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RF Test Report

Test Report Number	NSC-20070241-LC-FCC-IC
FCC ID	EF400190
ISED ID	1078A-00190
Applicant	Nortek Security & Control LLC
Applicant Address	5919 Sea Otter Pl #100, Carlsbad, CA 92010
Product Name	Garage Door Opener Remote Command Transceiver with TILT Sensor
Model (s)	GD00BLE-1
Date of Receipt	08/25/2020
Date of Test	08/25/2020 – 08/26/2020
Report Issue Date	08/26/2020
Test Standards	47 CFR Part 15.247 RSS-247 Issue 2.0: Feb. 2017 RSS-Gen Issue 5: Apr. 2018
Test Result	**PASS**

Issued by:

Vista Compliance Laboratories
1261 Puerta Del Sol, San Clemente, CA 92673 USA
www.vista-compliance.com

Daniel Bruno (Test Technician)

David Zhang (Technical Manager)

REVISION HISTORY

Report Number	Version	Description	Issued Date
NSC-20070241-LC-FCC-IC-BLE	01	Initial report	08/26/2020

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1 Test Summary

Test Item	Test Requirement	Test Method	Result
Radiated Spurious Emissions Below 1GHz	47 CFR Part 15.247 RSS-247 Issue 2.0: Feb. 2017 RSS-Gen Issue 5: Apr. 2018	ANSI C63.10: 2013 RSS-Gen Issue 5, Apr 2018 558074 D01 15.247 Meas. Guidance v05r02	Pass
Radiated Spurious Emissions Above 1GHz	47 CFR Part 15.247 RSS-247 Issue 2.0: Feb. 2017 RSS-Gen Issue 5: Apr. 2018	ANSI C63.10: 2013 RSS-Gen Issue 5, Apr 2018 558074 D01 15.247 Meas. Guidance v05r02	Pass

2 General Information

2.1 Applicant

Applicant	Nortek Security & Control LLC/GTO Access
Applicant address	5919 Sea Otter Pl #100, Carlsbad, CA 92010
Manufacturer	Nortek Security & Control LLC/GTO Access
Manufacturer Address	5919 Sea Otter Pl #100, Carlsbad, CA 92010

2.2 Product information

Product Name	Garage Door Opener Remote Command Transceiver with TILT Sensor
Model Number	GD00BLE-1
Family Models	N/A
Serial Number	N/A
Frequency Band	2.4GHz BLE: 2402-2480MHz
Type of modulation	BLE: GFSK
Equipment Class	DTS
Antenna Information	BLE: Internal Antenna, 2.1 dBi Gain
Clock Frequencies	N/A
Input Power	120VAC/230VAC
Power Adapter Manufacturer/Model	HDP/HDP12-MD12010C
Power Adapter SN	N/A
Hardware version	N/A
Software version	N/A
Simultaneous Transmission	N/A
Additional Info	This product has received FCC grant and ISED certification under FCC ID: EF400190 and IC ID: 1078A-00190. There is minor hardware change as described in C2PC request letter, but the change does not affect RF performance. The purpose of this testing and report is to evaluate the spurious emission after the hardware change and to support C2PC filing.

2.3 Test standard and method

Test standard	47 CFR Part 15.247 RSS-247 Issue 2.0: Feb. 2017 RSS-Gen Issue 5: Apr. 2018
Test method	ANSI C63.10: 2013 RSS-Gen Issue 5, Apr 2018 558074 D01 15.247 Meas. Guidance v05r02

Lab performing tests	Vista Laboratories, Inc.
Lab Address	1261 Puerta Del Sol, San Clemente, CA 92673 USA
Phone Number	+1 (949) 393-1123
Website	www.vista-compliance.com

Test Condition	Temperature	Humidity	Atmospheric Pressure
EMC Testing	23.5°C	58.2%	996 mbar

3 Modification of EUT / Deviations from Standards

N/A

4 Test Configuration and Operation

4.1 EUT Test Configuration

The EUT is powered by a 12 VDC power adapter. The EUT was set to continuous transmission mode during TX testing and was set to continuous receiver mode during RX testing.

The following software was used for testing and to monitor EUT performance

Software	Description
EMISoft Vasona	EMC/RF Spurious emission test software used during testing

4.2 Supporting Equipment

Description	Manufacturer	Model #	Serial #
Laptop	Dell	Latitude E6440	FFF4JC2

5 Uncertainty of Measurement

Test item	Measurement Uncertainty (dB)
RF Conducted Measurement (30MHz – 18GHz)	±1.5 dB
Radiated Emission (30MHz-1GHz)	±4.6 dB
Radiated Emission (1-18GHz)	±4.9 dB
Radiated Emission (18-40GHz)	±3.5 dB

