



**CENTRE OF TESTING SERVICE
INTERNATIONAL**

OPERATE ACCORDING TO ISO/IEC 17025

FCC ID TEST REPORT

TEST REPORT NUMBER : CGZ3100607-02061-O



CENTRE OF TESTING SERVICE CO., LTD.

Building F, Dachuang industrial park, No.379, Zhongshan Dadao,
Guangzhou, China.



TEST REPORT For FCC ID

47 CFR PART 15 OCT, 2009

Report Reference No. CGZ3100607-02061-O

Date of issue 17 July 2010

Testing Laboratory Name CETRE OF TESTING SERVICE CO., LTD

Address Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China.

Testing location/ procedure Full application of Harmonised standards
 Partial application of Harmonised standards
 Other standard testing method

Applicant's name CHOICELORED LIMITED

Address 15/F.Commercial Building 478 Nathan Road Kowloon, Hong Kong

Test specification

Standard 47 CFR PART 15 OCT, 2009

Test Report Form No. CTSEMC-1.0

TRF Originator CENTRE OF TESTING SERVICE CO., LTD

Master TRF Dated 2009-01

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Test item description Wireless Controller

Trade Mark /

Manufacturer Heshan Lide Electronic Enterprise Co.,Ltd

Model/Type reference FRC-4

Ratings DC 12V

Operating Frequency 315.00MHz/ MSK

Result Positive

Compiled by:

Quty Liu / File administrators

Supervised by:

Jackson Zhang / Technique principal

Approved by:

Kevin Liang / Manager

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FCC ID -- T E S T R E P O R T

| | | |
|-------------------|---------------------------|-------------------------------------|
| Test Report No. : | CGZ3100607-02061-O | <u>17 May 2010</u> Date of issue |
|-------------------|---------------------------|-------------------------------------|

| | |
|-------------------|---------------------|
| Type / Model..... | Wireless Controller |
|-------------------|---------------------|

| | |
|----------|-------|
| EUT..... | FRC-4 |
|----------|-------|

| | |
|----------------|---------------------|
| Applicant..... | CHOICELORED LIMITED |
|----------------|---------------------|

| | |
|--------------|---|
| Address..... | 15/F.Commercial Building 478 Nathan Road Kowloon, Hong Kong |
|--------------|---|

| | |
|----------------|-----------------|
| Telephone..... | +86-750-8318092 |
|----------------|-----------------|

| | |
|----------|-----------------------|
| Fax..... | +86-750-8309 400-8565 |
|----------|-----------------------|

| | |
|--------------|-----------|
| Contact..... | Peter tao |
|--------------|-----------|

| | |
|-------------------|---|
| Manufacturer..... | Heshan Lide Electronic Enterprise Co.,Ltd |
|-------------------|---|

| | |
|--------------|--|
| Address..... | Gunhe Town 529728,Heshan City,Guangdon |
|--------------|--|

| | |
|----------------|---|
| Telephone..... | / |
|----------------|---|

| | |
|----------|---|
| Fax..... | / |
|----------|---|

| | |
|--------------|---|
| Contact..... | / |
|--------------|---|

| | |
|-------------------------|---------------------|
| Test report holder..... | CHOICELORED LIMITED |
|-------------------------|---------------------|

| | |
|--------------|---|
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|--------------|---|

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|----------|-----------------------|

| | |
|--------------|-----------|
| Contact..... | Peter tao |
|--------------|-----------|

| |
|--|
| Test Result according to the standards on page 3: Positive |
|--|

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

- 47 CFR PART 15 OCT, 2009
- ANSI C63.4-2009

2. SUMMARY

2.1 GENERAL REMARKS

| | |
|--------------------------------|--------------|
| Date of receipt of test sample | 08 June 2010 |
| Testing commenced on | 14 June 2010 |
| Testing concluded on | 17 July 2010 |

2.2 FINAL ASSESSMENT

The FCC requirements pertaining to the technical standards and tested operation modes are

- fulfilled.
- **not** fulfilled.

The equipment under test

- fulfills the FCC requirements cited on page 3.
- **does not** fulfil the FCC requirements cited on page 3.

