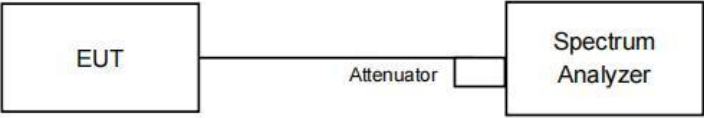


5.5 Power Spectral Density

Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	ANSI C63.10: 2013
Test Setup:	 Offset=cable loss+ attenuation factor
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Only the worst case is recorded in the report.
Limit:	≤8.00dBm/3kHz
Test Results:	Pass

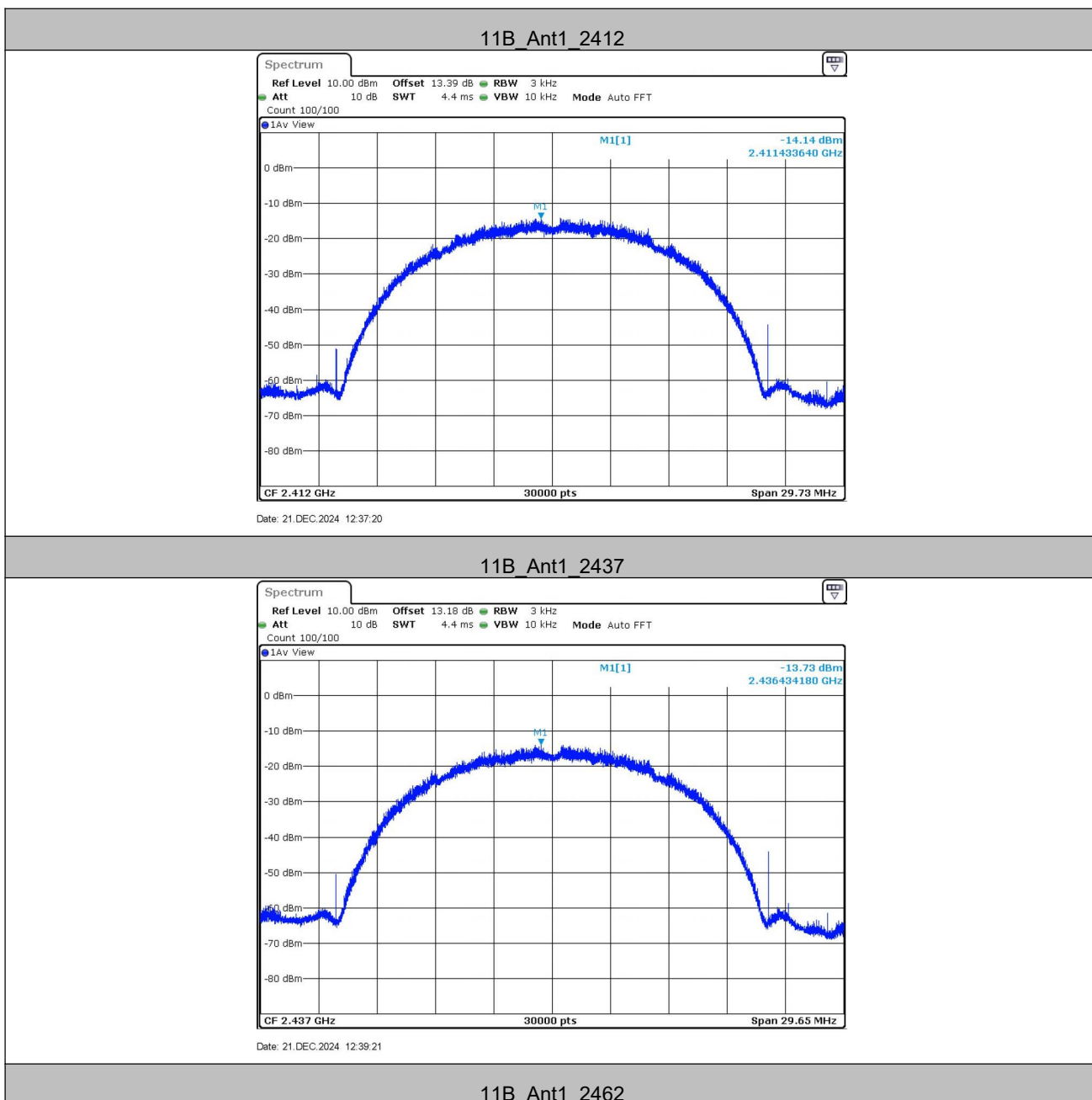
Test Result

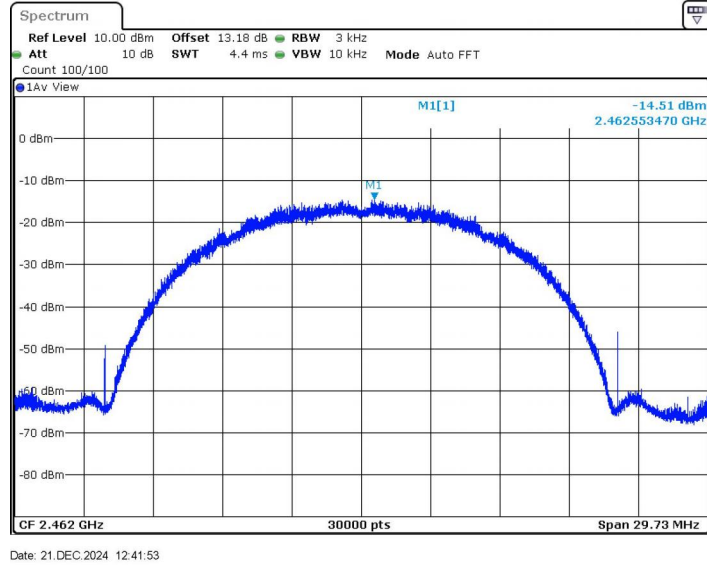
TestMode	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	2412	-14.14	≤8.00	PASS
	2437	-13.73	≤8.00	PASS
	2462	-14.51	≤8.00	PASS
11G	2412	-14.66	≤8.00	PASS
	2437	-15.00	≤8.00	PASS
	2462	-15.60	≤8.00	PASS
11N20SISO	2412	-14.39	≤8.00	PASS
	2437	-15.57	≤8.00	PASS
	2462	-16.53	≤8.00	PASS

Note:

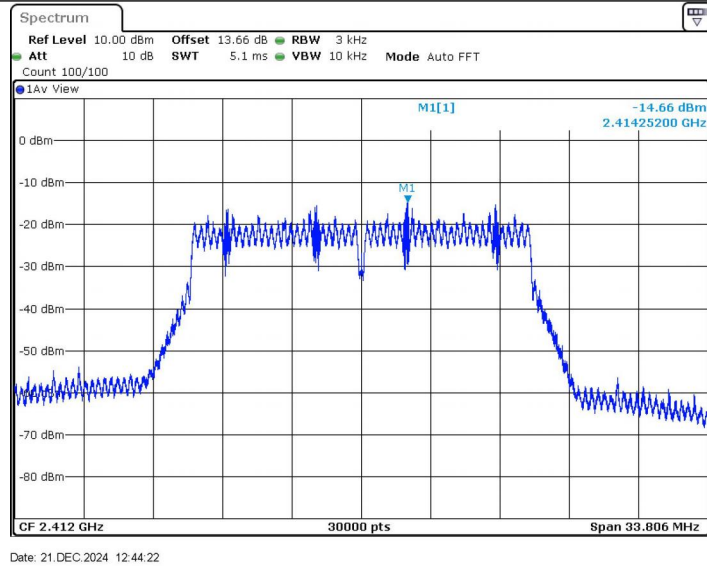
When Duty cycle >98%, D.C.F is not required.

