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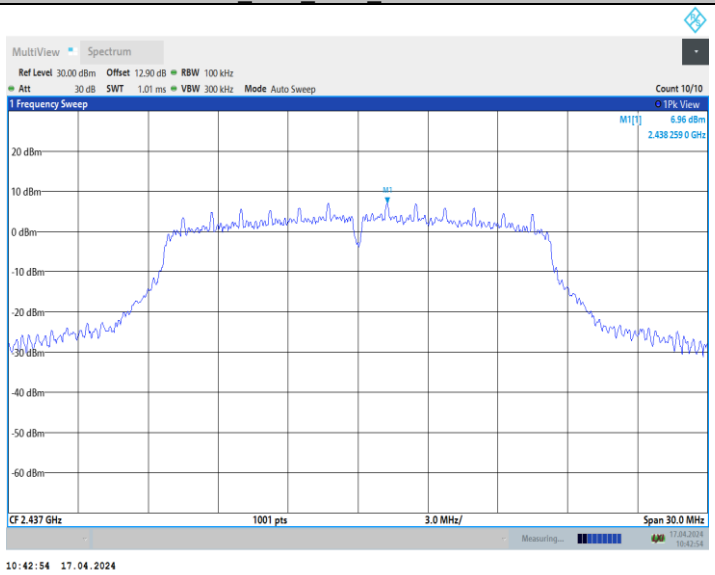

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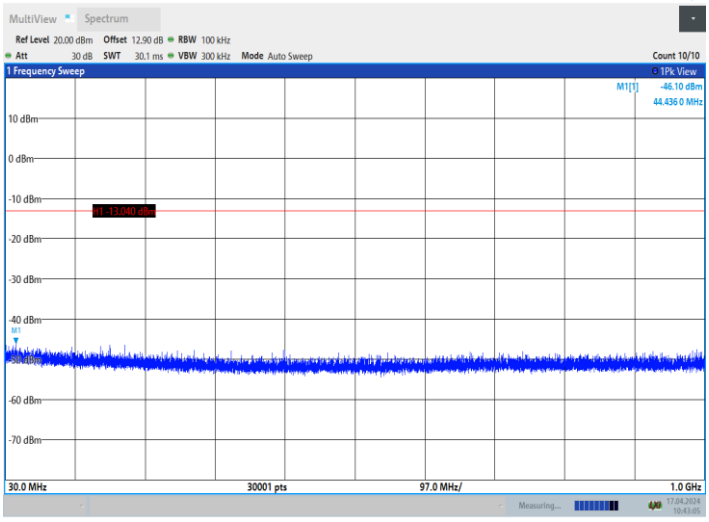

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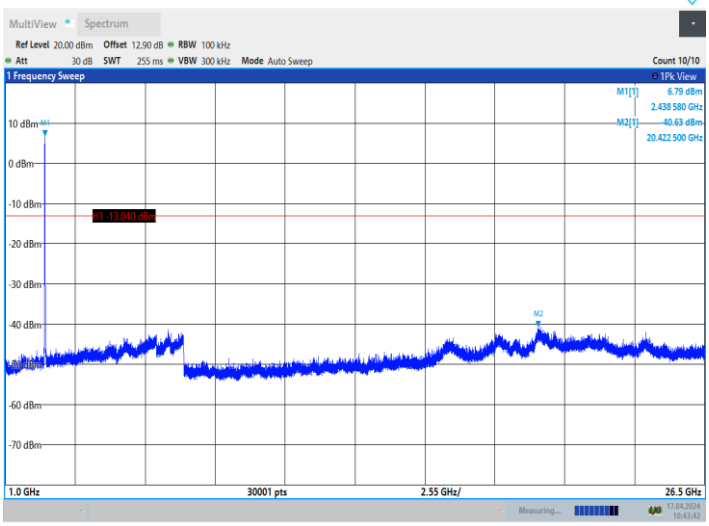

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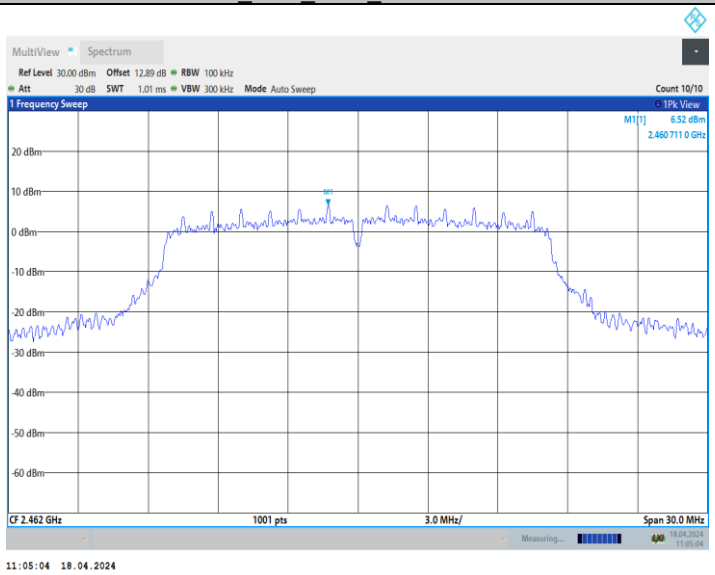
11G_Ant1_2462_0~Reference



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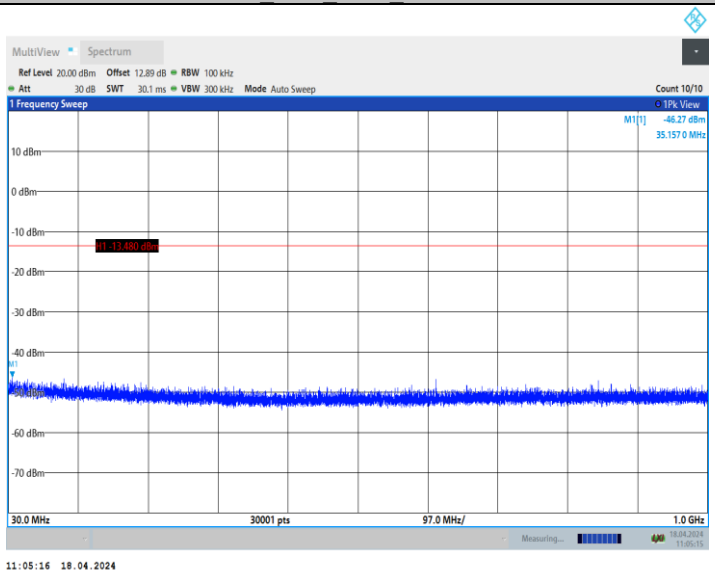

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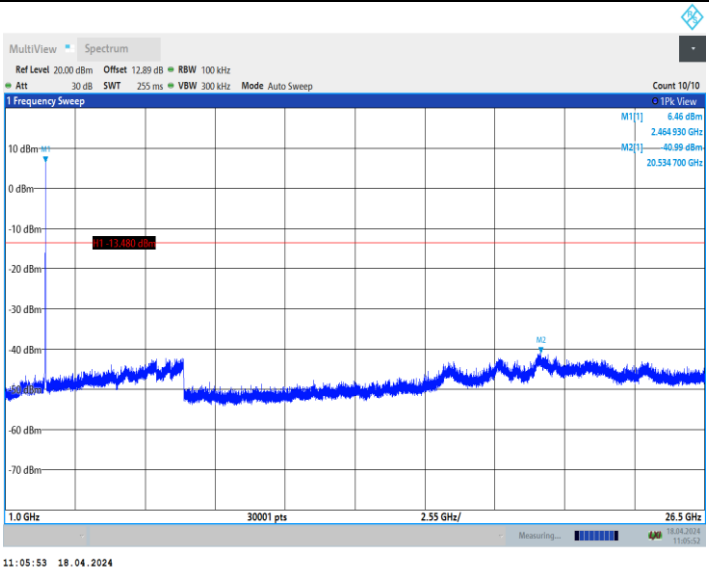
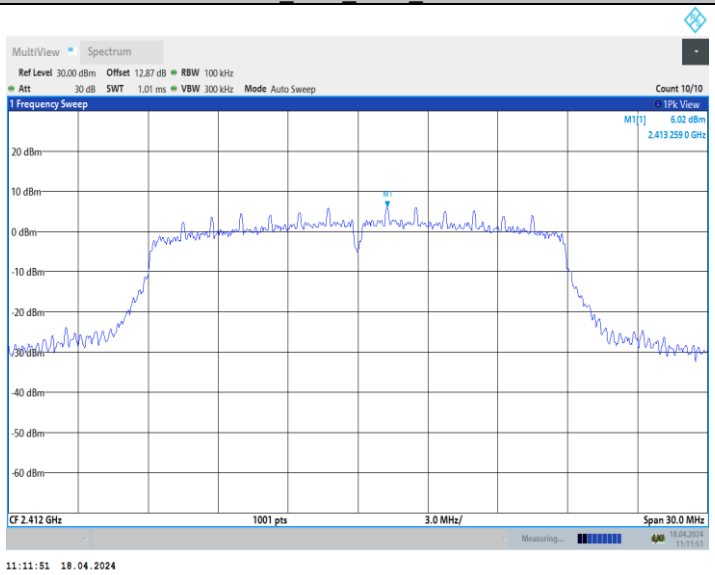


11N20SISO_Ant1_2412_0~Reference



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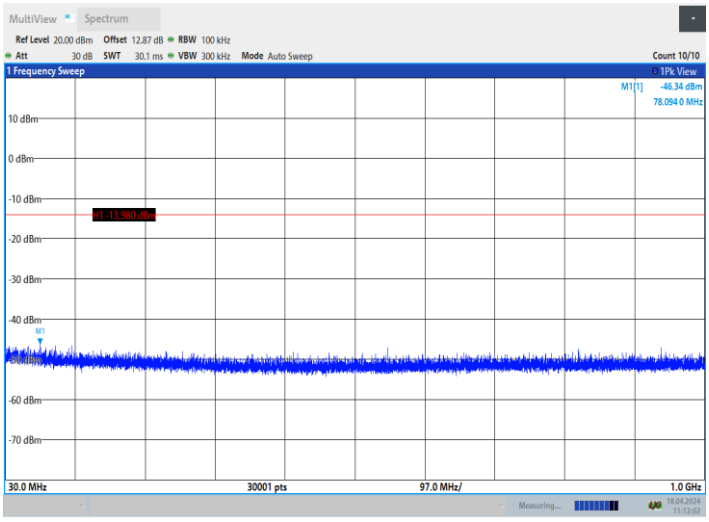
11N20SISO_Ant1_2412_30~1000



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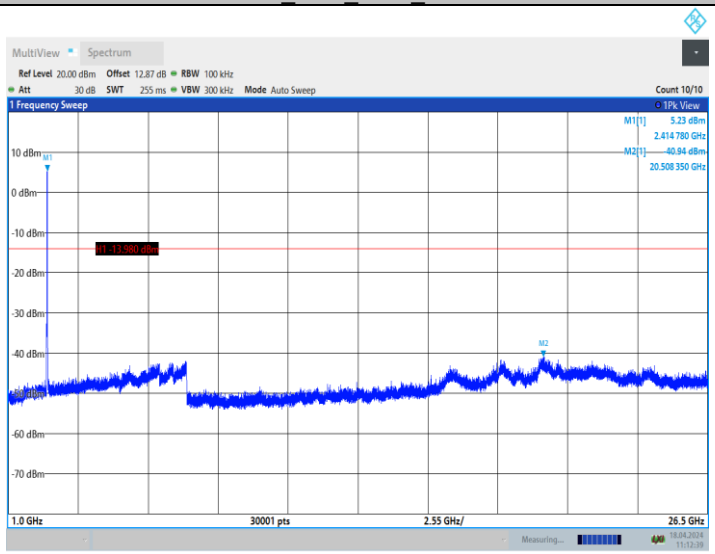
11N20SISO_Ant1_2412_1000~26500



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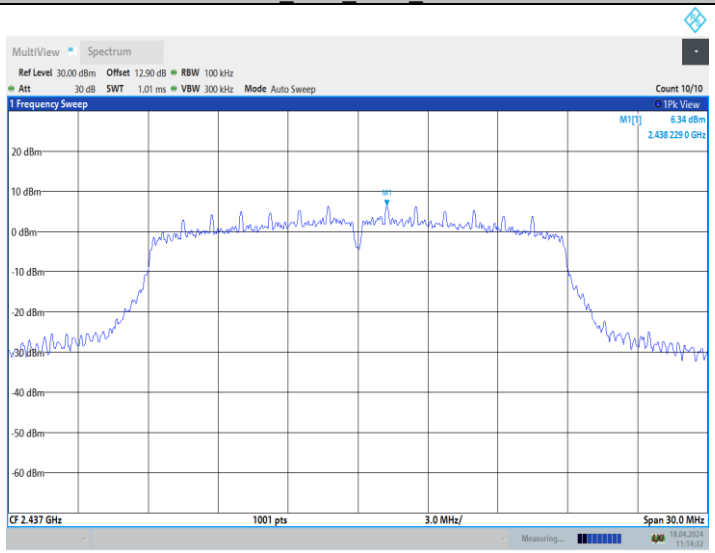

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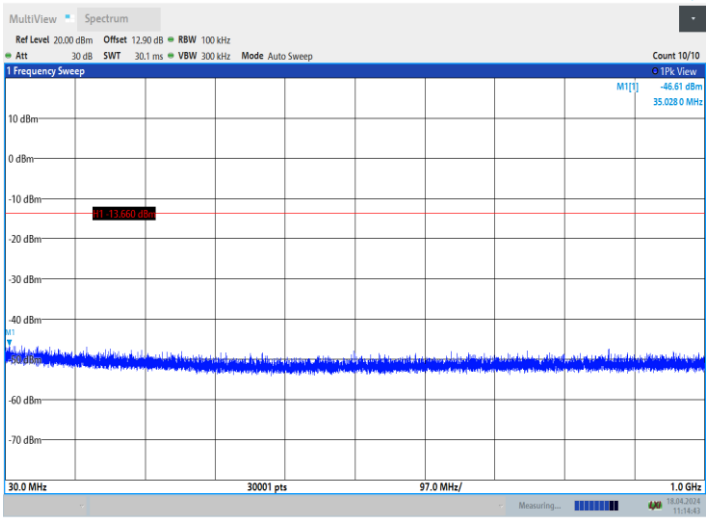
11N20SISO_Ant1_2437_30~1000



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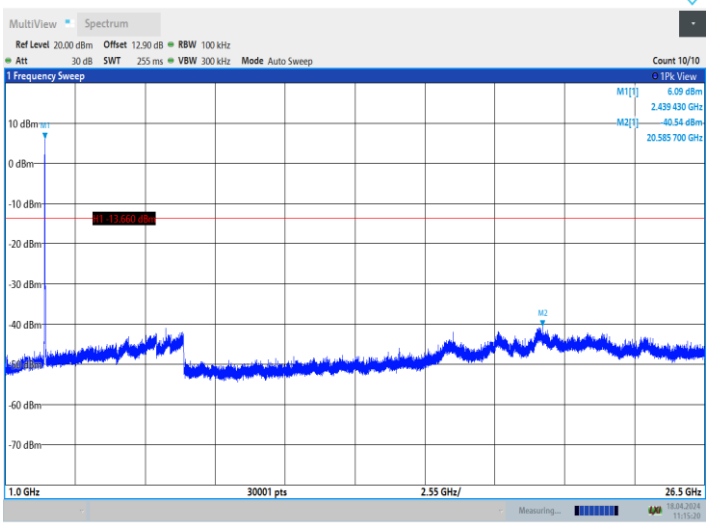

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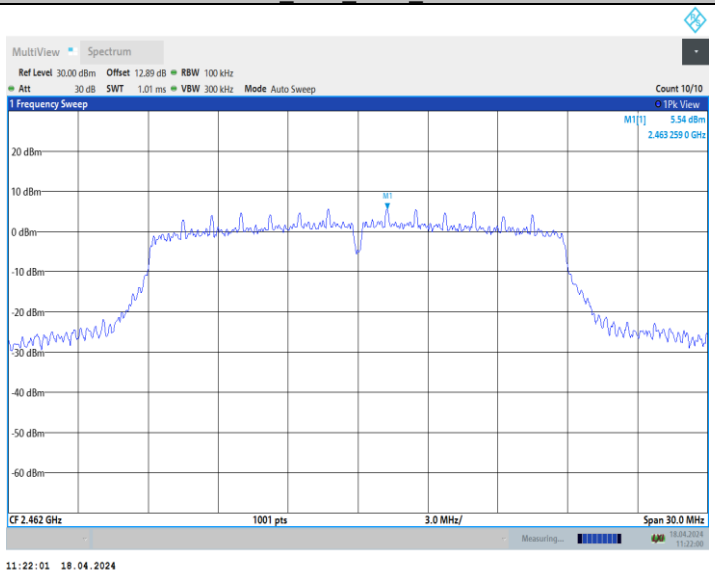

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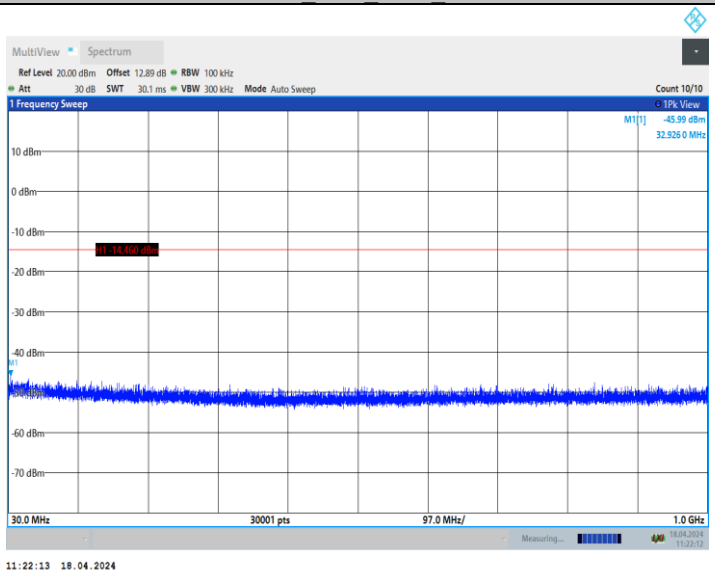

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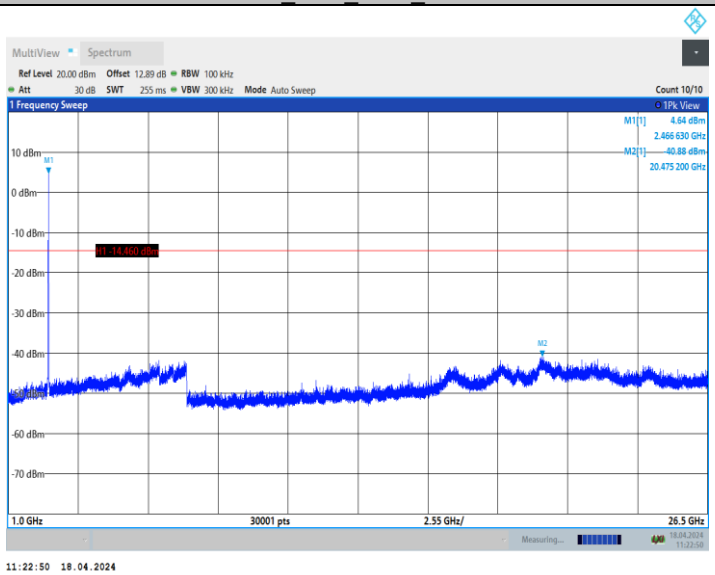

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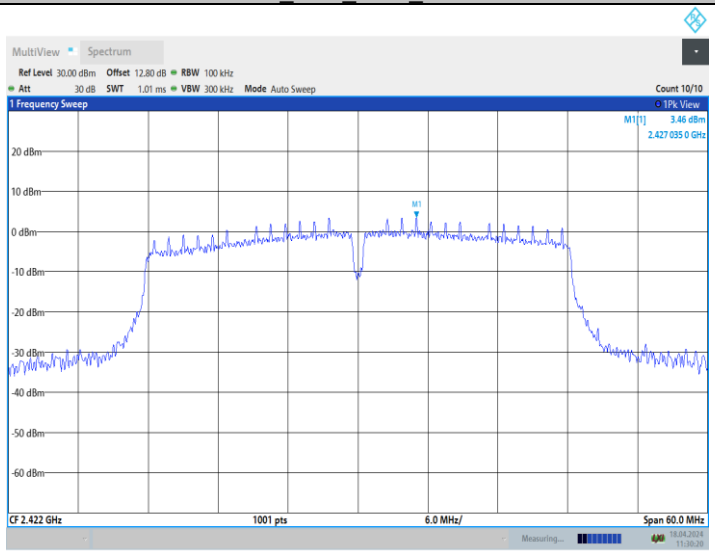

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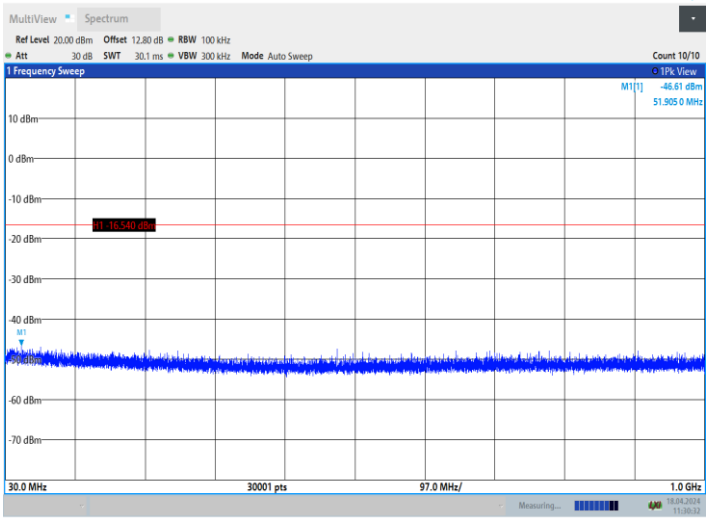

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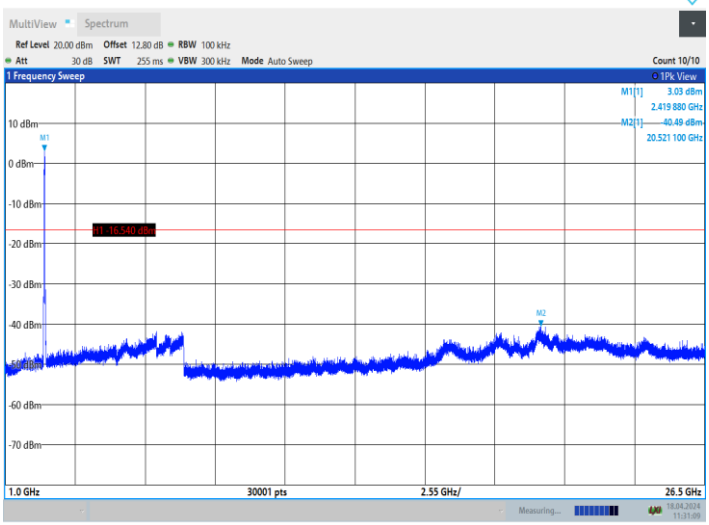

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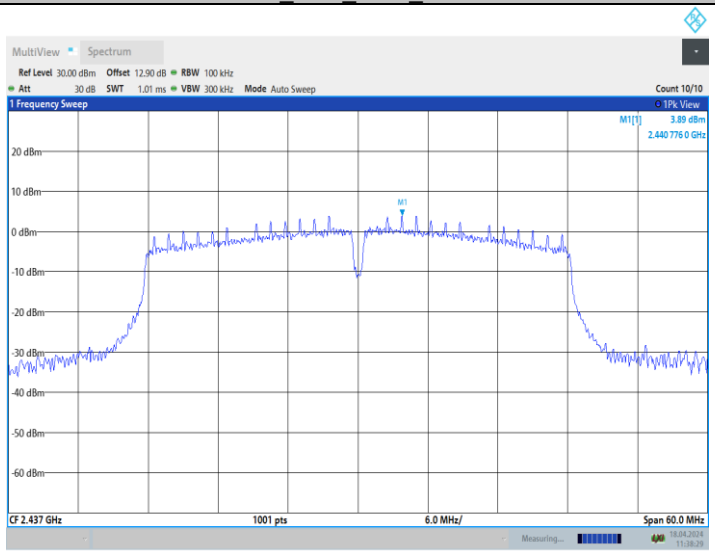

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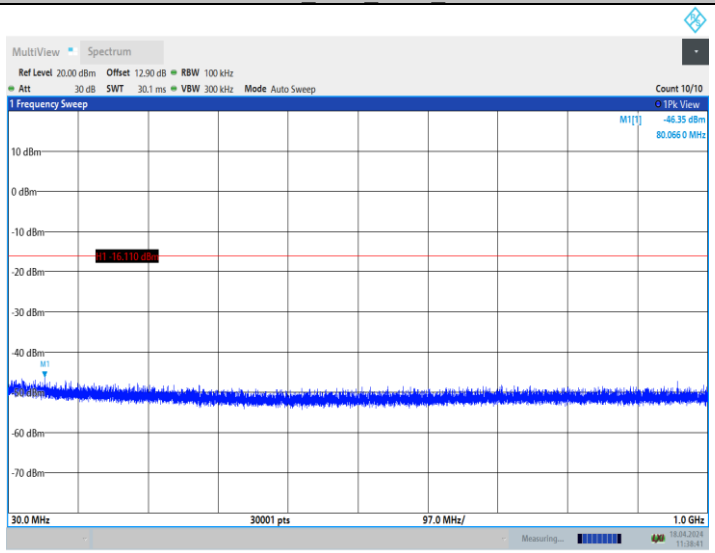

