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RF Exposure Evaluation Report

Report No.: CQASZ20201001192E-02
Applicant: Shenzhen Leaderment Technology Co.,Ltd
Address of Applicant: 1st Floor, Building 24, Longcheng Industrial Zone, No. 39 Longguan West Road, Gaofeng Community, Dalang Street, Longhua District, Shenzhen
Equipment Under Test (EUT):
EUT Name: Car Wireless FM Transmitter
Model No.: UBCH261
Brand Name: UNBREAKcable
FCC ID: 2ASUP-UBCH261
Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2020-10-26
Date of Test: 2020-10-26 to 2020-10-30
Date of Issue: 2020-10-30
Test Result: **PASS***

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

Tested By:

Martin Lee

(Martin Lee)

Reviewed By:

Sheek Luo

(Sheek Luo)

Approved By:

Jack Ai

(Jack Ai)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20201001192E-02	Rev.01	Initial report	2020-10-30

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3 General Information

3.1 Client Information

Applicant:	Shenzhen Leaderment Technology Co.,Ltd
Address of Applicant:	1st Floor, Building 24, Longcheng Industrial Zone, No. 39 Longguan West Road, Gaofeng Community, Dalang Street, Longhua District, Shenzhen
Manufacturer:	Shenzhen Leaderment Technology Co.,Ltd
Address of Manufacturer:	1st Floor, Building 24, Longcheng Industrial Zone, No. 39 Longguan West Road, Gaofeng Community, Dalang Street, Longhua District, Shenzhen

3.2 General Description of EUT

Product Name:	Car Wireless FM Transmitter
Model No.:	UBCH261
Trade Mark:	UNBREAKcable
Hardware Version:	BT23_2819_8027_V1.0
Software Version:	BT23V1.0
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	V5.0
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK
Transfer Rate:	1Mbps/2Mbps/3Mbps
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Product Type:	<input type="checkbox"/> Mobile <input type="checkbox"/> Portable <input checked="" type="checkbox"/> Fix Location
Test Software of EUT:	BT FCC Tool V2.00 (manufacturer declare)
Antenna Type:	PCB Antenna
Antenna Gain:	4.0dBi
Power Supply:	DC 12-24V

4 SAR Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Limitst

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

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is 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.

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 BT Classic

Antenna Gain: 4.0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.51 in linear scale.

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)	-2.720	-3.5±1	-2.5	0.562
Middle(2441MHz)	-1.100	-2.0±1	-1.0	0.794
Highest(2480MHz)	0.160	-0.5±1	0.5	1.122
π/4DQPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-0.070	-1.0±1	0	1.000
Middle(2441MHz)	1.530	1.0±1	2.0	1.585
Highest(2480MHz)	2.950	2.0±1	3.0	1.995
8DPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	0.530	0±1	1.0	1.259
Middle(2441MHz)	2.160	1.5±1	2.5	1.778
Highest(2480MHz)	3.610	3.0±1	4.0	2.512

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
2.512	4.0	0.00126	1.0	PASS

Note: 1) Refer to report No. CQASZ20201001192E-01 for EUT test Max Conducted Peak Output Power value.

2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (2.512 * 2.51) / (4 * 3.1416 * 20^2) = 0.00126$

--THE END--