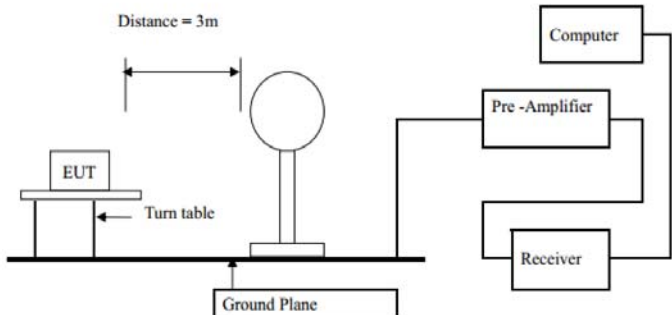
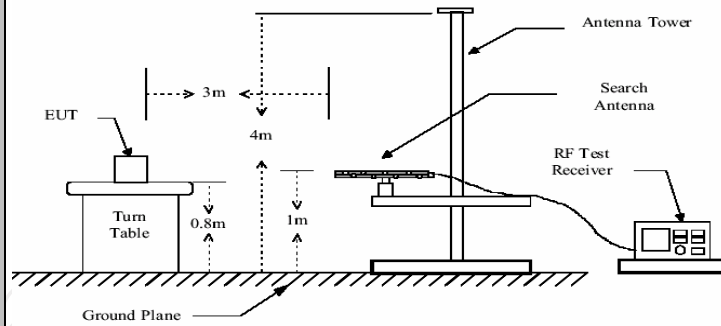


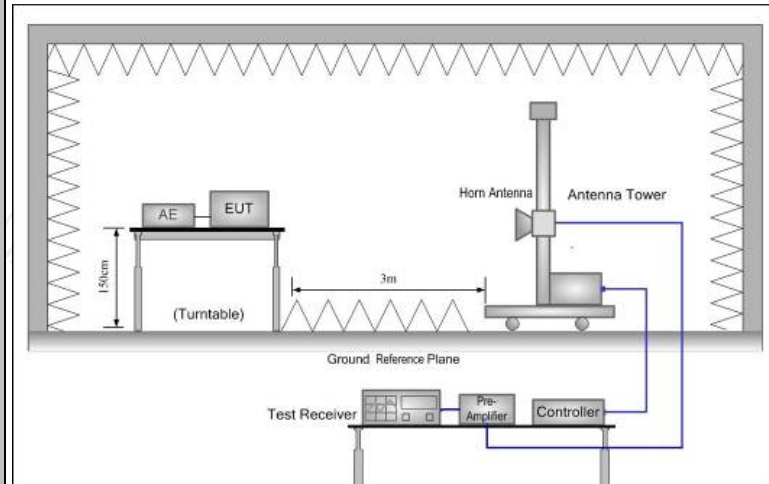
6.11. Radiated Spurious Emission Measurement

6.11.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Frequency Range:	9 kHz to 25 GHz				
Measurement Distance:	3 m				
Antenna Polarization:	Horizontal & Vertical				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
	150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
Limit:	Frequency		Field Strength (microvolts/meter)		Measurement Distance (meters)
	0.009-0.490		2400/F(KHz)		300
	0.490-1.705		24000/F(KHz)		30
	1.705-30		30		30
	30-88		100		3
	88-216		150		3
	216-960		200		3
	Above 960		500		3
	Frequency		Field Strength (microvolts/meter)	Measurement Distance (meters)	Detector
	Above 1GHz		500	3	Average
		5000	3	Peak	
Test setup:	For radiated emissions below 30MHz				
					
	30MHz to 1GHz				



Above 1GHz



Test Mode:

Transmitting mode with modulation

Test Procedure:

1. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10:2013 Measurement Guidelines.

2. For the radiated emission test below 1GHz:

The EUT was placed on a turntable with 0.8 meter above ground. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high PASS filter are used for the test in order to get better signal level.

