

**Engineering Test Report No. 2200772-01**

Report Date	March 29, 2022	
Manufacturer Name	Genie Company	
Manufacturer Address	One Door Drive Mount Hope, OH 44660	
Model No.	GK-A Keypad Transmitter	
Date Received	March 16, 2022	
Test Dates	March 16, 2022	
Specifications	FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.231(b) Innovation, Science, and Economic Development Canada, RSS-210 Innovation, Science, and Economic Development Canada, RSS-GEN	
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	<i>Nathaniel Bouchie</i>	
Tested by	Nathaniel Bouchie	
Signature	<i>Raymond J Klouda</i>	
Approved by	Raymond J. Klouda, Registered Professional Engineer of Illinois – 44894	
PO Number	950323	

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1. Report Revision History

Revision	Date	Description
–	30 MAR 2022	Initial Release of Engineering Test Report No. 2200772-01

2. Introduction

2.1. Scope of Tests

This document presents the results of a series of RF emissions tests that were performed on the Genie Company Model GK-A Keypad Transmitter (hereinafter referred to as the Equipment Under Test (EUT)). The EUT was manufactured and submitted for testing by Genie Company located in Mount Hope, OH.

2.2. Purpose

The test series was performed to determine if the EUT meets the RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.231(b).

The test series was also performed to determine if the EUT meets the RF emission requirements of the Industry Canada Radio Standards Specification RSS-Gen and Industry Canada Radio Standards Specification RSS-210 for Transmitters.

Testing was performed in accordance with ANSI C63.10-2013.

2.3. Identification of the EUT

The EUT was identified as follows:

EUT Identification	
Product Description	Universal Keypad
Model/Part No.	GK-A
S/N	Unit 2
Band of Operation	315MHz and 390MHz
Antenna Type	Printed Differential Loop
Antenna Gain (dBi)*	-8.5
20dB Bandwidth	20kHz
99% Bandwidth	36.7kHz
Size of EUT	6.5 in x 2.5 in x 1.5 in

*- Antenna gain is supplied by the manufacturer and Elite is not responsible for the accuracy of the antenna gain.

The EUT listed above was used throughout the test series.

Per Genie Company personnel, the Overhead Door Model No. OKP-A is electrically identical to the EUT.

3. Power Input

The EUT was powered by 2 AAA Batteries.

4. Grounding

The EUT was not connected to ground.

5. Support Equipment

No support equipment was used during the tests.

6. Interconnect Leads

No interconnect leads were used during the tests.

7. Modifications Made to the EUT

No modifications were made to the EUT during the testing.

8. Modes of Operation

Mode	Description
Normal Operation	Used for duty cycle correction factor, bandwidth measurements, and periodic operation tests
CW Tx @ 315MHz	Transmit at 315MHz unmodulated carrier Used for radiated emissions tests
CW Tx @ 390MHz	Transmit at 390MHz unmodulated carrier Used for radiated emissions tests

9. Test Specifications

The tests were performed to selected portions of, and in accordance with the FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.231(b) and Innovation, Science, and Economic Development Canada, RSS-210 test specifications.

- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 15, Subpart C
- ANSI C63.10-2013, "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices"
- RSS-210 Issue 10, December 2019, "License-Exempt Radio Apparatus: Category I Equipment"
- RSS-Gen Issue 5, April 2018, Amendment 1, March 2019, Amendment 2, February 2021, Innovation, Science, and Economic Development Canada, "Spectrum Management and Telecommunications, Radio Standards Specification, General Requirements for Compliance of Radio Apparatus"

10. Test Plan

No test plan was provided. Instructions were provided by personnel from Genie Company and used in conjunction with the FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.231(b) and Innovation, Science, and Economic Development Canada, RSS-210, and ANSI C63.10-2013 specifications.

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

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

12. Laboratory Conditions

Ambient Parameters	Value
Temperature	24.7°C
Relative Humidity	18%
Atmospheric Pressure	1011.9mb

13. Summary

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

Test Description	Requirements	Test Methods	S/N	Results
Duty Cycle Factor Measurements	FCC 15C ISED RSS-210	ANSI C63.10: 2013	Unit 2	N/A
Spurious Radiated Emissions	FCC 15C ISED RSS-210	ANSI C63.10: 2013	Unit 2	Conforms
Occupied Bandwidth Measurements	FCC 15C ISED RSS-210	ANSI C63.10: 2013	Unit 2	Conforms
Periodic Operation	FCC 15C ISED RSS-210	ANSI C63.10: 2013	Unit 2	Conforms

14. Sample Calculations

For Powerline Conducted Emissions:

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

$$\text{Formula 1: VL (dBuV) = MTR (dBuV) + CF (dB).}$$

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 preamplifier is used, the total is reduced by its gain (-PA). If a distance correction (DC) is required, it is added to the total.

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

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.

$$\text{Formula 2: FS (uV/m) = AntiLog [(FS (dBuV/m))/20]}$$

15. Statement of Conformity

The Genie Company Keypad Transmitter, Model No. GK-A, Serial No. Unit 2, did fully conform to the selected requirements of FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.231(b) and Innovation, Science, and Economic Development Canada, RSS-210.

16. Certification

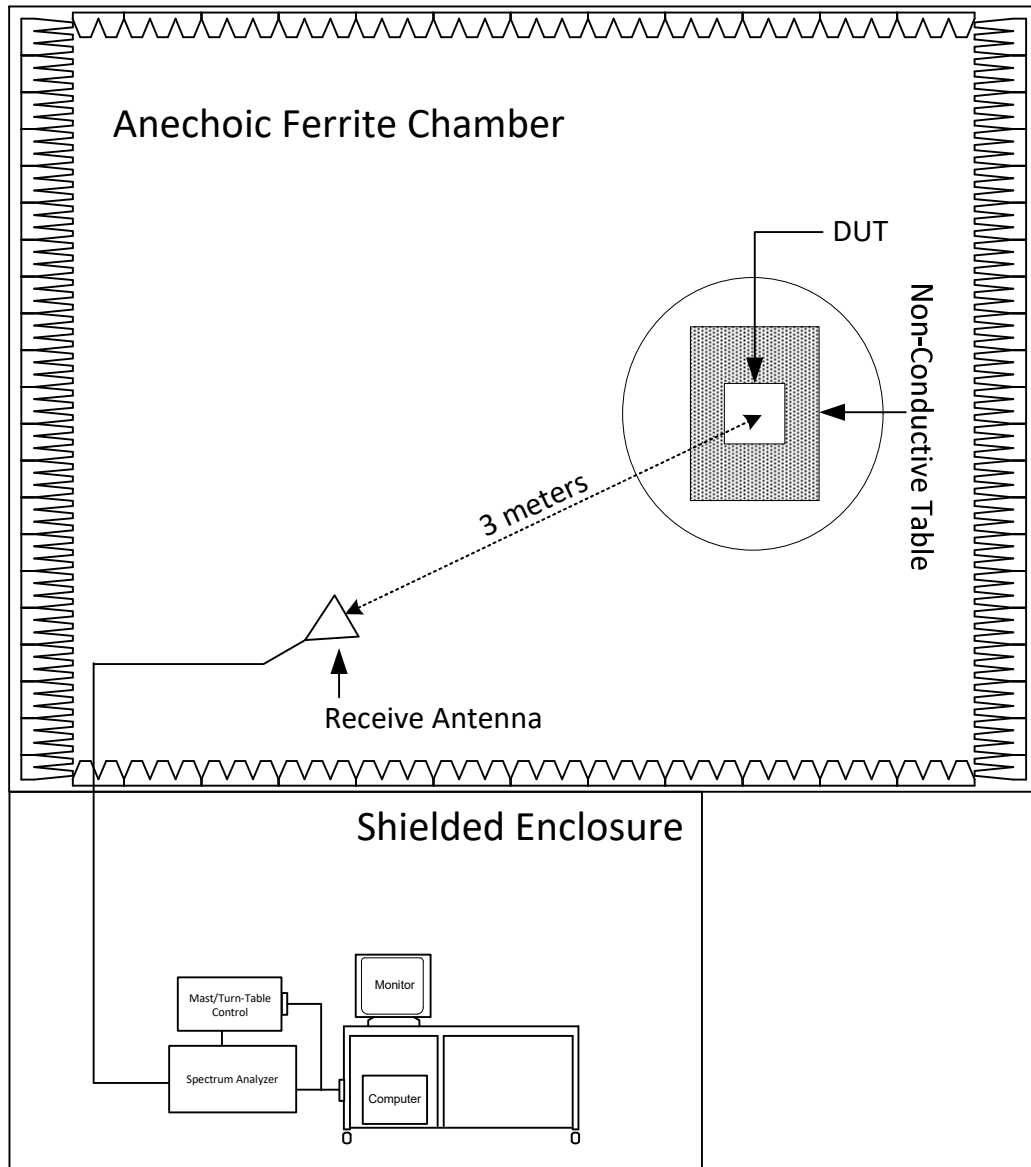
Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.231(b) and Innovation, Science, and Economic Development Canada, RSS-210 test specifications. The data presented in this test report pertains to the EUT on the test date specified. Any electrical or mechanical modifications made to the EUT subsequent to the specified test date will serve to invalidate the data and void this certification.

17. Photographs of EUT





18. Block Diagram of Test Setup



Radiated Measurements Test Setup

19. Equipment List

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
CDZ3	LAB WORKSTATION	ELITE	LWS-10		WINDOWS 10	CNR	
NTA3	BILOG ANTENNA	TESEQ	6112D	32853	25-1000MHz	10/20/2020	10/20/2022
NWQ2	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS LINDGREN	3117	66659	1GHZ-18GHZ	4/7/2020	4/7/2022
RBG0	EMI ANALYZER	ROHDE & SCHWARZ	ESW44	101533	10HZ-44GHZ	11/15/2021	11/15/2022
WKA1	SOFTWARE, UNIVERSAL RCV EMI	ELITE	UNIV_RCV_EMI	1	---	I/O	

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.

20. Duty Cycle Factor Measurements

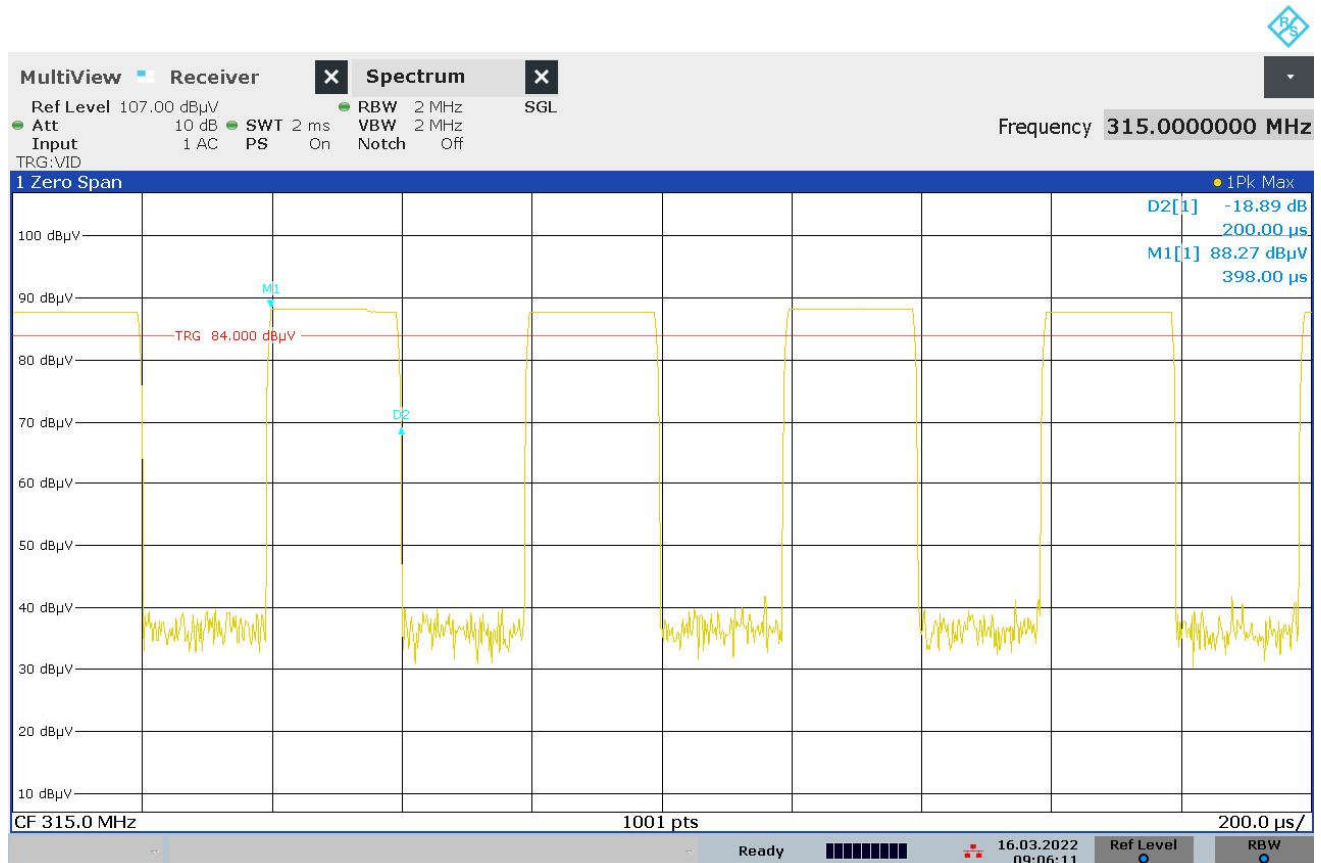
Test Information	
Manufacturer	Genie Company
Product	Keypad Transmitter
Model	GK-A
Serial No	Unit 2
Mode	Normal Operation
Test Date	March 16, 2022

Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Type of Test Site	Semi-Anechoic Chamber
Test site used	Room 29
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
Radiated disturbance (electric field strength on an open area test site or alternative test site) (26.5 GHz – 40 GHz)	3.4

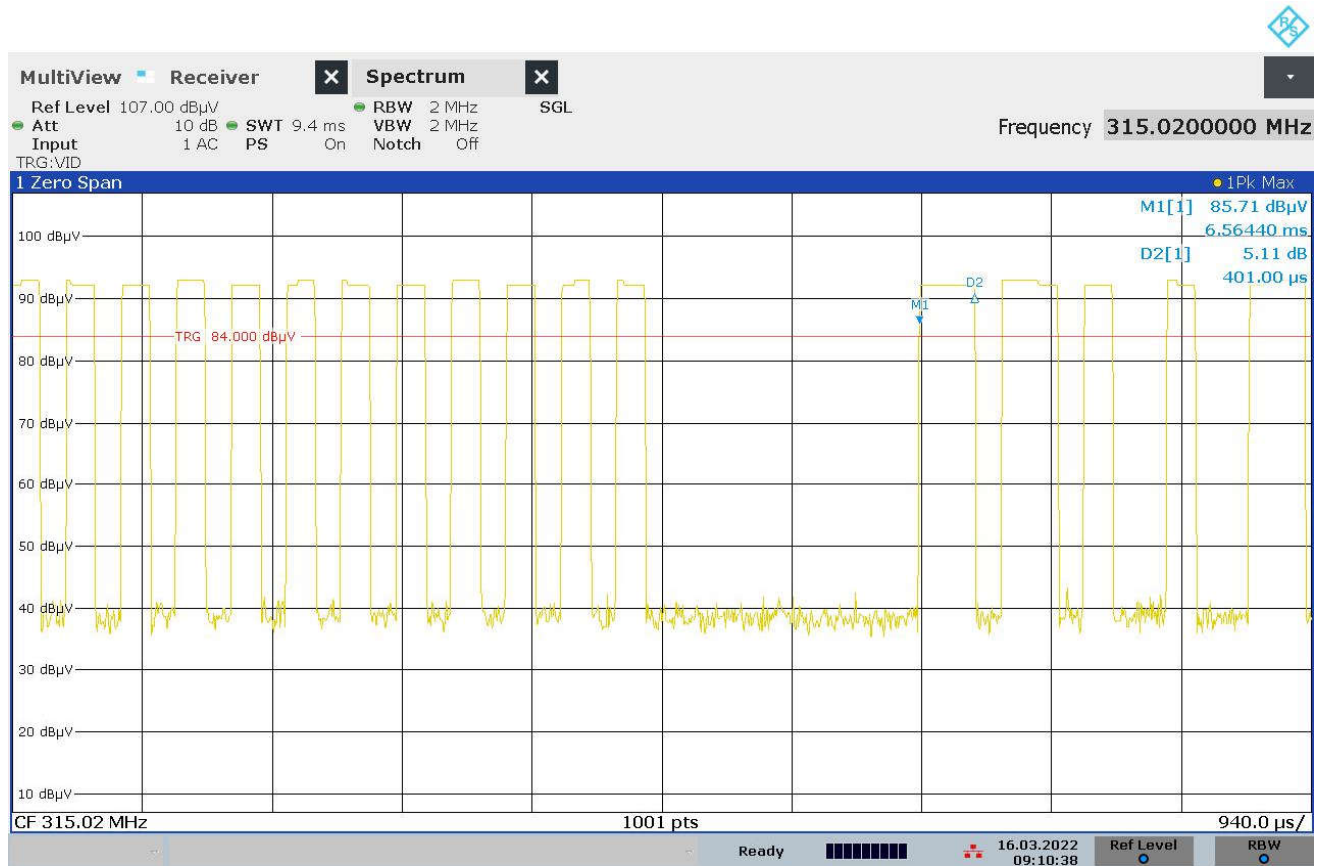
Procedures
The duty cycle factor is used to convert peak detected readings to average readings. This factor is computed from the time domain trace of the pulse modulation signal. The following procedure was used to measure a representative sample: 1) With the transmitter set up to transmit for maximum pulse density, the time domain trace is displayed on the spectrum analyzer. 2) The pulse width is measured, and a plot of this measurement is recorded. 3) Next the number of pulses in the word period is measured and a plot is recorded. 4) Finally, the length of the word period is measured, and a third plot is recorded. If the word period exceeds 100msec, the word period is limited to 100msec. 5) The pulse width and number of pulses for the word period are used to compute the on-time. The duty cycle is then computed as the (on-time/ word period). 6) The duty cycle factor is computed from the duty cycle.

Test Details	
Manufacturer	Genie Company
Model	GK-A
S/N	Unit 2
Mode	Normal Operation
Carrier Frequency	315MHz
Parameters	Short Pulse = 200usec
Notes	None



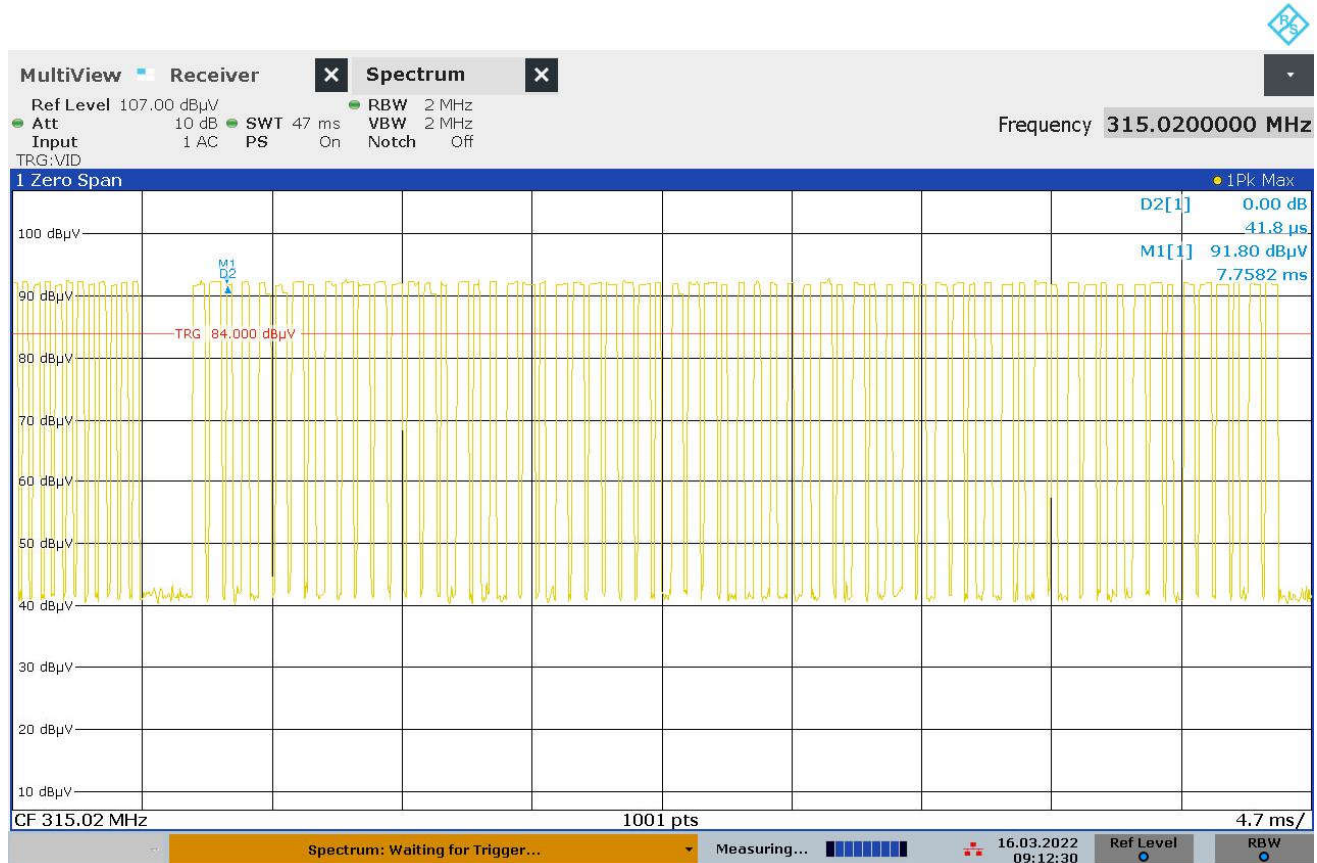
09:06:12 16.03.2022

Test Details	
Manufacturer	Genie Company
Model	GK-A
S/N	Unit 2
Mode	Normal Operation
Carrier Frequency	315MHz
Parameters	Long Pulse = 401usec
Notes	None



