



**BUREAU
VERITAS**

Test Report No.: W7L-P23100008RF02

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

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,479.760	95.55			7.36	H	205.4	2
6	2,483.500	33.82	54.00	20.18	7.36	H	5.6	1
6	2,483.720	33.79	54.00	20.21	7.36	H	5.6	1

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,479.540	97.50			7.36	H	207.7	2
6	2,483.500	46.56	74.00	27.44	7.36	H	355	2
6	2,484.820	46.95	74.00	27.05	7.36	H	130	2

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,479.980	88.76			7.36	V	80.6	1
6	2,483.500	32.23	54.00	21.77	7.36	V	80.6	1
6	2,483.940	32.09	54.00	21.91	7.36	V	80.6	1

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,480.200	90.17			7.36	V	78.2	1
6	2,483.500	46.99	74.00	27.01	7.36	V	78.2	1
6	2,492.520	46.91	74.00	27.09	7.37	V	0.9	2

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Limit value - Emission Level .
2. 2480MHz: Fundamental frequency.

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	MY54510523	Feb. 14,23	Feb. 13,24
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.10,23	May.09,24
Power Sensor	ANRITSU	MA2411B	1339352	Feb. 14,23	Feb. 13,24

NOTE:

1. The calibration interval of the above test instruments is 24 months or 6 months and the calibrations are traceable to CEPREI/CHINA, GREGT/CHINA and NIM/CHINA.
2. The test was performed in RF Oven room.

3.3.3 TEST PROCEDURE

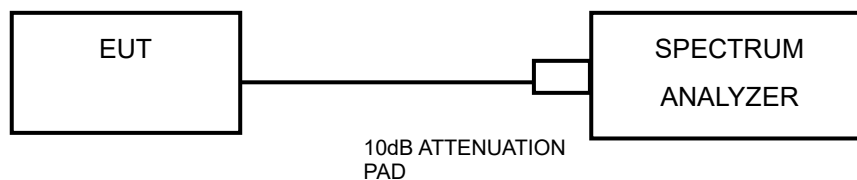
1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points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



Test Report No.: W7L-P23100008RF02

3.3.7 TEST RESULTS

Please Refer to Appendix1/2 Of this test report.

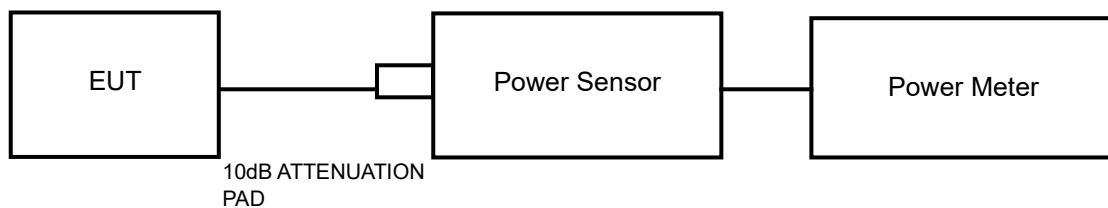


3.4 CONDUCTED OUTPUT POWER

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.



Test Report No.: W7L-P23100008RF02

3.4.7 TEST RESULTS

3.4.7.1 MAXIMUM PEAK OUTPUT POWER

Please Refer to Appendix1/2 Of this test report.



Test Report No.: W7L-P23100008RF02

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.

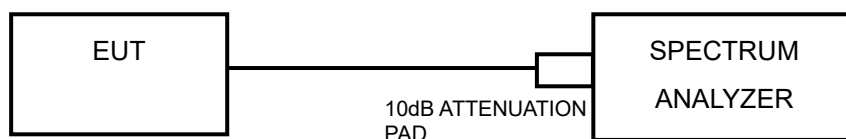
Please Refer to Appendix1/2 Of this test report.

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.



Test Report No.: W7L-P23100008RF02

3.5.7 TEST RESULTS

Please Refer to Appendix1/2 Of this test report.

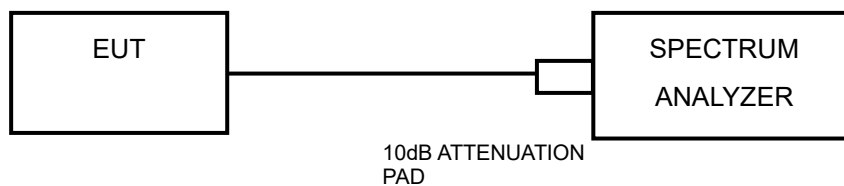


3.6 OUT OF BAND EMISSION MEASUREMENT

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.



Test Report No.: W7L-P23100008RF02

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



Test Report No.: W7L-P23100008RF02

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 DTS BANDWIDTH

TEST RESULT

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	7.600	2408.440	2416.040	0.5	PASS
		2437	7.720	2433.000	2440.720	0.5	PASS
		2462	8.000	2457.960	2465.960	0.5	PASS
11G	Ant1	2412	14.440	2404.080	2418.520	0.5	PASS
		2437	15.400	2429.720	2445.120	0.5	PASS
		2462	15.440	2454.120	2469.560	0.5	PASS
11N20SISO	Ant1	2412	15.000	2404.480	2419.480	0.5	PASS
		2437	15.120	2429.440	2444.560	0.5	PASS
		2462	16.000	2453.480	2469.480	0.5	PASS



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Test Report No.: W7L-P23100008RF02

TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437



11B_Ant1_2462



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Test Report No.: W7L-P23100008RF02



