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RF Exposure Evaluation Report

Report No. : CQASZ20220100049E-03
Applicant: Lightcomm Technology Co., Ltd.
Address of Applicant: UNIT 1306 13/F ARION COMMERCIAL CENTRE, 2-12 QUEEN'S ROAD WEST, SHEUNG WAN HK
Manufacturer: Huizhou Hengdu Electronics Co., Ltd.
Address of Manufacturer: No.8 Huitai Road, Huinan High-tech Industrial Park, Huiao Avenue, Huizhou, Guangdong, China
Factory: Huizhou Hengdu Electronics Co., Ltd.
Address of Factory: No.8 Huitai Road, Huinan High-tech Industrial Park, Huiao Avenue, Huizhou, Guangdong, China
Equipment Under Test (EUT):
EUT Name: Car Multimedia System
Model No.: CVD1506-SD
Brand Name: N/A
FCC ID: XMF-CVD1506
Standards: 47 CFR Part 1.1307
47 CFR Part 2.1093
KDB447498D01 General RF Exposure Guidance v06
Date of Test: 2021-12-28 to 2022-01-10
Date of Issue: 2022-01-19
Test Result: PASS*

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

Tested By: Lewis Zhou

(Lewis Zhou)

Reviewed By: Rock Huang

(Rock Huang)

Approved By: Jack ai

(Jack ai)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20220100049E-03	Rev.01	Initial report	2022-01-19

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3 General Information

3.1 Client Information

Applicant:	Lightcomm Technology Co., Ltd.
Address of Applicant:	UNIT 1306 13/F ARION COMMERCIAL CENTRE,2-12 QUEEN'S ROAD WEST,SHEUNG WAN HK
Manufacturer:	Huizhou Hengdu Electronics Co.,Ltd.
Address of Manufacturer:	No.8 Huitai Road,Huinan High-tech Industrial Park,Huiao Avenue,Huizhou,Guangdong,China
Factory:	Huizhou Hengdu Electronics Co.,Ltd.
Address of Factory:	No.8 Huitai Road,Huinan High-tech Industrial Park,Huiao Avenue,Huizhou,Guangdong,China

3.2 General Description of EUT

Product Name:	Car Multimedia System
Model No.:	CVD1506-SD
Series Model:	BVCP9690A,BV900ACP,P9950CPA,P62CP,BE62CP,BCP62,DDCP62,DDCP62-R,BV800ACP, BVCP9685A,P9900CPA ,P9900CPAP,DD988ACP ,MRCP9685A,BE7ACP,P70CPA,P70CPAP, BVCP9700A-MR,BVCP9700A,DD7CPA,BE7ACP-FT,BE7ACP-SD,BVCP9700A-FL,P70CPA-F, P70CPA-PF,DD7CPA-S,BE8ACP,BCPA8,P80CPA,P80CPAP,SDML8ACP,BE9ACP,BCPA9, P90CPA,P90CPAP,SDML9ACP,BE10ACP,BCPA10,P100CPA,P100CPAP,SDML10ACP, BE11ACP,BCPA11,P110CPA,P110CPAP,SDML11ACP,BE13ACP,BCPA13,P130CPA, P130CPAP,SDML13ACP,BECA9W,PWCPA9P,DS9ACPW,BVCPA9W,PWCPA9, BECPA10W,PWCPA10P,DS10ACPW,BVCPA10W,PWCPA10,BE8ACPW,BCPA8W,P80CPAW, P80CPAWP,SDML8ACPW,BE920WCPA-FT,BVCP9800W-FL,PCPA650W-F,PCPA650W- FP,DD990ACPW-S,BE920WCPA,PCPA650W,PCPA650WP,BVCP9800W,DD990ACPW, BE945WCPA,BVCP9820W,PCPA660W,PCPA660WP,DD995ACPW,NA3625,NA3625X, NA3625-W6,NA3625X-W6,NA3625-WUX,NA3625X-WUX,CVD6481-SA,CVD6483D-SD, CVD6439-SD,CVD6483C-SD,CVD6483E-SD,CVD6472-SD,CVD6472A-SD,CVD7470-SD, CVD7361A-SD,CVD7361-SD,CVS7489-SD,CVS8488-SD,CVD9502-SD,CVD9502W-SD, CVD1506W-SD,CVS8488W-SD,CVS7489W-SD,CVD7470W-SD,CVD7361W-SD, CVD7361AW-SD,CVD6472AW-SD,CVD6472W-SD,CVD6490-SA,CVD6491-SD,CVS1507-SD, CVS1508-SD, CVS1509-SD (All these models are identical with each other except for Brand name and model number.)
Power Supply:	DC 12V

3.3 General Description of BLE

Operation Frequency:	2402MHz~2480MHz
Type of Modulation:	Bluetooth 4.1 (GFSK, $\pi/4$ -DQPSK, 8-DPSK)
Transfer Rate:	1Mbps
Number of Channel:	40
Product Type:	☐ Mobile ☐ Portable ☒ Fix Location
Antenna Type:	PCB antenna
Antenna Gain:	1.71 dBi gain

3.4 General Description of BT

Operation Frequency:	2402MHz~2480MHz
Type of Modulation:	Bluetooth 4.1 (GFSK, $\pi/4$ -DQPSK 8DPSK))
Transfer Rate:	1Mbps/2Mbps/3Mbps
Number of Channel:	79
Product Type:	☐ Mobile ☐ Portable ☒ Fix Location
Antenna Type:	PCB antenna
Antenna Gain:	1.71 dBi gain

4 SAR Evaluation

4.1 RF Exposure Compliance Requirement

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

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

4.1.3 EUT RF Exposure

1) For BT Classic

Antenna Gain: 1.71dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.48 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

BLE(1Mbps)

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	0.12	1±1	2	1.585
Middle(2440MHz)	2.34	2±1	3	1.995
Highest(2480MHz)	2.95	2±1	3	1.995

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
1.995	1.71	0.00059	1.0	PASS

Note: 1) Refer to report No. CQASZ20220100049E-02 for EUT test Max Conducted Peak Output Power value.

2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (1.995 * 1.48) / (4 * 3.1416 * 20^2) = 0.00059$

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

2) For BT

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	1.456	2±1	3	1.995
Middle(2441MHz)	0.749	1±1	2	1.585
Highest(2480MHz)	-0.345	0±1	1	1.259
8-DQPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	0.446	1±1	2	1.585
Middle(2441MHz)	-0.243	0±1	1	1.259
Highest(2480MHz)	-1.453	-1±1	0	1

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
1.995	1.71	0.00059	1.0	PASS

Note: 1) Refer to report No. CQASZ20220100049E-01 for EUT test Max Conducted Peak Output Power value.

2) $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = (1.995 \cdot 1.48) / (4 \cdot 3.1416 \cdot 20^2) = 0.00059$

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

*** END OF REPORT ***