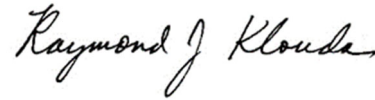




Engineering Test Report No. 2502548-01 Rev. A

Report Date	January 26, 2026	
Manufacturer Name	Genie Company	
Manufacturer Address	Overhead Door Co. TREQ Center 2170 French Settlement Rd Dallas, TX 75212	
Equipment Under Test Model No.	Door Position Sensor ALDPS2	
Date Received	1/20/2026	
Test Dates	1/20/2026 – 1/22/2026	
Specifications	FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.247 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		
Tested by	Jack Gallet	
Signature		
Approved by	Raymond J. Klouda, Registered Professional Engineer of Illinois – 44894	
PO Number	979347	

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Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.247 and Innovation, Science, and Economic Development Canada, RSS-247 test specifications. The data presented in this test report pertains to the EUT on the test dates specified. Any electrical or mechanical modifications made to the EUT subsequent to the specified test date will serve to invalidate the data and void this certification. This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the Federal Government.

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1. Report Revision History

Revision	Date	Description
–	27 JAN 2026	Initial Release of Engineering Test Report No. 2502548-01
A	28 JAN 2026 By Jack Gallet	- Throughout report: Added Rev A to report number in header. - Section 2.3: Corrected FCC ID.

2. Introduction

2.1. Scope of Tests

This document presents the results of a series of RF emissions tests that were performed on two (2) Genie Company Door Position Sensors (hereinafter referred to as the Equipment Under Test (EUT)). The EUTs were manufactured and submitted for testing by Genie Company located in Dallas, TX.

2.2. Purpose

The test series was performed to determine if the EUTs meet the RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, §15.247 for a Digital Modulation intentional radiator operating within the 2400 – 2483.5MHz band.

The test series was also performed to determine if the EUTs meet the RF emission requirements of the Innovation, Science, and Economic Development Canada Radio Standards Specification RSS-Gen and Innovation, Science, and Economic Development Canada Radio Standards Specification RSS-247 for a Digital Modulation intentional radiator operating within the 2400 – 2483.5MHz band.

Testing was performed in accordance with ANSI C63.10-2020+Cor. 1:2023+C63.10a:2024.

2.3. Identification of the EUT

The EUTs were identified as follows:

EUT Identification	
EUT #1	
Equipment Under Test Description	The Door Position Sensor (DPS) with an integral antenna for BLE5.x frequencies ranging 2400MHz to 2483.5MHz. External antenna port added for antenna port conducted testing.
Model No.	ALDPS2
Serial No.	A1
Software/Firmware Version	Developer version
Device Type	Digitally Modulated Transmission Device
Band of Operation	2400 – 2483.5MHz
Modulation Type	BLE
Antenna Type	Antenna Port
Conducted Output Power	1.3mW (1.0dBm)
6dB Bandwidth	0.854MHz
Occupied Bandwidth (99% CBW)	1.05MHz
Emission Classification	1M05F1D
FCC ID	FCC ID: B8QALDPS2
ISED Certification Number	IC: 2133A-ALDPS2
EUT #2	
Equipment Under Test Description	The Door Position Sensor (DPS) with an integral antenna for BLE5.x frequencies ranging 2400MHz to 2483.5MHz.
Model No.	ALDPS2
Serial No.	A2
Software/Firmware Version	Developer version
Device Type	Digitally Modulated Transmission Device
Band of Operation	2400 – 2483.5MHz
Modulation Type	BLE
Antenna Type	Trace
EIRP	1.05mW (0.2dBm)
Emission Classification	1M05F1D
FCC ID	FCC ID: B8QALDPS2
ISED Certification Number	IC: 2133A-ALDPS2

The EUTs listed above were used throughout the test series.

3. Power Input

The EUTs were powered by 3V from internal batteries.

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
Laptop (1)	--	--
Laptop Power Supply (1)	--	--
USB Thumb Drive (1)	--	--
CR2450 Battery (10)	--	--
USB to Serial Interface Board (1)	--	--
USB Cable (1)	--	--
DUT Housing (1)	--	--

6. Interconnect Leads

No interconnect leads were used during the tests.

7. Modifications Made to the EUT

No modifications were made to the EUTs during the testing.

8. Modes of Operation

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

Mode	Description
BLE Low	2402MHz Transmit Frequency, 0dBm Power Setting
BLE Mid	2440MHz Transmit Frequency, 0dBm Power Setting
BLE High	2480MHz Transmit Frequency, 0dBm Power Setting

9. Test Specifications

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

- Federal Communications Commission "Code of Federal Regulations", Title 47, Chapter I, Subchapter A, Part 15, Subpart C
- ANSI C63.10-2020+Cor. 1:2023+C63.10a:2024, "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 Systems, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating Under Section 15.247 April 2, 2019 KDB 558074 D01v05r02
- RSS-Gen Issue 5, February 2021, Amendment 2, Innovation, Science, and Economic Development Canada, "General Requirements for Compliance of Radio Apparatus"

- RSS-247 Issue 4, July 2025, "Digital Transmission Systems, Frequency Hopping Systems and License-Exempt Local Area Network Devices in 902-928 MHz, 2400-2483.5 MHz, 5150-5350 MHz, and 5470-5895 MHz bands"

10. Test Plan

The Genie_DCM_FCC_Test_Plan_20251009 (10/09/2025) test plan was provided by Genie Company and was referenced during the testing.

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

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

12. Laboratory Conditions

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

Ambient Parameters	Value
Temperature	21.1°C
Relative Humidity	23%
Atmospheric Pressure	1023mb

13. Summary

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

Test Description	Requirements	Test Method	S/N	Results
6dB Bandwidth	FCC 15.247 ISED RSS-247	ANSI C63.10:2020 +Cor.1+C63.10a	A1	Conforms
Occupied Bandwidth (99%)	FCC 15.247 ISED RSS-247	ANSI C63.10:2020 +Cor.1+C63.10a	A1	Conforms
Maximum Peak Conducted Output Power	FCC 15.247 ISED RSS-247	ANSI C63.10:2020 +Cor.1+C63.10a	A1	Conforms
Effective Isotropic Radiated Power (EIRP)	FCC 15.247 ISED RSS-247	ANSI C63.10:2020 +Cor.1+C63.10a	A2	Conforms
Transmitter Antenna Conducted Emissions	FCC 15.247 ISED RSS-247	ANSI C63.10:2020 +Cor.1+C63.10a	A1	Conforms
Transmitter Radiated Emissions	FCC 15.247 ISED RSS-247	ANSI C63.10:2020 +Cor.1+C63.10a	A2	Conforms
Band-Edge Compliance	FCC 15.247 ISED RSS-247	ANSI C63.10:2020 +Cor.1+C63.10a	A1, A2	Conforms
Power Spectral Density	FCC 15.247 ISED RSS-247	ANSI C63.10:2020 +Cor.1+C63.10a	A1	Conforms

14. Sample Calculations

For Radiated Emissions:

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

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

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

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

For Effective Isotropic Radiated Power:

The resultant effective radiated power is a summation of the matched signal (dBm), equivalent antenna gain (dB) and the cable loss factor (dB).

$$\text{EIRP (dBm)} = \text{Matched Signal (dBm)} + \text{Antenna Gain (dB)} - \text{Cable Loss (dB)}$$

Alternatively, the effective radiated power can be calculated by summing the measured conducted output power (dBm) and antenna gain (dB)

$$\text{EIRP (dBm)} = \text{Conducted Output Power (dBm)} + \text{Antenna Gain (dB)}$$

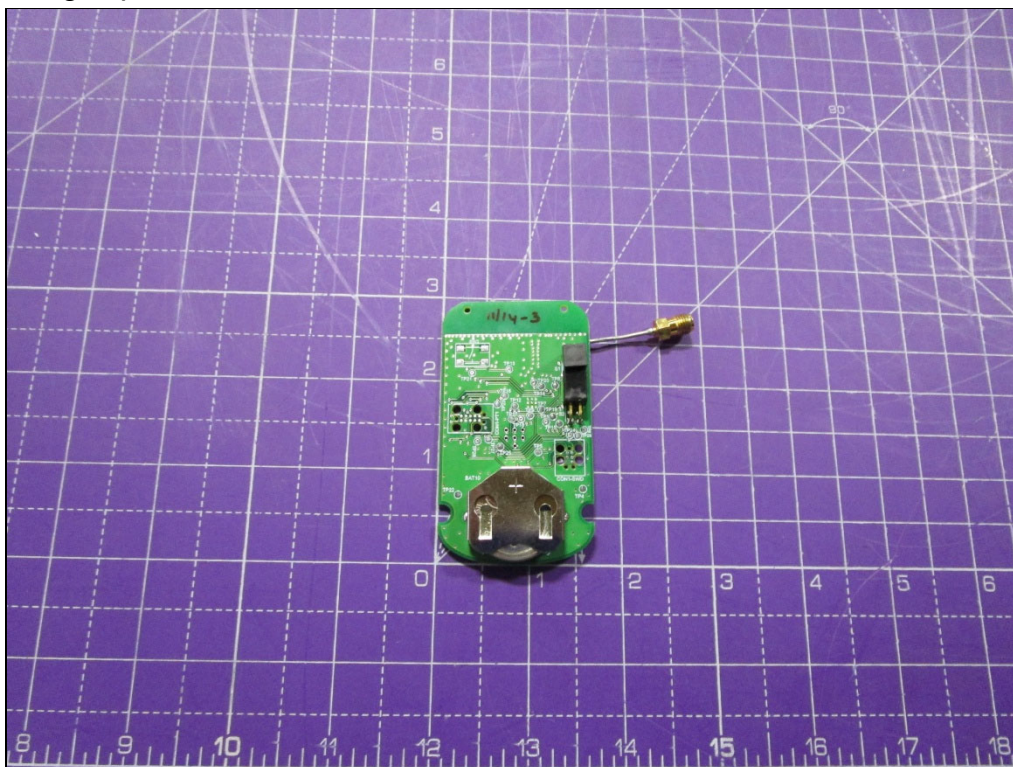
15. Statement of Conformity

The Genie Company Door Position Sensor, Model No. ALDPS2, Serial Nos. A1 and A2, did fully conform to the selected requirements of FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.247 and Innovation, Science, and Economic Development Canada, RSS-247.

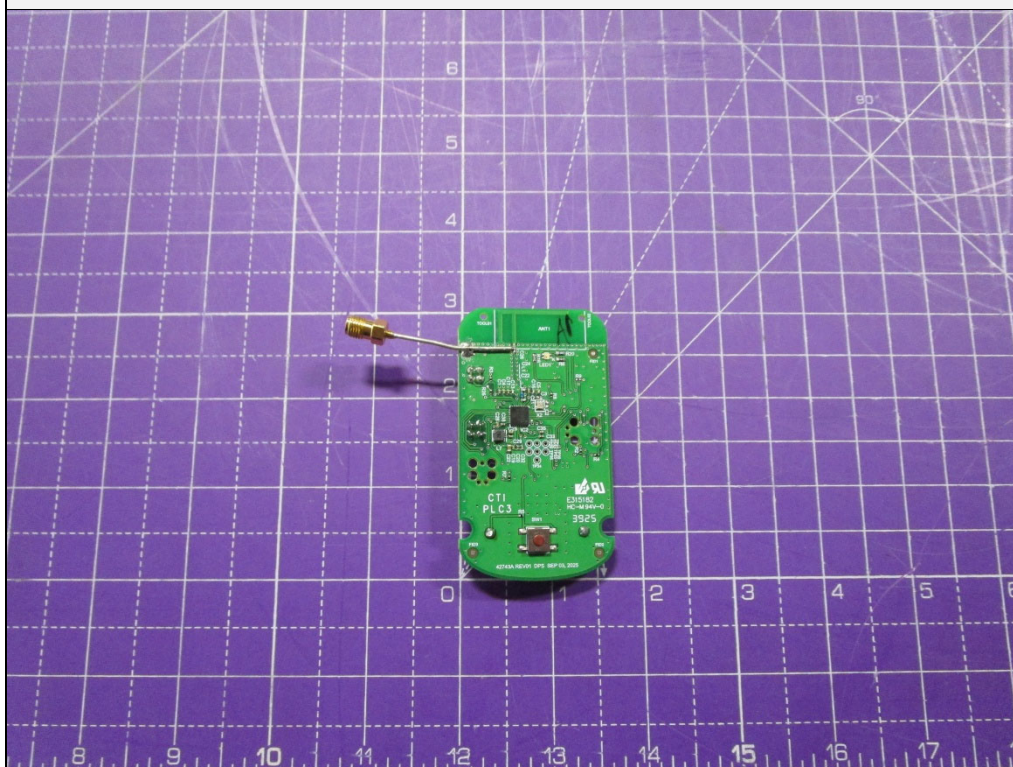
16. Certification

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, Section 15.247 and Innovation, Science, and Economic Development Canada, RSS-247 test specifications. The data presented in this test report pertains to the EUTs as received by the customer 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.

