

FCC PART 15C

TEST REPORT

For

ZKTECO CO.,LTD.

No.26,Pingshan 188 Industry zone,Tangxia Town,Dongguan City,Guangdong Province,China
523728

FCC ID: 2AJ9T-GL300

Report Type: Original Report	Product Type: Fingerprint Glass Door Lock
Report Number: RDG190730016-00	
Report Date: 2019-09-19	
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This report must not be used by the customer to claim product certification, approval, or endorsement by A2LA* or any agency of the Federal Government. * This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk “*”

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

EUT Name:	Fingerprint Glass Door Lock
EUT Model:	GL300
Operation Frequency:	13.56 MHz
Modulation Type:	ASK
External Dimension:	131mm(L) * 200mm(W) * 75mm(H)
Rated Input Voltage:	DC 6V from Battery
Serial Number:	190730016
EUT Received Date:	2019.7.30

Objective

This type approval report is prepared on behalf of **ZKTECO CO.,LTD.** in accordance with Part 2, Subpart J, and Part 15, Subparts A and C of the Federal Communications Commission's rules

The objective is to determine the compliance of the EUT with FCC rules, sec 15.203, 15.205, 15.215, 15.209 and 15.225.

Related Submittal(s)/Grant(s)

No Related Submittal(s)/Grant(s)

Test Methodology

All measurements detailed in this Test Report were performed in accordance with ANSI C63.10-2013 "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices".

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
radiated Emissions	9kHz~30MHz: 4.12dB 30M~200MHz: 4.55 dB, 200M~1GHz: 5.92 dB
Temperature	±1 °C
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a test mode.

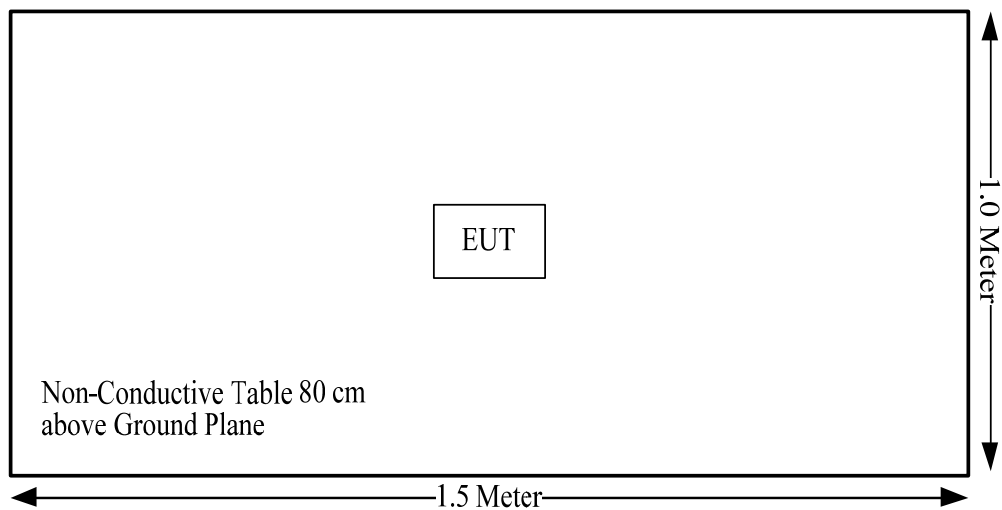
EUT Exercise Software

No software used in test.

Equipment Modifications

No modification was made to the EUT.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207	AC Line Conducted Emission	Not Applicable
§15.225 §15.209 §15.205	Radiated Emission Test	Compliance
§15.225(e)	Frequency Stability	Compliance
§15.215(c)	20 dB Bandwidth	Compliance

Not Applicable: the EUT was powered by Battery.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.
- c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

