ETSI EN 301 908-1 V13.1.1 (2019-11)
ETSI EN 301 908-2 V13.1.1 (2020-06)
TEST REPORT

For

Xiamen Milesight IoT Co., Ltd.

4/F,NO. 63-2 Wanghai Road, 2nd Software Park,Xiamen ,China

Tested Model: UG67-L04EU-868M
Multiple Models: UG67-L00E-868M, UG67-L04EU-868M-H32, UG67-L00E-868M-H32

Report Type: Original Report	**Product Type:** LoRaWAN Gateway
Report Number:	RXM210219050-22D
Report Date:	2021-09-17
Reviewed By:	Rocky Xiao RF Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	LoRaWAN Gateway
Test Model:	UG67-L04EU-868M
Multiple Models:	UG67-L00E-868M,UG67-L04EU-868M-H32, UG67-L00E-868M-H32
Model Difference:	Refer to Dos
Rated Input Voltage:	DC 56V from POE
Serial Number:	RXM210219050-RF-S1
EUT Received Date:	2021.02.20
EUT Received Status:	Good

Objective

This report is prepared on behalf of ***Xiamen Milesight IoT Co., Ltd.*** in accordance with ETSI EN 301 908-1 V13.1.1 (2019-11) IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 1: Introduction and common requirements;

ETSI EN 301 908-2 V13.1.1 (2020-06) IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 2: CDMA Direct Spread (UTRA FDD) User Equipment (UE).

The objective is to determine the compliance of EUT with: ETSI EN 301 908-1 V13.1.1 (2019-11), ETSI EN 301 908-2 V13.1.1 (2020-06).

Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 908-1 V13.1.1 (2019-11) IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 1: Introduction and common requirements; ETSI EN 301 908-2 V13.1.1 (2020-06) IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 2: CDMA Direct Spread (UTRA FDD) User Equipment (UE);

Measurement Uncertainty

Parameter	Flab	Maximum allow uncertainty
Transmitter maximum output power	±0.6 dB	±0,7 dB
Transmitter spectrum emissions mask	±1,5 dB	±1,5 dB
Transmitter spurious emissions f ≤ 2,2 GHz	±2.5 dB*	±1,5 dB
Transmitter spurious emissions 2,2 GHz < f ≤ 4 GHz	±2.5 dB*	±2,0 dB
Transmitter spurious emissions f > 4 GHz	±2.5 dB	±4,0 dB
Transmitter spurious emissions Co-existence band (≥ -60 dBm)	±2.5 dB*	±2,0 dB
Transmitter spurious emissions Co-existence band (< -60 dBm)	±2.5 dB	±3,0 dB
Transmitter Minimum output power	±0.6 dB	±1,0 dB
Receiver Adjacent Channel Selectivity (ACS)	±1.5 dB*	±1,1 dB
Receiver Blocking characteristics f < 15 MHz offset	±1.5 dB*	±1,4 dB
Receiver Blocking characteristics 15 MHz offset ≤ f ≤ 2,2 GHz	±1.5 dB*	±1,0dB
Receiver Blocking characteristics 2,2 GHz < f ≤ 4 GHz	±2.5 dB*	±1,7dB
Receiver Blocking characteristics 2,2 GHz < f ≤ 4 GHz	±2.5 dB*	±1,7dB
Receiver Blocking characteristics f > 4 GHz	±2.5 dB	±3,1dB
Receiver spurious response f ≤ 2,2 GHz	±1.5 dB	±2,0 dB
Receiver spurious response 2,2 GHz < f ≤ 4 GHz	±1.5 dB	±2,0 dB
Receiver spurious response f > 4 GHz	±2.5 dB	±4,0 dB
Receiver spurious response For UE receive band (-60 dBm)	±2.5 dB	±3,0 dB
Receiver spurious response For UE transmit band (-60 dBm)	±2.5 dB	±3,0 dB
Receiver intermodulation characteristics	±1.3 dB	±1,3 dB
Out of synchronization of handling power DPCCH Ec	±0.6 dB*	±0,4 dB
Out of synchronization of handling power Ior Transmit OFF power	±0.6 dB	±1,0 dB
Transmitter adjacent channel leakage power ratio	±0.8 dB	±0,8 dB

