FCC RF Test Report

APPLICANT	:	Quectel Wireless Solutions Co., Ltd.
EQUIPMENT	:	Smart Module
BRAND NAME	:	Quectel
MODEL NAME	:	SG885G-WF
FCC ID	:	XMR2023SG885GWF
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System
TEST DATE(S)	:	Dec. 14, 2023 ~ Jan. 11, 2024

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

This report contains data that were produced under subcontract by Sporton International Inc. (ShenZhen)

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

ACCREDITED Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

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APPENDIX A. CONDUCTED TEST RESULTS

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APPENDIX C. RADIATED SPURIOUS EMISSION

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR3N0102C	Rev. 01	Initial issue of report	Mar. 18, 2024

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	99% Bandwidth	-	Report Only	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.59 dB at 2485.60 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 16.18 dB at 0.292 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	15.203 & 15.247(b)	Pass	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Applicant

Quectel Wireless Solutions Co., Ltd.
Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, 200233, China

1.2 Manufacturer

Quectel Wireless Solutions Co., Ltd.
Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, 200233, China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Smart Module
Brand Name	Quectel
Model Name	SG885G-WF
FCC ID	XMR2023SG885GWF
SN Code	Conducted: E1Y23IA0Y000008/E1Y23IB25000010 Conduction: E1Y23IA0Y0000021 Radiation: E1Y23IA0Y000031
HW Version	R1.0
SW Version	SG885GWFNAR01A03
EUT Stage	Identical Prototype

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

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Maximum (Peak) Output Power to antenna	**<MIMO Ant.1+2>** 802.11b : 24.05 dBm (0.2541 W) 802.11g : 26.64 dBm (0.4613 W) 802.11n HT20 : 26.15 dBm (0.4121 W) 802.11n HT40 : 25.72 dBm (0.3733 W) 802.11ax HE20 : 26.29 dBm (0.4256 W) 802.11ax HE40 : 25.72 dBm (0.3733 W) 802.11be EHT20 : 26.43 dBm (0.4395 W) 802.11be EHT40 : 26.08 dBm (0.4055 W)
99% Occupied Bandwidth	802.11b : 14.306MHz 802.11g : 17.463MHz 802.11n HT20 : 18.302MHz 802.11n HT40 : 37.962MHz 802.11ax HE20 : 19.301MHz 802.11ax HE40 : 39.001MHz 802.11be EHT20 : 19.341MHz 802.11be EHT40 : 39.081MHz
Antenna Type / Gain	**<Ant.1>:**Dipole Antenna type with gain 0.47 dBi **<Ant.2>:**Dipole Antenna type with gain 0.47 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ax : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM) 802.11be: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM / 4096QAM)

Note:

1. The device supports WLAN MIMO CDD mode and TXBF mode, the Power setting between them is the same, the whole testing has assessed only MIMO CDD mode by referring to their higher conducted power.
2. For WLAN SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to the higher normal output power.
3. For 802.11n/11ax/11be mode, 802.11n mode is covered by 802.11ax/be mode referring to the higher output power for RSE testing.
4. 802.11ax/be support OFDMA full RU tone and partial RU tone, both full RU and partial RU-left (for low CH) and partial RU-right (for high CH) test output power, the full RU power > partial RU, therefore the full RU perform full, and partial RU verify PSD, band edge/spurious.
5. 802.11be support OFDMA for small size RU, 52Tone + 26 Tone or 106Tone + 26Tone, test combination as below,
   a. For Low channel, 52Tone_Index37 + 26Tone_Index2 and 106Tone_Index53 + 26Tone_Index4
   b. For High channel, 52Tone_Index40 + 26Tone_Index6 and 106Tone_Index54 + 26Tone_Index4
6. The worse cases of RSE for partial RU and small size RU are shown in this report.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO01-KS	CN1257	314309

Sporton International Inc. (ShenZhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	TH01-SZ	CN1256	421272

Note: Test data subcontracted: conducted test case in section 3.1~3.4 of this report

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City, Guangdong Province 518103 People's Republic of China TEL: +86-755-86066985		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH01-SZ	CN1256	421272

Note: Test data subcontracted: Radiation test case in section 3.5 of this report

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	CO01-KS	AUDIX	E3	6.2009-8-24
2.	03CH01-SZ	AUDIX	E3	6.2009-8-24

1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart C §15.247
- FCC KDB 558074 D01 15.247 Meas Guidance v05r02
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437	-	-

2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

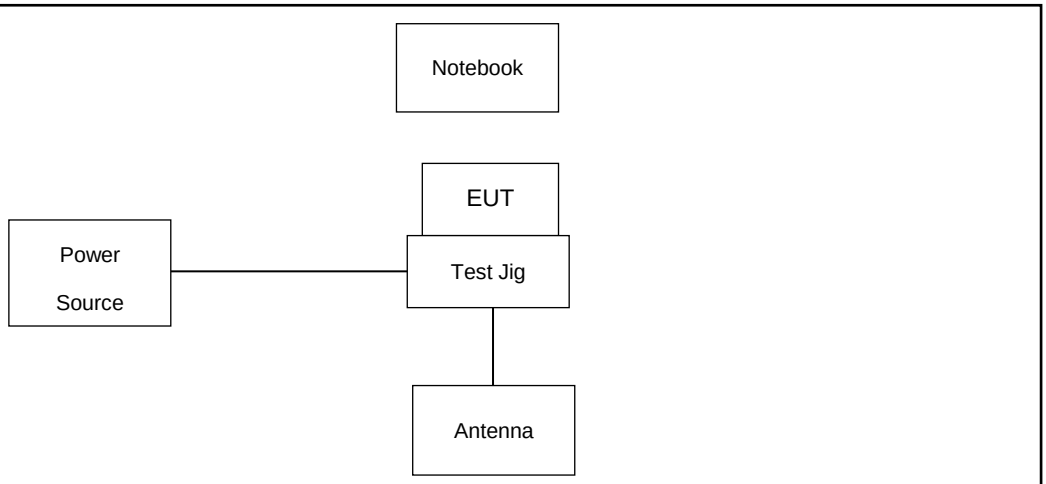
MIMO Antenna

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11be EHT20	MCS0
802.11be EHT40	MCS0

Test Cases	
AC Conducted Emission	Mode 1 :BT Link+ WLAN Link(2.4G)+Charging from Test Jig

2.3 Connection Diagram of Test System

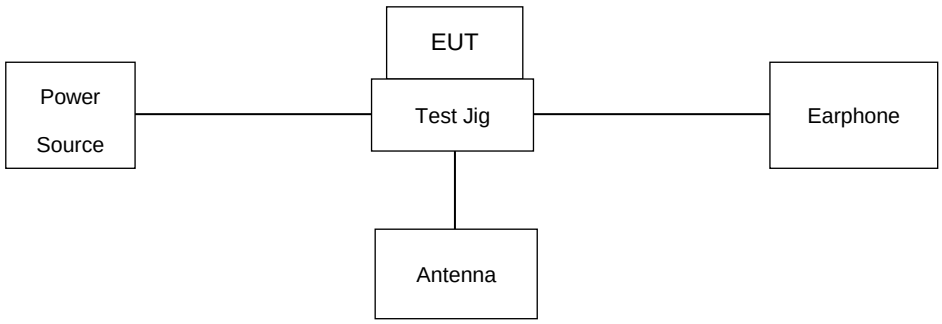
AC Conducted Emission:



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

Radiated Emission:



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	Lenovo	V130-15IKB005	N/A	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
2.	Adapter	N/A	N/A	N/A	N/A	N/A
3.	Antenna	N/A	N/A	N/A	N/A	N/A
4.	Test Jig	N/A	N/A	N/A	N/A	N/A
5.	Earphone	N/A	N/A	N/A	Unshielded, 1.2m	N/A

2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous transmit.

For AC power line conducted emissions, the EUT was set to connect with the notebook under large package sizes transmission.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 1.62 dB and 20dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 1.62 + 20 = 21.62 (dB)

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 11.8
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 1%~5% of OBW and set the VBW is set to 3 times of the RBW.
6. Measure and record the results in the test report.

3.1.4 Test Setup

3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A.

3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

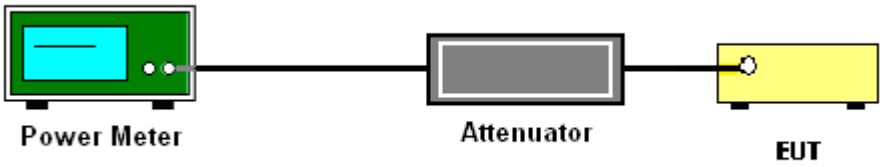
3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 clause 11.9.1.3 PKPM1 Peak power meter or ANSI C63.10-2013 clause 11.9.2.3.1 Method AVGPM method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

3.2.4 Test Setup



3.2.5 Test Result of Peak Output Power

Please refer to Appendix A.

3.2.6 Test Result of Average Output Power (Reporting Only)

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

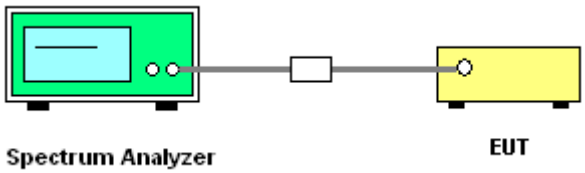
3.3.3 Test Procedures

1. The testing follows Measurement Procedure of ANSI C63.10-2013 clause 11.10.2 Method PKPSD.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.
7. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01:

   Method (b): Measure and sum spectral maxima across the outputs.

   The measurement on each individual output were performed with the same span and number on each individual output. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement.

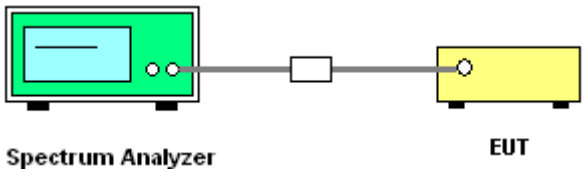
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 11.11
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup



3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Please refer to Appendix A.

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.5.2 Measuring Instruments

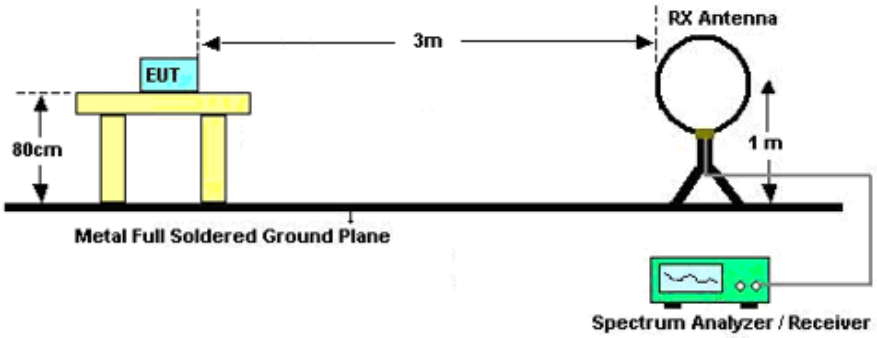
The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

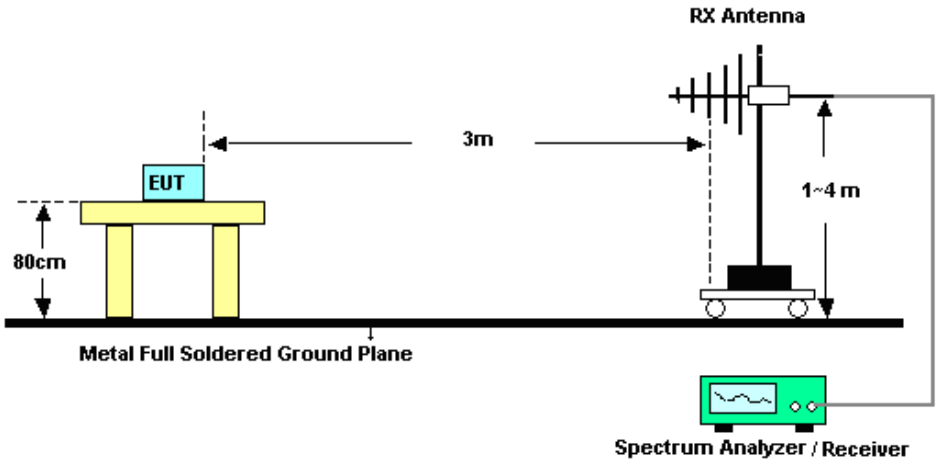
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

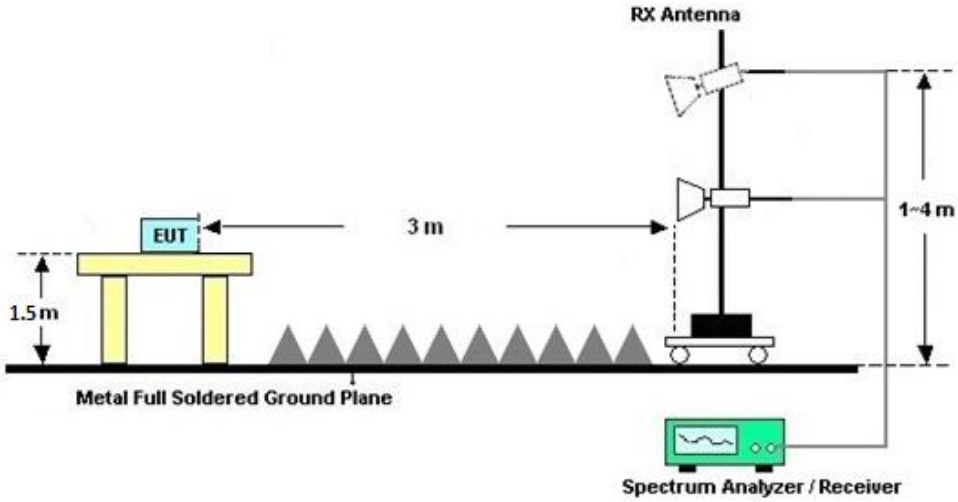
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.5.5 Test Results of Radiated Spurious Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.5.7 Duty Cycle

Please refer to Appendix D.

3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)

Please refer to Appendix C.

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

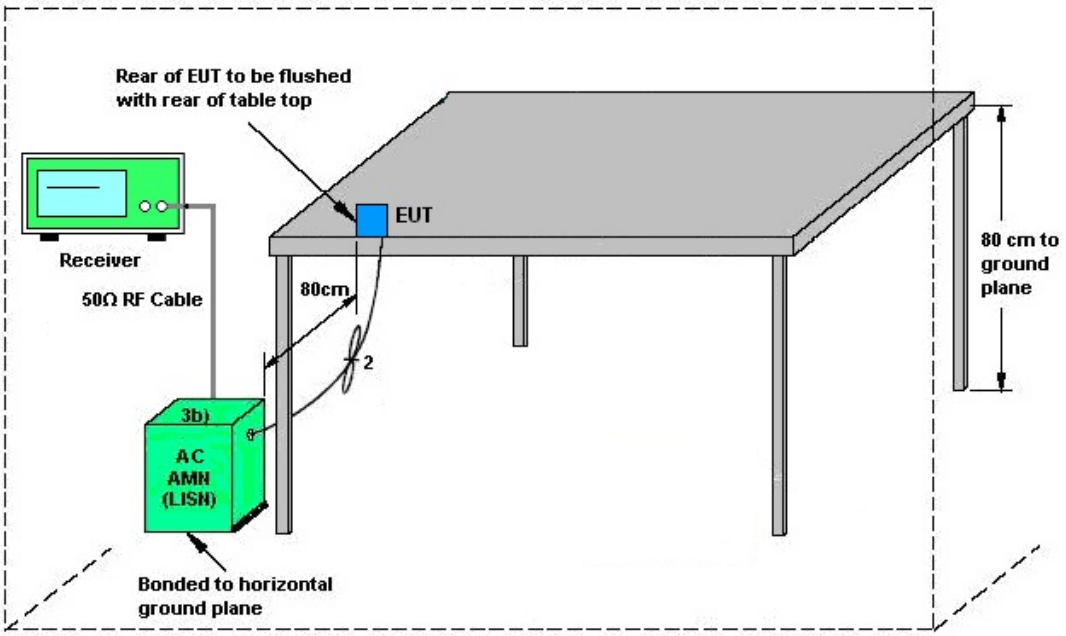
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9kHz) with Maximum Hold Mode.

3.6.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached Antenna or of an Antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.7.2 Antenna Anti-Replacement Construction

Non-standard antenna connector is used.

3.7.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = 10 log(N_{ANT}/N_{SS}=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain G_{ANT} is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

<CDD Modes>

	Ant. 0 (dBi)	Ant. 1 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
2.4 GHz	0.47	0.47	0.47	3.48	0.00	0.00

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)

<TXBF Mode>

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For TXBF transmissions, directional gain is calculated as

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k / 20}$ if the kth antenna is being fed by spatial stream j, or zero if it is not;

G_k is the gain in dBi of the kth antenna.

The EUT supports beamforming for 802.11n/ax/be modes.

The directional gain calculation is following F)2)e)ii).

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is as following table.

	Ant 1 (dBi)	Ant 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)
2.4GHz	0.47	0.47	3.48	3.48

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 06, 2023	Dec. 17, 2023~ Dec. 22, 2023	Apr. 05, 2024	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1339473	30MHz~40GHz	Dec. 27, 2022	Dec. 17, 2023~ Dec. 22, 2023	Dec. 26, 2023	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1542004	50MHz Bandwidth	Dec. 27, 2022	Dec. 17, 2023~ Dec. 22, 2023	Dec. 26, 2023	Conducted (TH01-SZ)
Thermo meter	Anymetre	JR593	#7	- 10℃ ~ 50℃ 10%RH~99%RH	Apr. 08, 2023	Dec. 17, 2023~ Dec. 22, 2023	Apr. 07, 2024	Conducted (TH01-SZ)
EMI Test Receiver&SA	Agilent	N9038A	MY52260185	20Hz~26.5GHz	Dec. 27, 2023	Jan. 03, 2024~ Jan. 11, 2024	Dec. 26, 2024	Radiation (03CH01-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 07, 2023	Jan. 03, 2024~ Jan. 11, 2024	Jul. 06, 2024	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jul. 28, 2022	Jan. 03, 2024~ Jan. 11, 2024	Jul. 27, 2024	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Oct. 24, 2023	Jan. 03, 2024~ Jan. 11, 2024	Oct. 23, 2025	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Jul. 08, 2023	Jan. 03, 2024~ Jan. 11, 2024	Jul. 07, 2024	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 08, 2023	Jan. 03, 2024~ Jan. 11, 2024	Apr. 07, 2024	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 04, 2023	Jan. 03, 2024~ Jan. 11, 2024	Apr. 03, 2024	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 18, 2023	Jan. 03, 2024~ Jan. 11, 2024	Oct. 17, 2024	Radiation (03CH01-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5Ghz	Oct. 18, 2023	Jan. 03, 2024~ Jan. 11, 2024	Oct. 17, 2024	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 07, 2023	Jan. 03, 2024~ Jan. 11, 2024	Jul. 06, 2024	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	Oct. 18, 2023	Jan. 03, 2024~ Jan. 11, 2024	Oct. 17, 2024	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jan. 03, 2024~ Jan. 11, 2024	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Jan. 03, 2024~ Jan. 11, 2024	NCR	Radiation (03CH01-SZ)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	May 16, 2023	Dec. 14, 2023	May 15, 2024	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 11, 2023	Dec. 14, 2023	Oct. 10, 2024	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	May 16, 2023	Dec. 14, 2023	May 15, 2024	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 11, 2023	Dec. 14, 2023	Oct. 10, 2024	Conduction (CO01-KS)

NCR: No Calibration Required

5 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Spurious Emission & Bandedge	±1.34 dB
Occupied Channel Bandwidth	±0.1%
Conducted Power	±1.34 dB
Conducted Power Spectral Density	±1.32 dB
Frequency	±1.3 Hz

Uncertainty of AC Conducted Emission Measurement (0.15 MHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.84 dB

Uncertainty of Radiated Emission Measurement (9 KHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.8 dB

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.2 dB

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0 dB

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.3 dB

---------- THE END ----------

Appendix A. Conducted Test Results

A1. Conducted Test Results

Test Engineer:	Ma Jie	Temperature:	21~25	°C
Test Date:	2023/12/17~2023/12/22	Relative Humidity:	51~54	%

Report Number : FR3N0102C

TEST RESULTS DATA
Peak Output Power

2.4GHz Band MIMO																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
11b	1Mbps	2	1	2412	20.72	21.34	24.05	30.00		0.47		24.52		36.00		Pass
11b	1Mbps	2	6	2437	20.70	20.63	23.68	30.00		0.47		24.15		36.00		Pass
11b	1Mbps	2	11	2462	20.73	20.71	23.73	30.00		0.47		24.20		36.00		Pass
11g	6Mbps	2	1	2412	23.15	23.67	26.43	30.00		0.47		26.90		36.00		Pass
11g	6Mbps	2	6	2437	23.96	23.28	26.64	30.00		0.47		27.11		36.00		Pass
11g	6Mbps	2	11	2462	23.52	23.53	26.54	30.00		0.47		27.01		36.00		Pass
HT20	MCS0	2	1	2412	23.23	23.05	26.15	30.00		0.47		26.62		36.00		Pass
HT20	MCS0	2	6	2437	22.65	22.71	25.69	30.00		0.47		26.16		36.00		Pass
HT20	MCS0	2	11	2462	22.73	23.23	26.00	30.00		0.47		26.47		36.00		Pass
HT40	MCS0	2	3	2422	22.46	22.74	25.61	30.00		0.47		26.08		36.00		Pass
HT40	MCS0	2	6	2437	22.51	22.91	25.72	30.00		0.47		26.19		36.00		Pass
HT40	MCS0	2	9	2452	22.41	22.50	25.47	30.00		0.47		25.94		36.00		Pass

Note: Measured power (dBm) has offset with cable loss.