6 Test Results

6.1 Radiated Emissions

6.1.1 Requirement

§ 15.247 (d), RSS-247 §5.5

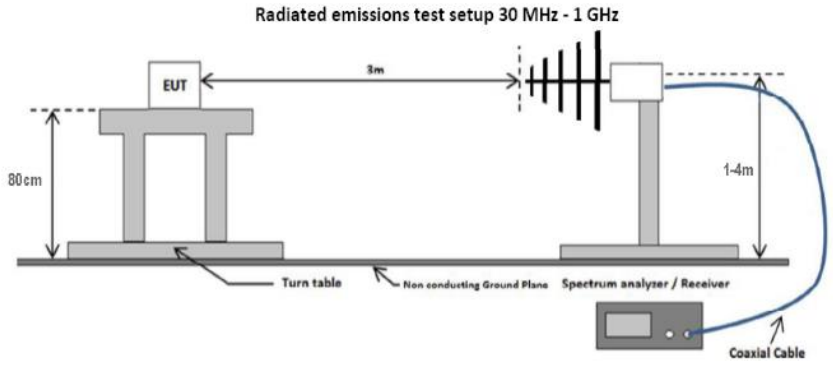
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Attenuation below the general limits specified in §15.209(a) and RSS-Gen is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

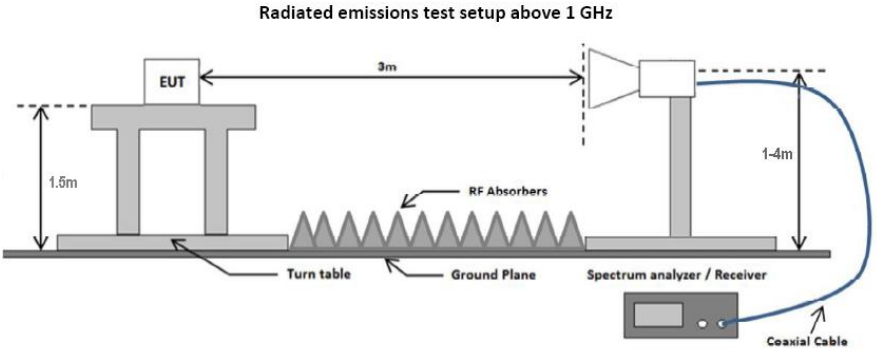
Frequency range (MHz)	Field Strength (μV/m)
0.009~0.490	2400/F (kHz)
0.490~1.705	24000/F (kHz)
1.705~30.0	30
30~88	100
88~216	150
216~960	200
Above 960	500

6.1.2 Test Setup

Typical test setup for 30MHz – 1GHz



Typical test setup for above 1GHz



6.1.3 Test Procedure

According to section 8.6 in KDB 558074 D01 DTS Meas Guidance v05r02 and subclause 11.12.2.7 Radiated spurious emission measurements in ANSI C62.10-2013 as well as the procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10 was followed. Boresight antenna mast was used during the scanning to point to EUT to maximize the emission. The process will be repeated in 3 EUT orientations.

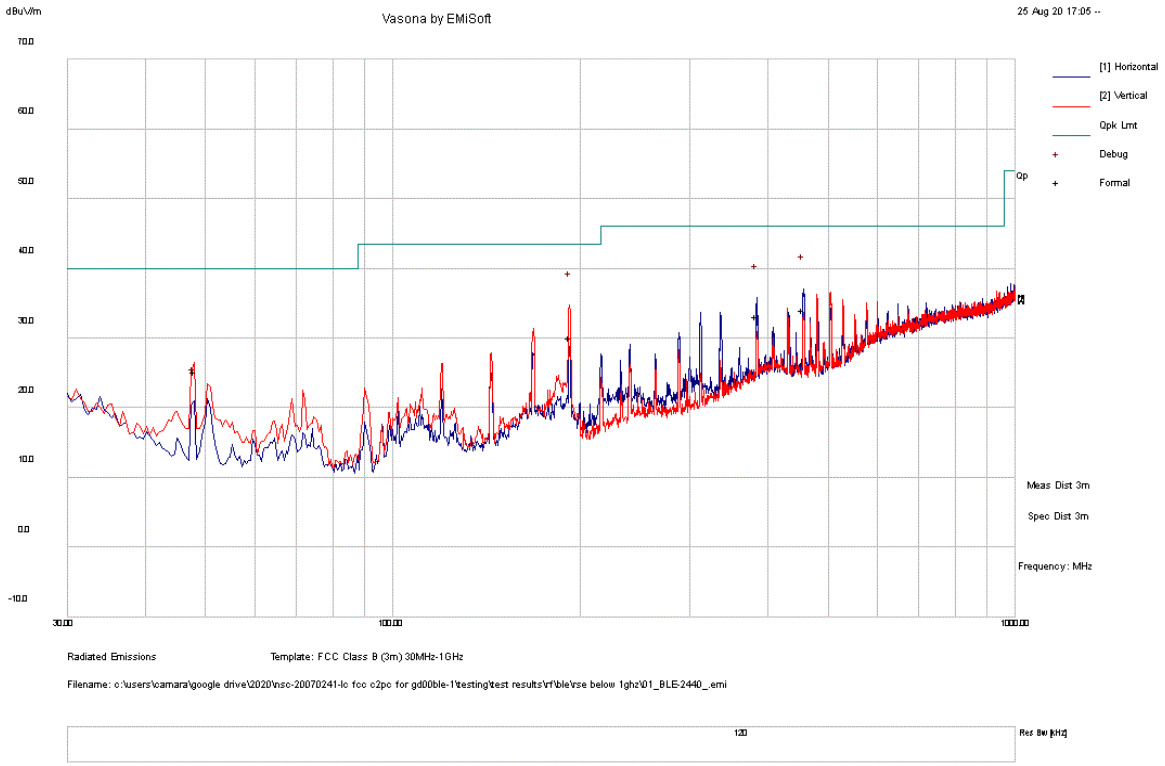
1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
    a. Vertical or horizontal polarization (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
    b. The EUT was then rotated to the direction that gave the maximum emission.
    c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 300 Hz for frequency below 150KHz.
4. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 10 kHz for frequency between 150KHz – 30MHz.
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-Peak detection at frequency between 30MHz - 1GHz.
6. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak and average measurement at frequency above 1GHz.
7. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.