Antenna Connected Construction

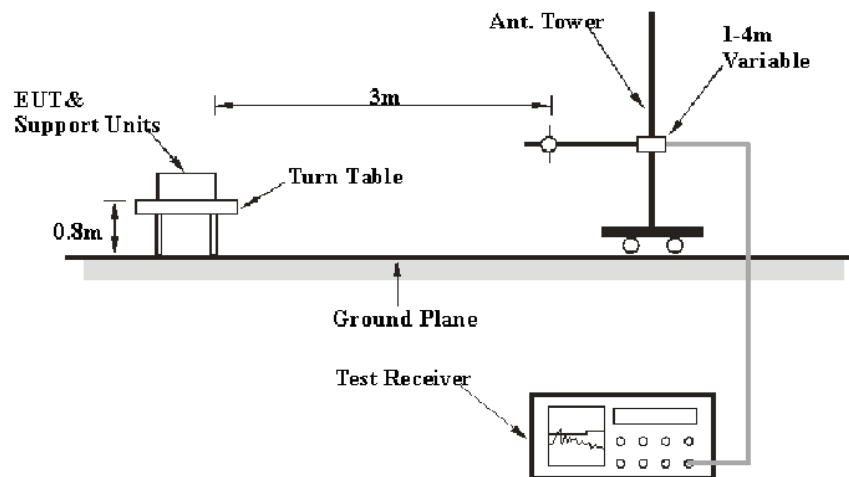
The EUT has one integral antenna arrangement, which was permanently attached and fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

FCC§15.225, §15.205 & §15.209- RADIATED EMISSIONS**Applicable Standard**

As per FCC Part 15.225

- (a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

EUT Setup

The radiated emission tests were performed in the 3-meter chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The system was investigated from 9 kHz to 1 GHz.

During the radiated emission test, the EMI test Receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	Detector
9 kHz – 150 kHz	200 Hz	1 kHz	QP
150 kHz – 30 MHz	9 kHz	30 kHz	QP
30 MHz – 1000 MHz	120 kHz	300 kHz	QP

If the maximized peak measured value complies with the limit, then it is unnecessary to perform an QP measurement

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corr. Ampl.}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMCO	Passive Loop	6512	9706-1206	2017-03-05	2020-03-04
R&S	EMI Test Receiver	ESR3	102453	2019-06-26	2020-06-26
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2019-05-06	2020-05-06
HP	Amplifier	8447D	2727A05902	2018-09-05	2019-09-05

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

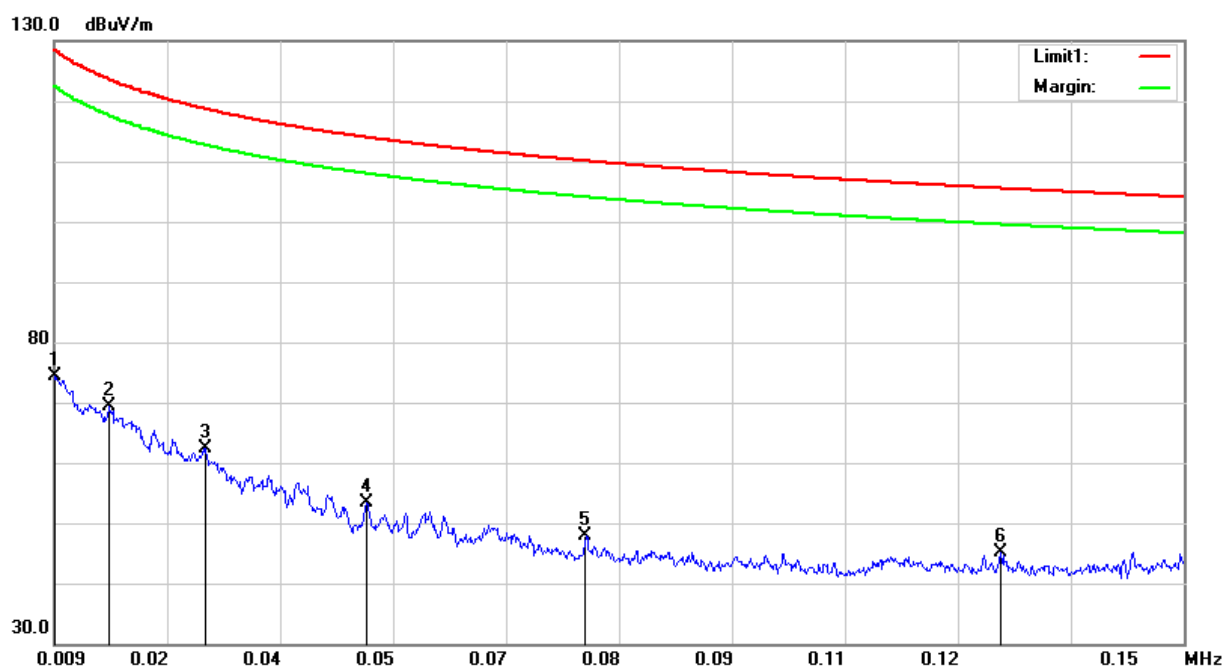
According to the data in the following table, the EUT complied with the FCC Part 15.209&15.225.

