

RF Test Report

Project Number: 5209337

Offer Number: SUW-202308005164

Report Number: 5209337EMC01

Revision Level: 1

Client: Persistent Systems LLC

Equipment Under Test: Wave Relay® MANET System

Host Name: MPU5 Dismount Kit

Host Model: WR-5100 (with RF-2150 Radio Module)

Module FCC ID: 2AG3JRF-2150

Applicable Standards: FCC Part 2 and Part 90

ANSI C63.26:2015

Report issued on: 07 February 2025

Report revised on: 03 April 2025

Test Result: Compliant



FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER: 3212.01

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1 Summary of Test Results

Test Description	Test Specification	Test Result
Output Power	FCC Parts 2.1046 & 90.205(o)	Compliant
Occupied Bandwidth	FCC Parts 2.1049 & 90.209	Reported
Emission Masks	FCC Parts 2.1049 & 90.210	Compliant
Frequency Stability	FCC Parts 2.1055 & 90.213	Reported
Radiated Spurious Emissions	FCC Parts 2.1053 & 90.210	Compliant

1.1 Modifications Required for Compliance

None

2 General Information

2.1 Client Information

Name: Persistent Systems LLC
Address: 303 Fifth Ave. Suite 306
City, State, Zip, Country: New York City, New York, 10016, USA

2.2 Test Laboratory

Name: SGS North America, Inc.
Address: 620 Old Peachtree Road NW, Suite 100
City, State, Zip, Country: Suwanee, GA 30024, USA

Accrediting Body: A2LA
Type of lab: Testing Laboratory
Certificate Number: 3212.01
Designation Number: US1126

2.3 General Information of EUT

Equipment Under Test: Wave Relay® MANET System
Host Name: MPU5 Dismount Kit
Host Model: WR-5100 (with RF-2150 Radio Module)
Host Serial Numbers: 87589 and 87881
Module Model: RF-2150
Module Serial Numbers: B-127707 and B-127234
Module FCC ID: 2AG3JRF-2150

Frequency Range: 2457 – 2472 MHz
Data Modes: WLAN 802.11b, 802.11g, 802.11n
Antenna Gain*: Chain 1: ANT-2005; 2.15 dBi
Chain 2: ANT-2040; 2.0 dBi
Chain 3: ANT-2005; 2.15 dBi

Rated Voltage: 12 V_{DC}
Test Voltage: 9-12 V_{DC}

Sample Received Date: 19 August 2024
Dates of testing: 30 August to 12 December 2024

*Data was not measured by SGS laboratory and therefore SGS is not responsible for accuracy. Data obtained via customer, specification sheet, previous filing or other.

2.4 Operating Modes and Conditions

The MPU5 with RF-2150 radio module was connected via a USB/Ethernet adapter to a laptop (provided by the client) running an application called Atheros Radio Test 2 (ART2-GUI). First the radio kernel had to be loaded into the EUT. Then the ART2-GUI was opened and used to configure the radio to transmit at maximum possible duty cycle at any supported channel, bandwidth, power level, antenna chain configuration, data mode and data rate for testing.

Following are the output power settings used during testing for each antenna chain configuration:

- Chain 1 (1x1 SISO): 35 dBm
- Chains 1 & 2 (2x2 MIMO): 33 dBm
- Chains 1, 2 & 3 (3x3 MIMO): 31 dBm

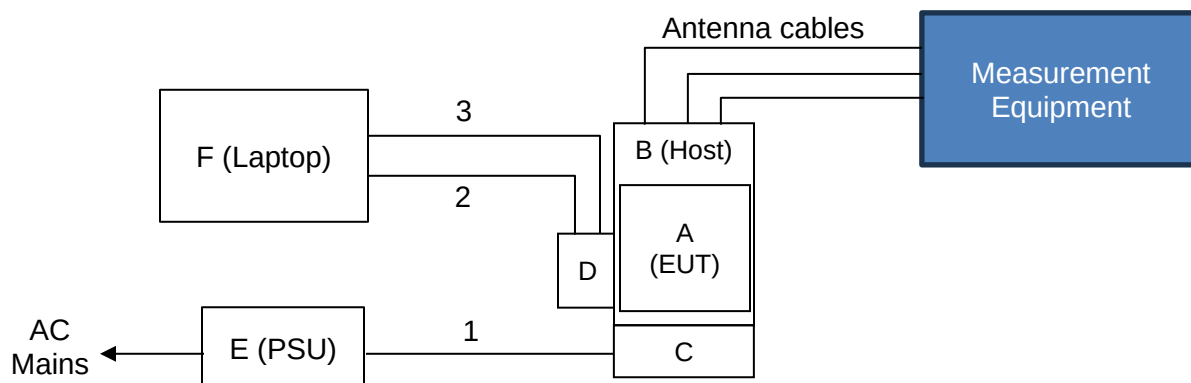
And following are the worst-case data rates determined and tested for each of the data modes:

- 802.11b: 2 Mbps long CCK
- 802.11g: 6 Mbps OFDM
- 802.11n: MCS0 6.5 Mbps

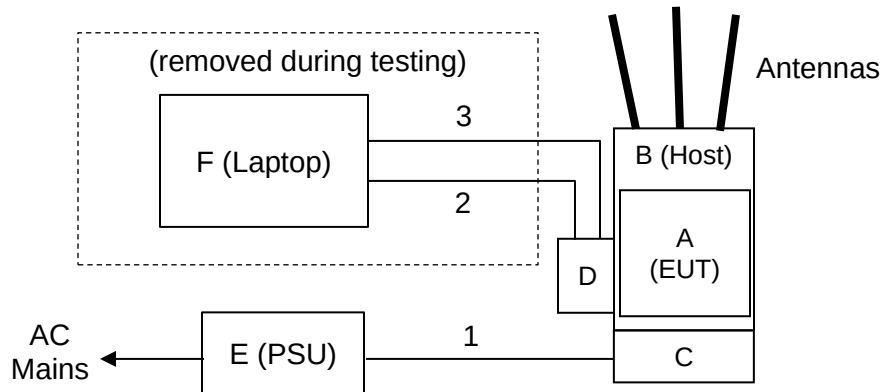
Since the frequency band authorized in FCC Part 90 is 2450 – 2483.5 MHz, the limited set of channels shown below was tested. The radio was designed to support channel bandwidths of 5, 10 and 20 MHz. In order for the transmitted signals to fit within the authorized frequency band, the following channel center frequencies and channel bandwidths are supported and covered in this report.

WLAN Channel	Frequency (MHz)	5MHz BW	10MHz BW	20MHz BW
10	2457	Yes	Yes	No
11	2462	Yes	Yes	Yes
12	2467	Yes	Yes	Yes
13	2472	Yes	Yes	Yes

2.5 EUT Connection Block Diagram – Conducted Measurements



2.6 EUT Connection Block Diagram – Radiated Measurements



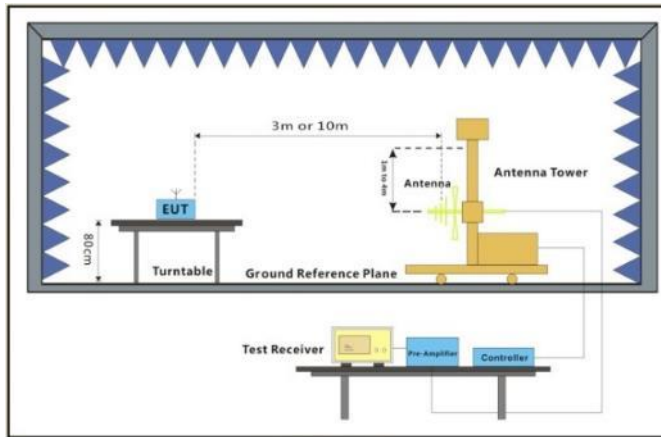
2.7 System Configurations

Device Reference	Manufacturer	Description	Model Number	Serial Number
A	Persistent Systems	Radio Module (EUT)	RF-2150	B-127707 B-127234
B	Persistent Systems	MPU5 Dismount Kit (Host)	WR-5100	87589 87881
C	Persistent Systems	Battery Eliminator	WR-PWR-0001	Not labeled
D	Persistent Systems	Data Port Adapter	CBL-DATA-2007	5995-01-662-3176
E	Mean Well	Power Supply	GSM90B12-P1M	SC30404851
F	Dell	Laptop PC	Precision 3560	10082954451

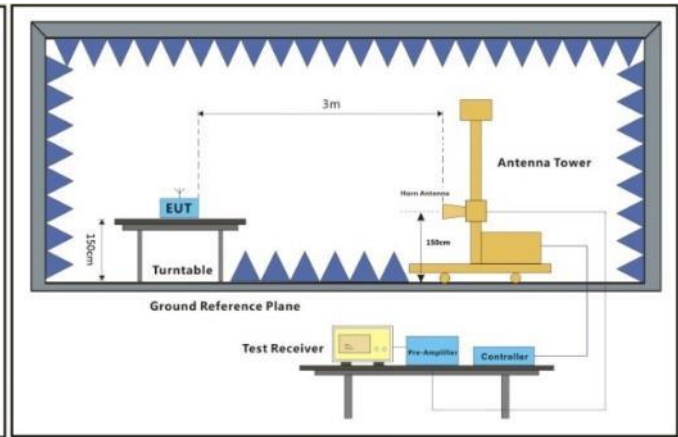
2.8 Cable List

Cable reference	Port Name	Start	End	Cable Length (m)	Ferrite installed?	Shielded?
1	DC Power	Power Supply	Battery Eliminator	0.8	No	No
2	Ethernet	Laptop	Data Port Adapter	Various	No	No
3	USB	Laptop	Data Port Adapter	Various	No	Yes

2.9 Test Setup Diagrams (Radiated)



30MHz-1GHz



Above 1GHz

3 Output Power

3.1 Test Result

Test Description	Test Specification	Test Result
Output Power	FCC Part 2.1046 & 90.205(o)	Compliant

3.2 Test Method

Fundamental output power measurements were performed in accordance with FCC Part 2.1046 and Part 90.205 clause (o). Measurements were taken using the procedures from ANSI C63.26: 2015 clause 5.2 and FCC KDB 971168 D01 Power Meas License Digital Systems v03r01.

Limit

(o) 2450-2483.5 MHz: The maximum transmitter power is 5 Watts (37.0 dBm).

3.3 Test Site

EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 24.38 °C

Relative Humidity: 52.8 %

Atmospheric Pressure: 99.25 kPa

3.4 Test Equipment

Test End Date: 31-Oct-2024

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
40DB ATTENUATOR NM TO NF	FAIRVIEW MICROWAVE	SA6N5WA-40	24010	3-Sep-2024	3-Sep-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20109	20-Mar-2024	20-Mar-2025
40DB ATTENUATOR NM TO NF	FAIRVIEW MICROWAVE	SA6N5WA-40	24011	3-Sep-2024	3-Sep-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20107	20-Mar-2024	20-Mar-2025
40DB ATTENUATOR NM TO NF	FAIRVIEW MICROWAVE	SA6N5WA-40	24012	3-Sep-2024	3-Sep-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	3-Jan-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025

Software Profile:

TSTPASS Version: 2.0

3.5 Test Data

Chain 1: 1x1 SISO (35 dBm Power Setting)

Mode	Frequency (MHz)	Maximum Average Conducted Output Power (dBm)
		ANT1
802.11b 5BW	2457	34.6
	2462	34.7
	2467	35.1
	2472	34.8
802.11b 10BW	2457	33.3
	2462	34.6
	2467	35.0
	2472	34.6
802.11b 20BW	2457	N/A
	2462	34.8
	2467	35.4
	2472	35.0
802.11g 5BW	2457	34.7
	2462	34.4
	2467	35.1
	2472	34.7
802.11g 10BW	2457	34.6
	2462	34.6
	2467	35.0
	2472	34.6
802.11g 20BW	2457	N/A
	2462	34.8
	2467	35.3
	2472	35.0
802.11n 5BW	2457	34.9
	2462	34.3
	2467	36.4
	2472	34.6
802.11n 10BW	2457	34.9
	2462	34.8
	2467	35.2
	2472	34.8
802.11n 20BW	2457	N/A
	2462	34.9
	2467	35.4
	2472	35.0

Chains 1 & 2: 2x2 MIMO (33 dBm Power Setting)

Mode	Frequency (MHz)	Maximum Average Conducted Output Power (dBm)		
		ANT1	ANT2	MIMO
802.11b 5BW	2457	33.4	33.9	36.7
	2462	33.3	33.8	36.6
	2467	33.5	33.8	36.6
	2472	33.6	33.8	36.7
802.11b 10BW	2457	33.2	33.6	36.4
	2462	32.6	33.4	36.0
	2467	33.1	33.4	36.2
	2472	33.3	33.2	36.3
802.11b 20BW	2457	N/A	N/A	N/A
	2462	32.9	33.1	36.0
	2467	33.0	33.6	36.3
	2472	33.9	33.4	36.7
802.11g 5BW	2457	33.5	34.0	36.8
	2462	33.4	34.0	36.7
	2467	33.5	34.2	36.9
	2472	33.7	34.1	36.9
802.11g 10BW	2457	33.6	33.9	36.7
	2462	33.3	33.8	36.6
	2467	33.3	34.1	36.7
	2472	33.6	33.9	36.7
802.11g 20BW	2457	N/A	N/A	N/A
	2462	33.2	33.9	36.5
	2467	33.4	33.9	36.6
	2472	33.7	34.2	37.0
802.11n 5BW	2457	33.6	33.9	36.8
	2462	33.1	33.6	36.4
	2467	33.5	34.5	37.0
	2472	33.6	34.2	36.9
802.11n 10BW	2457	33.5	33.9	36.7
	2462	33.2	33.9	36.6
	2467	33.2	34.1	36.7
	2472	33.7	33.9	36.8
802.11n 20BW	2457	N/A	N/A	N/A
	2462	33.0	33.8	36.4
	2467	33.3	34.1	36.7
	2472	33.6	34.0	36.8

Chains 1, 2 & 3: 3x3 MIMO (31 dBm Power Setting)

Mode	Frequency (MHz)	Maximum Average Conducted Output Power (dBm)			
		ANT1	ANT2	ANT3	MIMO
802.11b 5BW	2457	31.1	31.8	30.8	36.0
	2462	30.8	32.0	30.6	36.0
	2467	30.7	31.9	30.9	35.9
	2472	30.5	31.7	31.6	36.1
802.11b 10BW	2457	30.7	31.8	30.6	35.8
	2462	30.9	31.3	30.4	35.6
	2467	30.1	31.6	30.6	35.6
	2472	30.4	31.4	30.9	35.7
802.11b 20BW	2457	N/A	N/A	N/A	N/A
	2462	30.3	30.8	30.3	35.3
	2467	30.2	30.7	30.5	35.3
	2472	30.2	31.1	30.4	35.3
802.11g 5BW	2457	31.0	32.0	30.9	36.1
	2462	31.0	31.5	30.7	35.8
	2467	30.4	31.9	30.7	35.8
	2472	30.3	31.7	31.8	36.1
802.11g 10BW	2457	31.6	31.7	31.2	36.3
	2462	30.5	31.6	31.1	35.9
	2467	30.5	31.6	31.4	35.9
	2472	30.2	31.6	31.7	36.0
802.11g 20BW	2457	N/A	N/A	N/A	N/A
	2462	31.0	31.5	30.9	35.9
	2467	31.0	31.9	30.9	36.1
	2472	30.8	31.8	31.3	36.1
802.11n 5BW	2457	31.6	31.6	31.4	36.3
	2462	31.0	31.7	31.3	36.1
	2467	30.8	32.0	31.5	36.2
	2472	31.0	31.9	31.8	36.3
802.11n 10BW	2457	31.4	31.8	31.4	36.3
	2462	31.1	31.5	31.0	36.0
	2467	30.8	31.5	31.1	35.9
	2472	30.7	31.5	31.5	36.0
802.11n 20BW	2457	N/A	N/A	N/A	N/A
	2462	31.3	32.9	31.3	36.7
	2467	31.2	32.8	31.0	36.5
	2472	30.6	32.7	31.8	36.5

4 Occupied Bandwidth

4.1 Test Result

Test Description	Test Specification	Test Result
6 dB Bandwidth 99% Occupied Bandwidth	FCC Part 2.1049 & 90.209	Reported

4.2 Test Method

The procedure from ANSI C63.26:2015 clause 5.4.3 was used to determine the 6 dB bandwidth and the procedure from ANSI C63.26:2015 clause 5.4.4 was used to measure the 99% occupied bandwidth.

4.3 Test Site

EMC Laboratory, Suwanee, GA

Environmental Conditions	6-Sept-2024	12-Dec-2024
Temperature:	23.7 °C	23.7 °C
Relative Humidity:	61.2 %	21.2 %
Atmospheric Pressure:	98.0 kPa	98.3 kPa

4.4 Test Equipment

Test End Date: 6-Sep-2024

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
40DB ATTENUATOR NM TO NF	FAIRVIEW MICROWAVE	SA6N5WA-40	24010	3-Sep-2024	3-Sep-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20109	20-Mar-2024	20-Mar-2025
40DB ATTENUATOR NM TO NF	FAIRVIEW MICROWAVE	SA6N5WA-40	24011	3-Sep-2024	3-Sep-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20107	20-Mar-2024	20-Mar-2025
40DB ATTENUATOR NM TO NF	FAIRVIEW MICROWAVE	SA6N5WA-40	24012	3-Sep-2024	3-Sep-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	3-Jan-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025

Test End Date: 12-Dec-2024

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
40DB ATTENUATOR NM TO NF	FAIRVIEW MICROWAVE	SA6N5WA-40	24010	3-Sep-2024	3-Sep-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	3-Jan-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025

Software Profile:

TSTPASS Version: 2.0

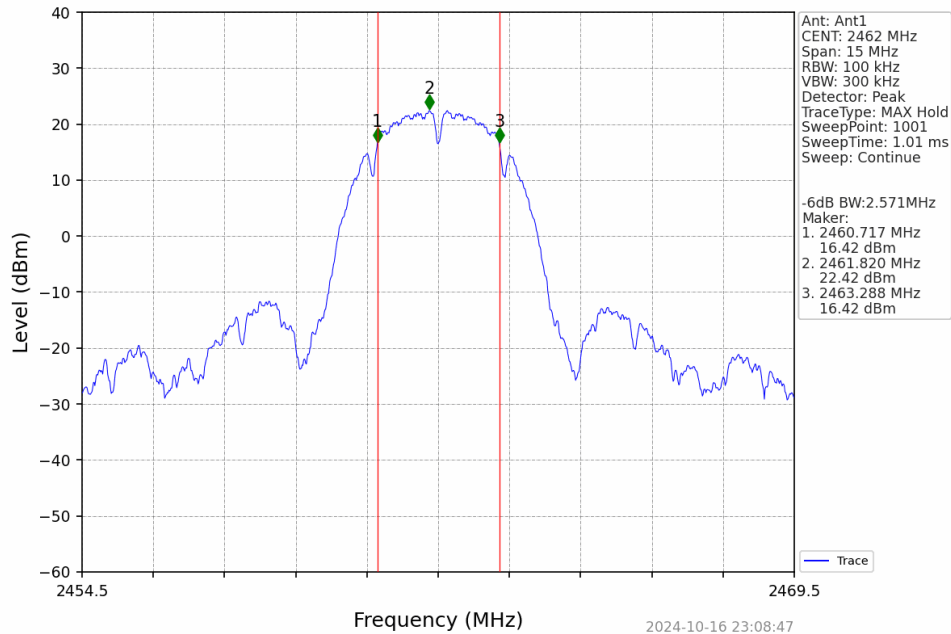
4.5 Test Data – 1x1 SISO

6dB Bandwidth

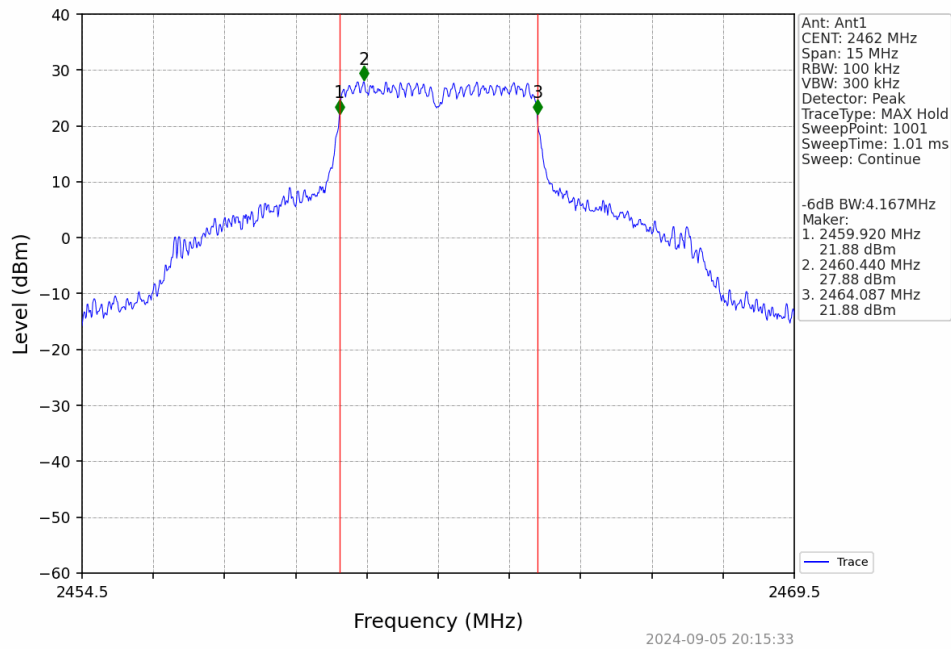
Channel Bandwidth	Mode	TX Type	Frequency (MHz)	6dB Bandwidth (MHz)
				ANT1
5 MHz	802.11b	SISO	2457	2.517
			2462	2.571
			2467	2.573
			2472	2.573
	802.11g	SISO	2457	4.212
			2462	4.167
			2467	4.167
			2472	4.160
	802.11n	SISO	2457	4.494
			2462	4.514
			2467	4.503
			2472	4.480
10 MHz	802.11b	SISO	2457	5.083
			2462	5.148
			2467	5.152
			2472	5.150
	802.11g	SISO	2457	8.306
			2462	8.270
			2467	8.275
			2472	8.286
	802.11n	SISO	2457	8.920
			2462	8.878
			2467	8.864
			2472	8.809
20 MHz	802.11b	SISO	2462	10.071
			2467	10.124
			2472	10.135
	802.11g	SISO	2462	16.720
			2467	16.718
			2472	16.687
	802.11n	SISO	2462	17.816
			2467	17.875
			2472	17.902

Sample Plots

802.11b (2462MHz) 5MHz



802.11g (2462MHz) 5MHz

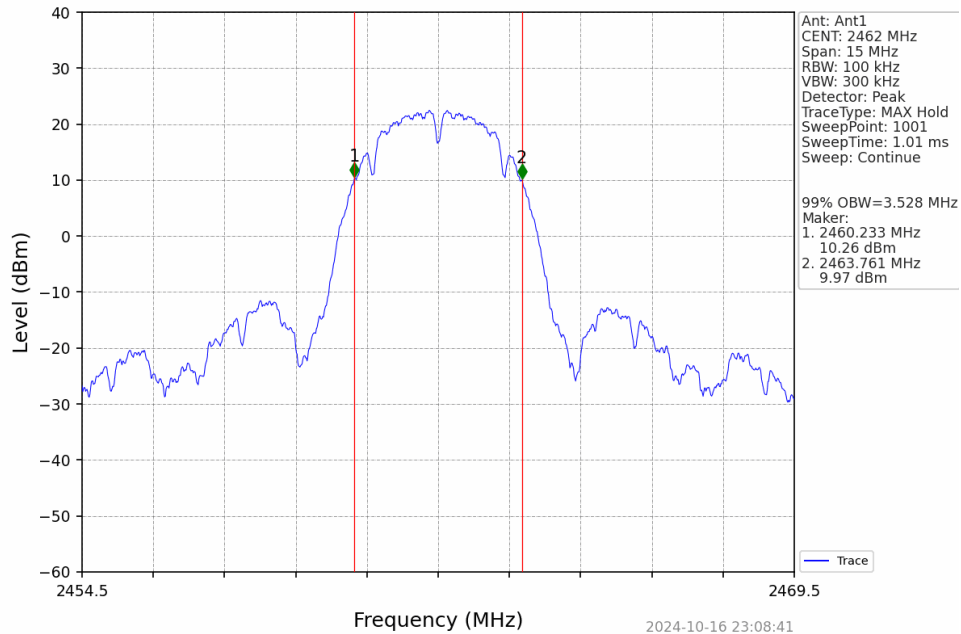


99% Occupied Bandwidth

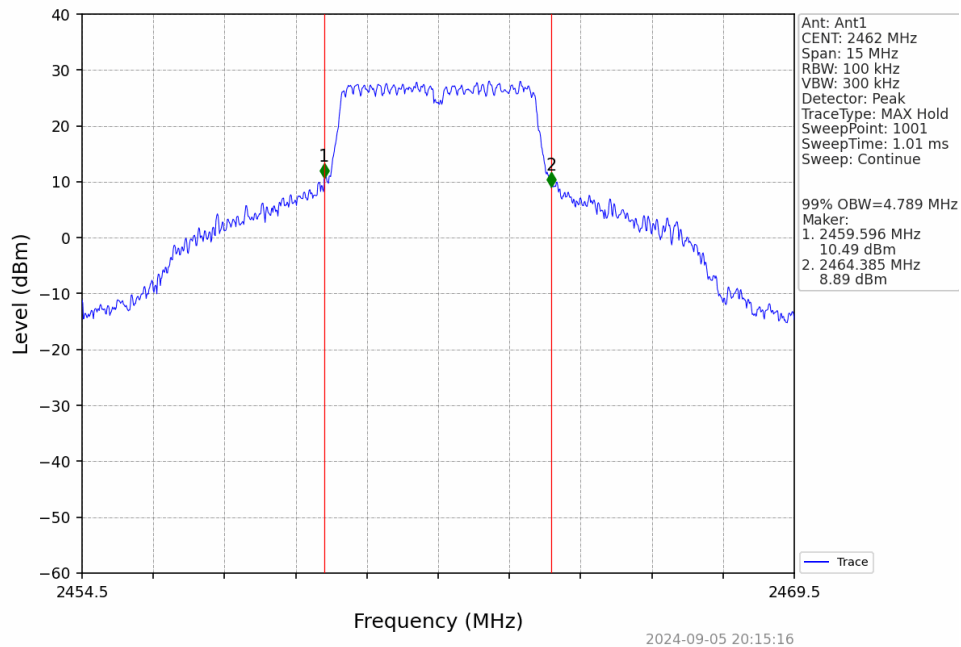
Channel Bandwidth	Mode	TX Type	Frequency (MHz)	99% Bandwidth (MHz)
				ANT1
5 MHz	802.11b	SISO	2457	3.525
			2462	3.528
			2467	3.527
			2472	3.522
	802.11g	SISO	2457	5.826
			2462	4.789
			2467	5.635
			2472	5.250
	802.11n	SISO	2457	5.051
			2462	4.739
			2467	5.121
			2472	4.921
10 MHz	802.11b	SISO	2457	6.951
			2462	6.980
			2467	6.961
			2472	6.959
	802.11g	SISO	2457	9.935
			2462	9.473
			2467	10.580
			2472	9.547
	802.11n	SISO	2457	9.428
			2462	9.299
			2467	9.838
			2472	9.294
20 MHz	802.11b	SISO	2462	14.031
			2467	14.024
			2472	14.045
	802.11g	SISO	2462	21.506
			2467	24.363
			2472	22.800
	802.11n	SISO	2462	20.282
			2467	21.811
			2472	20.655

Sample Plots

802.11b (2462MHz) 5MHz



802.11g (2462MHz) 5MHz



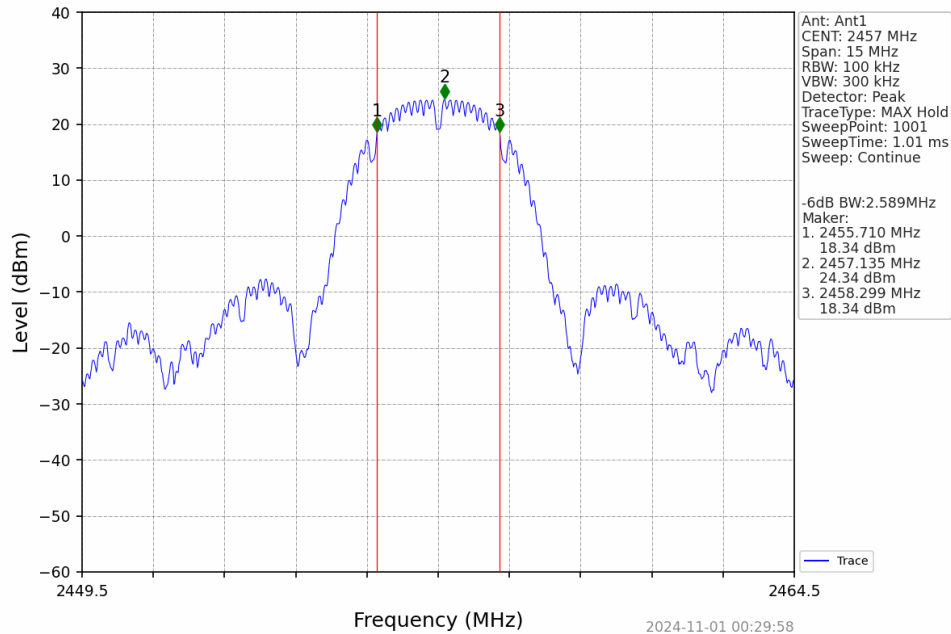
4.6 Test Data – 2x2 MIMO

6dB Bandwidth

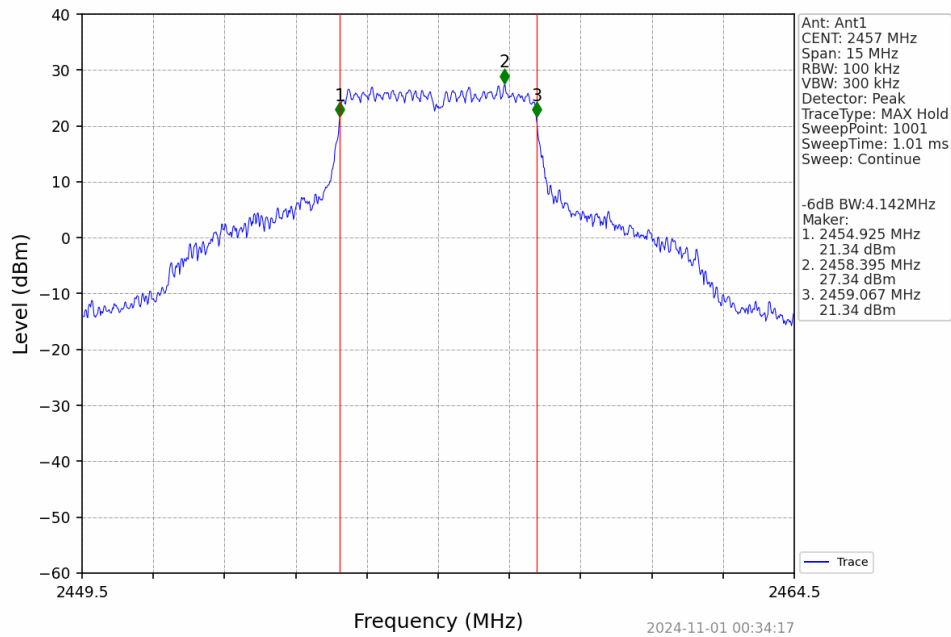
Channel Bandwidth	Mode	TX Type	Frequency (MHz)	6dB Bandwidth (MHz)	
				ANT1	ANT2
5 MHz	802.11b	MIMO 2x2	2457	2.589	2.587
			2462	2.580	2.584
			2467	2.585	2.589
			2472	2.588	2.585
	802.11g	MIMO 2x2	2457	4.142	4.151
			2462	4.170	4.146
			2467	4.165	4.154
			2472	4.167	4.178
	802.11n	MIMO 2x2	2457	4.487	4.480
			2462	4.459	4.492
			2467	4.463	4.473
			2472	4.465	4.466
10 MHz	802.11b	MIMO 2x2	2457	5.177	5.169
			2462	5.180	5.171
			2467	5.171	5.178
			2472	5.167	5.174
	802.11g	MIMO 2x2	2457	8.264	8.218
			2462	8.248	8.239
			2467	8.273	8.266
			2472	8.272	8.271
	802.11n	MIMO 2x2	2457	8.869	8.889
			2462	8.887	8.893
			2467	8.889	8.862
			2472	8.812	8.882
20 MHz	802.11b	MIMO 2x2	2462	10.114	10.102
			2467	10.110	10.104
			2472	10.110	10.120
	802.11g	MIMO 2x2	2462	16.652	16.616
			2467	16.764	16.697
			2472	16.746	16.649
	802.11n	MIMO 2x2	2462	17.744	17.856
			2467	17.804	17.939
			2472	17.912	17.878

