

# FCC Test Report

Product Name	WiFi module
Model No	WL960E5
FCC ID.	RK9-WL960E5

Applicant	CastleNet Technology Inc.
Address	No.64, Chung-Shan Rd. Tu-Cheng District, New Taipei City, Taiwan

Date of Receipt	Aug. 29, 2013
Issue Date	Oct. 11, 2013
Report No.	139073R-RFUSP42V01
Report Version	V1.0



The test results relate only to the samples tested.

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This report must not be used to claim product endorsement by TAF or any agency of the U.S. Government

# Test Report Certification

Issue Date: Oct. 11, 2013

Report No.: 139073R-RFUSP42V01



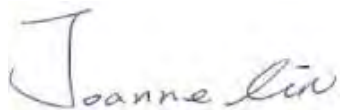
Product Name	WiFi module
Applicant	CastleNet Technology Inc.
Address	No.64, Chung-Shan Rd. Tu-Cheng District, New Taipei City, Taiwan
Manufacturer	CastleNet Technology Inc.
Model No.	WL960E5
EUT Rated Voltage	DC3.3V (via Mini-PCI Express slot)
EUT Test Voltage	AC 120V/60Hz
Trade Name	CastleNet
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2012 ANSI C63.4: 2003, ANSI C63.10: 2009, FCC KDB 558074
Test Result	Complied

The test results relate only to the samples tested.

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Documented By :



(Senior Adm. Specialist / Joanne Lin )

Tested By :



(Engineer / Jack Hsu )

Approved By :



( Manager / Vincent Lin)

# TABLE OF CONTENTS

Description	Page
<b>1. GENERAL INFORMATION .....</b>	<b>5</b>
1.1. EUT Description.....	5
1.2. Operational Description .....	7
1.3. Tested System Details.....	8
1.4. Configuration of Tested System .....	8
1.5. EUT Exercise Software .....	8
1.6. Test Facility .....	9
<b>2. Conducted Emission.....</b>	<b>10</b>
2.1. Test Equipment.....	10
2.2. Test Setup .....	10
2.3. Limits .....	11
2.4. Test Procedure .....	11
2.5. Uncertainty .....	11
2.6. Test Result of Conducted Emission.....	12
<b>3. Peak Power Output .....</b>	<b>16</b>
3.1. Test Equipment.....	16
3.2. Test Setup .....	16
3.3. Limits .....	16
3.4. Test Procedure .....	16
3.5. Uncertainty .....	16
3.6. Test Result of Peak Power Output.....	17
<b>4. Radiated Emission.....</b>	<b>24</b>
4.1. Test Equipment.....	24
4.2. Test Setup .....	25
4.3. Limits .....	26
4.4. Test Procedure .....	27
4.5. Uncertainty .....	27
4.6. Test Result of Radiated Emission.....	28
<b>5. RF antenna conducted test.....</b>	<b>50</b>
5.1. Test Equipment.....	50
5.2. Test Setup .....	50
5.3. Limits .....	50
5.4. Test Procedure .....	50
5.5. Uncertainty .....	51
5.6. Test Result of RF antenna conducted test.....	52
<b>6. Band Edge .....</b>	<b>70</b>
6.1. Test Equipment.....	70
6.2. Test Setup .....	70
6.3. Limits .....	70
6.4. Test Procedure .....	71
6.5. Uncertainty .....	71
6.6. Test Result of Band Edge .....	72

<b>7.</b>	<b>Occupied Bandwidth .....</b>	<b>72</b>
7.1.	Test Equipment .....	86
7.2.	Test Setup .....	86
7.3.	Limits .....	86
7.4.	Test Procedure .....	86
7.5.	Uncertainty .....	86
7.6.	Test Result of Occupied Bandwidth .....	86
<b>8.</b>	<b>Power Density .....</b>	<b>105</b>
8.1.	Test Equipment .....	105
8.2.	Test Setup .....	105
8.3.	Limits .....	105
8.4.	Test Procedure .....	105
8.5.	Uncertainty .....	105
8.6.	Test Result of Power Density .....	106
<b>9.</b>	<b>EMI Reduction Method During Compliance Testing .....</b>	<b>118</b>
Attachment 1: EUT Test Photographs		
Attachment 2: EUT Detailed Photographs		

## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	WiFi module
Trade Name	CastleNet
Model No.	WL960E5
FCC ID.	RK9-WL960E5
Frequency Range	802.11a/n-20MHz:5745-5825MHz ,802.11n-40MHz:5755-5795MHz
Number of Channels	802.11a/n-20MHz: 5, n-40MHz: 2
Data Speed	802.11b: 1-11Mbps, 802.11a/g: 6-54Mbps, 802.11n: up to 450Mbps
Channel separation	802.11b/g/n-20MHz: 5 MHz, 802.11a/n-20MHz: 20MHz 802.11n-40MHz: 40MHz
Type of Modulation	802.11b:DSSS, DBPSK, DQPSK, CCK 802.11a/g/n: OFDM, BPSK, QPSK, 16QAM, 64QAM
Antenna Type	Dipole / PIFA
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto

#### Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1.	Master Wave	98619PIPF013 (TX1)(TX2)(TX3)	Dipole	5725-5850MHz:4.17
2.	Master Wave	98619PIPF014 (TX1)(TX2)(TX3)	Dipole	5725-5850MHz:4.20
3	Master Wave	98619PIPF015 (TX1)(TX2)(TX3)	Dipole	5725-5850MHz: 4.21
4	Taiwan Anjie	AP11I-0001 (TX1)(TX2)(TX3)	PIFA	5725-5850MHz:5.65
5	Taiwan Anjie	AD11I-0003 (TX1)(TX2)(TX3)	Dipole	5725-5850MHz:3.63
6	Taiwan Anjie	AD11I-0004 (TX1)(TX2)(TX3)	Dipole	5725-5850MHz:3.63
7	Taiwan Anjie	AD11I-0005 (TX1)(TX2)(TX3)	Dipole	5725-5850MHz:3.63
8	Aristotle	RFA-52-P171-TF-1 (TX1)(TX2)(TX3)	Dipole	5725-5850MHz:3.60
9	Aristotle	RFA-52-T42-TF-200 (TX1)(TX2)(TX3)	Dipole	5725-5850MHz:2.00
10	Taiwan Anjie	AP11I-00003 (TX1)(TX2)(TX3)	Dipole	5725-5850MHz:3.16

Note: 1.The antenna of EUT is conform to FCC 15.203

2.Only the higher gain antenna was tested and recorded in this report.

## 802.11a/n-20MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 149: 5745 MHz		Channel 153: 5765 MHz		Channel 157: 5785 MHz		Channel 161: 5805 MHz	
Channel 165: 5825 MHz							

## 802.11n-40MHz (5G Band) Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency
Channel 151: 5755 MHz		Channel 159: 5795 MHz	

## Note:

1. This device is a WiFi module with a built-in 5GHz WLAN transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. At result of pretests, module supports three-channel transmission, only the worst case is shown in the report. (802.11a is chain A 、 802.11n is chain A+ chain B +chain C)
4. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps 、 802.11g is 6Mbps 、 802.11n(20M-BW) is 21.7Mbps and 、 802.11n(40M-BW) is 45Mbps).
5. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11a/b/g/n transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices.

Test Mode	Mode 1: Transmit (802.11b 1Mbps)
	Mode 2: Transmit (802.11g 6Mbps)
	Mode 3: Transmit - 802.11a 6Mbps
	Mode 4: Transmit - 802.11n-20BW_21.7Mbps(5G Band)
	Mode 5: Transmit - 802.11n-40BW_45Mbps(5G Band)

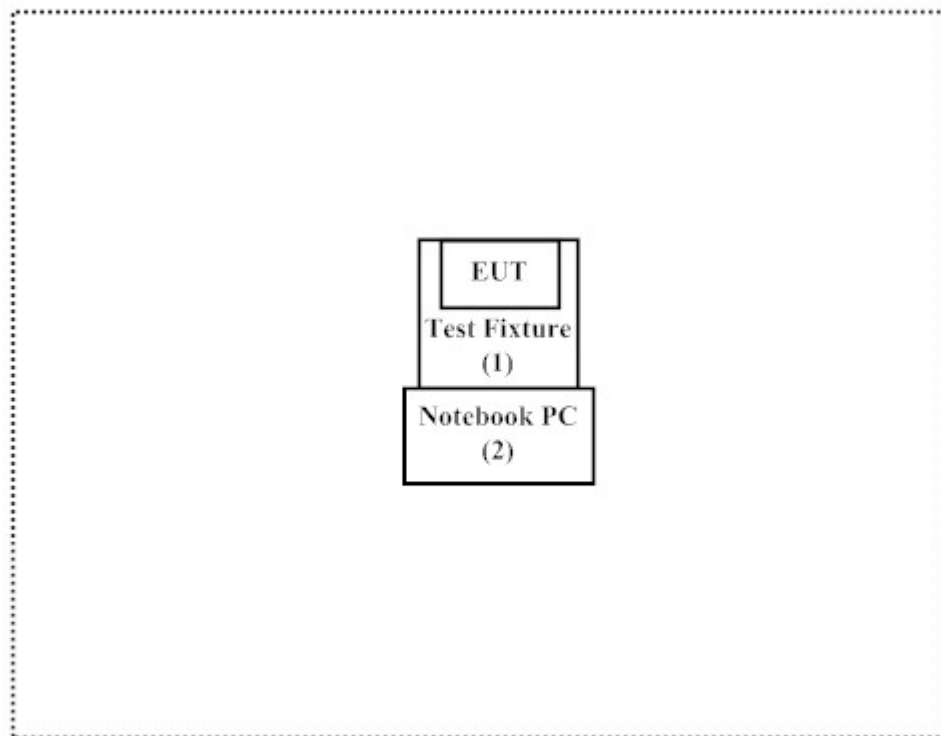
### 1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Test Fixture	N/A	N/A	N/A	N/A
2 Notebook PC	N/A	N/A	N/A	N/A

Signal Cable Type	Signal cable Description
N/A	

### 1.4. Configuration of Tested System



### 1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute program "Mtool v6.30.130.0" on the Notebook PC.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Start transmits continually.
- (5) Verify that the EUT works properly.

## 1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from

Quietek Corporation's Web Site : <http://www.quietek.com/tw/ctg/cts/accreditations.htm>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : <http://www.quietek.com/>

Site Description: File on  
Federal Communications Commission  
FCC Engineering Laboratory  
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Registration Number: 92195

Site Name: Quietek Corporation  
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New Taipei City 24451, Taiwan, R.O.C.  
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FCC Accreditation Number: TW1014



## 2. Conducted Emission

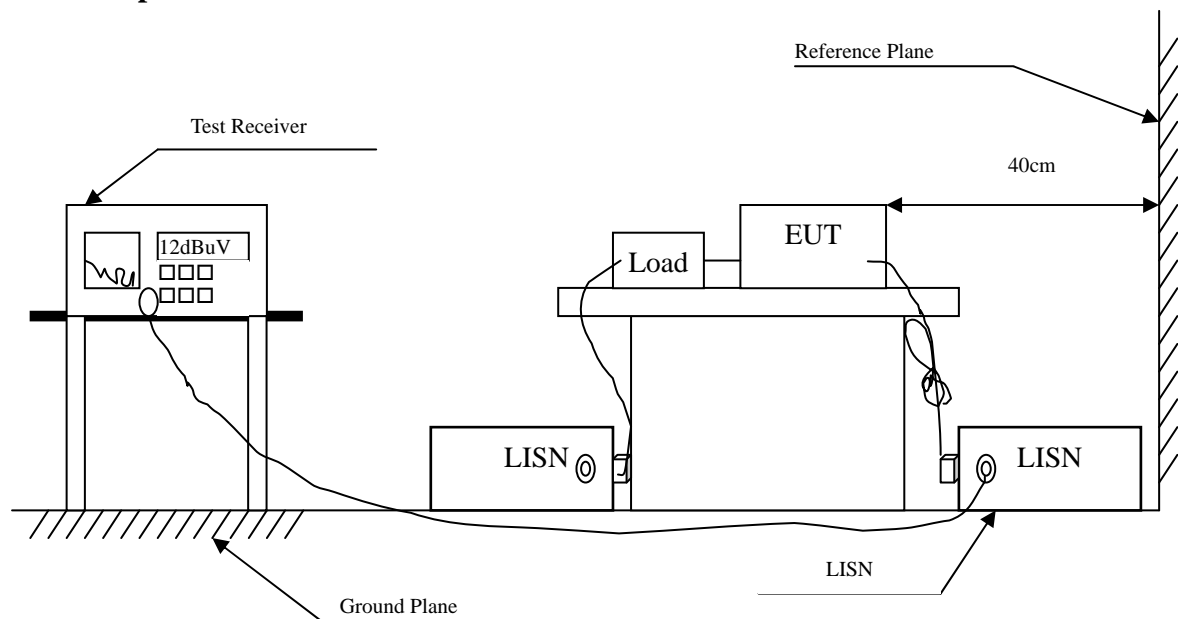
### 2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2013	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2013	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2013	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar., 2013	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2013	
	No.1 Shielded Room				

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

### 2.2. Test Setup



### 2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AVG
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

### 2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2009 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

### 2.5. Uncertainty


± 2.26 dB

## 2.6. Test Result of Conducted Emission

Product : WiFi module  
 Test Item : Conducted Emission Test  
 Power Line : Line 1  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band) (5755MHz)\_Dipole

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
<b>Line 1</b>					
<b>Quasi-Peak</b>					
0.677	9.720	34.650	44.370	-11.630	56.000
1.416	9.764	23.910	33.674	-22.326	56.000
2.568	9.810	19.340	29.150	-26.850	56.000
3.931	9.820	24.130	33.950	-22.050	56.000
7.193	9.850	28.330	38.180	-21.820	60.000
16.111	9.900	44.430	54.330	-5.670	60.000
<b>Average</b>					
0.677	9.720	33.730	43.450	-2.550	46.000
1.416	9.764	17.180	26.944	-19.056	46.000
2.568	9.810	11.790	21.600	-24.400	46.000
3.931	9.820	19.370	29.190	-16.810	46.000
7.193	9.850	23.210	33.060	-16.940	50.000
16.111	9.900	38.080	47.980	-2.020	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : WiFi module  
 Test Item : Conducted Emission Test  
 Power Line : Line 2  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band) (5755MHz)\_Dipole

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
<b>Line 2</b>					
<b>Quasi-Peak</b>					
0.681	9.701	32.680	42.381	-13.619	56.000
0.826	9.717	22.980	32.697	-23.303	56.000
1.634	9.764	21.560	31.324	-24.676	56.000
3.943	9.810	24.040	33.850	-22.150	56.000
7.045	9.850	27.690	37.540	-22.460	60.000
17.326	9.990	44.840	54.830	-5.170	60.000
<b>Average</b>					
0.681	9.701	26.750	36.451	-9.549	46.000
0.826	9.717	21.480	31.197	-14.803	46.000
1.634	9.764	17.140	26.904	-19.096	46.000
3.943	9.810	18.940	28.750	-17.250	46.000
7.045	9.850	21.750	31.600	-18.400	50.000
17.326	9.990	36.990	46.980	-3.020	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : WiFi module  
 Test Item : Conducted Emission Test  
 Power Line : Line 1  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band) (5755MHz)\_PIFA

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
<b>Line 1</b>					
<b>Quasi-Peak</b>					
0.380	9.707	37.100	46.807	-12.622	59.429
0.927	9.732	29.020	38.752	-17.248	56.000
1.623	9.773	24.230	34.003	-21.997	56.000
2.052	9.803	19.330	29.133	-26.867	56.000
3.646	9.820	26.270	36.090	-19.910	56.000
15.662	9.900	44.130	54.030	-5.970	60.000
<b>Average</b>					
0.380	9.707	35.100	44.807	-4.622	49.429
0.927	9.732	23.060	32.792	-13.208	46.000
1.623	9.773	17.500	27.273	-18.727	46.000
2.052	9.803	13.130	22.933	-23.067	46.000
3.646	9.820	21.300	31.120	-14.880	46.000
15.662	9.900	36.440	46.340	-3.660	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : WiFi module  
Test Item : Conducted Emission Test  
Power Line : Line 2  
Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band) (5755MHz)\_PIFA

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
<b>Line 2</b>					
<b>Quasi-Peak</b>					
0.380	9.687	40.040	49.727	-9.702	59.429
0.677	9.700	35.900	45.600	-10.400	56.000
0.943	9.722	29.100	38.822	-17.178	56.000
1.224	9.735	27.240	36.975	-19.025	56.000
3.873	9.810	25.670	35.480	-20.520	56.000
16.720	9.980	46.870	56.850	-3.150	60.000
<b>Average</b>					
0.380	9.687	36.100	45.787	-3.642	49.429
0.677	9.700	31.960	41.660	-4.340	46.000
0.943	9.722	24.210	33.932	-12.068	46.000
1.224	9.735	23.120	32.855	-13.145	46.000
3.873	9.810	20.540	30.350	-15.650	46.000
16.720	9.980	36.260	46.240	-3.760	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

### 3. Peak Power Output

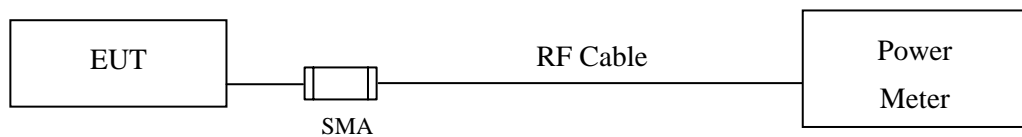
#### 3.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2013
X	Power Sensor	Anritsu	MA2411B/0738448	Jun., 2013

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

#### 3.2. Test Setup



#### 3.3. Limits

The maximum peak power shall be less 1 Watt.

#### 3.4. Test Procedure

The EUT was tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using KDB 558074 section 9.1.3 PKPM1 Peak power meter method.

#### 3.5. Uncertainty

$\pm 1.27$  dB

### 3.6. Test Result of Peak Power Output

Product : WiFi module  
 Test Item : Peak Power Output Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps

#### CHAIN A

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		6	9	12	18	24	36	48	54	6		
		Measurement Level (dBm)										
149	5745	11.92	--	--	--	--	--	--	--	21.44	<30dBm	Pass
157	5785	11.88	11.88	11.86	11.84	11.81	11.79	11.72	11.7	21.37	<30dBm	Pass
165	5825	11.86	--	--	--	--	--	--	--	21.41	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

#### CHAIN B

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		6	9	12	18	24	36	48	54			
		Measurement Level (dBm)										
149	5745	11.42	--	--	--	--	--	--	--	21.21	<30dBm	Pass
157	5785	11.30	11.3	11.28	11.3	11.3	11.27	11.27	11.26	21.11	<30dBm	Pass
165	5825	11.36	--	--	--	--	--	--	--	21.23	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss



## CHAIN C

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		6	9	12	18	24	36	48	54	6		
		Measurement Level (dBm)										
149	5745	11.41	--	--	--	--	--	--	--	21.23	<30dBm	Pass
157	5785	11.42	11.42	11.41	11.4	11.41	11.4	11.39	11.38	21.20	<30dBm	Pass
165	5825	11.23	--	--	--	--	--	--	--	21.26	<30dBm	Pass

Note: Peak Power Output Value = Reading value on power meter + cable loss

Product : WiFi module  
 Test Item : Peak Power Output Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band)

#### CHAIN A

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power
		21.7	43.3	65	86.7	130	173.3	195	216.7	21.7
		Measurement Level (dBm)								
149	5745	6.92	--	--	--	--	--	--	--	18.54
157	5785	6.94	6.94	6.92	6.88	6.87	6.86	6.83	6.81	18.11
165	5825	6.88	--	--	--	--	--	--	--	17.79

Note: Peak Power Output Value =Reading value on power meter + cable loss

#### CHAIN B

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power
		21.7	43.3	65	86.7	130	173.3	195	216.7	21.7
		Measurement Level (dBm)								
149	5745	6.93	--	--	--	--	--	--	--	17.79
157	5785	6.83	6.82	6.82	6.8	6.79	6.77	6.75	6.75	17.21
165	5825	7.03	--	--	--	--	--	--	--	17.81

Note: Peak Power Output Value =Reading value on power meter + cable loss

**CHAIN C**

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power
		21.7	43.3	65	86.7	130	173.3	195	216.7	21.7
		Measurement Level (dBm)								
149	5745	6.72	--	--	--	--	--	--	--	17.58
157	5785	6.93	6.93	6.92	6.92	6.9	6.88	6.86	6.86	17.71
165	5825	6.61	--	--	--	--	--	--	--	17.21

Note: Peak Power Output Value =Reading value on power meter + cable loss

# CHAIN A+B+C

Channel	Frequency (MHz)	Data Rate (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain C Power (dBm)	Chain A+B+C Power (dBm)	Limit (dBm)	Result
149	5745	21.7	18.54	17.79	17.58	22.76	<30dBm	Pass
157	5785	21.7	18.11	17.21	17.71	22.46	<30dBm	Pass
165	5825	21.7	17.79	17.81	17.21	22.38	<30dBm	Pass

Note: Peak Power Output Value (dBm) = 10\*LOG (Chain A (mW)+ Chain B (mW) + Chain C (mW))

Product : WiFi module  
 Test Item : Peak Power Output Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band)

#### CHAIN A

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power
		45	90	135	180	270	360	405	450	45
		Measurement Level (dBm)								
151	5755	7.02	--	--	--	--	--	--	--	18.51
159	5795	6.92	6.9	6.87	6.86	6.83	6.83	6.81	6.79	18.27

Note: Peak Power Output Value =Reading value on power meter + cable loss

#### CHAIN B

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power
		45	90	135	180	270	360	405	450	45
		Measurement Level (dBm)								
151	5755	6.93	--	--	--	--	--	--	--	18.71
159	5795	6.94	6.94	6.93	6.94	6.93	6.93	6.92	6.9	18.66

Note: Peak Power Output Value =Reading value on power meter + cable loss

#### CHAIN C

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power
		45	90	135	180	270	360	405	450	
		Measurement Level (dBm)								
151	5755	6.83	--	--	--	--	--	--	--	17.97
159	5795	6.72	6.71	6.71	6.68	6.68	6.67	6.65	6.65	17.68

Note: Peak Power Output Value =Reading value on power meter + cable loss

# CHAIN A+B+C

Channel	Frequency (MHz)	Data Rate (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain C Power (dBm)	Chain A+B+C Power (dBm)	Limit (dBm)	Result
151	5755	45	18.51	18.71	17.97	23.18	<30dBm	Pass
159	5795	HT16	18.27	18.66	17.68	22.99	<30dBm	Pass

Note: Peak Power Output Value (dBm) = 10\*LOG (Chain A (mW)+ Chain B (mW) + Chain C (mW))

## 4. Radiated Emission

### 4.1. Test Equipment

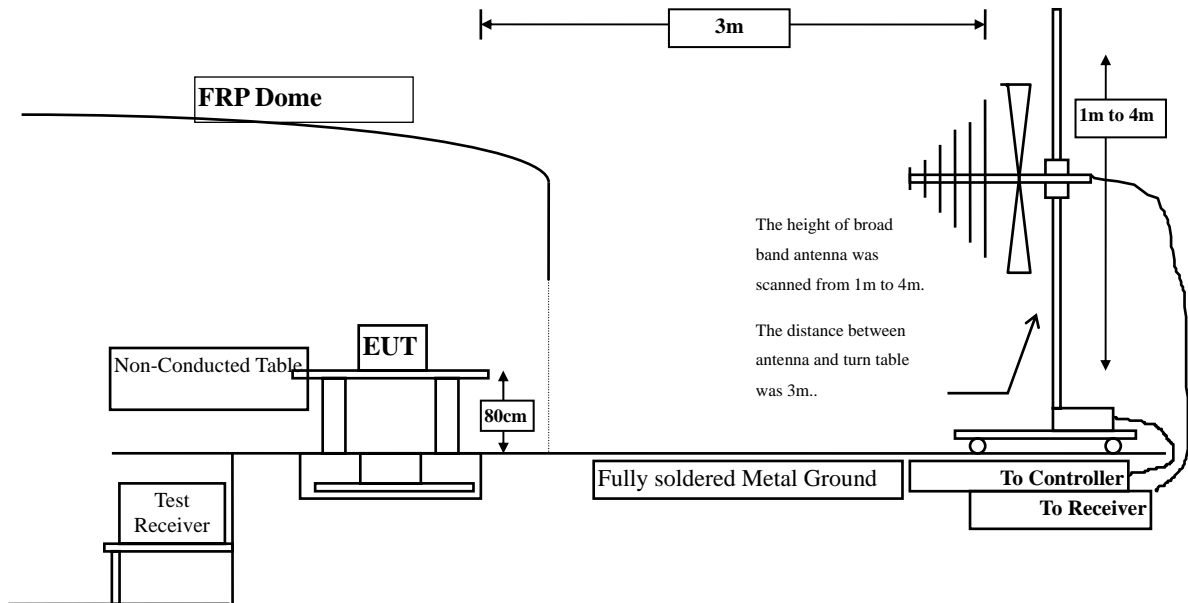
The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
<input checked="" type="checkbox"/> Site # 3	X	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2013
	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
	X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2013
	X	Pre-Amplifier	QTK	AP-180C / CHM_0906076	Sep., 2013
	X	Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P/ 925975	Mar. 2013
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2013
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2013
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

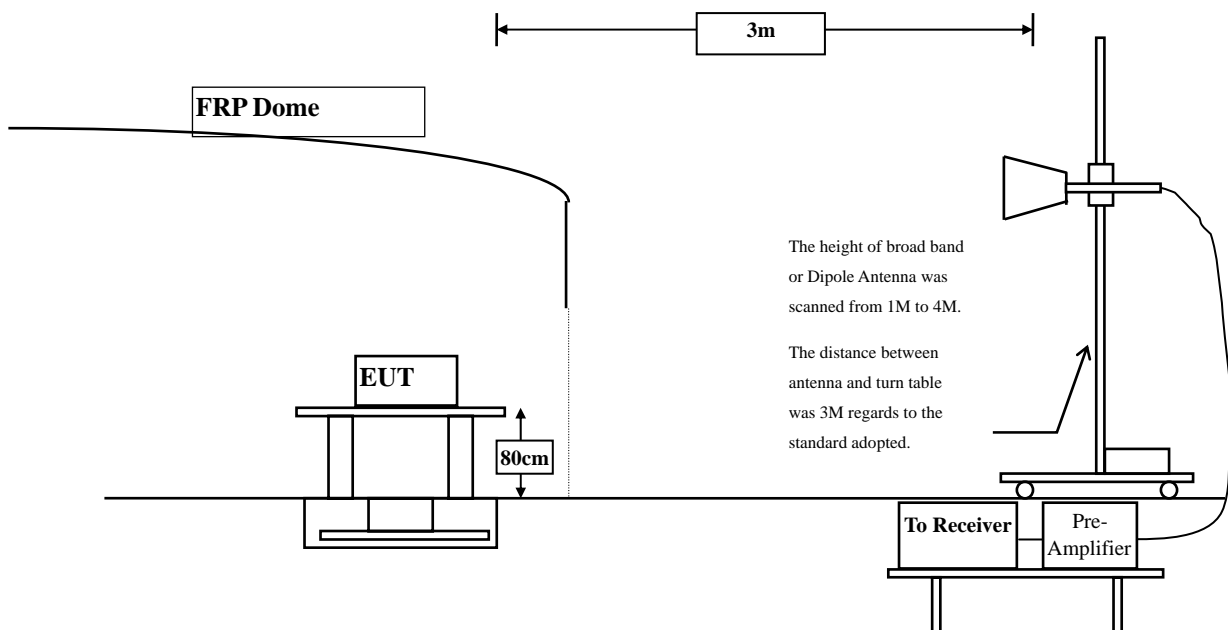
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
  2. The test instruments marked with "X" are used to measure the final test results.

