



Engineering Test Report No. 2302602-01 Rev. E

Report Date	February 29, 2024	
Manufacturer Name	Generac Power Systems, Inc.	
Manufacturer Address	S45 W29290 Hwy 59 Waukesha, WI 53189	
Test Item Name Model No.	Generac Generator Connectivity Accessory, Cellular RADIO-G3-12V	
Date Received	January 16, 2024	
Test Dates	January 16, 2024 through February 9, 2024	
Specifications	FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C FCC "Code of Federal Regulations" Title 47, Part 22, Subpart C FCC "Code of Federal Regulations" Title 47, Part 24, Subpart C FCC "Code of Federal Regulations" Title 47, Part 27, Subpart L FCC "Code of Federal Regulations" Title 47, Part 90, Subpart S Innovation, Science, and Economic Development Canada, RSS-GEN Innovation, Science, and Economic Development Canada, RSS-130 Innovation, Science, and Economic Development Canada, RSS-132 Innovation, Science, and Economic Development Canada, RSS-133 Innovation, Science, and Economic Development Canada, RSS-139	
Test Facility	Elite Electronic Engineering, Inc. 1516 Centre Circle, Downers Grove, IL 60515	FCC Reg. Number: 269750 IC Reg. Number: 2987A CAB Identifier: US0107
Signature	MARK E. LONGINOTTI	
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Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the FCC and ISSED test specifications. The data presented in this test report pertains to the EUT on the test dates specified. Any electrical or mechanical modifications made to the EUT subsequent to the specified test date will serve to invalidate the data and void this certification. This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the Federal Government.

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1. Report Revision History

Revision	Date	Description
–	01 MAR 2024	Initial Release of Engineering Test Report No. 2302602-01
A	22 MAR 2024 By NDB, Rick King and Javier Cardenas	- Throughout the report: Report number changed from 2302602-01 to 2302602-01 Rev. A. - Added references to RSS-130, RSS-132, RSS-133 and RSS 139 throughout report. - Section 2.2: Table was updated to include BLE information, FCC ID, ISED ID, and ISED HVIN. - Section 8: Added BLE mode. - Section 20: Added BLE data. - Section 21: Added for conducted spurious emissions to show Unwanted Emissions compliance to RSS-139 for LTE CAT-M1 Band 4 and Band 66.
B	01 APR 2024 By Rick King	- Throughout the report: Report number changed from 2302602-01 Rev. A to 2302602-01 Rev. B. - Throughout report: Removed all references to bands 8 and 26. - Section 2.2: Changed 2402 - 2480 MHz to 2400 - 2483.5 MHz. - Section 2.2: Added verbiage for the 2400 - 2483.5MHz band. - Section 8: Changed the “BLE, Band 38” to “BLE, Channel 38”
C	04 APR 2024 By Rick King	- Throughout the report: Report number changed from 2302602-01 Rev. B to 2302602-01 Rev. C. - Section 20, Page 16: Updated Test Details Notes row to read 27.2 dBm EIRP. Updated spurious emissions table to EIRP. Updated the equivalent Antenna Gain to EIRP. - Section 20, Page 17: Updated Test Details Notes row to read 23.4 dBm EIRP. Updated spurious emissions table to EIRP. Updated the equivalent Antenna Gain to EIRP. - Section 20, Page 22: Updated Test Details Notes row to read 24.3 dBm EIRP. Updated spurious emissions table to EIRP. Updated the equivalent Antenna Gain to EIRP. - Section 20, Page 23: Updated Test Details Notes row to read 24.7 dBm EIRP. Updated spurious emissions table to EIRP. Updated the equivalent Antenna Gain to EIRP.
D	09 APR 2024 By Rick King	- Throughout the report: Report number changed from 2302602-01 Rev. C to 2302602-01 Rev. D. - Section 20, pages 16, 17, 22, and 23: Updated the conducted EIRP levels per the EIRP values supplied by Sierra Wireless and Generac's new antenna gain. This update was performed on bands 2, 4, 25, and 66.
E	16 APR 2024 By Rick King	- Throughout the report: Report number changed from 2302602-01 Rev. D to 2302602-01 Rev. E. - Section 20: Removed Note, ERP or EIRP on each data page.

2. Introduction

2.1. Scope of Tests

This document presents the results of a series of RF emissions tests that were performed on the Generac Power Systems, Inc. Generac Generator Connectivity Accessory, Cellular (hereinafter referred to as the Equipment Under Test (EUT)). The EUT was manufactured and submitted for testing by Generac Power Systems, Inc. located in Waukesha, WI.

2.1. Purpose

The test series was performed to determine if the EUT meets the RF emission requirements of the FCC "Code of Federal Regulations" Title 47 Part 15, Subpart 15, Section 15.247, Part 22 Subpart C Section 22.917(a), Part 24 Subpart E Section 24.238, Part 27 Subpart L Sections 27.53(c)(2)(h)(1), 27.238(a), 27.1509 (a) and Title 47 Part 90 Subpart D Section 90.61.

Testing was performed in accordance with ANSI C63.4-2014 and ANSI C63.26-2015.

The test series was also performed to determine if the EUT meets the RF emission requirements of the Innovation, Science, and Economic Development Canada Radio Standards Specification RSS-Gen and Innovation, Science, and Economic Development Canada Radio Standards Specification RSS-130 for Equipment Operating in the Frequency Bands 617-652 MHz, 663-698 MHz, 698-756 MHz and 777-787 MHz, Innovation, Science, and Economic Development Canada Radio Standards Specification RSS-132 for Equipment Operating Cellular Systems Operating in the Bands 824-849 MHz and 869-894 MHz, Innovation, Science, and Economic Development Canada Radio Standards Specification RSS-133 for Equipment Operating 2 GHz Personal Communications Services, Innovation, Science, and Economic Development Canada Radio Standards Specification RSS-139 for Equipment Operating Advanced Wireless Services Equipment Operating in the Bands 1710-1780 MHz and 2110-2200 MHz.

2.2. Identification of the EUT

The EUT was identified as follows:

EUT Identification	
Product Description	Generac Generator Connectivity Accessory, Cellular
Model/Part No.	RADIO-G3-12V
Serial No.	C1
Size of EUT	89 x 483 x 438 mm
Software/Firmware Version	D20.22.03.09
Device Type	CAT-M1 BLE
Band of Operation	Band 2, Band 4, Band 5, Band 12, Band 13, Band 25, Band 66
	2400 – 2483.5MHz with WLAN/BLE transmitters supported and only BLE is able to be simultaneously transmitted with cellular bands so this report contains such evaluation.
Modulation Type	QPSK
FCC ID:	VDE-GGCAC
ISED ID:	8036A-GGCAC
ISED HVIN:	RADIO-G3-12V

The EUT listed above was used throughout the test series.

3. Power Input

The EUT was powered by 12VDC through a twisted pair.

4. Grounding

The EUT was not connected to ground.

5. Support Equipment

The EUT was submitted for testing along with the following support equipment:

Description	Model #	S/N	Notes
Elite Support Laptop	---	---	

6. Interconnect Leads

The following interconnect cables were submitted with the test item:

Item	Description
I/O Cable	Connects EUT to the support laptop

7. Modifications Made to the EUT

No modifications were made to the EUT during the testing.

8. Modes of Operation

The EUT and all peripheral equipment were energized. The unit was programmed to transmit in one of the following modes:

Mode	Description
CAT-M1 Band 2	The EUT was powered on and set to Transmit at 1880MHz, 5MHz Bandwidth, QPSK modulation
CAT-M1 Band 4	The EUT was powered on and set to Transmit at 1754.3MHz, 1.4MHz Bandwidth, QPSK modulation
CAT-M1 Band 5	The EUT was powered on and set to Transmit at 848.3MHz, 1.4MHz Bandwidth, QPSK modulation
CAT-M1 Band 12	The EUT was powered on and set to Transmit at 707.5MHz, 5MHz Bandwidth, QPSK modulation
CAT-M1 Band 13	The EUT was powered on and set to Transmit at 782MHz, 5MHz Bandwidth, QPSK modulation
CAT-M1 Band 25	The EUT was powered on and set to Transmit at 1850.7MHz, 15MHz Bandwidth, QPSK modulation
CAT-M1 Band 66	The EUT was powered on and set to Transmit at 1720MHz, 20MHz Bandwidth, QPSK modulation
BLE, Channel 38	The EUT was powered on and set to Transmit at 2478MHz

9. Test Specifications

The tests were performed to selected portions of, and in accordance with, the following test specifications.

- Federal Communications Commission "Code of Federal Regulations", Title 47, Chapter I, Subchapter A, Part 15, Subpart C
- Federal Communications Commission "Code of Federal Regulations", Title 47, Chapter I, Subchapter B, Part 22, Subpart H
- Federal Communications Commission "Code of Federal Regulations", Title 47, Chapter I, Subchapter B, Part 24, Subpart E

- Federal Communications Commission "Code of Federal Regulations", Title 47, Chapter I, Subchapter B, Part 27, Subpart C
- Federal Communications Commission "Code of Federal Regulations", Title 47, Chapter I, Subchapter D, Part 90, Subpart S
- ANSI C63.4-2014, "American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz"
- ANSI C63.26-2015, "American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services"
- RSS-Gen Issue 5, March 2019, Amendment 1, Innovation, Science, and Economic Development Canada, "Spectrum Management and Telecommunications, Radio Standards Specification, General Requirements for Compliance of Radio Apparatus"
- RSS-130 Issue 2, February 2019, Innovation, Science, and Economic Development Canada, "Spectrum Management and Telecommunications, Radio Standards Specification, Equipment Operating in the Frequency Bands 617-652 MHz, 663-698 MHz, 698-756 MHz and 777-787 MHz"
- RSS-132 Issue 4, January 2023, Innovation, Science, and Economic Development Canada, "Spectrum Management and Telecommunications, Radio Standards Specification, Equipment Operating Cellular Systems Operating in the Bands 824-849 MHz and 869-894 MHz"
- RSS-133 Issue 6, January 2018, Amendment 1, Innovation, Science, and Economic Development Canada, "Spectrum Management and Telecommunications, Radio Standards Specification, 2 GHz Personal Communications Services"
- RSS-139 Issue 4, September 2022, Innovation, Science, and Economic Development Canada, "Spectrum Management and Telecommunications, Radio Standards Specification, Advanced Wireless Services Equipment Operating in the Bands 1710-1780 MHz and 2110-2200 MHz"

10. Test Plan

No test plan was provided. Instructions were provided by personnel from Generac Power Systems, Inc. and used in conjunction with the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, FCC "Code of Federal Regulations" Title 47 Part 22, Subpart H, Part 24 Subpart E, Part 27 Subpart C, ANSI C63.4-2014, and ANSI C63.26-2015 specifications.

