

## FCC - TEST REPORT

Report Number : **68.950.23.0862.01** Date of Issue: **2023-11-03**

Model : **DG-WF-H**

Product Type : **WLAN Dongle**

Applicant : **Anker Innovations Limited**

Address : **Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok**  
**Kowloon, HONG KONG**

Manufacturer : **Anker Innovations Limited**

Address : **Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok**  
**Kowloon, HONG KONG**

Test Result :  **Positive**     **Negative**

Total pages including Appendices : **70**

*Any use for advertising purposes must be granted in writing. This technical report may only be quoted in full. This report is the result of a single examination of the object in question and is not generally applicable evaluation of the quality of other products in regular production. For further details, please see testing and certification regulation, chapter A-3.4.*



# 1 Table of Contents

1	Table of Contents .....	2
2	Details about the Test Laboratory .....	3
3	Description of the Equipment Under Test .....	4
4	Summary of Test Standards .....	5
5	Summary of Test Results .....	6
6	General Remarks .....	7
7	Test Setups .....	8
8	Systems Test Configuration .....	9
9	Technical Requirement .....	10
9.1	Conducted Output Power .....	10
9.2	6dB Bandwidth .....	12
9.3	99% Occupied Bandwidth .....	19
9.4	Power Spectral Density .....	26
9.5	Spurious RF Conducted Emissions .....	33
9.6	Band Edge Testing .....	53
9.7	Spurious Radiated Emissions for Transmitter .....	58
10	Test Equipment List .....	68
11	System Measurement Uncertainty .....	70

## 2 Details about the Test Laboratory

### Details about the Test Laboratory

#### Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch  
Building 12 & 13, Zhiheng Wisdomland Business Park, Guankou Erlu,  
Nantou, Nanshan District,  
Shenzhen, Guangdong, China

Telephone: 86 755 8828 6998

Fax: 86 755 8828 5299

FCC Registration No.: 514049

FCC Designation Number: CN5009

### 3 Description of the Equipment Under Test

Product: WLAN Dongle

Model no.: DG-WF-H

FCC ID: 2AOKB-DGWFH

Rating: 8VDC, 0.3A

RF Transmission Frequency: 2412MHz-2462MHz

No. of Operated Channel: 11

Modulation: DSSS, OFDM

Antenna Type: Internal antenna

Antenna Gain: Gain: 2.9dBi

Description of the EUT: The Equipment Under Test (EUT) is a WLAN Dongle which support Bluetooth Low Energy and 2.4GHz WIFI functions. This report only for 2.4GWiFi part.

NOTE 1: The above EUT's information is declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2021 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to KDB 558074 D01 15.247 Meas Guidance v05r02 Measurement Guidance and ANSI C63.10-2020.

## 5 Summary of Test Results

Technical Requirements			
FCC Part 15 Subpart C			
Test Condition		Test Site	Test Result
§15.207	Conducted emission AC power port	N/A	N/A
§15.247(b)(3)	Conducted peak output power	Site 1	Pass
§15.247(e)	Power spectral density	Site 1	Pass
§15.247(a)(2)	6dB bandwidth and 99% Occupied Bandwidth	Site 1	Pass
§15.247(d)	Spurious RF conducted emissions	Site 1	Pass
§15.247(d)	Band edge	Site 1	Pass
§15.247(d) & §15.209	Spurious radiated emissions for transmitter	Site 1	Pass
§15.203	Antenna requirement	See note 2	Pass

Note 1: N/A=Not Applicable.

Note 2: The EUT uses an internal antenna, which gain is 2.9dBi. In accordance to §15.203, it is considered sufficiently to comply with the provisions of this section.

## 6 General Remarks

### Remarks

This submittal(s) (test report) is intended for FCC ID: 2AOKB-DGWFH, complies with complies with Section 15.209, 15.247 of the FCC Part 15, Subpart C rules.

### SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: 2023-09-27

Testing Start Date: 2023-09-27

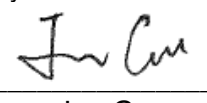
Testing End Date: 2023-11-02

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch

Reviewed by:

  
John Zhi  
Project Manager

Prepared by:

  
Joe Gu  
Project Engineer

Tested by:

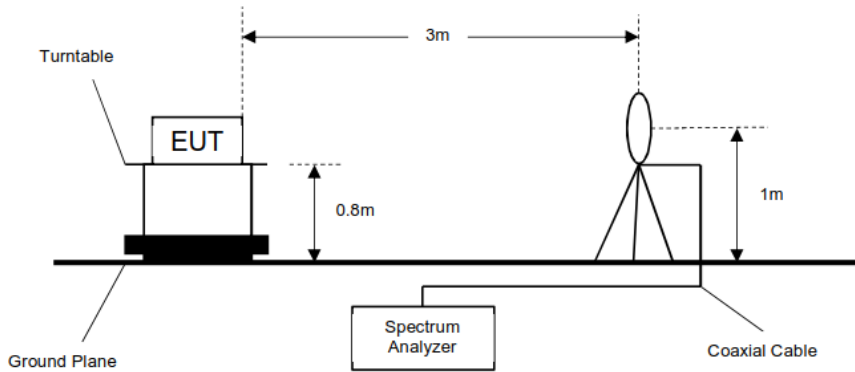
  
Carry Cai  
Test Engineer



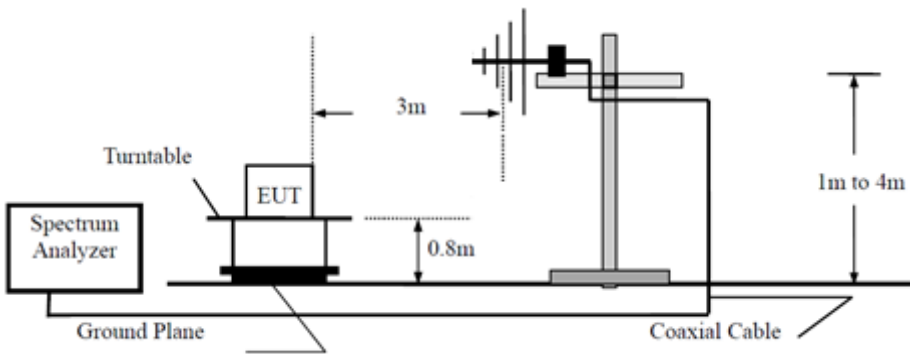
## 7 Test Setups

### 7.1 Radiated test setups

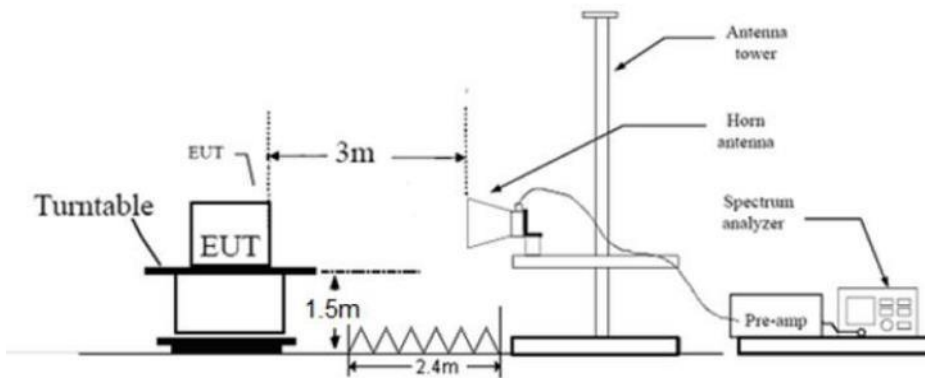
#### 9KHz - 30MHz



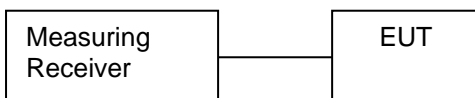
#### 30MHz - 1GHz



#### Above 1GHz



### 7.2 Conducted RF test setups





## 8 Systems Test Configuration

Auxiliary Equipment Used during Test:

Equipment	Brand	Model/Type No.	Series No.
LAPTOP	Lenove	ThinkPad T460s	---

Test Channel information:

Test Mode	Channel (MHz)		
802.11b	CH 1: 2412MHz	CH 6: 2437MHz	CH 11: 2462MHz
802.11g	CH 1: 2412MHz	CH 6: 2437MHz	CH 11: 2462MHz
802.11n HT20	CH 1: 2412MHz	CH 6: 2437MHz	CH 11: 2462MHz
802.11n HT40	CH 3: 2422MHz	CH 6: 2437MHz	CH 9: 2452MHz

## 9 Technical Requirement

### 9.1 Conducted Output Power

#### Test Method

1. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions are satisfied: The EUT is configured to transmit continuously or to transmit with a consistent duty cycle. At all times when the EUT is transmitting, it must be transmitting at its maximum power control level. The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
2. If the transmitter does not transmit continuously, measure the duty cycle,  $x$ , of the transmitter output signal as described in 12.2 in C63.10-2020.
3. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
4. Adjust the measurement in dBm by adding  $10 \log (1/x)$  where  $x$  is the duty cycle (e.g.,  $10 \log (1/0.25)$  if the duty cycle is 25%).

#### Limits

According to §15.247 (b) (1), conducted output power limit as below:

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	$\leq 1$	$\leq 30$

Test result as below table

802.11b\_SISO modulation Test Result

Frequency (MHz)	Conducted Output Power (dBm)	Result
Low channel 2412MHz	16.7	Pass
Middle channel 2437MHz	16.9	Pass
High channel 2462MHz	16.8	Pass

802.11g\_SISO modulation Test Result

Frequency (MHz)	Conducted Output Power (dBm)	Result
Low channel 2412MHz	16.1	Pass
Middle channel 2437MHz	16.4	Pass
High channel 2462MHz	16.3	Pass

802.11n20\_SISO modulation Test Result

Frequency (MHz)	Conducted Output Power (dBm)	Result
Low channel 2412MHz	16.2	Pass
Middle channel 2437MHz	16.3	Pass
High channel 2462MHz	16.3	Pass

802.11n40\_SISO modulation Test Result

Frequency (MHz)	Conducted Output Power (dBm)	Result
Low channel 2422MHz	16.0	Pass
Middle channel 2437MHz	16.2	Pass
High channel 2452MHz	16.1	Pass

## 9.2 6dB Bandwidth

### Test Method for 6 dB Bandwidth

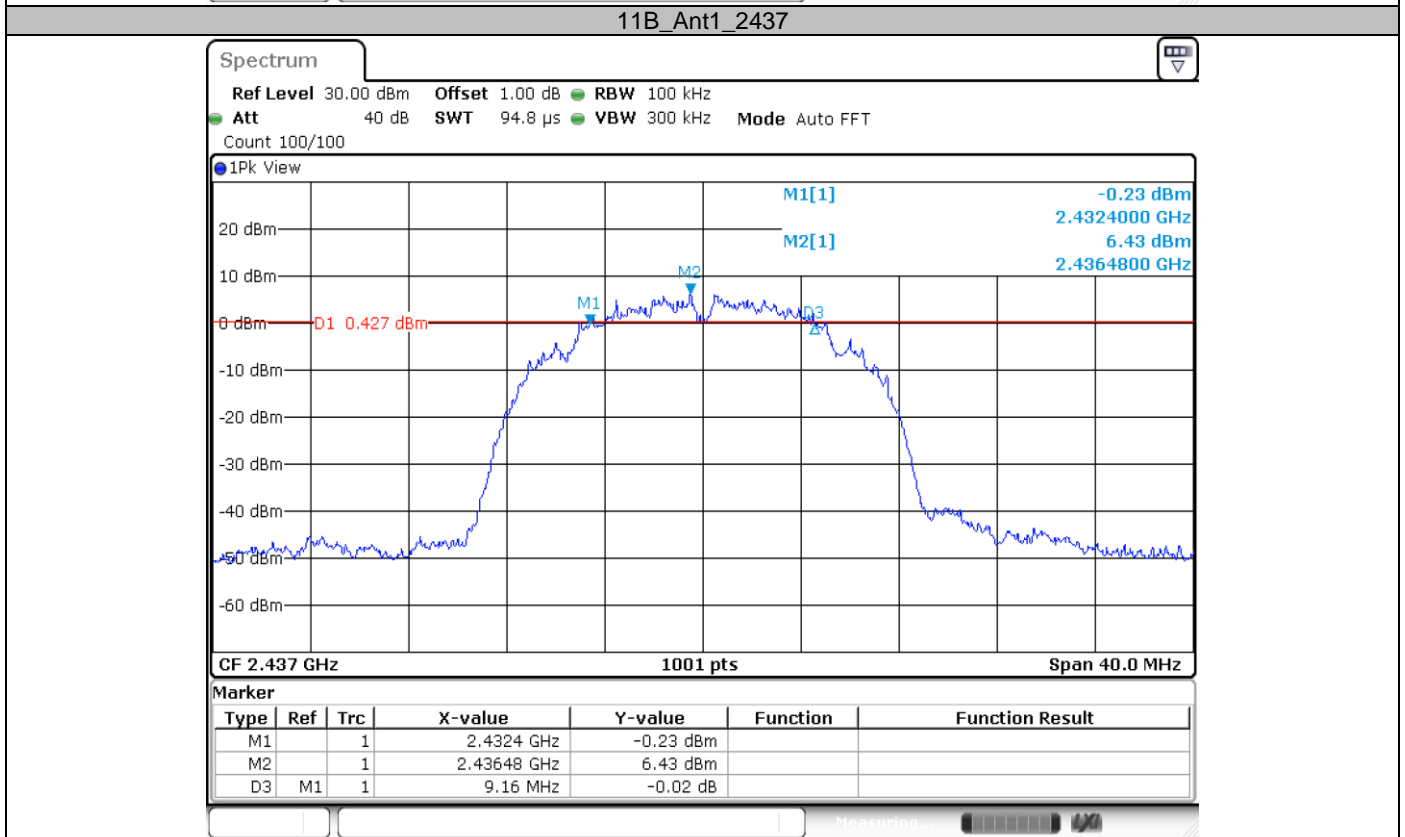
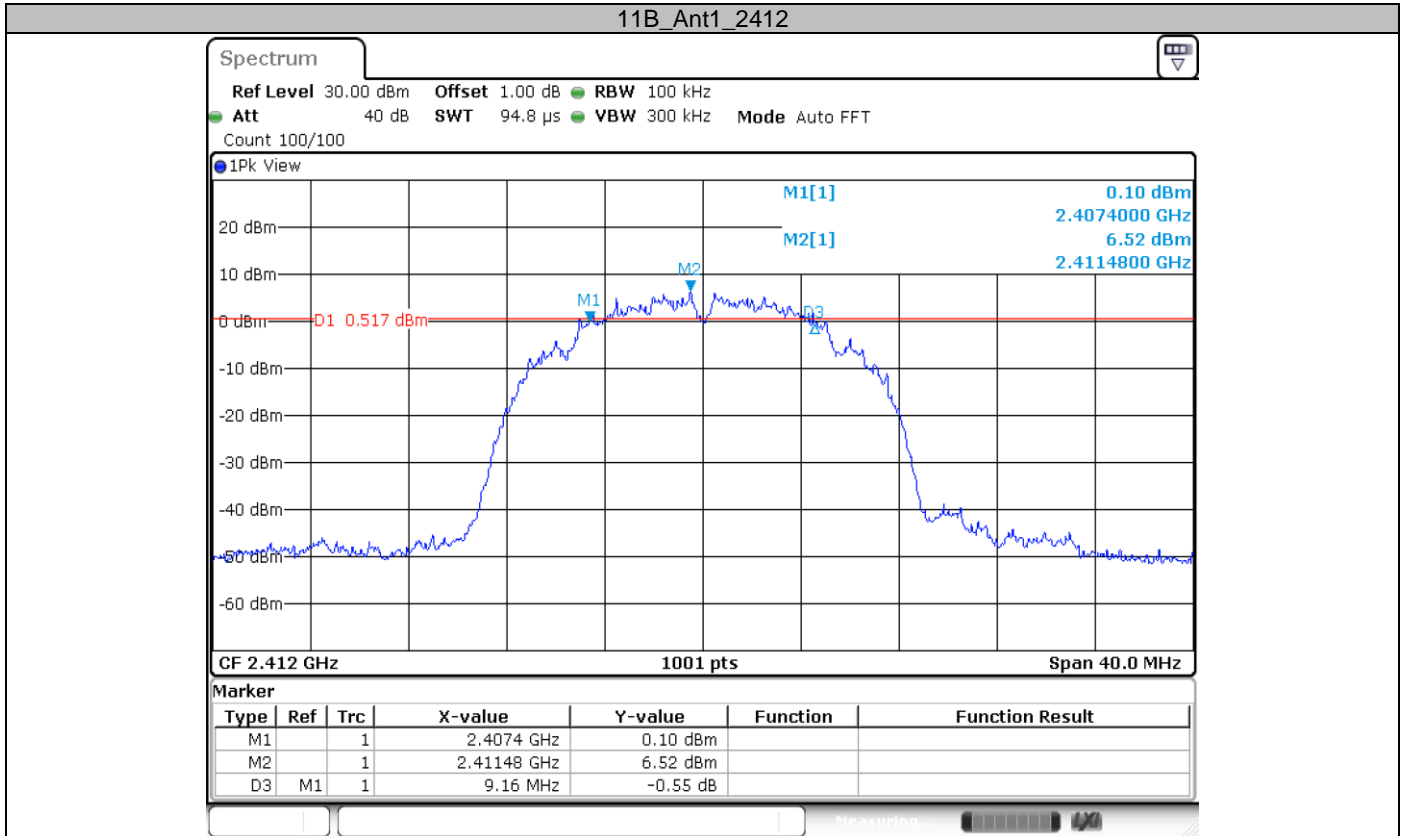
1. Set center frequency to the nominal EUT channel center frequency
2. Set RBW = 100KHz
3. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = Sweep = No faster than coupled (auto) time.
7. Allow the trace to stabilize.
8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
9. Record the results in the test report.

