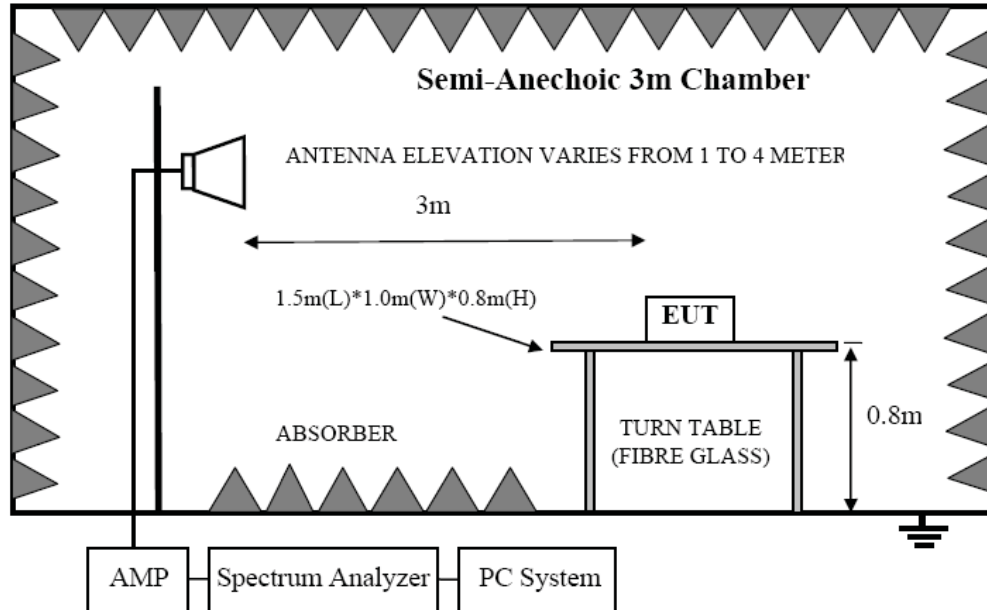


1GHz—25GHz Radiated emission Test result									
EUT: Multifunction Speaker					M/N: CL-680				
Power: DC 3.7V From battery									
Test date: 2015-09-25					Test site: 3m Chamber			Tested by: Mason	
Test mode: 8- DPSK Tx CH79 2480MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960	42.53	33.98	10.22	34.25	52.48	74	21.52	PK
2	4960	31.84	33.98	10.22	34.25	41.79	54	12.21	AV
3	7440	/							
4	9920	/							
5	12400	/							
Antenna Polarity: Horizontal									
1	4960	43.16	33.98	10.22	34.25	53.11	74	20.89	PK
2	4960	32.66	33.98	10.22	34.25	42.61	54	11.39	AV
3	7440	/							
4	9920	/							
5	12400	/							
Note:									
1, Measuring frequency from 1GHz to 25GHz									
2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK									
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK									
3, Result = Read level + Antenna factor + cable loss-Amp factor									
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

## 9. Band Edge Compliance

### 9.1. Block Diagram of Test Setup



### 9.2. Limit

All the lower and upper band-edges emissions appearing within restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation shall be at least 30dB below the fundamental emissions, or comply with 15.209 limits.

### 9.3. Test Procedure

All restriction band and non- restriction band have been tested , only worse case is reported.

### 9.4. Test Result

**PASS. (See below detailed test data)**

## Radiated Method

GFSK (CH Low)

Band Edge Test result								
EUT: Multifunction Speaker					M/N: CL-680			
Power: DC 3.7V From battery								
Test date: 2015-09-25			Test site: 3m Chamber			Tested by: Mason		
Test mode: Tx CH Low 2402MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	45.38	27.62	3.92	34.97	41.95	74	32.05	PK
2390	/	27.62	3.92	34.97	/	54	/	AV
2400	52.64	27.62	3.94	34.97	49.23	74	24.77	PK
2400	/	27.62	3.94	34.97	/	54	/	AV
Antenna Polarity: Horizontal								
2390	46.27	27.62	3.92	34.97	42.84	74	31.16	PK
2390	/	27.62	3.92	34.97	/	54	/	AV
2400	53.83	27.62	3.94	34.97	50.42	74	23.58	PK
2400	/	27.62	3.94	34.97	/	54	/	AV
Note: 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

**GFSK ( CH High )**

Band Edge Test result								
EUT: Multifunction Speaker					M/N: CL-680			
Power: DC 3.7V From battery								
Test date: 2015-09-25			Test site: 3m Chamber			Tested by: Mason		
Test mode: Tx CH High 2480MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	47.35	27.59	4.00	34.97	43.97	74	30.03	PK
2483.5	/	27.59	4.00	34.97	/	54	/	AV
Antenna Polarity: Horizontal								
2483.5	46.62	27.59	4.00	34.97	43.24	74	30.76	PK
2483.5	/	27.59	4.00	34.97	/	54	/	AV
Note: 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

## GFSK (Hopping Low)

Band Edge Test result								
EUT: Multifunction Speaker					M/N: CL-680			
Power: DC 3.7V From battery								
Test date: 2015-09-25					Test site: 3m Chamber		Tested by: Mason	
Test mode: Tx CH Low 2402MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	46.81	27.62	3.92	34.97	43.38	74	30.62	PK
2390	/	27.62	3.92	34.97	/	54	/	AV
2400	55.34	27.62	3.94	34.97	51.93	74	22.07	PK
2400	/	27.62	3.94	34.97	/	54	/	AV
Antenna Polarity: Horizontal								
2390	45.57	27.62	3.92	34.97	42.14	74	31.86	PK
2390	/	27.62	3.92	34.97	/	54	/	AV
2400	53.64	27.62	3.94	34.97	50.23	74	23.77	PK
2400	/	27.62	3.94	34.97	/	54	/	AV
Note:								
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK								
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK								
3, Result = Read level + Antenna factor + cable loss-Amp factor								
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

## GFSK (Hopping High)

Band Edge Test result								
EUT: Multifunction Speaker					M/N: CL-680			
Power: DC 3.7V From battery								
Test date: 2015-09-25					Test site: 3m Chamber		Tested by: Mason	
Test mode: Tx CH High 2480MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	45.27	27.59	4.00	34.97	41.89	74	32.11	PK
2483.5	/	27.59	4.00	34.97	/	54	/	AV
Antenna Polarity: Horizontal								
2483.5	46.16	27.59	4.00	34.97	42.78	74	31.22	PK
2483.5	/	27.59	4.00	34.97	/	54	/	AV
Note:								
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK								
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK								
3, Result = Read level + Antenna factor + cable loss-Amp factor								
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

$\pi/4$  DQPSK ( CH Low )

Band Edge Test result								
EUT: Multifunction Speaker					M/N: CL-680			
Power: DC 3.7V From battery								
Test date: 2015-09-25					Test site: 3m Chamber		Tested by: Mason	
Test mode: Tx CH Low 2402MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	44.84	27.62	3.92	34.97	41.41	74	32.59	PK
2390	/	27.62	3.92	34.97	/	54	/	AV
2400	53.77	27.62	3.94	34.97	50.36	74	23.64	PK
2400	/	27.62	3.94	34.97	/	54	/	AV
Antenna Polarity: Horizontal								
2390	45.38	27.62	3.92	34.97	41.95	74	32.05	PK
2390	/	27.62	3.92	34.97	/	54	/	AV
2400	52.75	27.62	3.94	34.97	49.34	74	24.66	PK
2400	/	27.62	3.94	34.97	/	54	/	AV
Note: 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

$\pi/4$  DQPSK ( CH High )