Test Graphs

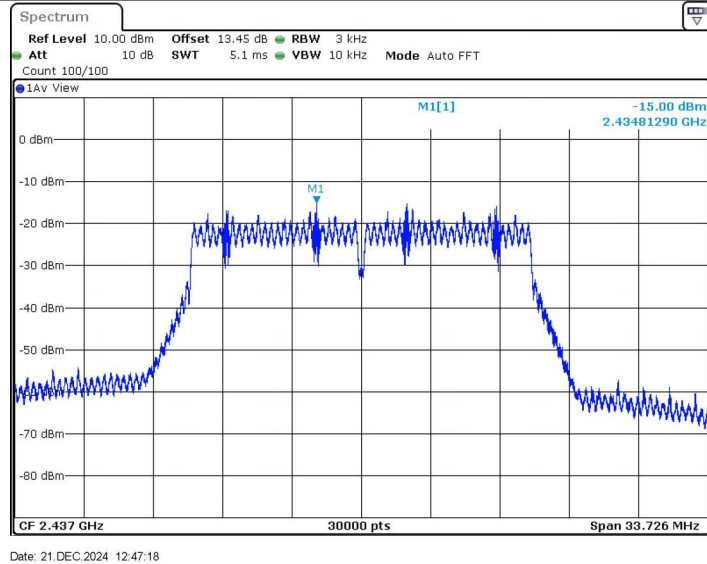




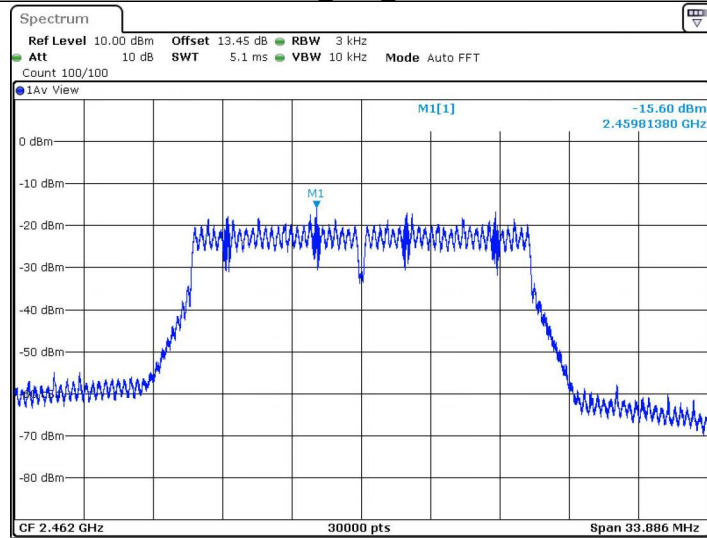
11G_Ant1_2412



11G_Ant1_2437

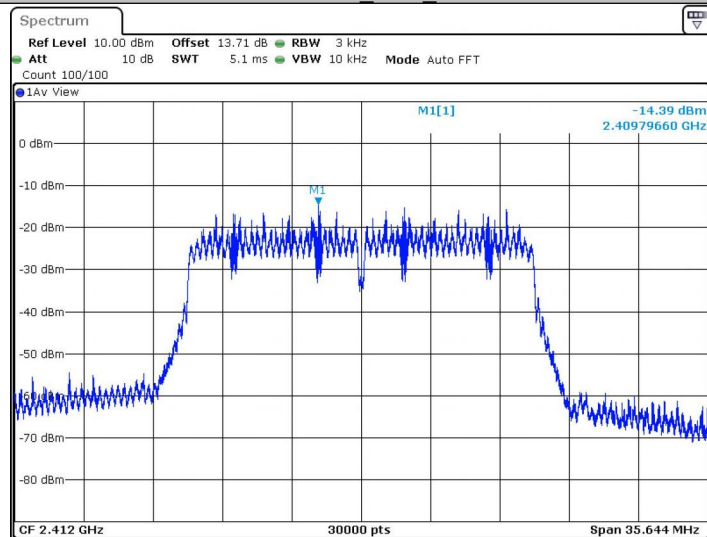


11G_Ant1_2462



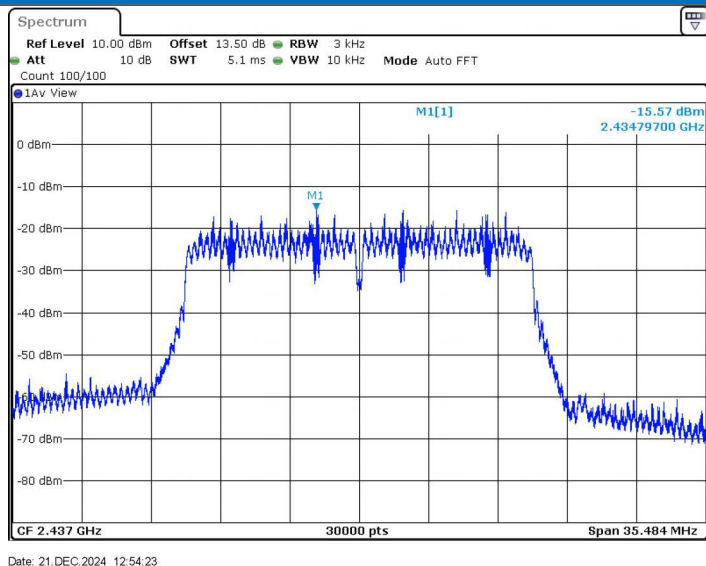
Date: 21.DEC.2024 12:49:02

11N20SISO_Ant1_2412

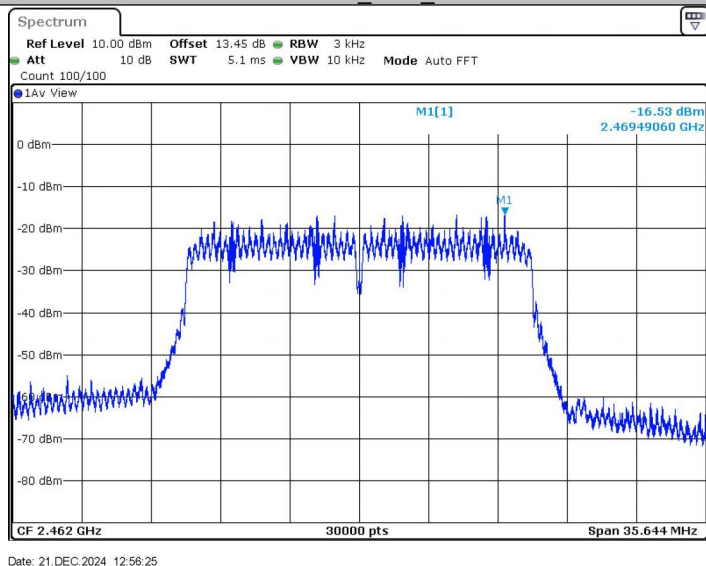


Date: 21.DEC.2024 12:52:01

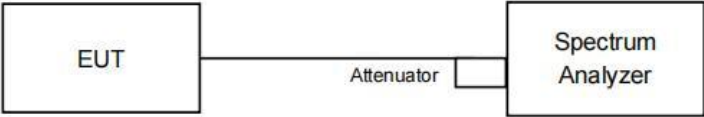
11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



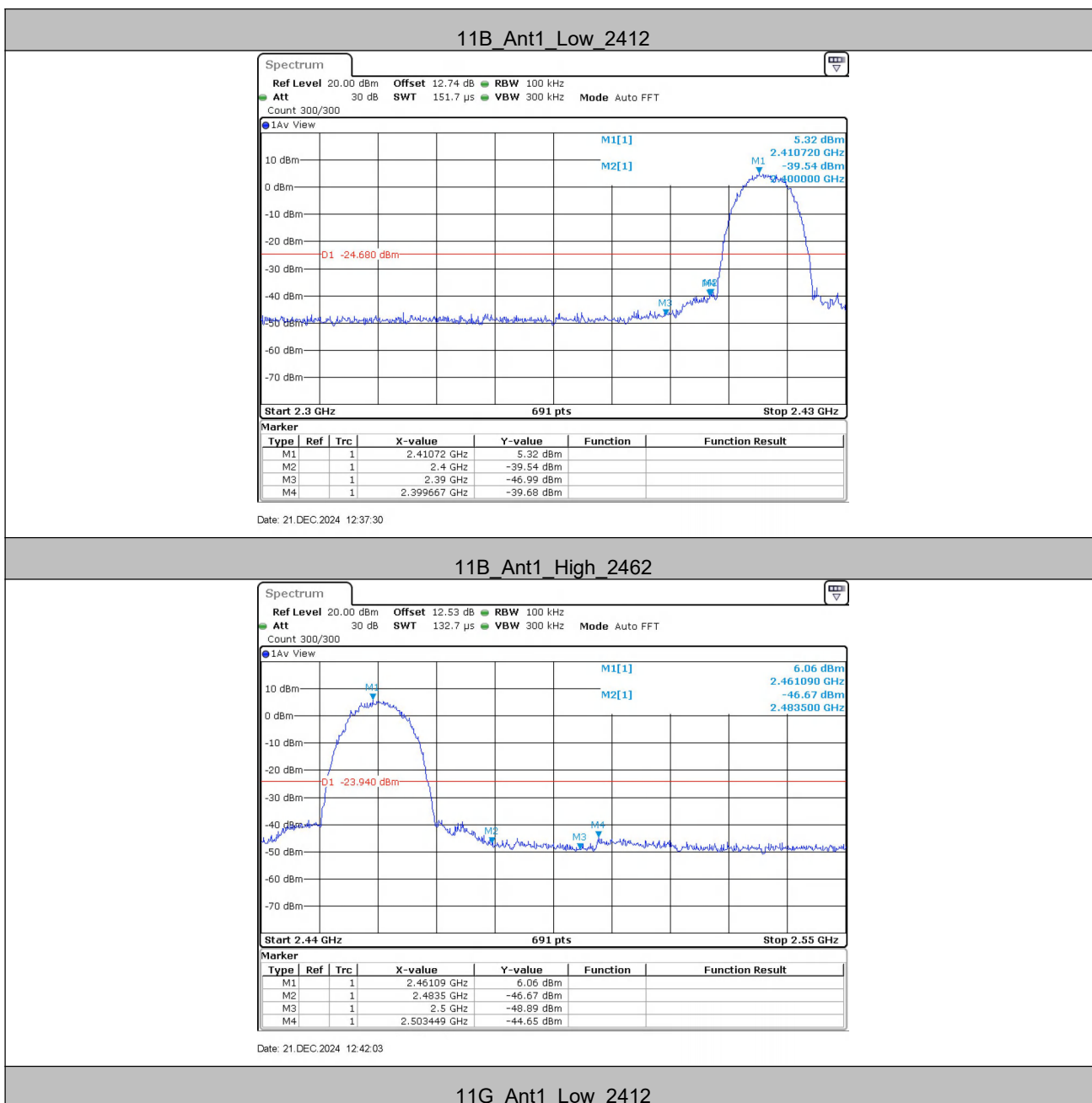
5.6 Band-edge for RF Conducted Emissions

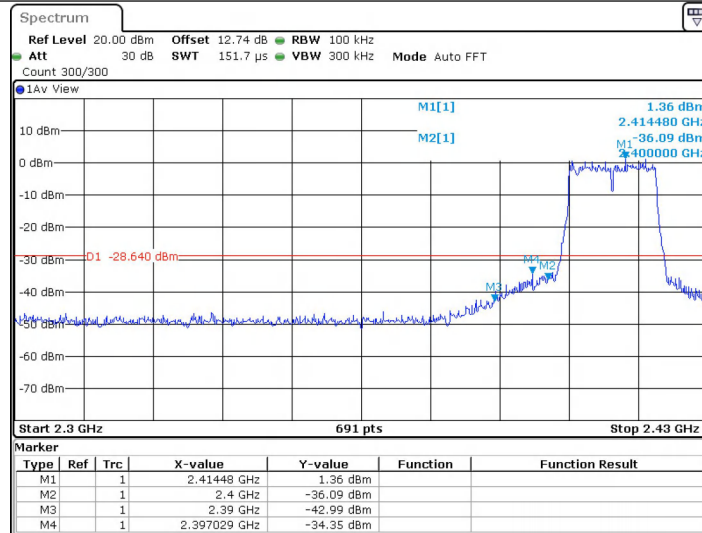
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013
Test Setup:	 Offset=cable loss+ attenuation factor
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Only the worst case is recorded in the report.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test Results:	Pass

Test Result

TestMode	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Low	2412	5.32	-39.68	≤ -24.68	PASS
	High	2462	6.06	-44.65	≤ -23.94	PASS
11G	Low	2412	1.36	-34.35	≤ -28.64	PASS
	High	2462	1.23	-44.75	≤ -28.77	PASS
11N20SISO	Low	2412	0.29	-35.51	≤ -29.71	PASS
	High	2462	0.35	-44.37	≤ -29.65	PASS