### Limit

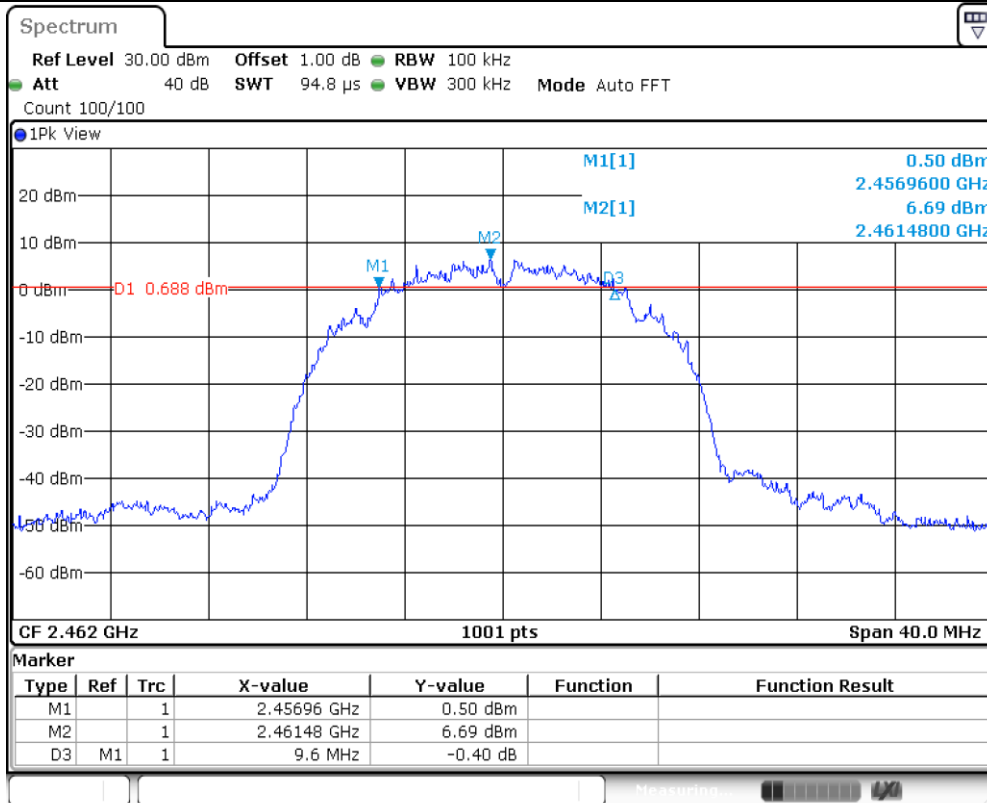
Limit [kHz]

≥500

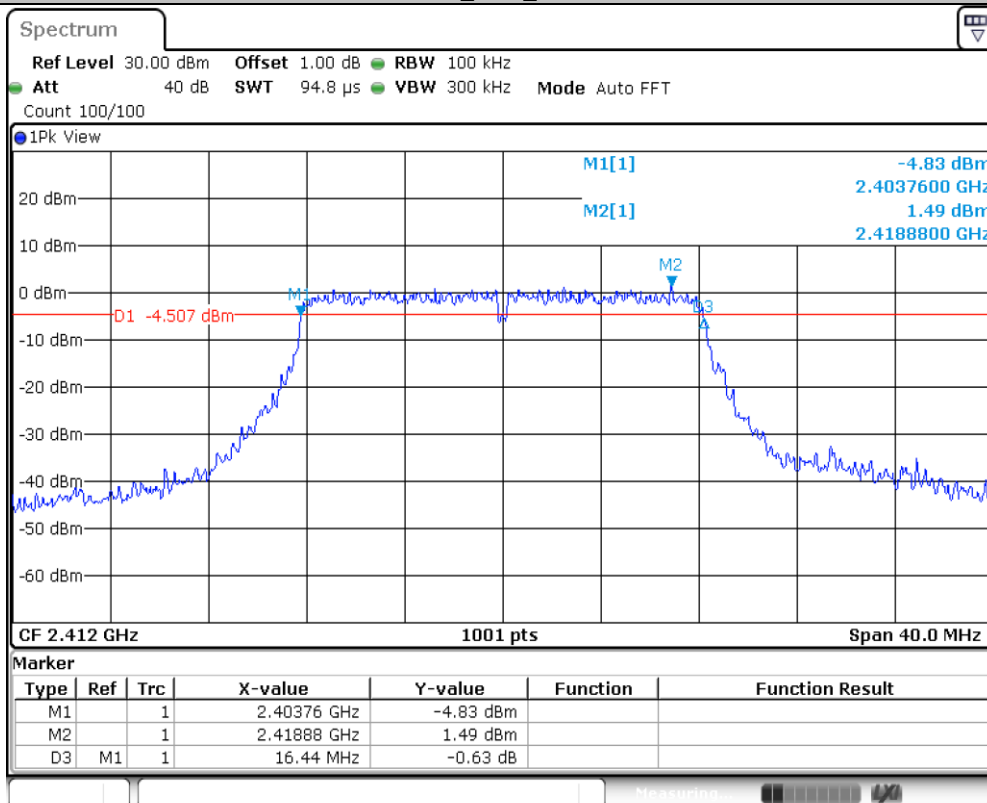
TestMode	Channel [MHz]	6dB bandwidth [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	2412	9.160	2407.400	2416.560	0.5	PASS
	2437	9.160	2432.400	2441.560	0.5	PASS
	2462	9.600	2456.960	2466.560	0.5	PASS
11G	2412	16.440	2403.760	2420.200	0.5	PASS
	2437	16.440	2428.760	2445.200	0.5	PASS
	2462	16.440	2453.760	2470.200	0.5	PASS
11N20SISO	2412	17.120	2403.400	2420.520	0.5	PASS
	2437	17.120	2428.400	2445.520	0.5	PASS
	2462	17.120	2453.400	2470.520	0.5	PASS
11N40SISO	2422	32.720	2405.680	2438.400	0.5	PASS
	2437	32.720	2420.680	2453.400	0.5	PASS
	2452	32.400	2436.000	2468.400	0.5	PASS



