



**BUREAU
VERITAS**

Test Report No.: W7L-P23060014RF02

CHANNEL	TX Channel 19	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	53.53	58.27	74	-20.47	35.05	6.18	45.97	182	138	Peak
2390	46.57	51.31	54	-7.43	35.05	6.18	45.97	182	138	Average
2440	88.92	93.41	/	/	35.21	6.25	45.95	108	76	Peak
2440	88.04	92.53	/	/	35.21	6.25	45.95	108	76	Average
2483.5	54.77	59.04	74	-19.23	35.35	6.31	45.93	185	39	Peak
2483.5	46.9	51.17	54	-7.1	35.35	6.31	45.93	185	39	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	51.75	58.68	74	-22.25	32.86	6.18	45.97	149	167	Peak
2390	43.91	50.84	54	-10.09	32.86	6.18	45.97	149	167	Average
2440	92.57	99.3	/	/	32.97	6.25	45.95	175	206	Peak
2440	91.91	98.64	/	/	32.97	6.25	45.95	175	206	Average
2483.5	52.78	59.34	74	-21.22	33.06	6.31	45.93	167	104	Peak
2483.5	45.06	51.62	54	-8.94	33.06	6.31	45.93	167	104	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2440MHz: Fundamental frequency.



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Test Report No.: W7L-P23060014RF02

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	54.33	59.07	74	-19.67	35.05	6.18	45.97	182	349	Peak
2390	47	51.74	54	-7	35.05	6.18	45.97	182	349	Average
2480	89.08	93.37	/	/	35.34	6.3	45.93	175	113	Peak
2480	87.56	91.85	/	/	35.34	6.3	45.93	175	113	Average
2483.5	54.99	59.26	74	-19.01	35.35	6.31	45.93	190	334	Peak
2483.5	48.08	52.35	54	-5.92	35.35	6.31	45.93	190	334	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	52.21	59.14	74	-21.79	32.86	6.18	45.97	145	314	Peak
2390	44.92	51.85	54	-9.08	32.86	6.18	45.97	145	314	Average
2480	93.18	99.75	/	/	33.06	6.3	45.93	142	295	Peak
2480	90.71	97.28	/	/	33.06	6.3	45.93	142	295	Average
2483.5	53.76	60.32	74	-20.24	33.06	6.31	45.93	159	31	Peak
2483.5	46.68	53.24	54	-7.32	33.06	6.31	45.93	159	31	Average

REMARKS:

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



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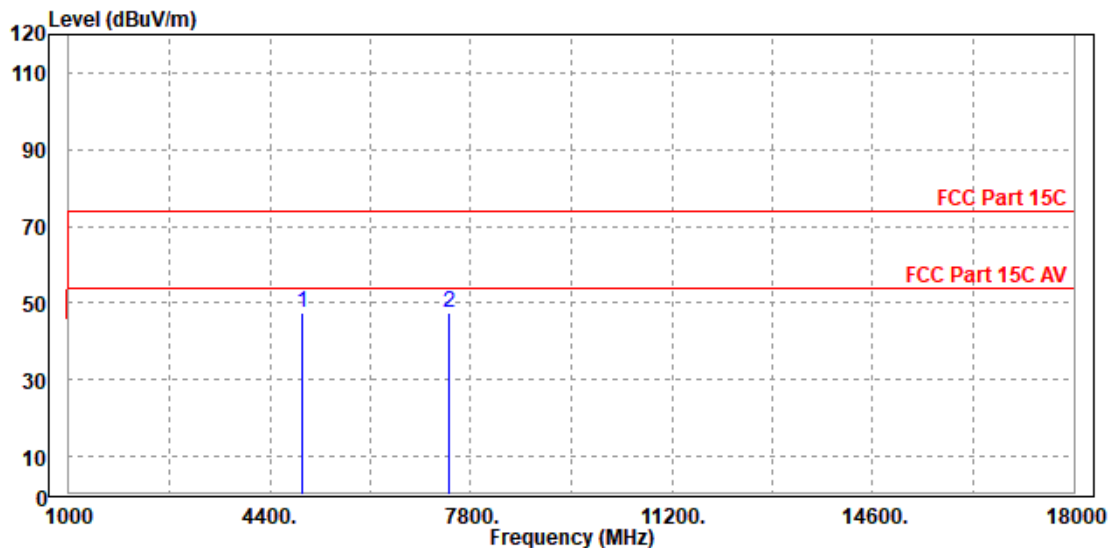
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Worst case harmonic:

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 Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m		
1	PP	4960.000	47.38	46.04	74.00	-26.62	1.34	Peak	Horizontal
2		7443.000	47.29	42.73	74.00	-26.71	4.56	Peak	Horizontal