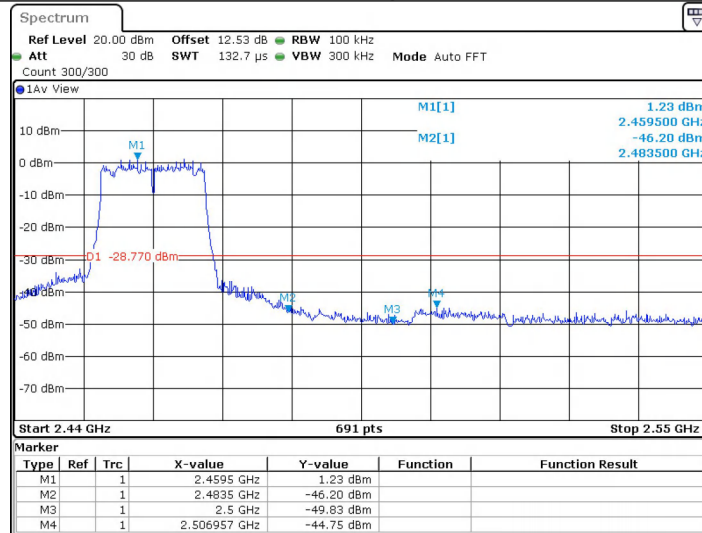
Test Graphs





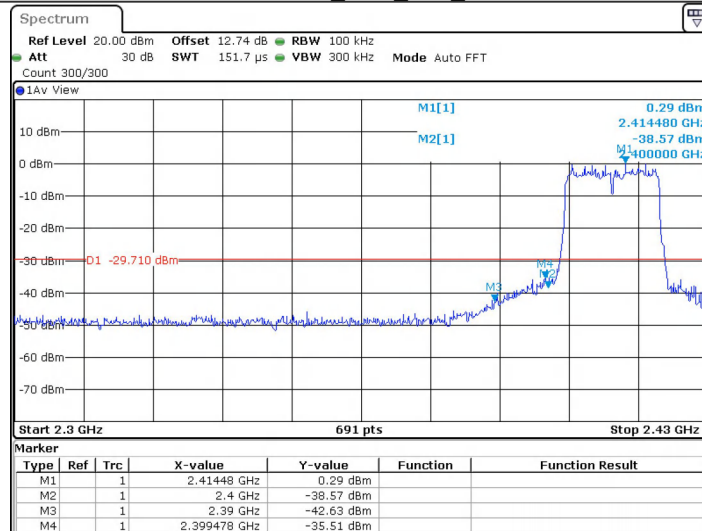
Date: 21.DEC.2024 12:44:32

11G_Ant1_High_2462

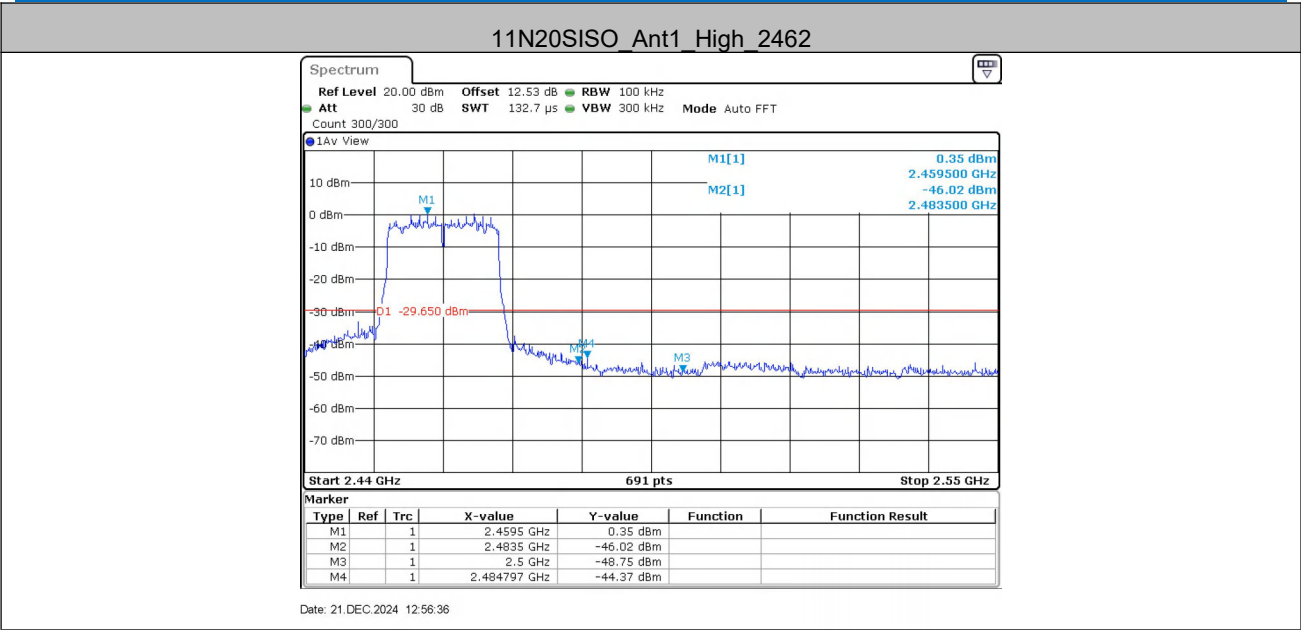


Date: 21.DEC.2024 12:49:13

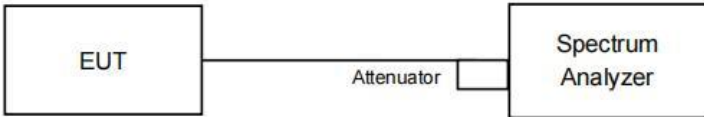
11N20SISO_Ant1_Low_2412



Date: 21.DEC.2024 12:52:11



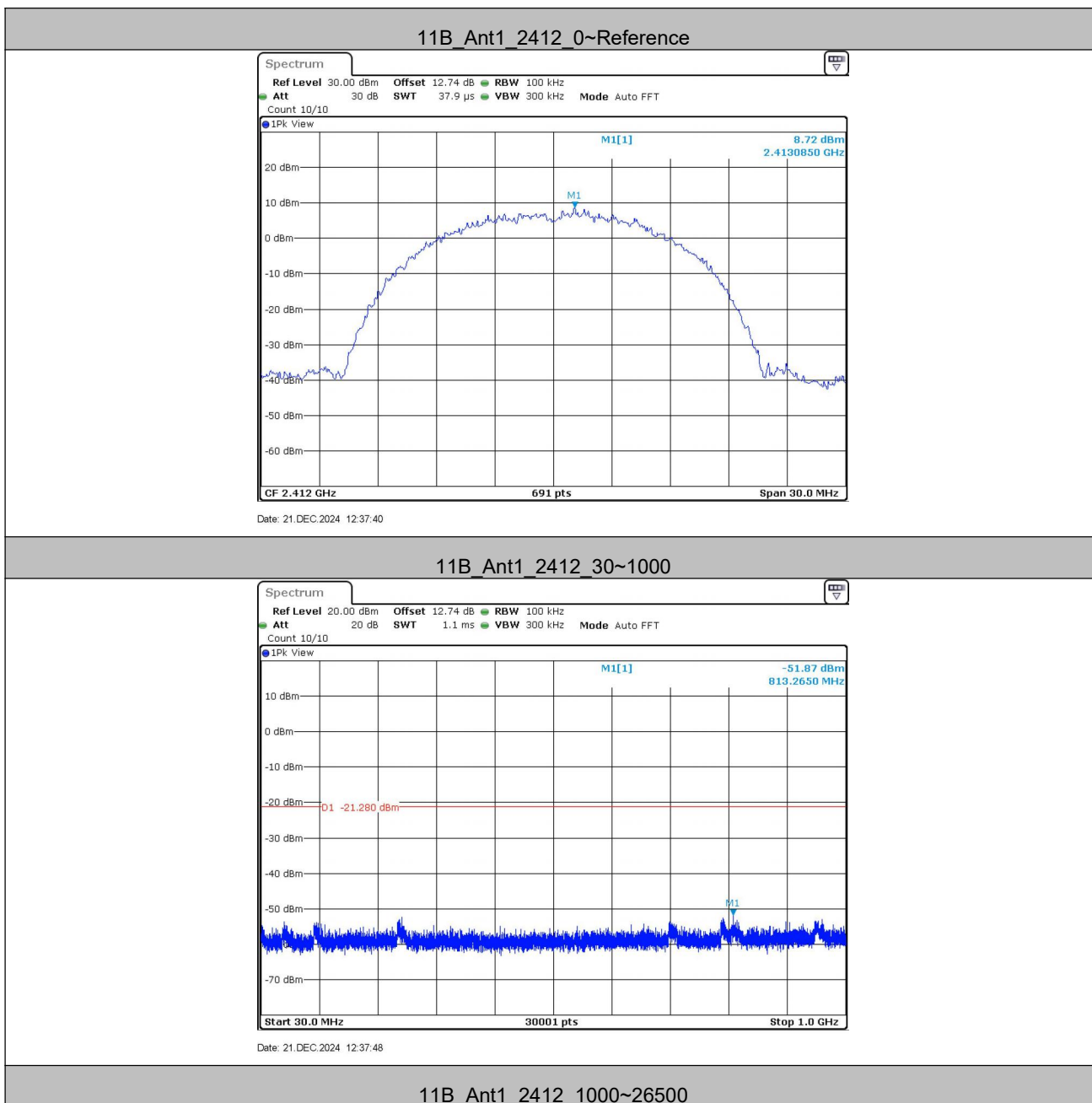
5.7 RF Conducted Spurious Emissions

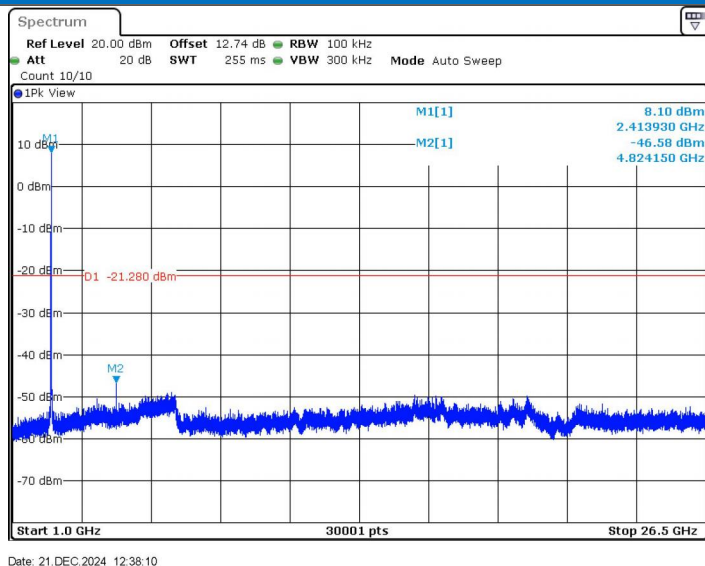
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013
Test Setup:	 Offset=cable loss+ attenuation factor
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Only the worst case is recorded in the report.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test Results:	Pass

