

TEST REPORT

FCC ID: IKQBTFM3

Product: Bluetooth FM Transmitter

Model No.: BTFM3

Additional Model No.: BTFM3SR-SP

Trade Mark: SCOSCHE

Report No.: TCT180201E015

Issued Date: Feb. 07, 2018

Issued for:

Scosche Industries Inc

1550 Pacific Ave Oxnard, CA 93033, USA

Issued By:

Shenzhen Tongce Testing Lab.

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Appendix A: Photographs of Test Setup

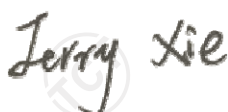
Appendix B: Photographs of EUT

1. Test Certification

Product:	Bluetooth FM Transmitter
Model No.:	BTFM3
Additional Model No.:	BTFM3SR-SP
Trade Mark:	SCOSCHE
Applicant:	Scosche Industries Inc
Address:	1550 Pacific Ave Oxnard, CA 93033, USA
Manufacturer:	SAGE HUMAN ELECTRONICS INTERNATIONAL CO., LTD.
Address:	4F., A Building, Rongli Industrial Park, No.2 Guiyuan Rd. Guihua Community, Guanlan Town, Longhua New Dist. Shenzhen 518110 China
Date of Test:	Feb. 02, 2018 – Feb. 06, 2018
Applicable Standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.239

The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:



Jerry Xie

Date:

Feb. 06, 2018

Reviewed By:



Beryl Zhao

Date:

Feb. 07, 2018

Approved By:



Tomsin

Date:

Feb. 07, 2018



2. Test Result Summary

Requirement	CFR 47 Section IC Paragraph	Result
Antenna requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	N/A
Field strength of the fundamental signal	§15.239 (b)	PASS
Spurious emissions	§15.239 (b) (c)/ §15.209	PASS
Occupied Bandwidth	§15.215 (c)	PASS

Note:

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

3. EUT Description

Product:	Bluetooth FM Transmitter
Model No.:	BTFM3
Additional Model No.:	BTFM3SR-SP
Trade Mark:	SCOSCHE
Operation Frequency:	88.1MHz – 107.9MHz
Channel Separation:	200 kHz
Number of Channel:	100CH(See NOTE 2)
Modulation Technology:	FM
Antenna Type:	Wire antenna
Antenna Gain:	-2dBi
Power Supply:	DC12V
Remark:	All models above are identical in interior structure, electrical circuits and components, and colour are different for the marketing requirement.

Operation Frequency Each of Channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	88.1 MHz	26	93.1 MHz	51	98.1 MHz	76	103.1 MHz
2	88.3 MHz	27	93.3 MHz	52	98.3 MHz	77	103.3 MHz
3	88.5 MHz	28	93.5 MHz	53	98.5 MHz	78	103.5 MHz
4	88.7 MHz	29	93.7 MHz	54	98.7 MHz	79	103.7 MHz
5	88.9 MHz	30	93.9 MHz	55	98.9 MHz	80	103.9 MHz
6	89.1 MHz	31	94.1 MHz	56	99.1 MHz	81	104.1 MHz
7	89.3 MHz	32	94.3 MHz	57	99.3 MHz	82	104.3 MHz
8	89.5 MHz	33	94.5 MHz	58	99.5 MHz	83	104.5 MHz
9	89.7 MHz	34	94.7 MHz	59	99.7 MHz	84	104.7 MHz
10	89.9 MHz	35	94.9 MHz	60	99.9 MHz	85	104.9 MHz
11	90.1 MHz	36	95.1 MHz	61	100.1 MHz	86	105.1 MHz
12	90.3 MHz	37	95.3 MHz	62	100.3 MHz	87	105.3 MHz
13	90.5 MHz	38	95.5 MHz	63	100.5 MHz	88	105.5 MHz
14	90.7 MHz	39	95.7 MHz	64	100.7 MHz	89	105.7 MHz
15	90.9 MHz	40	95.9 MHz	65	100.9 MHz	90	105.9 MHz
16	91.1 MHz	41	96.1 MHz	66	101.1 MHz	91	106.1 MHz
17	91.3 MHz	42	96.3 MHz	67	101.3 MHz	92	106.3 MHz
18	91.5 MHz	43	96.5 MHz	68	101.5 MHz	93	106.5 MHz
19	91.7 MHz	44	96.7 MHz	69	101.7 MHz	94	106.7 MHz
20	91.9 MHz	45	96.9 MHz	70	101.9 MHz	95	106.9 MHz
21	92.1 MHz	46	97.1 MHz	71	102.1 MHz	96	107.1 MHz
22	92.3 MHz	47	97.3 MHz	72	102.3 MHz	97	107.3 MHz
23	92.5 MHz	48	97.5 MHz	73	102.5 MHz	98	107.5 MHz
24	92.7 MHz	49	97.7 MHz	74	102.7 MHz	99	107.7 MHz
25	92.9 MHz	50	97.9 MHz	75	102.9 MHz	100	107.9 MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	88.1 MHz
The middle channel	98.1 MHz
The highest channel	107.9 MHz

