

APPLICATION CERTIFICATION FCC Part 15C

On Behalf of

MODULAR ROBOTICS INCORPORATED

Cubelet

Model No.: CB-KT-EDUII-1, CB-KT-BARGRAPH-1, CB-KT-BATTERY-1,
CB-KT-BATTERY4PK-1, CB-KT-BLOCKER-1, CB-KT-BLUETOOTH-1,
CB-KT-BLUETOOTH4PK-1, CB-KT-BRICK4PK-1, CB-KT-BRIGHTNESS-1,
CB-KT-CUBELETS12, CB-KT-CUBELETS20, CB-KT-CUBELETS6,
CB-KT-DISTANCE-1, CB-KT-DRIVE-1, CB-KT-EDUCC-1, CB-KT-EDUDELIGHT-1,
CB-KT-EDUMM-1, CB-KT-EDUWONDER-1, CB-KT-FLASHLIGHT-1, CB-KT-INVERSE-1,
CB-KT-KT-KNOB-1, CB-KT-MAX-1, CB-KT-MIN-1, CB-KT-PASSIVE-1,
CB-KT-PLAYFULONE-1, CB-KT-PLAYFULTWO-1, CB-KT-ROTATE-1,
CB-KT-SPEAKER-1, CB-KT-TEMPERATURE-1, CB-KT-THRESHOLD-1

FCC ID: 2ADWM-CUBELET

Prepared for : MODULAR ROBOTICS INCORPORATED
Address : 1860 38th ST BOULDER COLORADO 80301 USA

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Report No. : ATE20180832
Date of Test : May 19, 2018-June 04, 2018
Date of Report : June 05, 2018

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Test Report Certification

Applicant : MODULAR ROBOTICS INCORPORATED
Manufacturer : MODULAR ROBOTICS INCORPORATED
EUT Description : Cubelet

Model No. : CB-KT-EDUII-1, CB-KT-BARGRAPH-1,
CB-KT-BATTERY-1, CB-KT-BATTERY4PK-1,
CB-KT-BLOCKER-1, CB-KT-BLUETOOTH-1,
CB-KT-BLUETOOTH4PK-1, CB-KT-BRICK4PK-1,
CB-KT-BRIGHTNESS-1, CB-KT-CUBELETS12
CB-KT-CUBELETS20, CB-KT-CUBELETS6,
CB-KT-DISTANCE-1, CB-KT-DRIVE-1, CB-KT-EDUCC-1,
CB-KT-EDUDELIGHT-1, CB-KT-EDUMM-1,
CB-KT-EDUWONDER-1, CB-KT-FLASHLIGHT-1,
CB-KT-INVERSE-1, CB-KT-KT-KNOB-1, CB-KT-MAX-1
CB-KT-MIN-1, CB-KT-PASSIVE-1, CB-KT-PLAYFULONE-1,
CB-KT-PLAYFULTWO-1, CB-KT-ROTATE-1,
CB-KT-TEMPERATURE-1, CB-KT-THRESHOLD-1

Note: These models are identical in schematic, structure and critical components except for different appearance, So we prepare CB-KT-EDUII-1 for test only

Trade Name : n.a

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247 ANSI C63.10: 2013

The EUT was tested according to DTS test procedure of Apr 05, 2017 KDB558074 D01 DTS Meas Guidance v04 for compliance to FCC 47CFR 15.247 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 15.247 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 :

May 19, 2018-June 04, 2018

Date of Report :

June 05, 2018

Prepared by :

(Timothy Eng, Engineer)



Approved & Authorized Signer :

(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	Cubelet
Model Number	:	CB-KT-EDUII-1, CB-KT-BARGRAPH-1, CB-KT-BATTERY-1, CB-KT-BATTERY4PK-1, CB-KT-BLOCKER-1, CB-KT-BLUETOOTH-1, CB-KT-BLUETOOTH4PK-1, CB-KT-BRICK4PK-1, CB-KT-BRIGHTNESS-1, CB-KT-CUBELETS12, CB-KT-CUBELETS20, CB-KT-CUBELETS6, CB-KT-DISTANCE-1, CB-KT-DRIVE-1, CB-KT-EDUCC-1, CB-KT-EDUDELIGHT-1, CB-KT-EDUMM-1, CB-KT-EDUWONDER-1, CB-KT-FLASHLIGHT-1, CB-KT-INVERSE-1, CB-KT-KT-KNOB-1, CB-KT-MAX-1, CB-KT-MIN-1, CB-KT-PASSIVE-1, CB-KT-PLAYFULONE-1, CB-KT-PLAYFULTWO-1, CB-KT-ROTATE-1, CB-KT-TEMPERATURE-1, CB-KT-THRESHOLD-1
Bluetooth version	:	BT V4.0 LE
Frequency Range	:	2402MHz-2480MHz
Number of Channels	:	40
Antenna Gain	:	0dBi
Antenna type	:	PCB Antenna
Trade Name	:	n.a
Power Supply	:	DC 3.7V (Powered by battery) Or DC 5V(Powered by USB charger port)
Modulation mode	:	GFSK
Applicant Address	:	MODULAR ROBOTICS INCORPORATED 1860 38th ST BOULDER COLORADO 80301 USA.
Manufacturer Address	:	MODULAR ROBOTICS INCORPORATED 1860 38th ST BOULDER COLORADO 80301 USA.
Date of sample received	:	May 18, 2018
Date of Test	:	May 19, 2018-June 04, 2018

1.2.Carrier Frequency of Channels

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

1.3.Model difference declaration

CB-KT-EDUII-1, CB-KT-BARGRAPH-1, CB-KT-BATTERY-1, CB-KT-BATTERY4PK-1, CB-KT-BLOCKER-1, CB-KT-BLUETOOTH-1, CB-KT-BLUETOOTH4PK-1, CB-KT-BRICK4PK-1, CB-KT-BRIGHTNESS-1, CB-KT-CUBELETS12, CB-KT-CUBELETS20, CB-KT-CUBELETS6, CB-KT-DISTANCE-1, CB-KT-DRIVE-1, CB-KT-EDUCC-1, CB-KT-EDUDELIGHT-1, CB-KT-EDUMM-1, CB-KT-EDUWONDER-1, CB-KT-FLASHLIGHT-1, CB-KT-INVERSE-1, CB-KT-KT-KNOB-1, CB-KT-MAX-1, CB-KT-MIN-1, CB-KT-PASSIVE-1, CB-KT-PLAYFULONE-1, CB-KT-PLAYFULTWO-1, CB-KT-ROTATE-1, CB-KT-TEMPERATURE-1, CB-KT-THRESHOLD-1 were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being model name for different customers.

1.4.Special Accessory and Auxiliary Equipment

AC/DC Power Adapter: Model: MX12X6-0502000VU
(provided by laboratory) INPUT: 100-240V~50/60Hz 0.35A
OUTPUT:5V/1A

PC: Model: LENOVO
(provided by laboratory) M/N: 4290-RT8
S/N: R9-FW93G 11/08

1.5.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

1.6.Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Power Disturbance Expanded Uncertainty	=	2.92 dB, 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	ESCS30	100307	Jan. 06, 2018	Jan. 05, 2019
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 06, 2018	Jan. 05, 2019
Spectrum Analyzer	Agilent	E7405A	MY45115511	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	BBHA9120D	9120D-655	Jan. 06, 2018	Jan. 05, 2019
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 06, 2018	Jan. 05, 2019
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 06, 2018	Jan. 05, 2019
LISN	Schwarzbeck	NSLK8126	8126431	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
Conducted Emission Test Software	Rohde&Schwarz	ES-K1	V1.71	N/A	N/A
Radiated Emission Test Software	Farad	EZ-EMC	1.1.4.2	N/A	N/A

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

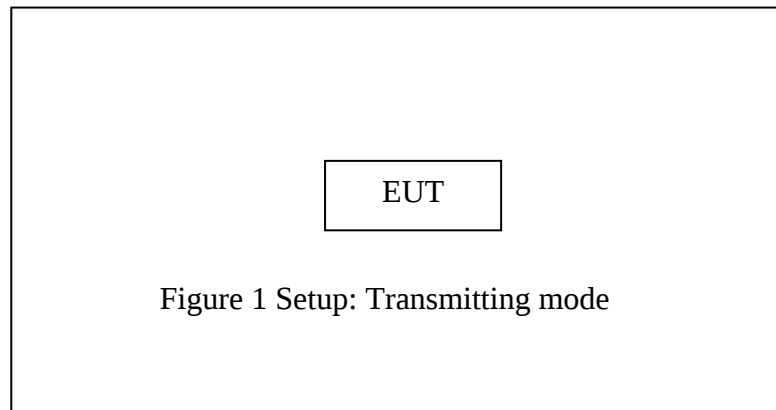
The mode is used: **BLE Transmitting mode**

Low Channel: 2402MHz

Middle Channel: 2440MHz

High Channel: 2480MHz

3.2.Configuration and peripherals

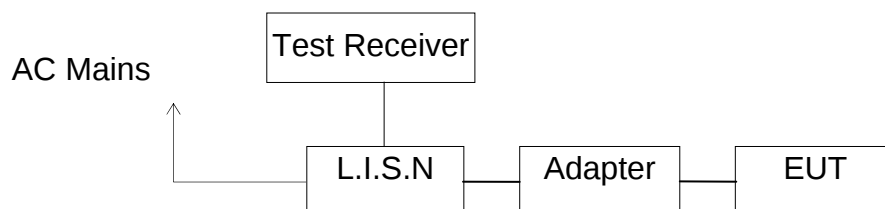


4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.247(a)(2)	6dB Bandwidth Test	Compliant
Section 15.247(e)	Power Spectral Density Test	Compliant
Section 15.247(b)(3)	Maximum Peak Output Power Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.247(d) Section 15.209	Radiated Spurious Emission Test	Compliant
Section 15.247(d)	Conducted Spurious Emission Test	Compliant
Section 15.207	AC Power Line Conducted Emission Test	Compliant
Section 15.203	Antenna Requirement	Compliant

5. POWER LINE CONDUCTED MEASUREMENT

5.1. Block Diagram of Test Setup



(EUT: Cubelet)

5.2. Power Line Conducted Emission Measurement Limits

Frequency (MHz)	Limit dB(μV)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0
NOTE1: The lower limit shall apply at the transition frequencies.		
NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

5.3. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

5.4. Operating Condition of EUT

- 5.4.1. Setup the EUT and simulator as shown as Section 5.1.
- 5.4.2. Turn on the power of all equipment.
- 5.4.3. Let the EUT work in test mode and measure it.

5.5.Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4: 2014 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

5.6.Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at ATC is +2.23dB.

5.7.DATA SAMPLE

Frequency (MHz)	Quasi Peak Level (dB μ V)	Average Level (dB μ V)	Transducer value (dB)	QuasiPeak Result (dB μ V)	Average Result (dB μ V)	Quasi Peak Limit (dB μ V)	Average Limit (dB μ V)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XX	29.4	18.3	11.1	40.5	29.4	56.0	56.0	15.5	16.6	Pass

Transducer value = Insertion loss of LISN + Cable Loss

Result = Quasi-peak Level/Average Level + Transducer value

Limit = Limit stated in standard

Calculation Formula:

Margin = Limit – Reading level value – Transducer value

5.8.Power Line Conducted Emission Measurement Results

PASS.

The frequency range from 150kHz to 30MHz is checked.

Test mode : Charging(AC 120V/60Hz)

MEASUREMENT RESULT: "F-0829-2_fin"

2018-5-24 10:22								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.336000	36.50	10.9	59	22.8	QP	L1	GND	
0.670000	39.70	11.1	56	16.3	QP	L1	GND	
1.068000	37.70	11.1	56	18.3	QP	L1	GND	
4.725000	39.50	11.4	56	16.5	QP	L1	GND	
5.625000	41.00	11.5	60	19.0	QP	L1	GND	
17.825000	35.00	11.7	60	25.0	QP	L1	GND	

MEASUREMENT RESULT: "F-0829-2_fin2"

2018-5-24 10:22								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.318000	29.30	10.9	50	20.5	AV	L1	GND	
0.692000	31.40	11.1	46	14.6	AV	L1	GND	
2.000000	27.90	11.3	46	18.1	AV	L1	GND	
4.650000	31.40	11.4	46	14.6	AV	L1	GND	
5.675000	32.40	11.5	50	17.6	AV	L1	GND	
12.850000	26.00	11.6	50	24.0	AV	L1	GND	

MEASUREMENT RESULT: "F-0829-1_fin"

2018-5-24 10:18								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.272000	33.50	10.9	61	27.6	QP	N	GND	
0.768000	34.00	11.1	56	22.0	QP	N	GND	
0.970000	30.40	11.1	56	25.6	QP	N	GND	
4.975000	30.80	11.4	56	25.2	QP	N	GND	
5.455000	32.60	11.5	60	27.4	QP	N	GND	
17.465000	27.50	11.7	60	32.5	QP	N	GND	

MEASUREMENT RESULT: "F-0829-1_fin2"

2018-5-24 10:18								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.292000	21.90	10.9	51	28.6	AV	N	GND	
0.768000	25.40	11.1	46	20.6	AV	N	GND	
0.888000	24.10	11.1	46	21.9	AV	N	GND	
4.770000	24.00	11.4	46	22.0	AV	N	GND	
5.665000	27.90	11.5	50	22.1	AV	N	GND	
17.465000	19.80	11.7	50	30.2	AV	N	GND	

Emissions attenuated more than 20 dB below the permissible value are not reported. We tested high and low voltage and recorded the worst case data.

