

EN IEC 62311:2020

ASSESSMENT REPORT

For

Xiamen Milesight IoT Co., Ltd.

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

Report Type: Original Report	Product Type: LoRaWAN Gateway
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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, UG67-868M, UG67-L04EU-868M-H32,UG67-L00E-868M-H32, UG67-868M-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 EN IEC 62311:2020, Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz to 300 GHz).

The objective is to determine the compliance of EUT with EN IEC 62311:2020.

Test Methodology

All measurements contained in this report were conducted with EN IEC 62311:2020.

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.

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.

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Technical Requirements Specification in EN 62311

General Description of Applied Standards

In general, the basic restrictions shall be used as exposure limits for the assessment of compliance. However, in most cases reference levels are used as limits. Such reference levels for exposure to electric, magnetic and electromagnetic fields are derived from the basic restrictions using realistic worst-case assumptions about exposure. If the reference levels are met, then the basic restrictions will also be met; if the reference levels are exceeded, that does not necessarily mean that the basic restrictions are exceeded. In some situations, it may be possible to show compliance with the basic restrictions directly. It may also be possible to derive compliance criteria that allow a simple measurement or calculation to demonstrate compliance with the basic restrictions. Often these compliance criteria can be derived using realistic assumptions about conditions under which exposures from a device may occur, rather than the conservative assumptions that are the basis for the reference levels.

RF Exposure Evaluation

Limit:

According to EN 62311, the criteria listed in the below table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified table 2 of Council Recommendation 1999/519/EC.

Reference levels for electric, magnetic and electromagnetic fields
(0 Hz to 300 GHz, unperturbed rms values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field(μ T)	Equivalent plane wave power density $S_{eq}(W/m^2)$
0-1 Hz	-	$3,2 \times 10^4$	4×10^4	-
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	-
8-25 Hz	10 000	4 000/f	5 000/f	-
0,025-0,8 kHz	250/f	4/f	5/f	-
0,8-3 kHz	250/f	5	6,25	-
3-150 kHz	87	5	6,25	-
0,15-1 MHz	87	0,73/f	0,92/f	-
1-10 MHz	$87/f^{1/2}$	0,73/f	0,92/f	-
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1,375 f^{1/2}$	$0,0037 f^{1/2}$	$0,0046 f^{1/2}$	f/200
2-300 GHz	61	0,16	0,20	10

Notes:

1. f as indicated in the frequency range column.

Test method

Far Field

The antenna of the product, under normal use condition is at least 20cm away from the body of the user. So, this product under normal use is located on electromagnetic far field between the human body.

Far Field Calculation Formula

$$E = \frac{\sqrt{30PG(\theta, \phi)}}{r}$$

Where:

P= Tune-up average conducted power

G= antenna gain relative to an isotropic antenna

θ, ϕ = elevation and azimuth angles to point of investigation

r= distance from observation point to the antenna

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{E_i}{E_{Limit, i}} \leq 1$$

Equivalent plane wave power density:

Equivalent plane wave power density Seq Calculation Formula

$$\text{Power density Seq} = PG / (4 \pi r^2)$$

Where:

P= Tune-up average conducted power

G= antenna gain relative to an isotropic antenna

r= distance from observation point to the antenna

Assessment result:

WWAN:

RF Mode	Frequency	Maximum Output Power	Maximum Output Power	Max Antenna Gain		Power Density Seq	Power Density Seq	Result
	MHz	(dBm)	(W)	(dBi)	(numeric)	(W/m ²)	Limit (W/m ²)	
EGSM 900	880-915	24	0.25	2	1.58	0.79	4.4	Pass
DCS 1800	1710-1785	21	0.13	2	1.58	0.41	8.55	Pass
WCDMA Band 1	1920-1980	23.5	0.22	2	1.58	0.69	9.6	Pass
WCDMA Band 8	880-915	23	0.2	2	1.58	0.63	4.4	Pass
LTE Band 1	1920-1980	23.5	0.22	2	1.58	0.69	9.6	Pass
LTE Band 3	1710-1785	23	0.2	2	1.58	0.63	8.55	Pass
LTE Band 7	2500-2570	22.5	0.18	2	1.58	0.57	10	Pass
LTE Band 8	880-915	23	0.2	2	1.58	0.63	4.4	Pass
LTE Band 20	832-862	23	0.2	2	1.58	0.63	4.16	Pass
LTE Band 28	703-733	23	0.2	2	1.58	0.63	3.52	Pass
LTE Band 38	2570-2620	23	0.2	2	1.58	0.63	10	Pass
LTE Band 40	2300-2400	23	0.2	2	1.58	0.63	10	Pass

WiFi:

Frequency	Tune-up average power(EIRP)		Power Density Seq	Seq Limit	Result
	MHz	(dBm)	(W)	(W/m ²)	
2412-2472	14	0.03	0.06	10	Pass

Lora:

Antenna Chain Type	Frequency	Tune-up average power(EIRP)		Power Density Seq	Seq Limit	Result
	MHz	(dBm)	(W)	(W/m ²)	(W/m ²)	
Internal	863-870	7	0.01	0.02	4.32	Pass
External	863-870	10	0.01	0.02	4.32	Pass

Note:

The distance from observation point to the antenna is 20cm.

The EUT have mutiple transmitters, WWAN, WiFi and Lora, the simultaneously transmit should be as below:

$$\text{Sum}_{\text{Seq}} = \text{Seq}_{\text{WWAN}}/\text{Seq}_{\text{Limit}} + \text{Seq}_{\text{Wifi}}/\text{Seq}_{\text{Limit}} + \text{Seq}_{\text{Lora}}/\text{Seq}_{\text{Limit}} = 0.79/4.4 + 0.06/10 + (0.02 + 0.02)/4.32 = 0.195 < 1$$

So $\text{Sum}_{\text{Seq}} < 1$.

Conclusion: Compliance

EXHIBIT A – EUT PHOTOGRAPHS

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

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

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