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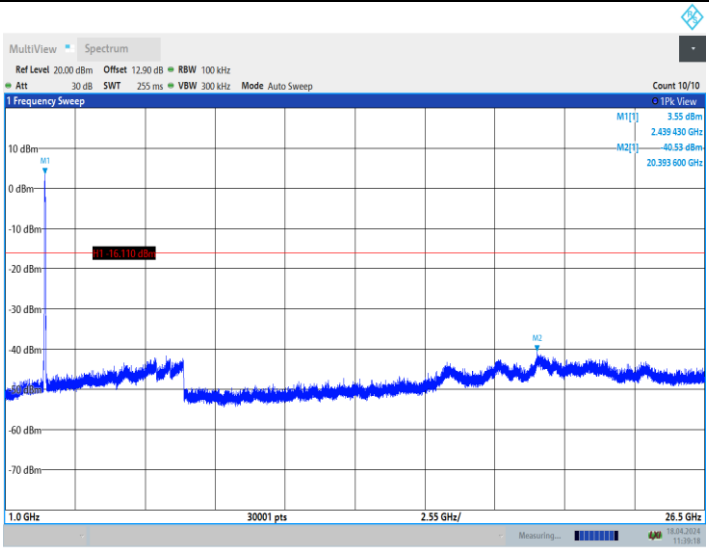
11N40SISO_Ant1_2437_1000~26500



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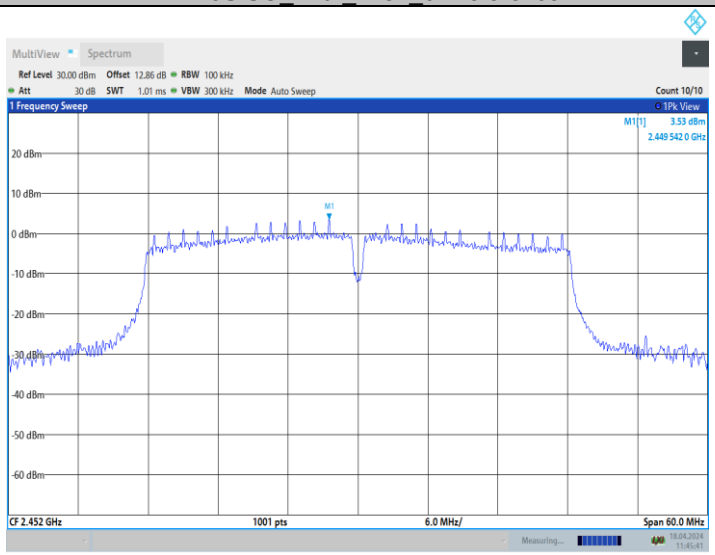

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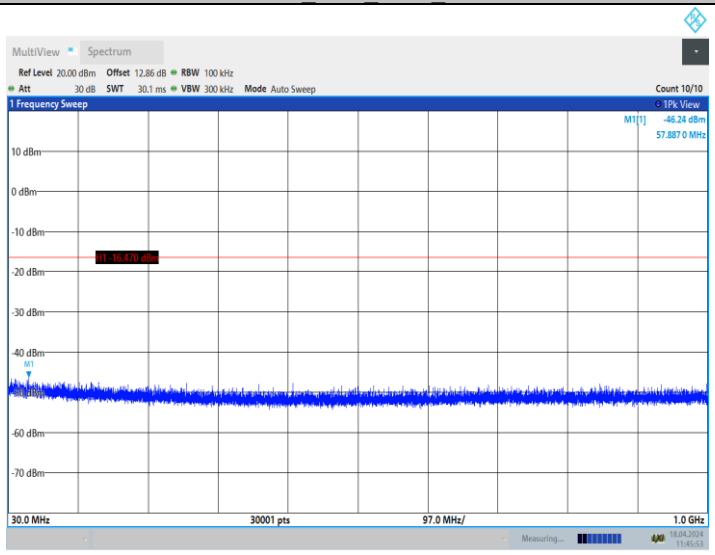

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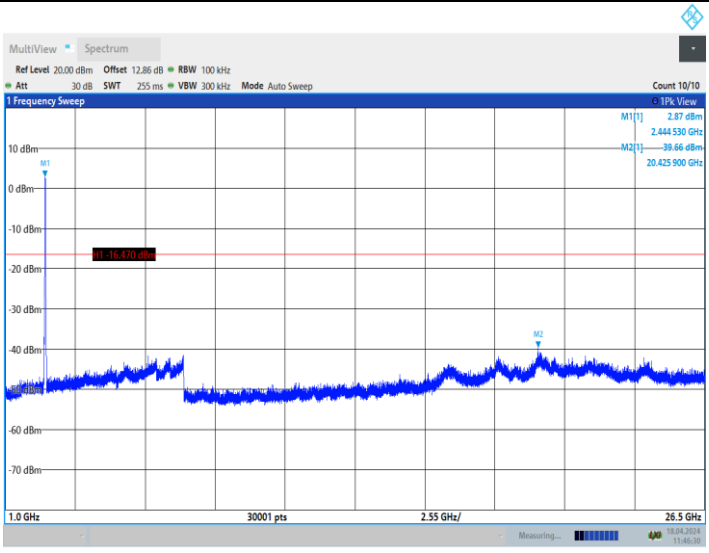
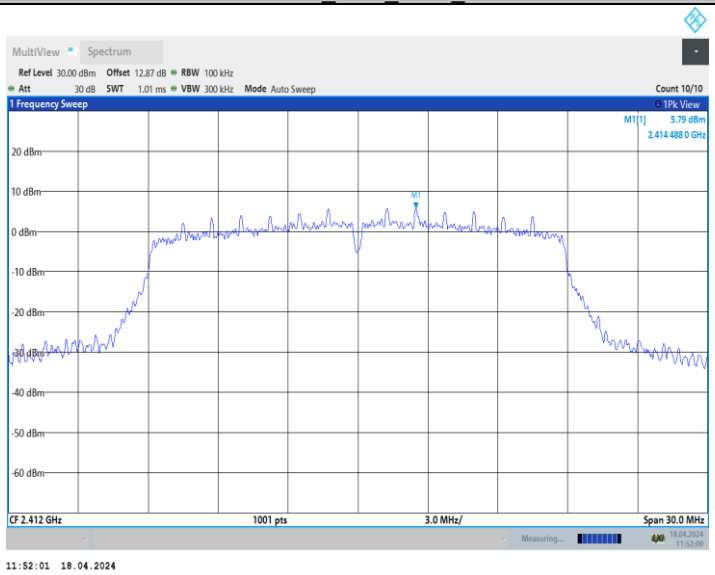


802.11 VHT20SISO_Ant1_2412_0~Reference



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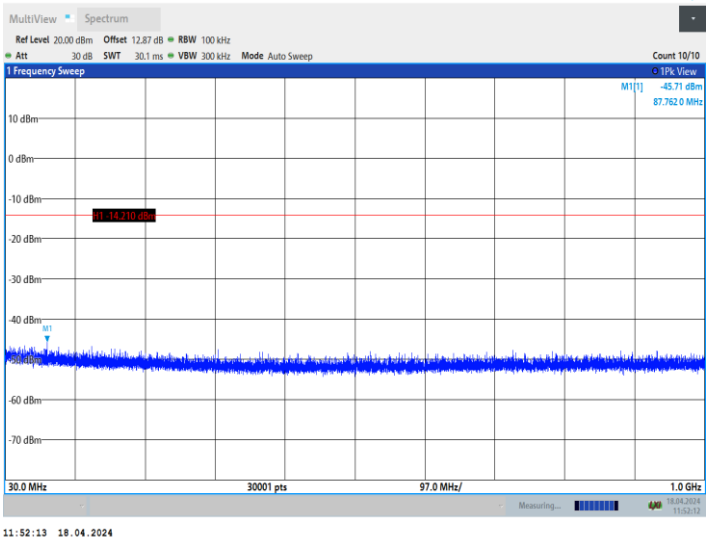

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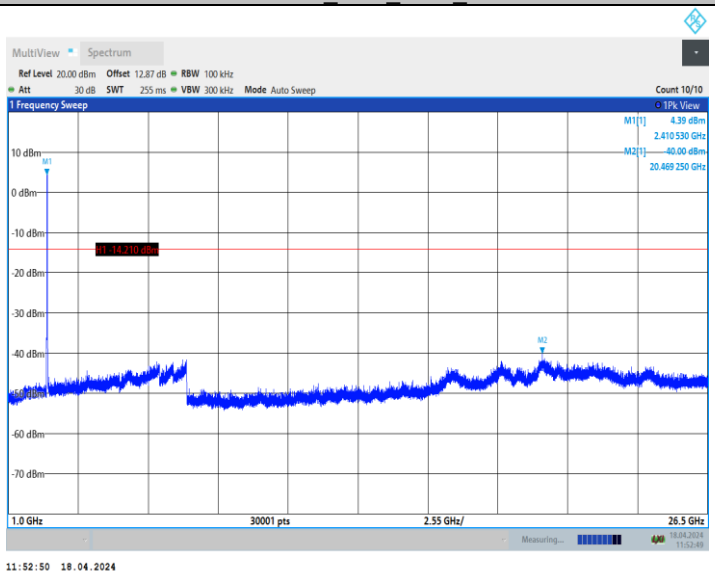

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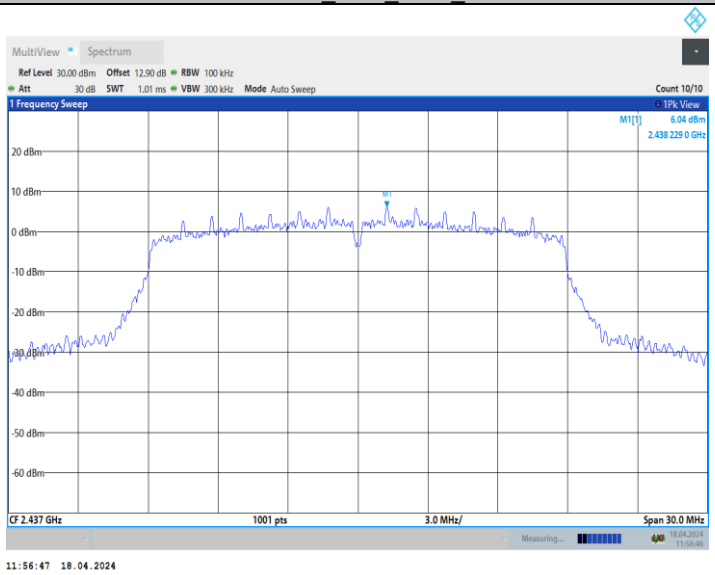

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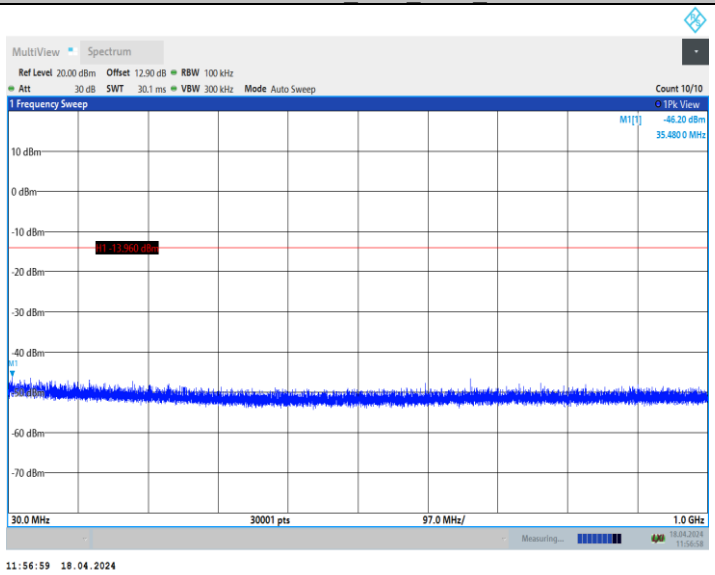

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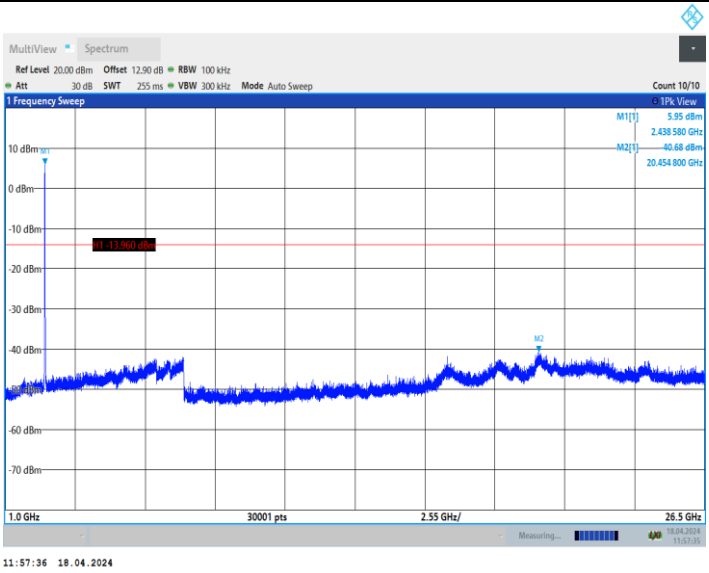

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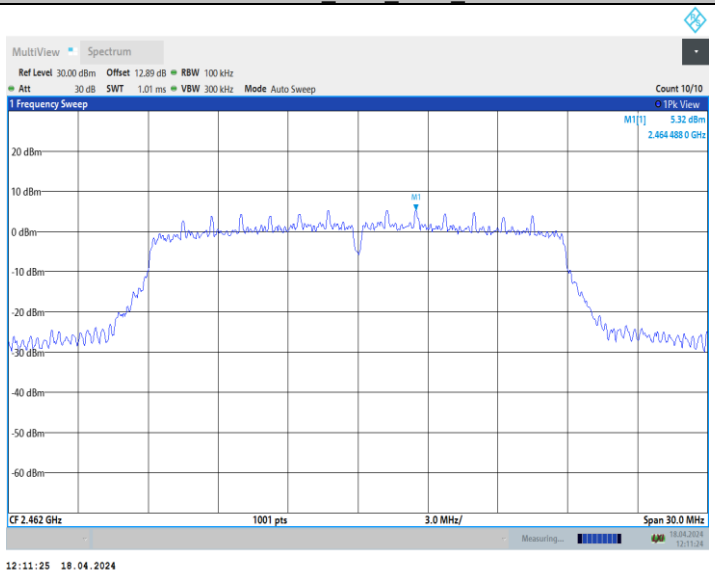

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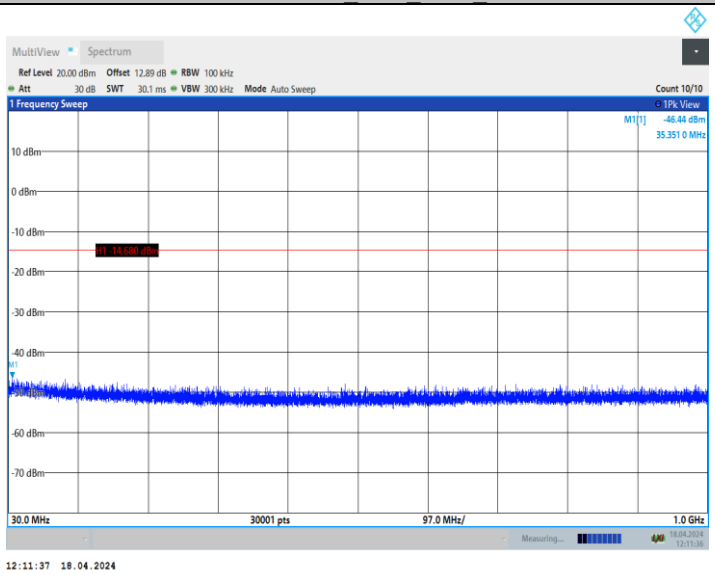

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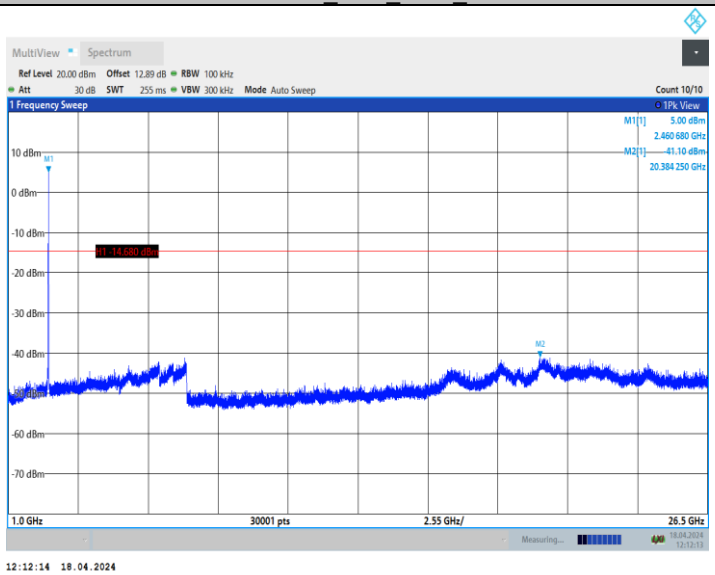

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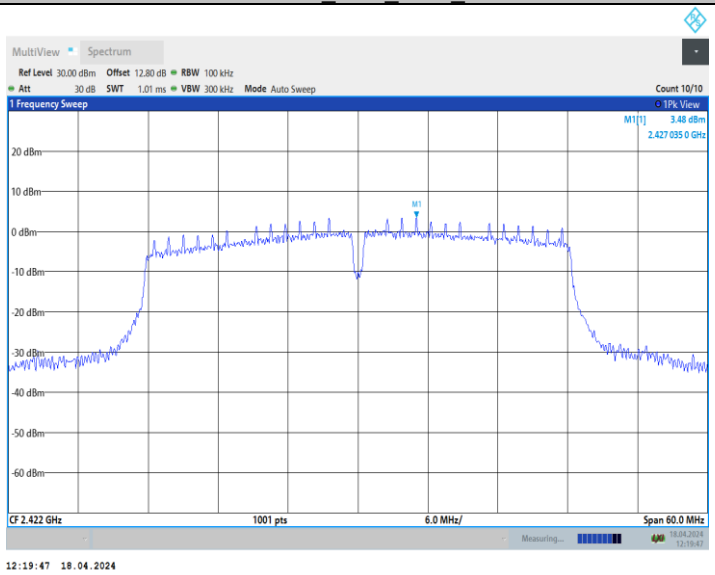

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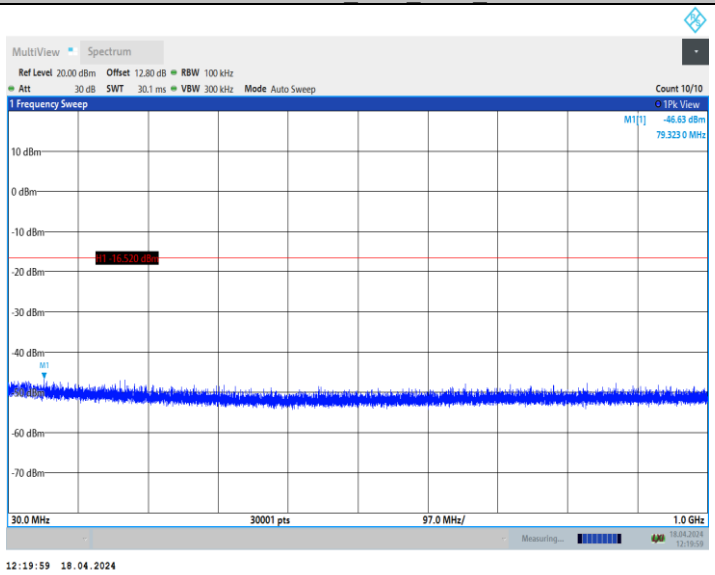

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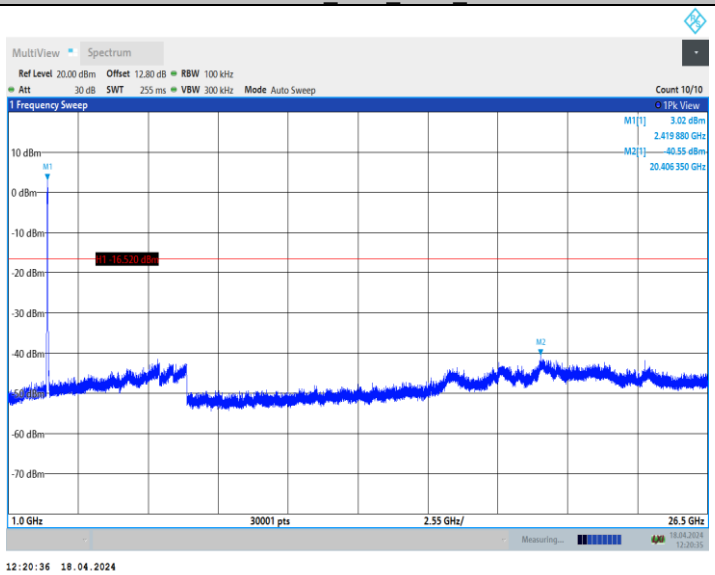

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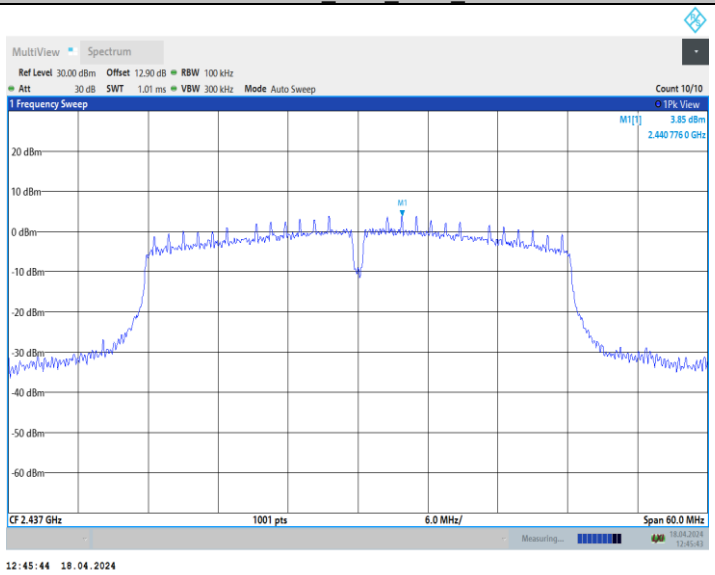

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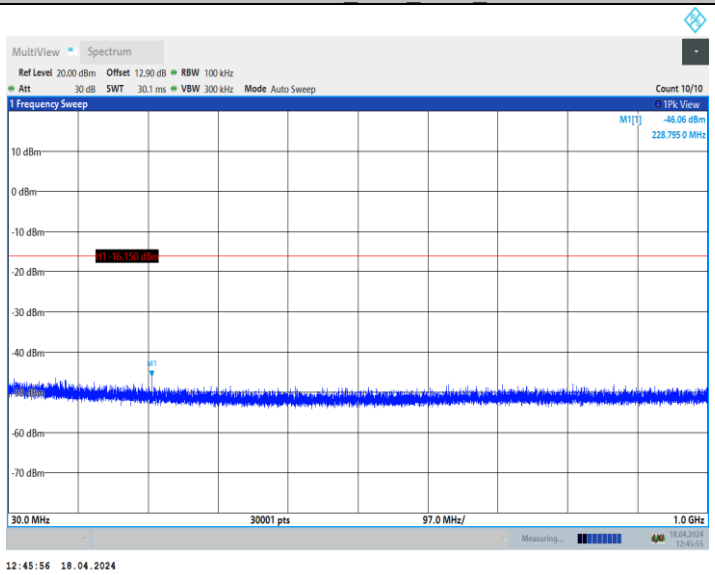

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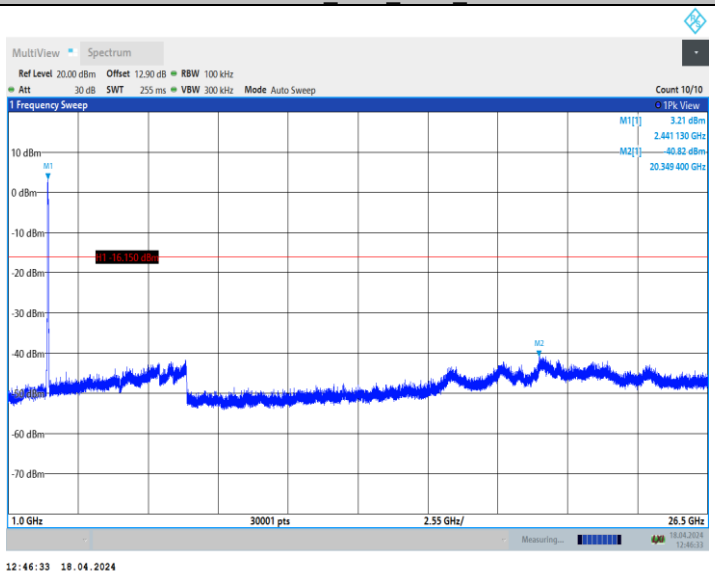