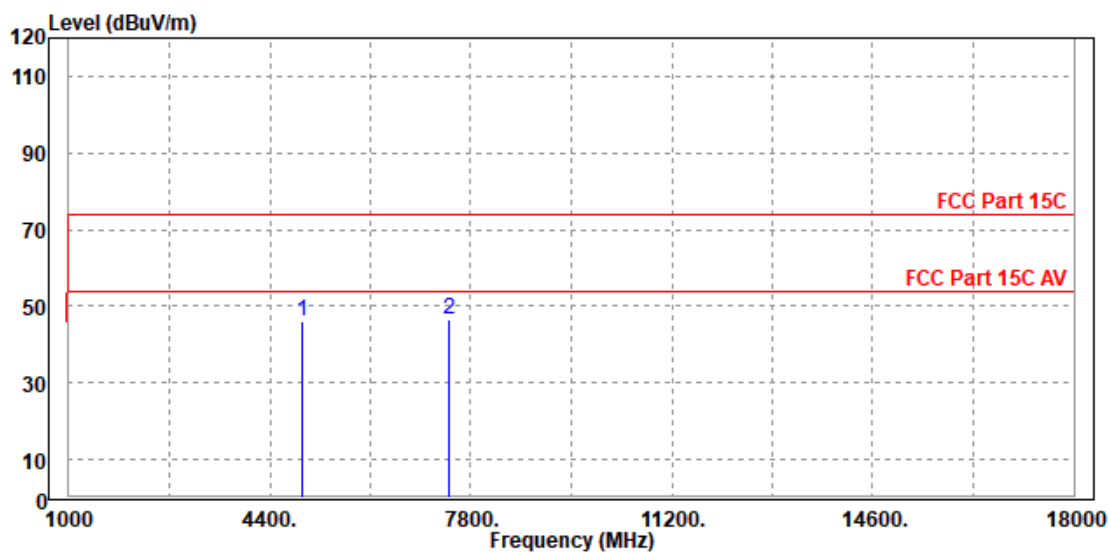


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Test Report No.: W7L-P23060014RF02

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	4961.000	46.14	46.48	74.00	-27.86	-0.34	Peak	Vertical
2 PP	7440.000	46.49	42.96	74.00	-27.51	3.53	Peak	Vertical



REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 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. 22,22	Feb. 21,23
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510322	Feb. 18,22	Feb. 17,23
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.15,22	May.14,23
Power Sensor	ANRITSU	MA2411B	1339352	May. 06,22	May. 05,23

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

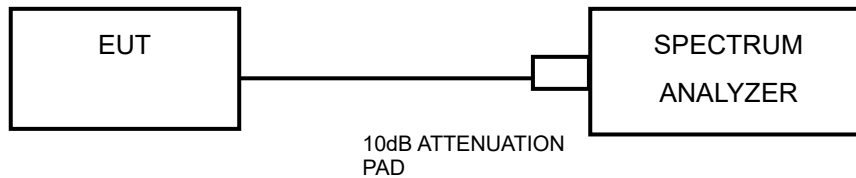
1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points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

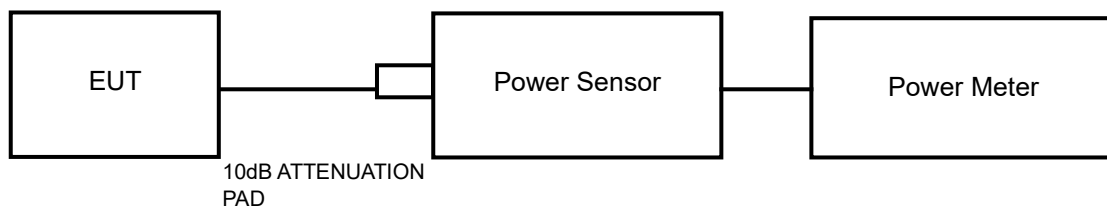


3.4 CONDUCTED OUTPUT POWER

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.

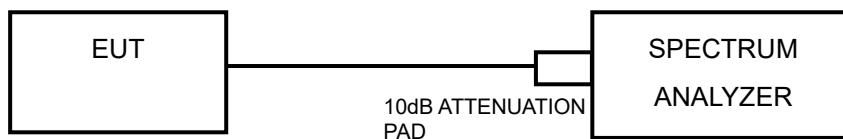


3.5 POWER SPECTRAL DENSITY MEASUREMENT

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.

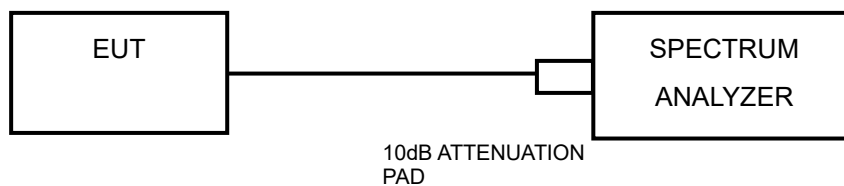


3.6 OUT OF BAND EMISSION MEASUREMENT

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.



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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.

