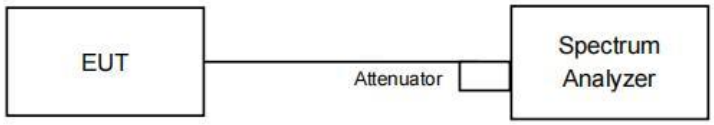
5.5 Power Spectral Density

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

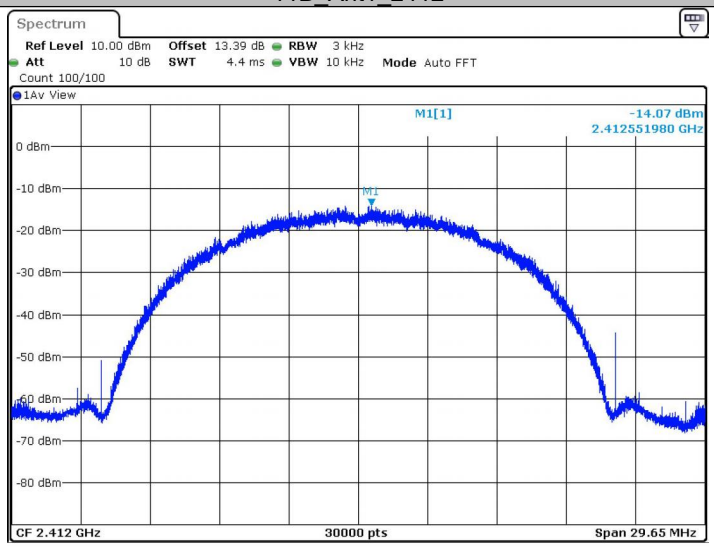
Test Result

TestMode	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B	2412	-14.07	≤8.00	PASS
	2437	-14.11	≤8.00	PASS
	2462	-14.27	≤8.00	PASS
11G	2412	-14.71	≤8.00	PASS
	2437	-15.23	≤8.00	PASS
	2462	-15.64	≤8.00	PASS
11N20SISO	2412	-14.87	≤8.00	PASS
	2437	-15.62	≤8.00	PASS
	2462	-16.61	≤8.00	PASS

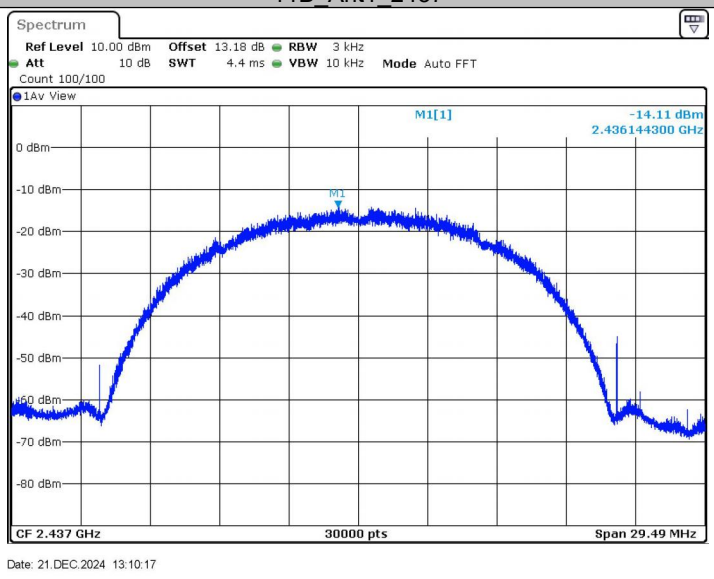
Note:
When Duty cycle >98%, D.C.F is not required.

Test Graphs

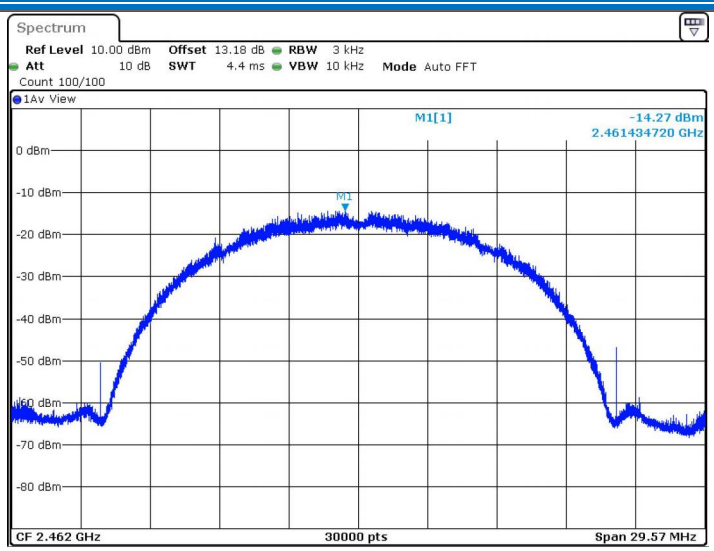
11B_Ant1_2412



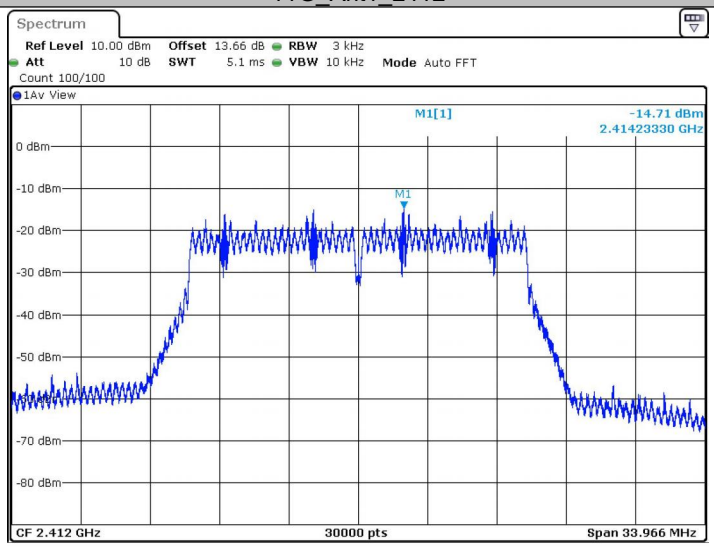
11B_Ant1_2437



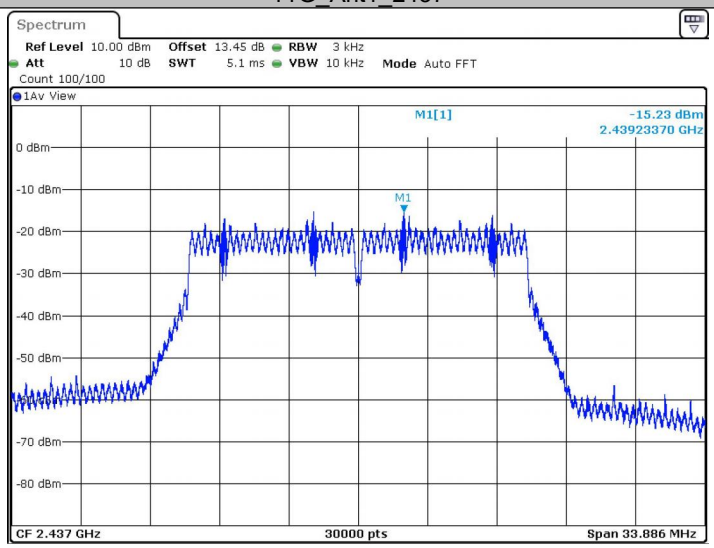
11B_Ant1_2462



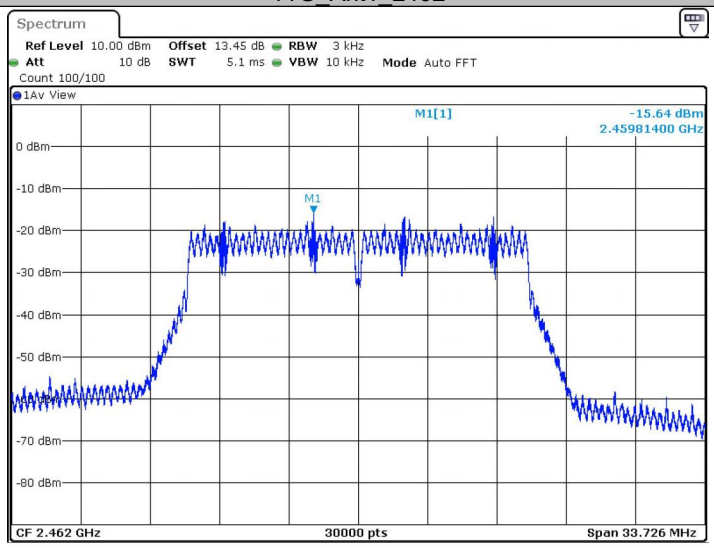
11G_Ant1_2412



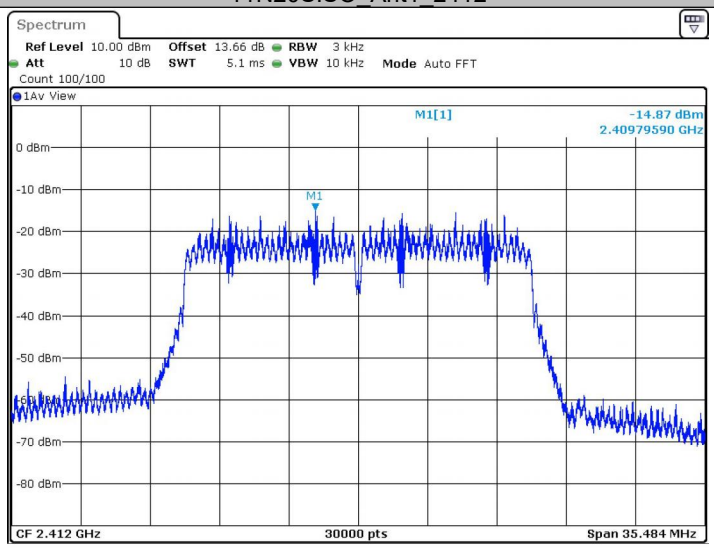
11G_Ant1_2437



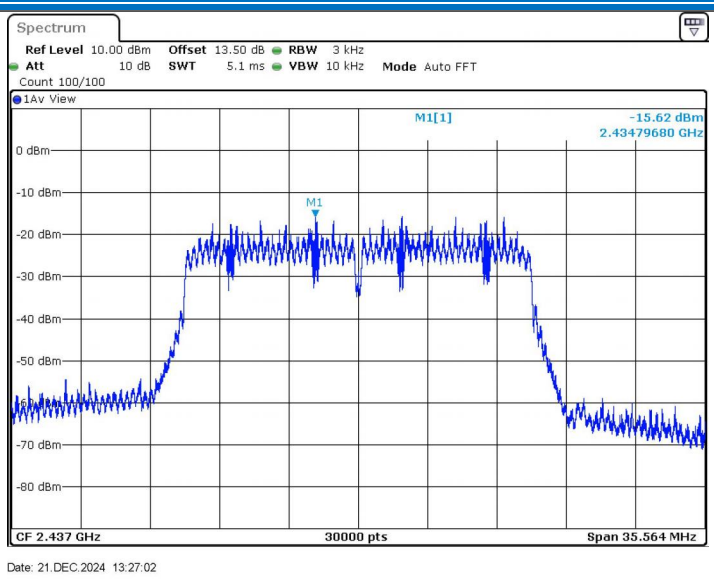
11G_Ant1_2462



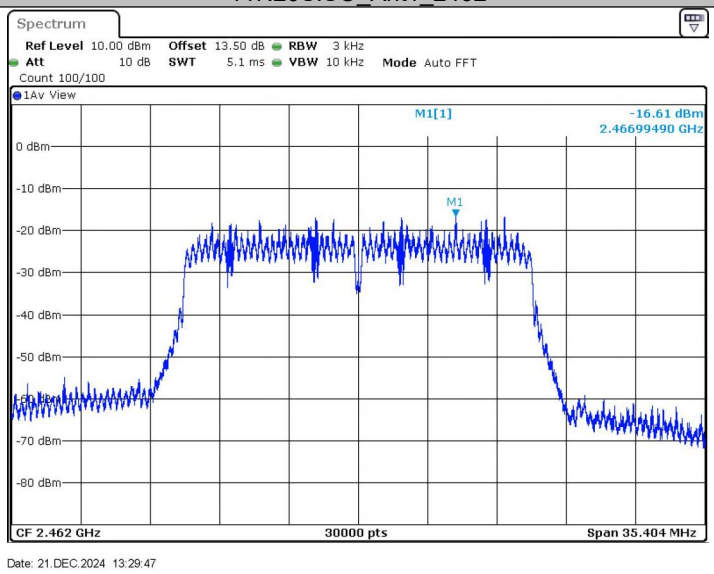
11N20SISO_Ant1_2412



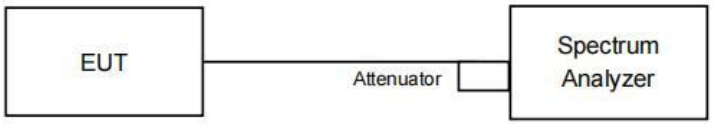
11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