Test Data**Environmental Conditions**

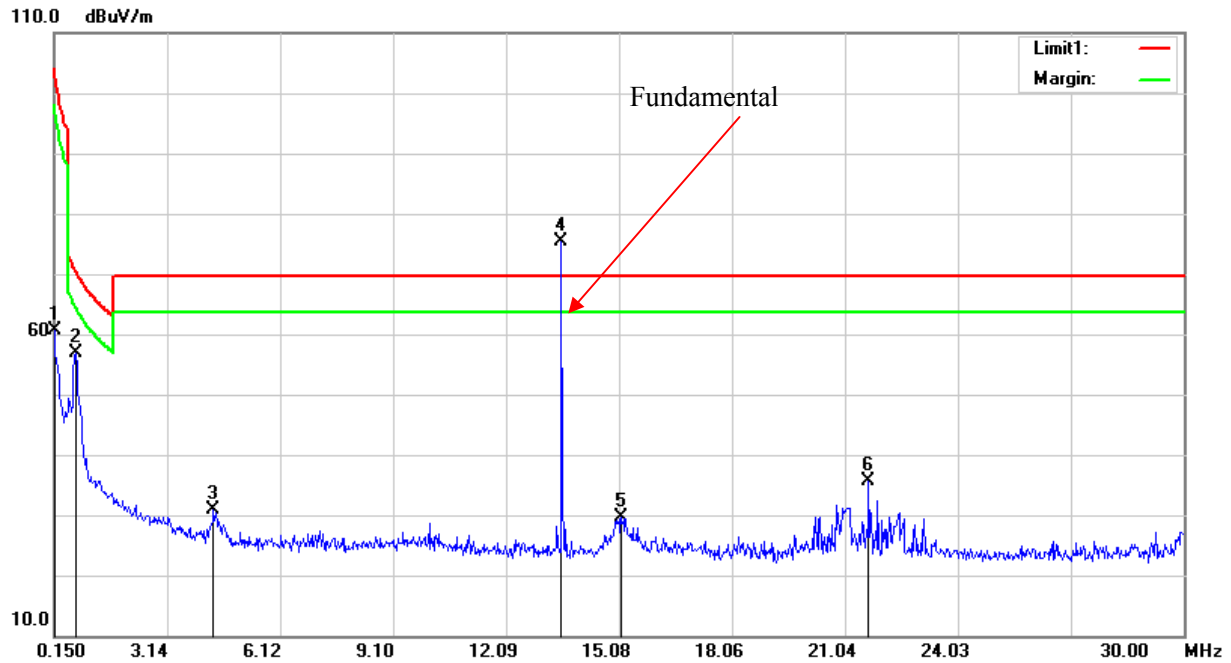
Test Items	Radiation Below 1GHz
Temperature:	27 °C
Relative Humidity:	50%
ATM Pressure:	100.1 kPa
Tester:	Tyler Pan
Test Date:	2019-08-17

Test mode: Transmitting

1) 9 kHz~30MHz:

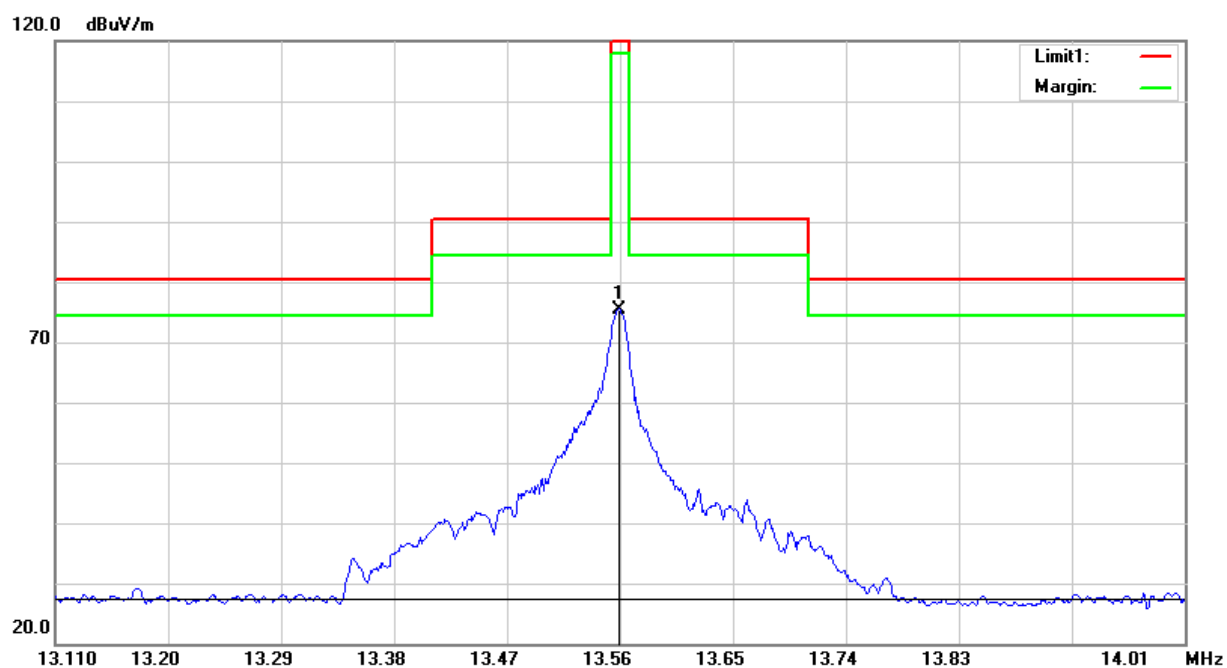


Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
0.0091	-14.39	peak	88.67	74.28	128.42	54.14
0.0158	-14.44	peak	83.86	69.42	123.63	54.21
0.0280	-15.29	peak	77.66	62.37	118.66	56.29
0.0480	-20.74	peak	74.05	53.31	113.98	60.67
0.0753	-21.40	peak	69.21	47.81	110.07	62.26
0.1272	-20.08	peak	65.26	45.18	105.51	60.33



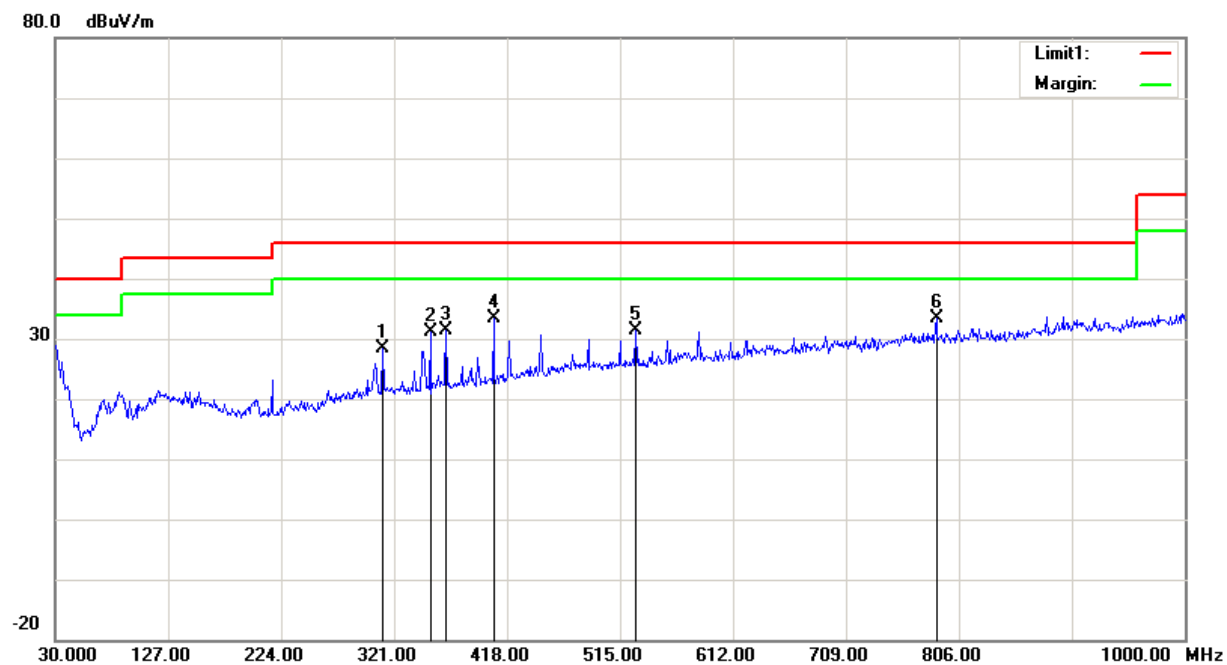
Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
0.1500	21.94	peak	38.62	60.56	104.08	43.52
0.7172	32.48	peak	24.51	56.99	70.49	13.50
4.3590	19.33	peak	11.47	30.80	69.54	38.74
15.1347	20.43	peak	9.26	29.69	69.54	39.85
21.6720	26.62	peak	9.07	35.69	69.54	33.85