**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	7.120	2408.440	2415.560	0.5	PASS
		2437	8.040	2433.000	2441.040	0.5	PASS
		2462	7.560	2458.480	2466.040	0.5	PASS
11G	Ant1	2412	15.160	2404.400	2419.560	0.5	PASS
		2437	15.320	2429.440	2444.760	0.5	PASS
		2462	15.120	2454.440	2469.560	0.5	PASS
11N20SISO	Ant1	2412	15.160	2404.440	2419.600	0.5	PASS
		2437	16.000	2429.440	2445.440	0.5	PASS
		2462	15.400	2454.440	2469.840	0.5	PASS



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TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437



11B_Ant1_2462



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Test Report No.: W7L-P23060014RF02



11G_Ant1_2412



11G_Ant1_2437



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Test Report No.: W7L-P23060014RF02



11G_Ant1_2462



11N20SISO_Ant1_2412



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Test Report No.: W7L-P23060014RF02



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



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Test Report No.: W7L-P23060014RF02



**OCCUPIED CHANNEL BANDWIDTH****TEST RESULT**

TestMode	Antenna	Channel Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	12.323	2405.9112	2418.2342	---	---
		2437	12.223	2430.9462	2443.1692	---	---
		2462	12.220	2455.9608	2468.1808	---	---
11G	Ant1	2412	16.968	2403.5564	2420.5244	---	---
		2437	16.944	2428.5656	2445.5096	---	---
		2462	16.842	2453.6261	2470.4681	---	---
11N20SISO	Ant1	2412	17.836	2403.1277	2420.9637	---	---
		2437	17.811	2428.1112	2445.9222	---	---
		2462	17.710	2453.2041	2470.9141	---	---

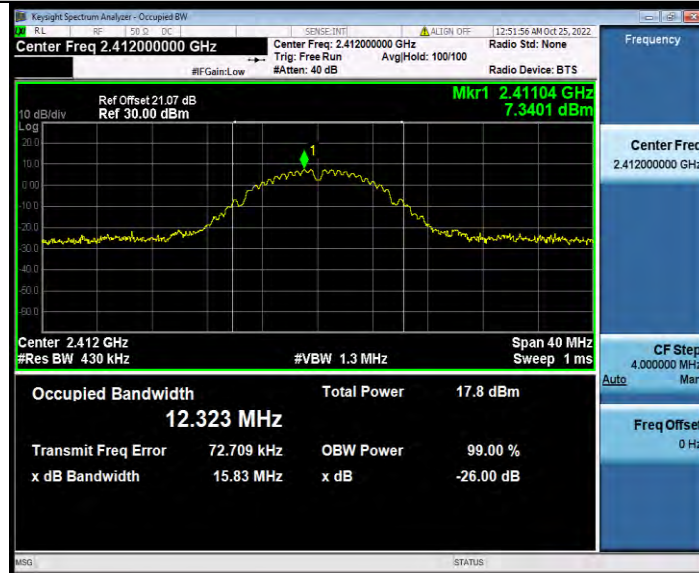


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TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437

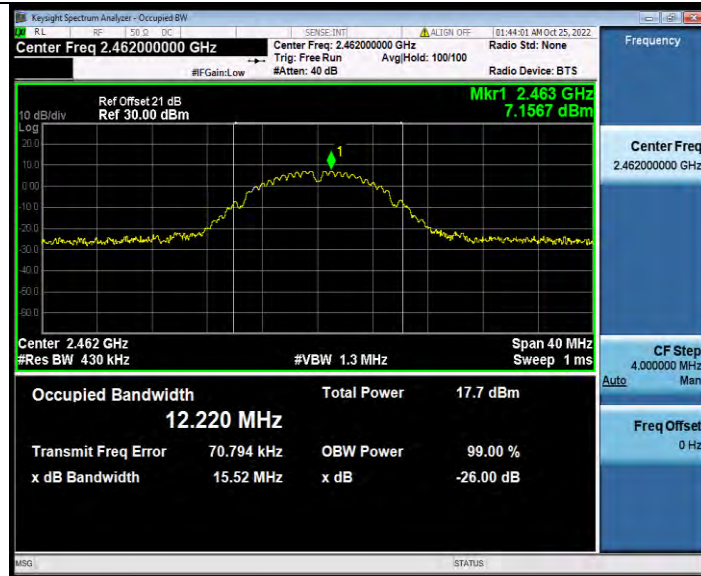


11B_Ant1_2462



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Test Report No.: W7L-P23060014RF02



