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Test Report No.: W7L-P23030004RF02

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	49.8	57.84	74	-24.2	31.75	6.18	45.97	100	195	Peak
2390	41.91	49.95	54	-12.09	31.75	6.18	45.97	100	195	Average
2480	96.75	104.34	/	/	32.04	6.3	45.93	100	195	Peak
2480	96.1	103.69	/	/	32.04	6.3	45.93	100	195	Average
2483.5	50.55	58.12	74	-23.45	32.05	6.31	45.93	100	195	Peak
2483.5	44.22	51.79	54	-9.78	32.05	6.31	45.93	100	195	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	49.76	57.41	74	-24.24	32.14	6.18	45.97	100	150	Peak
2390	42.1	49.75	54	-11.9	32.14	6.18	45.97	100	150	Average
2480	89.61	96.89	/	/	32.35	6.3	45.93	100	150	Peak
2480	88.57	95.85	/	/	32.35	6.3	45.93	100	150	Average
2483.5	50.18	57.44	74	-23.82	32.36	6.31	45.93	100	150	Peak
2483.5	43.51	50.77	54	-10.49	32.36	6.31	45.93	100	150	Average

REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 2480MHz: Fundamental frequency.



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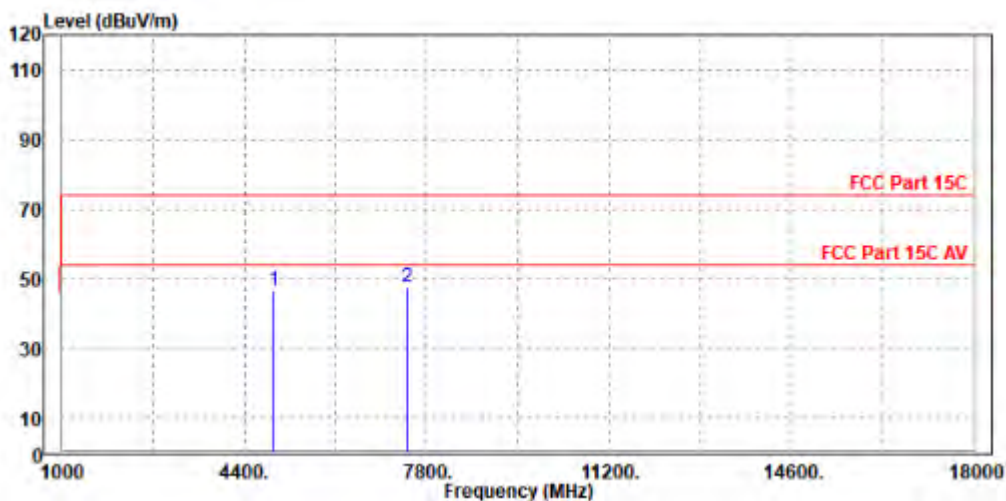
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Worst case harmonic:

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

	Freq	Level	Read	Limit	Over			
	MHz	dBuV/m	Level	Line	Limit	Factor	Remark	Pol/Phase
			dBuV	dBuV/m	dB	dB/m		
1	4961.000	46.54	47.73	74.00	-27.46	-1.19	Peak	Horizontal
2 PP	7440.000	47.64	45.66	74.00	-26.36	1.98	Peak	Horizontal



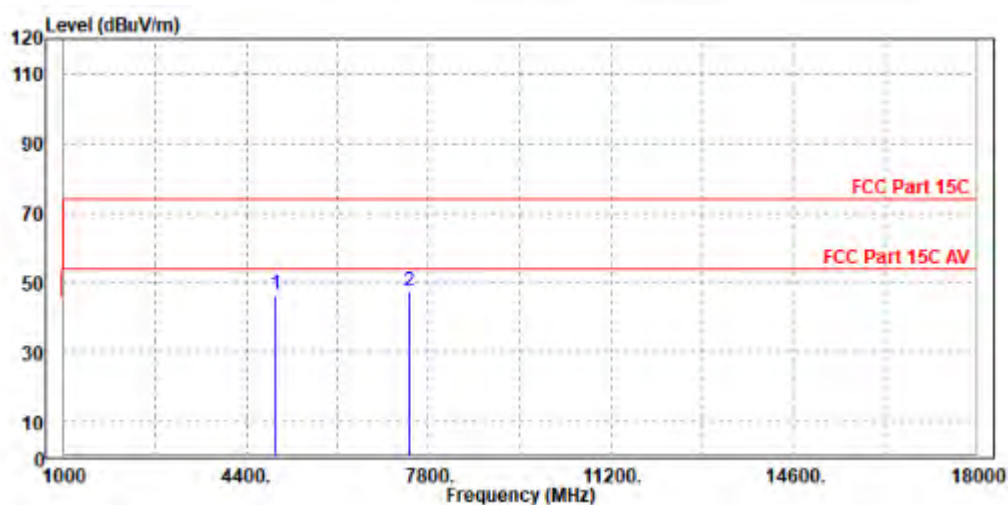


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ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m		
1	4960.000	46.44	47.43	74.00	-27.56	-0.99	Peak	Vertical
2 PP	7443.000	47.67	45.67	74.00	-26.33	2.00	Peak	Vertical



REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2480MHz: Fundamental frequency.
3. For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet



3.3 6 dB BANDWIDTH MEASUREMENT

3.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

3.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Meter	ANRITSU	ML2495A	1506002	Feb. 14,23	Feb. 13,24
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510322	Feb. 17,23	Feb. 16,24
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.14,22	May.13,23
Power Sensor	ANRITSU	MA2411B	1339352	Feb. 14,23	Feb. 13,24

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in RF Oven room.

3.3.3 TEST PROCEDURE

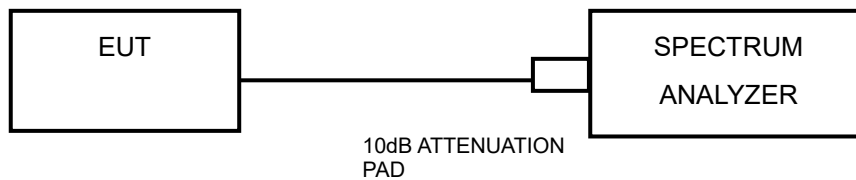
1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



3.3.4 DEVIATION FROM TEST STANDARD

No deviation.

