

APPLICATION CERTIFICATION FCC Part 15C

On Behalf of
Lakeshore Learning Materials

Gear-Bot
Model No.: GG127

FCC ID: 2AGG4GG12701

Prepared for : Lakeshore Learning Materials
Address : 2695 E. Dominguez St., Carson, California 90895, United States

Prepared by : Shenzhen Accurate Technology Co., Ltd.
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Report Number : ATE20181151
Date of Test : July 5-July 13, 2018
Date of Report : July 13, 2018

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Test Report Certification

Applicant : Lakeshore Learning Materials
Address : 2695 E. Dominguez St., Carson, California 90895, United States
Product : Gear-Bot
Model No. : GG127

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.249
ANSI C63.10: 2013

The EUT was tested according to FCC 47CFR 15.249 for compliance to FCC 47CFR 15.249 requirements

The device described above is tested by Shenzhen Accurate Technology Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.249 limits. The measurement results are contained in this test report and Shenzhen Accurate Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Shenzhen Accurate Technology Co., Ltd.

Date of Test : July 5-July 13, 2018
Date of Report : July 13, 2018

Prepared by :

Star Yang

(Star Yang, Engineer)

Approved & Authorized Signer :


(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Product	:	Gear-Bot
Model Number	:	GG127
Frequency Range	:	2411-2459MHz
Number of Channels	:	2411, 2413, 2415, 2417, 2419, 2421, 2423, 2431, 2433, 2435, 2437, 2441, 2443, 2445, 2447, 2457, 2455, 2459MHz
Modulation Type	:	GFSK
Type of Antenna	:	Integral Antenna
Max antenna gain	:	0dBi
Power Supply	:	DC 3V (AA size batteries (1.5V) x2)

1.2. Special Accessory and Auxiliary Equipment

N/A

1.3.Description of Test Facility

EMC Lab	:	Recognition of accreditation by Federal Communications Commission (FCC) The Designation Number is CN1189 The Registration Number is 708358 Listed by Innovation, Science and Economic Development Canada (ISED) The Registration Number is 5077A-2 Accredited by China National Accreditation Service for Conformity Assessment (CNAS) The Registration Number is CNAS L3193 Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01
Name of Firm	:	Shenzhen Accurate Technology Co., Ltd.
Site Location	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

1.4.Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty (Above 1GHz)	=	4.06dB, k=2

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde & Schwarz	ESR	101817	Jan. 06, 2018	Jan. 05, 2019
Spectrum Analyzer	Rohde&Schwarz	FSV40	101495	Jan. 06, 2018	Jan. 05, 2019
Pre-Amplifier	Rohde&Schwarz	CBLU118354 0-01	3791	Jan. 06, 2018	Jan. 05, 2019
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 06, 2018	Jan. 05, 2019
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 06, 2018	Jan. 05, 2019
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 06, 2018	Jan. 05, 2019
Highpass Filter	Wainwright Instruments	WHKX3.6/18 G-10SS	N/A	Jan. 06, 2018	Jan. 05, 2019
Band Reject Filter	Wainwright Instruments	WRCG2400/2 485-2375/2510 -60/11SS	N/A	Jan. 06, 2018	Jan. 05, 2019

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

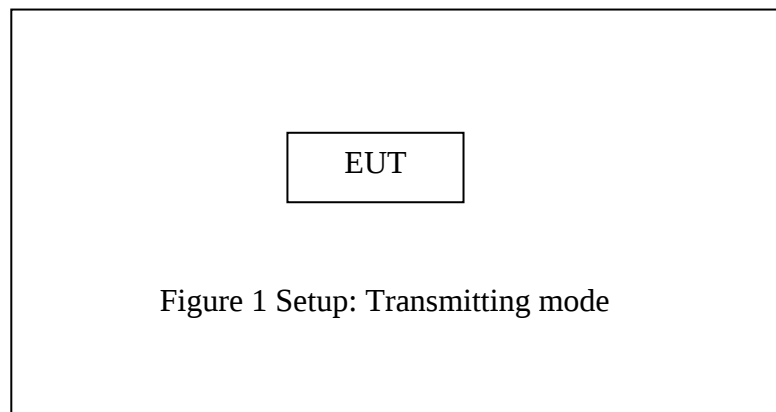
The mode is used: **Transmitting mode**

Low Channel: 2411MHz

Middle Channel: 2433MHz

High Channel: 2459MHz

3.2.Configuration and peripherals



4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.215(c)	20dB Bandwidth	Compliant
Section 15.249(d)	Band Edge Compliance Test	Compliant
Section 15.205(a), Section 15.209(a), Section 15.249, Section 15.35	Radiated Spurious Emission Test	Compliant
Section 15.207	AC Power Line Conducted Emission Test	N/A
Section 15.203	Antenna Requirement	Compliant

Note: The EUT is powered by the battery 3V, so the conducted emission is not applicable and skipped

5. 20DB BANDWIDTH MEASUREMENT

5.1. Block Diagram of Test Setup



5.2. The Requirement For Section 15.215(c)

The bandwidth of a frequency hopping channel is the 20 dB emission bandwidth, measured with the hopping stopped. The system RF bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hopset. The hopset shall be such that the near-term distribution of frequencies appears random, with sequential hops randomly distributed in both direction and magnitude of change in the hopset while the long-term distribution appears evenly distributed.

5.3. Operating Condition of EUT

5.3.1. Setup the EUT and simulator as shown as Section 5.1.

5.3.2. Turn on the power of all equipment.

5.3.3. Let the EUT work in TX modes measure it. The transmit frequency are 2411-2459 MHz. We select 2411MHz, 2433MHz, and 2459MHz TX frequency to transmit.

5.4. Test Procedure

5.4.1. Place the EUT on the table and set it in transmitting mode.

5.4.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

5.4.3. Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz, Detector function=peak, Trace=max hold, Sweep=auto.

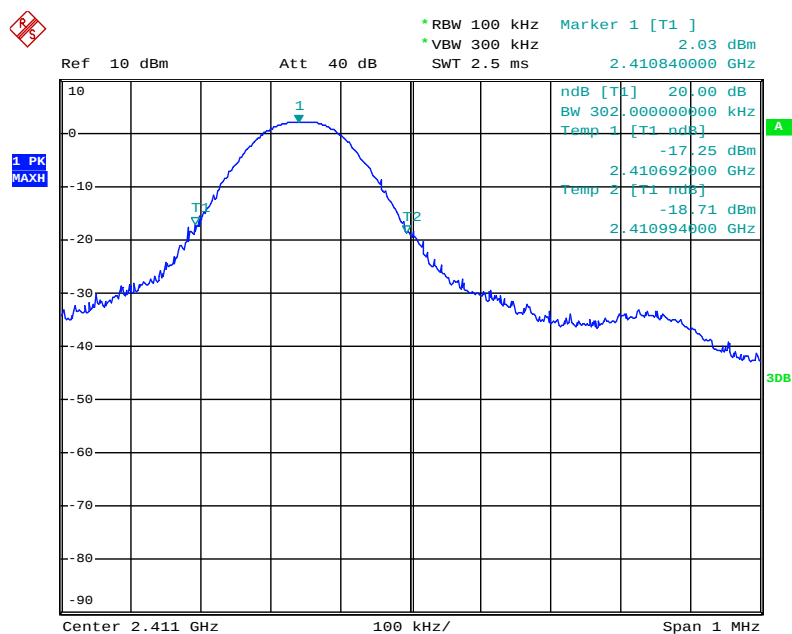
5.4.4. Set the measured low, middle and high frequency and test 20dB bandwidth with spectrum analyzer.

5.5. Test Result

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2411	0.302
Middle	2433	0.302
High	2459	0.300

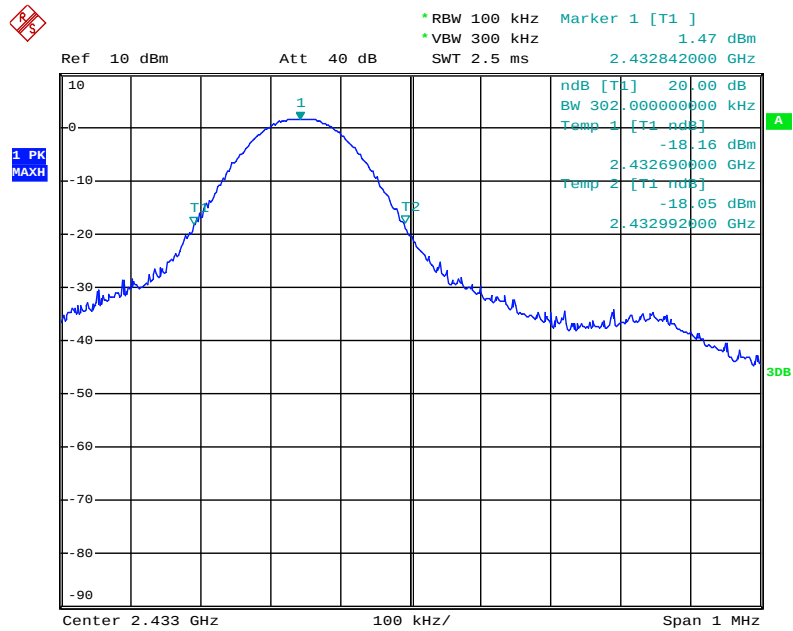
The spectrum analyzer plots are attached as below.

