



# FCC PART 15.231

## TEST REPORT

For

### ETROG SYSTEMS LTD.

124 Hertzal street, Jerusalem, Israel

**FCC ID: 2ATHKES005**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Medical Alert System
<b>Report Number:</b> RSZ190606002-00B	
<b>Report Date:</b> 2019-07-16	
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The information marked # is provided by the applicant, the laboratory is not responsible for its authenticity.

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## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

Product	Medical Alert System
Tested Model	ES005
Multiple Model <sup>#</sup>	ES005-BP, ES005-BC, ES005-BW, ES005-BM
Frequency Range	434.21MHz
Field Strength	80 dBuV/m@3m
Modulation Technique	ASK
Antenna Specification	2 dBi
Voltage Range	DC 3.7V from battery or DC 5V from adapter
Date of Test	2019-06-18 ~ 2019-07-16
Sample serial number	190606002
Received date	2019-06-06
Sample/EUT Status	Good condition
Adapter information	Model: JF005WR-0500100UH Input: AC 100-240V, 50/60Hz, 0.18A Output: DC 5V, 1A

#### Manufacturer information

Company Name: Shenzhen Joy Technology Co. Ltd

Company Address: 5/F,3rd Building, Shunchengji Park, Huayun Road of Dalang, Longhua, Shenzhen, China

*Notes: This series products model: ES005-BP, ES005-BC, ES005-BW, ES005-BM and ES005 are identical schematics, they have different model name. Model ES005 was selected for fully testing, the detailed information can be referred to the declaration.*

### Objective

This test report is prepared on behalf of *ETROG SYSTEMS LTD.*. All the test measurements were performed according to the measurement procedure described in ANSI C63.10 - 2013.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209, 15.35(c) and 15.231 rules.

### Related Submittal(s)/Grant(s)

Not Related Submittal(s)/Grant(s).

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.10 - 2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

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

### Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF Output Power with Power meter		±0.5dB
RF conducted test with spectrum		±1.5dB
AC Power Lines Conducted Emissions		±1.95dB
Radiated Emissions	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
Temperature		±3°C
Humidity		±6%
Supply voltages		±0.4%

*Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.*

### Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

## SYSTEM TEST CONFIGURATION

### Justification

The system was configured for testing by manufacturer.

Operating frequency:434.21 MHz.

### Special Accessories

No special accessories was used

### Equipment Modifications

No modification was made to the EUT.

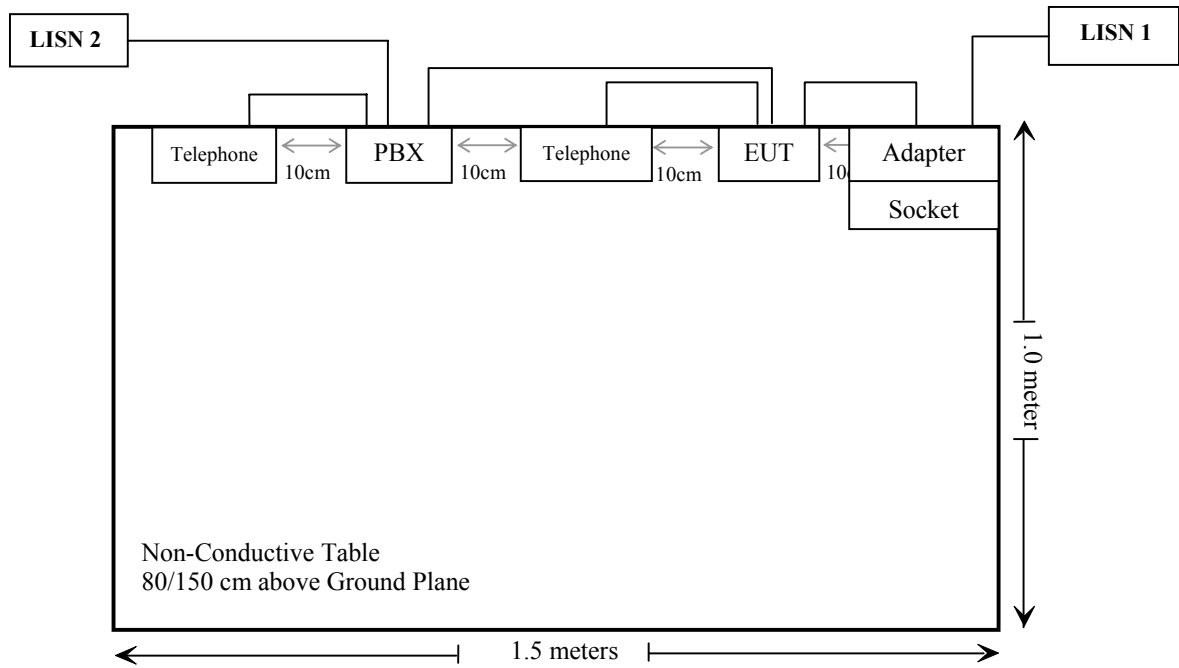
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Yeastar	PBX	MY PBX_SOHO	1103020
Kinhao	Telephone	N/A	14589612
Herene	Telephone	HD-70	N/A