3.3.5 TEST SETUP



3.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



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3.3.7 TEST RESULTS

Please Refer to Appendix1/2 Of this test report.

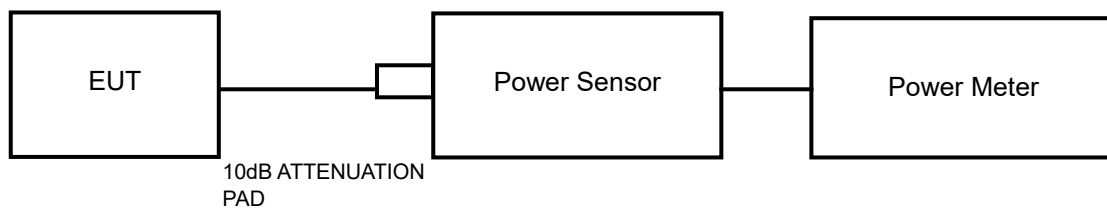


3.4 CONDUCTED OUTPUT POWER

3.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm)

3.4.2 TEST SETUP



3.4.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

3.4.4 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

3.4.5 DEVIATION FROM TEST STANDARD

No deviation.

3.4.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



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3.4.7 TEST RESULTS

3.4.7.1 MAXIMUM PEAK OUTPUT POWER

Please Refer to Appendix1/2 Of this test report.



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3.4.7.2 AVERAGE OUTPUT POWER (FOR REFERENCE)

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

Please Refer to Appendix1/2 Of this test report.

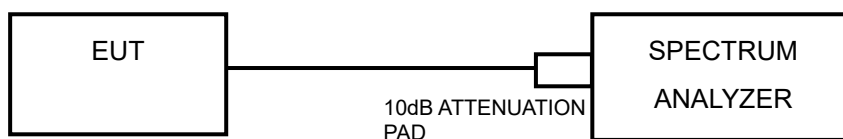


3.5 POWER SPECTRAL DENSITY MEASUREMENT

3.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

3.5.2 TEST SETUP



3.5.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

3.5.4 TEST PROCEDURE

1. Set the span to 1.5 times the DTS bandwidth
2. Set the RBW = 3 kHz, VBW $\geq 3 \times$ RBW, Detector = peak.
3. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

3.5.5 DEVIATION FROM TEST STANDARD

No deviation.

3.5.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



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3.5.7 TEST RESULTS

Please Refer to Appendix1/2 Of this test report.

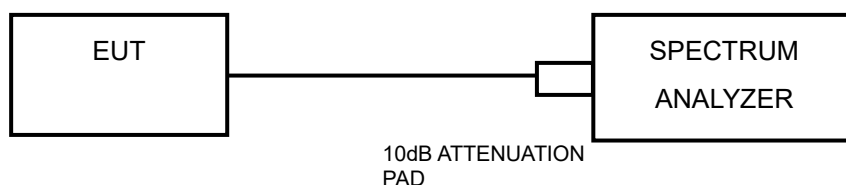


3.6 OUT OF BAND EMISSION MEASUREMENT

3.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

3.6.2 TEST SETUP



3.6.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

3.6.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.



MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

3.6.5 DEVIATION FROM TEST STANDARD

No deviation.

3.6.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.6.7 TEST RESULTS

The spectrum plots are attached on the following images. D1 line indicates the highest level. D2 line indicates the 20dB offset below D1. It shows compliance to the requirement.

Please Refer to Appendix1/2 Of this test report.



3.7 ANTENNA REQUIREMENTS

3.7.1 STANDARD APPLICABLE

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.7.2 ANTENNA CONNECTED CONSTRUCTION

An embedded-in antenna design is used.

3.7.3 ANTENNA GAIN

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit and PSD limit



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4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



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5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

**6 APPENDIX 1 WLAN 2.4G****DTS BANDWIDTH****TEST RESULT**

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	7.520	2408.480	2416.000	0.5	PASS
		2437	8.080	2432.960	2441.040	0.5	PASS
		2462	8.560	2457.960	2466.520	0.5	PASS
11G	Ant1	2412	14.280	2405.480	2419.760	0.5	PASS
		2437	15.680	2429.120	2444.800	0.5	PASS
		2462	14.160	2455.400	2469.560	0.5	PASS
11N20SISO	Ant1	2412	15.040	2404.480	2419.520	0.5	PASS
		2437	15.040	2429.440	2444.480	0.5	PASS
		2462	14.440	2455.360	2469.800	0.5	PASS



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TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437



11B_Ant1_2462



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11G_Ant1_2412



11G_Ant1_2437



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11G_Ant1_2462

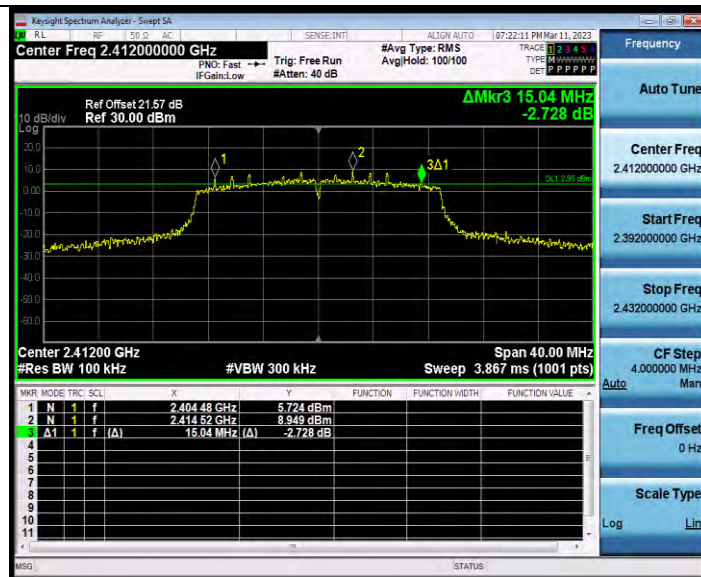


11N20SISO_Ant1_2412



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11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



