

RF Test Report

Report No. CJJJ-TNY-P23060072-5

Test Model: NBGLW

Test Date: 07/20/2023 - 07/27/2023

Issued Date: 10/20/2023

Applicant: Blues, Inc.

Address: 50 Harbor St
Manchester, MA 01944

Manufacturer: Blues, Inc.

Address: 50 Harbor St
Manchester, MA 01944

Issued By: Bureau Veritas Consumer Products Services, Inc.

Lab Address: 775 Montague Expressway, Milpitas, CA 95035

Test Location (1): 775 Montague Expressway, Milpitas, CA 95035



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Release Control Record

Issue No.	Description	Date Issued
CJJJ-TNY-P23060072-5	Original Release	10/20/2023

1 Certificate of Conformity

Product: NOTE

Brand: Blues, Inc.

Test Model: NBGLW


Sample Status: Engineering sample

Applicant: Blues, Inc.

Test Date: 07/20/2023 – 07/27/2023

Standards: EN 301 908-1 V15.2.1 (2023-01)
EN 301 908-13 V13.2.1 (2022-02)
EN 301 511 V12.1.1 (2015-06)

The above equipment has been tested by **Bureau Veritas Consumer Products Services, Inc., Milpitas Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :  _____, **Date:** 10/20/2023
Brandon Quan / Test Engineer

Approved by :  _____, **Date:** 10/20/2023
Suresh Kondapalli / Engineer Reviewer

2 Summary of Test Results

The EUT has been tested to the following specifications:

EN 301 908-1 V15.2.1 (2023-01)			
No.	Test Parameter	Result	Remarks
1	Radiated Emissions (UE)	Pass	N/A

Note: Testing listed above done as required for module integration

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

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

Measurement	Frequency	Expanded Uncertainty ($k=2$) (\pm)
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	3.73dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	4.64dB
	6GHz ~ 18GHz	4.82dB
	18GHz ~ 40GHz	4.91dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