5.6 Band-edge for RF Conducted Emissions

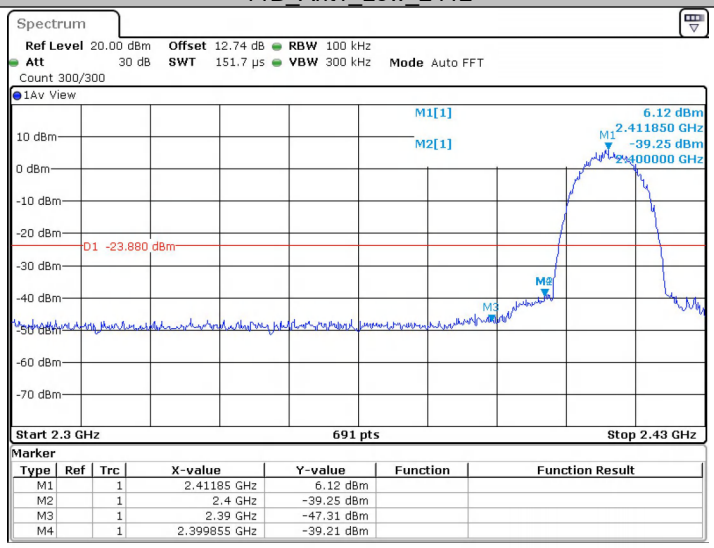
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013
Test Setup:	 Offset=cable loss+ attenuation factor
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
. Final Test Mode:	Only the worst case is recorded in the report.
Limit:	In any 100 kHz bandwidth 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	6.12	-39.21	≤-23.88	PASS
	High	2462	6.36	-45.14	≤-23.64	PASS
11G	Low	2412	1.27	-34.4	≤-28.73	PASS
	High	2462	1.20	-44.19	≤-28.8	PASS
11N20SISO	Low	2412	0.16	-35.7	≤-29.84	PASS
	High	2462	0.39	-45.11	≤-29.61	PASS

Test Graphs

11B_Ant1_Low_2412



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41185 GHz	6.12 dBm		
M2		1	2.4 GHz	-39.25 dBm		
M3		1	2.39 GHz	-47.31 dBm		
M4		1	2.399855 GHz	-39.21 dBm		

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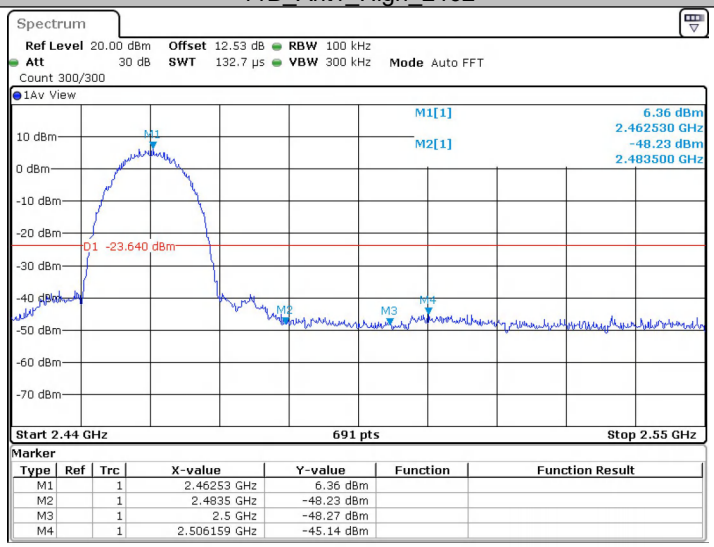
11B_Ant1_High_2462

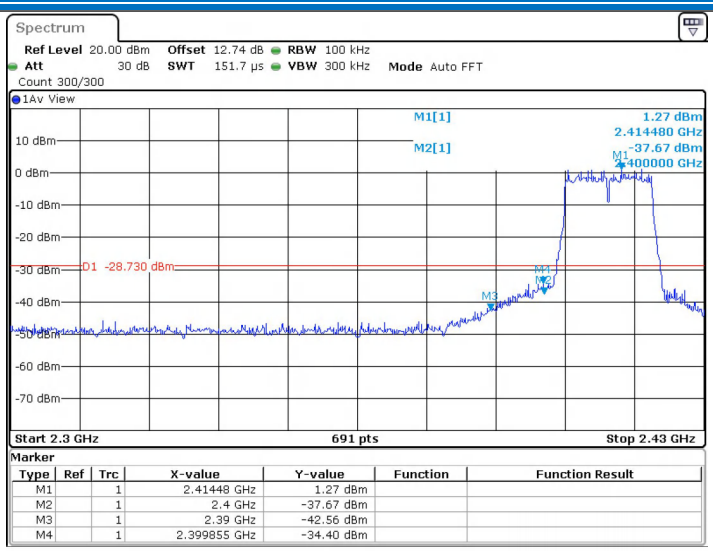


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.46253 GHz	6.36 dBm		
M2		1	2.4835 GHz	-48.23 dBm		
M3		1	2.5 GHz	-48.27 dBm		
M4		1	2.506159 GHz	-45.14 dBm		

Date: 21.DEC.2024 13:12:23

11G_Ant1_Low_2412

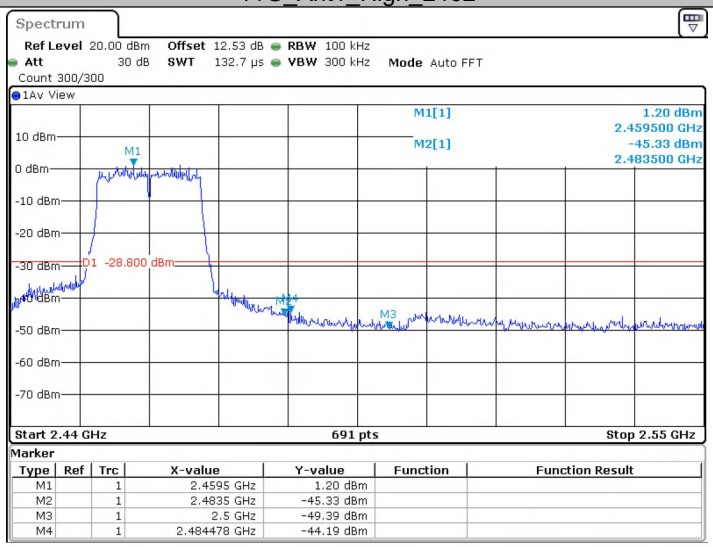


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41448 GHz	1.27 dBm		
M2		1	2.4 GHz	-37.67 dBm		
M3		1	2.39 GHz	-42.56 dBm		
M4		1	2.399855 GHz	-34.40 dBm		

Date: 21.DEC.2024 13:14:56

11G_Ant1_High_2462



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4595 GHz	1.20 dBm		
M2		1	2.4835 GHz	-45.33 dBm		
M3		1	2.5 GHz	-49.39 dBm		
M4		1	2.484478 GHz	-44.19 dBm		

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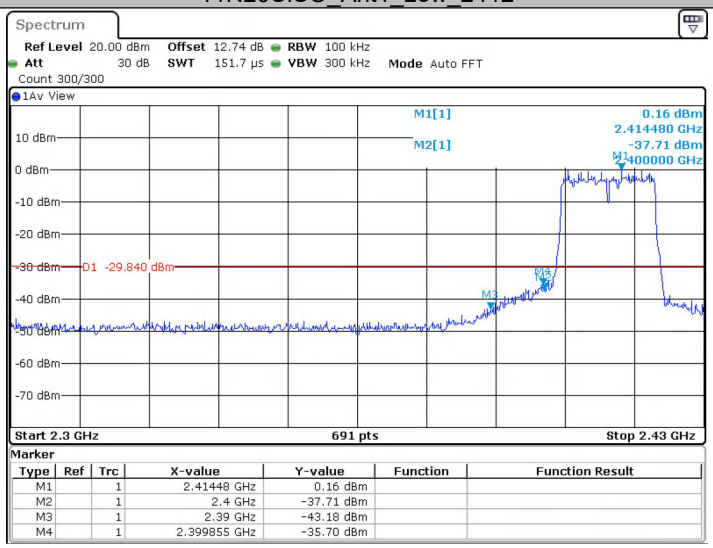
11N20SISO_Ant1_Low_2412



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41448 GHz	0.16 dBm		
M2		1	2.4 GHz	-37.71 dBm		
M3		1	2.39 GHz	-43.18 dBm		
M4		1	2.399855 GHz	-35.70 dBm		

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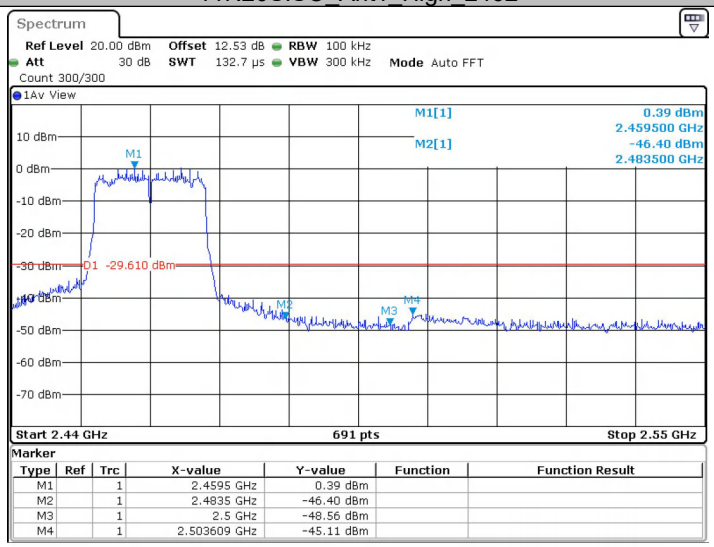
11N20SISO_Ant1_High_2462

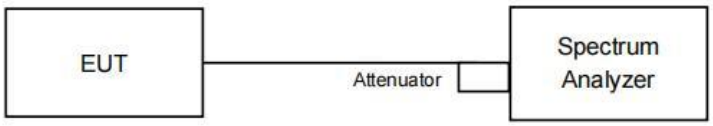


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4595 GHz	0.39 dBm		
M2		1	2.4835 GHz	-46.40 dBm		
M3		1	2.5 GHz	-48.56 dBm		
M4		1	2.503609 GHz	-45.11 dBm		

Date: 21.DEC.2024 13:29:58

5.7 RF Conducted Spurious Emissions

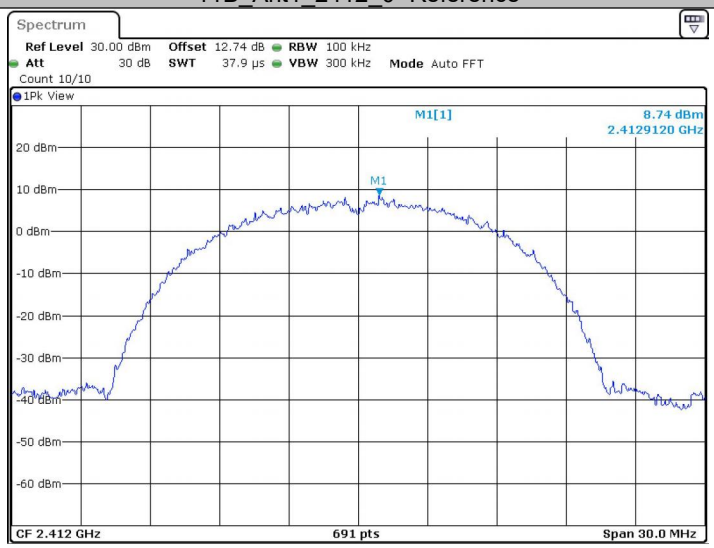
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013
Test Setup:	 Offset=cable loss+ attenuation factor
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Only the worst case is recorded in the report.
Limit:	In any 100 kHz bandwidth 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