11G_Ant1_2412

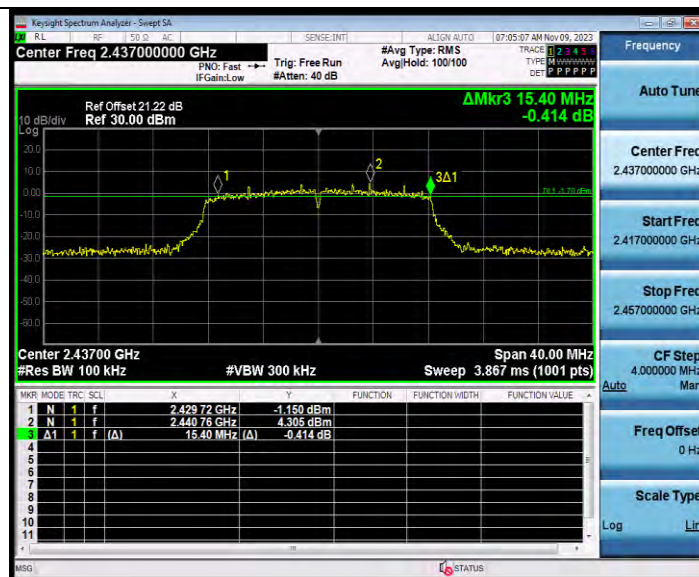


11G_Ant1_2437

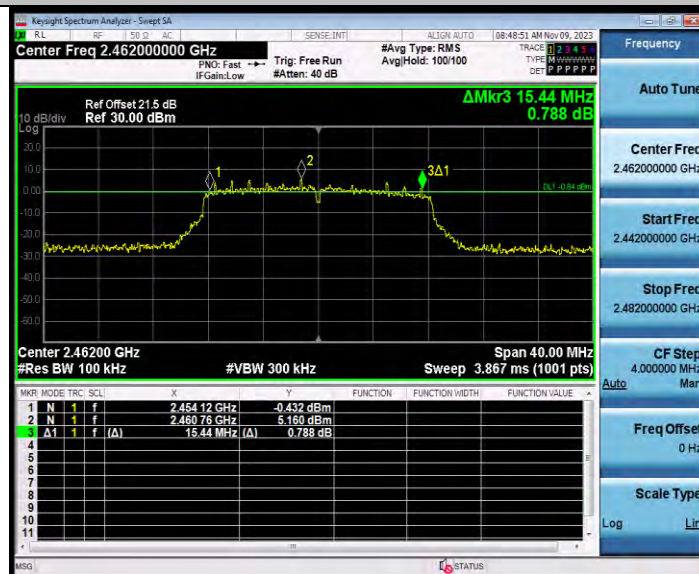


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Test Report No.: W7L-P23100008RF02



11G_Ant1_2462



11N20SISO_Ant1_2412



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Test Report No.: W7L-P23100008RF02



11N20SISO_Ant1_2437

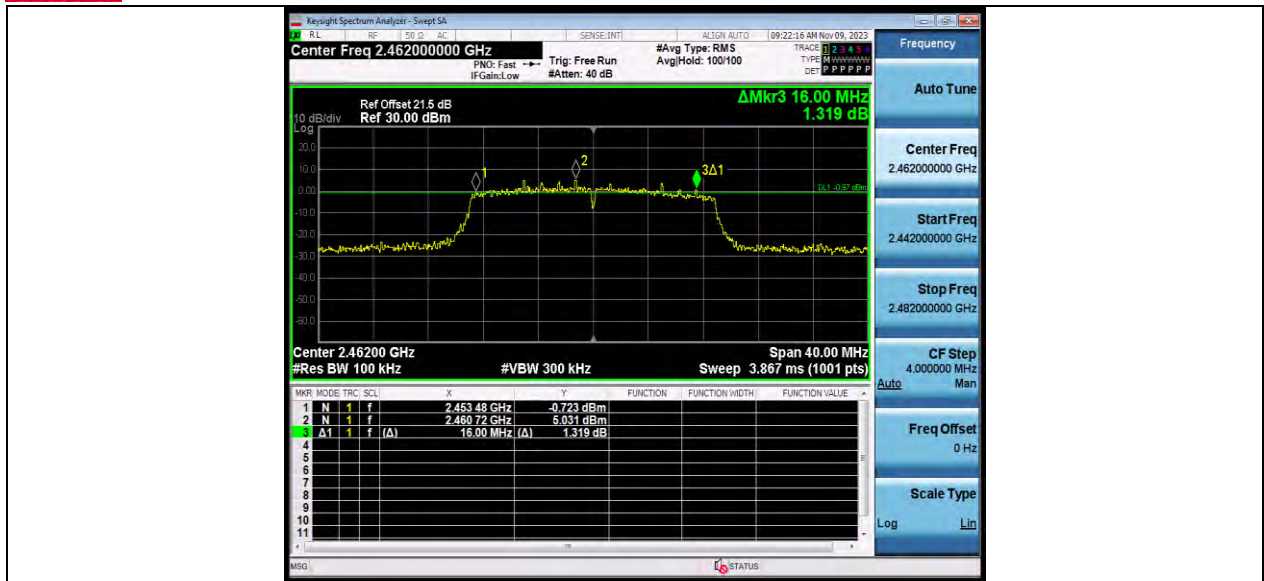


11N20SISO_Ant1_2462



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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	13.721	2405.0763	2418.7973	---	---
		2437	13.755	2430.2336	2443.9886	---	---
		2462	13.929	2454.8987	2468.8277	---	---
11G	Ant1	2412	17.017	2403.4348	2420.4518	---	---
		2437	17.090	2428.5573	2445.6473	---	---
		2462	17.128	2453.3337	2470.4617	---	---
11N20SISO	Ant1	2412	17.928	2402.9932	2420.9212	---	---
		2437	17.994	2428.0461	2446.0401	---	---
		2462	17.975	2452.9103	2470.8853	---	---

