

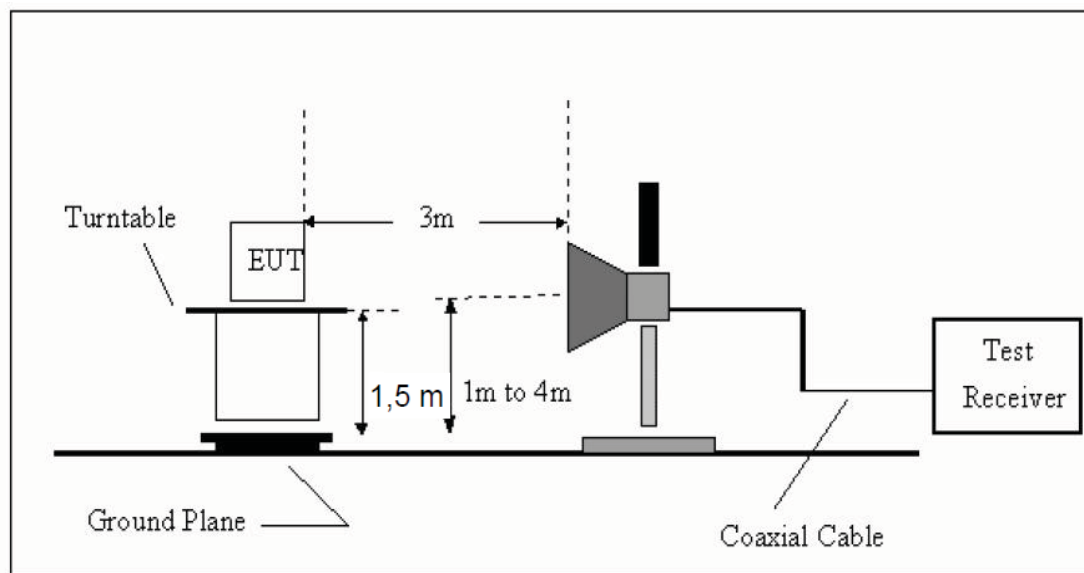
1GHz—25GHz Radiated emission Test result									
EUT: Bluetooth lighting speaker					M/N: HZ-9458				
Power: DC 3.7V from battery									
Test date: 2016-04-11 Test site: 3m Chamber Tested by: Peter									
Test mode: 8- DQPSK Tx CH1 2402MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804	42.99	33.95	10.18	34.26	52.86	74	21.14	PK
2	4804	31.51	33.95	10.18	34.26	41.38	54	12.62	AV
3	7206	/							
4	9608	/							
5	12010	/							
Antenna Polarity: Horizontal									
1	4804	42.83	33.95	10.18	34.26	52.7	74	21.3	PK
2	4804	31.58	33.95	10.18	34.26	41.45	54	12.55	AV
3	7206	/							
4	9608	/							
5	12010	/							
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.									

1GHz—25GHz Radiated emission Test result									
EUT: Bluetooth lighting speaker					M/N: HZ-9458				
Power: DC 3.7V from battery									
Test date: 2016-04-11 Test site: 3m Chamber Tested by: Peter									
Test mode: 8- DQPSK Tx CH40 2441MHz									
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	4882	42.86	33.93	10.2	34.29	52.7	74	21.3	PK
2	4882	31.74	33.93	10.2	34.29	41.58	54	12.42	AV
3	7323	/							
4	9764	/							
5	12205	/							
Antenna Polarity: Horizontal									
1	4882	42.89	33.93	10.2	34.29	52.73	74	21.27	PK
2	4882	31.84	33.93	10.2	34.29	41.68	54	12.32	AV
3	7323	/							
4	9764	/							
5	12205	/							
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.									

