

Test Report

Verified code: 444375

Report No.: E20211217696105-9

Customer: BYD Auto Industry Company Limited

Address: No. 3001, 3007, Hengping Road, Pingshan, Shenzhen, P. R. China

Sample Name: DiLink

Sample Model: DiLink 3.0F

Receive Sample Date: Feb.10,2022

Test Date: Feb.25,2022 ~ May.10,2022

Reference Document: CFR 47, FCC Part 2.1091 Radio frequency radiation exposure evaluation: mobile devices.

Test Result: Pass

Prepared by: Yang Zhaoyun

Reviewed by: Zhao Zetian

Approved by: Xiao Liang

GUANGZHOU GRG METROLOGY & TEST CO., LTD

Issued Date: 2022-06-08

GUANGZHOU GRG METROLOGY & TEST CO., LTD.

Address: No.163, Pingyun Road, West of Huangpu Avenue, Guangzhou, Guangdong, China
Tel: (+86) 400-602-0999 FAX: (+86) 020-38698685 Web: <http://www.grgtest.com>



Statement

1. The report is invalid without "special seal for inspection and testing"; some copies are invalid; The report is invalid if it is altered or missing; The report is invalid without the signature of the person who prepared, reviewed and approved it.
2. The sample information is provided by the client and responsible for its authenticity; The content of the report is only valid for the samples sent this time.
3. When there are reports in both Chinese and English, the Chinese version will prevail when the language problems are inconsistent.
4. If there is any objection concerning the report, please inform us within 15 days from the date of receiving the report.
5. Without the agreement of the laboratory, the client is not authorized to use the test results for unapproved propaganda.

----- The following blanks -----

TABLE OF CONTENTS

1.	GENERAL DESCRIPTION OF EUT	5
1.1.	APPLICANT	5
1.2.	MANUFACTURER	5
1.3.	FACTORY	5
1.4.	BASIC DESCRIPTION OF EQUIPMENT UNDER TEST.....	5
2.	LABORATORY AND ACCREDITATIONS	7
2.1.	LABORATORY	7
2.2.	ACCREDITATIONS	7
3.	EVALUATION METHOD	8
4.	LIMITS FOR GENERAL POPULATION/UNCONTROLLED EXPOSURE.....	8
5.	CALCULATION METHOD	9
6.	ESTIMATION RESULT	11
6.1.	MEASUREMENT RESULTS	11
7.	CONCLUSION.....	13

----- The following blanks -----

REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E20211217696105-9	Original Issue	2022-05-12

----- The following blanks -----

1. GENERAL DESCRIPTION OF EUT

1.1. APPLICANT

Name: BYD Auto Industry Company Limited
Address: No. 3001, 3007, Hengping Road, Pingshan, Shenzhen, P. R. China

1.2. MANUFACTURER

Name: BYD Auto Industry Company Limited
Address: No. 3001, 3007, Hengping Road, Pingshan, Shenzhen, P. R. China

1.3. FACTORY

Name: Huizhou BYD Electronics Co., Ltd.
Address: Xiangshui River, Economic Development Zone, Daya Bay, Huizhou, Guangdong, P. R. China

1.4. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment: DiLink
Model No.: DiLink 3.0F
Adding Model: /
Trade Name: BYD
FCC ID: SD4-DILINK6125F
Power Supply: DC 12V
Adapter Specification: /
Frequency Range: GSM 850: 824 MHz ~ 849 MHz
GSM 1900: 1850 MHz ~ 1910 MHz
WCDMA Band 2: 1850 MHz ~ 1910 MHz
WCDMA Band 4: 1710 MHz ~ 1755 MHz
WCDMA Band 5: 824 MHz ~ 849 MHz
FDD LTE Band 2: 1850 MHz ~ 1910 MHz
FDD LTE Band 4: 1710 MHz ~ 1755 MHz
FDD LTE Band 5: 824 MHz ~ 849 MHz
FDD LTE Band 7: 2500 MHz ~ 2570 MHz
FDD LTE Band 12: 699 MHz ~ 716 MHz
FDD LTE Band 13: 777 MHz ~ 787 MHz
FDD LTE Band 17: 704 MHz ~ 716 MHz
TDD LTE Band 38: 2570 MHz ~ 2620 MHz
TDD LTE Band 41: 2496 MHz ~ 2690 MHz
BT&BLE: 2402 MHz ~ 2480 MHz
2.4G WIFI: 2412 MHz ~ 2462 MHz
U-NII-1: 5180 MHz ~ 5240 MHz
U-NII-2A: 5260 MHz ~ 5320 MHz
U-NII-2C: 5500 MHz ~ 5700 MHz

