

	    CERTIFICATE 2518.08 SAMM 825
MOTOROLA PENANG ADV. COMM. LABORATORY Motorola Solutions Malaysia Sdn. Bhd. Plot 2A Medan Bayan Lepas, Mukim 12, S.W.D. 11900 Bayan Lepas, Penang, Malaysia.	FCC / ISED TEST REPORT Report Revision : Rev.B
Date/s Tested : 06-Sep-2023 - 28-Sep-2023 Report Issue Date : 06-Nov-2023 Manufacturer/Location : Motorola Solutions Malaysia Sdn Bhd Plot 2A, Medan Bayan Lepas, Mukim 12 SWD, 11900, Bayan Lepas, Penang, Malaysia Requestor : HOMICIL HARLY Product Type : Portable Product Version (PMN) : APX N50 Model Number (HVIN) : H25XDF9PW6AN Frequency Band : 2.412-2.462 GHz Max RF Output Power : 802.11b - 126 mWatts 802.11g - 251.19 mWatts 802.11n - 251.19 mWatts Applicant Name : Motorola Solutions Inc Applicant Address : 8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322 FCC Registrations : 461337 ISED Registrations : MY0001 Firmware Version (FVIN) : L06221125 The equipment was tested accordance to the requirement listed below: (2.4GHz Wifi) 47CFR Part 15C ISED RSS 247 Issue 2 February 2017 PASS	
This report shall not be reproduced without written approval from an officially designated representative of the Motorola Penang Adv. Comm. Laboratory. The results and statements contained in this report pertain only to the device(s) evaluated.	
Prepared By: <i>hidayati</i> SITI NUR HIDAYATI BINTI ABDUL HALIM Test Personnel	Approved Signatory: <i>MAHESHVARAN</i> MAHESHVARAN A/L RAJAGOPAL Responsible Engineer

Table of Contents

1.0. General Information.....	3
1.1. Channel number and frequency information:	3
2.0. Summary of Test Results	4
3.0. Measurement Uncertainty	5
4.0. Equipment List.....	5
5.0. Test Mode Applicability and Test Channel Detail.....	6
6.0. Transmitter Test Parameters	10
6.1. 6dB Channel Bandwidth.....	10
6.1.1. Test Setup	10
6.1.2. Test Limits:.....	10
6.1.3. Test Data:.....	11
6.2. Conducted RF Output Power	17
6.2.1. Test Setup	17
6.2.2. Test Limits:.....	17
6.2.3. Test Data:.....	18
6.3. Duty Cycle of the test signal	19
6.3.1. Test Setup	19
6.3.2. Test Data	20
6.4. Maximum Peak Power Spectral Density	23
6.4.1. Test Setup	23
6.4.2. Test Limits	23
6.4.3. Test Result	24
6.5. Conducted Spurious Emission	27
6.5.1. Test Setup	27
6.5.2. Test Limits:.....	27
6.5.3. Test Result	28
6.6. Band edge Conducted Spurious Emission	46
6.6.1. Test Setup	46
6.6.2. Test Limits:.....	46
6.6.3. Test Result	47
6.7. Radiated Emission within restricted Bands	50
6.7.1. Test Setup	50
6.7.2. Test Limits:.....	51
6.7.3. Test Data:.....	52
6.8. AC Powerline Conducted Emission.....	99
6.8.1. Test Setup	99
6.8.2. Test Limits:.....	99
6.8.3. Test Result	101

REVISION HISTORY

Revision History	Description	Date	Originator
Rev. A	Initial Report	17-Oct-2023	Hidayati
Rev. B	Update revision history table date and Add on bracket at remark on margin.	6-Nov-2023	Hidayati

1.0. General Information

EUT Description:

Technologies	2.4GHz Wi-Fi
TX Frequency range	2412MHz – 2462MHz
Modulation Type	DSSS, OFDM
Connector type	PROGRAMMING, TEST & ALIGNMENT CABLE
Antenna type	BT/WiFi Antenna (2.4-2.48 GHz)

1.1. Channel number and frequency information:

There are two bandwidth systems.

For 20MHz Bandwidth systems (802.11b, 802.11g, 802.11n), use channel 1 ~ channel 11

For 40MHz Bandwidth systems (802.11n), use channel 3 ~ channel 9

Channel	Frequency	Channel	Frequency
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437		

The EUT contains following accessory devices and data cable:

Item	Brand	Model or P/N
BATT LIION IMPRES 2 IP68 2850T	MOTOROLA	PMNN4813A
UHF Whip Antenna (380 – 520 MHz) 380-520MHz	MOTOROLA	AN000452A01
CHGR DEKSTOP MULTI UNIT IMPRES 2 1 DISPLAYS BASE ONLY	MOTOROLA	PMPN4593A
CHGR DEKSTOP SINGLE UNIT IMPRES 2 BASE ONLY	MOTOROLA	PMPN4819A
CGAI mini programming cable and test cable, non-DIV1	MOTOROLA	PMKN4231A

General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, the EUT is to comply with the requirements of the following standards:

FCC 47 CFR Part 15 Subpart C
KDB 558074 D01 15.247 Meas Guidance v05
ANSI C63.10-2013

Deviation from standard

Not applicable as no deviation from standard test method

Modifications to EUT

For RF conducted measurements a pigtail was soldered out of the board while for radiated measurements there were no modifications to the device

2.0. Summary of Test Results

FCC Clause	IC Clause	Test Item	Result	Remark	Serial number tested	Tested by
15.247 (a)(2)	RSS-247 5.2(a)	DTS & 99% Channel Bandwidth	Pass	Highest 99% OCB: 802.11b: 13.465 MHz(13M5G1D) 802.11g: 16.985 MHz(17M0D1D) 802.11n: 17.804 MHz(17M8D1D)	657BWT0123	Hidayati
15.247 (b)(3)	RSS-247 5.4(d)	Conducted RF Output Power (Peak)	Pass	Highest output power: 802.11b: 19.51 dBm (89.33 mW) 802.11g: 22.93 dBm (196.34 mW) 802.11n: 22.8 dBm (190.55 mW)	657BWT0123	Hidayati
15.247(e)	RSS-247 5.2(b)	Maximum Power Spectral Density	Pass	Meet the limit requirement.	657BWT0123	Hidayati
15.247(d)	RSS-247 5.5	Conducted Spurious Emissions	Pass	Worst case emission: 802.11b: -42.65 dBm 802.11g: -41.90 dBm 802.11n: -42.57 dBm	657BWT0123	Hidayati
15.247 (d)	RSS-247 5.5	Band edge Conducted Spurious Emission	Pass	Worst case emission: 802.11b: -46.85 dBm 802.11g: -29.12 dBm 802.11n: -29.78 dBm	657BWT0123	Hidayati
15.205, 15.209, 15.247 (d)	RSS-247 5.5	Radiated Emission within Restricted Bands	Pass	Worst case emission: RBE: 73.6175 dBuV/m (margin:0.3825 dB) RSE: 52.1117 dBuV/m (margin: 1.8883 dB)	287TZP0060	Haikal & Nazrin
15.207	RSS-Gen 8.8	AC Power Line Conducted Emission	NA	Meet the limit requirement.	287TZP0060	Shidee
15.203		Antenna requirement	NA	Internal antenna is not accessible to the enduser	NA	NA

NA → Not Available

3.0. Measurement Uncertainty

Measurement	Frequency	Expended Uncertainty (k=1.96) (±dB)
AC Power Line Conducted Spurious Emission	150KHz ~ 30MHz	3.48
Radiated Emissions up to 1 GHz	30MHz ~ 1000MHz	5.88
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.84
	18GHz ~ 40GHz	6.02
Conducted Spurious Emissions	9kHz ~ 12.75GHz	2.82

4.0. Equipment List

Bluetooth ATE # 1 (SW Version: Ate Main_3.1.12_R1)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
CHAMBER	SH-641	92003820	18-Jul-23	18-Jul-24
POWER SUPPLY	6652A	3640A02967	19-Oct-22	19-Oct-23
SPECTRUM ANALYZER	E4440A	MY46185415	27-Dec-22	27-Dec-23
PULSE POWER METER	ML2495A	1845014	16-Aug-23	16-Aug-24
PULSE POWER SENSOR	MA2411B	1726287	22-Aug-23	22-Aug-24

Radiated Emission Station (SW Version: EMC FCC RE v1.6.5)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
DRG HORN FREQ.	SAS-571	1143	08-Mar-23	08-Mar-25
DRG HORN FREQ.	SAS-571	720	18-Apr-23	18-Apr-25
DC Power Supply	6033A	3211A06649	12-Jun-22	12-Jun-24
SIGNAL GENERATOR	SMB 100A	182511	4-Jun-21	4-Jun-24
EMI TEST RECEIVER	ESW44	101731	11-Aug-23	11-Aug-24
5m SEMI-ANECHOIC CHAMBER	S800-HX	J2308	No Cal. Req'd	No Cal. Req'd
BILOG ANTENNA	CBL6112D	30991	5-Jan-23	5-Jan-24
BILOG ANTENNA	CBL6112D	55546	23-Jun-22	23-Dec-23
DATA LOGGER THERMOHYGROMETER	SDL500	A.016800	21-Jun-23	21-Jun-24
SYSTEM CONTROLLER	SC104V	050806-1	No Cal. Req'd	No Cal. Req'd
TURNTABLE FLUSH MOUNT 2M	FM2011	NA	No Cal. Req'd	No Cal. Req'd
ANTENNA POSITIONING TOWER	TLT2	NA	No Cal. Req'd	No Cal. Req'd
BROAD-BAND HORN ANTENNA	BBHA9170	BBHA9170255	22-Feb-23	22-Feb-24
PREAMPLIFIER 18-40GHz	Miteq Hi Gain Sucoflex	002	No Cal. Req'd	No Cal. Req'd
PREAMPLIFIER	PAM-0118P	269	28-Mar-23	28-Mar-24
LOOP ANTENNA	6502	00208416	12-Oct-22	12-Oct-23

AC Powerline Station (SW Version: EMC32 Ver. 10.60.10)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
DATA LOGGER	DSB	16344143	21-Jun-2023	23-Jun-2024
V-NETWORK 2-LINE	ENV216	101268	15-Nov-2022	15-Nov-2023
EMI TEST RECEIVER	ESCI	100225	9-Nov-2022	9-Nov-2023
PROGRAMMABLE AC SOURCE	61604	616040003502	12-Dec-2022	12-Dec-2023

5.0. Test Mode Applicability and Test Channel Detail

The device employs MIMO technology. Below are the possible configurations.

WLAN Configurations		Mode					
		SISO		Spatial Diversity Multiplexing (MIMO)		Cyclic Delay Diversity (MIMO)	
	Antenna	Primary	Secondary	Primary	Secondary	Primary	Secondary
2.4GHz	802.11b	√	√	x	x	x	x
	802.11g	√	√	x	x	x	x
	802.11n (HT20)	√	√	x	x	x	x
	802.11n (HT40)	x	x	x	x	x	x

√ = **Support;**

x = **NOT Support**

Note: This Device supports simultaneous transmission operation, which allows for two SISO or two MIMO channels to operate independent of one another in the 2.4GHz band on each antenna. 802.11n mode is capable of transmitting simultaneously on two antennas using Cyclic Delay Diversity and Spatial Diversity Multiplexing (2x2 MIMO).

The following tables show the worst case configurations determined during testing. The data for these configurations is contained in this test report.

Radiated Emission Test (Above 1GHz)

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Modulation	Available Channel	Tested Channel	Modulation Technology	Data Modulation Type	Date Rate (Mbps)	Mode	Environmental Conditions
Test Mode	802.11b	1 to 11	1,6,11	DSSS	QPSK	2	SISO	22.8°C, 70.1%RH
Test Mode	802.11g	1 to 11	1,6,11	OFDM	BPSK	6	SISO	22.8°C, 70.1%RH
Test Mode	802.11n (HT20)	1 to 11	1,6,11	OFDM	BPSK	6.5	SISO CDD (MIMO)	22.8°C, 70.1%RH
Test Mode	802.11n (HT40)	3 to 9	3,6,9	OFDM	BPSK	6.5	SISO CDD (MIMO)	NA

Radiated Emission Test (Below 1GHz)

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Modulation	Available Channel	Tested Channel	Modulation Technology	Data Modulation Type	Date Rate (Mbps)	Mode	Environmental Conditions
Test Mode	802.11b	1 to 11	1,6,11	DSSS	QPSK	2	SISO	22.8°C, 70.1%RH
Test Mode	802.11g	1 to 11	1,6,11	OFDM	BPSK	6	SISO	22.8°C, 70.1%RH
Test Mode	802.11n (HT20)	1 to 11	1,6,11	OFDM	BPSK	6.5	SISO CDD (MIMO)	22.8°C, 70.1%RH
Test Mode	802.11n (HT40)	3 to 9	3,6,9	OFDM	BPSK	6.5	SISO CDD (MIMO)	NA

Power Line Conducted Emission Test

☐ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☐ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Modulation	Available Channel	Tested Channel	Modulation Technology	Data Modulation Type	Date Rate (Mbps)	Environmental Conditions
Application Mode	802.11bgn mixed	1 to 11	AUTO	DSSS, OFDM	AUTO	AUTO	NA

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Modulation	Available Channel	Tested Channel	Modulation Technology	Data Modulation Type	Data Rate (Mbps)	Mode	Environmental Conditions
Test Mode	802.11b	1 to 11	1,6,11	DSSS	QPSK	2	SISO	25°C, 54.8%RH
Test Mode	802.11g	1 to 11	1,6,11	OFDM	BPSK	6	SISO	25°C, 54.8%RH
Test Mode	802.11n (HT20)	1 to 11	1,6,11	OFDM	BPSK	6.5	SISO CDD (MIMO)	25°C, 54.8%RH
Test Mode	802.11n (HT40)	1 to 11	3,6,9	OFDM	BPSK	6.5	SISO CDD (MIMO)	NA

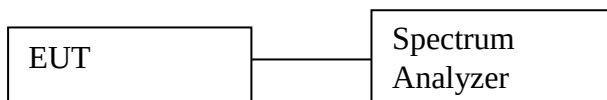
Duty Cycle of Test Signal

802.11b, 802.11g and 802.11n : Duty cycle of test signal is $\geq 98\%$. (Refer to Clause 6.3 for duty cycle test signal)

6.0. Transmitter Test Parameters

6.1. 6dB Channel Bandwidth

6.1.1. Test Setup



- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the DUT and set DUT to transmit maximum power.
- c) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- d) Setting of Spectrum analyzer :
 - a. RBW = 100 kHz
 - b. VBW = 300 kHz
 - c. Detector mode = Peak
 - d. Trace = Max hold
 - e. Sweep = auto
- e) Measure the freq different of two frequencies that were attenuated 6dB from peak of the emission & record the frequency difference as the emission bandwidth.
- f) Measure every antenna port by repeat the step above for MIMO measurement.

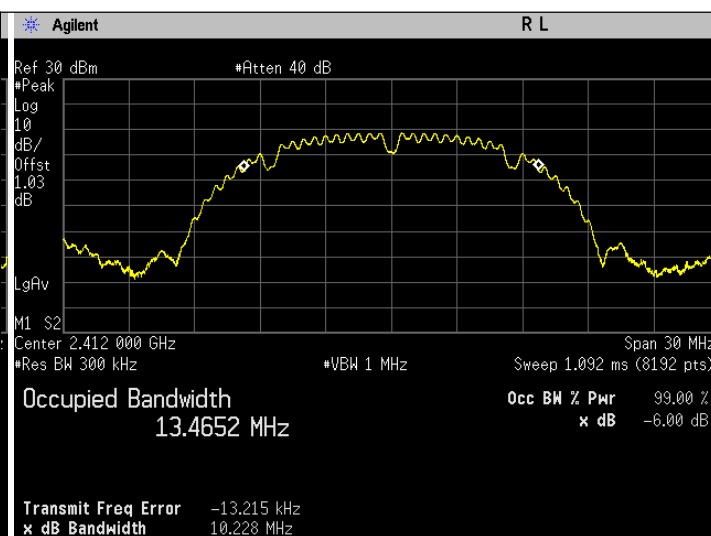
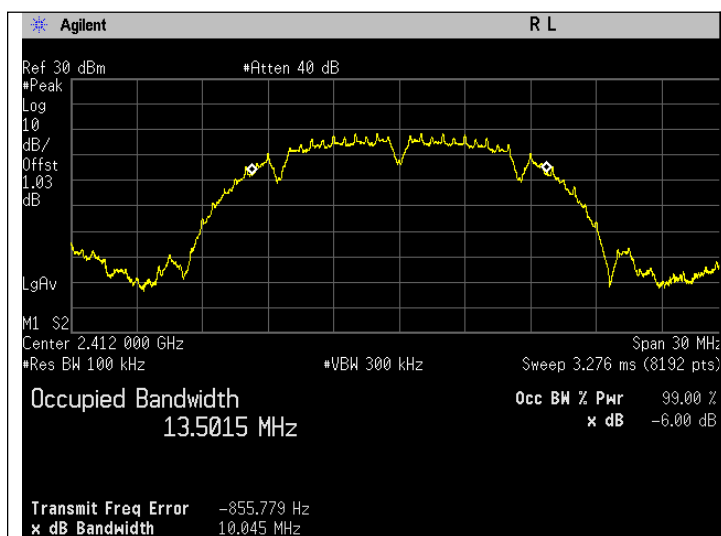
6.1.2. Test Limits:

Normal Condition (25 ° C)
≥500 kHz

6.1.3. Test Data:

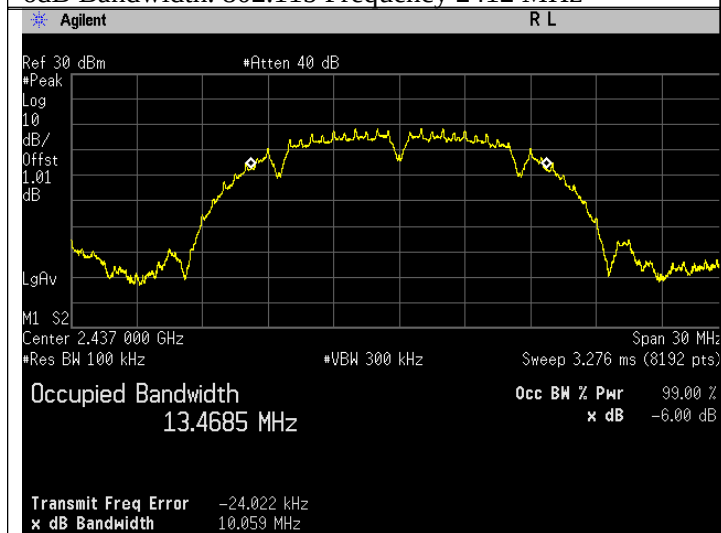
802.11 b

Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Status
802.11b	DSSS	QPSK	1	2412	10.045	13.465	Pass
802.11b	DSSS	QPSK	1	2437	10.059	13.429	Pass
802.11b	DSSS	QPSK	1	2462	10.052	13.405	Pass



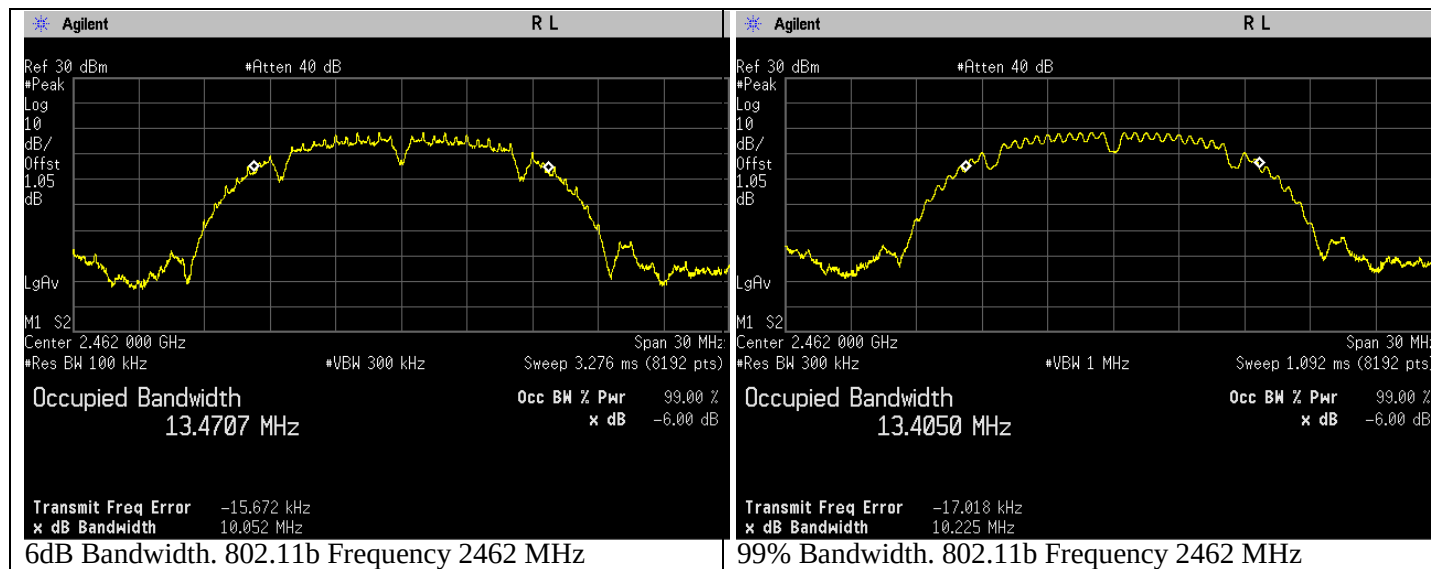
6dB Bandwidth. 802.11b Frequency 2412 MHz

99% Bandwidth. 802.11b Frequency 2412 MHz



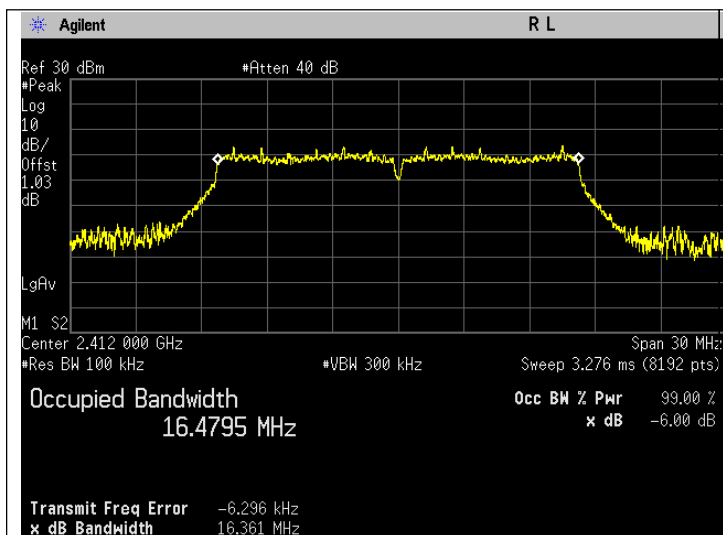
6dB Bandwidth. 802.11b Frequency 2437 MHz

99% Bandwidth. 802.11b Frequency 2437 MHz

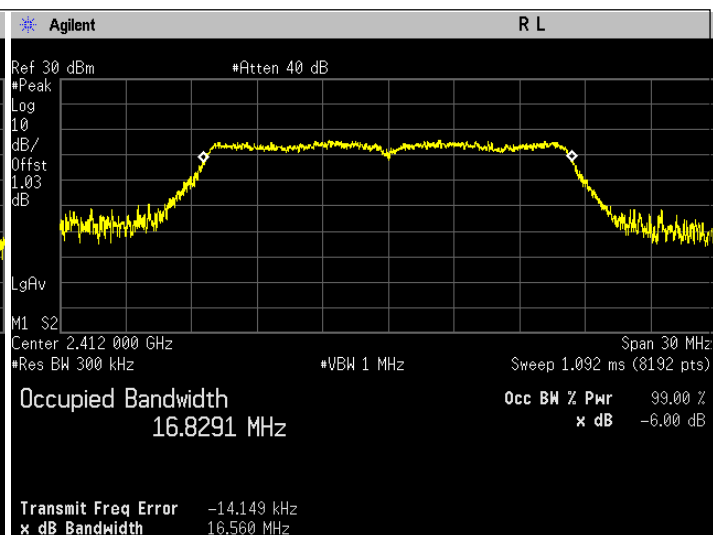


802.11g

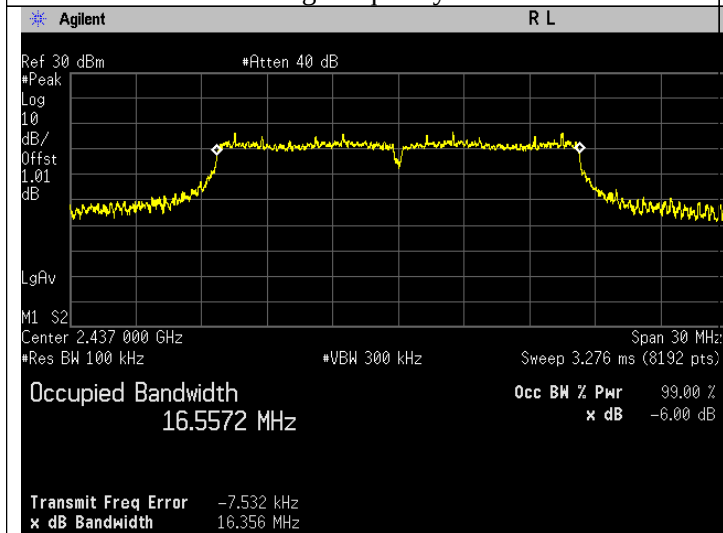
Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Status
802.11g	OFDM	BPSK	6	2412	16.361	16.829	Pass
802.11g	OFDM	BPSK	6	2437	16.356	16.985	Pass
802.11g	OFDM	BPSK	6	2462	16.383	16.793	Pass



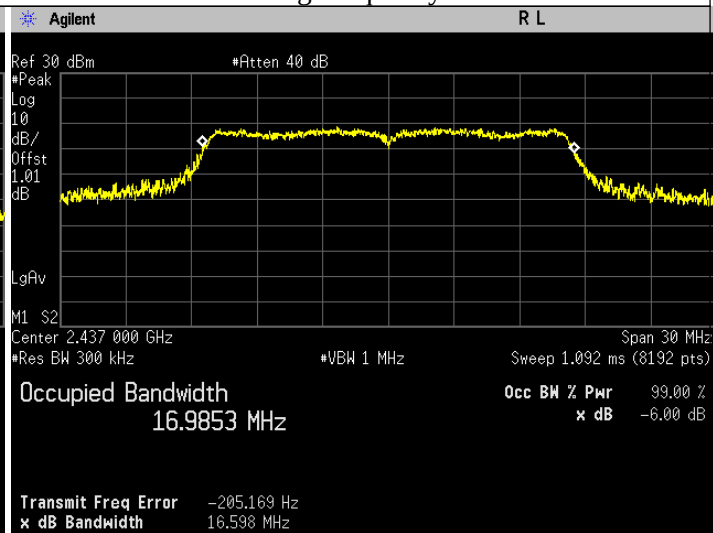
6dB Bandwidth. 802.11g Frequency 2412 MHz



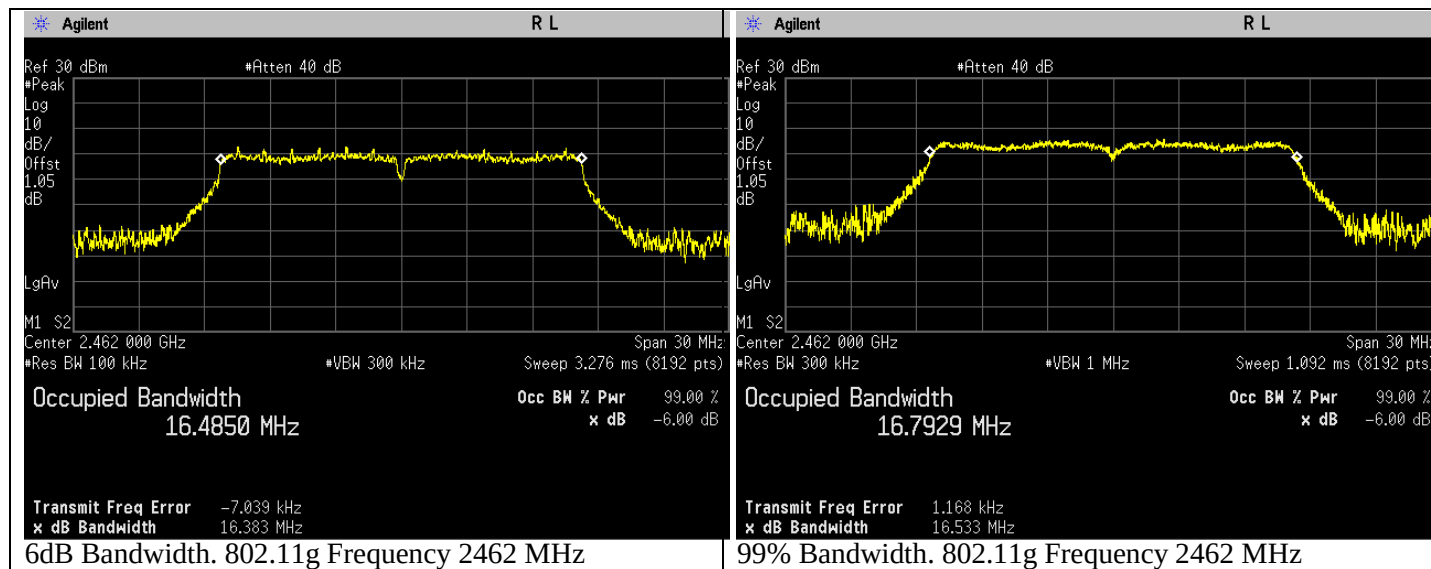
99% Bandwidth. 802.11g Frequency 2412 MHz



6dB Bandwidth. 802.11g Frequency 2437 MHz

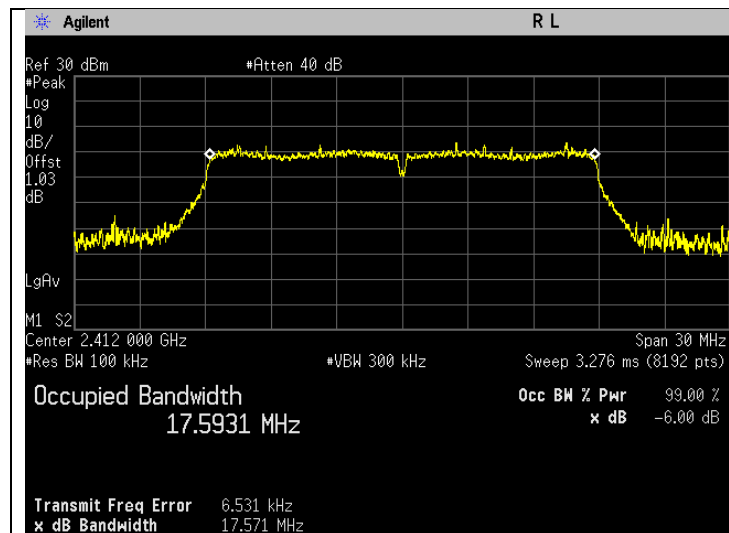


99% Bandwidth. 802.11g Frequency 2437 MHz

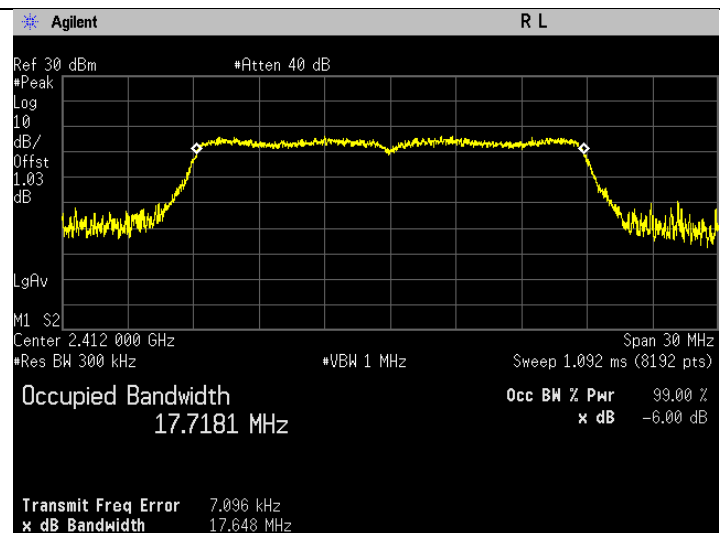


802.11n (HT20)

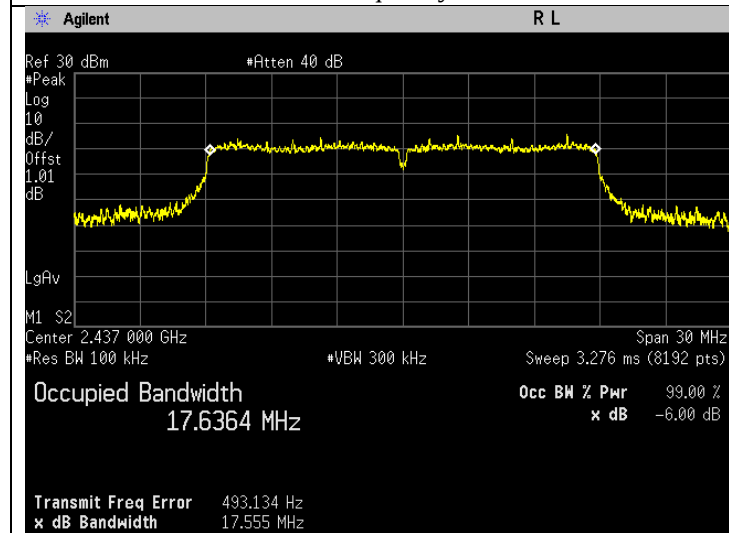
Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Status
802.11n	OFDM	BPSK	6.5	2412	17.571	17.718	Pass
802.11n	OFDM	BPSK	6.5	2437	17.555	17.804	Pass
802.11n	OFDM	BPSK	6.5	2462	17.572	17.698	Pass



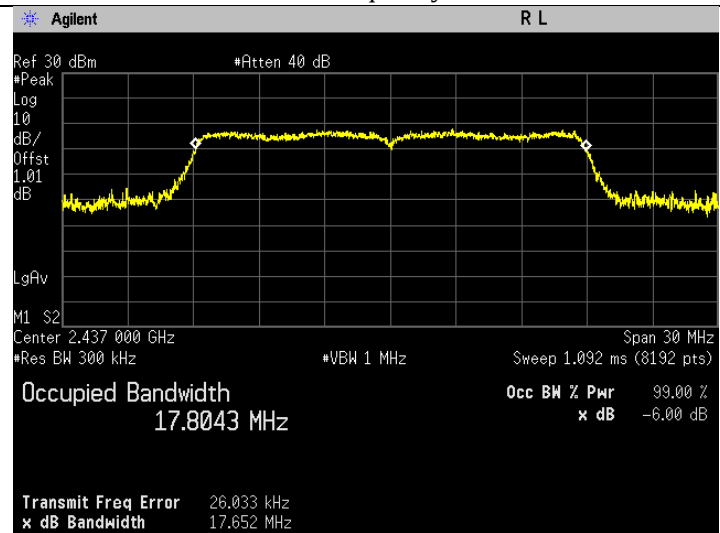
6dB Bandwidth. 802.11n Frequency 2412 MHz



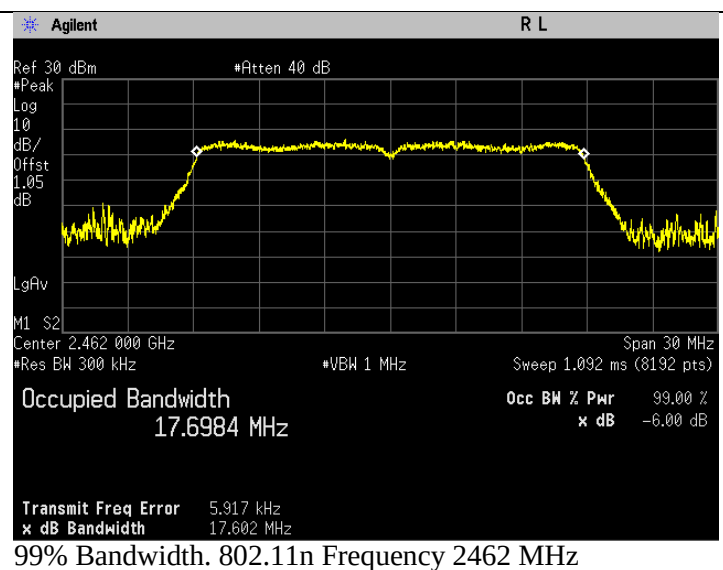
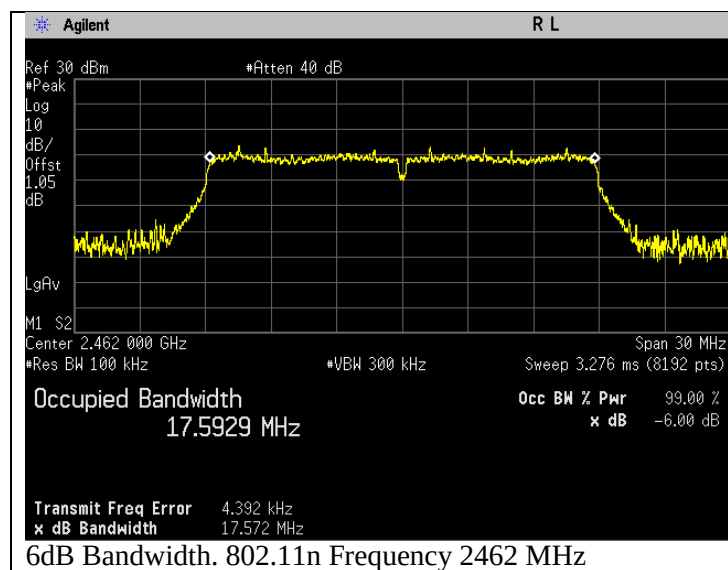
99% Bandwidth. 802.11n Frequency 2412 MHz



6dB Bandwidth. 802.11n Frequency 2437 MHz

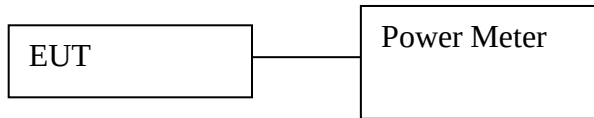


99% Bandwidth. 802.11n Frequency 2437 MHz



6.2. Conducted RF Output Power

6.2.1. Test Setup



Peak

- a) Set the following settings on the power meter:
 - a. Preset -> reset
 - b. Cal/Zero -> Zero & Cal
 - c. Preset -> 802.11g
 - d. Sensor -> Cal Factor -> Enter freq
 - e. Channel -> Trigger -> Trigger Source -> Internal, Rising Edge
 - f. Channel -> Trigger -> More -> Arming -> Automatic
 - g. Channel -> Averaging -> Averaging
 - h. Sensor -> offset -> fixed to couple for losses from ancillaries
 - i. Record peak data
- b) Key up DUT
- c) Restart averaging and read data once the numbers stabilize.
- d) Record power by reading peak data
- e) Repeat the steps in (1) (omit first 3 steps if done previously) by setting DUT to transmit at mid frequency and high frequency.

6.2.2. Test Limits:

Normal Condition (25 ° C)
≤1 Watt(30 dBm)

6.2.3. Test Data:

Test was conducted with peak power.

802.11b

Test Conditions				Test Frequency	Results	
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Output Power (dBm)	Status
802.11b	DSSS	DBPSK	1	2412	19.51	Pass
802.11b	DSSS	DBPSK	1	2437	19.065	Pass
802.11b	DSSS	DBPSK	1	2462	18.905	Pass

802.11g

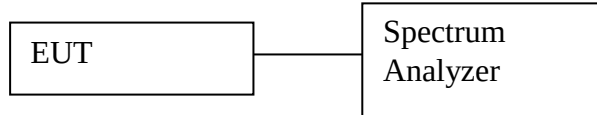
Test Conditions				Test Frequency	Results	
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Output Power (dBm)	Status
802.11g	OFDM	BPSK	6	2412	22.86	Pass
802.11g	OFDM	BPSK	6	2437	22.93	Pass
802.11g	OFDM	BPSK	6	2462	22.83	Pass

802.11n (HT20)

Test Conditions				Test Frequency	Results	
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Output Power (dBm)	Status
802.11n20	OFDM	BPSK	6.5	2412	22.7	Pass
802.11n20	OFDM	BPSK	6.5	2437	22.8	Pass
802.11n20	OFDM	BPSK	6.5	2462	22.52	Pass

6.3.Duty Cycle of the test signal

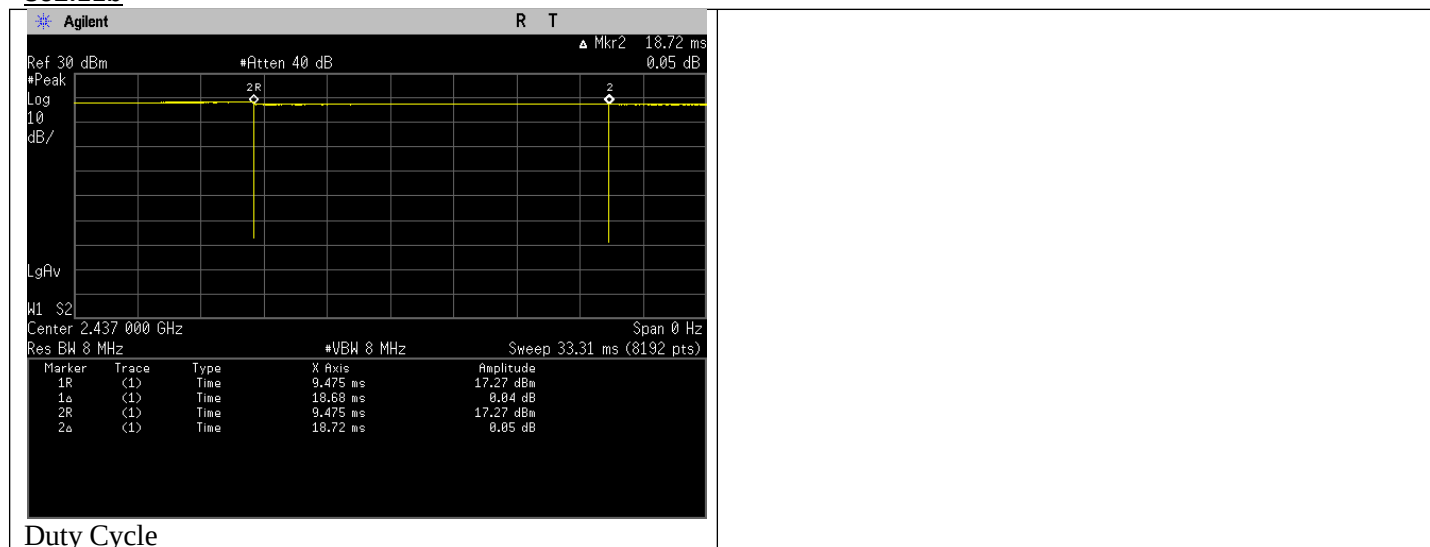
6.3.1. Test Setup



- 1) Check and ensure the spectrum analyzer well calibrate.
- 2) Turn on the DUT and set DUT to transmit maximum power.
- 3) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- 4) Setting of Spectrum analyzer :
 - a. Set the RBW = 10 MHz or the highest RBW available on spectrum analyzer.
 - b. Set the VBW $\geq$ RBW.
 - c. Set the span $\geq [1.5 \times \text{DTS bandwidth}]$.
 - d. Detector = Peak.
 - e. Sweep time = 10ms or others that allow to measure accurate duty cycle.
 - f. Trace mode = max hold.
 - g. Allow trace to fully stabilize.
- 5) Record the duty cycle as X and save the plot.
- 6) Measure every antenna port by repeat the step above for MIMO measurement.

