

	    CERTIFICATE 2518.08 MS ISO/IEC 17025 TESTING SAMM NO. 0825
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-Feb-2022 - 01-Jun-2022 Report Issue Date : 01-Jun-2022 Manufacturer/Location : Motorola Solutions Malaysia Sdn Bhd Plot 2A, Medan Bayan Lepas, Mukim 12 SWD, 11900, Bayan Lepas, Penang, Malaysia Requestor : ISMAIL, ABDUL HAKIM Product Type : Hand-held Product Version (PMN) : APX N50 Model Number (HVIN) : H25UCF9PW6AN Frequency Band : 2.412-2.462 GHz Max RF Output Power : 802.11b - 126 mWatts 802.11g - 282 mWatts 802.11n - 282 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) : S27.50.08 The equipment was tested accordance to the requirement listed below: (2.4GHz Wifi) PASS 47CFR Part 15C ISED RSS 247 Issue 2	
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REVISION HISTORY

Revision History	Description	Date	Originator
Rev. A	Initial Report	28-Feb-2022	Gan Boon Teong
Rev. B	Update Conducted RF Output Power and Radiated Emission within restricted Bands data	01-Jun-2022	Gan Boon Teong

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	Integral Antenna

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
CABLE,PORT PROG,TEST AND ALIGN CABLE PSA	MOTOROLA	PMKN4231A
7/800 Whip Antenna (762-870MHz)	MOTOROLA	AN000411A01

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

Test configuration of EUT

All relevant configurations involving radio models and accessories (including chargers, batteries, antennas) were assessed. Only worst case configurations will be included in this report.

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: 13.4611 MHz(13M5G1D) 802.11g: 16.932 MHz(16M9D1D) 802.11n: 17.774 MHz(17M8D1D)	657TYB0678	Gan
15.247 (b)(3)	RSS-247 5.4(d)	Conducted RF Output Power (Peak)	Pass	Highest output power: 802.11b: 20.34 dBm (108.14 mW) 802.11g: 23.80 dBm(239.88 mW) 802.11n: 23.70 dBm(234.42 mW)	657TYB0678	Gan
15.247(e)	RSS-247 5.2(b)	Maximum Power Spectral Density	Pass	Meet the limit requirement.	657TYB0678	Gan
15.247(d)	RSS-247 5.5	Conducted Spurious Emissions	Pass	Worst case emission: -39.94 dBm	657TYB0678	Gan
15.247 (d)	RSS-247 5.5	Band edge Conducted Spurious Emission	Pass	Worst case emission: -31.61 dBm	657TYB0678	Gan
15.205, 15.209, 15.247 (d)	RSS-247 5.5	Radiated Emission within Restricted Bands	Pass	Worst case emission: RBE: 66.9393 dBuV/m (margin: 7.0607 dB)	657TYB0771	Qawiman&Nazrin
15.207	RSS-Gen 8.8	AC Power Line Conducted Emission	NA	Worst case emission: CE: 38.95 dBuV (margin: 8.94dB)	657TYB0771	Alif
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) (±)
AC Power Line Conducted Spurious Emission	150kHz ~ 30MHz	3.48 dB
Radiated Emissions up to 1 GHz (Field Strength)	30MHz ~ 1000MHz	5.88 dB
Radiated Emissions above 1 GHz (Field Strength)	1GHz ~ 18GHz	5.84 dB
	18GHz ~ 40GHz	6.02 dB
Conducted Spurious Emissions	9kHz ~ 12.75GHz	2.82 dB

4.0. Equipment List

Bluetooth ATE # 1 (SW Version: Ate Main_3.1.11)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
ANALYZER SPECTRUM	E4440A	US45303111	14-Jul-21	14-Jul-22
CHAMBER	SH-641	92003820	14-Jul-21	14-Jul-22
POWER SUPPLY	6652A	MY40001436	22-Nov-21	22-Nov-22
PULSE POWER METER	ML2495A	1845014	19-Jan-22	19-Jan-23
PULSE SENSOR	MA2411B	1726287	19-Jan-22	19-Jan-23
N to N RF Cable # 1	SF126/11N/11N	NA	NA	NA

Radiated Emission Station (SW Version: EMC FCC RE v1.6.4)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
DRG HORN FREQ.	SAS-571	720	06-Apr-21	06-Apr-23
DRG HORN FREQ.	SAS-571	719	13-Sep-21	13-Sep-22
POWER SUPPLY	N7977A	MY54420118	17-Aug-21	17-Aug-22
SIGNAL GENERATOR	SMB 100A	182511	4-Jun-21	4-Jun-24
EMI TEST RECEIVER	ESW44	101731	5-Nov-21	5-Nov-22
EMI TEST RECEIVER	ESW44	101731	5-Nov-21	5-Nov-22
5m SEMI-ANECHOIC CHAMBER	S800-HX	J2308	Not Required	Not Required
BILOG ANTENNA	CBL6112D	55546	06-Jun-21	06-Jun-22
BILOG ANTENNA	CBL6112D	30991	05-Oct-21	05-Oct-22
DATA LOGGER	SDL500	A.016785	24-Jun-21	24-Jun-22
SYSTEM CONTROLLER	SC104V	050806-1	Not Required	Not Required
TURNTABLE FLUSH MOUNT 2M	FM2011	NA	Not Required	Not Required
ANTENNA POSITIONING TOWER	TLT2	NA	Not Required	Not Required
BROAD-BAND HORN ANTENNA	BBHA9170	BBHA9170143	3-Aug-21	3-Aug-22
PREAMPLIFIER 18-40GHz	BBV9721	9721-007	Not Required	Not Required
PREAMPLIFIER	PAM-0118P	361	11-Sep-20	11-Sep-23
LOOP ANTENNA	6502	00208416	8-Oct-21	8-Oct-22

Radiated Emission Station (SW Version: EMC 32 V10.60.10)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
ETHERNET TEMPERATURE & HUMIDITY SENSOR TRANSMITTER	iTHX-SD	M21280391	20-Nov-21	20-Nov-22
V-NETWORK 2-LINE	ENV216V	101268	19-Aug-21	19Aug-22
EMI TEST RECEIVER	ESCI	10025	5-Feb-21	5-Apr-22
PROGRAMMABLE AC SOURCE	61604	ABR000000926	14-Jul-21	14-Jul-22

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	DBPSK	1	SISO	22.6°C, 69.3%RH
Test Mode	802.11g	1 to 11	1,6,11	OFDM	BPSK	6	SISO	22.6°C, 69.3%RH
Test Mode	802.11n (HT20)	1 to 11	1,6,11	OFDM	BPSK	6.5	SISO CDD (MIMO)	22.6°C, 69.3%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	DBPSK	1	SISO	22.6°C, 69.3%RH
Test Mode	802.11g	1 to 11	1,6,11	OFDM	BPSK	6	SISO	22.6°C, 69.3%RH
Test Mode	802.11n (HT20)	1 to 11	1,6,11	OFDM	BPSK	6.5	SISO CDD (MIMO)	22.6°C, 69.3%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	18.5°C, 66.4%RH

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	DBPSK	1	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

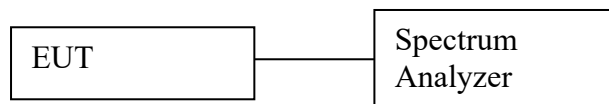
Duty Cycle of Test Signal

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.

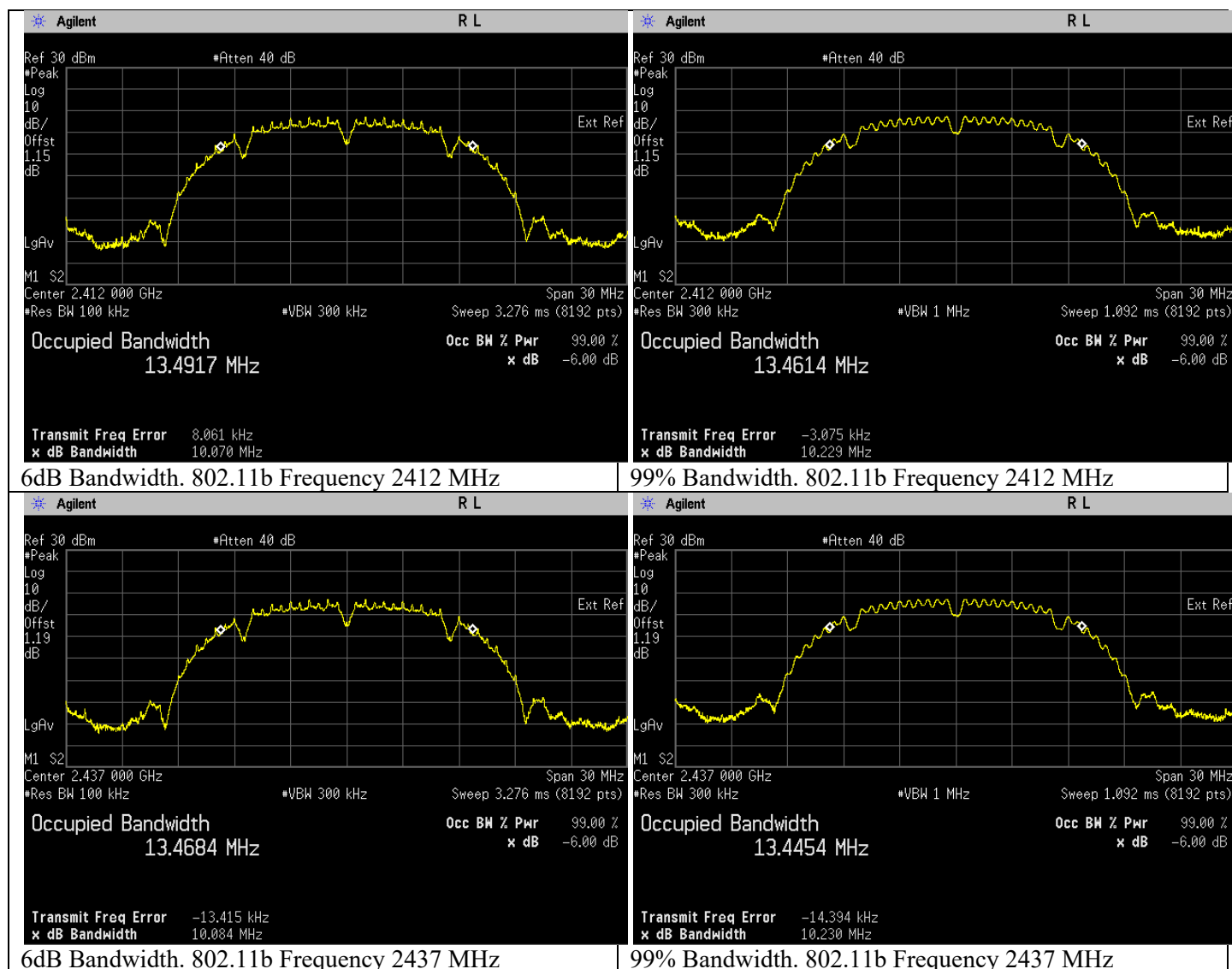
6.1.2. Test Limits:

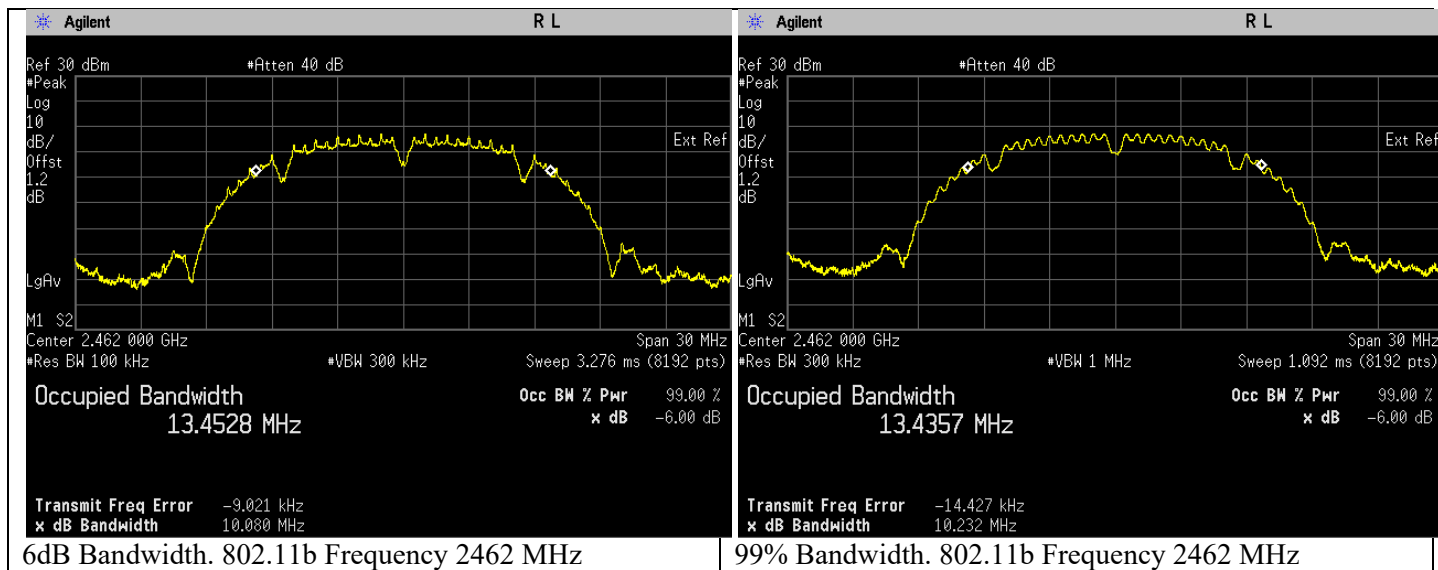
Normal Condition (25 ° C)
≥ 500 kHz

6.1.3. Test Data:

802.11 b

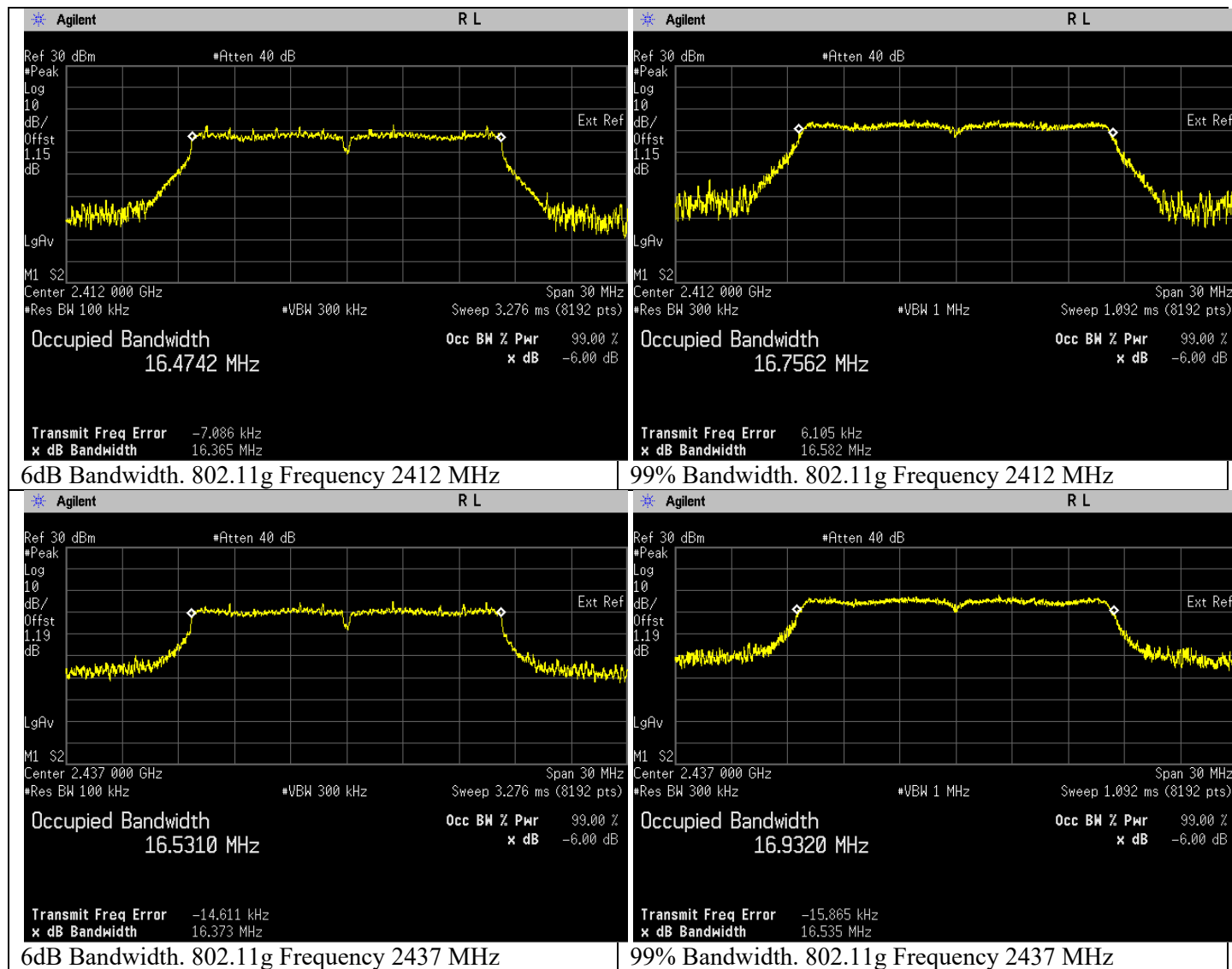
Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Status
802.11b	DSSS	DBPSK	1	2412	10.070	13.461	Pass
802.11b	DSSS	DBPSK	1	2437	10.084	13.445	Pass
802.11b	DSSS	DBPSK	1	2462	10.080	13.436	Pass

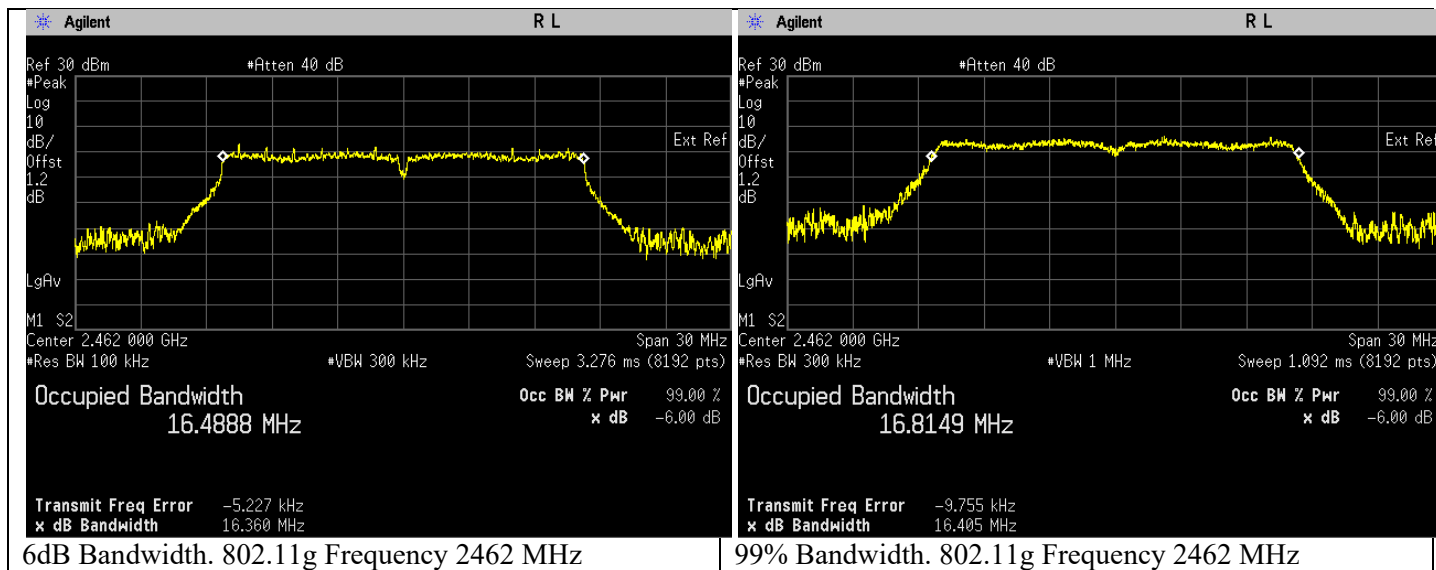




802.11g

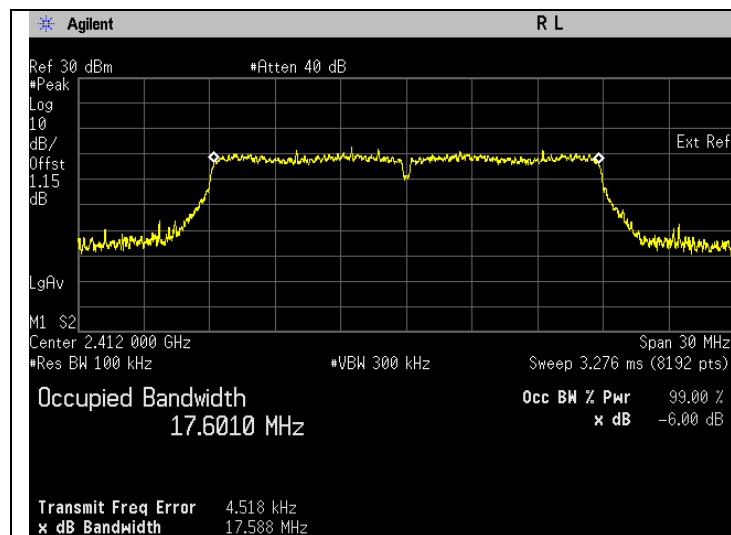
Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Status
802.11g	OFDM	BPSK	6	2412	16.365	16.756	Pass
802.11g	OFDM	BPSK	6	2437	16.373	16.932	Pass
802.11g	OFDM	BPSK	6	2462	16.360	16.815	Pass



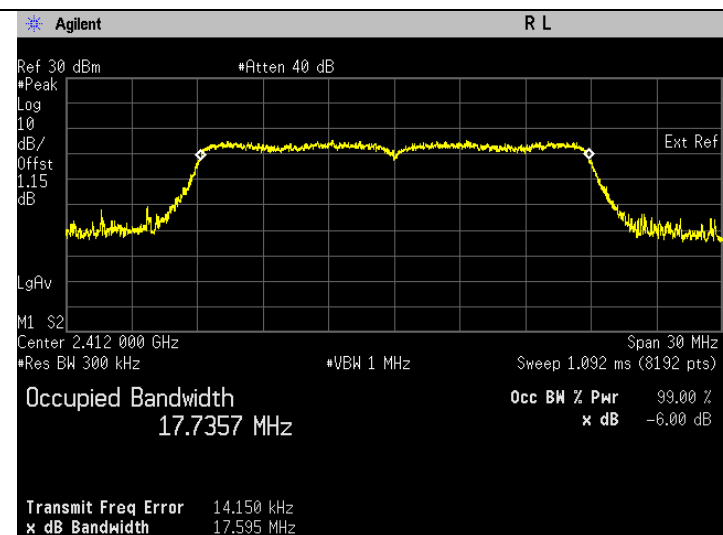


802.11n (HT20)

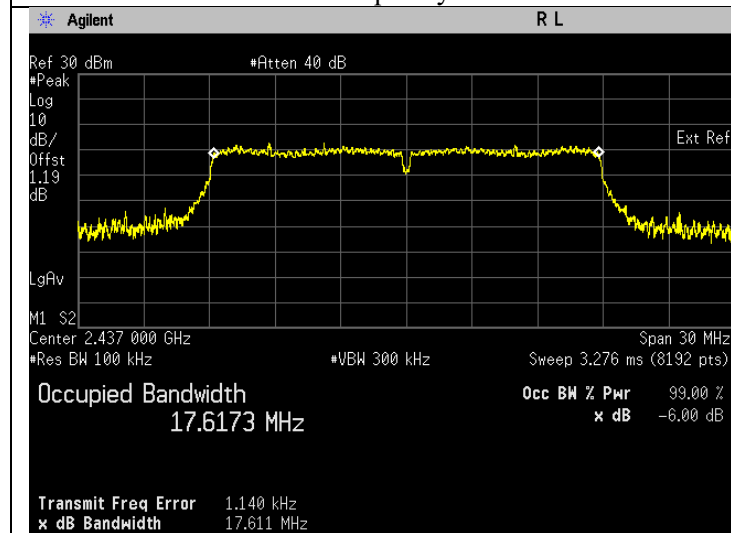
Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Status
802.11n	OFDM	DBPSK	6.5	2412	17.588	17.736	Pass
802.11n	OFDM	DBPSK	6.5	2437	17.611	17.774	Pass
802.11n	OFDM	DBPSK	6.5	2462	17.580	17.730	Pass



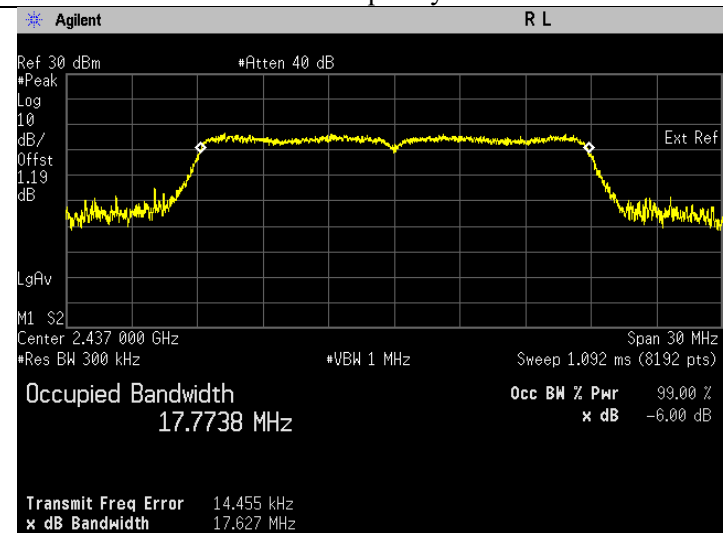
6dB Bandwidth. 802.11n Frequency 2412 MHz



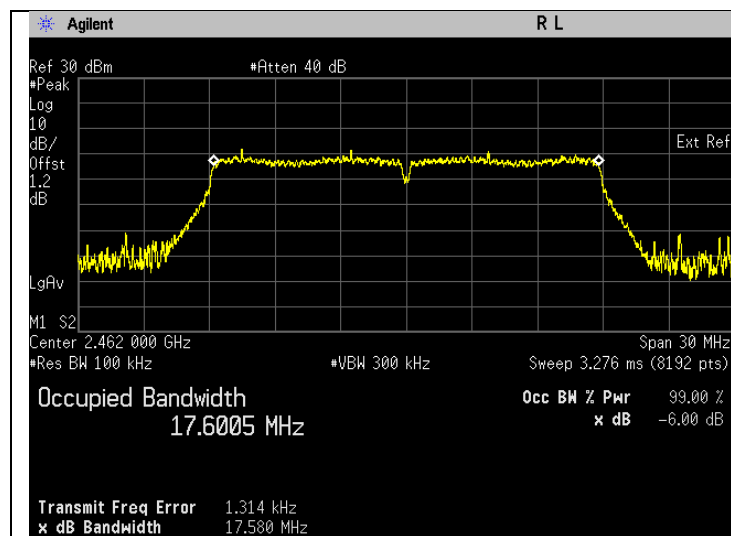
99% Bandwidth. 802.11n Frequency 2412 MHz



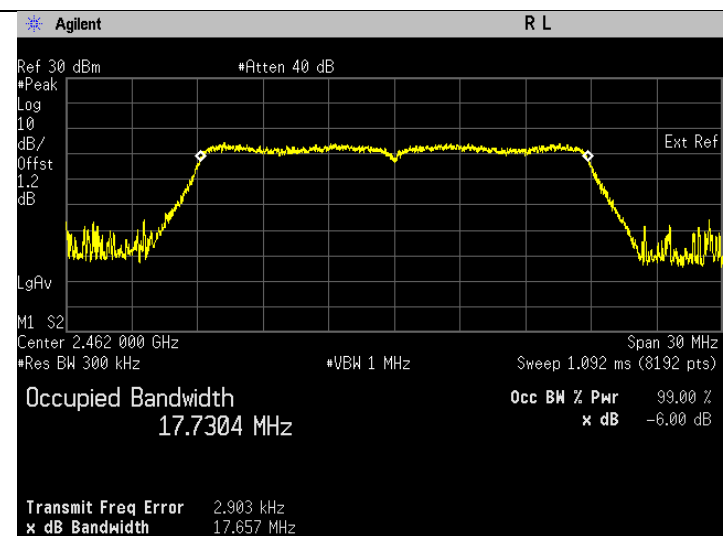
6dB Bandwidth. 802.11n Frequency 2437 MHz



99% Bandwidth. 802.11n Frequency 2437 MHz



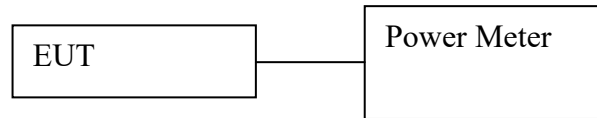
6dB Bandwidth. 802.11n Frequency 2462 MHz



99% Bandwidth. 802.11n Frequency 2462 MHz

6.2. Conducted RF Output Power

6.2.1. Test Setup



Peak

1. Set the following settings on the power meter:
 - Preset -> reset
 - Cal/Zero -> Zero & Cal
 - Preset -> 802.11g
 - Sensor -> Cal Factor -> Enter freq
 - Channel -> Trigger -> Trigger Source -> Internal, Rising Edge
 - Channel -> Trigger -> More -> Arming -> Automatic
 - Channel -> Averaging -> Averaging
 - Sensor -> offset -> fixed to couple for losses from ancillaries
 - Record peak/avg and crest data
2. Key up DUT
3. Restart averaging and read data once the numbers stabilize.
4. Record power by reading peak/avg and crest data
5. 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:

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	20.34	Pass
802.11b	DSSS	DBPSK	1	2437	20.27	Pass
802.11b	DSSS	DBPSK	1	2462	20.06	Pass

802.11g

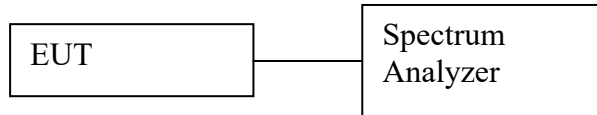
Test Conditions				Test Frequency	Results	
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Output Power (dBm)	Status
802.11g	OFDM	BPSK	6	2412	23.31	Pass
802.11g	OFDM	BPSK	6	2437	23.70	Pass
802.11g	OFDM	BPSK	6	2462	23.80	Pass

802.11n (HT20)

Test Conditions				Test Frequency	Results	
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Output Power (dBm)	Status
802.11n	OFDM	DBPSK	6.5	2412	23.31	Pass
802.11n	OFDM	DBPSK	6.5	2437	23.70	Pass
802.11n	OFDM	DBPSK	6.5	2462	23.46	Pass

6.3.Duty Cycle of the test signal

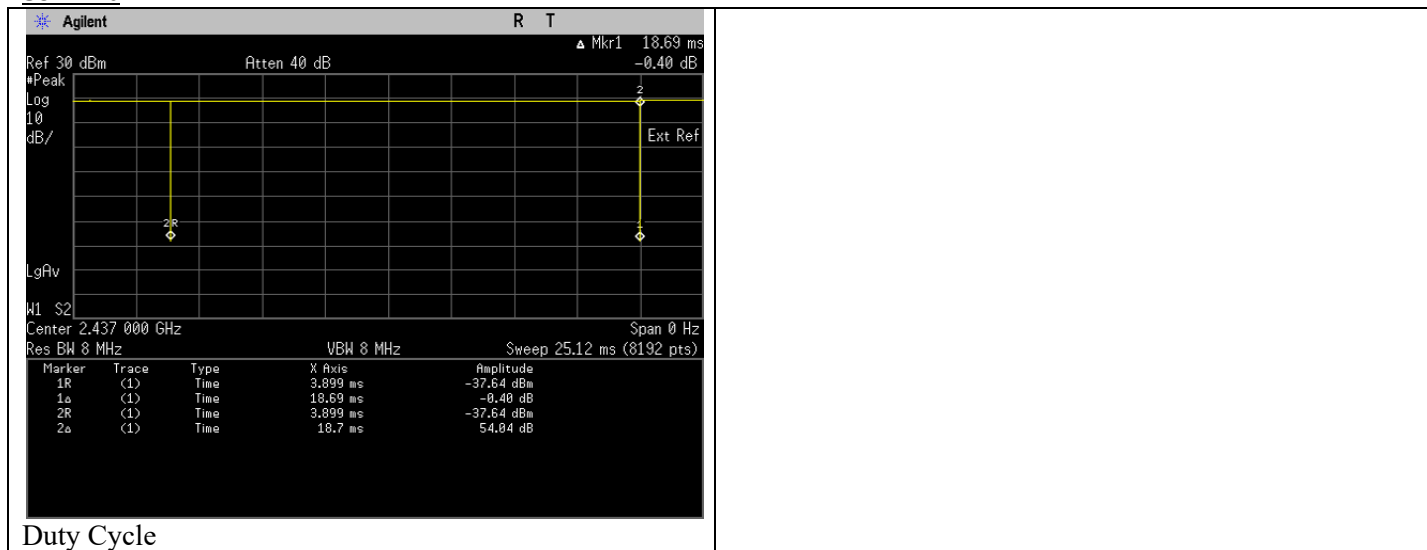
6.3.1. Test Setup



- 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

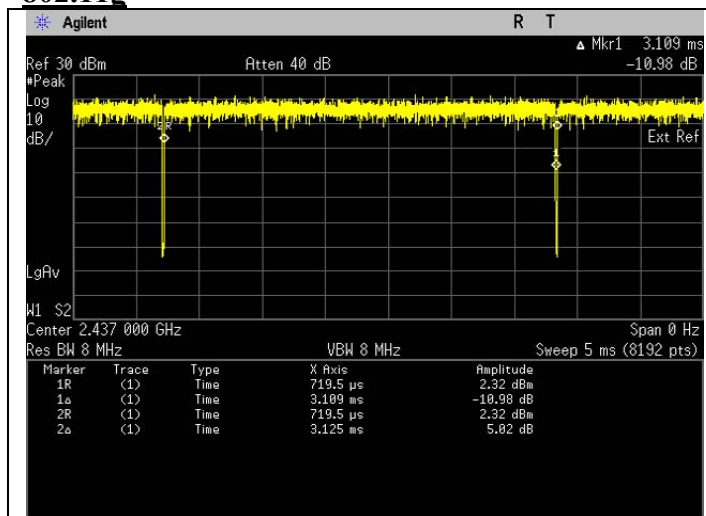


On time (ms)	18.69
On + Off Time (ms)	18.7
Duty cycle	0.9995
Duty Cycle factor	0.002

*Duty cycle = On time/ On +off time

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

802.11g



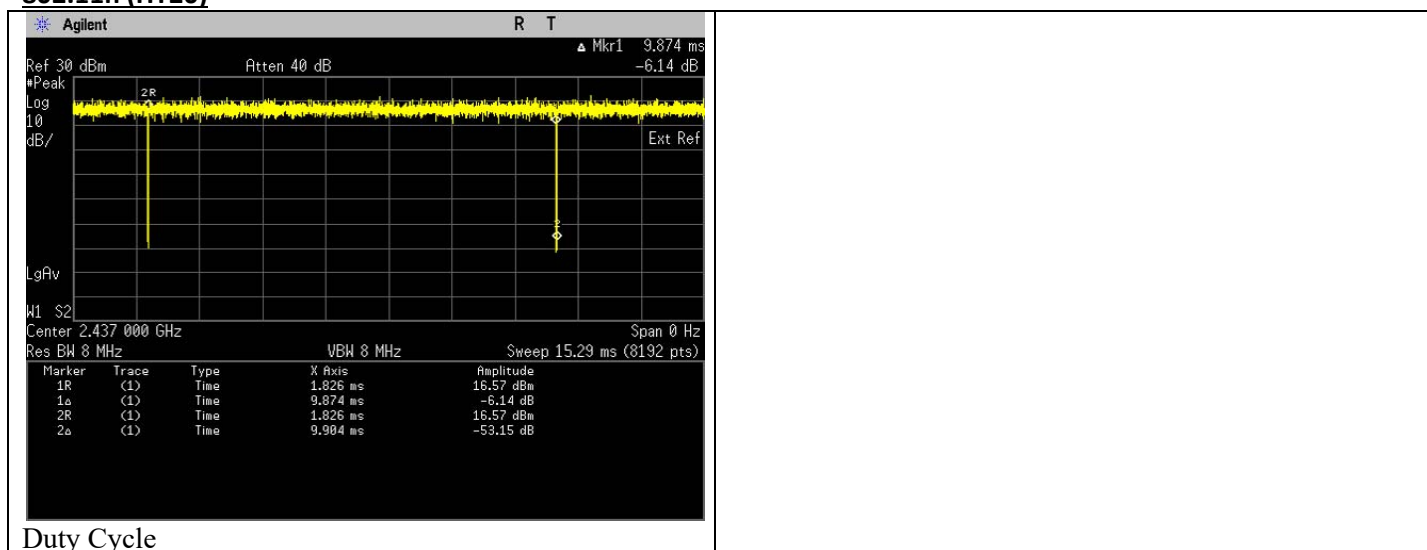
Duty Cycle

On time (ms)	3.109
On + Off Time (ms)	3.125
Duty cycle	0.9949
Duty Cycle factor	0.022

*Duty cycle = On time/ On +off time

*Duty Cycle factor = $10 \cdot \log(1/\text{Duty Cycle})$

802.11n (HT20)



Duty Cycle

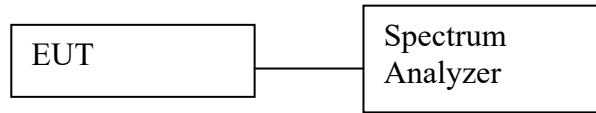
On time (ms)	9.874
On + Off Time (ms)	9.904
Duty cycle	0.9970
Duty Cycle factor	0.013

*Duty cycle = On time/ On +off time

*Duty Cycle factor = $10 \cdot \log(1/\text{Duty Cycle})$

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.