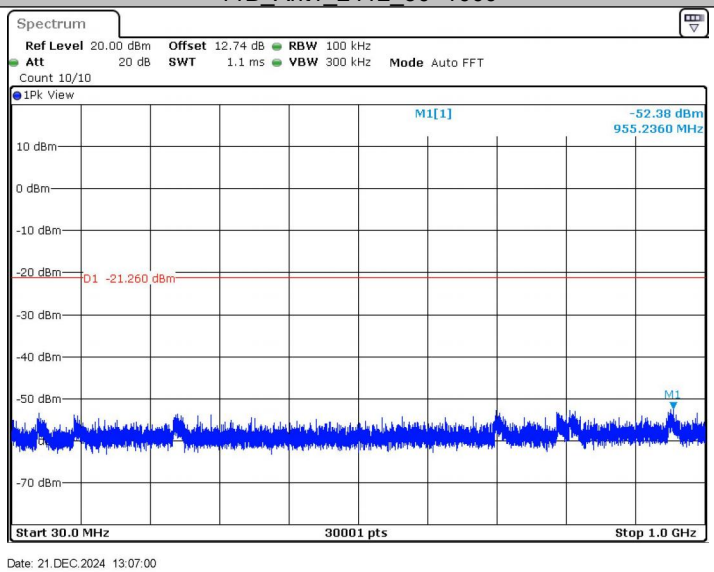
TestMode	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	2412	Reference	8.74	8.74	---	PASS
		30~1000	8.74	-52.38	≤-21.26	PASS
		1000~26500	8.74	-46.31	≤-21.26	PASS
	2437	Reference	7.92	7.92	---	PASS
		30~1000	7.92	-51.93	≤-22.08	PASS
		1000~26500	7.92	-49.15	≤-22.08	PASS
	2462	Reference	7.80	7.80	---	PASS
		30~1000	7.80	-52.36	≤-22.2	PASS
		1000~26500	7.80	-49.78	≤-22.2	PASS
11G	2412	Reference	3.86	3.86	---	PASS
		30~1000	3.86	-52.49	≤-26.14	PASS
		1000~26500	3.86	-49.49	≤-26.14	PASS
	2437	Reference	3.77	3.77	---	PASS
		30~1000	3.77	-52.43	≤-26.23	PASS
		1000~26500	3.77	-49.66	≤-26.23	PASS
	2462	Reference	3.36	3.36	---	PASS
		30~1000	3.36	-52.86	≤-26.64	PASS
		1000~26500	3.36	-49.36	≤-26.64	PASS
11N20SISO	2412	Reference	2.78	2.78	---	PASS
		30~1000	2.78	-52.16	≤-27.22	PASS
		1000~26500	2.78	-48.92	≤-27.22	PASS
	2437	Reference	2.86	2.86	---	PASS
		30~1000	2.86	-52.82	≤-27.14	PASS
		1000~26500	2.86	-49.86	≤-27.14	PASS
	2462	Reference	2.55	2.55	---	PASS
		30~1000	2.55	-52.48	≤-27.45	PASS
		1000~26500	2.55	-49.07	≤-27.45	PASS