6.3.2. Test Data

802.11b

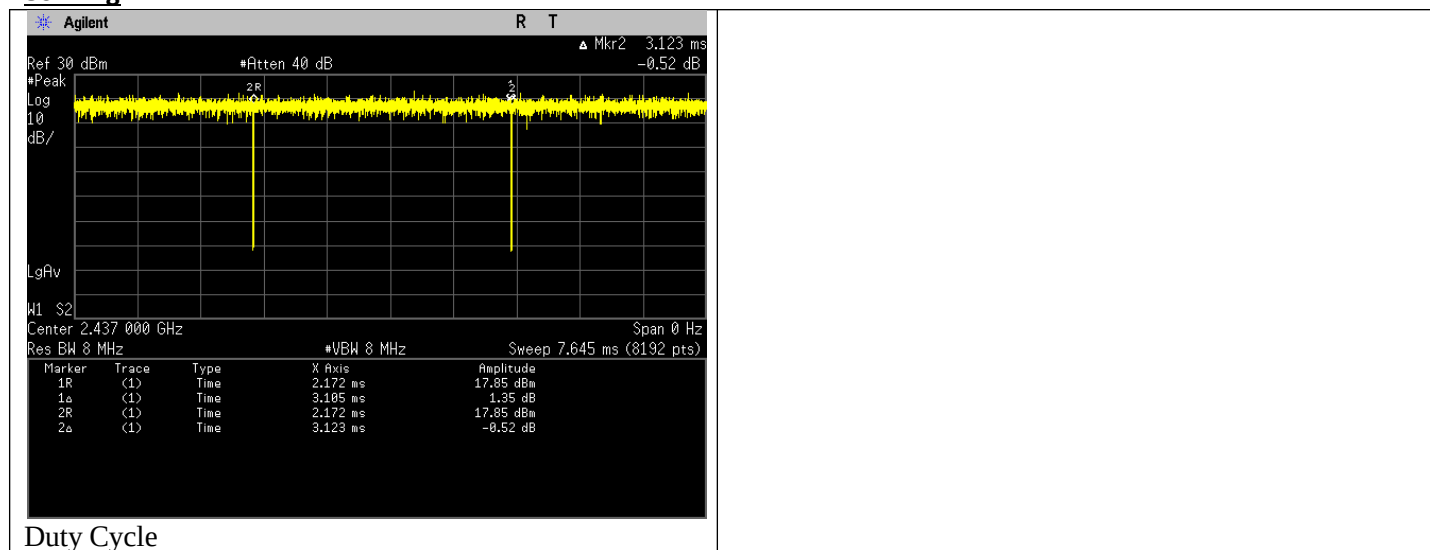


On time (ms)	18.68
On + Off Time (ms)	18.72
Duty cycle	0.9979
Duty Cycle factor	0.009

*Duty cycle = On time/ On +off time

*Duty Cycle factor = 10*log(1/Duty Cycle)

802.11g

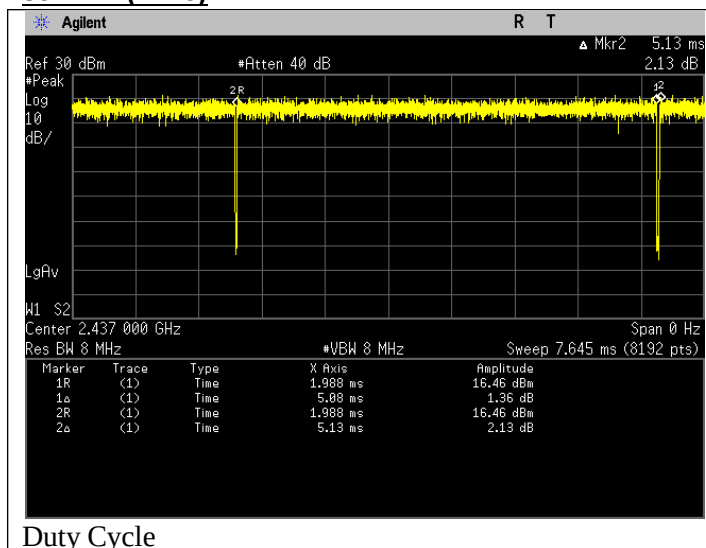


On time (ms)	3.1025
On + Off Time (ms)	3.123
Duty cycle	0.9942
Duty Cycle factor	0.025

*Duty cycle = On time/ On +off time

*Duty Cycle factor = 10*log(1/Duty Cycle)

802.11n (HT20)



Duty Cycle

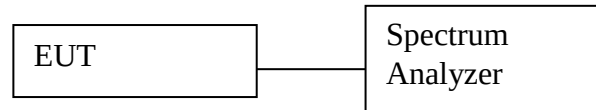
On time (ms)	5.08
On + Off Time (ms)	5.13
Duty cycle	0.9903
Duty Cycle factor	0.043

*Duty cycle = On time/ On +off time

*Duty Cycle factor = 10*log(1/Duty Cycle)

6.4. Maximum Peak Power Spectral Density

6.4.1. Test Setup



Maximum Peak

- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the DUT and set DUT to transmit maximum power.
- c) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- d) Setting of Spectrum analyzer :
 - a. Set analyzer center frequency to DTS channel center frequency.
 - b. Set the span to 1.5 times the DTS bandwidth.
 - c. Set the RBW to $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
 - d. Set the VBW $\geq [3 \times \text{RBW}]$.
 - e. Detector = peak.
 - f. Sweep time = auto couple.
 - g. Trace mode = max hold.
 - h. Allow trace to fully stabilize.
 - i. Use the peak marker function to determine the maximum amplitude level within the RBW.
 - j. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.
- e) Measure every antenna port by repeat the step above for MIMO measurement.

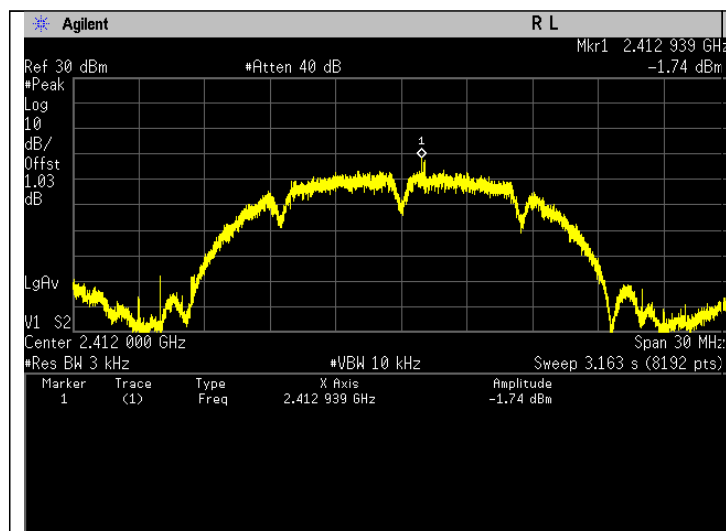
6.4.2. Test Limits

Normal Condition (25 ° C)
$\leq 8 \text{ dBm/3kHz}$

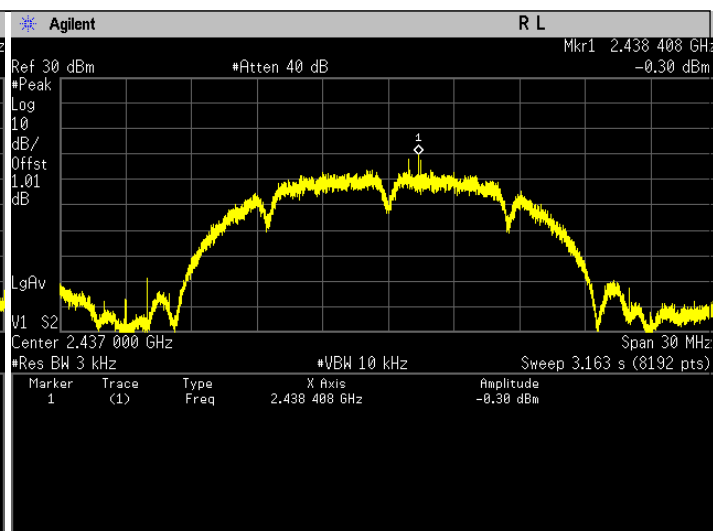
6.4.3. Test Result

802.11b

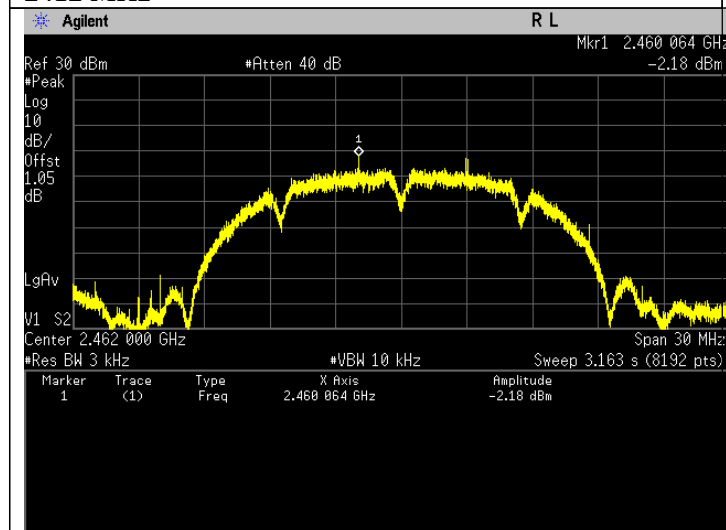
Test Conditions				Test Frequency	Results	
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Power (dBm/3kHz)	Status
802.11b	OFDM	BPSK	1	2412	-1.74	Pass
802.11b	OFDM	BPSK	1	2437	-0.30	Pass
802.11b	OFDM	BPSK	1	2462	-2.18	Pass



Maximum Power Spectral Density. 802.11b Frequency 2412 MHz



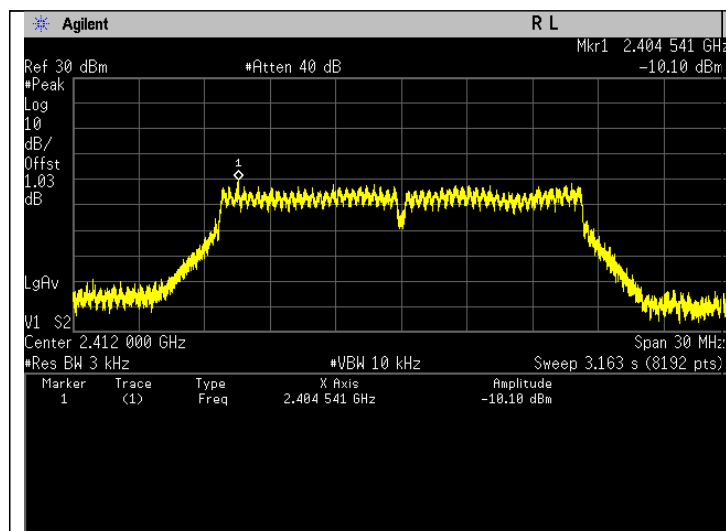
Maximum Power Spectral Density. 802.11b Frequency 2437 MHz



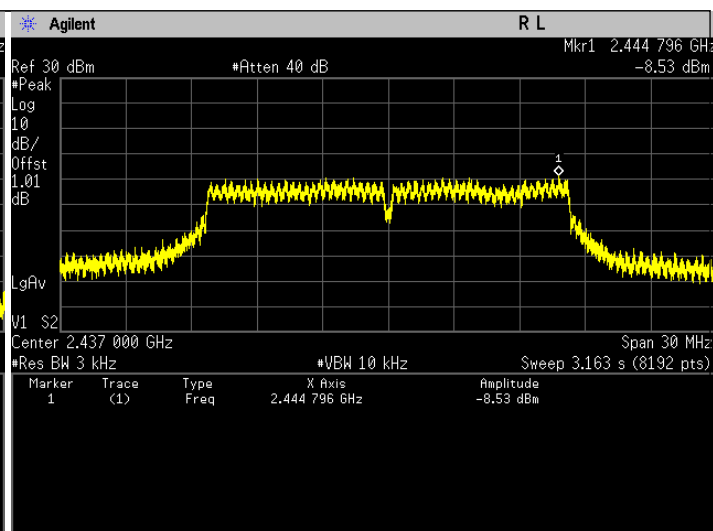
Maximum Power Spectral Density. 802.11b Frequency 2462 MHz

802.11g

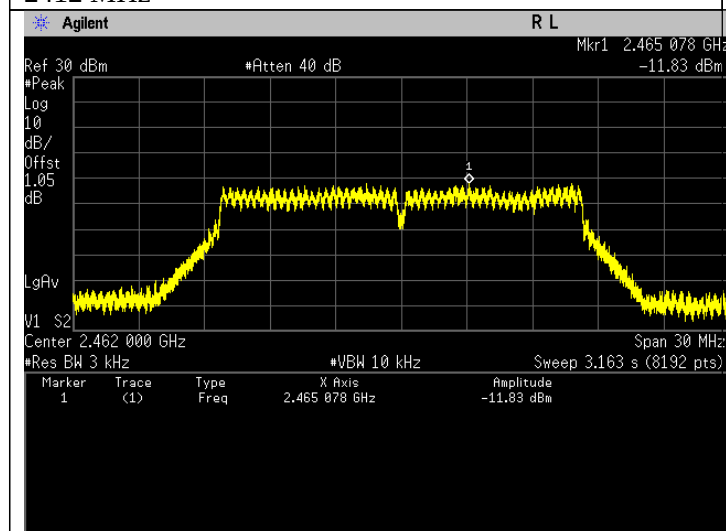
Test Conditions				Test Frequency	Results	
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Power (dBm/3kHz)	Status
802.11g	OFDM	BPSK	6	2412	-10.10	Pass
802.11g	OFDM	BPSK	6	2437	-8.53	Pass
802.11g	OFDM	BPSK	6	2462	-11.83	Pass



Maximum Power Spectral Density. 802.11g Frequency 2412 MHz



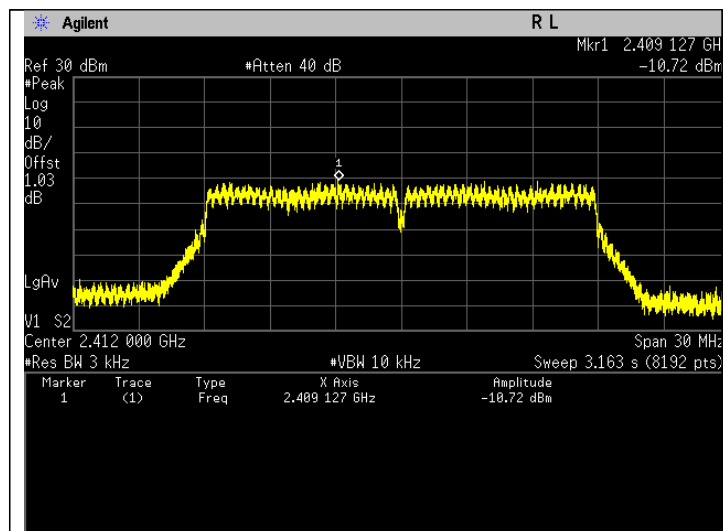
Maximum Power Spectral Density. 802.11g Frequency 2437 MHz



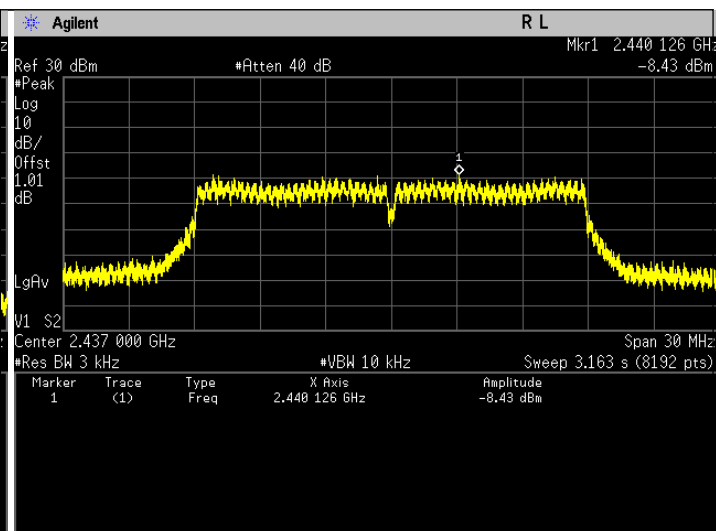
Maximum Power Spectral Density. 802.11g Frequency 2462 MHz

802.11n (HT20)

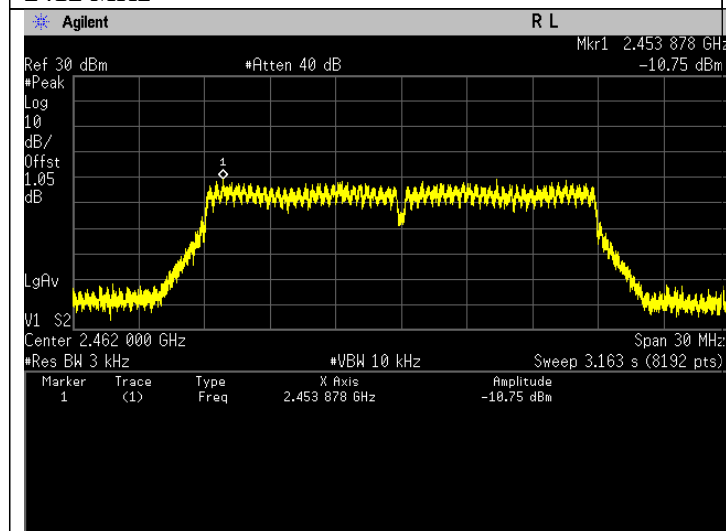
Test Conditions				Test Frequency	Results	
Standard	Modulation Type	Modulation Technology	Data Rate (Mbps)	Tx (MHz)	Power (dBm/3kHz)	Status
802.11n	OFDM	BPSK	6.5	2412	-10.72	Pass
802.11n	OFDM	BPSK	6.5	2437	-8.43	Pass
802.11n	OFDM	BPSK	6.5	2462	-10.75	Pass



Maximum Power Spectral Density. 802.11n Frequency 2412 MHz



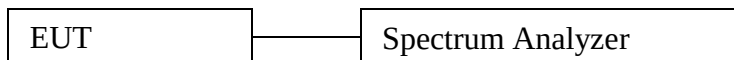
Maximum Power Spectral Density. 802.11n Frequency 2437 MHz



Maximum Power Spectral Density. 802.11n Frequency 2462 MHz

6.5. Conducted Spurious Emission

6.5.1. Test Setup



- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the DUT and set DUT to transmit maximum power.
- c) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- d) Setting of Spectrum analyzer :
 - a. RBW = 100 kHz
 - b. VBW = 300 kHz
 - c. Detector mode = Peak
 - d. Trace = Max Hold
 - e. Sweep = auto
- e) Use the peak marker function to measure highest emission and scan up to 10th harmonic.
- f) Measure every antenna port by repeat the step above for MIMO measurement.

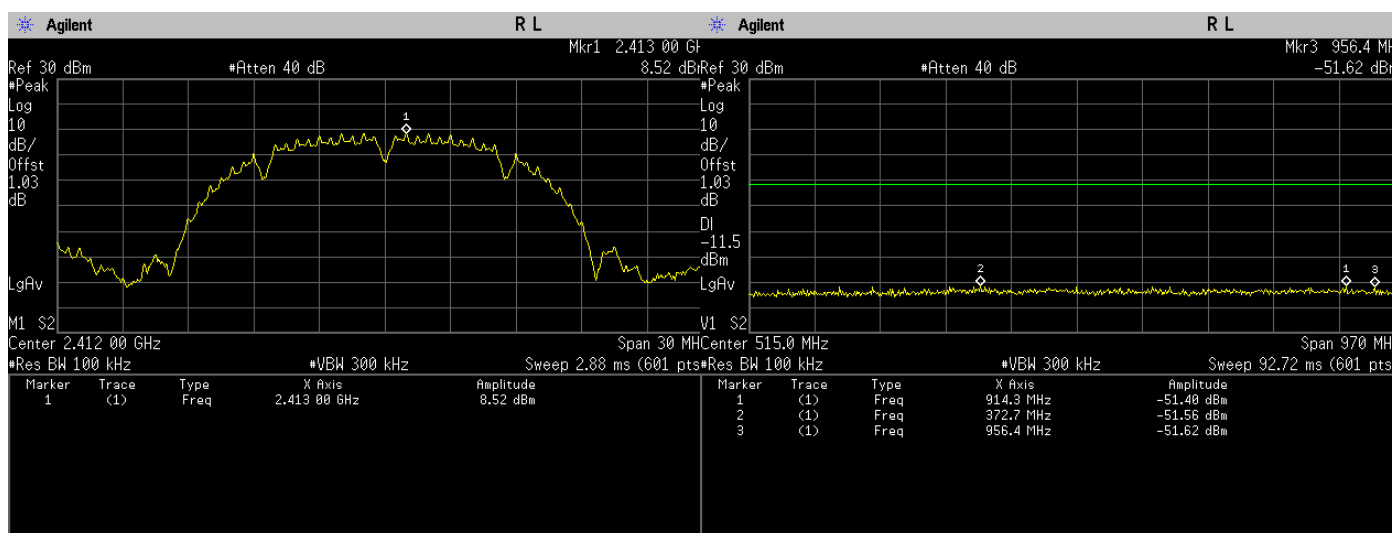
6.5.2. Test Limits:

Normal Condition (25 ° C)
Shall be at least 20 dB below max power. (Peak detector)

6.5.3. Test Result

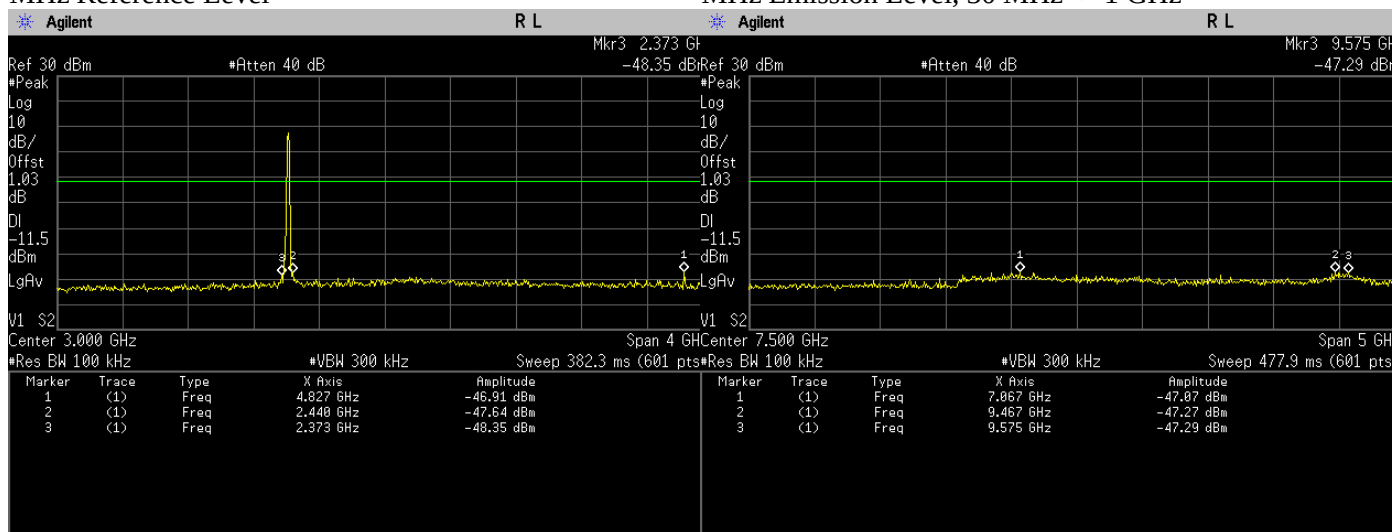
802.11b

Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Spurs (MHz)	Level (dBm)	Status
802.11b	OFDM	BPSK	1	2412	24717.000	-42.91	Pass
					24992.000	-43.04	Pass
					24558.000	-43.40	Pass
802.11b	OFDM	BPSK	1	2437	24683.000	-42.89	Pass
					24350.000	-42.94	Pass
					24725.000	-43.30	Pass
802.11b	OFDM	BPSK	1	2462	24325.000	-42.65	Pass
					23683.000	-43.58	Pass
					24883.000	-43.58	Pass



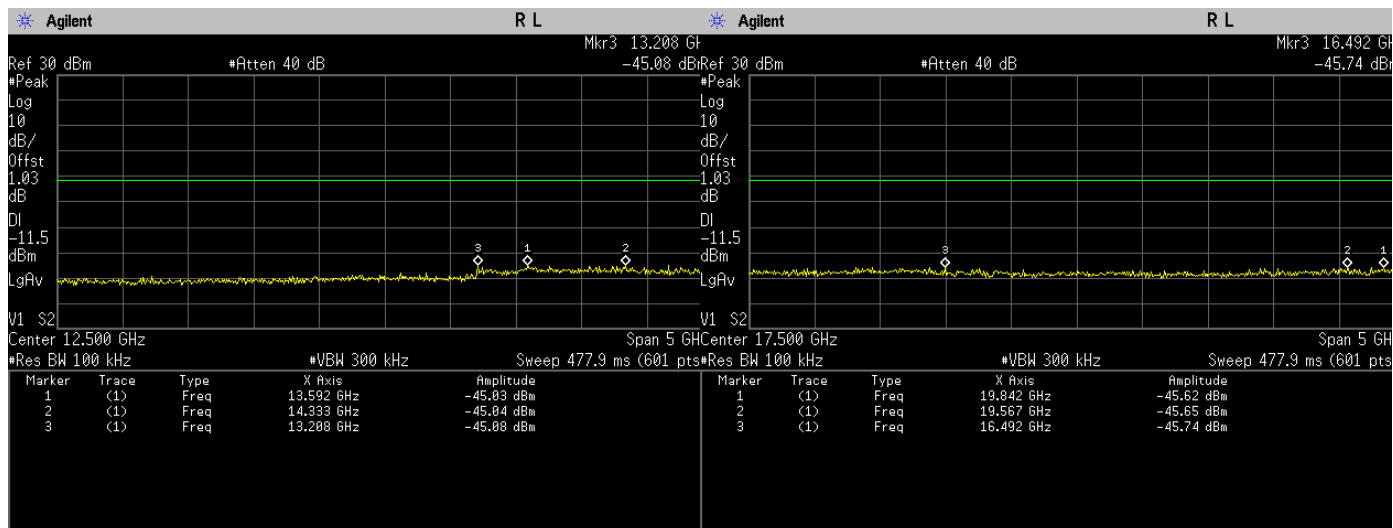
Conducted Emissions(Peak). 802.11b, Frequency 2412 MHz Reference Level

Conducted Emissions(Peak). 802.11b, Frequency 2412 MHz Emission Level, 30 MHz -> 1 GHz



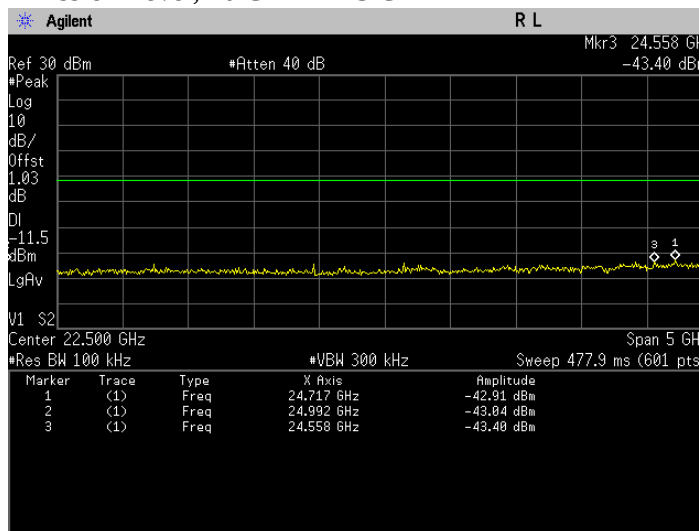
Conducted Emissions(Peak). 802.11b, Frequency 2412 MHz Emission Level, 1 GHz -> 5 GHz

Conducted Emissions(Peak). 802.11b, Frequency 2412 MHz Emission Level, 5 GHz -> 10 GHz

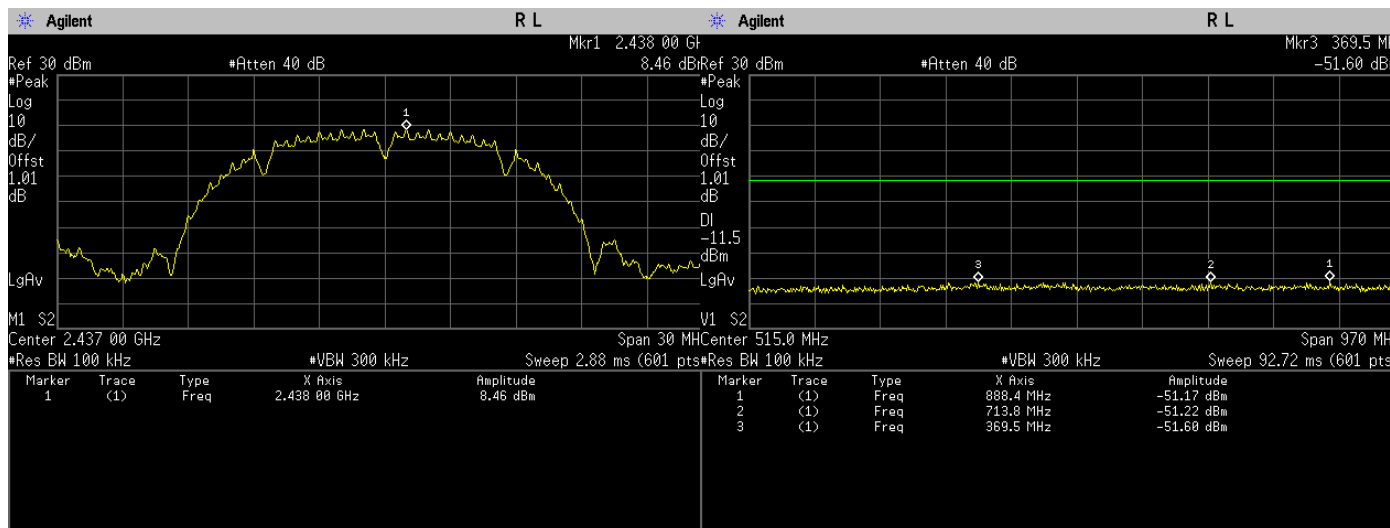


Conducted Emissions(Peak). 802.11b, Frequency 2412 MHz Emission Level, 10 GHz -> 15 GHz

Conducted Emissions(Peak). 802.11b, Frequency 2412 MHz Emission Level, 15 GHz -> 20 GHz

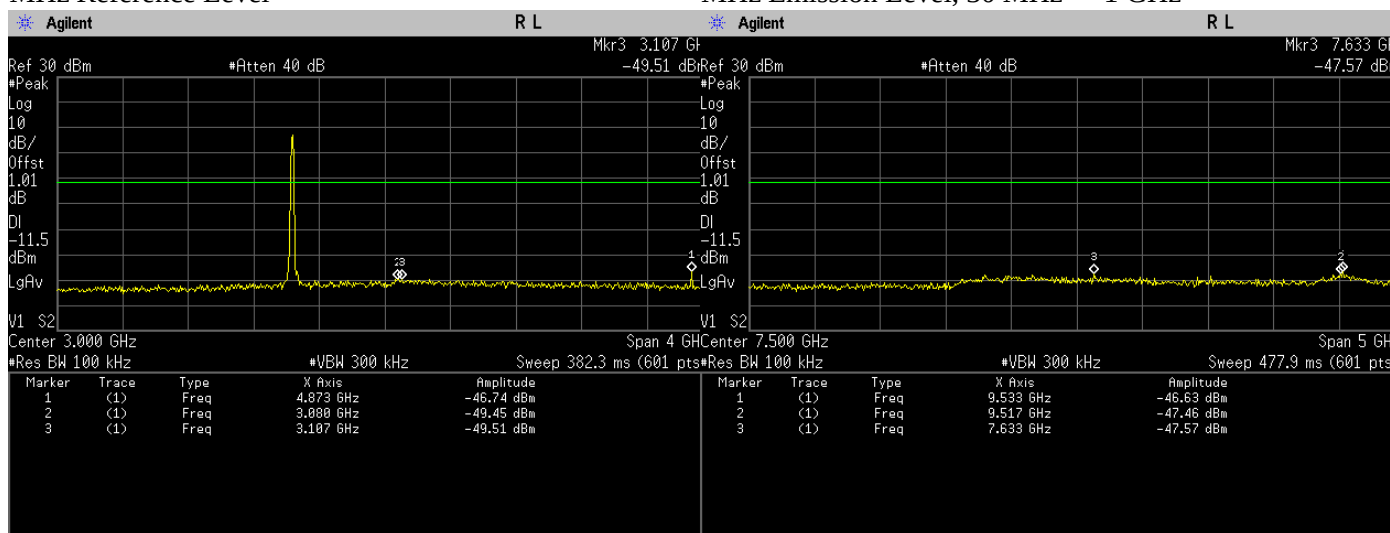


Conducted Emissions(Peak). 802.11b, Frequency 2412 MHz Emission Level, 20 GHz -> 25 GHz



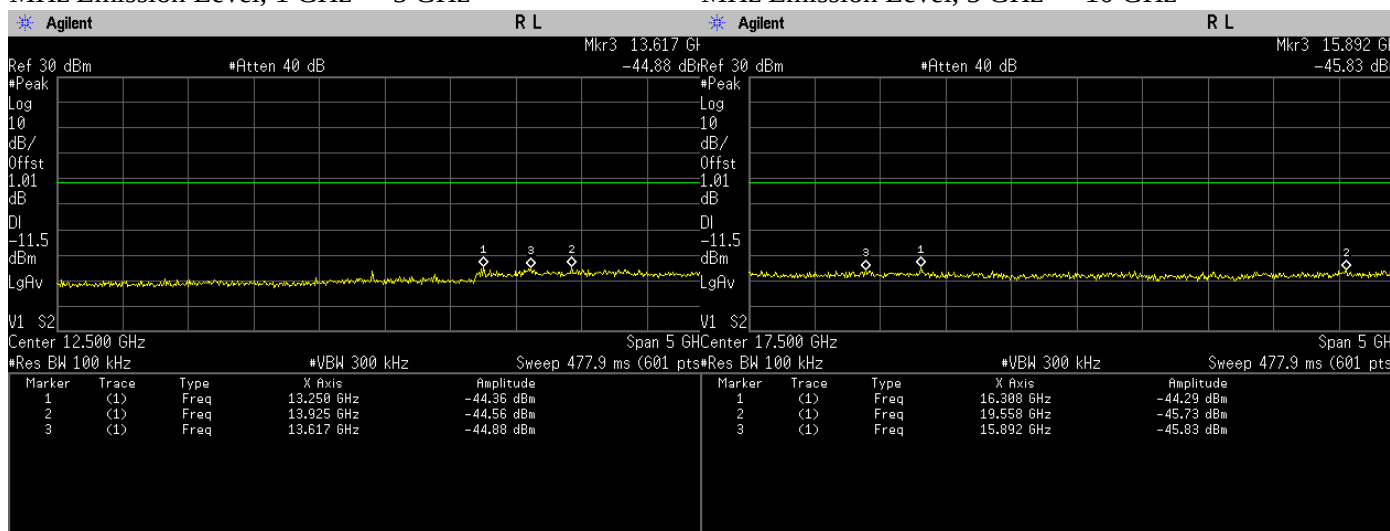
Conducted Emissions(Peak). 802.11b, Frequency 2437 MHz Reference Level

Conducted Emissions(Peak). 802.11b, Frequency 2437 MHz Emission Level, 30 MHz -> 1 GHz



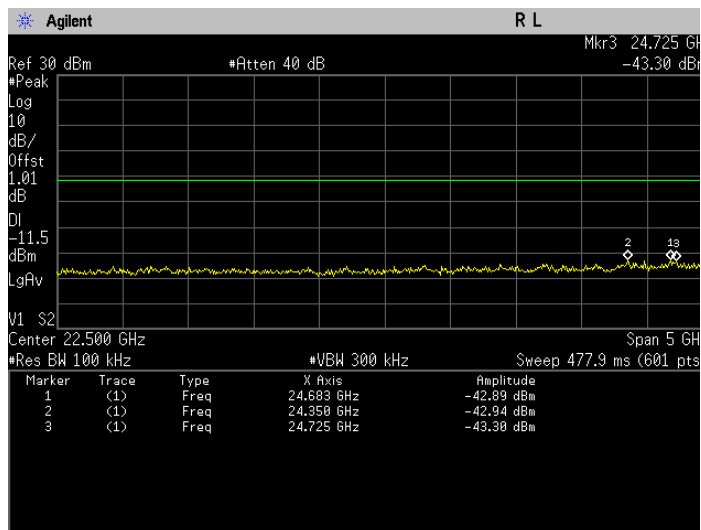
Conducted Emissions(Peak). 802.11b, Frequency 2437 MHz Emission Level, 1 GHz -> 5 GHz

Conducted Emissions(Peak). 802.11b, Frequency 2437 MHz Emission Level, 5 GHz -> 10 GHz

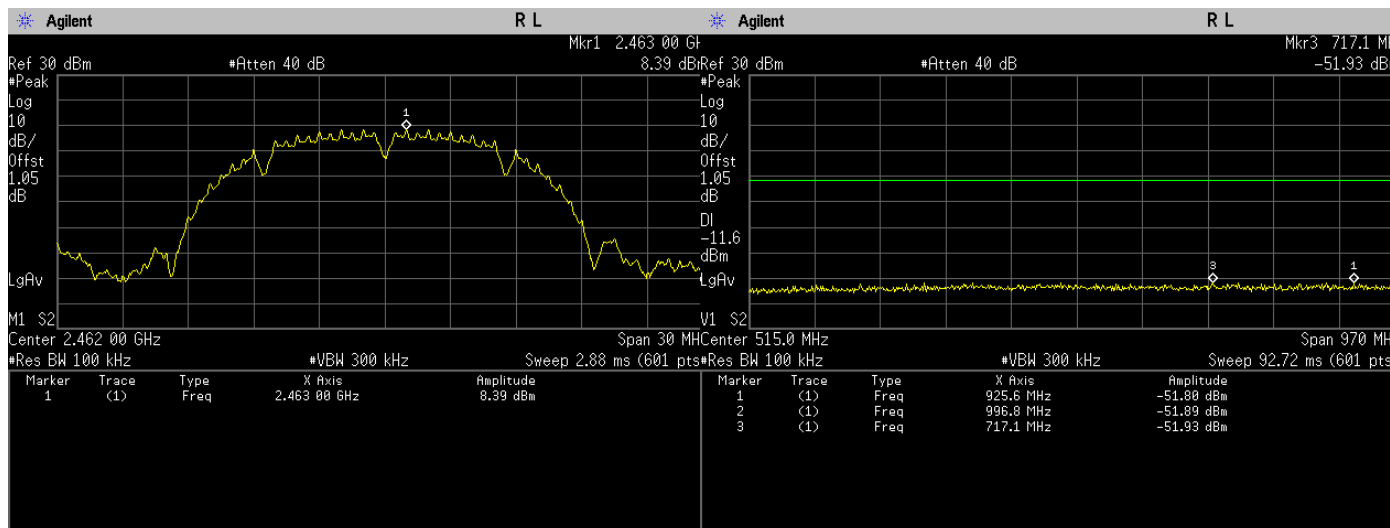


Conducted Emissions(Peak). 802.11b, Frequency 2437 MHz Emission Level, 10 GHz -> 15 GHz

Conducted Emissions(Peak). 802.11b, Frequency 2437 MHz Emission Level, 15 GHz -> 20 GHz

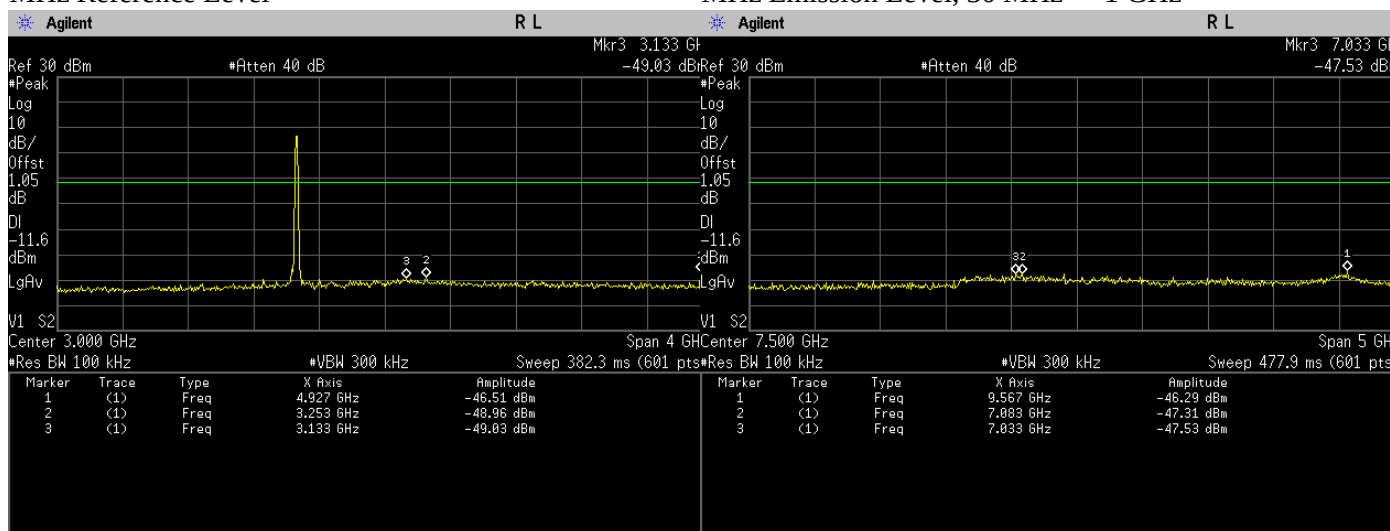


Conducted Emissions(Peak). 802.11b, Frequency 2437
 MHz Emission Level, 20 GHz -> 25 GHz