Fundamental:



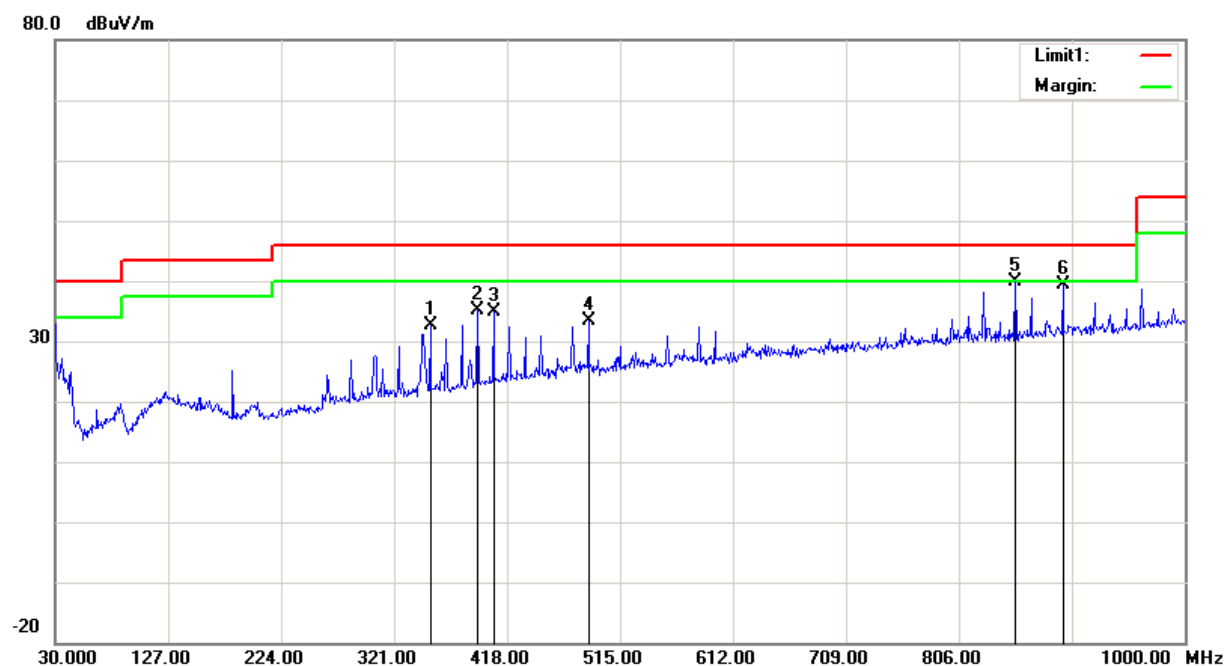
Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
13.5591	66.14	peak	9.36	75.50	124.00	48.50

30MHz-1GHz

Horizontal

Frequency (MHz)	Receiver Reading (dB μ V)	Detector	Correction Factor (dB)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
311.3000	31.83	peak	-3.56	28.27	46.00	17.73
352.0400	34.10	peak	-2.99	31.11	46.00	14.89
365.6200	34.17	peak	-2.81	31.36	46.00	14.64
406.3600	35.20	peak	-1.90	33.30	46.00	12.70
528.5800	30.96	peak	0.34	31.30	46.00	14.70
786.6000	28.88	peak	4.39	33.27	46.00	12.73

Vertical



Frequency (MHz)	Receiver Reading (dB μ V)	Detector	Correction Factor (dB)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
352.0400	35.65	peak	-2.99	32.66	46.00	13.34
392.7800	37.22	peak	-2.20	35.02	46.00	10.98
406.3600	36.68	peak	-1.90	34.78	46.00	11.22
487.8400	33.74	peak	-0.38	33.36	46.00	12.64
854.5000	34.82	peak	5.09	39.91	46.00	6.09
895.2400	39.35	peak	-0.01	39.34	46.00	6.66

FCC§15.225(e) - FREQUENCY STABILITY**Applicable Standard**

As per FCC Part 15.225:

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power.

The EUT was placed inside the temperature chamber.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the Spectrum Analyzer.