Sample Plots

802.11b (2457MHz) 5MHz



802.11g (2457MHz) 5MHz

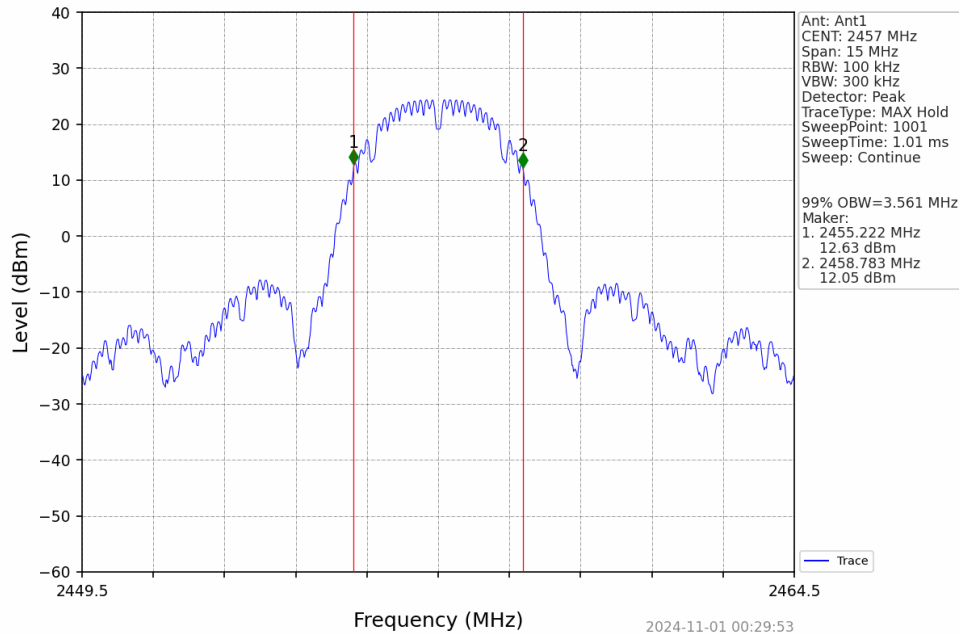


99% Occupied Bandwidth

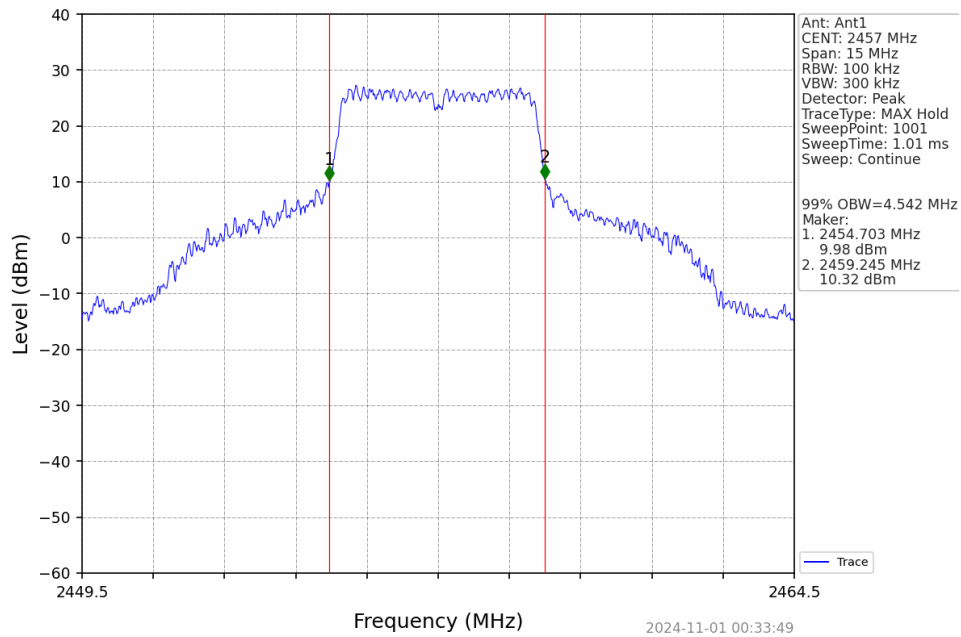
Channel Bandwidth	Mode	TX Type	Frequency (MHz)	99% Bandwidth (MHz)	
				ANT1	ANT2
5 MHz	802.11b	MIMO 2x2	2457	3.561	3.546
			2462	3.536	3.539
			2467	3.531	3.536
			2472	3.554	3.536
	802.11g	MIMO 2x2	2457	4.542	4.621
			2462	4.437	4.488
			2467	4.332	4.623
			2472	4.657	4.656
	802.11n	MIMO 2x2	2457	4.820	5.183
			2462	4.600	4.787
			2467	4.703	4.896
			2472	4.969	4.935
10 MHz	802.11b	MIMO 2x2	2457	7.069	7.038
			2462	7.045	7.026
			2467	7.022	7.031
			2472	7.019	7.025
	802.11g	MIMO 2x2	2457	8.770	8.826
			2462	8.728	8.746
			2467	8.708	8.761
			2472	9.028	8.693
	802.11n	MIMO 2x2	2457	9.408	9.412
			2462	9.189	9.296
			2467	9.330	9.264
			2472	9.408	9.299
20 MHz	802.11b	MIMO 2x2	2462	14.107	14.114
			2467	14.172	14.134
			2472	14.182	14.129
	802.11g	MIMO 2x2	2462	19.696	18.996
			2467	20.368	20.041
			2472	21.429	20.502
	802.11n	MIMO 2x2	2462	19.984	20.235
			2467	21.023	21.280
			2472	21.980	21.360

Sample Plots

802.11b (2457MHz) 5MHz BW



802.11g (2457MHz) 5MHz BW



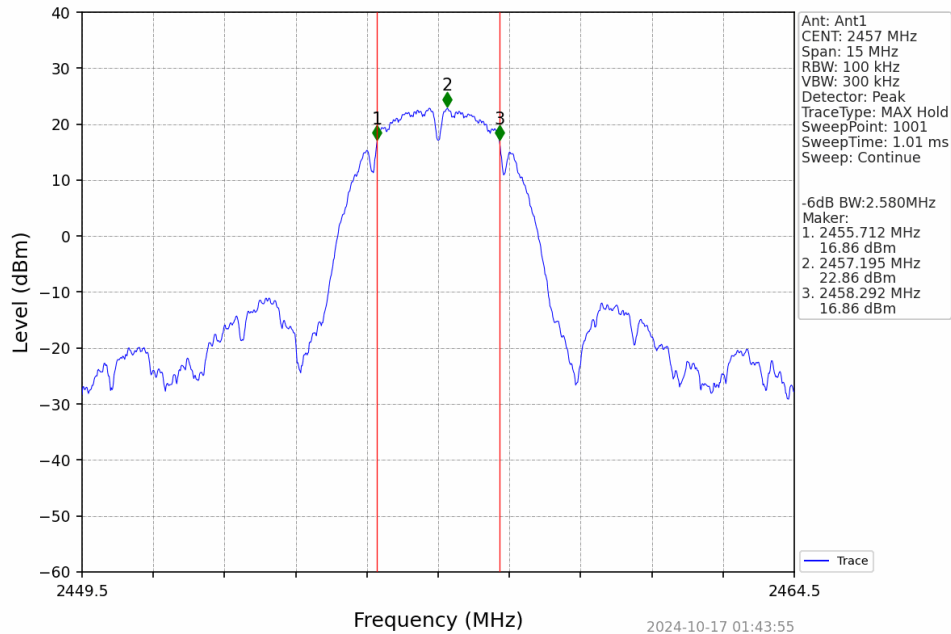
4.7 Test Data – 3x3 MIMO

6dB Bandwidth

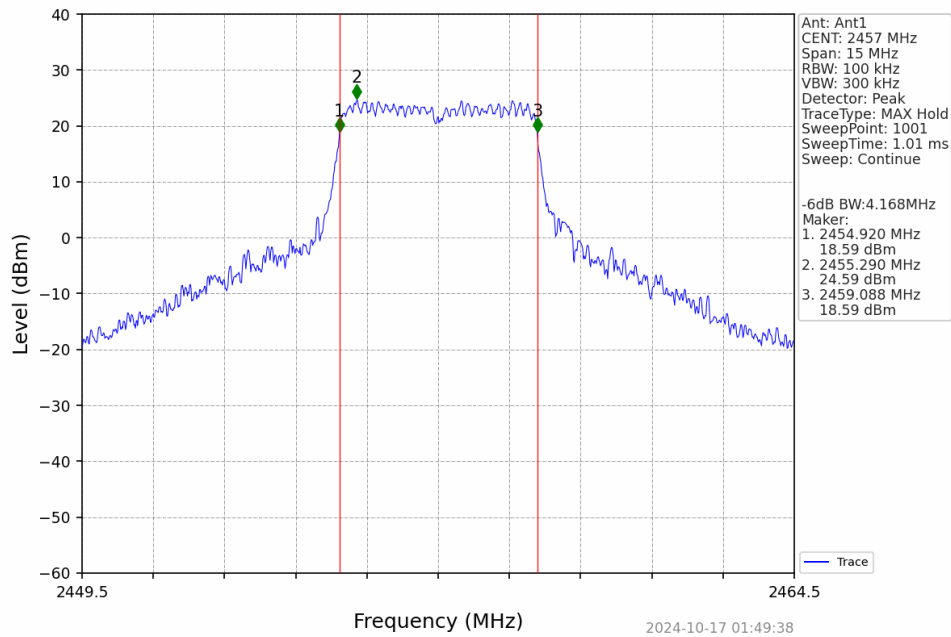
Channel Bandwidth	Mode	TX Type	Frequency (MHz)	6dB Bandwidth (MHz)		
				ANT1	ANT2	ANT3
5 MHz	802.11b	MIMO 3x3	2457	2.580	2.571	2.566
			2462	2.568	2.568	2.564
			2467	2.572	2.569	2.569
			2472	2.565	2.569	2.567
	802.11g	MIMO 3x3	2457	4.168	4.154	4.155
			2462	4.160	4.157	4.157
			2467	4.162	4.160	4.152
			2472	4.163	4.167	4.163
	802.11n	MIMO 3x3	2457	4.485	4.474	4.477
			2462	4.469	4.452	4.455
			2467	4.479	4.456	4.460
			2472	4.470	4.474	4.478
10 MHz	802.11b	MIMO 3x3	2457	5.149	5.144	5.145
			2462	5.153	5.147	5.148
			2467	5.152	5.140	5.147
			2472	5.127	5.148	5.115
	802.11g	MIMO 3x3	2457	8.268	8.254	8.247
			2462	8.251	8.252	8.251
			2467	8.250	8.266	8.258
			2472	8.288	8.255	8.263
	802.11n	MIMO 3x3	2457	8.889	8.887	8.878
			2462	8.836	8.849	8.868
			2467	8.853	8.873	8.851
			2472	8.859	8.875	8.892
20 MHz	802.11b	MIMO 3x3	2462	9.770	9.970	10.015
			2467	10.039	10.116	10.014
			2472	10.099	10.069	10.147
	802.11g	MIMO 3x3	2462	16.769	16.684	16.638
			2467	16.646	16.714	16.620
			2472	16.632	16.775	16.691
	802.11n	MIMO 3x3	2462	17.721	17.883	17.935
			2467	17.811	17.909	17.862
			2472	17.874	17.980	17.955

Sample Plots

802.11b (2457MHz) 5MHz



802.11g (2457MHz) 5MHz

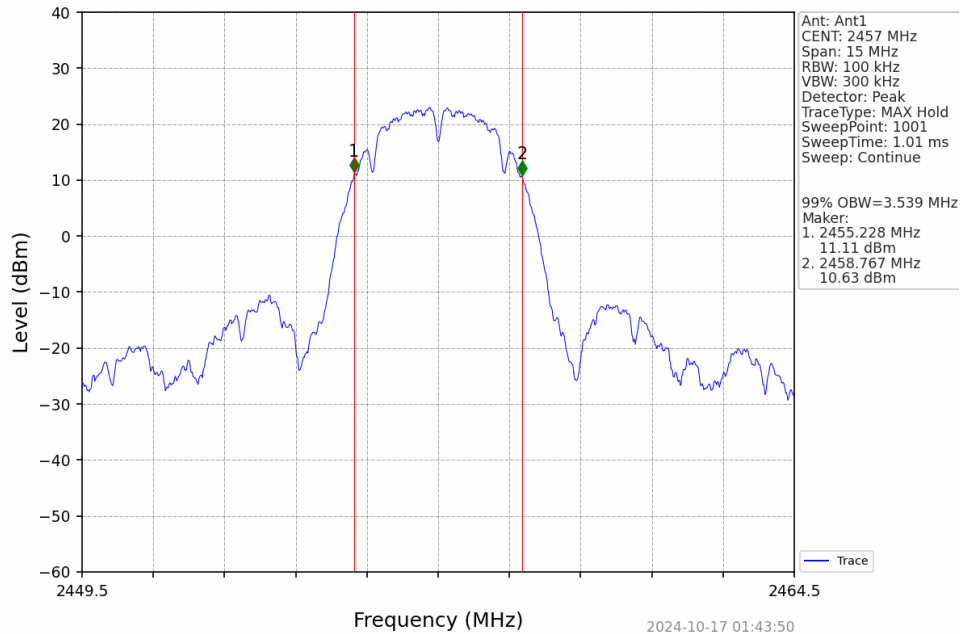


99% Occupied Bandwidth

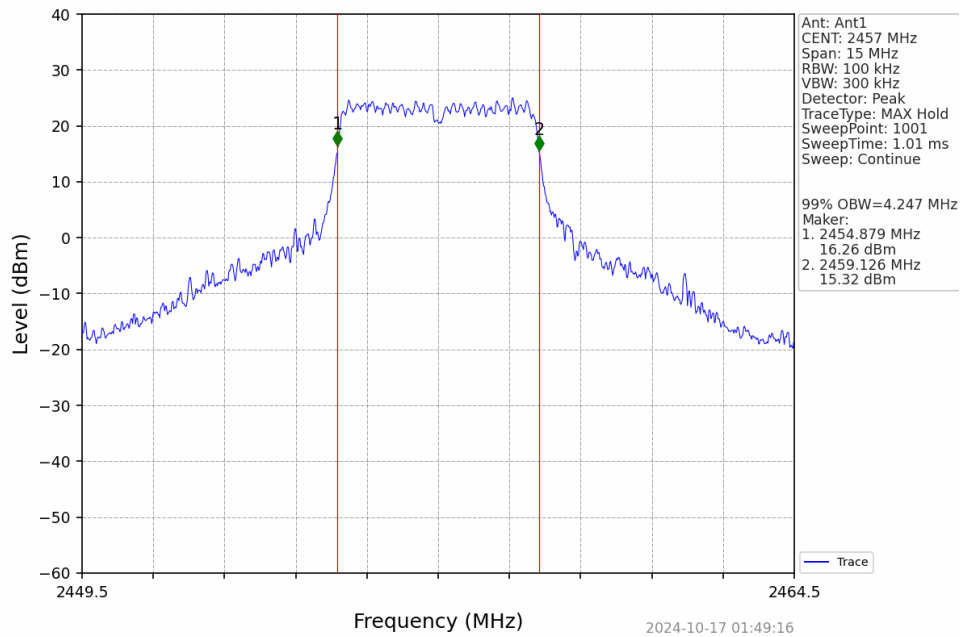
Channel Bandwidth	Mode	TX Type	Frequency (MHz)	99% Bandwidth (MHz)		
				ANT1	ANT2	ANT3
5 MHz	802.11b	MIMO 3x3	2457	3.539	3.548	3.543
			2462	3.515	3.542	3.530
			2467	3.512	3.543	3.528
			2472	3.506	3.547	3.528
	802.11g	MIMO 3x3	2457	4.247	4.226	4.222
			2462	4.238	4.202	4.205
			2467	4.227	4.232	4.221
			2472	4.240	4.219	4.263
	802.11n	MIMO 3x3	2457	4.542	4.547	4.542
			2462	4.539	4.533	4.534
			2467	4.532	4.528	4.550
			2472	4.529	4.547	4.582
10 MHz	802.11b	MIMO 3x3	2457	6.987	7.005	6.991
			2462	6.946	7.024	6.996
			2467	6.957	7.027	7.004
			2472	6.935	7.022	6.987
	802.11g	MIMO 3x3	2457	8.365	8.365	8.405
			2462	8.361	8.346	8.380
			2467	8.346	8.350	8.385
			2472	8.370	8.350	8.430
	802.11n	MIMO 3x3	2457	8.961	8.948	8.974
			2462	8.960	8.942	8.950
			2467	8.938	8.941	8.950
			2472	8.941	8.941	8.974
20 MHz	802.11b	MIMO 3x3	2462	13.991	14.074	14.115
			2467	14.067	14.151	14.021
			2472	14.045	14.124	14.110
	802.11g	MIMO 3x3	2462	18.319	18.035	17.909
			2467	18.372	18.460	18.022
			2472	18.466	18.380	18.125
	802.11n	MIMO 3x3	2462	19.194	19.101	18.858
			2467	19.081	19.254	18.932
			2472	19.253	19.189	19.041

Sample Plots

802.11b (2457MHz) 5MHz BW



802.11g (2457MHz) 5MHz BW



5 Emission Masks

5.1 Test Result

Test Description	Test Specification	Test Result
Emission Masks	FCC Parts 2.1049 & 90.210	Compliant

5.2 Test Methods

The procedure from ANSI C63.26:2015 clause 5.7.3 was used to measure the emissions masks using the conducted method. The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

Limit

Emission Mask B: The power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

- (1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.
- (2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.
- (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log (P)$ dB.

5.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 23.7 °C
Relative Humidity: 21.2 %
Atmospheric Pressure: 98.3 kPa

5.4 Test Equipment

Test End Date: 18-Nov-2024

Tester: SGM

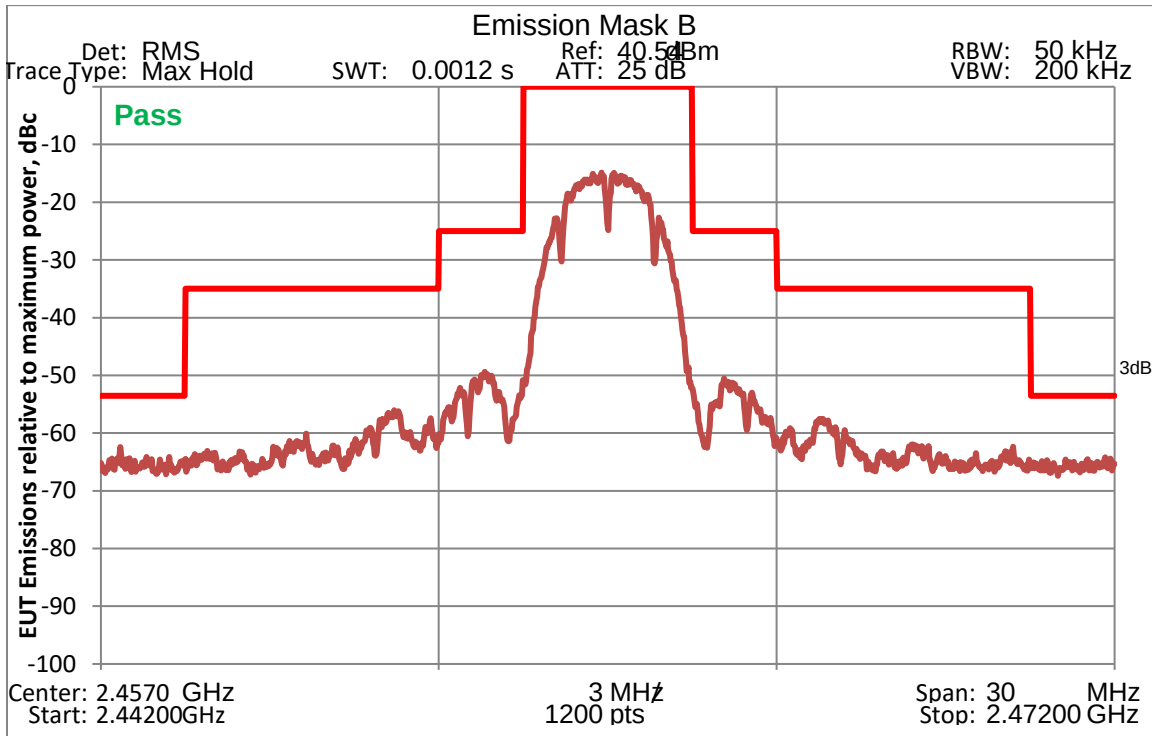
Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
40DB ATTENUATOR NM TO NF	FAIRVIEW MICROWAVE	SA6N5WA-40	24010	3-Sep-2024	3-Sep-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20109	20-Mar-2024	20-Mar-2025
40DB ATTENUATOR NM TO NF	FAIRVIEW MICROWAVE	SA6N5WA-40	24011	3-Sep-2024	3-Sep-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20107	20-Mar-2024	20-Mar-2025
40DB ATTENUATOR NM TO NF	FAIRVIEW MICROWAVE	SA6N5WA-40	24012	3-Sep-2024	3-Sep-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	3-Jan-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025

Software Profile:

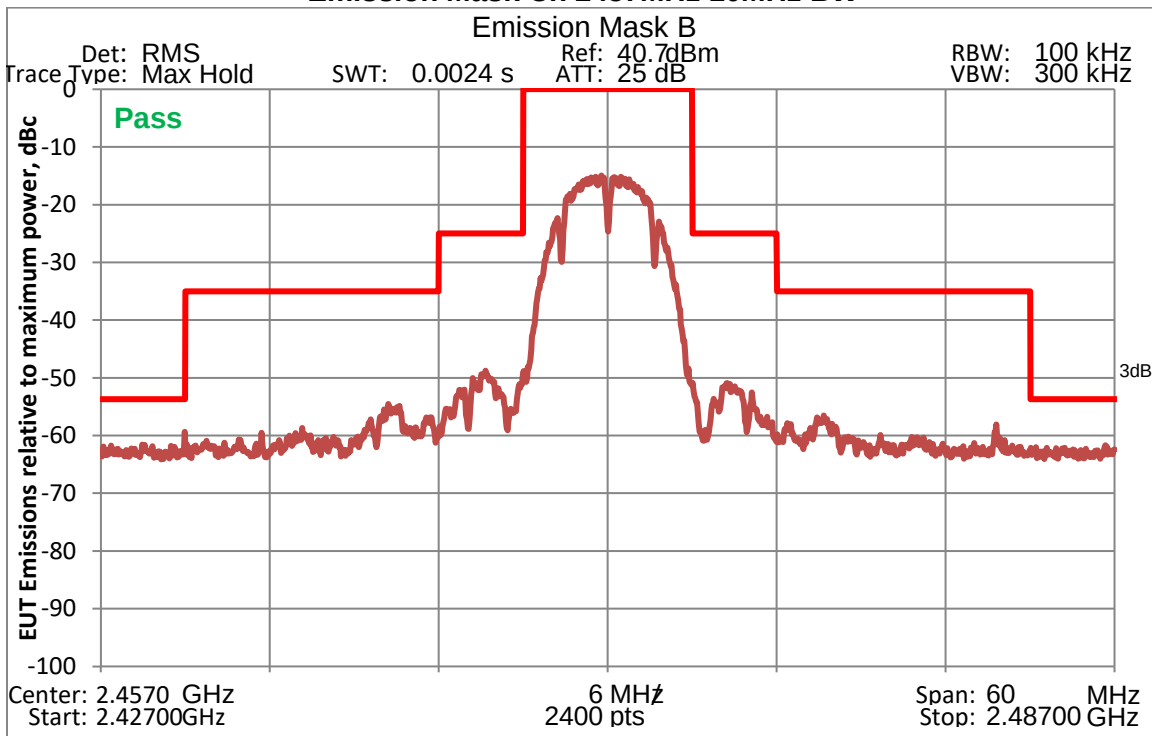
TSTPASS Version: 2.0

5.5 Test Data – 802.11b

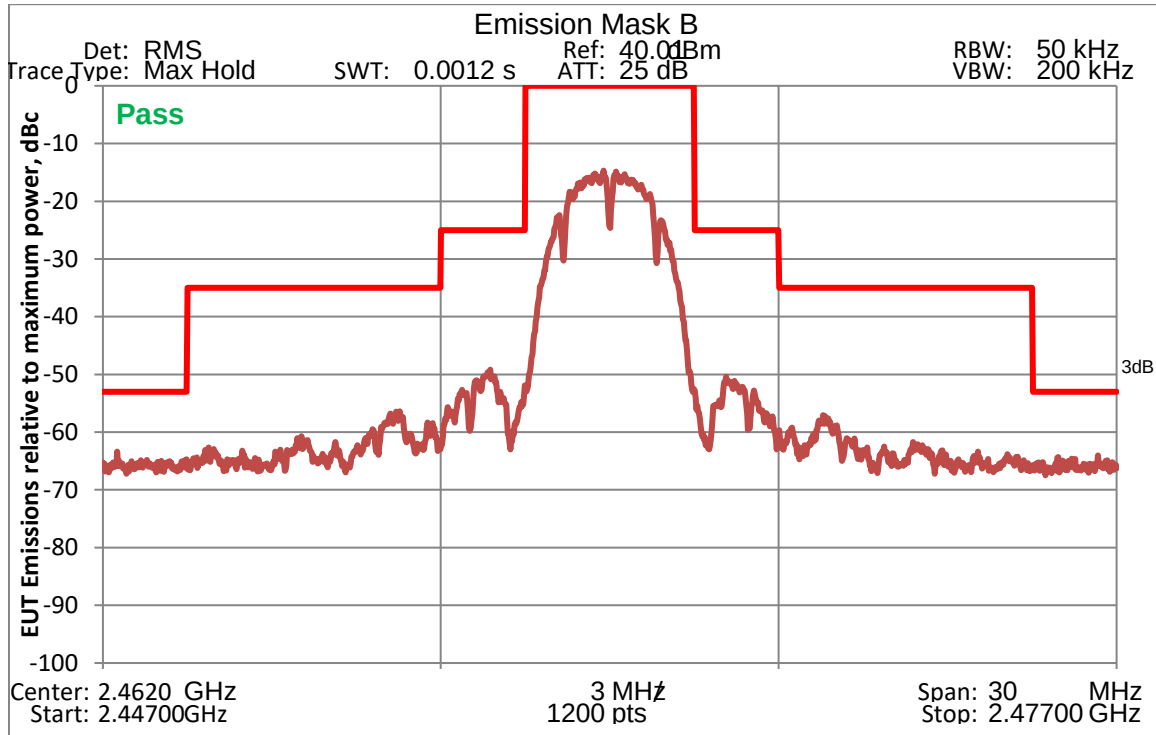
Emission Mask Ch 2457MHz 5MHz BW



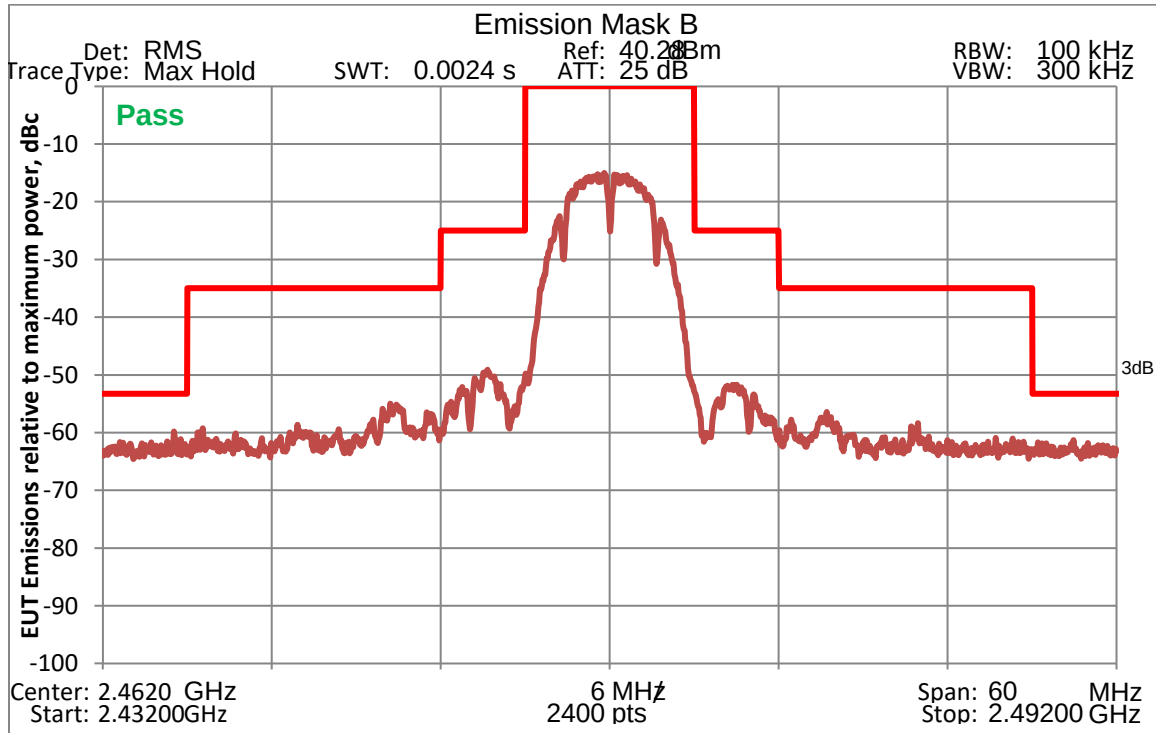
Emission Mask Ch 2457MHz 10MHz BW



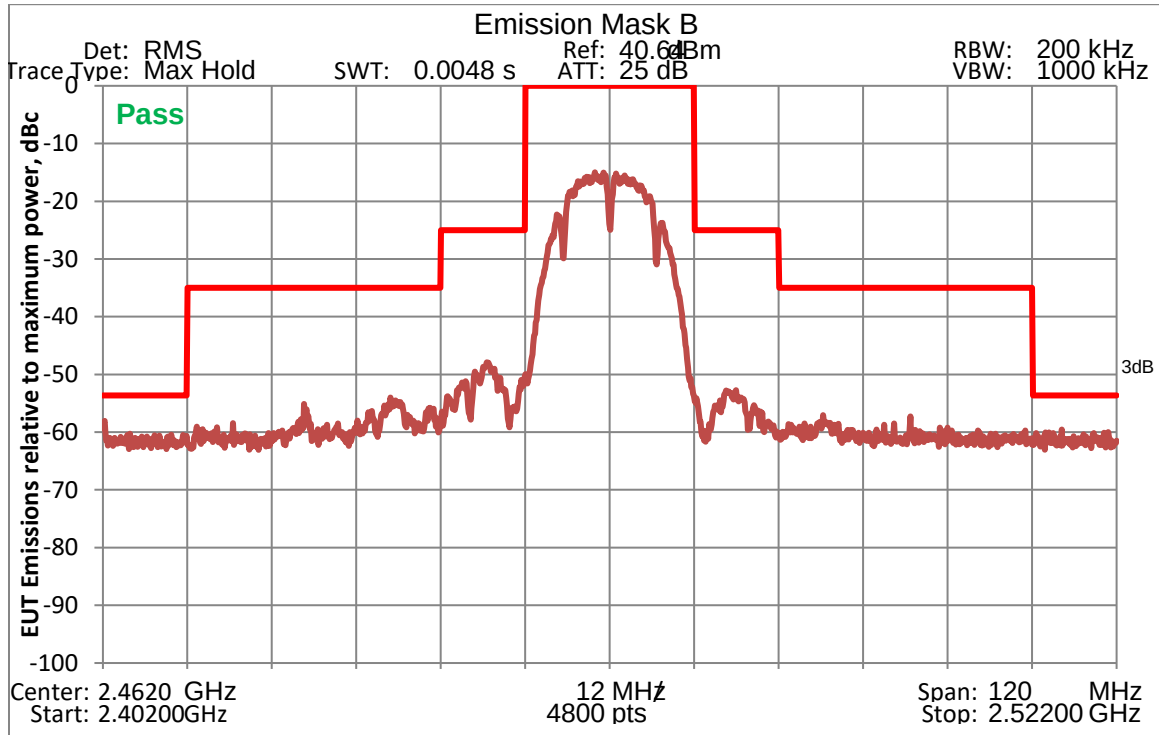
Emission Mask Ch 2462 MHz 5MHz BW



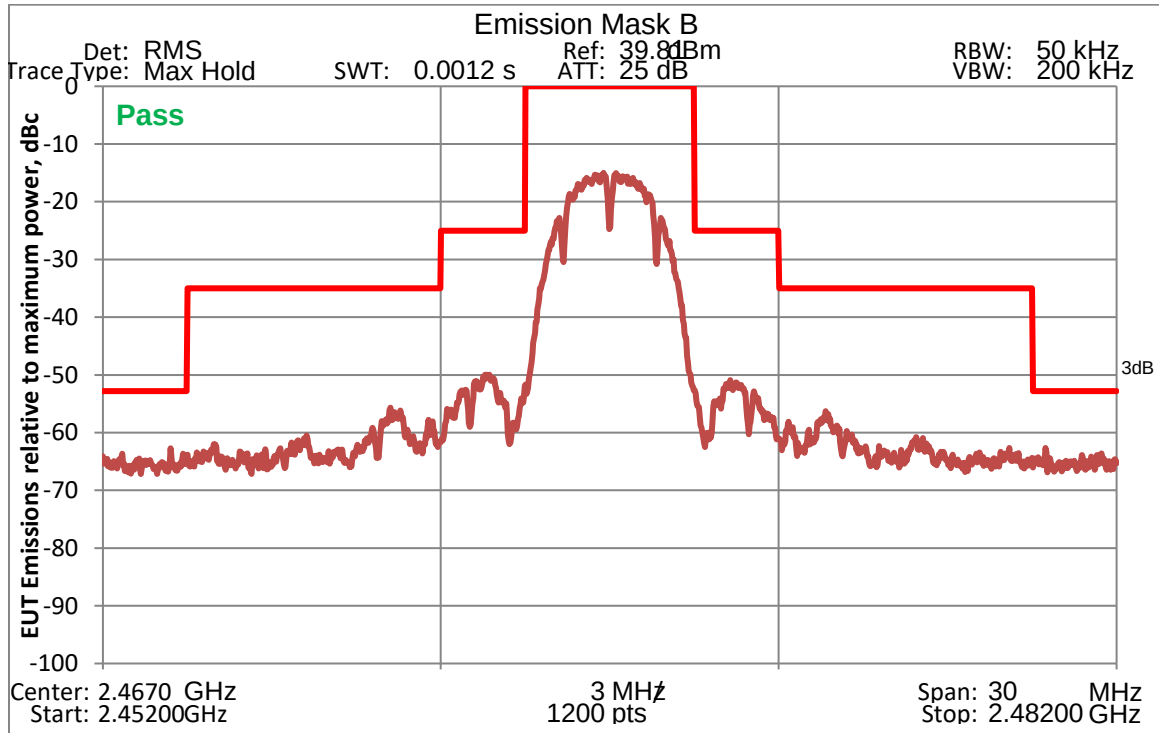
Emission Mask Ch 2462 MHz 10MHz BW



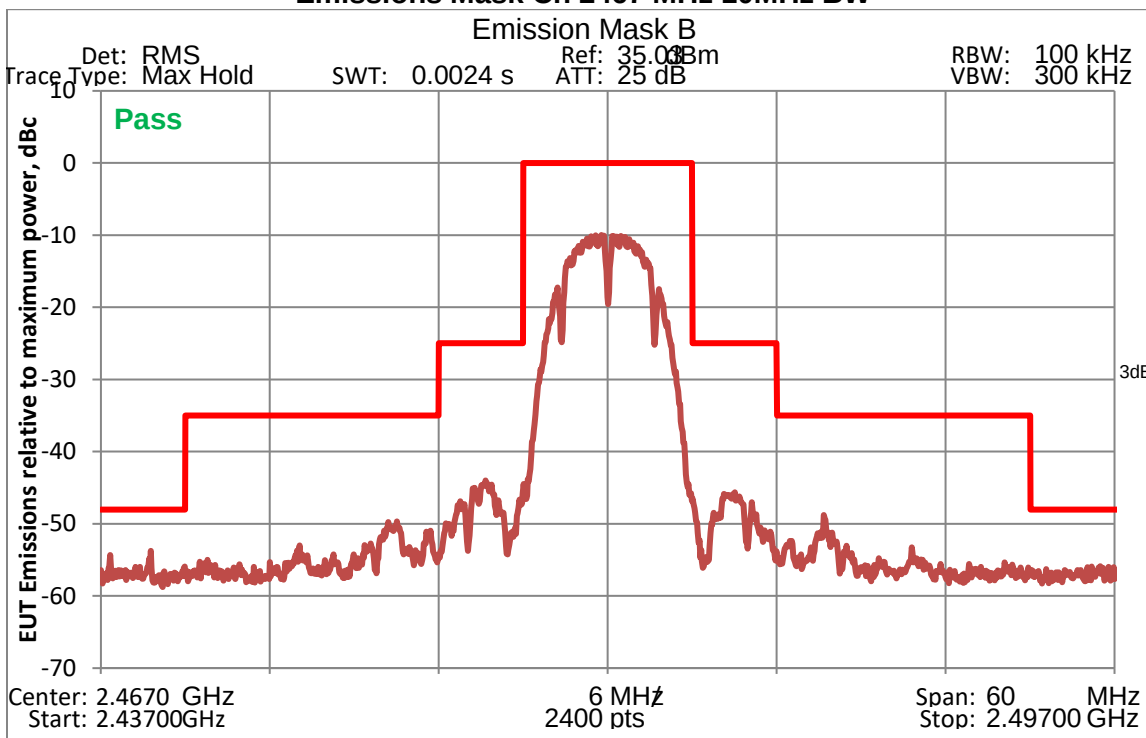
Emissions Mask Ch 2462 MHz 20MHz BW



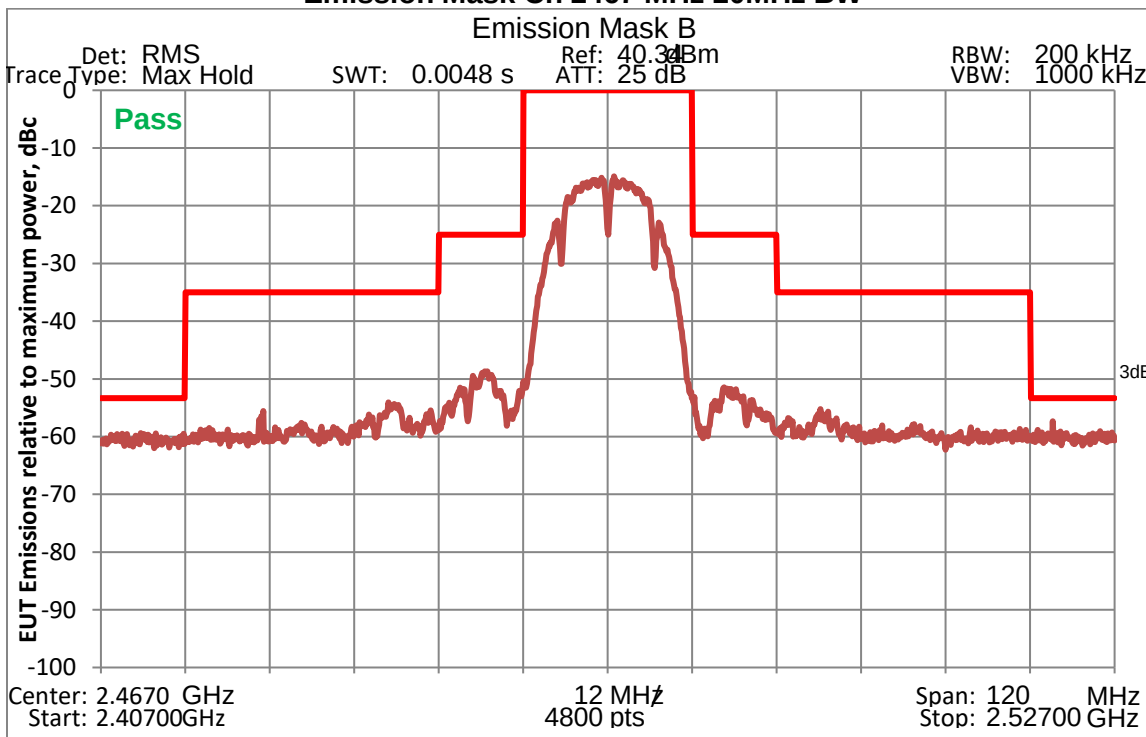
Emission Mask Ch 2467 MHz 5MHz BW



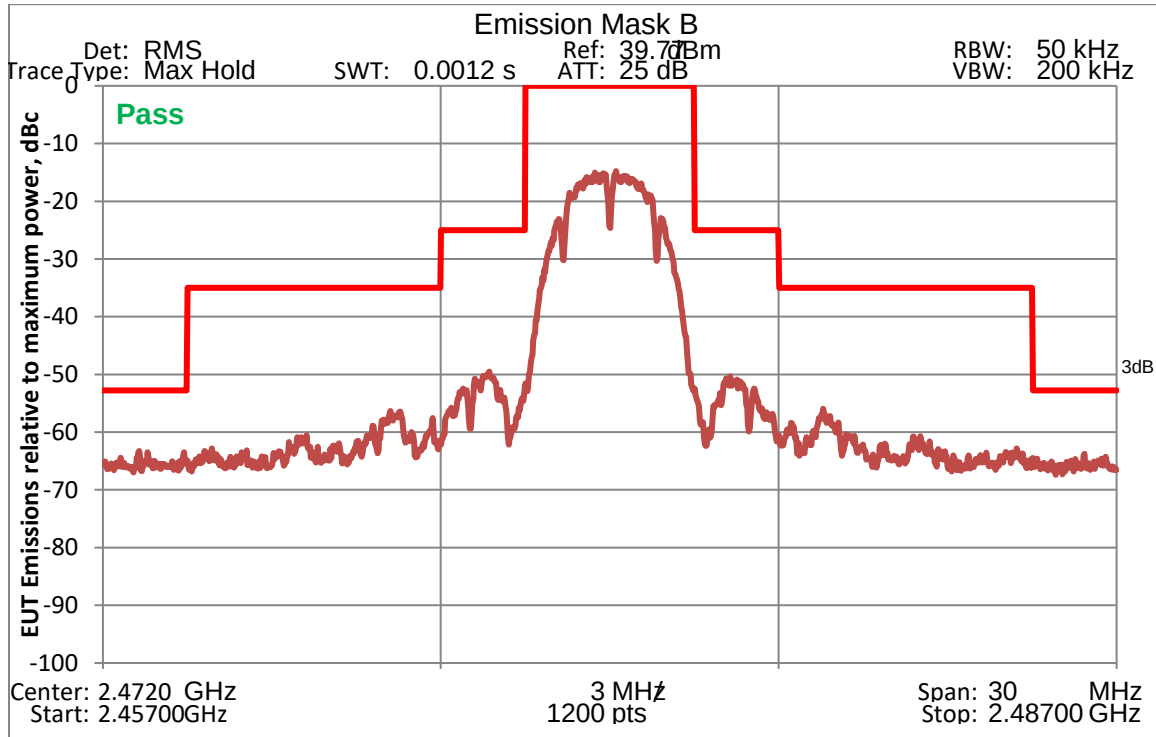
Emissions Mask Ch 2467 MHz 10MHz BW



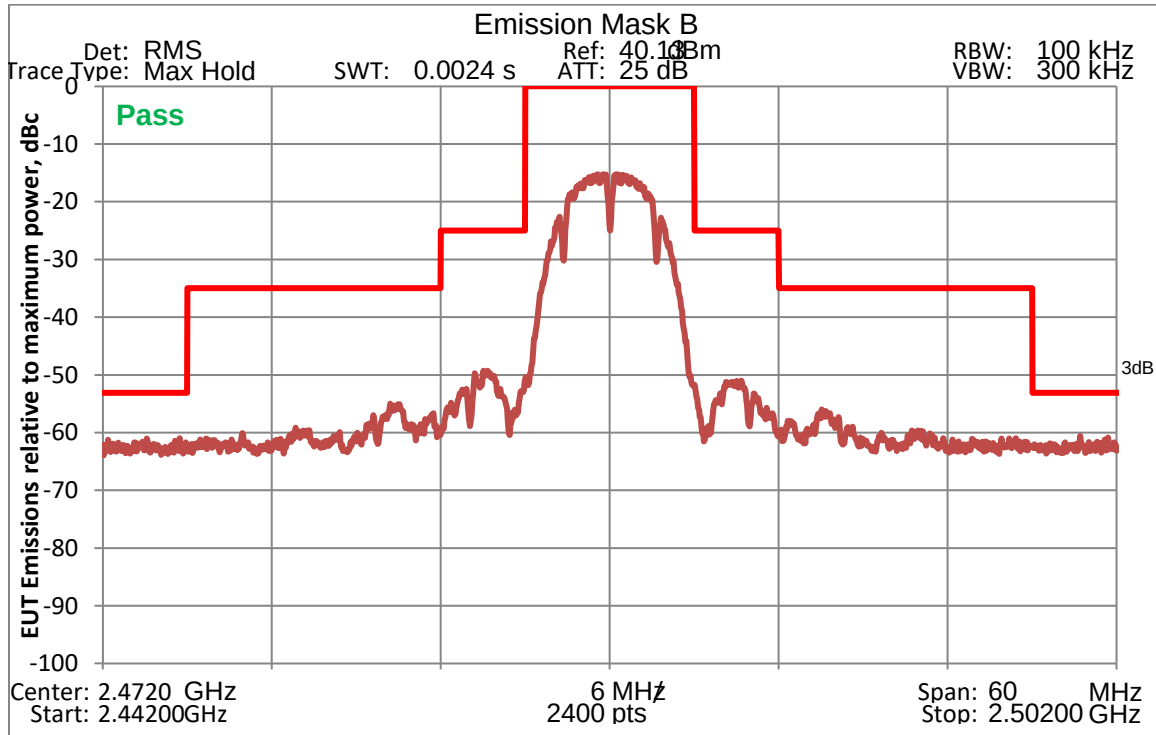
Emission Mask Ch 2467 MHz 20MHz BW



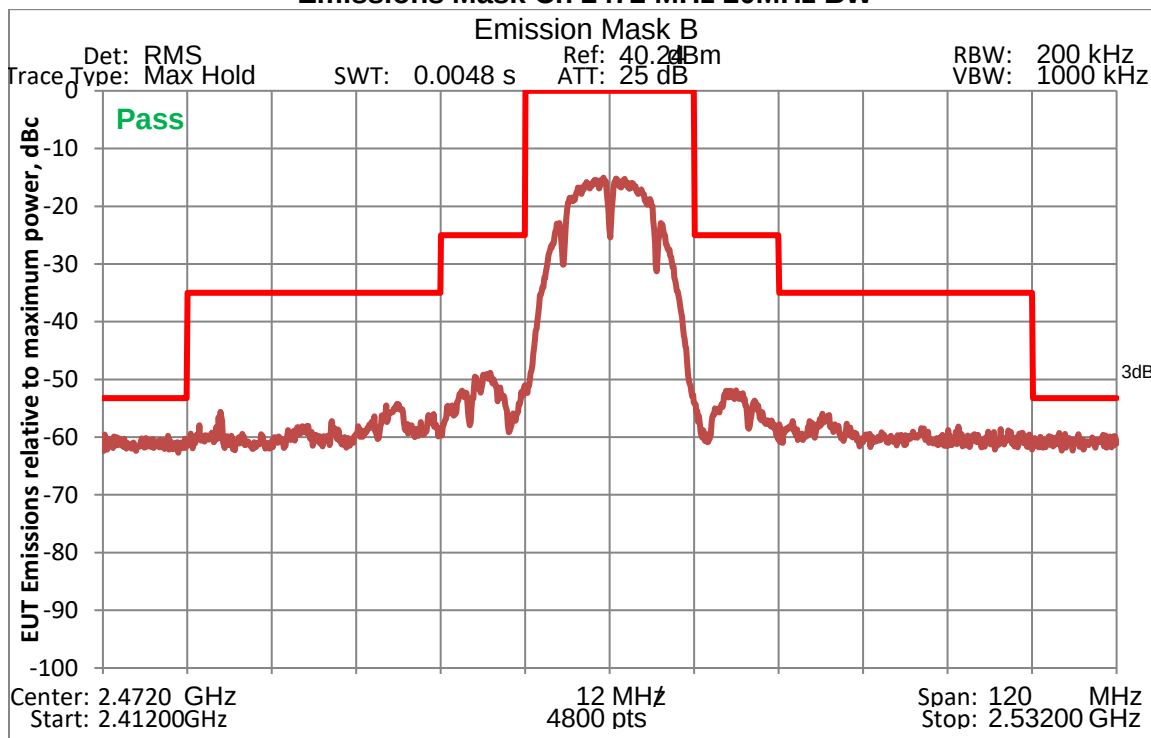
Emissions Mask Ch 2472 MHz 5MHz BW



Emission Mask Ch 2472 MHz 10MHz BW

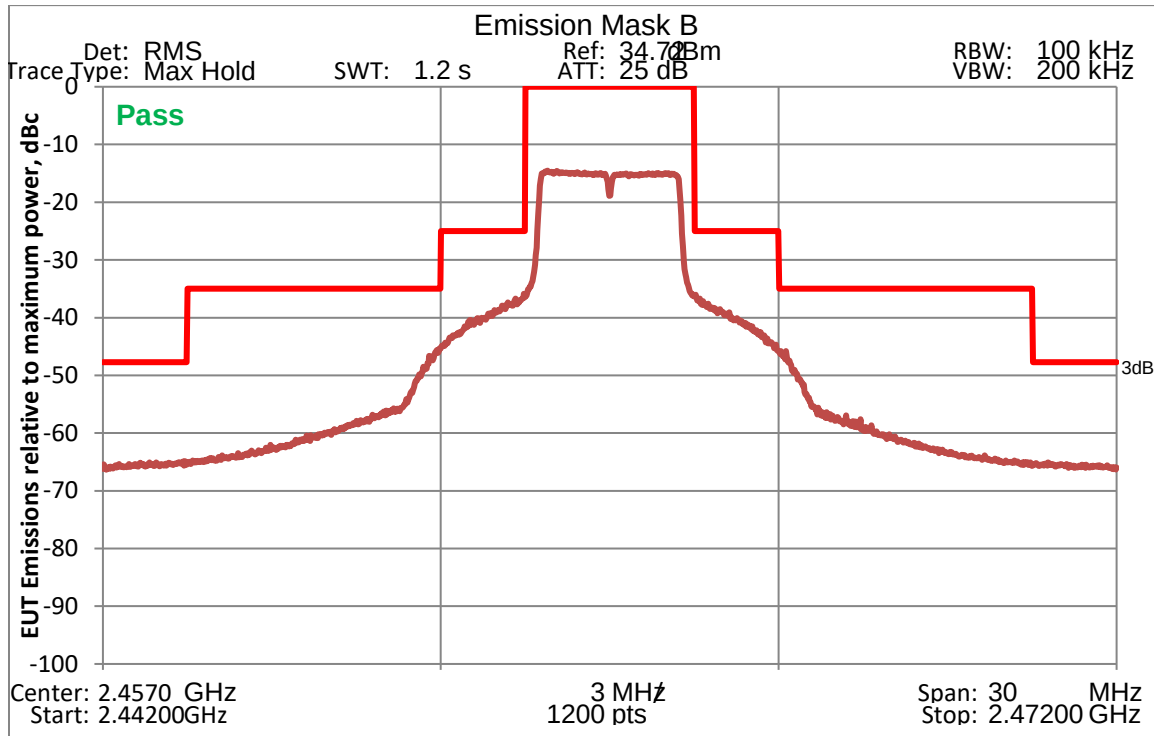


Emissions Mask Ch 2472 MHz 20MHz BW

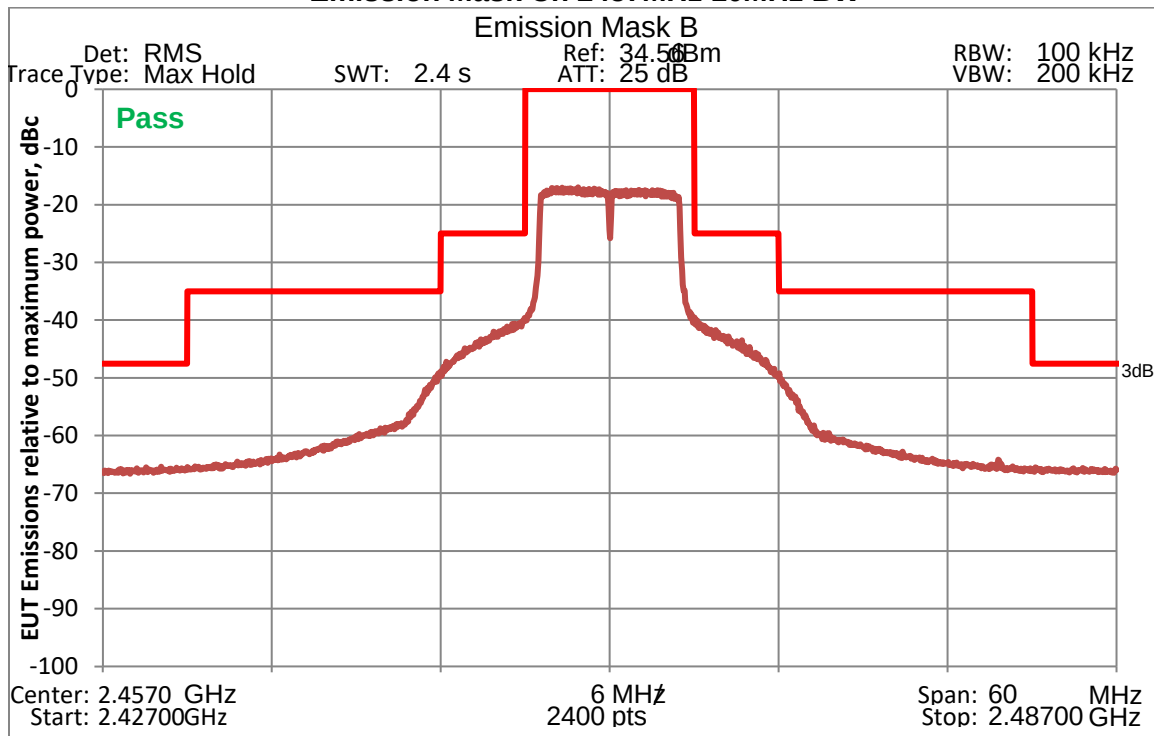


5.6 Test Data – 802.11g

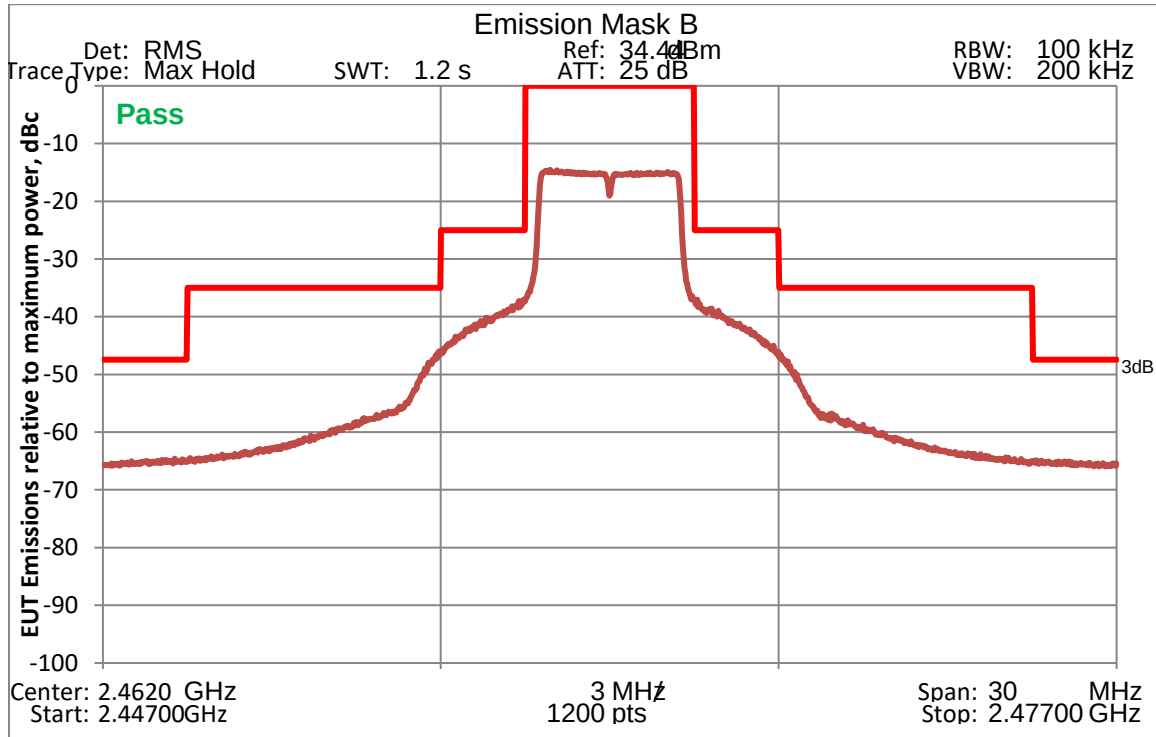
Emission Mask Ch 2457MHz 5MHz BW



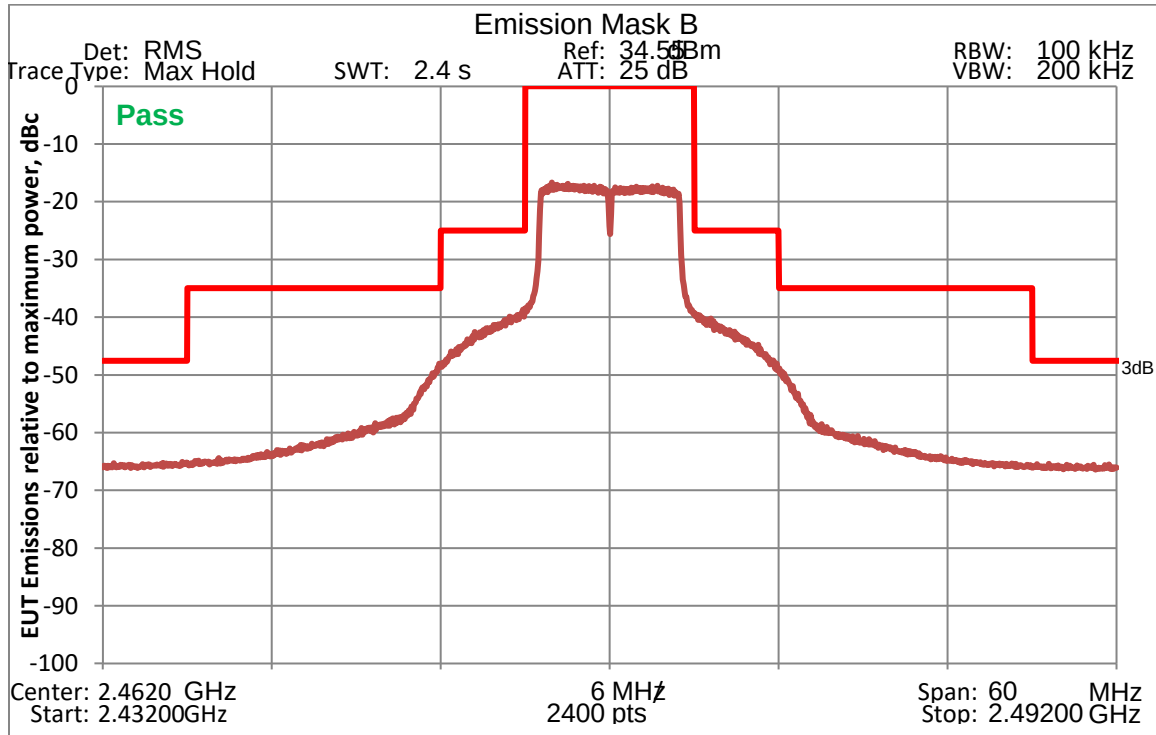
Emission Mask Ch 2457MHz 10MHz BW



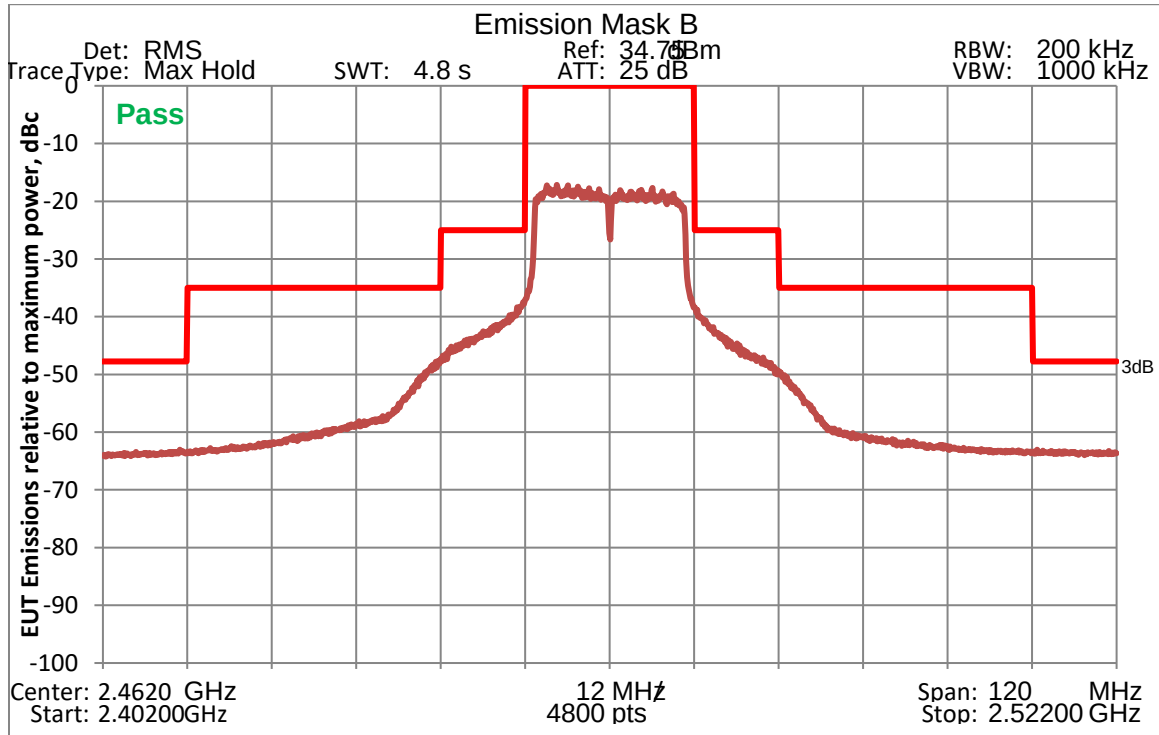
Emission Mask Ch 2462 MHz 5MHz BW



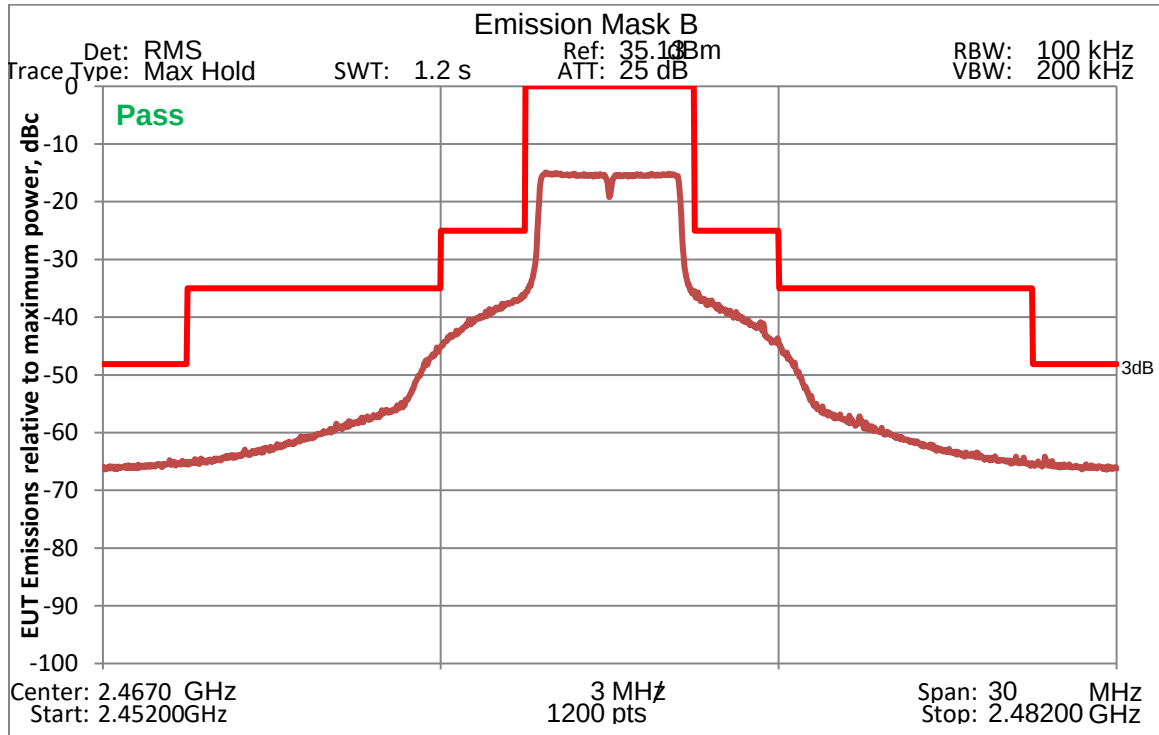
Emission Mask Ch 2462 MHz 10MHz BW



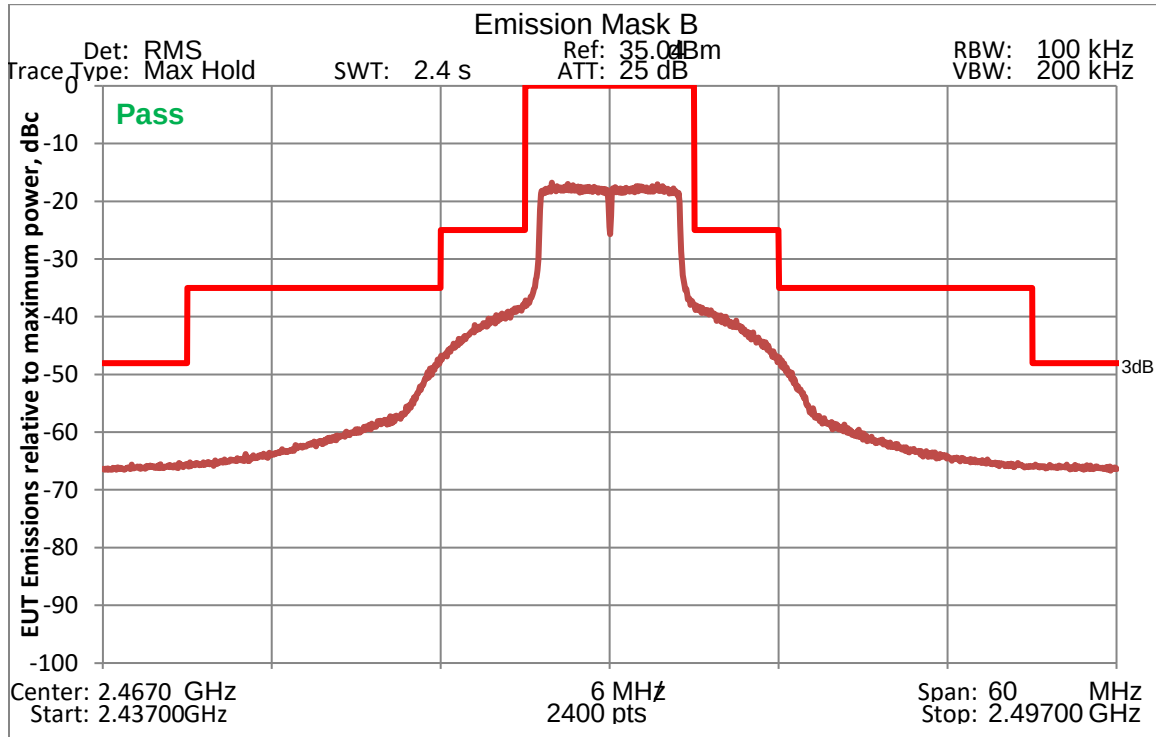
Emissions Mask Ch 2462 MHz 20MHz BW



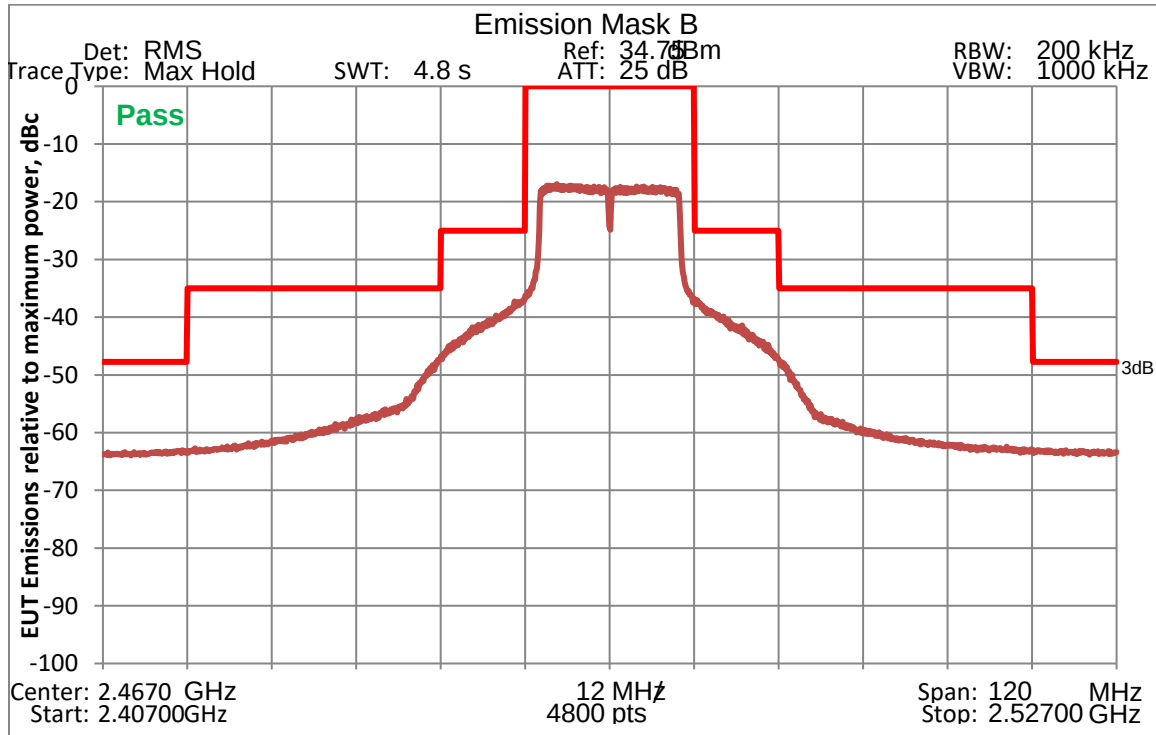
Emission Mask Ch 2467 MHz 5MHz BW



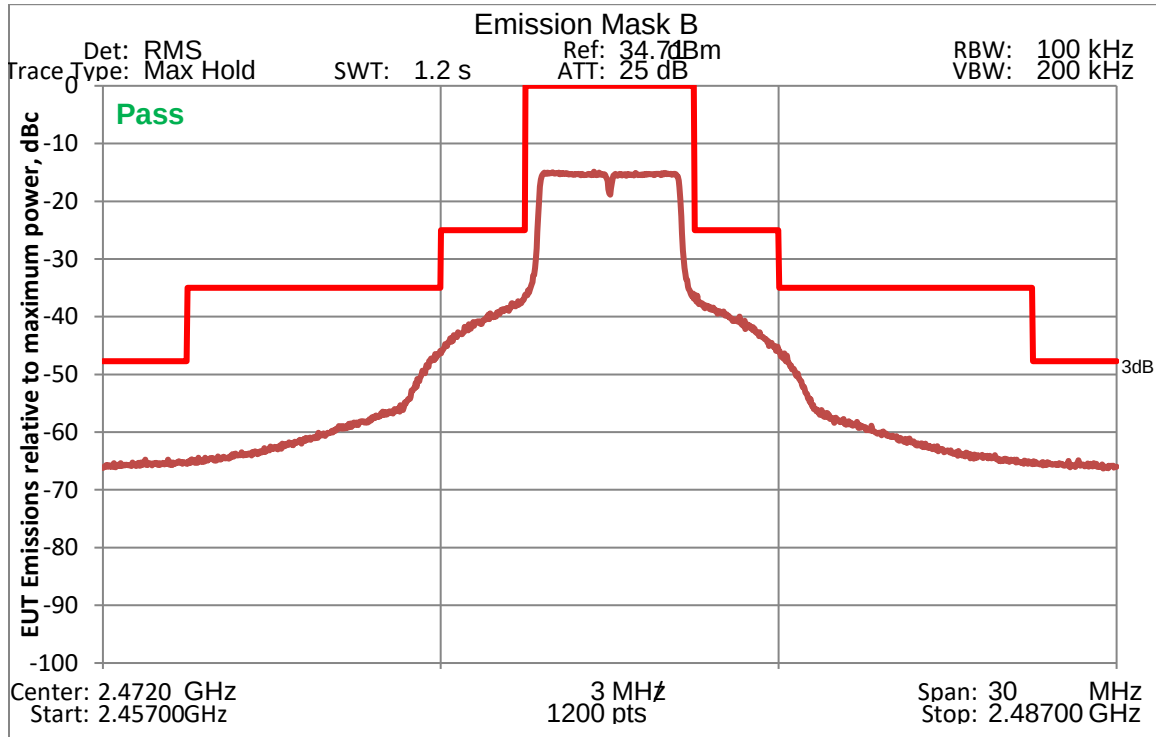
Emissions Mask Ch 2467 MHz 10MHz BW



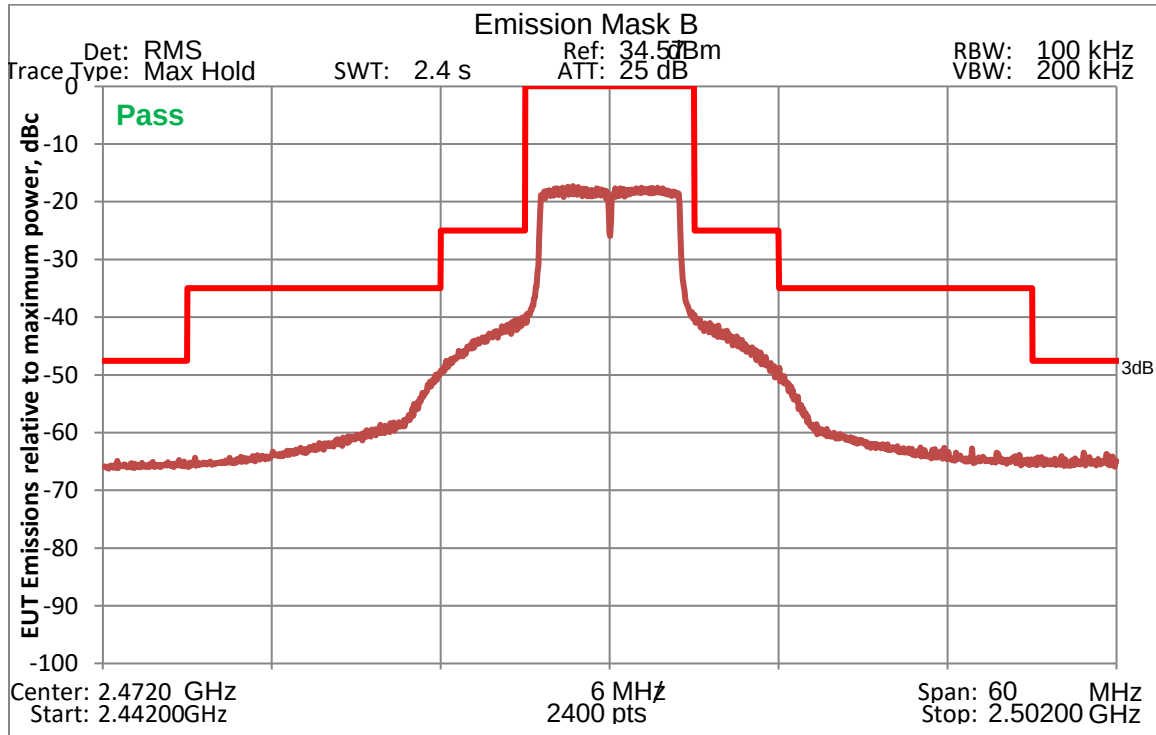
Emission Mask Ch 2467 MHz 20MHz BW



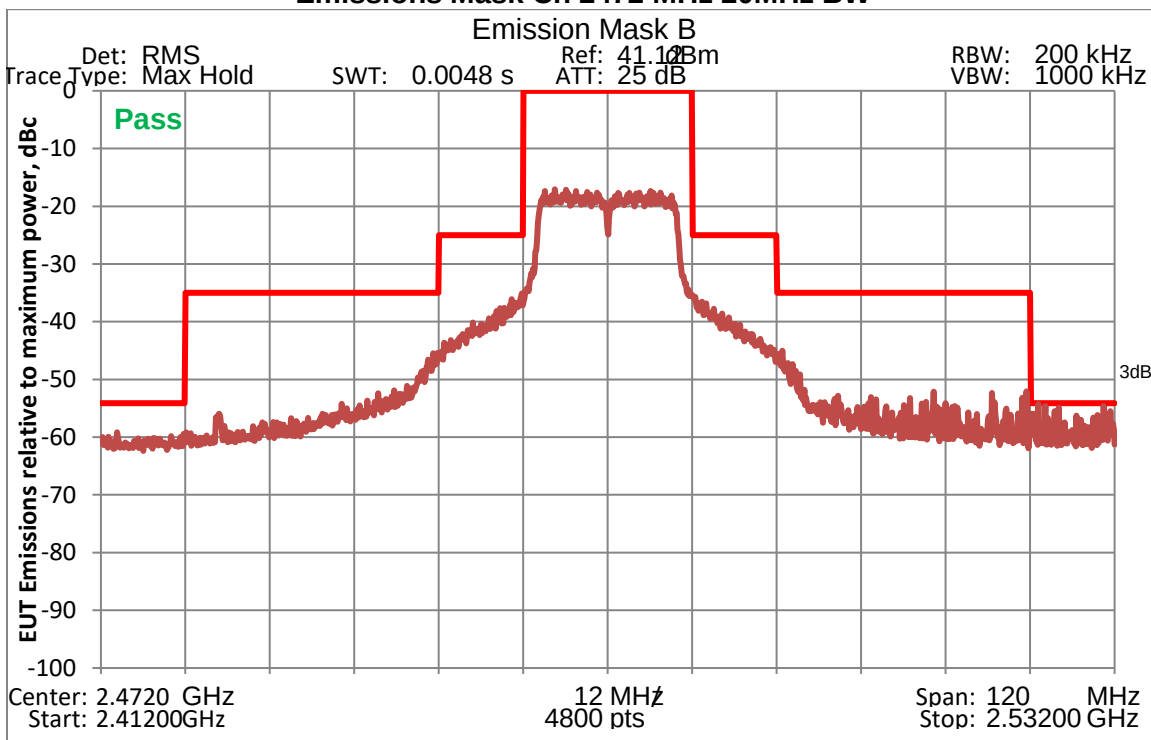
Emissions Mask Ch 2472 MHz 5MHz BW



Emission Mask Ch 2472 MHz 10MHz BW

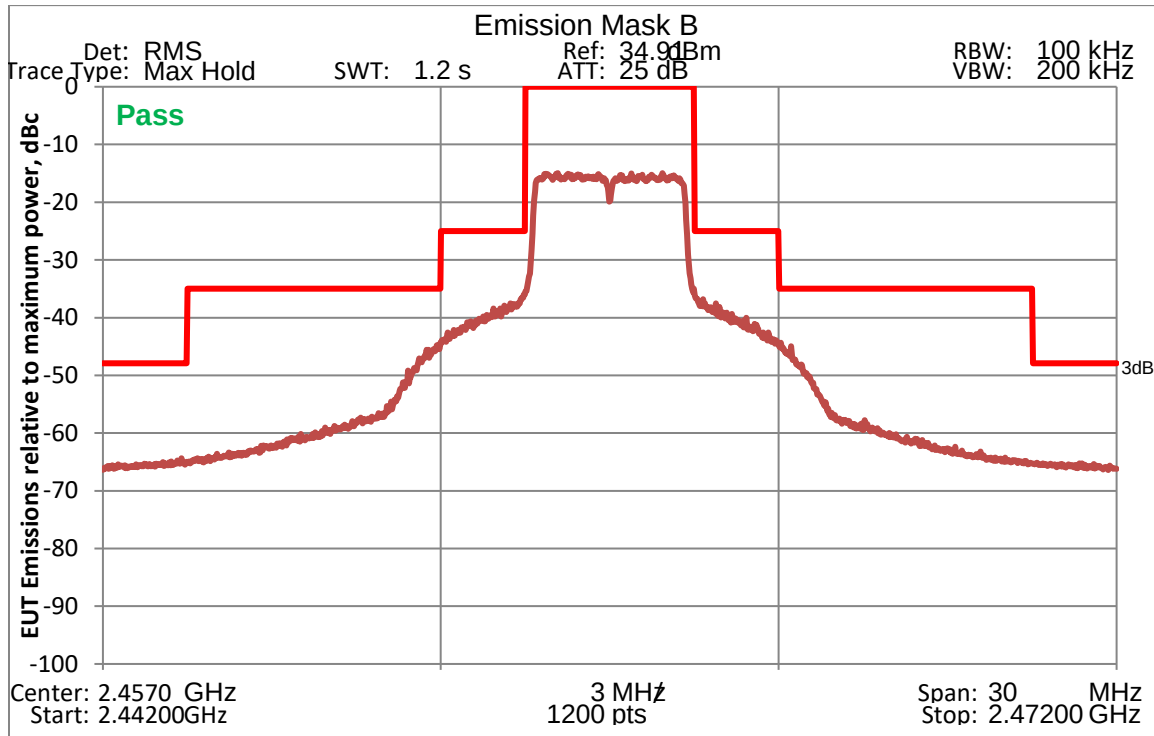


Emissions Mask Ch 2472 MHz 20MHz BW

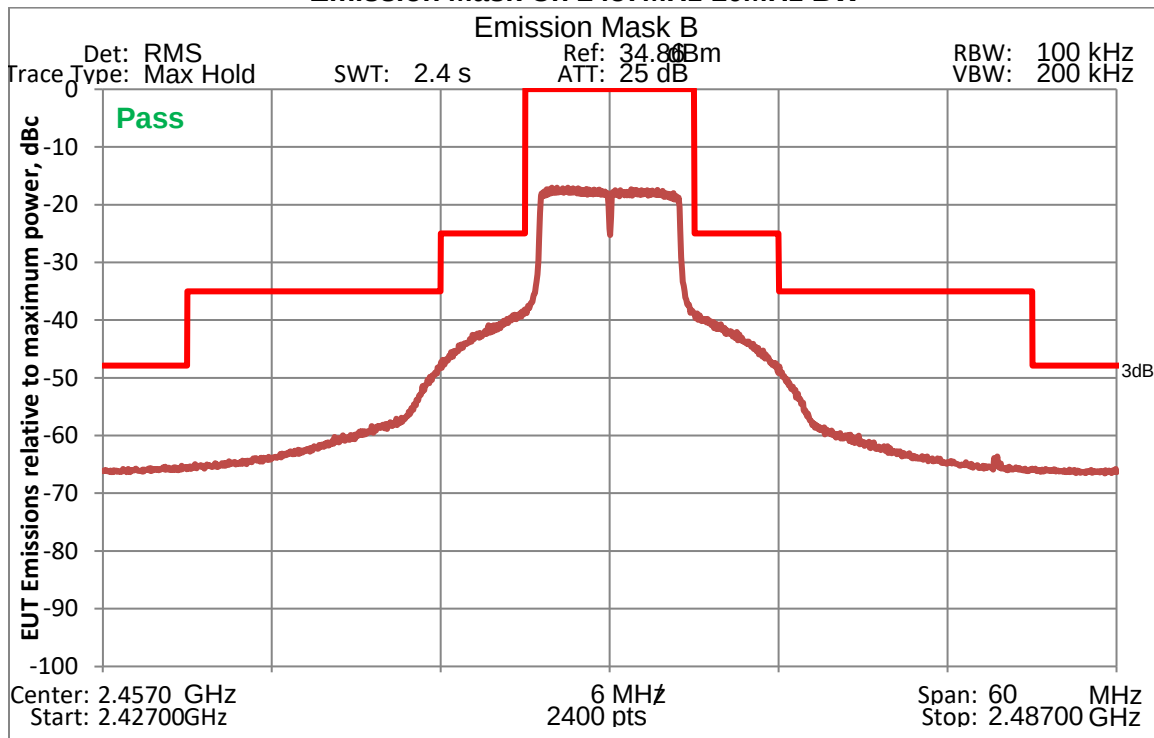


5.7 Test Data – 802.11n

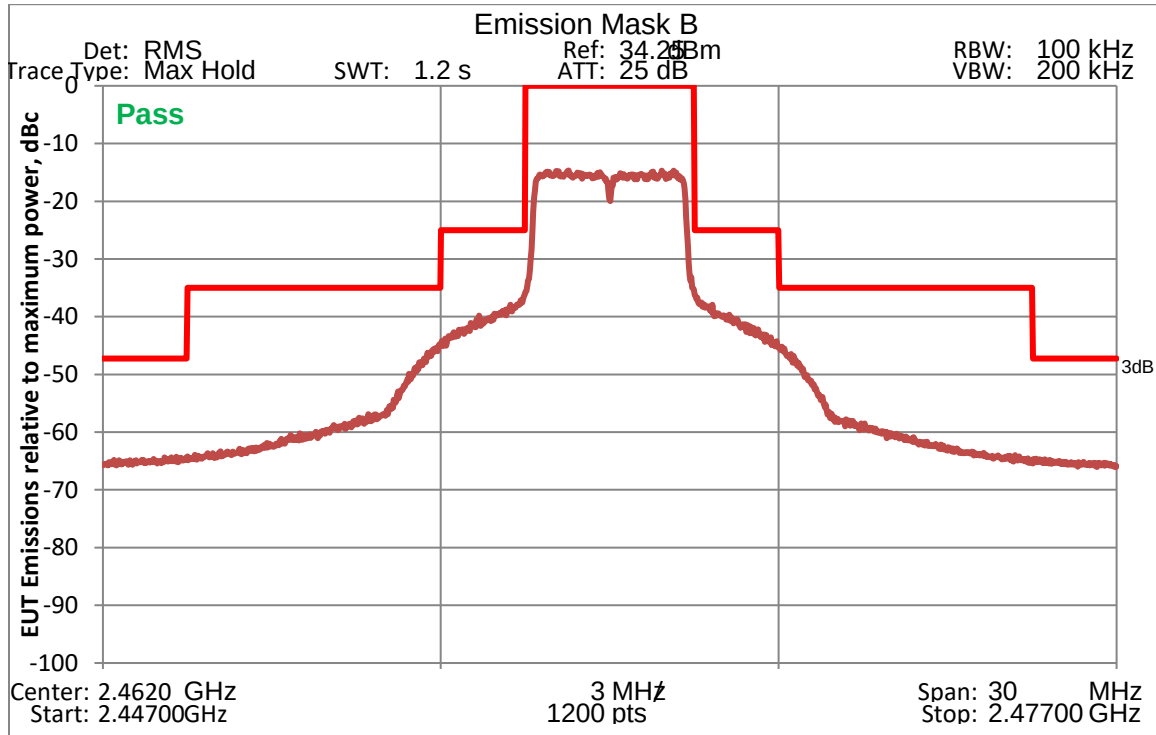
Emission Mask Ch 2457MHz 5MHz BW



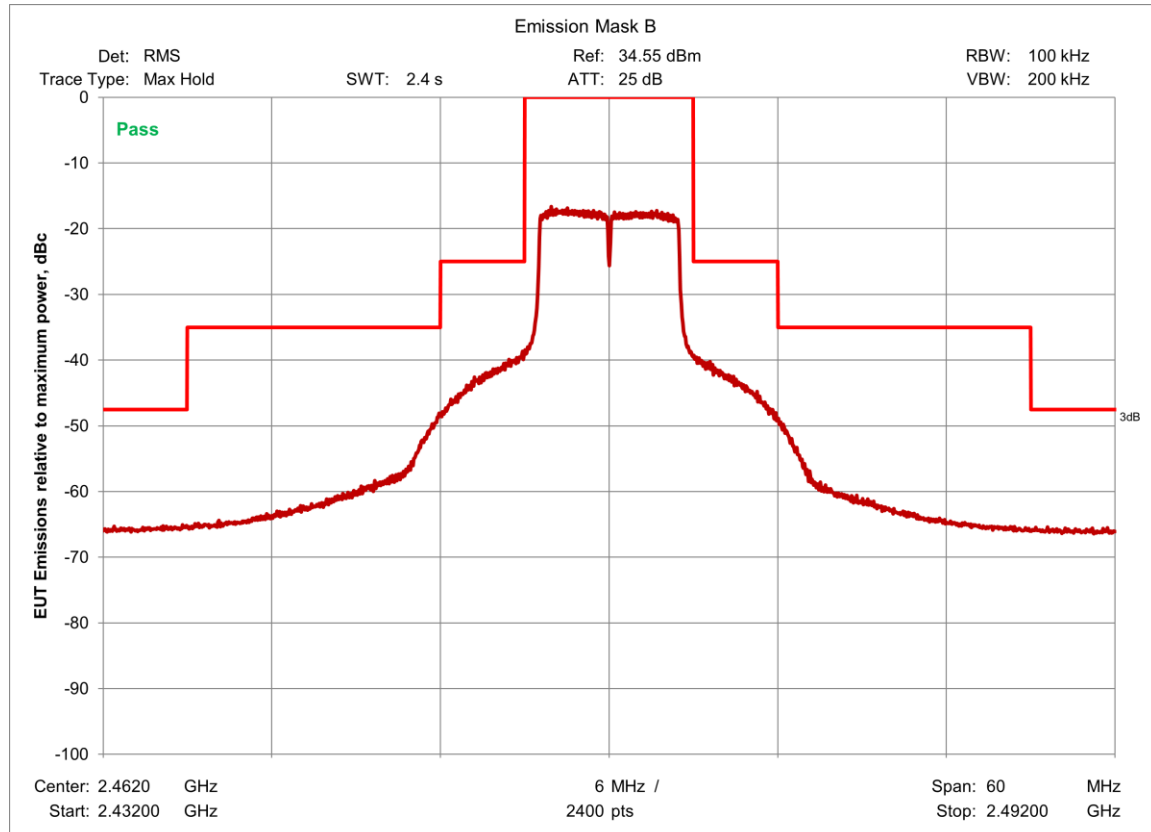
Emission Mask Ch 2457MHz 10MHz BW



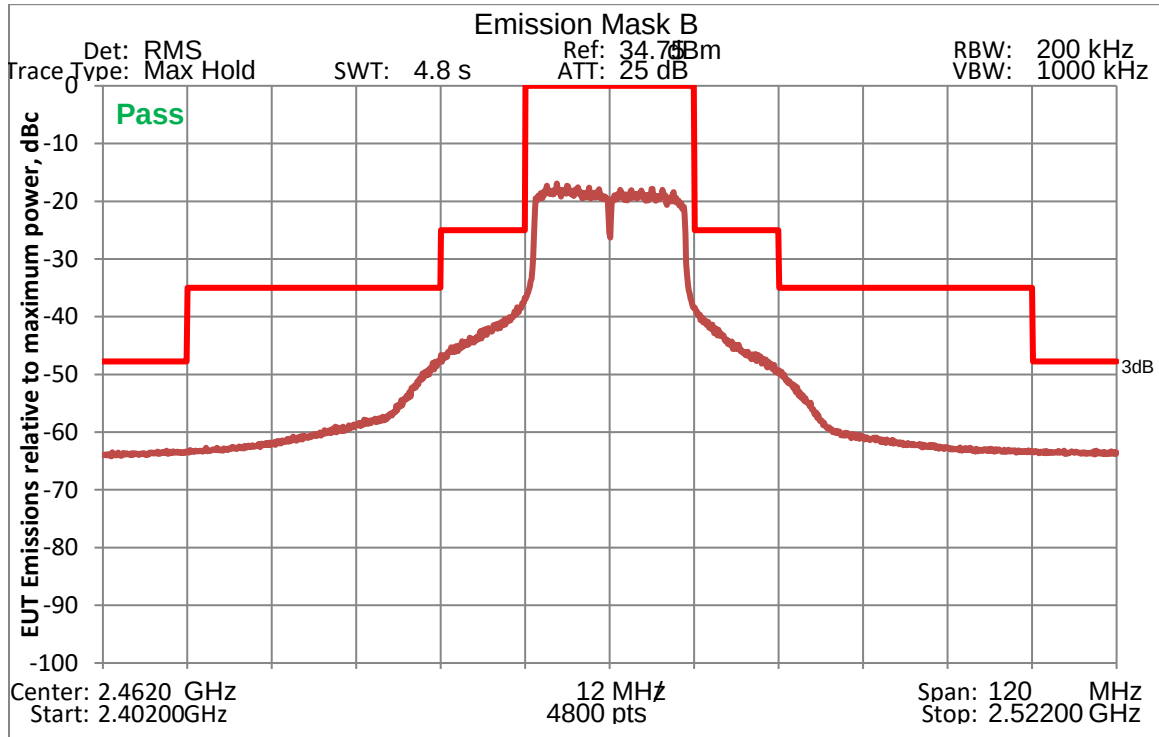
Emission Mask Ch 2462 MHz 5MHz BW



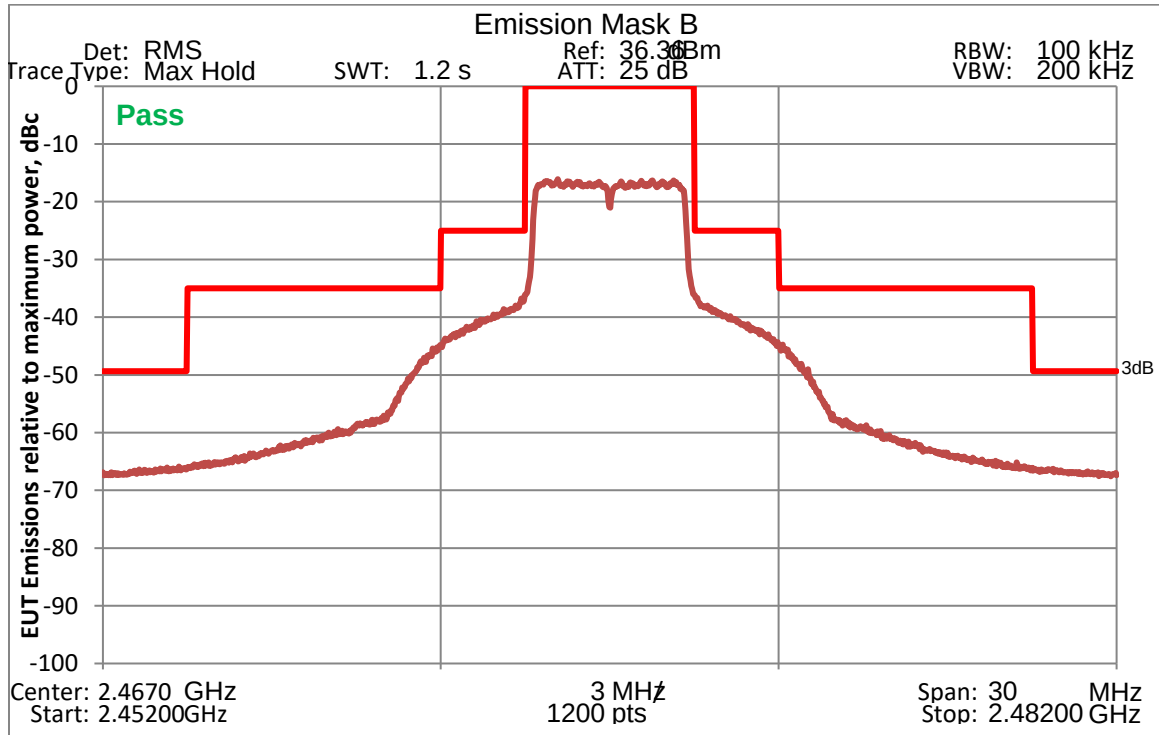
Emission Mask Ch 2462 MHz 10MHz BW



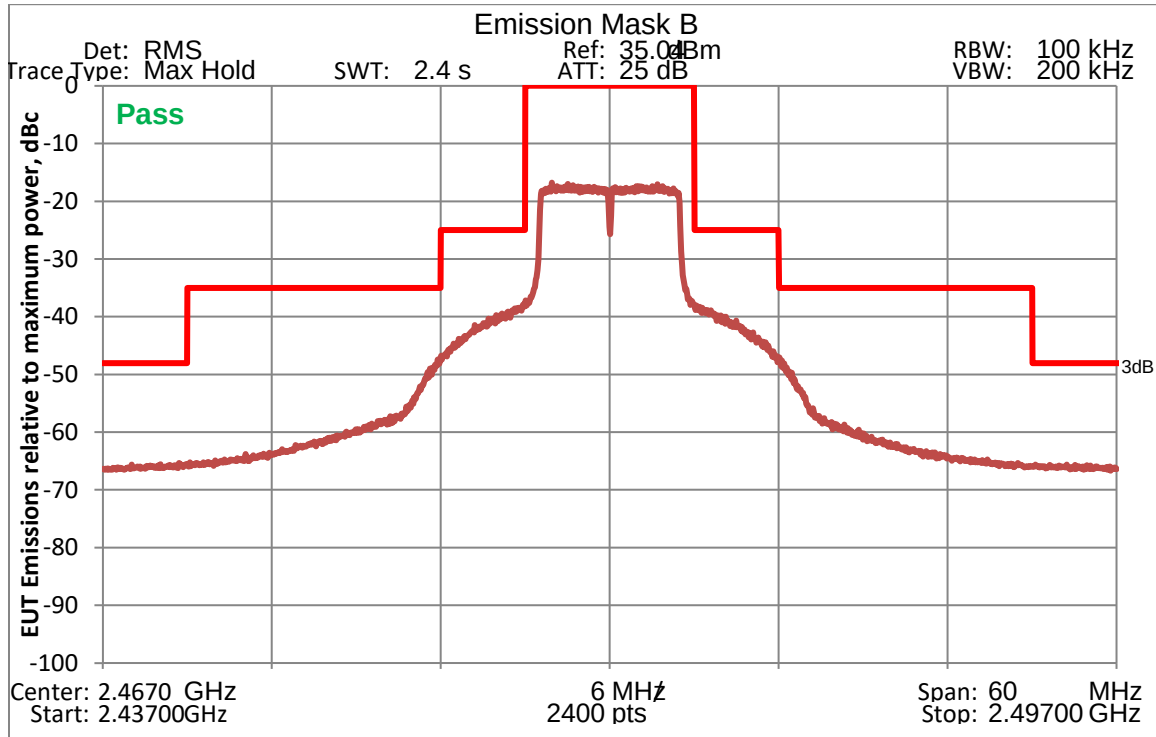
Emissions Mask Ch 2462 MHz 20MHz BW



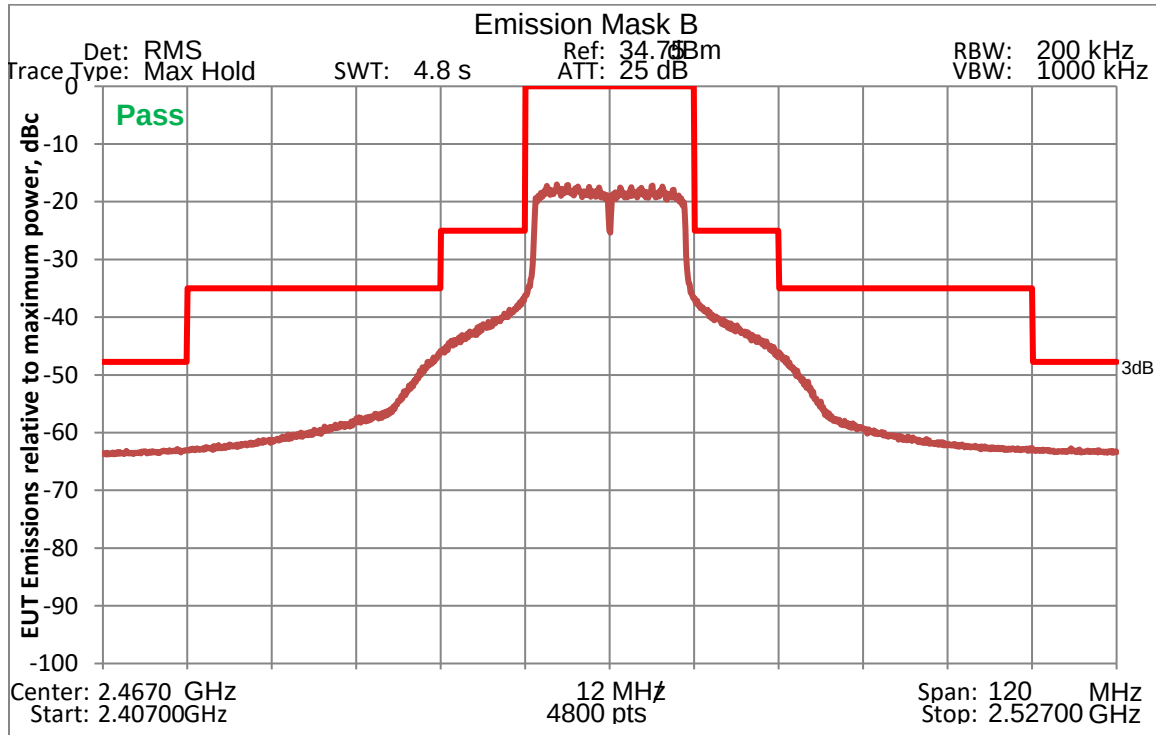
Emission Mask Ch 2467 MHz 5MHz BW



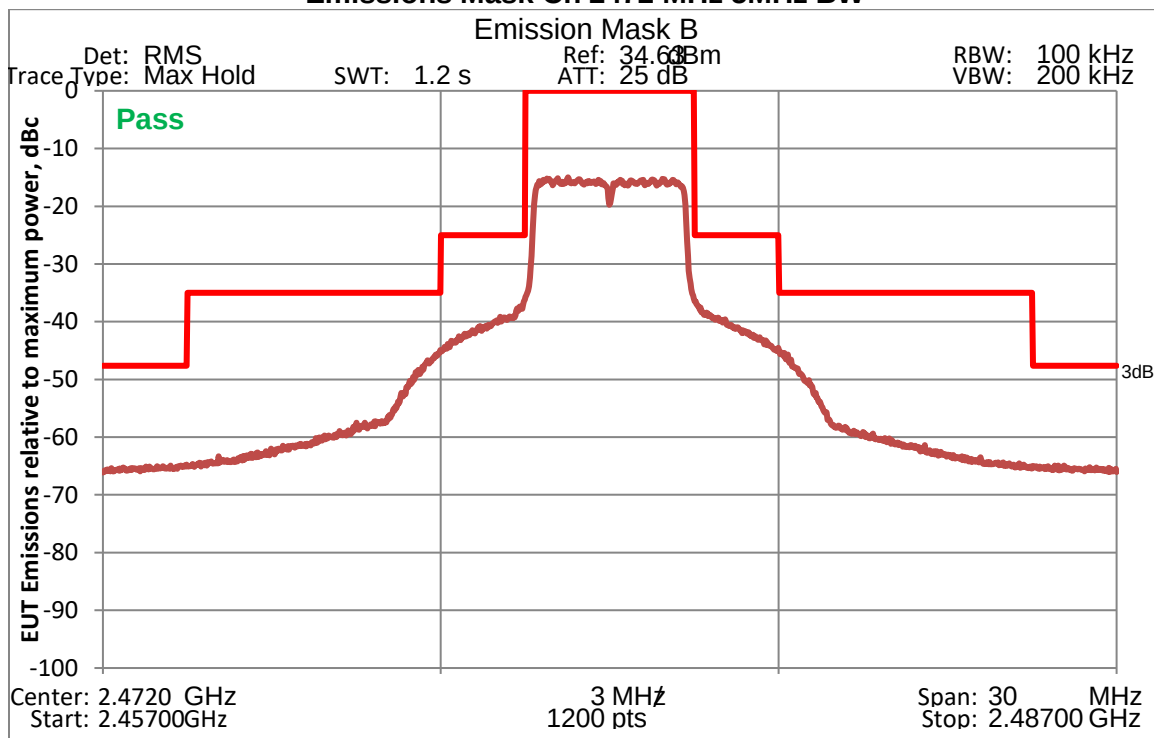
Emissions Mask Ch 2467 MHz 10MHz BW



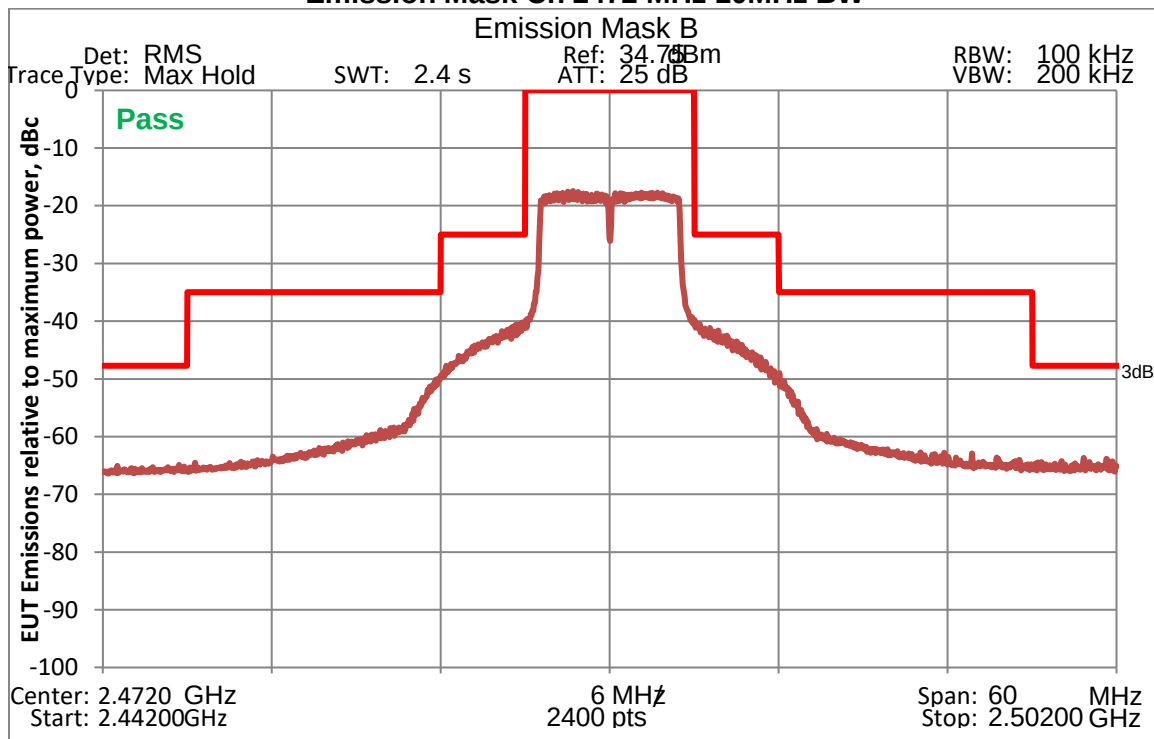
Emission Mask Ch 2467 MHz 20MHz BW



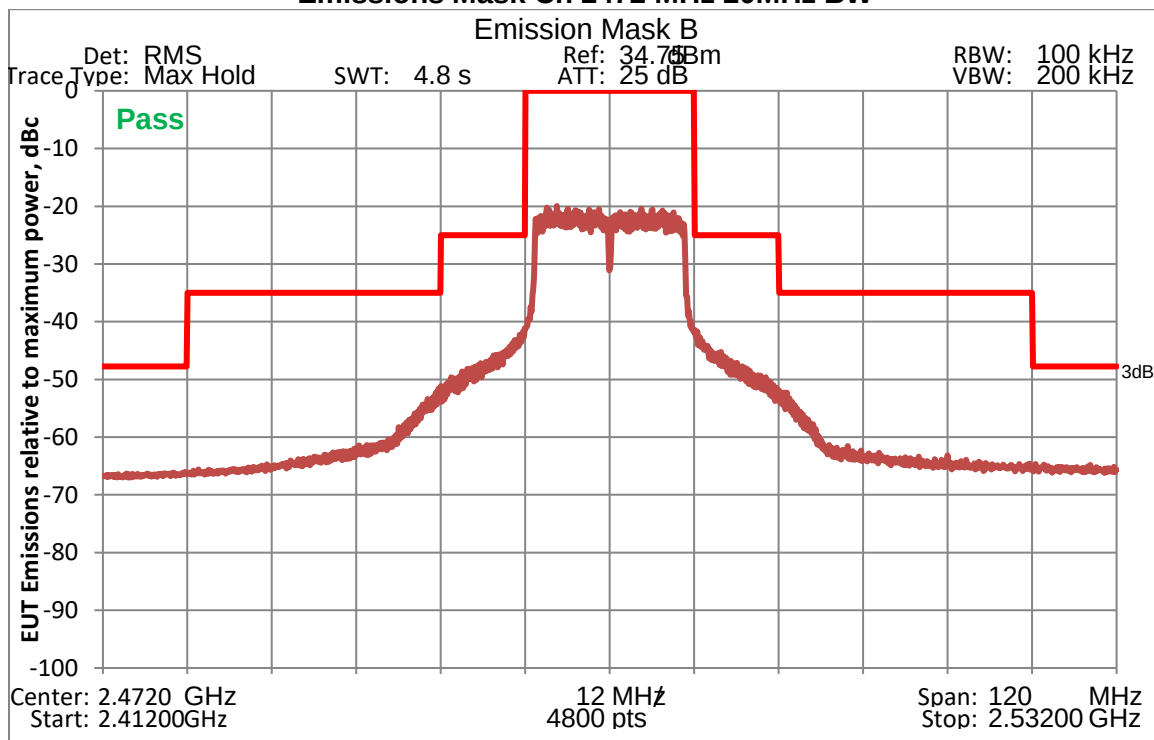
Emissions Mask Ch 2472 MHz 5MHz BW



Emission Mask Ch 2472 MHz 10MHz BW



Emissions Mask Ch 2472 MHz 20MHz BW



6 Frequency Stability

6.1 Test Result

Test Description	Test Specification	Test Result
Frequency Stability	FCC Parts 2.1055 & 90.213	Reported

6.2 Test Method

The measurement methods defined in ANSI C63.26 clause 5.6 were used with a conducted setup. Frequency stability was measured over variations in temperature following clause 5.6.4, and over variations in supply voltage following clause 5.6.5. Since the EUT is powered by a battery, frequency stability tests were performed at the nominal battery voltage and the battery end point voltage specified by the manufacturer, which is 9 Vdc.