1GHz—25GHz Radiated emission Test result									
EUT: Bluetooth lighting speaker					M/N: HZ-9458				
Power: DC 3.7V from battery									
Test date: 2016-04-11 Test site: 3m Chamber Tested by: Peter									
Test mode: 8- DQPSK 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	42.93	33.98	10.22	34.25	52.88	74	21.12	PK
2	4960	32.56	33.98	10.22	34.25	42.51	54	11.49	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	32.39	33.98	10.22	34.25	42.34	54	11.66	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 FCC Part 15, all the other emissions outside operation shall be at least 20dB below the fundamental emissions, or comply with FCC Part 15 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: Bluetooth lighting speaker					M/N: HZ-9458			
Power: DC 3.7V from battery								
Test date: 2016-04-11 Test site: 3m Chamber Tested by: Peter								
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	44.15	27.62	3.92	34.97	40.72	74	33.28	PK
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	43.64	27.62	3.92	34.97	40.21	74	33.79	PK
2390	--	27.62	3.92	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: Bluetooth lighting speaker					M/N: HZ-9458			
Power: DC 3.7V from battery								
Test date: 2016-04-11			Test site: 3m Chamber		Tested by: Peter			
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	43.48	27.89	4	34.97	40.4	74	33.6	PK
2483.5	--	27.89	4	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	43.67	27.89	4	34.97	40.59	74	33.41	PK
2483.5	--	27.89	4	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: Bluetooth lighting speaker					M/N: HZ-9458			
Power: DC 3.7V from battery								
Test date: 2016-04-11			Test site: 3m Chamber		Tested by: Peter			
Test mode: Tx								
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	42.48	27.62	3.92	34.97	39.05	74	34.95	PK
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	43.43	27.62	3.92	34.97	40	74	34	PK
2390	--	27.62	3.92	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: Bluetooth lighting speaker					M/N: HZ-9458			
Power: DC 3.7V from battery								
Test date: 2016-04-11			Test site: 3m Chamber		Tested by: Peter			
Test mode: Tx								
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	42.95	27.89	4	34.97	39.87	74	34.13	PK
2483.5	--	--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	43.17	27.89	4	34.97	40.09	74	33.91	PK
2483.5	--	--	--	--	--	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: Bluetooth lighting speaker					M/N: HZ-9458			
Power: DC 3.7V from battery								
Test date: 2016-04-11			Test site: 3m Chamber		Tested by: Peter			
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	43.25	27.62	3.92	34.97	39.82	74	34.18	PK
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	43.57	27.62	3.92	34.97	40.14	74	33.86	PK
2390	--	27.62	3.92	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: Bluetooth lighting speaker					M/N: HZ-9458			
Power: DC 3.7V from battery								
Test date: 2016-04-11 Test site: 3m Chamber Tested by: Peter								
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	42.66	27.89	4	34.97	39.58	74	34.42	PK
2483.5	--	--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	43.1	27.89	4	34.97	40.02	74	33.98	PK
2483.5	--	--	--	--	--	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: Bluetooth lighting speaker					M/N: HZ-9458			
Power: DC 3.7V from battery								
Test date: 2016-04-11 Test site: 3m Chamber Tested by: Peter								
Test mode:								
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	43.25	27.62	3.92	34.97	39.82	74	34.18	PK
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	43.21	27.62	3.92	34.97	39.78	74	34.22	PK
2390	--	27.62	3.92	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: Bluetooth lighting speaker					M/N: HZ-9458			
Power: DC 3.7V from battery								
Test date: 2016-04-11			Test site: 3m Chamber			Tested by: Peter		
Test mode: Tx								
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	42.5	27.89	4	34.97	39.42	74	34.58	PK
2483.5	--	--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	43.75	27.89	4	34.97	40.67	74	33.33	PK
2483.5	--	--	--	--	--	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: Bluetooth lighting speaker					M/N: HZ-9458			
Power: DC 3.7V from battery								
Test date: 2016-04-11 Test site: 3m Chamber Tested by: Peter								
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	43.43	27.62	3.92	34.97	40	74	34	PK
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	43.64	27.62	3.92	34.97	40.21	74	33.79	PK
2390	--	27.62	3.92	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: Bluetooth lighting speaker					M/N: HZ-9458			
Power: DC 3.7V from battery								
Test date: 2016-04-11			Test site: 3m Chamber		Tested by: Peter			
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	42.48	27.89	4	34.97	39.4	74	34.6	PK
2483.5	--	--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	43.83	27.89	4	34.97	40.75	74	33.25	PK
2483.5	--	--	--	--	--	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)