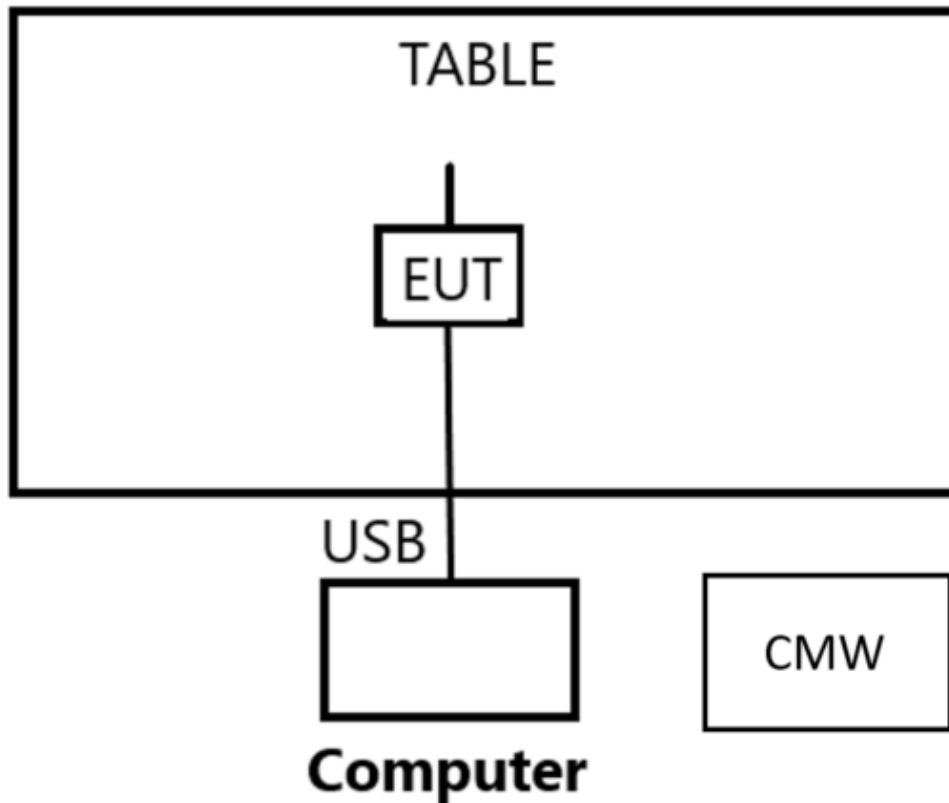
3.1 General Description of EUT

Product	Notecard					
Brand	Blues, Inc.					
Test Model	NOTE NBGLW					
Status of EUT	Engineering sample					
Power Supply Rating	2.5VDC to 5.5VDC					
Temperature Operating Range	-35°C to 75°C					
Modulation Type	GSM	GMSK				
	GPRS	GMSK				
	EDGE	GMSK, 8PSK				
	WCDMA	UL: QPSK DL: QPSK, 16QAM				
	LTE	UL: QPSK, 16QAM DL: QPSK, 16QAM, 64QAM				
Operating Frequency	2g: GSM 850, PCS1900 3g: B2, B4, B5 4g: B2, B4, B5, B7, B12, B13, B66					
	Frequency range	Uplink	824	849	MHz	Module transmit
	GSM 850	Downlink	869	894	MHz	Module receive
	Frequency range	Uplink	1850	1910	MHz	Module transmit
	PCS 1900	Downlink	1930	1990	MHz	Module receive
	Frequency range	Uplink	1850	1910	MHz	Module transmit
	FDD Band 2 (1900 MHz)	Downlink	1930	1990	MHz	Module receive
	Frequency range	Uplink	1710	1755	MHz	Module transmit
	FDD Band 4 (1700 MHz)	Downlink	2110	2155	MHz	Module receive
	Frequency range	Uplink	824	849	MHz	Module transmit
	FDD Band 5 (850 MHz)	Downlink	869	894	MHz	Module receive
	Frequency range	Uplink	2500	2570	MHz	Module transmit
	FDD Band 7 (2600 MHz)	Downlink	2620	2690	MHz	Module receive
	Frequency range	Uplink	699	716	MHz	Module transmit
FDD Band 12 (700 MHz)	Downlink	729	746	MHz	Module receive	
Frequency range	Uplink	777	787	MHz	Module transmit	
FDD Band 13 (750 MHz)	Downlink	746	756	MHz	Module receive	
Frequency range	Downlink	2110	2200	MHz	Module receive	
FDD Band 66 (2500 MHz)						
BT/WLAN Module						

	WIFI	Modulation	802.11b - BPSK, QPSK, CSK, DSSS 802.11g - BPSK, QPSK, 16/64QAM, OFDM 802.11n - HT mode MCS0-7
		Data rate max	802.11b - 11Mbps 802.11g - 54Mbps 802.11n - 72.2Mbps
		Output Level	802.11b - +15dBm 802.11g - +13dBm 802.11n - +11dBm
		Sensitivity	802.11b - -90dBm 802.11g - -74dBm 802.11n - -72dBm
	BT	Frequency	2402 -2480MHz
		Channel Spacing	Normal mode - 1MHz BLE mode -2MHz
Antenna Type	External		

3.1.1 Configuration of System under Test

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.



3.2 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

- EN 301 908-1 V15.2.1 (2023-01)
- EN 301 908-13 V13.2.1 (2022-02)
- EN 301 511 V12.1.1 (2015-06)

All test items have been performed and recorded as per the above standards.

3.2.1 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Horn Antenna 1-18GHz ETS-Lingren	3117	218553	4/24/2023	4/24/2025
ESW 44, EMI Test Receiver Rohde & Schwarz	1328.4100K44	101662	9/20/2022	9/20/2023
Wideband Radio Communicator, CMW500 Rohde & Schwarz	1201.0002K50	108852	12/22/2022	12/22/2023
Bilog Antenna SunAR RF Motion	JB6	A111717	9/22/2022	9/22/2023
Preamplifier 1-18GHz The EMC Shop	PA18G-HA	1337	12/20/2022	12/20/2023
Test Software Toyo Corporation	EP7/RE	V.8.0.130	-	-

3.2.2 Deviation from Test Standard

No deviation

4 TEST PROCEDURE AND RESULTS

4.1 RADIATED EMISSIONS (UE)

This test assesses the ability of radio communications equipment and ancillary equipment to limit unwanted emissions from the enclosure port. This test is applicable to radio communications equipment and ancillary equipment. This test shall be performed on the radio communications equipment and/or a representative configuration of the ancillary equipment.