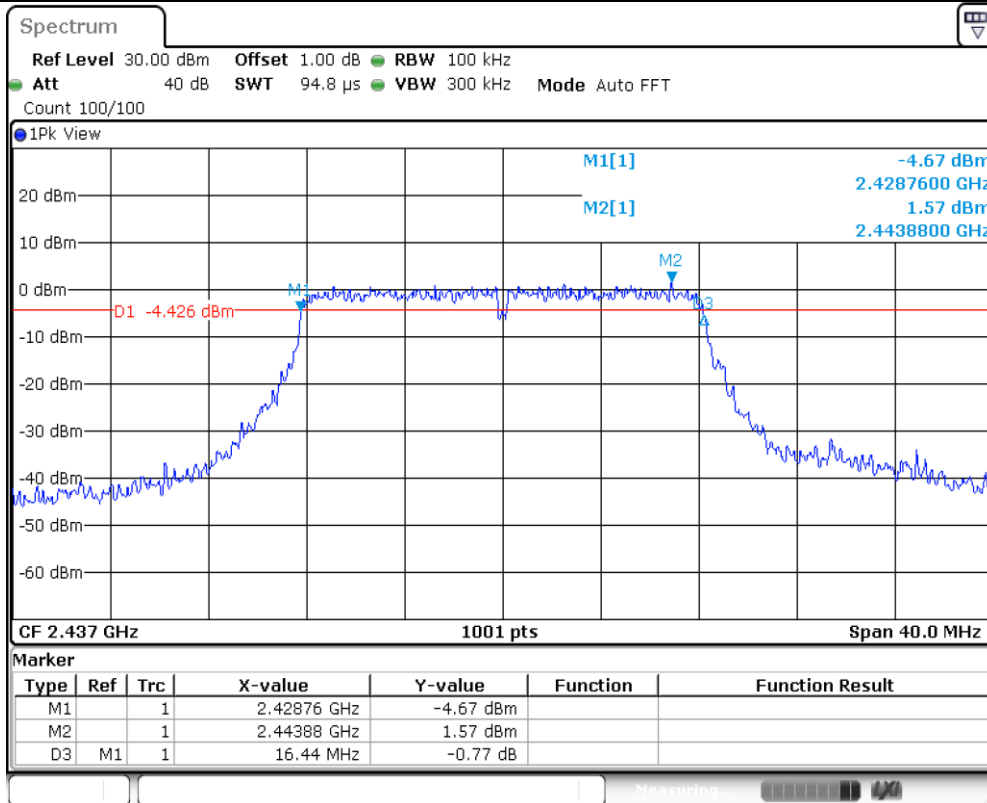
11B\_Ant1\_2462



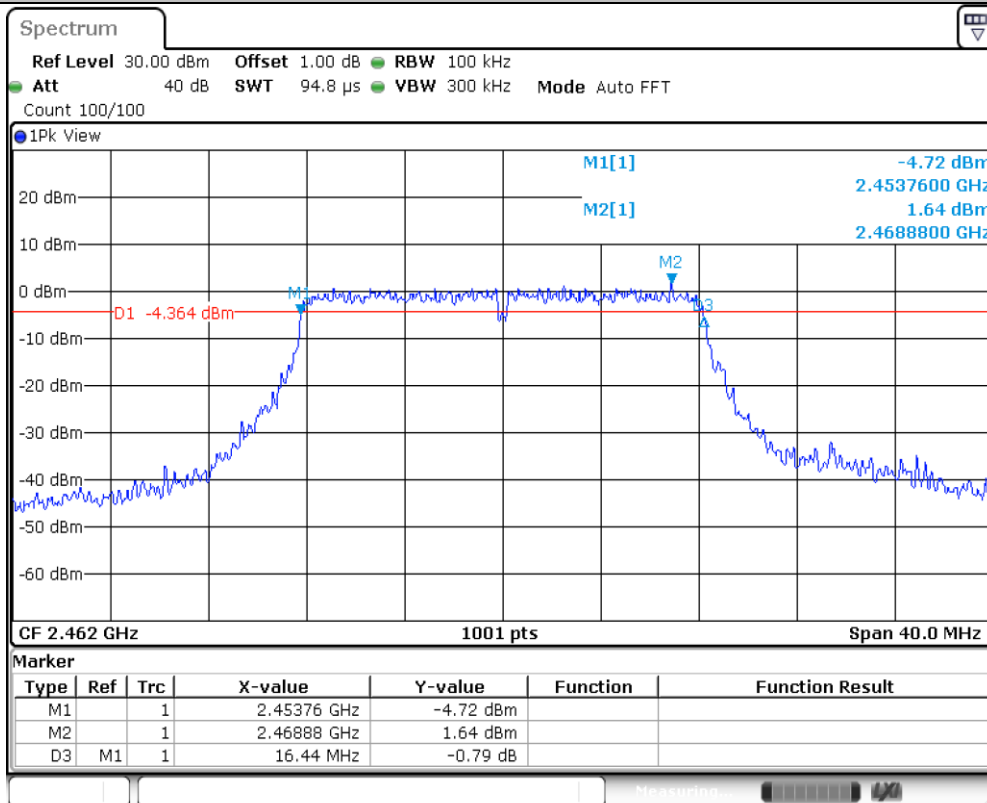
11G\_Ant1\_2412



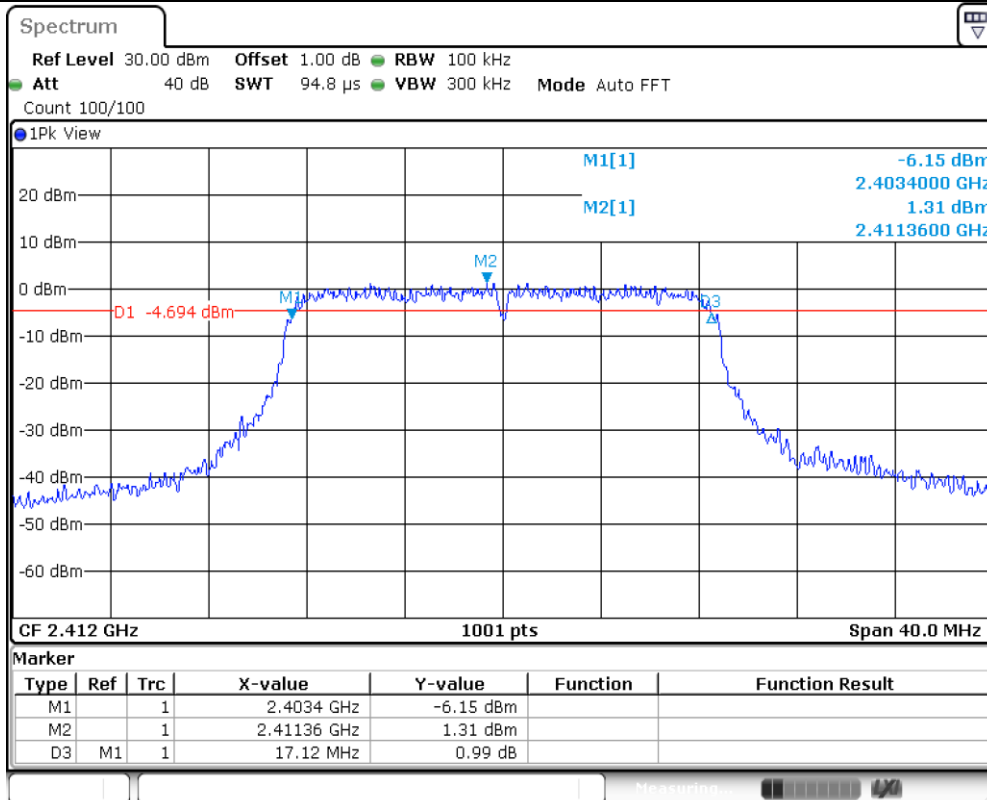
11G\_Ant1\_2437



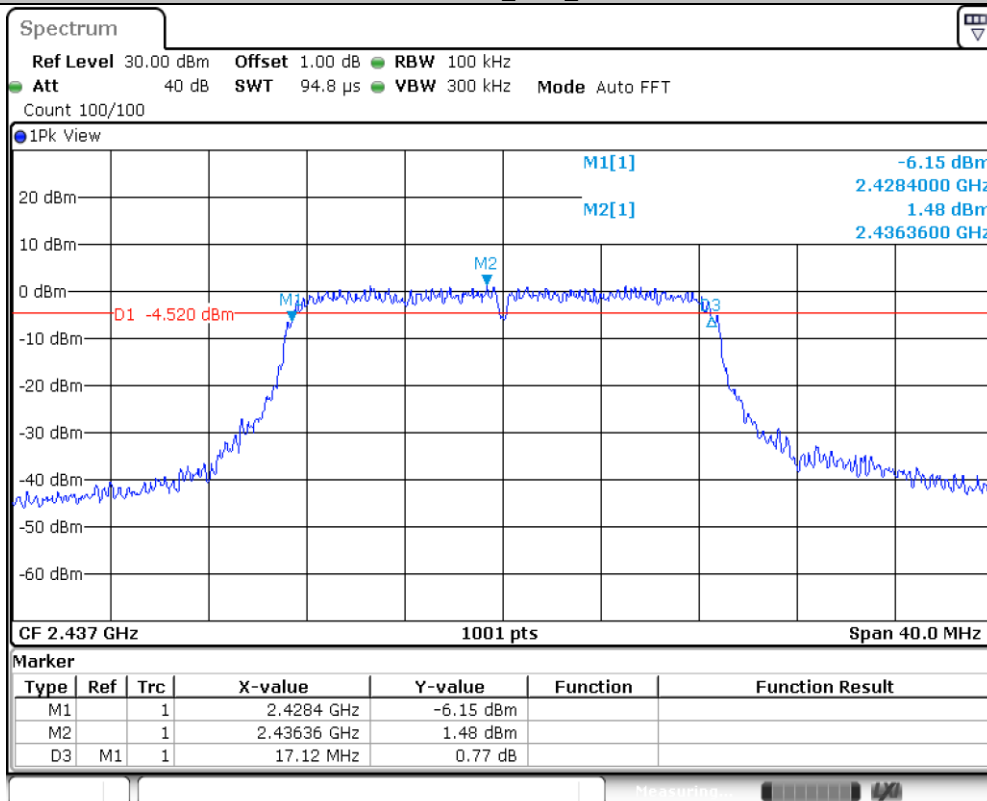
11G\_Ant1\_2462



11N20SISO\_Ant1\_2412

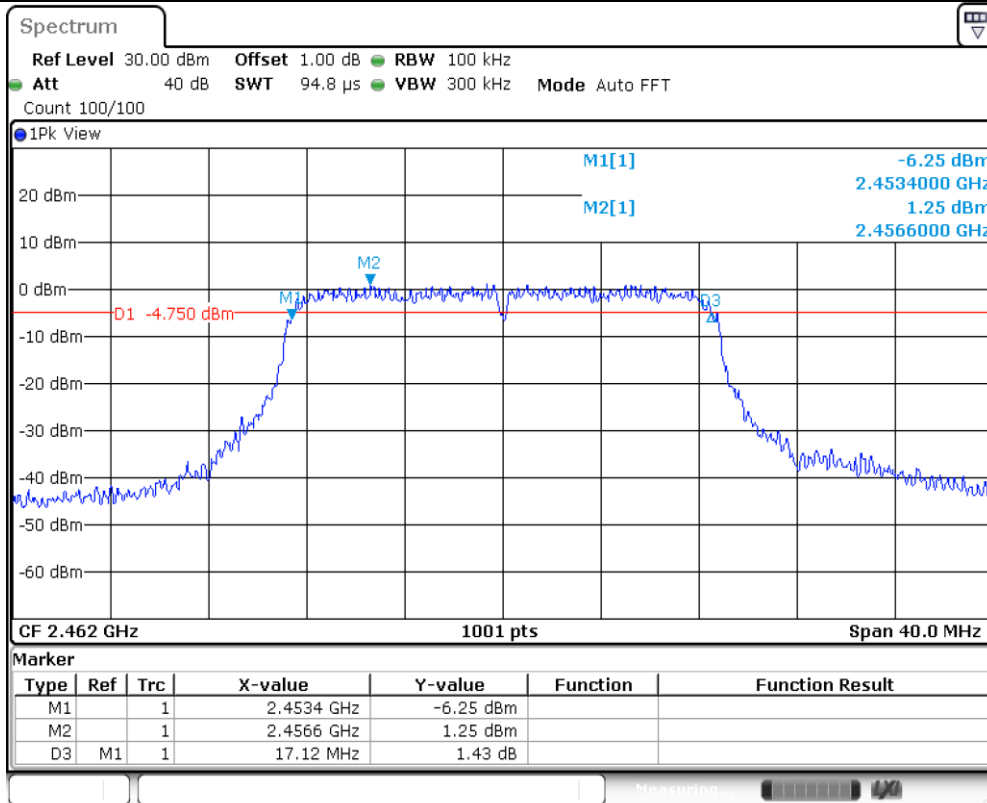


11N20SISO\_Ant1\_2437

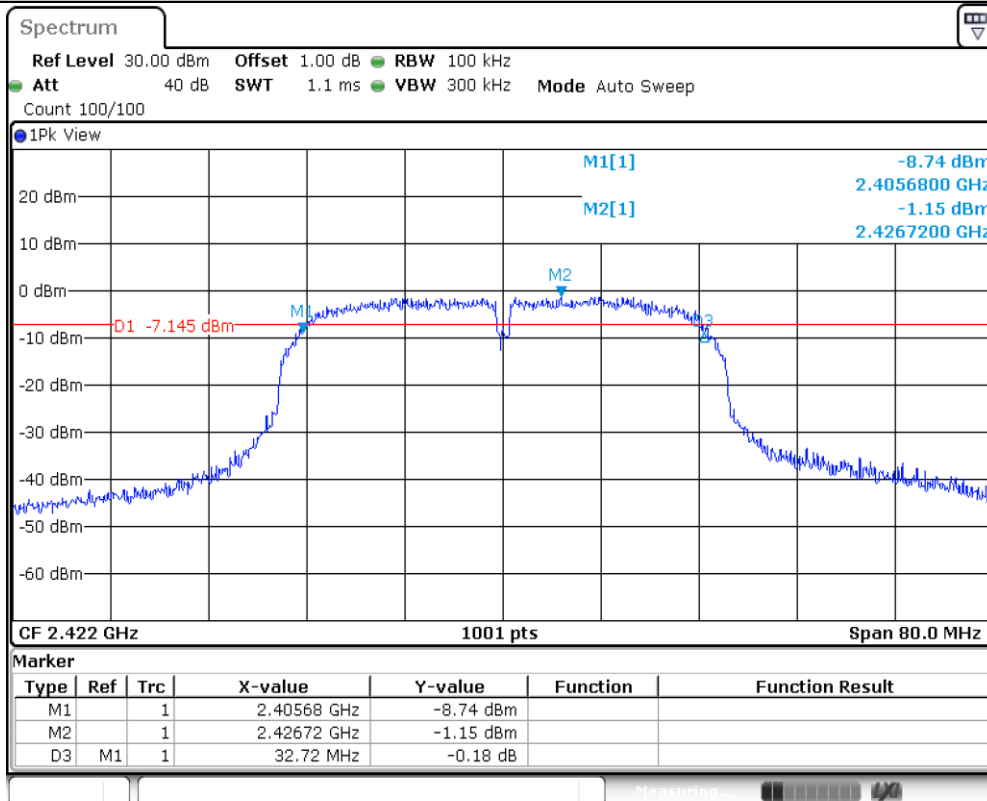


11N20SISO\_Ant1\_2462

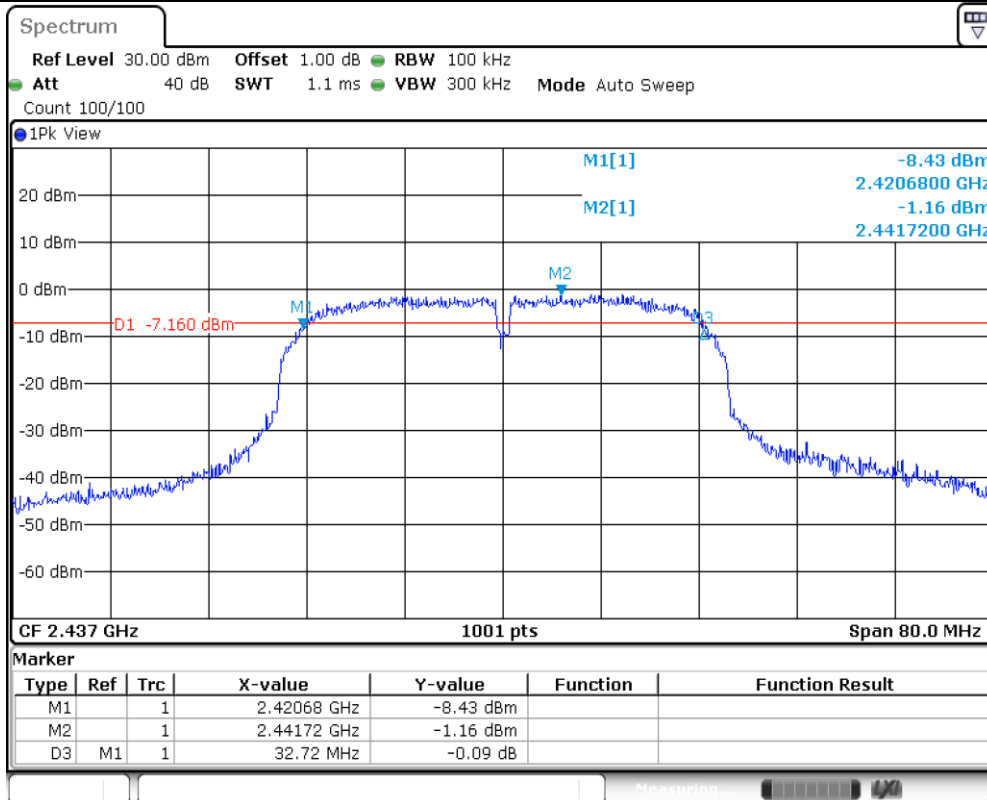




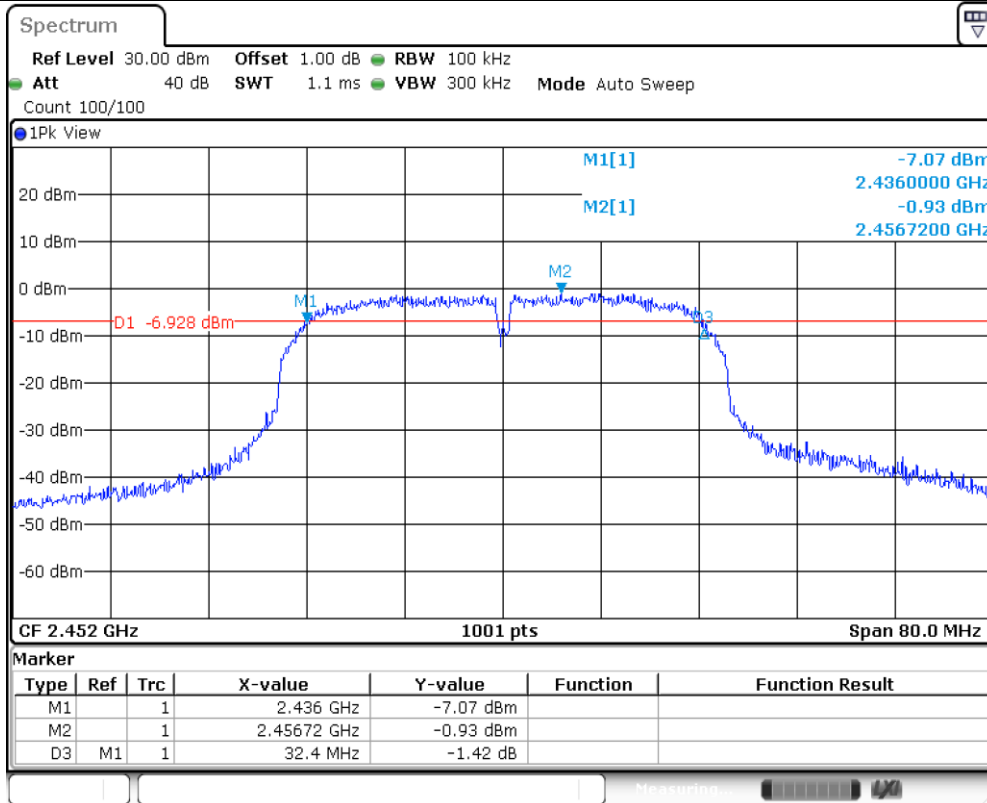
11N40SISO\_Ant1\_2422



11N40SISO\_Ant1\_2437



11N40SISO\_Ant1\_2452



### 9.3 99% Occupied Bandwidth

#### Test Method for 99 % Bandwidth

1. Set center frequency to the nominal EUT channel center frequency
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW ≥ 3 RBW
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. Use the 99 % power bandwidth function of the instrument.
9. Record the results in the test report.