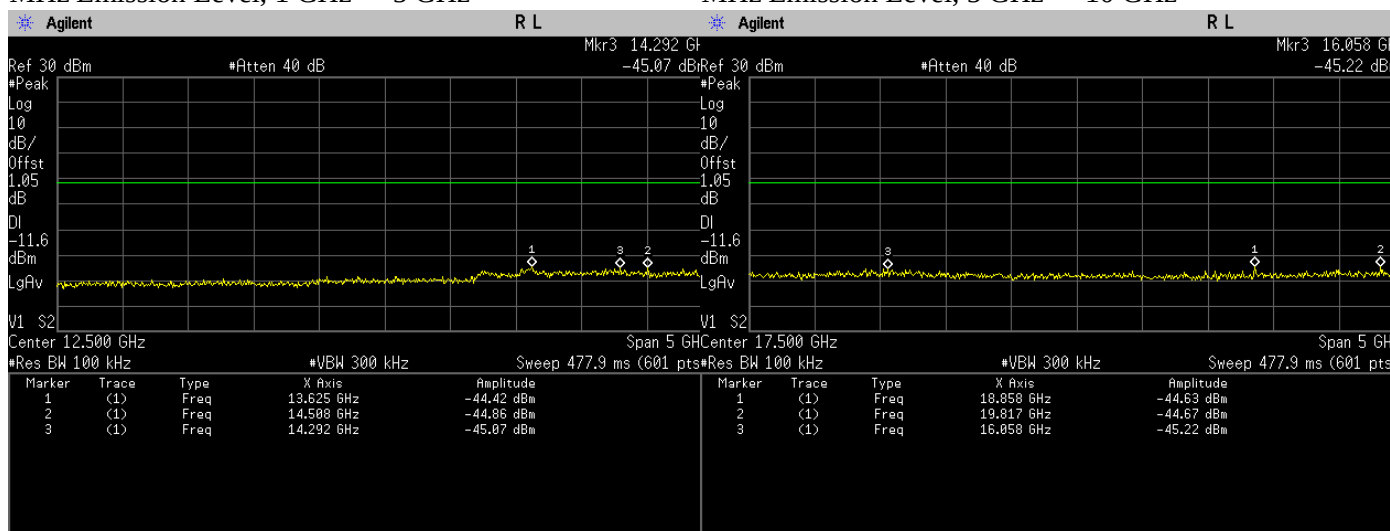
Conducted Emissions(Peak). 802.11b, Frequency 2462 MHz Reference Level

Conducted Emissions(Peak). 802.11b, Frequency 2462 MHz Emission Level, 30 MHz -> 1 GHz



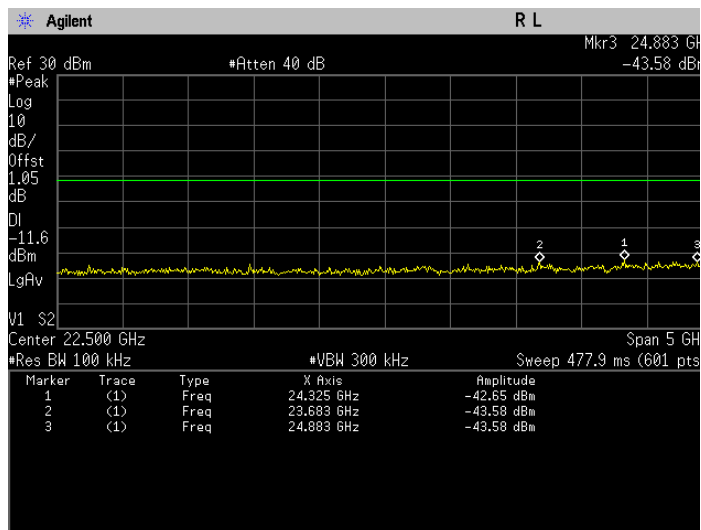
Conducted Emissions(Peak). 802.11b, Frequency 2462 MHz Emission Level, 1 GHz -> 5 GHz

Conducted Emissions(Peak). 802.11b, Frequency 2462 MHz Emission Level, 5 GHz -> 10 GHz



Conducted Emissions(Peak). 802.11b, Frequency 2462 MHz Emission Level, 10 GHz -> 15 GHz

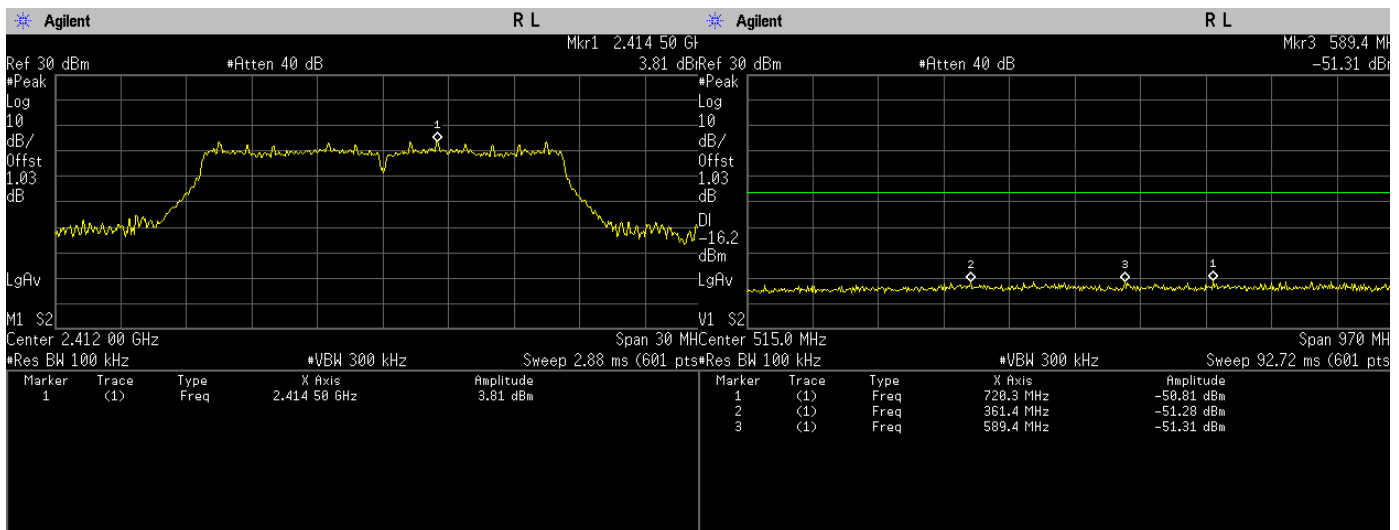
Conducted Emissions(Peak). 802.11b, Frequency 2462 MHz Emission Level, 15 GHz -> 20 GHz



Conducted Emissions(Peak). 802.11b, Frequency 2462 MHz Emission Level, 20 GHz -> 25 GHz

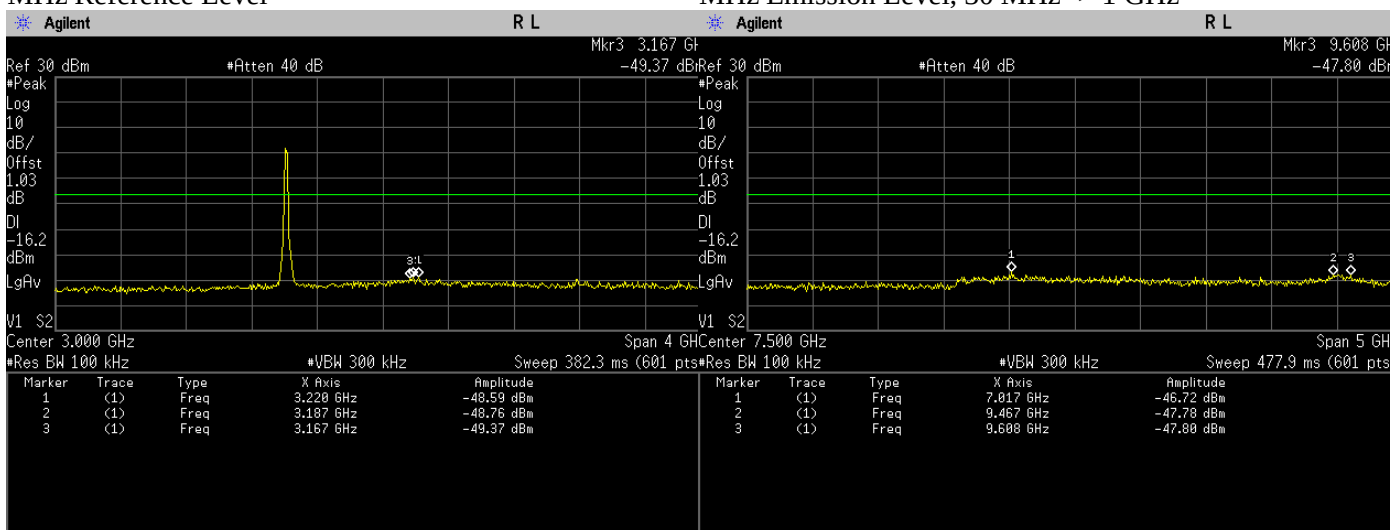
802.11g

Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Spurs (MHz)	Level (dBm)	Status
802.11g	OFDM	BPSK	6	2412	24317.000	-42.95	Pass
					24950.000	-43.35	Pass
					24925.000	-43.68	Pass
802.11g	OFDM	BPSK	6	2437	24733.000	-41.90	Pass
					24650.000	-43.56	Pass
					24975.000	-43.61	Pass
802.11g	OFDM	BPSK	6	2462	24892.000	-43.35	Pass
					24692.000	-43.51	Pass
					24850.000	-43.51	Pass



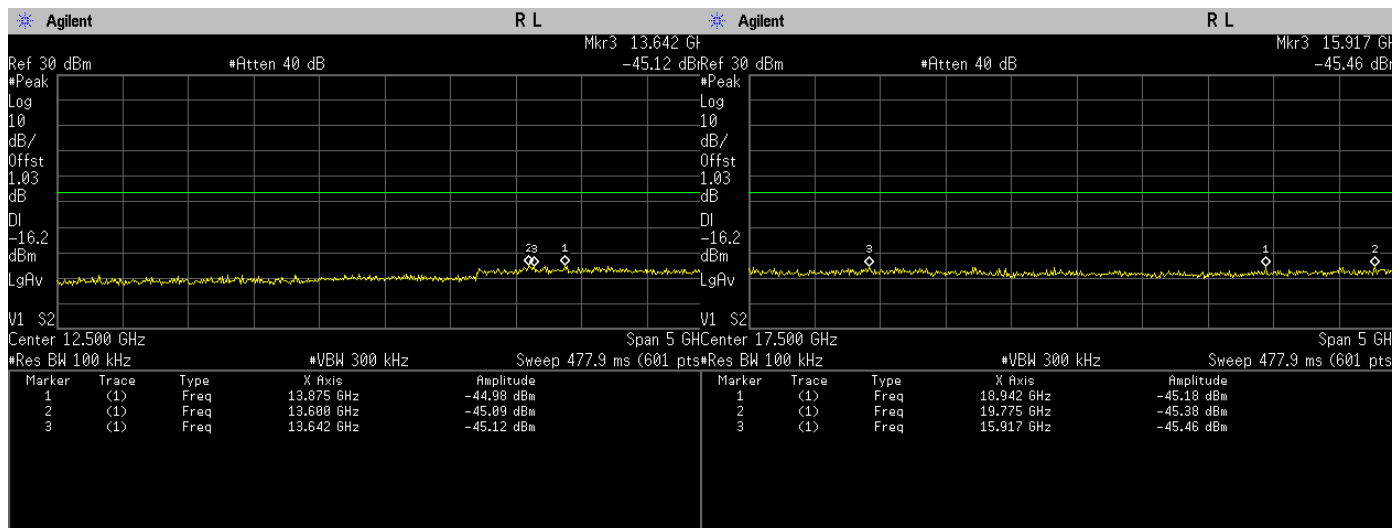
Conducted Emissions(Peak). 802.11g, Frequency 2412 MHz Reference Level

Conducted Emissions(Peak). 802.11g, Frequency 2412 MHz Emission Level, 30 MHz -> 1 GHz



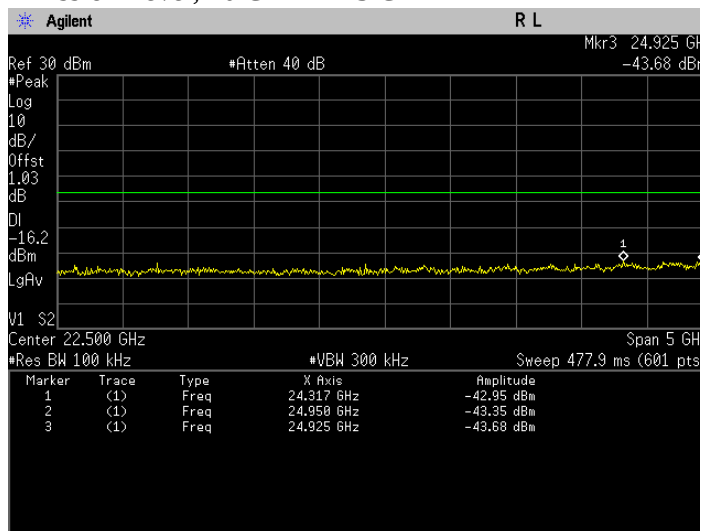
Conducted Emissions(Peak). 802.11g, Frequency 2412 MHz Emission Level, 1 GHz -> 5 GHz

Conducted Emissions(Peak). 802.11g, Frequency 2412 MHz Emission Level, 5 GHz -> 10 GHz

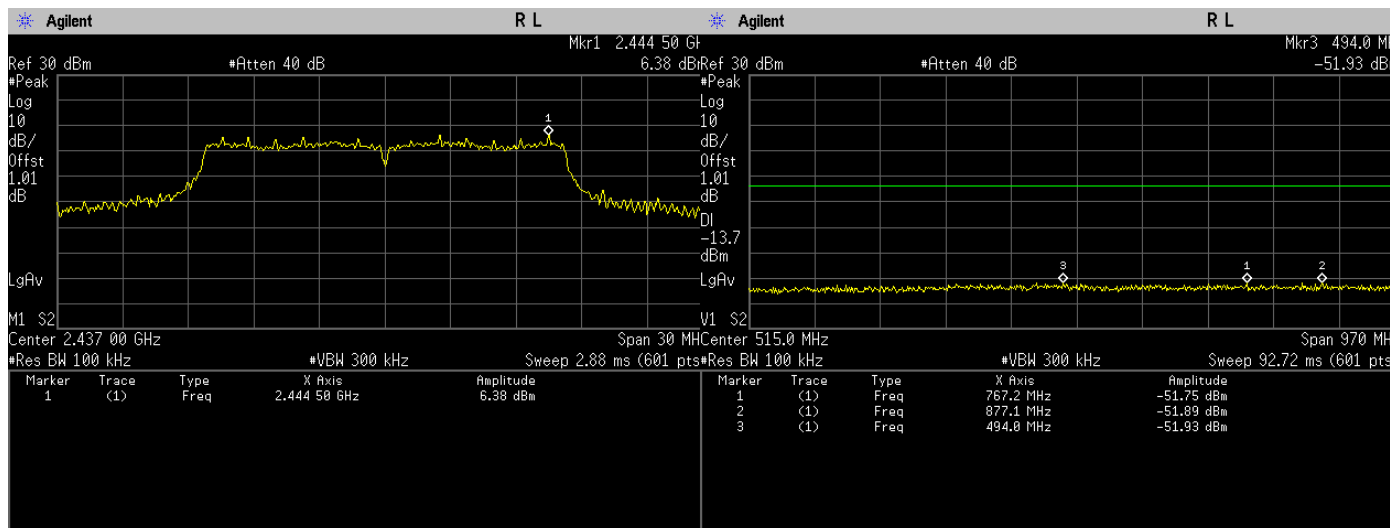


Conducted Emissions(Peak). 802.11g, Frequency 2412 MHz Emission Level, 10 GHz -> 15 GHz

Conducted Emissions(Peak). 802.11g, Frequency 2412 MHz Emission Level, 15 GHz -> 20 GHz

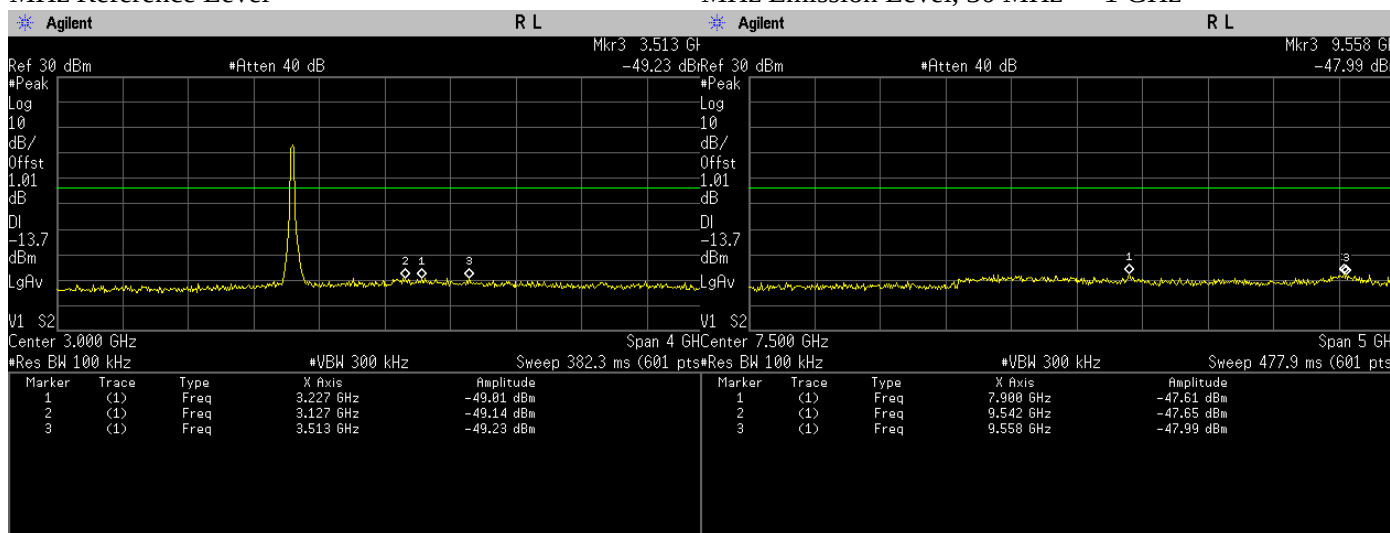


Conducted Emissions(Peak). 802.11g, Frequency 2412 MHz Emission Level, 20 GHz -> 25 GHz



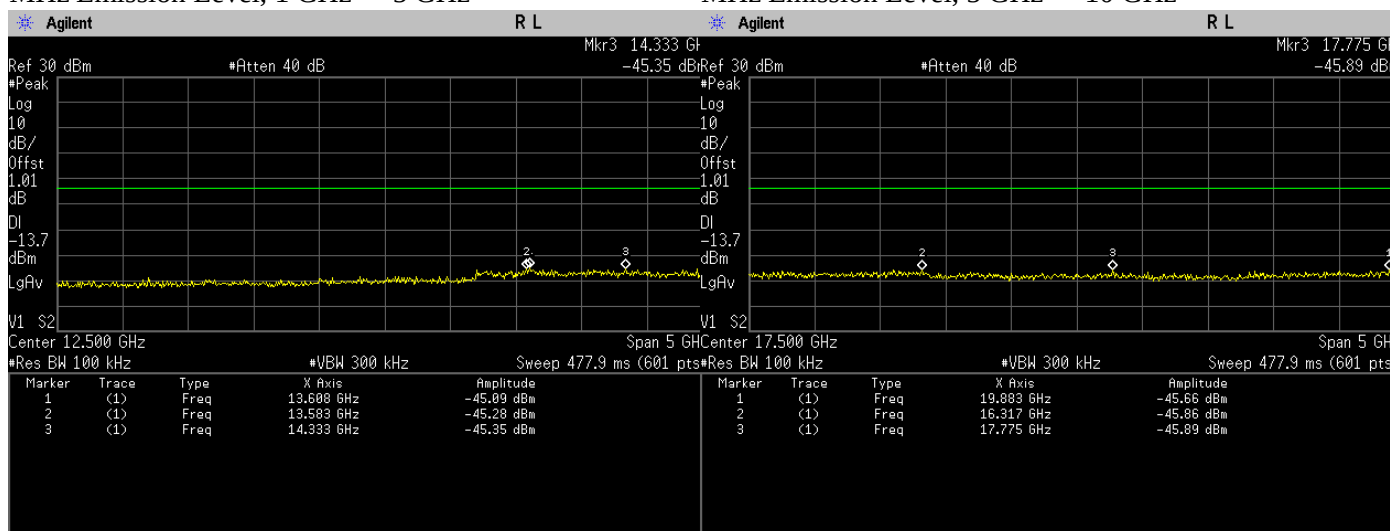
Conducted Emissions(Peak). 802.11g, Frequency 2437 MHz Reference Level

Conducted Emissions(Peak). 802.11g, Frequency 2437 MHz Emission Level, 30 MHz -> 1 GHz



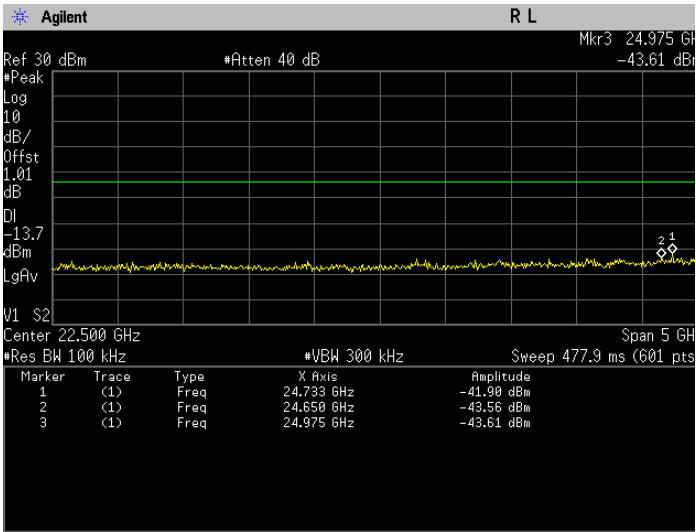
Conducted Emissions(Peak). 802.11g, Frequency 2437 MHz Emission Level, 1 GHz -> 5 GHz

Conducted Emissions(Peak). 802.11g, Frequency 2437 MHz Emission Level, 5 GHz -> 10 GHz

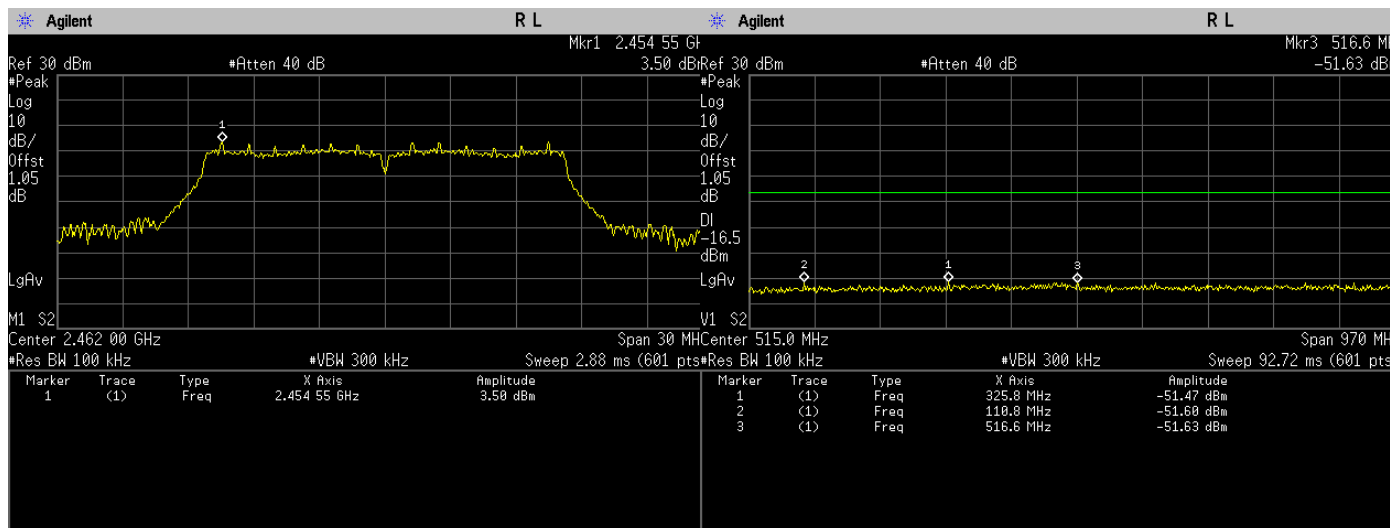


Conducted Emissions(Peak). 802.11g, Frequency 2437 MHz Emission Level, 10 GHz -> 15 GHz

Conducted Emissions(Peak). 802.11g, Frequency 2437 MHz Emission Level, 15 GHz -> 20 GHz

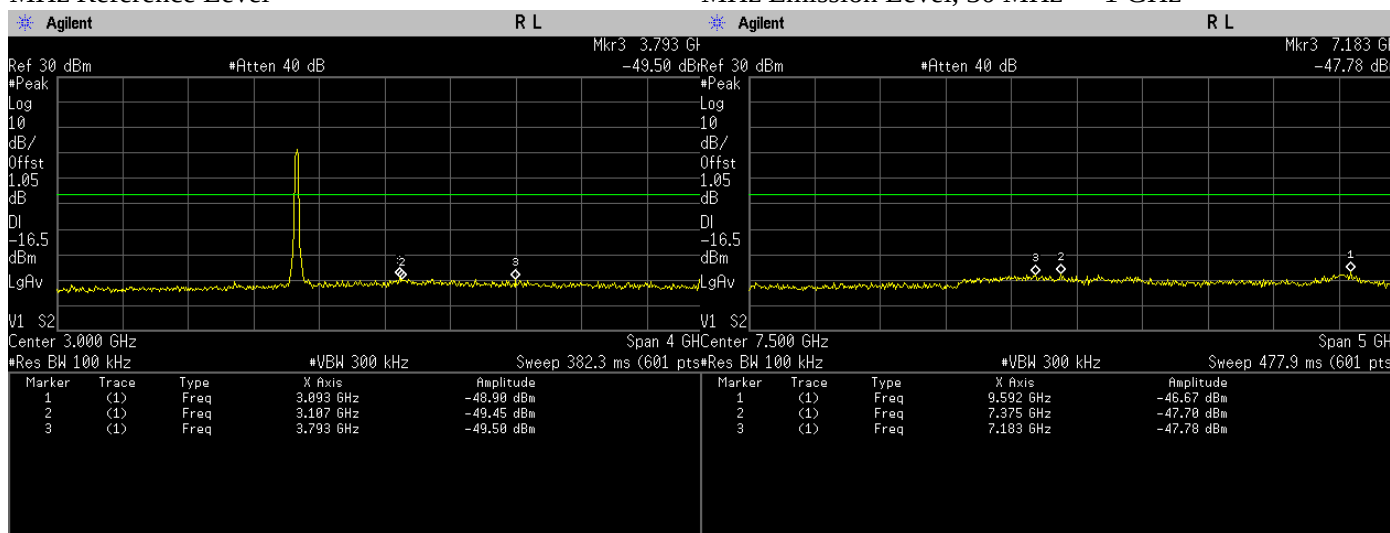


Conducted Emissions(Peak). 802.11g, Frequency 2437 MHz Emission Level, 20 GHz -> 25 GHz



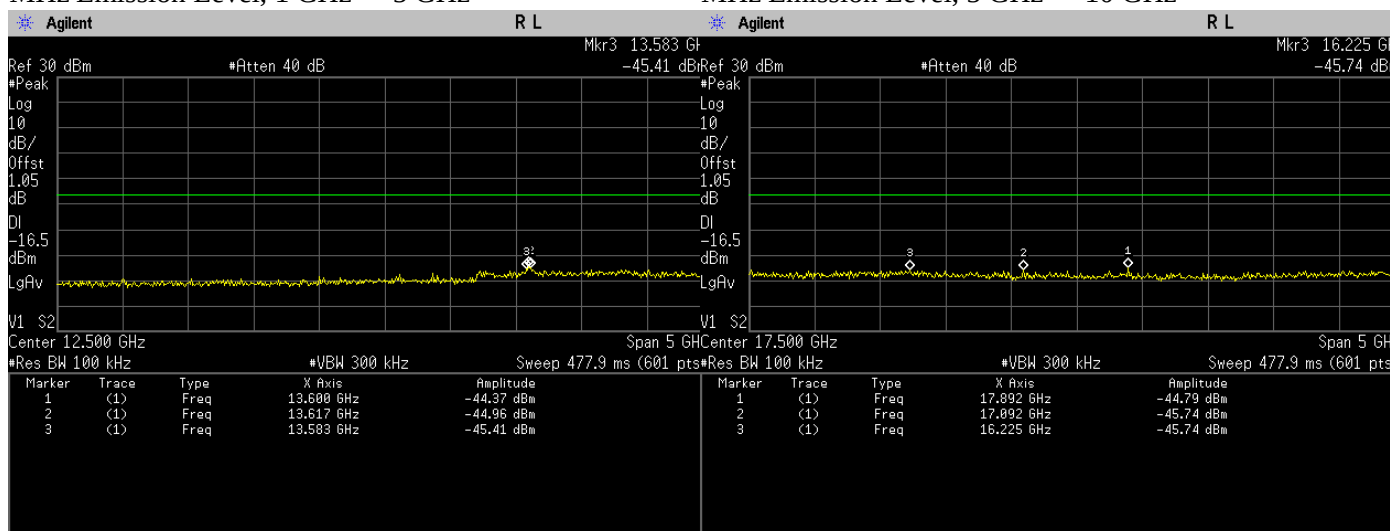
Conducted Emissions(Peak). 802.11g, Frequency 2462 MHz Reference Level

Conducted Emissions(Peak). 802.11g, Frequency 2462 MHz Emission Level, 30 MHz -> 1 GHz



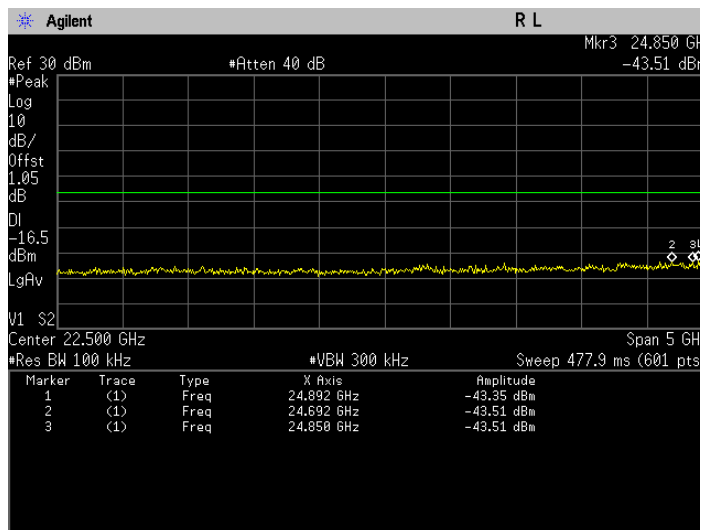
Conducted Emissions(Peak). 802.11g, Frequency 2462 MHz Emission Level, 1 GHz -> 5 GHz

Conducted Emissions(Peak). 802.11g, Frequency 2462 MHz Emission Level, 5 GHz -> 10 GHz



Conducted Emissions(Peak). 802.11g, Frequency 2462 MHz Emission Level, 10 GHz -> 15 GHz

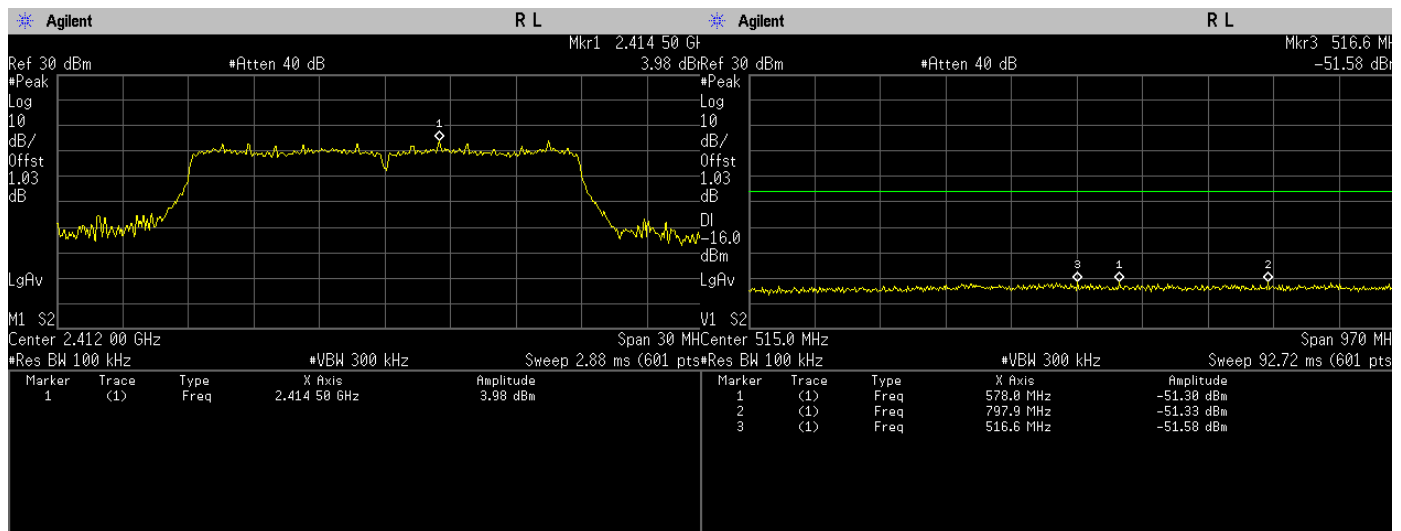
Conducted Emissions(Peak). 802.11g, Frequency 2462 MHz Emission Level, 15 GHz -> 20 GHz



Conducted Emissions(Peak). 802.11g, Frequency 2462 MHz Emission Level, 20 GHz -> 25 GHz

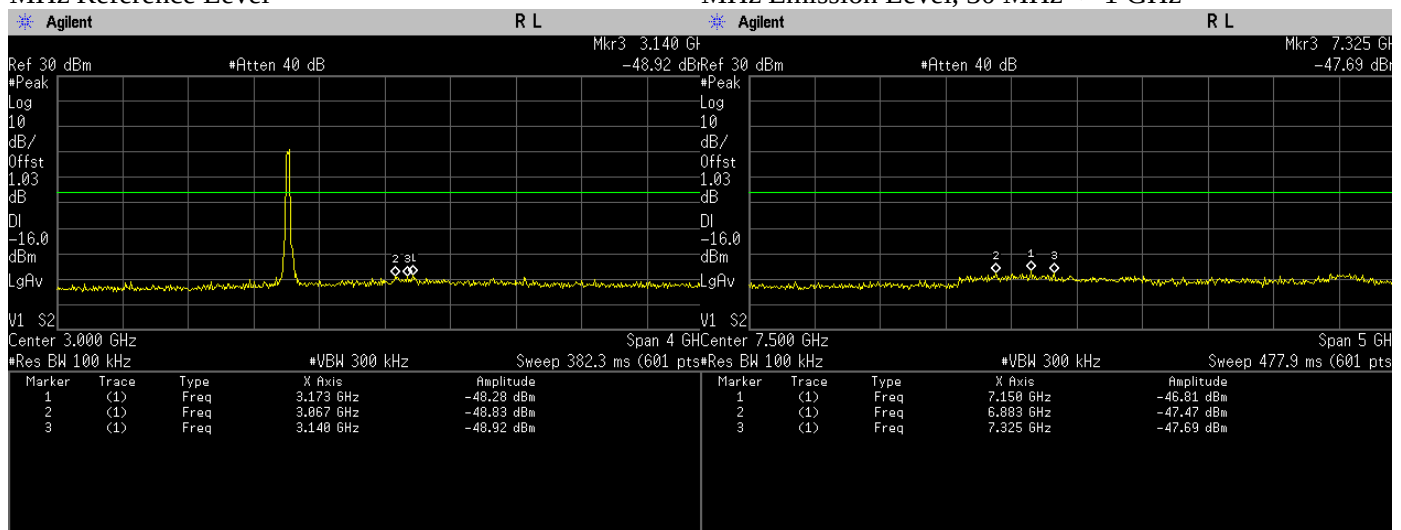
802.11n (HT20)

Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Spurs (MHz)	Level (dBm)	Status
802.11n	OFDM	BPSK	6.5	2412	24742.000	-43.26	Pass
					24683.000	-43.57	Pass
					24375.000	-43.80	Pass
802.11n	OFDM	BPSK	6.5	2437	24958.000	-42.57	Pass
					24700.000	-43.25	Pass
					24733.000	-43.26	Pass
802.11n	OFDM	BPSK	6.5	2462	24992.000	-42.73	Pass
					24725.000	-43.22	Pass
					24825.000	-43.31	Pass



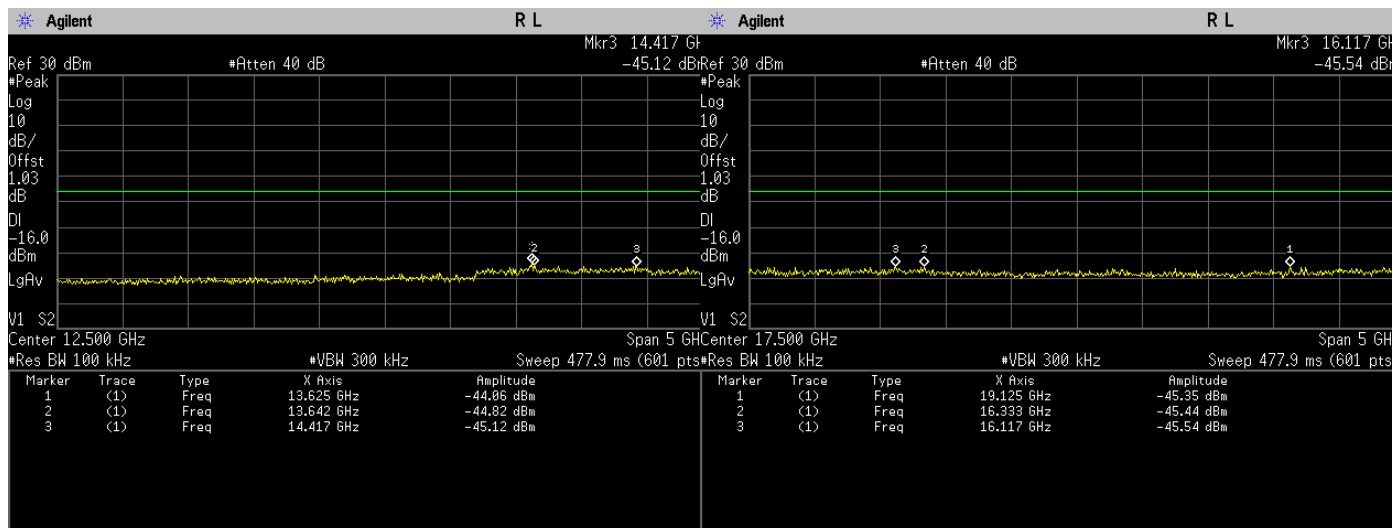
Conducted Emissions(Peak). 802.11n, Frequency 2412 MHz Reference Level

Conducted Emissions(Peak). 802.11n, Frequency 2412 MHz Emission Level, 30 MHz -> 1 GHz



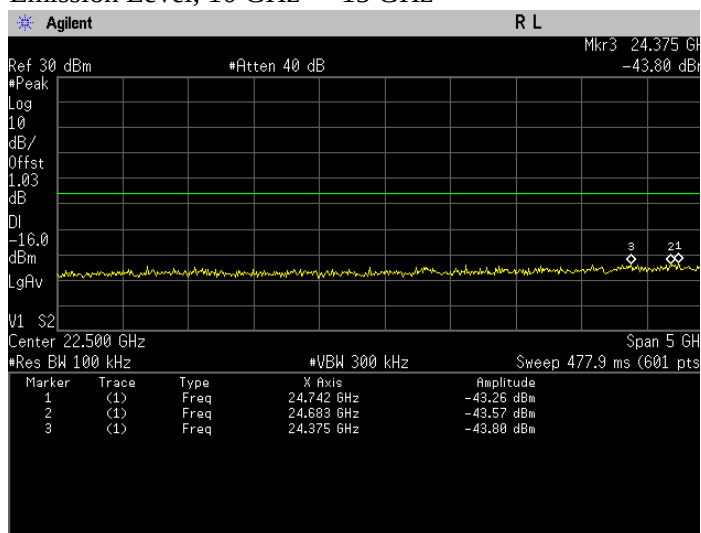
Conducted Emissions(Peak). 802.11n, Frequency 2412 MHz Emission Level, 1 GHz -> 5 GHz

Conducted Emissions(Peak). 802.11n, Frequency 2412 MHz Emission Level, 5 GHz -> 10 GHz

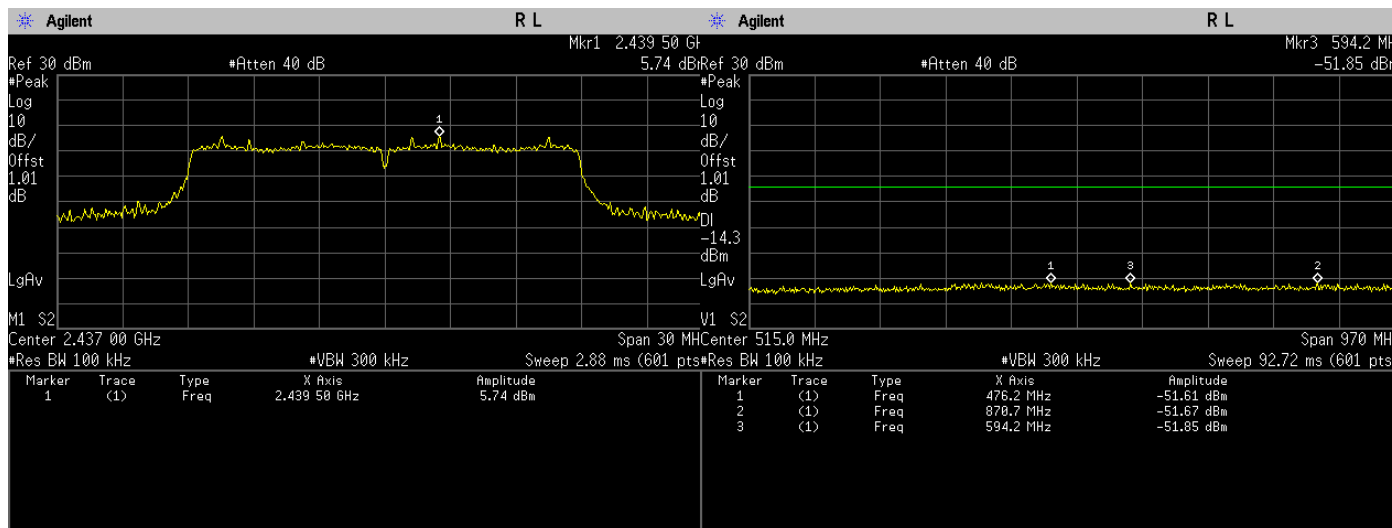


Conducted Emissions(Peak). 802.11n, Frequency 2412 MHz Emission Level, 10 GHz -> 15 GHz

Conducted Emissions(Peak). 802.11n, Frequency 2412 MHz Emission Level, 15 GHz -> 20 GHz