4. General Information

4.1. Test Environment and Mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Operation mode:	Keep the EUT in continuous transmitting with modulation
The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

4.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID/DOC	Trade Name
/	/	/	/	/

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

5. Facilities and Accreditations

5.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

- FCC - Registration No.: 645098

Shenzhen Tongce Testing Lab The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

5.2. Location

Shenzhen Tongce Testing Lab

Address: 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China

TEL: +86-755-27673339

5.3. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	$\pm 2.56\text{dB}$
2	RF power, conducted	$\pm 0.12\text{dB}$
3	Spurious emissions, conducted	$\pm 0.11\text{dB}$
4	All emissions, radiated(<1G)	$\pm 3.92\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.28\text{dB}$
6	Temperature	$\pm 0.1^{\circ}\text{C}$
7	Humidity	$\pm 1.0\%$

6. Test Results and Measurement Data

6.1. Antenna Requirement

Standard requirement:

FCC Part15 C Section 15.203 /247(c)

15.203 requirement:

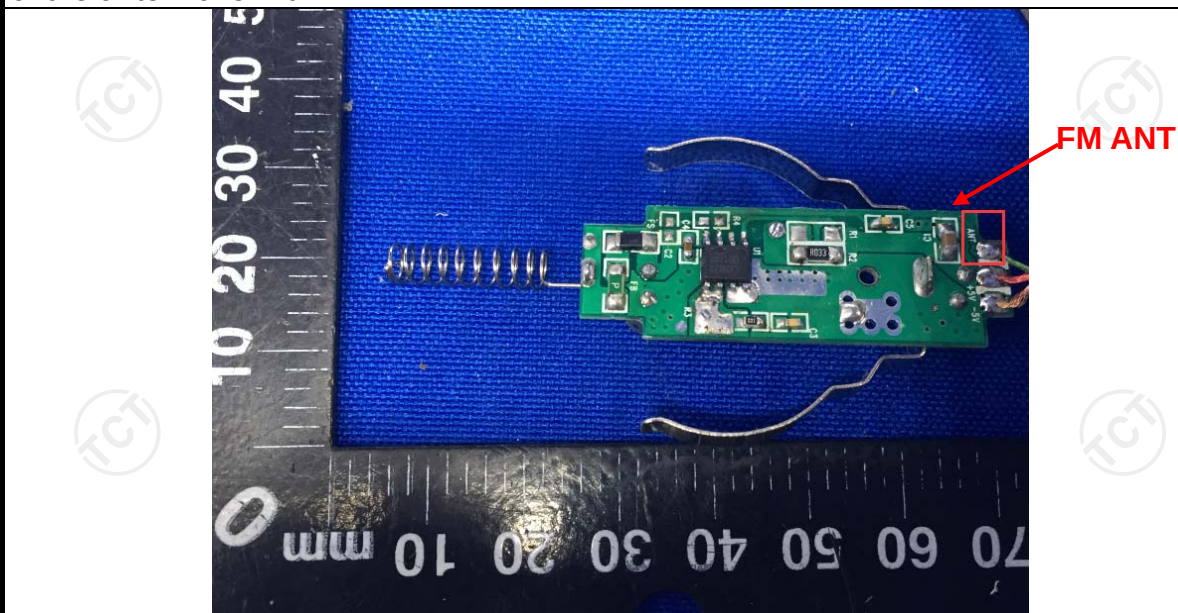
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

E.U.T Antenna:

The FM antenna is wire antenna which permanently attached, and the best case gain of the antenna is -2dBi.



