

## MPE Report

Applicant : InnoComm Mobile Technology Corporation  
Product Type : Wireless Audio Module  
Trade Name : InnoComm  
Model Number : WB15  
Applicable Standard : IEEE Std.C95.1  
47 CFR § 2.1091 / 47 CFR § 1.1310  
Received Date : Jul. 08, 2020  
Test Period : Jul. 27 ~ Jul. 28, 2020  
Issue Date : Nov. 05, 2020

### Issued by

Approved By : Kris Pan  
(Kris Pan)

A Test Lab Techno Corp.  
No. 140-1, Changan Street, Bade District,  
Taoyuan City 33465, Taiwan (R.O.C.)  
Tel : +886-3-2710188 / Fax : +886-3-2710190



Taiwan Accreditation Foundation accreditation number: 1330  
Test Firm MRA designation number: TW0010

#### Note:

- 1.The test results are valid only for samples provided by customers and under the test conditions described in this report.
- 2.This report shall not be reproduced except in full, without the written approval of A Test Lab Technology Corporation.
- 3.The relevant information is provided by customers in this test report. According to the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error in the information which affects the validity of the test results, the laboratory does not take the responsibility.



### Revision History

| Rev. | Issued Date   | Revisions                       | Revised By |
|------|---------------|---------------------------------|------------|
| 00   | Oct. 27, 2020 | Initial Issue                   | Nicole Chu |
| 01   | Nov. 05, 2020 | P06 Revised Antenna Information | Nicole Chu |
|      |               |                                 |            |
|      |               |                                 |            |



## Contents

|     |  |    |
|-----|--|----|
| 1.  | Reference Applicable Standard .....                | 4  |
| 2.  | Description of Equipment under Test (EUT) .....    | 5  |
| 3.  | Human Exposure Assessment.....                     | 7  |
| 4.  | Power Density Limit – RF Exposure Evaluation ..... | 8  |
| 4.1 | Conducted Power .....                              | 9  |
| 5.  | Test Result .....                                  | 12 |



## 1. *Reference Applicable Standard*

| Standard            | Description  | Version |
|---------------------|--|---------|
| ANSI/IEEE C95.1     | American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 300 KHz to 100 GHz, New York. | 1992    |
| 47 CFR Part §2.1091 | Radiofrequency radiation exposure evaluation: mobile devices.  | -       |
| 47 CFR Part §1.1310 | Radiofrequency radiation exposure limits.  | -       |