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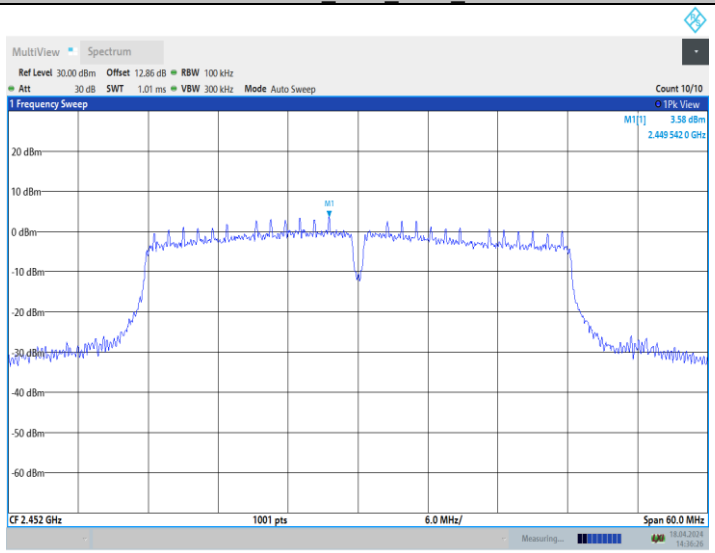

14:36:26 18.04.2024

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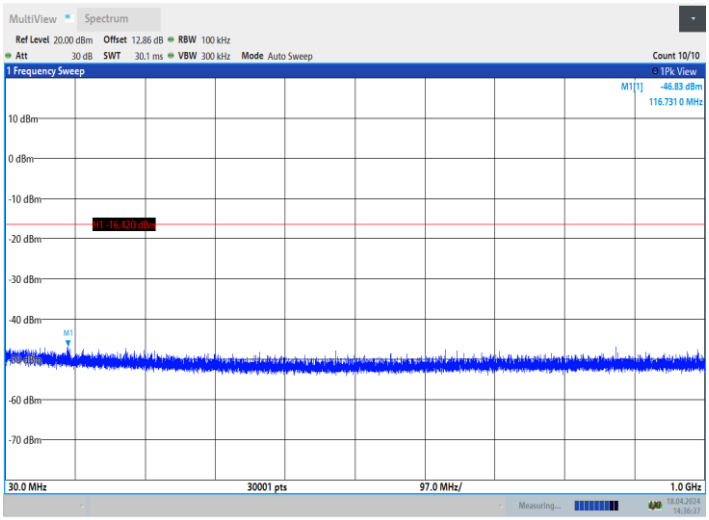

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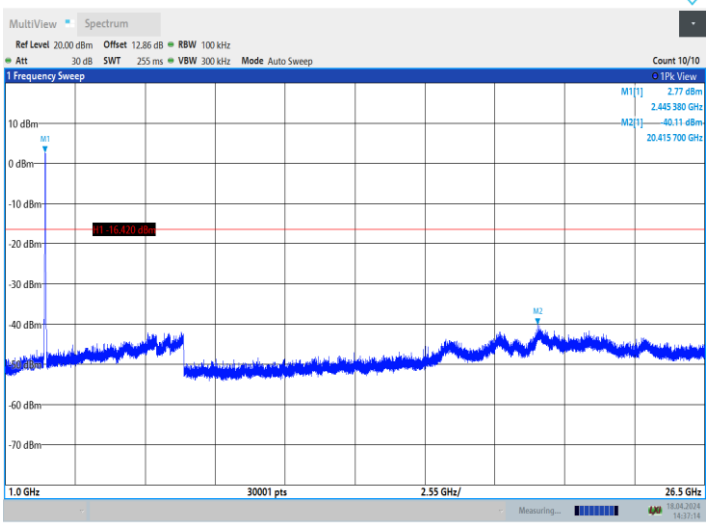
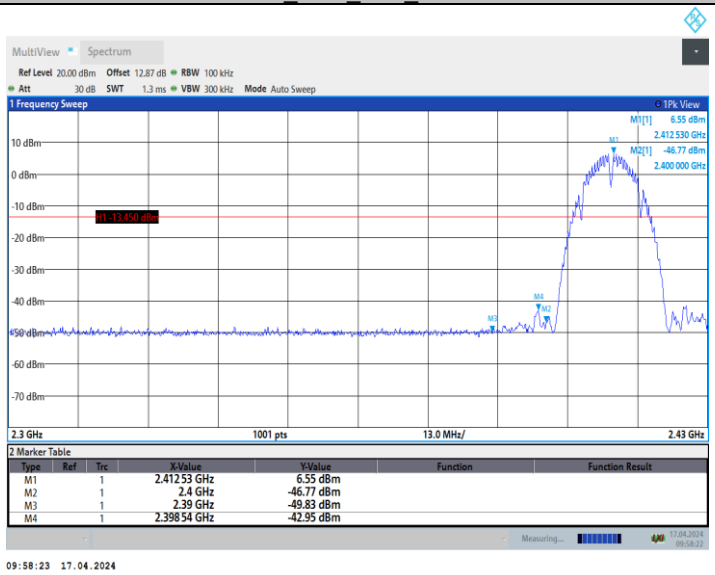


14:37:15 18.04.2024

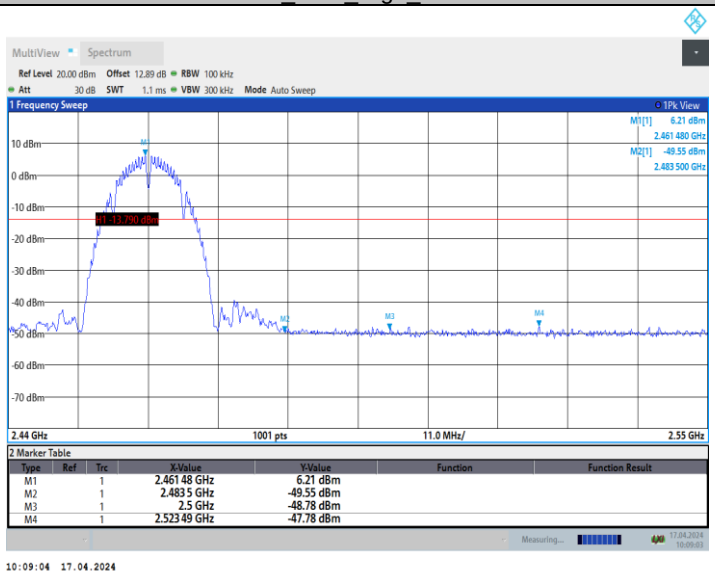
Band Edge

TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	6.55	-42.95	≤-13.45	PASS
		High	2462	6.21	-47.78	≤-13.79	PASS
11G	Ant1	Low	2412	6.73	-24.19	≤-13.27	PASS
		High	2462	6.17	-38.04	≤-13.83	PASS
11N20SISO	Ant1	Low	2412	5.98	-26.05	≤-14.02	PASS
		High	2462	5.47	-37.88	≤-14.53	PASS
11N40SISO	Ant1	Low	2422	3.48	-30.16	≤-16.52	PASS
		High	2452	3.48	-31.51	≤-16.52	PASS
802.11 VHT20SISO	Ant1	Low	2412	5.73	-27.74	≤-14.27	PASS
		High	2462	5.31	-38.24	≤-14.69	PASS
802.11 VHT40SISO	Ant1	Low	2422	3.49	-29.91	≤-16.51	PASS
		High	2452	3.55	-31.57	≤-16.45	PASS

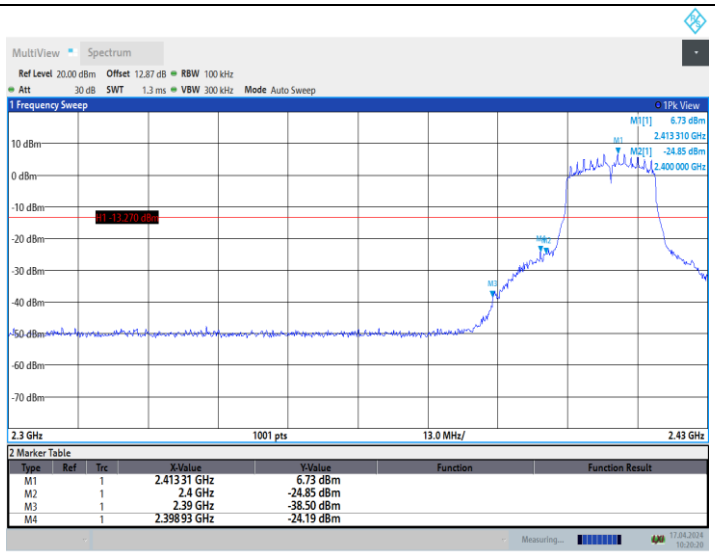
11B_Ant1_Low_2412



11B_Ant1_High_2462



11G_Ant1_Low_2412



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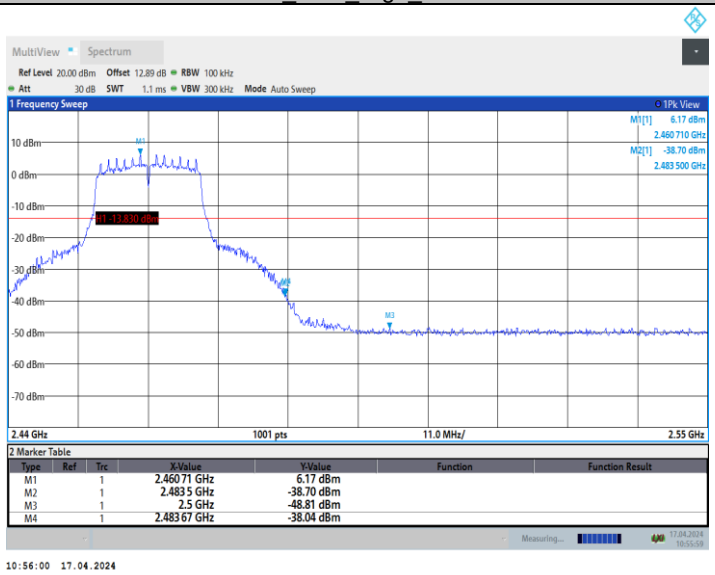

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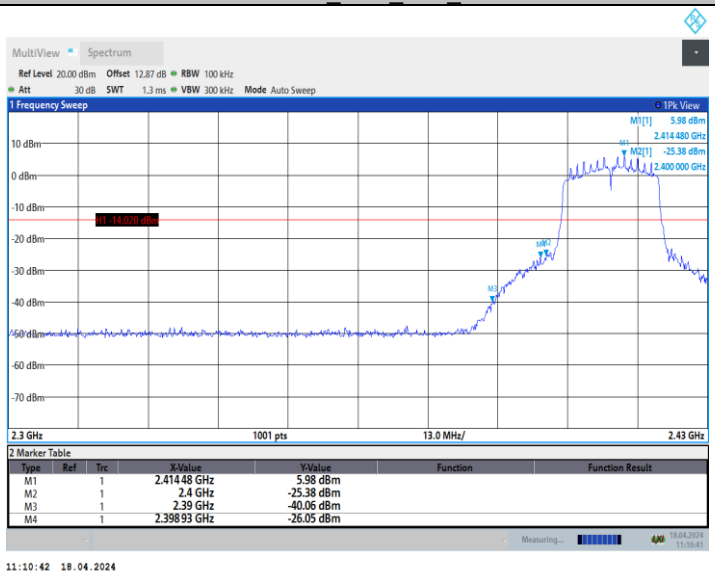

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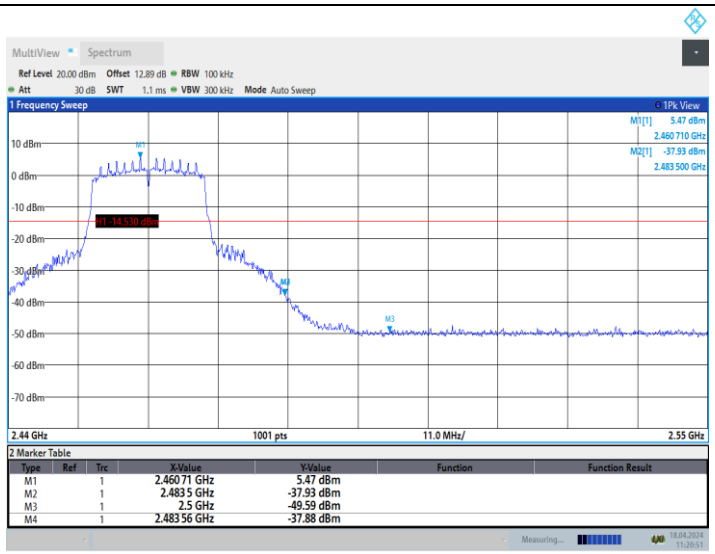

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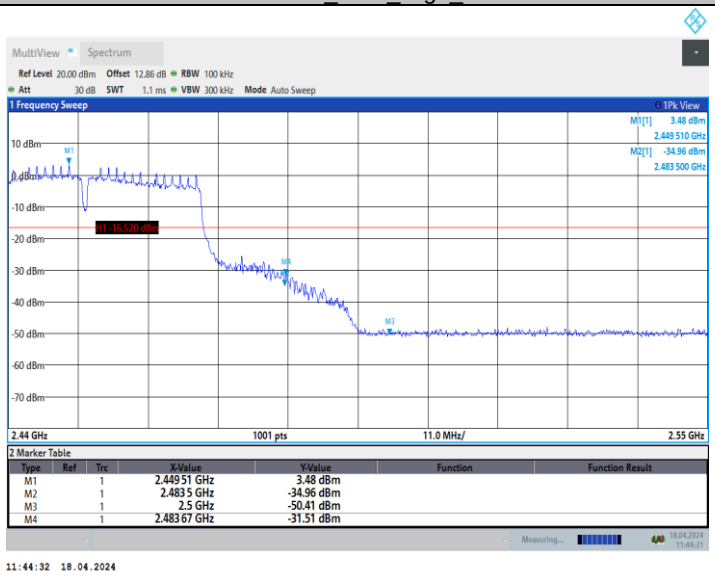

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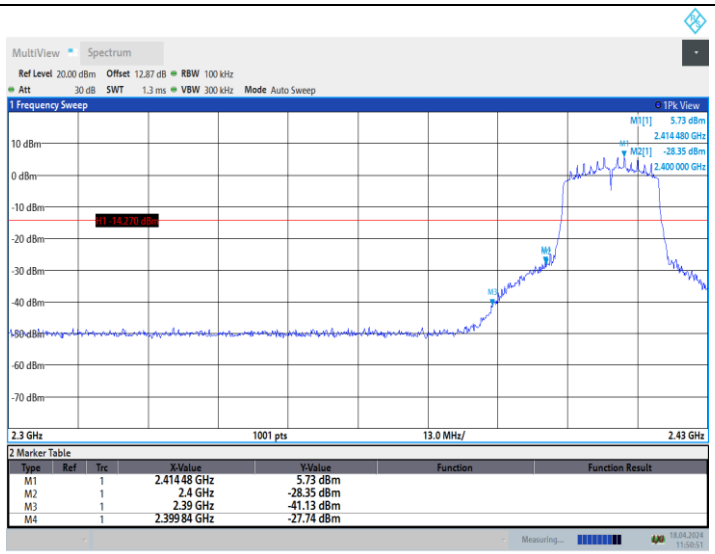

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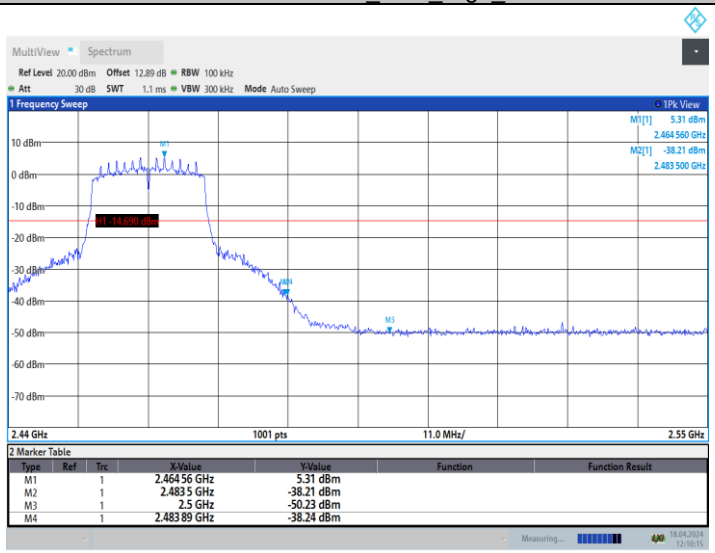

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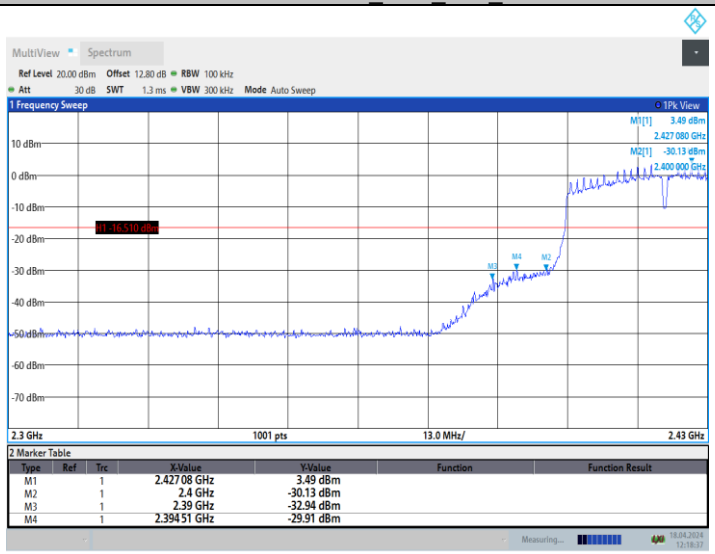

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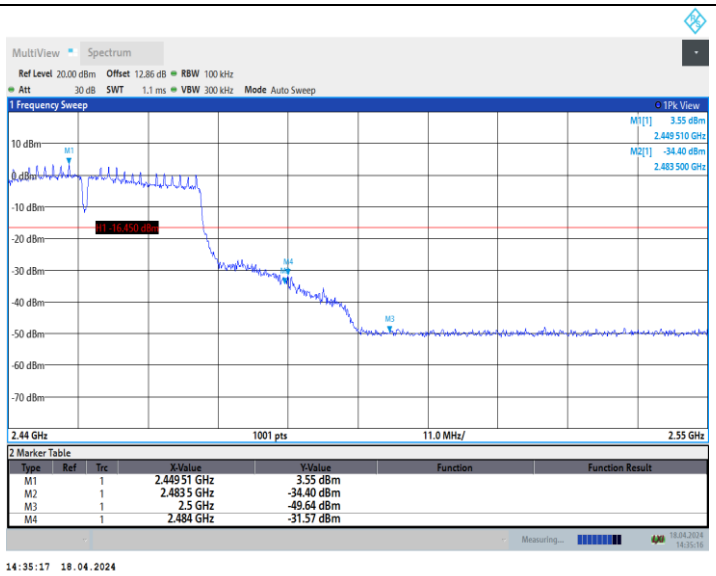


14:35:17 18.04.2024

10. RADIATED BANDEDGE AND SPURIOUS MEASUREMENT

10.1. LIMITS OF Radiated Bandedge and Spurious Measurement

Table 8 Radiation Emission Test Limit for FCC (9KHz-1GHz)

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
960~1000	500	3

Table 9 Radiation Emission Test Limit for FCC (Above 1G)

Frequency (MHz)	(dBuV/m) (at 3 meters)	
	PEAK	AVERAGE
Above 1000	74	54

* The lower limit shall apply at the transition frequency.
* The test distance is 3m.

10.2. TEST PROCEDURE

ANSI C63.10-2013 Clause 11.12

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. For measurement below 1GHz, the EUT was placed on a turntable with 0.8 meter,above ground. For measurement above 1 GHz, test at FAR, the EUT is placed on a non-conductive table, which is 1.5 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:

(1) Span shall wide enough to fully capture the emission being measured;
(2) Set RBW=100 kHz for f < 1 GHz; VBW >= RBW; Sweep = auto; Detector function = peak; Trace = max hold;

(3) Set RBW = 1 MHz, VBW= 3MHz for f > 1 GHz for peak measurement.
Set RBW = 1 MHz, and VBW= 1/T (on time) for average measurement.

10.3.TEST DATA

9 kHz-30MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the r esult which was 20dB lower than the limit line per 15.31(o) was not reported.

Table 10 Radiated Emission Test Data 9k Hz-30MHz

Frequency (MHz)	Cable Loss +preamp (dB)	Antenna Factor (dB)	Reading (dBμV/m)	Level (dBμV/m)	Polarity (H/V)	Limit (dBμV/m)	Margin (dB)	Note
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--

30MHz-1GHz

Worst case is shown below for 30MHz-1GHz only.

The emissions don't show in following result tables are more than 20dB below the limits.

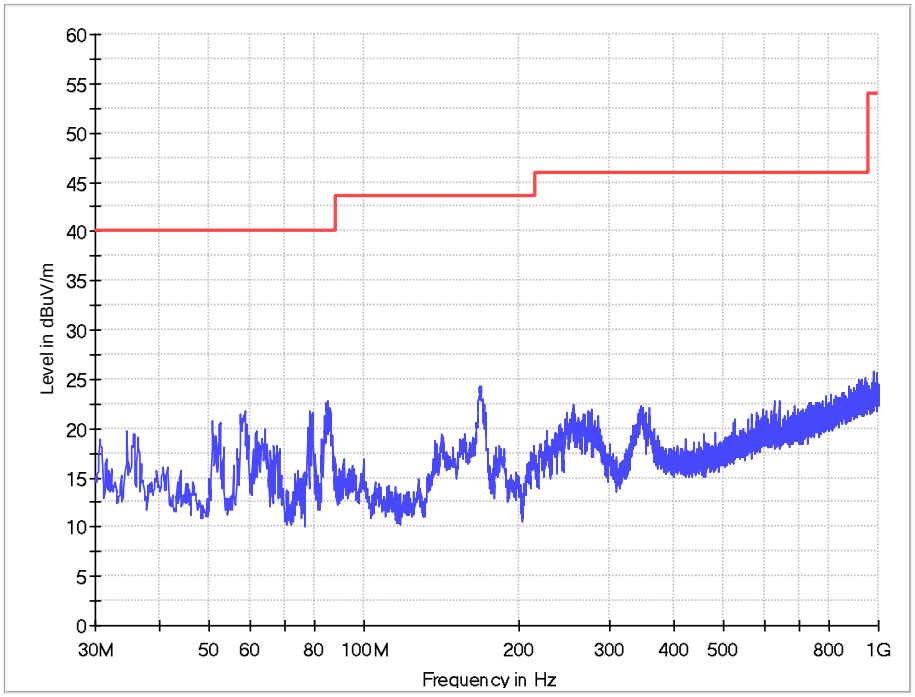
Table 11 Radiated Emission Test Data 30MHz-1GHz

Frequency (MHz)	Cable Loss +preamp (dB)	Antenna Factor (dB)	Reading (dBμV/m)	Level (dBμV/m)	Polarity (Horizontal/ Vertical)	Limit (dBμV/m)	Margin (dB)	Note
33.987	0.7	12.3	14.4	27.4	Vertical	40.0	12.6	QP
38.514	0.7	12.3	10.6	23.6	Vertical	40.0	16.4	QP
51.016	0.8	13.3	12.0	26.1	Vertical	40.0	13.9	QP
58.237	0.8	13.0	13.8	27.6	Vertical	40.0	12.4	QP
78.607	1.0	7.8	16.7	25.5	Vertical	40.0	14.5	QP
84.966	0.9	8.5	21.3	30.7	Vertical	40.0	9.3	QP
50.693	0.8	13.3	4.5	18.6	Horizontal	40.0	21.4	QP
58.668	0.8	13.0	4.9	18.7	Horizontal	40.0	21.3	QP
64.165	0.9	12.7	4.5	18.1	Horizontal	40.0	21.9	QP
78.607	1.0	7.8	11.0	19.8	Horizontal	40.0	20.2	QP
84.858	0.9	8.5	11.3	20.7	Horizontal	40.0	19.3	QP
168.386	1.5	8.7	11.7	21.9	Horizontal	43.5	21.6	QP

Remark: Emission level (dBuV)=Read Value(dBuV/m) + Antenna Factor(dB)+ Cable Loss +preamp(dB)