U-NII-3: 5745 MHz ~ 5825 MHz

Transmit Power: Reference Section 5 Table 2

Modulation type: GSM: GMSK, 8PSK
WCDMA: QPSK
LTE: QPSK, 16QAM
BLE: GFSK
BT: GFSK, $\pi/4$ -DQPSK, 8DPSK
2.4G RLAN: DSSS, OFDM
5G RLAN: OFDM

Antenna Specification: Reference Section 5 Table 1

Temperature Range: $-30^{\circ}\text{C} \sim 70^{\circ}\text{C}$

Hardware Version: DiLink HW 6125F

Software Version: DiLink SW 4.0F

Sample No: /

Note: /

----- The following blanks -----

2. LABORATORY AND ACCREDITATIONS

2.1. LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of Guangzhou GRG Metrology & Test Co., Ltd.

Add.: No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District
Shenzhen, 518110, People's Republic of China.

P.C.: 518110

Tel : 0755-61180008

Fax: 0755-61180008

2.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	A2LA(Certificate #2861.01)
------------	----------------------------

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	ISED (Company Number: 24897, CAB identifier:CN0069)
USA	FCC (Registration Number: 759402, Designation Number:CN1198)

Copies of granted accreditation certificates are available for downloading from our web site,
<http://www.grgtest.com>

----- The following blanks -----

3. EVALUATION METHOD

Exposure category: General population/uncontrolled environment

EUT Type: Production Unit

Device Type: Mobile Device

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

In accordance with KDB447498D04 Either SAR-based or MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (*Evaluated_k* term) shall be used to determine exemption for simultaneous transmission according to Formula (C.1)

$$\sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1 \quad (C.1)$$

Evaluated_k the maximum reported SAR or MPE of fixed, mobile, or portable RF source *k* either in the device or at the transmitter site from an existing evaluation.

Exposure Limit_k either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable sources, as applicable

the sum of the ratios of the applicable terms for SAR-based, MPE-based and measured SAR or MPE shall be less than 1, to determine simultaneous transmission exposure compliance

4. LIMITS FOR GENERAL POPULATION/UNCONTROLLED EXPOSURE

For mobile devices at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in Table B.2 is necessary if the ERP of the device is greater than ERP_{20cm} in Formula (B.1)

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

(B.2) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength(H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100,000	/	/	1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

5. CALCULATION METHOD

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG / 4\pi R^2$$

Where: S=power density

P=power input to antenna

G=power gain of the antenna in the direction of interest relative to anisotropic radiator

R=distance to the center of radiation of the antenna

From the EUT RF output power, the minimum mobile separation distance, d=20cm, as well as the maximum gain of the used as following information, the RF power density can be obtained.

Table 1 Antenna Specification

Frequency Band	Antenna type	Internal Identification	Maximum antenna gain
GSM 850	External antenna	Antenna 1	-0.63 dBi
GSM 1900			-2.95 dBi
WCDMA Band 2			-2.95 dBi
WCDMA Band 4			-1.00 dBi
WCDMA Band 5			-0.63 dBi
FDD LTE Band 2			-1.94 dBi
FDD LTE Band 4			-1.00 dBi
FDD LTE Band 5			-0.63 dBi
FDD LTE Band 7			-0.37 dBi
FDD LTE Band 12			-1.02 dBi
FDD LTE Band 13			-1.02 dBi
FDD LTE Band 17			-1.02 dBi
TDD LTE Band 38			-0.37 dBi
TDD LTE Band 41			-0.37 dBi
2.4 GHz WIFI	External antenna	Antenna 2	-1.77 dBi
U-NII-1			-3.81 dBi
U-NII-2A			-4.34 dBi
U-NII-2C			-4.34 dBi
U-NII-3			-4.39 dBi
BT			-1.77 dBi
BLE			-1.77 dBi