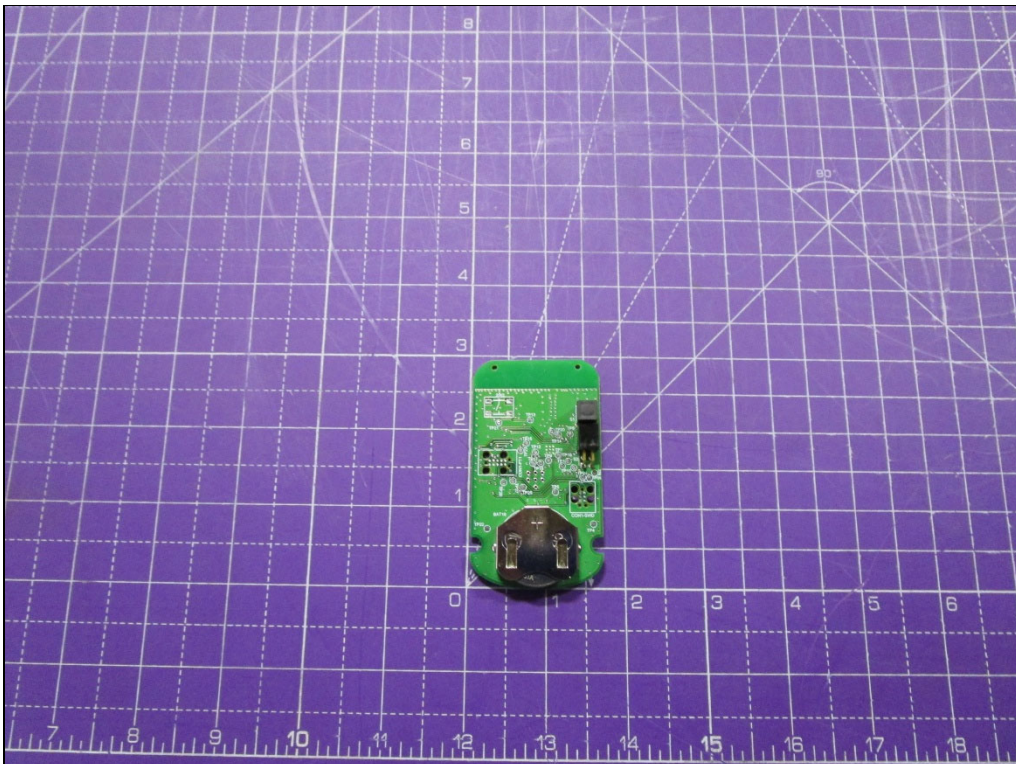
17. Photographs of EUT



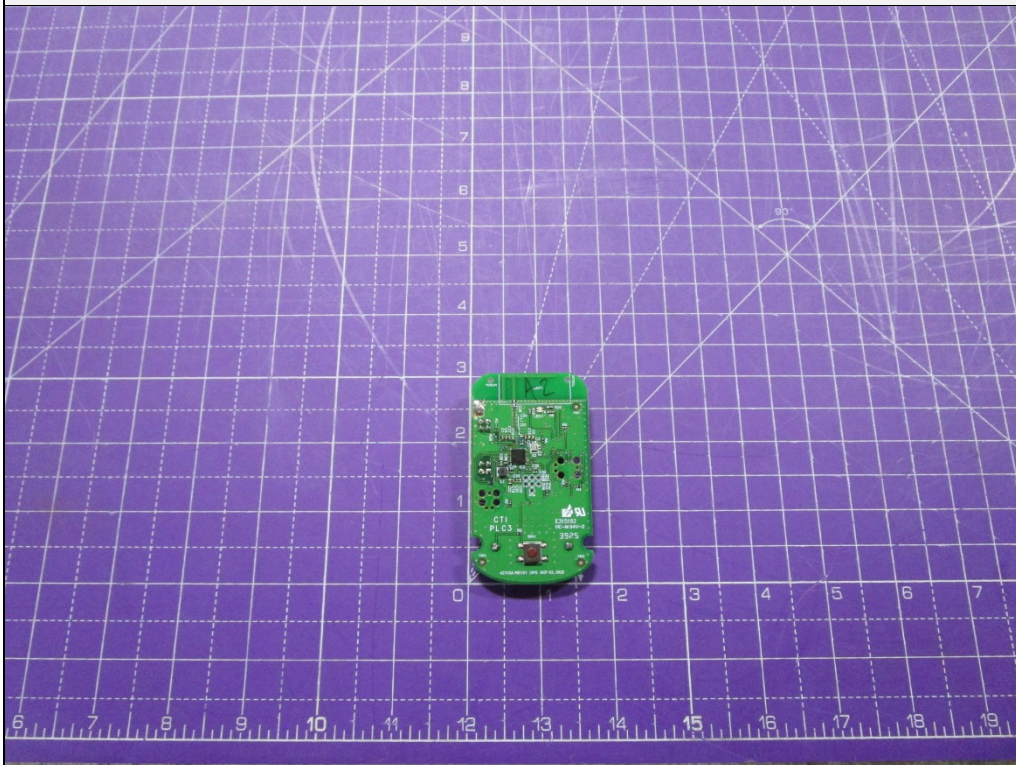
A1 Front



A1 Back



A2 Front



A2 Back



DUT Housing Front



DUT Housing Back

18. Equipment List

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
APW10	Preamplifier	Planar	PE2-35-120-5R0-10-12-SFF	PL11685/1241	1-18GHz	3/18/2025	3/18/2026
APW18	Preamplifier	Planar	PE2-30-20G20R6G-3R0-10-12-SFF	PL34312/2148	18-26.5GHz	2/11/2025	2/11/2026
CDM5	Lab Computer	ELITE		---	---	N/A	
GSE2	SIGNAL GENERATOR (40GHZ)	ROHDE & SCHWARZ	SMB100A	183293	100KHZ-40GHZ	3/7/2025	3/7/2027
GSFB	OSP-B157W BASE UNIT	ROHDE & SCHWARZ	OSP-B157W	101071	---	9/2/2025	9/2/2027
GSFE	OSP120	ROHDE & SCHWARZ	OSP120	102278	.01-40GHZ	7/22/2025	7/22/2027
NSDS1	UNIVERSAL SPHERICAL DIPOLE SOURCE	AET	USDS-H	AET-1116		NOTE 1	
NTA2	BILOG ANTENNA	TESEQ	6112D	28040	25-2000MHz	6/21/2024	6/21/2026
NWQ0	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS LINDGREN	3117	66657	1GHZ-18GHZ	6/24/2024	6/24/2026
NWQ1	Double Ridged Waveguide	ETS-Lindgren	3117	66655	1-18GHz	7/26/2024	7/26/2026
R29F	3M ANECHOIC CHAMBER NSA	EMC TEST SYSTEMS	3M ANECHOIC		30MHZ-18GHZ	6/1/2025	6/1/2027
RBG2	EMI Analyzer	Rohde & Schwarz	ESW44	101591	2HZ-44GHZ	12/12/2025	12/12/2026
RBG4	EMI Analyzer	Rohde & Schwarz	ESW44	103007	2HZ-44GHZ	4/5/2025	4/5/2026
SES0	24VDC POWER SUPPLY	P-TRANS	FS-32024-1M	001	18-27VDC	NOTE 1	
XPQ4	HIGH PASS FILTER	K&L MICROWAVE	11SH10-4800/X20000-O/O	1	4.8-20GHZ	9/16/2025	9/16/2027

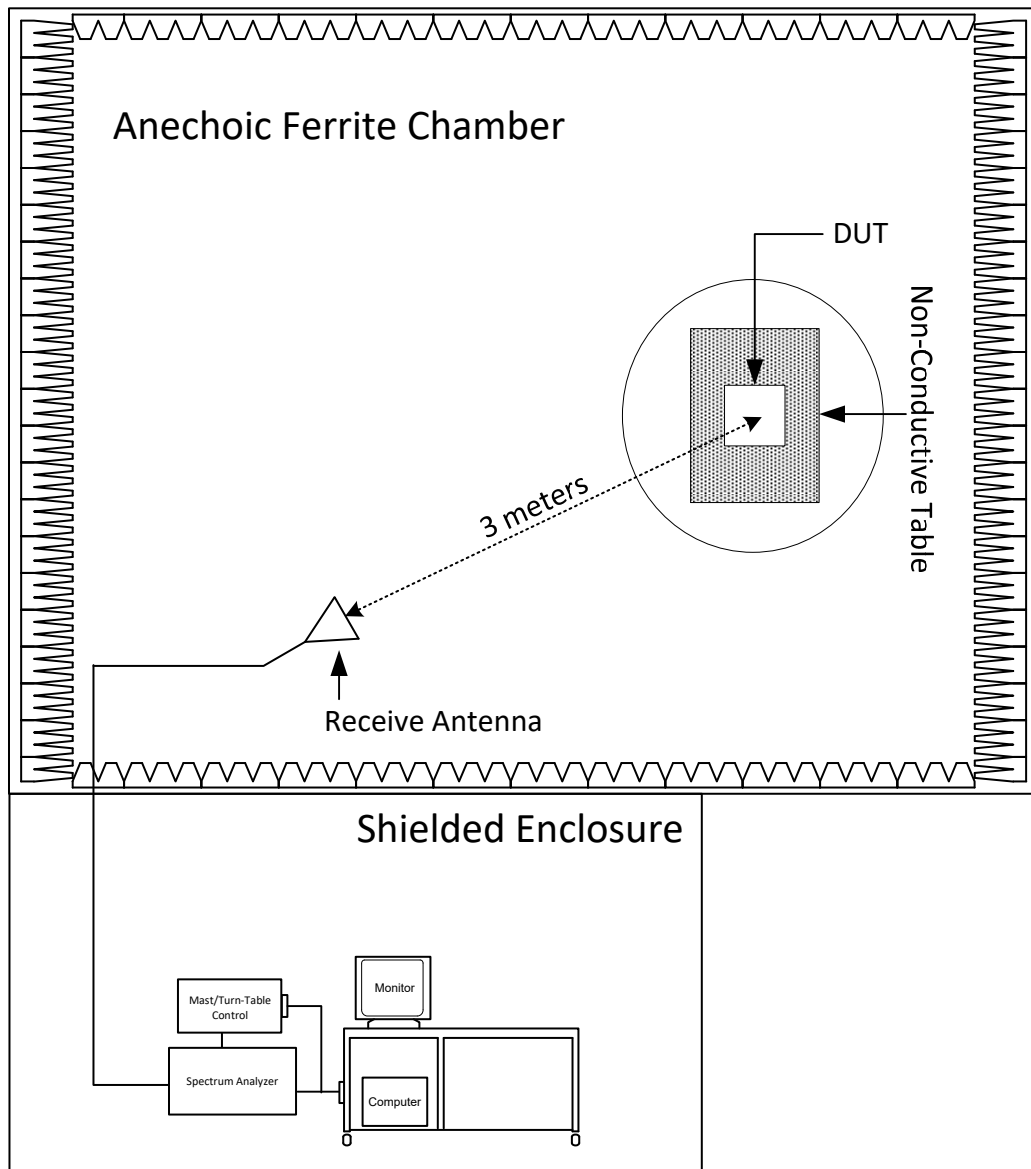
N/A: Not Applicable

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. 6dB Bandwidth

EUT Information	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Modes	BLE Low, BLE Mid, and BLE High

Test Setup Details	
Setup Format	Tabletop
Height of Support	NA
Measurement Method	Antenna Port Conducted
Type of Test Site	Elite Test Bench
Test Site Used	Elite Test Bench
Notes	None