### External I/O Cable

Cable Description	Length (m)	From / Port	To
Un-shielding detachable RJ11 cable	1.5	EUT	PBX
Un-shielding detachable RJ11 cable	2.0	Telephone	PBX
Un-shielding detachable RJ11 cable	2.0	EUT	Telephone
Un-shielding Un-detachable AC cable	1.2	PBX	LISN 2
Un-shielding Un-detachable DC cable	1.0	EUT	Adapter

### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Compliance
§15.205, §15.209, §15.231(b)	Radiated Emissions	Compliance
§15.231 (c)	20dB Emission Bandwidth	Compliance
§15.231 (a) (1)	Deactivation	Compliance

**TEST EQUIPMENT LIST AND DETAILS**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>AC Line Conducted Emission Test</b>					
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2018-07-11	2019-07-11
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2019-01-25	2020-01-25
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2019-03-02	2020-03-01
Unknown	Conducted Emission Cable	78652	UF A210B-1-0720-504504	2018-11-12	2019-11-12
Rohde & Schwarz	CE Test software	EMC 32	V 09.10.0	NCR	NCR
<b>Radiated Emission Test</b>					
A.H. System	Horn Antenna	SAS-200/571	135	2018-09-01	2021-08-31
Rohde & Schwarz	Signal Analyzer	FSEM	845987/005	2018-06-23	2019-06-23
Rohde & Schwarz	Signal Analyzer	FSEM	845987/005	2019-06-23	2020-06-23
COM-POWER	Pre-amplifier	PA-122	181919	2018-11-12	2019-11-12
Sonoma Instrument	Amplifier	310N	186238	2018-11-12	2019-11-12
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017-12-22	2020-12-21
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2018-07-11	2019-07-11
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2019-07-11	2020-07-11
Rohde & Schwarz	Spectrum Analyzer	FSU26	200120	2019-03-02	2020-03-01
UTiFLEX MICRO-C0AX	RF Cable	UFA147A-2362-100100	MFR64639-231029-003	2018-11-12	2019-11-12
Ducommun Technologies	RF Cable	104PEA	218124002	2018-11-12	2019-11-12
Ducommun Technologies	RF Cable	RG-214	1	2018-11-19	2019-05-21
Ducommun Technologies	RF Cable	RG-214	1	2019-05-21	2019-11-19
Ducommun Technologies	RF Cable	RG-214	2	2018-11-12	2019-11-12

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



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## **FCC §15.203 - ANTENNA REQUIREMENT**

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### **Applicable Standard**

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.

### **Antenna Connector Construction**

The EUT has one internal antenna arrangement, which used a unique coupling to this product. And the antenna is 2dBi; fulfill the requirement of this section. Please refer to EUT photos.

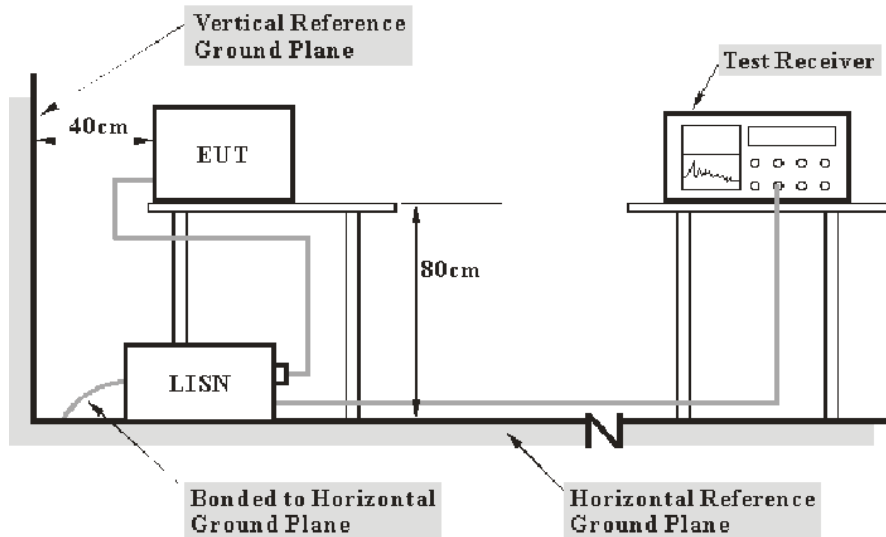
**Result:** Compliant.

**FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS**

**Applicable Standard**

FCC§15.207

**EUT Setup**



- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The adapter was connected to a 120 VAC/60 Hz power source.

**EMI Test Receiver Setup**

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

**Test Procedure**

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

## Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

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

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL,  $U_{(Lm)}$  is less than  $U_{cispr}$ , if  $L_m$  is less than  $L_{lim}$ , it implies that the EUT complies with the limit.

## Test Data

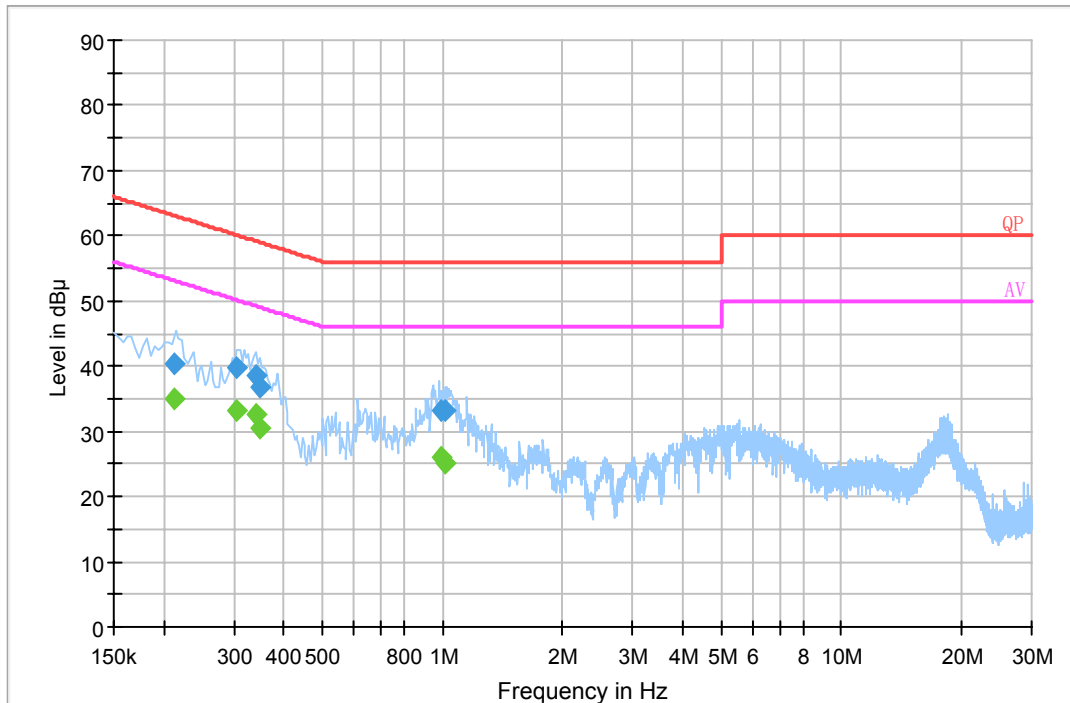
### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Haiguo Li on 2019-06-26.*

