IEEE C95.1 2005
KDB 447498 D03
47 C.F.R. Part 1, Subpart I, Section 1.1310
47 C.F.R. Part 2, Subpart J, Section 2.1091

RF EXPOSURE REPORT

For

WiFi and Bluetooth module

Model: WG3221-00

Trade Name: JORJIN

Issued to

Jorjin Technologies Inc.
17F.-1, NO.239, SEC. 1, DATONG RD., XIZHI DIST.
New Taipei City, 22161 Taiwan

Issued by

Compliance Certification Services Inc.
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No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
Issue Date: April 16, 2020

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	March 9, 2020	Initial Issue	ALL	Doris Chu
01	April 16, 2020	1. Revised test data.	ALL	Doris Chu

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1. TEST RESULT CERTIFICATION

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
IEEE C95.1 2005 KDB 447498 D03 47 C.F.R. Part 1, Subpart I, Section 1.1310 47 C.F.R. Part 2, Subpart J, Section 2.1091	No non-compliance noted
Statements of Conformity	
Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.	

Approved by:

Kevin Tsai
Deputy Manager
Compliance Certification Services Inc.

2. LIMIT

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

3. EUT SPECIFICATION

EUT	WiFi and Bluetooth module
Model	WG3221-00
Model Discrepancy	N/A
Frequency band (Operating)	☒ Bluetooth: 2402MHz-2480MHz ☒ 802.11b/g/n HT20: 2412MHz ~ 2462 MHz ☒ 802.11n HT40: 2422MHz ~ 2452MHz ☒ 802.11a/n HT20: 5180MHz ~ 5240MHz / 5260 ~ 5320MHz 5500 ~ 5700MHz / 5745MHz ~ 5825MHz 802.11n HT40: 5190MHz ~ 5230MHz / 5270 ~ 5310MHZ 5510 ~ 5670MHz / 5755MHz ~ 5795MHz 802.11ac VHT80: 5210MHz / 5290MHz / 5530 MHz~5610MHz / 5775MHz ☐ Others
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm^2) ☒ General Population/Uncontrolled exposure (S=1mW/cm^2)

Antenna Specification

BT

Trade Name	Model Number	Type	Peak Gain
Unictron	AA222	PCB Antenna	3.73 dBi
JOINSOON ELECTRONICS MFG .CO,LTO	WiFi3dB Antenna	Dipole Antenna	2.45 dBi
Unictron	AA077	Chip Antenna	1.4 dBi

2.4G

Trade Name	Model Number	Type	Peak Gain
Unictron	AA222	PCB Antenna	3.73 dBi
JOINSOON ELECTRONICS MFG .CO,LTO	WiFi3dB Antenna	Dipole Antenna	2.45 dBi
Unictron	AA077	Chip Antenna	1.4 dBi

5G

Trade Name	Model Number	Type	Band	Peak Gain
Unictron	AA222	PCB Antenna	UNII-1	3.46 dBi
			UNII-2a	3.3 dBi
			UNII-2c	3.79 dBi
			UNII-3	3.91 dBi
JOINSOON ELECTRONICS MFG .CO,LTO	WiFi3dB Antenna	Dipole Antenna	UNII-1	2.71 dBi
			UNII-2a	2.57 dBi
			UNII-2c	2.02 dBi
			UNII-3	2.3 dBi
Unictron	AA077	Chip Antenna	UNII-1	2.3 dBi
			UNII-2a	
			UNII-2c	
			UNII-3	

BT: Directional Gain : 3.73 dBi (Numeric gain: 2.36) Worst
2.4GHz: Directional Gain : 3.73 dBi (Numeric gain: 2.36) Worst
5GHz: Directional Gain : 3.91 dBi (Numeric gain: 2.46) Worst