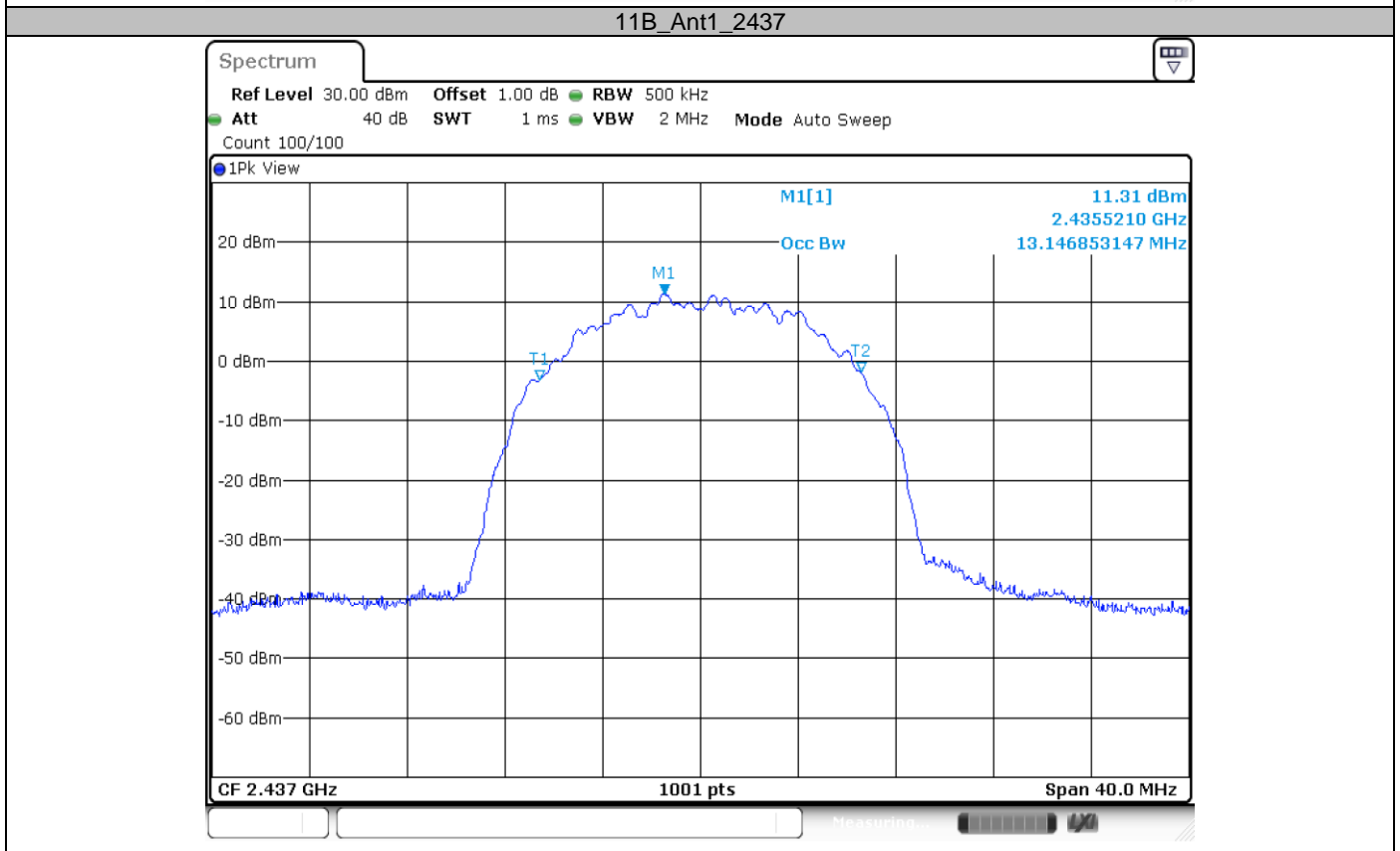
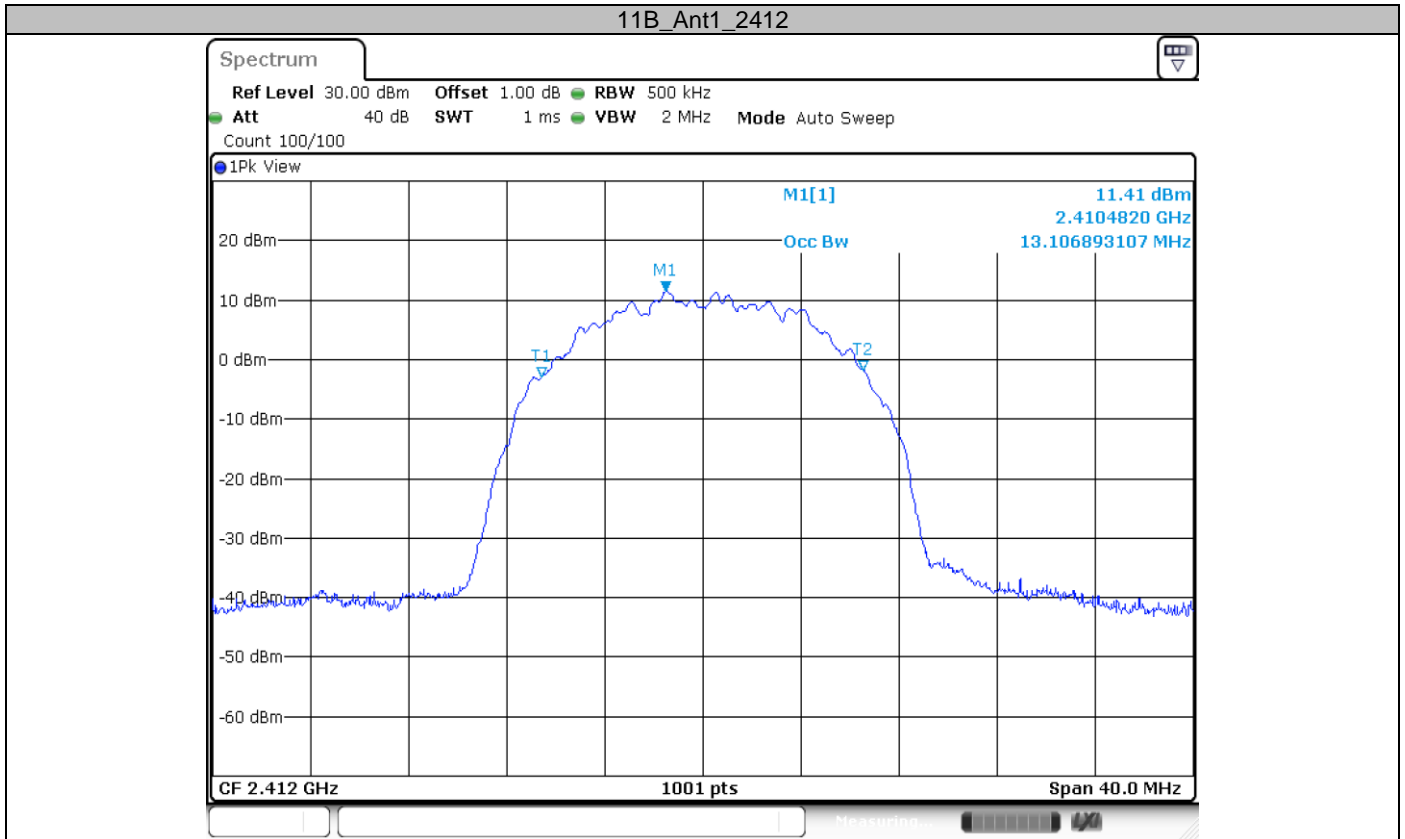
#### Limit

Limit [kHz]

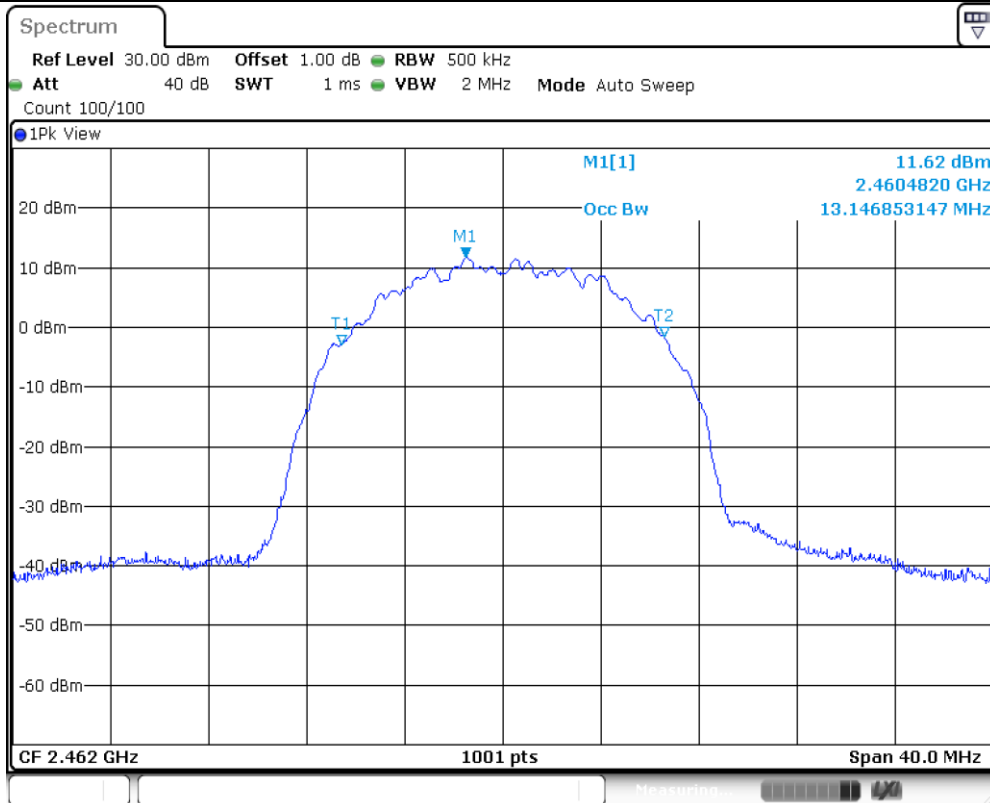
--

TestMode	Channel [MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	2412	13.107	2405.407	2418.513	---	PASS
	2437	13.147	2430.407	2443.553	---	PASS
	2462	13.147	2455.407	2468.553	---	PASS
11G	2412	16.583	2403.768	2420.352	---	PASS
	2437	16.583	2428.768	2445.352	---	PASS
	2462	16.623	2453.728	2470.352	---	PASS
11N20SISO	2412	17.263	2403.369	2420.631	---	PASS
	2437	17.303	2428.369	2445.671	---	PASS
	2462	17.303	2453.369	2470.671	---	PASS
11N40SISO	2422	34.286	2404.977	2439.263	---	PASS
	2437	34.286	2419.977	2454.263	---	PASS
	2452	34.286	2434.977	2469.263	---	PASS