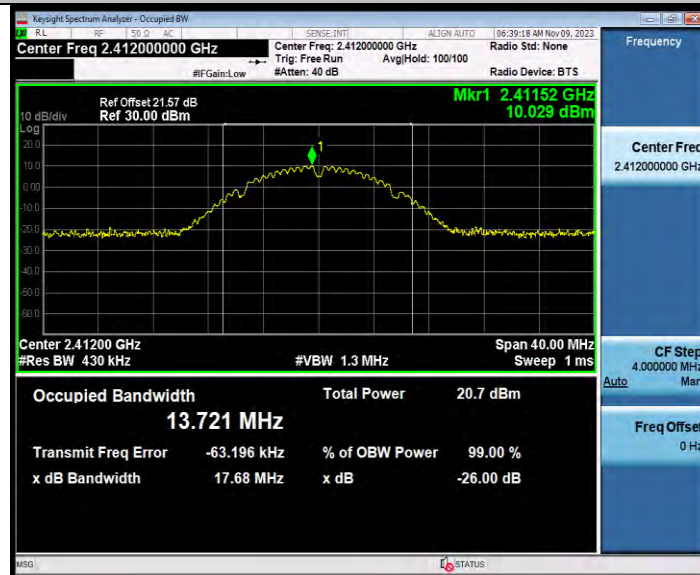


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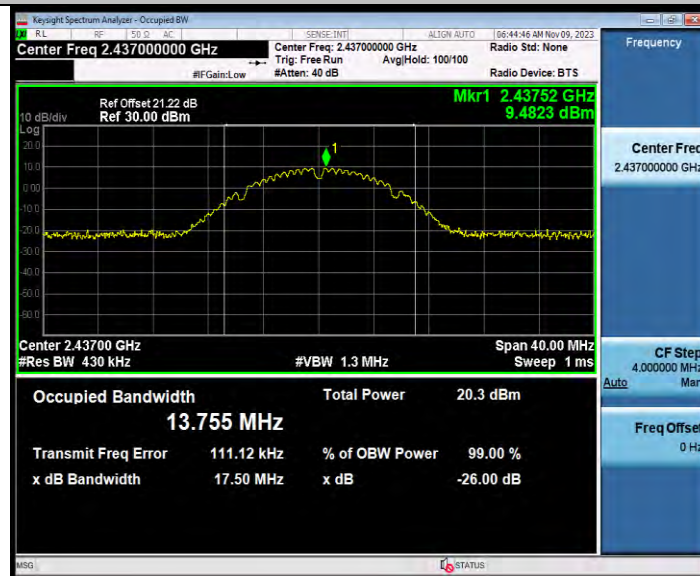
Test Report No.: W7L-P23100008RF02

TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437



11B_Ant1_2462

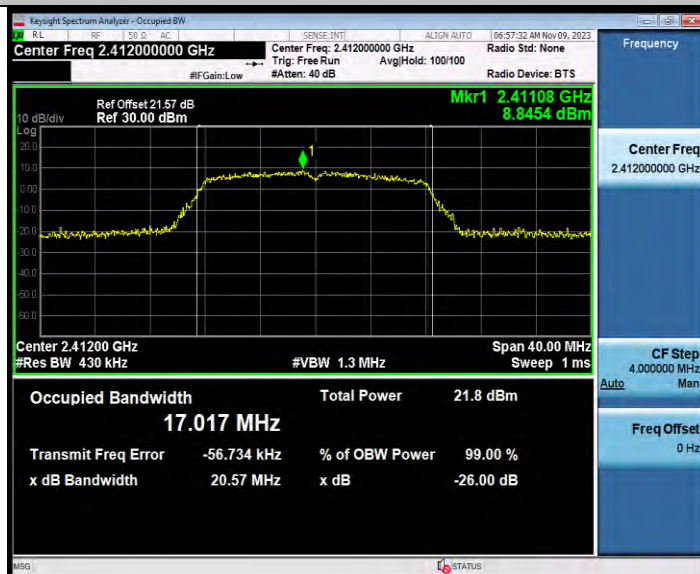


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11G_Ant1_2412



11G_Ant1_2437

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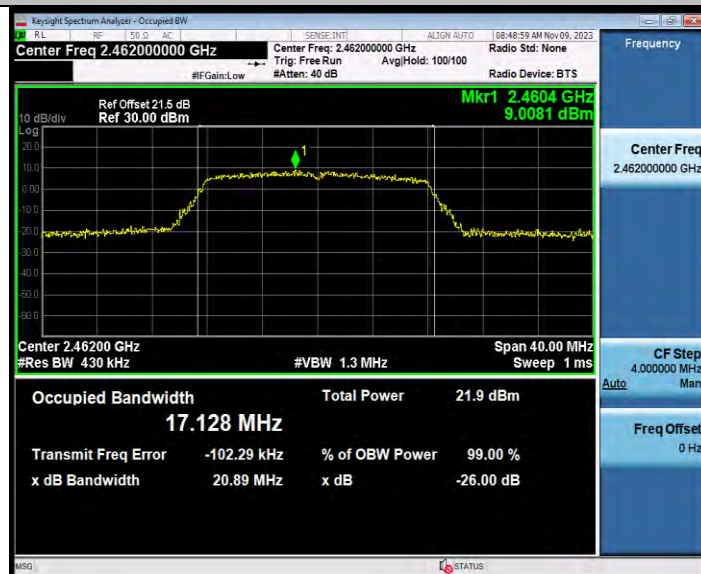


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Test Report No.: W7L-P23100008RF02