Band Edge Test result								
EUT: Multifunction Speaker					M/N: CL-680			
Power: DC 3.7V From battery								
Test date: 2015-09-25			Test site: 3m Chamber			Tested by: Mason		
Test mode: Tx CH High 2480MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	44.68	27.59	4.00	34.97	41.30	74	32.70	PK
2483.5	/	27.59	4.00	34.97	/	54	/	AV
Antenna Polarity: Horizontal								
2483.5	45.72	27.59	4.00	34.97	42.34	74	31.66	PK
2483.5	/	27.59	4.00	34.97	/	54	/	AV
Note:								
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK								
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK								
3, Result = Read level + Antenna factor + cable loss-Amp factor								
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								



$\pi/4$  DQPSK ( Hopping Low)

Band Edge Test result								
EUT: Multifunction Speaker					M/N: CL-680			
Power: DC 3.7V From battery								
Test date: 2015-09-25					Test site: 3m Chamber		Tested by: Mason	
Test mode: Tx CH Low 2402MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	44.21	27.62	3.92	34.97	40.78	74	33.22	PK
2390	/	27.62	3.92	34.97	/	54	/	AV
2400	51.99	27.62	3.94	34.97	48.58	74	25.42	PK
2400	/	27.62	3.94	34.97	/	54	/	AV
Antenna Polarity: Horizontal								
2390	43.85	27.62	3.92	34.97	40.42	74	33.58	PK
2390	/	27.62	3.92	34.97	/	54	/	AV
2400	52.63	27.62	3.94	34.97	49.22	74	24.78	PK
2400	/	27.62	3.94	34.97	/	54	/	AV
Note:								
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK								
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK								
3, Result = Read level + Antenna factor + cable loss-Amp factor								
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

$\pi/4$  DQPSK (Hopping High )

Band Edge Test result								
EUT: Multifunction Speaker						M/N: CL-680		
Power: DC 3.7V From battery								
Test date: 2015-09-25						Test site: 3m Chamber		Tested by: Mason
Test mode: Tx CH High 2480MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	43.54	27.59	4.00	34.97	40.16	74	33.84	PK
2483.5	/	27.59	4.00	34.97	/	54	/	AV
Antenna Polarity: Horizontal								
2483.5	44.82	27.59	4.00	34.97	41.44	74	32.56	PK
2483.5	/	27.59	4.00	34.97	/	54	/	AV
Note: 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

## 8- DPSK ( CH Low )

Band Edge Test result								
EUT: Multifunction Speaker					M/N: CL-680			
Power: DC 3.7V From battery								
Test date: 2015-09-25					Test site: 3m Chamber		Tested by: Mason	
Test mode: Tx CH Low 2402MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	43.16	27.62	3.92	34.97	39.73	74	34.27	PK
2390	/	27.62	3.92	34.97	/	54	/	AV
2400	52.65	27.62	3.94	34.97	49.24	74	24.76	PK
2400	/	27.62	3.94	34.97	/	54	/	AV
Antenna Polarity: Horizontal								
2390	43.14	27.62	3.92	34.97	39.71	74	34.29	PK
2390	/	27.62	3.92	34.97	/	54	/	AV
2400	52.88	27.62	3.94	34.97	49.47	74	24.53	PK
2400	/	27.62	3.94	34.97	/	54	/	AV
Note:								
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK								
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK								
3, Result = Read level + Antenna factor + cable loss-Amp factor								
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

## 8- DPSK ( CH High )

Band Edge Test result								
EUT: Multifunction Speaker					M/N: CL-680			
Power: DC 3.7V From battery								
Test date: 2015-09-25					Test site: 3m Chamber		Tested by: Mason	
Test mode: Tx CH High 2480MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	44.04	27.59	4.00	34.97	40.66	74	33.34	PK
2483.5	/	27.59	4.00	34.97	/	54	/	AV
Antenna Polarity: Horizontal								
2483.5	44.28	27.59	4.00	34.97	40.90	74	33.10	PK
2483.5	/	27.59	4.00	34.97	/	54	/	AV
Note:								
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK								
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK								
3, Result = Read level + Antenna factor + cable loss-Amp factor								
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

## 8- DPSK ( Hopping Low )

Band Edge Test result								
EUT: Multifunction Speaker					M/N: CL-680			
Power: DC 3.7V From battery								
Test date: 2015-09-25 Test site: 3m Chamber					Tested by: Mason			
Test mode: Tx CH Low 2402MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	42.97	27.62	3.92	34.97	39.54	74	34.46	PK
2390	/	27.62	3.92	34.97	/	54	/	AV
2400	53.34	27.62	3.94	34.97	49.93	74	24.07	PK
2400	/	27.62	3.94	34.97	/	54	/	AV
Antenna Polarity: Horizontal								
2390	42.47	27.62	3.92	34.97	39.04	74	34.96	PK
2390	/	27.62	3.92	34.97	/	54	/	AV
2400	52.82	27.62	3.94	34.97	49.41	74	24.59	PK
2400	/	27.62	3.94	34.97	/	54	/	AV
Note: 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

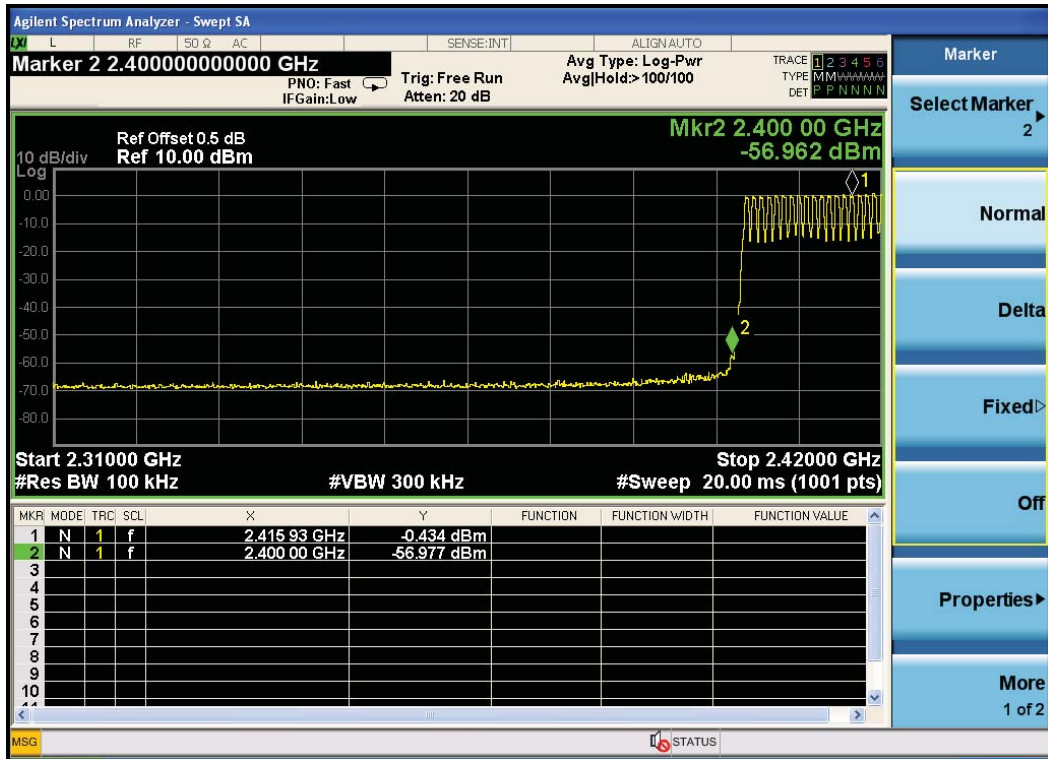
## 8- DPSK ( Hopping High )