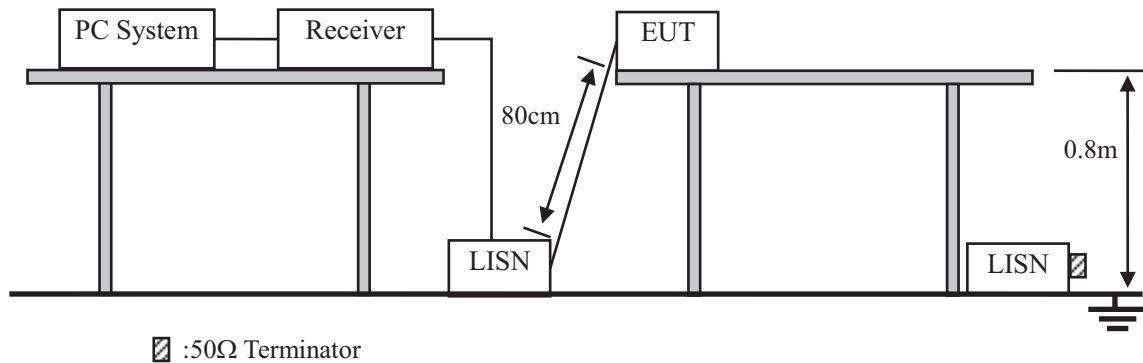
Band Edge Test result								
EUT: Bluetooth lighting speaker					M/N: HZ-9458			
Power: DC 3.7V from battery								
Test date: 2016-04-11			Test site: 3m Chamber		Tested by: Peter			
Test mode: Tx								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	43.15	27.62	3.92	34.97	39.72	74	34.28	PK
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	43.68	27.62	3.92	34.97	40.25	74	33.75	PK
2390	--	27.62	3.92	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: Bluetooth lighting speaker					M/N: HZ-9458			
Power: DC 3.7V from battery								
Test date: 2016-04-11			Test site: 3m Chamber			Tested by: Peter		
Test mode: Tx								
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	42.57	27.89	4	34.97	39.49	74	34.51	PK
2483.5	--	--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	43.28	27.89	4	34.97	40.2	74	33.8	PK
2483.5	--	--	--	--	--	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.								

10. Power Line Conducted Emissions

10.1. Block Diagram of Test Setup



10.2. Limit

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

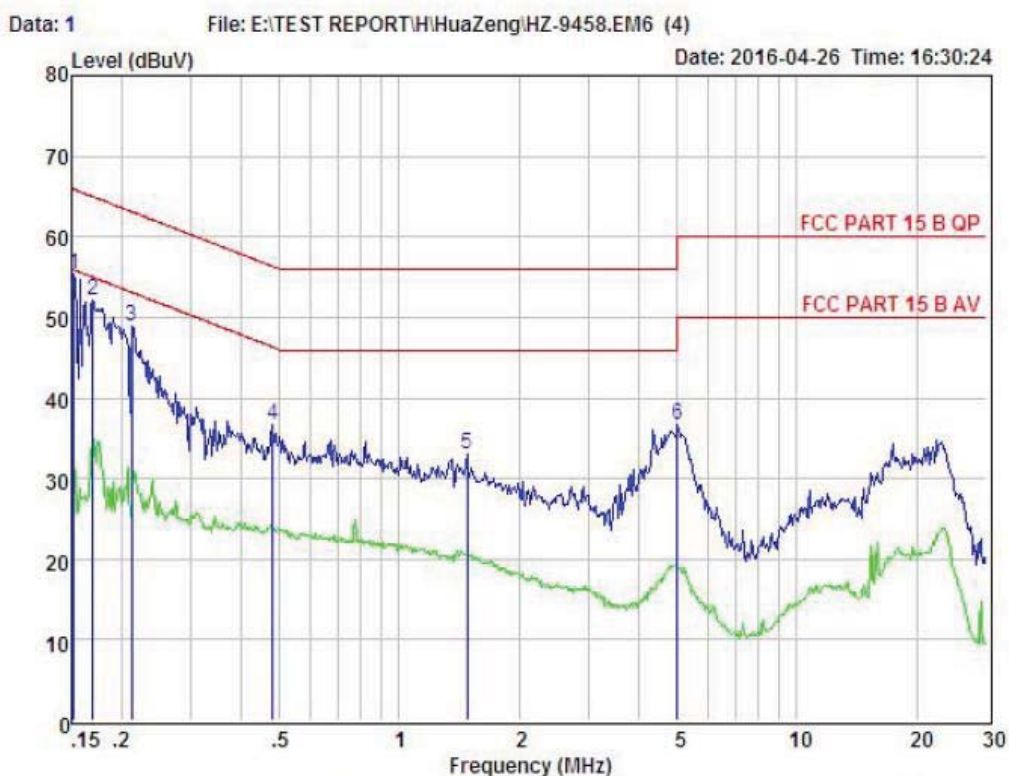
Notes: 1. * Decreasing linearly with logarithm of frequency.

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 C63.10 2013 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.

