Engineering Test Report No. 2200527-07		
Report Date	May 13, 2022	
Manufacturer Name	Chamberlain Group, Inc.	
Manufacturer Address	300 Windsor Dr Oak Brook, IL 60523	
Product Name Brand/Model No.	GDO 003-0454-8 Rev B - GDO 87504-267 GDO 003-0454-8 Rev B - GDO B6753TC	
Date Received	May 2, 2022	
Test Dates	May 2 – 13, 2022	
Specifications	FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C Innovation, Science, and Economic Development Canada, RSS-GEN Innovation, Science, and Economic Development Canada, RSS-247	
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	
Tested by	Mark Longinotti	
Signature	Raymond J Klouda	
Approved by	Raymond J. Klouda, Registered Professional Engineer of Illinois – 44894	
PO Number	4900081875	

Table of Contents

1. Report Revision History

Revision	Date	Description
–	03 JUN 2022	Initial Release of Engineering Test Report No. 2200527-07

2. Introduction

This document presents the results of a series of multi-transmitter tests that were performed on two (2) Falcon GDO Logic Boards (hereinafter referred to as the Equipment Under Test (EUT)).

The EUTs were identified as follows:

EUT Identification	
EUT #1	
Description	Falcon GDO Logic Board
Model/Part No.	GDO 003-0454-8 Rev B - GDO 87504-267
Serial No.	Sample 1 and Sample 2
Software/Firmware Version	Sample 1: Realtek WiFi/BLE: 126A0582 Rev A.1 Sec+3.0 BLELR: Preliminary test image Rev 1 GDO Firmware: 126A0543 Rev 2.9 Sample 2: GDO Firmware: Motor Forever Run 126A0583 Rev A.5
Size of EUT	10.5 in x 10 in x 7.5 in
Number of Interconnection Wires	twisted pairs x 2
Type of Interconnection Wires	Safety Sensor signal leads Motor control signal leads
EUT #2	
Description	Falcon GDO Logic Board
Model/Part No.	GDO 003-0454-8 Rev B - GDO B6753TC
Serial No.	Sample 3
Software/Firmware Version	GDO Firmware: Motor Forever Run 126A0583 Rev A.4
Size of EUT	10.5 in x 10 in x 7.5 in
Number of Interconnection Wires	twisted pairs x 2
Type of Interconnection Wires	Safety Sensor signal leads Motor control signal leads

The EUTs listed above were used throughout the test series.

3. Power Input

The EUTs obtained 115V 60Hz power via a 3 wire, 1-meter, unshielded power cord.

4. Grounding

The EUTs were not connected to ground.

5. Support Equipment

The EUTs were submitted for testing along with the following support equipment:

Description	Model #	S/N
1 Dell Laptop	Latitude 7480	---

6. Interconnect Leads

The following interconnect cables were submitted with the test item:

Item	Description
1 USB A Cable	Connects laptop to EUT to configure radios
1 Micro-USB Cable	Connects laptop to EUT to configure radios
FTDI UART Bridge	Connects laptop to EUT to configure radios
FT232 UART Bridge	Connects laptop to EUT to configure radios

7. Modifications Made to the EUT

No modifications were made to the EUTs during the testing.

8. Modes of Operation

The EMC tests were performed with the EUTs operating in the test mode described below.

8.1. Multi-Tx

This mode was achieved by applying 120VAC to the EUTs with the support equipment attached. The support equipment software was used to configure the EUTs into the proper operating mode. For Multi-Transmitter testing, the following combinations were used:

Combination	Description
1	- Realtek WiFi 802.11b: 2402MHz - Security 3.0 BLE: 2402MHz - Camera BLE: 2480MHz - FHSS: 926.75MHz
2	- Realtek BLE: 2402MHz - FHSS: 926.75MHz

Note: All transmitters were on for the Conducted Emissions test.

-Realtek WiFi 802.11b + Security 3.0 BLE Tx @ 2402MHz + Camera BLE Tx @ 2480MHz + FHSS 926.75MHz

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
- RSS-247, Issue 2, February, 2017, “Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices”
- RSS-Gen, Issue 5, February 2021, Amendment 2, “General Requirements for Compliance of Radio Apparatus”
- 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 9 kHz to 40 GHz"
- ANSI C63.10-2013, “American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices”
- 996369 D04 Module Integration Guide v02, October 13, 2020

10. Test Plan

No test plan was provided. Instructions were provided by personnel from Chamberlain Group, Inc. and used in conjunction with the FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Innovation, Science, and Economic Development Canada, RSS-247, and ANSI C63.4-2014 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 following were the laboratory conditions while the EMC tests were performed:

Ambient Parameters	Value
Temperature	23°C
Relative Humidity	25%
Atmospheric Pressure	1007.5mb

13. Summary

The following EMC tests were performed, and the results are shown below:

Test Description	Test Requirements	Test Methods	Equipment Class	S/N	Result
RF Conducted Emissions (AC Mains)	FCC 15.207 ISED RSS-GEN	ANSI C63.4:2014	---	Sample 2 Sample 3	Conforms
Multi-Tx Radiated Emissions	FCC 15.247 ISED RSS-247	ANSI C63.10:2013	---	Sample 1	Conforms

14. Sample Calculations

For Powerline Conducted Emissions:

The resultant voltage level (VL) is a summation in decibels (dB) of the receiver meter reading (MTR) and the cable loss factor (CF).

Formula 1: VL (dBµV) = MTR (dBµV) + CF (dB).

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.

Formula 1: FS (dBµV/m) = MTR (dBµV) + AF (dB/m) + CF (dB) + (- PA (dB)) + DC (dB)

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

Formula 2: FS (µV/m) = AntiLog [(FS (dBµV/m))/20]

15. Statement of Conformity

The Chamberlain Group, Inc. Falcon GDO Logic Board, Model No. GDO 003-0454-8 Rev B, Serial No. Sample 1, Serial No. Sample 2 and Serial No. Sample 3, did fully conform to the selected requirements of FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C and Innovation, Science, and Economic

Development Canada, RSS-247.

16. Certification

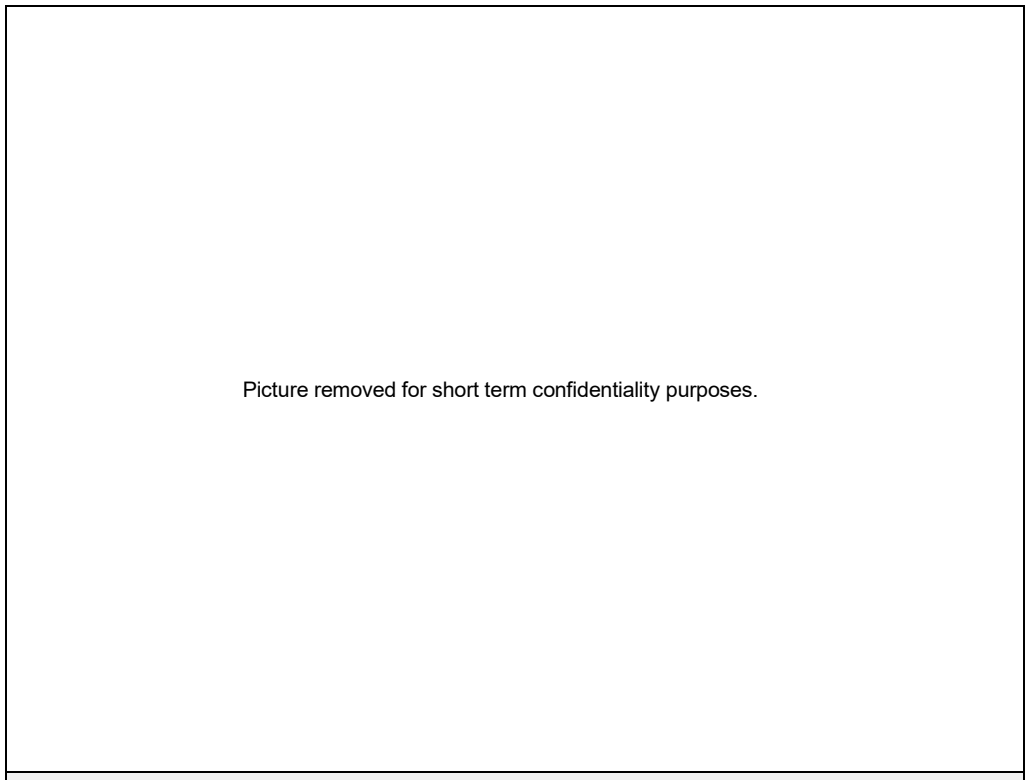
Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C and Innovation, Science, and Economic Development Canada, RSS-247 test specifications. The data presented in this test report pertains to the EUTs on the test date specified. Any electrical or mechanical modifications made to the EUTs subsequent to the specified test date will serve to invalidate the data and void this certification.

17. Photographs of EUT

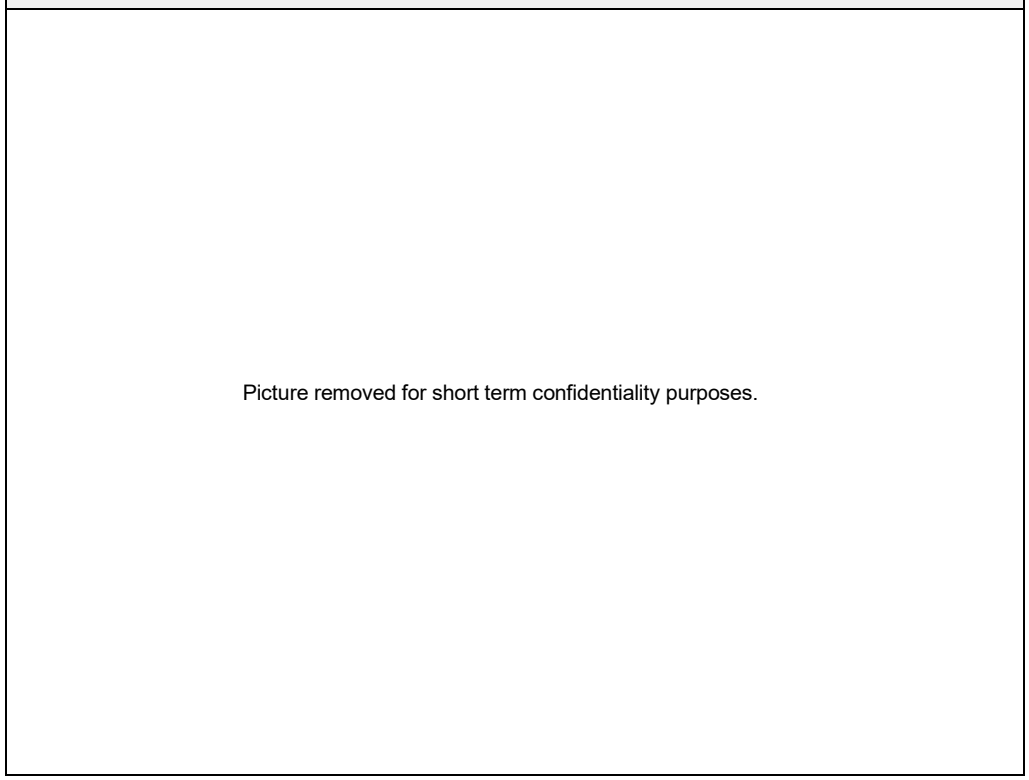
Picture removed for short term confidentiality purposes.

EUT top and bottom. EUT modified with external connectors for antenna conducted testing only. EUT does not normally have the external connectors attached.

Picture removed for short term confidentiality purposes.



