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Report Template Version: V03
Report Template Revision Date: Mar.1st, 2017

RF Exposure Evaluation Report

Report No. :	CQASZ20190600024EX-03
Applicant:	Hangzhou Meari Technology Co., Ltd.
Address of Applicant:	No.91, Chutian Road, Xixing Block, Binjiang, Hangzhou,310051 Zhejiang, CHINA
Manufacturer:	Hangzhou Meari Technology Co., Ltd.
Address of Manufacturer:	No.91, Chutian Road, Xixing Block, Binjiang, Hangzhou,310051 Zhejiang, CHINA
Equipment Under Test (EUT):	
Product:	Wireless DoorBell
Model No.:	Bell 7S
Brand Name:	N/A
FCC ID:	2AG7C-BELL7S
Standards:	47 CFR Part 1.1307 47 CFR Part 1.1310 KDB447498D01 General RF Exposure Guidance v06
Date of Test:	May 31, 2019 to Jun. 21, 2019
Date of Issue:	Jun. 21, 2019
Test Result :	**PASS***

Tested By: Daisy Qin

(Daisy Qin)

Reviewed By: Aaron Ma

(Aaron Ma)

Approved By:

(Jack Ai)

SHENZHEN HUAXIA TESTING TECHNOLOGY CO., LTD. 华夏准测 APPROVED

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

2 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20190600024EX-01	Rev.01	Initial report	Jun. 21, 2019

3 Contents

4 General Information

4.1 Client Information

Applicant:	Hangzhou Meari Technology Co., Ltd.
Address of Applicant:	No.91, Chutian Road, Xixing Block, Binjiang, Hangzhou,310051 Zhejiang, CHINA
Manufacturer:	Hangzhou Meari Technology Co., Ltd.
Address of Manufacturer:	No.91, Chutian Road, Xixing Block, Binjiang, Hangzhou,310051 Zhejiang, CHINA

4.2 General Description of EUT

Product Name:	Wireless DoorBell
Model No.:	Bell 7S
Trade Mark:	N/A
Hardware Version:	V1.1
Software Version:	V2.0
Sample Type:	☐ Mobile ☐ Portable ☒ Fix Location
Power Supply:	DC3.7V from battery

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 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 IEEE for 802.11n(HT20): OFDM IEEE 802.11n HT40: OFDM
Test Software of EUT:	RF test (manufacturer declare)
Antenna Type	IPEX Antenna
Antenna Gain	1.5dBi

4.4 General Description of 433.92MHz

Operation Frequency:	433.92MHz
Channel Numbers:	1
Modulation Type:	GFSK
Antenna Type:	Spring antenna
Antenna Gain:	-3.5dBi

5 RF Exposure Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Limits

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^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f^2)	6
30–300	61.4	0.163	1.0	6
300–1500	.....	.....	f/300	6
1500–100,000	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f^2)	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: $Pd = (Pout*G)/(4* Pi * R^2)$

Where

Pd = power density in mW/cm2

Pout = 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

Pd id 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 Test Procedure

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

5.2 1.1.3 EUT RF Exposure Evaluation

1) For WIFI

Antenna Gain: 1.5dBi

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				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	16.385	16.5	16.5	44.67
Middle(2442MHz)	15.503	16	16	39.81
Highest(2462MHz)	15.664	16	16	39.81
802.11g				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	15.173	15.5	15.5	35.48
Middle(2442MHz)	14.874	15	15	31.62
Highest(2462MHz)	15.196	15.5	15.5	35.48
802.11n(HT20)				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	14.803	15	15	31.62
Middle(2442MHz)	14.522	15	15	31.62
Highest(2462MHz)	14.834	15	15	31.62
802.11n(HT40)				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2422MHz)	12.245	12.5	12.5	17.78
Middle(2442MHz)	12.321	12.5	12.5	17.78
Highest(2452MHz)	12.349	12.5	12.5	17.78

The worst case:

Maximum tune-up Power (mW)	**Antenna Gain (dBi)**	**Power Density at R = 20 cm (mW/cm^2)**	**Limit**	**Result**
44.67	1.5	0.0126	1.0	PASS

Note: 1) Refer to report No. CQASZ20190600024EX-01 for EUT test Max Conducted Peak Output Power

value.

2) Pd = (Pout*G)/(4* Pi * R^2)=(44.67*1.41)/(4*3.1416*20^2)=0.0126

2) For 433.92MHz:

The worst case (refer to report CQASZ20190600024EX-02) is below:

Antenna polarization: Horizontal		
Frequency (MHz)	Level (dBuV/m)	Polarization
433.92	85.31	Peak
433.92	76.97	Average

Antenna polarization: Vertical		
Frequency (MHz)	Level (dBuV/m)	Polarization
433.92	85.93	Peak
433.92	77.59	Average

eirp = pt x gt = $(E \times d)^2/30$

where:

pt = transmitter output power in watts,

gt = 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,

So pt = $(E \times d)^2/30$ / gt

For 433.92MHz wireless:

Field strength = 85.93dBμV/m @3m

Ant. gain -3.5dBi; so Ant numeric gain=0.45

So pt={[$10^{85.93/20)}/10^6$x3]^2/30 /0.45}x1000mW =0.263mW

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
0.263	-3.5	2.34 x 10^{-5}	0.289	PASS

Note: 1) Pd = (Pout*G)/(4* Pi * R^2)=(0.263*0.45)/(4*3.1416*20^2)=2.34 x 10^{-5}

2) Limit=433.92/1500=0.289

3) For 433.92MHz and WIFI

The 433.92MHz and WIFI radios can not transmit simultaneously.