

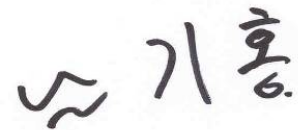
ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : OT-214-RWD-021
Reception No. : 2103001384
Applicant : AMOSENSE
Address : 19-1BL, 90, 4Sandan 5 gil, Jiksan-eup, Cheonan-Si, Chungcheongnam-Do, South Korea
Manufacturer : AMOSENSE
Address : 19-1BL, 90, 4Sandan 5 gil, Jiksan-eup, Cheonan-Si, Chungcheongnam-Do, South Korea
Type of Equipment : MUSE-R
FCC ID. : 2AS9T-SB12-SO
Model Name : SB12
Multiple Model Name : N/A
Serial number : N/A
Total page of Report : 7 pages (including this page)
Date of Incoming : April 01, 2021
Date of issue : April 08, 2021

SUMMARY

The equipment complies with the regulation; *FCC PART 15 SUBPART C Section 15.247*
 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.





Tested by
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 ONETECH Corp.

Reviewed by
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 ONETECH Corp.

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-214-RWD-021	April 08, 2021	Initial Release	All

1. VERIFICATION OF COMPLIANCE

Applicant : AMOSENSE
 Address : 19-1BL, 90, 4Sandan 5 gil, Jiksan-eup, Cheonan-Si, Chungcheongnam-Do, South Korea
 Manufacturer : AMOSENSE
 Address : 19-1BL, 90, 4Sandan 5 gil, Jiksan-eup, Cheonan-Si, Chungcheongnam-Do, South Korea
 Contact Person : Taik Jin, Yang / Principal engineer
 Telephone No. : +82-10-3795-4037
 FCC ID : 2AS9T-SB12-SO
 Model Name : SB12
 Brand Name : -
 Serial Number : N/A
 Date : April 08, 2021

EQUIPMENT CLASS	DSS – PART 15 SPREAD SPECTRUM TRANSMITTER DTS – DIGITAL TRNSMISSION SYSTEM
E.U.T. DESCRIPTION	MUSE-R
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2020
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 558074 D01 15.247 Meas Guidance v05r02
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 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 AMOSENSE, Model SB12 (referred to as the EUT in this report) is an MUSE-R, Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	MUSE-R	
Temperature Range	-20 °C ~ 50 °C	
OPERATING FREQUENCY	Sig Fox	902.137 5 MHz ~ 904.662 5 MHz
	Bluetooth LE	2 402 MHz ~ 2 480 MHz
MODULATION TYPE	Sig Fox	DBPSK
	Bluetooth LE	GFSK
RF OUTPUT POWER'	Sig Fox	22.55 dBm
	Bluetooth LE	-1.01 dBm
ANTENNA TYPE	Sig Fox: Chip + Metal Antenna Bluetooth LE: Chip Antenna	
ANTENNA GAIN	Sig Fox: 0.57 dBi Bluetooth LE: -0.02 dBi	
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	32.768 kHz, 32 MHz, 50 MHz	

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

-. None

3. EUT MODIFICATIONS

-. None

4. MAXIMUM PERMISSIBLE EXPOSURE

4.1 Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission’s guideline.

This is a Portable device with its physical nature to be used nearby, the distance between radiating structure and human is less than 20 cm.

As per KDB 447498 D01, The 1-g and 10-g SAR test exclusion thesholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are detrmined by:

$[(\text{Max. Power of channel, including tune-up tolerance, mW})/(\text{Mim. test separation distance, mm})] \times [\sqrt{f(\text{GHz})}]$
 < 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

F(GHz) is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation

The result is rounded to one decimal place for comparison.

Kind of EUT	MUSE-R
Device Category	<input type="checkbox"/> Portable (< 20 cm separation) <input type="checkbox"/> Mobile (> 20 cm separation) <input checked="" type="checkbox"/> Others
Exposure Evaluation Applied	<input checked="" type="checkbox"/> MPE <input type="checkbox"/> SAR <input type="checkbox"/> N/A

4.2 Test Result

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance	Max tune up power		Antenna Gain		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
		(dBm)	(dBm)	(mW)	Log	Linear			
2 402 ~ 2 480	Bluetooth LE	-1.0 ± 0.5	0.50	1.12	-0.02	1.00	0.30	0.000 2	1.00
902.00 ~ 928.00	Sig Fox	22.5 ± 0.5	23.00	199.53	0.57	1.14	4.25	0.045 3	

According to above table, for 902 MHz ~ 928 MHz Band(Sig Fox), safe distance,

$$D = 0.282 * \sqrt{(199.53 * 1.14) / 1.00} = 4.25 \text{ cm}$$

For getting power density at 20 cm separation in above table, following formula was used.

$$S = P * G / (4\pi * R^2) = 199.53 * 1.14 / (4 * 3.14 * 20^2) = 0.045 3$$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna