-. Test Result : Pass

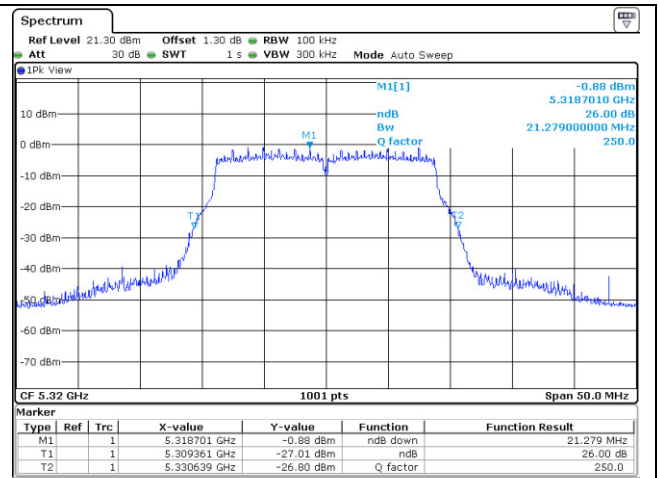
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5 150 ~ 5 250	Low	5 180	20.93	17.68
	Middle	5 220	21.08	17.68
	High	5 240	21.33	17.68
5 250 ~ 5 350	Low	5 260	21.23	17.68
	Middle	5 300	21.18	17.68
	High	5 320	21.28	17.73
5 470 ~ 5 725	Low	5 500	21.18	17.73
	Middle	5 560	21.03	17.73
	High	5 720	20.88	17.68
5 725 ~ 5 850	Low	5 745	20.68	17.68
	Middle	5 785	20.93	17.68
	High	5 825	20.93	17.68



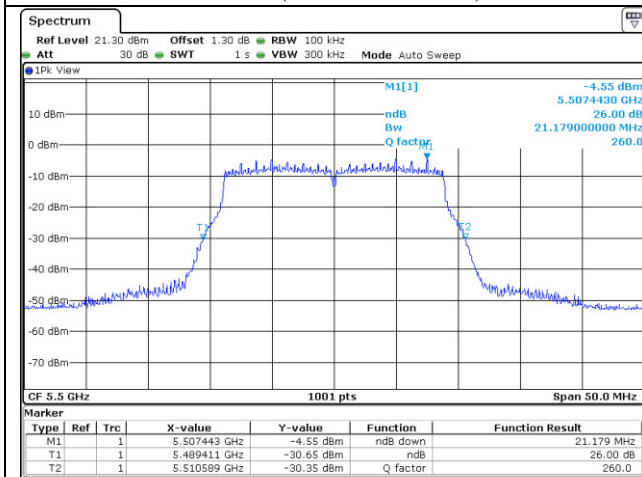
**Tested by: Min-Gu, Ji / Project Engineer**



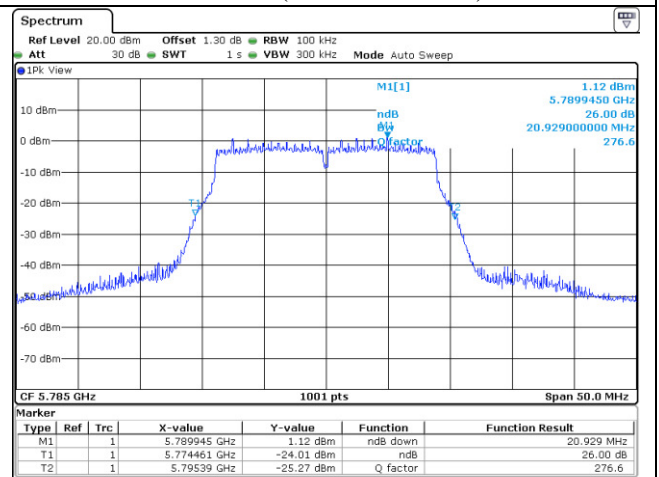
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

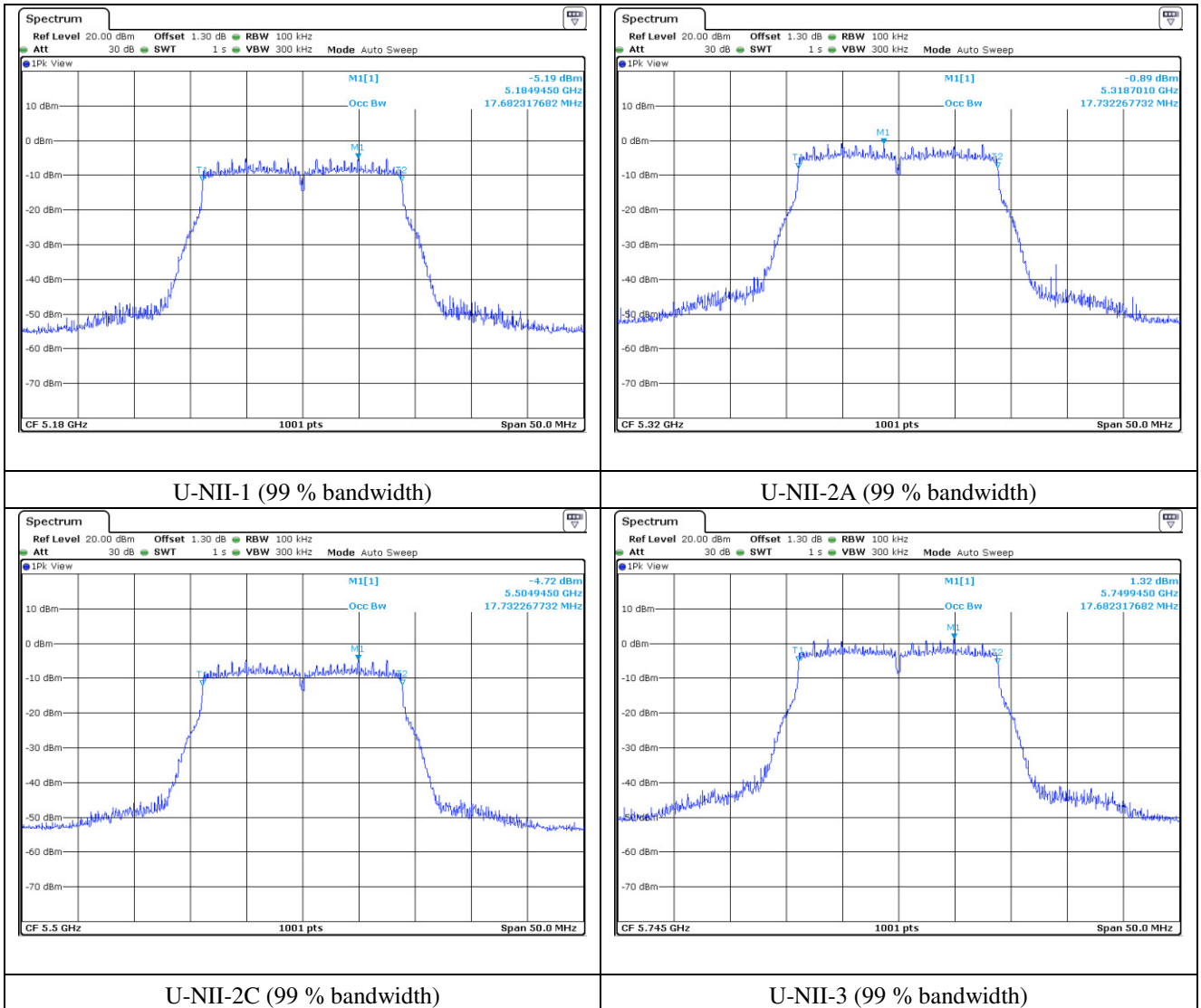


U-NII-2C (26 dB Bandwidth)



U-NII-3 (26 dB Bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.



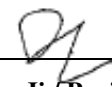
Note: In order to simplify the report, attached plots were only the most wide channel.

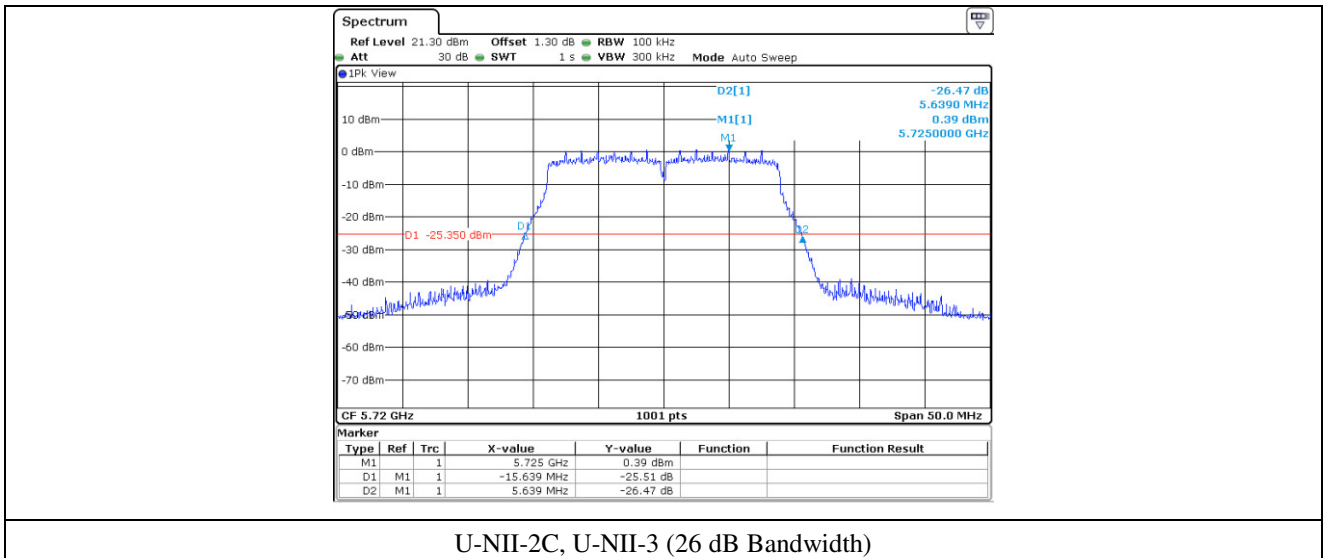
**7.4.2.6 Test data for Staddle Channel\_Antenna 0**

-. Test Date : June 14, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 470 ~ 5 725	5 720	15.64
5 725 ~ 5 850	5 720	5.64

  
**Tested by: Min-Gu, Ji / Project Engineer**



U-NII-2C, U-NII-3 (26 dB Bandwidth)

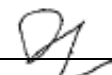
Note: In order to simplify the report, attached plots were only the most wide channel.