6.1.4 Test Result

RADIATED SPURIOUS EMISSION BELOW 30MHZ

Test Standard:	15.209, 15.247, RSS-247	Mode:	Radiated Spurious Emission-Mid
Frequency Range:	30 MHz - 1 GHz	Test Date:	08/25/2020 - 08/26/2020
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Daniel Bruno
Remark:	N/A	Test Result:	Pass

BLE-2440MHz

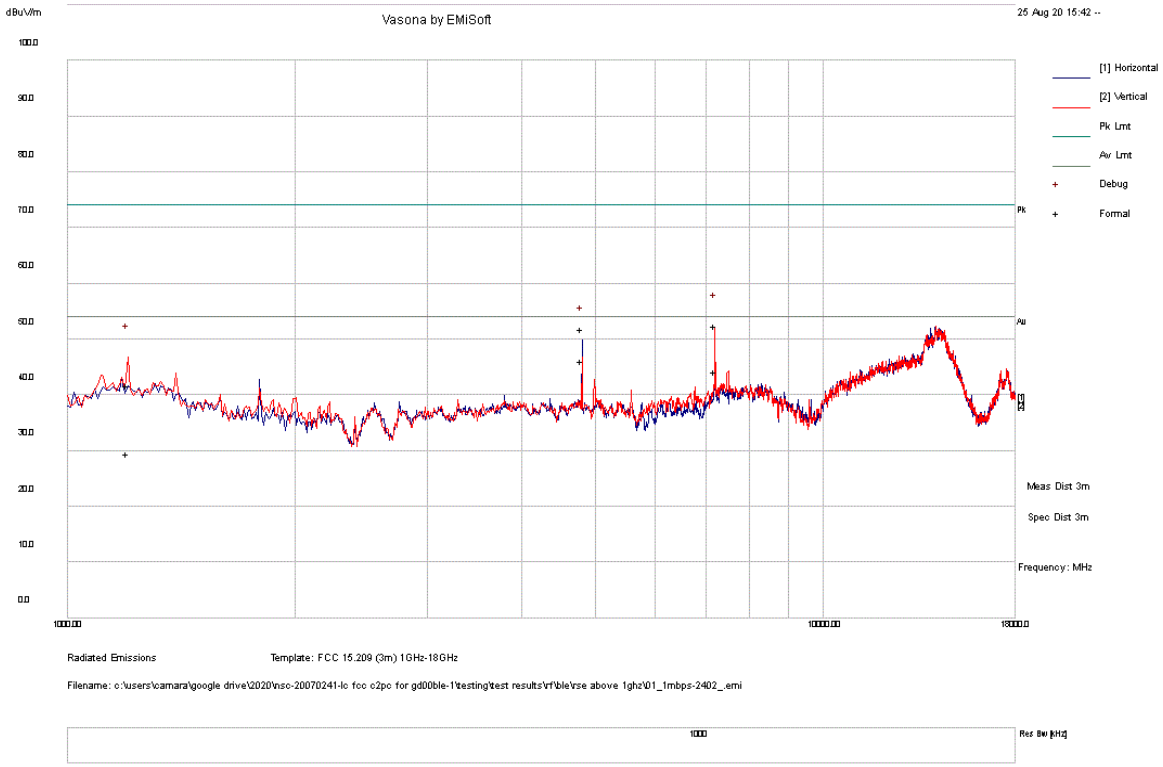


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
192.17	47.01	4.66	-21.61	30.06	Quasi Max	V	136	58	43.50	-13.44	Pass
455.92	41.72	6.20	-13.78	34.14	Quasi Max	H	101	204	46.00	-11.86	Pass
384.02	40.87	6.27	-13.90	33.24	Quasi Max	H	117	220	46.00	-12.76	Pass
48.02	46.86	2.75	-24.40	25.21	Quasi Max	V	100	302	40.00	-14.79	Pass

RADIATED SPURIOUS EMISSION ABOVE 1GHZ

Test Standard:	15.209, 15.247, RSS-247	Mode:	Radiated Spurious Emission-Low
Frequency Range:	1 GHz - 18 GHz	Test Date:	08/25/2020 - 08/26/2020
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Daniel Bruno
Remark:	N/A	Test Result:	Pass