Report Number : FR3N0102C

TEST RESULTS DATA
Average Output Power

2.4GHz Band MIMO																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
11b	1Mbps	2	1	2412	17.61	18.34	21.00	30.00		0.47		21.47		36.00		Pass
11b	1Mbps	2	6	2437	17.27	17.79	20.55	30.00		0.47		21.02		36.00		Pass
11b	1Mbps	2	11	2462	17.68	18.15	20.93	30.00		0.47		21.40		36.00		Pass
11g	6Mbps	2	1	2412	17.26	17.95	20.63	30.00		0.47		21.10		36.00		Pass
11g	6Mbps	2	6	2437	17.08	17.61	20.36	30.00		0.47		20.83		36.00		Pass
11g	6Mbps	2	11	2462	17.38	17.96	20.69	30.00		0.47		21.16		36.00		Pass
HT20	MCS0	2	1	2412	16.29	16.87	19.60	30.00		0.47		20.07		36.00		Pass
HT20	MCS0	2	6	2437	15.93	16.65	19.32	30.00		0.47		19.79		36.00		Pass
HT20	MCS0	2	11	2462	16.33	16.91	19.64	30.00		0.47		20.11		36.00		Pass
HT40	MCS0	2	3	2422	16.23	17.01	19.65	30.00		0.47		20.12		36.00		Pass
HT40	MCS0	2	6	2437	16.38	17.10	19.77	30.00		0.47		20.24		36.00		Pass
HT40	MCS0	2	9	2452	16.53	17.05	19.81	30.00		0.47		20.28		36.00		Pass

Setting	
Ant 1	Ant 2
17.50	
17.50	
17.50	
17.50	
17.50	
17.50	
16.50	
16.50	
16.50	
16.50	
16.50	
16.50	

Note: Measured power (dBm) has offset with cable loss.

Report Number : FR3N0102C

TEST RESULTS DATA
Peak Output Power

2.4GHz Band MIMO																	
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
						Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
HE20	MCS0	2	1	2412	Full	23.31	23.25	26.29	30.00		0.47		26.76		36.00		Pass
HE20	MCS0	2	1	2412	26/0	15.18	15.51	18.36	30.00		0.47		18.83		36.00		Pass
HE20	MCS0	2	1	2412	52/37	17.62	18.21	20.94	30.00		0.47		21.41		36.00		Pass
HE20	MCS0	2	1	2412	106/53	20.48	21.15	23.84	30.00		0.47		24.31		36.00		Pass
HE20	MCS0	2	6	2437	Full	22.78	22.91	25.86	30.00		0.47		26.33		36.00		Pass
HE20	MCS0	2	11	2462	Full	22.54	23.01	25.79	30.00		0.47		26.26		36.00		Pass
HE20	MCS0	2	11	2462	26/8	14.31	14.96	17.66	30.00		0.47		18.13		36.00		Pass
HE20	MCS0	2	11	2462	52/40	17.25	17.26	20.27	30.00		0.47		20.74		36.00		Pass
HE20	MCS0	2	11	2462	106/54	20.22	20.18	23.21	30.00		0.47		23.68		36.00		Pass
HE40	MCS0	2	3	2422	Full	22.56	22.65	25.62	30.00		0.47		26.09		36.00		Pass
HE40	MCS0	2	6	2437	Full	22.61	22.81	25.72	30.00		0.47		26.19		36.00		Pass
HE40	MCS0	2	9	2452	Full	20.78	20.85	23.83	30.00		0.47		24.30		36.00		Pass

Note: Measured power (dBm) has offset with cable loss.

Report Number : FR3N0102C

TEST RESULTS DATA
Average Output Power

2.4GHz Band MIMO																		
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail	Setting	
						Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2		Ant 1	Ant 2
HE20	MCS0	2	1	2412	Full	16.37	17.07	19.74	30.00		0.47		20.21		36.00		Pass	16.50	
HE20	MCS0	2	1	2412	26/0	6.27	7.73	10.07	30.00		0.47		10.54		36.00		Pass	7.50	
HE20	MCS0	2	1	2412	52/37	9.07	10.24	12.70	30.00		0.47		13.17		36.00		Pass	10.00	
HE20	MCS0	2	1	2412	106/53	12.21	13.35	15.83	30.00		0.47		16.30		36.00		Pass	13.00	
HE20	MCS0	2	6	2437	Full	16.09	16.79	19.46	30.00		0.47		19.93		36.00		Pass	16.50	
HE20	MCS0	2	11	2462	Full	16.02	16.72	19.39	30.00		0.47		19.86		36.00		Pass	16.00	
HE20	MCS0	2	11	2462	26/8	5.83	6.95	9.44	30.00		0.47		9.91		36.00		Pass	6.50	
HE20	MCS0	2	11	2462	52/40	8.71	9.61	12.19	30.00		0.47		12.66		36.00		Pass	9.00	
HE20	MCS0	2	11	2462	106/54	11.53	12.48	15.04	30.00		0.47		15.51		36.00		Pass	12.00	
HE40	MCS0	2	3	2422	Full	16.35	17.05	19.72	30.00		0.47		20.19		36.00		Pass	16.50	
HE40	MCS0	2	6	2437	Full	16.42	17.12	19.79	30.00		0.47		20.26		36.00		Pass	16.50	
HE40	MCS0	2	9	2452	Full	14.45	15.18	17.84	30.00		0.47		18.31		36.00		Pass	14.50	

Note: Measured power (dBm) has offset with cable loss.

Report Number : FR3N0102C

TEST RESULTS DATA
Peak Output Power

2.4GHz Band MIMO																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
						Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
EHT20	MCS0	2	1	2412	Full	23.23	23.61	26.43	30.00		0.47		26.90		36.00		Pass
EHT20	MCS0	2	1	2412	26/0	14.40	15.10	17.77	30.00		0.47		18.24		36.00		Pass
EHT20	MCS0	2	1	2412	52/37	17.85	18.50	21.20	30.00		0.47		21.67		36.00		Pass
EHT20	MCS0	2	1	2412	106/53	20.79	21.45	24.14	30.00		0.47		24.61		36.00		Pass
EHT20	MCS0	2	6	2437	Full	23.35	22.77	26.08	30.00		0.47		26.55		36.00		Pass
EHT20	MCS0	2	11	2462	Full	22.77	23.10	25.95	30.00		0.47		26.42		36.00		Pass
EHT20	MCS0	2	11	2462	26/8	14.11	14.77	17.46	30.00		0.47		17.93		36.00		Pass
EHT20	MCS0	2	11	2462	52/40	18.16	18.23	21.21	30.00		0.47		21.68		36.00		Pass
EHT20	MCS0	2	11	2462	106/54	21.05	21.36	24.22	30.00		0.47		24.69		36.00		Pass
EHT40	MCS0	2	3	2422	Full	22.58	22.66	25.63	30.00		0.47		26.10		36.00		Pass
EHT40	MCS0	2	6	2437	Full	22.83	23.30	26.08	30.00		0.47		26.55		36.00		Pass
EHT40	MCS0	2	9	2452	Full	21.21	21.04	24.14	30.00		0.47		24.61		36.00		Pass

Note: Measured power (dBm) has offset with cable loss.

Report Number : FR3N0102C

TEST RESULTS DATA
Average Output Power

2.4GHz Band MIMO																		
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail	Setting
						Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2		Ant 1 / Ant 2
EHT20	MCS0	2	1	2412	Full	16.36	17.03	19.72	30.00		0.47		20.19		36.00		Pass	16.50
EHT20	MCS0	2	1	2412	26/0	5.82	7.09	9.51	30.00		0.47		9.98		36.00		Pass	7.00
EHT20	MCS0	2	1	2412	52/37	9.19	10.10	12.68	30.00		0.47		13.15		36.00		Pass	10.00
EHT20	MCS0	2	1	2412	106/53	12.33	13.19	15.79	30.00		0.47		16.26		36.00		Pass	13.00
EHT20	MCS0	2	6	2437	Full	16.07	16.77	19.44	30.00		0.47		19.91		36.00		Pass	16.50
EHT20	MCS0	2	11	2462	Full	16.07	16.75	19.43	30.00		0.47		19.90		36.00		Pass	16.00
EHT20	MCS0	2	11	2462	26/8	5.84	6.82	9.37	30.00		0.47		9.84		36.00		Pass	6.50
EHT20	MCS0	2	11	2462	52/40	9.77	10.52	13.17	30.00		0.47		13.64		36.00		Pass	10.00
EHT20	MCS0	2	11	2462	106/54	12.54	13.48	16.05	30.00		0.47		16.52		36.00		Pass	13.00
EHT40	MCS0	2	3	2422	Full	15.66	16.26	18.98	30.00		0.47		19.45		36.00		Pass	16.00
EHT40	MCS0	2	6	2437	Full	16.05	17.14	19.64	30.00		0.47		20.11		36.00		Pass	16.50
EHT40	MCS0	2	9	2452	Full	14.15	15.13	17.68	30.00		0.47		18.15		36.00		Pass	14.50

Note: Measured power (dBm) has offset with cable loss.

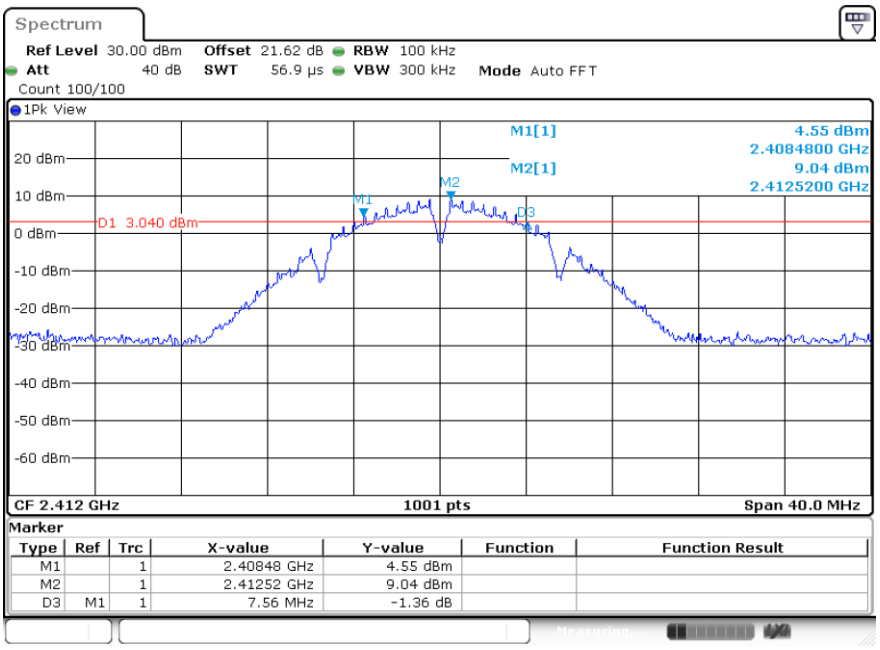
DTS Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B-CDD	Ant1	2412	7.56	2408.48	2416.04	0.5	PASS
	Ant2	2412	8.04	2408.00	2416.04	0.5	PASS
	Ant1	2437	8.04	2433.00	2441.04	0.5	PASS
	Ant2	2437	8.04	2433.00	2441.04	0.5	PASS
	Ant1	2462	8.04	2458.00	2466.04	0.5	PASS
	Ant2	2462	8.08	2457.96	2466.04	0.5	PASS
11G-CDD	Ant1	2412	16.36	2403.84	2420.20	0.5	PASS
	Ant2	2412	16.36	2403.84	2420.20	0.5	PASS
	Ant1	2437	16.36	2428.84	2445.20	0.5	PASS
	Ant2	2437	16.32	2428.88	2445.20	0.5	PASS
	Ant1	2462	16.36	2453.84	2470.20	0.5	PASS
	Ant2	2462	16.36	2453.84	2470.20	0.5	PASS
11N20MIMO	Ant1	2412	17.64	2403.20	2420.84	0.5	PASS
	Ant2	2412	17.64	2403.20	2420.84	0.5	PASS
	Ant1	2437	17.64	2428.20	2445.84	0.5	PASS
	Ant2	2437	17.56	2428.24	2445.80	0.5	PASS
	Ant1	2462	17.72	2453.12	2470.84	0.5	PASS
	Ant2	2462	17.60	2453.20	2470.80	0.5	PASS
11N40MIMO	Ant1	2422	36.40	2403.84	2440.24	0.5	PASS
	Ant2	2422	36.32	2403.84	2440.16	0.5	PASS
	Ant1	2437	36.40	2418.84	2455.24	0.5	PASS
	Ant2	2437	36.32	2418.84	2455.16	0.5	PASS
	Ant1	2452	36.32	2433.84	2470.16	0.5	PASS
	Ant2	2452	35.92	2434.24	2470.16	0.5	PASS
11AX20MIMO	Ant1	2412	19.04	2402.48	2421.52	0.5	PASS
	Ant2	2412	19.00	2402.52	2421.52	0.5	PASS
	Ant1	2437	18.96	2427.56	2446.52	0.5	PASS
	Ant2	2437	18.92	2427.60	2446.52	0.5	PASS
	Ant1	2462	19.04	2452.48	2471.52	0.5	PASS
	Ant2	2462	19.00	2452.52	2471.52	0.5	PASS
11AX40MIMO	Ant1	2422	38.24	2402.88	2441.12	0.5	PASS
	Ant2	2422	38.16	2402.96	2441.12	0.5	PASS
	Ant1	2437	38.16	2417.88	2456.04	0.5	PASS
	Ant2	2437	37.84	2418.12	2455.96	0.5	PASS
	Ant1	2452	38.16	2432.96	2471.12	0.5	PASS
	Ant2	2452	38.16	2433.04	2471.20	0.5	PASS
11BE20MIMO	Ant1	2412	19.00	2402.52	2421.52	0.5	PASS
	Ant2	2412	19.16	2402.44	2421.60	0.5	PASS
	Ant1	2437	19.12	2427.48	2446.60	0.5	PASS
	Ant2	2437	18.96	2427.64	2446.60	0.5	PASS
	Ant1	2462	19.04	2452.48	2471.52	0.5	PASS
	Ant2	2462	19.04	2452.52	2471.56	0.5	PASS
11BE40MIMO	Ant1	2422	38.32	2402.88	2441.20	0.5	PASS
	Ant2	2422	38.08	2402.96	2441.04	0.5	PASS
	Ant1	2437	38.32	2417.88	2456.20	0.5	PASS
	Ant2	2437	38.32	2417.88	2456.20	0.5	PASS
	Ant1	2452	38.32	2432.88	2471.20	0.5	PASS
	Ant2	2452	38.16	2433.04	2471.20	0.5	PASS

Test Graphs

11B-CDD_Ant1_2412



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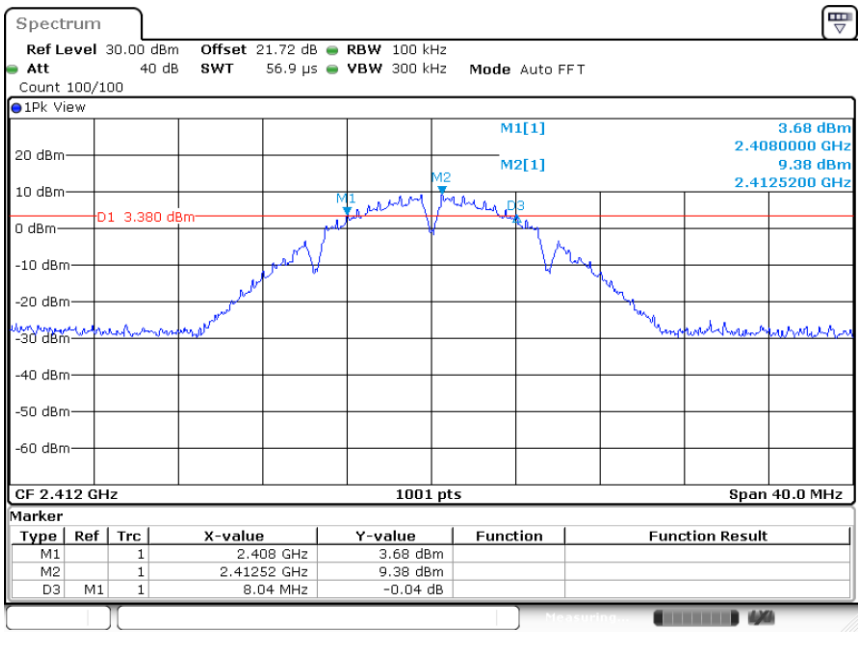
11B-CDD_Ant2_2412



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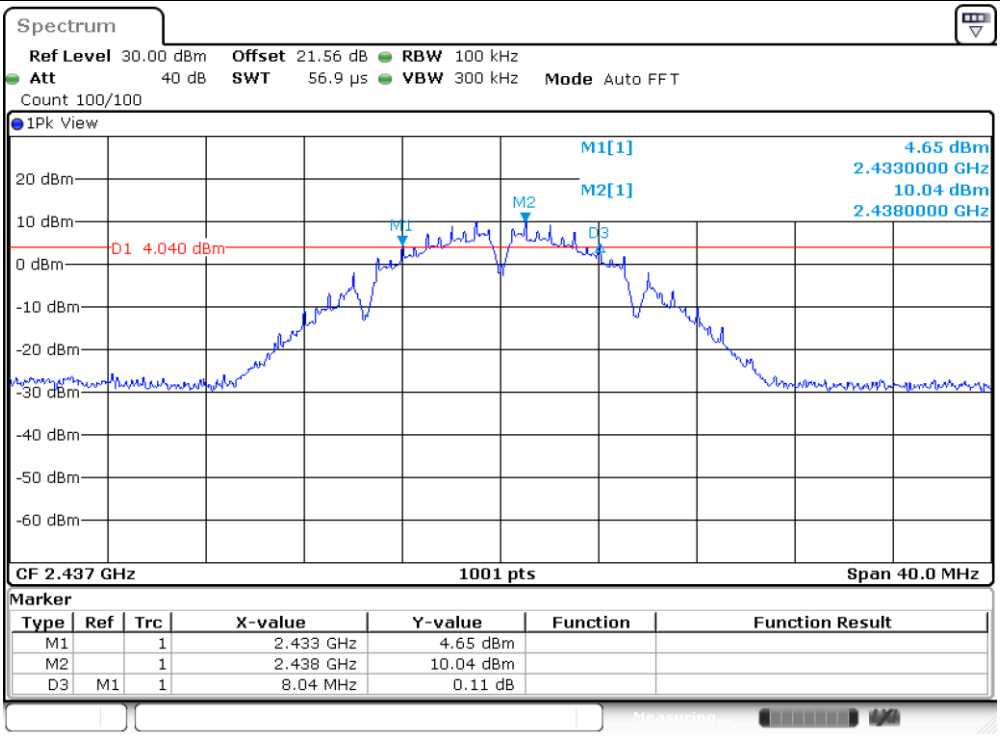