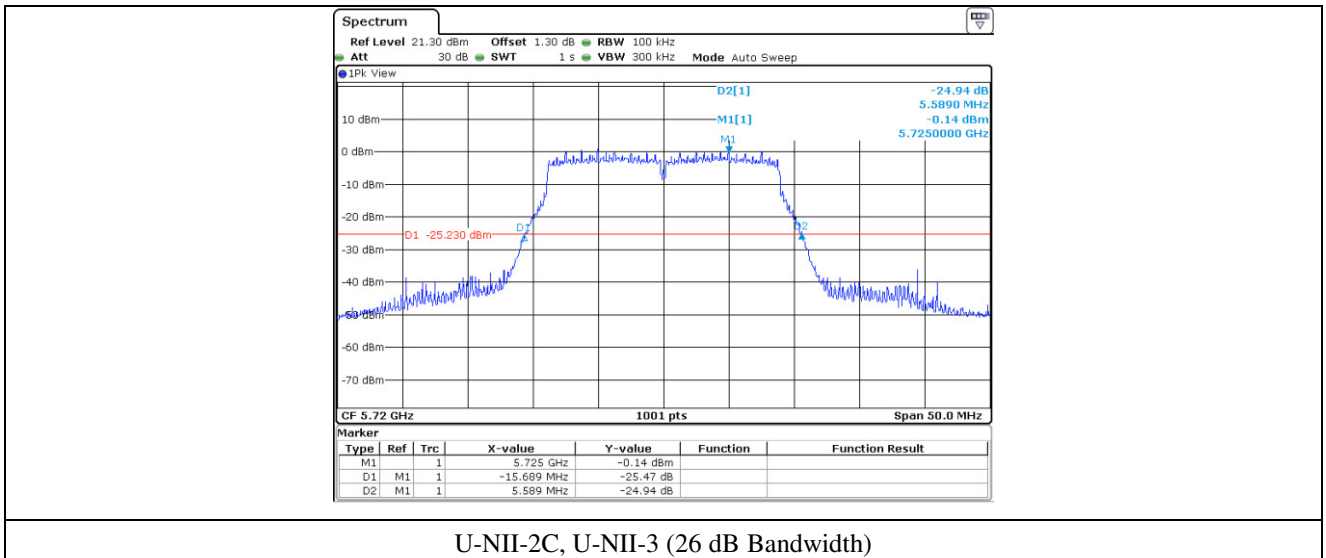
**7.4.2.7 Test data for Staddle Channel\_Antenna 1**

-. Test Date : June 14, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 470 ~ 5 725	5 720	15.69
5 725 ~ 5 850	5 720	5.59

  
 Tested by: Min-Gu, Ji / Project Engineer



U-NII-2C, U-NII-3 (26 dB Bandwidth)

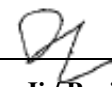
Note: In order to simplify the report, attached plots were only the most wide channel.

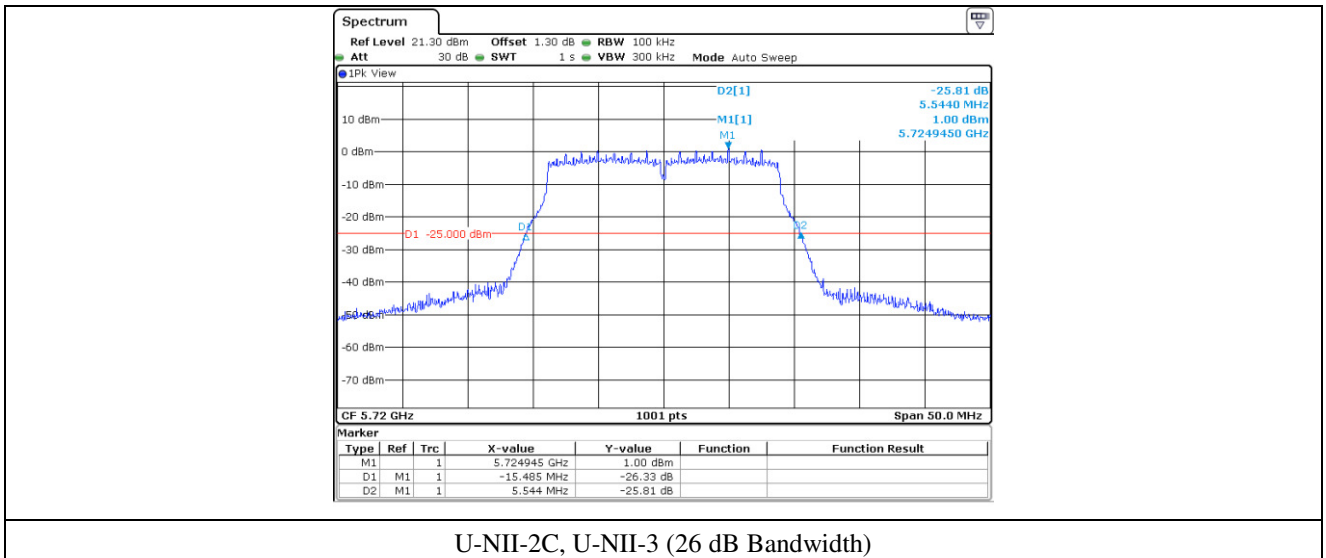
**7.4.2.8 Test data for Staddle Channel\_Antenna 2**

- Test Date : June 14, 2016

- Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 470 ~ 5 725	5 720	15.49
5 725 ~ 5 850	5 720	5.54

  
 Tested by: Min-Gu, Ji / Project Engineer



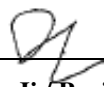
U-NII-2C, U-NII-3 (26 dB Bandwidth)

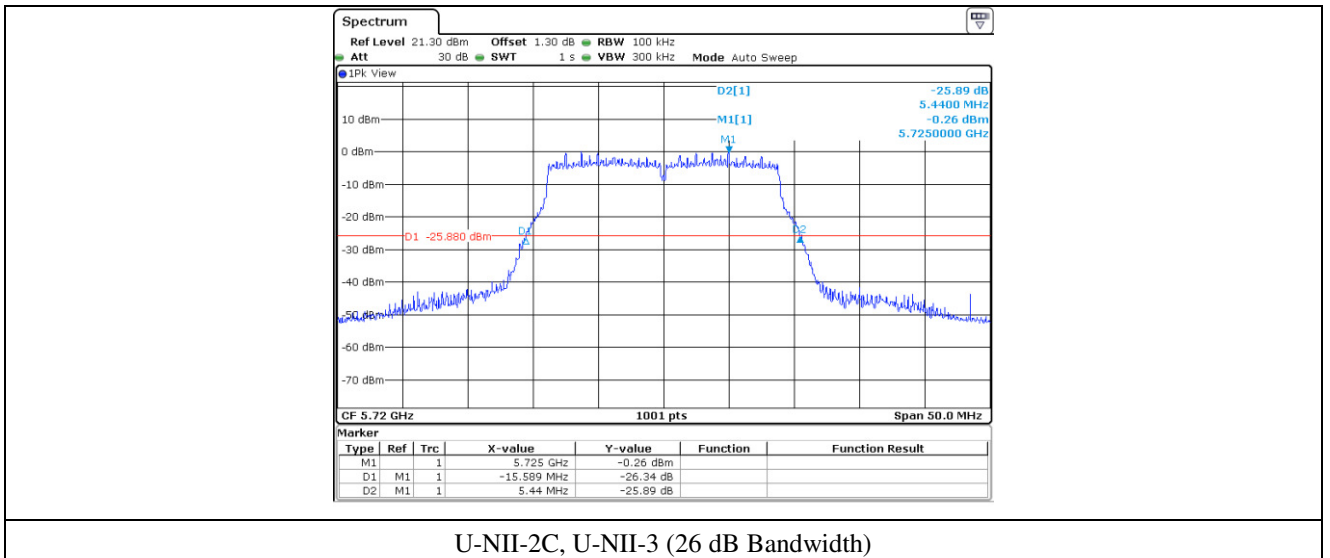
Note: In order to simplify the report, attached plots were only the most wide channel

**7.4.2.9 Test data for Staddle Channel\_Antenna 3**

- Test Date : June 14, 2016
- Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 470 ~ 5 725	5 720	15.59
5 725 ~ 5 850	5 720	5.44

  
 Tested by: Min-Gu, Ji / Project Engineer



U-NII-2C, U-NII-3 (26 dB Bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel

**7.4.3 Test data for 802.11n\_HT40 RLAN Mode**

**7.4.3.1 Test data for Antenna 0**

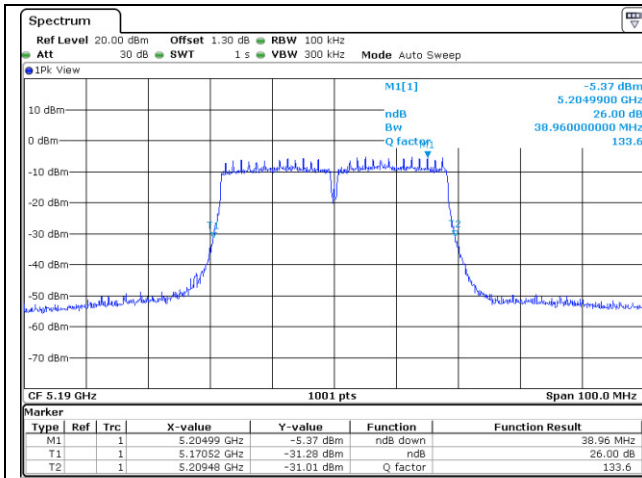
-. Test Date : June 14, 2016

-. Test Result : Pass

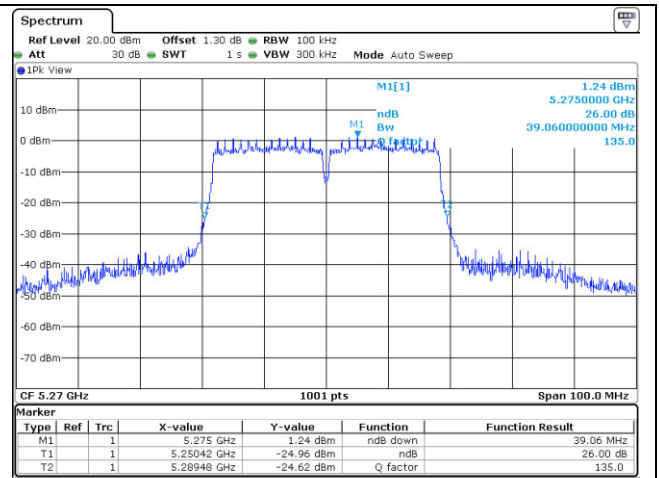
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5 150 ~ 5 250	Low	5 190	38.96	36.16
	High	5 230	38.96	36.16
5 250 ~ 5 350	Low	5 270	39.06	36.16
	High	5 310	39.06	36.16
5 470 ~ 5 725	Low	5 510	39.06	36.16
	Middle	5 550	39.06	36.16
	High	5 710	39.06	36.16
5 725 ~ 5 850	Low	5 755	39.06	36.26
	High	5 795	38.36	36.16



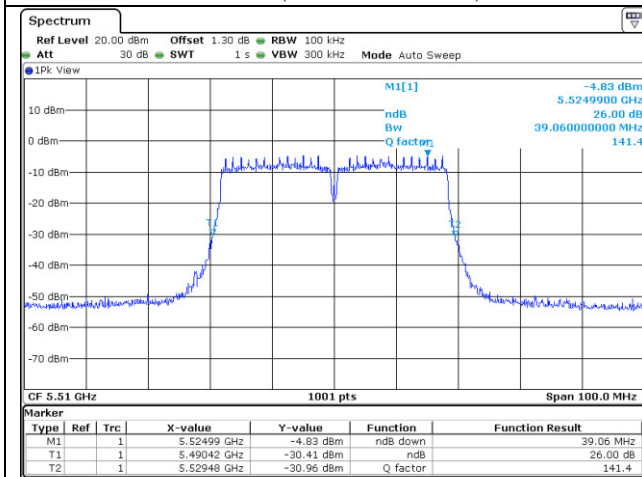
**Tested by: Min-Gu, Ji / Project Engineer**



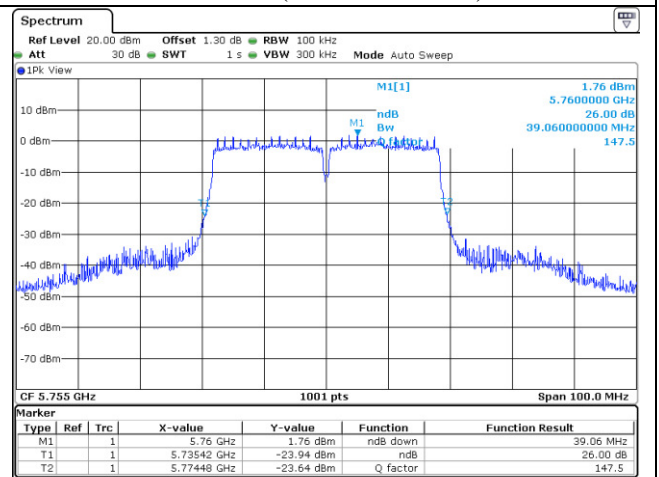
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

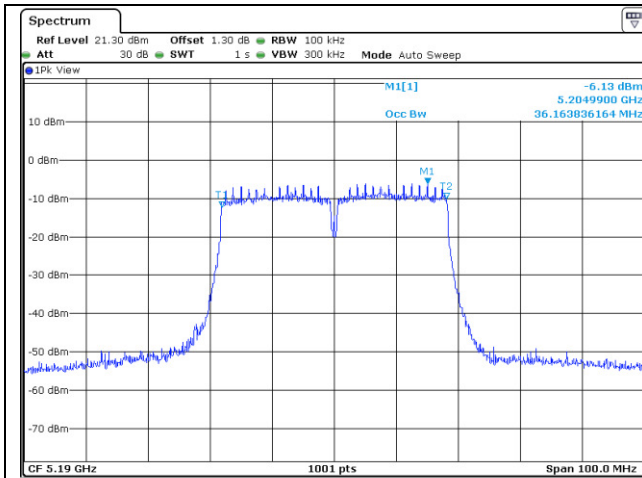


U-NII-2C (26 dB Bandwidth)

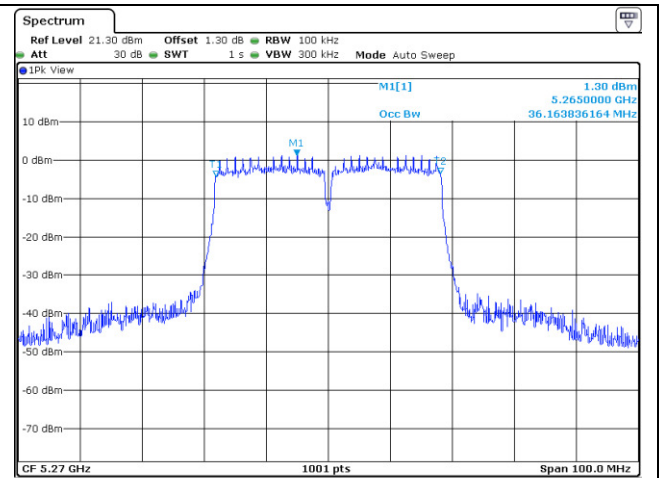


U-NII-3 (26 dB Bandwidth)

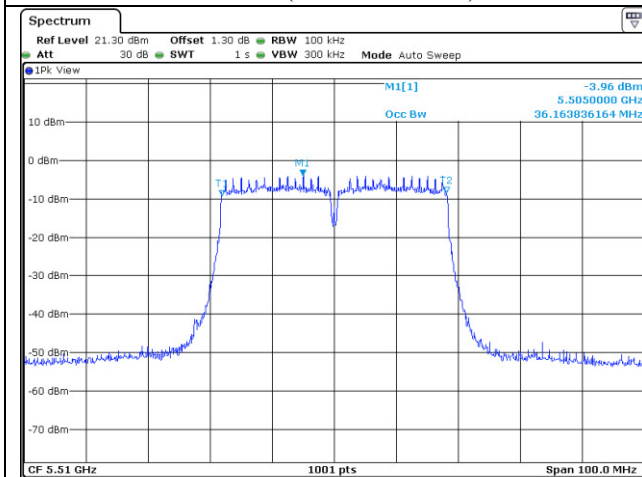
Note: In order to simplify the report, attached plots were only the most wide channel.



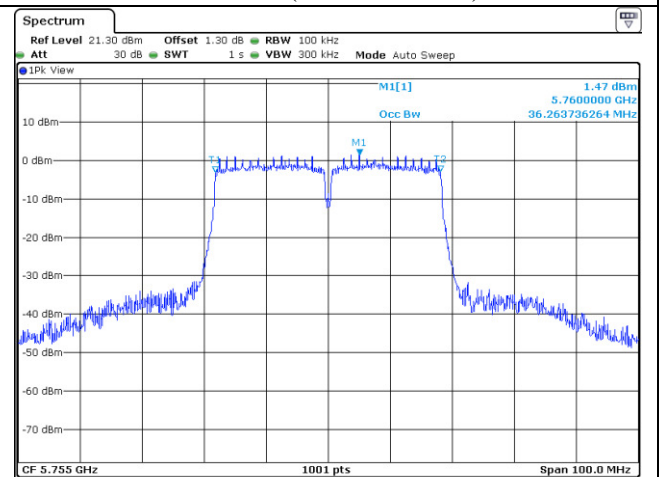
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