11. Deviation, Additions to, or Exclusions from Test Specifications

There were no deviations, additions to, or exclusions from the test specifications during this test series.

12. Laboratory Conditions

The ambient parameters of the laboratory during testing were as follows:

Ambient Parameters	Value
Temperature	23°C
Relative Humidity	22%
Atmospheric Pressure	1016mb

13. Summary

The following EMC test was performed, and the results are shown below:

Test Description	Requirements	Test Method	S/N	Results
Spurious Radiated Emissions	FCC 22.917(a) FCC 24.238(a) FCC 27.53(c)(2)(h)(1) FCC 27.238(a) FCC Section 90.61	ANSI C63.26:2015	C1	Conforms

14. Sample Calculations

For Radiated Emissions:

The resultant field strength (FS) is a summation in decibels (dB) of the receiver meter reading (MTR), the antenna correction factor (AF), and the cable loss factor (CF). If an external preamplifier is used, the total is reduced by its gain (-PA). If a distance correction (DC) is required, it is added to the total.

$$\text{Formula 1: FS (dB}\mu\text{V/m)} = \text{MTR (dB}\mu\text{V)} + \text{AF (dB/m)} + \text{CF (dB)} + (-\text{PA (dB)}) + \text{DC (dB)}$$

To convert the Field Strength dB μ V/m term to μ V/m, the dB μ V/m is first divided by 20. The Base 10 AntiLog is taken of this quotient. The result is the Field Strength value in μ V/m terms.

$$\text{Formula 2: FS (}\mu\text{V/m)} = \text{AntiLog}[(\text{FS (dB}\mu\text{V/m)})/20]$$

15. Statement of Conformity

The Generac Power Systems, Inc. Generac Generator Connectivity Accessory, Cellular (Model No. RADIO-G3-12V, Serial No. C1) did fully conform to the selected requirements of FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, FCC "Code of Federal Regulations" Title 47 Part 22, Subpart H, Part 24 Subpart E, Part 27 Subpart C, Federal Communications Commission "Code of Federal Regulations", Title 47, Chapter I, Subchapter D, Part 90, Subpart S, Innovation, Science, and Economic Development Canada, RSS-130, Innovation, Science, and Economic Development Canada, RSS-132, Innovation, Science, and Economic Development Canada, RSS-133 and Innovation, Science, and Economic Development Canada, RSS-139.

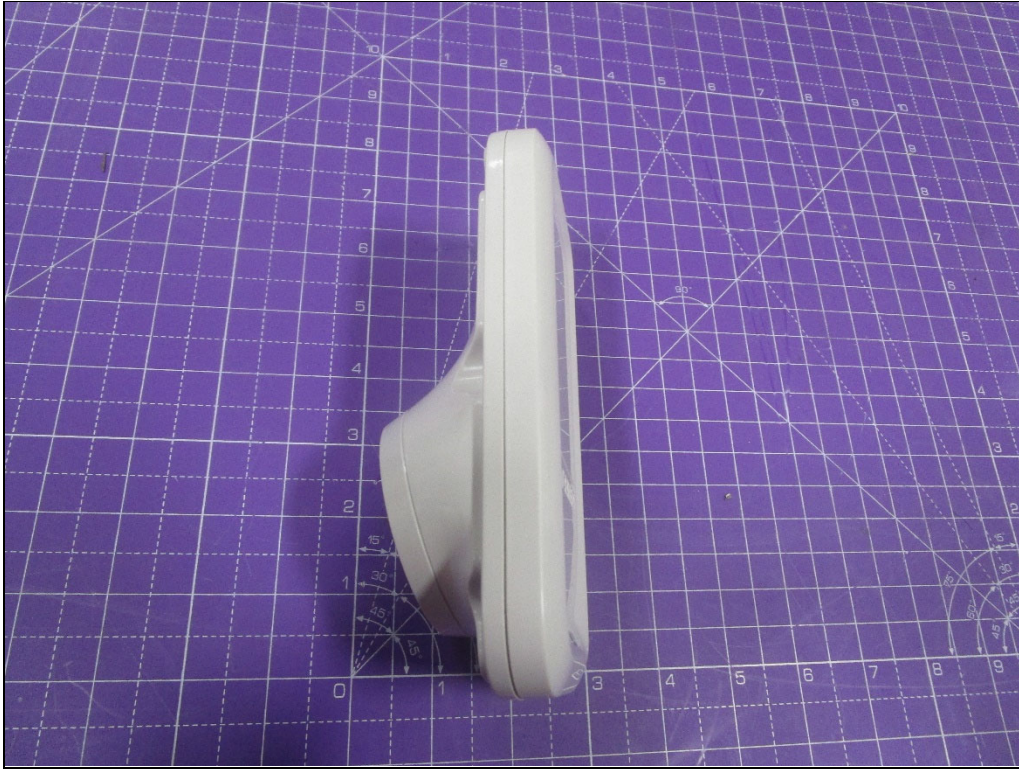
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16. Certification

Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, FCC "Code of Federal Regulations" Title 47 Part 22, Subpart H, Part 24 Subpart E, Part 27 Subpart C, and Federal Communications Commission "Code of Federal Regulations", Title 47, Chapter I, Subchapter D, Part 90, Subpart S, Innovation, Science, and Economic Development Canada, RSS-130, Innovation, Science, and Economic Development Canada, RSS-132, Innovation, Science, and Economic Development Canada, RSS-133 and Innovation, Science, and Economic Development Canada, RSS-139. test specifications. The data presented in this test report pertains to the EUT on the test date specified. Any electrical or mechanical modifications made to the EUT subsequent to the specified test date will serve to invalidate the data and void this certification.

17. Photographs of EUT





18. Equipment List

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
APW10	PREAMPLIFIER	PMI	PE2-35-120-5R0-10-12-SFF	PL11685/1241	1GHZ-20GHZ	3/10/2023	3/10/2024
APW18	PREAMPLIFIER	PLANAR	PE2-30-20G20RG6-3R0-10-12-SFF	PL34312/2148	18-26.5GHZ	1/19/2023	2/19/2024
APW3	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-35-120-5R0-10-12	PL2924	1GHZ-20GHZ	3/10/2023	3/10/2024
GRE1	SIGNAL GENERATOR	AGILENT	E4438C	MY42081749	250KHZ-6GHZ	2/25/2023	2/25/2024
NDQ1	TUNED DIPOLE ANTENNA	EMCO	3121C-DB4	313	400-1000MHZ	9/14/2022	9/14/2024
NHG1	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ	NOTE 1	
NTA4	BILOG ANTENNA	TESEQ	6112D	46660	20-2000GHZ	10/26/2022	10/26/2024
NWQ0	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS LINDGREN	3117	66657	1GHZ-18GHZ	6/13/2022	6/13/2024
NWQ1	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS-LINDGREN	3117	66655	1GHZ-18GHZ	5/26/2022	5/26/2024
NWQ2	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS LINDGREN	3117	66659	1GHZ-18GHZ	4/27/2022	4/27/2024
RBE0	EMI ANALYZER	ROHDE & SCHWARZ	ESU26	100095	20Hz-26GHz	4/27/2023	4/27/2024
RBG3	EMI ANALYZER	ROHDE & SCHWARZ	ESW44	101592	2HZ-44GHZ	11/11/2022	2/11/2024
WKA1	SOFTWARE, UNIVERSAL RCV EMI	ELITE	UNIV_RCV_EMI	1	---	I/O	
XOB2	ADAPTER	HEWLETT PACKARD	K281C.012	09407	18-26.5GHZ	NOTE 1	
XPQ4	HIGH PASS FILTER	K&L MICROWAVE	11SH10-4800/X20000-O/O	1	4.8-20GHZ	9/14/2023	9/14/2025
XPR0	HIGH PASS FILTER	K&L MICROWAVE	11SH10-4800/X20000	001	4.8-20GHZ	9/14/2023	9/14/2025

