

# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : OT-199-RWD-046

AGR No. : A195A-069

Applicant : BBB Inc.

Address : 28, Yatap-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea

Manufacturer : BBB Inc.

Address : 28, Yatap-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea

Type of Equipment : Immnuoassay Analyzer

FCC ID. : 2AKGP-MB100

Model Name : MB-100

Multiple Model Name : N/A

Serial number : N/A

Total page of Report : 9 pages (including this page)

Date of Incoming : May 13, 2019

Date of issue : September 24, 2019

## SUMMARY

The equipment complies with the regulation; **FCC PART 15 SUBPART C Section 15.247**

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by:



Ha-Ram Lee / Assistant Manager  
ONETECH Corp.

Approved by:



Jae-Ho Lee / Chief Engineer  
ONETECH Corp.

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### REVISION HISTORY

| Issued Report No. | Issued Date        | Revisions     | Effect Section |
|-------------------|--------------------|---------------|----------------|
| OT-199-RWD-046    | September 24, 2019 | Initial Issue | All            |

## 1. VERIFICATION OF COMPLIANCE

Applicant : BBB Inc.  
Address : 28, Yatap-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea  
Contact Person : Jaekyu Choi / CEO  
Telephone No. : +82-2-565-9653  
FCC ID : 2AKGP-MB100  
Model Name : MB-100  
Brand Name : markB Analyzer  
Serial Number : N/A  
Date : September 24, 2019

|                                                         |                                      |
|---------------------------------------------------------|--------------------------------------|
| EQUIPMENT CLASS                                         | DTS – DIGITAL TRNSMISSION SYSTEM     |
| E.U.T. DESCRIPTION                                      | Immnuoassay Analyzer                 |
| THIS REPORT CONCERNS                                    | Original Grant                       |
| MEASUREMENT PROCEDURES                                  | ANSI C63.10: 2013                    |
| TYPE OF EQUIPMENT TESTED                                | Pre-Production                       |
| KIND OF EQUIPMENT<br>AUTHORIZATION REQUESTED            | Certification                        |
| EQUIPMENT WILL BE OPERATED<br>UNDER FCC RULES PART(S)   | FCC PART 15 SUBPART C Section 15.247 |
| Modifications on the Equipment to Achieve<br>Compliance | None                                 |
| Final Test was Conducted On                             | 3 m, Semi Anechoic Chamber           |

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

## 2. GENERAL INFORMATION

### 2.1 Product Description

The BBB Inc., Model MB-100 (referred to as the EUT in this report) is a Immnuoassay Analyzer. Product specification information described herein was obtained from product data sheet or user's manual.

|                                                    |                              |                                           |
|----------------------------------------------------|------------------------------|-------------------------------------------|
| Device Type                                        | Immnuoassay Analyzer         |                                           |
| Operating Frequency                                | Bluetooth LE                 | 2 402 MHz ~ 2 480 MHz                     |
|                                                    | WLAN                         | 2 412 MHz ~ 2 462 MHz (802.11b/g/n(HT20)) |
|                                                    | 2.4 GHz Band                 | 2 422 MHz ~ 2 452 MHz (802.11n(HT40))     |
|                                                    | NFC                          | 13.56 MHz                                 |
| RF Output Power                                    | Bluetooth LE                 | -6.78 dBm                                 |
|                                                    | WLAN                         | 802.11b (13.13 dBm)                       |
|                                                    | 2.4 GHz Band                 | 802.11g (10.67 dBm)                       |
|                                                    |                              | 802.11n(HT20) (11.01 dBm)                 |
|                                                    |                              | 802.11n(HT40) (10.81 dBm)                 |
| Number of Channel                                  | Bluetooth LE                 | 40 Channels                               |
|                                                    | WLAN                         | 11 Channels                               |
|                                                    | 2.4 GHz Band                 |                                           |
|                                                    | NFC                          | 1 Channel                                 |
| Modulation Type                                    | Bluetooth LE                 | DSSS Modulation(GFSK)                     |
|                                                    | WLAN                         | DSSS Modulation(DBPSK/DQPSK/CCK)          |
|                                                    | 2.4 GHz Band                 | OFDM Modulation(BPSK/QPSK/16QAM/64QAM)    |
|                                                    | NFC                          | ASK                                       |
| Antenna Type                                       | Bluetooth LE                 | FPC Antenna                               |
|                                                    | WLAN                         |                                           |
|                                                    | 2.4 GHz Band                 |                                           |
|                                                    | NFC                          | PCB Antenna                               |
| Antenna Gain                                       | Bluetooth LE                 | 1.74 dBi                                  |
|                                                    | WLAN                         |                                           |
|                                                    | 2.4 GHz Band                 |                                           |
| List of each Osc. or crystal Freq.(Freq. >= 1 MHz) | 32.768kHz, 13.56 MHz, 32 MHz |                                           |
| Rated Supply Voltage                               | DC 3.8 V                     |                                           |

Note: Bluetooth and WLAN do not operate simultaneously.

