

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : E14DR-101

AGR No. : A14DA-148

Applicant : mondo systems, inc.

Address : 3F, Dongyang Bldg., 128-5, Cheongpa-dong 3-ga, Yongsan-Gu, Seoul, 140-133 Korea

Manufacturer : mondo systems, inc.

Address : 3F, Dongyang Bldg., 128-5, Cheongpa-dong 3-ga, Yongsan-Gu, Seoul, 140-133 Korea

Type of Equipment : Bluetooth Speaker

FCC ID. : VAP-SM-100

IC Certification No. : 9737A-SM100

Model Name : SM-100

Serial number : N/A

Total page of Report : 7 pages (including this page)

Date of Incoming : December 15, 2014

Date of issue : December 24, 2014

SUMMARY

The equipment complies with the regulation; *FCC PART 15 SUBPART C Section 15.247 and IC RSS-Gen Issue 4 and RSS 210 Issue 8*

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Prepared by: 
Ki-Hong, Nam / Senior Engineer
ONETECH Corp.

Approved by: 
Gea-Won, Lee / Managing Director
ONETECH Corp.

CONTENTS

PAGE

1. VERIFICATION OF COMPLIANCE	4
2. GENERAL INFORMATION.....	5
2.1 PRODUCT DESCRIPTION.....	5
2.2 ALTERNATIVE TYPE(S)/MODEL(S); ALSO COVERED BY THIS TEST REPORT.....	5
3. EUT MODIFICATIONS.....	5
4. RADIO FREQUENCY EXPOSURE	6
4.1 TEST DATA FOR FCC.....	6
4.1.1 RF EXPOSURE LIMIT	6
4.1.2 EUT DESCRIPTION.....	6
4.1.3 TEST RESULT	6
4.2 TEST DATA FOR IC	7
4.2.1 RF Exposure Limit	7
4.2.2 EUT Description	7
4.2.3 Evaluation Results	7

Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
E14DR-101	December 24, 2014	Initial Issue	All

1. VERIFICATION OF COMPLIANCE

APPLICANT : mondo systems, inc.
 ADDRESS : 3F, Dongyang Bldg., 128-5, Cheongpa-dong 3-ga, Yongsan-Gu, Seoul, 140-133 Korea
 CONTACT PERSON : Joel-Lee, Joel / Chief Manager
 TELEPHONE NO : +82-2-3016-3406
 FCC ID : VAP-SM-100
 IC CERTIFICATION NO. : 9737A-SM100
 MODEL NAME : SM-100
 SERIAL NUMBER : N/A
 DATE : December 24, 2014

EQUIPMENT CLASS	FCC: DSS – PART 15 SPREAD SPECTRUM TRANSMITTER IC: Low Power License-Exempt Radio-communication Device
KIND OF EQUIPMENT	Modular Transmitter Bluetooth Speaker
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2009
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247 and RSS 210 Issue 8, RSS-Gen Issue 4.
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	None
FINAL TEST WAS CONDUCTED ON	3 m, Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC& IC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. GENERAL INFORMATION

2.1 Product Description

The mondo systems, inc., Model SM-100 (referred to as the EUT in this report) is a Bluetooth Speaker. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Portable Device	
OPERATING FREQUENCY	2 402 MHz ~ 2 480 MHz	
RF OUTPUT POWER	1 Mbps	-1.38 dBm
	2 Mbps	-0.98 dBm
	3 Mbps	-0.28 dBm
NUMBER OF CHANNEL	79 Channels	
MODULATION TYPE	GFSK for 1 Mbps, DQPSK for 2 Mbps, 8-DPSK for 3 Mbps	
ANTENNA TYPE	Wire Antenna	
ANTENNA GAIN	-2.32 dBi	
LIST OF EACH OSC. OR CRYSTAL. FREQ.(FREQ.>=1 MHz)	26 MHz	
RATED SUPPLY VOLTAGE	DC 3.7 V	

2.2 Alternative type(s)/model(s); also covered by this test report.

-. None

3. EUT MODIFICATIONS

-. None

4. RADIO FREQUENCY EXPOSURE

4.1 Test Data for FCC

4.1.1 RF Exposure Limit

According to the FCC rule §1.1310, the limit for General Population/Uncontrolled exposure is 1 mW/cm² for the device operating 1 500 ~ 100 000 MHz.