**7.4.3.2 Test data for Antenna 1**

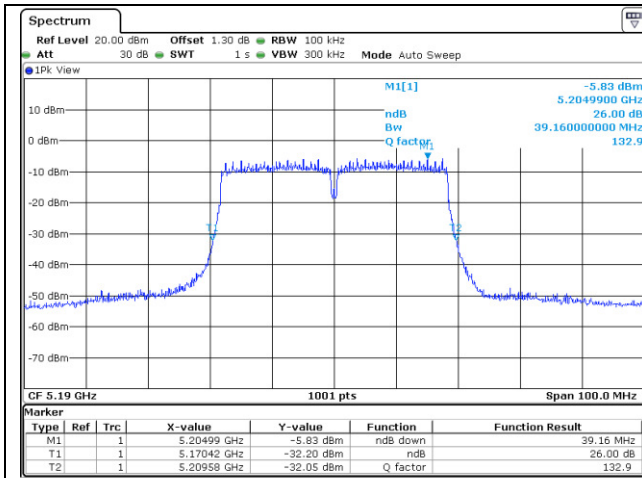
-. Test Date : June 14, 2016

-. Test Result : Pass

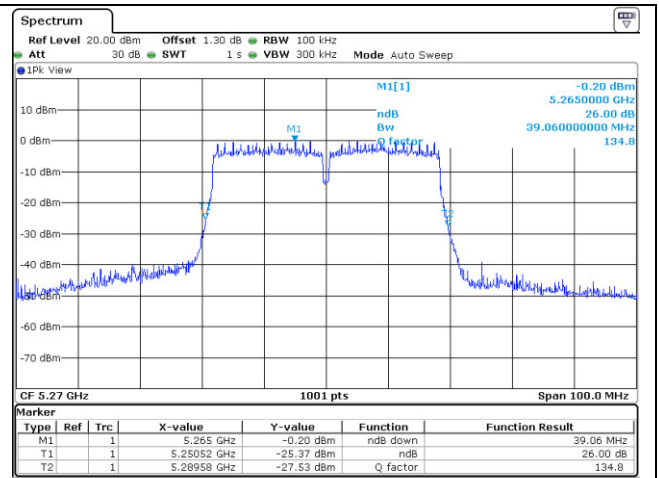
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5 150 ~ 5 250	Low	5 190	39.16	36.16
	High	5 230	38.96	36.16
5 250 ~ 5 350	Low	5 270	39.06	36.16
	High	5 310	39.06	36.16
5 470 ~ 5 725	Low	5 510	38.96	36.16
	Middle	5 550	39.16	36.16
	High	5 710	39.16	36.26
5 725 ~ 5 850	Low	5 755	38.86	36.16
	High	5 795	39.26	36.16



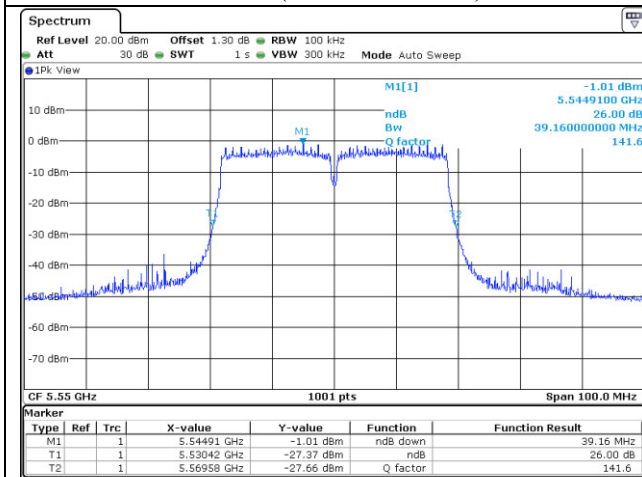
**Tested by: Min-Gu, Ji / Project Engineer**



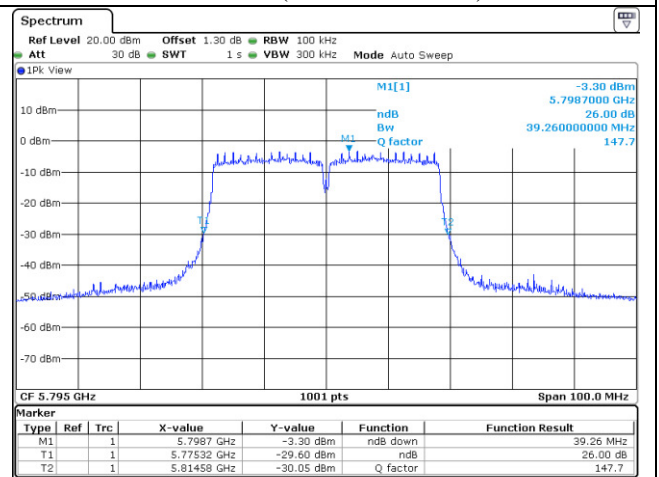
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

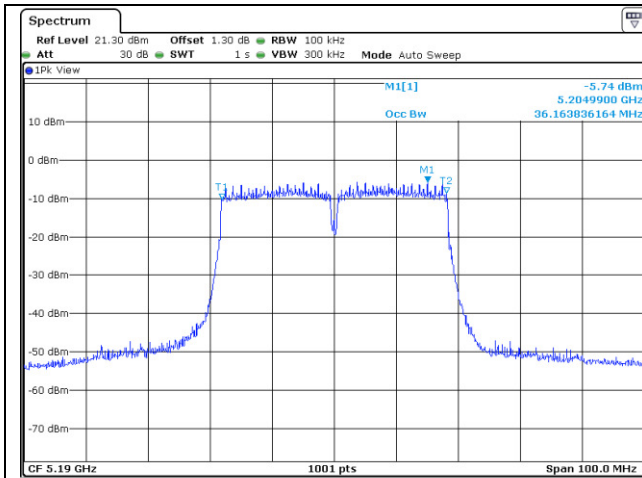


U-NII-2C (26 dB Bandwidth)

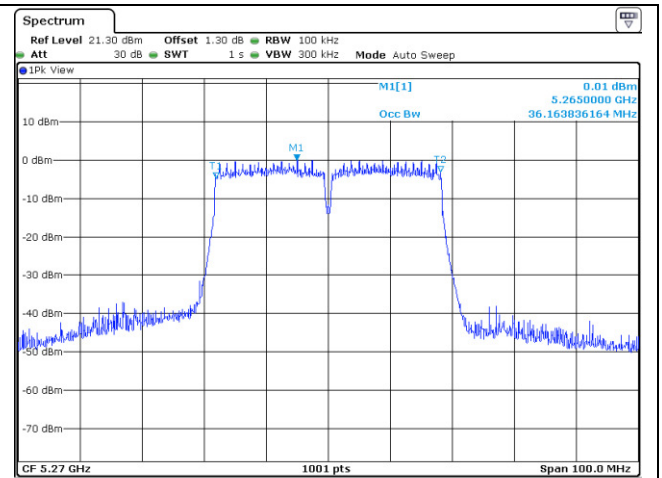


U-NII-3 (26 dB Bandwidth)

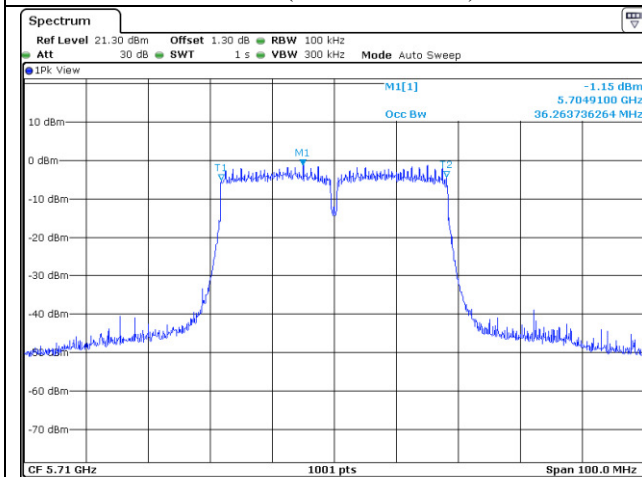
Note: In order to simplify the report, attached plots were only the most wide channel.



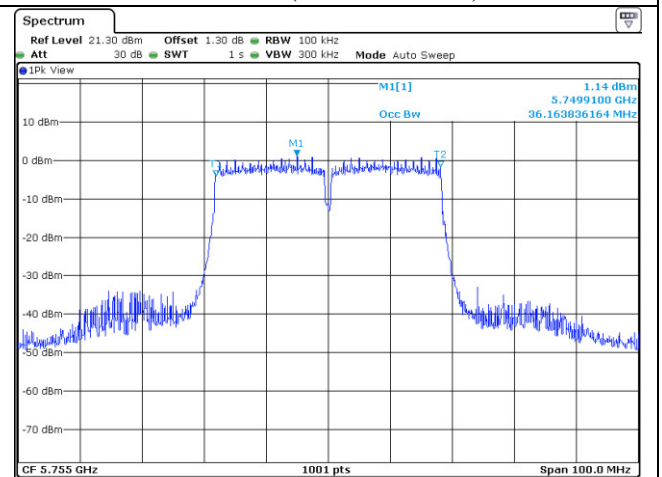
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