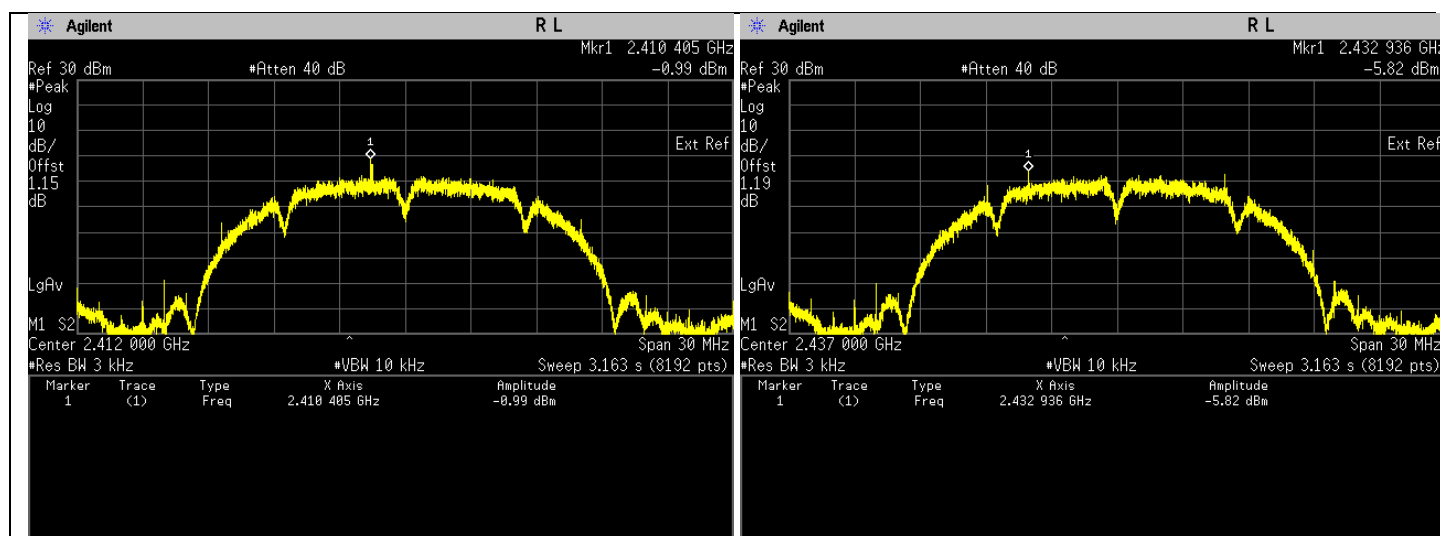
6.4.2. Test Limits

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

6.4.3. Test Result

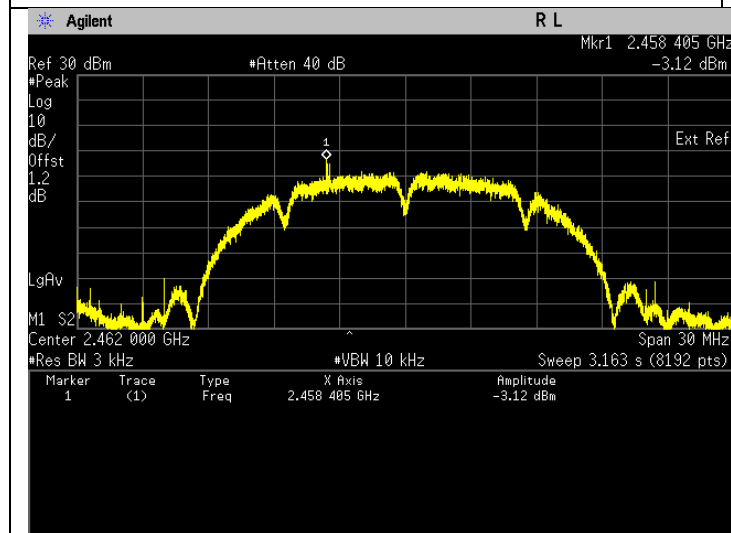
802.11b

Test Conditions				Test Frequency	Results	
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Power (dBm/3kHz)	Status
802.11b	DSSS	DBPSK	1	2412	-0.98	Pass
802.11b	DSSS	DBPSK	1	2437	-5.82	Pass
802.11b	DSSS	DBPSK	1	2462	-3.12	Pass



Maximum Power Spectral Density. 802.11b Frequency 2412 MHz

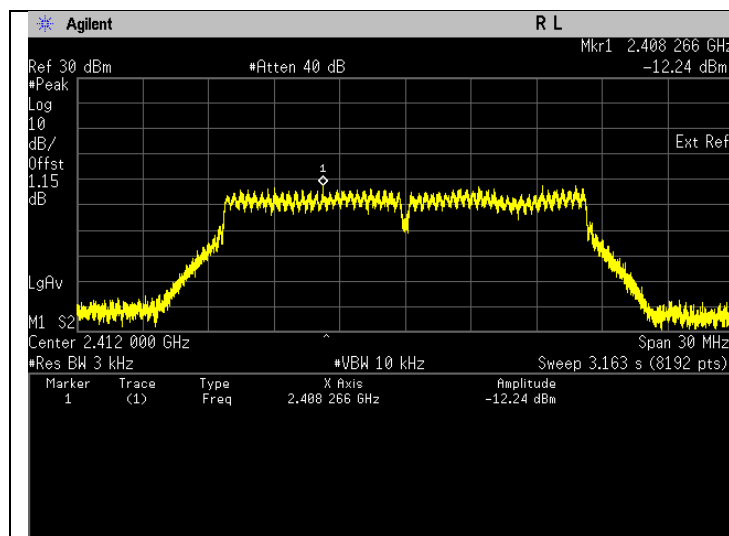
Maximum Power Spectral Density. 802.11b Frequency 2437 MHz



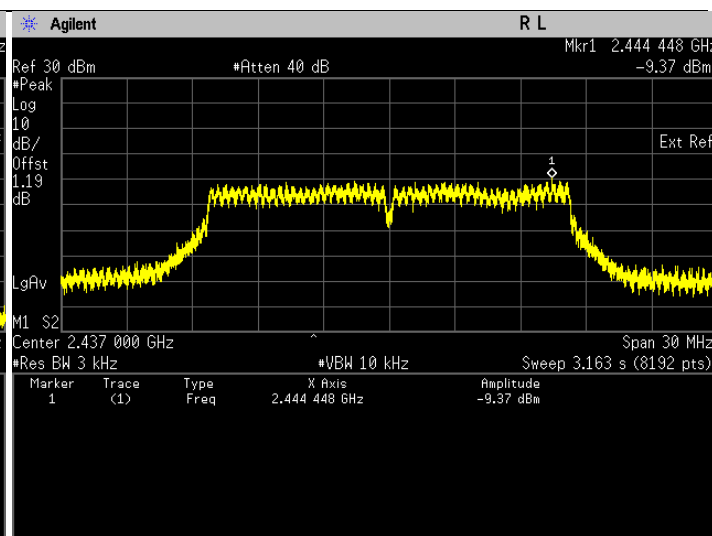
Maximum Power Spectral Density. 802.11b Frequency 2462 MHz

802.11g

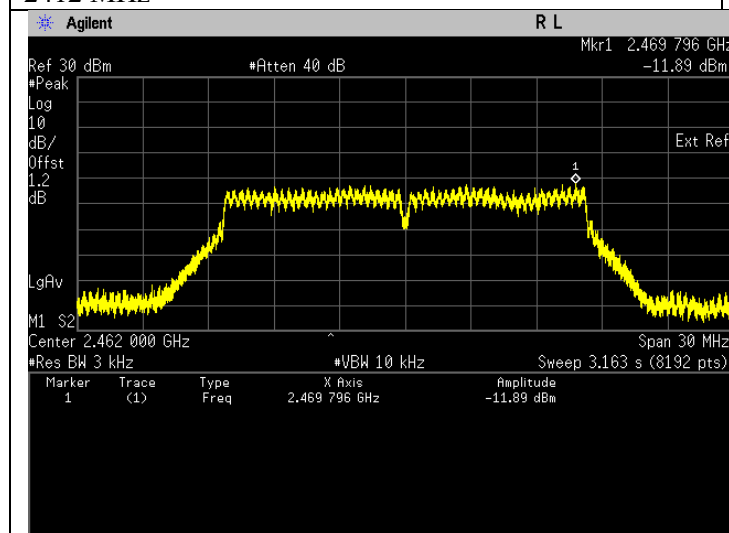
Test Conditions				Test Frequency	Results	
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Power (dBm/3kHz)	Status
802.11g	OFDM	BPSK	6	2412	-12.24	Pass
802.11g	OFDM	BPSK	6	2437	-9.37	Pass
802.11g	OFDM	BPSK	6	2462	-11.89	Pass



Maximum Power Spectral Density. 802.11g Frequency 2412 MHz



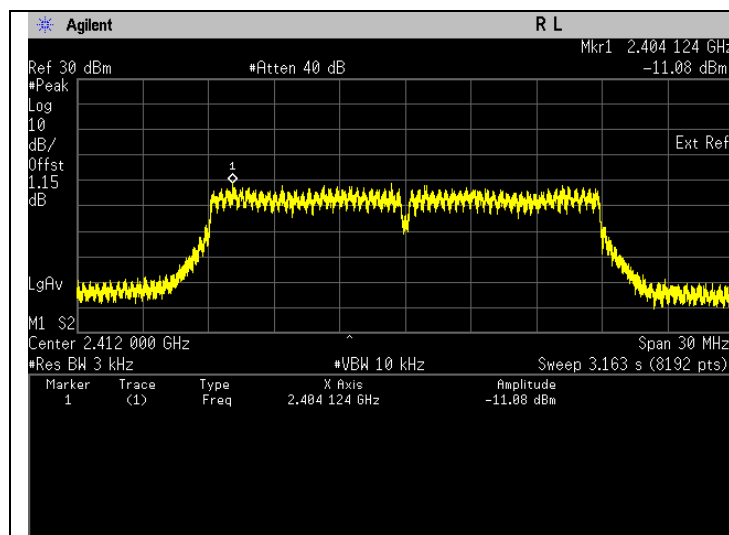
Maximum Power Spectral Density. 802.11g Frequency 2437 MHz



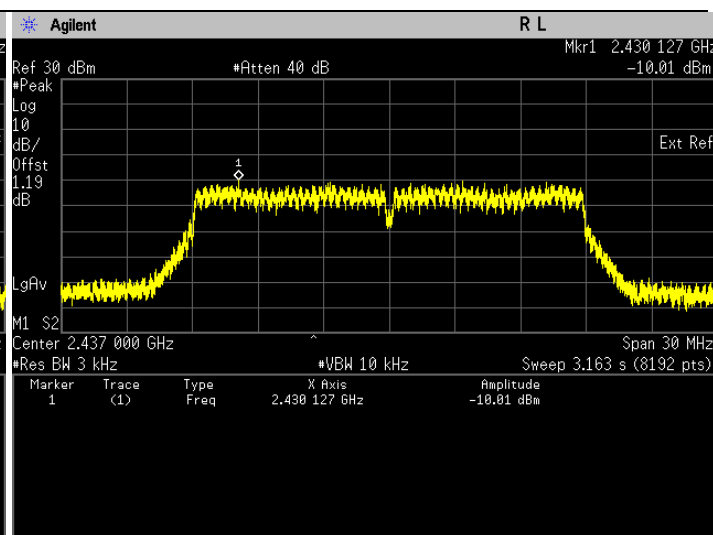
Maximum Power Spectral Density. 802.11g Frequency 2462 MHz

802.11n (HT20)

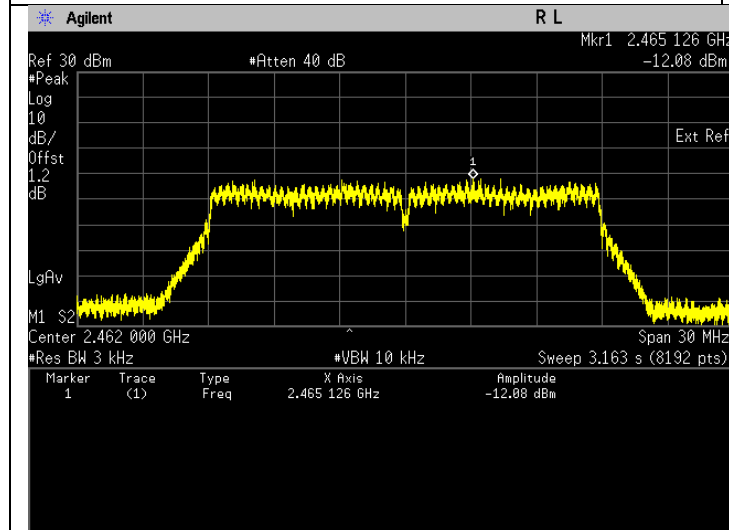
Test Conditions				Test Frequency	Results	
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Power (dBm/3kHz)	Status
802.11n	OFDM	DBPSK	6.5	2412	-11.08	Pass
802.11n	OFDM	DBPSK	6.5	2437	-10.01	Pass
802.11n	OFDM	DBPSK	6.5	2462	-12.08	Pass



Maximum Power Spectral Density. 802.11n Frequency 2412 MHz



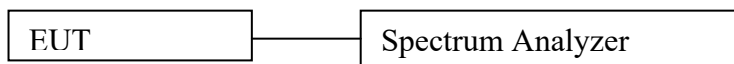
Maximum Power Spectral Density. 802.11n Frequency 2437 MHz



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.

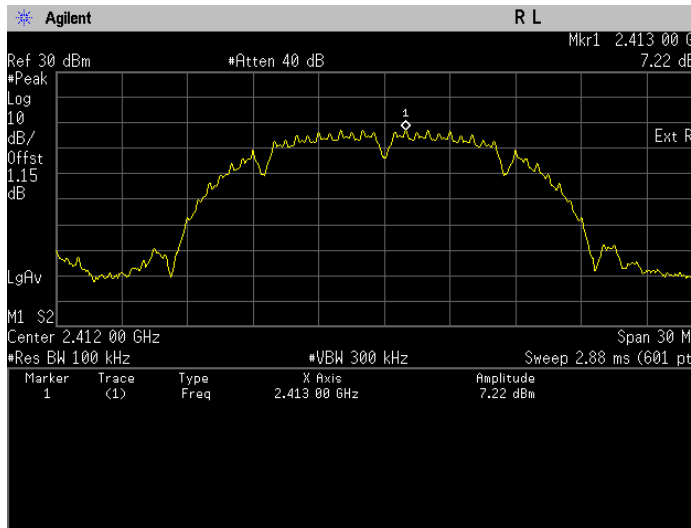
6.5.2. Test Limits:

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

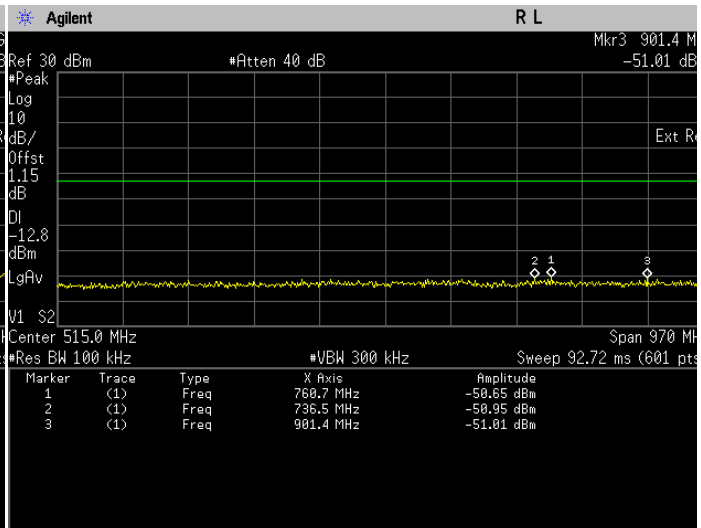
6.5.3. Test Result

802.11b

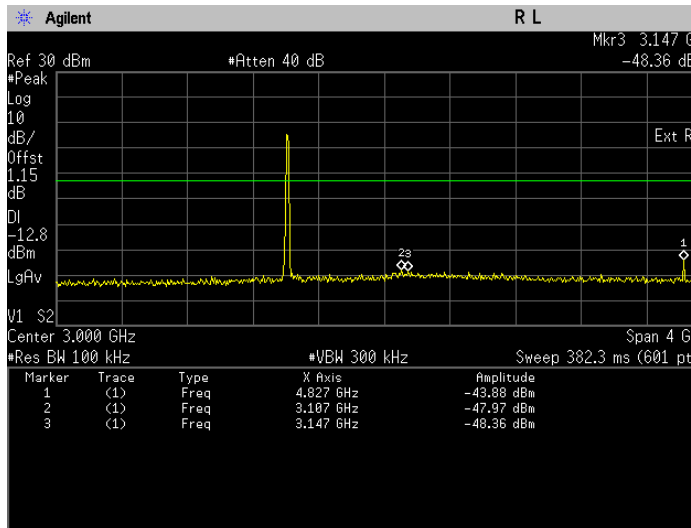
Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Spurs (MHz)	Level (dBm)	Status
802.11b	DSSS	DBPSK	1	2412	24200.00	-41.04	Pass
					24808.00	-41.32	Pass
					24508.00	-41.50	Pass
802.11b	DSSS	DBPSK	1	2437	24908.00	-39.94	Pass
					24933.00	-41.02	Pass
					24208.00	-41.14	Pass
802.11b	DSSS	DBPSK	1	2462	24875.00	-40.33	Pass
					24208.00	-40.41	Pass
					24617.00	-41.00	Pass



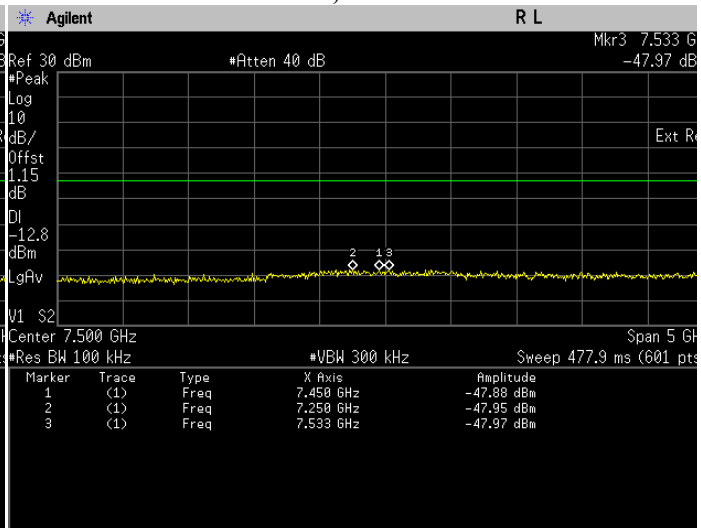
Conducted Emissions(Peak). 802.11b, Frequency 2412 MHz Reference Level



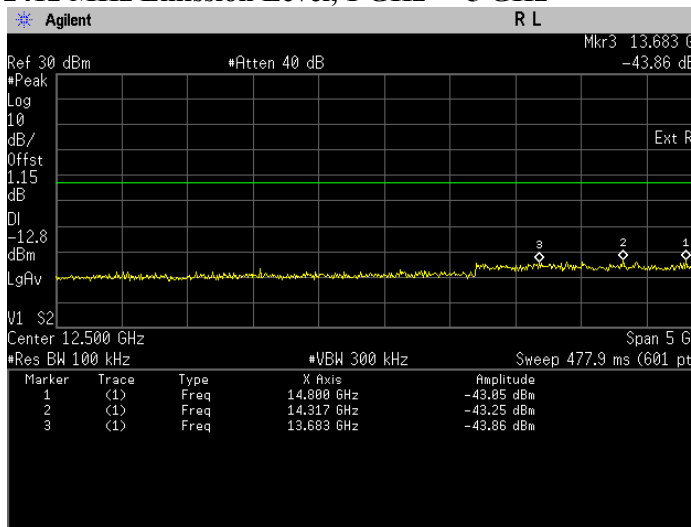
Conducted Emissions(Peak). 802.11b, Frequency 2412 MHz Emission Level, 30 MHz -> 1 GHz



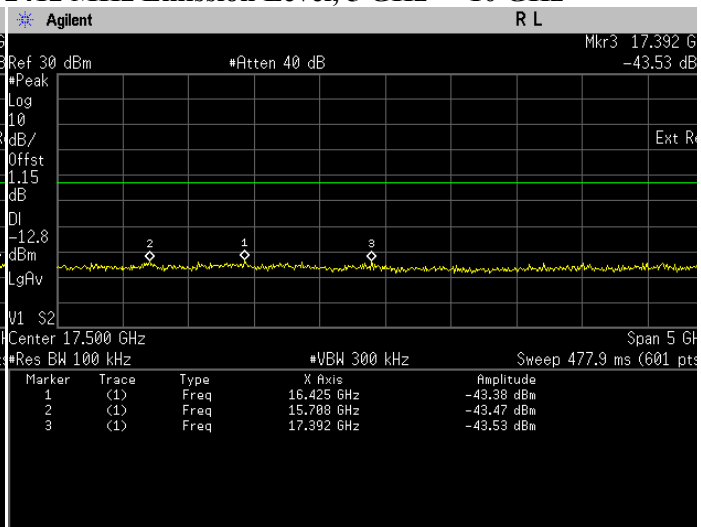
Conducted Emissions(Peak). 802.11b, Frequency 2412 MHz Emission Level, 1 GHz -> 5 GHz



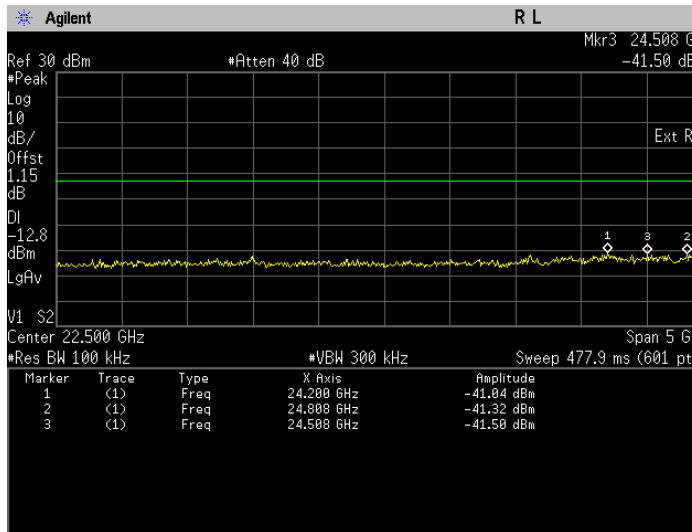
Conducted Emissions(Peak). 802.11b, Frequency 2412 MHz Emission Level, 5 GHz -> 10 GHz



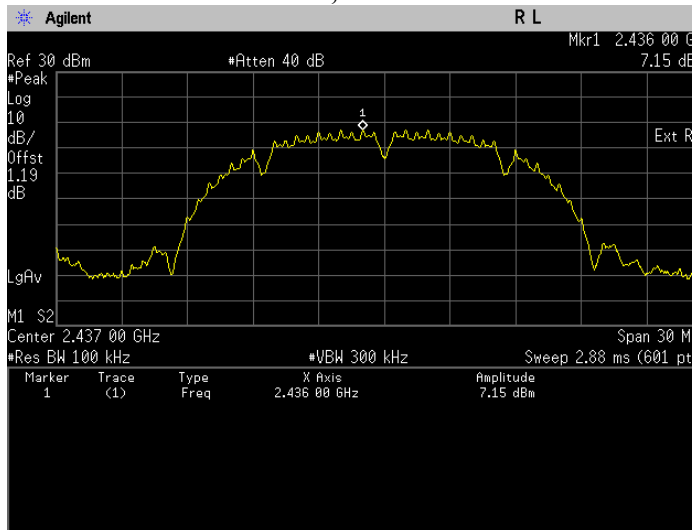
Conducted Emissions(Peak). 802.11b, Frequency 2412 MHz Emission Level, 10 GHz -> 15 GHz



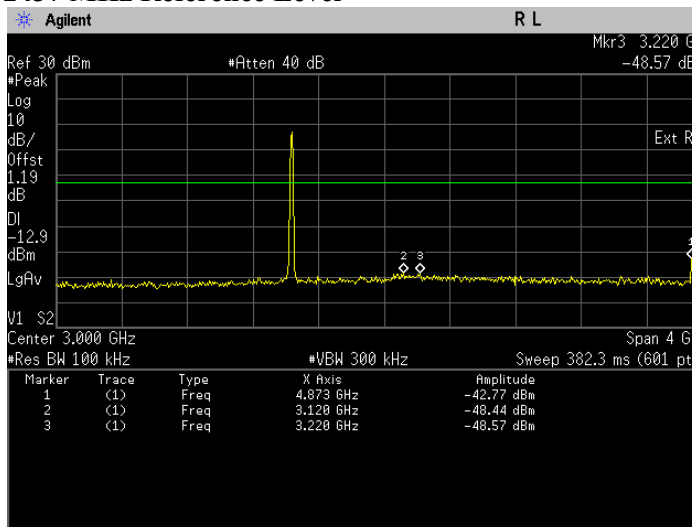
Conducted Emissions(Peak). 802.11b, Frequency 2412 MHz Emission Level, 15 GHz -> 20 GHz



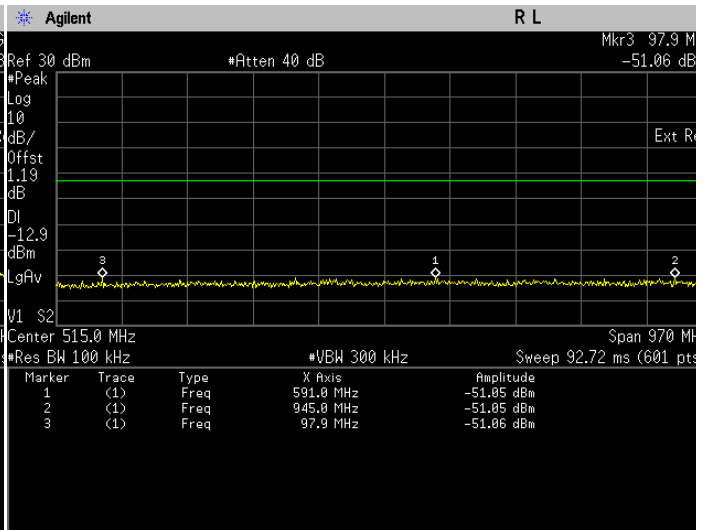
Conducted Emissions(Peak). 802.11b, Frequency 2412 MHz Emission Level, 20 GHz -> 25 GHz



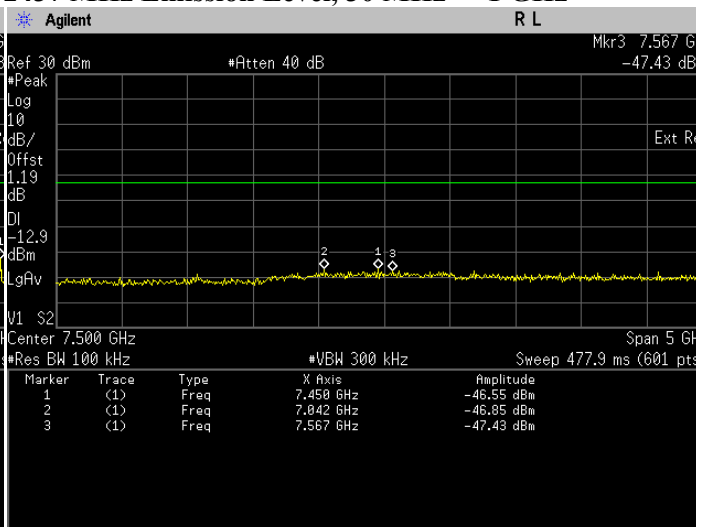
Conducted Emissions(Peak). 802.11b, Frequency 2437 MHz Reference Level



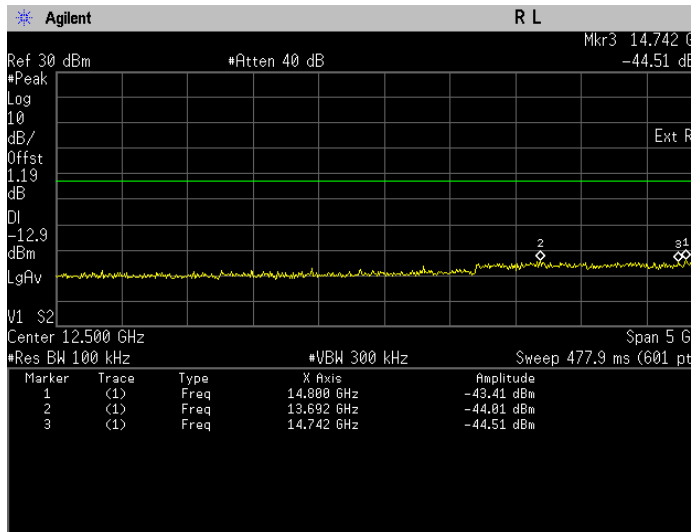
Conducted Emissions(Peak). 802.11b, Frequency 2437 MHz Emission Level, 1 GHz -> 5 GHz



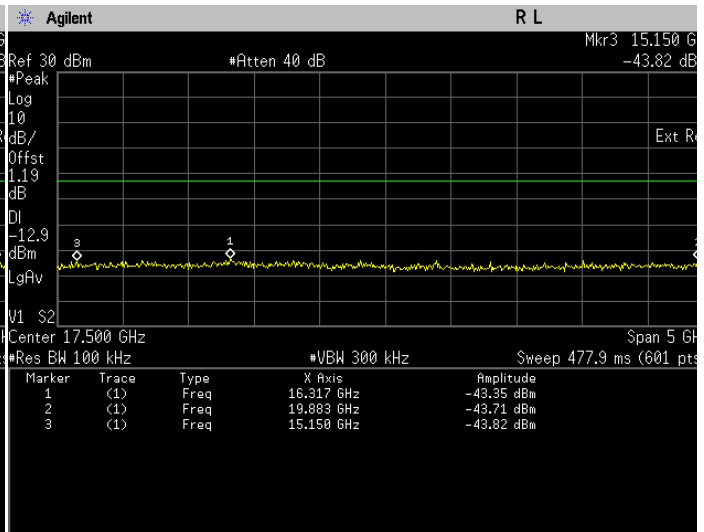
Conducted Emissions(Peak). 802.11b, Frequency 2437 MHz Emission Level, 30 MHz -> 1 GHz



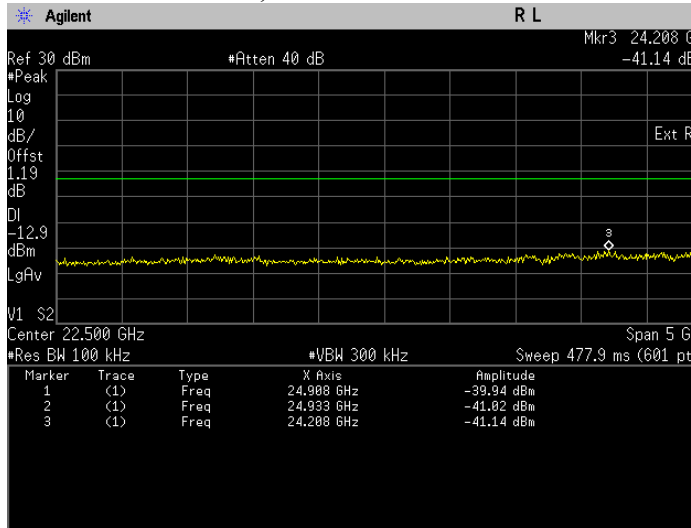
Conducted Emissions(Peak). 802.11b, Frequency 2437 MHz Emission Level, 5 GHz -> 10 GHz



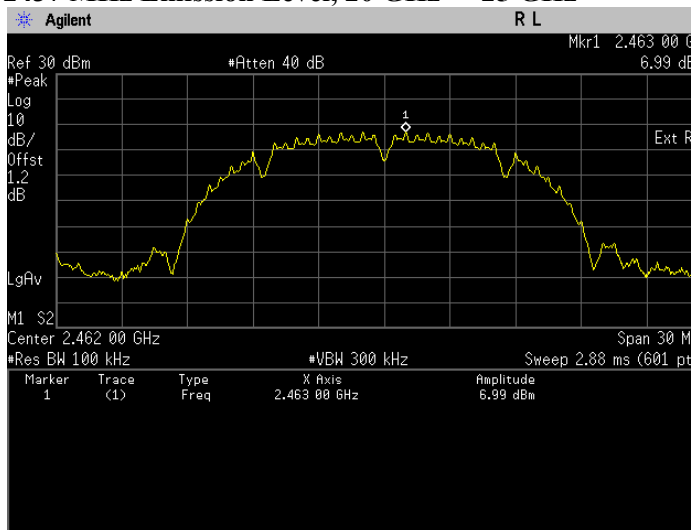
Conducted Emissions(Peak). 802.11b, Frequency 2437 Emission Level, 10 GHz -> 15 GHz



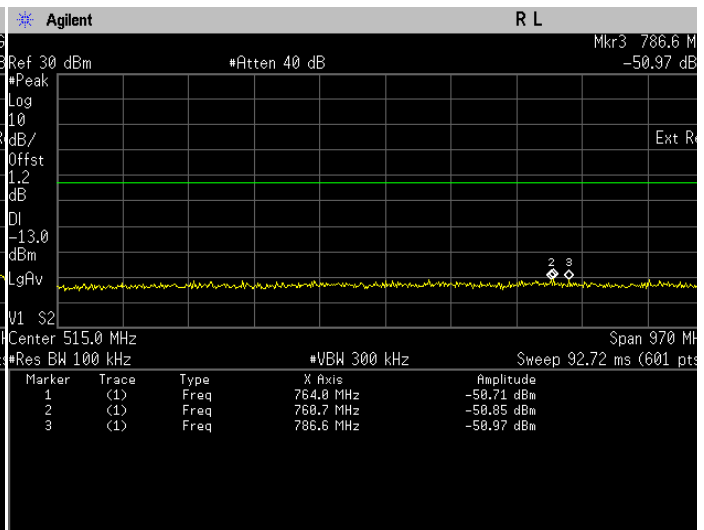
Conducted Emissions(Peak). 802.11b, Frequency 2437 MHz Emission Level, 15 GHz -> 20 GHz



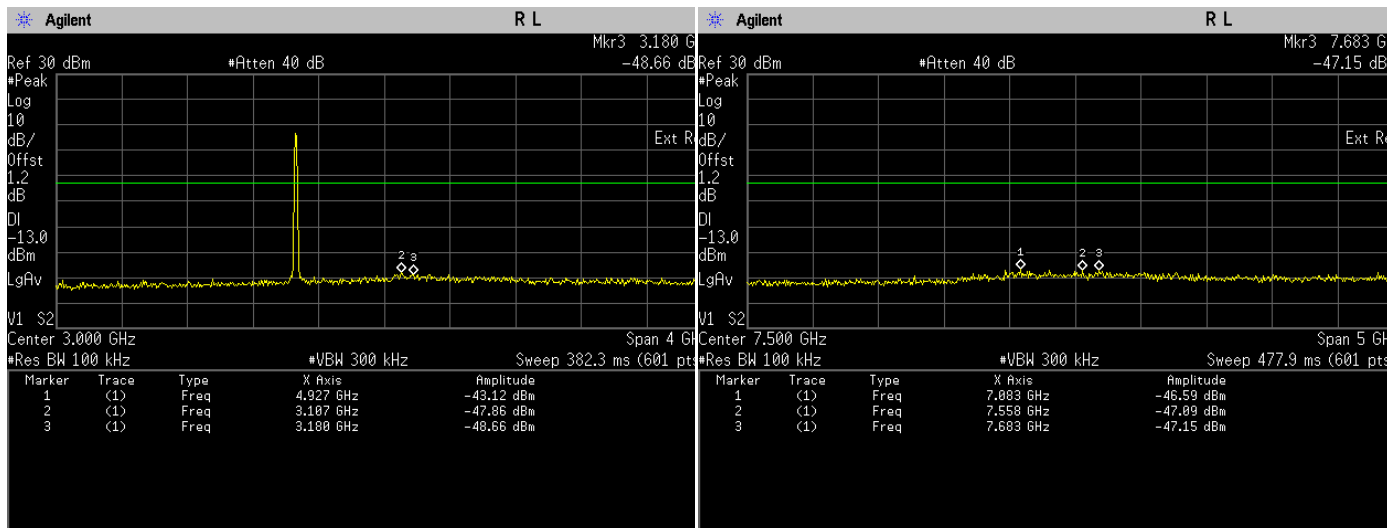
Conducted Emissions(Peak). 802.11b, Frequency 2437 MHz Emission Level, 20 GHz -> 25 GHz



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

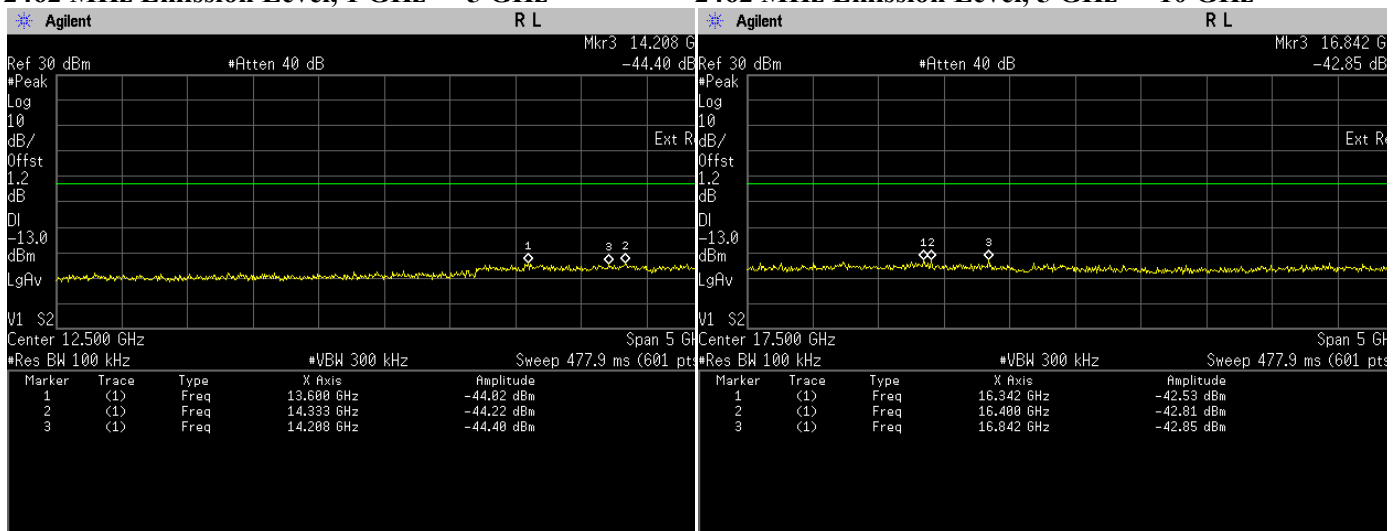


Conducted Emissions(Peak). 802.11b, Frequency 2462 MHz Emission Level, 30 MHz -> 1 GHz



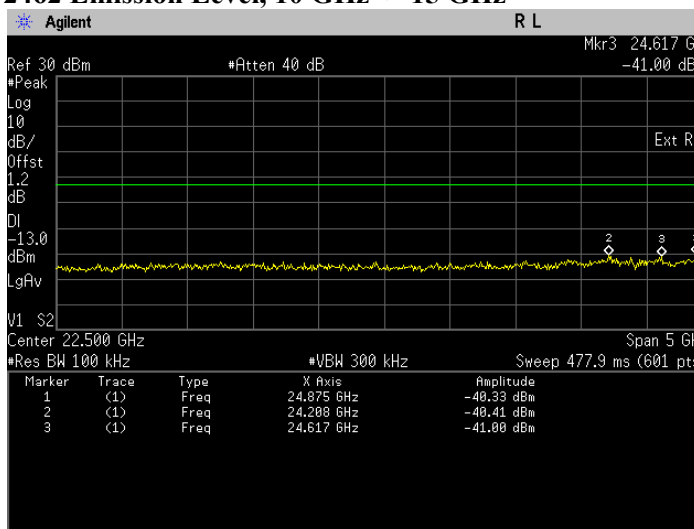
Conducted Emissions(Peak). 802.11b, Frequency 2462 MHz Emission Level, 1 GHz -> 5 GHz

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

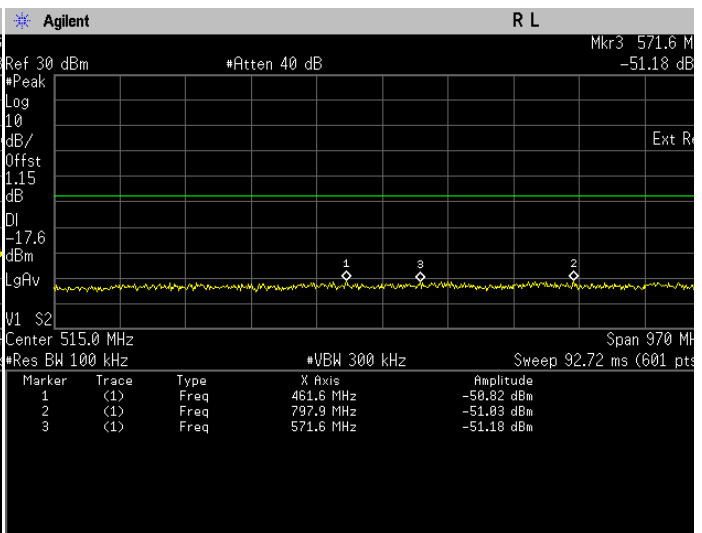
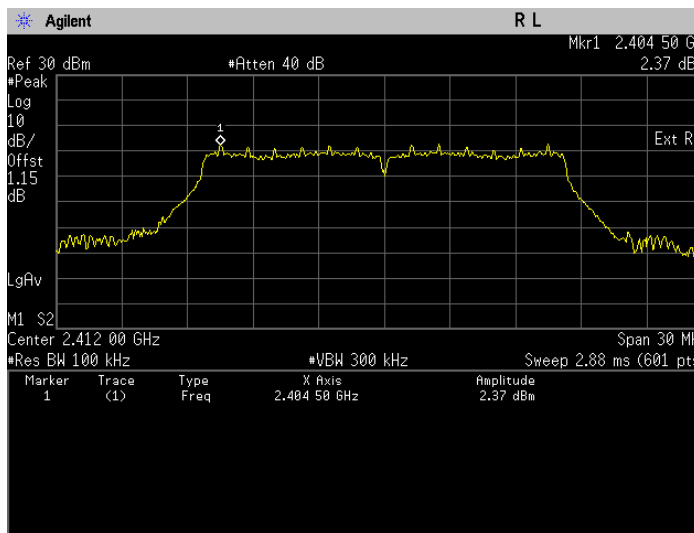
Conducted Emissions(Peak). 802.11b, Frequency 2462 MHz Emission Level, 15 GHz -> 20 GHz