Test Graphs

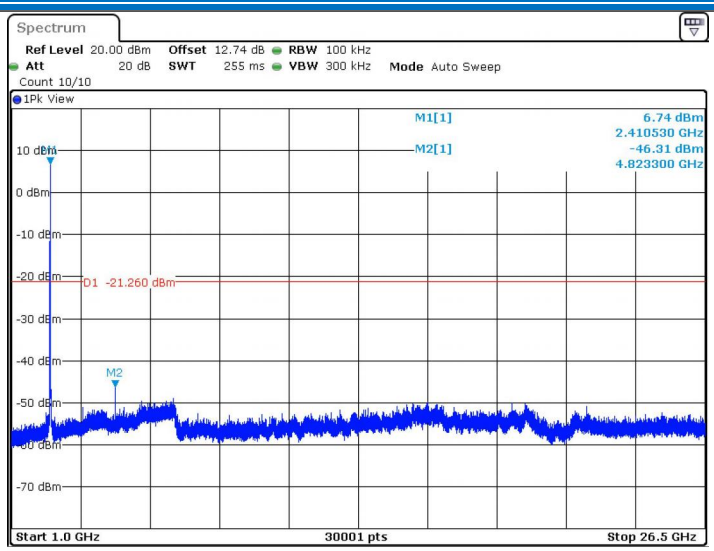
11B_Ant1_2412_0~Reference



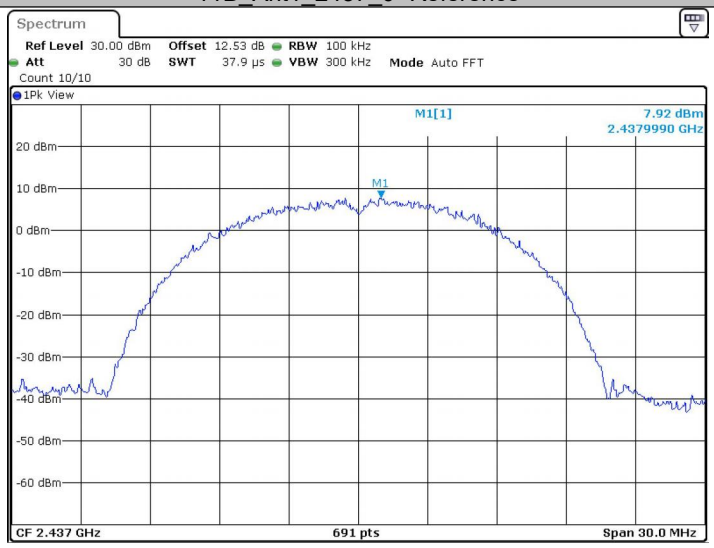
11B_Ant1_2412_30~1000



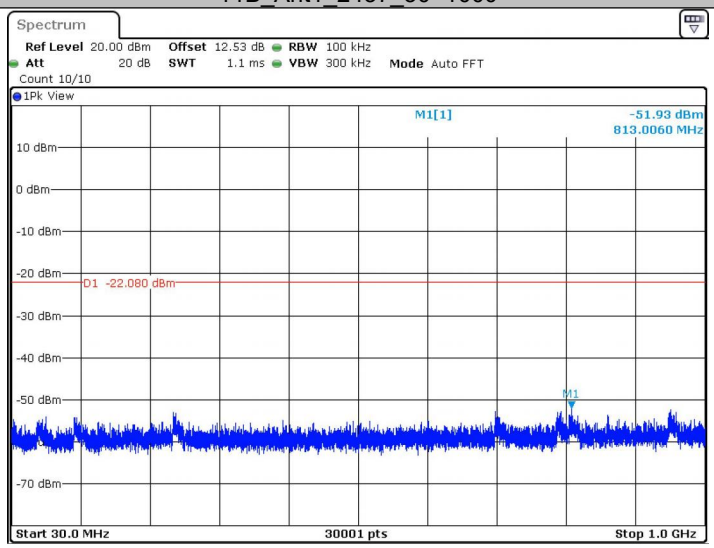
11B_Ant1_2412_1000~26500



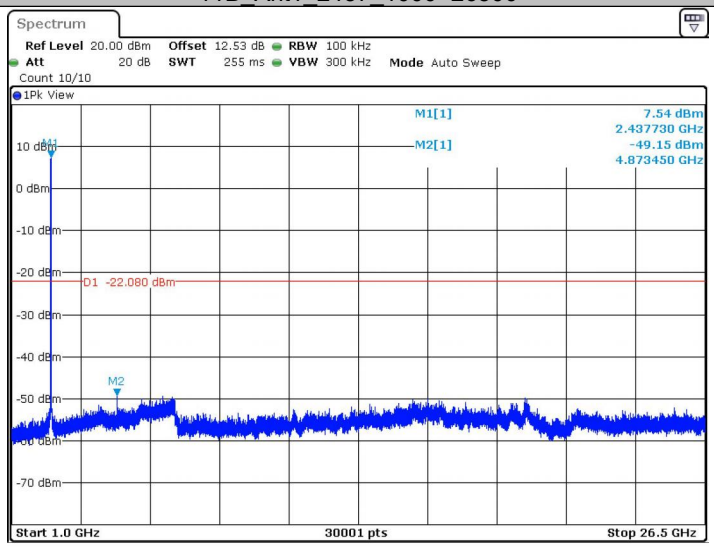
11B_Ant1_2437_0~Reference



11B_Ant1_2437_30~1000

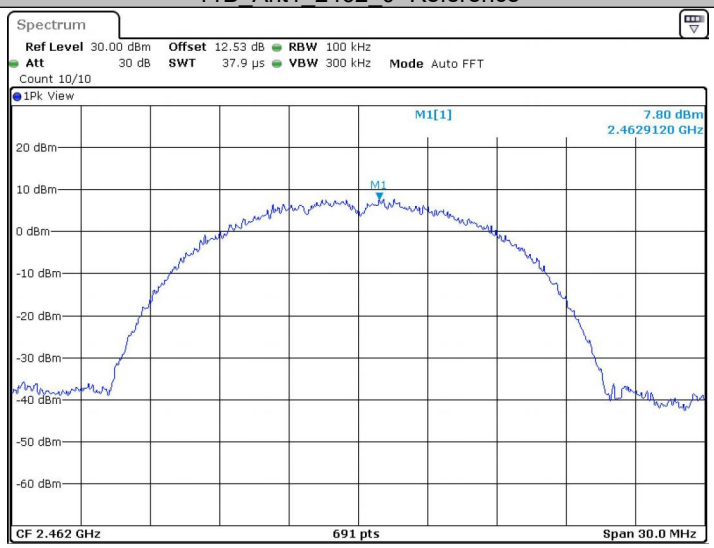


11B_Ant1_2437_1000~26500



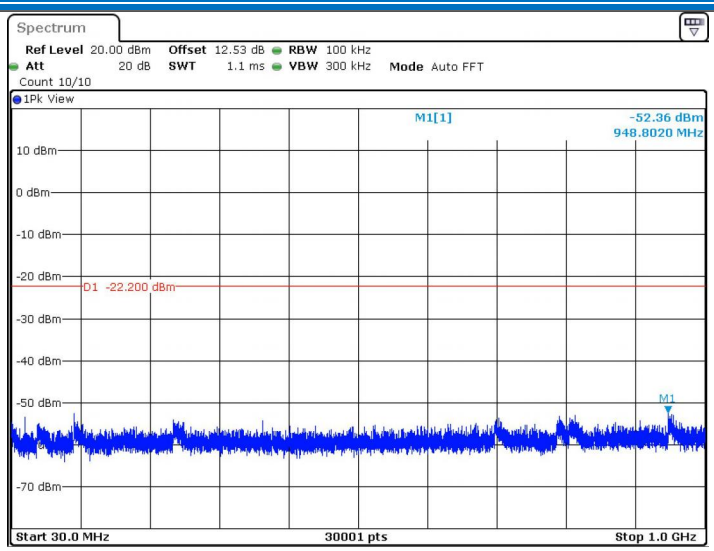
Date: 21.DEC.2024 13:10:56

11B_Ant1_2462_0~Reference

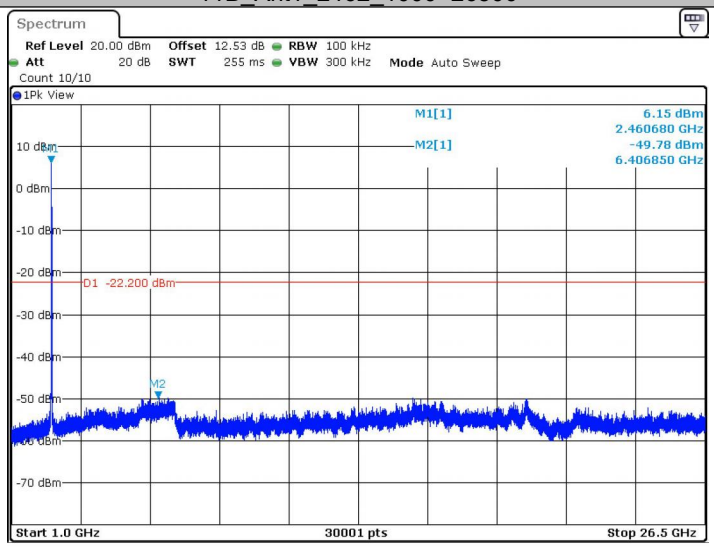


Date: 21.DEC.2024 13:12:32

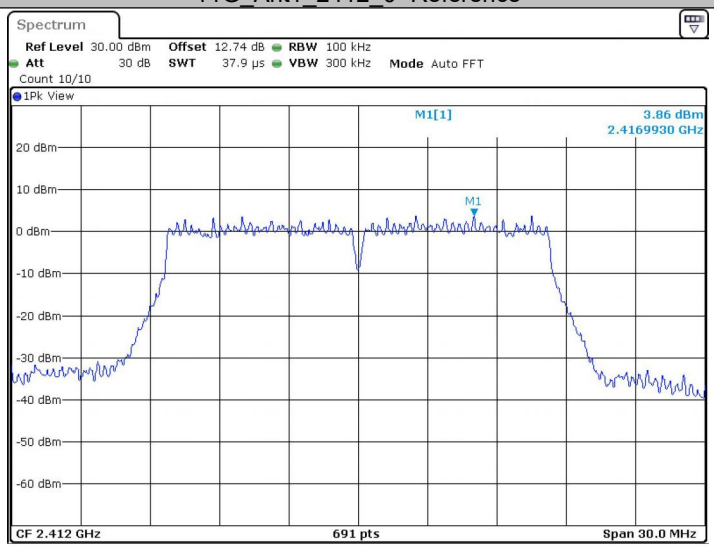
11B_Ant1_2462_30~1000



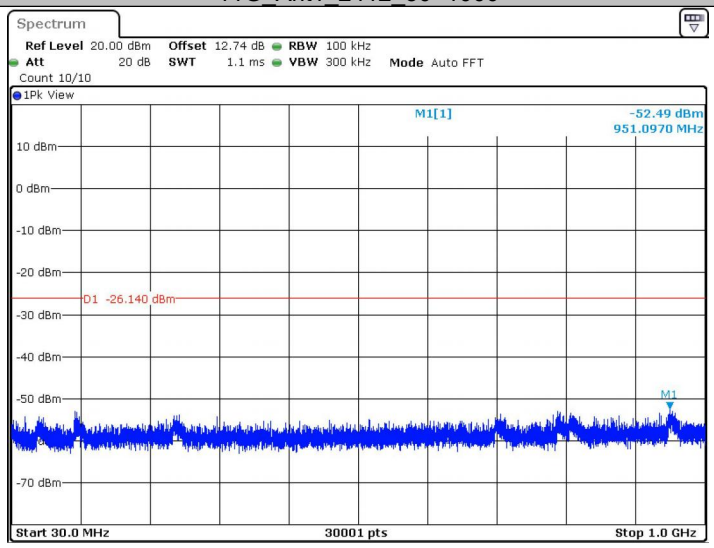
11B_Ant1_2462_1000~26500



11G_Ant1_2412_0~Reference

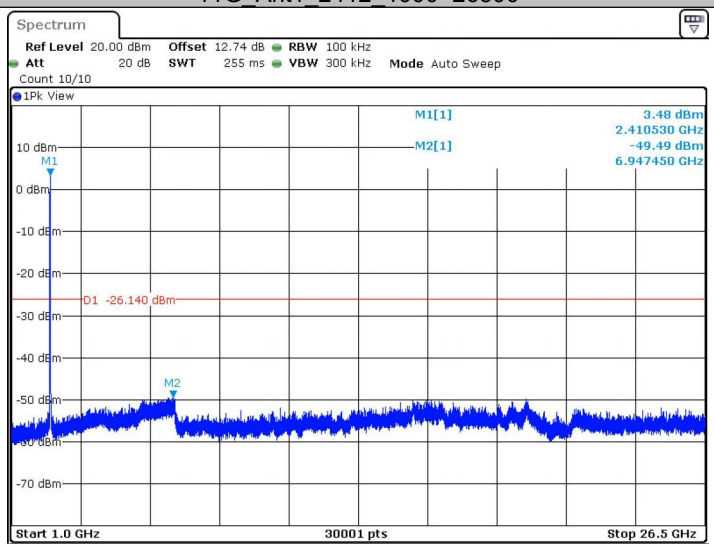


11G_Ant1_2412_30~1000



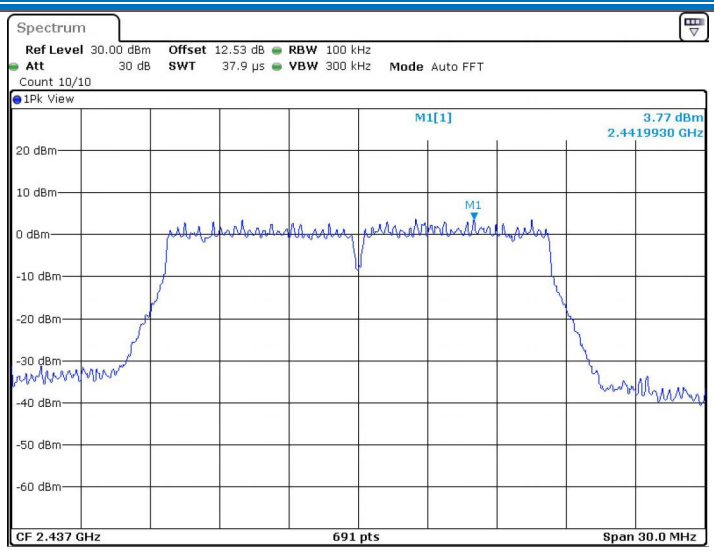
Date: 21.DEC.2024 13:15:14

11G_Ant1_2412_1000~26500



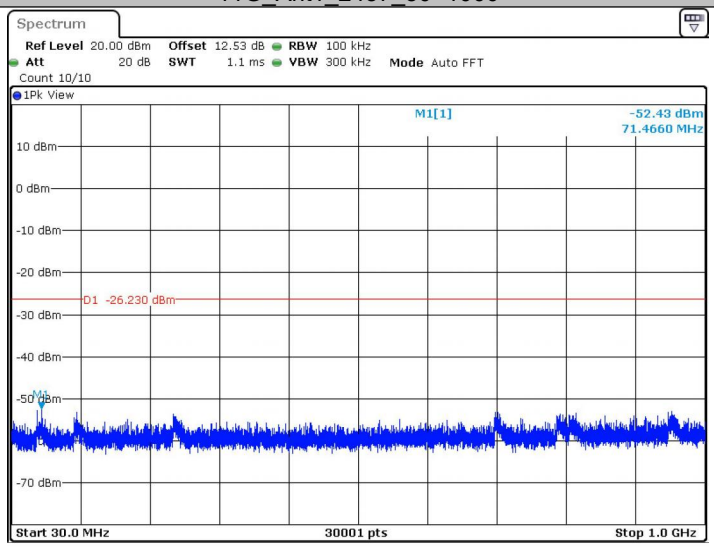
Date: 21.DEC.2024 13:15:36

11G_Ant1_2437_0~Reference



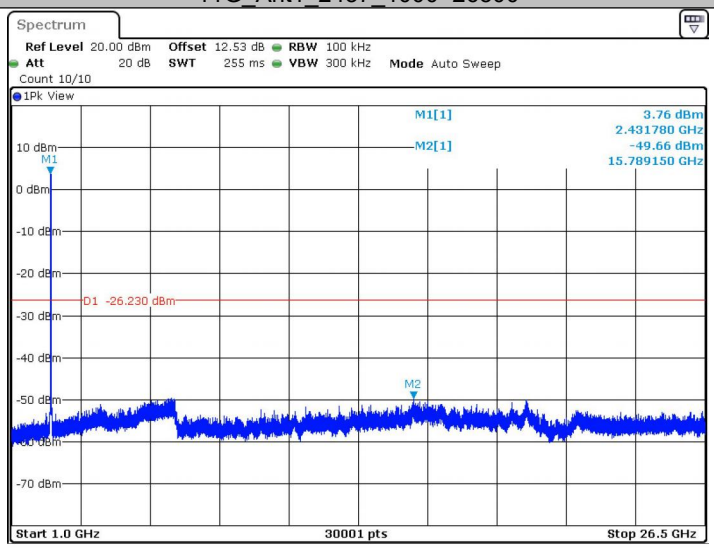
Date: 21.DEC.2024 13:17:31

11G_Ant1_2437_30~1000



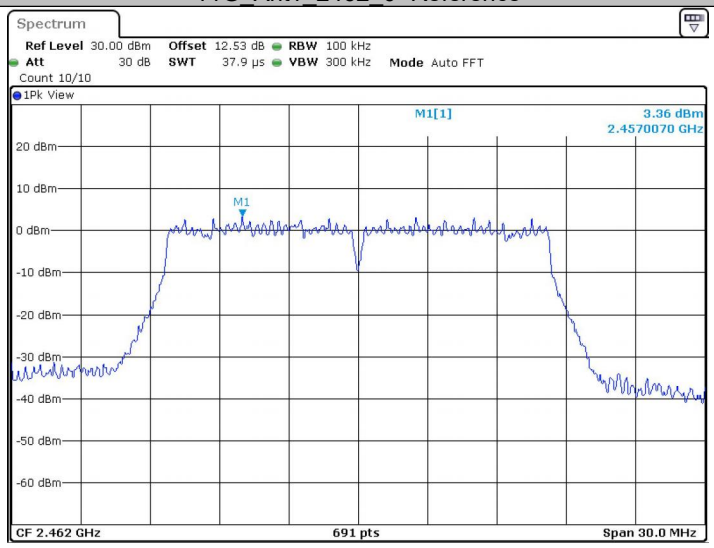
Date: 21.DEC.2024 13:17:40

11G_Ant1_2437_1000~26500



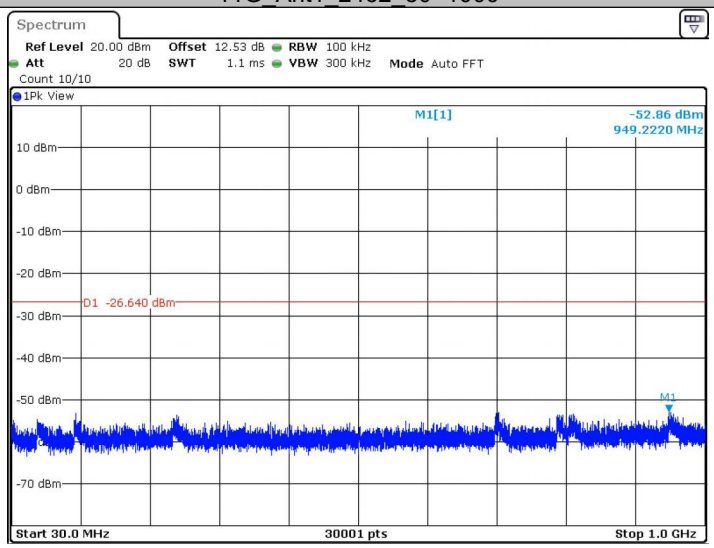
Date: 21.DEC.2024 13:18:02

11G_Ant1_2462_0~Reference



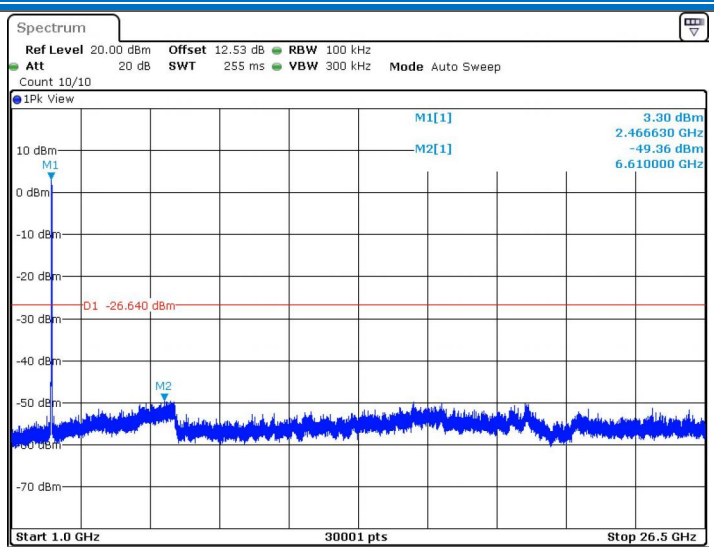
Date: 21.DEC.2024 13:19:52

11G_Ant1_2462_30~1000



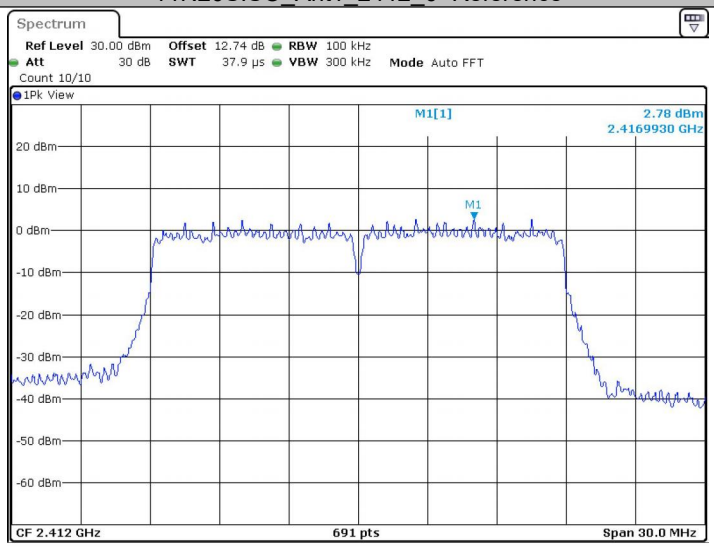