Test Result

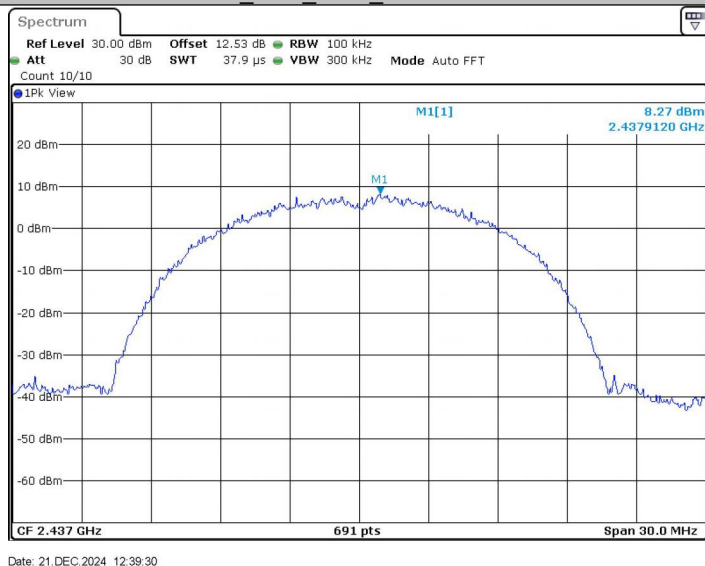
TestMode	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	2412	Reference	8.72	8.72	---	PASS
		30~1000	8.72	-51.87	≤ -21.28	PASS
		1000~26500	8.72	-46.58	≤ -21.28	PASS
	2437	Reference	8.27	8.27	---	PASS
		30~1000	8.27	-52.67	≤ -21.73	PASS
		1000~26500	8.27	-47.25	≤ -21.73	PASS
	2462	Reference	8.17	8.17	---	PASS
		30~1000	8.17	-51.23	≤ -21.83	PASS
		1000~26500	8.17	-49.64	≤ -21.83	PASS
11G	2412	Reference	3.84	3.84	---	PASS
		30~1000	3.84	-52.22	≤ -26.16	PASS
		1000~26500	3.84	-48.84	≤ -26.16	PASS
	2437	Reference	3.78	3.78	---	PASS
		30~1000	3.78	-52.48	≤ -26.22	PASS
		1000~26500	3.78	-49.48	≤ -26.22	PASS
	2462	Reference	3.41	3.41	---	PASS
		30~1000	3.41	-52.18	≤ -26.59	PASS
		1000~26500	3.41	-49	≤ -26.59	PASS
11N20SISO	2412	Reference	2.80	2.80	---	PASS
		30~1000	2.80	-52.52	≤ -27.2	PASS
		1000~26500	2.80	-49.24	≤ -27.2	PASS
	2437	Reference	2.85	2.85	---	PASS
		30~1000	2.85	-51.86	≤ -27.15	PASS
		1000~26500	2.85	-49.13	≤ -27.15	PASS
	2462	Reference	2.54	2.54	---	PASS
		30~1000	2.54	-52.6	≤ -27.46	PASS
		1000~26500	2.54	-48.44	≤ -27.46	PASS