Band Edge Test result								
EUT: Multifunction Speaker					M/N: CL-680			
Power: DC 3.7V From battery								
Test date: 2015-09-25					Test site: 3m Chamber		Tested by: Mason	
Test mode: Tx CH High 2480MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	44.02	27.59	4.00	34.97	40.64	74	33.36	PK
2483.5	/	27.59	4.00	34.97	/	54	/	AV
Antenna Polarity: Horizontal								
2483.5	44.26	27.59	4.00	34.97	40.88	74	33.12	PK
2483.5	/	27.59	4.00	34.97	/	54	/	AV
Note:								
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK								
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK								
3, Result = Read level + Antenna factor + cable loss-Amp factor								
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

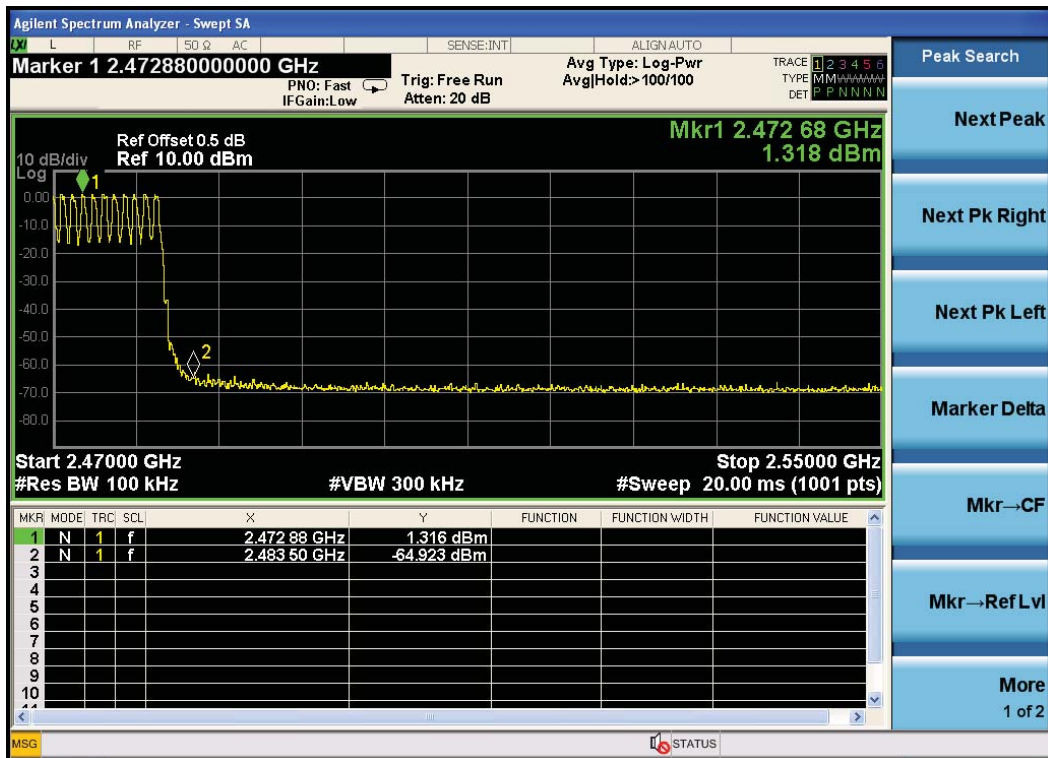


# Hopping

Low



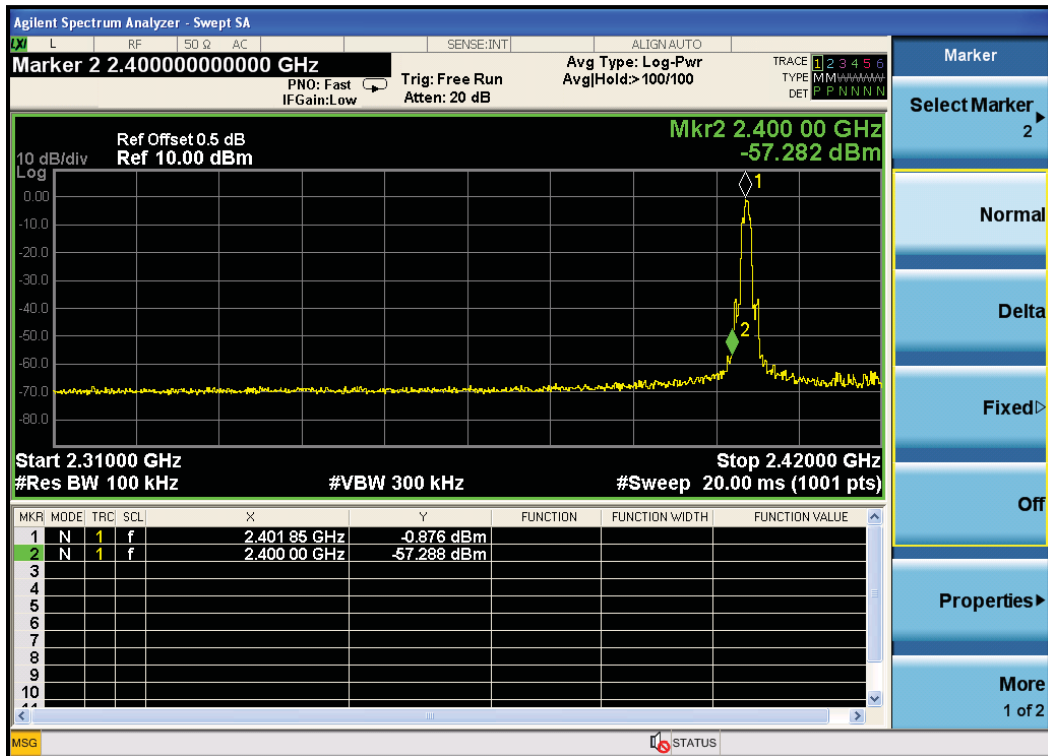
High



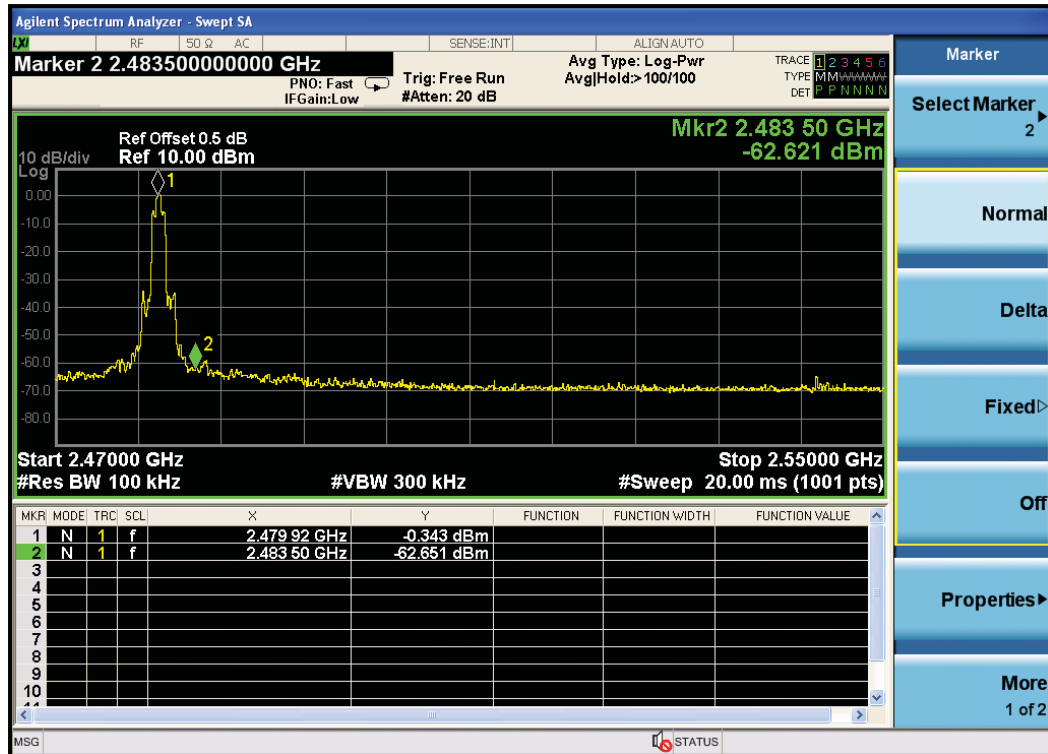


$\pi/4$  DQPSK

Low



High



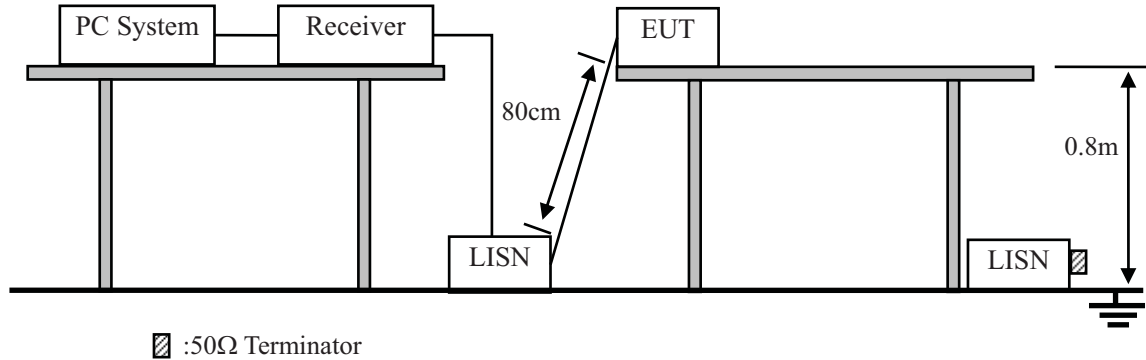






## 10. Power Line Conducted Emissions

### 10.1. Block Diagram of Test Setup



### 10.2. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

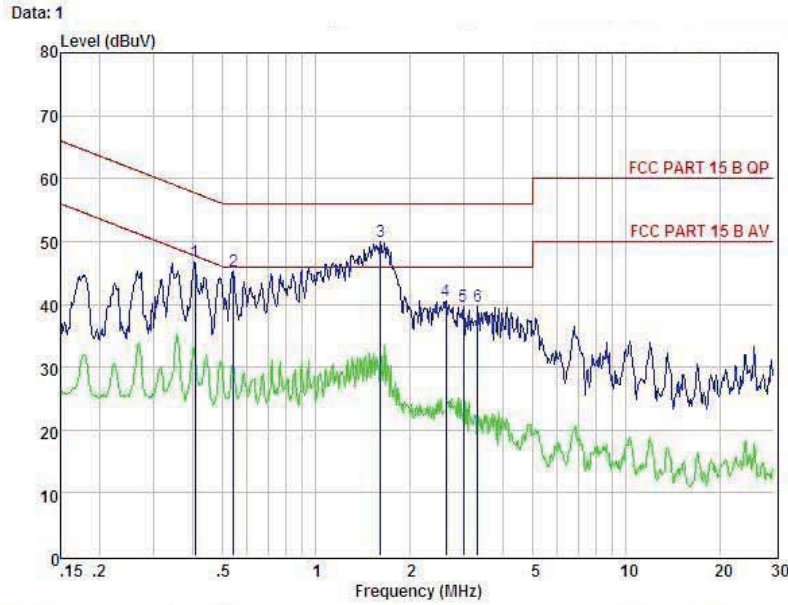
- Notes: 1. \* Decreasing linearly with logarithm of frequency.  
 2. The lower limit shall apply at the transition frequencies.

### 10.3. Test Procedure

- (1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