Date: 21.DEC.2024 13:20:00

11G_Ant1_2462_1000~26500



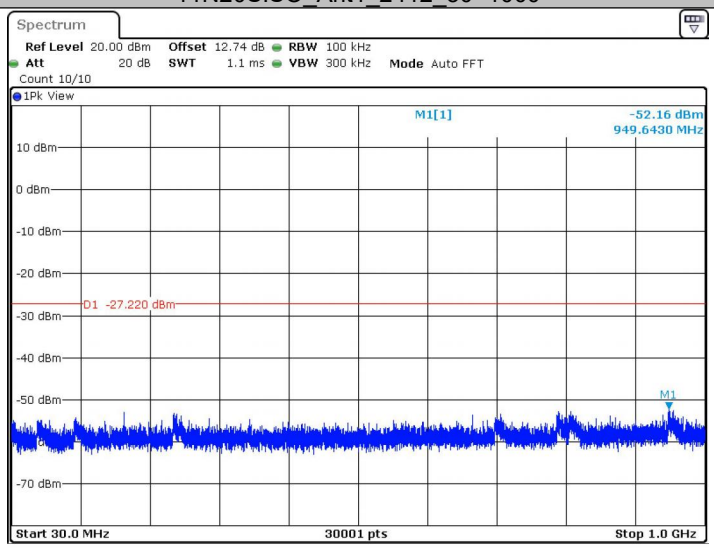
Date: 21.DEC.2024 13:20:22

11N20SISO_Ant1_2412_0~Reference



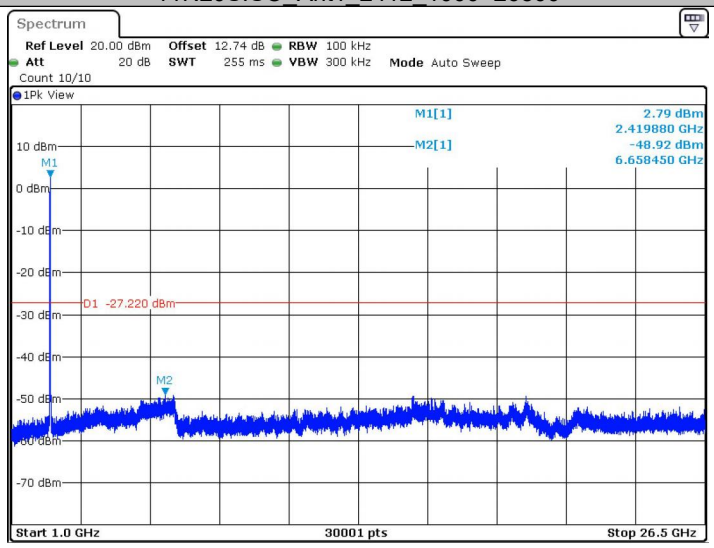
Date: 21.DEC.2024 13:22:42

11N20SISO_Ant1_2412_30~1000



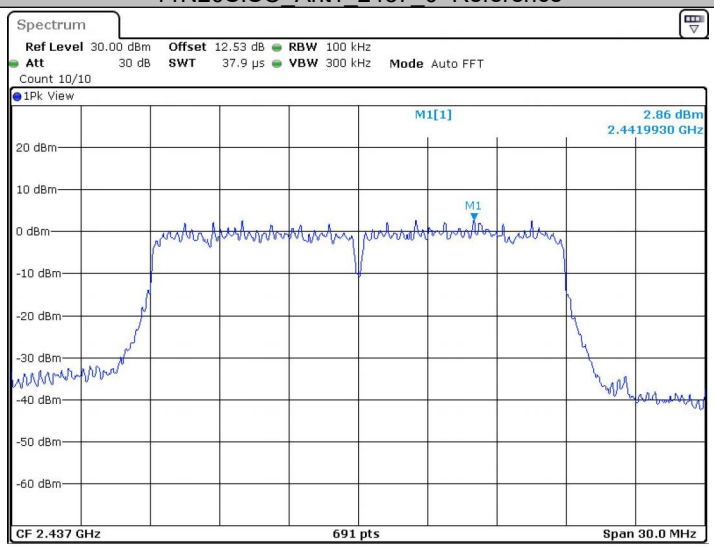
Date: 21.DEC.2024 13:22:50

11N20SISO_Ant1_2412_1000~26500



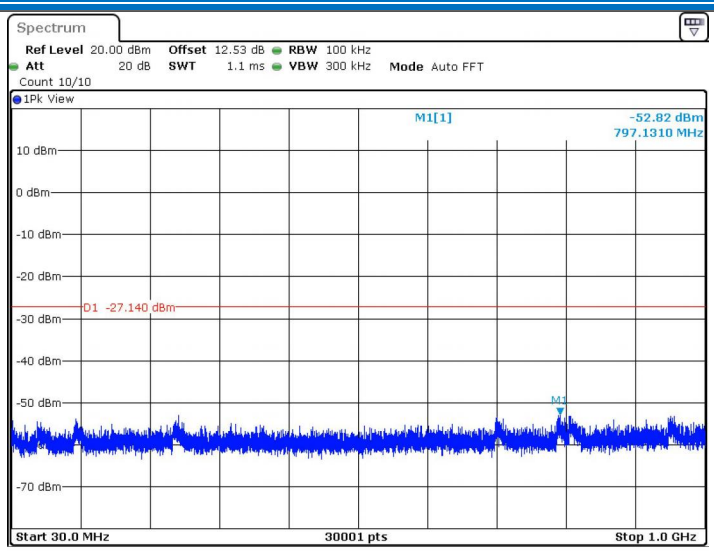
Date: 21.DEC.2024 13:23:12

11N20SISO_Ant1_2437_0~Reference



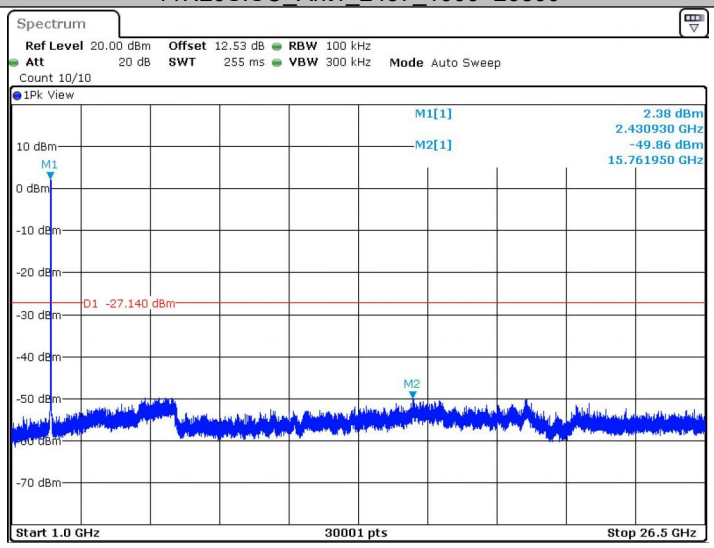
Date: 21.DEC.2024 13:27:11

11N20SISO_Ant1_2437_30~1000



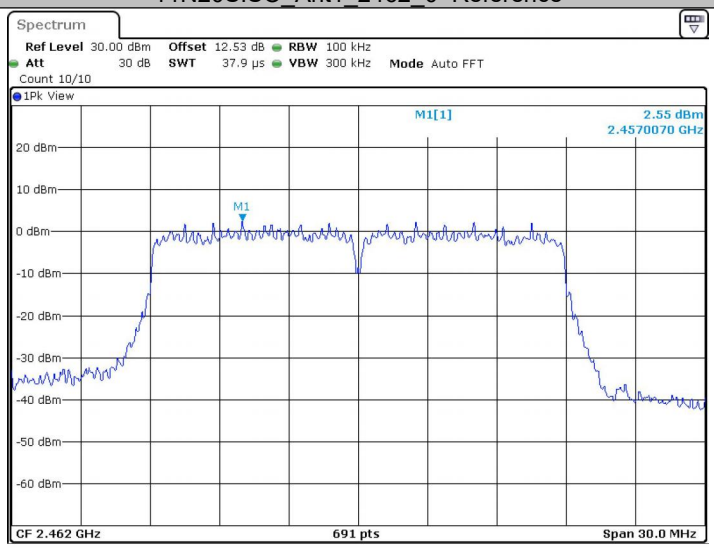
Date: 21.DEC.2024 13:27:19

11N20SISO_Ant1_2437_1000~26500



Date: 21.DEC.2024 13:27:41

11N20SISO_Ant1_2462_0~Reference



Date: 21.DEC.2024 13:30:07

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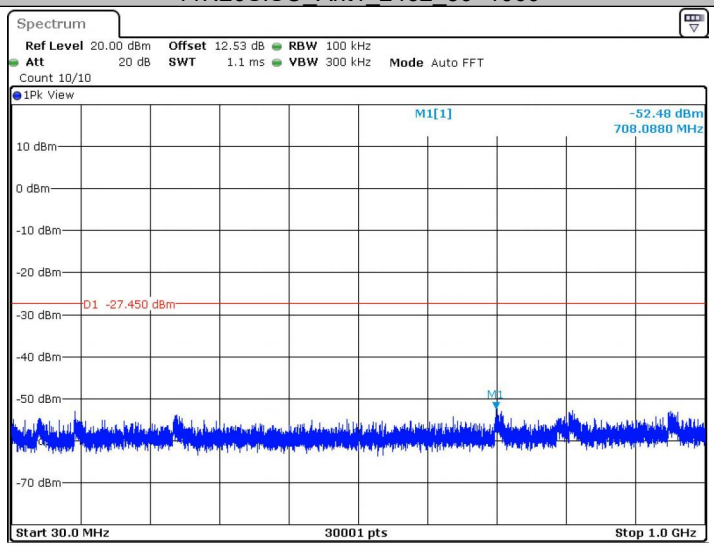
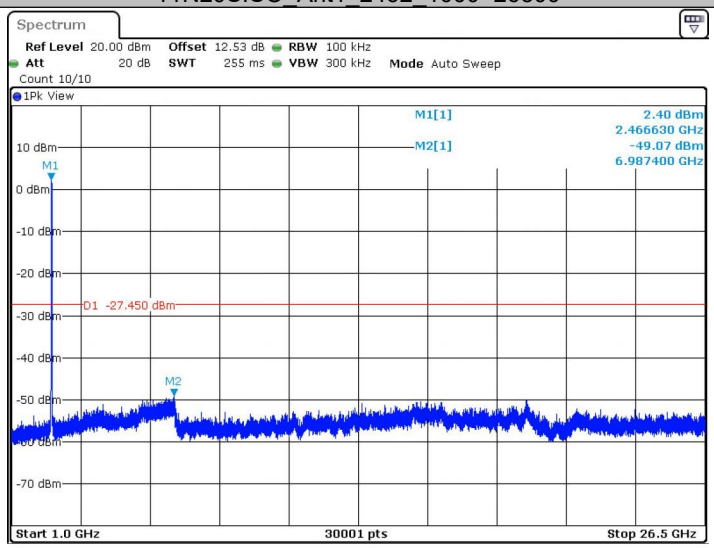


11N20SISO_Ant1_2462_1000~26500



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:	

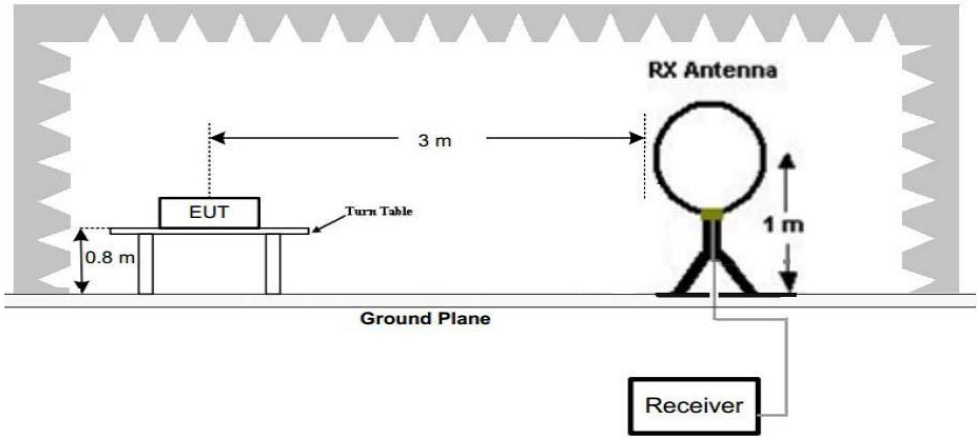


Figure 1. Below 30MHz

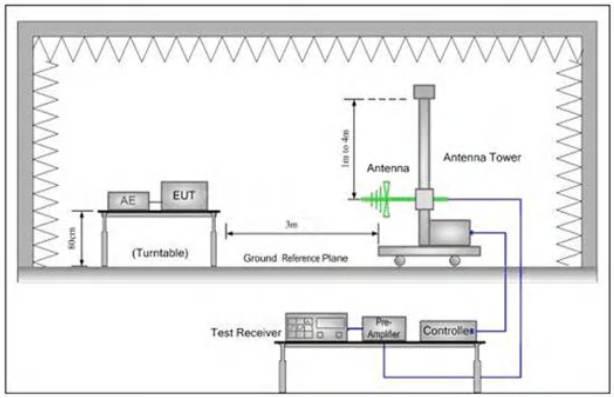


Figure 2. 30MHz to 1GHz

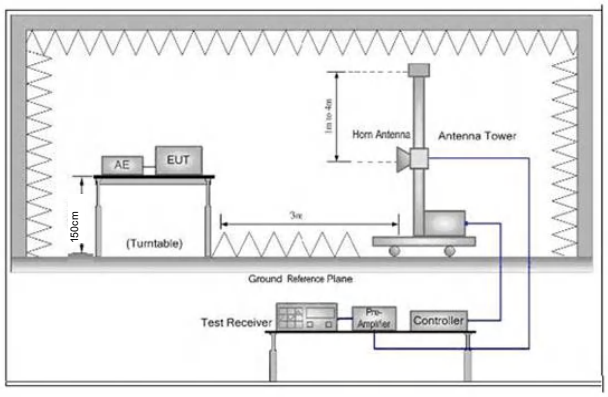


Figure 3. Above 1 GHz

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 camber. 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 camber. 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.