Low channel



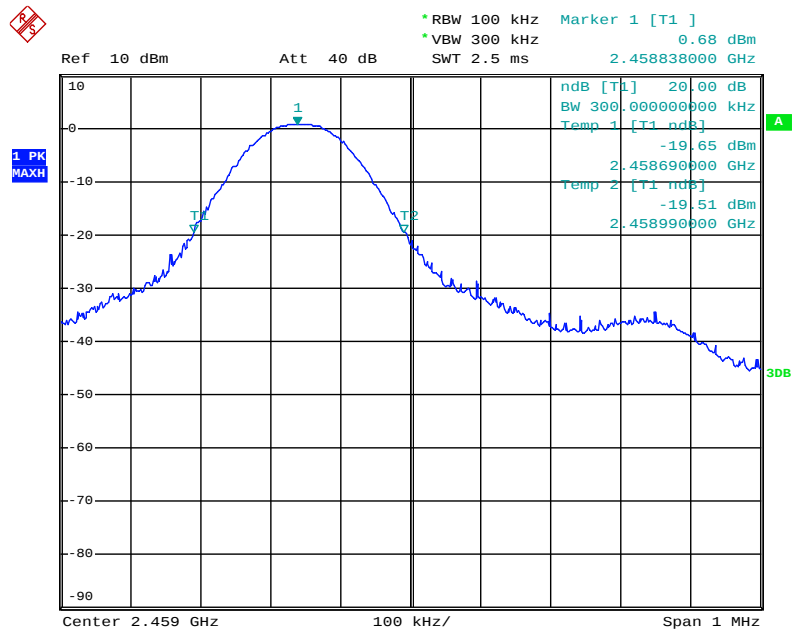
Date: 5.JUL.2018 15:38:17

Middle channel



Date: 5.JUL.2018 15:38:39

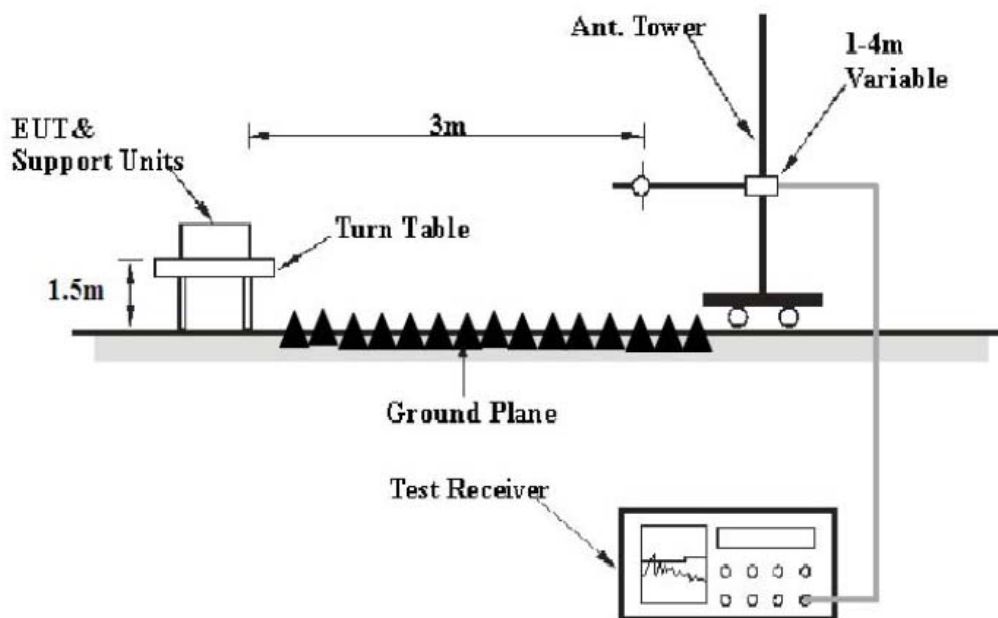
High channel



Date: 5.JUL.2018 15:37:48

6. BAND EDGE COMPLIANCE TEST

6.1. Block Diagram of Test Setup



6.2. The Requirement For Section 15.249

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

6.3. EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.4. Operating Condition of EUT

6.4.1. Setup the EUT and simulator as shown as Section 6.1.

6.4.2. Turn on the power of all equipment.

6.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 2411-2459 MHz. We select 2411MHz, 2459MHz TX frequency to transmit.

6.5. Test Procedure

Radiate Band Edge:

6.5.1. The EUT is placed on a turntable, which is 1.5m above the ground plane and worked at highest radiated power.

6.5.2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.

6.5.3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

6.5.4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

RBW=1MHz, VBW=1MHz

6.5.5. The band edges was measured and recorded.

6.6. Test Result

Pass.

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

3. Display the measurement of peak values.

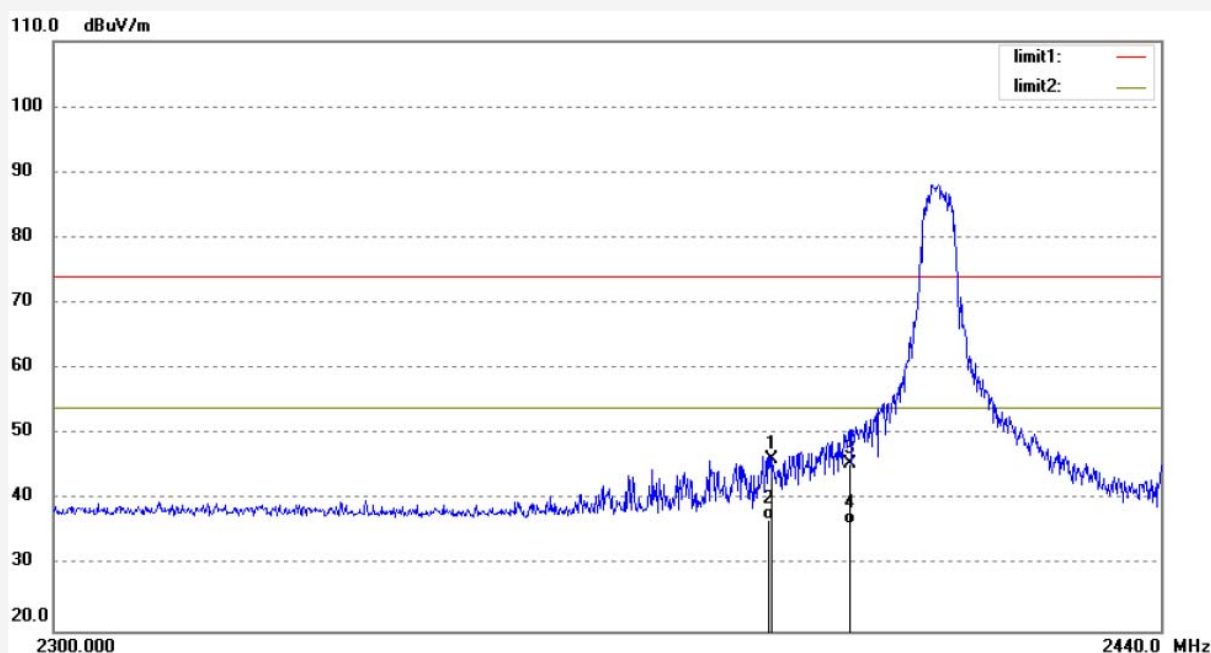
4. The average measurement was not performed when peak measured data under the limit of average detection.

The spectral diagrams are attached as below.

Job No.: star2016 #2648
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Gear-Bot
Mode: TX 2411MHz
Model: GG127
Manufacturer: Lakeshore Learning Materials

Polarization: Horizontal
Power Source: DC 3V
Date: 2018/07/12
Time: 17:17:31
Engineer Signature: star
Distance: 3m

Note: Report No.: ATE20181151



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	45.47	0.79	46.26	74.00	-27.74	peak	250	42	
2	2390.000	36.15	0.79	36.94	54.00	-17.06	AVG	250	222	
3	2400.000	44.74	0.88	45.62	74.00	-28.38	peak	250	201	
4	2400.000	35.46	0.88	36.34	54.00	-17.66	AVG	250	300	

Job No.: star2016 #2649

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Gear-Bot

Mode: TX 2411MHz

Model: GG127

Manufacturer: Lakeshore Learning Materials

Polarization: Vertical

Power Source: DC 3V

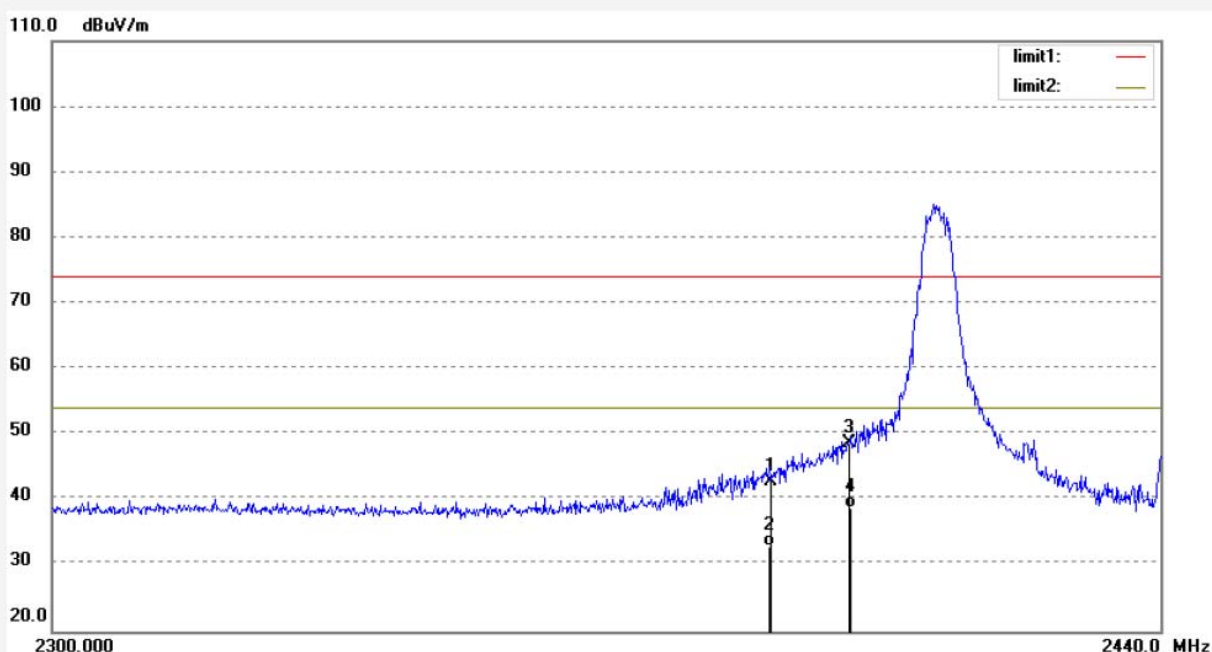
Date: 2018/07/12

Time: 17:18:35

Engineer Signature: star

Distance: 3m

Note: Report No.: ATE20181151



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	42.11	0.79	42.90	74.00	-31.10	peak	250	105	
2	2390.000	32.12	0.79	32.91	54.00	-21.09	AVG	200	64	
3	2400.000	47.88	0.88	48.76	74.00	-25.24	peak	250	232	
4	2400.000	37.81	0.88	38.69	54.00	-15.31	AVG	250	185	

Job No.: star2016 #2651

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Gear-Bot

Mode: TX 2459MHz

Model: GG127

Manufacturer: Lakeshore Learning Materials

Polarization: Horizontal

Power Source: DC 3V

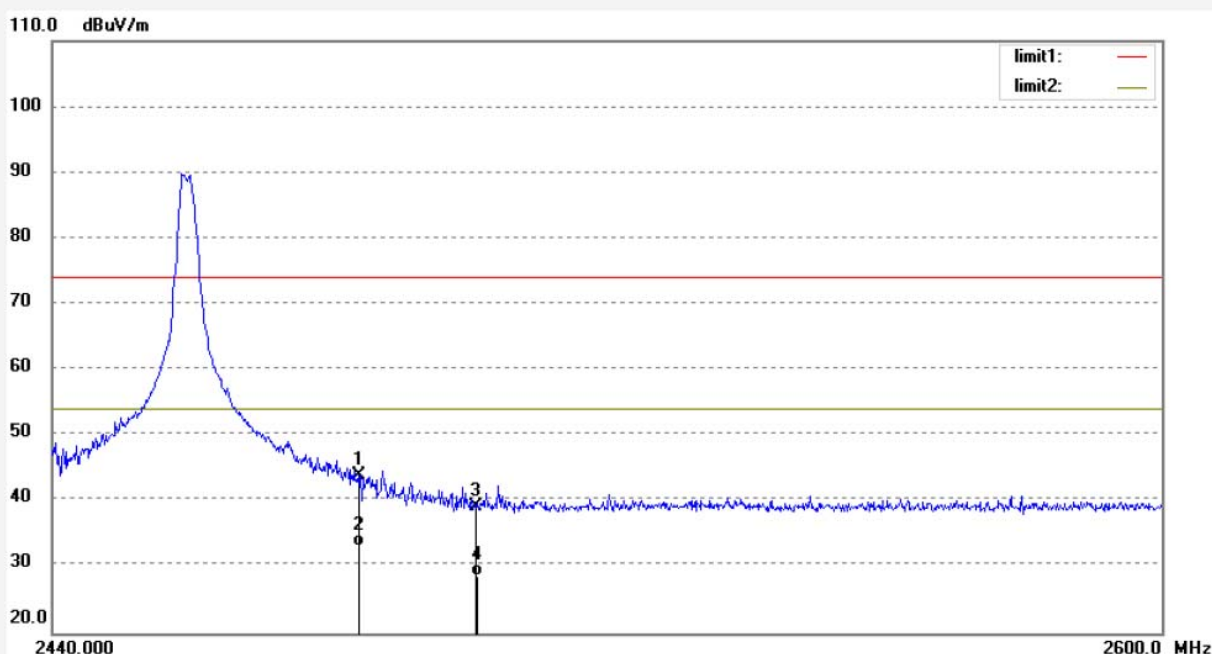
Date: 2018/07/12

Time: 17:21:38

Engineer Signature: star

Distance: 3m

Note: Report No.: ATE20181151



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	42.77	1.10	43.87	74.00	-30.13	peak	250	132	
2	2483.500	32.01	1.10	33.11	54.00	-20.89	AVG	250	12	
3	2500.000	38.11	1.10	39.21	74.00	-34.79	peak	250	315	
4	2500.000	27.50	1.10	28.60	54.00	-25.40	AVG	250	55	