## 4.2. Test Setup

### Radiated Emission Below 1GHz



### Radiated Emission Above 1GHz





### 4.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remarks: E field strength (dBuV/m) = 20 log E field strength (uV/m)

#### **4.4. Test Procedure**

The EUT was setup according to ANSI C63.10, 2009 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2009 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

#### **4.5. Uncertainty**

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

#### 4.6. Test Result of Radiated Emission

Product : WiFi module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5745 MHz)\_Dipole

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11490.000	15.004	36.153	51.157	-22.843	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11490.000	16.520	37.260	53.780	-20.220	74.000
<b>Average Detector:</b>					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5785 MHz) \_Dipole

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11570.000	15.207	36.150	51.357	-22.643	74.000
<b>Average</b>					
<b>Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11570.000	16.573	37.140	53.712	-20.288	74.000
<b>Average</b>					
<b>Detector:</b>					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi module  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5825MHz)\_Dipole

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11650.000	13.504	36.470	49.974	-24.026	74.000
<b>Average</b>					
<b>Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11650.000	14.959	37.140	52.099	-21.901	74.000
<b>Average</b>					
<b>Detector:</b>					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band) (5745MHz)\_Dipole

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11490.000	15.004	36.140	51.144	-22.856	74.000
<b>Average</b>					
<b>Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11490.000	16.520	37.140	53.660	-20.340	74.000
<b>Average</b>					
<b>Detector:</b>					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band) (5785MHz)\_Dipole

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11570.000	15.207	36.170	51.377	-22.623	74.000
<b>Average</b>					
<b>Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11570.000	16.573	36.670	53.242	-20.758	74.000
<b>Average</b>					
<b>Detector:</b>					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band) (5825 MHz)\_Dipole

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11650.000	13.504	36.490	49.994	-24.006	74.000
<b>Average</b>					
<b>Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11650.000	14.959	36.890	51.849	-22.151	74.000
<b>Average</b>					
<b>Detector:</b>					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product : WiFi module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band) (5755MHz)\_Dipole

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m

#### Horizontal

##### Peak Detector:

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measurement Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)
11510.000	15.044	37.010	52.053	-21.947	74.000

##### Average

##### Detector:

--

#### Vertical

##### Peak Detector:

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measurement Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)
11510.000	16.536	36.890	53.426	-20.574	74.000

##### Average

##### Detector:

--

#### Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band) (5795MHz)\_Dipole

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11590.000	15.364	36.890	52.254	-21.746	74.000
<b>Average</b>					
<b>Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11590.000	16.687	36.890	53.577	-20.423	74.000
<b>Average</b>					
<b>Detector:</b>					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi module  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5745 MHz)\_PIFA

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11490.000	17.106	36.080	53.187	-20.813	74.000
<b>Average</b>					
<b>Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11490.000	18.034	38.190	56.225	-17.775	74.000
<b>Average</b>					
<b>Detector:</b>					
11490.000	18.034	24.990	43.025	-10.975	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi module  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5785MHz)\_PIFA

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11570.000	16.809	36.140	52.949	-21.051	74.000
<b>Average</b>					
<b>Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11570.000	17.698	39.900	57.598	-16.402	74.000
<b>Average</b>					
<b>Detector:</b>					
11570.000	17.698	26.210	43.908	-10.092	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi module  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5825MHz)\_PIFA

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11650.000	16.158	36.660	52.818	-21.182	74.000
<b>Average</b>					
<b>Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11650.000	17.274	39.290	56.565	-17.435	74.000
<b>Average</b>					
<b>Detector:</b>					
11650.000	17.274	25.660	42.935	-11.065	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band) (5745MHz)\_PIFA

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11490.000	17.106	34.720	51.827	-22.173	74.000
<b>Average</b>					
<b>Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11490.000	18.034	36.070	54.105	-19.895	74.000
<b>Average</b>					
<b>Detector:</b>					
11490.000	18.034	23.720	41.755	-12.245	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band) (5785MHz)\_PIFA

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11570.000	16.809	34.670	51.479	-22.521	74.000
<b>Average</b>					
<b>Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11570.000	17.698	36.520	54.218	-19.782	74.000
<b>Average</b>					
<b>Detector:</b>					
11570.000	17.698	23.730	41.428	-12.572	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band) (5825MHz)\_PIFA

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11650.000	16.158	34.430	50.588	-23.412	74.000
<b>Average</b>					
<b>Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11650.000	17.274	36.270	53.545	-20.455	74.000
<b>Average</b>					
<b>Detector:</b>					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product : WiFi module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band) (5755MHz)\_PIFA

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m

#### Horizontal

##### Peak Detector:

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measurement Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)
11510.000	17.124	35.060	52.184	-21.816	74.000

##### Average

##### Detector:

--

#### Vertical

##### Peak Detector:

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measurement Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)
11510.000	18.081	35.880	53.961	-20.039	74.000

##### Average

##### Detector:

--

#### Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi module  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band) (5795MHz)\_PIFA

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11590.000	16.701	35.510	52.210	-21.790	74.000
<b>Average</b>					
<b>Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11590.000	17.567	37.650	55.216	-18.784	74.000
<b>Average</b>					
<b>Detector:</b>					
11590.000	17.567	22.630	40.196	-13.804	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi module  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5785MHz) \_Dipole

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
99.840	-9.873	43.521	33.648	-9.852	43.500
191.020	-9.679	50.186	40.507	-2.993	43.500
398.600	0.879	40.230	41.109	-4.891	46.000
598.420	3.524	29.688	33.212	-12.788	46.000
792.420	6.391	30.253	36.644	-9.356	46.000
961.200	6.810	24.695	31.505	-22.495	54.000
<b>Vertical</b>					
78.500	-5.604	37.341	31.737	-8.263	40.000
144.460	-5.503	42.027	36.524	-6.976	43.500
264.740	-5.071	40.277	35.207	-10.793	46.000
398.600	-2.371	40.230	37.859	-8.141	46.000
530.520	1.192	28.417	29.609	-16.391	46.000
676.020	0.451	33.019	33.471	-12.529	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : WiFi module  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band) (5785MHz)\_Dipole

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
99.840	-9.873	43.521	33.648	-9.852	43.500
245.340	-6.478	41.982	35.504	-10.496	46.000
375.320	0.918	31.667	32.585	-13.415	46.000
530.520	3.062	28.417	31.479	-14.521	46.000
676.020	2.841	33.019	35.861	-10.139	46.000
792.420	6.391	30.253	36.644	-9.356	46.000
<b>Vertical</b>					
99.840	-6.063	43.521	37.458	-6.042	43.500
204.600	-5.473	45.329	39.856	-3.644	43.500
398.600	-2.371	40.230	37.859	-8.141	46.000
530.520	1.192	28.417	29.609	-16.391	46.000
676.020	0.451	33.019	33.471	-12.529	46.000
792.420	2.681	30.253	32.934	-13.066	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : WiFi module  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band) (5795MHz)\_Dipole

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
99.840	-9.873	43.521	33.648	-9.852	43.500
191.020	-9.679	50.186	40.507	-2.993	43.500
398.600	0.879	40.230	41.109	-4.891	46.000
598.420	3.524	29.688	33.212	-12.788	46.000
749.740	3.963	27.689	31.652	-14.348	46.000
932.100	7.270	25.014	32.284	-13.716	46.000
<b>Vertical</b>					
99.840	-6.063	43.521	37.458	-6.042	43.500
204.600	-5.473	45.329	39.856	-3.644	43.500
400.540	-2.868	37.463	34.595	-11.405	46.000
530.520	1.192	28.417	29.609	-16.391	46.000
676.020	0.451	33.019	33.471	-12.529	46.000
792.420	2.681	30.307	32.988	-13.012	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : WiFi module  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5785MHz) \_PIFA

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
171.620	-10.242	41.640	31.398	-12.102	43.500
249.220	-6.014	41.892	35.878	-10.122	46.000
664.380	2.062	29.784	31.846	-14.154	46.000
745.860	3.308	27.596	30.904	-15.096	46.000
800.180	5.141	25.635	30.776	-15.224	46.000
901.060	5.591	26.417	32.008	-13.992	46.000
<b>Vertical</b>					
99.840	-0.021	34.578	34.557	-8.943	43.500
152.220	-6.215	40.293	34.078	-9.422	43.500
691.540	2.421	31.719	34.140	-11.860	46.000
769.140	2.923	27.059	29.982	-16.018	46.000
934.040	5.792	26.441	32.233	-13.767	46.000
963.140	7.604	28.515	36.119	-17.881	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : WiFi module  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band) (5785 MHz)\_PIFA

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
173.560	-9.954	40.698	30.745	-12.755	43.500
262.800	-5.013	41.216	36.203	-9.797	46.000
664.380	2.062	29.377	31.439	-14.561	46.000
745.860	3.308	26.808	30.116	-15.884	46.000
800.180	5.141	24.507	29.648	-16.352	46.000
901.060	5.591	27.977	33.568	-12.432	46.000
<b>Vertical</b>					
152.220	-6.215	39.562	33.347	-10.153	43.500
499.480	-0.852	29.460	28.608	-17.392	46.000
689.600	2.538	27.963	30.501	-15.499	46.000
769.140	2.923	27.043	29.966	-16.034	46.000
887.480	2.544	26.325	28.869	-17.131	46.000
968.960	8.191	25.887	34.078	-19.922	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : WiFi module  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band) (5795MHz)\_PIFA

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
173.560	-9.954	40.728	30.775	-12.725	43.500
262.800	-5.013	41.204	36.191	-9.809	46.000
612.000	3.819	24.915	28.734	-17.266	46.000
745.860	3.308	26.051	29.359	-16.641	46.000
901.060	5.591	26.942	32.533	-13.467	46.000
968.960	6.981	23.314	30.295	-23.705	54.000
<b>Vertical</b>					
152.220	-6.215	40.503	34.288	-9.212	43.500
499.480	-0.852	28.065	27.213	-18.787	46.000
689.600	2.538	26.923	29.461	-16.539	46.000
769.140	2.923	27.904	30.827	-15.173	46.000
866.140	0.656	27.665	28.321	-17.679	46.000
939.860	6.450	28.879	35.329	-10.671	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.



## 5. RF antenna conducted test

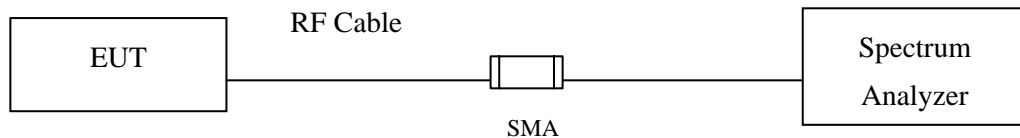
### 5.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2013
	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
  2. The test instruments marked with "X" are used to measure the final test results.

### 5.2. Test Setup

#### RF antenna Conducted Measurement:



### 5.3. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

### 5.4. Test Procedure

The EUT was tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

## 5.5. Uncertainty

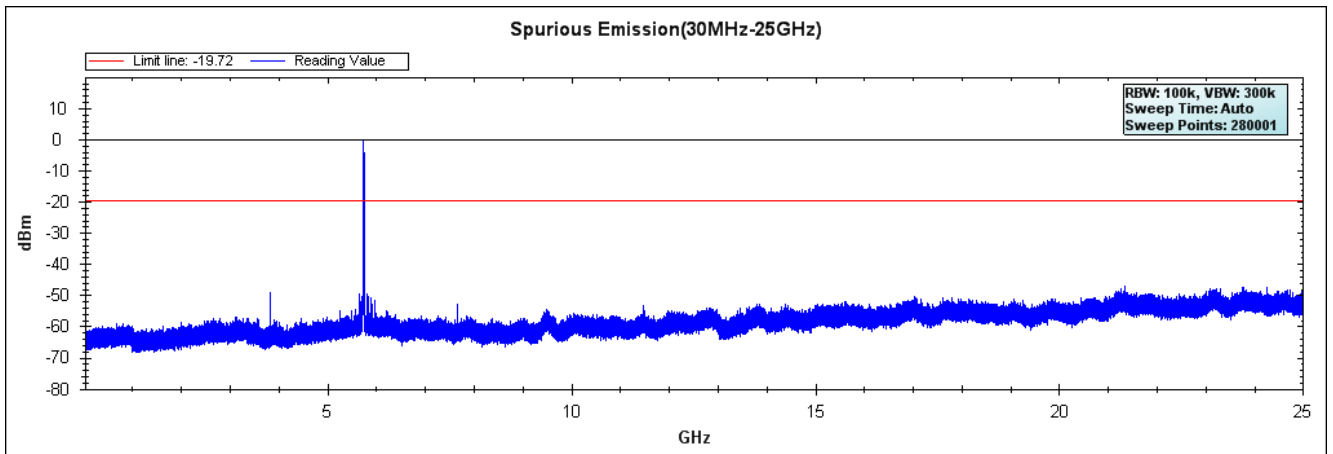
The measurement uncertainty

Conducted is defined as  $\pm 1.27\text{dB}$

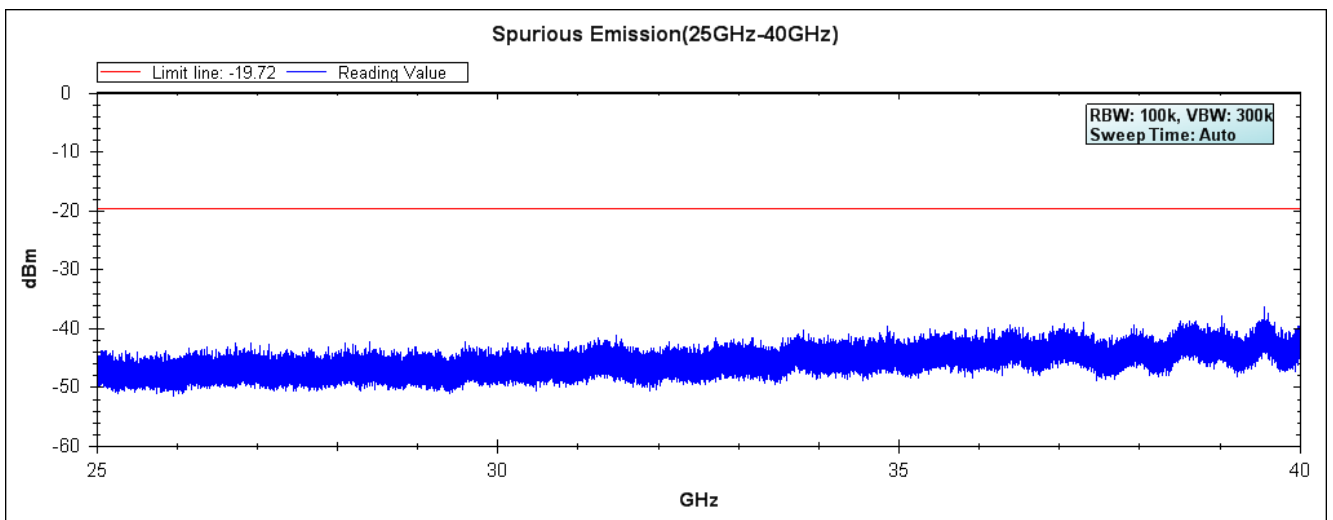
## 5.6. Test Result of RF antenna conducted test

Product : WiFi module  
 Test Item : RF Antenna Conducted Spurious  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps

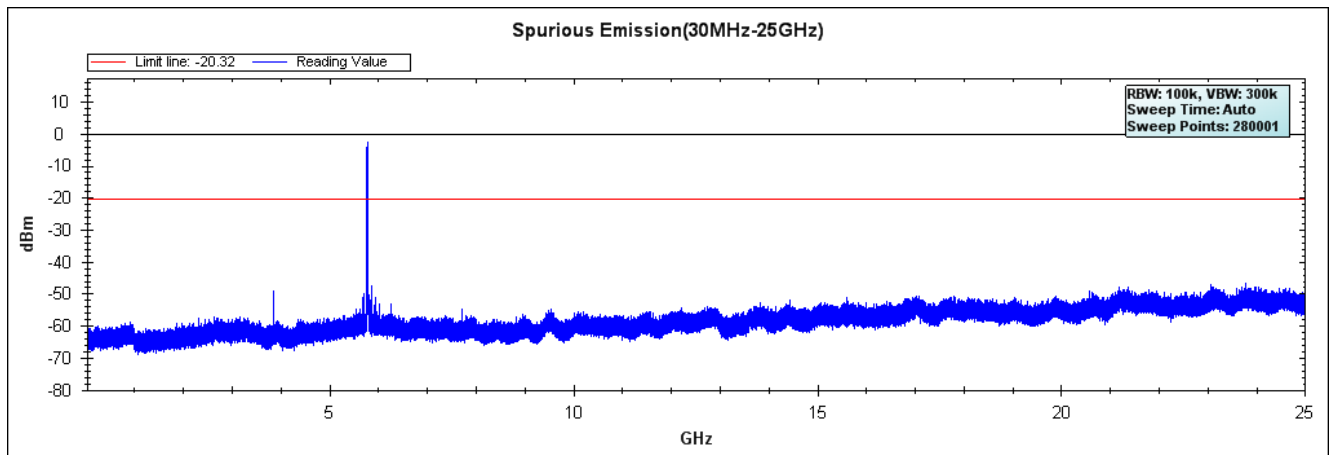
### Channel 149 (5745MHz) 30MHz -25GHz-Chain A



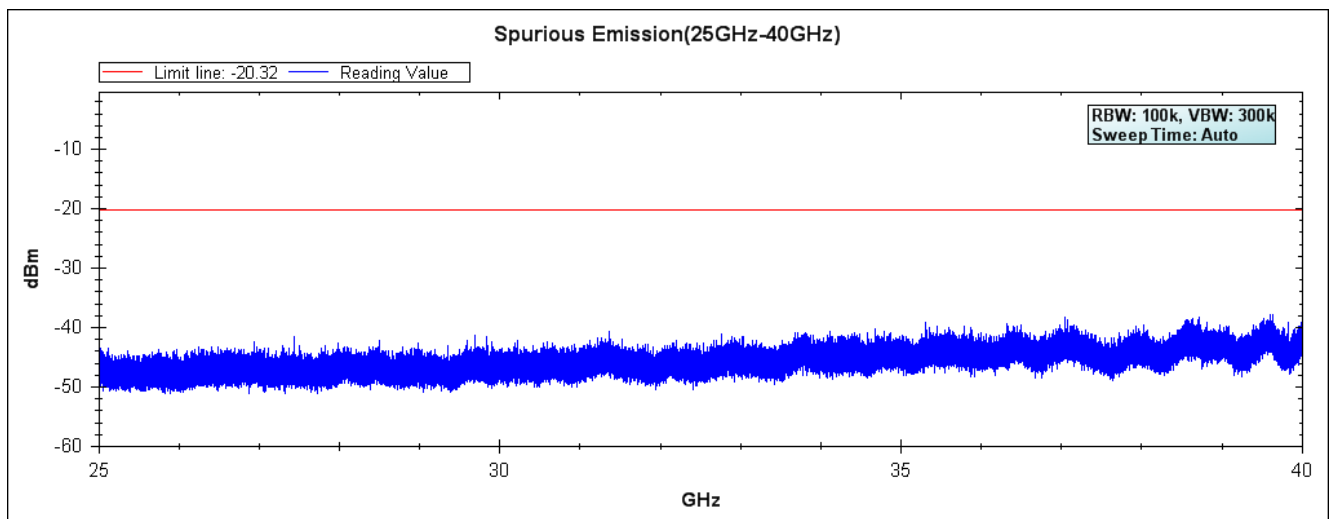
### Channel 149 (5745MHz) 25GHz -40GHz-Chain A



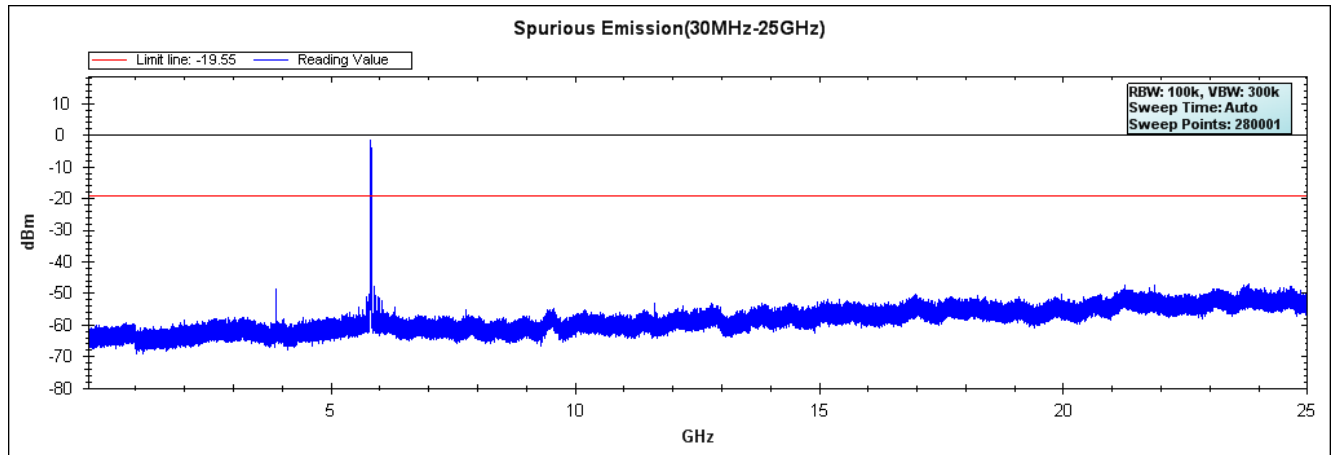
### Channel 157 (5785MHz) 30MHz -25GHz-Chain A



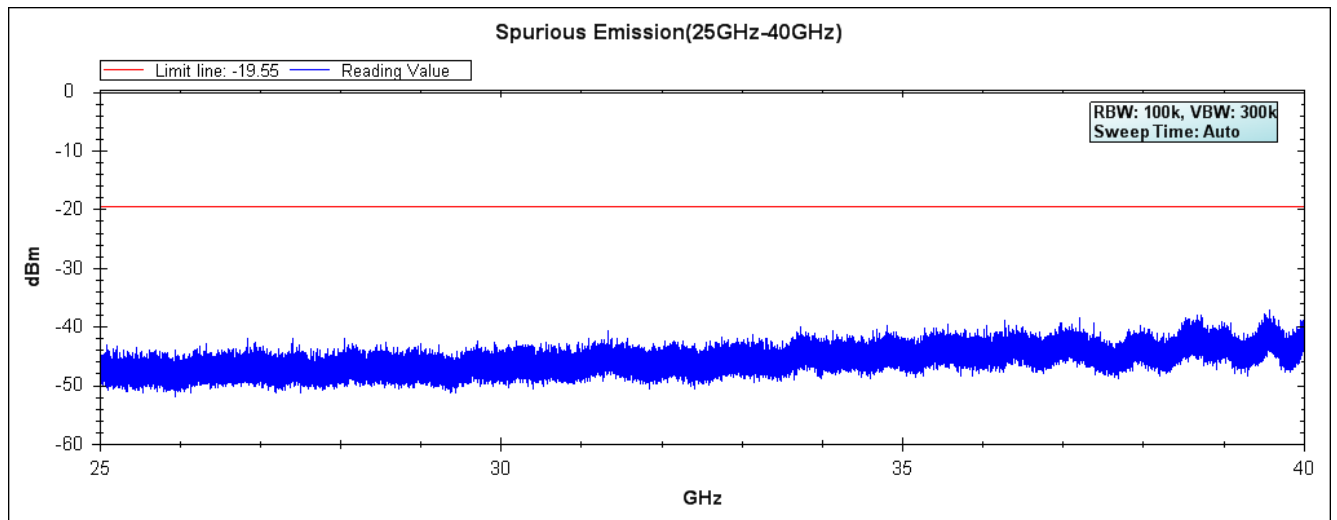
### Channel 157 (5785MHz) 25GHz -40GHz-Chain A



### Channel 165 (5825MHz) 30MHz -25GHz-Chain A

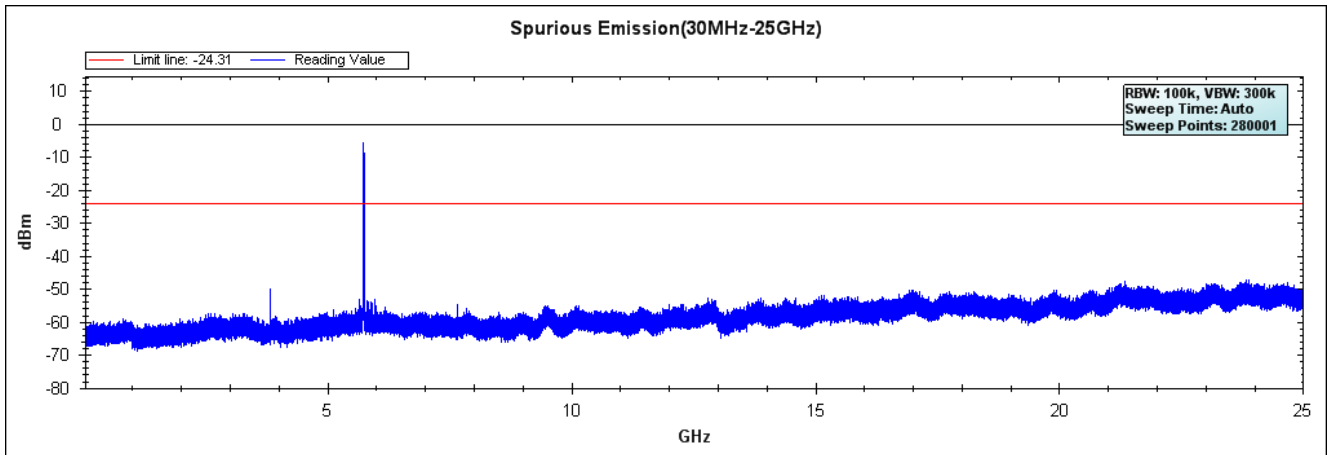


### Channel 165 (5825MHz) 25GHz -40GHz-Chain A

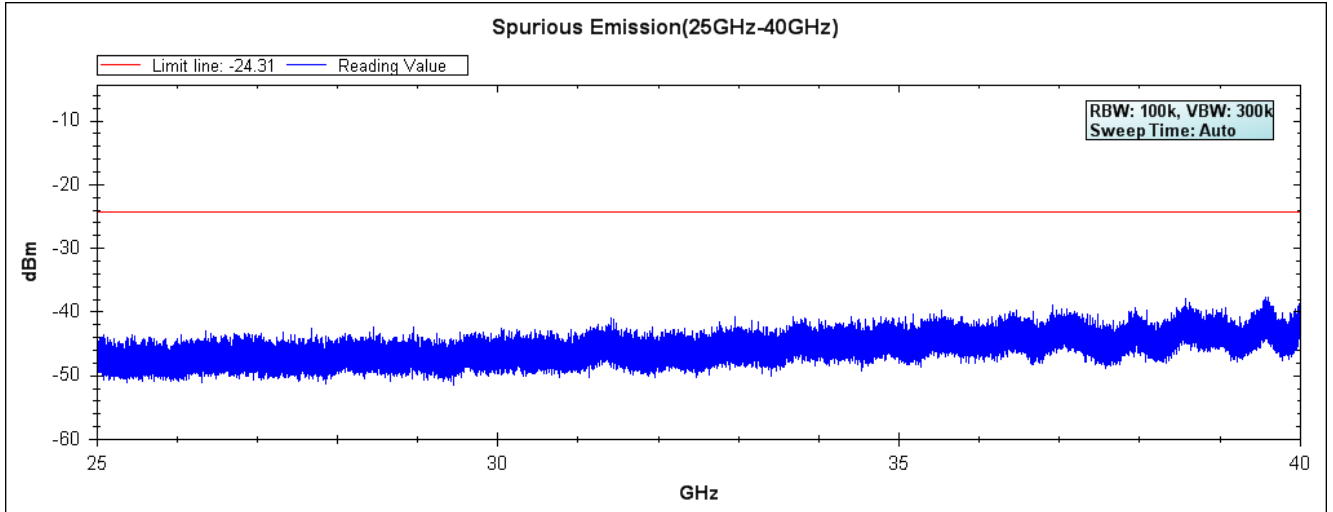


Product : WiFi module  
 Test Item : RF Antenna Conducted Spurious  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band)

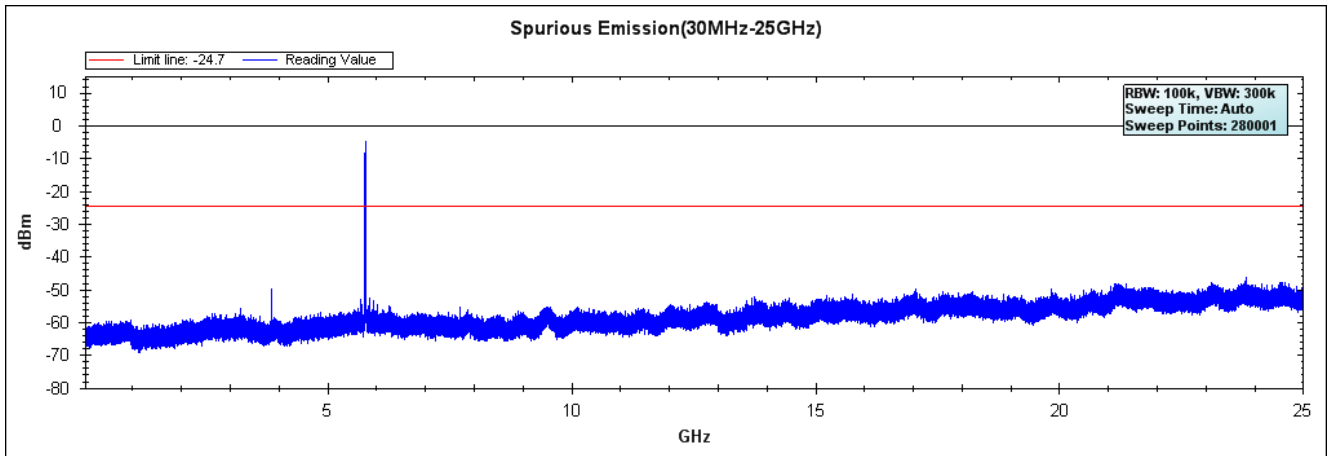
### Channel 149 (5745MHz) 30MHz -25GHz-Chain A



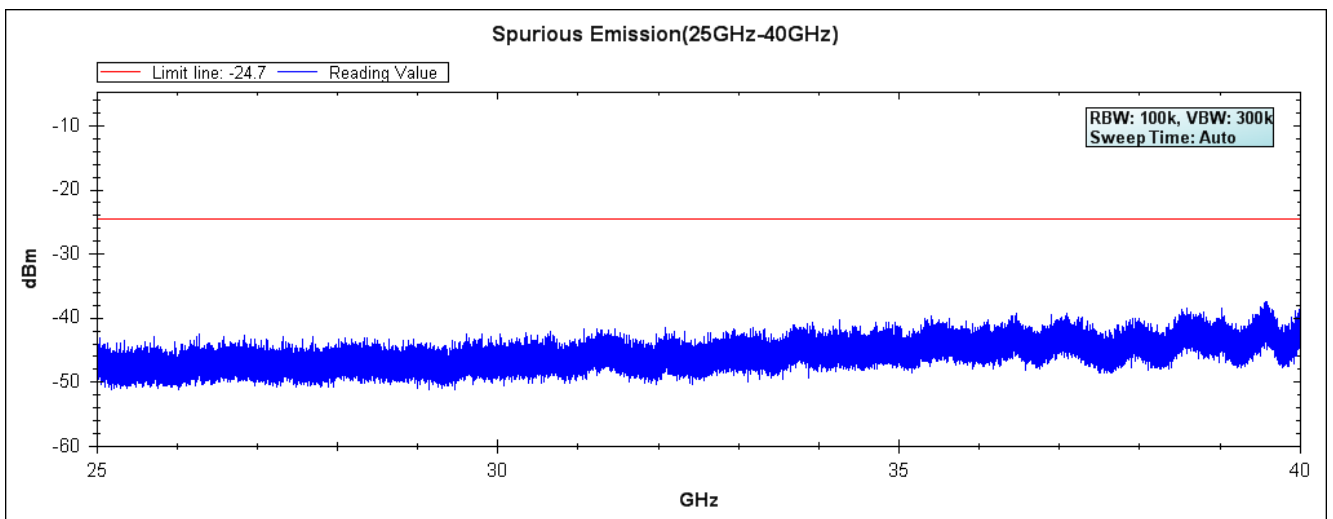
### Channel 149 (5745MHz) 25GHz -40GHz-Chain A