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

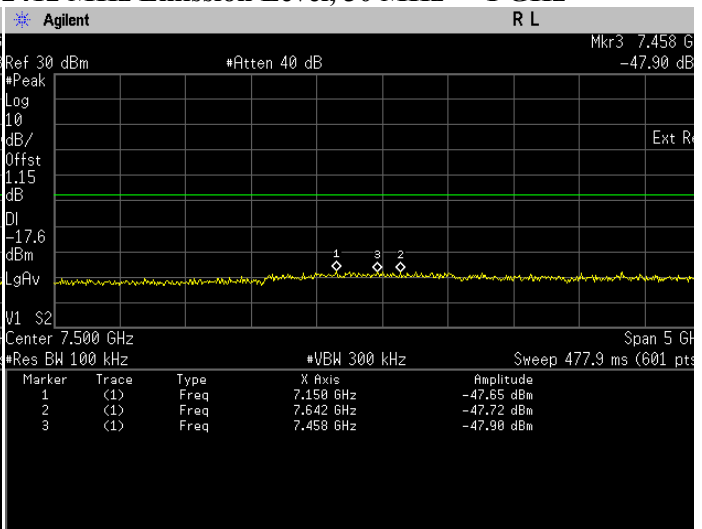
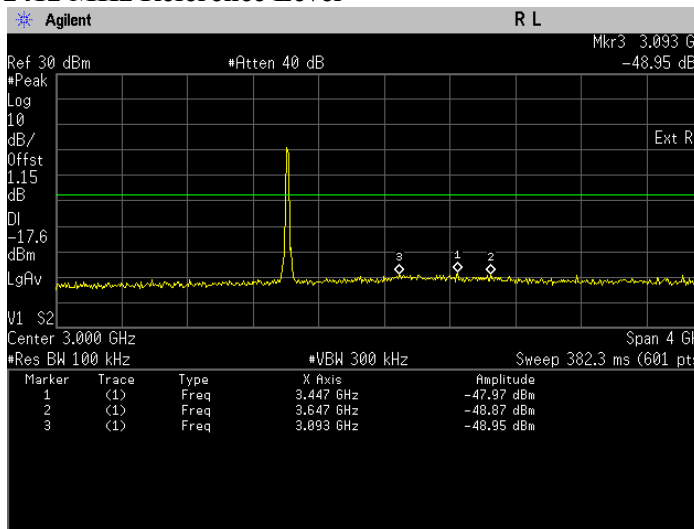
802.11g

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	23625.00	-40.53	Pass
					24875.00	-40.66	Pass
					24950.00	-41.15	Pass
802.11g	OFDM	BPSK	6	2437	24917.00	-40.54	Pass
					24933.00	-40.75	Pass
					24950.00	-41.20	Pass
802.11g	OFDM	BPSK	6	2462	24608.00	-41.13	Pass
					24883.00	-41.25	Pass
					24900.00	-41.49	Pass



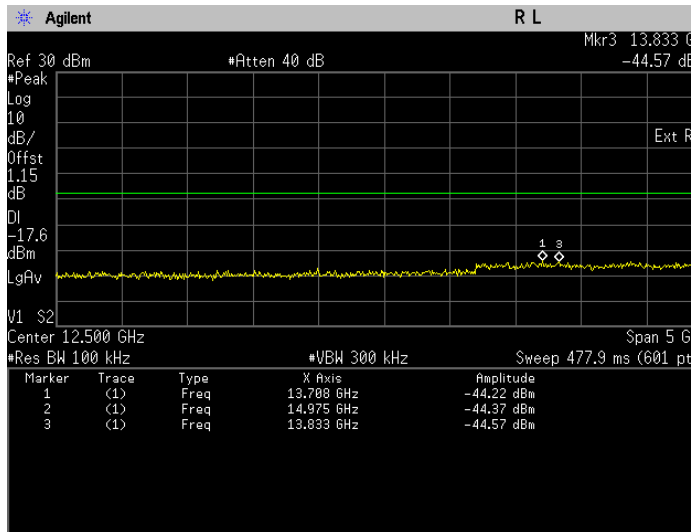
Conducted Emissions(Peak). 802.11g, Frequency 2412 MHz Reference Level

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

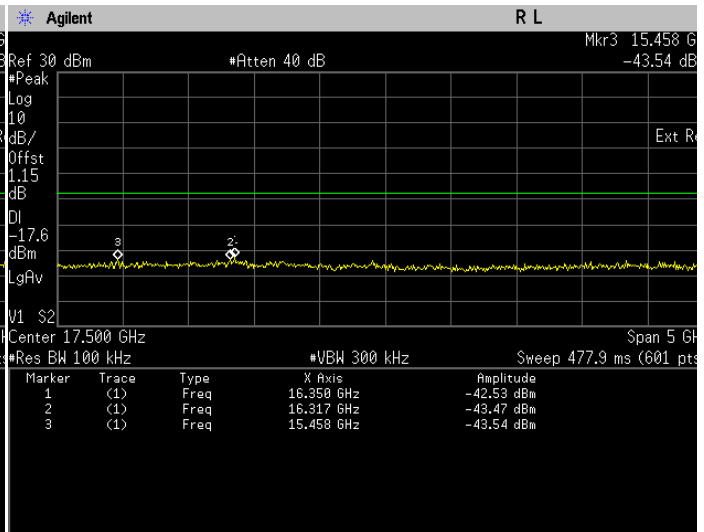


Conducted Emissions(Peak). 802.11g, Frequency 2412 MHz Emission Level, 1 GHz -> 5 GHz

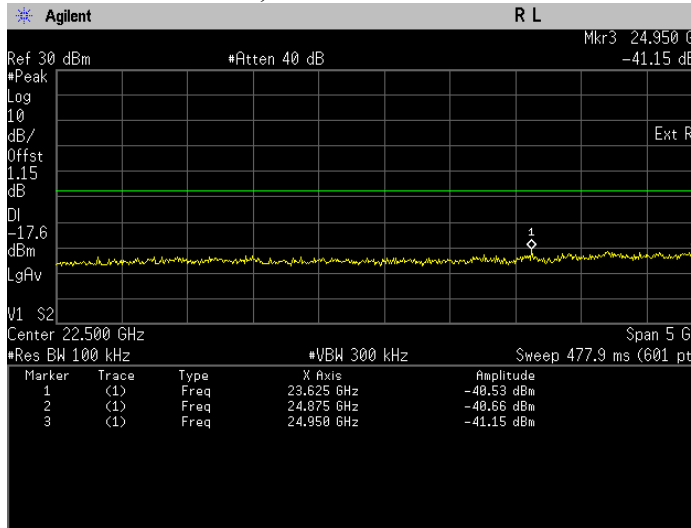
Conducted Emissions(Peak). 802.11g, Frequency 2412 MHz Emission Level, 5 GHz -> 10 GHz



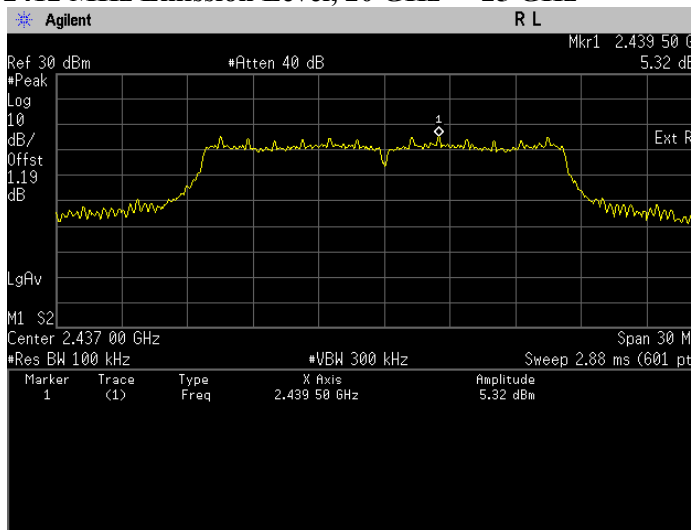
Conducted Emissions(Peak). 802.11g, Frequency
2412 Emission Level, 10 GHz -> 15 GHz



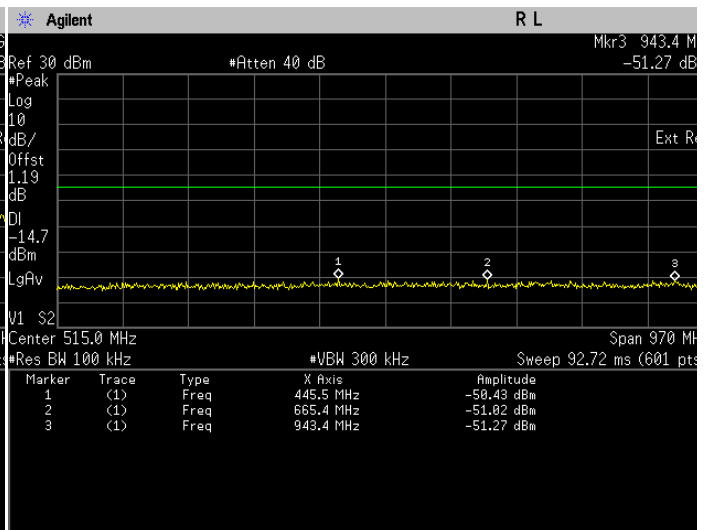
Conducted Emissions(Peak). 802.11g, Frequency
2412 MHz Emission Level, 15 GHz -> 20 GHz



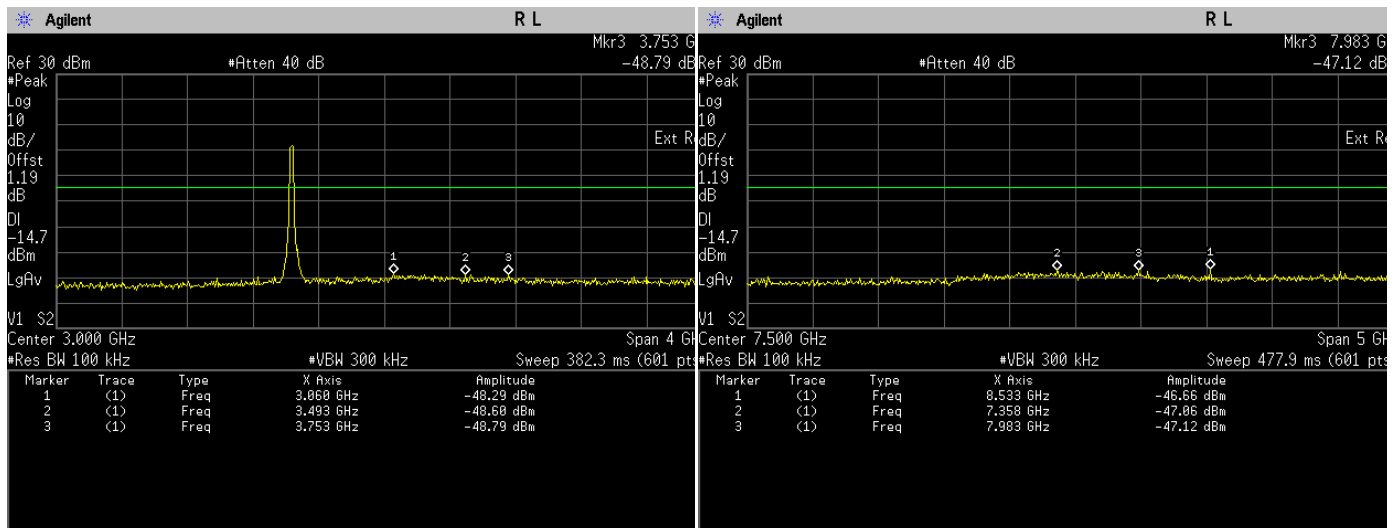
Conducted Emissions(Peak). 802.11g, Frequency
2412 MHz Emission Level, 20 GHz -> 25 GHz



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

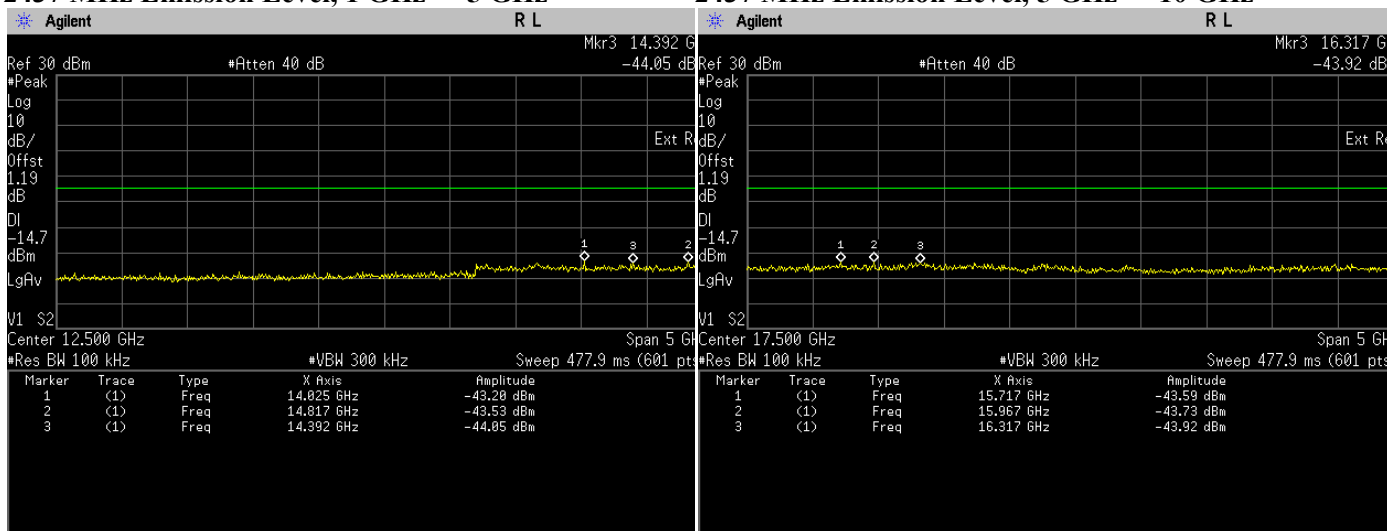


Conducted Emissions(Peak). 802.11g, Frequency
2437 MHz Emission Level, 30 MHz -> 1 GHz



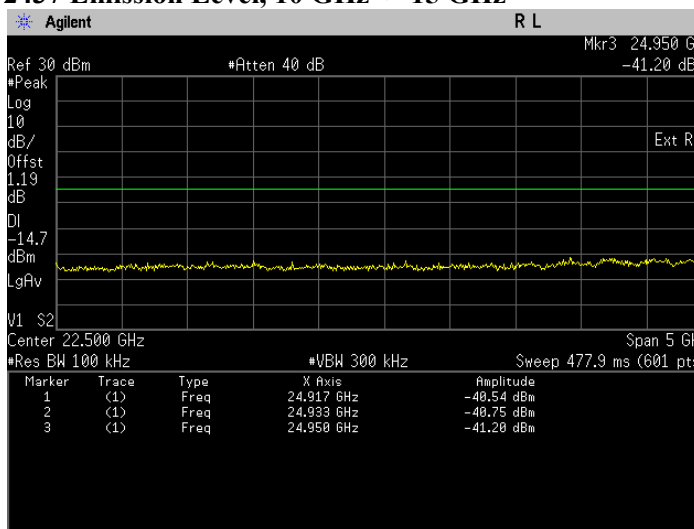
Conducted Emissions(Peak). 802.11g, Frequency 2437 MHz Emission Level, 1 GHz -> 5 GHz

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

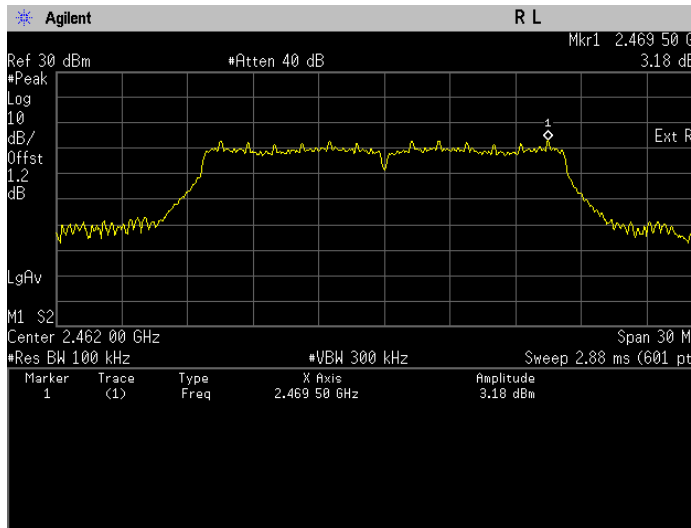


Conducted Emissions(Peak). 802.11g, Frequency 2437 MHz Emission Level, 10 GHz -> 15 GHz

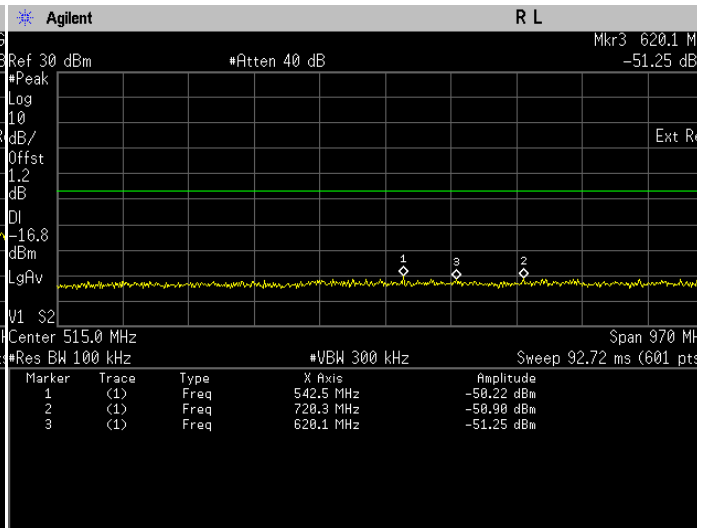
Conducted Emissions(Peak). 802.11g, Frequency 2437 MHz Emission Level, 15 GHz -> 20 GHz



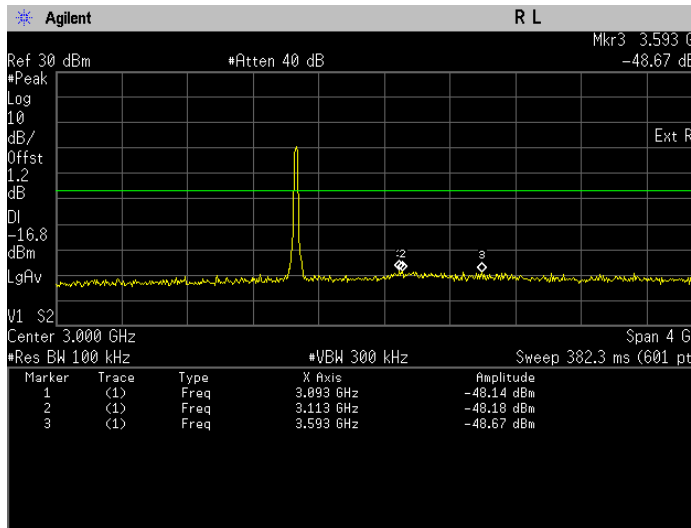
Conducted Emissions(Peak). 802.11g, Frequency 2437 MHz Emission Level, 20 GHz -> 25 GHz



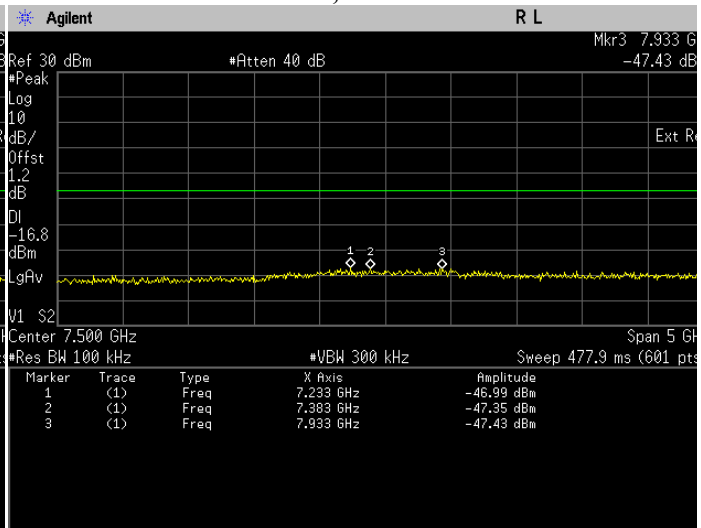
Conducted Emissions(Peak). 802.11g, Frequency 2462 MHz Reference Level



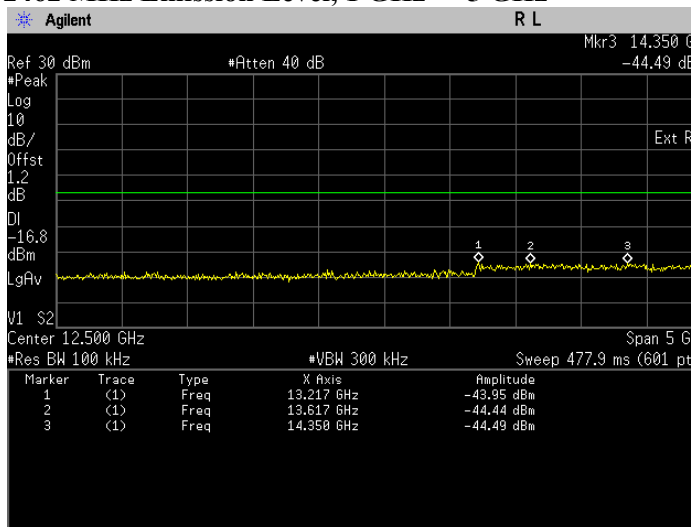
Conducted Emissions(Peak). 802.11g, Frequency 2462 MHz Emission Level, 30 MHz -> 1 GHz



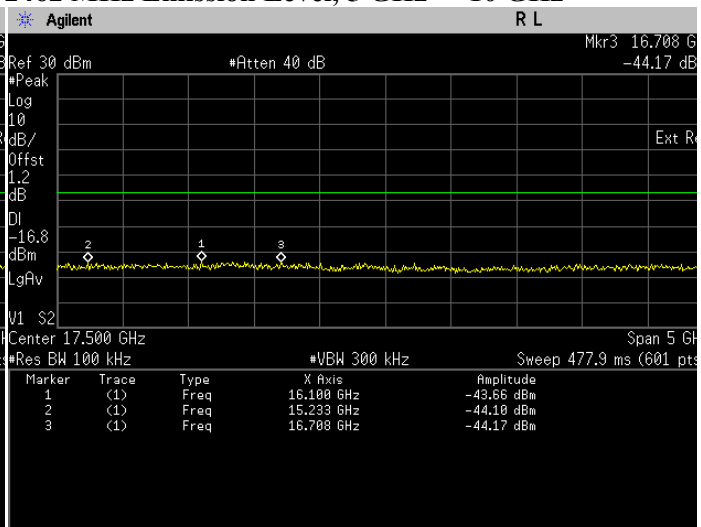
Conducted Emissions(Peak). 802.11g, Frequency 2462 MHz Emission Level, 1 GHz -> 5 GHz



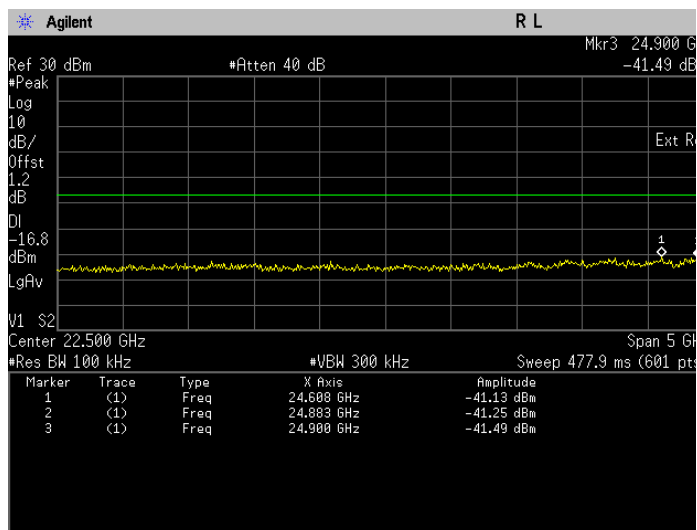
Conducted Emissions(Peak). 802.11g, Frequency 2462 MHz Emission Level, 5 GHz -> 10 GHz



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



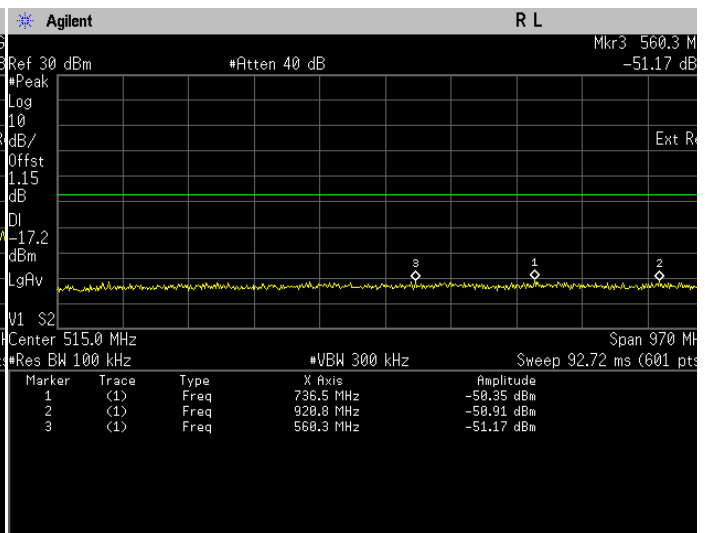
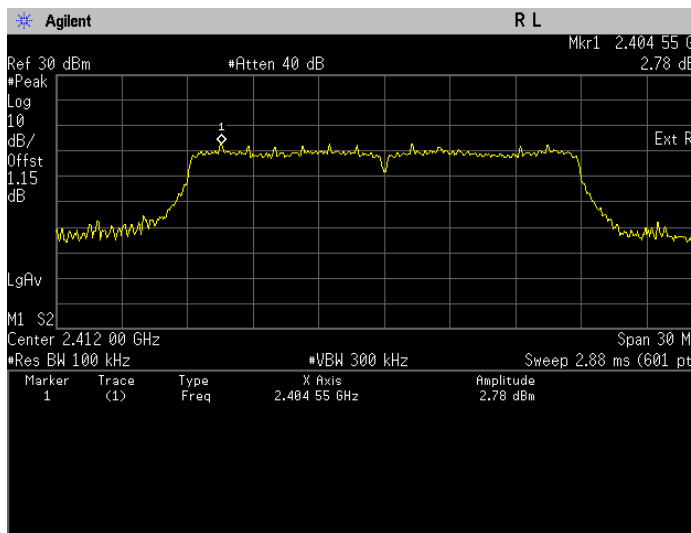
Conducted Emissions(Peak). 802.11g, Frequency 2462 MHz Emission Level, 15 GHz -> 20 GHz



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

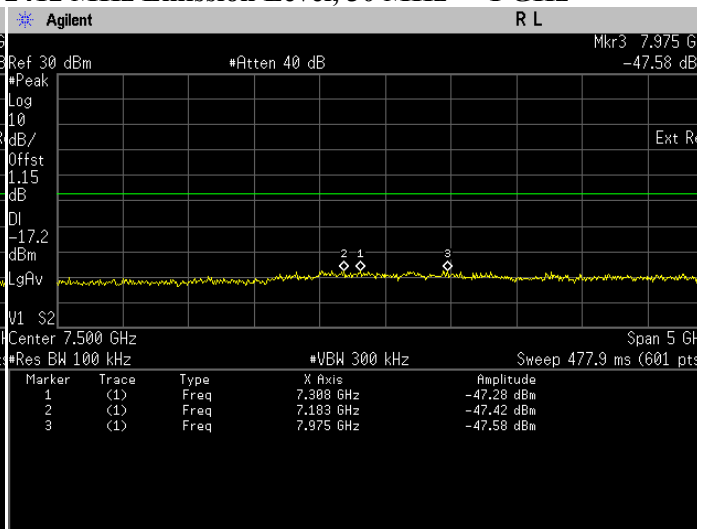
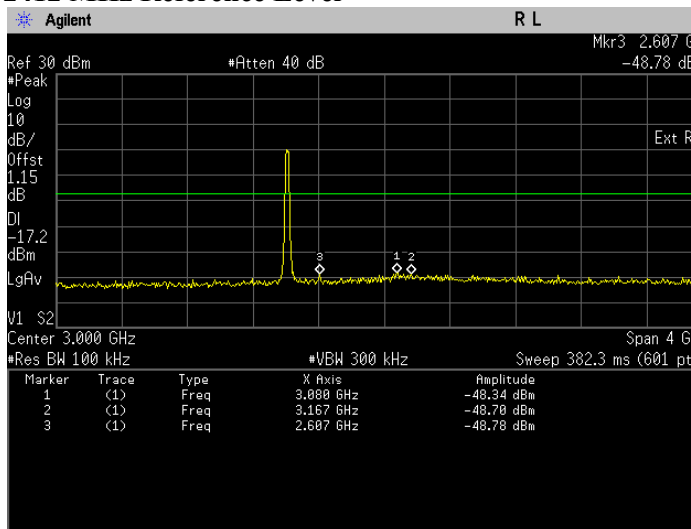
802.11n (HT20)

Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Spurs (MHz)	Level (dBm)	Status
802.11n	OFDM	DBPSK	6.5	2412	24983.00	-40.94	Pass
					24917.00	-41.32	Pass
					24542.00	-41.33	Pass
802.11n	OFDM	DBPSK	6.5	2437	24908.00	-41.02	Pass
					24933.00	-41.12	Pass
					24242.00	-41.42	Pass
802.11n	OFDM	DBPSK	6.5	2462	23908.00	-40.40	Pass
					24925.00	-41.36	Pass
					24208.00	-41.36	Pass



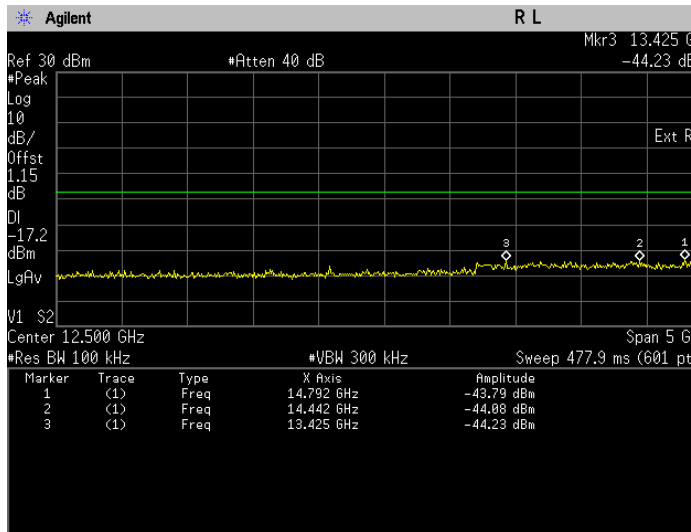
Conducted Emissions(Peak). 802.11n, Frequency 2412 MHz Reference Level

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

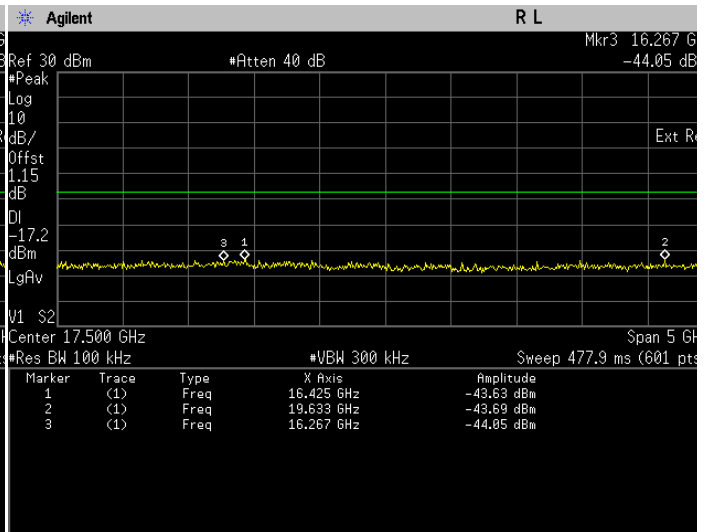


Conducted Emissions(Peak). 802.11n, Frequency 2412 MHz Emission Level, 1 GHz -> 5 GHz

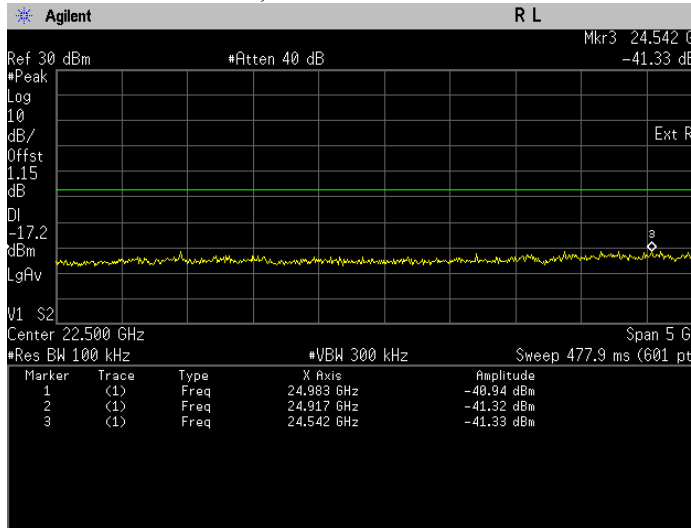
Conducted Emissions(Peak). 802.11n, Frequency 2412 MHz Emission Level, 5 GHz -> 10 GHz



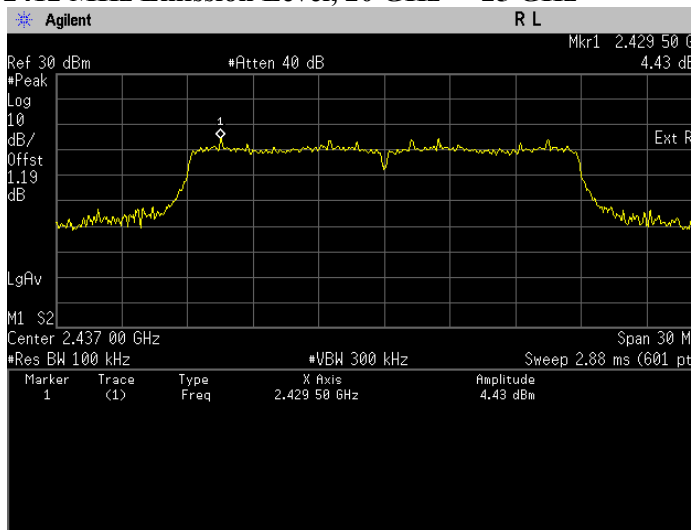
Conducted Emissions(Peak). 802.11n, Frequency
2412 Emission Level, 10 GHz -> 15 GHz



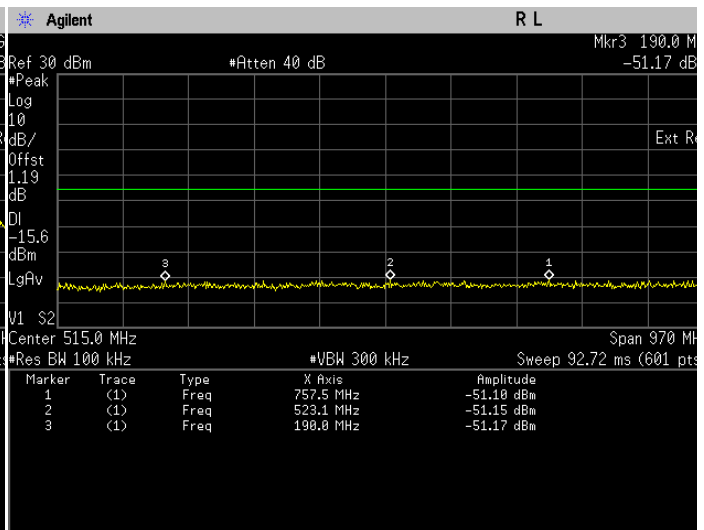
Conducted Emissions(Peak). 802.11n, Frequency
2412 MHz Emission Level, 15 GHz -> 20 GHz



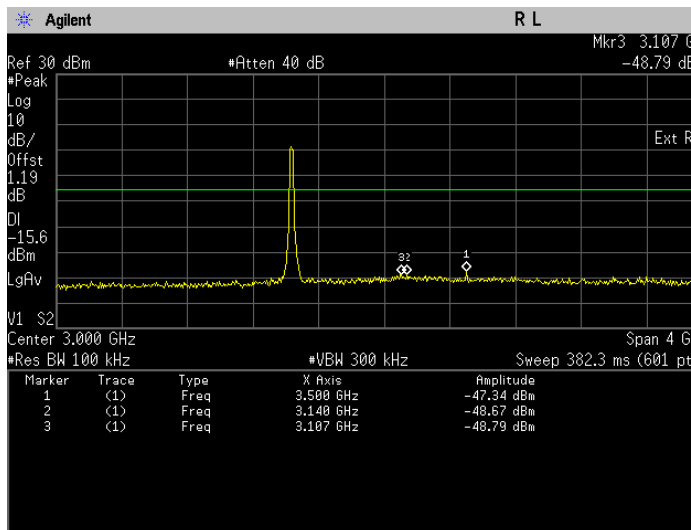
Conducted Emissions(Peak). 802.11n, Frequency
2412 MHz Emission Level, 20 GHz -> 25 GHz



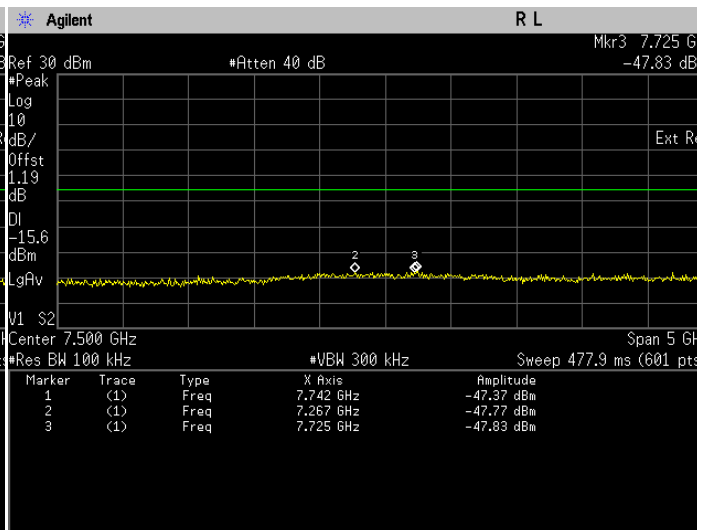
Conducted Emissions(Peak). 802.11n, Frequency
2437 MHz Reference Level



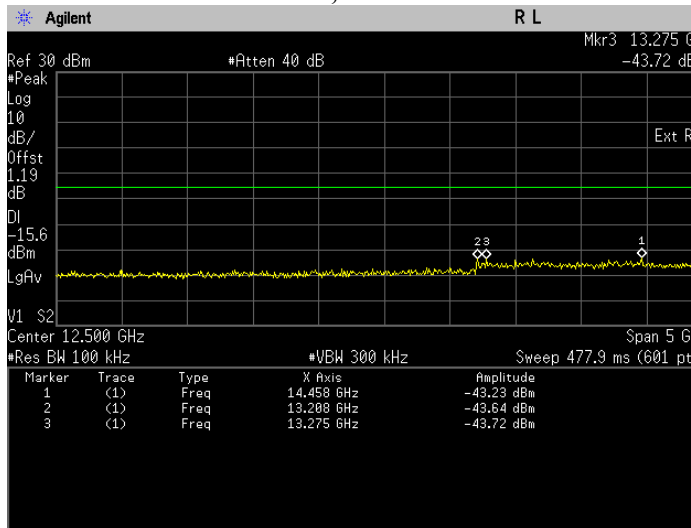
Conducted Emissions(Peak). 802.11n, Frequency
2437 MHz Emission Level, 30 MHz -> 1 GHz