## 2. Description of Equipment under Test (EUT)

|  |  |                       |
|--|--|-----------------------|
| Applicant                                  | InnoComm Mobile Technology Corporation<br>3F, No. 6, Hsin Ann Rd., Hsinchu Science Park, Hsinchu, Taiwan, R.O.C.   |                       |
| Manufacturer                               | InnoComm Mobile Technology Corporation<br>3F, No. 6, Hsin Ann Rd., Hsinchu Science Park, Hsinchu, Taiwan, R.O.C.   |                       |
| Product Type                               | Wireless Audio Module  |                       |
| Trade Name                                 | InnoComm   |                       |
| Model Number                               | WB15   |                       |
| FCC ID                                     | YAIWB15  |                       |
| Difference description of Hardware Version | Mozart_R004 version difference than Mozart_R003 is fine-tunes the DDR trace spacing according to the vendor's recommendations to improve its performance.<br>The appearance and all components are same. |                       |
| Frequency Range                            | Operate Band   | Frequency Range (MHz) |
|  | IEEE 802.11b / 802.11g / 802.11n 2.4 GHz 20 MHz  | 2412 - 2462           |
|  | IEEE 802.11a U-NII Band I  | 5180 - 5240           |
|  | IEEE 802.11a U-NII Band II-A   | 5260 - 5320           |
|  | IEEE 802.11a U-NII Band II-C   | 5500 - 5700           |
|  | IEEE 802.11a U-NII Band III  | 5745 - 5825           |
|  | IEEE 802.11n 5 GHz 20 MHz U-NII Band I   | 5180 - 5240           |
|  | IEEE 802.11n 5 GHz 20 MHz U-NII Band II-A  | 5260 - 5320           |
|  | IEEE 802.11n 5 GHz 20 MHz U-NII Band II-C  | 5500 - 5700           |
|  | IEEE 802.11n 5 GHz 20 MHz U-NII Band III   | 5745 - 5825           |
|  | IEEE 802.11n 5 GHz 40 MHz U-NII Band I   | 5190 - 5230           |
|  | IEEE 802.11n 5 GHz 40 MHz U-NII Band II-A  | 5270 - 5310           |
|  | IEEE 802.11n 5 GHz 40 MHz U-NII Band II-C  | 5510 - 5670           |
|  | IEEE 802.11n 5 GHz 40 MHz U-NII Band III   | 5755 - 5795           |
|  | IEEE 802.11ac 80 MHz U-NII Band I  | 5210                  |
|  | IEEE 802.11ac 80 MHz U-NII Band II-A   | 5290                  |
|  | IEEE 802.11ac 80 MHz U-NII Band II-C   | 5530 - 5610           |
|  | IEEE 802.11ac 80 MHz U-NII Band III  | 5775                  |
|  | Bluetooth BR/EDR   | 2402 - 2480           |
|  | Bluetooth LE   | 2402 - 2480           |



|                     | Antenna   | Model          | Type         | Max. Gain (dBi) |             |
|---------------------|---|----------------|--------------|-----------------|-------------|
|                     | Antenna Information   | ANT-0          | N14-0808-R0A | PCB Antenna     | 2402 - 2480 |
| ANT-1               |   | WA-F-LA-01-015 | FPCB Antenna | 2402 - 2480     | 2.17        |
| ANT-0               |   | N12-5776-R0A   | PCB Antenna  | 2412 - 2462     | 5.42        |
|                     |   |                |              | 5180 - 5850     | 5.48        |
| ANT-1               |   | N12-5777-R0A   | PCB Antenna  | 2412 - 2462     | 5.28        |
|                     |   |                |              | 5180 - 5850     | 6.39        |
| ANT-2               |   | WA-F-LB-03-110 | FPCB Antenna | 2412 - 2462     | 2.91        |
|                     |   |                |              | 5180 - 5850     | 2.79        |
| ANT-3               |   | WA-F-LB-02-187 | FPCB Antenna | 2412 - 2462     | 2.22        |
|                     |   |                |              | 5180 - 5850     | 3.23        |
| ANT-4               |   | N12-7231-R0A   | PCB Antenna  | 2412 - 2462     | 1.81        |
|                     |   |                |              | 5180 - 5850     | 3.40        |
| G <sub>ANT</sub>    |   |                | 2412 - 2462  | 5.42            |             |
| Directional         |   |                | 2412 - 2462  | 8.43            |             |
| G <sub>ANT</sub>    |   |                | 5150 - 5250  | 6.39            |             |
| Directional         |   |                |              | 9.40            |             |
| G <sub>ANT</sub>    |   |                | 5250 - 5350  | 6.39            |             |
| Directional         |   |                |              | 9.40            |             |
| G <sub>ANT</sub>    |   |                | 5470 - 5725  | 6.39            |             |
| Directional         |   |                |              | 9.40            |             |
| G <sub>ANT</sub>    |   |                | 5725 - 5850  | 6.39            |             |
| Directional         |   |                |              | 9.40            |             |
| Antenna Delivery    | IEEE 802.11b: 1TX / 1RX (Diversity)<br>IEEE 802.11g : 2TX / 2RX (CDD)<br>IEEE 802.11n 2.4 GHz 20 MHz: 2TX / 2RX (MIMO)<br>IEEE 802.11a: 2TX / 2RX (CDD)<br>IEEE 802.11ac 20 MHz / 40 MHz / 80 MHz: 2TX / 2RX (MIMO) |                |              |                 |             |
| RF Evaluation       | 0.224 mW/cm <sup>2</sup>  |                |              |                 |             |
| Operate Temp. Range | 0 ~ +55°C   |                |              |                 |             |