The frequency stability values are reported in parts per million (ppm) which is calculated as follows:

$$ppm\ error = (MCF_{MHz}/ACF_{MHz} - 1) * 10^6$$

where: MCF_{MHz} is the Measured Carrier Frequency in MHz
 ACF_{MHz} is the Assigned Carrier Frequency in MHz

6.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 25.3 °C
Relative Humidity: 43.4 %
Atmospheric Pressure: 97.4 kPa

6.4 Test Equipment

Test End Date: 29-Oct-2024

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
40DB ATTENUATOR NM TO NF	FAIRVIEW MICROWAVE	SA6N5WA-40	24010	3-Sep-2024	3-Sep-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20109	20-Mar-2024	20-Mar-2025
40DB ATTENUATOR NM TO NF	FAIRVIEW MICROWAVE	SA6N5WA-40	24011	3-Sep-2024	3-Sep-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20107	20-Mar-2024	20-Mar-2025
40DB ATTENUATOR NM TO NF	FAIRVIEW MICROWAVE	SA6N5WA-40	24012	3-Sep-2024	3-Sep-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	3-Jan-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025

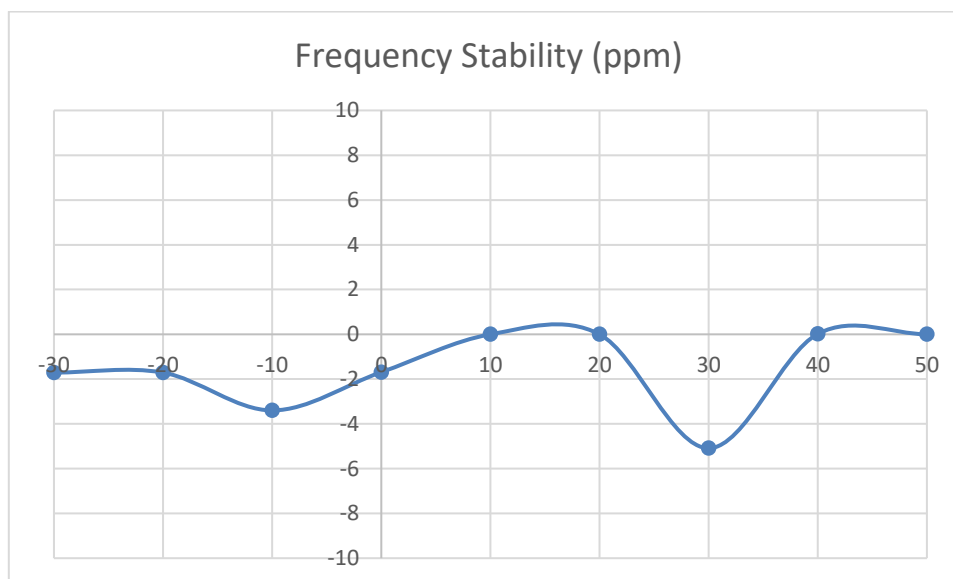
Software Profile:

TSTPASS Version: 2.0

6.5 Test Data

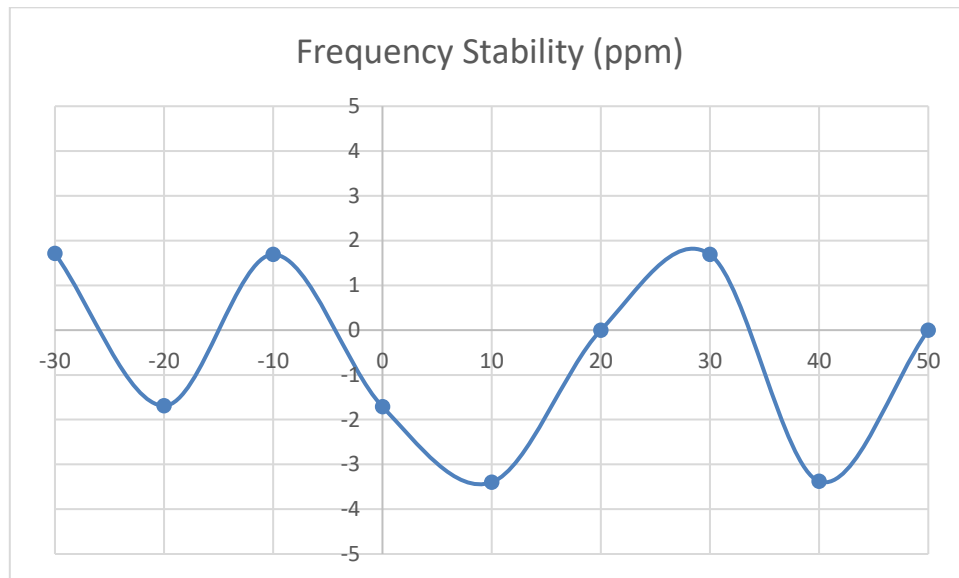
802.11b at 2457 MHz

Temp / Voltage	Fmin (GHz)	Fmax (GHz)	Measured Center Frequency (GHz)	Frequency Stability (ppm)
50 °C	2.4549125	2.4590875	2.457	0
40 °C	2.45492929	2.4590708	2.457000045	0.0183
30 °C	2.4549125	2.4590625	2.4569875	-5.0875
20 °C	2.4549208	2.4590792	2.457	0
10 °C	2.4549208	2.4590792	2.457	0
0 °C	2.4555792	2.4584125	2.45699585	-1.6891
-10 °C	2.4555708	2.4584125	2.45699165	-3.3985
-20 °C	2.4555708	2.4584208	2.4569958	-1.7094
-30 °C	2.4555708	2.4584208	2.4569958	-1.7094
12 V	2.454931	2.459084	2.4570075	3.0525
9 V	2.455046	2.458939	2.4569925	-3.0525



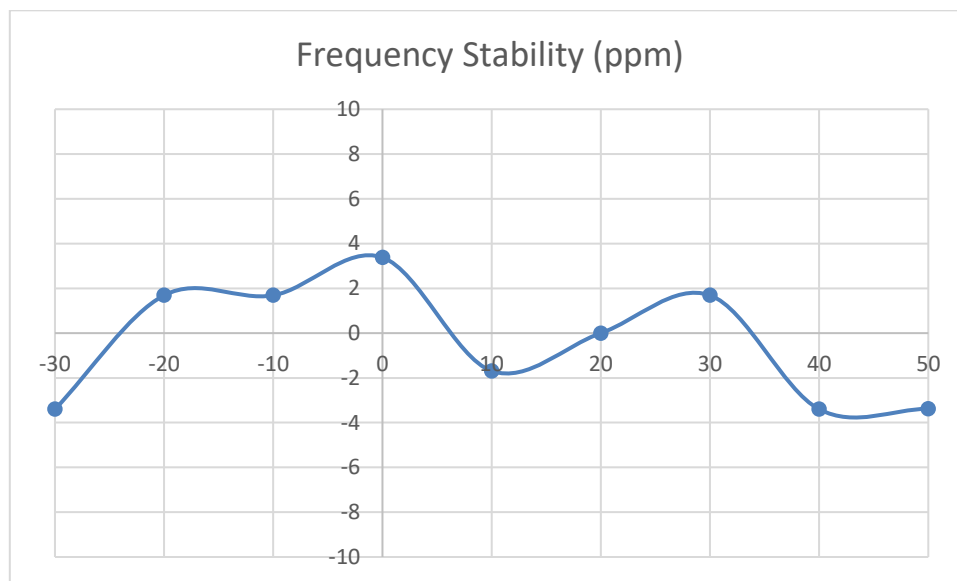
802.11g at 2457 MHz

Temp / Voltage	Fmin (GHz)	Fmax (GHz)	Measured Center Frequency (GHz)	Frequency Stability (ppm)
50 °C	2.4548708	2.4591292	2.457	0
40 °C	2.4548792	2.4591042	2.4569917	-3.3781
30 °C	2.4548875	2.4591208	2.45700415	1.6891
20 °C	2.4549042	2.4590958	2.457	0
10 °C	2.4549125	2.4590708	2.45699165	-3.3985
0 °C	2.4548958	2.4590958	2.4569958	-1.7094
-10 °C	2.4548708	2.4591375	2.45700415	1.6891
-20 °C	2.4548625	2.4591292	2.45699585	-1.6891
-30 °C	2.4548792	2.4591292	2.4570042	1.7094
12 V	2.454873	2.459113	2.456993	-2.8490
9 V	2.454902	2.459098	2.457	0



802.11n at 2457 MHz

Temp / Voltage	Fmin (GHz)	Fmax (GHz)	Measured Center Frequency (GHz)	Frequency Stability (ppm)
50 °C	2.4547542	2.4592292	2.4569917	-3.3781
40 °C	2.4547458	2.4592375	2.45699165	-3.3985
30 °C	2.4547458	2.4592625	2.45700415	1.6891
20 °C	2.4547292	2.4592708	2.457	0
10 °C	2.4547375	2.4592542	2.45699585	-1.6891
0 °C	2.4547458	2.4592708	2.4570083	3.3781
-10 °C	2.4547208	2.4592875	2.45700415	1.6891
-20 °C	2.4547125	2.4592958	2.45700415	1.6891
-30 °C	2.4547125	2.4592708	2.45699165	-3.3985
12 V	2.454742	2.459258	2.457	0
9 V	2.454742	2.459243	2.4569925	-3.0525



7 Radiated Spurious Emissions

7.1 Test Result

Test Description	Test Specification	Test Result
Radiated Spurious Emissions	FCC Parts 2.1053 & 90.210	Compliant

7.2 Test Method

The measurement methods defined in ANSI C63.26 clause 5.7.4 were used.

Lowest, middle, and highest channels were investigated – the device was commanded to continuously transmit on low, middle, and high channels.