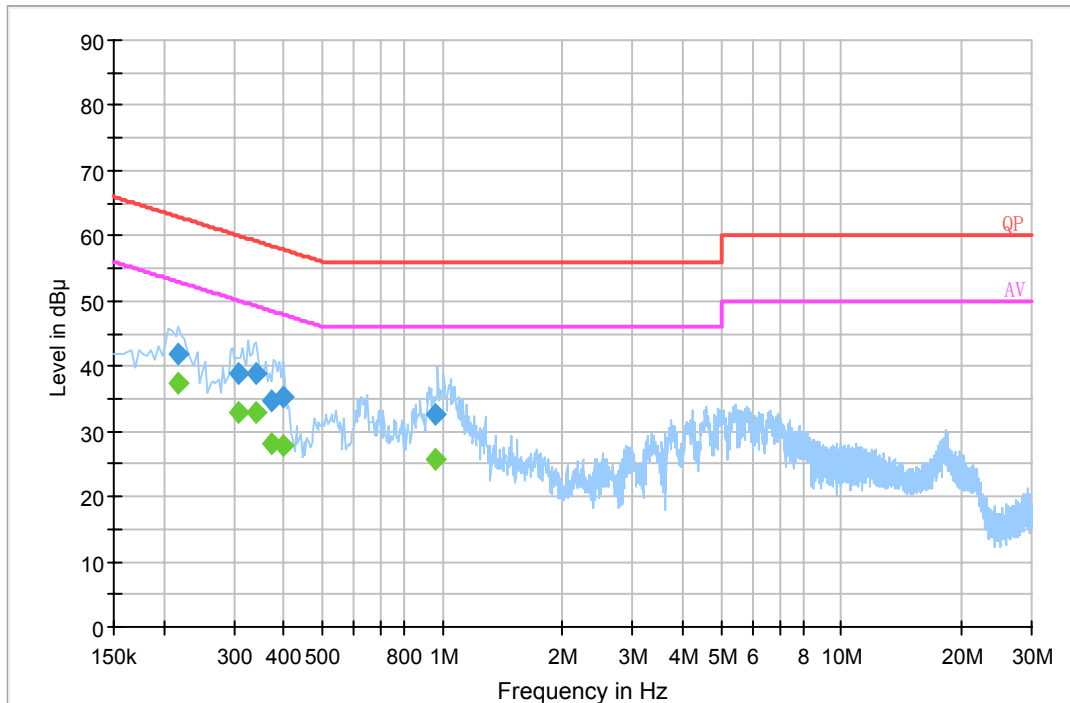
*EUT operation mode: Transmitting & Talking*

**AC 120V/60 Hz, Line**



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.213500	40.4	19.8	63.1	22.7	QP
0.305350	39.8	19.7	60.1	20.3	QP
0.340870	38.4	19.9	59.2	20.8	QP
0.348690	36.8	19.9	59.0	22.2	QP
0.996730	33.2	19.9	56.0	22.8	QP
1.010730	33.3	19.9	56.0	22.7	QP
0.213500	34.9	19.8	53.1	18.2	Ave.
0.305350	33.3	19.7	50.1	16.8	Ave.
0.340870	32.6	19.9	49.2	16.6	Ave.
0.348690	30.4	19.9	49.0	18.6	Ave.
0.996730	26.1	19.9	46.0	19.9	Ave.
1.010730	25.3	19.9	46.0	20.7	Ave.

**AC 120V/60 Hz, Neutral**



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.217500	42.0	19.8	62.9	20.9	QP
0.309290	38.8	19.7	60.0	21.2	QP
0.340870	38.8	19.8	59.2	20.4	QP
0.372330	34.8	19.8	58.4	23.6	QP
0.400030	35.2	19.8	57.9	22.7	QP
0.959390	32.6	19.8	56.0	23.4	QP
0.217500	37.3	19.8	52.9	15.6	Ave.
0.309290	32.9	19.7	50.0	17.1	Ave.
0.340870	32.8	19.8	49.2	16.4	Ave.
0.372330	28.2	19.8	48.4	20.2	Ave.
0.400030	27.9	19.8	47.9	20.0	Ave.
0.959390	25.6	19.8	46.0	20.4	Ave.

**Note:**

- 1) Correction Factor = LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
- 2) Corrected Amplitude = Reading + Correction Factor
- 3) Margin = Limit – Corrected Amplitude

**FCC §15.205, §15.209, §15.231 (b) - RADIATED EMISSIONS**

**Applicable Standard**

FCC §15.205, §15.209, §15.231 (b)

According to FCC §15.231(b), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