The above equipment was tested by A Test Lab Techno Corp. For compliance with the requirements set forth in 47 CFR § 2.1091 / 47 CFR § 1.1310. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

### 3. Human Exposure Assessment

Due to the design and installation of this product, it is not possible to conduct SAR evaluation. This is because client either manufactures or supplies the antenna(s) that will be used in the installation of this product. Therefore, this product will be evaluated as a mobile device per 47 CFR § 1.1310 titled "Radiofrequency radiation exposure limits", generally referred to as MPE limits.

In 47 CFR § 2.1091, paragraph (b) defines a mobile device as "a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons." This product is intended to be installed into a vehicle such that the unit is physically secured at one location. In the installation guide supplied with the product,

Client has made the following statement: "IMPORTANT: To meet the FCC's RF Exposure Guidelines, the antenna should be installed so there is at least 20 cm of separation between the body of the user and nearby persons and the antenna". Based on the installation of the transceiver and the antenna, the transmitters radiating structure is more than 20 cm from the user. Thus, this product is a "mobile device" as defined in section § 2.1091 paragraph (b).

Exposure evaluation

$$S_{eirp} = \frac{EIRP}{4\pi d^2} = \frac{PG}{4\pi d^2} (W / m^2)$$

Where

S: is the input power (W);

G: is the antenna gain;

d : is the distance between antennas and evaluation point (m).



#### 4. Power Density Limit – RF Exposure Evaluation

Thv In 47 CFR § 1.1310, use of the device as based upon the user's awareness and ability to exercise control over human exposure. The two categories defined are Occupational / Controlled Exposure and General Population / Uncontrolled. These two categories are defined as follow:

| 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 <sup>2</sup> ) | Averaging Time E  <sup>2</sup> , H  <sup>2</sup> or S (minutes) |
| 0.3-1.34  | 614                               | 1.63                              | (100)*                                  | 30  |
| 1.34-30   | 824 / f                           | 2.19 / f                          | (180 / f <sup>2</sup> )*                | 30  |
| 30-300  | 27.5                              | 0.073                             | 0.2                                     | 30  |
| 300-1500  | -                                 | -                                 | F / 1,500                               | 30  |
| 1,500-100,000   | -                                 | -                                 | 1.0                                     | 30  |
| Limits for Occupational / Controlled Exposure         |                                   |                                   |   |   |
| Frequency Range (MHz)                                 | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/cm <sup>2</sup> ) | Averaging Time E  <sup>2</sup> , H  <sup>2</sup> or S (minutes) |
| 0.3-3.0   | 614                               | 1.63                              | (100)*                                  | 6   |
| 3.0-30  | 1,842 / f                         | 4.89 / f                          | (900 / f <sup>2</sup> )*                | 6   |
| 30-300  | 61.4                              | 0.163                             | 1.0                                     | 6   |
| 300-1,500   | -                                 | -                                 | F / 300                                 | 6   |
| 1,500-100,000   | -                                 | -                                 | 5                                       | 6   |





