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# RF Exposure Evaluation Report

**Report No. :** CQASZ20190700561E-03

**Applicant:** MIGU Video Co., Ltd

**Address of Applicant:** No. 636 Qiaoyun Road, Shanghai, China.

**Manufacturer:** MIGU Video Co., Ltd

**Address of Manufacturer:** No. 636 Qiaoyun Road, Shanghai, China.

**Factory:** UNIONMAN TECHNOLOGY CO., LTD.

**Address of Factory:** No.5 Huitai Road, Huinan High-Tech Industrial Park, Huizhou City, Guangdong, China.

**Equipment Under Test (EUT):**

**Product:** Set-top box

**Model No.:** MGV2002

**Brand Name:** MIGU

**FCC ID:** 2ATTH-MGV2002

**Standards:** 47 CFR Part 1.1307  
47 CFR Part 1.1310  
KDB447498D01 General RF Exposure Guidance v06

**Date of Test:** 2019-06-17 to 2019-07-04

**Date of Issue:** 2019-07-04

**Test Result :** PASS\*

**Tested By:**

*Martin Lee*

(Martin Lee)

**Reviewed By:**

*Aaron Ma*

(Aaron Ma)

**Approved By:**

*Jack Ai*  
( Jack Ai)



\* In the configuration tested, the EUT complied with the standards specified above.

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.

## 2 Version

### Revision History Of Report

| Report No.           | Version | Description    | Issue Date |
|----------------------|---------|----------------|------------|
| CQASZ20190700561E-03 | Rev.01  | Initial report | 2019-07-04 |

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## 4 RF Exposure Evaluation

### 4.1 RF Exposure Compliance Requirement

#### 4.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency range<br>(MHz)                                       | Electric field<br>strength<br>(V/m) | Magnetic field<br>strength<br>(A/m) | Power density<br>(mW/cm <sup>2</sup> ) | Averaging time<br>(minutes) |
|----------------------------------------------------------------|-------------------------------------|-------------------------------------|----------------------------------------|-----------------------------|
| <b>(A) Limits for Occupational/Controlled Exposures</b>        |                                     |                                     |                                        |                             |
| 0.3–3.0 .....                                                  | 614                                 | 1.63                                | *(100)                                 | 6                           |
| 3.0–30 .....                                                   | 1842/f                              | 4.89/f                              | *(900/f <sup>2</sup> )                 | 6                           |
| 30–300 .....                                                   | 61.4                                | 0.163                               | 1.0                                    | 6                           |
| 300–1500 .....                                                 | .....                               | .....                               | f/300                                  | 6                           |
| 1500–100,000 .....                                             | .....                               | .....                               | 5                                      | 6                           |
| <b>(B) Limits for General Population/Uncontrolled Exposure</b> |                                     |                                     |                                        |                             |
| 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