The spectral diagrams are attached as below.

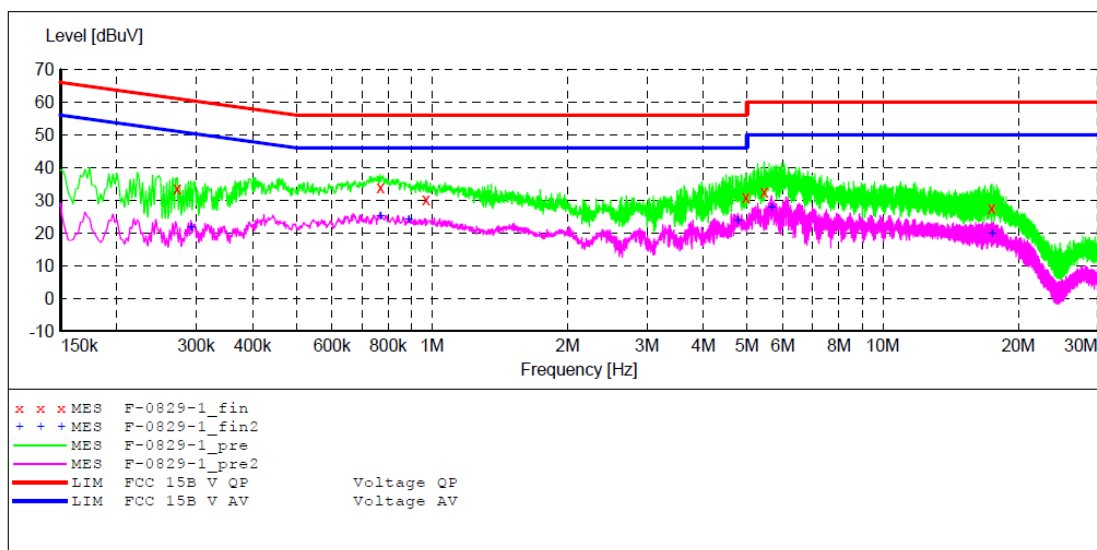
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART 15

EUT: Cubelet M/N:CB-KT-EDUII-1
 Manufacturer: MODULAR ROBOTICS INCORPORATED
 Operating Condition: Charging
 Test Site: 2#Shielding Room
 Operator: Frank
 Test Specification: N 120V/60Hz
 Comment: Report NO.:ATE20180832
 Start of Test: 2018-5-24 / 10:16:54

SCAN TABLE: "V 150K-30MHz fin"

Short Description: SUB STD VTERM2 1.70
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
 Average



MEASUREMENT RESULT: "F-0829-1_fin"

2018-5-24 10:18

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.272000	33.50	10.9	61	27.6	QP	N	GND
0.768000	34.00	11.1	56	22.0	QP	N	GND
0.970000	30.40	11.1	56	25.6	QP	N	GND
4.975000	30.80	11.4	56	25.2	QP	N	GND
5.455000	32.60	11.5	60	27.4	QP	N	GND
17.465000	27.50	11.7	60	32.5	QP	N	GND

MEASUREMENT RESULT: "F-0829-1_fin2"

2018-5-24 10:18

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.292000	21.90	10.9	51	28.6	AV	N	GND
0.768000	25.40	11.1	46	20.6	AV	N	GND
0.888000	24.10	11.1	46	21.9	AV	N	GND
4.770000	24.00	11.4	46	22.0	AV	N	GND
5.665000	27.90	11.5	50	22.1	AV	N	GND
17.465000	19.80	11.7	50	30.2	AV	N	GND

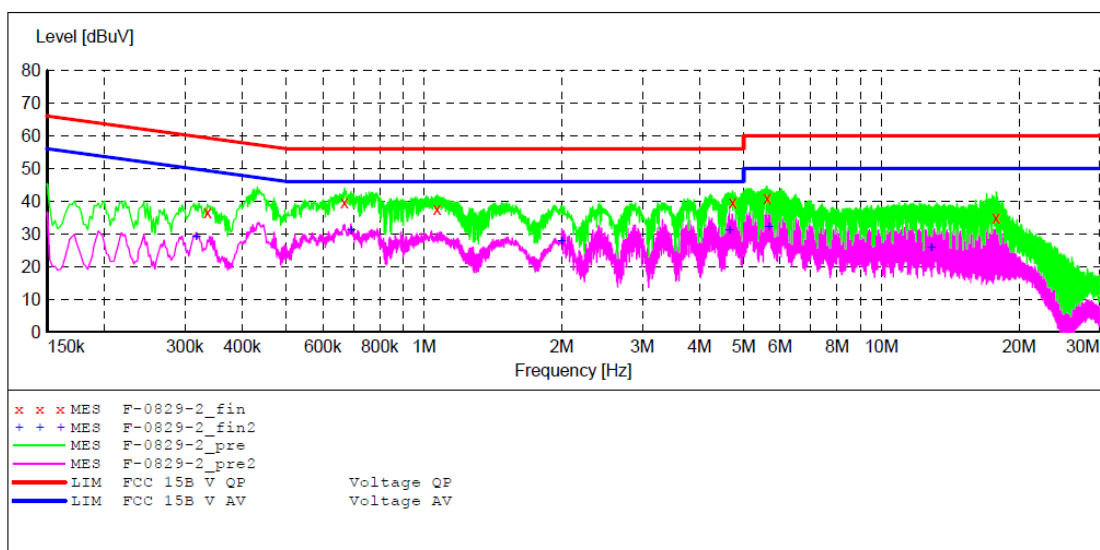
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART 15

EUT: Cubelet M/N:CB-KT-EDUII-1
 Manufacturer: MODULAR ROBOTICS INCORPORATED
 Operating Condition: Charging
 Test Site: 2#Shielding Room
 Operator: Frank
 Test Specification: L 120V/60Hz
 Comment: Report NO.:ATE20180832
 Start of Test: 2018-5-24 / 10:20:29

SCAN TABLE: "V 150K-30MHz fin"

Short Description: SUB STD VTERM2 1.70
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
 Average



MEASUREMENT RESULT: "F-0829-2_fin"

2018-5-24 10:22

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.336000	36.50	10.9	59	22.8	QP	L1	GND
0.670000	39.70	11.1	56	16.3	QP	L1	GND
1.068000	37.70	11.1	56	18.3	QP	L1	GND
4.725000	39.50	11.4	56	16.5	QP	L1	GND
5.625000	41.00	11.5	60	19.0	QP	L1	GND
17.825000	35.00	11.7	60	25.0	QP	L1	GND

MEASUREMENT RESULT: "F-0829-2_fin2"

2018-5-24 10:22

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.318000	29.30	10.9	50	20.5	AV	L1	GND
0.692000	31.40	11.1	46	14.6	AV	L1	GND
2.000000	27.90	11.3	46	18.1	AV	L1	GND
4.650000	31.40	11.4	46	14.6	AV	L1	GND
5.675000	32.40	11.5	50	17.6	AV	L1	GND
12.850000	26.00	11.6	50	24.0	AV	L1	GND

6. 6DB BANDWIDTH MEASUREMENT

6.1. Block Diagram of Test Setup



(EUT: Cubelet)

6.2. The Requirement For Section 15.247(a)(2)

Section 15.247(a)(2): Systems using digital modulation techniques may operate in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

6.3. EUT Configuration on Measurement

The equipment is 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 2402-2480MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

6.5. Test Procedure

6.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.

6.5.2. Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.

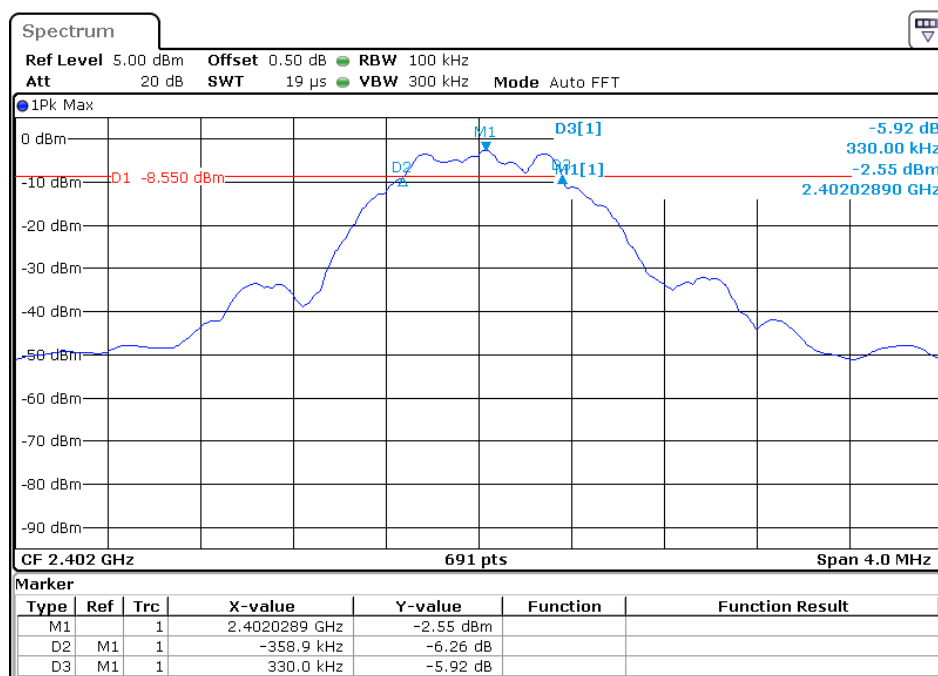
6.5.3. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

6.6.Test Result

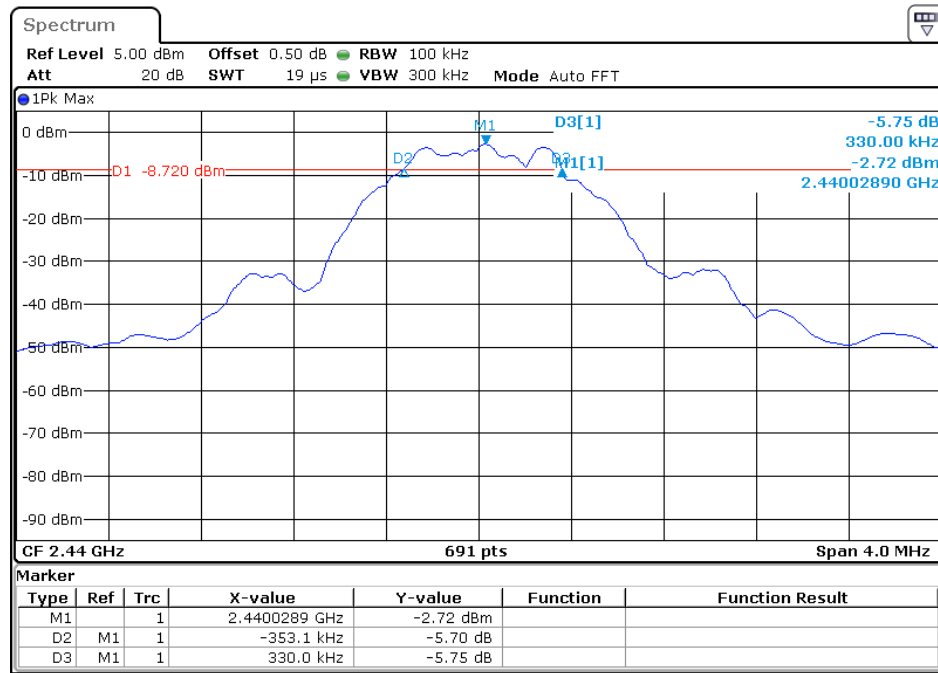
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit(MHz)	PASS/FAIL
0	2402	0.6889	0.5	PASS
19	2440	0.6831	0.5	PASS
39	2480	0.6946	0.5	PASS

The spectrum analyzer plots are attached as below.

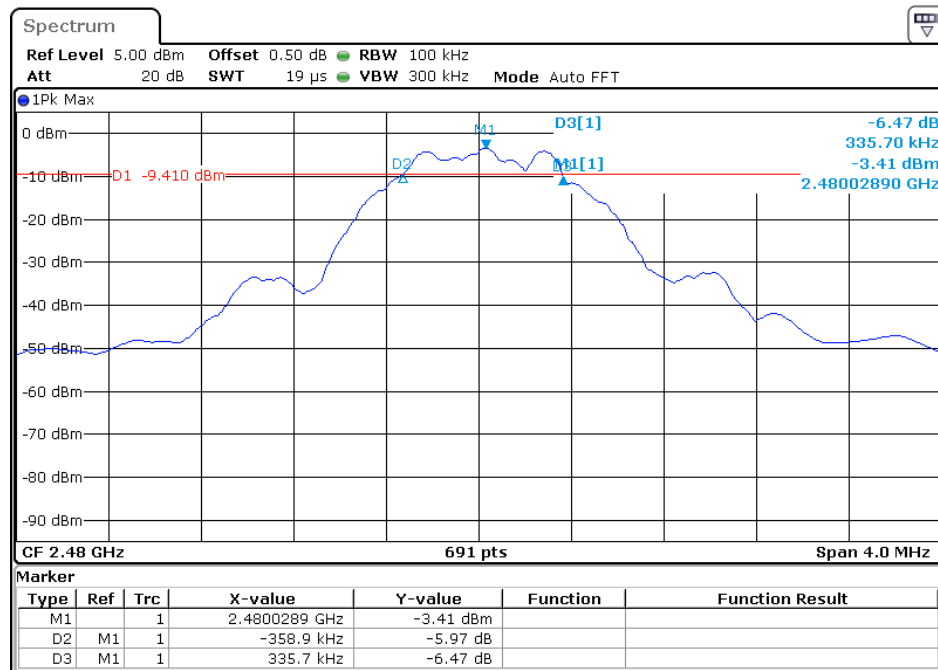
channel 0



channel 19



channel 39



7. MAXIMUM PEAK OUTPUT POWER

7.1. Block Diagram of Test Setup



(EUT: Cubelet)

7.2. The Requirement For Section 15.247(b)(3)

Section 15.247(b)(3): For systems using digital modulation in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands: 1 Watt.