Job No.: star2016 #2650

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Gear-Bot

Mode: TX 2459MHz

Model: GG127

Manufacturer: Lakeshore Learning Materials

Polarization: Vertical

Power Source: DC 3V

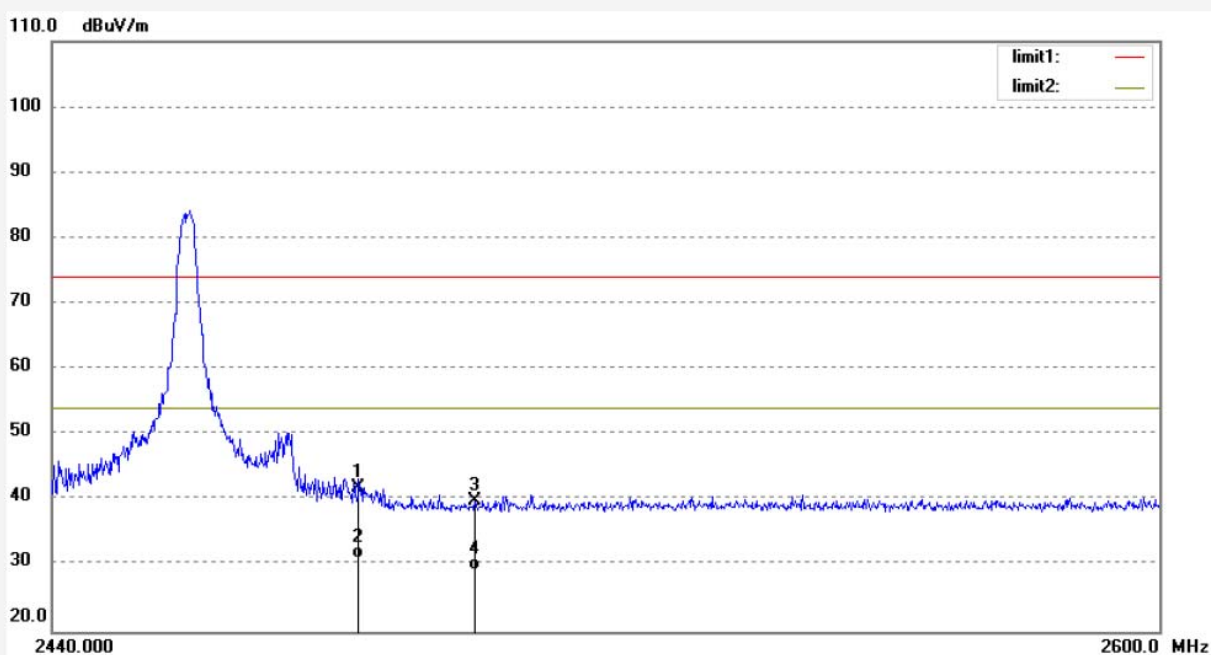
Date: 2018/07/12

Time: 17:20:20

Engineer Signature: star

Distance: 3m

Note: Report No.: ATE20181151

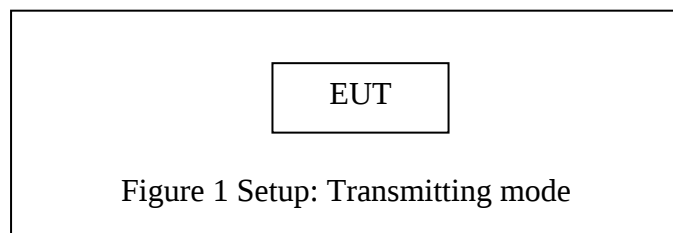


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	40.79	1.10	41.89	74.00	-32.11	peak	250	301	
2	2483.500	30.15	1.10	31.25	54.00	-22.75	AVG	200	22	
3	2500.000	38.90	1.10	40.00	74.00	-34.00	peak	250	156	
4	2500.000	28.15	1.10	29.25	54.00	-24.75	AVG	200	45	

7. RADIATED SPURIOUS EMISSION TEST

7.1. Block Diagram of Test Setup

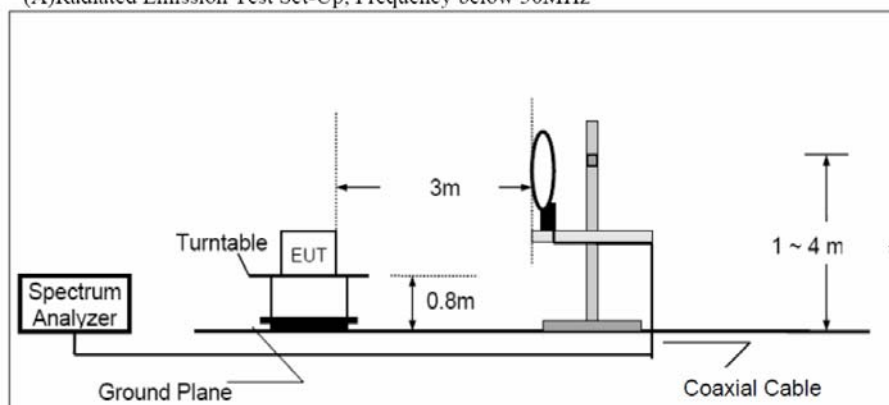
7.1.1. Block diagram of connection between the EUT and peripherals



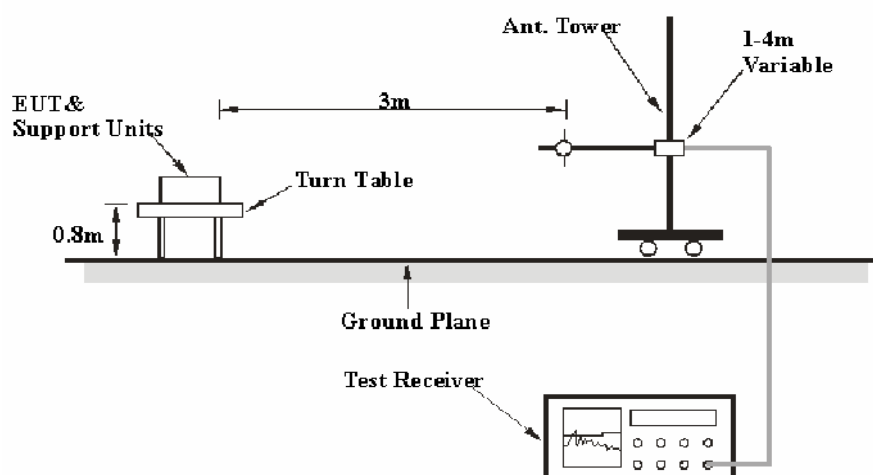
(EUT: Gear-Bot)

7.1.2. Semi-Anechoic Chamber Test Setup Diagram

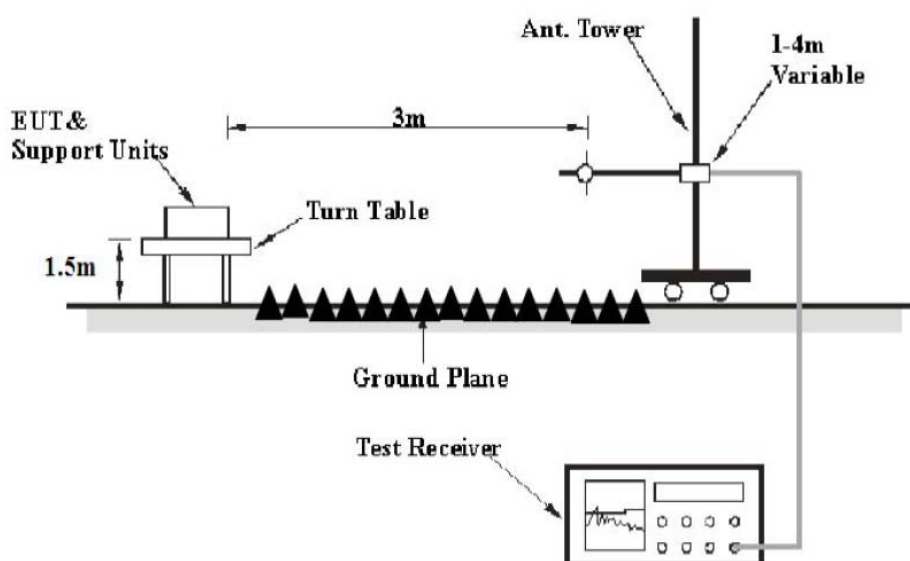
(A) Radiated Emission Test Set-Up, Frequency below 30MHz



(B) Radiated Emission Test Set-Up, Frequency 30-1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1GHz



7.2.The Limit For Section 15.249

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph A8.4(4), the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

7.3.Restricted bands of operation

7.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

¹Until February 1, 1999, this restricted band shall be 0.490-0.510

²Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

7.4.Configuration of EUT on Measurement

The equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.5. Operating Condition of EUT

7.5.1. Setup the EUT and simulator as shown as Section 7.1.

7.5.2. Turn on the power of all equipment.

7.5.3. Let the EUT work in TX modes measure it. The transmit frequency are 2411-2459 MHz. We select 2411MHz, 2433MHz, and 2459MHz TX frequency to transmit.

7.6. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground (Below 1GHz). The EUT and its simulators are placed on a turntable, which is 1.5 meter high above ground (Above 1GHz). The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The bandwidth of test receiver is set at 9 kHz in below 30MHz. and set at 120 kHz in 30-1000MHz, and 1MHz in above 1000MHz.

The final measurement in band 9-90 kHz, 110-490 kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.