For the radiated emission test above 1GHz:

Place the measurement antenna on a turntable with 1.5 meter above ground, which is away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT,

	depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. 3. Set to the maximum power setting and enable the EUT transmit continuously. 4. Use the following spectrum analyzer settings: (1) Span shall wide enough to fully capture the emission being measured; (2) Set RBW=100 kHz for $f < 1$ GHz, RBW=1MHz for $f > 1$GHz ; VBW$\geq$RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak (3) For average measurement: use duty cycle correction factor method per 15.35(c). Duty cycle = On time/100 milliseconds On time = $N_1 \cdot L_1 + N_2 \cdot L_2 + \dots + N_{n-1} \cdot L_{n-1} + N_n \cdot L_n$ Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc. Average Emission Level = Peak Emission Level + $20 \cdot \log(\text{Duty cycle})$ Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
Test results:	PASS

6.11.2. Test Instruments

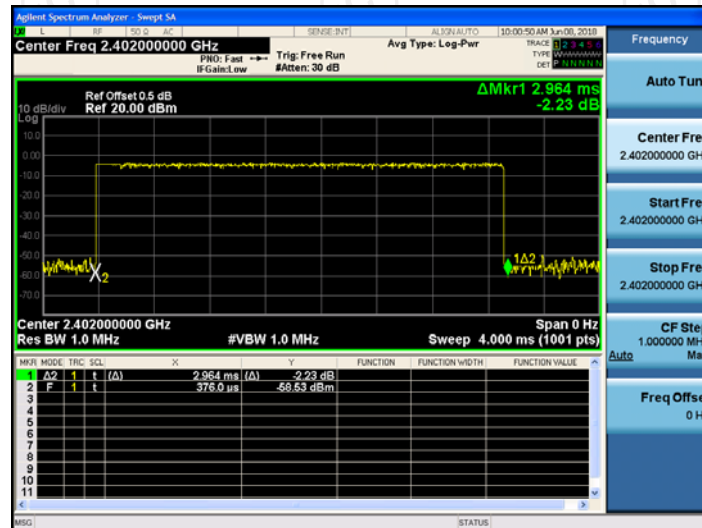
Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	ROHDE&SCHW ARZ	ESVD	100008	Sep. 27, 2018
Spectrum Analyzer	ROHDE&SCHW ARZ	FSQ	200061	Sep. 27, 2018
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Sep. 27, 2018
Pre-amplifier	HP	8447D	2727A05017	Sep. 27, 2018
Loop antenna	ZHINAN	ZN30900A	12024	Sep. 27, 2018
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 27, 2018
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep. 27, 2018
Horn Antenna	Schwarzbeck	BBH 9170	582	Sep. 27, 2018
Antenna Mast	Keleto	CC-A-4M	N/A	N/A
Coax cable (9KHz-1GHz)	TCT	RE-low-01	N/A	Sep. 27, 2018
Coax cable (9KHz-40GHz)	TCT	RE-high-02	N/A	Sep. 27, 2018
Coax cable (9KHz-1GHz)	TCT	RE-low-03	N/A	Sep. 27, 2018
Coax cable (9KHz-40GHz)	TCT	RE-high-04	N/A	Sep. 27, 2018
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

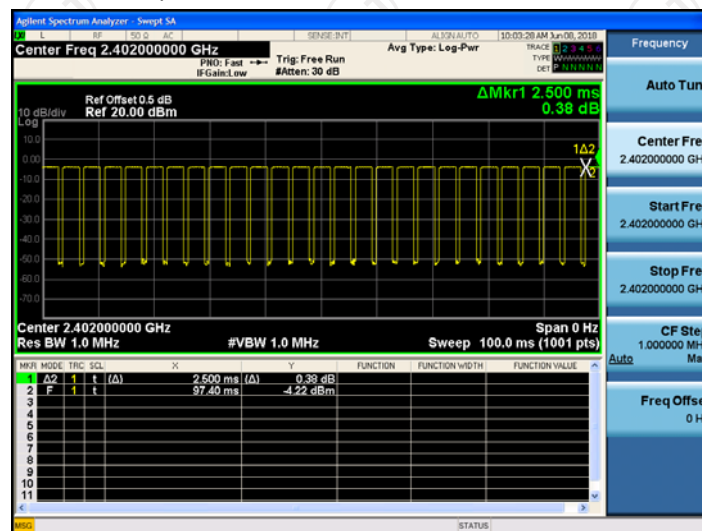
6.11.3. Test Data

Duty cycle correction factor for average measurement

2DH5 on time (One Pulse) Plot on Channel 00



2DH5 on time (Count Pulses) Plot on Channel 00



Note:

1. Worst case Duty cycle = on time/100 milliseconds = $(2.964 \times 26 + 2.500) / 100 = 0.7956$
2. Worst case Duty cycle correction factor = $20 \times \log(\text{Duty cycle}) = -1.99\text{dB}$
3. 2DH5 has the highest duty cycle worst case and is reported.
4. The average levels were calculated from the peak level corrected with duty cycle correction factor (-1.99dB) derived from $20 \log(\text{dwell time}/100\text{ms})$. This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

Please refer to following diagram for individual

Below 1GHz

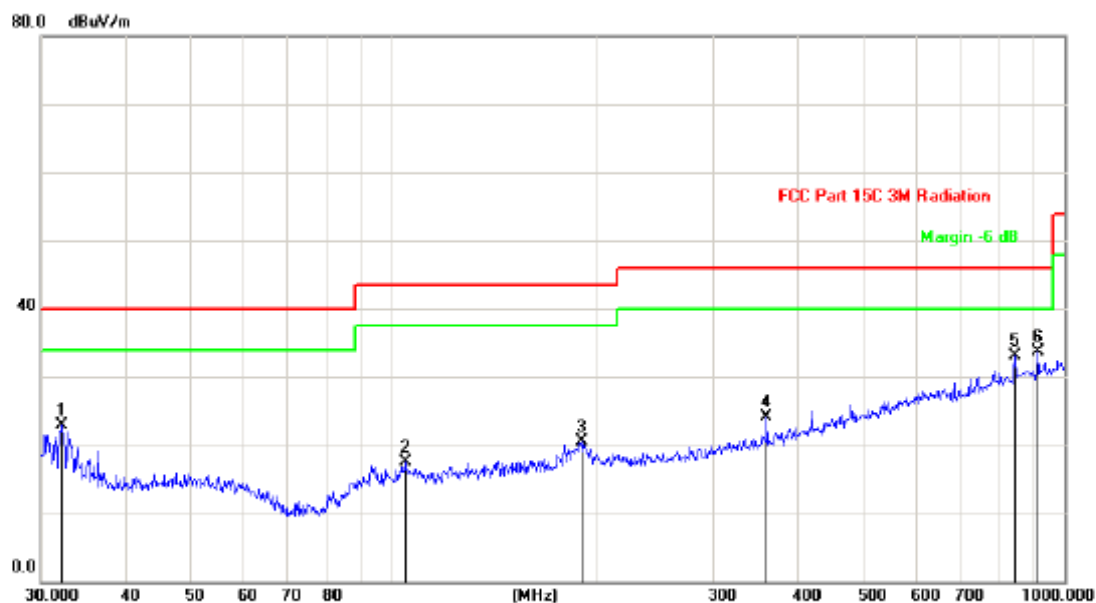
Horizontal:



Site: Polarization: **Horizontal** Temperature: 25
 Limit: FCC Part 15C 3M Radiation Power: DC 12V Humidity: 55 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	cm	degree	Comment
1		87.4177	38.91	-14.61	24.30	40.00	-15.70	peak	100	78
2		190.4050	42.02	-13.33	28.69	43.50	-14.81	peak	100	216
3		314.3765	35.20	-8.27	26.93	46.00	-19.07	peak	100	248
4		360.4476	35.01	-6.94	28.07	46.00	-17.93	peak	100	332
5		721.7259	33.70	0.41	34.11	46.00	-11.89	peak	100	0
6	*	842.1296	33.29	2.49	35.78	46.00	-10.22	peak	100	360

Vertical:



Site: Polarization: **Vertical** Temperature: 25
 Limit: FCC Part 15C 3M Radiation Power: DC 12V Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Antenna Height cm	Table Degree	Comment
1		32.2925	36.46	-13.57	22.89	40.00	-17.11	peak	100	0
2		104.5361	29.64	-12.16	17.48	43.50	-26.02	peak	200	236
3		191.0738	33.73	-13.28	20.45	43.50	-23.05	peak	100	142
4		360.4476	31.03	-6.94	24.09	46.00	-21.91	peak	100	360
5		842.1295	30.54	2.49	33.03	46.00	-12.97	peak	200	360
6	*	912.8620	30.22	3.44	33.66	46.00	-12.34	peak	100	0

Note: 1. The low frequency, which started from 9KHz~30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported

2. Measurements were conducted in all three channels (high, middle, low) and two modulation (GFSK, Pi/4 DQPSK) and the worst case Mode (Middle channel and Pi/4 DQPSK) was submitted only.

Above 1GHz

Modulation Type: Pi/4 DQPSK

Low channel: 2402 MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
2390	H	46.05	---	-8.27	37.78	---	74	54	-16.22
4804	H	47.31	---	0.66	47.97	---	74	54	-6.03
7206	H	38.74	---	9.50	48.24	---	74	54	-5.76
---	H	---	---	---	---	---	---	---	---
2390	V	43.59	---	-8.27	35.32	---	74	54	-18.68
4804	V	44.16	---	0.66	44.82	---	74	54	-9.18
7206	V	38.23	---	9.50	47.73	---	74	54	-6.27
---	V	---	---	---	---	---	---	---	---

Middle channel: 2441 MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4882	H	43.93	---	0.99	44.92	---	74	54	-9.08
7323	H	38.15	---	9.87	48.02	---	74	54	-5.98
---	H	---	---	---	---	---	---	---	---
4882	V	44.47	---	0.99	45.46	---	74	54	-8.54
7323	V	39.01	---	9.87	48.88	---	74	54	-5.12
---	V	---	---	---	---	---	---	---	---

High channel: 2480 MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
2483.5	H	46.78	---	-7.83	38.95	---	74	54	-15.05
4960	H	48.55	---	1.33	49.88	---	74	54	-4.12
7440	H	40.14	---	10.22	50.36	---	74	54	-3.64
---	H	---	---	---	---	---	---	---	---
2483.5	V	48.29	---	-7.83	40.46	---	74	54	-13.54
4960	V	47.32	---	1.33	48.65	---	74	54	-5.35
7440	V	37.98	---	10.22	48.20	---	74	54	-5.80
---	V	---	---	---	---	---	---	---	---

Note:

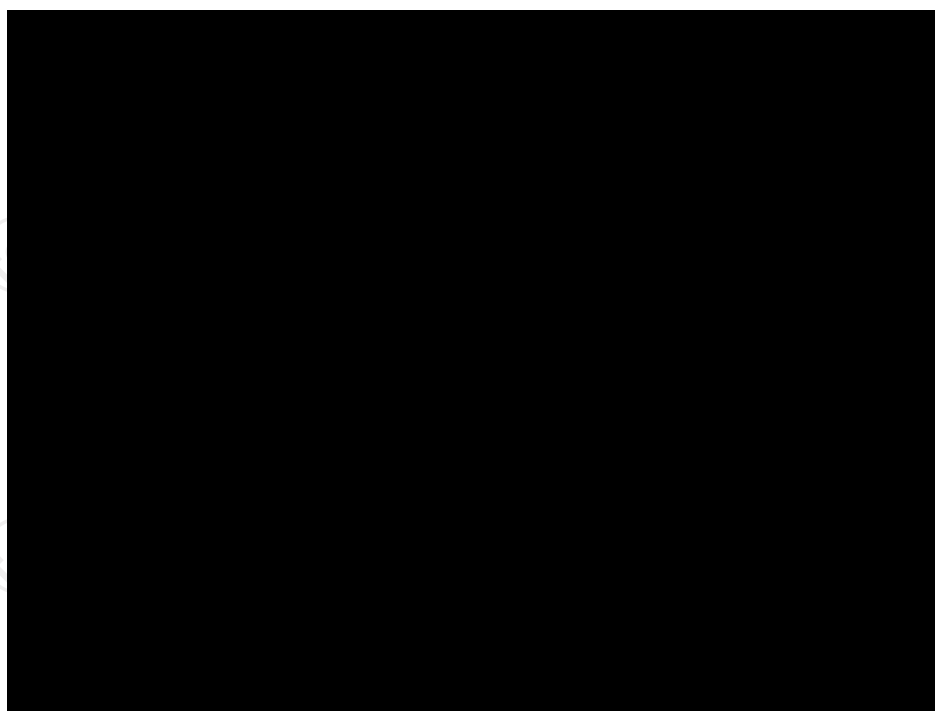
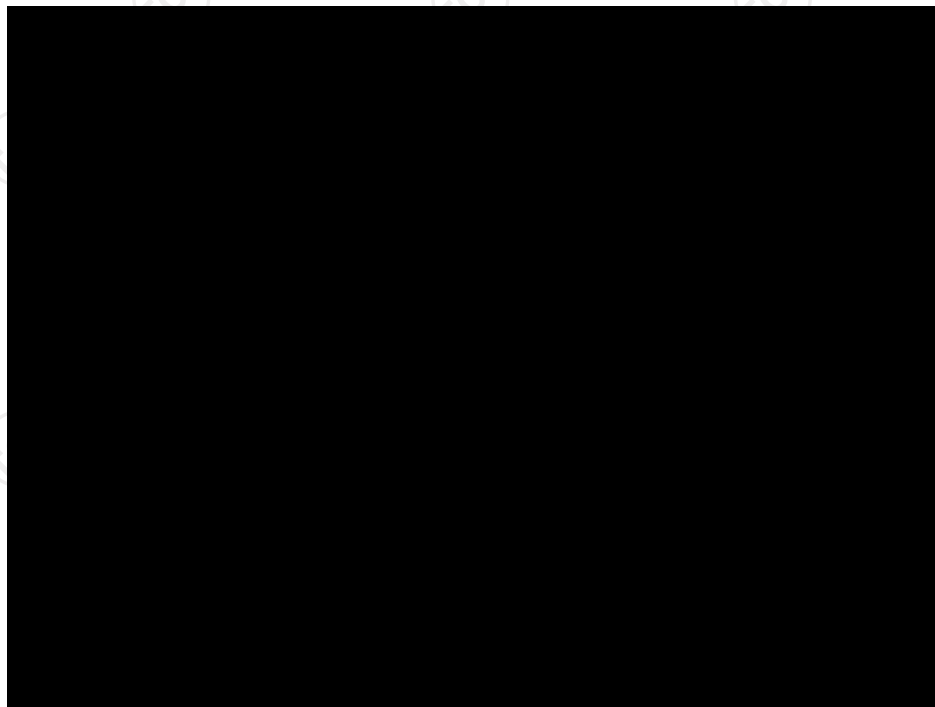
1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier
2. Margin (dB) = Emission Level (Peak) (dBμV/m)-Average limit (dBμV/m)
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
5. Data of measurement shown "----" in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.
6. Measurements were conducted in all two modulation (GFSK, Pi/4 DQPSK), and the worst case Mode (Pi/4 DQPSK) was submitted only.