**7.4.3.3 Test data for Antenna 2**

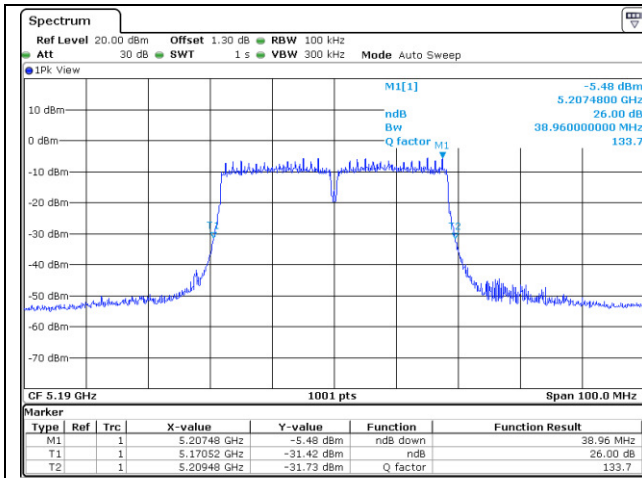
-. Test Date : June 14, 2016

-. Test Result : Pass

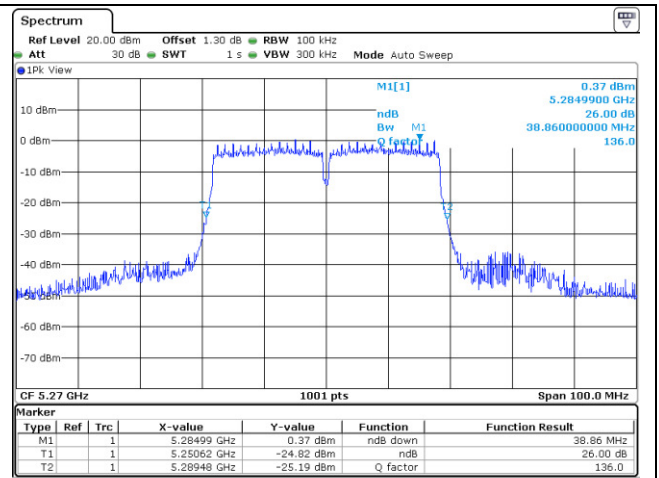
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5 150 ~ 5 250	Low	5 190	38.96	36.16
	High	5 230	38.76	36.16
5 250 ~ 5 350	Low	5 270	38.86	36.16
	High	5 310	38.76	36.16
5 470 ~ 5 725	Low	5 510	39.06	36.16
	Middle	5 550	38.96	36.16
	High	5 710	39.06	36.26
5 725 ~ 5 850	Low	5 755	39.06	36.26
	High	5 795	38.96	36.16



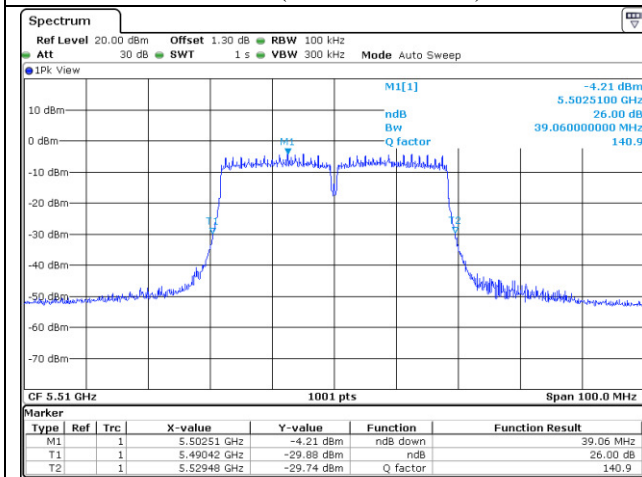
**Tested by: Min-Gu, Ji / Project Engineer**



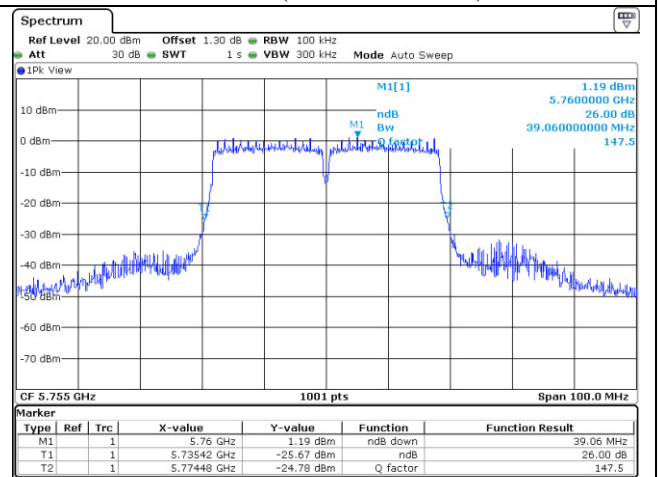
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

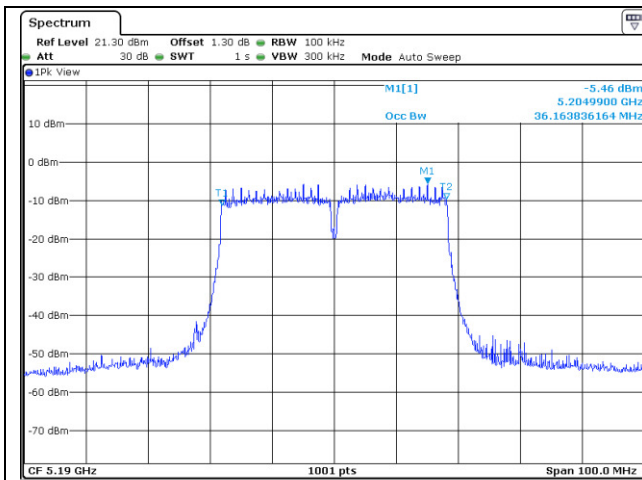


U-NII-2C (26 dB Bandwidth)

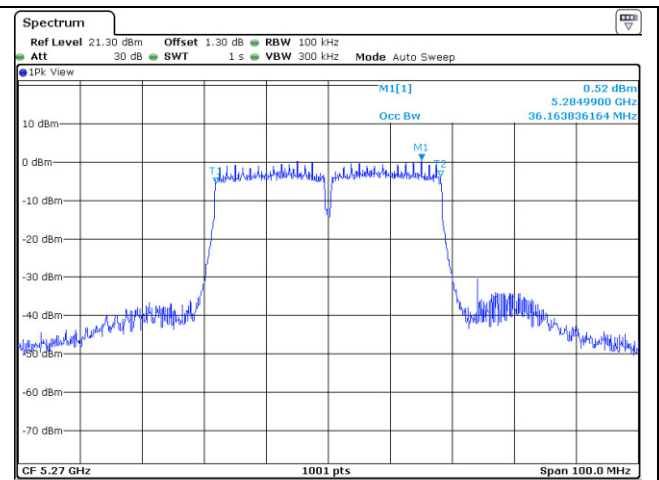


U-NII-3 (26 dB Bandwidth)

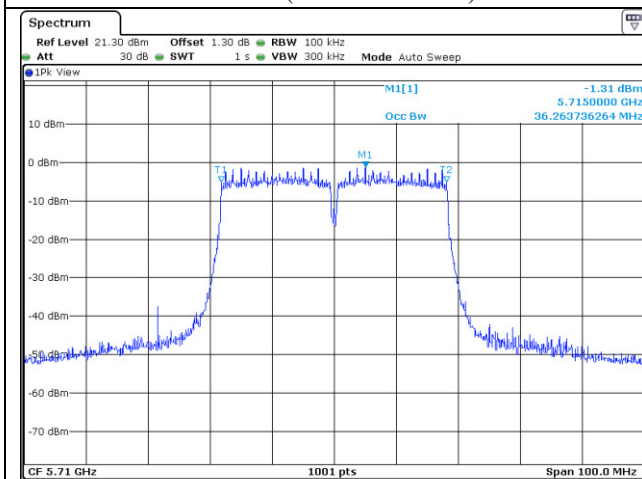
Note: In order to simplify the report, attached plots were only the most wide channel.



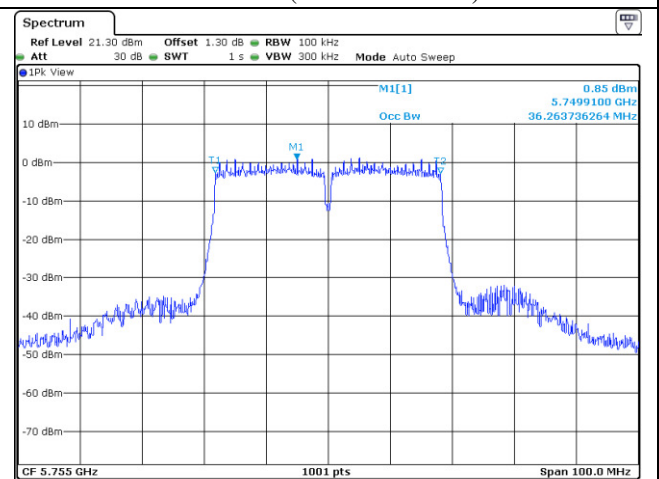
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

