



**Test Report for Blues Wireless Inc.  
Report No. EX0646-2 Issue 1**



# TEST REPORT

Applicant	Blues Wireless Inc.
Address	50 Dunham Ridge Suite 1650 Beverly, MA 01915

Model	NOTE-ESP
Date of tests	Sept 20 - 25, 2023
FCC Test Firm DN	US1028
Canada CABID	US0106

The tests have been carried out according to the requirements of the following standard:

- FCC Part 15, Subpart C, Section 15.247**
- ISED Canada RSS-247 Issue 2**

**CONCLUSION: The submitted sample was found to COMPLY with the test requirement**

Prepared by Bryan Valcourt EMC Engineer	Approved by Ahmed Ait Ahmed EMC Supervisor
Report Issue Date: Oct 30, 2023	Issue Number: 1

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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
1	Original release	Oct 30, 2023



# 1 SUMMARY OF TEST RESULTS

EUT was tested against the following requirements:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247), RSS-247				
STANDARD SECTION		TEST TYPE AND LIMIT	APPLICABLE	RESULT
47CFR15	RSS			
15.205	247 3.3	Radiated Spurious Emissions	Y	PASS
15.209	247 5.5			
	Gen 8.9			
	Gen 8.10			

**Note:** Radiated spurious emissions compliance verification only for integration purposes of a previously approved radio module (FCC ID: 2AC7Z-ESPS3WROOM1 and ISED Canada IC: 21098-ESPS3WROOM1).



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## 2 MEASUREMENT UNCERTAINTY

The listed uncertainties are the worst-case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results. Values for measurement uncertainty are calculated per ETSI TR 100 028 (2001).

Measurement	Expanded Uncertainty k=2	Maximum allowable uncertainty
Radio frequency (@ 2.4GHz)	3.23 x 10 <sup>-8</sup>	1 x 10 <sup>-7</sup>
RF power, conducted	0.40dB	0.75dB
Maximum frequency deviation: Within 300Hz and 6kHz of audio frequency / Within 6kHz and 25kHz of audio frequency	3.4% 0.3dB	5% 3dB
Adjacent channel power	1.9dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	2.39dB	3dB
Conducted emission of receivers	1.3dB	3dB
Radiated emission of transmitter, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of transmitter, valid up to 80GHz	3.3dB	6dB
Radiated emission of receiver, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of receiver, valid up to 80GHz	3.3dB	6dB
Humidity	2.37%	5%
Temperature	0.7°C	1.0°C
Time	4.1%	10%
RF Power Density, Conducted	0.4dB	3dB
DC and low frequency voltages	1.3%	3%
Voltage (AC, <10kHz)	1.3%	2%
Voltage (DC)	0.62%	1%
The above reflects a 95% confidence level		

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.



### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>NOMINAL VOLTAGE</b>	5VDC
<b>RADIO TECHNOLOGY</b>	WLAN (802.11b/g/n(HT20)/n(HT40))
<b>OPERATING FREQUENCY</b>	802.11b/g/n(HT20): 2412 - 2462MHz 802.11n(HT40): 2422 - 2452MHz
<b>EUT Power/Attenuation Settings</b>	Power reductions were necessary. Attenuation settings required for radiated band-edge compliance: 802.11b: 2, 802.11g: 8, 802.11n(HT20): 3, 802.11n(HT40): 2
<b>ANTENNA TYPE</b>	PCB antenna with 3.26dBi gain Note: Blues Wireless Inc. has declared that they have not modified the original antenna as supplied on the PCB by the radio module manufacturer.

Lowest clock frequency in the device (used/generated): 80MHz

Highest clock frequency in the device (used/generated): 2480MHz

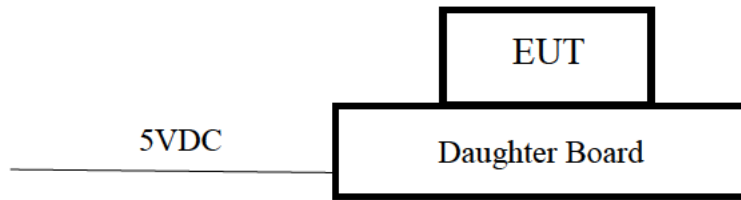
EUT Configuration											
Work Order: X0646 Company: Blues Wireless Inc. Company Address: 50 Dunham Ridge Suite 1650 Beverly, MA 01915 Contact: Robert [REDACTED] Present: Yes, Sean Taylor											
EUT:			MN	PN	SN						
NOTE-ESP					4827E21DED00						
EUT Description: Embeddable Wifi Communications Module EUT Max Frequency: 2480MHz EUT Min Frequency: 80MHz											
Support Equipment:			MN	SN							
Daughter Board			CARR-B	N/A							
Dell Inspiron Lap top											
Archer Wifi Router			AX21	Y218003000680							
<i>EUT Ports:</i>											
Port Label	Port Type	No. of ports	No. Populated	Cable Type	Shielded	Ferrites	Length	Max Length	In/Out	NEBS Type	Unpopulated Reason
Micro USB	USB	1	0	USB	Y	N	2m	5m	Inside		On daughter Board for Set Up
2 Pin JST Lipo Connection	Battery	1	0	Twisted Pair	N	N	0.1m	0.1m	Inside		Connected to DC Power Supply
Qwic 12C	Twisted pair	1	0	Twisted Pair	N	N	0.1m	0.1m	Inside		For Client connectivity

EUT test modes:

TEST MODE	DESCRIPTION
A	Continuous Transmit at selected data rate (Duty-cycle: >98%)

## EUT SETUP BLOCK DIAGRAMS

### Radiated Emissions EUT Setup



Following channels/modes were selected for the applicable tests below.

TEST	TEST MODE	AVAILABLE CHANNELS	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)	Notes
RSE<1G	A	1 to 11	11	802.11b	1Mbps	1, 4
RSE≥1G	A	1 to 11	11	802.11b	1 Mbps	1, 2, 3, 4
		1 to 11	11	802.11g	6 Mbps	
		1 to 11	11	802.11n HT20	MCS0	
		3 to 9	9	802.11n HT40	MCS0	
RBE	A	1 to 11	1, 11	802.11b	1 Mbps	4
		1 to 11	1, 11	802.11g	6 Mbps	
		1 to 11	1, 11	802.11n HT20	MCS0	
		3 to 9	3, 9	802.11n HT40	MCS0	

Note 1: Only 1 channel was tested for compliance verification purposes.

Note 2: Spurious emissions were scanned up to 13GHz to cover the 5<sup>th</sup> harmonic of the radio module.

Note 3: Only 802.11n and 802.11g modes were tested in 6-13GHz range for compliance verification purposes.

Note 4: For radiated emissions, worst-case orientation was found when the EUT was positioned on Y-axis as shown in the Test Setup Photos section of this report.

RSE<1G: Radiated Spurious Emissions Below 1GHz

RSE≥1G: Radiated Spurious Emissions Above 1GHz

RBE: Radiated Band-edge

## 3.2 MEASUREMENT PROCEDURES USED

All tests were performed in accordance with the following measurement procedures:

### ANSI C63.10-2013



## 4 TEST RESULTS

### 4.1 RADIATED SPURIOUS EMISSIONS

#### 4.1.1 LIMITS

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emissions limits specified in Section 15.209(a).