Appendix A: Photographs of Test Setup

Product: Bluetooth FM transmitter

Model: BBL08

Radiated Emission



Appendix B: Photographs of EUT

Product: Bluetooth FM transmitter

Model: BBL08

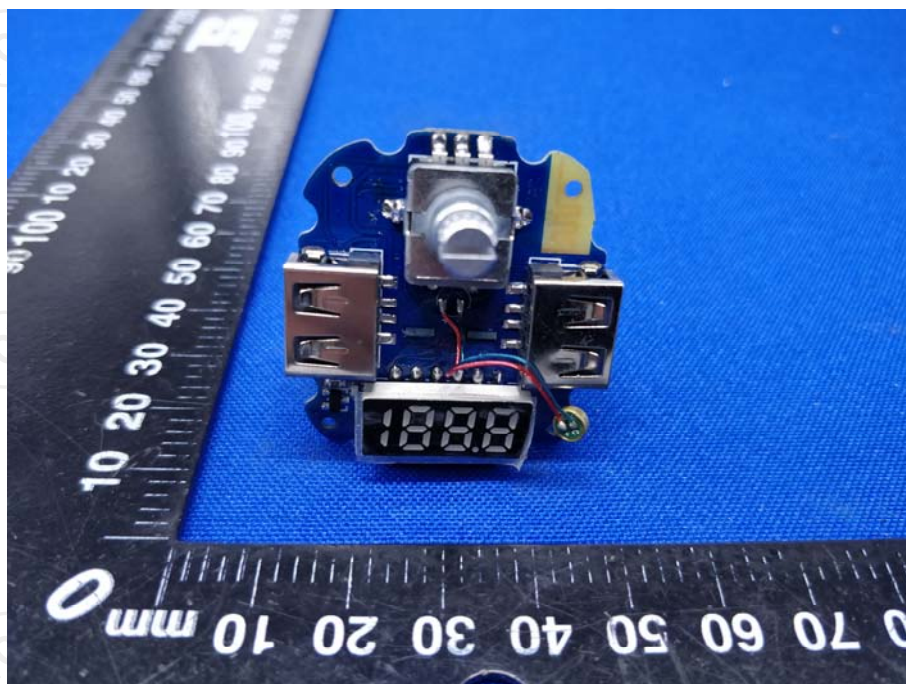
External Photos

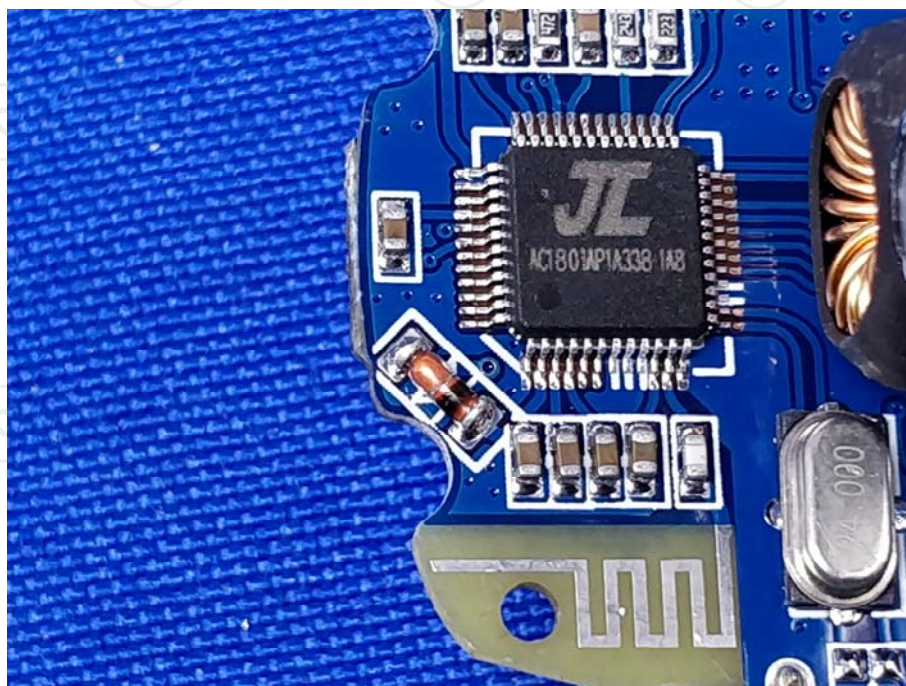
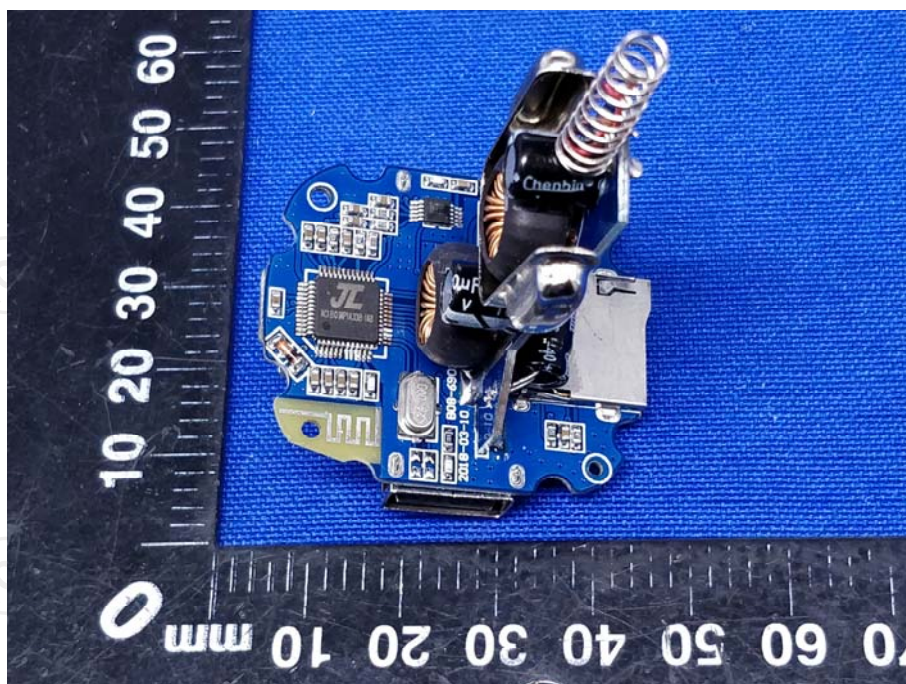