RBW (120 kHz), VBW (300 kHz) for QP detector below 1GHz

Peak detector above 1GHz

RBW (1 MHz), VBW (3MHz) for Peak measurement

RBW (1 MHz), VBW (10Hz) for AV measurement

7.7.Data Sample

Frequency(MHz)	Reading (dB μ v)	Factor (dB/m)	Result (dB μ v/m)	Limit (dB μ v/m)	Margin (dB)	Remark
X.XX	30.21	-17.87	12.34	40.00	-27.66	QP

Frequency(MHz) = Emission frequency in MHz

Reading(dB μ v) = Uncorrected Analyzer/Receiver reading

Factor (dB/m) = Antenna factor + Cable Loss – Amplifier gain

Result(dB μ v/m) = Reading(dB μ v) + Factor(dB/m)

Limit (dB μ v/m) = Limit stated in standard

Margin (dB) = Result(dB μ v/m) - Limit (dB μ v/m)

QP = Quasi-peak Reading

Calculation Formula:

Margin(dB) = Result (dB μ V/m)–Limit(dB μ V/m)

Result(dB μ V/m)= Reading(dB μ V)+ Factor(dB/m)

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.

7.8.The Field Strength of Radiation Emission Measurement Results

Pass.

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. *: Denotes restricted band of operation.

3. The EUT is tested radiation emission at Low, Middle, High channel in three axes. The worst emissions are reported in all channels.

4. Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 3th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

The measurements greater than 20dB below the limit from 9kHz to 30MHz and 18 to 26.5GHz.

Job No.: STAR2016 #2613

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Gear-Bot

Mode: TX 2411MHz

Model: GG127

Manufacturer: Lakeshore Learning Materials

Polarization: Horizontal

Power Source: DC 3V

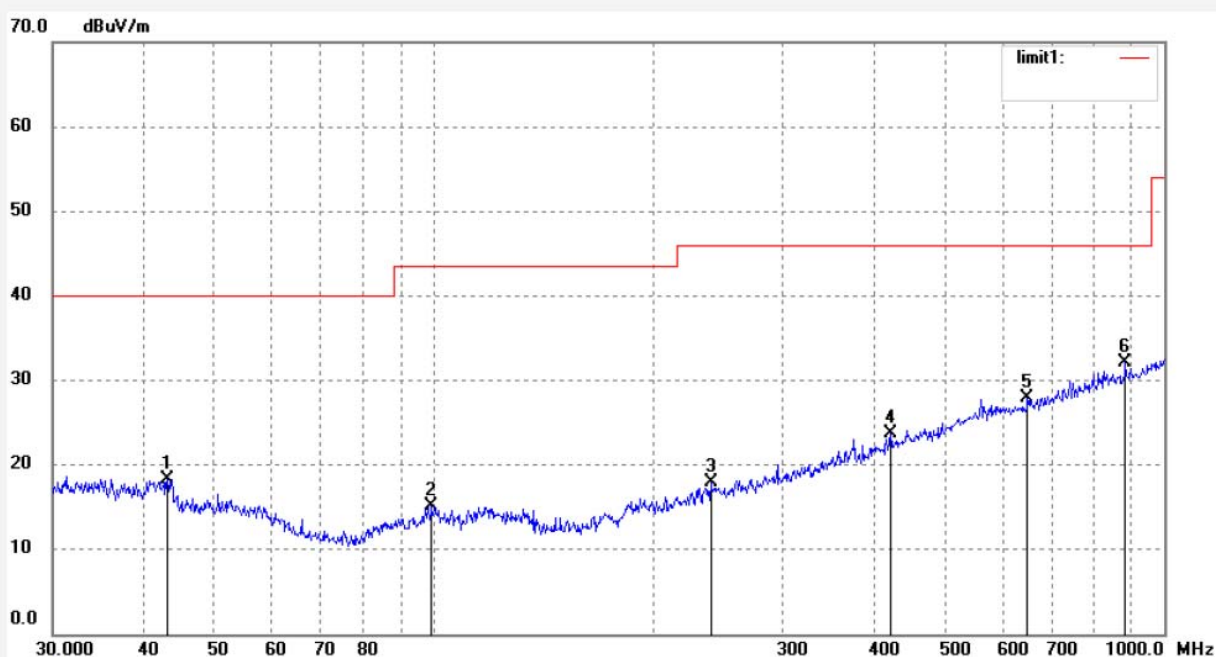
Date: 18/07/05/

Time: 18/54/00

Engineer Signature: star

Distance: 3m

Note: Report No.: ATE20181151



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	43.0504	30.47	-12.20	18.27	40.00	-21.73	peak	100	136	
2	99.1796	28.49	-13.33	15.16	43.50	-28.34	peak	100	112	
3	239.1473	28.65	-10.67	17.98	46.00	-28.02	peak	100	191	
4	422.0577	29.52	-5.76	23.76	46.00	-22.24	peak	100	139	
5	649.6597	29.64	-1.81	27.83	46.00	-18.17	peak	100	242	
6	884.5028	30.10	2.08	32.18	46.00	-13.82	peak	100	345	

Job No.: STAR2016 #2614

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Gear-Bot

Mode: TX 2411MHz

Model: GG127

Manufacturer: Lakeshore Learning Materials

Polarization: Vertical

Power Source: DC 3V

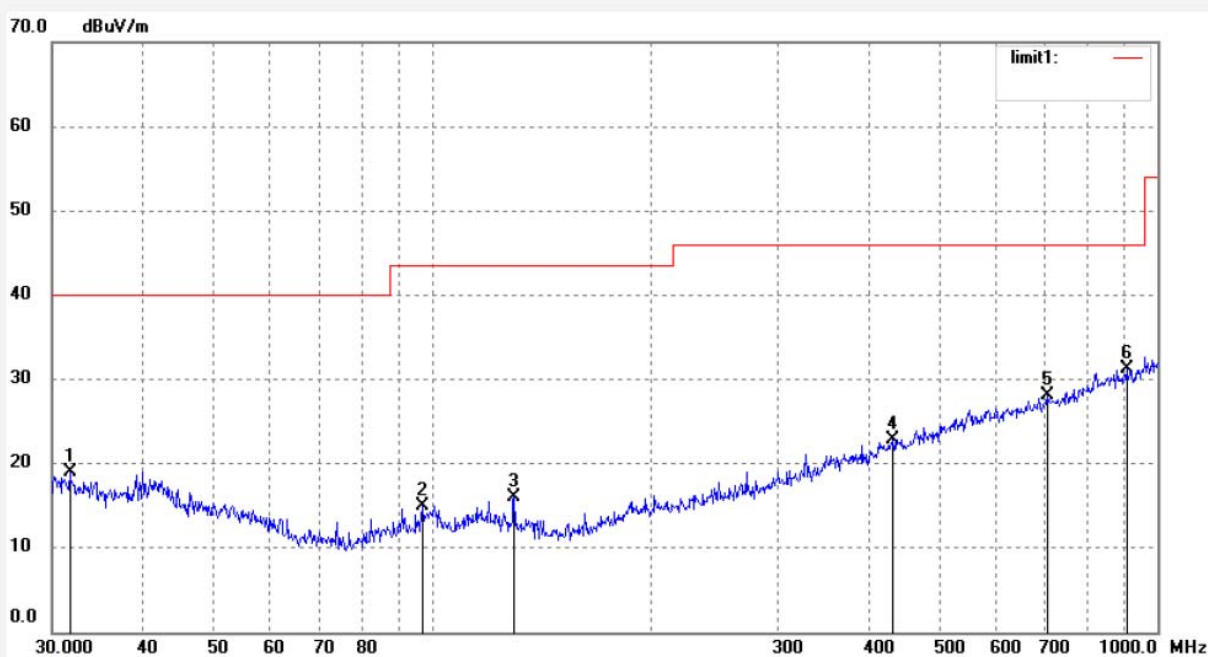
Date: 18/07/05/

Time: 18/55/12

Engineer Signature: star

Distance: 3m

Note: Report No.: ATE20181151



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	31.7313	28.48	-9.45	19.03	40.00	-20.97	peak	100	34	
2	97.1148	29.00	-14.02	14.98	43.50	-28.52	peak	100	113	
3	129.9226	29.79	-13.76	16.03	43.50	-27.47	peak	100	344	
4	432.5457	28.41	-5.58	22.83	46.00	-23.17	peak	100	241	
5	704.2261	29.01	-0.96	28.05	46.00	-17.95	peak	100	320	
6	906.4824	29.06	2.22	31.28	46.00	-14.72	peak	100	21	

Job No.: STAR2016 #2616

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Gear-Bot

Mode: TX 2433MHz

Model: GG127

Manufacturer: Lakeshore Learning Materials

Polarization: Horizontal

Power Source: DC 3V

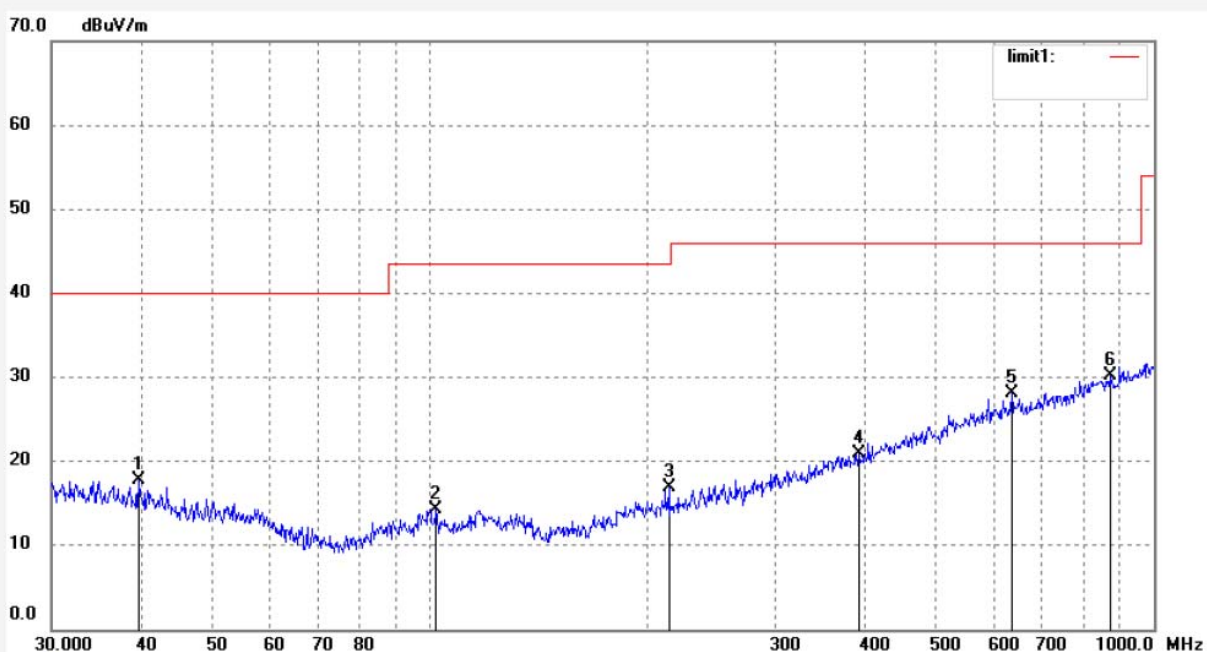
Date: 18/07/05/

Time: 18/56/10

Engineer Signature: star

Distance: 3m

Note: Report No.: ATE20181151



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	39.5756	29.20	-11.44	17.76	40.00	-22.24	peak	100	77	
2	102.0014	27.72	-13.38	14.34	43.50	-29.16	peak	100	39	
3	213.7633	28.70	-11.76	16.94	43.50	-26.56	peak	100	149	
4	392.0951	27.66	-6.77	20.89	46.00	-25.11	peak	100	199	
5	636.1340	29.99	-1.94	28.05	46.00	-17.95	peak	100	230	
6	869.1301	28.25	1.90	30.15	46.00	-15.85	peak	100	217	