Test distances:

- 9k to 30 MHz – Near field pre-scan to determine if there were any emissions
- 30 to 1000 MHz – The EUT to measurement antenna distance was 3 meters
- 1 to 18 GHz – The EUT to measurement antenna distance was 3 meters
- 18 to 26 GHz – The EUT to measurement antenna distance was 1 meter

Limit

The power of any emission on any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth must be attenuated below the unmodulated carrier output power (P) by at least $43 + 10 \log (P)$ dB. This translates to a simple absolute limit of -13 dBm.

7.3 Test Site

3m and 10m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

Environmental Conditions	30-1000MHz	1-18GHz	18-26GHz
Temperature:	23.3 °C	22.1 – 23.4 °C	22.0 °C
Relative Humidity:	55.7 %	52.7 – 56.7 %	61.5 %
Atmospheric Pressure:	98.0 kPa	97.5 – 97.8 kPa	97.6 kPa

7.4 Test Equipment

30-1000MHz

Test End Date: 24-Sep-2024

Tester: EW

Equipment	Model	Manufacturer	Asset	Cal Date	Cal Due Date
ANTENNA, BILOG	SUNOL	JB6	B079690	19-Apr-2024	19-Apr-2026
N to N RF Cable	ECHELON	EM-B810NM-276	24000	15-Jan-2024	15-Jan-2025
RF CABLE	HUBER & SUHNER	SF106	B079713	20-Aug-2024	20-Aug-2025
RF CABLE NM TO NM, 0.01-18GHZ	TELEDYNE STORM MICROWAVE	90-195-118	20125	7-Aug-2024	7-Aug-2025
RF CABLE	HUBER & SUHNER	SF106	B085895	20-Mar-2024	20-Mar-2025
LOW NOISE AMPLIFIER	MINI-CIRCUITS	ZKL-2+	B079800	9-Sep-2024	10-Sep-2025
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW44	22032	15-Nov-2023	15-Nov-2024

1-18GHz

Test End Date: 25-Sep-2024

Tester: SGM

Equipment	Model	Manufacturer	Asset	Cal Date	Cal Due Date
ANTENNA, DRG HORN (MEDIUM)	3117	ETS LINDGREN	B079691	2-Aug-2024	2-Aug-2026
ANTENNA, DRG HORN (MEDIUM)	3117	ETS LINDGREN	B079699	23-Jul-2024	23-Jul-2026
N to N RF Cable	EM-B810NM-276	ECHELON	23007	31-Mar-2024	31-Mar-2025
RF CABLE RIGHT ANGLE NM TO NM, 0.01-18GHZ	90-076-020	TELEDYNE STORM MICROWAVE	20133	20-Mar-2024	20-Mar-2025
N to N RF Cable	EM-B810NM-276	ECHELON	24000	15-Jan-2024	15-Jan-2025
LOW NOISE AMPLIFIER	TS-PR18	ROHDE & SCHWARZ	15003	8-Oct-2024	8-Oct-2025
ATTENUATOR, 20W 30DB DC-18GHZ	BW-N30W20+	MINI-CIRCUITS	21018	19-Mar-2024	19-Mar-2025
FILTER, HIGH PASS, >2800MHZ	HPM50111	MICRO-TRONICS	22017	14-Jun-2024	14-Jun-2025
EMI TEST RECEIVER	ESW44	ROHDE & SCHWARZ	22027	14-Nov-2024	14-Nov-2025

18-26GHz

Test End Date: 25-Sep-2024

Tester: SGM

Equipment	Manufacturer	Model	Asset	Cal Date	Cal Due Date
ANTENNA, DRG HORN (SMALL)	3116B	ETS LINDGREN	B079697	2-Jul-2024	2-Jul-2026
SMA to SMA RF Cable	NC12-K1K1-138	MEGAPHASE	22002	6-Feb-2024	6-Feb-2025
2.92MM MALE TO 2.92MM MALE RF CABLE	HULL140A-29P-29P-60	HASCO COMPONENTS	18033	20-Mar-2024	20-Mar-2025
LOW NOISE AMPLIFIER	NSP1840-HG	MITEQ	B087572	21-Oct-2024	21-Oct-2025
EMI TEST RECEIVER	ESW44	ROHDE & SCHWARZ	22027	14-Nov-2024	14-Nov-2025

Software Profiles:

"RSE 30-1000 MHz T7 240701" TILE! profile dated 01 July 2024

"RSE 1-18 GHz T7 210212" TILE! profile dated 12 February 2021

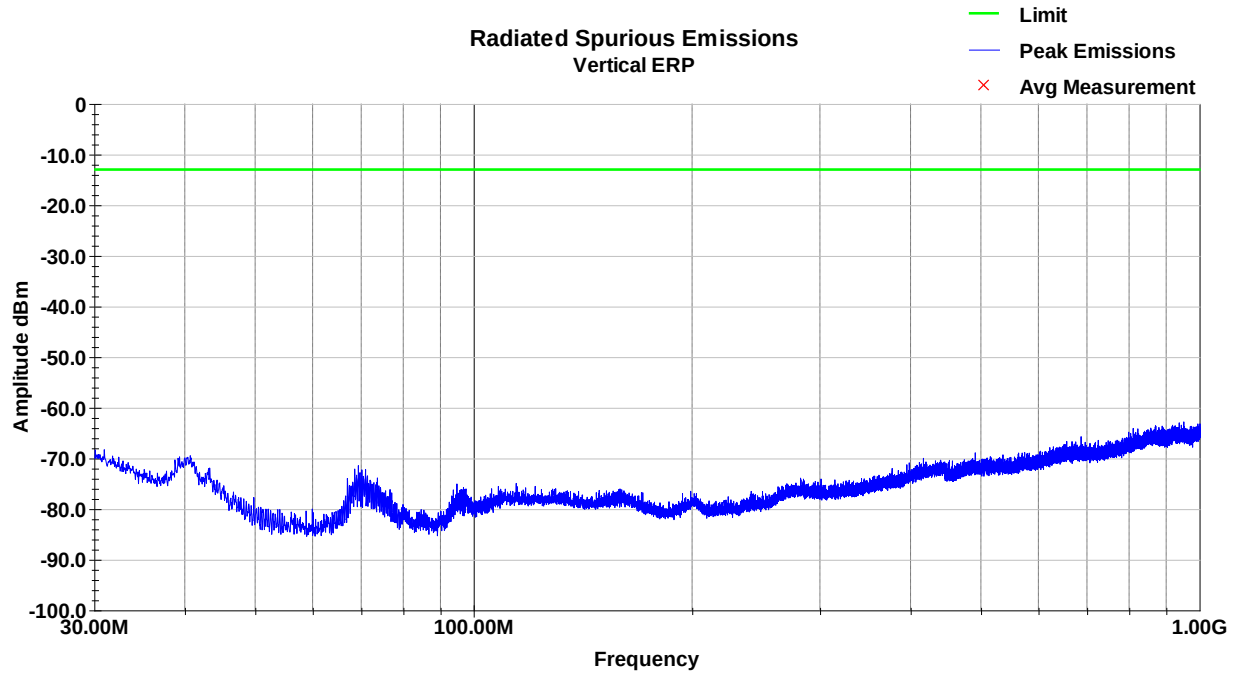
"RSE 18-26 GHz TILE7 240607" TILE! profile dated 07 June 2024

7.5 Test Data

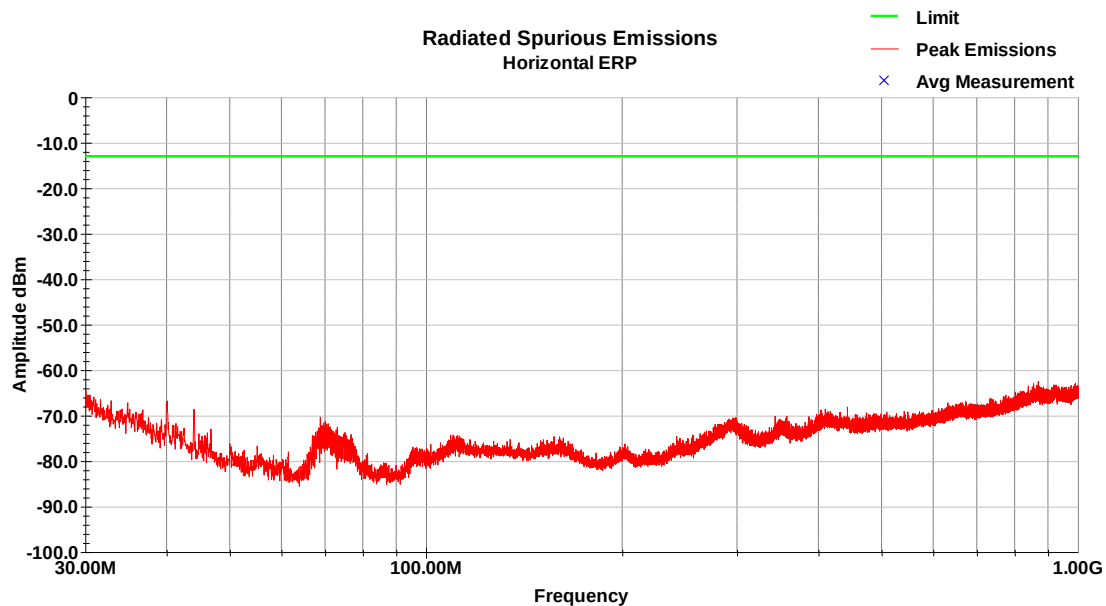
No emissions were detected in the 9kHz to 30MHz frequency range.

In the 30-1000MHz frequency range there was little deviation with respect to axis, modulation or channel.