4.1.1 Limits

The frequency boundary and reference bandwidths for the detailed transitions of the limits between the requirements for out-of-band emissions and spurious emissions are based on Recommendations ITU-R SM.329-12 [I] and SM.1539-1 [i.6].

The requirements shown in table 4.2.2.2-1 are only applicable for frequencies in the spurious domain.

Table 4.2.2.2-1: Radiated spurious emissions requirements (UE)

Frequency	Minimum requirement (e.r.p.)/ reference bandwidth idle mode	Minimum requirement (e.r.p.)/ reference bandwidth traffic mode	Applicability
$30 \text{ MHz} \leq f < 1\,000 \text{ MHz}$	-57 dBm/100 kHz	-36 dBm/100 kHz	All
$1 \text{ GHz} \leq f < 12,75 \text{ GHz}$	-47 dBm/1 MHz	-30 dBm/1 MHz	All
$f_c - 2,5 \times 5 \text{ MHz} < f < f_c + 2,5 \times 5 \text{ MHz}$ (Note 2)		Not defined	UTRA FDD, UTRA TDD, 3,84 Mcps option, cdma2000, spreading rate 3
$f_c - 2,5 \times \text{BW}_{\text{Channel}} \text{ MHz} < f < f_c + 2,5 \times \text{BW}_{\text{Channel}} \text{ MHz}$ (Note 2)		Not defined	E-UTRA FDD, E-UTRA TDD, Mobile WiMAX™
$f_c - 2,5 \times 10 \text{ MHz} < f < f_c + 2,5 \times 10 \text{ MHz}$ (Note 2)		Not defined	UTRA TDD, 7,68 Mcps option
$f_c - 4 \text{ MHz} < f < f_c + 4 \text{ MHz}$ (Note 2)		Not defined	UTRA TDD, 1,28 Mcps option cdma2000, spreading rate 1

NOTE 1: f_c is the UE transmit centre frequency.
NOTE 2: This frequency range is not in the spurious domain, no requirement is then defined for this frequency range.

4.1.2 Test Procedure

Refer to chapter 5.3.1 of EN 301 908-1 V13.1.1.

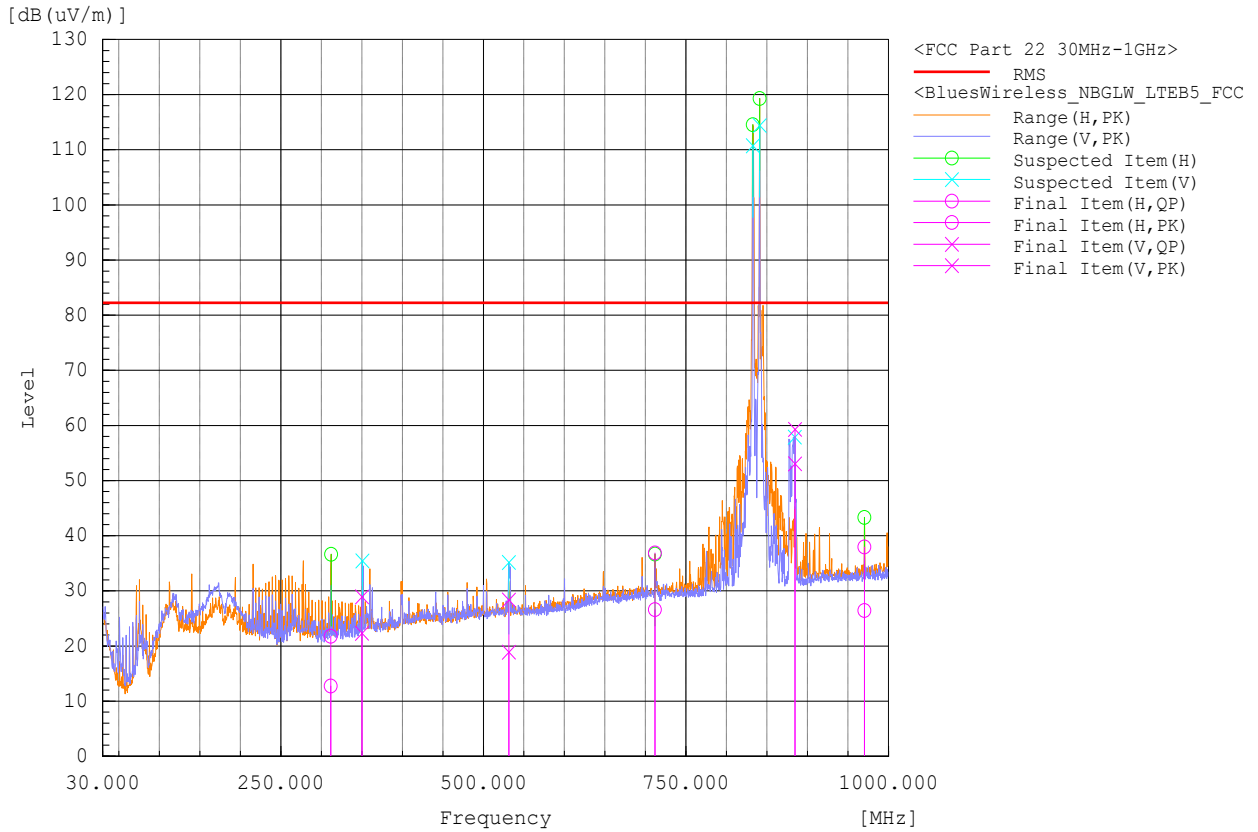
Measurement Method	
<input type="checkbox"/> Conducted measurement	<input checked="" type="checkbox"/> Radiated measurement