Frequency Stability vs. Voltage: An external variable DC power supply Source. The voltage was set to the end point of the battery. The output frequency was recorded for each voltage.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMCO	Passive Loop	6512	9706-1206	2017-03-05	2020-03-04
R&S	EMI Test Receiver	ESR3	102453	2019-06-26	2020-06-26
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2018-09-05	2019-09-05
HP	Amplifier	8447D	2727A05902	2018-09-05	2019-09-05
ESPEC	Constant temperature and humidity Tester	ESX-4CA	018 463	2019-03-26	2020-03-26
UNI-T	Multimeter	UT39A	M130199938	2019-07-24	2020-07-24
Pro instrument	DC Power Supply	pps3300	3300012	N/A	N/A

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	27.3 °C
Relative Humidity:	64%
ATM Pressure:	100.3 kPa
Tester:	Tyler Pan
Test Date:	2019-08-16

Test Mode: Transmitting

Test Result: Pass

f₀ = 13.56 MHz				
Temperature	Voltage	Measured frequency	Frequency Error	Limit
°C	V_{DC}	MHz	Hz	Hz
-20	6	13.55895	-1050	±1356
-10		13.55886	-1140	±1356
0		13.55911	-890	±1356
10		13.55924	-760	±1356
20		13.55889	-1110	±1356
25		13.55898	-1020	±1356
30		13.55893	-1070	±1356
40		13.55916	-840	±1356
50		13.55901	-990	±1356
20	4.0	13.55876	-1240	±1356
20	6.6	13.55898	-1020	±1356

Note: the battery voltage range was declared by manufacturer.

FCC §15.215(c)– 20 dB BANDWIDTH TESTING

Applicable Standard

Per FCC §15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §15.217 through § 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Test Procedure

Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMCO	Passive Loop	6512	9706-1206	2017-03-05	2020-03-04
R&S	EMI Test Receiver	ESR3	102453	2019-06-26	2020-06-26
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2018-09-05	2019-09-05
HP	Amplifier	8447D	2727A05902	2018-09-05	2019-09-05

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Test Data

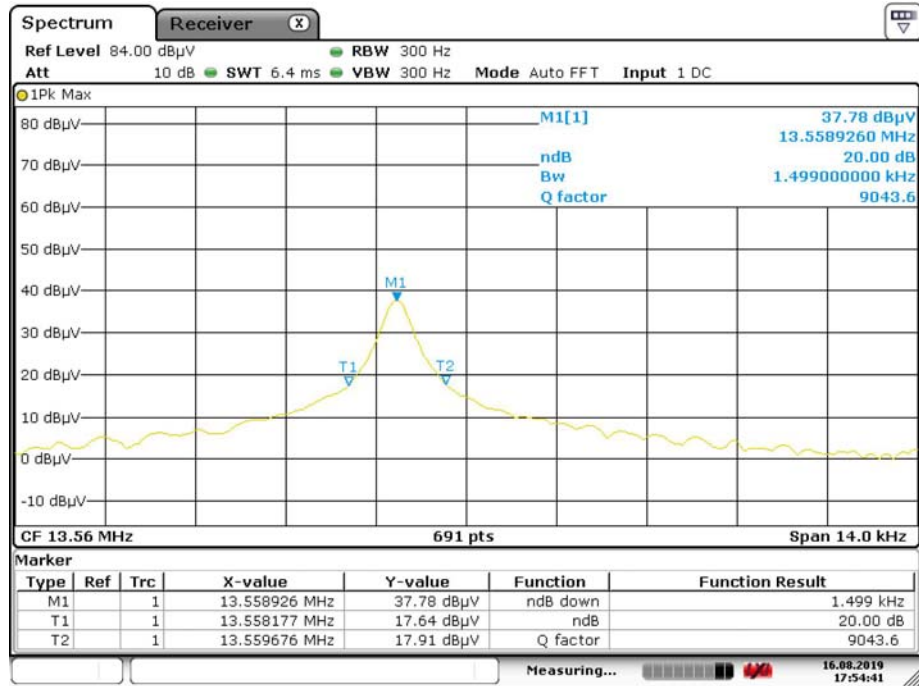
Environmental Conditions

Temperature:	27.3 °C
Relative Humidity:	64%
ATM Pressure:	100.3 kPa
Tester:	Tyler Pan
Test Date:	2019-08-16

Test Mode: Transmitting

Frequency (MHz)	20 dB Bandwidth (kHz)
13.56	1.499

20 dB Bandwidth



Date: 16.AUG.2019 17:54:41

***** END OF REPORT *****