- (2) Setup the EUT and simulator as shown in 10.1
- (3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N2), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4 2009 on conducted Emission test.
- (4) The bandwidth of test receiver is set at 10KHz.
- (5) The frequency range from 150 KHz to 30MHz is checked.

### 10.4. Test Result

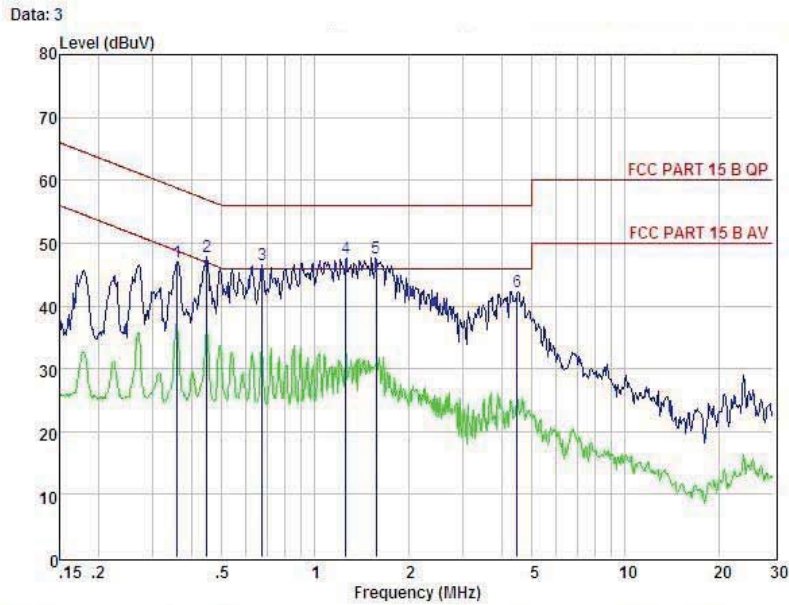
PASS. (See below detailed test data)



Condition : FCC PART 15 B QP POL: NEUTRAL Temp:25.7 °C Hum:51 %  
 EUT : Multifunction Speaker  
 Model No : CL-680  
 Test Mode : GFSK Low CH TX Mode  
 Power : DC 12V from DC Power with AC 120V/60Hz  
 Test Engineer:  
 Remark :

Item	Freq MHz	Read dBuV	LISN Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	0.407	36.95	0.03	-9.57	0.10	46.65	57.72	-11.07	Peak
2	0.541	35.46	0.03	-9.58	0.10	45.17	56.00	-10.83	Peak
3	1.612	40.21	0.05	-9.69	0.10	50.05	56.00	-5.95	Peak
4	2.620	30.62	0.06	-9.76	0.11	40.55	56.00	-15.45	Peak
5	2.989	29.66	0.07	-9.80	0.12	39.65	56.00	-16.35	Peak
6	3.322	29.58	0.08	-9.83	0.12	39.61	56.00	-16.39	Peak

Remarks: Level = Read + LISN Factor - Preamp Factor + Cable loss



Data: 3  
 Condition : FCC PART 15 B QP      POL: LINE      Temp:25.7 °C Hum:51 %  
 EUT : Multifunction Speaker  
 Model No : CL-680  
 Test Mode : GFSK Low CH TX Mode  
 Power : DC 12V from DC Power with AC 120V/60Hz  
 Test Engineer:  
 Remark :