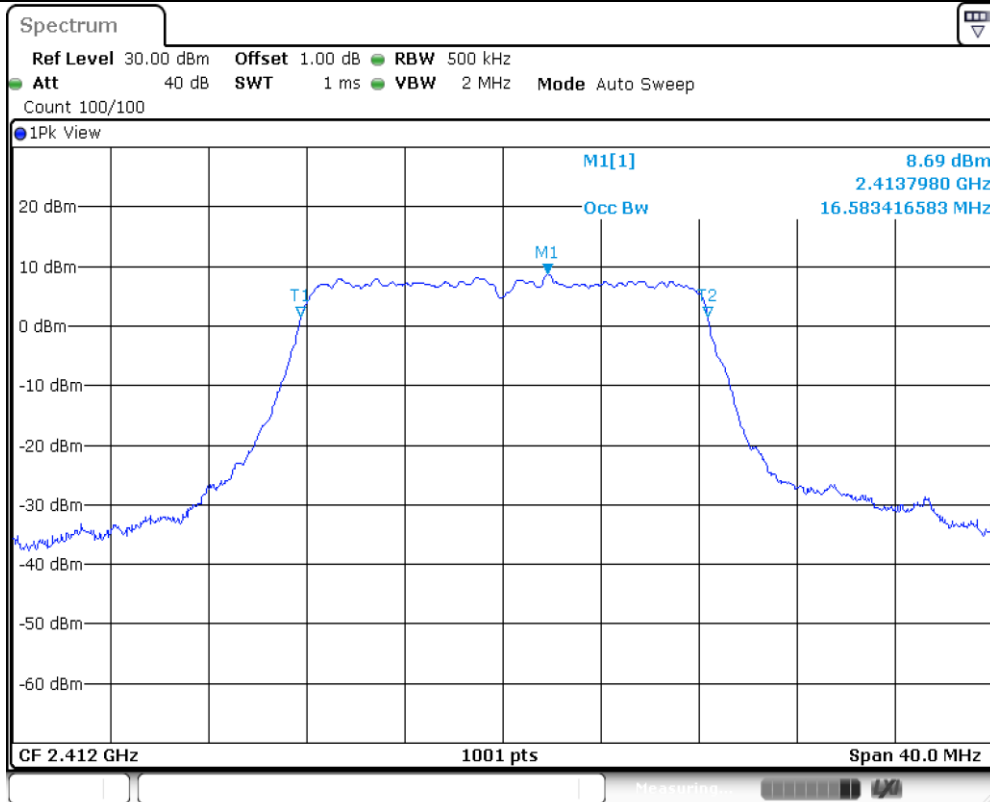
### 99% Bandwidth



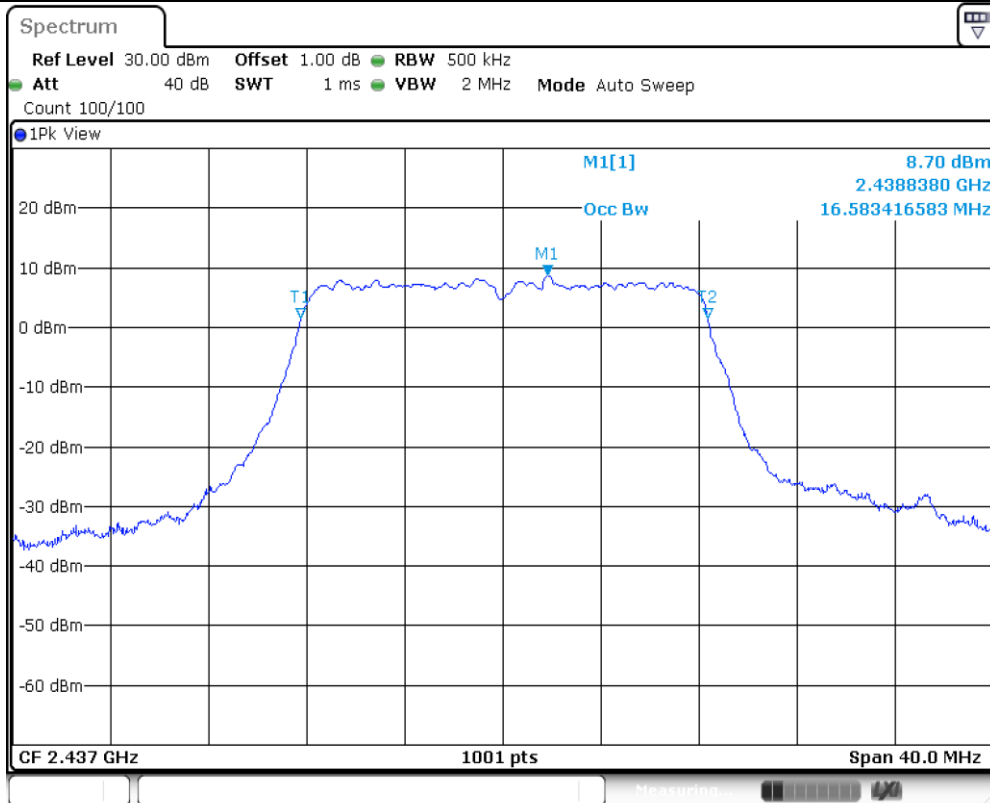
11B\_Ant1\_2462



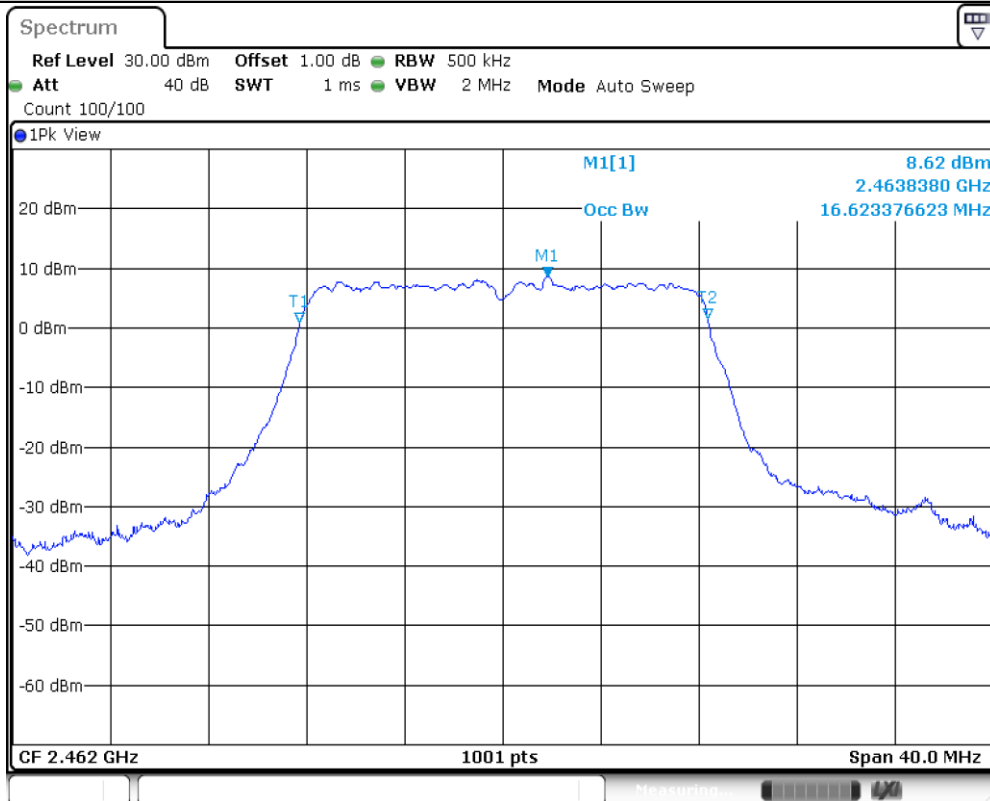
11G\_Ant1\_2412



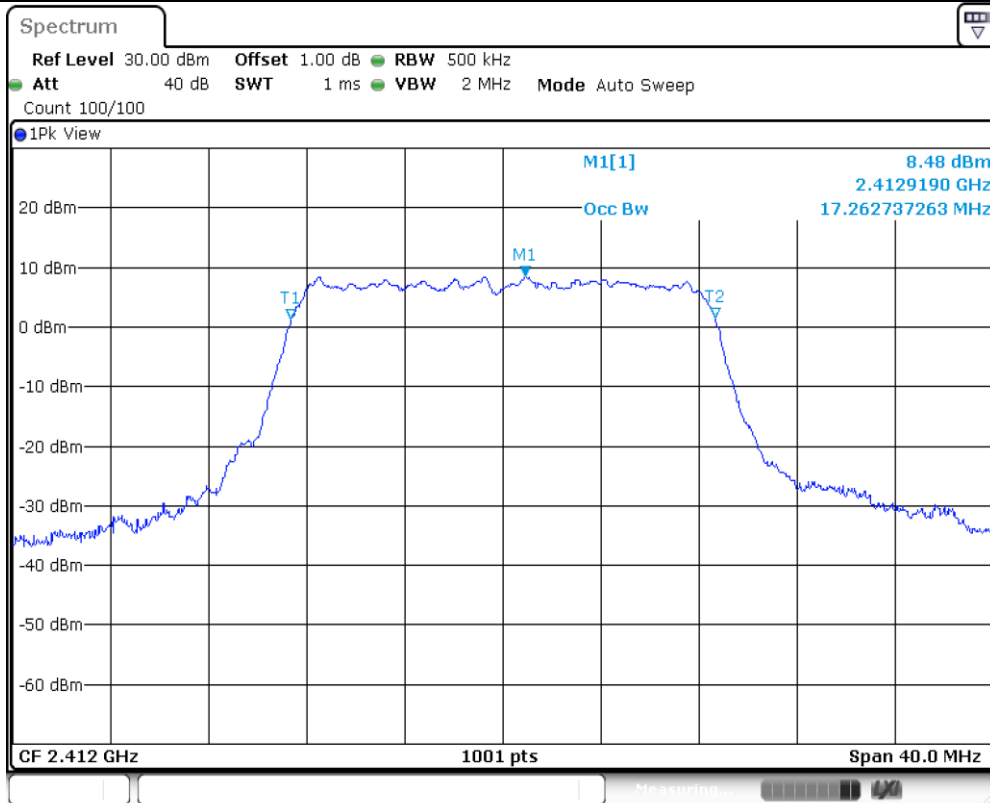
11G\_Ant1\_2437



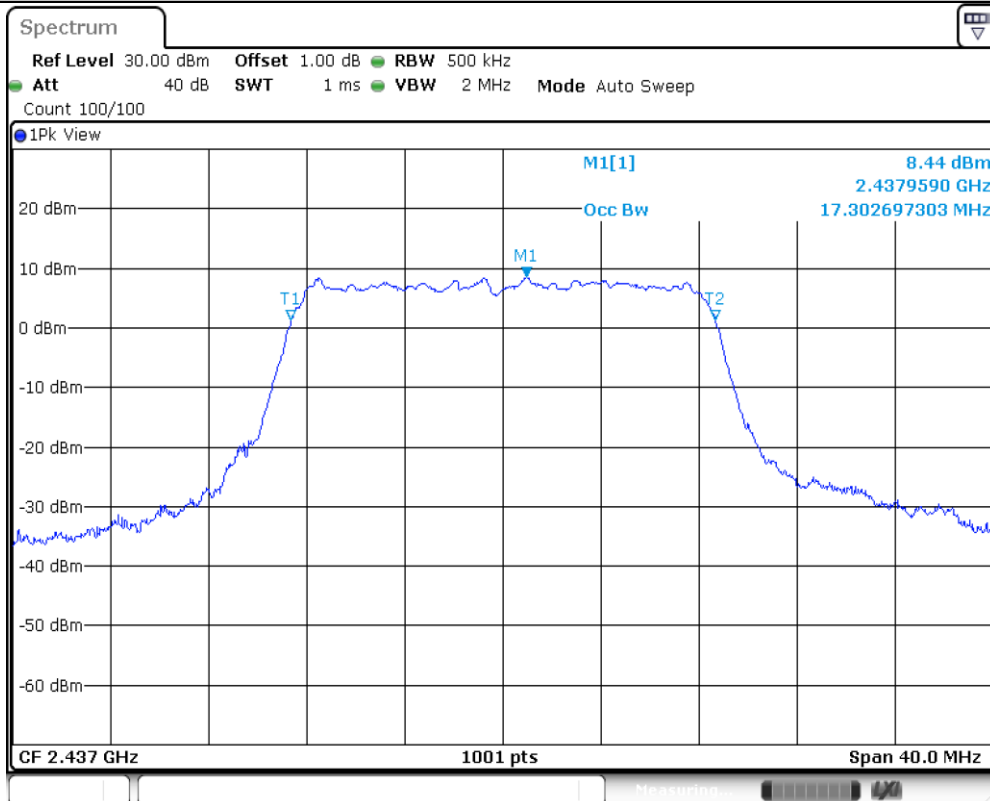
11G\_Ant1\_2462



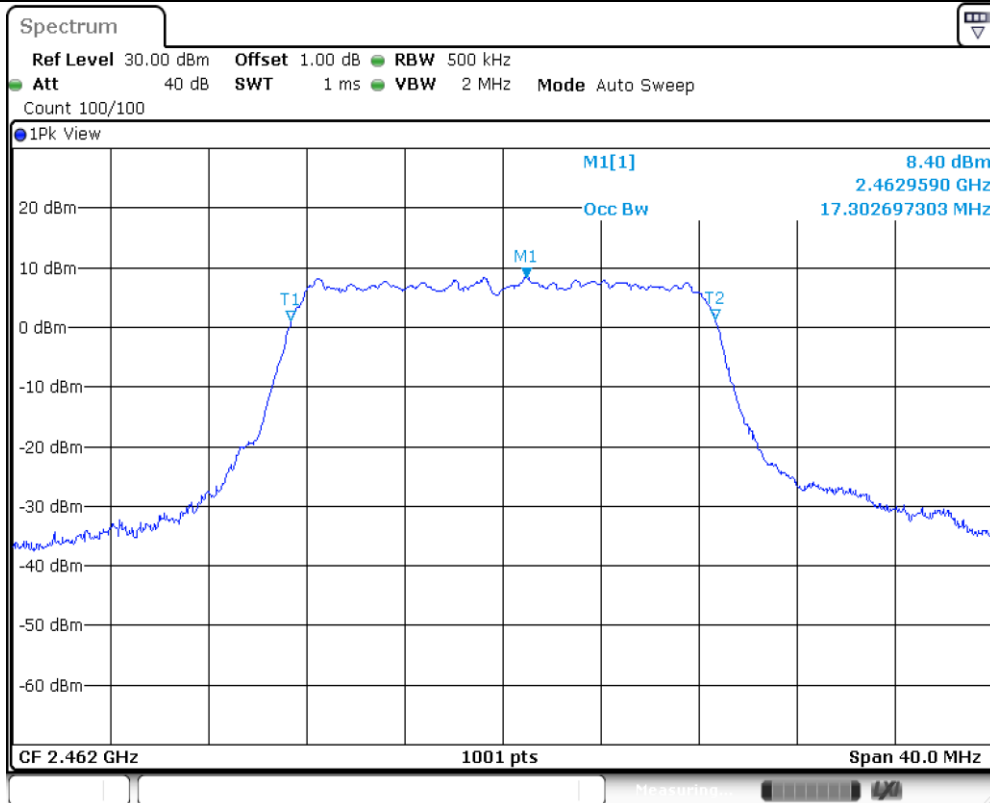
11N20SISO\_Ant1\_2412



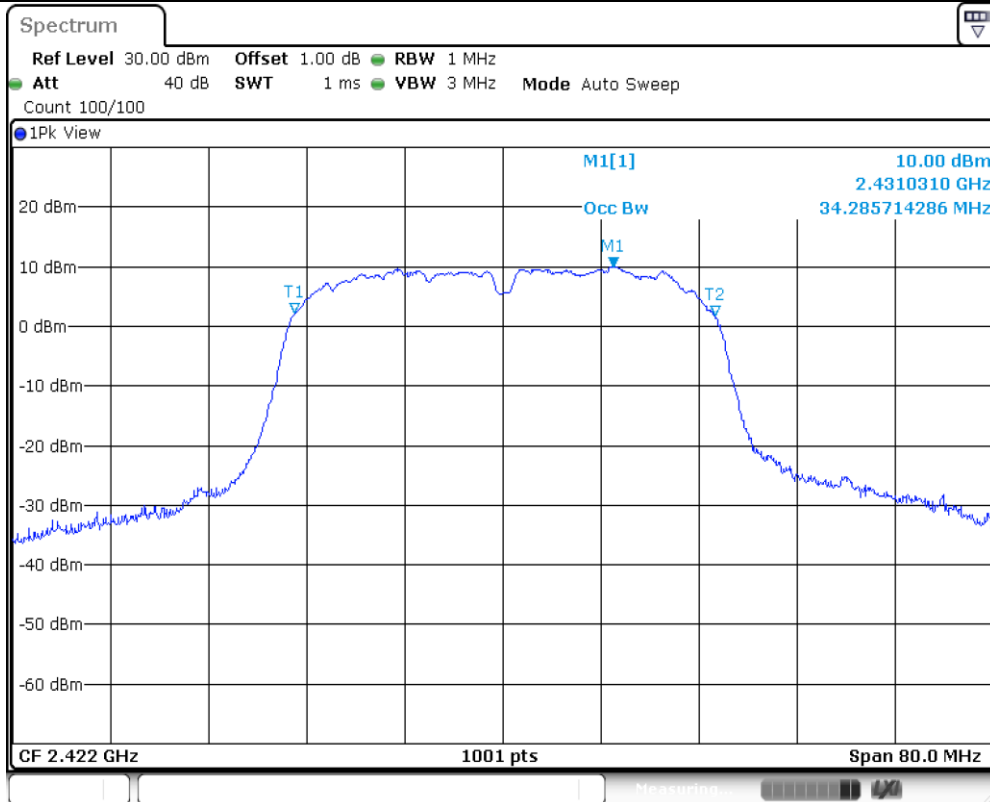
11N20SISO\_Ant1\_2437



11N20SISO\_Ant1\_2462

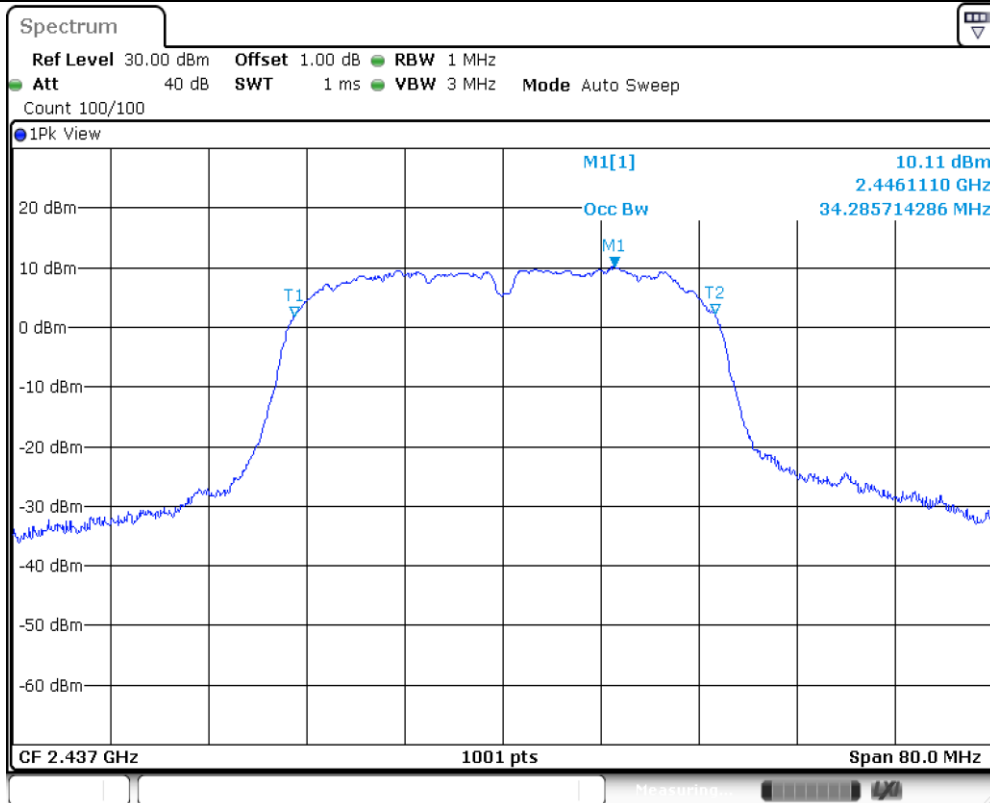


11N40SISO\_Ant1\_2422

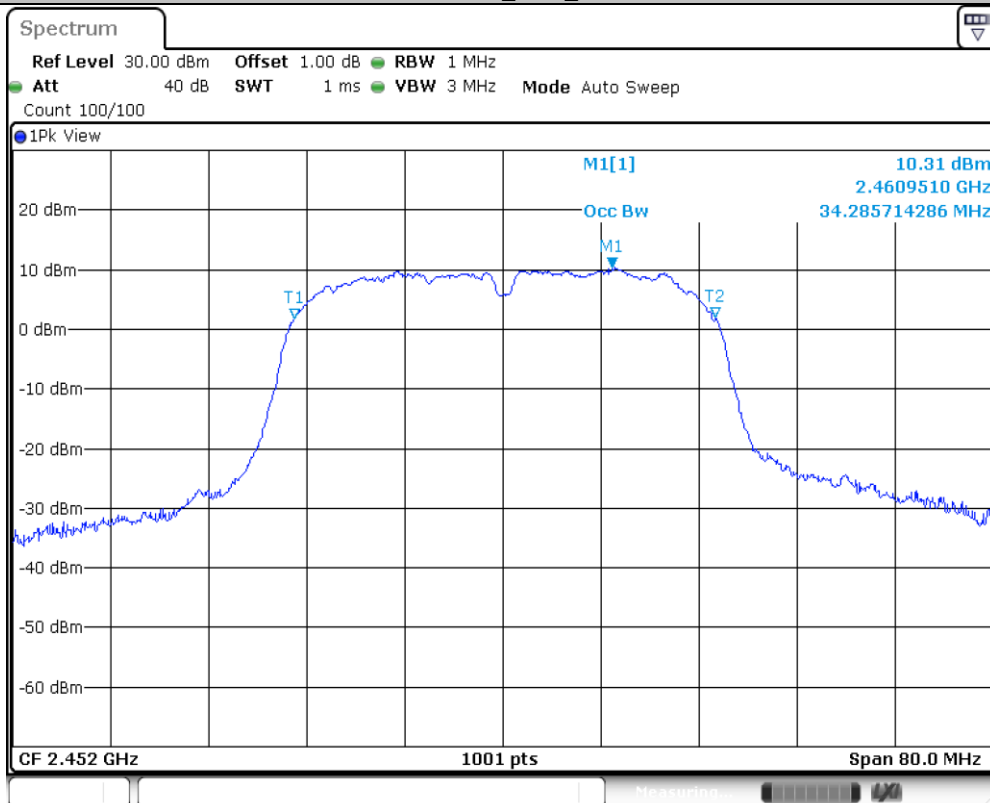


11N40SISO\_Ant1\_2437





11N40SISO\_Ant1\_2452



## 9.4 Power Spectral Density

### Test Method

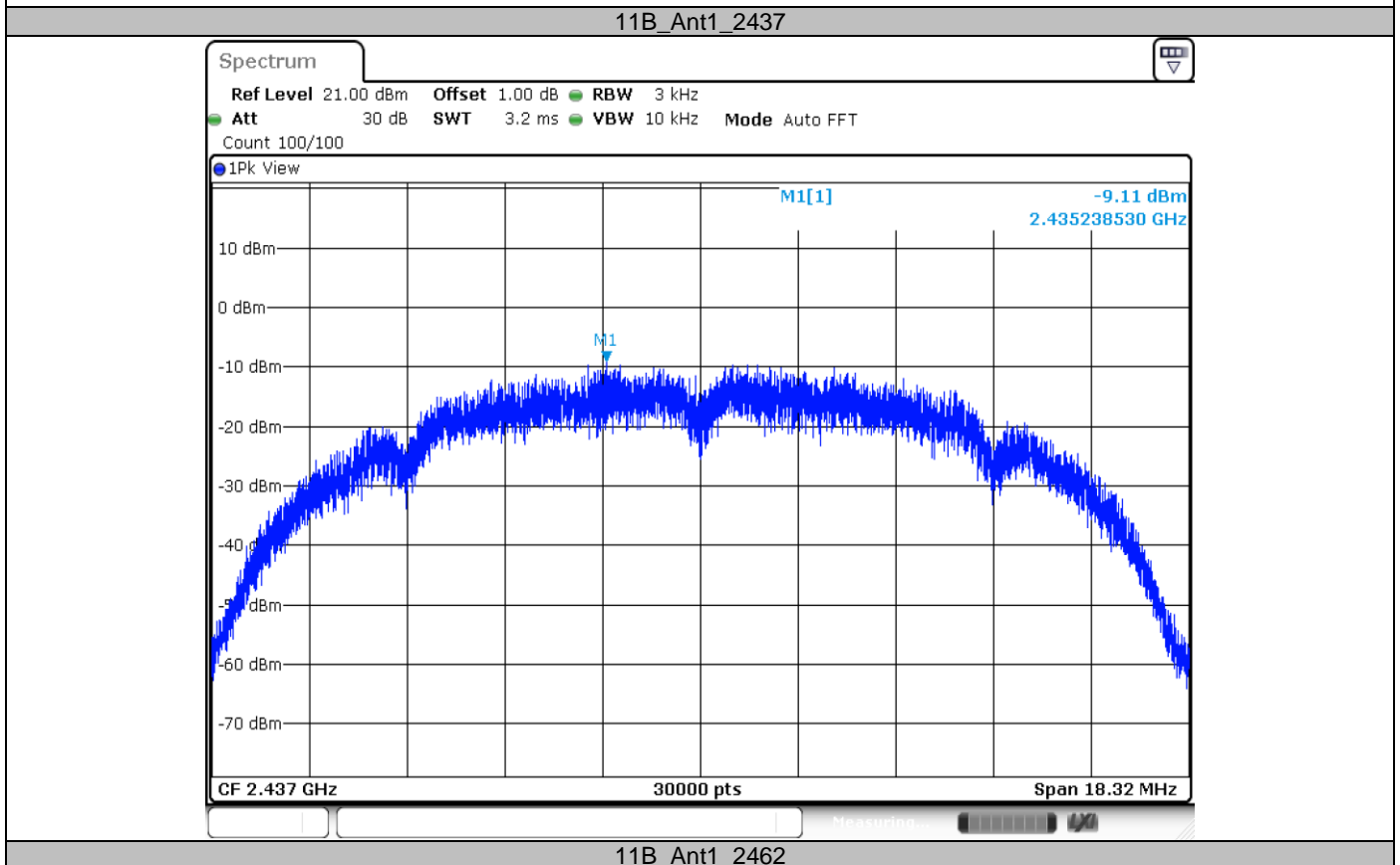
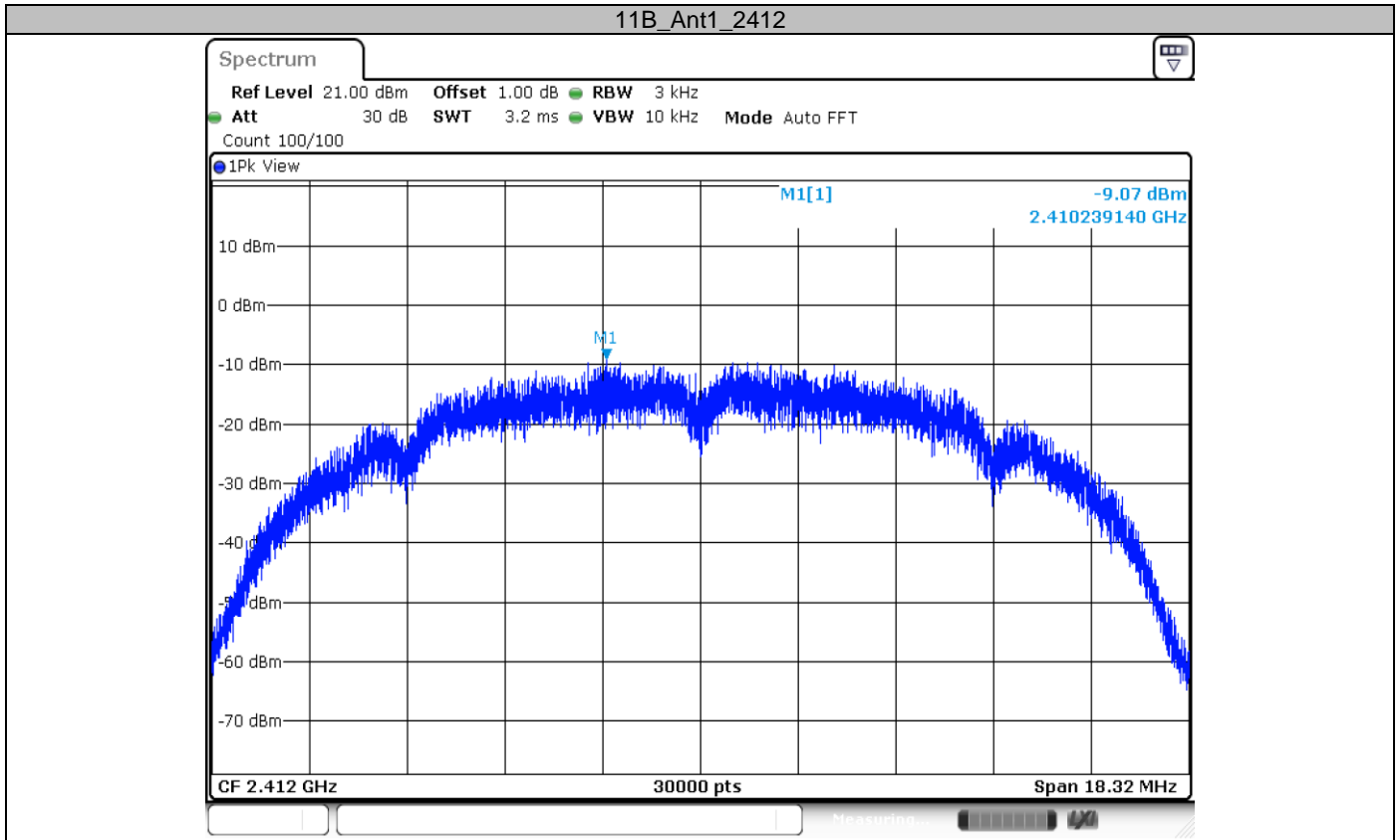
