



FCC PART 15.239
TEST REPORT

For

Zhongshan K-mate General Electronics Co., Ltd0

Fuwan Industrial Zone, Fuwan South Road, Sunwen East Road, East District, Zhongshan, China

FCC ID: WAD-BTC019

Report Type: Original Report	Product Type: Bluetooth FM Transmitter
Test Engineer: Leon Chen	<i>Leon Chen</i>
Report Number: R2DG130523001-00A	
Report Date: 2013-06-04	
Reviewed By: Ivan Cao RF Leader	<i>Ivan Cao</i>
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP*, or any agency of the Federal Government.
* This report may contain data that are not covered by the NVLAP accreditation and shall be marked with an asterisk "★" (Rev.2)
This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

TABLE OF CONTENTS

GENERAL INFORMATION.....	3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	3
OBJECTIVE	3
RELATED SUBMITTAL(S)/GRANT(S).....	3
TEST METHODOLOGY	3
TEST FACILITY	4
SYSTEM TEST CONFIGURATION.....	5
JUSTIFICATION	5
EUT EXERCISE SOFTWARE	5
EQUIPMENT MODIFICATIONS	5
SUPPORT EQUIPMENT LIST AND DETAILS	5
EXTERNAL I/O CABLE.....	5
BLOCK DIAGRAM OF TEST SETUP	6
SUMMARY OF TEST RESULTS	7
§15.203 - ANTENNA REQUIREMENT.....	8
§15.205, §15.209, §15.239- RADIATED EMISSIONS.....	9
APPLICABLE STANDARD	9
MEASUREMENT UNCERTAINTY.....	9
EUT SETUP	9
EMI TEST RECEIVER SETUP.....	10
TEST EQUIPMENT LIST AND DETAILS.....	10
TEST PROCEDURE	10
CORRECTED AMPLITUDE & MARGIN CALCULATION	10
TEST RESULTS SUMMARY	11
TEST DATA	11
§15.239(A) – EMISSION BANDWIDTH	13
STANDARD APPLICABLE	13
TEST EQUIPMENT LIST AND DETAILS.....	13
TEST PROCEDURE	13
TEST DATA	13

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The Zhongshan K-mate General Electronics Co., Ltd.'s product, model number: *BTC019* (FCC ID: *WAD-BTC019*) or ("EUT") in this report is a *Bluetooth FM Transmitter*, which was measured approximately: 9.0 cm (L) x 5.0 cm (W) x 20.8 cm (H), rated input voltage: DC 12.0-24.0V .

Technical Specification:

FM Transmitter		
1	Operating Frequency Band	88.1~107.9 MHz
2	Channel Step	100kHz
3	Harmonic Emission	35.03 dBμV@3m
4	Antenna	Wired Antenna

* All measurement and test data in this report was gathered from production sample serial number: 130523001 (Assigned by BACL, Dongguan). The EUT was received on 2013-05-24.

Objective

This report is prepared on behalf of *Zhongshan K-mate General Electronics Co., Ltd.* in accordance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209, and 15.239 rules.

Related Submittal(s)/Grant(s)

FCC Part 15C DSS submissions with FCC ID: WAD-BTC019 for Bluetooth.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4 - 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Dongguan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Dongguan) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 500069-0).



The current scope of accreditations can be found at <http://ts.nist.gov/standards/scopes/5000690.htm>

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in the test mode.

EUT Exercise Software

No software was used.

Equipment Modifications

No modification was made to the unit tested.