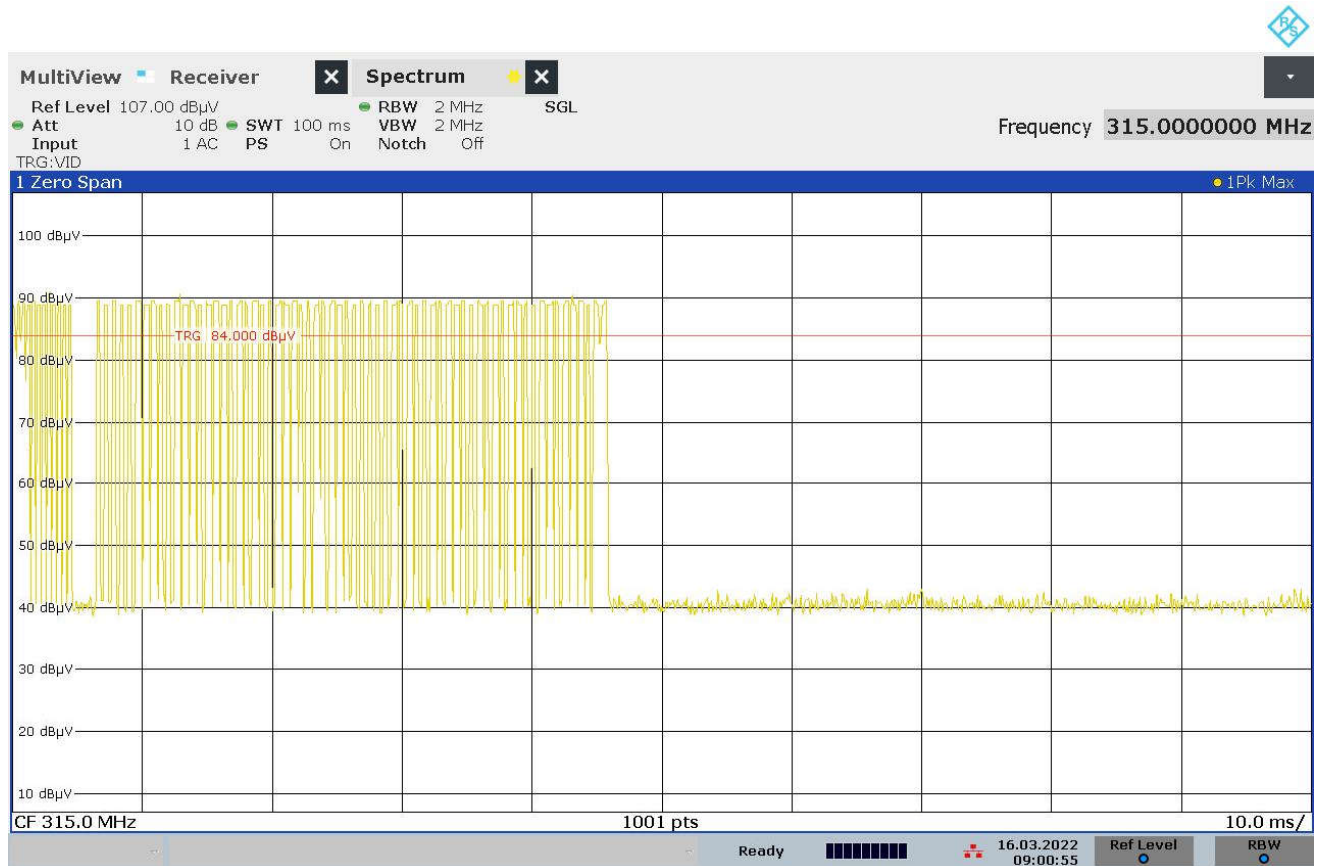
09:10:39 16.03.2022

Test Details	
Manufacturer	Genie Company
Model	GK-A
S/N	Unit 2
Mode	Normal Operation
Carrier Frequency	315MHz
Parameters	12 short pulses in preamble, 26 short pulses in the data, 40 long pulses in the data
Notes	None



09:12:31 16.03.2022

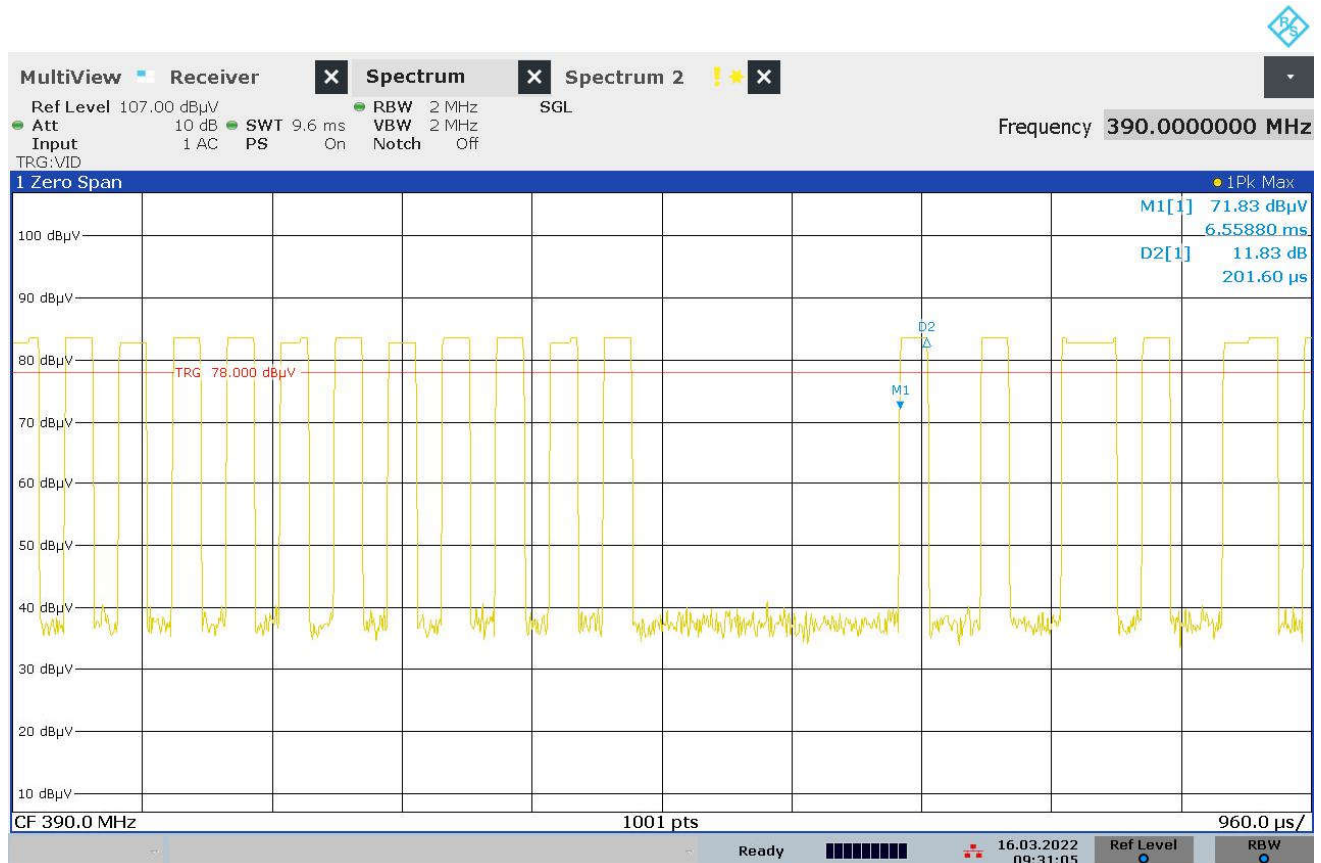
Test Details	
Manufacturer	Genie Company
Model	GK-A
S/N	Unit 2
Mode	Normal Operation
Carrier Frequency	315MHz
Parameters	On time = 23.64%
Notes	None



09:00:55 16.03.2022

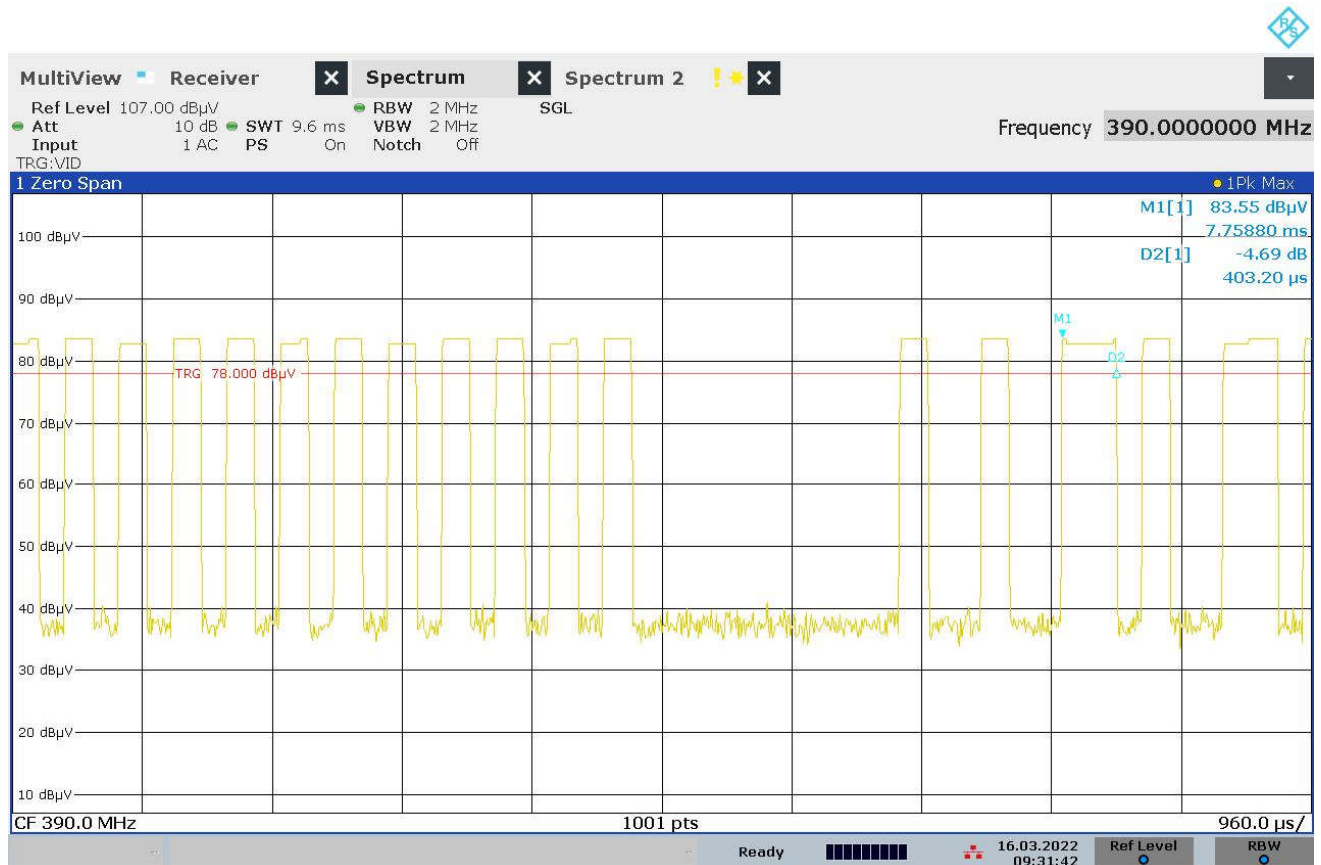
$$\text{Duty Cycle Factor} = 20 \log \left(\frac{\text{On - Time}}{\text{Word Length (100msec)}} \right) = 20 * \log \left(\frac{(200 * 12 + (401 * 40 + 200 * 26)) * 10^{-6}}{100 * 10^{-3}} \right) = -12.52 \text{ dB}$$

Test Details	
Manufacturer	Genie Company
Model	GK-A
S/N	Unit 2
Mode	Normal Operation
Carrier Frequency	390MHz
Parameters	Short Pulse = 201usec
Notes	None