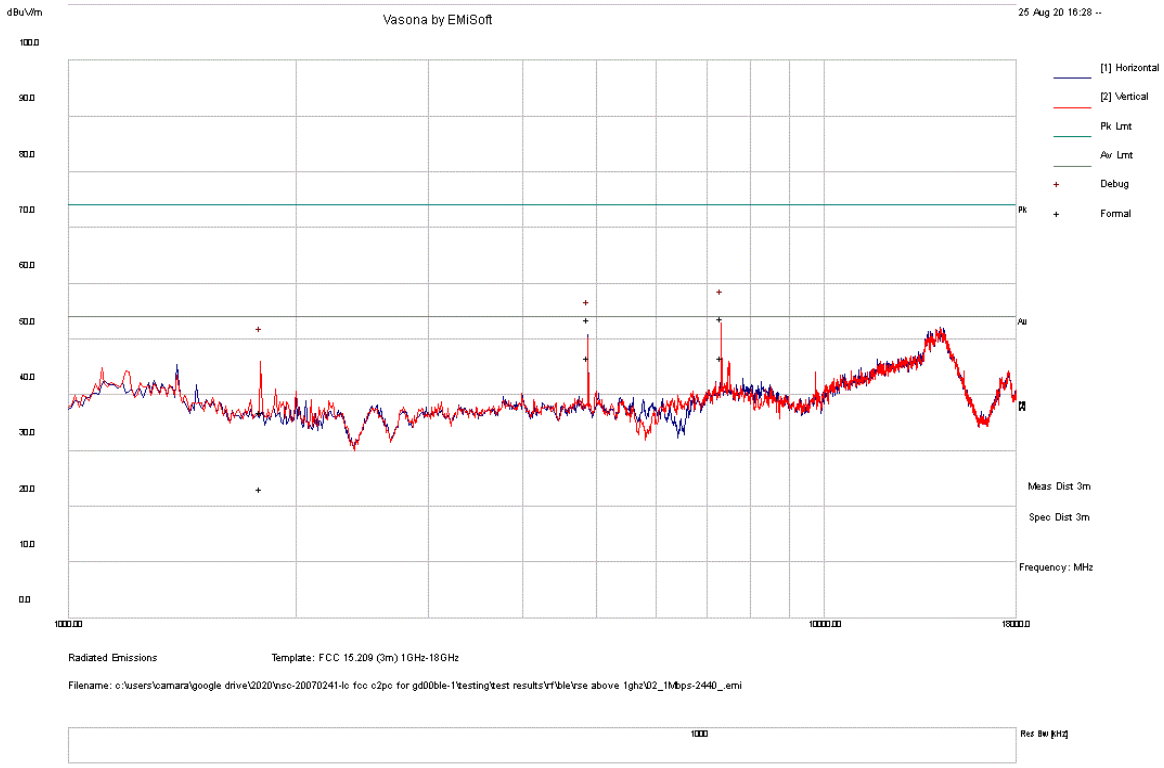
BLE-1Mbps-2402



Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
7206.92	30.81	20.46	1.20	52.47	Peak Max	V	156	182	74.00	-21.53	Pass
4803.76	36.84	17.35	-2.25	51.95	Peak Max	H	179	134	74.00	-22.05	Pass
1201.79	32.76	14.31	-5.25	41.82	Peak Max	V	368	292	74.00	-32.18	Pass
7206.92	22.54	20.46	1.20	44.21	Average Max	V	156	182	54.00	-9.80	Pass
4803.76	31.06	17.35	-2.25	46.16	Average Max	H	179	134	54.00	-7.84	Pass
1201.79	20.39	14.31	-5.25	29.45	Average Max	V	368	292	54.00	-24.55	Pass

Test Standard:	15.209, 15.247, RSS-247	Mode:	Radiated Spurious Emission-Mid
Frequency Range:	1 GHz - 18 GHz	Test Date:	08/25/2020 - 08/26/2020
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Daniel Bruno
Remark:	N/A	Test Result:	Pass

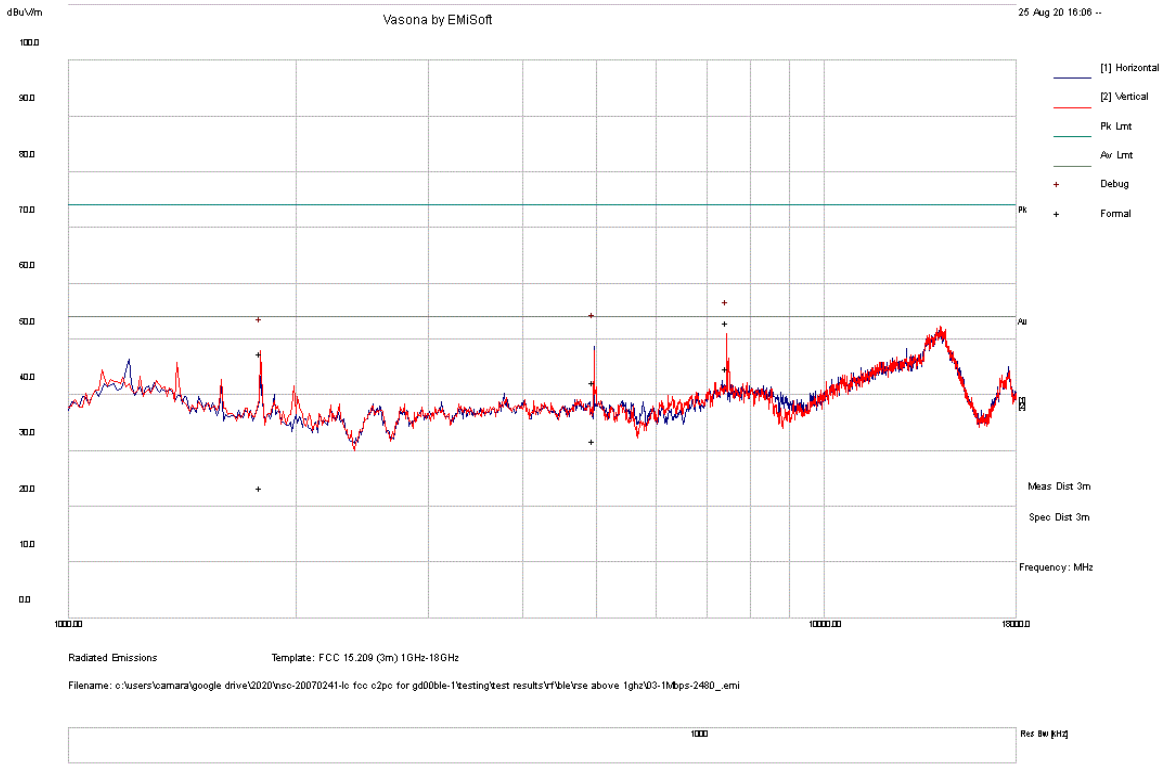
BLE-1Mbps-2440



Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
7320.74	32.01	20.68	1.19	53.87	Peak Max	V	100	173	74.00	-20.13	Pass
4879.63	38.33	17.37	-2.16	53.55	Peak Max	H	157	132	74.00	-20.46	Pass
1796.78	31.62	14.48	-9.07	37.04	Peak Max	V	338	95	74.00	-36.96	Pass
7320.74	24.91	20.68	1.19	46.78	Average Max	V	100	173	54.00	-7.23	Pass
4879.63	31.49	17.37	-2.16	46.70	Average Max	H	157	132	54.00	-7.30	Pass
1796.78	17.84	14.48	-9.07	23.25	Average Max	V	338	95	54.00	-30.75	Pass

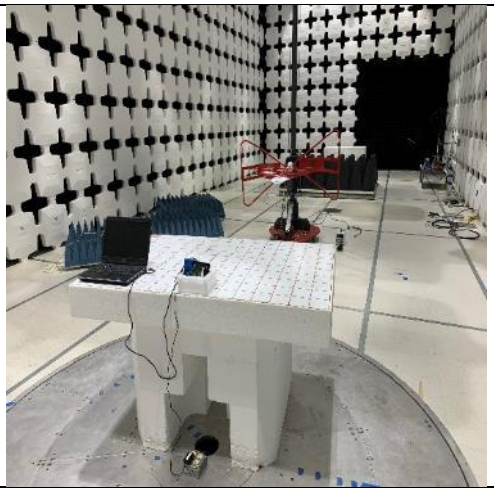
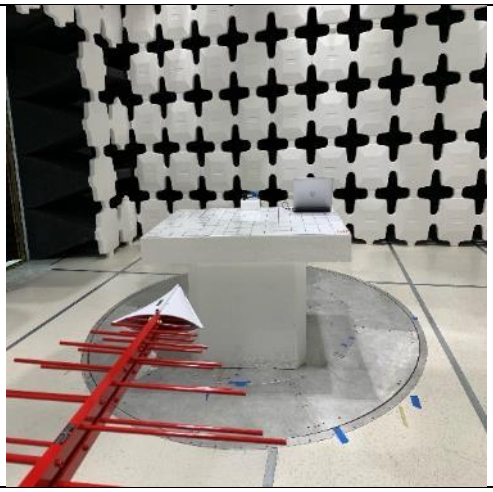
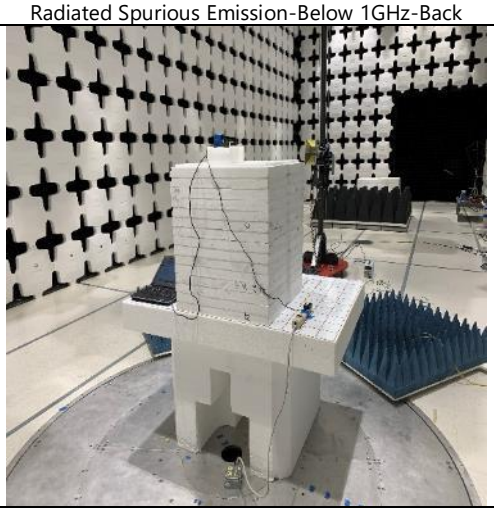
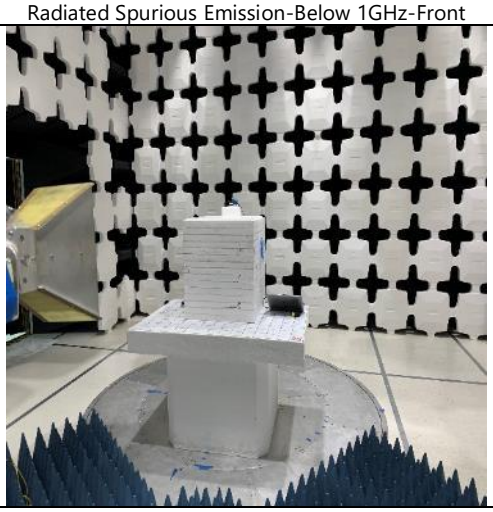
Test Standard:	15.209, 15.247, RSS-247	Mode:	Radiated Spurious Emission-High
Frequency Range:	1 GHz - 18 GHz	Test Date:	08/25/2020 - 08/26/2020
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Daniel Bruno
Remark:	N/A	Test Result:	Pass

