Engineering Test Report No. 1904265-01 Rev. A	
Report Date	January 23, 2020
Manufacturer Name	Chamberlain Group, Inc.
Manufacturer Address	300 Windsor Dr Oak Brook, IL 60523
Product Name Brand/Model No.	001D9586
Date Received	December 12th 2019
Test Dates	December 12th, 2019 through January 9th , 2020
Specifications	FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.207 and 15.247 for Digital Modulation Intentional Radiators Operating within the band 2400-2483.5MHz FCC “Code of Federal Regulations” Title 47, Part15, Subpart 15B, Section 15.107 and 15.109 for Receivers Innovation, Science, and Economic Development Canada RSS-247 Innovation, Science, and Economic Development Canada RSS-GEN
Test Facility	Elite Electronic Engineering, Inc. 1516 Centre Circle, Downers Grove, IL 60515
Signature	Richard E. King
Tested by	Richard E. King
Signature	Raymond J Klouda
Approved by	Raymond J. Klouda, Registered Professional Engineer of Illinois – 44894

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 15.247 for transceivers and RSS-247 For Transceivers test specification(s). The data presented in this test report pertains to the EUT on the test date(s) 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
–	27 Jan 2020	Initial Release of Engineering Test Report No. 1904265-01 Rev. A
A	03 Feb 2020 By Rick King	- Changed 194265-01 to 194265-01 Rev. A throughout report. - Changed the model number from 001D9585 BLE to 001D9586 throughout report. - Section 12.1: Added the output power setting. - Page 25: Removed references to 18dBm power.

2. Introduction

This document presents the results of a series of electromagnetic compatibility (EMC) tests that were performed on one (1) Phoenix Transceiver 001D9586 (hereinafter referred to as the Equipment Under Test (EUT)). The EUT was identified as follows:

Description	Part #	S/N
Phoenix Transceiver	001D9586	None given

The EUT listed above was used throughout the test series.

3. Test Specification(s)

This document presents the technical information of the EUT as tested to a series of electromagnetic compatibility (EMC) tests. This information is listed as follows:

Applicant FCC FRN Company number (If known)	N/A
Applicant IC company number (If known)	N/A
FCC ID Number (If known)	N/A
IC UPN number (If Known)	N/A
FCC test site(s) Reg. number	269750
IC test site(s) Reg. number	2987A
FCC Test Speciation	FCC 15.247
RSS number and Issue number	RSS-247 Issue 2, Feb 2017
Frequency band	2400–2480 MHz
Frequency Min (MHz)	2402 BLE
Frequency Mid (MHz)	2442 BLE
Frequency Max (MHz)	2480 BLE
RF power Max (W), Conducted	3.63mW (5.6 dBm)
Field strength, Units @ distance	N/A
Measured BW (kHz)	1025
Calculated BW (kHz), as per TRC-43	N/A
Type of modulation	GFSK, π/4-DQPSK BLE
Transmitter spurious, dBµV/m @ 3 m	49.0 dBµV/m @ 3Meters
Emission classification	F1D BLE
Power requirements	120VAC 60Hz

4. Test Specification(s)

The tests were performed to selected portions of, and in accordance with the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.207 and 15.247 for Intentional Radiators Operating within the 2400-2483.5 MHz band:

Federal Communications Commission "Code of Federal Regulations", Title 47, Part 15, Subpart C
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”
“Federal Communications Commission Office of Engineering and Technology Laboratory Division, Guidance For Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating Under Section 15.247 of the FCC Rules” April 2, 2019, KDB 558074 D01 DTS Meas Guidance v05
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-247 Issue 2, February 2017, Innovation, Science, and Economic Development Canada, “Spectrum

Management and Telecommunications, Radio Standards Specification, Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices"

5. Laboratory Conditions

The temperature at the time of the test was 22.6°C, and the relative humidity was 17%.

6. Summary

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

Test Description	Results
Transmitter RF Conducted Emissions Test (AC Mains)	Conforms
Transmitter 6dB Bandwidth Test	Conforms
Transmitter 99% Bandwidth Test	Conforms
Transmitter Average Conducted Output Power Test	Conforms
Transmitter Power Spectral Density Test	Conforms
Transmitter Low Band Edge Test	Conforms
Transmitter EIRP Test	Conforms
Transmitter Duty Cycle Correction Factor Test	N/A
Transmitter Spurious Radiated Emissions Test	Conforms
Transmitter High Band Edge Test	Conforms

7. Test Plan

No test plan was provided. Instructions were provided by personnel from Chamberlain Group, Inc. and used in conjunction with the FCC 15.247 for transceivers and RSS-247 For Transceivers specification(s).

8. Grounding

The EUT was ungrounded during the tests.

9. Firmware/Software

For all tests, the EUT had Firmware Version 6.2 loaded onto the device to provide correct load characteristics. The EUT requires Software RTLBTAPP Version 5.22.40 to control the device during testing.

10. Modifications Made to EUT

No modifications were made to the EUT during the testing.

11. Deviations from Specification(s)

No deviations from the specification(s) were made during the testing.

12. Modes of Operation

The EMC tests were performed with the EUT(s) operating in one or more of the test modes described below. See the specific test section for the applicable test modes.

12.1. Transmit/Standby

The EUT was energized. The EUT was programmed for Standby or to continuously transmit separately at each of the following channels:

- Transmit at 2402MHz; 4.5dBm
- Transmit at 2440MHz; 4.5dBm
- Transmit at 2480MHz; 4.5dBm
- Standby

13. Test Method

The tests were performed using the referenced methods described in the FCC 15.247 for transceivers and RSS-247 For Transceivers test specification(s). The specific test sections and specification references are called out in the individual test sections.

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 (dBuV) = MTR (dBuV) + 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 pre-amplifier 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 (dBuV/m) = MTR (dBuV) + AF (dB/m) + CF (dB) + (- PA (dB)) + DC (dB)

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

Formula 2: FS (uV/m) = AntiLog [(FS (dBuV/m))/20]

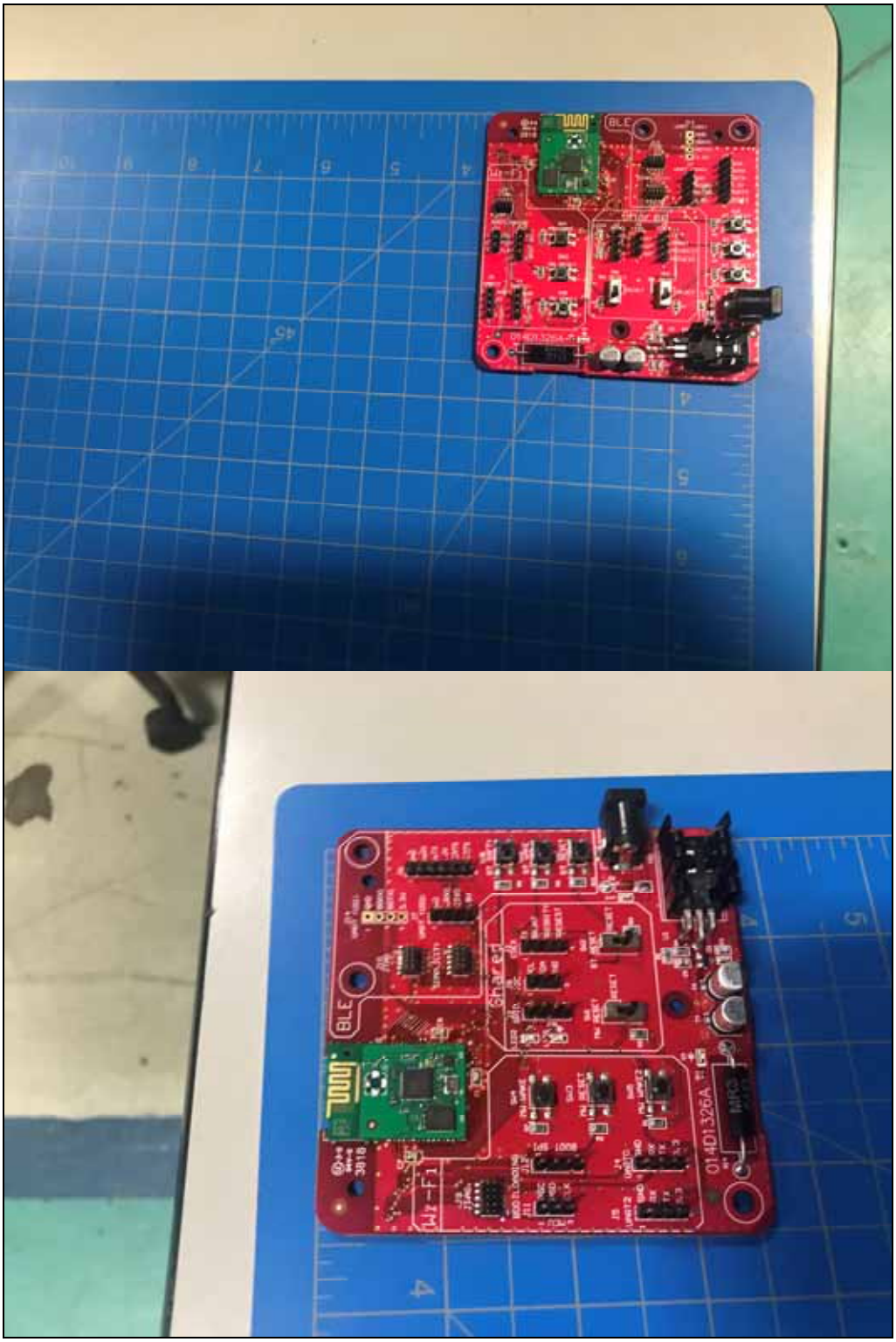
15. Statement of Conformity

The Chamberlain Group, Inc. Phoenix Transceiver, Model No. 001D9586, No Serial No. assigned, did fully conform to the selected requirements of FCC 15.247 for transceivers and RSS-247 For Transceivers.

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 15.247 for transceivers and RSS-247 For Transceivers test specification(s). 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
APW0	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-30-20G20R6G	PL2926/0646	20GHZ-26.5GHZ	10/2/2019	10/2/2020
APW11	PREAMPLIFIER	PMI	PE2-35-120-5R0-10-12-SFF	PL11685/1241	1GHZ-20GHZ	4/8/2019	4/8/2020
GSFB	OSP120 BASE UNIT	ROHDE & SCHWARZ	OSP120	101246	---	4/1/2019	4/1/2020
GSFE	OSP120	ROHDE & SCWARZ	OSP120	101288	.01-40GHZ	5/2/2019	5/2/2020
NHG1	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ	NOTE 1	
NTA4	BILOG ANTENNA	TESEQ	6112D	46660	20-2000GHZ	9/23/2019	9/23/2020
NWQ1	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS-LINDGREN	3117	66655	1GHZ-18GHZ	4/10/2018	4/10/2020
PLF2	CISPR16 50UH LISN	ELITE	CISPR16/70A	002	.15-30MHz	4/23/2019	4/23/2020
PLF4	CISPR16 50UH LISN	ELITE	CISPR16/70A	003	.15-30MHz	4/23/2019	4/23/2020
RBG0	EMI ANALYZER	ROHDE & SCHWARZ	ESW44	101533	10HZ-44GHZ	12/5/2018	1/5/2020
RBG2	EMI ANALYZER	ROHDE & SCHWARZ	ESW44	101591	2HZ-44GHZ	2/21/2019	2/21/2020
SES0	24VDC POWER SUPPLY	P-TRANS	FS-32024-1M	001	18-27VDC	NOTE 1	
T1N6	10DB 20W ATTENUATOR	NARDA	766-10	---	DC-4GHZ	5/14/2018	5/14/2020
VBR8	CISPR EN FCC CE VOLTAGE.exe						
WKA1	SOFTWARE, UNIVERSAL RCV EMI	ELITE	UNIV_RCV_EMI	1	---	I/O	
XLT5	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	---	DC-2GHZ	1/10/2020	1/10/2022
XOA2	WAVE-TO-COAX ADAPTER	HEWLETT PACKARD	R281B	01138	26.5-65GHZ	NOTE 1	
XPQ4	HIGH PASS FILTER	K&L MICROWAVE	11SH10-4800/X20000-O/O	1	4.8-20GHZ	9/6/2019	9/6/2021
XPR0	HIGH PASS FILTER	K&L MICROWAVE	11SH10-4800/X20000	001	4.8-20GHZ	9/6/2019	9/6/2021

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. RF Conducted Emissions Test (AC Mains)

Manufacturer	Chamberlain Group, Inc.
Product	Phoenix Transceiver
Model	001D9586
Mode	Transmit/Standby

Information	
Size of EUT	3.5 in by 3.5 in
Setup Format	Tabletop
Height of Support	80cm below 1GHz
Type of Test Site	Semi-anechoic
Power Cable	Three wire 6 feet long
Note	

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

Procedures

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.

a) The EUT was operated in the Transmit mode.
b) Measurements were first made on the Voltage high line.
c) The frequency range from 150 kHz to 30 MHz was broken up into smaller frequency sub-bands.
d) Conducted emissions measurements were taken on the first frequency sub-band using a peak detector.
e) 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.)
f) Steps (d) and (e) 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.
g) Steps (c) through (f) were repeated on the Voltage return line.
h) Steps (b) through (g) were repeated with the EUT operated in the Standby mode.