30MHz-1GHz

Horizontal



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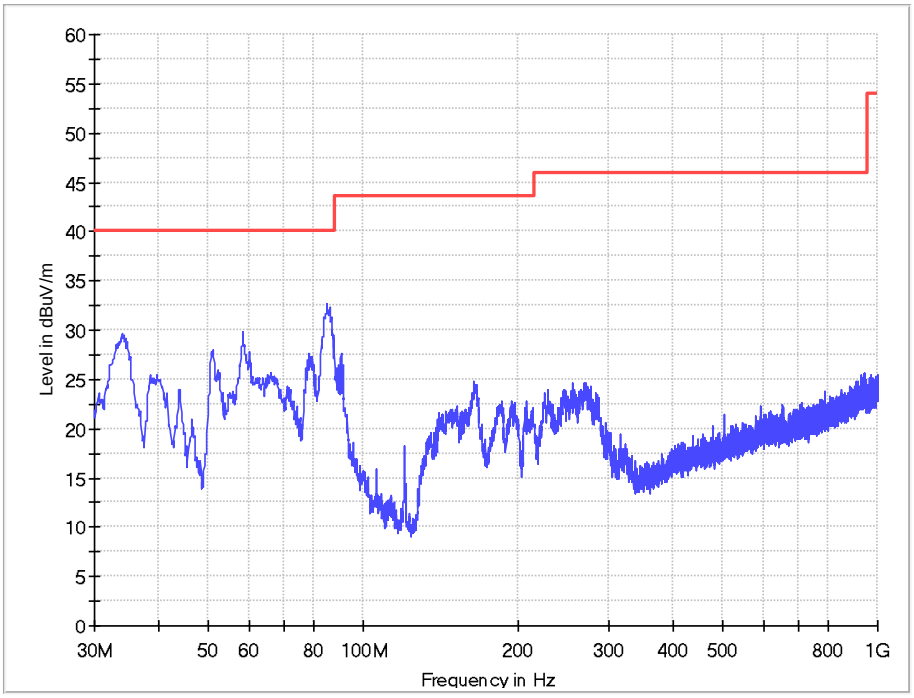
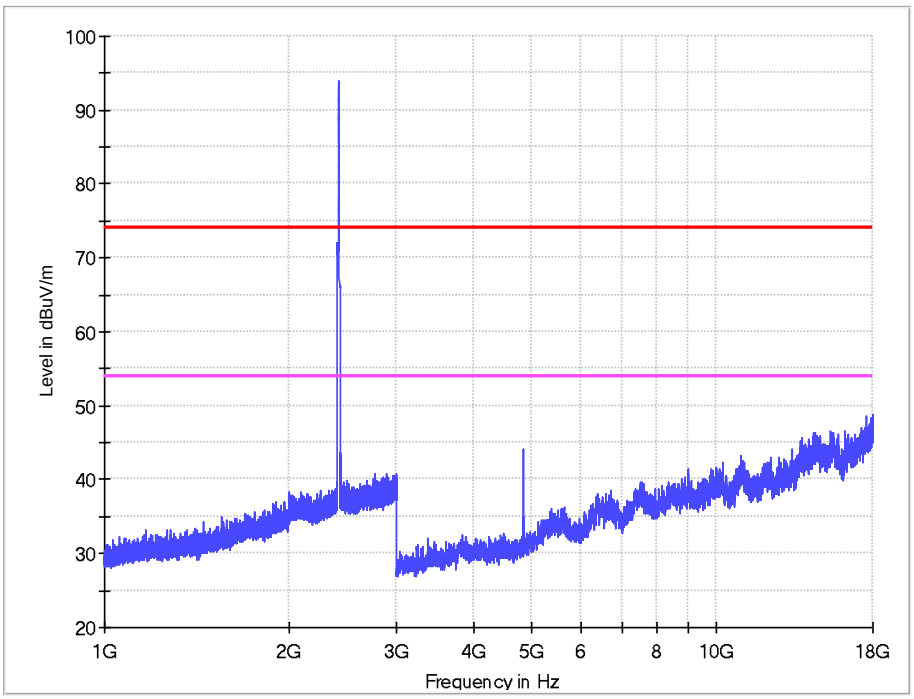


1-18G

802.11b CH1

Horizontal



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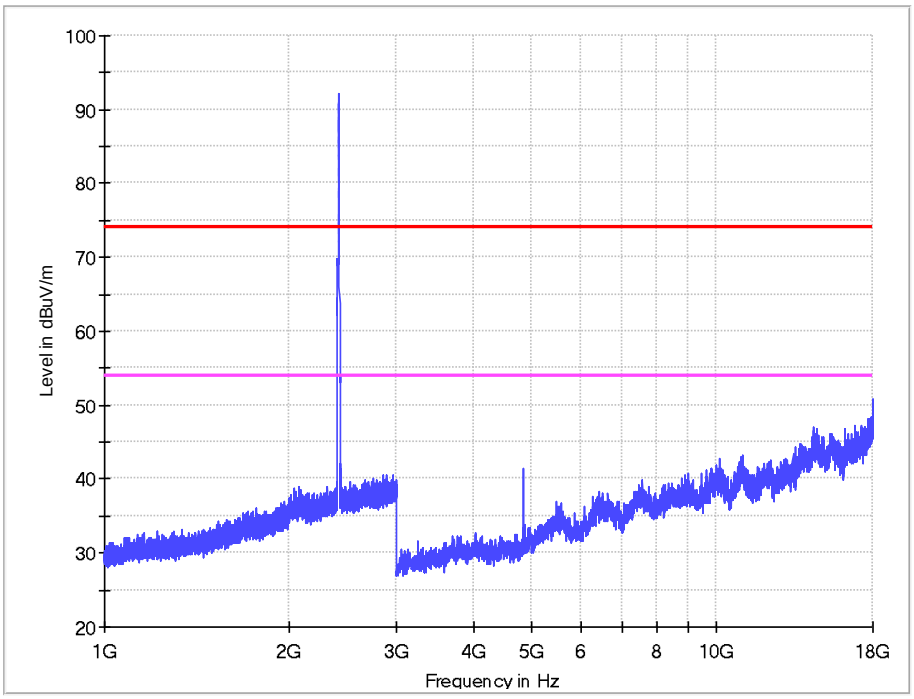
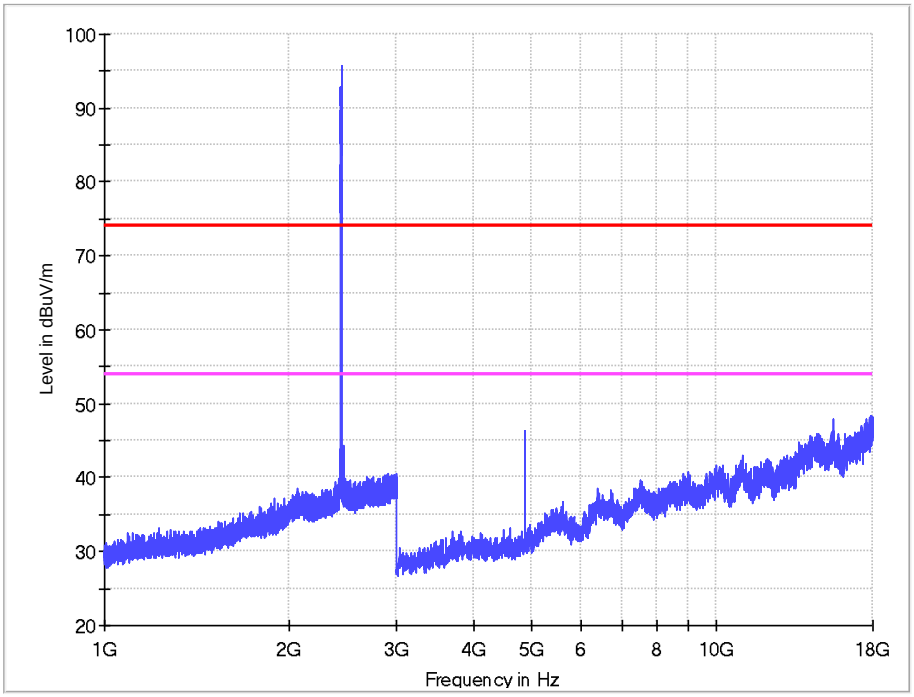


1-18G

802.11b CH6

Horizontal



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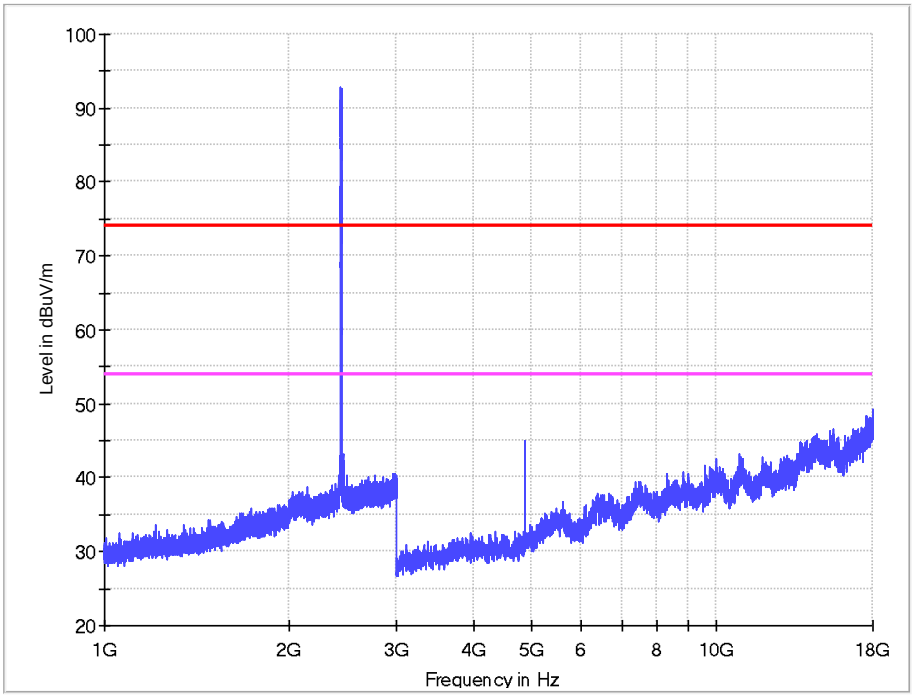

1-18G

802.11b CH11

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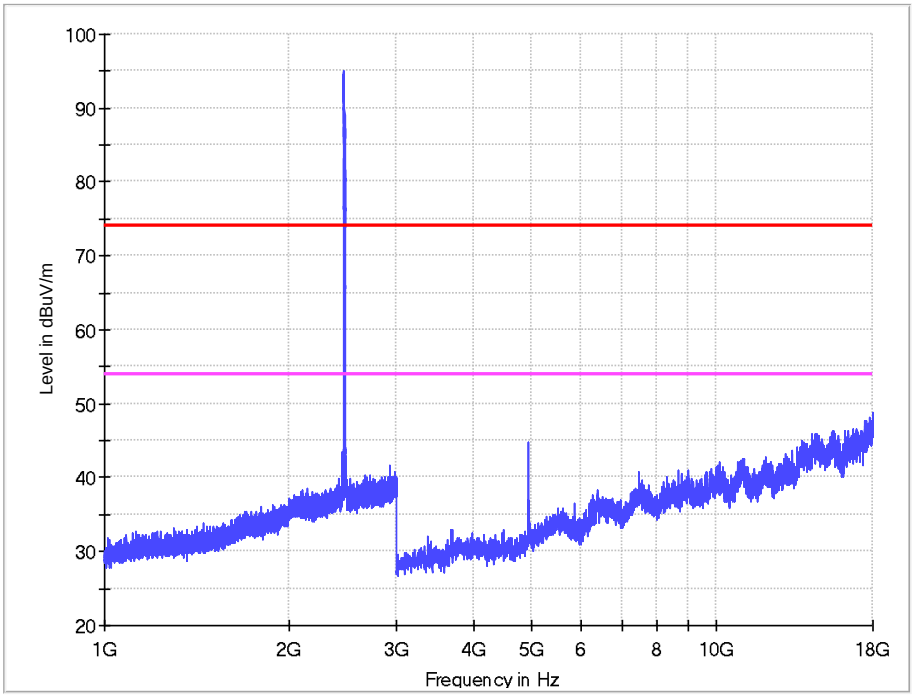

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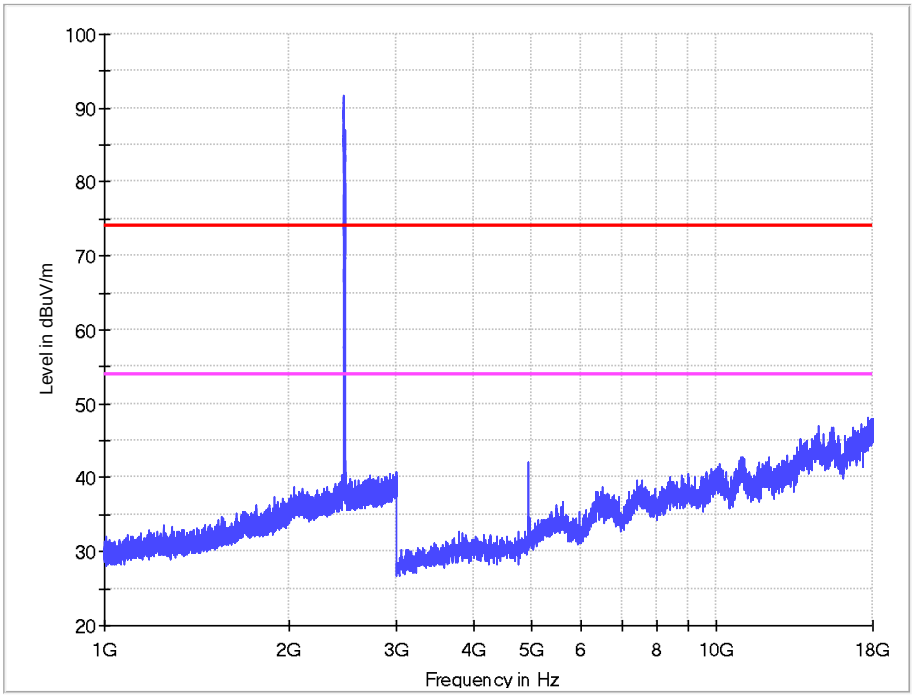
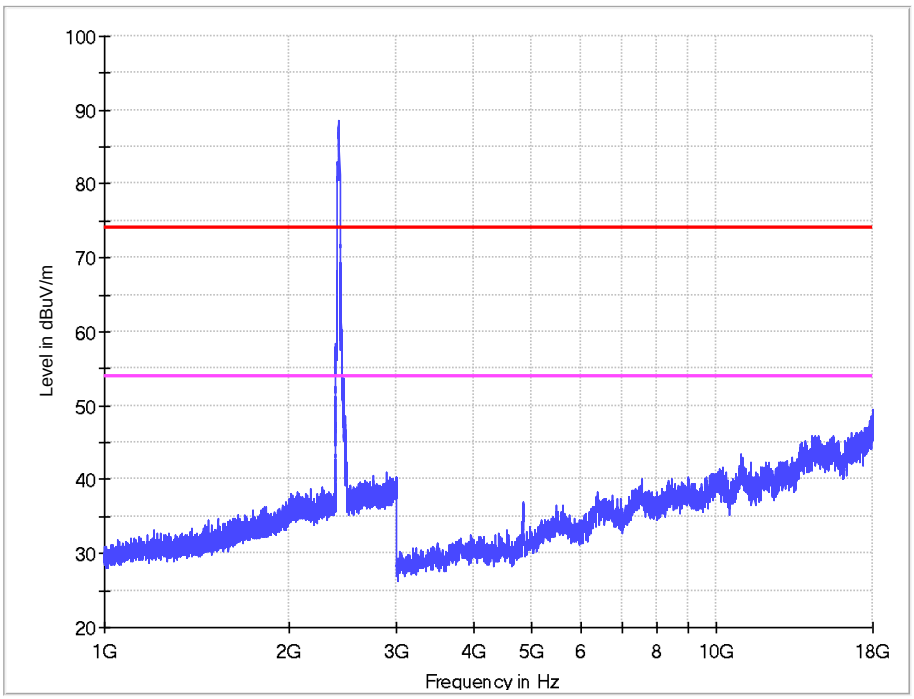


1-18G

802.11g CH1

Horizontal



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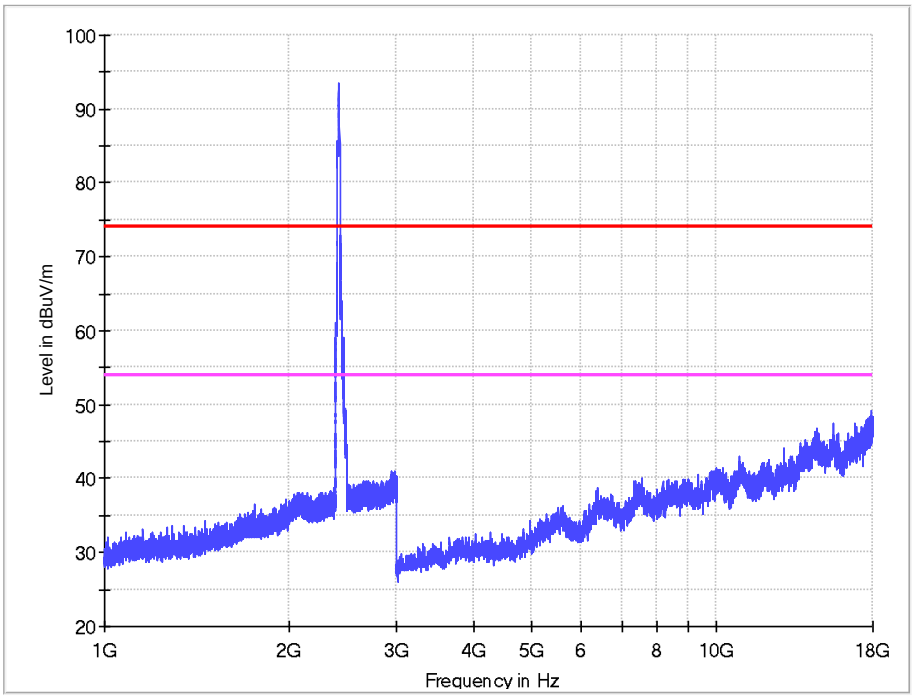

1-18G

802.11g CH6

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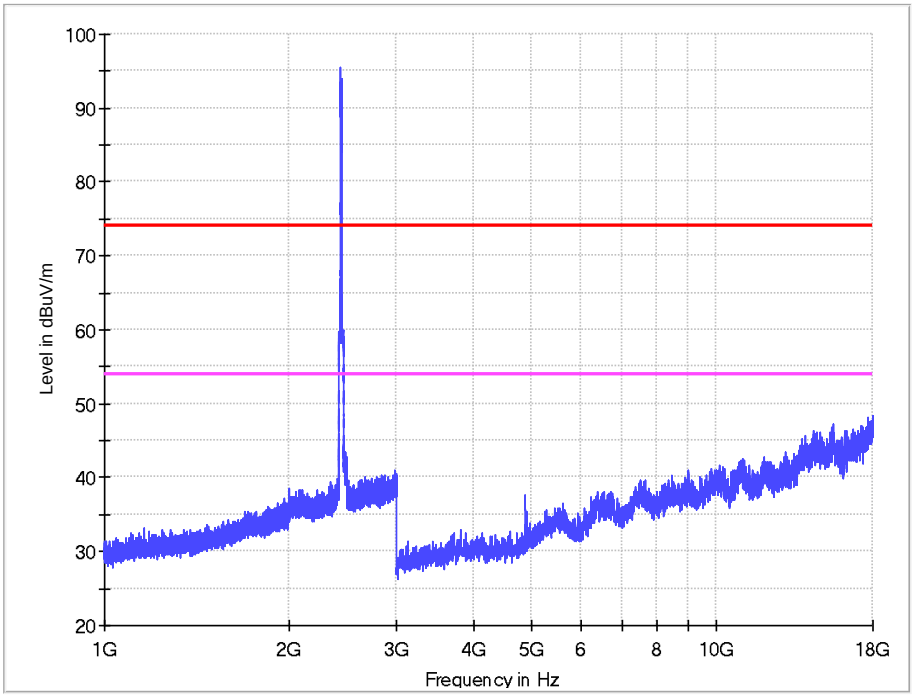

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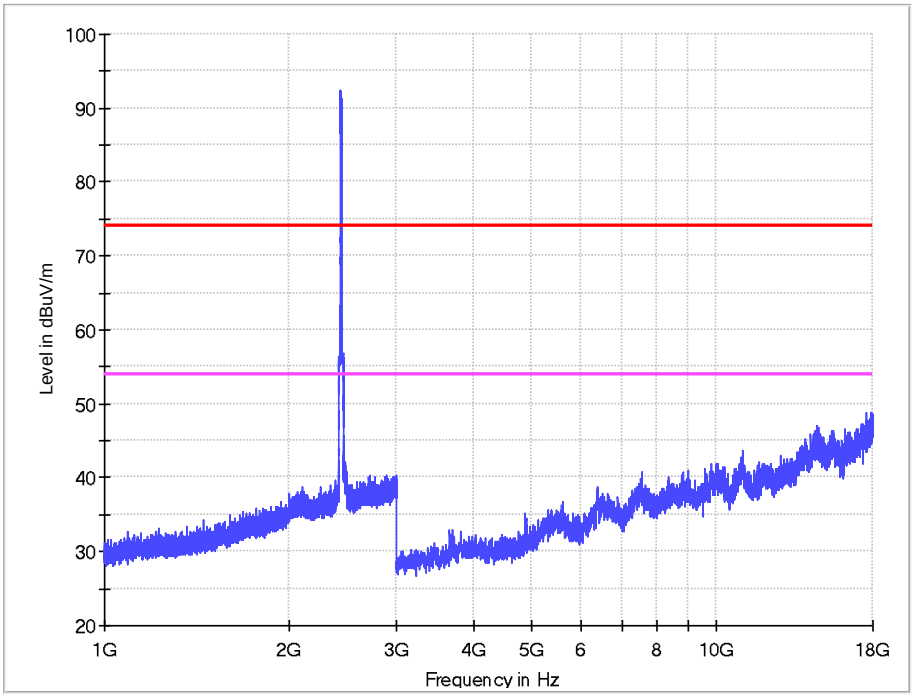

1-18G

802.11g CH11

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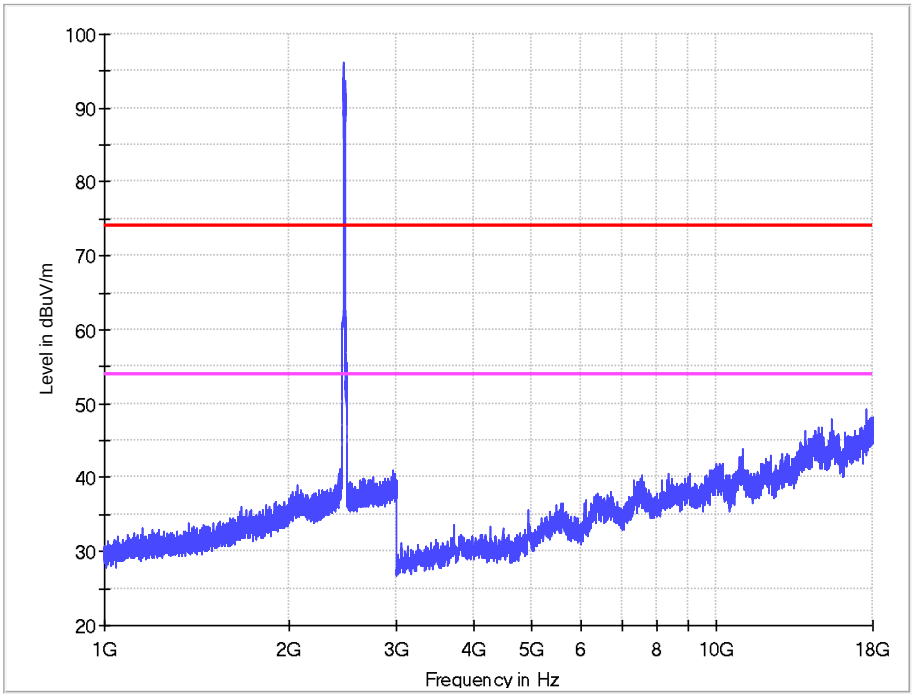

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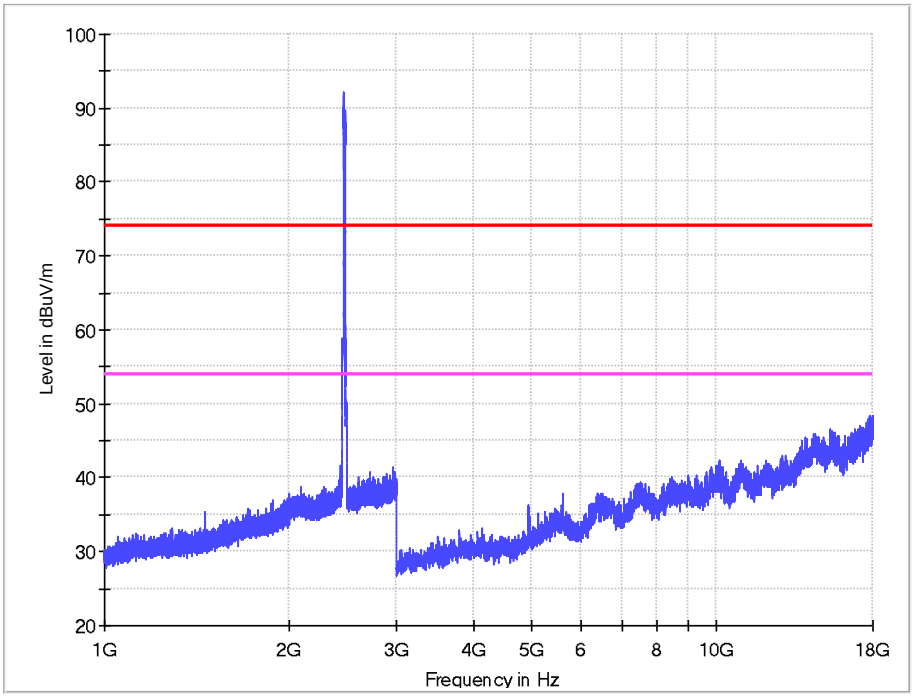
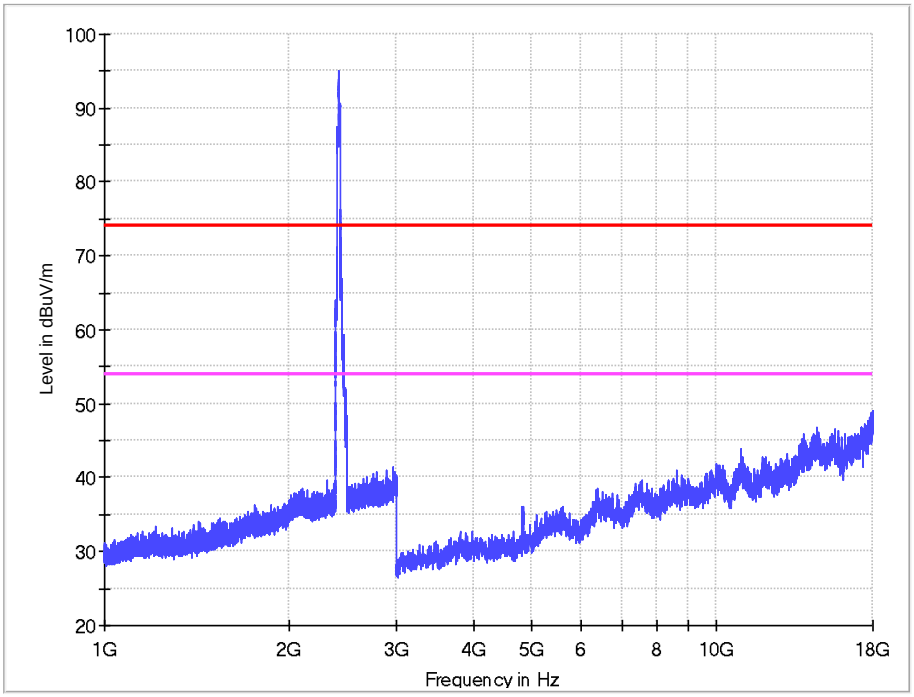


