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RF Exposure Evaluation Report

Report No.:	CQASZ20240701528E-04
Applicant:	SHENZHEN XINWU TECHNOLOGY LIMITED
Address of Applicant:	Floor 6, Building 2, Chungu Science park, Meisheng Huigu Science Park, 83 Dabao Road, Baoan District, Shenzhen
Equipment Under Test (EUT):	
EUT Name:	Smart Doorbell X9
Test Model No.:	XW133-X1, XW133-X2, XW133-X3, XW133-X4, XW133-X5, XW133-X6, XW133-X7, XW133-X8, XW133-X9, XW133-X10, XW133-D10
Model No.:	XW133-X9
Brand Name:	N/A
FCC ID:	2AW97-XW133
Standards:	47 CFR Part 1.1307 47 CFR Part 2.1091 447498 D04 Interim General RF Exposure Guidance v01
Date of Receipt:	2024-07-30
Date of Test:	2024-07-30 to 2024-08-05
Date of Issue:	2024-08-12
Test Result:	**PASS***

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

Tested By: lewis zhou
(Lewis Zhou)

Reviewed By: Timo Lei
(Timo Lei)

Approved By: Alex
(Alex Wang)

1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20240701528E-04	Rev.01	Initial report	2024-08-12

2 Contents

3 General Information

3.1 Client Information

Applicant:	SHENZHEN XINWU TECHNOLOGY LIMITED
Address of Applicant:	Floor 6, Building 2, Chungu Science park, Meisheng Huigu Science Park, 83 Dabao Road, Baoan District, Shenzhen
Manufacturer:	SHENZHEN XINWU TECHNOLOGY LIMITED
Address of Manufacturer:	Floor 6, Building 2, Chungu Science park, Meisheng Huigu Science Park, 83 Dabao Road, Baoan District, Shenzhen
Factory:	SHENZHEN XINWU TECHNOLOGY LIMITED
Address of Factory:	Floor 6, Building 2, Chungu Science park, Meisheng Huigu Science Park, 83 Dabao Road, Baoan District, Shenzhen

3.2 General Description of EUT

Product Name:	Smart Doorbell X9
Model No.:	XW133-X1, XW133-X2, XW133-X3, XW133-X4, XW133-X5, XW133-X6, XW133-X7, XW133-X8, XW133-X9, XW133-X10, XW133-D10
Test Model No	XW133-X9
Trade Mark:	N/A
EUT Supports Radios application:	BT: 2402-2480MHz 2.4GHz: Wi-Fi: 802.11b/g/n(HT20): 2412MHz~2462MHz; 802.11n(HT40): 2422MHz~2452MHz 433.92MHz
Software Version:	XW133-X9_V1.5
Hardware Version:	XW133-X9-P0_V1.0&XW133-X9-P1_V1.0
Sample Type:	☐ Mobile ☐ Portable ☒ Fix Location
EUT Power Supply:	Li-ion battery: DC 3.7V 750mAh, Charge by DC 5V for adapter
	Li-ion battery: DC 3.7V 600mAh, Charge by DC 5V for adapter

3.3 General Description of BLE

Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	V5.0
Modulation Technique:	Non Frequency Hopping Spread Spectrum(NFHSS)
Modulation Type:	GFSK
Number of Channel:	BLE:40
Transfer Rate:	1Mbps
Test Software of EUT:	Wifi Test Tool v1.6.5
Antenna Type:	PCB antenna
Antenna Gain:	2dBi

3.4 General Description of wifi

Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels IEEE 802.11n HT40: 7 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g : OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20 and HT40) : OFDM (64QAM, 16QAM, QPSK, BPSK)
Transfer Rate:	IEEE for 802.11b: 1Mbps/2Mbps/5.5Mbps/11Mbps IEEE for 802.11g : 6Mbps/9Mbps/12Mbps/18Mbps/24Mbps/36Mbps/48Mbps/54Mbps IEEE for 802.11n(HT20) : 6.5Mbps/13Mbps/19.5Mbps/26Mbps/39Mbps/52Mbps/58.5Mbps/65Mbps IEEE for 802.11n(HT40) : 13.5Mbps/27Mbps/40.5Mbps/54Mbps/81Mbps/108Mbps/121.5Mbps/135Mbps
Test Software of EUT:	Wifi Test Tool v1.6.5
Antenna Type:	PCB antenna
Antenna Gain:	2dBi

3.5 General Description of 433.92MHz

Operation Frequency:	433.92MHz
Channel Numbers:	1CH
Transfer Rate:	FSK
Test Software of EUT:	key frequency
Antenna Type:	internal antenna
Antenna Gain:	0 dBi

4 MPE Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Limits

The table applies to any RF source (i.e., single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits. These criteria apply at separation distances from any part of the radiating structure of at least $\lambda/2\pi$. The thresholds are based on the general population MPE limits with a single perfect reflection, outside of the reactive near-field, and in the main beam of the radiator.For mobile devices that are not exempt per Table B.1 [Table 1 of § 1.1307(b)(1)(i)(C)] at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in § 1.1310 is necessary if the ERP of the device is greater than ERP20cm inFormula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

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

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i.e., without consideration of ERP only 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.
SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

4.1.2 Test Procedure

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

4.1.3 EUT RF Exposure

1) For WIFI Classic

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	14.90	15±1	16	39.81
Middle(2437MHz)	17.06	17±1	18	63.09
Highest(2462MHz)	14.00	14±1	15	31.62
GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	11.43	11±1	12	15.85
Middle(2437MHz)	12.37	12±1	13	19.95
Highest(2462MHz)	10.91	11±1	12	15.85
GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	11.52	11±1	12	15.85
Middle(2437MHz)	12.41	12±1	13	19.95
Highest(2462MHz)	10.99	11±1	12	15.85
GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2422MHz)	11.47	11±1	12	15.85
Middle(2437MHz)	12.24	12±1	13	19.95
Highest(2452MHz)	10.93	11±1	12	15.85

The maximum output power of this product is less than 3060mW

Note: 1) Refer to report No. CQASZ20220400584E-01 for EUT test Max Conducted Peak Output Power value.

2) EUT's Bluetooth module is more than 20cm away from the human body.

2) For BLE Classic

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-1.04	-1±1	0	1
Middle(2440MHz)	0.19	0±1	1	1.259
Highest(2480MHz)	-0.54	-1±1	0	1

The maximum output power of this product is less than 3060mW

Note: 1) Refer to report No. CQASZ20220400584E-02 for EUT test Max Conducted Peak Output Power value.

2) EUT's Bluetooth module is more than 20cm away from the human body.

3) For 433.92MHz Classic

$$\mathrm{EIRP} = E_{\mathrm{Meas}} + 20\log\left(d_{\mathrm{Meas}}\right) - 104.7$$

where

EIRP	is the equivalent isotropically radiated power, in dBm
E_{Meas}	is the field strength of the emission at the measurement distance, in dBμV/m
d_{Meas}	is the measurement distance, in m

Frequency	EIRP (dBm)	ERP (dBm)	Maximum tune-up Power (mW)	Exclusion threshold (mW)
433.92MHz	-21.09	-23.24	0.005	1

Remark: The Max Conducted Peak Output Power data refer to report Report No.: CQASZ20240701528E-01.

*** END OF REPORT ***