BLE-1Mbps-2480



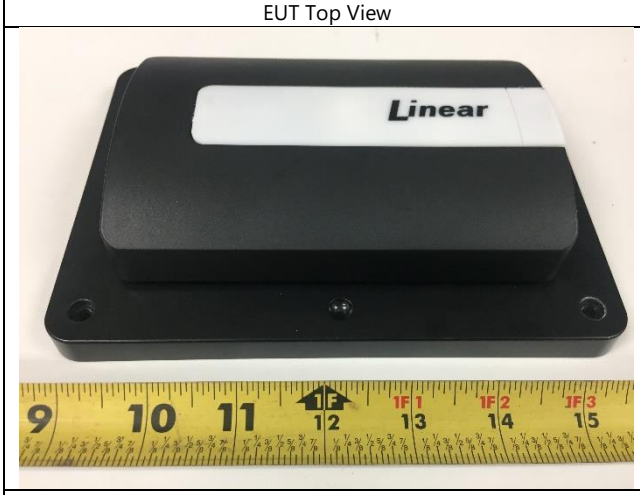
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
7439.35	31.04	20.90	0.98	52.93	Peak Max	V	110	185	74.00	-21.08	Pass
4961.17	27.21	17.39	-2.20	42.40	Peak Max	H	143	46	74.00	-31.60	Pass
1796.62	42.13	14.48	-9.07	47.54	Peak Max	V	226	0	74.00	-26.46	Pass
7439.35	22.94	20.90	0.98	44.82	Average Max	V	110	185	54.00	-9.18	Pass
4961.17	16.68	17.39	-2.20	31.87	Average Max	H	143	46	54.00	-22.13	Pass
1796.62	17.93	14.48	-9.07	23.34	Average Max	V	226	0	54.00	-30.66	Pass

7 EUT and Test Setup Photos

	
Radiated Spurious Emission-Below 1GHz-Back	Radiated Spurious Emission-Below 1GHz-Front
	
Radiated Spurious Emission-Above 1GHz-Back	Radiated Spurious Emission-Above 1GHz-Front