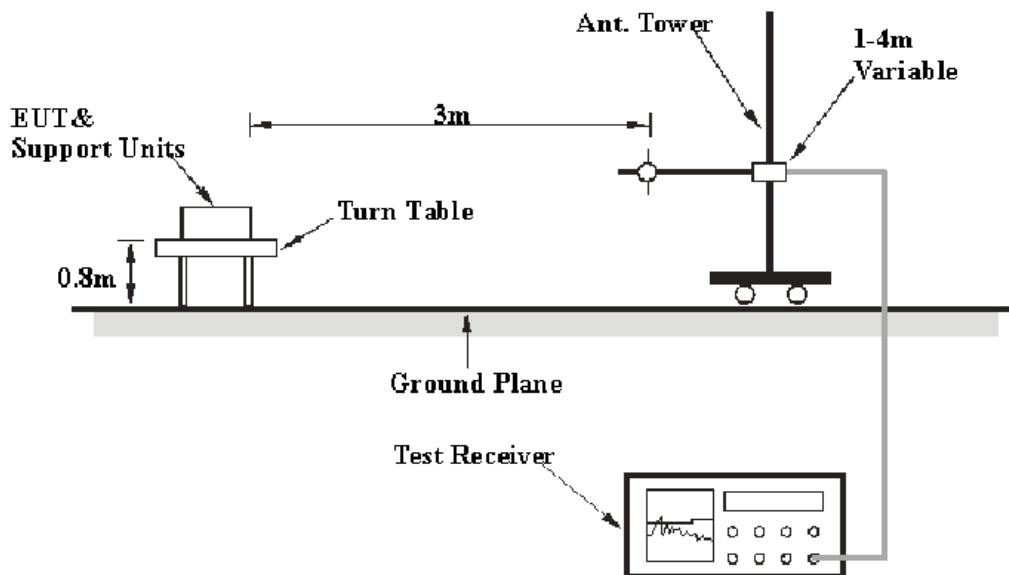
Fundamental frequency (MHz)	Field Strength of Fundamental (Microvolts /meter)	Field Strength of spurious emissions ((Microvolts /meter)
40.66-40.70	2250	225
70-130	1250	125
130-174	1250 to 3750**	125 to 375**
174-260	3750	375
260-470	3750 to 12500**	375 to 1250**
Above 470	12500	1250

\*Linear interpolations.

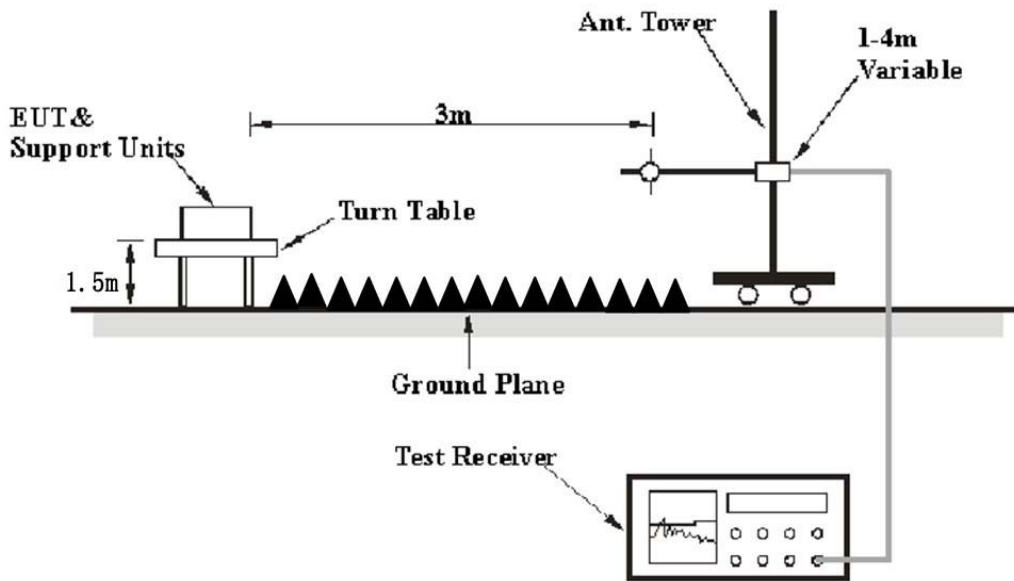
The above field strength limits are specified at a distance of 3-meters the tighter limits apply at the band edges.

**EUT Setup**

**Below 1 GHz:**



**Above 1 GHz:**



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10 - 2013. The specification used was the FCC 15 § 15.209, 15.205 and 15.231.

**EMI Test Receiver Setup**

The system was investigated from 30 MHz to 5 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK

**Test Procedure**

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All final data was recorded in the Quasi-peak detection mode from 30MHz to 1GHz, Peak and average detection mode above 1 GHz.

## Corrected Amplitude & Margin Calculation

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

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 5.8 dB means the emission is 5.8 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Results Summary

According to the data in the following table, the EUT complied with the FCC §15.205, §15.209, §15.231 (b)

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(L_m)} \leq L_{\text{lim}} + U_{\text{cispr}}$$

In BACL,  $U_{(L_m)}$  is less than  $U_{\text{cispr}}$ , if  $L_m$  is less than  $L_{\text{lim}}$ , it implies that the EUT complies with the limit.