11G_Ant1_2412



11G_Ant1_2437

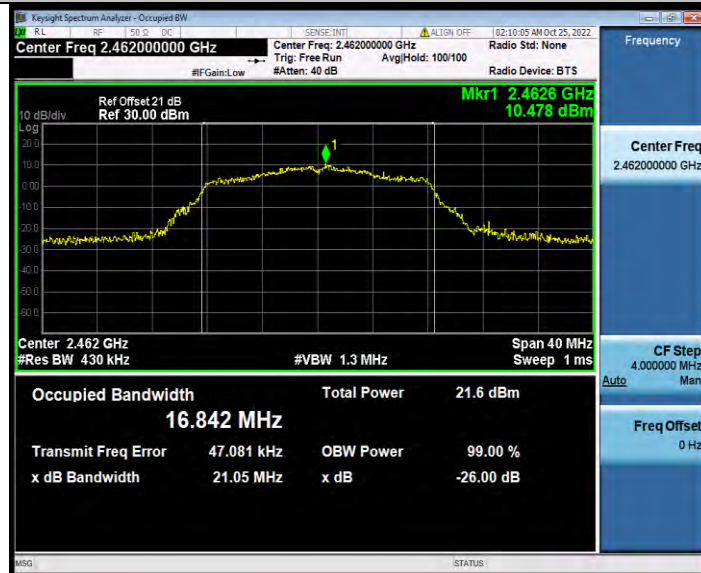


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11G_Ant1_2462

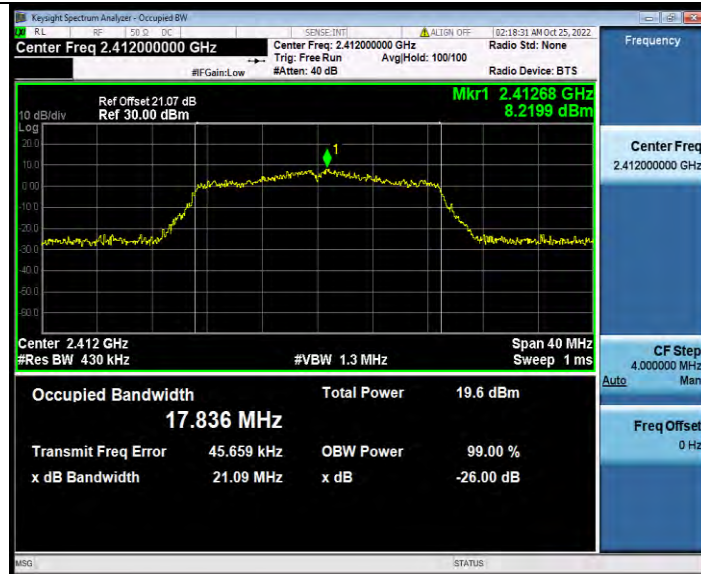


11N20SISO_Ant1_2412

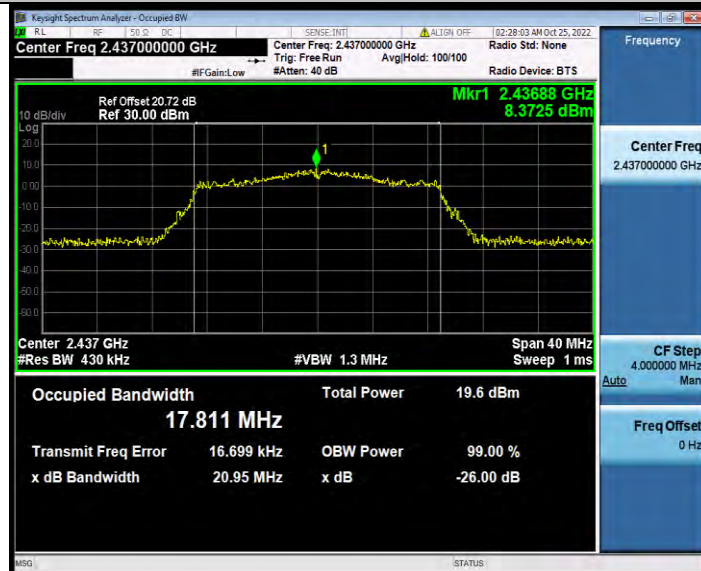


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Test Report No.: W7L-P23060014RF02



11N20SISO_Ant1_2437

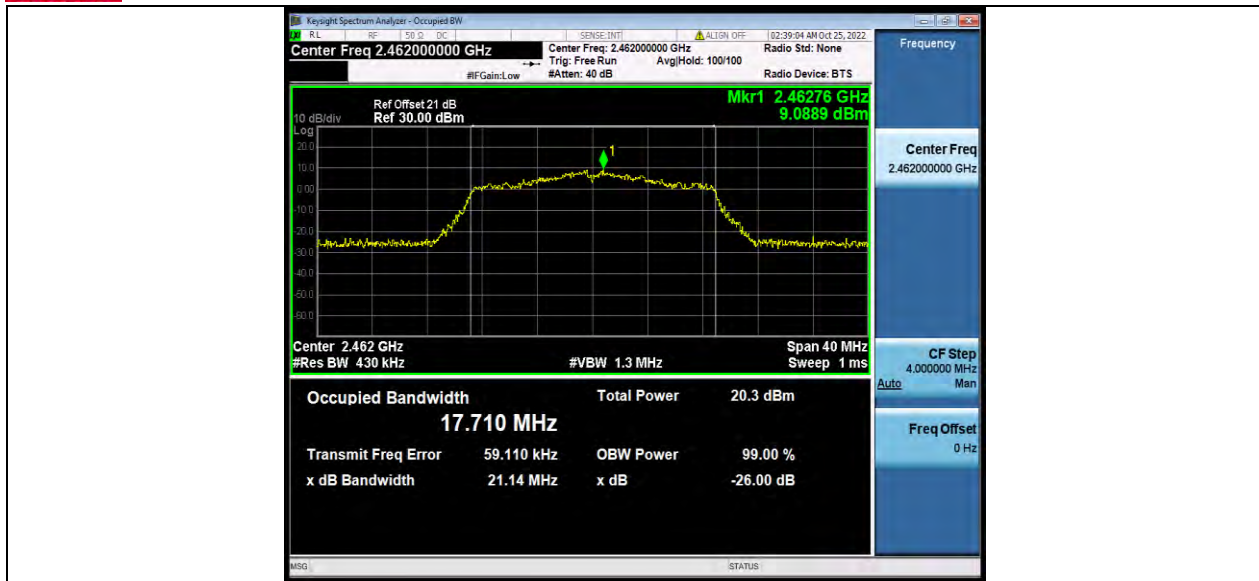


11N20SISO_Ant1_2462



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MAXIMUM CONDUCTED OUTPUT POWER