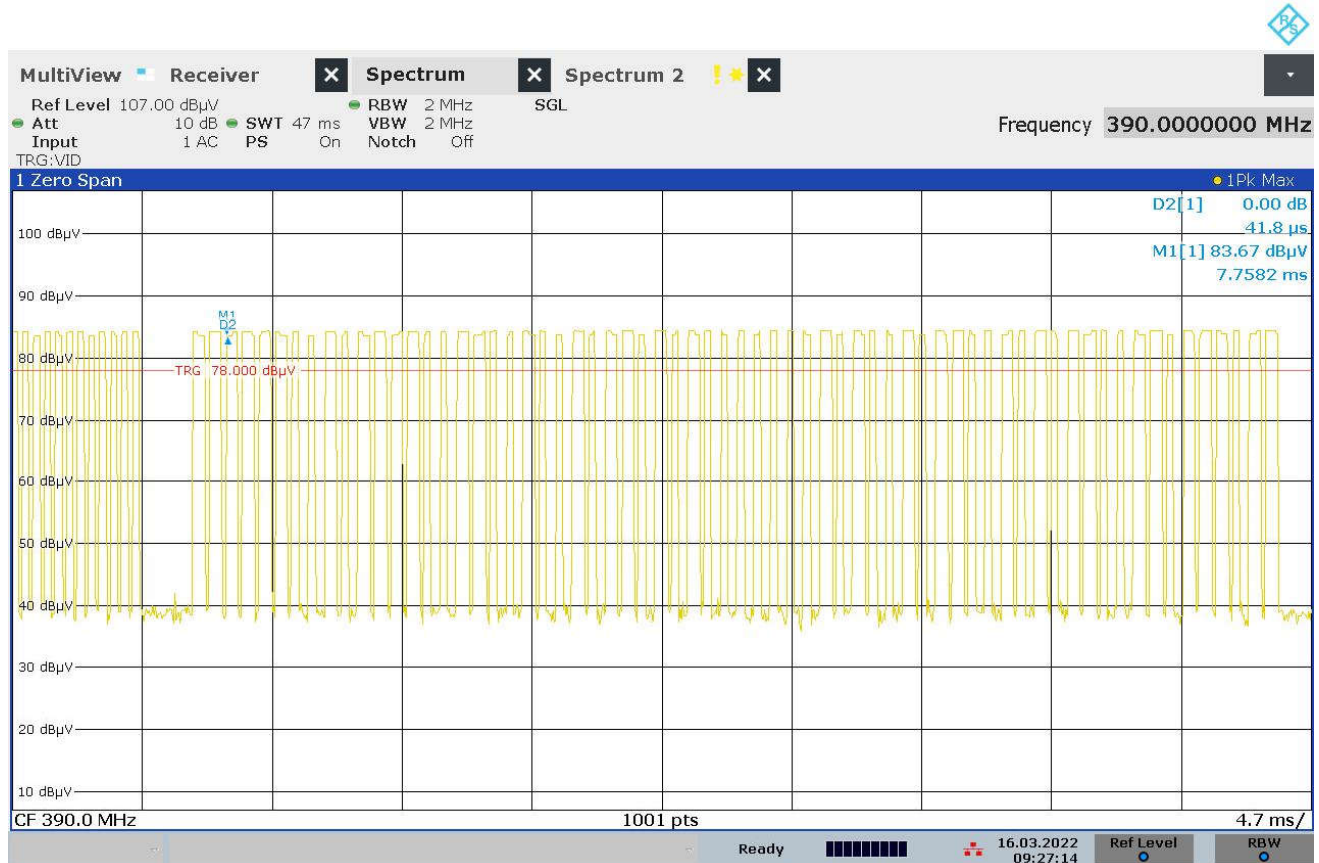
09:31:05 16.03.2022

Test Details	
Manufacturer	Genie Company
Model	GK-A
S/N	Unit 2
Mode	Normal Operation
Carrier Frequency	390MHz
Parameters	Long Pulse = 403usec
Notes	None



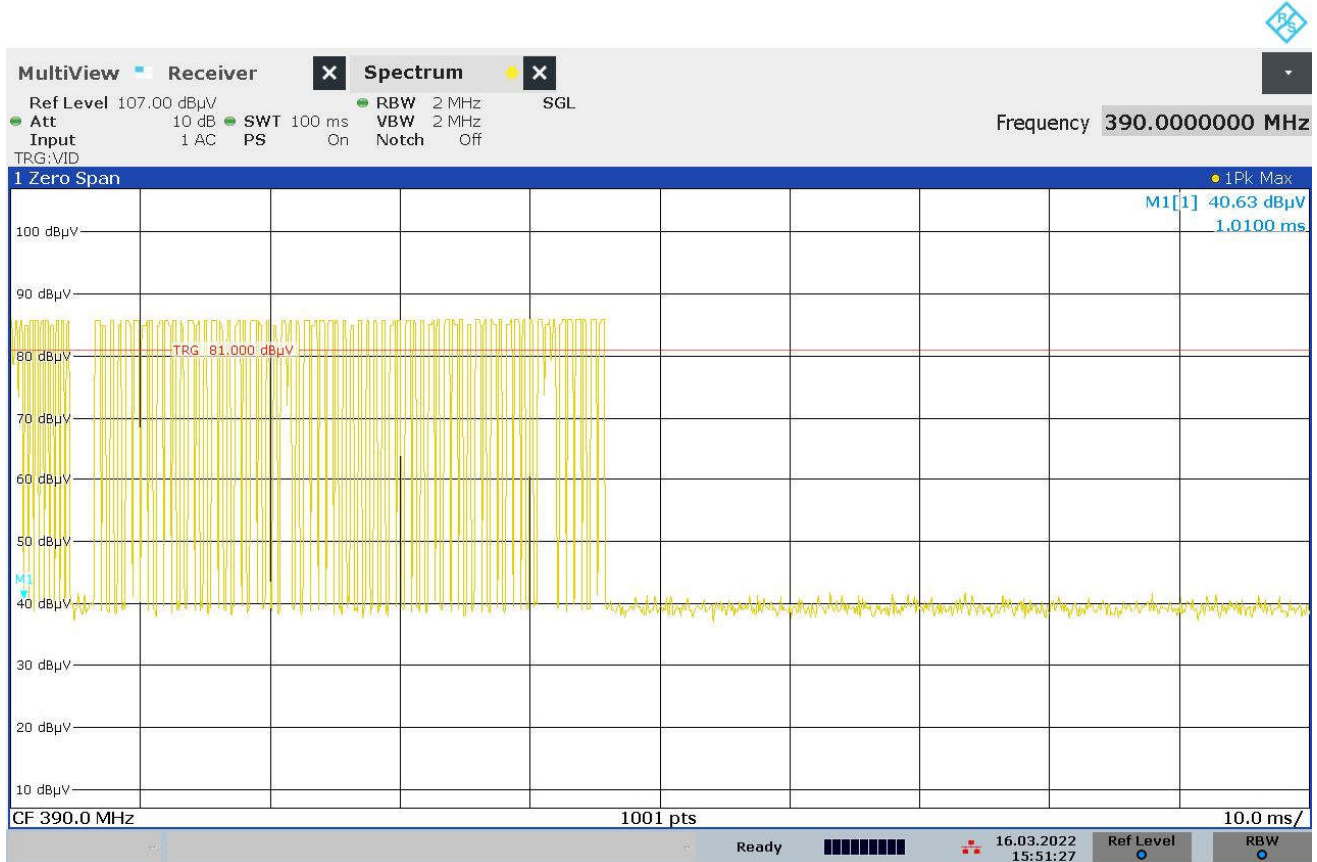
09:31:43 16.03.2022

Test Details	
Manufacturer	Genie Company
Model	GK-A
S/N	Unit 2
Mode	Normal Operation
Carrier Frequency	390MHz
Parameters	12 short pulses in preamble, 31 short pulses in the data, 35 long pulses in the data
Notes	None



09:27:14 16.03.2022

Test Details	
Manufacturer	Genie Company
Model	GK-A
S/N	Unit 2
Mode	Normal Operation
Carrier Frequency	390MHz
Parameters	On time = 22.75%
Notes	None



15:51:28 16.03.2022

$$\text{Duty Cycle Factor} = 20 \log \left(\frac{\text{On-Time}}{\text{Word Length (100msec)}} \right) = 20 * \log \left(\frac{(201*12+(403*35+201*31))*10^{-6}}{100*10^{-3}} \right) = -12.9 \text{ dB}$$

21. Spurious Radiated Emissions

Test Information	
Manufacturer	Genie Company
Product	Keypad Transmitter
Model	GK-A
Serial No	Unit 2
Mode	CW Tx @ 315MHz
Test Date	March 16, 2022

Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Type of Test Site	Semi-Anechoic Chamber
Test site used	Room 29
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
Radiated disturbance (electric field strength on an open area test site or alternative test site) (26.5 GHz – 40 GHz)	3.4

Requirements		
The EUT must comply with the requirements of FCC "Code of Federal Regulations Title 47", Part 15, Subpart C, Section 15.231(b) as well as the requirements of the RSS-210 Table A1. Those limits are shown below:		
Carrier Frequency (MHz)	Field Strength of Carrier (μV/m)	Field Strength of Spurious Emissions (μV/m)
40.66-40.70 (FCC Only)	2250 (FCC Only)	225 (FCC Only)
70-130	1250	125
130-174	1250 to 3750*	125 to 375*
174-260	3750	375
260-470	3750 to 12500*	375 to 1250*
Above 470	12500	1250
Emissions which fall in the restricted bands of FCC Part 15.205(a) and RSS-GEN Section 8.10 must meet the limits of FCC Part 15.209(a) and RSS-GEN Table 5 and Table 6.		

*Linear interpolations

Procedures

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2013 for site attenuation.

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

A preliminary radiated emissions test was 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 4GHz was investigated using a peak detector function. The data was then processed by the computer to calculate equivalent field intensity.

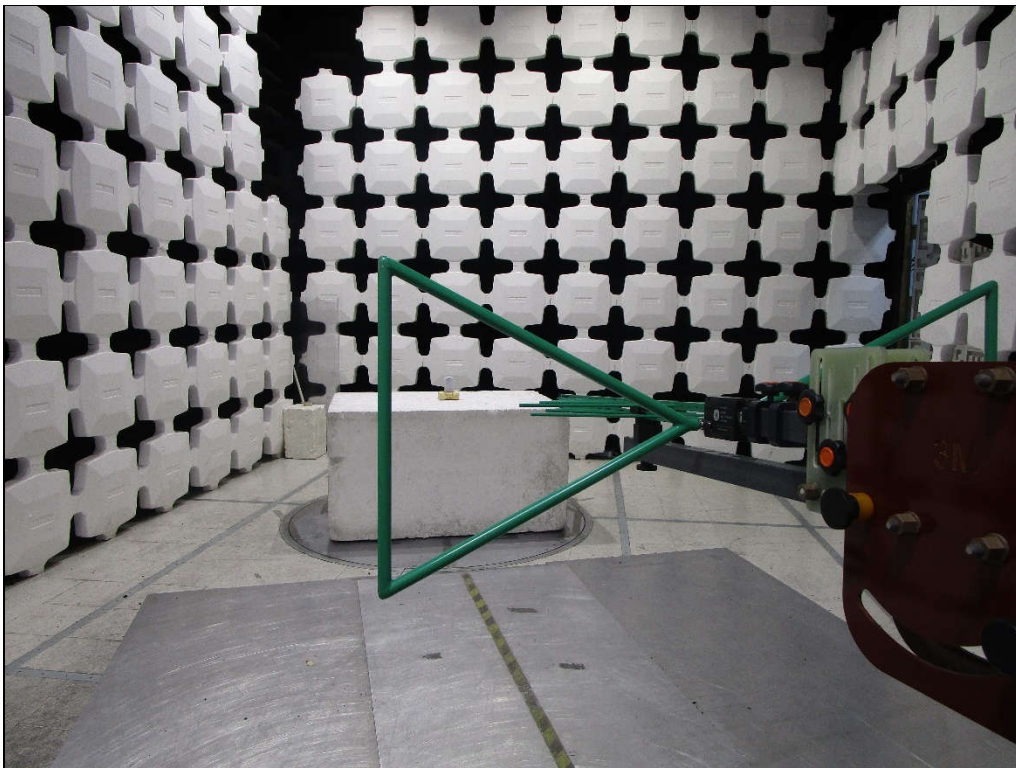
The final emission tests were then manually performed over the frequency range of 30MHz to 4GHz. Between 30MHz and 1000MHz, a bi-log antenna was used as the pick-up device. The EUT was placed on an 80cm high non-conductive stand. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer.

Above 1GHz, a broadband double ridged waveguide antenna was used as the pick-up device. The EUT was placed on an 150cm high non-conductive stand. A peak detector with a resolution bandwidth of 1 MHz was used on the spectrum analyzer.

The peak detected levels were converted to average levels using a duty cycle factor which was computed from the pulse train.