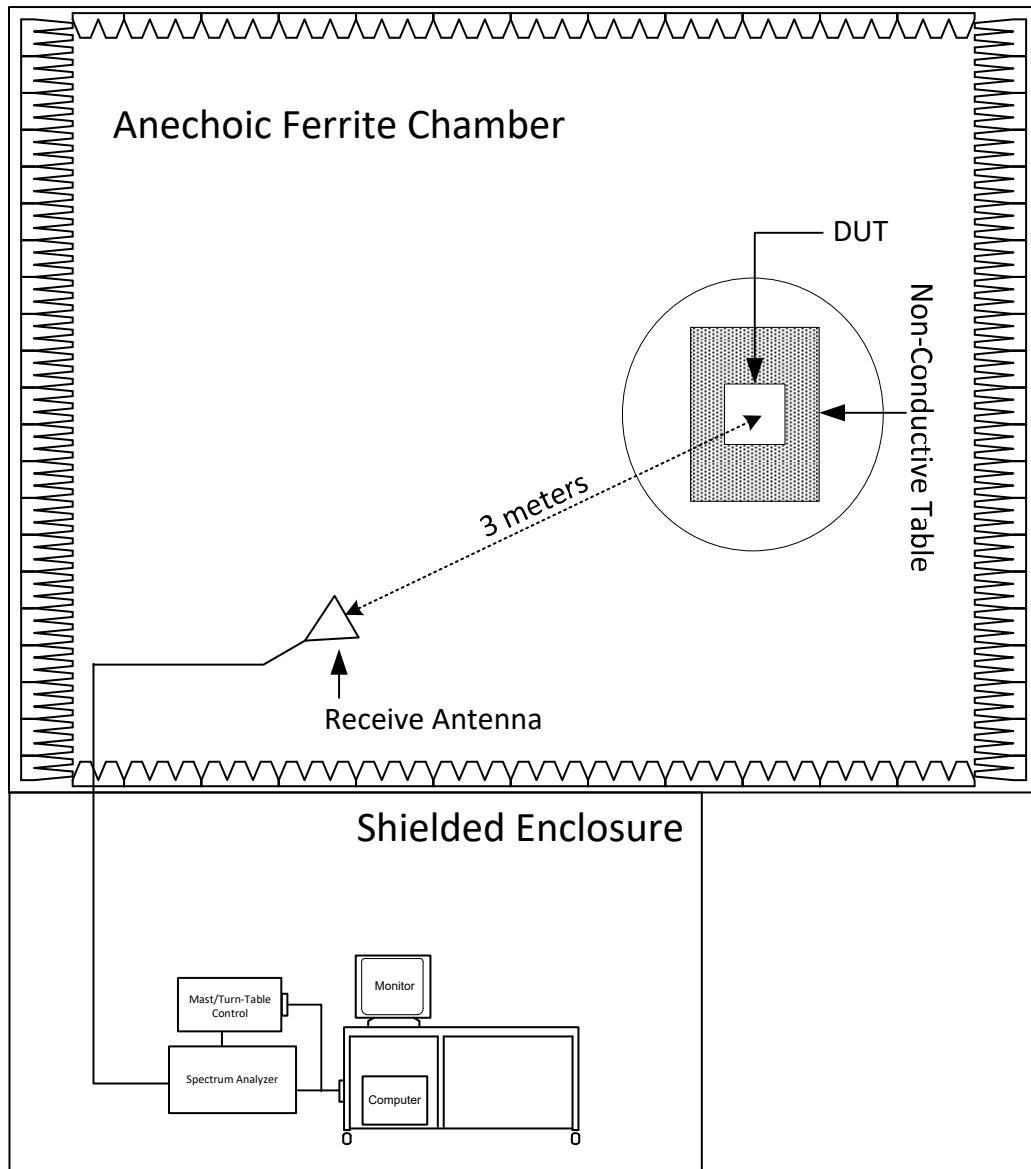
N/A: Not Applicable

I/O: Initial Only

CNR: Calibration Not Required

NOTE 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.

19. Block Diagram of Test Setup



Radiated Measurements Test Setup

20. Spurious Radiated Emissions

EUT Information	
Manufacturer	Generac Power Systems, Inc.
Product	Generac Generator Connectivity Accessory, Cellular
Model No.	RADIO-G3-12V
Serial No.	C1
Mode	CAT-M1 Band 2, Transmit at 1880MHz, 5MHz Bandwidth, QPSK modulation CAT-M1 Band 4, Transmit at 1754.3MHz, 1.4MHz Bandwidth, QPSK modulation CAT-M1 Band 5, Transmit at 848.3MHz, 1.4MHz Bandwidth, QPSK modulation CAT-M1 Band 12, Transmit at 707.5MHz, 5MHz Bandwidth, QPSK modulation CAT-M1 Band 13, Transmit at 782MHz, 5MHz Bandwidth, QPSK modulation CAT-M1 Band 25, Transmit at 1850.7MHz, 15MHz Bandwidth, QPSK modulation CAT-M1 Band 66, Transmit at 1720MHz, 20MHz Bandwidth, QPSK modulation

Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Type of Test Site	Semi-Anechoic Chamber
Test Site Used	R29F
Type of Antennas Used	Below 1GHz: Bilog (or equivalent) Above 1GHz: Double-Ridged Waveguide (or equivalent)
Notes	N/a

Measurement Uncertainty	
Measurement Type	Expanded Measurement Uncertainty
Radiated disturbance (electric field strength on an open area test site or alternative test site) (30 MHz – 1000 MHz)	4.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (1 GHz – 6 GHz)	3.1

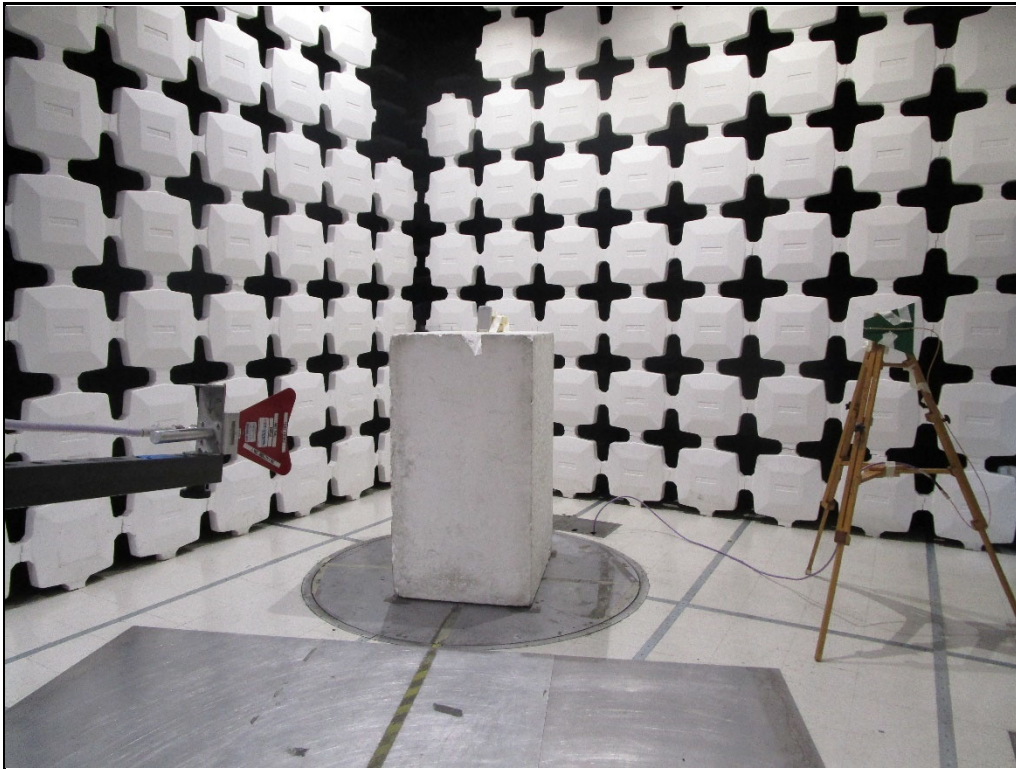
Requirements
FCC 22.917(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. FCC 24.238(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. FCC 27.53(c)(2),(h)(1),(f) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. FCC 90.691 On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5kHz: at least $50 + 10\log(P)$ dB or 70dB, whichever is the lesser attenuation.

Procedure

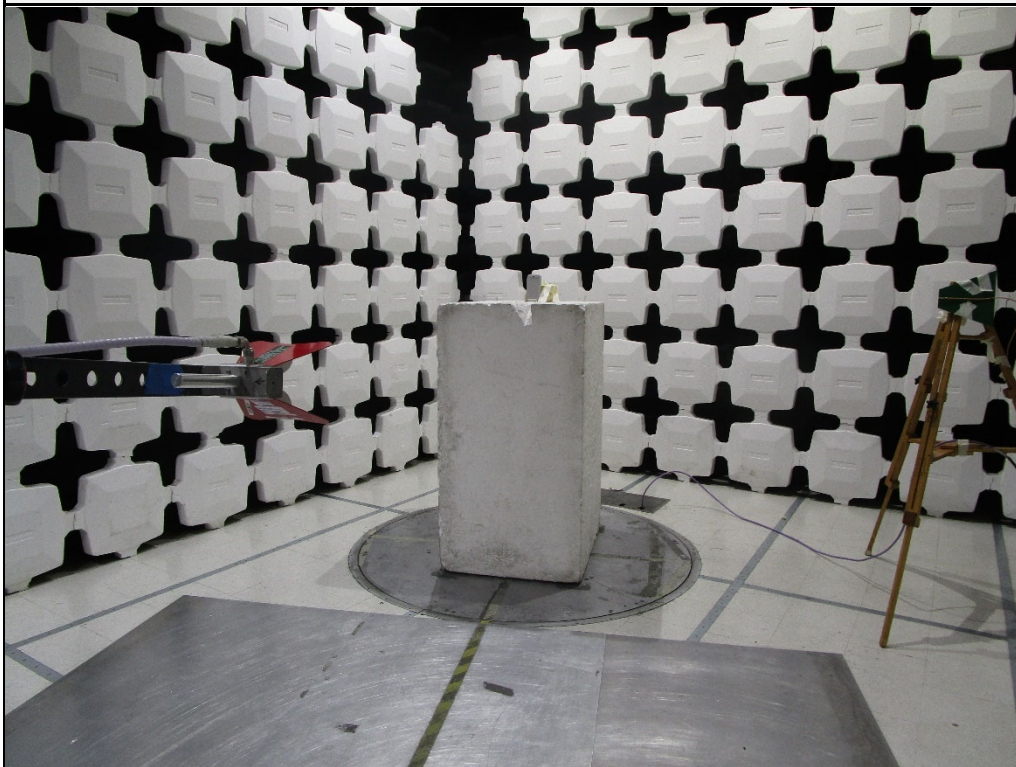
All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with CISPR 16 for site attenuation.

The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.