Test Graphs

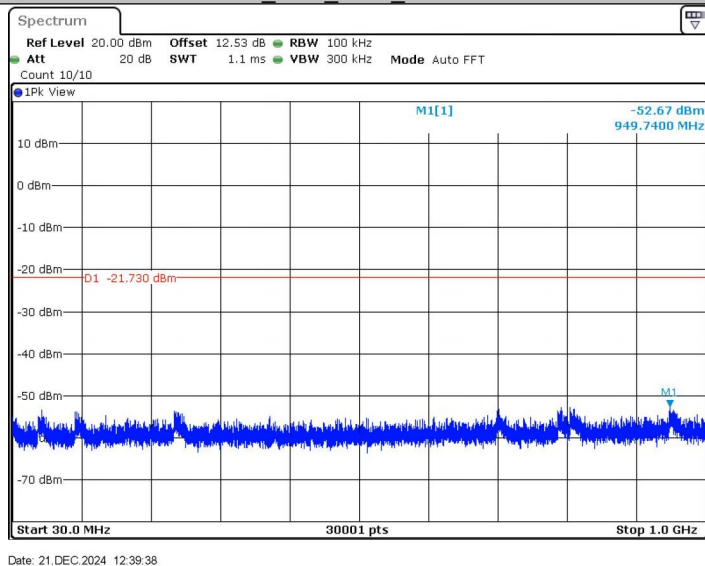




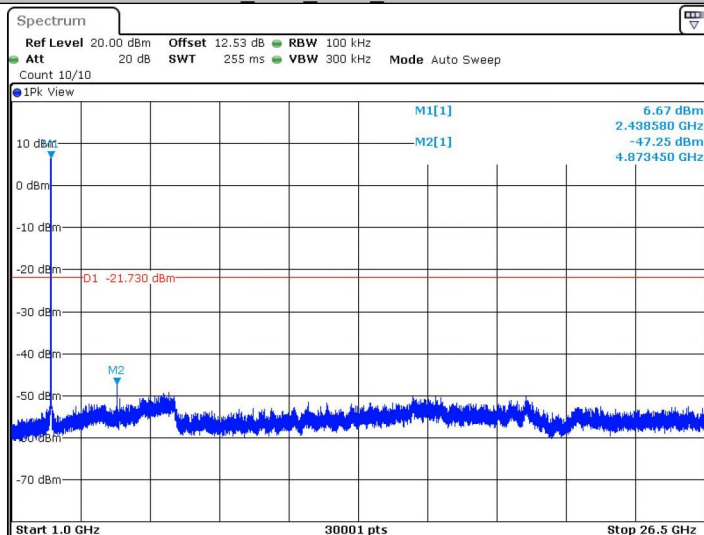
11B_Ant1_2437_0~Reference



11B_Ant1_2437_30~1000

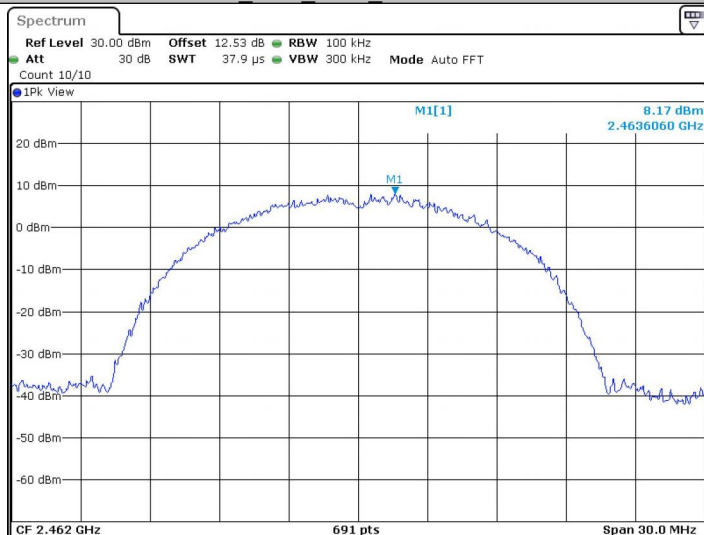


11B_Ant1_2437_1000~26500



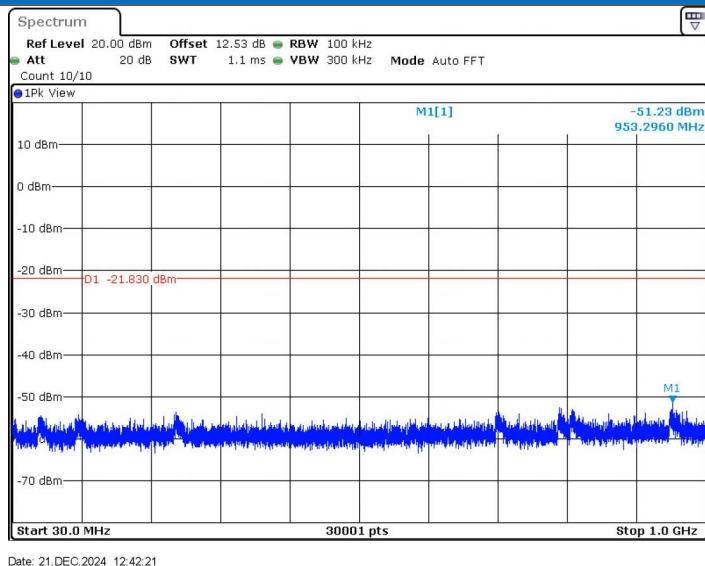
Date: 21.DEC.2024 12:40:00

11B_Ant1_2462_0~Reference

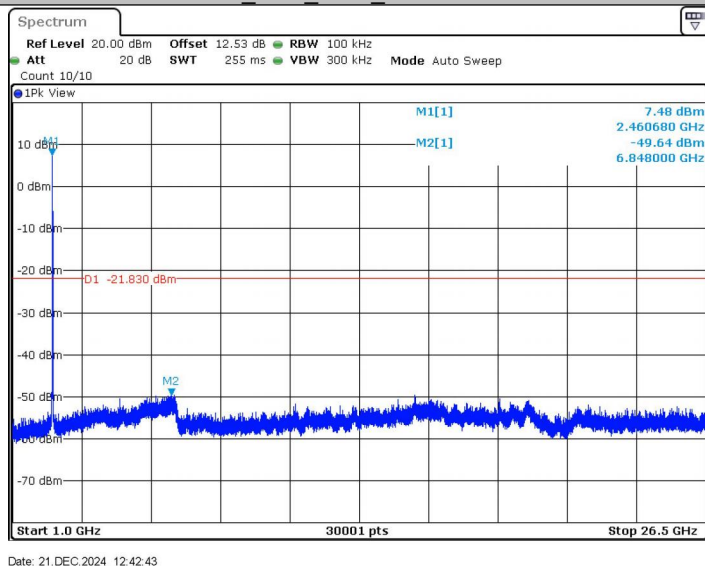


Date: 21.DEC.2024 12:42:13

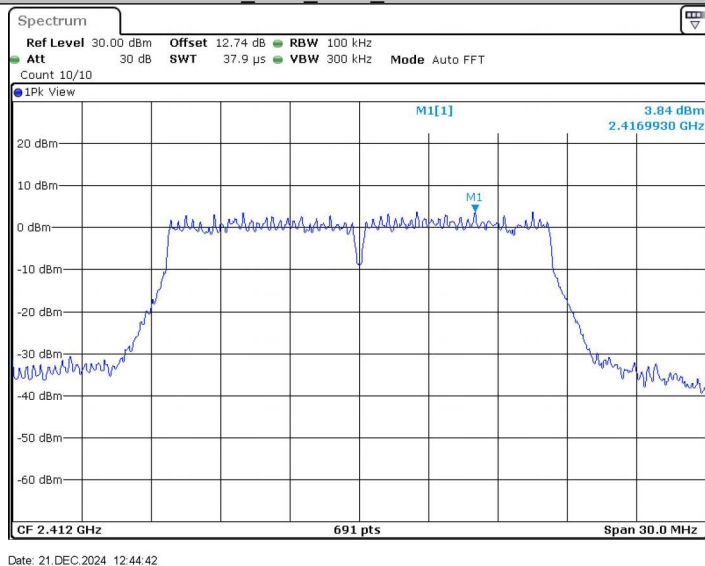
11B_Ant1_2462_30~1000



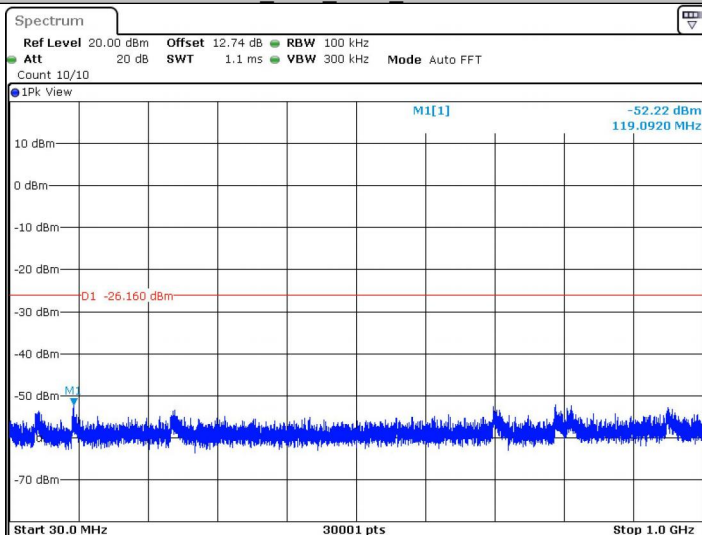
11B_Ant1_2462_1000~26500



11G_Ant1_2412_0~Reference

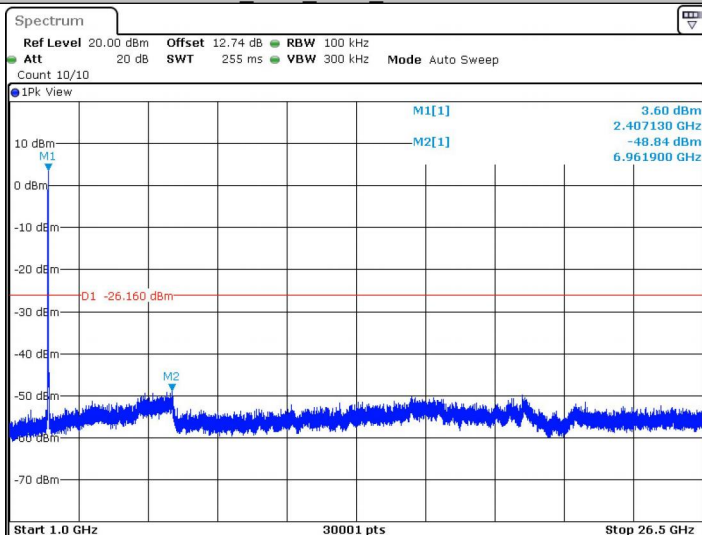


11G_Ant1_2412_30~1000



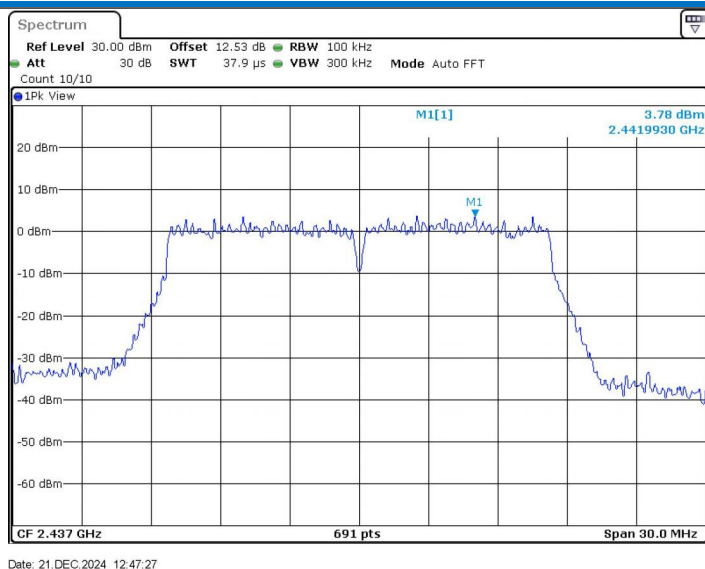
Date: 21.DEC.2024 12:44:50

11G_Ant1_2412_1000~26500

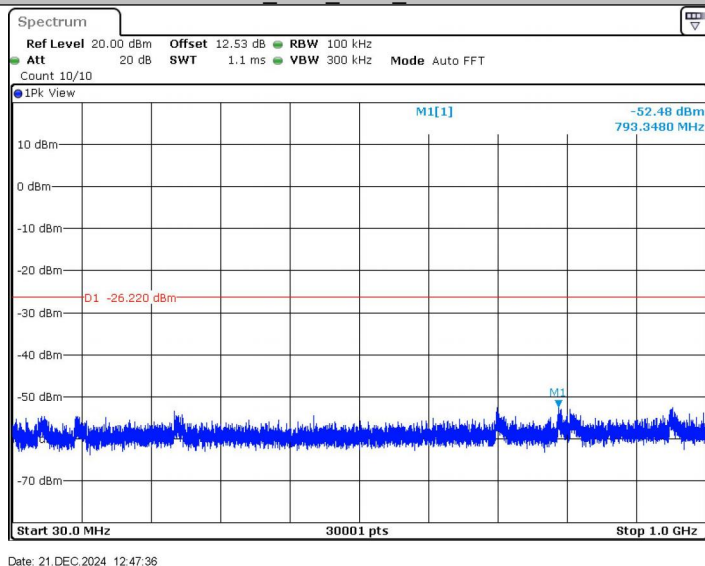


Date: 21.DEC.2024 12:45:12

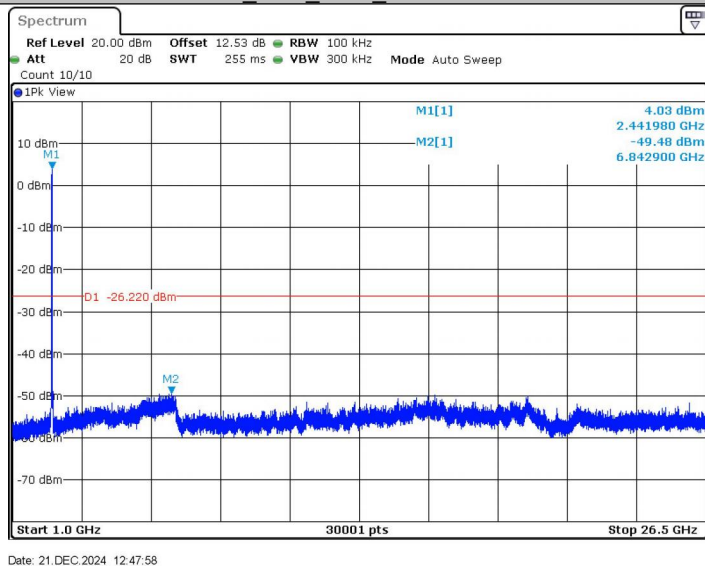
11G_Ant1_2437_0~Reference



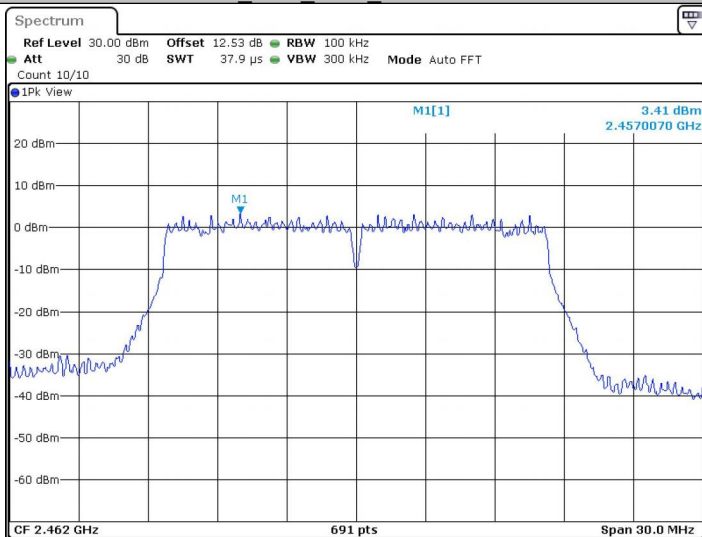
11G_Ant1_2437_30~1000



11G_Ant1_2437_1000~26500

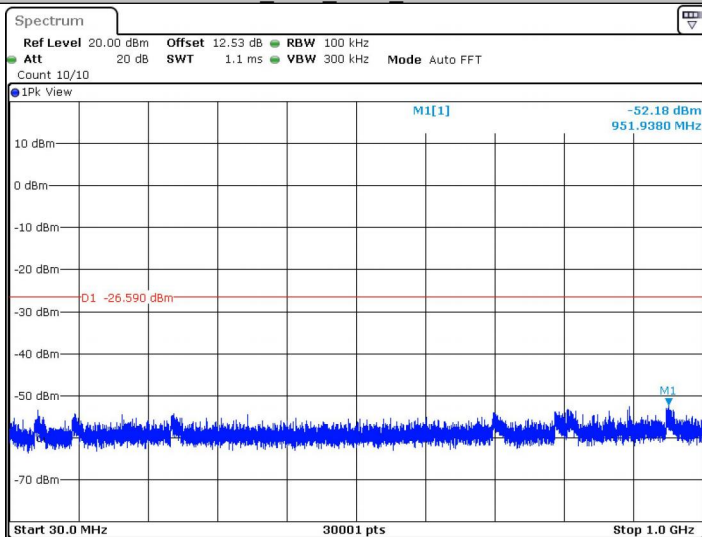


11G_Ant1_2462_0~Reference