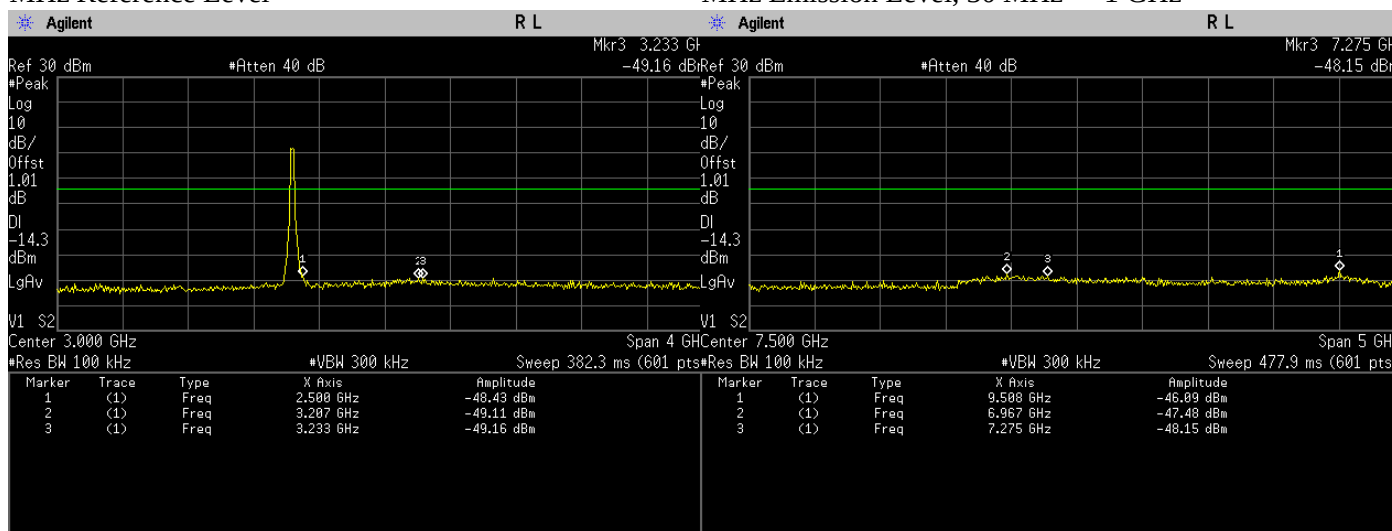


Conducted Emissions(Peak). 802.11n, Frequency 2412 MHz Emission Level, 20 GHz -> 25 GHz



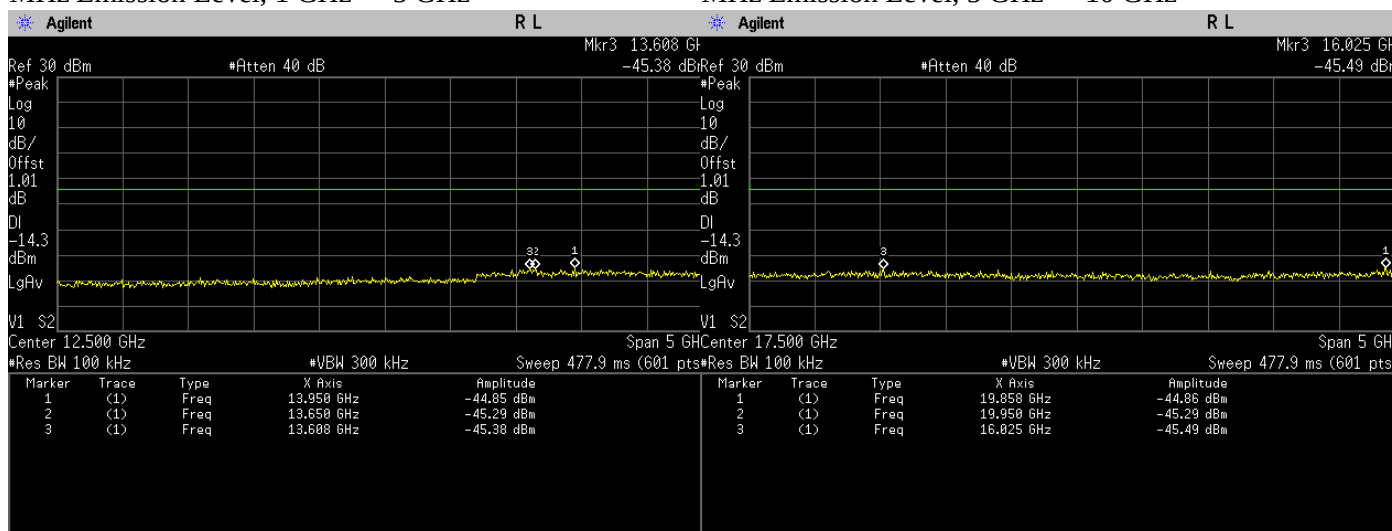
Conducted Emissions(Peak). 802.11n, Frequency 2437 MHz Reference Level

Conducted Emissions(Peak). 802.11n, Frequency 2437 MHz Emission Level, 30 MHz -> 1 GHz



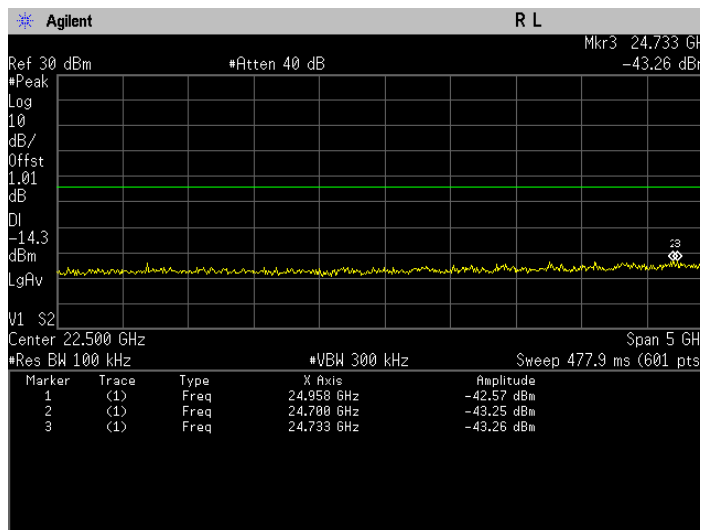
Conducted Emissions(Peak). 802.11n, Frequency 2437 MHz Emission Level, 1 GHz -> 5 GHz

Conducted Emissions(Peak). 802.11n, Frequency 2437 MHz Emission Level, 5 GHz -> 10 GHz

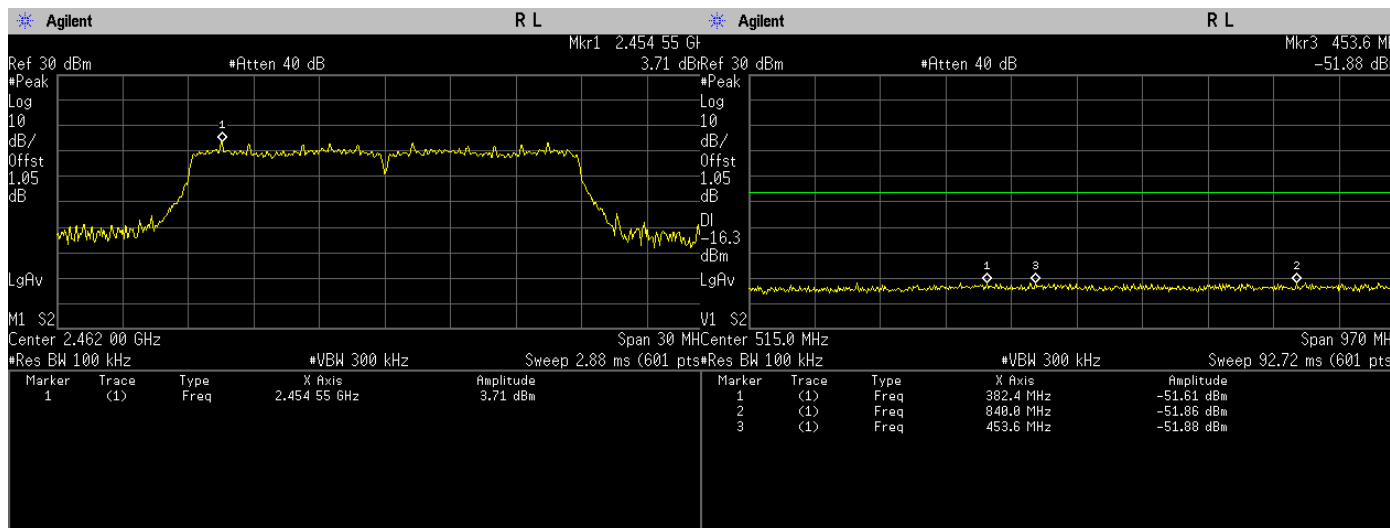


Conducted Emissions(Peak). 802.11n, Frequency 2437 MHz Emission Level, 10 GHz -> 15 GHz

Conducted Emissions(Peak). 802.11n, Frequency 2437 MHz Emission Level, 15 GHz -> 20 GHz

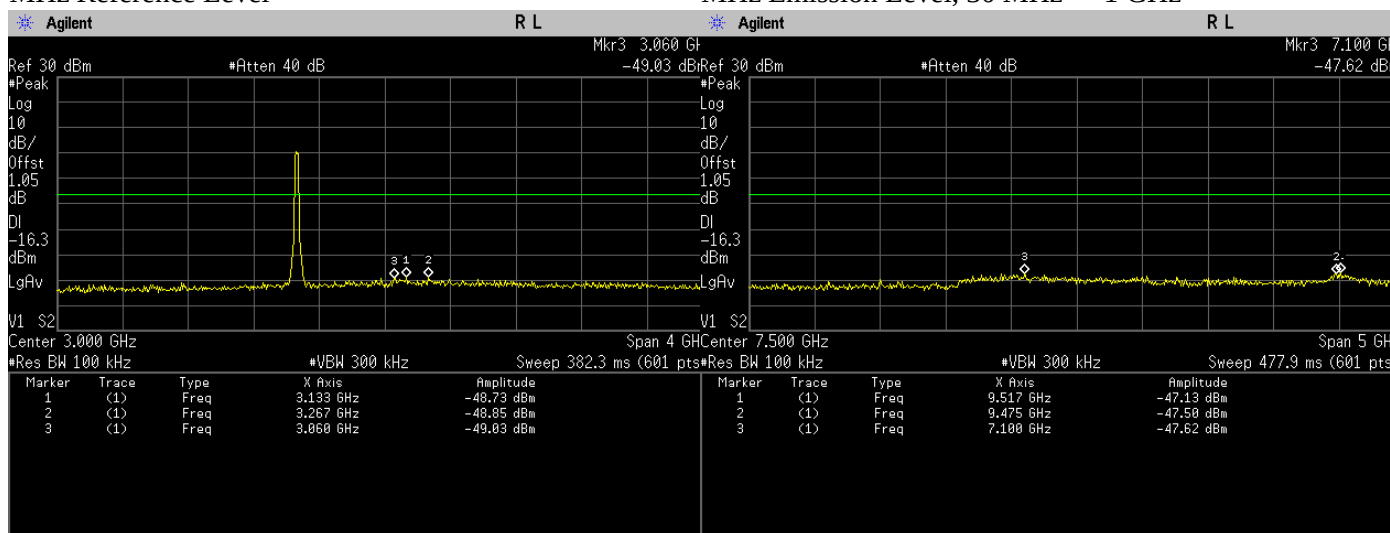


Conducted Emissions(Peak). 802.11n, Frequency 2437 MHz Emission Level, 20 GHz -> 25 GHz



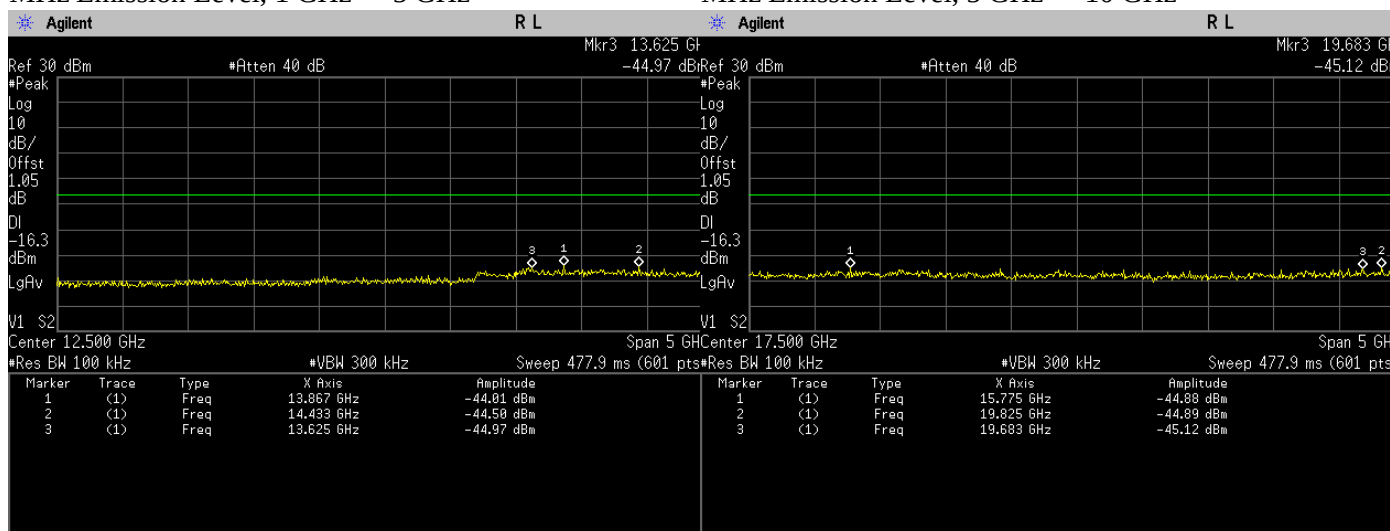
Conducted Emissions(Peak). 802.11n, Frequency 2462 MHz Reference Level

Conducted Emissions(Peak). 802.11n, Frequency 2462 MHz Emission Level, 30 MHz -> 1 GHz



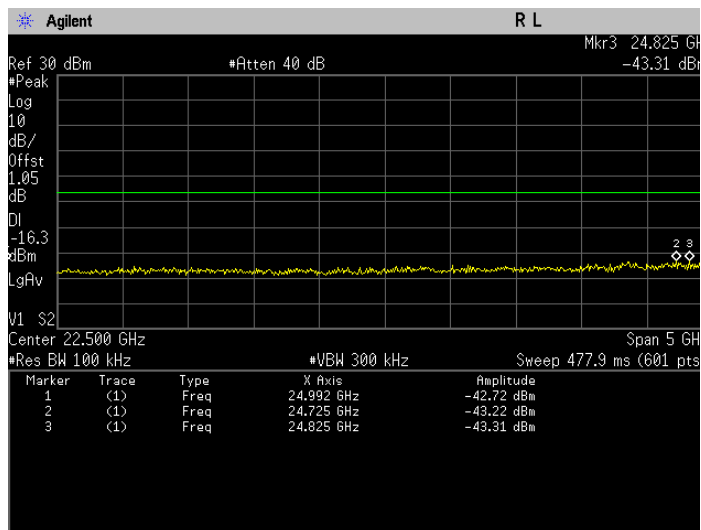
Conducted Emissions(Peak). 802.11n, Frequency 2462 MHz Emission Level, 1 GHz -> 5 GHz

Conducted Emissions(Peak). 802.11n, Frequency 2462 MHz Emission Level, 5 GHz -> 10 GHz



Conducted Emissions(Peak). 802.11n, Frequency 2462 MHz Emission Level, 10 GHz -> 15 GHz

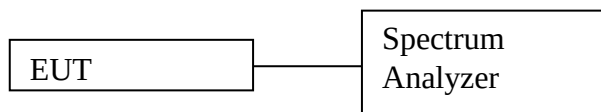
Conducted Emissions(Peak). 802.11n, Frequency 2462 MHz Emission Level, 15 GHz -> 20 GHz



Conducted Emissions(Peak). 802.11n, Frequency 2462 MHz Emission Level, 20 GHz -> 25 GHz

6.6. Band edge Conducted Spurious Emission

6.6.1. Test Setup



- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the DUT and set DUT to transmit maximum power.
- c) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- d) Setting of Spectrum analyzer :
 - a. RBW = 100 kHz
 - b. VBW = 300 kHz
 - c. Detector mode = Peak
 - d. Trace = Max Hold
 - e. Sweep = auto
- e) Use the peak marker function to measure highest emission.
- f) Measure every antenna port by repeat the step above for MIMO measurement.

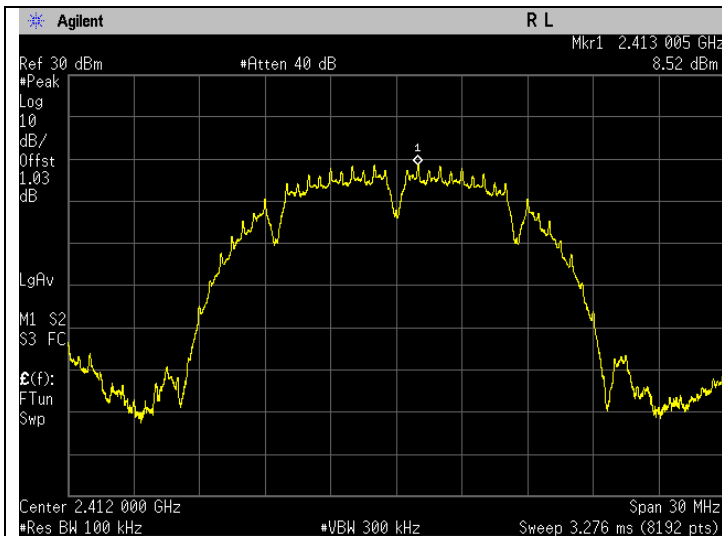
6.6.2. Test Limits:

Normal Condition (25 ° C)
Shall be at least 20 dB below max power. (Peak detector)

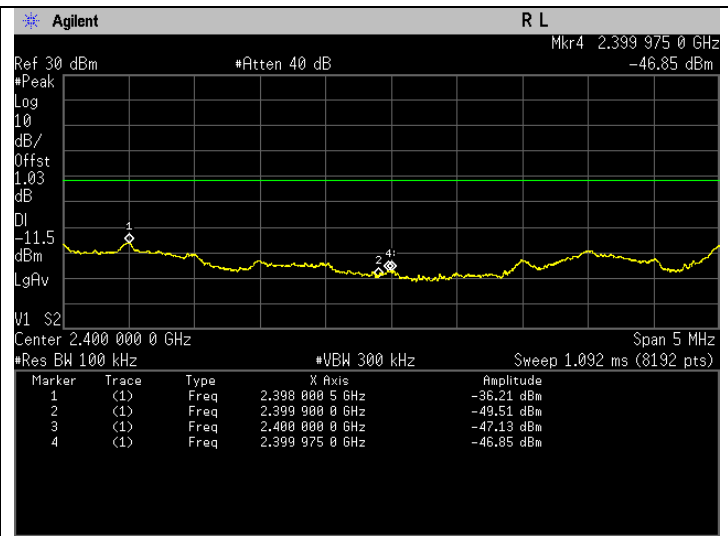
6.6.3. Test Result

802.11b

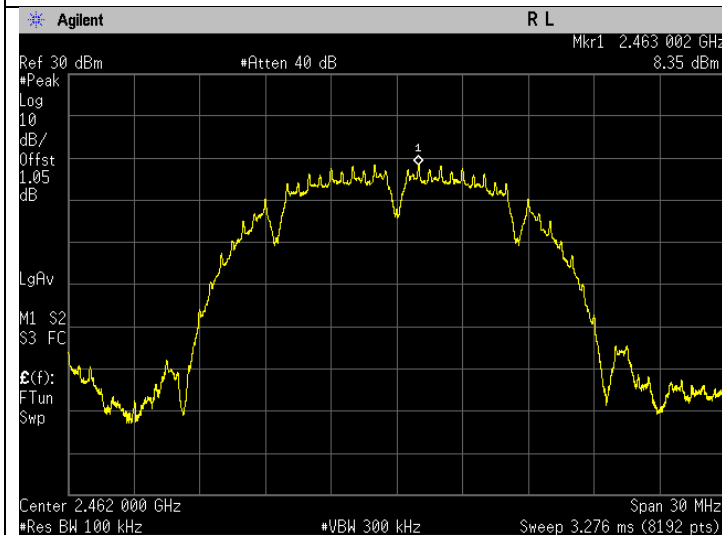
Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Frequencies (MHz)	Power (dBm)	Status
802.11b	OFDM	BPSK	1	2412	2399.97	-46.85	Pass
802.11b	OFDM	BPSK	1	2462	2483.53	-49.69	Pass



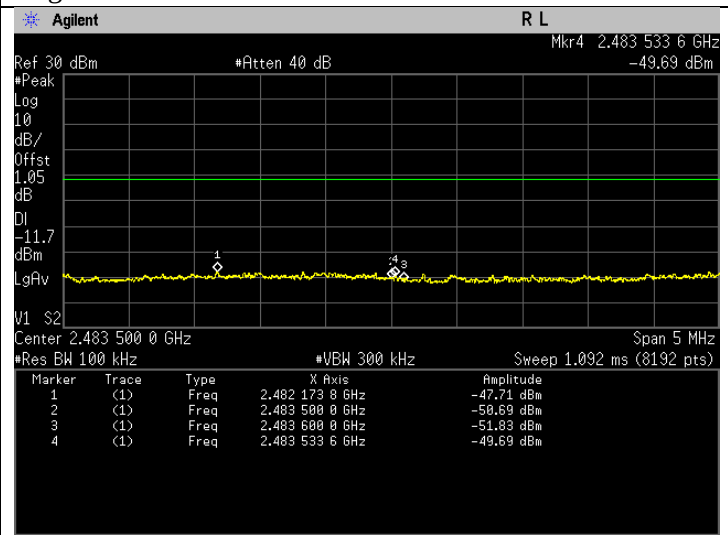
Band Edge(Peak). 802.11b Frequency 2412 MHz
Reference Level



Band Edge(Peak). 802.11b Frequency 2412 MHz Band
Edge



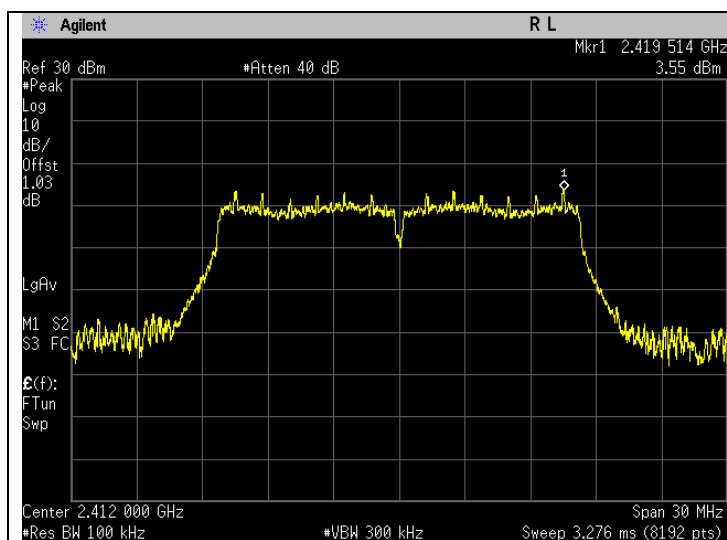
Band Edge(Peak). 802.11b Frequency 2462 MHz
Reference Level



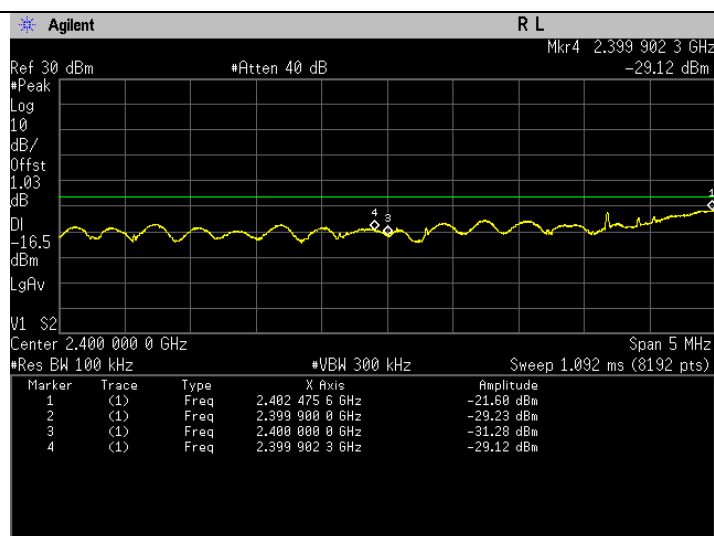
Band Edge(Peak). 802.11b Frequency 2462 MHz Band
Edge

802.11g

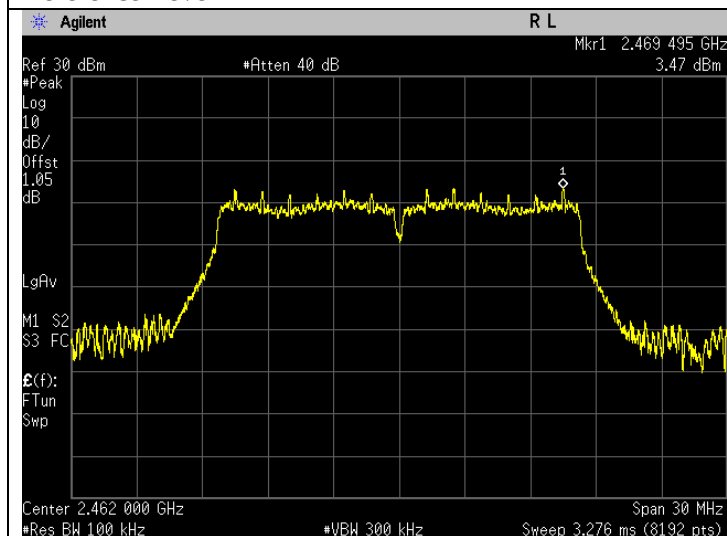
Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Frequencies (MHz)	Power (dBm)	Status
802.11g	OFDM	BPSK	6	2412	2399.90	-29.12	Pass
802.11g	OFDM	BPSK	6	2462	2483.57	-33.63	Pass



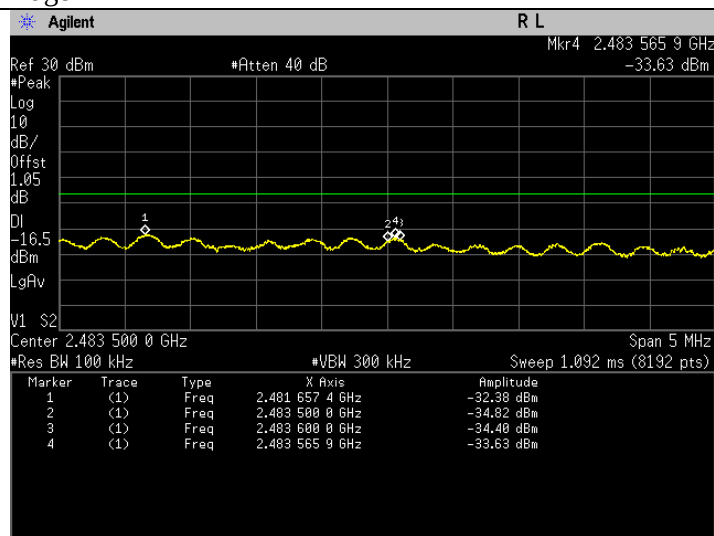
Band Edge(Peak). 802.11g Frequency 2412 MHz
Reference Level



Band Edge(Peak). 802.11g Frequency 2412 MHz Band
Edge



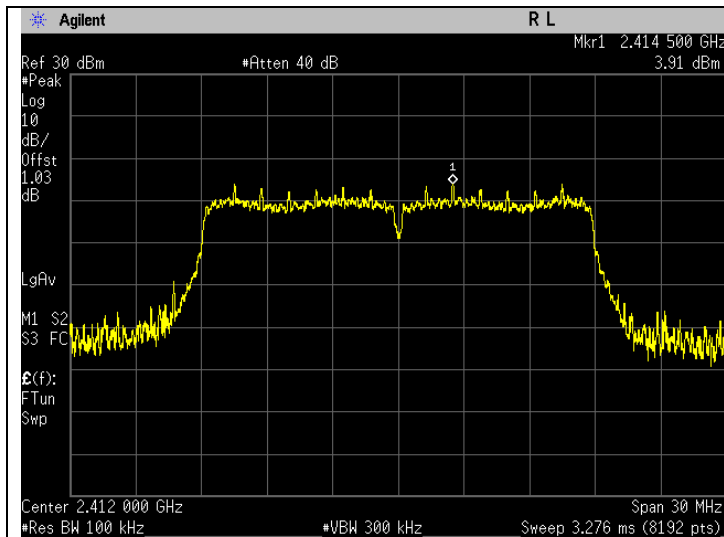
Band Edge(Peak). 802.11g Frequency 2462 MHz
Reference Level



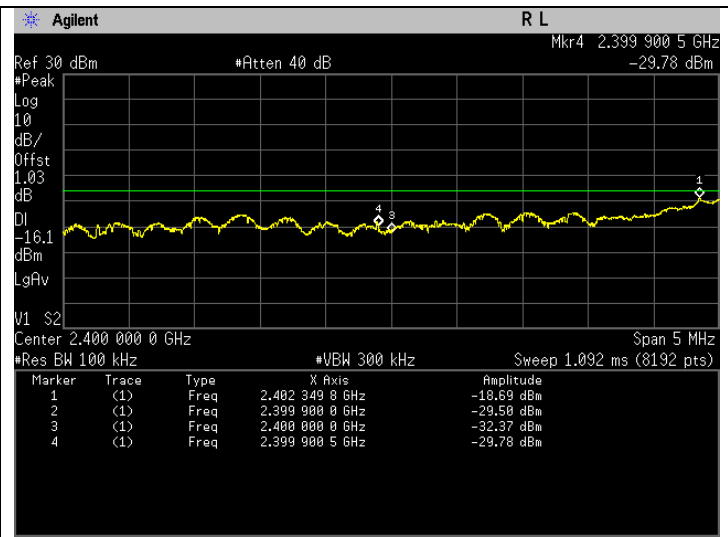
Band Edge(Peak). 802.11g Frequency 2462 MHz Band
Edge

802.11n (HT20)

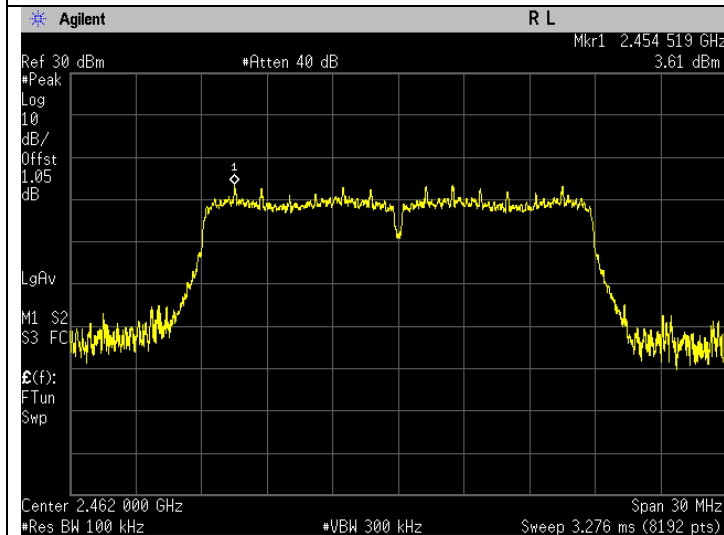
Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Frequencies (MHz)	Power (dBm)	Status
802.11n	OFDM	BPSK	6.5	2412	2399.90	-29.78	Pass
802.11n	OFDM	BPSK	6.5	2462	2483.56	-35.96	Pass



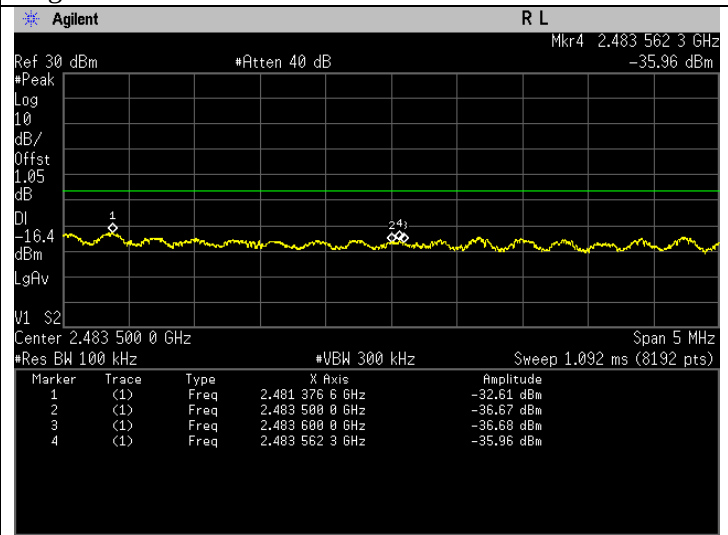
Band Edge(Peak). 802.11n Frequency 2412 MHz
Reference Level



Band Edge(Peak). 802.11n Frequency 2412 MHz Band
Edge



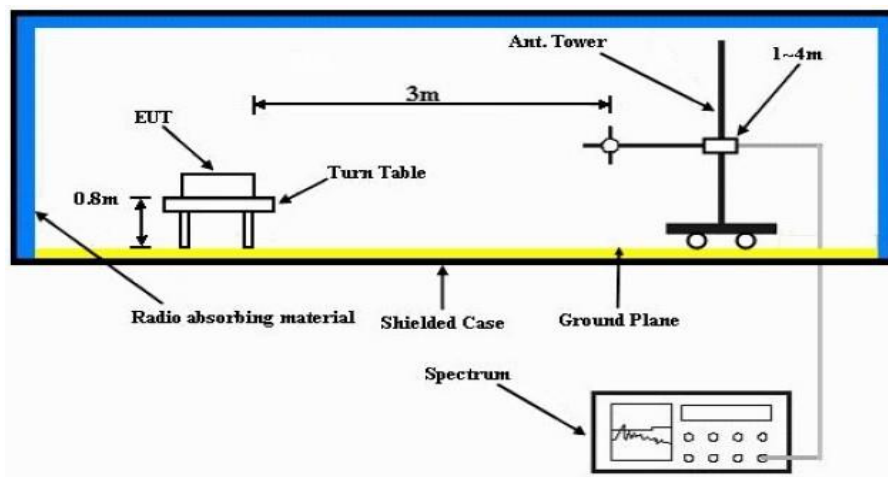
Band Edge(Peak). 802.11n Frequency 2462 MHz
Reference Level



Band Edge(Peak). 802.11n Frequency 2462 MHz Band
Edge

6.7. Radiated Emission within restricted Bands

6.7.1. Test Setup



- The EUT is placed on the top of a rotating table 0.8m above the ground (<1GHz) and 1.5m above the ground (>1GHz) at a 3m semi-anechoic chamber. The table is rotated 360 degrees to determine the position of the highest radiation.
- The EUT is set 3m away from the interference-receiving antenna, which is mounted on the top of a variable-height antenna tower.
- The antenna is Bilog/Horn antenna depend on which frequency range uses, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT is arranged to its worst case and then the antenna is tuned to heights from 1m to 4m and the rotatable table is turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system is set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode is fall within the range of 10dB from the limit specified, the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. Otherwise, the testing could be stopped and the peak values of the EUT would be reported.

NOTE:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1 GHz.
- All modes of operation were investigated and the worst-case emissions are reported.

6.7.2. Test Limits:

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power.

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

NOTE:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Test: WIFI SAC Restricted Band Edge

Model Number: H25XDF9PW6AN	S/N: 287TZP0060	EMC SR ID#: 39809-EMC-00051
Battery: PMNN4813A	Accessory: AN000452A01	
Test Channel: Low	Test Frequency: 2412.0000 MHz	Test Standard: ANSI C63.10-2013
Worst Case Plane: Z-Plane (802.11b)		

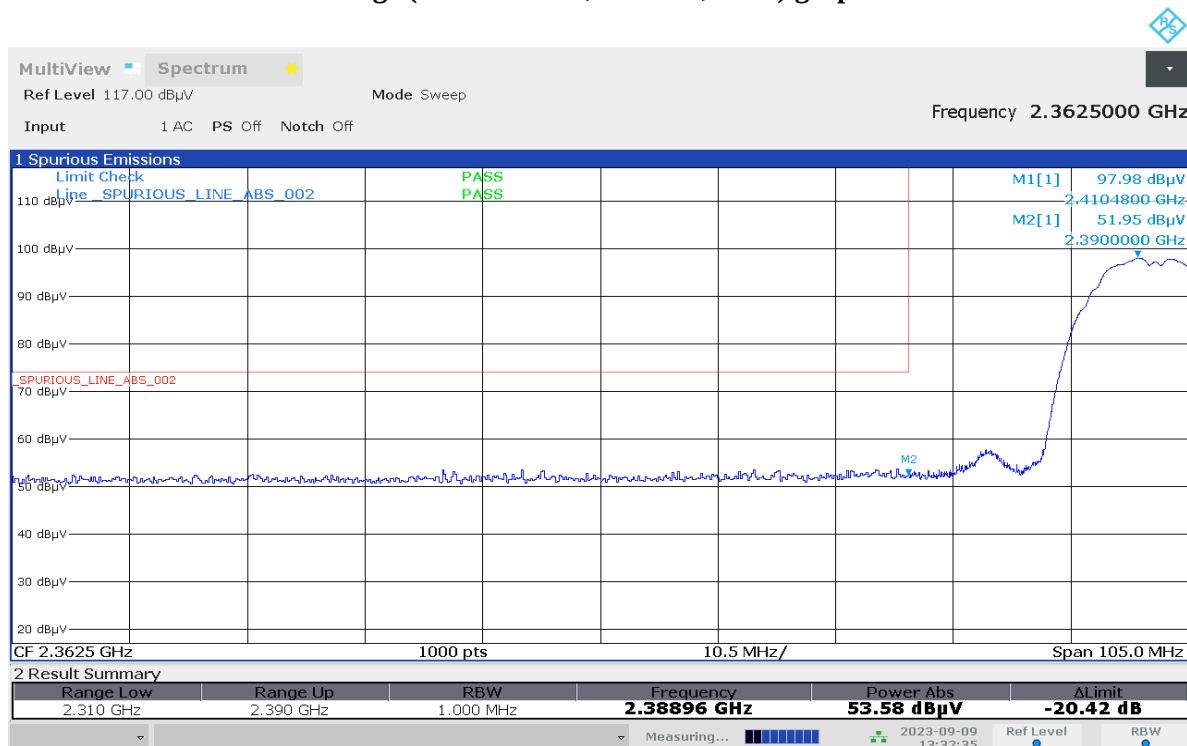
Vertical Radiated Emission Result

Horizontal Radiated Emission ResultRemarks:
Pass Result

Fail Result

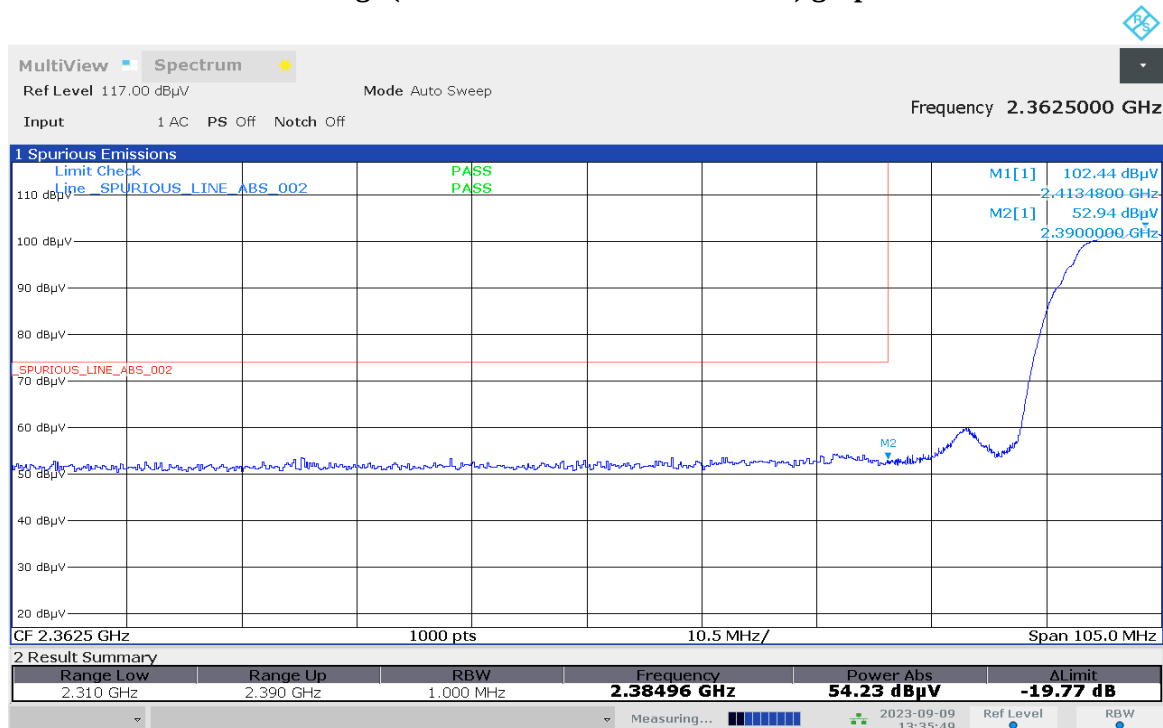
Humidity (%): 69.5
Test Date: Sat, 9 Sep, 2023

Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot



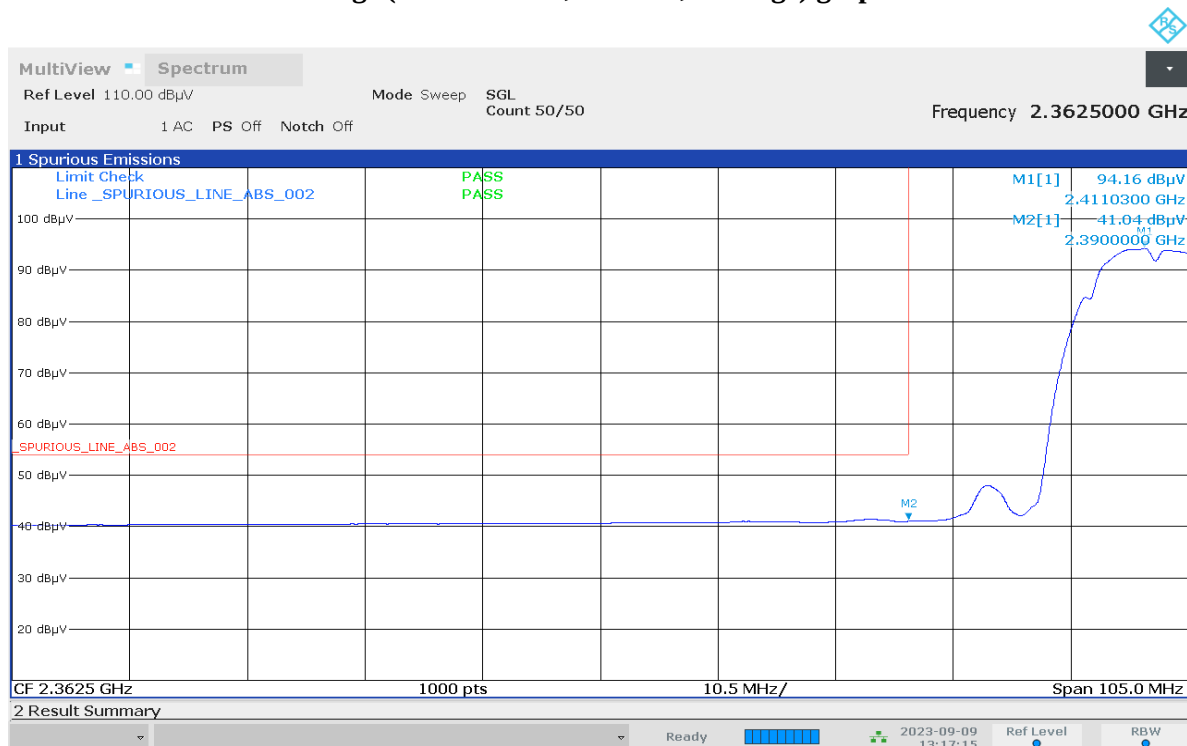
01:32:35 PM 09/09/2023

Restricted Band Edge (Low Channel, Horizontal, Peak) graphical screen shot



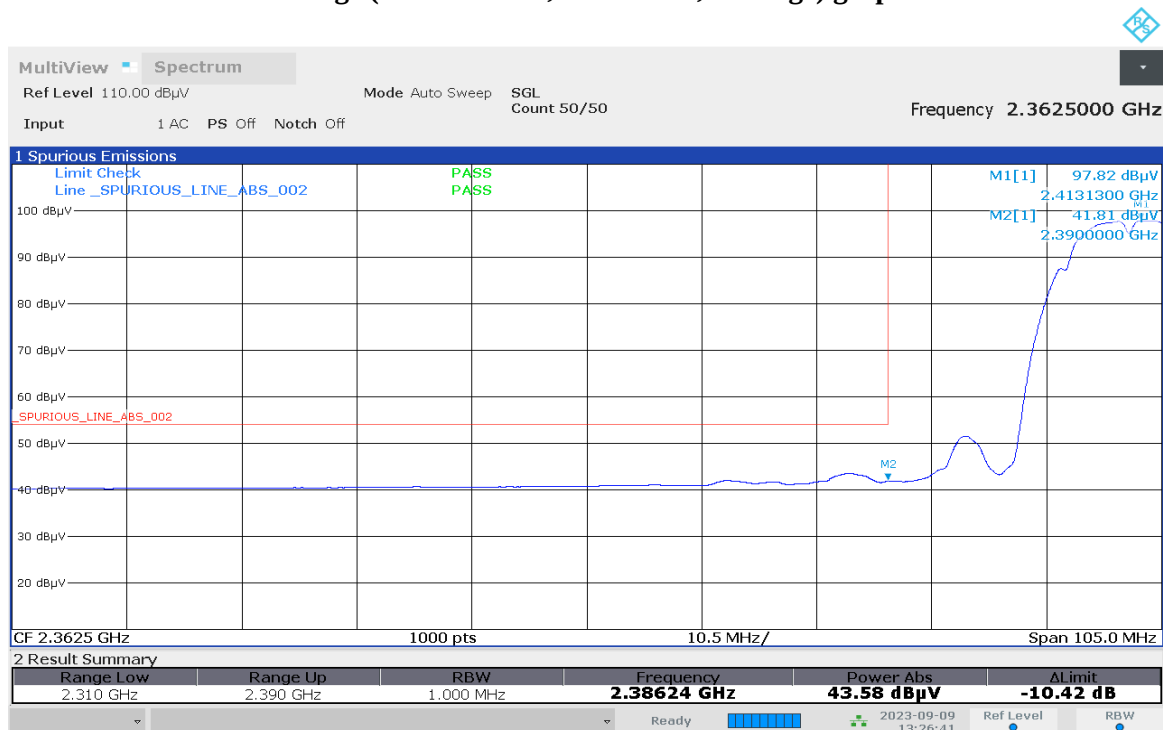
01:35:49 PM 09/09/2023

Restricted Band Edge (Low Channel, Vertical, Average) graphical screen shot



01:17:16 PM 09/09/2023

Restricted Band Edge (Low Channel, Horizontal, Average) graphical screen shot



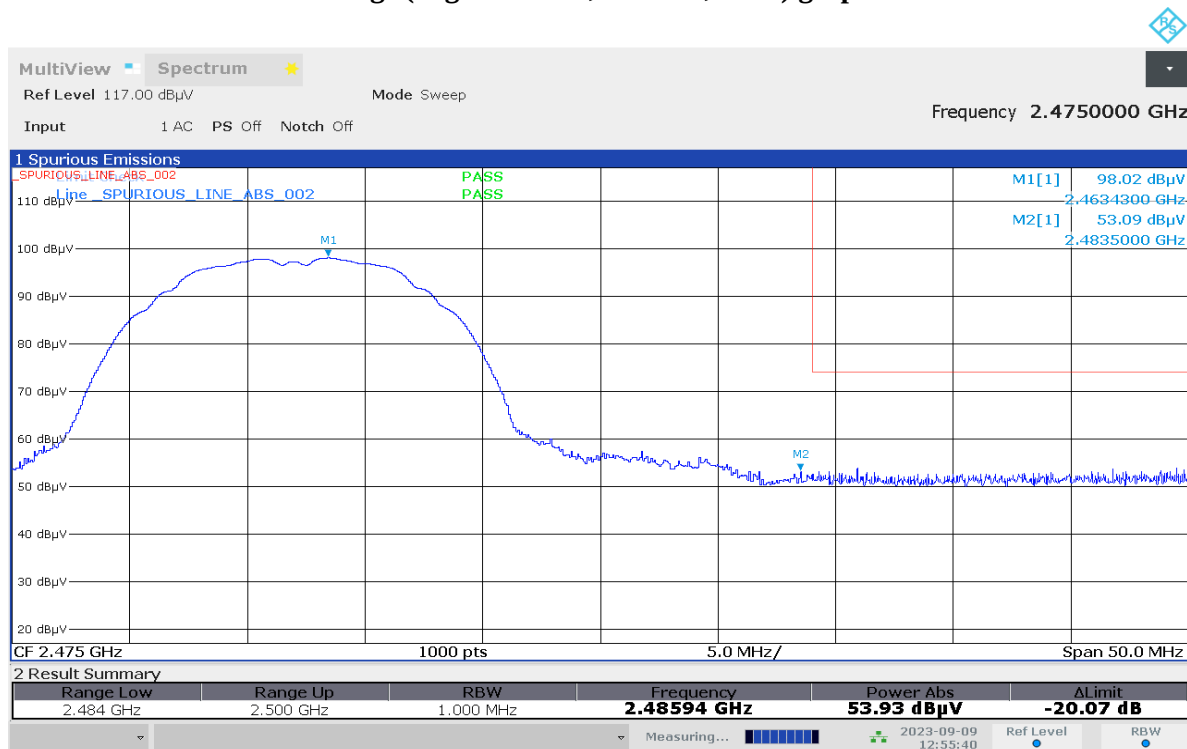
01:26:41 PM 09/09/2023

Restricted Band Edge (High Channel) tabular data

Remarks: Pass Result	Marginal Result	Fail Result
-------------------------	-----------------	-------------

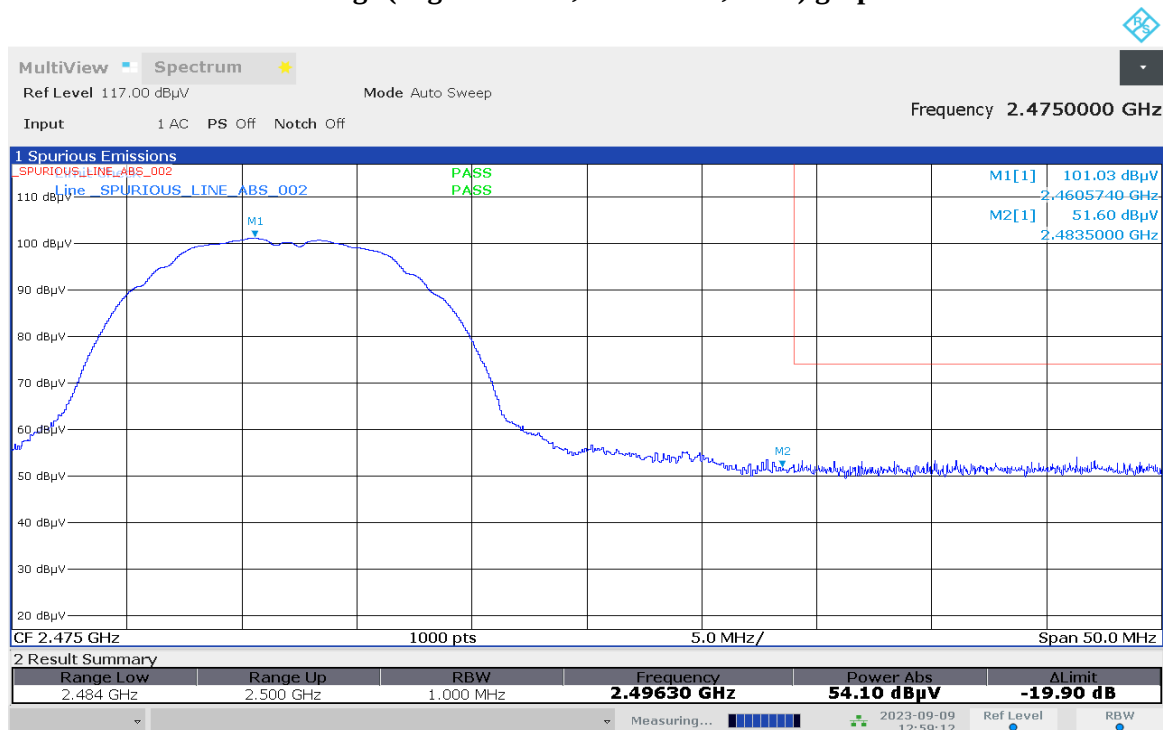
Humidity (%): 69.5
Test Date: Sat, 9 Sep, 2023

Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot



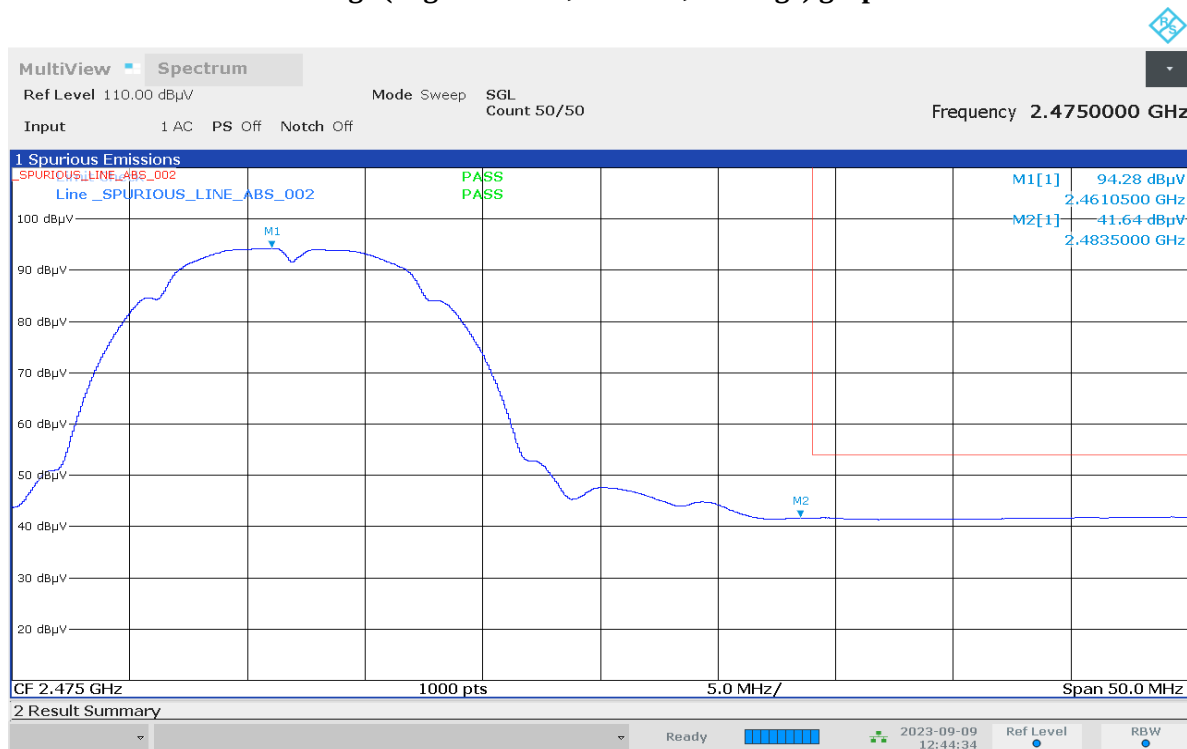
12:55:41 PM 09/09/2023

Restricted Band Edge (High Channel, Horizontal, Peak) graphical screen shot



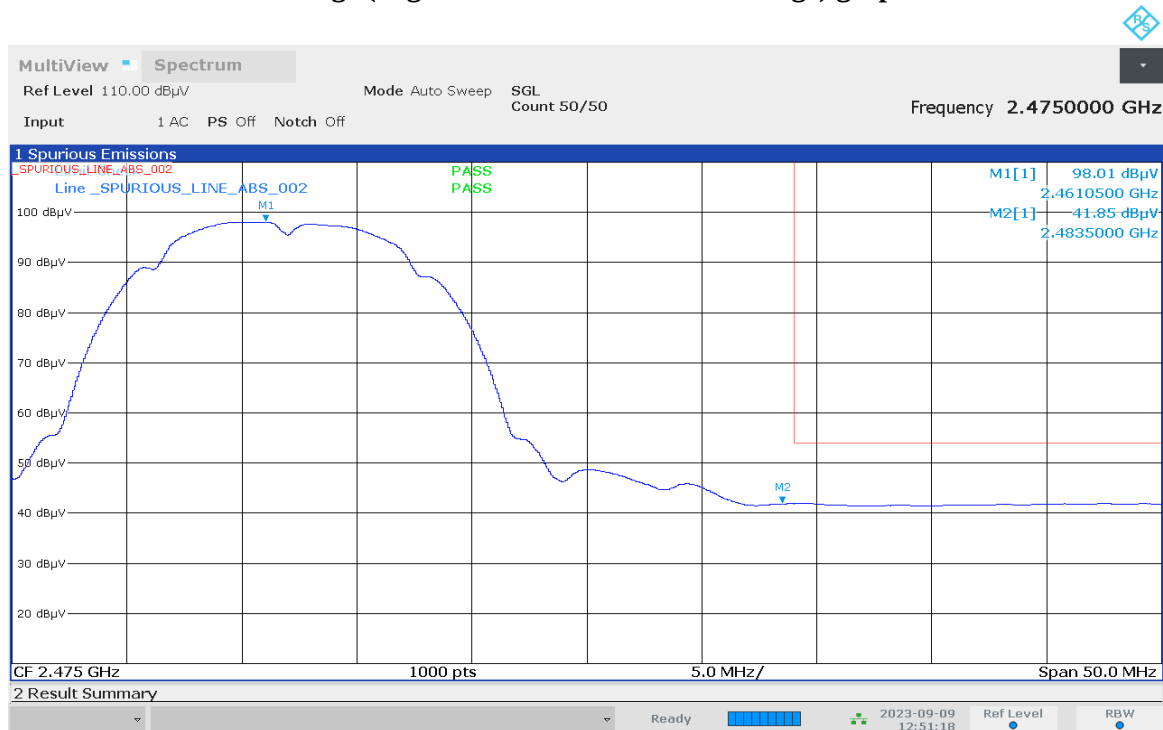
12:59:13 PM 09/09/2023

Restricted Band Edge (High Channel, Vertical, Average) graphical screen shot



12:44:35 PM 09/09/2023

Restricted Band Edge (High Channel, Horizontal, Average) graphical screen shot



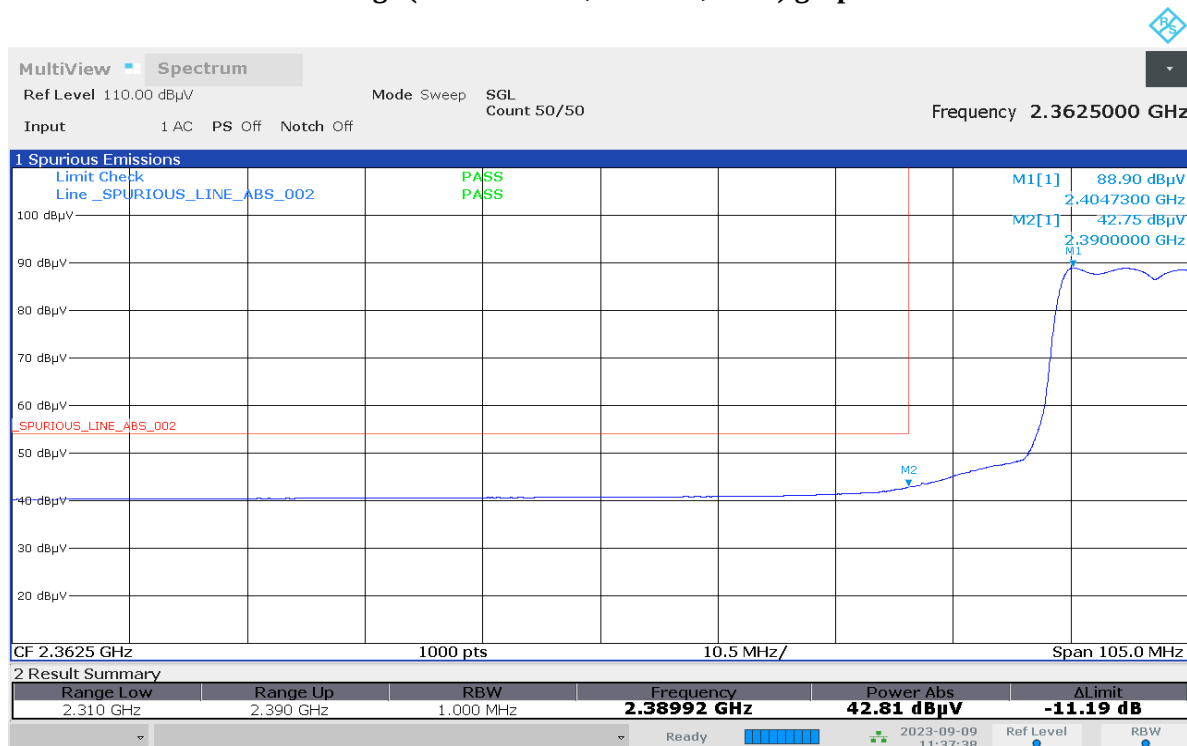
12:51:18 PM 09/09/2023

Restricted Band Edge (Low Channel) tabular data

Remarks: Pass Result	Marginal Result	Fail Result
-------------------------	-----------------	-------------

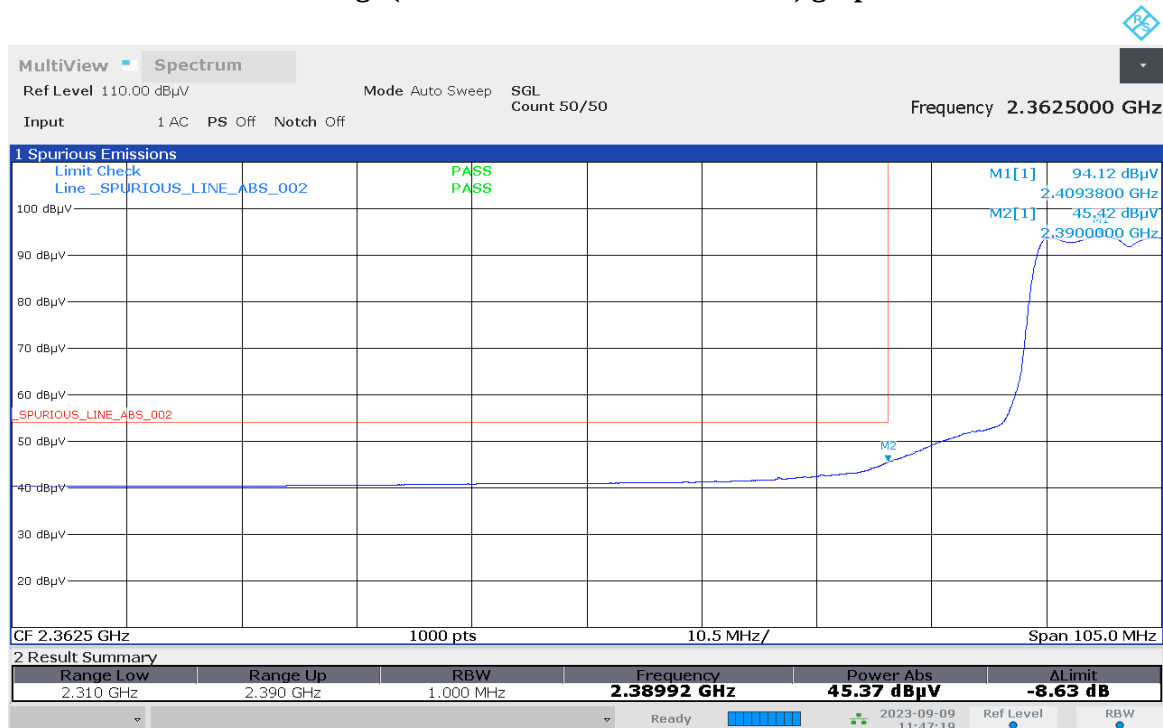
Humidity (%): 69.5
Test Date: Sat, 9 Sep, 2023

Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot



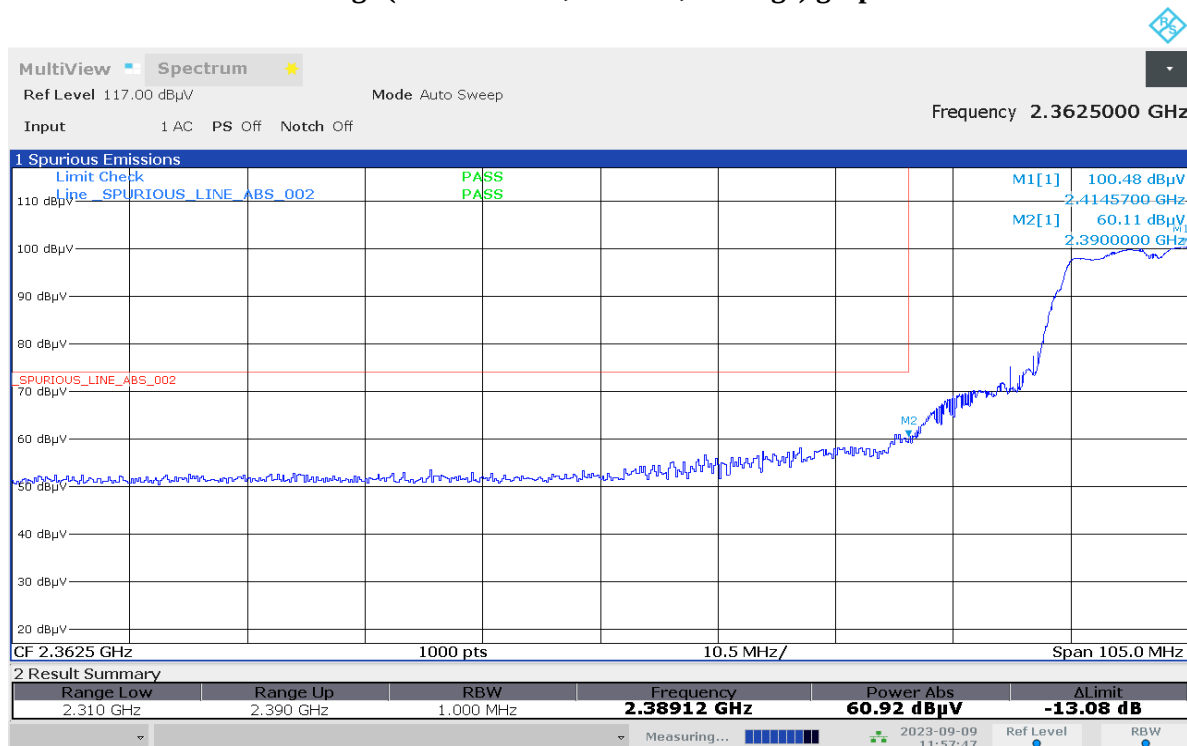
11:37:38 AM 09/09/2023

Restricted Band Edge (Low Channel, Horizontal, Peak) graphical screen shot



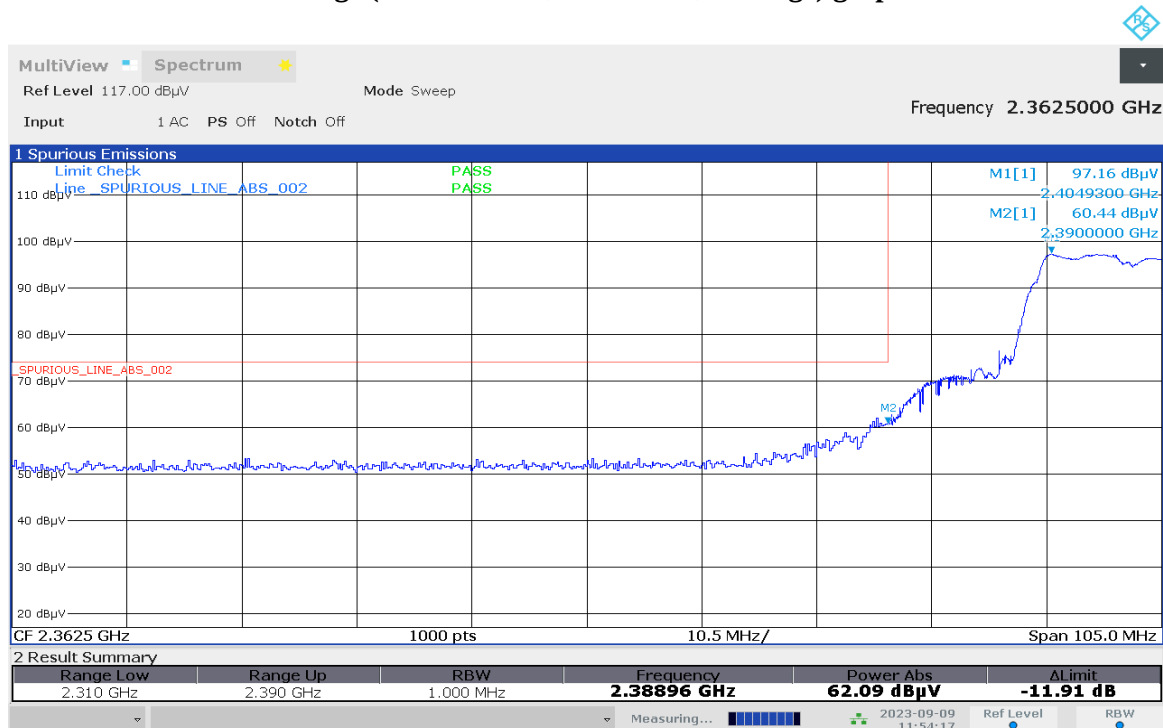
11:47:19 AM 09/09/2023

Restricted Band Edge (Low Channel, Vertical, Average) graphical screen shot



11:57:48 AM 09/09/2023

Restricted Band Edge (Low Channel, Horizontal, Average) graphical screen shot



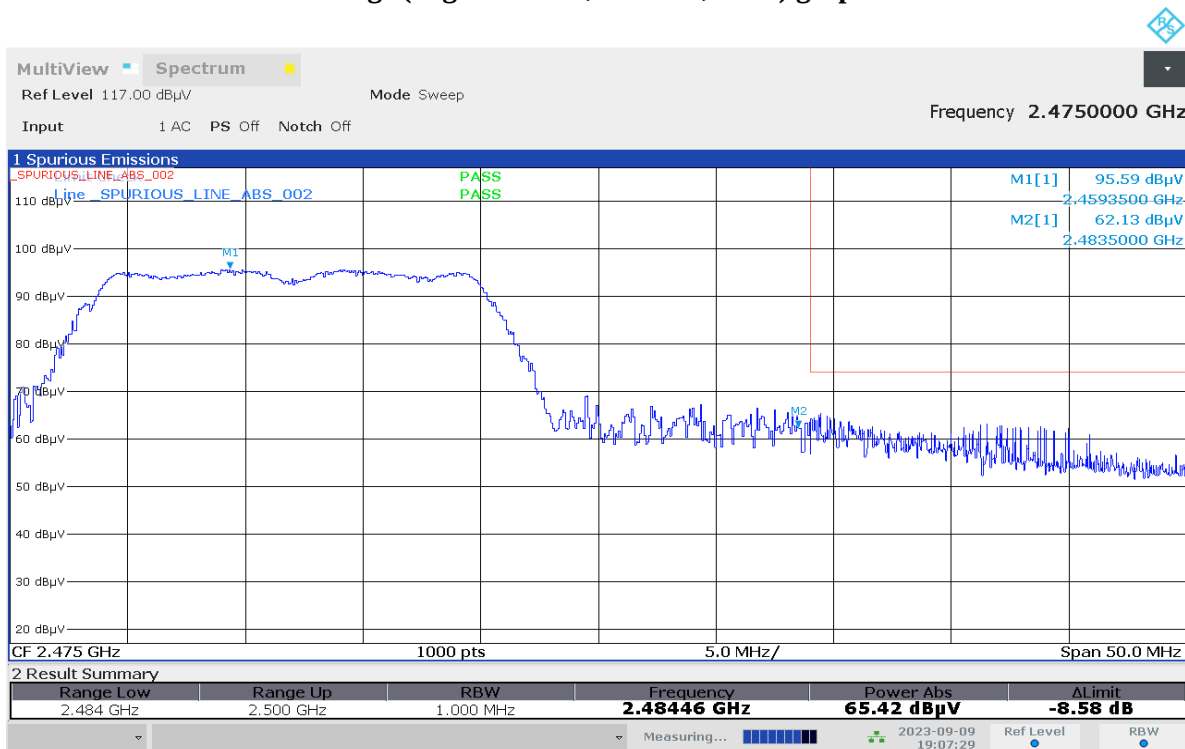
11:54:18 AM 09/09/2023

Restricted Band Edge (High Channel) tabular data

Remarks: Pass Result	Marginal Result	Fail Result
-------------------------	-----------------	-------------

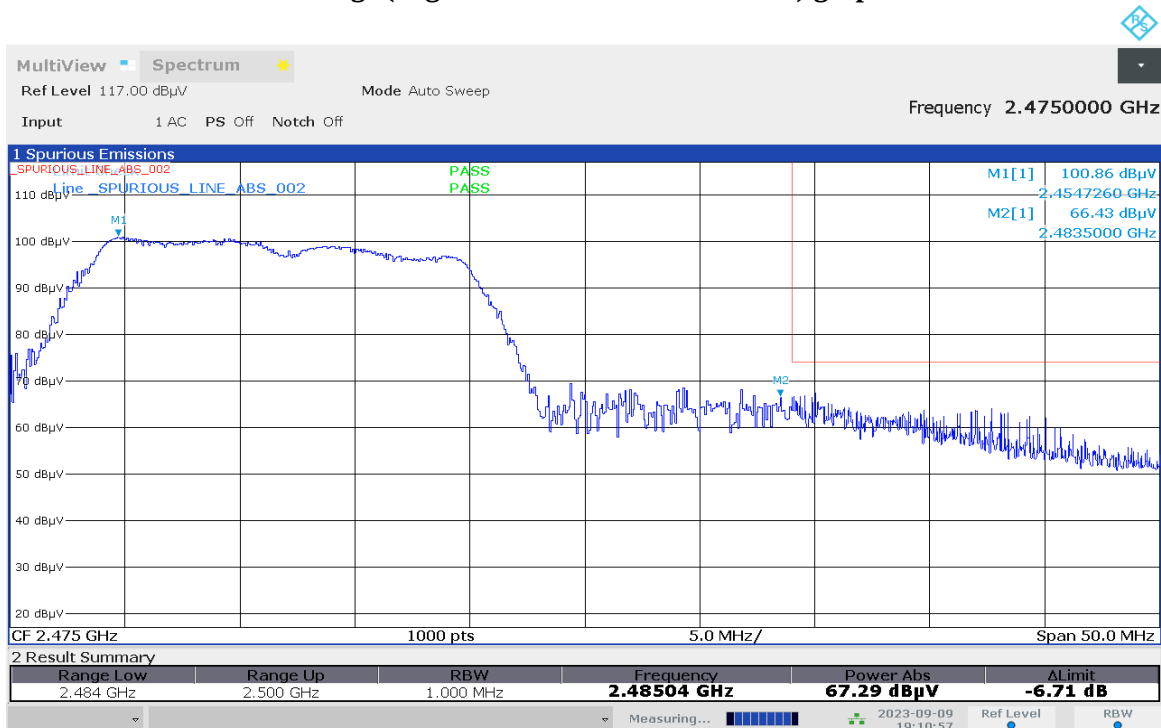
Humidity (%): 69.5
Test Date: Sun, 10 Sep, 2023

Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot



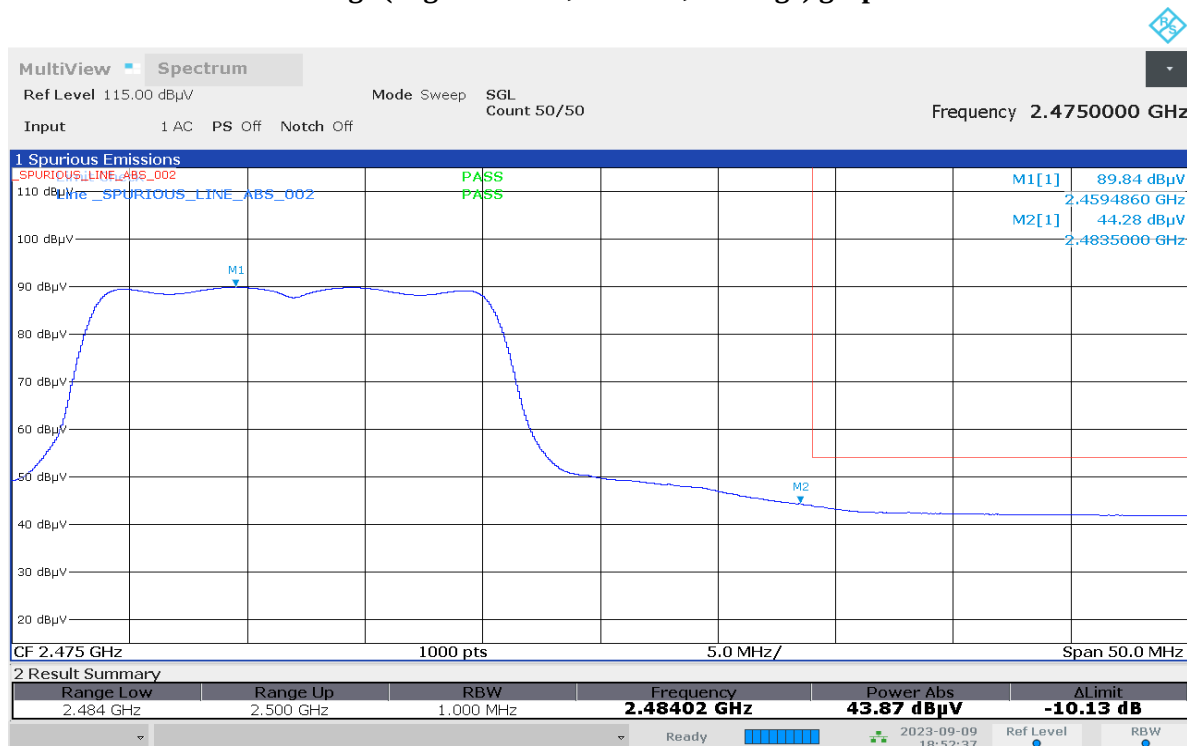
07:07:30 PM 09/09/2023

Restricted Band Edge (High Channel, Horizontal, Peak) graphical screen shot



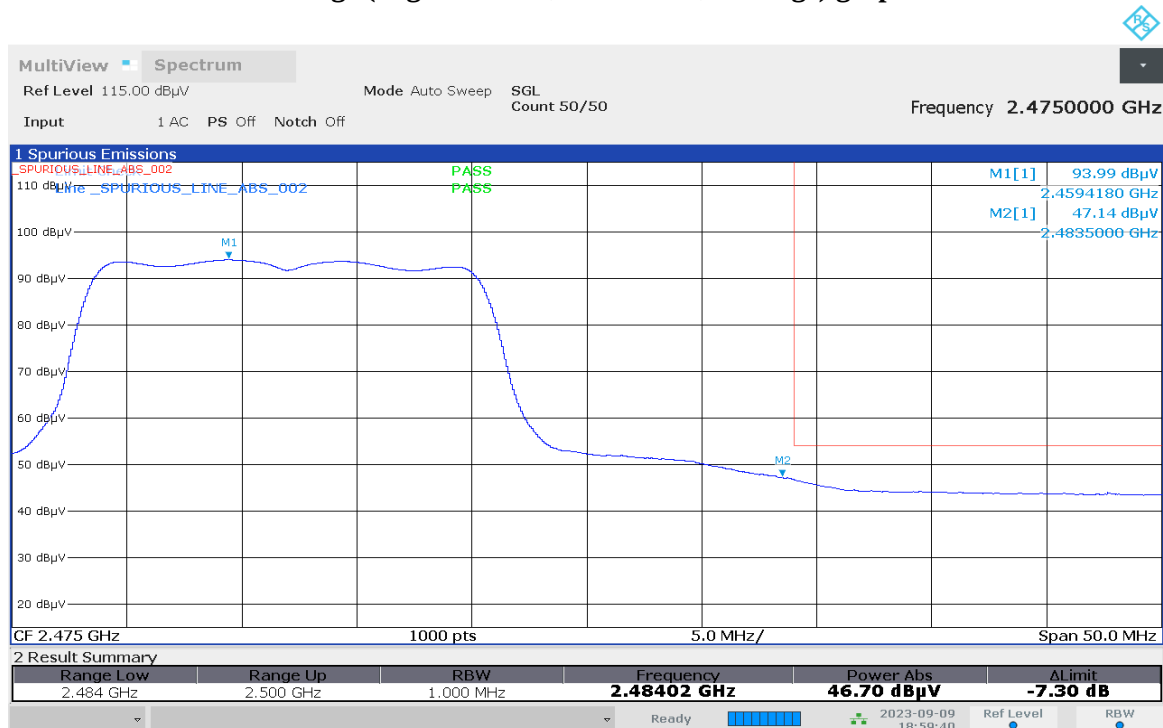
07:10:58 PM 09/09/2023

Restricted Band Edge (High Channel, Vertical, Average) graphical screen shot



06:52:37 PM 09/09/2023

Restricted Band Edge (High Channel, Horizontal, Average) graphical screen shot



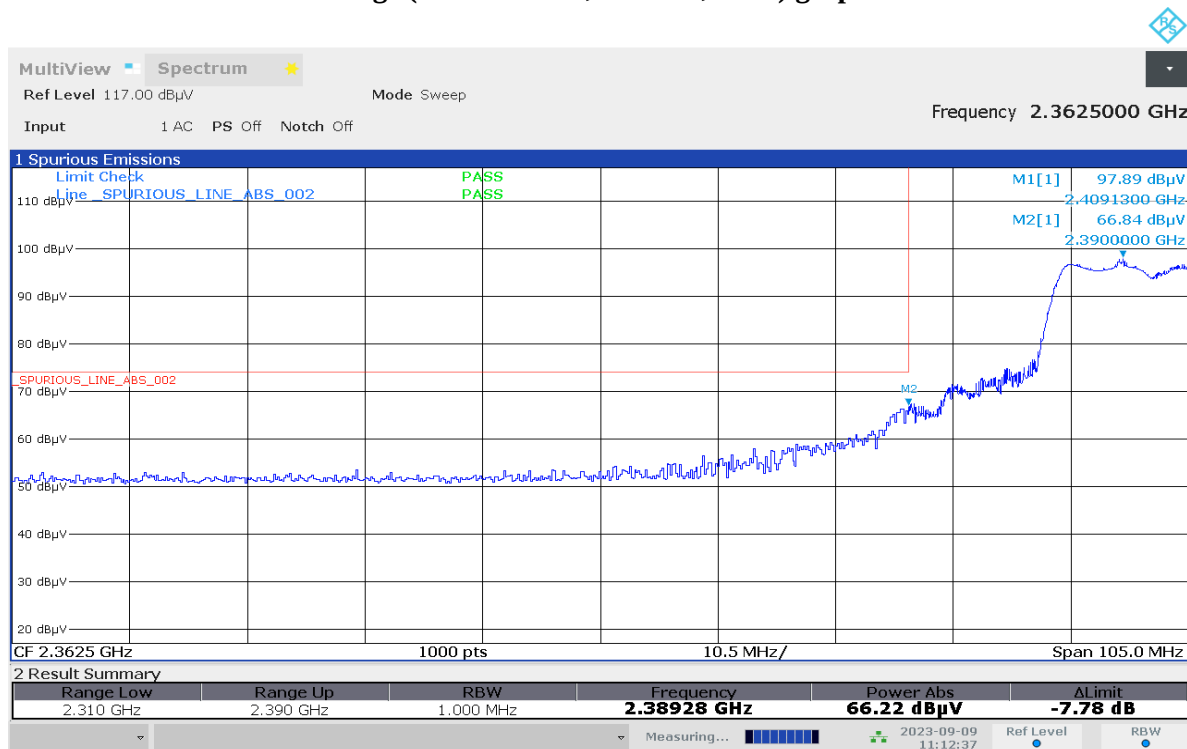
06:59:41 PM 09/09/2023

Restricted Band Edge (Low Channel) tabular data

Remarks: Pass Result	Marginal Result	Fail Result
-------------------------	-----------------	-------------

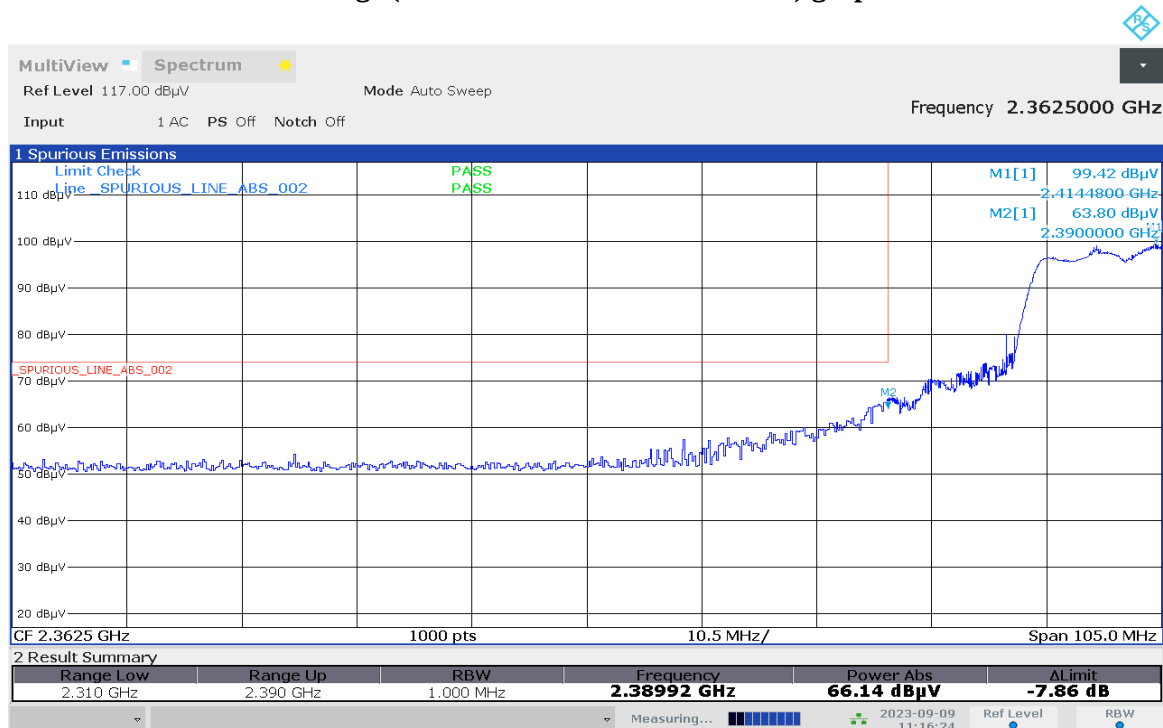
Humidity (%): 69.5
Test Date: Sat, 9 Sep, 2023

Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot



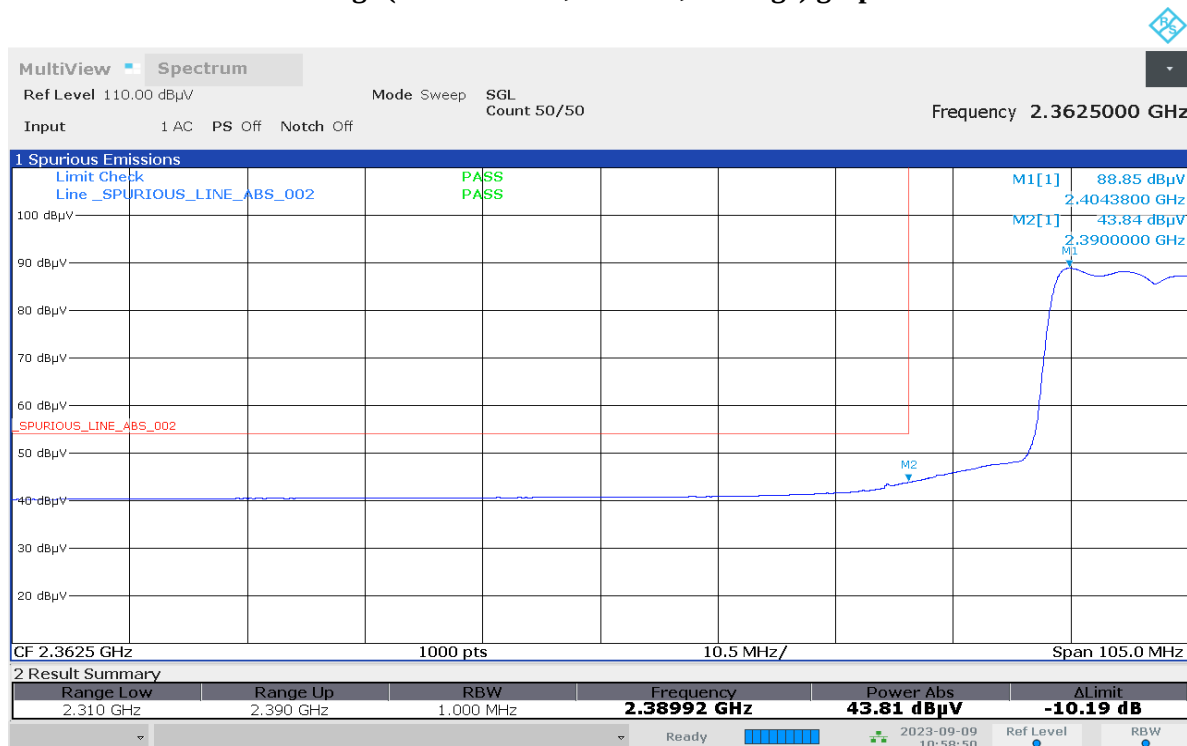
11:12:38 AM 09/09/2023

Restricted Band Edge (Low Channel, Horizontal, Peak) graphical screen shot



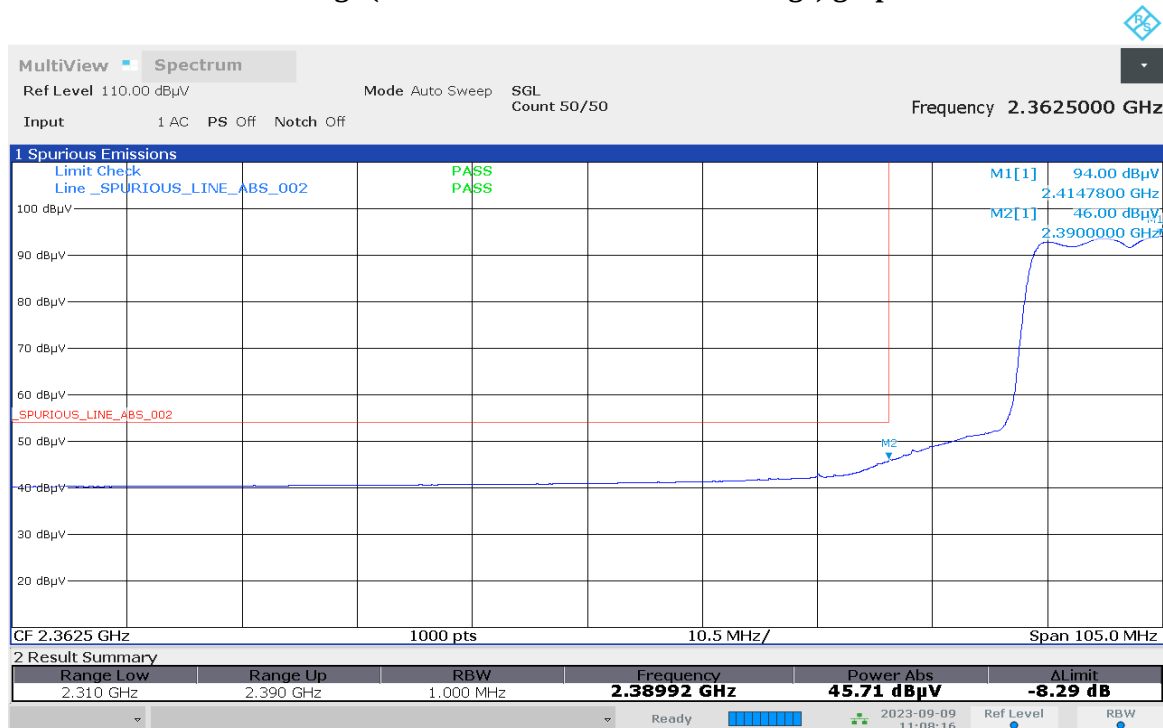
11:16:24 AM 09/09/2023

Restricted Band Edge (Low Channel, Vertical, Average) graphical screen shot



10:58:51 AM 09/09/2023

Restricted Band Edge (Low Channel, Horizontal, Average) graphical screen shot



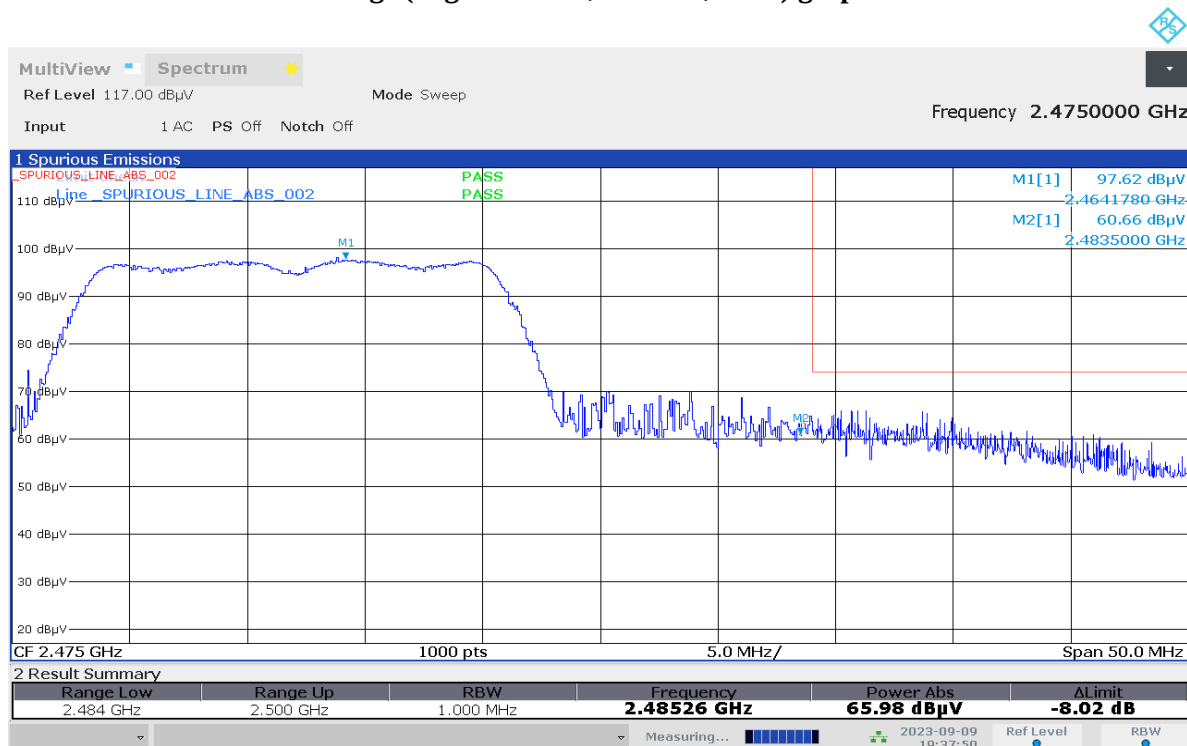
11:08:16 AM 09/09/2023

Restricted Band Edge (High Channel) tabular data

Remarks: Pass Result	Marginal Result	Fail Result
-------------------------	-----------------	-------------

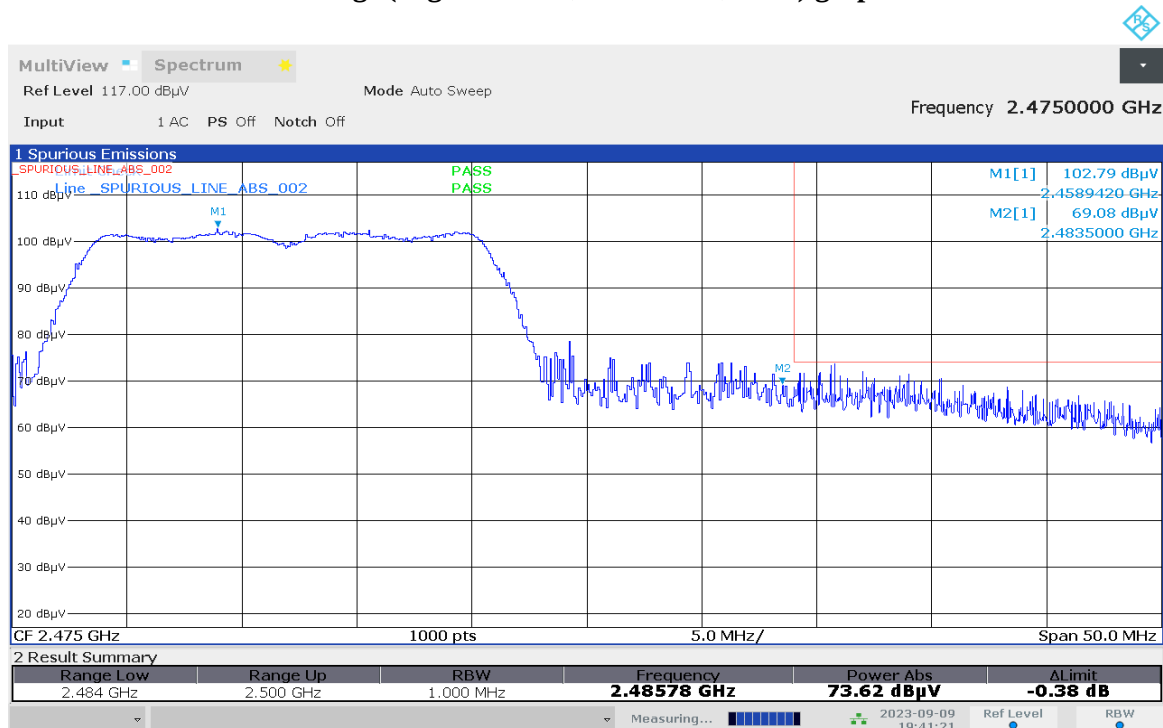
Humidity (%): 69.5
Test Date: Sun, 10 Sep, 2023

Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot



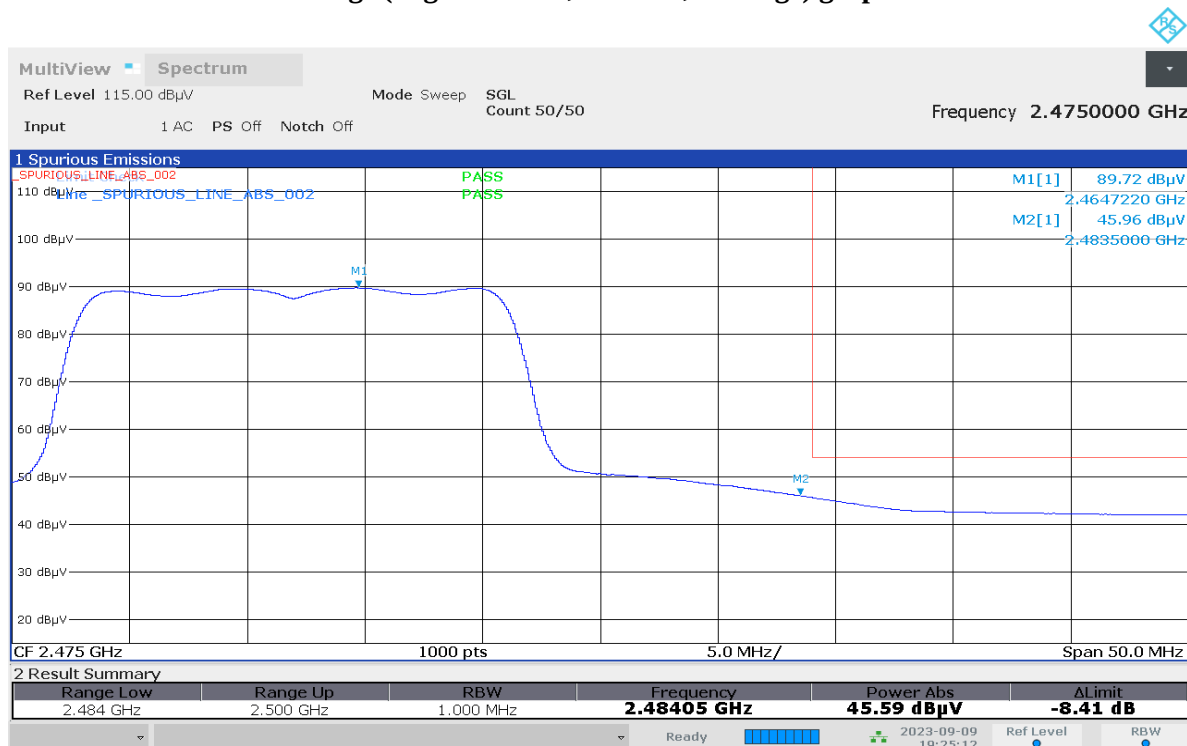
07:37:50 PM 09/09/2023

Restricted Band Edge (High Channel, Horizontal, Peak) graphical screen shot



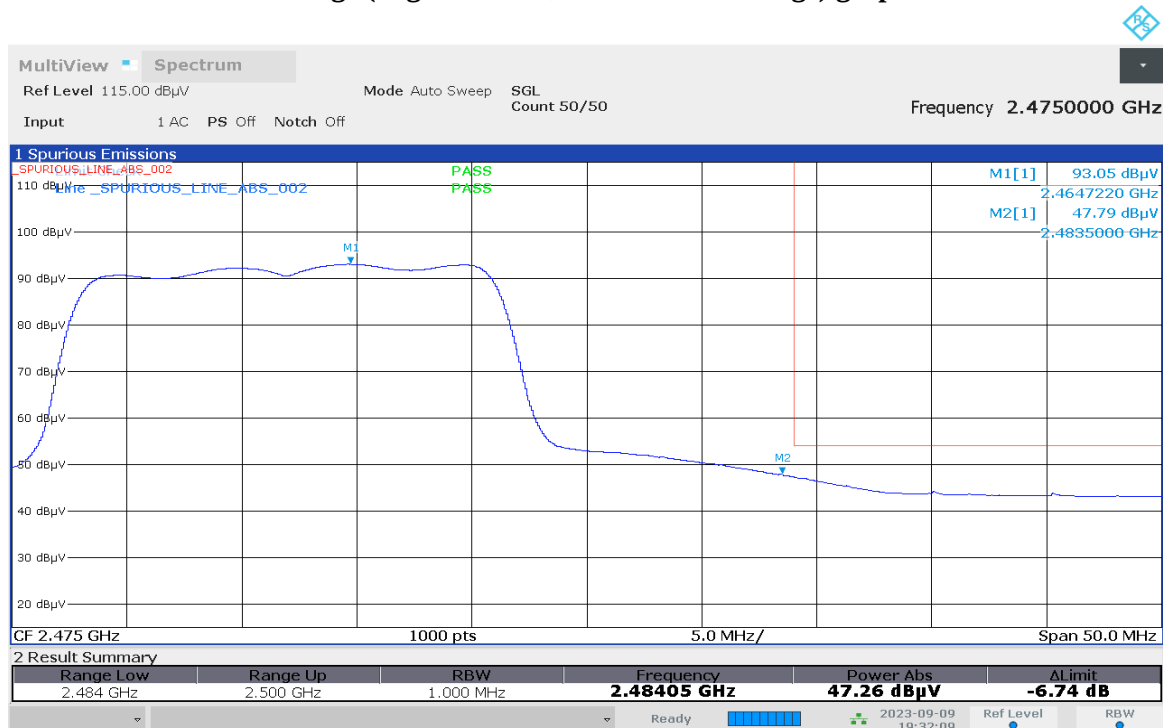
07:41:22 PM 09/09/2023

Restricted Band Edge (High Channel, Vertical, Average) graphical screen shot



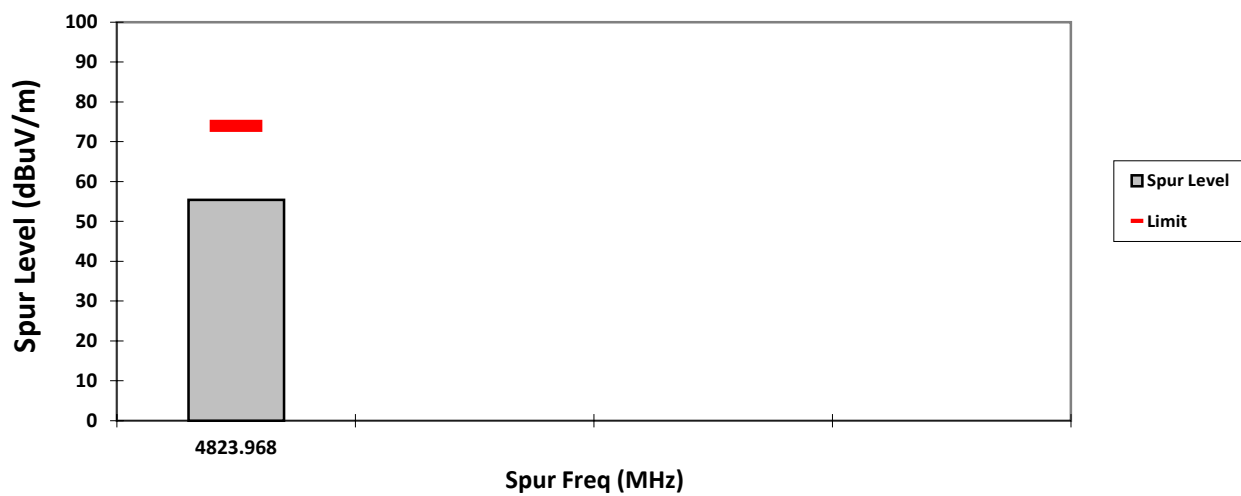
07:25:12 PM 09/09/2023

Restricted Band Edge (High Channel, Horizontal, Average) graphical screen shot

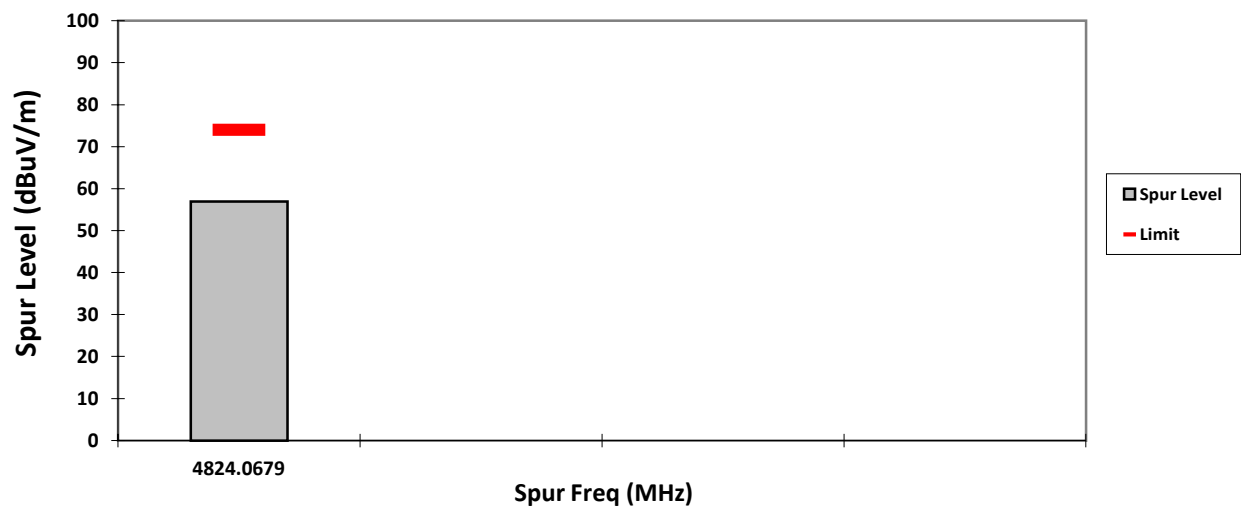


07:32:10 PM 09/09/2023

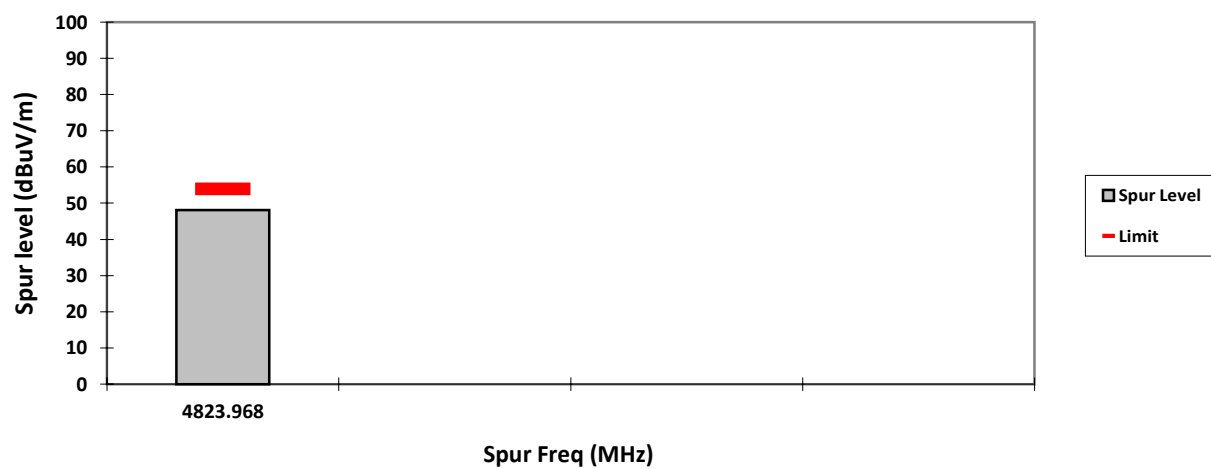
VERTICAL, PK



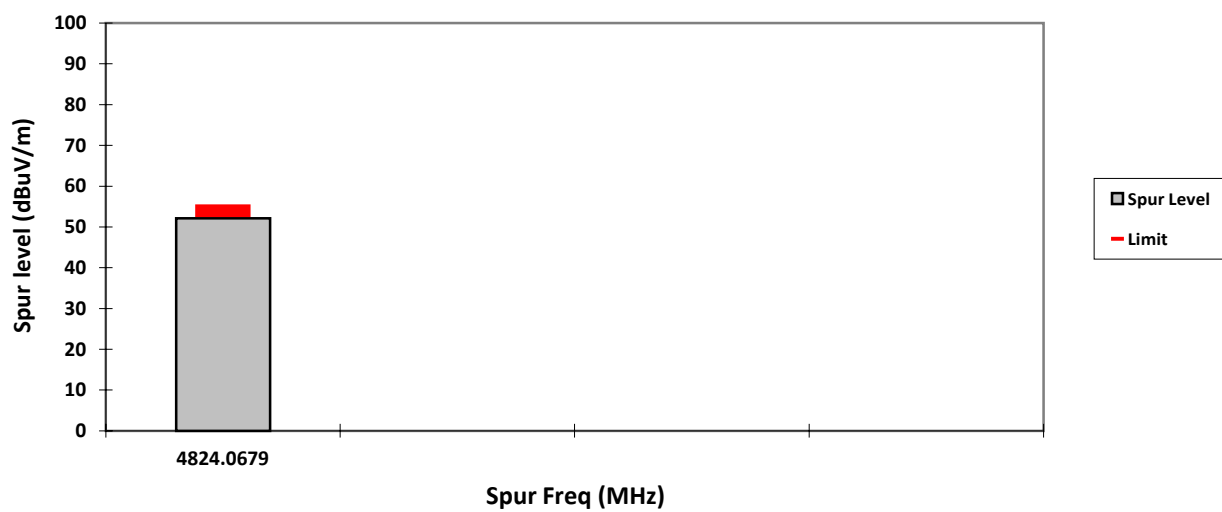
HORIZONTAL, PK



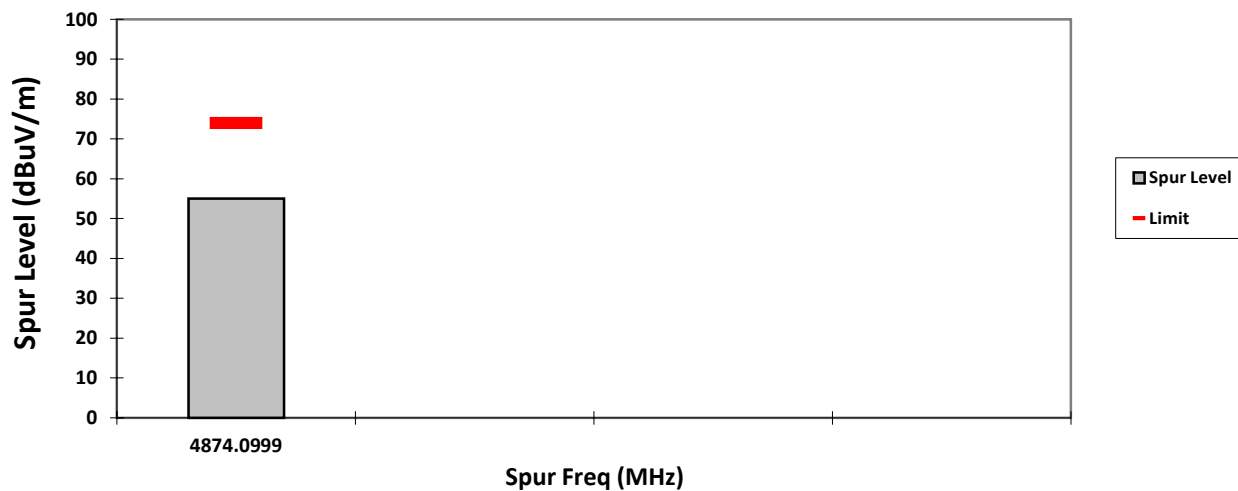
VERTICAL, AV



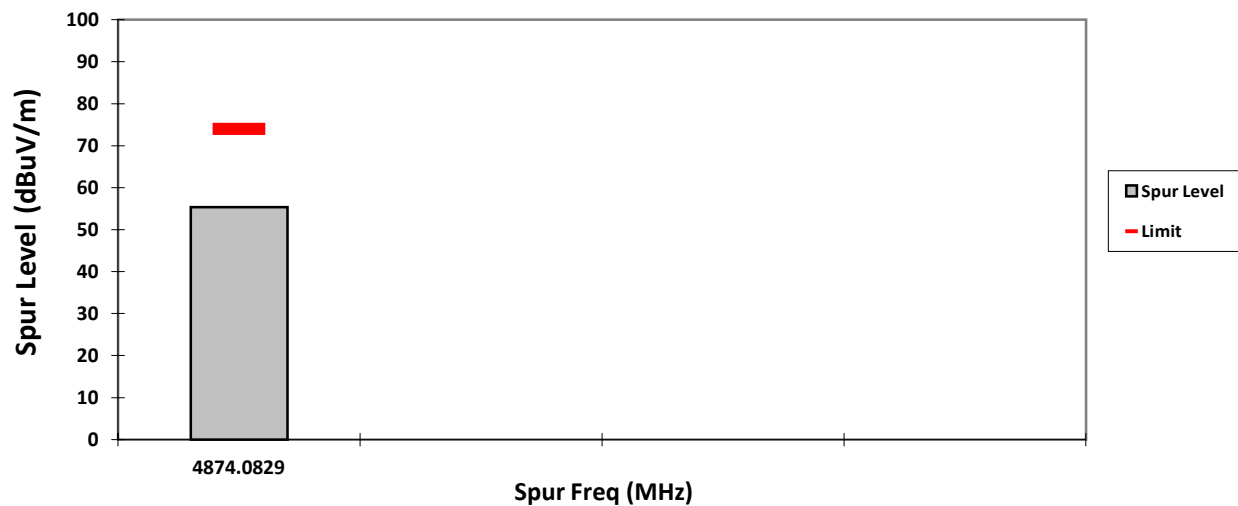
HORIZONTAL, AV



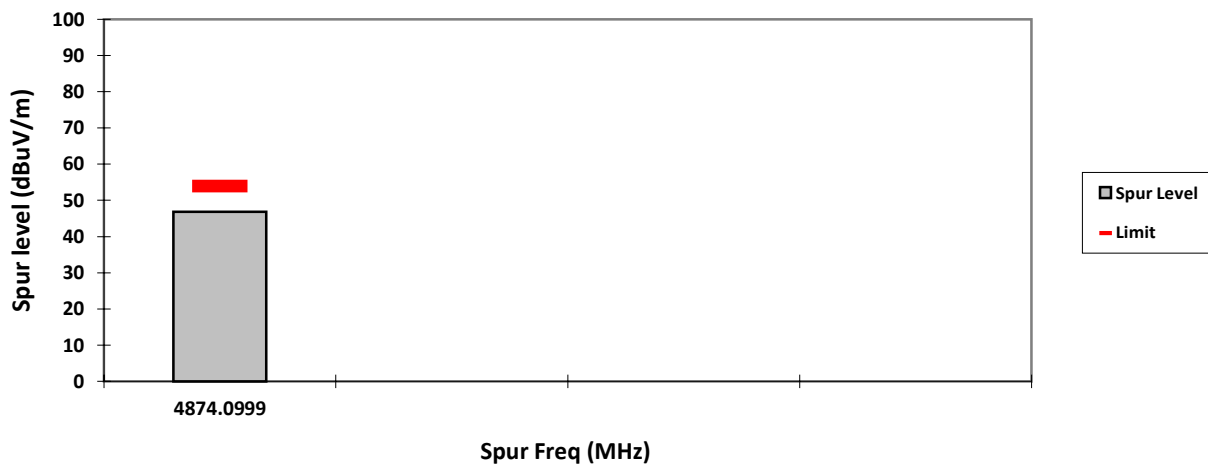
VERTICAL, PK



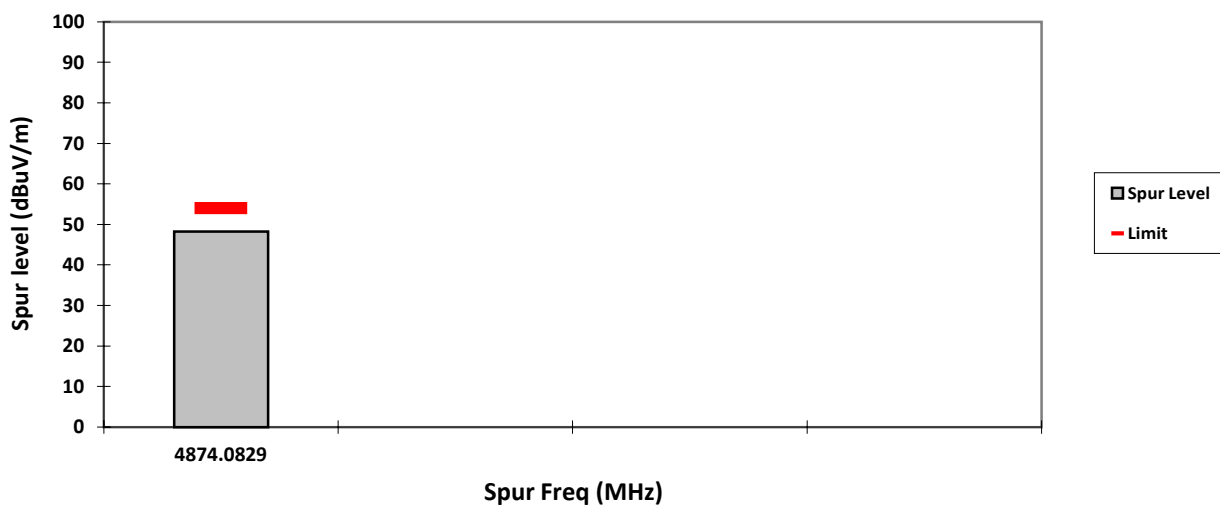
HORIZONTAL, PK



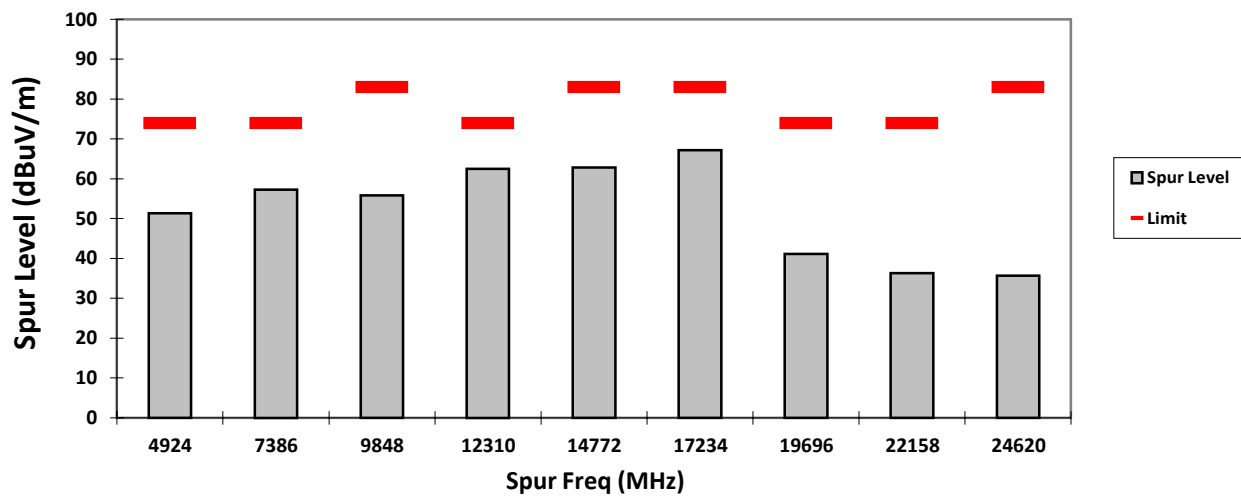
VERTICAL, AV



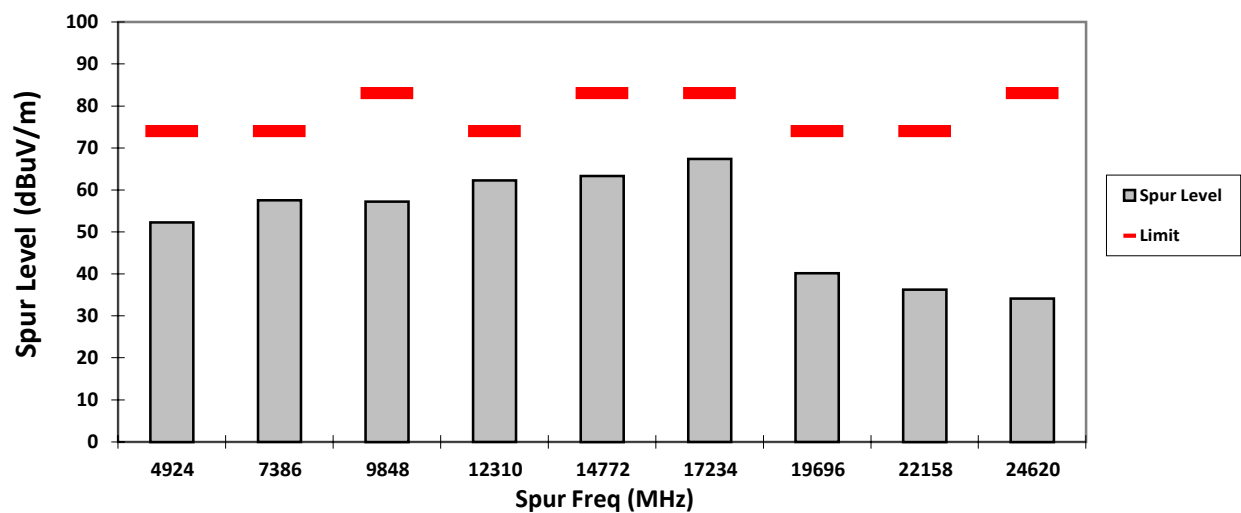
HORIZONTAL, AV



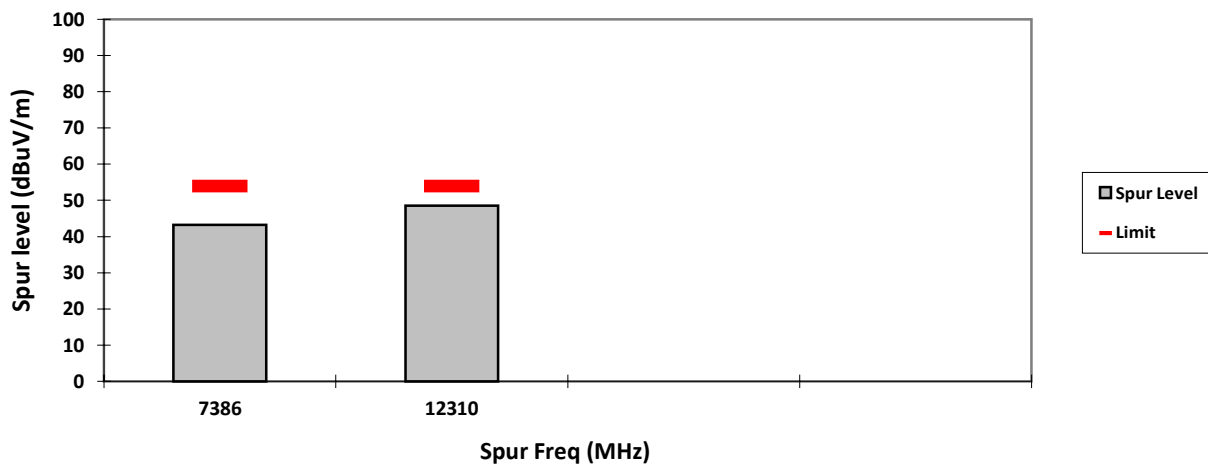
VERTICAL, PK



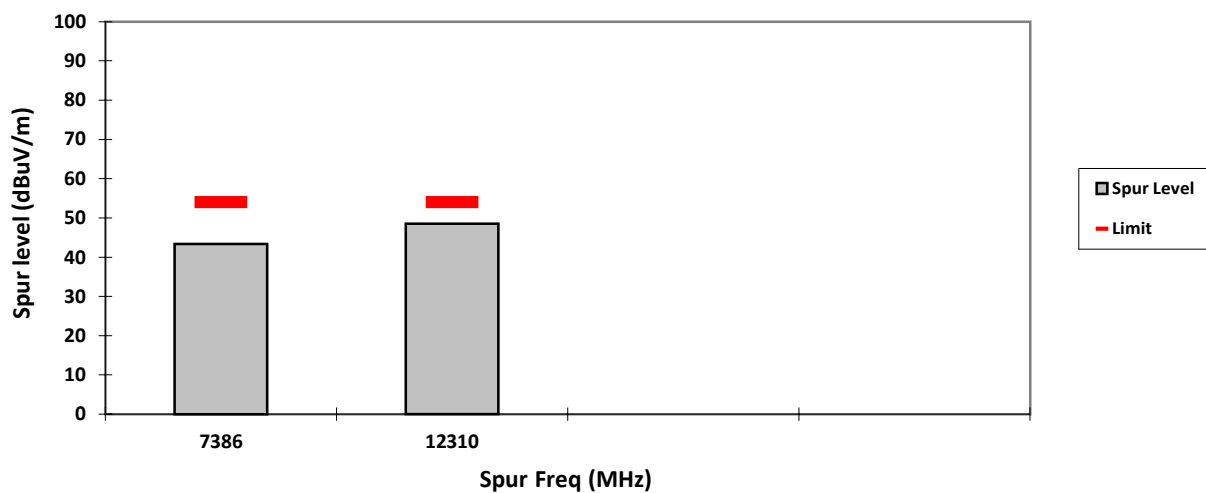
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV

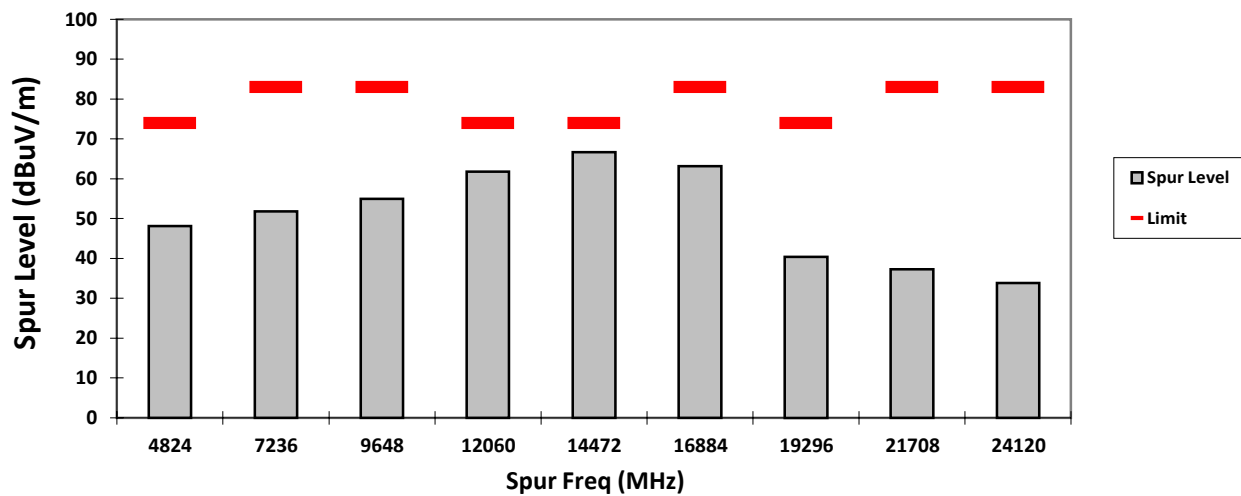


Radiated Emission (Low Channel) tabular data

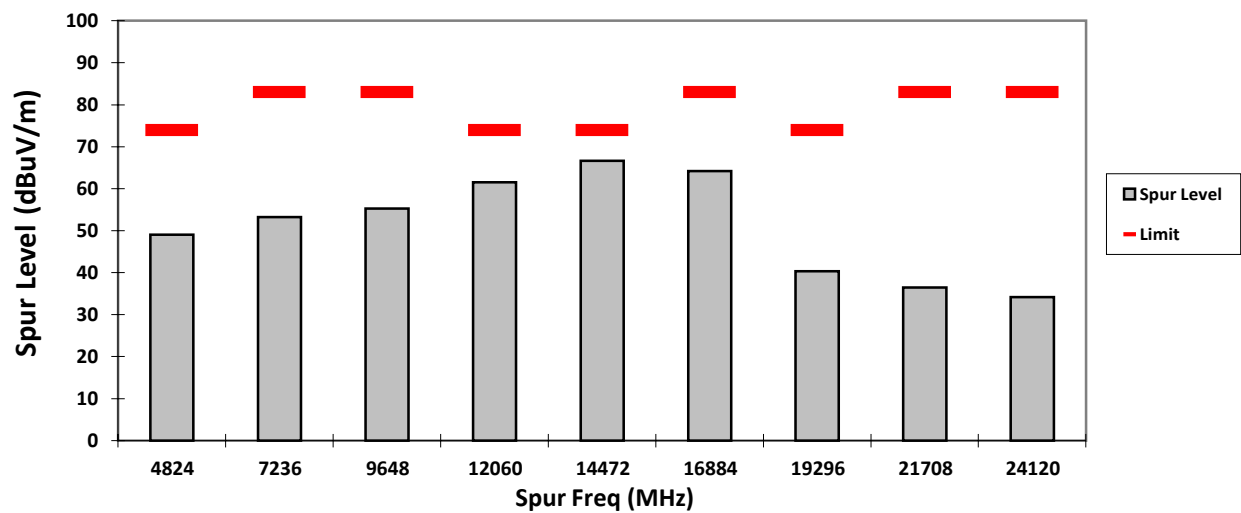
Remarks: Pass Result	Marginal Result	Fail Result
-------------------------	-----------------	-------------

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
***Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit**
are not reported.