Job No.: STAR2016 #2615

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Gear-Bot

Mode: TX 2433MHz

Model: GG127

Manufacturer: Lakeshore Learning Materials

Polarization: Vertical

Power Source: DC 3V

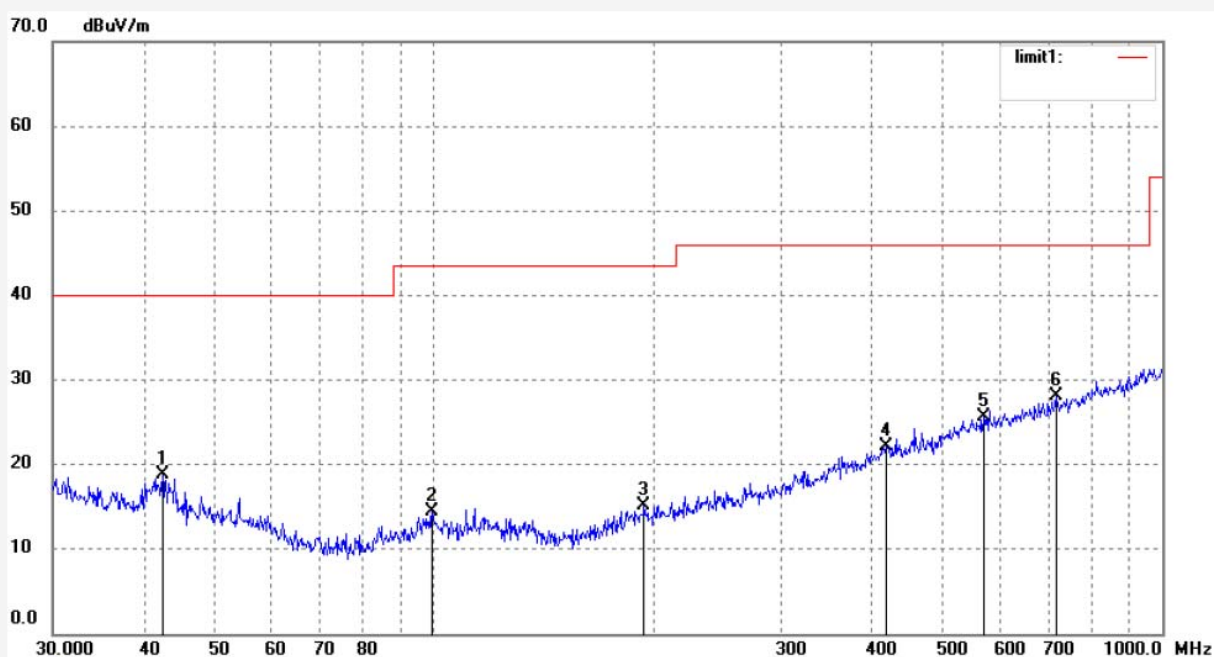
Date: 18/07/05/

Time: 18/55/34

Engineer Signature: star

Distance: 3m

Note: Report No.: ATE20181151



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	42.4508	30.86	-12.07	18.79	40.00	-21.21	peak	100	200	
2	99.5279	27.69	-13.21	14.48	43.50	-29.02	peak	100	91	
3	194.4533	27.47	-12.32	15.15	43.50	-28.35	peak	100	174	
4	417.6409	27.96	-5.87	22.09	46.00	-23.91	peak	100	200	
5	568.6127	28.38	-2.78	25.60	46.00	-20.40	peak	100	239	
6	714.1734	28.95	-0.85	28.10	46.00	-17.90	peak	100	117	

Job No.: STAR2016 #2617

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Gear-Bot

Mode: TX 2459MHz

Model: GG127

Manufacturer: Lakeshore Learning Materials

Polarization: Horizontal

Power Source: DC 3V

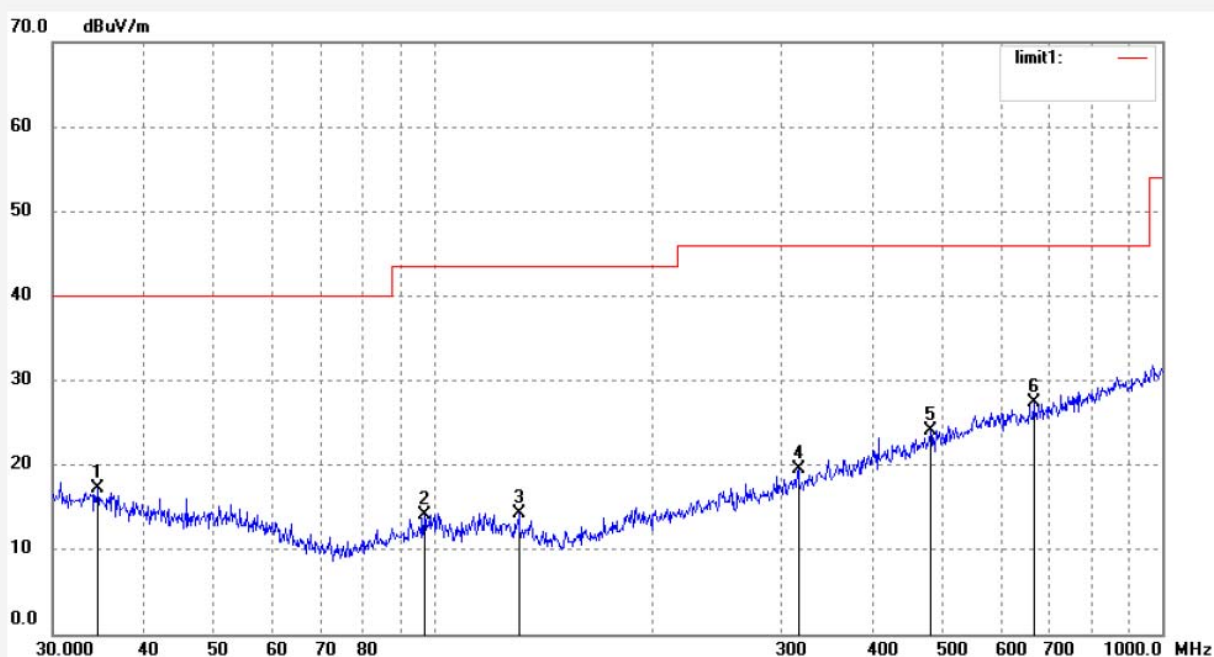
Date: 18/07/05/

Time: 18/56/32

Engineer Signature: star

Distance: 3m

Note: Report No.: ATE20181151



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	34.6385	27.66	-10.39	17.27	40.00	-22.73	peak	100	299	
2	97.1148	28.14	-14.02	14.12	43.50	-29.38	peak	100	210	
3	130.8369	28.07	-13.80	14.27	43.50	-29.23	peak	100	29	
4	316.5889	28.03	-8.55	19.48	46.00	-26.52	peak	100	130	
5	480.5276	28.88	-4.88	24.00	46.00	-22.00	peak	100	110	
6	665.8034	28.98	-1.53	27.45	46.00	-18.55	peak	100	133	

Job No.: STAR2016 #2618

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Gear-Bot

Mode: TX 2459MHz

Model: GG127

Manufacturer: Lakeshore Learning Materials

Polarization: Vertical

Power Source: DC 3V

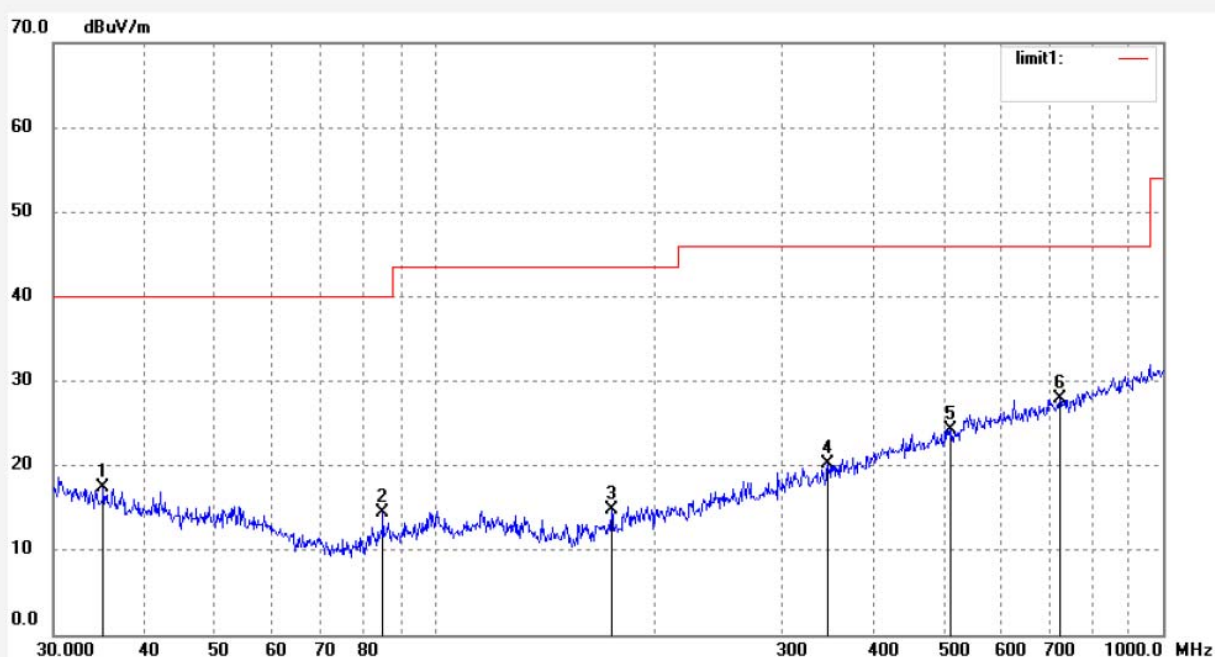
Date: 18/07/05/

Time: 18/57/12

Engineer Signature: star

Distance: 3m

Note: Report No.: ATE20181151



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	35.1278	27.78	-10.44	17.34	40.00	-22.66	peak	100	171	
2	84.9995	29.83	-15.33	14.50	40.00	-25.50	peak	100	169	
3	175.0368	28.26	-13.48	14.78	43.50	-28.72	peak	100	111	
4	346.8092	27.80	-7.50	20.30	46.00	-25.70	peak	100	146	
5	511.8352	28.33	-4.03	24.30	46.00	-21.70	peak	100	130	
6	721.7259	28.58	-0.75	27.83	46.00	-18.17	peak	100	218	