3. EQUIPMENT UNDER TEST

3.1 Power supply system utilised

Power supply voltage : DC 12V

3.2 Short description of the Equipment under Test (EUT)

Number of tested samples: 1

Serial number: Prototype

3.3 EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

- Standby
- Test program (customer specific)

Operation mode 1: TX

Note: X position of EUT is the worst case, so only these test results be recorded in the test report.

3.4 EUT configuration

3.4.1. Description of configuration (EUT)

| | | |
|-----------------------|---|---|
| Description | : | Wireless Controller |
| Model Number | : | FRC-4 |
| Operation frequency | : | 315.00MHz |
| Radio Technology | : | MSK |
| Modulation Technology | : | MSK modulation |
| Antenna | : | Integral antenna, met requirement of FCC 15.203 |
| Antenna Assembly Gain | : | 2dBi (maximum) |

3.4.2. Tested Supporting System Details

N/A

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4. TEST ENVIRONMENT

4.1 Address of the test laboratory

Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China

Tel: +86-20-85543113 (32 lines) Fax: +86-20-38780406

4.2 Test facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L3394

CENTRE OF TESTING SERVICE CO., LTD has been assessed and proved to be in compliance with CNAS-CL01: 2006 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

IC-Registration No.: 8374

The 3m Alternate Test Site of CENTRE OF TESTING SERVICE CO., LTD has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 8374 on June 24, 2009 .

FCC-Registration No.: 971995

CENTRE OF TESTING SERVICE CO., LTD, EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration No.791995, July 21, 2009.

4.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

| | |
|-----------------------|------------|
| Temperature: | 15~35 ° C |
| Humidity: | 25~75 % |
| Atmospheric pressure: | 86~106 kPa |

4.4 Definitions of symbols used in this test report

- - The black square indicates that the listed condition, standard or equipment is applicable for this report.
- - The empty square indicates that the listed condition, standard or equipment is **not** applicable for this report.

4.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the CTS quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

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4.6 Measurement Uncertainty

| Test Item | Frequency Range | Uncertainty | Note |
|-------------------------|-----------------|-------------|------|
| Conduction disturbance | 150kHz~30MHz | ±1.22dB | (1) |
| Power disturbance | 30MHz~300MHz | ±1.38dB | (1) |
| Radiation emission (3m) | 30MHz~300MHz | ±3.14dB | (1) |
| | 300MHz~1000MHz | ±3.18dB | (1) |

(1).This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

5. Summary of standards and results

5.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

| EMISSION | | |
|--|--|---------|
| Description of Test Item | Standard | Results |
| Conducted Emission Test | FCC Part 15 C: 15.231 ANSI C63.4-2009 | PASSED |
| Radiated Emission Test | FCC Part 15 C: 15.231 ANSI C63.4-2009 | PASSED |
| 20 dB Bandwidth Test | FCC Part 15 C: 15.231 ANSI C63.4-2009 | PASSED |
| Stop Transmitting Time Test | FCC Part 15 C: 15.231 ANSI C63.4-2009 | PASSED |
| N/A is an abbreviation for Not Applicable. | | |

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6. Power Line Conducted Emission Test

According to Paragraph (f) of FCC Part 15 section 15.231, Tests to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

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7. Radiated disturbance (electric field)

7.1. Test Equipment

| Radiated disturbance (electric field) | | | | | |
|---------------------------------------|-------------------|-----------------|-----------|------------|-----------|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | EMI Test Receiver | ROHDE & SCHWARZ | ESCI | 100868 | 2009/12 |
| 2 | Biconical Antenna | ROHDE & SCHWARZ | HK116 | 100221 | 2009/12 |
| 3 | Log per Antenna | ROHDE & SCHWARZ | HL223 | 100226 | 2009/12 |
| 4 | Log per Antenna | ROHDE & SCHWARZ | HL050 | 100186 | 2009/12 |
| 5 | Signal analyzer | ROHDE & SCHWARZ | FSIQ26 | 100311 | 2009/12 |

7.2. Block Diagram of Test Setup

7.2.1 Block Diagram of connection between EUT and simulators



(EUT: Wireless Controller)