11G_Ant1_2462

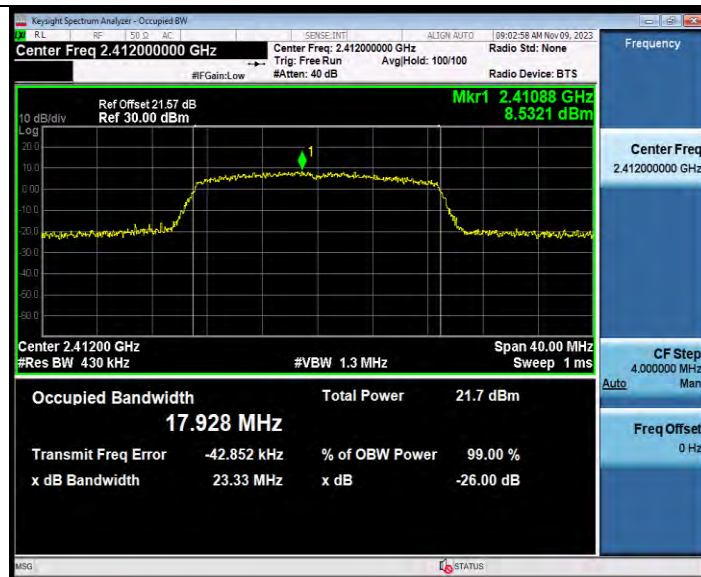


11N20SISO_Ant1_2412

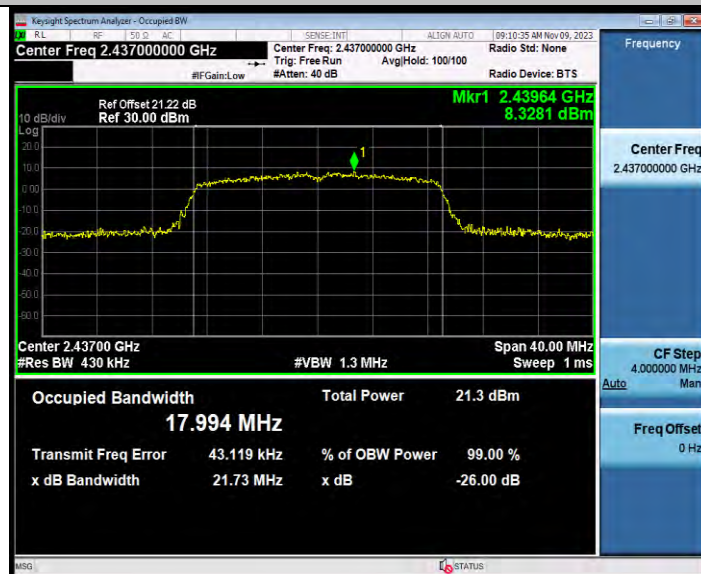


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11N20SISO_Ant1_2437

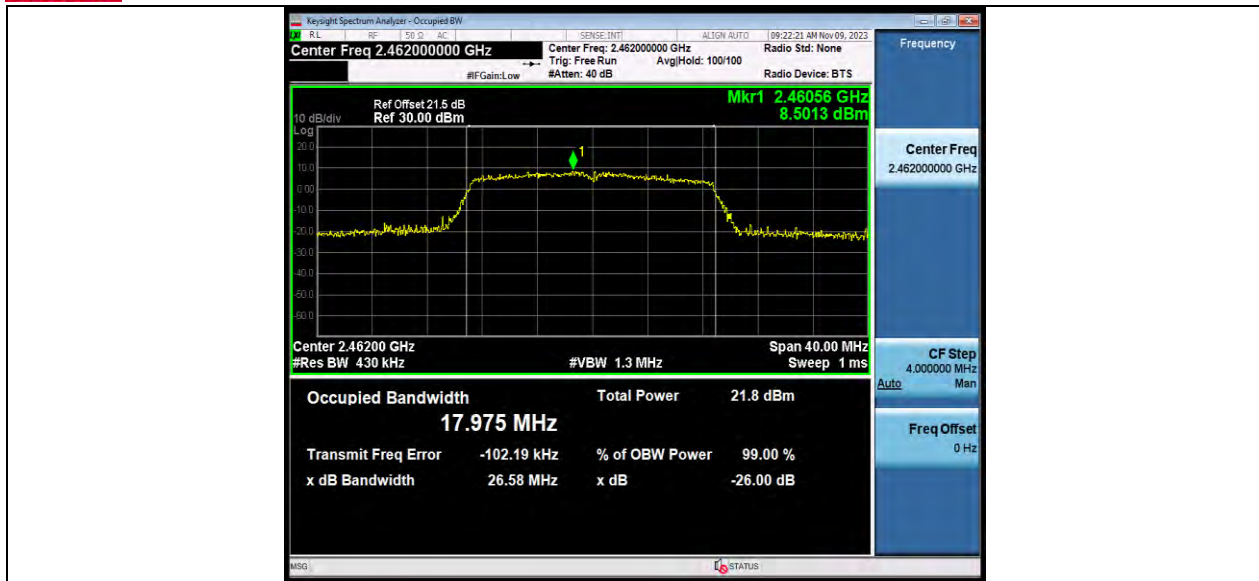


11N20SISO_Ant1_2462



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Test Report No.: W7L-P23100008RF02



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

Test Mode	TX Mod.	Freq. [MHz]	Ant.	Average power [dBm]	Peak power [dBm]	Peak power [mw]	Conducted Power Limit [dBm]	EIRP power [dBm]	EIRP power [mw]	EIRP Limit [dBm]	Verdict	Power Setting
11B	SISO	2412	ANT1	17.07	19.47	88.51	≤30.00	21.47	140.28	≤36.00	PASS	17
		2437	ANT1	17.2	19.54	89.95	≤30.00	21.54	142.56	≤36.00	PASS	17
		2462	ANT1	17.27	19.59	90.99	≤30.00	21.59	144.21	≤36.00	PASS	17
11G	SISO	2412	ANT1	15.25	17.57	57.15	≤30.00	19.57	90.57	≤36.00	PASS	15
		2437	ANT1	15.37	17.66	58.34	≤30.00	19.66	92.47	≤36.00	PASS	15
		2462	ANT1	15.39	17.71	59.02	≤30.00	19.71	93.54	≤36.00	PASS	15
11N20	SISO	2412	ANT1	14.77	24.19	262.42	≤30.00	26.19	415.91	≤36.00	PASS	15
		2437	ANT1	15.0	24.61	289.07	≤30.00	26.61	458.14	≤36.00	PASS	15
		2462	ANT1	14.93	24.45	278.61	≤30.00	26.45	441.57	≤36.00	PASS	15

Note: The Average power with duty cycle factor.