Job No.: STAR2016 #2632

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Gear-Bot

Mode: TX 2411MHz

Model: GG127

Manufacturer: Lakeshore Learning Materials

Polarization: Horizontal

Power Source: DC 3V

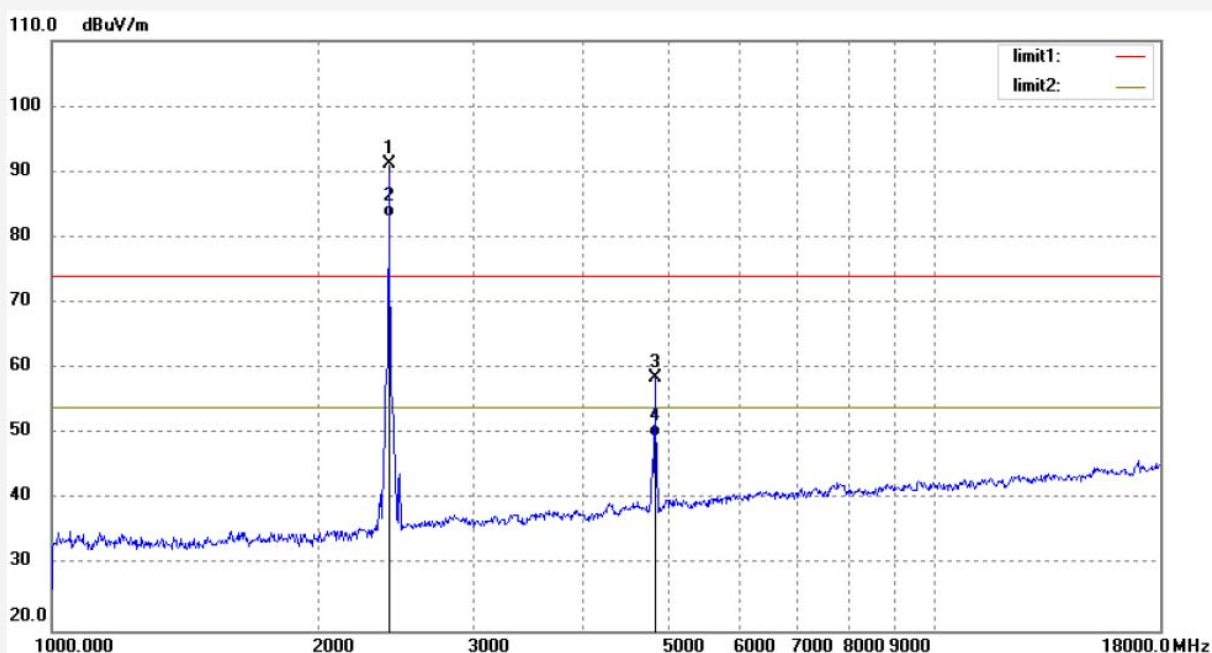
Date: 2018-7-9

Time: 19:50:07

Engineer Signature: star

Distance: 3m

Note: Report No.: ATE20181151



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2411.003	90.24	0.91	91.15	114.00	-22.85	peak	250	13	
2	2411.003	82.15	0.91	83.06	94.00	-10.94	AVG	200	185	
3	4822.016	51.16	7.53	58.69	74.00	-15.31	peak	200	144	
4	4822.090	41.94	7.56	49.50	54.00	-4.50	AVG	200	52	



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Job No.: STAR2016 #2631

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Gear-Bot

Mode: TX 2411MHz

Model: GG127

Manufacturer: Lakeshore Learning Materials

Polarization: Vertical

Power Source: DC 3V

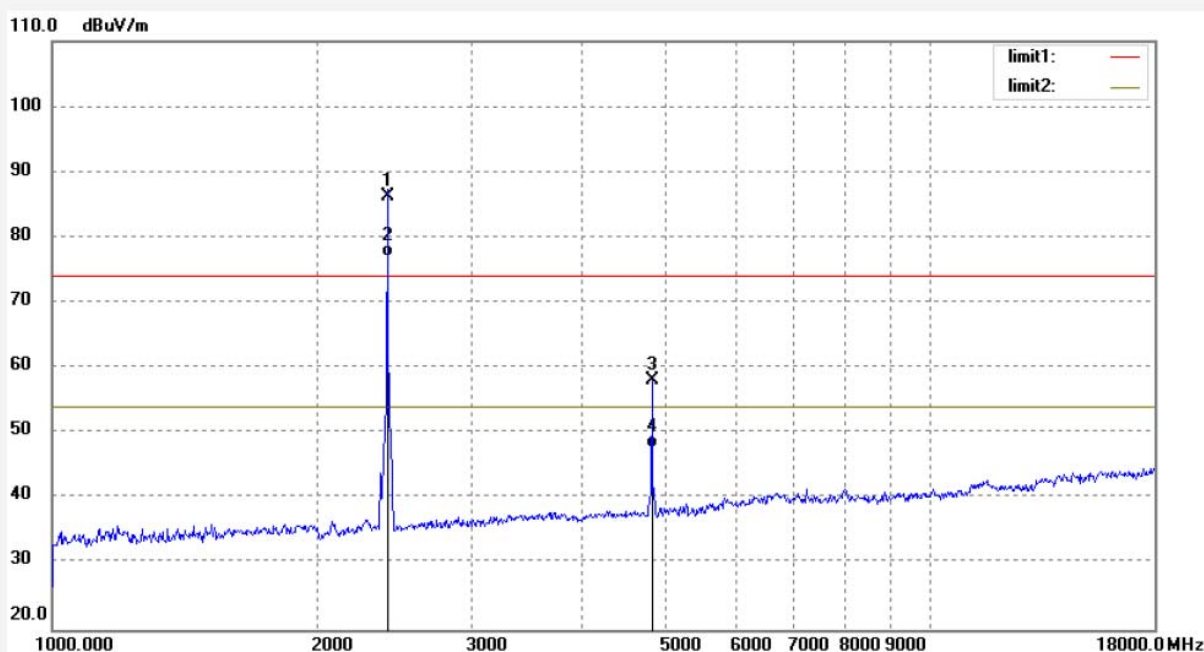
Date: 2018-7-9

Time: 19:44:18

Engineer Signature: star

Distance: 3m

Note: Report No.: ATE20181151



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2411.003	85.44	0.91	86.35	114.00	-27.65	peak	200	94	
2	2411.003	76.15	0.91	77.06	94.00	-16.94	AVG	150	101	
3	4822.016	50.63	7.53	58.16	74.00	-15.84	peak	150	44	
4	4822.012	40.14	7.56	47.70	54.00	-6.30	AVG	150	54	

Job No.: STAR2016 #2633

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Gear-Bot

Mode: TX 2433MHz

Model: GG127

Manufacturer: Lakeshore Learning Materials

Polarization: Horizontal

Power Source: DC 3V

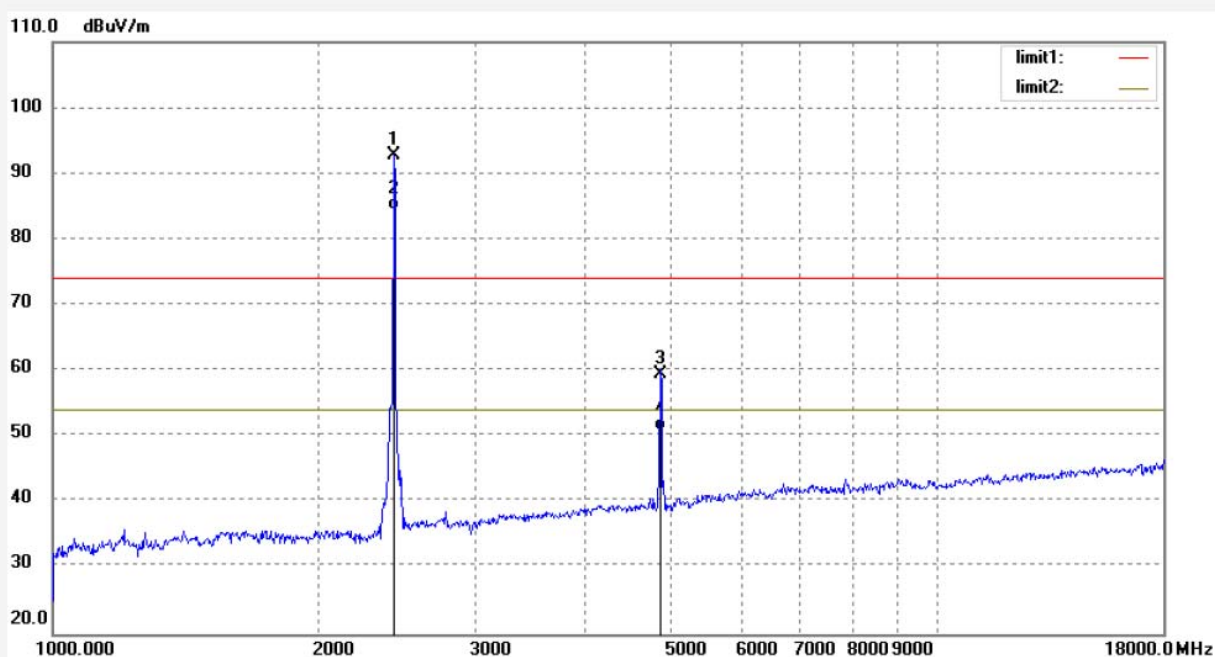
Date: 2018-7-9

Time: 19:55:25

Engineer Signature: star

Distance: 3m

Note: Report No.: ATE20181151



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2433.071	91.81	1.00	92.81	114.00	-21.19	peak	250	325	
2	2433.071	83.56	1.00	84.56	94.00	-9.44	AVG	250	26	
3	4866.075	51.68	7.92	59.60	74.00	-14.40	peak	250	156	
4	4866.089	42.93	7.97	50.90	54.00	-3.10	AVG	250	101	