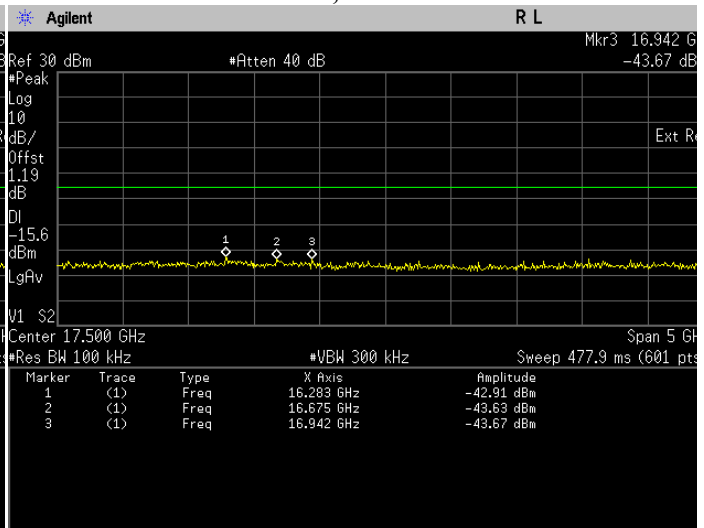
Conducted Emissions(Peak). 802.11n, Frequency 2437 MHz Emission Level, 1 GHz -> 5 GHz



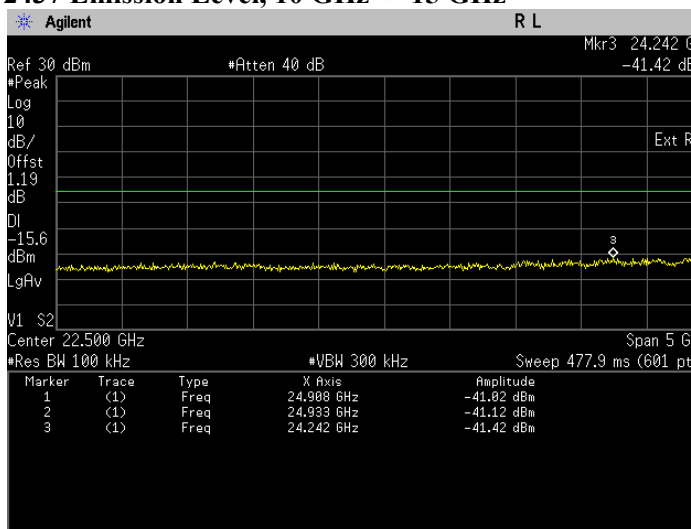
Conducted Emissions(Peak). 802.11n, Frequency 2437 MHz Emission Level, 5 GHz -> 10 GHz



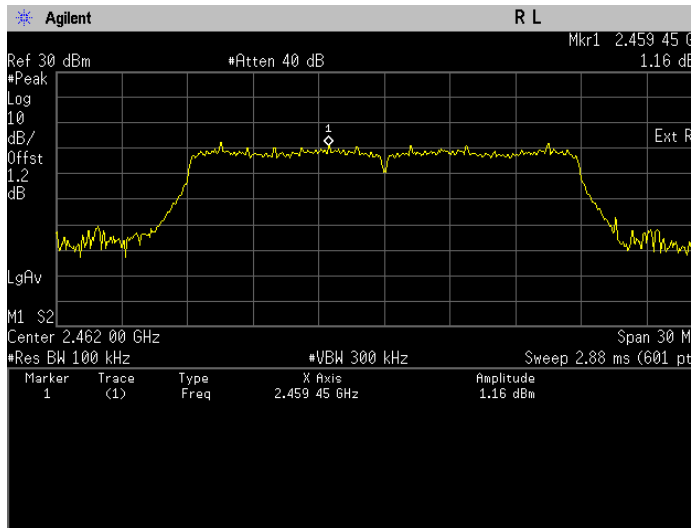
Conducted Emissions(Peak). 802.11n, Frequency 2437 MHz Emission Level, 10 GHz -> 15 GHz



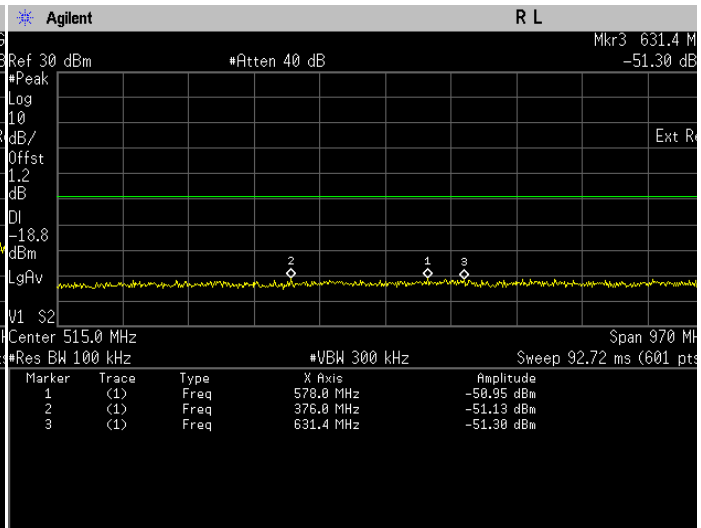
Conducted Emissions(Peak). 802.11n, Frequency 2437 MHz Emission Level, 15 GHz -> 20 GHz



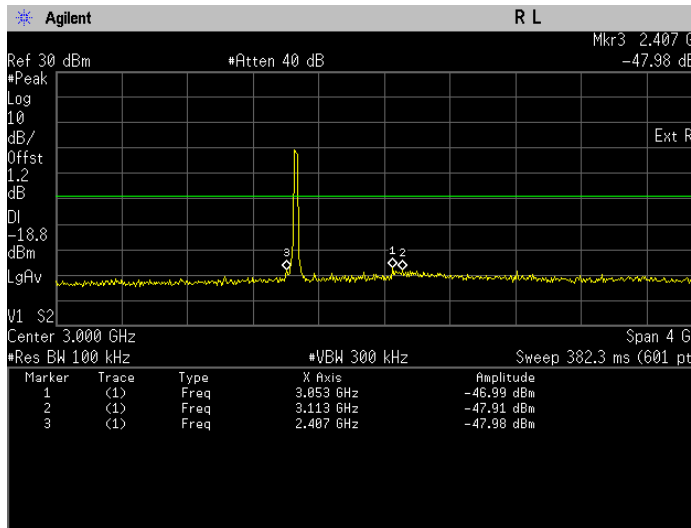
Conducted Emissions(Peak). 802.11n, Frequency 2437 MHz Emission Level, 20 GHz -> 25 GHz



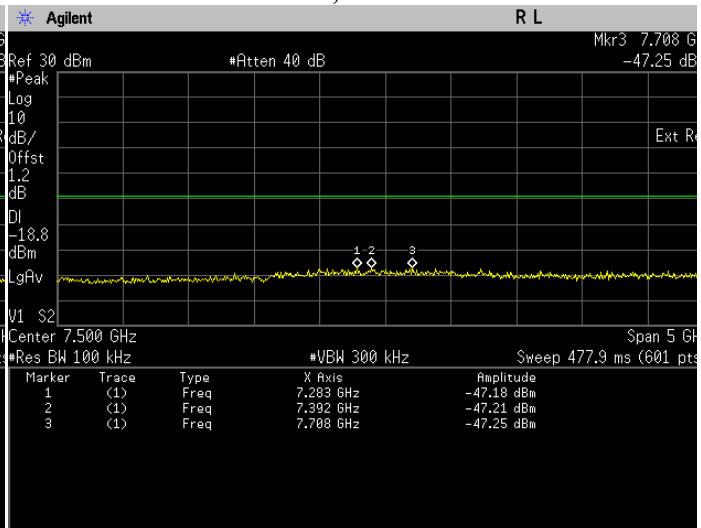
Conducted Emissions(Peak). 802.11n, Frequency 2462 MHz Reference Level



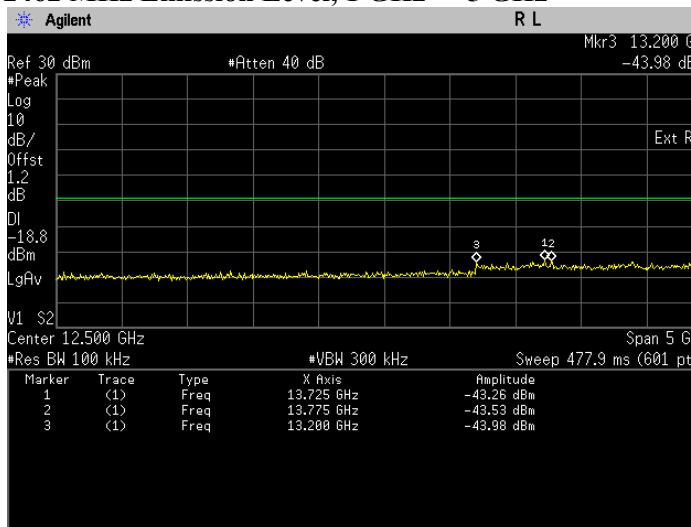
Conducted Emissions(Peak). 802.11n, Frequency 2462 MHz Emission Level, 30 MHz -> 1 GHz



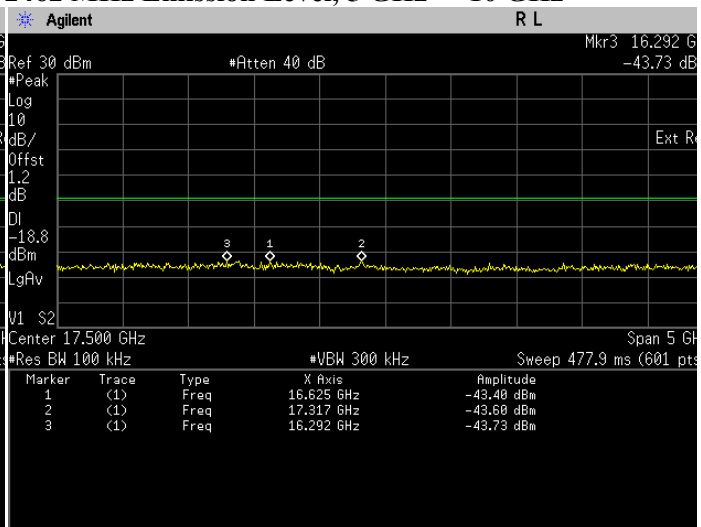
Conducted Emissions(Peak). 802.11n, Frequency 2462 MHz Emission Level, 1 GHz -> 5 GHz



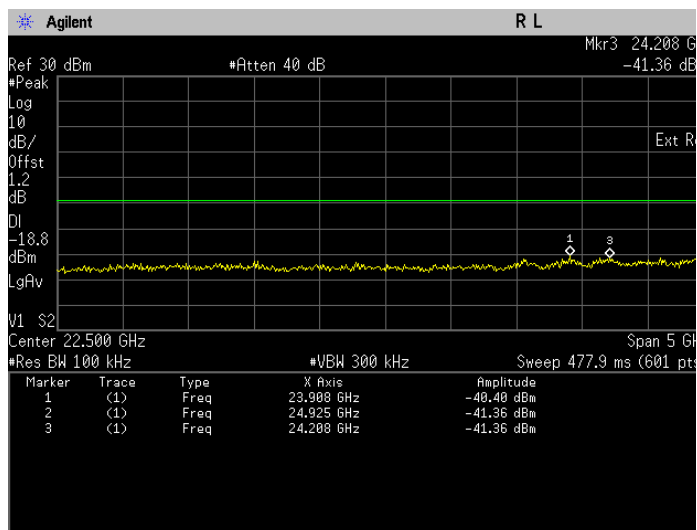
Conducted Emissions(Peak). 802.11n, Frequency 2462 MHz Emission Level, 5 GHz -> 10 GHz



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



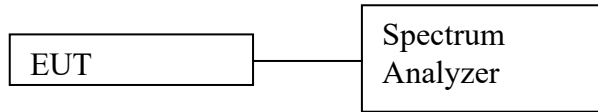
Conducted Emissions(Peak). 802.11n, Frequency 2462 MHz Emission Level, 15 GHz -> 20 GHz



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:

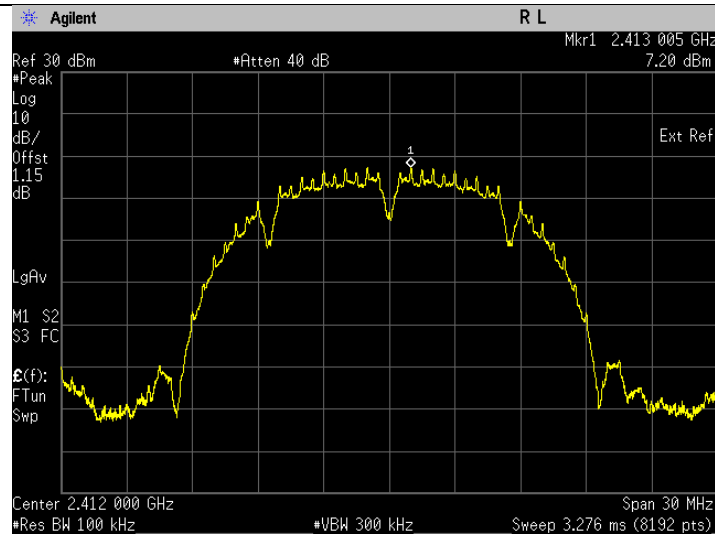
Normal Condition (25 ° C)
Shall be at least 20 dB below peak (max) power.

6.6.3. Test Result

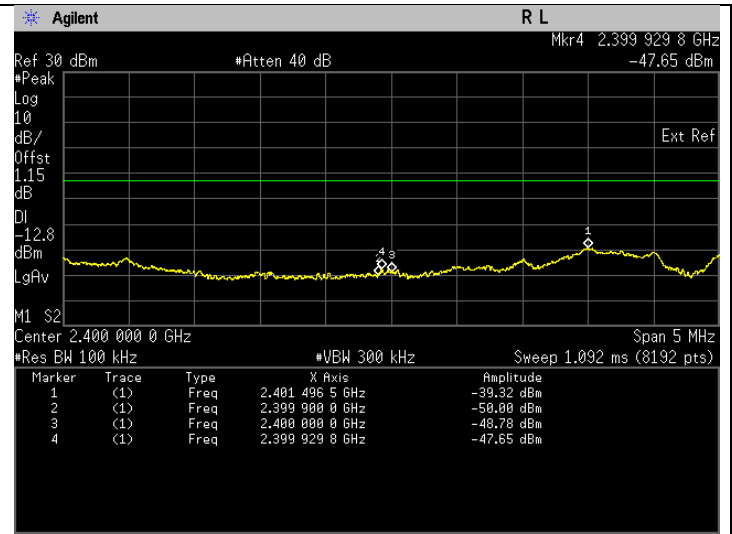
802.11b

Antenna 1:

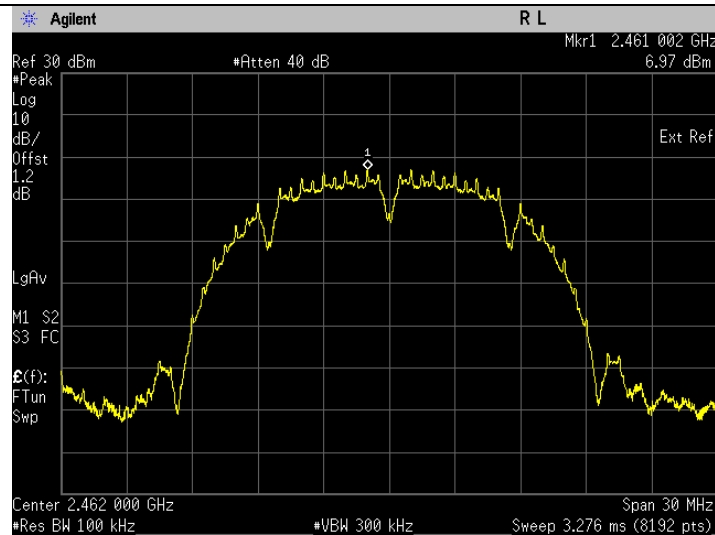
Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Frequencies (MHz)	Power (dBm)	Status
802.11b	DSSS	DBPSK	1	2412	2399.93	-47.65	Pass
802.11b	DSSS	DBPSK	1	2462	2483.51	-49.76	Pass



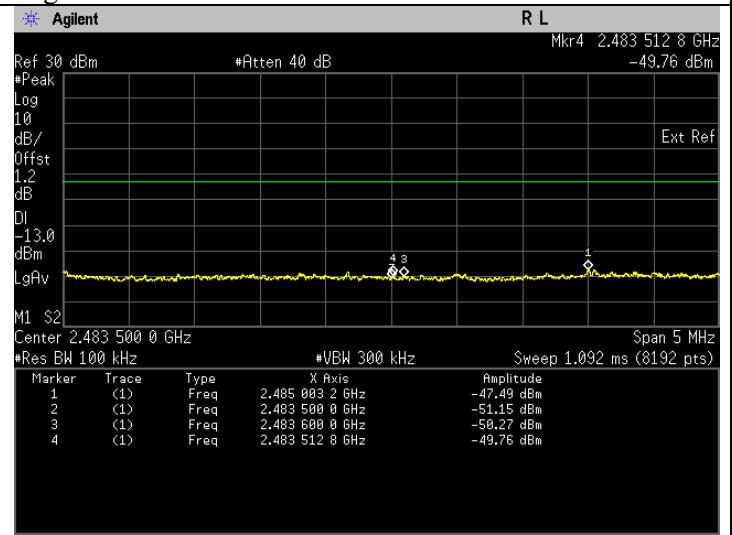
Band Edge(Peak). 802.11b Frequency 2412 MHz
Reference Level



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



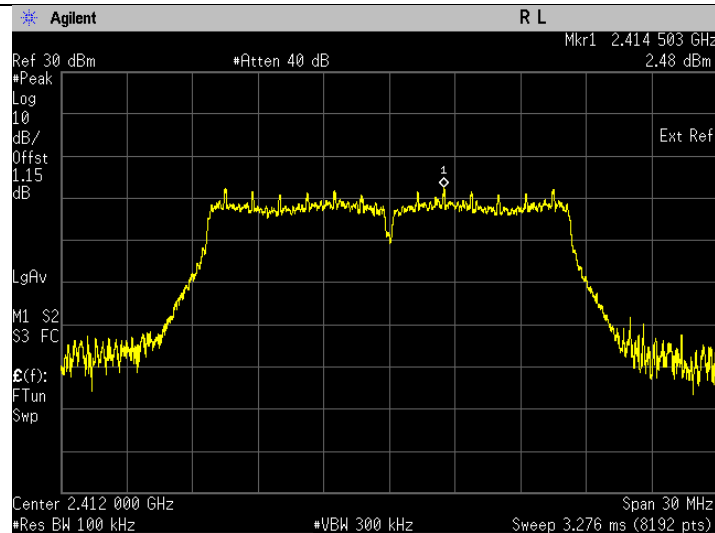
Band Edge(Peak). 802.11b Frequency 2462 MHz
Reference Level



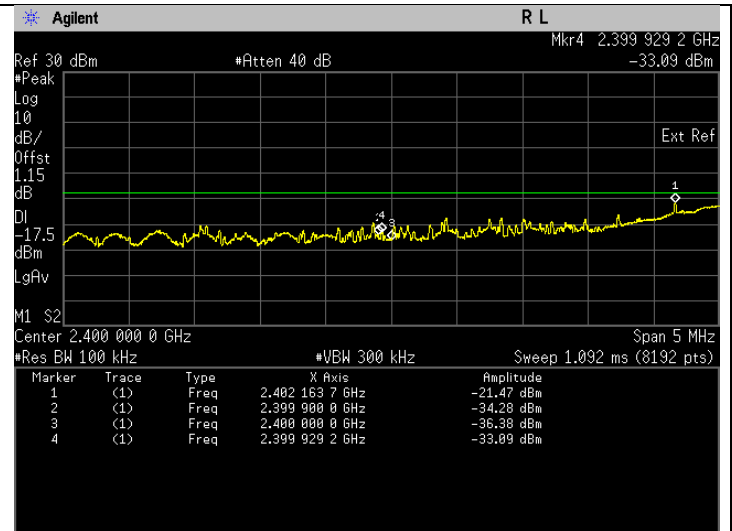
Band Edge(Peak). 802.11b Frequency 2462 MHz Band
Edge

802.11g

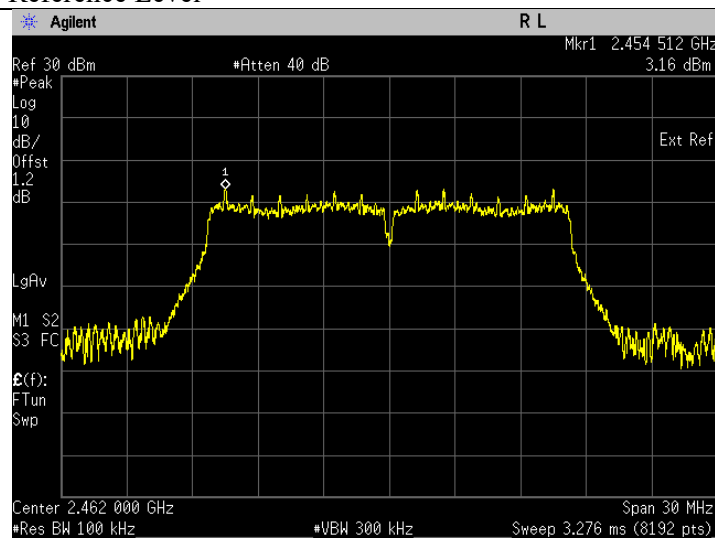
Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Frequencies (MHz)	Power (dBm)	Status
802.11g	OFDM	BPSK	6	2412	2399.93	-33.09	Pass
802.11g	OFDM	BPSK	6	2462	2483.57	-35.13	Pass



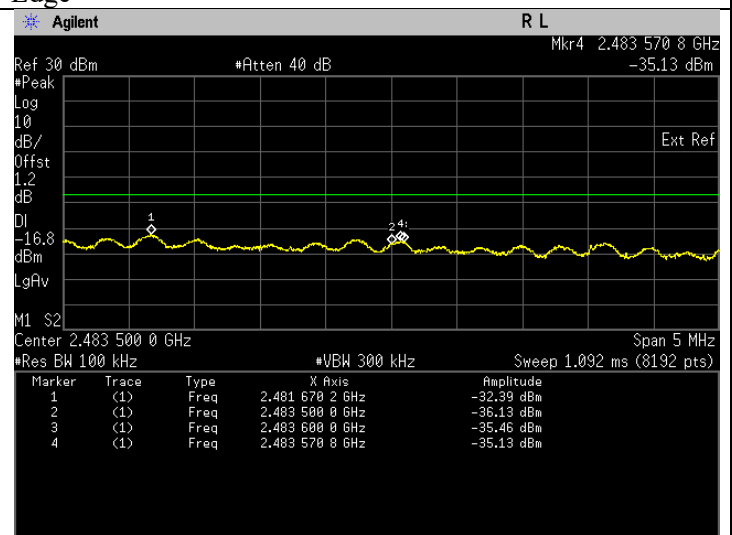
Band Edge(Peak). 802.11g Frequency 2412 MHz
Reference Level



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



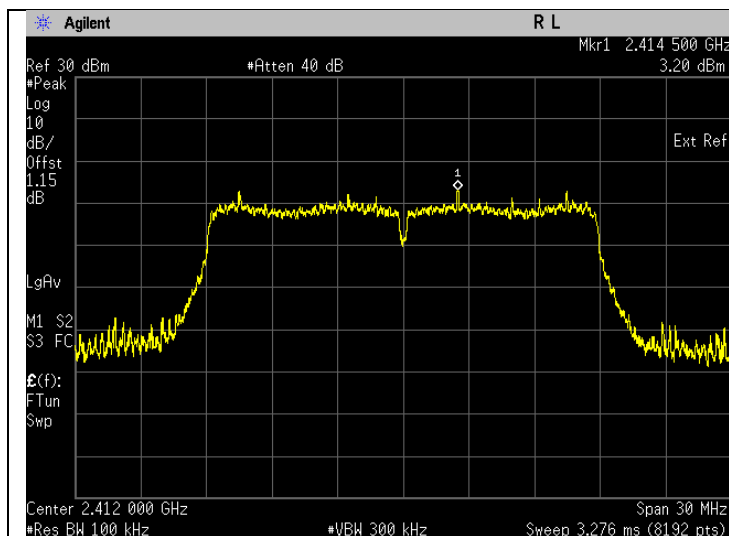
Band Edge(Peak). 802.11g Frequency 2462 MHz
Reference Level



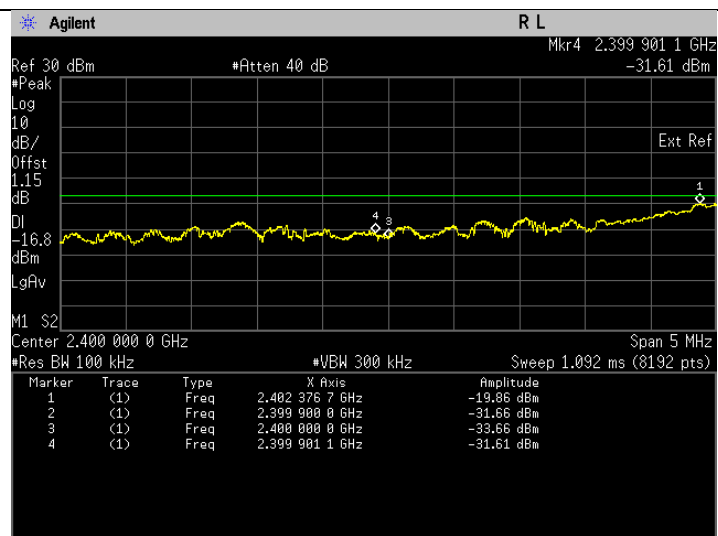
Band Edge(Peak). 802.11g Frequency 2462 MHz Band
Edge

802.11n (HT20)

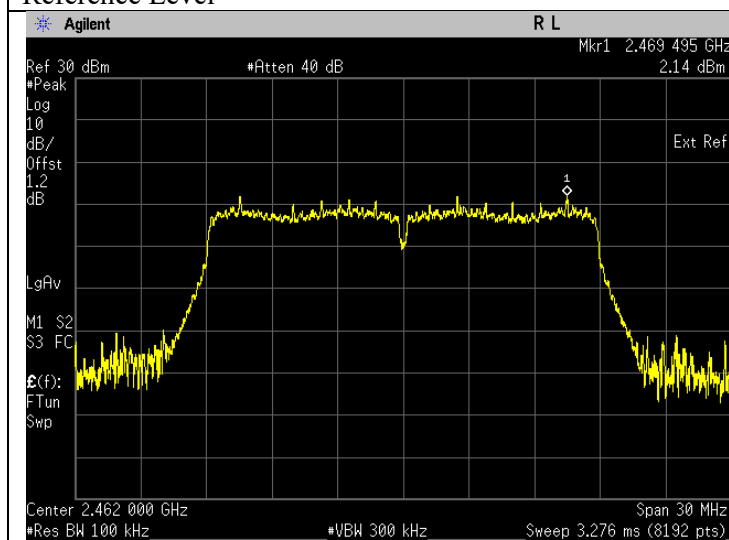
Test Conditions				Test Frequency	Results		
Standard	Modulation Type	Modulation Technology	Data Rate (mbps)	Tx (MHz)	Frequencies (MHz)	Power (dBm)	Status
802.11n	OFDM	DBPSK	6.5	2412	2399.90	-31.61	Pass
802.11n	OFDM	DBPSK	6.5	2462	2483.57	-36.85	Pass



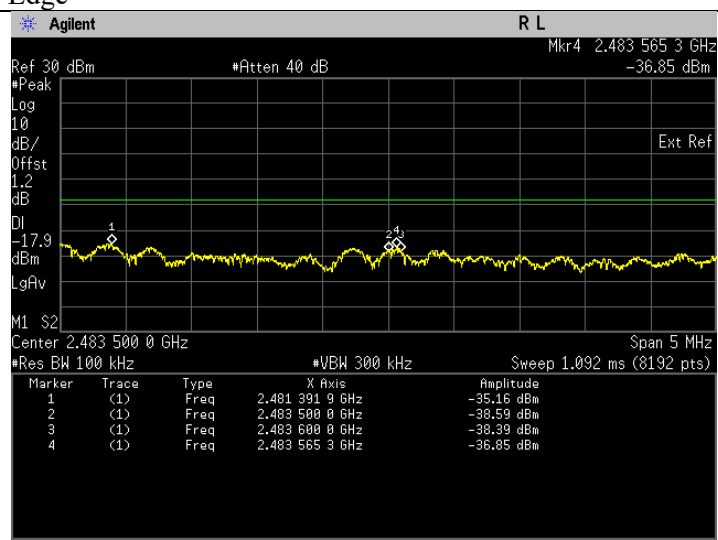
Band Edge(Peak). 802.11n Frequency 2412 MHz
Reference Level



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



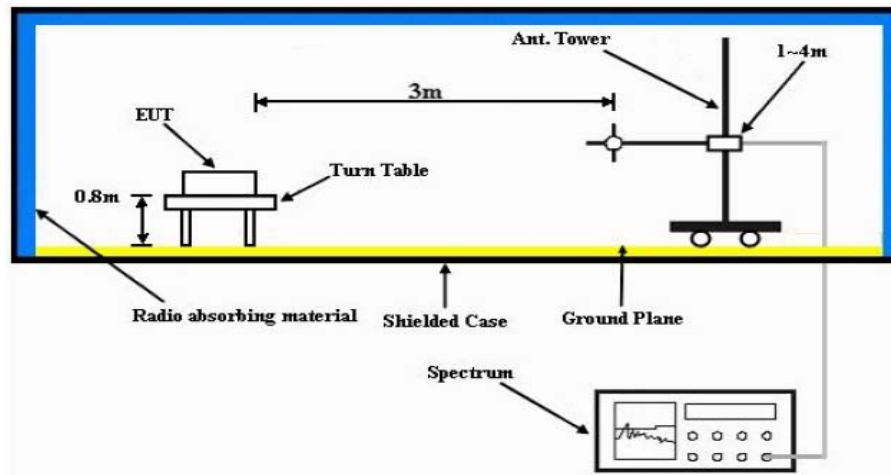
Band Edge(Peak). 802.11n Frequency 2462 MHz
Reference Level



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: H25UCF9PW6AN S/N: 657TYB0771 EMC SR ID#: 26860-EMC-00077
Battery: PMNN4813A Accessory: AN000411A01
Test Channel: Low Test Frequency: 2412.0000 MHz Test Standard: ANSI C63.10-2013
Worst Case Plane: Z-Plane (802.11b)

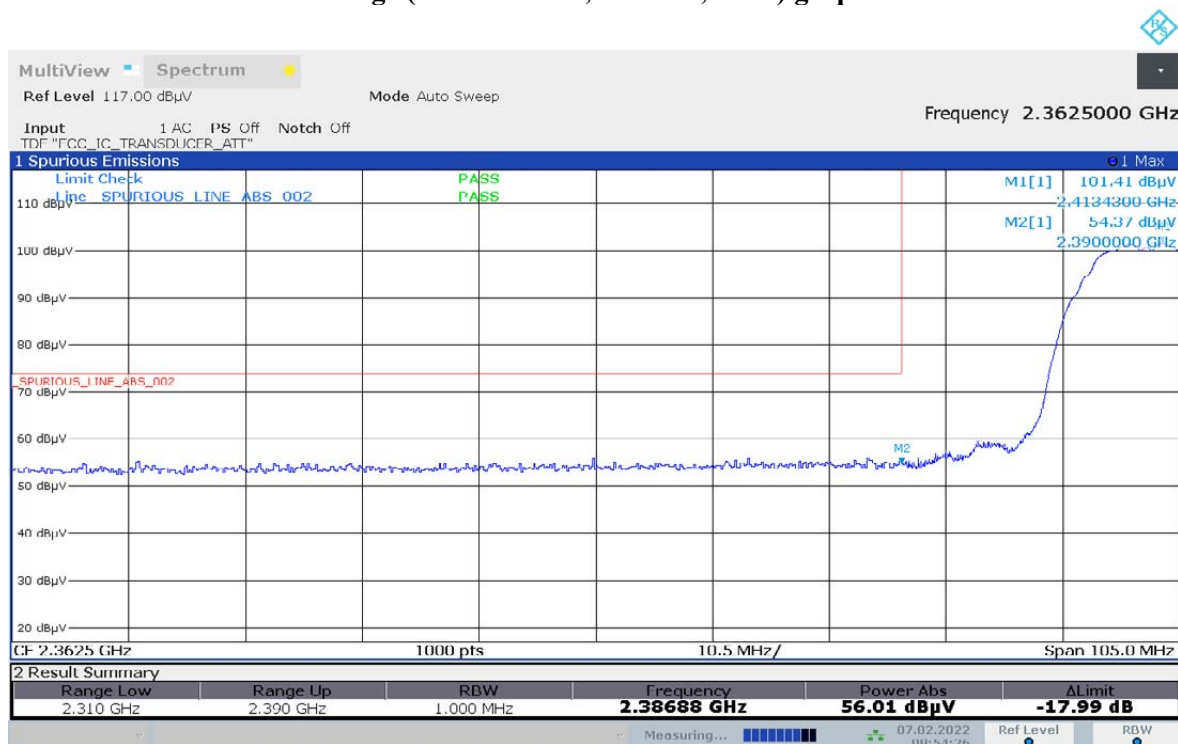
Vertical Radiated Emission Result

[illegible]

Remarks: Pass Result	Marginal Result	Fail Result
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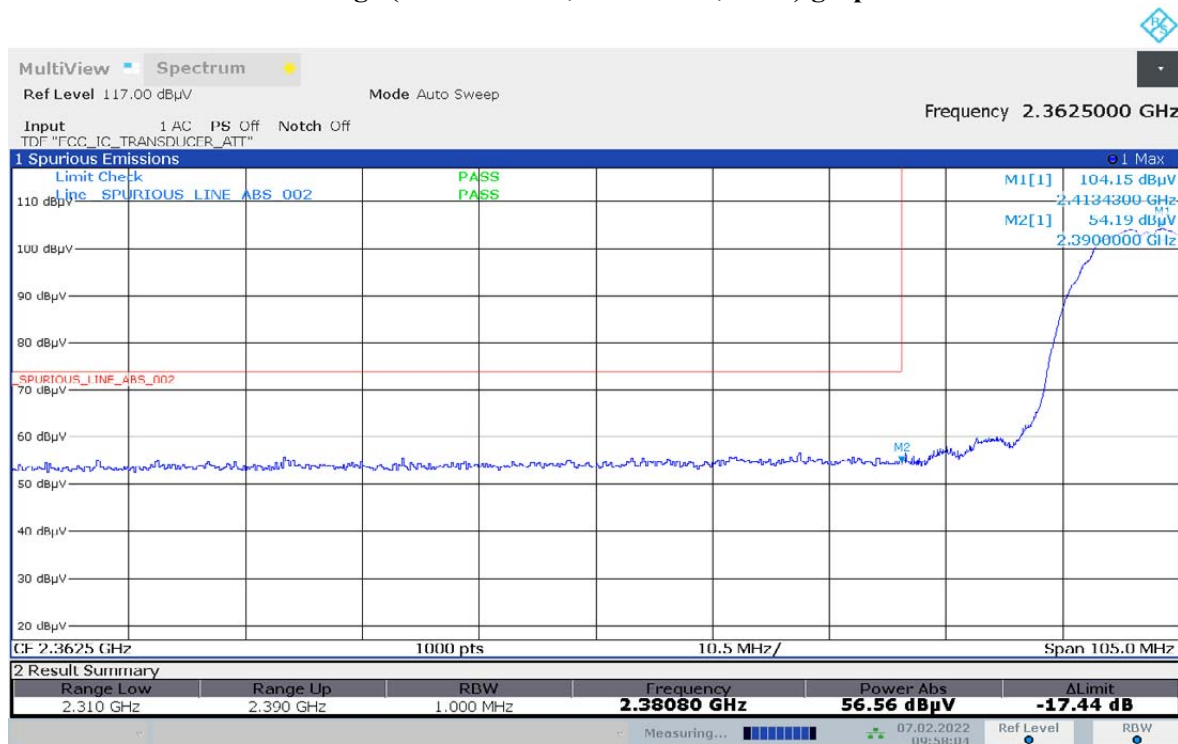
Humidity (%): 69.3
Test Date: Mon, 7 Feb, 2022