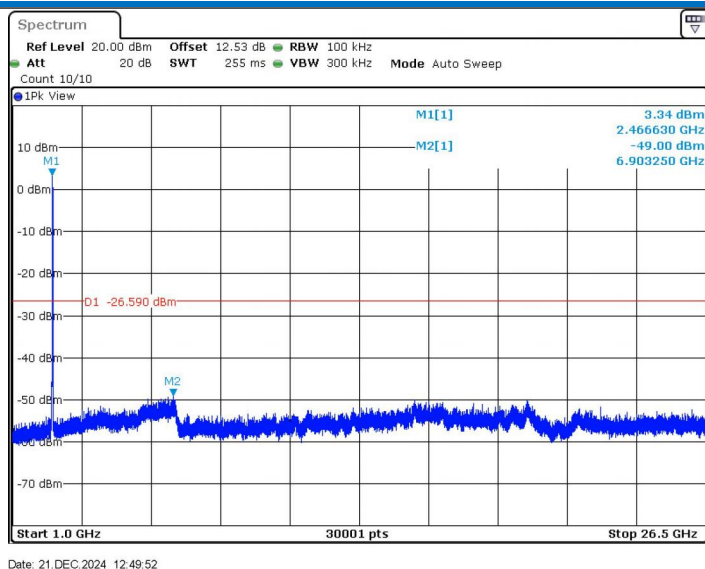
Date: 21.DEC.2024 12:49:22

11G_Ant1_2462_30~1000

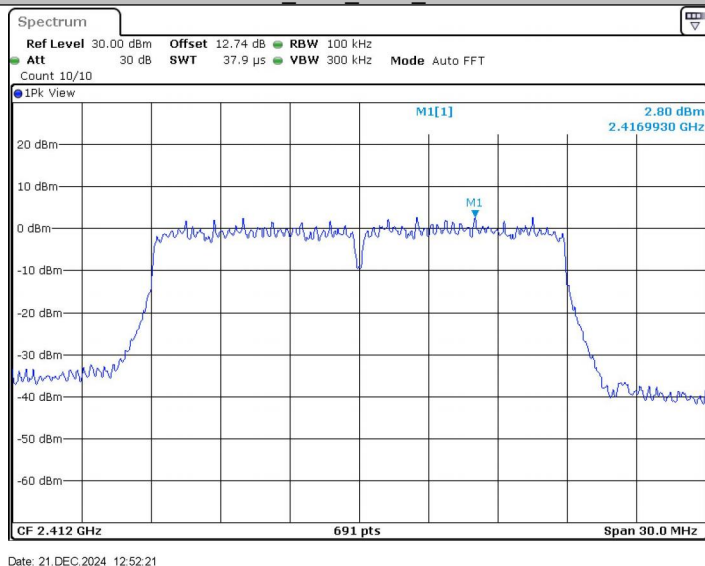


Date: 21.DEC.2024 12:49:30

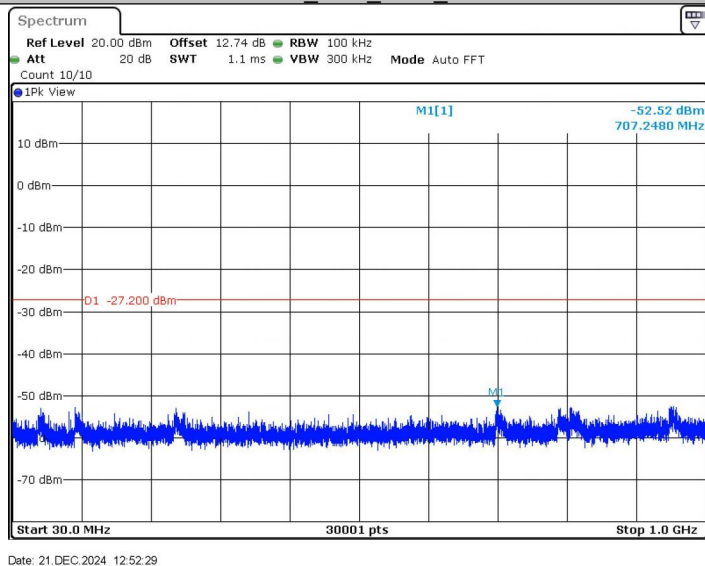
11G_Ant1_2462_1000~26500



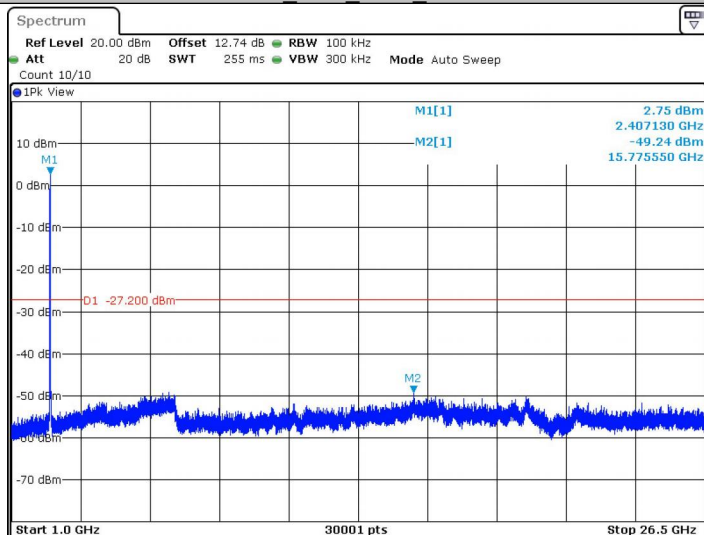
11N20SISO_Ant1_2412_0~Reference



11N20SISO_Ant1_2412_30~1000

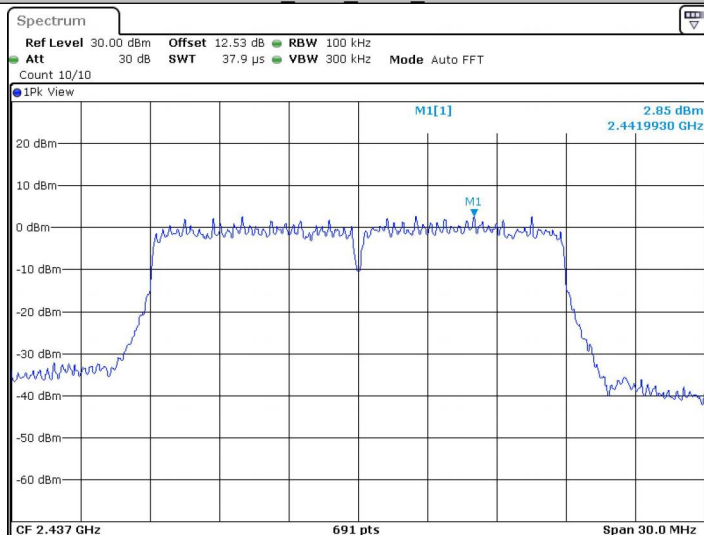


11N20SISO_Ant1_2412_1000~26500



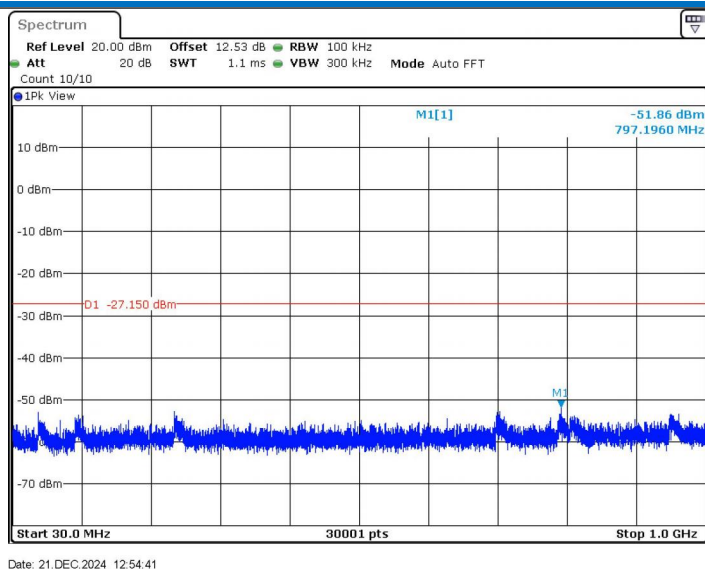
Date: 21.DEC.2024 12:52:51

11N20SISO_Ant1_2437_0~Reference

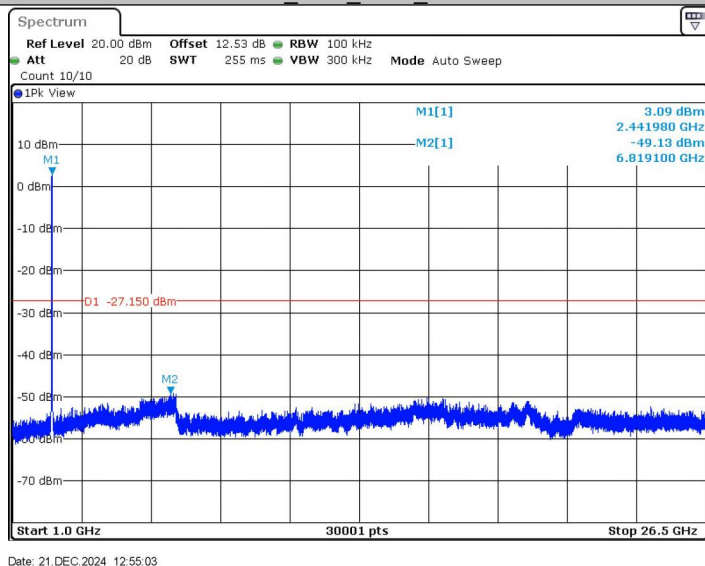


Date: 21.DEC.2024 12:54:32

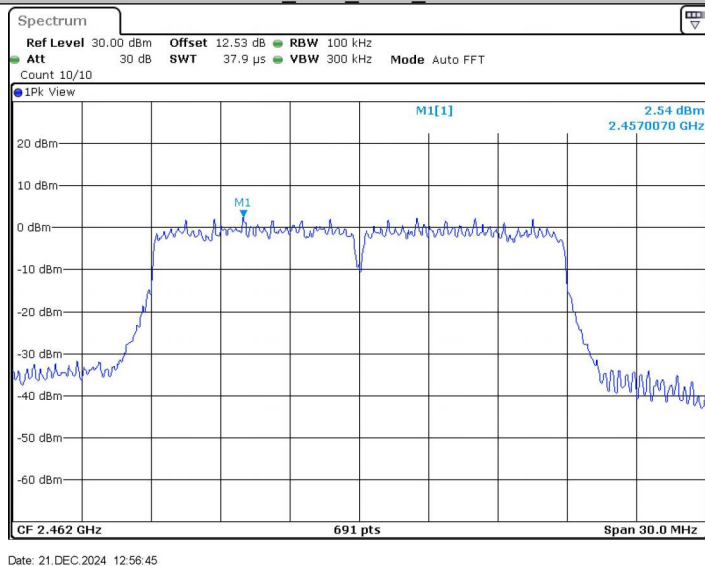
11N20SISO_Ant1_2437_30~1000

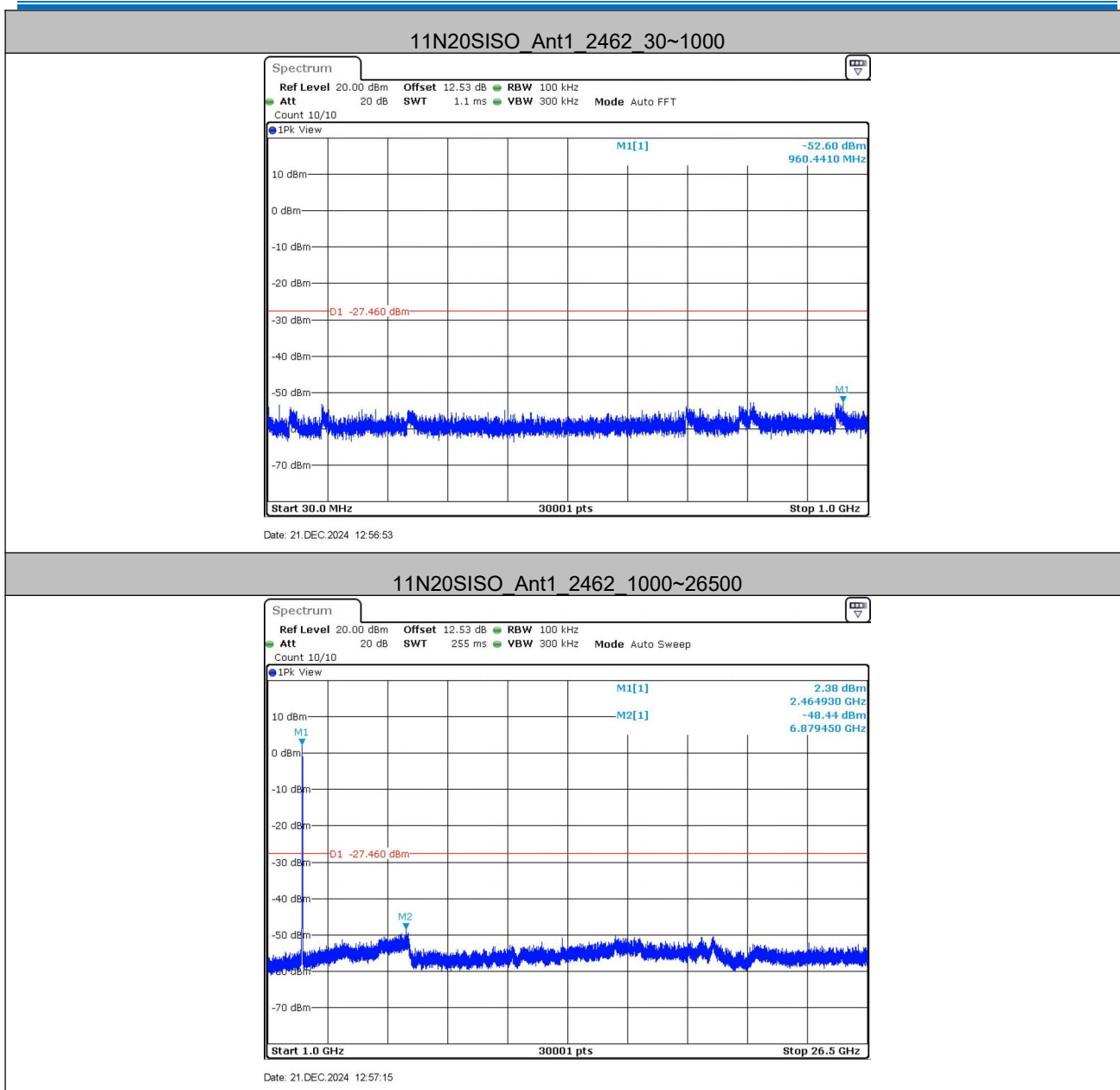


11N20SISO_Ant1_2437_1000~26500



11N20SISO_Ant1_2462_0~Reference





Remark:

Pretest 9kHz to 25GHz, find the highest point when testing, so only the worst data were shown in the test report. Per FCC Part 15.33 (a) and 15.31 (o) ,The amplitude of spurious emissions from intentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