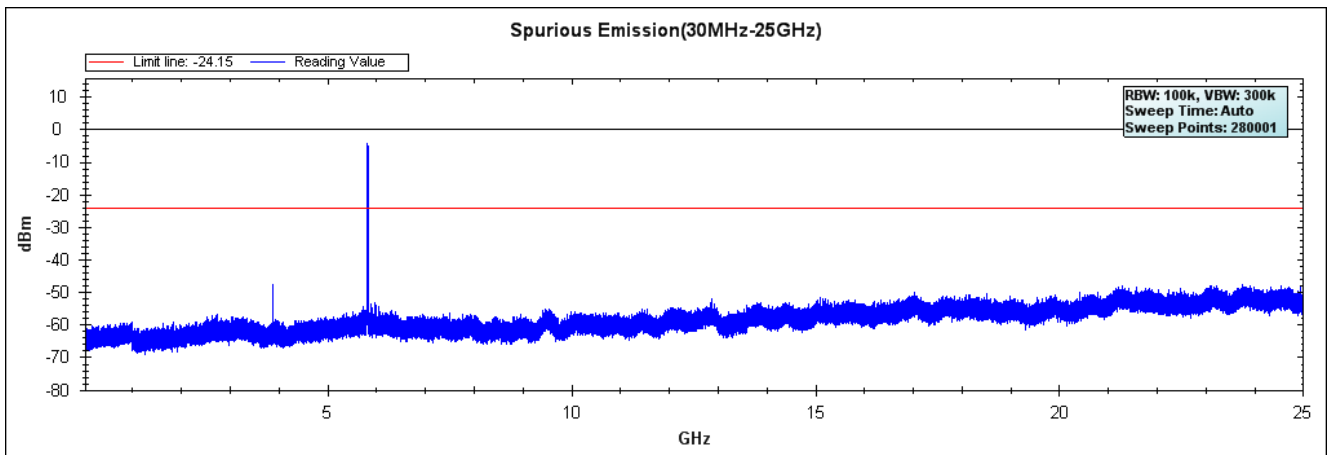
### Channel 157 (5785MHz) 30MHz -25GHz-Chain A



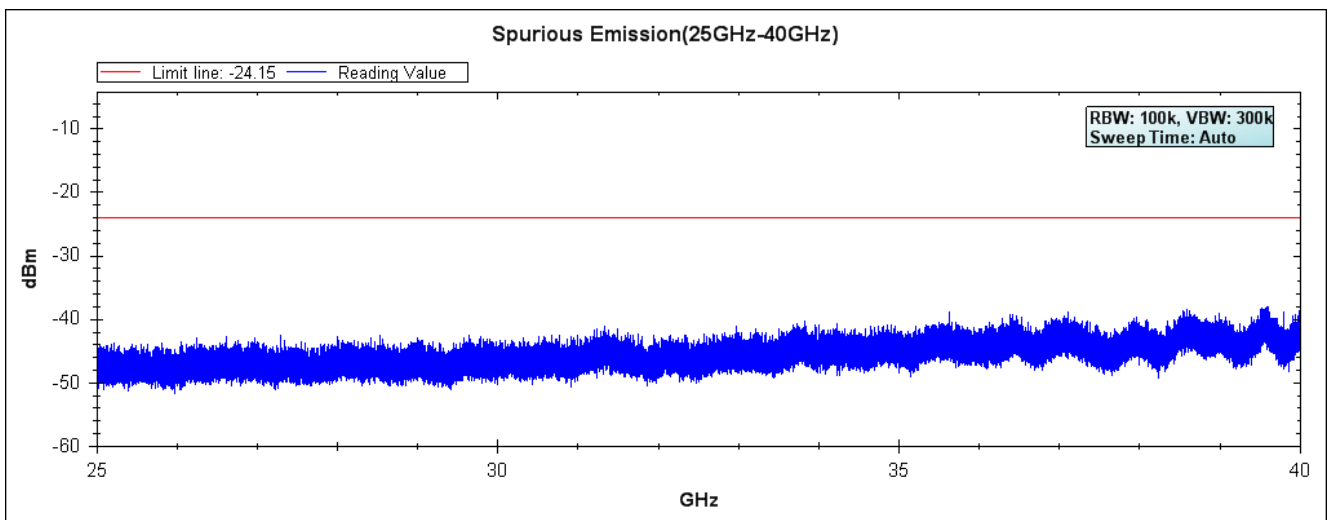
### Channel 157 (5785MHz) 25GHz -40GHz-Chain A



### Channel 165 (5825MHz) 30MHz -25GHz-Chain A

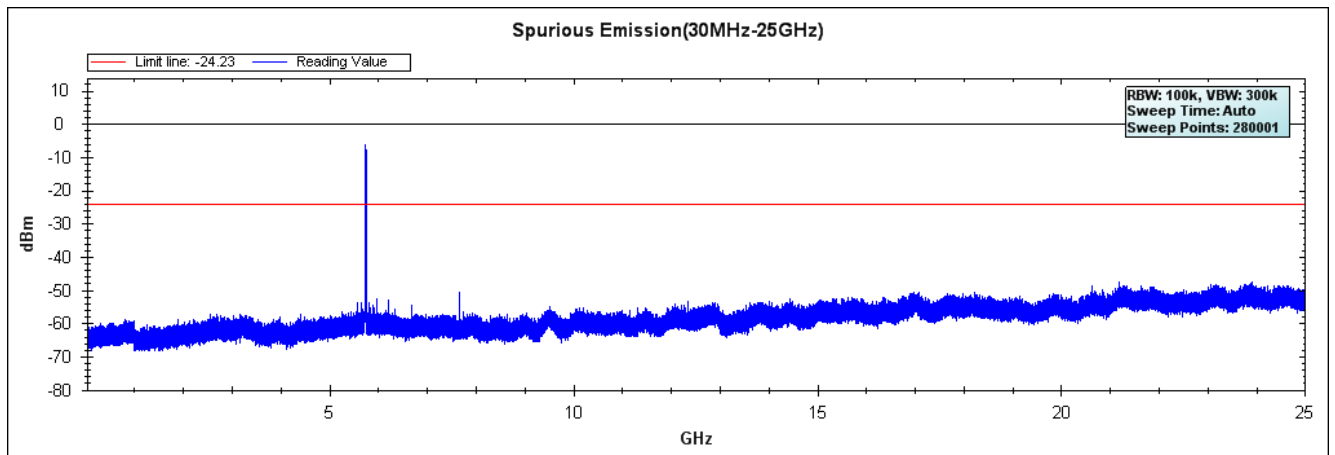


### Channel 165 (5825MHz) 25GHz -40GHz-Chain A

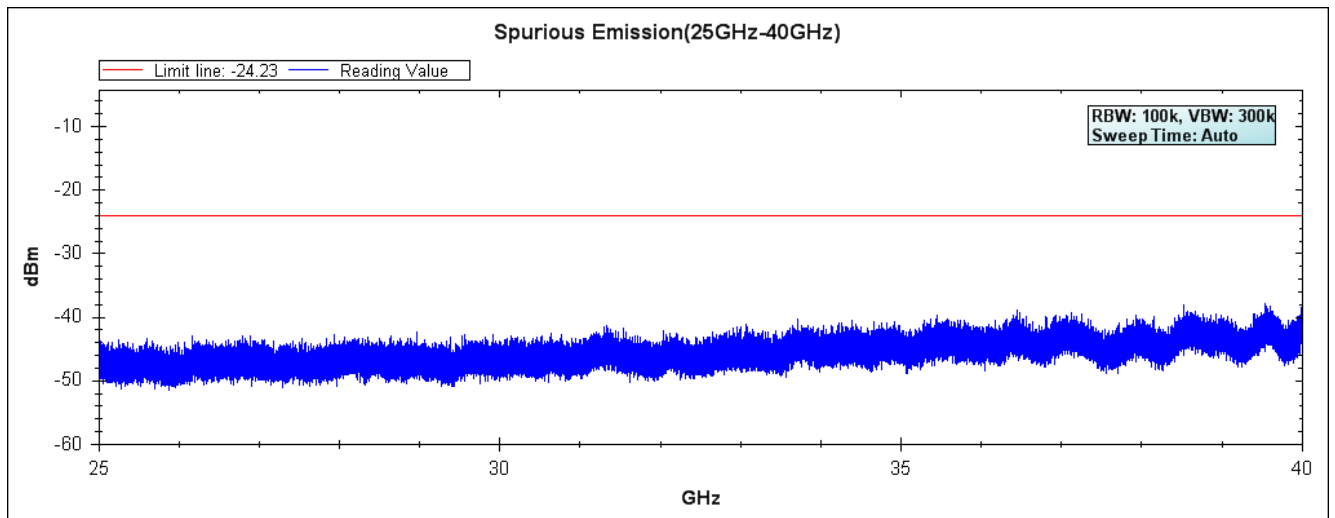




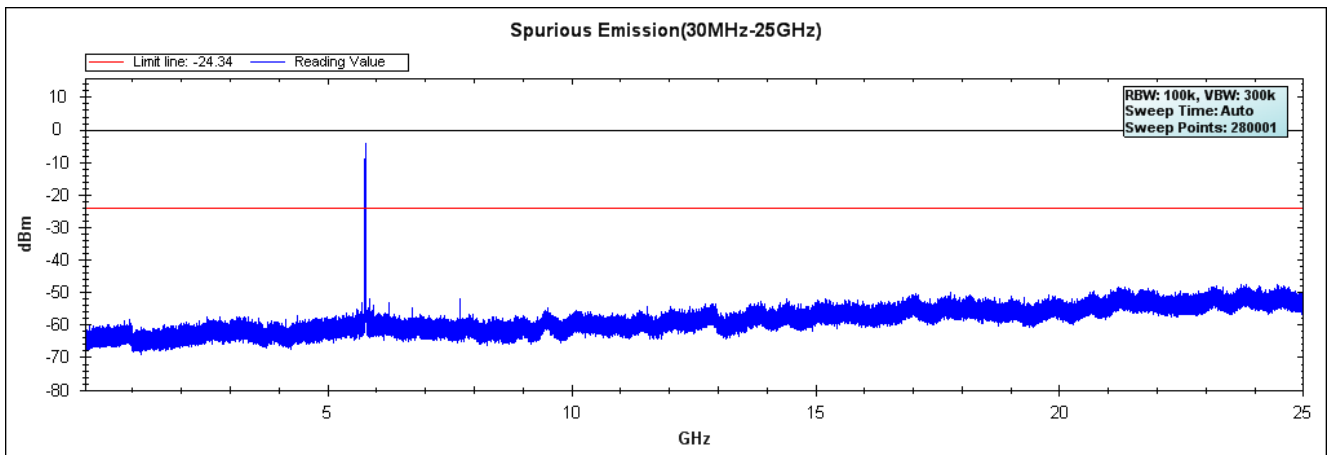
### Channel 49 (5745MHz) 30MHz -25GHz-Chain B



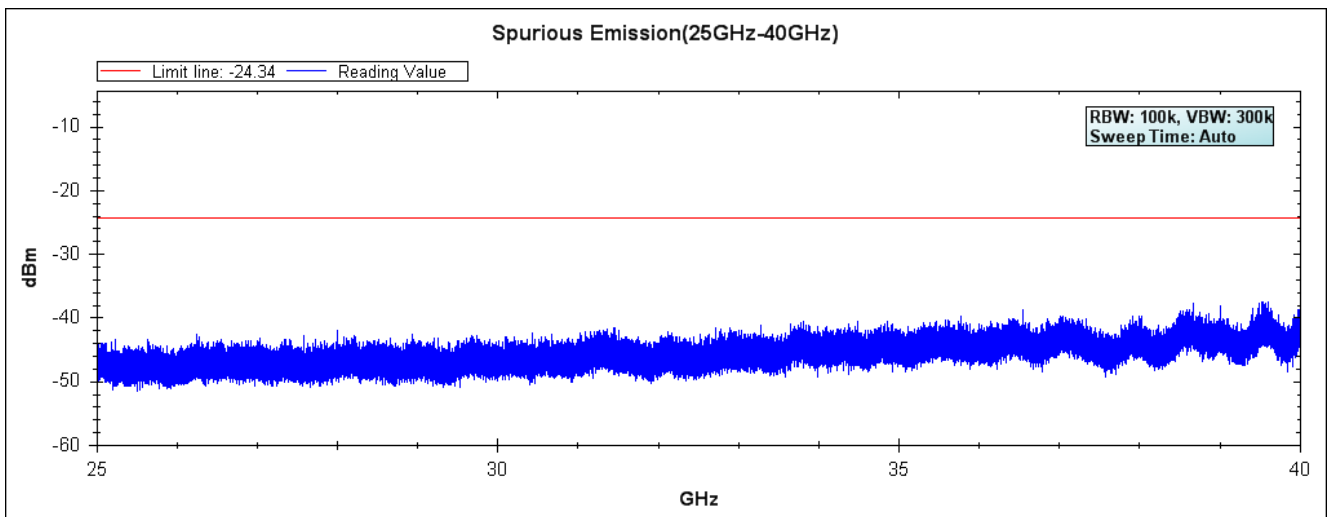
### Channel 49 (5745MHz) 25GHz -40GHz-Chain B



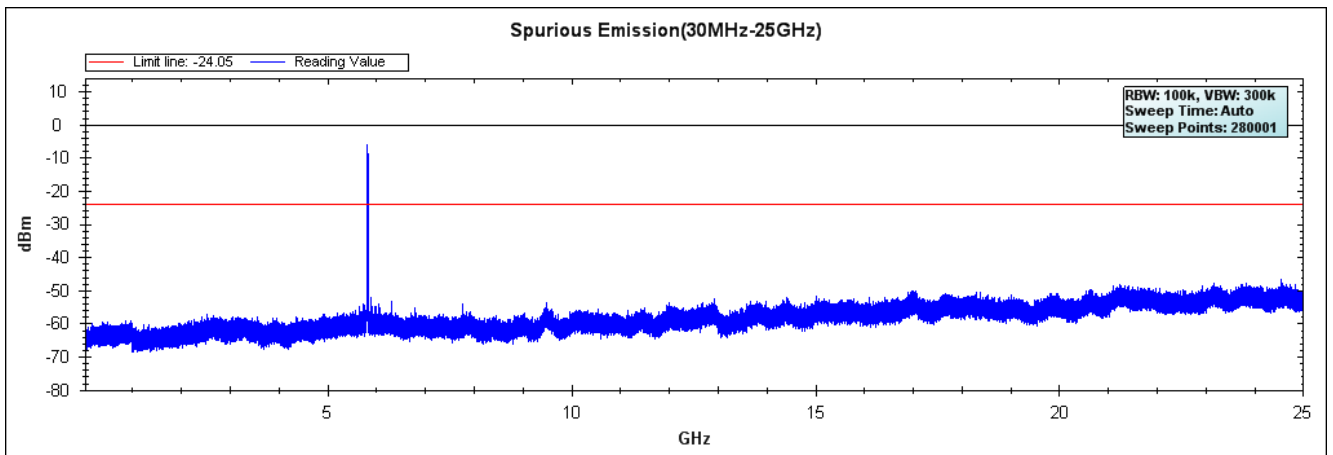
### Channel 157 (5785MHz) 30MHz -25GHz-Chain B



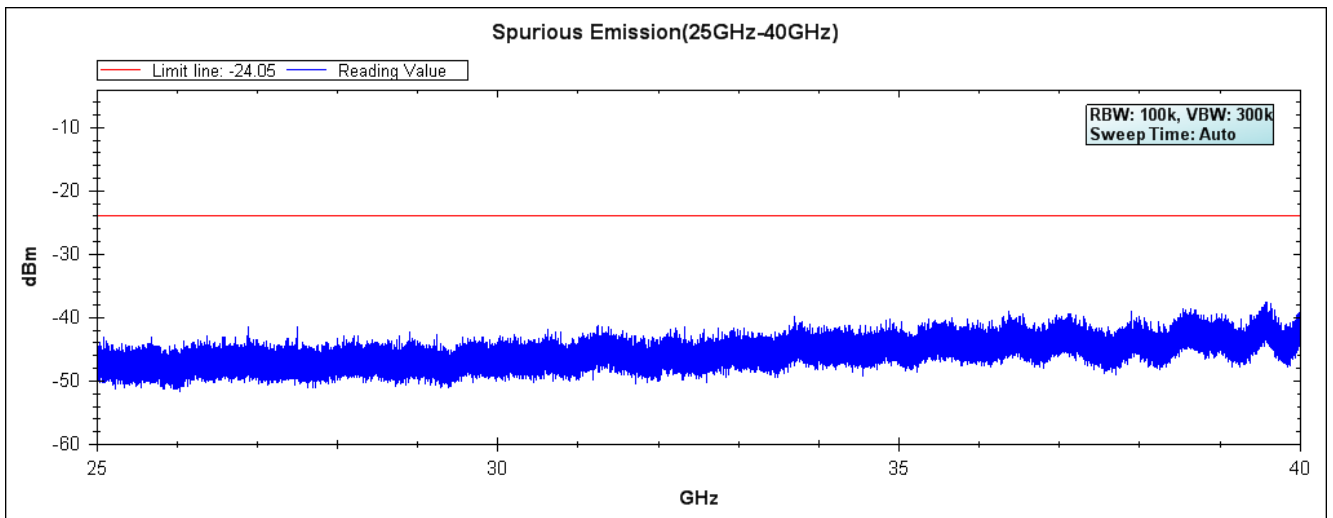
### Channel 157 (5785MHz) 25GHz -40GHz-Chain B



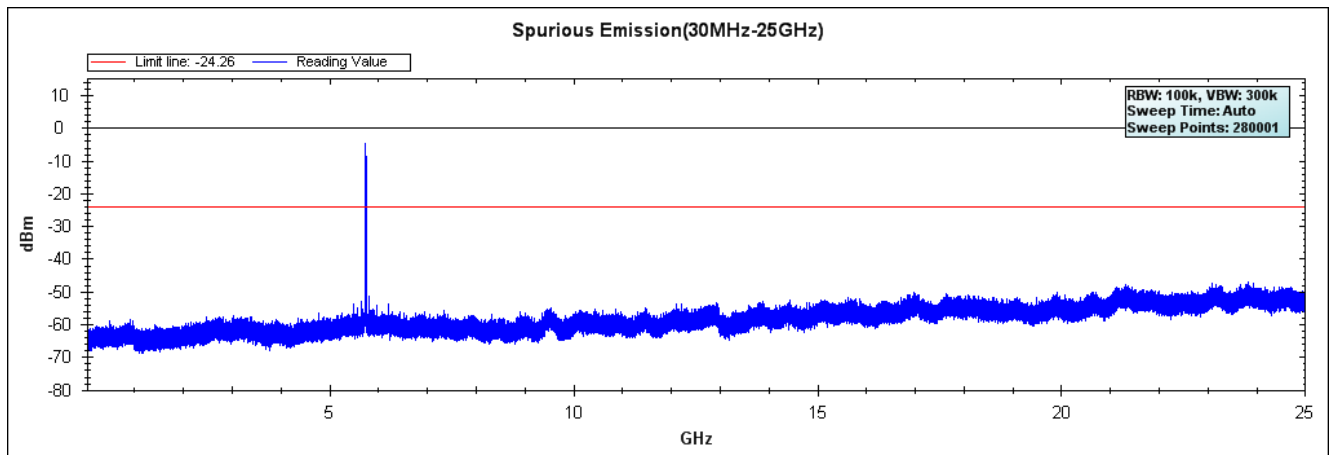
### Channel 165 (5825MHz) 30MHz -25GHz-Chain B



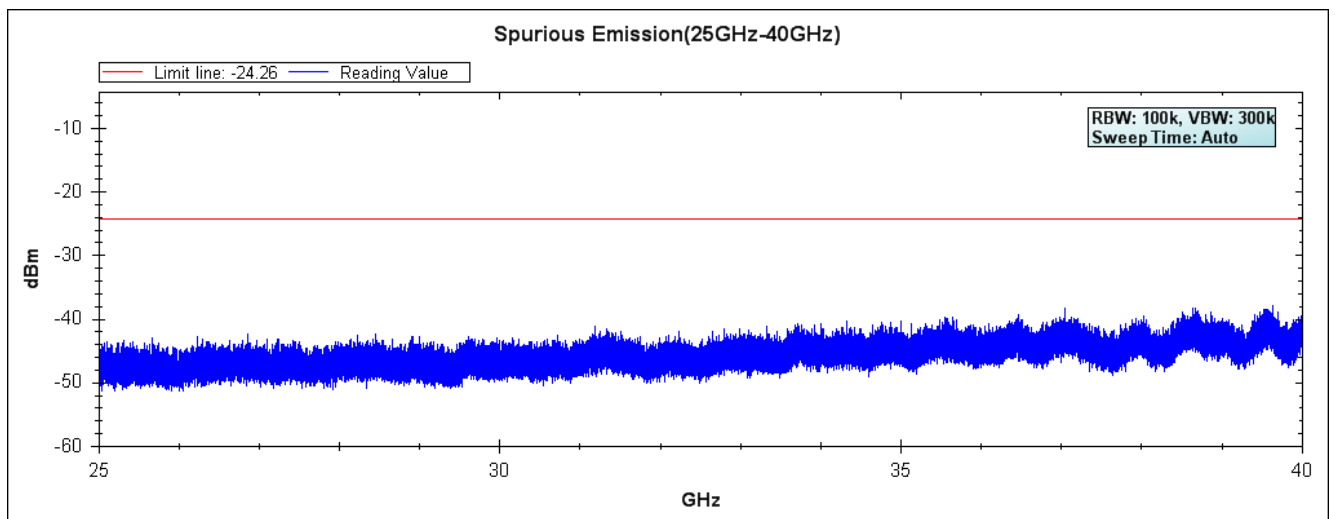
### Channel 165 (5825MHz) 25GHz -40GHz-Chain B



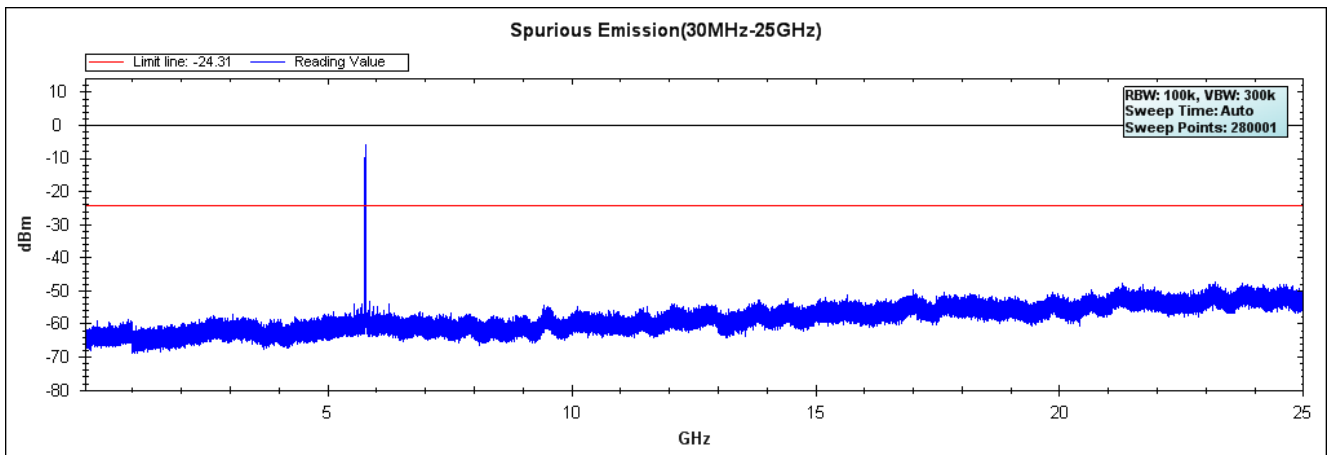
### Channel 49 (5745MHz) 30MHz -25GHz-Chain C



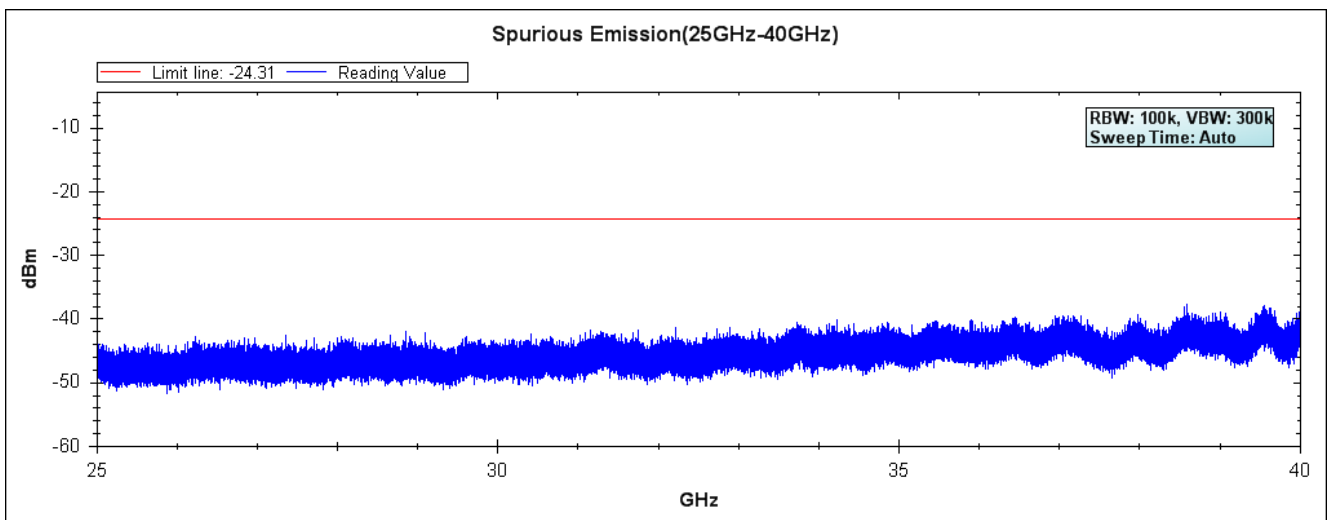
### Channel 49 (5745MHz) 25GHz -40GHz-Chain C



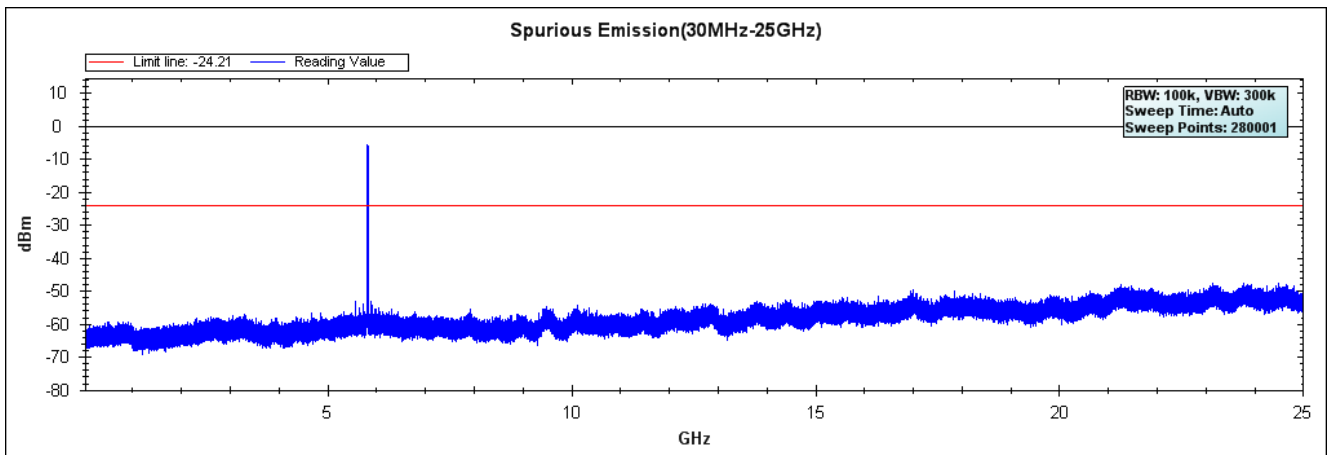
### Channel 157 (5785MHz) 30MHz -25GHz-Chain C



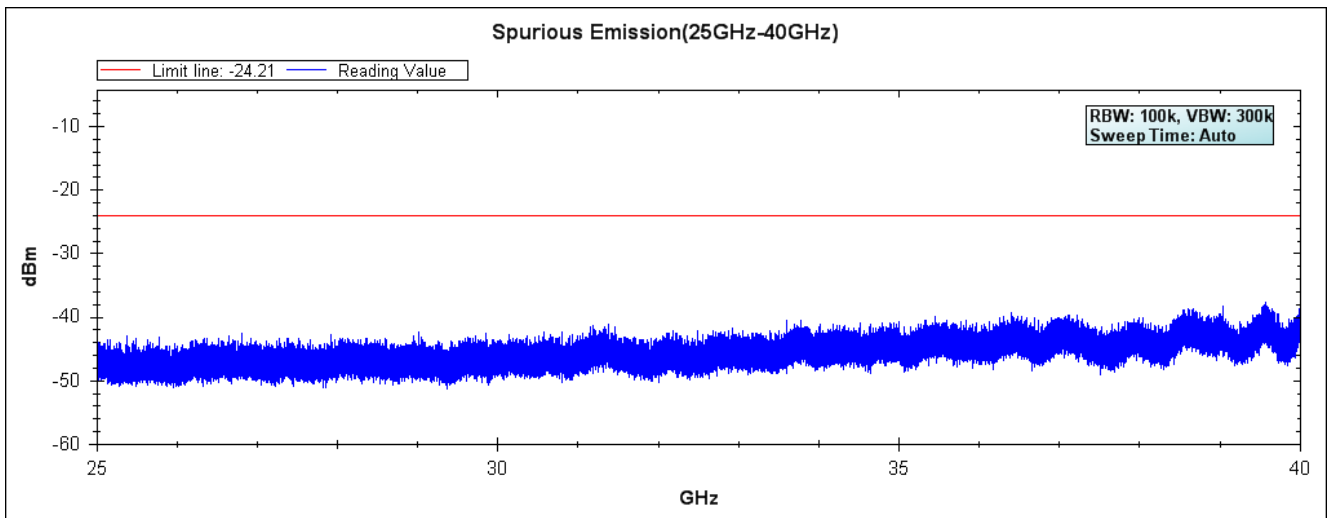
### Channel 157 (5785MHz) 25Hz -40GHz-Chain C