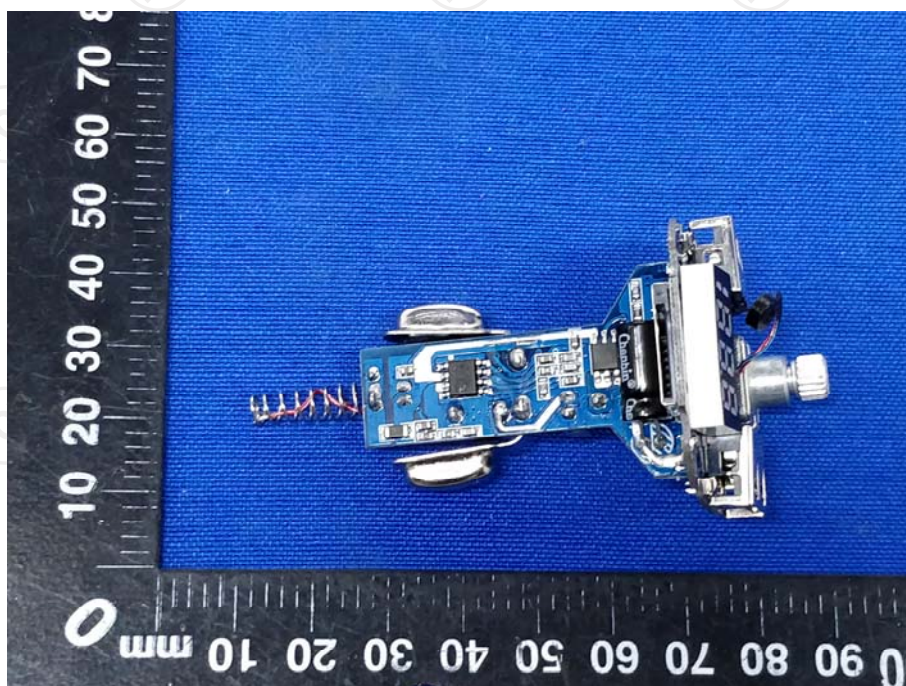
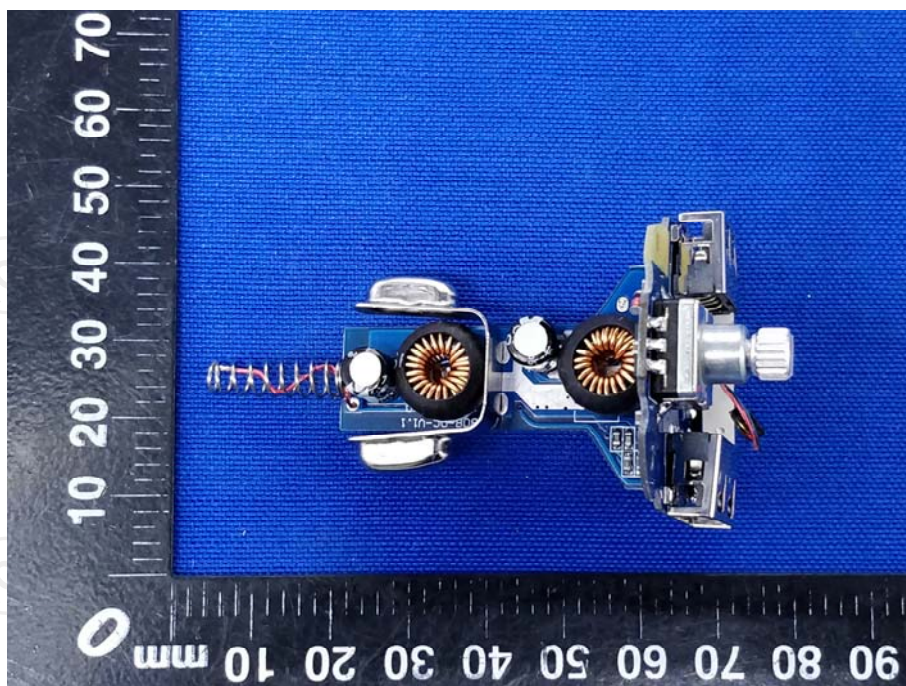