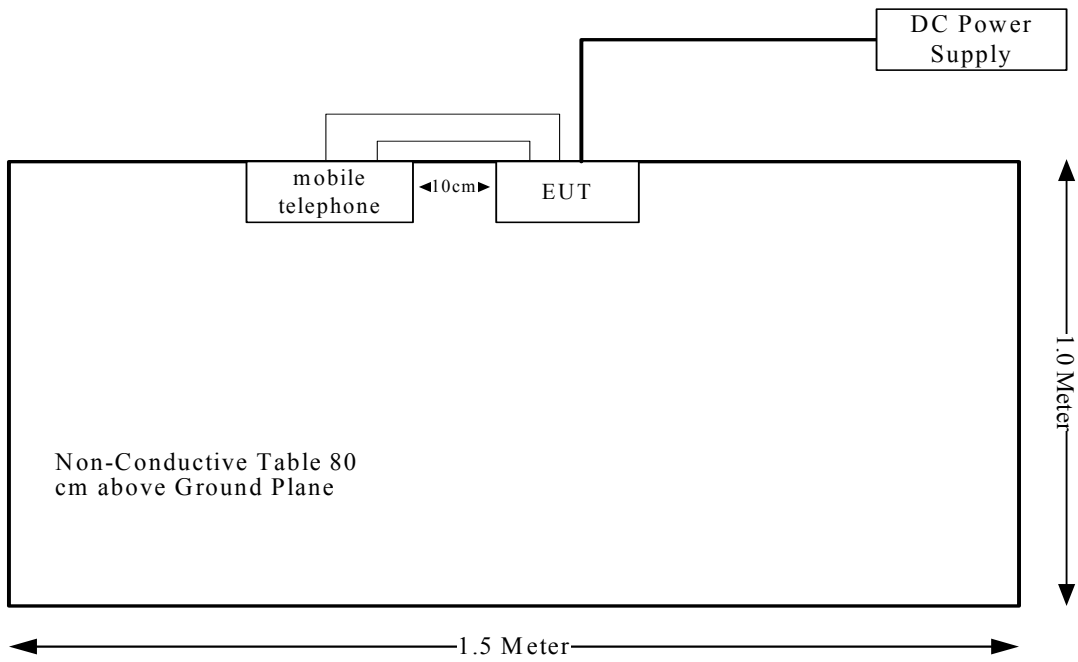
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Bea-fon	mobile phone	SL205	N/A

External I/O Cable

Cable Description	Length (m)	From Port	To
Shielded Detachable USB Cable	0.5	USB Port of EUT	mobile phone
Un-Shielded Detachable Audio Cable	1.0	Line In of EUT	mobile phone
Un-Shielded Detachable Earphone Cable	1.1	Line Out of EUT	Earphone

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Test Result
§15.203	Antenna Requirement	Compliance
§15.207	Conducted Emissions	Not Applicable*
§15.205, §15.209, §15.239	Radiated Emissions	Compliance
§15.239 (a)	Emission Bandwidth	Compliance

Not Applicable*: the EUT was powered by DC 12V-24V.

§15.203 - ANTENNA REQUIREMENT

Applicable Standard

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 shall be considered sufficient to comply with the provisions of this section.

Antenna Connector Construction

The EUT has a wire antenna permanently soldering on the printed circuit boards, which complied with 15.203, Please refer to the internal photos.

Result: Compliance.

§15.205, §15.209, §15.239- RADIATED EMISSIONS

Applicable Standard

FCC §15.239(a)(b)(c); §15.209; §15.205;

Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit.

Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:

30M~200MHz: 5.0 dB

200M~1GHz: 6.2 dB

1G~6GHz: 4.45 dB

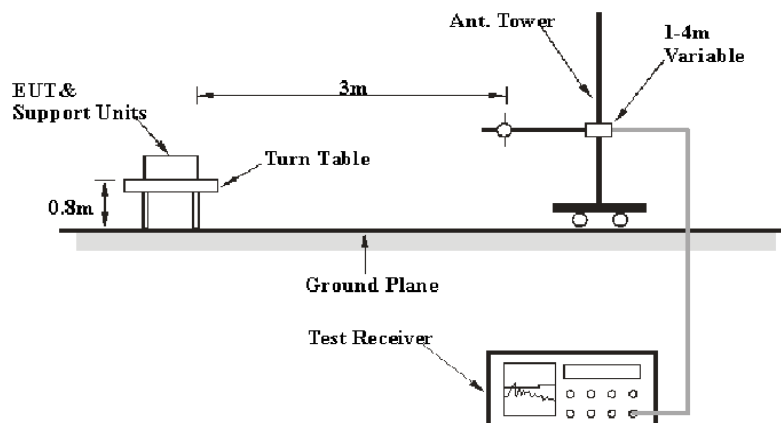
6G~18GHz: 5.23 dB

Table 1 – Values of U_{cispr}

Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1GHz:



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4 - 2003. The specification used was the FCC Part 15.209 and FCC Part 15.239.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 1000 MHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

<i>Frequency Range</i>	<i>RBW</i>	<i>Video BW</i>	<i>Detector</i>
30 MHz – 1000 MHz	100 kHz	300 kHz	QP

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI TEST RECEIVER	ESCI	100224	2013-5-6	2014-5-5
Sunol Sciences	Antenna	JB3	A060611-1	2012-9-6	2015-9-5
HP	HP AMPLIFIER	8447E	2434A02181	N/A	N/A

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The data was recorded in Quasi-peak detection mode for 30 MHz to 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 5.8dB means the emission is 5.8dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 and 15.239, with the worst margin reading of:

4.10 dB at 343.31 MHz in the Horizontal polarization

Test Data

Environmental Conditions

Temperature:	26.1°C
Relative Humidity:	69%
ATM Pressure:	100.3kPa

The testing was performed by Leon Chen on 2013-05-29.