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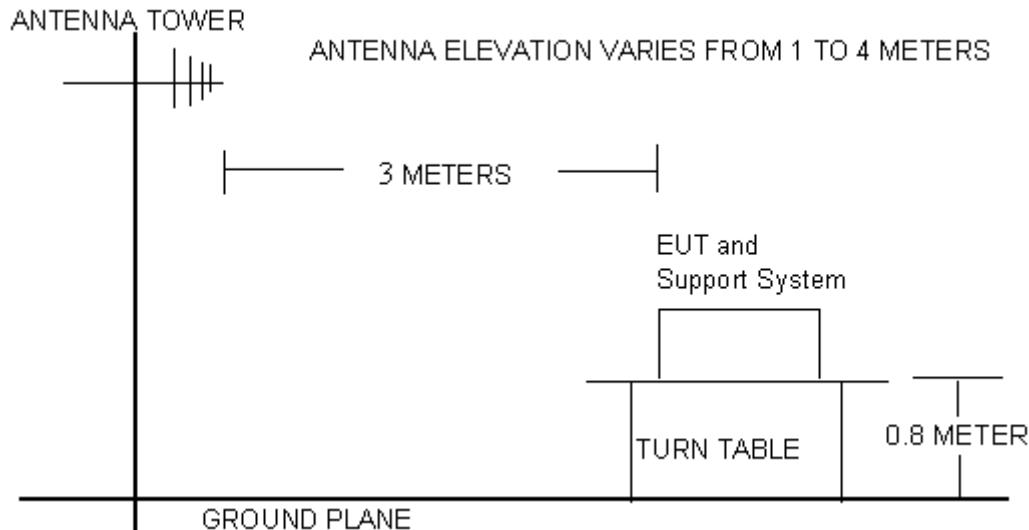
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7.2.2 Anechoic Chamber Setup Diagram



7.3. Radiated Emission Limit Standard: FCC 15.231

| FREQUENCY MHz | DISTANCE Meters | FIELD STRENGTHS LIMIT | |
|------------------|--------------------|--|----------------|
| | | μ V/m | dB(μ V)/m |
| 30 ~ 88 | 3 | 100 | 40.0 |
| 88 ~ 216 | 3 | 150 | 43.5 |
| 216 ~ 960 | 3 | 200 | 46.0 |
| 960 ~ 1000 | 3 | 500 | 54.0 |
| Above 1000 | 3 | Other: 74.0 dB(μ V)/m (Peak) 54.0 dB(μ V)/m (Average) | |

Remark: (1) Emission level $\text{dB}\mu\text{V} = 20 \log \text{Emission level } \mu\text{V}/\text{m}$
 (2) The smaller limit shall apply at the cross point between two frequency bands.
 (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

7.4. Test Procedure

The EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2009 on radiated emission Test.

The frequency range from 30MHz to 1000MHz and above 1GHz. is investigated. Please see the following pages.

All measurements for radiated emissions within the restricted bands were performed using a Quasi-Peak detector with 120kHz RBW below 1GHz and a Peak and Average detector with 1MHz RBW above 1GHz,

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All measurements for radiated emissions within the restricted bands were performed using a Quasi-Peak detector with 300kHz VBW below 1GHz and a Peak detector with 1MHz VBW above 1GHz, A average detector be caluclated from peak value using duty cycle factor Both 30MHz to 1000MHz and above 1GHz

Pretest x, y, z position of EUT, final, select the worst case x position test and record the test results in the report.

The test modes (TX Mode) is tested in Anechoic Chamber and all the scanning waveforms are reported on section 7.5

7.5.Radiated Emission Test Results

PASSED.

The frequency range from 30MHz to 230MHz, 230MHz to 1000MHz and above 1GHz. is investigated. Please see the following pages.