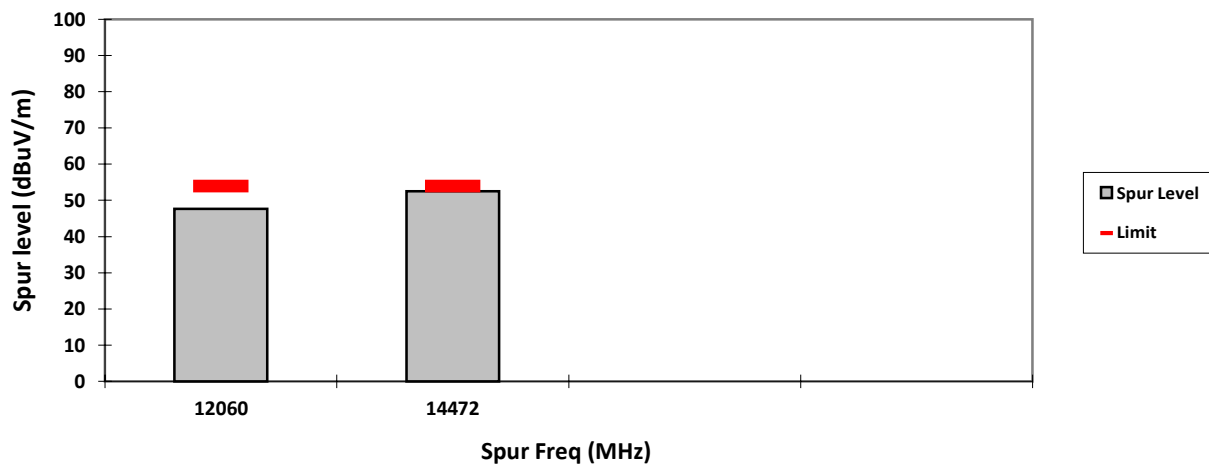
VERTICAL, PK



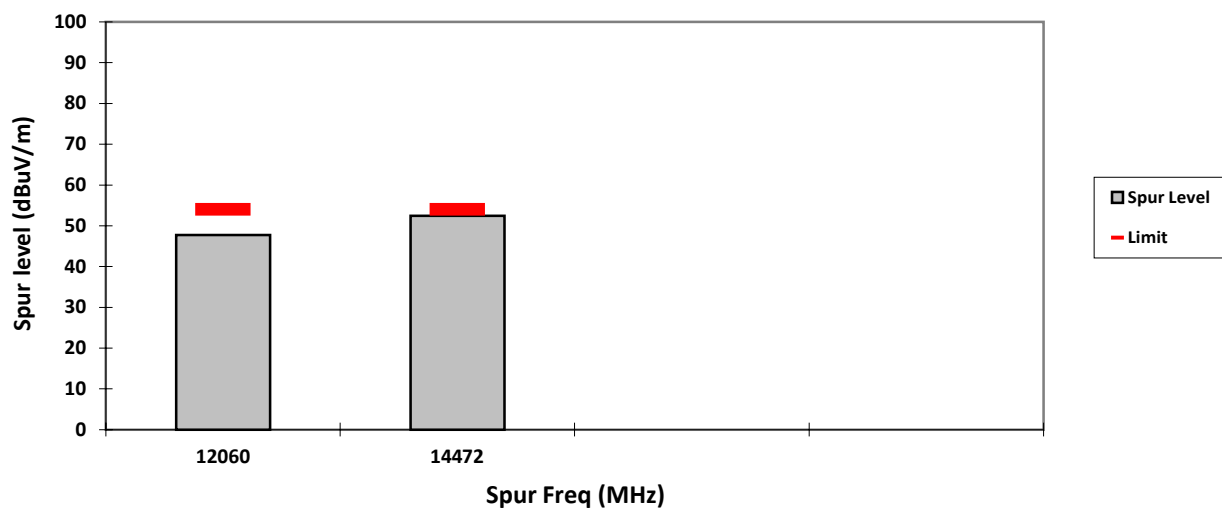
HORIZONTAL, PK



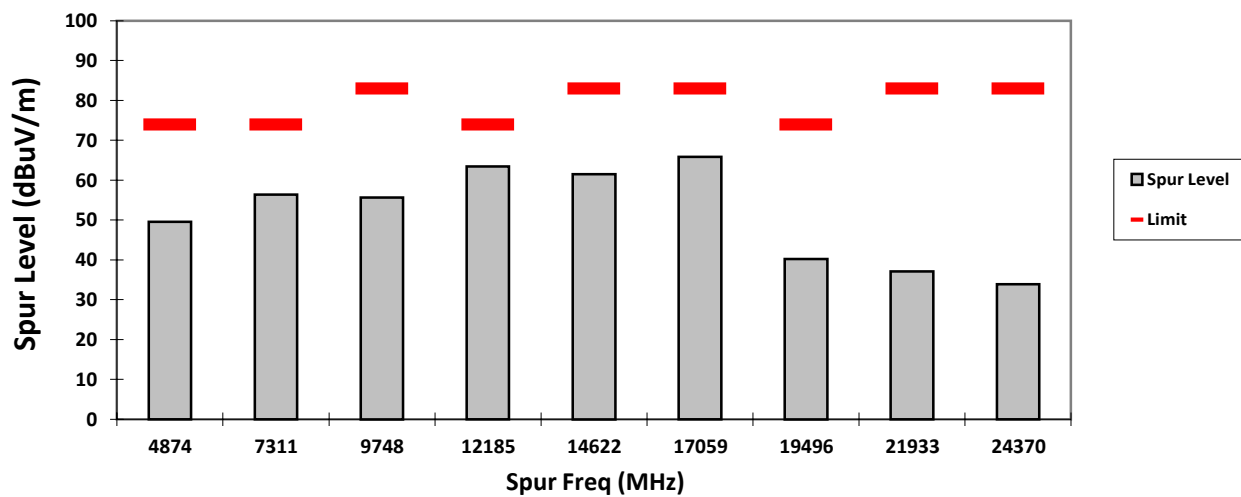
VERTICAL, AV



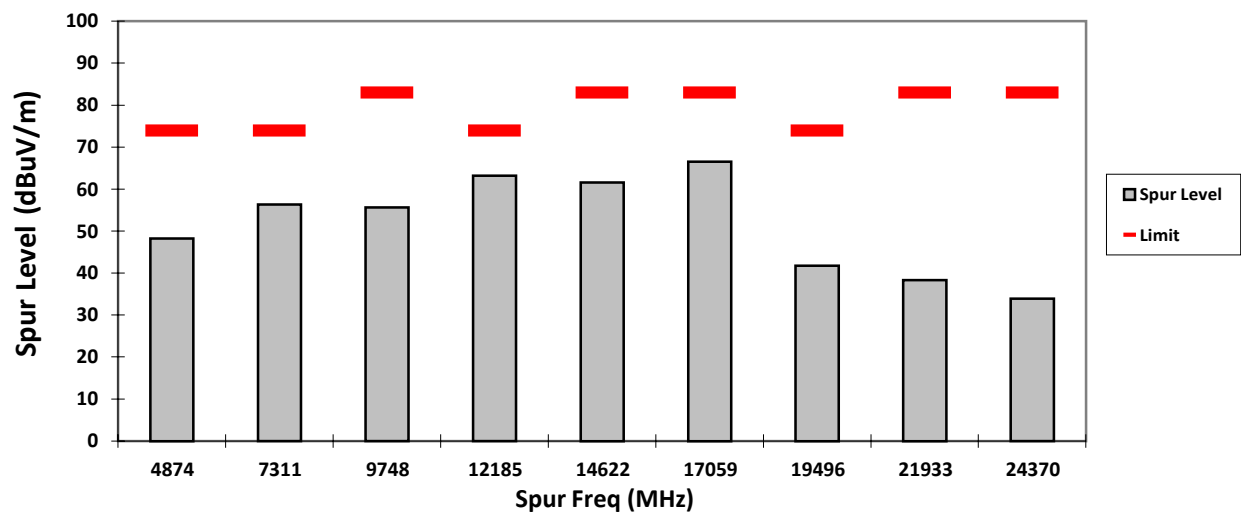
HORIZONTAL, AV



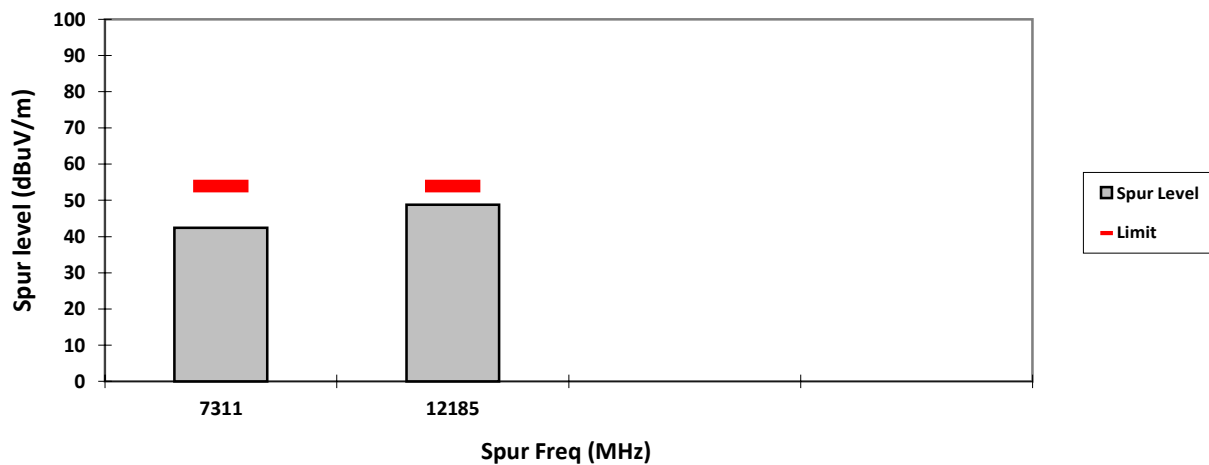
VERTICAL, PK



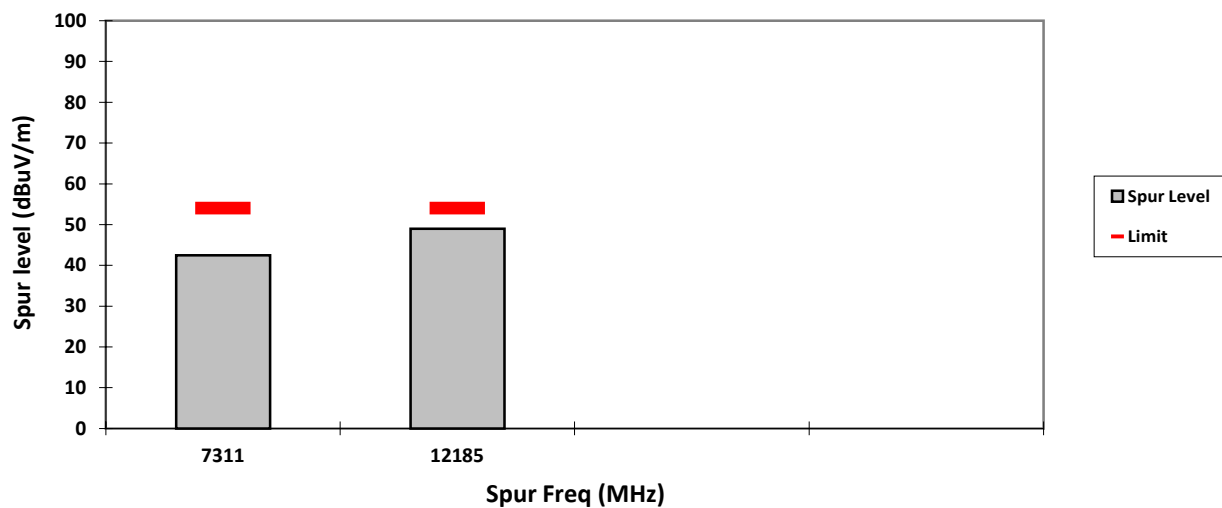
HORIZONTAL, PK



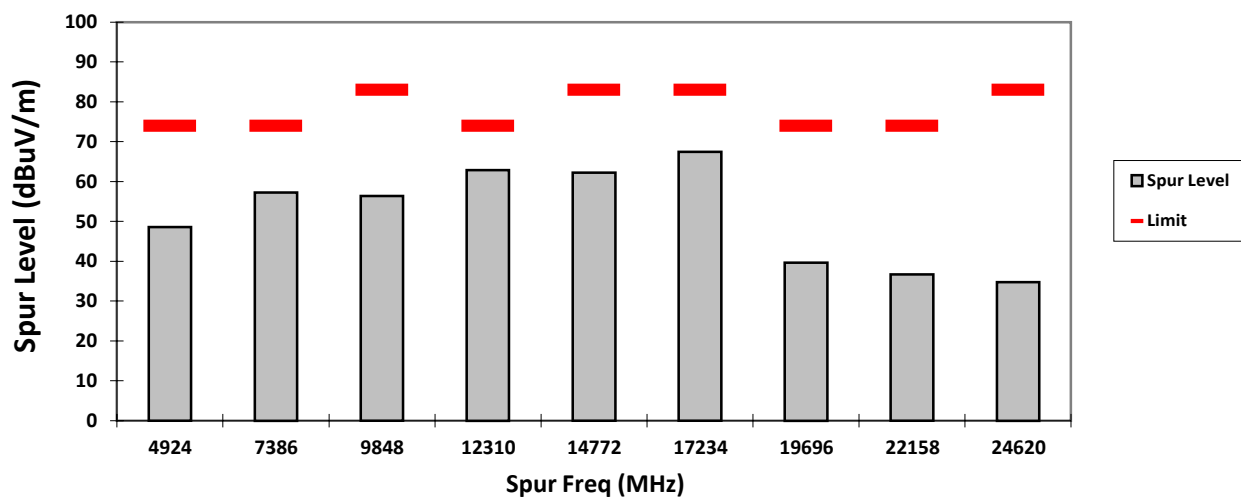
VERTICAL, AV



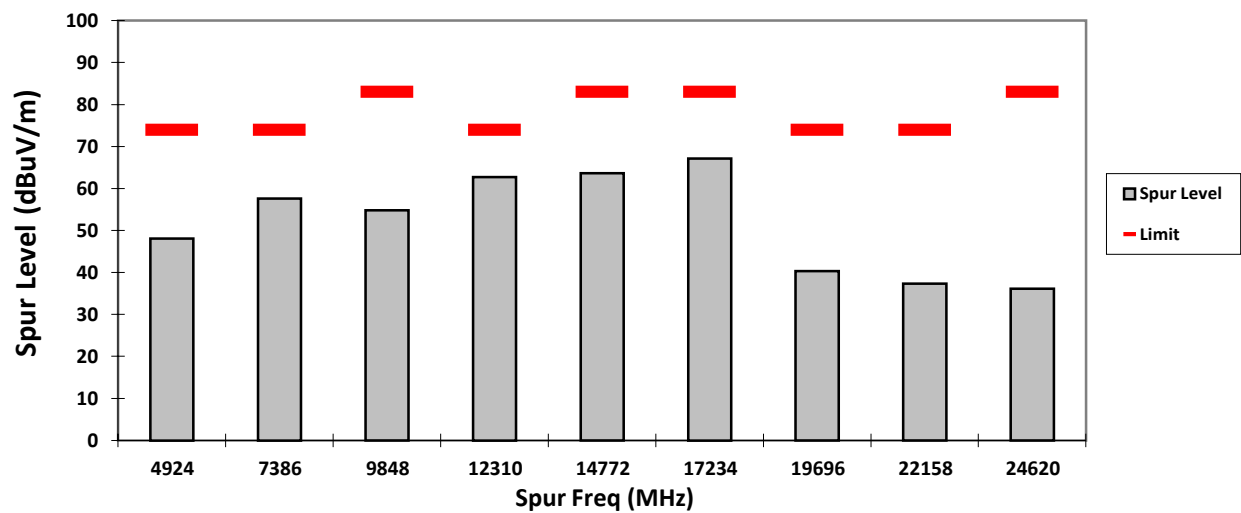
HORIZONTAL, AV



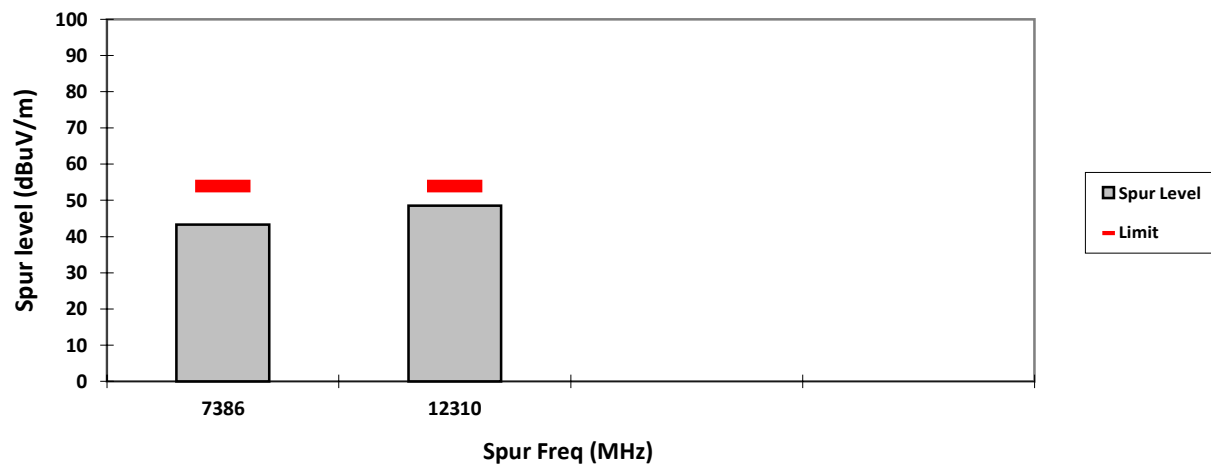
VERTICAL, PK



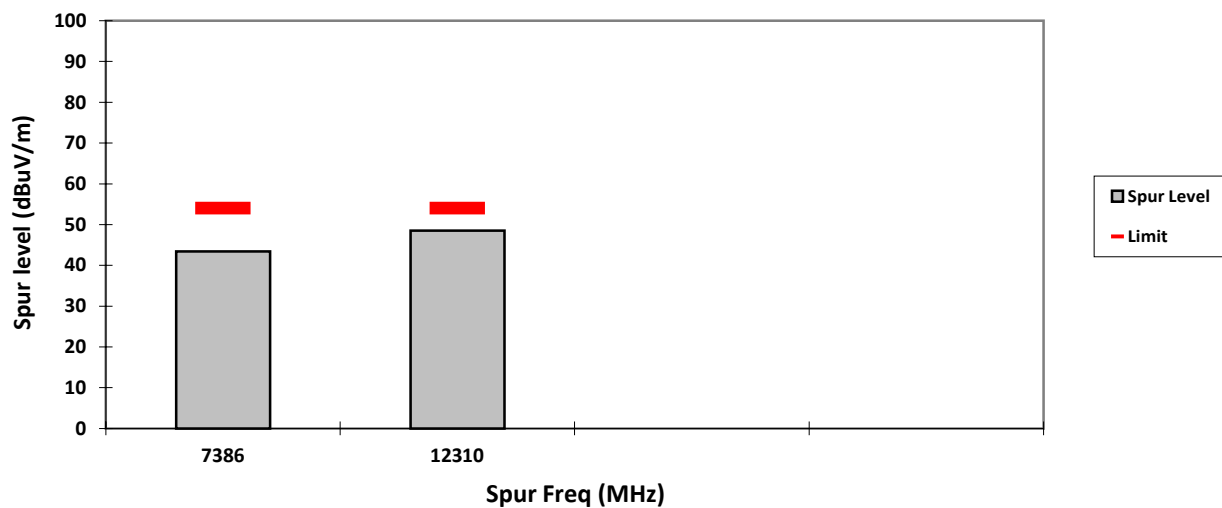
HORIZONTAL, PK



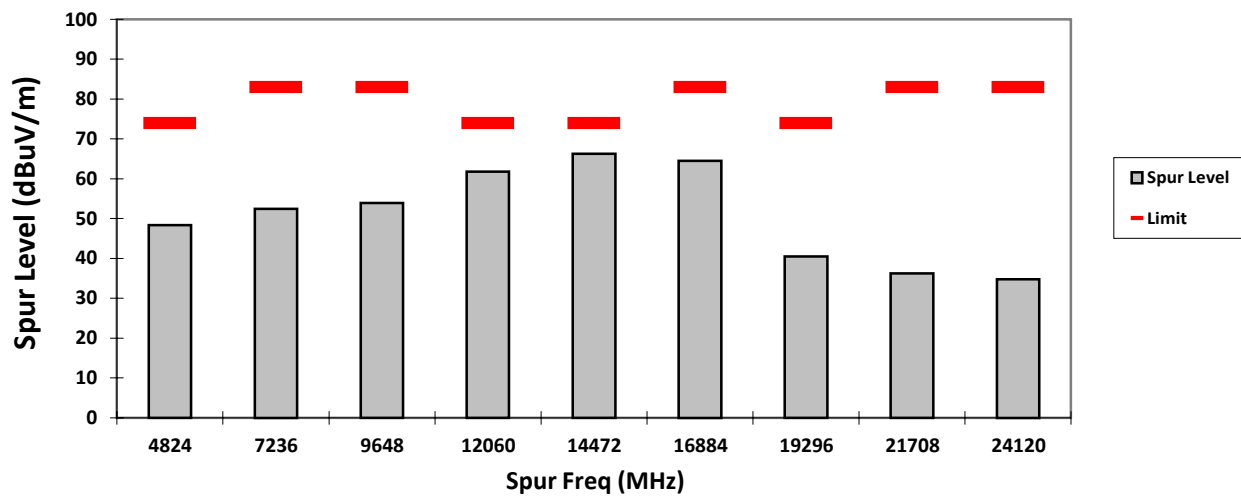
VERTICAL, AV



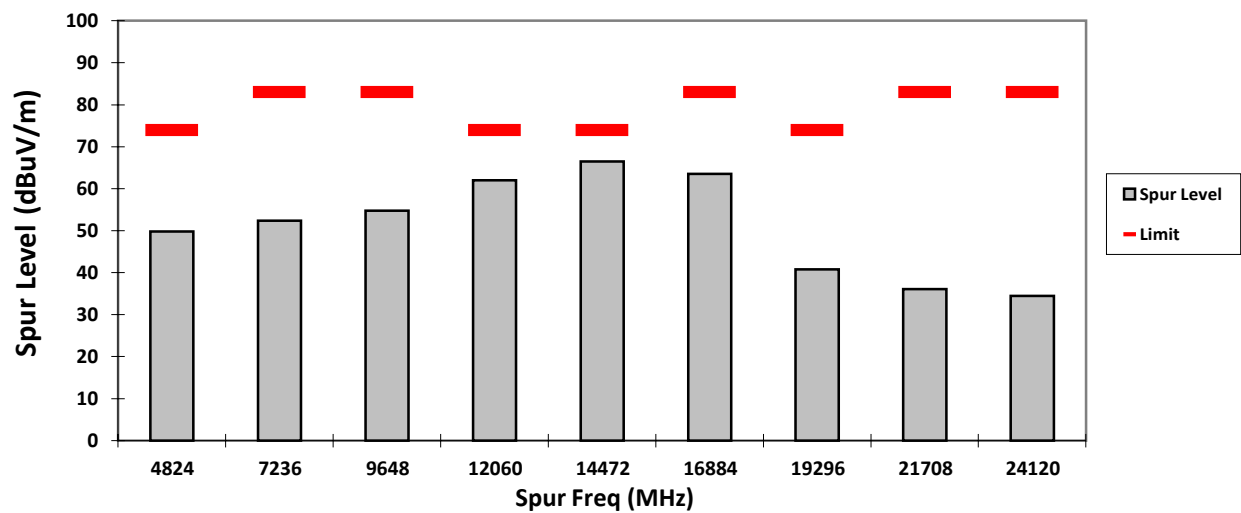
HORIZONTAL, AV



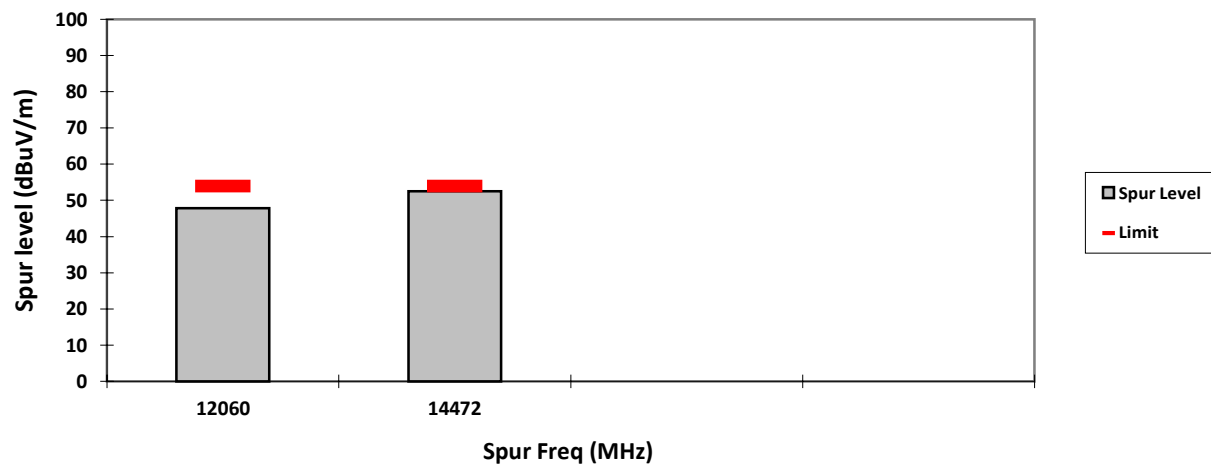
VERTICAL, PK



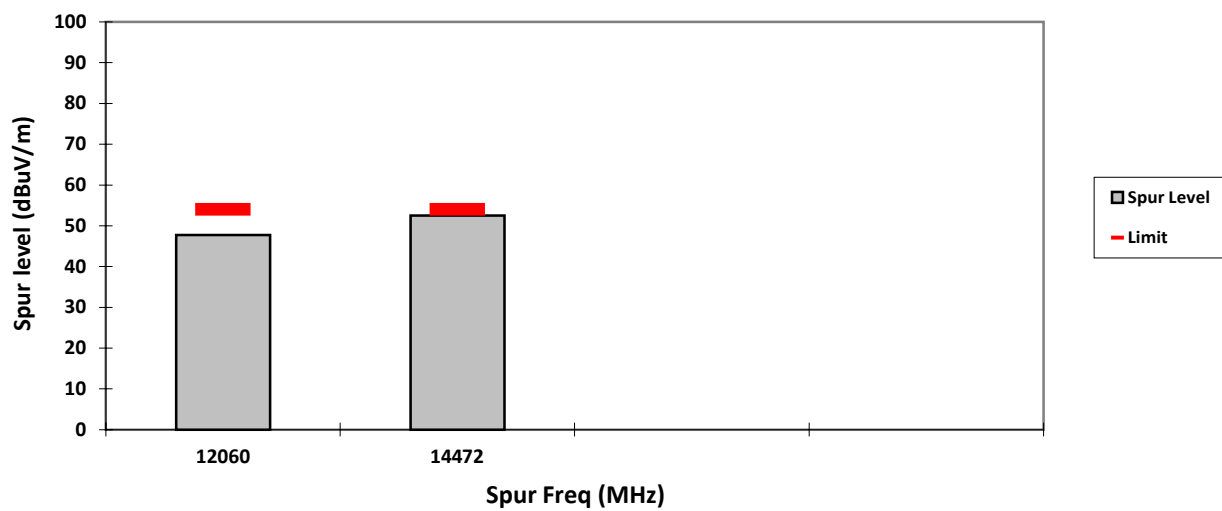
HORIZONTAL, PK



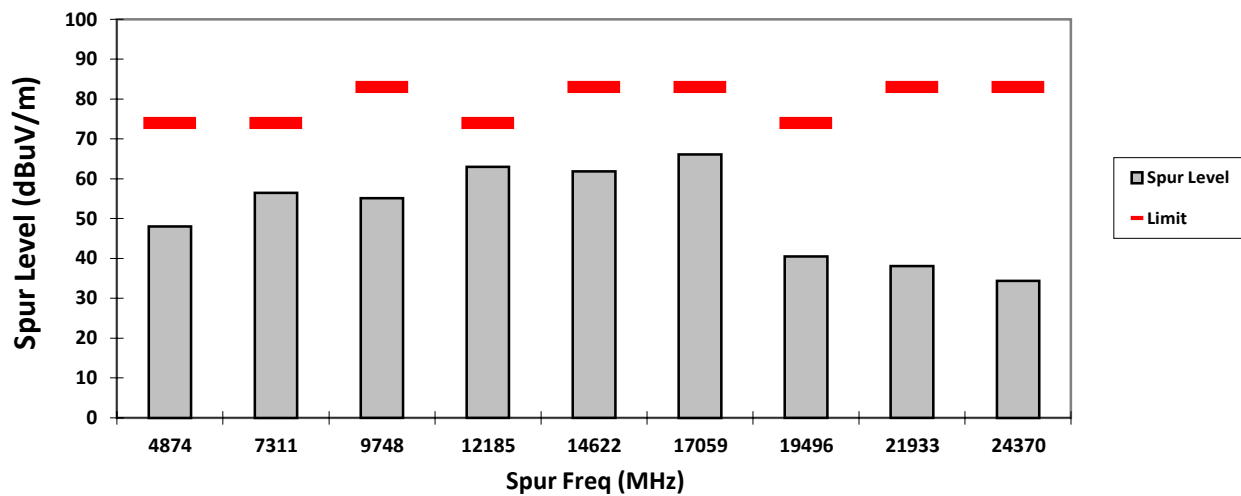
VERTICAL, AV



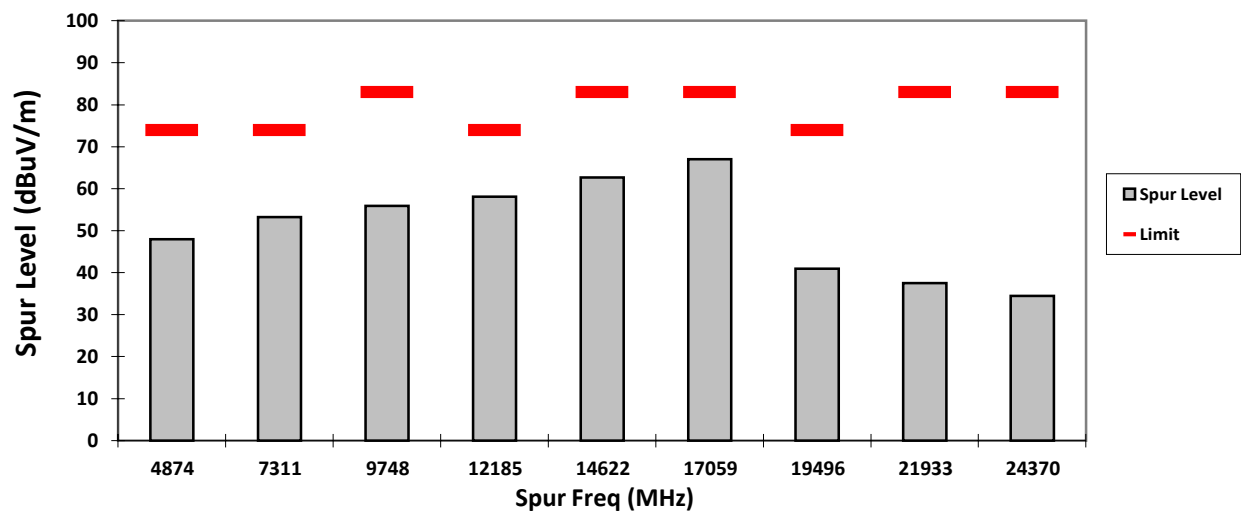
HORIZONTAL, AV



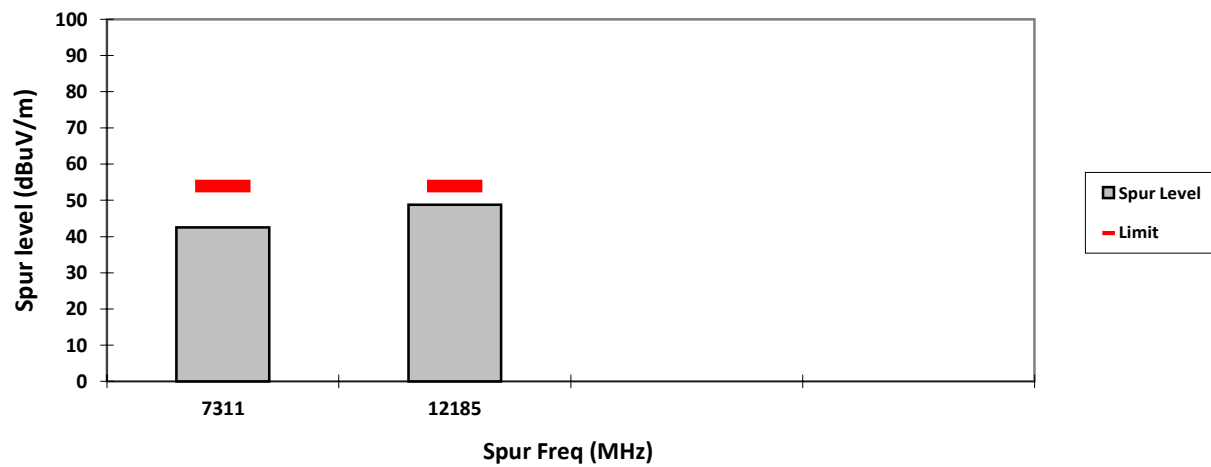
VERTICAL, PK



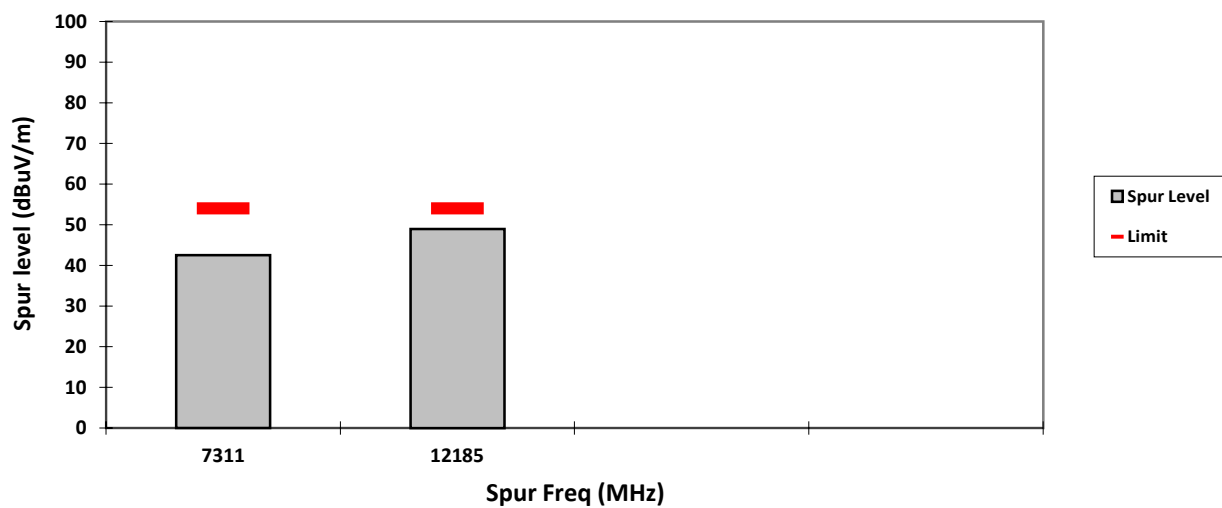
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV

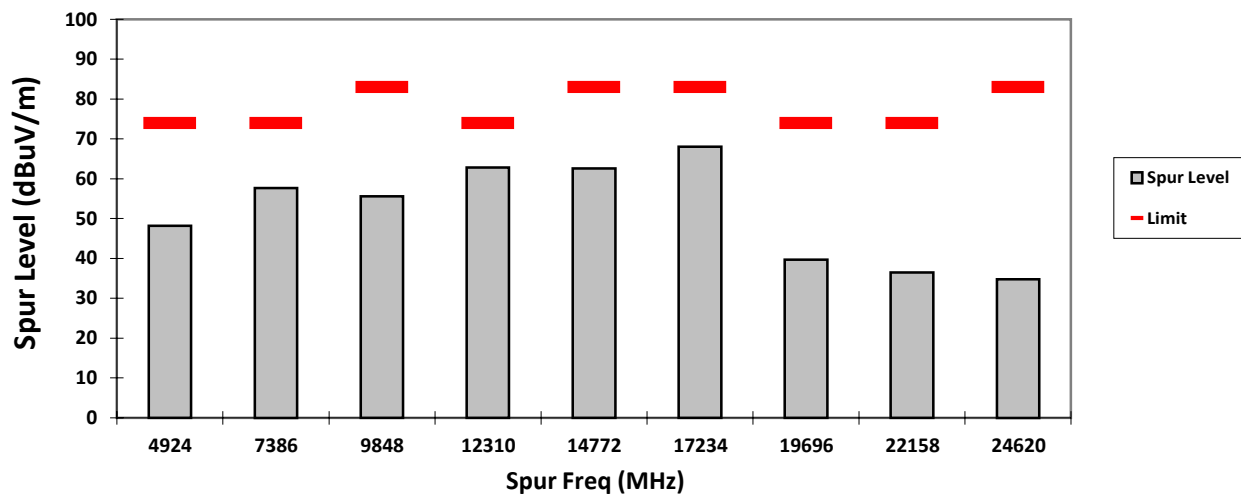


Radiated Emission (High Channel) tabular data

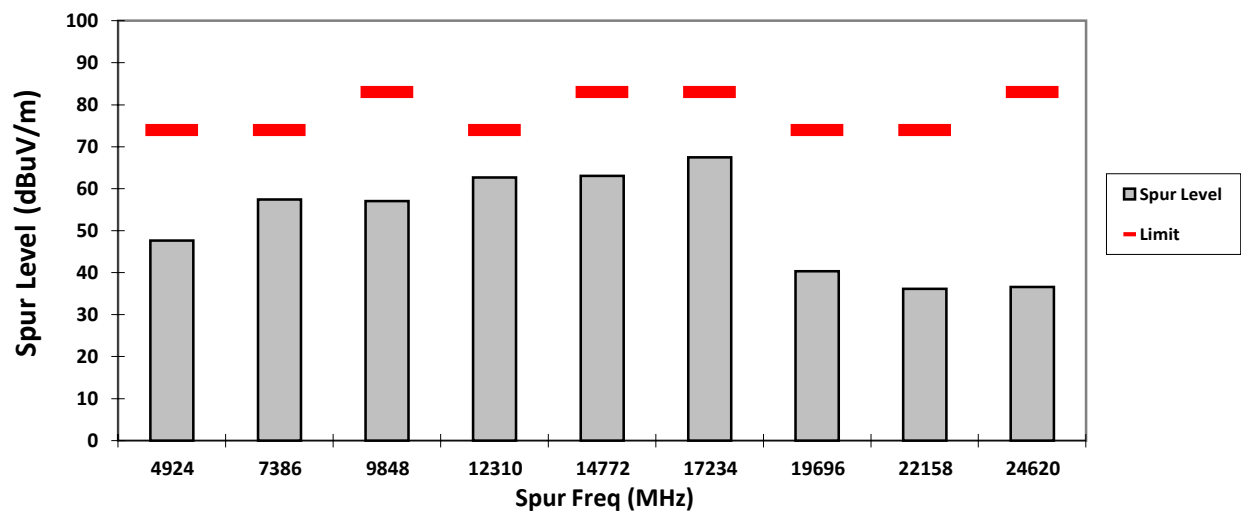
Remarks: Pass Result	Marginal Result	Fail Result
-------------------------	-----------------	-------------

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
***Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported.**