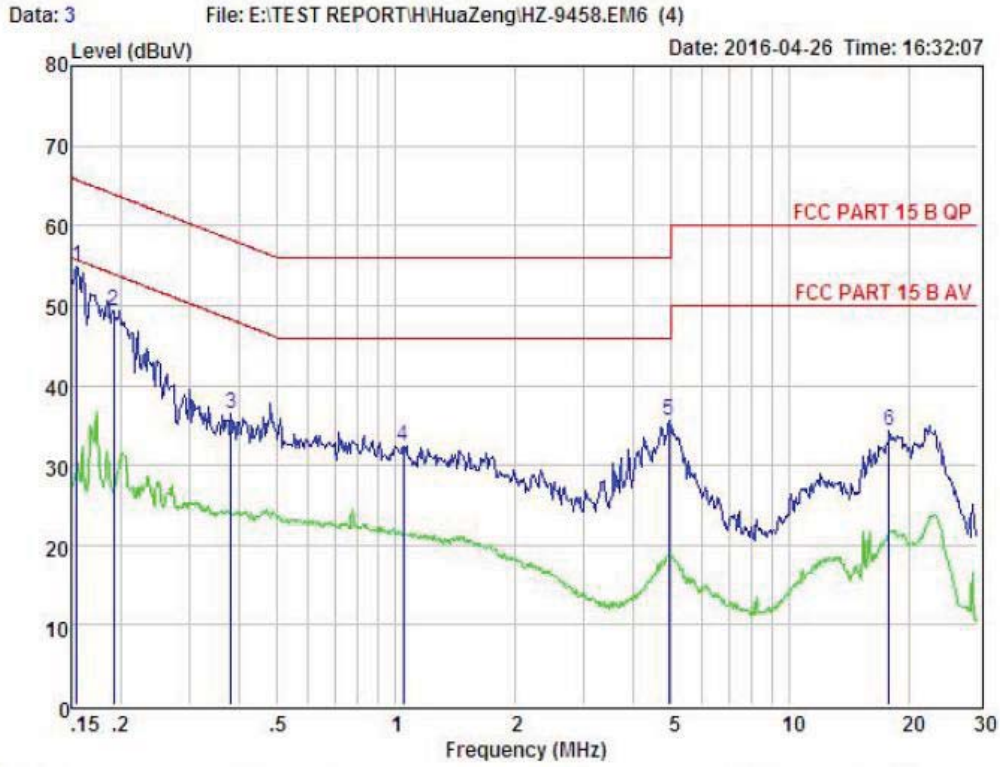
10.4. Test Result



Condition : FCC PART 15 B QP POL: LINE Temp: 25°C Hum: 51 %
 EUT :
 Model No :
 Test Mode :
 Power : DC 5V from PC with AC 120V/60Hz
 Test Engineer :
 Remark :

Item	Freq MHz	Read Level dBuV	LISN Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	0.152	45.67	0.03	-9.52	0.10	55.32	65.91	-10.59	Peak
2	0.169	42.38	0.03	-9.52	0.10	52.03	64.99	-12.96	Peak
3	0.213	39.27	0.03	-9.52	0.10	48.92	63.10	-14.18	Peak
4	0.481	26.89	0.03	-9.58	0.10	36.60	56.32	-19.72	Peak
5	1.480	23.30	0.05	-9.68	0.10	33.13	56.00	-22.87	Peak
6	5.005	26.55	0.10	-9.93	0.12	36.70	60.00	-23.30	Peak

Remark: Level = Read Level + LISN Factor - Preamp Factor + Cable Loss



Condition : FCC PART 15 B QP POL: NEUTRAL Temp: 25°C Hum: 51 %
 EUI :
 Model No :
 Test Mode :
 Power : DC 5V from PC with AC 120V/60Hz
 Test Engineer :
 Remark :

Item	Freq MHz	Read Level dBuV	LISN Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	0.155	45.26	0.03	-9.52	0.10	54.91	65.74	-10.83	Peak
2	0.192	39.76	0.03	-9.52	0.10	49.41	63.93	-14.52	Peak
3	0.381	26.78	0.03	-9.57	0.10	36.48	58.25	-21.77	Peak
4	1.043	22.72	0.04	-9.63	0.10	32.49	56.00	-23.51	Peak
5	4.926	25.56	0.10	-9.92	0.12	35.70	56.00	-20.30	Peak
6	17.849	23.80	0.29	-9.82	0.32	34.23	60.00	-25.77	Peak

