

**FCC/IC - TEST REPORT**

Report Number : **68.910.19.0009.01** Date of Issue: February 27, 2020

Model : **MT02-0101-069006**

Product Type : Transmitter

Applicant : Rollease Acmeda Inc

Address : 750 East Main Street, 7th Floor Stamford Connecticut  
: United States 06902

Production Facility : Ningbo Dooya Mechanic & Electronic Technology Co., Ltd.

Address : No.168 Shengguang Road, Luotuo, Zhenhai, Ningbo,  
: Zhejiang province, P.R.China 315202

Test Result : **n Positive      o Negative**

Total pages including Appendices : 17

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## 2 Details about the Test Laboratory

### Details about the Test Laboratory

#### Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch  
Building 12&13, Zhiheng Wisdomland Business Park,  
Nantou Checkpoint Road 2, Nanshan District,  
Shenzhen City, 518052,  
P. R. China

FCC Registration Number: 514049

IC Registration Number: 10320A

Telephone: 86 755 8828 6998  
Fax: 86 755 8828 5299

### 3 Description of the Equipment Under Test

|                            |                                                                        |
|----------------------------|------------------------------------------------------------------------|
| Product:                   | Transmitter                                                            |
| Model no./HVIN/PMN:        | MT02-0101-069006                                                       |
| FCC ID:                    | 2AGGZMT020101069006                                                    |
| IC:                        | 21769-MT020101006                                                      |
| Rating:                    | 3VDC                                                                   |
| RF Transmission Frequency: | 433.925MHz                                                             |
| Modulation:                | FSK                                                                    |
| Antenna Type:              | PCB Antenna                                                            |
| Antenna Gain:              | 1dBi                                                                   |
| Description of the EUT:    | The Equipment Under Test (EUT) is a Transmitter operated at 433.925MHz |

## 4 Summary of Test Standards

| Test Standards                               |                                                                                         |
|----------------------------------------------|-----------------------------------------------------------------------------------------|
| FCC Part 15 Subpart C<br>10-1-2019 Edition   | PART 15 - RADIO FREQUENCY DEVICES<br>Subpart C - Intentional Radiators                  |
| RSS-Gen Issue 5<br>March 2019<br>Amendment 1 | General Requirements and Information for the Certification of<br>Radio Apparatus        |
| RSS-210 Issue 10<br>December 2019            | RSS-210 — Licence-exempt Radio Apparatus (All Frequency<br>Bands): Category I Equipment |

All the test methods were according to ANSI C63.10-2013.

## 5 Summary of Test Results

| Technical Requirements                 |                  |                                    |       |            |                |
|----------------------------------------|------------------|------------------------------------|-------|------------|----------------|
| FCC Part 15 Subpart C, RSS-210 Issue 9 |                  |                                    |       |            |                |
| Test Condition                         |                  |                                    | Pages | Test Site  | Test Result    |
| §15.207                                | RSS-GEN A8.8     | Conducted emission AC power port   | N/A   | N/A        | Not Applicable |
| §15.205, §15.209, 15.35 (c)§15.231(b)  | RSS-210 A.1.2    | Radiated Emission, 30MHz to 4.5GHz | 10    | Site 1     | Pass           |
| §15.231(c)                             | RSS-210 A.1.3    | Bandwidth Measurement              | 14    | Site 1     | Pass           |
| §15.231(a)(1)                          | RSS-210 A.1.1(a) | Deactivation Time                  | 15    | Site 1     | Pass           |
| §15.203                                | RSS-Gen 6.8      | Antenna requirement                | --    | See Note 2 | Pass           |

Note 1: N/A=Not Applicable.

Note 2: The EUT uses an PCB Antenna, which gain is 1dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

## 6 General Remarks

### Remarks

This submittal(s) (test report) is intended for FCC ID: 2AGGZMT020101069006, IC: 21769-MT020101006 complies with Section 15.205, 15.209, 15.231 of the FCC Part 15, Subpart C Rules, RSS-Gen Issue 5 and RSS-210 issue 10.

### SUMMARY:

All tests according to the regulations cited on page 5 were

n - Performed

o - **Not** Performed

The Equipment Under Test

n - **Fulfills** the general approval requirements.

o - **Does not** fulfill the general approval requirements.