MAXIMUM POWER SPECTRAL DENSITY

TEST RESULT

TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-2.72	≤8.00	PASS
		2437	-3.95	≤8.00	PASS
		2462	-2.67	≤8.00	PASS
11G	Ant1	2412	-6.84	≤8.00	PASS
		2437	-8.54	≤8.00	PASS
		2462	-7.65	≤8.00	PASS
11N20SISO	Ant1	2412	-7.50	≤8.00	PASS
		2437	-7.13	≤8.00	PASS
		2462	-7.43	≤8.00	PASS



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Test Report No.: W7L-P23100008RF02

TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437



11B_Ant1_2462



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Test Report No.: W7L-P23100008RF02



11G_Ant1_2412



11G_Ant1_2437



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Test Report No.: W7L-P23100008RF02



11G_Ant1_2462

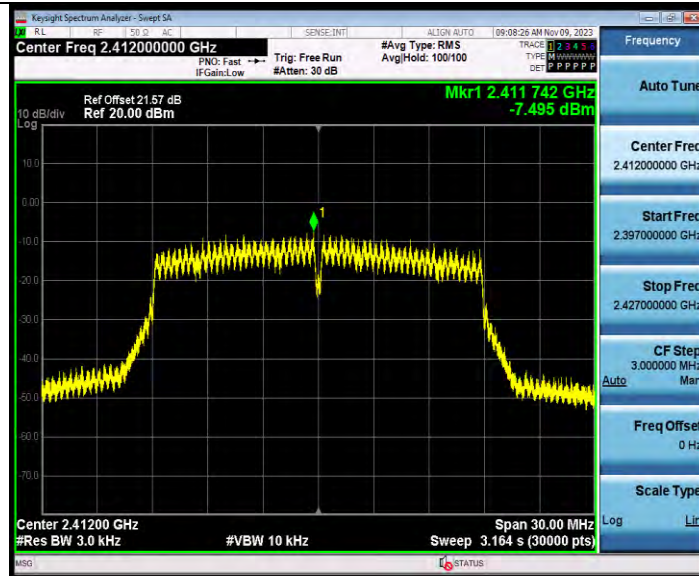


11N20SISO_Ant1_2412

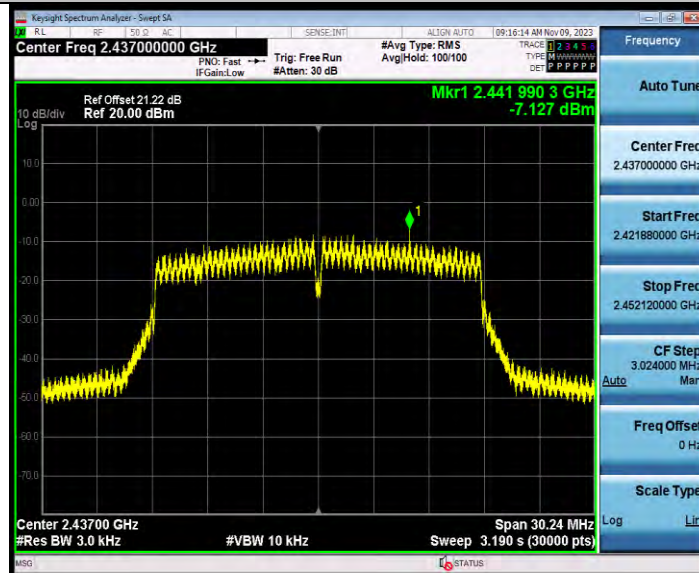


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11N20SISO_Ant1_2437

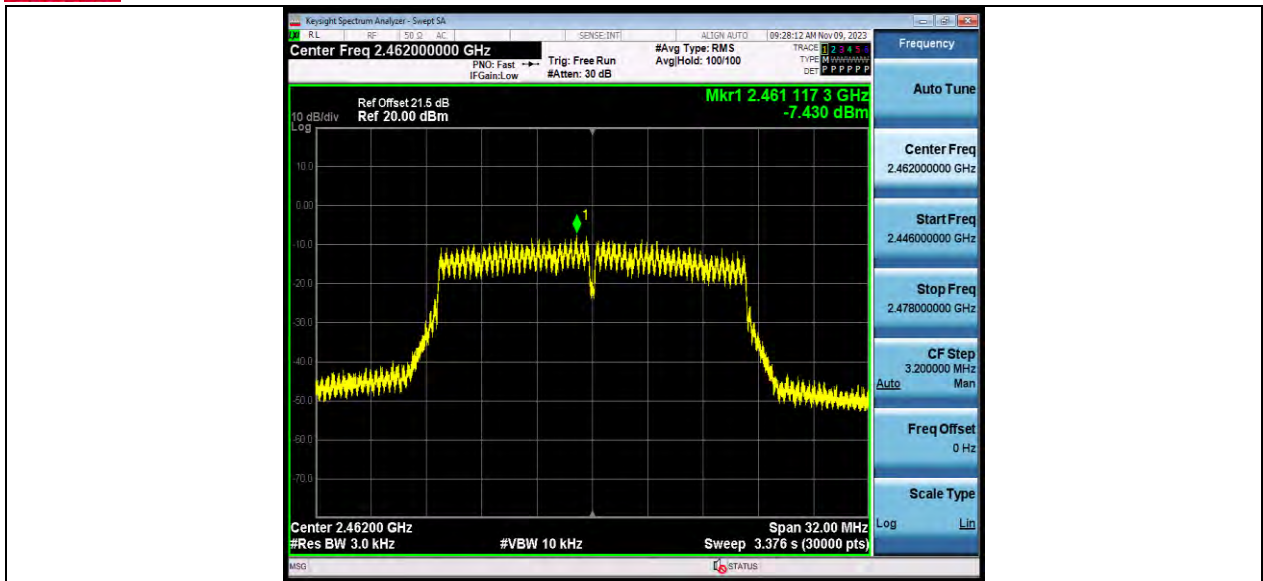


11N20SISO_Ant1_2462



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Test Report No.: W7L-P23100008RF02



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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	9.70	-33.42	≤-10.3	PASS
		High	2462	9.42	-33.79	≤-10.58	PASS
11G	Ant1	Low	2412	4.61	-27.12	≤-15.39	PASS
		High	2462	5.53	-33.66	≤-14.47	PASS
11N20SISO	Ant1	Low	2412	5.78	-27.81	≤-14.23	PASS
		High	2462	5.12	-33.25	≤-14.88	PASS