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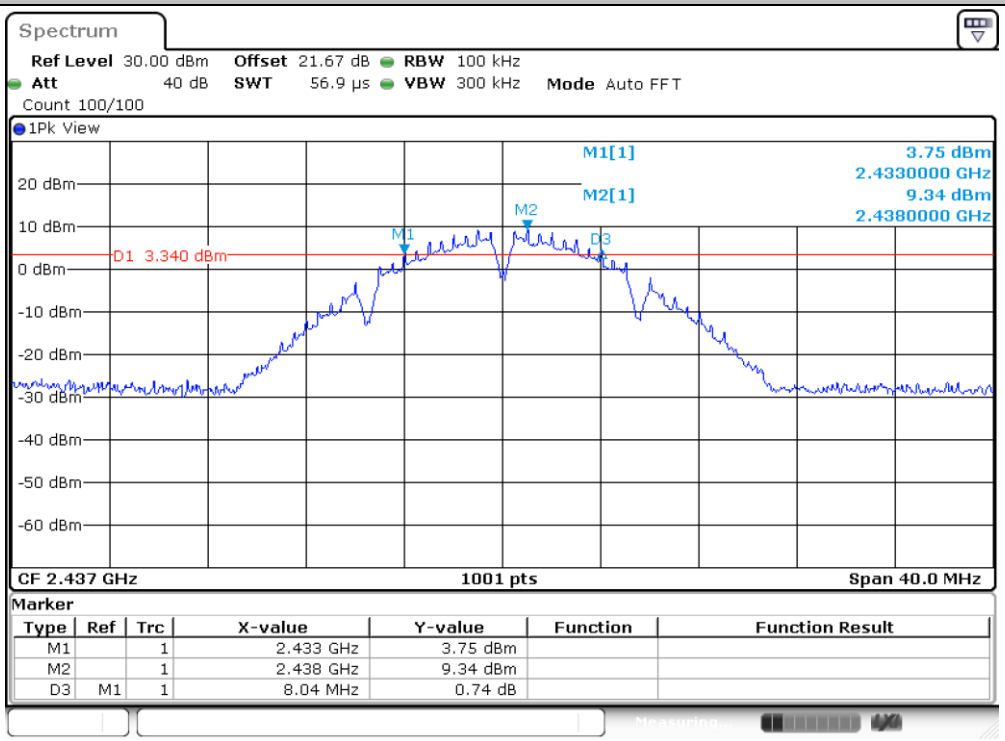

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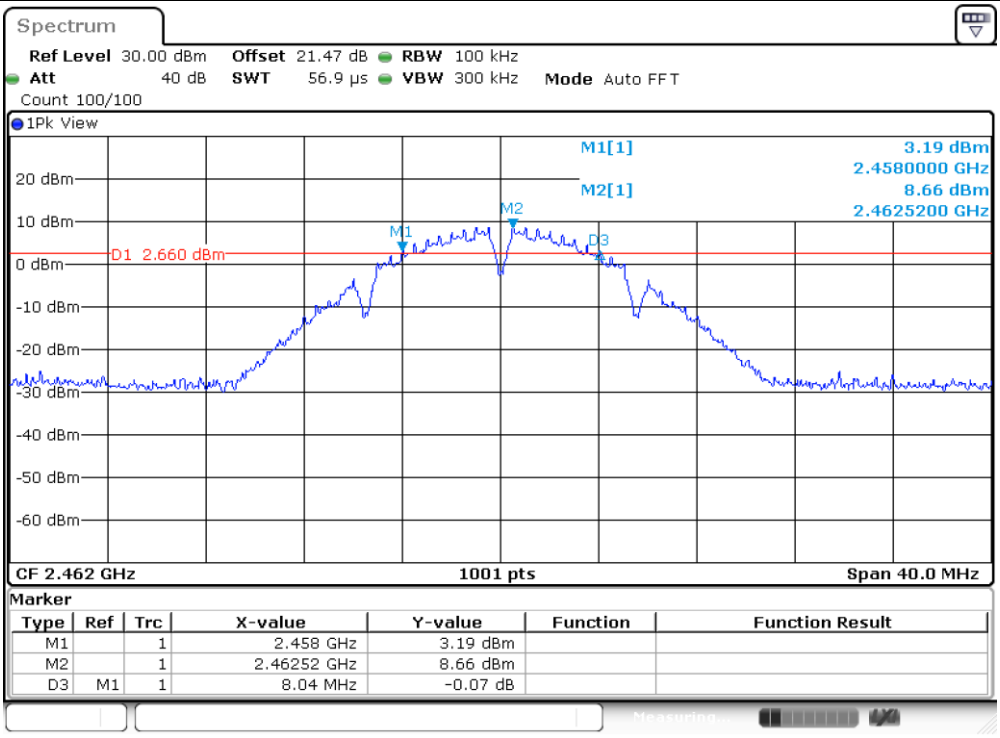

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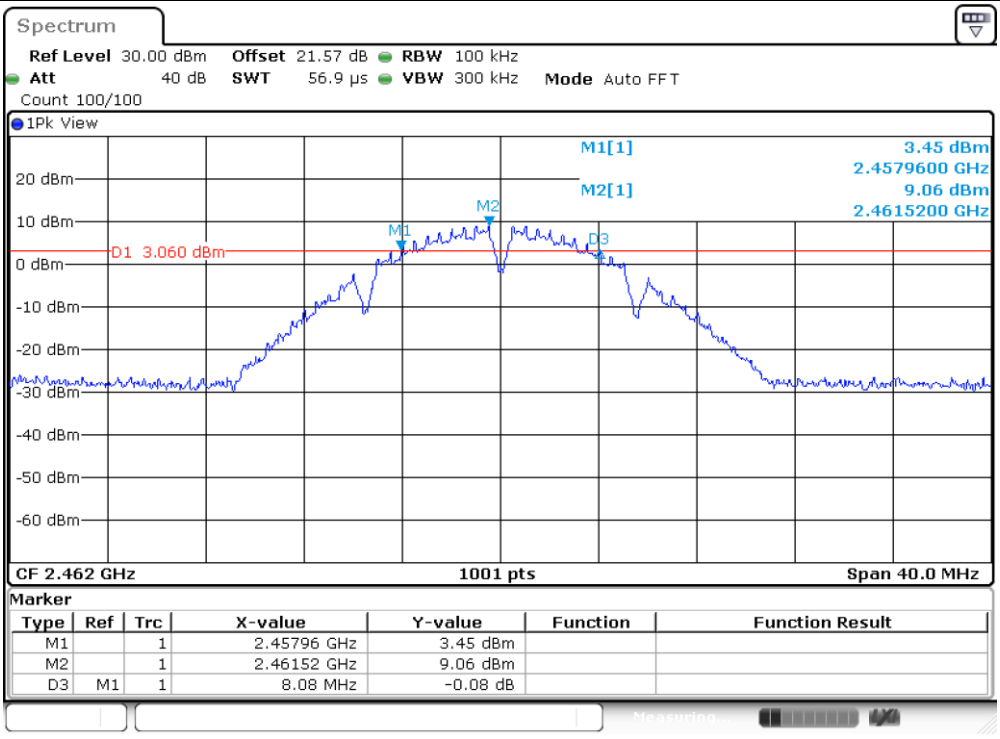

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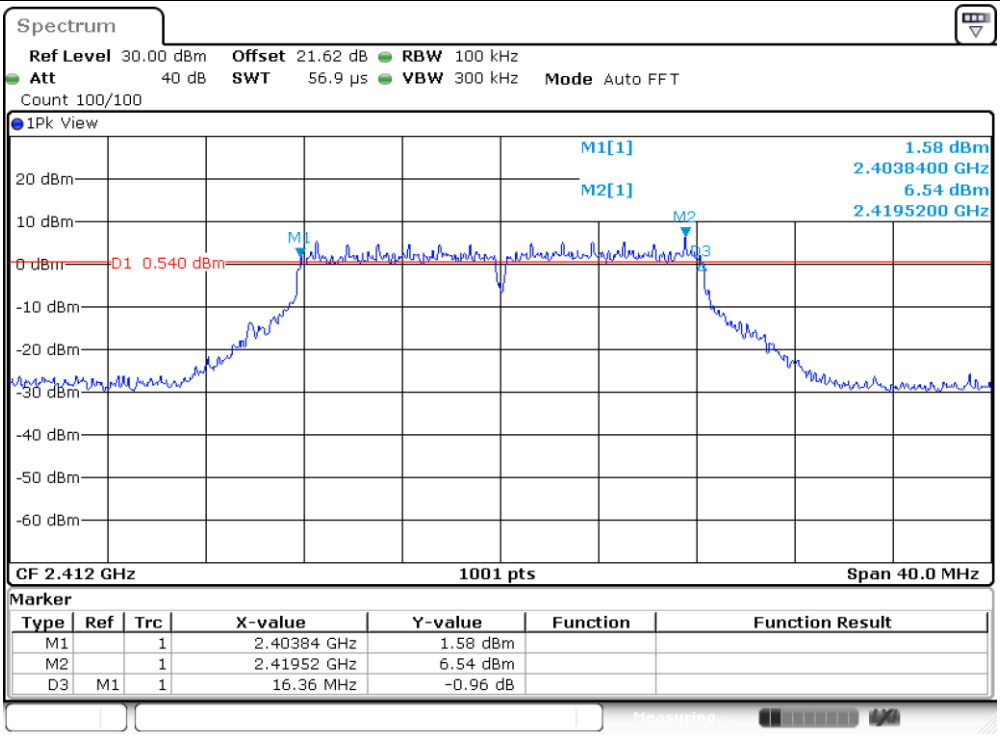

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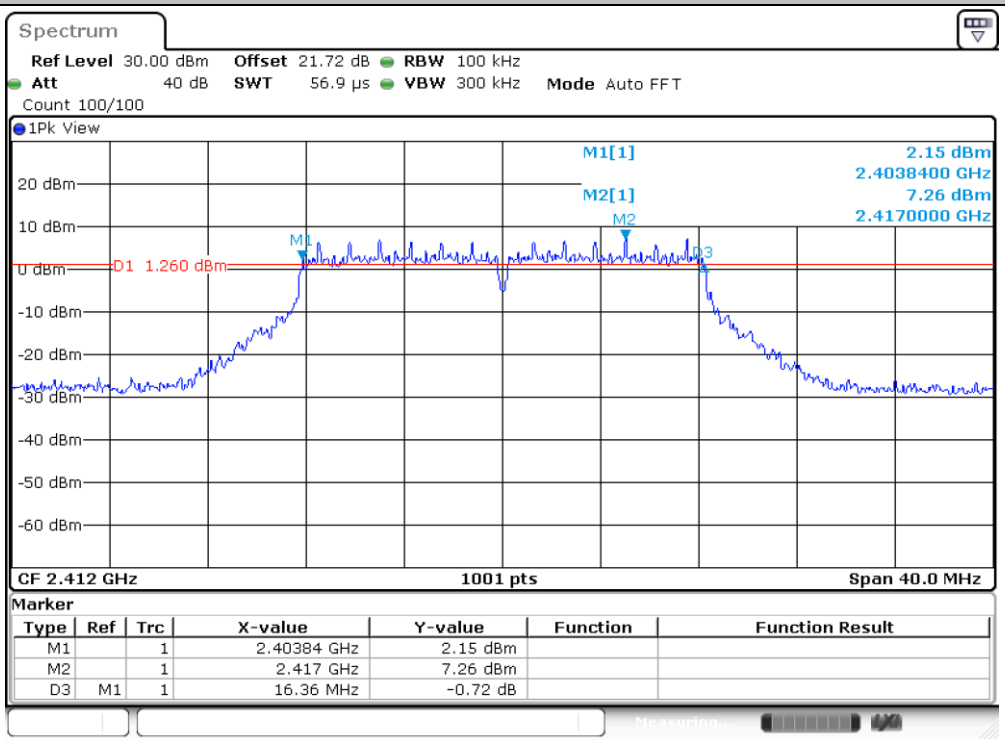

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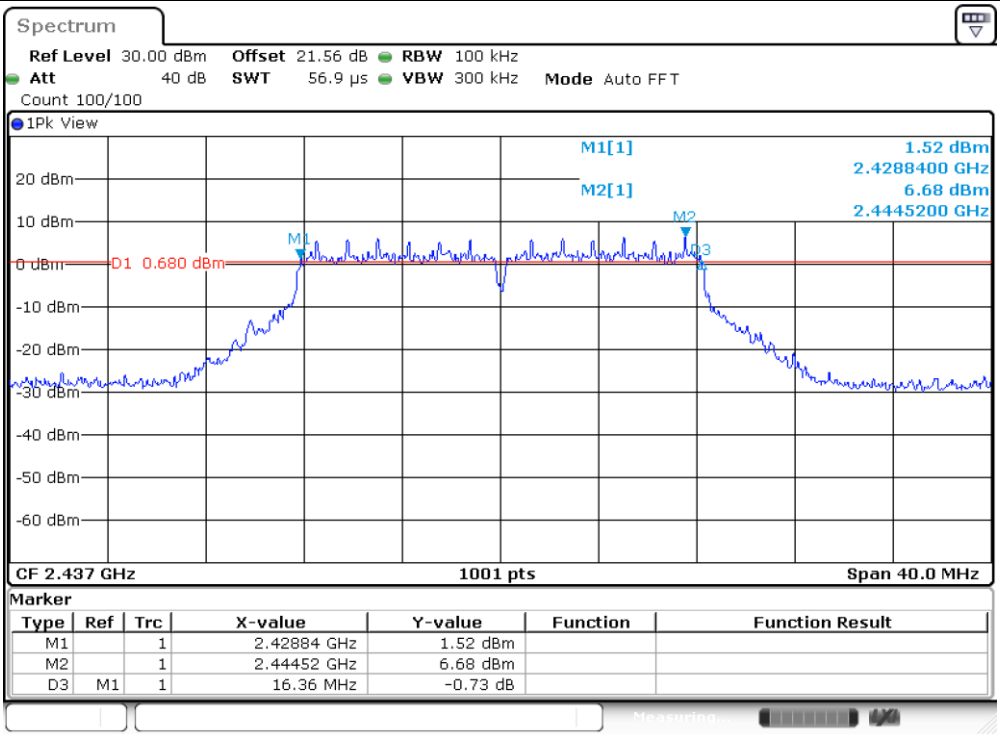

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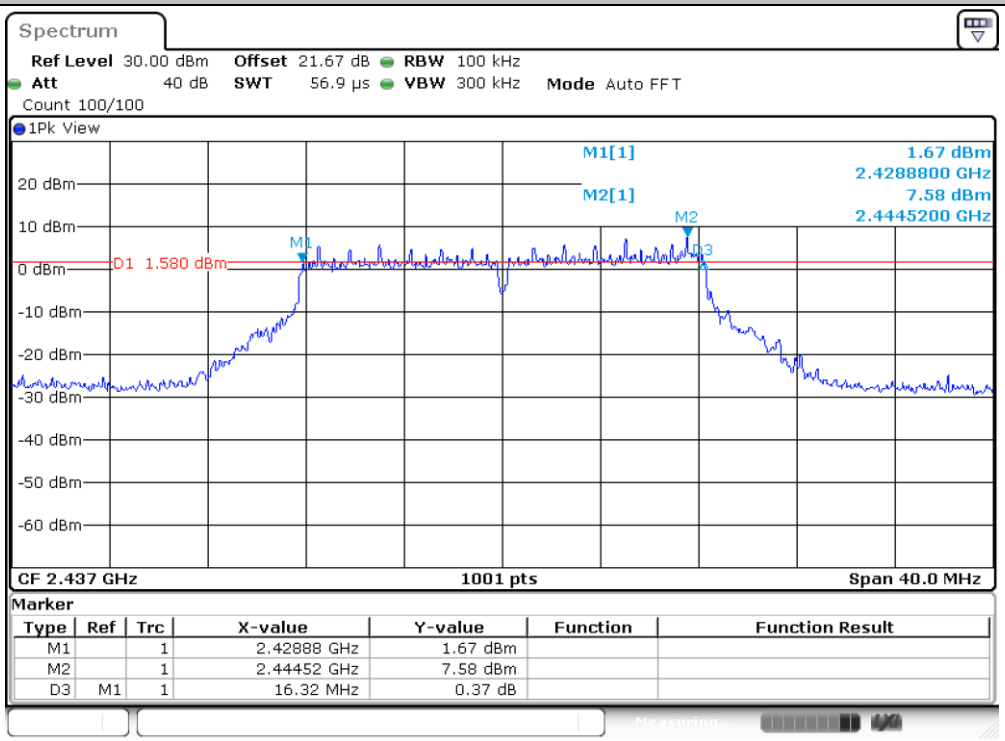

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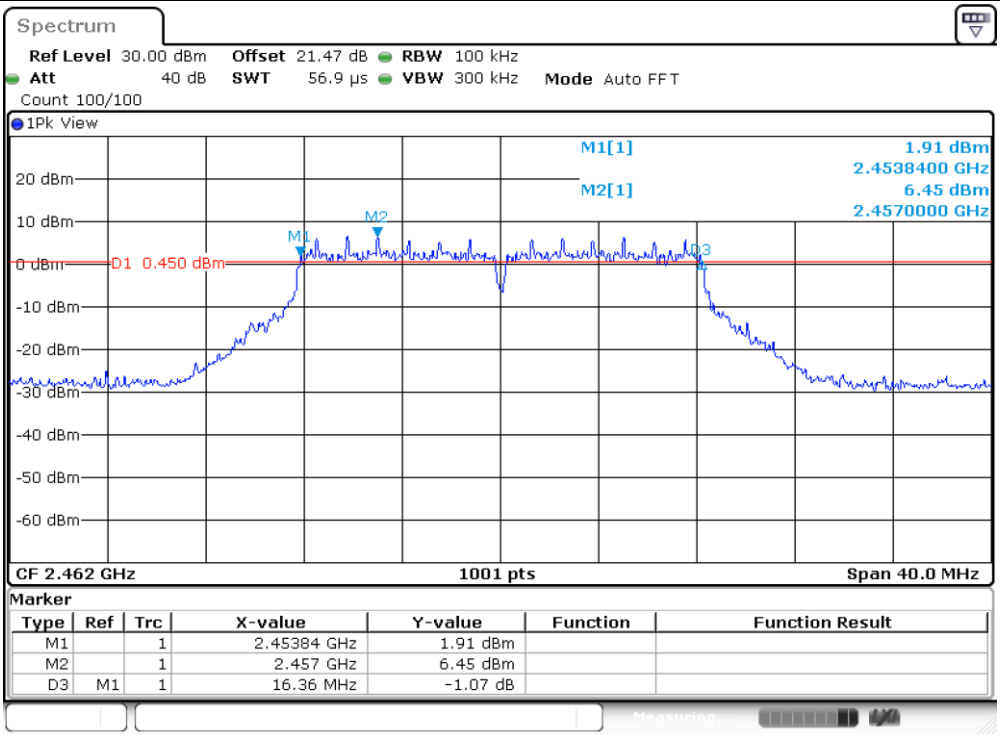