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OCCUPIED CHANNEL BANDWIDTH

TEST RESULT

TestMode	Antenna	Channel Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	13.466	2405.4039	2418.8699	---	---
		2437	13.631	2430.2217	2443.8527	---	---
		2462	13.642	2455.2331	2468.8751	---	---
11G	Ant1	2412	17.149	2403.4922	2420.6412	---	---
		2437	17.042	2428.5168	2445.5588	---	---
		2462	17.106	2453.4842	2470.5902	---	---
11N20SISO	Ant1	2412	18.078	2403.0323	2421.1103	---	---
		2437	18.122	2427.9432	2446.0652	---	---
		2462	18.140	2452.9427	2471.0827	---	---

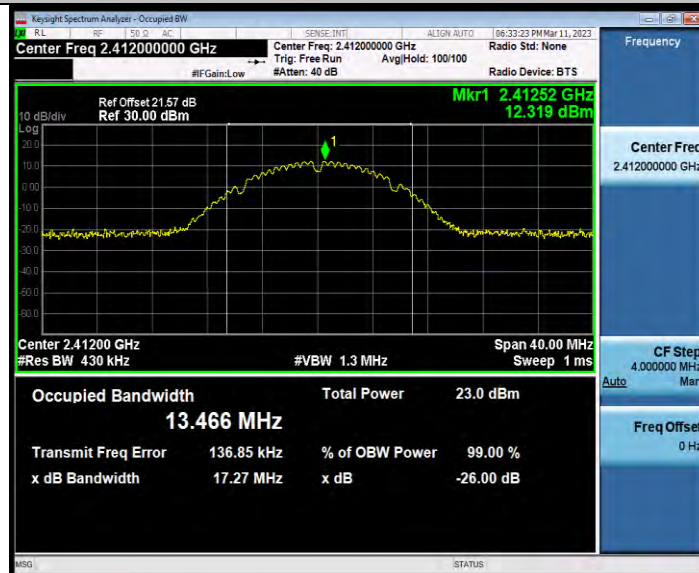


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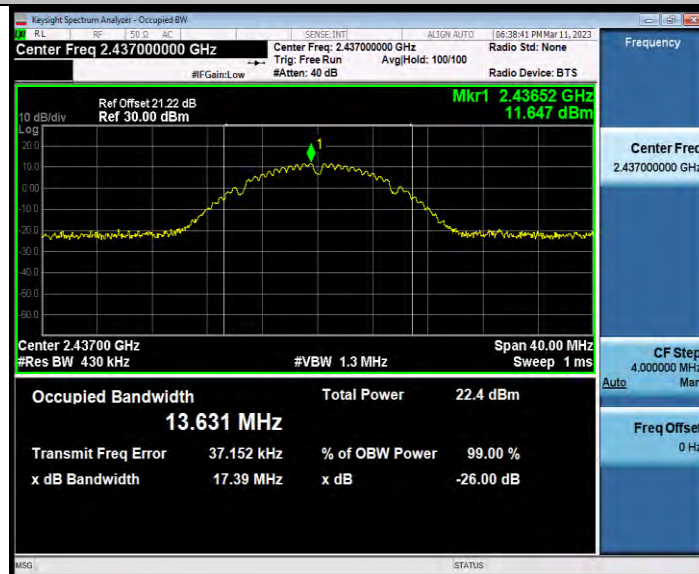
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TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437