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



09:54:27 07.02.2022

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

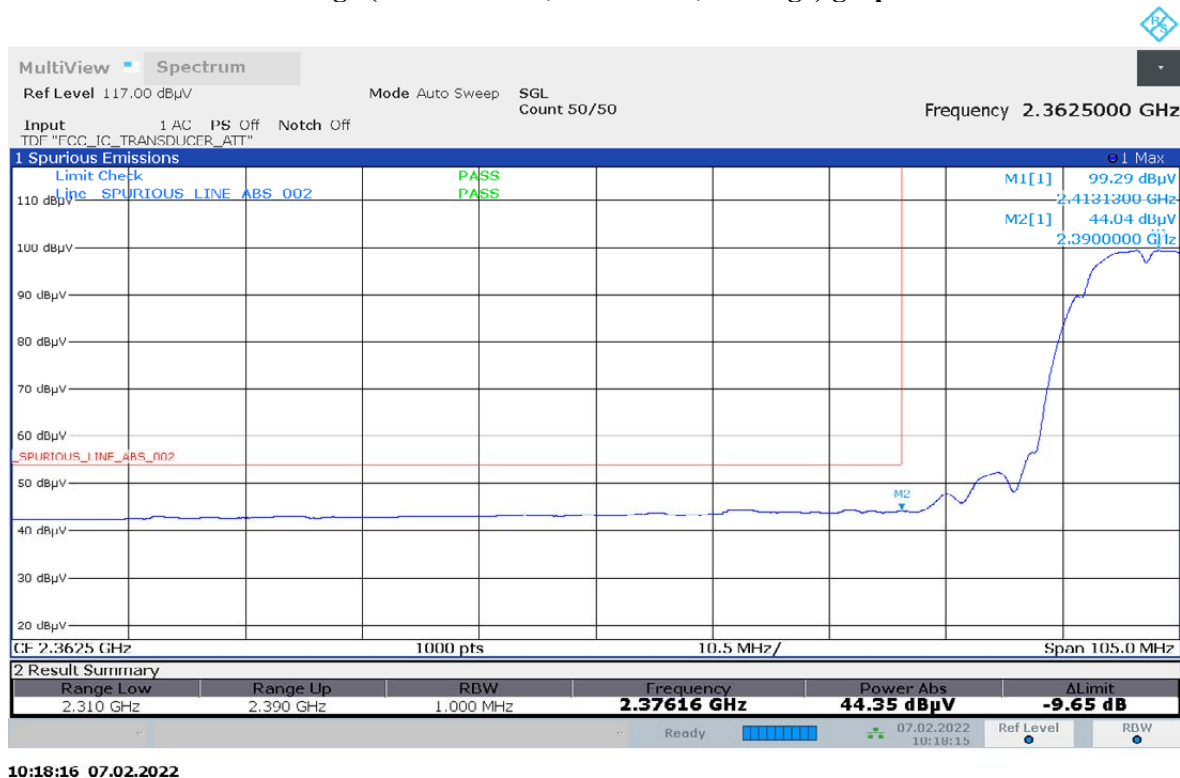


09:58:05 07.02.2022

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



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

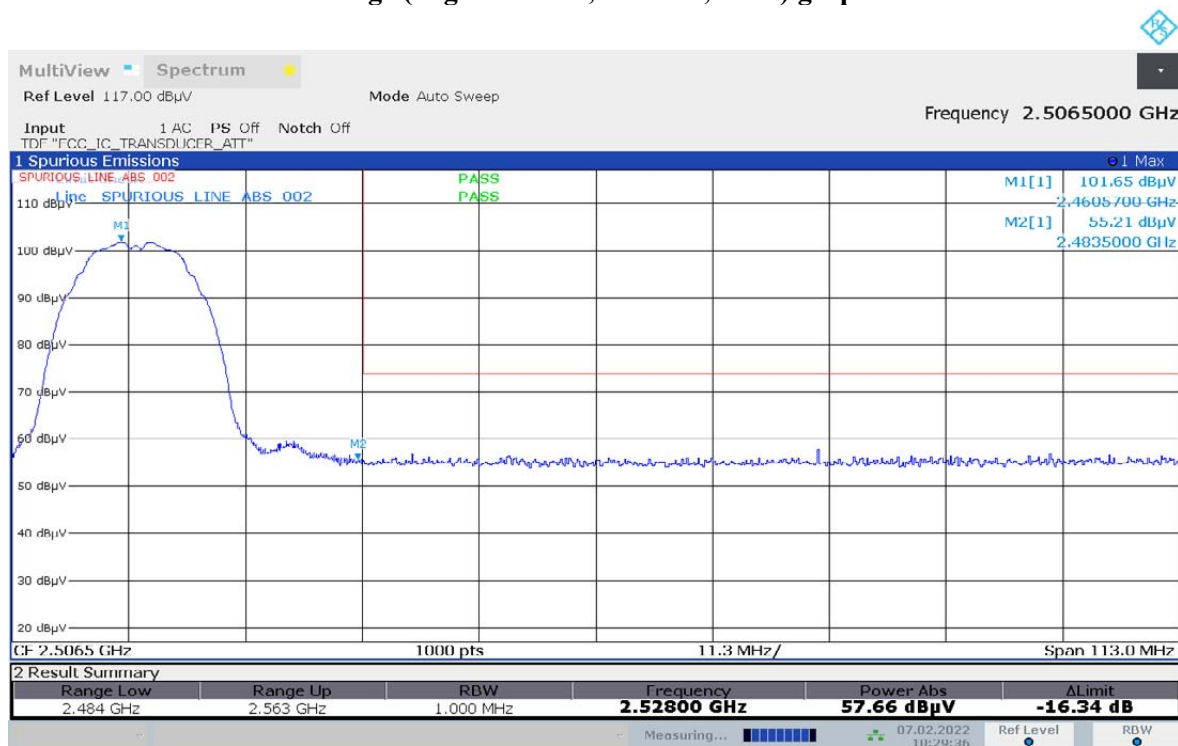


Restricted Band Edge (High Channel) tabular data

Remarks: Pass Result	Marginal Result	Fail Result
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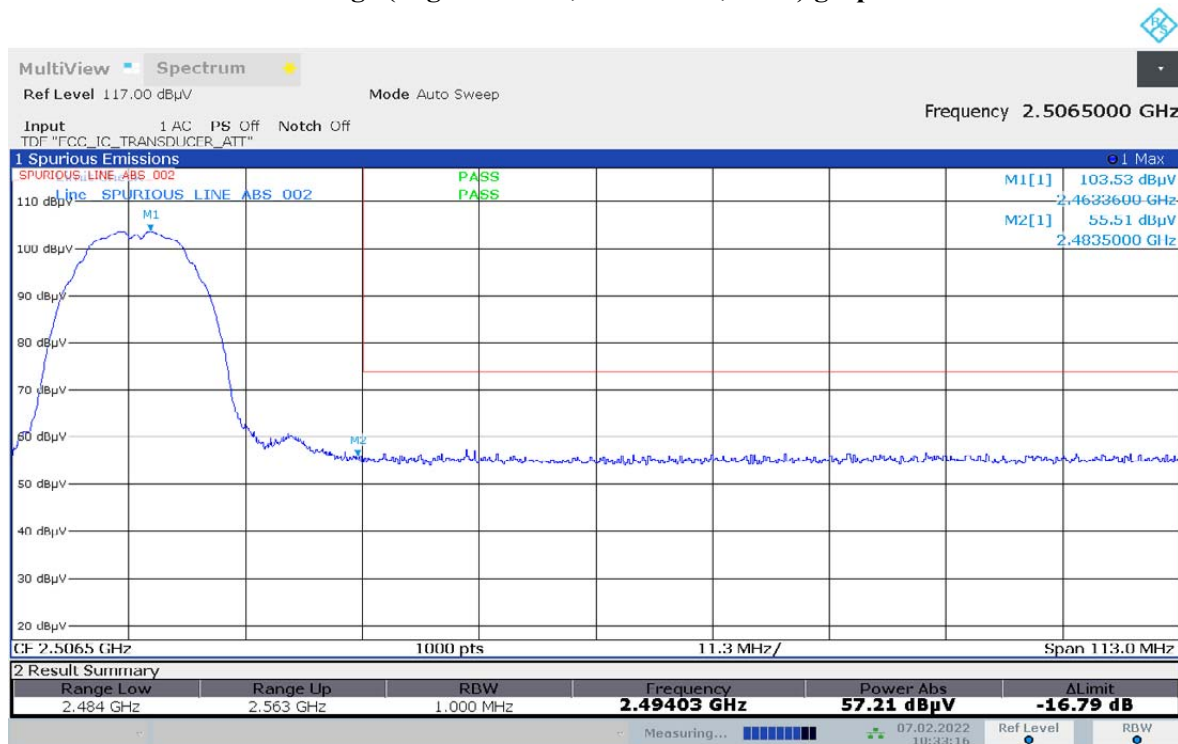
Humidity (%): 69.3
Test Date: Mon, 7 Feb, 2022

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



10:29:36 07.02.2022

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



10:33:16 07.02.2022

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



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

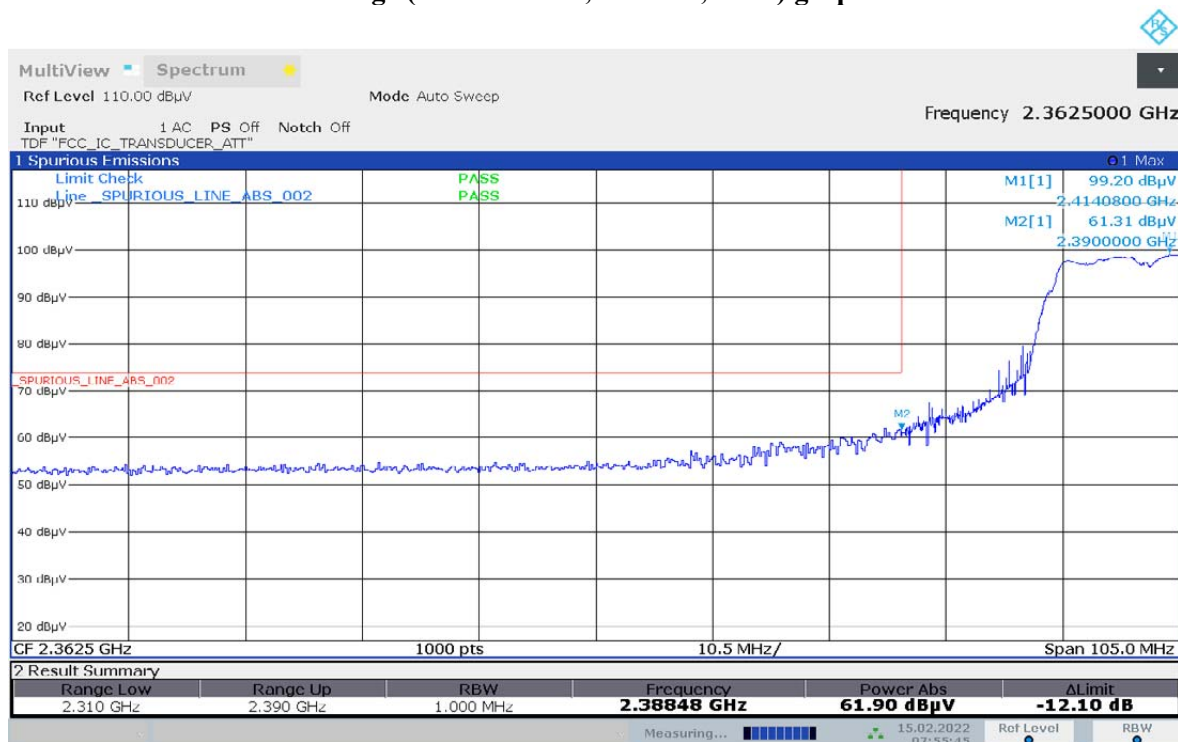


Restricted Band Edge (Low Channel) tabular data

Remarks: Pass Result	Marginal Result	Fail Result
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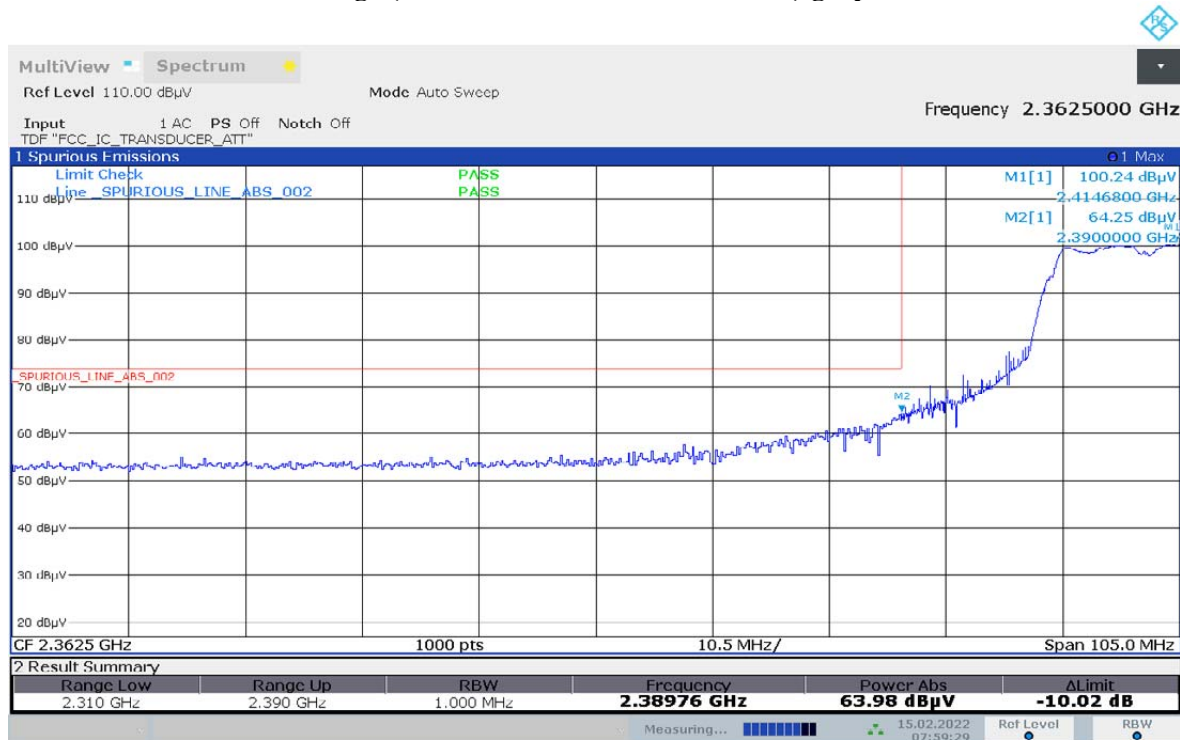
Humidity (%): 69.7
Test Date: Tue, 15 Feb, 2022

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



07:55:45 15.02.2022

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



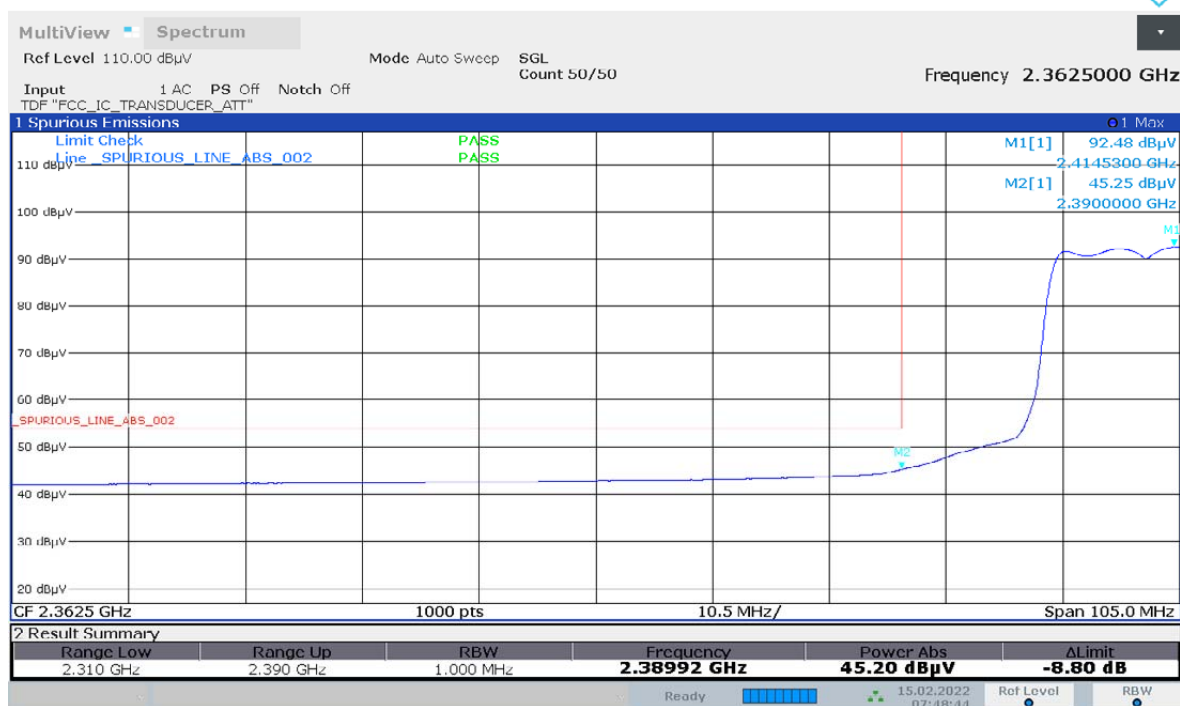
07:59:30 15.02.2022

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



07:38:34 15.02.2022

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



07:48:45 15.02.2022

Restricted Band Edge (High Channel) tabular data

Remarks: Pass Result	Marginal Result	Fail Result
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Humidity (%): 69.9
Test Date: Wed, 1 Jun, 2022

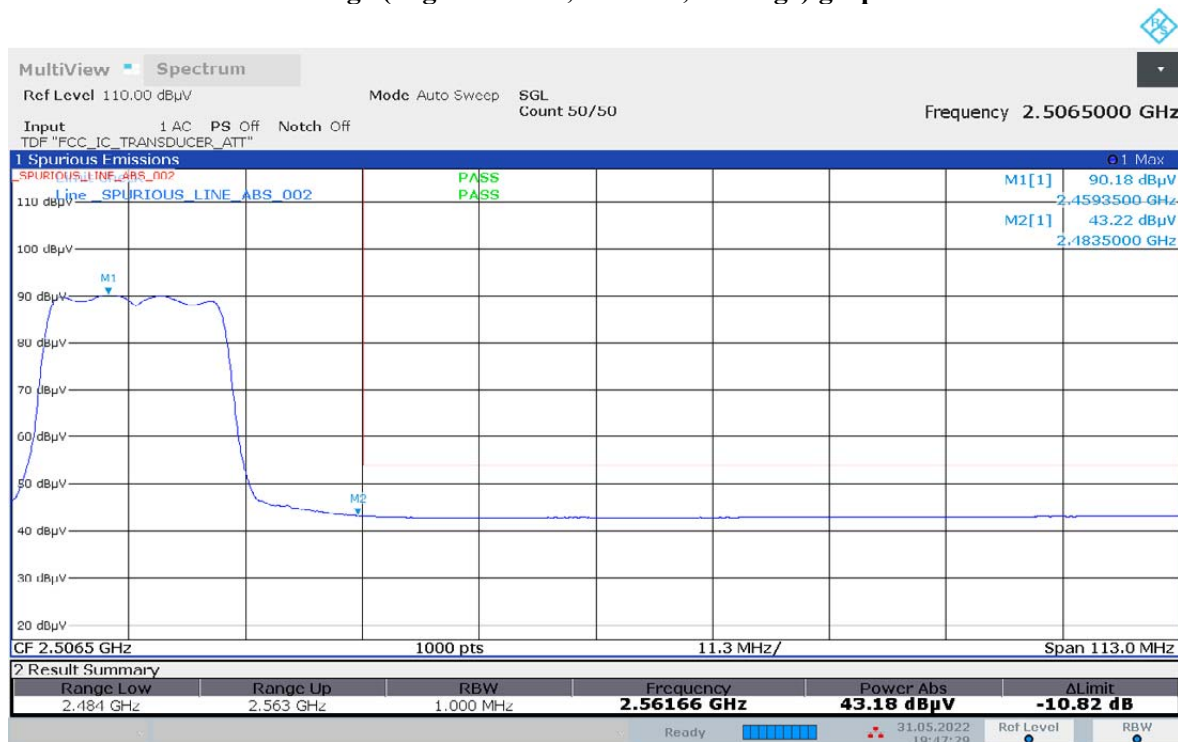
Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot



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

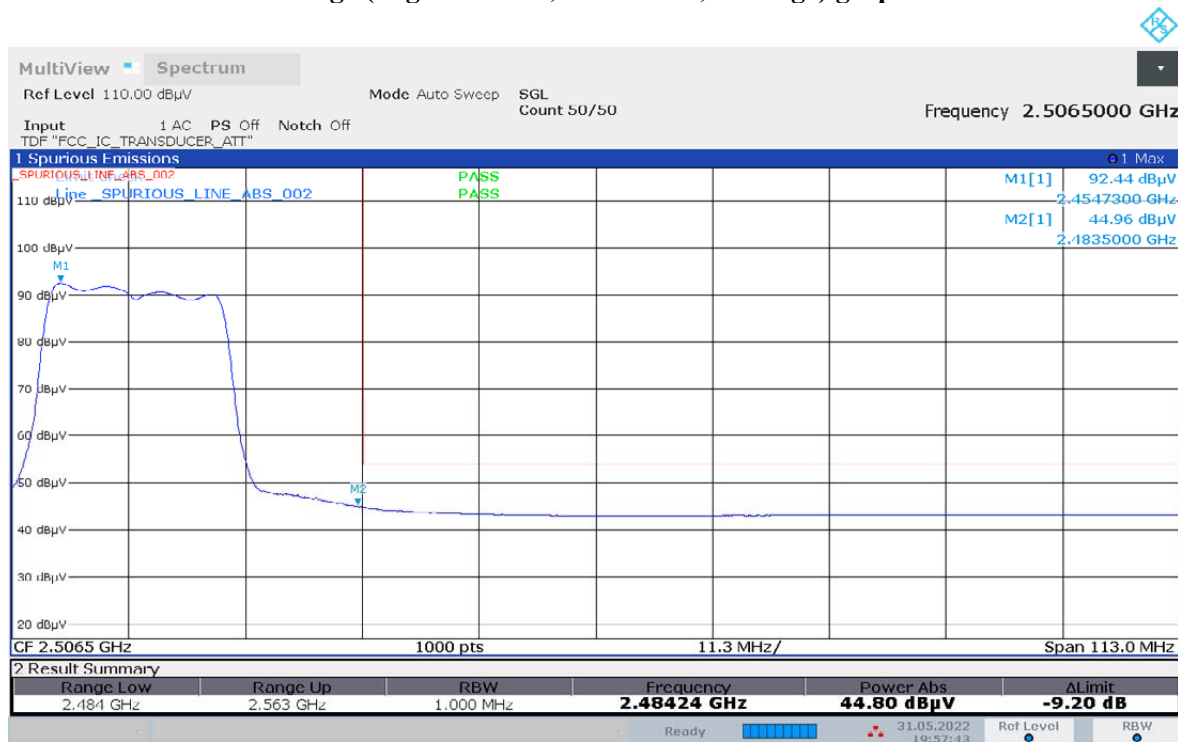


Restricted Band Edge (High Channel, Vertical, Average) graphical screen shot



19:47:30 31.05.2022

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



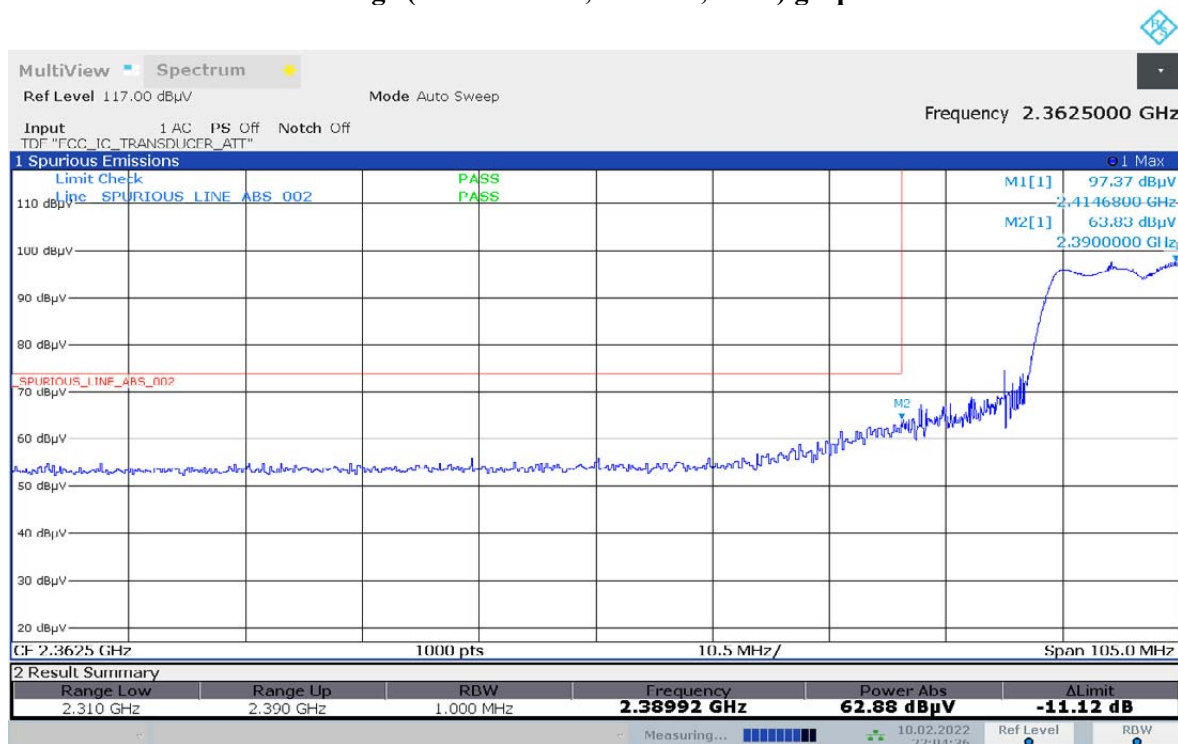
19:57:44 31.05.2022

Restricted Band Edge (Low Channel) tabular data

Remarks: Pass Result	Marginal Result	Fail Result
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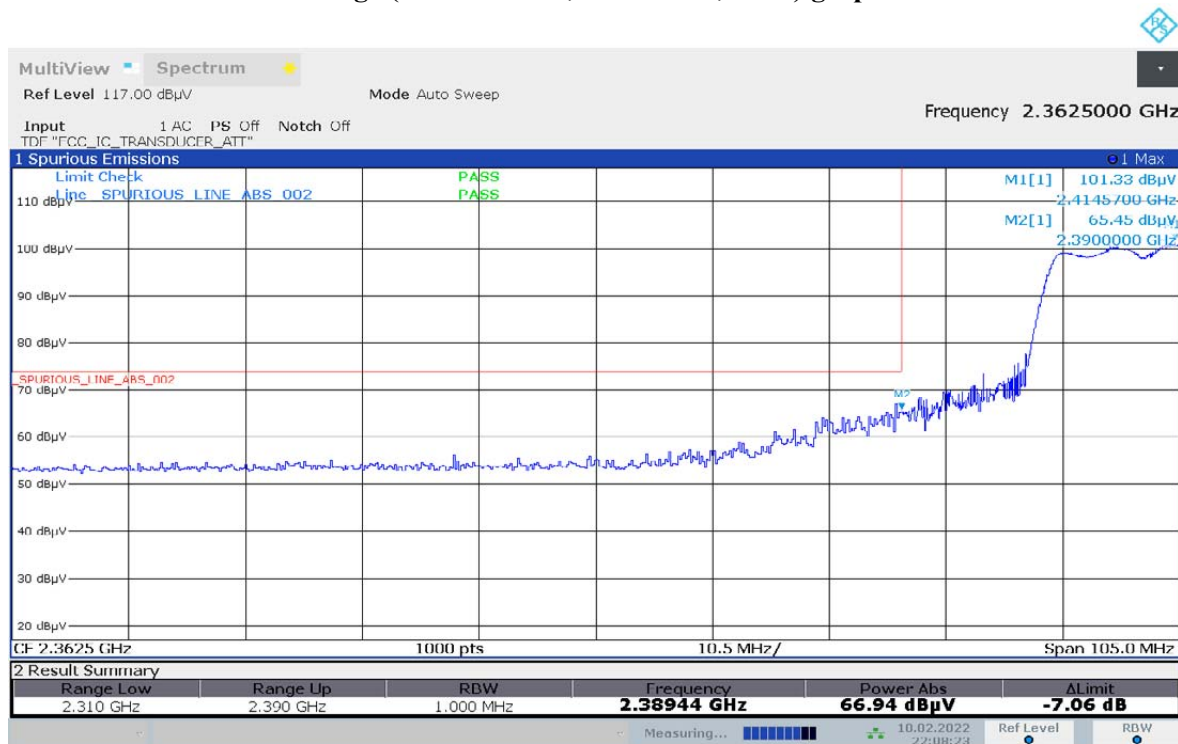
Humidity (%): 69.4
Test Date: Fri, 11 Feb, 2022

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



22:04:37 10.02.2022

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



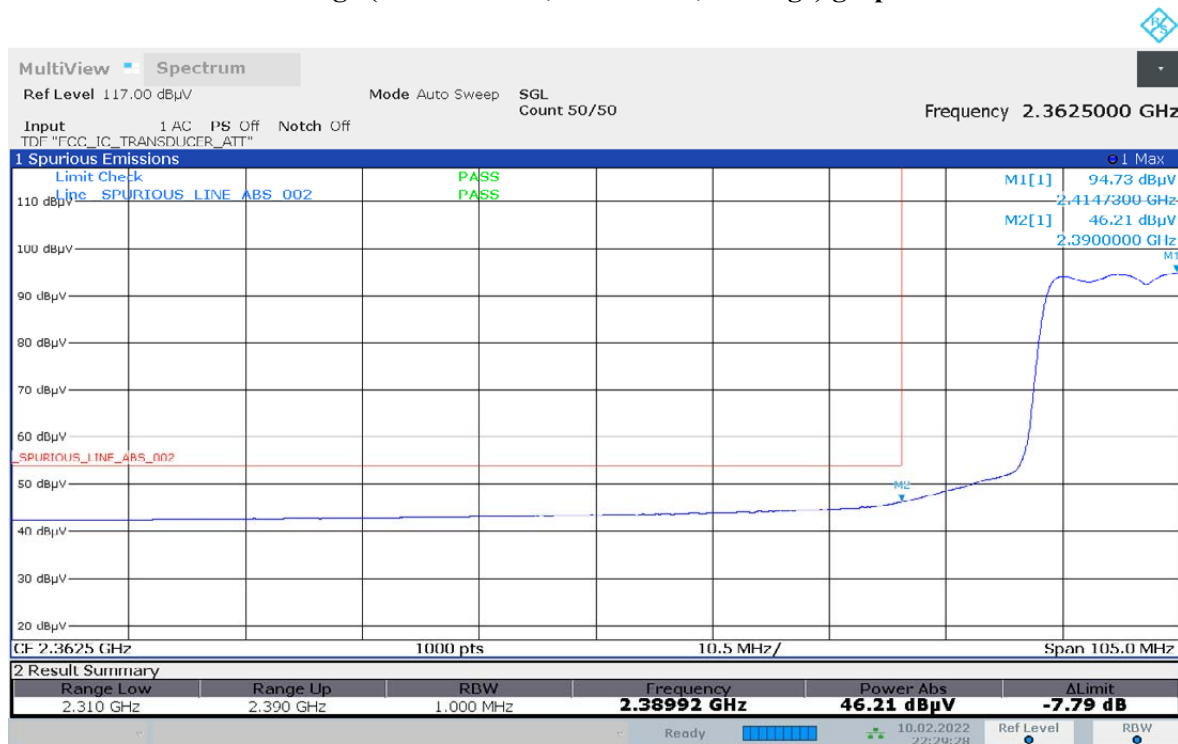
22:08:23 10.02.2022

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



22:19:28 10.02.2022

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



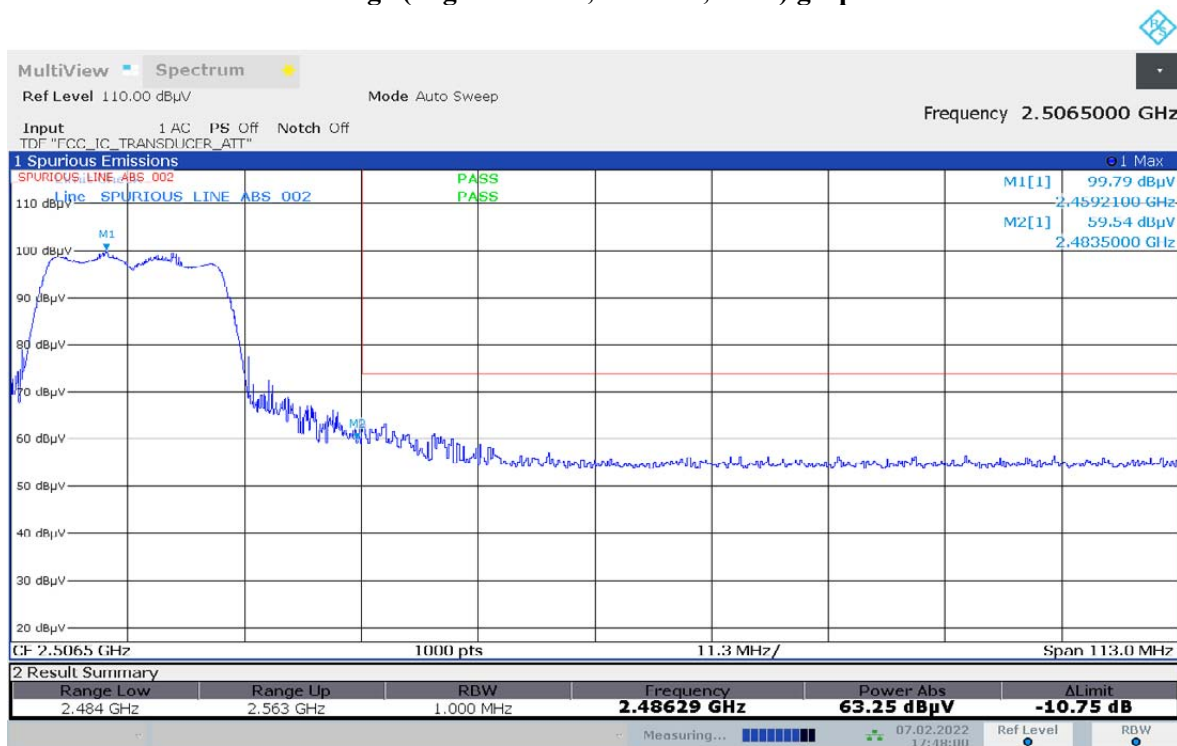
22:29:29 10.02.2022

Restricted Band Edge (High Channel) tabular data

Remarks: Pass Result	Marginal Result	Fail Result
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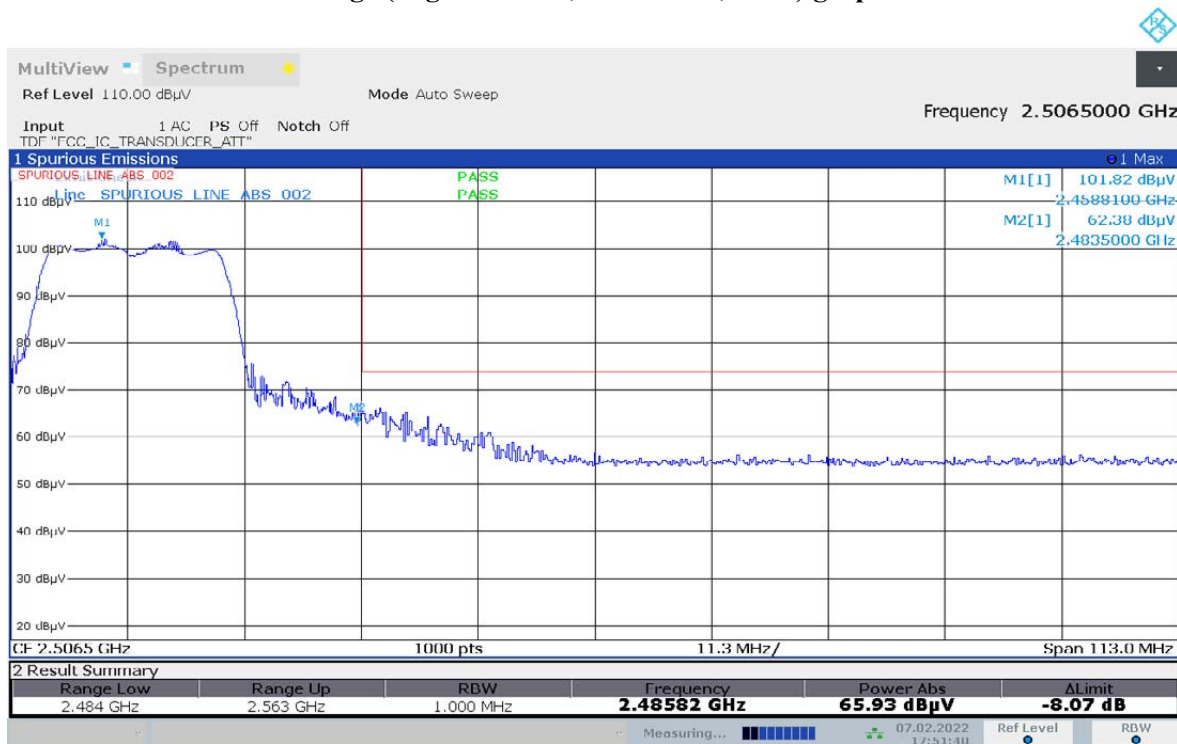
Humidity (%): 69.3
Test Date: Tue, 8 Feb, 2022

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



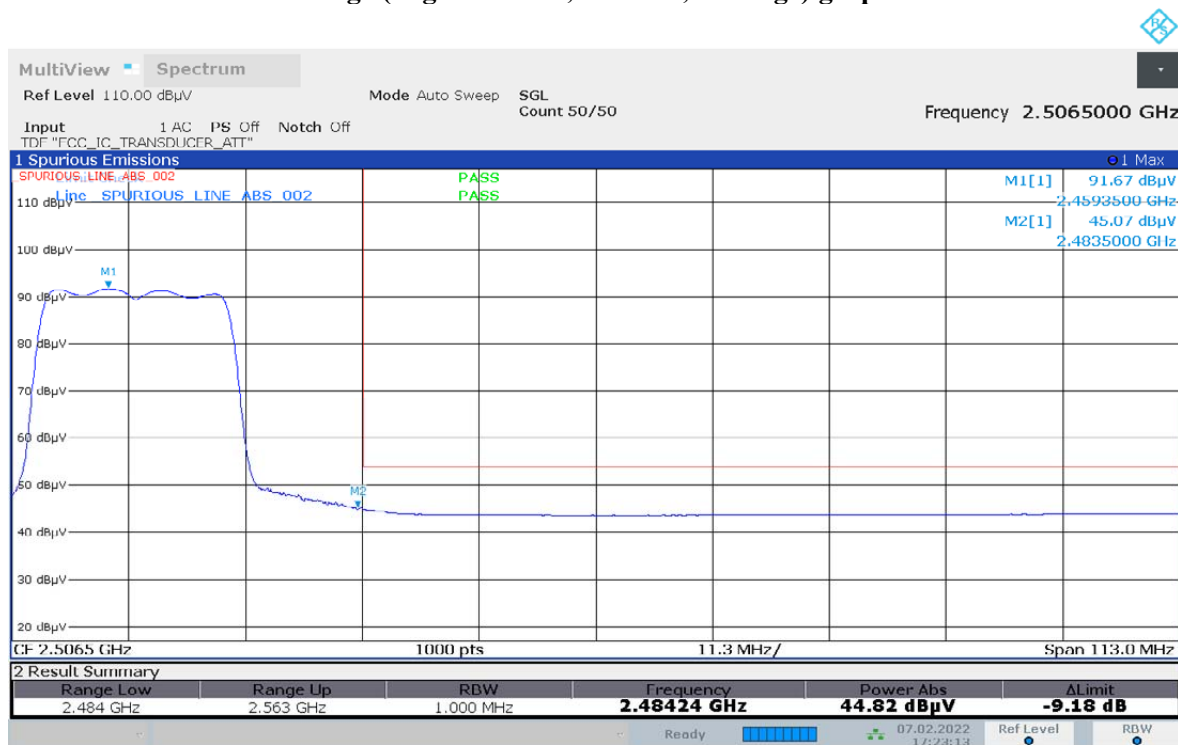
17:48:01 07.02.2022

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



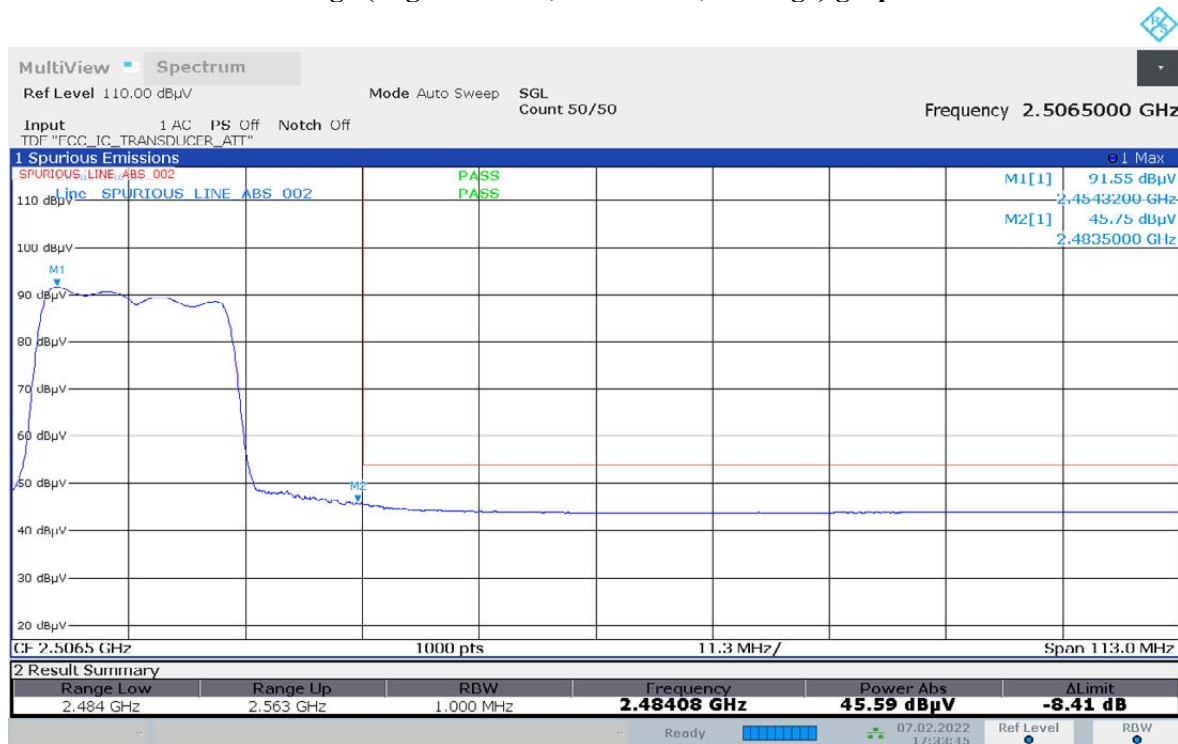
17:51:41 07.02.2022

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



17:23:14 07.02.2022

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



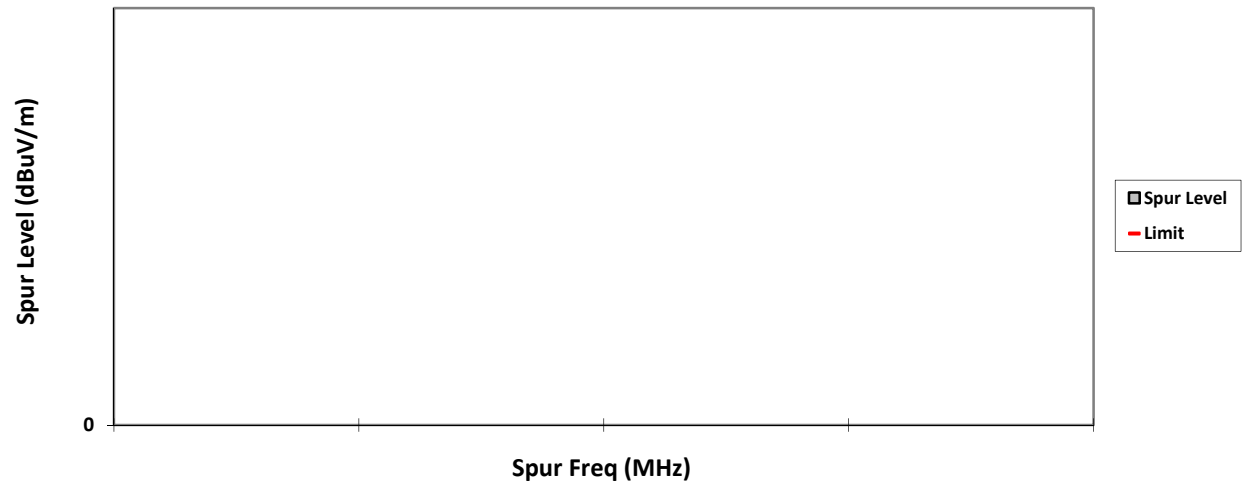
17:33:46 07.02.2022

Radiated Emission (Low Channel) tabular data

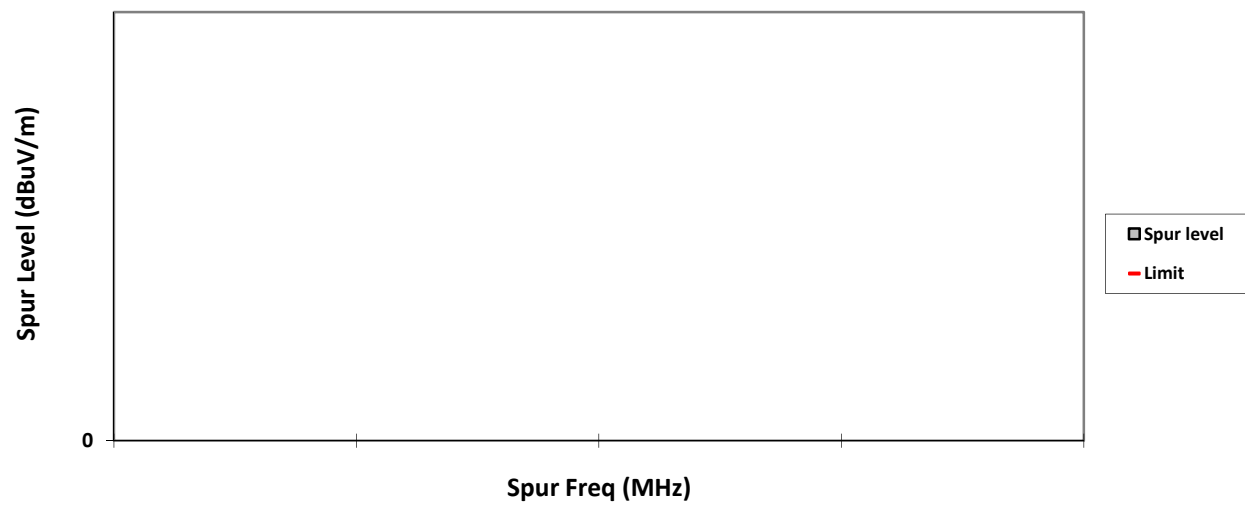
Remarks: Pass Result	Marginal Result	Fail Result
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Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
***Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible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