Remark: Level = Read Level + LISN Factor - Preamp Factor + Cable Loss

11. Antenna Requirements

11.1. Limit

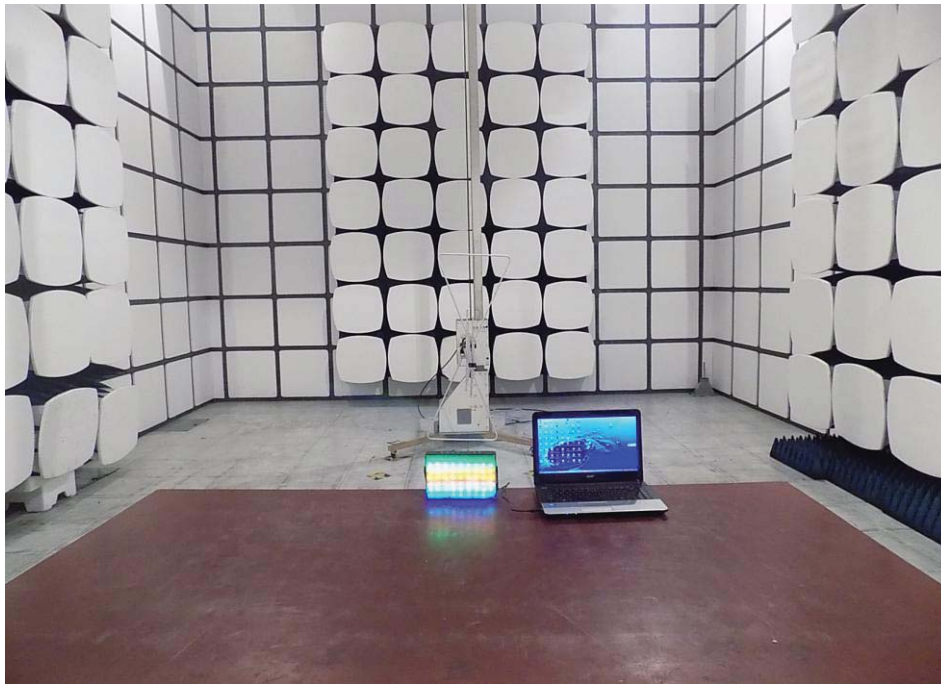
For intentional device, according to FCC Part 15, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC Part 15, if transmitting antennas of directional gain greater than 6dBi are used, 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 .

12. Test setup photo

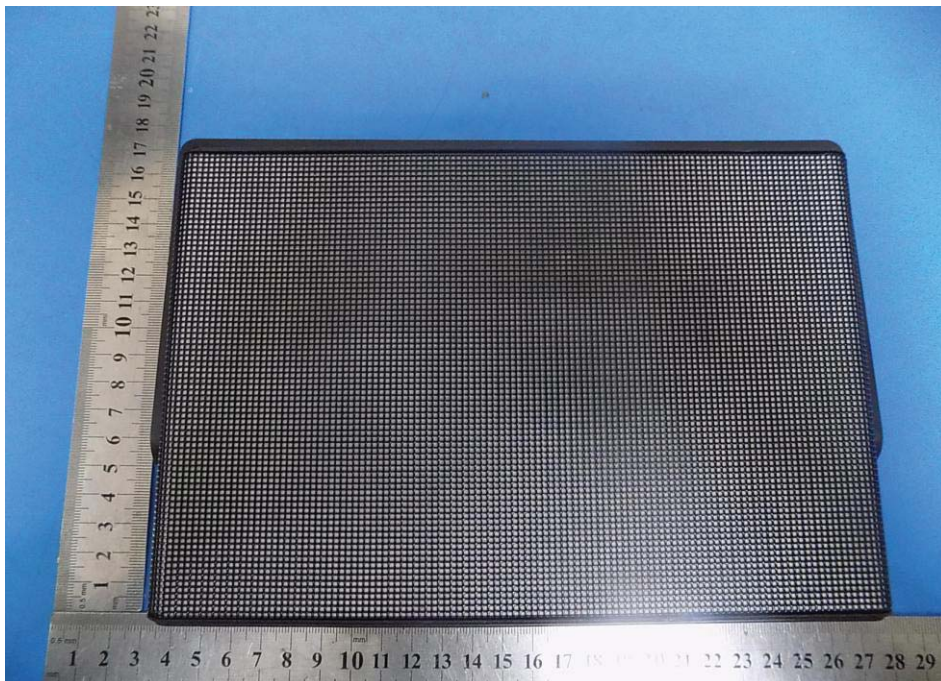
Photographs-Radiated Emission Test Setup in Chamber