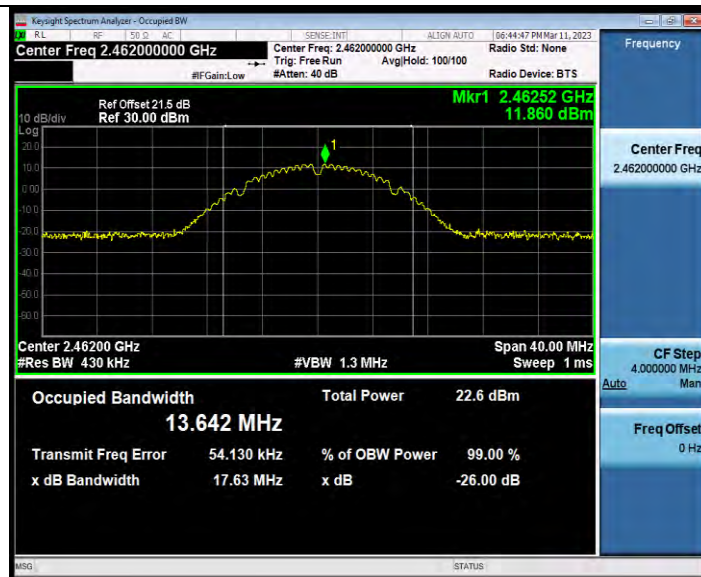


11B_Ant1_2462

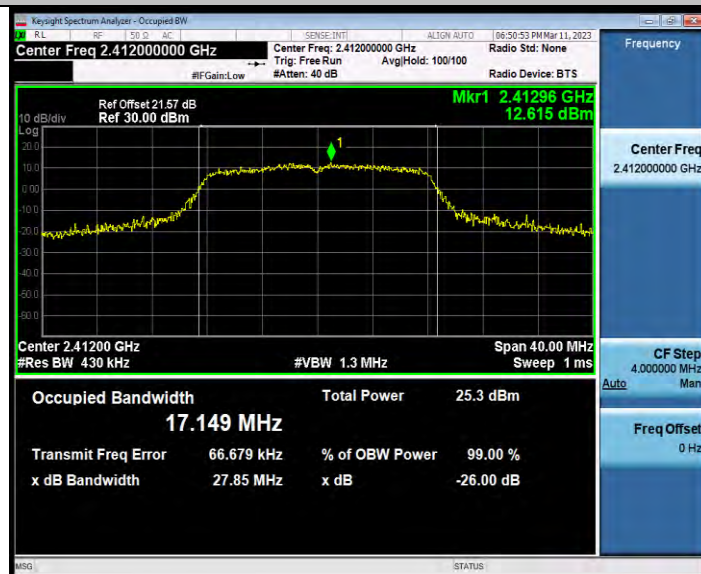


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11G_Ant1_2412

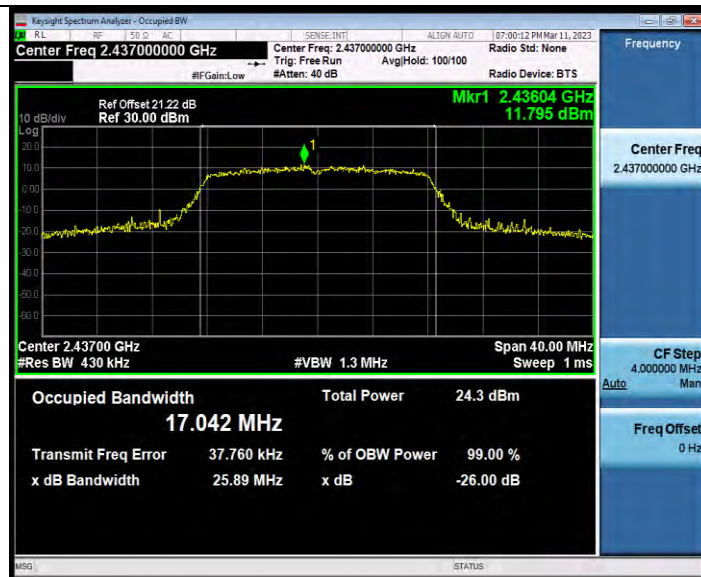


11G_Ant1_2437

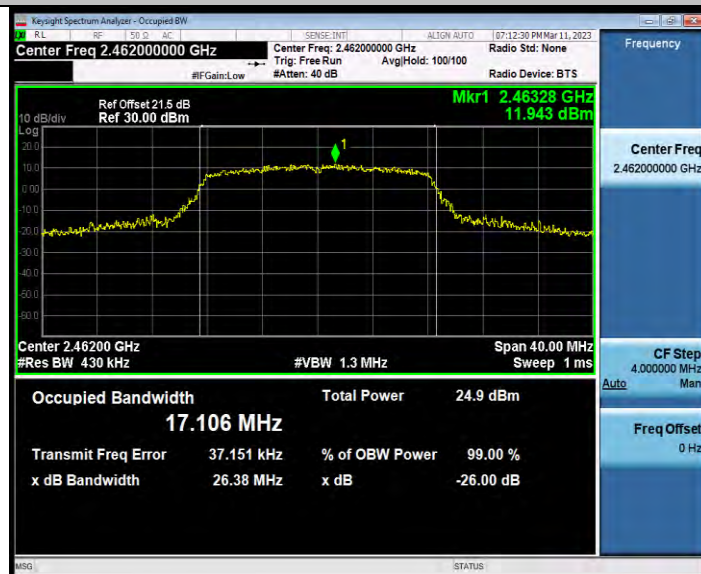


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11G_Ant1_2462

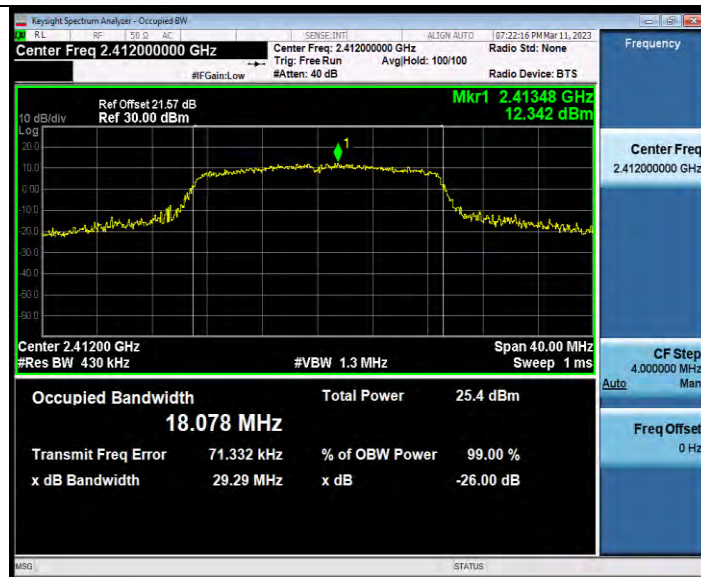


11N20SISO_Ant1_2412

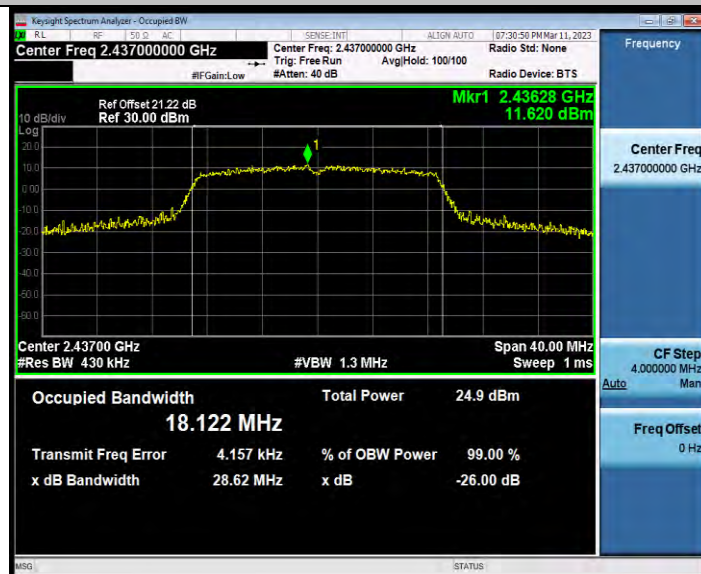


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11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