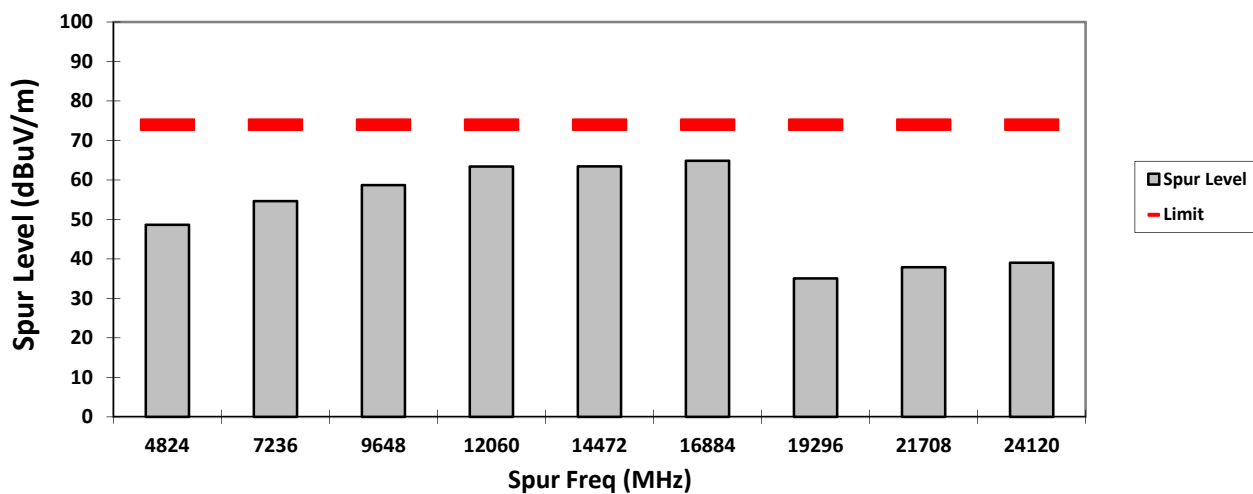
VERTICAL, QPK



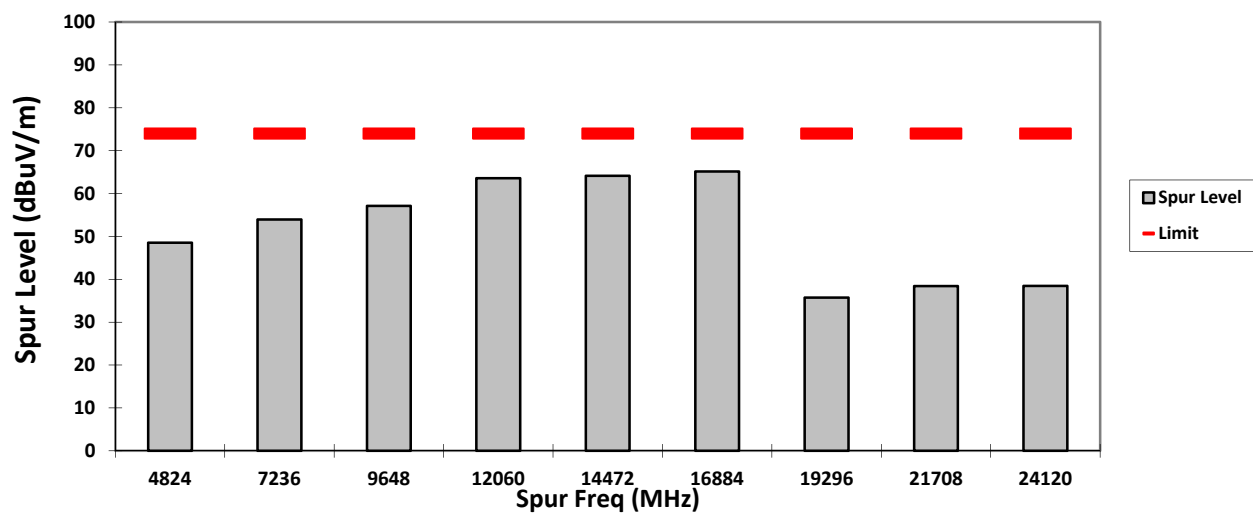
HORIZONTAL, QPK



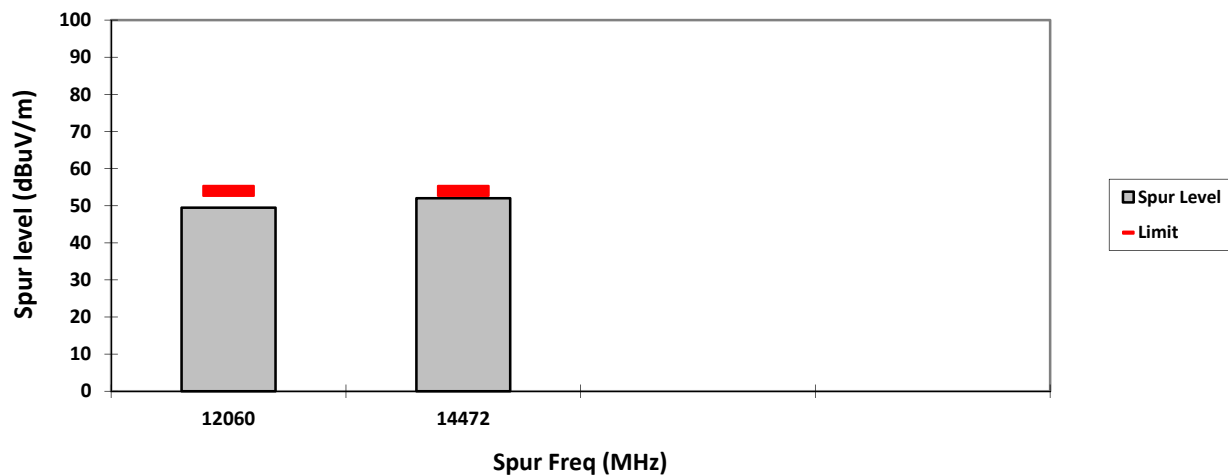
VERTICAL, PK



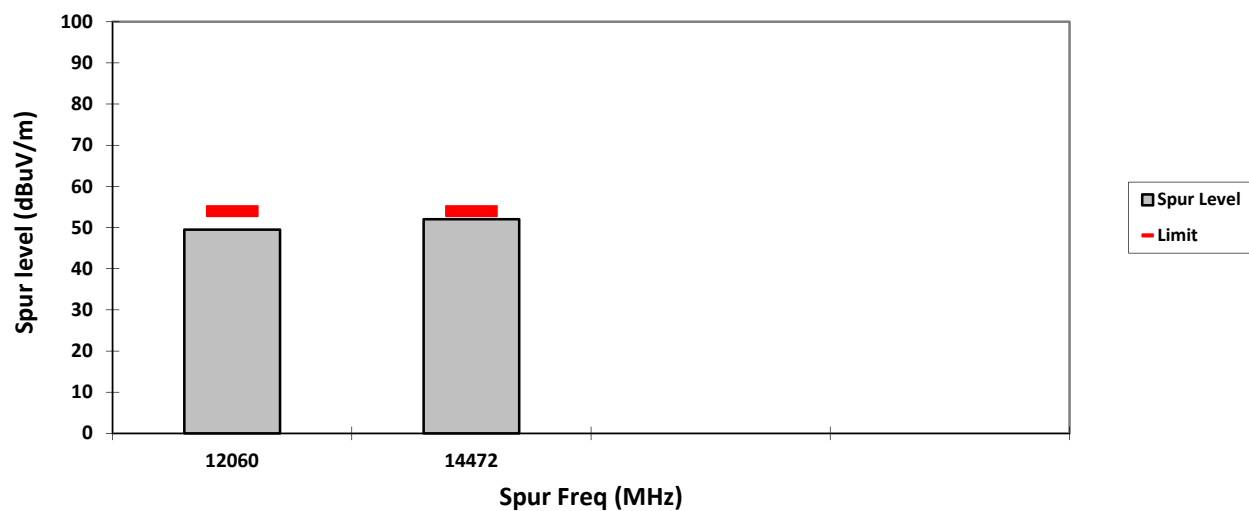
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



Test Channel: Mid Test Frequency: 2437.0000 MHz Test Standard: ANSI C63.10-2013 Worst Case Plane: Z-Plane (802.11b)

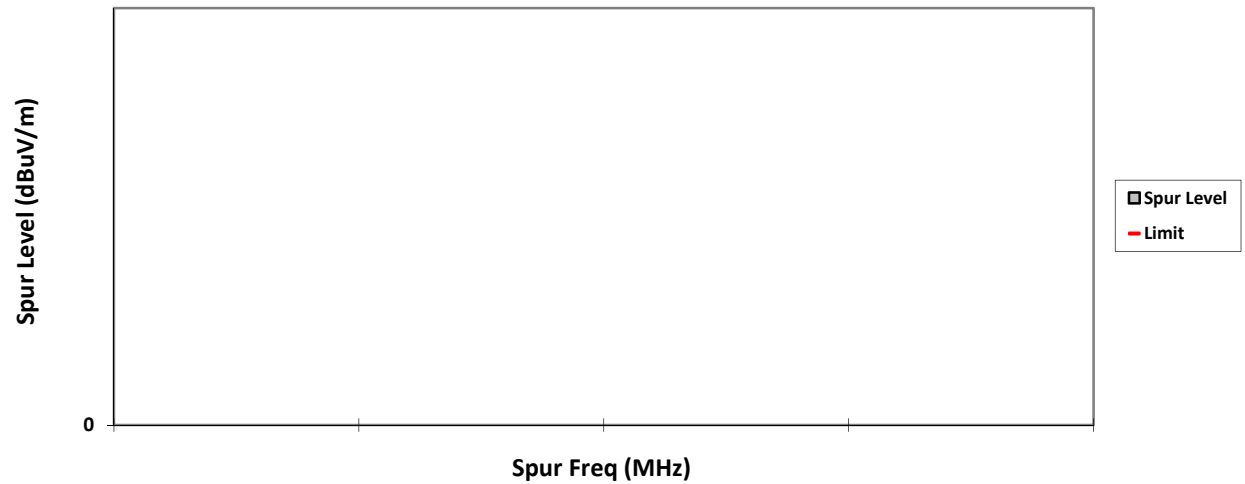
Vertical Radiated Emission Result

Remarks: Pass Result	Marginal Result	Fail Result
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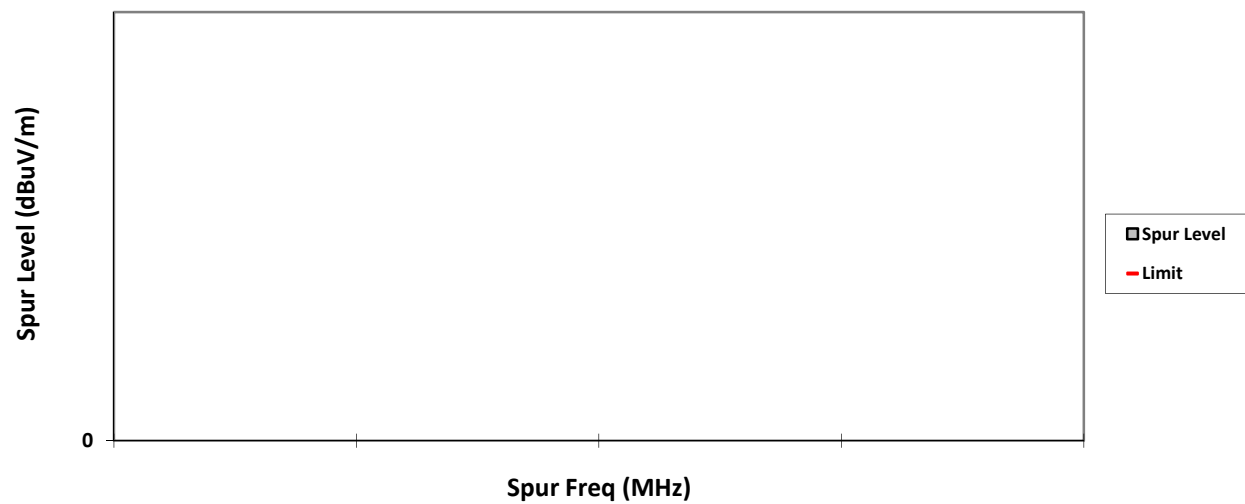
Temperature (degC): 23.6 **Humidity (%):** 69.3
Test Performed by: Qawiman&Nazrin **Test Date:** Tue, 8 Feb, 2022
System MU: 5.88 dB (30-1000MHz), 5.84 dB (1000-18000MHz), 6.02 dB (18000MHz-40000MHz)

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.**

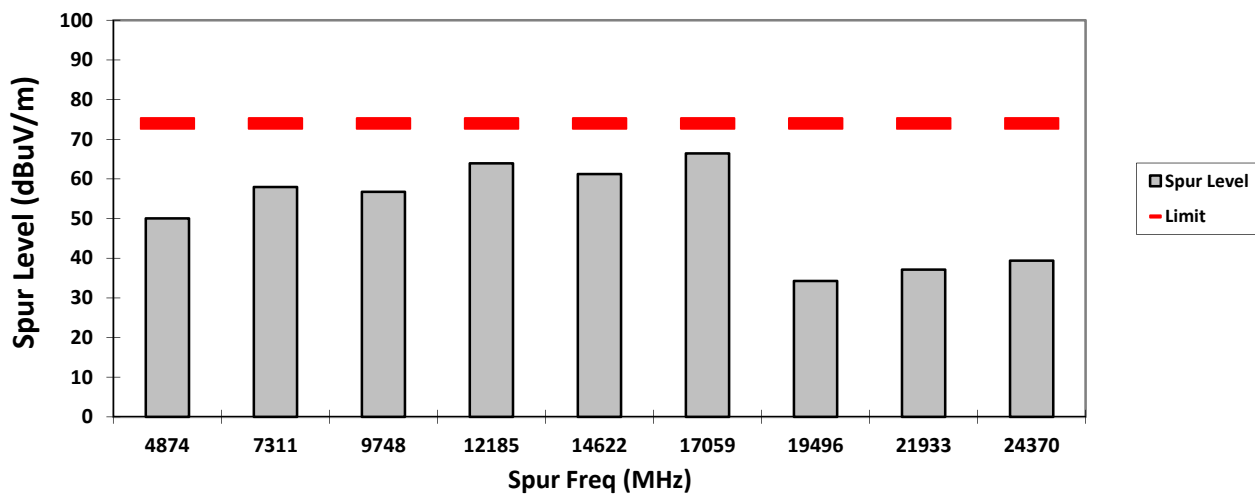
VERTICAL, QPK



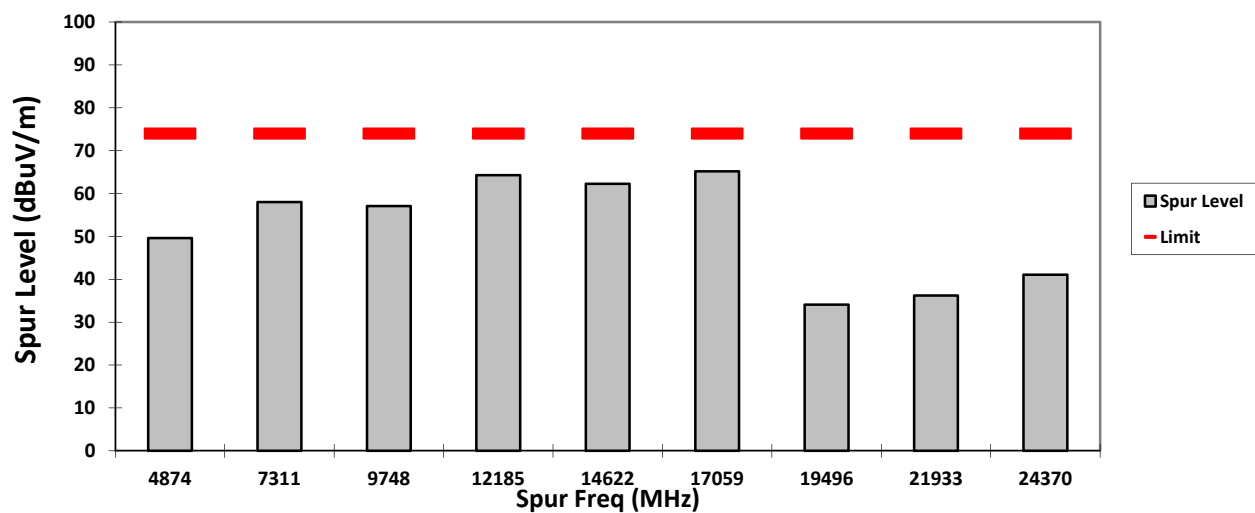
HORIZONTAL, QPK



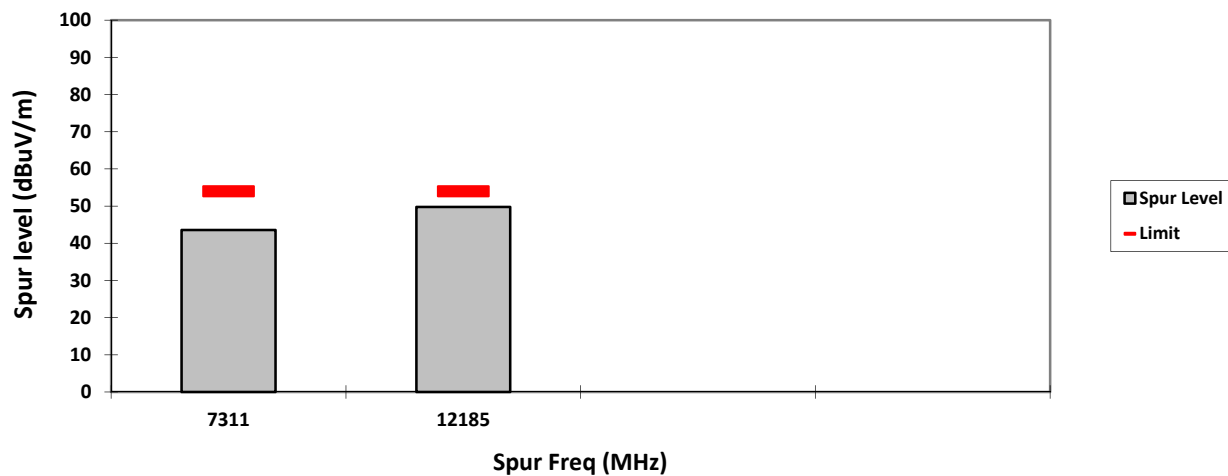
VERTICAL, PK



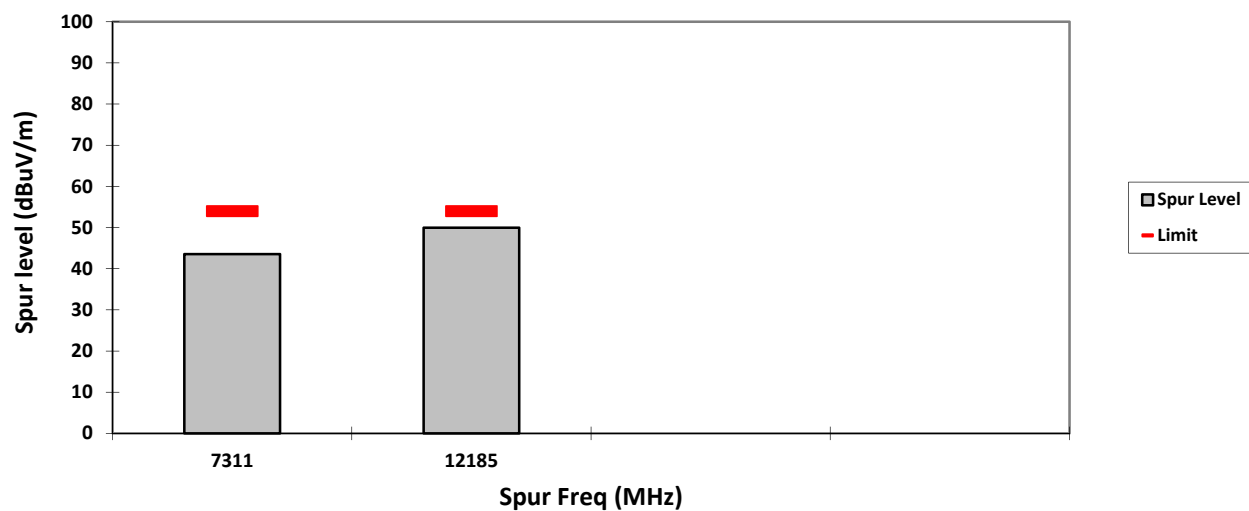
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV

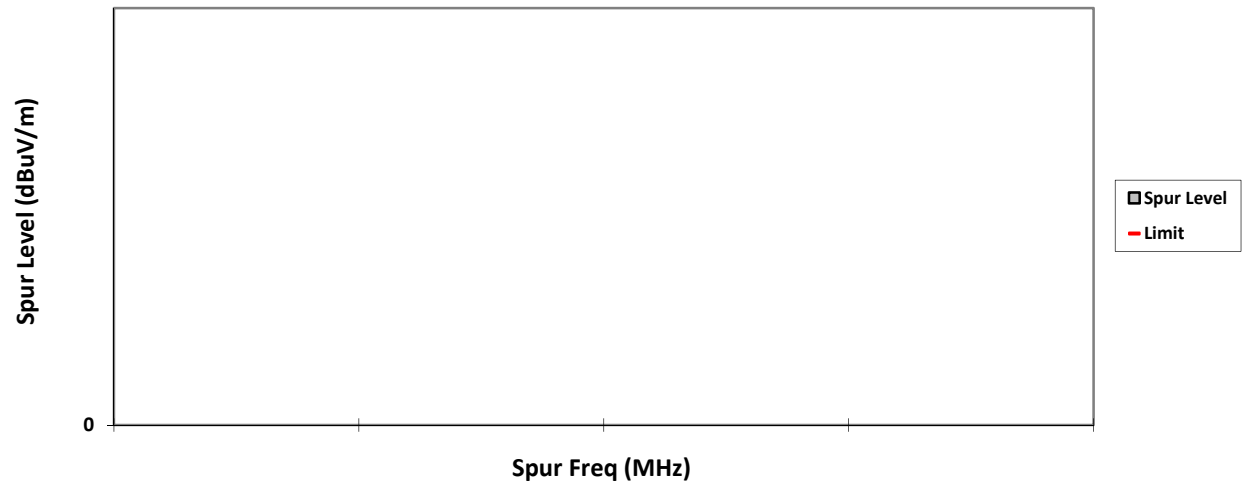


Radiated Emission (High Channel) tabular data

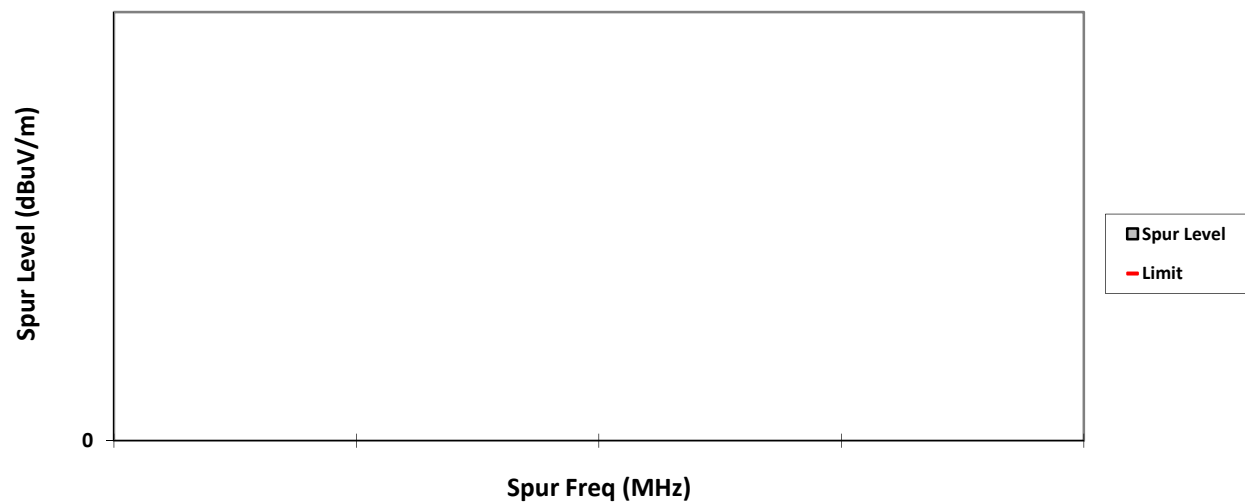
Remarks: Pass Result	Marginal Result	Fail Result
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Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
***Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible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

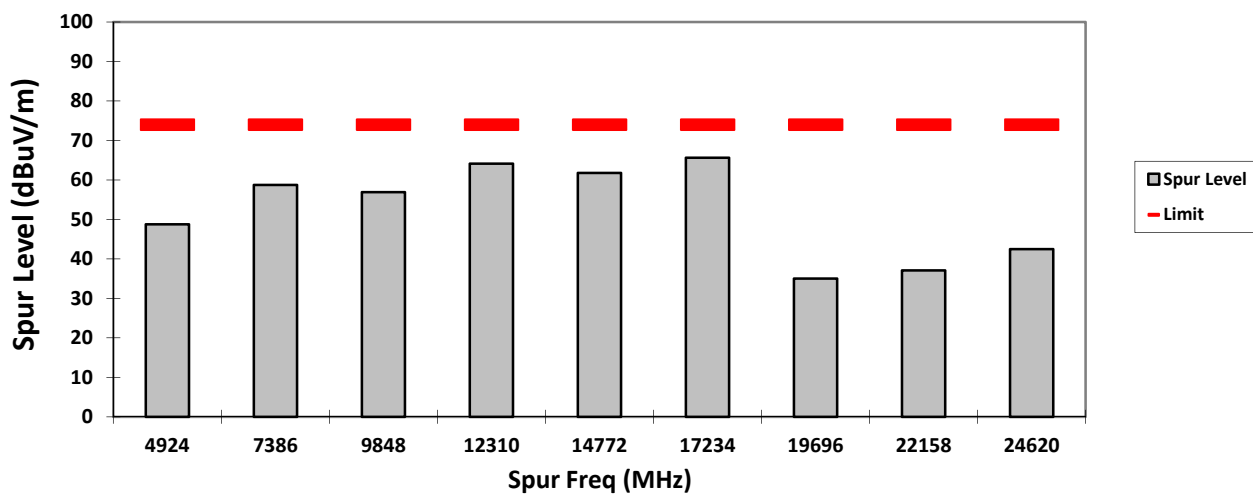
VERTICAL, QPK



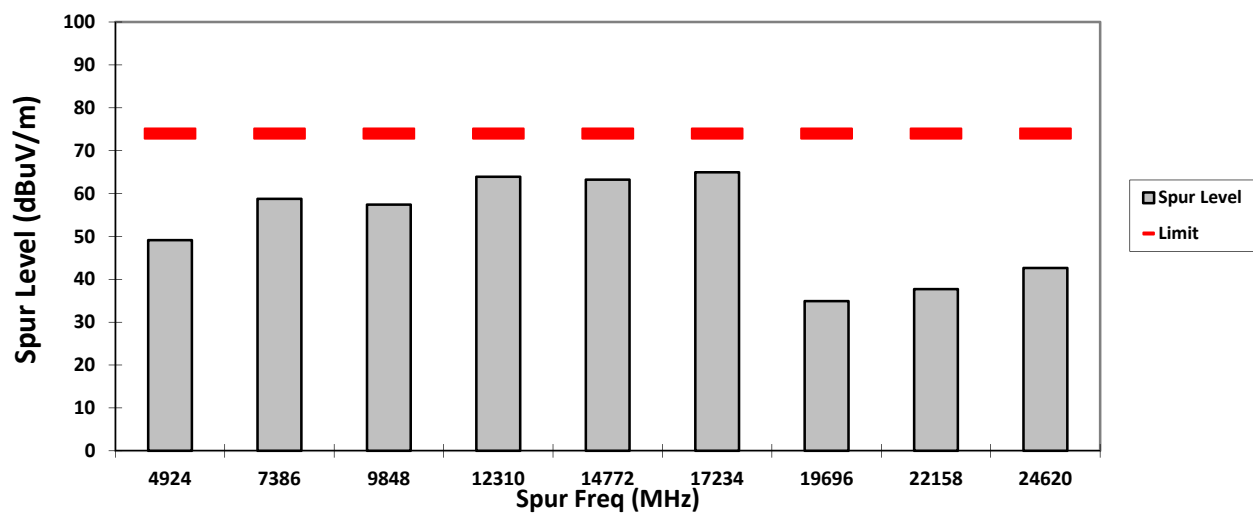
HORIZONTAL, QPK



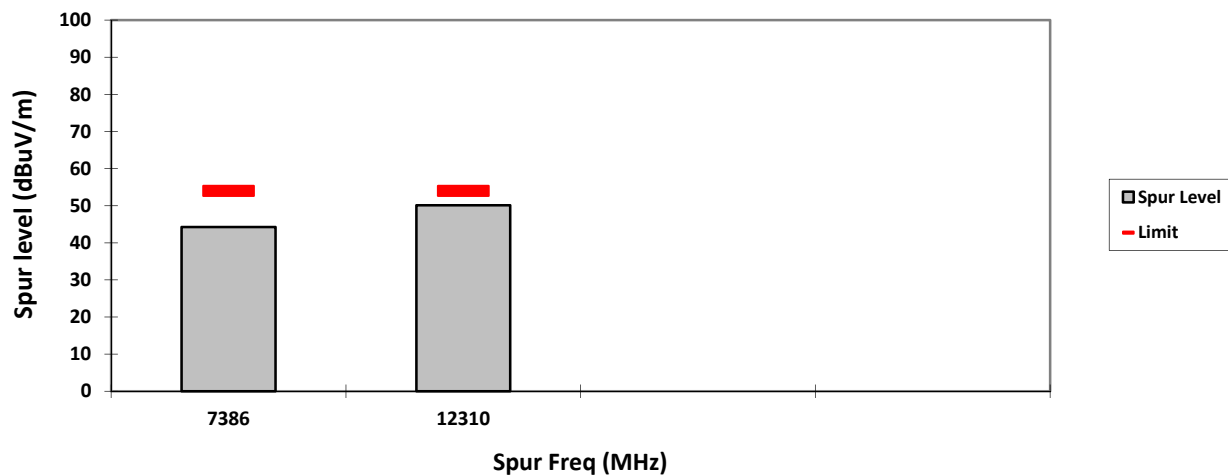
VERTICAL, PK



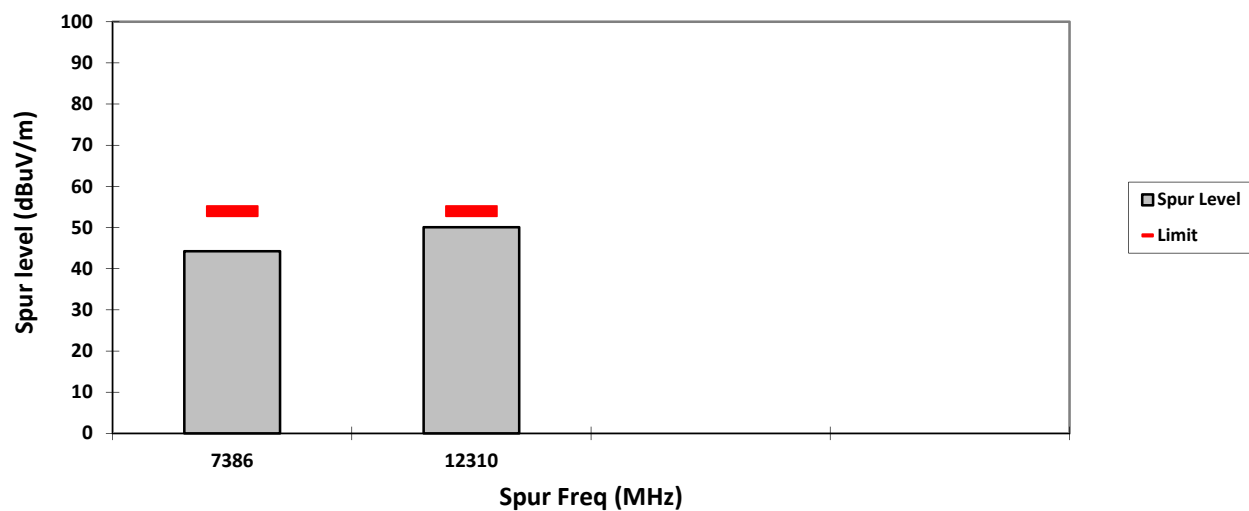
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



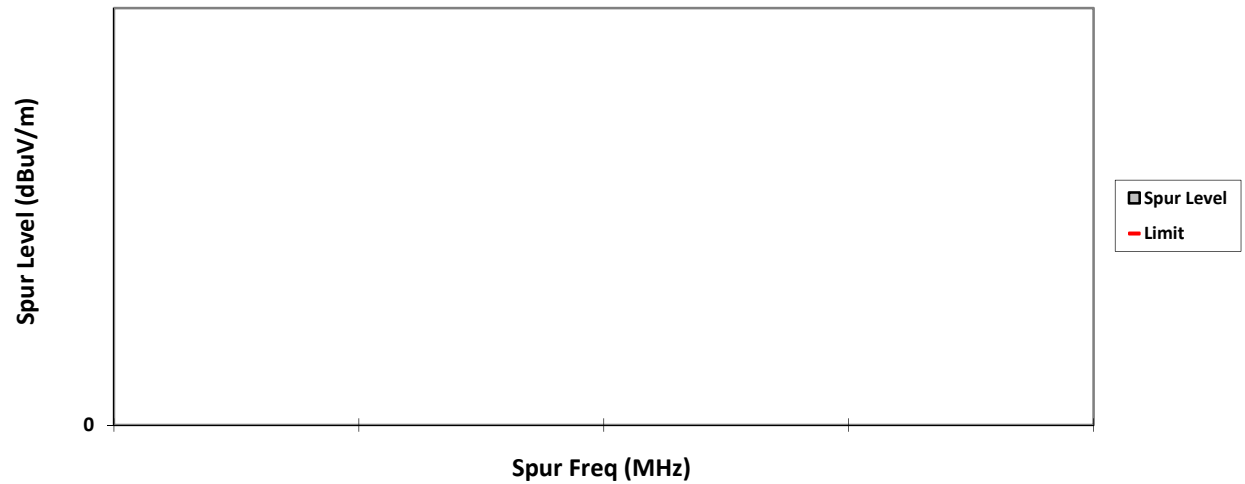
Radiated Emission (Low Channel) tabular data

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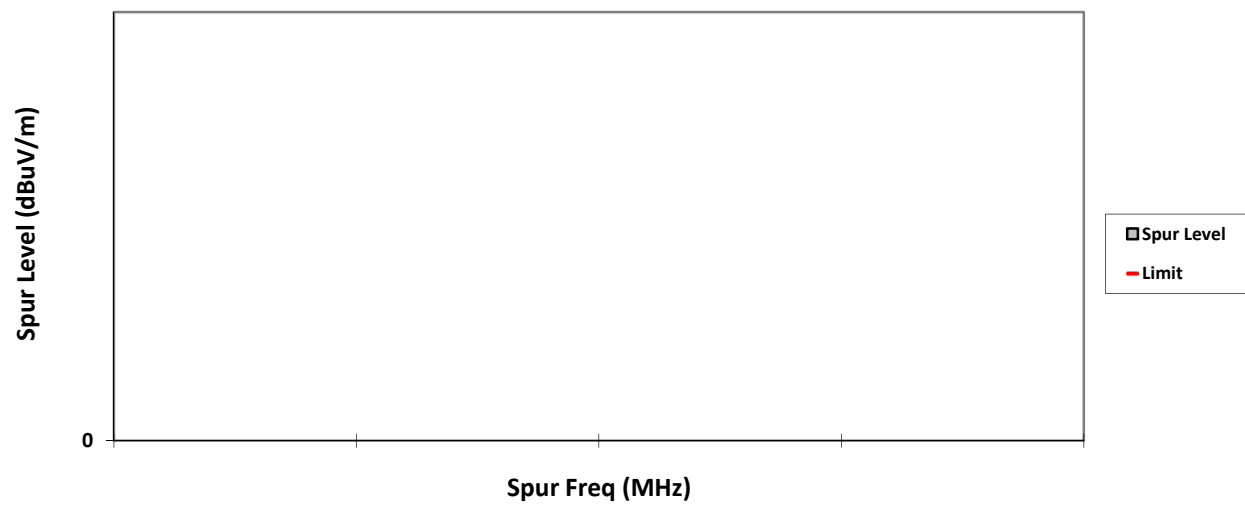
Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
***Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported.**