Friis Formula

Friis transmission formula:  $P_d = (P_{out} * G) / (4 * \pi * R^2)$

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

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

#### 4.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

## 4.2 EUT RF Exposure Evaluation

### Calculated Result and Limit (For 2.4G WIFI)

| Mode                               | Frequency<br>(MHz) | output<br>power<br>(dBm) | output<br>power<br>(mW) | Target<br>power<br>(dBm) | Antenna gain |          | Power<br>Density<br>(S)<br>(mW<br>/cm <sup>2</sup> ) | Limited<br>of<br>Power<br>Density<br>(S)<br>(mW<br>/cm <sup>2</sup> ) | Test<br>Result |
|------------------------------------|--------------------|--------------------------|-------------------------|--------------------------|--------------|----------|------------------------------------------------------|-----------------------------------------------------------------------|----------------|
|                                    |                    |                          |                         |                          | (dBi)        | (Linear) |                                                      |                                                                       |                |
| IEEE<br>802.11b<br>(ANT 1)         | 2412               | 15.81                    | 38.11                   | 15 ± 1                   | 2            | 1.59     | 0.01255                                              | 1                                                                     | Compiles       |
|                                    | 2437               | 15.42                    | 34.83                   | 15 ± 1                   | 2            | 1.59     | 0.01255                                              | 1                                                                     | Compiles       |
|                                    | 2462               | 15.50                    | 35.48                   | 15 ± 1                   | 2            | 1.59     | 0.01255                                              | 1                                                                     | Compiles       |
| IEEE<br>802.11g<br>(ANT 1)         | 2412               | 11.90                    | 15.49                   | 11 ± 1                   | 2            | 1.59     | 0.00500                                              | 1                                                                     | Compiles       |
|                                    | 2437               | 10.36                    | 10.86                   | 11 ± 1                   | 2            | 1.59     | 0.00500                                              | 1                                                                     | Compiles       |
|                                    | 2462               | 10.30                    | 10.72                   | 11 ± 1                   | 2            | 1.59     | 0.00500                                              | 1                                                                     | Compiles       |
| IEEE<br>802.11b<br>(ANT 2)         | 2412               | 13.72                    | 23.55                   | 13 ± 1                   | 2            | 1.59     | 0.00792                                              | 1                                                                     | Compiles       |
|                                    | 2437               | 13.85                    | 24.27                   | 13 ± 1                   | 2            | 1.59     | 0.00792                                              | 1                                                                     | Compiles       |
|                                    | 2462               | 13.16                    | 20.70                   | 13 ± 1                   | 2            | 1.59     | 0.00792                                              | 1                                                                     | Compiles       |
| IEEE<br>802.11g<br>(ANT 2)         | 2412               | 8.81                     | 7.60                    | 9 ± 1                    | 2            | 1.59     | 0.00315                                              | 1                                                                     | Compiles       |
|                                    | 2437               | 9.12                     | 8.17                    | 9 ± 1                    | 2            | 1.59     | 0.00315                                              | 1                                                                     | Compiles       |
|                                    | 2462               | 8.46                     | 7.01                    | 9 ± 1                    | 2            | 1.59     | 0.00315                                              | 1                                                                     | Compiles       |
| IEEE<br>802.11n<br>HT20<br>(ANT 1) | 2412               | 11.11                    | 12.91                   | 11 ± 1                   | 2            | 1.59     | 0.00500                                              | 1                                                                     | Compiles       |
|                                    | 2437               | 10.85                    | 12.16                   | 11 ± 1                   | 2            | 1.59     | 0.00500                                              | 1                                                                     | Compiles       |
|                                    | 2462               | 10.38                    | 10.91                   | 11 ± 1                   | 2            | 1.59     | 0.00500                                              | 1                                                                     | Compiles       |
| IEEE<br>802.11n<br>HT20<br>(ANT 2) | 2412               | 8.63                     | 7.30                    | 9 ± 1                    | 2            | 1.59     | 0.00315                                              | 1                                                                     | Compiles       |
|                                    | 2437               | 8.83                     | 7.64                    | 9 ± 1                    | 2            | 1.59     | 0.00315                                              | 1                                                                     | Compiles       |
|                                    | 2462               | 8.76                     | 7.52                    | 9 ± 1                    | 2            | 1.59     | 0.00315                                              | 1                                                                     | Compiles       |
| IEEE<br>802.11n<br>HT40<br>(ANT 1) | 2422               | 8.88                     | 7.73                    | 8 ± 1                    | 2            | 1.59     | 0.00251                                              | 1                                                                     | Compiles       |
|                                    | 2437               | 7.73                     | 5.93                    | 8 ± 1                    | 2            | 1.59     | 0.00251                                              | 1                                                                     | Compiles       |
|                                    | 2452               | 7.78                     | 6.00                    | 8 ± 1                    | 2            | 1.59     | 0.00251                                              | 1                                                                     | Compiles       |
| IEEE<br>802.11n<br>HT40<br>(ANT 2) | 2422               | 6.71                     | 4.69                    | 7 ± 1                    | 2            | 1.59     | 0.00199                                              | 1                                                                     | Compiles       |
|                                    | 2437               | 6.43                     | 4.40                    | 7 ± 1                    | 2            | 1.59     | 0.00199                                              | 1                                                                     | Compiles       |
|                                    | 2452               | 6.60                     | 4.57                    | 7 ± 1                    | 2            | 1.59     | 0.00199                                              | 1                                                                     | Compiles       |

| Mode                                    | Frequency<br>(MHz) | Power Density<br>(S)<br>(mW/cm <sup>2</sup> ) |          |         | Limited<br>of<br>Power Density<br>(S)<br>(mW/cm <sup>2</sup> ) | Test<br>Result |
|-----------------------------------------|--------------------|-----------------------------------------------|----------|---------|----------------------------------------------------------------|----------------|
|                                         |                    | ANT<br>1                                      | ANT<br>2 | Sum     |                                                                |                |
| IEEE<br>802.11n<br>HT20<br>(ANT<br>1+2) | 2412               | 0.00500                                       | 0.00315  | 0.00815 | 1                                                              | Compiles       |
|                                         | 2437               | 0.00500                                       | 0.00315  | 0.00815 | 1                                                              | Compiles       |
|                                         | 2462               | 0.00500                                       | 0.00315  | 0.00815 | 1                                                              | Compiles       |
| IEEE<br>802.11n<br>HT40<br>(ANT<br>1+2) | 2422               | 0.00251                                       | 0.00199  | 0.00450 | 1                                                              | Compiles       |
|                                         | 2437               | 0.00251                                       | 0.00199  | 0.00450 | 1                                                              | Compiles       |
|                                         | 2452               | 0.00251                                       | 0.00199  | 0.00450 | 1                                                              | Compiles       |

**Calculated Result and Limit ( For 5G WIFI)**

Antenna 1: 2dBi

Antenna 2: 3dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.59/1.99 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

The worst case is IEEE 802.11N20 ANT1+ANT2

| Mode                          | Frequency<br>(MHz) | output<br>power<br>(dBm) | output<br>power<br>(mW) | Target<br>power<br>(dBm) | Antenna gain |          | Power<br>Density<br>(S)<br>(mW<br>/cm2) | Limited<br>of<br>Power<br>Density<br>(S)<br>(mW<br>/cm2) | Test<br>Result |
|-------------------------------|--------------------|--------------------------|-------------------------|--------------------------|--------------|----------|-----------------------------------------|----------------------------------------------------------|----------------|
|                               |                    |                          |                         |                          | (dBi)        | (Linear) |                                         |                                                          |                |
| IEEE<br>802.11N20<br>(ANT 1)+ | 5610               | 21.50                    | 141.25                  | 20 ± 2                   | ANT1+ANT2    | 3.58     | 0.11288                                 | 1                                                        | Compiles       |
| IEEE<br>802.11N20<br>(ANT 2)  | 5775               | 20.37                    | 108.90                  | 19 ± 1.5                 | ANT1+ANT2    | 3.58     | 0.07755                                 | 1                                                        | Compiles       |