Test Setup for RF Conducted Emissions (AC Mains)

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VBR8 04/23/2015

Manufacturer	:	Chamberlain Group, Inc.
Model	:	001D9586
DUT Mode	:	Standby
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Dec 18, 2019 01:44:02 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

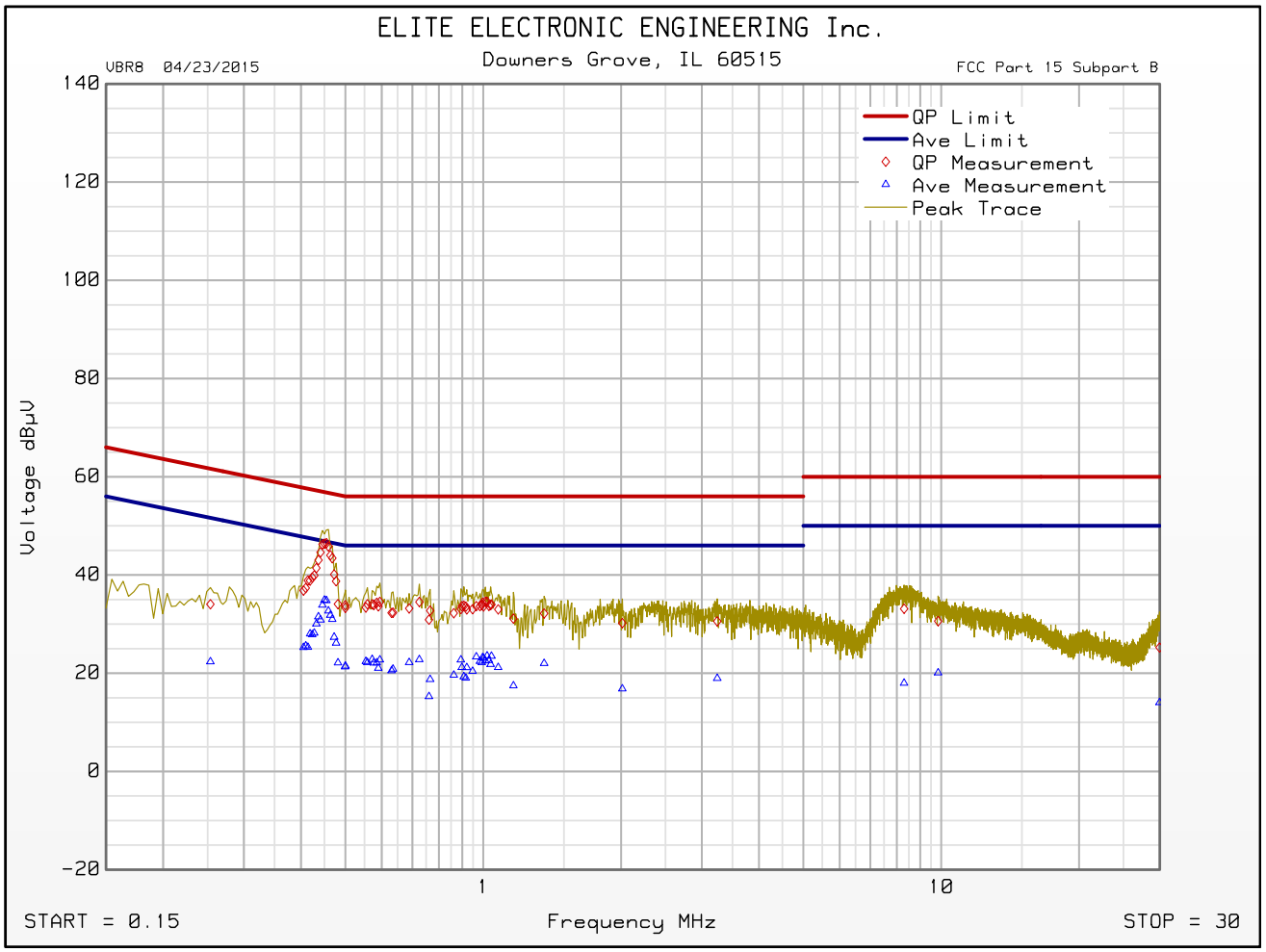
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.254	34.0	61.6		22.3	51.6	
0.455	46.5	56.8		34.8	46.8	
0.595	34.5	56.0		22.7	46.0	
1.011	34.6	56.0		22.6	46.0	
1.358	32.2	56.0		22.0	46.0	
2.012	30.2	56.0		16.8	46.0	
3.244	30.6	56.0		19.0	46.0	
8.299	33.1	60.0		18.0	50.0	
9.846	30.6	60.0		20.1	50.0	
29.980	25.2	60.0		14.0	50.0	

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VBR8 04/23/2015

Manufacturer	:	Chamberlain Group, Inc.
Model	:	001D9586
DUT Mode	:	Standby
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Dec 18, 2019 01:44:02 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VBR8 04/23/2015

Manufacturer	:	Chamberlain Group, Inc.
Model	:	001D9586
DUT Mode	:	Standby
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Dec 18, 2019 01:37:23 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

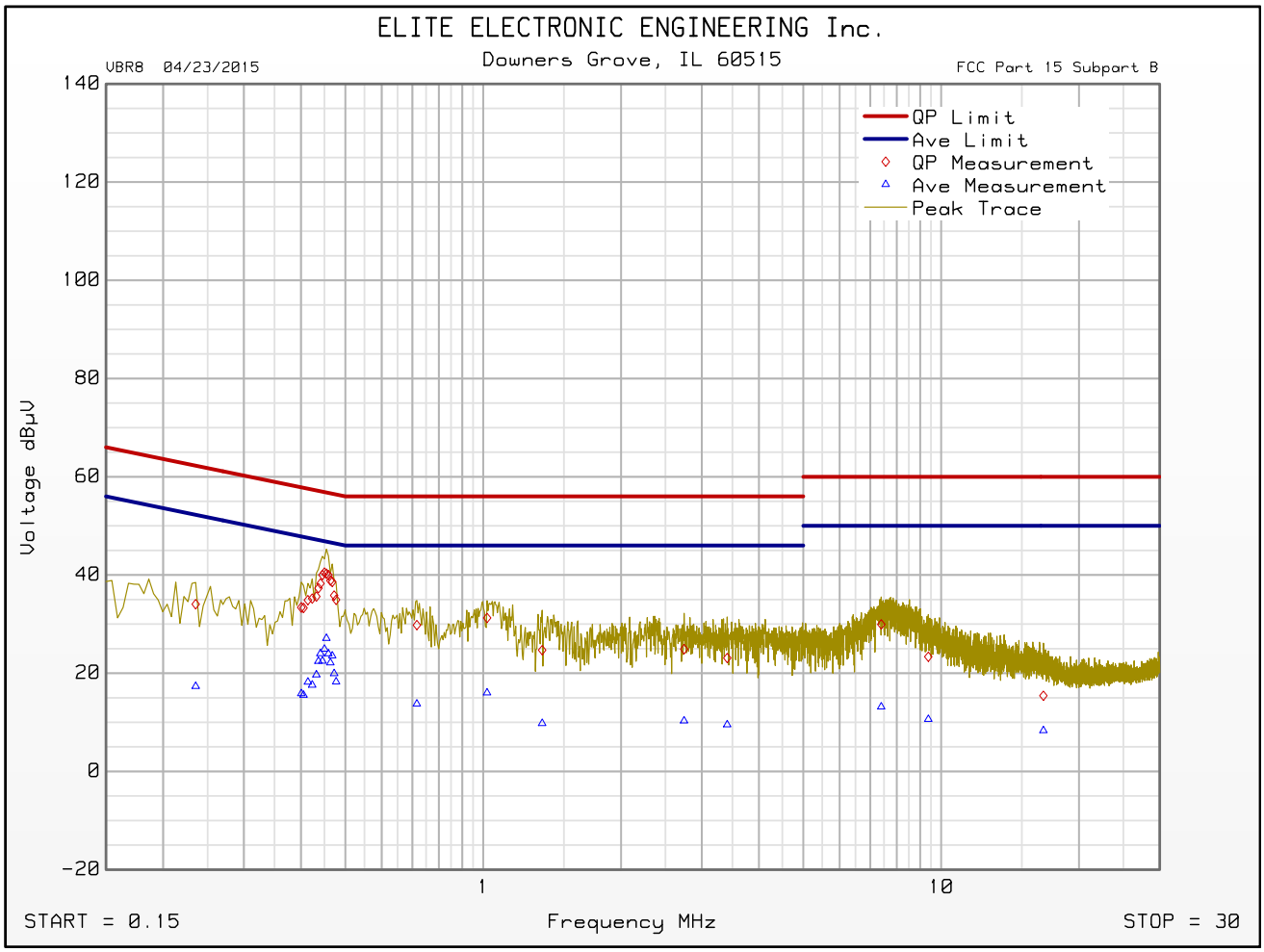
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.236	34.1	62.3		17.3	52.3	
0.450	40.5	56.9		24.9	46.9	
0.716	29.8	56.0		13.8	46.0	
1.020	31.3	56.0		16.0	46.0	
1.345	24.7	56.0		9.8	46.0	
2.745	24.9	56.0		10.3	46.0	
3.410	23.1	56.0		9.5	46.0	
7.399	30.0	60.0		13.2	50.0	
9.374	23.3	60.0		10.6	50.0	
16.723	15.4	60.0		8.3	50.0	

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VBR8 04/23/2015

Manufacturer	:	Chamberlain Group, Inc.
Model	:	001D9586
DUT Mode	:	Standby
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Dec 18, 2019 01:37:23 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VBR8 04/23/2015

Manufacturer	:	Chamberlain Group, Inc.
Model	:	001D9586
DUT Mode	:	Transmitting
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	Channel 6
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Dec 18, 2019 02:37:59 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