Note 1:
* Test system of laboratory have a measurement uncertainty greater than that specified in harmonized standard, this equipment can still be used provided that an adjustment is made follows:
any additional uncertainty in the test system over and above that specified in harmonized standard should be used to tighten the test requirements - making the test harder to pass (for some tests, e.g. receiver tests, this may require modification of stimulus signals). This procedure will ensure that a test system not compliant with harmonized standard does not increase the probability of passing an EUT that would otherwise have failed a test if a test system compliant with harmonized standard had been used.
Note 2:
Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Declarations

BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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SYSTEM TEST CONFIGURATION

Description of Test Configuration

L.T.: Low Temperature -20℃; N.T.: Normal Temperature +25℃; H.T.: High Temperature +55℃;
L.V.: Low Voltage 203VAC; N.V.: Normal Voltage 230VAC; H.V.: High Voltage 253VAC;

Nominal Voltage: 230Vac.

The extreme conditions are declared by applicant.

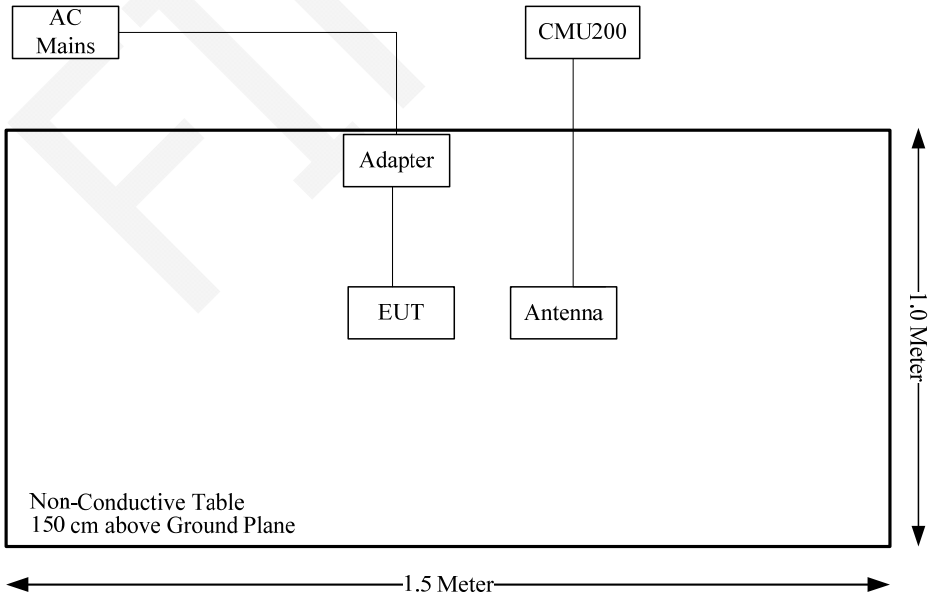
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R&S	Universal Radio Communication Tester	CMU200	110 822

Support Cable List and Details

Cable Description	Shielding Cable	Ferrite Core	Length (m)	From Port	To
AC Line	No	No	1.5	AC main	POE
RJ45	No	No	1.2	POE	EUT

Block Diagram of Test Setup



Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated emissions below 1GHz					
Sunol Sciences	Antenna	JB3	A060611-2	2020-08-25	2023-08-25
R&S	EMI Test Receiver	ESCI	100224	2020-09-12	2021-09-12
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2021-08-19	2022-08-18
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-02	2021-08-19	2022-08-18
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2021-08-19	2022-08-18
Sonoma	Amplifier	310N	185914	2021-08-19	2022-08-18
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2021-09-04	2022-09-03
Agilent	Signal Generator	E8247C	MY43321350	2021-04-25	2022-04-24
Radiated emissions above 1GHz					
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Agilent	Spectrum Analyzer	E4440A	SG43360054	2021-07-22	2022-07-21
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2021-09-04	2022-09-03
Mini-Circuit	Amplifier	ZVA-213-S+	54201245	2021-09-04	2022-09-03
TDK RF	Horn Antenna	HRN-0118	130 084	2018-10-12	2021-10-12
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2021-09-04	2022-09-03
Agilent	Signal Generator	E8247C	MY43321350	2021-04-25	2022-04-24

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

Environmental Conditions

Test Item:	Radiated emissions
Temperature:	27.1~29.7°C
Relative Humidity:	58~67 %
ATM Pressure:	100.6~100.8 kPa
Tester:	Johnson Huang Jeremy Liang
Test Date:	2021.09.04~2021.09.06