Sample Received Date: March 1, 2019

Testing Start Date: March 1, 2019

Testing End Date: March 20, 2019

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch

Reviewed by:

Prepared by:

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John Zhi  
EMC Project Manager



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EMC Project Engineer



Carry Cai  
EMC Test Engineer

## 7 Systems test configuration

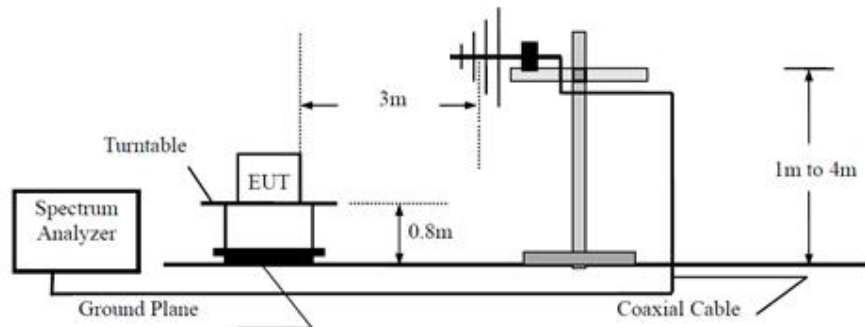
Auxiliary Equipment Used during Test:

| DESCRIPTION | MANUFACTURER | MODEL NO.(SHIELD) | S/N(LENGTH) |
|-------------|--------------|-------------------|-------------|
| --          | --           | --                | --          |

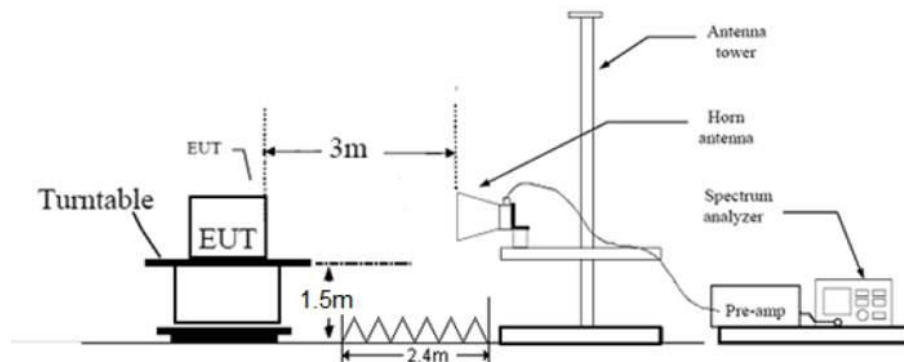
## 8 Test Setups

### 8.1 Radiated test setups

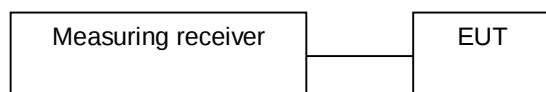
Below 1GHz



Above 1GHz



### 8.2 Conducted RF test setups



## 9 Test Methodology

### 9.1 Radiated Emission

#### Test Method

- 1: The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
- 3: The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4: For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5: Use the following spectrum analyzer settings According to C63.10:  
For Above 1GHz

Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 1MHz, VBW $\geq$ 3RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Below 1GHz

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 100 KHz, VBW $\geq$ 3RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

#### Note:

- 1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.
- 3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (duty cycle  $\geq$ 98%) for peak detection at frequency above 1GHz
- 4: If the emission is pulsed (duty cycle  $<$ 98%), modify the unit for continuous operation: use the settings shown above, then correct the reading by subtracting the peak to average duty cycle correction factor  $20\log(\text{duty cycle})$ , derived from the appropriate duty cycle calculation.