Table 2 Transmit Power

Frequency Band	Mode	Maximum Output Power (dBm)	Maximum Tune-up Output power (dBm)
GSM 850	GPRS 4slots	29.68	30.00
GSM 1900	GPRS 4slots	26.53	27.00
WCDMA Band 2	RMC	23.41	24.50
WCDMA Band 4	RMC	23.67	24.50
WCDMA Band 5	RMC	23.66	24.50
FDD LTE Band 2	20MHz	23.15	24.50
FDD LTE Band 4	1.4MHz	23.42	24.50
FDD LTE Band 5	3MHz	23.21	24.50
FDD LTE Band 7	10MHz	23.59	24.50
FDD LTE Band 12	5MHz	23.41	24.50
FDD LTE Band 13	5MHz	23.43	24.50
FDD LTE Band 17	5MHz	23.38	24.50
TDD LTE Band 38	20MHz	24.16	24.50
TDD LTE Band 41	10MHz	23.56	24.50
2.4 GHz WIFI	802.11g	21.16	21.50
U-NII-1	802.11a	14.67	15.00
U-NII-2A	802.11a	15.88	16.00
U-NII-2C	802.11a	16.14	16.50
U-NII-3	802.11a	16.22	16.50
BT	DH5	-0.14	0.00
BLE	1M	5.08	5.50

Note:

Other configurations of GSM / GPRS / EDGE are considered as secondary modes. The frame-averaged power is linearly reported the maximum burst averaged power over 8 time slots. The calculated method are shown as below:

The duty cycle “x” of different time slots as below:

1 TX slot is 1/8, 2 TX slots is 2/8, 3 TX slots is 3/8 and 4 TX slots is 4/8

Based on the calculation formula:

Frame-averaged power = Burst averaged power + 10 log (x)

So,

Frame-averaged power (1 TX slot) = Burst averaged power (1 TX slot)– 9.03

Frame-averaged power (2 TX slots) = Burst averaged power (2 TX slots)– 6.02

Frame-averaged power (3 TX slots) = Burst averaged power (3 TX slots)– 4.26

Frame-averaged power (4 TX slots) = Burst averaged power (4 TX slots) – 3.01

6. ESTIMATION RESULT

6.1. MEASUREMENT RESULTS

STANDALONE MPE

Mode	Frequency (MHz)	Tune-up Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
		(dBm)	(mW)				
GSM 850	824 - 849	30.00	1000.00	-0.63	0.86	0.17	0.55
GSM 1900	1850 - 1910	27.00	501.19	-2.95	0.51	0.05	1.00
WCDMA Band 2	1850 - 1910	24.50	281.84	-2.95	0.51	0.03	1.00
WCDMA Band 4	1710 -1755	24.50	281.84	-1.00	0.79	0.04	1.00
WCDMA Band 5	824 - 849	24.50	281.84	-0.63	0.86	0.05	0.55
FDD LTE Band 2	1850 - 1910	24.50	281.84	-1.94	0.64	0.04	1.00
FDD LTE Band 4	1710 -1755	24.50	281.84	-1.00	0.79	0.04	1.00
FDD LTE Band 5	824 - 849	24.50	281.84	-0.63	0.86	0.05	1.00
FDD LTE Band 7	2500 - 2570	24.50	281.84	-0.37	0.92	0.05	1.00
FDD LTE Band 12	699 - 716	24.50	281.84	-1.02	0.79	0.04	0.47
FDD LTE Band 13	777 - 787	24.50	281.84	-1.02	0.79	0.04	0.52
FDD LTE Band 17	704 - 716	24.50	281.84	-1.02	0.79	0.04	0.47
TDD LTE Band 38	2570 - 2620	24.50	281.84	-0.37	0.92	0.05	1.00
TDD LTE Band 41	2496 - 2690	24.50	281.84	-0.37	0.92	0.05	1.00
2.4 GHz WIFI	2412 - 2462	21.50	141.25	-1.77	0.67	0.02	1.00
U-NII-1	5180 - 5240	15.00	31.62	-3.81	0.41	0.00	1.00
U-NII-2A	5260 - 5320	16.00	39.81	-4.34	0.37	0.00	1.00
U-NII-2C	5500 - 5700	16.50	44.67	-4.34	0.37	0.00	1.00
U-NII-3	5745 - 5825	16.50	44.67	-4.39	0.36	0.00	1.00
BT	2402 - 2480	0.00	1.00	-1.77	0.67	0.00	1.00
BLE	2402 - 2480	5.50	3.55	-1.77	0.67	0.00	1.00

Remark: 1. MPE use distance is 20cm from manufacturer declaration of user manual.

Maximum Simultaneous transmission MPE Ratio for WWLAN & WLAN & BT(BR+EDR&BLE)

Maximum MPE ratio (GSM 850)	Maximum MPE ratio (2.4 GHz WIFI)	Maximum MPE ratio (BLE)	Σ MPE ratios	Limit	Results
0.31	0.02	0.00	0.33	1.000	Pass

Note: The estimation distance is 20cm.

----- The following blanks -----

7. CONCLUSION

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

----- End of Report -----