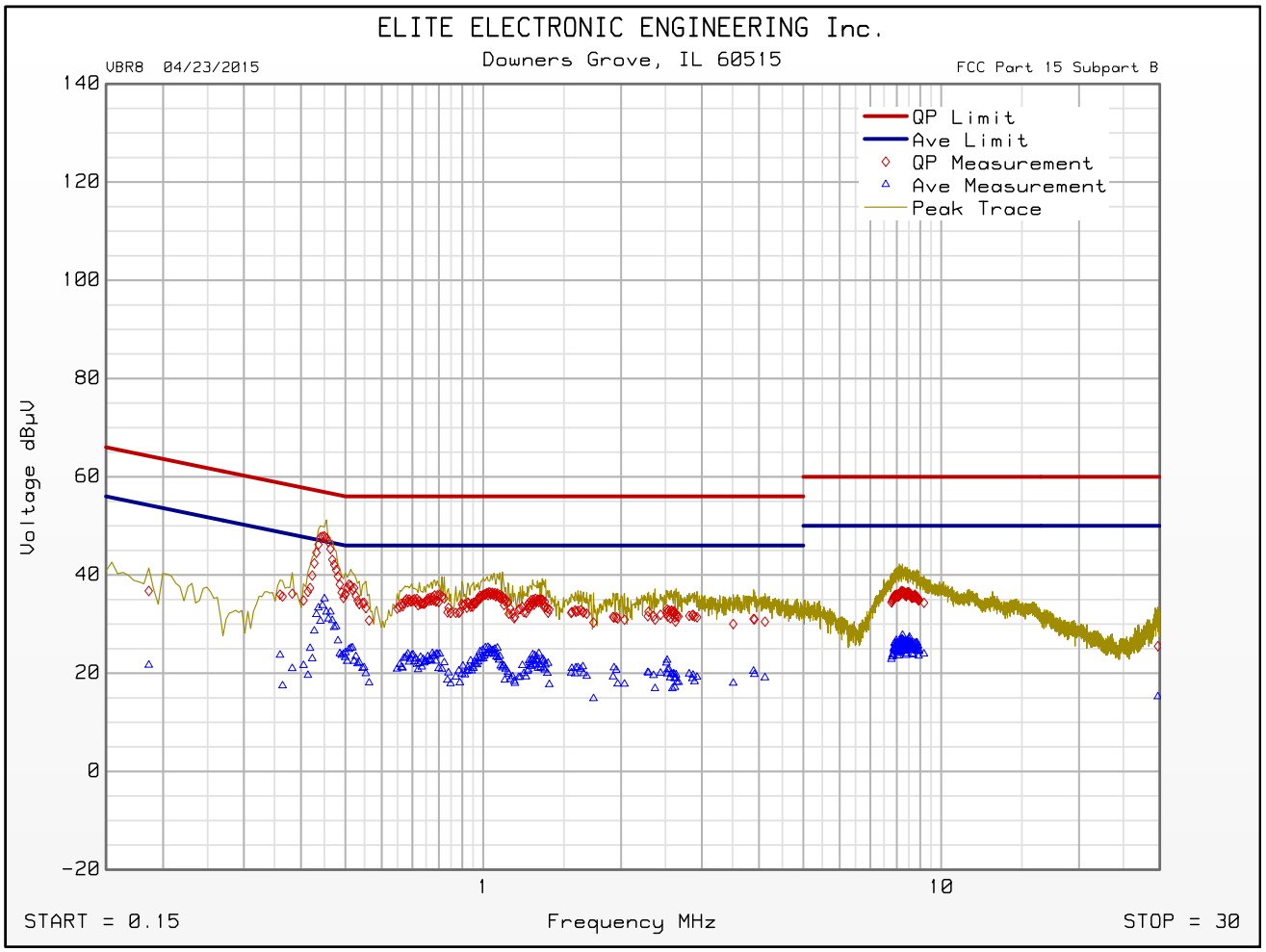
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.186	36.8	64.2		21.7	54.2	
0.450	47.9	56.9		35.2	46.9	
0.509	38.1	56.0		24.9	46.0	
1.029	36.4	56.0		24.1	46.0	
1.300	35.2	56.0		21.7	46.0	
2.520	33.0	56.0		22.7	46.0	
3.892	31.0	56.0		20.4	46.0	
8.209	36.8	60.0		26.7	50.0	
9.171	34.3	60.0		23.9	50.0	
29.737	25.5	60.0		15.2	50.0	

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VBR8 04/23/2015

Manufacturer	:	Chamberlain Group, Inc.
Model	:	001D9586
DUT Mode	:	Transmitting
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	Channel 6
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Dec 18, 2019 02:37:59 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VBR8 04/23/2015

Manufacturer	:	Chamberlain Group, Inc.
Model	:	001D9586
DUT Mode	:	Transmitting
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	Channel 6
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Dec 18, 2019 02:59:47 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

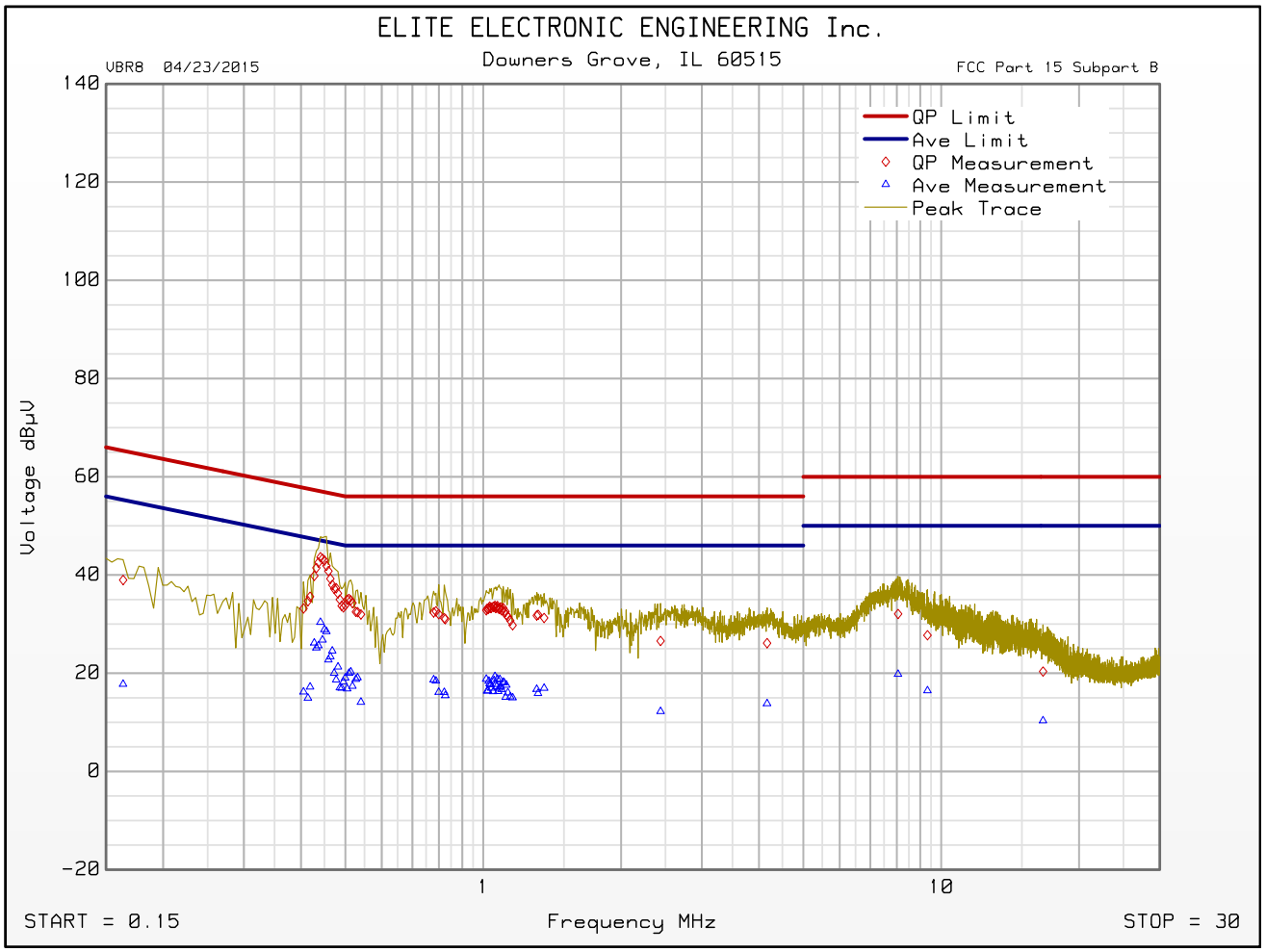
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.164	39.0	65.3		17.8	55.3	
0.441	43.6	57.0		30.4	47.0	
0.509	35.1	56.0		20.0	46.0	
1.060	33.7	56.0		19.3	46.0	
1.318	31.9	56.0		15.9	46.0	
2.439	26.6	56.0		12.2	46.0	
4.166	26.1	56.0		13.8	46.0	
8.051	32.1	60.0		19.8	50.0	
9.333	27.7	60.0		16.5	50.0	
16.687	20.3	60.0		10.3	50.0	

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VBR8 04/23/2015

Manufacturer	:	Chamberlain Group, Inc.
Model	:	001D9586
DUT Mode	:	Transmitting
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	Channel 6
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Dec 18, 2019 02:59:47 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit

20. Antenna Port Conducted Emissions Tests

Manufacturer	Chamberlain Group, Inc.
Product	Phoenix Transceiver
Model	001D9586
Serial No	S/N1
Mode	Transmit per Paragraph 11.1

Information	
Setup Format	Tabletop
Height of Support (radiated spurious emissions)	80cm below 1GHz; 1.5M above 1GHz
Type of Test Site	Semi-anechoic chamber
Type of Antennas Used	Below 1GHz: Bilog (or equivalent) Above 1GHz: Double-ridged waveguide (or equivalent)
Highest Internal Frequency of the EUT:	2.4 GHz BLE transmitter and 2.4GHz WiFI transmitter
Highest Measurement Frequency:	25GHz
Notes	The cables were manually maximized during the preliminary emissions sweeps. The cable arrangement which resulted in the worst-case emissions was utilized.

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

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

Procedures

6dB Bandwidth (DTS Bandwidth)

C63.10-2013 section 11.8 Option 1:

a) The following settings were employed on the EMI Test Receiver:

1. Center Frequency = Transmit Frequency of the EUT
2. Frequency Span = 2 x Occupied Channel Bandwidth
3. RBW = 100kHz
4. VBW = 3 x RBW
5. Detector Mode = Max Peak
6. Trace Mode = Max Hold

b) Allow the trace to stabilize.

c) Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).

d) Determine the 6dB down amplitude.

e) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope trace, such that each marker is at or slightly below the 6dB down amplitude determined in step d). If a marker is below this 6dB down amplitude value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers.

99% Bandwidth (OBW)

C63.10-2013 section 6.9.3:

a) The following settings were employed on the EMI Test Receiver:

1. Center Frequency = Transmit Frequency of the EUT
2. Frequency Span = Between 1.5 and 5 times the OBW
3. RBW = Between 1% to 5% of the OBW
4. VBW = Approximately 3 x RBW
5. Steps 1) through 4) might require iterations to adjust within the specified range
6. Detector Mode = Max Peak
7. Trace Mode = Max Hold

b) Allow the trace to stabilize.

c) Use the 99% power bandwidth function of the EMI receiver.

Average Conducted Output Power

C63.10-2013 section 11.9.2.3.2:

a) The antenna port of the EUT was connected to the input of a gated RF average power meter. The gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level.

b) The average conducted output power was recorded.

Average Power Spectral Density (Duty Cycle ≥ 98%)

C63.10-2013 section 11.10.3

a) The following settings were employed on the EMI Test Receiver:

1. Center Frequency = Transmit Frequency of the EUT
2. Frequency Span = At least 1.5 times the OBW
3. RBW = 3kHz ≤ RBW ≤ 100kHz
4. VBW ≥ 3 x RBW
5. Detector Mode = RMS

6. Number of Measurement Points ≥ 2 x span/RBW
7. Sweep Time = Auto Couple
8. Employ RMS mode over a minimum of 100 traces

b) Use the peak marker function to determine the maximum amplitude level within the RBW.

c) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

Low Band Edge

C63.10-2013 section 11.11:

a) Reference Level Measurement

1. Start Frequency = 2400MHz
2. Stop Frequency = 2483.5MHz
3. RBW = 100kHz
4. VBW ≥ 3 x RBW
5. Detector Mode = Max Peak
6. Trace Mode = Max Hold
7. Sweep Time = Auto

b) Allow the trace to stabilize

c) Use the peak marker function to determine the maximum level

d) Emission Level Measurement

1. Start Frequency = 2310MHz
2. Stop Frequency = 2400MHz
3. RBW = 100kHz
4. VBW ≥ 3 x RBW
5. Detector Mode = Max Peak
6. Trace Mode = Max Hold
7. Sweep Time = Auto

e) Allow the trace to stabilize

f) Use the peak marker function to determine the maximum level

g) The two sweeps were combined and plotted.

h) Ensure that the amplitude of all unwanted emissions are attenuated by at least the minimum requirements.

High Band Edge

1) The EUT was set to transmit continuously at the channel closest to the high band-edge.
2) A double ridged waveguide was placed 3 meters away from the EUT. The antenna was connected to the input of a spectrum analyzer.
3) The center frequency of the analyzer was set to the high band edge (2483.5MHz)
4) The resolution bandwidth was set to 1MHz.
5) To ensure that the maximum or worst case emission level was measured, the following steps were taken:

   a. The EUT was rotated so that all of its sides were exposed to the receiving antenna.
   b. Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
   c. The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.

6) The highest measured peak reading was recorded.
7) The highest measured average reading was recorded.