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

**NOTE:**

- Lower limit applies at the transition frequencies.
- $\text{dB}\mu\text{V}/\text{m} = 20 \cdot \log(\mu\text{V}/\text{m})$ .
- As specified in 15.35(b), for frequencies above 1000MHz, field strength limits are based on the use of measurement instrumentation employing an average detector function. However, there is also a limit on the peak level of the emissions that is 20 dB above the maximum permitted average emission limit.
- Limit conversion below 30MHz is done by using the square of an inverse linear distance extrapolation factor (40 dB/decade) as allowed in FCC 15.31(f)(2).  
 $\text{Limit}(3\text{m}) = \text{Limit}(30\text{m}) + 40 \cdot \log(30/3) = \text{Limit}(30\text{m}) + 40$   
 $\text{Limit}(3\text{m}) = \text{Limit}(300\text{m}) + 40 \cdot \log(300/3) = \text{Limit}(300\text{m}) + 80$
- RSS-GEN Table 6 H-field limits are 51.5dB lower than FCC 15.209(a) E-field limits. Measurements are performed in terms of magnetic field and converted to electric field using the free space impedance of  $377\Omega$  ( $\text{E-field} = \text{H-field} \cdot 377$ ). Therefore resulting pass/fail margin would be the same if an E-field reading is compared to an E-field limit or an H-field reading is compared to an H-field limit.





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## 4.1.2 TEST EQUIPMENT USED

Rev. 9/22/2023

Spectrum Analyzers / Receivers /Preselectors									
	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	3/30/2024	3/30/2023	
Radiated Emissions Sites									
	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on	
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz	1686	I	12/28/2024	12/28/2022	
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz	1686	I	12/28/2024	12/28/2022	
Preamps /Couplers Attenuators / Filters									
	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
8449B HF Preamp	1-18GHz	8449B	Agilent	1149055		II	11/1/2023	11/1/2022	
8447F Rental PA	9KHz-1.3GHz	84477F	HP	3113A05395		II	10/17/2023	10/17/2022	
Antennas									
	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Red-Brown Bilog	30-2000MHz	JB1	Sunol	A0032406	1218	I	4/6/2025	4/6/2023	
Blue Horn	1-18Ghz	3117	ETS	157647	1861	I	3/27/2025	3/27/2023	
Meteorological Meters/Chambers									
		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	12/15/2025	12/15/2022	
Asset #2654		1235C97	Control Company	200477432	2654	I	8/18/2025	8/18/2022	
Cables									
	Range		Mfr		Asset	Cat	Calibration Due	Calibrated on	
Asset #2466	9KHz-18GHz		MegaPhase			II	11/1/2023	11/1/2022	
Asset #2608	9KHz-18GHz		Pasternack			II	11/1/2023	11/1/2022	
Asset #2682	9KHz-18GHz		Pasternack			II	10/6/2023	10/6/2022	

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



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**4.1.3 TEST PROCEDURES**

- a. The EUT was placed on the top of a rotating table 1.5 meters (above 1GHz) and 0.8 meters (below 1GHz) above the ground at a 3 meters semi-anechoic chamber.
- b. For below 30MHz, a loop antenna with its lowest point 1m above the ground was placed 3m away from the EUT and it was rotated 0 and 90 degrees around its vertical axis.
- c. In 30MHz-1GHz range, a biconilog antenna was mounted on a variable-height antenna tower and placed 3m away from the EUT. Antenna height was varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were investigated. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. In 1GHz-6GHz range, a horn antenna was mounted on a variable-height antenna tower and placed 3m away from the EUT. Antenna height was varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were investigated. The table was rotated 360 degrees to determine the position of the highest radiation. Using the same antenna, the measurement distance was reduced to 1m in 6-18GHz range.
- e. Following bandwidths were used during emissions testing:

Freq. (MHz)	RBW	VBW	Pre-scan	Final
30-1000	120kHz	300kHz	Peak	Quasi Peak
>1000	1MHz	3MHz	Peak	Peak Max Hold and RMS Power Avg (Trace Avg)

Per FCC §15.209(d), limits §15.209(a) are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. If peak measurements in these frequency bands were below the applicable limits, QPk and RMS measurements were not performed.



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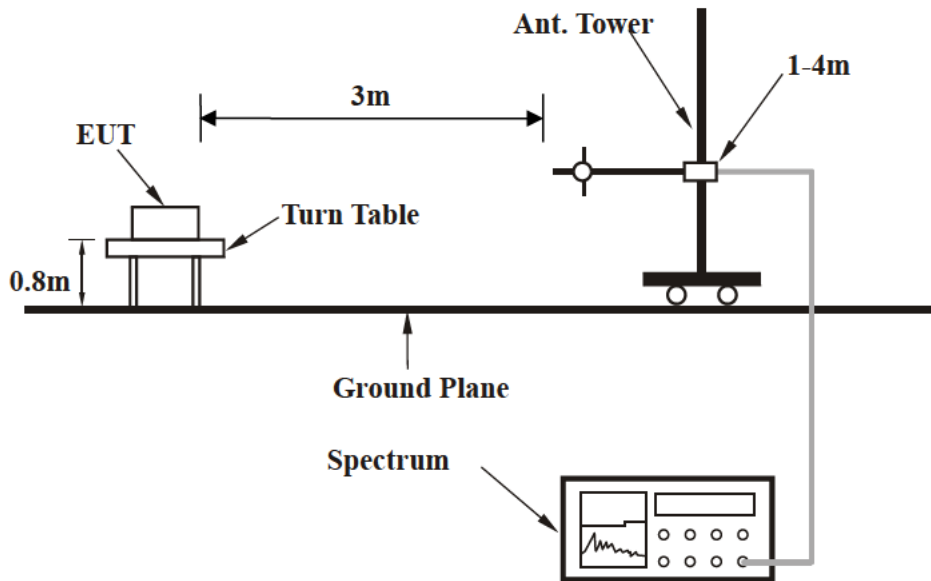


4.1.4 DEVIATIONS

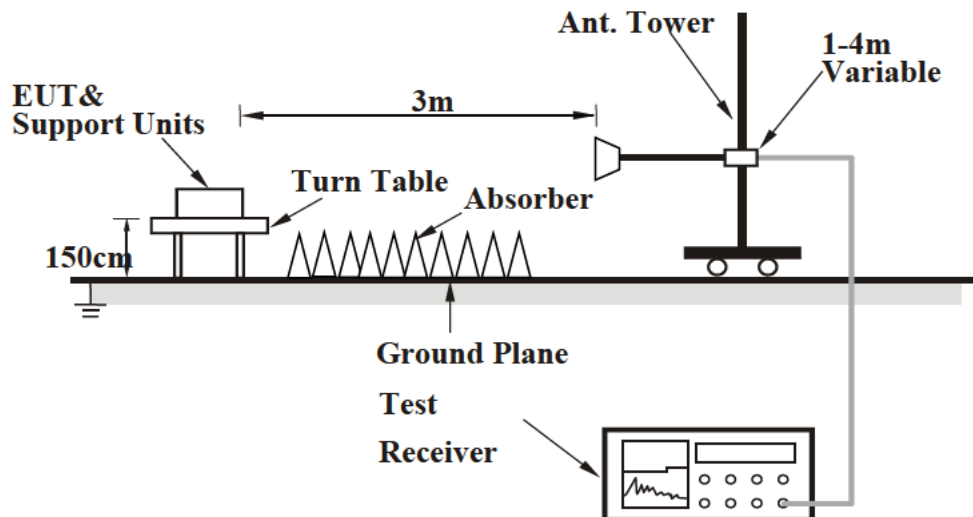
No deviations from the standard.