7.3. 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.

7.4. Operating Condition of EUT

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

7.4.2. Turn on the power of all equipment.

7.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

7.5. Test Procedure

7.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.

7.5.2. Test method is refer to KDB558074 D01 DTS Meas Guidance v04

7.5.3. Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz.

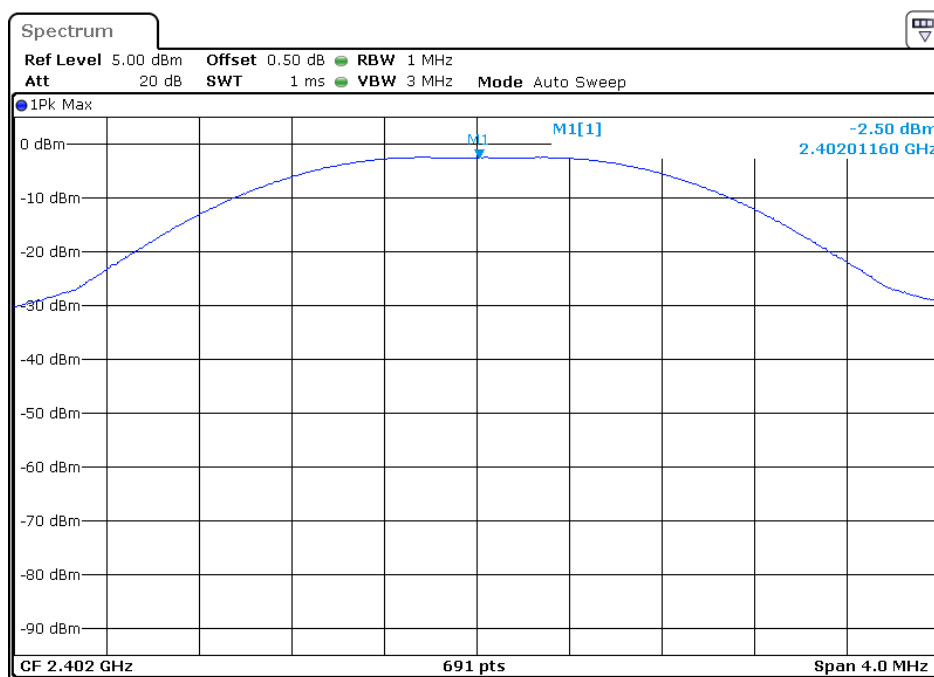
7.5.4. Measurement the maximum peak output power.

7.6.Test Result

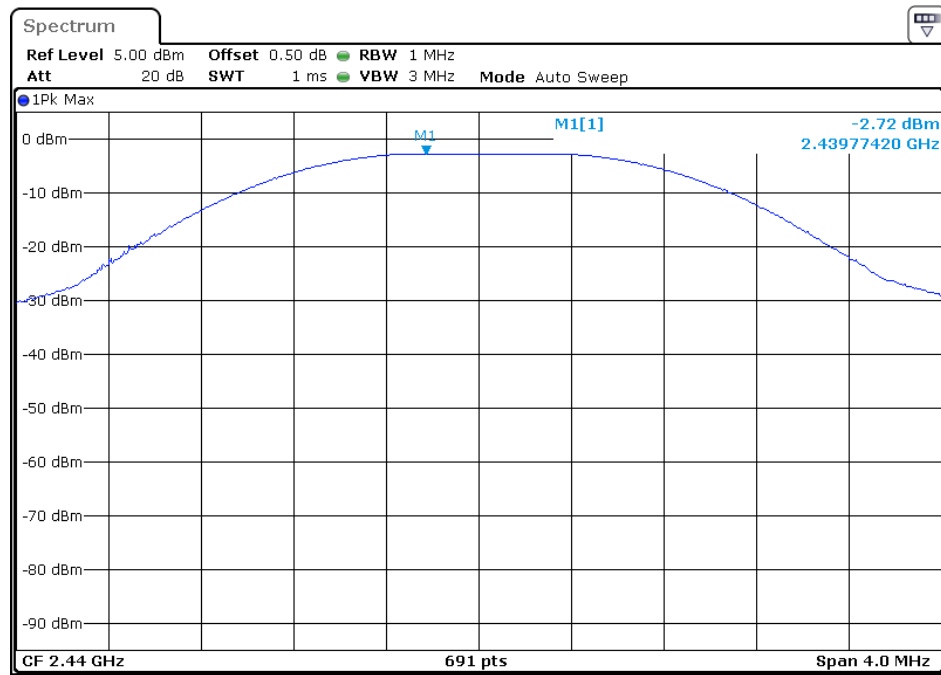
Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
0	2402	-2.50	30	PASS
19	2440	-2.72	30	PASS
39	2480	-3.46	30	PASS

The spectrum analyzer plots are attached as below.

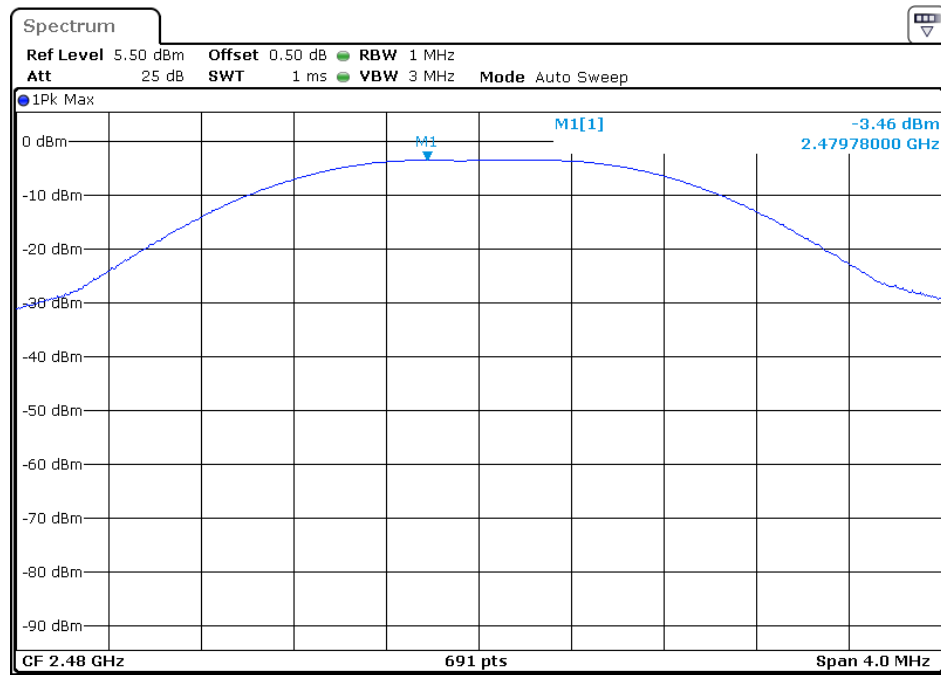
channel 0



channel 19



channel 39



8. POWER SPECTRAL DENSITY MEASUREMENT

8.1. Block Diagram of Test Setup



(EUT: Cubelet)

8.2. The Requirement For Section 15.247(e)

Section 15.247(e): For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

8.3. 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.

8.4. Operating Condition of EUT

8.4.1. Setup the EUT and simulator as shown as Section 8.1.

8.4.2. Turn on the power of all equipment.

8.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

8.5. Test Procedure

8.5.1. The EUT was tested according to DTS test procedure of April 05, 2017 KDB558074 D01 DTS Meas Guidance v04 for compliance to FCC 47CFR 15.247 requirements.

8.5.2. The transmitter output was connected to the spectrum analyzer through a low loss cable.

8.5.3. Measurement Procedure PKPSD:

8.5.4. This procedure must be used if maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit, and is optional if the maximum (average) conducted output power was used to demonstrate compliance.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
4. Set the VBW $\geq 3 \times \text{RBW}$.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

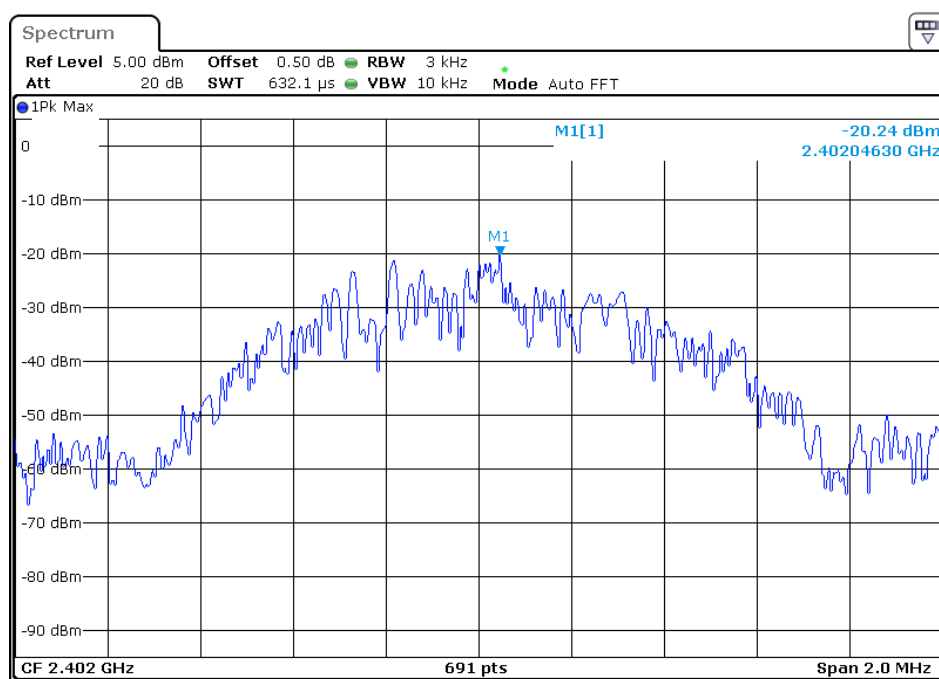
8.5.5. Measurement the maximum power spectral density.

8.6.Test Result

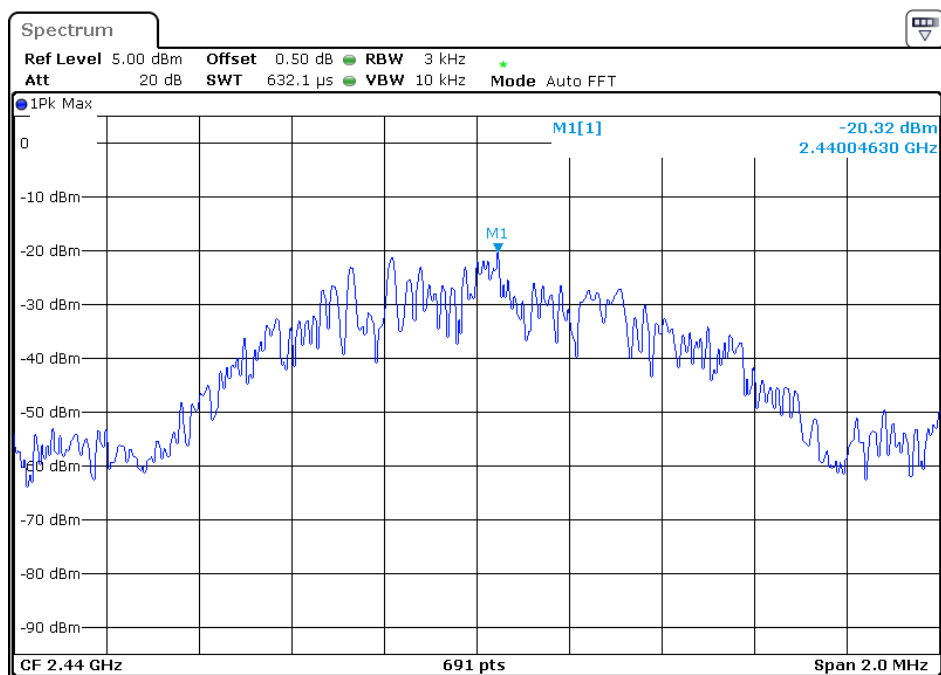
CHANNEL NUMBER	FREQUENCY (MHz)	PSD (dBm/3KHz)	LIMIT (dBm/3KHz)	PASS/FAIL
0	2402	-20.24	8	PASS
19	2440	-20.32	8	PASS
39	2480	-21.13	8	PASS

The spectrum analyzer plots are attached as below.