1. The RF output of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
4. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz, VBW≥3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
5. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
6. Repeat above procedures until other frequencies measured were completed.

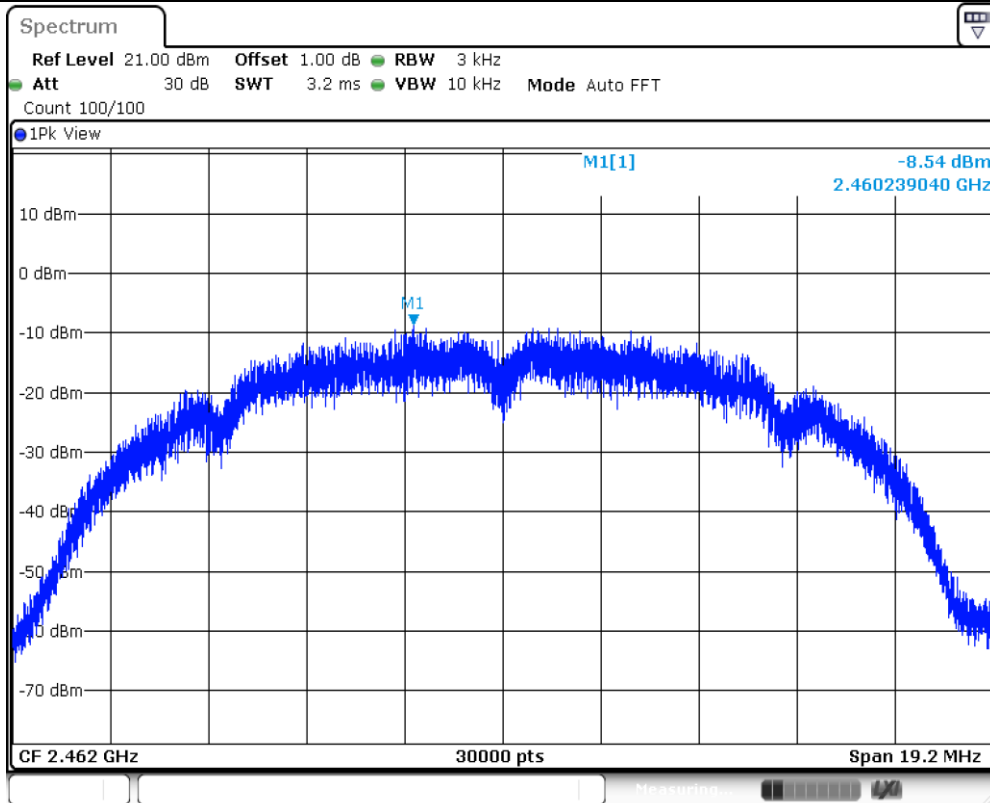
### Limit

Limit [dBm/3KHz]

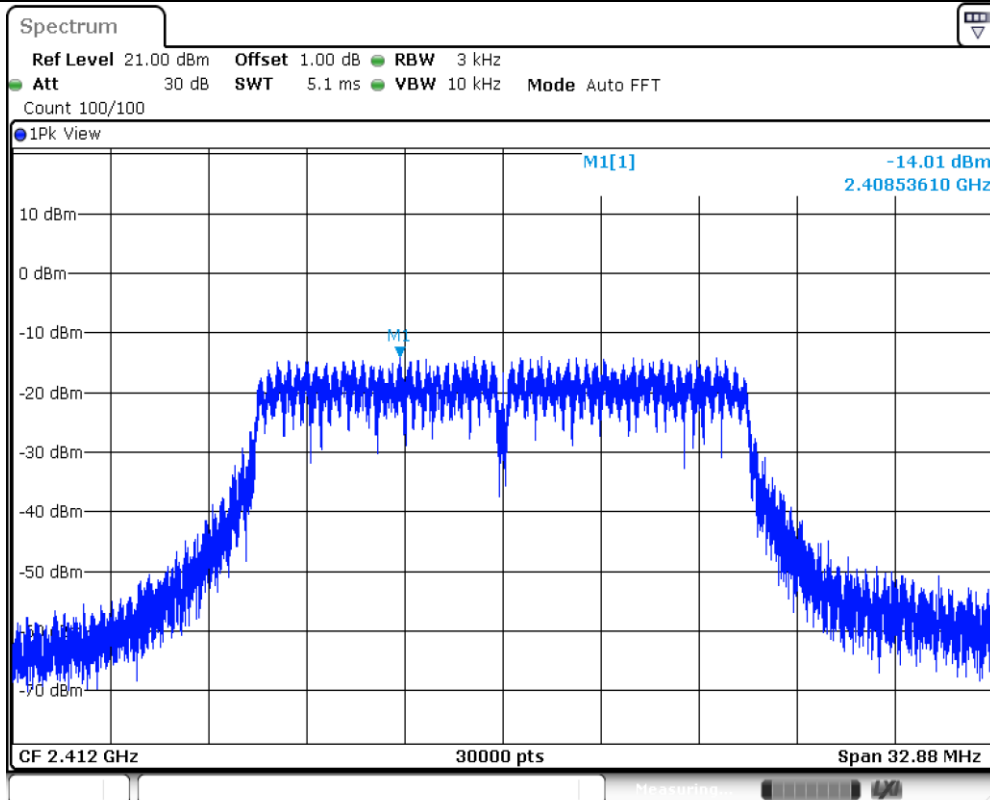
≤8

TestMode	Channel[MHz]	Result[dBm/3KHz]	Limit[dBm/3KHz]	Verdict
11B	2412	-9.07	<=8	PASS
	2437	-9.11	<=8	PASS
	2462	-8.54	<=8	PASS
11G	2412	-14.01	<=8	PASS
	2437	-14.02	<=8	PASS
	2462	-14	<=8	PASS
11N20SISO	2412	-13.41	<=8	PASS
	2437	-13.54	<=8	PASS
	2462	-13.47	<=8	PASS
11N40SISO	2422	-13.98	<=8	PASS
	2437	-13.78	<=8	PASS
	2452	-13.86	<=8	PASS