4.1.5 TEST SETUP

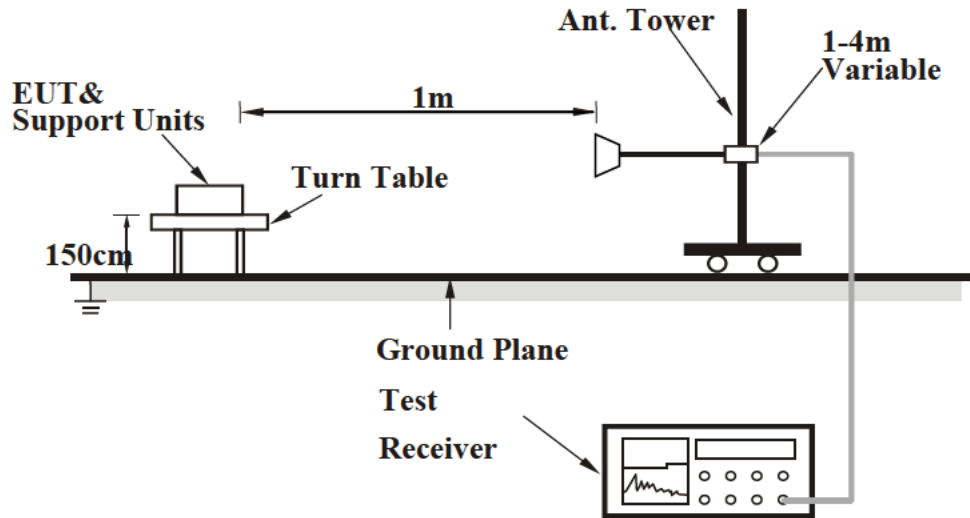
30MHz - 1GHz Test Setup



1GHz – 6GHz Test Setup



## 6GHz – 13GHz Test Setup



**Note:** For the actual test configuration, please refer to the Test Setup Photos exhibit.

### 4.1.6 EUT OPERATING CONDITIONS

EUT was operated according to the manufacturer's specifications.



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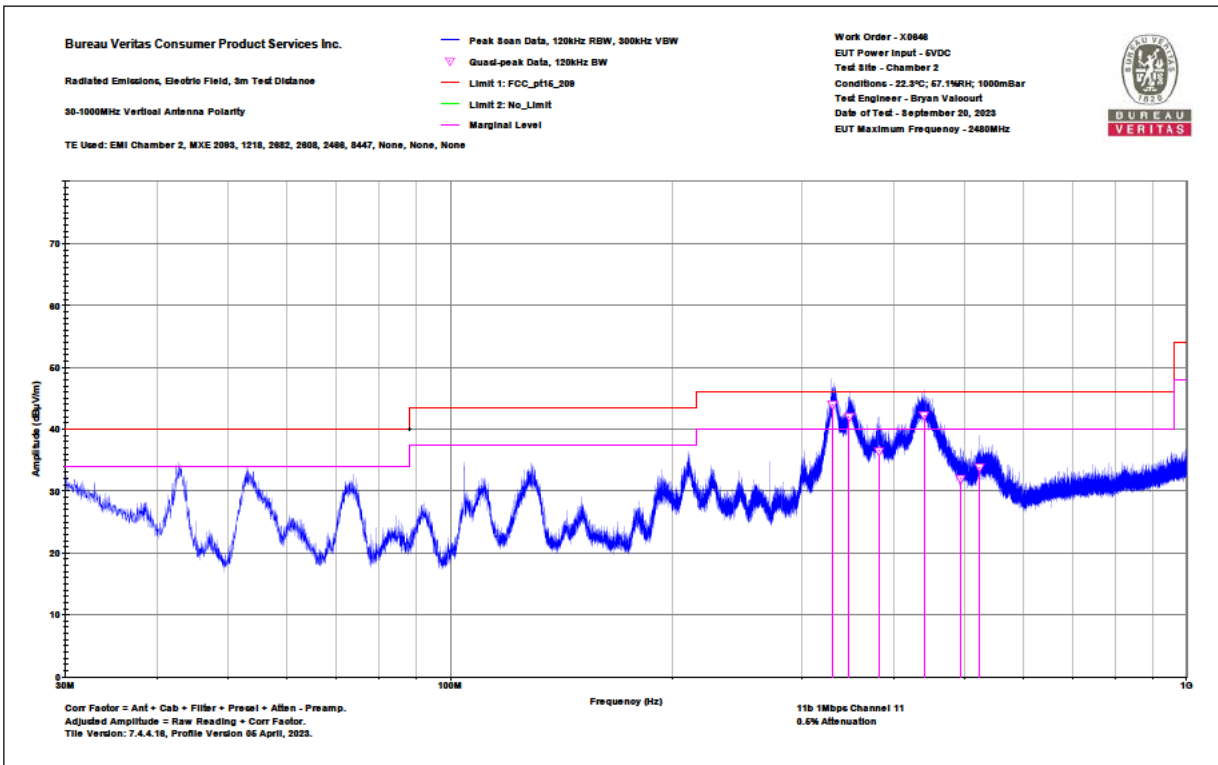
## 4.1.7 TEST RESULTS

### Emissions below 1GHz

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance 30-1000MHz Vertical Data Notes: 11b 1Mbps Channel 11 0.5% Attenuation	Work Order - X0646 EUT Power Input - 5VDC Test Site - Chamber 2 Conditions - 22.3°C; 57.1%RH; 1000mBar Test Engineer - Bryan Valcourt Date of Test - September 20, 2023
--	--

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_20 9 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
330.149	47.5	-3.6	44	46	-2	PASS	-2	141	213
347.9	45.4	-3.4	42	46	-4	PASS		100	57
382.478	39.3	-2.8	36.5	46	-9.5	PASS		101	65
440.049	43.9	-1.7	42.2	46	-3.8	PASS		113	107
493.232	32.8	-0.8	32	46	-14	PASS		102	140
523.053	34.7	-0.9	33.8	46	-12.2	PASS		110	219

30-1000MHz 802.11b Vertical Data Table



30-1000MHz 802.11b Vertical Graph

Bureau Veritas Consumer Product Services Inc.