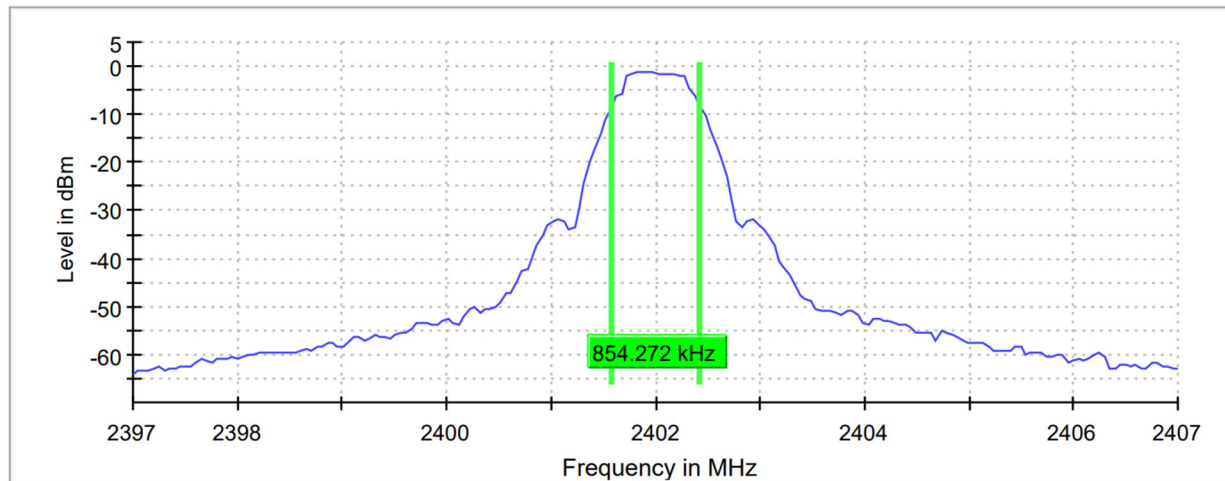
Measurement Uncertainty	
Measurement Type	Expanded Measurement Uncertainty
Radiated disturbance (electric field strength on an open area test site or alternative test site) (1 GHz – 6 GHz)	3.1

Requirements
Systems using digital modulation techniques shall have a minimum 6dB bandwidth of 500kHz

Procedure
The antenna port of the EUT was connected to a spectrum analyzer through an RF switch and control, OSP 120. The EUT was allowed to transmit continuously. The transmit channel was set separately to low, middle, and high channels. The resolution bandwidth (RBW) was set to $\geq 1\%$ and $\leq 5\%$ of the 6dB BW but not less than 100kHz, the video bandwidth (VBW) was set to the same as or three (3) times greater than the RBW, and the span was set to approximately two (2) to five (5) times the RBW. The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined. The analyzer's dBc bandwidth marker function was utilized to determine the 6dB bandwidth. The analyzer's display was then screenshot and saved.

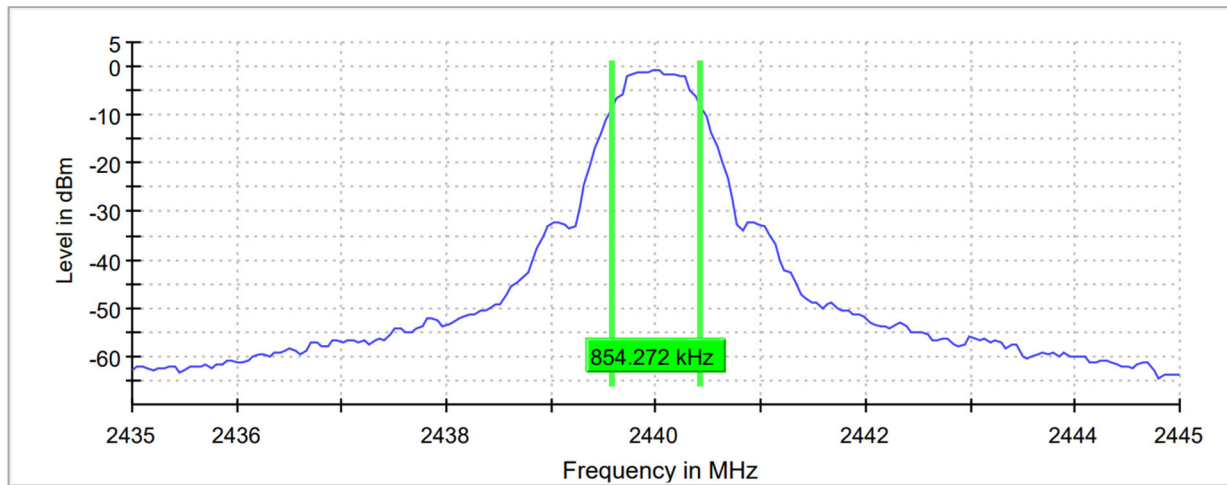
Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Mode	BLE Low
Frequency Tested	2402MHz
Result	6dB BW = 0.854272MHz
Notes	None

6 dB Bandwidth



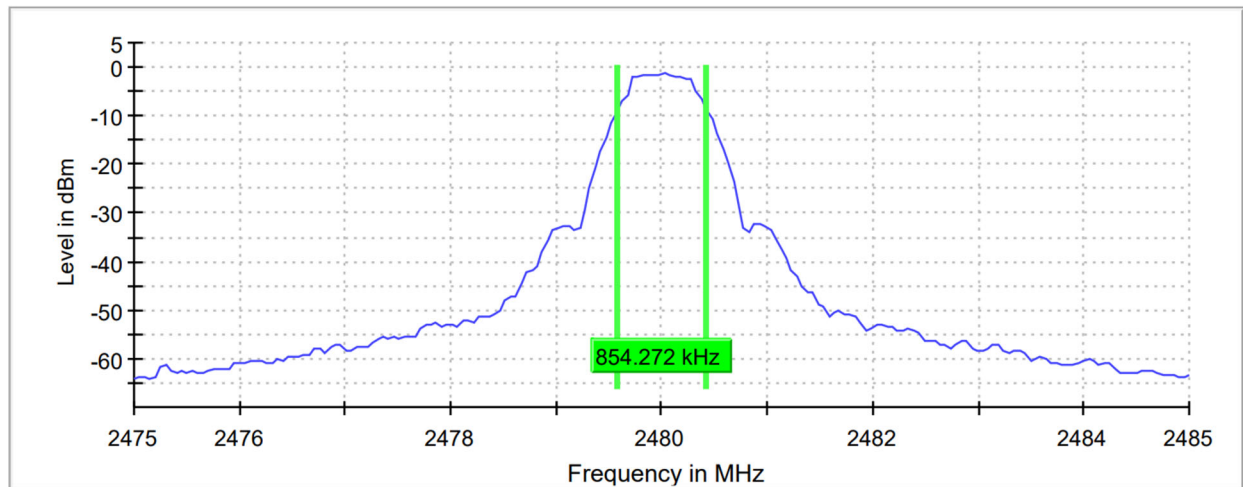
Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Mode	BLE Mid
Frequency Tested	2440MHz
Result	6dB BW = 0.854272MHz
Notes	None

6 dB Bandwidth



Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Mode	BLE High
Frequency Tested	2480MHz
Result	6dB BW = 0.854272MHz
Notes	None

6 dB Bandwidth



21. Occupied Bandwidth (99%)

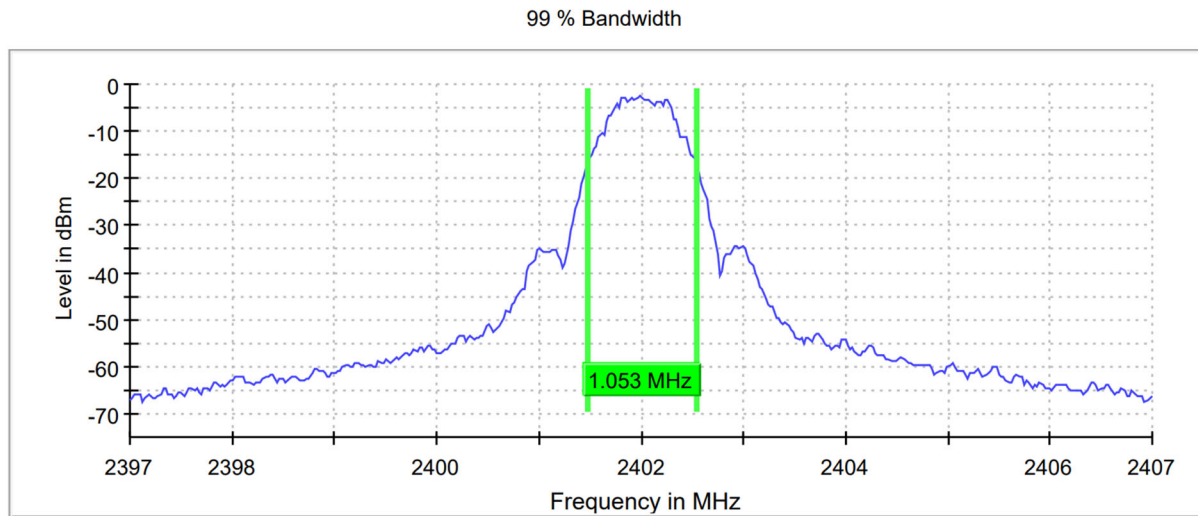
EUT Information	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Modes	BLE Low, BLE Mid, and BLE High

Test Setup Details	
Setup Format	Tabletop
Height of Support	NA
Measurement Method	Antenna Port Conducted
Type of Test Site	Elite Test Bench
Test Site Used	Elite Test Bench
Notes	None

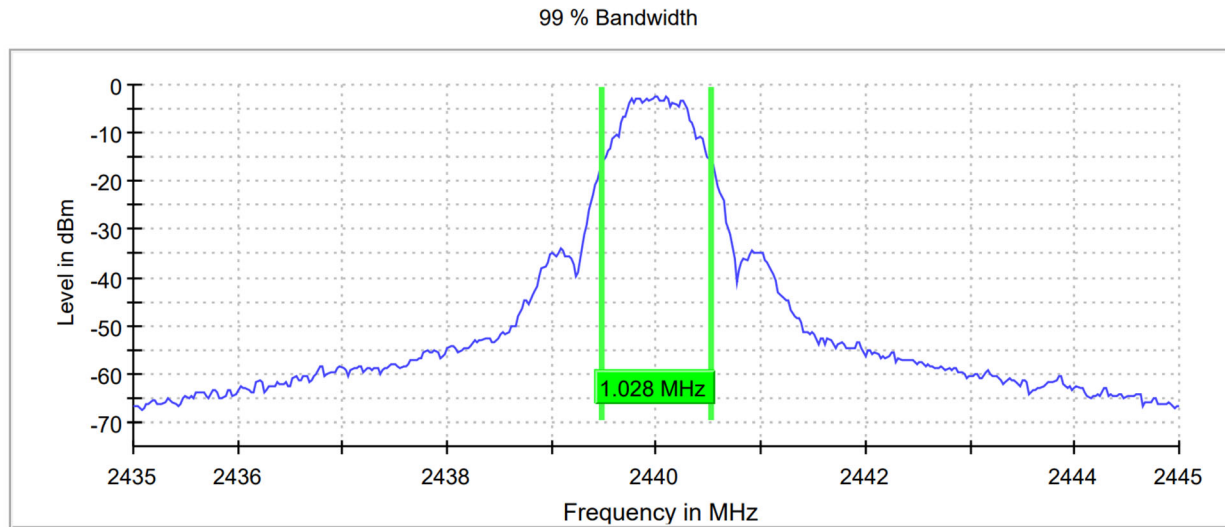
Measurement Uncertainty	
Measurement Type	Expanded Measurement Uncertainty
Radiated disturbance (electric field strength on an open area test site or alternative test site) (1 GHz – 6 GHz)	3.1

Procedure
The antenna port of the EUT was connected to a spectrum analyzer through an RF switch and control, OSP 120. The EUT was allowed to transmit continuously. The frequency hopping channel was set separately to low, middle, and high hopping channels. The resolution bandwidth (RBW) was set to $\geq 1\%$ and $\leq 5\%$ of the 99% emission bandwidth. The video bandwidth (VBW) was set to at least three (3) times the RBW. The span was set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency. The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined. The analyzer's OBW function was utilized to determine the 99% emission bandwidth. The analyzer's display was then screenshot and saved.

Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Mode	BLE Low
Frequency Tested	2402MHz
Result	OBW = 1.053MHz
Notes	None

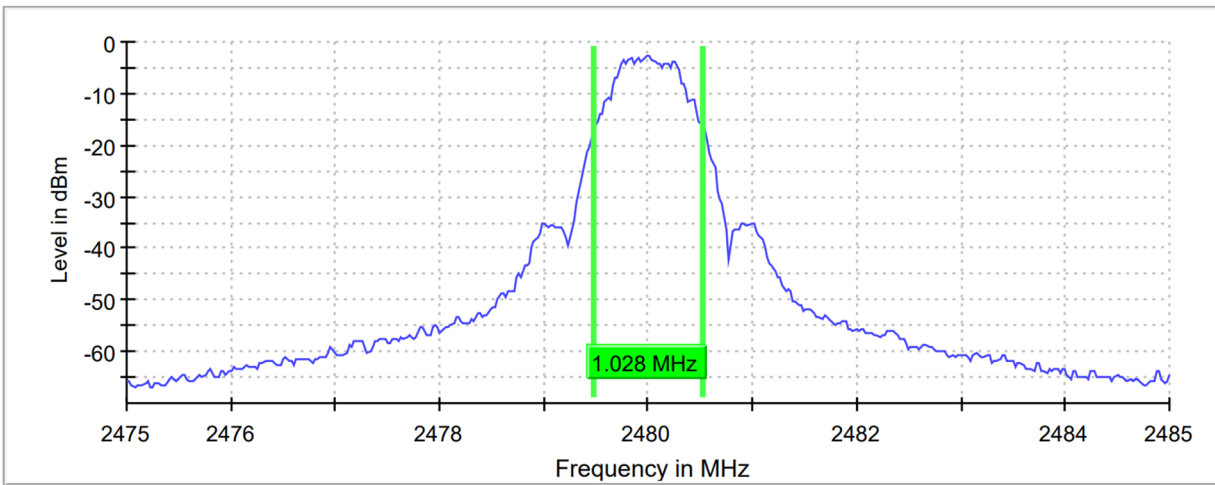


Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Mode	BLE Mid
Frequency Tested	2440MHz
Result	OBW = 1.028MHz
Notes	None



Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Mode	BLE High
Frequency Tested	2480MHz
Result	OBW = 1.028MHz
Notes	None

99 % Bandwidth



22. Maximum Peak Conducted Output Power

EUT Information	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Modes	BLE Low, BLE Mid, and BLE High

Test Setup Details	
Setup Format	Tabletop
Height of Support	NA
Measurement Method	Antenna Port Conducted
Type of Test Site	Elite Test Bench
Test Site Used	Elite Test Bench
Type of Antennas Used	NA
Notes	None

Requirements
The output power shall not exceed 1W (30dBm).

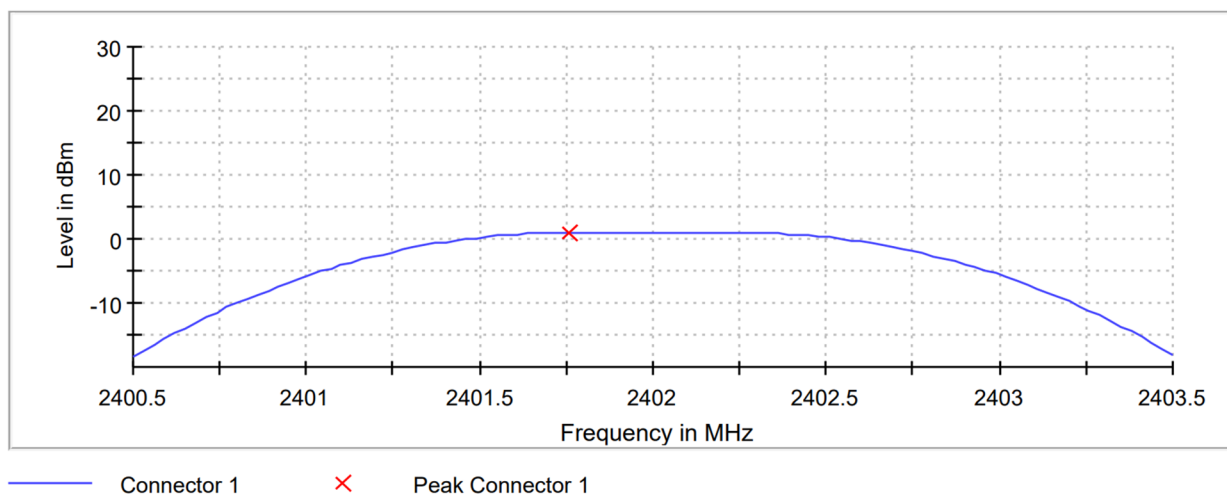
Procedure
The antenna port of the EUT was connected to a spectrum analyzer through an RF switch and control, OSP 120. The EUT was set to transmit separately at the low, middle, and high channels. The resolution bandwidth (RBW) was set $\geq$ the 6dB bandwidth. The video bandwidth (VBW) was set $\geq$ three (3) times the RBW. The span was set $\geq$ three (3) times the RBW. A peak detector was utilized. The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the trace stabilized. The analyzer's peak search function was utilized to indicate the highest measured reading. The indicated level was corrected for the external 40dB of attenuation and cables. The analyzer's display was then screenshot and saved. The peak power output was recorded for the low, middle, and high hopping frequencies.

Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Mode	BLE Low
Frequency Tested	2402MHz
Result	Output Power = 1.3mW (1.0dBm)
Notes	None

Maximum Peak Conducted Output Power

DUT Frequency (MHZ)	Peak Power (dBm)	Limit Max (dBm)
2402.00 MHz	1.0	30.0

Peak Power

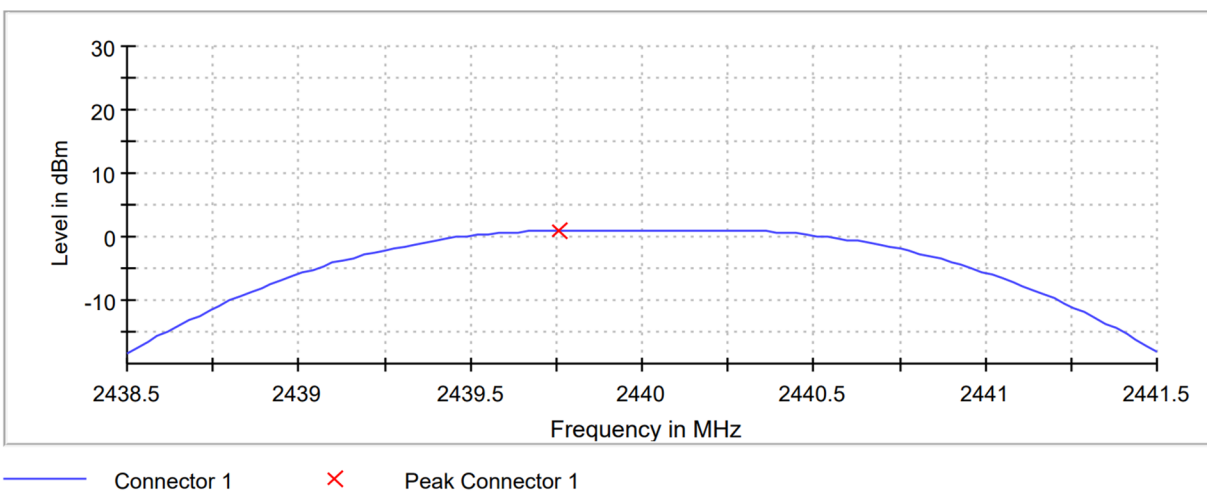


Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Mode	BLE Mid
Frequency Tested	2440MHz
Result	Output Power = 1.23mW (0.9dBm)
Notes	None

Maximum Peak Conducted Output Power

DUT Frequency (MHZ)	Peak Power (dBm)	Limit Max (dBm)
2440.00 MHZ	0.9	30.0

Peak Power

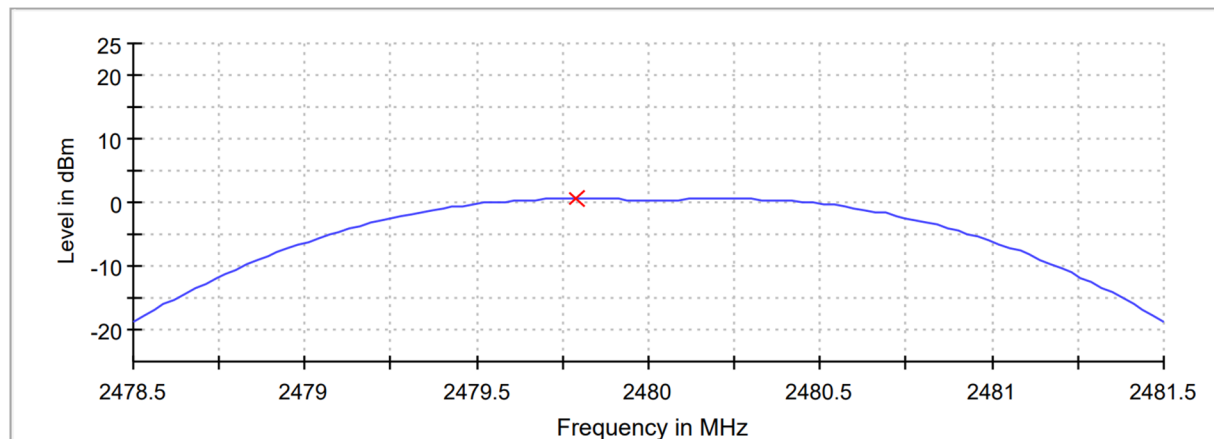


Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Mode	BLE High
Frequency Tested	2480MHz
Result	Output Power = 1.12mW (0.5dBm)
Notes	None

Maximum Peak Conducted Output Power

DUT Frequency (MHZ)	Peak Power (dBm)	Limit Max (dBm)
2480.00 MHz	0.5	30.0

Peak Power



Connector 1 × Peak Connector 1

23. Effective Isotropic Radiated Power (EIRP)

EUT Information	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A2
Modes	BLE Low, BLE Mid, and BLE High

Test Setup Details	
Setup Format	Tabletop
Height of Support	1.5m
Measurement Method	Radiated
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	None

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

Requirements
The output power shall not exceed 4W (36dBm).

Procedure
The EUT was placed on the non-conductive stand and set to transmit. A bilog antenna (double ridged waveguide antenna for all measurements above 1GHz) 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 peak power output was measured for the low, middle, and high channels. The equivalent power was determined from the field intensity levels measured at 3 meters using the substitution method. To determine the emission power, a dipole antenna (double ridged waveguide antenna for all measurements above 1GHz) 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 for all measurements above 1GHz), as required. The peak power output was calculated for low, middle, and high hopping frequencies.

Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A2
Mode	BLE Low, BLE Mid, and BLE High
Result	Max EIRP = 1.05mW (0.2dBm)
Notes	None

Freq (MHz)	Ant Pol	Wide BW Meter Reading (dBμV)	Matched Sig Gen Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
2402.00	H	58.3	-4.6	5.3	3.4	-2.7	36.0	-38.7
	V	52.6	-12.2	5.3	3.4	-10.3	36.0	-46.3
2440.00	H	58.1	-5.1	5.2	3.5	-3.4	36.0	-39.4
	V	60.9	-1.5	5.2	3.5	0.2	36.0	-35.8
2480.00	H	58.2	-4.9	5.2	3.5	-3.3	36.0	-39.3
	V	60.5	-2.2	5.2	3.5	-0.6	36.0	-36.6

EIRP (dBm) = Sig Gen Reading (dBm) + Ant Gain (dB) + Cable Loss (dB)

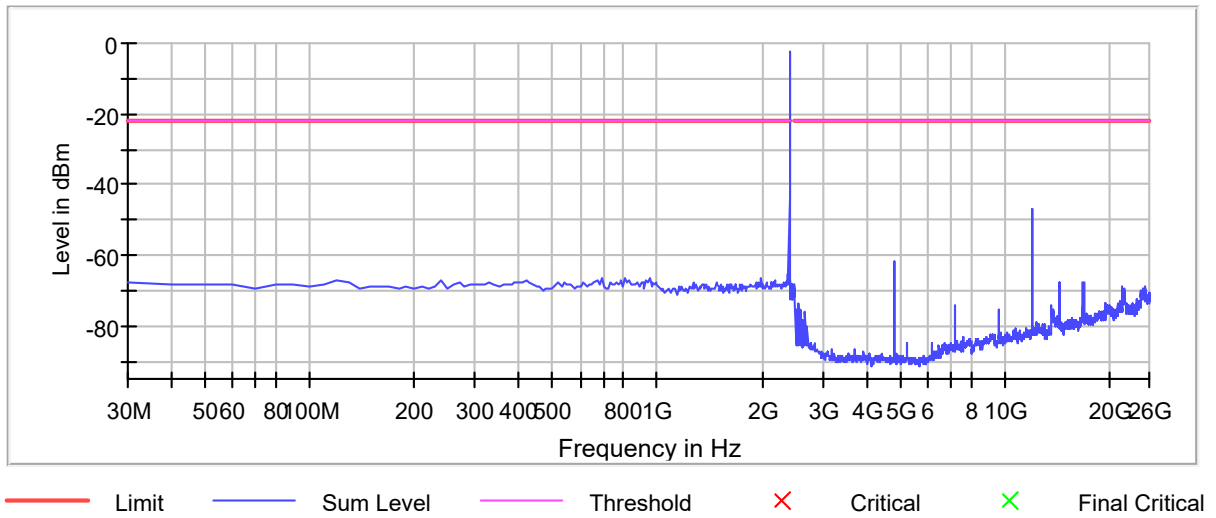
24. Transmitter Antenna Conducted Emissions

EUT Information	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Modes	BLE Low, BLE Mid, and BLE High

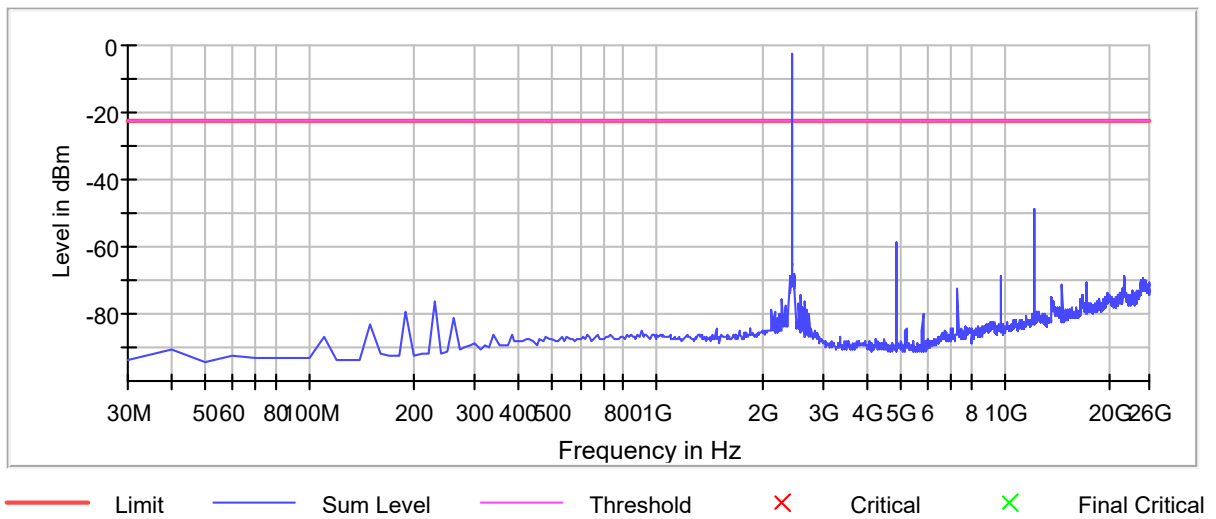
Test Setup Details	
Setup Format	Tabletop
Height of Support	NA
Measurement Method	Antenna Port Conducted
Type of Test Site	Elite Test Bench
Test Site Used	Elite Test Bench
Notes	None

Procedure	
The antenna port of the EUT was connected to the spectrum analyzer through an external OSP. The resolution bandwidth (RBW) was set to 100kHz. The peak detector and 'Max-Hold' function were engaged. The emissions in the frequency range from 30MHz to 25GHz were observed and plotted separately with the EUT transmitting at low, middle, and high channels.	

BLE Low 2402MHz Tx Spurious Conducted Emissions Spurious

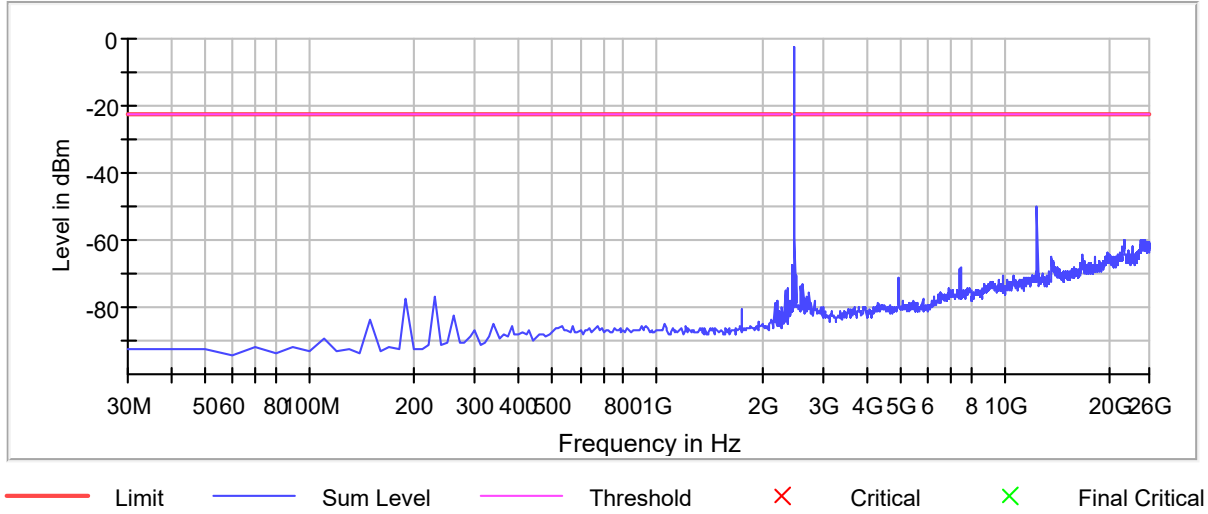


BLE Mid 2440MHz Tx Spurious Conducted Emissions Spurious



BLE High 2480MHz Tx Spurious Conducted Emissions

Spurious



25. Transmitter Radiated Emissions

EUT Information	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A2
Modes	BLE Low, BLE Mid, and BLE High

Test Setup Details	
Setup Format	Tabletop
Height of Support	0.8 m Below 1GHz, 1.5m Above 1GHz
Measurement Method	Radiated
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	None

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

Procedure

Radiated measurements were performed in a 32ft. x 20ft. x 14ft. high shielded enclosure. The shielded enclosure prevents emissions from other sources, such as radio and TV stations, from interfering with the measurements. All power lines 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 25.0GHz was investigated using a peak detector function.

The final open field emission tests were then manually performed over the frequency range of 30MHz to 25.0GHz.

1) For all harmonics not in the restricted bands, the following procedure was used:

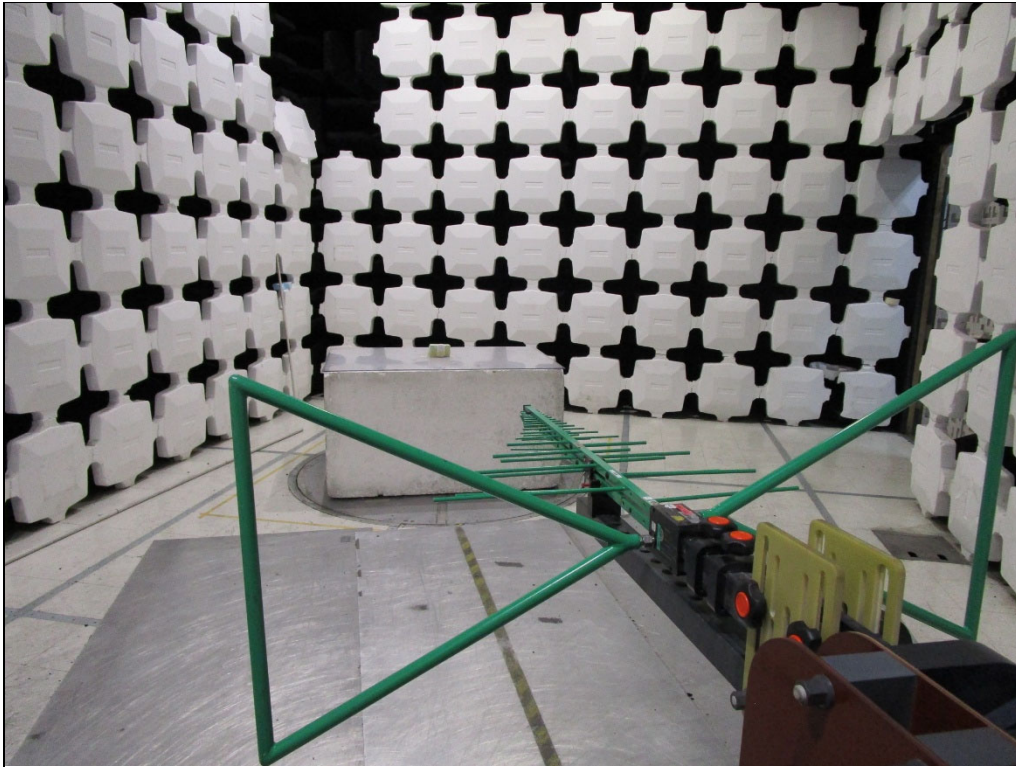
- a) The field strength of the fundamental was measured using a double ridged waveguide antenna. The waveguide antenna was positioned at a 3 meter distance from the EUT. The EUT was placed on a 1.5 meter high non-conductive stand. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer.
- b) The field strengths of all of the harmonics not in the restricted band were then measured using a double-ridged waveguide antenna. The waveguide antenna was positioned at a 3 meter distance from the EUT. The EUT was placed on a 1.5 meter high non-conductive stand. A peak detector with a resolution bandwidth of 100kHz was used on the spectrum analyzer.
- c) To ensure that maximum or worst case emission levels at the fundamental and harmonics were measured, the following steps were taken when measuring the fundamental emissions and the spurious emissions:
 - i) The EUT was rotated so that all of its sides were exposed to the receiving antenna.
 - ii) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
 - iii) The measuring antenna was raised and lowered for each antenna polarization to maximize the readings.
 - iv) In instances where it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer, the measuring antenna was not raised or lowered to ensure maximized readings. Instead, the EUT was rotated through all axis to ensure the maximum readings were recorded for the EUT.
- d) All harmonics not in the restricted bands must be at least 20dB below levels measured at the fundamental. However, attenuation below the general limits specified in §15.209(a) is not required.