1-18G

802.11n-HT20 CH1

Horizontal



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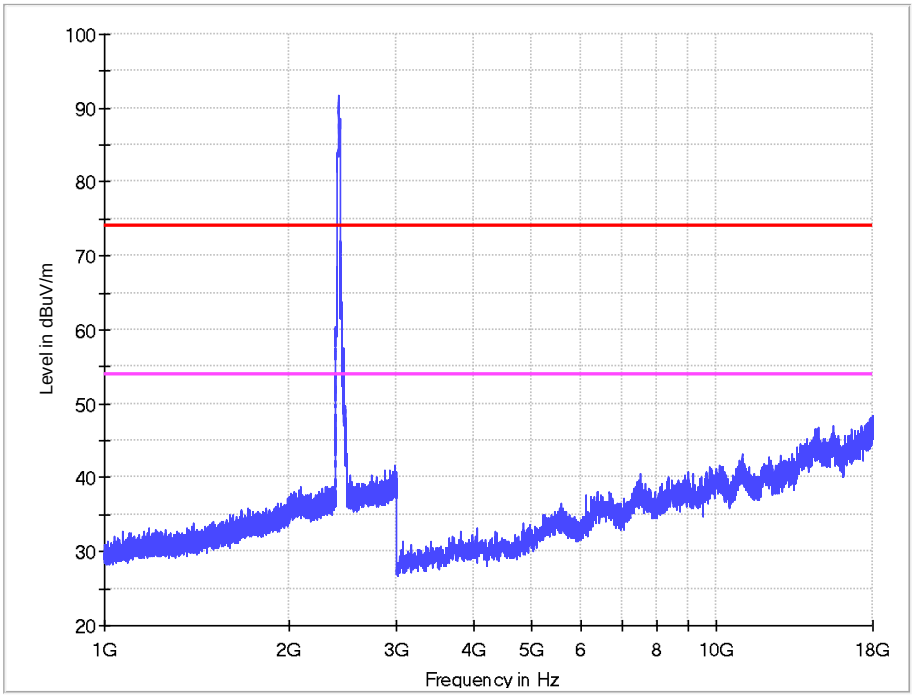

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802.11n-HT20 CH6

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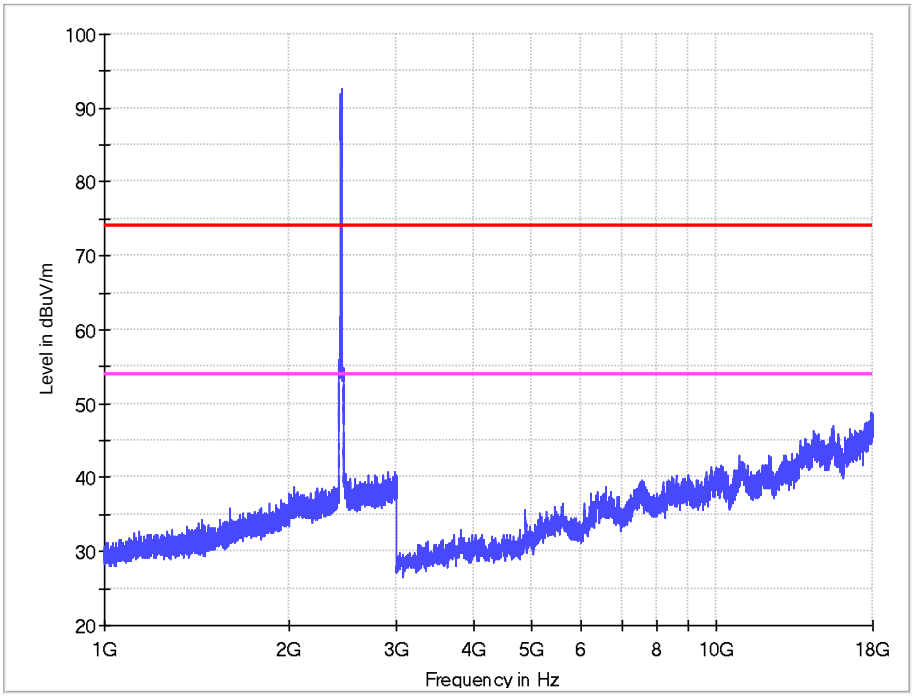

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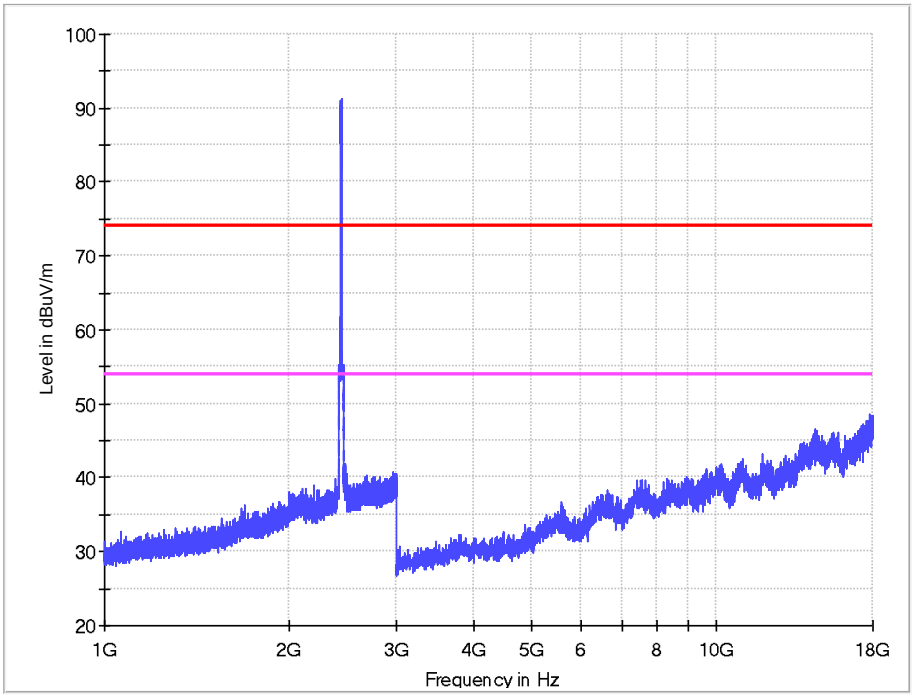

1-18G

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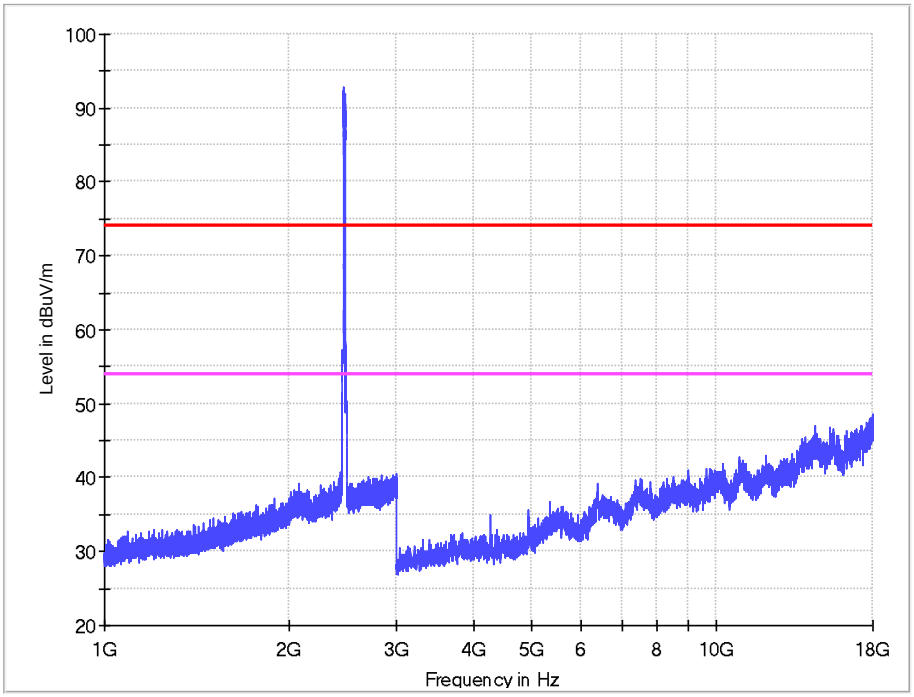

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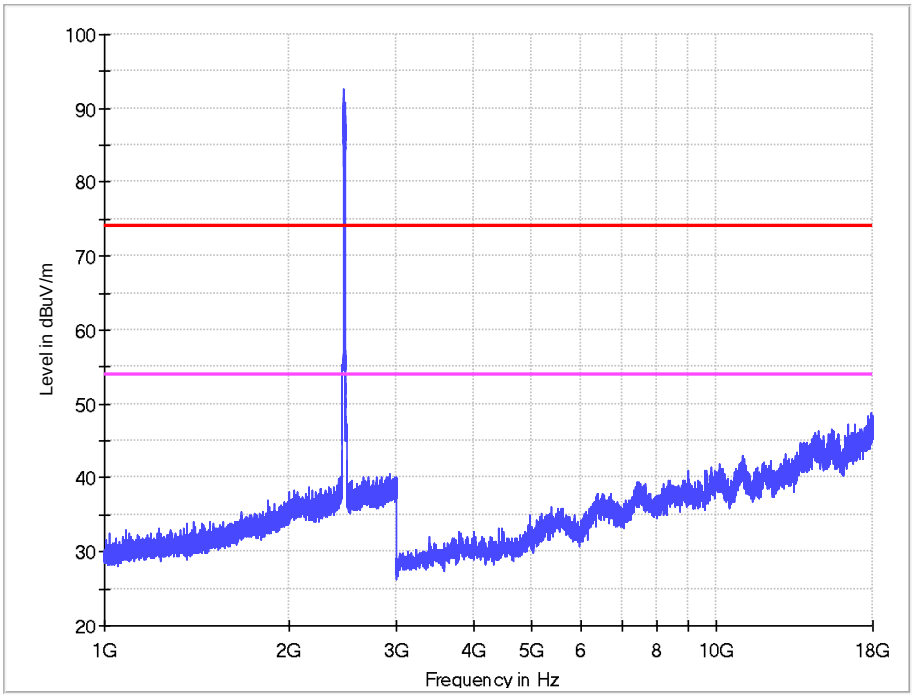
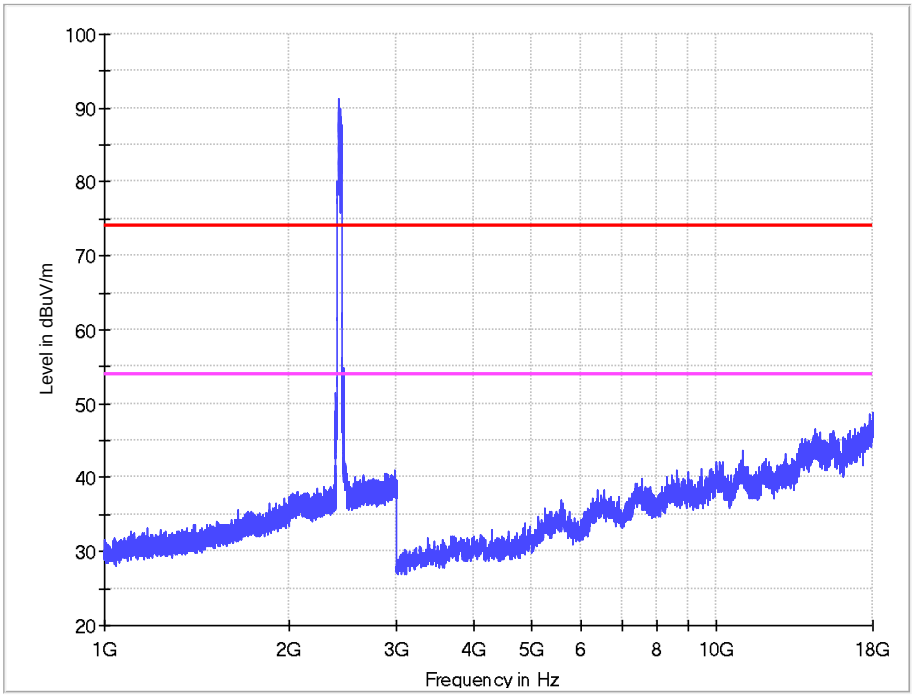


1-18G

802.11n-HT40 CH3

Horizontal



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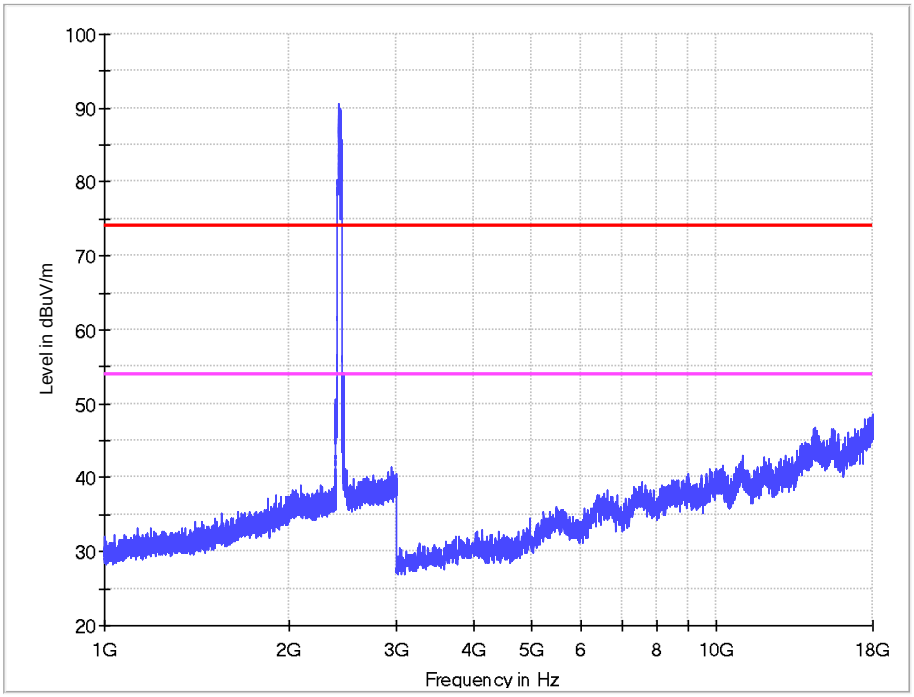

1-18G

802.11n-HT40 CH6

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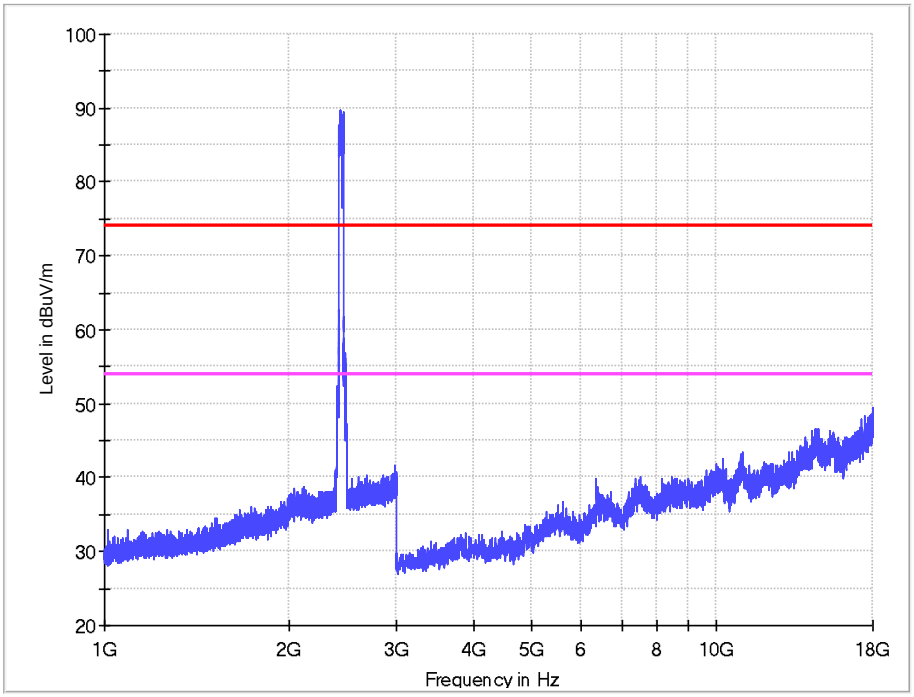

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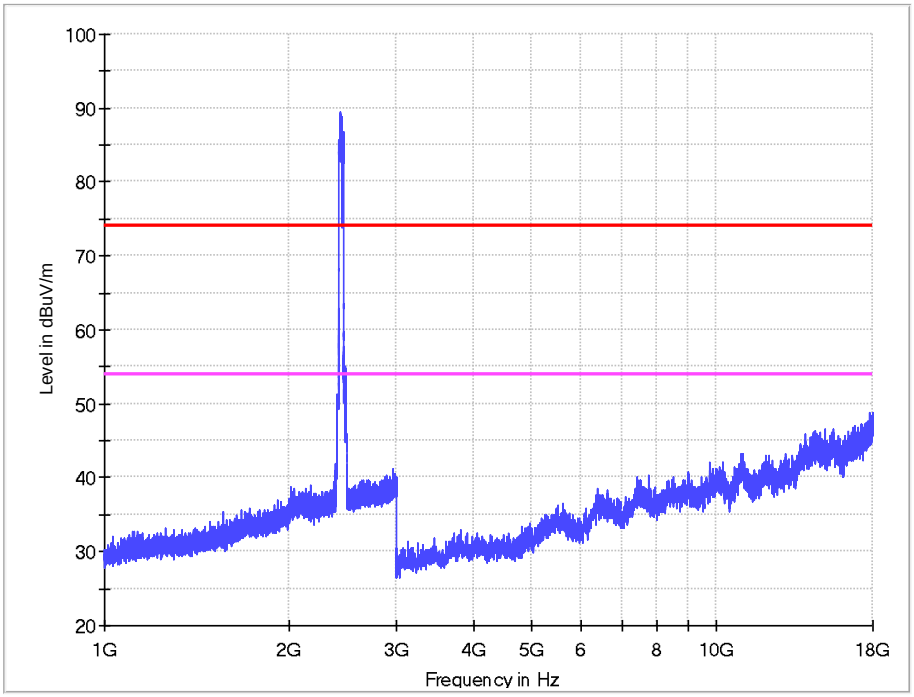
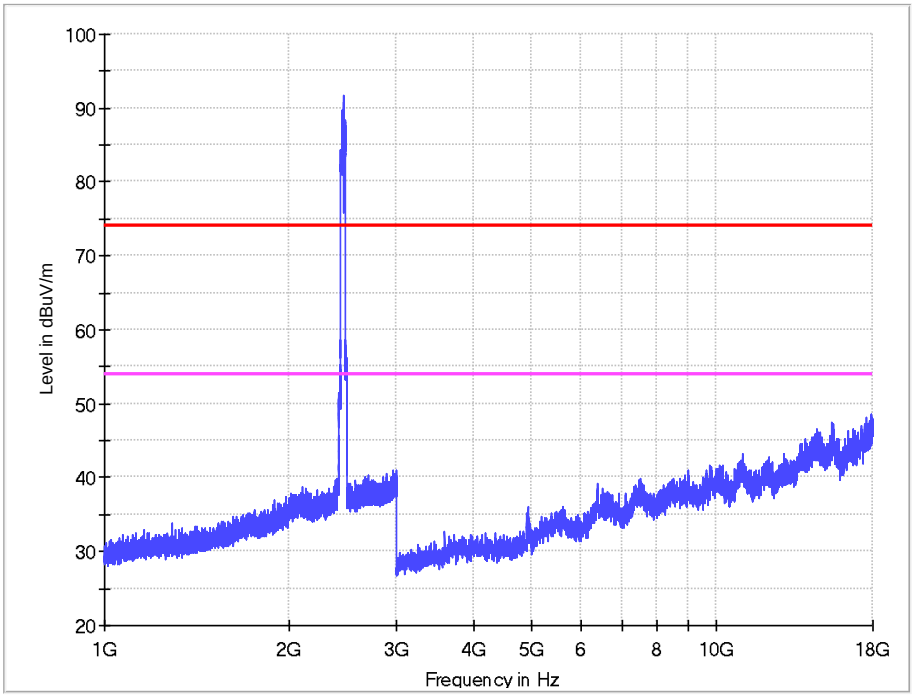


1-18G

802.11n-HT40 CH9

Horizontal



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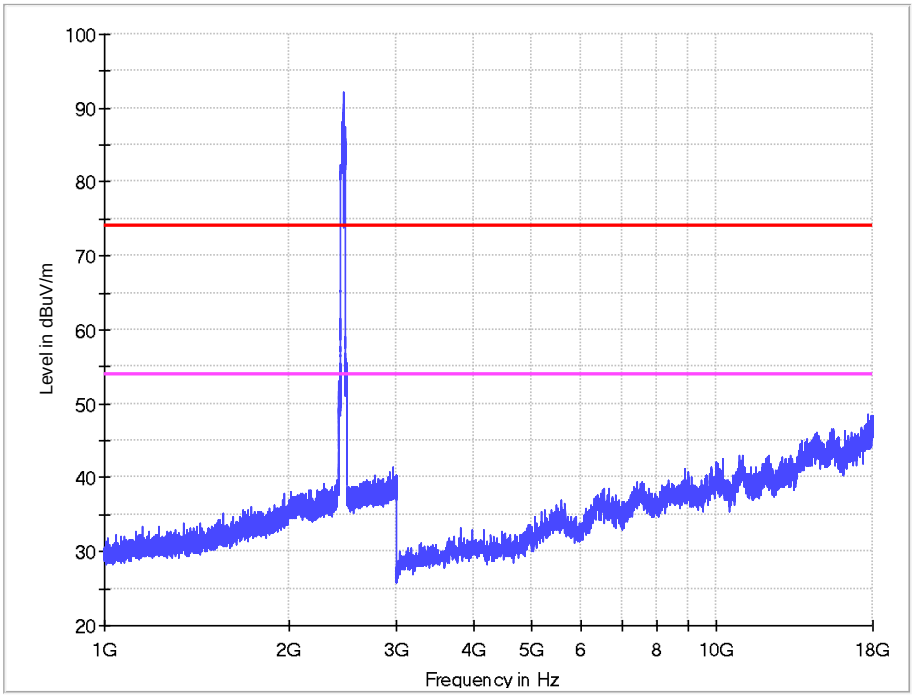
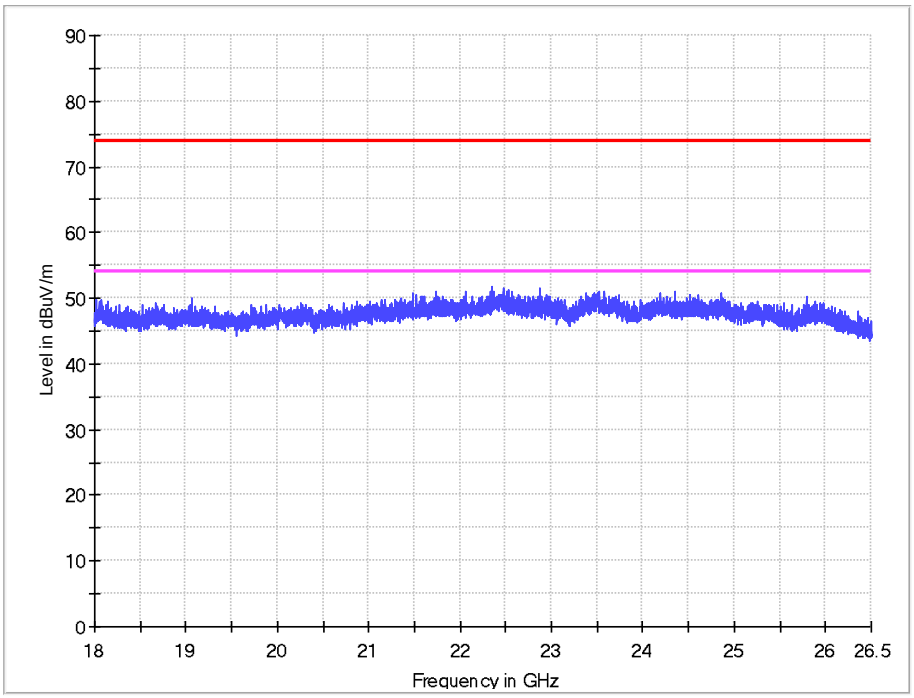