One Distribution Center Circle, #1  
Littleton, MA

Tel.: (978) 486-8880  
Fax: (978) 486-8828



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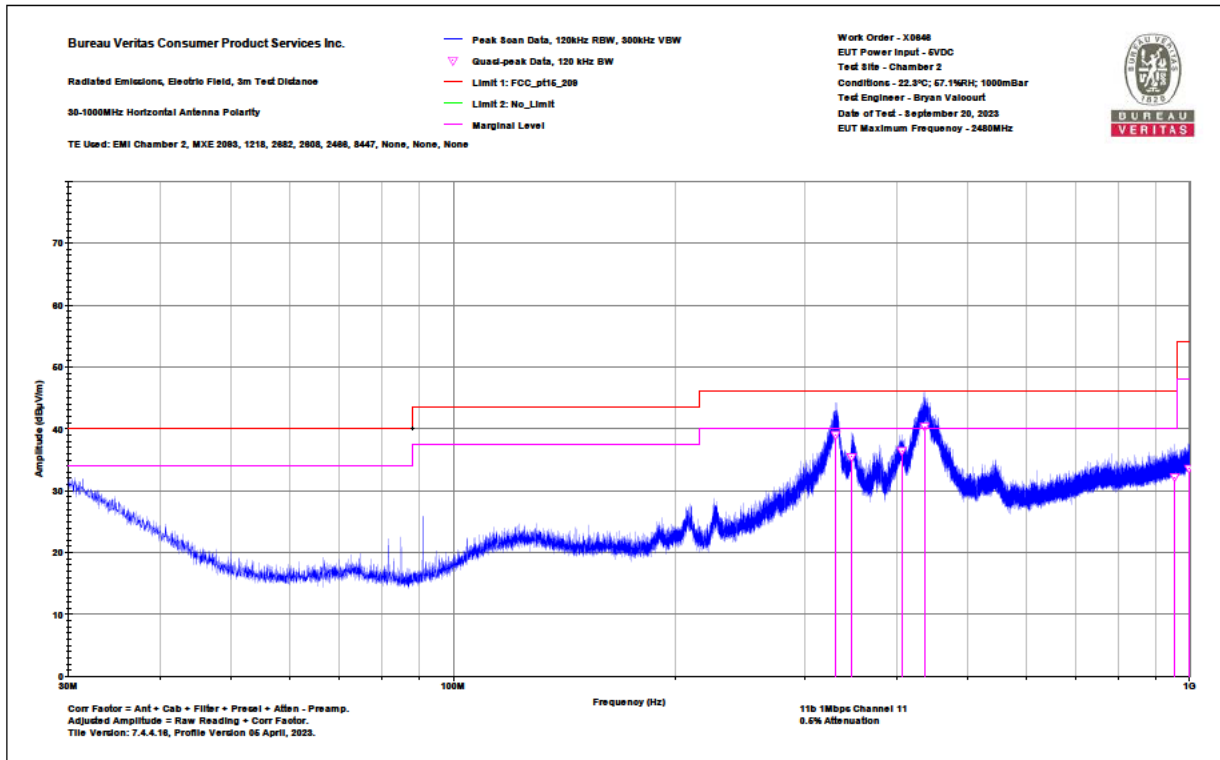


Bureau Veritas Consumer Product Services Inc.  
 Radiated Emissions Electric Field 3m Distance  
 30-1000MHz Horizontal Data  
 Notes:  
 11b 1Mbps Channel 11  
 0.5% Attenuation

Work Order - X0646  
 EUT Power Input - 5VDC  
 Test Site - Chamber 2  
 Conditions - 22.3°C; 57.1%RH; 1000mBar  
 Test Engineer - Bryan Valcourt  
 Date of Test - September 20, 2023

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_20 9 (dbµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
330.419	42.6	-3.6	39	46	-7	PASS		125	3
347.46	39	-3.4	35.5	46	-10.5	PASS		100	174
406.363	38.7	-2.2	36.5	46	-9.5	PASS		100	200
436.355	42.1	-1.8	40.3	46	-5.7	PASS	-5.7	112	155
953.859	25.4	6.8	32.2	46	-13.8	PASS		144	0
996.648	26.1	7.6	33.6	54	-20.4	PASS		151	313

**30-1000MHz 802.11b Horizontal Data Table**



**30-1000MHz 802.11b Horizontal Graph**



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## Emissions above 1GHz

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance 1-6GHz Vertical Data Notes: Constant Transmit Mode 11b 1Mbps Channel 11 0.5% Attenuation	Work Order - X0646 EUT Power Input - 5VDC Test Site - Chamber 2 Conditions - 22.7°C; 51.7%RH; 1017mBar Test Engineer - Bryan Valcourt Date of Test - September 21, 2023
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Frequency (MHz)	Raw Peak (dBµV)	Raw RMS (dBµV)	Correction Factor (dB/m)	Adjusted Peak (dBµV/m)	Adjusted RMS (dBµV/m)	Peak Limit FCC 15.209 (dBµV/m)	Peak Margin (dB)	Peak Result (Pass/Fail)	Peak Worst Margin (dB)	RMS Limit FCC 15.209 (dBµV/m)	RMS Margin (dB)	RMS Result (Pass/Fail)	RMS Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1023.5	49.9	49.9	-9.6	40.3	40.3	74	-33.7	PASS	--	54	-13.7	PASS	--	207	51
1068.9	48.2	40.081	-9.4	38.8	30.681	74	-35.2	PASS	--	54	-23.319	PASS	--	214	93
2192.1	44.1	37.479	0.7	44.8	38.179	74	-29.2	PASS	--	54	-15.821	PASS	--	295	25
2812.8	42	36.964	3.8	45.8	40.764	74	-28.2	PASS	--	54	-13.236	PASS	--	125	64
4924	55	47.813	3.5	58.5	51.313	74	-15.5	PASS	-15.5	54	-2.687	PASS	-2.687	125	316

### 1-6GHz 802.11b Vertical Peak and RMS Data Table

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance 1-6GHz Horizontal Data Notes: Constant Transmit Mode 11b 1Mbps Channel 11 0.5% Attenuation	Work Order - X0646 EUT Power Input - 5VDC Test Site - Chamber 2 Conditions - 22.7°C; 51.7%RH; 1017mBar Test Engineer - Bryan Valcourt Date of Test - September 21, 2023
--	--

Frequency (MHz)	Raw Peak (dBµV)	Raw RMS Average (dBµV)	Correction Factor (dB/m)	Adjusted Peak (dBµV/m)	Adjusted RMS Average (dBµV/m)	Peak Limit FCC 15.209 (dBµV/m)	Peak Margin (dB)	Peak Result (Pass/Fail)	Peak Worst Margin (dB)	Average Limit FCC 15.209 (dBµV/m)	Average Margin (dB)	Average Result (Pass/Fail)	Average Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1059.4	49.3	41.701	-9.5	39.8	32.201	74	-34.2	PASS	--	54	-21.799	PASS	--	184	315
1483.2	43.4	38.704	-6.4	37	32.304	74	-37	PASS	--	54	-21.696	PASS	--	100	192
2174.8	43	37.201	0.5	43.5	37.701	74	-30.5	PASS	--	54	-16.299	PASS	--	175	208
2807.5	43.9	36.966	4.1	48	41.066	74	-26	PASS	--	54	-12.934	PASS	--	193	16
4923.9	53.9	49.8	3.5	57.4	53.3	74	-16.6	PASS	-16.6	54	-0.7	PASS	-0.7	100	18