Item	Freq MHz	Read dBuV	LISN Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	0.359	37.37	0.03	-9.57	0.10	47.07	56.75	-11.68	Peak
2	0.447	38.19	0.03	-9.57	0.10	47.89	56.93	-9.04	Peak
3	0.674	36.80	0.04	-9.59	0.10	46.53	56.00	-9.47	Peak
4	1.257	37.80	0.05	-9.65	0.10	47.60	56.00	-8.40	Peak
5	1.572	37.86	0.05	-9.69	0.10	47.70	56.00	-8.30	Peak
6	4.493	32.21	0.09	-9.90	0.12	42.32	56.00	-13.68	Peak

Remarks: Level = Read + LISN Factor - Preamp Factor + Cable loss

Note: If QP Result comply with AV limit, AV Result is deemed to comply with AV limit

## **11. Antenna Requirements**

### **11.1. Limit**

For intentional device, according to FCC 47 CFR 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

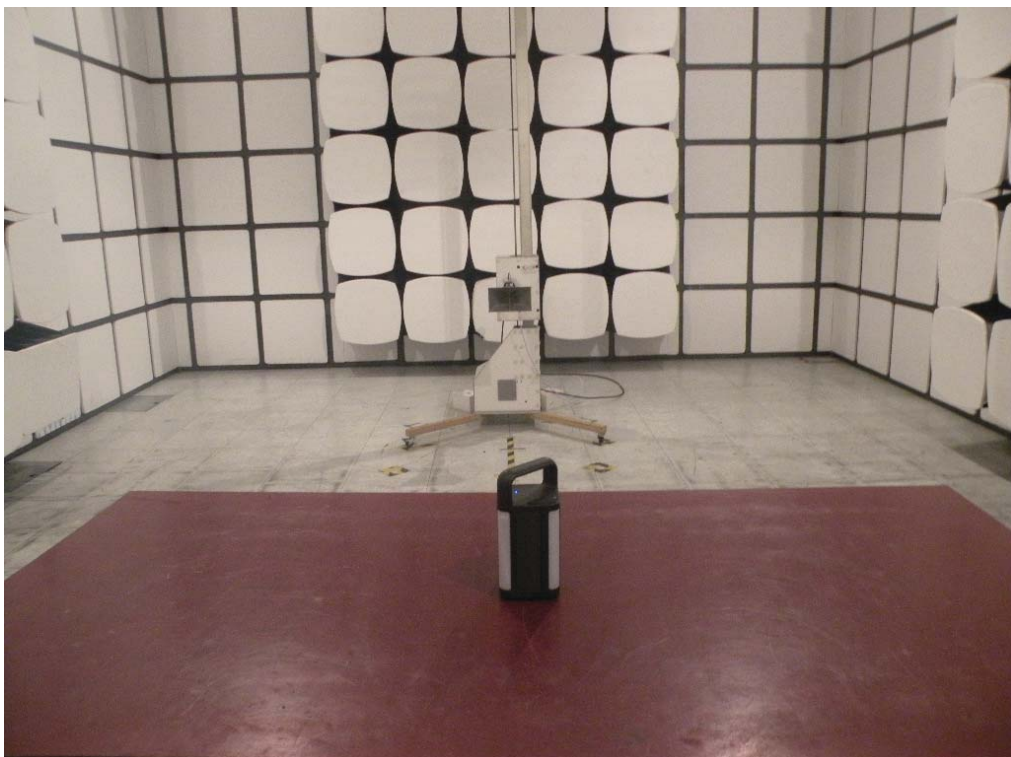
### **11.2. Result**

The antennas used for this product are PCB Antenna for Bluetooth, no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 0dBi for Bluetooth.



## 12. Test setup photo

### 12.1. Photos of Radiated emission

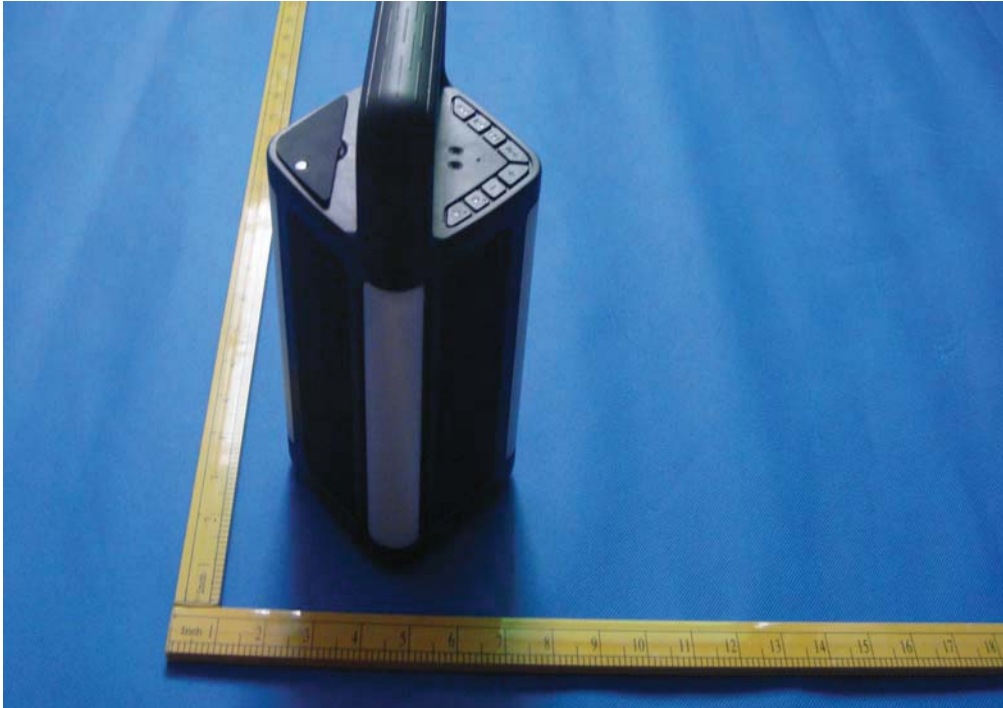


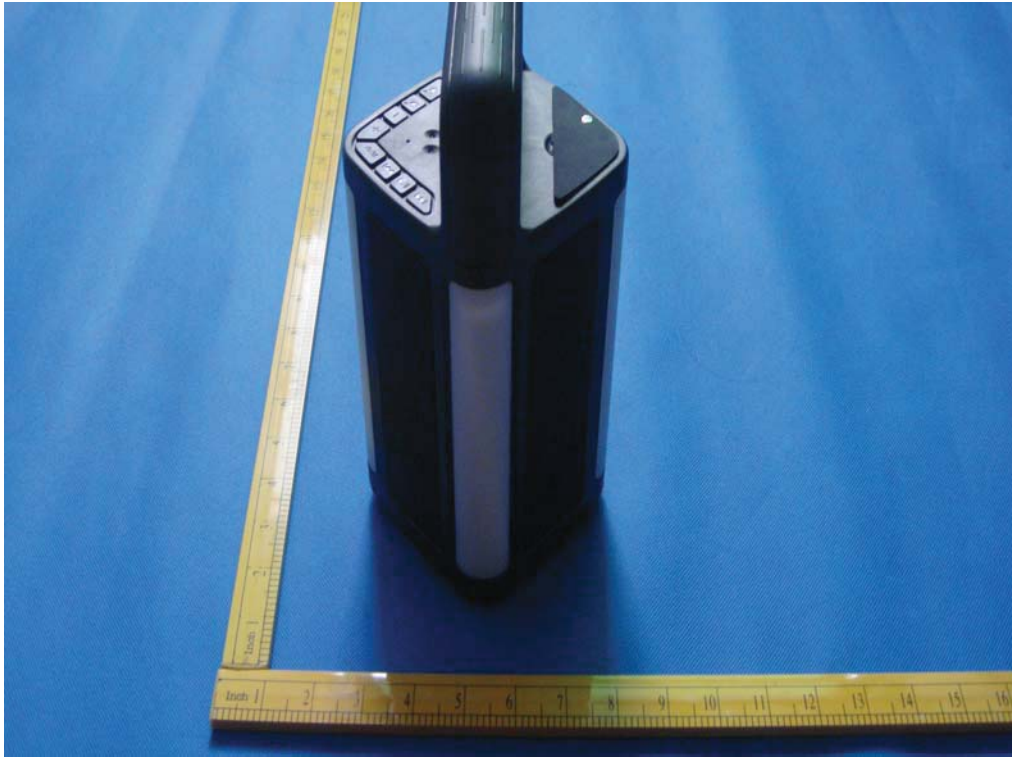
## 12.2.Photos of Conducted Emission test