4.1.3 Test Setup

The measurements was performed in semi-anechoic chamber, CMW 500 has been used to set the EUT on specific channel and power level.

4.1.4 TEST RESULTS

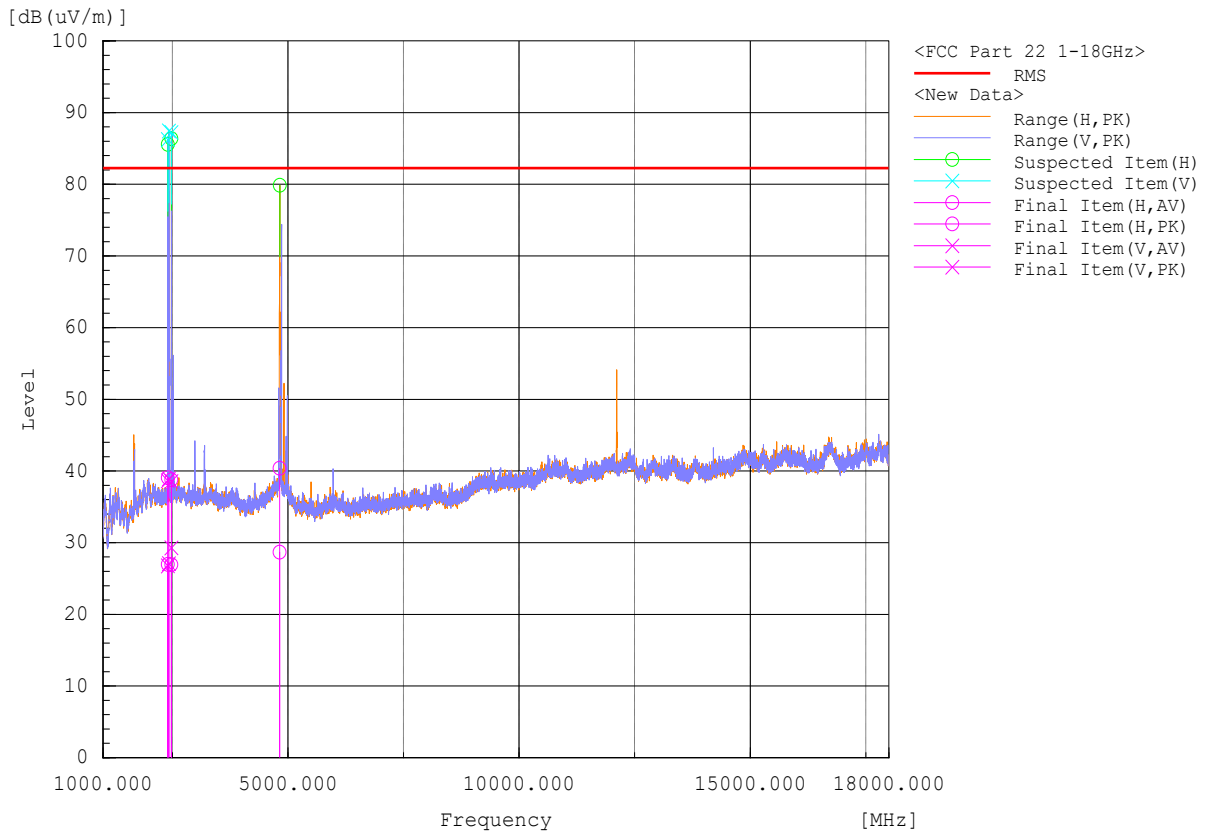
LTE B5 30MHz-1GHz



*Note: Limit shown on plot is not the limit used

Frequency [MHz]	Pol	Height [cm]	Angle [deg]	Level [dBUV/m]	ERP/EIRP Power [dBm]	Limit [dBm]	Margin [dB]
884.552	V	101.5	0	59.3	-64.6	-36	28.6
350.177	V	110.3	143.5	28.9	-95.5	-36	59.5
531.513	V	191.9	162.6	28.4	-98.9	-36	62.9
970.207	H	390.5	280.4	37.9	-91.2	-36	55.2
311.67	H	266.7	11	21.7	-105.0	-36	69.0
711.619	H	186.4	163.7	36.9	-91.1	-36	55.1