### 1-6GHz 802.11b Horizontal Peak and RMS Data Table

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance 1-6GHz Vertical Data Notes: Constant Transmit Mode 11g 6Mbps Channel 11 0.5% Attenuation	Work Order - X0646 EUT Power Input - 5VDC Test Site - Chamber 2 Conditions - 22.7°C; 51.7%RH; 1017mBar Test Engineer - Bryan Valcourt Date of Test - September 21, 2023
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Frequency (MHz)	Raw Peak (dBµV)	Raw RMS Average (dBµV)	Correction Factor (dB/m)	Adjusted Peak (dBµV/m)	Adjusted RMS Average (dBµV/m)	Peak Limit FCC 15.209 (dBµV/m)	Peak Margin (dB)	Peak Result (Pass/Fail)	Peak Worst Margin (dB)	Average Limit FCC 15.209 (dBµV/m)	Average Margin (dB)	Average Result (Pass/Fail)	Average Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1016.7	50.6	50.6	-9.4	41.2	41.2	74	-32.8	PASS	--	54	-12.8	PASS	--	194	16
1101.6	50.7	50.7	-8.8	41.9	41.9	74	-32.1	PASS	--	54	-12.1	PASS	--	207	35
1491.8	43.5	43.5	-6.5	37	37	74	-37	PASS	--	54	-17	PASS	--	215	45
2186.1	45.4	45.4	0.7	46.1	46.1	74	-27.9	PASS	--	54	-7.9	PASS	-7.9	297	141
2808.6	41.9	41.9	4	45.9	45.9	74	-28.1	PASS	--	54	-8.1	PASS	--	292	270
4926	49.4	38.085	3.5	52.9	41.585	74	-21.1	PASS	-21.1	54	-12.415	PASS	--	125	324

### 1-6GHz 802.11g Vertical Peak and RMS Data Table



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Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance 1-6GHz Horizontal Data Notes: Constant Transmit Mode 11g 6Mbps Channel 11 0.5% Attenuation						Work Order - X0646 EUT Power Input - 5VDC Test Site - Chamber 2 Conditions - 22.7°C; 51.7%RH; 1017mBar Test Engineer - Bryan Valcourt Date of Test - September 21, 2023									
Frequency (MHz)	Raw Peak (dBµV)	Raw RMS Average (dBµV)	Correction Factor (dB/m)	Adjusted Peak (dBµV/m)	Adjusted RMS Average (dBµV/m)	Peak Limit FCC 15.209 (dBµV/m)	Peak Margin (dB)	Peak Result (Pass/Fail)	Peak Worst Margin (dB)	Average Limit FCC 15.209 (dBµV/m)	Average Margin (dB)	Average Result (Pass/Fail)	Average Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1028.1	52.3	52.3	-9.6	42.7	42.7	74	-31.3	PASS	--	54	-11.3	PASS	--	199	0
2201.4	43.2	43.2	-0.6	42.6	42.6	74	-31.4	PASS	--	54	-11.4	PASS	--	125	295
2816.8	43.3	43.3	3.6	46.9	46.9	74	-27.1	PASS	--	54	-7.1	PASS	-7.1	125	25
4924.7	49.9	41.861	3.5	53.4	45.361	74	-20.6	PASS	-20.6	54	-8.639	PASS	--	102	5

### 1-6GHz 802.11g Horizontal Peak and RMS Data Table

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance 1-6GHz Vertical Data Notes: Constant Transmit Mode 11n(20) Mcs0 Channel 11 0.5% Attenuation						Work Order - X0646 EUT Power Input - 5VDC Test Site - Chamber 2 Conditions - 22.7°C; 51.7%RH; 1017mBar Test Engineer - Bryan Valcourt Date of Test - September 21, 2023									
Frequency (MHz)	Raw Peak (dBµV)	Raw RMS Average (dBµV)	Correction Factor (dB/m)	Adjusted Peak (dBµV/m)	Adjusted RMS Average (dBµV/m)	Peak Limit FCC 15.209 (dBµV/m)	Peak Margin (dB)	Peak Result (Pass/Fail)	Peak Worst Margin (dB)	Average Limit FCC 15.209 (dBµV/m)	Average Margin (dB)	Average Result (Pass/Fail)	Average Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1027.5	52.3	52.3	-9.6	42.7	42.7	74	-31.3	PASS	--	54	-11.3	PASS	--	197	53
2161.6	45	45	0.2	45.2	45.2	74	-28.8	PASS	--	54	-8.8	PASS	--	299	54
2816.3	44.1	44.1	3.6	47.7	47.7	74	-26.3	PASS	--	54	-6.3	PASS	-6.3	125	214
4924	48.2	37.985	3.5	51.7	41.485	74	-22.3	PASS	-22.3	54	-12.515	PASS	--	125	324

### 1-6GHz 802.11n(20) Vertical Peak and RMS Data Table

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance 1-6GHz Horizontal Data Notes: Constant Transmit Mode 11n(20) Mcs0 Channel 11 0.5% Attenuation						Work Order - X0646 EUT Power Input - 5VDC Test Site - Chamber 2 Conditions - 22.7°C; 51.7%RH; 1017mBar Test Engineer - Bryan Valcourt Date of Test - September 21, 2023									
Frequency (MHz)	Raw Peak (dBµV)	Raw RMS Average (dBµV)	Correction Factor (dB/m)	Adjusted Peak (dBµV/m)	Adjusted RMS Average (dBµV/m)	Peak Limit FCC 15.209 (dBµV/m)	Peak Margin (dB)	Peak Result (Pass/Fail)	Peak Worst Margin (dB)	Average Limit FCC 15.209 (dBµV/m)	Average Margin (dB)	Average Result (Pass/Fail)	Average Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1146.3	47.1	47.1	-8.4	38.7	38.7	74	-35.3	PASS	--	54	-15.3	PASS	--	192	220
2165.7	44.8	44.8	0.3	45.1	45.1	74	-28.9	PASS	--	54	-8.9	PASS	--	127	143
2799.9	41.9	41.9	4.3	46.2	46.2	74	-27.8	PASS	--	54	-7.8	PASS	-7.8	275	241
4924.2	49.6	41.953	3.5	53.1	45.453	74	-20.9	PASS	-20.9	54	-8.547	PASS	--	127	0
5962.7	42.1	42.1	4.1	46.2	46.2	74	-27.8	PASS	--	54	-7.8	PASS	-7.8	102	195

### 1-6GHz 802.11n(20) Horizontal Peak and RMS Data Table

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance 1-6GHz Vertical Data Notes: Constant Transmit Mode 11n(40) Mcs0 Channel 9 0.5% Attenuation						Work Order - X0646 EUT Power Input - 5VDC Test Site - Chamber 2 Conditions - 22.7°C; 51.7%RH; 1017mBar Test Engineer - Bryan Valcourt Date of Test - September 21, 2023									
Frequency (MHz)	Raw Peak (dBµV)	Raw RMS Average (dBµV)	Correction Factor (dB/m)	Adjusted Peak (dBµV/m)	Adjusted RMS Average (dBµV/m)	Peak Limit FCC 15.209 (dBµV/m)	Peak Margin (dB)	Peak Result (Pass/Fail)	Peak Worst Margin (dB)	Average Limit FCC 15.209 (dBµV/m)	Average Margin (dB)	Average Result (Pass/Fail)	Average Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1068.2	49.4	49.4	-9.4	40	40	74	-34	PASS	--	54	-14	PASS	--	300	187
2165.4	44.5	44.5	0.3	44.8	44.8	74	-29.2	PASS	--	54	-9.2	PASS	--	225	232
2807.4	42	42	4.1	46.1	46.1	74	-27.9	PASS	--	54	-7.9	PASS	-7.9	208	210
4909.4	47	38.427	3.5	50.5	41.927	74	-23.5	PASS	-23.5	54	-12.073	PASS	--	100	297