EUT tested in a host GDO

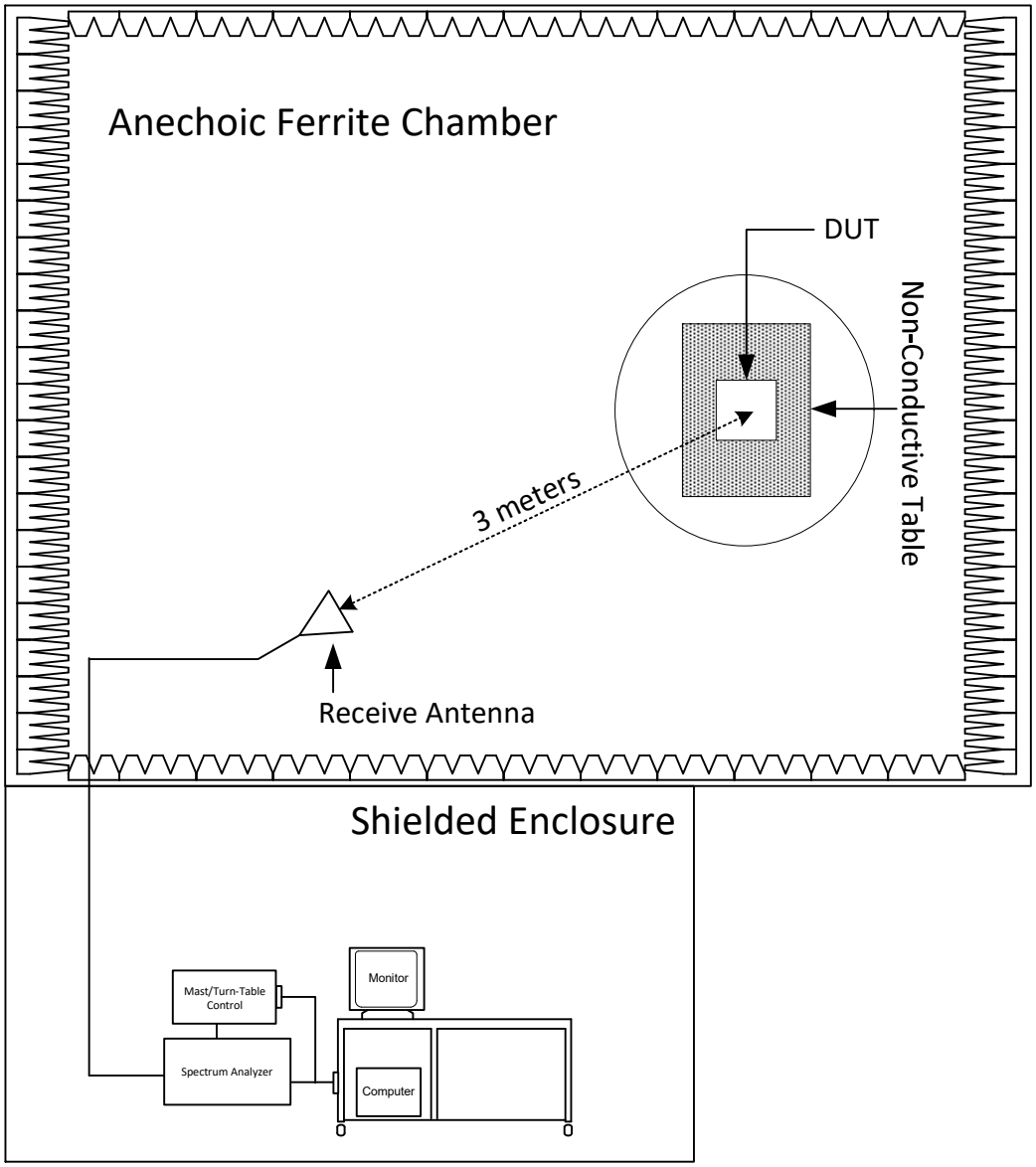


18. Equipment List

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
APW14	PREAMPLIFIER	PLANAR	PE2-35-120-5R0-10-12-SFF	PL22671	1-20GHz	9/21/2021	9/21/2022
CDZ3	LAB WORKSTATION	ELITE	LWS-10		WINDOWS 10	CNR	
GRB0	1MHZ, LISN SIGNAL CHECKER	ELITE	LISNCHKR1M	1	1MHZ	6/17/2021	6/17/2023
NHG1	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ	NOTE 1	
NTA3	BILOG ANTENNA	TESEQ	6112D	32853	25-1000MHz	10/20/2020	10/20/2022
NWQ0	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS LINDGREN	3117	66657	1GHZ-18GHZ	5/13/2020	5/13/2022
PLF2	CISPR16 50UH LISN	ELITE	CISPR16/70A	002	.15-30MHz	4/5/2022	4/5/2023
PLF4	CISPR16 50UH LISN	ELITE	CISPR16/70A	003	.15-30MHz	4/5/2022	4/5/2023
RBG2	EMI ANALYZER	ROHDE & SCHWARZ	ESW44	101591	2HZ-44GHZ	3/31/2022	3/31/2023
RBJ0	EMI ANALYZER	ROHDE & SCHWARZ	ESW8	100986	2HZ-8GHZ	12/10/2021	12/10/2022
SES0	24VDC POWER SUPPLY	P-TRANS	FS-32024-1M	001	18-27VDC	NOTE 1	
T1ED	10DB 25W ATTENUATOR	WEINSCHEL	46-10-34	BN2320	DC-18GHZ	1/6/2022	1/6/2024
VBR8	CISPR EN FCC CE VOLTAGE.exe					N/A	
WKA1	SOFTWARE, UNIVERSAL RCV EMI	ELITE	UNIV_RCV_EMI	1	---	I/O	
XLTK	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	---	DC-2GHZ	1/5/2022	1/5/2024
XPQ3	HIGH PASS FILTER	K&L MICROWAVE	4IH30-1804/T10000-0	4	1.8GHZ-10GHZ	9/7/2021	9/7/2023
XPQ4	HIGH PASS FILTER	K&L MICROWAVE	11SH10-4800/X20000-O/O	1	4.8-20GHZ	9/7/2021	9/7/2023

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. RF Conducted Emissions (AC Mains)

EUT Information	
Manufacturer	Chamberlain Group, Inc.
Product	Falcon GDO Logic Board
Model No.	GDO 003-0454-8 Rev B
Serial No.	Sample 2 & Sample 3
Mode	Multi-Tx

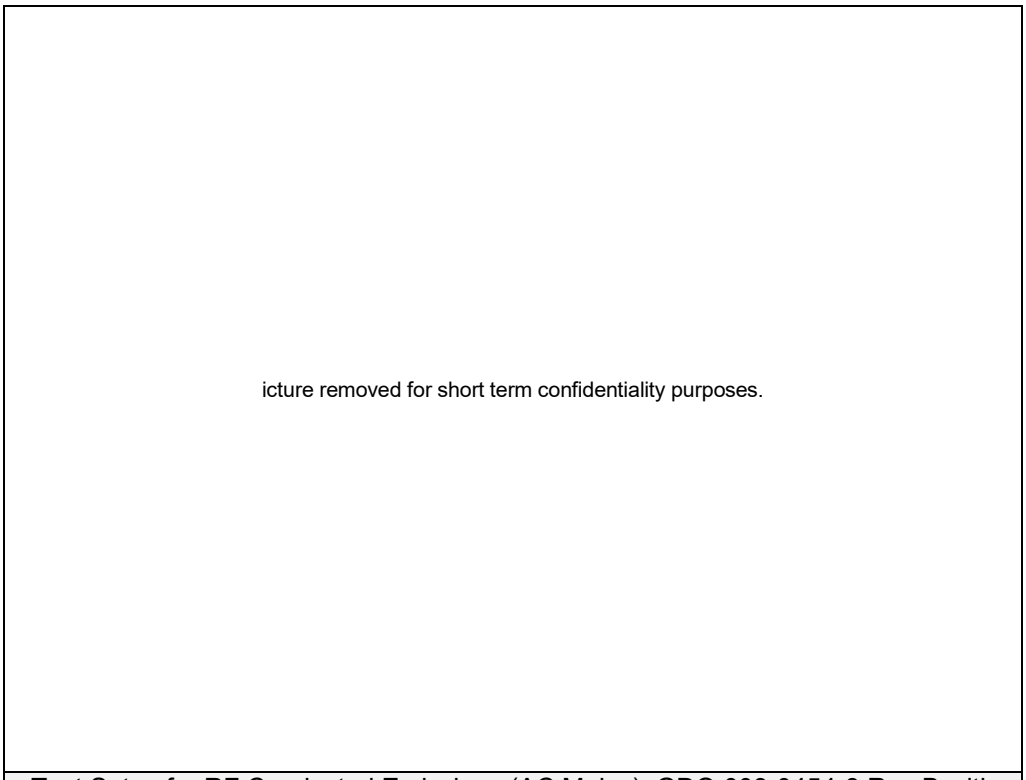
Test Site Information	
Setup Format	Tabletop
Height of Support	NA
Type of Test Site	Reverberation Chamber
Test Site Used	Room 28
Note	None

Measurement Uncertainty	
Measurement Type	Expanded Measurement Uncertainty
Conducted disturbance (mains port) (150 kHz – 30 MHz)	2.7

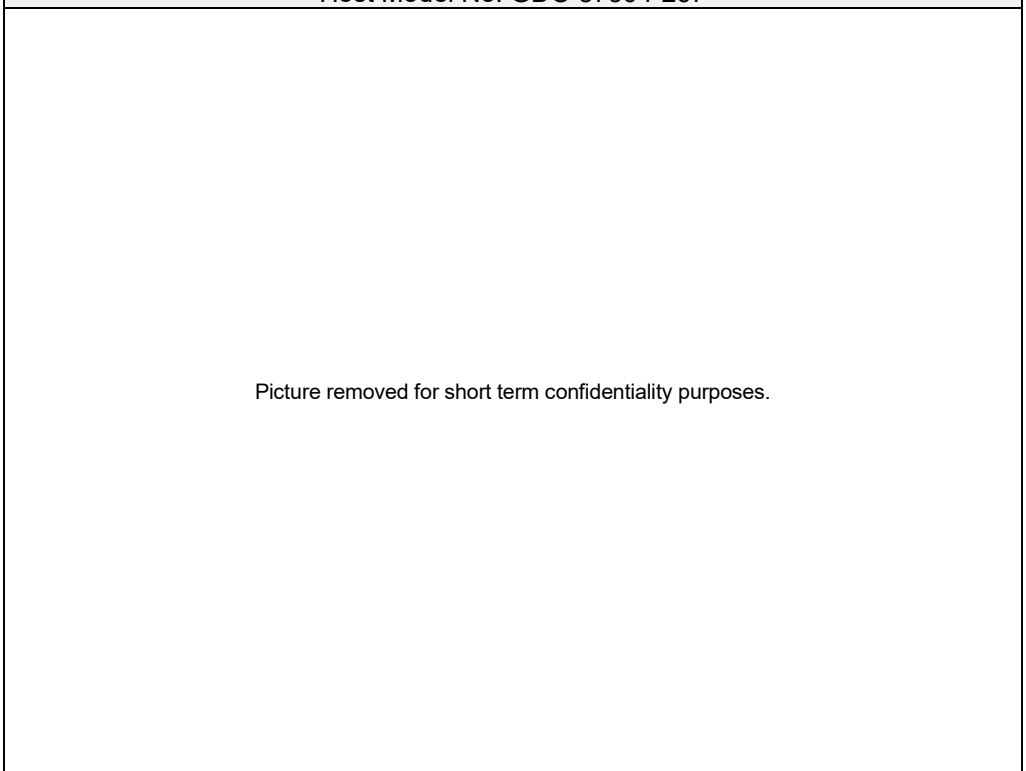
Requirements
For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30MHz shall not exceed the limits in the following table.

Conducted Emissions Limits		
Frequency (MHz)	Conducted limit (dBµV)	
	Quasi-Peak	Average
0.15 – 0.5	66 decreasing with logarithm of frequency to 56	56 decreasing with logarithm of frequency to 46
0.5 – 5	56	46
5 – 30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: If the levels measured using the QP detector meet both the QP and the Average limits, the EUT is considered to have met both requirements and measurements do not need to be performed using the Average detector.		

Procedure
The interference on each power lead of the EUT was measured by connecting the measuring equipment to the appropriate meter terminal of the Line Impedance Stabilization Network (LISN). The meter terminal of the LISN not under test was terminated with 50 ohms. 1) The EUT was operated in the Multi-Tx mode. 2) Measurements were first made on the 120VAC high line. 3) The frequency range from 150kHz to 30MHz was broken up into smaller frequency sub-bands. 4) Conducted emissions measurements were taken on the first frequency sub-band using a peak detector. 5) The data thus obtained was then searched by the computer for the highest levels. Any emissions levels that were within 10dB of the average limit were then measured again using both a quasi-peak detector and an average detector. (If no peak readings were within 10dB of the average limit, quasi-peak and average readings were taken on the highest emissions levels measured during the peak detector scan.) 6) Steps (4) and (5) were repeated for the remainder of the frequency sub-bands until the entire frequency range from 150kHz to 30MHz was investigated. The peak trace was automatically plotted. The plot also shows quasi-peak and average readings that were taken on discrete frequencies. A table showing the quasi-peak and average readings was also generated. This tabular data compares the quasi-peak and average conducted emissions to the applicable conducted emissions limits. The resultant voltage level (VL) is a summation in decibels (dB) of the receiver meter reading (MTR) and the cable loss factor (CF). Formula 1: VL (dBµV) = MTR (dBµV) + CF (dB) 7) Steps (3) through (6) were repeated on the neutral line.



Test Setup for RF Conducted Emissions (AC Mains), GDO 003-0454-8 Rev B with Host Model No. GDO 87504-267



Test Setup for RF Conducted Emissions (AC Mains), GDO 003-0454-8 Rev B with Host Model No. GDO 87504-267

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Test Setup for RF Conducted Emissions (AC Mains), GDO 003-0454-8 Rev B with Host Model No. GDO B6753TC
Picture removed for short term confidentiality purposes.
Test Setup for RF Conducted Emissions (AC Mains), GDO 003-0454-8 Rev B with Host Model No. GDO B6753TC

FCC Part 15 Subpart C Conducted Emissions Test

Significant Emissions Data

VBR8 05/14/2020

Manufacturer	:	Chamberlain Group, Inc.
Model		:GDO 003-0454-8 Rev B - GDO 87504-267
DUT Revision	:	N/A
Serial Number	:	Sample 2
DUT Mode	:	Multi-Tx
Line Tested	:	115V, 60Hz Line
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-1
Notes	:	CAM + Realtek + Sec3.0 + 900MHz all on, Motor Running Continuously
Test Engineer	:	J. Cardenas
Limit	:	FCC 15.207
Test Date	:	May 10, 2022 02:44:44 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 1 dB margin below limit

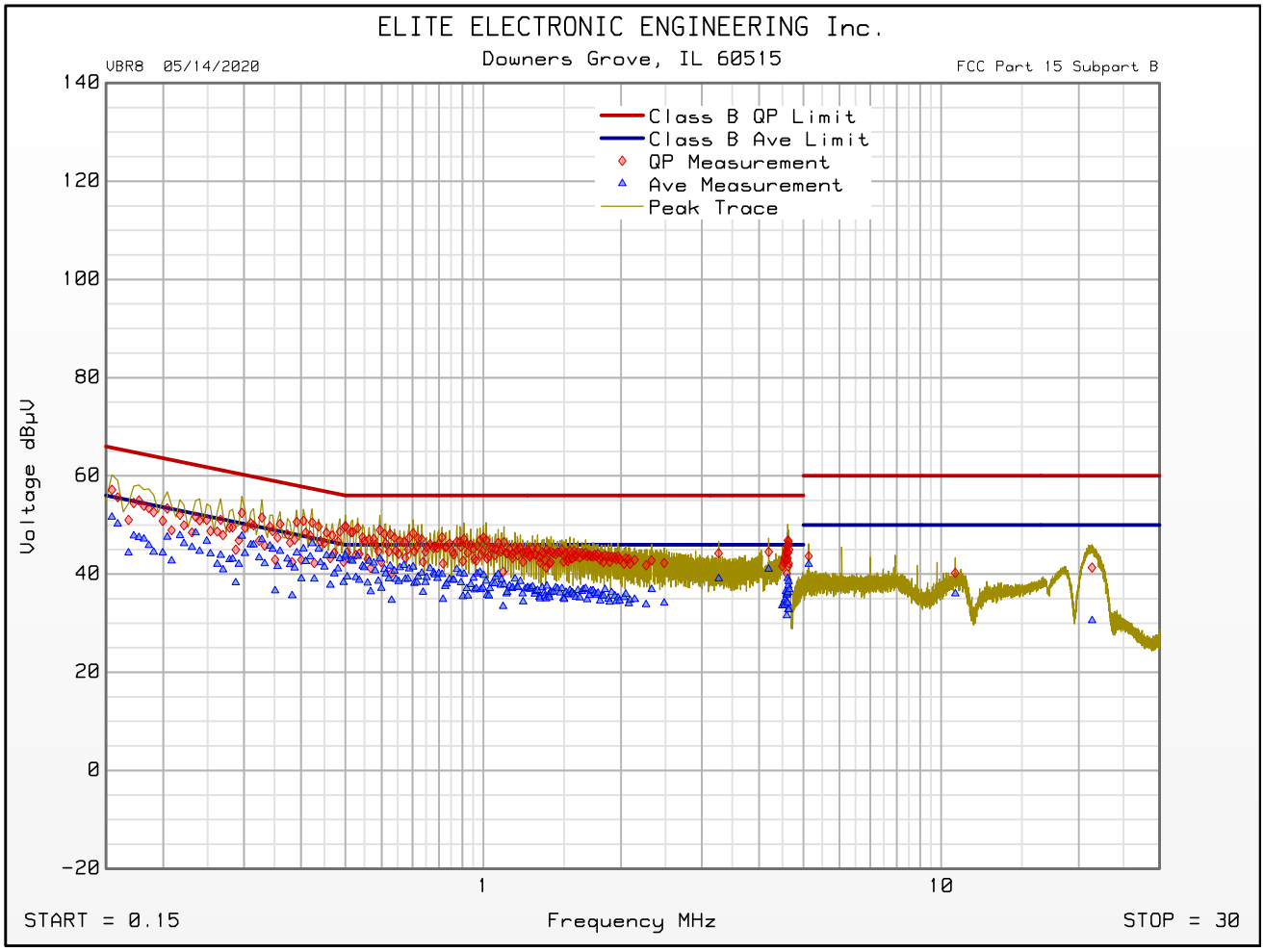
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.155	57.2	65.8		51.6	55.8	
0.500	49.7	56.0		43.9	46.0	
0.813	47.5	56.0		40.0	46.0	
1.282	45.3	56.0		37.5	46.0	
2.048	43.2	56.0		35.9	46.0	
4.625	46.8	56.0		39.1	46.0	
5.135	43.7	60.0		42.0	50.0	
10.733	40.2	60.0		36.0	50.0	
21.349	41.3	60.0		30.5	50.0	