Duty Cycle Correction Factor

C63.10-2013 section 11.6

a) The following settings were employed on the EMI Test Receiver:

1. Center Frequency = Transmit Frequency of the EUT
2. Frequency Span = 0Hz
3. RBW ≥ OBW if possible; otherwise set RBW as large as possible
4. VBW ≥ RBW
5. Detector Mode = Peak or RMS
6. Number of Measurement Points ≥ 2 x span/RBW

b) Measure the ON and OFF times of the transmitted signal

c) Duty Cycle (D) = ((ON TIME)/((ON TIME) + (OFF TIME)))

EIRP

The EUT was placed on a 1.5 meter high non-conductive stand and set to transmit. A double ridged waveguide antenna was placed at a test distance of 3 meters from the EUT. The resolution bandwidth (RBW) of the spectrum analyzer was set to greater than the 6dB bandwidth. The EUT was maximized for worst case emissions (or maximum output power) at the measuring antenna. The maximum meter reading was recorded.
The equivalent power was determined from the field intensity levels measured at 3 meters using the substitution method. To determine the emission power, a double ridged waveguide antenna was then set in place of the EUT and connected to a calibrated signal generator. 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 then corrected to compensate for cable loss and antenna gain.

Since a quasi-peak detector and an average detector requires a long integration times, it is not practical to automatically sweep through the quasi-peak and average levels. Therefore, radiated emissions from the EUT were first scanned using a peak detector and automatically plotted. The frequencies where significant emission levels were noted were then re-measured using the quasi-peak detector or average detector.

The broadband measuring antenna was positioned at a 3 meter distance from the EUT. The frequency range from 30MHz to 1GHz was investigated using a peak detector function with the bilog antenna at several heights, horizontal and vertical polarization, and with several different orientations of the EUT with respect to the antenna. The frequency range from 1GHz to 25GHz was investigated using a peak detector function with the double ridged waveguide antenna at several heights, horizontal and vertical polarization, and with several different orientations of the EUT with respect to the antenna. The maximum levels for each antenna polarization were plotted.

Final radiated emissions were performed on all significant broadband and narrowband emissions found in the exploratory sweeps using the following methods:

1) Measurements from 30MHz to 1GHz were made using a quasi-peak detector and a broadband bilog antenna. Measurements above 1GHz were made using an average detector and a broadband double ridged waveguide antenna.
2) To ensure that maximum or worst case, emission levels were measured, the following steps were taken:
   a) The EUT was rotated so that all sides were exposed to the receiving antenna.
   b) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
   c) The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.
   d) For hand-held or body-worn devices, the EUT was rotated through three orthogonal axes to determine which orientation produces the highest emission relative to the limit.

Test Setup for Radiated Emissions: 1GHz to 18GHz, Horizontal Polarization

Test Setup for Radiated Emissions: 1GHz to 18GHz, Vertical Polarization

Test Setup for Radiated Emissions: Above 18GHz, Horizontal Polarization

Test Setup for Radiated Emissions: Above 18GHz, Vertical Polarization

FCC Part 47 §15.247 2400-2483.5 MHz 2018

DUT Information

DUT Name:	001D9586
Manufacturer:	Chamberlain
Serial Number:	
Hardware Rev:	
Software Rev:	
Comment:	

Frequencies

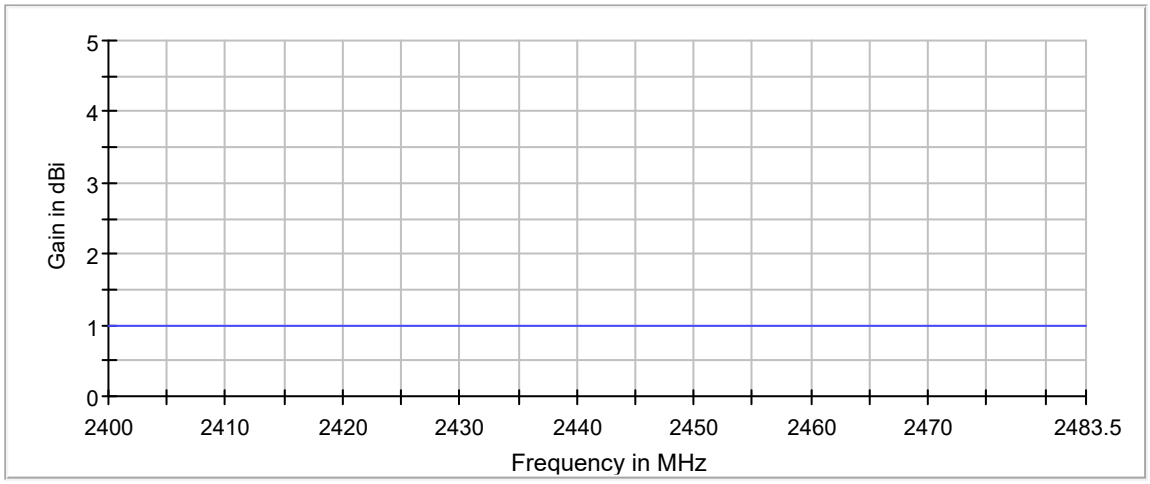
(2402 MHz) (2442 MHz) (2480 MHz)

Bandwidths

1 MHz (1 MHz)

DUT Settings

No. of transmission chains	1
Equipment Type	Other
Digital Modulation	Yes
Frequency Hopping	No



Hardware Setup: WMS Measurements\TS8997

Spectrum Analyzer:	SA ESW 44 (SA ESW 44) @ VISA (ADR TCPIP::192.168.48.148::inst0::instr), SN 1328.4100K44/101533, FW 1.50 SP1
Vector Generator:	VG SMBV100A (VG SMBV100A) @ VISA (ADR TCPIP::192.168.48.149::inst0::instr), SN 260452, FW 3.1.18.2-3.01.130.48.1
Generator:	SMB100A (SMB100A) @ VISA (ADR TCPIP::192.168.48.150::inst0::instr)
OSP:	OSP-B157W (OSP-B157W) @ VISA (ADR TCPIP::192.168.48.157::inst0::instr), SN 1527.1144. /, FW 1.24.0.10

Emission Bandwidth 20 dB (2402 MHz; 1 MHz)

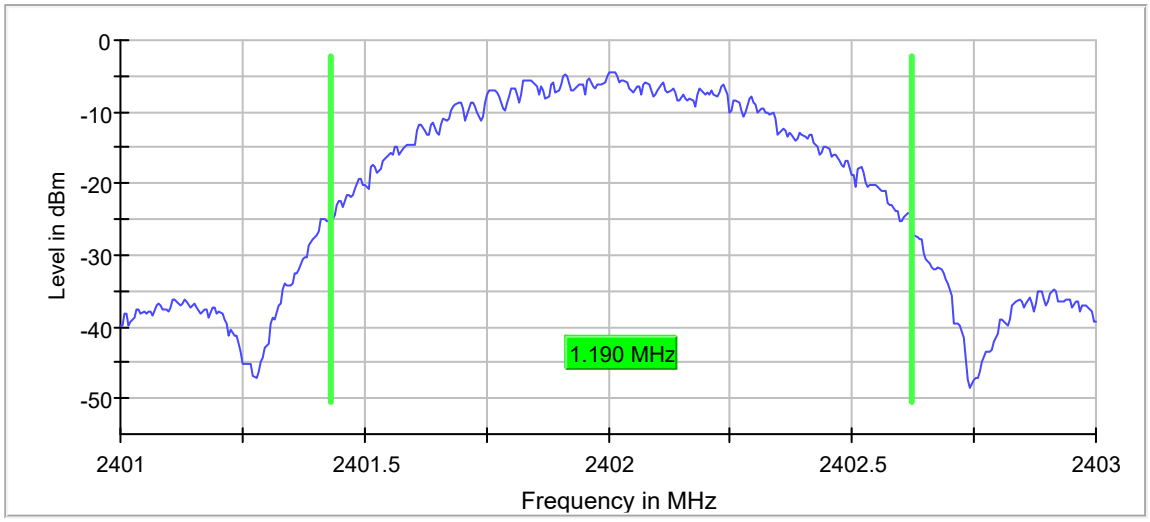
Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.8.1

20 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2402.000000	1.190000	---	---	2401.432500	2402.622500

(continuation of the "20 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2402.000000	-4.4	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40100 GHz	2.40100 GHz
Stop Frequency	2.40300 GHz	2.40300 GHz
Span	2.000 MHz	2.000 MHz
RBW	10.000 kHz	>= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
Sweep Points	400	~ 400
Sweep time	419.000 µs	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	25.000 dB	AUTO
Detector	Max Peak	Max Peak
Sweep Count	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweep type	FFT	AUTO
Preamp	off	off
Stable mode	Trace	Trace
Stable value	0.50 dB	0.50 dB
Run	8 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.06 dB	0.50 dB

Minimum Emission Bandwidth 6 dB (2402 MHz; 1 MHz)

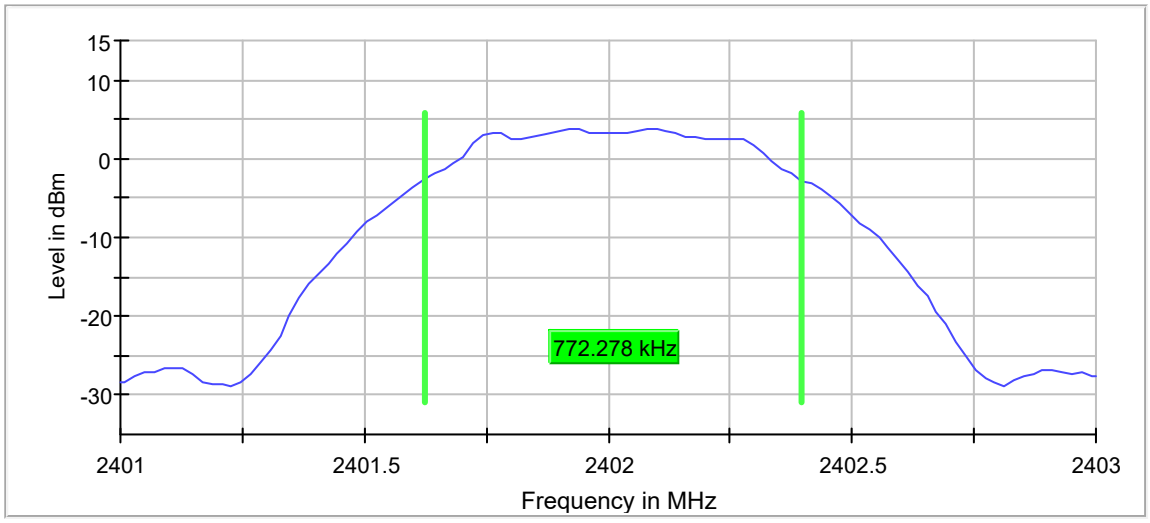
Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.8.1

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2402.000000	0.772278	0.500000	---	2401.623762	2402.396040

(continuation of the "6 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2402.000000	3.8	PASS

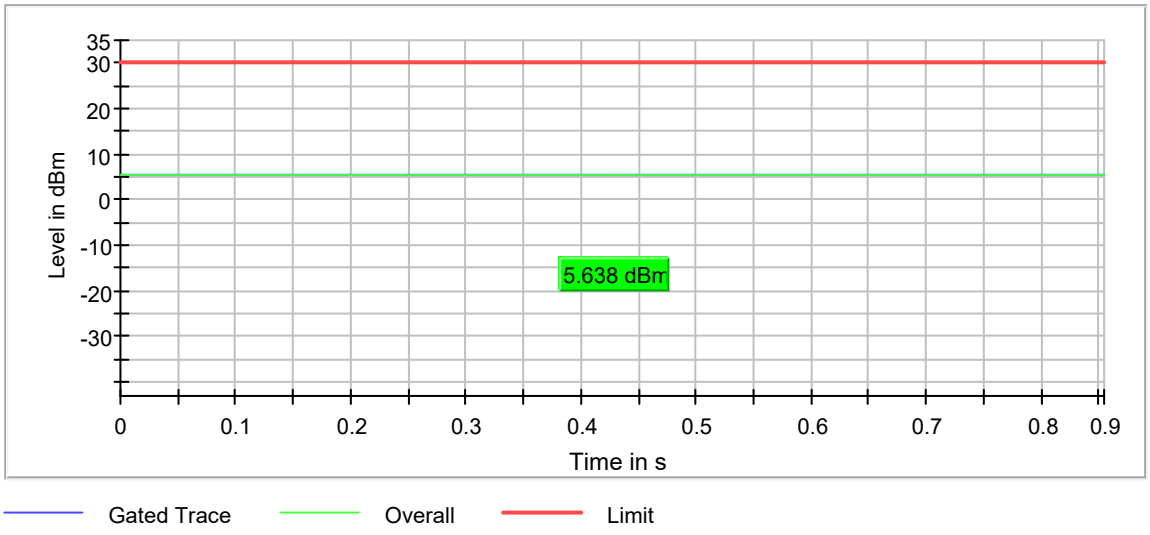


RF output power (2402 MHz; 1 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.9.2.3.2

