

## RF EXPOSURE REPORT

OF

**Applicant:** Z-Com, Inc.  
5F, No.8, HSIN ANN RD., HSINCH SCIENCE PARK,  
HSINCHU, 30078 TAIWAN

**Product Name:** 802.11ac Access Point

**Brand Name:** ZCOM

**Marketing Name:** SP220-C02

**Model No.:** SP220-C02

**Model Difference:** N/A

**Report Number:** E2/2019/50020

**FCC ID:** M4Y-SP220C02

**FCC Rule Part** Part 2.1091

**Issue Date:** Dec. 20, 2019

**Date of Test:** May 14, 2019 ~ Jul. 31, 2019

**Date of EUT Received:** May 14, 2019

**We hereby certify that:**

The above equipment was tested by SGS Taiwan Ltd. The test data, data evaluation in this report is in compliance with FCC Rules Part 2.

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

**Approved By:**

John Teh

**John Yeh / Asst. Manager**

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## Revision History

| Revision | Description | Issue Date    | Remark                  |
|----------|-------------|---------------|-------------------------|
| Rev.00   | Original.   | Dec. 20, 2019 | Revised By: Karen Huang |

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# 1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

General:

|                   |                       |                                   |
|-------------------|-----------------------|-----------------------------------|
| Product Name:     | 802.11ac Access Point |                                   |
| Brand Name:       | ZCOM                  |                                   |
| Marketing Name:   | SP220-C02             |                                   |
| Model No.:        | SP220-C02             |                                   |
| Model Difference: | N/A                   |                                   |
| Hardware Version: | N/A                   |                                   |
| Software Version: | N/A                   |                                   |
| Power Supply:     | 48V by POE Injector   |                                   |
|                   | POE Injector:         | Model No.: PSE301G, Supplier: N/A |

| WLAN<br>802.11       | Frequency<br>Range | Channels                                                                                                                                 | Rated Power (Avg.) (dBm) | Modulation<br>Technology |
|----------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|
| b                    | 2412-2462          | 11                                                                                                                                       | 21.85                    | DSSS                     |
| g                    |                    |                                                                                                                                          | 17.98                    | OFDM                     |
| n_HT20               |                    |                                                                                                                                          | 19.73 (MIMO)             |                          |
| n_HT40               | 2422-2452          | 7                                                                                                                                        | 17.91 (MIMO)             |                          |
| Antenna Designation: |                    | Dipole Antenna, Gain: 4.91dBi                                                                                                            |                          |                          |
| Modulation type:     |                    | CCK, DQPSK, DBPSK for DSSS<br>64QAM, 16QAM, QPSK, BPSK for OFDM                                                                          |                          |                          |
| Transition Rate:     |                    | 802.11 b: 1/2/5.5/11 Mbps<br>802.11 g: 6/9/12/18/24/36/48/54 Mbps<br>802.11 n_20MHz: 6.5 – 144.4Mbps<br>802.11 n_40MHz: 13.5 – 300.0Mbps |                          |                          |

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| WLAN 802.11           | Frequency Range | Channels                                                                                                                                                                                                                | Rated Power (Avg.) (dBm) | Modulation Technology |
|-----------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------|
| a                     | 5150~5250       | 4                                                                                                                                                                                                                       | 21.75                    | OFDM                  |
|                       | 5725~5850       | 5                                                                                                                                                                                                                       | 21.84                    |                       |
| n_HT<br>ac_VHT<br>20M | 5150~5250       | 4                                                                                                                                                                                                                       | HT: 23.72 (MIMO)         | OFDM                  |
|                       | 5725~5850       | 5                                                                                                                                                                                                                       | HT: 23.88 (MIMO)         |                       |
| n_HT<br>ac_VHT<br>40M | 5150~5250       | 2                                                                                                                                                                                                                       | HT: 20.64 (MIMO)         | OFDM                  |
|                       | 5725~5850       | 2                                                                                                                                                                                                                       | HT: 20.82 (MIMO)         |                       |
| ac_VHT<br>80M         | 5150~5250       | 1                                                                                                                                                                                                                       | 17.55 (MIMO)             | OFDM                  |
|                       | 5725~5850       | 1                                                                                                                                                                                                                       | 17.59 (MIMO)             |                       |
| Antenna Designation:  |                 | Dipole Antenna,<br>Gain: 5.34dBi (5150~5250) / 4.73dBi (5725~5850)                                                                                                                                                      |                          |                       |
| Modulation type       |                 | 64QAM, 16QAM, QPSK, BPSK for OFDM<br>256QAM for OFDM in 802.11ac only                                                                                                                                                   |                          |                       |
| Transition Rate:      |                 | 802.11 a: 6/9/12/18/24/36/48/54 Mbps<br>802.11 n_20MHz: 6.5 – 144.4Mbps<br>802.11 n_40MHz: 13.5 – 300.0Mbps<br>802.11 ac_20MHz: 6.5 –173.3Mbps<br>802.11 ac_40MHz: 13.5 –400.0Mbps<br>802.11 ac_80MHz: 29.3 – 866.7Mbps |                          |                       |

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## 2 FCC MAXIMUM PERMISSIBLE EXPOSURE (MPE)

### 2.1 FCC Standard Applicable

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.

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

| Frequency Range (MHz)                               | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (minute) |
|-----------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|-------------------------|
| 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                      |
| 1500-15000                                          | /                             | /                             | 1.0                                 | 30                      |

f = frequency in MHz

\* = Plane-wave equipment power density

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## 2.2 Power Density Calculation (Worst Case)

| Operation Mode | Evaluation Frequency (MHz) | Operation Distance (cm) | Max. output Power (dBm) | Antenna Gain (dBi) | Max. output Power EIRP (mW) | Power Density (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) | Pass / Fail |
|----------------|----------------------------|-------------------------|-------------------------|--------------------|-----------------------------|-------------------------------------|-----------------------------|-------------|
| WLAN 2.4G      | 2462.00                    | 20                      | 21.85                   | 4.91               | 474.24                      | 0.094                               | 1.000                       | Pass        |
| WLAN 5G        | 5825.00                    | 20                      | 23.88                   | 7.74               | 1452.11                     | 0.289                               | 1.000                       | Pass        |

## 2.3 Collocated Power Density Calculation

| Operation Mode | Power Density (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) | Power Density / Limit | Σ(E- Field Strength / Limit) |
|----------------|-------------------------------------|-----------------------------|-----------------------|------------------------------|
| WLAN 2.4G      | 0.094                               | 1.00                        | 0.094                 | 0.3834                       |
| WLAN 5G        | 0.289                               | 1.00                        | 0.289                 |                              |

### Note:

- Σ(E- Field Strength / Limit): This is a summation of [(E- Field Strength for each transmitter/antenna included in the simultaneous transmission) / (corresponding MPE limit)], for WLAN.
- Considering the WLAN 2.4G / 5G transmitter, the aggregated (E- Field Strength /limit) is smaller than 1, and MPE of 2 collocated transmitters is compliant.

~ End of Report ~

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