**7.4.3.4 Test data for Antenna 3**

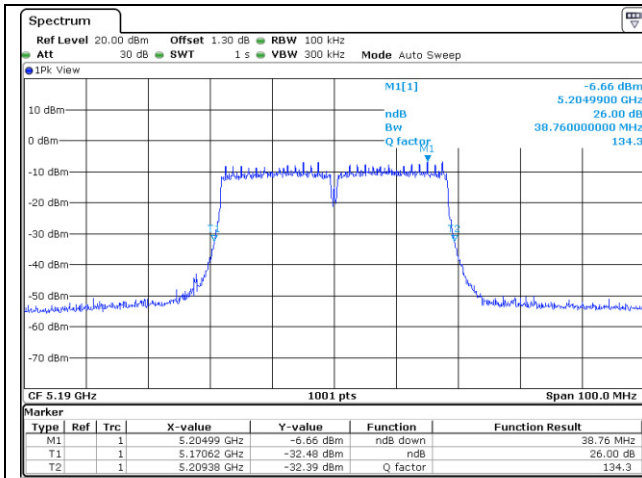
-. Test Date : June 14, 2016

-. Test Result : Pass

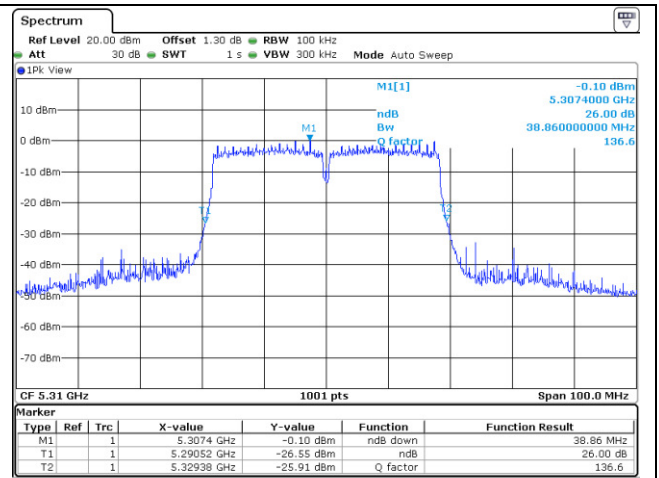
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5 150 ~ 5 250	Low	5 190	38.76	36.16
	High	5 230	38.76	36.16
5 250 ~ 5 350	Low	5 270	38.76	36.16
	High	5 310	38.86	36.16
5 470 ~ 5 725	Low	5 510	38.96	36.16
	Middle	5 550	38.76	36.16
	High	5 710	38.86	36.26
5 725 ~ 5 850	Low	5 755	38.86	36.26
	High	5 795	38.86	36.16



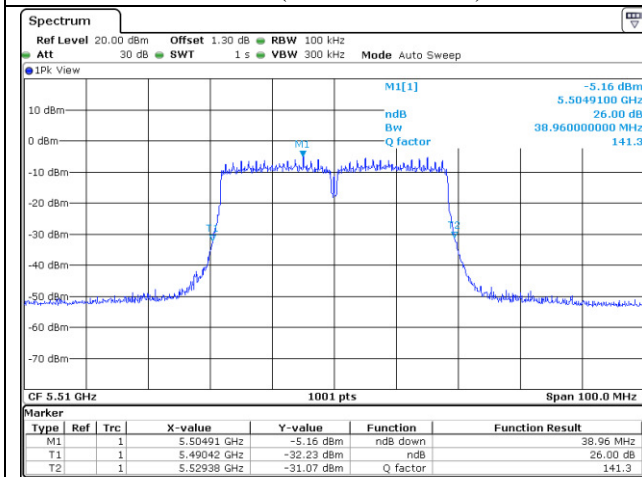
**Tested by: Min-Gu, Ji / Project Engineer**



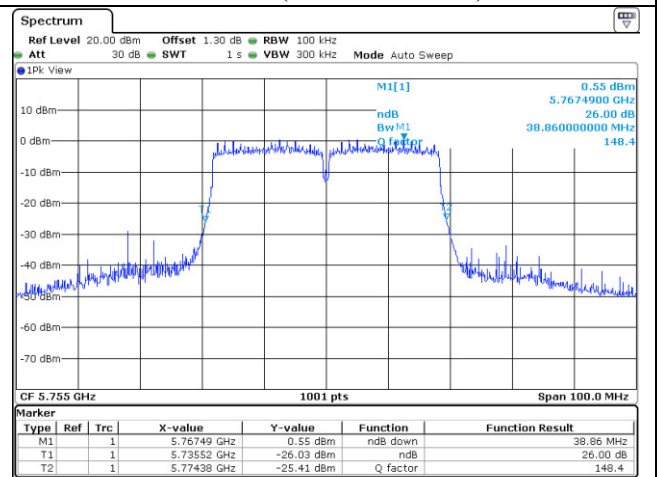
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

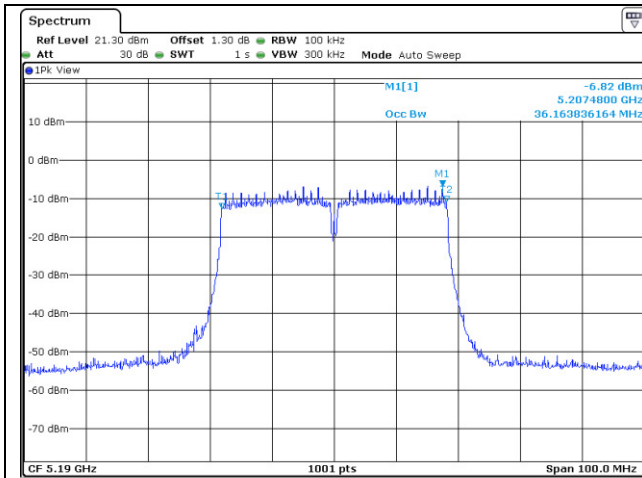


U-NII-2C (26 dB Bandwidth)

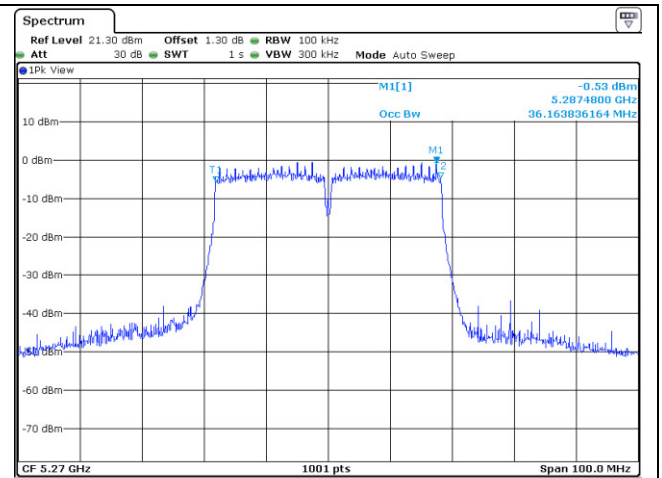


U-NII-3 (26 dB Bandwidth)

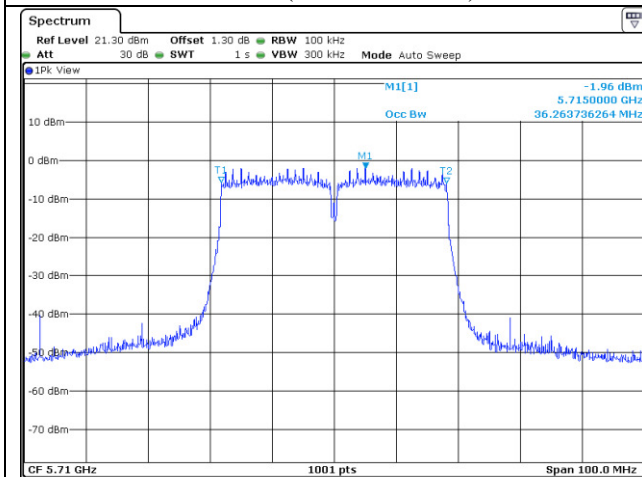
Note: In order to simplify the report, attached plots were only the most wide channel.



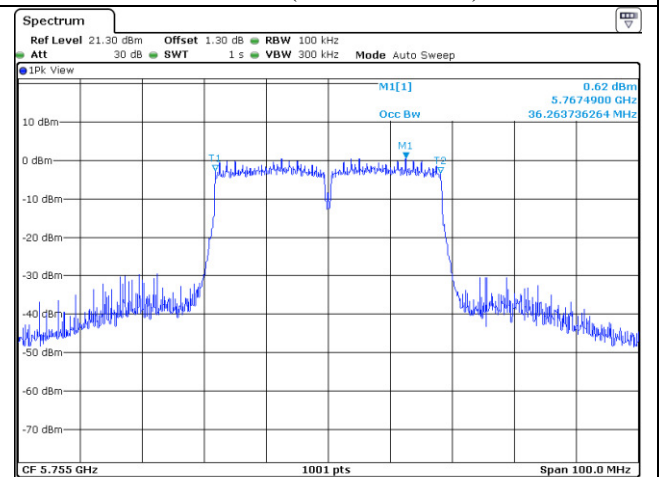
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

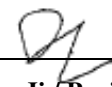
Note: In order to simplify the report, attached plots were only the most wide channel.

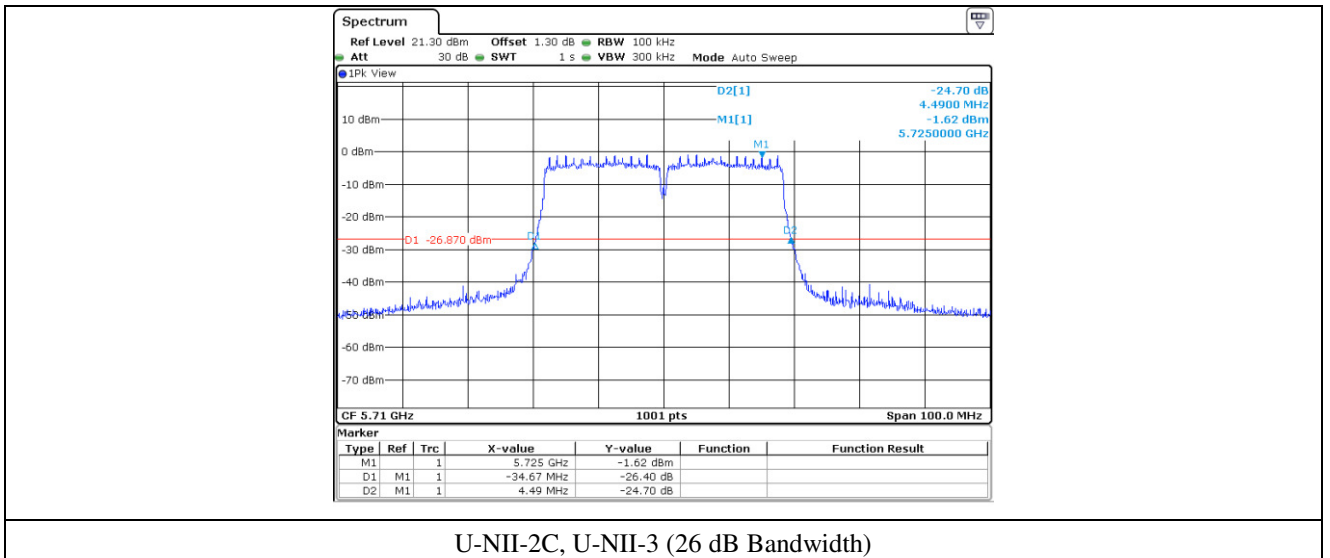
**7.4.3.5 Test data for Staddle Channel\_Antenna 0**