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**MAXIMUM CONDUCTED OUTPUT POWER****TEST RESULT**

TestMod e	Antenn a	Freq. [MHz]	Average power [dBm]	Peak Power [dBm]	Peak Power [mw]	Conducted Limit [dBm]	EIRP [dBm]	EIRP [mw]	EIRP Limit [dBm]	Verdic t	Power Settin g
11B	Ant1	2412	19.21	21.61	144.88	≤30.00	17.91	61.80	≤36.00	PASS	19
		2437	19.12	21.46	139.96	≤30.00	17.76	59.70	≤36.00	PASS	19
		2462	18.84	21.26	133.66	≤30.00	17.56	57.02	≤36.00	PASS	19
11G	Ant1	2412	17.72	24.76	299.23	≤30.00	21.06	127.64	≤36.00	PASS	18
		2437	17.95	25.34	341.98	≤30.00	21.64	145.88	≤36.00	PASS	18
		2462	17.06	24.62	289.73	≤30.00	20.92	123.59	≤36.00	PASS	17.5
11N20SI SO	Ant1	2412	17.56	24.82	303.39	≤30.00	21.12	129.42	≤36.00	PASS	18
		2437	17.87	25.58	361.41	≤30.00	21.88	154.17	≤36.00	PASS	18
		2462	16.01	24.78	300.61	≤30.00	21.08	128.23	≤36.00	PASS	16.5

Note: EIRP=Peak Power + Gain



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MAXIMUM POWER SPECTRAL DENSITY

TEST RESULT

TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-0.85	≤ 8.00	PASS
		2437	-2.28	≤ 8.00	PASS
		2462	-1.45	≤ 8.00	PASS
11G	Ant1	2412	-2.62	≤ 8.00	PASS
		2437	-4.61	≤ 8.00	PASS
		2462	-4.04	≤ 8.00	PASS
11N20SISO	Ant1	2412	-3.58	≤ 8.00	PASS
		2437	-3.35	≤ 8.00	PASS
		2462	-5.11	≤ 8.00	PASS



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TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437