To ensure that maximum or worst case, emission levels were measured, the following steps were taken:

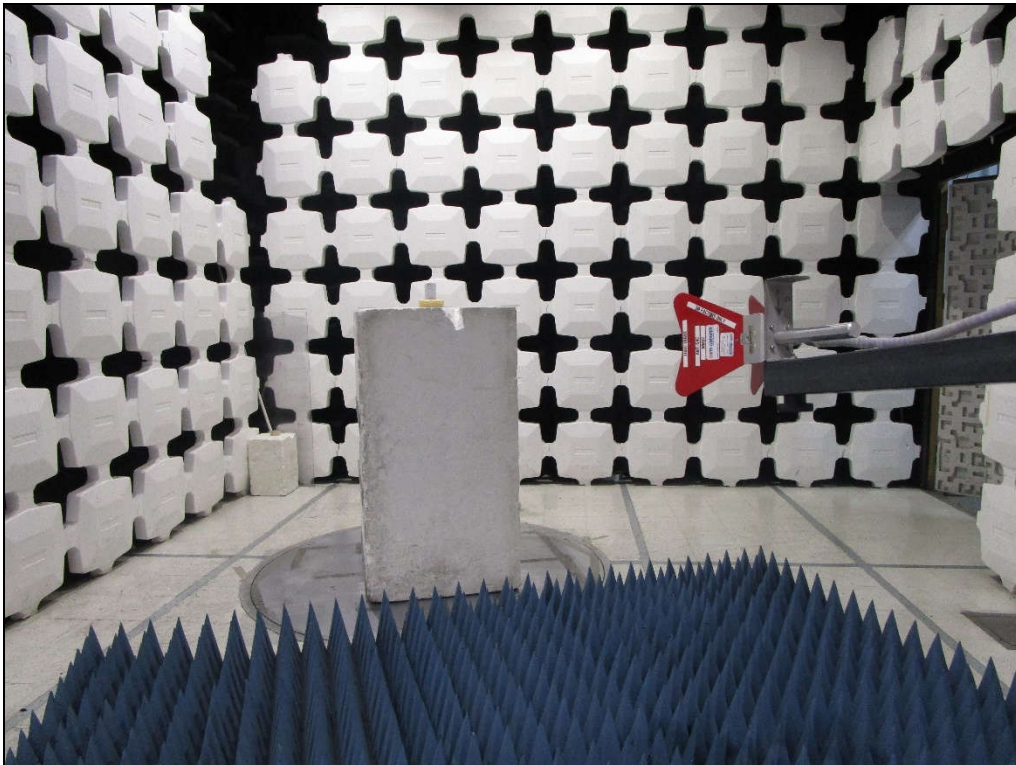
- 1) The EUT was rotated so that all of its sides were exposed to the receiving antenna.
- 2) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
- 3) The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization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



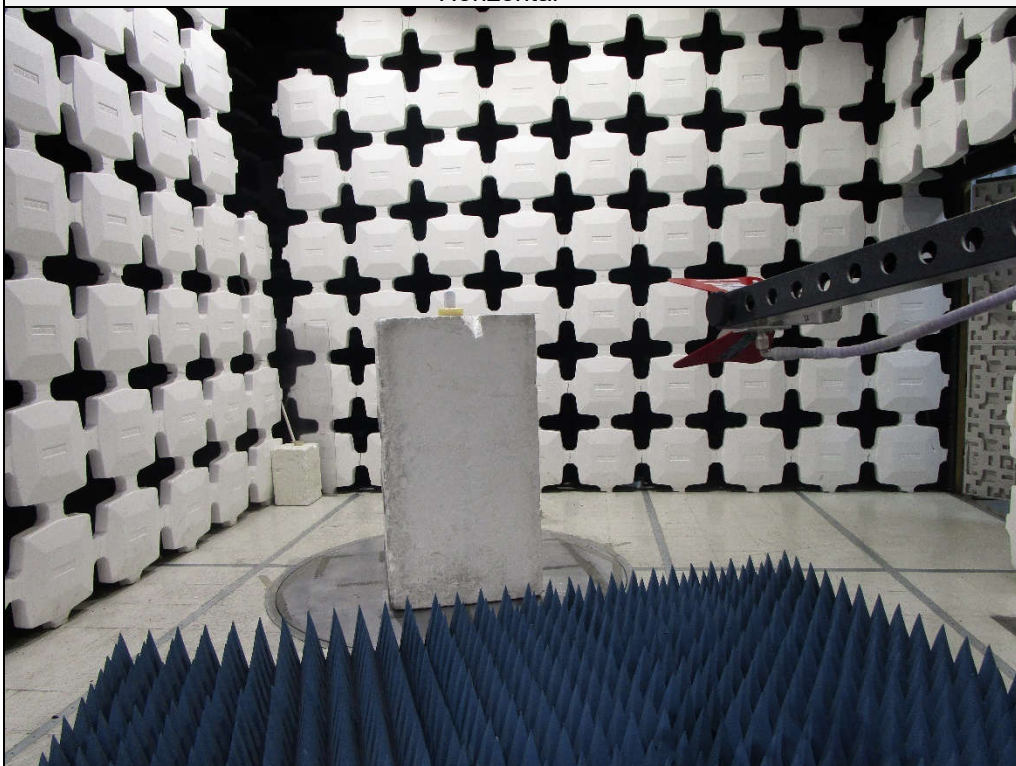
Test Setup for Spurious Radiated Emissions, 30-1000MHz – Antenna Polarization
Horizontal



Test Setup for Spurious Radiated Emissions, 30-1000MHz – Antenna Polarization
Vertical



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



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

Test Details	
Manufacturer	Genie Company
Model	GK-A
S/N	Unit 2
Mode	CW Tx @ 315MHz
Carrier Frequency	315MHz
Requirements	Field Strength of Carrier Limit = 6041.7µV/m
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Duty Cycle (dB)	Total (dBuV/m)	Total (uV/m)	Limit (uV/m)	Margin (dB)
315.000	H	57.2		0.9	19.3	0.0	-12.5	64.9	1754.4	6041.7	-10.7
315.000	V	64.7		0.9	19.3	0.0	-12.5	72.4	4179.4	6041.7	-3.2
630.000	H	26.3	*	1.3	25.0	0.0	-12.5	40.1	101.4	604.2	-15.5
630.000	V	26.5	*	1.3	25.0	0.0	-12.5	40.3	103.5	604.2	-15.3
945.000	H	33.3		1.6	27.0	0.0	-12.5	49.4	293.7	604.2	-6.3
945.000	V	35.2		1.6	27.0	0.0	-12.5	51.2	363.9	604.2	-4.4
1260.000	H	18.6		1.9	29.8	0.0	-12.5	37.7	76.7	604.2	-17.9
1260.000	V	21.1		1.9	29.8	0.0	-12.5	40.3	103.2	604.2	-15.4
1575.000	H	27.0		2.1	29.3	0.0	-12.5	45.9	196.2	500.0	-8.1
1575.000	V	26.8		2.1	29.3	0.0	-12.5	45.7	192.4	500.0	-8.3
1890.000	H	21.6		2.3	32.5	0.0	-12.5	43.9	157.1	604.2	-11.7
1890.000	V	20.7		2.3	32.5	0.0	-12.5	43.0	140.6	604.2	-12.7
2205.000	H	25.0		2.5	32.8	0.0	-12.5	47.7	243.1	500.0	-6.3
2205.000	V	21.0		2.5	32.8	0.0	-12.5	43.7	153.4	500.0	-10.3
2520.000	H	24.7		2.7	33.2	0.0	-12.5	48.1	254.0	604.2	-7.5
2520.000	V	21.5		2.7	33.2	0.0	-12.5	44.9	175.5	604.2	-10.7
2835.000	H	17.3	*	2.9	32.9	0.0	-12.5	40.5	105.5	500.0	-13.5
2835.000	V	18.8		2.9	32.9	0.0	-12.5	42.0	126.1	500.0	-12.0
3150.000	H	18.6	*	3.0	34.3	0.0	-12.5	43.4	147.6	604.2	-12.2
3150.000	V	18.2	*	3.0	34.3	0.0	-12.5	42.9	139.8	604.2	-12.7

Test Details	
Manufacturer	Genie Company
Model	GK-A
S/N	Unit 2
Mode	CW Tx @ 390MHz
Carrier Frequency	390MHz
Requirements	Field Strength of Carrier Limit = 9166.7 μ V/m
Notes	None

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Duty Cycle (dB)	Total (dBuV/m)	Total (uV/m)	Limit (uV/m)	Margin (dB)
390.000	H	48.8		1.0	21.5	0.0	-12.9	58.5	838.0	9166.7	-20.8
390.000	V	61.6		1.0	21.5	0.0	-12.9	71.3	3662.4	9166.7	-8.0
780.000	H	26.5	*	1.4	25.9	0.0	-12.9	40.9	110.4	916.7	-18.4
780.000	V	31.6		1.4	25.9	0.0	-12.9	46.0	199.0	916.7	-13.3
1170.000	H	32.2		1.8	29.3	0.0	-12.9	50.4	330.1	500.0	-3.6
1170.000	V	26.9		1.8	29.3	0.0	-12.9	45.1	179.1	500.0	-8.9
1560.000	H	20.7		2.1	29.1	0.0	-12.9	39.0	88.7	500.0	-15.0
1560.000	V	24.0		2.1	29.1	0.0	-12.9	42.3	130.0	500.0	-11.7
1950.000	H	21.1		2.3	32.6	0.0	-12.9	43.1	142.6	916.7	-16.2
1950.000	V	19.1		2.3	32.6	0.0	-12.9	41.1	113.3	916.7	-18.2
2340.000	H	17.1		2.6	32.5	0.0	-12.9	39.2	91.7	500.0	-14.7
2340.000	V	19.8		2.6	32.5	0.0	-12.9	42.0	125.7	500.0	-12.0
2730.000	H	16.8	*	2.8	33.3	0.0	-12.9	40.0	100.3	500.0	-13.9
2730.000	V	17.5	*	2.8	33.3	0.0	-12.9	40.7	108.3	500.0	-13.3
3120.000	H	17.9	*	3.0	33.8	0.0	-12.9	41.8	123.0	916.7	-17.4
3120.000	V	18.9	*	3.0	33.8	0.0	-12.9	42.8	137.4	916.7	-16.5
3510.000	H	17.3	*	3.2	34.0	0.0	-12.9	41.6	120.6	916.7	-17.6
3510.000	V	17.6	*	3.2	34.0	0.0	-12.9	41.9	124.1	916.7	-17.4
3900.000	H	18.1	*	3.4	35.1	0.0	-12.9	43.7	152.6	500.0	-10.3
3900.000	V	18.4	*	3.4	35.1	0.0	-12.9	44.0	158.1	500.0	-10.0

22. Occupied Bandwidth Measurements

Test Information	
Manufacturer	Genie Company
Product	Keypad Transmitter
Model	GK-A
Serial No	Unit 2
Mode	Normal Operation
Test Date	March 16, 2022

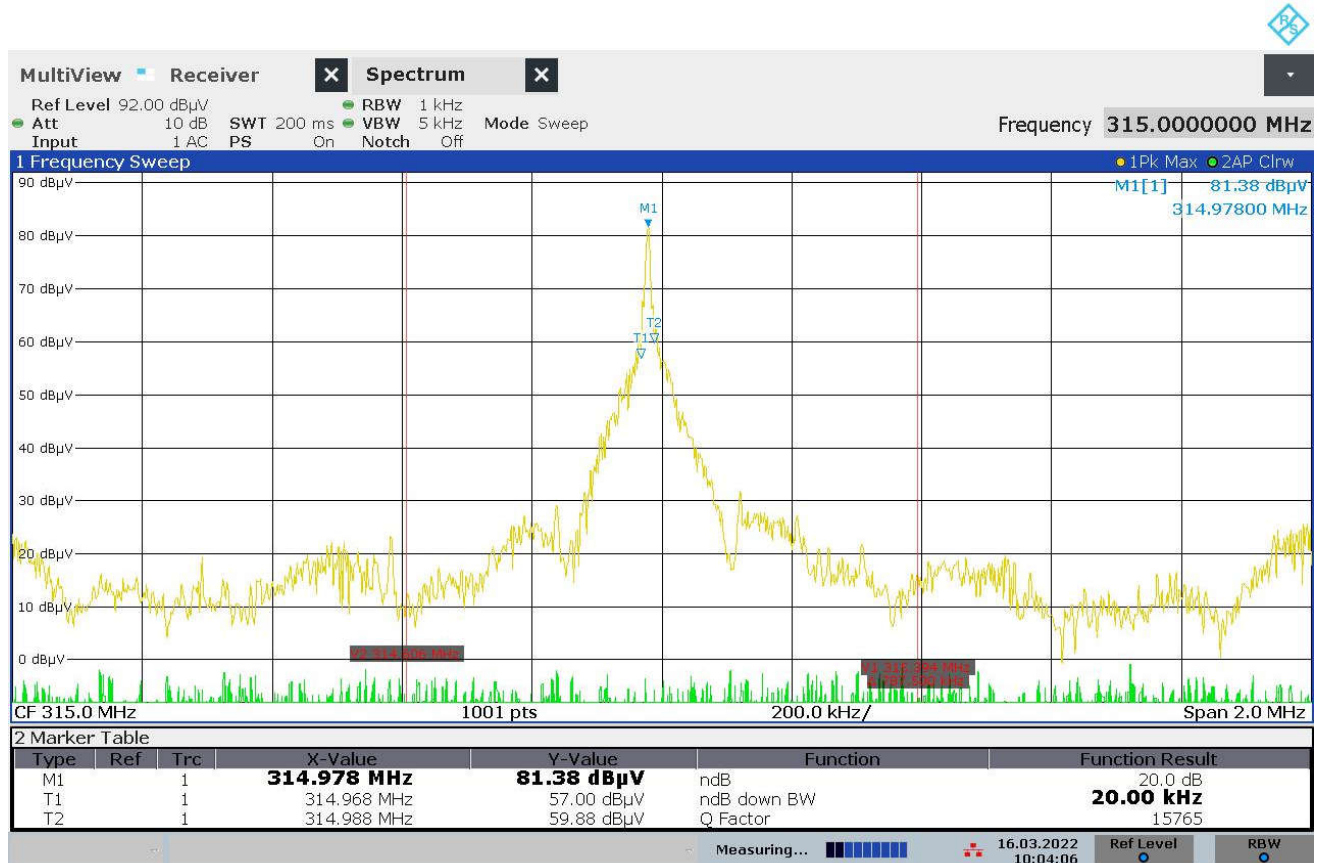
Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Type of Test Site	Semi-Anechoic Chamber
Test site used	Room 29
Notes	None