18-26.5G

(Worst Case)
Horizontal



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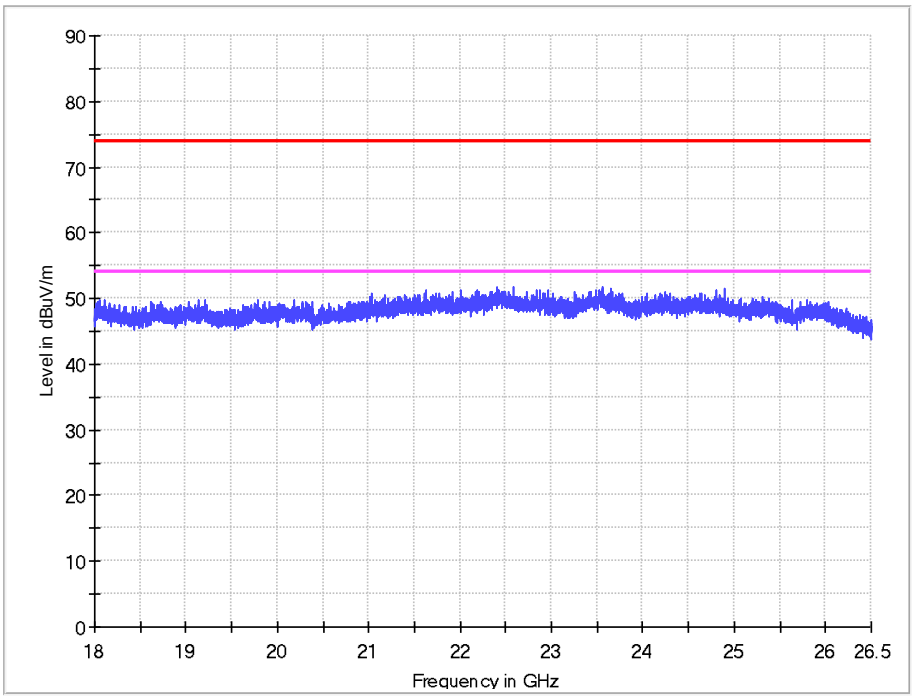
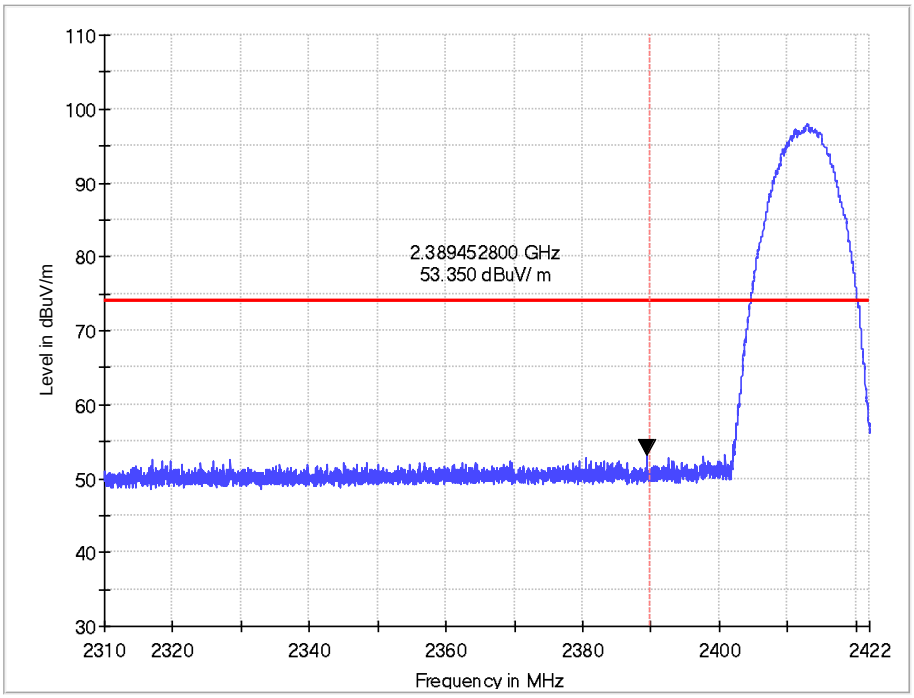
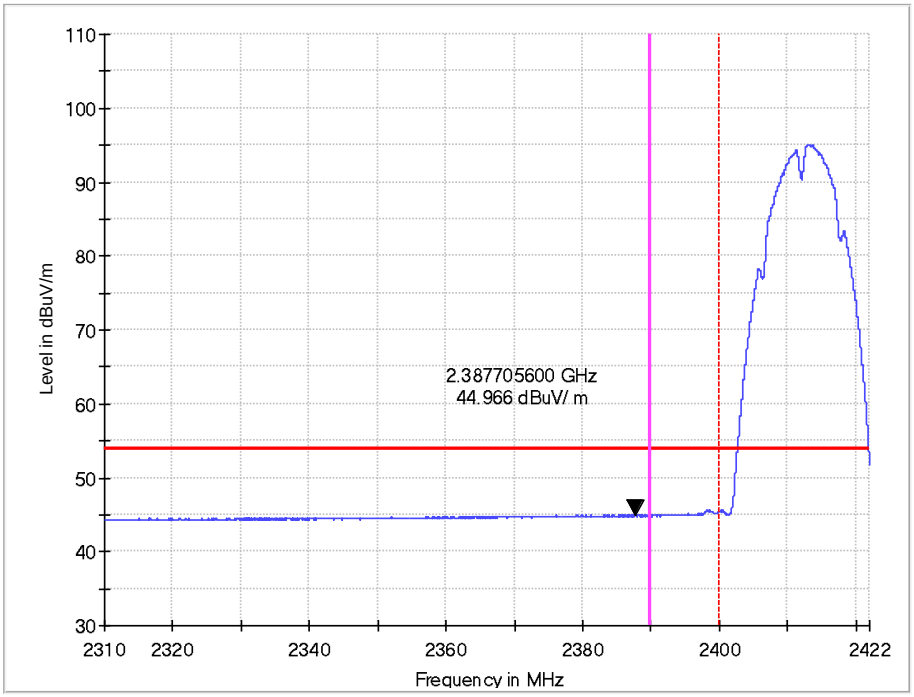


Band edge

11b
CH1

Horizontal





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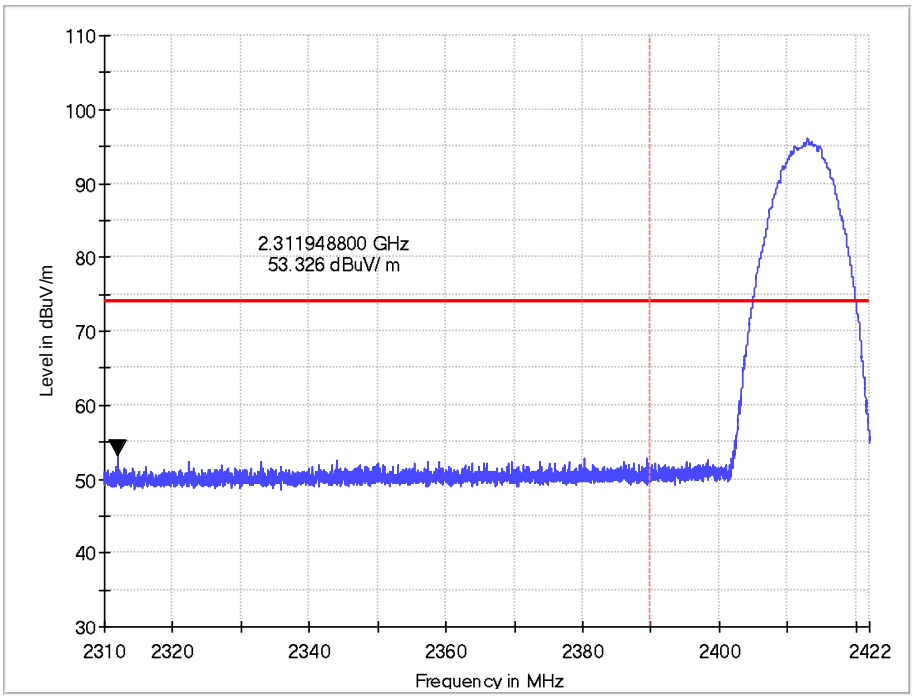
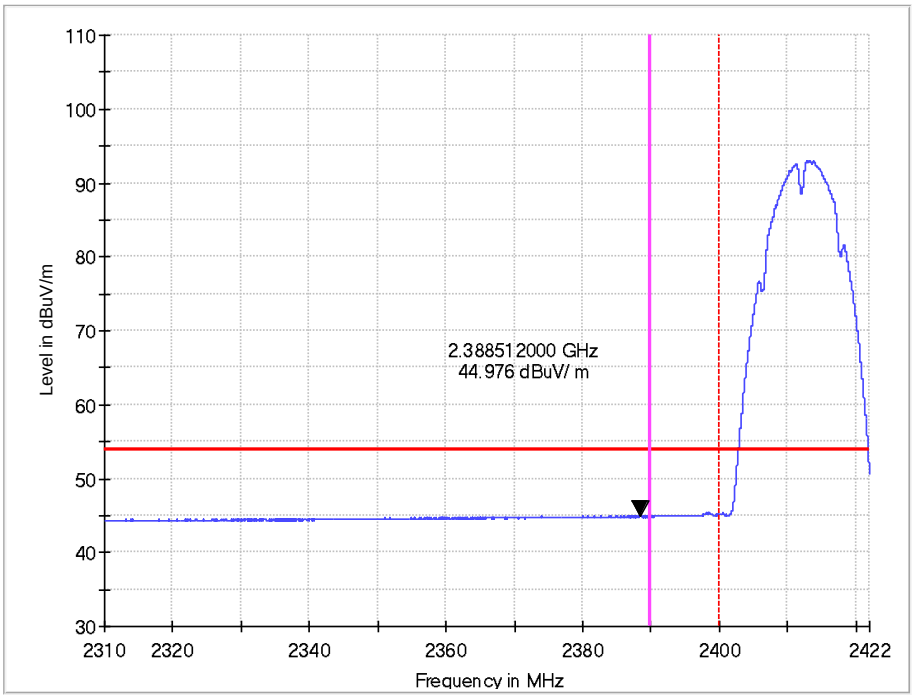
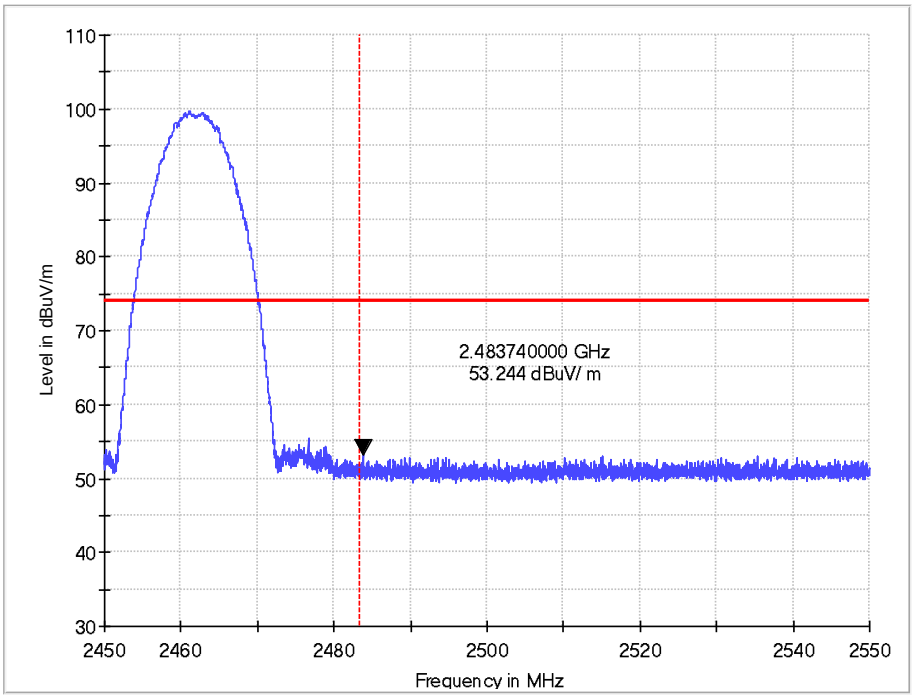

2.311948800 GHz
53.326 dBuV/ m
Level in dBuV/m
Frequency in MHz

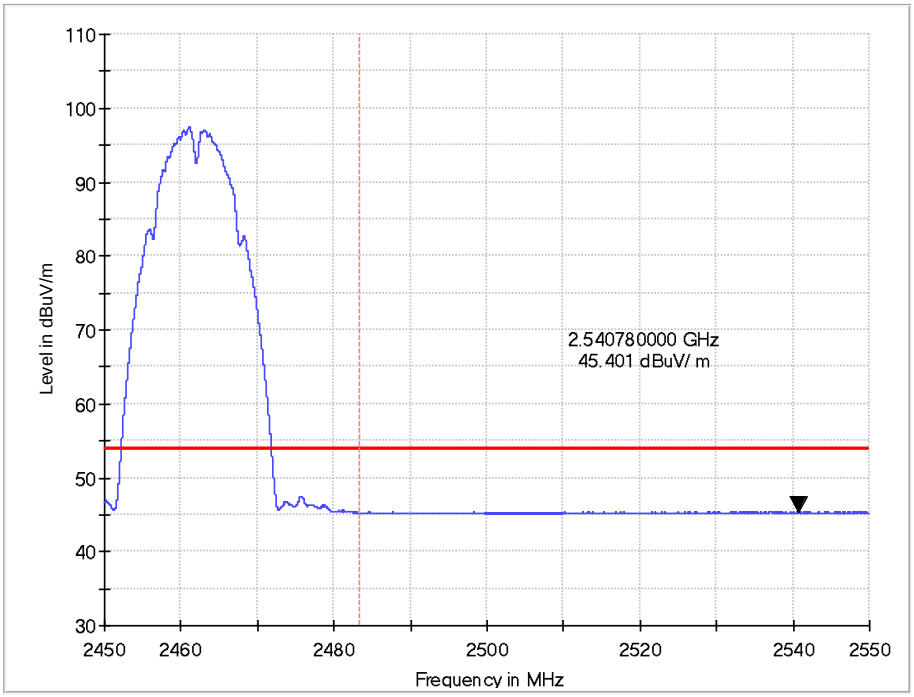

2.388512000 GHz
44.976 dBuV/ m
Level in dBuV/m
Frequency in MHz

Band edge

11b
CH11

Horizontal





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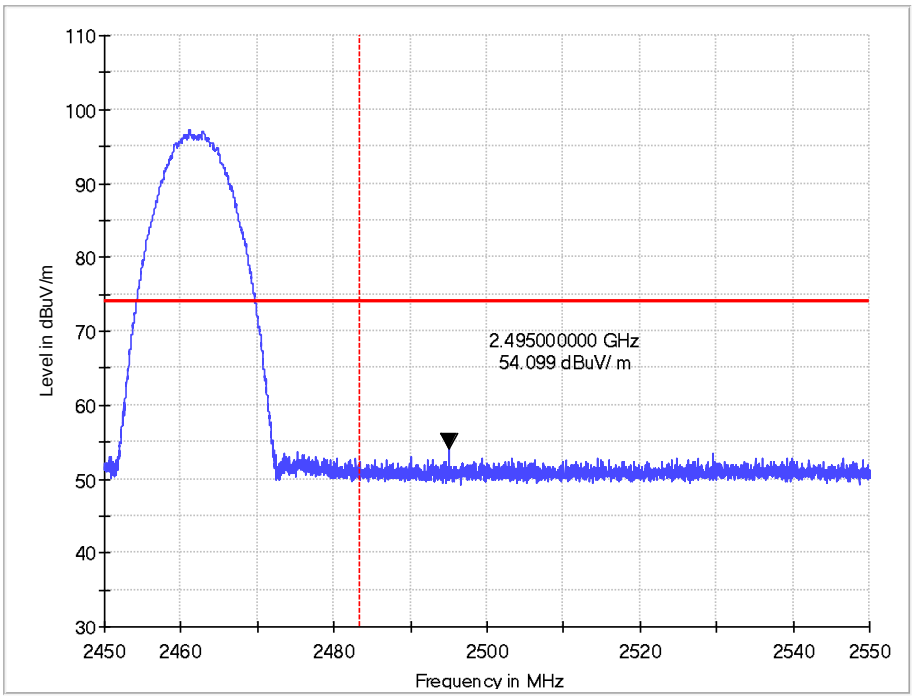
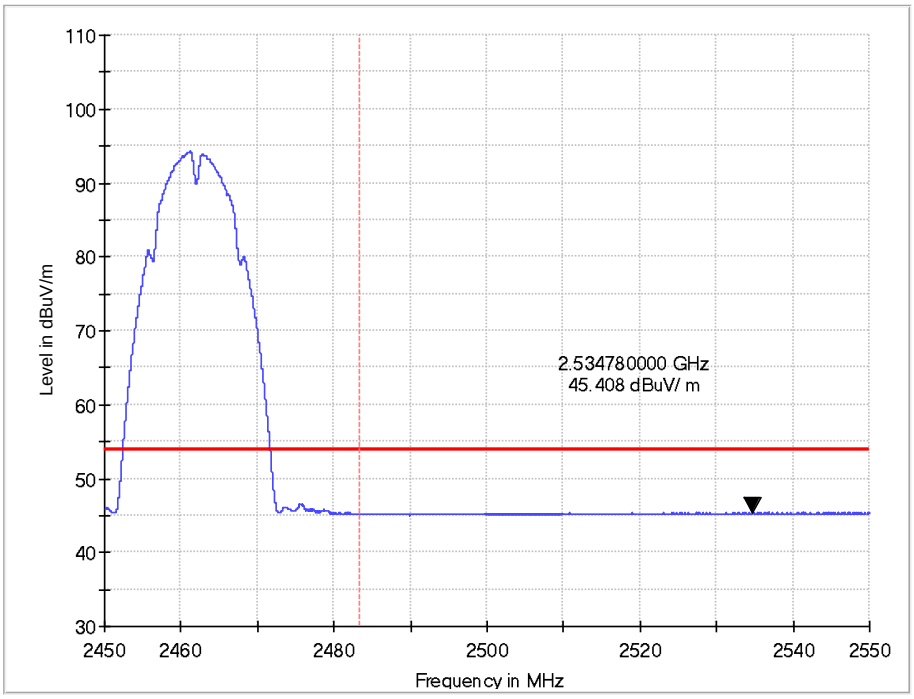
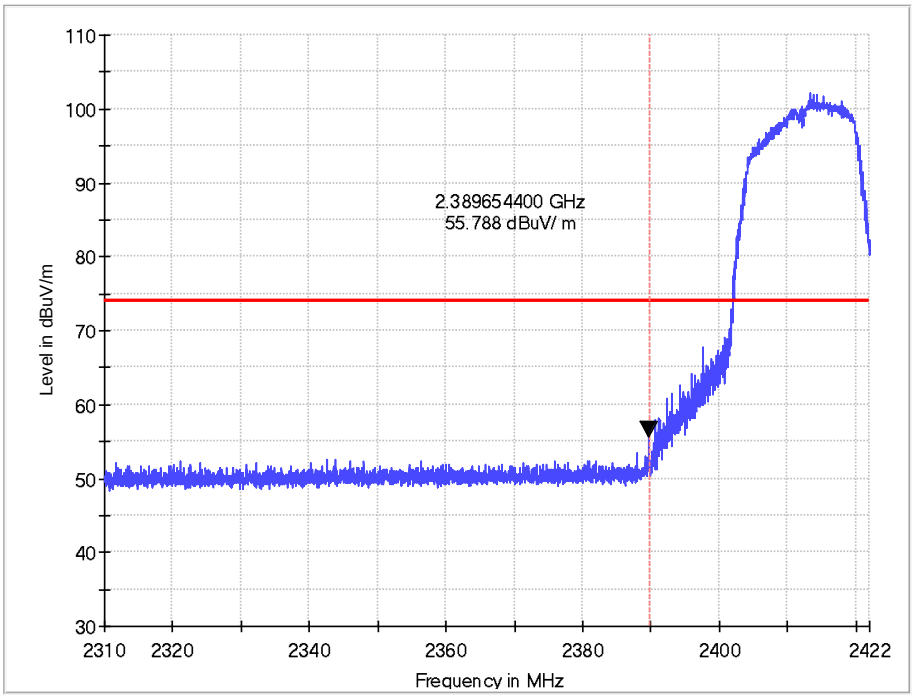

110
100
90
80
70
60
50
40
30
Level in dBuV/m
2.495000000 GHz
54.099 dBuV/ m
2450
2460
2480
2500
2520
2540
2550
Frequency in MHz

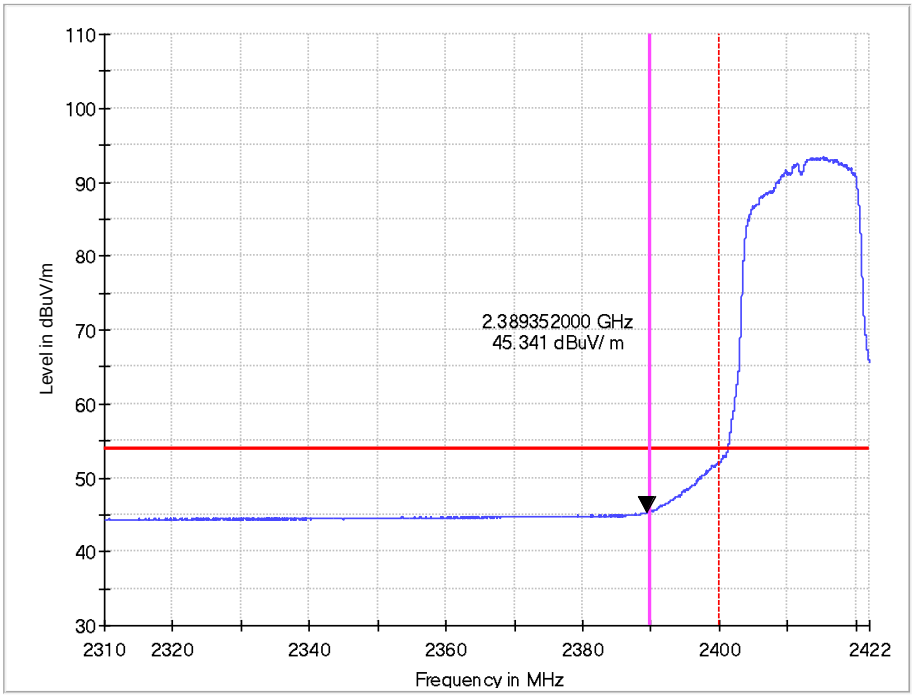

110
100
90
80
70
60
50
40
30
Level in dBuV/m
2.534780000 GHz
45.408 dBuV/ m
2450
2460
2480
2500
2520
2540
2550
Frequency in MHz