6.2. Conducted Emission

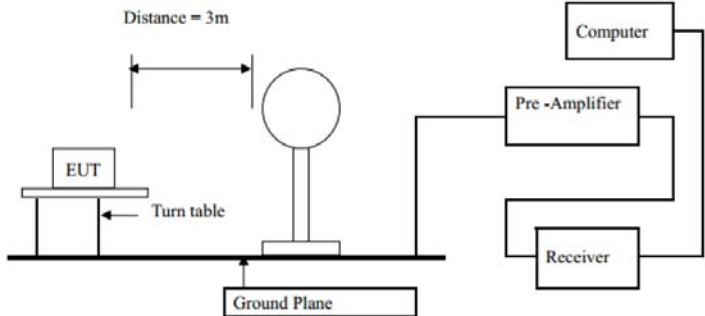
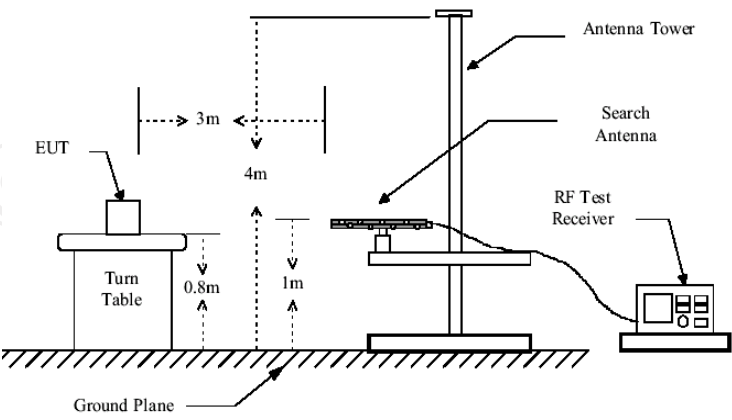
6.2.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.207														
Test Method:	ANSI C63.10:2013														
Frequency Range:	150 kHz to 30 MHz														
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto														
Limits:	<table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table>	Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													
Test Setup:	Reference Plane LISN AUX Equipment E.U.T Test table/Insulation plane LISN Filter AC power EMI Receiver 40cm 80cm <i>Remark</i> E.U.T.: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m														
Test Mode:	Refer to section 4.1 for details														
Test Procedure:	1. The E.U.T is connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.														
Test Result:	N/A														

6.3. Radiated Emission Measurement

6.3.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10: 2013				
Frequency Range:	9 kHz to 1 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
Limit(Field strength of the fundamental signal):	Frequency		Limit (dBuV/m @3m)		Remark
	88-108MHz		48		Average Value
			68		Peak Value
	Note: Fcc part15.239 (b) The field strength of any emissions within the permitted 200 kHz band shall not exceed 250 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.				
Limit(Spurious Emissions):	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-88MHz		40.0		Quasi-peak Value
	88MHz-216MHz		43.5		Quasi-peak Value
	216MHz-960MHz		46.0		Quasi-peak Value
	960MHz-1GHz		54.0		Quasi-peak Value
Limit (band edge) :	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.				
Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber in below 1GHz, 1.5m above the ground in above 1GHz. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make				

	the measurement. - For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. - The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. - If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test setup:	For radiated emissions below 30MHz  30MHz to 1GHz 
Test Mode:	Refer to section 4.1 for details
Test results:	PASS

6.3.2. 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
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).

6.3.3. Test Data

Field Strength of Fundamental

Frequency (MHz)	Emission PK/AV (dBuV/m)	Horizontal /Vertical	Limits PK/AV (dBuV/m)	Margin (dB)
88.1	43.06 (AV)	H	48	-4.94
88.1	47.54 (PK)	H	68	-20.46
88.1	34.33 (AV)	V	48	-13.67
88.1	36.67 (PK)	V	68	-31.33

Frequency (MHz)	Emission PK/AV (dBuV/m)	Horizontal /Vertical	Limits PK/AV (dBuV/m)	Margin (dB)
98.1	41.56 (AV)	H	48	-6.44
98.1	44.83 (PK)	H	68	-23.17
98.1	30.78 (AV)	V	48	-17.22
98.1	32.99 (PK)	V	68	-35.01

Frequency (MHz)	Emission PK/AV (dBuV/m)	Horizontal /Vertical	Limits PK/AV (dBuV/m)	Margin (dB)
107.9	44.03 (AV)	H	48	-3.97
107.9	46.87 (PK)	H	68	-21.13
107.9	29.94 (AV)	V	48	-18.06
107.9	32.16 (PK)	V	68	-35.84