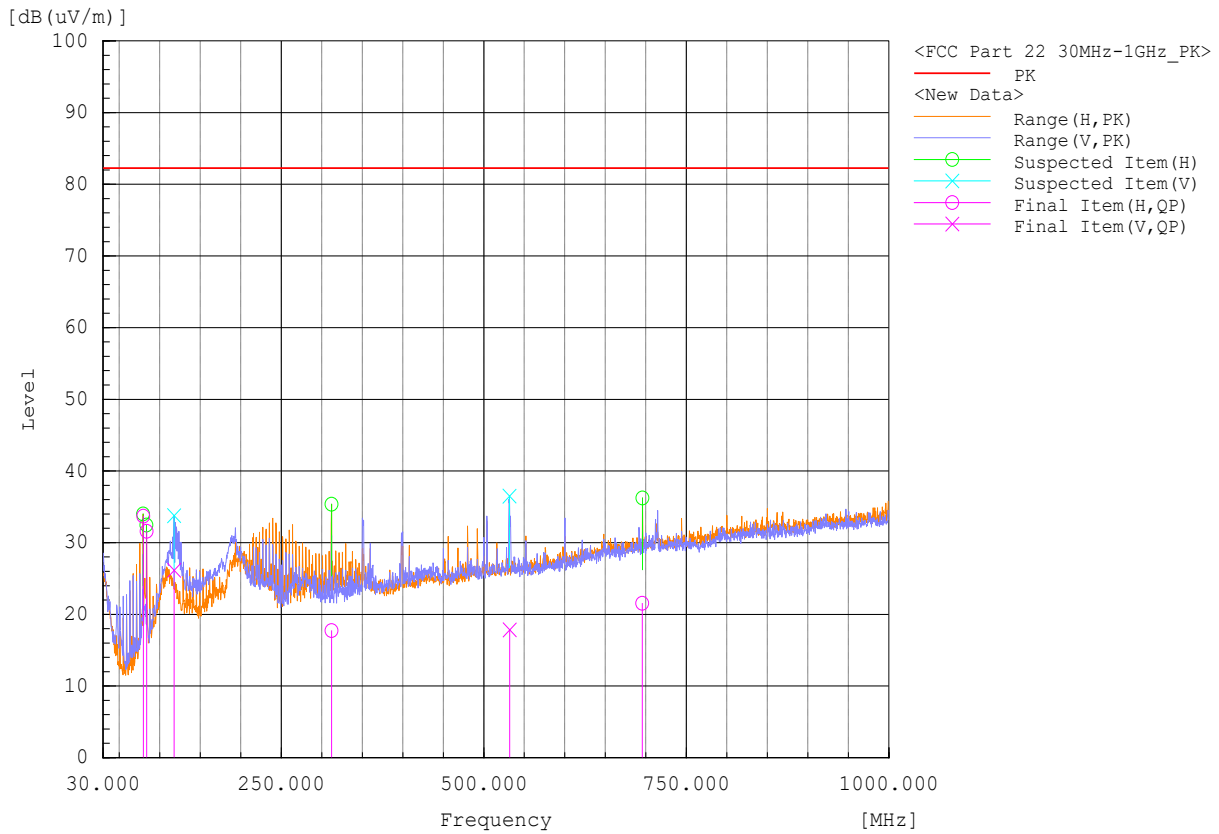
LTE B5 1-18GHz



*Note: Limit shown on plot is not the limit used

Frequency [MHz]	Pol	Height [cm]	Angle [deg]	Level [dBUV/m]	ERP/EIRP Power [dBm]	Limit [dBm]	Margin [dB]
2400.415	V	158	151.3	38.6	-73.2	-30	43.2
2400.338	H	217	271.8	39	-72.8	-30	42.8
2423.953	V	193	33.5	38.9	-72.9	-30	42.9
2478.692	V	229	204.8	38.6	-73.1	-30	43.1
2479.481	H	100	350.1	38.8	-73.0	-30	43.0
4822.501	H	182	119.9	40.4	-71.2	-30	41.2