Vertical Radiated Spurious Emissions Plot – 30-1000MHz (802.11b LCH)

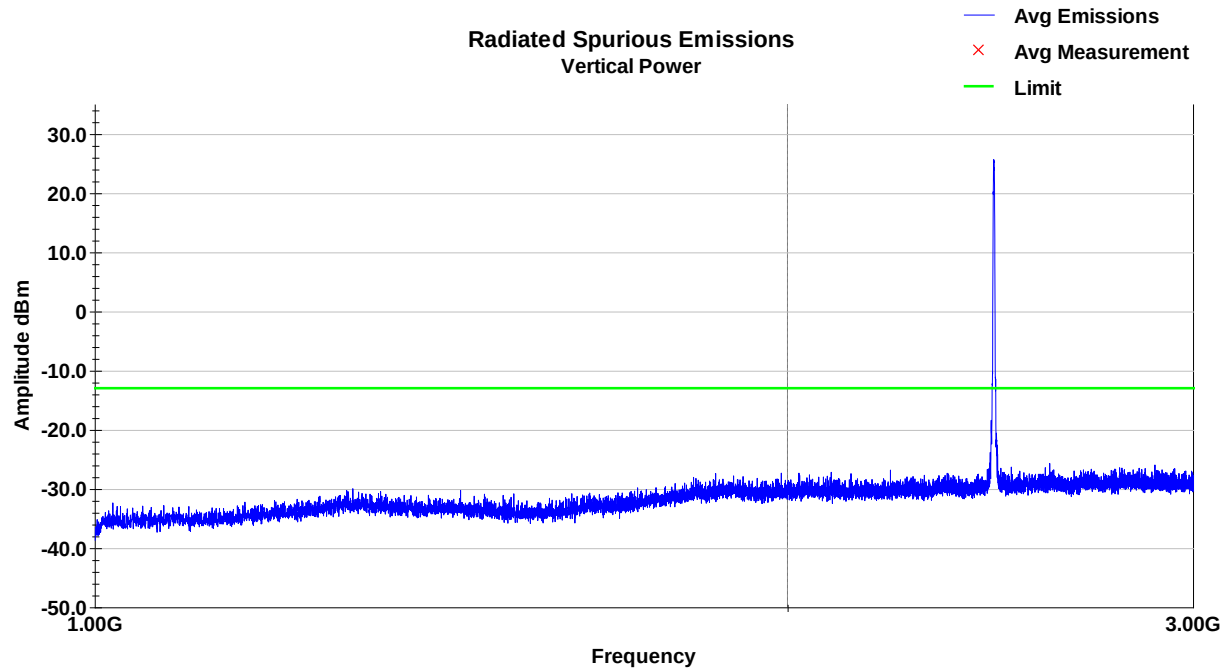


Horizontal Radiated Spurious Emissions Plot – 30-1000MHz (802.11b LCH)

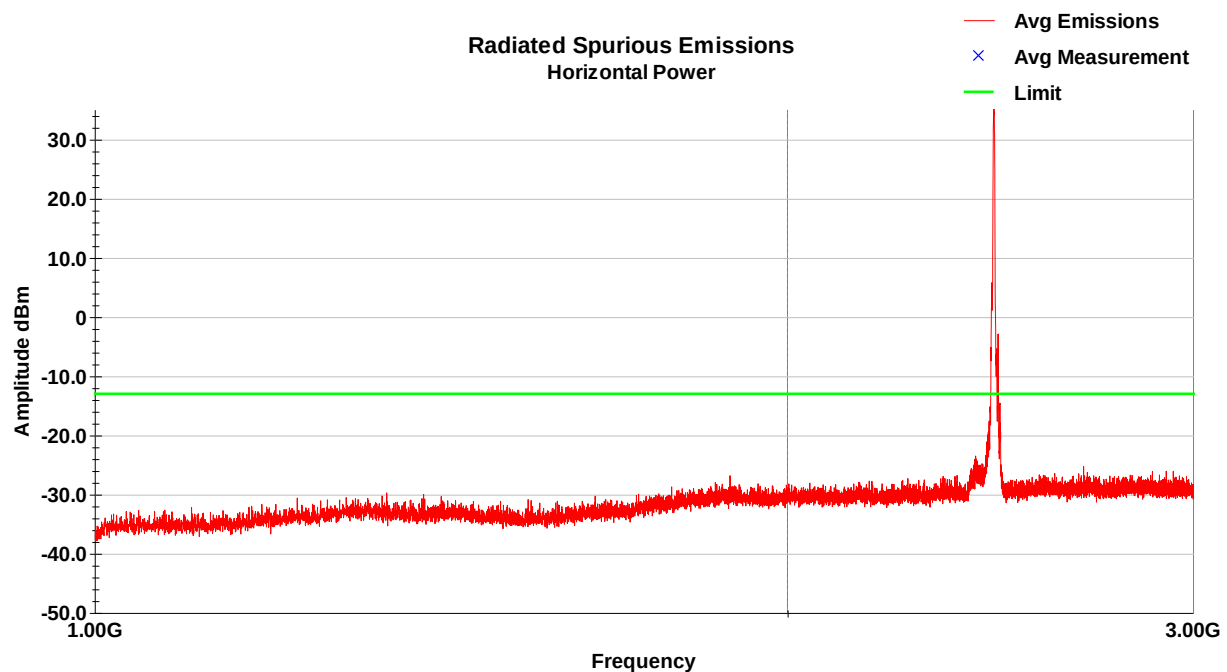


7.5.1 Chains: 1x1 SISO

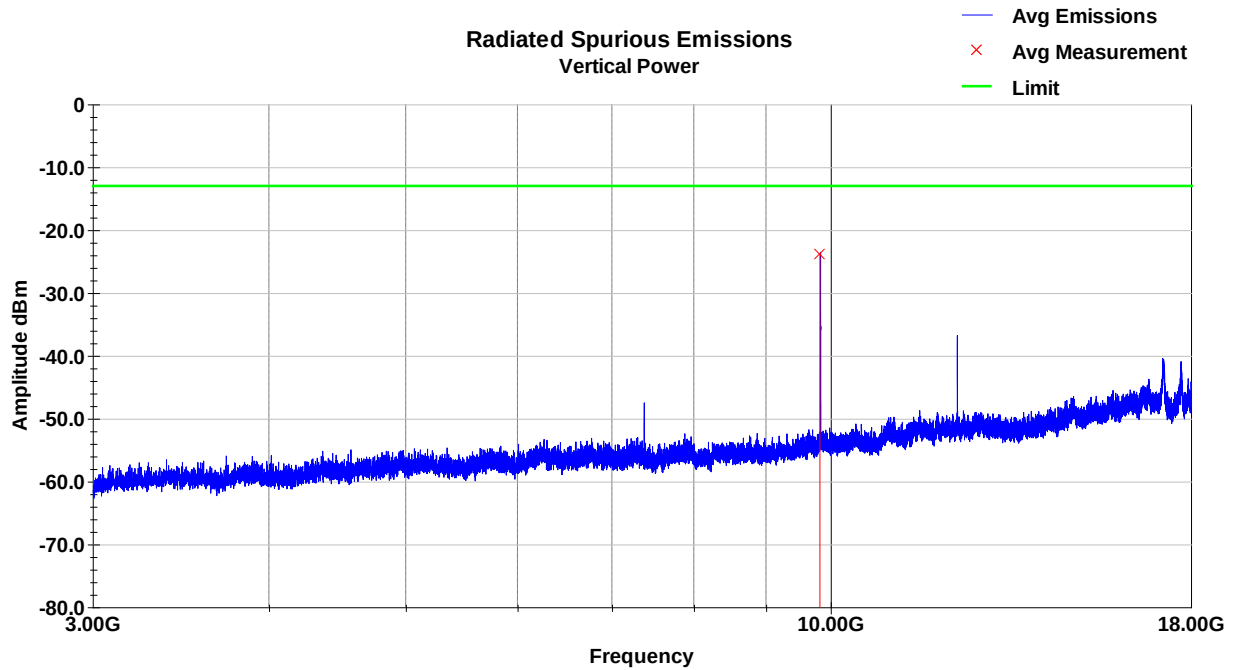
Vertical Radiated Spurious Emissions Plot – 1-3GHz (802.11b LCH)



Horizontal Radiated Spurious Emissions Plot – 1-3GHz (802.11b LCH)



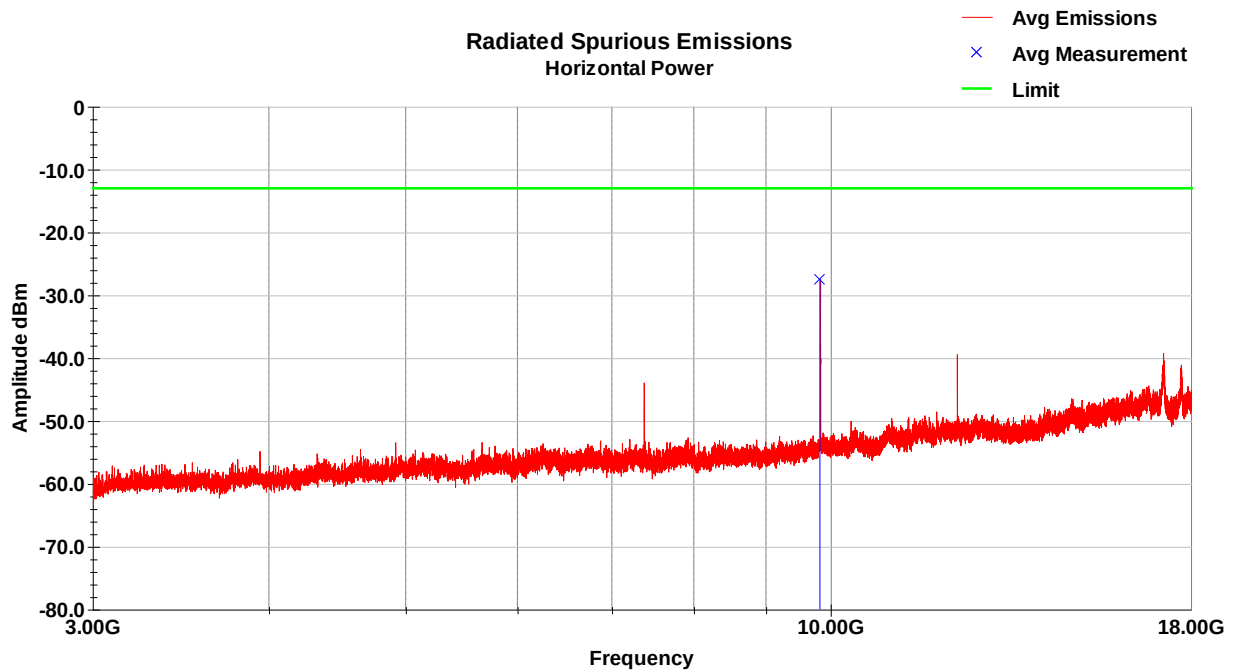
Vertical Radiated Spurious Emissions Plot – 3-18GHz (802.11b LCH)



Vertical Radiated Spurious Emissions Tabular Data – 3-18GHz (802.11b LCH)

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
9827.92	-22.5	V	189.0	181.0	36.9	3.9	42.0	-23.9	-13.0	-10.9
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

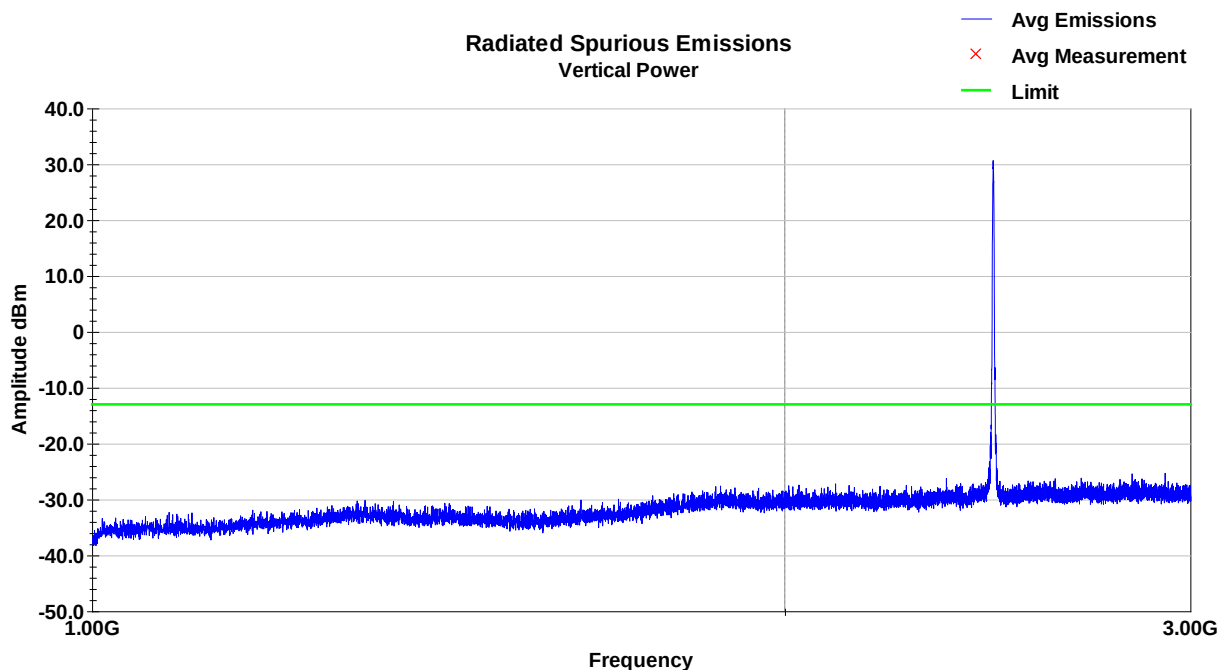
Horizontal Radiated Spurious Emissions Plot – 3-18GHz (802.11b LCH)



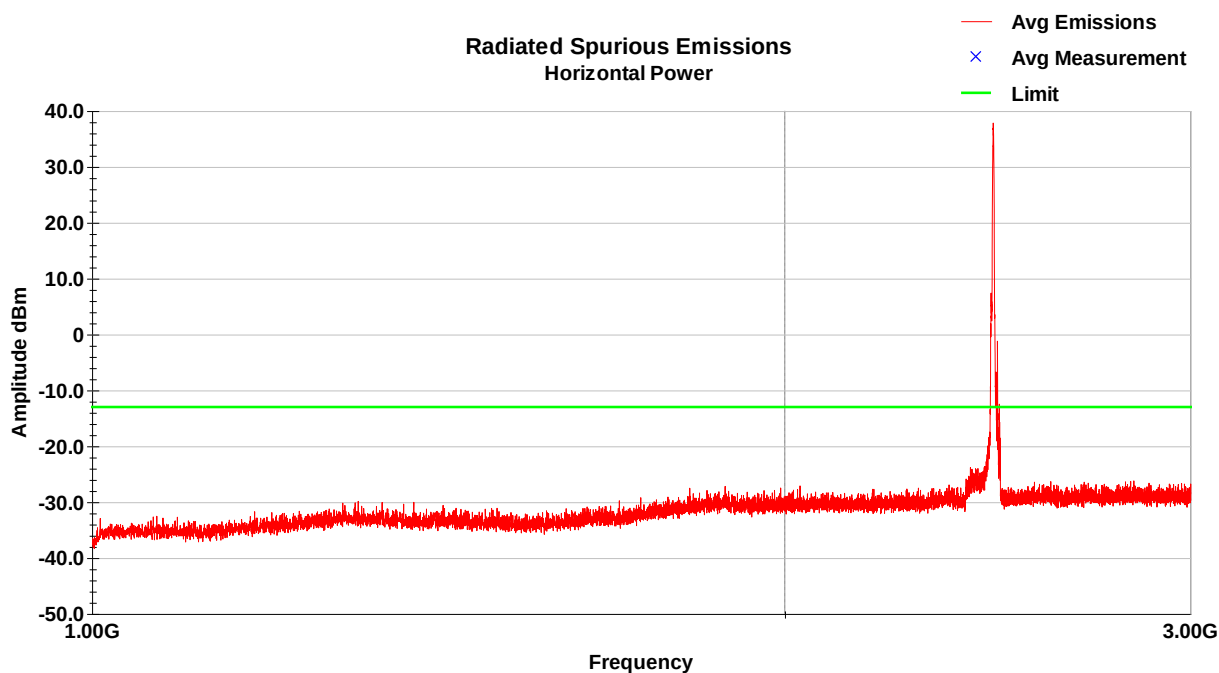
Horizontal Radiated Spurious Emissions Tabular Data – 3-18GHz (802.11b LCH)

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
9828.04	-26.2	H	225.0	193.0	36.9	3.9	42.0	-27.5	-13.0	-14.5
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

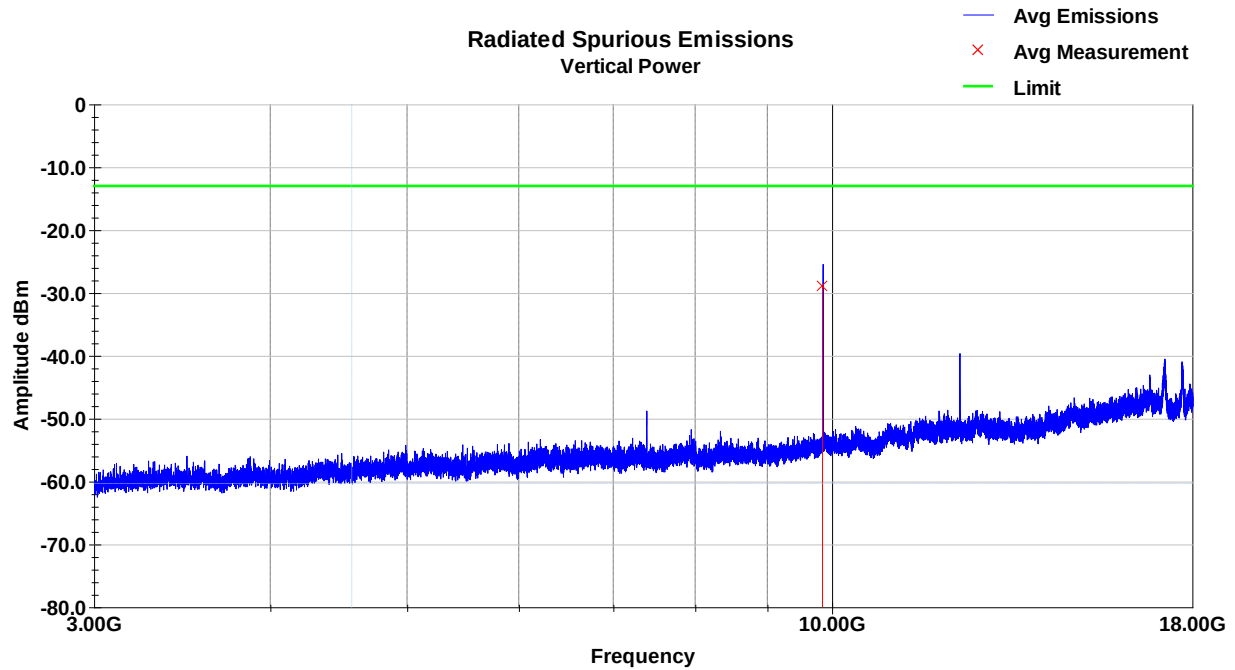
Vertical Radiated Spurious Emissions Plot – 1-3GHz (802.11b MCH)



Horizontal Radiated Spurious Emissions Plot – 1-3GHz (802.11b MCH)



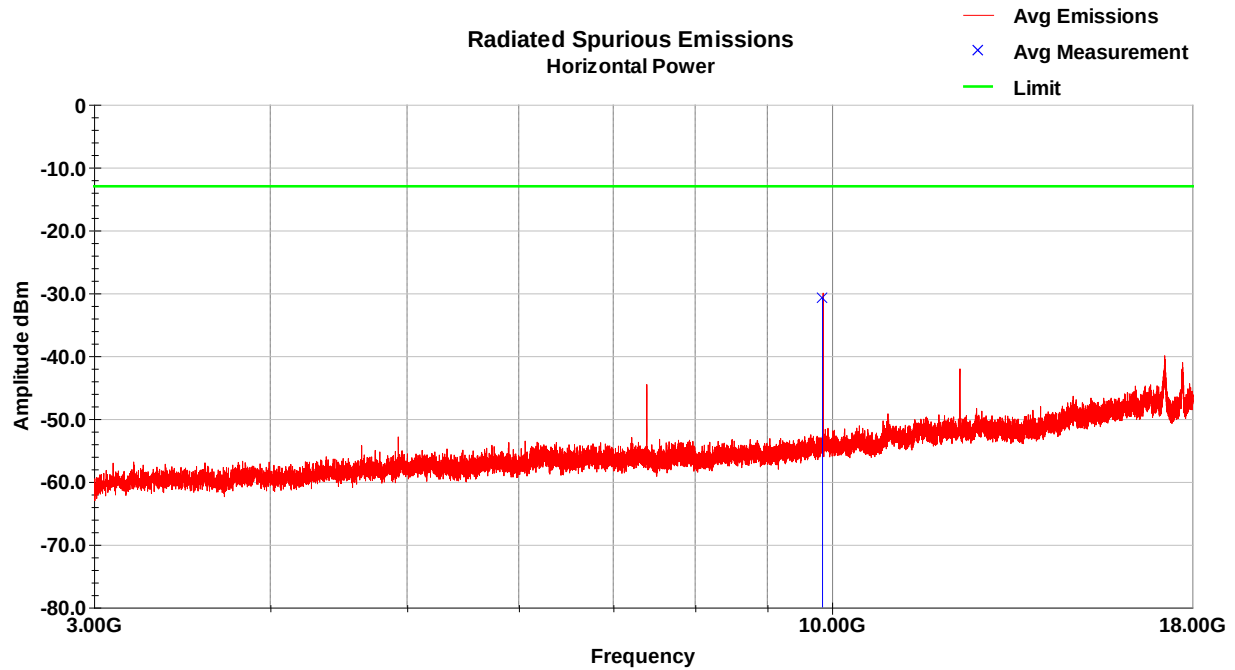
Vertical Radiated Spurious Emissions Plot – 3-18GHz (802.11b MCH)



Vertical Radiated Spurious Emissions Tabular Data – 3-18GHz (802.11b MCH)

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
9847.92	-27.6	V	143.0	173.0	36.9	4.1	42.2	-28.8	-13.0	-15.8
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

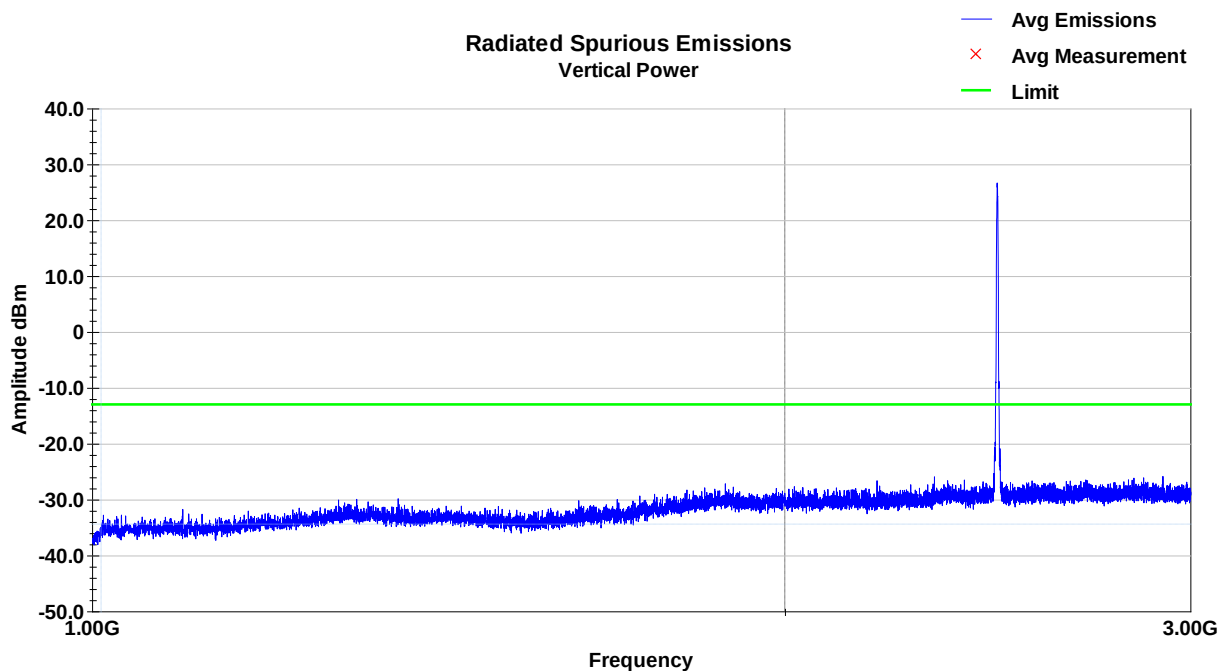
Horizontal Radiated Spurious Emissions Plot – 3-18GHz (802.11b MCH)



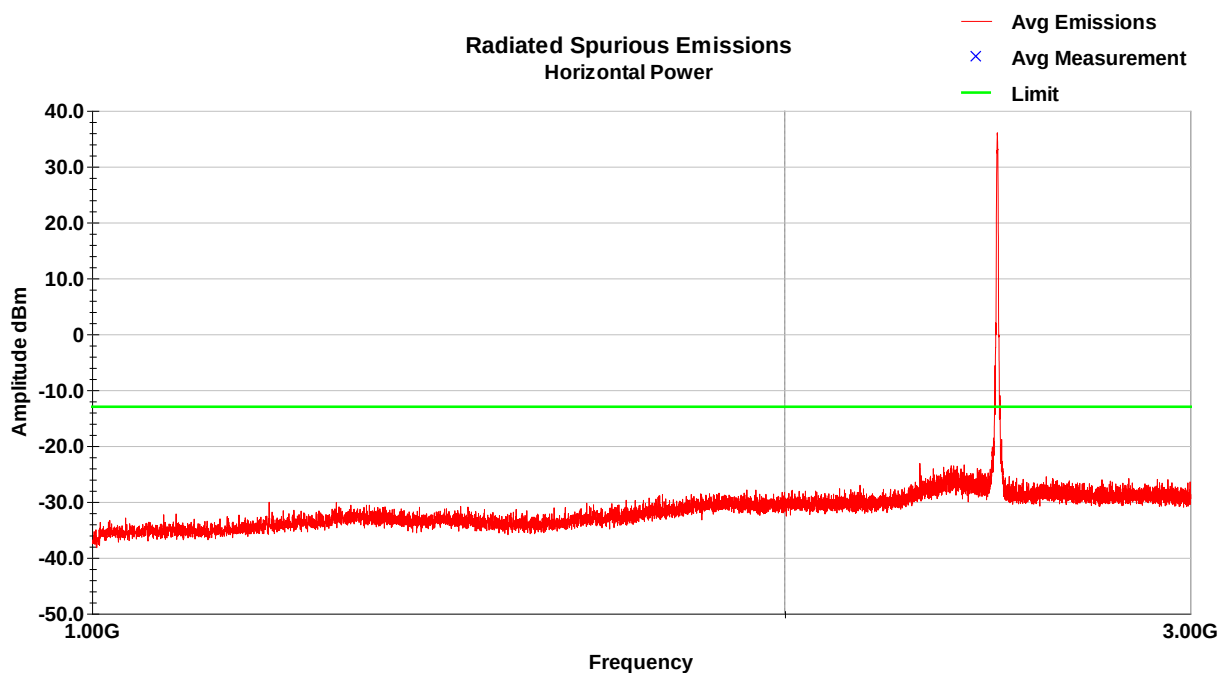
Horizontal Radiated Spurious Emissions Tabular Data – 3-18GHz (802.11b MCH)

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
9848.04	-29.5	H	221.0	198.0	36.9	4.1	42.2	-30.7	-13.0	-17.7
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

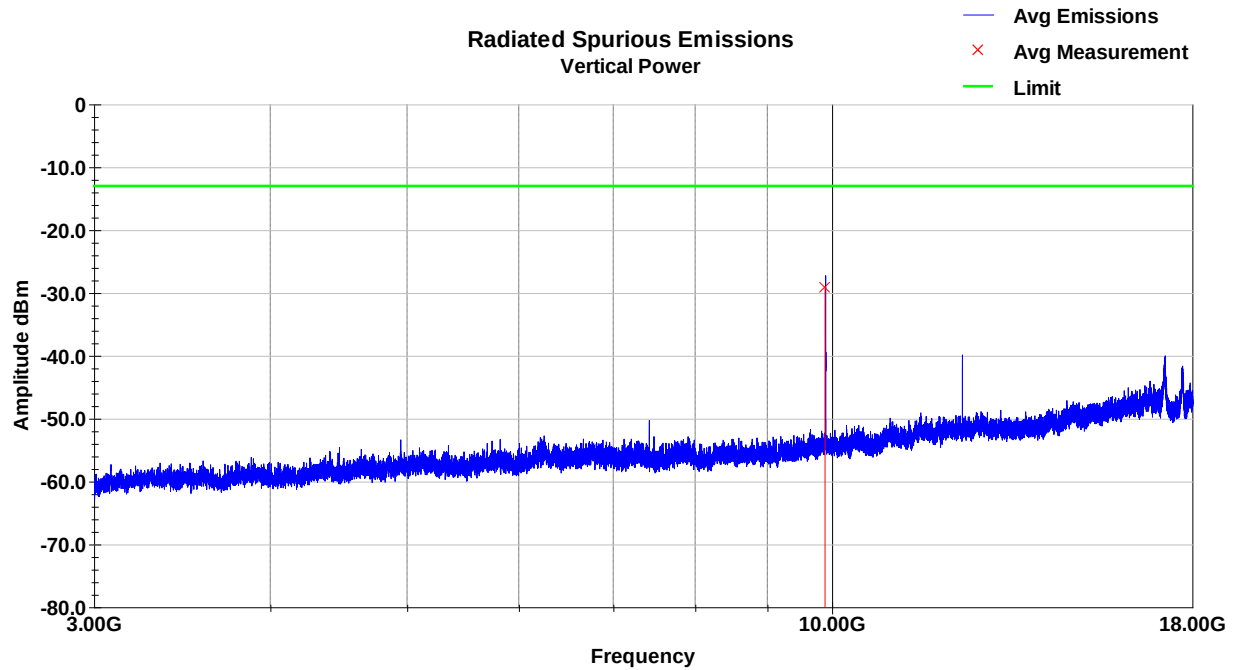
Vertical Radiated Spurious Emissions Plot – 1-3GHz (802.11b HCH)



Horizontal Radiated Spurious Emissions Plot – 1-3GHz (802.11b HCH)



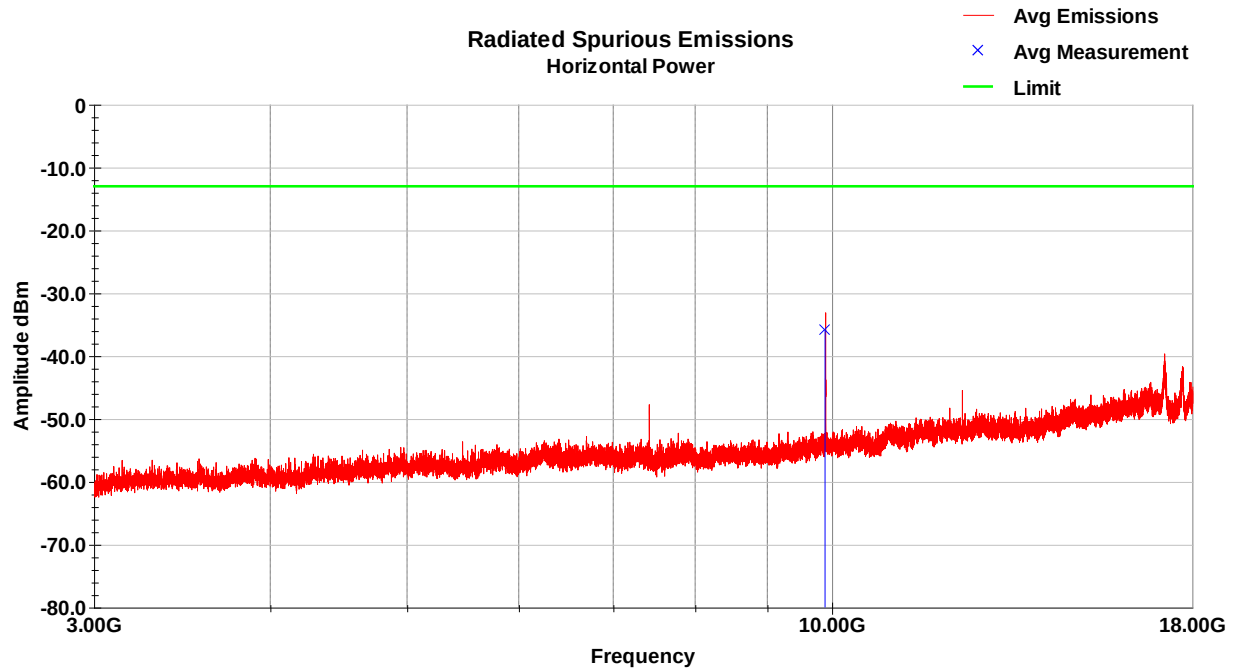
Vertical Radiated Spurious Emissions Plot – 3-18GHz (802.11b HCH)



Vertical Radiated Spurious Emissions Tabular Data – 3-18GHz (802.11b HCH)

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
9888.04	-27.5	V	188.0	233.0	37.0	3.3	41.8	-29.0	-13.0	-16.0
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

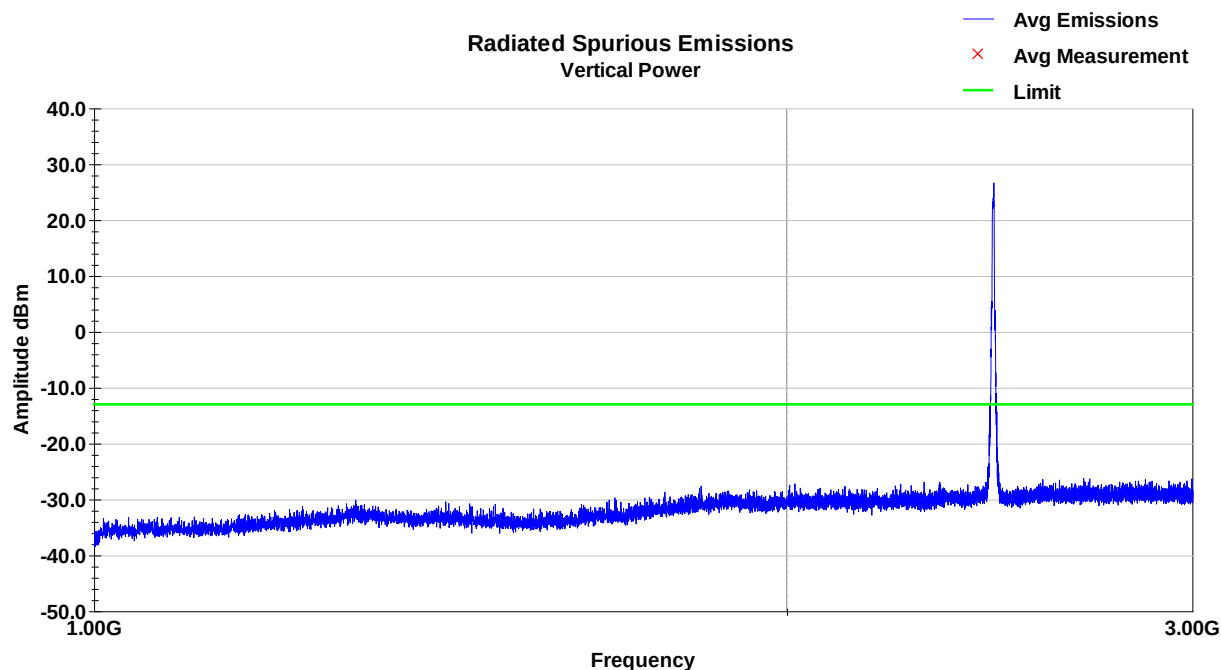
Horizontal Radiated Spurious Emissions Plot – 3-18GHz (802.11b HCH)