Band edge

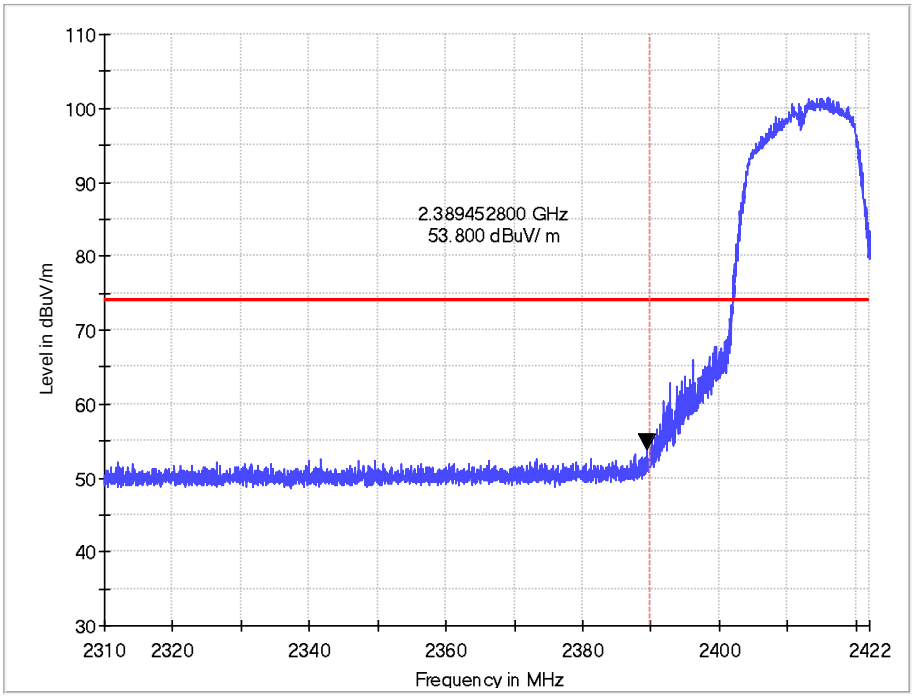
11g
CH1

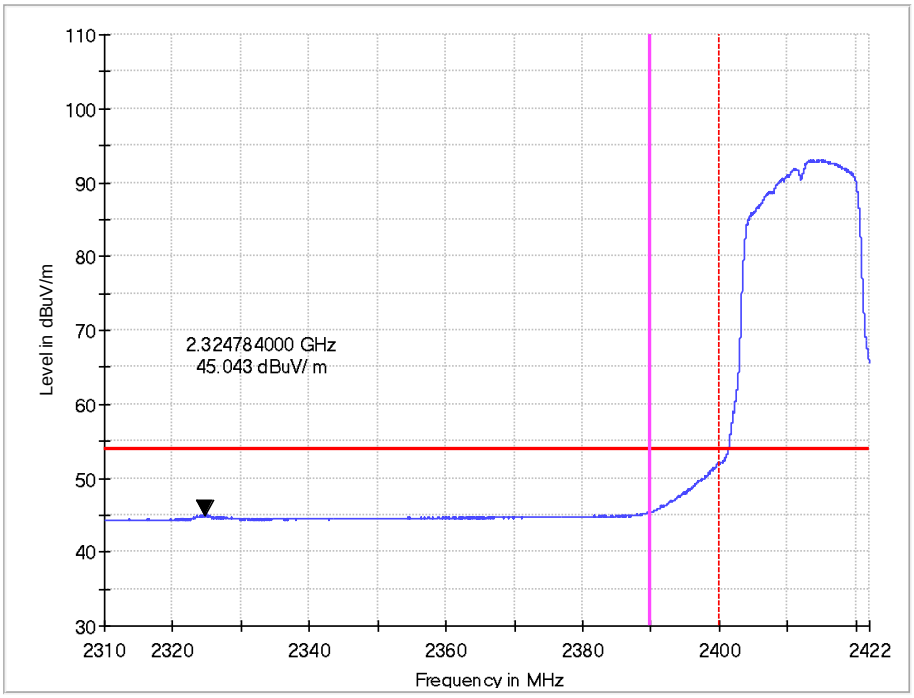
Horizontal





Vertical

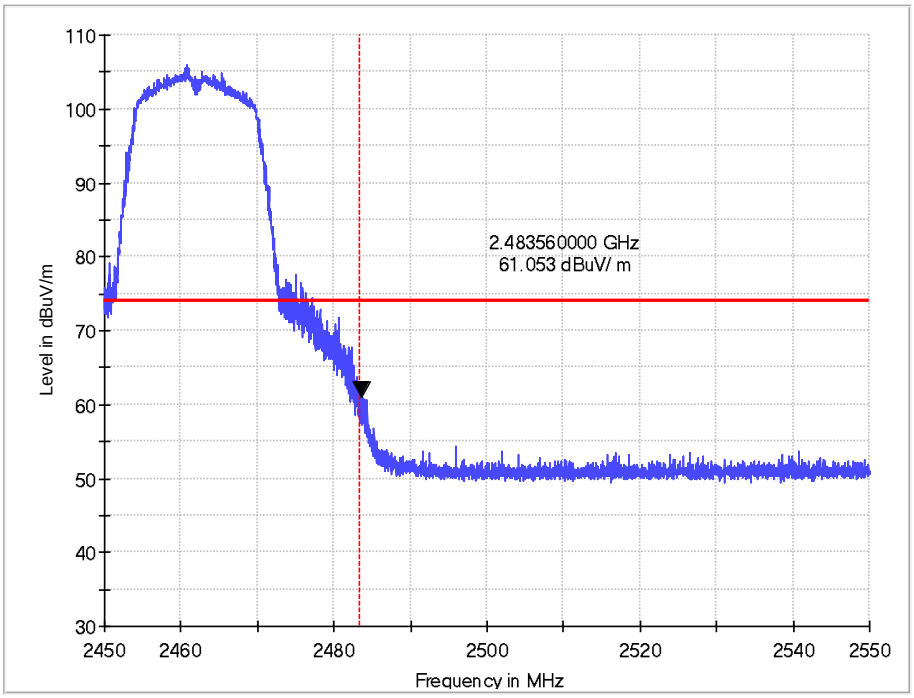

2.389452800 GHz
53.800 dBuV/ m
Level in dBuV/m
Frequency in MHz
110
100
90
80
70
60
50
40
30
2310
2320
2340
2360
2380
2400
2422

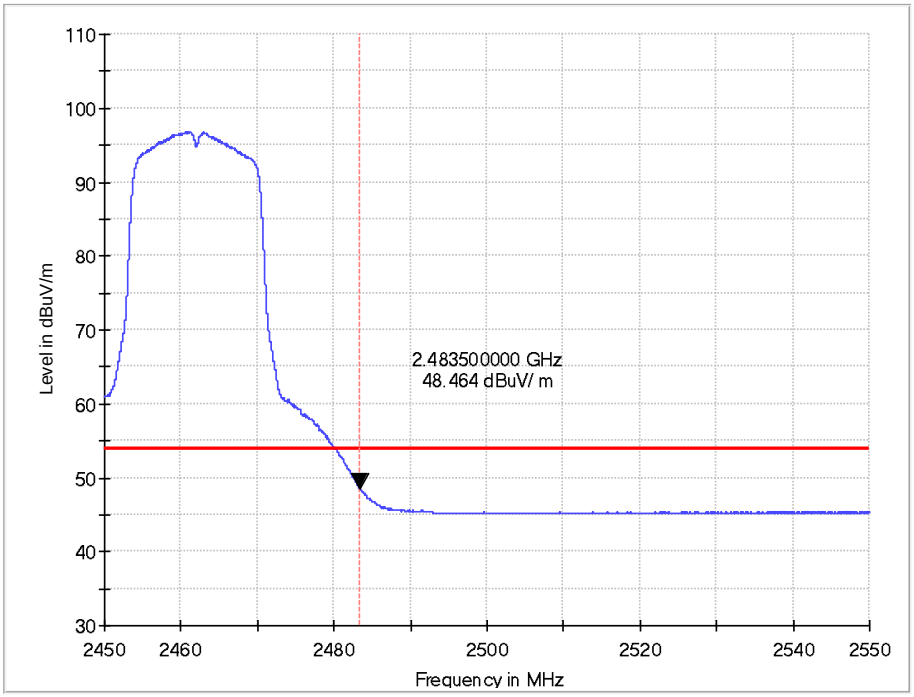

2.324784000 GHz
45.043 dBuV/ m
Level in dBuV/m
Frequency in MHz
110
100
90
80
70
60
50
40
30
2310
2320
2340
2360
2380
2400
2422

Band edge

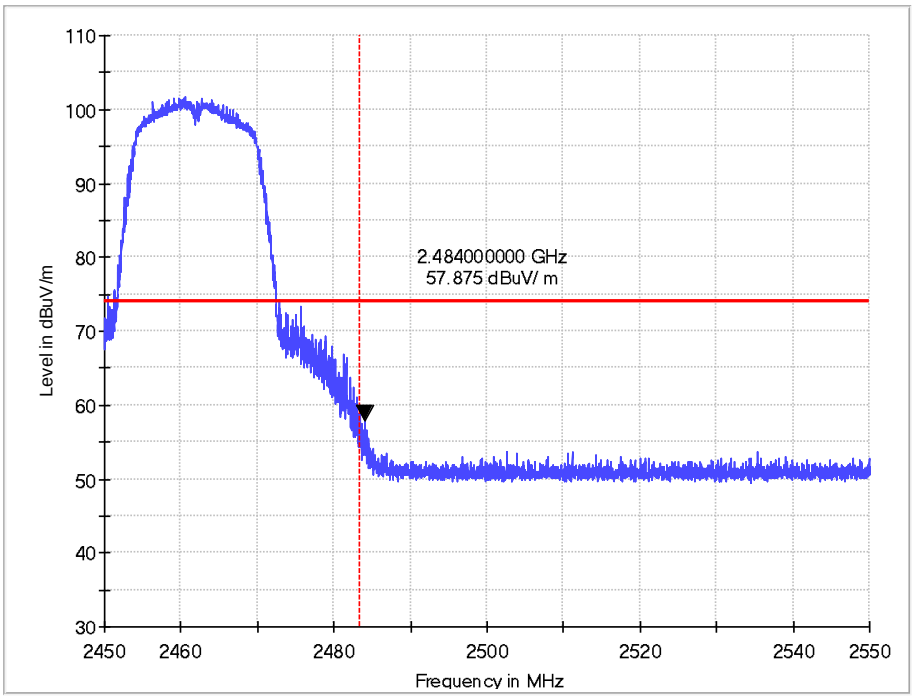
11g
CH11

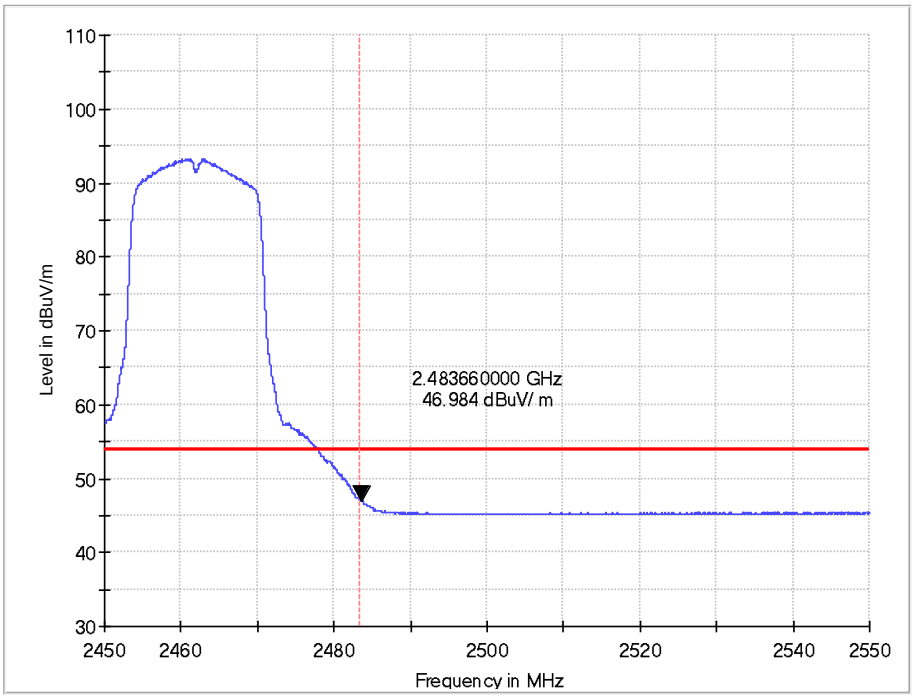
Horizontal





Vertical

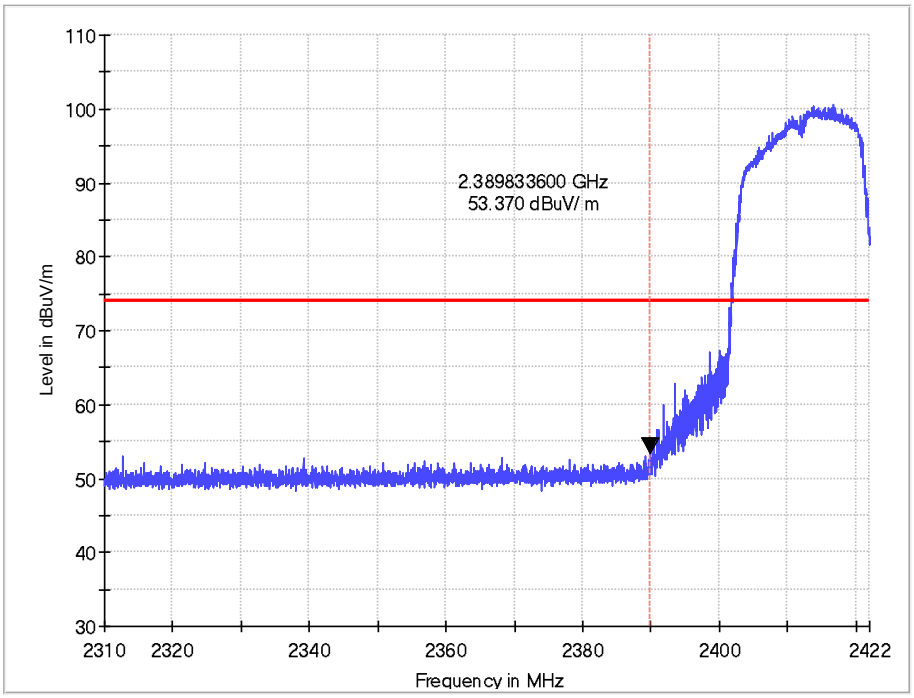

110
100
90
80
70
60
50
40
30
Level in dBuV/m
2.484000000 GHz
57.875 dBuV/ m
2450
2460
2480
2500
2520
2540
2550
Frequency in MHz

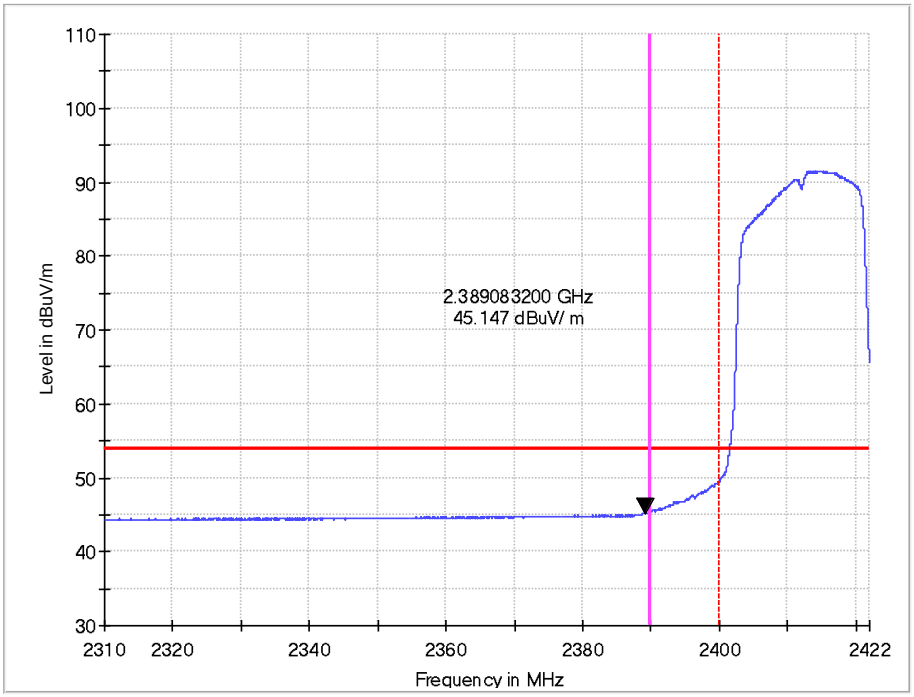

110
100
90
80
70
60
50
40
30
Level in dBuV/m
2.483660000 GHz
46.984 dBuV/ m
2450
2460
2480
2500
2520
2540
2550
Frequency in MHz

Band edge

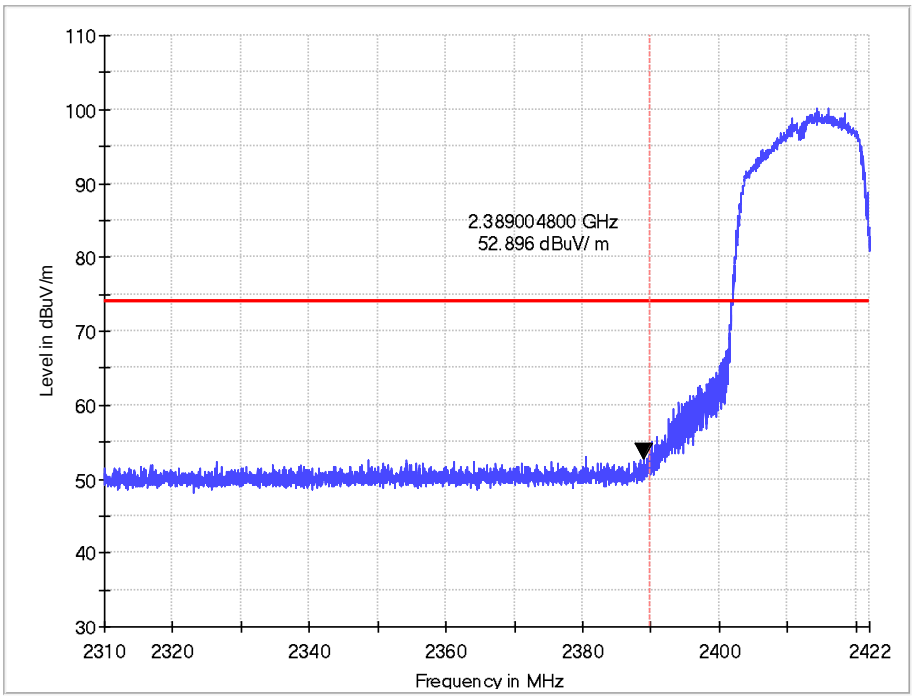
11n-HT20
CH1

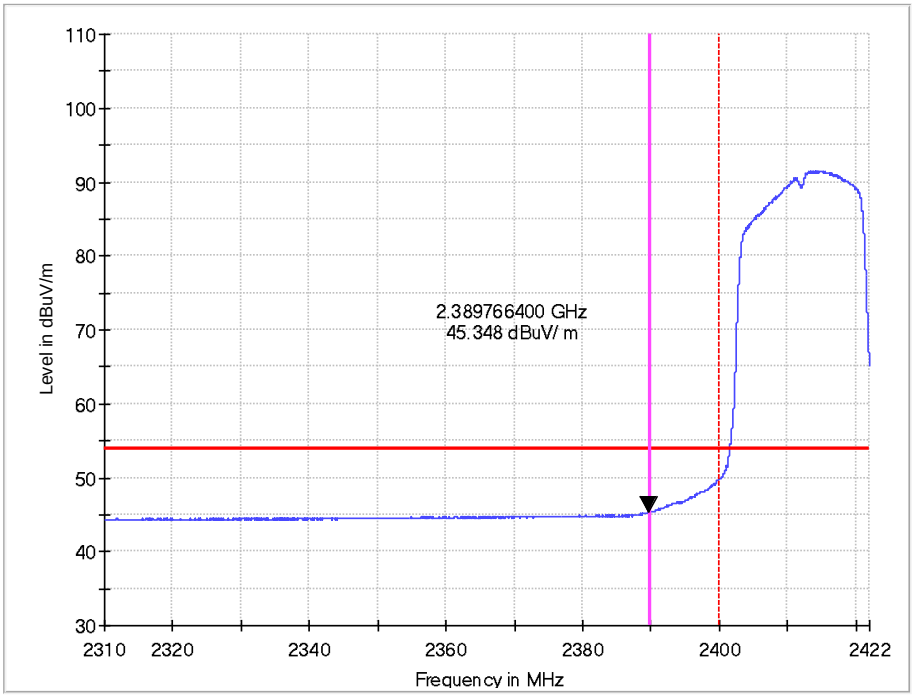
Horizontal





Vertical

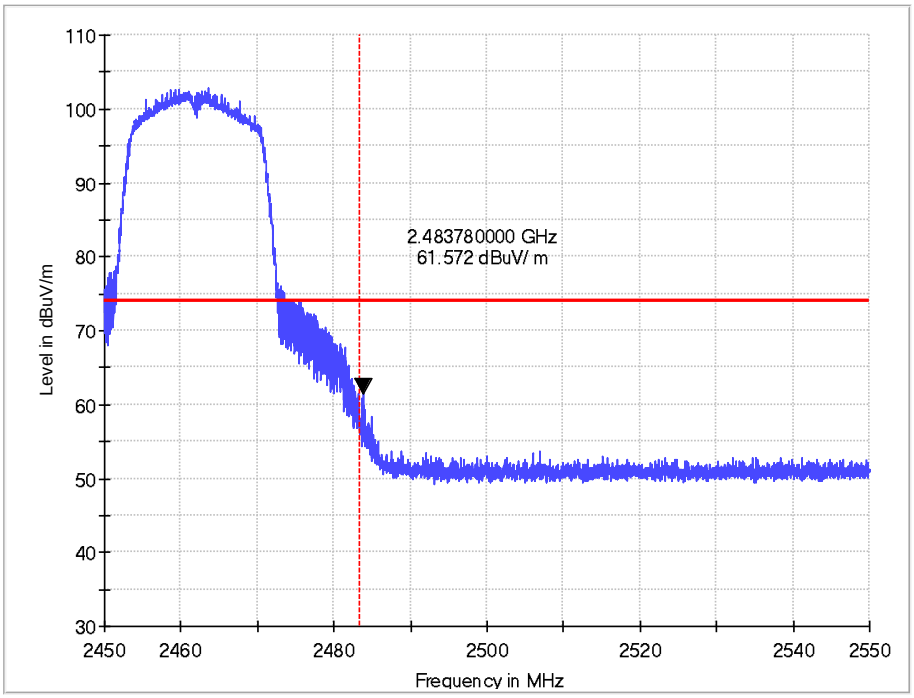

2.389004800 GHz
52.896 dBuV/ m
Level in dBuV/m
Frequency in MHz
110
100
90
80
70
60
50
40
30
2310
2320
2340
2360
2380
2400
2422

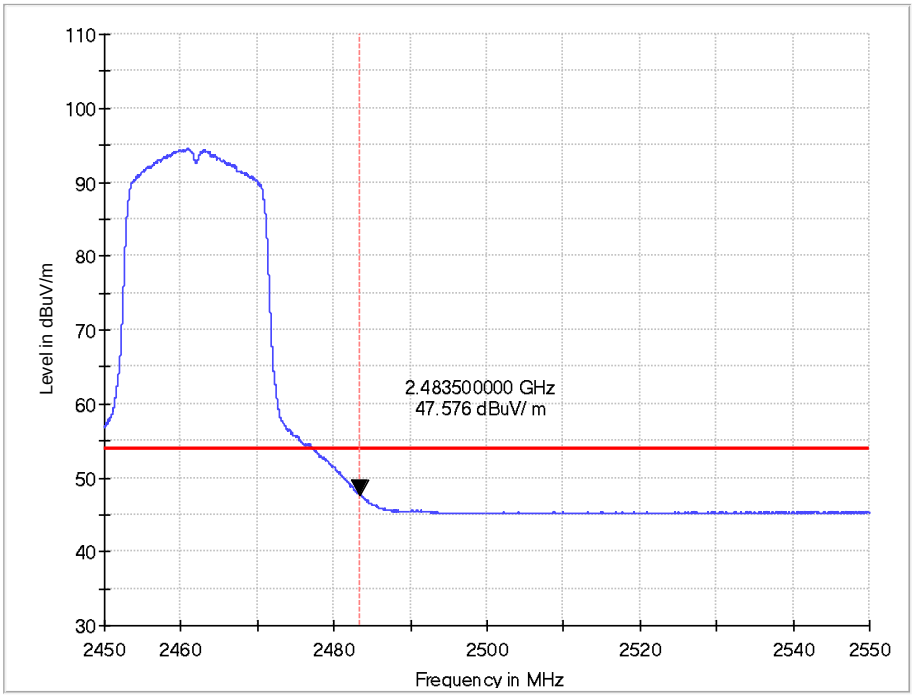

2.389766400 GHz
45.348 dBuV/ m
Level in dBuV/m
Frequency in MHz
110
100
90
80
70
60
50
40
30
2310
2320
2340
2360
2380
2400
2422