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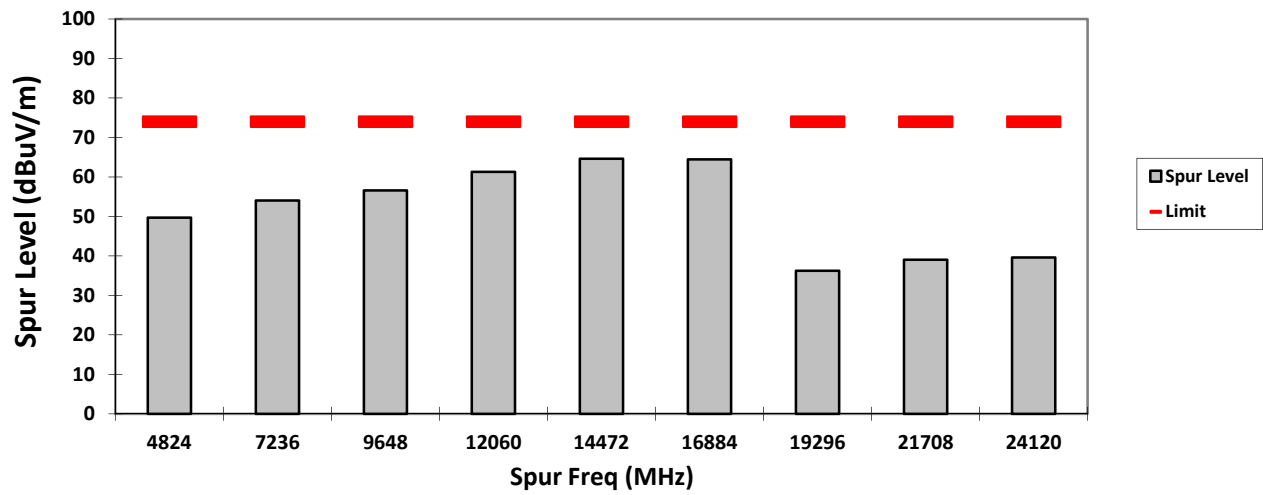
VERTICAL, QPK



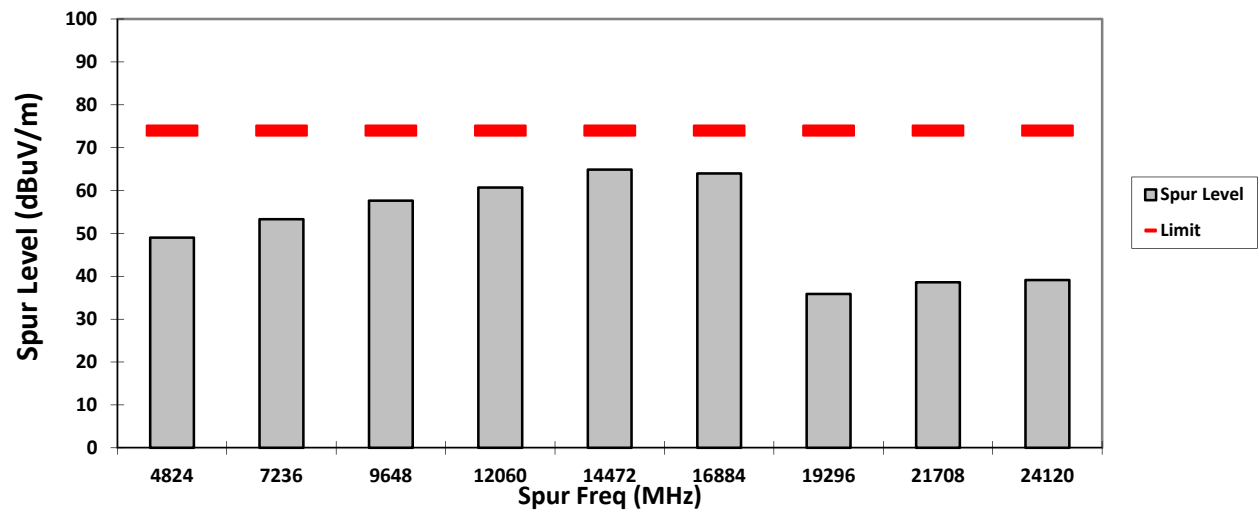
HORIZONTAL, QPK



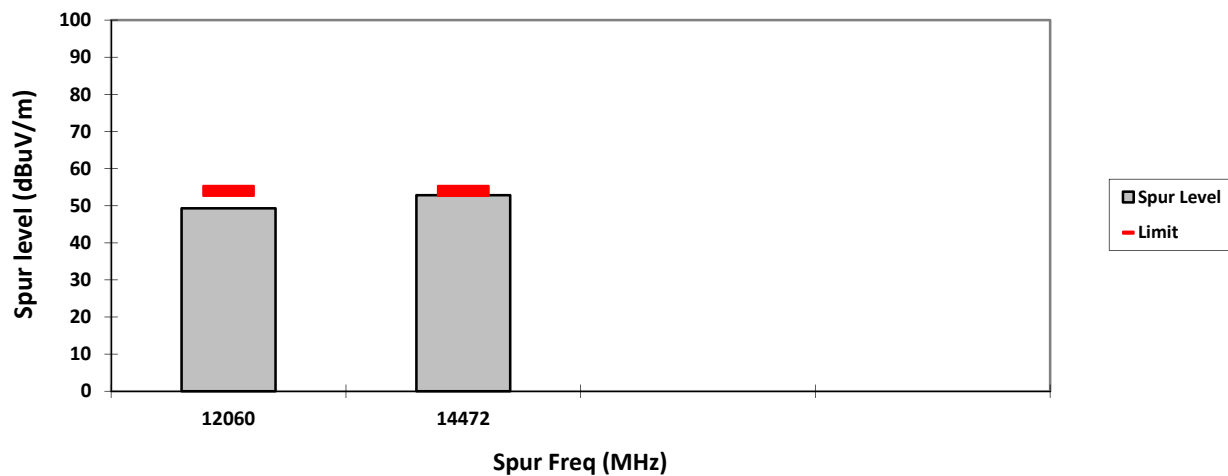
VERTICAL, PK



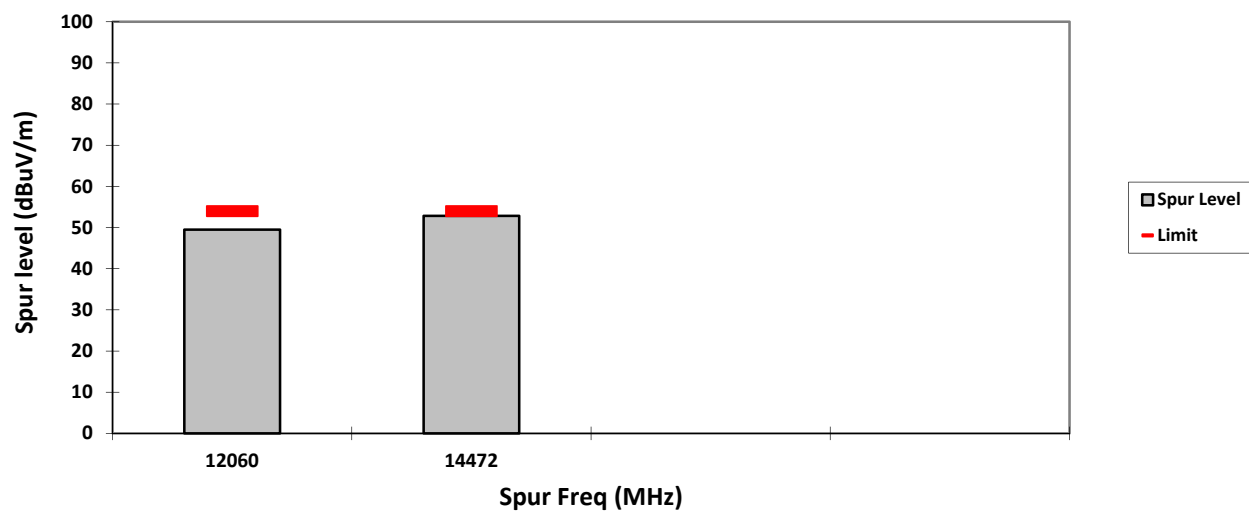
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



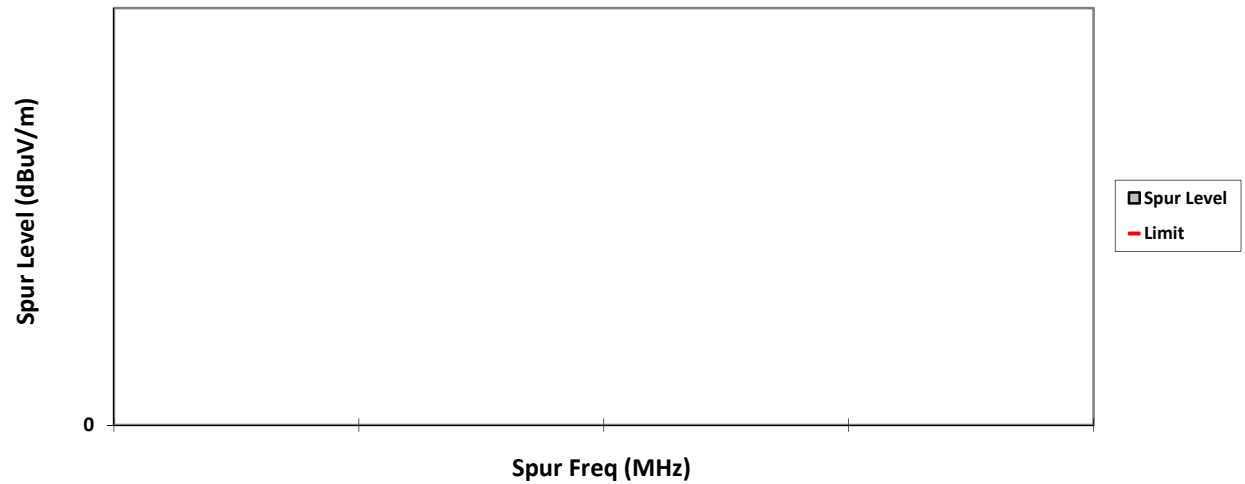
Test Channel: Mid Test Frequency: 2437.0000 MHz Test Standard: ANSI C63.10-2013 Worst Case Plane: Z-Plane (802.11g)

Vertical Radiated Emission Result

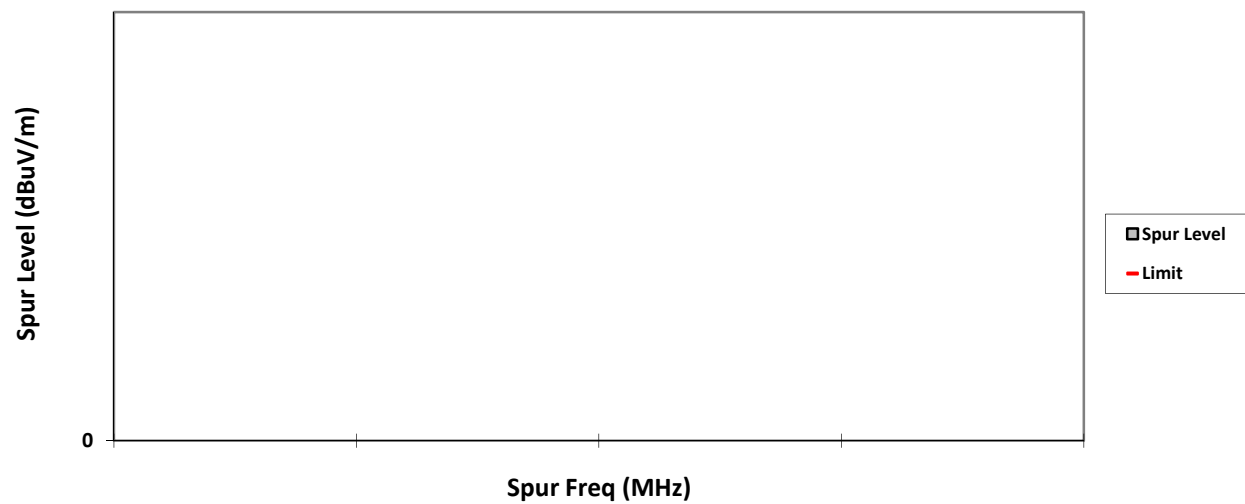
Remarks: Pass Result	Marginal Result	Fail Result
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Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
***Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible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

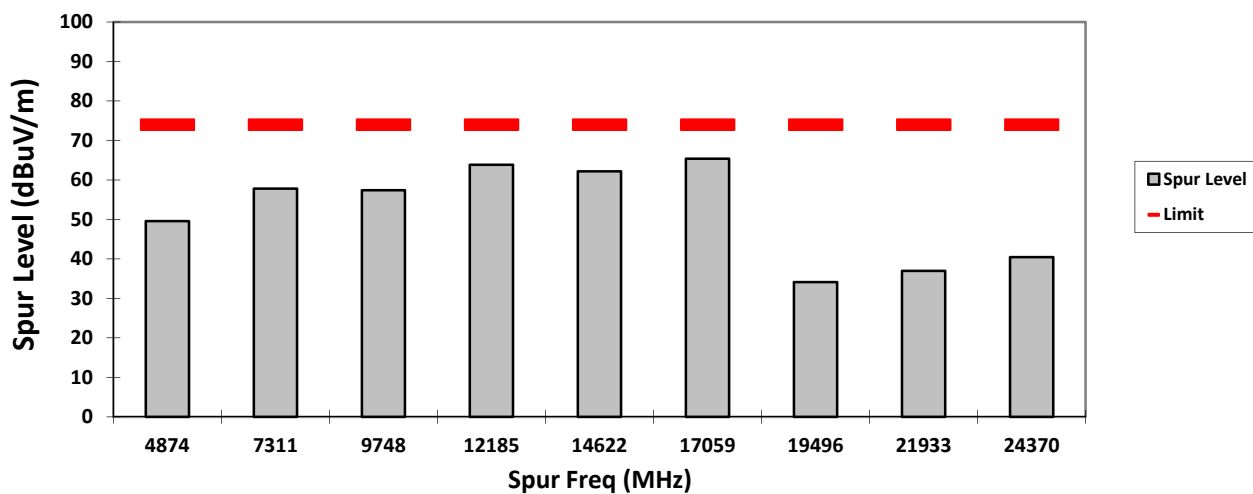
VERTICAL, QPK



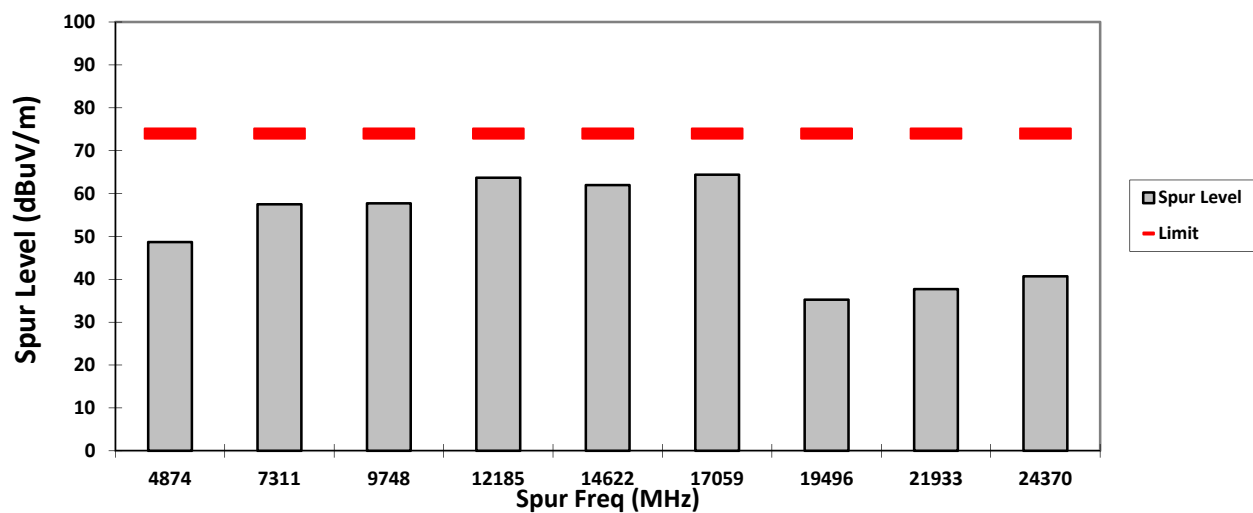
HORIZONTAL, QPK



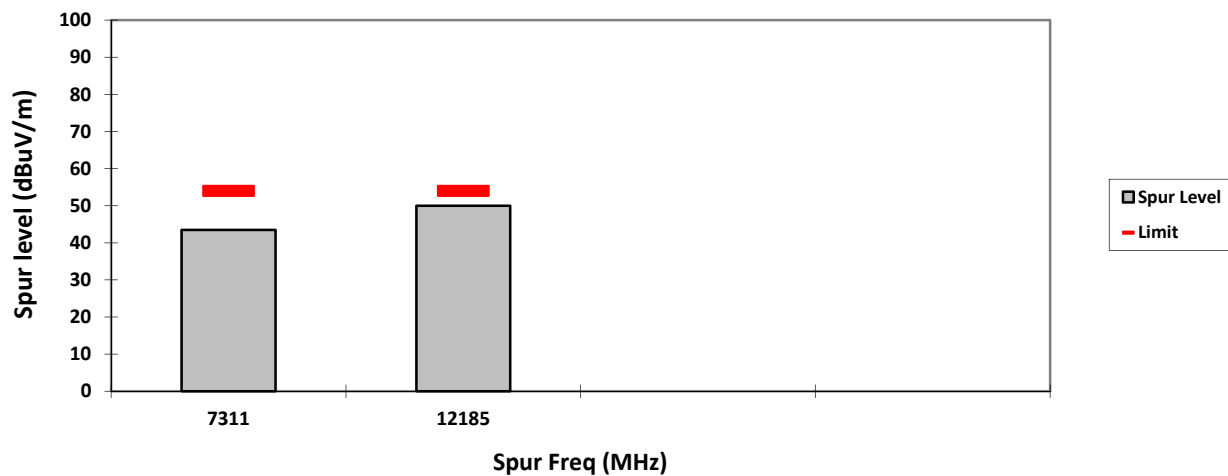
VERTICAL, PK



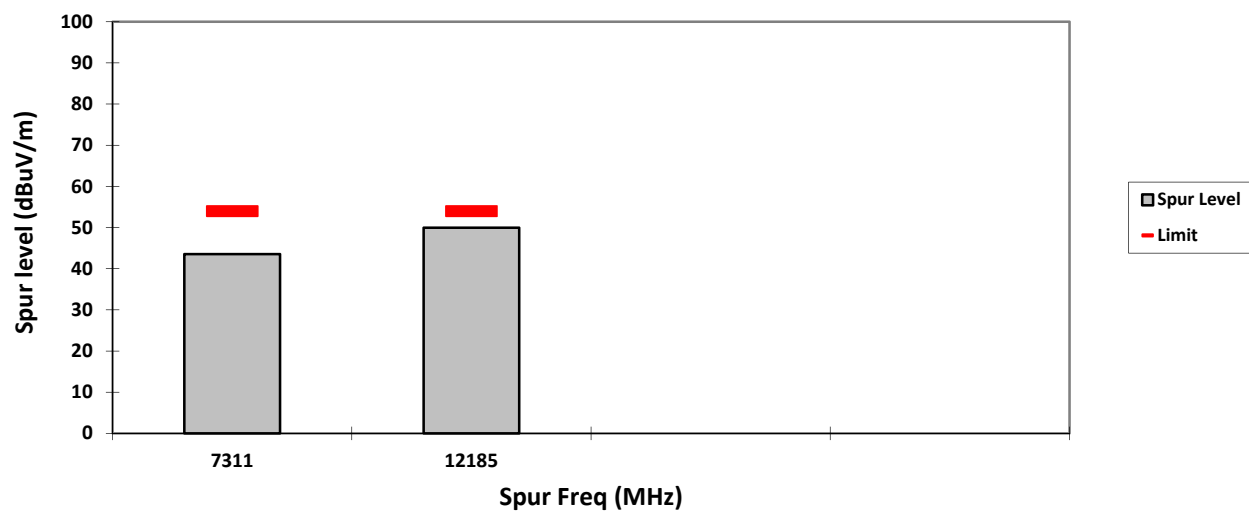
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV

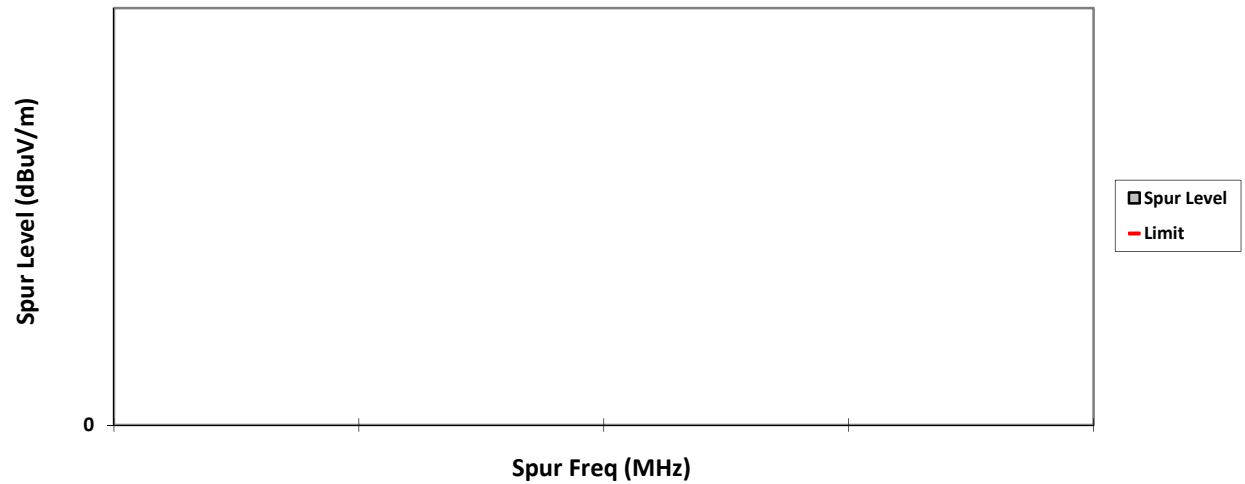


Radiated Emission (High Channel) tabular data

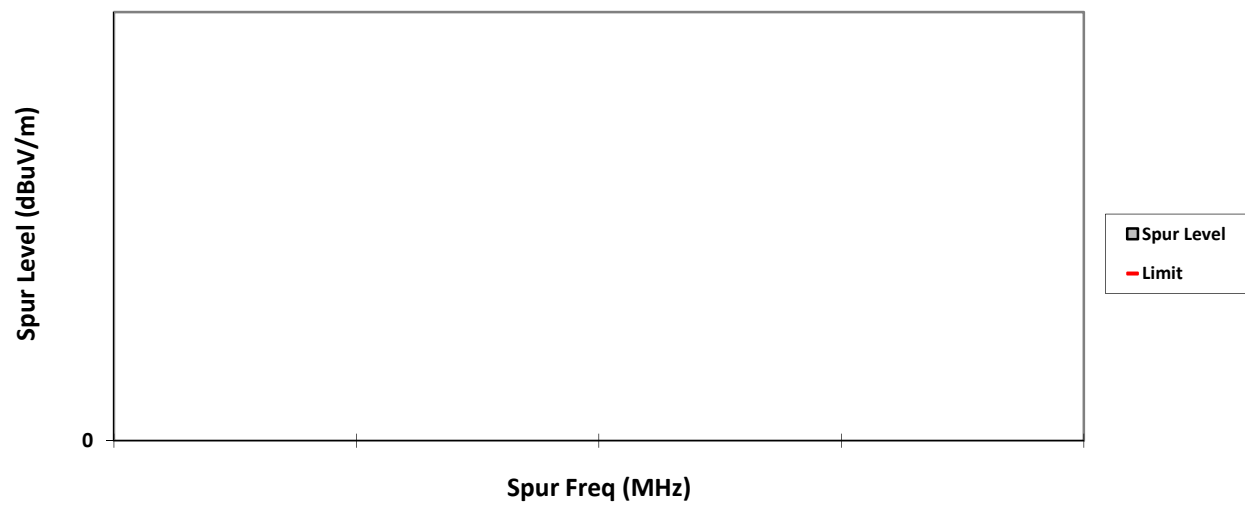
Remarks: Pass Result	Marginal Result	Fail Result
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Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
***Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible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

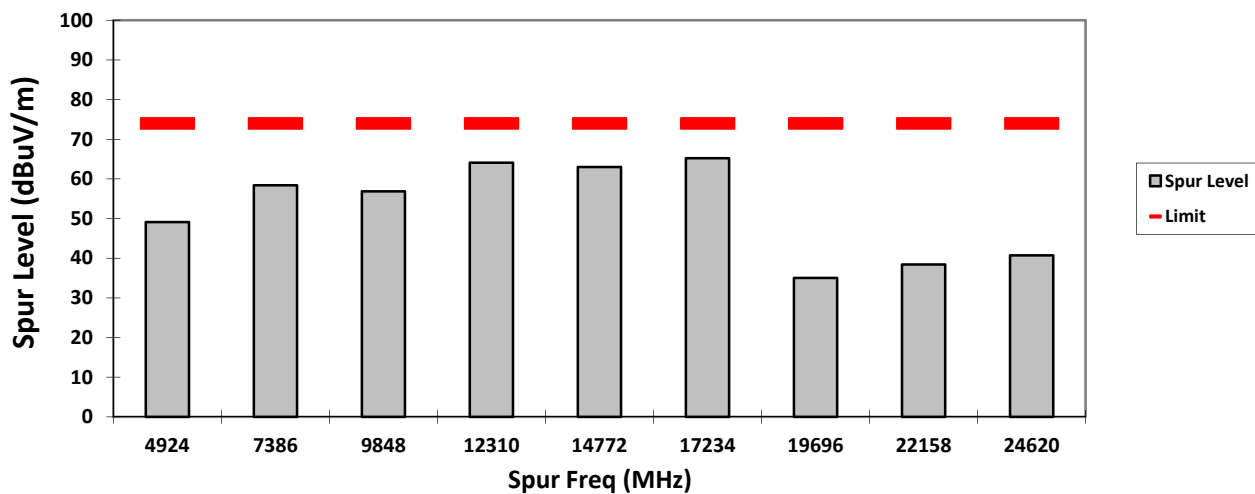
VERTICAL, QPK



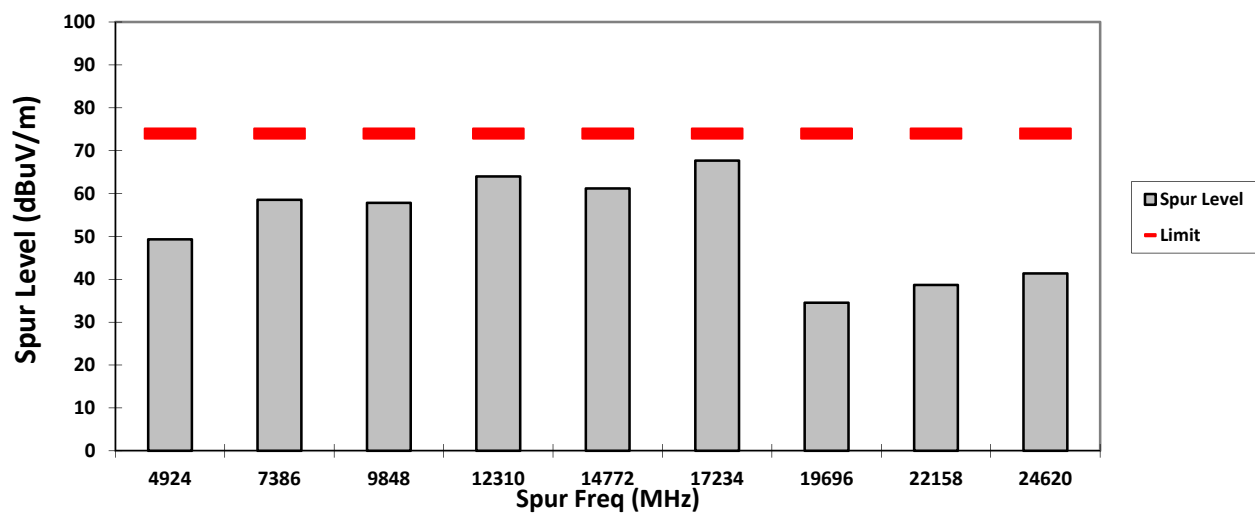
HORIZONTAL, QPK



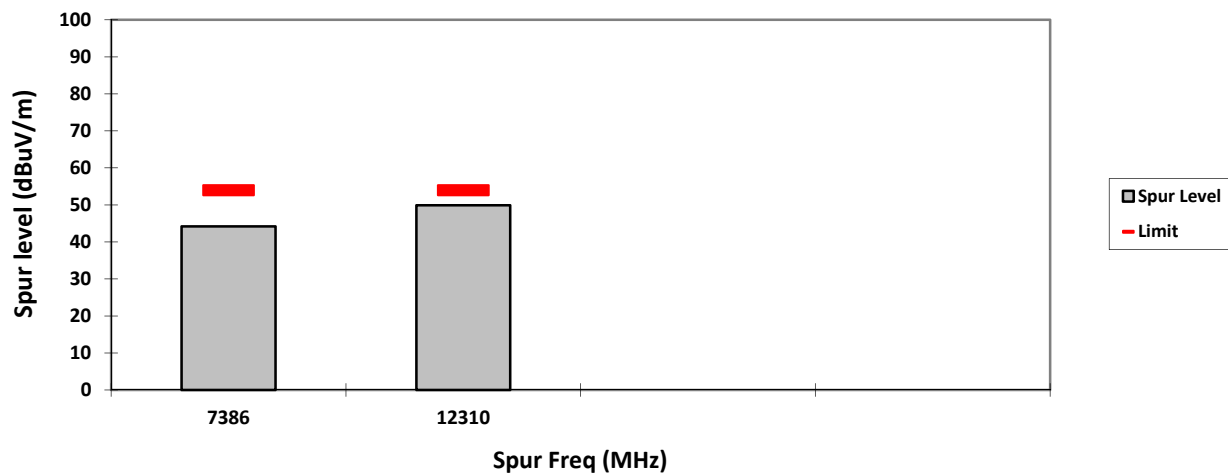
VERTICAL, PK



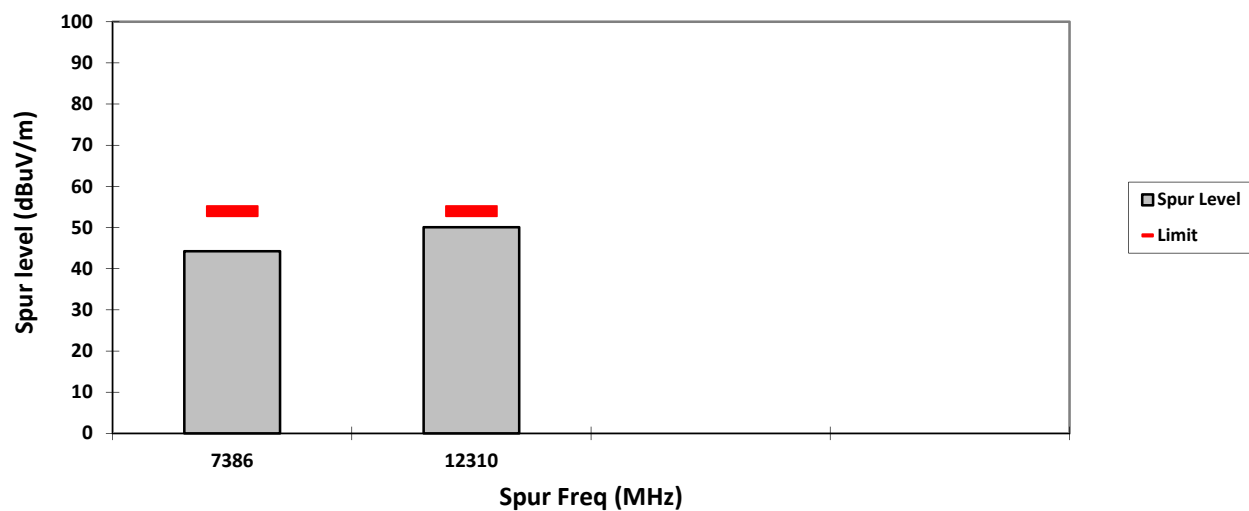
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



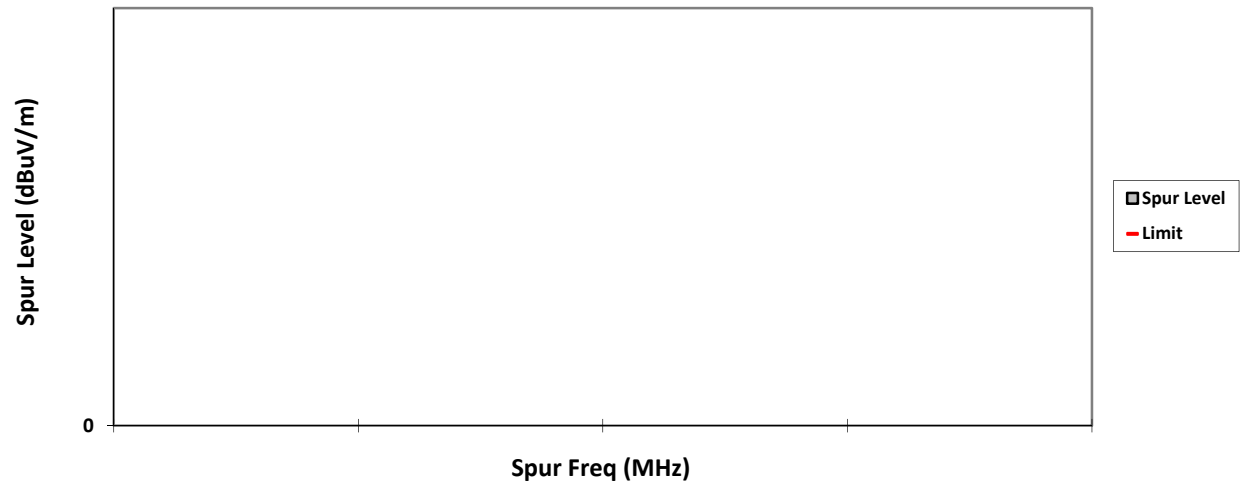
Radiated Emission (Low Channel) tabular data

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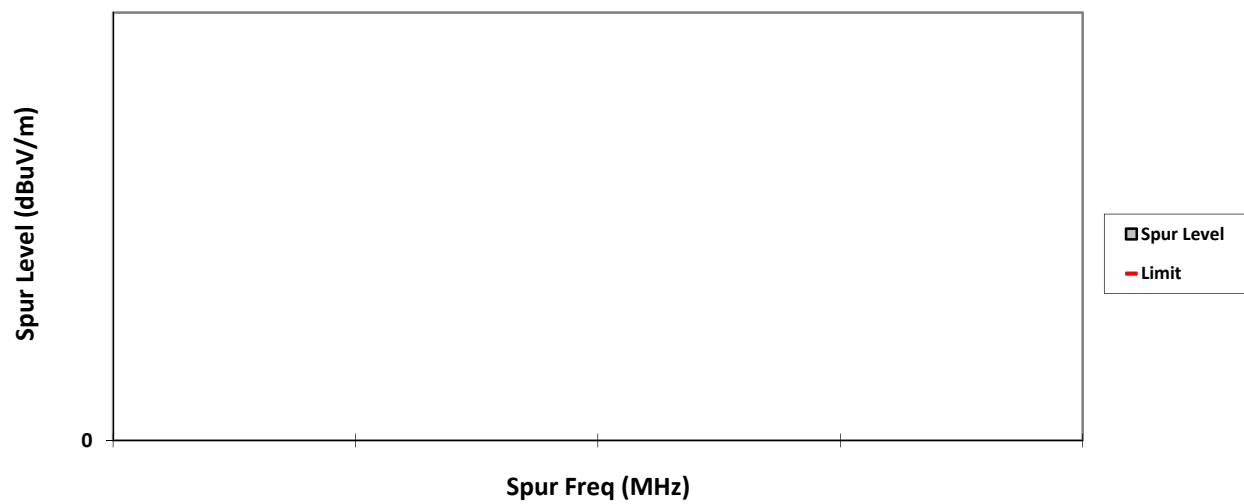
Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
***Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported.**

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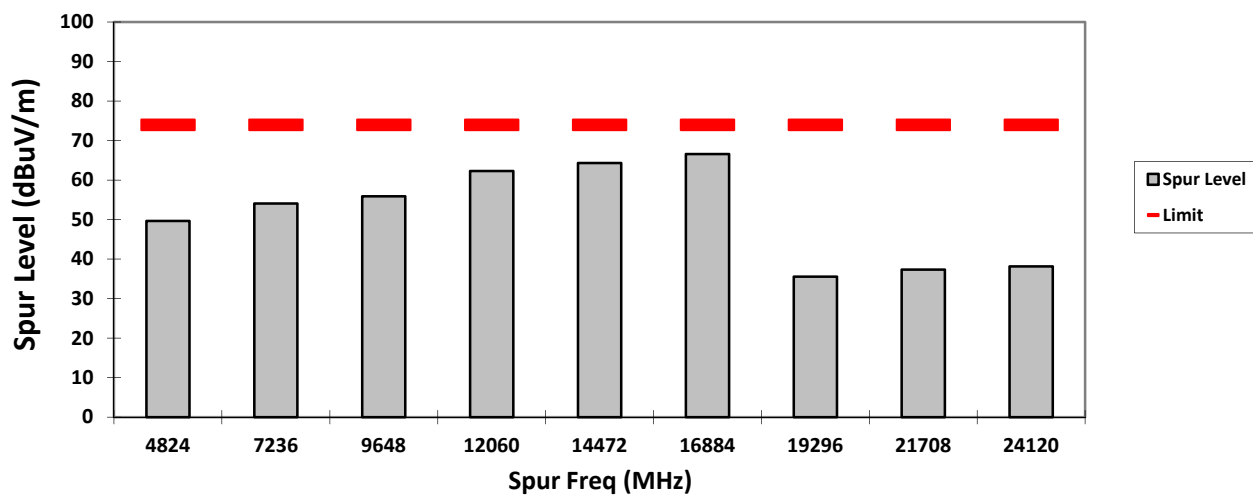
VERTICAL, QPK