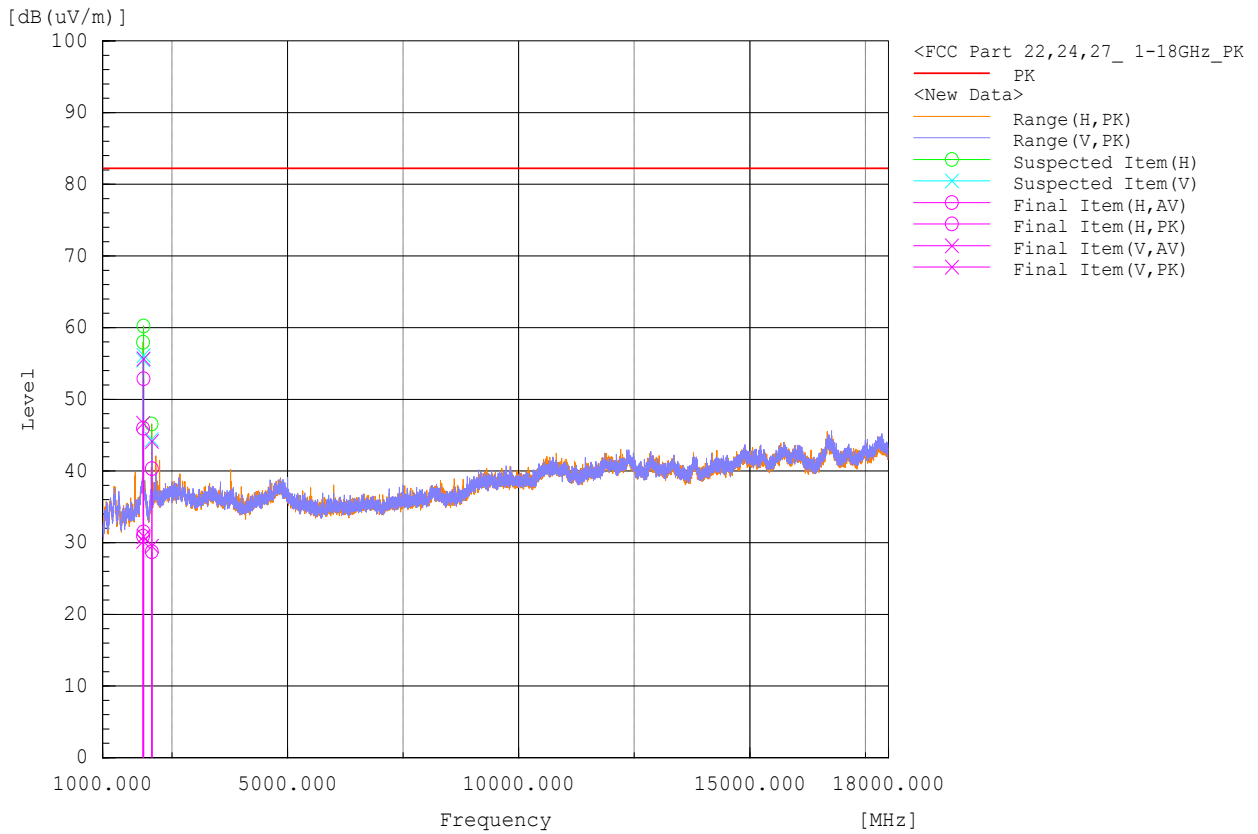
GSM 1900 30MHz-1GHz



*Note: Limit shown on plot is not the limit used

Frequency [MHz]	Pol	Height [cm]	Angle [deg]	Level [dBuV/m]	ERP/EIRP Power [dBm]	Limit [dBm]	Margin [dB]
79.883	H	233.4	192.8	33.7	-84.0	-36	48.0
83.973	H	228.7	211.5	31.6	-86.2	-36	50.2