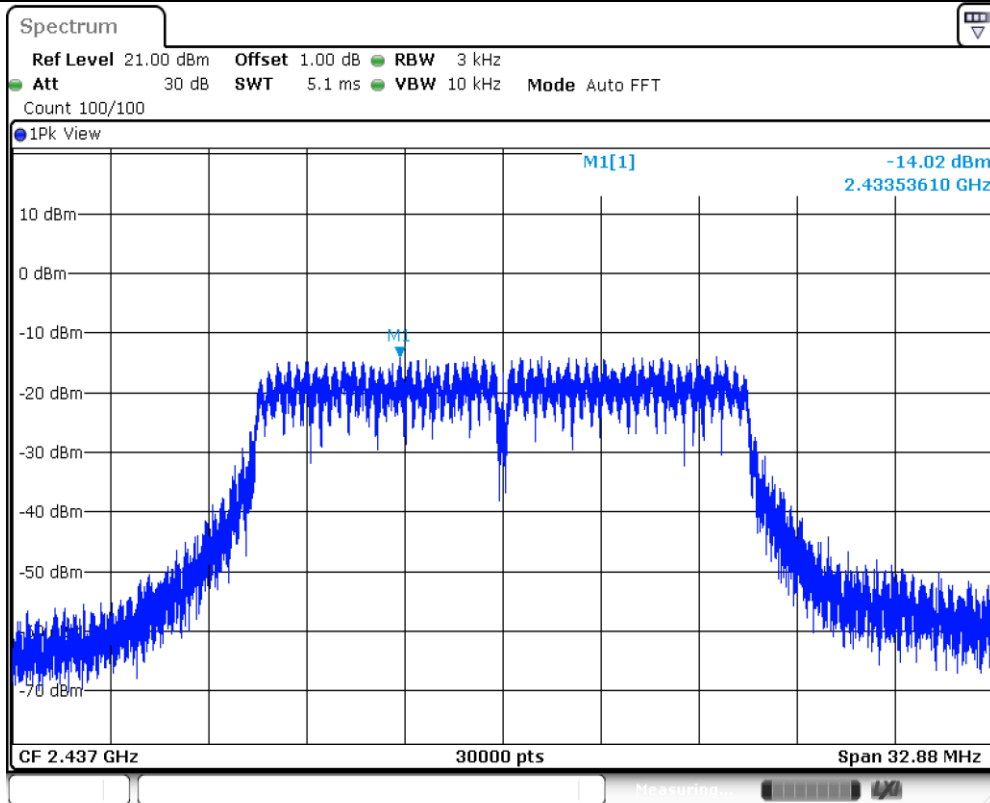




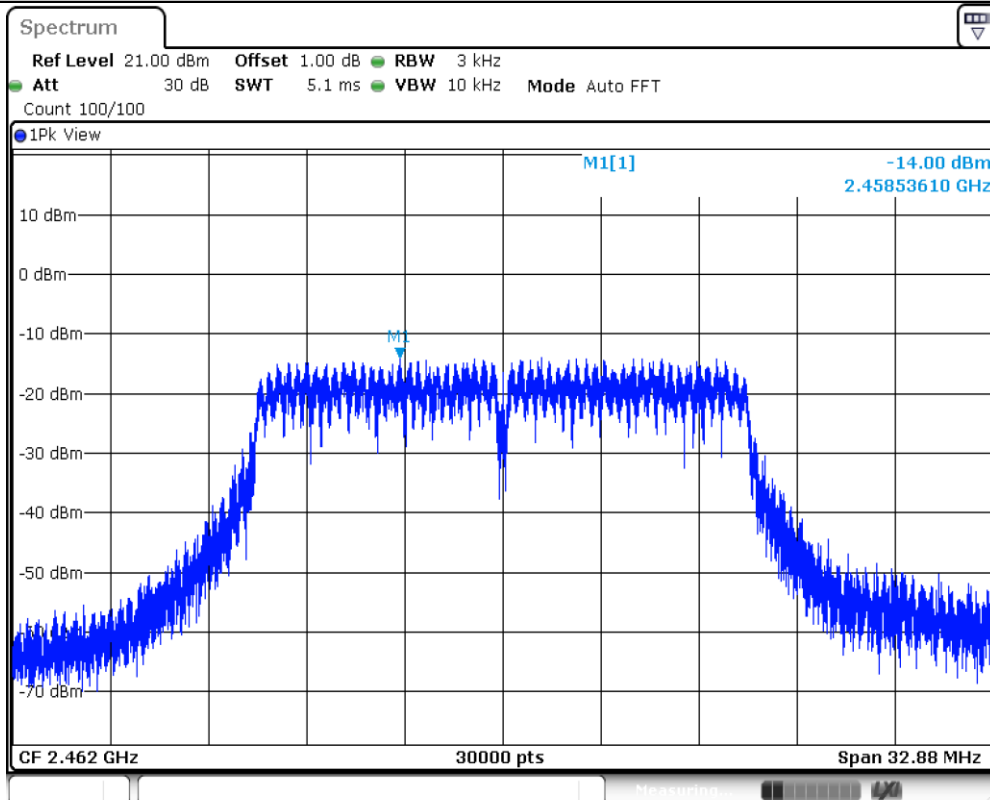
11G\_Ant1\_2412



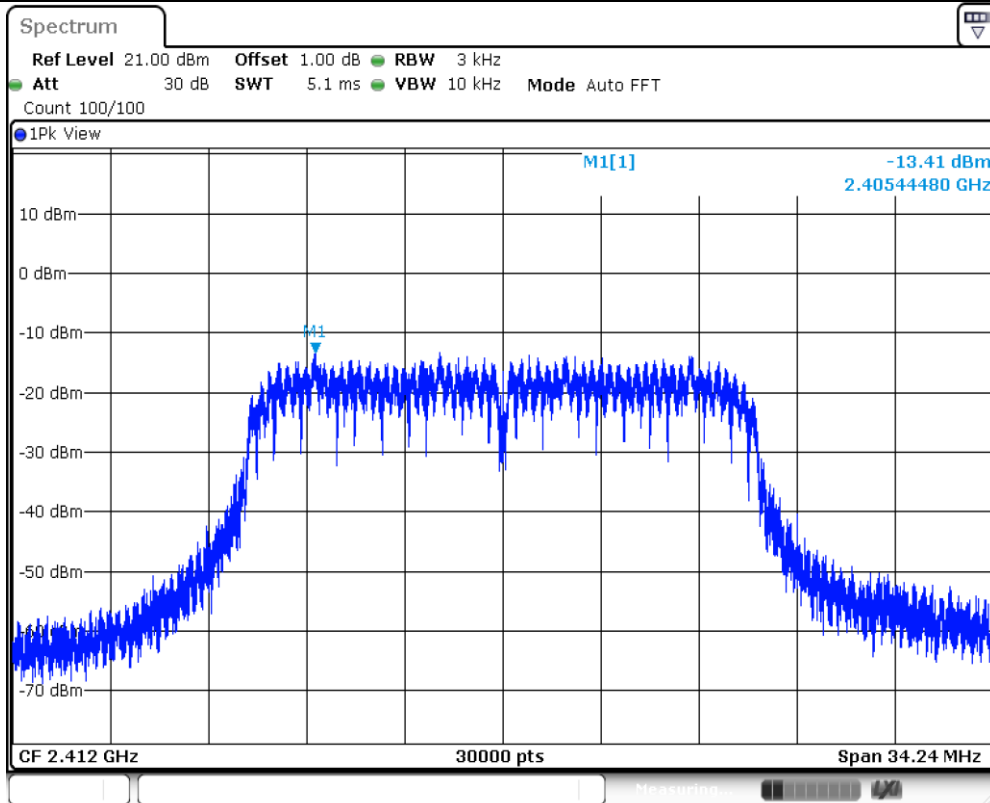
11G\_Ant1\_2437



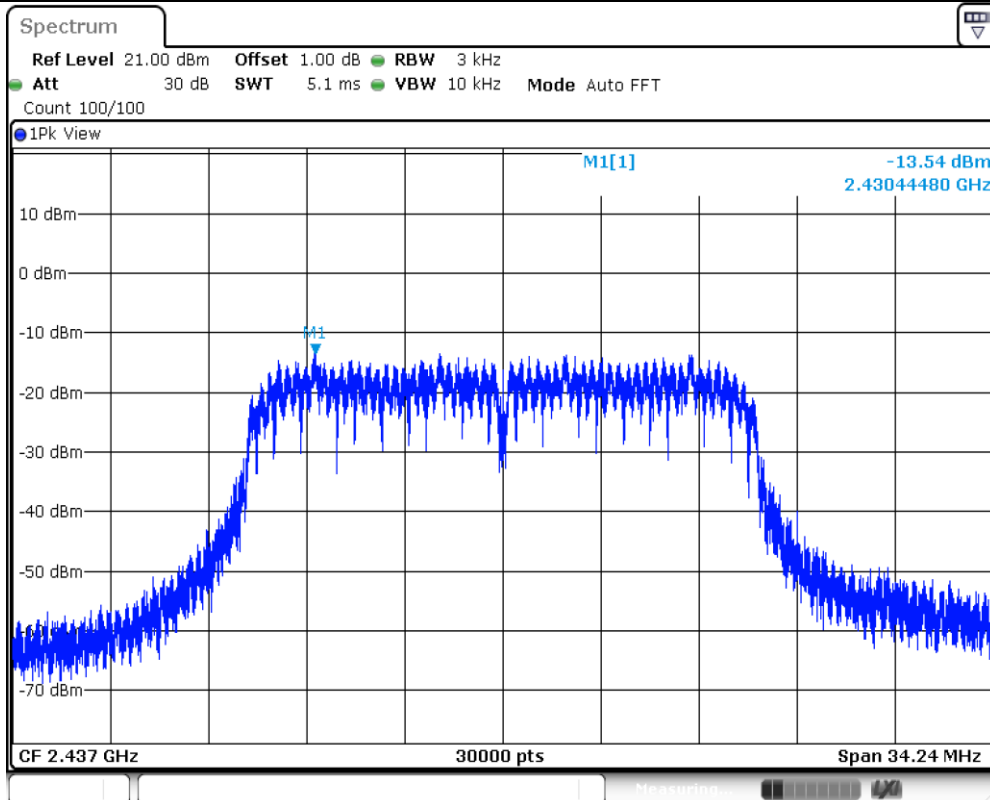
11G\_Ant1\_2462



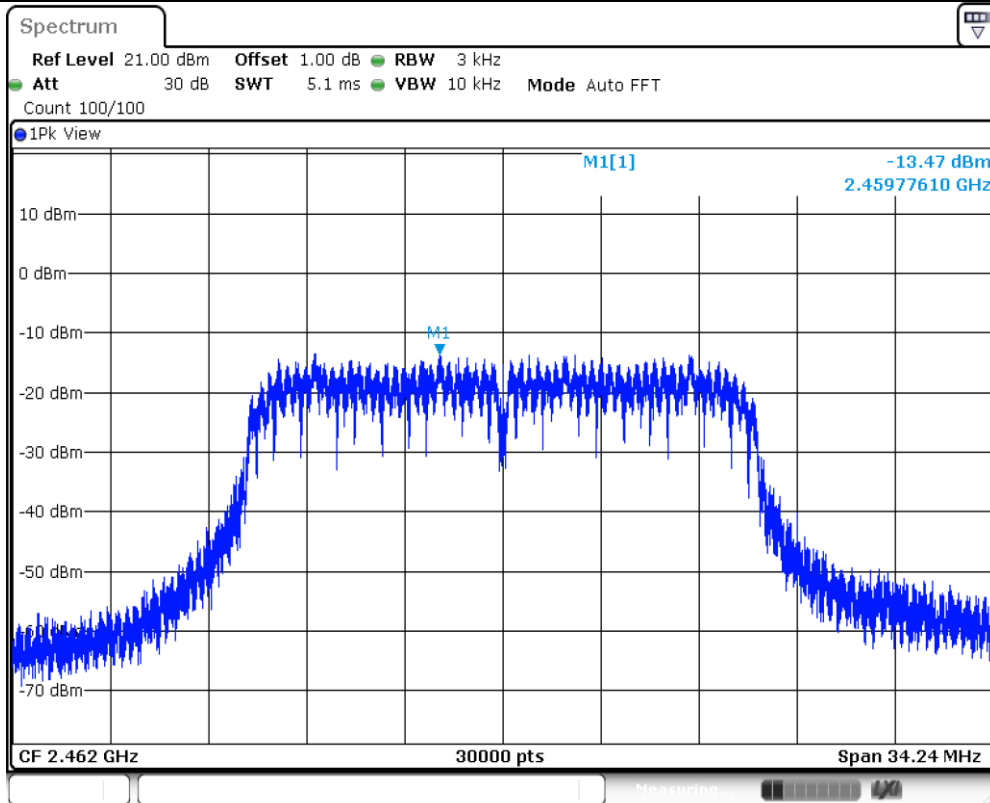
11N20SISO\_Ant1\_2412



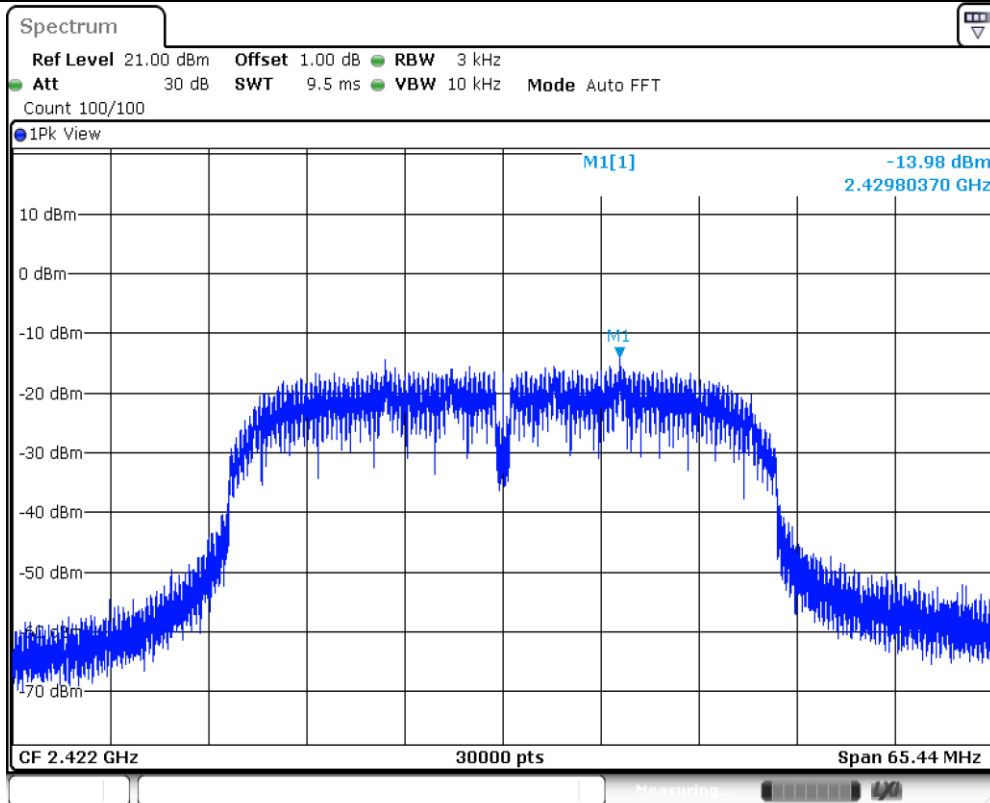
11N20SISO\_Ant1\_2437



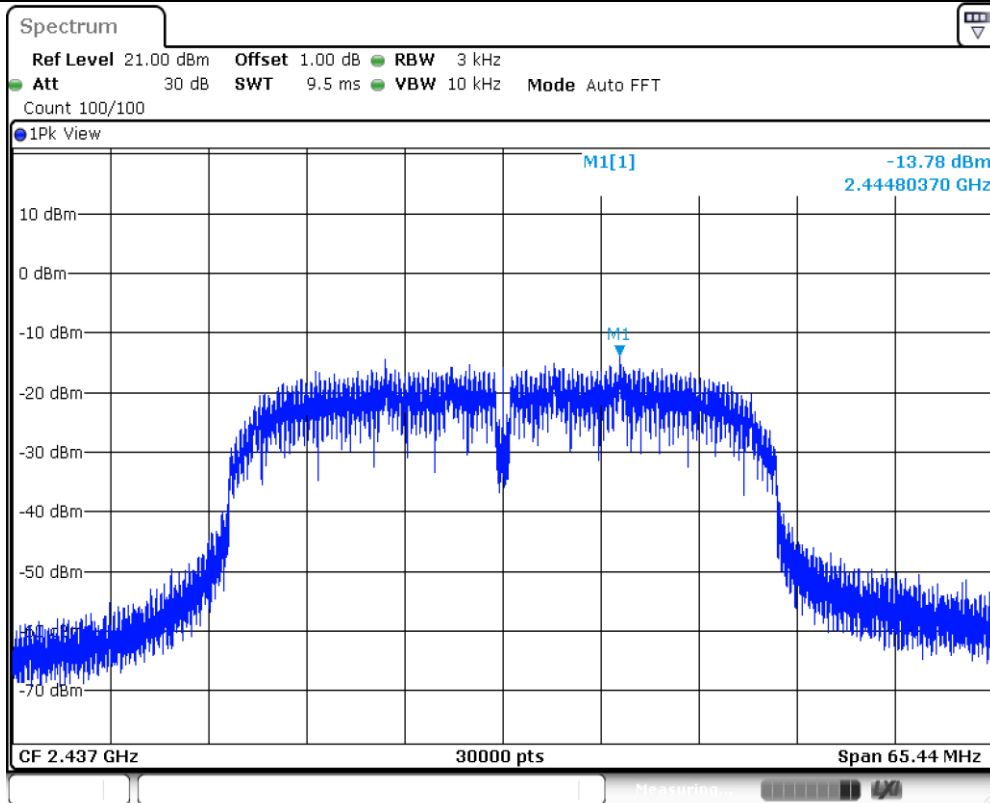
11N20SISO\_Ant1\_2462



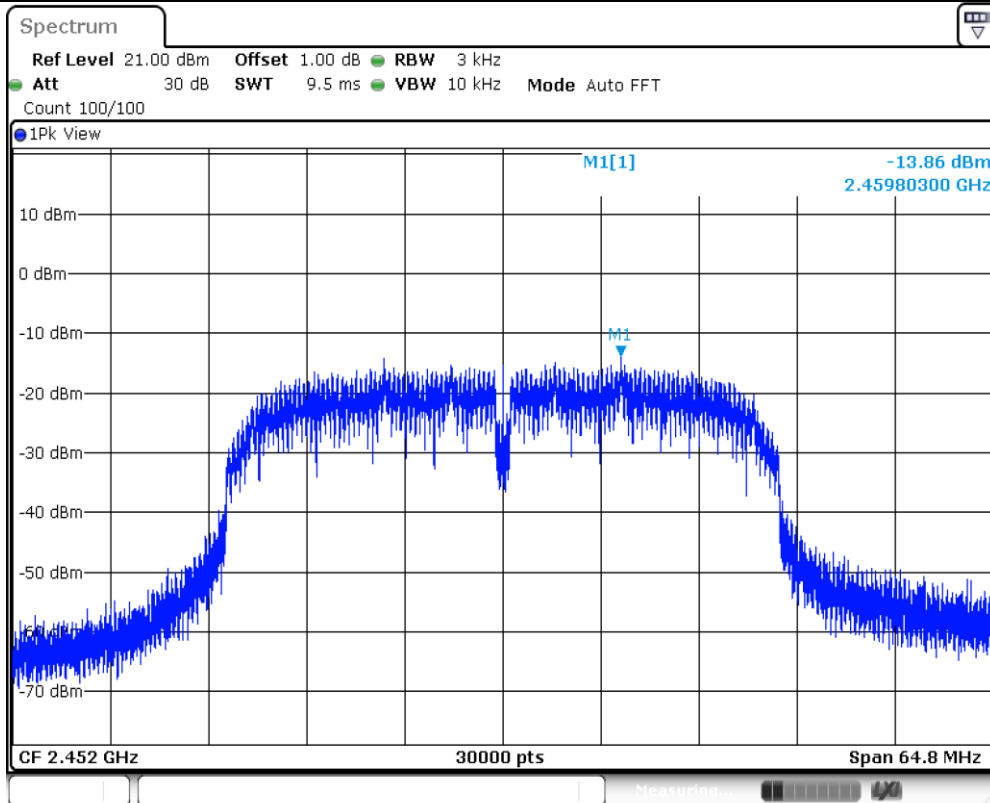
11N40SISO\_Ant1\_2422



11N40SISO\_Ant1\_2437



11N40SISO\_Ant1\_2452





## 9.5 Spurious RF Conducted Emissions

### Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:  
Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10<sup>th</sup> harmonic. Typically, several plots are required to cover this entire span.  
RBW = 100 kHz, VBW $\geq$ 3RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
5. The level displayed must comply with the limit specified in this Section. Submit these plots.
6. Repeat above procedures until all frequencies measured were complete.

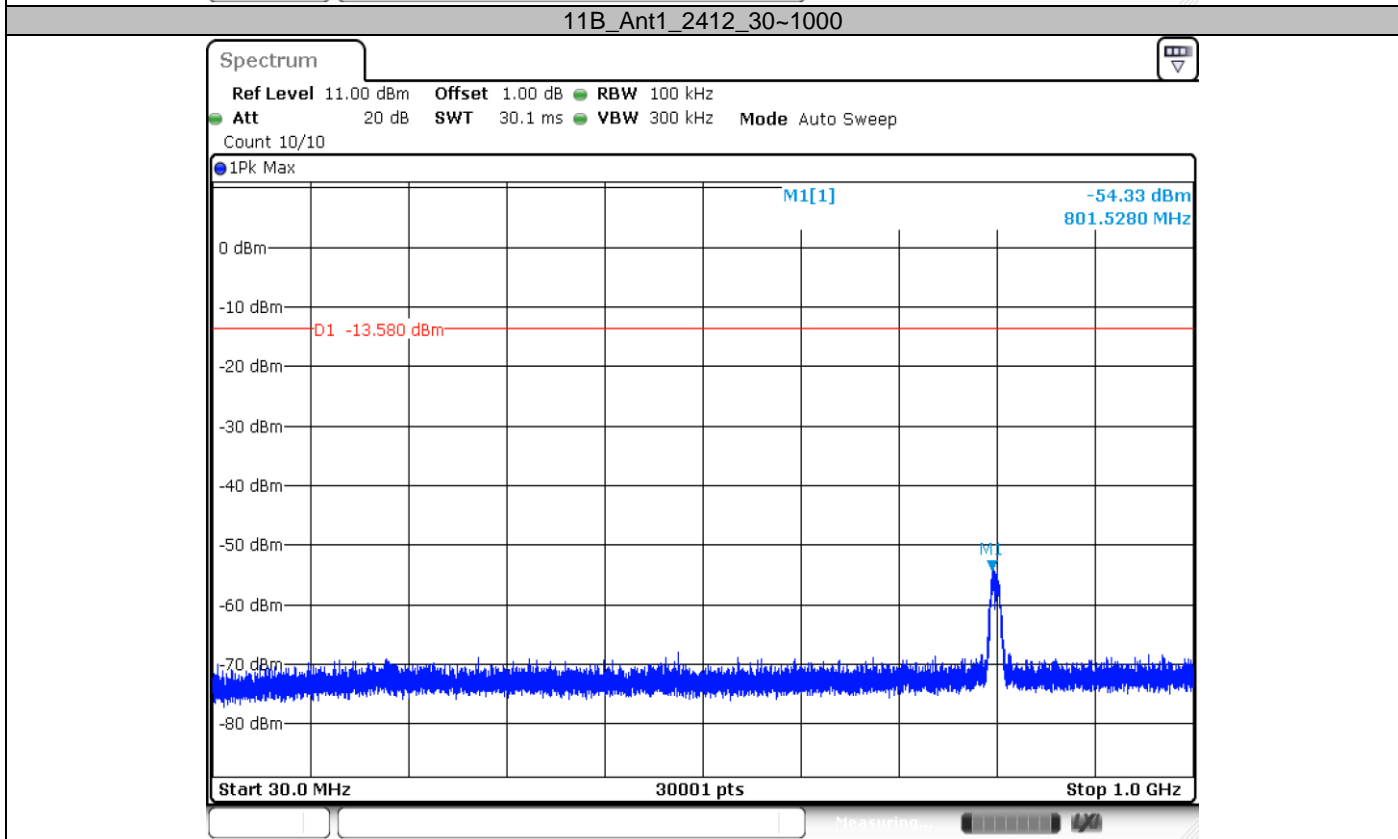
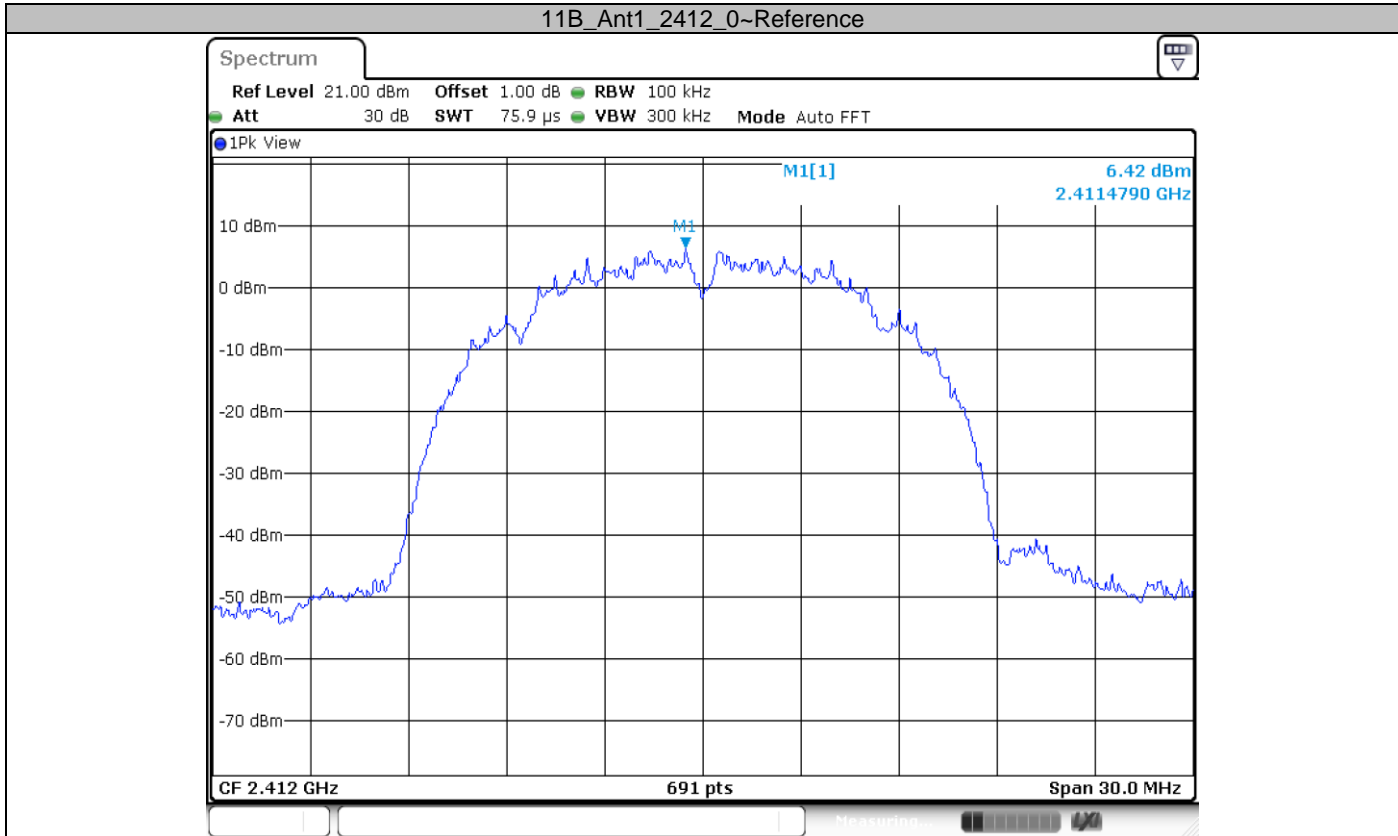
### Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20



**Spurious RF conducted emissions**

TestMode	Channel (MHz)	Frequency Range (MHz)	Reference Level	Result (MHz)	Limit(dBm)	Verdict
11B	2412	Reference	6.42	6.42	---	PASS
		30~1000	30~1000	-54.33	<=-13.58	PASS