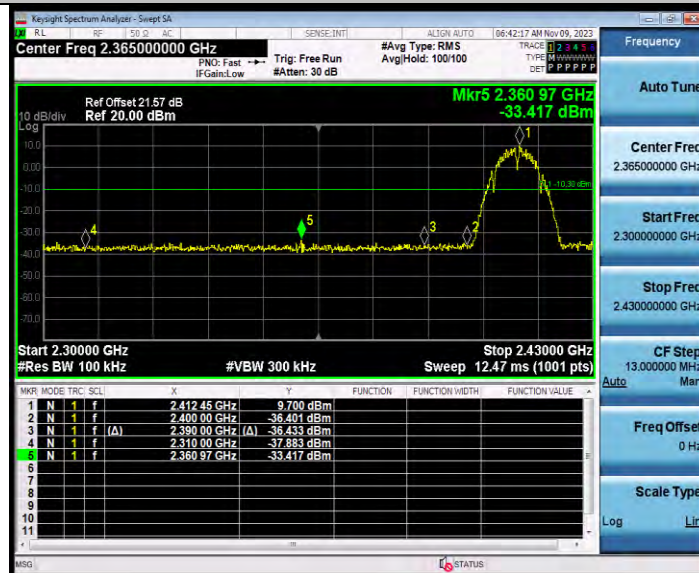


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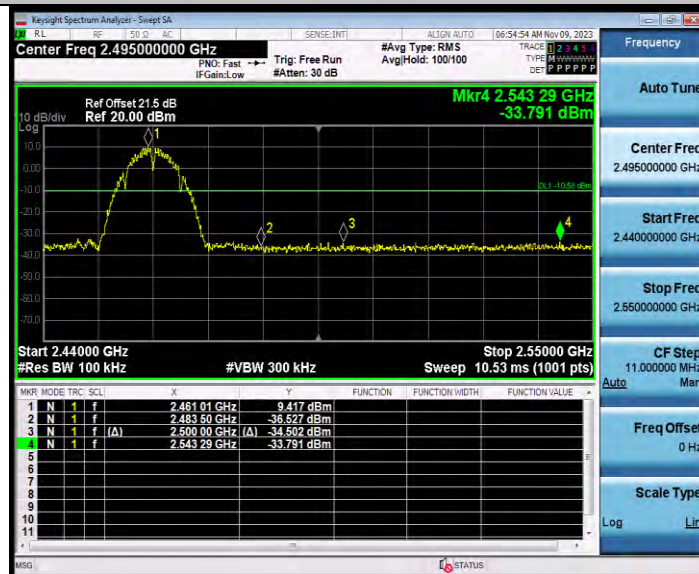
Test Report No.: W7L-P23100008RF02

TEST GRAPHS

11B_Ant1_Low_2412



11B_Ant1_High_2462



11G_Ant1_Low_2412



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VERITAS

Test Report No.: W7L-P23100008RF02



11G_Ant1_High_2462



11N20SISO_Ant1_Low_2412



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Test Report No.: W7L-P23100008RF02



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	7.61	7.61	---	PASS
			30~1000	7.61	-43.48	≤-12.39	PASS
			1000~26500	7.61	-24.36	≤-12.39	PASS
		2437	Reference	8.68	8.68	---	PASS
			30~1000	8.68	-43.43	≤-11.32	PASS
			1000~26500	8.68	-24.26	≤-11.32	PASS
		2462	Reference	9.01	9.01	---	PASS
			30~1000	9.01	-42.68	≤-10.99	PASS
			1000~26500	9.01	-23.76	≤-10.99	PASS
11G	Ant1	2412	Reference	2.02	2.02	---	PASS
			30~1000	2.02	-42.81	≤-17.98	PASS
			1000~26500	2.02	-22.77	≤-17.98	PASS
		2437	Reference	4.57	4.57	---	PASS
			30~1000	4.57	-43.3	≤-15.43	PASS
			1000~26500	4.57	-23.58	≤-15.43	PASS
		2462	Reference	2.43	2.43	---	PASS
			30~1000	2.43	-43.33	≤-17.57	PASS
			1000~26500	2.43	-23.89	≤-17.57	PASS
11N20SISO	Ant1	2412	Reference	1.83	1.83	---	PASS
			30~1000	1.83	-42.65	≤-18.17	PASS
			1000~26500	1.83	-24	≤-18.17	PASS
		2437	Reference	1.18	1.18	---	PASS
			30~1000	1.18	-43.27	≤-18.82	PASS
			1000~26500	1.18	-23.84	≤-18.82	PASS
		2462	Reference	2.73	2.73	---	PASS
			30~1000	2.73	-42.19	≤-17.27	PASS
			1000~26500	2.73	-23.86	≤-17.27	PASS



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VERITAS

Test Report No.: W7L-P23100008RF02

TEST GRAPHS

11B_Ant1_2412_0~Reference



11B_Ant1_2412_30~1000



11B_Ant1_2412_1000~26500



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VERITAS

Test Report No.: W7L-P23100008RF02



11B_Ant1_2437_0~Reference



11B_Ant1_2437_30~1000



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VERITAS

Test Report No.: W7L-P23100008RF02



11B_Ant1_2437_1000~26500



11B_Ant1_2462_0~Reference



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VERITAS

Test Report No.: W7L-P23100008RF02



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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Test Report No.: W7L-P23100008RF02



11G_Ant1_2412_1000~26500



11G_Ant1_2437_0~Reference

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VERITAS

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11G_Ant1_2437_30~1000



11G_Ant1_2437_1000~26500

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VERITAS

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11G_Ant1_2462_0~Reference



11G_Ant1_2462_30~1000

Huarui 7Layers High
Technology (Suzhou) Co., Ltd

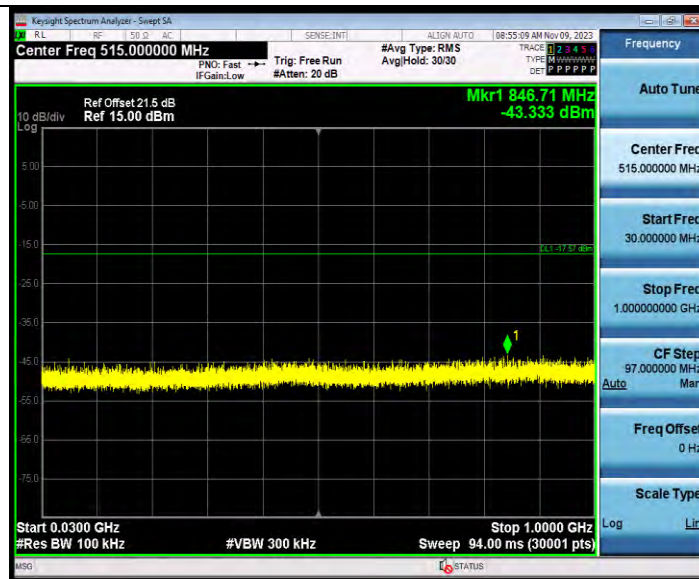
Tower N, Innovation Center, 88 Zhuyi Road, High-tech District,
Suzhou City, Anhui Province

