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RF Exposure Evaluation Report

Report No. : CQASZ20200300140E-02
Applicant: Schneider Electric (China) Co., Ltd., Shenzhen Branch
Address of Applicant: Room 201, Building A, No. 1 Qianwanyi Road, Shengang Cooperation Zone, Qianhai, Shenzhen, China
Equipment Under Test (EUT):
EUT Name: Z-wave dimmer
Model No.: SQR22101WHZ, SQR22101LAZ, SQR22101BKZ
Test Model No.: SQR22101WHZ
Brand Name: Schneider Electric, Square D
FCC ID: 2AUCU-22101Z
Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2020-03-12
Date of Test: 2020-03-12 to 2020-06-04
Date of Issue: 2020-06-04
Test Result : PASS*

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

Tested By:

Tom Chen

(Tom Chen)

Reviewed By:

Aaron Ma

(Aaron Ma)

Approved By:

Jack Ai

(Jack Ai)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20200300140E-02	Rev.01	Initial report	2020-06-04

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3 General Information

3.1 Client Information

Applicant:	Schneider Electric (China) Co., Ltd., Shenzhen Branch
Address of Applicant:	Room 201, Building A, No. 1 Qianwanyi Road, Shengang Cooperation Zone, Qianhai, Shenzhen, China
Manufacturer:	Schneider Electric (China) Co., Ltd., Shenzhen Branch
Address of Manufacturer:	Room 201, Building A, No. 1 Qianwanyi Road, Shengang Cooperation Zone, Qianhai, Shenzhen, China

3.2 General Description of EUT

Product Name:	Z-wave dimmer
Model No.:	SQR22101WHZ, SQR22101LAZ, SQR22101BKZ
Test Model No.:	SQR22101WHZ
Trade Mark:	Schneider Electric, Square D
Hardware Version:	DC-HW01/AC-HW01
Software Version:	V1.08
Frequency Range:	908.4MHz ~ 916MHz
Modulation Type:	GFSK
Number of Channels:	3 (declared by the client)
Sample Type:	☐ Mobile ☐ Portable ☒ Fix Location
Test Software of EUT:	RF test (manufacturer declare)
Antenna Type:	External antenna
Antenna Gain:	0dBi
Power Supply:	120V 60Hz

Note:

Model: SQR22101WHZ, SQR22101LAZ, SQR22101BKZ

Only the model SQR22101WHZ was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being color of appearance.

4 SAR Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

4.1.2 Limits

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$$\left[\frac{(\text{max. power of channel, including tune-up tolerance, mW})}{(\text{min. test separation distance, mm})} \right] \cdot \sqrt{f(\text{GHz})} \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, where}$$

$f(\text{GHz})$ is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation¹⁷

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

4.1.3 EUT RF Exposure

$$e_{irp} = p_t \times g_t = (E \times d)^2 / 30$$

where:

p_t = transmitter output power in watts,

g_t = numeric gain of the transmitting antenna (unitless),

E = electric field strength in V/m, $10^{((dB\mu V/m)/20)/10^6}$,

d = measurement distance in meters (m)---3m,

$$\text{So } p_t = (E \times d)^2 / 30 / g_t$$

The worst case (refer to report CQASZ20200300140E-01) is below:

Antenna polarization: Horizontal		
Frequency (MHz)	Level (dBuV/m)	Polarization
916	77.58	Peak

Antenna polarization: Vertical		
Frequency (MHz)	Level (dBuV/m)	Polarization
916	74.61	Peak

For 916MHz wireless:

Field strength = 77.58dBuV/m @3m

Ant. gain 0dBi; so Ant numeric gain=1

$$\text{So } p_t = \{ [10^{(77.58/20)/10^6} \times 3]^2 / 30 / 1 \} \times 1000 \text{mW} = 0.017 \text{mW}$$

$$\text{So } (0.017 \text{mW} / 5 \text{mm}) \times \sqrt{0.916 \text{GHz}} = 0.0033$$

$$0.0033 < 3.0 \text{ for 1-g SAR}$$

So the SAR report is not required.