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2402.000000	5.6	30.0	5.6	85.626	PASS

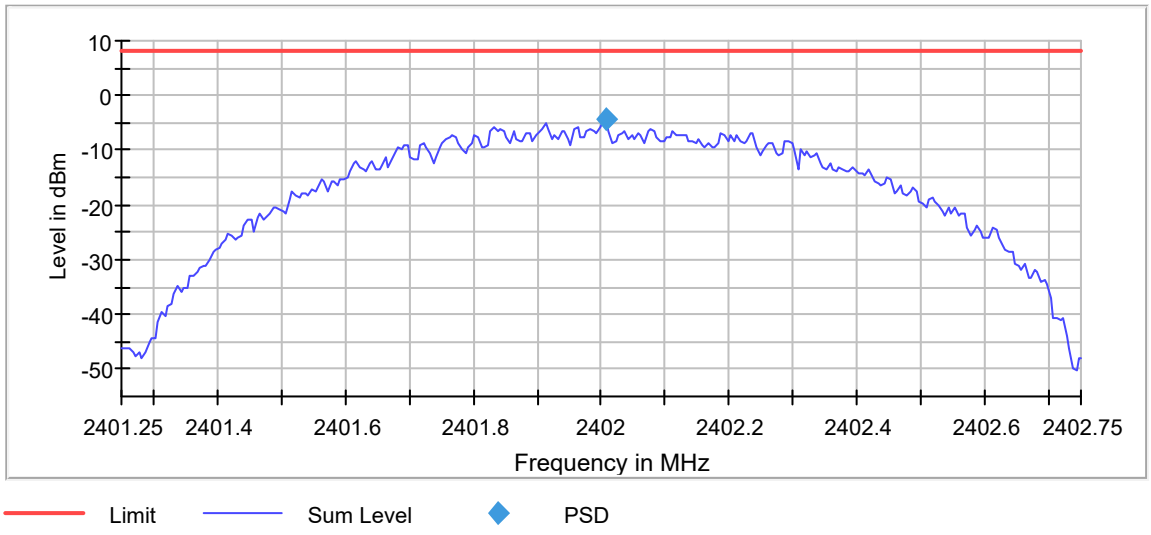


Power Spectral Density (2402 MHz; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), (e), KDB 558074 D01 DTS Meas Guidance v05 F and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2402.000000	2402.007500	-4.494	8.0	PASS



Occupied Channel Bandwidth 99% (2402 MHz; 1 MHz)

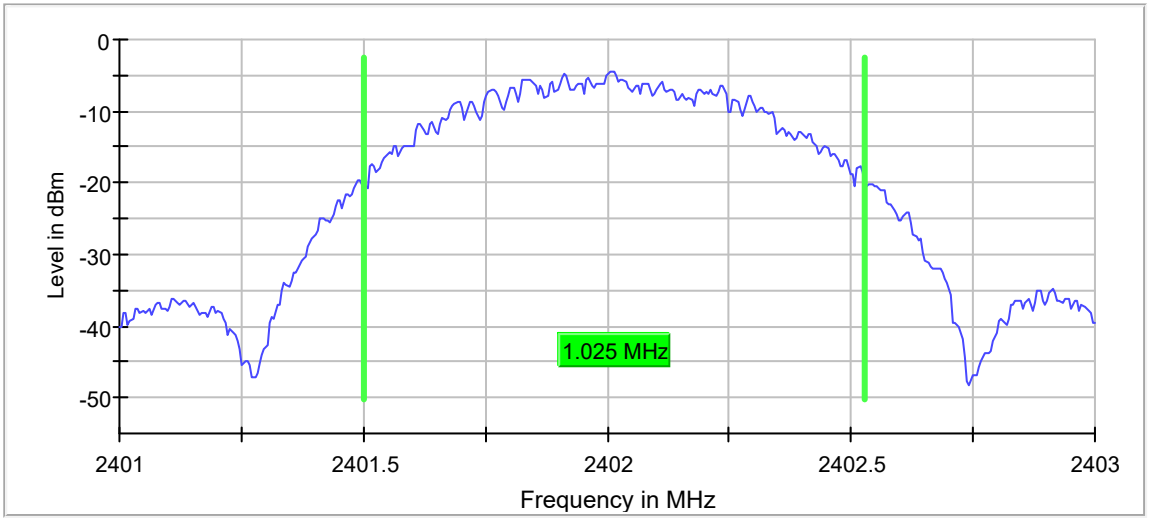
Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.8.1

99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2402.000000	1.025000	---	---	2401.502500	2402.527500

(continuation of the "99 % Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Result
2402.000000	PASS



Band Edge low (2402 MHz; 1 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v05 8.7 and ANSI C63.10-2013

Result

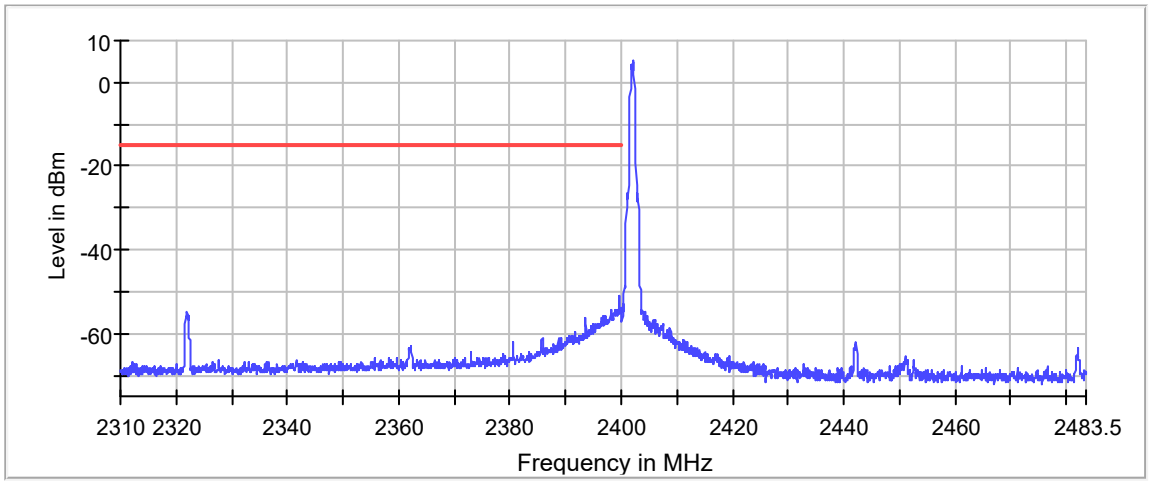
DUT Frequency (MHz)	Result
2402.000000	PASS

Inband Peak

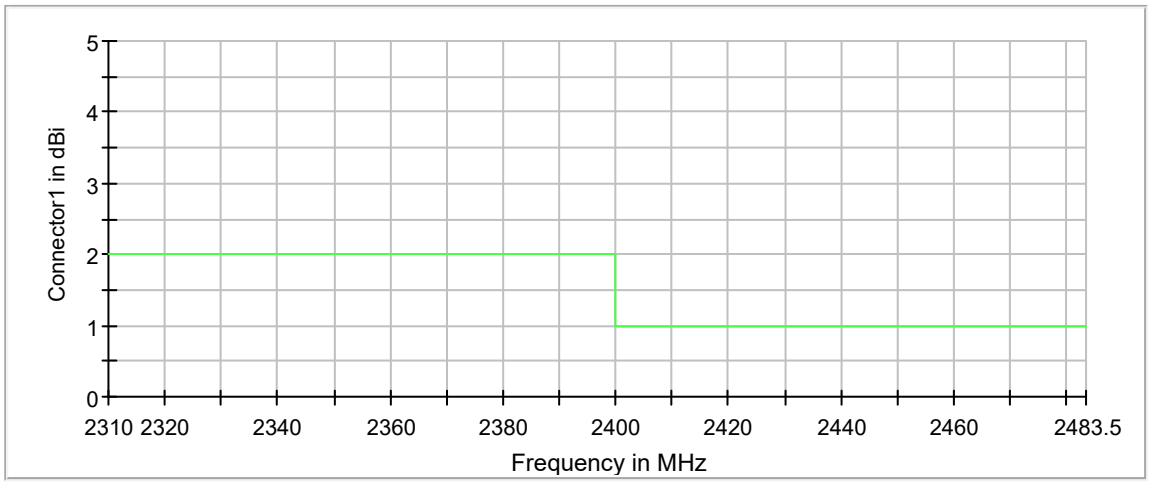
Frequency (MHz)	Level (dBm)
2402.025000	5.1

Measurements

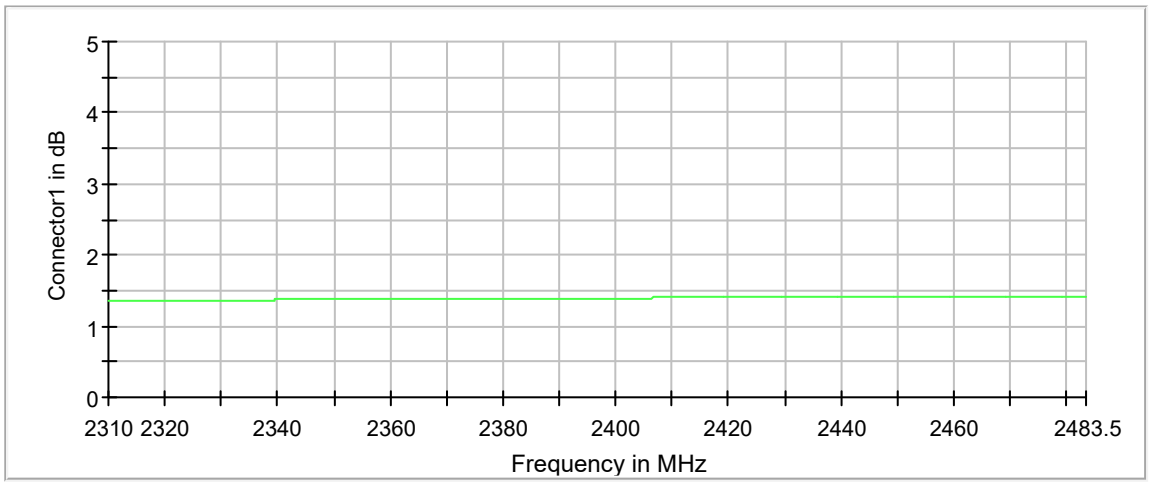
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.625000	-50.9	36.0	-14.9	PASS
2399.675000	-51.5	36.6	-14.9	PASS
2399.575000	-52.0	37.2	-14.9	PASS
2399.975000	-54.1	39.2	-14.9	PASS
2399.875000	-54.1	39.2	-14.9	PASS
2398.175000	-54.2	39.3	-14.9	PASS
2398.225000	-54.3	39.4	-14.9	PASS
2399.825000	-54.3	39.4	-14.9	PASS
2399.225000	-54.3	39.4	-14.9	PASS
2398.125000	-54.3	39.5	-14.9	PASS
2399.925000	-54.4	39.5	-14.9	PASS
2399.325000	-54.5	39.6	-14.9	PASS
2398.925000	-54.5	39.6	-14.9	PASS
2399.175000	-54.6	39.7	-14.9	PASS
2399.125000	-54.7	39.8	-14.9	PASS



Limit Sum Level Fail



Connector1



Connector1

Emission Bandwidth 20 dB (2442 MHz; 1 MHz)