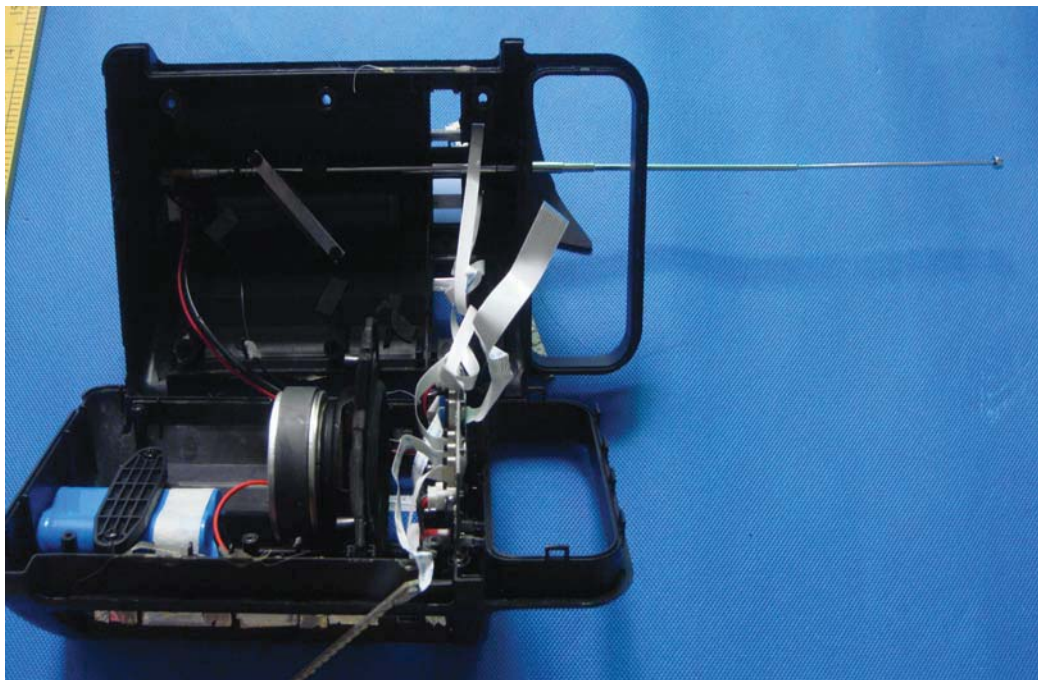
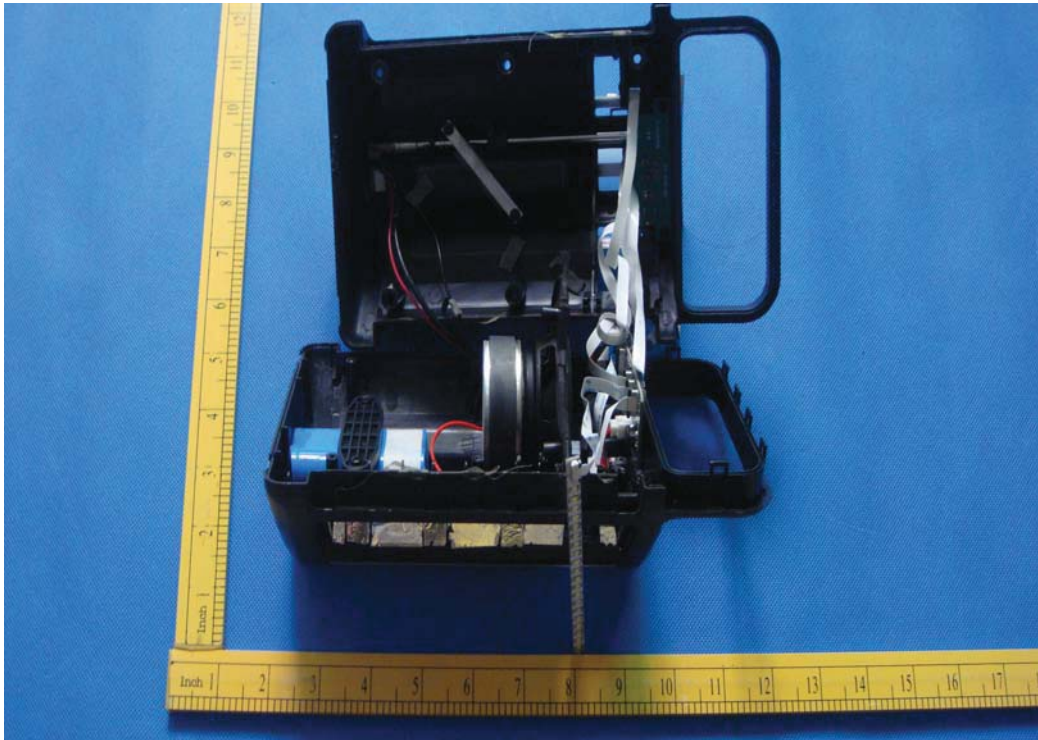
### 13. Photos of EUT