FCC Part 15 Subpart C Conducted Emissions Test

Cumulative Data

VBR8 05/14/2020

Manufacturer	:	Chamberlain Group, Inc.
Model		:GDO 003-0454-8 Rev B - GDO 87504-267
DUT Revision	:	N/A
Serial Number	:	Sample 2
DUT Mode	:	Multi-Tx
Line Tested	:	115V, 60Hz Line
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-1
Notes	:	CAM + Realtek + Sec3.0 + 900MHz all on, Motor Running Continuously
Test Engineer	:	J. Cardenas
Limit	:	FCC 15.207
Test Date	:	May 10, 2022 02:44:44 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart C Conducted Emissions Test

Significant Emissions Data

VBR8 05/14/2020

Manufacturer	:	Chamberlain Group, Inc.
Model		:GDO 003-0454-8 Rev B - GDO 87504-267
DUT Revision	:	N/A
Serial Number	:	Sample 2
DUT Mode	:	Multi-Tx
Line Tested	:	Neutral
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-1
Notes	:	CAM + Realtek + Sec3.0 + 900MHz all on, Motor Running Continuously
Test Engineer	:	J. Cardenas
Limit	:	FCC 15.207
Test Date	:	May 10, 2022 02:35:30 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 1 dB margin below limit

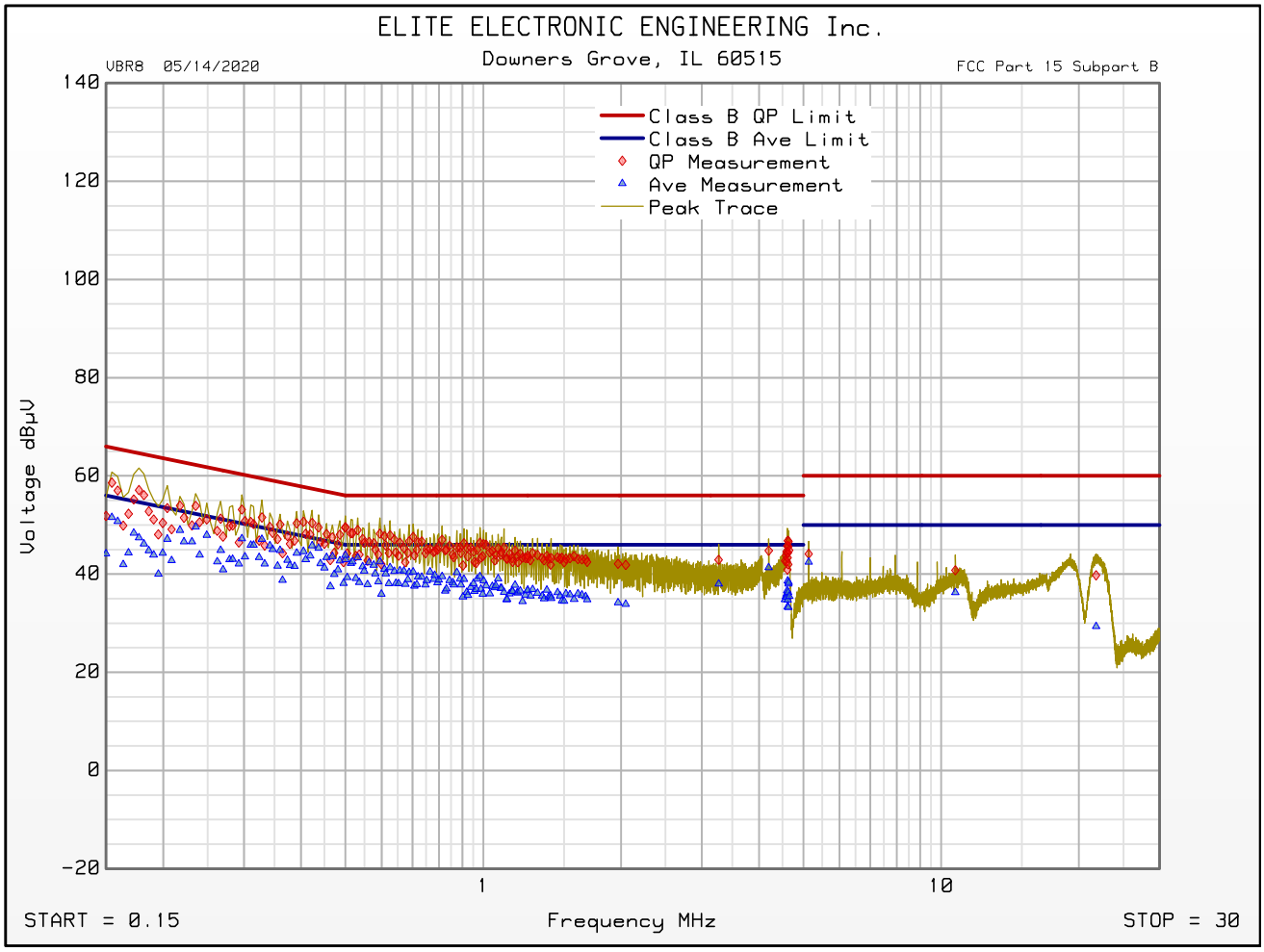
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.155	58.6	65.8		51.6	55.8	
0.500	49.6	56.0		43.8	46.0	
0.813	47.0	56.0		39.5	46.0	
1.282	44.2	56.0		36.9	46.0	
2.048	41.9	56.0		33.9	46.0	
4.625	46.8	56.0		38.6	46.0	
5.135	44.1	60.0		42.5	50.0	
10.737	40.8	60.0		36.2	50.0	
21.799	39.7	60.0		29.3	50.0	

FCC Part 15 Subpart C Conducted Emissions Test

Cumulative Data

VBR8 05/14/2020

Manufacturer	:	Chamberlain Group, Inc.
Model		:GDO 003-0454-8 Rev B - GDO 87504-267
DUT Revision	:	N/A
Serial Number	:	Sample 2
DUT Mode	:	Multi-Tx
Line Tested	:	Neutral
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-1
Notes	:	CAM + Realtek + Sec3.0 + 900MHz all on, Motor Running Continuously
Test Engineer	:	J. Cardenas
Limit	:	FCC 15.207
Test Date	:	May 10, 2022 02:35:30 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart C Conducted Emissions Test

Significant Emissions Data

VBR8 05/14/2020

Manufacturer	:	Chamberlain Group, Inc.
Model		:GDO 003-0454-8 Rev B - GDO 87504-267
DUT Revision	:	N/A
Serial Number	:	Sample 3
DUT Mode	:	Multi-Tx
Line Tested	:	115V, 60Hz Line
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-1
Notes	:	CAM + Realtek + Sec3.0 + 900MHz all on, Motor Running Continuously
Test Engineer	:	J. Cardenas
Limit	:	FCC 15.207
Test Date	:	May 10, 2022 02:59:58 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 1 dB margin below limit

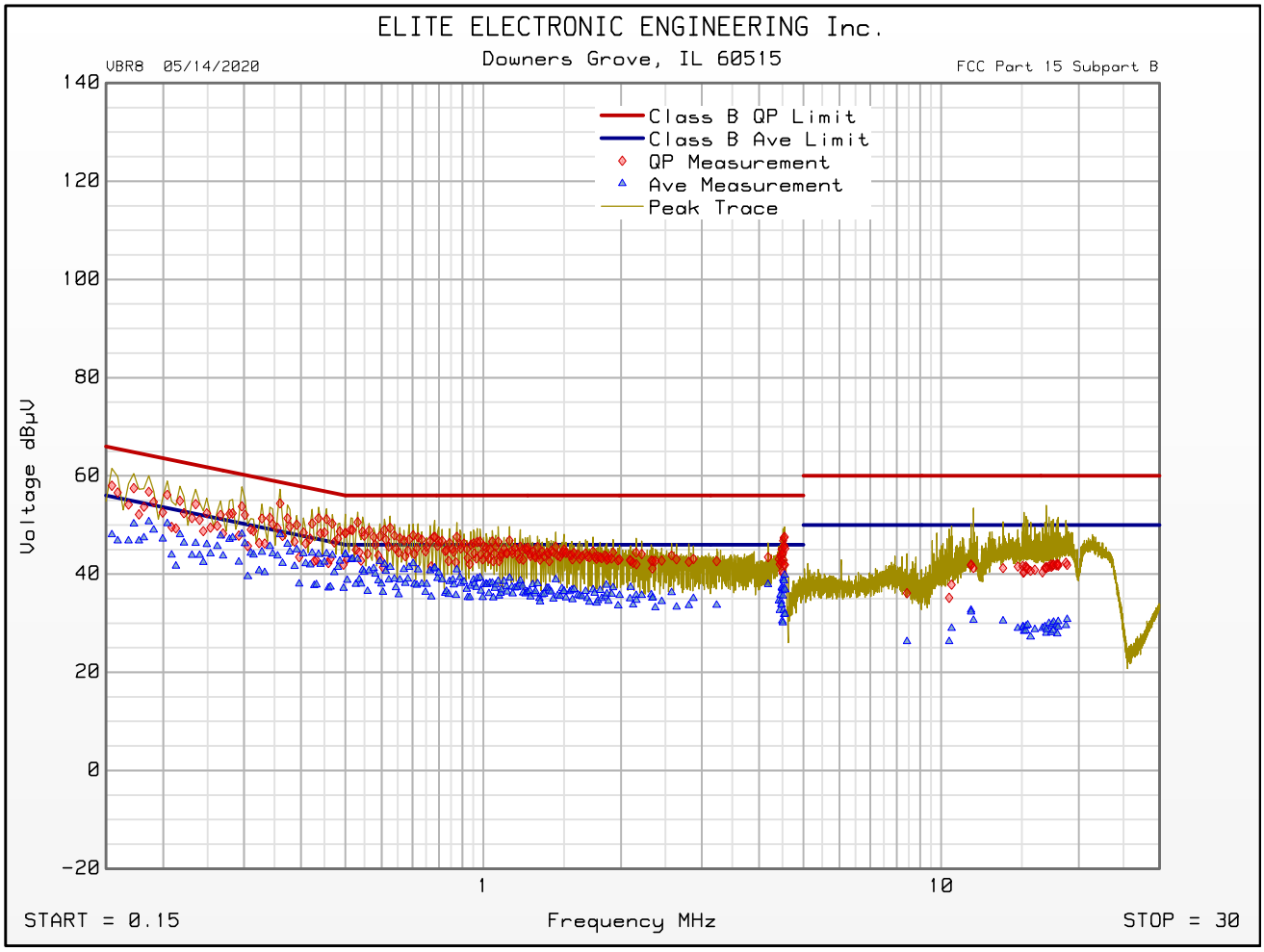
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.204	56.1	63.4		50.3	53.4	
0.360	54.4	58.7		48.1	48.7	
0.532	50.6	56.0		43.1	46.0	
0.876	47.6	56.0		40.9	46.0	
1.439	45.6	56.0		38.9	46.0	
2.156	44.4	56.0		35.7	46.0	
4.549	47.6	56.0		39.8	46.0	
8.420	36.1	60.0		26.3	50.0	
11.628	41.9	60.0		32.3	50.0	
18.739	42.3	60.0		29.5	50.0	

FCC Part 15 Subpart C Conducted Emissions Test

Cumulative Data

VBR8 05/14/2020

Manufacturer	:	Chamberlain Group, Inc.
Model		:GDO 003-0454-8 Rev B - GDO 87504-267
DUT Revision	:	N/A
Serial Number	:	Sample 3
DUT Mode	:	Multi-Tx
Line Tested	:	115V, 60Hz Line
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-1
Notes	:	CAM + Realtek + Sec3.0 + 900MHz all on, Motor Running Continuously
Test Engineer	:	J. Cardenas
Limit	:	FCC 15.207
Test Date	:	May 10, 2022 02:59:58 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart C Conducted Emissions Test

Significant Emissions Data

VBR8 05/14/2020

Manufacturer	:	Chamberlain Group, Inc.
Model		:GDO 003-0454-8 Rev B - GDO 87504-267
DUT Revision	:	N/A
Serial Number	:	Sample 3
DUT Mode	:	Multi-Tx
Line Tested	:	Neutral
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-1
Notes	:	CAM + Realtek + Sec3.0 + 900MHz all on, Motor Running Continuously
Test Engineer	:	J. Cardenas
Limit	:	FCC 15.207
Test Date	:	May 10, 2022 03:23:36 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 1 dB margin below limit