### Channel 165 (5825MHz) 30MHz -25GHz-Chain C

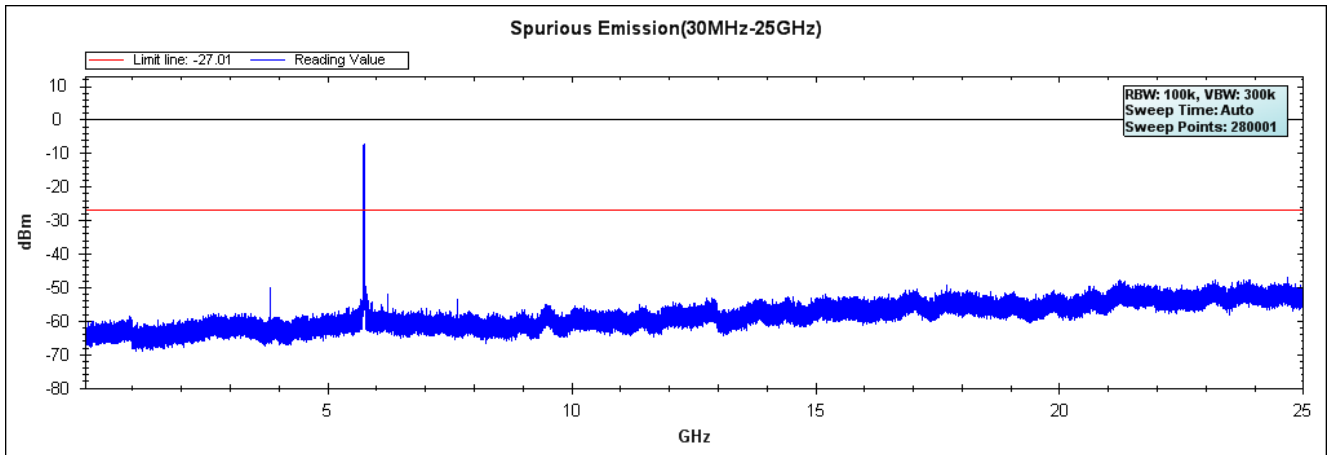


### Channel 165 (5825MHz) 25GHz -40GHz-Chain C

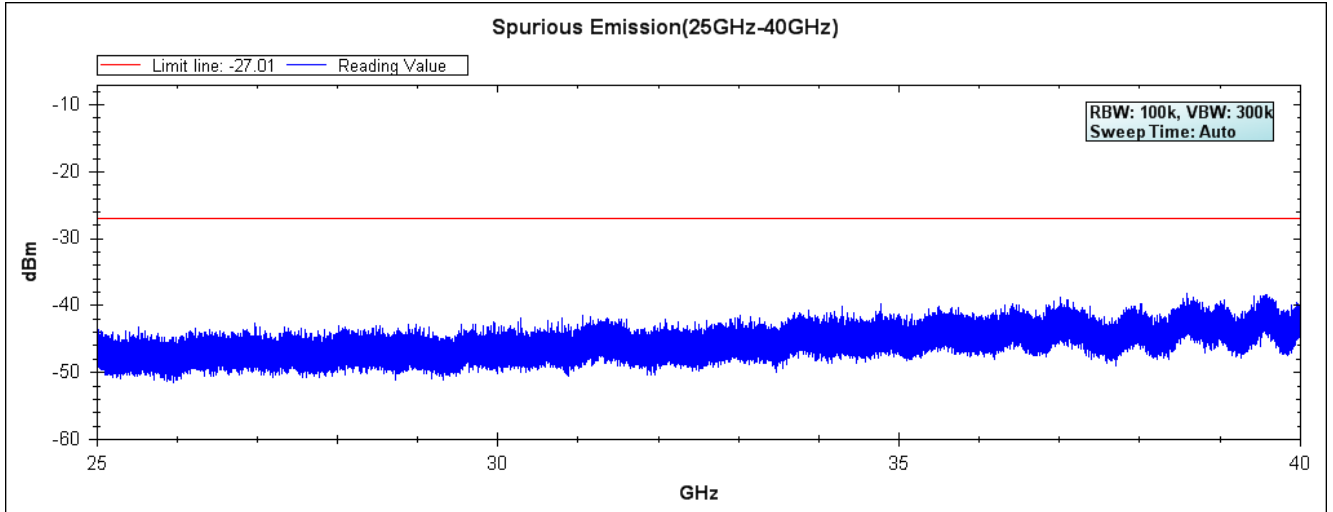


Product : WiFi module  
 Test Item : RF Antenna Conducted Spurious  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band)

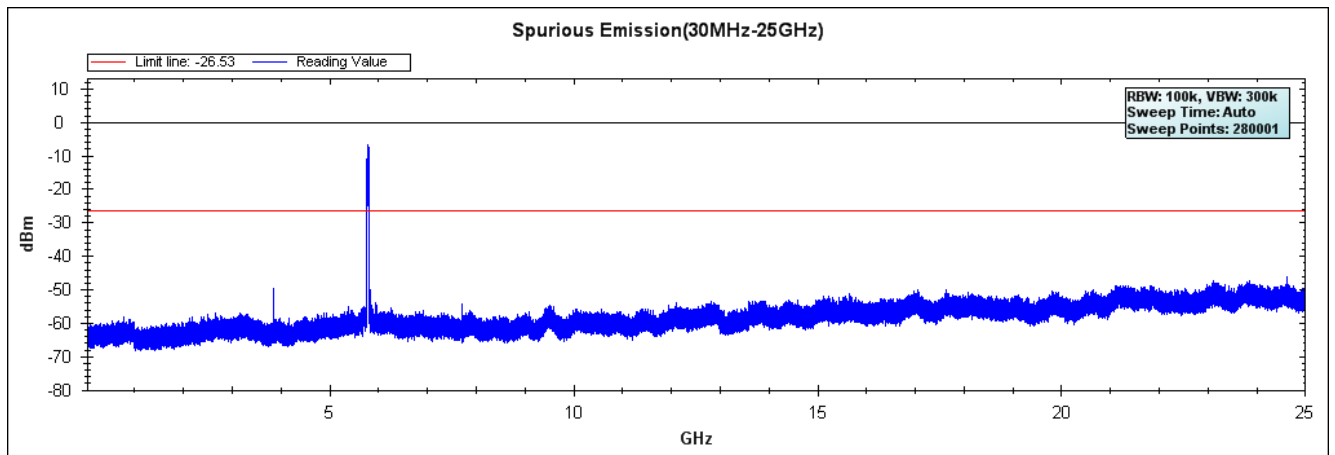
### Channel 151 (5755MHz) 30MHz -25GHz-Chain A



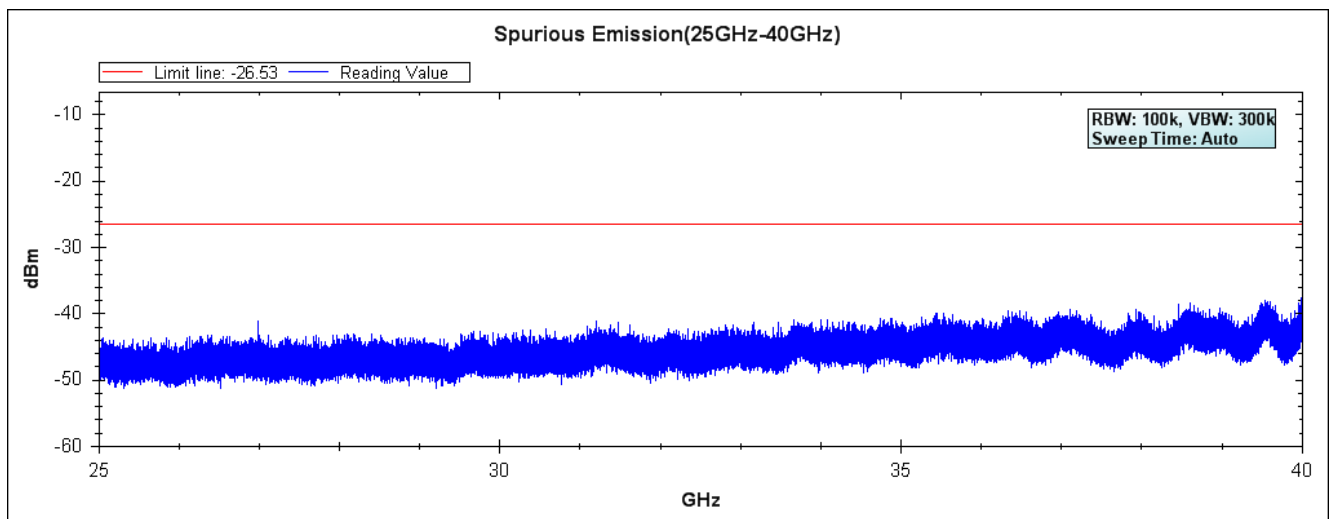
### Channel 151 (5755MHz) 25GHz -40GHz-Chain A



### Channel 159 (5795MHz) 30MHz -25GHz-Chain A

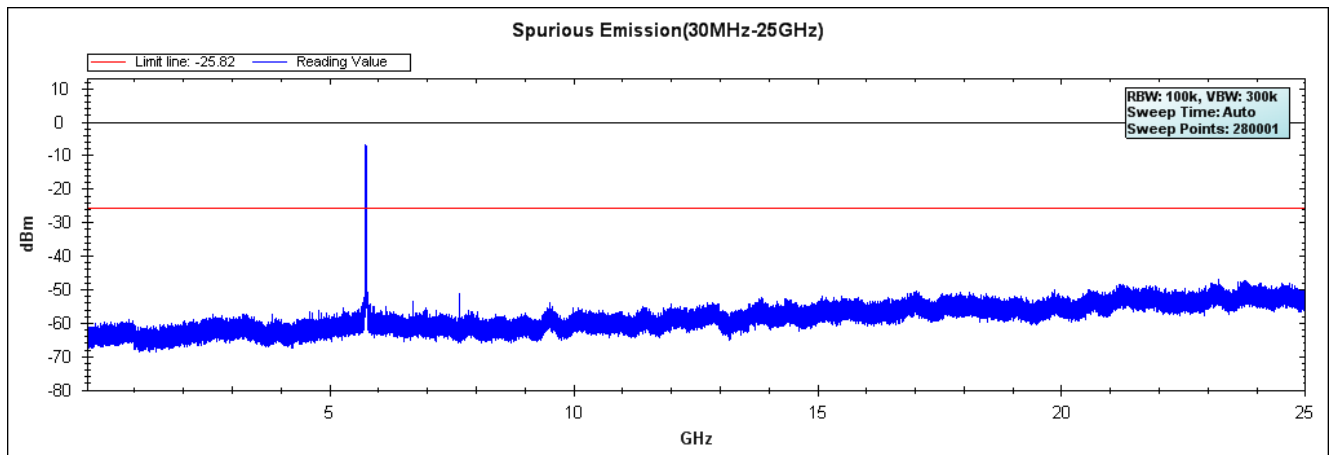


### Channel 159 (5795MHz) 25GHz -40GHz-Chain A

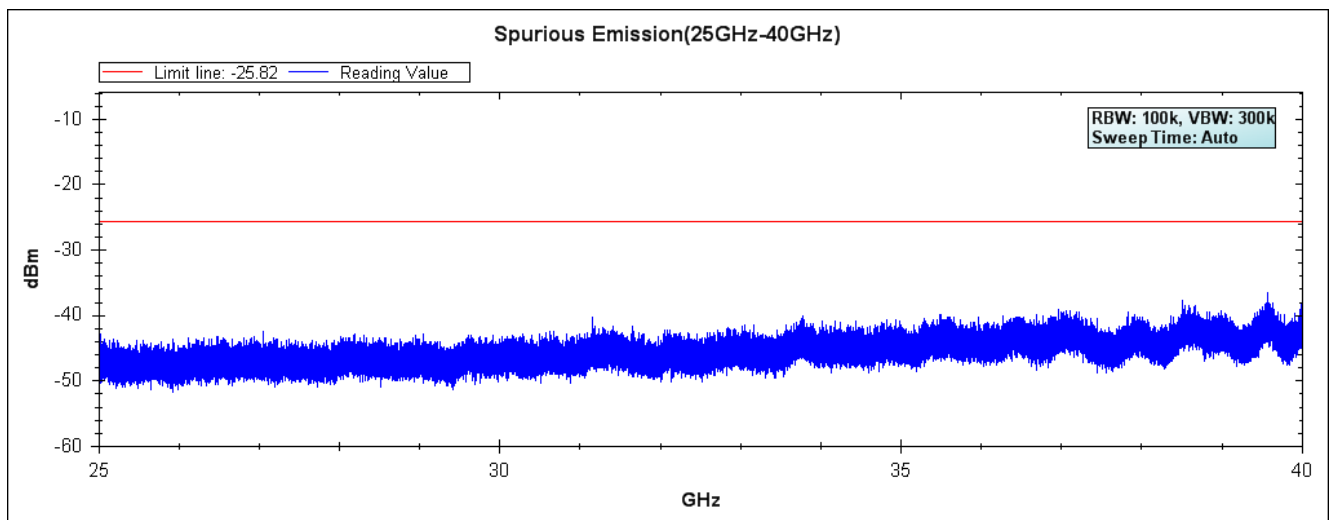




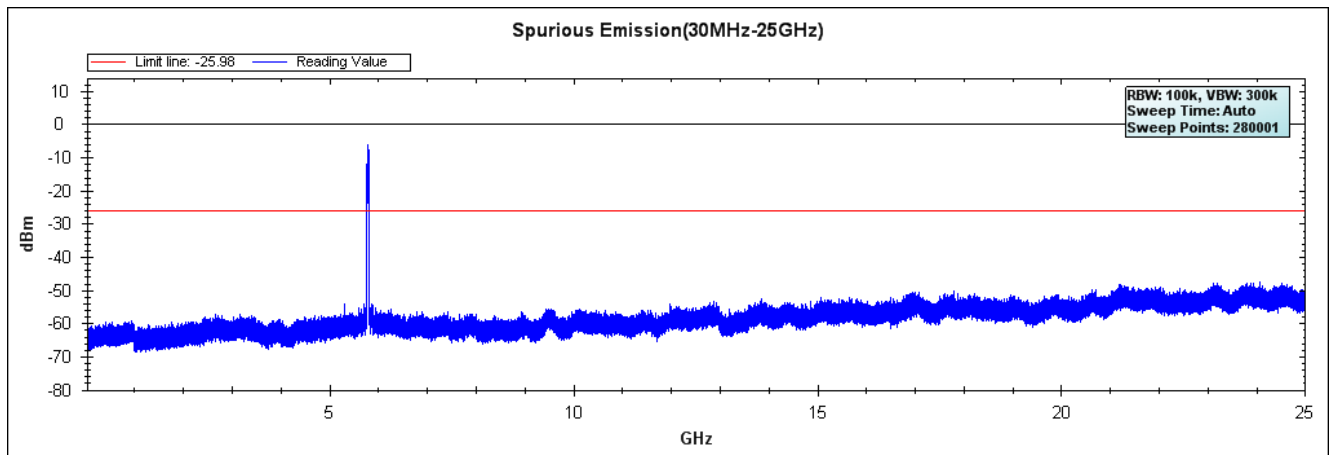
### Channel 151 (5755MHz) 30MHz -25GHz-Chain B



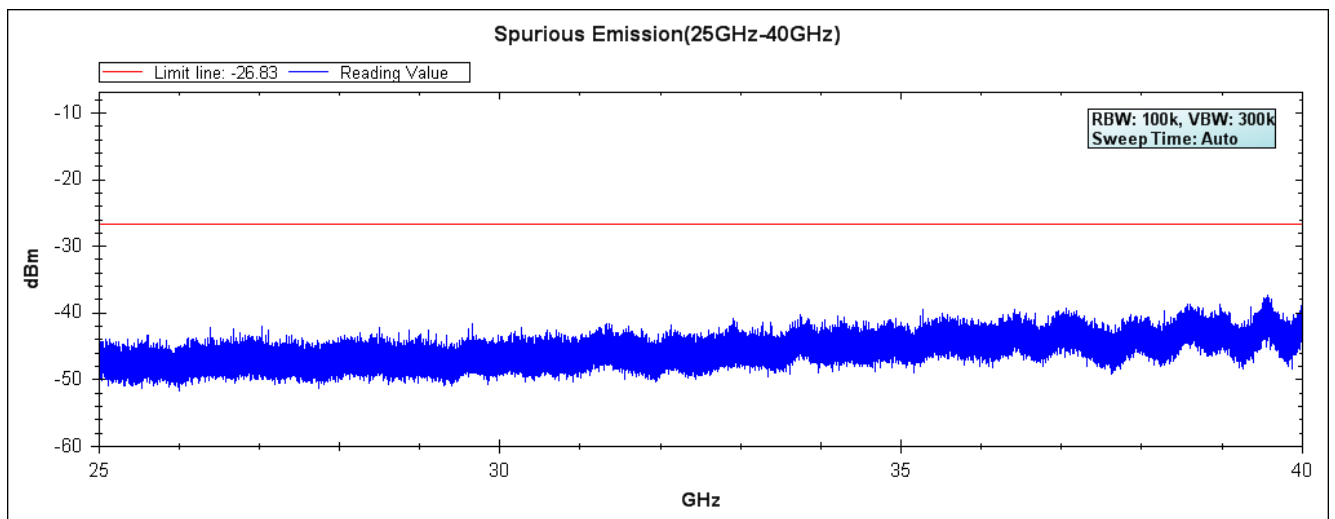
### Channel 151 (5755MHz) 25Hz -40GHz-Chain B



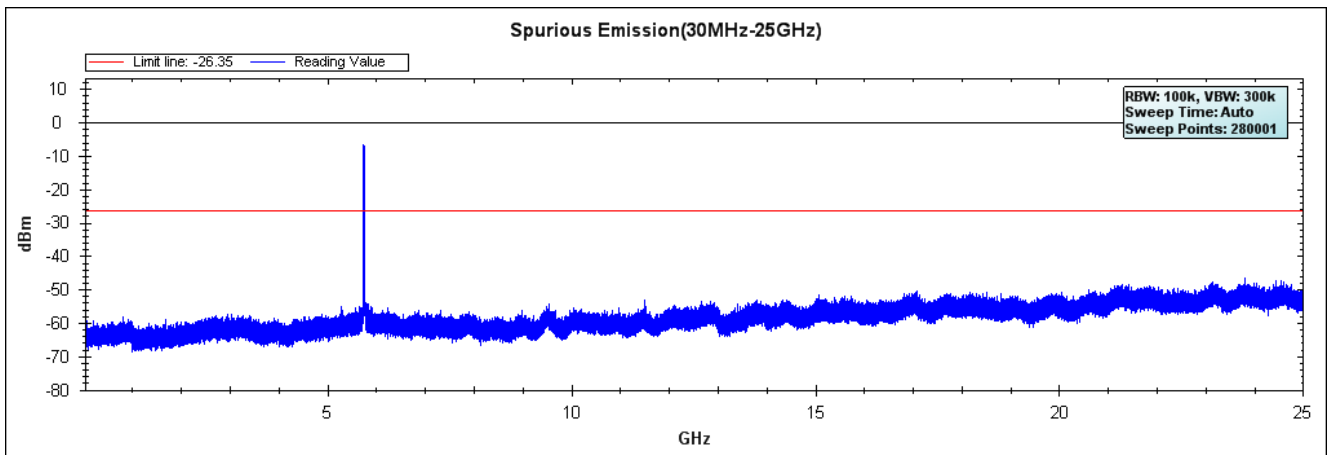
### 159 (5795MHz) 30MHz -25GHz-Chain B



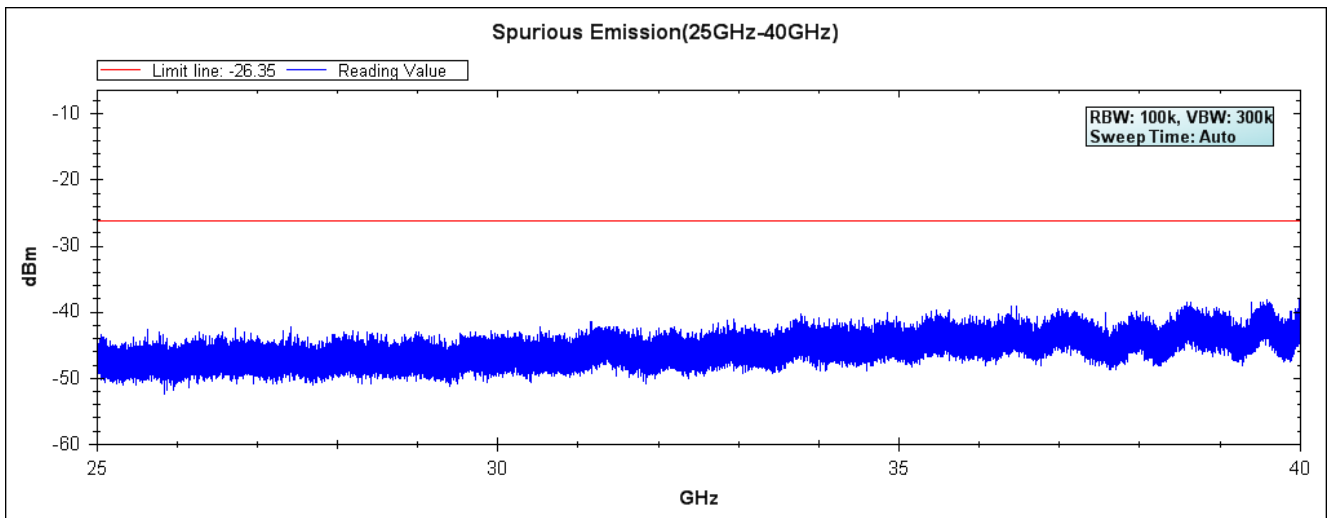
### 159 (5795MHz) 25GHz -40GHz-Chain B



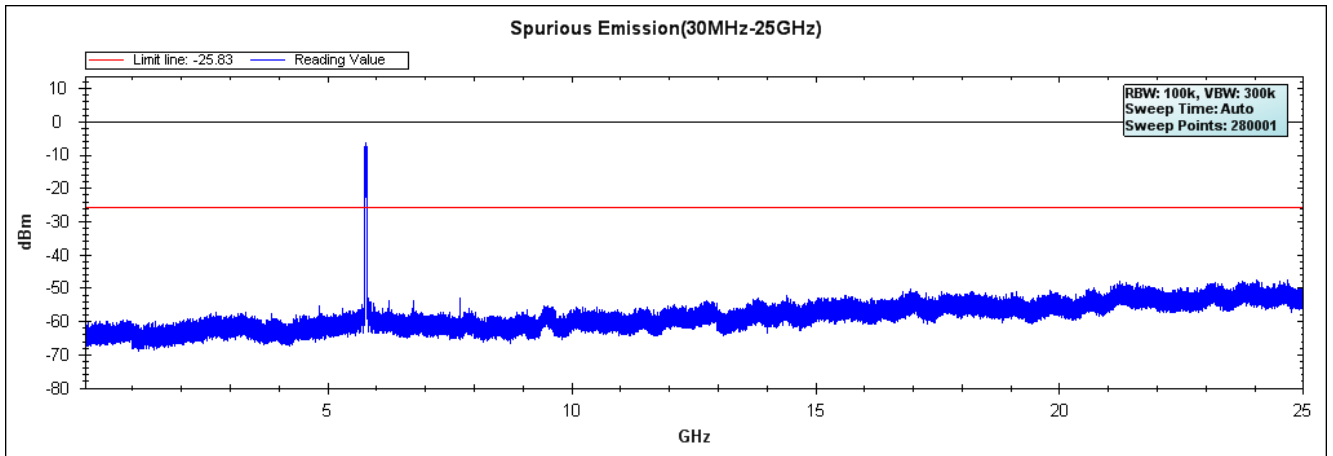
### Channel 151 (5755MHz) 30MHz -25GHz-Chain C



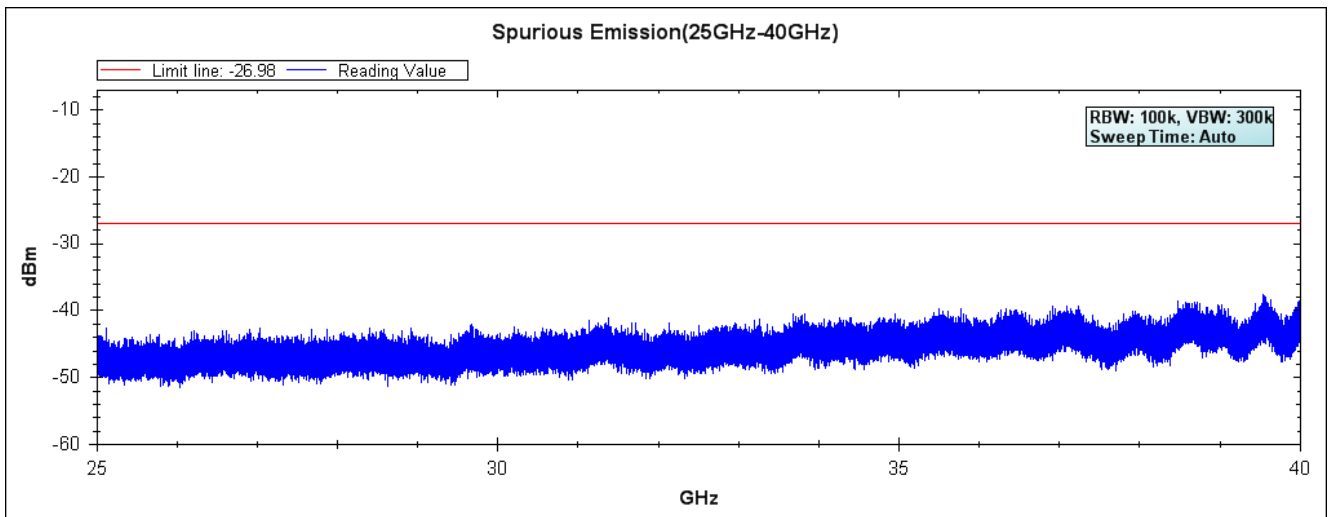
### Channel 151 (5755MHz) 25GHz -40GHz-Chain C



### Channel 159 (5795MHz) 30MHz -25GHz-Chain C



### Channel 159 (5795MHz) 25GHz -40GHz-Chain C



## 6. Band Edge

### 6.1. Test Equipment

#### RF Conducted Measurement

The following test equipments are used during the band edge tests:

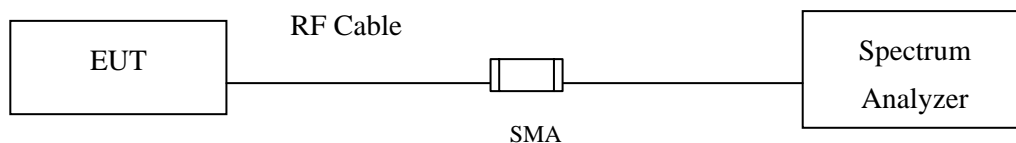
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2013
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

### 6.2. Test Setup

#### RF Conducted Measurement



### 6.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

#### **6.4. Test Procedure**

The EUT was setup according to ANSI C63.10, 2009 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2009 on radiated measurement.