SUMMARY OF TEST RESULTS

SN	Rule and Clause	Description of Test	Test Result
1	EN 301 908-1 Clause 4.2.2	Radiated emissions (UE)	Compliance
2	EN 301 908-1 Clause 4.2.3	Radiated emissions (BS and repeater)	Not applicable*
3	EN 301 908-1 Clause 4.2.4	Control and monitoring functions (UE)	Compliance*
4	EN 301 908-2 Clause 4.2.2	Transmitter maximum output power	Compliance*
5	EN 301 908-2 Clause 4.2.3	Transmitter spectrum emission mask	Compliance*
6	EN 301 908-2 Clause 4.2.4	Transmitter spurious emissions	Compliance*
7	EN 301 908-2 Clause 4.2.5	Transmitter minimum output power	Compliance*
8	EN 301 908-2 Clause 4.2.6	Receiver adjacent channel selectivity (ACS)	Compliance*
9	EN 301 908-2 Clause 4.2.7	Receiver blocking characteristics	Compliance*
10	EN 301 908-2 Clause 4.2.8	Receiver spurious response	Compliance*
11	EN 301 908-2 Clause 4.2.9	Receiver intermodulation characteristics	Compliance*
12	EN 301 908-2 Clause 4.2.10	Receiver spurious emissions	Compliance*
13	EN 301 908-2 Clause 4.2.11	Out-of-synchronization handling of output power	Compliance*
14	EN 301 908-2 Clause 4.2.12	Transmitter adjacent channel leakage power ratio	Compliance*
15	EN 301 908-2 Clause 4.2.13	Receiver reference sensitivity level	Compliance*
16	EN 301 908-2 Clause 4.2.14	Receiver Total Radiated Sensitivity (TRS)	Not applicable**
17	EN 301 908-2 Clause 4.2.15	Total Radiated Power (TRP)	Not applicable**

Note:
Not applicable*: This product does not belong to BS and repeater.
Not applicable**: The width of EUT is lager than 72mm.
Compliance*: This device contains module (model No.: EC25-EUX, EC25-EUX MINIPCIE), please refer to the module test report No.: GCA210112W004 and REA210112W004-2.

1 – RADIATED EMISSIONS (UE)

Applicable Standard

This test assesses the ability of radio communications equipment and ancillary equipment to limit unwanted emissions from the enclosure port.

This test is applicable to radio communications equipment and ancillary equipment.

This test shall be performed on the radio communications equipment and/or a representative configuration of the ancillary equipment.

Limit

The frequency boundary and reference bandwidths for the detailed transitions of the limits between the requirements for out-of-band emissions and spurious emissions are based on Recommendations ITU-R SM.329-12 [1] and SM.1539-1 [i.6].

The requirements shown in table 4.2.2.2-1 are only applicable for frequencies in the spurious domain.

Table 4.2.2.2-1: Radiated spurious emissions requirements (UE)

Frequency	Minimum requirement (e.r.p.)/ reference bandwidth idle mode	Minimum requirement (e.r.p.)/ reference bandwidth traffic mode	Applicability
30 MHz ≤ f < 1 000 MHz	-57 dBm/100 kHz	-36 dBm/100 kHz	All
1 GHz ≤ f < 12,75 GHz	-47 dBm/1 MHz	-30 dBm/1 MHz	All
fc - 2,5 × 5 MHz < f < fc + 2,5 × 5 MHz (note 2)		Not defined	UTRA FDD, UTRA TDD, 3,84 Mcps option, cdma2000, spreading rate 3
fc - 2,5 × $BW_{Channel}$ MHz < f < fc + 2,5 × $BW_{Channel}$ MHz (note 2)		Not defined	E-UTRA FDD, E-UTRA TDD, Mobile WiMAX™
fc - 2,5 × 10 MHz < f < fc1 + 2,5 × 10 MHz (note 2)		Not defined	UTRA TDD, 7,68 Mcps option
fc - 4 MHz < f < fc + 4 MHz (note 2)		Not defined	UTRA TDD, 1,28 Mcps option cdma2000, spreading rate 1
NOTE 1: fc is the UE transmit centre frequency. NOTE 2: This frequency range is not in the spurious domain, no requirement is then defined for this frequency range.			

Test Procedure

According to ETSI EN 301 908-1 V13.1.1 (2019-11) clause 5.3.1

Test Data

Pre-scan low/ middle/ high channel, the worst case as below.

