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# RF Exposure Evaluation Report

**Report No. :** CQASZ20190800042EX-02  
**Applicant:** Wenzhou Morning Electronics Co.,LTD  
**Address of Applicant:** No.231-2, Wei 6 Road, Yueqing Economic Development Zone, Yueqing City, Zhejiang, China 325604  
**Manufacturer:** Wenzhou Morning Electronics Co.,LTD  
**Address of Manufacturer:** No.231-2, Wei 6 Road, Yueqing Economic Development Zone, Yueqing City, Zhejiang, China 325604  
**Equipment Under Test (EUT):**  
**Product:** Smart Switch  
**All Model No.:** MS-101, MS-101R, MS-101WR, MS-102, MS-102B, MS-103, MS-104, MS-104R, MS-104WR, MS-104B-R, MS-104B-WR, MS-104B, MS-105,MS-106, MS-107, MS-108  
**Test Model No.:** MS-101  
**Brand Name:** N/A  
**FCC ID:** 2AT8P-MS10X  
**Standards:** 47 CFR Part 1.1307  
47 CFR Part 2.1093  
KDB447498D01 General RF Exposure Guidance v06  
**Date of Test:** Aug. 05, 2019 to Aug. 12, 2019  
**Date of Issue:** Aug. 12, 2019  
**Test Result :** **PASS\***

**Tested By:**

(Tom Chen)

**Reviewed By:**

(Aaron Ma)

**Approved By:**

( Jack Ai)



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

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.

## 2. Version

### Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20190800042EX-02	Rev.01	Initial report	Aug. 12, 2019

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## 4. General Information

### 4.1 Client Information

Applicant:	Wenzhou Morning Electronics Co.,LTD
Address of Applicant:	No.231-2, Wei 6 Road, Yueqing Economic Development Zone, Yueqing City, Zhejiang, China 325604
Manufacturer:	Wenzhou Morning Electronics Co.,LTD
Address of Manufacturer:	No.231-2, Wei 6 Road, Yueqing Economic Development Zone, Yueqing City, Zhejiang, China 325604

### 4.2 General Description of EUT

Product Name:	Smart Switch
Test Model No.:	MS-101
Trade Mark:	N/A
Hardware Version:	V1.0
Software Version:	V2.2.3
Sample Type:	<input type="checkbox"/> Mobile <input type="checkbox"/> Portable <input checked="" type="checkbox"/> Fix Location
Power Supply:	AC 110V 60Hz

### 4.3 General Description of WIFI

Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g : OFDM IEEE for 802.11n(HT20): OFDM
Test Software of EUT:	RF test (manufacturer declare )
Antenna Type:	PCB Antenna
Antenna Gain:	0.0dBi

## 5. SAR Evaluation

### 5.1 RF Exposure Compliance Requirement

#### 5.1.1 Standard Requirement

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300 .....	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula:  $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

$\pi$  = 3.1416

R = distance between observation point and center of the radiator in cm

$P_d$  is the limit of MPE . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

#### 5.1.2 Limits

Software provided by client enabled the EUT to transmit data at lowest, middle and highest channel individually.

## 5.2 EUT RF Exposure

### 1) For WIFI

Antenna Gain: 0Bi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.41 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

#### Measurement Data

802.11b mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	13.49	15±2	17	50.119
Middle(2437MHz)	14.19	15±2	17	50.119
Highest(2462MHz)	14.46	15±2	17	50.119
802.11g mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	14.09	13±2	15	31.623
Middle(2437MHz)	14.59	13±2	15	31.623
Highest(2462MHz)	14.91	13±2	15	31.623
802.11n(HT20)mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	12.83	12±2	14	25.119
Middle(2437MHz)	13.29	12±2	14	25.119
Highest(2462MHz)	13.43	12±2	14	25.119

Worst case

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 50 cm (mW/cm <sup>2</sup> )	Limit	Result
50.119	0	0.00225	1	PASS

Remark: The Max Conducted Peak Output Power data refer to report Report No.: CQASZ20190800042EX-01

value.:

$$2) P_d = (P_{out} * G) / (4 * \pi * R^2) = (50.119 * 1.41) / (4 * 3.1416 * 50^2) = 0.00225$$