2) For all emissions in the restricted bands, the following procedure was used:

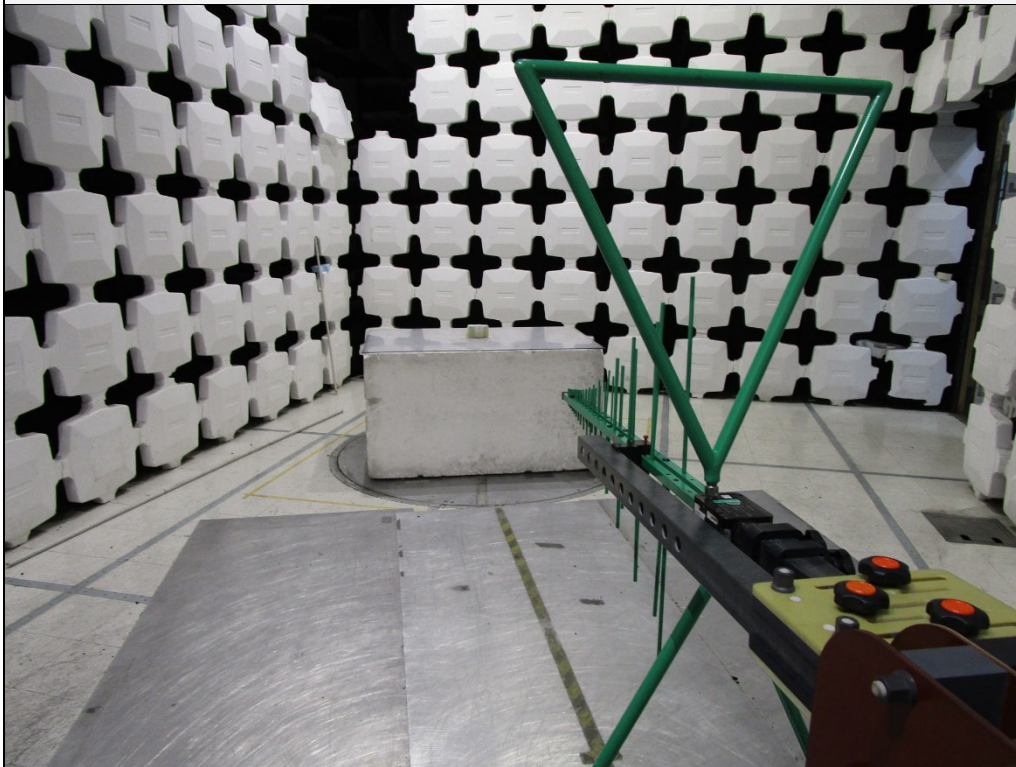
- a) The field strengths of all emissions below 1GHz were measured using a bi-log antenna. The bi-log antenna was positioned at a 3 meter distance from the EUT. The EUT was placed on an 80cm high non-conductive stand. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer.
- b) The field strengths of all emissions above 1GHz were measured using a double-ridged waveguide antenna. The waveguide antenna was positioned at a 3 meter distance from the EUT. The EUT was placed on a 1.5 meter high non-conductive stand. A peak detector with a resolution bandwidth of 1MHz was used on the spectrum analyzer.
- c) To ensure that maximum or worst case emission levels were measured, the following steps were taken when taking all measurements:
 - i) The EUT was rotated so that all of its sides were exposed to the receiving antenna.
 - ii) Since the measuring antenna is linearly polarized, both horizontal and vertical field components

were measured.

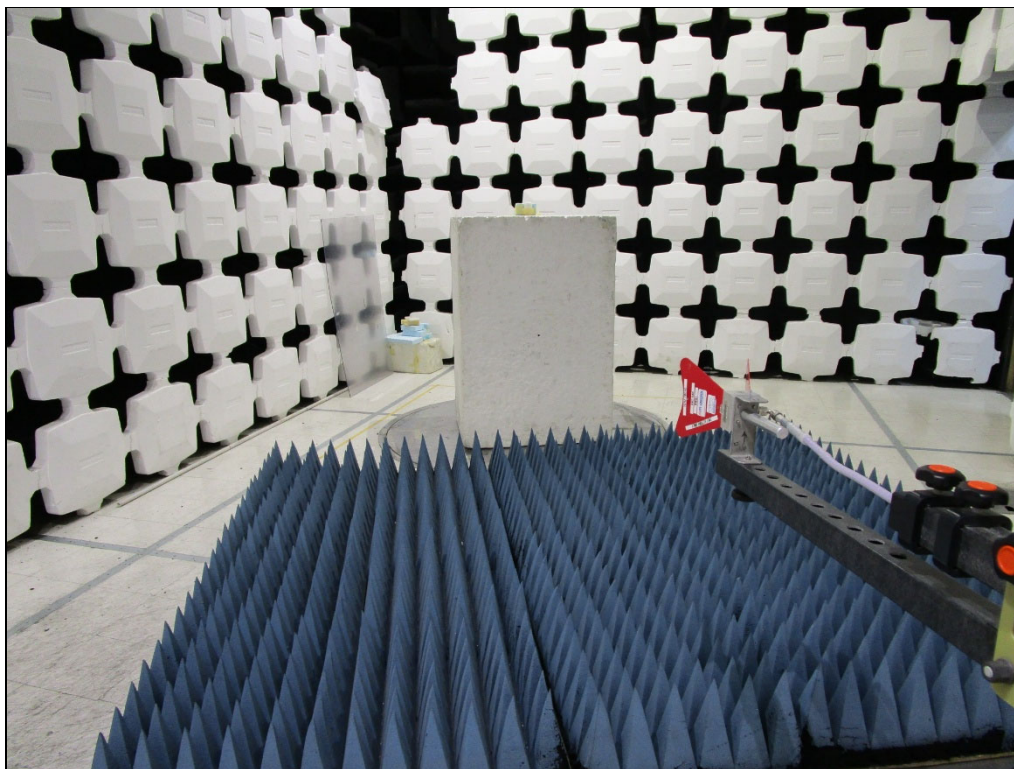
- iii) The measuring antenna was raised and lowered for each antenna polarization to maximize the readings.
- iv) In instances where it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer, the measuring antenna was not raised or lowered to ensure maximized readings. Instead, the EUT was rotated through all axis to ensure the maximum readings were recorded for the EUT.
- d) For all radiated emissions measurements below 1GHz, if the peak reading is below the limits listed in §15.209(a), no further measurements are required. If, however, the peak readings exceed the limits listed in §15.209(a), then the emissions are remeasured using a quasi-peak detector.
- e) For all radiated emissions measurements above 1GHz, the peak readings must comply with the §15.35(b) limits. §15.35(b) states that when average radiated emissions measurements are specified, there also is a limit on the peak level of the radiated emissions. The limit on the peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. Therefore, all peak readings above 1GHz must be no greater than 20dB above the limits specified in §15.209(a).
- f) Lastly, for all radiated emissions measurements above 1GHz, the resolution bandwidth (RBW) was set to 1MHz with the video bandwidth (VBW) set to $\geq 3 \times \text{RBW}$. The detector was set to power averaging (rms). Averaging type was set to power. Sweep time was set to auto and a trace average of at least 100 traces was performed. The measurement was recorded and compared to the limit specified in §15.209(a).



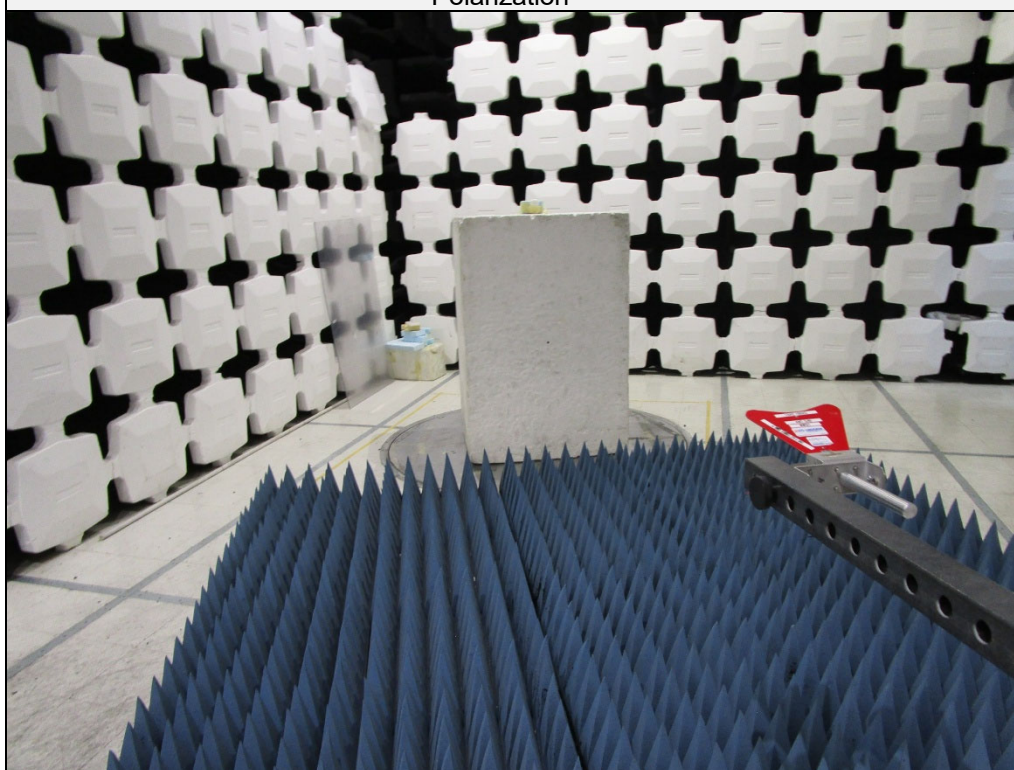
Test Setup for Radiated Spurious Emissions: 30MHz to 1GHz, Horizontal Polarization



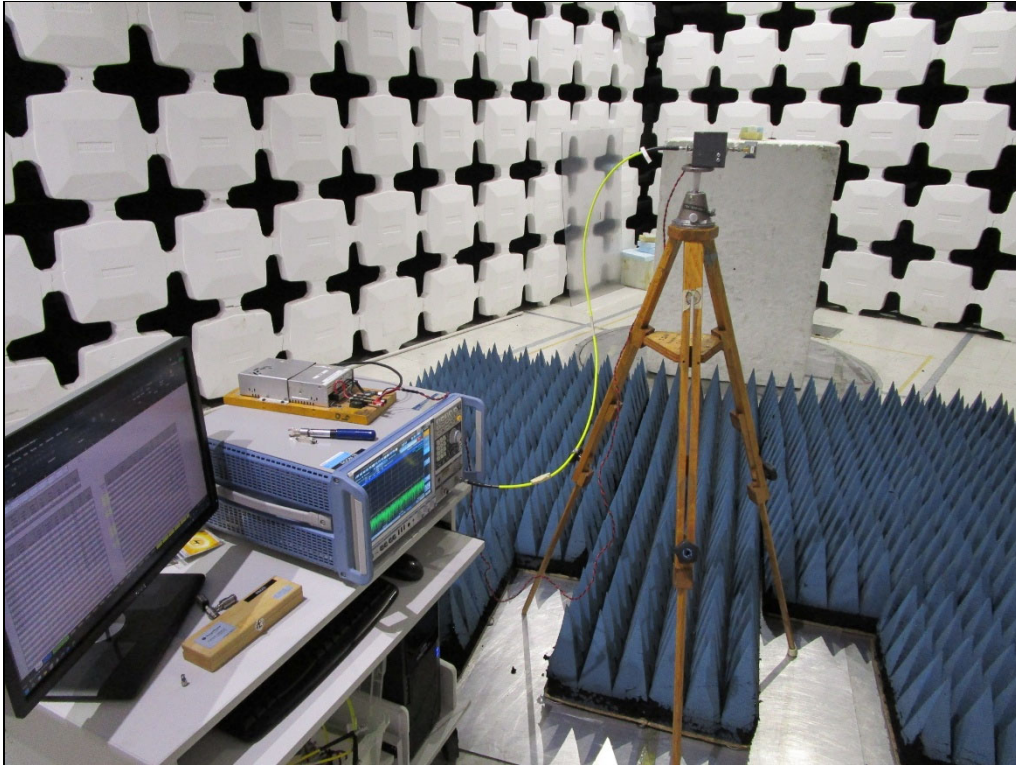
Test Setup for Radiated Spurious Emissions: 30MHz to 1GHz, Vertical Polarization