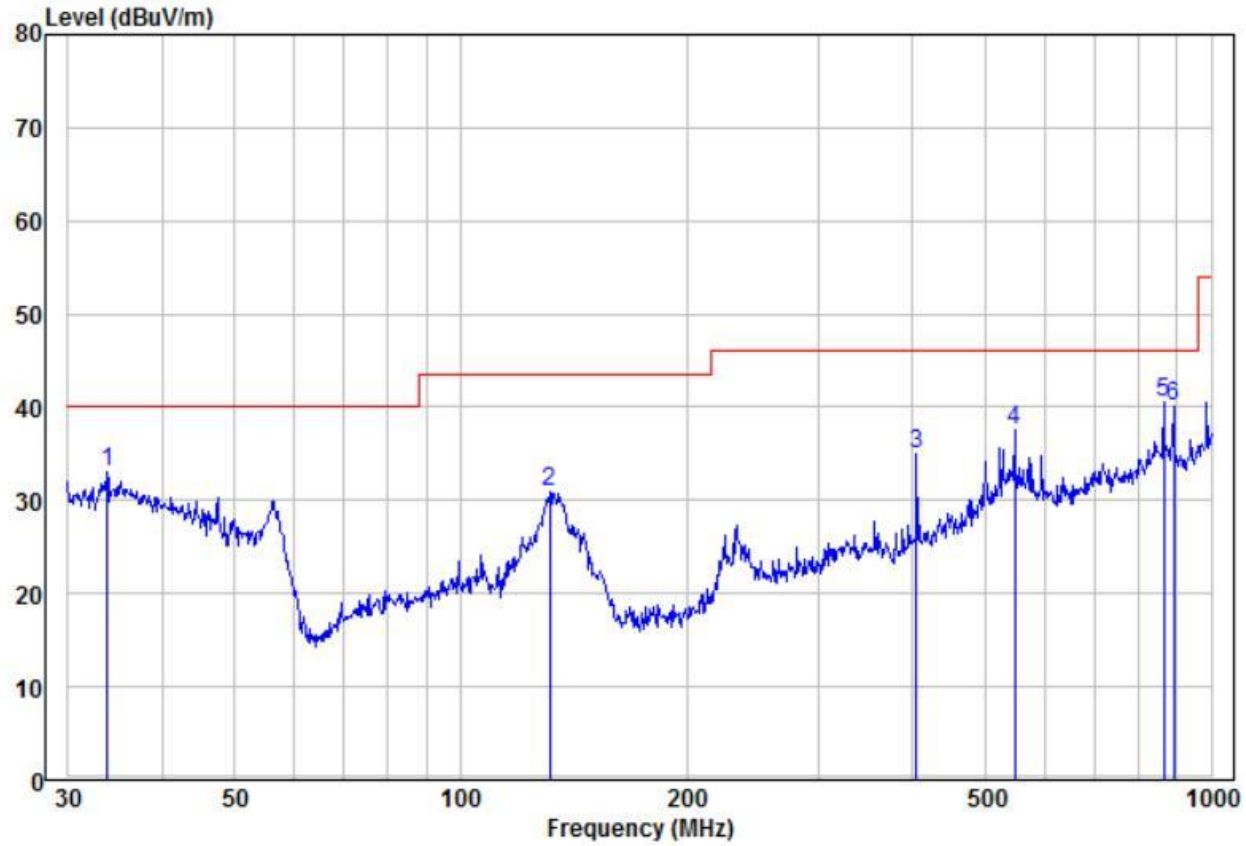
	d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum 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

30MHz~1GHz

AS011Z-0501500UU

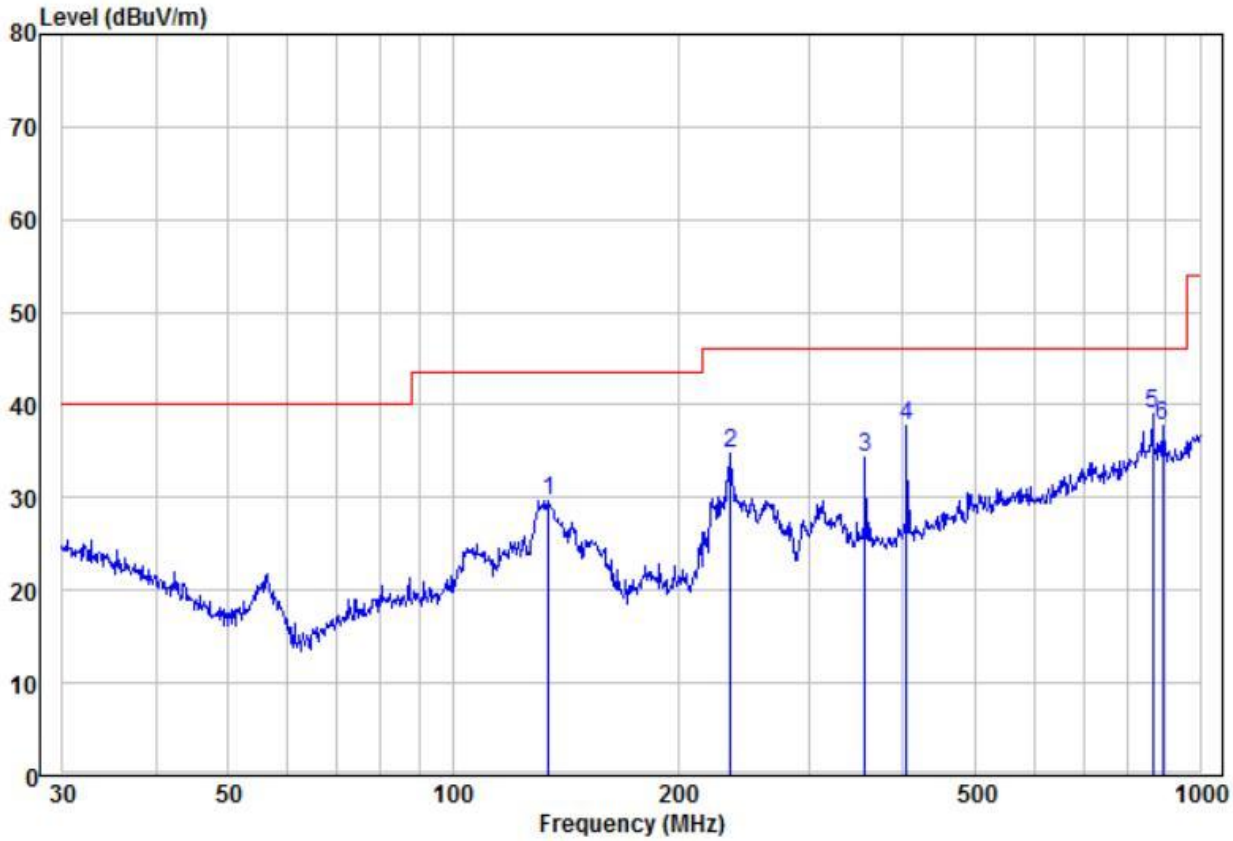
Vertical



	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	33.80	18.19	14.81	33.00	40.00	-7.00	Peak	VERTICAL	100	360
2	131.30	20.25	10.59	30.84	43.50	-12.66	Peak	VERTICAL	100	341
3	404.67	18.67	16.35	35.02	46.00	-10.98	Peak	VERTICAL	100	291
4	547.10	17.34	20.15	37.49	46.00	-8.51	Peak	VERTICAL	100	240
5 pp	866.09	14.51	25.94	40.45	46.00	-5.55	Peak	VERTICAL	100	160
6	890.73	14.27	25.92	40.19	46.00	-5.81	Peak	VERTICAL	100	164

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

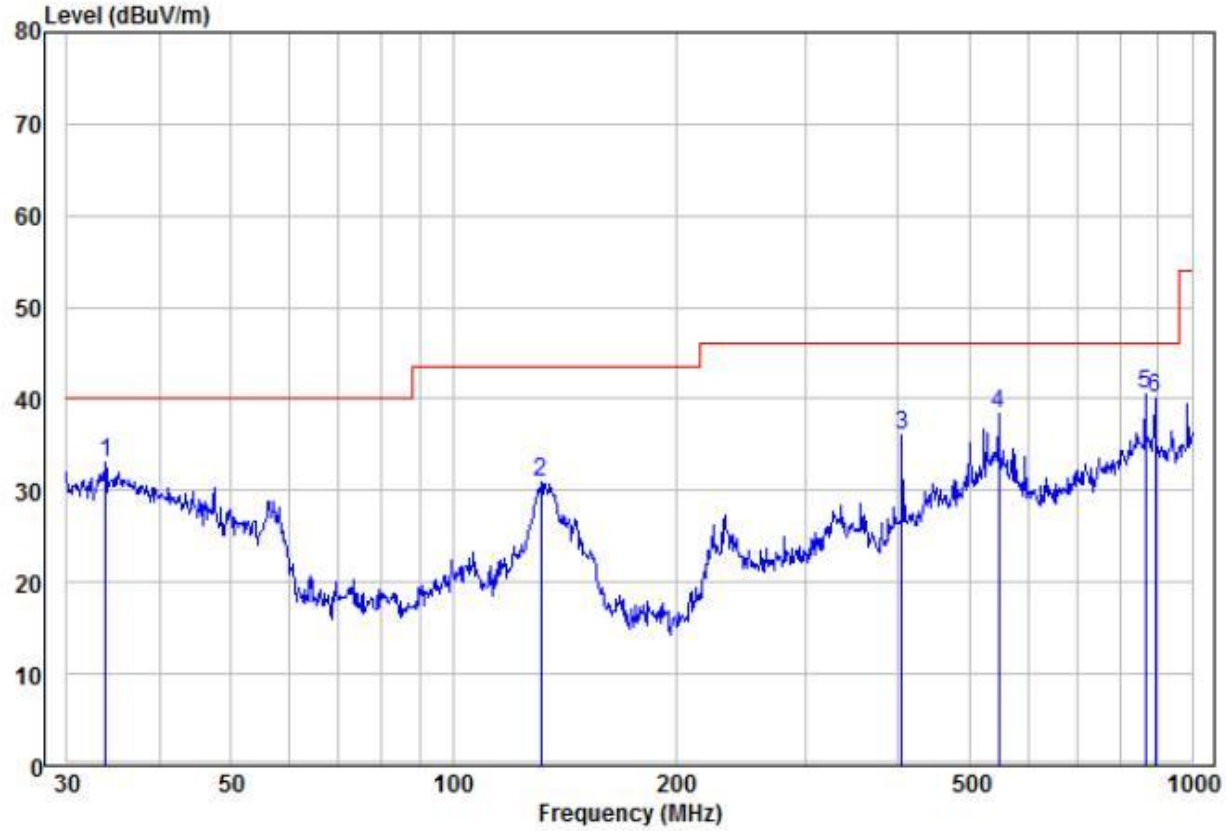


	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase	APos	TPos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB			cm	deg
1	134.09	19.76	9.97	29.73	43.50	-13.77	Peak	HORIZONTAL	100	34
2	234.99	23.06	11.77	34.83	46.00	-11.17	Peak	HORIZONTAL	100	77
3	356.68	18.32	16.06	34.38	46.00	-11.62	Peak	HORIZONTAL	100	112
4	404.67	21.42	16.35	37.77	46.00	-8.23	Peak	HORIZONTAL	100	154
5 pp	866.09	13.15	25.94	39.09	46.00	-6.91	Peak	HORIZONTAL	100	209
6	890.73	11.77	25.92	37.69	46.00	-8.31	Peak	HORIZONTAL	100	129