Test Mode: Transmitting(DC 24V was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	FCC 15.239	
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBµV/m)	Margin (dB)
Low Channel: 88.1 MHz									
88.1	41.1	AV	H	7.68	1.21	21.40	28.59	48.00	19.41
88.1	44.7	AV	V	7.68	1.21	21.40	32.19	48.00	15.81
88.1	43.46	PK	H	7.68	1.21	21.40	30.95	68.00	37.05
88.1	47.56	PK	V	7.68	1.21	21.40	35.05	68.00	32.95
88	24.1	QP	H	7.67	1.21	21.40	11.58	40.00	28.42
88	31.8	QP	V	7.67	1.21	21.40	19.28	40.00	20.72
176.2	38.4	QP	V	11.43	1.60	21.45	29.98	43.50	13.52
264.74	47.6	QP	H	13.35	1.96	21.50	41.41	46.00	4.59*
343.31	46.4	QP	H	14.92	2.21	21.63	41.90	46.00	4.10*
363.68	43.2	QP	H	15.67	2.32	21.68	39.51	46.00	6.49
30.97	31.5	QP	V	21.58	0.76	21.42	32.42	40.00	7.58
Middle Channel: 98.1 MHz									
98.1	40.3	AV	H	9.99	1.24	21.40	30.13	48.00	17.87
98.1	45.2	AV	V	9.99	1.24	21.40	35.03	48.00	12.97
98.1	44.24	PK	H	9.99	1.24	21.40	34.07	68.00	33.93
98.1	49.34	PK	V	9.99	1.24	21.40	39.17	68.00	28.83
196.2	39.3	QP	V	12.12	1.68	21.46	31.64	43.50	11.86
343.12	46.13	QP	H	14.91	2.21	21.63	41.62	46.00	4.38*
312.28	43.8	QP	H	14.38	2.19	21.55	38.82	46.00	7.18
363.68	44.3	QP	H	15.67	2.32	21.68	40.61	46.00	5.39*
205.58	43.8	QP	V	11.53	1.73	21.46	35.60	43.50	7.90
345.28	41.7	QP	V	14.98	2.22	21.63	37.27	46.00	8.73
High Channel: 107.9 MHz									
107.9	34	AV	H	12.50	1.26	21.40	26.36	48.00	21.64
107.9	36.7	AV	V	12.50	1.26	21.40	29.06	48.00	18.94
107.9	38.7	PK	H	12.50	1.26	21.40	31.06	68.00	36.94
107.9	42.1	PK	V	12.50	1.26	21.40	34.46	68.00	33.54
108	27.4	QP	H	12.52	1.26	21.40	19.78	43.50	23.72
108	30.2	QP	V	12.52	1.26	21.40	22.58	43.50	20.92
215.8	35.2	QP	H	11.40	1.78	21.47	26.91	43.50	16.59
408.3	32.5	QP	H	16.42	2.45	21.79	29.58	46.00	16.42
30.42	32.1	QP	H	22.02	0.76	21.42	33.46	40.00	6.54
285.63	46.8	QP	H	13.82	2.05	21.51	41.16	46.00	4.84*
205.58	44.2	QP	V	11.53	1.73	21.46	36.00	43.50	7.50

*Within measurement uncertainty!

Note: The tuning range of device was verified, the tuning controls were manually adjusted in 88.1 to 107.9 MHz.

§15.239(A) – EMISSION BANDWIDTH

Standard applicable

Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88–108 MHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum analyzer	ESPI	100337	2012-11-10	2013-11-9

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

With the EUT's antenna attached, the EUT's radiated emission power was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