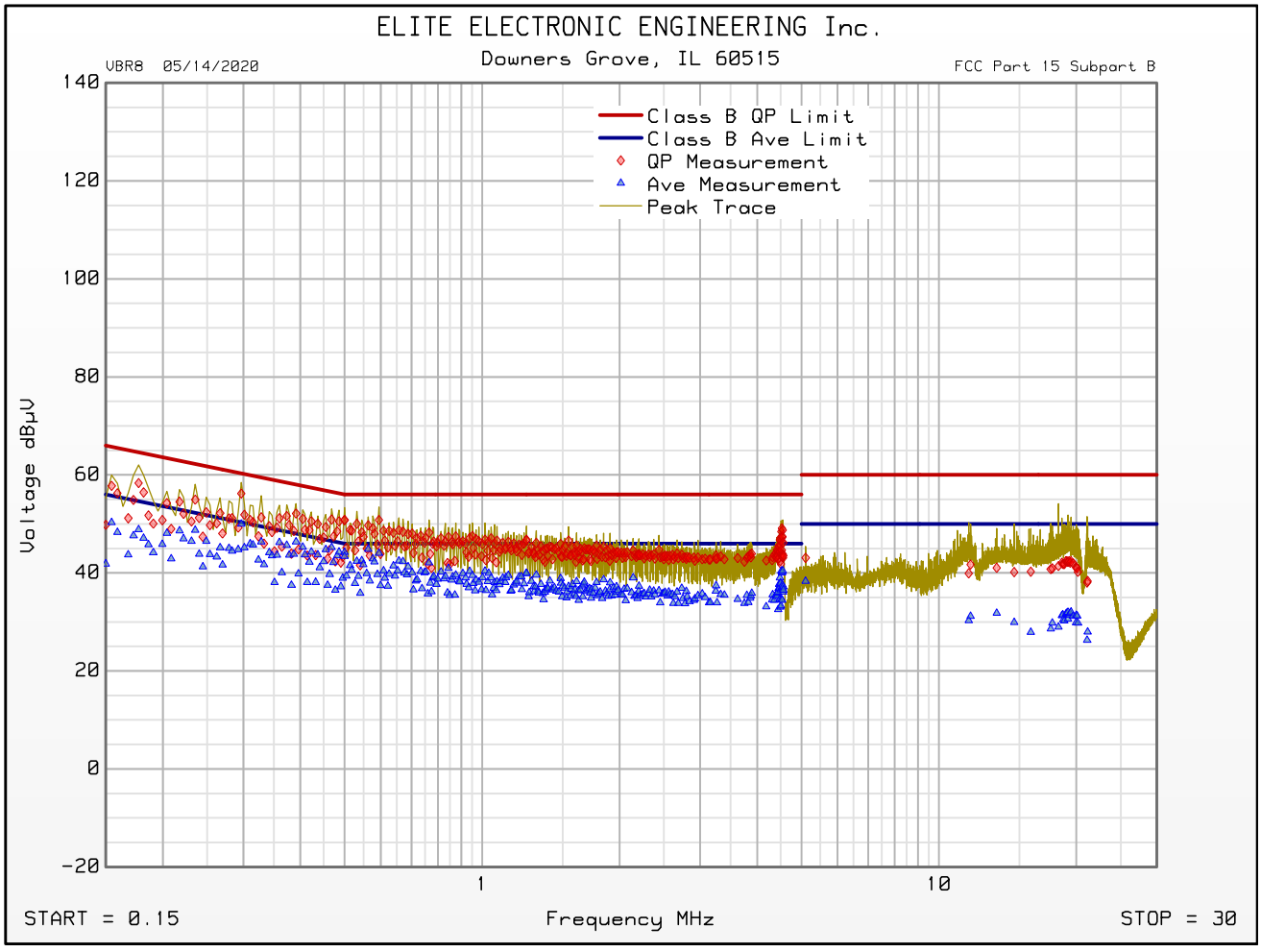
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.177	58.3	64.6		48.8	54.6	
0.297	56.2	60.3		50.0	50.3	
0.595	50.8	56.0		44.0	46.0	
0.952	47.5	56.0		39.5	46.0	
1.250	46.8	56.0		40.0	46.0	
2.439	44.7	56.0		36.4	46.0	
4.531	49.1	56.0		40.0	46.0	
5.108	43.1	60.0		38.3	50.0	
11.732	41.7	60.0		31.1	50.0	
19.058	42.4	60.0		31.8	50.0	

FCC Part 15 Subpart C Conducted Emissions Test

Cumulative Data

VBR8 05/14/2020

Manufacturer	:	Chamberlain Group, Inc.
Model		:GDO 003-0454-8 Rev B - GDO 87504-267
DUT Revision	:	N/A
Serial Number	:	Sample 3
DUT Mode	:	Multi-Tx
Line Tested	:	Neutral
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-1
Notes	:	CAM + Realtek + Sec3.0 + 900MHz all on, Motor Running Continuously
Test Engineer	:	J. Cardenas
Limit	:	FCC 15.207
Test Date	:	May 10, 2022 03:23:36 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit

21. Multi-Transmitter – Emissions Test

EUT Information	
Manufacturer	Chamberlain Group, Inc.
Product	Falcon GDO Logic Board
Model No.	GDO 003-0454-8 Rev B
Serial No.	Sample 1
Mode	Multi-Tx

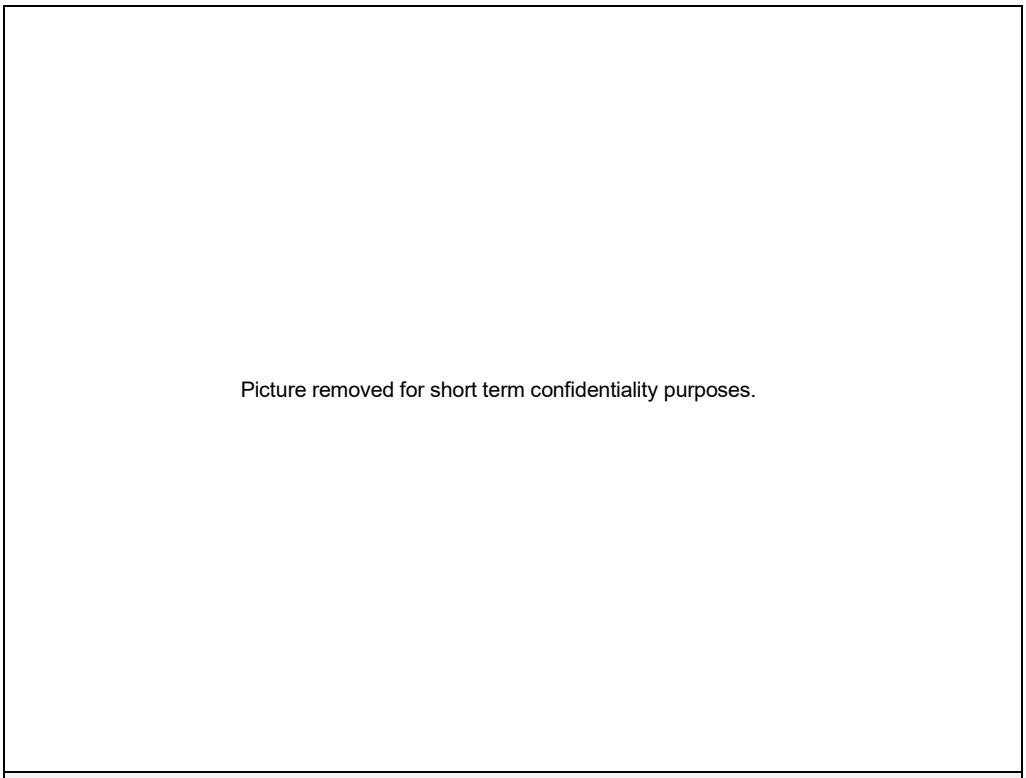
Test Site Information	
Setup Format	Tabletop
Height of Support	N/A
Type of Test Site	Semi-Anechoic Chamber
Test Site Used	R29F
Type of Antennas Used	Below 1GHz: Bilog (or equivalent) Above 1GHz: Double-ridged waveguide (or equivalent)
Notes	2.4GHz

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
Radiated disturbance (electric field strength on an open area test site or alternative test site) (6 GHz – 18 GHz)	3.2
Radiated disturbance (electric field strength on an open area test site or alternative test site) (18 GHz – 26.5 GHz)	3.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (26.5 GHz – 40 GHz)	3.4

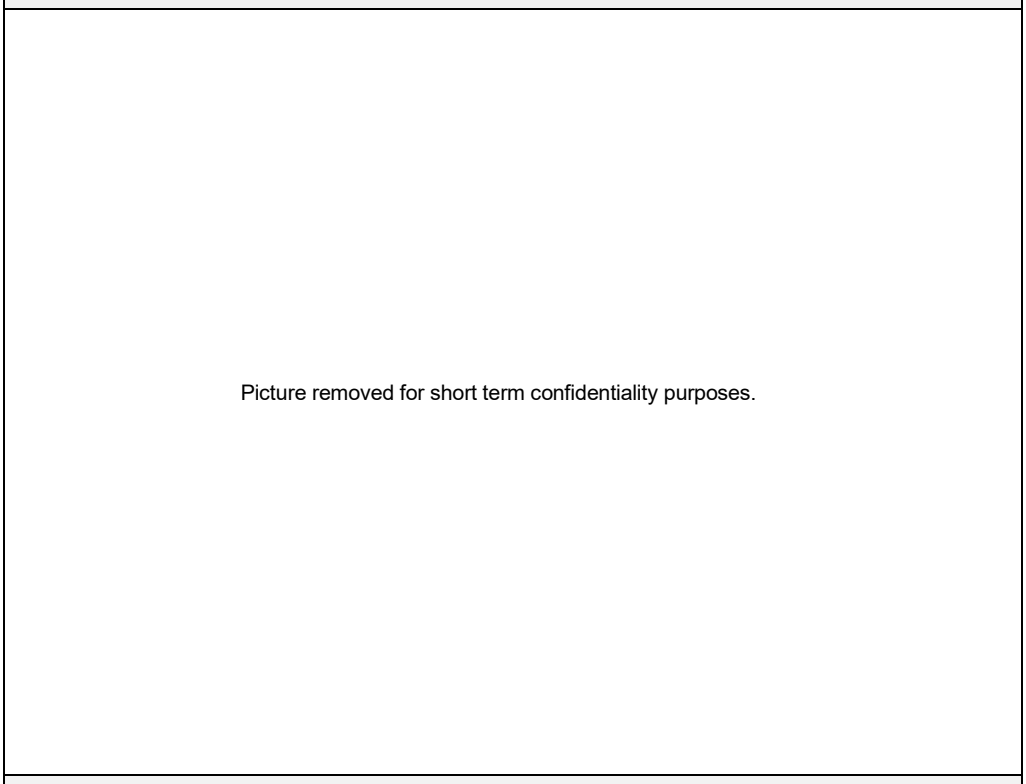
Requirements
Per 996369 D04 Module Integration Guide v01: Testing of the host product with all the transmitters installed is recommended, to verify that the host product meets all the applicable FCC rules. The radio spectrum is to be investigated with all the transmitters in the final host product functioning to determine that no emissions exceed the highest limit permitted for any one individual transmitter as required by Section 2.947(f). The testing shall also check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration. No emissions exceed the highest limit permitted for any one individual transmitter as required by Section 2.947(f).

Procedure
Radiated measurements 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 and anechoic absorber material is installed over the ferrite tiles. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2014 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. Preliminary radiated emissions tests were performed to determine the emission characteristics of the EUT. For the preliminary test, a broadband measuring antenna was positioned at a 3-meter distance from the EUT. The entire frequency range from 30MHz to 18.0GHz was investigated using a peak detector function. The final open field emission tests were then manually performed over the frequency range of 30MHz to 18.0GHz.