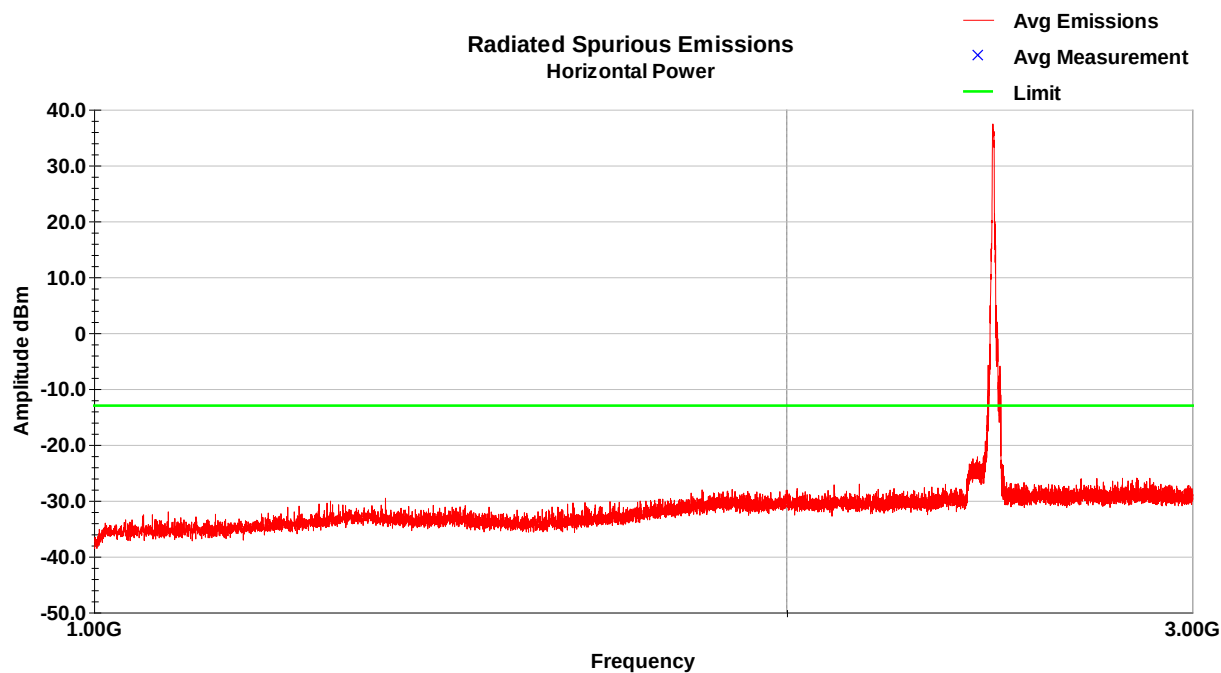
Horizontal Radiated Spurious Emissions Tabular Data – 3-18GHz (802.11b HCH)

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
9887.92	-34.3	H	75.0	203.0	37.0	3.3	41.8	-35.8	-13.0	-22.8
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

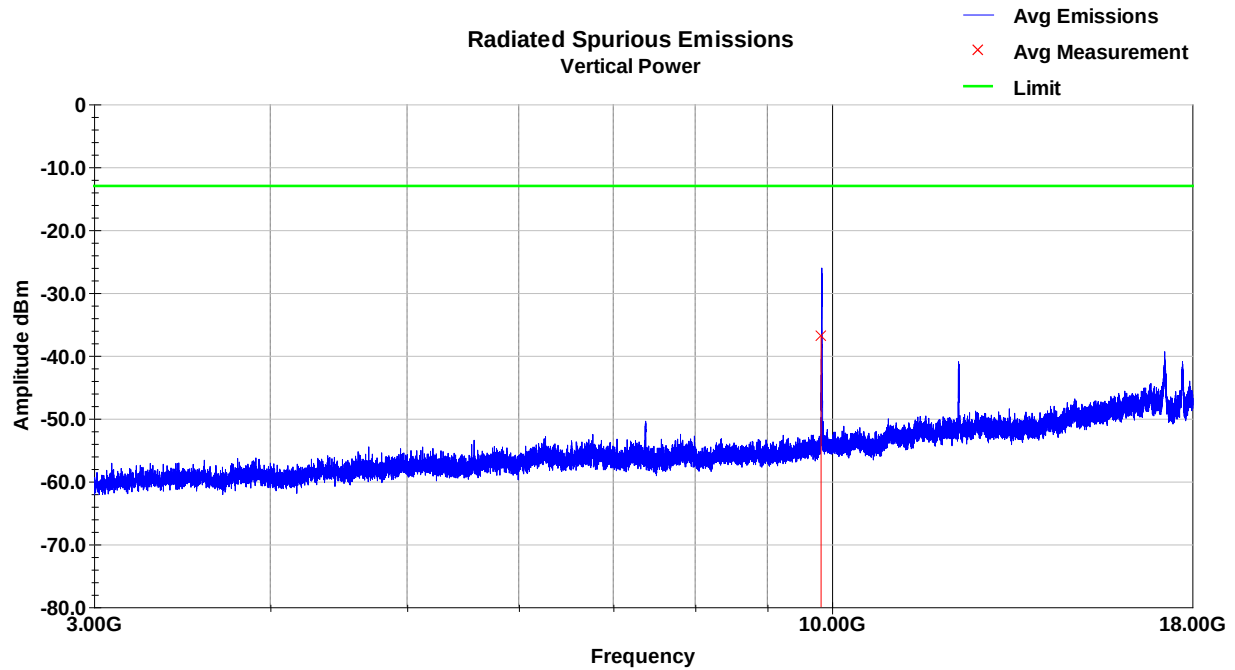
Vertical Radiated Spurious Emissions Plot – 1-3GHz (802.11g LCH)



Horizontal Radiated Spurious Emissions Plot – 1-3GHz (802.11g LCH)



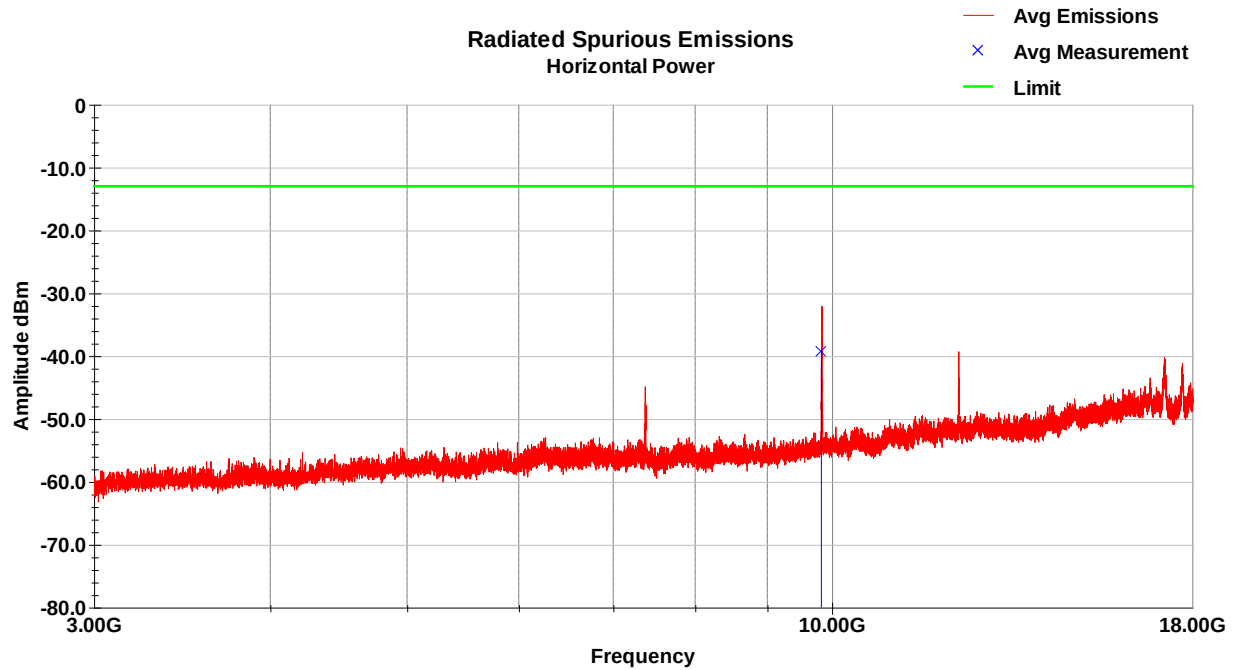
Vertical Radiated Spurious Emissions Plot – 3-18GHz (802.11g LCH)



Vertical Radiated Spurious Emissions Tabular Data – 3-18GHz (802.11g LCH)

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
9824.76	-35.5	V	232.0	187.0	36.9	3.8	42.0	-36.9	-13.0	-23.9
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

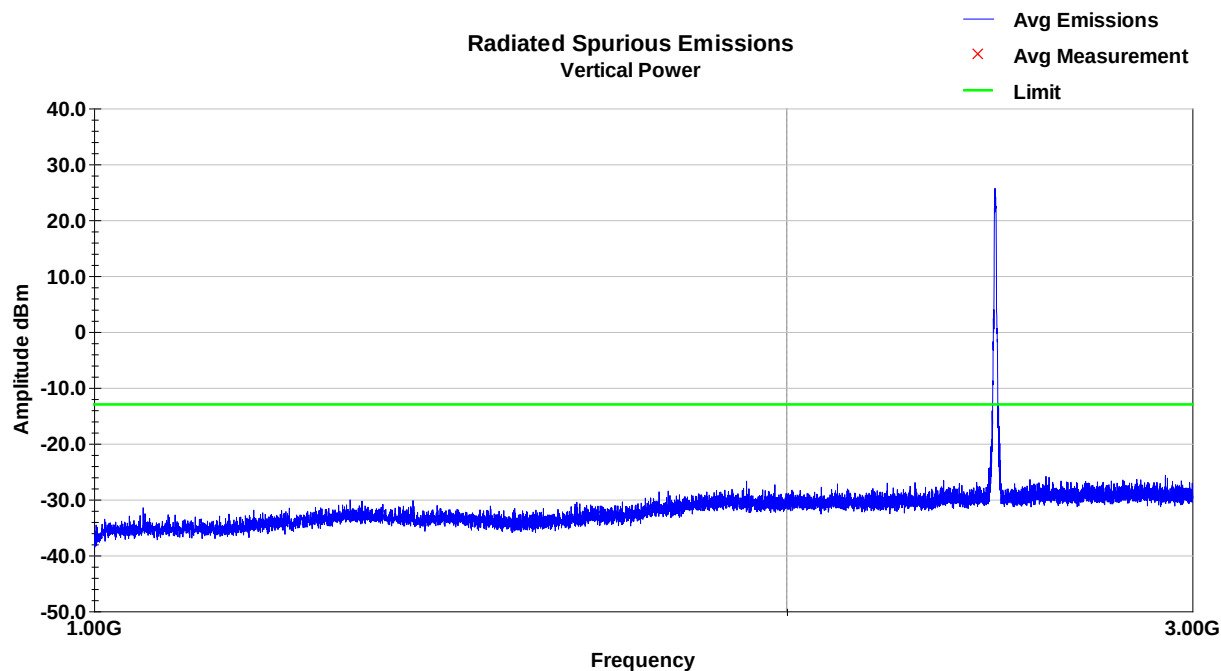
Horizontal Radiated Spurious Emissions Plot – 3-18GHz (802.11g LCH)



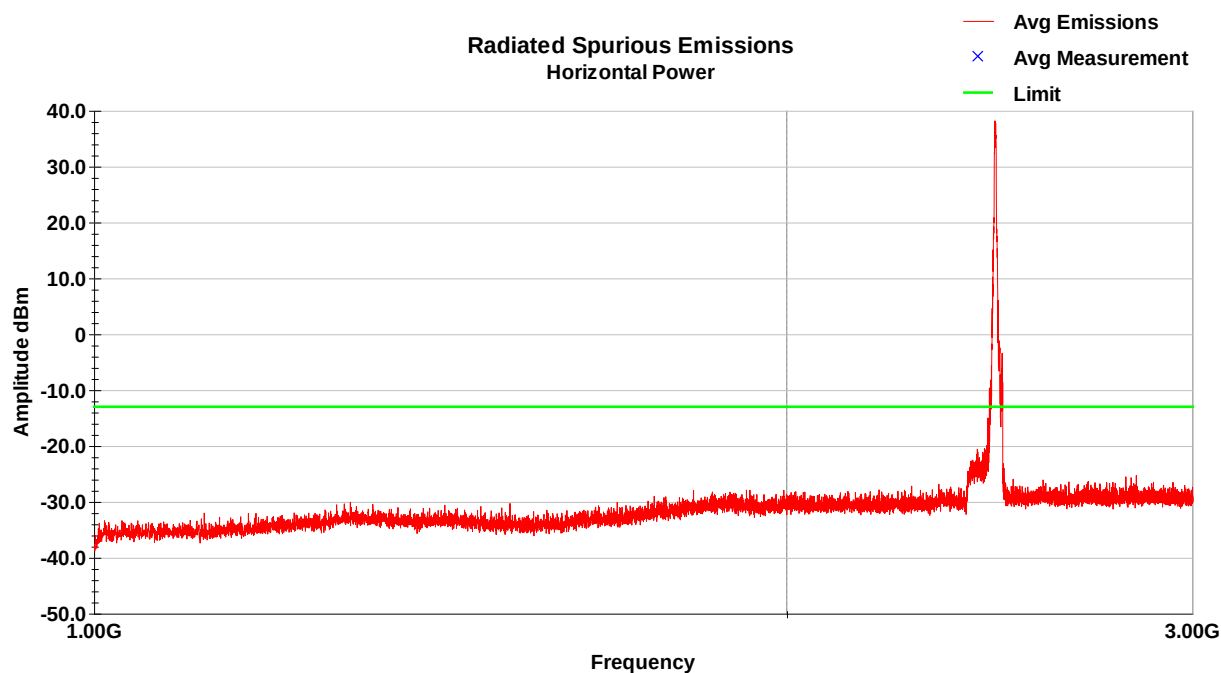
Horizontal Radiated Spurious Emissions Tabular Data – 3-18GHz (802.11g LCH)

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
9829.28	-38.0	H	208.0	136.0	36.9	3.9	42.0	-39.3	-13.0	-26.3
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

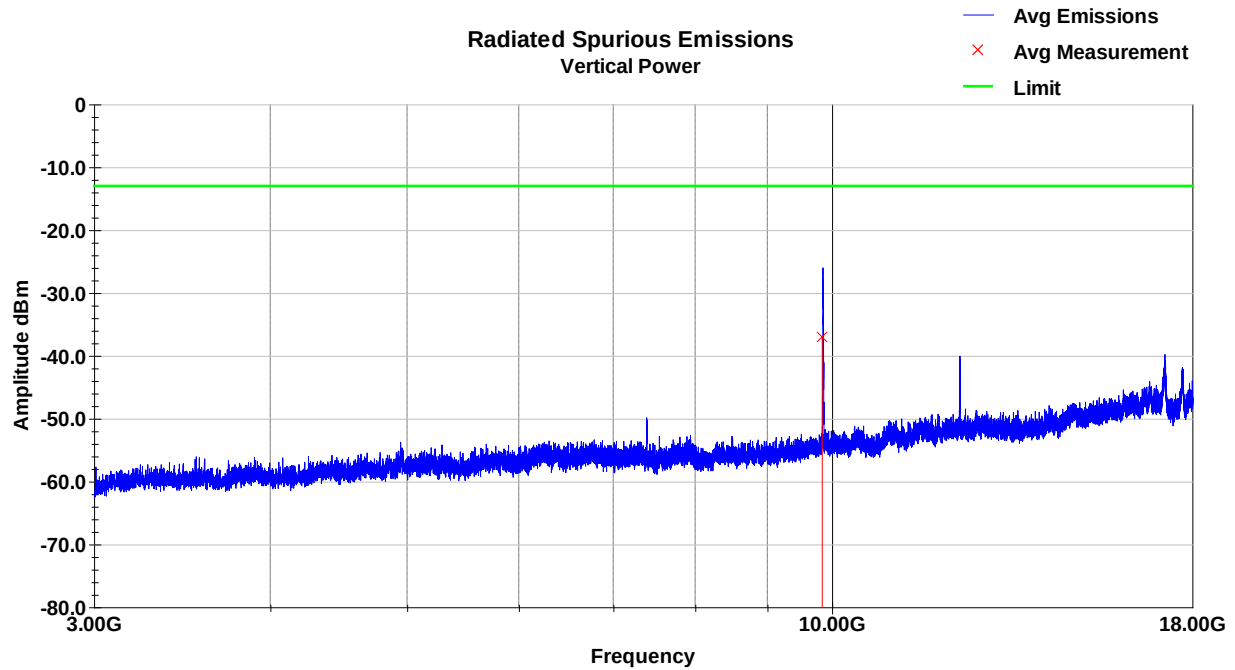
Vertical Radiated Spurious Emissions Plot – 1-3GHz (802.11g MCH)



Horizontal Radiated Spurious Emissions Plot – 1-3GHz (802.11g MCH)



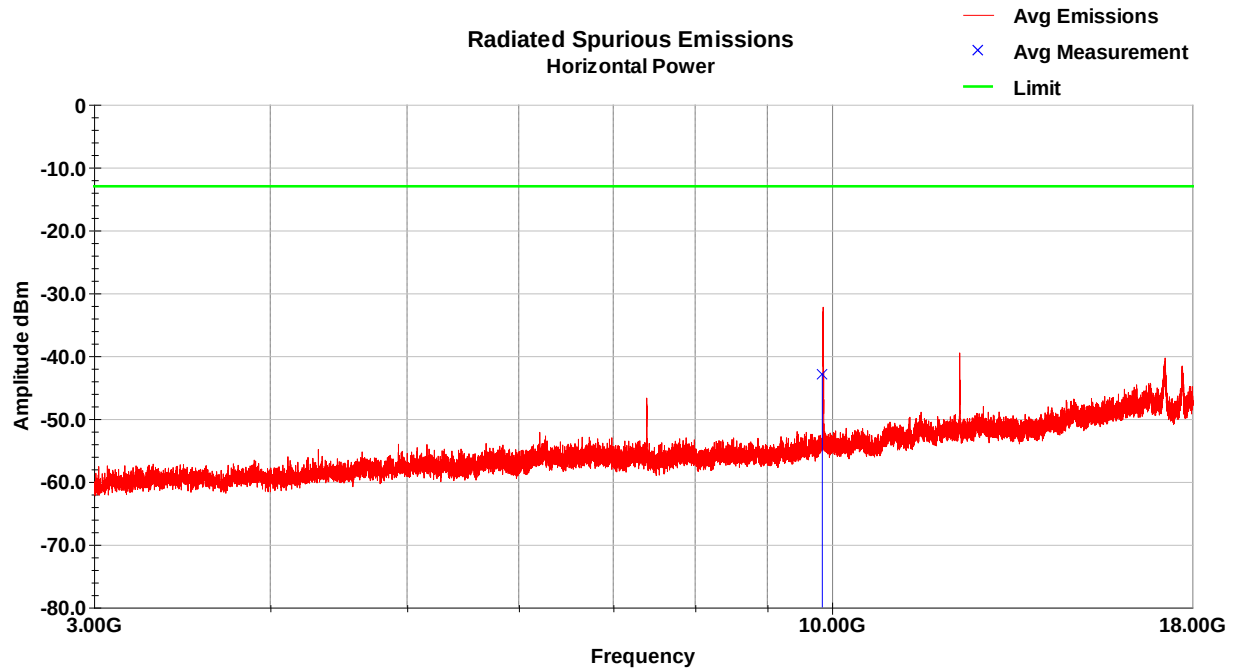
Vertical Radiated Spurious Emissions Plot – 3-18GHz (802.11g MCH)



Vertical Radiated Spurious Emissions Tabular Data – 3-18GHz (802.11g MCH)

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
9843.98	-35.8	V	195.0	198.0	36.9	4.1	42.2	-37.0	-13.0	-24.0
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

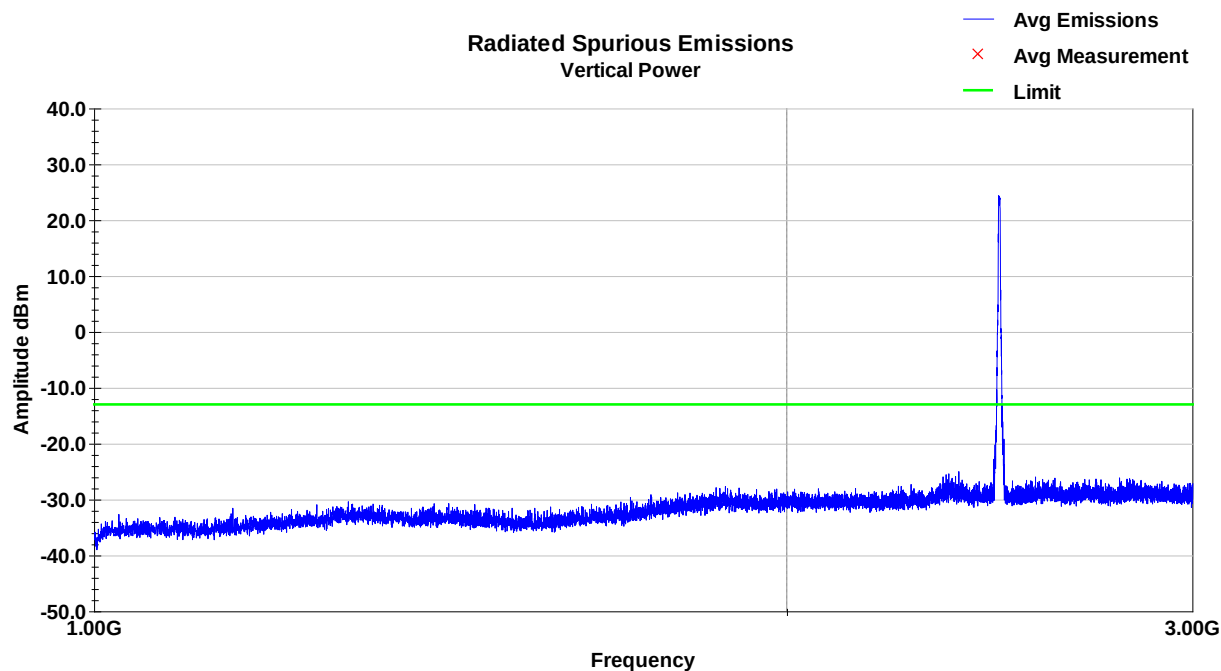
Horizontal Radiated Spurious Emissions Plot – 3-18GHz (802.11g MCH)



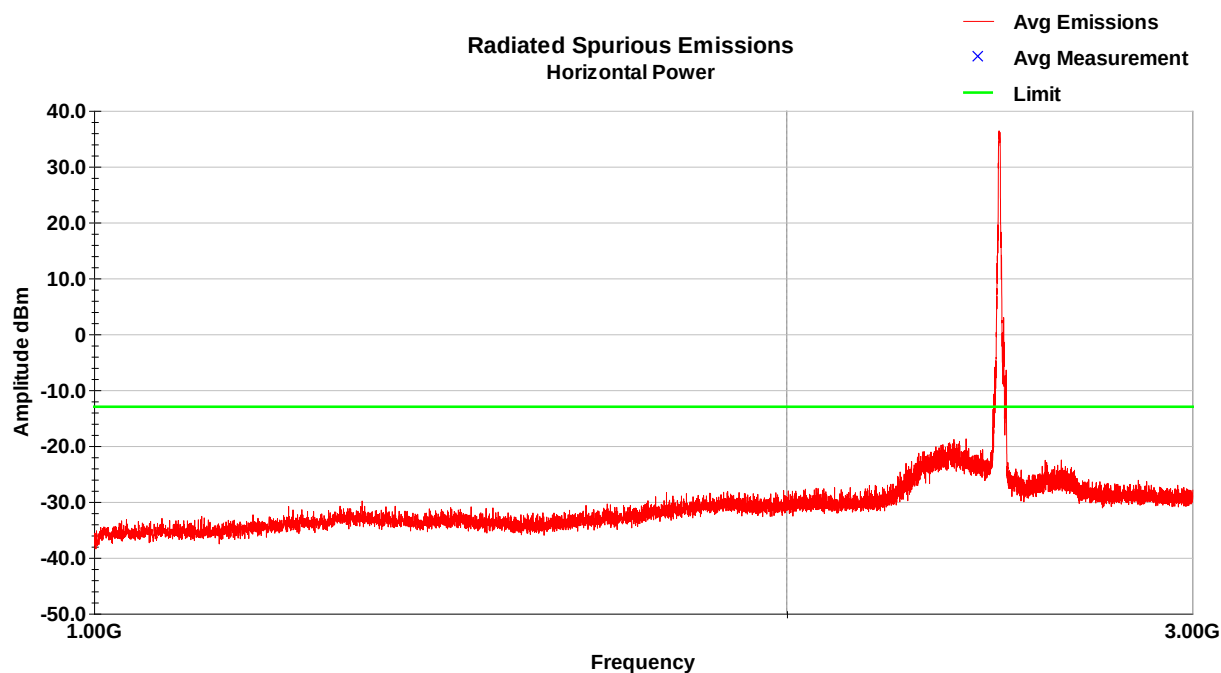
Horizontal Radiated Spurious Emissions Tabular Data – 3-18GHz (802.11g MCH)

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
9844.60	-41.6	H	175.0	163.0	36.9	4.1	42.2	-42.9	-13.0	-29.9
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

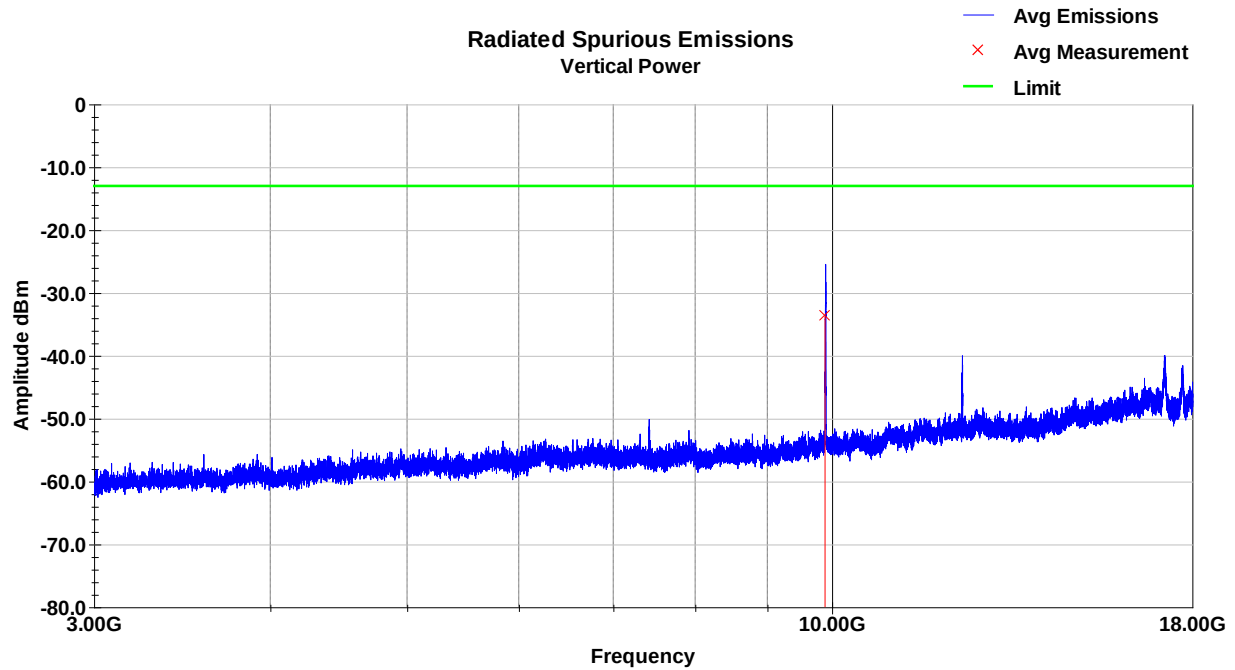
Vertical Radiated Spurious Emissions Plot – 1-3GHz (802.11g HCH)



Horizontal Radiated Spurious Emissions Plot – 1-3GHz (802.11g HCH)



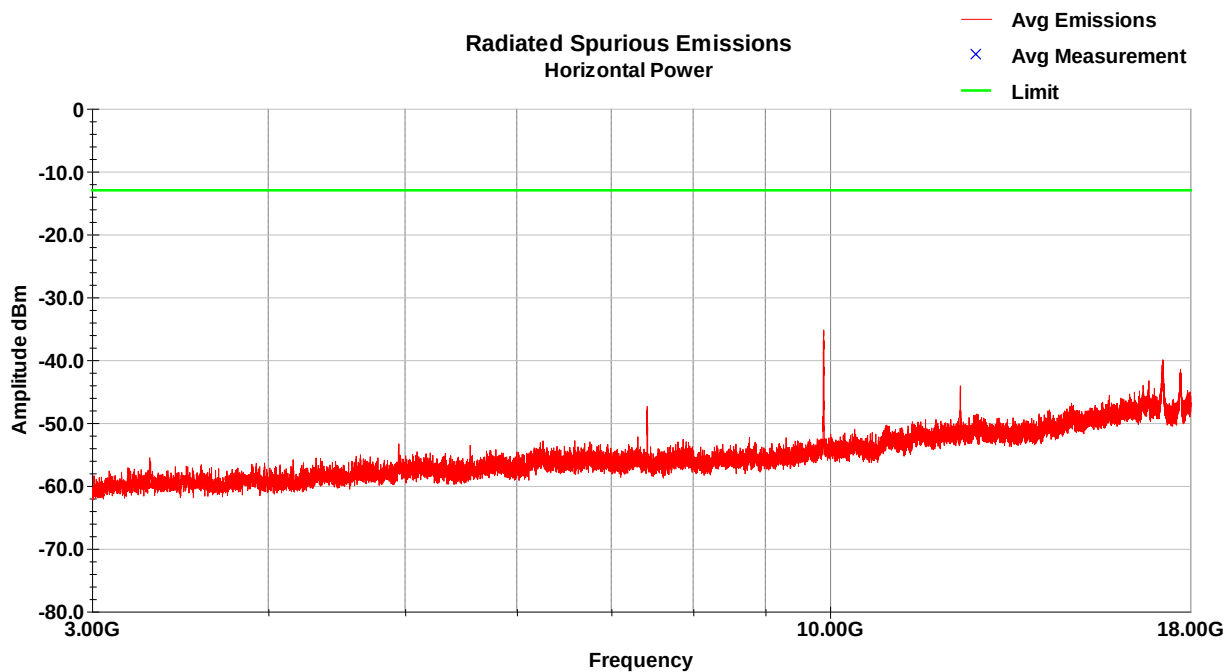
Vertical Radiated Spurious Emissions Plot – 3-18GHz (802.11g HCH)



Vertical Radiated Spurious Emissions Tabular Data – 3-18GHz (802.11g HCH)

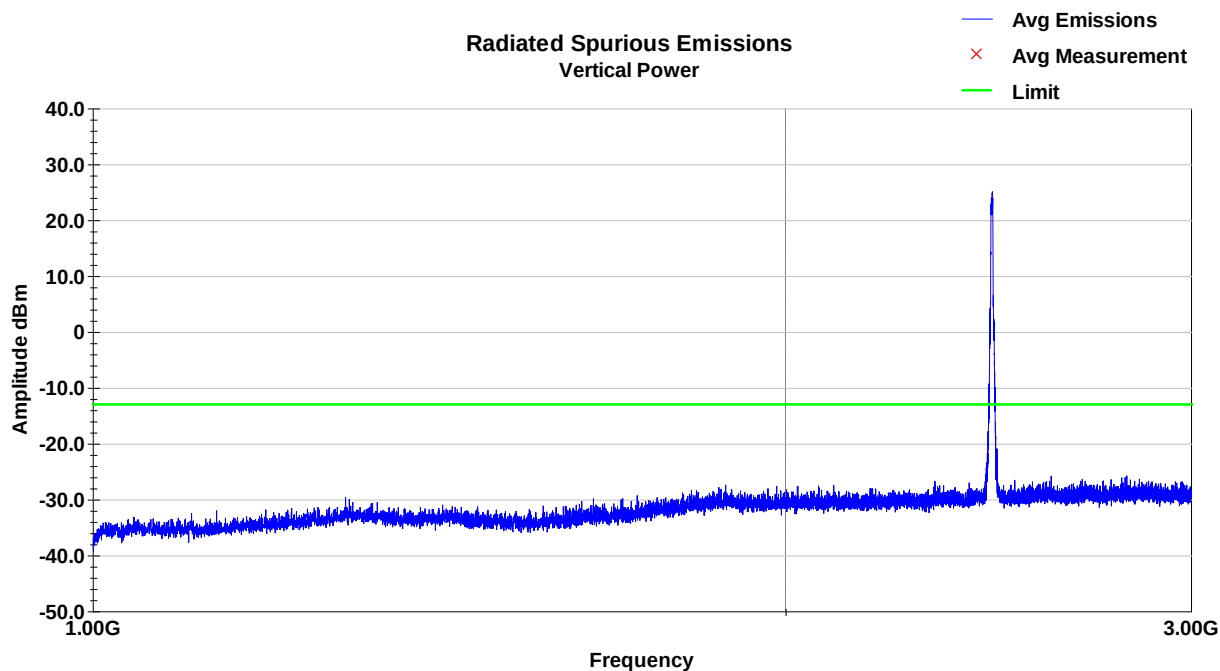
Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
9888.30	-32.2	V	195.0	195.0	37.0	3.3	41.8	-33.7	-13.0	-20.7
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

Horizontal Radiated Spurious Emissions Plot – 3-18GHz (802.11g HCH)

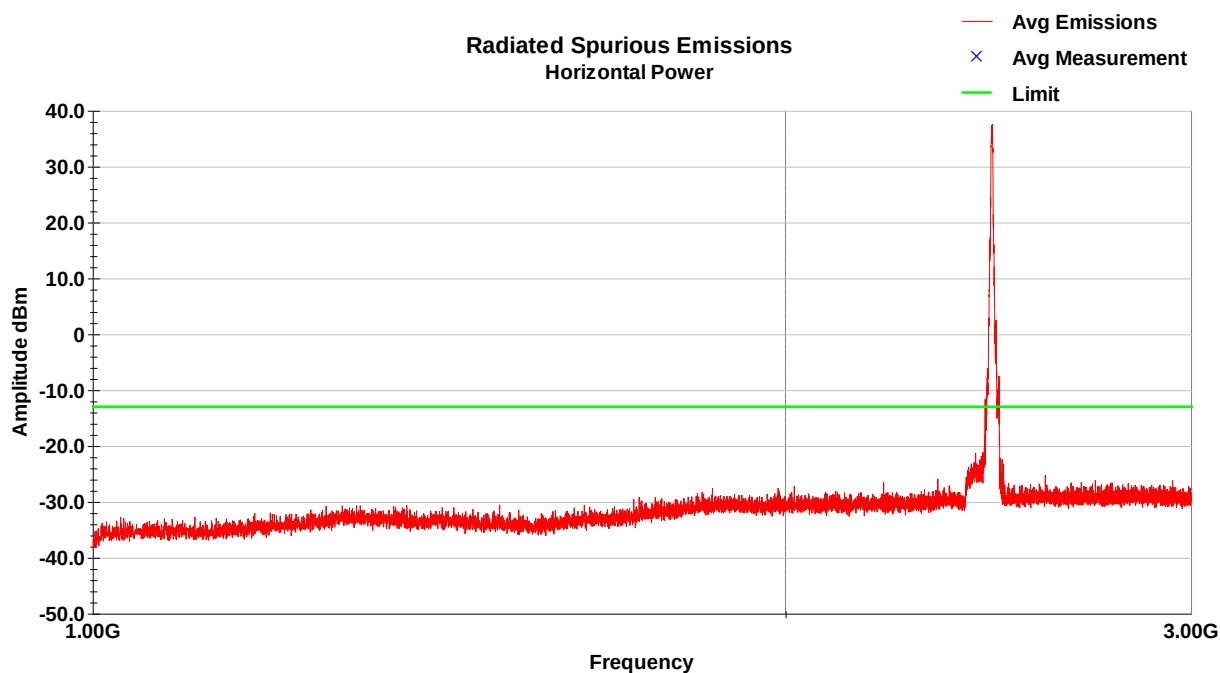


All pre-scan emissions are more than 20dB below the limit.

