

Test Report No.:
FCC2022-0047-H1

RF Test Report

EUT	:	Wall Switch
MODEL	:	WS501-915M
BRAND NAME	:	Milesight
APPLICANT	:	Xiamen Milesight IoT Co., Ltd.
CLASSIFICATION OF TEST	:	N/A

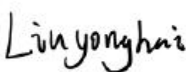
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Page 2 of 10

Applicant		Name: Xiamen Milesight IoT Co., Ltd. Address: Building C09, Software Park Phase III, Xiamen 361024, Fujian, China	
Manufacturer		Name: Xiamen Milesight IoT Co., Ltd. Address: Building C09, Software Park Phase III, Xiamen 361024, Fujian, China	
Equipment Under Test		Name: Wall Switch Model/Type: WS501-915M Additional Model/Type: See Section 2 Brand: Milesight Serial No.: N/A Sampe No.: 3-1	
Date of Receipt.	2022.08.17	Date of Testing	2022.08.17~2022.11.29
Test Specification		Test Result	
FCC Part 2 (Section 2.1091) KDB 447498 D04 IEEE C95.1		PASS	
Evaluation of Test Result		The equipment under test was found to comply with the requirements of the standards applied. Seal of CVC Issue Date: 2022.12.01	
Tested by:  Xu ZhenFei Name Signature		Reviewed by:  Liu YongHai Name Signature	Approved by:  Chen HuaWen Name Signature
Other Aspects: NONE.			
Abbreviations:OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested			

This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of CVC.



TABLE OF CONTENTS

RELEASE CONTROL RECORD	4
1. GENERAL PRODUCT INFORMATION	5
2. ADDITIONAL MODEL/TYPE	5
3. RF EXPOSURE LIMIT	6
4. CLASSIFICATION	8
5. ANTENNA GAIN	8
6. CALCULATION RESULT OF MAXIMUM CONDUCTED AV POWER	8



RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCC2022-0047-H1	Original release	2022.12.01



1. GENERAL PRODUCT INFORMATION

PRODUCT	Wall Switch
BRAND	Milesight
MODEL	WS501-915M
ADDITIONAL MODEL	See Section 2.2
FCC ID	2AYHY-WS50X
POWER SUPPLY	AC 120V/60Hz
OPERATING FREQUENCY	DTS 500kHz, 903MHz~926.9MHz
	Hybrid 125kHz, 902.3MHz~927.6MHz
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A
Remark: 1. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report. 3. EUT photo refer to the report (Report NO.: FCC2022-0047-E).	

2. ADDITIONAL MODEL/TYPE

Models	
1	NE501-915M
2	WS501-9M
3	NE501-9M
Note: The only differences are silk-screen 、trade name and model no. for trading purpose.	



3. RF EXPOSURE LIMIT

(Option B) According to FCC Part2.1091 and FCC Part1.1307b, the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where:

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and f is in GHz;

and

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

(Option C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to §1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source Frequency (MHz)	Threshold ERP (W)
0.3 - 1.34	$1920R^2$
1.34 - 30	$3450R^2 / f^2$
30 - 300	$3.38R^2$
300 - 1500	$0.0128R^2 / f^2$
1500 - 100000	$19.2R^2$



For multiple RF sources: Multiple RF sources are exempt if:

- The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(i)(A).
- in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (b)(3)(i)(B) of this section for Pth, including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.

c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

Pi = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

Pth,i = the exemption threshold power (Pth) according to paragraph (b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i.

ERPj = the ERP of fixed, mobile, or portable RF source j.

ERPth,j = exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least λ/2π according to the applicable formula of paragraph (b)(3)(i)(C) of this section.

Evaluatedk = the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.

Exposure Limitk = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source k, as applicable from § 1.1310 of this chapter.



4. CLASSIFICATION

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

5. ANTENNA GAIN

The antennas provided to the EUT, please refer to the following table:

Transmitter Circuit	Peak Gain (dBi)	Antenna Type
LORA	-1.79	PCB Antenna
NFC	/	Loop Antenna

This is provided by the manufacturer. The laboratory is not responsible for technical data provided by the customer.

6. CALCULATION RESULT OF MAXIMUM CONDUCTED AV POWER

The measured conducted Average Power

Option	Mode	Frequency (MHz)	Target Power (dBm)	Tolerance (dBm)	Lower Tolerance (dBm)	Upper Tolerance (dBm)
B	LORA	902.3MHz~927.6MHz	5	+/-1	4	6

Option	Mode	Frequency (MHz)	ERP(dBm)
C	NFC	13.56	-56.9

NOTE:

1. The NFC Field strength is -2.95dBμV at 30m or is 37.05dBμV at 3m.
2. $E[dBμV/m] = EIRP[dBm] + 95.2$, for $d = 3\text{ m}$.

The tuned conducted Average Power (declared by client)

Option	Technology	Maximum conducted power (dBm)	Maximum Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Part1.1307b Threshold (mW)	Verify
B	LORA	5.38	-1.79	3.59	2.29	1840.692	PASS

Option	Technology	ERP(dBm)	ERP(W)	Threshold ERP (W)	Verify
C	NFC	-56.9	2.04e-9	76.8	PASS

Note: This device can operate simultaneously in LORA and NFC.



CALCULATION FOR SIMULTANEOUS TRANSMISSION:

LORA and NFC can transmit simultaneously, the formula of calculated the MPE is

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

Max: $(2.29/1840.692) + (2.04e-9/76.8) = 0.00124 < 1$, which is less than the “1” limit.



Important

- (1) The test report is valid without the official stamp of CVC;
- (2) Any part photocopies of the test report are forbidden without the written permission from CVC;
- (3) The test report is invalid without the signatures of Approval and Reviewer;
- (4) The test report is invalid if altered;
- (5) Objections to the test report must be submitted to CVC within 15 days.
- (6) Generally, commission test is responsible for the tested samples only.
- (7) As for the test result “-” or “N” means “not applicable”, “/” means “not test”, “P” means “pass” and “F” means “fail”

The test data and test results given in this test report should only be used for purposes of scientific research, teaching and internal quality control when the CMA symbol is not presented.

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