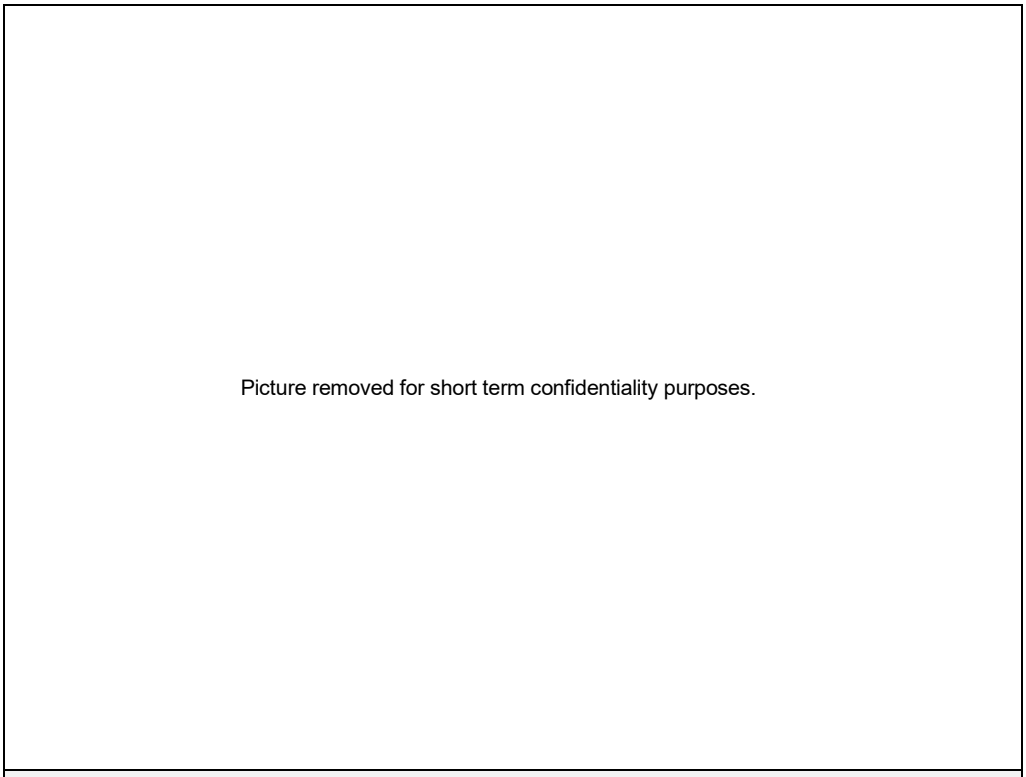
,



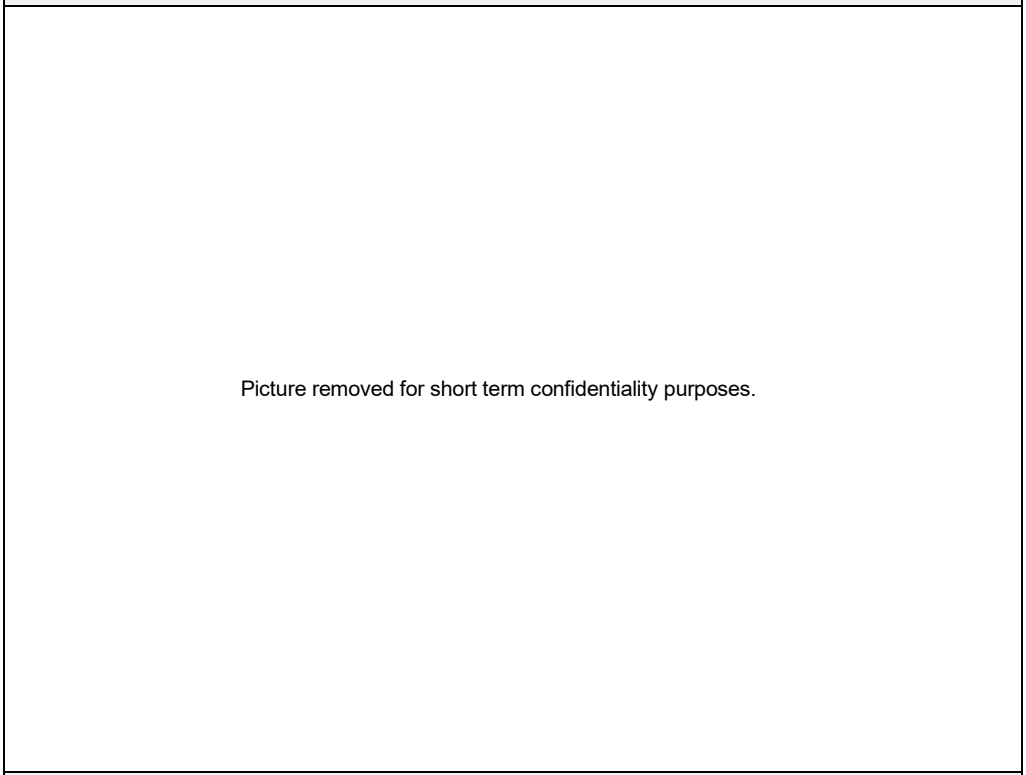
Test Setup for Spurious Emissions: 30MHz to 1GHz, Horizontal Polarization



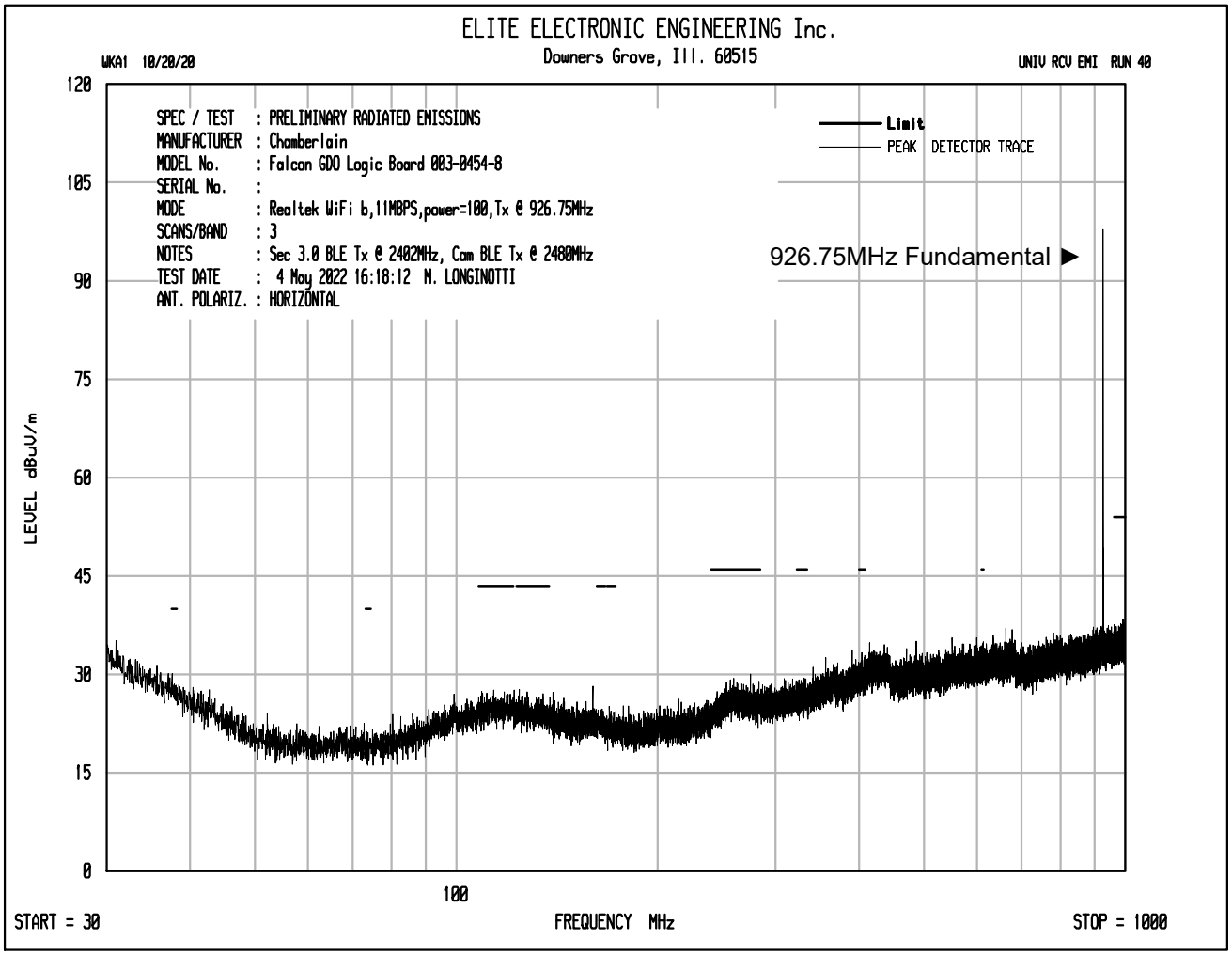
Test Setup for Spurious Emissions: 30MHz to 1GHz, Vertical Polarization

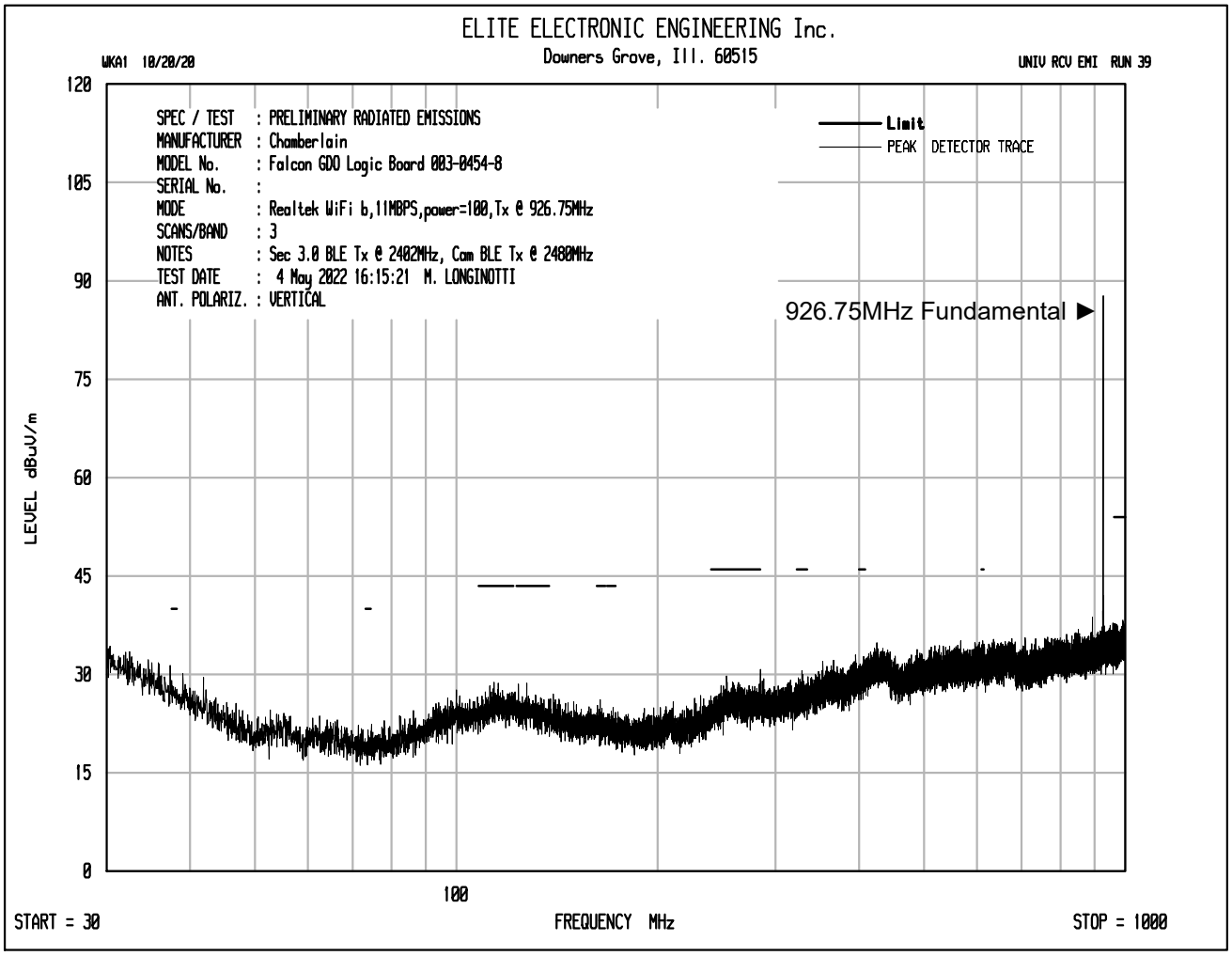


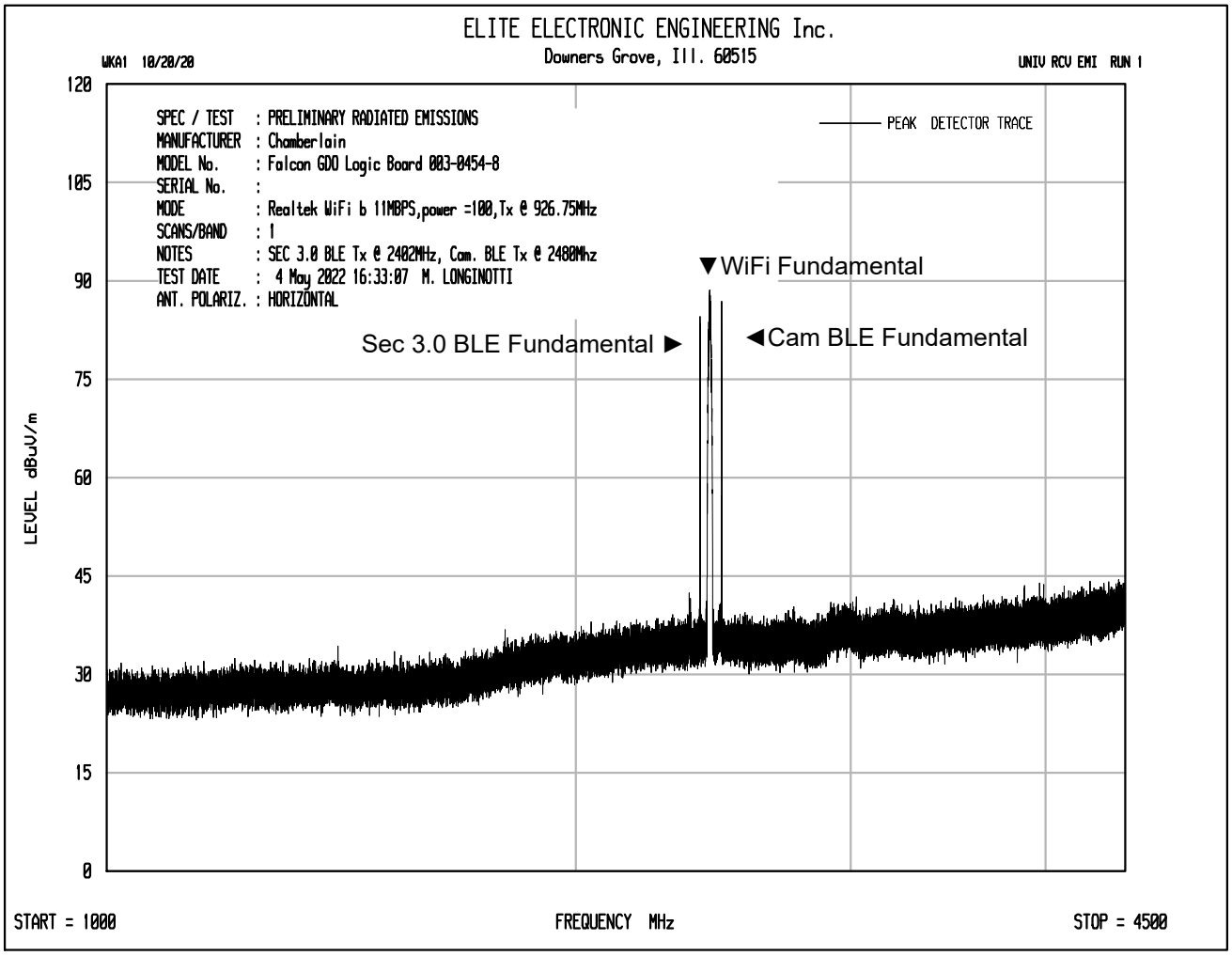
Test Setup for Spurious Emissions: Above 1GHz, Horizontal Polarization