Band edge

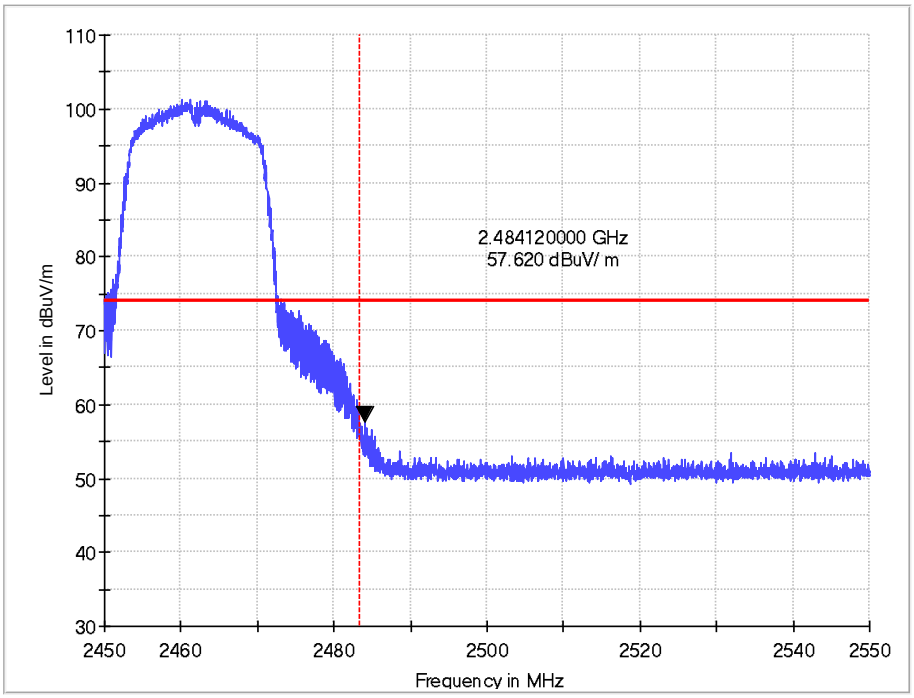
11n-HT20
CH11

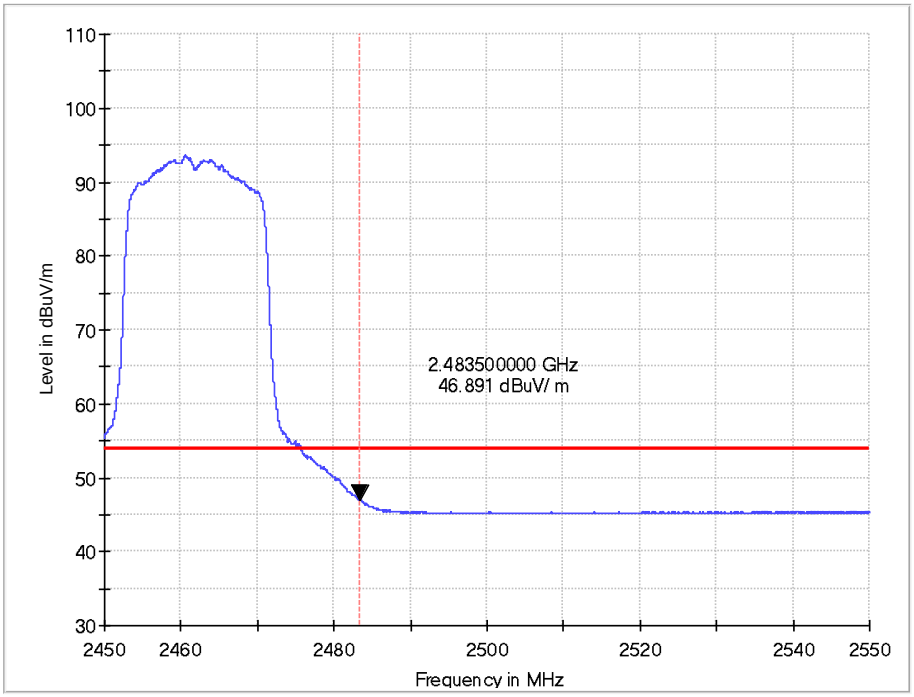
Horizontal





Vertical

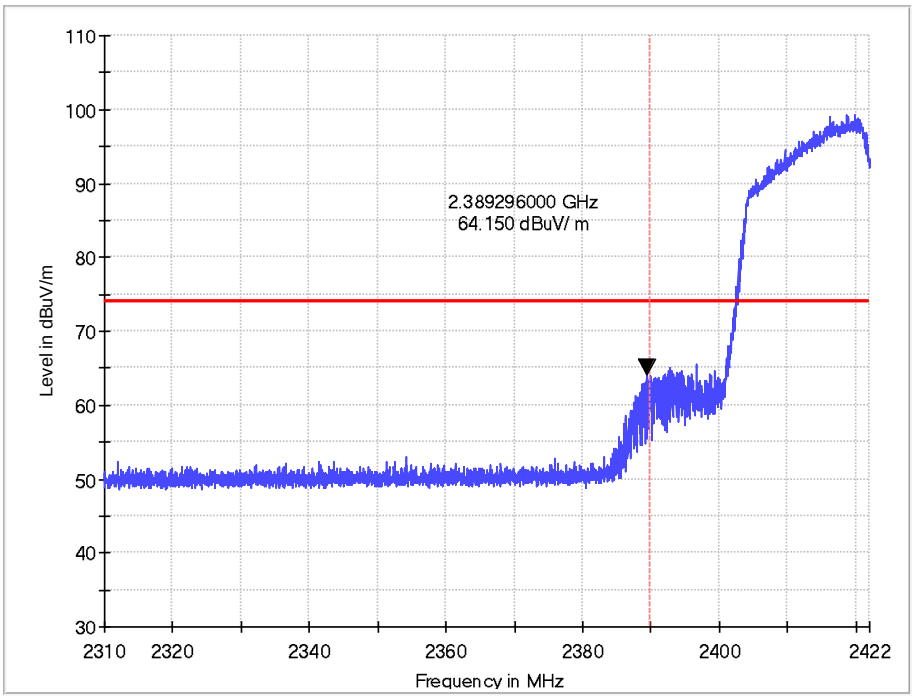

110
100
90
80
70
60
50
40
30
Level in dBuV/m
2.484120000 GHz
57.620 dBuV/ m
2450
2460
2480
2500
2520
2540
2550
Frequency in MHz

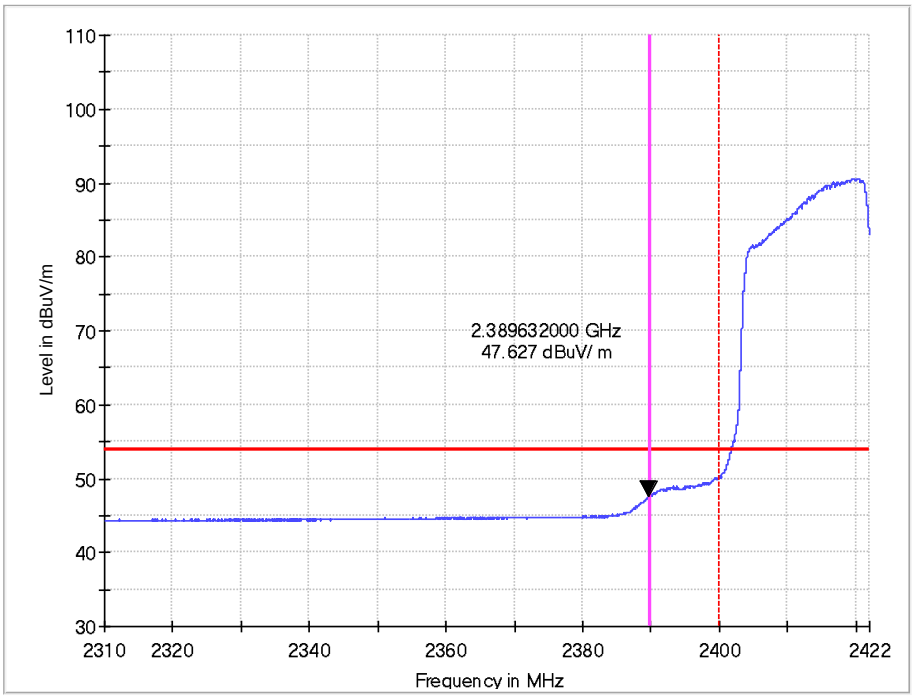

110
100
90
80
70
60
50
40
30
Level in dBuV/m
2.483500000 GHz
46.891 dBuV/ m
2450
2460
2480
2500
2520
2540
2550
Frequency in MHz

Band edge

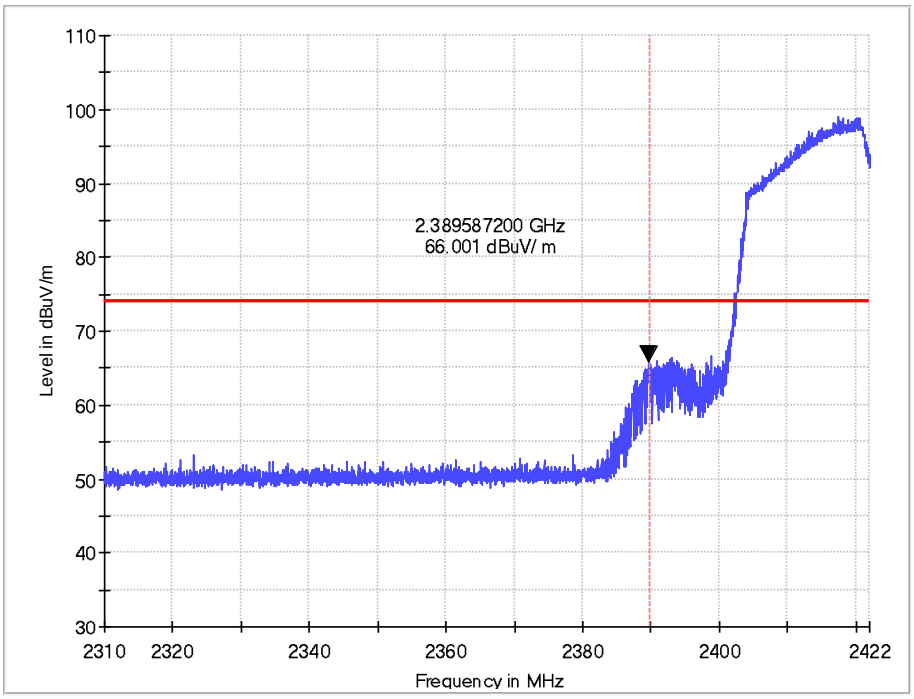
11n-HT40
CH3

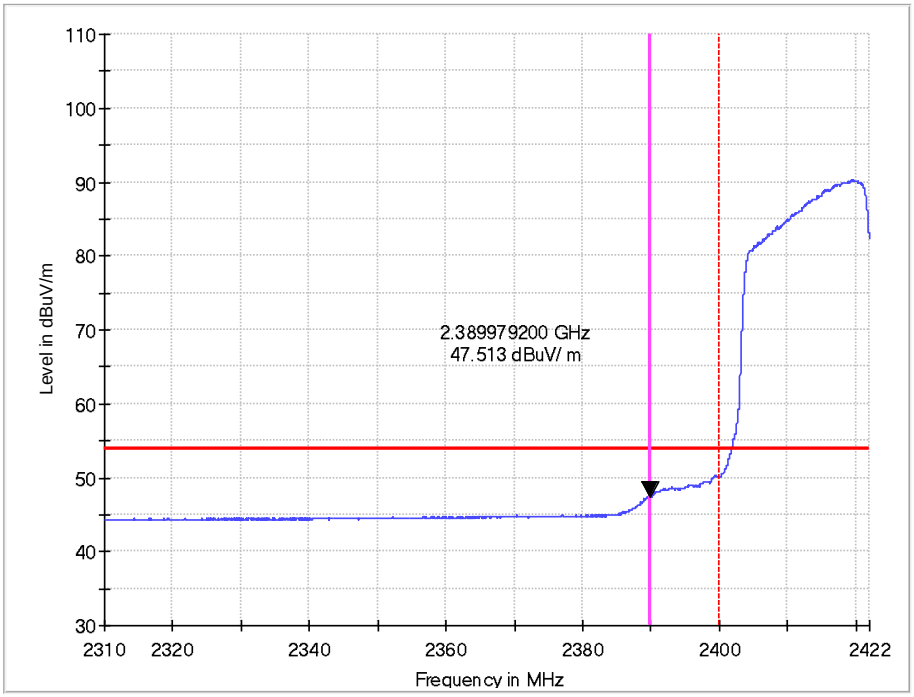
Horizontal





Vertical

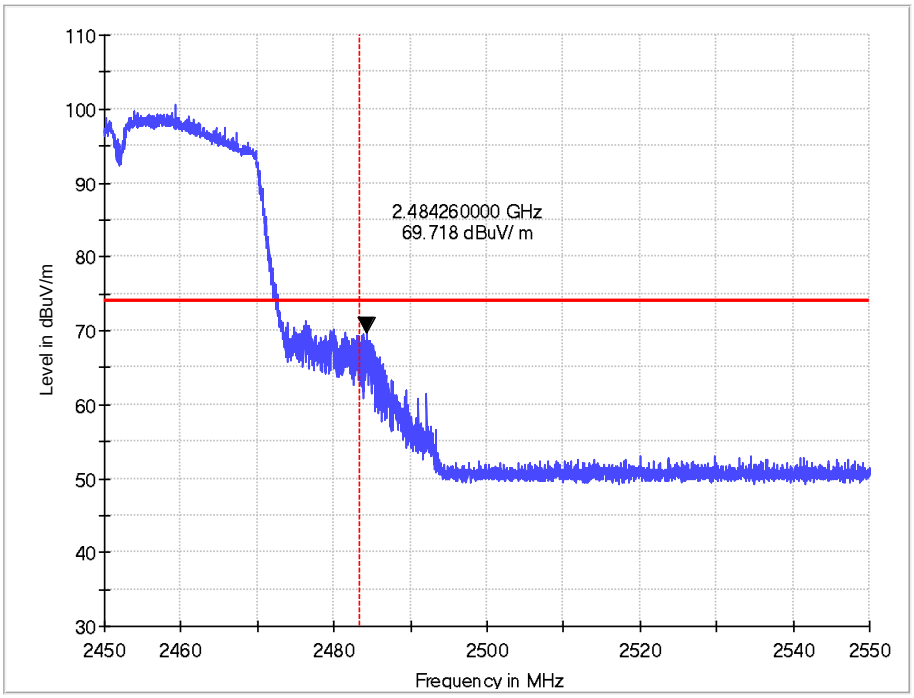

110
100
90
80
70
60
50
40
30
Level in dBuV/m
2.389587200 GHz
66.001 dBuV/ m
2310
2320
2340
2360
2380
2400
2422
Frequency in MHz

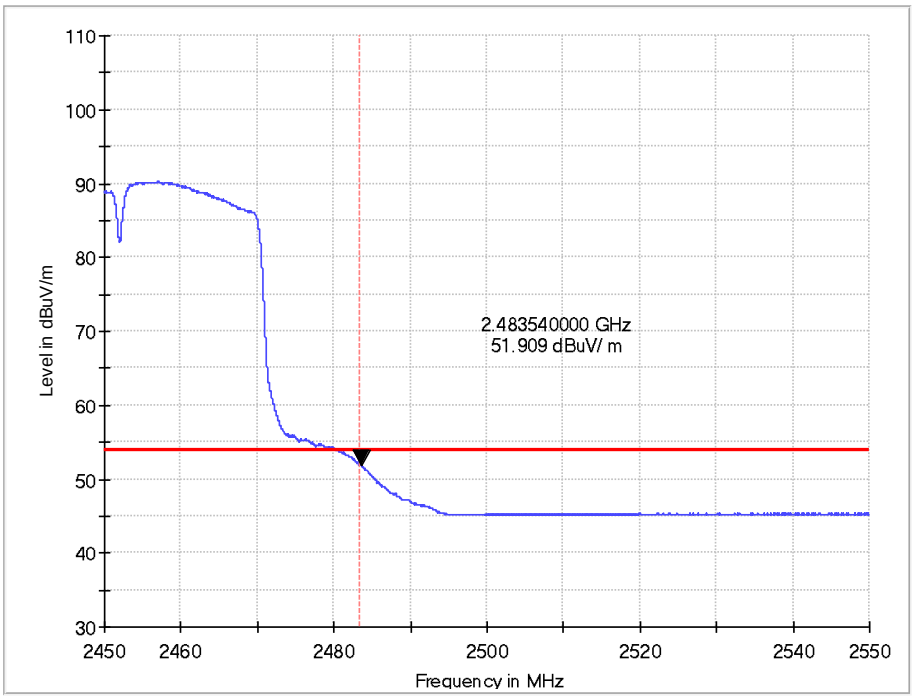

110
100
90
80
70
60
50
40
30
Level in dBuV/m
2.389979200 GHz
47.513 dBuV/ m
2310
2320
2340
2360
2380
2400
2422
Frequency in MHz

Band edge

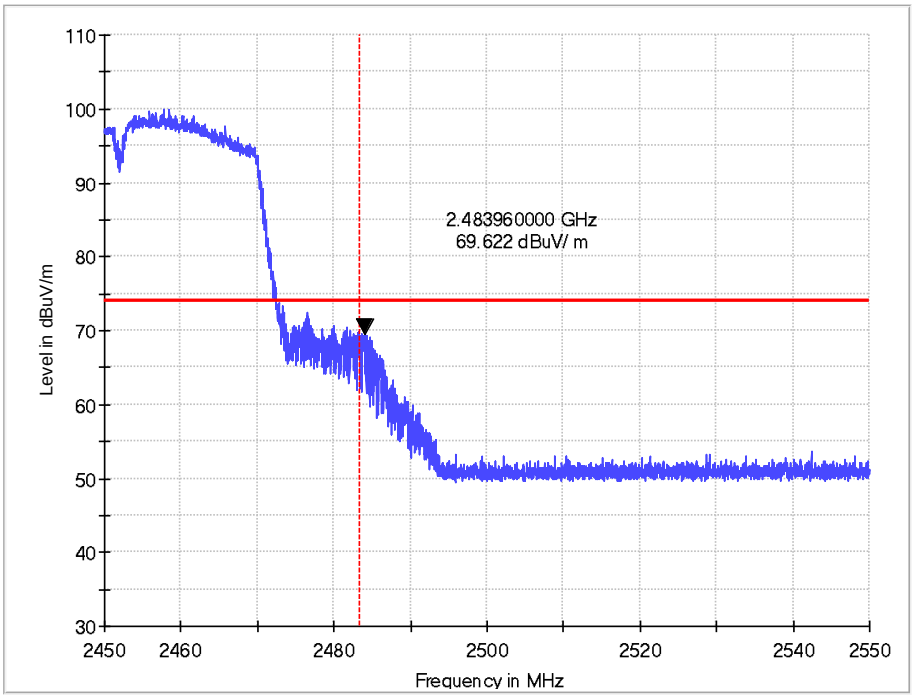
11n-HT40
CH9

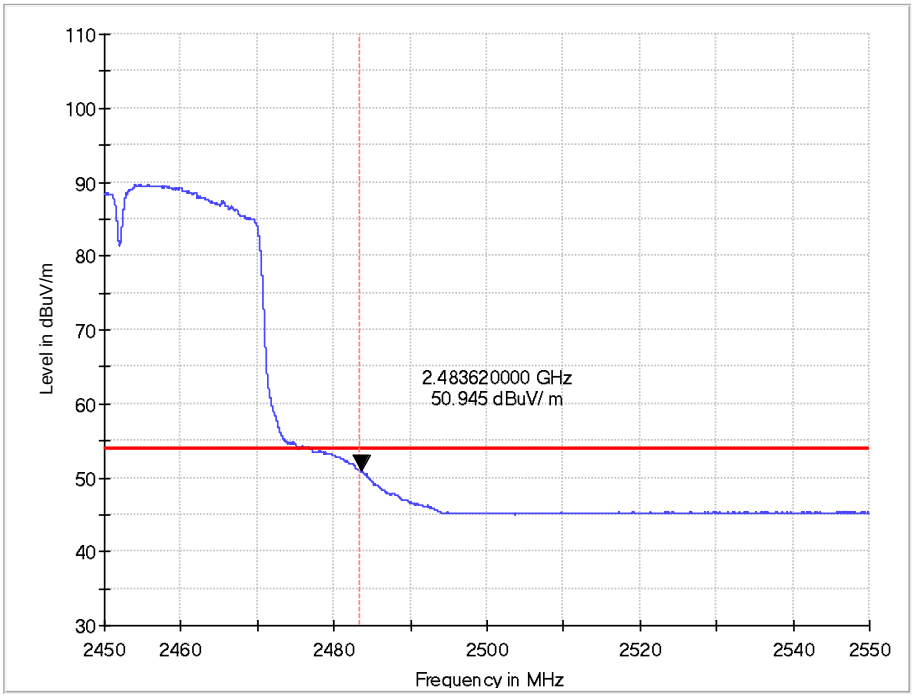
Horizontal





Vertical


110
100
90
80
70
60
50
40
30
Level in dBuV/m
2.483960000 GHz
69.622 dBuV/ m
2450
2460
2480
2500
2520
2540
2550
Frequency in MHz


110
100
90
80
70
60
50
40
30
Level in dBuV/m
2.483620000 GHz
50.945 dBuV/ m
2450
2460
2480
2500
2520
2540
2550
Frequency in MHz

11. CONDUCTED EMISSION TEST FOR AC POWER PORT MEASUREMENT

11.1. Test Standard and Limit

11.1.1. Test Standard

FCC Part 15 15.207

11.1.2. Test Limit

Table 12 Conducted Disturbance Test Limit

Frequency	Maximum RF Line Voltage (dBμV)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

* Decreasing linearly with logarithm of the frequency
* The lower limit shall apply at the transition frequency.

11.2. Test Procedure

The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI test receiver is used to test the emissions from both sides of AC line. According to the requirements of ANSI C63.10-2013.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.
The bandwidth of EMI test receiver is set at 9 kHz.

11.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

11.4. Test Data

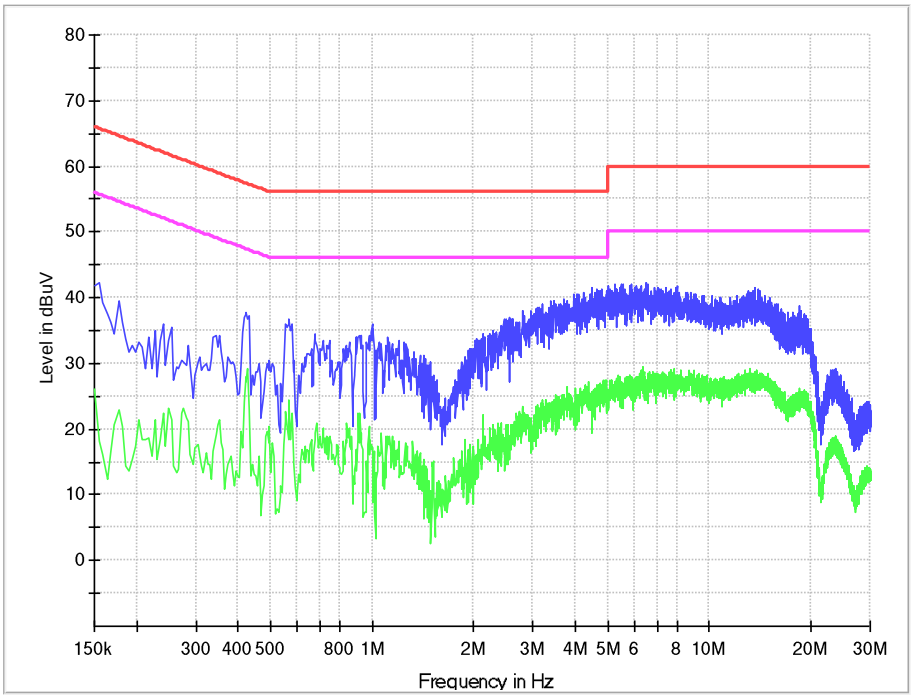
The emissions don’t show in below are too low against the limits. Refer to the test curves.

Table 13 Conducted Emission Test Data

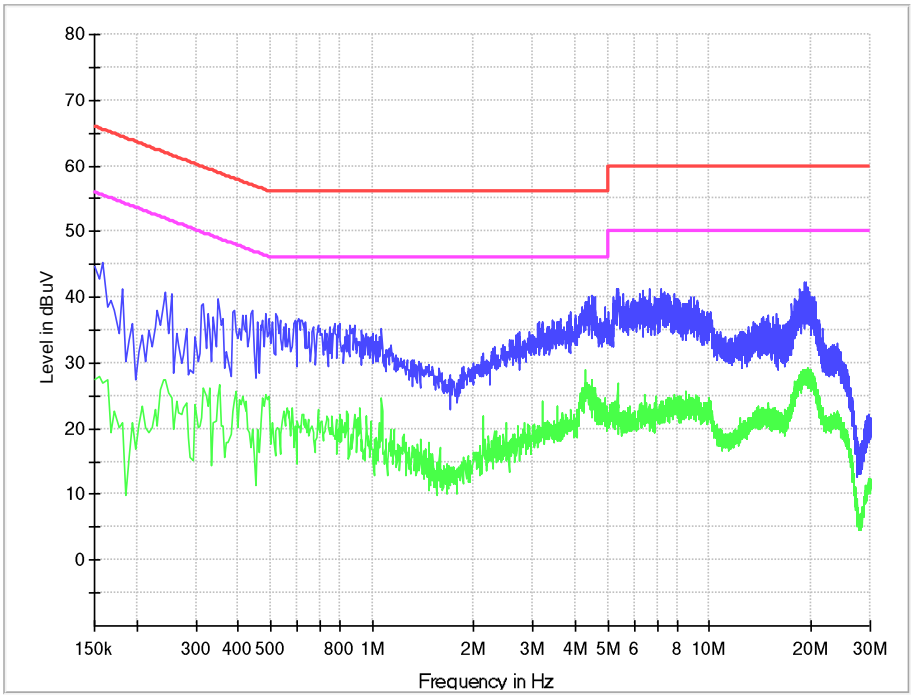
Test mode: Charging and Transmitting								
	Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
			Reading (dBμV)	Emission Level (dBμV)	Limit (dBμV)	Reading (dBμV)	Emission Level (dBμV)	Limit (dBμV)
Line	0.159	9.7	32.3	42	65.5	17.5	27.2	55.5
	0.613	9.8	24.8	34.6	56	9.0	18.8	46
	1.032	9.8	22.3	32.1	56	6.3	16.1	46
	4.861	9.9	27.1	37.0	56	15.1	25	46
	5.000	10.0	27.9	37.9	56	14.7	24.7	46
	5.590	10.0	28.1	38.1	60	15.9	25.9	50
Neutral	0.159	9.7	32.1	41.8	65.5	18.5	28.2	55.5
	0.348	9.7	24.1	33.8	59.0	15.3	25	49.0
	1.068	9.8	20.7	30.5	56	14.0	23.8	46
	4.465	9.9	20.1	30.0	56	12.2	22.1	46
	5.320	10.0	19.7	29.7	60	10.5	20.5	50
	19.387	9.9	25.5	35.4	60	18.5	28.4	50

REMARKS: 1. Emission level (dBuV) =Read Value (dBuV) + Correction Factor (dB)
2. Correction Factor (dB) =LISN Factor (dB) + Cable Factor (dB) +Limiter Factor (dB)
3. The other emission levels were very low against the limit.

Line



Neutral



12. ANTENNA REQUIREMENTS

15.203 requirements:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
15.247(b) (4) requirements:
The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

12.1. Antenna Connector

Antenna Connector is on the PCB within enclosure and not accessible to user.

12.2. Antenna Gain

The antenna gain of EUT is less than 6 dBi.

END OF REPORT