### 1-6GHz 802.11n(40) Vertical Peak and RMS Data Table





BUREAU VERITAS

# Test Report for Blues Wireless Inc. Report No. EX0646-2 Issue 1



Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance 1-6GHz Horizontal Data Notes: Constant Transmit Mode 11n(40) Mcs0 Channel 9 0.5% Attenuation	Work Order - X0646 EUT Power Input - 5VDC Test Site - Chamber 2 Conditions - 22.7°C; 51.7%RH; 1017mBar Test Engineer - Bryan Valcourt Date of Test - September 21, 2023
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Frequency (MHz)	Raw Peak (dBµV)	Raw RMS Average (dBµV)	Correction Factor (dB/m)	Adjusted Peak (dBµV/m)	Adjusted RMS Average (dBµV/m)	Peak Limit FCC 15.209 (dBµV/m)	Peak Margin (dB)	Peak Result (Pass/Fail)	Peak Worst Margin (dB)	Average Limit FCC 15.209 (dBµV/m)	Average Margin (dB)	Average Result (Pass/Fail)	Average Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1070.1	49.8	49.8	-9.3	40.5	40.5	74	-33.5	PASS	--	54	-13.5	PASS	--	300	249
1339.2	47.2	47.2	-5.9	41.3	41.3	74	-32.7	PASS	--	54	-12.7	PASS	--	289	174
2190	43.6	43.6	0.7	44.3	44.3	74	-29.7	PASS	--	54	-9.7	PASS	--	299	174
2813.9	43.7	43.7	3.8	47.5	47.5	74	-26.5	PASS	--	54	-6.5	PASS	-6.5	102	77
4909.2	45	38.566	3.6	48.6	42.166	74	-25.4	PASS	-25.4	54	-11.834	PASS	--	117	8

### 1-6GHz 802.11n(40) Horizontal Peak and RMS Data Table

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 1m Distance 6-18GHz Vertical Data Notes: Constant Transmit Mode 11b 1Mbps Channel 11 0.5% Attenuation	Work Order - X0646 EUT Power Input - 5VDC Test Site - Chamber 2 Conditions - 21.7°C; 51.7%RH; 1017mBar Test Engineer - Bryan Valcourt Date of Test - September 21, 2023
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Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_20 9_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_20 9_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
9848	44.1	33.8	6.4	50.4	83.5	-33.1	PASS		40.2	63.5	-23.3	PASS		100	94
11701.8	45	35.4	8.8	53.9	83.5	-29.6	PASS	-29.6	44.3	63.5	-19.2	PASS	-19.2	131	100

### 6-13GHz 802.11b Vertical Data Table

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 1m Distance 6-18GHz Horizontal Data Notes: Constant Transmit Mode 11b 1Mbps Channel 11 0.5% Attenuation	Work Order - X0646 EUT Power Input - 5VDC Test Site - Chamber 2 Conditions - 21.7°C; 51.7%RH; 1017mBar Test Engineer - Bryan Valcourt Date of Test - September 21, 2023
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Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_20 9_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_20 9_Average (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
9848.1	53.6	50.1	6.4	60	83.5	-23.5	PASS	-23.5	56.4	63.5	-7.1	PASS	-7.1	197	51
11672.7	43.8	35.1	8.9	52.7	83.5	-30.8	PASS		44	63.5	-19.5	PASS		165	278

### 6-13GHz 802.11b Horizontal Data Table



BUREAU VERITAS

# Test Report for Blues Wireless Inc. Report No. EX0646-2 Issue 1



Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 1m Distance 6-18GHz Vertical Data Notes: Constant Transmit Mode 11g 6Mbps Channel 11 0.5% Attenuation	Work Order - X0646 EUT Power Input - 5VDC Test Site - Chamber 2 Conditions - 21.7°C; 51.7%RH; 1017mBar Test Engineer - Bryan Valcourt Date of Test - September 21, 2023
---	--

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_20 9_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_20 9_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
11764.7	44.4	35.3	8.8	53.2	83.5	-30.3	PASS	-30.3	44.1	63.5	-19.4	PASS	-19.4	164	161

## 6-13GHz 802.11g Vertical Data Table

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 1m Distance 6-18GHz Horizontal Data Notes: Constant Transmit Mode 11g 6Mbps Channel 11 0.5% Attenuation	Work Order - X0646 EUT Power Input - 5VDC Test Site - Chamber 2 Conditions - 21.7°C; 51.7%RH; 1017mBar Test Engineer - Bryan Valcourt Date of Test - September 21, 2023
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Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_20 9_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_20 9_Average (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
7385	46.3	36.9	4	50.4	83.5	-33.1	PASS		40.9	63.5	-22.6	PASS		165	323
9853.4	43.7	35.3	6.3	50	83.5	-33.5	PASS		41.6	63.5	-21.9	PASS		150	238
11719	44.4	35.8	8.8	53.2	83.5	-30.3	PASS	-30.3	44.7	63.5	-18.8	PASS	-18.8	109	194

## 6-13GHz 802.11g Horizontal Data Table



BUREAU VERITAS

# Test Report for Blues Wireless Inc. Report No. EX0646-2 Issue 1



## Radiated Band-edge:

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Bandedges Notes: Constant Transmit Mode 11b 1Mbps Low Bandedge - Ch1, High Bandedge - Ch11 Attenuation Setting 2		Work Order - X0646 EUT Power Input - SVDC Test Site - Chamber 2 Conditions - 20.9°C; 57.9%RH; 1014mBar Test Engineer - Yunus Faziloglu Date of Test - September 25, 2023				Antenna: 1861_3m_BLUE_HORN RF Cable 1: 2682 RF Cable 2: 2608 RF Cable 3: 2466 Preamplifier: 8449B_HFPA										
Orientation	Frequency (MHz)	Raw Peak (dBµV)	Raw RMS (dBµV)	Correction Factor (dB/m)	Adjusted Peak (dBµV/m)	Adjusted RMS (dBµV/m)	Peak Limit FCC 15.209 (dBµV/m)	Peak Margin (dB)	Peak Result (Pass/Fail)	Peak Worst Margin (dB)	RMS Limit FCC 15.209 (dBµV/m)	RMS Margin (dB)	RMS Result (Pass/Fail)	RMS Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
Vertical	2390	54.4	46.1	-2.6	51.8	43.5	74	-22.2	PASS	--	54	-10.5	PASS	--	227.1	7.2
Vertical	2483.5	52.4	45.1	-2	50.4	43.1	74	-23.6	PASS	--	54	-10.9	PASS	--	136	0
Horizontal	2390	55.4	46.8	-2.6	52.8	44.2	74	-21.2	PASS	-21.2	54	-9.8	PASS	-9.8	109.4	123.3
Horizontal	2483.5	49	40.5	-2	47	38.5	74	-27	PASS	--	54	-15.5	PASS	--	239.7	125.2