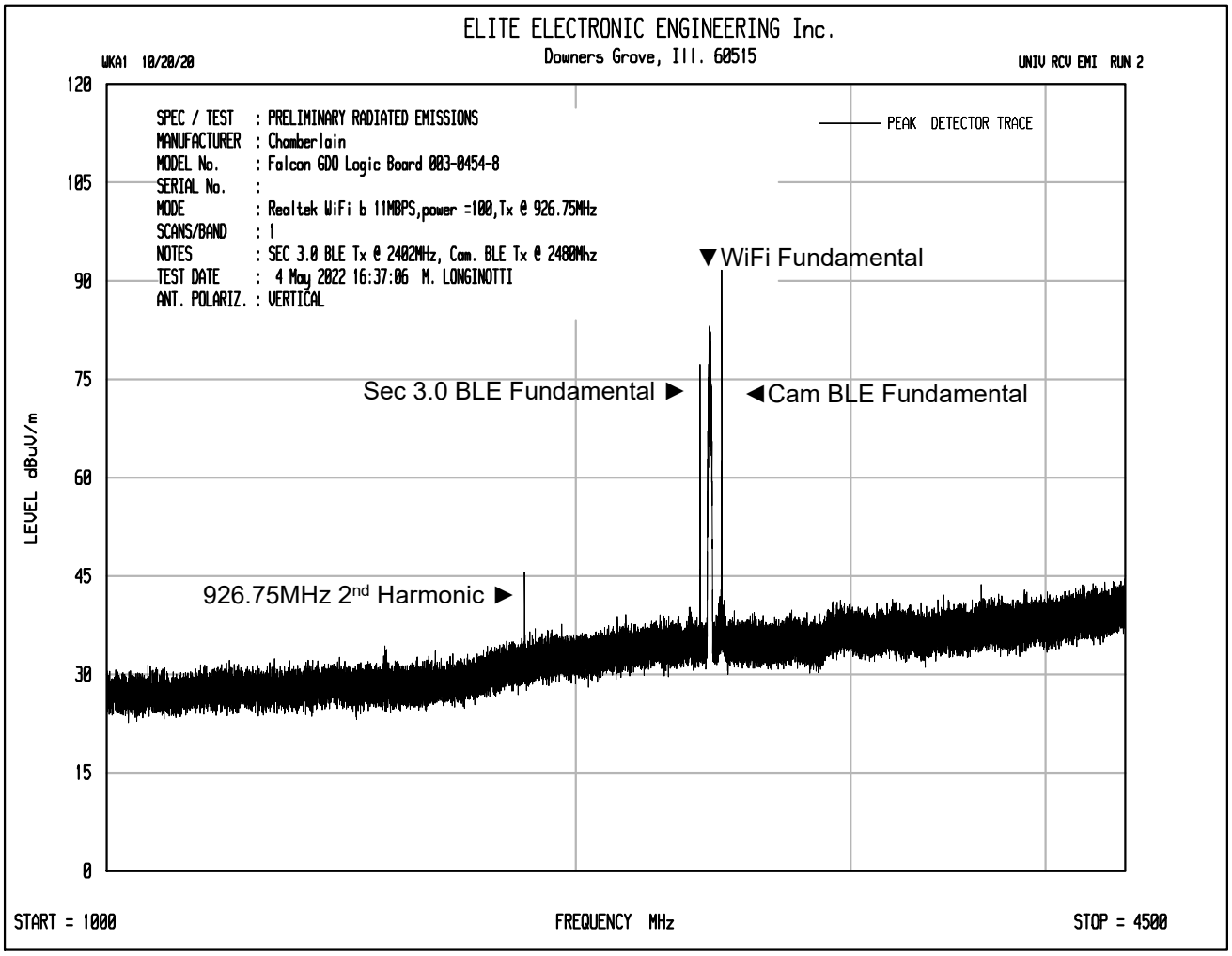


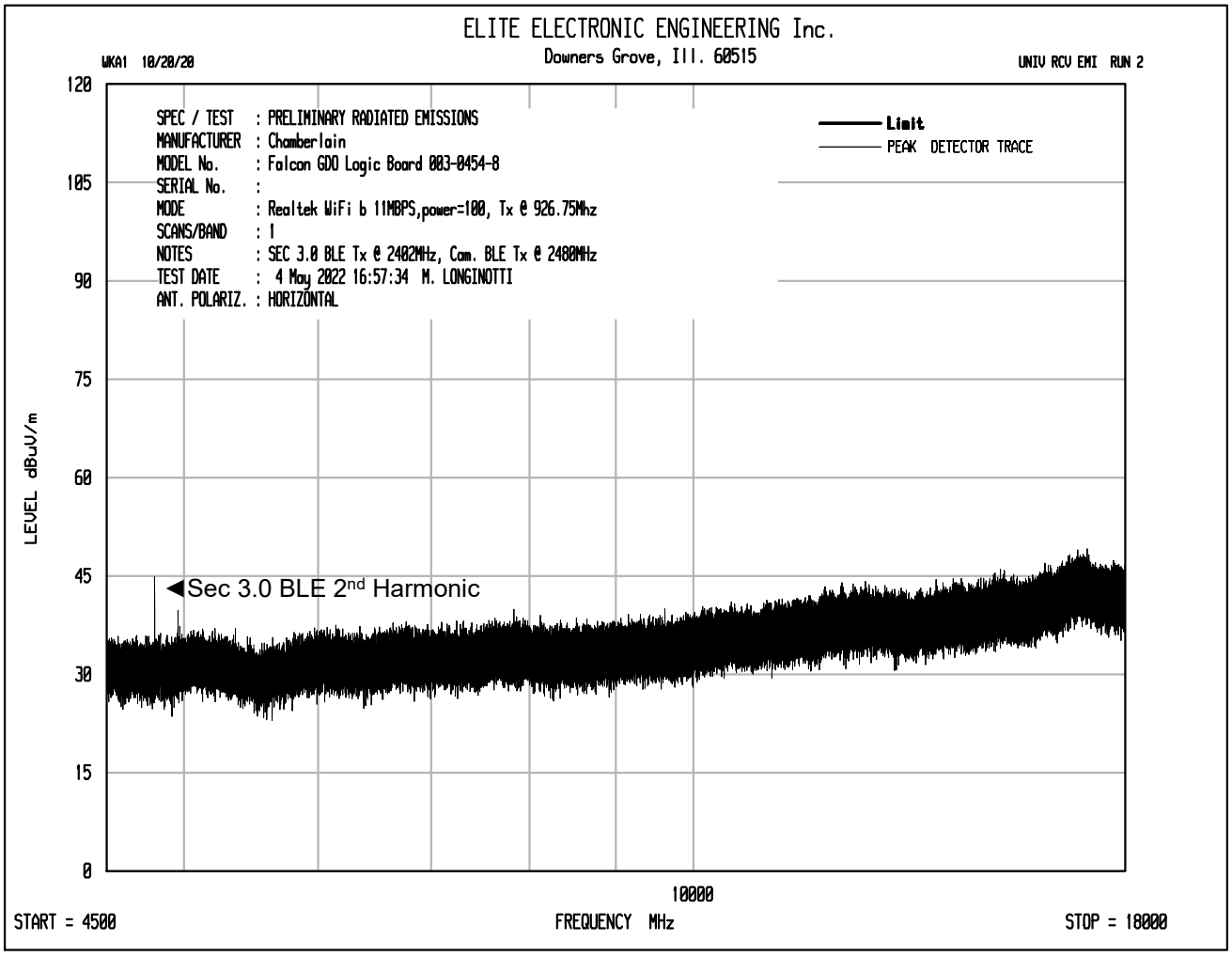
Test Setup for Spurious Emissions: Above 1GHz, Vertical Polarization

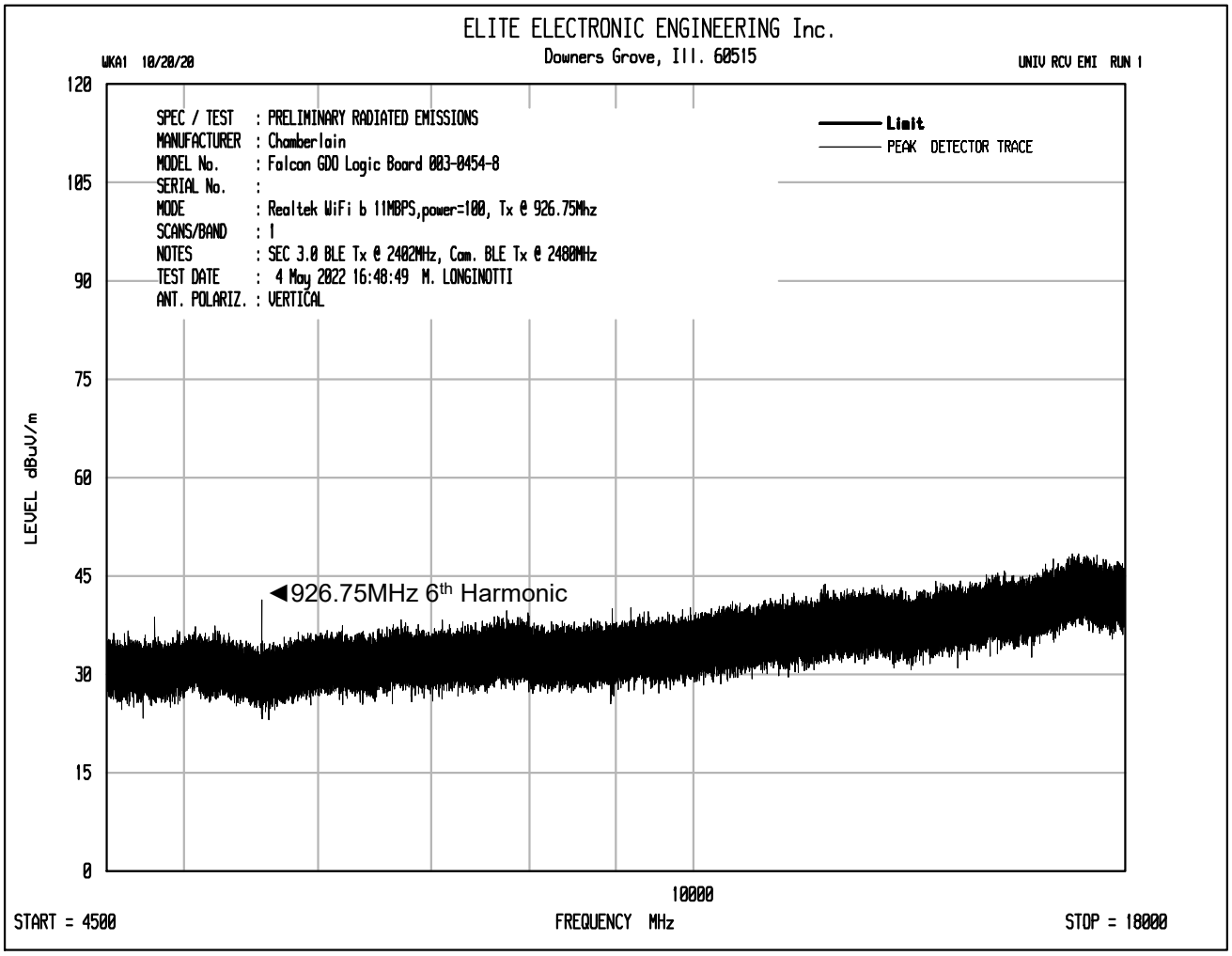

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 40
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Chamberlain
MODEL No. : Falcon GDO Logic Board 003-0454-8
SERIAL No. :
MODE : Realtek WiFi b,11MBPS,power=100,Tx @ 926.75MHz
SCANS/BAND : 3
NOTES : Sec 3.0 BLE Tx @ 2402MHz, Com BLE Tx @ 2480MHz
TEST DATE : 4 May 2022 16:18:12 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
Limit
PEAK DETECTOR TRACE
926.75MHz Fundamental ▶
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

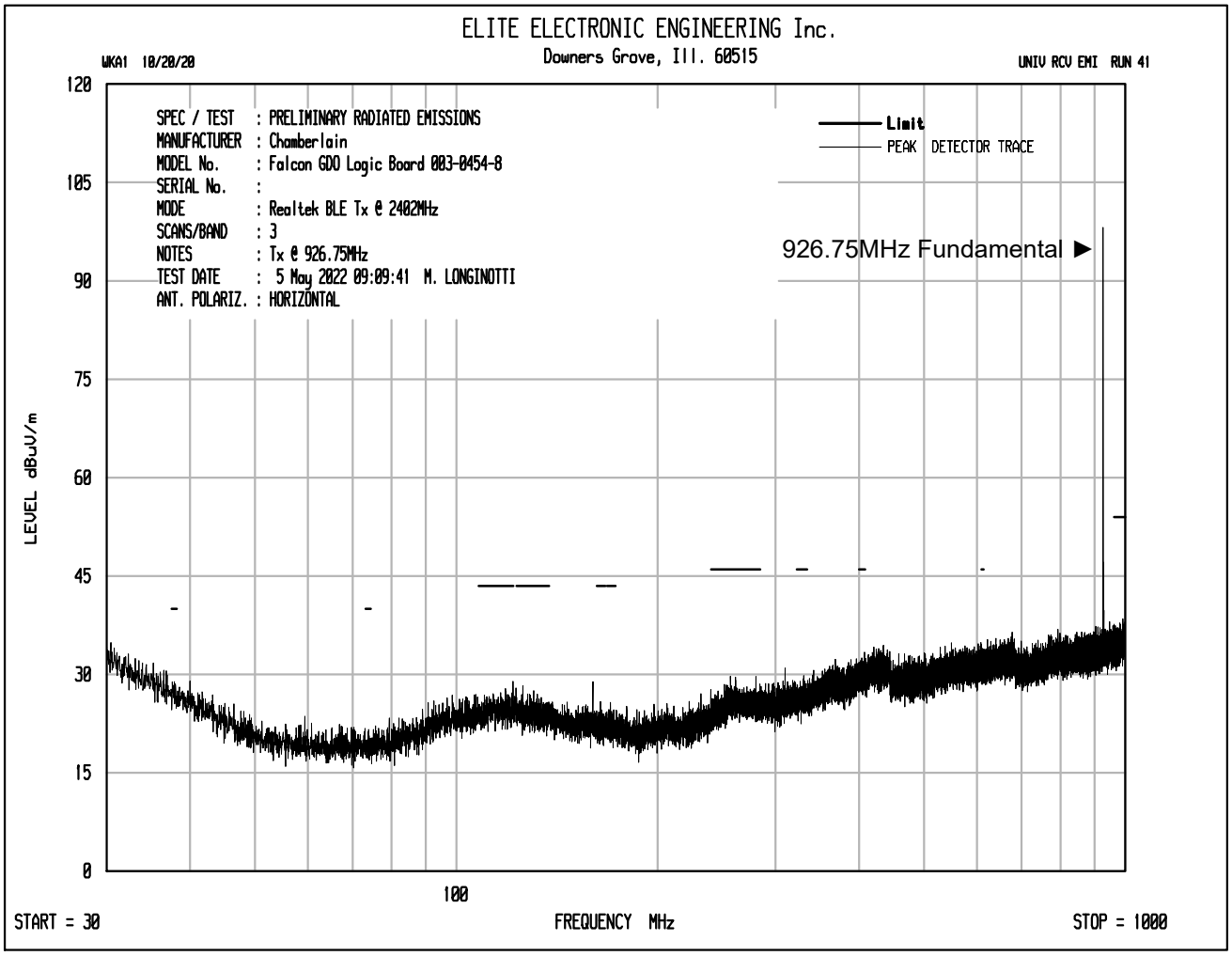

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 39
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Chamberlain
MODEL No. : Falcon GDO Logic Board 003-0454-8
SERIAL No. :
MODE : Realtek WiFi b,11MBPS,power=100,Tx @ 926.75MHz
SCANS/BAND : 3
NOTES : Sec 3.0 BLE Tx @ 2402MHz, Com BLE Tx @ 2480MHz
TEST DATE : 4 May 2022 16:15:21 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
926.75MHz Fundamental ▶
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