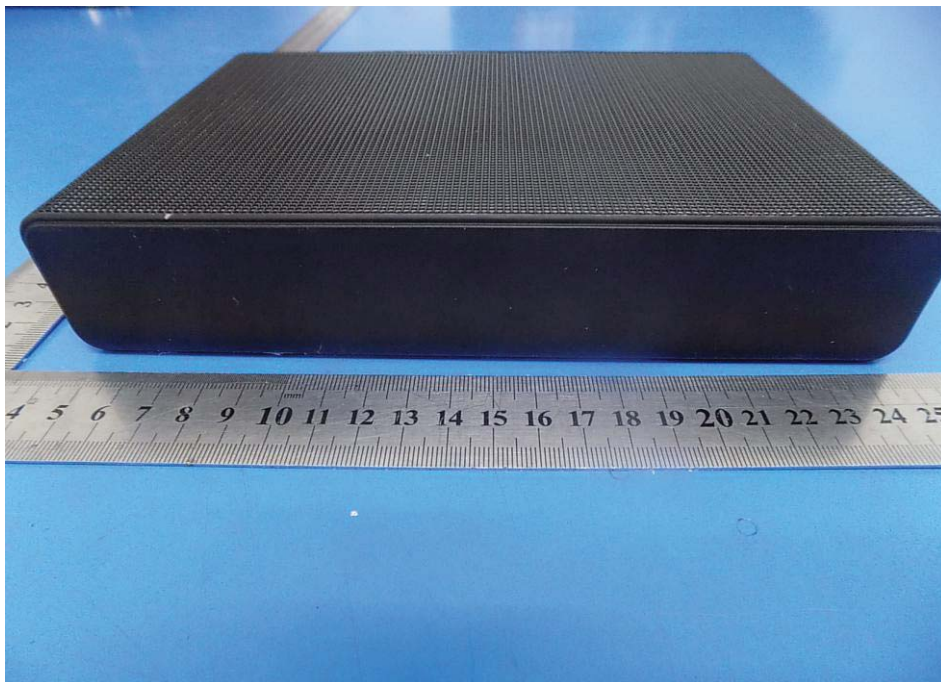
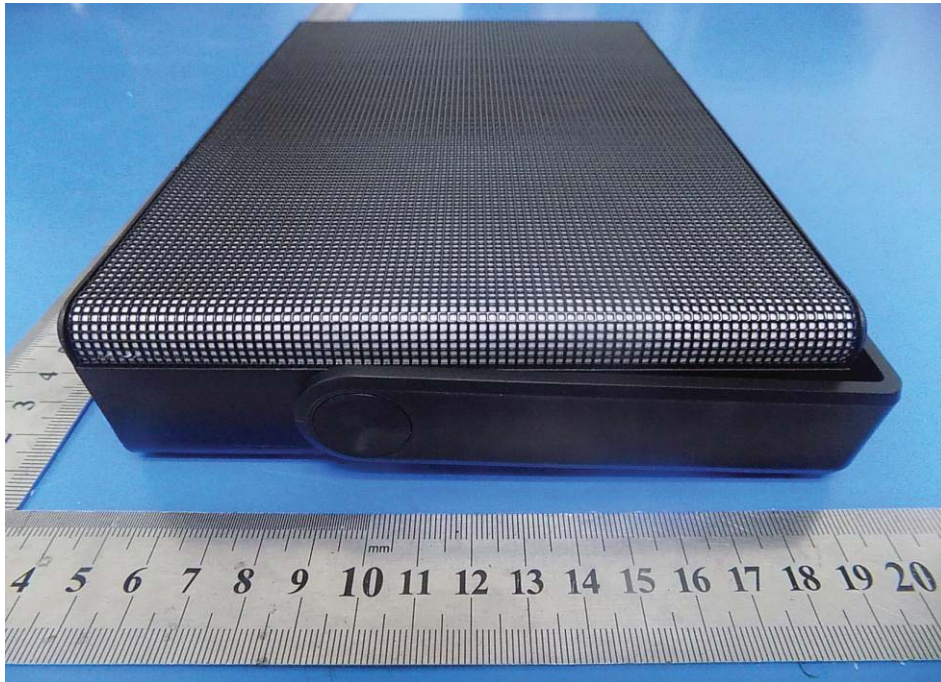
Photos of conducted emission