- 1) Preliminary radiated measurements were performed to determine the frequencies where the significant emissions might be found. The EUT was placed on an 80cm meter high, non-conductive stand and set to transmit. With the EUT at one set position and the measurement antenna at a set height (i.e., without maximizing), the radiated emissions were measured using a peak detector and automatically plotted. The broadband measuring antenna was positioned at a 3-meter distance from the EUT. This data was then automatically plotted up through the tenth harmonic of the transmit frequency of the EUT. All preliminary tests were performed separately with the EUT operating in the modes listed in paragraph 3.2.
- 2) All significant broadband and narrowband signals found in the preliminary sweeps were then maximized. For all measurements below 1GHz, a bilog antenna was used as the measurement antenna. For all measurements above 1GHz, a horn antenna was used as the measurement antenna. For all tests, a peak detector was used.
- 3) To ensure that maximum or worst-case emission levels were measured, the following steps were taken when taking all measurements:
 - i) The EUT was rotated so that all of its sides were exposed to the receiving antenna.
 - ii) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
 - iii) The measuring antenna was raised and lowered for each antenna polarization to maximize the readings.
 - iv) In instances where it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer, the measuring antenna was not raised or lowered to ensure maximized readings. Instead, the EUT was rotated through all axis to ensure the maximum readings were recorded for the EUT.
- b) To determine the emission power, another antenna was set in place of the EUT and connected to a calibrated signal generator. (A tuned dipole was used for all measurements below 1GHz, and a double ridged waveguide antenna was used for all measurements above 1GHz.) The output of the signal generator was adjusted to match the received level at the spectrum analyzer. The signal level was recorded. The reading was corrected to compensate for cable loss, as required, and for frequencies above 1GHz, increased by the gain of the waveguide.



Test Setup for Spurious Radiated Emissions, 1GHz – 18GHz – Antenna Polarization Horizontal



Test Setup for Spurious Radiated Emissions, 1GHz – 18GHz – Antenna Polarization Vertical



Test Setup for Spurious Radiated Emissions, Above 18GHz – Antenna Polarization Horizontal



Test Setup for Spurious Radiated Emissions, Above 18GHz – Antenna Polarization Vertical

Test Details	
Manufacturer	Generac Power Systems, Inc.
EUT	Generac Generator Connectivity Accessory, Cellular
Model No.	RADIO-G3-12V
Serial No.	C1
Mode	CAT-M1 Band 2, Transmit at 1880MHz, 5MHz Bandwidth, QPSK modulation
Date Tested	January 16, 2024 through February 9, 2024
FCC Rule Part	24.238(a)

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	EIRP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
3760.00	H	30.7	Ambient	-32.3	7.2	4.3	-29.4	56.8	40.4
3760.00	V	30.3	Ambient	-31.5	7.2	4.3	-28.7	56.1	40.4
5640.00	H	56.3		-42.8	7.8	5.3	-40.2	67.6	40.4
5640.00	V	60.2		-39.0	7.8	5.3	-36.5	63.9	40.4
7520.00	H	49.5	Ambient	-47.6	9.8	6.3	-44.1	71.5	40.4
7520.00	V	49.8	Ambient	-47.8	9.8	6.3	-44.3	71.7	40.4
9400.00	H	50.3	Ambient	-45.2	10.5	6.7	-41.4	68.8	40.4
9400.00	V	50.7	Ambient	-45.1	10.5	6.7	-41.3	68.7	40.4
11280.00	H	49.8	Ambient	-42.5	10.6	7.7	-39.6	67.0	40.4
11280.00	V	49.1	Ambient	-44.1	10.6	7.7	-41.1	68.5	40.4
13160.00	H	49.5	Ambient	-39.7	11.0	8.1	-36.8	64.3	40.4
13160.00	V	49.1	Ambient	-41.1	11.0	8.1	-38.2	65.7	40.4
15040.00	H	48.9	Ambient	-37.4	11.0	9.0	-35.3	62.8	40.4
15040.00	V	48.6	Ambient	-39.1	11.0	9.0	-37.1	64.5	40.4
16920.00	H	47.7	Ambient	-35.2	9.9	9.5	-34.7	62.2	40.4
16920.00	V	47.9	Ambient	-36.2	9.9	9.5	-35.7	63.1	40.4
18800.00	H	38.7	Ambient	-55.2	13.1	1.9	-44.0	71.4	40.4
18800.00	V	38.2	Ambient	-55.7	13.1	1.9	-44.5	71.9	40.4

Test Details	
Manufacturer	Generac Power Systems, Inc.
EUT	Generac Generator Connectivity Accessory, Cellular
Model No.	RADIO-G3-12V
Serial No.	C1
Mode	CAT-M1 Band 4, Transmit at 1754.3MHz, 1.4MHz Bandwidth, QPSK modulation
Date Tested	January 16, 2024 through February 9, 2024
FCC Rule Part	27.53(h)

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	EIRP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
3508.60	H	37.2	Ambient	-27.2	7.0	4.2	-24.3	51.7	40.3
3508.60	V	37.5	Ambient	-25.3	7.0	4.2	-22.5	49.9	40.3
5262.90	H	51.7	Ambient	-46.5	7.2	5.1	-44.4	71.7	40.3
5262.90	V	52.3	Ambient	-46.5	7.2	5.1	-44.4	71.7	40.3
7017.20	H	49.6	Ambient	-46.9	9.3	6.0	-43.6	70.9	40.3
7017.20	V	49.5	Ambient	-47.9	9.3	6.0	-44.6	71.9	40.3
8771.50	H	49.1	Ambient	-47.5	10.2	6.5	-43.8	71.1	40.3
8771.50	V	49.1	Ambient	-47.7	10.2	6.5	-44.0	71.3	40.3
10525.80	H	49.5	Ambient	-43.9	10.2	7.3	-41.0	68.3	40.3
10525.80	V	49.5	Ambient	-44.9	10.2	7.3	-41.9	69.3	40.3
12280.10	H	49.4	Ambient	-40.6	10.3	8.0	-38.3	65.6	40.3
12280.10	V	50.8	Ambient	-40.6	10.3	8.0	-38.4	65.7	40.3
14034.40	H	48.7	Ambient	-37.8	11.8	8.5	-34.5	61.9	40.3
14034.40	V	48.8	Ambient	-40.0	11.8	8.5	-36.7	64.0	40.3
15788.70	H	49.0	Ambient	-36.2	10.8	9.0	-34.4	61.7	40.3
15788.70	V	48.5	Ambient	-38.3	10.8	9.0	-36.5	63.8	40.3
17543.00	H	49.1	Ambient	-33.3	11.4	9.8	-31.7	59.0	40.3
17543.00	V	49.2	Ambient	-31.8	11.4	9.8	-30.2	57.5	40.3

Test Details	
Manufacturer	Generac Power Systems, Inc.
EUT	Generac Generator Connectivity Accessory, Cellular
Model No.	RADIO-G3-12V
Serial No.	C1
Mode	CAT-M1 Band 5, Transmit at 848.3MHz, 1.4MHz Bandwidth, QPSK modulation
Date Tested	January 16, 2024 through February 9, 2024
FCC Rule Part	22.917(a)

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1696.60	H	18.1	Ambient	-50.4	2.5	2.8	-50.7	74.8	37.1
1696.60	V	22.4		-43.3	2.5	2.8	-43.6	67.6	37.1
2544.90	H	24.9		-40.2	2.3	3.6	-41.4	65.4	37.1
2544.90	V	31.3		-33.0	2.3	3.6	-34.2	58.2	37.1
3393.20	H	20.3	Ambient	-45.1	5.1	4.1	-44.0	68.1	37.1
3393.20	V	22.1	Ambient	-41.2	5.1	4.1	-40.2	64.3	37.1
4241.50	H	12.5	Ambient	-49.1	5.2	4.6	-48.5	72.6	37.1
4241.50	V	14.1	Ambient	-46.6	5.2	4.6	-46.0	70.0	37.1
5089.80	H	49.9	Ambient	-49.5	5.2	5.0	-49.2	73.3	37.1
5089.80	V	55.6		-43.0	5.2	5.0	-42.7	66.8	37.1
5938.10	H	57.3		-40.2	6.0	5.4	-39.7	63.7	37.1
5938.10	V	62.9		-35.3	6.0	5.4	-34.7	58.8	37.1
6786.40	H	49.7	Ambient	-46.1	6.0	5.9	-46.0	70.0	37.1
6786.40	V	51.9		-45.0	6.0	5.9	-44.9	69.0	37.1
7634.70	H	49.5	Ambient	-47.4	7.5	6.3	-46.3	70.3	37.1
7634.70	V	49.6	Ambient	-48.1	7.5	6.3	-47.0	71.0	37.1
8483.00	H	49.4	Ambient	-47.4	8.0	6.5	-45.8	69.9	37.1
8483.00	V	49.6	Ambient	-47.7	8.0	6.5	-46.2	70.3	37.1

Test Details	
Manufacturer	Generac Power Systems, Inc.
EUT	Generac Generator Connectivity Accessory, Cellular
Model No.	RADIO-G3-12V
Serial No.	C1
Mode	CAT-M1 Band 12, Transmit at 707.5MHz, 5MHz Bandwidth, QPSK modulation
Date Tested	January 16, 2024 through February 9, 2024
FCC Rule Part	27.53

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1415.00	H	27.2		-41.3	1.6	2.6	-42.3	66.3	37.0
1415.00	V	27.7		-38.7	1.6	2.6	-39.7	63.7	37.0
2122.50	H	39.4		-27.2	2.8	3.2	-27.6	51.6	37.0
2122.50	V	40.1		-24.7	2.8	3.2	-25.1	49.1	37.0
2830.00	H	28.3		-37.4	3.8	3.8	-37.4	61.3	37.0
2830.00	V	29.1		-34.8	3.8	3.8	-34.8	58.8	37.0
3537.50	H	21.8	Ambient	-42.3	5.1	4.2	-41.4	65.4	37.0
3537.50	V	21.7	Ambient	-41.0	5.1	4.2	-40.1	64.1	37.0
4245.00	H	12.4	Ambient	-49.2	5.1	4.6	-48.6	72.6	37.0
4245.00	V	12.9	Ambient	-47.7	5.1	4.6	-47.2	71.2	37.0
4952.50	H	49.8	Ambient	-50.3	5.6	4.9	-49.6	73.6	37.0
4952.50	V	49.4	Ambient	-49.4	5.6	4.9	-48.7	72.7	37.0
5660.00	H	54.2		-44.8	5.6	5.3	-44.5	68.4	37.0
5660.00	V	56.9		-42.2	5.6	5.3	-41.9	65.9	37.0
6367.50	H	61.4		-37.0	8.6	5.7	-34.0	58.0	37.0
6367.50	V	65.1		-34.2	8.6	5.7	-31.2	55.2	37.0
7075.00	H	49.6	Ambient	-47.0	7.3	6.0	-45.7	69.7	37.0
7075.00	V	49.4	Ambient	-48.1	7.3	6.0	-46.8	70.8	37.0