Please refer to following table:

Band 1_traffic mode_middle channel 1950 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
3900.00	H	39.64	-57.00	13.40	1.52	-45.12	-30.00	15.12
3900.00	V	38.45	-58.12	13.40	1.52	-46.24	-30.00	16.24
5850.00	H	35.89	-56.82	14.05	1.54	-44.31	-30.00	14.31
5850.00	V	35.21	-57.56	14.05	1.54	-45.05	-30.00	15.05
1125.00	H	48.22	-55.41	7.38	1.04	-49.07	-30.00	19.07
1125.00	V	47.13	-57.07	7.38	1.04	-50.73	-30.00	20.73
165.80	H	50.75	-60.17	0.00	0.24	-60.41	-36.00	24.41
216.24	V	50.46	-56.50	0.00	0.21	-56.71	-36.00	20.71

Band 1_idle mode 1950 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1125.00	H	45.34	-58.29	7.38	1.04	-51.95	-47.00	4.95
1125.00	V	45.98	-58.22	7.38	1.04	-51.88	-47.00	4.88
1370.00	H	29.05	-74.46	8.79	1.20	-66.87	-47.00	19.87
1370.00	V	27.67	-76.53	8.79	1.20	-68.94	-47.00	21.94
140.58	V	41.90	-62.79	0.00	0.23	-63.02	-57.00	6.02
119.24	H	44.93	-64.75	0.00	0.21	-64.96	-57.00	7.96

Band 8_traffic mode_middle channel 897.6 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1795.20	H	45.12	-59.14	11.09	0.68	-48.73	-30.00	18.73
1795.20	V	44.65	-60.21	11.09	0.68	-49.80	-30.00	19.80
2692.80	H	36.72	-65.31	13.11	1.25	-53.45	-30.00	23.45
2692.80	V	36.91	-65.23	13.11	1.25	-53.37	-30.00	23.37
3590.40	H	36.01	-63.02	14.07	1.51	-50.46	-30.00	20.46
3590.40	V	35.71	-63.32	14.07	1.51	-50.76	-30.00	20.76
1125.00	H	47.34	-56.29	7.38	1.04	-49.95	-30.00	19.95
1125.00	V	16.72	-87.48	7.38	1.04	-81.14	-30.00	51.14
161.92	H	50.25	-60.59	0.00	0.24	-60.83	-36.00	24.83
249.20	V	49.55	-58.40	0.00	0.27	-58.67	-36.00	22.67

Band 8_idle mode 897.6 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1125.00	H	45.41	-58.22	7.38	1.04	-51.88	-47.00	4.88
1125.00	V	44.98	-59.22	7.38	1.04	-52.88	-47.00	5.88
1920.00	H	29.46	-73.36	11.84	1.04	-62.56	-47.00	15.56
1920.00	V	29.58	-73.56	11.84	1.04	-62.76	-47.00	15.76
136.28	H	41.22	-68.74	0.00	0.23	-68.97	-57.00	11.97
118.95	V	42.05	-62.36	0.00	0.20	-62.56	-57.00	5.56