Test Data

Environmental Conditions

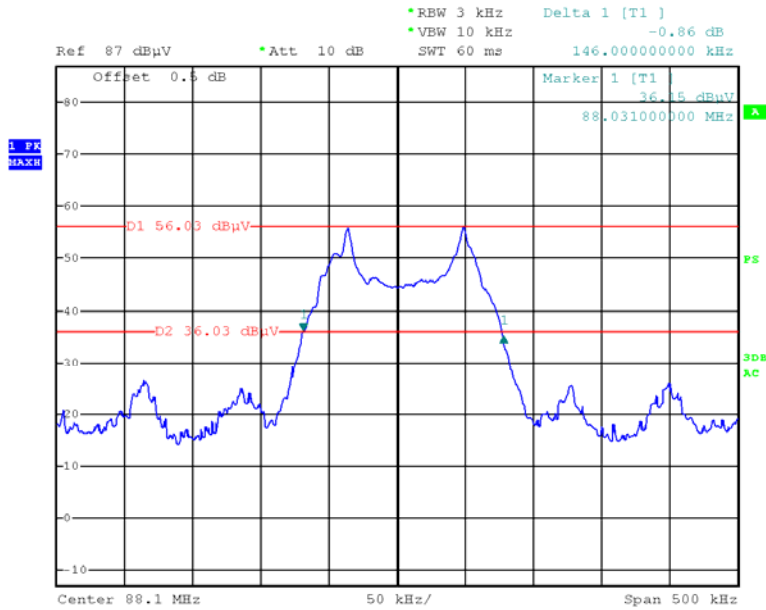
Temperature:	27.6 °C
Relative Humidity:	68%
ATM Pressure:	100.3 kPa

The testing was performed by Leon Chen on 2013-05-29

Please refer to the following table and plots.

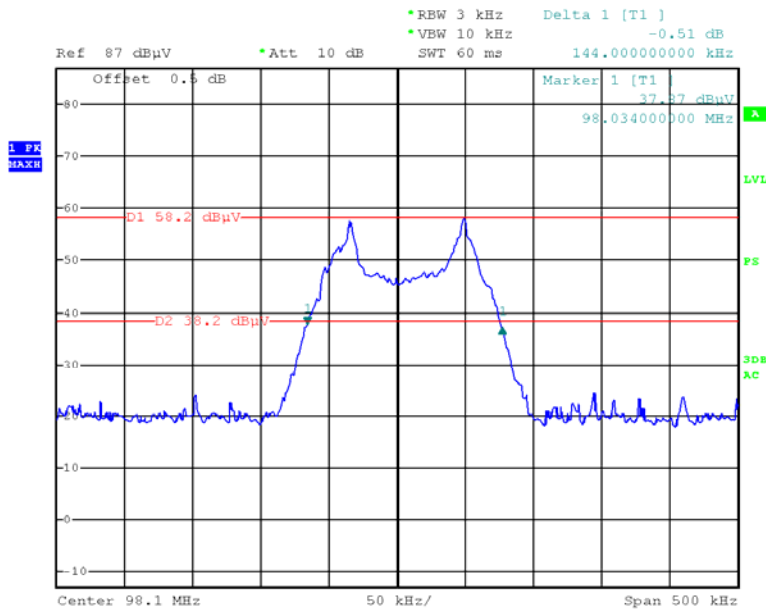
Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	Limit (kHz)
Low	88.1	146.0	200
Middle	98.1	144.0	200
High	107.9	146.0	200

Low Channel



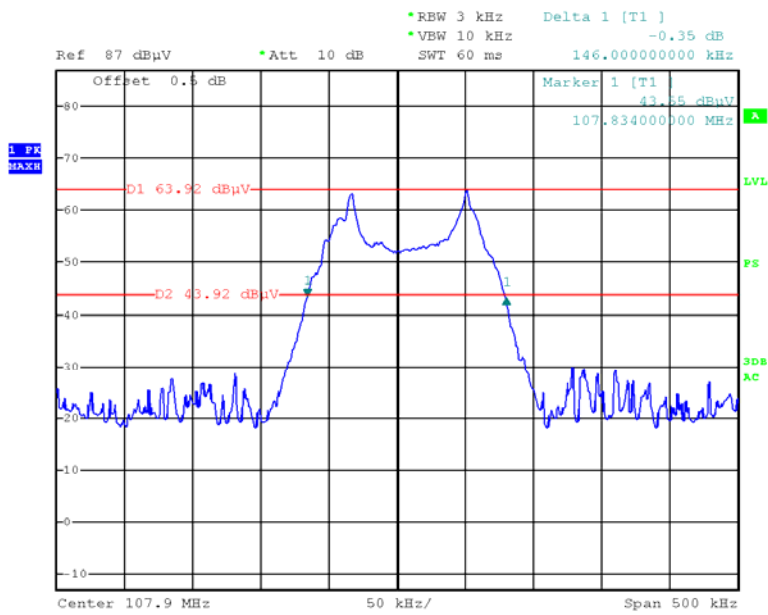
Date: 29.MAY.2013 12:43:31

Middle Channel



Date: 29.MAY.2013 12:44:02

High Channel



Date: 29.MAY.2013 12:42:43

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