

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: Certification Ordinance Article 2-1-19
Report No.: RJBYSR-WTW-P21050722A-3
Product: EIC-QCNFA324
Brand: e-Infochips
Model No.: QCNFA324
Received Date: 2022/11/18
Test Date: 2022/12/12
Issued Date: 2023/1/10

Applicant: e-Infochips Private Limited

Address: Block-E, Ratna, Ground FLR to 4th FLR,
3rd Eye voice IT/ITES SEZ,
Developed by Calica Construction & Impex Pvt. Ltd.,
Village Ognaj, Tal: Dascroi, Dist: Ahmedabad India- 380060

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

Approved by: _____

May Chen / Manager

Date: _____

2023/1/10

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Prepared by : Vivian Huang / Specialist

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Release Control Record

Issue No.	Description	Date Issued
RJB YCR-WTW-P21050722A-3	Original release.	2023/1/10

1 Certificate

Product: EIC-QCNFA324

Brand: e-Infochips

Test Model: QCNFA324

Sample Status: Engineering sample

Applicant: e-Infochips Private Limited

Test Date: 2022/12/12

Standard: Certification Ordinance Article 2-1-19

Measurement procedure: MIC notice 88 Appendix 43

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Summary of Test Results

Certification Ordinance Article 2-1-19		
Clause	Test Item	Result
OR: Article 49-20	Antenna Specifications	Pass
OR: Article 49-20	Housing Requirements	Pass (Refer to Note 3)
OR: Article 49-20	Communication Method	Pass (Refer to Note 3)
OR: Article 49-20	Modulation Mehtod	Pass (Refer to Note 3)
OR: Article 49-20 Notice 88 -Appendix 43 - 6	Antenna Power	Pass
OR: Article 49-20 Notice 88 -Appendix 43 - 10	Absolute Gain of Transmitting Antenna	Pass

Notes:

1. OR:Ordinance Regulating Radio Equipment
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
3. The relative information refer section 3.1 of this report
4. This report is prepared for supplementary report.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in ETSI TR 100 028-1:

Parameter	Uncertainty (±)
Occupied Bandwidth	960 Hz
Spurious Emissions	2.5 dB
Output Power Density	1.2 dB
Out of Band Radiated Power	2.5 dB
Frequency Tolerance	960 Hz

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description

Product	EIC-QCNFA324
Brand	e-Infochips
Test Model	QCNA324
Test Software Version	qdart_conn_qrct.win.4.0_installer_00053.3
Status of EUT	Engineering sample
Power Supply Rating	DC 3.3V from test tool (Test tool input 7.5Vdc)
Modulation Type	GFSK
Modulation Technology	DTS
Transfer Rate	1 Mbps
Operating Frequency	2.402 GHz ~ 2.48 GHz
Number of Channel	40
Assembly	The EUT is constructed as a Wi-Fi + BT Module (Wi-Fi + BT). The RF circuit was covered by metal shielding case, and the metal shielding case won't be easy to be opened.

Note:

1. This is a supplementary report of Report No.: RJB YCR-WTW-P21050722-3. The differences between them are as below information:
 - ◆ Add new antenna (refer to section 3.3).
2. According to above conditions, only Antenna Power needs to be performed. And all data are verified to meet the requirements.
3. There are WLAN and Bluetooth technology used for the EUT.
4. Simultaneously transmission condition.

Condition	Technology	
1	WLAN(5GHz)	Bluetooth

5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Output Power Description of EUT

Operation Mode	Rated Output Power (mW)	Conducted RF Output Power (mW)	Radiated RF Output Power (mW)
BT-LE 1M	2	1.945	4.178