117.679	V	119.3	244.3	26.1	-91.6	-36	55.6
312.012	H	100.1	78.7	17.7	-100.0	-36	64.0
531.849	V	132	213.7	17.8	-99.9	-36	63.9
695.515	H	382.6	49.4	21.5	-96.2	-36	60.2

GSM 1900 1-18GHz



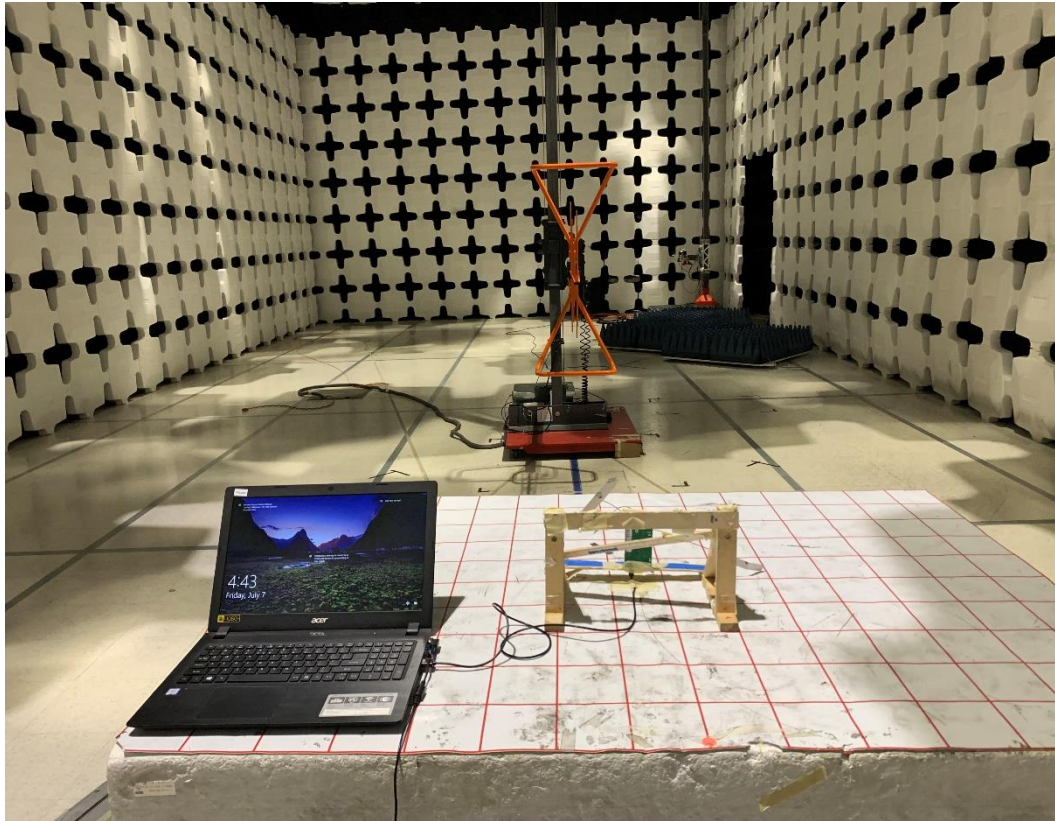
*Note: Limit shown on plot is not the limit used