Spurious Emissions

Frequency Range (9 kHz-30MHz)

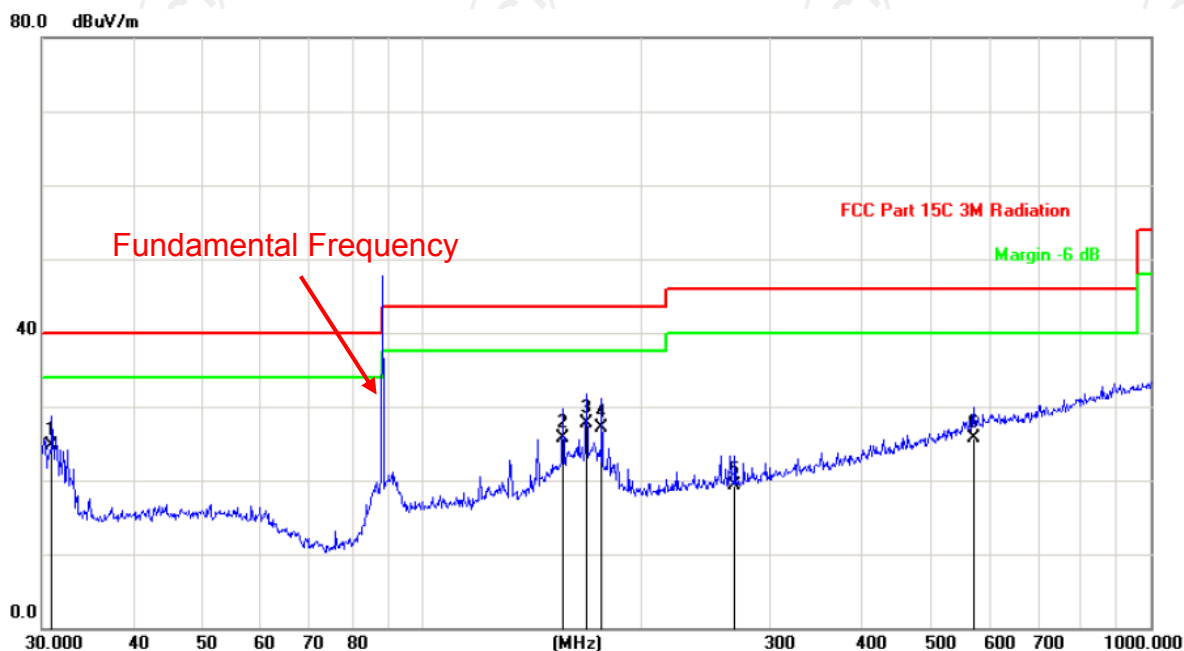
Frequency (MHz)	Level@3m (dBμV/m)	Limit@3m (dBμV/m)
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--	--	--
--	--	--
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Note: 1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

Frequency Range (30MHz-1GHz)

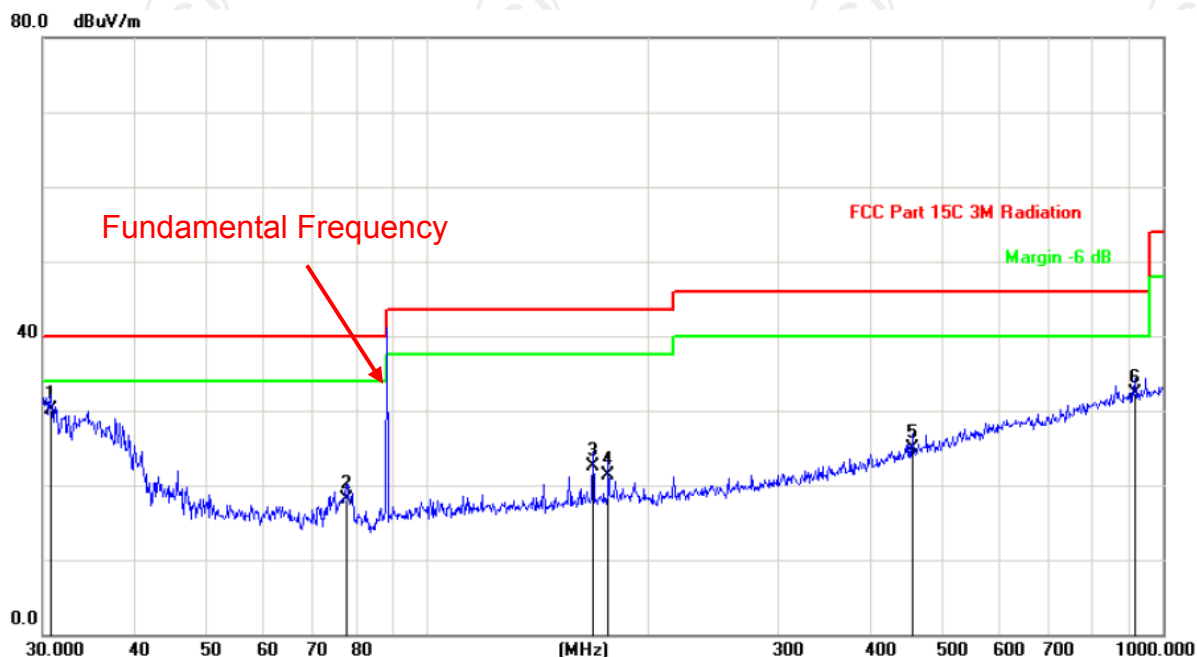
Horizontal:



Site: Polarization: **Horizontal** 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 degree	Comment
1	*	30.9619	38.34	-13.69	24.65	40.00	-15.35	QP		
2		155.9101	41.18	-15.44	25.74	43.50	-17.76	QP		
3		167.8243	42.49	-14.71	27.78	43.50	-15.72	QP		
4		176.2686	41.20	-14.19	27.01	43.50	-16.49	QP		
5		268.4853	29.39	-10.03	19.36	46.00	-26.64	QP		
6		570.6100	27.26	-1.46	25.80	46.00	-20.20	QP		

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 degree	Comment
1	*	30.7454	43.84	-13.72	30.12	40.00	-9.88	QP		
2		77.5928	35.45	-17.28	18.17	40.00	-21.83	QP		
3		167.8243	37.29	-14.71	22.58	43.50	-20.92	QP		
4		176.2685	35.58	-14.19	21.39	43.50	-22.11	QP		
5		455.9058	29.14	-4.29	24.85	46.00	-21.15	QP		
6		916.0687	28.82	3.48	32.30	46.00	-13.70	QP		

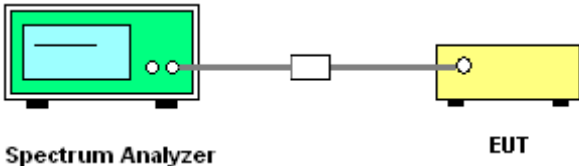
Note : 1) QP= Quasi-peak

2) Emission Level = Reading Level + Antenna Factor + Cable Loss.

3) Measurements were conducted in all three channels (high, middle, low) and the worst case Mode (Middle channel) was submitted only.

6.4. Occupied Bandwidth

6.4.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.215(c)
Test Method:	ANSI C63.10: 2013
Limit:	200kHz
Test Procedure:	1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; RBW $\geq$ 1% of the 20 dB bandwidth; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold. 4. Measure and record the results in the test report.
Test setup:	 The diagram illustrates the test setup. On the left is a green Spectrum Analyzer with a screen and two ports. A cable connects one of its ports to a small white rectangular component, which is then connected to a yellow rectangular component labeled 'EUT' (Equipment Under Test).
Test Mode:	Refer to section 4.1 for details
Test results:	PASS

6.4.2. Test Instruments

RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSU	200054	Sep. 27, 2018

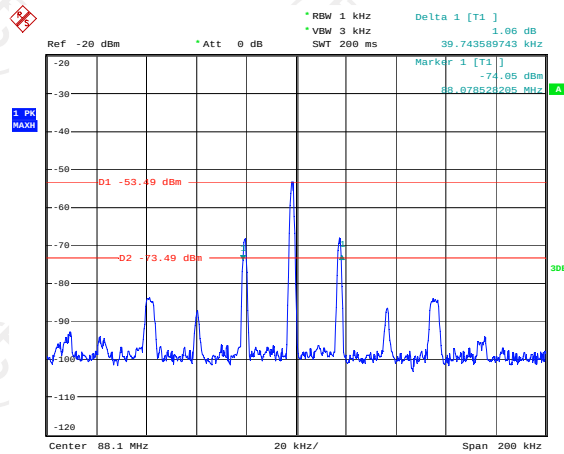
Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.4.3. Test data