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| | | | |
|------------------|---------------------------|---------|--|
| Channel: | 315.00MHz | Result: | <input checked="" type="checkbox"/> - passed |
| Test point: | Horizontal | | <input type="checkbox"/> - not passed |
| Frequency range: | 30-230MHz and 230-1000MHz | | |

| | |
|---------------------|---|
| EUT | Wireless Controller |
| Firm Name | Choicelored Limited |
| Operating Condition | DC 12V |
| Test Condition | Ambient Temperature: 25°C Humidity: 56% |
| Test Date: | 14 June~16 July 2010 |
| Operator | Roy |
| MODEL NO | FRC-4 |

| Fundamental and Harmonics Average Result | | | | | |
|--|---------------------------|-------------------------------------|------------------------------|-------------------------------|------------|
| Frequency (MHz) | Peak Level (dB μ V/m) | PDCF(dB μ V/m) (See section 11) | Average Level (dB μ V/m) | Limit(dB μ V/m) (average) | Conclusion |
| 315.00 | 72.50 | -5.7 | 68.80 | 75.60 | PASSED |
| 630.00 | 50.90 | -5.7 | 45.20 | 55.60 | PASSED |

| Frequency [MHz] | Result [dB μ V] | | Limit [dB μ V] | | Dlimit [dB μ V] | |
|-----------------|---------------------|------|--------------------|------|---------------------|------|
| | Average | QP | Average | QP | Average | QP |
| 30.85 | --- | 26.9 | --- | 40.0 | --- | 13.1 |
| 56.21 | --- | 27.5 | --- | 40.0 | --- | 12.5 |
| 86.97 | --- | 29.6 | --- | 43.5 | --- | 13.9 |
| 120.25 | --- | 27.6 | --- | 43.5 | --- | 15.9 |
| 198.86 | --- | 31.5 | --- | 43.5 | --- | 12.0 |
| 210.38 | --- | 32.4 | --- | 43.5 | --- | 11.1 |

| Frequency [MHz] | Result [dB μ V] | | Limit [dB μ V] | | Dlimit [dB μ V] | |
|-----------------|---------------------|------|--------------------|------|---------------------|------|
| | Average | QP | Average | QP | Average | QP |
| 303.00 | --- | 32.0 | --- | 46.0 | --- | 14.0 |
| 434.00 | --- | 33.0 | --- | 46.0 | --- | 13.0 |
| 868.00 | --- | 34.5 | --- | 46.0 | --- | 11.5 |
| 945.04 | --- | 42.8 | --- | 55.6 | --- | 12.8 |

Note: 1. Emission level=Read level + Factor
 2. Factor=Antenna factor + Cable loss

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| | | | |
|------------------|------------|---------|----------------|
| Channel: | 315.00MHz | Result: | ■ - passed |
| Test point: | Horizontal | | □ - not passed |
| Frequency range: | 1GHz-5GHz | | |

| Frequency [MHz] | Result [dB μ V] | | Limit [dB μ V] | | Dlimit [dB μ V] | |
|--------------------|---------------------|------|--------------------|------|---------------------|------|
| | Average | Peak | Average | Peak | Average | Peak |
| 1839.7 | 48.3 | 54.0 | 54 | 74 | 5.7 | 20.0 |
| 2734.5 | 48.0 | 53.7 | 54 | 74 | 6.0 | 20.3 |
| 3481.2 | 43.0 | 48.7 | 54 | 74 | 11.0 | 25.3 |
| 4158.7 | 46.1 | 51.8 | 54 | 74 | 7.9 | 22.2 |
| 4274.5 | 45.0 | 50.7 | 54 | 74 | 9.0 | 23.3 |
| 4932.0 | 47.3 | 53.0 | 54 | 74 | 4.7 | 21.0 |

Note: 1. Emission level (Peak)=Read level + Factor
 2. Emission level (Average) =Duty cycle factor +Peak value
 3. Duty cycle factor value see section 11

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| | | | |
|------------------|---------------------------|---------|--|
| Channel: | 315.00MHz | Result: | <input checked="" type="checkbox"/> - passed |
| Test point: | Vertical | | <input type="checkbox"/> - not passed |
| Frequency range: | 30-230MHz and 230-1000MHz | | |

| | |
|---------------------|---|
| EUT | Wireless Controller |
| Firm Name | Choicelored Limited |
| Operating Condition | DC 12V |
| Test Condition | Ambient Temperature: 25°C Humidity: 56% |
| Test Date: | 14 June~16 July 2010 |
| Operator | Roy |
| MODEL NO | FRC-4 |