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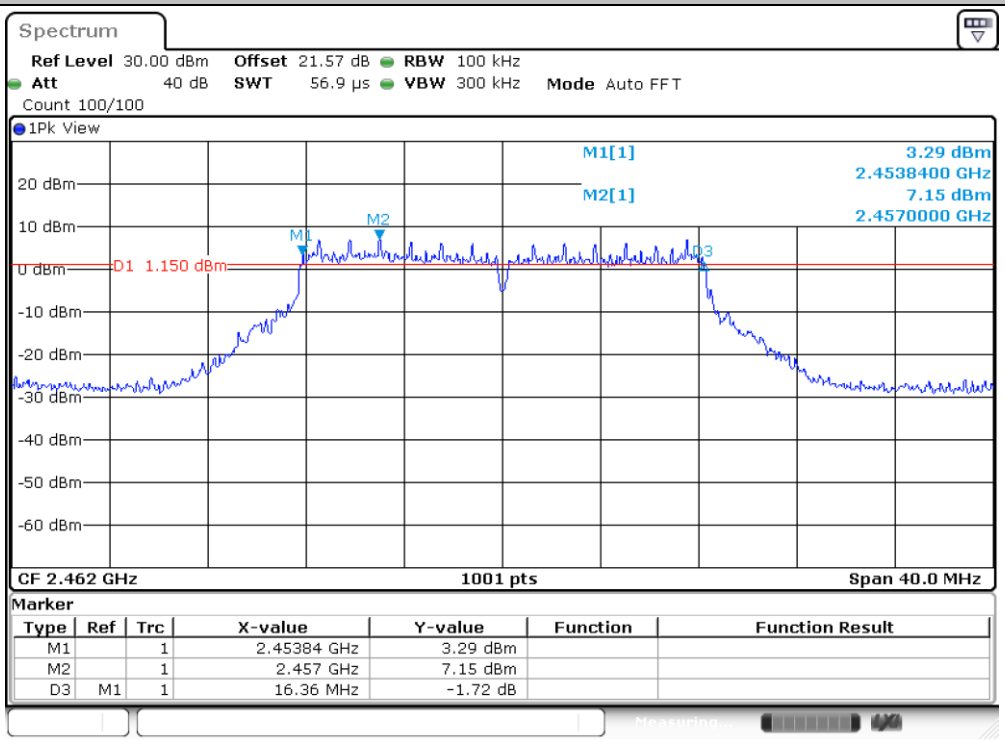

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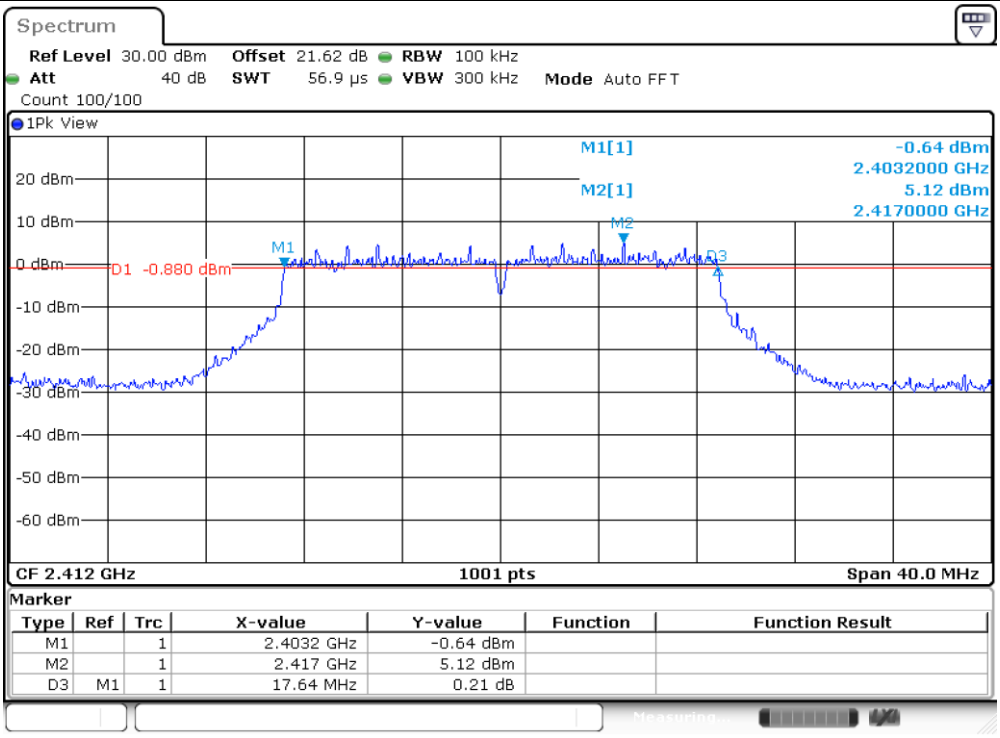

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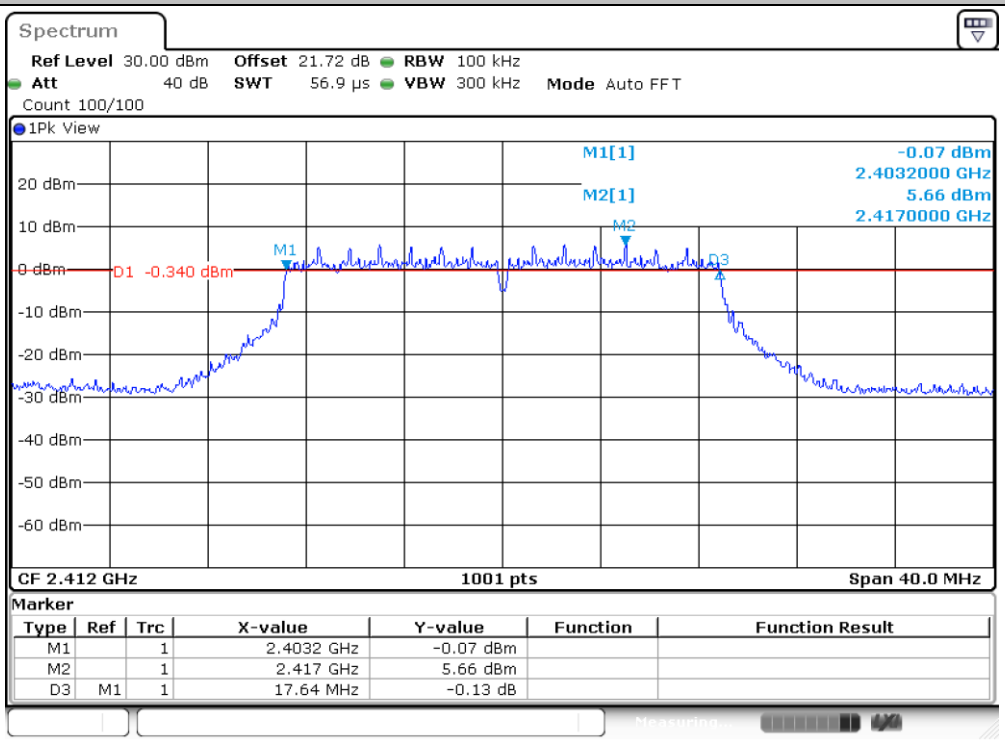

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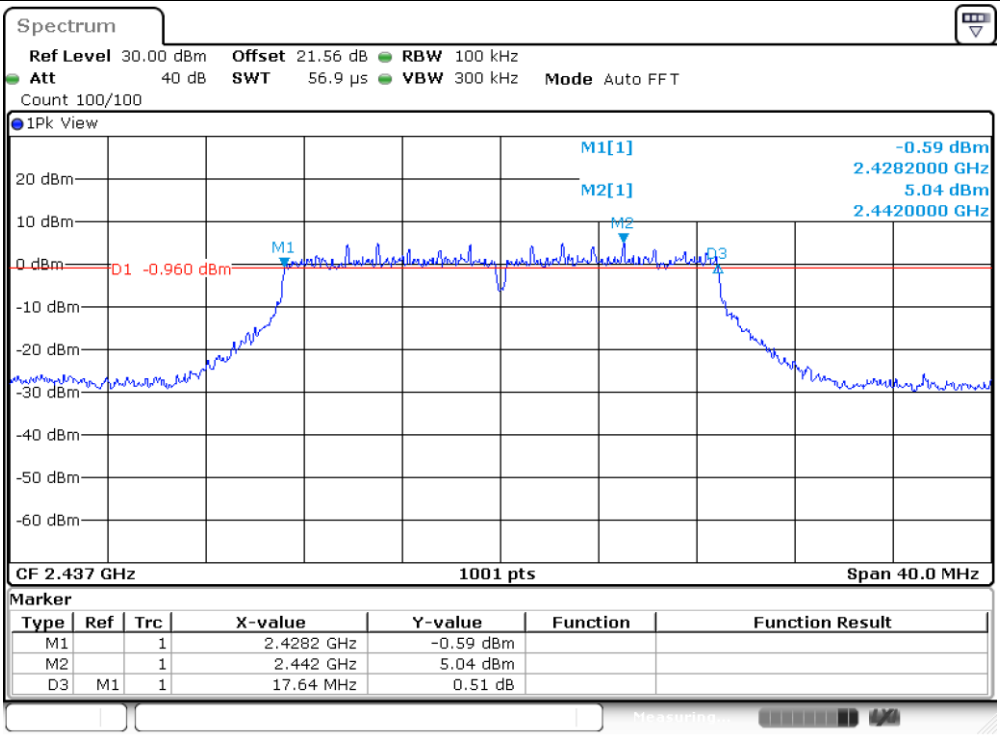

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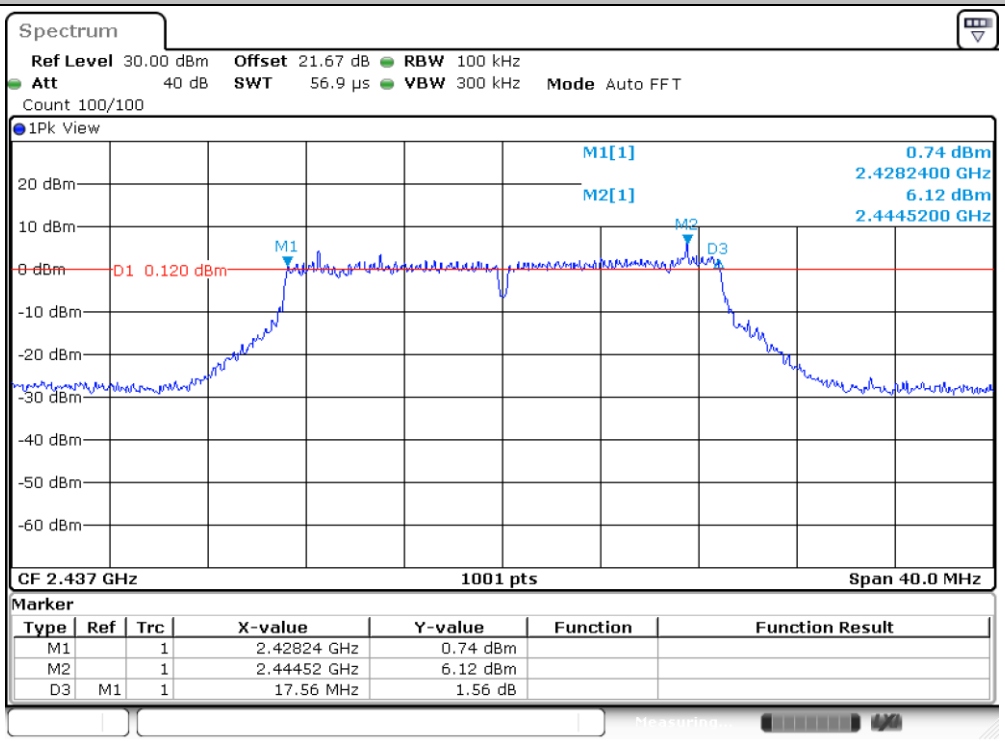

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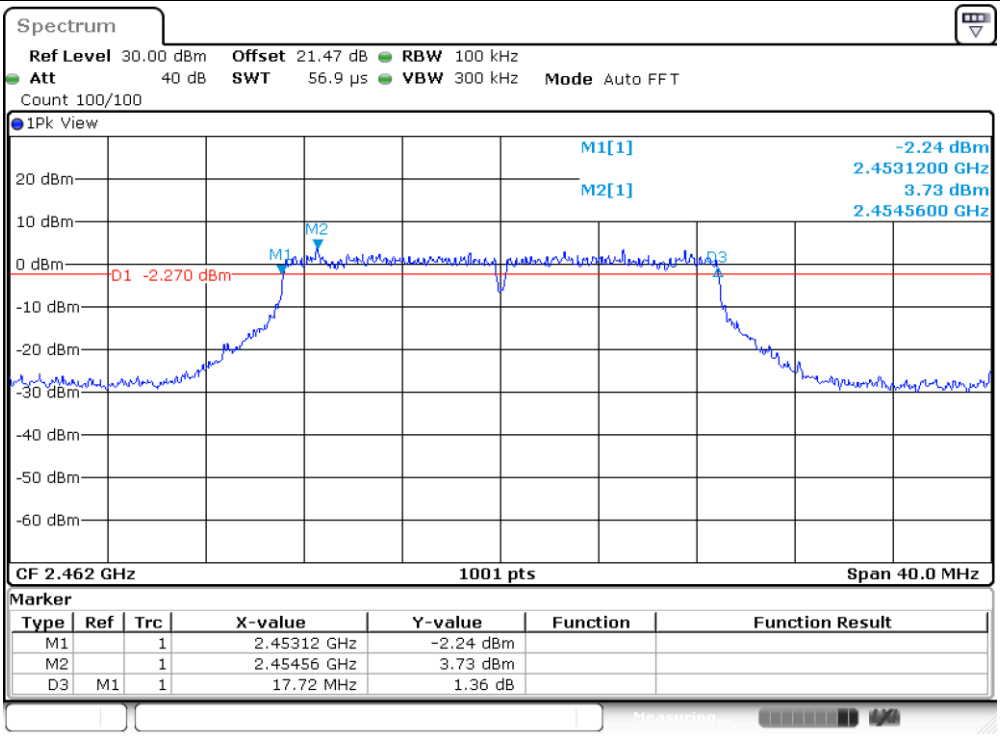

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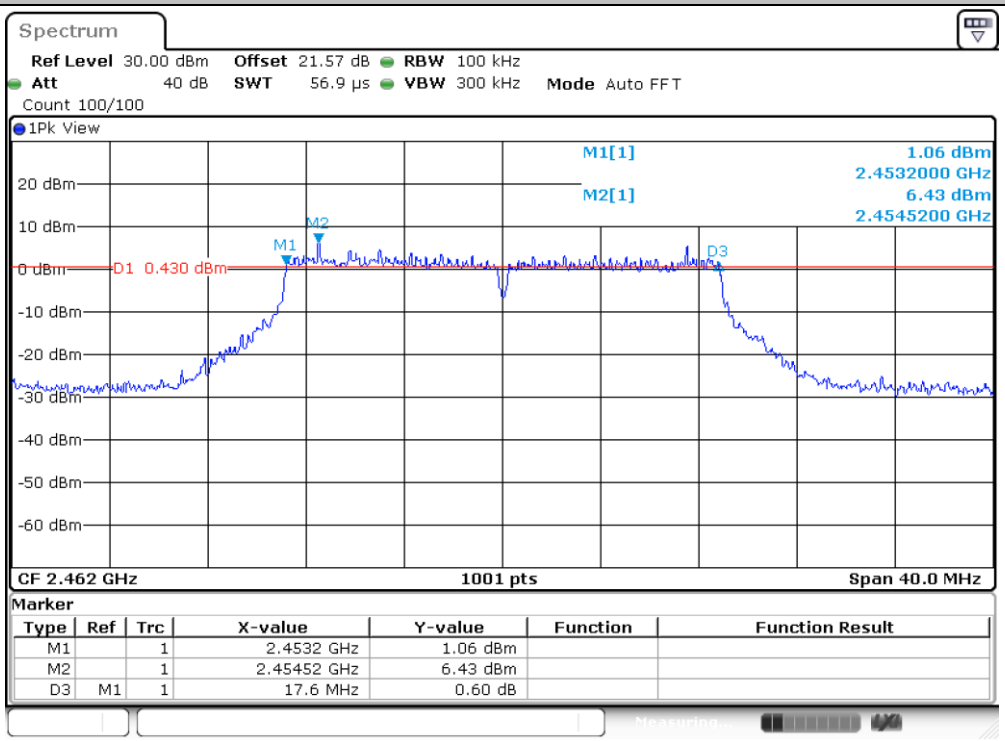

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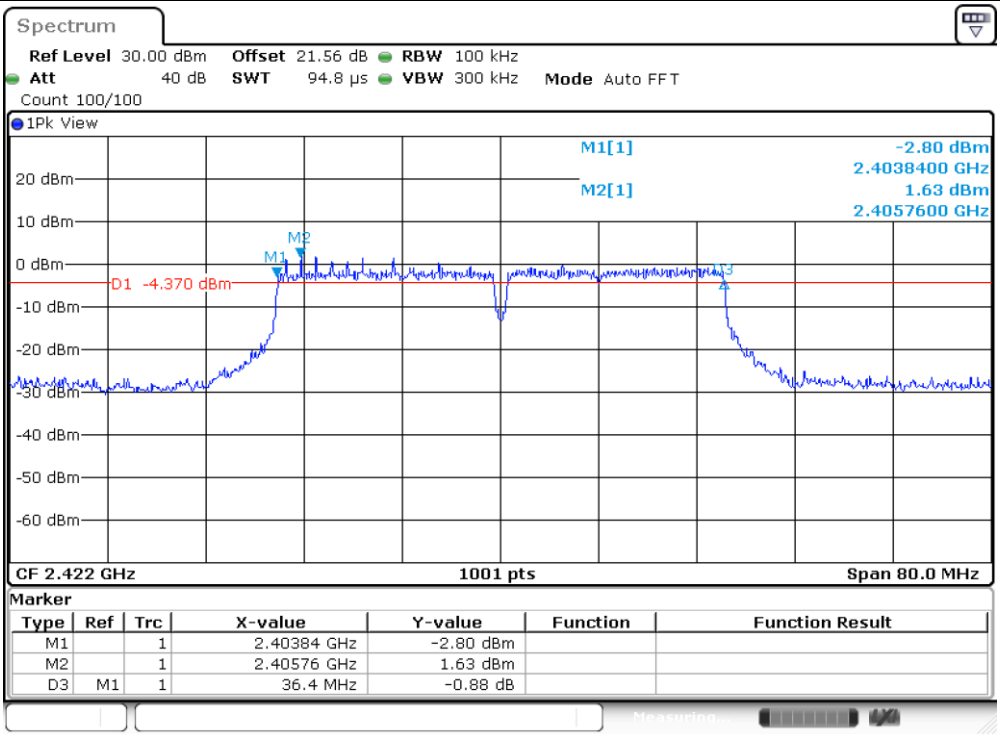