## Limit

According to §15.231 (b), the and RSS-210 A.1.2 field strength of emissions from intentional radiators operated under this section shall not exceed the following:

| Fundamental frequency (MHz) | Field Strength of Fundamental (Microvolts /meter) | Field Strength of spurious emissions ((Microvolts /meter) |
|-----------------------------|---------------------------------------------------|-----------------------------------------------------------|
| 40.66-40.70                 | 2,250                                             | 225                                                       |
| 70-130                      | 1,250                                             | 125                                                       |
| 130-174                     | 1,250 to 3,370 *                                  | 125 to 375 *                                              |
| 174-260                     | 3,750                                             | 375                                                       |
| 260-470 √                   | 3,750 to 12, 500*                                 | 375 to 1,250*                                             |
| Above 470                   | 12,500                                            | 1,250                                                     |

## Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

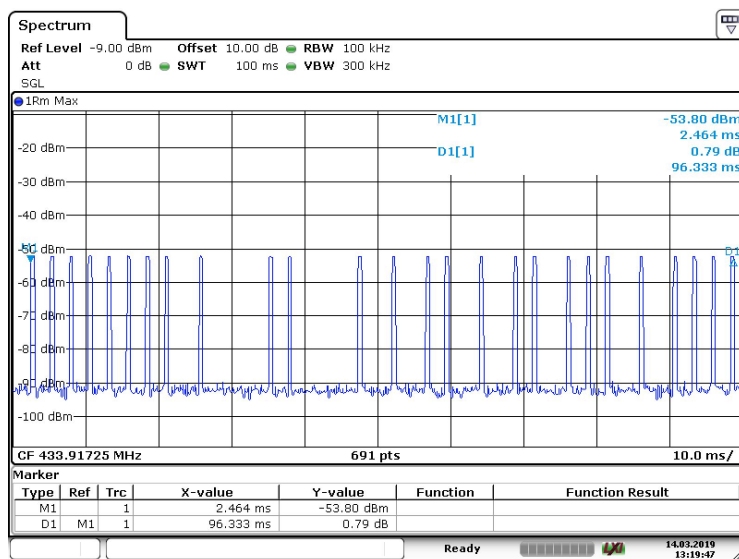
| Radiated Emissions |                         |                  |                    |                   |                        |              |        |               |
|--------------------|-------------------------|------------------|--------------------|-------------------|------------------------|--------------|--------|---------------|
| Value              | Emissions Frequency MHz | E-Field Polarity | Field at 3m dBμV/m | Average Factor dB | Net Field at 3m dBμV/m | Limit dBμV/m | Margin | Emission Type |
| Below 1GHz         |                         |                  |                    |                   |                        |              |        |               |
| PK                 | 433.925                 | H                | 68.89              | 0.00              | 68.89                  | 100.83       | 31.94  | Fundamental   |
| AV                 | 433.925                 | H                | 68.89              | -16.44            | 52.45                  | 80.83        | 28.38  | Fundamental   |
| PK                 | 433.925                 | V                | 85.48              | 0.00              | 85.48                  | 100.83       | 15.35  | Fundamental   |
| AV                 | 433.925                 | V                | 85.48              | -16.44            | 69.04                  | 80.83        | 11.79  | Fundamental   |
| PK                 | 867.850                 | H                | 38.34              | 0.00              | 38.84                  | 80.83        | 41.99  | Spurious      |
| AV                 | 867.850                 | H                | 38.34              | -16.44            | 21.90                  | 60.83        | 38.93  | Spurious      |
| PK                 | 867.850                 | V                | 58.01              | 0.00              | 58.01                  | 80.83        | 22.82  | Spurious      |
| AV                 | 867.850                 | V                | 58.01              | -16.44            | 41.57                  | 60.83        | 19.26  | Spurious      |
| Above 1GHz         |                         |                  |                    |                   |                        |              |        |               |
| PK                 | 3037.48                 | H                | 43.36              | 0.00              | 43.36                  | 74           | 30.64  | Spurious      |
| AV                 | 3037.48                 | H                | 43.36              | -16.44            | 26.92                  | 54           | 27.08  | Spurious      |
| PK                 | 1301.78                 | V                | 48.25              | 0.00              | 48.25                  | 74           | 25.75  | Spurious      |
| AV                 | 1301.78                 | V                | 48.25              | -16.44            | 31.81                  | 54           | 22.19  | Spurious      |

Remark:

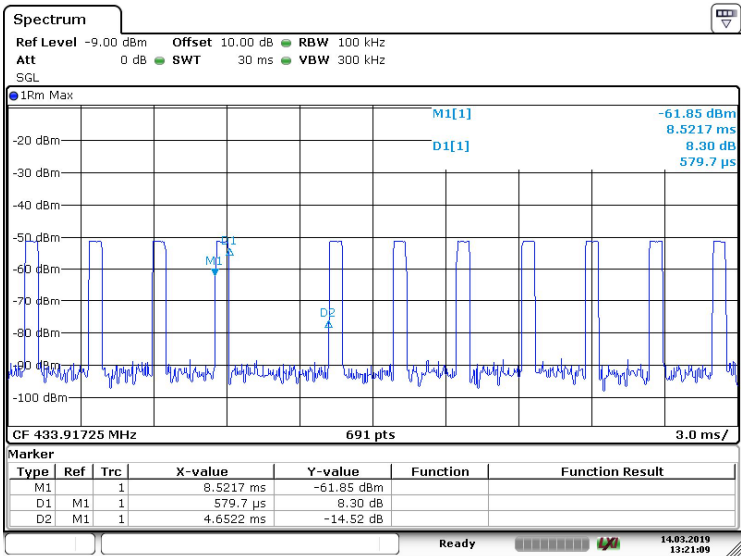
- 1: AV Emission Level= PK Emission Level+20log(dutycycle)
- 2: Data of measurement within this frequency range shown "I" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
- 3: "\*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
- 4: Corrected Amplitude = Read level + Corrector factor  
 Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain  
 Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

Duty Cycle =  $[(0.5797 \times 26) \text{ms} / 100 \text{ (ms)}] = 15.07\%$

Duty Cycle Factor =  $20 \log (\text{Duty Cycle}) = -16.44$



Date: 14.MAR.2019 13:19:47



Date: 14.MAR.2019 13:21:09

## 9.2 Bandwidth Measurement

### Test Method

1. The RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Use the following test receiver settings:  
Span = approximately 5 times the 20dB bandwidth, centered on a hopping channel  
RBW > the 20dB bandwidth of the emission being measured, VBW ≥ RBW,  
Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth. Record the results.
5. Repeat above procedures until all frequencies measured were complete.

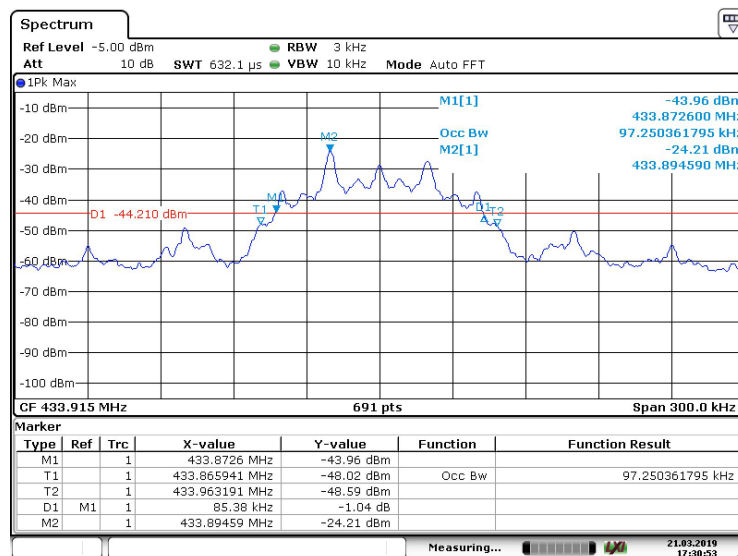
### Limit

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. For devices operating above 900MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20dB down from the modulated carrier.

The limit for the EUT = 0.25% \* 433.91 MHz = 1084 kHz

### Test Result

| Channel | 20dB Bandwidth (KHz) | 99% bandwidth (KHz) | Limit (KHz) |
|---------|----------------------|---------------------|-------------|
| 1       | 85.38                | 97.25KHz            | 1084        |



Date: 21.MAR.2019 17:30:53

### 9.3 Deactivation Time

#### Test Method

1. The RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT in transmitting mode.
3. Set center frequency of spectrum analyzer=operating frequency.
4. Set the spectrum analyzer as RBW=120 KHz, VBW=1MHz, Span=0Hz.
5. Repeat above procedures until all frequency measured was complete.