5.8 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205				
Test Method:	ANSI C63.10 2013				
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100 kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1GHz	500	54.0	Quasi-peak	3
	Above 1GHz	500	54.0	Average	3
	Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.				

Test Setup:

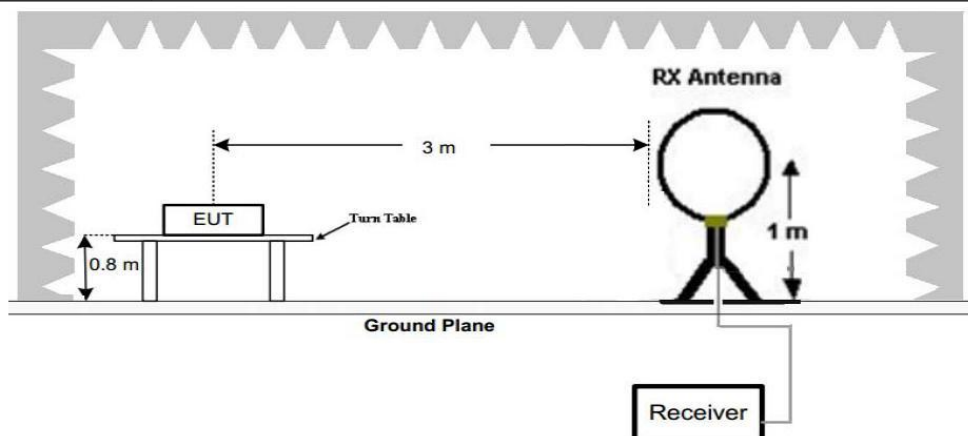


Figure 1. Below 30MHz

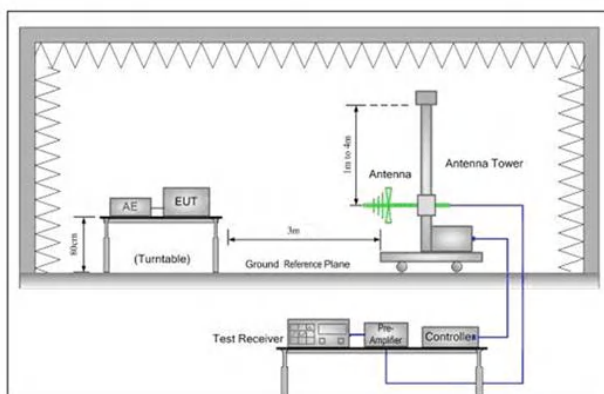


Figure 2. 30MHz to 1GHz

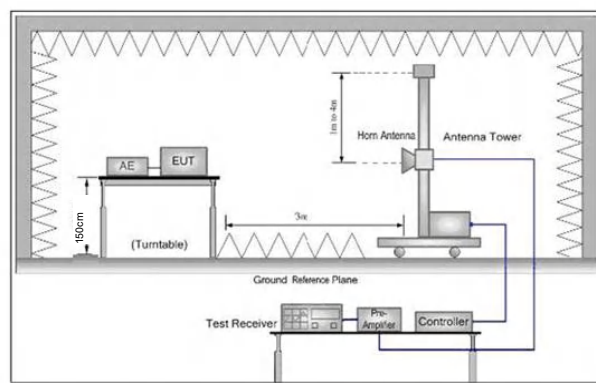


Figure 3. Above 1 GHz

Test Procedure:

- a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- Note: For the radiated emission test above 1GHz:
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

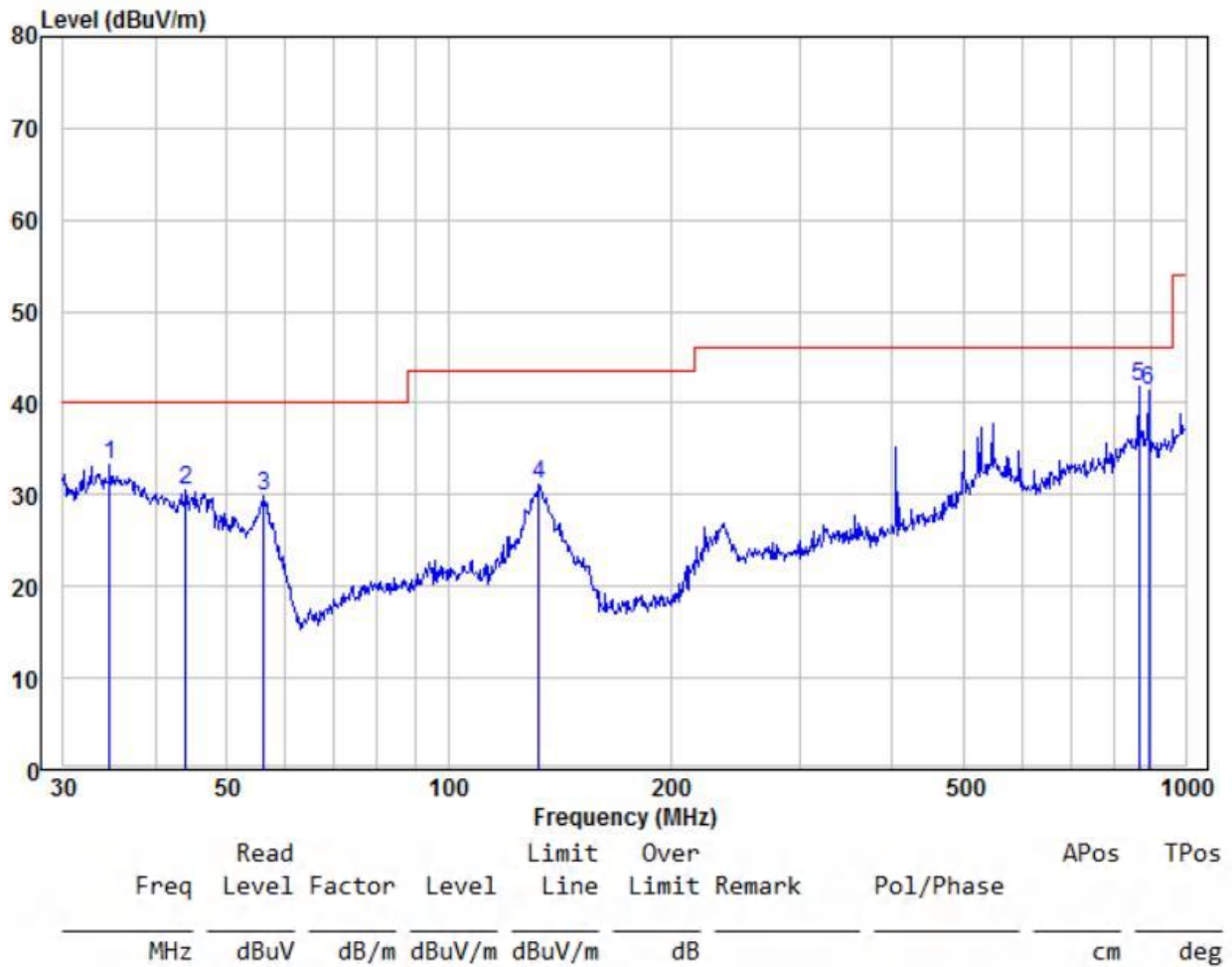
	d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel, the middle channel, the Highest channel. h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case . i. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.
Final Test Mode:	Only the worst case is recorded in the report.
Test Results:	Pass