Test Channel	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Conclusion
Lowest	39.74	200	PASS
Middle	39.74	200	PASS
Highest	39.74	200	PASS

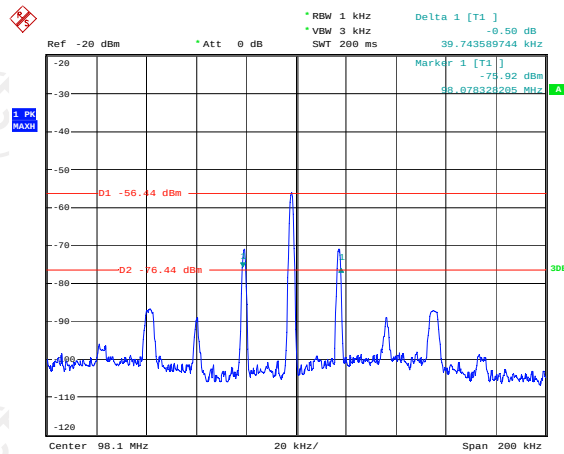
Test plots as follows:

Lowest channel



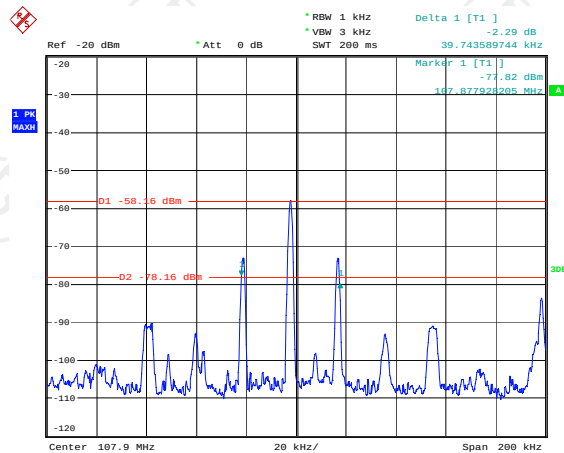
Date: 5.FEB.2018 16:24:28

Middle channel



Date: 5.FEB.2018 16:22:48

Highest channel



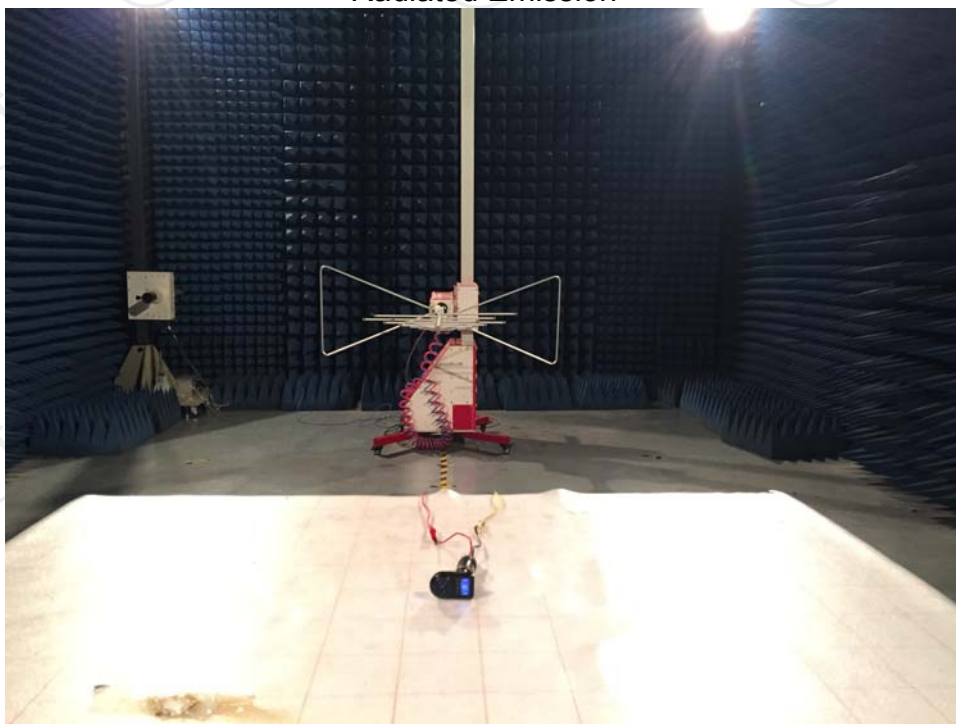
Date: 5.FEB.2018 16:25:31

Appendix A: Photographs of Test Setup

Product: Bluetooth FM Transmitter

Model: BTFM3

Radiated Emission



Appendix B: Photographs of EUT
Product: Bluetooth FM Transmitter
Model: BTFM3
External Photos