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

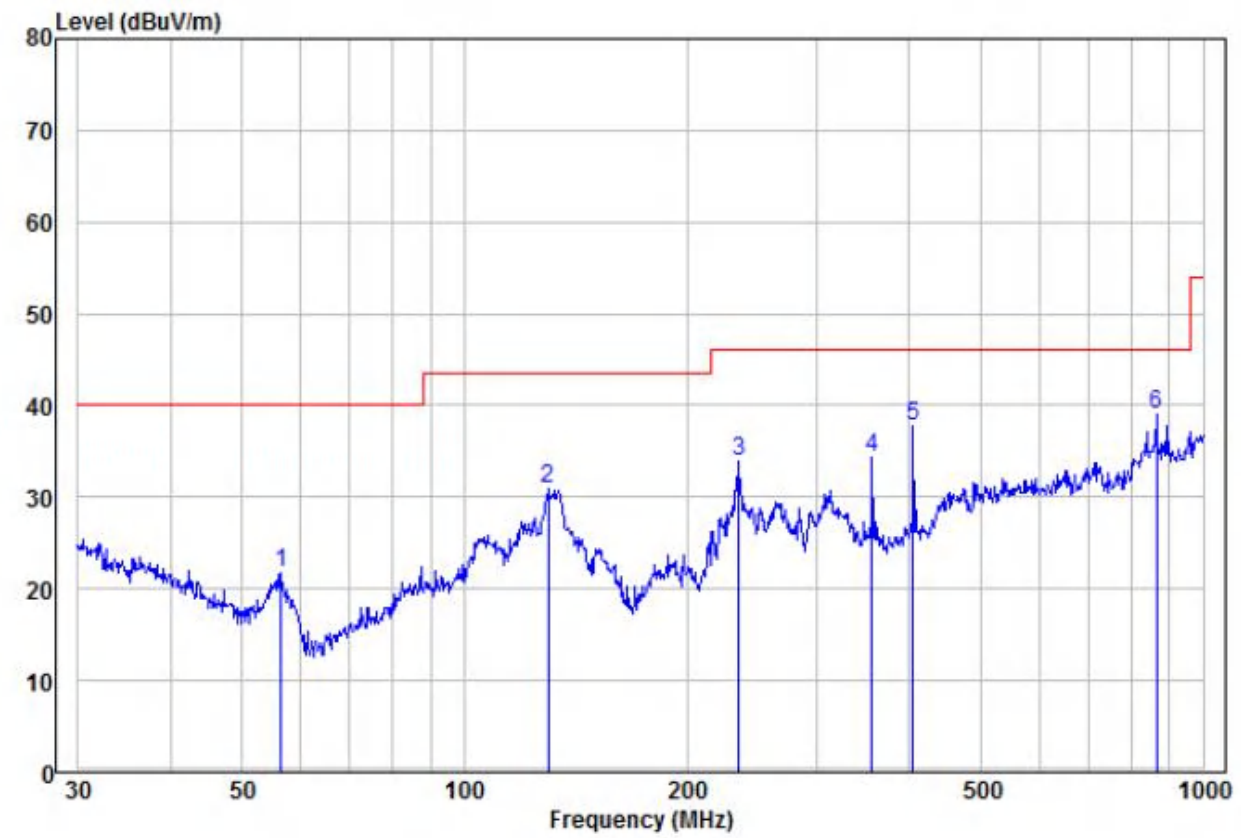
Vertical



	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	33.80	18.19	14.81	33.00	40.00	-7.00	Peak	VERTICAL	100	341
2	131.30	20.25	10.59	30.84	43.50	-12.66	Peak	VERTICAL	100	30
3	404.67	19.67	16.35	36.02	46.00	-9.98	Peak	VERTICAL	100	241
4	547.10	18.34	20.15	38.49	46.00	-7.51	Peak	VERTICAL	100	180
5 pp	866.09	14.51	25.94	40.45	46.00	-5.55	Peak	VERTICAL	100	79
6	890.73	14.27	25.92	40.19	46.00	-5.81	Peak	VERTICAL	100	32

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	56.39	15.17	6.62	21.79	40.00	-18.21	Peak	HORIZONTAL	100	55
2	129.92	20.11	10.88	30.99	43.50	-12.51	Peak	HORIZONTAL	100	56
3	234.99	22.06	11.77	33.83	46.00	-12.17	Peak	HORIZONTAL	100	152
4	356.68	18.32	16.06	34.38	46.00	-11.62	Peak	HORIZONTAL	100	63
5	404.67	21.42	16.35	37.77	46.00	-8.23	Peak	HORIZONTAL	100	53
6 pp	866.09	13.15	25.94	39.09	46.00	-6.91	Peak	HORIZONTAL	100	129

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.

5.8.2 Transmitter emission above 1GHz

Test mode:		802.11b(1Mbps)		Test channel:		Lowest			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V	(m)	(Degree)
4824.000	54.11	-4.26	49.85	74	-24.15	peak	H	1.5	97
4824.000	37.35	-4.26	33.09	54	-20.91	AVG	H	1.5	102
7236.000	50.39	1.18	51.57	74	-22.43	peak	H	1.5	91
7236.000	38.93	1.18	40.11	54	-13.89	AVG	H	1.5	20
4824.000	54.47	-4.26	50.21	74	-23.79	peak	V	1.5	85
4824.000	39.71	-4.26	35.45	54	-18.55	AVG	V	1.5	297
7236.000	52.19	1.18	53.37	74	-20.63	peak	V	1.5	252
7236.000	35.38	1.18	36.56	54	-17.44	AVG	V	1.5	339

Test mode:		802.11b(1Mbps)		Test channel:		Middle			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V	(m)	(Degree)
4874.000	51.52	-4.12	47.40	74	-26.60	peak	H	1.5	157
4874.000	37.28	-4.12	33.16	54	-20.84	AVG	H	1.5	229
7311.000	48.92	1.46	50.38	74	-23.62	peak	H	1.5	286
7311.000	36.33	1.46	37.79	54	-16.21	AVG	H	1.5	173
4874.000	53.88	-4.12	49.76	74	-24.24	peak	V	1.5	307
4874.000	36.25	-4.12	32.13	54	-21.87	AVG	V	1.5	268
7311.000	49.74	1.46	51.20	74	-22.80	peak	V	1.5	70
7311.000	35.56	1.46	37.02	54	-16.98	AVG	V	1.5	27

Test mode:		802.11b(1Mbps)		Test channel:		Highest			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol. H/V	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)			(m)	(Degree)
4924.000	52.96	-4.03	48.93	74	-25.07	peak	H	1.5	87
4924.000	38.38	-4.03	34.35	54	-19.65	AVG	H	1.5	343
7386.000	51.08	1.66	52.74	74	-21.26	peak	H	1.5	348
7386.000	36.40	1.66	38.06	54	-15.94	AVG	H	1.5	299
4924.000	53.69	-4.03	49.66	74	-24.34	peak	V	1.5	348
4924.000	37.82	-4.03	33.79	54	-20.21	AVG	V	1.5	129
7386.000	50.02	1.66	51.68	74	-22.32	peak	V	1.5	59
7386.000	37.70	1.66	39.36	54	-14.64	AVG	V	1.5	337

Remark:

1) The 1Mbps of rate of 802.11b is the worst case.
2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
   Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
3) Scan from 9kHz to 25GHz,The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

Test mode:		802.11g(6Mbps)		Test channel:		Lowest			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V	(m)	(Degree)
4824.000	53.47	-4.26	49.21	74	-24.79	peak	H	1.5	151
4824.000	36.21	-4.26	31.95	54	-22.05	AVG	H	1.5	170
7236.000	50.64	1.18	51.82	74	-22.18	peak	H	1.5	7
7236.000	38.02	1.18	39.20	54	-14.80	AVG	H	1.5	66
4824.000	54.68	-4.26	50.42	74	-23.58	peak	V	1.5	343
4824.000	38.97	-4.26	34.71	54	-19.29	AVG	V	1.5	314
7236.000	51.86	1.18	53.04	74	-20.96	peak	V	1.5	185
7236.000	35.60	1.18	36.78	54	-17.22	AVG	V	1.5	217

Test mode:		802.11g(6Mbps)		Test channel:		Middle			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V	(m)	(Degree)
4874.000	52.03	-4.12	47.91	74	-26.09	peak	H	1.5	338
4874.000	37.18	-4.12	33.06	54	-20.94	AVG	H	1.5	35
7311.000	48.68	1.46	50.14	74	-23.86	peak	H	1.5	350
7311.000	36.20	1.46	37.66	54	-16.34	AVG	H	1.5	112
4874.000	53.74	-4.12	49.62	74	-24.38	peak	V	1.5	60
4874.000	36.50	-4.12	32.38	54	-21.62	AVG	V	1.5	88
7311.000	48.72	1.46	50.18	74	-23.82	peak	V	1.5	336
7311.000	36.58	1.46	38.04	54	-15.96	AVG	V	1.5	193

Test mode:		802.11g(6Mbps)		Test channel:		Highest			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V	(m)	(Degree)
4924.000	51.93	-4.03	47.90	74	-26.10	peak	H	1.5	333
4924.000	38.90	-4.03	34.87	54	-19.13	AVG	H	1.5	78
7386.000	49.48	1.66	51.14	74	-22.86	peak	H	1.5	9
7386.000	37.85	1.66	39.51	54	-14.49	AVG	H	1.5	114
4924.000	53.59	-4.03	49.56	74	-24.44	peak	V	1.5	82
4924.000	38.07	-4.03	34.04	54	-19.96	AVG	V	1.5	26
7386.000	49.26	1.66	50.92	74	-23.08	peak	V	1.5	293
7386.000	37.84	1.66	39.50	54	-14.50	AVG	V	1.5	84

Remark:

1) The 6Mbps of rate of 802.11g is the worst case.

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

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

3) Scan from 9kHz to 25GHz,The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

Test mode:		802.11n20(6.5Mbps)		Test channel:		Lowest			
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V	Antenna Height (m)	Table Angle (Degree)
4824.000	52.96	-4.26	48.70	74	-25.30	peak	H	1.5	77
4824.000	37.75	-4.26	33.49	54	-20.51	AVG	H	1.5	90
7236.000	51.60	1.18	52.78	74	-21.22	peak	H	1.5	153
7236.000	38.60	1.18	39.78	54	-14.22	AVG	H	1.5	344
4824.000	55.00	-4.26	50.74	74	-23.26	peak	V	1.5	3
4824.000	39.73	-4.26	35.47	54	-18.53	AVG	V	1.5	52
7236.000	51.13	1.18	52.31	74	-21.69	peak	V	1.5	43
7236.000	36.04	1.18	37.22	54	-16.78	AVG	V	1.5	312

Test mode:		802.11n20(6.5Mbps)		Test channel:		Middle			
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V	Antenna Height (m)	Table Angle (Degree)
4874.000	51.25	-4.12	47.13	74	-26.87	peak	H	1.5	252
4874.000	37.12	-4.12	33.00	54	-21.00	AVG	H	1.5	305
7311.000	48.43	1.46	49.89	74	-24.11	peak	H	1.5	40
7311.000	36.17	1.46	37.63	54	-16.37	AVG	H	1.5	37
4874.000	53.37	-4.12	49.25	74	-24.75	peak	V	1.5	227
4874.000	36.94	-4.12	32.82	54	-21.18	AVG	V	1.5	247
7311.000	49.64	1.46	51.10	74	-22.90	peak	V	1.5	59
7311.000	36.76	1.46	38.22	54	-15.78	AVG	V	1.5	114

Test mode:		802.11n20(6.5Mbps)		Test channel:		Highest			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol. H/V	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)			(m)	(Degree)
4924.000	51.63	-4.03	47.60	74	-26.40	peak	H	1.5	175
4924.000	38.21	-4.03	34.18	54	-19.82	AVG	H	1.5	104
7386.000	50.14	1.66	51.80	74	-22.20	peak	H	1.5	46
7386.000	37.16	1.66	38.82	54	-15.18	AVG	H	1.5	178
4924.000	54.83	-4.03	50.80	74	-23.20	peak	V	1.5	197
4924.000	38.67	-4.03	34.64	54	-19.36	AVG	V	1.5	253
7386.000	51.10	1.66	52.76	74	-21.24	peak	V	1.5	185
7386.000	36.68	1.66	38.34	54	-15.66	AVG	V	1.5	310

Remark:

1) The MCS0 of rate of 802.11n20 is the worst case.