Tel: +86(0557) 368 1008



BUREAU
VERITAS

Test Report No.: W7L-P23100008RF02



11G_Ant1_2462_1000~26500



11N20SISO_Ant1_2412_0~Reference



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VERITAS

Test Report No.: W7L-P23100008RF02



11N20SISO_Ant1_2412_30~1000



11N20SISO_Ant1_2412_1000~26500



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VERITAS

Test Report No.: W7L-P23100008RF02



11N20SISO_Ant1_2437_0~Reference



11N20SISO_Ant1_2437_30~1000

Huarui 7Layers High
Technology (Suzhou) Co., Ltd

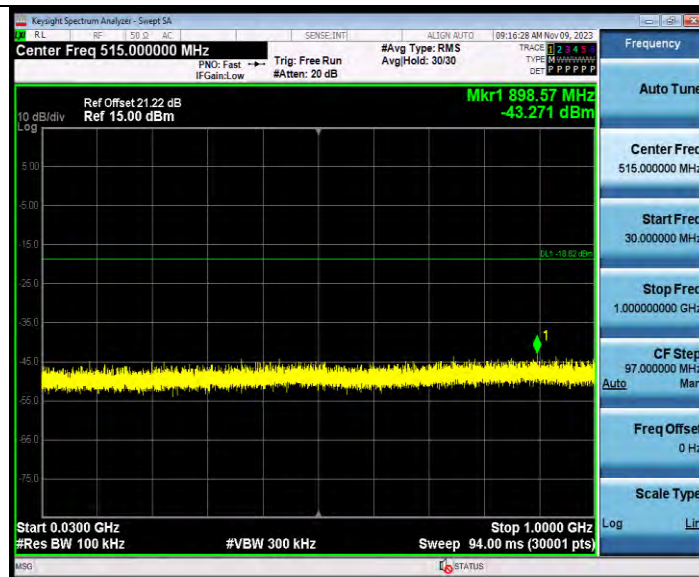
Tower N, Innovation Center, 88 Zhuyi Road, High-tech District,
Suzhou City, Anhui Province

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VERITAS

Test Report No.: W7L-P23100008RF02



11N20SISO_Ant1_2437_1000~26500



11N20SISO_Ant1_2462_0~Reference



BUREAU
VERITAS

Test Report No.: W7L-P23100008RF02



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	8.43	99.53	0.02
		2437	8.39	8.43	99.53	0.02
		2462	8.39	8.43	99.53	0.02
11G	Ant1	2412	1.39	1.43	97.20	0.12
		2437	1.39	1.43	97.20	0.13
		2462	1.39	1.43	97.20	0.12
11N20SISO	Ant1	2412	1.30	1.35	96.30	0.16
		2437	1.30	1.34	97.01	0.13
		2462	1.30	1.35	96.30	0.16