| Fundamental and Harmonics Average Result | | | | | |
|--|---------------------------|-------------------------------------|------------------------------|-------------------------------|------------|
| Frequency (MHz) | Peak Level (dB μ V/m) | PDCF(dB μ V/m) (See section 11) | Average Level (dB μ V/m) | Limit(dB μ V/m) (average) | Conclusion |
| 315.00 | 73.34 | -3.6 | 69.74 | 75.60 | PASSED |
| 630.00 | 52.34 | -3.6 | 48.74 | 55.60 | PASSED |

| Frequency [MHz] | Result [dB μ V] | | Limit [dB μ V] | | Dlimit [dB μ V] | |
|-----------------|---------------------|------|--------------------|------|---------------------|------|
| | Average | QP | Average | QP | Average | QP |
| 30.23 | --- | 26.6 | --- | 40.0 | --- | 13.4 |
| 56.22 | --- | 27.6 | --- | 40.0 | --- | 12.4 |
| 86.63 | --- | 29.7 | --- | 43.5 | --- | 13.8 |
| 120.37 | --- | 27.8 | --- | 43.5 | --- | 15.7 |
| 198.87 | --- | 31.6 | --- | 43.5 | --- | 11.9 |
| 210.36 | --- | 32.5 | --- | 43.5 | --- | 11.0 |

| Frequency [MHz] | Result [dB μ V] | | Limit [dB μ V] | | Dlimit [dB μ V] | |
|-----------------|---------------------|------|--------------------|------|---------------------|------|
| | Average | QP | Average | QP | Average | QP |
| 303.56 | --- | 32.6 | --- | 46.0 | --- | 13.4 |
| 434.70 | --- | 33.4 | --- | 46.0 | --- | 12.6 |
| 868.60 | --- | 34.5 | --- | 46.0 | --- | 11.5 |
| 945.04 | --- | 42.8 | --- | 55.6 | --- | 12.8 |

Note: 1. Emission level=Read level + Factor
 2. Factor=Antenna factor + Cable loss

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| | | | |
|------------------|-----------|---------|--|
| Channel: | 315.00MHz | Result: | <input checked="" type="checkbox"/> - passed |
| Test point: | Vertical | | <input type="checkbox"/> - not passed |
| Frequency range: | 1~5GHz | | |

| Frequency [MHz] | Result [dB μ V] | | Limit [dB μ V] | | Dlimit [dB μ V] | |
|--------------------|---------------------|------|--------------------|------|---------------------|------|
| | Average | Peak | Average | Peak | Average | Peak |
| 1829.5 | 47.6 | 53.3 | 54 | 74 | 6.4 | 20.7 |
| 2744.5 | 45.0 | 50.7 | 54 | 74 | 9.0 | 23.3 |
| 3471.2 | 44.0 | 49.7 | 54 | 74 | 10.0 | 24.3 |
| 4148.7 | 48.3 | 54.0 | 54 | 74 | 5.7 | 20.0 |
| 4284.5 | 44.3 | 50.0 | 54 | 74 | 9.7 | 24.0 |
| 4952.0 | 46.3 | 52.0 | 54 | 74 | 7.7 | 22.0 |

Note: 1. Emission level (Peak)=Read level + Factor
 2. Emission level (Average) =Duty cycle factor +Peak value
 3. Duty cycle factor value see section 11

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8. 20 dB Bandwidth test**8.1. Test Equipment**

| 20 dB Bandwidth test | | | | | |
|----------------------|-------------------|-----------------|-----------|------------|-----------|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | EMI Test Receiver | ROHDE & SCHWARZ | ESCI | 10868 | 200912 |
| 2 | Log per Antenna | ROHDE & SCHWARZ | HL223 | 100226 | 2009/12 |
| 3 | Signal analyzer | ROHDE & SCHWARZ | FSIQ26 | 100311 | 200912 |

8.2. Test Information

| | |
|-----------------|---|
| EUT: | Wireless Controller |
| M/N: | FRC-4 |
| Firm Name: | Choicelored Limited |
| Power supply: | DC 12V |
| Test Condition: | Ambient Temperature: 25°C Humidity: 56% |
| Test standard: | FCC PART 15C: 15.231 |
| Test mode: | Transmitting |
| Test Frequency: | 315.00MHz |
| Test Date: | 14 June~16 July 2010 |
| Test By: | Roy |

8.3. Test Results**PASSED.**

The testing data was attached in the next pages.

