



FCC RADIO EXPOSURE TEST REPORT

FCC ID : MSQ-RTGW00

Equipment : Wireless-AC3100 Dual Band Gigabit Router

Brand Name : ASUS

Model Name : RT-AC3100, RT-AC88R, RT-AC88U

Applicant : ASUSTeK COMPUTER INC.
4F, No. 150, Li-Te Rd., Peitou, Taipei 112, Taiwan

Manufacturer (1) : ASKEY TECHNOLOGY (JIANG SU) LTD
NO1388, Jiao Tong Road, Wujiang Economic
Technological Development Area Jiangsu Province
215200 China

Manufacturer (2) : Compal Networking (KunShan) Co., LTD.
No. 520, Nabbang Rd., Economic & Technical
Development Zone Kunshan, Jiangsu Province China

Standard : 47 CFR Part 2.1091

The product was received on Nov. 29, 2018, and testing was started from Dec. 11, 2018 and completed on Jan. 29, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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Summary of Test Result

| Report Clause | Ref Std. Clause | Test Items | Result (PASS/FAIL) | Remark |
|---------------|-----------------|---------------------|--------------------|--------|
| 2 | - | Exposure evaluation | PASS | - |

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: **Sam Chen**

Report Producer: **Cindy Peng**



1 General Description

1.1 EUT General Information

| RF General Information | | | |
|------------------------|--|--|---|
| Evaluation Mode | Frequency Range (MHz) | Operating Frequency (MHz) | Modulation Type |
| 2.4GHz WLAN | 2400-2483.5 | 2412-2462 | 802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) |
| 5GHz WLAN | 5150-5250 5250-5350 5470-5725 5725-5850 | 5180-5240 5260-5320 5500-5720 5745-5825 | 802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) |

1.2 Table for Multiple Listing

The EUT has three model numbers which are identical to each other in all aspects except for the following table:

| Model No. | LAN Port | Heat sink color |
|-----------|-------------|-----------------|
| RT-AC88U | 8 LAN ports | Silver, Red |
| RT-AC3100 | 4 LAN ports | Silver, Black |
| RT-AC88R | 8 LAN ports | Silver, Red |

From the above models, model: RT-AC88U was selected as representative model for the test and its data was recorded in this report.



1.3 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FA531828-13

Below is the table for the change of the product with respect to the original one.

| Modifications | Performance Checking |
|---|---|
| 1. Adding two adapters “Adapter 7, Model Name: AD2066320 and Adapter 8, Model Name: ADP-45BW Y”. | It doesn't need to verify Maximum Permissible Exposure. |
| 2. Adding two types for 802.11ac (VHT80+80) mode “Type 1, 5210+5290 MHz and Type 2, 5530+5610 MHz”. | Maximum Permissible Exposure. |
| 3. Adding 5GHz band 2 and band 3 (5250~5350 MHz, 5470~5725 MHz) for this device. | |

Note: Other Maximum Permissible Exposure results are based on original test report.

1.4 Testing Location

| Testing Location | | |
|-------------------------------------|--------|---|
| <input type="checkbox"/> | HWA YA | ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-327-0973 |
| <input checked="" type="checkbox"/> | JHUBEI | ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085 |

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.



2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(A) 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 ²) | Averaging Time E ² , H ² or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|--|--|
| 0.3-3.0 | 614 | 1.63 | (100)* | 6 |
| 3.0-30 | 1842 / f | 4.89 / f | (900 / f)* | 6 |
| 30-300 | 61.4 | 0.163 | 1.0 | 6 |
| 300-1500 | | | F/300 | 6 |
| 1500-100,000 | | | 5 | 6 |

(B) 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 ²) | Averaging Time E ² , H ² or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|--|--|
| 0.3-1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34-30 | 824/f | 2.19/f | (180/f)* | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | | | F/1500 | 30 |
| 1500-100,000 | | | 1.0 | 30 |

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Method

The MPE was calculated at 25 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



2.3 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

| Mode | DG (dBi) | Power (dBm) | EIRP (dBm) | Tolerance (dB) | Tune-up EIRP (dBm) | Tune-up EIRP (W) | Distance (cm) | S (mW/cm ²) | S Limit (mW/cm ²) |
|----------|----------|-------------|------------|----------------|--------------------|------------------|---------------|-------------------------|-------------------------------|
| 2.4G;G1D | 8.27 | 27.49 | 35.76 | 0.12 | 35.88 | 3.87570 | 25 | 0.49346 | 1.00000 |
| 5.2G;D1D | 9.39 | 23.57 | 32.96 | 0.50 | 33.46 | 2.21820 | 25 | 0.28242 | 1.00000 |
| 5.3G;D1D | 9.39 | 20.52 | 29.91 | 0.08 | 29.99 | 0.99770 | 25 | 0.12703 | 1.00000 |
| 5.6G;D1D | 9.39 | 20.54 | 29.93 | 0.06 | 29.99 | 0.99770 | 25 | 0.12703 | 1.00000 |
| 5.8G;D1D | 9.39 | 26.53 | 35.92 | 0.07 | 35.99 | 3.97256 | 25 | 0.50579 | 1.00000 |

Simultaneous Transmission Analysis Mode: WLAN 2.4GHz + WLAN 5GHz

| Mode | DG (dBi) | Power (dBm) | EIRP (dBm) | Tolerance (dB) | Tune-up EIRP (dBm) | Tune-up EIRP (W) | Distance (cm) | S (mW/cm ²) | S Limit (mW/cm ²) | Ratio (S/Limit) |
|----------|----------|-------------|------------|----------------|--------------------|------------------|---------------|-------------------------|-------------------------------|-----------------|
| 2.4G;G1D | 8.27 | 27.49 | 35.76 | 0.12 | 35.88 | 3.87570 | 25 | 0.49346 | 1 | 0.49346 |
| 5.8G;D1D | 9.39 | 26.53 | 35.92 | 0.07 | 35.99 | 3.97256 | 25 | 0.50579 | 1 | 0.50579 |
| | | | | | | | | | Sum Ratio | 0.99925 |
| | | | | | | | | | Ratio Limit | 1 |

Note: The above antenna gain was declared by manufacturer.

—————THE END—————