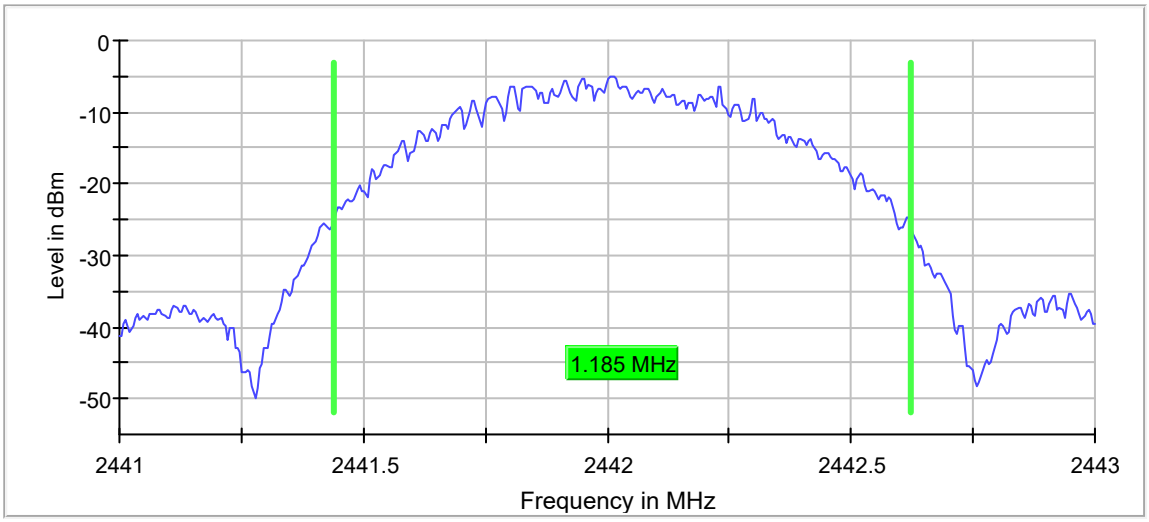
Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.8.1

20 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2442.000000	1.185000	---	---	2441.437500	2442.622500

(continuation of the "20 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2442.000000	-5.1	PASS



Minimum Emission Bandwidth 6 dB (2442 MHz; 1 MHz)

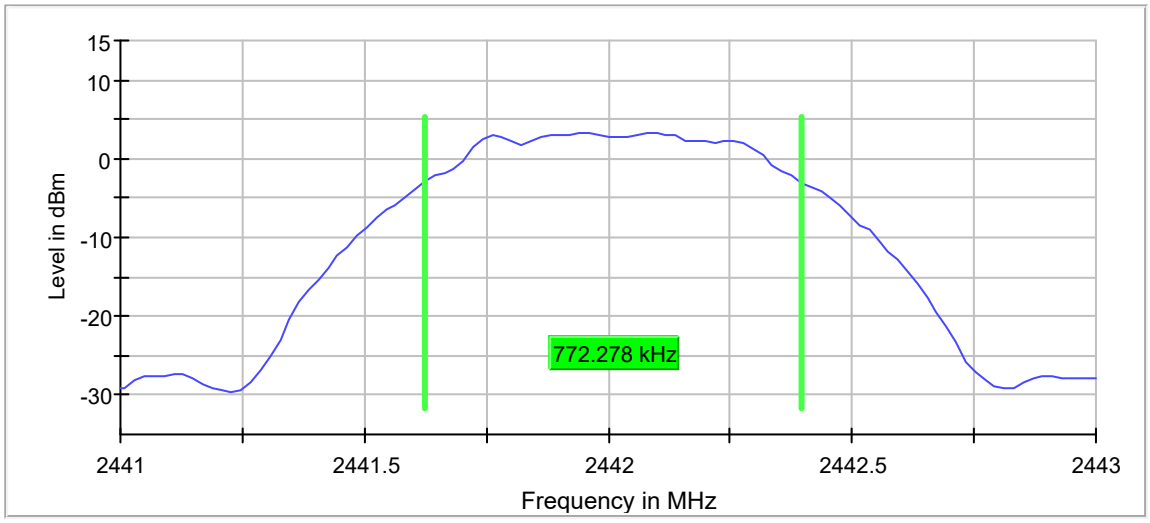
Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.8.1

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2442.000000	0.772278	0.500000	---	2441.623762	2442.396040

(continuation of the "6 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2442.000000	3.3	PASS

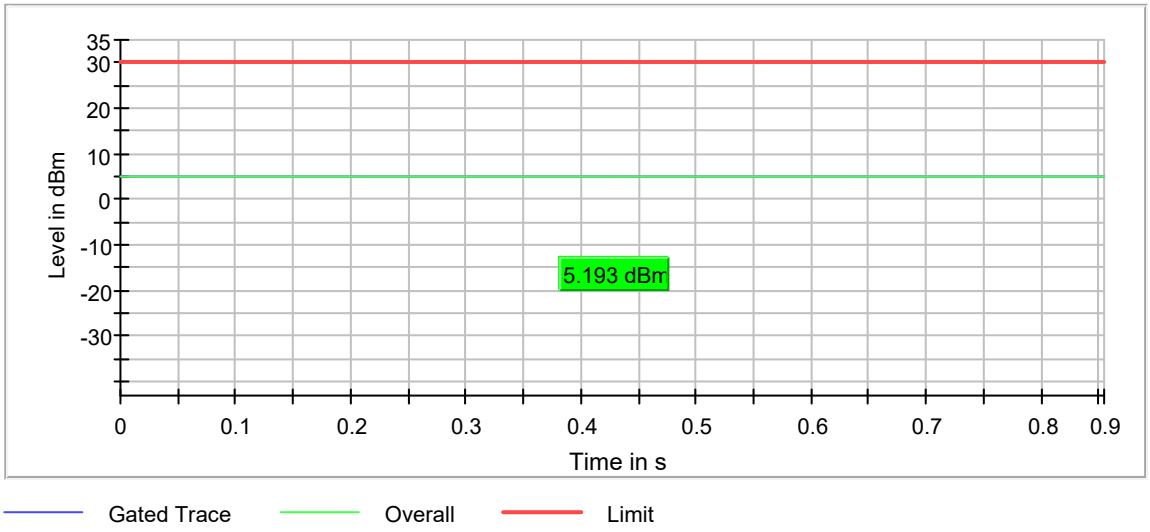


RF output power (2442 MHz; 1 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.9.2.3.2

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2442.000000	5.2	30.0	5.2	85.626	PASS

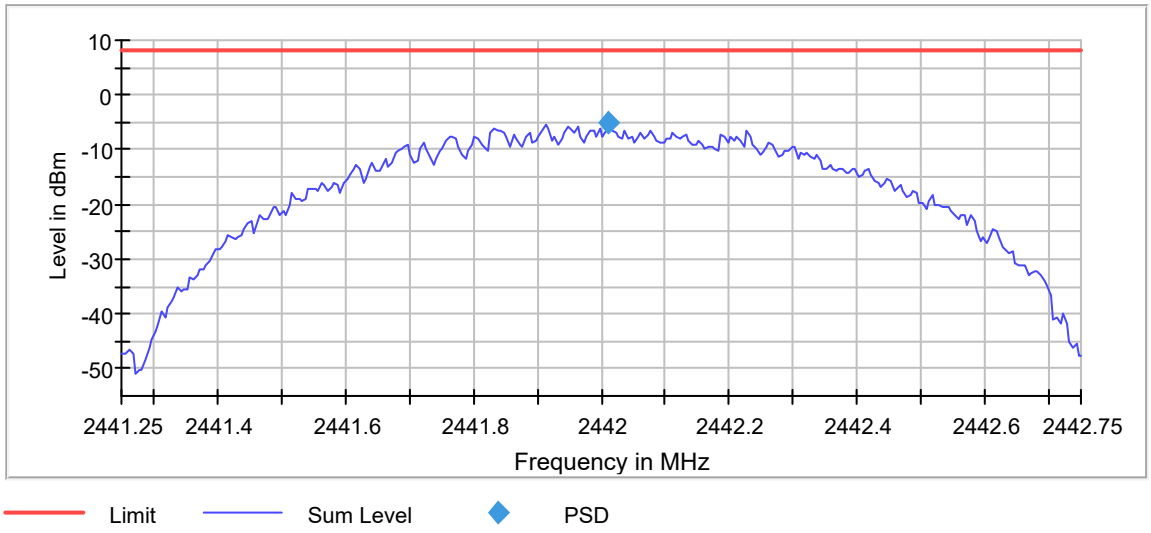


Power Spectral Density (2442 MHz; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), (e), KDB 558074 D01 DTS Meas Guidance v05 F and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2442.000000	2442.012500	-5.206	8.0	PASS



Occupied Channel Bandwidth 99% (2442 MHz; 1 MHz)

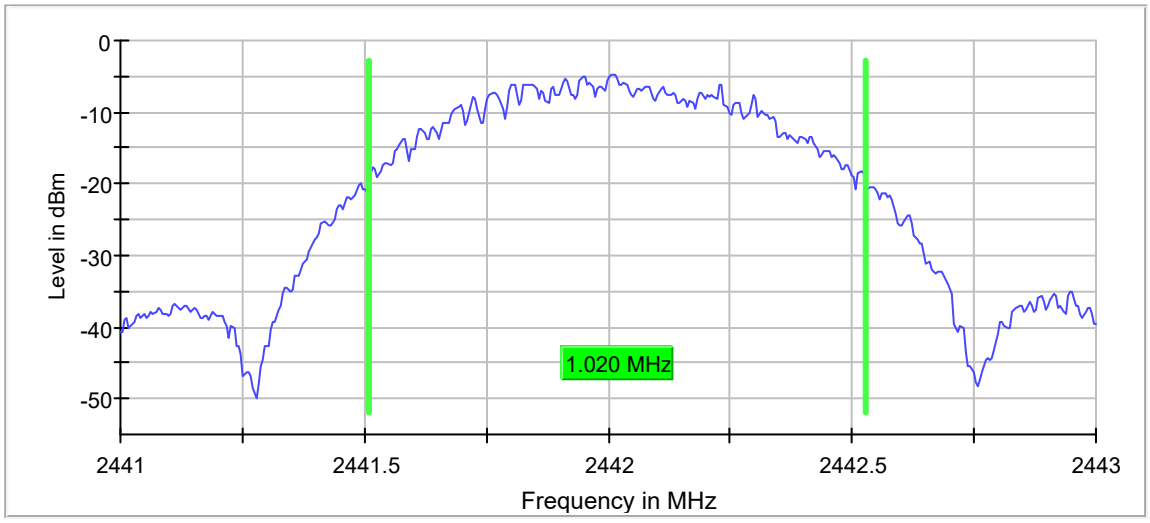
Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.8.1

99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2442.000000	1.020000	---	---	2441.507500	2442.527500

(continuation of the "99 % Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Result
2442.000000	PASS



Emission Bandwidth 20 dB (2480 MHz; 1 MHz)

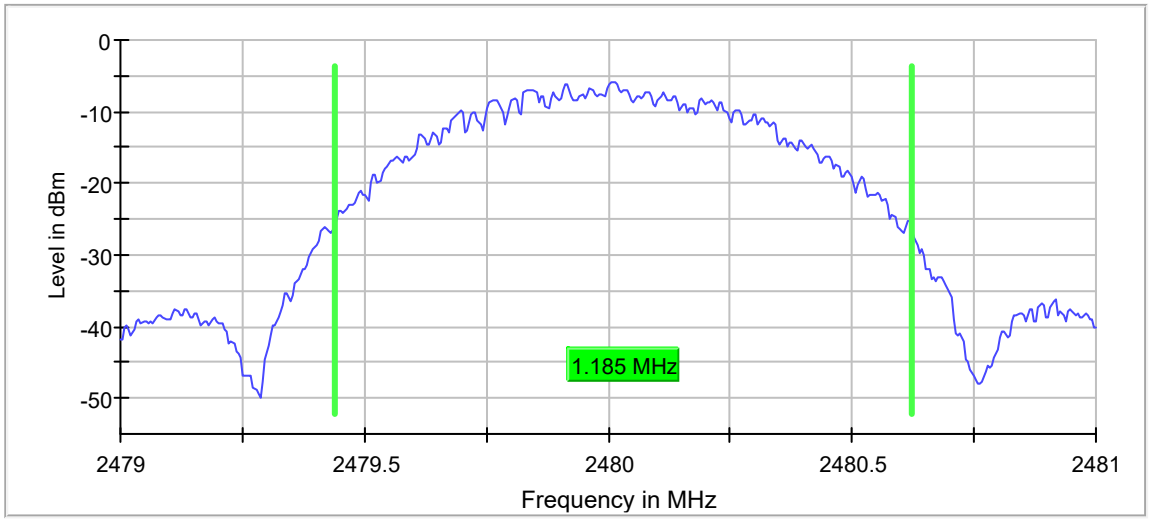
Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.8.1

20 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2480.000000	1.185000	---	---	2479.437500	2480.622500

(continuation of the "20 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2480.000000	-5.8	PASS



Minimum Emission Bandwidth 6 dB (2480 MHz; 1 MHz)