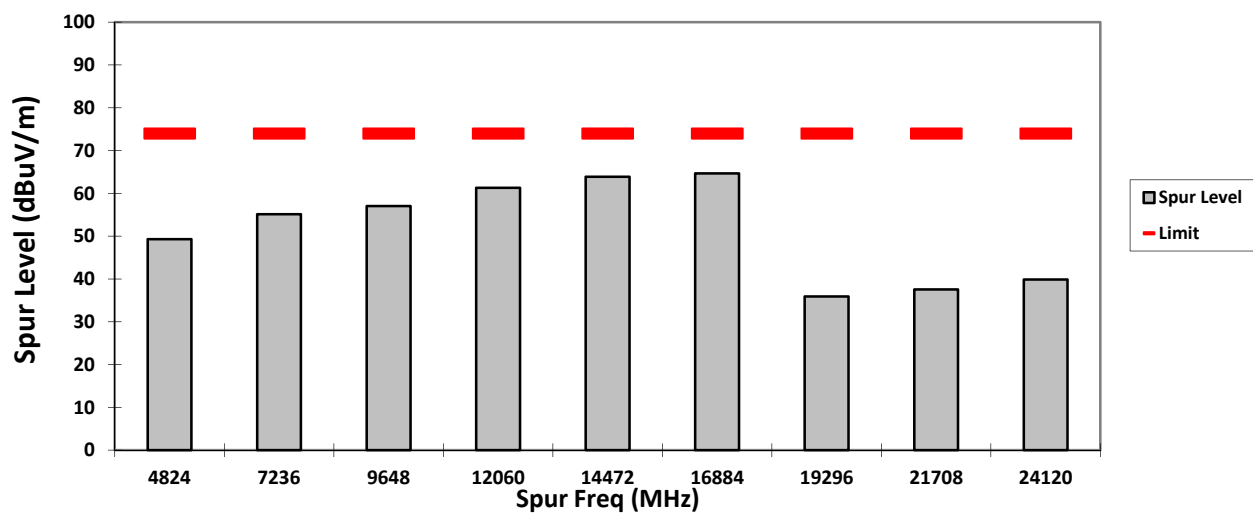
HORIZONTAL, QPK



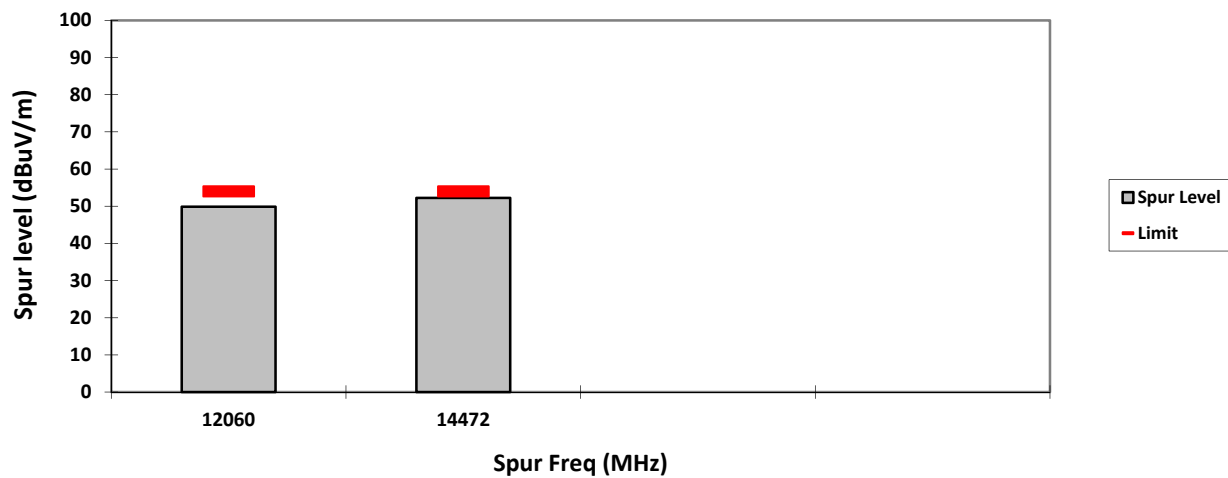
VERTICAL, PK



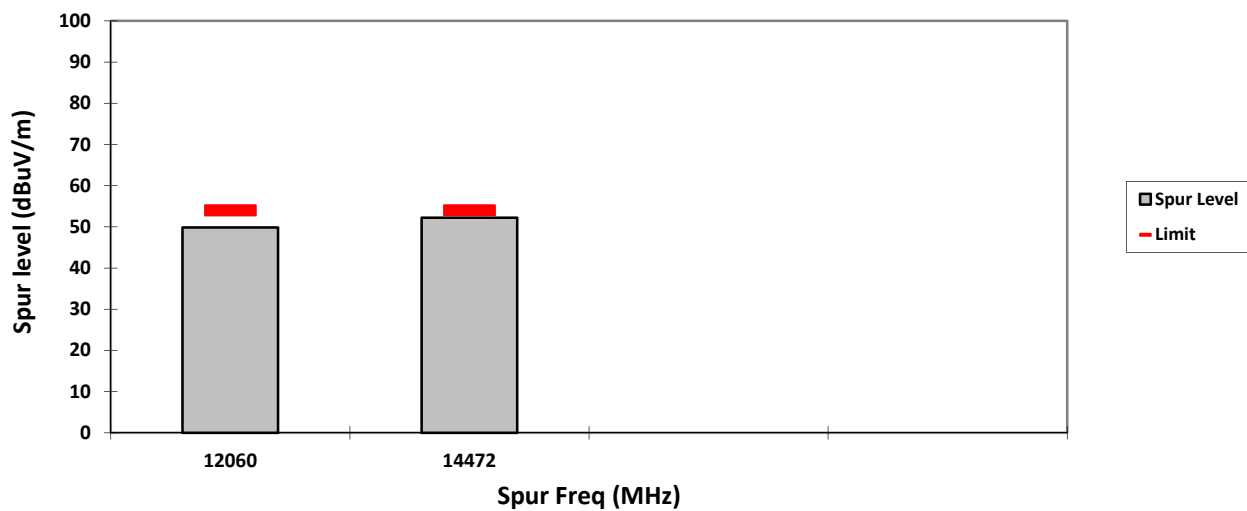
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



Test Channel: Mid Test Frequency: 2437.0000 MHz Test Standard: ANSI C63.10-2013 Worst Case Plane: Z-Plane (802.11n)

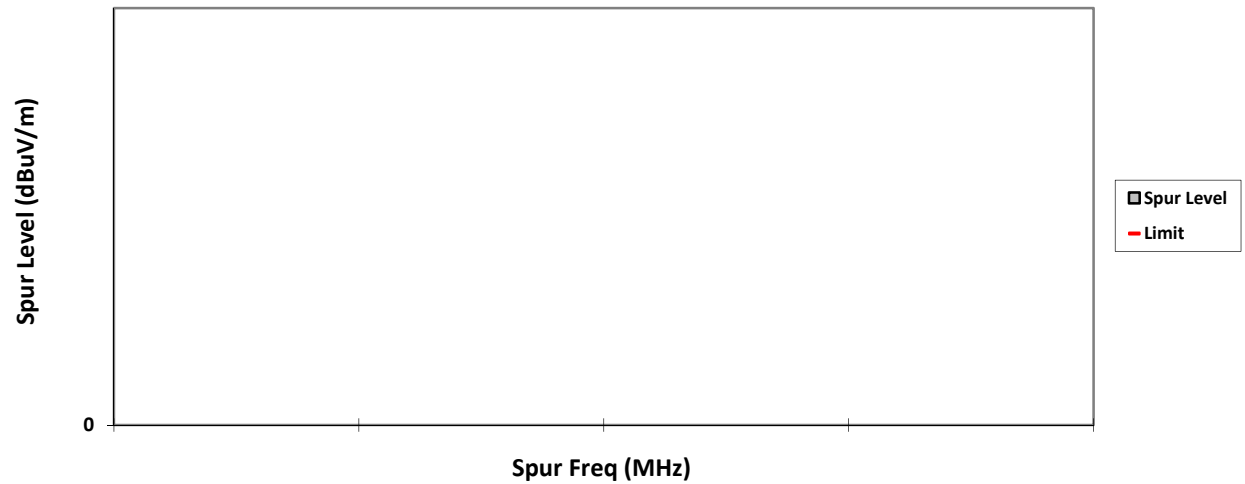
Vertical Radiated Emission Result

Horizontal Radiated Emission Result

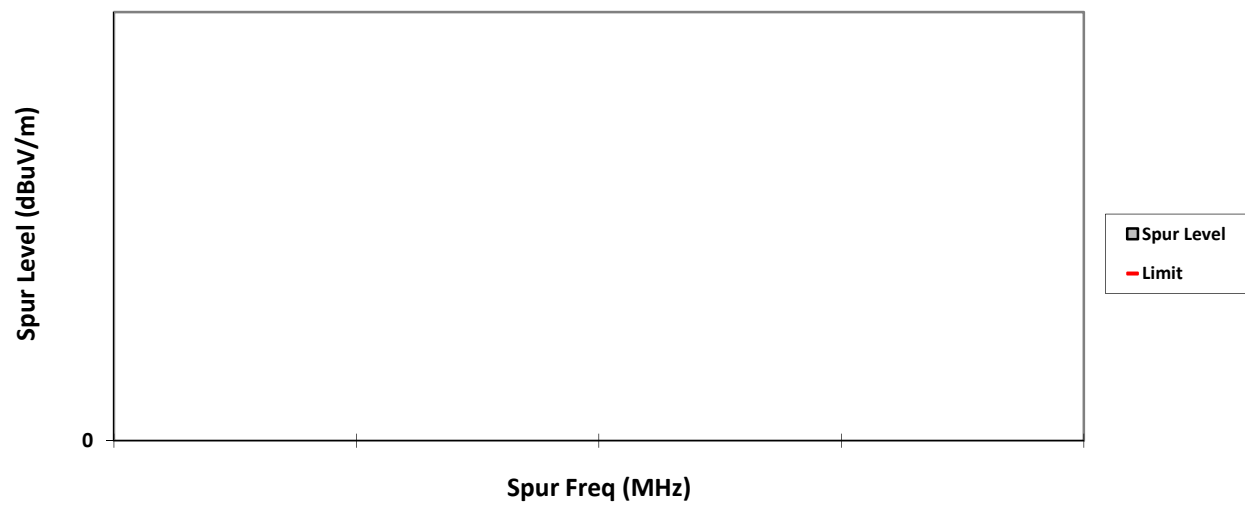
Temperature (degC): 23.6 **Humidity (%):** 69.3
Test Performed by: Qawiman&Nazrin **Test Date:** Tue, 8 Feb, 2022
System MU: 5.88 dB (30-1000MHz), 5.84 dB (1000-18000MHz), 6.02 dB (18000MHz-40000MHz)

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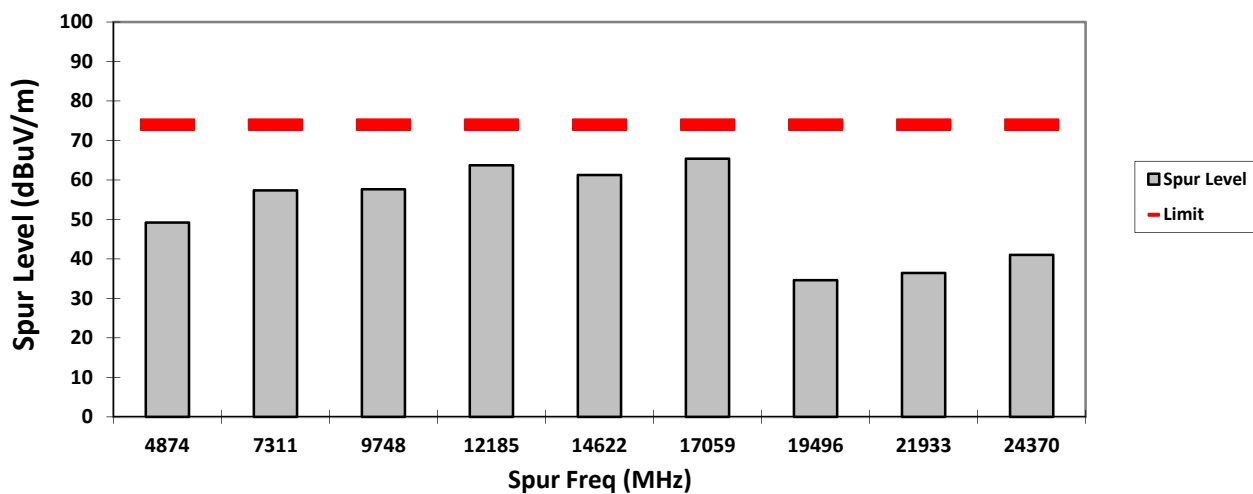
VERTICAL, QPK



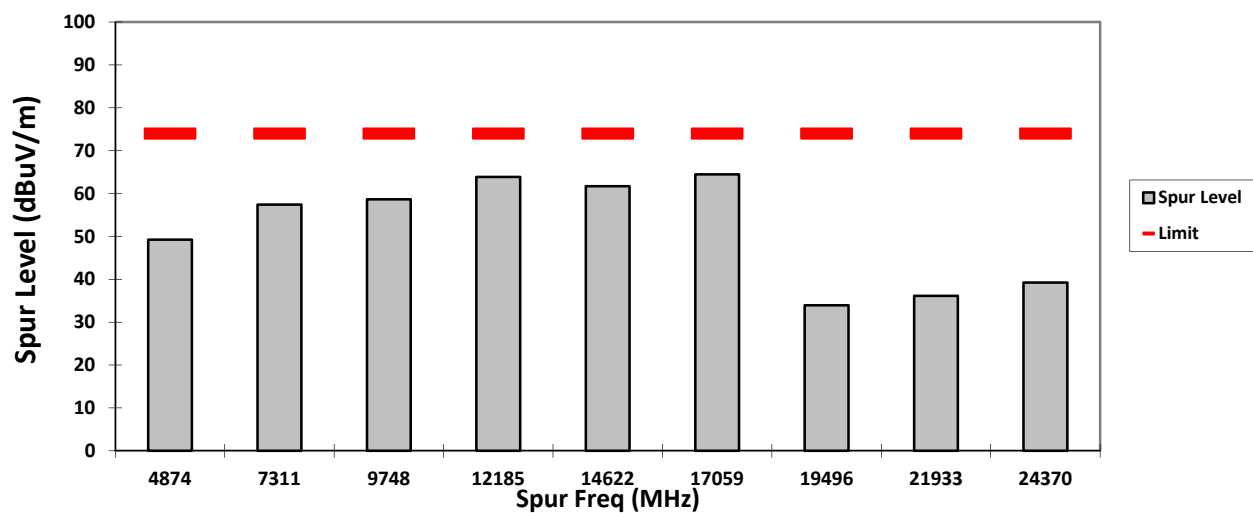
HORIZONTAL, QPK



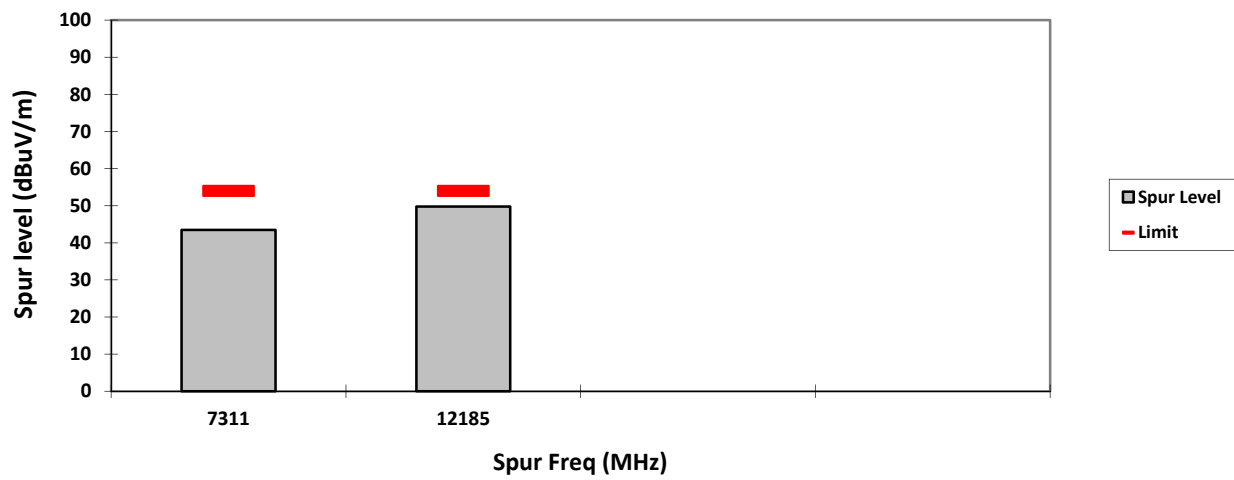
VERTICAL, PK



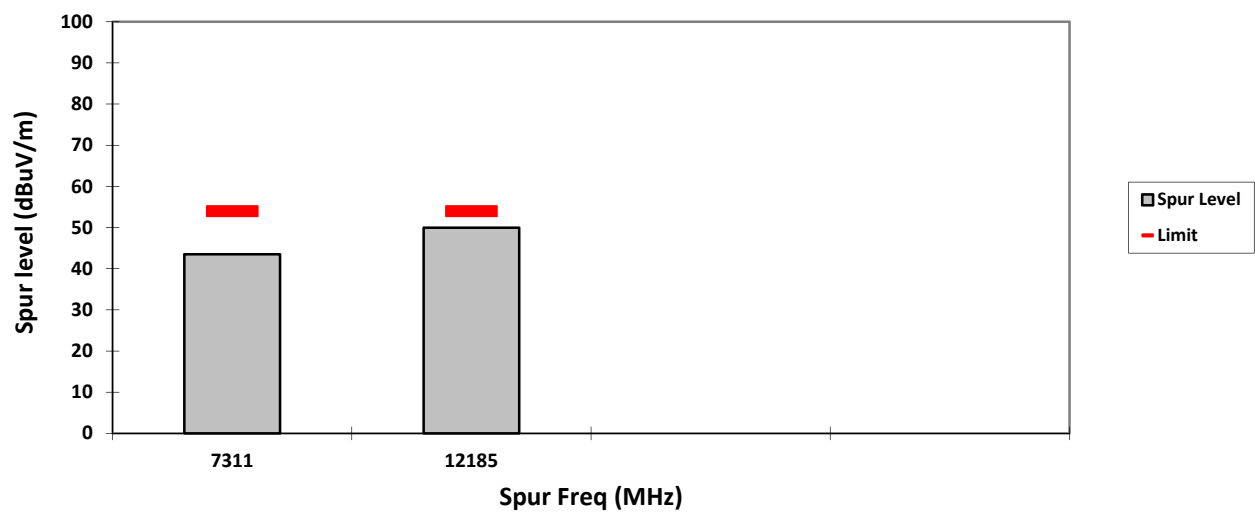
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV

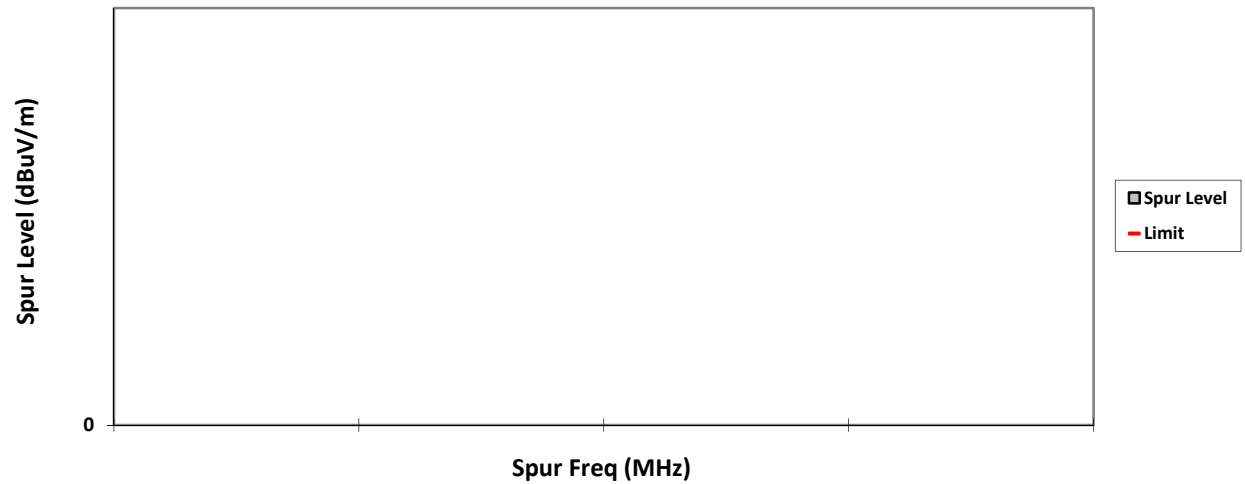


Radiated Emission (High Channel) tabular data

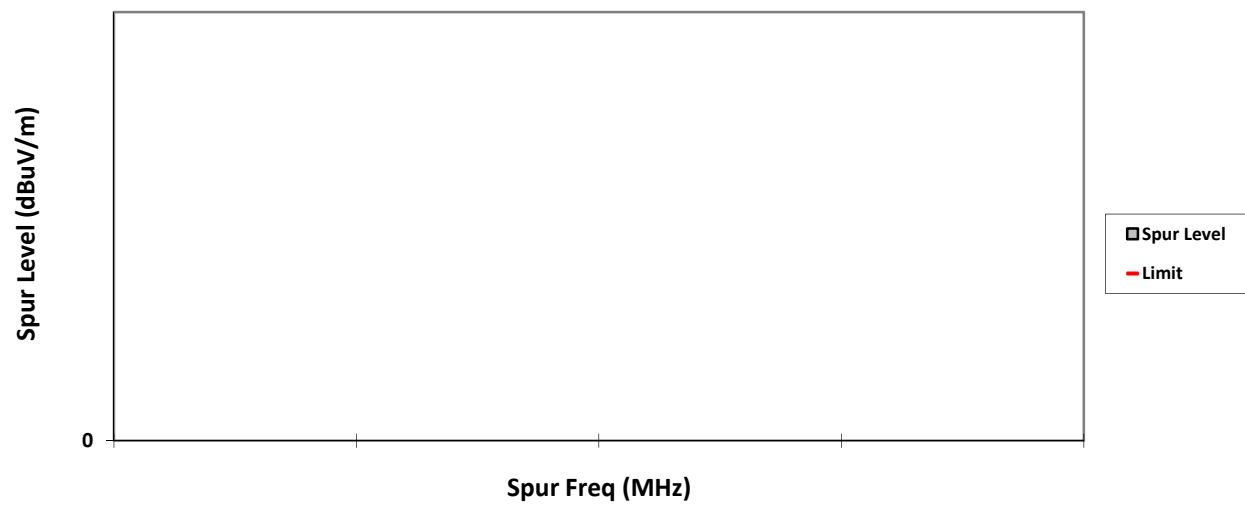
Remarks: Pass Result	Marginal Result	Fail Result
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Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
***Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible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

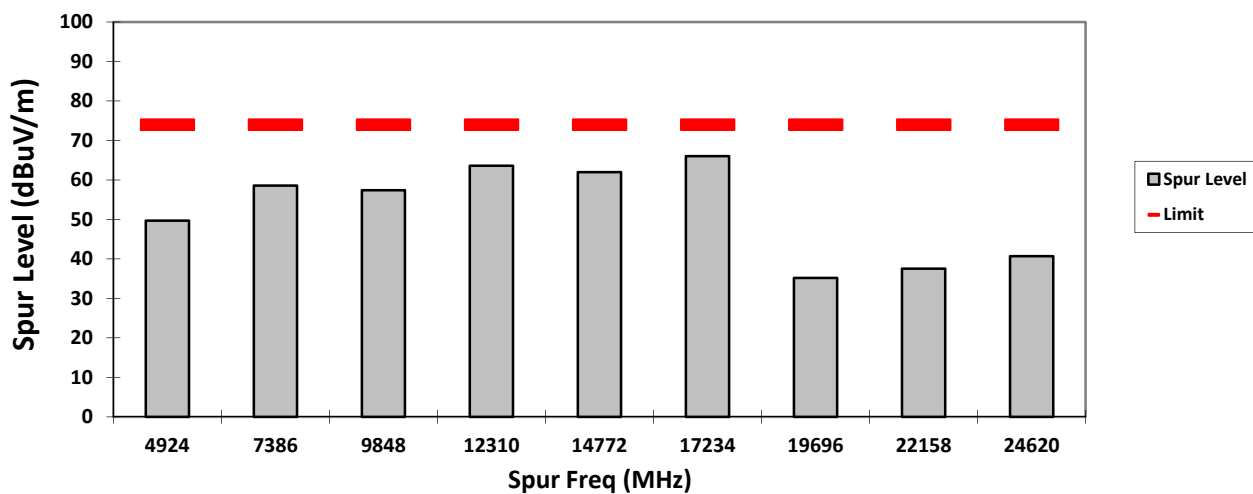
VERTICAL, QPK



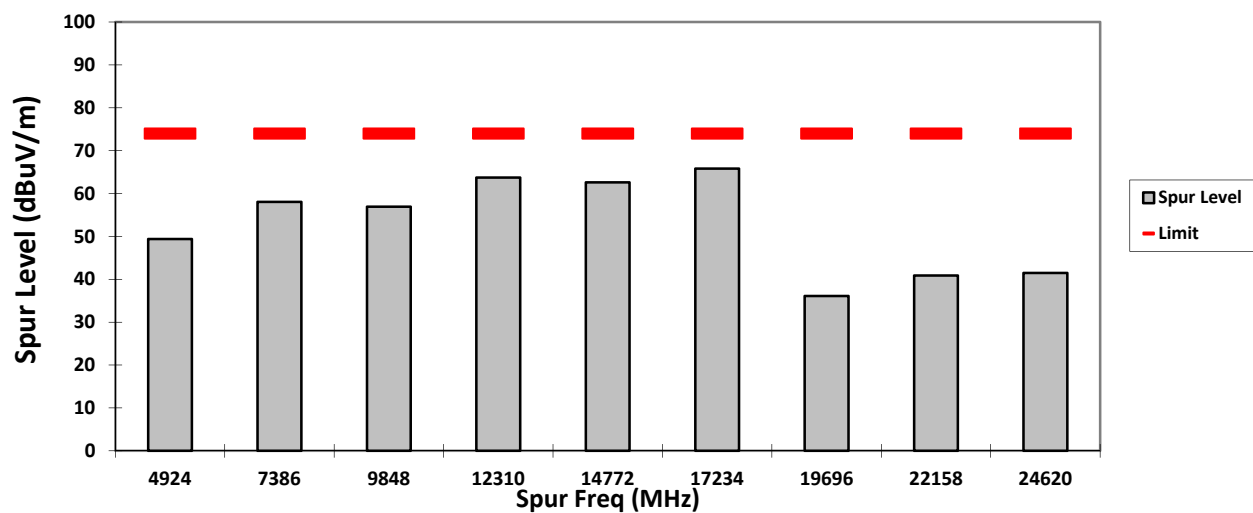
HORIZONTAL, QPK



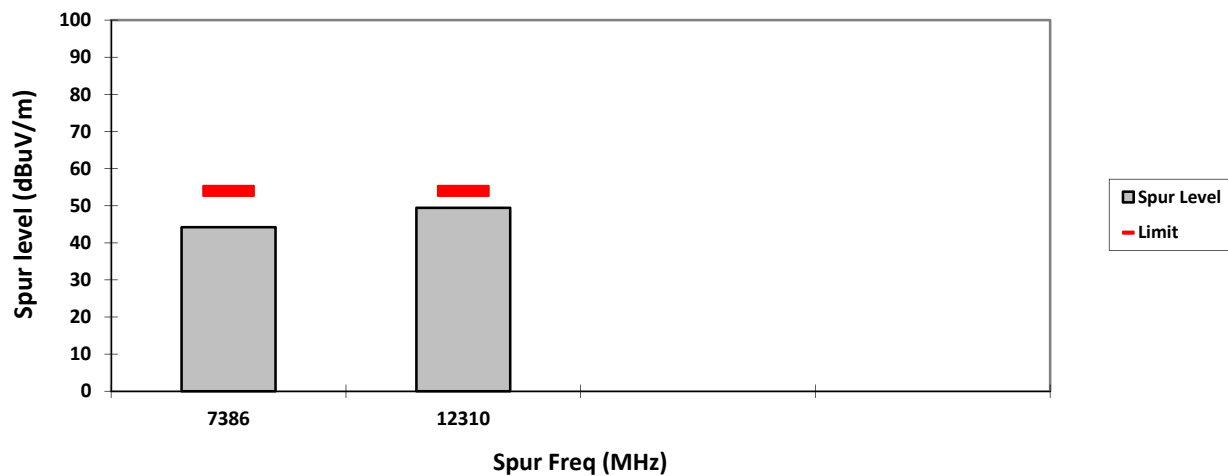
VERTICAL, PK



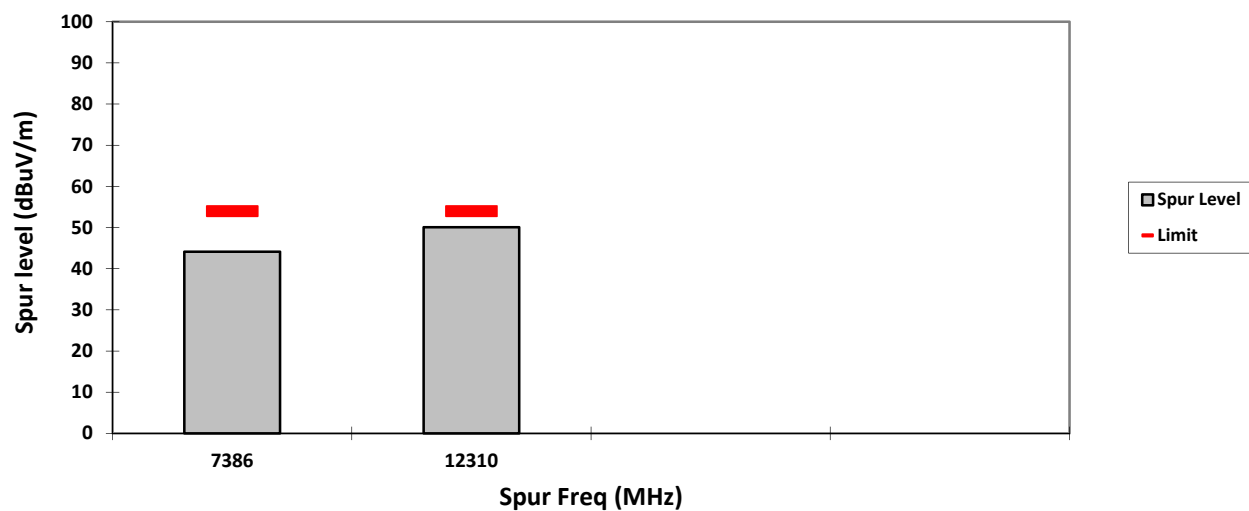
HORIZONTAL, PK



VERTICAL, AV

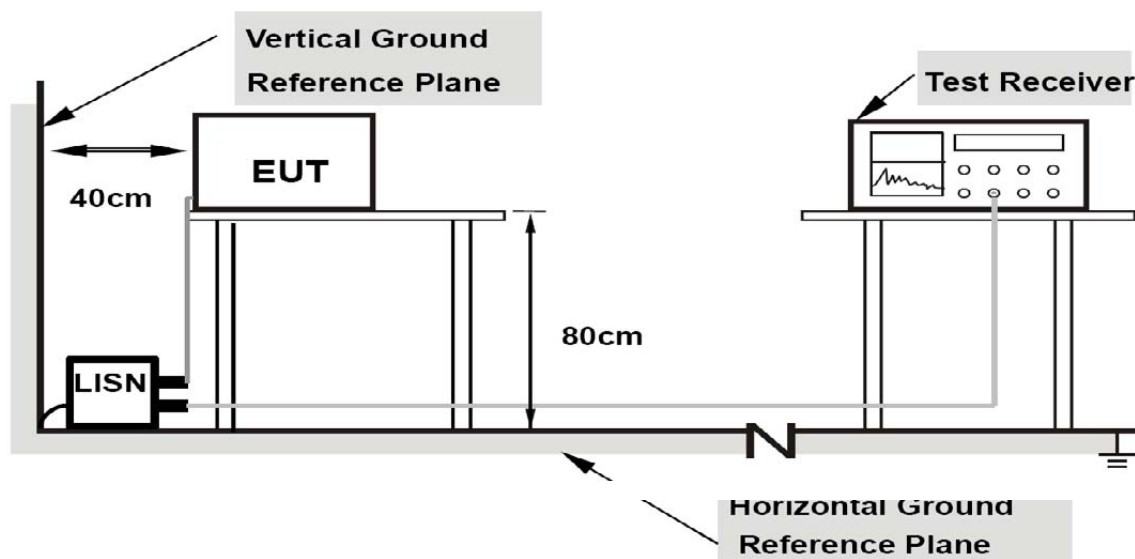


HORIZONTAL, AV



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(μ V)	
	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**

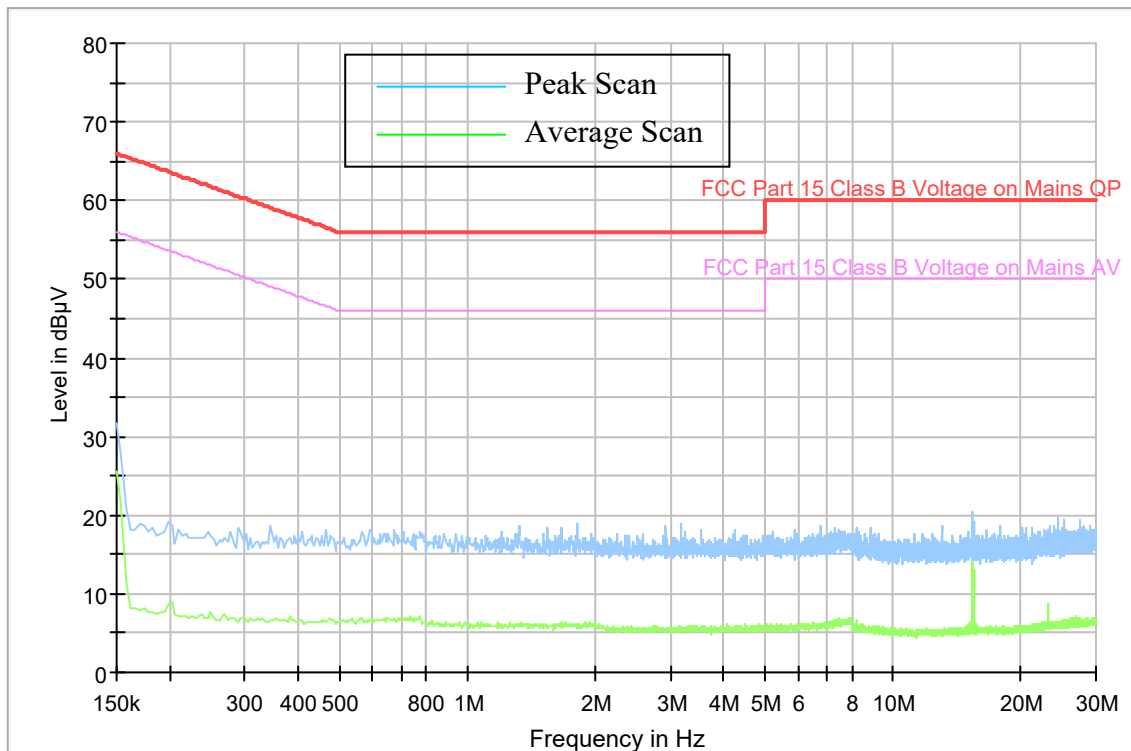
Frequency range MHz	Limits dB(μ V)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50
NOTE 1 The lower limit shall apply at the transition frequencies.		
NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

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

6.8.3. Test Result

1) Ambient

Full Spectrum

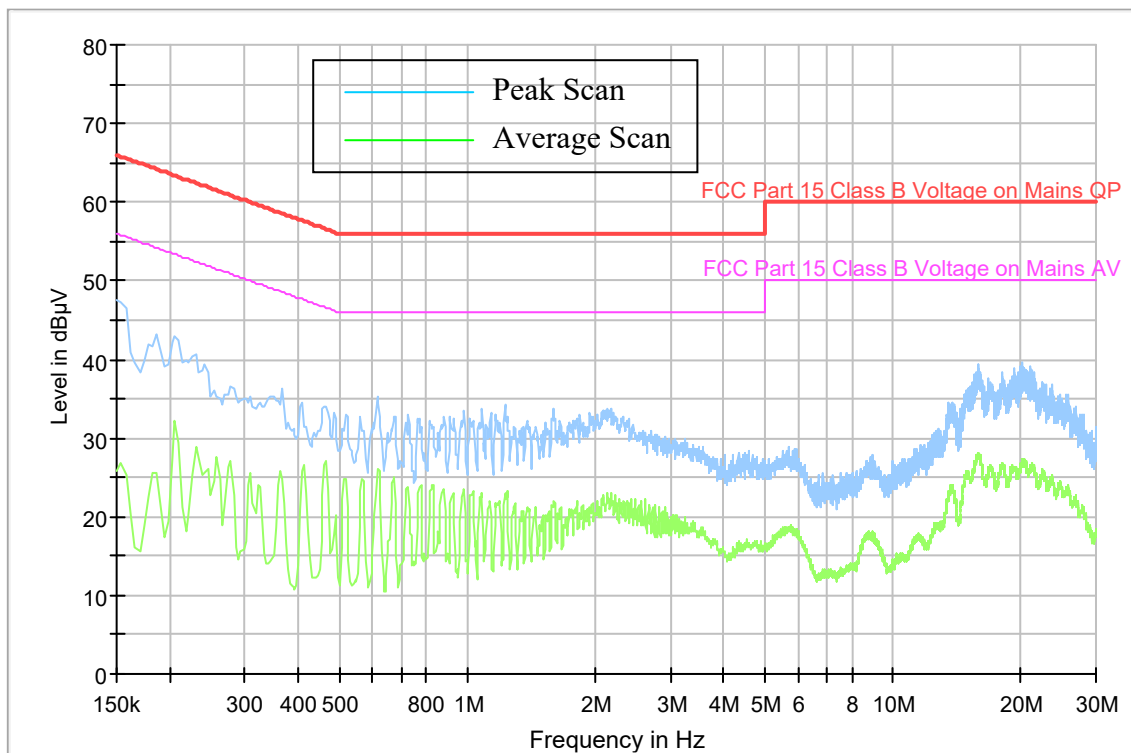


120VAC , 60Hz

MUC

2) Charger + Radio in WIFI 2.4GHz (Tx)

Full Spectrum

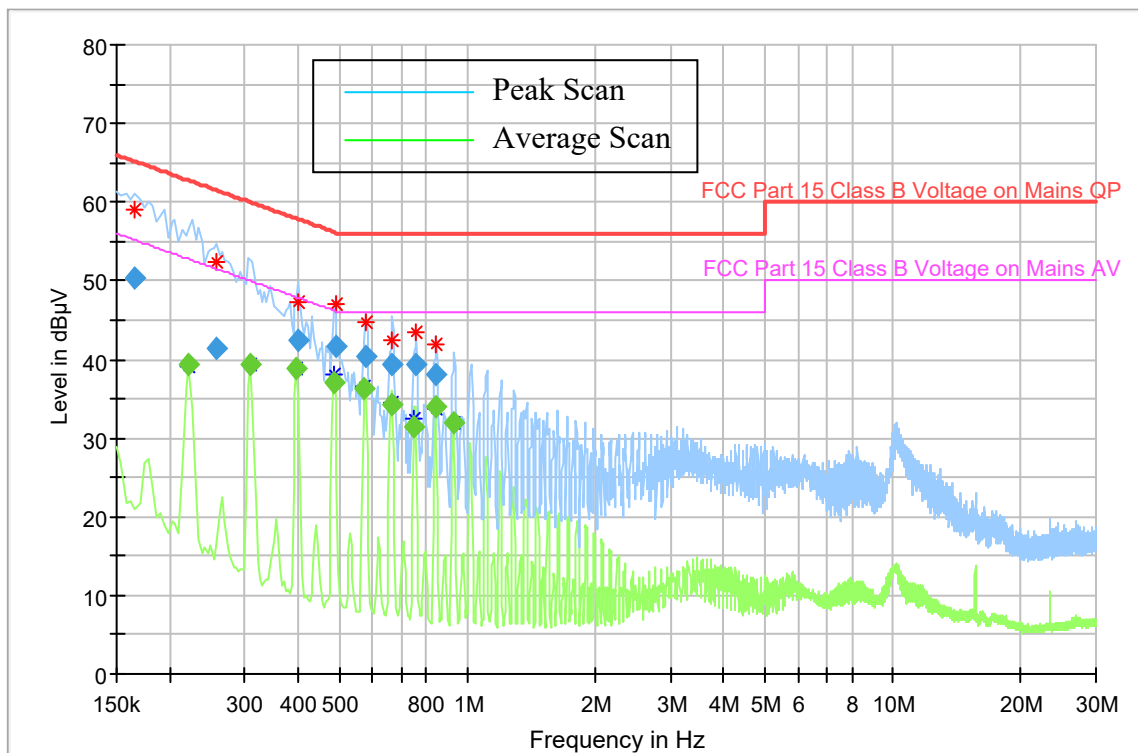


120VAC , 60Hz

SUC

3) Charger + Radio in WIFI 2.4GHz (Tx)

Full Spectrum



Quasipeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.166000	50.26	---	65.16	14.90	1000.0	9.000	N	ON	10.7	PASS
0.222000	---	39.34	52.74	13.40	1000.0	9.000	N	ON	10.4	PASS
0.258000	41.49	---	61.50	20.00	1000.0	9.000	N	ON	10.3	PASS
0.310000	---	39.25	49.97	10.72	1000.0	9.000	N	ON	10.4	PASS
0.398000	---	38.95	47.90	8.94	1000.0	9.000	N	ON	10.4	PASS
0.402000	42.52	---	57.81	15.30	1000.0	9.000	L1	ON	10.4	PASS
0.486000	---	36.95	46.24	9.29	1000.0	9.000	N	ON	10.5	PASS
0.490000	41.59	---	56.17	14.58	1000.0	9.000	L1	ON	10.4	PASS
0.574000	---	36.24	46.00	9.76	1000.0	9.000	N	ON	10.5	PASS
0.578000	40.33	---	56.00	15.67	1000.0	9.000	N	ON	10.5	PASS
0.662000	---	34.16	46.00	11.84	1000.0	9.000	N	ON	10.4	PASS
0.666000	39.38	---	56.00	16.62	1000.0	9.000	N	ON	10.4	PASS
0.750000	---	31.48	46.00	14.52	1000.0	9.000	N	ON	10.4	PASS
0.758000	39.26	---	56.00	16.74	1000.0	9.000	N	ON	10.4	PASS
0.842000	---	33.98	46.00	12.02	1000.0	9.000	N	ON	10.3	PASS
0.846000	38.18	---	56.00	17.82	1000.0	9.000	N	ON	10.3	PASS
0.930000	---	32.02	46.00	13.98	1000.0	9.000	N	ON	10.3	PASS

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

END OF TEST REPORT