Test Details	
Manufacturer	Generac Power Systems, Inc.
EUT	Generac Generator Connectivity Accessory, Cellular
Model No.	RADIO-G3-12V
Serial No.	C1
Mode	CAT-M1 Band 13, Transmit at 782MHz, 5MHz Bandwidth, QPSK modulation
Date Tested	January 16, 2024 through February 9, 2024
FCC Rule Part	27.53 (c)(2)

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	EIRP (dBm)	EIRP Limit (dBm/MHz)	Margin (dB)
1564.00	H	18.2		-52.2	5.1	2.2	-49.3	-40.0	-9.3
1564.00	V	19.9		-48.0	5.1	2.2	-45.1	-40.0	-5.1

27.53(f) states that for operations in the 746–758 MHz, 775–788 MHz, and 805–806 MHz bands, emissions in the band 1559–1610 MHz shall be limited to –70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals.

$$\text{dBm} = \text{dBW} + 30 = -70\text{dBW} + 30 = -40\text{dBm}$$

Test Details	
Manufacturer	Generac Power Systems, Inc.
EUT	Generac Generator Connectivity Accessory, Cellular
Model No.	RADIO-G3-12V
Serial No.	C1
Mode	CAT-M1 Band 13, Transmit at 782MHz, 5MHz Bandwidth, QPSK modulation
Date Tested	January 16, 2024 through February 9, 2024
FCC Rule Part	27.53 (f)

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
2346.00	H	33.2		-31.9	3.0	3.4	-32.3	56.3	36.9
2346.00	V	33.0		-31.0	3.0	3.4	-31.5	55.4	36.9
3128.00	H	22.7		-41.6	4.4	4.0	-41.2	65.1	36.9
3128.00	V	25.7		-36.6	4.4	4.0	-36.1	60.0	36.9
3910.00	H	13.6		-49.4	5.5	4.4	-48.3	72.2	36.9
3910.00	V	14.9		-47.1	5.5	4.4	-46.0	69.9	36.9
4692.00	H	13.0	Ambient	-47.4	5.0	4.8	-47.2	71.2	36.9
4692.00	V	13.0	Ambient	-47.1	5.0	4.8	-47.0	70.9	36.9
5474.00	H	51.3	Ambient	-48.4	6.1	5.2	-47.4	71.4	36.9
5474.00	V	54.7	Ambient	-45.2	6.1	5.2	-44.3	68.2	36.9
6256.00	H	65.0		-32.1	5.4	5.6	-32.3	56.3	36.9
6256.00	V	72.0		-25.8	5.4	5.6	-26.0	50.0	36.9
7038.00	H	49.8	Ambient	-46.7	7.2	6.0	-45.5	69.5	36.9
7038.00	V	50.0	Ambient	-47.4	7.2	6.0	-46.2	70.2	36.9
7820.00	H	50.0	Ambient	-46.9	7.2	6.4	-46.1	70.1	36.9
7820.00	V	50.0	Ambient	-47.9	7.2	6.4	-47.1	71.0	36.9

Test Details	
Manufacturer	Generac Power Systems, Inc.
EUT	Generac Generator Connectivity Accessory, Cellular
Model No.	RADIO-G3-12V
Serial No.	C1
Mode	CAT-M1 Band 25, Transmit at 1850.7MHz, 15MHz Bandwidth, QPSK modulation
Date Tested	January 16, 2024 through February 9, 2024
FCC Rule Part	27.238(a)

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	EIRP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
3701.40	H	18.0	Ambient	-44.8	8.4	3.4	-39.8	67.1	40.3
3701.40	V	18.6	Ambient	-42.1	8.4	3.4	-37.1	64.4	40.3
5552.10	H	53.2		-44.9	10.1	4.2	-38.9	66.2	40.3
5552.10	V	52.2		-45.9	10.1	4.2	-39.9	67.2	40.3
7402.80	H	49.1	Ambient	-48.3	11.9	5.0	-41.3	68.6	40.3
7402.80	V	49.3	Ambient	-48.4	11.9	5.0	-41.4	68.7	40.3
9253.50	H	51.2	Ambient	-45.1	13.2	5.3	-37.3	64.5	40.3
9253.50	V	50.5	Ambient	-42.5	13.2	5.3	-34.6	61.9	40.3
11104.20	H	49.1	Ambient	-43.6	12.9	6.1	-36.8	64.0	40.3
11104.20	V	49.6	Ambient	-43.7	12.9	6.1	-36.8	64.0	40.3
12954.90	H	48.3	Ambient	-41.4	13.2	6.4	-34.5	61.8	40.3
12954.90	V	48.4	Ambient	-43.2	13.2	6.4	-36.3	63.6	40.3
14805.60	H	49.5	Ambient	-39.1	13.3	7.1	-33.0	60.2	40.3
14805.60	V	49.7	Ambient	-39.3	13.3	7.1	-33.1	60.4	40.3
16656.30	H	49.6	Ambient	-32.3	11.5	7.5	-28.3	55.5	40.3
16656.30	V	49.6	Ambient	-34.6	11.5	7.5	-30.5	57.8	40.3
18507.00	H	38.8	Ambient	-55.9	13.1	1.8	-44.6	71.9	40.3
18507.00	V	38.7	Ambient	-56	13.1	1.8	-44.7	72.0	40.3

Test Details	
Manufacturer	Generac Power Systems, Inc.
EUT	Generac Generator Connectivity Accessory, Cellular
Model No.	RADIO-G3-12V
Serial No.	C1
Mode	CAT-M1 Band 66, Transmit at 1720MHz, 20MHz Bandwidth, QPSK modulation
Date Tested	January 16, 2024 through February 9, 2024
FCC Rule Part	27.53(h)(1)

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	EIRP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
3440.00	H	19.0		-42.3	7.8	3.3	-37.9	65.1	40.3
3440.00	V	22.1		-39.3	7.8	3.3	-34.8	62.1	40.3
5160.00	H	50.1		-48.6	9.9	4.0	-42.7	69.9	40.3
5160.00	V	50.5		-48.0	9.9	4.0	-42.2	69.4	40.3
6880.00	H	49.7	Ambient	-47.9	11.4	4.7	-41.2	68.5	40.3
6880.00	V	49.6	Ambient	-48.4	11.4	4.7	-41.8	69.0	40.3
8600.00	H	49.5	Ambient	-47.8	13.0	5.2	-40.0	67.2	40.3
8600.00	V	49.0	Ambient	-48.3	13.0	5.2	-40.5	67.8	40.3
10320.00	H	49.3	Ambient	-44.6	12.9	5.7	-37.4	64.7	40.3
10320.00	V	49.0	Ambient	-44.4	12.9	5.7	-37.2	64.5	40.3
12040.00	H	49.6	Ambient	-41.8	13.2	6.4	-35.1	62.3	40.3
12040.00	V	50.5	Ambient	-42.0	13.2	6.4	-35.2	62.5	40.3
13760.00	H	49.6	Ambient	-39.4	13.7	6.7	-32.3	59.6	40.3
13760.00	V	49.9	Ambient	-39.9	13.7	6.7	-32.9	60.2	40.3
15480.00	H	48.8	Ambient	-39.4	13.6	7.2	-33.0	60.3	40.3
15480.00	V	49.9	Ambient	-38.7	13.6	7.2	-32.3	59.6	40.3
17200.00	H	49.1	Ambient	-32.4	12.3	7.7	-27.8	55.0	40.3
17200.00	V	49.4	Ambient	-33.4	12.3	7.7	-28.8	56.1	40.3

Test Details	
Manufacturer	Generac Power Systems, Inc.
Model No.	RADIO-G3-12V
Serial No.	C1
Test	Host Product Testing – Case Spurious Emissions
Mode	BLE Ch38 @ 2478MHz
Frequency Tested	2478MHz
Notes	Peak Measurement in the Restricted Bands

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBμV/m)	Peak Total at 3m (μV/m)	Peak Limit at 3m (μV/m)	Margin (dB)
4956.00	H	55.3		3.7	34.4	-39.3	54.1	505.6	5000.0	-19.9
	V	52.9		3.7	34.4	-39.3	51.7	386.6	5000.0	-22.2
7434.00	H	49.0		4.7	35.7	-39.4	50.0	318.0	5000.0	-23.9
	V	49.2		4.7	35.7	-39.4	50.2	325.4	5000.0	-23.7
12390.00	H	48.7		6.1	38.9	-39.0	54.7	541.1	5000.0	-19.3
	V	48.9		6.1	38.9	-39.0	54.9	553.0	5000.0	-19.1

Test Details	
Manufacturer	Generac Power Systems, Inc.
Model No.	RADIO-G3-12V
Serial No.	C1
Test	Host Product Testing – Case Spurious Emissions
Mode	BLE Ch38 @ 2478MHz
Frequency Tested	2478MHz
Notes	Average Measurement in the Restricted Bands

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Duty Cycle Factor (dB)	Average Total at 3m (dBμV/m)	Average Total at 3m (μV/m)	Average Limit at 3m (μV/m)	Margin (dB)
4956.00	H	50.78		3.7	34.4	-39.3	0.0	49.6	301.8	500.0	-4.4
	V	45.58		3.7	34.4	-39.3	0.0	44.4	165.9	500.0	-9.6
7434.00	H	34.86		4.7	35.7	-39.4	0.0	35.9	62.3	500.0	-18.1
	V	35.33		4.7	35.7	-39.4	0.0	36.4	65.8	500.0	-17.6
12390.00	H	34.45		6.1	38.9	-39.0	0.0	40.4	104.8	500.0	-13.6
	V	33.77		6.1	38.9	-39.0	0.0	39.7	96.9	500.0	-14.3