## Test Data

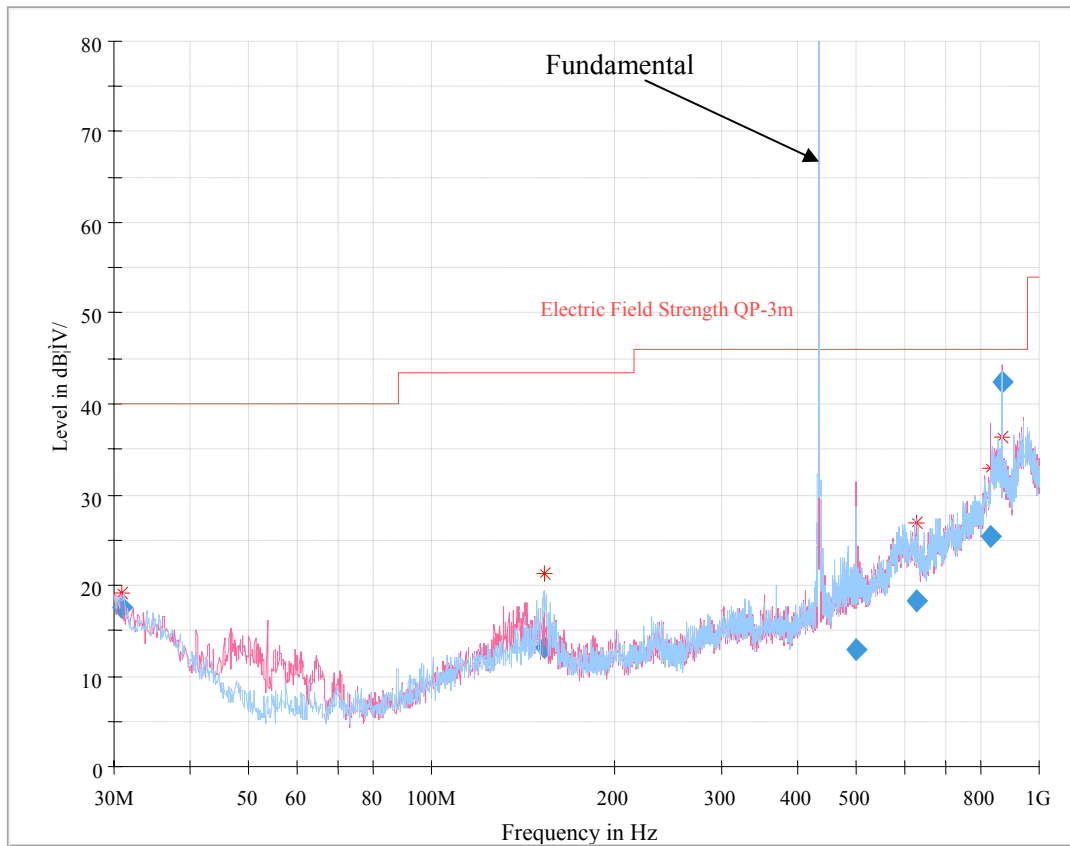
### Environmental Conditions

<b>Temperature:</b>	23~25 °C
<b>Relative Humidity:</b>	49~50 %
<b>ATM Pressure:</b>	100.0~101.0 kPa

*The testing was performed by Alan He from 2019-06-18 to 2019-07-16.*

*Test mode: Transmitting&talking*





Frequency (MHz)	Corrected Amplitude (dBµV/m)	Detector (PK/QP/Ave.)	Antenna Height (cm)	Antenna Polarity	Turntable Position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
30.975375	17.70	QP	389.0	H	179.0	-8.2	22.30	40.00
153.599750	13.13	QP	365.0	H	119.0	-14.3	13.13	43.50
497.874750	12.92	QP	302.0	V	284.0	-7.2	12.92	46.00
626.145000	18.23	QP	275.0	V	0.0	-2.6	18.23	46.00
832.569875	25.42	QP	278.0	V	223.0	5.2	25.42	46.00
868.016750	42.61	QP	105.0	V	44.0	6.0	3.39	46.00

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.231(b)		
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)	Comment
434.21	89.86	PK	359	1	H	-8.9	80.00	80.8	0.80	Fundamental
434.21	79.35	PK	165	1.1	V	-8.9	70.45	80.8	10.35	Fundamental
1302.63	50.44	PK	349	1.6	H	-4.31	46.13	54	7.87	Harmonic
1302.63	46.93	PK	98	2.0	V	-4.31	42.62	54	11.38	Harmonic
1736.84	53.86	PK	285	2.2	H	-2.01	51.85	60.8	8.95	Harmonic
1736.84	53.00	PK	151	2.4	V	-2.01	50.99	60.8	9.81	Harmonic