TEST RESULT

TestMode	Freq. [MHz]	Average power [dBm]	Peak Power [dBm]	Peak Power [mw]	Conducted Limit [dBm]	EIRP [dBm]	EIRP [mw]	EIRP Limit [dBm]	Verdict	Power Setting
11B	2412	14.15	17.85	60.95	≤30.00	19.85	96.61	≤36.00	PASS	15
	2437	14.64	18.01	63.24	≤30.00	20.01	100.23	≤36.00	PASS	15
	2462	14.08	17.73	59.29	≤30.00	19.73	93.97	≤36.00	PASS	15
11G	2412	13.55	22.25	167.88	≤30.00	24.25	266.07	≤36.00	PASS	14
	2437	14.13	22.27	168.66	≤30.00	24.27	267.30	≤36.00	PASS	14
	2462	13.70	23.36	216.77	≤30.00	25.36	343.56	≤36.00	PASS	14
11N20SIS O	2412	10.45	20.68	116.95	≤30.00	22.68	185.35	≤36.00	PASS	13
	2437	10.78	21.59	144.21	≤30.00	23.59	228.56	≤36.00	PASS	13
	2462	11.45	21.49	140.93	≤30.00	23.49	223.36	≤36.00	PASS	13



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Test Report No.: W7L-P23060014RF02

MAXIMUM POWER SPECTRAL DENSITY

TEST RESULT

TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-6.02	≤8.00	PASS
		2437	-5.34	≤8.00	PASS
		2462	-4.88	≤8.00	PASS
11G	Ant1	2412	-7.71	≤8.00	PASS
		2437	-7.33	≤8.00	PASS
		2462	-6.64	≤8.00	PASS
11N20SISO	Ant1	2412	-10.32	≤8.00	PASS
		2437	-9.75	≤8.00	PASS
		2462	-9.15	≤8.00	PASS



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Test Report No.: W7L-P23060014RF02

TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437



11B_Ant1_2462



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Test Report No.: W7L-P23060014RF02



11G_Ant1_2412

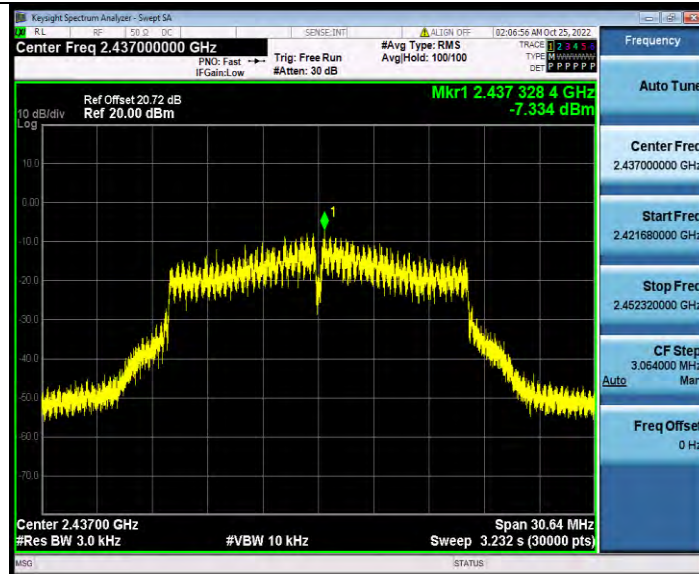


11G_Ant1_2437



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Test Report No.: W7L-P23060014RF02



11G_Ant1_2462



11N20SISO_Ant1_2412



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Test Report No.: W7L-P23060014RF02



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



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Test Report No.: W7L-P23060014RF02



BV 7Layers Communications Technology
(Shenzhen) Co., Ltd

No.B102, Dazui Chuangxin Mansion, North of Beihuan
Avenue, North Area, Hi-Tech Industrial Park, Nanshan
District, Shenzhen, Guangdong, China

Tel: +86 755 8869 6566
Fax: +86 755 8869 6577
Email: customerservice.sw@bureauveritas.com



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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	6.62	-32.55	≤ -13.38	PASS
		High	2462	6.87	-38.17	≤ -13.13	PASS
11G	Ant1	Low	2412	3.28	-30.16	≤ -16.72	PASS
		High	2462	4.26	-36.42	≤ -15.74	PASS
11N20SISO	Ant1	Low	2412	3.14	-34.69	≤ -16.86	PASS
		High	2462	3.52	-38.01	≤ -16.48	PASS