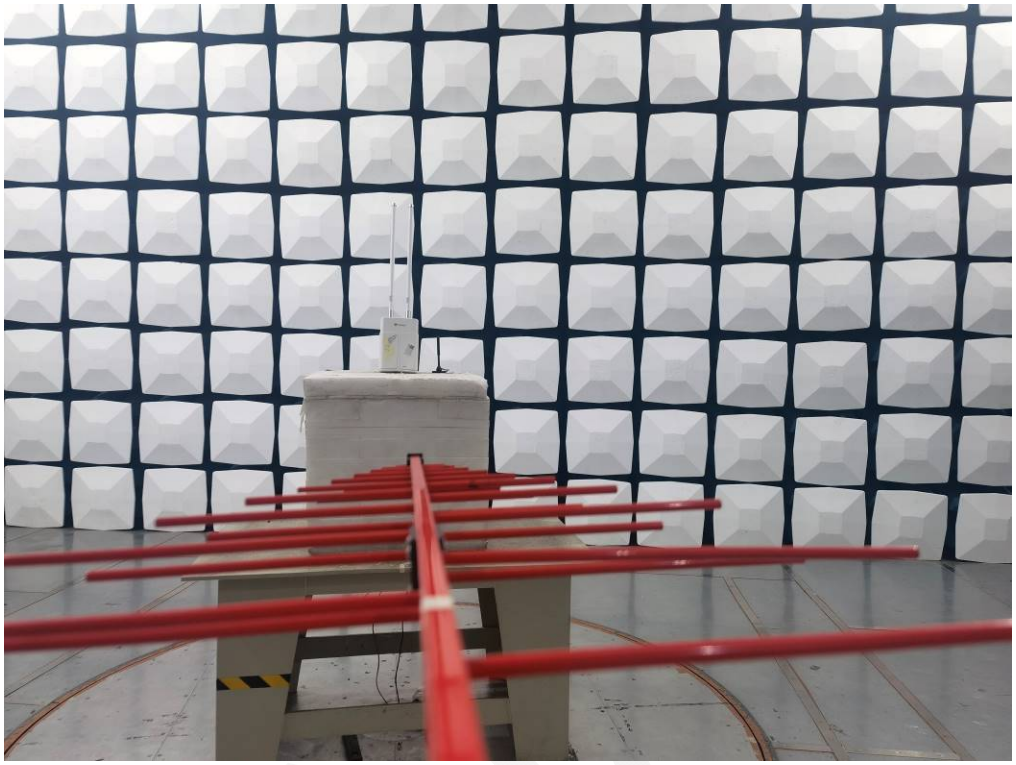
Note 1:The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.
Note 2:
Absolute Level = Substituted Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level

EXHIBIT A – EUT PHOTOGRAPHS

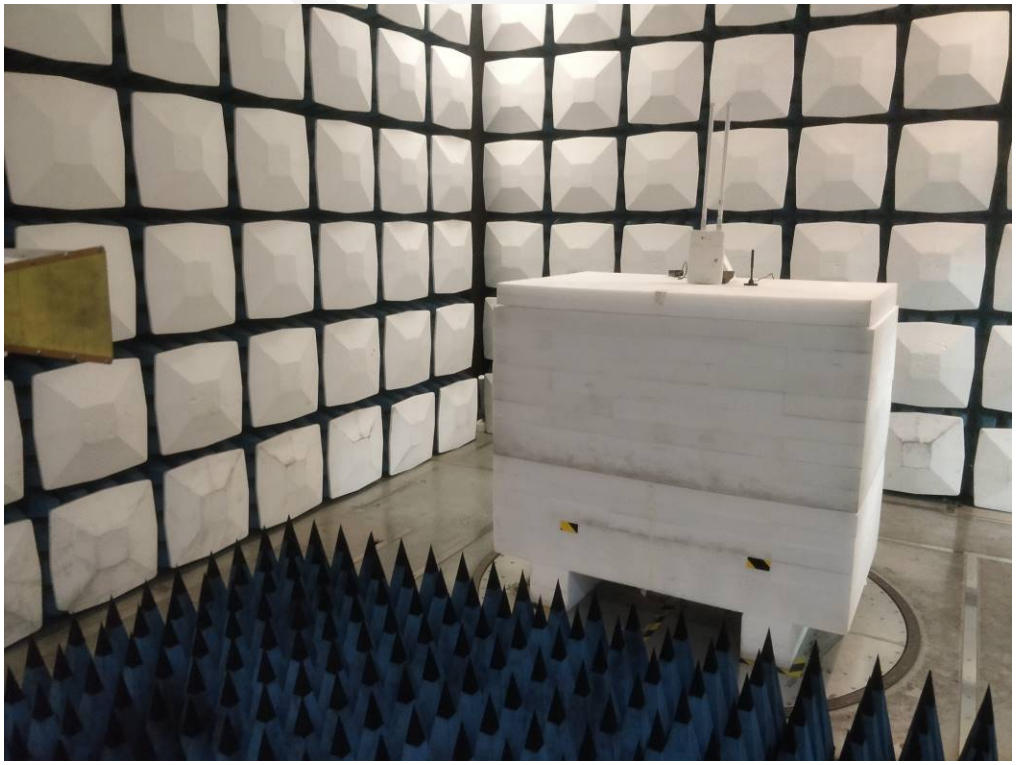
For photos in this section, please refer to report No.: RXM210219050-02 EXHIBIT A.

EXHIBIT B – TEST SETUP PHOTOGRAPHS

RE Below 1GHz View



RE Above 1GHz View



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