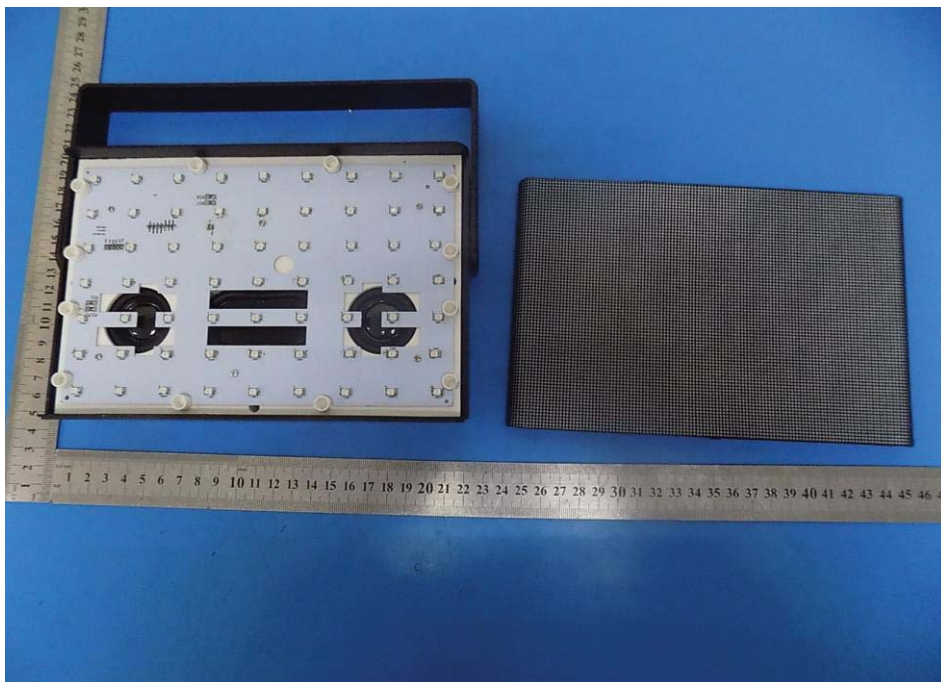


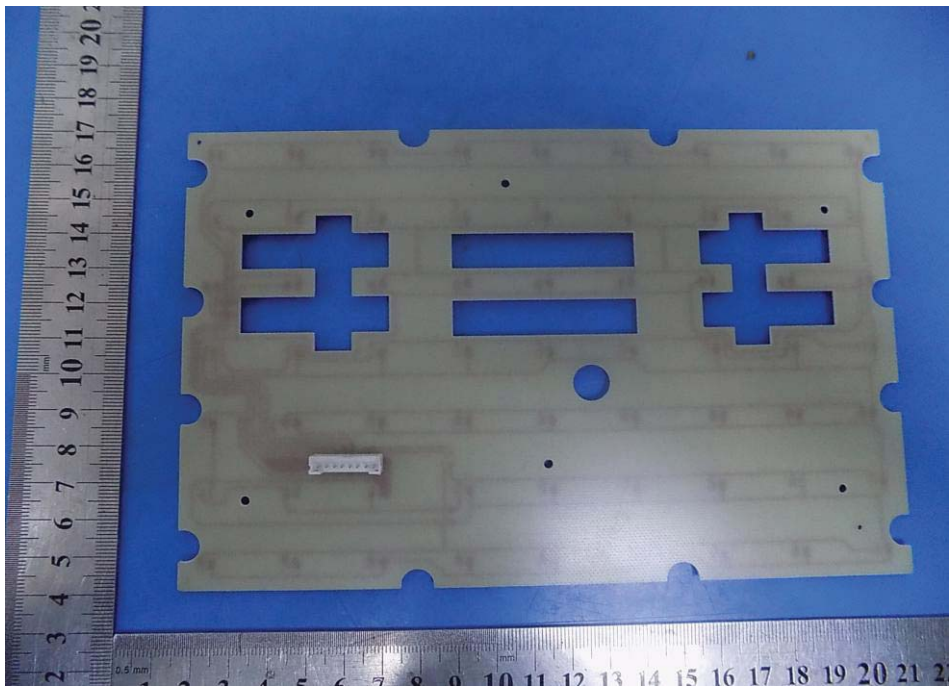
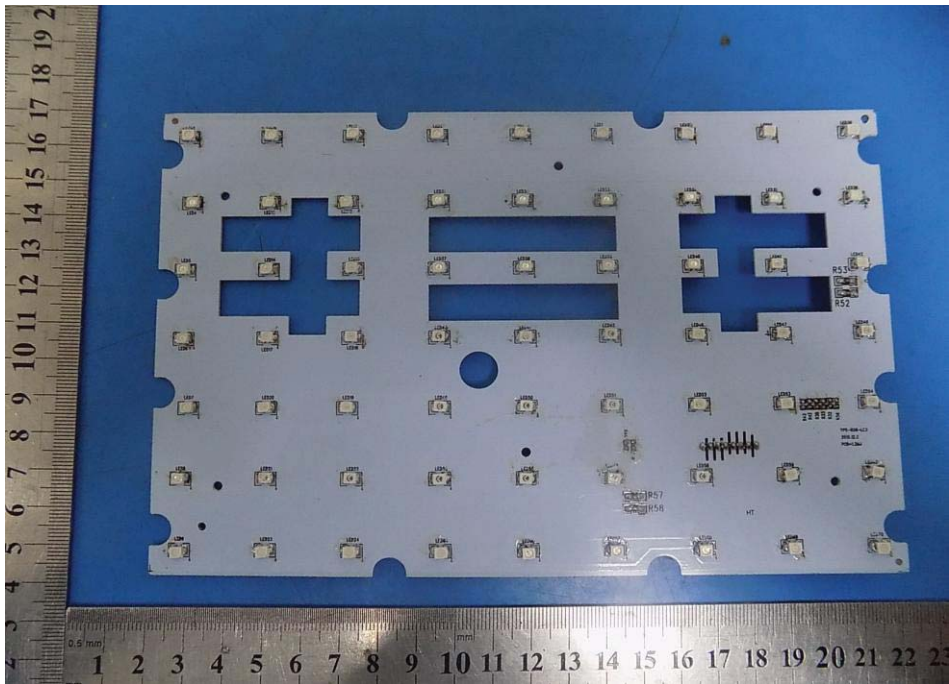
13. Photos of EUT