#### 4.1 Conducted Power

##### 【2.4 GHz】

| Band         | Data Rate or Sub-test | CH | Frequency (MHz) | Average Conducted power (dBm) |       |         |
|--------------|-----------------------|----|-----------------|-------------------------------|-------|---------|
|              |                       |    |                 | ANT-0                         | ANT-1 | All ANT |
| 802.11b      | 1M                    | 1  | 2412.0          | 16.51                         | 17.63 | ---     |
|              |                       | 6  | 2437.0          | 18.61                         | 21.19 | ---     |
|              |                       | 11 | 2462.0          | 17.30                         | 18.99 | ---     |
| 802.11g      | 6M                    | 1  | 2412.0          | 10.47                         | 10.39 | 13.44   |
|              |                       | 6  | 2437.0          | 16.32                         | 17.29 | 19.84   |
|              |                       | 11 | 2462.0          | 10.31                         | 10.74 | 13.54   |
| 802.11n_HT20 | 13M                   | 1  | 2412.0          | 7.92                          | 7.52  | 10.73   |
|              |                       | 6  | 2437.0          | 16.24                         | 17.06 | 19.68   |
|              |                       | 11 | 2462.0          | 9.25                          | 9.01  | 12.14   |

##### 【5 GHz】

| Band    | Data Rate or Sub-test | CH    | Frequency (MHz) | Average Conducted power (dBm) |       |         |
|---------|-----------------------|-------|-----------------|-------------------------------|-------|---------|
|         |                       |       |                 | ANT-0                         | ANT-1 | All ANT |
| 802.11a | 6M                    | 36    | 5180.0          | 6.21                          | 10.08 | 11.57   |
|         |                       | 40    | 5200.0          | 6.16                          | 9.93  | 11.45   |
|         |                       | 44    | 5220.0          | 6.09                          | 9.88  | 11.40   |
|         |                       | 48    | 5240.0          | 6.48                          | 10.32 | 11.82   |
|         |                       | 52    | 5260.0          | 14.17                         | 17.71 | 19.30   |
|         |                       | 56    | 5280.0          | 13.89                         | 16.91 | 18.67   |
|         |                       | 60    | 5300.0          | 13.84                         | 16.85 | 18.61   |
|         |                       | 64    | 5320.0          | 9.36                          | 11.00 | 13.27   |
|         |                       | 100   | 5500.0          | 11.56                         | 11.69 | 14.64   |
|         |                       | 104   | 5520.0          | 15.39                         | 14.56 | 18.01   |
|         |                       | 108   | 5540.0          | 15.41                         | 14.53 | 18.00   |
|         |                       | 112   | 5560.0          | 15.43                         | 14.59 | 18.04   |
|         |                       | 116   | 5580.0          | 15.38                         | 14.10 | 17.80   |
|         |                       | 120   | 5600.0          | 15.40                         | 14.20 | 17.85   |
|         |                       | 124   | 5620.0          | 15.36                         | 13.86 | 17.68   |
|         |                       | 128   | 5640.0          | 15.32                         | 13.61 | 17.56   |
|         |                       | 132   | 5660.0          | 15.30                         | 13.31 | 17.43   |
|         |                       | 136   | 5680.0          | 15.40                         | 13.22 | 17.46   |
|         |                       | 140   | 5700.0          | 13.41                         | 11.62 | 15.62   |
|         |                       | 149   | 5745.0          | 18.09                         | 15.38 | 19.95   |
| 153     | 5765.0                | 17.90 | 14.68           | 19.59                         |       |         |
| 157     | 5785.0                | 17.93 | 14.72           | 19.63                         |       |         |
| 161     | 5805.0                | 17.87 | 14.48           | 19.51                         |       |         |
| 165     | 5825.0                | 17.82 | 14.12           | 19.36                         |       |         |



