

## RF Exposure Report

**Report No.:** FCC\_RF\_SL19041701-SEV-040\_MPE\_Rev1.0

**FCC ID:** AFJ382500

**Test Model:** IP501M

**Issued Date:** 08/15/2019

**Applicant:** ICOM Incorporated

**Address:** 1-1-32 Kamiminami Hirano-ku Osaka 547-0003 Japan

**Manufacturer:** ICOM Incorporated

**Address:** 1-1-32 Kamiminami Hirano-ku Osaka 547-0003 Japan

**Issued By:** Bureau Veritas Consumer Products Services, Inc.

**Lab Address:** 775 Montague Expressway, Milpitas, CA 95035

**Test Location (1):** 775 Montague Expressway, Milpitas, CA 95035

**FCC Registration /  
Designation Number:** 540430



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### Release Control Record

| Issue No.                            | Description                        | Date Issued |
|--------------------------------------|------------------------------------|-------------|
| FCC_RF_SL19041701-SEV-040_MPE        | Original Release                   | 07/19/2019  |
| FCC_RF_SL19041701-SEV-040_MPE_Rev1.0 | Updated as per reviewer's comments | 08/15/2019  |

## 1 Certificate of Conformity

**Product:** IP Advanced Radio System

**Brand:** Icom

**Test Model:** IP501M

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** ICOM Incorporated

**Test Date:** 06/27/2019 – 06/08/2019

**Standards:** FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.1-1992

The above equipment has been tested by **Bureau Veritas Consumer Products Services, Inc., Milpitas 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 EMC characteristics under the conditions specified in this report.

**Prepared by :**



**Date:**

08/15/2019

Rachana Khanduri / Test Engineer

**Approved by :**



**Date:**

08/15/2019

Chen Ge / Engineer Reviewer

## 2 RF Exposure

### 2.1 Limits for Maximum Permissible Exposure (MPE)

| Frequency Range (MHz)                                 | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Average Time (minutes) |
|-------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|------------------------|
| Limits For General Population / Uncontrolled Exposure |                               |                               |                                     |                        |
| 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/1500                              | 30                     |
| 1500-100,000                                          | ...                           | ...                           | 1.0                                 | 30                     |

f = Frequency in MHz; \*Plane-wave equivalent power density

### 2.2 MPE Calculation Formula

$$P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$$

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

$\pi$  = 3.1416

R = distance between observation point and center of the radiator in cm

### 2.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

### 2.4 Antenna Gain

BT: Chip Antenna, -6.5dBi Gain

WCDMA: Passive Antenna, 0dBi Gain

LTE (Band 2, Band 4, Band 12): Passive Antenna, 0dBi Gain

## 2.5 Calculation Result of Maximum Conducted Power

| Type            | CH Freq (MHz) | Conducted Power (dBm) | Antenna Gain (dBi) | Tune-Up Tolerance | Tolerance Max Power (dBm) | Measurement Distance (cm) | Calculated MPE (mW/cm <sup>2</sup> ) | MPE Limit (mW/cm <sup>2</sup> ) | Pass / Fail |
|-----------------|---------------|-----------------------|--------------------|-------------------|---------------------------|---------------------------|--------------------------------------|---------------------------------|-------------|
| BT (3DH5)       | 2402          | 5.03                  | -6.5               | ±1dB              | 6.03                      | 20                        | 0.00018                              | 1                               | Pass        |
| WCDMA (Band II) | 1850          | 24.79                 | 0                  | ±1dB              | 25.79                     | 20                        | 0.0755                               | 1                               | Pass        |
| WCDMA (Band V)  | 824           | 24.82                 | 0                  | ±1dB              | 25.82                     | 20                        | 0.0760                               | 0.549                           | Pass        |
| LTE (Band II)   | 1850.0        | 22.98                 | 0                  | ±1dB              | 23.98                     | 20                        | 0.0498                               | 1                               | Pass        |
| LTE (Band IV)   | 1755.0        | 23.32                 | 0                  | ±1dB              | 24.32                     | 20                        | 0.0538                               | 1                               | Pass        |
| LTE (Band XII)  | 699.0         | 21.91                 | 0                  | ±1dB              | 22.91                     | 20                        | 0.0389                               | 0.466                           | Pass        |

### Conclusion:

The formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

If BT and LTE/WCDMA transmit simultaneously;

Bluetooth =  $(0.00018/1) \times 100 = 0.02 \%$

WCDMA (Band II) =  $(0.0755/ 1) \times 100 = 7.55 \%$

WCDMA (Band V) =  $(0.0760 / 0.549) \times 100 = 13.84 \%$

LTE (Band II) =  $(0.0497 / 1) \times 100 = 4.97 \%$

LTE (Band IV) =  $(0.0538 / 1) \times 100 = 5.38 \%$

LTE (Band XII) =  $(0.0389 / 0.466) \times 100 = 8.35 \%$

Total MPE Percentage (Worst case) =  $0.02 + 13.84 = 13.86 \% < 100\%$

**The Above Result had shown that the Device complied with MPE requirement.**

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