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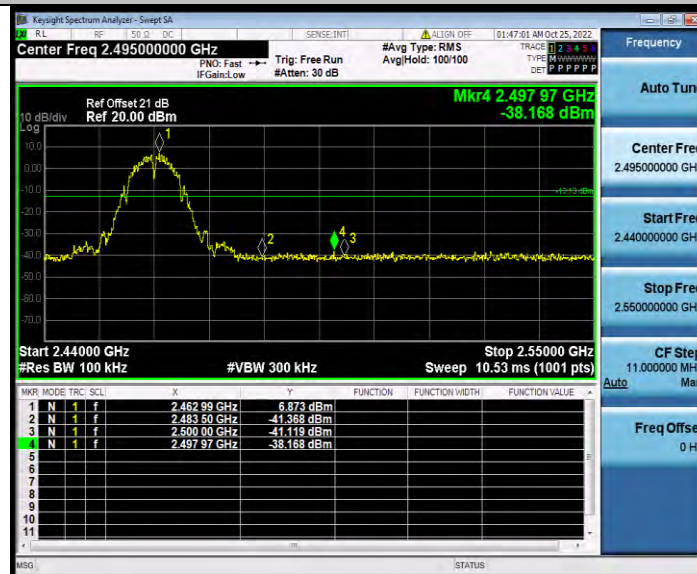
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TEST GRAPHS

11B_Ant1_Low_2412



11B_Ant1_High_2462



11G_Ant1_Low_2412



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Test Report No.: W7L-P23060014RF02