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

Requirements
FCC 15.231(c): The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier. RSS-210, Annex A, Section A.1.3: The occupied bandwidth (99% Bandwidth) of momentarily operated devices shall be less than or equal to 0.25% of the center frequency for devices operating between 70 MHz and 900 MHz. For devices operating above 900 MHz, the occupied bandwidth shall be less than or equal to 0.5% of the center frequency.

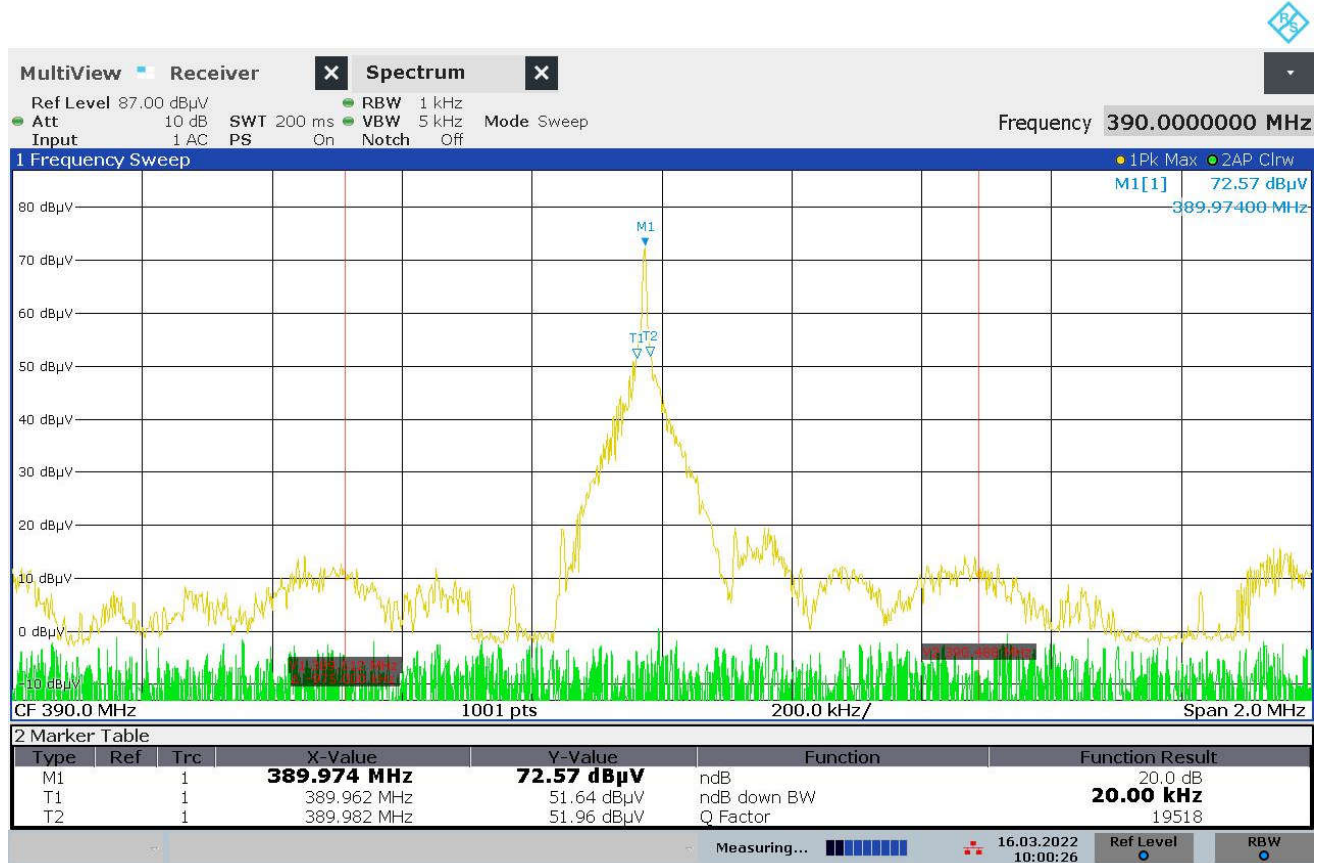
Procedures
The EUT was placed on an 80cm high non-conductive stand. The unit was set to transmit in normal operation mode. With an antenna positioned nearby, occupied bandwidth emissions were displayed on the spectrum analyzer. The resolution bandwidth was set to 1kHz, and span was set to 2MHz. A screen capture was taken of the frequency spectrum near the carrier using a screen dump function on the spectrum analyzer.

Test Details	
Manufacturer	Genie Company
Model	GK-A
S/N	Unit 2
Mode	CW Tx @ 315MHz
Carrier Frequency	315MHz
Parameters	20dB BW = 20kHz
Notes	Vertical Lines V1 and V2 represent the 0.25% points of the center frequency of the EUT. The 20dB bandwidth must be narrower than the 0.25% points.



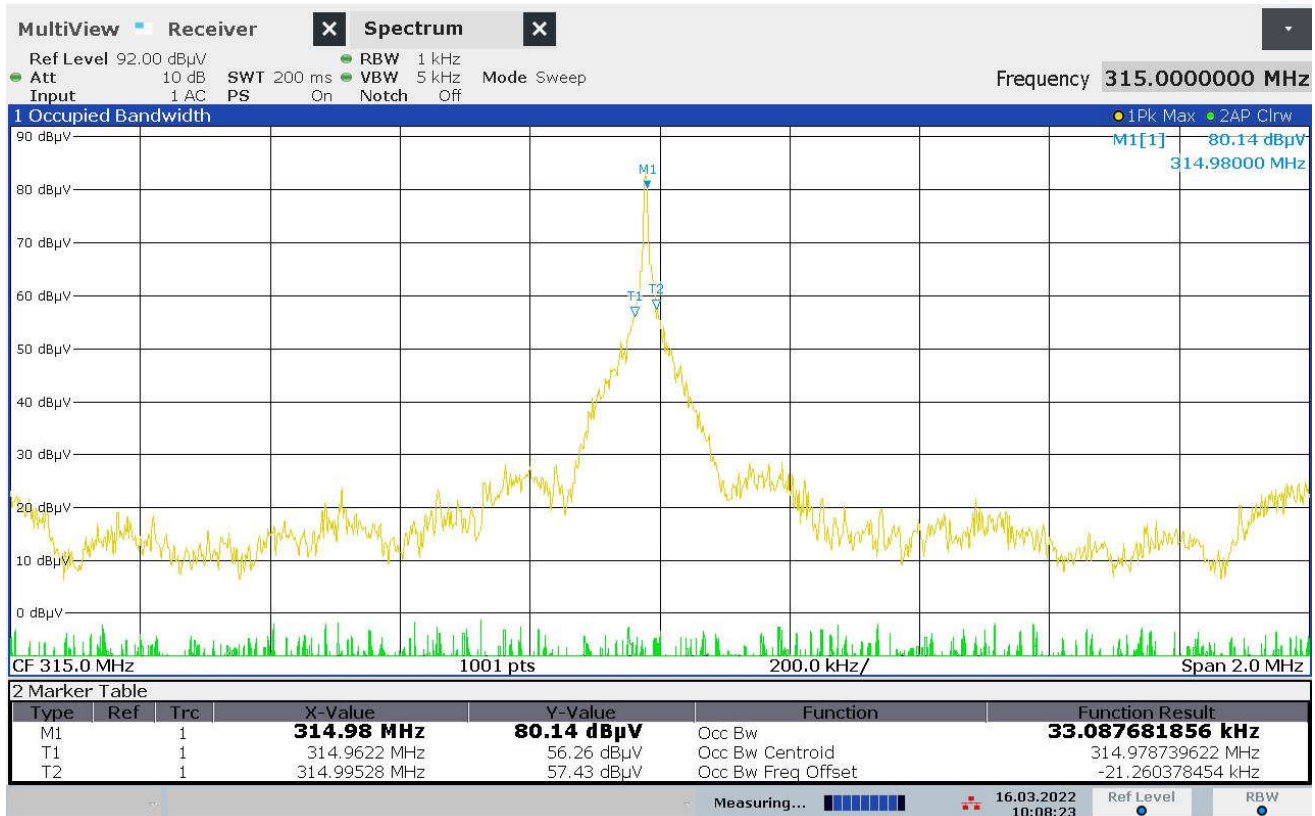
10:04:07 16.03.2022

Test Details	
Manufacturer	Genie Company
Model	GK-A
S/N	Unit 2
Mode	CW Tx @ 390MHz
Carrier Frequency	390MHz
Parameters	20dB BW = 20kHz
Notes	Vertical Lines V1 and V2 represent the 0.25% points of the center frequency of the EUT. The 20dB bandwidth must be narrower than the 0.25% points.