11B_Ant1_2462



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11G_Ant1_2412

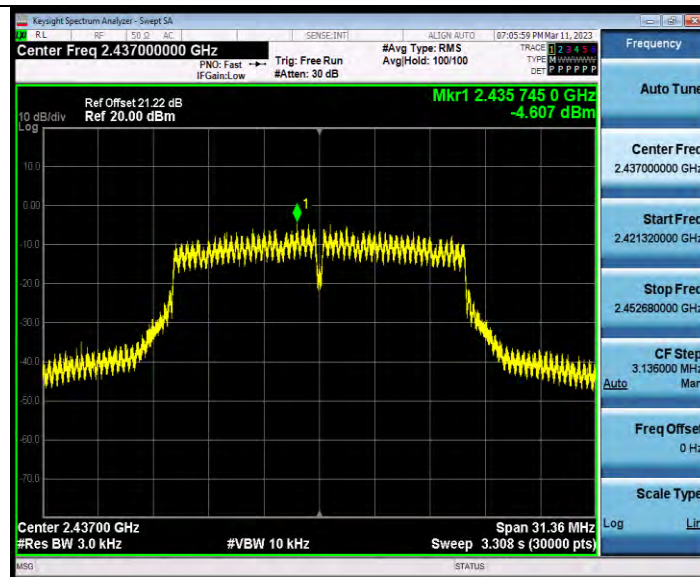


11G_Ant1_2437



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11G_Ant1_2462

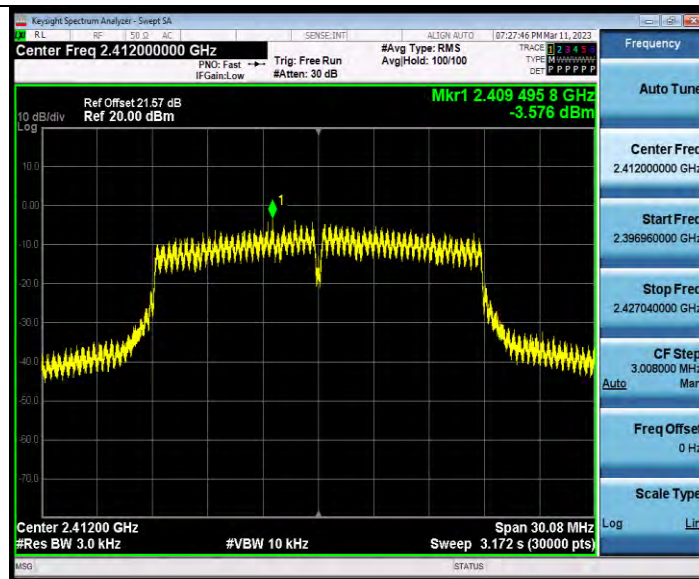


11N20SISO_Ant1_2412

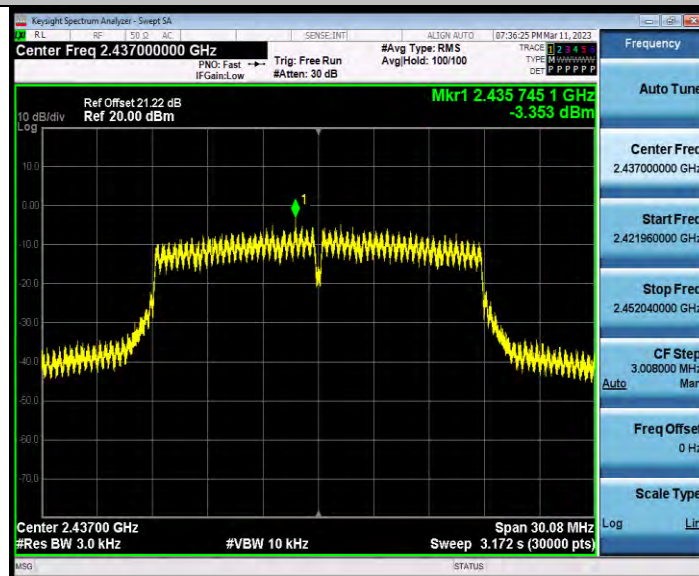


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11N20SISO_Ant1_2437

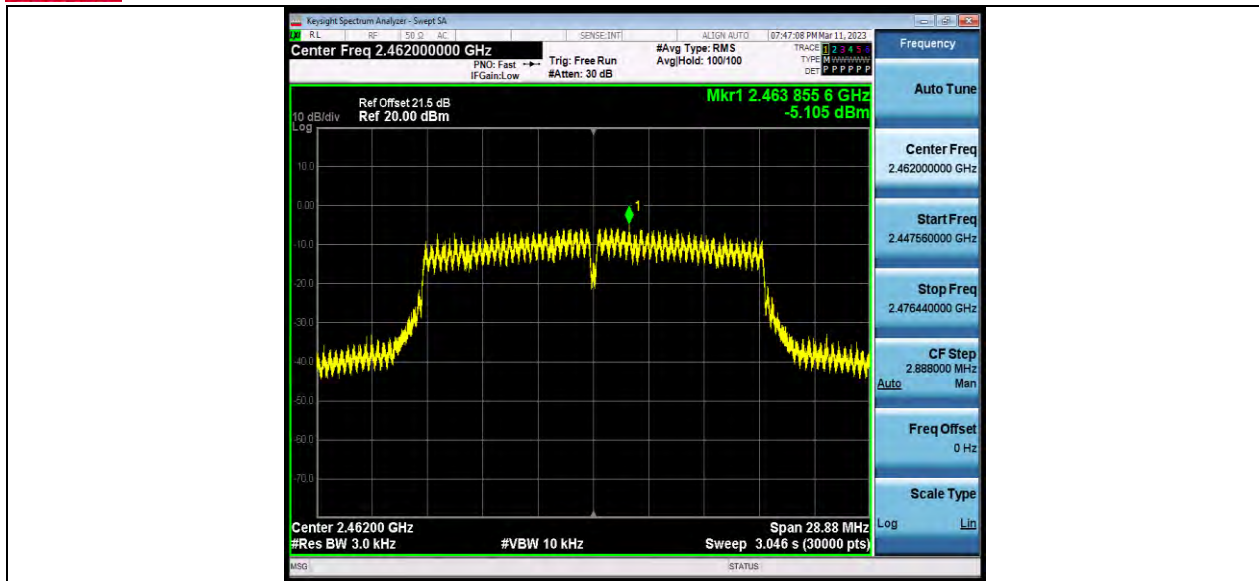


11N20SISO_Ant1_2462



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BAND EDGE MEASUREMENTS

TEST RESULT

TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	11.33	-33.42	≤ -8.67	PASS
		High	2462	11.39	-33.83	≤ -8.61	PASS
11G	Ant1	Low	2412	9.55	-21.35	≤ -10.45	PASS
		High	2462	7.86	-34.47	≤ -12.14	PASS
11N20SISO	Ant1	Low	2412	8.83	-21.41	≤ -11.17	PASS
		High	2462	7.70	-32.6	≤ -12.3	PASS

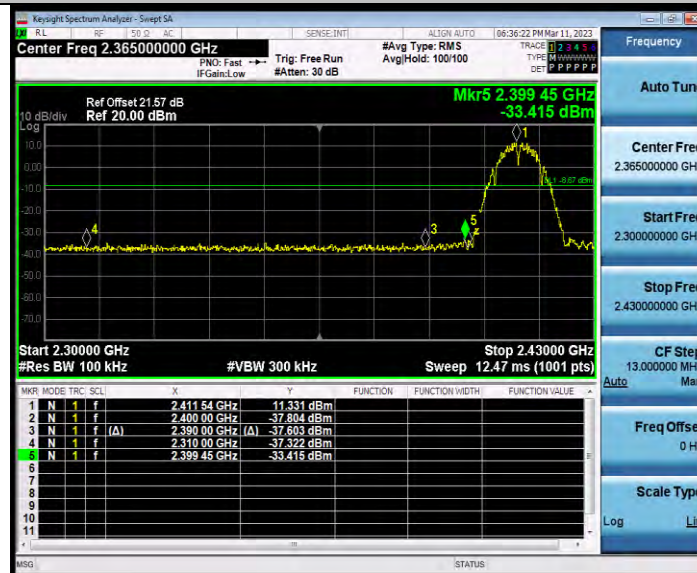


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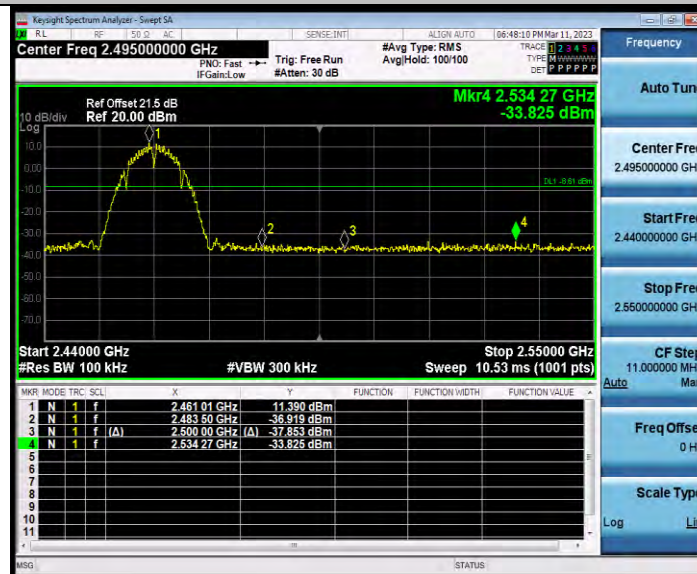
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TEST GRAPHS