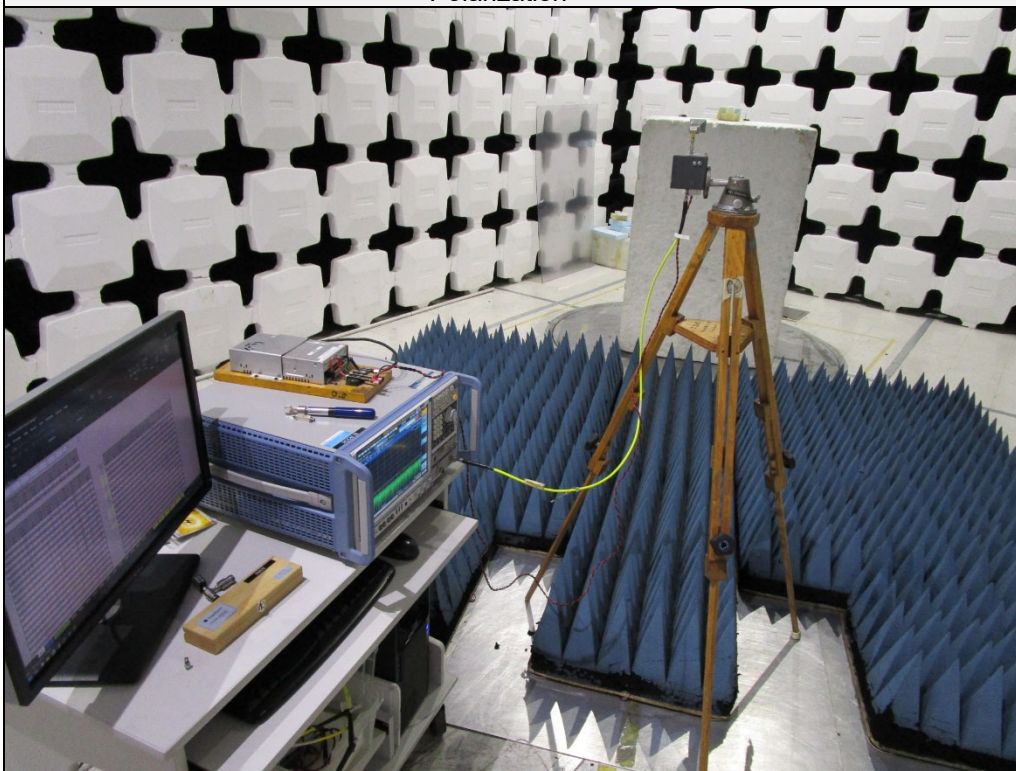
Test Setup for Radiated Spurious Emissions: 1GHz to 18GHz, Horizontal Polarization



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



Test Setup for Radiated Spurious Emissions: 18GHz to 25GHz, Horizontal Polarization



Test Setup for Radiated Spurious Emissions: 18GHz to 25GHz, Vertical Polarization

Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A2
Mode	BLE Low
Frequency Tested	2402MHz
Notes	Peak Measurements in the Restricted Bands

BLE Low Peak Measurements in the Restricted Bands

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBμV/m)	Peak Total at 3m (μV/m)	Peak Limit at 3m (μV/m)	Margin (dB)
4804.00	H	49.3	*	3.7	34.7	-39.3	48.4	262.5	5000.0	-25.6
4804.00	V	49.8	*	3.7	34.7	-39.3	48.9	277.4	5000.0	-25.1
12010.00	H	48.9	*	6.1	39.0	-39.2	54.9	555.1	5000.0	-19.1
12010.00	V	49.6	*	6.1	39.0	-39.2	55.5	596.8	5000.0	-18.5
19216.00	H	38.4	*	2.0	40.4	-27.6	53.1	453.6	5000.0	-20.8
19216.00	V	38.7	*	2.0	40.4	-27.6	53.4	467.9	5000.0	-20.6

Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A2
Mode	BLE Low
Frequency Tested	2402MHz
Notes	Average Measurements in the Restricted Bands

BLE Low Average Measurements in the Restricted Bands

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Average Total at 3m (dBμV/m)	Average Total at 3m (μV/m)	Average Limit at 3m (μV/m)	Margin (dB)
4804.00	H	49.3	*	3.7	34.7	-39.3	36.2	64.9	500.0	-17.7
4804.00	V	49.8	*	3.7	34.7	-39.3	36.4	66.4	500.0	-17.5
12010.00	H	48.9	*	6.1	39.0	-39.2	42.8	138.6	500.0	-11.1
12010.00	V	49.6	*	6.1	39.0	-39.2	42.4	132.4	500.0	-11.5
19216.00	H	38.4	*	2.0	40.4	-27.6	45.0	177.9	500.0	-9.0
19216.00	V	38.7	*	2.0	40.4	-27.6	45.5	188.7	500.0	-8.5

Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A2
Mode	BLE Low
Frequency Tested	2402MHz
Notes	Peak Measurements in Non-Restricted Bands

BLE Low Peak Measurements in Non-Restricted Bands

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBμV/m)	Peak Total at 3m (μV/m)	Peak Limit at 3m (μV/m)	Margin (dB)
2402.00	H	56.3		2.6	32.6	0.0	91.4	37281.2	NA	NA
2402.00	V	48.6		2.6	32.6	0.0	83.8	15523.5	NA	NA
7206.00	H	47.2		4.6	35.7	-39.4	48.2	256.7	3728.1	-23.2
7206.00	V	43.7		4.6	35.7	-39.4	44.6	170.6	3728.1	-26.8
9608.00	H	38.3	*	5.2	36.7	-39.3	40.9	111.1	3728.1	-30.5
9608.00	V	36.9	*	5.2	36.7	-39.3	39.4	93.7	3728.1	-32.0
14412.00	H	37.8	*	6.6	39.9	-38.3	46.0	198.9	3728.1	-25.5
14412.00	V	37.9	*	6.6	39.9	-38.3	46.1	202.4	3728.1	-25.3
16814.00	H	36.5	*	7.2	42.7	-37.5	48.9	277.1	3728.1	-22.6
16814.00	V	36.8	*	7.2	42.7	-37.5	49.1	285.9	3728.1	-22.3
21618.00	H	26.1	*	2.1	40.6	-25.3	43.6	150.5	3728.1	-27.9
21618.00	V	26.9	*	2.1	40.6	-25.3	44.3	164.7	3728.1	-27.1
24020.00	H	27.2	*	2.3	40.6	-25.2	44.9	176.0	3728.1	-26.5
24020.00	V	27.3	*	2.3	40.6	-25.2	45.0	177.2	3728.1	-26.5

Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A2
Mode	BLE Mid
Frequency Tested	2440MHz
Notes	Peak Measurements in the Restricted Bands

BLE Mid Peak Measurements in the Restricted Bands

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBμV/m)	Peak Total at 3m (μV/m)	Peak Limit at 3m (μV/m)	Margin (dB)
4880.00	H	50.2	*	3.7	34.6	-39.3	49.1	285.5	5000.0	-24.9
4880.00	V	49.2	*	3.7	34.6	-39.3	48.2	256.0	5000.0	-25.8
7320.00	H	51.7		4.7	35.7	-39.4	52.7	430.2	5000.0	-21.3
7320.00	V	51.7		4.7	35.7	-39.4	52.7	429.3	5000.0	-21.3
12200.00	H	49.5		6.1	39.1	-39.1	55.6	604.1	5000.0	-18.4
12200.00	V	50.4		6.1	39.1	-39.1	56.5	667.8	5000.0	-17.5
19520.00	H	39.0	*	2.1	40.4	-26.7	54.7	542.0	5000.0	-19.3
19520.00	V	39.5	*	2.1	40.4	-26.7	55.2	576.1	5000.0	-18.8

Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A2
Mode	BLE Mid
Frequency Tested	2440MHz
Notes	Average Measurements in the Restricted Bands

BLE Mid Average Measurements in the Restricted Bands

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Average Total at 3m (dBμV/m)	Average Total at 3m (μV/m)	Average Limit at 3m (μV/m)	Margin (dB)
4880.00	H	37.5	*	3.7	34.6	-39.3	36.5	66.7	500.0	-17.5
4880.00	V	37.1	*	3.7	34.6	-39.3	36.1	63.8	500.0	-17.9
7320.00	H	41.5		4.7	35.7	-39.4	42.5	133.1	500.0	-11.5
7320.00	V	42.7		4.7	35.7	-39.4	43.7	153.2	500.0	-10.3
12200.00	H	38.1		6.1	39.1	-39.1	44.2	162.2	500.0	-9.8
12200.00	V	39.6		6.1	39.1	-39.1	45.7	192.6	500.0	-8.3
19520.00	H	30.5	*	2.1	40.4	-26.7	46.1	203.0	500.0	-7.8
19520.00	V	30.6	*	2.1	40.4	-26.7	46.3	205.6	500.0	-7.7

Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A2
Mode	BLE Mid
Frequency Tested	2440MHz
Notes	Peak Measurements in Non-Restricted Bands

BLE Mid Peak Measurements in Non-Restricted Bands

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBμV/m)	Peak Total at 3m (μV/m)	Peak Limit at 3m (μV/m)	Margin (dB)
2440.00	H	55.9		2.6	32.7	0.0	91.3	36653.0	NA	NA
2440.00	V	59.1		2.6	32.7	0.0	94.5	53224.2	NA	NA
9760.00	H	37.6	*	5.2	36.9	-39.3	40.5	105.9	5322.4	-34.0
9760.00	V	38.2	*	5.2	36.9	-39.3	41.0	112.8	5322.4	-33.5
14640.00	H	38.0	*	6.7	40.2	-38.2	46.7	216.1	5322.4	-27.8
14640.00	V	38.2	*	6.7	40.2	-38.2	46.8	219.1	5322.4	-27.7
17080.00	H	37.0	*	7.3	41.9	-37.6	48.6	269.2	5322.4	-25.9
17080.00	V	37.4	*	7.3	41.9	-37.6	49.0	280.3	5322.4	-25.6
21960.00	H	27.9	*	2.1	40.6	-25.5	45.1	179.2	5322.4	-29.5
21960.00	V	30.6		2.1	40.6	-25.5	47.8	245.1	5322.4	-26.7
24400.00	H	27.2	*	2.1	40.6	-25.6	44.4	165.5	5322.4	-30.1
24400.00	V	27.9	*	2.1	40.6	-25.6	45.1	179.4	5322.4	-29.4

Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A2
Mode	BLE High
Frequency Tested	2480MHz
Notes	Peak Measurements in the Restricted Bands

BLE High Peak Measurements in the Restricted Bands

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBμV/m)	Peak Total at 3m (μV/m)	Peak Limit at 3m (μV/m)	Margin (dB)
4960.00	H	50.8		3.7	34.4	-39.3	49.6	300.9	5000.0	-24.4
4960.00	V	50.6		3.7	34.4	-39.3	49.4	293.7	5000.0	-24.6
7440.00	H	52.5		4.7	35.7	-39.4	53.5	472.0	5000.0	-20.5
7440.00	V	52.2		4.7	35.7	-39.4	53.2	456.5	5000.0	-20.8
12400.00	H	50.7		6.1	38.9	-39.0	56.7	682.1	5000.0	-17.3
12400.00	V	50.7		6.1	38.9	-39.0	56.6	678.2	5000.0	-17.4
19840.00	H	39.0	*	1.9	40.4	-26.8	54.5	533.6	5000.0	-19.4
19840.00	V	39.0	*	1.9	40.4	-26.8	54.6	534.3	5000.0	-19.4
22320.00	H	37.9		1.9	40.6	-26.0	54.4	526.5	5000.0	-19.6
22320.00	V	39.1		1.9	40.6	-26.0	55.6	605.2	5000.0	-18.3

Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A2
Mode	BLE High
Frequency Tested	2480MHz
Notes	Average Measurements in the Restricted Bands

BLE High Average Measurements in the Restricted Bands

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Average Total at 3m (dBμV/m)	Average Total at 3m (μV/m)	Average Limit at 3m (μV/m)	Margin (dB)
4960.00	H	38.6		3.7	34.4	-39.3	37.4	74.5	500.0	-16.5
4960.00	V	37.6		3.7	34.4	-39.3	36.4	66.3	500.0	-17.6
7440.00	H	43.7		4.7	35.7	-39.4	44.7	172.6	500.0	-9.2
7440.00	V	42.5		4.7	35.7	-39.4	43.5	150.1	500.0	-10.5
12400.00	H	38.7		6.1	38.9	-39.0	44.6	170.2	500.0	-9.4
12400.00	V	39.7		6.1	38.9	-39.0	45.6	191.1	500.0	-8.4
19840.00	H	30.9	*	1.9	40.4	-26.8	46.5	210.3	500.0	-7.5
19840.00	V	30.9	*	1.9	40.4	-26.8	46.5	211.5	500.0	-7.5
22320.00	H	29.8		1.9	40.6	-26.0	46.3	207.0	500.0	-7.7
22320.00	V	31.8		1.9	40.6	-26.0	48.3	260.3	500.0	-5.7

Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A2
Mode	BLE High
Frequency Tested	2480MHz
Notes	Peak Measurements in Non-Restricted Bands