4.1.2 EUT Description

Kind of EUT	Main Control Unit	
Operating Frequency Band	<input type="checkbox"/> Wireless Microphone: 494.000 MHz ~ 501.000 MHz and 498.200 MHz ~ 505.200 MHz <input type="checkbox"/> WLAN: 2 412 MHz ~ 2 462 MHz <input type="checkbox"/> WLAN: 5 180 MHz ~ 5 320 MHz / 5 500 MHz ~ 5 700 MHz <input type="checkbox"/> WLAN: 5 745 MHz ~ 5 825 MHz <input checked="" type="checkbox"/> Bluetooth: 2 402 MHz ~ 2 480 MHz	
Device Category	<input checked="" type="checkbox"/> Portable (< 20 cm separation) <input type="checkbox"/> Mobile (> 20 cm separation) <input type="checkbox"/> Others	
Max. Output Power	1 Mbps	-1.38 dBm
	2 Mbps	-0.98 dBm
	3 Mbps	-0.28 dBm
Used Antenna	Wire Antenna	
Used Antenna Gain	-2.32 dBi	
Exposure Evaluation Applied	<input type="checkbox"/> MPE <input type="checkbox"/> SAR <input checked="" type="checkbox"/> N/A	

4.1.3 Test Result

According to the procedure, KDB 447498 D01, the standalone SAR test exclusion threshold is

$$[(\text{Max. Power of channel, including tune-up tolerance, mW})/(\text{Mim. test separation distance, mm})] \times [\sqrt{f(\text{GHz})}] < 3$$

$$= (1.0/5) \times \sqrt{2.402} = 0.31$$

Conclusion: The SAR test exclusion threshold is less than 3, so the device meets the RF Exposure Requirement and excluded SAR Test.

	Frequency (MHz)	Target Power W/tolerance (dBm)	Max tune up power (dBm)	Max tune up power (mW)	Separation distance (mm)	RF exposure
Bluetooth (8-DPSK)	2 402	-1 ± 1.0	0	1.0	5	0.31

4.2 Test Data for IC

4.2.1 RF Exposure Limit

According to the IC rule RSS-102 Section 2.4.1, the limit for General Population/Uncontrolled exposure is 1 mW/cm² for the device operating 1 500 ~ 100 000 MHz.

4.2.2 EUT Description

Kind of EUT	Main Control Unit	
Operating Frequency Band	<input type="checkbox"/> Wireless Microphone: 494.000 MHz ~ 501.000 MHz and 498.200 MHz ~ 505.200 MHz <input type="checkbox"/> WLAN: 2 412 MHz ~ 2 462 MHz <input type="checkbox"/> WLAN: 5 180 MHz ~ 5 320 MHz / 5 500 MHz ~ 5 700 MHz <input type="checkbox"/> WLAN: 5 745 MHz ~ 5 825 MHz <input checked="" type="checkbox"/> Bluetooth: 2 402 MHz ~ 2 480 MHz	
Device Category	<input checked="" type="checkbox"/> Portable (< 20 cm separation) <input type="checkbox"/> Mobile (> 20 cm separation) <input type="checkbox"/> Others	
Max. Output Power	1 Mbps	-1.38 dBm
	2 Mbps	-0.98 dBm
	3 Mbps	-0.28 dBm
Used Antenna	Wire Antenna	
Used Antenna Gain	-2.32 dBi	
Exposure Evaluation Applied	<input type="checkbox"/> MPE <input type="checkbox"/> SAR <input checked="" type="checkbox"/> N/A	

4.2.3 Evaluation Results

4.2.3.1 Test result of RF Conducted Power and antenna gain

Operating Freq.	Max. Output Power		EIRP		Antenna Gain		Distance	E Field Strength (V/m)	
(MHz)	dBm	Watts	dBm	Watts	Log	Linear	m	Result	Limit
2 402	-0.28	0.000 93	-7.97	0.000 16	-2.32	0.586	0.2	0.64	61

4.2.3.2 Results

The maximum E Field strength level of this EUT is 0.64 V/m when safety distance between the EUT and human body is maintained at least 0.2m, so the electromagnetic field of the EUT are **MET** the RF exposure requirement mentioned on the clause 4 in the standard., RSS-102.