11B_Ant1_Low_2412



11B_Ant1_High_2462



11G_Ant1_Low_2412

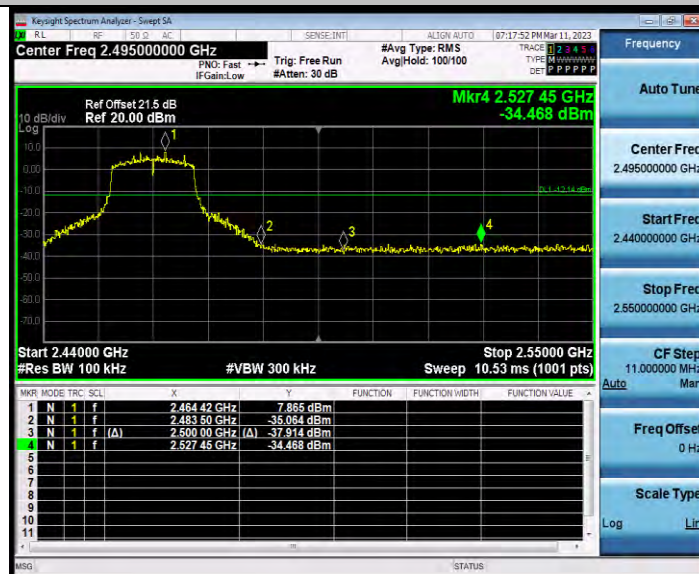


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11G_Ant1_High_2462



11N20SISO_Ant1_Low_2412



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11N20SISO_Ant1_High_2462



**CONDUCTED SPURIOUS EMISSION****TEST RESULT**

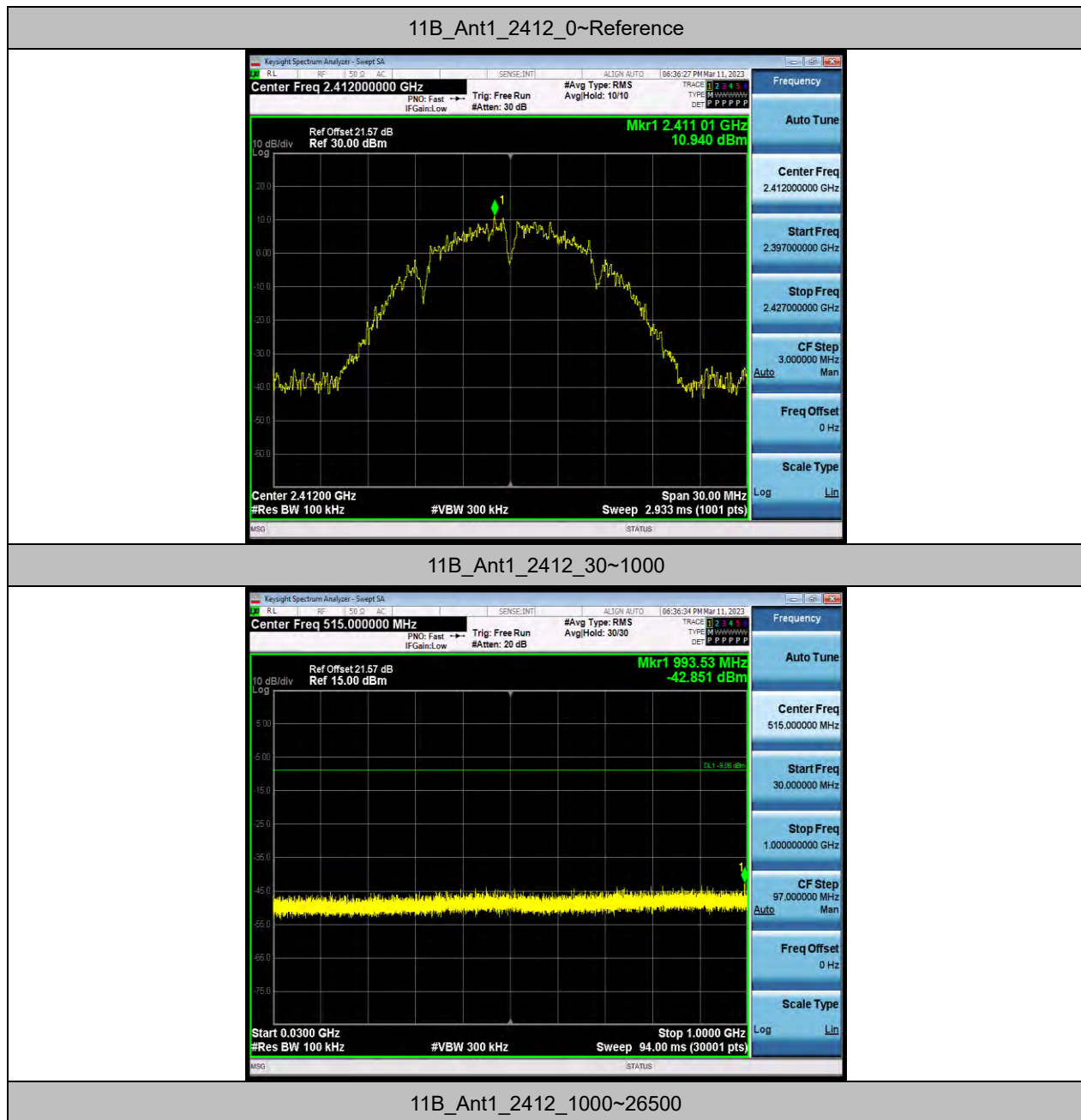
TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	10.94	10.94	---	PASS
			30~1000	10.94	-42.85	≤-9.06	PASS
			1000~26500	10.94	-24.06	≤-9.06	PASS
		2437	Reference	9.54	9.54	---	PASS
			30~1000	9.54	-43.86	≤-10.46	PASS
			1000~26500	9.54	-24.49	≤-10.46	PASS
		2462	Reference	10.56	10.56	---	PASS
			30~1000	10.56	-43.25	≤-9.44	PASS
			1000~26500	10.56	-24.14	≤-9.44	PASS
11G	Ant1	2412	Reference	6.61	6.61	---	PASS
			30~1000	6.61	-42.67	≤-13.39	PASS
			1000~26500	6.61	-23.51	≤-13.39	PASS
		2437	Reference	5.44	5.44	---	PASS
			30~1000	5.44	-44.05	≤-14.56	PASS
			1000~26500	5.44	-24.76	≤-14.56	PASS
		2462	Reference	5.37	5.37	---	PASS
			30~1000	5.37	-42.59	≤-14.63	PASS
			1000~26500	5.37	-23.94	≤-14.63	PASS
11N20SISO	Ant1	2412	Reference	5.19	5.19	---	PASS
			30~1000	5.19	-43.07	≤-14.81	PASS
			1000~26500	5.19	-24.38	≤-14.81	PASS
		2437	Reference	6.97	6.97	---	PASS
			30~1000	6.97	-43.43	≤-13.03	PASS
			1000~26500	6.97	-24.66	≤-13.03	PASS
		2462	Reference	8.98	8.98	---	PASS
			30~1000	8.98	-43.06	≤-11.02	PASS
			1000~26500	8.98	-24.02	≤-11.02	PASS