| Frequency (MHz) | 20 dB Bandwidth (kHz) | Limit(kHz): No wider than 0.25% of the center frequency | Conclusion |
|-----------------|-----------------------|---|------------|
| 315.00 | 410.0 | 315*0.25%=787kHz | PASSED |

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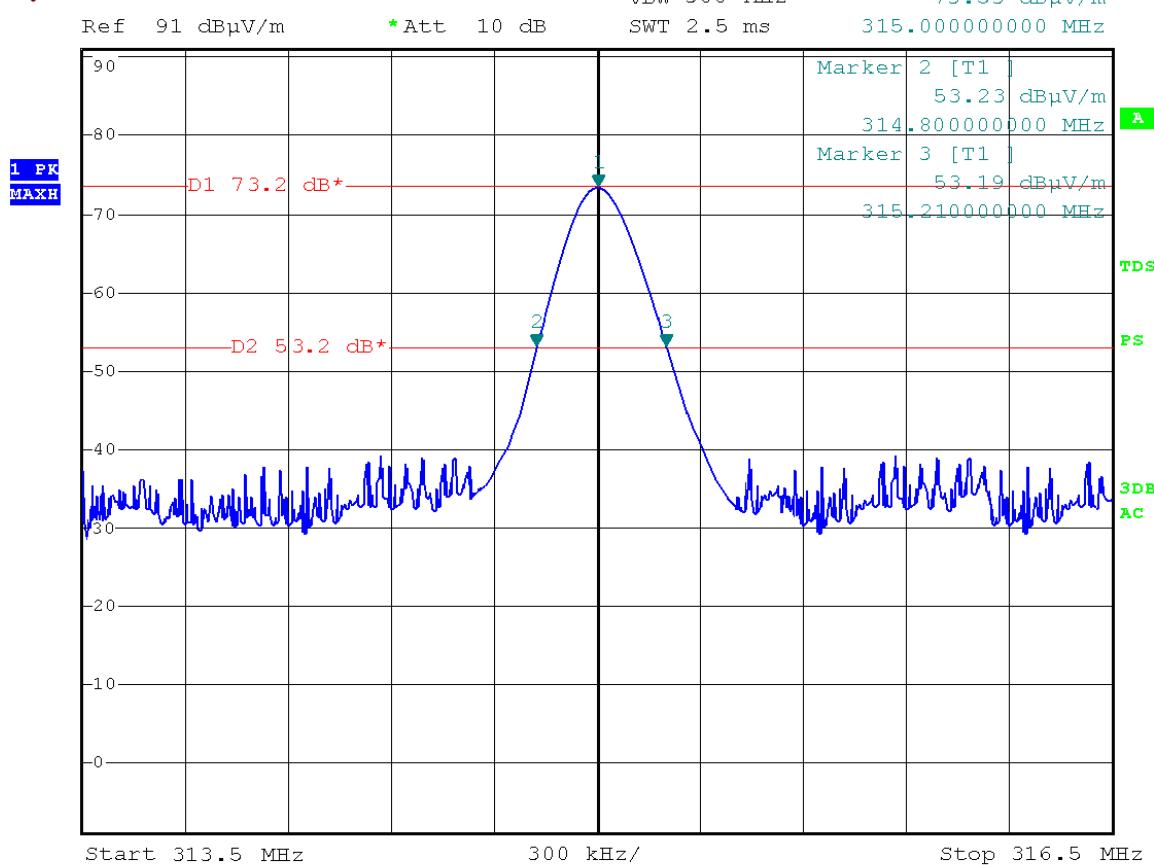
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9. Stop Transmitting Time Test

9.1. Test Equipment

| Band Edge Compliance test | | | | | |
|---------------------------|-------------------|-----------------|-----------|------------|-----------|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | EMI Test Receiver | ROHDE & SCHWARZ | ESCI | 10868 | 200912 |
| 2 | Log per Antenna | ROHDE & SCHWARZ | HL223 | 100226 | 2009/12 |
| 3 | Signal analyzer | ROHDE & SCHWARZ | FSIQ26 | 100311 | 200912 |

9.2. Test Information

| | |
|-----------------|---|
| EUT: | Wireless Controller |
| M/N: | FRC-4 |
| Firm Name: | Choicelored Limited |
| Power supply: | DC 12V |
| Test Condition: | Ambient Temperature: 25°C Humidity: 56% |
| Test standard: | FCC PART 15C: 15.231 |
| Test mode: | Transmitting |
| Test Frequency: | 315.00MHz |
| Test Date: | 14 June~16 July 2010 |
| Test By: | Roy |

9.3. Test Results

PASSED.