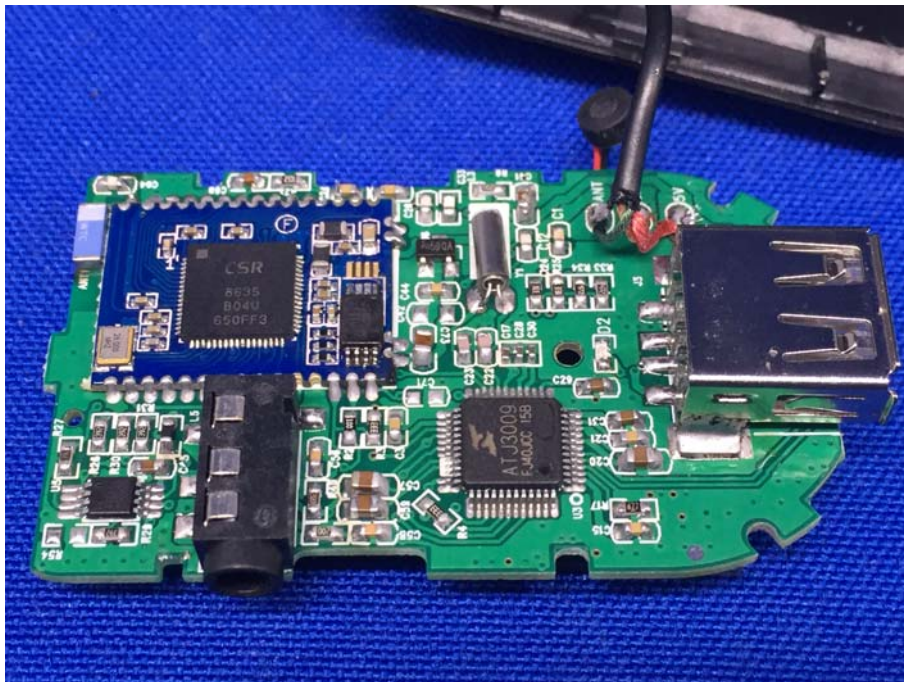


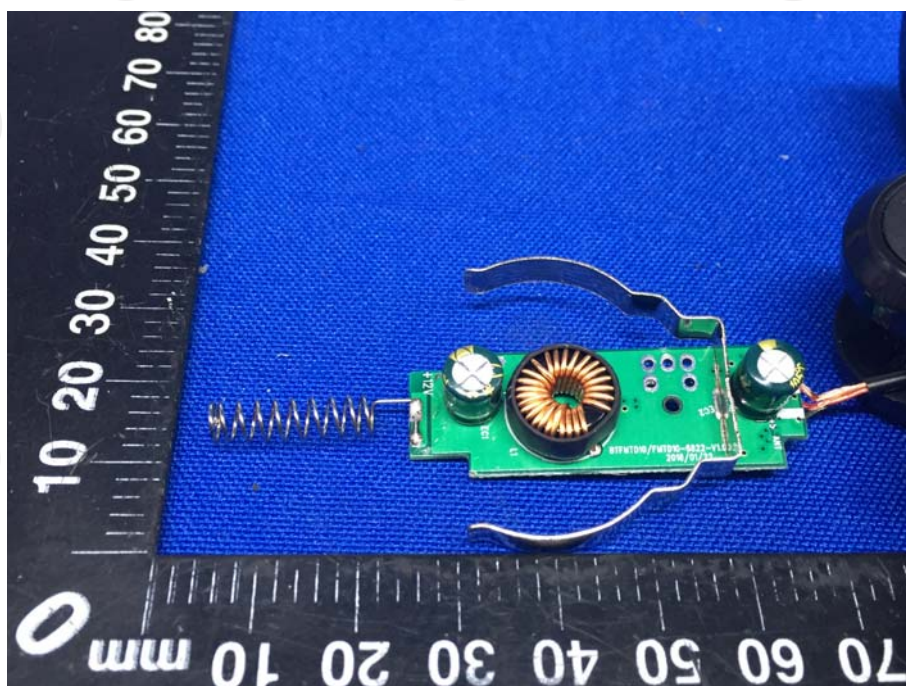
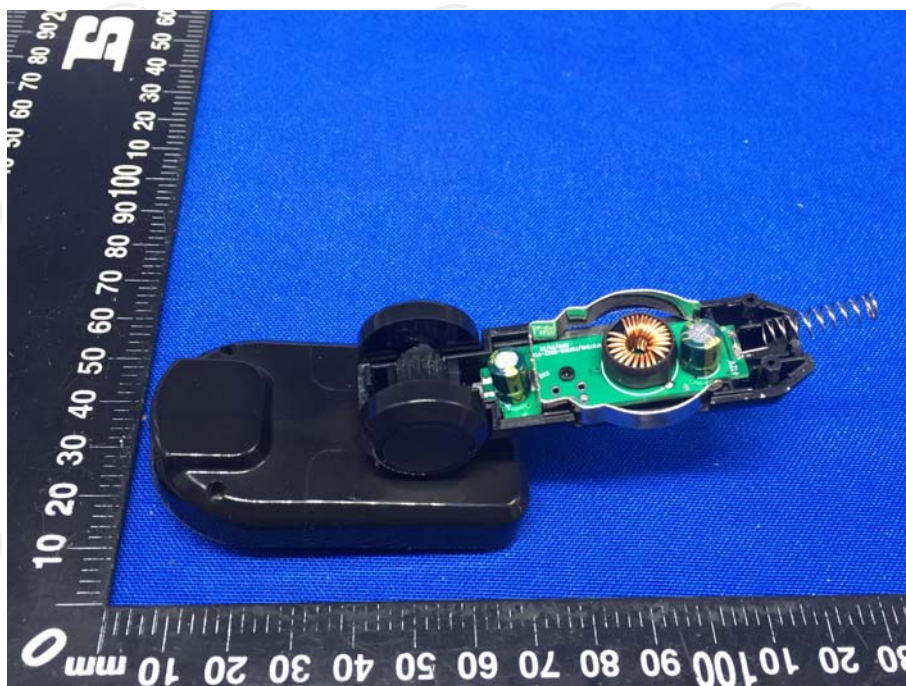