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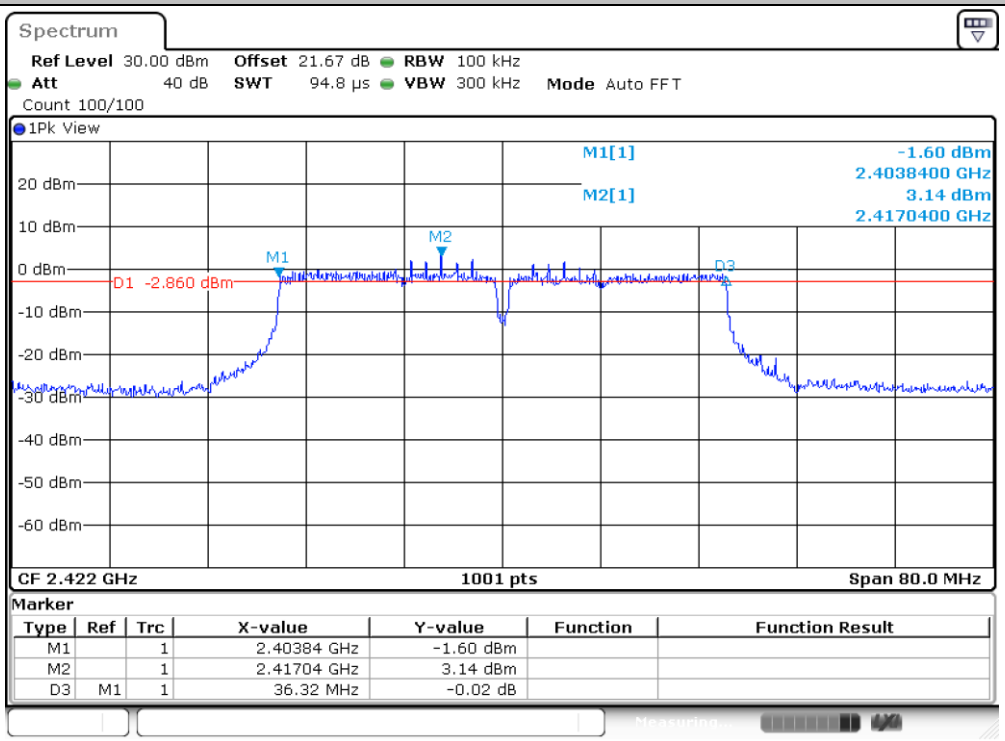

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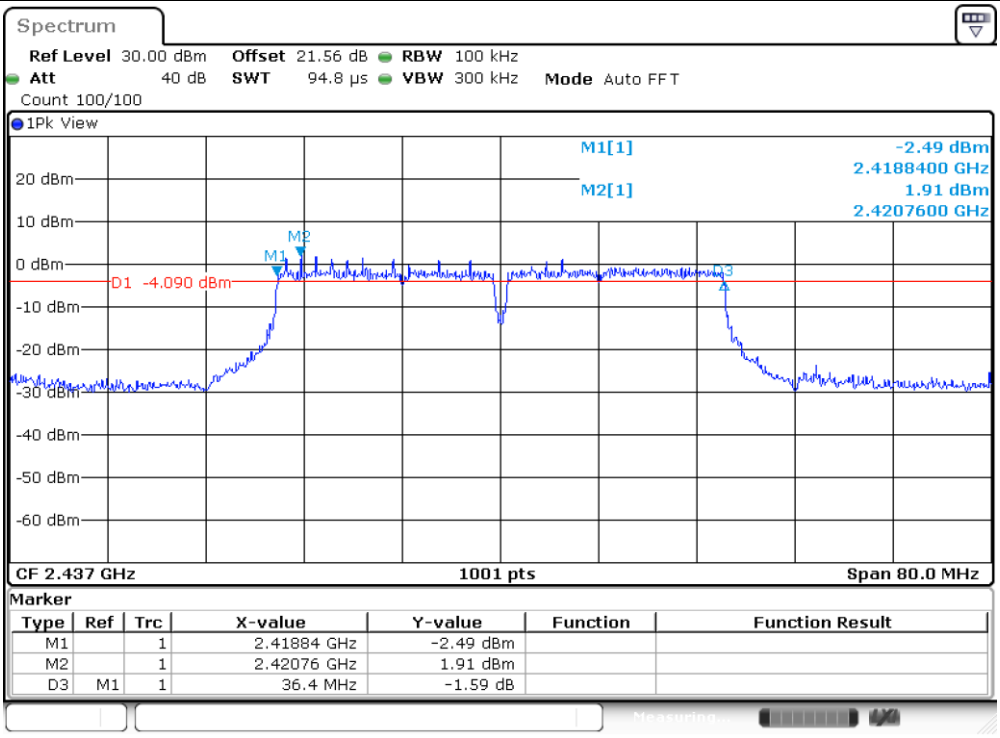

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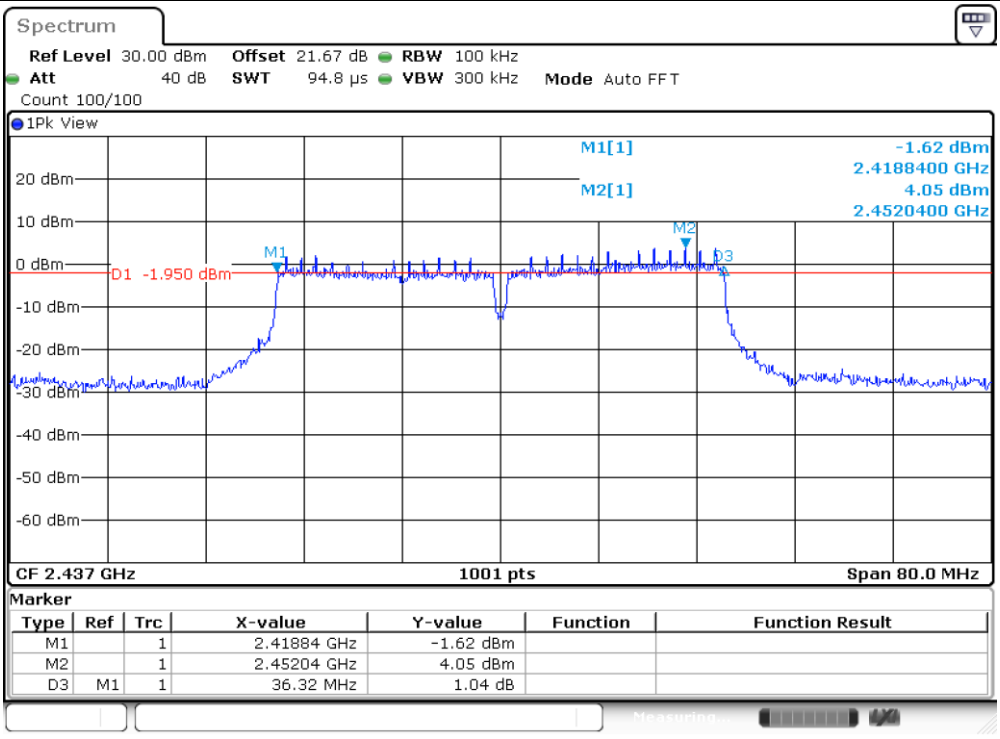

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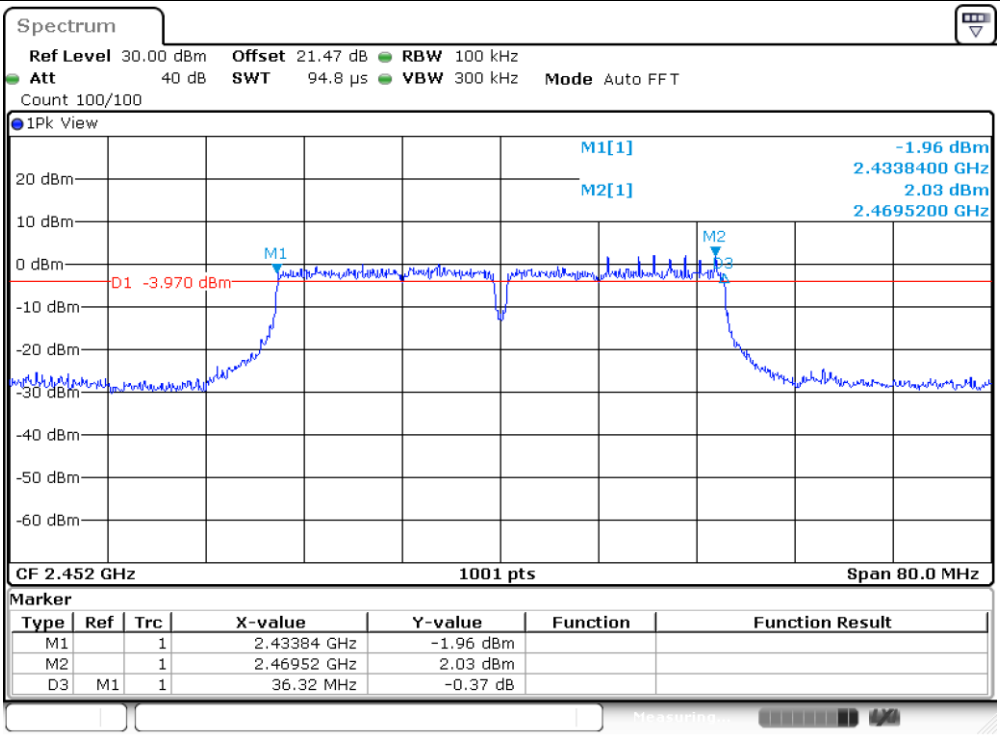

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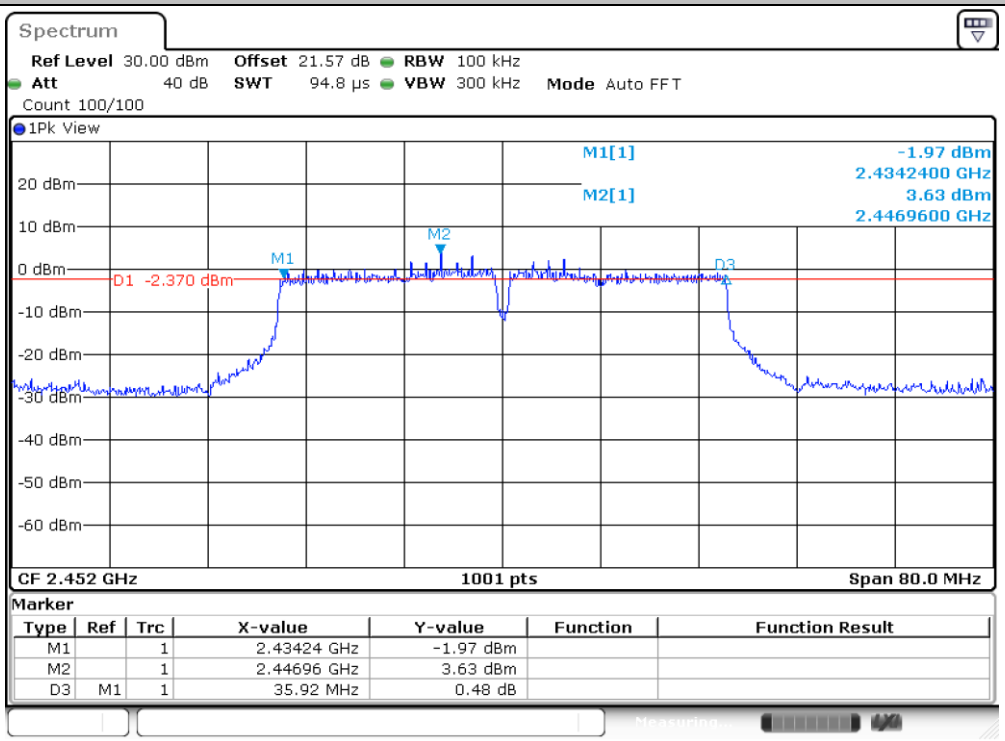

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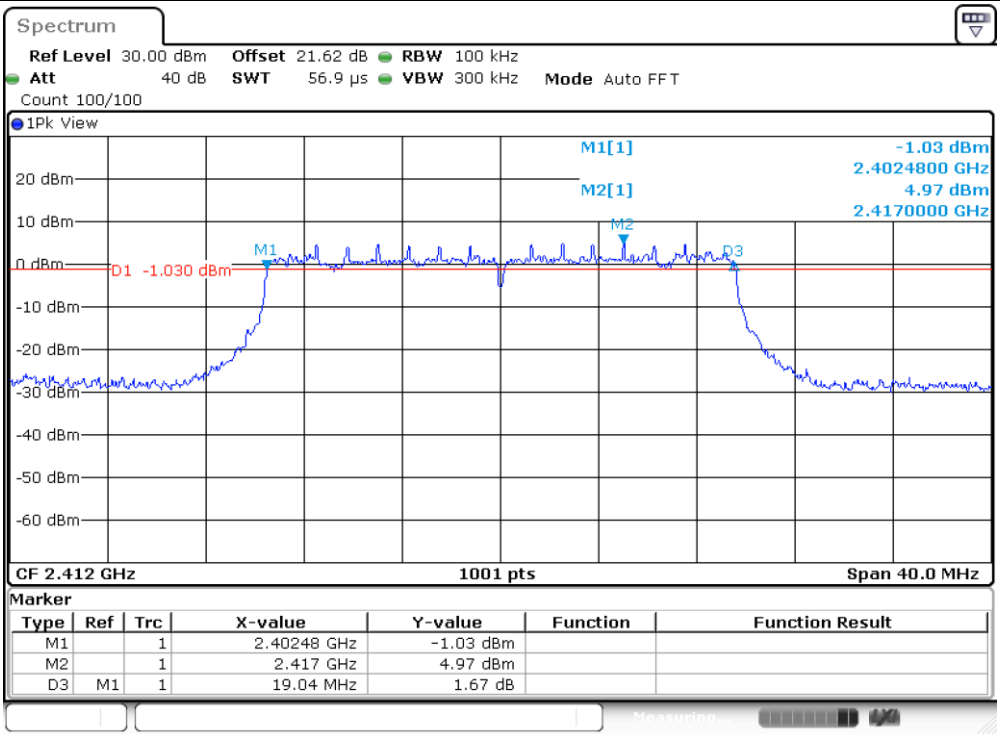
11AX20MIMO_Ant1_2412



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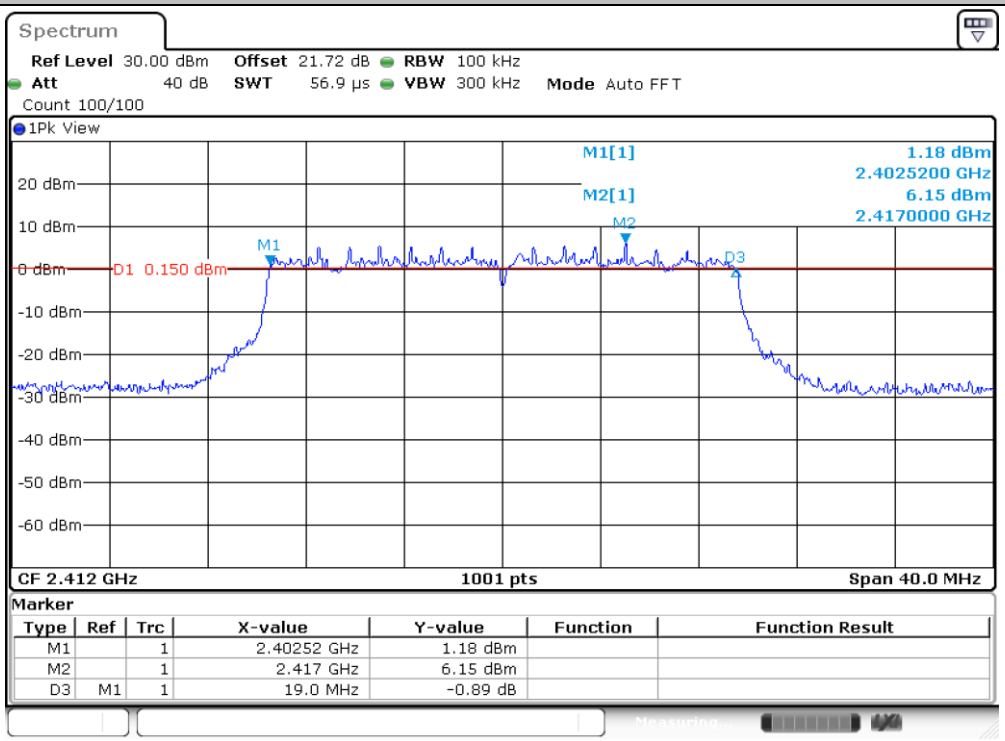

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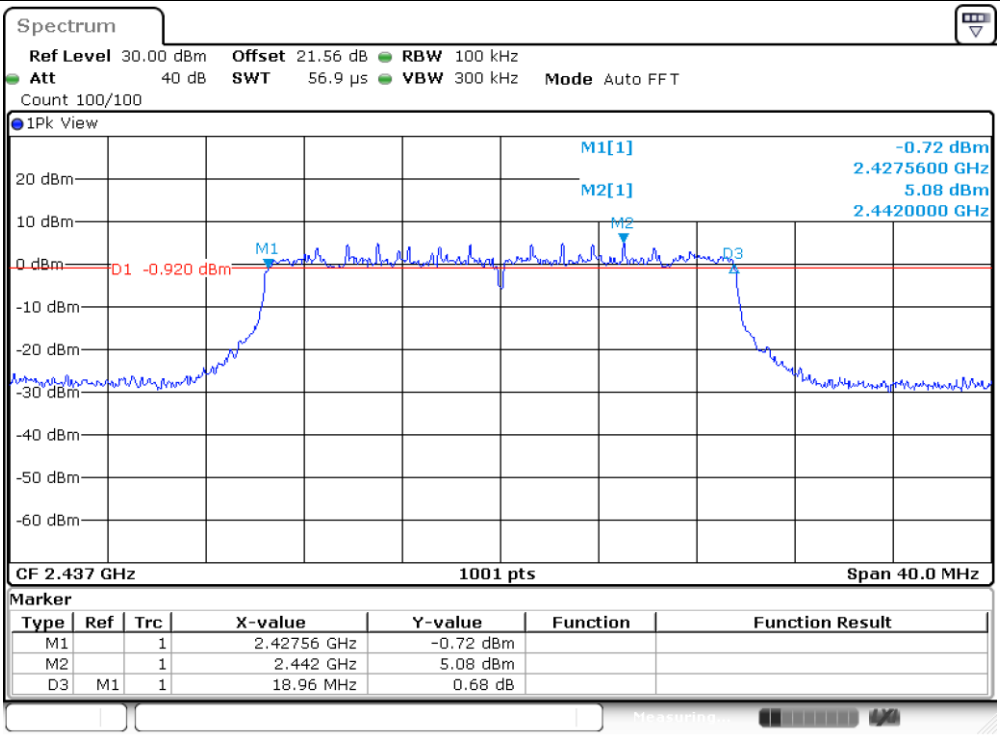

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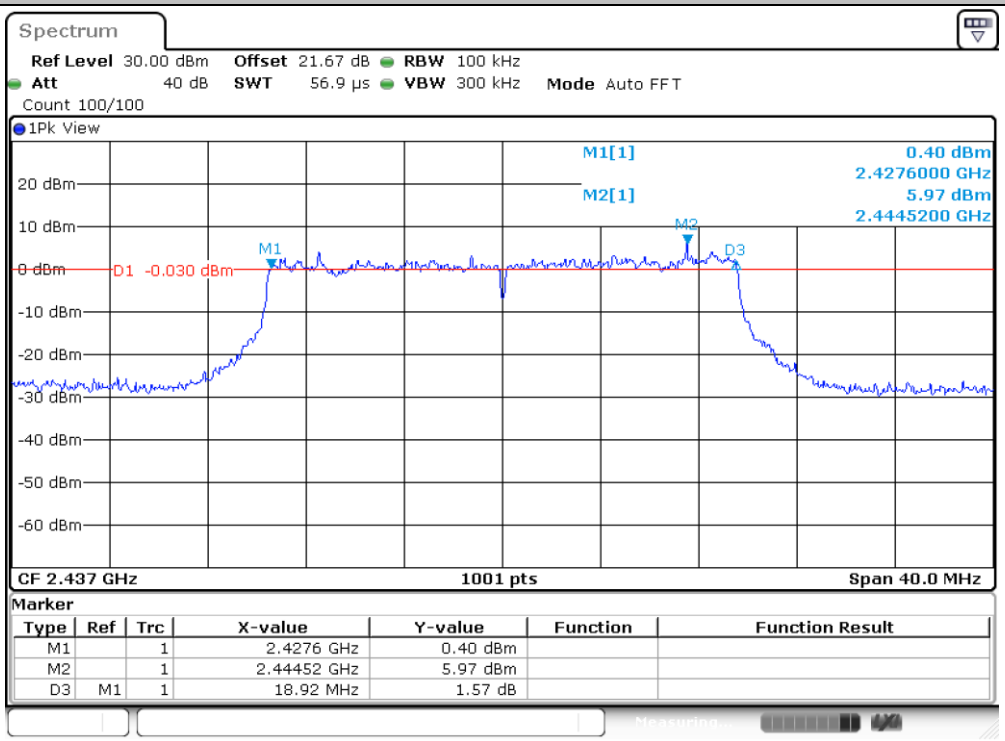