Job No.: STAR2016 #2635

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Gear-Bot

Mode: TX 2433MHz

Model: GG127

Manufacturer: Lakeshore Learning Materials

Polarization: Vertical

Power Source: DC 3V

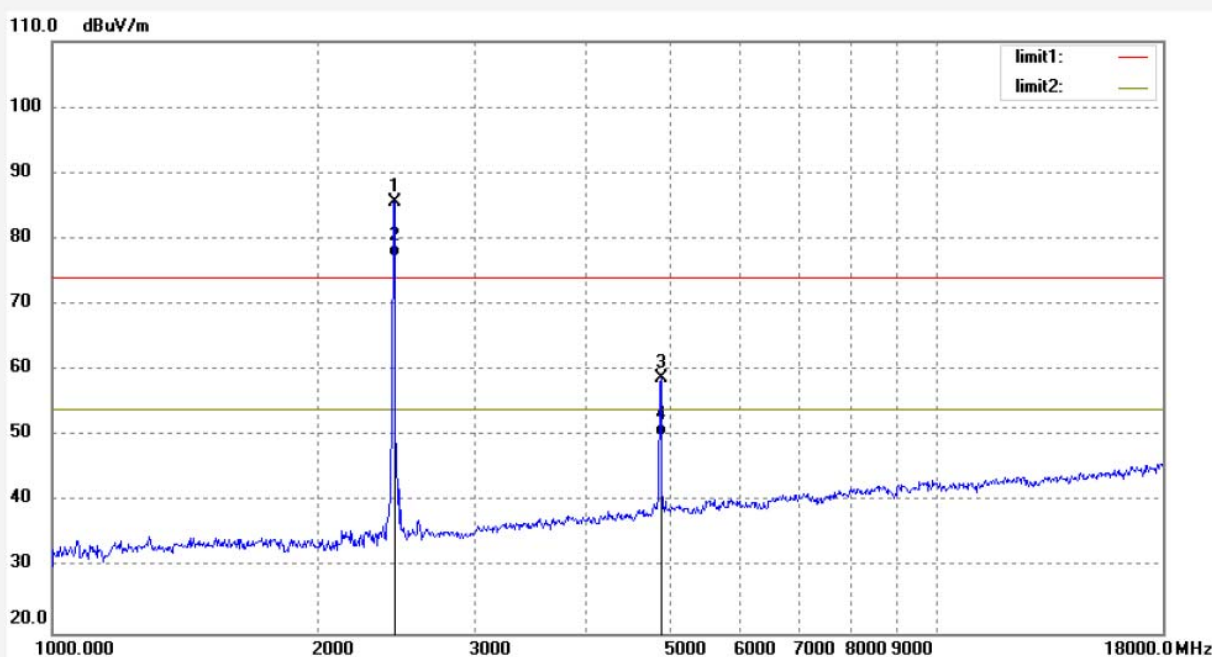
Date: 2018-7-9

Time: 19:56:38

Engineer Signature: star

Distance: 3m

Note: Report No.: ATE20181151



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2433.001	84.50	1.03	85.53	114.00	-28.47	peak	250	302	
2	2433.001	76.15	1.03	77.18	94.00	-16.82	AVG	150	166	
3	4866.042	50.80	8.04	58.84	74.00	-15.16	peak	150	214	
4	4866.042	41.96	8.04	50.00	54.00	-4.00	AVG	150	84	

Job No.: STAR2016 #2636

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Gear-Bot

Mode: TX 2459MHz

Model: GG127

Manufacturer: Lakeshore Learning Materials

Polarization: Horizontal

Power Source: DC 3V

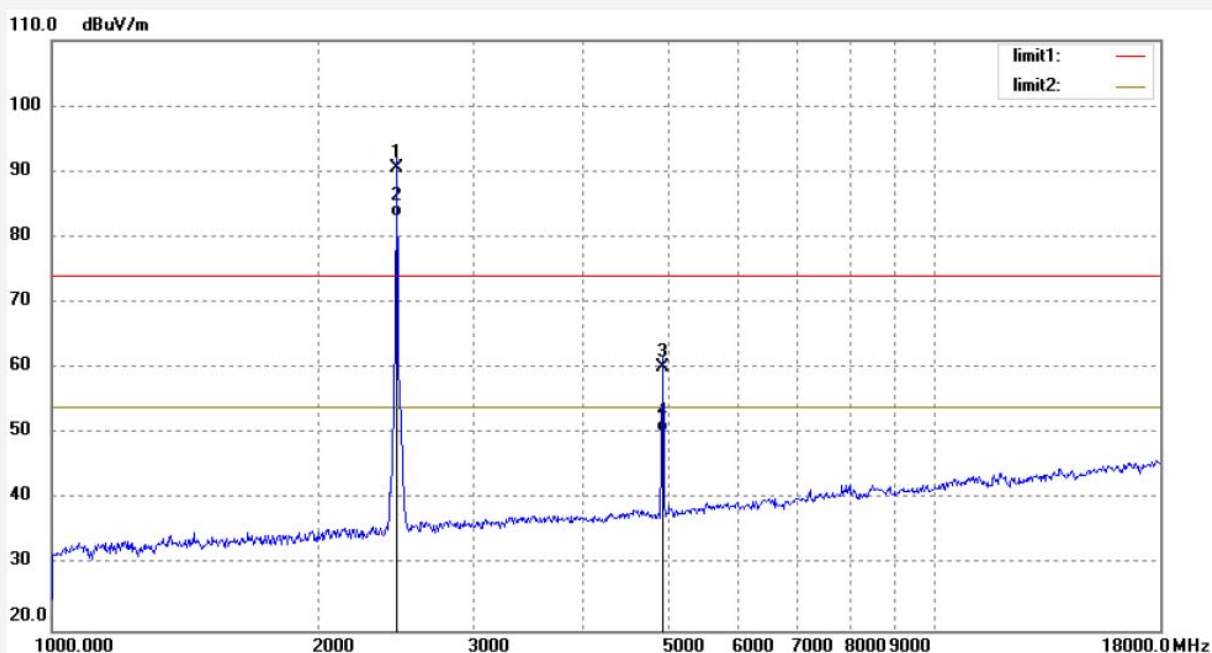
Date: 2018/07/09

Time: 20:04:48

Engineer Signature: star

Distance: 3m

Note: Report No.: ATE20181151



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2459.013	89.47	1.09	90.56	114.00	-23.44	peak	250	321	
2	2459.013	82.12	1.09	83.21	94.00	-10.79	AVG	150	122	
3	4918.490	51.76	8.37	60.13	74.00	-13.87	peak	250	51	
4	4918.490	41.92	8.38	50.30	54.00	-3.70	AVG	150	156	

Job No.: STAR2016 #2637

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Gear-Bot

Mode: TX 2459MHz

Model: GG127

Manufacturer: Lakeshore Learning Materials

Polarization: Vertical

Power Source: DC 3V

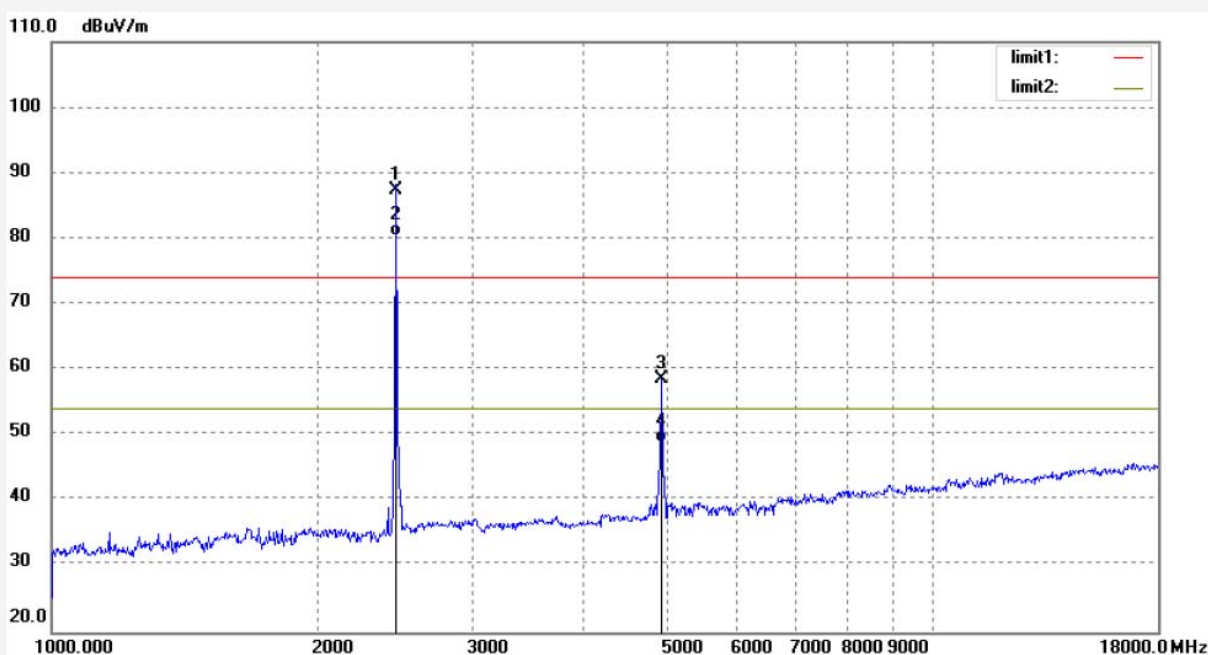
Date: 2018/07/09

Time: 20:05:57

Engineer Signature: star

Distance: 3m

Note: Report No.: ATE20181151



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2459.013	86.23	1.09	87.32	114.00	-26.68	peak	250	101	
2	2459.013	79.26	1.09	80.35	94.00	-13.65	AVG	200	165	
3	4918.090	50.23	8.37	58.60	74.00	-15.40	peak	200	105	
4	4918.029	40.52	8.38	48.90	54.00	-5.10	AVG	200	28	

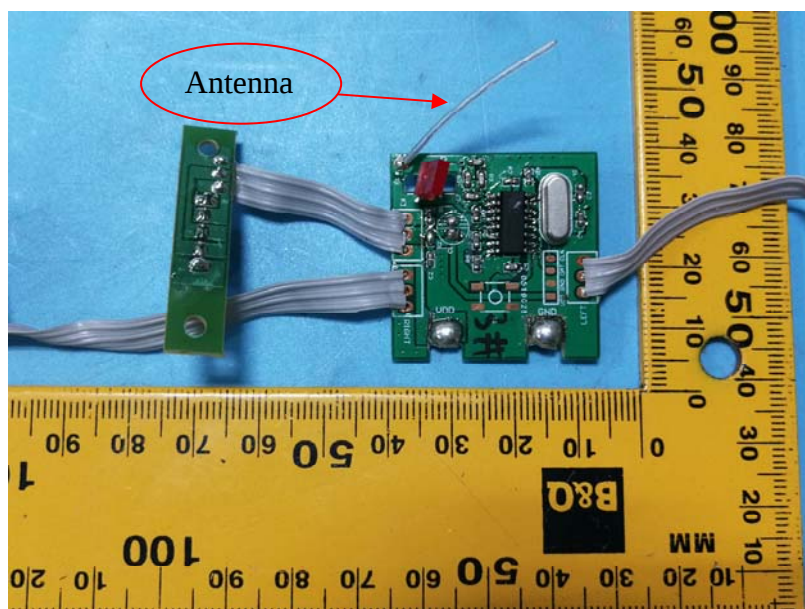
8. ANTENNA REQUIREMENT

8.1.The Requirement

According to Section 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.

8.2.Antenna Construction

Device is equipped with unique antenna, which isn't displaced by other antenna. Therefore, the equipment complies with the antenna requirement of Section 15.203.