- Test Date : June 14, 2016

- Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 470 ~ 5 725	5 710	34.67
5 725 ~ 5 850	5 710	4.49

  
 Tested by: Min-Gu, Ji / Project Engineer



U-NII-2C, U-NII-3 (26 dB Bandwidth)

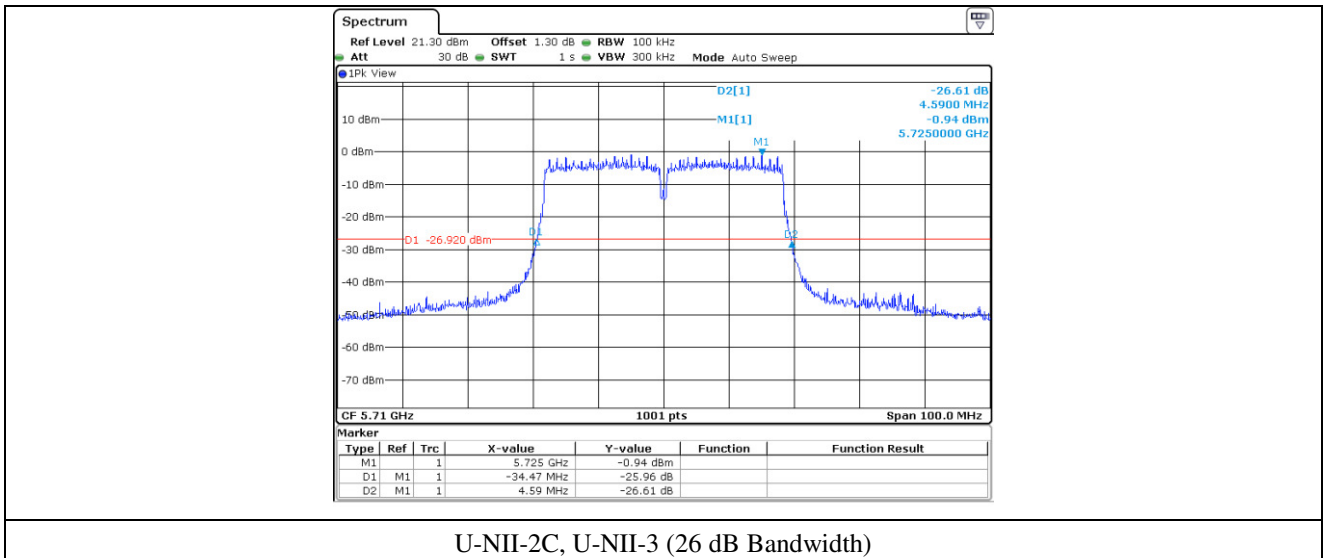
Note: In order to simplify the report, attached plots were only the most wide channel.

**7.4.3.6 Test data for Staddle Channel\_Antenna 1**

- Test Date : June 14, 2016  
 - Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 470 ~ 5 725	5 710	34.47
5 725 ~ 5 850	5 710	4.59

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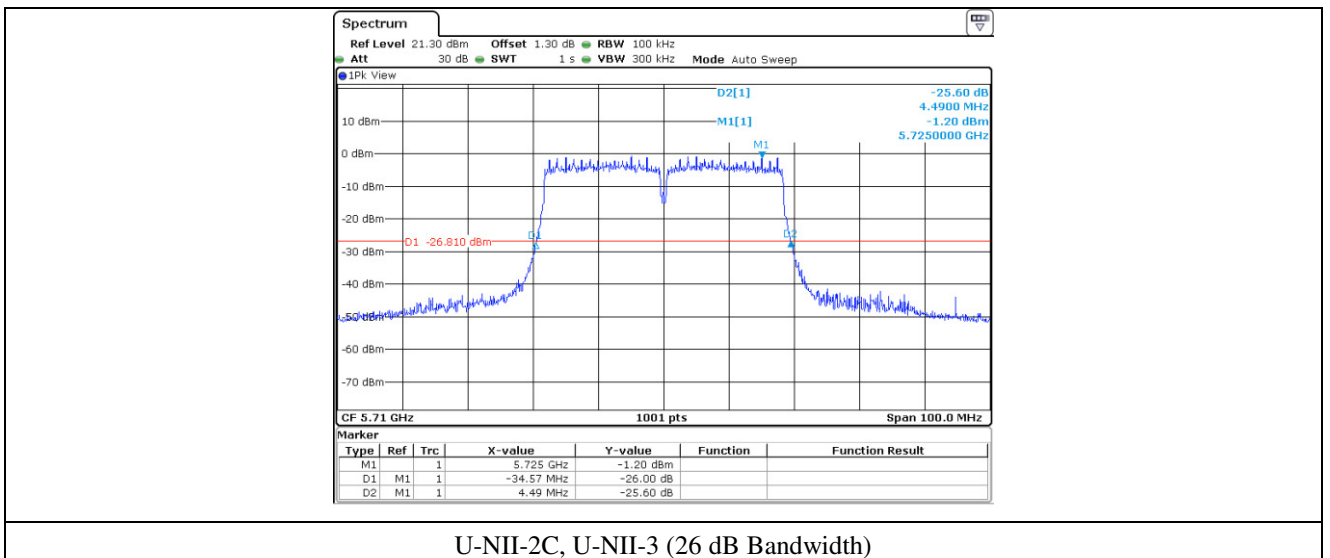
Note: In order to simplify the report, attached plots were only the most wide channel.

**7.4.3.7 Test data for Staddle Channel\_Antenna 2**

- Test Date : June 14, 2016  
 - Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 470 ~ 5 725	5 710	34.57
5 725 ~ 5 850	5 710	4.49

*Min-Gu Ji*  
 Tested by: Min-Gu, Ji / Project Engineer



U-NII-2C, U-NII-3 (26 dB Bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

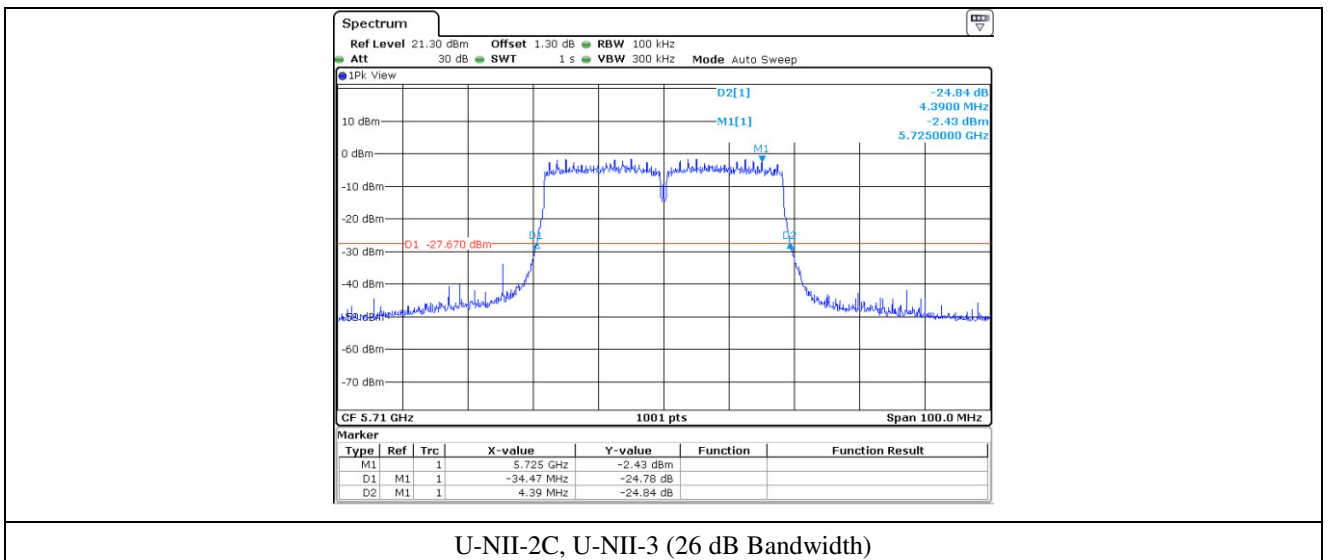
**7.4.3.8 Test data for Staddle Channel\_Antenna 3**

- Test Date : June 14, 2016

- Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 470 ~ 5 725	5 710	34.47
5 725 ~ 5 850	5 710	4.39

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**Tested by: Min-Gu, Ji / Project Engineer**