3.3 Antenna Description of EUT

1. The antenna information is listed as below.

Original								
Ant. (Set)	Brand	Model	Ant.Net Gain (dBi)	Freq. Range (GHz)	Ant. Type	Connector Type	Cable Length	Cable Loss(dB)
1	Wepotec	2458N (120-232-01)	3	2.4~2.4835	Chip	MHF4	130 mm ±10	0.66
			0.2	5.15~5.85				1
		2458S (120-233-01)	3	2.4~2.4835	Chip	MHF4	270 mm ±10	1.38
			0.2	5.15~5.85				2.08
2	Leica	Kingfisher antenna (927101A)	2.9	2.4~2.4835	Chip	MHF4 connector Receptacle	125 mm +3 / -2	0.3125
			3.8	5.15~5.85				0.466
Newly								
Ant. (Set)	Brand	Model	Ant.Net Gain (dBi)	Freq. Range (GHz)	Ant. Type	Connector Type	Cable Length	Cable Loss(dB)
3	Leica	850201	3.32	2.4~2.4835	PIFA	IPEX	123mm	N.A.
			4.82	5.15~5.85				

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

2. Antenna Pattern:

Please refer to the attached file (Antenna pattern).

3.4 Channel List

40 channels are provided for BT-LE:

Channel	Frequency (MHz)						
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

3.5 Power Setting

Power Setting	
Channel	BT-LE 1M
0	Default
19	Default
39	Default

3.6 Test Mode Applicability and Tested Channel Detail

Test Conditions	Voltage (Vdc)
V_{normal}	7.5
$V_{max. (+10\%)}$	8.25
$V_{min. (-10\%)}$	6.75

Pre-Scan:	1. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
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Following channel(s) was (were) selected for the final test as listed below:

Test Item	Mode	Tested Channel	Modulation	Data Rate Parameter
Antenna Power	BT-LE 1M	0, 19, 39	GFSK	1Mb/s

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 Antenna Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until	Calibration Authority	Calibration Method
DC POWER SUPPLY Topward	6603D	795558	Note 2	Note 2	BV CPS E&E	(d)
Power Meter Anritsu	ML2495A	1529002	2022/6/22	2023/6/21	ETC	(c)
Pulse Power Sensor Anritsu	MA2411B	1726434	2022/6/22	2023/6/21	ETC	(c)
True RMS Clamp Meter Fluke	325	31130711WS	2022/6/9	2023/6/8	ETC	(c)

Notes:

1. Calibration method:
 - (a): Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph (1).
 - (b): Calibration conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) Japan Calibration Service System.
 - (c): Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).
 - (d): Calibration conducted by using other equipment that listed above from a) to c).
2. The power supply no evaluation calibrated, which used the digital multimeter to verify before each testing.
3. The test was performed in Oven room 2.
4. Tested Date: 2022/12/12

5 Limits of Test Items

5.1 Antenna Power

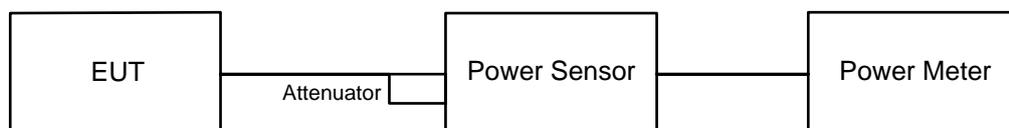
Modulation System	Frequency Band Used	Antenna Power (Max.)	EIRP Limit (Note 3)
DSSS	2400 – 2483.5 MHz	10 mW/MHz	12.14 dBm/MHz ~ 22.14 dBm/MHz (16.368 mW/MHz ~ 163.68 mW/MHz)
OFDM (Note 1)	2400 – 2483.5 MHz	10 mW/MHz	12.14 dBm/MHz ~ 22.14 dBm/MHz (16.368 mW/MHz ~ 163.68 mW/MHz)
OFDM (Note 2)	2400 – 2483.5 MHz	5 mW/MHz	9.13 dBm/MHz ~ 19.13 dBm/MHz (8.184 mW/MHz ~ 81.84 mW/MHz)
FHSS	2400 – 2483.5 MHz	3 mW/MHz	6.91 dBm/MHz ~ 16.91 dBm/MHz (4.91 mW/MHz ~ 49.10 mW/MHz)
Other Digital	2400 – 2483.5 MHz	10 mW	12.14 dBm ~ 22.14 dBm (16.368 mW ~ 163.68 mW)

Notes:

1. Occupied bandwidth is less than 26MHz
2. Occupied bandwidth is more than 26MHz and less than 40MHz
3. EIRP limit is variable by the HPBA, the HPBA (half-power beam width) of the antenna shall be $360/A$ degrees or less, where $A = \text{EIRP} / (2.14 \text{ dBi} + \text{“Antenna Power (limit)”})$.
4. Tolerance of antenna power shall be +20% (upper value) and –80% (lower value).