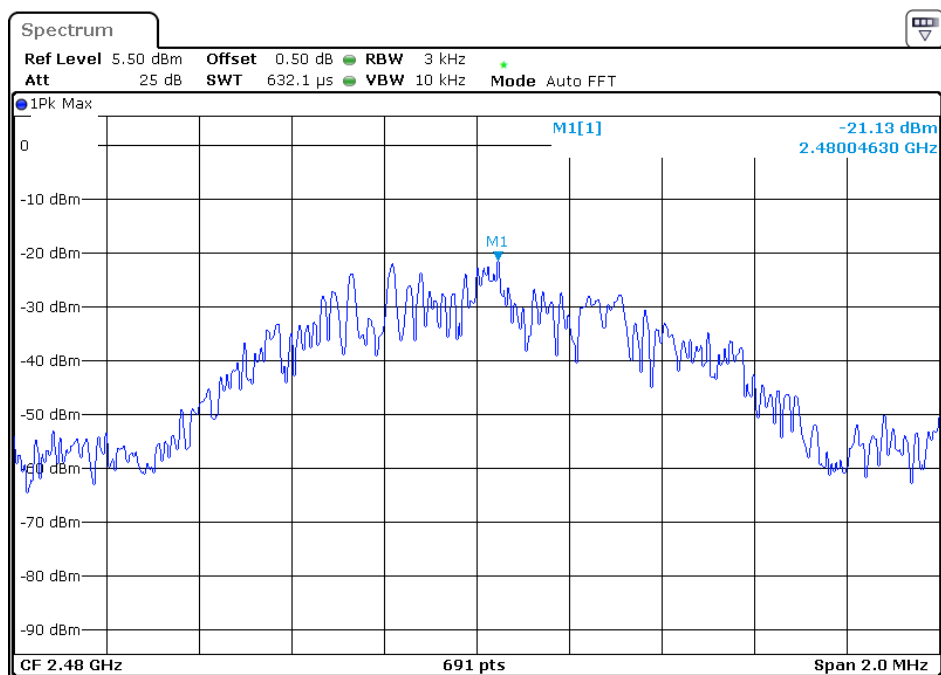
channel 0



channel 19



channel 39



9. BAND EDGE COMPLIANCE TEST

9.1. Block Diagram of Test Setup



(EUT: Cubelet)

9.2. The Requirement For Section 15.247(d)

Section 15.247(d): 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 (b)(3) of this section, 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).

9.3. 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.

9.4. Operating Condition of EUT

9.4.1. Setup the EUT and simulator as shown as Section 9.1.

9.4.2. Turn on the power of all equipment.

9.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2480MHz TX frequency to transmit.

9.5.Test Procedure

Conducted Band Edge:

9.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.

9.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.

9.5.3. Radiate Band Edge:

9.5.4.The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.

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

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

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

9.5.8.RBW=1MHz, VBW=1MHz

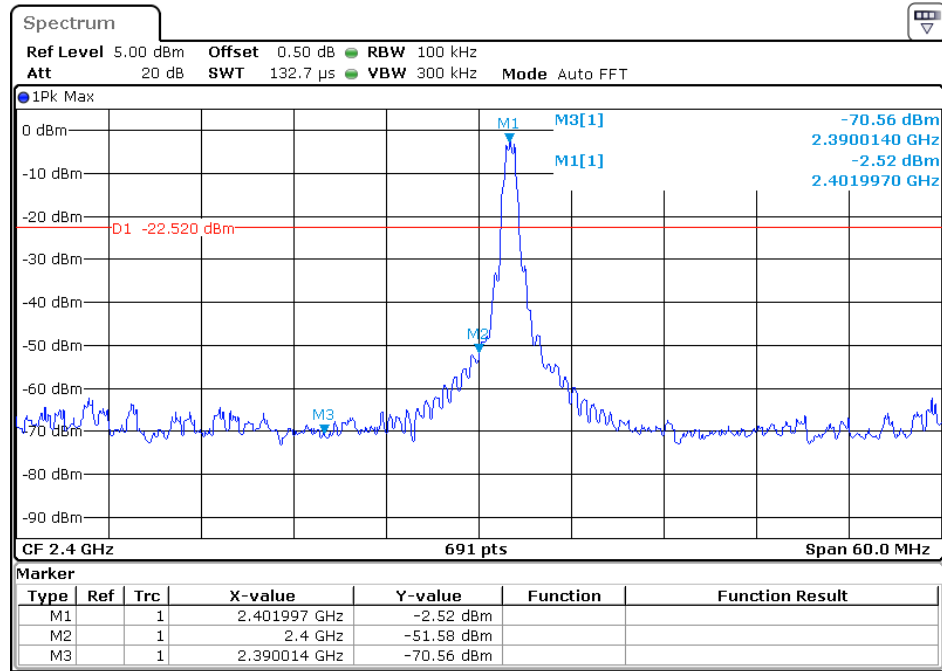
9.5.9.The band edges was measured and recorded.

9.6.Test Result

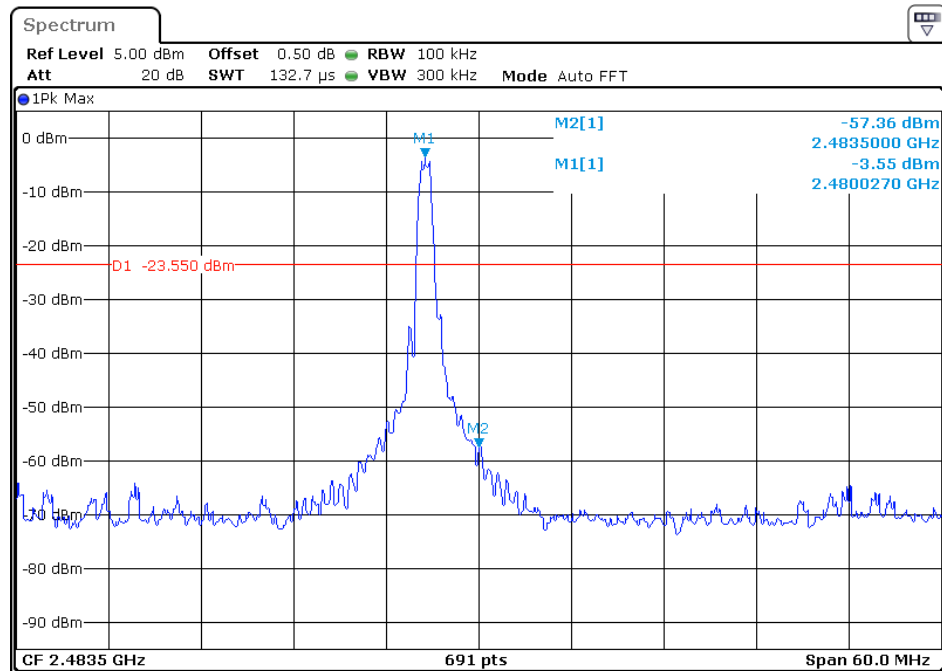
Pass

Channel	Frequency	Delta peak to band emission	Limit(dBc)
0	2.4GHz	49.06	20
39	2.4835GHz	53.81	20

channel 0



channel 39



Radiated Band Edge Result



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Job No.: FRANK2018A #160

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Cubelet

Mode: TX 2402MHz

Model: CB-KT-EDUII-1

Manufacturer: MODULAR ROBOTICS INCORPORATED

Polarization: Horizontal

Power Source: DC 3.7V

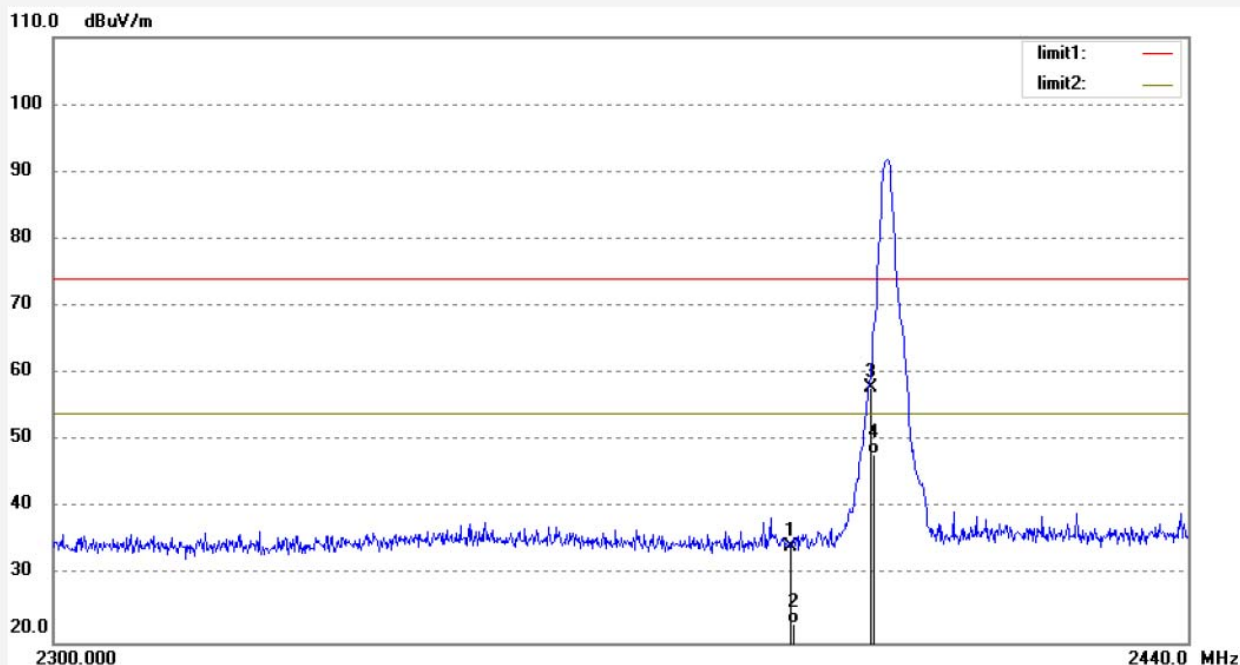
Date: 2018/05/28

Time: 13:41:35

Engineer Signature: STAR

Distance: 3m

Note: Report NO.:ATE20180832



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	38.70	-4.32	34.38	74.00	-39.62	peak	250	132	
2	2390.000	27.15	-4.32	22.83	54.00	-31.17	AVG	250	97	
3	2400.000	62.15	-4.27	57.88	74.00	-16.12	peak	250	45	
4	2400.000	52.18	-4.27	47.91	54.00	-6.09	AVG	250	102	

Job No.: FRANK2018A #161

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Cubelet

Mode: TX 2402MHz

Model: CB-KT-EDUII-1

Manufacturer: MODULAR ROBOTICS INCORPORATED

Polarization: Vertical

Power Source: DC 3.7V

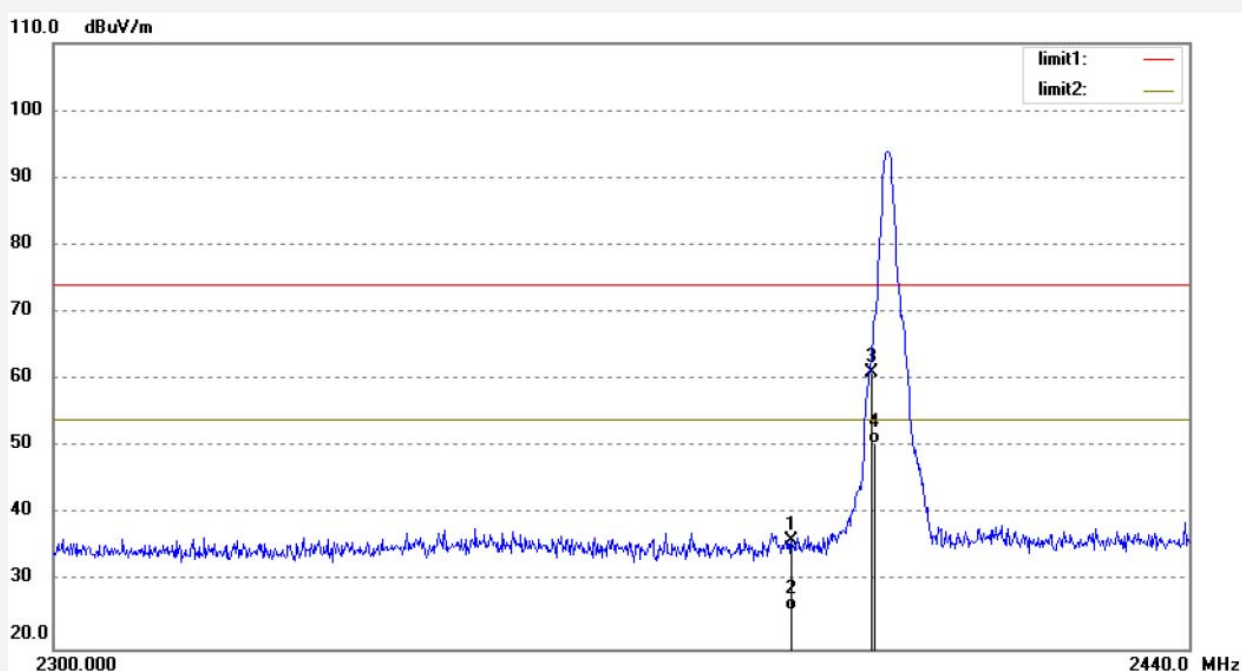
Date: 2018/05/28

Time: 13:42:28

Engineer Signature: STAR

Distance: 3m

Note: Report NO.:ATE20180832



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	40.31	-4.32	35.99	74.00	-38.01	peak	250	132	
2	2390.000	30.12	-4.32	25.80	54.00	-28.20	AVG	250	185	
3	2400.000	65.35	-4.27	61.08	74.00	-12.92	peak	250	58	
4	2400.000	54.78	-4.27	50.51	54.00	-3.49	AVG	250	241	