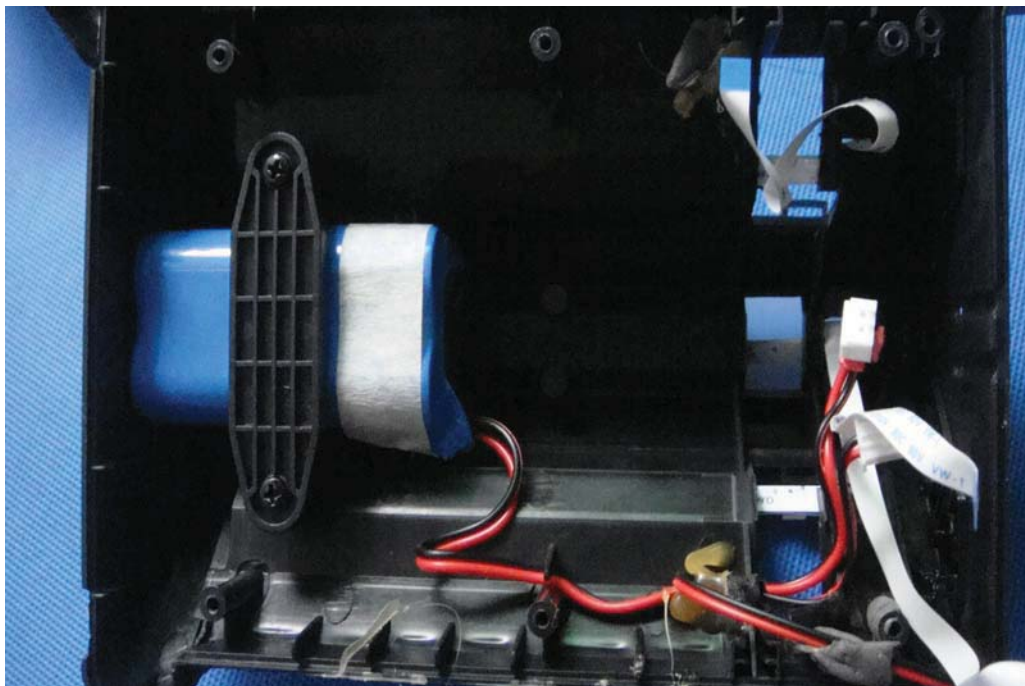
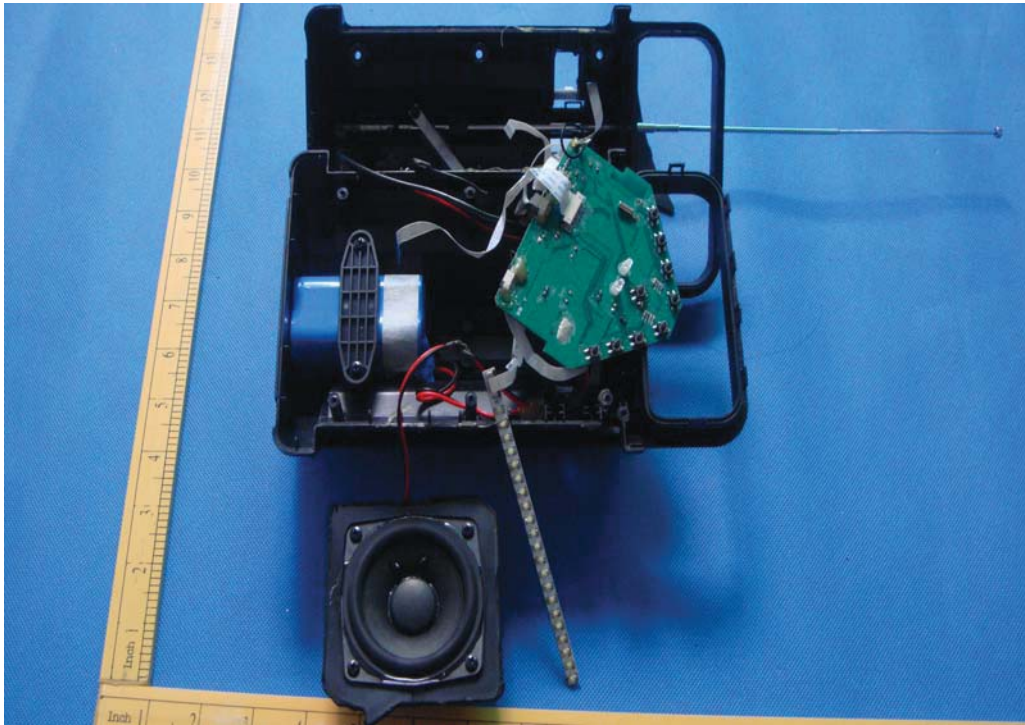




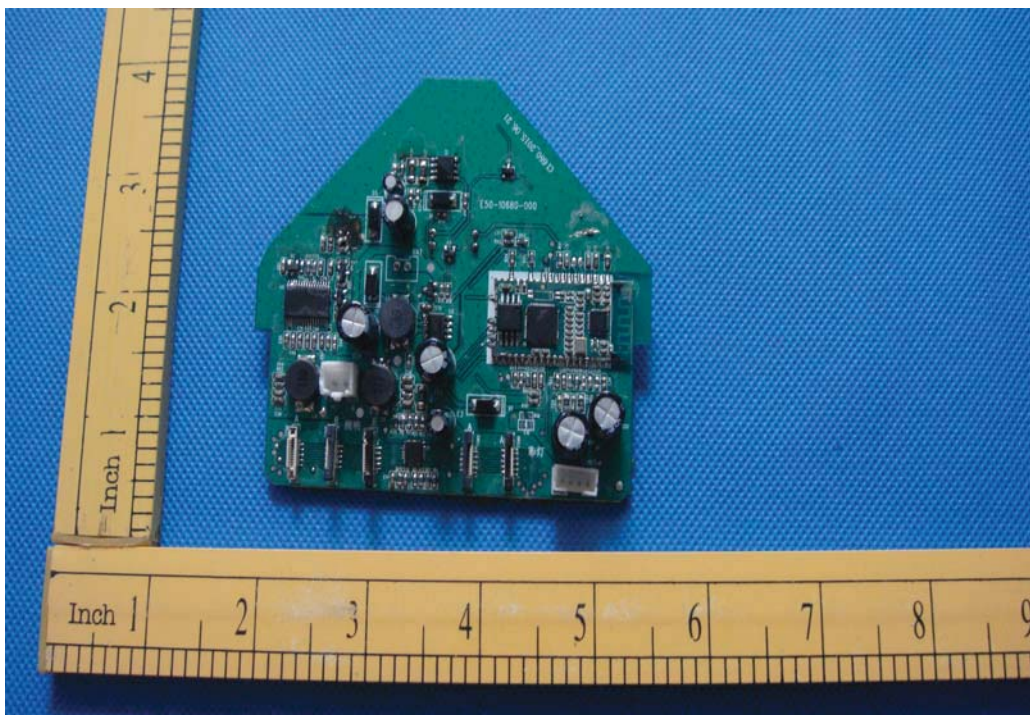
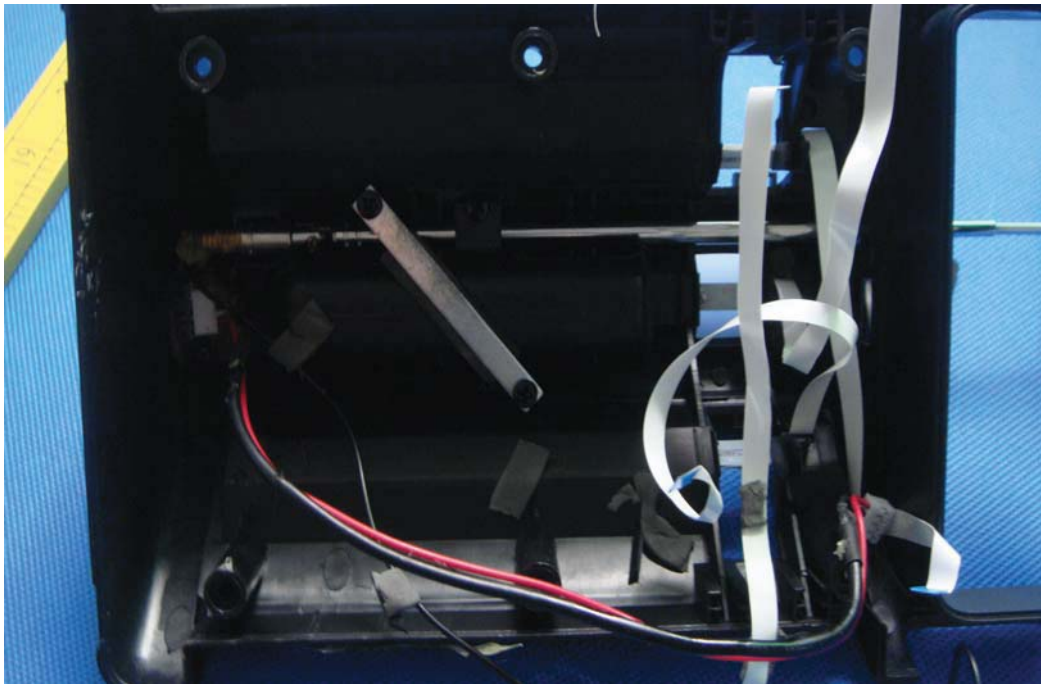