## Band Edge for 802.11b RMS Band Edge Data Table

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Bandedges Notes: Constant Transmit Mode 11g 6Mbps Low Bandedge - Ch1, High Bandedge - Ch11 Attenuation Setting 8		Work Order - X0646 EUT Power Input - SVDC Test Site - Chamber 2 Conditions - 20.9°C; 57.9%RH; 1014mBar Test Engineer - Yunus Faziloglu Date of Test - September 25, 2023				Antenna: 1861_3m_BLUE_HORN RF Cable 1: 2682 RF Cable 2: 2608 RF Cable 3: 2466 Preamplifier: 8449B_HFPA										
Orientation	Frequency (MHz)	Raw Peak (dBµV)	Raw RMS (dBµV)	Correction Factor (dB/m)	Adjusted Peak (dBµV/m)	Adjusted RMS (dBµV/m)	Peak Limit FCC 15.209 (dBµV/m)	Peak Margin (dB)	Peak Result (Pass/Fail)	Peak Worst Margin (dB)	RMS Limit FCC 15.209 (dBµV/m)	RMS Margin (dB)	RMS Result (Pass/Fail)	RMS Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
Vertical	2390	72.9	56.1	-2.6	70.3	53.5	74	-3.7	PASS	-3.7	54	-0.5	PASS	--	209.4	21.6
Vertical	2483.5	69.4	55.8	-2	67.4	53.8	74	-6.6	PASS	--	54	-0.2	PASS	-0.2	136	0
Horizontal	2390	71.1	55.8	-2.6	68.5	53.2	74	-5.5	PASS	--	54	-0.8	PASS	--	111.5	122.7
Horizontal	2483.5	62.5	49.2	-2	60.5	47.2	74	-13.5	PASS	--	54	-6.8	PASS	--	268.8	123.6

## Band Edge for 802.11g RMS Band Edge Data Table

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Bandedges Notes: Constant Transmit Mode 11n(20) MCS0 Low Bandedge - Ch1, High Bandedge - Ch11 Attenuation Setting 3		Work Order - X0646 EUT Power Input - SVDC Test Site - Chamber 2 Conditions - 20.9°C; 57.9%RH; 1014mBar Test Engineer - Yunus Faziloglu Date of Test - September 25, 2023				Antenna: 1861_3m_BLUE_HORN RF Cable 1: 2682 RF Cable 2: 2608 RF Cable 3: 2466 Preamplifier: 8449B_HFPA										
Orientation	Frequency (MHz)	Raw Peak (dBµV)	Raw RMS (dBµV)	Correction Factor (dB/m)	Adjusted Peak (dBµV/m)	Adjusted RMS (dBµV/m)	Peak Limit FCC 15.209 (dBµV/m)	Peak Margin (dB)	Peak Result (Pass/Fail)	Peak Worst Margin (dB)	RMS Limit FCC 15.209 (dBµV/m)	RMS Margin (dB)	RMS Result (Pass/Fail)	RMS Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
Vertical	2390	67.8	54.2	-2.6	65.2	51.6	74	-8.8	PASS	-8.8	54	-2.4	PASS	--	210.3	8.6
Vertical	2483.5	65.2	53.4	-2	63.2	51.4	74	-10.8	PASS	--	54	-2.6	PASS	--	247.2	5.1
Horizontal	2390	67.2	55.1	-2.6	64.6	52.5	74	-9.4	PASS	--	54	-1.5	PASS	-1.5	111.1	122.1
Horizontal	2483.5	61.4	49.6	-2	59.4	47.6	74	-14.6	PASS	--	54	-6.4	PASS	--	239.7	123.6

## Band Edge for 802.11n(20) RMS Band Edge Data Table

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Bandedges Notes: Constant Transmit Mode 11n(40) MCS0 Low Bandedge - Ch3, High Bandedge - Ch9 Attenuation Setting 2		Work Order - X0646 EUT Power Input - SVDC Test Site - Chamber 2 Conditions - 20.9°C; 57.9%RH; 1014mBar Test Engineer - Yunus Faziloglu Date of Test - September 25, 2023				Antenna: 1861_3m_BLUE_HORN RF Cable 1: 2682 RF Cable 2: 2608 RF Cable 3: 2466 Preamplifier: 8449B_HFPA										
Orientation	Frequency (MHz)	Raw Peak (dBµV)	Raw RMS (dBµV)	Correction Factor (dB/m)	Adjusted Peak (dBµV/m)	Adjusted RMS (dBµV/m)	Peak Limit FCC 15.209 (dBµV/m)	Peak Margin (dB)	Peak Result (Pass/Fail)	Peak Worst Margin (dB)	RMS Limit FCC 15.209 (dBµV/m)	RMS Margin (dB)	RMS Result (Pass/Fail)	RMS Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
Vertical	2390	66.5	55.1	-2.6	63.9	52.5	74	-10.1	PASS	--	54	-1.5	PASS	-1.5	210.5	20.6
Vertical	2483.5	66.6	53.8	-2	64.6	51.8	74	-9.4	PASS	-9.4	54	-2.2	PASS	--	225.3	10.9
Horizontal	2390	66.4	54.9	-2.6	63.8	52.3	74	-10.2	PASS	--	54	-1.7	PASS	--	147.4	125.8
Horizontal	2483.5	60.6	48.5	-2	58.6	46.5	74	-15.4	PASS	--	54	-7.5	PASS	--	239.7	123.6

## Band Edge for 802.11n(40) RMS Band Edge Data Table

Bureau Veritas Consumer Product Services Inc.