Job No.: star2018 #814

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Cubelet

Mode: TX 2480MHz

Model: CB-KT-EDUII-1

Manufacturer: MODULAR ROBOTICS INCORPORATED

Polarization: Horizontal

Power Source: DC 3.7V

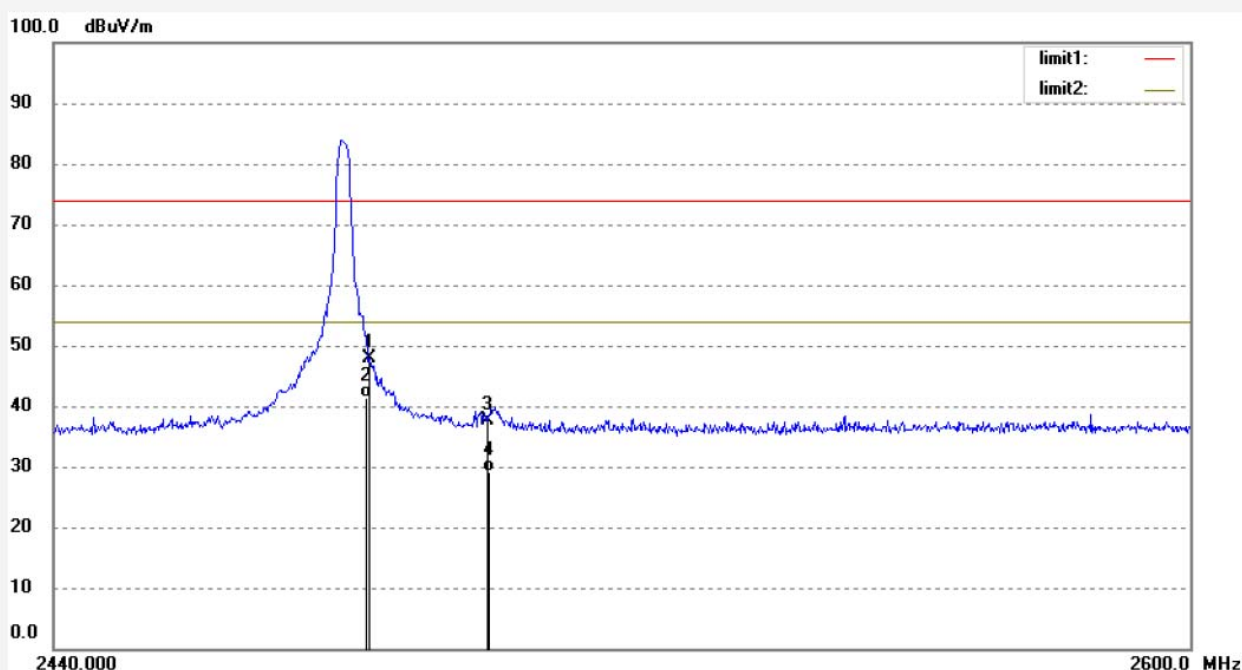
Date: 18/05/28/

Time: 10/31/16

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20180832



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	54.54	-6.54	48.00	74.00	-26.00	peak	150	317	
2	2483.500	47.85	-6.54	41.31	54.00	-12.69	AVG	150	320	
3	2500.000	44.13	-6.50	37.63	74.00	-36.37	peak	150	123	
4	2500.000	35.69	-6.50	29.19	54.00	-24.81	AVG	150	125	

Job No.: star2018 #815

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Cubelet

Mode: TX 2480MHz

Model: CB-KT-EDUII-1

Manufacturer: MODULAR ROBOTICS INCORPORATED

Polarization: Vertical

Power Source: DC 3.7V

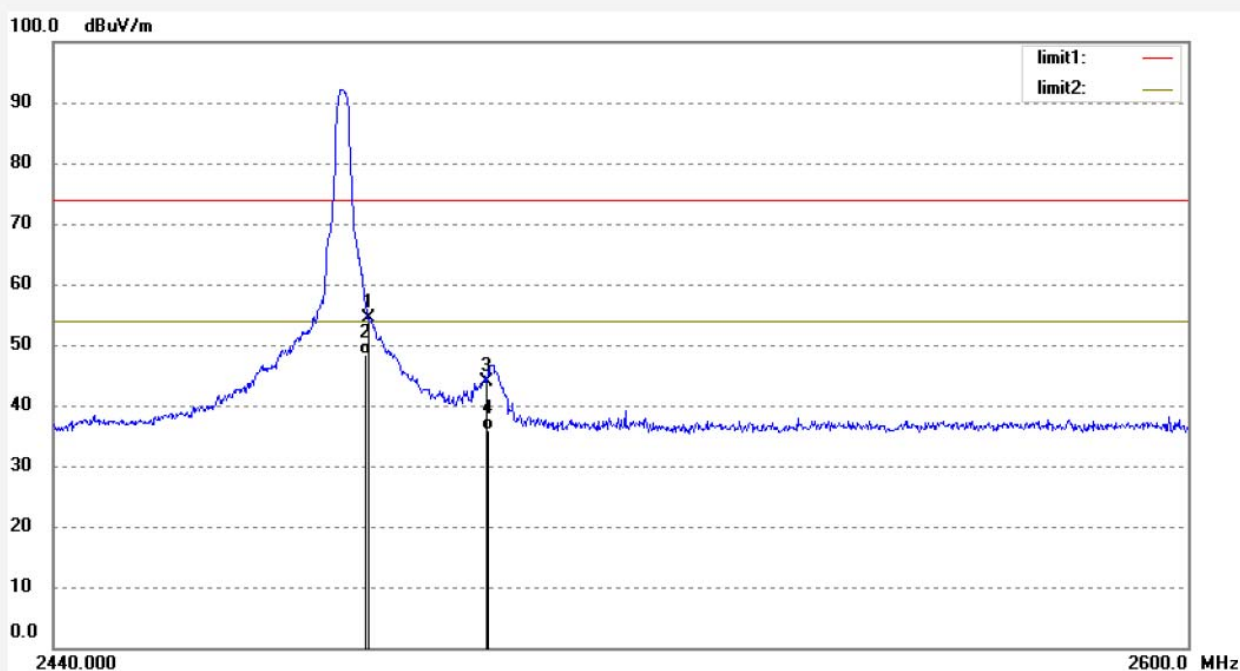
Date: 18/05/28/

Time: 10/32/55

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20180832



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	61.00	-6.54	54.46	74.00	-19.54	peak	150	118	
2	2483.500	55.00	-6.54	48.46	54.00	-5.54	AVG	150	120	
3	2500.000	50.45	-6.50	43.95	74.00	-30.05	peak	150	216	
4	2500.000	42.36	-6.50	35.86	54.00	-18.14	AVG	150	218	

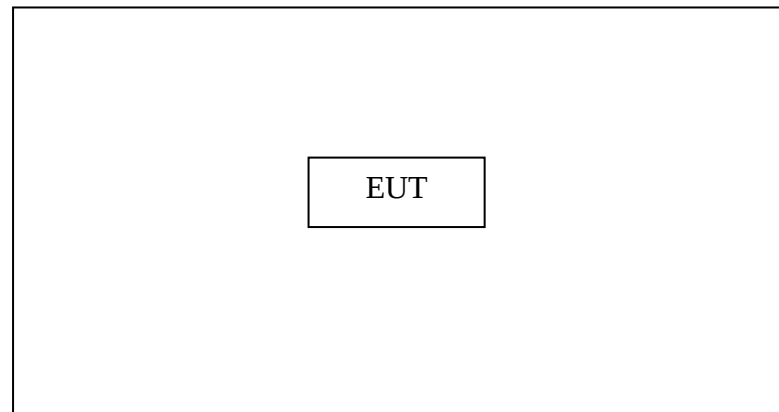
Note:

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.

10.RADIATED SPURIOUS EMISSION TEST

10.1.Block Diagram of Test Setup

10.1.1.Block diagram of connection between the EUT and peripherals

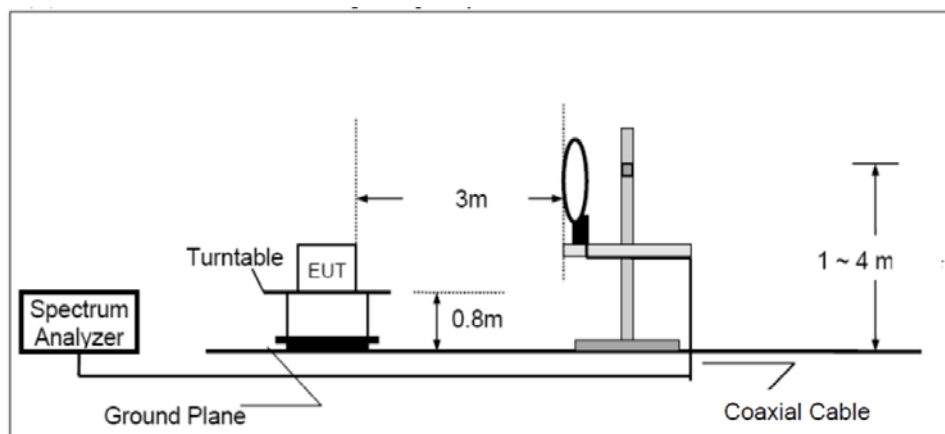


Setup: Transmitting mode

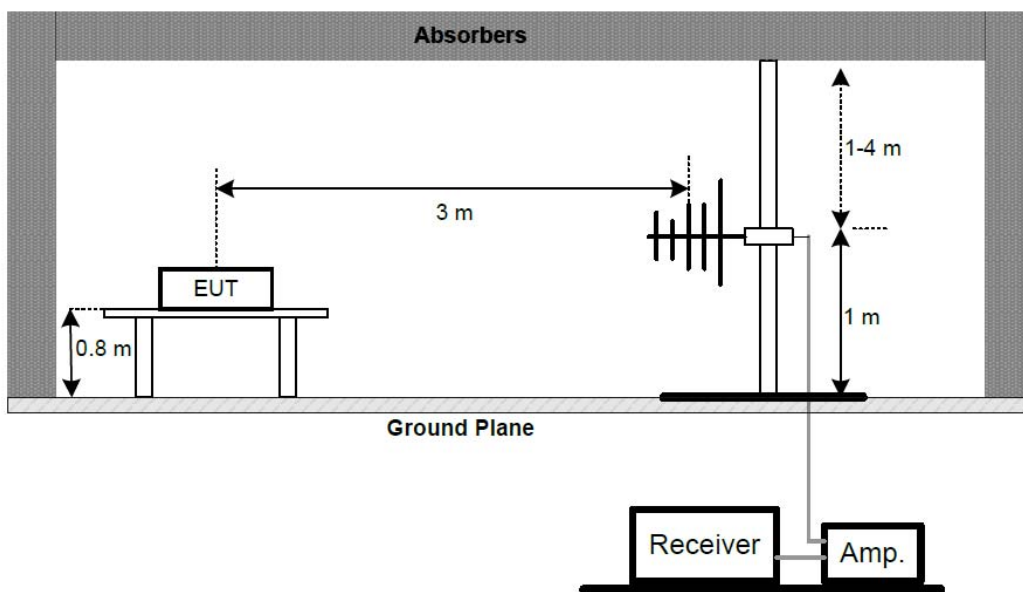
(EUT: Cubelet)

10.1.2.Semi-Anechoic Chamber Test Setup Diagram

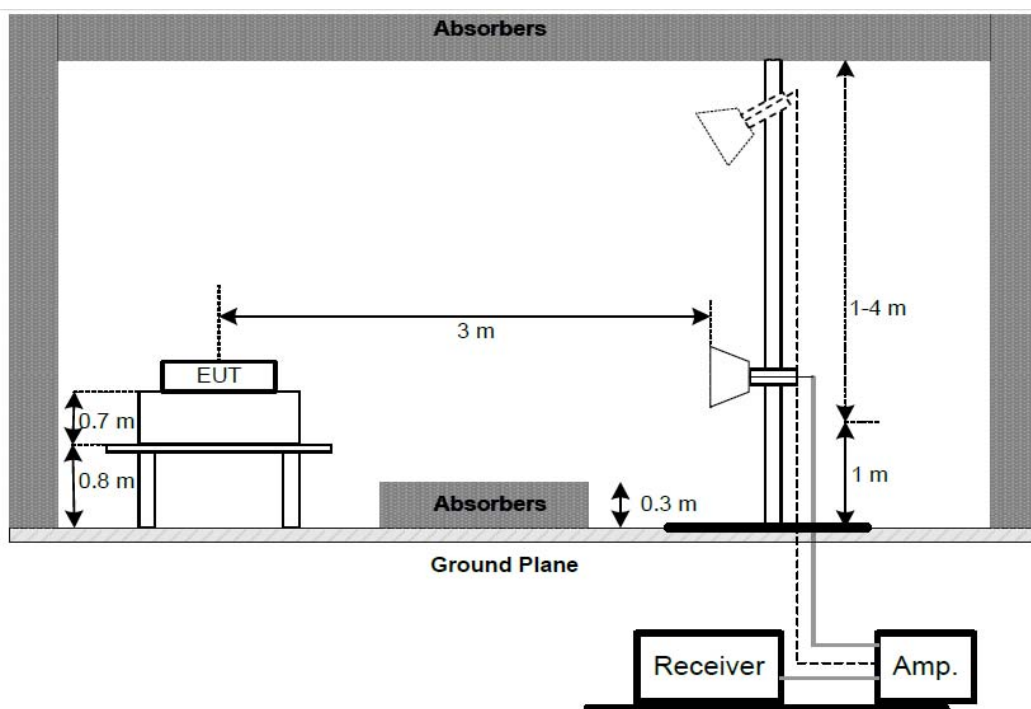
(A) Radiated Emission Test Set-Up, Frequency below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1GHz



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



10.2.The Limit For Section 15.247(d)

Section 15.247(d): 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 (b)(3) of this section, 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).