BLE High Peak Measurements in Non-Restricted Bands

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBμV/m)	Peak Total at 3m (μV/m)	Peak Limit at 3m (μV/m)	Margin (dB)
2480.00	H	56.0		2.7	32.9	0.0	91.6	37852.4	NA	NA
2480.00	V	58.7		2.7	32.9	0.0	94.3	51891.1	NA	NA
9920.00	H	38.3	*	5.3	37.1	-39.2	41.4	117.0	5189.1	-32.9
9920.00	V	38.1	*	5.3	37.1	-39.2	41.2	115.3	5189.1	-33.1
14880.00	H	37.9	*	6.8	40.1	-38.2	46.6	213.6	5189.1	-27.7
14880.00	V	37.5	*	6.8	40.1	-38.2	46.2	205.0	5189.1	-28.1
17360.00	H	37.7	*	7.4	41.7	-37.7	49.0	283.0	5189.1	-25.3
17360.00	V	38.7	*	7.4	41.7	-37.7	50.0	317.6	5189.1	-24.3
24800.00	H	27.5	*	2.3	40.6	-25.0	45.4	186.7	5189.1	-28.9
24800.00	V	27.5	*	2.3	40.6	-25.0	45.5	187.5	5189.1	-28.8

26. Band-Edge Compliance

EUT Information	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1 and A2
Modes	BLE Low and BLE High

Test Setup Details	
Setup Format	Tabletop
Height of Support	1.5m (Radiated)
Measurement Methods	Antenna Port Conducted Radiated
Type of Test Sites	Elite Test Bench Semi-Anechoic Chamber
Test Sites Used	Elite Test Bench R29F
Type of Antennas Used	Below 1GHz: Bilog (or equivalent) Above 1GHz: Double-ridged waveguide (or equivalent)
Notes	None

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

Procedure
1) Low Band Edge: - The antenna port of the EUT was connected to the spectrum analyzer through an external OSP. - The EUT was set to transmit continuously at the channel closest to the low band-edge. - To determine the band edge compliance, the following spectrum analyzer settings were used: - Center Frequency = 2400MHz (low band-edge frequency). - Span = Wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation. - Resolution Bandwidth (RBW) = $\geq 1\%$ of the span. 'Max-Hold' function was engaged. - The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined. - The marker was set on the peak of the in-band emissions. A display line was placed 20dB down from the peak of the in-band emissions. All emissions which fall outside of the authorized band of operation must be below the 20dB down display line. (All emissions to the left of the center frequency (band-edge) must be below the display line.) - The analyzer's display was then screenshot and saved.

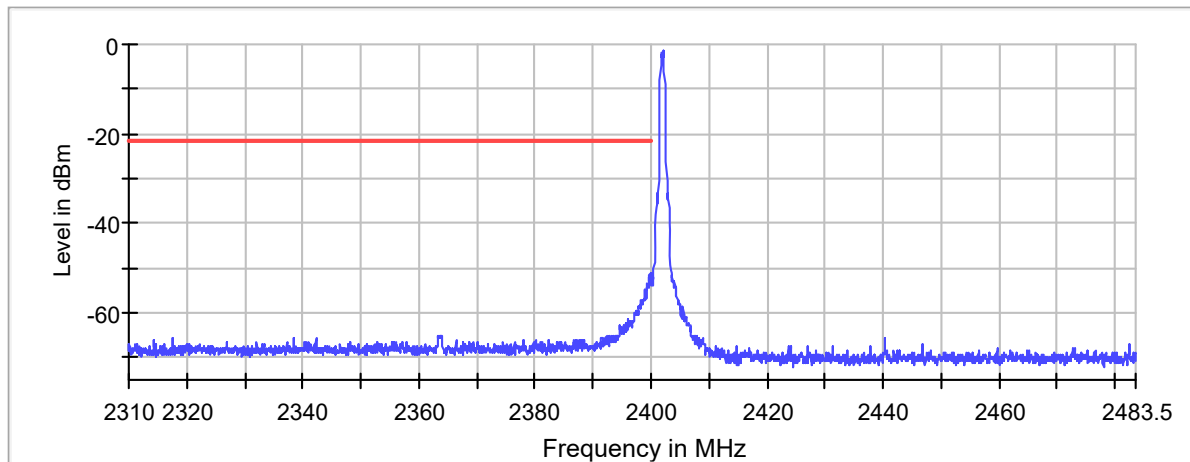
2) High Band Edge:

- a) The EUT was set up inside the test chamber on a non-conductive stand and set to transmit continuously at the channel closest to the high band-edge
- b) A broadband measuring antenna was placed at a test distance of 3 meters from the EUT. The antenna was connected to the input of a spectrum analyzer.
- c) The center frequency of the analyzer was set to the high band edge (2483.5MHz).
- d) The Resolution Bandwidth was set to 1MHz.
- e) To ensure that the maximum or worst case emission level was measured, the following steps were taken:
 - o The EUT was rotated so that all of its sides were exposed to the receiving antenna.
 - o Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
 - o The EUT was rotated so that all of its sides were exposed to the receiving antenna.
 - o The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.
 - o The highest measured peak reading and the highest measured average reading were recorded.

Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Mode	BLE Low
Frequency Tested	2402MHz
Notes	Low Band Edge

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.949972	-51.0	29.4	-21.6	PASS
2399.849917	-51.1	29.5	-21.6	PASS
2399.799889	-51.5	29.9	-21.6	PASS
2399.749861	-51.8	30.2	-21.6	PASS
2399.599778	-52.1	30.5	-21.6	PASS
2399.899944	-52.3	30.7	-21.6	PASS
2399.549750	-52.3	30.7	-21.6	PASS
2399.699833	-52.9	31.3	-21.6	PASS
2399.649805	-53.2	31.6	-21.6	PASS
2399.399666	-53.4	31.8	-21.6	PASS
2399.449694	-54.0	32.4	-21.6	PASS
2399.249583	-54.3	32.7	-21.6	PASS
2399.499722	-54.5	32.9	-21.6	PASS
2399.299611	-54.6	33.0	-21.6	PASS
2399.199555	-54.6	33.0	-21.6	PASS

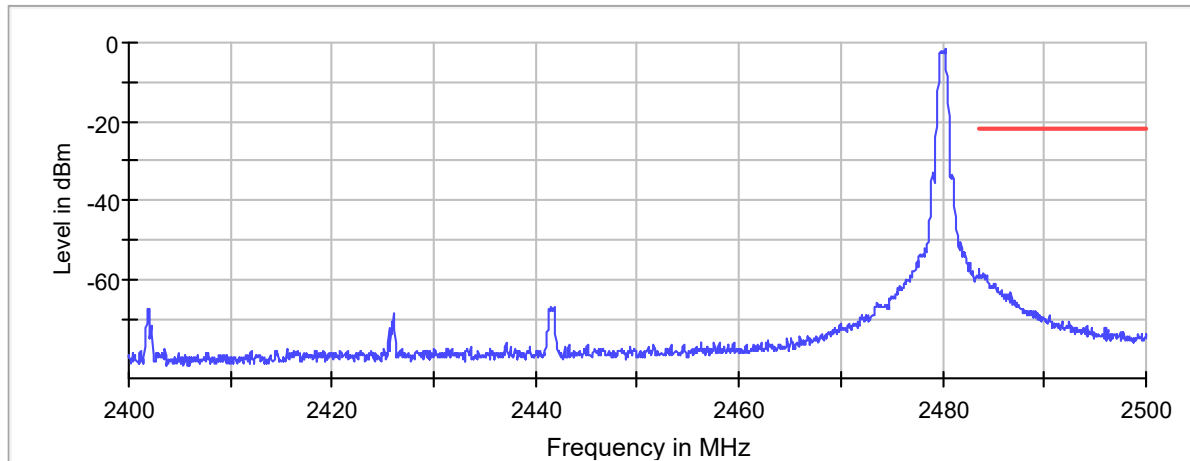
Band Edge



— Limit — Sum Level × Fail

Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A2
Mode	BLE High
Frequency Tested	2480 MHz
Notes	High Band Edge – Peak and Average Measurements

Band Edge



— Limit — Sum Level × Fail

High Band Edge - Peak Measurements

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBμV/m)	Peak Total at 3m (μV/m)	Peak Limit at 3m (μV/m)	Margin (dB)
2483.50	H	22.4	*	2.7	32.9	0.0	58.0	798.0	5000.0	-15.9
	V	23.2	*	2.7	32.9	0.0	58.8	875.0	5000.0	-15.1

High Band Edge – Average Measurements

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Duty Cycle Factor (dB)	Average Total at 3m (dBμV/m)	Average Total at 3m (μV/m)	Average Limit at 3m (μV/m)	Margin (dB)
2483.50	H	11.39	*	2.7	32.9	0.0	0.0	47.0	223.9	500.0	-7.0
	V	11.74	*	2.7	32.9	0.0	0.0	47.4	233.1	500.0	-6.6

27. Power Spectral Density

EUT Information	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Modes	BLE Low, BLE Mid, and BLE High

Test Setup Details	
Setup Format	Tabletop
Height of Support	NA
Measurement Method	Antenna Port Conducted
Type of Test Site	Elite Test Bench
Test Site Used	Elite Test Bench
Notes	None

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

Requirement
The power spectral density from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

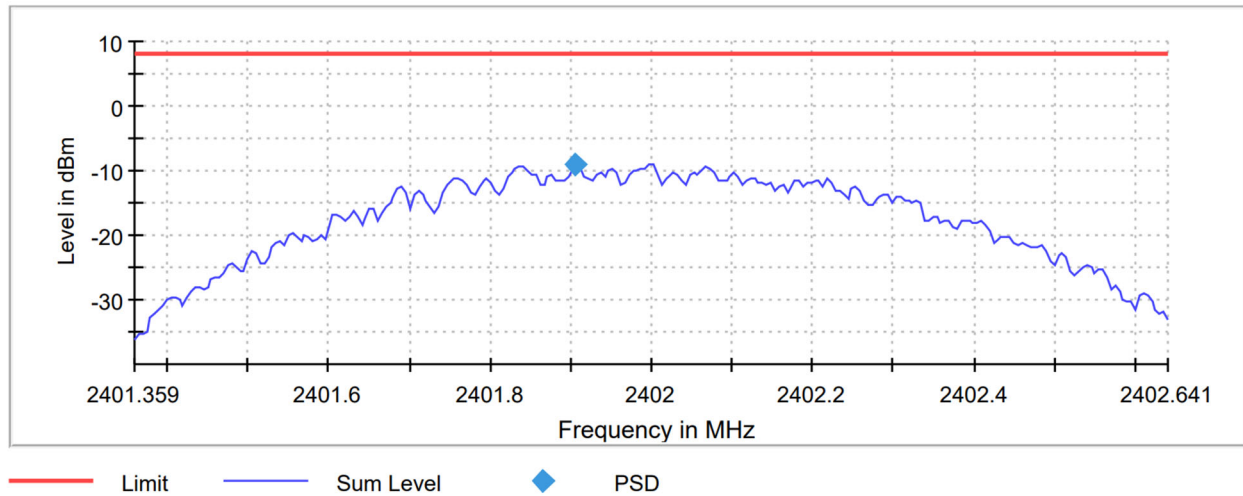
Procedure
1) The antenna port of the EUT was connected to the spectrum analyzer through an external OSP. 2) The EUT was then placed in the normal operation mode. 3) To determine the power spectral density, the following spectrum analyzer settings were used: a) Center Frequency = Transmit Frequency b) Span = 1.5× the DTS (6dB) bandwidth c) Resolution Bandwidth (RBW) = 3kHz ≤ RBW ≤ 100kHz d) Sweep time = Auto e) Detector = Peak f) Trace Function = Max-Hold 4) A display line was then placed on the corresponding +8dBm level. 5) The analyzers display was then screenshot and saved.

Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Mode	BLE Low
Frequency Tested	2402MHz
Result	PSD = -9.028dBm
Notes	None

BLE Low Power Spectral Density

DUT Frequency (MHZ)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)
2402.00 MHz	2401.907035	-9.028	8.0

Peak Power Spectral Density



Test Details	
Manufacturer	Genie Company
Equipment Under Test	Door Position Sensor
Model No.	ALDPS2
Serial No.	A1
Mode	BLE Mid
Frequency Tested	2440MHz
Result	PSD = -9.023dBm
Notes	None

BLE Mid Power Spectral Density

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)
2440.00 MHz	2439.907035	-9.023	8.0

Peak Power Spectral Density

