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

RF Exposure Evaluation Report

Report No. :	CQASZ20180100033EW-03
Applicant:	Wonders Technology Co., Ltd.
Address of Applicant:	4/F, Tower A,3rd Building, Tian'an Cloud Park, Bantian Avenue, Longgang District, Shenzhen 518129, China
Manufacturer:	Wonders Technology Co., Ltd
Address of Manufacturer:	4/F, Tower A,3rd Building, Tian'an Cloud Park, Bantian Avenue, Longgang District, Shenzhen 518129, China
Factory:	Wonders Technology Co., Ltd
Address of Factory:	4/F, Tower A,3rd Building, Tian'an Cloud Park, Bantian Avenue, Longgang District, Shenzhen 518129, China
Equipment Under Test (EUT):	
Product:	WiFi Bluetooth Speaker
Model No.:	W1, DS-1728
Test Model No.:	W1
Brand Name:	N/A
FCC ID:	WC2-000W1
Standards:	47 CFR Part 1.1307 47 CFR Part 1.1310 KDB447498D01 General RF Exposure Guidance v06
Date of Test:	2018-01-20 to 2018-03-07
Date of Issue:	2018-03-07
Test Result :	**PASS***

Tested By: Aaron Ma

(Aaron Ma)

Reviewed By: Owen Zhou

(Owen Zhou)

Approved By:

(Jack Ai)

SHENZHEN HUAXIA TESTING TECHNOLOGY CO., LTD. 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
CQASZ20180100033EW-03	Rev.01	Initial report	2018-02-04
CQASZ20180100033EW-03	Rev.02	Updated model name	2018-03-01
CQASZ20180100033EW-03	Rev.03	Re-tested wifi conducted out power	2018-03-07

3 Contents

4 General Information

4.1 Client Information

Applicant:	Wonders Technology Co., Ltd.
Address of Applicant:	Doss Industrial Zone, Qiping Kengdu Industrial Area,Guihua Village, Guanlan Town, Baoan District, Shenzhen, China
Manufacturer:	Wonders Technology Co., Ltd
Address of Manufacturer:	4/F, Tower A,3rd Building, Tian'an Cloud Park, Bantian Avenue, Longgang District, Shenzhen 518129, China
Factory:	Wonders Technology Co., Ltd
Address of Factory:	4/F, Tower A,3rd Building, Tian'an Cloud Park, Bantian Avenue, Longgang District, Shenzhen 518129, China

4.2 General Description of EUT

Product Name:	WiFi Bluetooth Speaker
Model No.:	W1, DS-1728
Trade Mark:	N/A
Hardware Version:	V1.0
Software Version:	V1.0
Power Supply:	lithium battery:DC3.7V, Charge by DC5.0V

4.3 General Description of BT

Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	V2.1+EDR
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Test Software of EUT:	Test V1.0 (manufacturer declare)
Antenna Type:	PCB antenna
Antenna Gain:	-0.68dBi

4.4 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) : OFDM (64QAM, 16QAM, QPSK,BPSK)
Test Software of EUT:	MT7628 QA 0.0.0.96 (manufacturer declare)
Antenna Type:	internal antenna with ipex connector
Antenna Gain:	0dBi

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, 1 mW/cm2 . 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 and receive data at lowest, middle and highest channel individually.

5.2 1.1.3 EUT RF Exposure Evaluation

Note: BT and WIFI simultaneous transmit was not supported.

1) For BT

Antenna Gain: -0.68dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.86 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

GFSK mode	
Test channel	Peak Output Power (dBm)
Lowest(2402MHz)	-1.46
Middle(2441MHz)	-2.77
Highest(2480MHz)	-3.26
π/4DQPSK mode	
Test channel	Peak Output Power (dBm)
Lowest(2402MHz)	-2.60
Middle(2441MHz)	-3.96
Highest(2480MHz)	-4.46
8DPSK mode	
Test channel	Peak Output Power (dBm)
Lowest(2402MHz)	-2.50
Middle(2441MHz)	-3.82
Highest(2480MHz)	-4.43

GFSK mode(worst case)

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
Lowest	2402	-1.46	0.71	-0.68	0.00012	1.0	PASS

Note: 1) Refer to report No. CQASZ20180100033EW-01 for EUT test Max Conducted Peak Output Power value.

2) $Pd = (Pout*G)/(4* Pi * R^2)=(0.71*0.86)/(4*3.1416*20^2)=0.00012$

2) For WIFI

Antenna Gain: 0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.0 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

802.11b mode	
Test channel	Average Output Power (dBm)
Lowest(2412MHz)	13.25
Middle(2437MHz)	13.12
Highest(2462MHz)	13.76
802.11g mode	
Test channel	Average Output Power (dBm)
Lowest(2412MHz)	12.47
Middle(2437MHz)	12.23
Highest(2462MHz)	12.78
802.11n(HT20)mode	
Test channel	Average Output Power (dBm)
Lowest(2412MHz)	12.43
Middle(2437MHz)	12.15
Highest(2462MHz)	12.58

802.11b(worst case)

Channel	Frequency (MHz)	Max Conducted Average Output Power (dBm)	Output Power to Antenna (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
Highest	2462	13.76	23.77	0	0.0047	1.0	PASS

Note: 1) Refer to report No. CQASZ20180100033E-02 for EUT test Max Conducted Average Output Power value.

2) $Pd = (Pout*G)/(4* Pi * R^2)=(23.77*1.0)/(4*3.1416*20^2)=0.0047$