#### **6.5. Uncertainty**

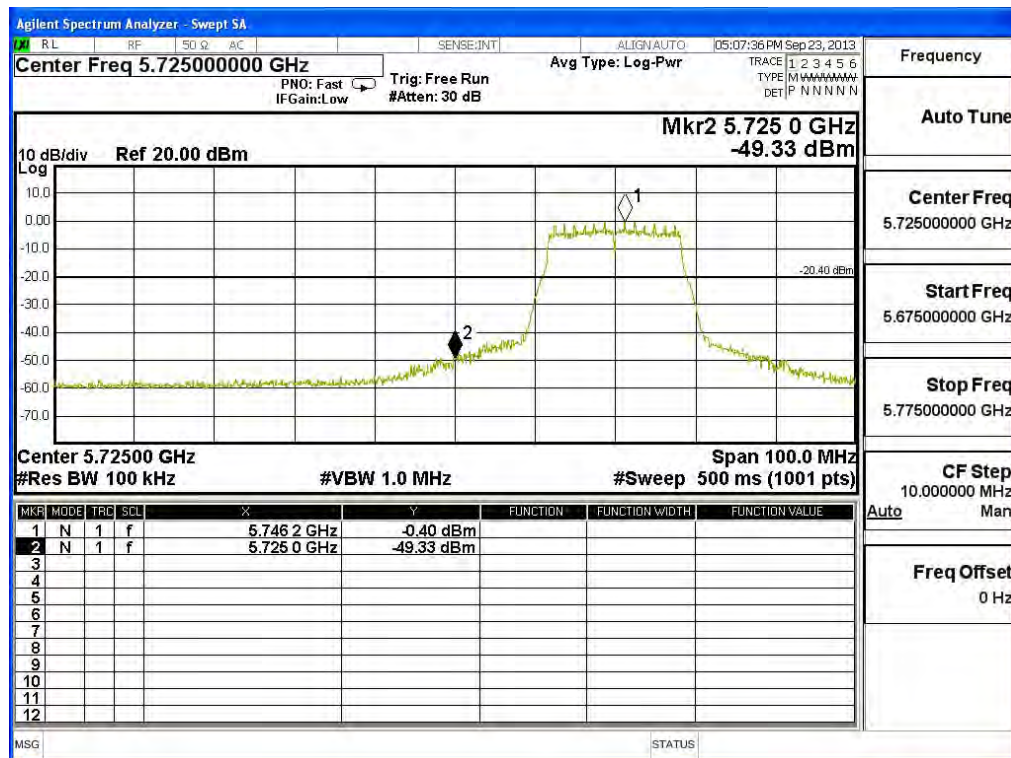
± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

## 6.6. Test Result of Band Edge

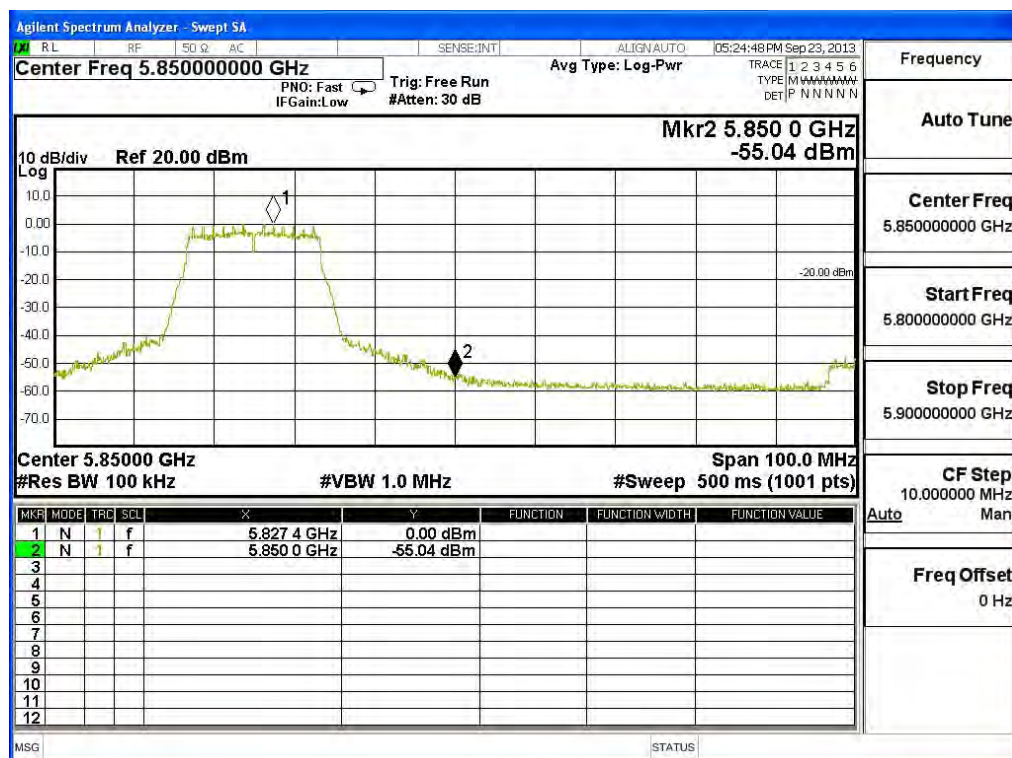
Product : WiFi module  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps

Test Frequency (MHz)	Measurement Level $\Delta$ (dB)	Limit $\Delta$ (dB)	Result
5745	48.93	>20	PASS



Product : WiFi module  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps

Test Frequency (MHz)	Measurement Level $\Delta$ (dB)	Limit $\Delta$ (dB)	Result
5825	55.04	>20	PASS

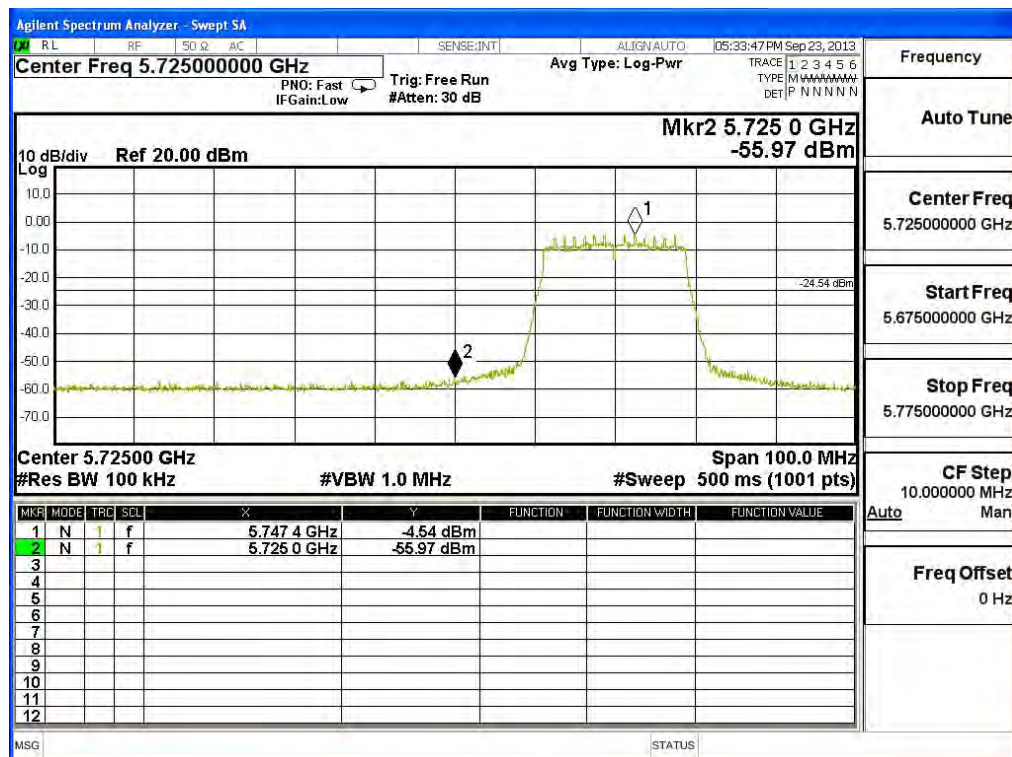




Product : WiFi module  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band)

### Chain A

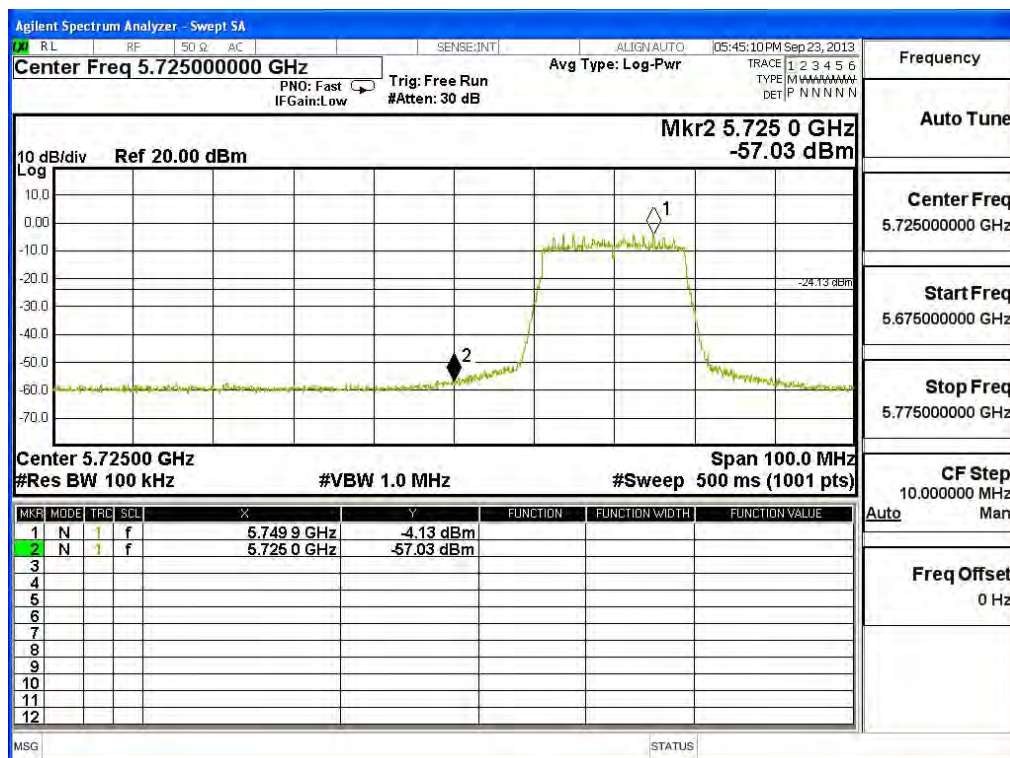
Test Frequency (MHz)	Measurement Level $\Delta$ (dB)	Limit $\Delta$ (dB)	Result
5745	51.43	>20	PASS



Product : WiFi module  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band)

### Chain B

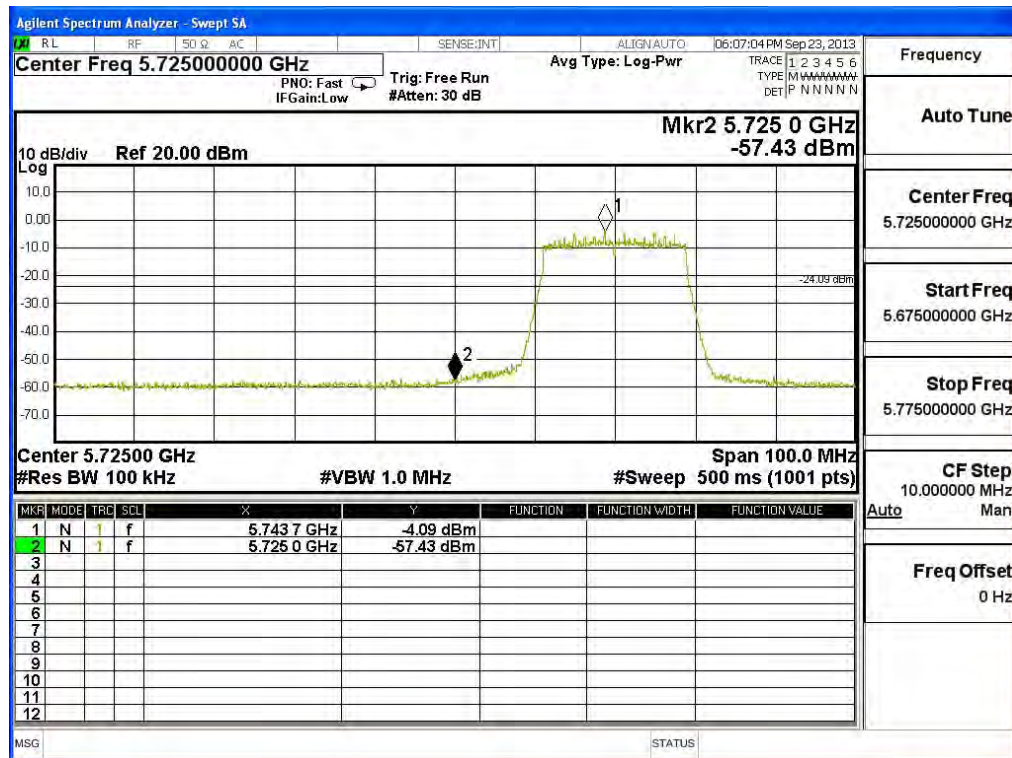
Test Frequency (MHz)	Measurement Level $\Delta$ (dB)	Limit $\Delta$ (dB)	Result
5745	52.9	>20	PASS



Product : WiFi module  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band)

### Chain C

Test Frequency (MHz)	Measurement Level $\Delta$ (dB)	Limit $\Delta$ (dB)	Result
5745	53.34	>20	PASS

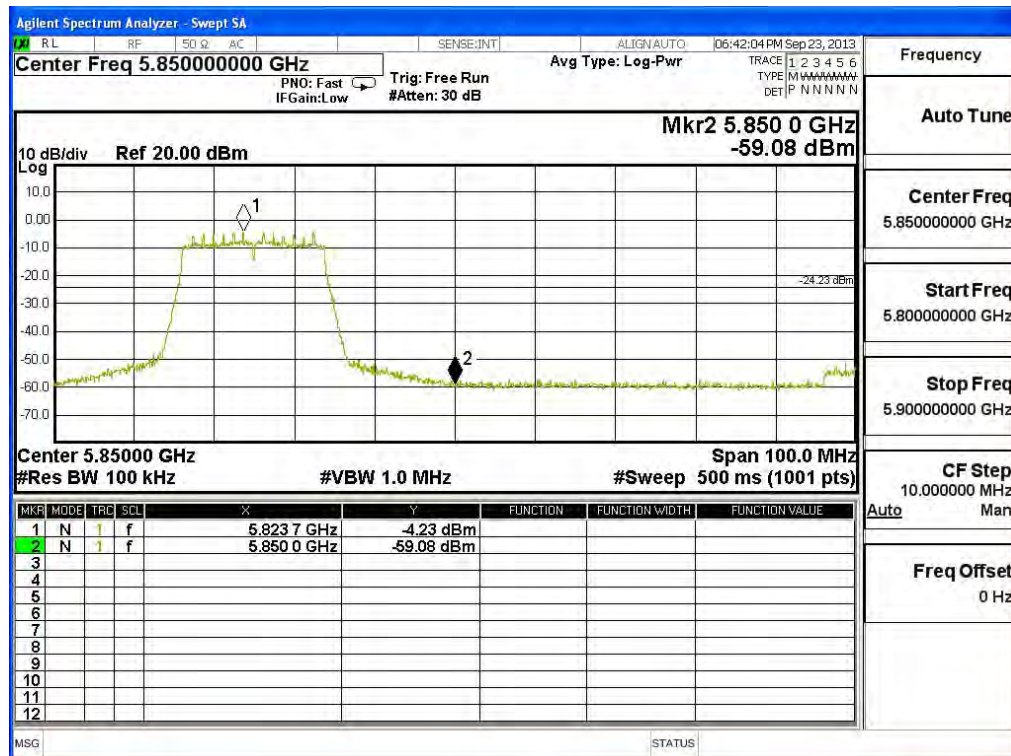


Product : WiFi module

Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band)

### Chain A

Test Frequency (MHz)	Measurement Level $\Delta$ (dB)	Limit $\Delta$ (dB)	Result
5825	54.85	>20	PASS



Product : WiFi module  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band)

### Chain B

Test Frequency (MHz)	Measurement Level $\Delta$ (dB)	Limit $\Delta$ (dB)	Result
5825	54.81	>20	PASS

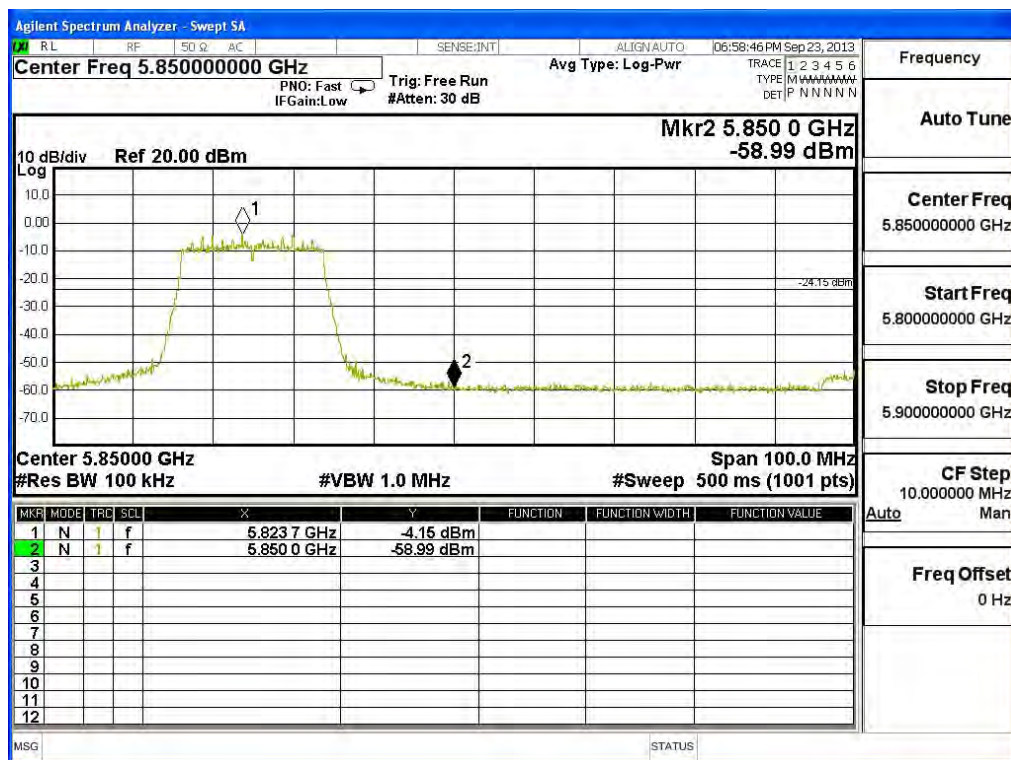




Product : WiFi module  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band)

### Chain C

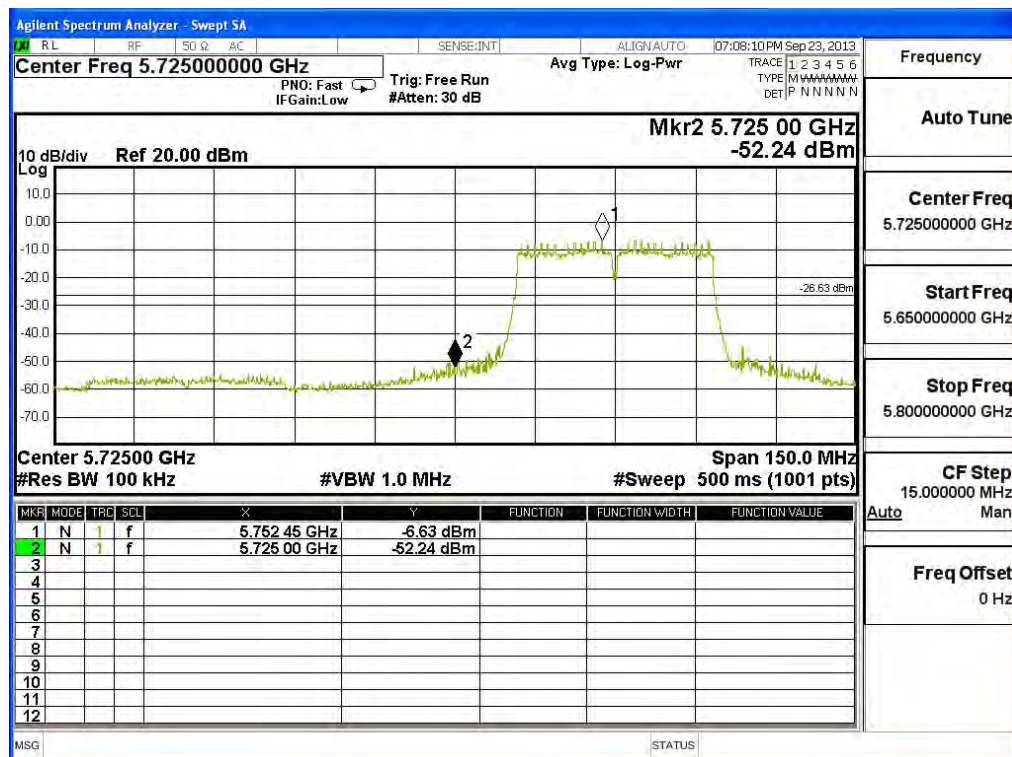
Test Frequency (MHz)	Measurement Level $\Delta$ (dB)	Limit $\Delta$ (dB)	Result
5825	54.84	>20	PASS



Product : WiFi module  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band)

### Chain A

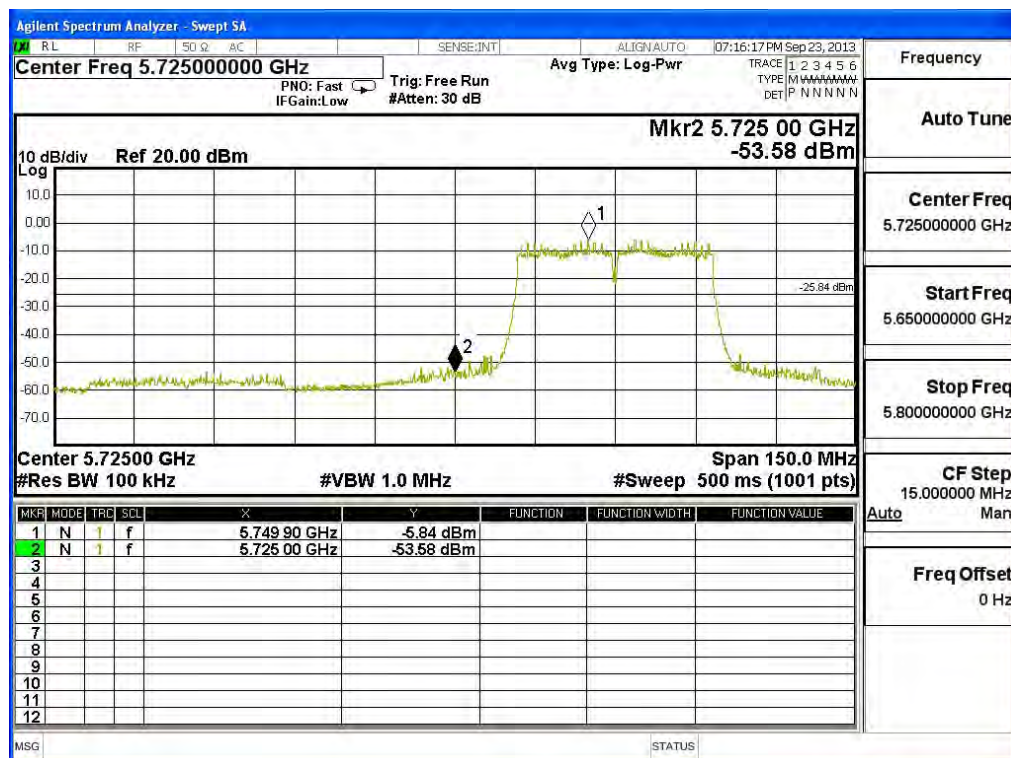
Test Frequency (MHz)	Measurement Level $\Delta$ (dB)	Limit $\Delta$ (dB)	Result
5755	45.61	>20	PASS



Product : WiFi module  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band)

### Chain B

Test Frequency (MHz)	Measurement Level $\Delta$ (dB)	Limit $\Delta$ (dB)	Result
5755	47.74	>20	PASS

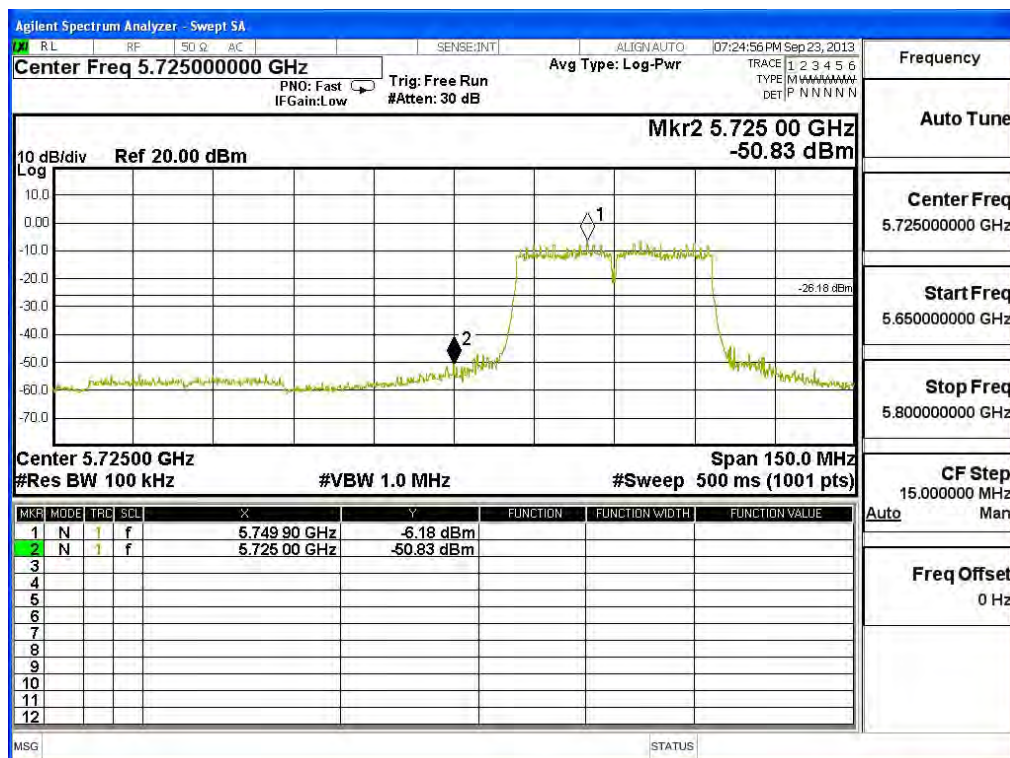




Product : WiFi module  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band)

### Chain C

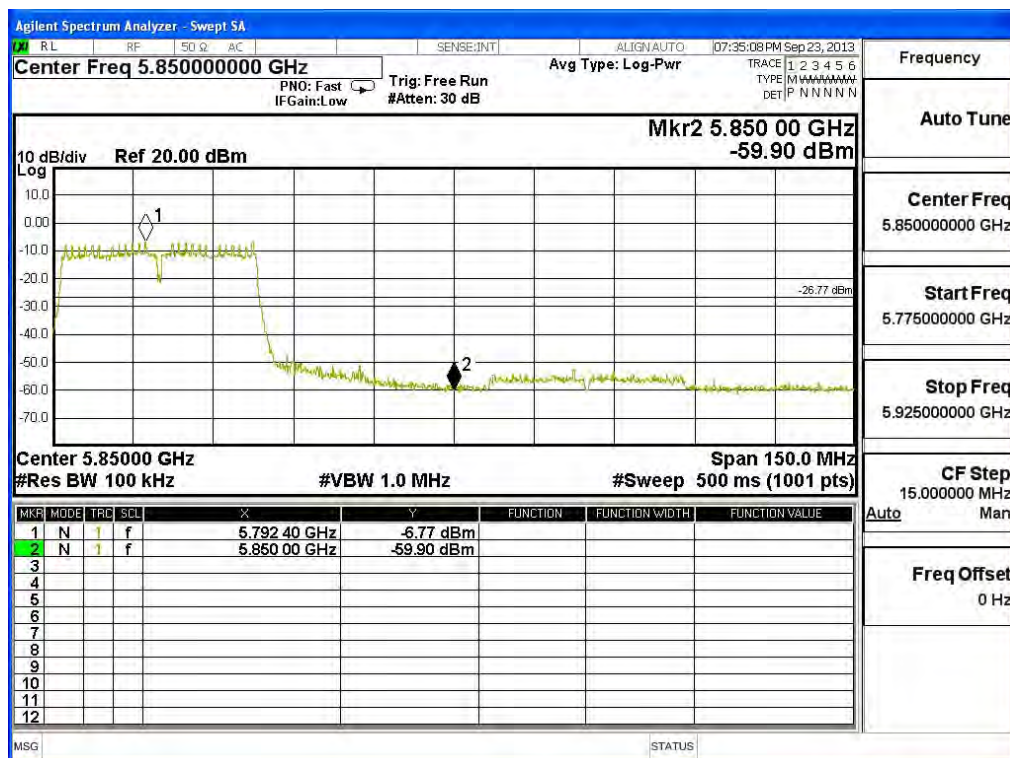
Test Frequency (MHz)	Measurement Level $\Delta$ (dB)	Limit $\Delta$ (dB)	Result
5755	44.65	>20	PASS



Product : WiFi module  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band)

### Chain A

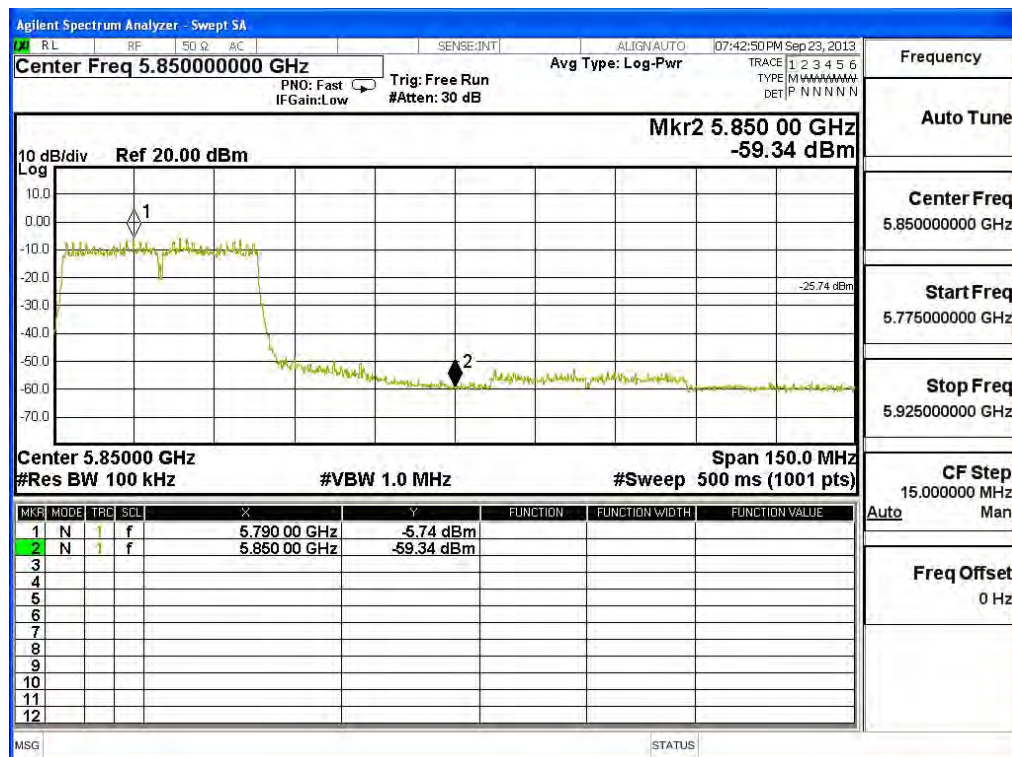
Test Frequency (MHz)	Measurement Level $\Delta$ (dB)	Limit $\Delta$ (dB)	Result
5795	53.13	>20	PASS



Product : WiFi module  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band)

### Chain B

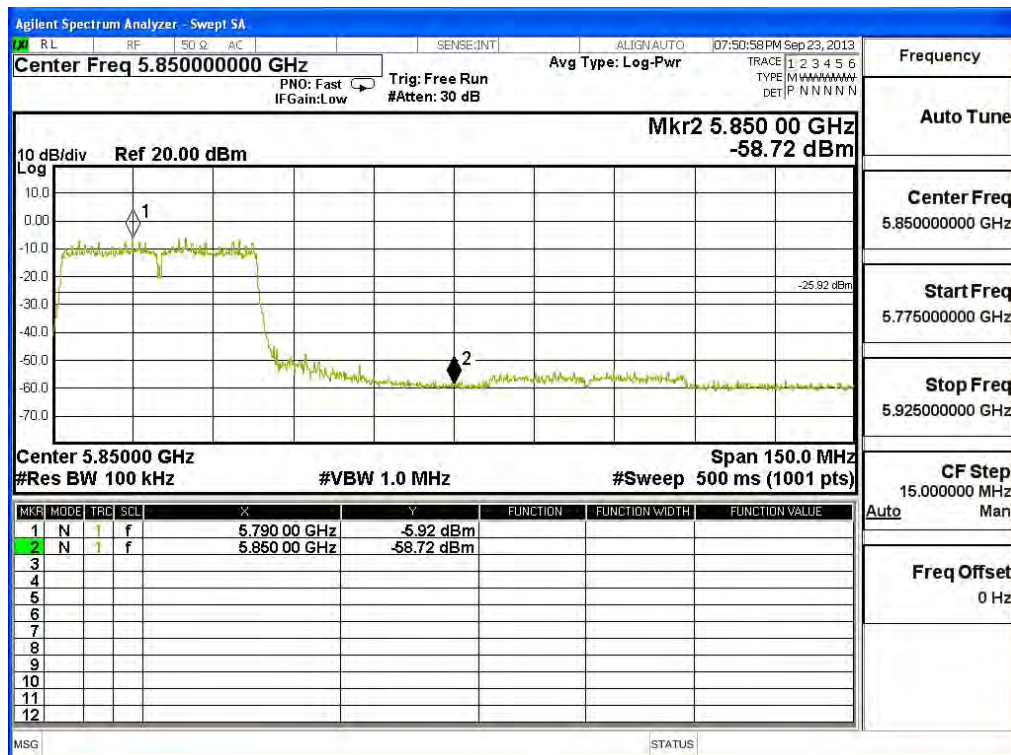
Test Frequency (MHz)	Measurement Level $\Delta$ (dB)	Limit $\Delta$ (dB)	Result
5795	43.60	>20	PASS



Product : WiFi module  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band)

### Chain C

Test Frequency (MHz)	Measurement Level $\Delta$ (dB)	Limit $\Delta$ (dB)	Result
5795	52.80	>20	PASS



## 7. Occupied Bandwidth

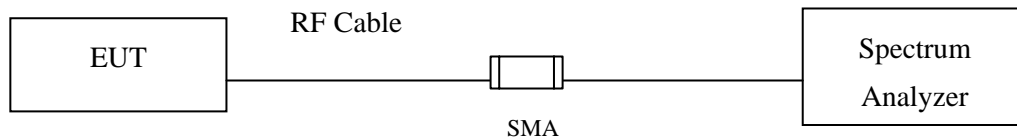
### 7.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2013
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

### 7.2. Test Setup



### 7.3. Limits

The minimum bandwidth shall be at least 500 kHz.