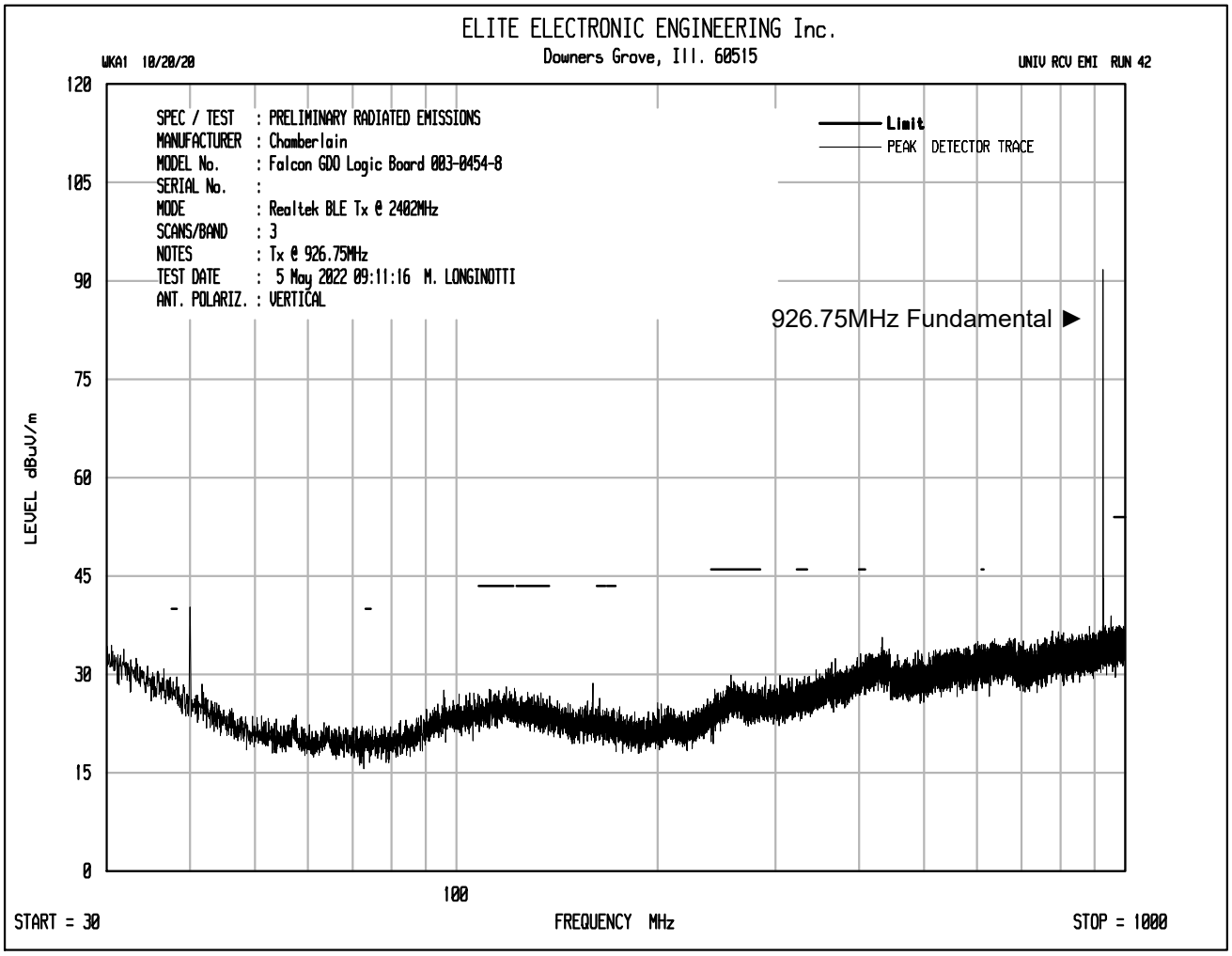

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 1
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Chamberlain
MODEL No. : Falcon GDO Logic Board 003-0454-8
SERIAL No. :
MODE : Realtek WiFi b 11MBPS,power =100,Tx @ 926.75MHz
SCANS/BAND : 1
NOTES : SEC 3.0 BLE Tx @ 2402MHz, Cam. BLE Tx @ 2480Mhz
TEST DATE : 4 May 2022 16:33:07 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
▼WiFi Fundamental
Sec 3.0 BLE Fundamental ►
◄Cam BLE Fundamental
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500

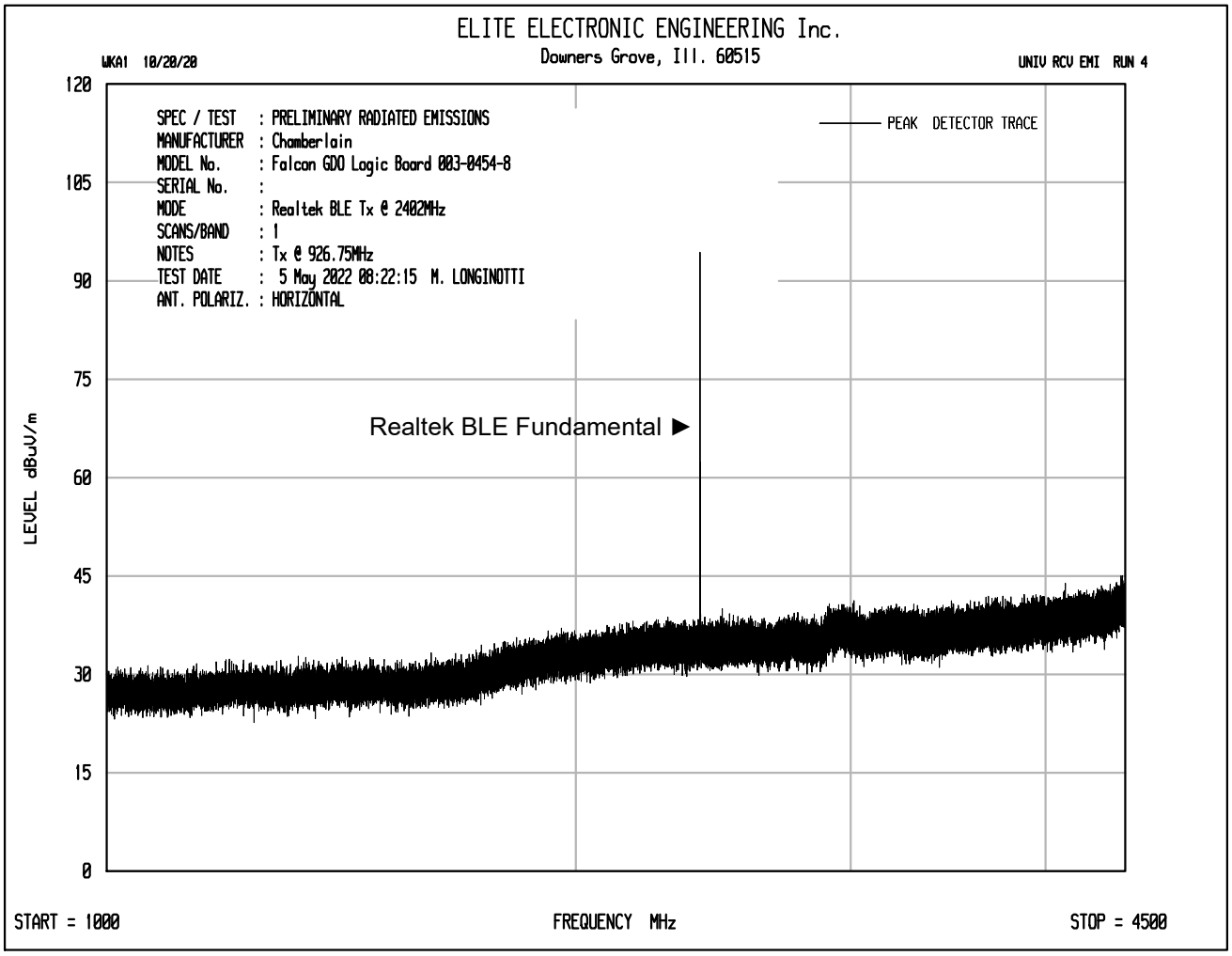

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 2
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Chamberlain
MODEL No. : Falcon GDO Logic Board 003-0454-8
SERIAL No. :
MODE : Realtek WiFi b 11MBPS,power =100,Tx @ 926.75MHz
SCANS/BAND : 1
NOTES : SEC 3.0 BLE Tx @ 2402MHz, Cam. BLE Tx @ 2480Mhz
TEST DATE : 4 May 2022 16:37:06 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
▼WiFi Fundamental
Sec 3.0 BLE Fundamental ►
◄Cam BLE Fundamental
926.75MHz 2nd Harmonic ►
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500

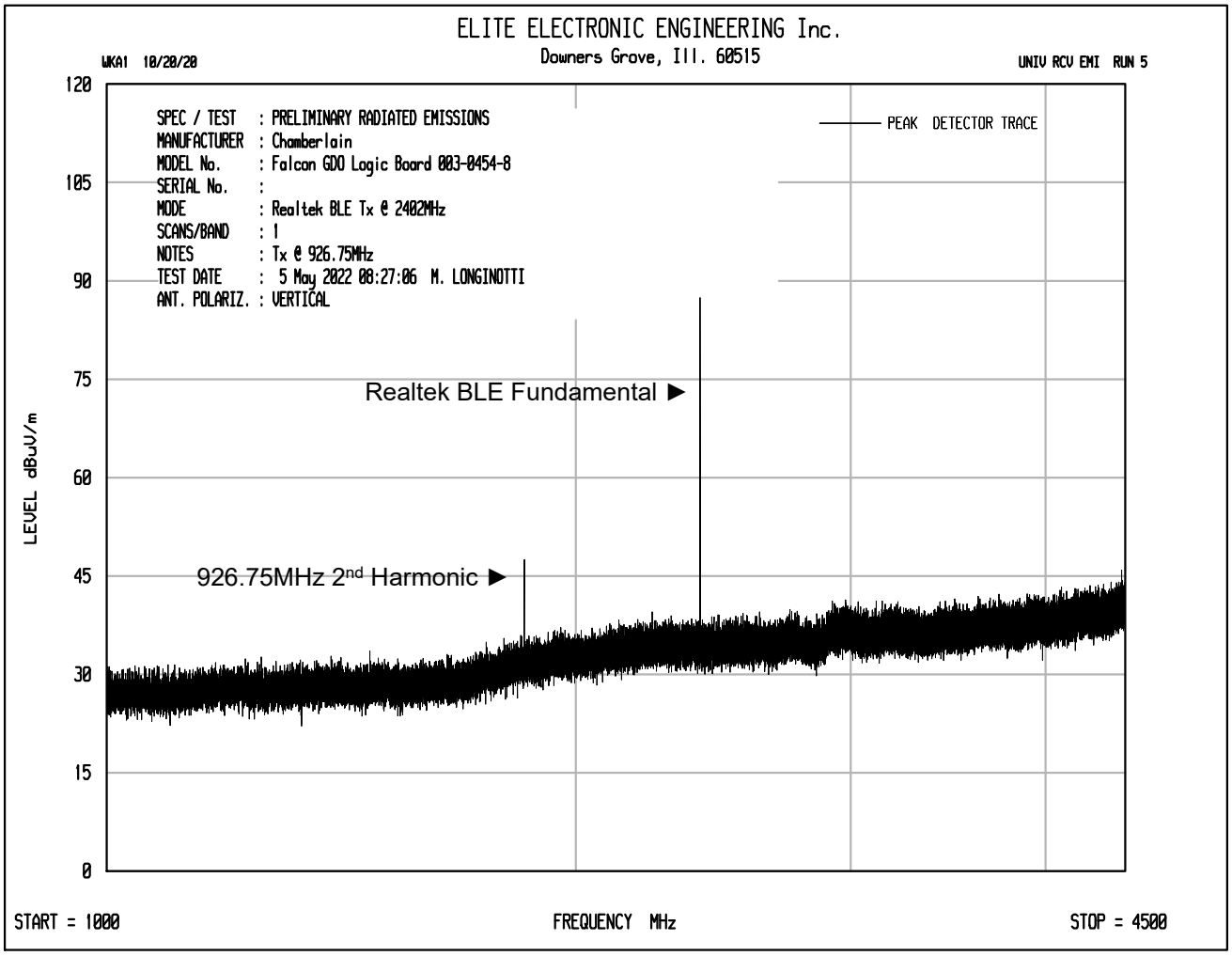

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 2
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Chamberlain
MODEL No. : Falcon GDO Logic Board 003-0454-8
SERIAL No. :
MODE : Realtek WiFi b 11MBPS,power=100, Tx @ 926.75Mhz
SCANS/BAND : 1
NOTES : SEC 3.0 BLE Tx @ 2402MHz, Com. BLE Tx @ 2480MHz
TEST DATE : 4 May 2022 16:57:34 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
◀Sec 3.0 BLE 2nd Harmonic
10000
START = 4500
FREQUENCY MHz
STOP = 18000