**2.2 Alternative type(s)/model(s); also covered by this test report.**

-. None

**3. EUT MODIFICATIONS**

-. None

## 4. RF Exposure Evaluation

### 4.1 RF Exposure Calculation

According to 1.1307 (b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

7.5 - the limit for extremity is being used. Extremity limit is being used since the device has a touch pad and not a handheld device.

### 4.2 EUT Description

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Kind of EUT                 | Immunoassay Analyzer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |
| Operating Frequency Band    | <input type="checkbox"/> Wireless Microphone: 494.000 MHz ~ 501.000 MHz<br>and 498.200 MHz ~ 505.200 MHz<br><input checked="" type="checkbox"/> WLAN: 2 412 MHz ~ 2 462 MHz<br><input checked="" type="checkbox"/> WLAN: 2 422 MHz ~ 2 452 MHz<br><input type="checkbox"/> WLAN: 5 180 MHz ~ 5 240 MHz<br><input type="checkbox"/> WLAN: 5 745 MHz ~ 5 825 MHz<br><input type="checkbox"/> Bluetooth: 2 402 MHz ~ 2 480 MHz<br><input checked="" type="checkbox"/> Bluetooth BLE: 2 402 MHz ~ 2 480 MHz<br><input checked="" type="checkbox"/> NFC : 13.56 MHz |           |
| MAX. RF OUTPUT POWER        | 802.11b                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 13.13 dBm |
|                             | 802.11g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 10.67 dBm |
|                             | 802.11n(HT20)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 11.01 dBm |
|                             | 802.11n(HT40)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 10.81 dBm |
| Antenna Gain                | 1.74 dBi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |
| Exposure Evaluation Applied | <input type="checkbox"/> MPE<br><input type="checkbox"/> SAR<br><input checked="" type="checkbox"/> SAR Test Exclusion Evaluation                                                                                                                                                                                                                                                                                                                                                                                                                              |           |

### 4.3 Test Result of SAR Exclusion for Devices

According to the procedure, KDB 447498 D01, the standalone SAR test exclusion threshold is

$$[(\text{Max. Power of channel, including tune-up tolerance, mW})/(\text{Mim. test separation distance, mm})] \times [\sqrt{f(\text{GHz})}] < 7.5$$

$$= (23.07/5) \times \sqrt{2.462} = 7.24$$

Conclusion: The SAR test exclusion threshold is less than 7.5, so the device meets the RF Exposure Requirement and excluded SAR Test.

| Mode          | Frequency<br>(MHz) | Target Power<br>W/tolerance<br>(dBm) | Max tune up<br>power<br>(dBm) | Max tune up<br>power<br>(mW) | Separation<br>distance<br>(mm) | RF exposure |
|---------------|--------------------|--------------------------------------|-------------------------------|------------------------------|--------------------------------|-------------|
| 802.11b       | 2 462              | 13.13 ± 0.5                          | 13.63                         | 23.07                        | 5                              | 7.24        |
| 802.11g       | 2 442              | 10.67 ± 0.5                          | 11.17                         | 13.09                        | 5                              | 4.09        |
| 802.11n(HT20) | 2 462              | 11.01 ± 0.5                          | 11.51                         | 14.16                        | 5                              | 4.44        |
| 802.11n(HT40) | 2 462              | 10.81 ± 0.5                          | 11.31                         | 13.52                        | 5                              | 4.24        |



#### 4.4 Calculation Result of Simultaneous RF Power

WLAN transmit simultaneously with NFC.

Simultaneous RF Power = Power of WLAN(Worst Case) + EIRP of NFC

$23.07 + 0.000\ 000\ 010\ 9 = 23.070\ 000\ 010\ 9\ \text{mW}$

$[(\text{Simultaneous RF Power, mW})/(\text{Mim. test separation distance, mm})] \times [\sqrt{f(\text{GHz})}] < 7.5$

$= (23.070\ 000\ 010\ 9/5) \times \sqrt{2.462} = 7.24$

- Therefore the maximum calculations of above situations are less than the “7.5” limit.

Note 1. Power of WLAN(Worst Case) = 23.07 mW

Note 2. EIRP of NFC =  $E\ (\text{dB}\mu\text{V/m}) + 20\ \log D - 104.8$ ; where D is the measurement distance in meters.

$= 15.64\ \text{dB}\mu\text{V/m} + 20\log(3) - 104.8$

$= -79.62\ \text{dBm}$

$= 0.000\ 000\ 010\ 9\ \text{mW}$



**Tested by: Yu-Seog, Sim / Assistant Manager**