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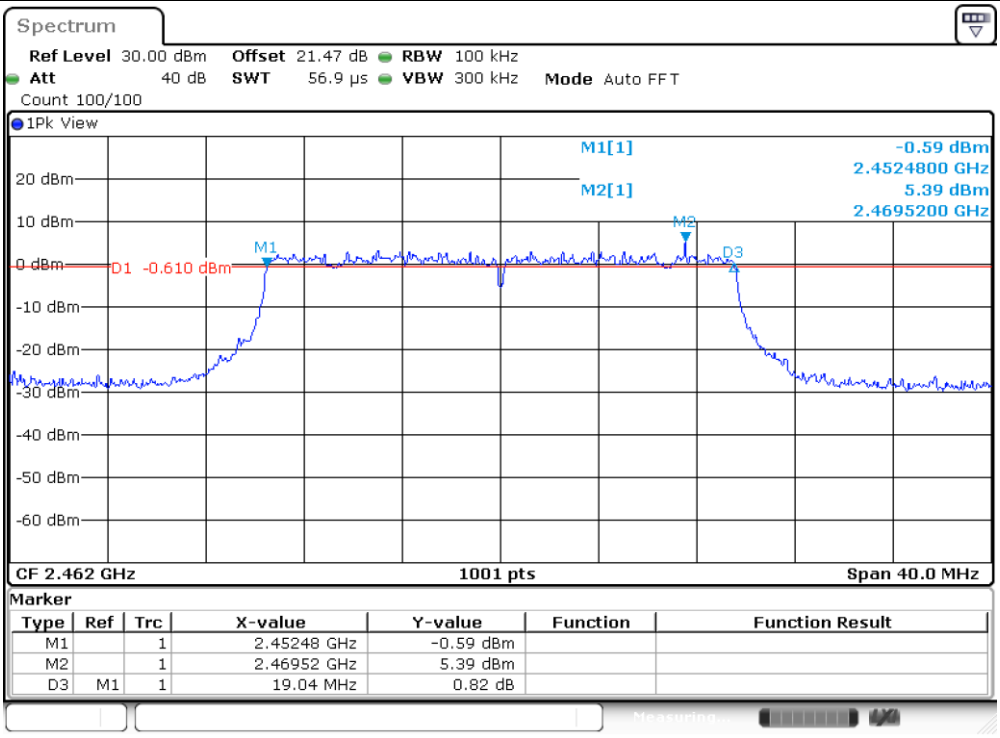
11AX20MIMO_Ant1_2462



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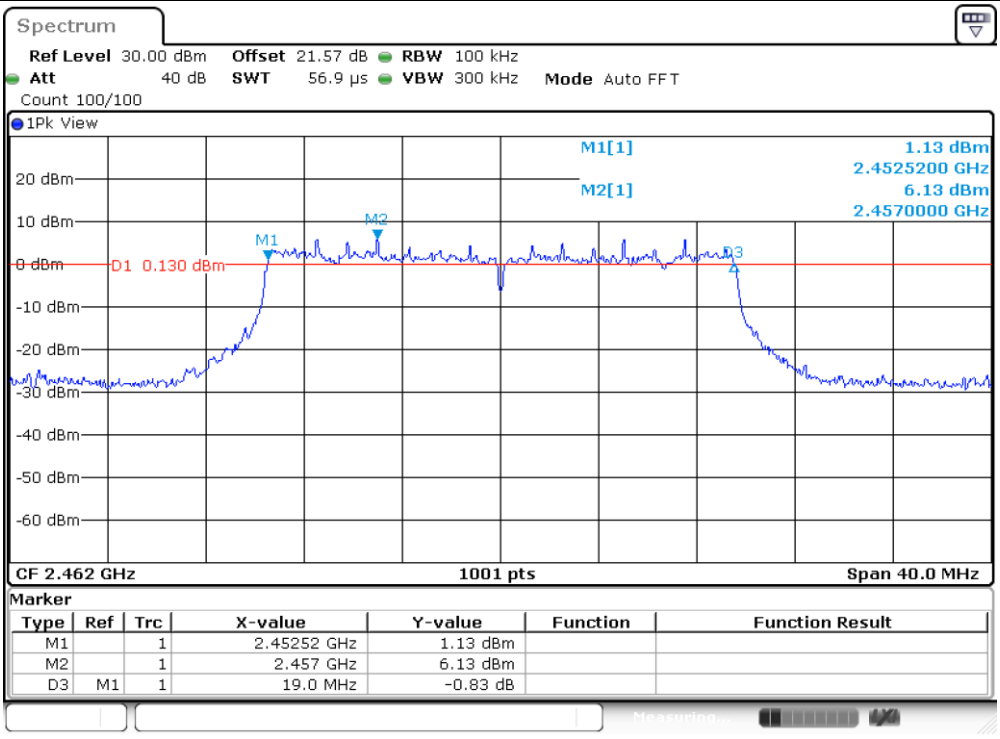

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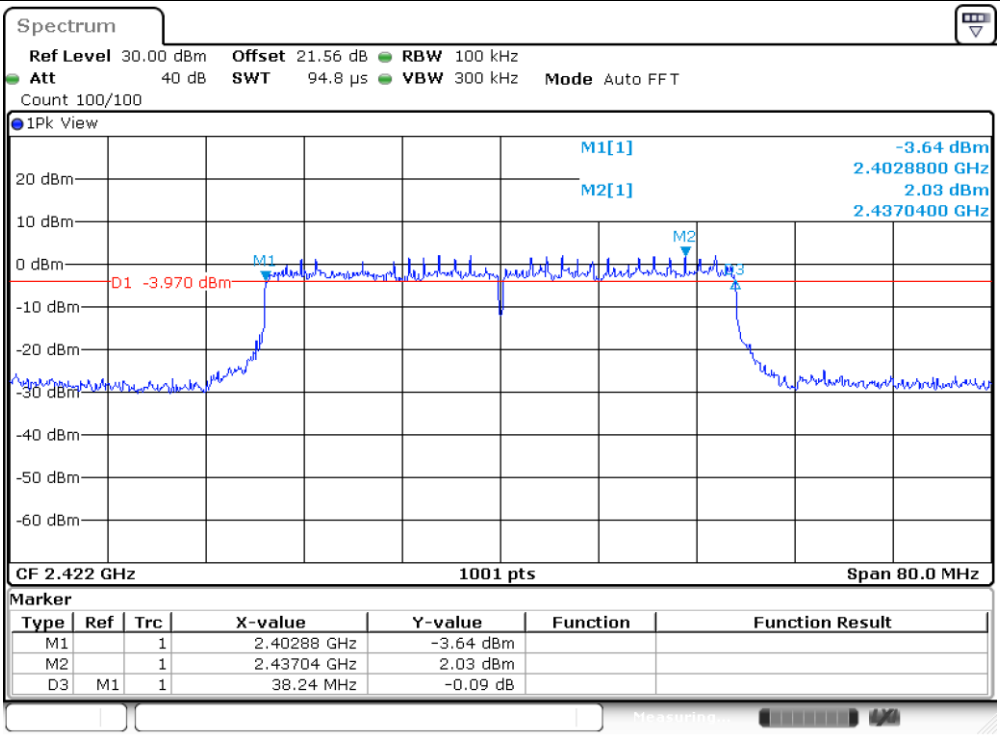

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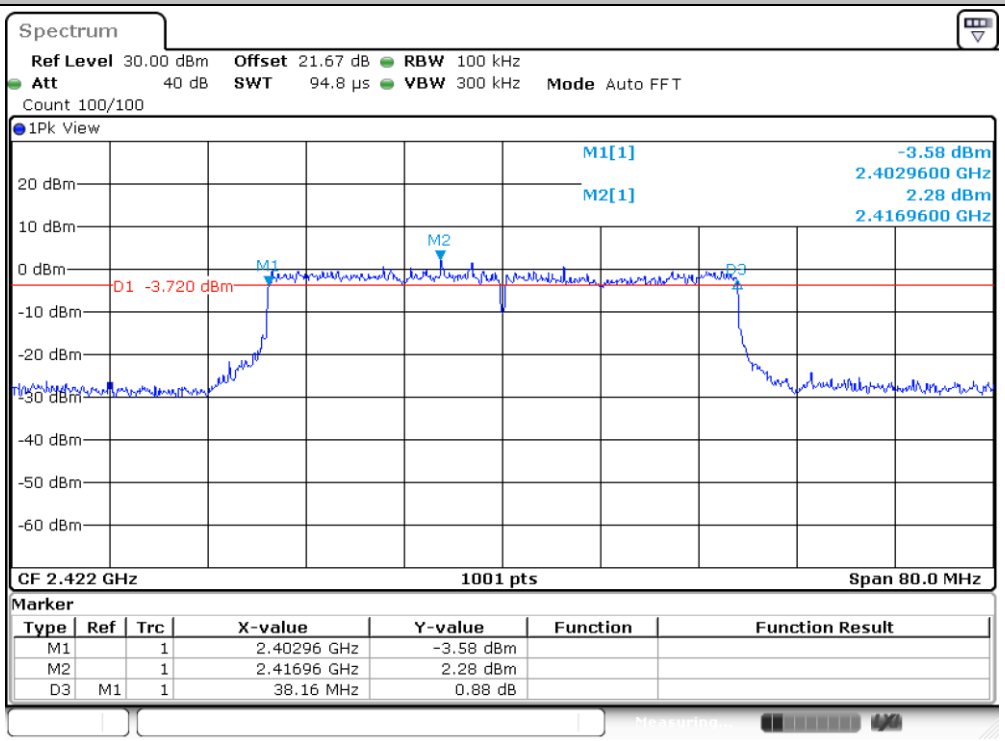

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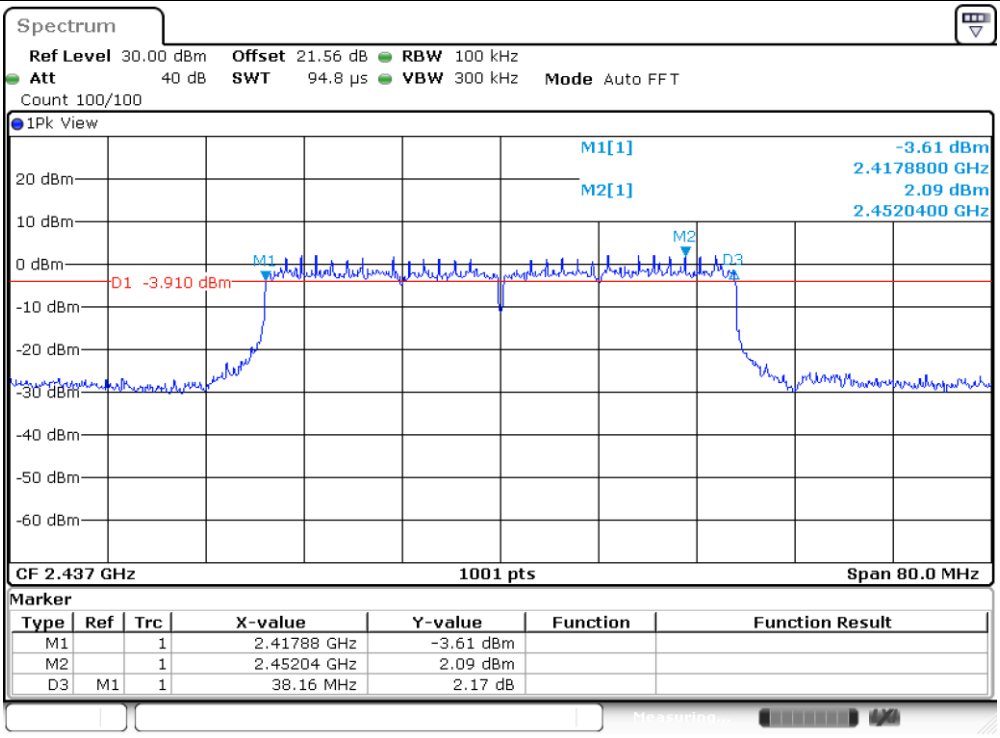

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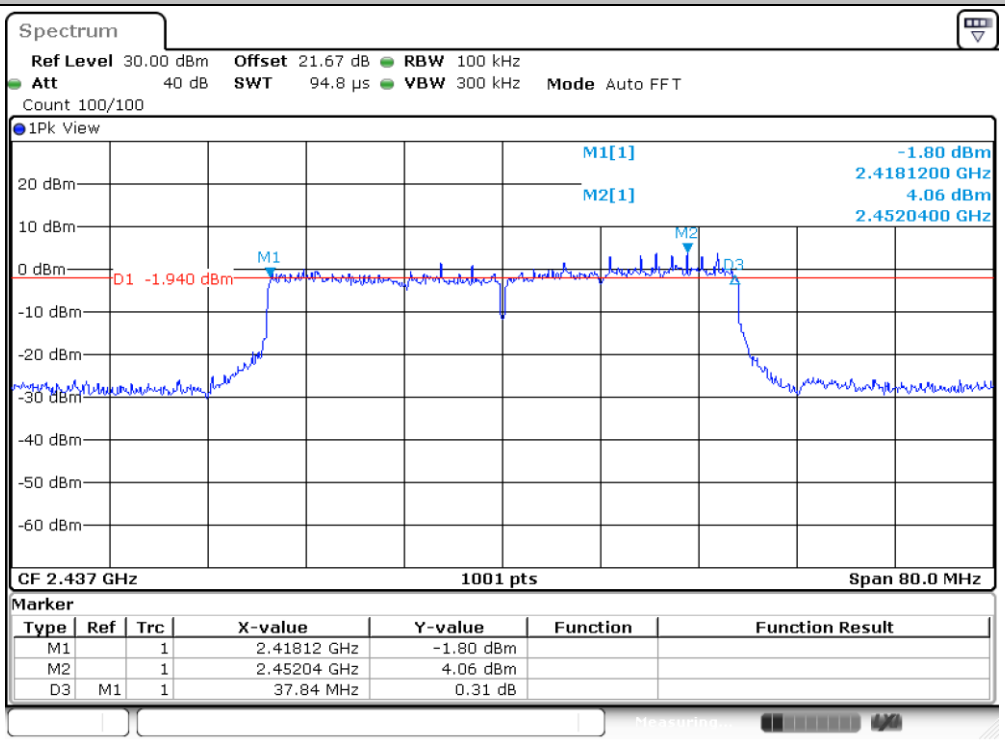

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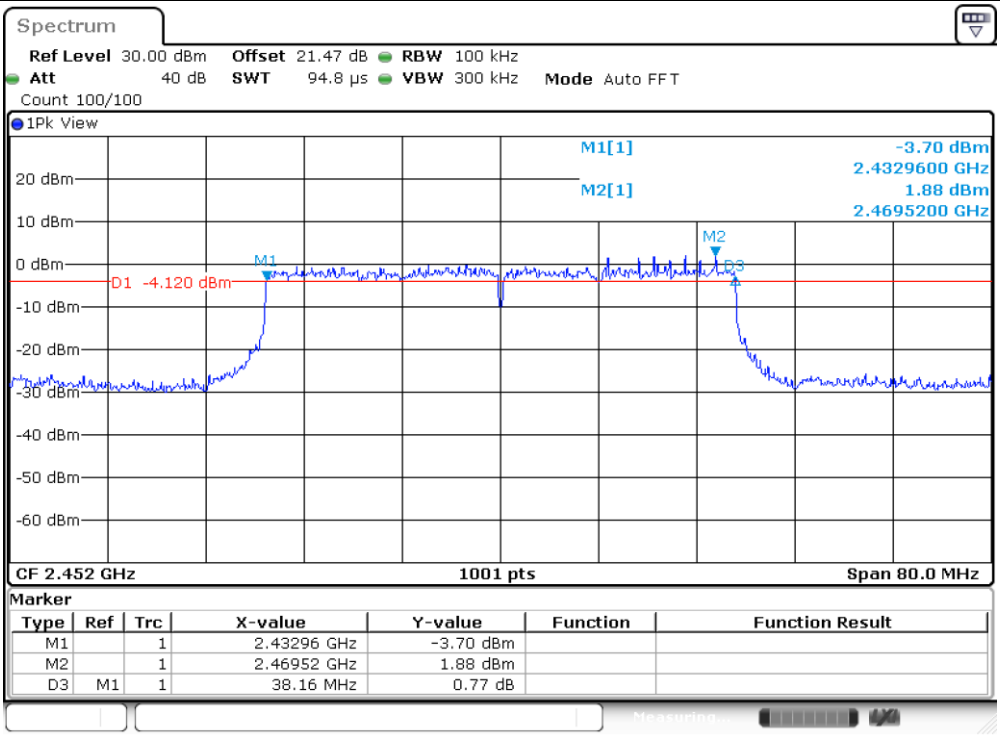

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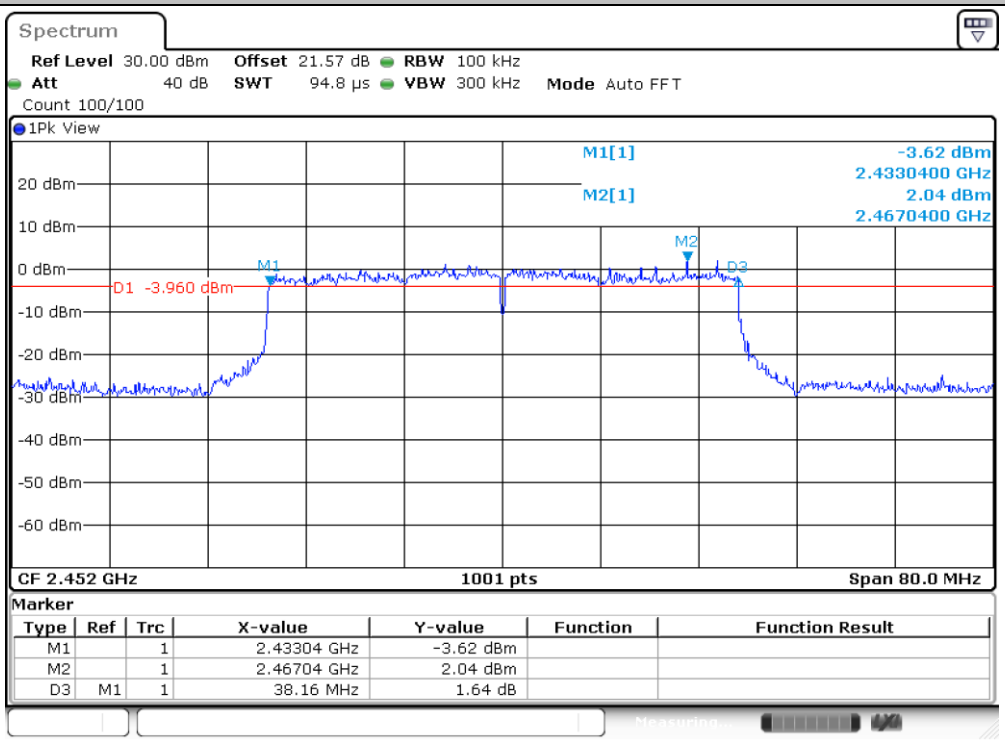