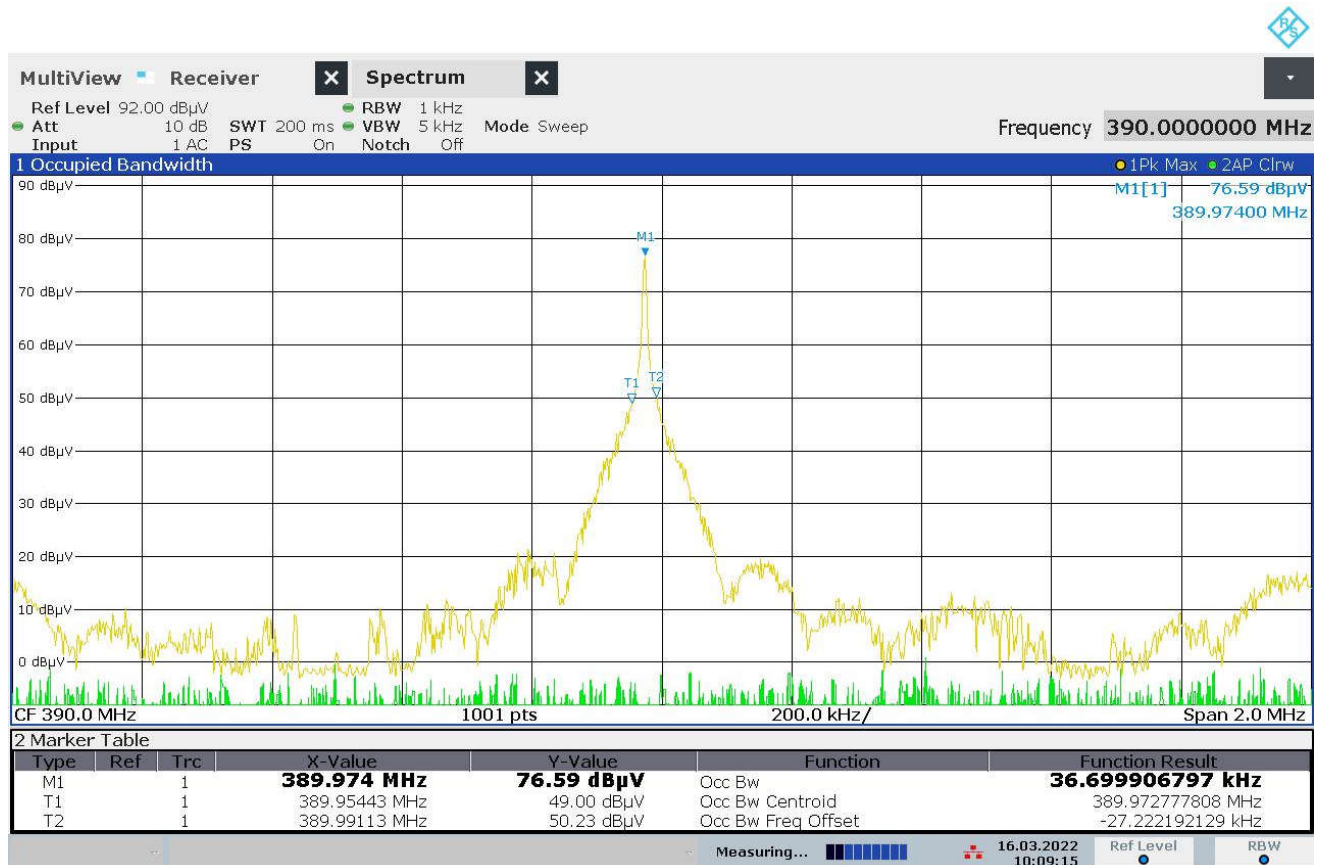
10:00:27 16.03.2022

Test Details	
Manufacturer	Genie Company
Model	GK-A
S/N	Unit 2
Mode	CW Tx @ 315MHz
Carrier Frequency	315MHz
Parameters	99% BW = 33.1kHz
Notes	None



10:08:23 16.03.2022

Test Details	
Manufacturer	Genie Company
Model	GK-A
S/N	Unit 2
Mode	CW Tx @ 390MHz
Carrier Frequency	390MHz
Parameters	99% BW = 36.7kHz
Notes	None



10:09:16 16.03.2022

23. Periodic Operation

Test Information	
Manufacturer	Genie Company
Product	Keypad Transmitter
Model	GK-A
Serial No	Unit 2
Mode	Normal Operation
Test Date	March 16, 2022

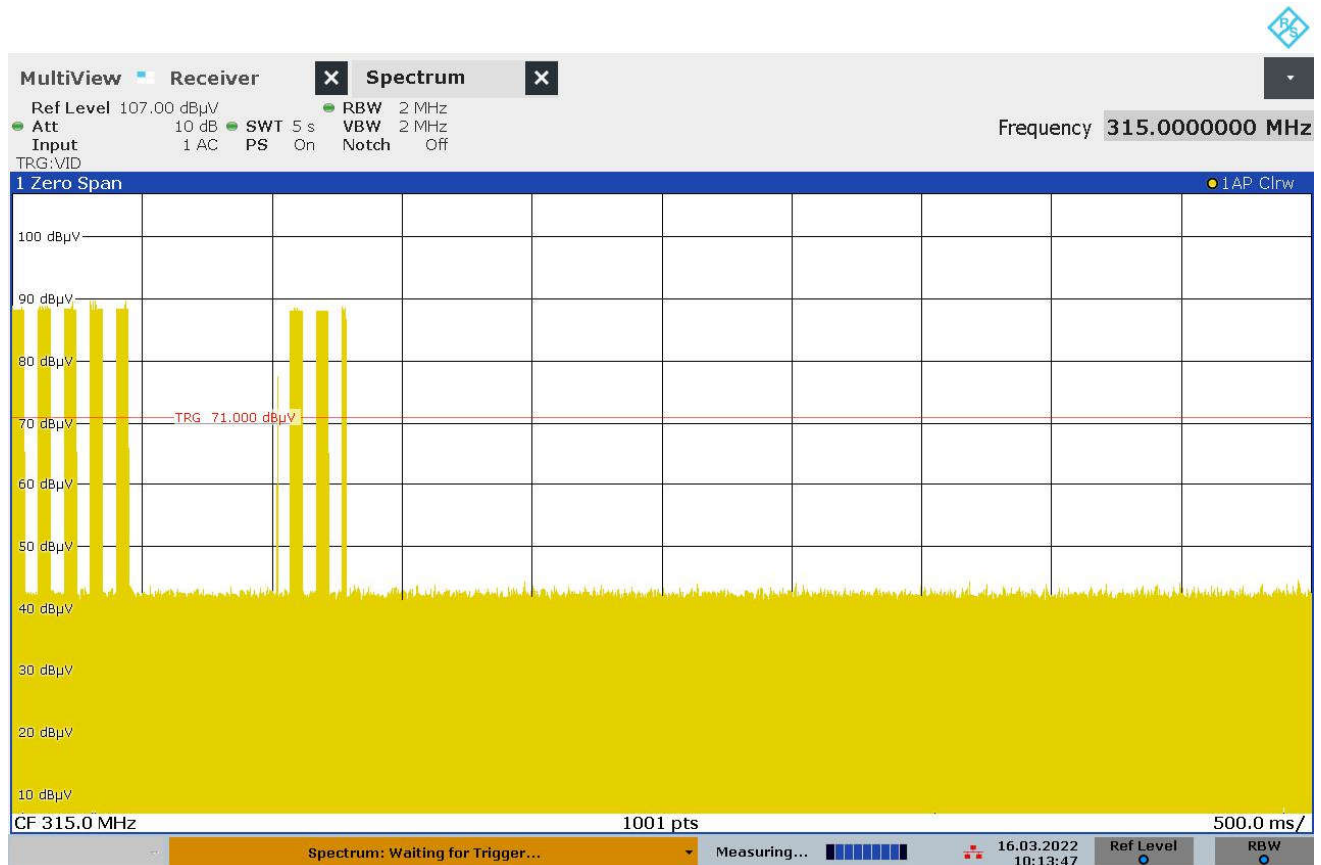
Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Type of Test Site	Semi-Anechoic Chamber
Test site used	Room 29
Notes	None

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

Requirements
FCC 15.231(a)(1): A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released. RSS-210, Annex A, Section A.1.1: A manually operated transmitter shall be equipped with a push-to-operate switch and be under manual control at all times during transmission. When released, the transmitter shall cease transmission within no more than 5 seconds of being released.

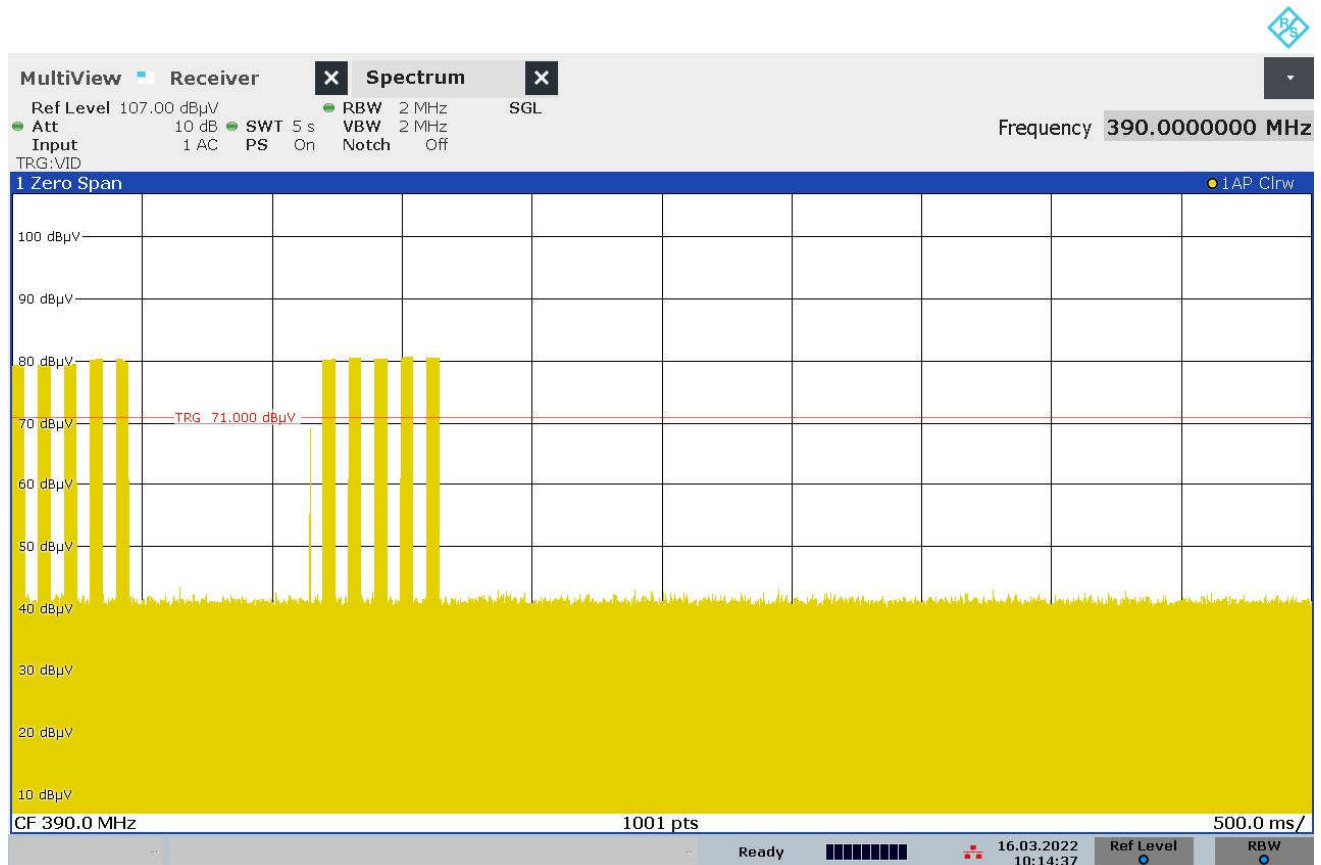
Procedures
A near field antenna was placed in close proximity to the EUT. The output of the antenna was connected to a spectrum analyzer. The following settings were selected on the spectrum analyzer: 1) Center frequency = transmit frequency of EUT 2) Span = 0 Hz 3) Sweep Time = 5 seconds 4) Trigger Level = Approximately 10dB to 20dB below the peak of the transmit signal 5) Sweep = Single Sweep The transmit button on the EUT was depressed and immediately released. A plot of the transmitted signal was captured to ensure that the EUT ceased operation within 5 seconds.