Test Details	
Manufacturer	Generac Power Systems, Inc.
Model No.	RADIO-G3-12V
Serial No.	C1
Test	Host Product Testing – Case Spurious Emissions
Mode	BLE Ch38 @ 2478MHz
Frequency Tested	2478MHz
Notes	Peak Measurement in the Non-Restricted Bands

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBμV/m)	Peak Total at 3m (μV/m)	Peak Limit at 3m (μV/m)	Margin (dB)
2478.00	H	68.39		2.7	32.9	0.0	104.0	157969.3	NA	NA
	V	68.06		2.7	32.9	0.0	103.6	152080.2	NA	NA
9912.00	H	40.89		5.3	37.1	-39.2	44.0	158.4	15796.9	-40.0
	V	39.13		5.3	37.1	-39.2	42.2	129.3	15796.9	-41.7
14868.00	H	38.96	Ambient	6.8	40.1	-38.2	47.7	242.5	15796.9	-36.3
	V	38.86	Ambient	6.8	40.1	-38.2	47.6	239.8	15796.9	-36.4
17346.00	H	39.32	Ambient	7.4	41.7	-37.7	50.6	339.6	15796.9	-33.4
	V	38.95	Ambient	7.4	41.7	-37.7	50.2	325.4	15796.9	-33.7

21. Conducted Spurious Emissions

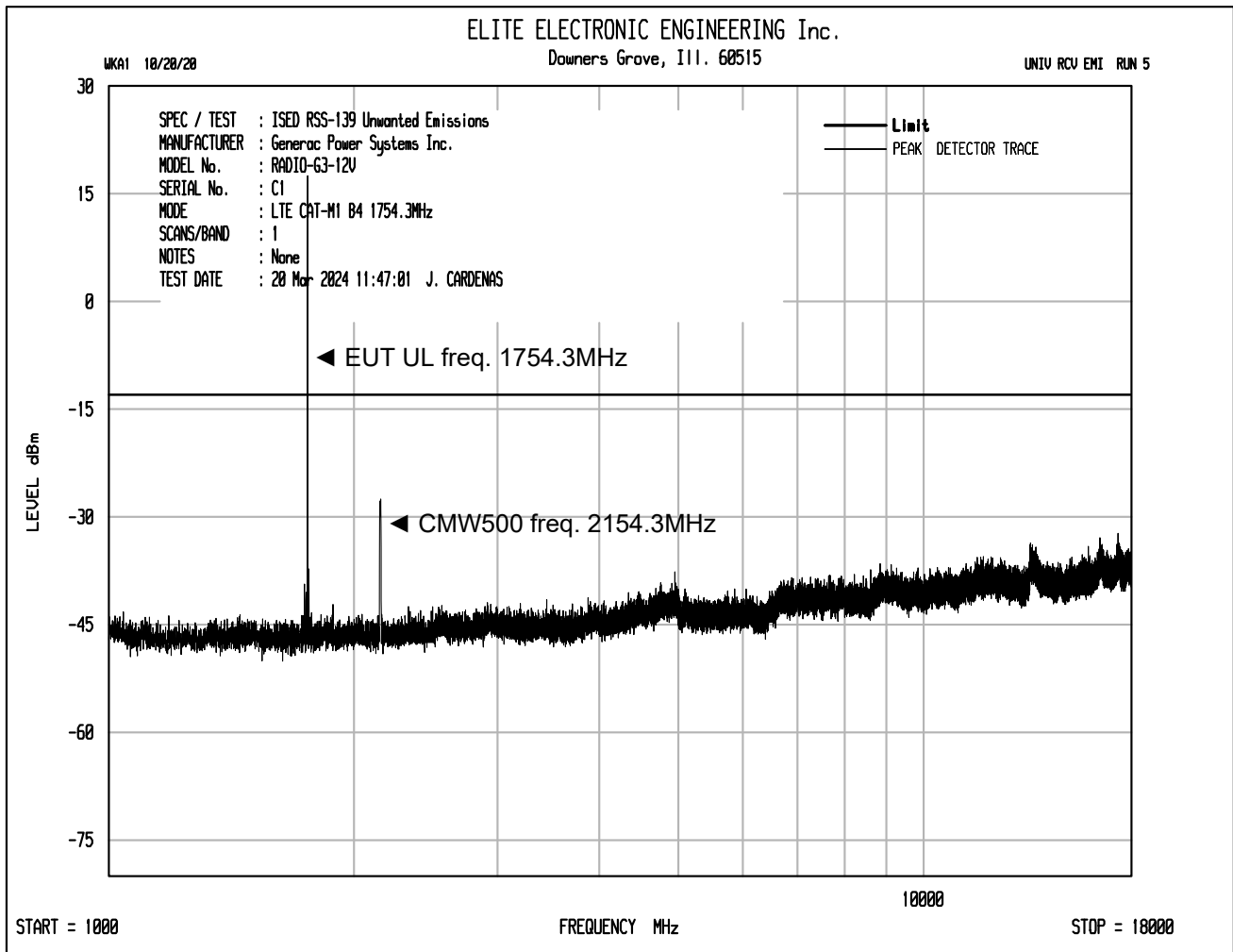
EUT Information	
Manufacturer	Generac Power Systems, Inc.
Product	Generac Generator Connectivity Accessory, Cellular
Model No.	RADIO-G3-12V
Serial No.	C1
Mode	CAT-M1 Band 4, Transmit at 1754.3MHz, 1.4MHz Bandwidth, QPSK modulation CAT-M1 Band 66, Transmit at 1720MHz, 20MHz Bandwidth, QPSK modulation

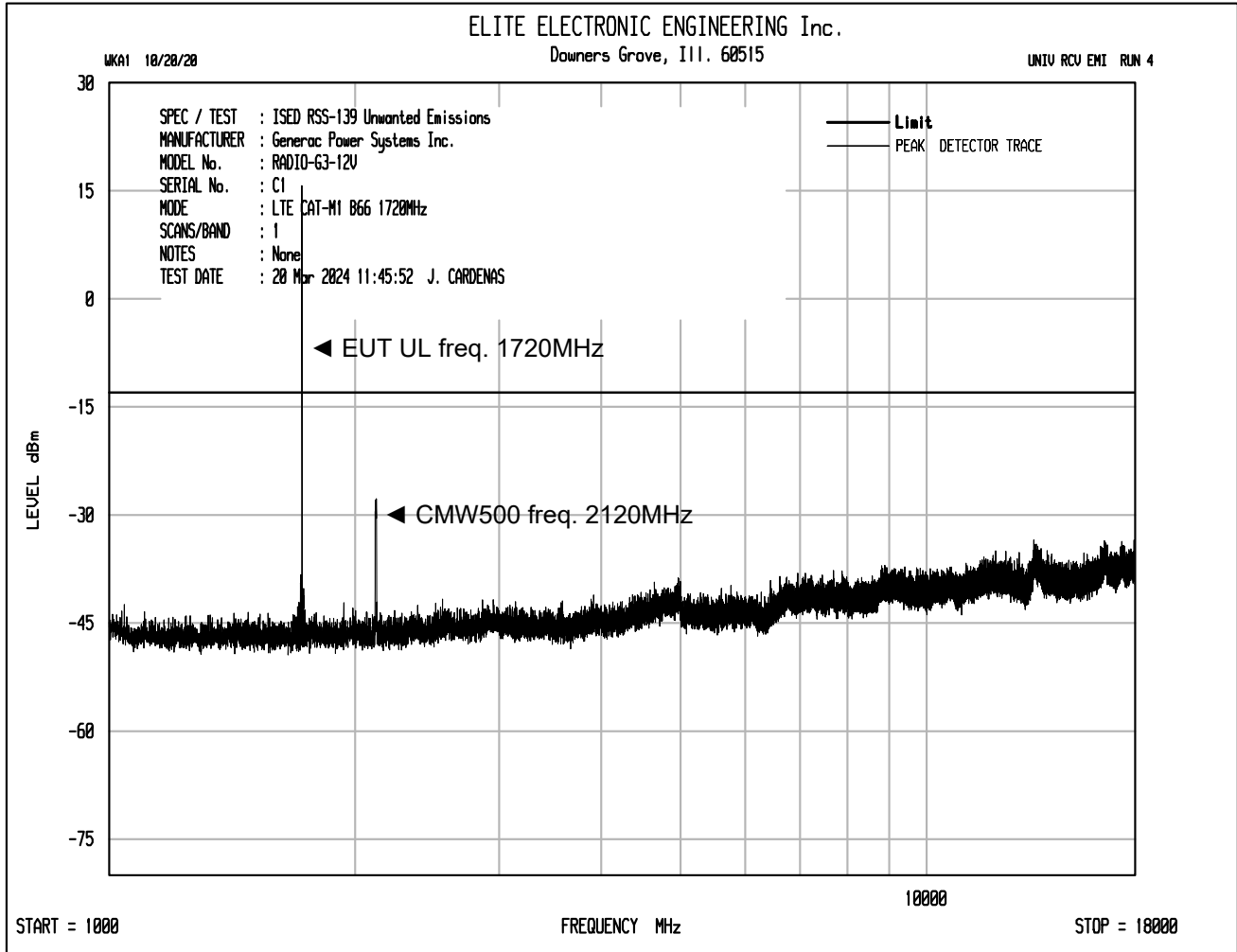
Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Measurement Method	Antenna Conducted
Type of Test Site	Elite Test Bench
Notes	N/A

Measurement Uncertainty	
Measurement Type	Expanded Measurement Uncertainty
Tx Conducted Spurious Emissions	4.011

Procedure
The antenna port of the EUT was connected to the spectrum analyzer through a power splitter. The other port of the power splitter was connected to a R&S CMW500 base station simulator. A communications link was established between the EUT and the base station simulator at specific channels and LTE CAT-1 bands. The resolution bandwidth (RBW) was set to 1MHz. The maximum power output was measured.