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

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

3) Scan from 9kHz to 25GHz,The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

5.9 Restricted bands around fundamental frequency

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)
Limit:	

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

Test Setup:

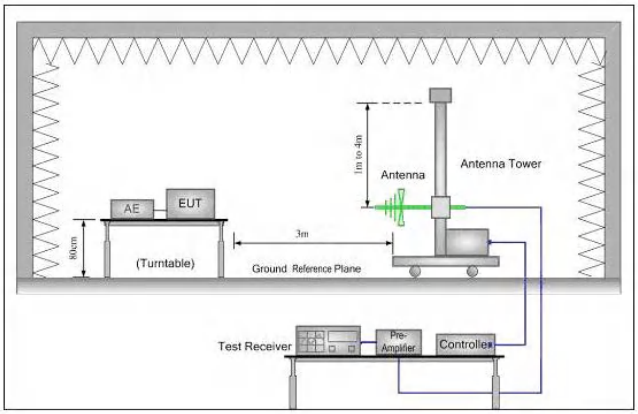


Figure 1. 30MHz to 1GHz

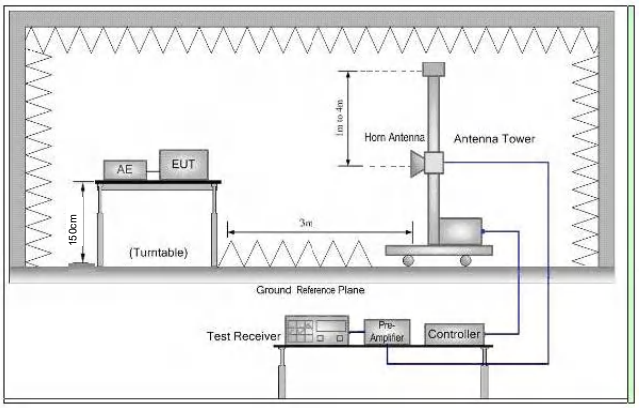


Figure 2. Above 1 GHz

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 camber. 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 camber. 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 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. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel 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. Transmitting mode.
Final Test Mode:	Pretest the EUT at Transmitting mode, found the Transmitting mode which it is worse case. Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20). Only the worst case is recorded in the report.
Test Results:	Pass

Test data:

Worse case mode:		802.11b(1Mbps)		Test channel:		Lowest			
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V	Antenna Height (m)	Table Angle (Degree)
2390.000	58.27	-9.2	49.07	74	-24.93	peak	H	1.5	211
2390.000	44.10	-9.2	34.90	54	-19.10	AVG	H	1.5	99
2400.000	60.00	-9.39	50.61	74	-23.39	peak	H	1.5	272
2400.000	46.01	-9.39	36.62	54	-17.38	AVG	H	1.5	22
2390.000	58.88	-9.2	49.68	74	-24.32	peak	V	1.5	283
2390.000	44.55	-9.2	35.35	54	-18.65	AVG	V	1.5	286
2400.000	59.79	-9.39	50.40	74	-23.60	peak	V	1.5	144
2400.000	46.25	-9.39	36.86	54	-17.14	AVG	V	1.5	49

Worse case mode:		802.11b(1Mbps)		Test channel:		Highest			
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V	Antenna Height (m)	Table Angle (Degree)
2483.500	58.35	-9.29	49.06	74	-24.94	peak	H	1.5	248
2483.500	43.58	-9.29	34.29	54	-19.71	AVG	H	1.5	291
2483.500	57.70	-9.29	48.41	74	-25.59	peak	V	1.5	272
2483.500	46.02	-9.29	36.73	54	-17.27	AVG	V	1.5	97

Worse case mode:		802.11g(6Mbps)		Test channel:		Lowest			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V	(m)	(Degree)
2390.000	58.82	-9.2	49.62	74	-24.38	peak	H	1.5	328
2390.000	44.33	-9.2	35.13	54	-18.87	AVG	H	1.5	245
2400.000	59.39	-9.39	50.00	74	-24.00	peak	H	1.5	311
2400.000	46.59	-9.39	37.20	54	-16.80	AVG	H	1.5	247
2390.000	58.99	-9.2	49.79	74	-24.21	peak	V	1.5	226
2390.000	44.08	-9.2	34.88	54	-19.12	AVG	V	1.5	144
2400.000	60.22	-9.39	50.83	74	-23.17	peak	V	1.5	132
2400.000	46.65	-9.39	37.26	54	-16.74	AVG	V	1.5	17

Worse case mode:		802.11g(6Mbps)		Test channel:		Highest			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V	(m)	(Degree)
2483.500	57.98	-9.29	48.69	74	-25.31	peak	H	1.5	43
2483.500	44.41	-9.29	35.12	54	-18.88	AVG	H	1.5	142
2483.500	57.52	-9.29	48.23	74	-25.77	peak	V	1.5	14
2483.500	46.43	-9.29	37.14	54	-16.86	AVG	V	1.5	221

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		Lowest			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V	(m)	(Degree)
2390.000	58.73	-9.2	49.53	74	-24.47	peak	H	1.5	213
2390.000	44.53	-9.2	35.33	54	-18.67	AVG	H	1.5	45
2400.000	59.94	-9.39	50.55	74	-23.45	peak	H	1.5	113
2400.000	46.24	-9.39	36.85	54	-17.15	AVG	H	1.5	163
2390.000	58.54	-9.2	49.34	74	-24.66	peak	V	1.5	81
2390.000	44.37	-9.2	35.17	54	-18.83	AVG	V	1.5	351
2400.000	60.00	-9.39	50.61	74	-23.39	peak	V	1.5	81
2400.000	46.96	-9.39	37.57	54	-16.43	AVG	V	1.5	263

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		Highest			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V	(m)	(Degree)
2483.500	57.93	-9.29	48.64	74	-25.36	peak	H	1.5	156
2483.500	44.18	-9.29	34.89	54	-19.11	AVG	H	1.5	66
2483.500	57.54	-9.29	48.25	74	-25.75	peak	V	1.5	203
2483.500	45.65	-9.29	36.36	54	-17.64	AVG	V	1.5	247

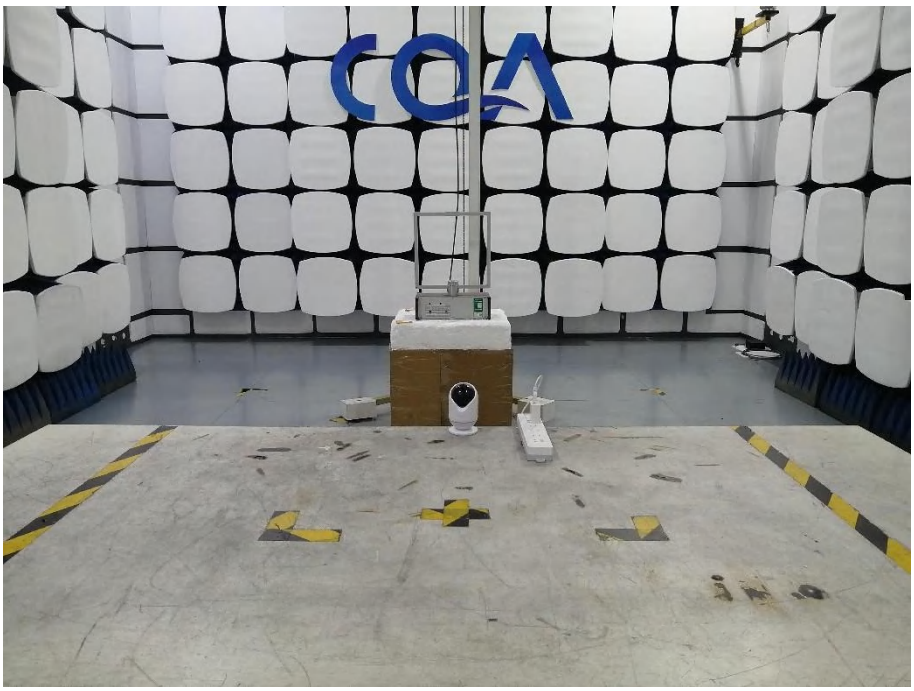
Note:
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

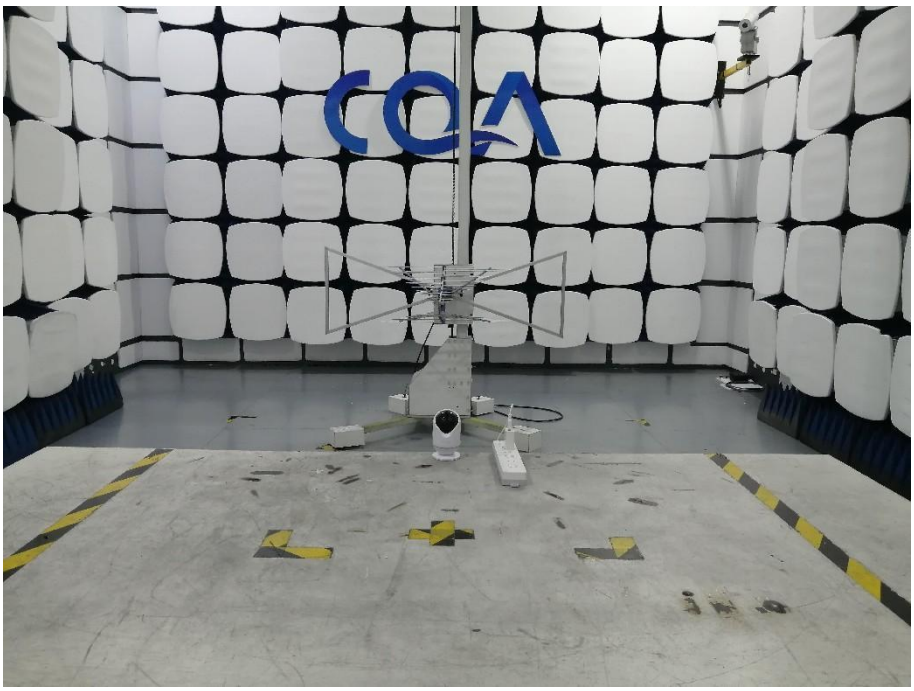
6 Photographs - EUT Test Setup

6.1 Radiated Spurious Emission

9kHz~30MHz:



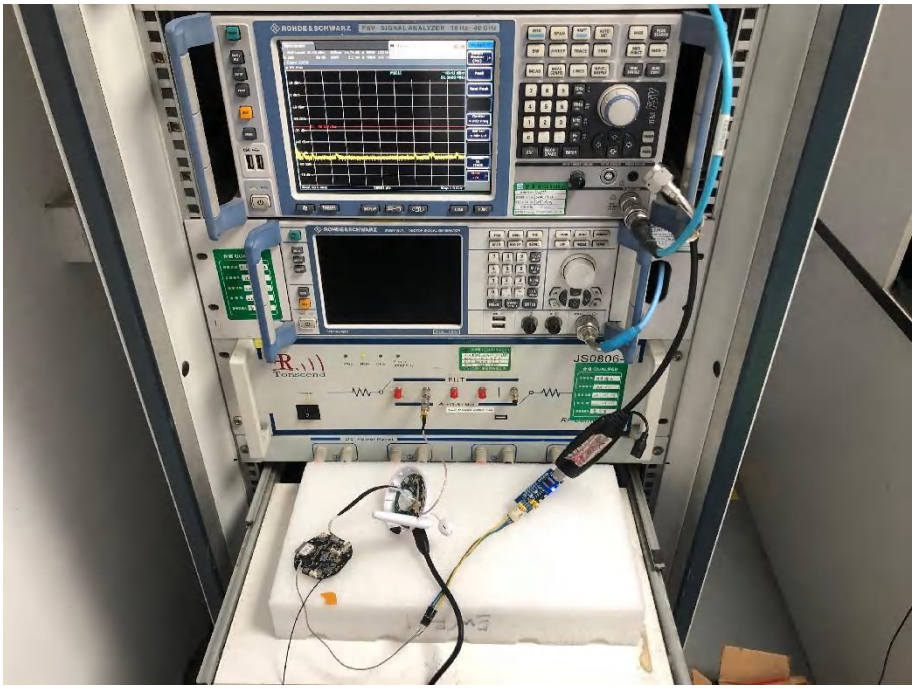
30MHz~1GHz:



Above 1GHz:

6.2 Conducted Emission

6.3 RF Conducted measurement



7 Photographs - EUT Constructional Details

Refer to APPENDIX 2 PHOTOGRAPHS OF EUT for CQASZ20241202641E-01.

*** END OF REPORT ***