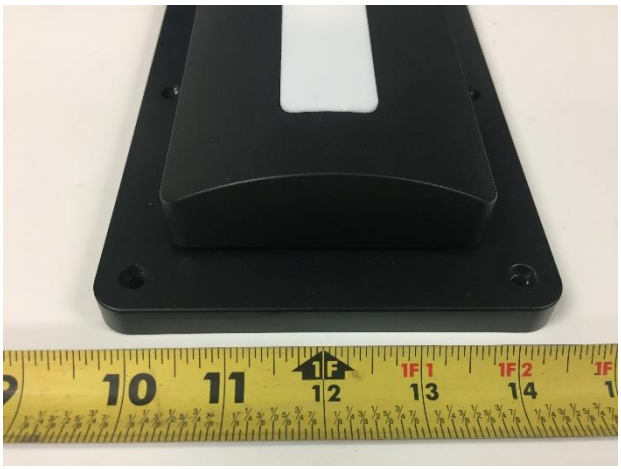
EUT Top View

EUT Bottom View

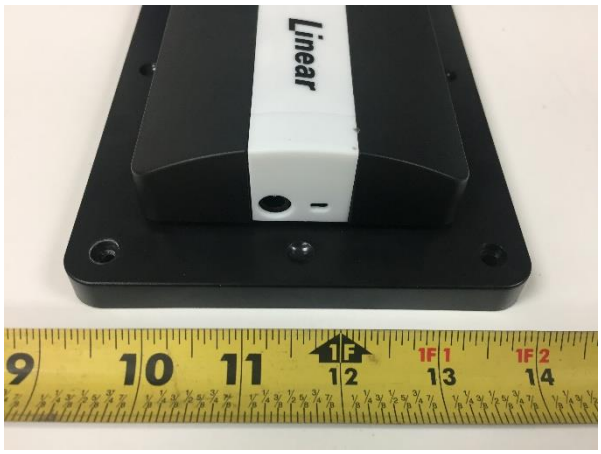


EUT Front View

EUT Rear View



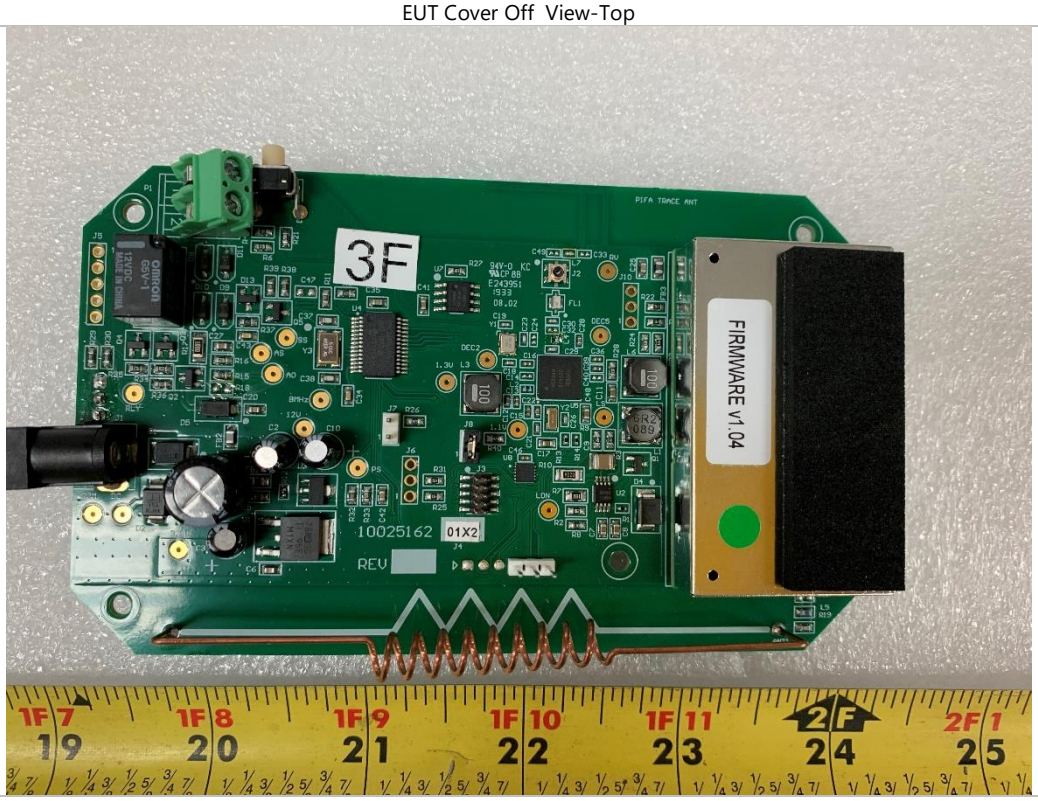
EUT Left Side View



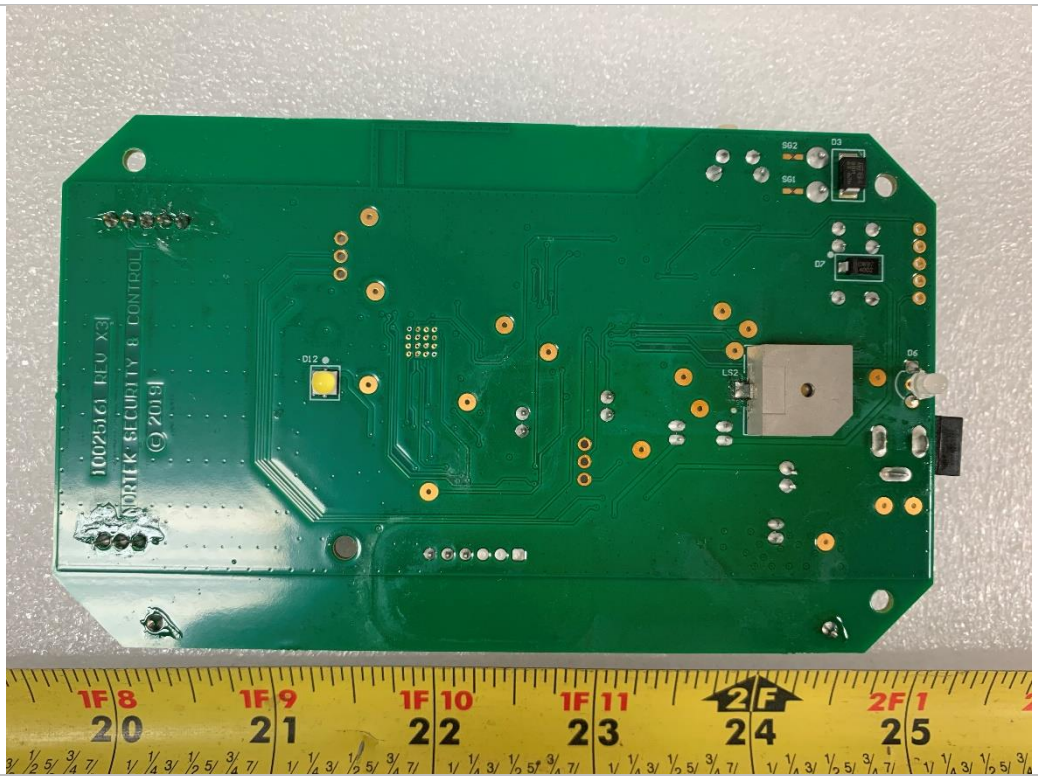
EUT Right Side View

	
Power Adapter Top View	Power Adapter Rear View

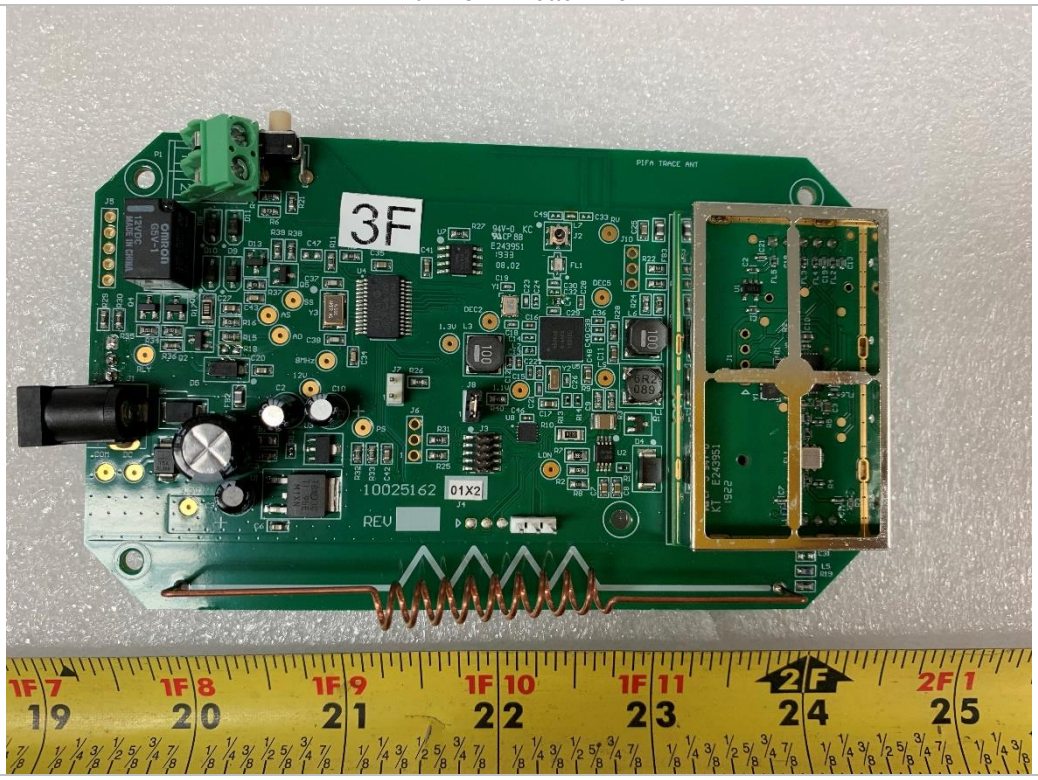
EUT Cover Off View-Top



Main PCBA – Top View



Main PCBA – Bottom View



Main PCBA without shielding

8 Test Instrument List

Equipment	Manufacturer	Model	Instrument Number	Cal. Date	Cal. Due
Semi-Anechoic Chamber	ETS-Lindgren	10M	VL001	10/18/19	10/18/20
Shielding Control Room	ETS-Lindgren	Series 81	VL006	N/A	N/A
Spectrum Analyzer	Keysight	N9020A	MY50110074	6/17/20	6/17/21
EMC Test Receiver	R&S	ESL6	100230	6/14/20	6/14/21
LISN (9KHz – 30MHz)	EMCO	3816/2	9705-1066	5/4/20	5/4/21
LISN (9KHz – 30MHz)	Com-Power	LI-550C	20140050	01/29/2020	01/29/2021
LISN (9KHz – 30MHz)	Com-Power	LI-550C	20140051	01/29/2020	01/29/2021
Bi-Log Antenna	ETS-Lindgren	3142E	217921	11/15/2019	11/15/2020
Horn Antenna (1-18GHz)	Electro-Metrics	EM-6961	6292	5/14/2020	5/14/2021
Horn Antenna (18-40GHz)	Com-Power	AH-840	101109	6/24/20	6/24/21
