

RF Exposure Evaluation Report

Product : 4G Intelligent Gateway
Trade mark : N/A
Model/Type reference : X2
Serial Number : N/A
Report Number : EED32P80040004
FCC ID : 2AG6GX2
Date of Issue : Mar. 09, 2023
Test Standards : 47 CFR Part 1.1307
47 CFR Part 1.1310
447498 D04 Interim General RF
Exposure Guidance v01
Test result : PASS

Prepared for:

Hongdian Corporation
Tower A, Hongdian Building, 100 Huabao Road, Pinghu,
Longgang District, Shenzhen, China

Prepared by:

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2 Version

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4 General Information

4.1 Client Information

Applicant:	Hongdian Corporation
Address of Applicant:	Tower A, Hongdian Building, 100 Huabao Road, Pinghu, Longgang District, Shenzhen, China
Manufacturer:	Hongdian Corporation
Address of Manufacturer:	Tower A, Hongdian Building, 100 Huabao Road, Pinghu, Longgang District, Shenzhen, China
Factory:	Hongdian Corporation
Address of Factory:	Tower A, Hongdian Building, 100 Huabao Road, Pinghu, Longgang District, Shenzhen, China

4.2 General Description of EUT

Product Name:	4G Intelligent Gateway
Model No.(EUT):	X2
Trade Mark:	N/A

4.3 Product Specification subjective to this standard

Frequency Range:	2.4G WIFI: IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz 5G WIFI: U-NII-1: 5180-5250MHz U-NII-3: 5745-5825MHz GSM: GSM 850: TX: 824-849MHz, RX: 869-894MHz GSM1900: TX: 1850-1910MHz, RX: 1930-1990MHz WCDMA: Band V: TX: 824-849MHz, RX: 869-894MHz WCDMA: Band II: TX: 1850-1910MHz, RX: 1930-1990MHz LTE: Band 5: TX:824-849MHz,RX:869-894MHz Band 2: TX:1850-1910MHz,RX:1930-1990MHz Band 4: TX:1710-1755MHz,RX:2110-2155MHz Band 7: TX:2500-2570MHz,RX:2620-2690MHz
Modulation Type:	2.4G WIFI: 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) 5G WIFI: IEEE 802.11a: OFDM (BPSK, QPSK, 16QAM, 64QAM) IEEE 802.11n(HT20/HT40): OFDM (BPSK, QPSK, 16QAM, 64QAM) IEEE 802.11ac(VHT20/VHT40/VHT80): OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) GMSK, 8PSK, QPSK
Test Power Grade:	Default
Test Software of EUT:	qdart
Power Supply:	DC12V,3A
Sample Received Date:	Jan. 10, 2023
Sample tested Date:	Jan. 10, 2023 to Feb. 03, 2023
Remark:	Company Name and Address shown on Report, the sample(s) and sample Information was/ were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified.

4.4 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd

Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China

Telephone: +86 (0) 755 33683668 Fax:+86 (0) 755 33683385

No tests were sub-contracted.

FCC Designation No.: CN1164

4.5 Deviation from Standards

None.

4.6 Abnormalities from Standard Conditions

None.

4.7 Other Information Requested by the Customer

None.

5 SAR Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Limits

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold Pth (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by Formula

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and f is in GHz, d is the separation distance (cm), and ERP20cm is per Formula (B.1).

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad (\text{B.1})$$

The 1 mW Blanket Exemption of § 1.1307(b)(3)(i)(A) applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power of no more than 1 mW, regardless of separation distance.

5.1.2 Test Procedure

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

5.1.3 EUT RF Exposure Evaluation

(1) For Stand alone:

1. For 2.4G Wi-Fi

Frequency (MHz)	Separation distance (cm)	Max. Conducted Output power (dBm)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Limit (mW)	MPE ratio	Result
2412	20	17.91	2.76	18.52	71.121	3060	0.023	PASS

2. For 5G Wi-Fi

Frequency (MHz)	Separation distance (cm)	Max. Conducted Output power (dBm)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Limit (mW)	MPE ratio	Result
5795	20	14.98	3.23	16.06	40.3645	3060	0.013	PASS

Note:

① EIRP = conducted power + antenna gain;

② ERP = EIRP - 2.15;

③ The test data please refer to the report of EED32P80040001, EED32P80040002, EED32P80040003, and only the worst case data and the worst antenna schemes 1 was recorded in the report.

3. For GSM & WCDMA & LTE

Band	Separation distance (cm)	Max. Conducted Output power (dBm)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Limit (mW)	MPE ratio	Result
GSM850	20	25.970	2.00	27.97	626.614	1680.96	0.373	PASS
GSM1900	20	22.970	2.00	22.82	191.426	3060	0.063	PASS
WCDMA II	20	25.000	2.00	24.85	305.492	3060	0.100	PASS
WCDMA V	20	25.000	2.00	27.00	501.187	1680.96	0.298	PASS
LTE Band 2	20	25.000	2.00	24.85	305.492	3060	0.100	PASS
LTE Band 4	20	25.000	2.00	24.85	305.492	3060	0.100	PASS
LTE Band 5	20	25.000	2.00	27.00	501.187	1680.96	0.298	PASS
LTE Band 7	20	25.000	2.00	24.85	305.492	3060	0.100	PASS

Note:

- ① EIRP=conducted power+antenna gain;
- ② ERP=EIRP-2.15;
- ③ The test data please refer to the report of R2108A0762-M1, and only the worst case data and the worst antenna schemes 1 was recorded in the report.

(2)For MIMO:

1.For 2.4G Wi-Fi

Frequency (MHz)	Separation distance(c m)	Max. Conducted Output power (dBm)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Limit (mW)	MPE ratio	Result
2462	20	17.58	2.76	18.19	65.9174	3060	0.022	PASS

2.For 5G Wi-Fi

Frequency (MHz)	Separation distance(c m)	Max. Conducted Output power (dBm)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Limit (mW)	MPE ratio	Result
5795	20	14.97	3.23	16.05	40.2717	3060	0.013	PASS

Note:

- ① EIRP=conducted power+antenna gain;
- ② ERP=EIRP-2.15;
- ③ The test data please refer to the report of EED32P80040001,EED32P80040002,EED32P80040003, and only the worst case data and the worst antenna schemes 1 was recorded in the report.

(3)For SUM:

SUM=0.022+0.013+0.373=0.408<1

Result: PASS

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CTI, this report can't be reproduced except in full.

*** End of Report ***