U-NII-2C, U-NII-3 (26 dB Bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

**7.4.4 Test data for 802.11ac\_VHT20 RLAN Mode**

**7.4.4.1 Test data for Antenna 0**

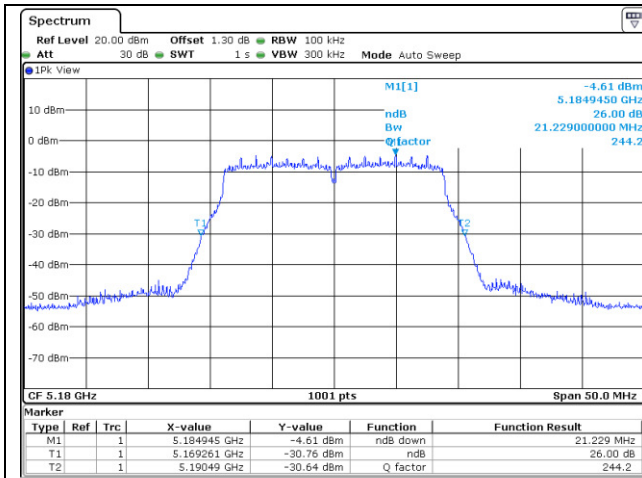
-. Test Date : June 14, 2016

-. Test Result : Pass

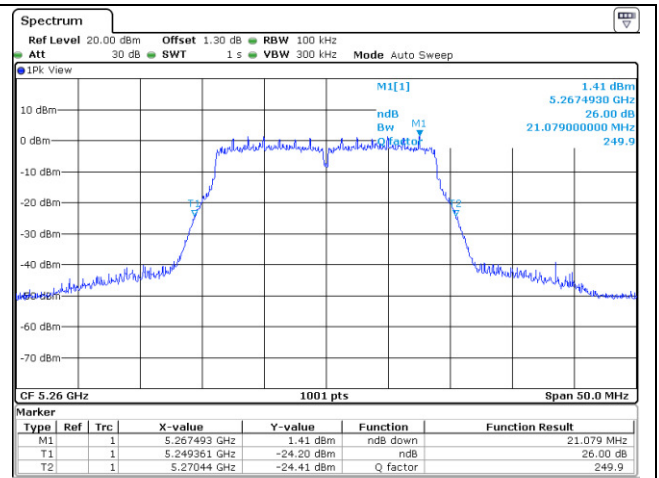
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5 150 ~ 5 250	Low	5 180	21.23	17.73
	Middle	5 220	20.93	17.78
	High	5 240	21.03	17.73
5 250 ~ 5 350	Low	5 260	21.08	17.78
	Middle	5 300	20.88	17.73
	High	5 320	20.98	17.78
5 470 ~ 5 725	Low	5 500	21.08	17.68
	Middle	5 560	21.18	17.73
	High	5 720	21.18	17.68
5 725 ~ 5 850	Low	5 745	21.13	17.73
	Middle	5 785	20.98	17.73
	High	5 825	21.23	17.68



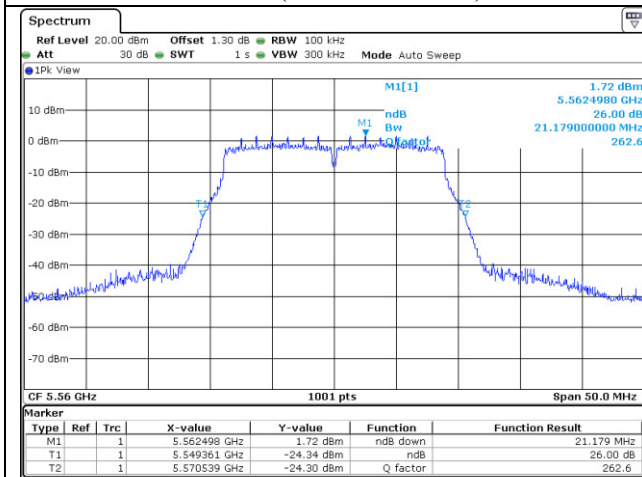
**Tested by: Min-Gu, Ji / Project Engineer**



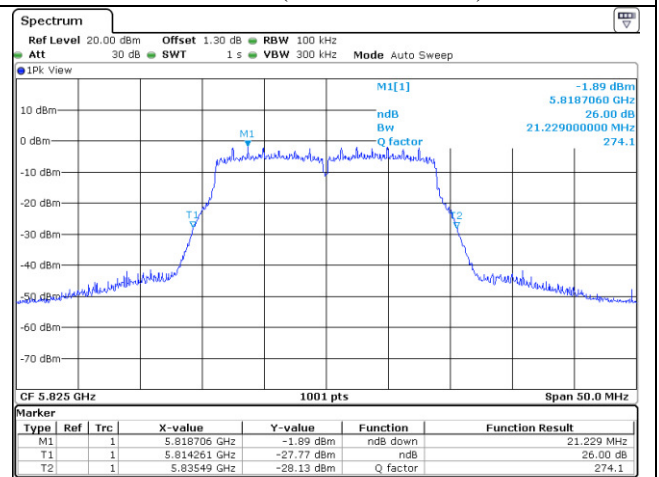
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

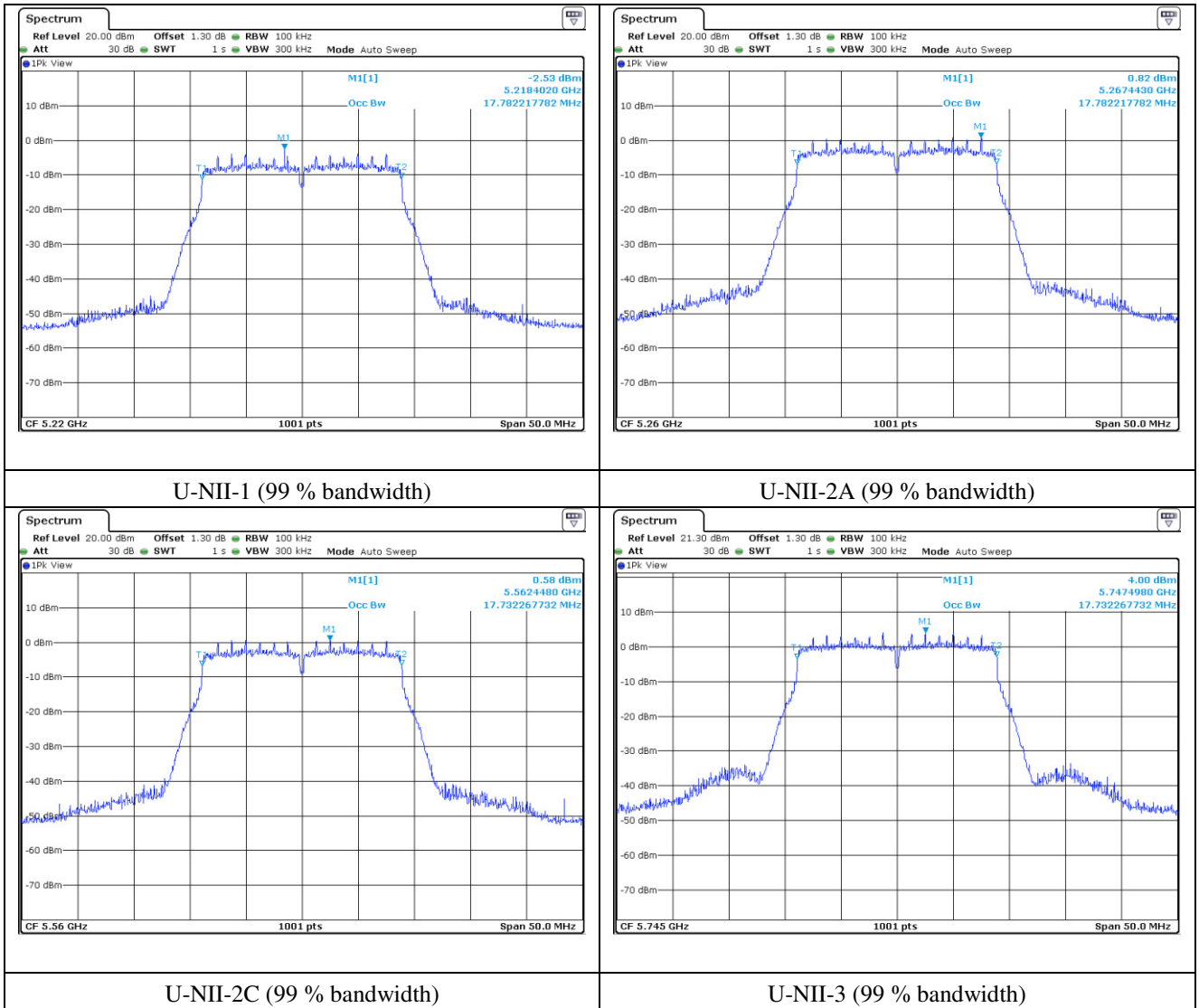


U-NII-2C (26 dB Bandwidth)



U-NII-3 (26 dB Bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.



Note: In order to simplify the report, attached plots were only the most wide channel.

**7.4.4.2 Test data for Antenna 1**

-. Test Date : June 14, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5 150 ~ 5 250	Low	5 180	21.23	17.73
	Middle	5 220	21.23	17.73
	High	5 240	20.98	17.73
5 250 ~ 5 350	Low	5 260	21.23	17.73
	Middle	5 300	21.13	17.68
	High	5 320	21.13	17.73
5 470 ~ 5 725	Low	5 500	21.08	17.73
	Middle	5 560	21.28	17.73
	High	5 720	21.18	17.73
5 725 ~ 5 850	Low	5 745	21.03	17.73
	Middle	5 785	21.28	17.73
	High	5 825	20.73	17.68



**Tested by: Min-Gu, Ji / Project Engineer**