5.8.1 Radiated emission below 1GHz

AS011Z-0501500UU

30MHz~1GHz

Vertical



Remark:

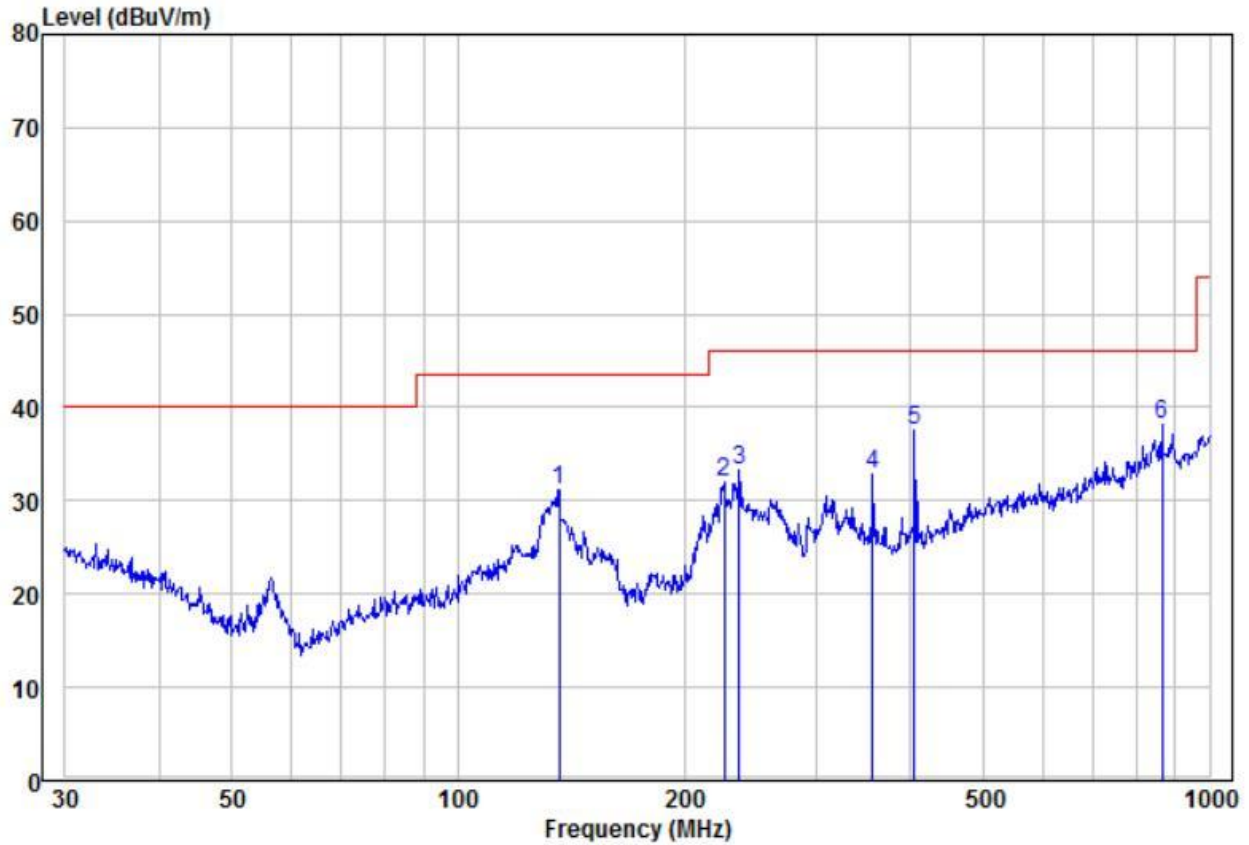
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

Horizontal



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase	APos	TPos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB			cm	deg
1	136.46	21.64	9.44	31.08	43.50	-12.42	Peak	HORIZONTAL	100	12
2	226.10	21.28	10.69	31.97	46.00	-14.03	Peak	HORIZONTAL	100	22
3	236.64	21.30	11.96	33.26	46.00	-12.74	Peak	HORIZONTAL	100	50
4	356.68	16.75	16.06	32.81	46.00	-13.19	Peak	HORIZONTAL	100	42
5	404.67	21.14	16.35	37.49	46.00	-8.51	Peak	HORIZONTAL	100	34
6 pp	866.09	12.17	25.94	38.11	46.00	-7.89	Peak	HORIZONTAL	100	77

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

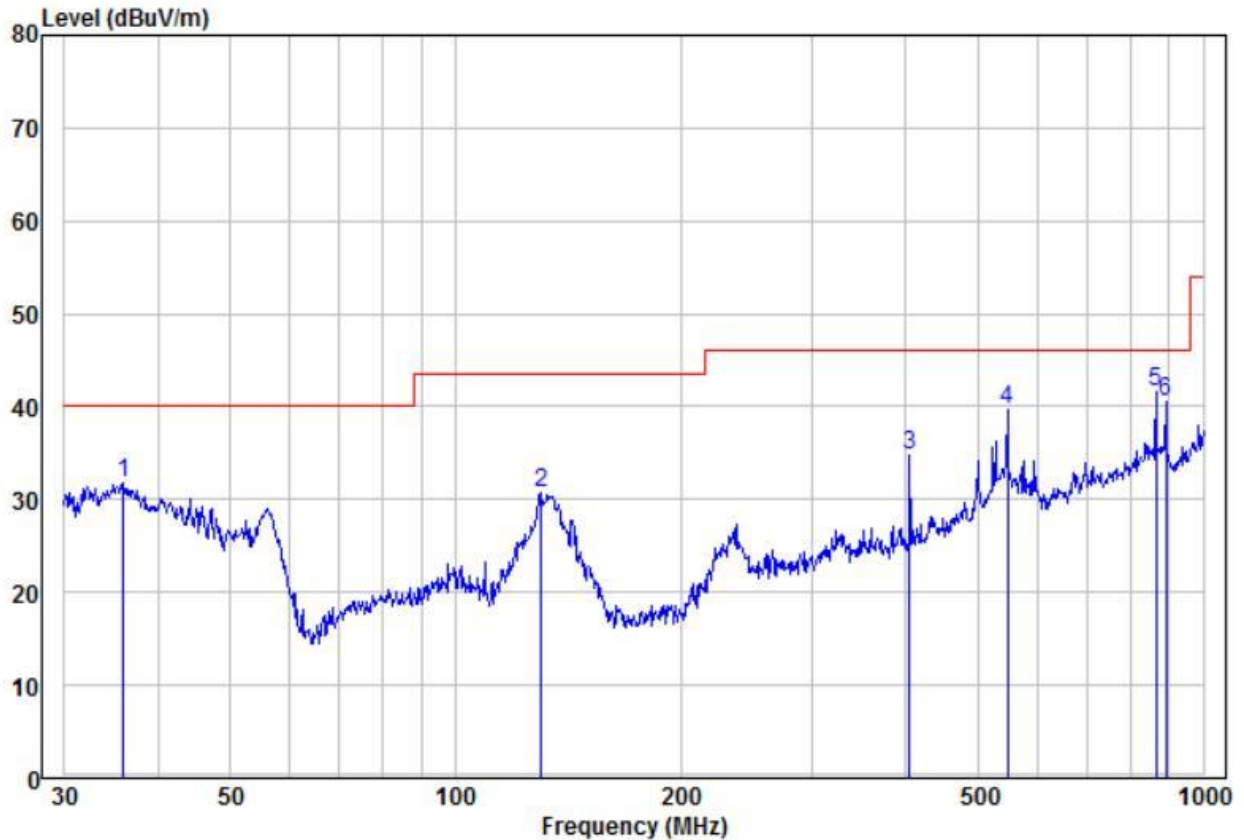
Level = Read Level + Factor,

Over Limit=Level-Limit Line.

RY019A050150UU

30MHz~1GHz

Vertical



	Read			Limit	Over			APos	TPos
Freq	Level	Factor	Level	Line	Limit	Remark	Pol/Phase		
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB			cm	deg
1	36.00	17.58	14.19	31.77	40.00	-8.23 Peak	VERTICAL	100	134
2	130.38	19.94	10.80	30.74	43.50	-12.76 Peak	VERTICAL	100	92
3	404.67	18.47	16.35	34.82	46.00	-11.18 Peak	VERTICAL	100	49
4	547.10	19.53	20.15	39.68	46.00	-6.32 Peak	VERTICAL	100	15
5 pp	866.09	15.70	25.94	41.64	46.00	-4.36 Peak	VERTICAL	100	0
6	890.73	14.65	25.92	40.57	46.00	-5.43 Peak	VERTICAL	100	223

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.