### 7.4. Test Procedure

The EUT was setup according to ANSI C63.10, 2009; tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

### 7.5. Uncertainty

$\pm 150\text{Hz}$

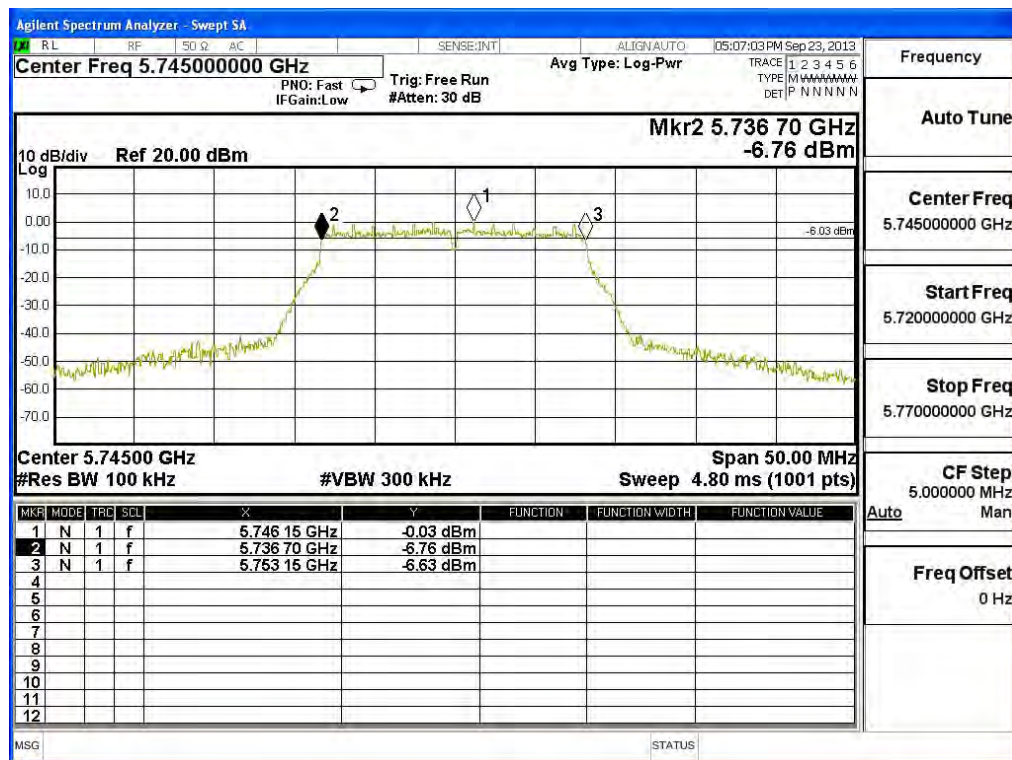


## 7.6. Test Result of Occupied Bandwidth

Product : WiFi module  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5745MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745.00	16450	>500	Pass

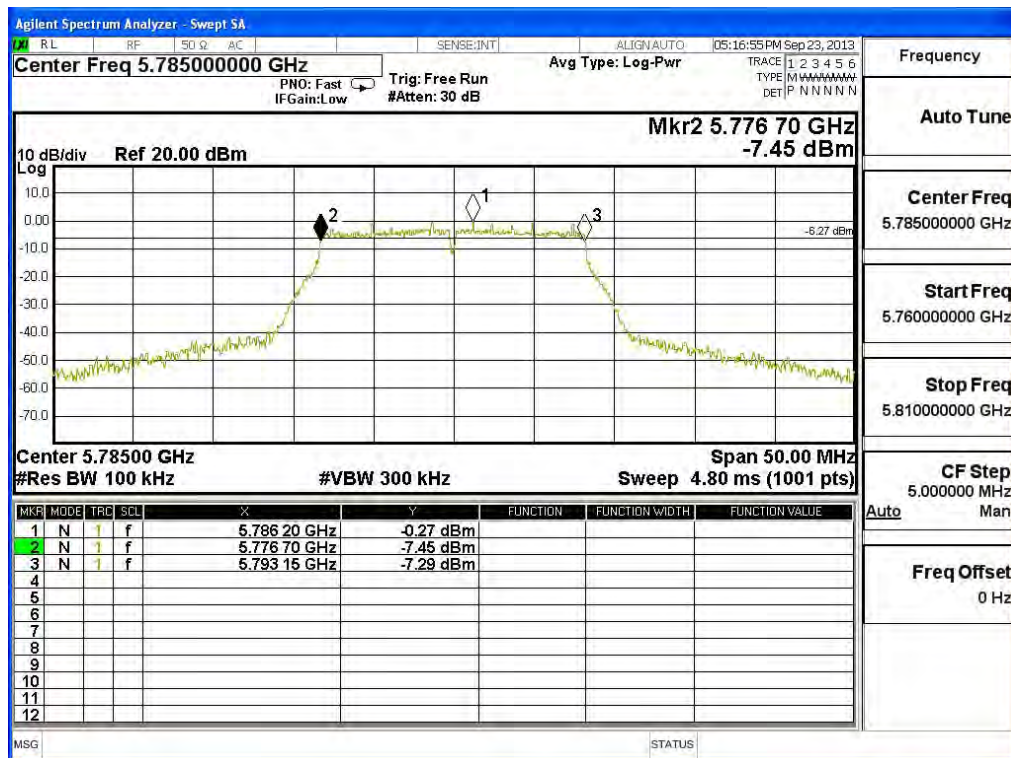
Figure Channel 149:



Product : WiFi module  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5785MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
157	5785.00	16450	>500	Pass

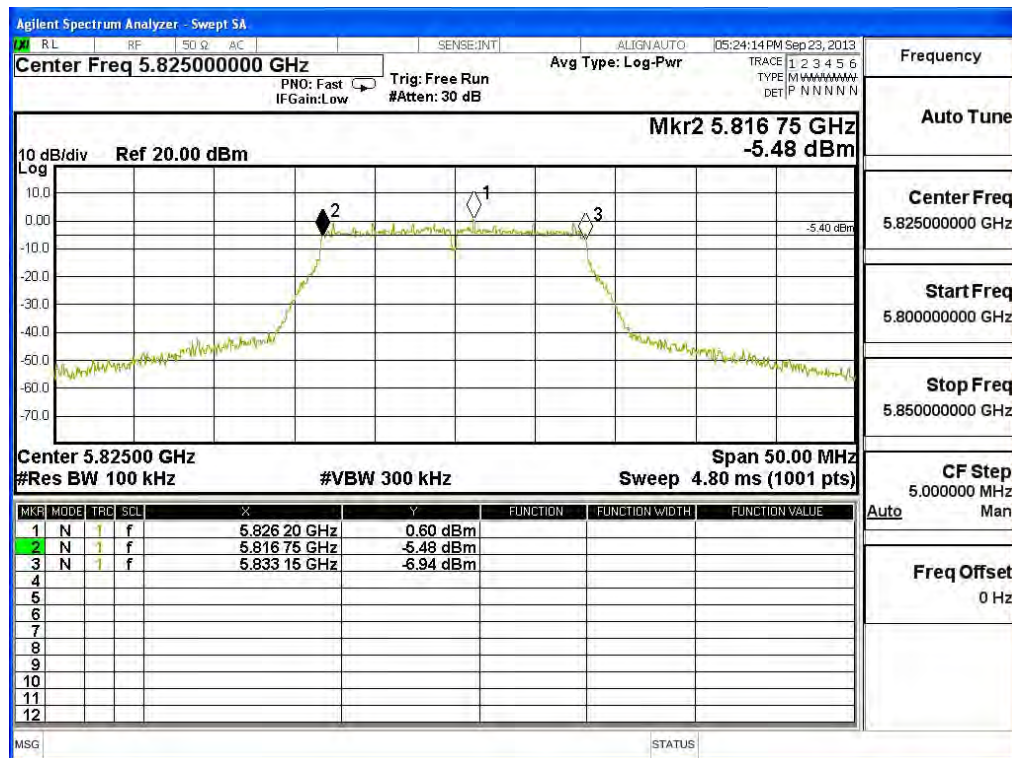
**Figure Channel 157:**



Product : WiFi module  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5825MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
165	5825.00	16400	>500	Pass

Figure Channel 165:

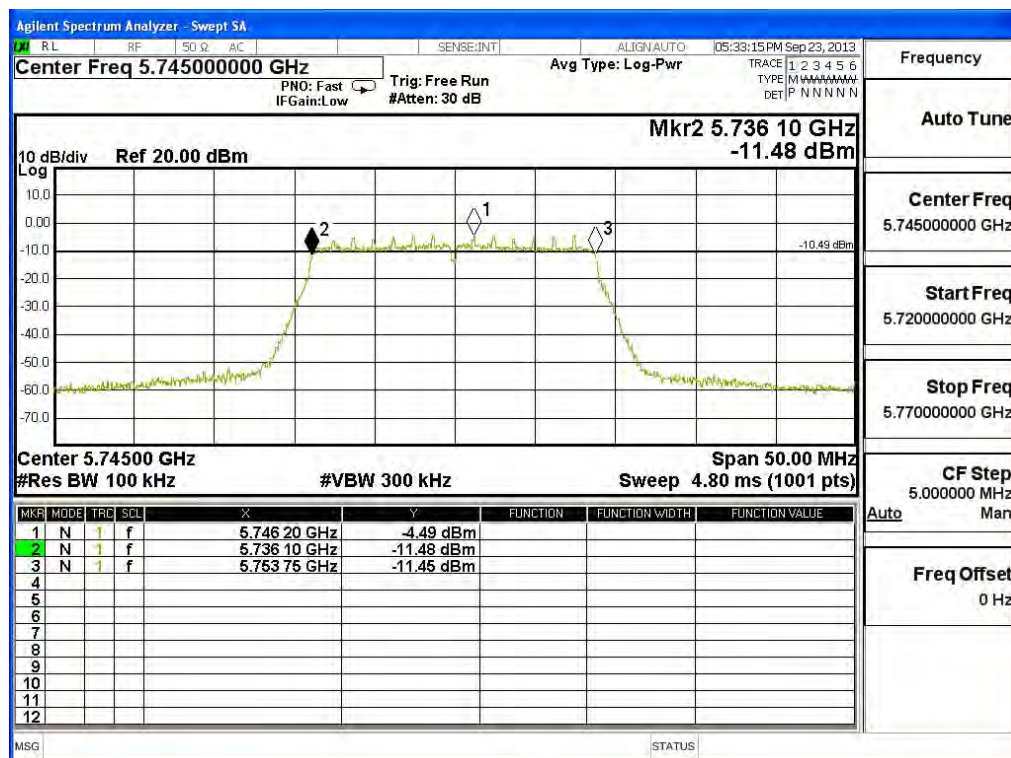




Product : WiFi module  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band) (5745MHz)

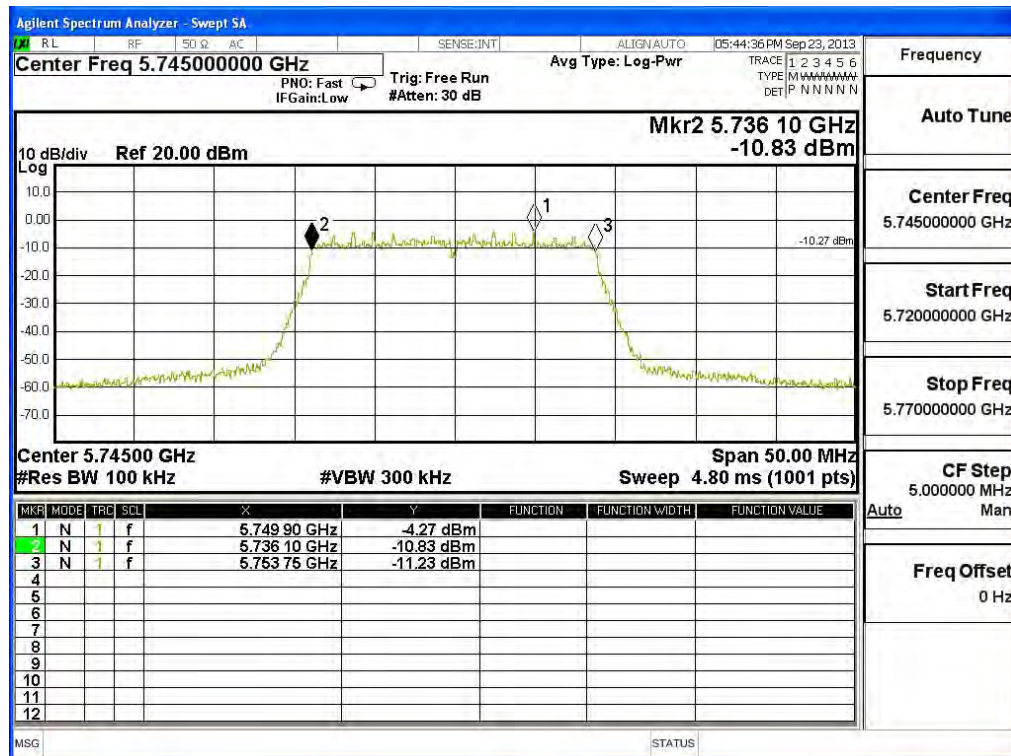
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745.00	17650	>500	Pass

Figure Channel 149: (Chain A)



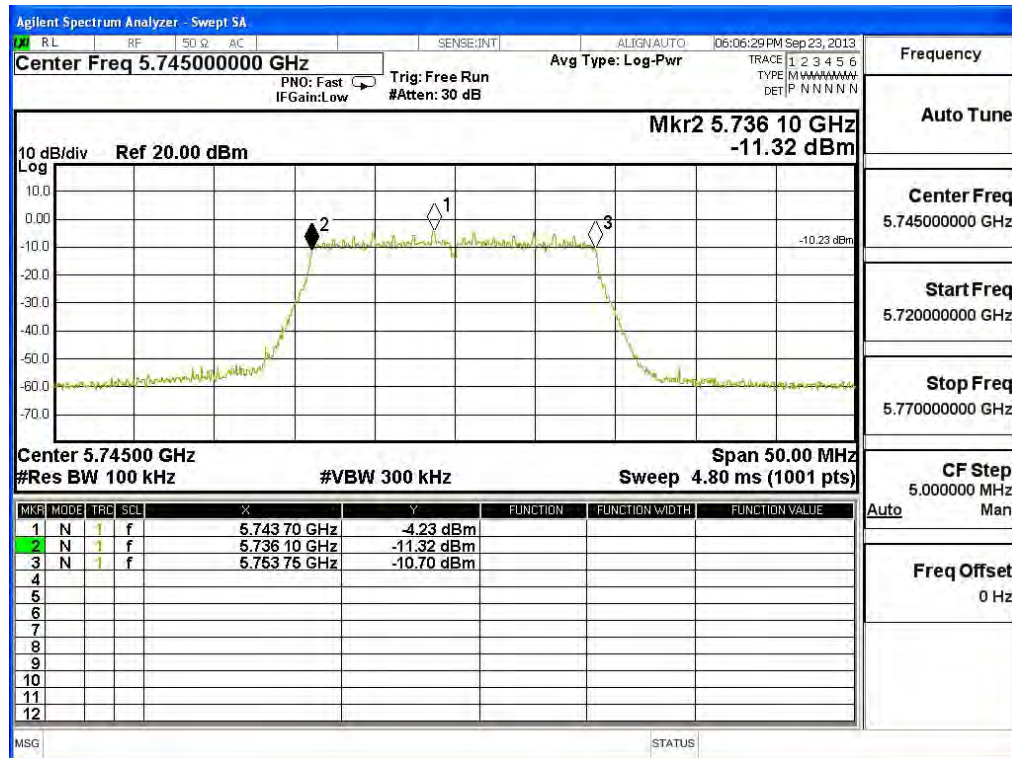
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745.00	17650	>500	Pass

Figure Channel 149: (Chain B)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745.00	17650	>500	Pass

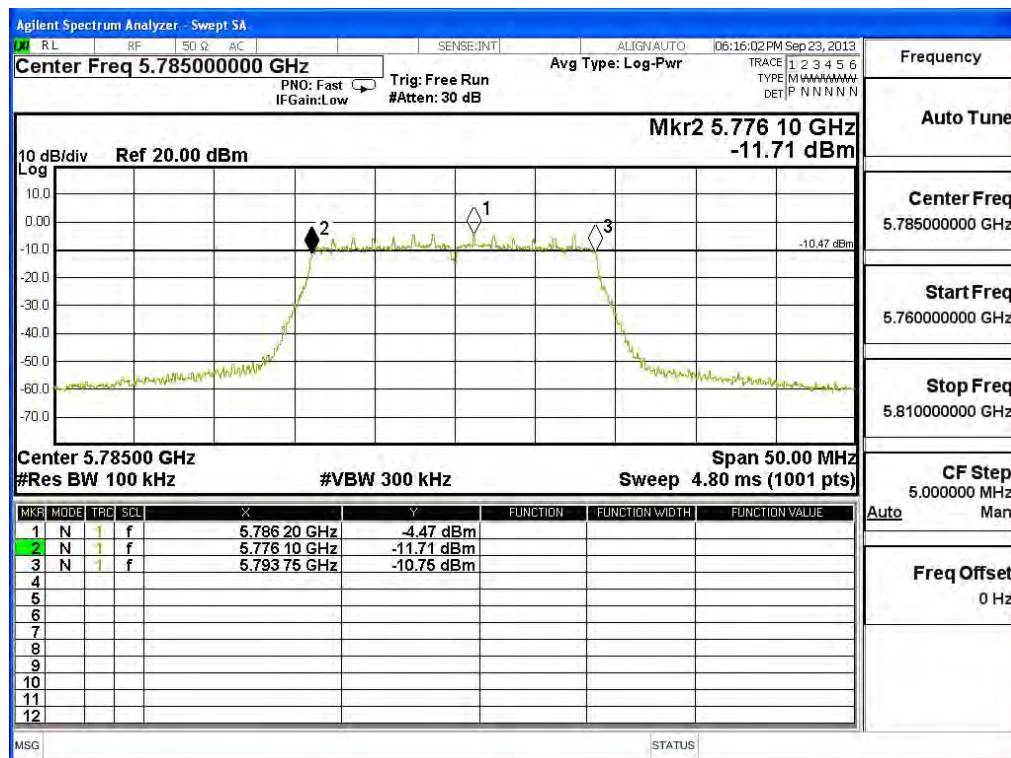
**Figure Channel 149: (Chain C)**



Product : WiFi module  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band) (5785MHz)

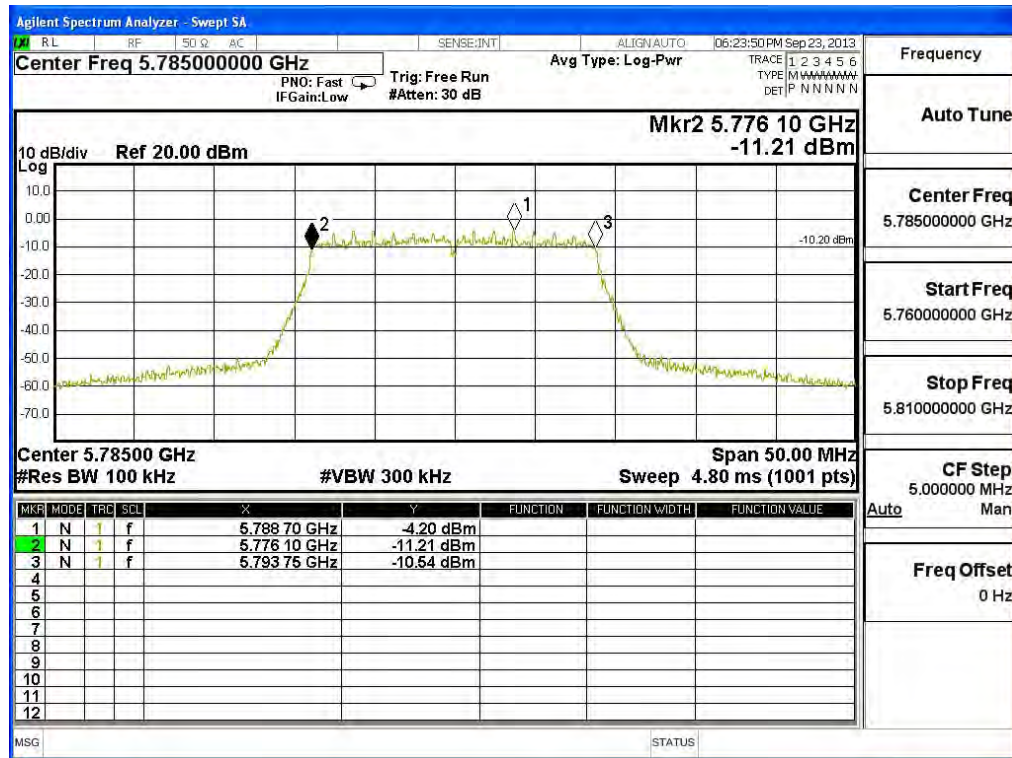
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
157	5785.00	17650	>500	Pass

**Figure Channel 157: (Chain A)**



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
157	5785.00	17650	>500	Pass

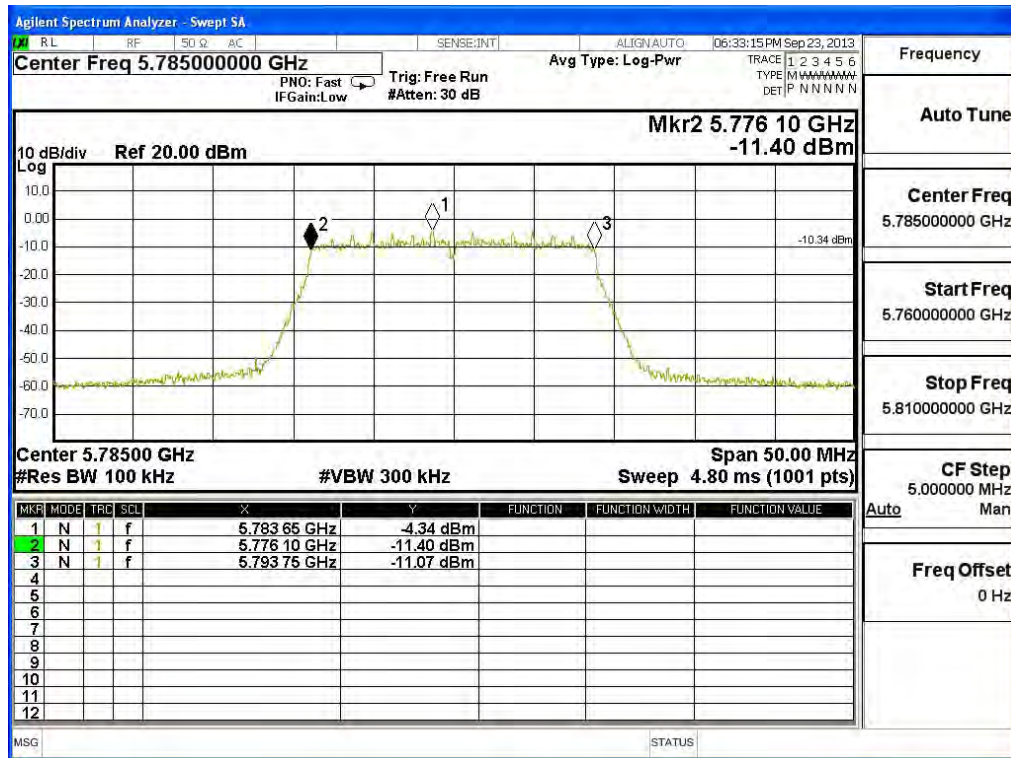
Figure Channel 157: (Chain B)





Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
157	5785.00	17650	>500	Pass

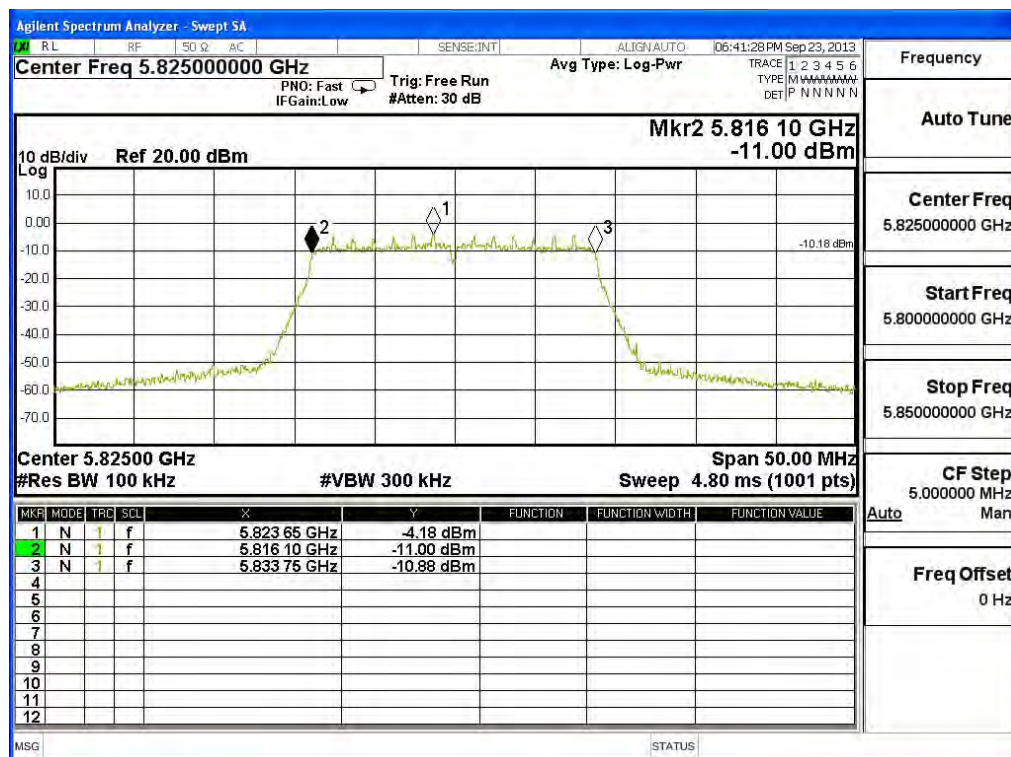
Figure Channel 157: (Chain C)



Product : WiFi module  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band) (5825MHz)

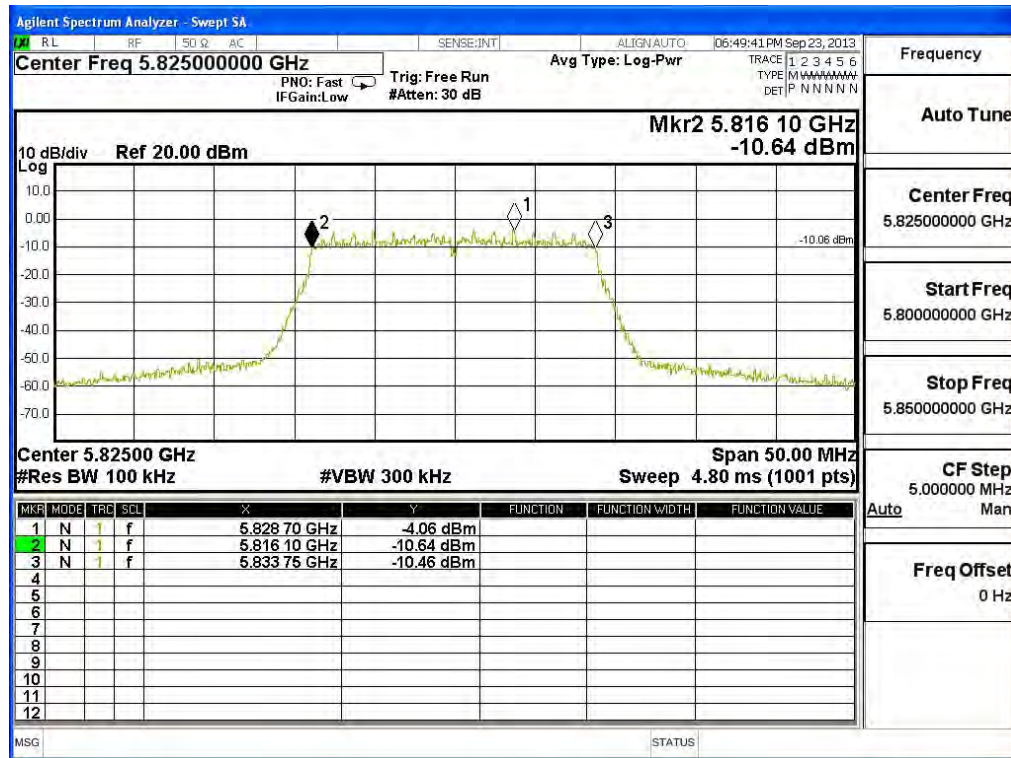
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
165	5825.00	17650	>500	Pass

**Figure Channel 165: (Chain A)**



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
165	5825.00	17650	>500	Pass