10.3.Restricted bands of operation

10.3.1.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.

10.4.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.

10.5.Operating Condition of EUT

10.5.1.Setup the EUT and simulator as shown as Section 10.1.

10.5.2.Turn on the power of all equipment.

10.5.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

10.6.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 frequency range from 9 kHz to 25GHz is checked.

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.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

10.7.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	49.83	-22.03	27.80	43.50	-15.70	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 + Factor

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

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

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.

10.8.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 radiation emissions from 18-25GHz are not reported, because the test values lower than the limits of 20dB.

From 30MHz to 1GHz



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Fax:+86-0755-26503396

Job No.: FRANK2018 #452

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Cubelet

Mode: TX2402MHz

Model: CB-KT-EDUII-1

Manufacturer: MODULAR ROBOTICS INCORPORATED

Polarization: Horizontal

Power Source: DC 3.7V

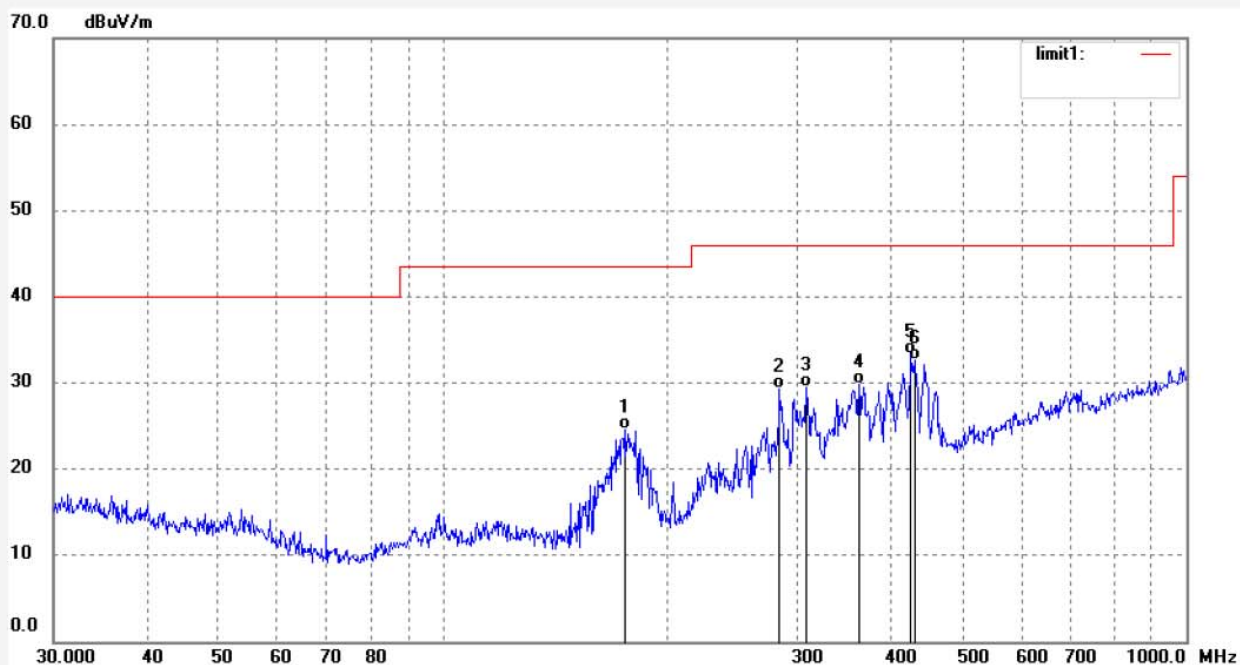
Date: 18/06/05/

Time: 9/25/41

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20180832



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	176.2685	38.00	-13.44	24.56	43.50	-18.94	QP	200	61	
2	283.9791	38.81	-9.45	29.36	46.00	-16.64	QP	200	189	
3	307.8312	38.24	-8.80	29.44	46.00	-16.56	QP	200	162	
4	362.9844	37.07	-7.24	29.83	46.00	-16.17	QP	200	48	
5	426.5210	39.14	-5.73	33.41	46.00	-12.59	QP	200	105	
6	431.0316	38.25	-5.60	32.65	46.00	-13.35	QP	200	145	

Job No.: FRANK2018 #453

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Cubelet

Mode: TX2402MHz

Model: CB-KT-EDUII-1

Manufacturer: MODULAR ROBOTICS INCORPORATED

Polarization: Vertical

Power Source: DC 3.7V

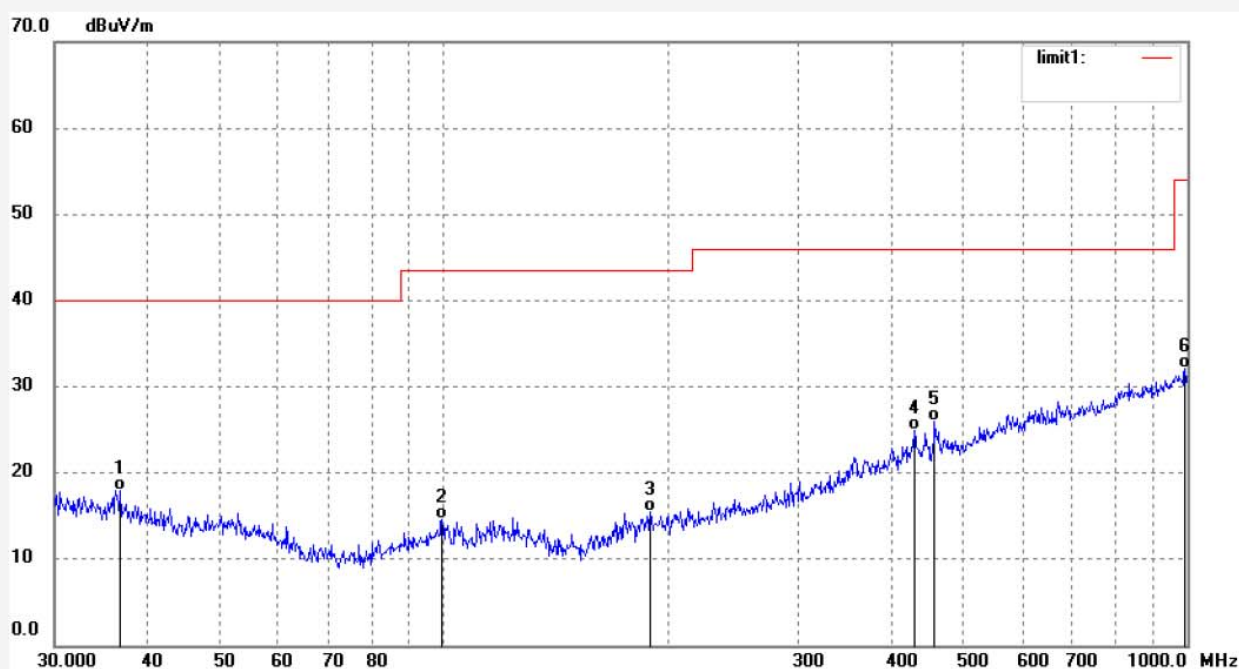
Date: 18/06/05/

Time: 9/26/16

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20180832



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	36.7661	28.71	-10.80	17.91	40.00	-22.09	QP	100	160	
2	99.5279	27.78	-13.21	14.57	43.50	-28.93	QP	100	156	
3	189.7384	27.93	-12.49	15.44	43.50	-28.06	QP	100	215	
4	429.5228	30.52	-5.64	24.88	46.00	-21.12	QP	100	94	
5	457.5072	31.25	-5.22	26.03	46.00	-19.97	QP	100	102	
6	993.0113	28.43	3.72	32.15	54.00	-21.85	QP	100	302	

Job No.: FRANK2018 #455

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Cubelet

Mode: TX2440MHz

Model: CB-KT-EDUII-1

Manufacturer: MODULAR ROBOTICS INCORPORATED

Polarization: Horizontal

Power Source: DC 3.7V

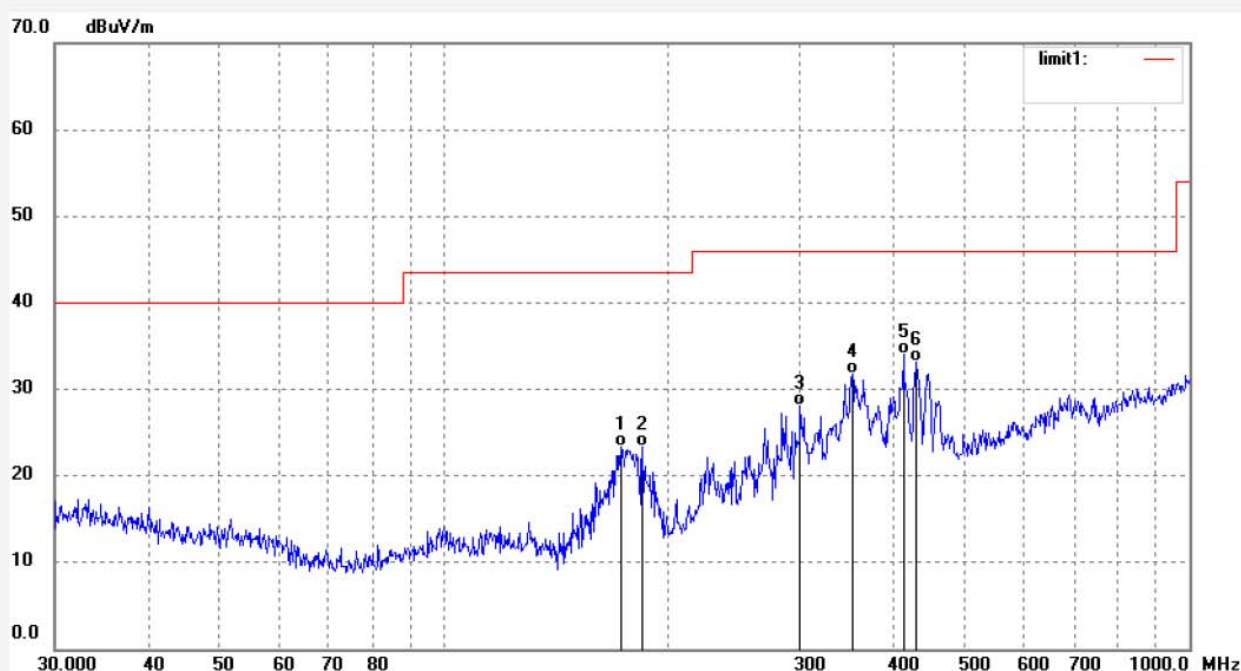
Date: 18/06/05/

Time: 9/26/54

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20180832



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	172.5988	36.83	-13.50	23.33	43.50	-20.17	QP	200	302	
2	184.4898	36.00	-12.63	23.37	43.50	-20.13	QP	200	220	
3	300.3672	37.16	-9.01	28.15	46.00	-17.85	QP	200	231	
4	352.9433	39.10	-7.40	31.70	46.00	-14.30	QP	200	102	
5	413.2706	40.16	-6.05	34.11	46.00	-11.89	QP	200	135	
6	429.5228	38.87	-5.64	33.23	46.00	-12.77	QP	200	169	

Job No.: FRANK2018 #454

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Cubelet

Mode: TX2440MHz

Model: CB-KT-EDUII-1

Manufacturer: MODULAR ROBOTICS INCORPORATED

Polarization: Vertical

Power Source: DC 3.7V

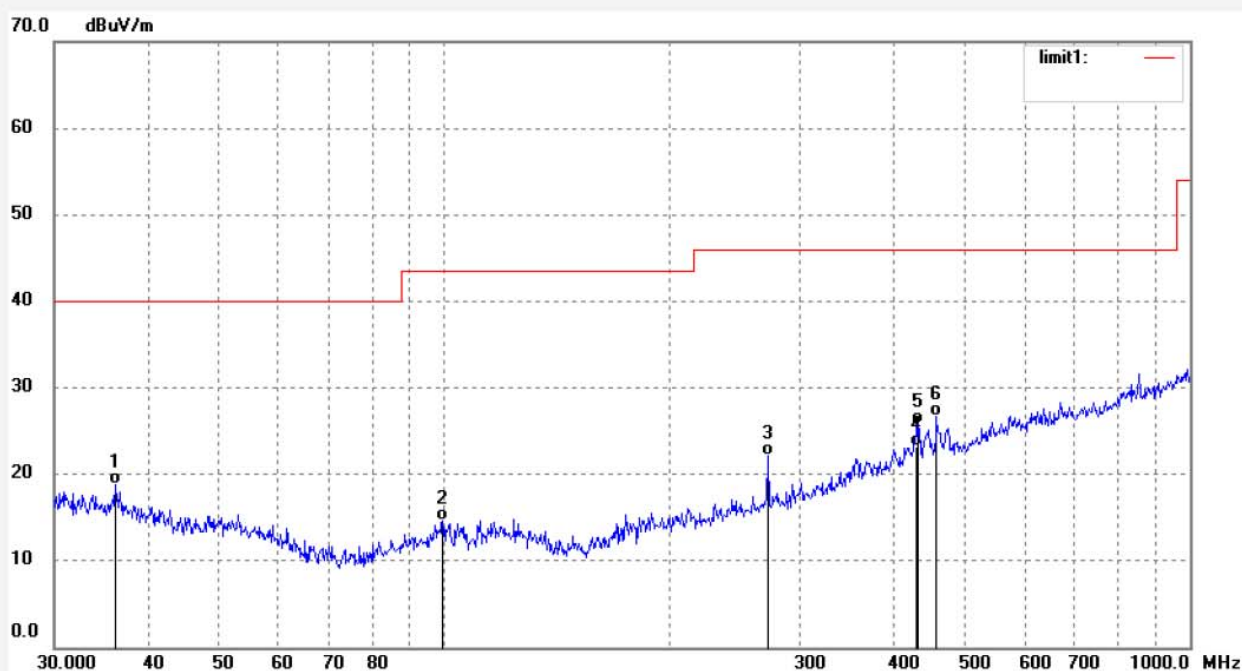
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Time: 9/26/30