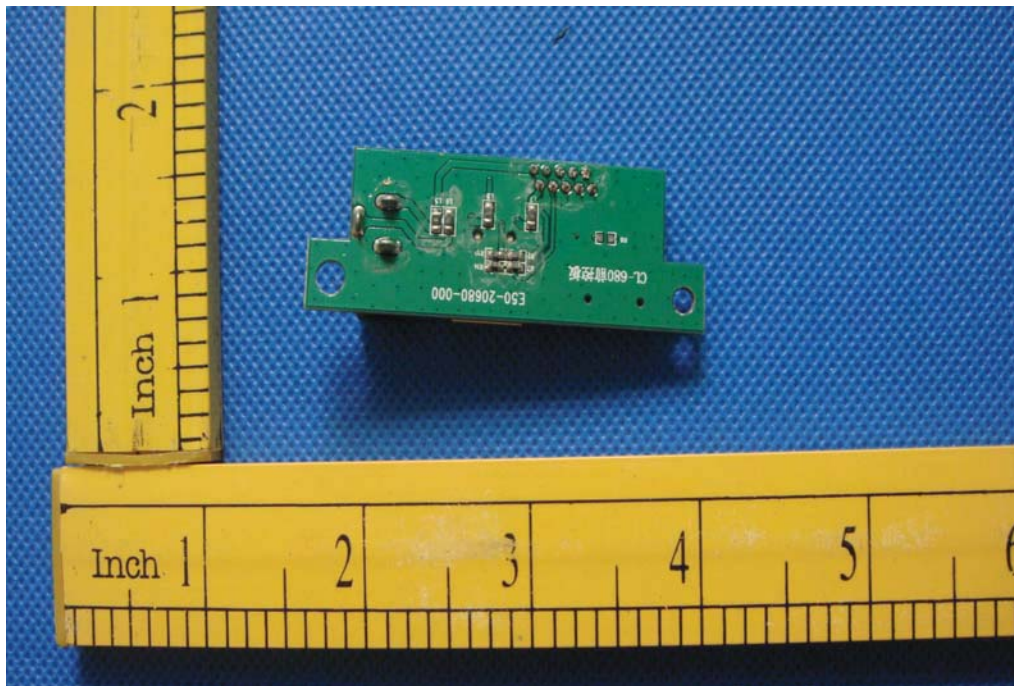
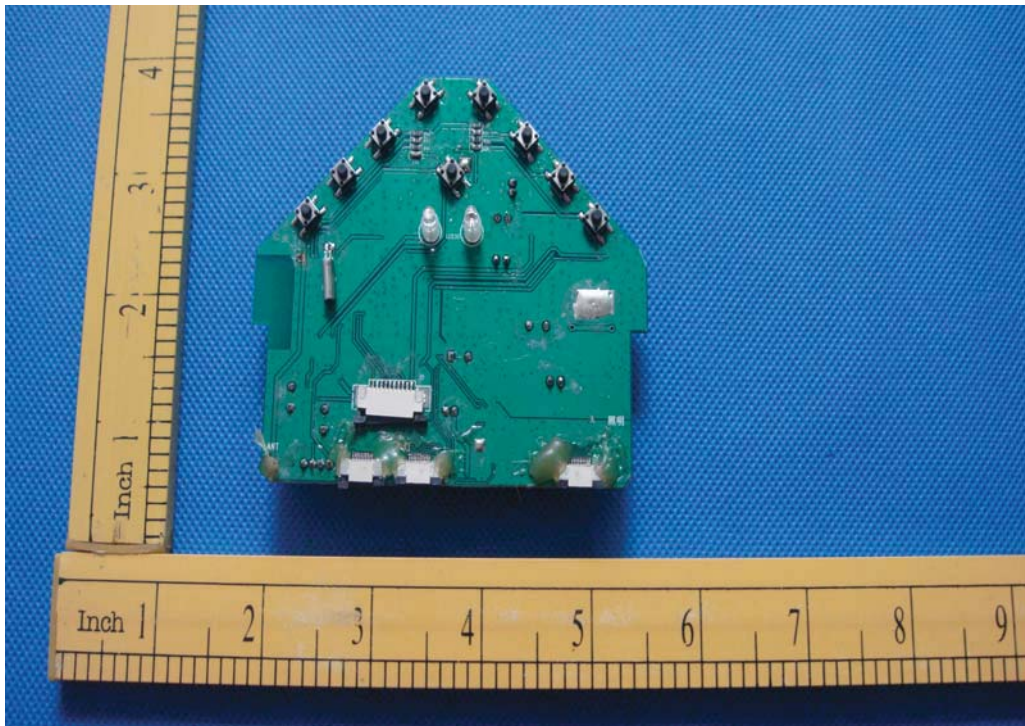


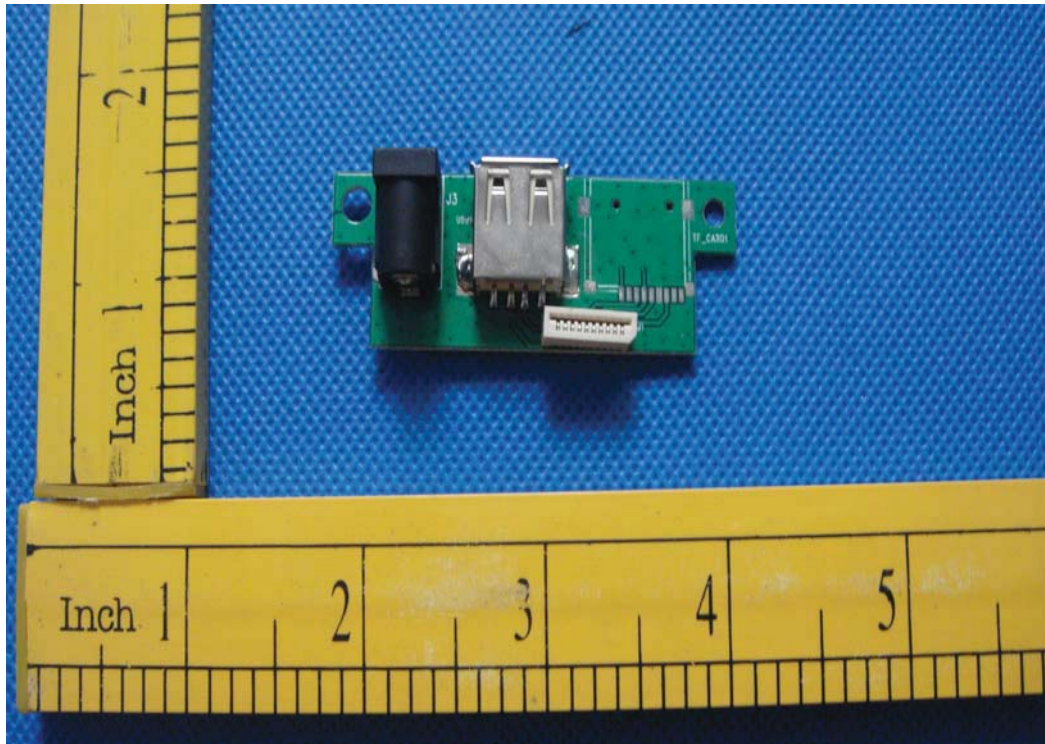












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