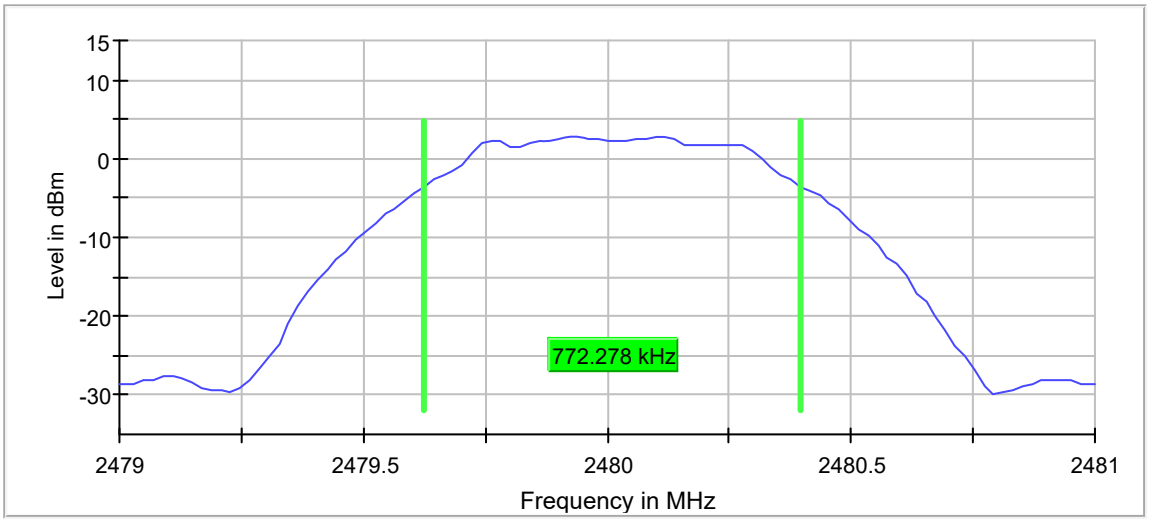
Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.8.1

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2480.000000	0.772278	0.500000	---	2479.623762	2480.396040

(continuation of the "6 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2480.000000	2.9	PASS

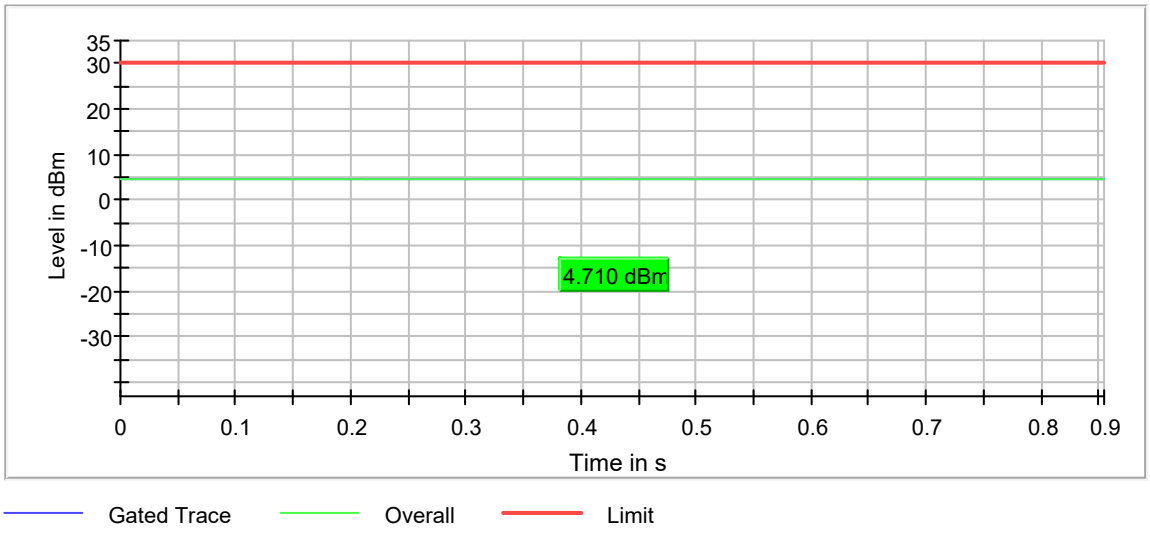


RF output power (2480 MHz; 1 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.9.2.3.2

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2480.000000	4.7	30.0	4.7	85.624	PASS

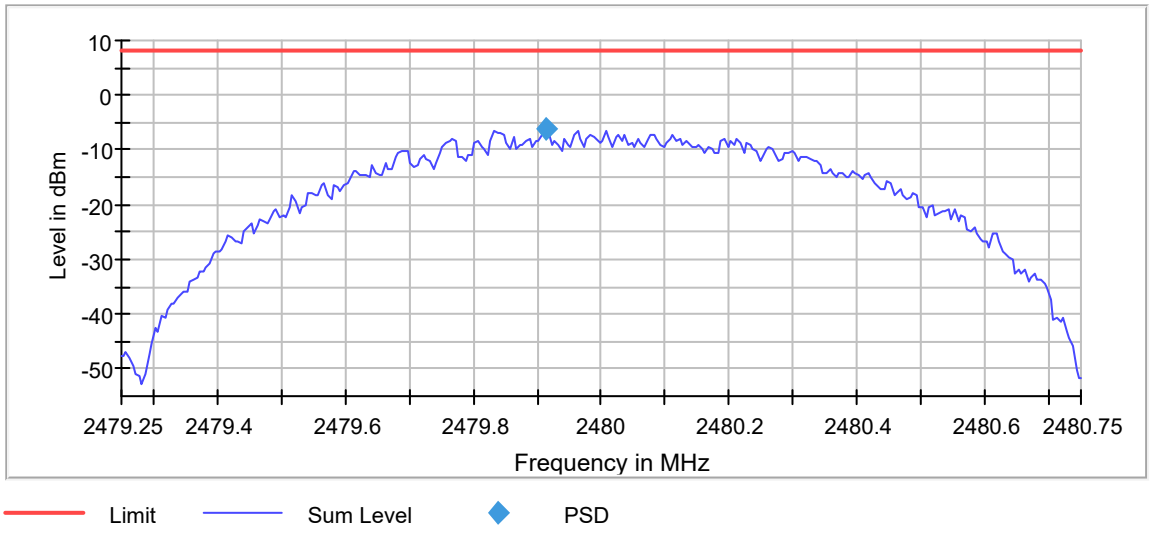


Power Spectral Density (2480 MHz; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), (e), KDB 558074 D01 DTS Meas Guidance v05 F and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2480.000000	2479.912500	-6.133	8.0	PASS



Occupied Channel Bandwidth 99% (2480 MHz; 1 MHz)

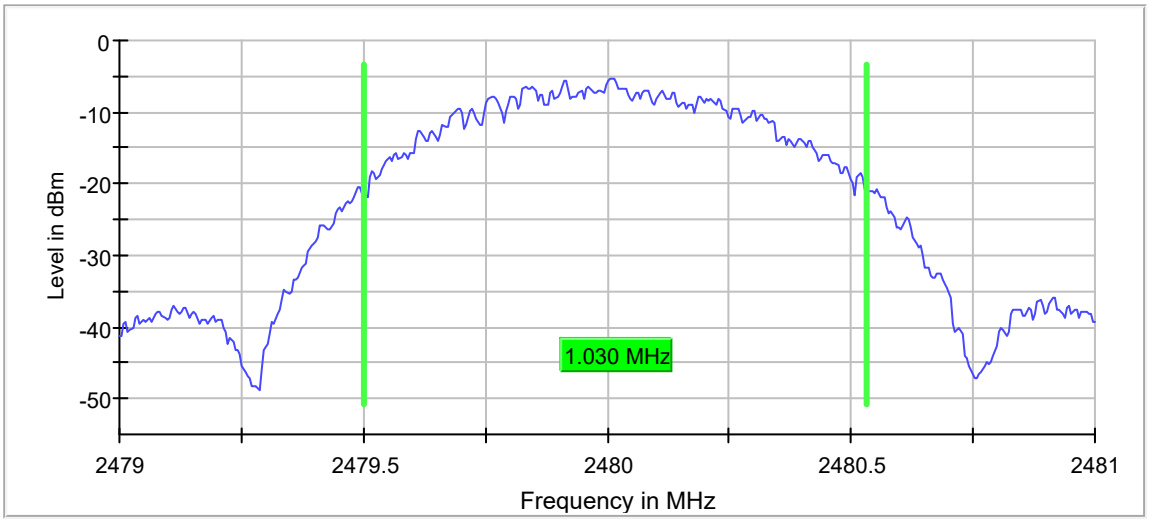
Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.8.1

99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2480.000000	1.030000	---	---	2479.502500	2480.532500

(continuation of the "99 % Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Result
2480.000000	PASS



Manufacturer : Chamberlain Group, Inc.
Test Item : Phoenix Transceiver
Model No. : 001D9586
Mode : Transmit at 2402MHz
Test Specification : FCC-15.247, RSS-247 Peak Radiated Emissions in Restricted Bands
Date : December 17, 2019
Test Distance : 3 meters
Notes : Peak Detector with 1MHz Resolution Bandwidth

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
4804.00	H	50.2		3.7	34.5	-39.3	49.0	283.3	5000.0	-24.9
4804.00	V	51.0		3.7	34.5	-39.3	49.8	310.6	5000.0	-24.1
12010.00	H	48.8	*	6.1	38.5	-39.2	54.3	518.1	5000.0	-19.7
12010.00	V	49.0	*	6.1	38.5	-39.2	54.4	526.6	5000.0	-19.6
19216.00	H	33.8	*	2.2	40.4	-28.8	47.6	240.0	5000.0	-26.4
19216.00	V	33.8	*	2.2	40.4	-28.8	47.6	240.0	5000.0	-26.4

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp

Checked BY Richard E. King :

Richard E. King

Manufacturer : Chamberlain Group, Inc.
Test Item : Phoenix Transceiver
Model No. : 001D9586
Mode : Transmit at 2402MHz
Test Specification : FCC-15.247, RSS-247 Average Radiated Emissions in Restricted Bands
Date : December 17, 2019
Test Distance : 3 meters
Notes : Average Detector with 1MHz Resolution Bandwidth

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Average Total dBuV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
4804.00	H	35.2		3.7	34.5	-39.3	34.1	50.9	500.0	-19.8
4804.00	V	35.6		3.7	34.5	-39.3	34.5	53.0	500.0	-19.5
12010.00	H	33.6	*	6.1	38.5	-39.2	39.1	89.8	500.0	-14.9
12010.00	V	33.7	*	6.1	38.5	-39.2	39.2	90.9	500.0	-14.8
19216.00	H	20.9	*	2.2	40.4	-28.8	34.7	54.4	500.0	-19.3
19216.00	V	20.9	*	2.2	40.4	-28.8	34.7	54.4	500.0	-19.3

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp

Checked BY Richard E. King :

Richard E. King

Manufacturer : Chamberlain Group, Inc.
Test Item : Phoenix Transceiver
Model No. : 001D9586
Mode : Transmit at 2402MHz
Test Specification : FCC-15.247, RSS-247 Peak Radiated Emissions not in Restricted Bands
Date : December 17, 2019
Test Distance : 3 meters
Notes : Peak Detector with 100kHz Resolution Bandwidth

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
2402.00	H	74.3		2.6	32.2	0.0	109.0	282785.3		
2402.00	V	75.3		2.6	32.2	0.0	110.1	319857.7		
7206.00	H	50.8		4.6	35.6	-39.4	51.6	380.6	31985.8	-38.5
7206.00	V	53.6		4.6	35.6	-39.4	54.4	526.0	31985.8	-35.7
9608.00	H	42.2		5.2	36.5	-39.3	44.6	170.2	31985.8	-45.5
9608.00	V	38.7		5.2	36.5	-39.3	41.1	114.0	31985.8	-49.0
14412.00	H	37.6	*	6.6	39.4	-38.3	45.3	184.1	31985.8	-44.8
14412.00	V	37.9	*	6.6	39.4	-38.3	45.7	191.8	31985.8	-44.4
16814.00	H	37.2	*	7.2	42.1	-37.5	49.0	280.9	31985.8	-41.1
16814.00	V	38.0	*	7.2	42.1	-37.5	49.7	306.2	31985.8	-40.4
21618.00	H	24.5	*	2.2	40.6	-28.9	38.4	83.3	31985.8	-51.7
21618.00	V	24.5	*	2.2	40.6	-28.9	38.4	83.3	31985.8	-51.7
24020.00	H	24.7	*	2.2	40.6	-30.2	37.3	73.7	31985.8	-52.8
24020.00	V	24.7	*	2.2	40.6	-30.2	37.4	74.0	31985.8	-52.7