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20180832



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	36.2541	29.45	-10.70	18.75	40.00	-21.25	QP	100	61	
2	99.5279	27.78	-13.21	14.57	43.50	-28.93	QP	100	216	
3	272.2776	31.91	-9.84	22.07	46.00	-23.93	QP	100	130	
4	426.5210	28.91	-5.73	23.18	46.00	-22.82	QP	100	49	
5	431.0316	31.46	-5.60	25.86	46.00	-20.14	QP	100	302	
6	457.5072	31.87	-5.22	26.65	46.00	-19.35	QP	100	164	



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Job No.: FRANK2018 #456

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Cubelet

Mode: TX2480MHz

Model: CB-KT-EDUII-1

Manufacturer: MODULAR ROBOTICS INCORPORATED

Polarization: Horizontal

Power Source: DC 3.7V

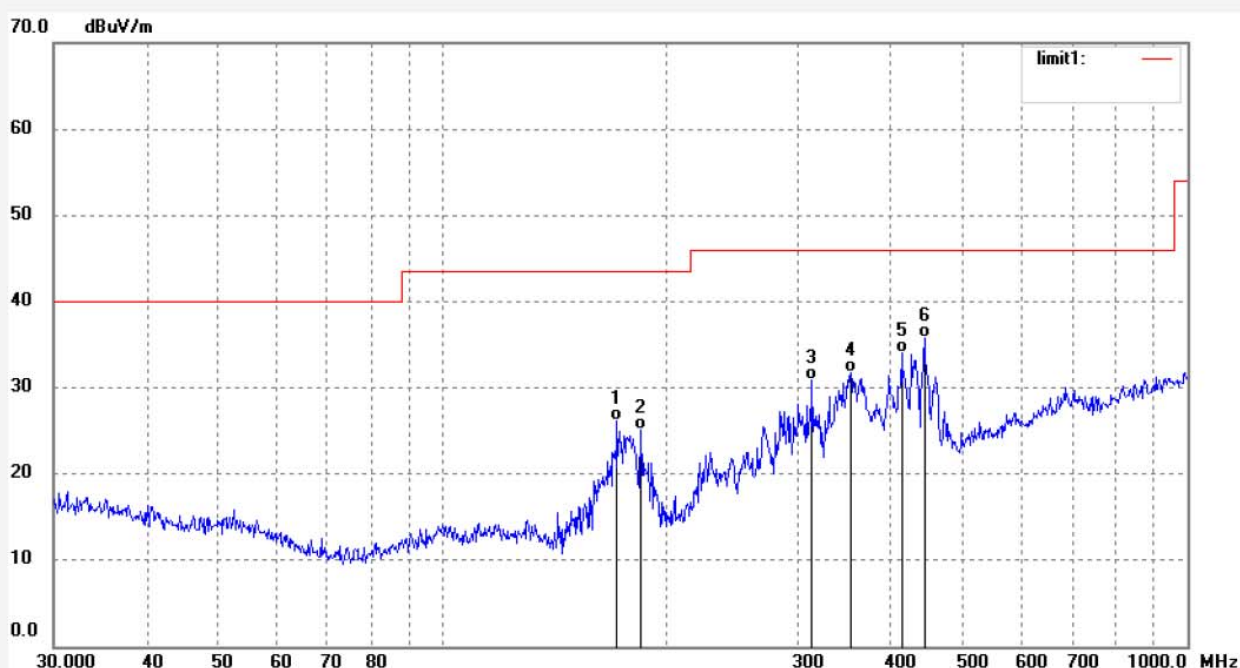
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Time: 9/27/38

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20180832



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	171.3925	39.65	-13.52	26.13	43.50	-17.37	QP	200	102	
2	184.4898	37.71	-12.63	25.08	43.50	-18.42	QP	200	125	
3	313.2760	39.46	-8.64	30.82	46.00	-15.18	QP	200	63	
4	352.9433	39.10	-7.40	31.70	46.00	-14.30	QP	200	155	
5	413.2706	40.16	-6.05	34.11	46.00	-11.89	QP	200	135	
6	443.2943	41.19	-5.44	35.75	46.00	-10.25	QP	200	102	

Job No.: FRANK2018 #457

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Cubelet

Mode: TX2480MHz

Model: CB-KT-EDUII-1

Manufacturer: MODULAR ROBOTICS INCORPORATED

Polarization: Vertical

Power Source: DC 3.7V

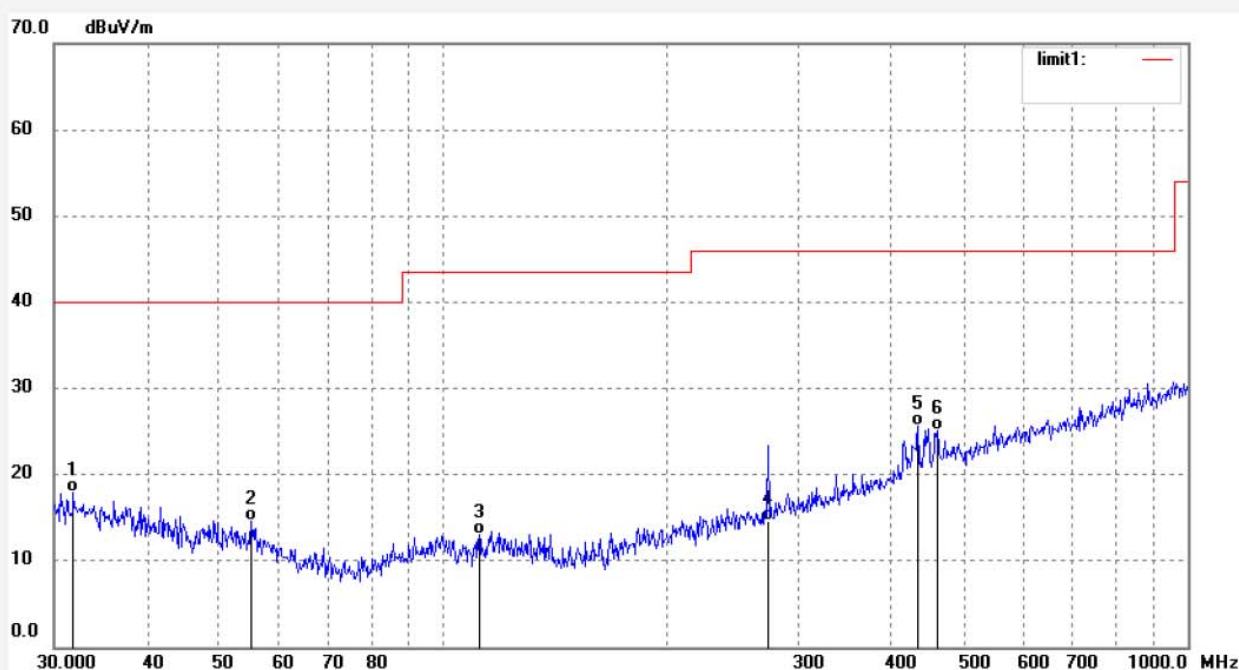
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Time: 9/27/50

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20180832



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	31.8427	27.40	-9.47	17.93	40.00	-22.07	QP	100	320	
2	55.2207	27.52	-12.99	14.53	40.00	-25.47	QP	100	182	
3	111.7380	26.68	-13.56	13.12	43.50	-30.38	QP	100	85	
4	273.2341	24.45	-9.79	14.66	46.00	-31.34	QP	100	215	
5	434.0651	31.20	-5.53	25.67	46.00	-20.33	QP	100	256	
6	460.7271	30.33	-5.17	25.16	46.00	-20.84	QP	100	154	

Above 1GHz



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Job No.: star2018 #1948

Standard: FCC 15.247 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Cubelet

Mode: TX 2402MHz

Model: CB-KT-EDUII-1

Manufacturer: MODULAR ROBOTICS INCORPORATED

Polarization: Horizontal

Power Source: DC 3.7V

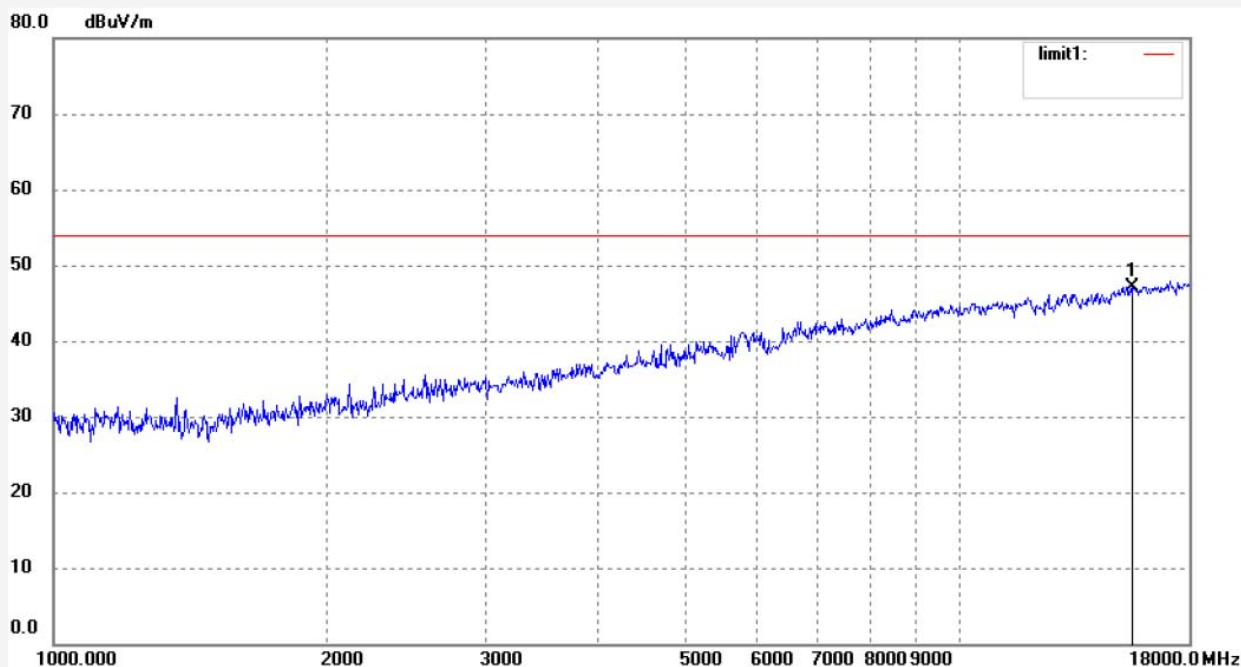
Date: 2018/05/30

Time: 11:08:45

Engineer Signature: star

Distance: 3m

Note: Report No.:ATE20180832



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	15607.400	34.46	12.64	47.10	54.00	-6.90	peak	150	312	

Job No.: star2018 #1949

Standard: FCC 15.247 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Cubelet

Mode: TX 2402MHz

Model: CB-KT-EDUII-1

Manufacturer: MODULAR ROBOTICS INCORPORATED

Polarization: Vertical

Power Source: DC 3.7V

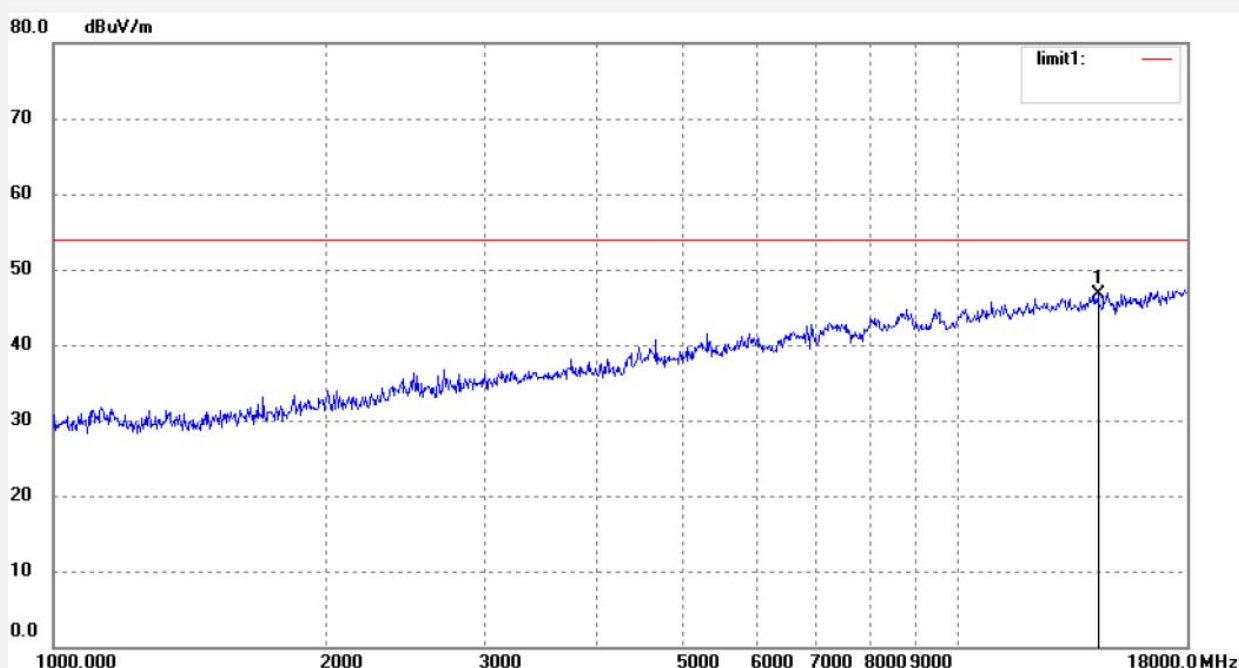
Date: 2018/05/30

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Engineer Signature: star

Distance: 3m

Note: Report No.:ATE20180832



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	14344.025	33.17	13.50	46.67	54.00	-7.33	peak	150	328	