6 Test Arrangements

6.1 Antenna Power



7 Test Results of Test Item

7.1 Antenna Power

Environmental Conditions:	25°C, 60% RH	Tested By:	John Peng
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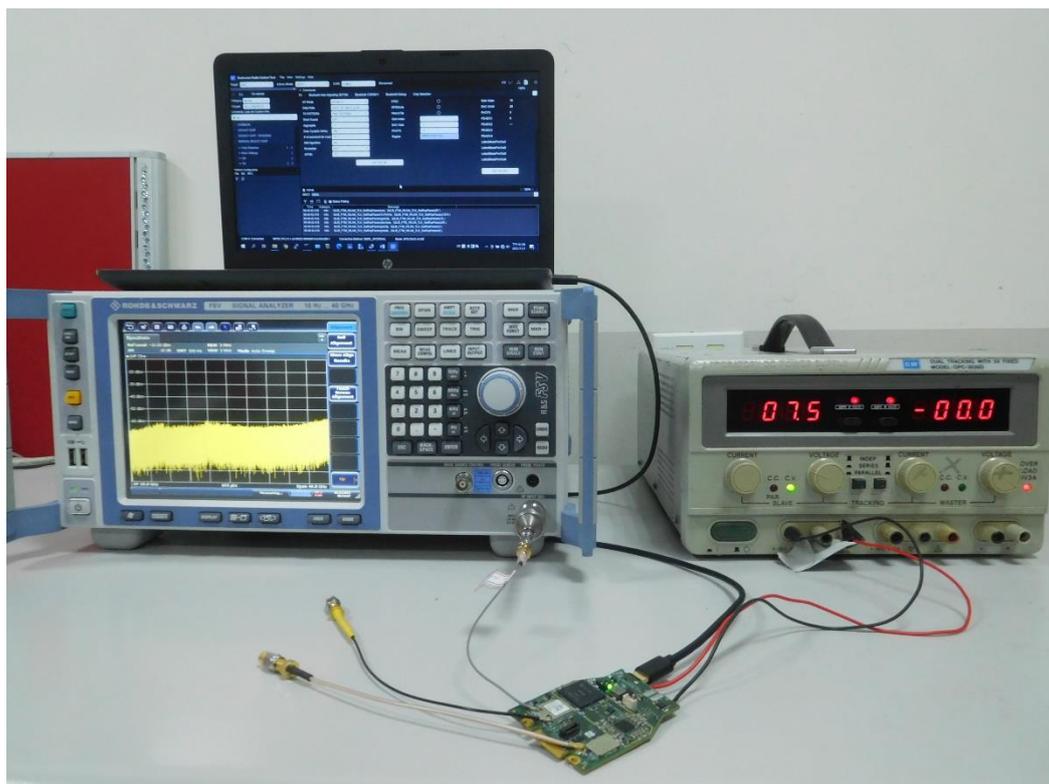
For BT LE-1M

Voltage (Vdc)	Channel Number	Frequency (MHz)	Conducted RF Output Power (mW)	Radiated RF Output Power (mW)
7.5	0	2402	1.618	3.475
	19	2440	1.782	3.827
	39	2480	1.871	4.019
8.25	0	2402	1.545	3.318
	19	2440	1.77	3.802
	39	2480	1.941	4.169
6.75	0	2402	1.641	3.525
	19	2440	1.706	3.664
	39	2480	1.945	4.178
Maximum Limit (mW):			10	-
Rated Power (mW):			2	-
Tolerance of Antenna Power (mW):			0.4 ~ 2.4	-
Maximum EIRP Limit (mW):			-	16.368

Notes:

1. Antenna gain is 3.32 dBi.
2. The radiated RF output power is a "calculated" value derived from the conducted value.
3. Formula: Radiated RF output power = Conducted RF output power + Antenna gain

8 Pictures of Test Arrangements



9 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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