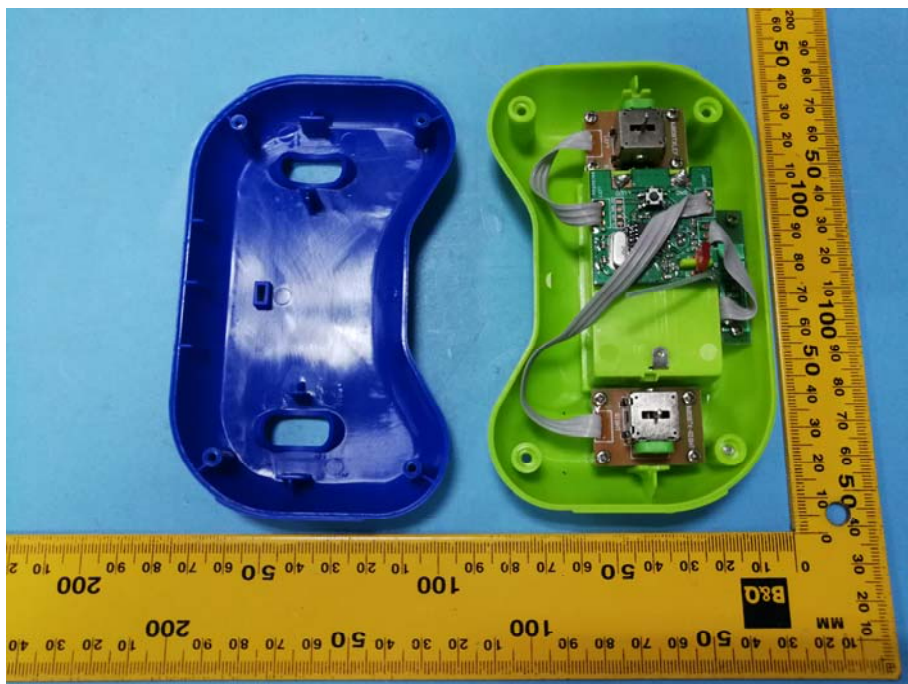
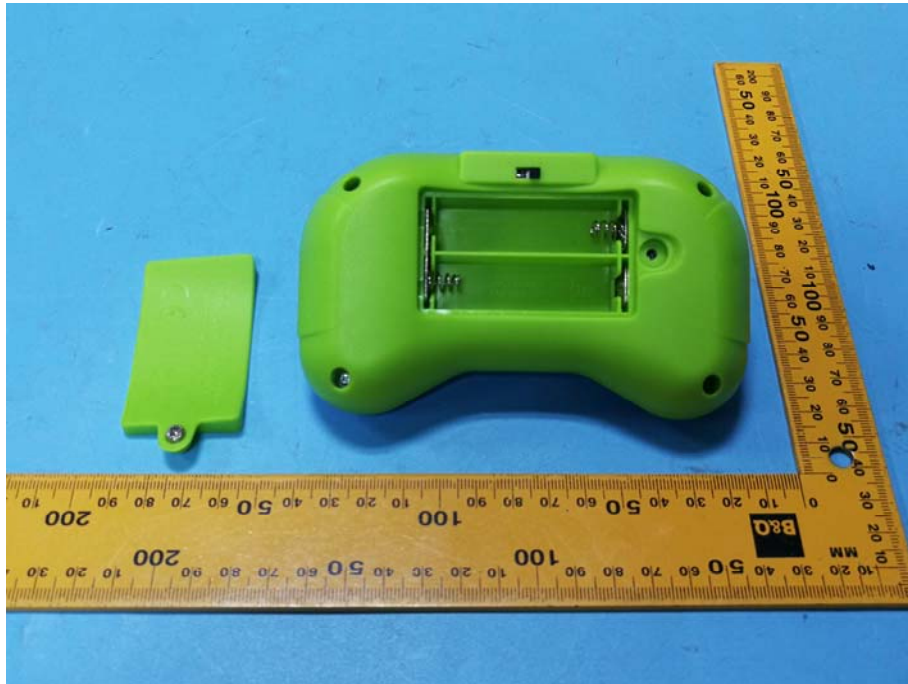


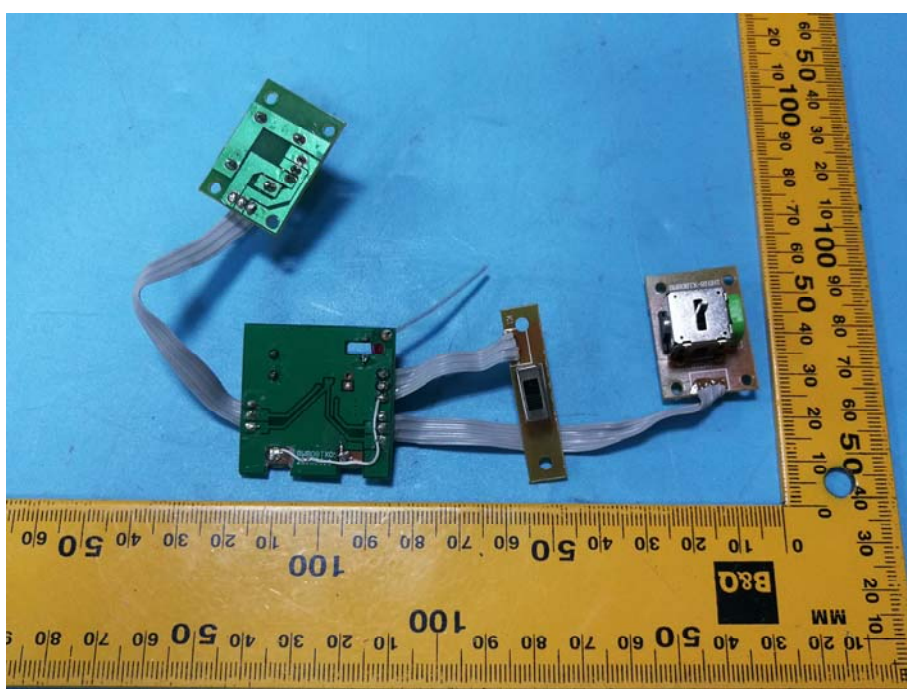
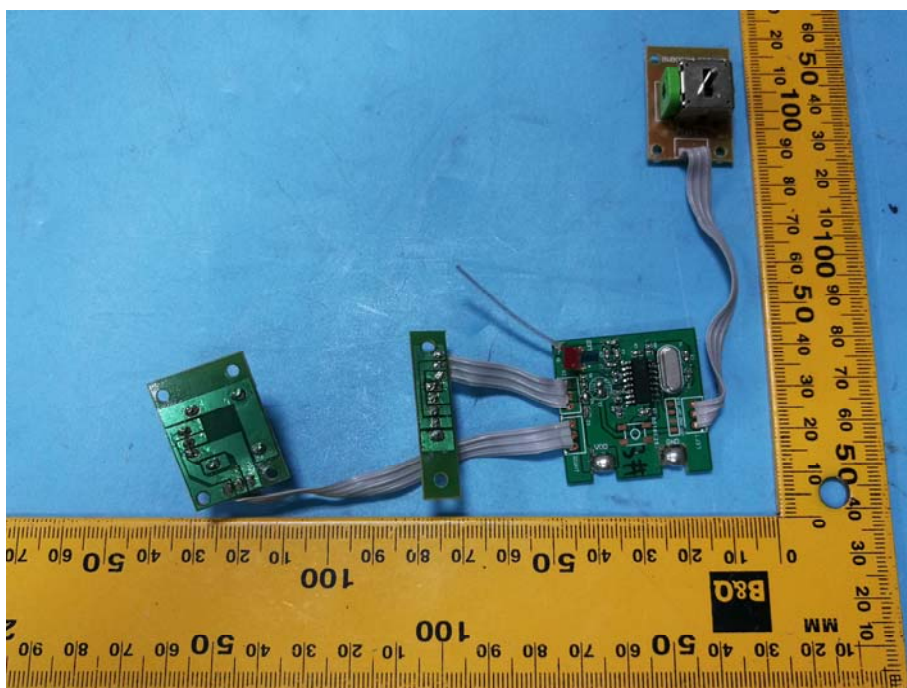
9. PHOTO OF EUT

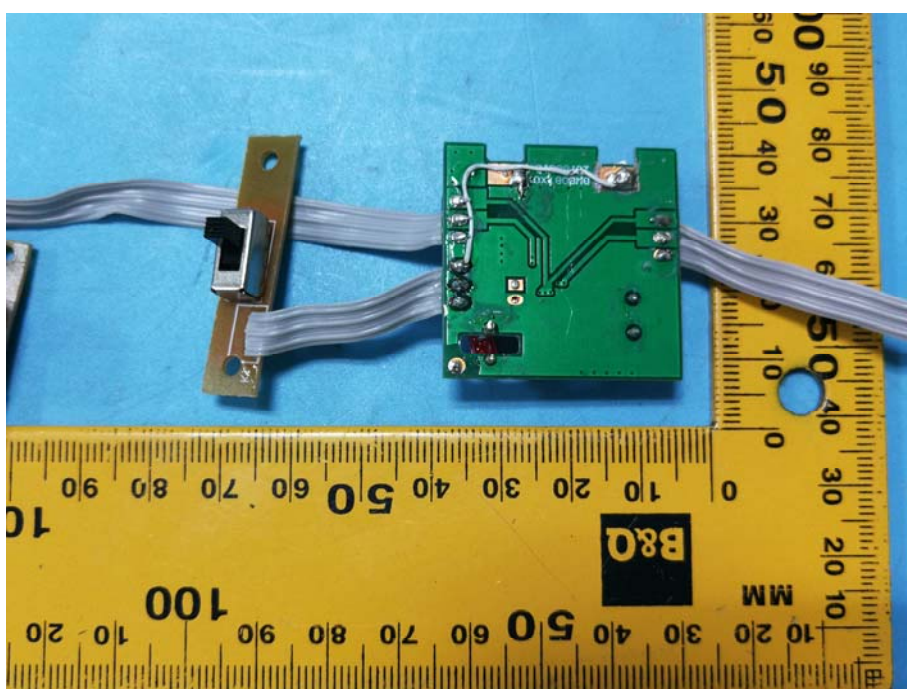
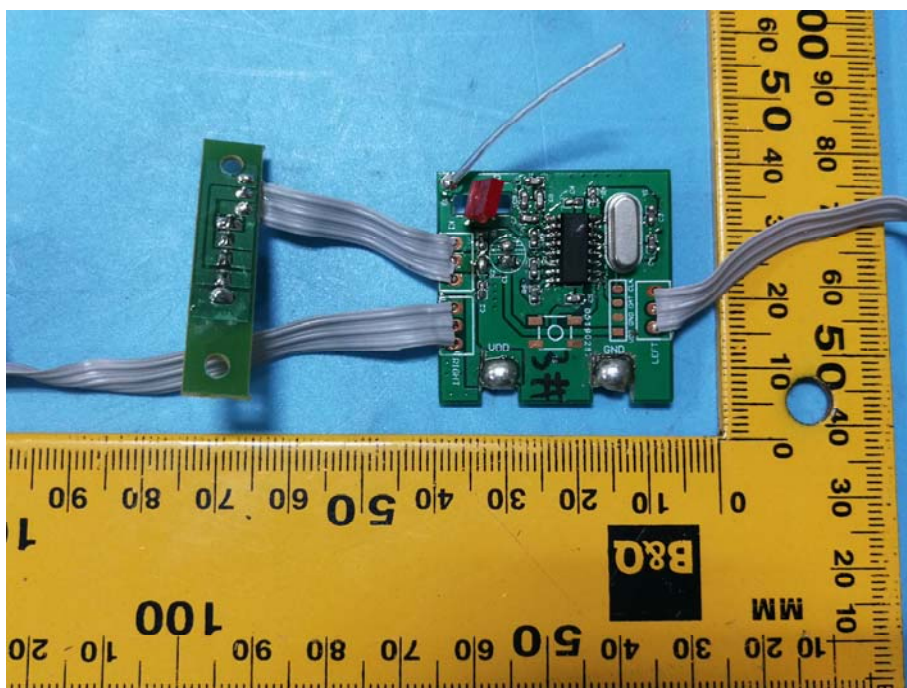












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