**[5 GHz]**

| Band              | Data Rate or Sub-test | CH    | Frequency (MHz) | Average Conducted power (dBm) |       |         |
|-------------------|-----------------------|-------|-----------------|-------------------------------|-------|---------|
|                   |                       |       |                 | ANT-0                         | ANT-1 | All ANT |
| 802.11ac_5G_VHT20 | 13M                   | 36    | 5180.0          | 6.51                          | 10.42 | 11.90   |
|                   |                       | 40    | 5200.0          | 8.05                          | 10.21 | 12.27   |
|                   |                       | 44    | 5220.0          | 7.98                          | 10.15 | 12.21   |
|                   |                       | 48    | 5240.0          | 7.91                          | 9.93  | 12.05   |
|                   |                       | 52    | 5260.0          | 12.26                         | 15.38 | 17.10   |
|                   |                       | 56    | 5280.0          | 12.24                         | 15.41 | 17.12   |
|                   |                       | 60    | 5300.0          | 12.21                         | 15.32 | 17.05   |
|                   |                       | 64    | 5320.0          | 9.68                          | 11.73 | 13.84   |
|                   |                       | 100   | 5500.0          | 11.38                         | 11.54 | 14.47   |
|                   |                       | 104   | 5520.0          | 14.12                         | 13.77 | 16.96   |
|                   |                       | 108   | 5540.0          | 14.04                         | 13.53 | 16.80   |
|                   |                       | 112   | 5560.0          | 14.09                         | 13.43 | 16.78   |
|                   |                       | 116   | 5580.0          | 14.02                         | 13.02 | 16.56   |
|                   |                       | 120   | 5600.0          | 13.97                         | 12.91 | 16.48   |
|                   |                       | 124   | 5620.0          | 13.84                         | 12.74 | 16.34   |
|                   |                       | 128   | 5640.0          | 13.77                         | 12.69 | 16.27   |
|                   |                       | 132   | 5660.0          | 13.69                         | 12.32 | 16.07   |
|                   |                       | 136   | 5680.0          | 13.61                         | 12.17 | 15.96   |
|                   |                       | 140   | 5700.0          | 13.57                         | 11.91 | 15.83   |
| 149               | 5745.0                | 17.97 | 15.57           | 19.94                         |       |         |
| 153               | 5765.0                | 17.81 | 14.60           | 19.51                         |       |         |
| 157               | 5785.0                | 17.85 | 14.63           | 19.54                         |       |         |
| 161               | 5805.0                | 17.76 | 14.47           | 19.43                         |       |         |
| 165               | 5825.0                | 17.70 | 14.14           | 19.29                         |       |         |
| 802.11ac_5G_VHT40 | 27M                   | 38    | 5190.0          | 3.35                          | 6.78  | 8.41    |
|                   |                       | 46    | 5230.0          | 9.09                          | 11.27 | 13.33   |
|                   |                       | 54    | 5270.0          | 10.14                         | 12.77 | 14.66   |
|                   |                       | 62    | 5310.0          | 1.88                          | 4.72  | 6.54    |
|                   |                       | 102   | 5510.0          | 4.94                          | 5.03  | 8.00    |
|                   |                       | 110   | 5550.0          | 11.89                         | 11.61 | 14.76   |
|                   |                       | 118   | 5590.0          | 11.81                         | 11.21 | 14.53   |
|                   |                       | 126   | 5630.0          | 11.78                         | 10.88 | 14.36   |
|                   |                       | 134   | 5670.0          | 12.72                         | 11.65 | 15.23   |
|                   |                       | 151   | 5755.0          | 15.56                         | 13.07 | 17.50   |
| 159               | 5795.0                | 16.71 | 13.95           | 18.56                         |       |         |
| 802.11ac_5G_VHT80 | 58.6M                 | 42    | 5210.0          | 4.48                          | 8.11  | 9.67    |
|                   |                       | 58    | 5290.0          | 3.08                          | 6.31  | 8.00    |
|                   |                       | 106   | 5530.0          | 4.95                          | 4.93  | 7.95    |
|                   |                       | 122   | 5610.0          | 10.49                         | 10.19 | 13.35   |
|                   |                       | 155   | 5775.0          | 13.63                         | 11.62 | 15.75   |