Frequency [MHz]	Pol	Height [cm]	Angle [deg]	Level [dBuV/m]	ERP/EIRP Power [dBm]	Limit [dBm]	Margin [dB]
1875.672	V	241	341.5	46.7	-71.0	-30	35.0
1876.149	H	135	124.7	46	-71.7	-30	35.7
1884.359	H	205	280.4	52.9	-64.9	-30	28.9
1884.592	V	270	296.8	55.6	-62.0	-30	26.0
2064.183	V	217	296	44.1	-73.6	-30	37.6
2063.614	H	148	236.9	40.3	-77.3	-30	41.3

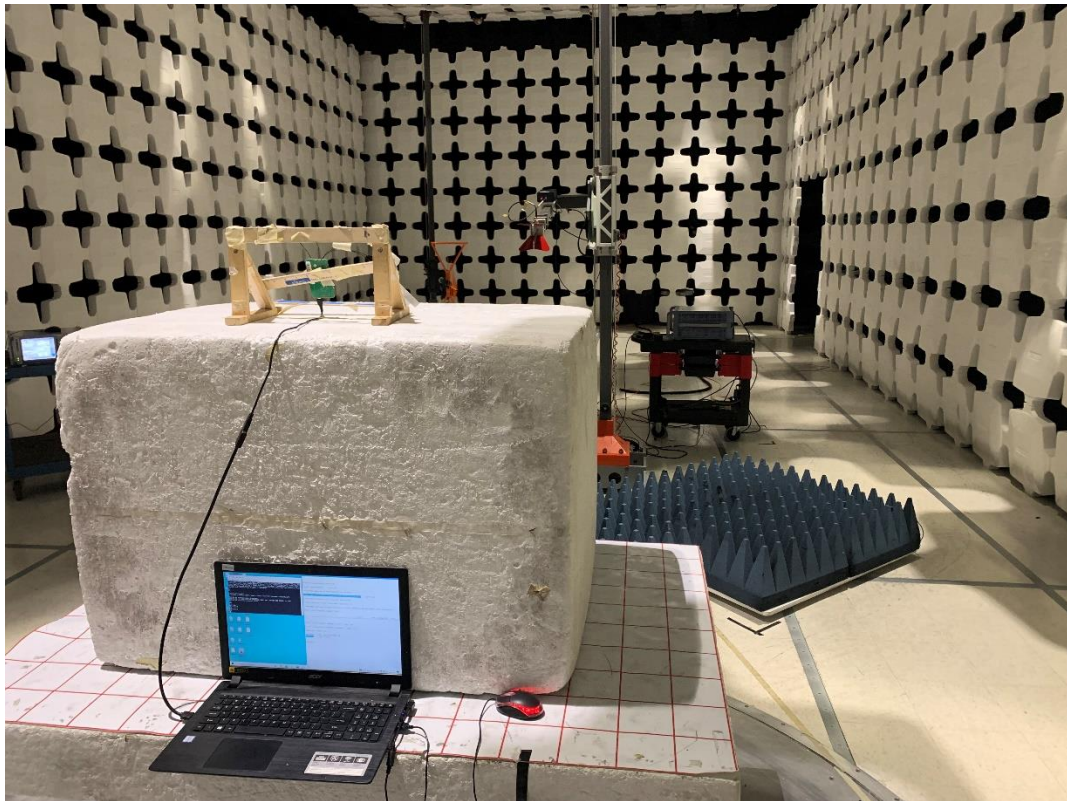
5 Pictures of Test Arrangements



Radiated Emission 30 – 1000MHz (Front View)



Radiated Emission 30 – 1000MHz (Rear View)



Radiated Emission 1 – 18GHz

Appendix – Information on the Testing Laboratories

Bureau Veritas is a global leader in testing, inspection and certification (TIC) services. We help businesses improve safety, sustainability and productivity; and our clients include the majority of leading brands in retail, manufacturing and other industries. With a presence in every major country around the world, our quality assurance and compliance solutions are vital in helping our customers enhance product quality and concept-to-consumer journeys. We also assist with increasing speed to market, profitability and brand equity throughout the supply chain. Bureau Veritas is a leading wireless/IoT testing, inspection, audit and certification provider, with a global network of test laboratories to support the IoT industry in areas of connectivity, security, interoperability as well as quality, health & safety, and environmental/chemical requirements.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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