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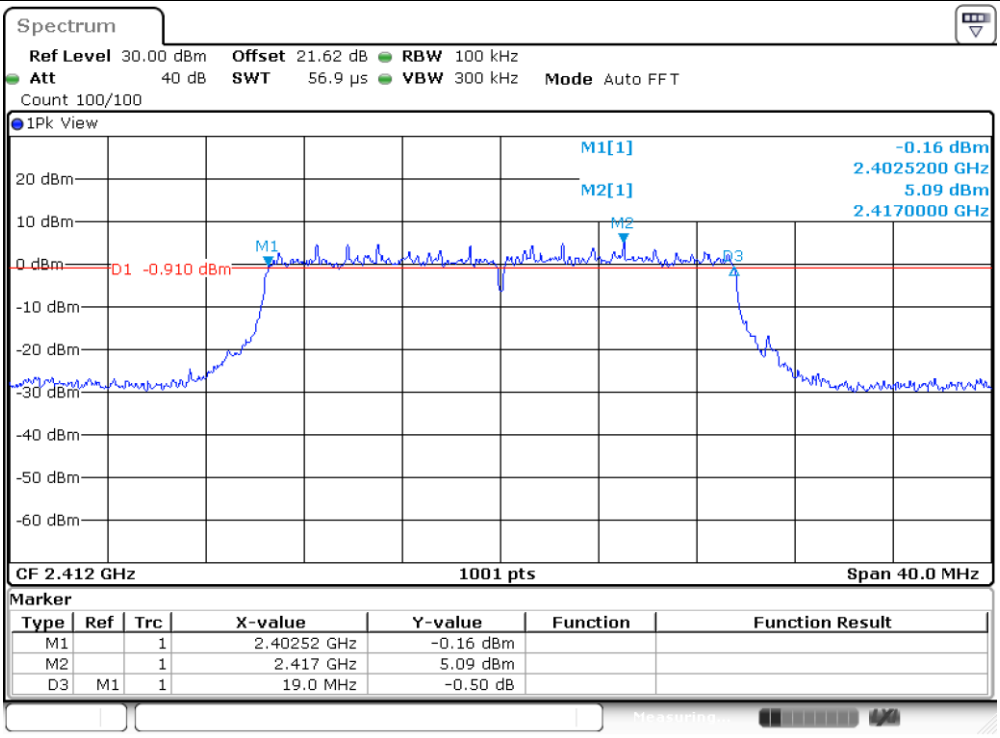

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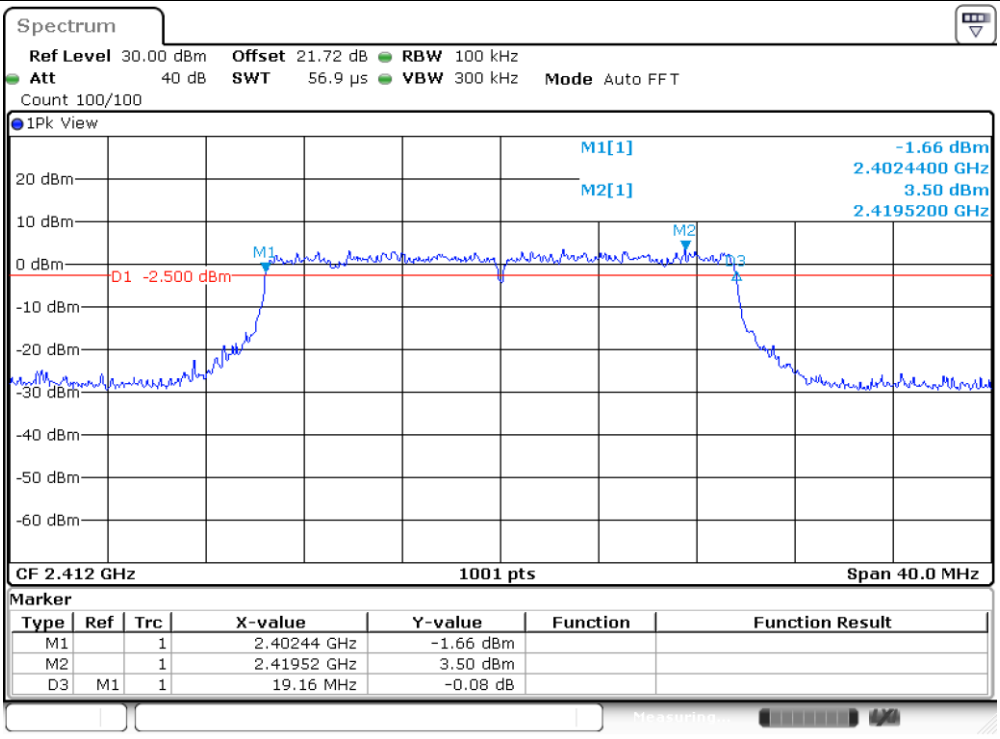

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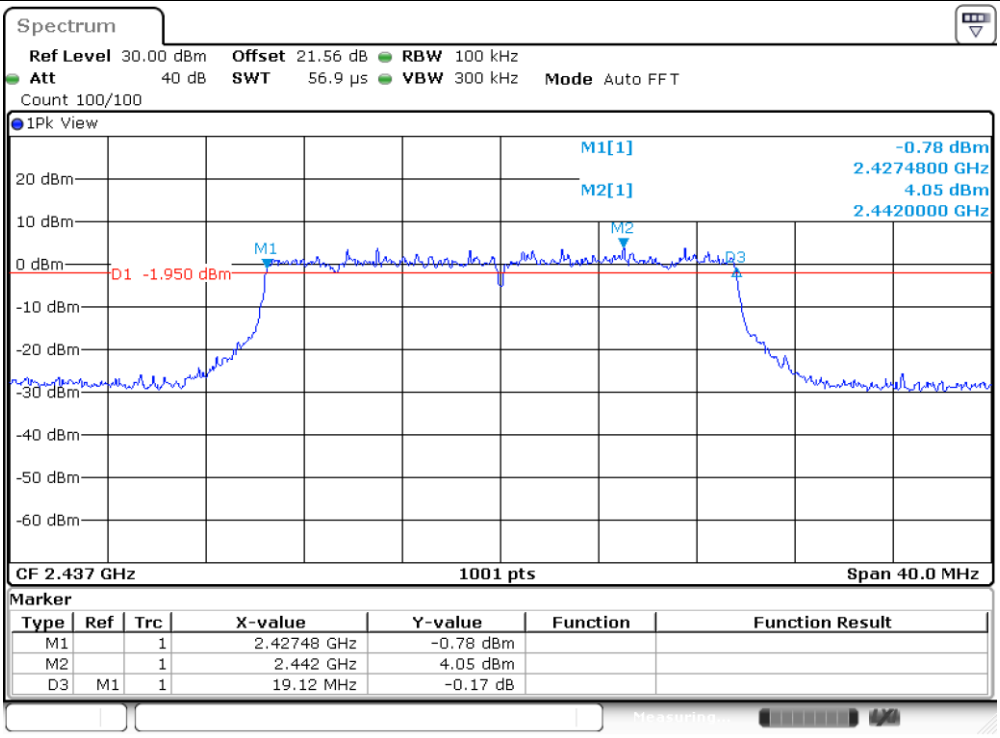

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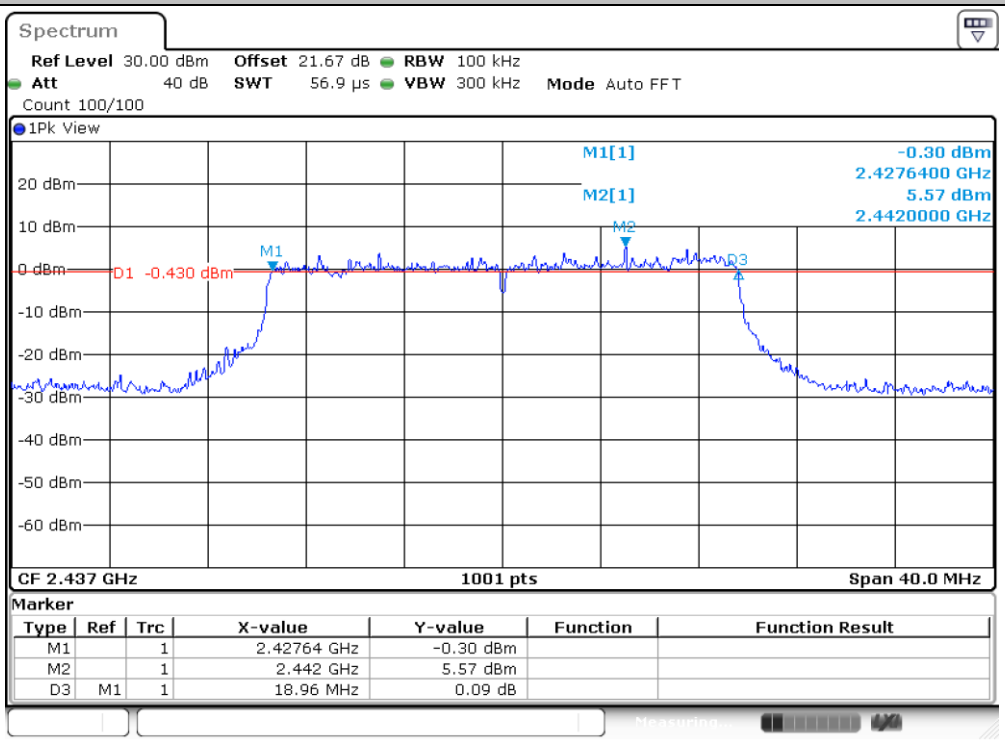

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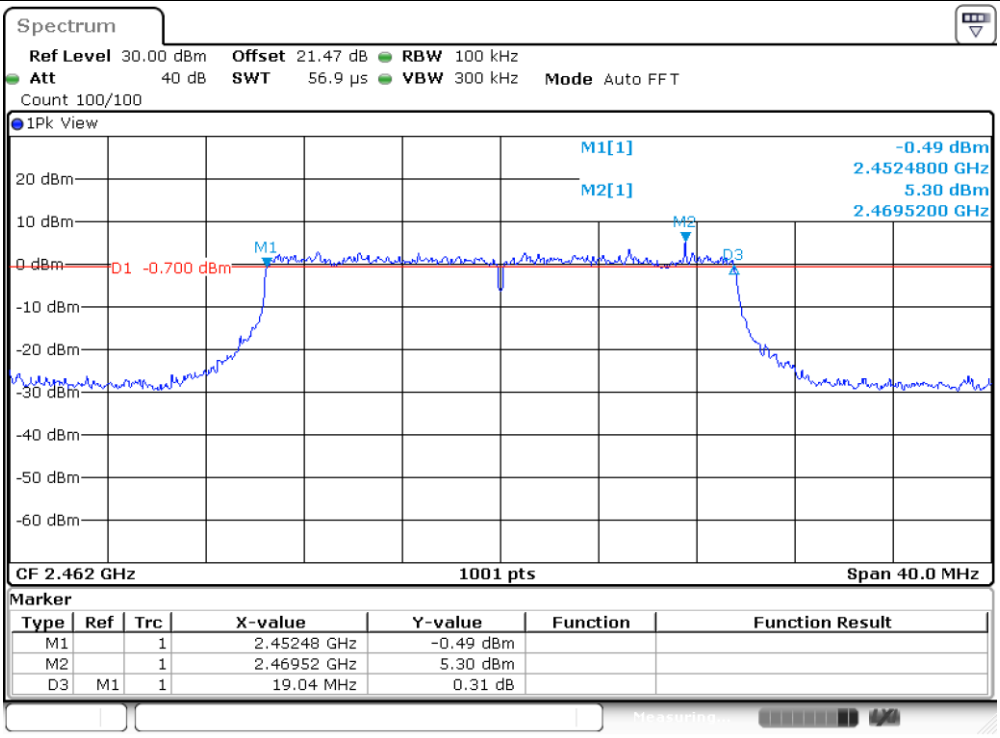

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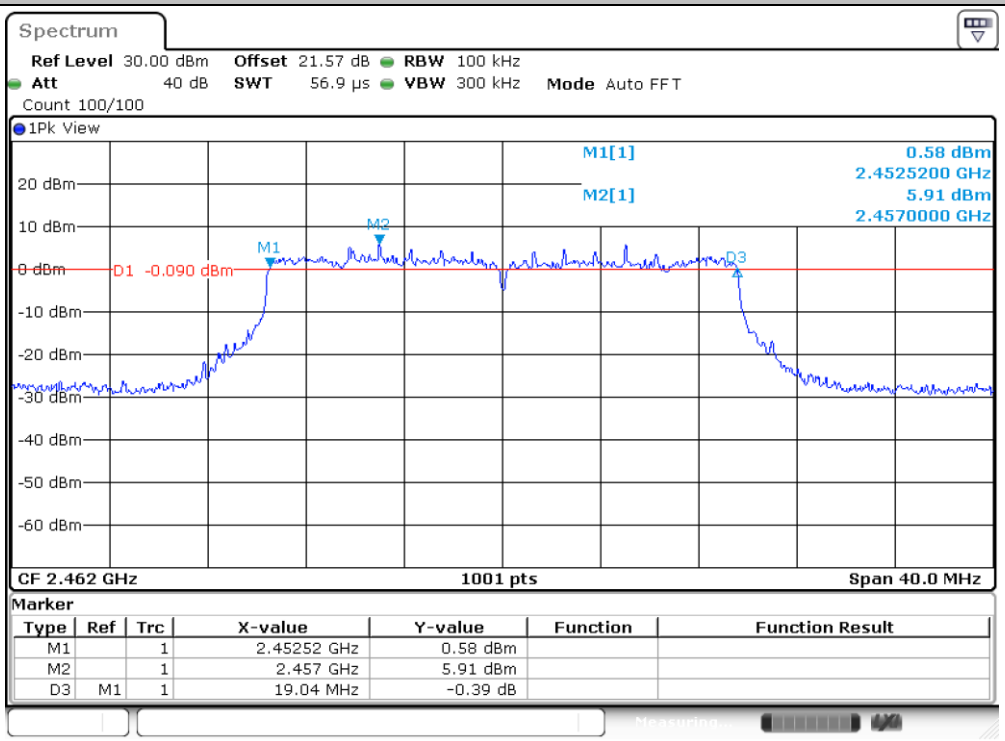

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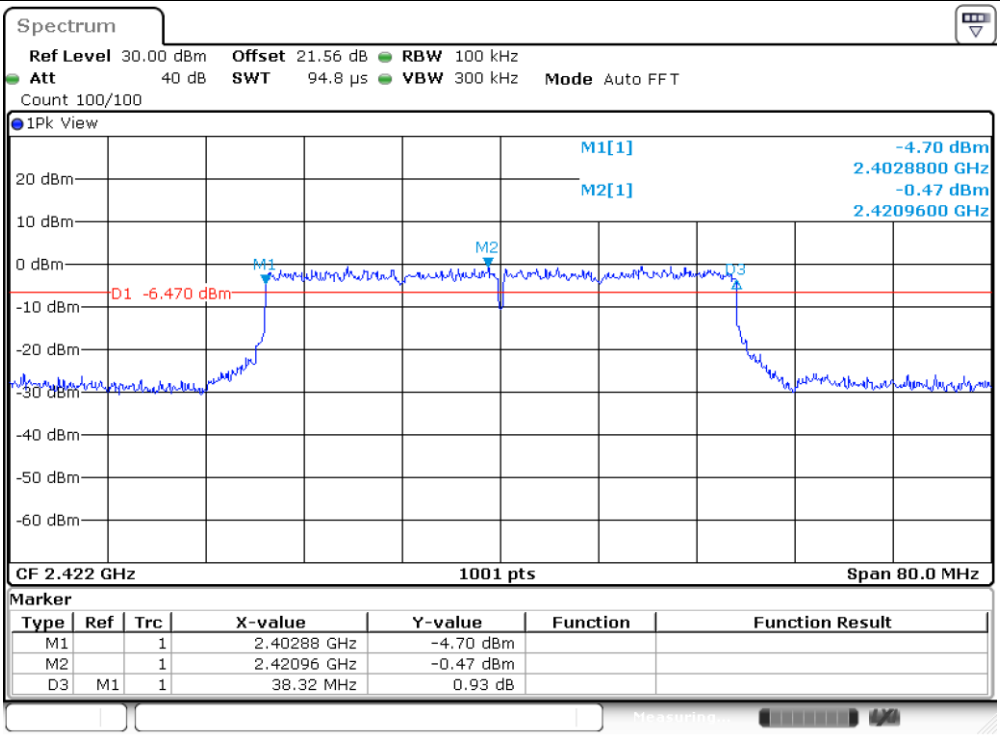

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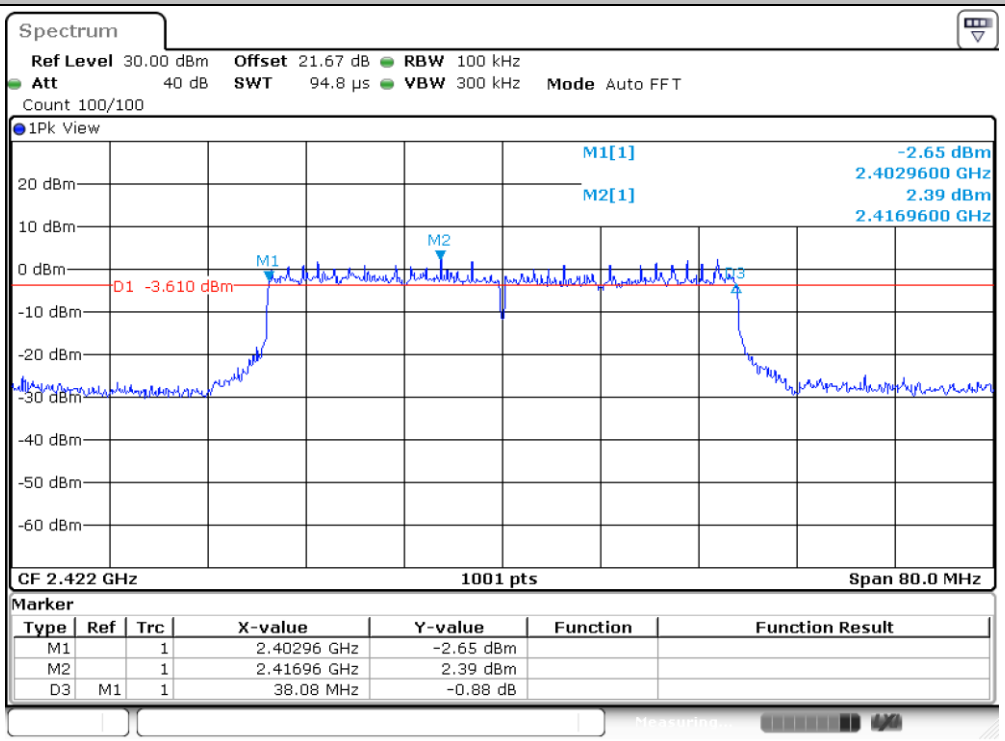

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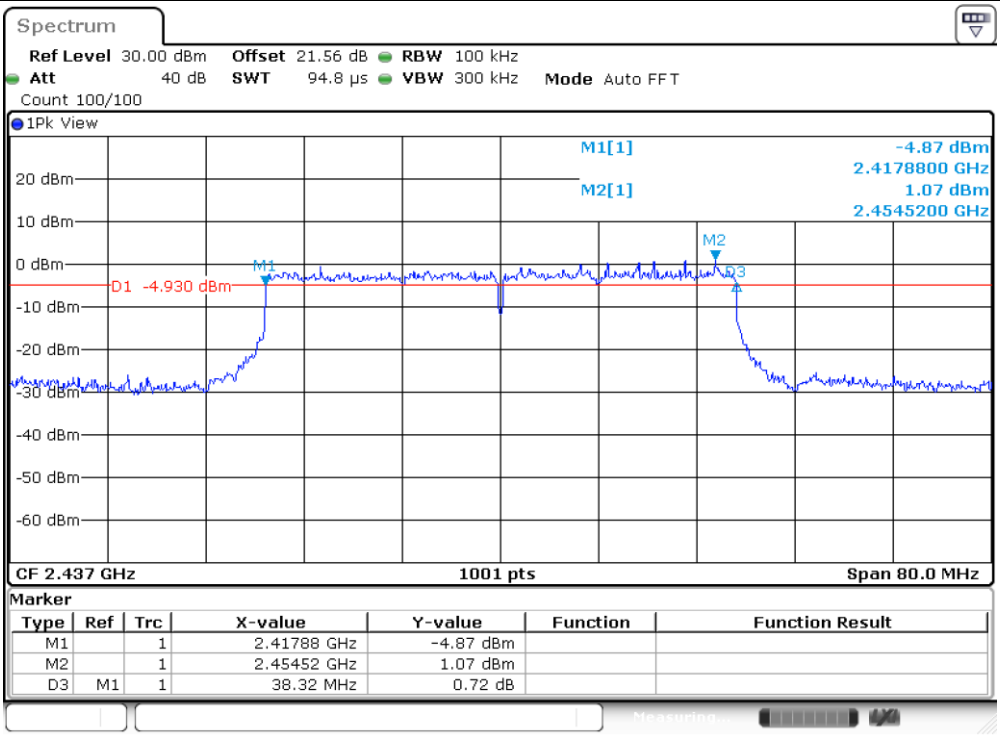

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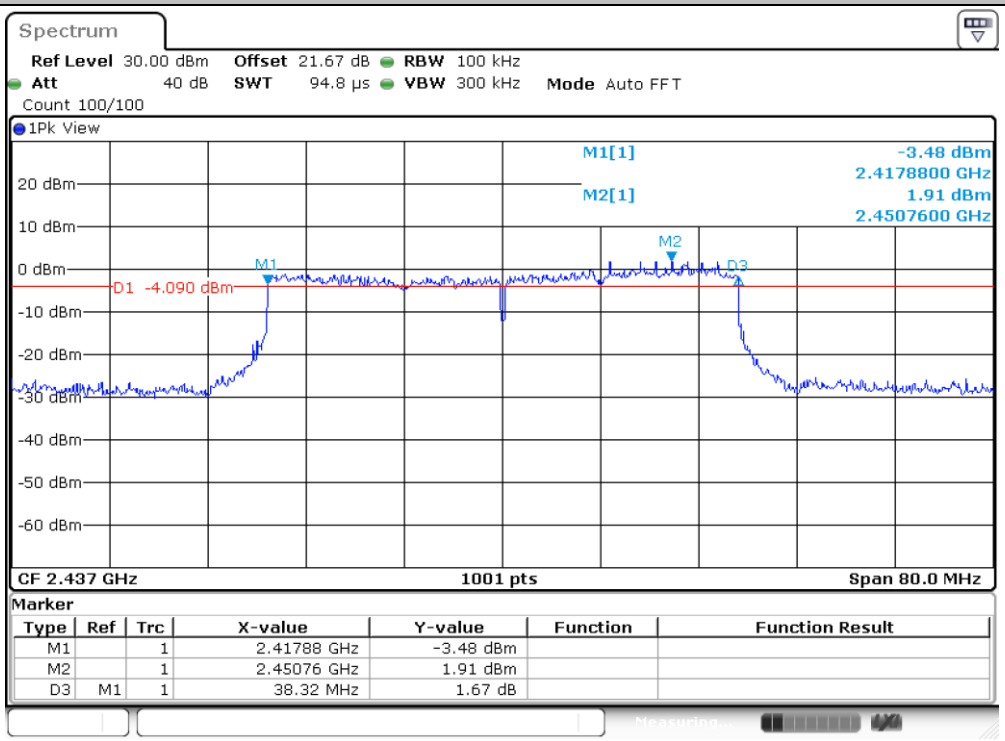

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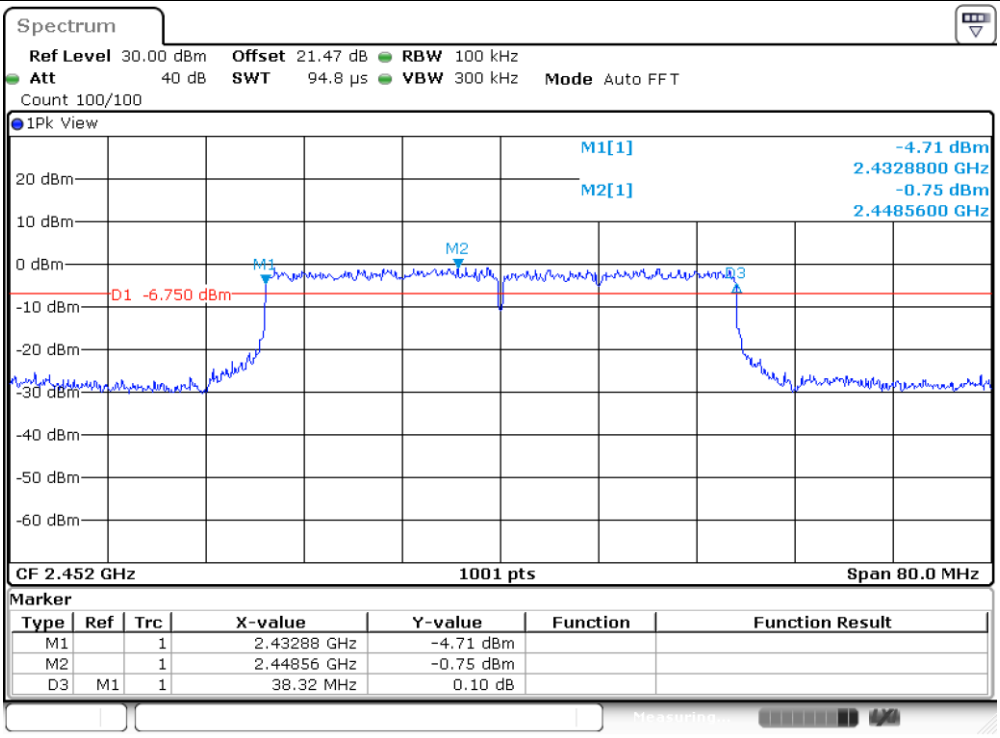
11BE40MIMO_Ant1_2452



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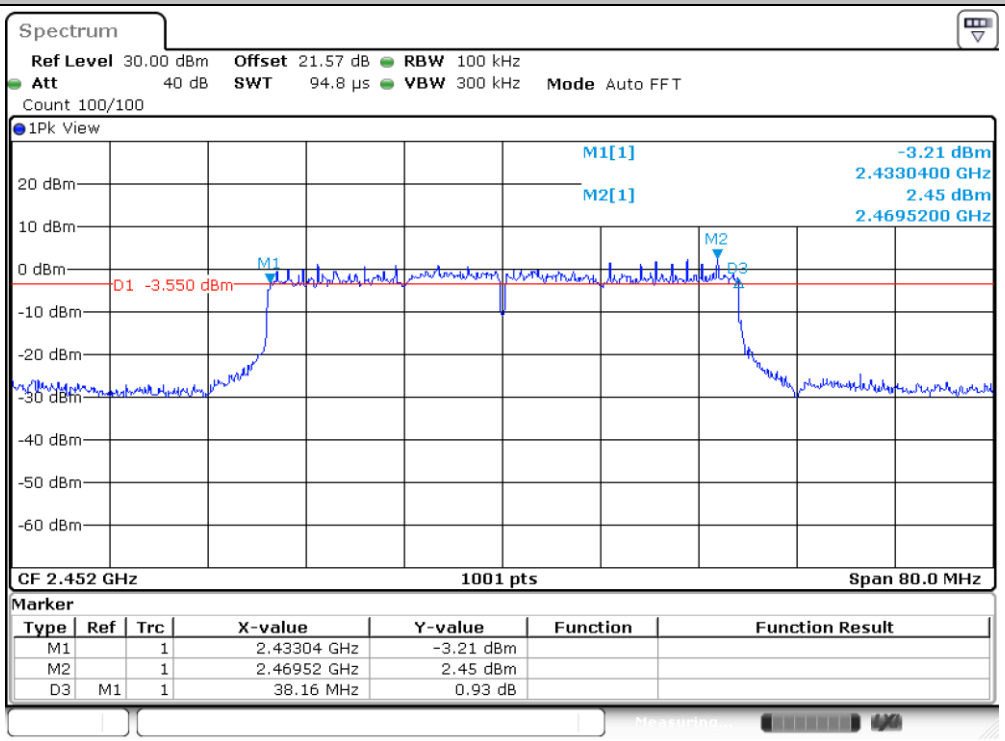
11BE40MIMO_Ant2_2452



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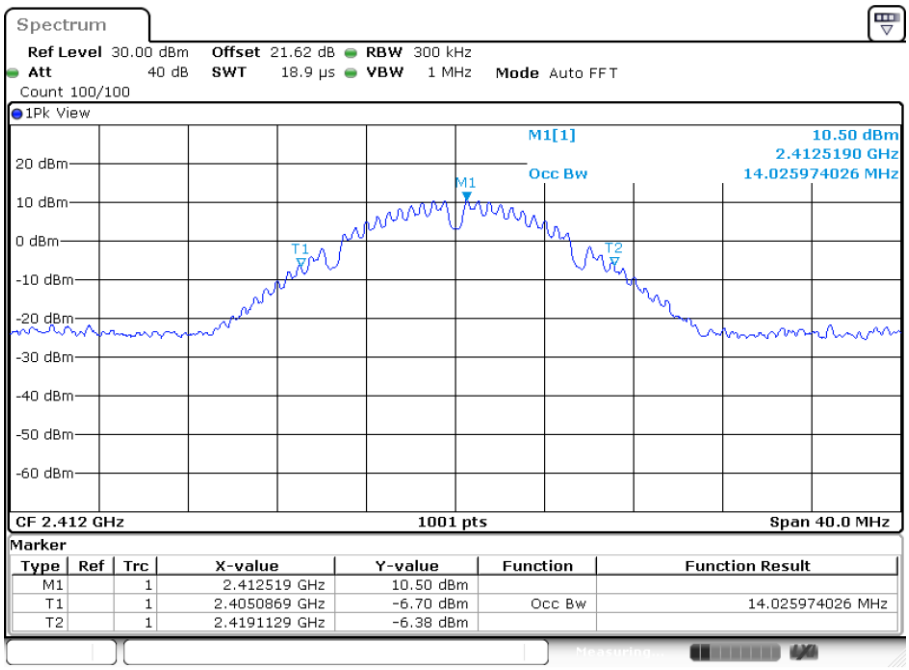
Occupied Channel Bandwidth

Test Result

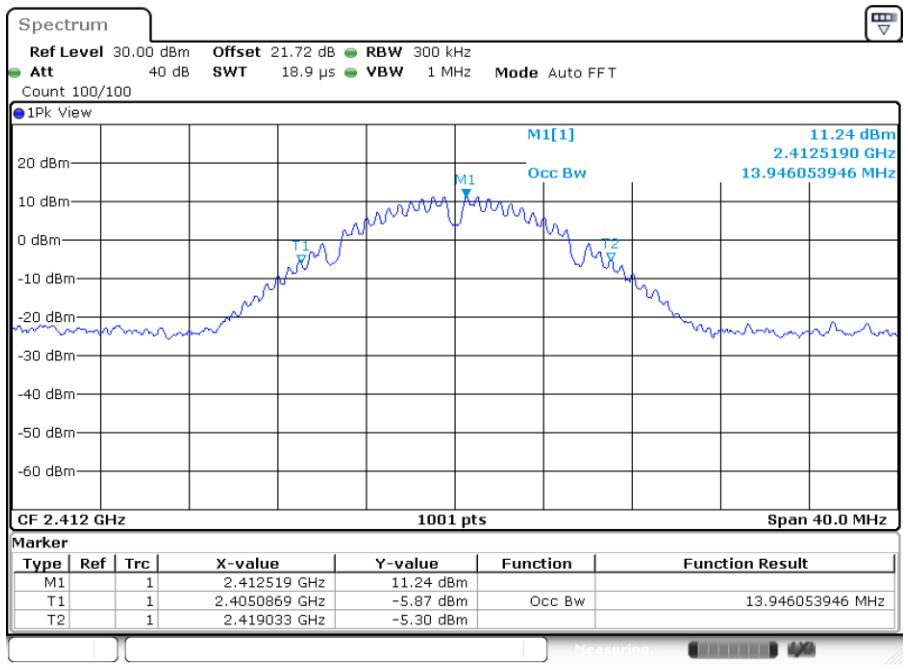
TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]
11B-CDD	Ant1	2412	14.026	2405.0869	2419.1129
	Ant2	2412	13.946	2405.0869	2419.0330
	Ant1	2437	14.106	2430.0470	2444.1528
	Ant2	2437	14.306	2430.0070	2444.3127
	Ant1	2462	14.026	2455.0070	2469.0330
	Ant2	2462	14.186	2454.8871	2469.0729
11G-CDD	Ant1	2412	17.463	2403.4086	2420.8711
	Ant2	2412	17.063	2403.4885	2420.5514
	Ant1	2437	17.223	2428.3686	2445.5914
	Ant2	2437	17.383	2428.4086	2445.7912
	Ant1	2462	17.103	2453.4086	2470.5115
	Ant2	2462	17.423	2453.1688	2470.5914
11N20MIMO	Ant1	2412	18.262	2402.9291	2421.1908
	Ant2	2412	18.182	2402.8891	2421.0709
	Ant1	2437	18.182	2427.9291	2446.1109
	Ant2	2437	18.302	2427.9291	2446.2308
	Ant1	2462	18.262	2452.8492	2471.1109
	Ant2	2462	18.262	2452.8492	2471.1109
11N40MIMO	Ant1	2422	37.243	2403.5385	2440.7812
	Ant2	2422	37.962	2403.0589	2441.0210
	Ant1	2437	37.323	2418.4585	2455.7812
	Ant2	2437	37.882	2418.1389	2456.0210
	Ant1	2452	37.323	2433.3786	2470.7013
	Ant2	2452	37.403	2433.5385	2470.9411
11AX20MIMO	Ant1	2412	19.141	2402.4496	2421.5904
	Ant2	2412	19.181	2402.4496	2421.6304
	Ant1	2437	19.221	2427.4496	2446.6703
	Ant2	2437	19.301	2427.4496	2446.7502
	Ant1	2462	19.261	2452.3696	2471.6304
	Ant2	2462	19.221	2452.4096	2471.6304
11AX40MIMO	Ant1	2422	38.761	2402.6593	2441.4206
	Ant2	2422	39.001	2402.5794	2441.5804
	Ant1	2437	38.841	2417.7393	2456.5804
	Ant2	2437	38.442	2417.8991	2456.3407
	Ant1	2452	38.362	2432.8991	2471.2607
	Ant2	2452	38.362	2432.8192	2471.1808
11BE20MIMO	Ant1	2412	19.181	2402.4096	2421.5904
	Ant2	2412	19.141	2402.4496	2421.5904
	Ant1	2437	19.181	2427.4496	2446.6304
	Ant2	2437	19.221	2427.4096	2446.6304
	Ant1	2462	19.181	2452.4096	2471.5904
	Ant2	2462	19.341	2452.2897	2471.6304
11BE40MIMO	Ant1	2422	38.282	2402.8991	2441.1808
	Ant2	2422	38.601	2402.8192	2441.4206
	Ant1	2437	38.681	2417.7393	2456.4206
	Ant2	2437	39.081	2417.3397	2456.4206
	Ant1	2452	38.601	2432.6593	2471.2607
	Ant2	2452	38.601	2432.7393	2471.3407

Test Graphs

11B-CDD_Ant1_2412



11B-CDD_Ant2_2412



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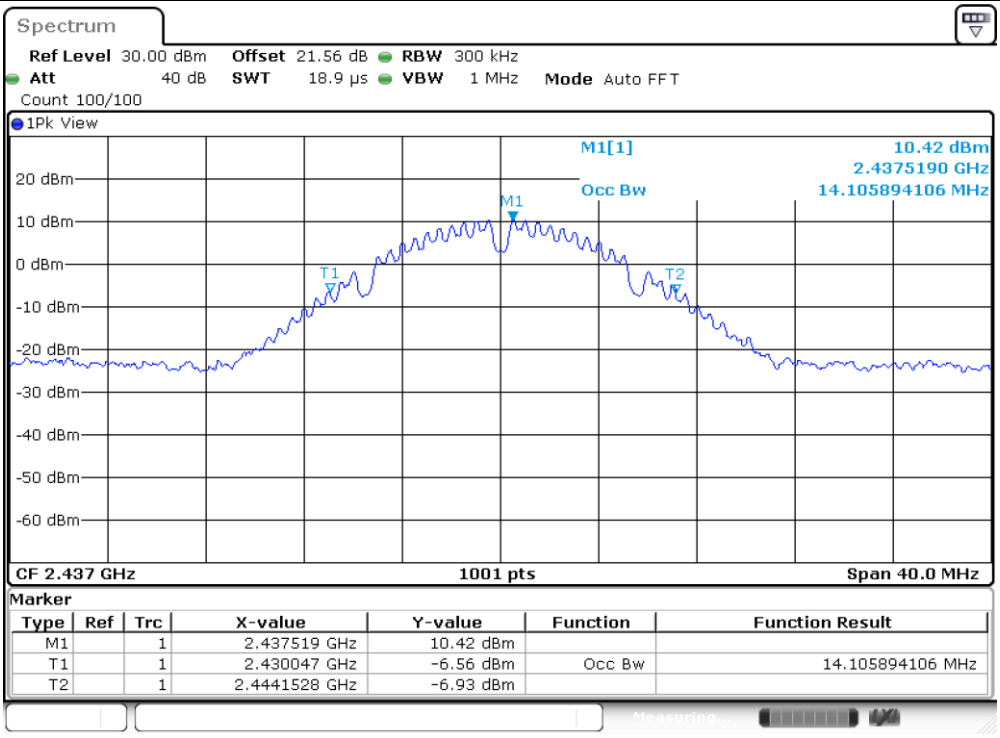

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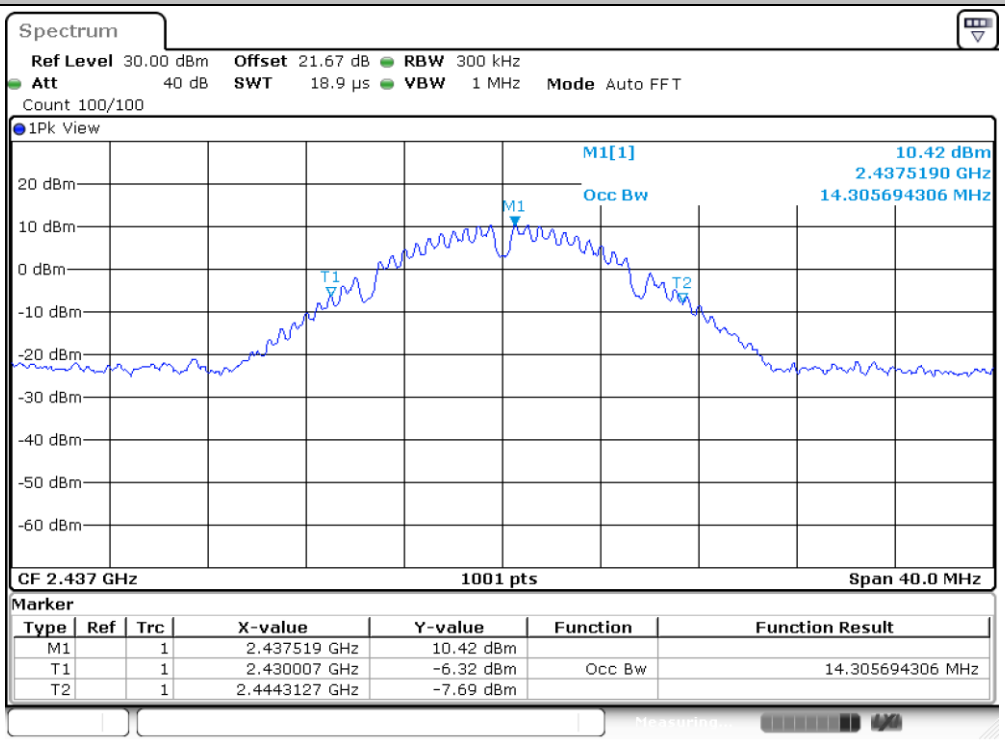
11B-CDD_Ant2_2437



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