#### Limit

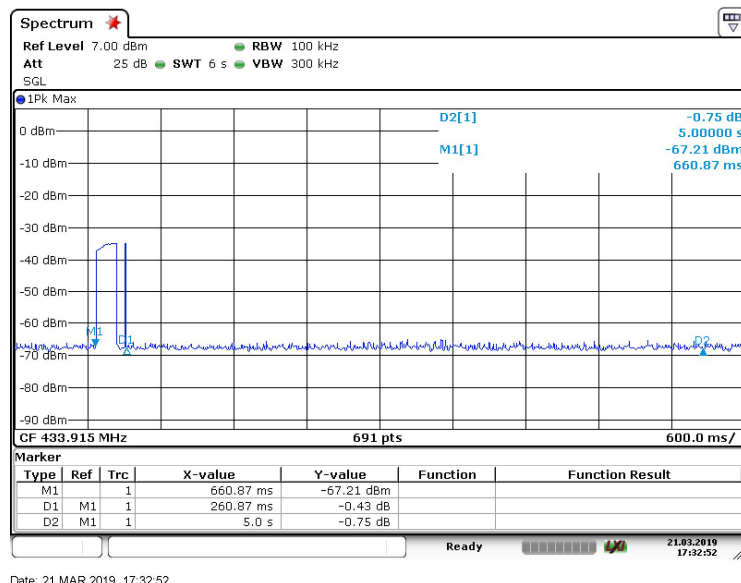
According to FCC Part 15.231 (a), the transmitter shall be complied the following requirements:  
(√) (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

(3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

#### Test Result

| Channel | Frequency  | Deactivation Time | Result |
|---------|------------|-------------------|--------|
| 1       | 433.925MHz | 260.87ms          | Pass   |



## 10 Test Equipment List

### List of Test Instruments

#### RF conducted Test

| Description     | Manufacturer    | Model no. | Equipment ID   | Serial no. | cal. due date |
|-----------------|-----------------|-----------|----------------|------------|---------------|
| Signal Analyzer | Rohde & Schwarz | FSV40     | 68-4-74-14-004 | 101030     | 2020-6-28     |

#### Radiated Emission Test

| Description                         | Manufacturer    | Model no. | Equipment ID       | Serial no.     | cal. due date |
|-------------------------------------|-----------------|-----------|--------------------|----------------|---------------|
| EMI Test Receiver                   | Rohde & Schwarz | ESR 26    | 68-4-74-14-002     | 101269         | 2020-6-28     |
| Trilog Super Broadband Test Antenna | Schwarzbeck     | VULB 9163 | 68-4-80-14-002     | 707            | 2020-8-20     |
| Horn Antenna                        | Rohde & Schwarz | HF907     | 68-4-80-14-005     | 102294         | 2020-6-22     |
| Loop Antenna                        | Rohde & Schwarz | HFH2-Z2   | 68-4-80-14-006     | 100398         | 2020-7-7      |
| Pre-amplifier                       | Rohde & Schwarz | SCU 18    | 68-4-29-14-001     | 102230         | 2020-6-28     |
| Signal Generator                    | Rohde & Schwarz | SMY01     | 68-4-48-16-001     | 839369/005     | 2020-6-28     |
| Attenuator                          | Agilent         | 8491A     | 68-4-81-16-001     | MY39264334     | 2020-6-28     |
| 3m Semi-anechoic chamber            | TDK             | 9X6X6     | 68-4-90-14-001     | ----           | 2020-7-7      |
| Test software                       | Rohde & Schwarz | EMC32     | 68-4-90-14-001-A10 | Version9.15.00 | N/A           |

## 11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

| System Measurement Uncertainty                               |                                                                                      |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Test Items                                                   | Extended Uncertainty                                                                 |
| Uncertainty for Radiated Spurious Emission 25MHz-3000MHz     | Horizontal: 4.81dB;<br>Vertical: 4.89dB;                                             |
| Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz  | Horizontal: 4.69dB;<br>Vertical: 4.68dB;                                             |
| Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz | Horizontal: 4.89dB;<br>Vertical: 4.87dB;                                             |
| RF Conducted test                                            | RF Power Conducted: 1.16dB<br>Frequency test involved:<br>0.6×10 <sup>-7</sup> or 1% |