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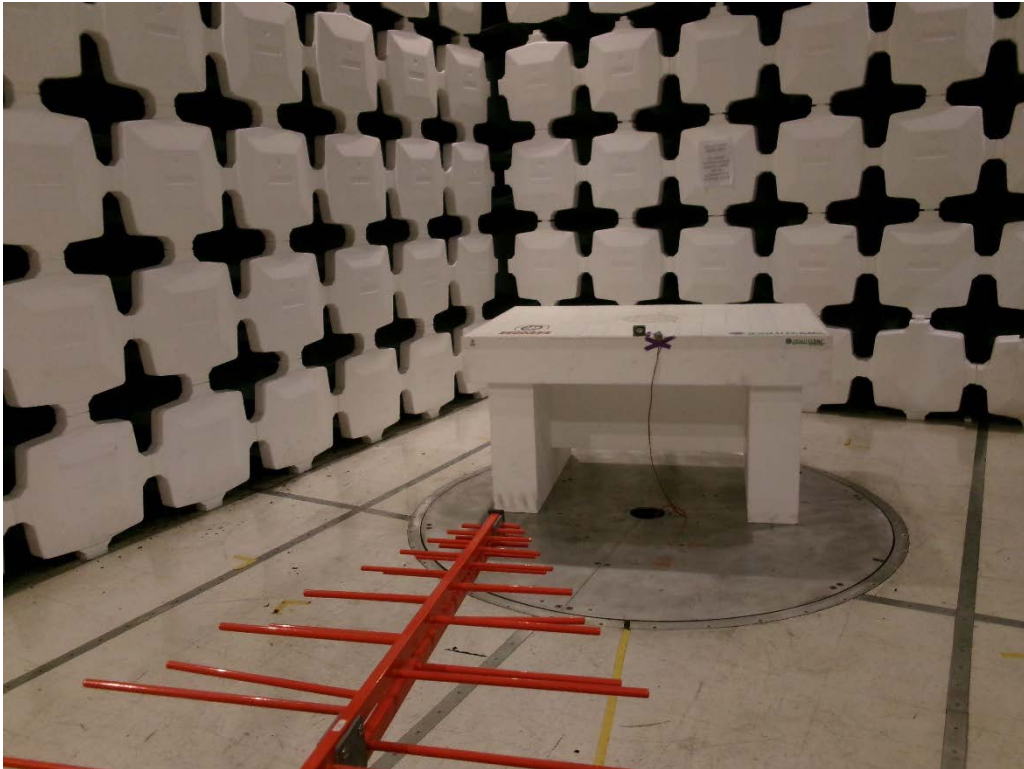


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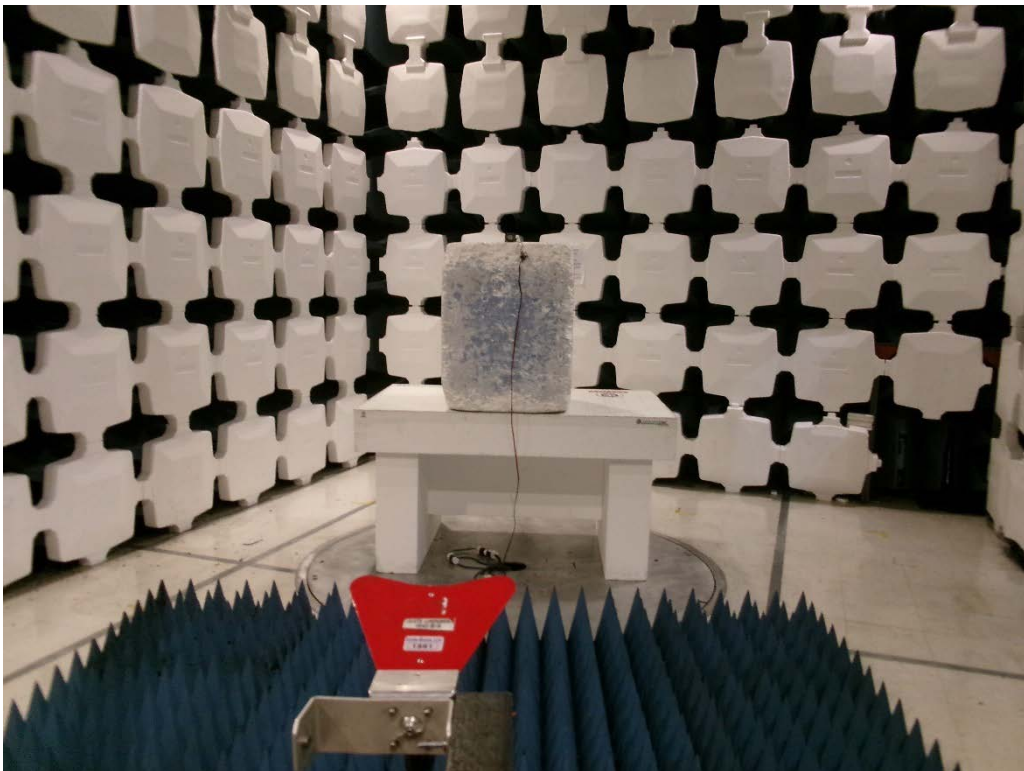
Test Report for Blues Wireless Inc.  
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## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION



30-1000MHz REMI Set Up

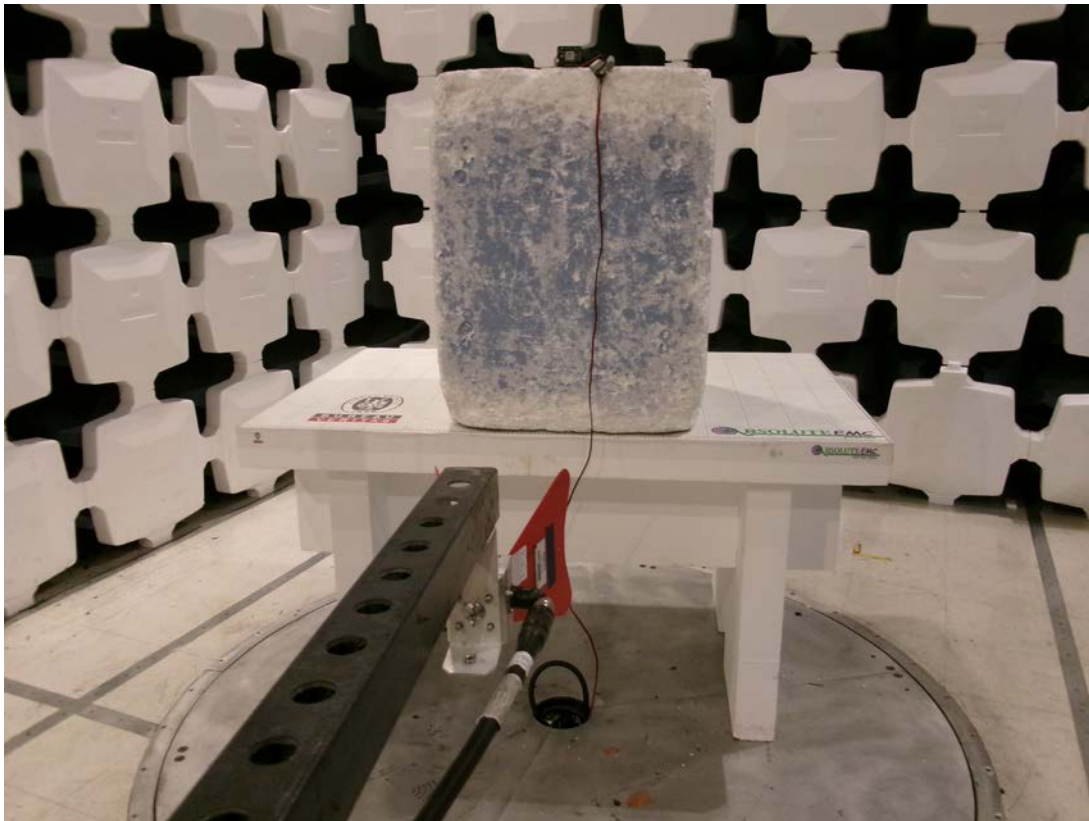


1-6MHz REMI Set Up

Bureau Veritas Consumer Product  
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6-13GHz REMI Set Up



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## **MODIFICATIONS DURING TESTING**

No modifications were made to the EUT during testing.

**---END OF REPORT---**