



SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China
Telephone: +86 (0) 21 6191 5666
Fax: +86 (0) 21 6191 5678
ee.shanghai@sgs.com

Report No.: SHEM160900621802
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1 Cover Page

FCC MPE REPORT

Application No.:	SHEM1609006218CR
Applicant:	Murata Manufacturing Co., Ltd
FCC ID:	VPYCMABZ
IC:	772C-CMABZ
Equipment Under Test (EUT): NOTE: The following sample(s) was/were submitted and identified by the client as	
Product Name:	LoRa module
Model No.(EUT):	CMWX1ZZABZ
Standards:	FCC Rules 47 CFR §2.1091 RSS-102 Issue 5:2015 KDB447498 D01 General RF Exposure Guidance v05r02
Date of Receipt:	2016-09-21
Date of Test:	2016-09-28 to 2016-12-16
Date of Issue:	2017-01-16
Test Result:	Pass*

* In the configuration tested, the EUT complied with the standards specified above.



Parlam Zhan
E&E Section Manager
SGS-CSTC (Shanghai) Co., Ltd.

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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3 General Information

3.1 Client Information

Applicant:	Murata Manufacturing Co., Ltd
Address of Applicant:	10-1, Higashikotari 1-chome, Nagaokakyo-shi Kyoto 617-8555 Japan
Manufacturer:	Murata Manufacturing Co., Ltd
Address of Manufacturer:	10-1, Higashikotari 1-chome, Nagaokakyo-shi Kyoto 617-8555 Japan
Factory:	Shenzhen Murata Technology Co., Ltd
Address of Factory:	15 Cuijing Road, Shenzhen Grand Industrial Zone, PingShan New District, Shenzhen, Guangdong, China 518118

3.2 General Description of E.U.T.

Product Description:	Module product with 902-928MHz Transceiver
Brand Name:	Murata
Power Supply:	DC 3.3V

3.3 Details of E.U.T.

Operation Frequency:	125KHz Channel: 902.3-914.9MHz 500kHz Channel: 903-914.2MHz
Modulation Technique:	LoRa
Spread Factor (SF):	125KHz Channel: 7-10 500KHz Channel: 7-12
Number of Channel:	125KHz Channel: 64 channels 500KHz Channel: 8 channels
Channel Space:	125KHz Channel: 200KHz 500kHz Channel: 1.6MHz
Antenna Type:	Monopole Antenna
Antenna Gain:	1.04 dBi

3.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

3.5 Test Facility

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

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A-1.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3868, C-4336, T-2221, G-830 respectively.

4 Test Standards and Limits

4.1 FCC Radiofrequency radiation exposure limits:

According to §1.1310, the limit for general population/uncontrolled exposures

Frequency	Power density(mW/cm ²)	Averaging time(minutes)
300MHz~1.5GHz	f/1500	30
1.5GHz~100GHz	1.0	30

4.2 IC Radiofrequency radiation exposure limits:

According to RSS-102 section 2.5.2, RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);

- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

For 915MHz device, the limit of worse case is 1.38 W

5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SHEM160900621801.

Test mode	Test Frequency (MHz)	Output Power (dBm)	Output Power (mW)
125KHz Channel	902.3	18.73	74.64
	908.5	18.11	64.71
	914.9	17.86	61.09
500KHz Channel	903	18.04	63.68
	907.8	18.09	64.42
	914.2	18.07	64.12

5.2 MPE Calculation

The Max Conducted (Average) Output Power is 74.64mW in the lowest channel;

The best case gain of the antenna is 1.04dBi. 1.04dB logarithmic terms convert to numeric result is nearly 1.27

For FCC:

According to the formula $S = \frac{PG}{4R^2\pi}$, we can calculate S which is MPE.

Note:

1) P (Watts) = Power Input to antenna = $10^{\frac{dBm}{10}} / 1000$

2) G (Antenna gain in numeric) = $10^{(Antenna\ gain\ in\ dBi / 10)}$

3) R = distance to the center of radiation of antenna (in meter) = 20cm

4) MPE limit = 0.61mW/cm²

$$S = \frac{PG}{4R^2\pi} = \frac{74.64 \times 1.27}{4 \times 400 \times 3.14} = 0.019\text{ mW/cm}^2$$

For IC:

$$E.I.R.P. = P \times G = 0.07464 \times 1.27 = 0.095W < 1.38W$$

So the device is exclusion from SAR test.

6 EUT Constructional Details

Refer to the Refer to the < CMWX1ZZABZ Photos >

--End of the Report--