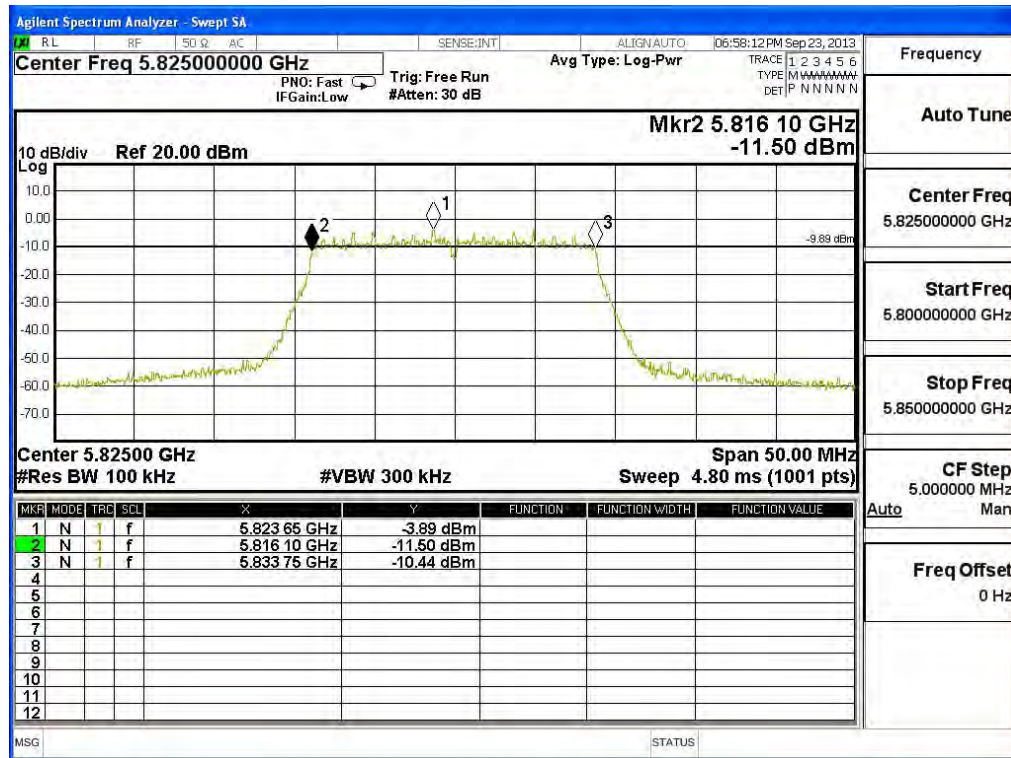
Figure Channel 165: (Chain B)





Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
165	5825.00	17650	>500	Pass

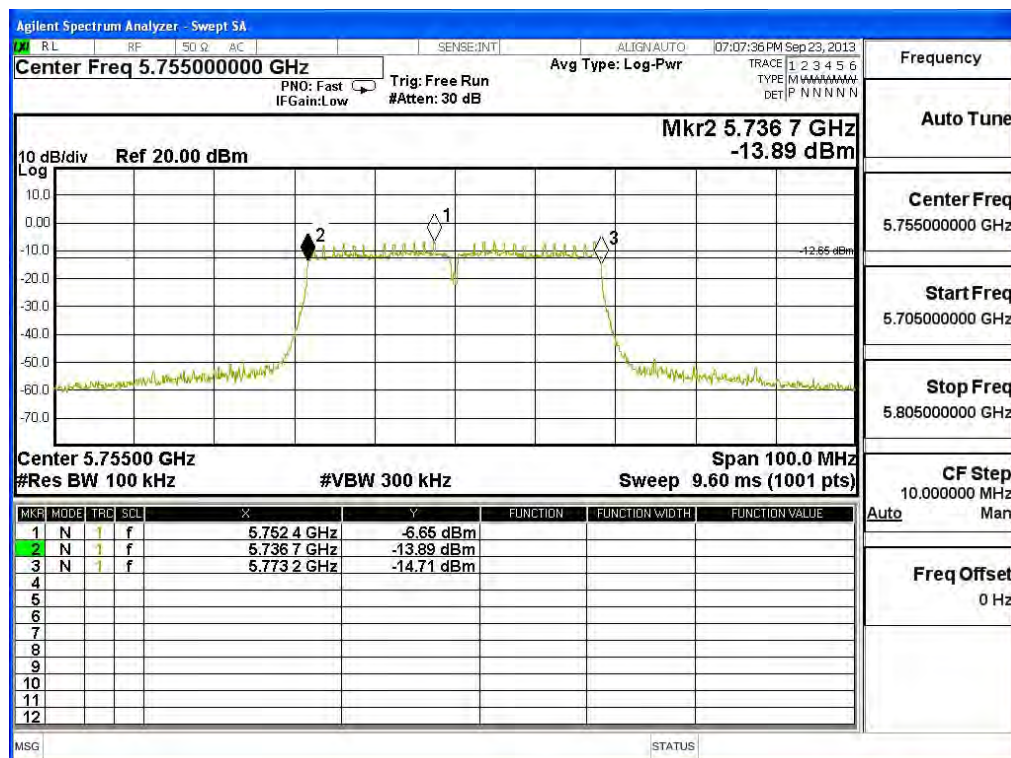
**Figure Channel 165: (Chain C)**



Product : WiFi module  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band) (5755MHz)

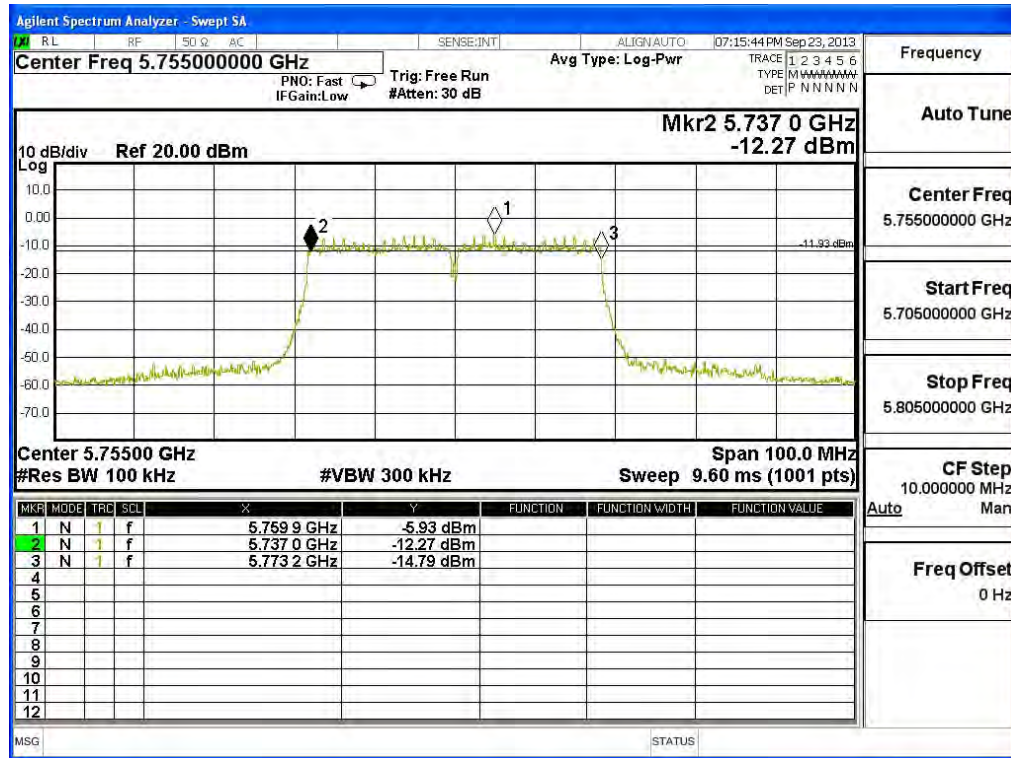
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
151	5755.00	36500	>500	Pass

**Figure Channel 151: (Chain A)**



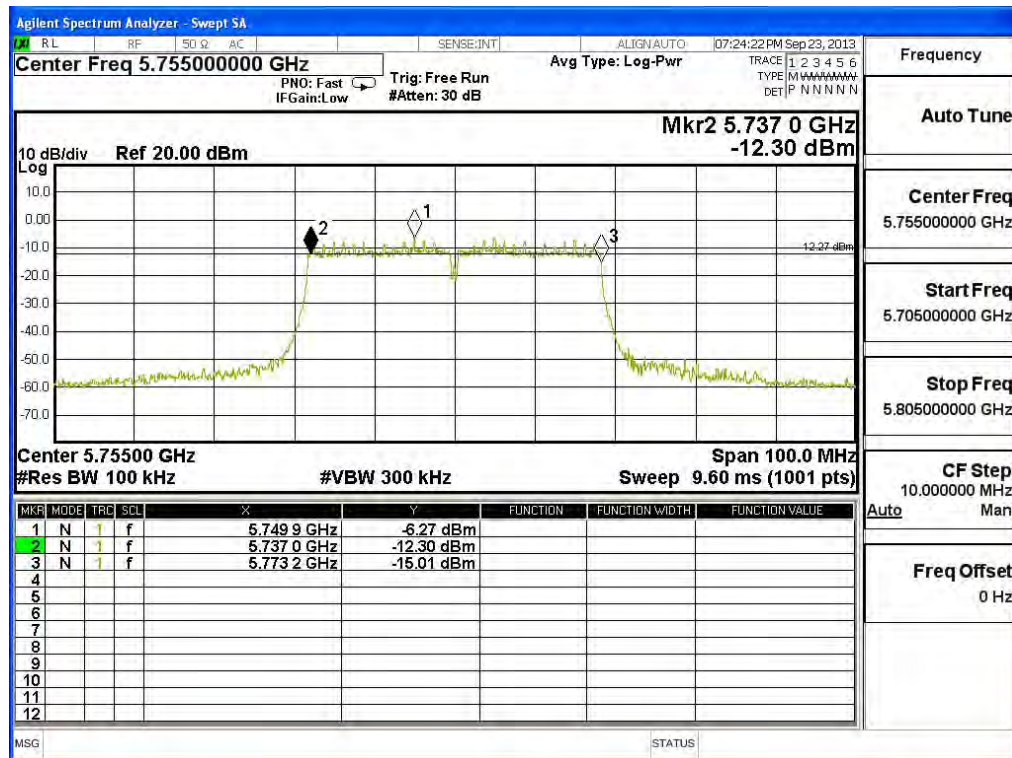
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
151	5755.00	36200	>500	Pass

**Figure Channel 151: (Chain B)**



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
151	5755.00	36200	>500	Pass

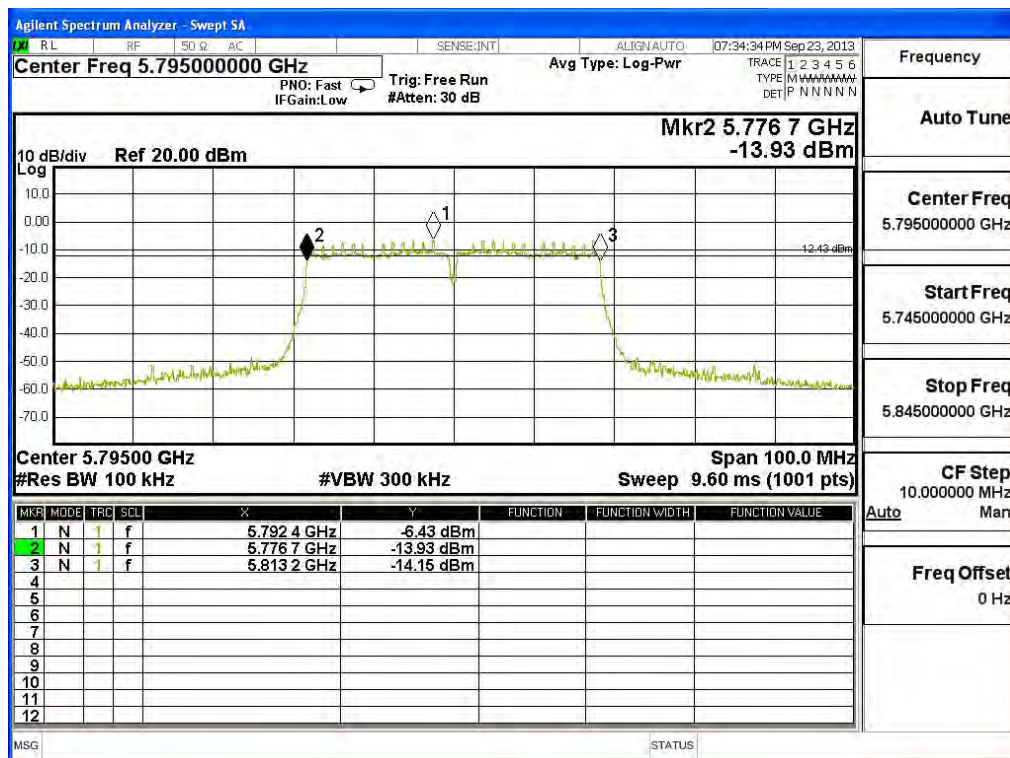
**Figure Channel 151: (Chain C)**



Product : WiFi module  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band) (5795MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
159	5795.00	36500	>500	Pass

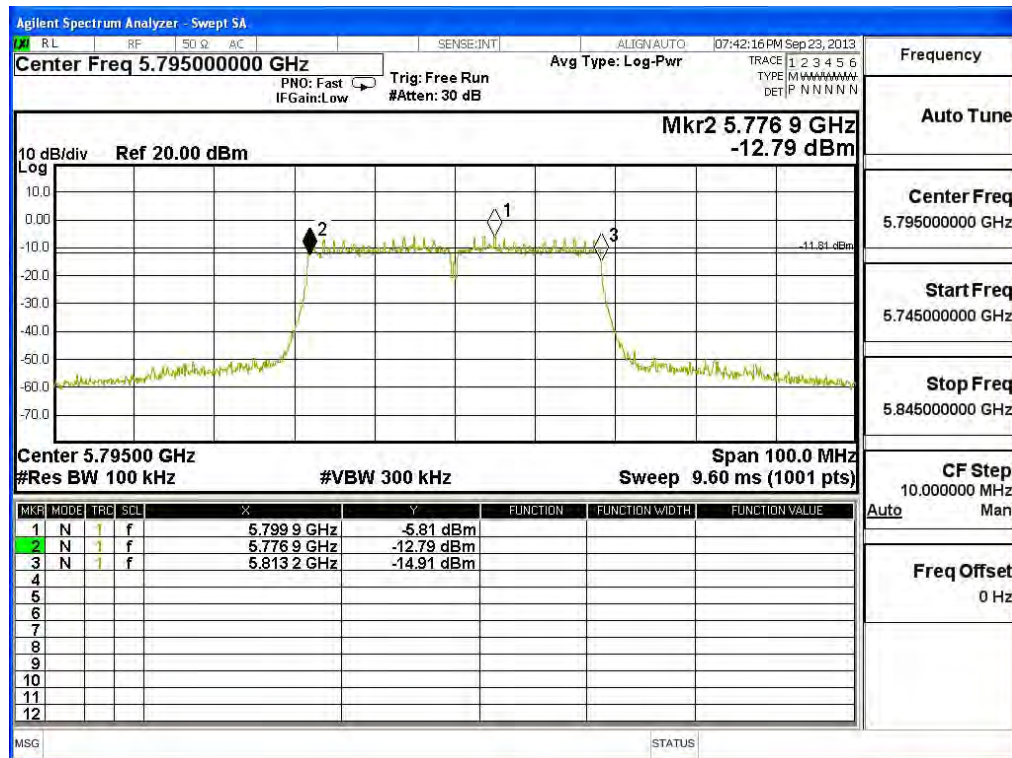
Figure Channel 159: (Chain A)



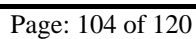


Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
159	5795.00	36300	>500	Pass

Figure Channel 159: (Chain B)



**Figure Channel 159: (Chain C)**



## 8. Power Density

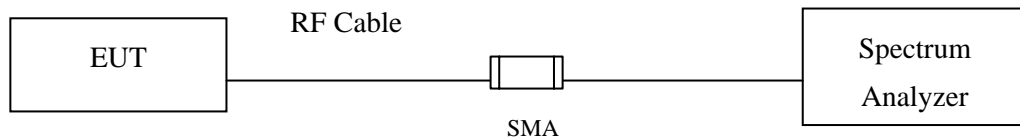
### 8.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2013
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

### 8.2. Test Setup



### 8.3. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

### 8.4. Test Procedure

The EUT was setup according to ANSI C63.10, 2009; tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

The maximum power spectral density using KDB 558074 section 10.2 PKPSD (peak PSD) method.

### 8.5. Uncertainty

± 1.27 dB

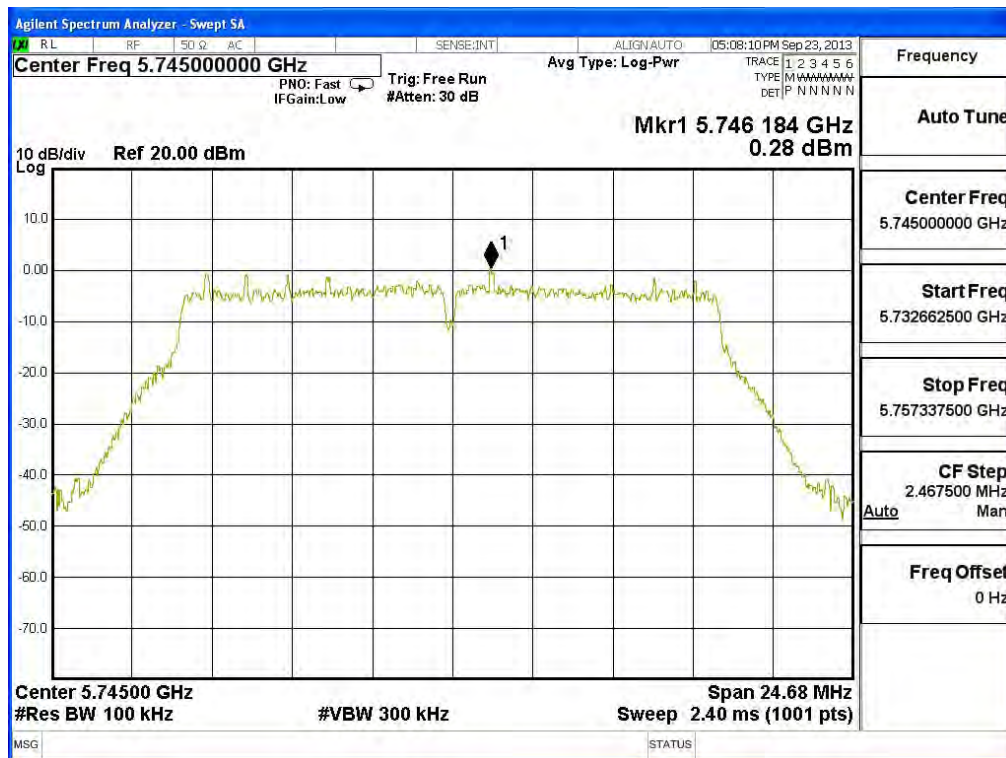


## 8.6. Test Result of Power Density

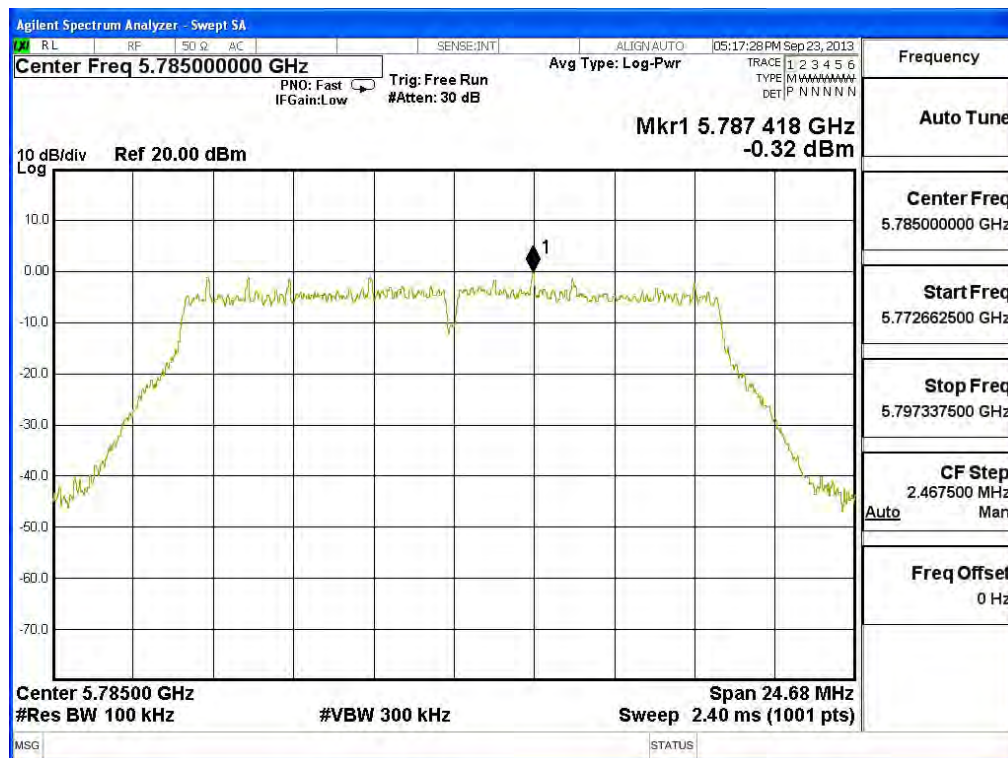
Product : WiFi module  
 Test Item : Power Density Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5745MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
149	5745.000	0.28	< 8dBm	Pass
157	5785.000	-0.32	< 8dBm	Pass
165	5825.000	0.45	< 8dBm	Pass

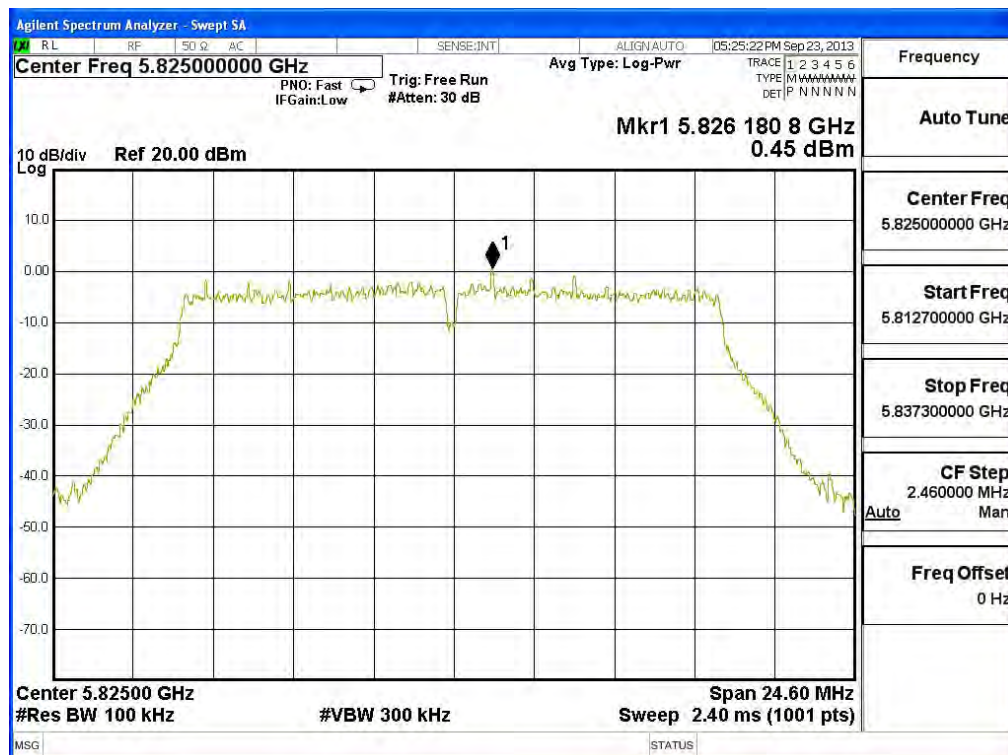
**Figure Channel 149:**



**Figure Channel 157:**



**Figure Channel 165:**



Product : WiFi module  
 Test Item : Power Density Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band) (5745MHz)

Channel No.	Frequency (MHz)	Chain (dBm)	PPSD/MHz (dBm)	Total PPSP/MHz (dBm)	Limit (dBm)	Result
149	5745	A	-4.310	0.460	< 8dBm	Pass
		B	-4.230	0.540	< 8dBm	Pass
		C	-4.260	0.510	< 8dBm	Pass

Note 1: The quantity  $10 \cdot \log 3$  (three antennas) is added to the spectrum peak value according to document 662911 D01.

Figure Channel 149: (Chain A)

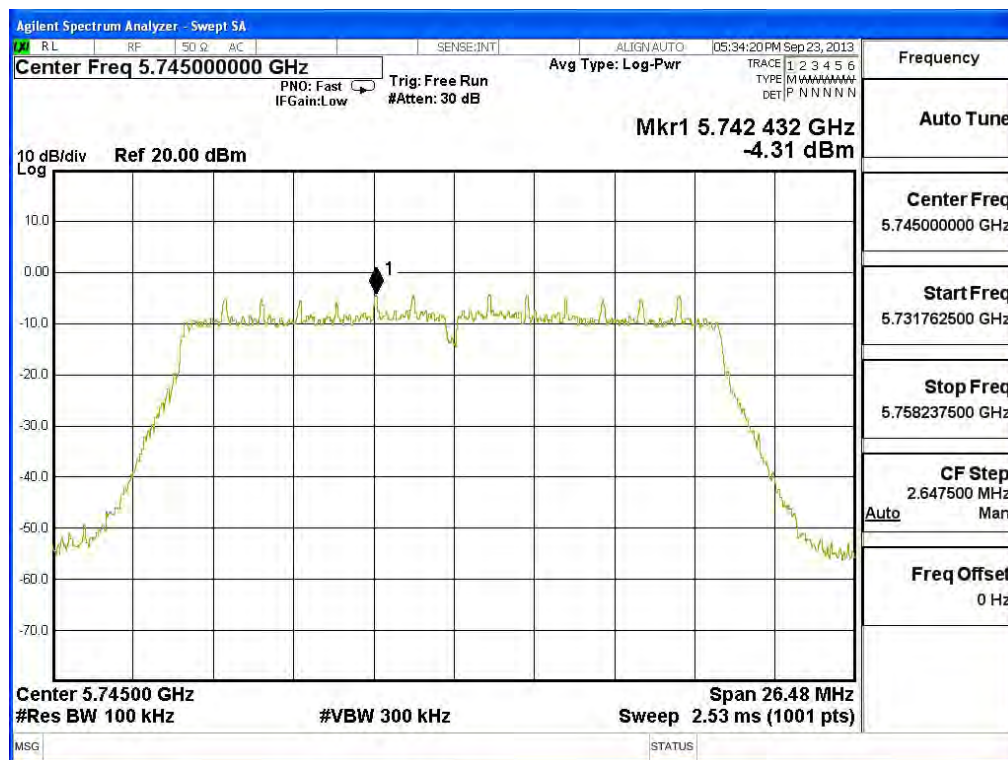


Figure Channel 149: (Chain B)

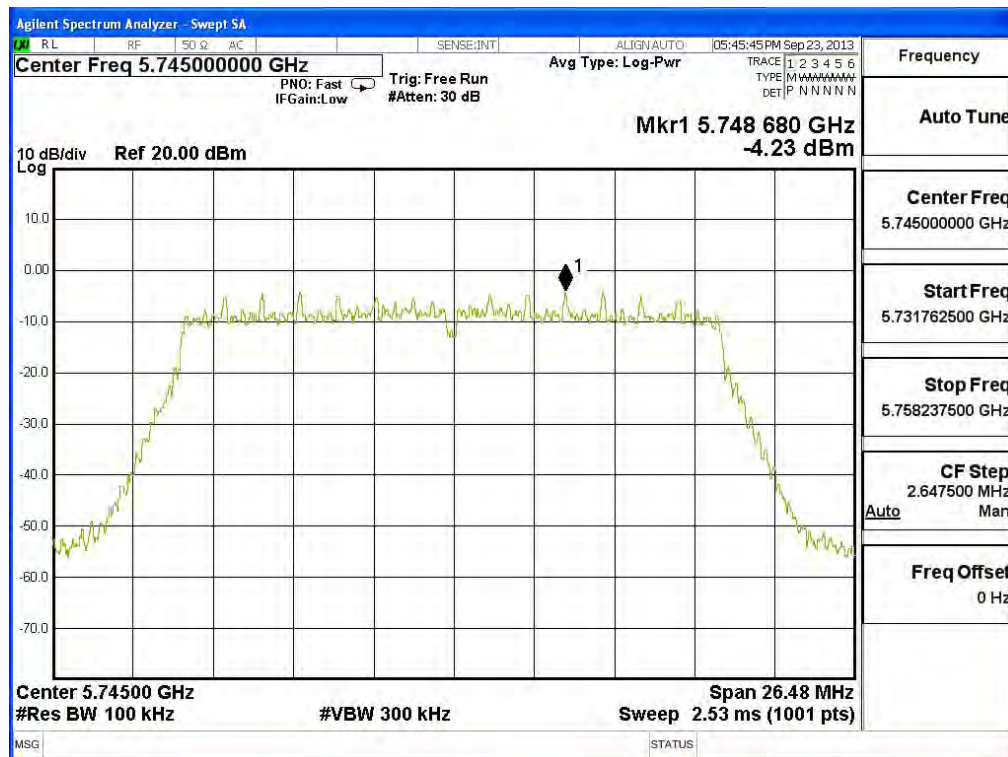
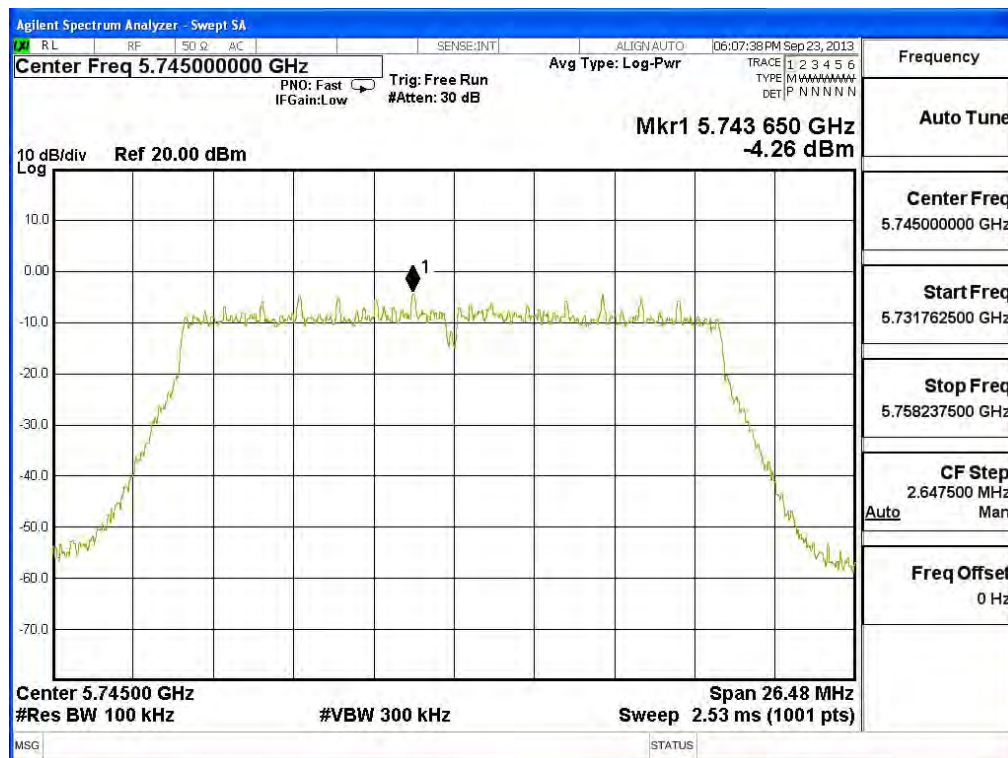


Figure Channel 149: (Chain C)



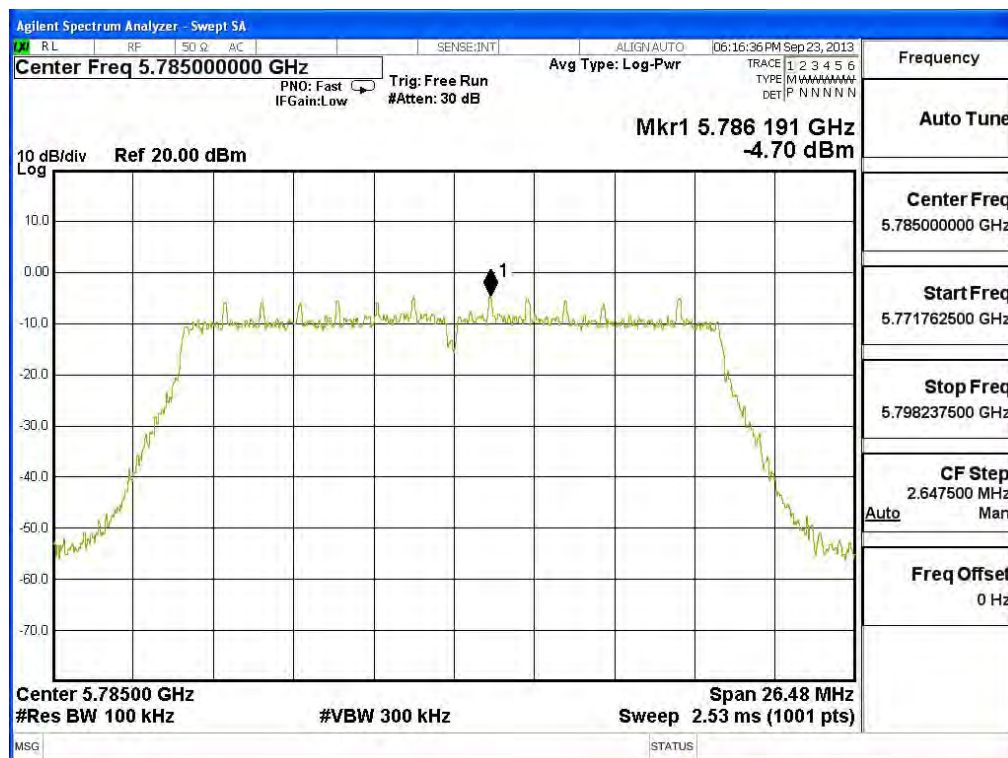


Product : WiFi module  
 Test Item : Power Density Data  
 Test Site : No.3OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band) (5785MHz)

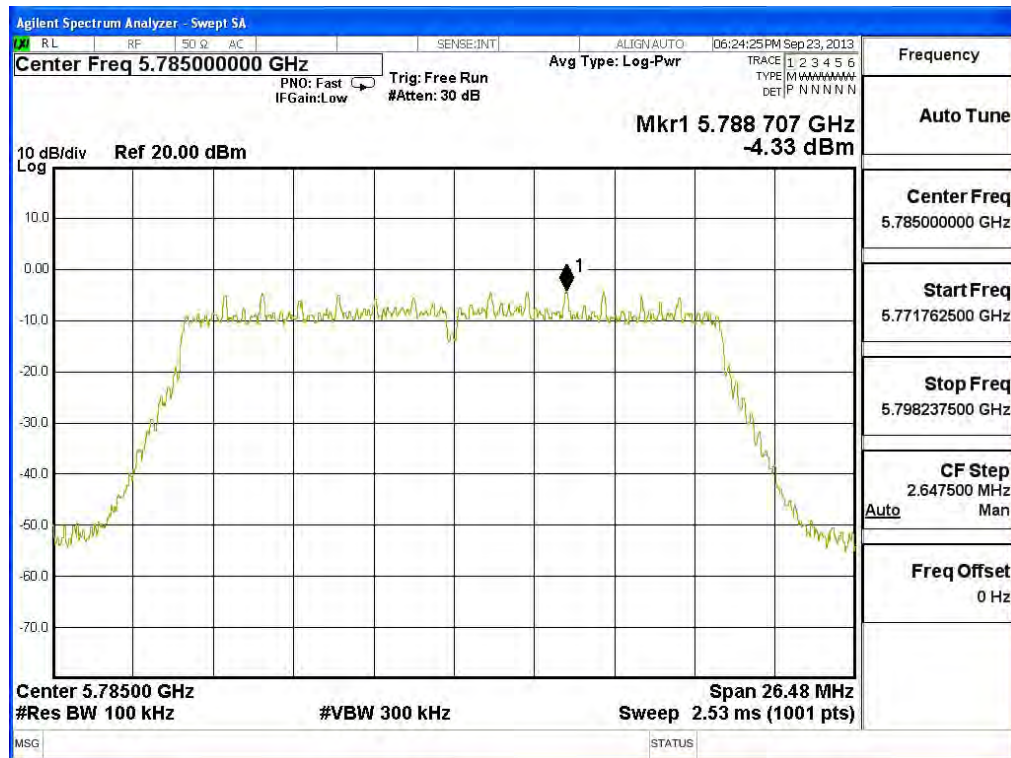
Channel No.	Frequency (MHz)	Chain (dBm)	PPSD/MHz (dBm)	Total PPSD/MHz (dBm)	Limit (dBm)	Result
157	5785	A	-4.700	0.070	< 8dBm	Pass
		B	-4.340	0.430	< 8dBm	Pass
		C	-4.310	0.460	< 8dBm	Pass

Note 1: The quantity  $10 \cdot \log 3$  (three antennas) is added to the spectrum peak value according to document 662911 D01.

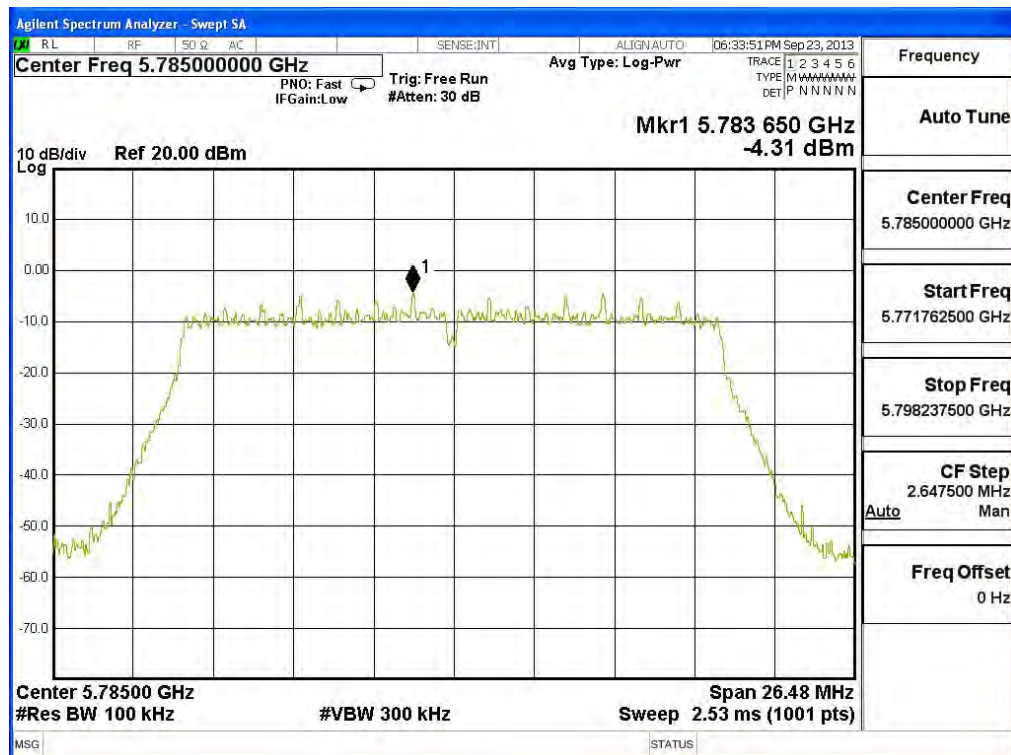
**Figure Channel 157: (Chain A)**



**Figure Channel 157: (Chain B)**



**Figure Channel 157: (Chain C)**



Product : WiFi module  
 Test Item : Power Density Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 4: Transmit - 802.11n-20BW\_21.7Mbps(5G Band) (5825MHz)

Channel No.	Frequency (MHz)	Chain (dBm)	PPSD/MHz (dBm)	Total PPSD/MHz (dBm)	Limit (dBm)	Result
165	5825	A	-4.150	0.620	< 8dBm	Pass
		B	-4.050	0.720	< 8dBm	Pass
		C	-4.210	0.560	< 8dBm	Pass

Note 1: The quantity  $10 \cdot \log 3$  (three antennas) is added to the spectrum peak value according to document 662911 D01.

Figure Channel 165: (Chain A)

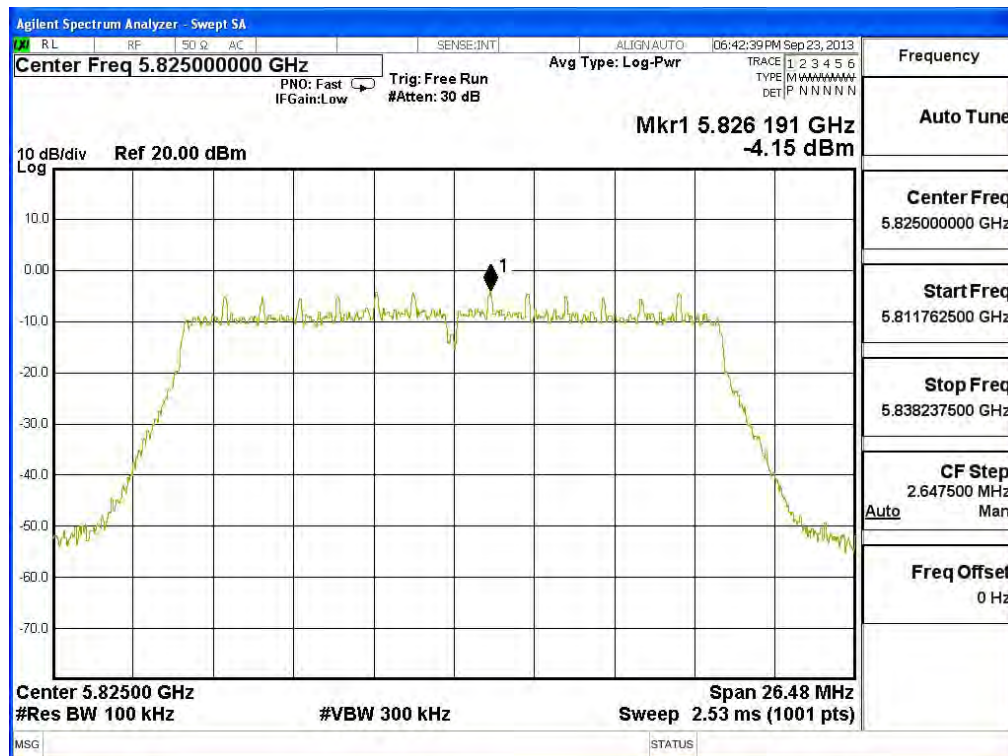


Figure Channel 165: (Chain B)

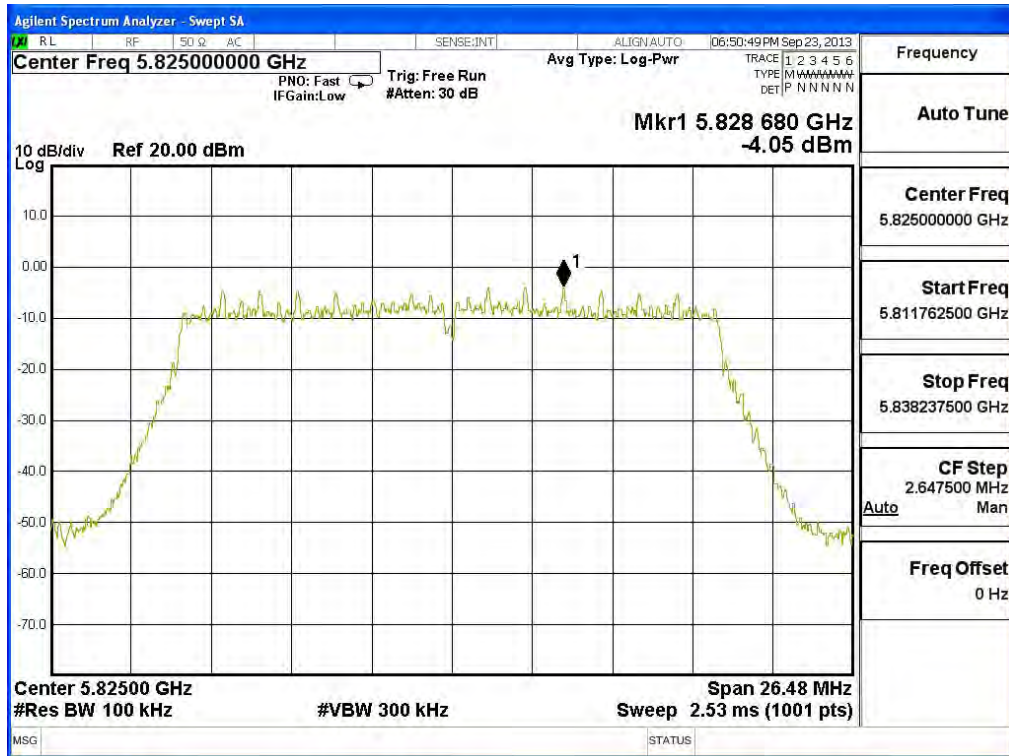
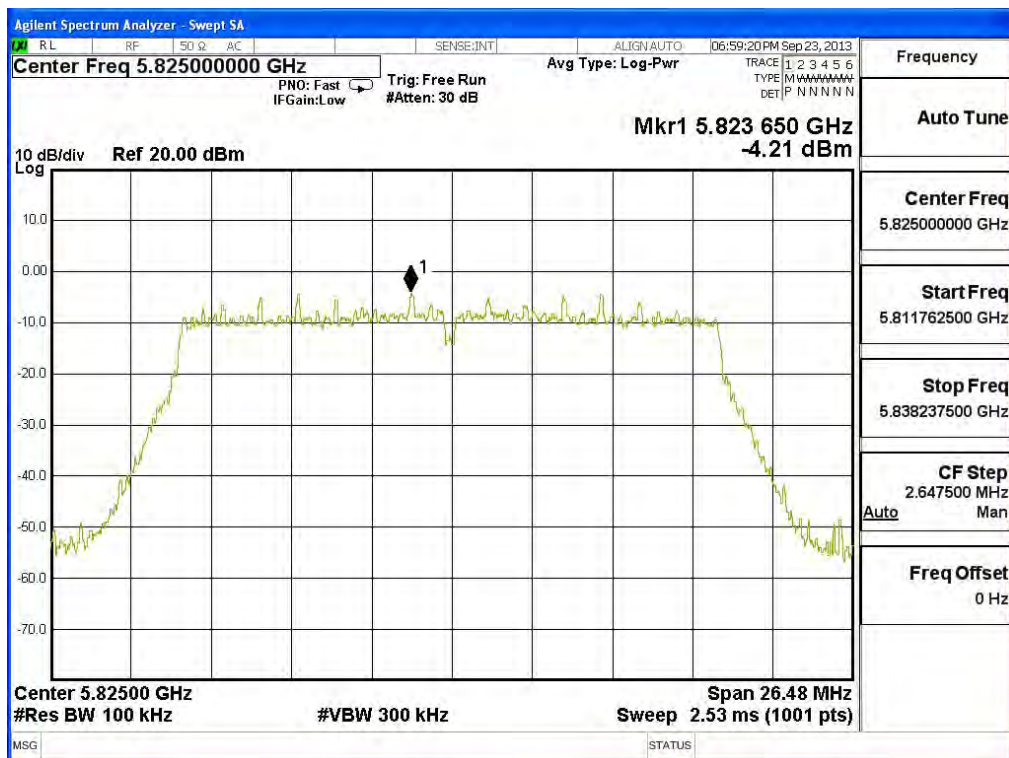


Figure Channel 165: (Chain C)





Product : WiFi module  
 Test Item : Power Density Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 5: Transmit - 802.11n-40BW\_45Mbps(5G Band) (5755MHz)

Channel No.	Frequency (MHz)	Chain (dBm)	PPSD/MHz (dBm)	Total PPSP/MHz (dBm)	Limit (dBm)	Result
151	5755	A	-7.010	-2.240	< 8dBm	Pass
		B	-5.820	-1.050	< 8dBm	Pass
		C	-6.350	-1.580	< 8dBm	Pass

Note 1: The quantity  $10 \cdot \log 3$  (three antennas) is added to the spectrum peak value according to document 662911 D01.

**Figure Channel 151: (Chain A)**

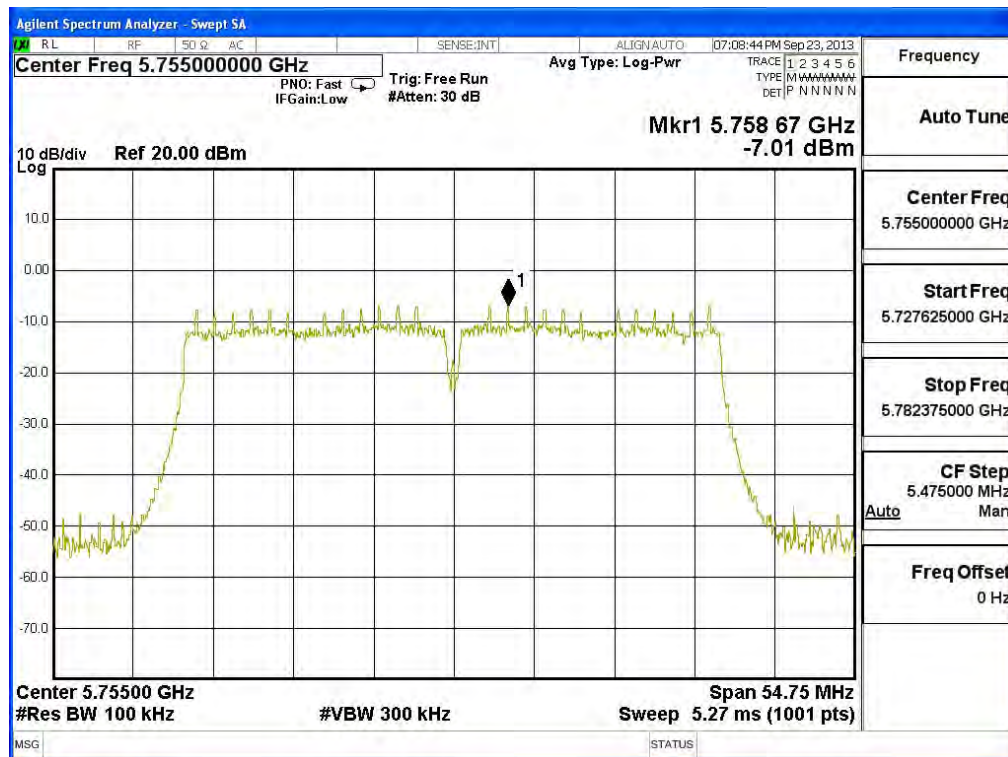


Figure Channel 151: (Chain B)

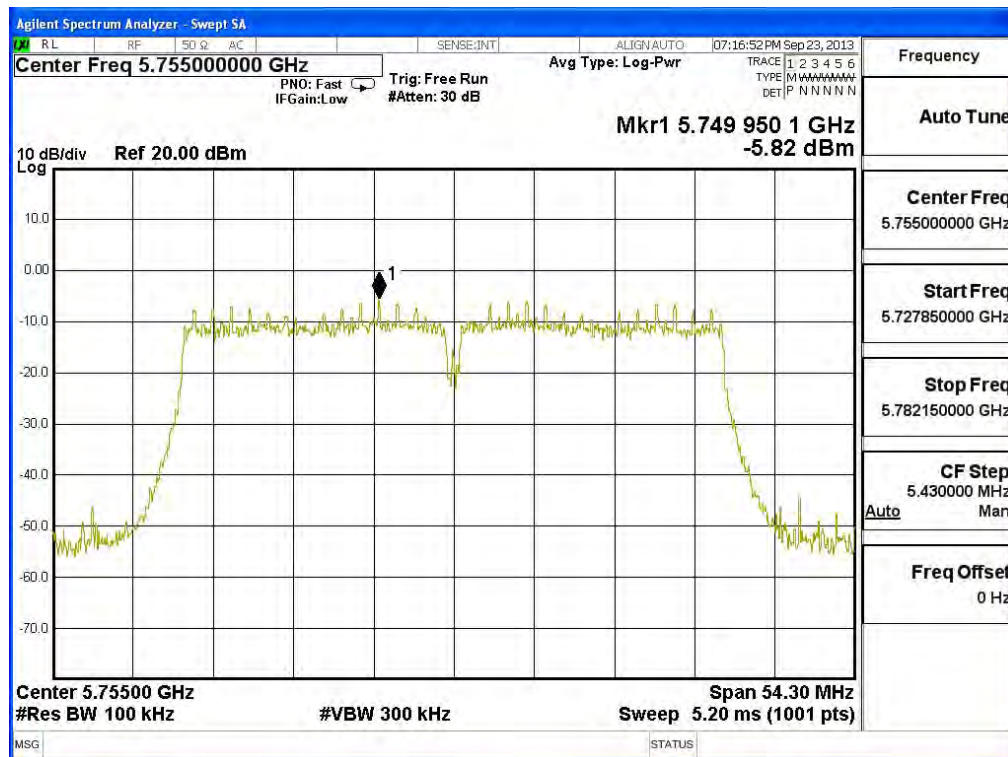


Figure Channel 151: (Chain C)



Channel No.	Frequency (MHz)	Chain (dBm)	PPSD/MHz (dBm)	Total PPSD/MHz (dBm)	Limit (dBm)	Result
159	5795	A	-6.530	-1.760	< 8dBm	Pass
		B	-5.830	-1.060	< 8dBm	Pass
		C	-5.980	-1.210	< 8dBm	Pass

**Figure Channel 159: (Chain A)**

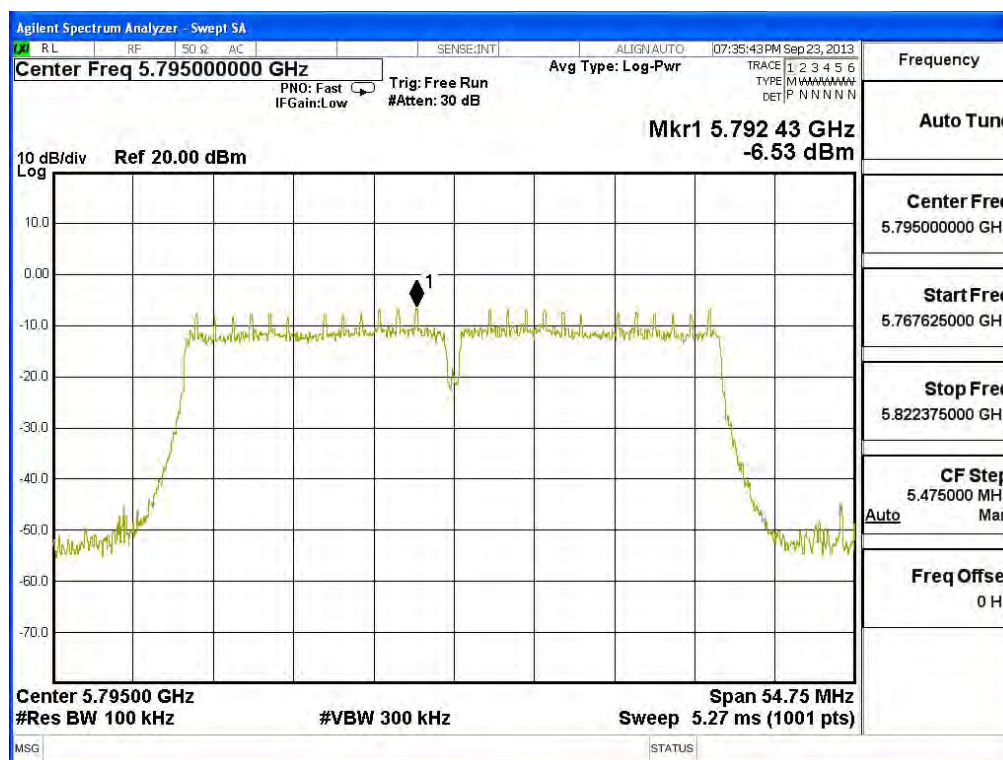


Figure Channel 159: (Chain B)

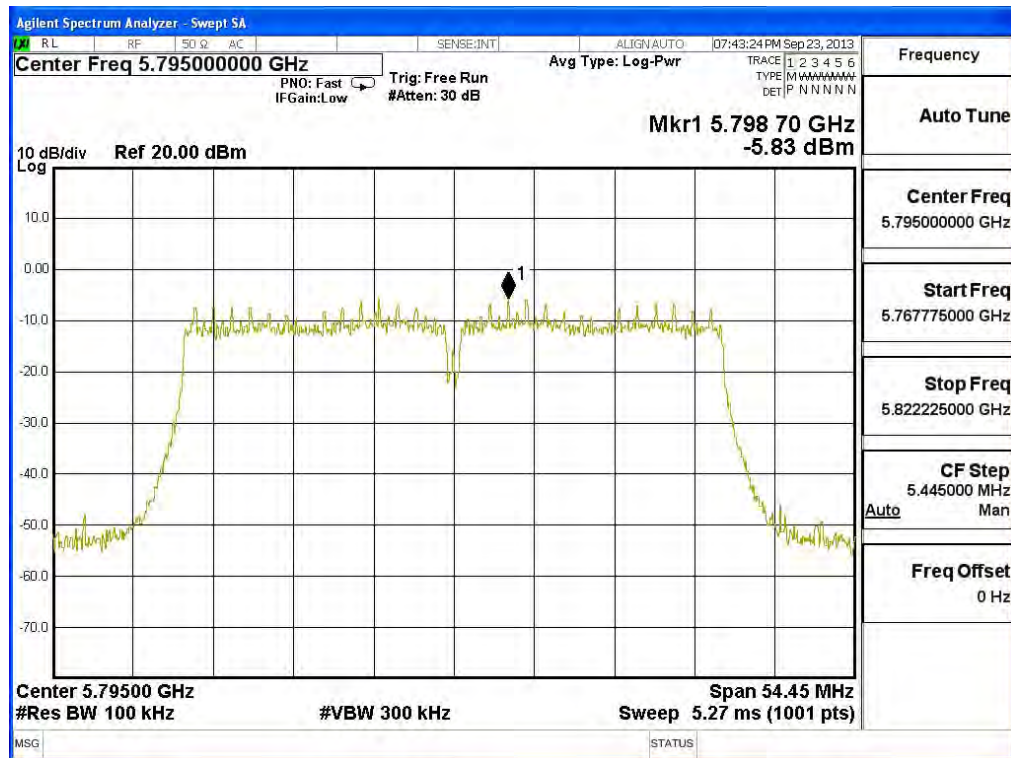
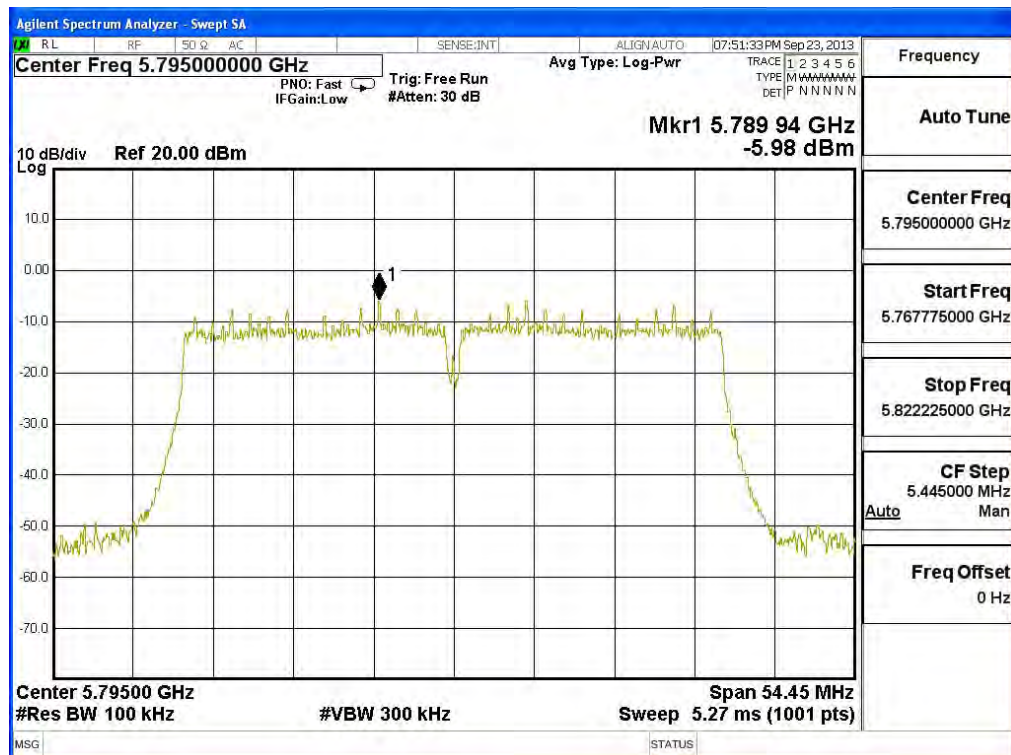


Figure Channel 159: (Chain C)



## **9. EMI Reduction Method During Compliance Testing**

No modification was made during testing.