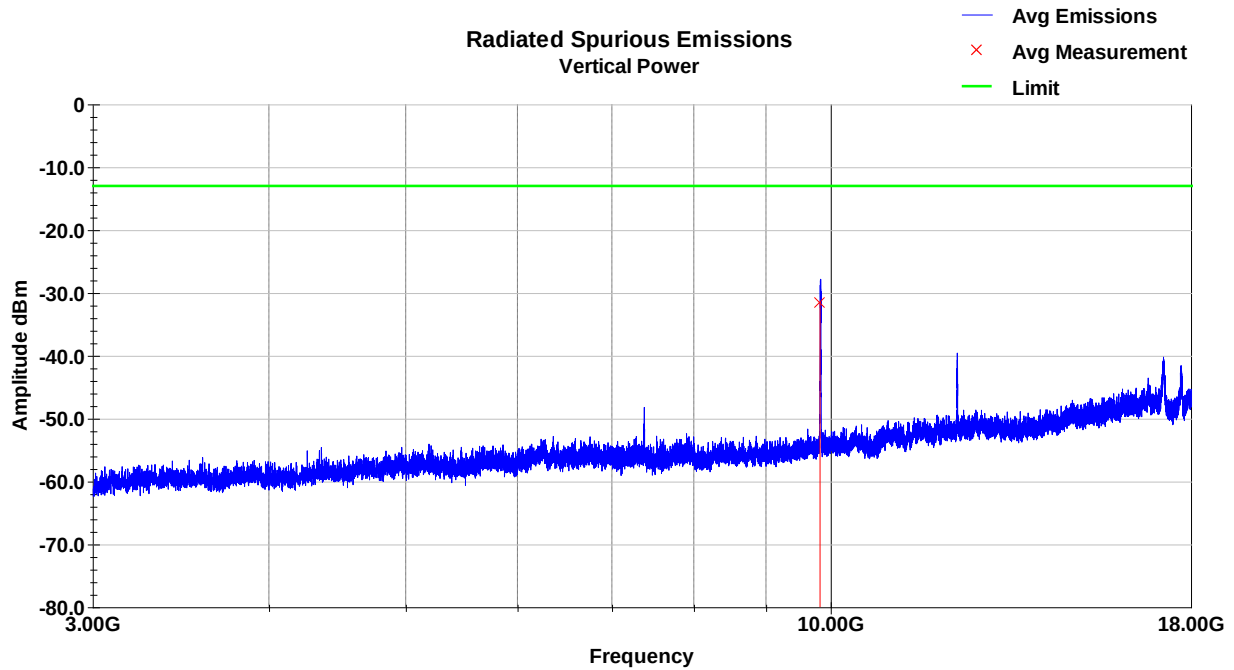
Vertical Radiated Spurious Emissions Plot – 1-3GHz (802.11n LCH)



Horizontal Radiated Spurious Emissions Plot – 1-3GHz (802.11n LCH)



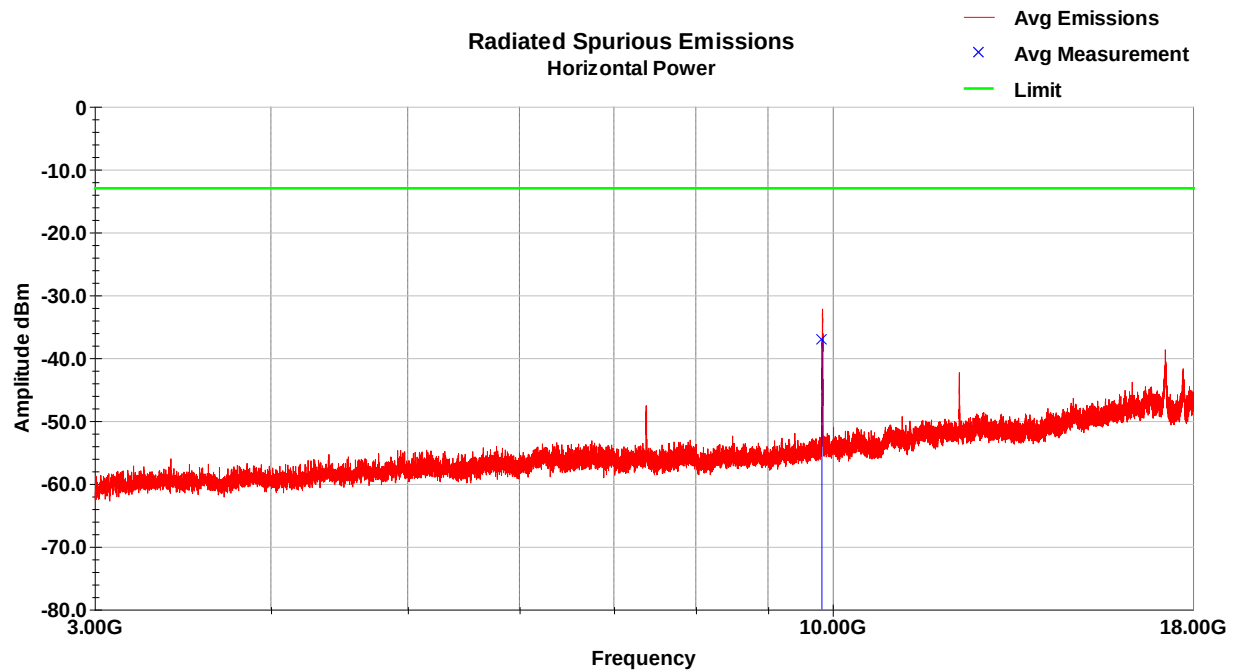
Vertical Radiated Spurious Emissions Plot – 3-18GHz (802.11n LCH)



Vertical Radiated Spurious Emissions Tabular Data – 3-18GHz (802.11n LCH)

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
9829.58	-30.2	V	195.0	203.0	36.9	3.9	42.0	-31.4	-13.0	-18.4
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

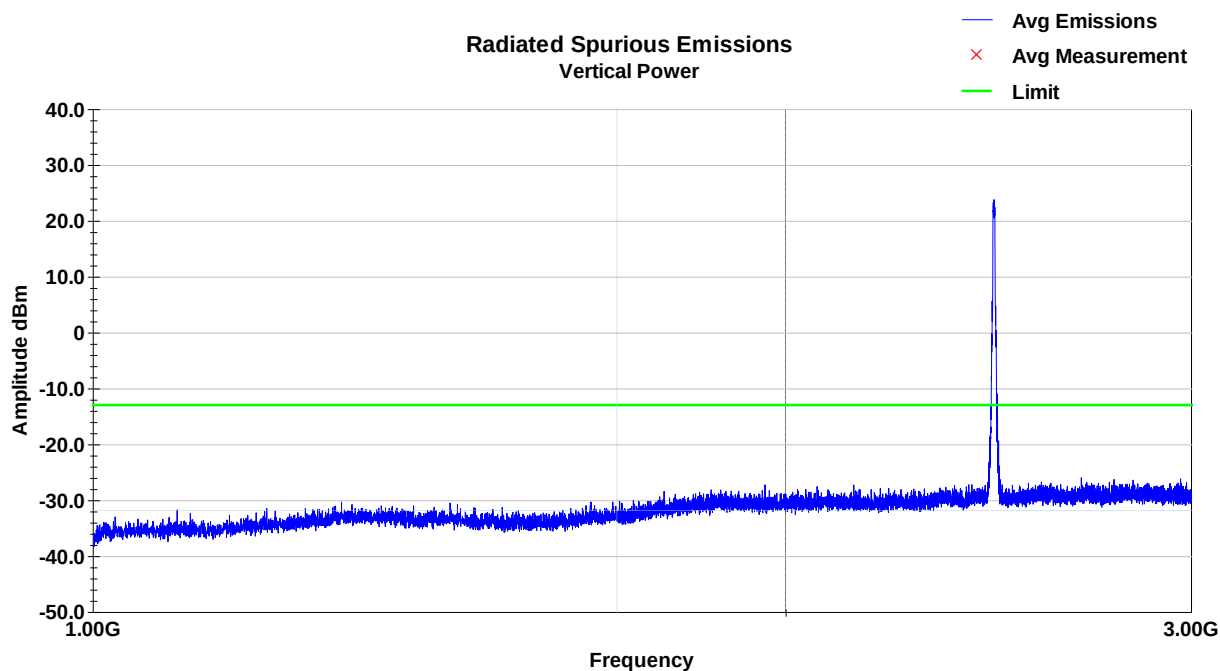
Horizontal Radiated Spurious Emissions Plot – 3-18GHz (802.11n LCH)



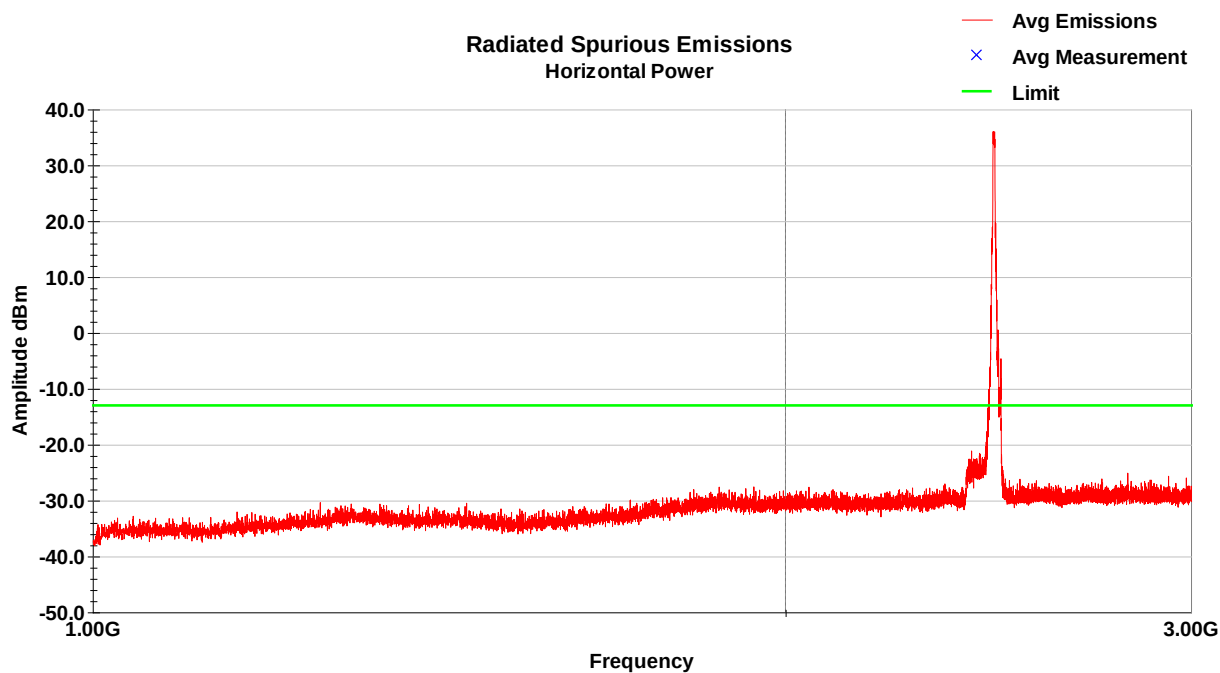
Horizontal Radiated Spurious Emissions Tabular Data – 3-18GHz (802.11n LCH)

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
9827.66	-35.7	H	131.0	167.0	36.9	3.8	42.0	-37.1	-13.0	-24.1
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

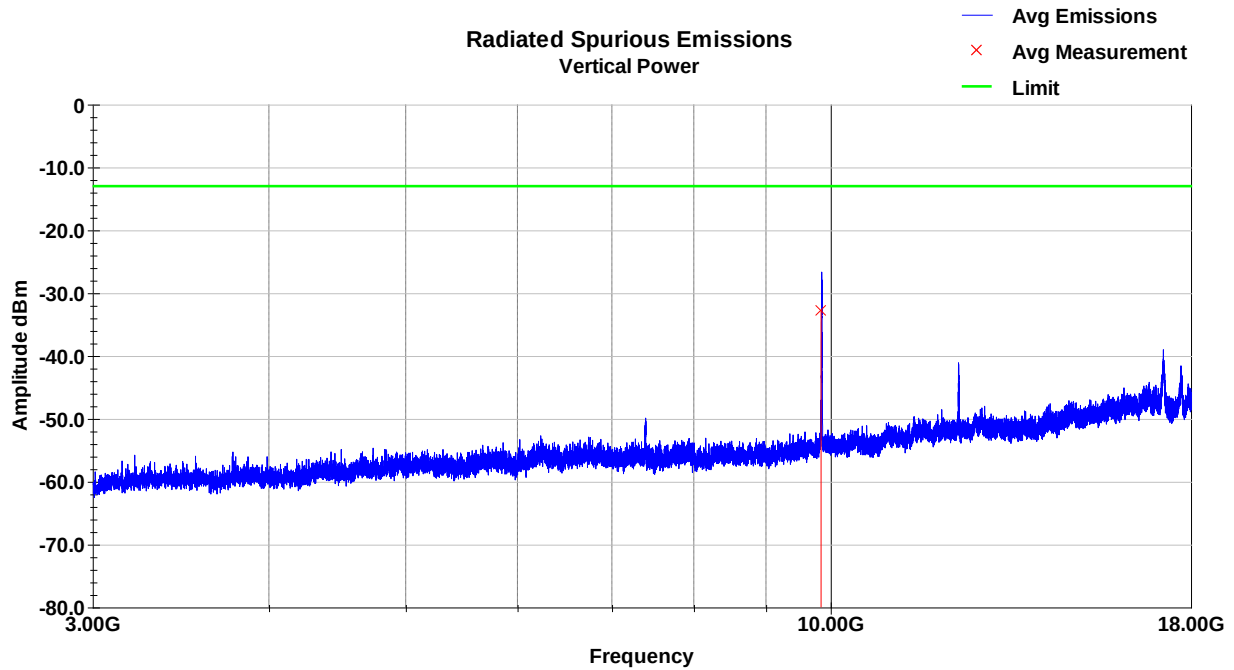
Vertical Radiated Spurious Emissions Plot – 1-3GHz (802.11n MCH)



Horizontal Radiated Spurious Emissions Plot – 1-3GHz (802.11n MCH)



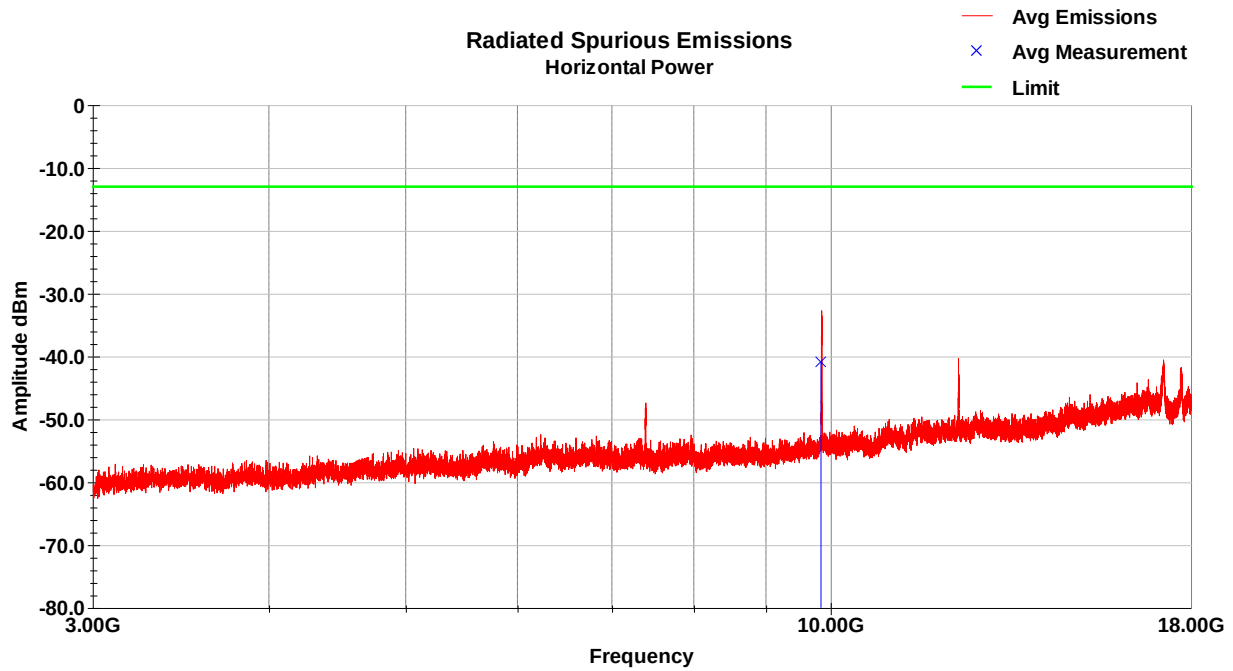
Vertical Radiated Spurious Emissions Plot – 3-18GHz (802.11n MCH)



Vertical Radiated Spurious Emissions Tabular Data – 3-18GHz (802.11n MCH)

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
9846.08	-31.5	V	196.0	203.0	36.9	4.1	42.2	-32.7	-13.0	-19.7
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

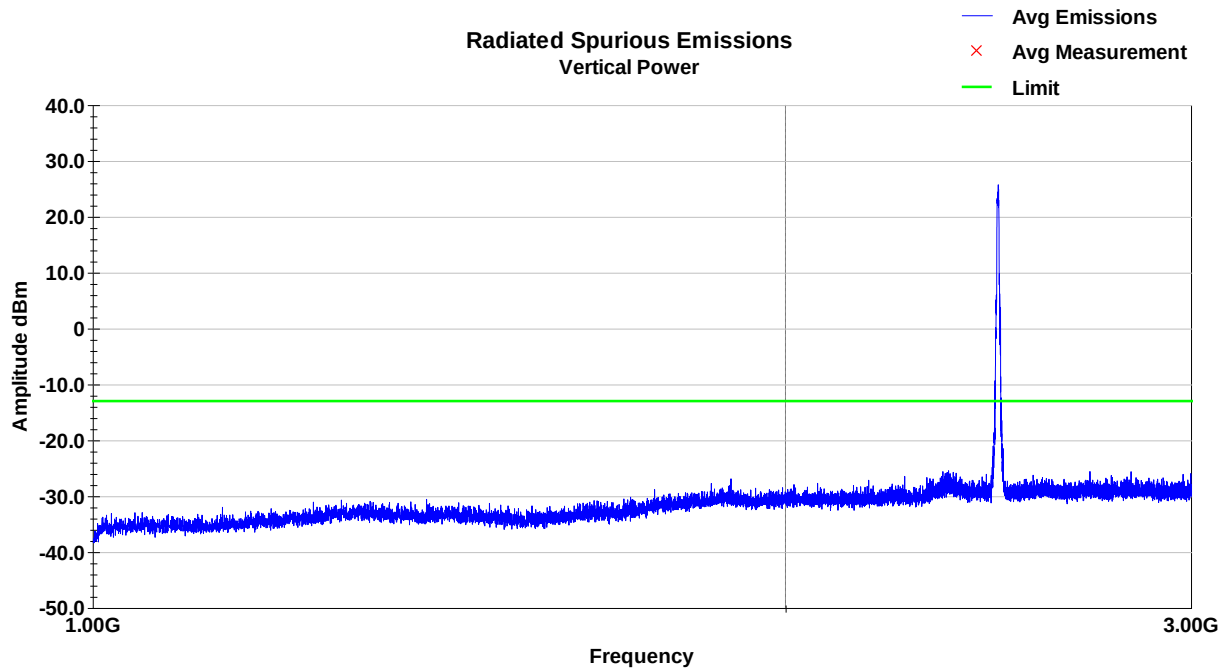
Horizontal Radiated Spurious Emissions Plot – 3-18GHz (802.11n MCH)



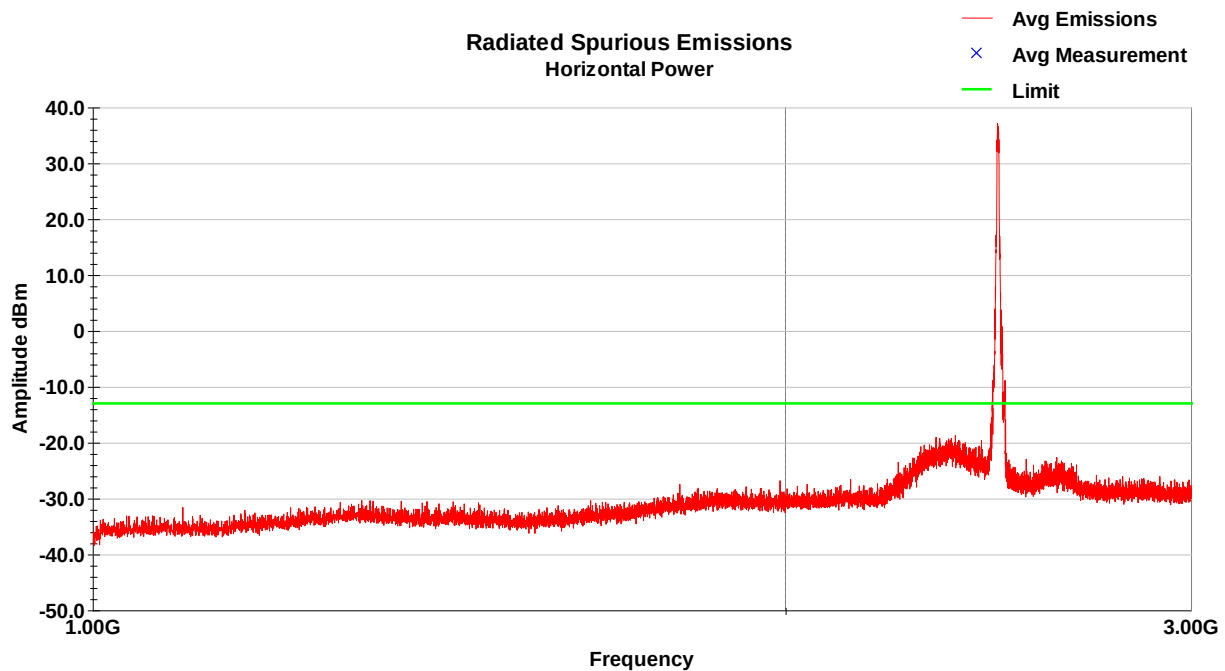
Horizontal Radiated Spurious Emissions Tabular Data – 3-18GHz (802.11n MCH)

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
9845.82	-39.7	H	291.0	177.0	36.9	4.1	42.2	-40.9	-13.0	-27.9
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

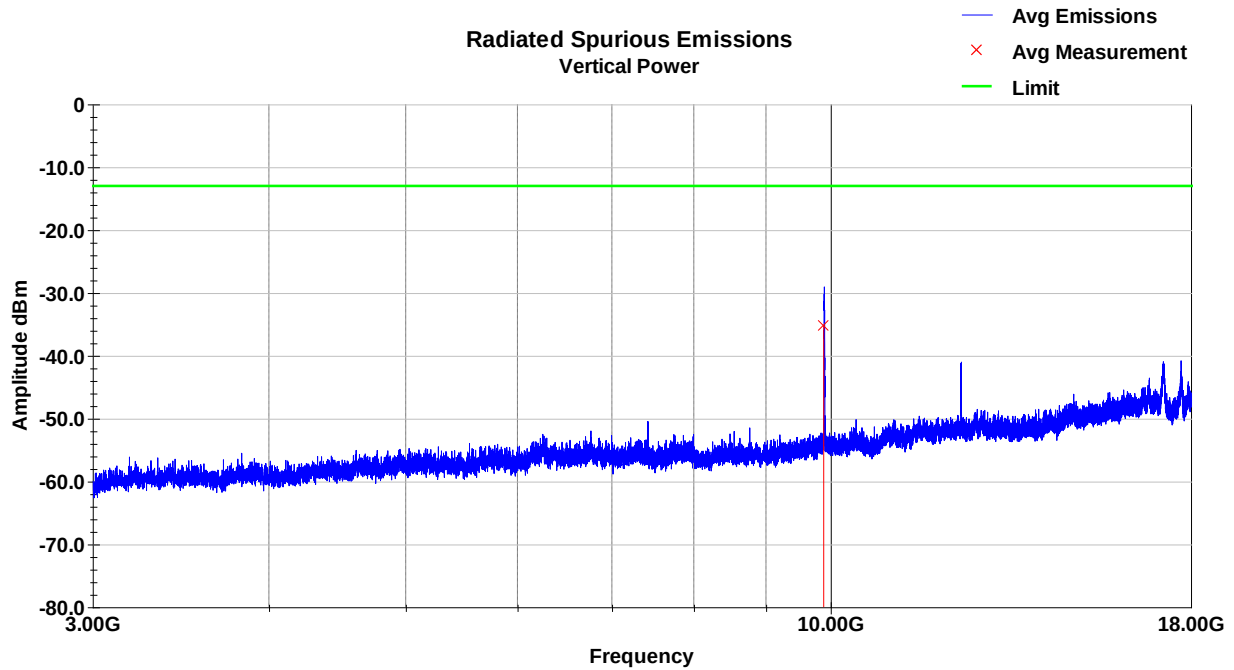
Vertical Radiated Spurious Emissions Plot – 1-3GHz (802.11n HCH)



Horizontal Radiated Spurious Emissions Plot – 1-3GHz (802.11n HCH)



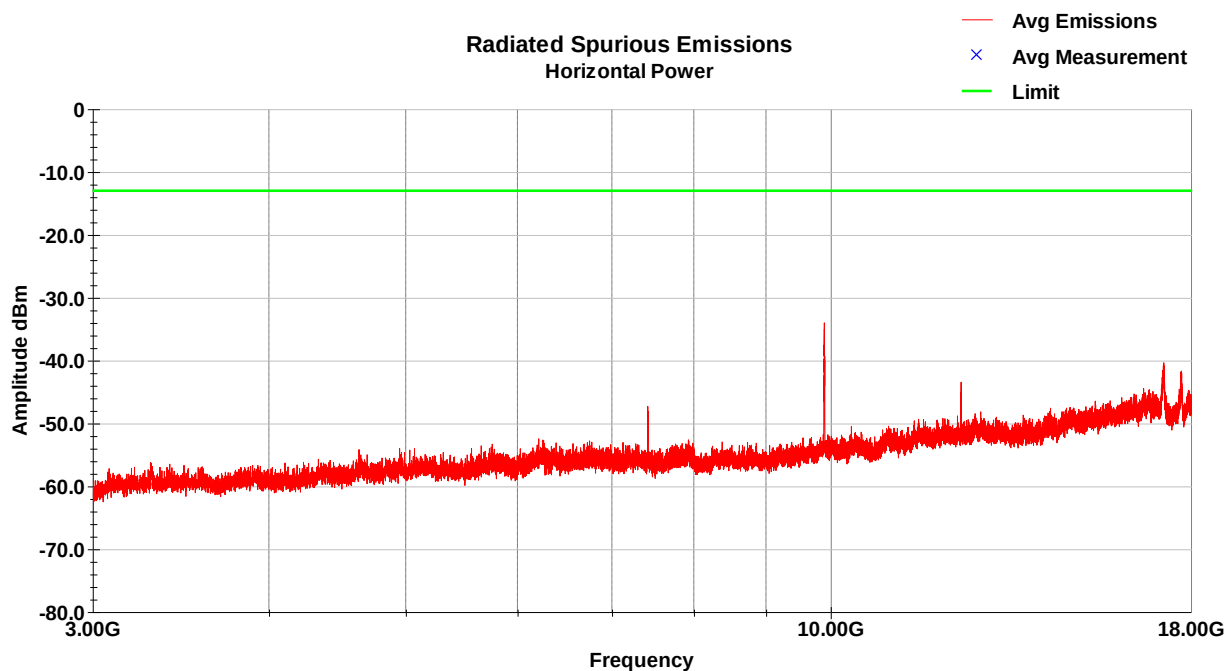
Vertical Radiated Spurious Emissions Plot – 3-18GHz (802.11n HCH)



Vertical Radiated Spurious Emissions Tabular Data – 3-18GHz (802.11n HCH)

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
9888.30	-33.7	V	188.0	187.0	37.0	3.3	41.8	-35.1	-13.0	-22.1
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

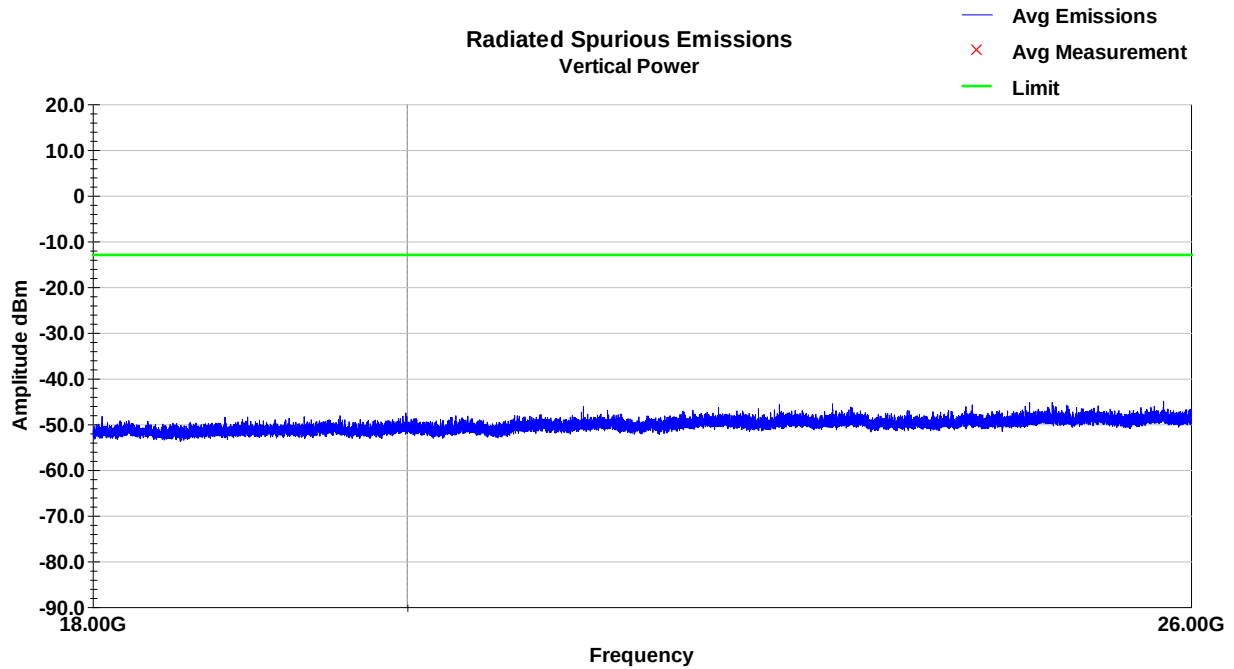
Horizontal Radiated Spurious Emissions Plot – 3-18GHz (802.11n HCH)



All pre-scan emissions are more than 20dB below the limit.

In the 18-26 GHz frequency range there was no deviation with respect to axis, modulation or channel.

Vertical Radiated Spurious Emissions Plot – 18-26GHz



Horizontal Radiated Spurious Emissions Plot – 18-26GHz