11G_Ant1_High_2462



11N20SISO_Ant1_Low_2412

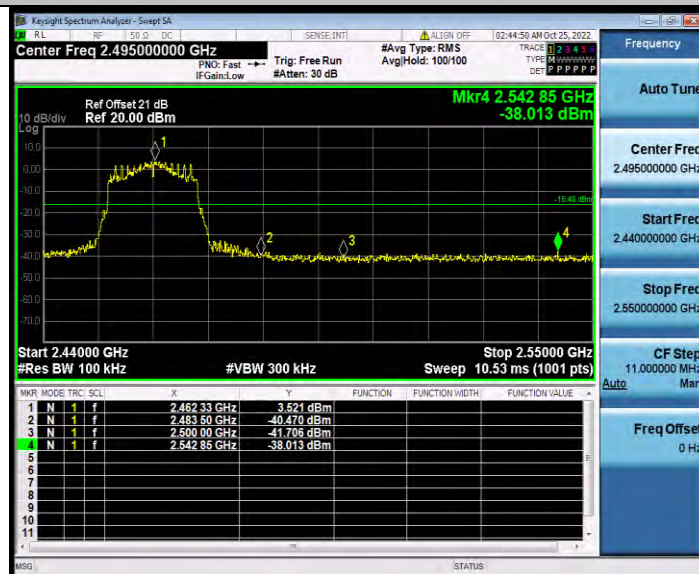


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VERITAS

Test Report No.: W7L-P23060014RF02



11N20SISO_Ant1_High_2462



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

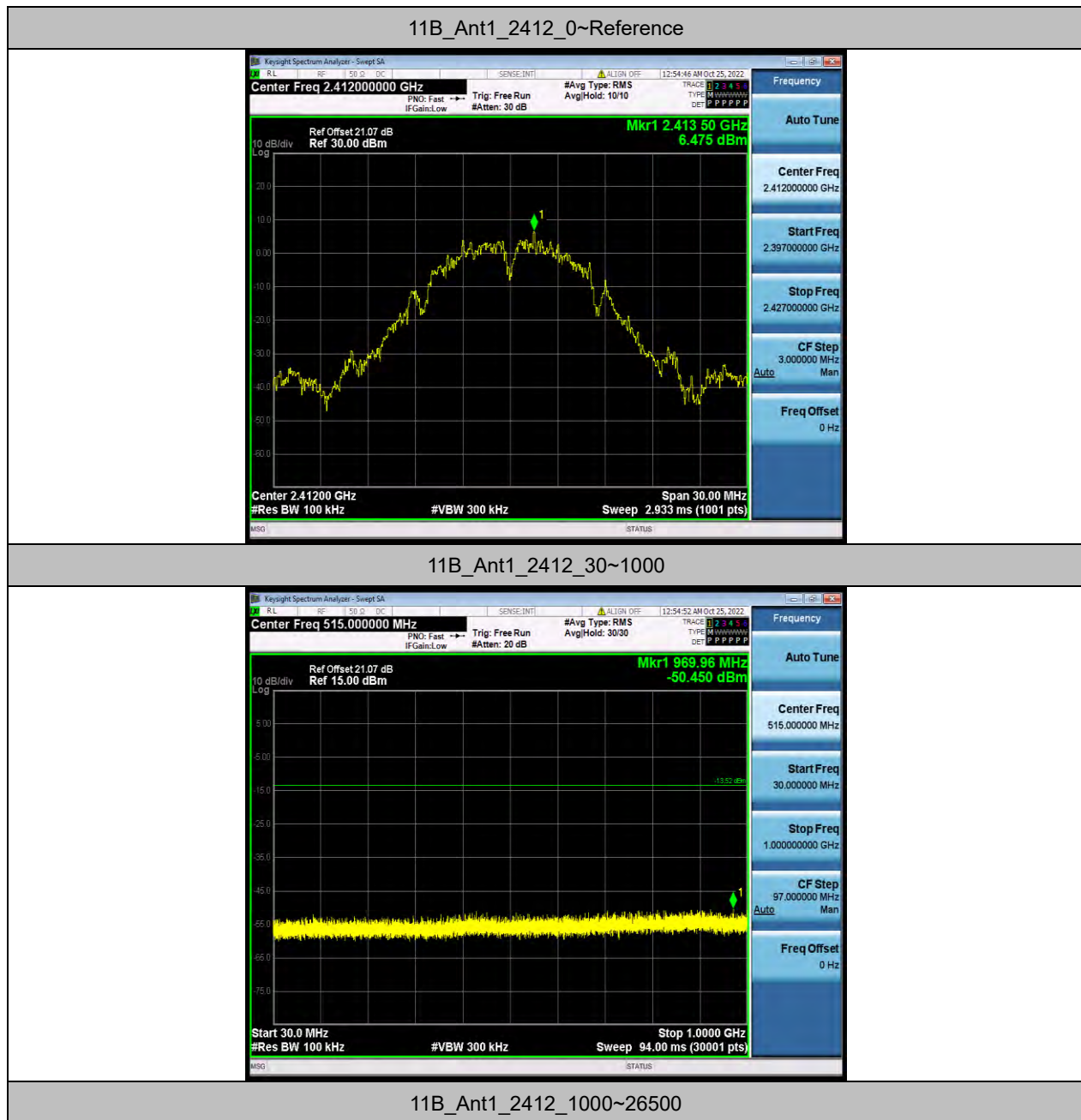
TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	6.48	6.48	---	PASS
			30~1000	6.48	-50.45	≤-13.52	PASS
			1000~26500	6.48	-41.19	≤-13.52	PASS
		2437	Reference	4.85	4.85	---	PASS
			30~1000	4.85	-50.2	≤-15.15	PASS
			1000~26500	4.85	-41.62	≤-15.15	PASS
		2462	Reference	4.19	4.19	---	PASS
			30~1000	4.19	-50.04	≤-15.81	PASS
			1000~26500	4.19	-41.8	≤-15.81	PASS
11G	Ant1	2412	Reference	2.18	2.18	---	PASS
			30~1000	2.18	-49.28	≤-17.82	PASS
			1000~26500	2.18	-41.32	≤-17.82	PASS
		2437	Reference	2.43	2.43	---	PASS
			30~1000	2.43	-50.81	≤-17.57	PASS
			1000~26500	2.43	-42.43	≤-17.57	PASS
		2462	Reference	3.37	3.37	---	PASS
			30~1000	3.37	-49.93	≤-16.63	PASS
			1000~26500	3.37	-42.11	≤-16.63	PASS
11N20SISO	Ant1	2412	Reference	2.38	2.38	---	PASS
			30~1000	2.38	-48.99	≤-17.62	PASS
			1000~26500	2.38	-41.65	≤-17.62	PASS
		2437	Reference	2.08	2.08	---	PASS
			30~1000	2.08	-49.65	≤-17.92	PASS
			1000~26500	2.08	-41.94	≤-17.92	PASS
		2462	Reference	2.91	2.91	---	PASS
			30~1000	2.91	-50.55	≤-17.09	PASS
			1000~26500	2.91	-41.5	≤-17.09	PASS