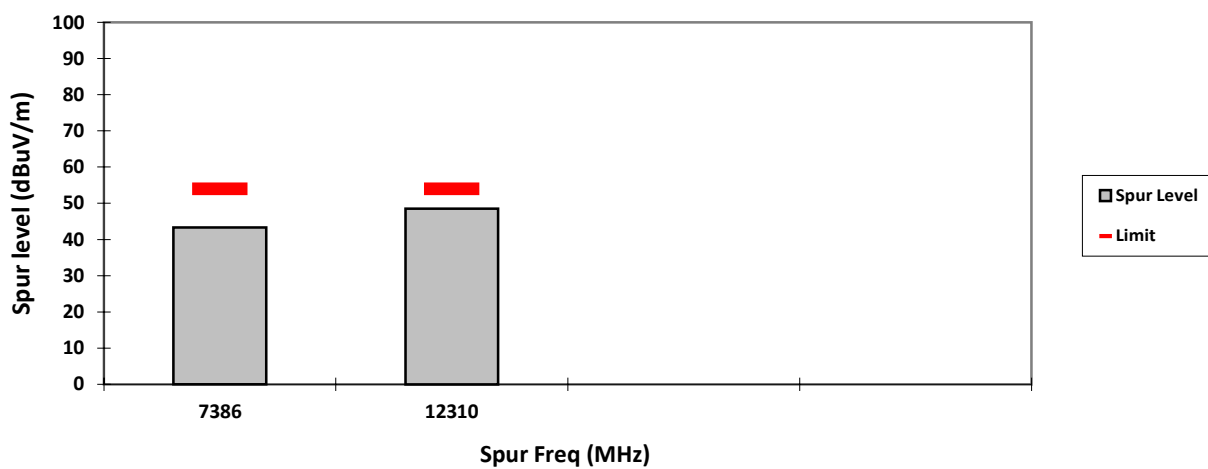
VERTICAL, PK



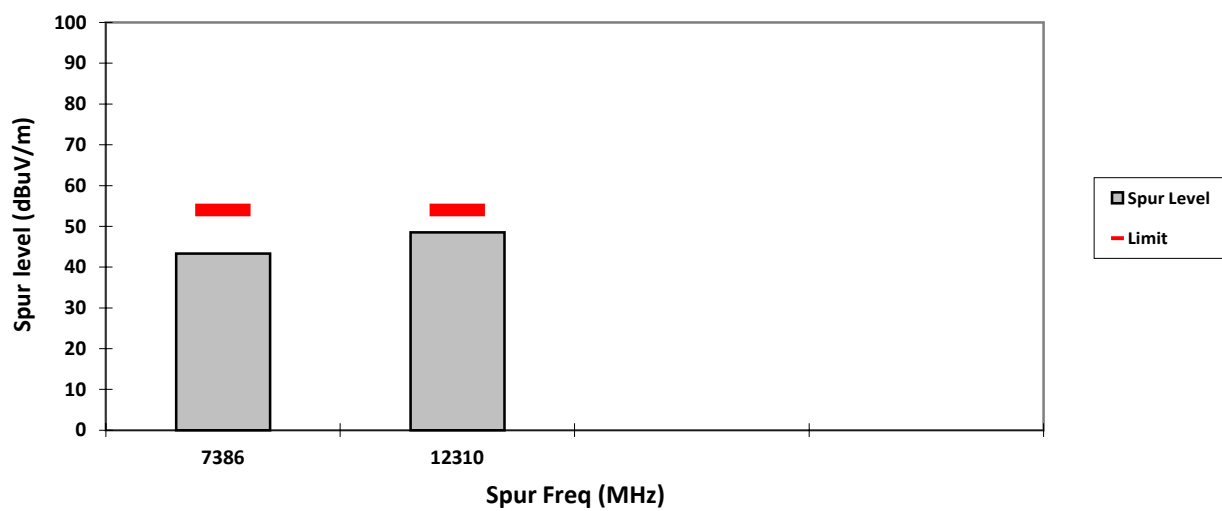
HORIZONTAL, PK



VERTICAL, AV

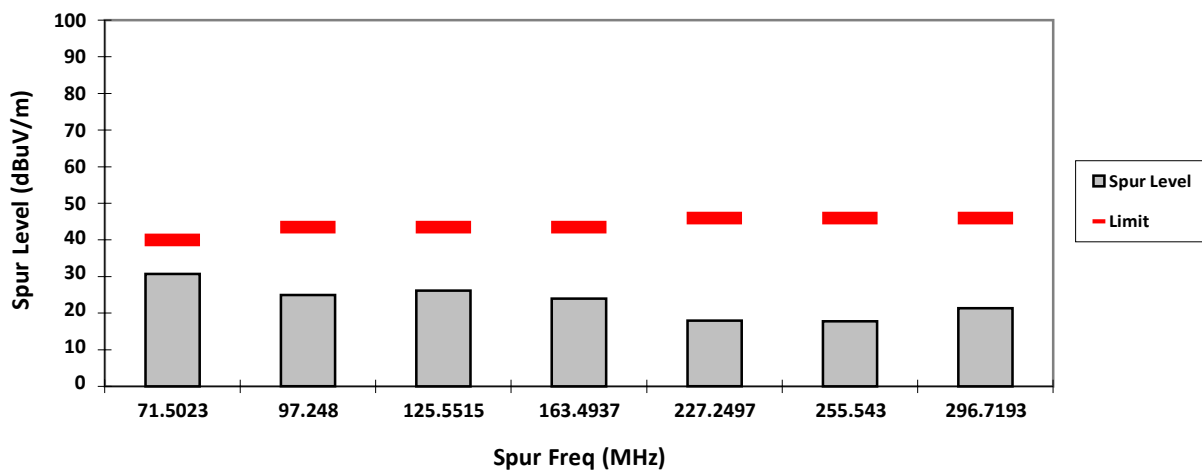


HORIZONTAL, AV

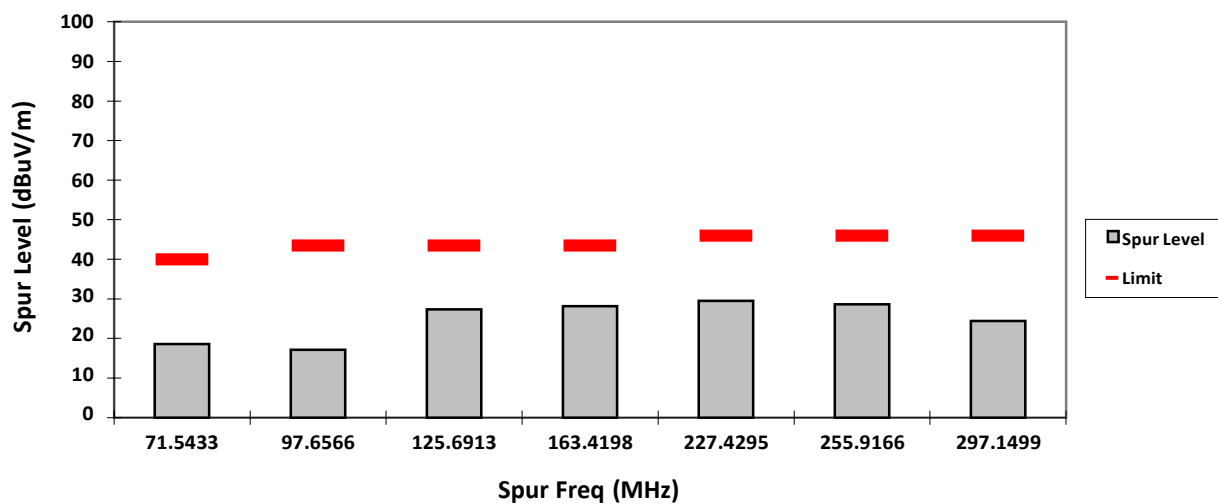


Worst Case Plane: Y-Plane (802.11b)

VERTICAL, QPK

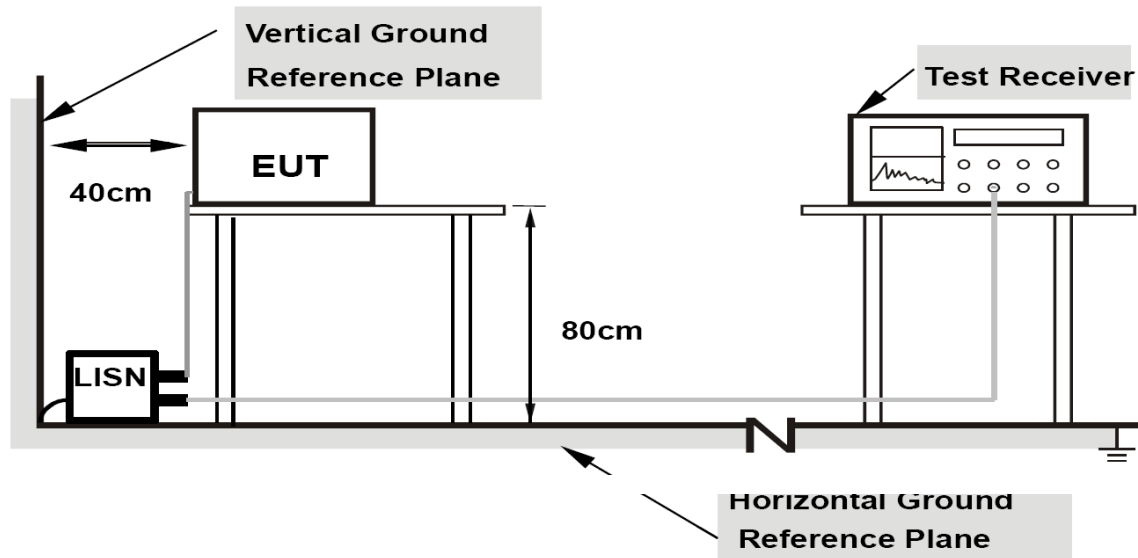


HORIZONTAL, QPK



6.8. AC Powerline Conducted Emission

6.8.1. Test Setup



- 1) Tests were conducted for both Receive and Transmit Mode of the EUT.
- 2) The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50uH of coupling impedance for the measuring instrument.
- 3) Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- 4) The frequency range from 150 kHz to 30MHz was measured.

6.8.2. Test Limits:

For AC Power Line Conducted Test Limit can be Class A or B depends on product classification.

Limits for conducted disturbance at the mains ports
of class A ITE

Frequency range MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	79	66
0,50 to 30	73	60
NOTE The lower limit shall apply at the transition frequency.		

Table 1: Limits for Conducted Disturbance at the Mains Ports of Class A ITE.

**Limits for conducted disturbance at the mains ports
of class B ITE**

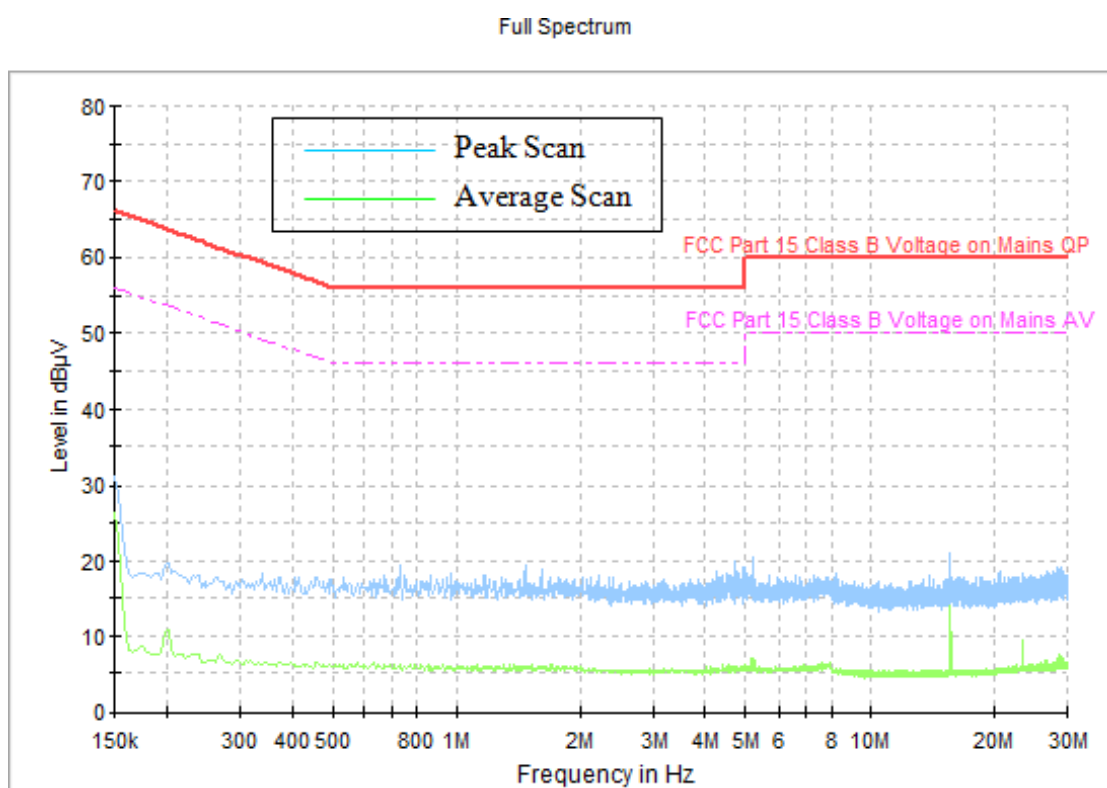
Frequency range MHz	Limits dB(μ V)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50
NOTE 1 The lower limit shall apply at the transition frequencies.		
NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

Table 2: Limits for Conducted Disturbance at the Mains Ports of Class B ITE

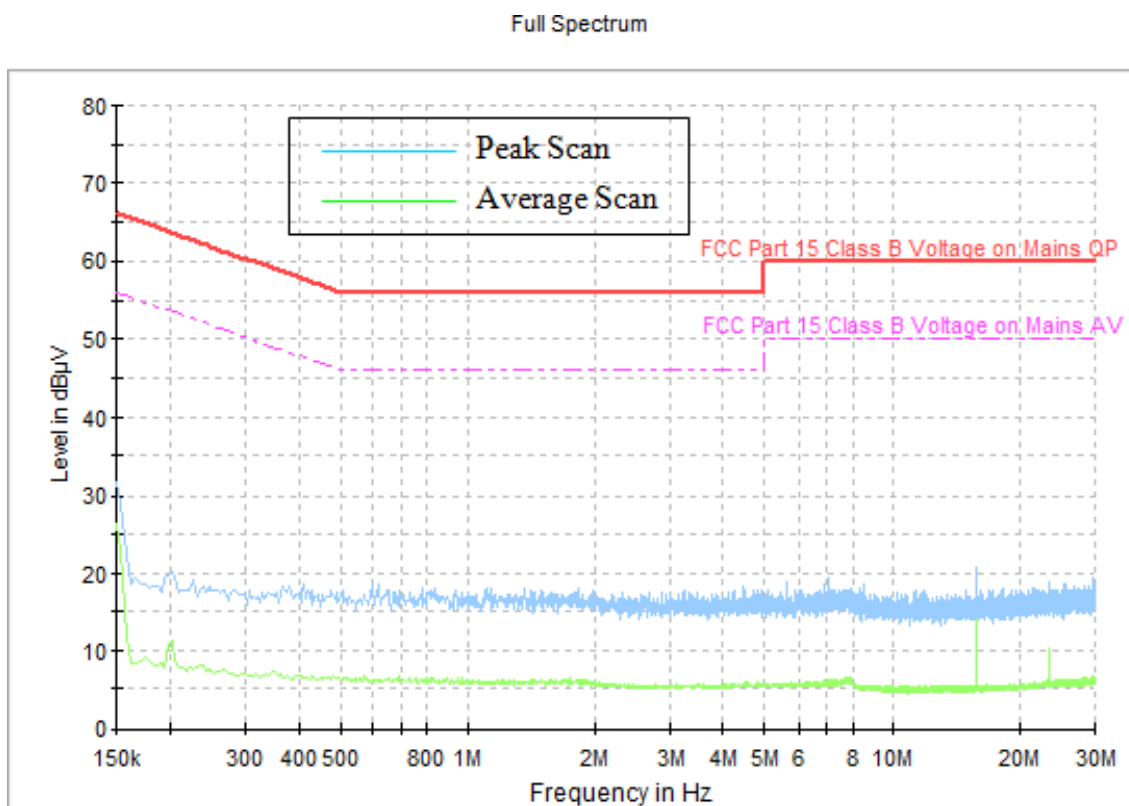
6.8.3. Test Result

Report ID.:	: 39809-EMC-00051
Ambient Temperature:	: 20.3 °C
Humidity:	: 59.5 %RH
Tester:	: Shidee
Date of test:	: 11 September 2023

1) Ambient SUC Power Cable



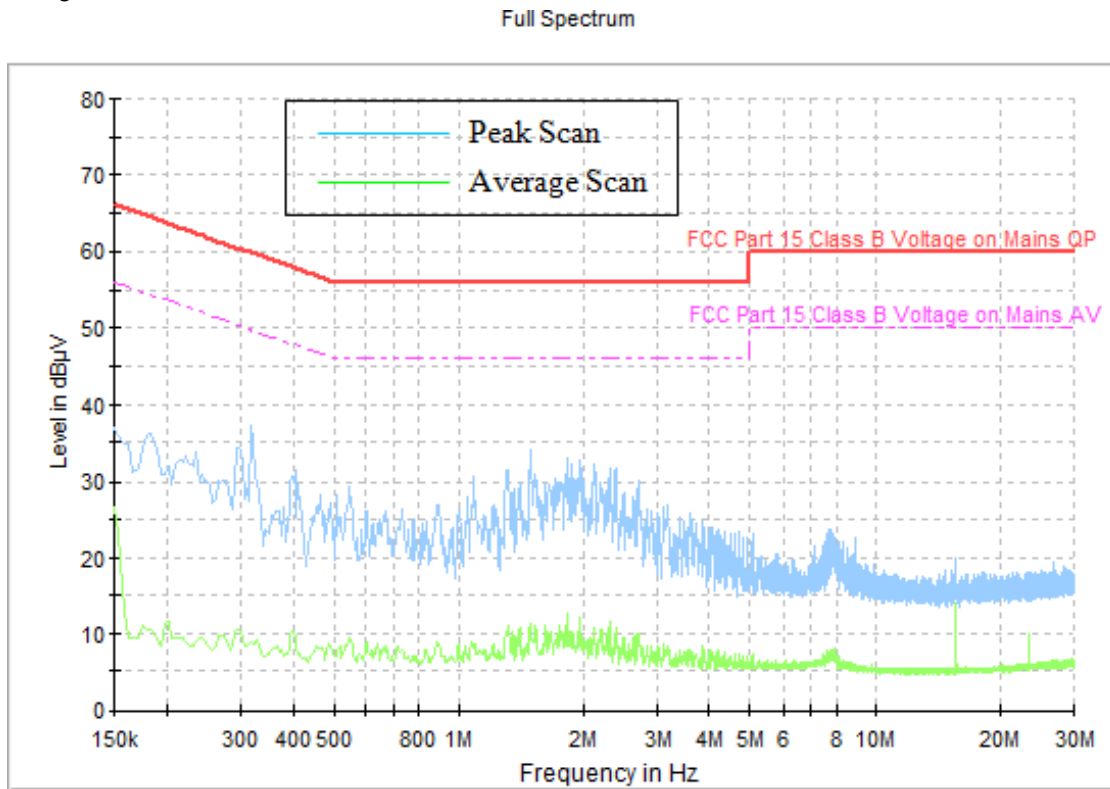
2) Ambient MUC Power Cable



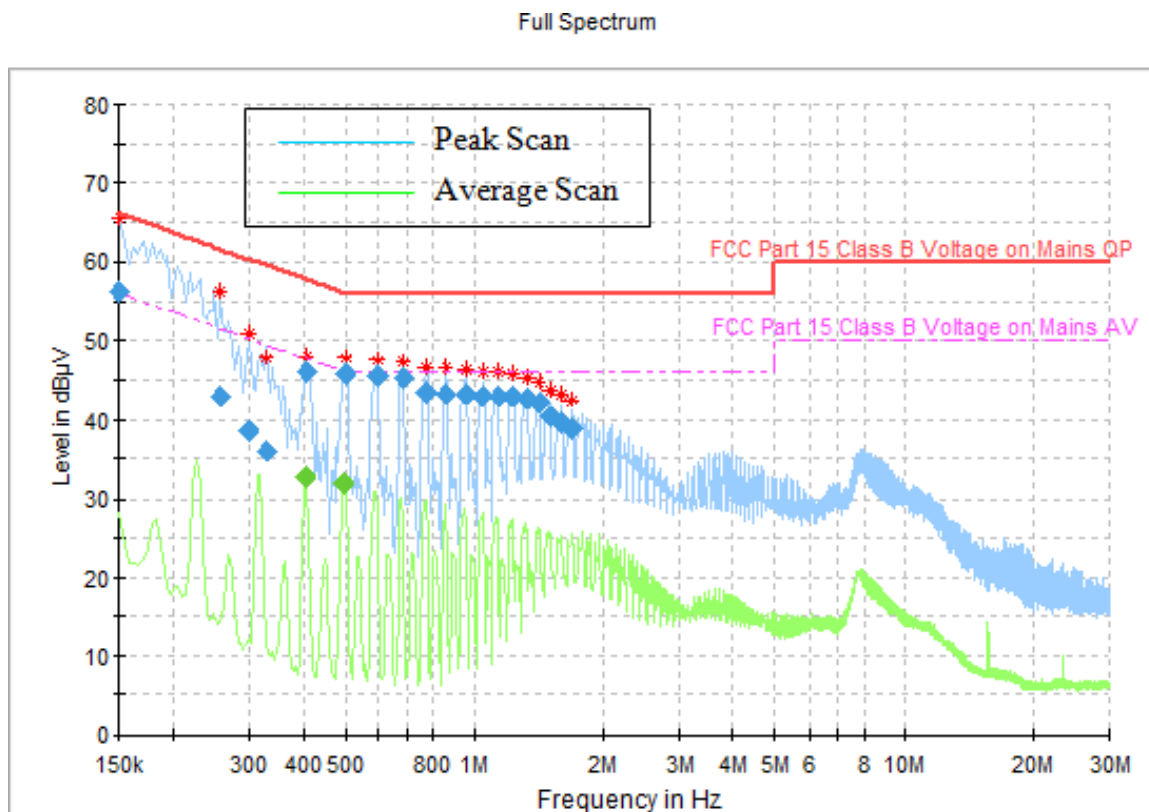
120 VAC , 60Hz

SUC

1) Charger Alone



2) Charger + Radio Off

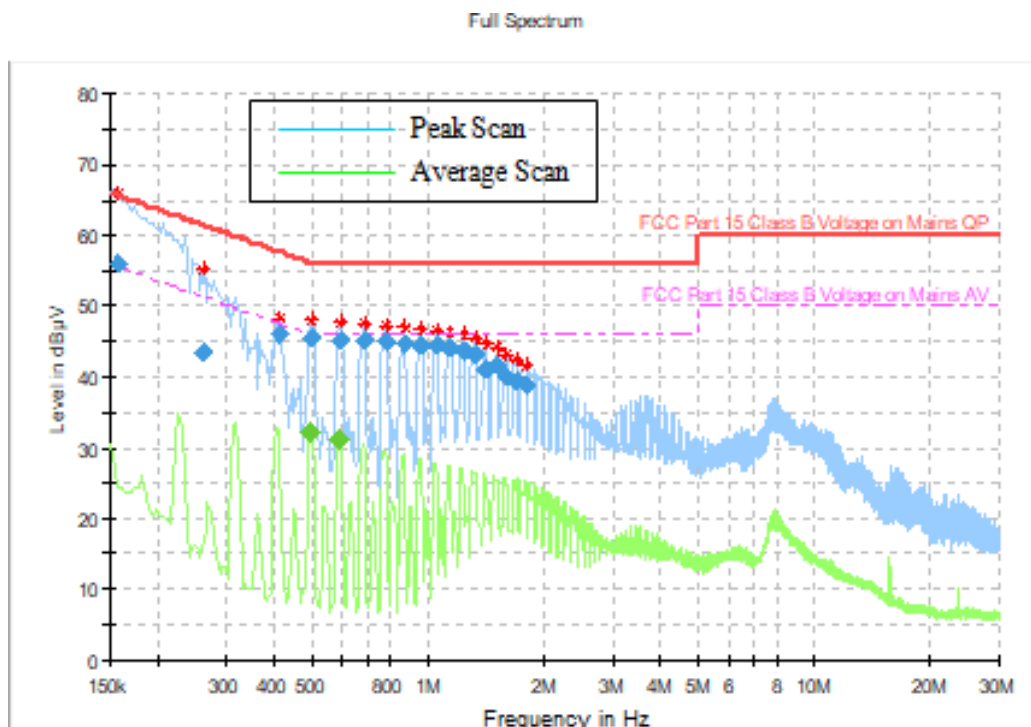


Quasipeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.150000	56.14	---	66.00	9.86	1000.0	9.000	L1	ON	10.3	Pass
0.258000	43.05	---	61.50	18.44	1000.0	9.000	N	ON	10.2	Pass
0.298000	38.62	---	60.30	21.68	1000.0	9.000	N	ON	10.2	Pass
0.330000	36.14	---	59.45	23.31	1000.0	9.000	N	ON	10.3	Pass
0.406000	---	32.81	47.73	14.92	1000.0	9.000	L1	ON	10.3	Pass
0.410000	45.90	---	57.65	11.74	1000.0	9.000	N	ON	10.3	Pass
0.498000	---	32.04	46.03	14.00	1000.0	9.000	L1	ON	10.3	Pass
0.502000	45.72	---	56.00	10.28	1000.0	9.000	N	ON	10.3	Pass
0.594000	45.40	---	56.00	10.60	1000.0	9.000	N	ON	10.3	Pass
0.686000	45.14	---	56.00	10.86	1000.0	9.000	N	ON	10.3	Pass
0.774000	43.51	---	56.00	12.49	1000.0	9.000	N	ON	10.3	Pass
0.866000	43.24	---	56.00	12.76	1000.0	9.000	N	ON	10.3	Pass
0.958000	43.12	---	56.00	12.88	1000.0	9.000	N	ON	10.3	Pass
1.050000	43.07	---	56.00	12.93	1000.0	9.000	N	ON	10.2	Pass
1.142000	43.06	---	56.00	12.94	1000.0	9.000	N	ON	10.2	Pass
1.234000	42.97	---	56.00	13.03	1000.0	9.000	N	ON	10.2	Pass
1.326000	42.69	---	56.00	13.31	1000.0	9.000	N	ON	10.2	Pass
1.418000	42.28	---	56.00	13.72	1000.0	9.000	N	ON	10.2	Pass
1.506000	40.29	---	56.00	15.71	1000.0	9.000	N	ON	10.2	Pass
1.598000	39.57	---	56.00	16.43	1000.0	9.000	N	ON	10.2	Pass
1.690000	38.94	---	56.00	17.06	1000.0	9.000	N	ON	10.2	Pass

* Expanded Uncertainty (U) = +/- 3.48dB

3) Charger + Radio Standby

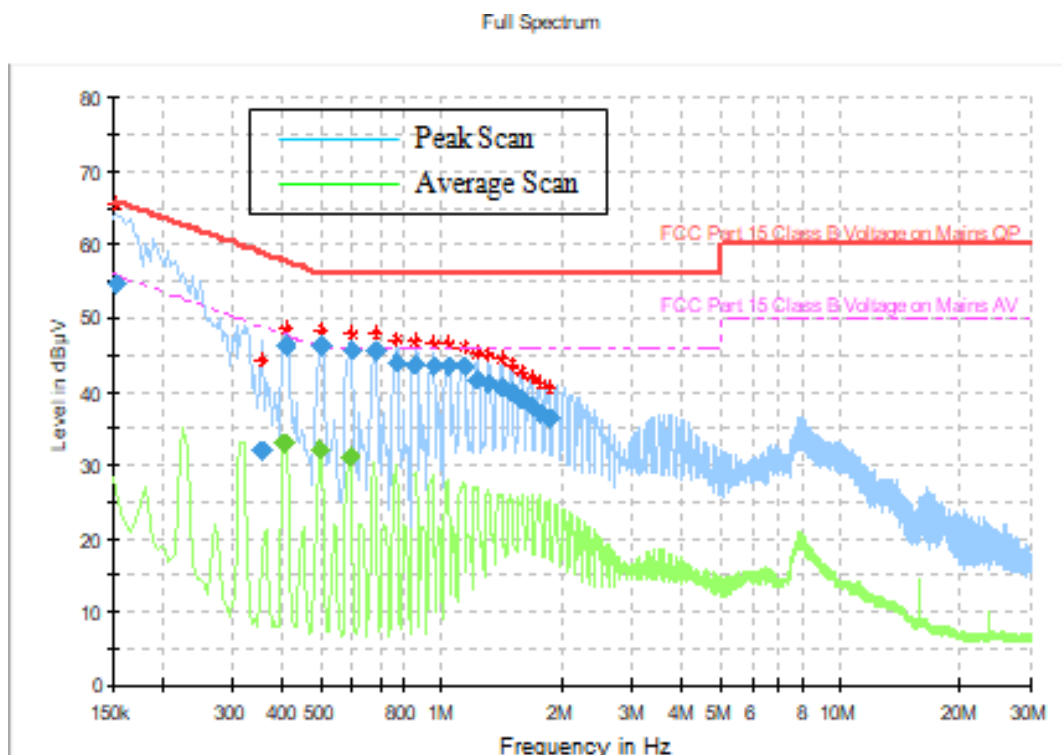


Quasipeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.158000	56.05	---	65.57	9.51	1000.0	9.000	L1	ON	10.5	Pass
0.262000	43.50	---	61.37	17.86	1000.0	9.000	L1	ON	10.2	Pass
0.414000	46.08	---	57.57	11.48	1000.0	9.000	N	ON	10.3	Pass
0.498000	---	32.13	46.03	13.90	1000.0	9.000	L1	ON	10.3	Pass
0.502000	45.59	---	56.00	10.41	1000.0	9.000	N	ON	10.3	Pass
0.590000	---	31.26	46.00	14.74	1000.0	9.000	L1	ON	10.3	Pass
0.594000	45.31	---	56.00	10.69	1000.0	9.000	N	ON	10.3	Pass
0.686000	45.17	---	56.00	10.83	1000.0	9.000	N	ON	10.3	Pass
0.778000	44.97	---	56.00	11.03	1000.0	9.000	N	ON	10.3	Pass
0.870000	44.73	---	56.00	11.27	1000.0	9.000	N	ON	10.3	Pass
0.962000	44.56	---	56.00	11.44	1000.0	9.000	N	ON	10.3	Pass
1.054000	44.36	---	56.00	11.64	1000.0	9.000	N	ON	10.2	Pass
1.146000	44.12	---	56.00	11.88	1000.0	9.000	N	ON	10.2	Pass
1.238000	43.74	---	56.00	12.26	1000.0	9.000	N	ON	10.2	Pass
1.330000	43.13	---	56.00	12.87	1000.0	9.000	N	ON	10.2	Pass
1.418000	41.23	---	56.00	14.77	1000.0	9.000	N	ON	10.2	Pass
1.514000	41.66	---	56.00	14.34	1000.0	9.000	N	ON	10.2	Pass
1.602000	40.05	---	56.00	15.95	1000.0	9.000	N	ON	10.2	Pass
1.694000	39.43	---	56.00	16.57	1000.0	9.000	N	ON	10.2	Pass
1.786000	38.75	---	56.00	17.25	1000.0	9.000	N	ON	10.2	Pass

* Expanded Uncertainty (U) = +/- 3.48dB

4) Charger + Radio TX with WiFi 2.4GHz 802.11b



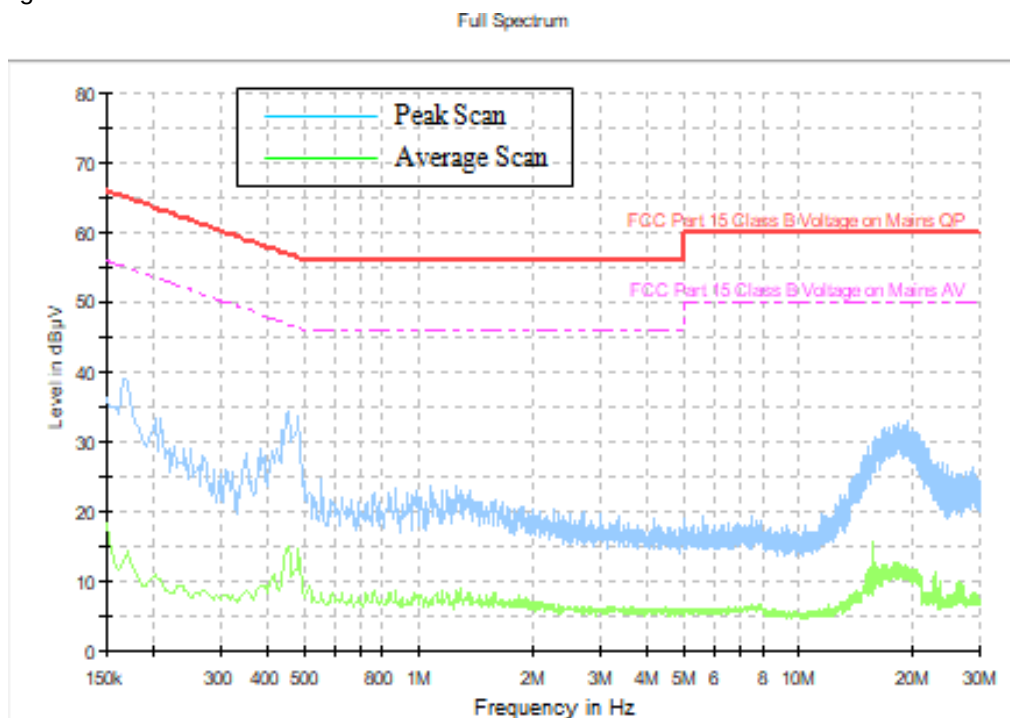
Quasipeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.154000	54.77	---	65.78	11.01	1000.0	9.000	L1	ON	10.4	Pass
0.354000	31.86	---	58.87	27.00	1000.0	9.000	L1	ON	10.3	Pass
0.406000	---	32.98	47.73	14.75	1000.0	9.000	L1	ON	10.3	Pass
0.410000	46.32	---	57.65	11.33	1000.0	9.000	N	ON	10.3	Pass
0.498000	---	32.14	46.03	13.89	1000.0	9.000	L1	ON	10.3	Pass
0.502000	46.16	---	56.00	9.84	1000.0	9.000	N	ON	10.3	Pass
0.590000	---	31.25	46.00	14.75	1000.0	9.000	L1	ON	10.3	Pass
0.594000	45.81	---	56.00	10.19	1000.0	9.000	N	ON	10.3	Pass
0.686000	45.55	---	56.00	10.46	1000.0	9.000	N	ON	10.3	Pass
0.774000	43.95	---	56.00	12.05	1000.0	9.000	N	ON	10.3	Pass
0.866000	43.66	---	56.00	12.34	1000.0	9.000	N	ON	10.3	Pass
0.958000	43.52	---	56.00	12.48	1000.0	9.000	N	ON	10.3	Pass
1.050000	43.50	---	56.00	12.50	1000.0	9.000	N	ON	10.2	Pass
1.142000	43.40	---	56.00	12.60	1000.0	9.000	N	ON	10.2	Pass
1.226000	41.71	---	56.00	14.29	1000.0	9.000	N	ON	10.2	Pass
1.318000	41.25	---	56.00	14.75	1000.0	9.000	N	ON	10.2	Pass
1.410000	40.66	---	56.00	15.34	1000.0	9.000	N	ON	10.2	Pass
1.502000	39.98	---	56.00	16.02	1000.0	9.000	N	ON	10.2	Pass
1.590000	38.81	---	56.00	17.19	1000.0	9.000	N	ON	10.2	Pass
1.682000	38.00	---	56.00	18.00	1000.0	9.000	N	ON	10.2	Pass
1.774000	37.18	---	56.00	18.82	1000.0	9.000	N	ON	10.2	Pass
1.866000	36.37	---	56.00	19.63	1000.0	9.000	N	ON	10.2	Pass

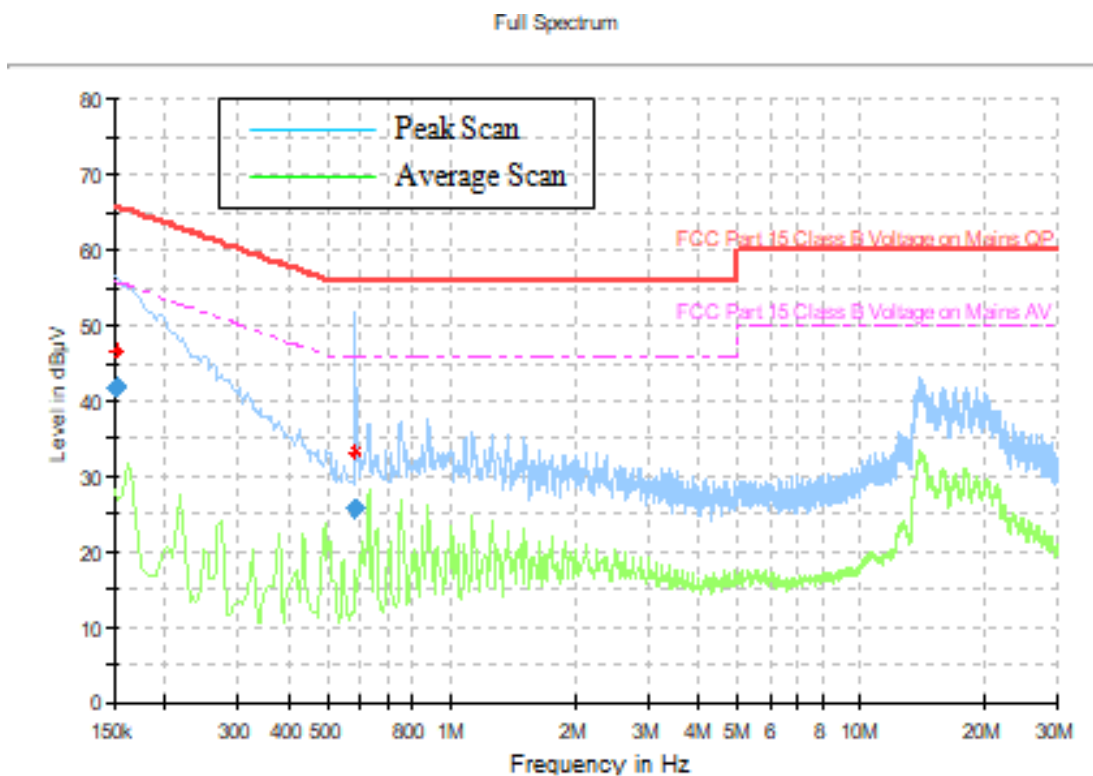
* Expanded Uncertainty (U) = +/- 3.48dB

MUC

5) Charger Alone



6) Charger + Radio Off

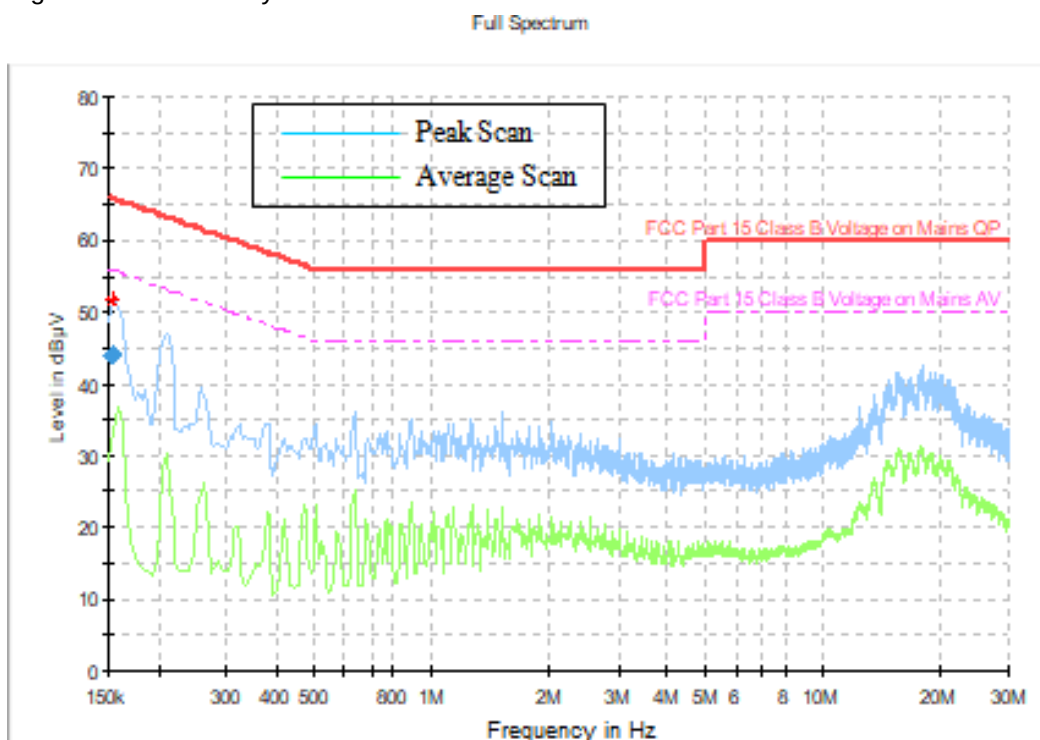


Quasipeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.154000	41.93	---	65.78	23.85	1000.0	9.000	L1	ON	10.4	Pass
0.586000	25.70	---	56.00	30.30	1000.0	9.000	N	ON	10.3	Pass

* Expanded Uncertainty (U) = +/- 3.48dB

7) Charger + Radio Standby

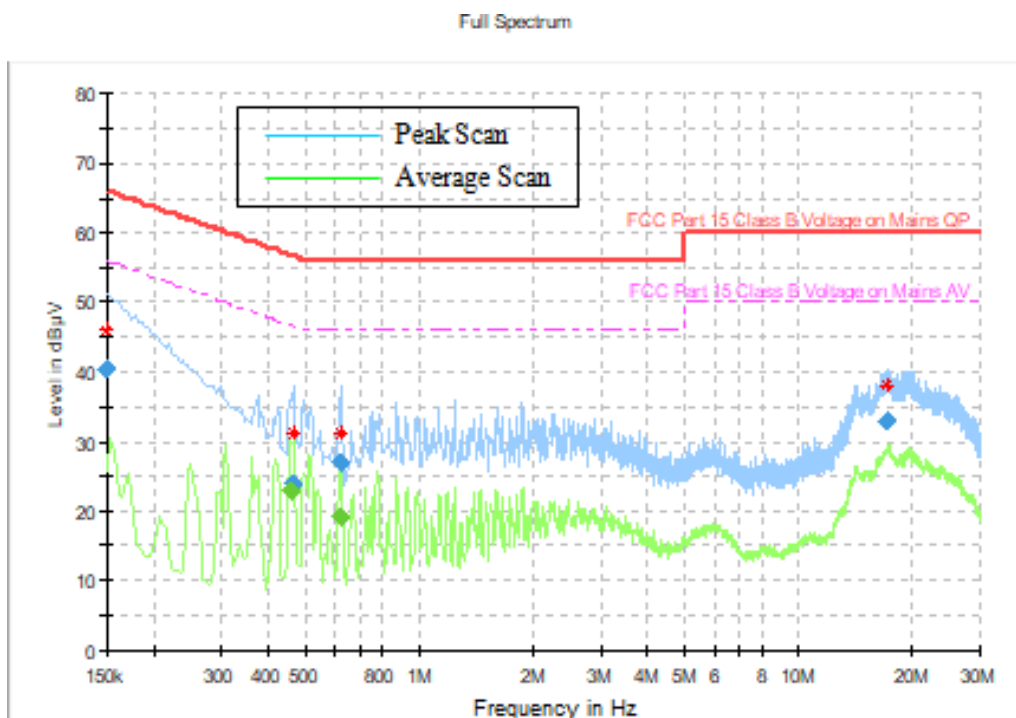


Quasipeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.154000	44.06	---	65.78	21.72	1000.0	9.000	L1	ON	10.4	Pass

* Expanded Uncertainty (U) = +/- 3.48dB

8) Charger + Radio TX with WiFi 2.4GHz 802.11b



Quasipeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.150000	40.46	---	66.00	25.54	1000.0	9.000	N	ON	10.3	Pass
0.462000	---	22.88	46.66	23.77	1000.0	9.000	L1	ON	10.3	Pass
0.466000	24.15	---	56.59	32.43	1000.0	9.000	N	ON	10.3	Pass
0.622000	27.03	---	56.00	28.97	1000.0	9.000	L1	ON	10.3	Pass
0.622000	---	19.05	46.00	26.95	1000.0	9.000	N	ON	10.3	Pass
17.078000	33.06	---	60.00	26.94	1000.0	9.000	L1	ON	10.4	Pass

* Expanded Uncertainty (U) = +/- 3.48dB

END OF TEST REPORT