**Note:**

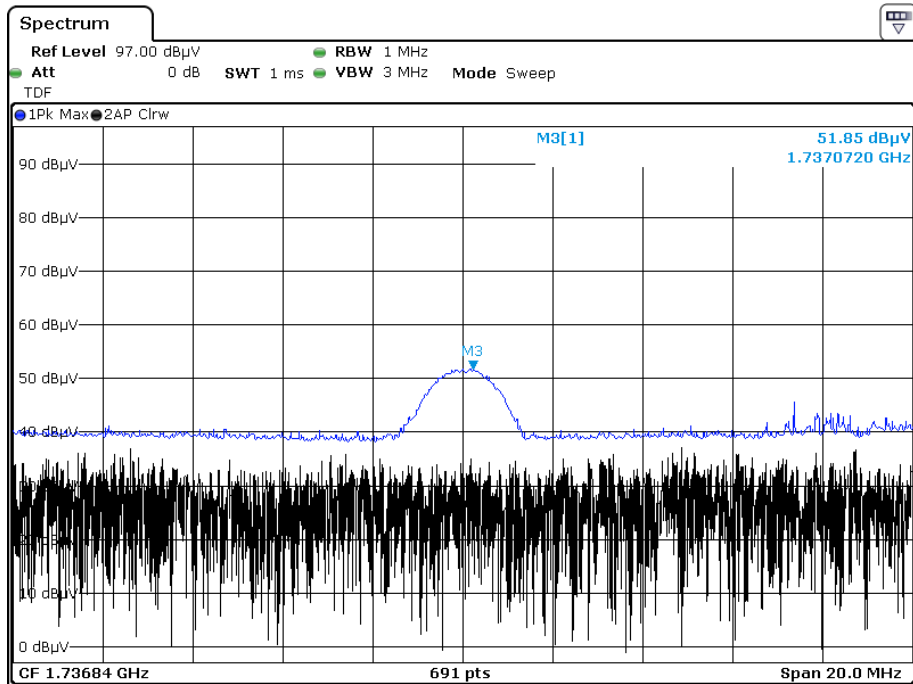
Peak detector data complies with the average limit, average results are not necessary to provide.

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor = Antenna factor (Rx) + cable loss – amplifier factor

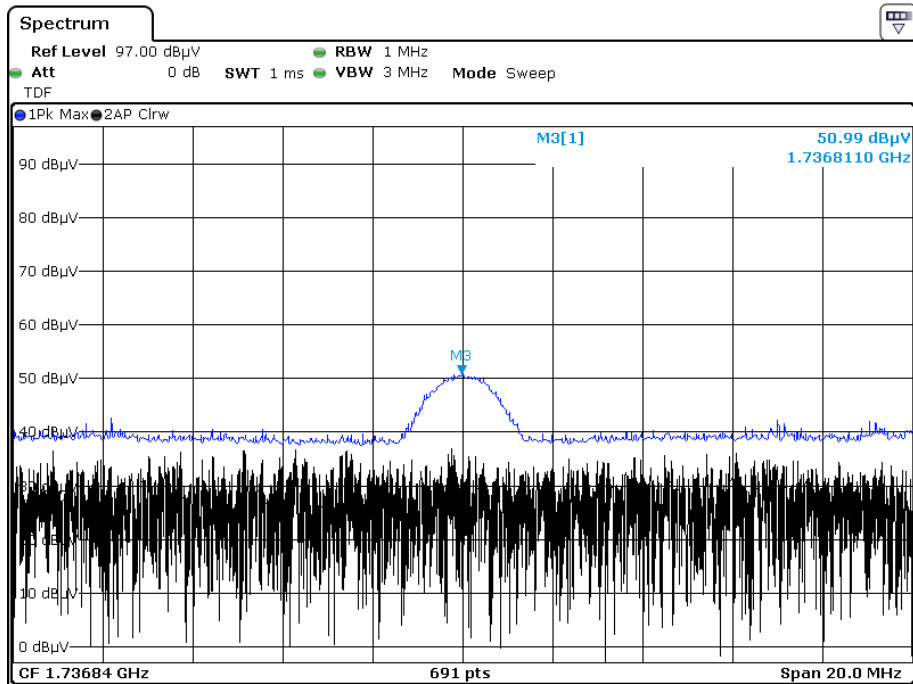
Margin = Limit - Corr. Amplitude

### Horizontal



Date: 16.JUL.2019 20:16:47

### Vertical



Date: 16.JUL.2019 20:10:48

## FCC §15.231(a) (1) - DEACTIVATION TESTING

### Applicable Standard

Per 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.

### Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set center frequency of spectrum analyzer=operating frequency.
3. Set the spectrum analyzer as RBW=100kHz/ VBW=300kHz/ Span=0Hz.
4. Repeat above procedures until all frequency measured was complete.

### Test Data

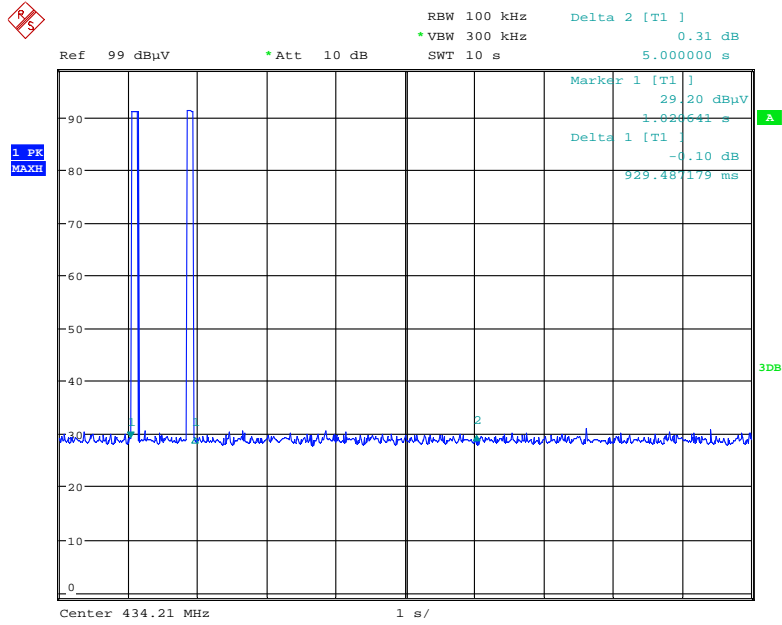
#### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Andy Yu on 2019-06-26.*

*Test mode: Transmitting*

**Test Result:** Compliant. This product will cease transmission within 5 seconds after activation. Please refer to following plots.



Date: 26.JUN.2019 16:04:23

## **FCC §15.231(c) – 20 dB EMISSION BANDWIDTH TESTING**

### **Applicable Standard**

Per 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. Bandwidth is determined at the points 20 dB down from the modulated carrier.

### **Test Procedure**

With the EUT's antenna attached, the waveform was received by the test antenna which was connected to the spectrum analyzer, plot the 20 dB bandwidth.

### **Test Data**

#### **Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0 kPa

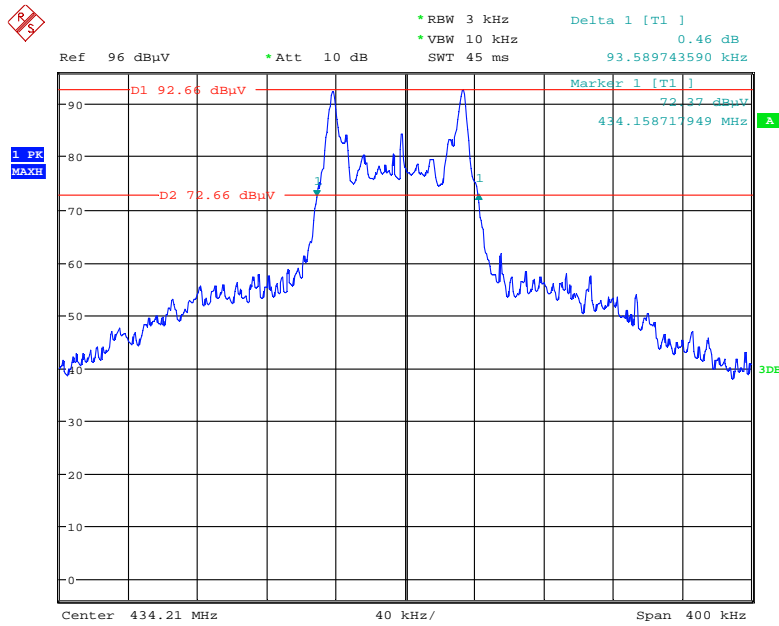
*The testing was performed by Andy Yu on 2019-06-26.*

*Test Mode: Transmitting*

Please refer to following table and plots.

Channel Frequency (MHz)	20 dB Emission Bandwidth (kHz)	<Limit (kHz)	Result
434.21	93.59	1085.525	Pass

**20 dB Emission Bandwidth**



Date: 26.JUN.2019 15:41:41

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