Preamplifier	RF Bay, Inc.	LPA-10-20	11180621	7/16/2020	7/16/2021
True RMS Multi-meter	UNI-T	UT181A	C173014829	5/5/2020	5/5/2021
Temp / Humidity / Pressure Meter	PCE Instruments	PCE-THB 40	R062028	5/15/2020	5/15/2021
RF Attenuator	Pasternack	PE7005-3	VL061	7/16/2020	7/16/2021
Preamplifier 100KHz - 40GHz	Aeroflex	33711-392-77150-11	064	7/16/2020	7/16/2021
EM Center Control	ETS-Lindgren	7006-001	160136	N/A	N/A
Turn Table	ETS-Lindgren	2181-3.03	VL002	N/A	N/A
Boresight Antenna Tower	ETS-Lindgren	2171B	VL003	N/A	N/A
Loop Antenna (9k-30MHz)	Com-Power	AL-130	121012	5/16/20	5/16/21
RE test cable(below 6GHz)	Vista	RE-6GHz-01	RE-6GHz-01	7/16/2020	7/16/2021
RE test cable (1-18GHz)	PhaseTrack	II-240	RE-18GHz-01	7/16/2020	7/16/2021
RE test cable (>18GHz)	Sucoflex	104	344903/4	7/16/2020	7/16/2021
Pulse limiter	Com-Power	LIT-930A	531727	7/16/2020	7/16/2021
CE test cable #1	FIRST RF	FRF-C-1002-001	CE-6GHz-01	7/16/2020	7/16/2021
CE test cable#2	FIRST RF	FRF-C-1002-001	CE-6GHz-02	7/16/2020	7/16/2021
Vector Signal Generator	Keysight	N5182A	US47080548	6/17/20	6/17/21
RF Power Amplifier (80-1000MHz)	Ophir	5226FE	1013/1815	N/A	N/A
RF Power Amplifier (700-6000MHz)	Ophir	5293FE	1063/1815	N/A	N/A
Horn Antenna (1-18GHz)	FT-RF	HA-07M18G-NF	180010HA	N/A	N/A