Test Details	
Manufacturer	Genie Company
Model	GK-A
S/N	Unit 2
Mode	Normal Operation
Carrier Frequency	315MHz
Parameters	Periodic Operation
Notes	



10:13:47 16.03.2022

Test Details	
Manufacturer	Genie Company
Model	GK-A
S/N	Unit 2
Mode	Normal Operation
Carrier Frequency	390MHz
Parameters	Periodic Operation
Notes	



10:14:38 16.03.2022

24. Scope of Accreditation



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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Website: www.elitetest.com

Valid To: June 30, 2023

ELECTRICAL

Certificate Number: 1786.01

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

Test Technology:

Test Method(s) ¹:

Transient Immunity

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

Electrostatic Discharge (ESD)

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

Conducted Emissions

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

Radiated Emissions Anechoic

CISPR 25 (2002, 2008), Section 6.4;
CISPR 25 (2016), Section 6.5;
CS-11979, Section 5.3; CS.00054, Section 5.6.3;
GMW 3097, Section 3.3.1;
EMC-CS-2009.1 (RE 310); FMC1278 (RE310);
ECE Regulation 10.06 Annex 7 (Broadband)
ECE Regulation 10.06 Annex 8 (Narrowband)

(A2LA Cert. No. 1786.01) Revised 06/24/2021



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

<u>Test Technology:</u>	<u>Test Method(s) ¹:</u>
<i>Vehicle Radiated Emissions</i>	CISPR 12; CISPR 36; ICES-002; ECE Regulation 10.06 Annex 5
<i>Bulk Current Injection (BCI)</i>	ISO 11452-4; CS-11979, Section 6.1; CS.00054, Section 5.8.1; GMW 3097, Section 3.4.1; SAE J1113-4; EMC-CS-2009.1 (RI112); FMC1278 (RI112); ECE Regulation 10.06 Annex 9
<i>Radiated Immunity Anechoic (Including Radar Pulse)</i>	ISO 11452-2; ISO 11452-5; CS-11979, Section 6.2; CS.00054, Section 5.8.2; GMW 3097, Section 3.4.2; EMC-CS-2009.1 (RI114); FMC1278 (RI114); SAE J1113-21; ECE Regulation 10.06 Annex 9
<i>Radiated Immunity Magnetic Field</i>	ISO 11452-8
<i>Radiated Immunity Reverb</i>	ISO/IEC 61000-4-21; GMW 3097, Section 3.4.3; EMC-CS-2009.1 (RI114); FMC1278 (RI114); ISO 11452-11
<i>Radiated Immunity (Portable Transmitters)</i>	ISO 11452-9; EMC-CS-2009.1 (RI115); FMC1278 (RI115)
<i>Vehicle Radiated Immunity (ALSE)</i>	ISO 11451-2; ECE Regulation 10.06 Annex 6
<i>Vehicle Product Specific EMC Standards</i>	EN 14982; EN ISO 13309; ISO 13766; EN 50498; EC Regulation No. 2015/208; EN 55012
<i>Electrical Loads</i>	ISO 16750-2
<i>Emissions</i> Radiated and Conducted (3m Semi-anechoic chamber, up to 40 GHz)	47 CFR, FCC Part 15 B (using ANSI C63.4:2014); 47 CFR, FCC Part 18 (using FCC MP-5:1986); ICES-001; ICES-003; ICES-005; IEC/CISPR 11, Ed. 4.1 (2004-06); AS/NZS CISPR 11 (2004); IEC/CISPR 11 Ed 5 (2009-05) + A1 (2010); KN 11 (2008-5) with RRL Notice No. 2008-3 (May 20, 2008); CISPR 11; EN 55011; KS C 9811; CNS 13803 (1997, 2003); CISPR 14-1; EN 55014-1; AS/NZS CISPR 14.1; KS C 9814-1; KN 14-1; IEC/CISPR 22 (1997); EN 55022 (1998) + A1(2000); EN 55022 (1998) + A1(2000) + A2(2003); EN 55022 (2006); IEC/CISPR 22 (2008-09); AS/NZS CISPR 22 (2004); AS/NZS CISPR 22, 3rd Edition (2006); KN 22 (up to 6 GHz); CNS 13438 (up to 6 GHz); VCCI V-3 (up to 6 GHz); CISPR 32; EN 55032; KS C 9832; KN 32; ECE Regulation 10.06 Annex 14
<i>Cellular Radiated Spurious Emissions</i>	ETSI TS 151 010-1 GSM; 3GPP TS 51.010-1, Sec 12; ETSI TS 134 124 UMTS; 3GPP TS 34.124; ETSI TS 136 124 LTE; E-UTRA; 3GPP TS 36.124

<u>Test Technology:</u>	<u>Test Method(s) ¹:</u>
Emissions (cont'd)	
Current Harmonics	IEC 61000-3-2; EN 61000-3-2; KN 61000-3-2; KS C 9610-3-2; ECE Regulation 10.06 Annex 11
Flicker and Fluctuations	IEC 61000-3-3; EN 61000-3-3; KN 61000-3-3; KS C 9610-3-3; ECE Regulation 10.06 Annex 12
Immunity	
Electrostatic Discharge	IEC 61000-4-2, Ed. 1.2 (2001); IEC 61000-4-2 (1995) + A1(1998) + A2(2000); EN 61000-4-2 (1995); EN 61000-4-2 (2009-05); KN 61000-4-2 (2008-5); RRL Notice No. 2008-4 (May 20, 2008); IEC 61000-4-2; EN 61000-4-2; KN 61000-4-2; KS C 9610-4-2; IEEE C37.90.3 2001
Radiated Immunity	IEC 61000-4-3 (1995) + A1(1998) + A2(2000); IEC 61000-4-3, Ed. 3.0 (2006-02); IEC 61000-4-3, Ed. 3.2 (2010); KN 61000-4-3 (2008-5); RRL Notice No. 2008-4 (May 20, 2008); IEC 61000-4-3; EN 61000-4-3; KN 61000-4-3; KS C 9610-4-3; IEEE C37.90.2 2004
Electrical Fast Transient/Burst	IEC 61000-4-4, Ed. 2.0 (2004-07); IEC 61000-4-4, Ed. 2.1 (2011); IEC 61000-4-4 (1995) + A1(2000) + A2(2001); KN 61000-4-4 (2008-5); RRL Notice No. 2008-5 (May 20, 2008); IEC 61000-4-4; EN 61000-4-4; KN 61000-4-4; KS C 9610-4-4; ECE Regulation 10.06 Annex 15
Surge	IEC 61000-4-5 (1995) + A1(2000); IEC 61000-4-5, Ed 1.1 (2005-11); EN 61000-4-5 (1995) + A1(2001); KN 61000-4-5 (2008-5); RRL Notice No. 2008-4 (May 20, 2008); IEC 61000-4-5; EN 61000-4-5; KN 61000-4-5; KS C 9610-4-5; IEEE C37.90.1 2012; IEEE STD C62.41.2 2002; ECE Regulation 10.06 Annex 16
Conducted Immunity	IEC 61000-4-6 (1996) + A1(2000); IEC 61000-4-6, Ed 2.0 (2006-05); IEC 61000-4-6 Ed. 3.0 (2008); KN 61000-4-6 (2008-5); RRL Notice No. 2008-4 (May 20, 2008); EN 61000-4-6 (1996) + A1(2001); IEC 61000-4-6; EN 61000-4-6; KN 61000-4-6; KS C 9610-4-6

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

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

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

Voltage Dips, Short Interrupts, and Line
Voltage Variations

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

Ring Wave

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

Generic and Product Specific EMC
Standards

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

TxRx EMC Requirements

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

European Radio Test Standards

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

<u>Test Technology:</u>	<u>Test Method(s) ¹:</u>
<i>Canadian Radio Tests</i>	RSS-102 (RF Exposure Evaluation only); RSS-111; RSS-112; RSS-117; RSS-119; RSS-123; RSS-125; RSS-127; RSS-130; RSS-131; RSS-132; RSS-133; RSS-134; RSS-135; RSS-137; RSS-139; RSS-140; RSS-141; RSS-142; RSS-170; RSS-181; RSS-182; RSS-191; RSS-192; RSS-194; RSS-195; RSS-196; RSS-197; RSS-199; RSS-210; RSS-211; RSS-213; RSS-215; RSS-216; RSS-220; RSS-222; RSS-236; RSS-238; RSS-243; RSS-244; RSS-247; RSS-251; RSS-252; RSS-287; RSS-288; RSS-310; RSS-GEN
<i>Mexico Radio Tests</i>	IFT-008-2015; NOM-208-SCFI-2016
<i>Japan Radio Tests</i>	Radio Law No. 131, Ordinance of MPT No. 37, 1981, MIC Notification No. 88:2004, Table No. 22-11; ARIB STD-T66, Regulation 18
<i>Taiwan Radio Tests</i>	LP-0002 (July 15, 2020)
<i>Australia/New Zealand Radio Tests</i>	AS/NZS 4268; Radiocommunications (Short Range Devices) Standard (2014)
<i>Hong Kong Radio Tests</i>	HKCA 1039 Issue 6; HKCA 1042; HKCA 1033 Issue 7; HKCA 1061; HKCA 1008; HKCA 1043; HKCA 1057; HKCA 1073
<i>Korean Radio Test Standards</i>	KN 301 489-1; KN 301 489-3; KN 301 489-9; KN 301 489-17; KN 301 489-52; KS X 3124; KS X 3125; KS X 3130; KS X 3126; KS X 3129
<i>Vietnam Radio Test Standards</i>	QCVN 47:2015/BTTTT; QCVN 54:2020/BTTTT; QCVN 55:2011/BTTTT; QCVN 65:2013/BTTTT; QCVN 73:2013/BTTTT; QCVN 74:2020/BTTTT; QCVN 112:2017/BTTTT; QCVN 117:2020/BTTTT
<i>Vietnam EMC Test Standards</i>	QCVN 18:2014/BTTTT; QCVN 86:2019/BTTTT; QCVN 96:2015/BTTTT; QCVN 118:2018/BTTTT
<i>Unlicensed Radio Frequency Devices (3 Meter Semi-Anechoic Room)</i>	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))
<i>Licensed Radio Service Equipment</i>	47 CFR FCC Parts 20, 22, 24, 25, 27, 30, 73, 74, 80, 87, 90, 95, 96, 97, 101 (using ANSI/TIA-603-E, TIA-102.CAAA-E, ANSI C63.26:2015)

Test Technology:

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

Test Method(s) ¹:

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

**Electrical Measurements and
Simulation**
AC Voltage / Current

(1mV to 5kV) 60 Hz

(0.1V to 250V) up to 500 MHz

(1μA to 150A) 60 Hz

FAA AC 150/5345-10H

FAA AC 150/5345-43J

FAA AC 150/5345-44K

DC Voltage / Current

(1mV to 15-kV) / (1μA to 10A)

FAA AC 150/5345-46E

FAA AC 150/5345-47C

Power Factor / Efficiency / Crest Factor

(Power to 30kW)

FAA EB 67D

Resistance

(1mΩ to 4000MΩ)

Surge

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

On the following products and materials:

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

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

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

Rule Subpart/Technology
Test Method
**Maximum
Frequency
(MHz)**
Unintentional Radiators

Part 15B

ANSI C63.4:2014

40000

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

Rule Subpart/Technology	Test Method	Maximum Frequency (MHz)
<u>Industrial, Scientific, and Medical Equipment</u> Part 18	FCC MP-5 (February 1986)	40000
<u>Intentional Radiators</u> Part 15C	ANSI C63.10:2013	40000
<u>Unlicensed Personal Communication Systems Devices</u> Part 15D	ANSI C63.17:2013	40000
<u>U-NII without DFS Intentional Radiators</u> Part 15E	ANSI C63.10:2013	40000
<u>U-NII with DFS Intentional Radiators</u> Part 15E	FCC KDB 905462 D02 (v02)	40000
<u>UWB Intentional Radiators</u> Part 15F	ANSI C63.10:2013	40000
<u>BPL Intentional Radiators</u> Part 15G	ANSI C63.10:2013	40000
<u>White Space Device Intentional Radiators</u> Part 15H	ANSI C63.10:2013	40000
<u>Commercial Mobile Services (FCC Licensed Radio Service Equipment)</u> Parts 22 (cellular), 24, 25 (below 3 GHz), and 27	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
<u>General Mobile Radio Services (FCC Licensed Radio Service Equipment)</u> Parts 22 (non-cellular), 90 (below 3 GHz), 95, 97, and 101 (below 3 GHz)	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
<u>Citizens Broadband Radio Services (FCC Licensed Radio Service Equipment)</u> Part 96	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000

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

Rule Subpart/Technology	Test Method	Maximum Frequency (MHz)
<u>Maritime and Aviation Radio Services</u> Parts 80 and 87	ANSI/TIA-603-E; ANSI C63.26:2015	40000
<u>Microwave and Millimeter Bands Radio Services</u> Parts 25, 30, 74, 90 (above 3 GHz), 97 (above 3 GHz), and 101	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
<u>Broadcast Radio Services</u> Parts 73 and 74 (below 3 GHz)	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
<u>Signal Boosters</u> Part 20 (Wideband Consumer Signal Boosters, Provider-specific signal boosters, and Industrial Signal Boosters) Section 90.219	ANSI C63.26:2015	40000

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



Accredited Laboratory

A2LA has accredited

ELITE ELECTRONIC ENGINEERING INC.

Downers Grove, IL

for technical competence in the field of

Electrical Testing

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



Presented this 19th day of May 2021.

A handwritten signature in blue ink, appearing to be 'A. Smith'.

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

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