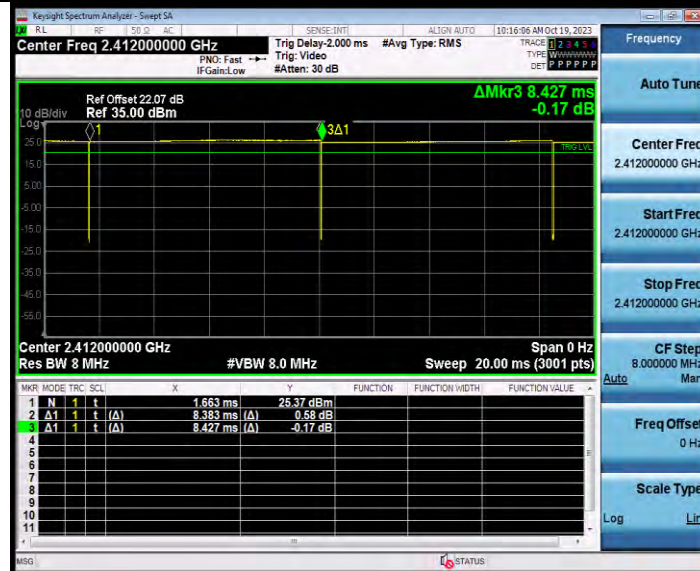


BUREAU
VERITAS

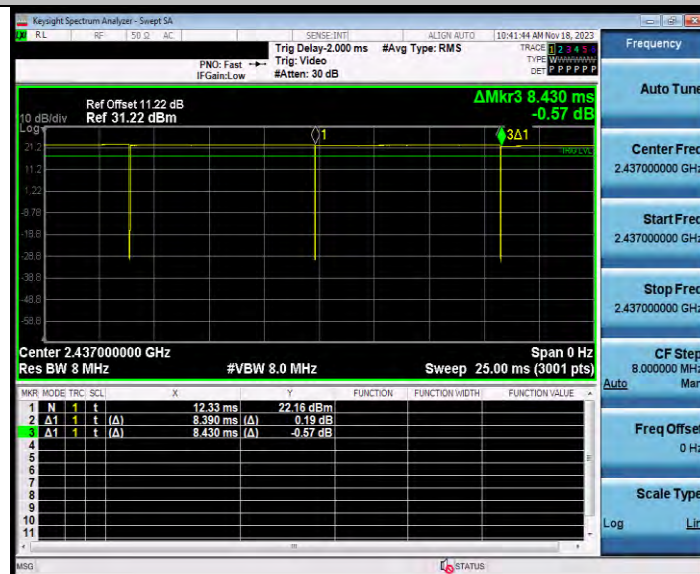
Test Report No.: W7L-P23100008RF02

TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437

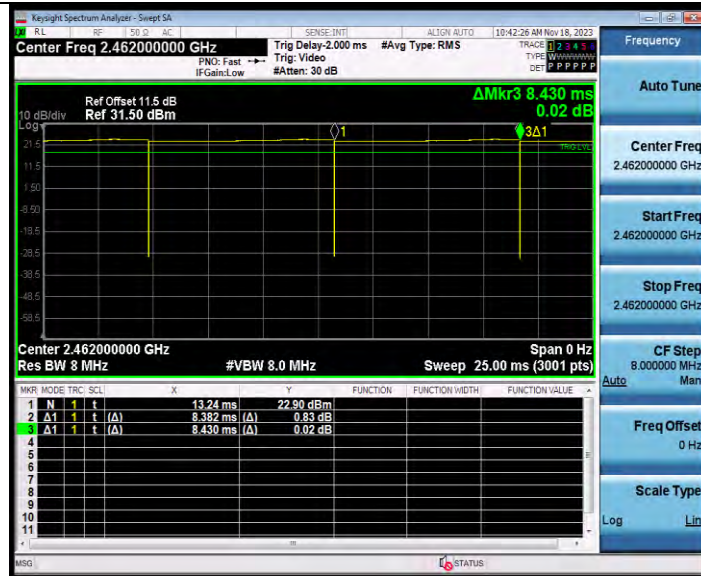


11B_Ant1_2462

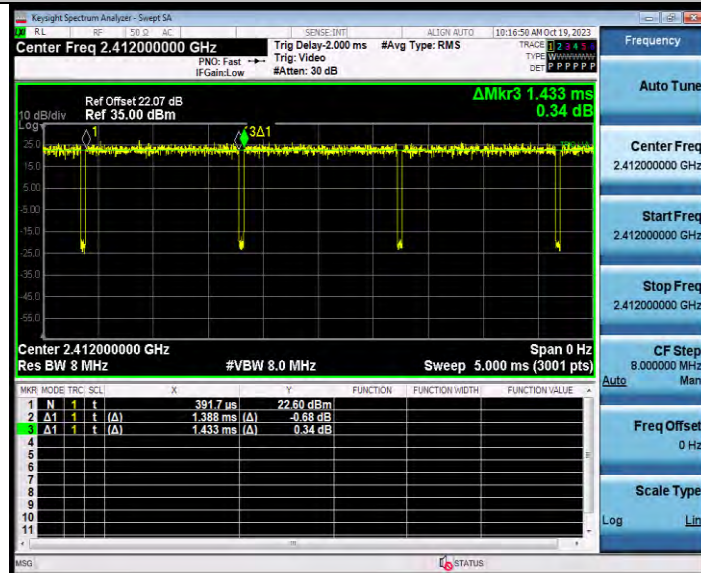


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VERITAS

Test Report No.: W7L-P23100008RF02



11G_Ant1_2412

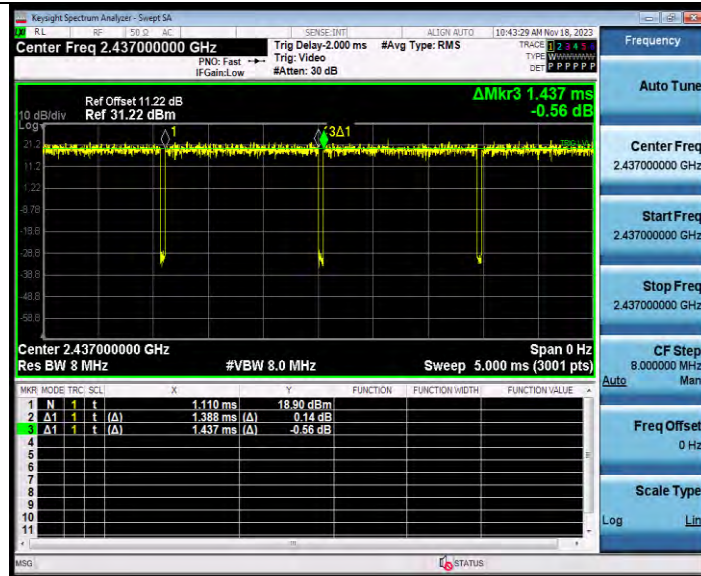


11G_Ant1_2437

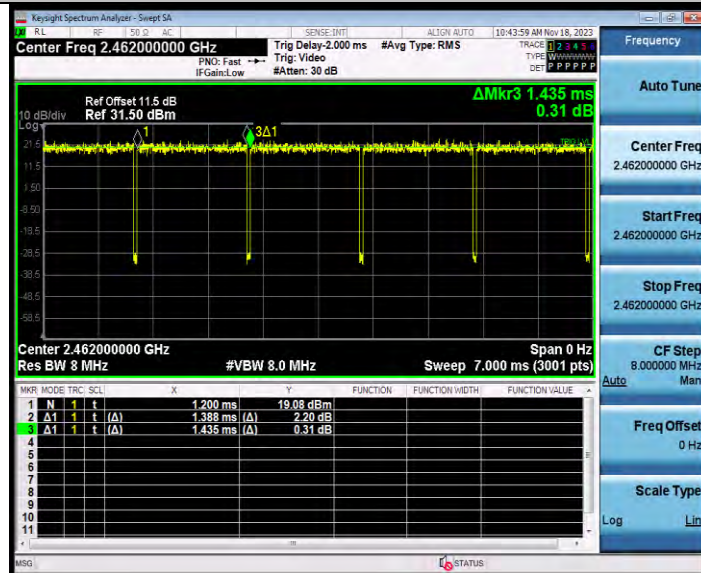


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VERITAS

Test Report No.: W7L-P23100008RF02



11G_Ant1_2462



11N20SISO_Ant1_2412