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp

Checked BY Richard E. King :

Richard E. King

Manufacturer : Chamberlain Group, Inc.
Test Item : Phoenix Transceiver
Model No. : 001D9586
Mode : Transmit at 2442MHz
Test Specification : FCC-15.247, RSS-247 Peak Radiated Emissions in Restricted Bands
Date : December 17, 2019
Test Distance : 3 meters
Notes : Peak Detector with 1MHz Resolution Bandwidth

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
4884.00	H	51.3		3.7	34.4	-39.3	50.1	321.3	5000.0	-23.8
4884.00	V	50.1		3.7	34.4	-39.3	48.9	280.2	5000.0	-25.0
7326.00	H	52.2		4.7	35.7	-39.4	53.1	453.2	5000.0	-20.9
7326.00	V	55.6		4.7	35.7	-39.4	56.5	666.5	5000.0	-17.5
12210.00	H	46.4		6.1	38.7	-39.1	52.1	401.5	5000.0	-21.9
12210.00	V	47.8		6.1	38.7	-39.1	53.5	470.6	5000.0	-20.5
19536.00	H	33.8	*	2.2	40.4	-28.7	47.7	243.5	5000.0	-26.2
19536.00	V	33.8	*	2.2	40.4	-28.7	47.7	243.5	5000.0	-26.2

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp

Checked BY Richard E. King :

Richard E. King

Manufacturer : Chamberlain Group, Inc.
Test Item : Phoenix Transceiver
Model No. : 001D9586
Mode : Transmit at 2442MHz
Test Specification : FCC-15.247, RSS-247 Average Radiated Emissions in Restricted Bands
Date : December 17, 2019
Test Distance : 3 meters
Notes : Average Detector with 1MHz Resolution Bandwidth

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Average Total dBuV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
4884.00	H	37.2		3.7	34.4	-39.3	36.1	63.5	500.0	-17.9
4884.00	V	36.2		3.7	34.4	-39.3	35.0	56.1	500.0	-19.0
7326.00	H	39.5		4.7	35.7	-39.4	40.5	105.4	500.0	-13.5
7326.00	V	44.2		4.7	35.7	-39.4	45.1	180.8	500.0	-8.8
12210.00	H	32.5		6.1	38.7	-39.1	38.2	81.1	500.0	-15.8
12210.00	V	33.0		6.1	38.7	-39.1	38.7	85.8	500.0	-15.3
19536.00	H	20.9	*	2.2	40.4	-28.7	34.8	55.2	500.0	-19.1
19536.00	V	20.9	*	2.2	40.4	-28.7	34.8	55.2	500.0	-19.1

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp

Checked BY Richard E. King :

Richard E. King

Manufacturer : Chamberlain Group, Inc.
Test Item : Phoenix Transceiver
Model No. : 001D9586
Mode : Transmit at 2402MHz
Test Specification : FCC-15.247, RSS-247 Peak Radiated Emissions not in Restricted Bands
Date : December 17, 2019
Test Distance : 3 meters
Notes : Peak Detector with 100kHz Resolution Bandwidth

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
2442.00	H	72.5		2.6	32.4	0.0	107.6	238713.6		
2442.00	V	77.1		2.6	32.4	0.0	112.1	403996.1		
9768.00	H	40.6		5.2	36.7	-39.3	43.3	145.9	40399.6	-48.8
9768.00	V	40.7		5.2	36.7	-39.3	43.4	148.1	40399.6	-48.7
14652.00	H	37.8		6.7	39.6	-38.2	45.8	196.1	40399.6	-46.3
14652.00	V	38.5		6.7	39.6	-38.2	46.6	213.0	40399.6	-45.6
17094.00	H	37.5	*	7.3	41.5	-37.6	48.7	272.2	40399.6	-43.4
17094.00	V	38.1	*	7.3	41.5	-37.6	49.3	292.4	40399.6	-42.8
21978.00	H	24.5	*	2.2	40.6	-29.4	37.9	78.3	40399.6	-54.3
21978.00	V	24.5	*	2.2	40.6	-29.4	37.9	78.3	40399.6	-54.3
24420.00	H	24.7	*	2.2	40.6	-30.4	37.1	71.8	40399.6	-55.0
24420.00	V	24.7	*	2.2	40.6	-30.4	37.2	72.1	40399.6	-55.0

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp

Checked BY Richard E. King :

Richard E. King

Manufacturer : Chamberlain Group, Inc.
Test Item : Phoenix Transceiver
Model No. : 001D9586
Mode : Transmit at 2480MHz
Test Specification : FCC-15.247, RSS-247 Peak Radiated Emissions in Restricted Bands
Date : December 17, 2019
Test Distance : 3 meters
Notes : Peak Detector with 1MHz Resolution Bandwidth

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
4960.00	H	51.3		3.7	34.3	-39.3	50.0	317.4	5000.0	-23.9
4960.00	V	50.1		3.7	34.3	-39.3	48.8	276.8	5000.0	-25.1
7440.00	H	52.2		4.7	35.7	-39.4	53.2	455.5	5000.0	-20.8
7440.00	V	55.6		4.7	35.7	-39.4	56.5	669.8	5000.0	-17.5
12400.00	H	46.4		6.1	38.8	-39.0	52.2	408.6	5000.0	-21.8
12400.00	V	47.8		6.1	38.8	-39.0	53.6	479.0	5000.0	-20.4
19840.00	H	33.8	*	2.2	40.4	-28.4	48.0	252.4	5000.0	-25.9
19840.00	V	33.8	*	2.2	40.4	-28.4	48.0	252.4	5000.0	-25.9
22320.00	H	24.5	*	2.2	40.6	-29.3	38.0	79.6	5000.0	-36.0
22320.00	V	24.5	*	2.2	40.6	-29.3	38.0	79.6	5000.0	-36.0

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp

Checked BY Richard E. King :

Richard E. King

Manufacturer : Chamberlain Group, Inc.
Test Item : Phoenix Transceiver
Model No. : 001D9586
Mode : Transmit at 2480MHz
Test Specification : FCC-15.247, RSS-247 Average Radiated Emissions in Restricted Bands
Date : December 17, 2019
Test Distance : 3 meters
Notes : Average Detector with 1MHz Resolution Bandwidth

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Average Total dBuV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
4960.00	H	37.2		3.7	34.3	-39.3	36.0	62.7	500.0	-18.0
4960.00	V	36.2		3.7	34.3	-39.3	34.9	55.4	500.0	-19.1
7440.00	H	39.54		4.7	35.7	-39.4	40.5	105.9	500.0	-13.5
7440.00	V	44.2		4.7	35.7	-39.4	45.2	181.7	500.0	-8.8
12400.00	H	32.5		6.1	38.8	-39.0	38.3	82.6	500.0	-15.6
12400.00	V	33.0		6.1	38.8	-39.0	38.8	87.4	500.0	-15.2
19840.00	H	21.5	*	2.2	40.4	-28.4	35.7	61.3	500.0	-18.2
19840.00	V	21.5	*	2.2	40.4	-28.4	35.7	61.3	500.0	-18.2
22320.00	H	23.5	*	2.2	40.6	-29.3	37.0	70.9	500.0	-17.0
22320.00	V	23.5	*	2.2	40.6	-29.3	37.0	70.9	500.0	-17.0

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp

Checked BY Richard E. King :

Richard E. King

Manufacturer : Chamberlain Group, Inc.
Test Item : Phoenix Transceiver
Model No. : 001D9586
Mode : Transmit at 2480MHz
Test Specification : FCC-15.247, RSS-247 Peak Radiated Emissions not in Restricted Bands
Date : December 17, 2019
Test Distance : 3 meters
Notes : Peak Detector with 100kHz Resolution Bandwidth

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
2480.00	H	72.5		2.7	32.5	0.0	107.7	241324.7		
2480.00	V	77.1		2.7	32.5	0.0	112.2	408415.1		
9920.00	H	40.6		5.3	36.7	-39.2	43.3	146.9	40841.5	-48.9
9920.00	V	40.7		5.3	36.7	-39.2	43.5	149.1	40841.5	-48.8
14880.00	H	37.8		6.8	39.7	-38.2	46.1	201.8	40841.5	-46.1
14880.00	V	38.5		6.8	39.7	-38.2	46.8	219.2	40841.5	-45.4
17360.00	H	37.5	*	7.4	41.1	-37.7	48.2	256.1	40841.5	-44.1
17360.00	V	38.1	*	7.4	41.1	-37.7	48.8	275.0	40841.5	-43.4
24800.00	H	24.7	*	2.2	40.6	-31.2	36.4	65.9	40841.5	-55.8
24800.00	V	24.7	*	2.2	40.6	-31.2	36.4	66.2	40841.5	-55.8

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp

Checked BY Richard E. King :

Richard E. King

21. Scope of Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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ELECTRICAL

Valid to: June 30, 2021 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
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)
Vehicle Radiated Emissions	CISPR 12; ICES-002

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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]:
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)
Bulk Current Injections (BCI) *(Closed Loop Method)*	ISO 11452-4; SAE J1113-4
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
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
Electrical Loads	ISO 16750-2, Sections 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.11, and 4.12
Dielectric Withstand Voltage	MIL-STD-202, Method 301; EIA-364-20D
Insulation Resistance	MIL-STD-202, Method 302; SAE/USCAR-2, Revision 6, Section 5.5.1; EIA-364-21D
Contact Resistance	MIL-STD-202, Method 307; SAE/USCAR-2, Revision 6, Section 5.3.1; EIA/ECA-364-23C; USCAR21-3 Section 4.5.3
DC Resistance	MIL-STD-202, Method 303
Contact Chatter	MIL-STD-202, Method 310; SAE/USCAR-2, Revision 6, Section 5.1.9
Voltage Drop	SAE/USCAR-2, Revision 6, Section 5.3.2; USCAR21-3 Section 4.5.6

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; KN 11; CNS 13803 (1997, 2003); CISPR 14-1; EN 55014-1; AS/NZS CISPR 14.1; 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; KN 32
Current Harmonics	IEC 61000-3-2; EN 61000-3-2; KN 61000-3-2
Flicker and Fluctuations	IEC 61000-3-3; EN 61000-3-3; KN 61000-3-3
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; 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; 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
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; IEEE C37.90.1 2012

Test Technology:	Test Method(s) [1]:
Immunity (cont'd)	
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
Power Frequency Magnetic Field Immunity	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
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
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
Generic and Product Specific EMC Standards	IEC/EN 61000-6-1; AS/NZS 61000-6-1; KN 61000-6-1; IEC/EN 61000-6-2; AS/NZS 61000-6-2; KN 61000-6-2; IEC/EN 61000-6-3; AS/NZS 61000-6-3; KN 61000-6-3; IEC/EN 61000-6-4; AS/NZS 61000-6-4; KN 61000-6-4; EN 50130-4; IEC 61326-1; IEC/CISPR 14-2; EN 55014-2; AS/NZS CISPR 14.2; KN 14-2; IEC/CISPR 24; AS/NZS CISPR 24; EN 55024; KN 24; 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 301 489-52;
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 300 330-1; 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 301 413; ETSI EN 302 502

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-246; RSS-247; RSS-251; RSS-252; RSS-287; RSS-288; RSS-310; RSS-GEN
Mexico Radio Tests	IFT-008; NOM-208-SCFI
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
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
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; ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015;
Electrical Measurements and Simulation	
AC Voltage / Current	FAA AC 150/5345-10H
(1mV to 5kV) 60 Hz	FAA AC 150/5345-43J
(0.1V to 250V) up to 500 MHz	FAA AC 150/5345-44K
(1µA to 150A) 60 Hz	FAA AC 150/5345-46E
DC Voltage / Current	FAA AC 150/5345-47C
(1mV to 15-kV) / (1µA to 10A)	FAA EB 67D
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, revision or edition of a test method standard is not identified on the scope of accreditation, the laboratory is expected to be using the current version within one year of the date of publication, per part C., Section 1 of A2LA *R101 - General Requirements - Accreditation of ISO-IEC 17025 Laboratories*.

Testing Activities Performed in Support of FCC Declaration of Conformity and 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
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-NIII without DFS Intentional Radiators Part 15E	ANSI C63.10:2013	40000
U-NIII 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

Testing Activities Performed in Support of FCC Declaration of Conformity and 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)
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
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 8th day of August 2019.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1786.01
Valid to June 30, 2021

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