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Test Report No.: W7L-P23030004RF02

TEST GRAPHS





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Test Report No.: W7L-P23030004RF02



11B_Ant1_2437_0~Reference

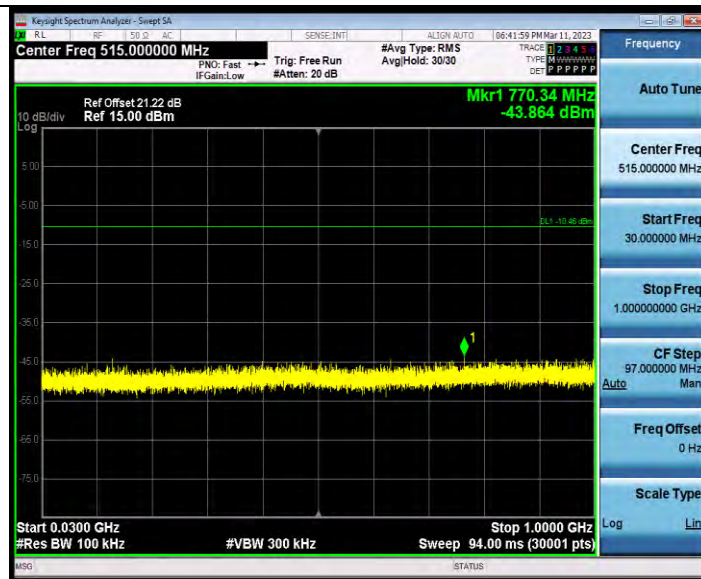


11B_Ant1_2437_30~1000



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11B_Ant1_2437_1000~26500



11B_Ant1_2462_0~Reference



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11B_Ant1_2462_30~1000



11B_Ant1_2462_1000~26500



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11G_Ant1_2412_0~Reference



11G_Ant1_2412_30~1000



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VERITAS

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11G_Ant1_2412_1000~26500



11G_Ant1_2437_0~Reference



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11G_Ant1_2437_30~1000



11G_Ant1_2437_1000~26500



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11G_Ant1_2462_0~Reference



11G_Ant1_2462_30~1000



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11G_Ant1_2462_1000~26500



11N20SISO_Ant1_2412_0~Reference



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11N20SISO_Ant1_2412_30~1000



11N20SISO_Ant1_2412_1000~26500



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Test Report No.: W7L-P23030004RF02



11N20SISO_Ant1_2437_0~Reference



11N20SISO_Ant1_2437_30~1000



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VERITAS

Test Report No.: W7L-P23030004RF02



11N20SISO_Ant1_2437_1000~26500



11N20SISO_Ant1_2462_0~Reference



BUREAU
VERITAS

Test Report No.: W7L-P23030004RF02



11N20SISO_Ant1_2462_30~1000



11N20SISO_Ant1_2462_1000~26500



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DUTY CYCLE TEST RESULT

TestMode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Factor
11B	Ant1	2412	8.39	8.44	99.41	0.03
		2437	8.39	8.44	99.41	0.03
		2462	8.38	8.43	99.41	0.03
11G	Ant1	2412	1.39	1.44	96.53	0.15
		2437	1.38	1.43	96.50	0.15
		2462	1.38	1.43	96.50	0.15
11N20SISO	Ant1	2412	1.30	1.35	96.30	0.16
		2437	1.30	1.35	96.30	0.16
		2462	1.30	1.35	96.30	0.16

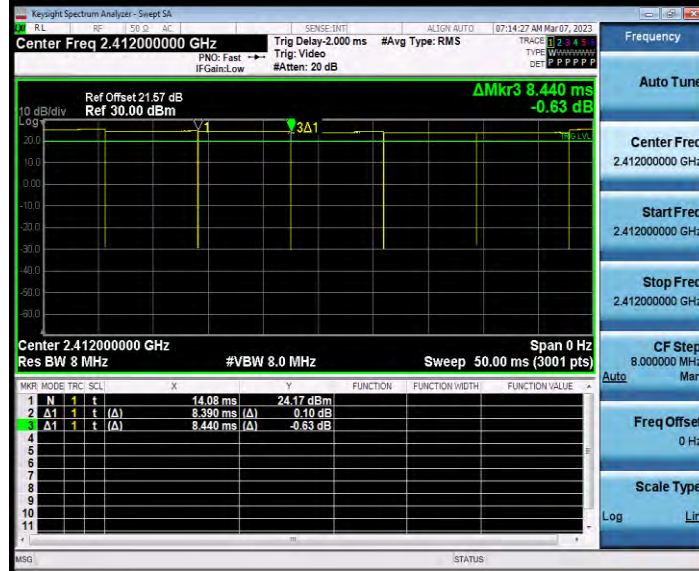


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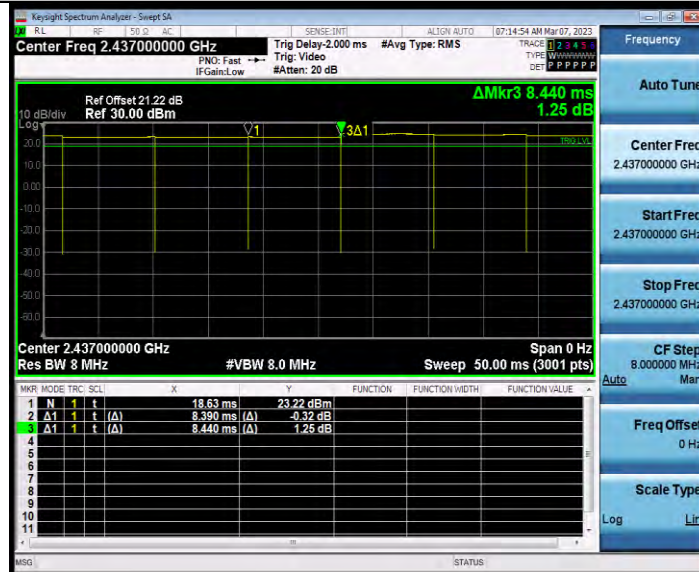
Test Report No.: W7L-P23030004RF02

TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437



11B_Ant1_2462