		1000~26500	1000~26500	-47.18	<=-13.58	PASS
	2437	Reference	6.41	6.41	---	PASS
		30~1000	30~1000	-53.02	<=-13.59	PASS
		1000~26500	1000~26500	-47.23	<=-13.59	PASS
	2462	Reference	6.60	6.60	---	PASS
		30~1000	30~1000	-52.78	<=-13.4	PASS
		1000~26500	1000~26500	-46.51	<=-13.4	PASS
11G	2412	Reference	1.31	1.31	---	PASS
		30~1000	30~1000	-56.56	<=-18.69	PASS
		1000~26500	1000~26500	-35.8	<=-18.69	PASS
	2437	Reference	1.66	1.66	---	PASS
		30~1000	30~1000	-55.52	<=-18.34	PASS
		1000~26500	1000~26500	-48.98	<=-18.34	PASS
	2462	Reference	1.43	1.43	---	PASS
		30~1000	30~1000	-55.2	<=-18.57	PASS
		1000~26500	1000~26500	-47.68	<=-18.57	PASS
11N20SISO	2412	Reference	1.34	1.34	---	PASS
		30~1000	30~1000	-55.71	<=-18.66	PASS
		1000~26500	1000~26500	-38.67	<=-18.66	PASS
	2437	Reference	1.15	1.15	---	PASS
		30~1000	30~1000	-56.5	<=-18.85	PASS
		1000~26500	1000~26500	-49.34	<=-18.85	PASS
	2462	Reference	1.13	1.13	---	PASS
		30~1000	30~1000	-56.07	<=-18.87	PASS
		1000~26500	1000~26500	-47.83	<=-18.87	PASS
11N40SISO	2422	Reference	-1.65	-1.65	---	PASS
		30~1000	30~1000	-56.66	<=-21.65	PASS
		1000~26500	1000~26500	-37.96	<=-21.65	PASS
	2437	Reference	-1.47	-1.47	---	PASS
		30~1000	30~1000	-57.77	<=-21.47	PASS
		1000~26500	1000~26500	-48.32	<=-21.47	PASS
	2452	Reference	-1.36	-1.36	---	PASS
		30~1000	30~1000	-56.93	<=-21.36	PASS
		1000~26500	1000~26500	-41.65	<=-21.36	PASS



11B\_Ant1\_2412\_1000~26500