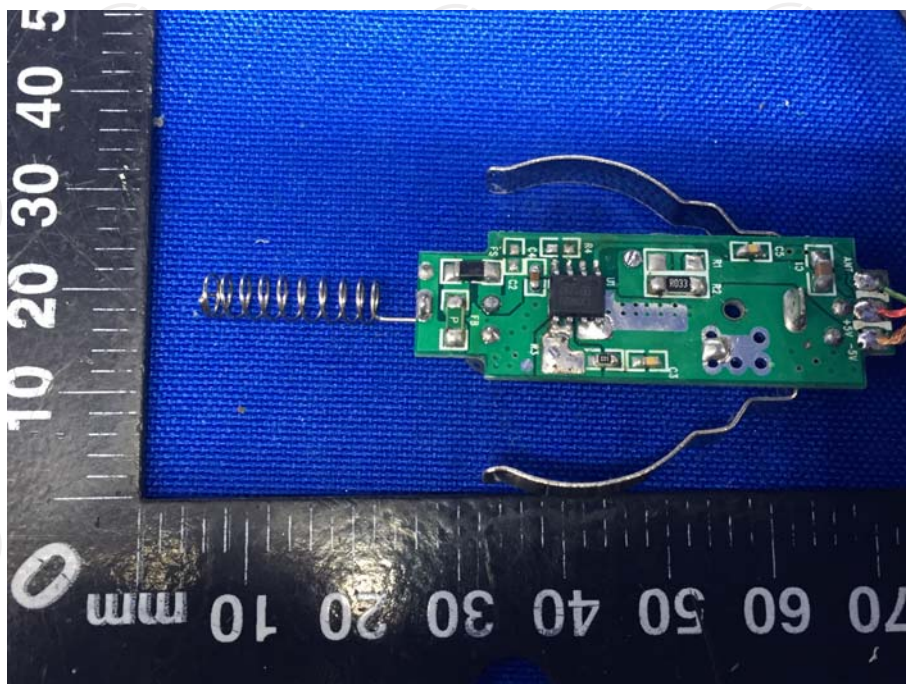


Product: Bluetooth FM Transmitter
Model: BTFM3
Internal Photos









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