<table>
<tr><td>Maximum Measurement Average Power</td><td>
<table>
<tr><td>BT</td><td>10.06 dBm</td><td>(10.139 mW)</td></tr>
<tr><td>2.4GHz</td><td></td><td></td></tr>
<tr><td>IEEE 802.11b Mode:</td><td>17.17 dBm</td><td>(52.119 mW)</td></tr>
<tr><td>IEEE 802.11g Mode:</td><td>17.22 dBm</td><td>(52.723 mW)</td></tr>
<tr><td>IEEE 802.11n HT 20 Mode:</td><td>17.86 dBm</td><td>(61.094 mW)</td></tr>
<tr><td>IEEE 802.11n HT 40 Mode:</td><td>16.30 dBm</td><td>(42.658 mW)</td></tr>
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<tr><td>IEEE 802.11a Mode:</td><td>16.68 dBm</td><td>(46.559 mW)</td></tr>
<tr><td>IEEE 802.11n HT 20 Mode:</td><td>15.58 dBm</td><td>(36.141 mW)</td></tr>
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<tr><td>IEEE 802.11ac VHT 80 Mode:</td><td>13.96 dBm</td><td>(24.889 mW)</td></tr>
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<tr><td>Maximum tune up power</td><td>
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<tr><td>BT</td><td>11.00 dBm</td><td>(12.589 mW)</td></tr>
<tr><td>2.4GHz</td><td></td><td></td></tr>
<tr><td>IEEE 802.11b Mode:</td><td>18.00 dBm</td><td>(63.096 mW)</td></tr>
<tr><td>IEEE 802.11g Mode:</td><td>18.00 dBm</td><td>(63.096 mW)</td></tr>
<tr><td>IEEE 802.11n HT 20 Mode:</td><td>18.00 dBm</td><td>(63.096 mW)</td></tr>
<tr><td>IEEE 802.11n HT 40 Mode:</td><td>17.00 dBm</td><td>(50.119 mW)</td></tr>
<tr><td>5GHz</td><td></td><td></td></tr>
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<tr><td>IEEE 802.11n HT 20 Mode:</td><td>16.00 dBm</td><td>(39.811 mW)</td></tr>
<tr><td>IEEE 802.11n HT 40 Mode:</td><td>16.00 dBm</td><td>(39.811 mW)</td></tr>
<tr><td>IEEE 802.11ac VHT 80 Mode:</td><td>14.00 dBm</td><td>(25.119 mW)</td></tr>
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<tr><td>Evaluation applied</td><td>☒ MPE Evaluation*
☐ SAR Evaluation
☐ N/A</td></tr>
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4. TEST RESULTS

No non-compliance noted.

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{377}$

Where E = Field strength in Volts / meter
P = Power in Watts
G = Numeric antenna gain
d = Distance in meters
S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{377 d^2}$$

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and

d (cm) = d(m) / 100

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$ ***Equation 1***

Where d = Distance in cm
P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm²

5. MAXIMUM PERMISSIBLE EXPOSURE

Substituting the MPE safe distance using d = 20 cm into Equation 1:

$$S = 0.000199 \times P \times G$$

Where *P = Power in mW*
G = Numeric antenna gain
S = Power density in mW / cm²

BT:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
0	2402	12.589	2.36	20	0.0059	1

IEEE 802.11b mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
6	2437	63.096	2.36	20	0.0296	1

IEEE 802.11g mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
6	2437	63.096	2.36	20	0.0296	1

IEEE 802.11n HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
11	2462	63.096	2.36	20	0.0296	1

IEEE 802.11n HT40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
6	2437	50.119	2.36	20	0.0235	1

IEEE 802.11a mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
64	5320	50.119	2.46	20	0.0245	1

IEEE 802.11n HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
116	5580	39.811	2.46	20	0.0195	1

IEEE 802.11n HT40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
134	5670	39.811	2.46	20	0.0195	1

IEEE 802.11ac VHT80 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
155	5775	25.119	2.46	20	0.0123	1

--End of Report--