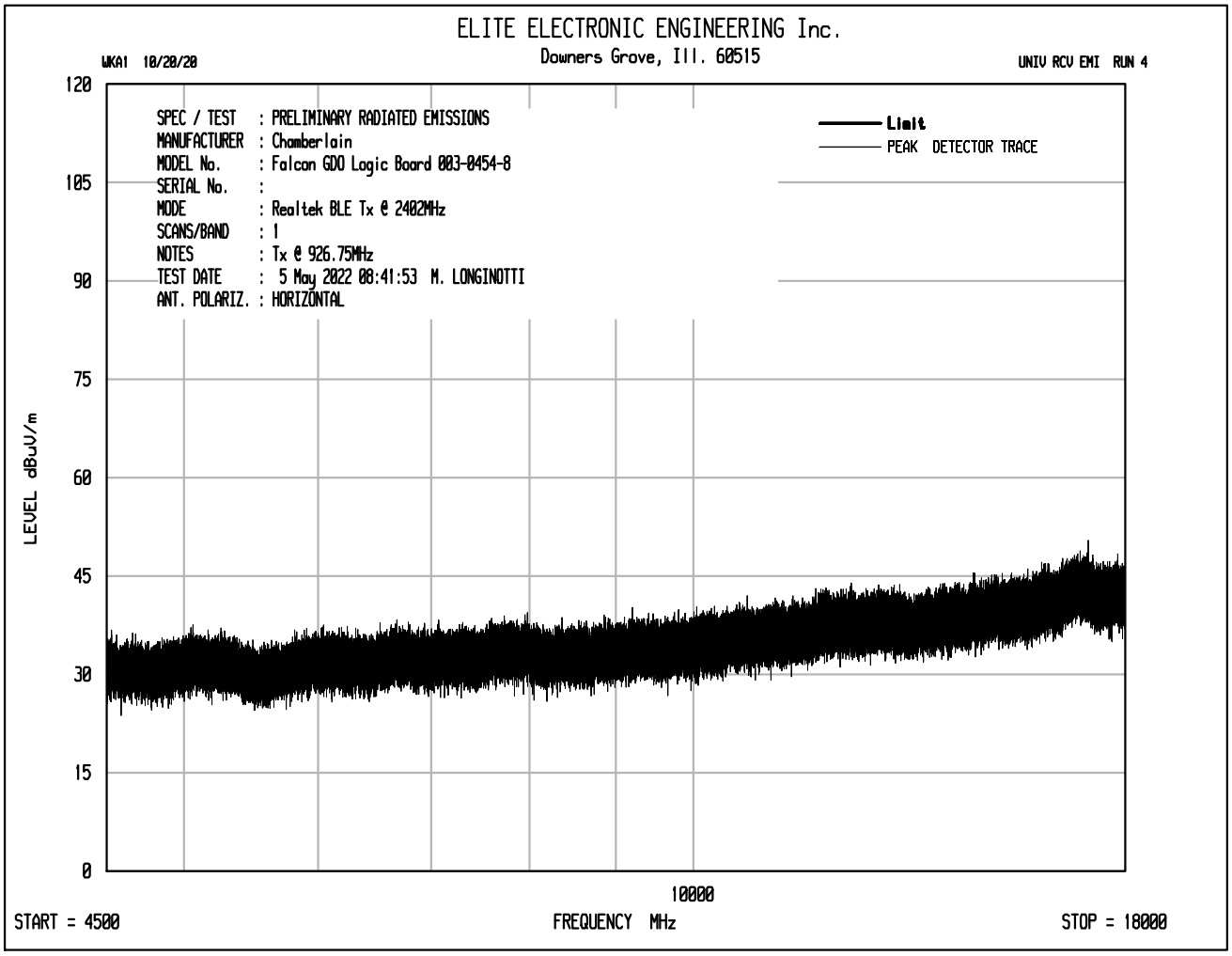

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 1
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Chamberlain
MODEL No. : Falcon GDO Logic Board 003-0454-8
SERIAL No. :
MODE : Realtek WiFi b 11MBPS,power=100, Tx @ 926.75Mhz
SCANS/BAND : 1
NOTES : SEC 3.0 BLE Tx @ 2402MHz, Com. BLE Tx @ 2480MHz
TEST DATE : 4 May 2022 16:48:49 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
◄926.75MHz 6th Harmonic
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 4500
FREQUENCY MHz
STOP = 18000

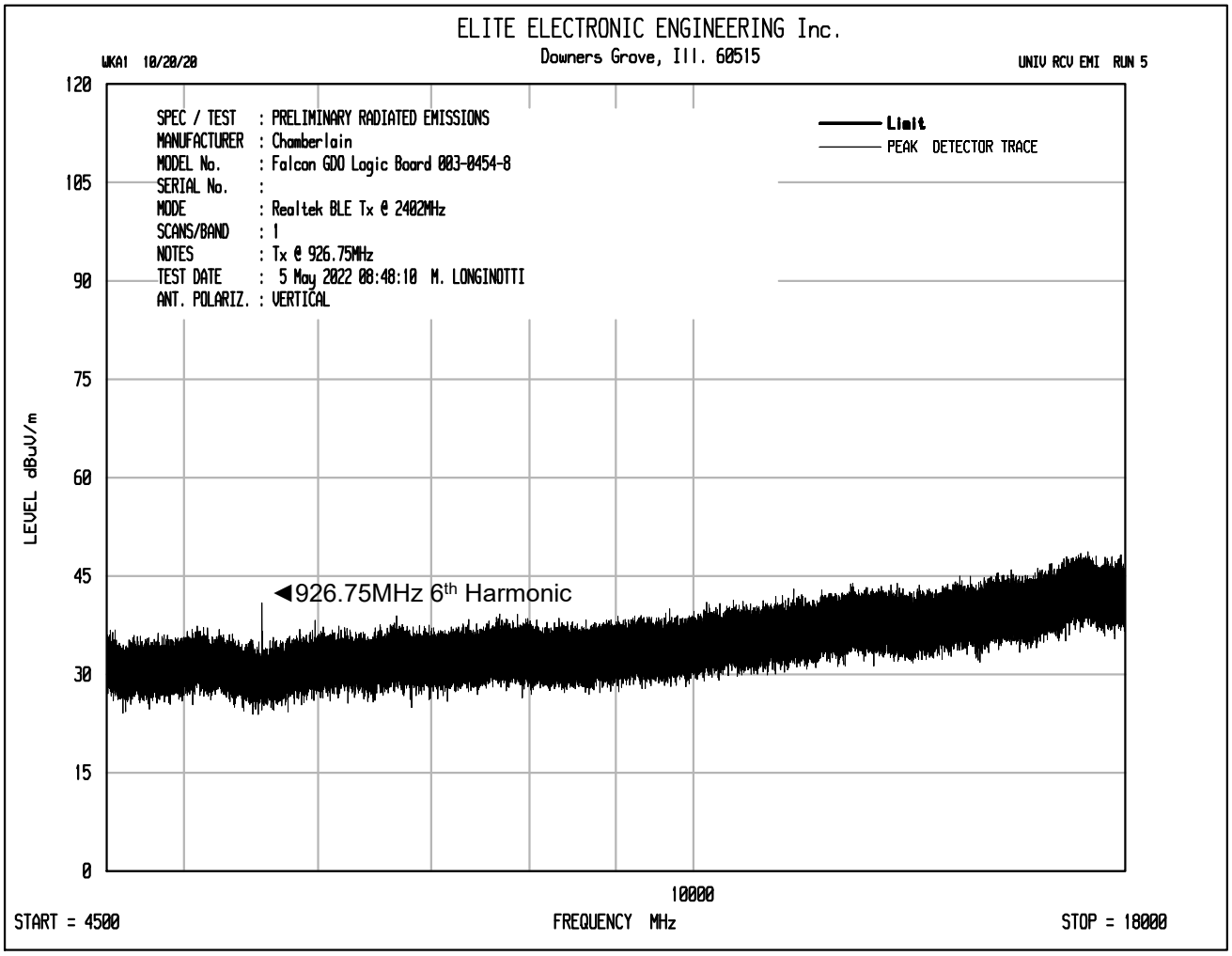

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 41
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Chamberlain
MODEL No. : Falcon GDO Logic Board 003-0454-8
SERIAL No. :
MODE : Realtek BLE Tx @ 2402MHz
SCANS/BAND : 3
NOTES : Tx @ 926.75MHz
TEST DATE : 5 May 2022 09:09:41 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
Limit
PEAK DETECTOR TRACE
926.75MHz Fundamental ▶
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 42
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Chamberlain
MODEL No. : Falcon GDO Logic Board 003-0454-8
SERIAL No. :
MODE : Realtek BLE Tx @ 2402MHz
SCANS/BAND : 3
NOTES : Tx @ 926.75MHz
TEST DATE : 5 May 2022 09:11:16 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
926.75MHz Fundamental ▶
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 4
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Chamberlain
MODEL No. : Falcon GDO Logic Board 003-0454-8
SERIAL No. :
MODE : Realtek BLE Tx @ 2402MHz
SCANS/BAND : 1
NOTES : Tx @ 926.75MHz
TEST DATE : 5 May 2022 08:22:15 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
Realtek BLE Fundamental ▶
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 5
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Chamberlain
MODEL No. : Falcon GDO Logic Board 003-0454-8
SERIAL No. :
MODE : Realtek BLE Tx @ 2402MHz
SCANS/BAND : 1
NOTES : Tx @ 926.75MHz
TEST DATE : 5 May 2022 08:27:06 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
Realtek BLE Fundamental ▶
926.75MHz 2nd Harmonic ▶
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 4
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Chamberlain
MODEL No. : Falcon GDO Logic Board 003-0454-8
SERIAL No. :
MODE : Realtek BLE Tx @ 2402MHz
SCANS/BAND : 1
NOTES : Tx @ 926.75MHz
TEST DATE : 5 May 2022 08:41:53 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 4500
FREQUENCY MHz
STOP = 18000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 5
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Chamberlain
MODEL No. : Falcon GDO Logic Board 003-0454-8
SERIAL No. :
MODE : Realtek BLE Tx @ 2402MHz
SCANS/BAND : 1
NOTES : Tx @ 926.75MHz
TEST DATE : 5 May 2022 08:48:10 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
◄926.75MHz 6th Harmonic
START = 4500
10000
FREQUENCY MHz
STOP = 18000

22. Scope of Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ELITE ELECTRONIC ENGINEERING, INC.
1516 Centre Circle
Downers Grove, IL 60515
Robert Bugielski (QA Manager) Phone: 630 495 9770 ext. 168
Email: rbugielski@elitetest.com
Craig Fanning (EMC Lab Manager) Phone: 630 495 9770 ext. 112
Email: cfanning@elitetest.com
Brandon Lugo (Automotive Team Leader) Phone: 630 495 9770 ext. 163
Email: blugo@elitetest.com
Richard King (FCC/Commercial Team Leader) Phone: 630 495 9770 ext. 123
Email: reking@elitetest.com
Website: www.elitetest.com

ELECTRICAL

Valid To: June 30, 2023 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	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)	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)
Radiated Emissions Anechoic	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); ECE Regulation 10.06 Annex 7 (Broadband) ECE Regulation 10.06 Annex 8 (Narrowband)

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]:
Vehicle Radiated Emissions	CISPR 12; CISPR 36; ICES-002; ECE Regulation 10.06 Annex 5
Bulk Current Injection (BCI)	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 *(Including Radar Pulse)*	ISO 11452-2; ISO 11452-5; 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
Radiated Immunity Reverb	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)*	ISO 11452-9; EMC-CS-2009.1 (RI115); FMC1278 (RI115)
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
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; 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 14
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

Test Technology:	Test Method(s) [1]:
Emissions (cont'd)	
Current Harmonics	IEC 61000-3-2; 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; 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
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

Test Technology:	Test Method(s) [1]:
Immunity (cont'd)	
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
Generic and Product Specific EMC Standards	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

Test Technology:	Test Method(s) [1]:
Canadian Radio Tests	RSS-102 (RF Exposure Evaluation only); 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)
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)

Test Technology:	Test Method(s) [1]:
OTA (Over the Air) Performance	
GSM, GPRS, EGPRS	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
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	
Electrical Measurements and Simulation	
AC Voltage / Current	
(1mV to 5kV) 60 Hz	FAA AC 150/5345-10H
(0.1V to 250V) up to 500 MHz	FAA AC 150/5345-43J
(1µA to 150A) 60 Hz	FAA AC 150/5345-44K
DC Voltage / Current	FAA AC 150/5345-46E
(1mV to 15-kV) / (1µA to 10A)	FAA AC 150/5345-47C
Power Factor / Efficiency / Crest Factor	FAA EB 67D
(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.1 [2]

Rule Subpart/Technology	Test Method	Maximum Frequency (MHz)
Unintentional Radiators		
Part 15B	ANSI C63.4:2014	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.1[2]

Rule Subpart/Technology	Test Method	Maximum Frequency (MHz)
Industrial, Scientific, and Medical Equipment Part 18	FCC MP-5 (February 1986)	40000
Intentional Radiators Part 15C	ANSI C63.10:2013	40000
Unlicensed Personal Communication Systems Devices Part 15D	ANSI C63.17:2013	40000
U-NII without DFS Intentional Radiators Part 15E	ANSI C63.10:2013	40000
U-NII with DFS Intentional Radiators Part 15E	FCC KDB 905462 D02 (v02)	40000
UWB Intentional Radiators Part 15F	ANSI C63.10:2013	40000
BPL Intentional Radiators Part 15G	ANSI C63.10:2013	40000
White Space Device Intentional Radiators Part 15H	ANSI C63.10:2013	40000
Commercial Mobile Services (FCC Licensed Radio Service Equipment) Parts 22 (cellular), 24, 25 (below 3 GHz), and 27	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
General Mobile Radio Services (FCC Licensed Radio Service Equipment) 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
Citizens Broadband Radio Services (FCC Licensed Radio Service Equipment) Part 96	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.1[2]

Rule Subpart/Technology	Test Method	Maximum Frequency (MHz)
Maritime and Aviation Radio Services		
Parts 80 and 87	ANSI/TIA-603-E; ANSI C63.26:2015	40000
Microwave and Millimeter Bands Radio Services		
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
Broadcast Radio Services		
Parts 73 and 74 (below 3 GHz)	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
Signal Boosters		
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 19th day of May 2021.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1786.01
Valid to June 30, 2023

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