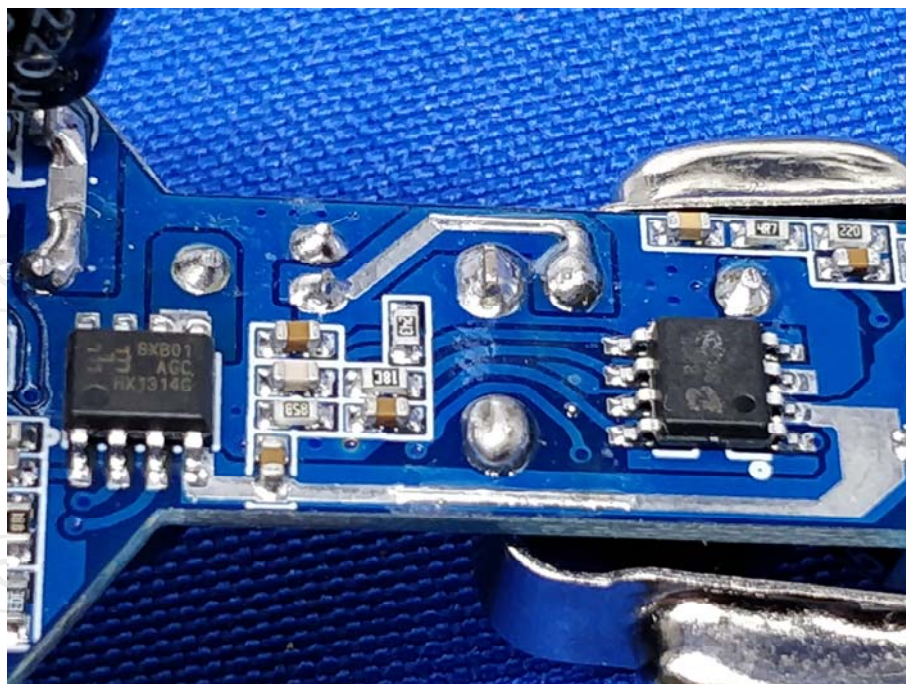


Product: Bluetooth FM transmitter
Model: BBL08
Internal Photos









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