



FCC ID: WS2-WG3221B  
Report No.: T191111W02-MF

Page 1 / 10  
Rev.: 01

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

**Note:** This document may be altered or revised by Compliance Certification Services Inc. personnel only, and shall be noted in the revision section of the document. The client should not use it to claim product endorsement by TAF, A2LA, NIST or any government agencies. The test results in the report only apply to the tested sample.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.  
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部分複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at [www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm) and for electronic format documents, subject to Terms and Conditions for Electronic Documents at [www.sgs.com/terms\\_e-document.htm](http://www.sgs.com/terms_e-document.htm). Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



Report No.: T191111W02-MF

Page 2 / 10  
Rev.: 01

## 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  |



Report No.: T191111W02-MF

Page 3 / 10  
Rev.: 01

## TABLE OF CONTENTS

|                                      |    |
|--------------------------------------|----|
| 1. TEST RESULT CERTIFICATION .....   | 4  |
| 2. LIMIT .....                       | 5  |
| 3. EUT SPECIFICATION.....            | 6  |
| 4. TEST RESULTS .....                | 9  |
| 5. MAXIMUM PERMISSIBLE EXPOSURE..... | 10 |

## 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<br>KDB 447498 D03<br>47 C.F.R. Part 1, Subpart I, Section 1.1310<br>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

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

|                                                                |                                                            |                 |                |           |           |
|----------------------------------------------------------------|------------------------------------------------------------|-----------------|----------------|-----------|-----------|
| 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   |                                                            |                 |                |           |           |

|                                   |                                                                                                                                                           |           |             |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|
| Maximum Measurement Average Power | BT                                                                                                                                                        | 10.06 dBm | (10.139 mW) |
|                                   | 2.4GHz                                                                                                                                                    |           |             |
|                                   | IEEE 802.11b Mode:                                                                                                                                        | 17.17 dBm | (52.119 mW) |
|                                   | IEEE 802.11g Mode:                                                                                                                                        | 17.22 dBm | (52.723 mW) |
|                                   | IEEE 802.11n HT 20 Mode:                                                                                                                                  | 17.86 dBm | (61.094 mW) |
|                                   | IEEE 802.11n HT 40 Mode:                                                                                                                                  | 16.30 dBm | (42.658 mW) |
|                                   | 5GHz                                                                                                                                                      |           |             |
|                                   | IEEE 802.11a Mode:                                                                                                                                        | 16.68 dBm | (46.559 mW) |
|                                   | IEEE 802.11n HT 20 Mode:                                                                                                                                  | 15.58 dBm | (36.141 mW) |
|                                   | IEEE 802.11n HT 40 Mode:                                                                                                                                  | 15.32 dBm | (34.041 mW) |
|                                   | IEEE 802.11ac VHT 80 Mode:                                                                                                                                | 13.96 dBm | (24.889 mW) |
| Maximum tune up power             | BT                                                                                                                                                        | 11.00 dBm | (12.589 mW) |
|                                   | 2.4GHz                                                                                                                                                    |           |             |
|                                   | IEEE 802.11b Mode:                                                                                                                                        | 18.00 dBm | (63.096 mW) |
|                                   | IEEE 802.11g Mode:                                                                                                                                        | 18.00 dBm | (63.096 mW) |
|                                   | IEEE 802.11n HT 20 Mode:                                                                                                                                  | 18.00 dBm | (63.096 mW) |
|                                   | IEEE 802.11n HT 40 Mode:                                                                                                                                  | 17.00 dBm | (50.119 mW) |
|                                   | 5GHz                                                                                                                                                      |           |             |
|                                   | IEEE 802.11a Mode:                                                                                                                                        | 17.00 dBm | (50.119 mW) |
|                                   | IEEE 802.11n HT 20 Mode:                                                                                                                                  | 16.00 dBm | (39.811 mW) |
|                                   | IEEE 802.11n HT 40 Mode:                                                                                                                                  | 16.00 dBm | (39.811 mW) |
|                                   | IEEE 802.11ac VHT 80 Mode:                                                                                                                                | 14.00 dBm | (25.119 mW) |
| Evaluation applied                | <div><input checked="" type="checkbox"/> MPE Evaluation*</div> <div><input type="checkbox"/> SAR Evaluation</div> <div><input type="checkbox"/> N/A</div> |           |             |

## 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:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = d \text{ (m)} / 100$$

Yields

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

Where  $d$  = Distance in cm

$P$  = Power in mW

$G$  = Numeric antenna gain

$S$  = Power density in mW / cm<sup>2</sup>

## 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 / cm<sup>2</sup>

**BT:**

| Ch. | Frq.(MHz) | P (mW) | Gain (num.) | D (cm) | Power density in mW / cm <sup>2</sup> | 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 / cm <sup>2</sup> | 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 / cm <sup>2</sup> | 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 / cm <sup>2</sup> | 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 / cm <sup>2</sup> | 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 / cm <sup>2</sup> | 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 / cm <sup>2</sup> | 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 / cm <sup>2</sup> | 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 / cm <sup>2</sup> | Limit (mW/cm2) |
|-----|-----------|--------|-------------|--------|---------------------------------------|----------------|
| 155 | 5775      | 25.119 | 2.46        | 20     | 0.0123                                | 1              |

--End of Report--