**【Bluetooth】**

| Data Rate                  | Frequency(MHz) | Packet Type | Average Power (dBm) |
|----------------------------|----------------|-------------|---------------------|
| 1Mbps<br>(GFSK)            | 2402           | DH1         | 9.86                |
|                            |                | DH3         | 9.87                |
|                            |                | DH5         | 9.88                |
|                            | 2441           | DH1         | 10.41               |
|                            |                | DH3         | 10.42               |
|                            |                | DH5         | 10.45               |
|                            | 2480           | DH1         | 10.41               |
|                            |                | DH3         | 10.42               |
|                            |                | DH5         | 10.43               |
| 2Mbps<br>( $\pi/4$ -DQPSK) | 2402           | DH1         | 7.25                |
|                            |                | DH3         | 7.27                |
|                            |                | DH5         | 7.31                |
|                            | 2441           | DH1         | 7.45                |
|                            |                | DH3         | 7.50                |
|                            |                | DH5         | 7.52                |
|                            | 2480           | DH1         | 6.97                |
|                            |                | DH3         | 7.01                |
|                            |                | DH5         | 7.03                |
| 3Mbps<br>(8DPSK)           | 2402           | DH1         | 7.34                |
|                            |                | DH3         | 7.38                |
|                            |                | DH5         | 7.41                |
|                            | 2441           | DH1         | 7.55                |
|                            |                | DH3         | 7.58                |
|                            |                | DH5         | 7.60                |
|                            | 2480           | DH1         | 7.08                |
|                            |                | DH3         | 7.10                |
|                            |                | DH5         | 7.13                |
| Bluetooth LE               | 2402.0         | ---         | 0.48                |
|                            | 2440.0         | ---         | 0.37                |
|                            | 2480.0         | ---         | -0.40               |

## 5. Test Result

| Antenna           | Band   | Frequency (MHz) | Limit (mW)/cm <sup>2</sup> | Distance | Tune-up Power | ANT Gain | Numeric Gain | Duty Cycle | Power with Duty cycle | Power Density        |
|-------------------|--------|-----------------|----------------------------|----------|---------------|----------|--------------|------------|-----------------------|----------------------|
|                   |        |                 |                            | (cm)     | (dBm)         |          |              |            | (mW)                  | (mW)/cm <sup>2</sup> |
|                   |        |                 |                            | [R]      | [P]           |          |              |            | [P]x[G]               | [S]                  |
| Bluetooth Antenna | BR/EDR | 2402-2480       | 10                         | 20       | 11.00         | 2.17     | 1.65         | 1          | 20.77                 | 0.004                |
|                   | LE     | 2402-2480       | 10                         | 20       | 1.00          | 2.17     | 1.65         | 1          | 2.08                  | 0.000                |
| Wi-Fi Antenna     | 2.4GHz | 2412-2462       | 10                         | 20       | 22.00         | 8.43     | 6.97         | 1          | 1104.67               | 0.220                |
|                   | 5GHz   | 5150-5250       | 10                         | 20       | 14.00         | 9.40     | 8.71         | 1          | 218.79                | 0.044                |
|                   |        | 5250-5350       | 10                         | 20       | 20.00         | 9.40     | 8.71         | 1          | 871.00                | 0.173                |
|                   |        | 5470-5725       | 10                         | 20       | 19.00         | 9.40     | 8.71         | 1          | 691.86                | 0.138                |
|                   |        | 5725-5850       | 10                         | 20       | 20.00         | 9.40     | 8.71         | 1          | 871.00                | 0.173                |

Note:

1. Mobile or fixed location transmitters, minimum separation distance is 20 cm, even if calculations indicate MPE distance is less.
2. We used the maximum power and gain to provide MPE results.
3. The Numeric Gain calculated by  $10^{(\text{ant. Gain(dBi)} / 10)}$ .
4. The MPE results are evaluated by lowest data rate for WLAN.

Simultaneous Transmitting :

$$\text{Total MPE} = 2.4\text{GHz MPE} + \text{Bluetooth MPE} = 0.220 + 0.004 = 0.224 \text{ (mW)/cm}^2 < 1 \text{ (mW)/cm}^2$$

---END---