Job No.: star2018 #1951

Standard: FCC 15.247 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Cubelet

Mode: TX 2440MHz

Model: CB-KT-EDUII-1

Manufacturer: MODULAR ROBOTICS INCORPORATED

Polarization: Horizontal

Power Source: DC 3.7V

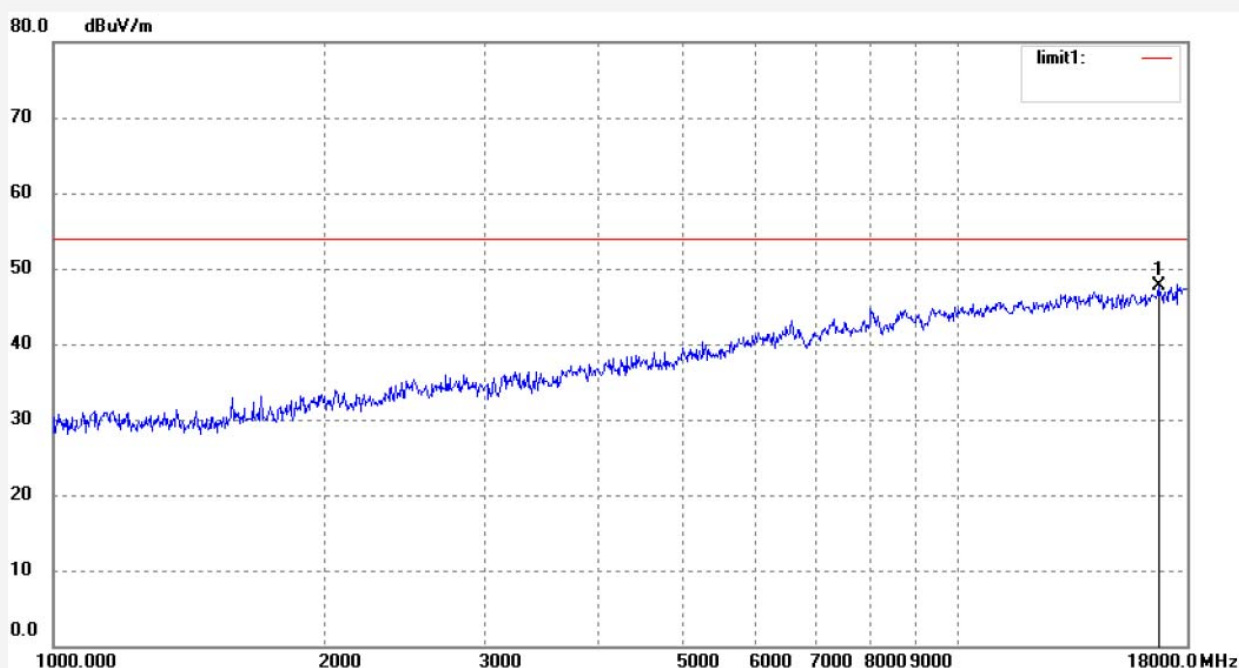
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Engineer Signature: star

Distance: 3m

Note: Report No.:ATE20180832



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	16736.686	33.59	14.08	47.67	54.00	-6.33	peak	150	332	

Job No.: star2018 #1950

Standard: FCC 15.247 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Cubelet

Mode: TX 2440MHz

Model: CB-KT-EDUII-1

Manufacturer: MODULAR ROBOTICS INCORPORATED

Polarization: Vertical

Power Source: DC 3.7V

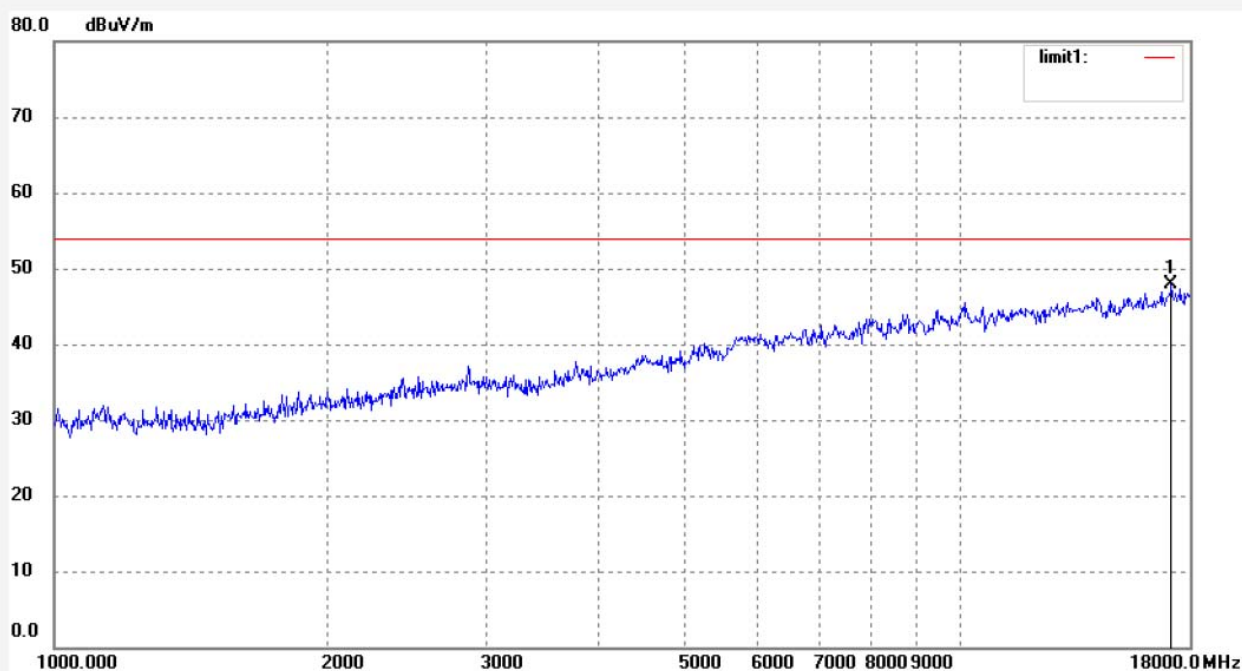
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Engineer Signature: star

Distance: 3m

Note: Report No.:ATE20180832



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	17180.926	32.93	15.02	47.95	54.00	-6.05	peak	150	271	

Job No.: star2018 #1952

Standard: FCC 15.247 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Cubelet

Mode: TX 2480MHz

Model: CB-KT-EDUII-1

Manufacturer: MODULAR ROBOTICS INCORPORATED

Polarization: Horizontal

Power Source: DC 3.7V

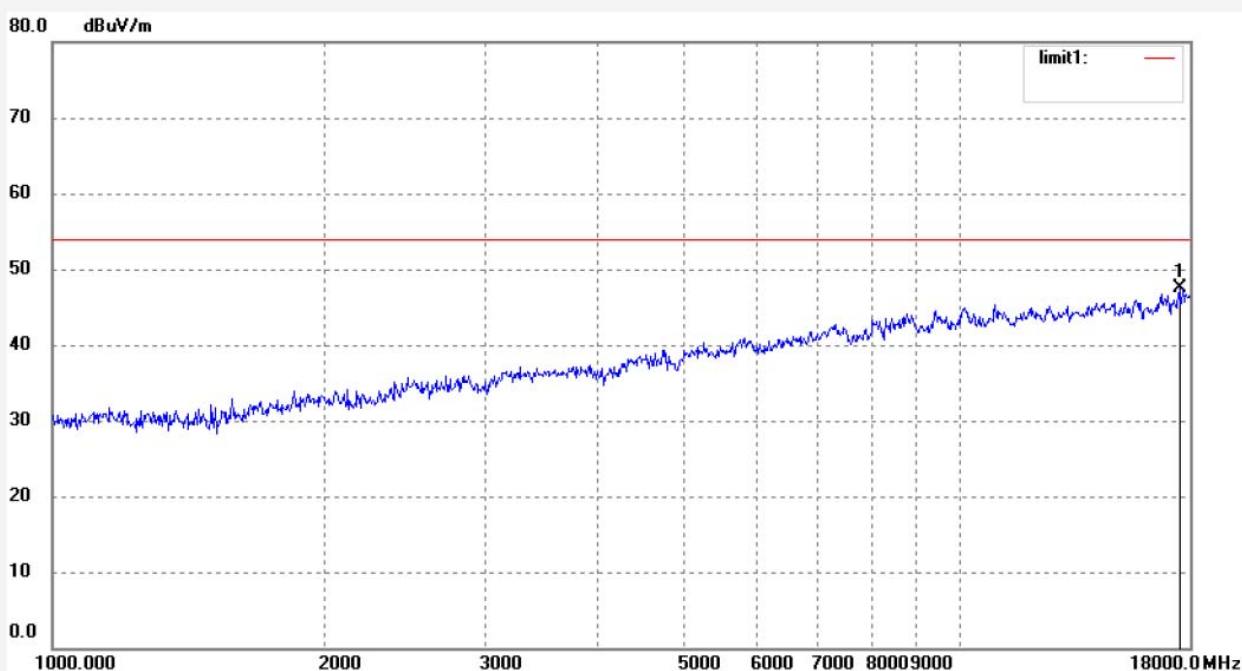
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Engineer Signature: star

Distance: 3m

Note: Report No.:ATE20180832



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	17585.695	32.23	15.21	47.44	54.00	-6.56	peak	150	228	

Job No.: star2018 #1953

Standard: FCC 15.247 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Cubelet

Mode: TX 2480MHz

Model: CB-KT-EDUII-1

Manufacturer: MODULAR ROBOTICS INCORPORATED

Polarization: Vertical

Power Source: DC 3.7V

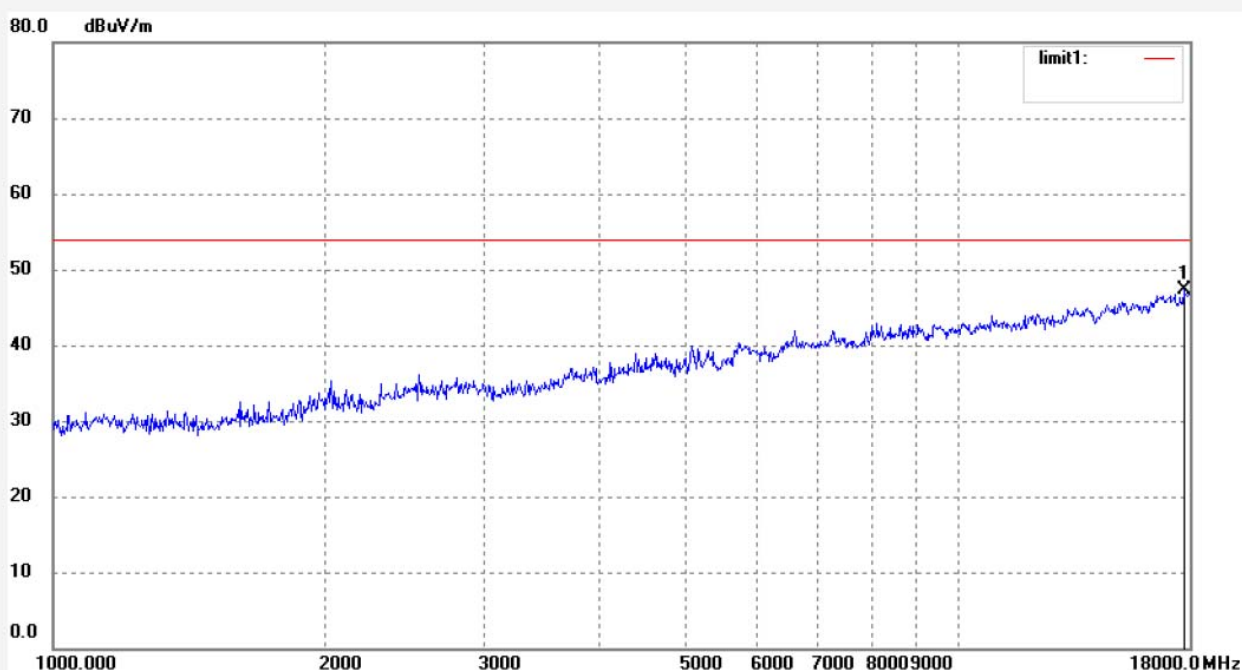
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Time: 11:13:57

Engineer Signature: star

Distance: 3m

Note: Report No.:ATE20180832



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	17739.930	31.90	15.32	47.22	54.00	-6.78	peak	150	174	

11.ANTENNA REQUIREMENT

11.1.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.

11.2.Antenna Construction

Device is equipped with permanent attached antenna, which isn't displaced by other antenna. The Max Antenna gain of EUT is 0dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.



Antenna