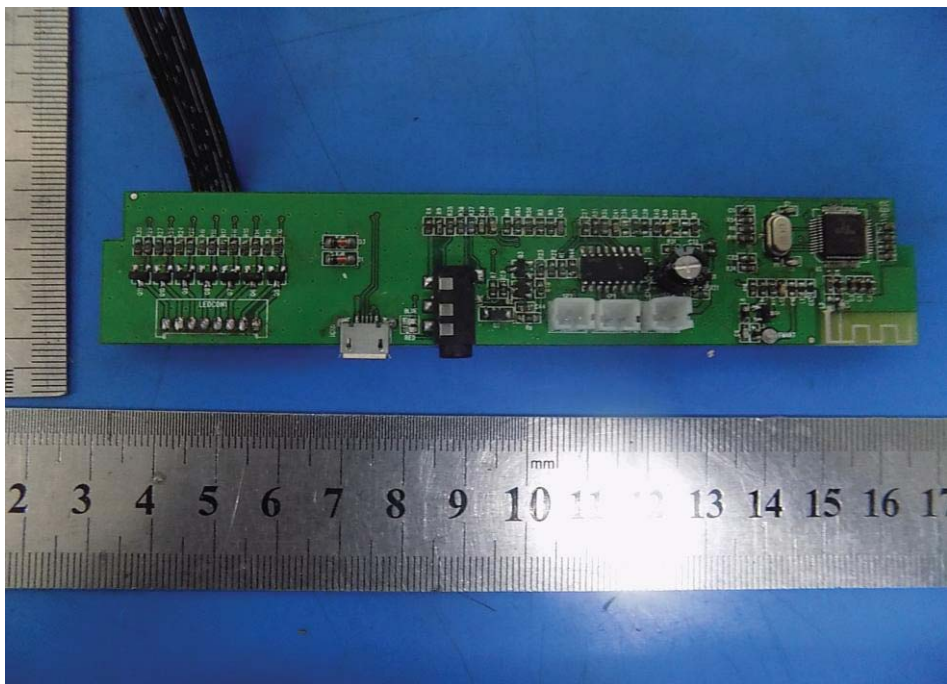


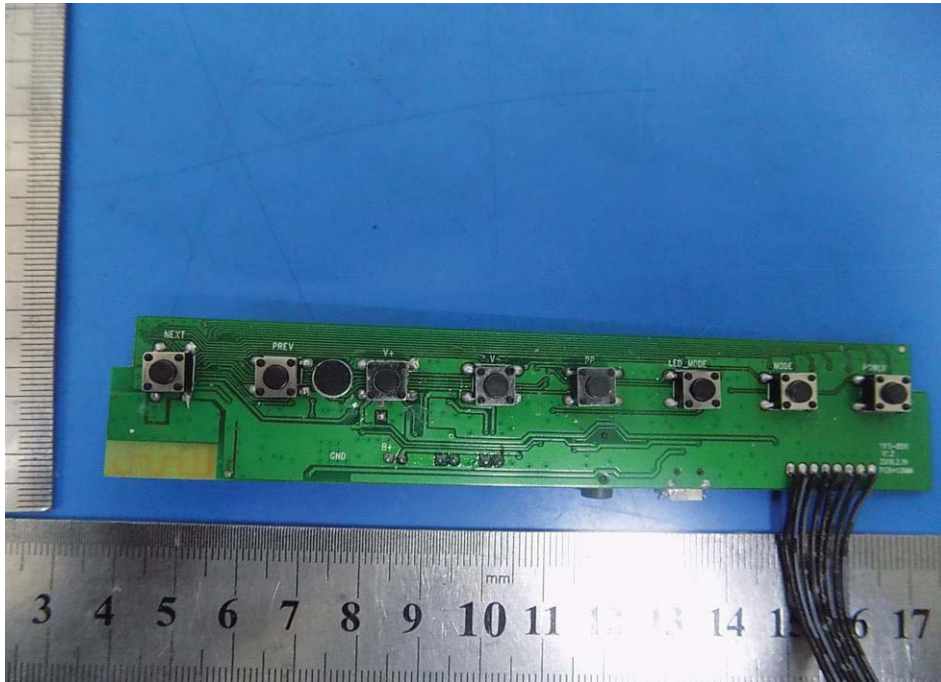












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