Requirements
<u>RSS-139</u> For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors) of the unwanted emissions outside the frequency block or frequency block group shall not exceed -13dBm/MHz





22. Scope of Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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Website: www.elitetest.com

ELECTRICAL

Valid To: June 30, 2025

Certificate Number: 1786.01

In recognition of the successful completion of the A2LA Accreditation Program evaluation process, accreditation is granted to this laboratory to perform the following automotive electromagnetic compatibility and other electrical tests:

Test Technology:**Test Method(s)¹:**

Transient Immunity
(Max Voltage 60V/Max current 100A)

ISO 7637-2 (including emissions); ISO 7637-3;
ISO 16750-2:2012, Sections 4.6.3 and 4.6.4;
CS-11979, Section 6.4; CS.00054, Section 5.9;
EMC-CS-2009.1 (CI220); FMC1278 (CI220, CI221, CI222);
GMW 3097, Section 3.5; SAE J1113-11; SAE J1113-12;
ECE Regulation 10.06 Annex 10

Electrostatic Discharge (ESD)
(Up to +/-25kV)

ISO 10605 (2001, 2008);
CS-11979 Section 7.0; CS.00054, Section 5.10;
EMC-CS-2009.1 (CI 280); FMC1278 (CI280); SAE J1113-13;
GMW 3097 Section 3.6

Conducted Emissions

CISPR 25 (2002, 2008), Sections 6.2 and 6.3;
CISPR 25 (2016), Sections 6.3 and 6.4;
CS-11979, Section 5.1; CS.00054, Sections 5.6.1 and 5.6.2;
GMW 3097, Section 3.3.2;
EMC-CS-2009.1 (CE 420); FMC1278 (CE420, CE421,
CE 430, CE440)

(A2LA Cert. No. 1786.01) 08/15/2023



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5202 Presidents Court, Suite 220 | Frederick, MD 21703-8515 | Phone: 301 644 3248 | Fax: 240 454 9449 | www.A2LA.org

Test Technology:
Test Method(s)¹:

Radiated Emissions Anechoic
(Up to 6GHz)

CISPR 25 (2002, 2008), Section 6.4;
CISPR 25 (2016), Section 6.5;
CS-11979, Section 5.3; CS.00054, Section 5.6.3;
GMW 3097, Section 3.3.1;
EMC-CS-2009.1 (RE 310); FMC1278 (RE310, RE320);

Vehicle Radiated Emissions

CISPR 12; CISPR 36; ICES-002;
ECE Regulation 10.06 Annex 5

Bulk Current Injection (BCI)
(1 to 400MHz 500mA)

ISO 11452-4; CS-11979, Section 6.1; CS.00054, Section 5.8.1;
GMW 3097, Section 3.4.1; SAE J1113-4;
EMC-CS-2009.1 (RI112); FMC1278 (RI112);
ECE Regulation 10.06 Annex 9

Radiated Immunity Anechoic
(Up to 6GHz and 200V/m)
(Including Radar Pulse 600V/m)

ISO 11452-2;
CS-11979, Section 6.2; CS.00054, Section 5.8.2;
GMW 3097, Section 3.4.2;
EMC-CS-2009.1 (RI114); FMC1278 (RI114); SAE J1113-21;
ECE Regulation 10.06 Annex 9

Radiated Immunity Magnetic Field

ISO 11452-8; FMC 1278 (RI140)

Radiated Immunity Reverb
(360MHz to 6GHz and 100V/m)

ISO/IEC 61000-4-21; GMW 3097, Section 3.4.3;
EMC-CS-2009.1 (RI114); FMC1278 (RI114);
ISO 11452-11

Radiated Immunity
(Portable Transmitters)
(Up to 6GHz and 20W)

ISO 11452-9;
EMC-CS-2009.1 (RI115); FMC1278 (RI115);
GMW 3097, Sec 3.4.4

Vehicle Radiated Immunity (ALSE)

ISO 11451-2; ECE Regulation 10.06 Annex 6

Vehicle Product Specific EMC Standards

EN 14982; EN ISO 13309; ISO 13766; EN 50498;
EC Regulation No. 2015/208; EN 55012

Electrical Loads

ISO 16750-2

Stripline

ISO 11452-5

Transverse Electromagnetic (TEM) Cell

ISO 11452-3

Test Technology:
Test Method(s)¹:
Emissions

Radiated and Conducted
(3m Semi-anechoic chamber,
up to 40 GHz)

47 CFR, FCC Part 15 B (using ANSI C63.4:2014);
47 CFR, FCC Part 18 (using FCC MP-5:1986);
ICES-001; ICES-003; ICES-005;
IEC/CISPR 11, Ed. 4.1 (2004-06); AS/NZS CISPR 11 (2004);
IEC/CISPR 11 Ed 5 (2009-05) + A1 (2010);
KN 11 (2008-5) with RRL Notice No. 2008-3 (May 20, 2008);
CISPR 11; EN 55011; KS C 9811; CNS 13803 (1997, 2003);
CISPR 14-1; EN 55014-1; AS/NZS CISPR 14.1;
CISPR 16-2-1 (2008); CISPR 16-2-1; KS C 9814-1; KN 14-1;
IEC/CISPR 22 (1997);
EN 55022 (1998) + A1(2000);
EN 55022 (1998) + A1(2000) + A2(2003); EN 55022 (2006);
IEC/CISPR 22 (2008-09); AS/NZS CISPR 22 (2004);
AS/NZS CISPR 22, 3rd Edition (2006); KN 22 (up to 6 GHz);
CNS 13438 (up to 6 GHz); VCCI V-3 (up to 6 GHz);
CISPR 32; EN 55032; KS C 9832; KN 32;
ECE Regulation 10.06 Annex 7 (Broadband);
ECE Regulation 10.06 Annex 8 (Narrowband);
ECE Regulation 10.06 Annex 14 (Conducted)

Cellular Radiated Spurious Emissions

ETSI TS 151 010-1 GSM; 3GPP TS 51.010-1, Sec 12;
ETSI TS 134 124 UMTS; 3GPP TS 34.124;
ETSI TS 136 124 LTE; E-UTRA; 3GPP TS 36.124

Current Harmonics

IEC 61000-3-2; IEC 61000-3-12;
EN 61000-3-2; KN 61000-3-2;
KS C 9610-3-2; ECE Regulation 10.06 Annex 11

Flicker and Fluctuations

IEC 61000-3-3; IEC 61000-3-11;
EN 61000-3-3; KN 61000-3-3;
KS C 9610-3-3; ECE Regulation 10.06 Annex 12

Immunity

Electrostatic Discharge

IEC 61000-4-2, Ed. 1.2 (2001);
IEC 61000-4-2 (1995) + A1(1998) + A2(2000);
EN 61000-4-2 (1995); EN 61000-4-2 (2009-05);
KN 61000-4-2 (2008-5);
RRL Notice No. 2008-4 (May 20, 2008);
IEC 61000-4-2; EN 61000-4-2; KN 61000-4-2;
KS C 9610-4-2; IEEE C37.90.3 2001

Radiated Immunity

IEC 61000-4-3 (1995) + A1(1998) + A2(2000);
IEC 61000-4-3, Ed. 3.0 (2006-02);
IEC 61000-4-3, Ed. 3.2 (2010);
KN 61000-4-3 (2008-5);
RRL Notice No. 2008-4 (May 20, 2008);
IEC 61000-4-3; EN 61000-4-3; KN 61000-4-3;
KS C 9610-4-3; IEEE C37.90.2 2004

Test Technology:
Test Method(s)¹:
Immunity (cont'd)

Electrical Fast Transient/Burst

IEC 61000-4-4, Ed. 2.0 (2004-07);
IEC 61000-4-4, Ed. 2.1 (2011);
IEC 61000-4-4 (1995) + A1(2000) + A2(2001);
KN 61000-4-4 (2008-5);
RRL Notice No. 2008-5 (May 20, 2008);
IEC 61000-4-4; EN 61000-4-4; KN 61000-4-4;
KS C 9610-4-4; ECE Regulation 10.06 Annex 15

Surge

IEC 61000-4-5 (1995) + A1(2000);
IEC 61000-4-5, Ed 1.1 (2005-11);
EN 61000-4-5 (1995) + A1(2001);
KN 61000-4-5 (2008-5);
RRL Notice No. 2008-4 (May 20, 2008);
IEC 61000-4-5; EN 61000-4-5; KN 61000-4-5;
KS C 9610-4-5;
IEEE C37.90.1 2012; IEEE STD C62.41.2 2002;
ECE Regulation 10.06 Annex 16

Conducted Immunity

IEC 61000-4-6 (1996) + A1(2000);
IEC 61000-4-6, Ed 2.0 (2006-05);
IEC 61000-4-6 Ed. 3.0 (2008);
KN 61000-4-6 (2008-5);
RRL Notice No. 2008-4 (May 20, 2008);
EN 61000-4-6 (1996) + A1(2001); IEC 61000-4-6;
EN 61000-4-6; KN 61000-4-6; KS C 9610-4-6

Power Frequency Magnetic Field
Immunity (*Down to 3 A/m*)

IEC 61000-4-8 (1993) + A1(2000); IEC 61000-4-8 (2009);
EN 61000-4-8 (1994) + A1(2000);
KN 61000-4-8 (2008-5);
RRL Notice No. 2008-4 (May 20, 2008);
IEC 61000-4-8; EN 61000-4-8; KN 61000-4-8; KS C 9610-4-8

Voltage Dips, Short Interrupts, and Line
Voltage Variations

IEC 61000-4-11, Ed. 2 (2004-03);
KN 61000-4-11 (2008-5);
RRL Notice No. 2008-4 (May 20, 2008);
IEC 61000-4-11; EN 61000-4-11; KN 61000-4-11;
KS C 9610-4-11

Ring Wave

IEC 61000-4-12, Ed. 2 (2006-09);
EN 61000-4-12:2006;
IEC 61000-4-12; EN 61000-4-12; KN 61000-4-12;
IEEE STD C62.41.2 2002

Test Technology:

Generic and Product Specific EMC Standards

Test Method(s)¹:

IEC/EN 61000-6-1; AS/NZS 61000-6-1; KN 61000-6-1;
KS C 9610-6-1; IEC/EN 61000-6-2; AS/NZS 61000-6-2;
KN 61000-6-2; KS C 9610-6-2; IEC/EN 61000-6-3;
AS/NZS 61000-6-3; KN 61000-6-3; KS C 9610-6-3;
IEC/EN 61000-6-4; AS/NZS 61000-6-4; KN 61000-6-4;
KS C 9610-6-4; EN 50130-4; EN 61326-1; EN 50121-3-2;
EN 12895; EN 50270; EN 50491-1; EN 50491-2; EN 50491-3;
EN 55015; EN 60730-1; EN 60945; IEC 60533;
EN 61326-2-6; EN 61800-3; IEC/CISPR 14-2; EN 55014-2;
AS/NZS CISPR 14-2; KN 14-2; KS C 9814-2;
IEC/CISPR 24; AS/NZS CISPR 24; EN 55024; KN 24;
IEC/CISPR 35; AS/NZS CISPR 35; EN 55035; KN 35;
KS C 9835; IEC 60601-1-2; JIS T0601-1-2

TxRx EMC Requirements

EN 301 489-1; EN 301 489-3; EN 301 489-9;
EN 301 489-17; EN 301 489-19; EN 301 489-20

European Radio Test Standards

ETSI EN 300 086-1; ETSI EN 300 086-2;
ETSI EN 300 113-1; ETSI EN 300 113-2;
ETSI EN 300 220-1; ETSI EN 300 220-2;
ETSI EN 300 220-3-1; ETSI EN 300 220-3-2;
ETSI EN 300 330-1; ETSI EN 300 330-2;
ETSI EN 300 440-1; ETSI EN 300 440-2;
ETSI EN 300 422-1; ETSI EN 300 422-2;
ETSI EN 300 328; ETSI EN 301 893;
ETSI EN 301 511; ETSI EN 301 908-1;
ETSI EN 908-2; ETSI EN 908-13;
ETSI EN 303 413; ETSI EN 302 502;
EN 303 340; EN 303 345-2; EN 303 345-3; EN 303 345-4

Canadian Radio Tests

RSS-102 measurement (RF Exposure Evaluation);
RSS-102 measurement (Nerve Stimulation);
SPR-002; RSS-111; RSS-112; RSS-117; RSS-119; RSS-123;
RSS-125; RSS-127; RSS-130; RSS-131; RSS-132; RSS-133;
RSS-134; RSS-135; RSS-137; RSS-139; RSS-140; RSS-141;
RSS-142; RSS-170; RSS-181; RSS-182; RSS-191; RSS-192;
RSS-194; RSS-195; RSS-196; RSS-197; RSS-199; RSS-210;
RSS-211; RSS-213; RSS-215; RSS-216; RSS-220; RSS-222;
RSS-236; RSS-238; RSS-243; RSS-244; RSS-247; RSS-248;
RSS-251; RSS-252; RSS-287; RSS-288; RSS-310; RSS-GEN

Mexico Radio Tests

IFT-008-2015; NOM-208-SCFI-2016

Japan Radio Tests

Radio Law No. 131, Ordinance of MPT No. 37, 1981,
MIC Notification No. 88:2004, Table No. 22-11;
ARIB STD-T66, Regulation 18

Taiwan Radio Tests

LP-0002 (July 15, 2020)

Test Technology:
Test Method(s)¹:

Australia/New Zealand Radio Tests

AS/NZS 4268; Radiocommunications (Short Range Devices) Standard (2014)

Hong Kong Radio Tests

HKCA 1039 Issue 6;
HKCA 1042;
HKCA 1033 Issue 7;
HKCA 1061;
HKCA 1008;
HKCA 1043;
HKCA 1057;
HKCA 1073

Korean Radio Test Standards

KN 301 489-1; KN 301 489-3; KN 301 489-9;
KN 301 489-17; KN 301 489-52; KS X 3124; KS X 3125;
KS X 3130; KS X 3126; KS X 3129

Vietnam Radio Test Standards

QCVN 47:2015/BTTTT; QCVN 54:2020/BTTTT;
QCVN 55:2011/BTTTT; QCVN 65:2013/BTTTT;
QCVN 73:2013/BTTTT; QCVN 74:2020/BTTTT;
QCVN 112:2017/BTTTT; QCVN 117:2020/BTTTT

Vietnam EMC Test Standards

QCVN 18:2014/BTTTT; QCVN 86:2019/BTTTT;
QCVN 96:2015/BTTTT; QCVN 118:2018/BTTTT

*Unlicensed Radio Frequency Devices
(3 Meter Semi-Anechoic Room)*

47 CFR FCC Part 15C, 15D, 15E, 15F, 15G, 15H
(using ANSI C63.10:2013, ANSI C63.17:2013 and
FCC KDB 905462 D02 (v02))

Licensed Radio Service Equipment

47 CFR FCC Parts 20, 22, 24, 25, 27, 30, 73, 74, 80, 87,
90, 95, 96, 97, 101 (using ANSI/TIA-603-E,
TIA-102.CAAA-E, ANSI C63.26:2015)

OIA (Over the Air) Performance

GSM, GPRS, EGPRS
UMTS (W-CDMA)
LTE including CAT M1
A-GPS for UMTS/GSM
LTS A-GPS, A-GLONASS,
SIB8/SIB16
Large Device/Laptop/Tablet Testing
Integrated Device Testing
WiFi 802.11 a/b/g/n/a

CTIA Test Plan for Wireless Device Over-the-Air
Performance (Method for Measurement for Radiated Power
and Receiver Performance) V3.8.2;
CTIA Test Plan for RF Performance Evaluation of WiFi
Mobile Converged Devices V2.1.0

Test Technology:
Test Method(s)¹:
Electrical Measurements and Simulation
AC Voltage / Current

(1mV to 5kV) 60 Hz
(0.1V to 250V) up to 500 MHz
(1μA to 150A) 60 Hz

FAA AC 150/5345-10H;
FAA AC 150/5345-43J;
FAA AC 150/5345-44K;
FAA AC 150/5345-46E;
FAA AC 150/5345-47C;
FAA EB 67D

DC Voltage / Current

(1mV to 15 kV) / (1μA to 10A)

Power Factor / Efficiency / Crest Factor

(Power to 30kW)

Resistance

(1mΩ to 4000MΩ)

Surge

(Up to 10 kV / 5 kA) (Combination
Wave and Ring Wave)

On the following products and materials:

Telecommunications Terminal Equipment (TTE), Radio Equipment, Network Equipment, Information Technology Equipment (ITE), Automotive Electronic Equipment, Automotive Hybrid Electronic Devices, Maritime Navigation and Radio Communication Equipment and Systems, Vehicles, Boats and Internal Combustion Engine Driven Devices, Automotive, Aviation, and General Lighting Products, Medical Electrical Equipment, Motors, Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment, Household Appliances, Electric Tools, Low-voltage Switchgear and Control gear, Programmable Controllers, Electrical Equipment for Measurement, Control and Laboratory Use, Base Materials, Power and Data Transmission Cables and Connectors

¹ When the date, edition, version, etc. is not identified in the scope of accreditation, laboratories may use the version that immediately precedes the current version for a period of one year from the date of publication of the standard measurement method, per part C., Section 1 of A2LA R101 - General Requirements - Accreditation of ISO-IEC 17025 Laboratories.

Testing Activities Performed in Support of FCC Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.1²

Rule Subpart/Technology	Test Method	Maximum Frequency (MHz)
<u>Unintentional Radiators</u>		
Part 15B	ANSI C63.4:2014	40000
<u>Industrial, Scientific, and Medical Equipment</u>		
Part 18	FCC MP-5 (February 1986)	40000
<u>Intentional Radiators</u>		
Part 15C	ANSI C63.10:2013	40000

Testing Activities Performed in Support of FCC Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.1²

Rule Subpart/Technology	Test Method	Maximum Frequency (MHz)
<u>Unlicensed Personal Communication Systems Devices</u>		
Part 15D	ANSI C63.17:2013	40000
<u>U-NII without DFS Intentional Radiators</u>		
Part 15E	ANSI C63.10:2013	40000
<u>U-NII with DFS Intentional Radiators</u>		
Part 15E	FCC KDB 905462 D02 (v02)	40000
<u>UWB Intentional Radiators</u>		
Part 15F	ANSI C63.10:2013	40000
<u>BPL Intentional Radiators</u>		
Part 15G	ANSI C63.10:2013	40000
<u>White Space Device Intentional Radiators</u>		
Part 15H	ANSI C63.10:2013	40000
<u>Commercial Mobile Services (FCC Licensed Radio Service Equipment)</u>		
Parts 22 (cellular), 24, 25 (below 3 GHz), and 27	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
<u>General Mobile Radio Services (FCC Licensed Radio Service Equipment)</u>		
Parts 22 (non-cellular), 90 (below 3 GHz), 95, 97, and 101 (below 3 GHz)	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
<u>Citizens Broadband Radio Services (FCC Licensed Radio Service Equipment)</u>		
Part 96	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
<u>Maritime and Aviation Radio Services</u>		
Parts 80 and 87	ANSI/TIA-603-E; ANSI C63.26:2015	40000
<u>Microwave and Millimeter Bands Radio Services</u>		
Parts 25, 30, 74, 90 (above 3 GHz), 97 (above 3 GHz), and 101	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000

Testing Activities Performed in Support of FCC Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.1²

Rule Subpart/Technology	Test Method	Maximum Frequency (MHz)
<u>Broadcast Radio Services</u> Parts 73 and 74 (below 3 GHz)	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
<u>Signal Boosters</u> Part 20 (Wideband Consumer Signal Boosters, Provider-specific signal boosters, and Industrial Signal Boosters) Section 90.219	ANSI C63.26:2015	40000

² Accreditation does not imply acceptance to the FCC equipment authorization program. Please see the FCC website (<https://apps.fcc.gov/oetcf/eas/>) for a listing of FCC approved laboratories.



Accredited Laboratory

A2LA has accredited

ELITE ELECTRONIC ENGINEERING INC.

Downers Grove, IL

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 15th day of August 2023.



Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1786.01
Valid to June 30, 2025

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.