BUREAU
VERITAS

Test Report No.: W7L-P23060014RF02

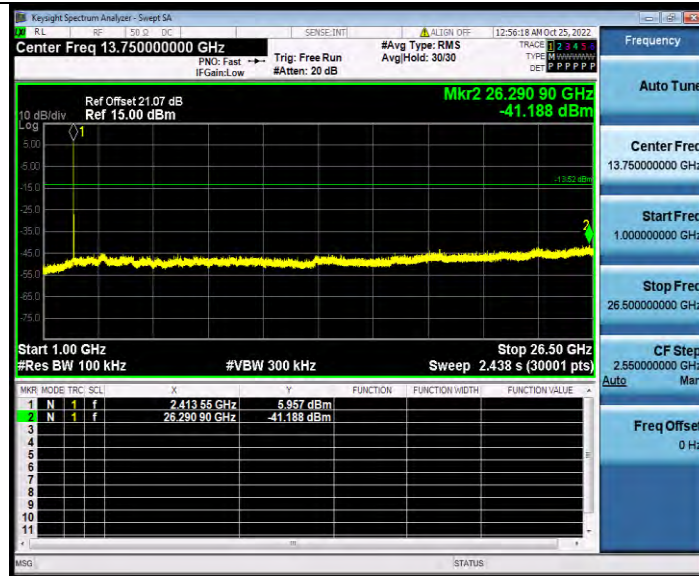
TEST GRAPHS





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VERITAS

Test Report No.: W7L-P23060014RF02



11B_Ant1_2437_0~Reference

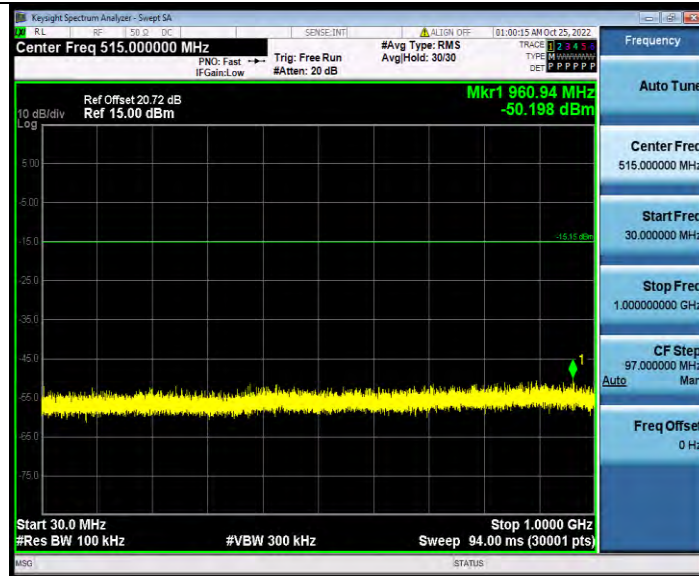


11B_Ant1_2437_30~1000

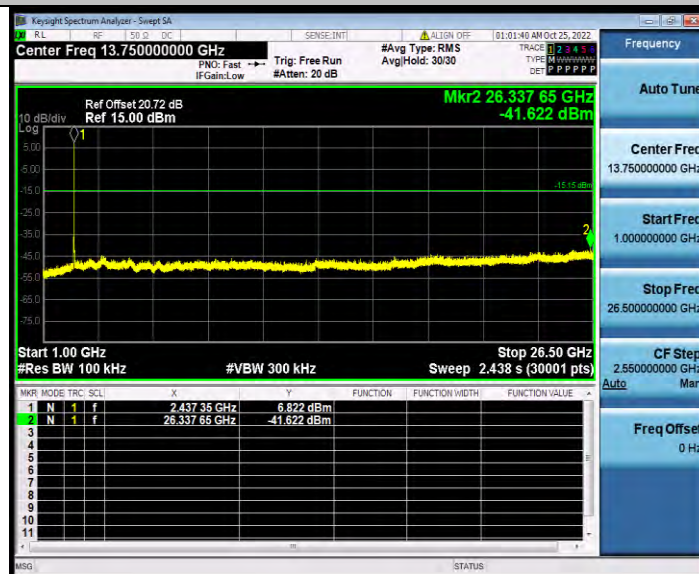


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VERITAS

Test Report No.: W7L-P23060014RF02



11B_Ant1_2437_1000~26500



11B_Ant1_2462_0~Reference

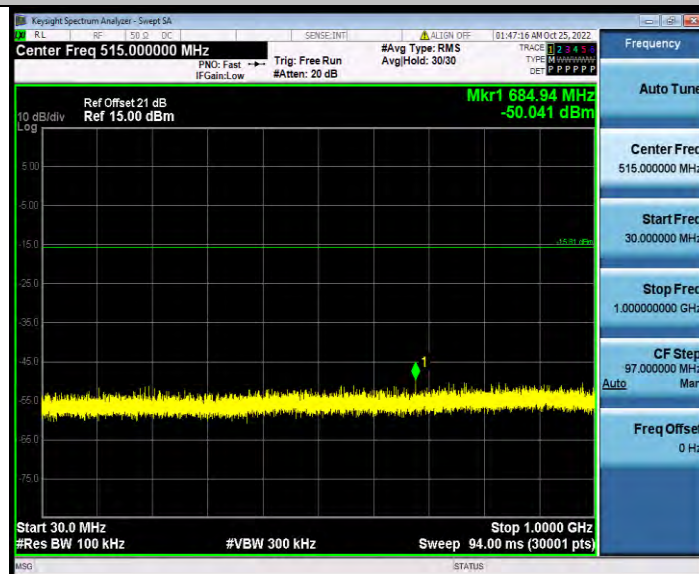


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VERITAS

Test Report No.: W7L-P23060014RF02



11B_Ant1_2462_30~1000

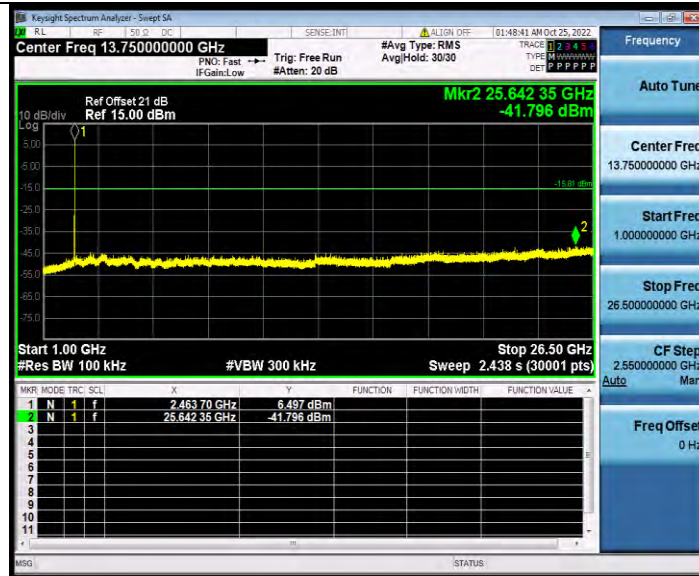


11B_Ant1_2462_1000~26500



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VERITAS

Test Report No.: W7L-P23060014RF02



11G_Ant1_2412_0~Reference



11G_Ant1_2412_30~1000