The testing data was attached in the next pages.

Set the spectrum to zero span, activated the EUT by manually, And then, we could see the transmitting wave in the spectrum, when the time marker went to “1R”, released the EUT, After 367.7ms, we could see the EUT stop transmitting.

| Frequency (MHz) | Stop Transmitting Time | Limit: not more than 5 seconds of being released | Conclusion |
|-----------------|------------------------|--|------------|
| 315.00 | 367.7ms | 5s | PASSED |

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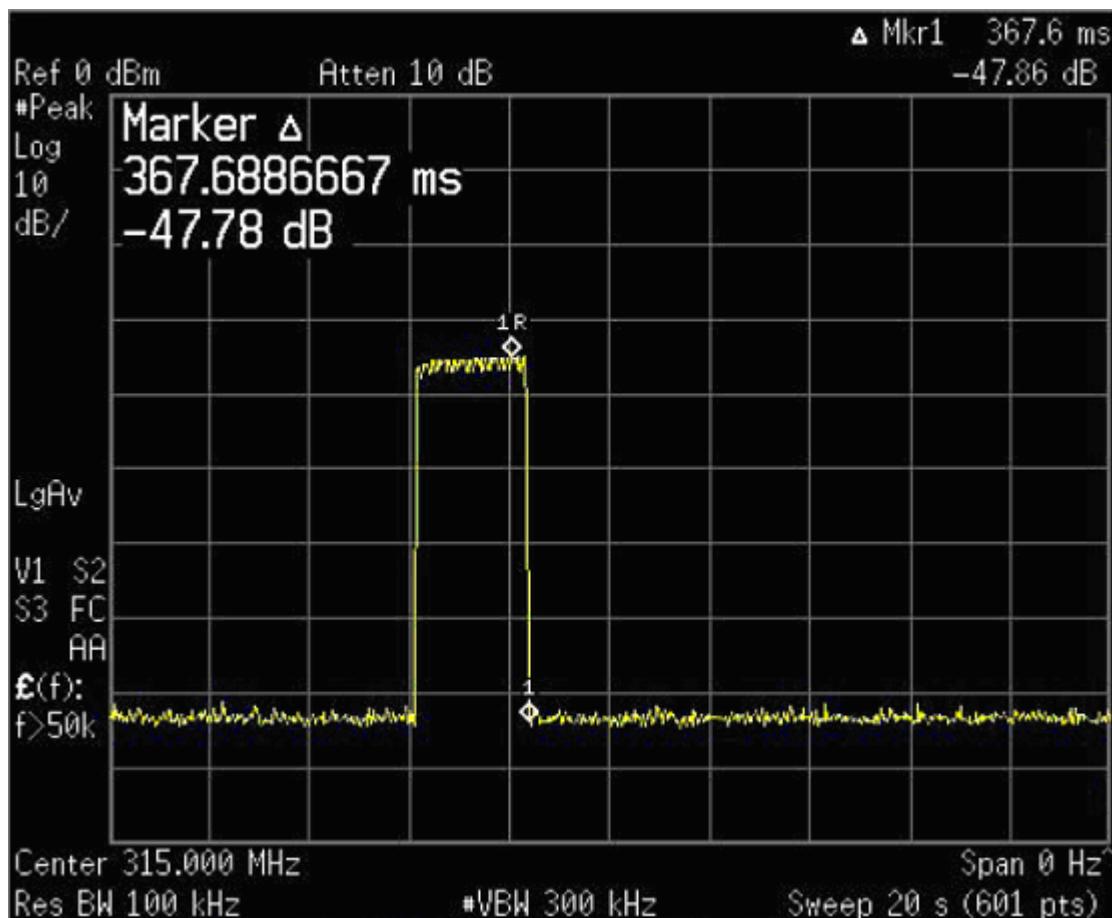
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10. Pulse Desensitization Correction Factor**10.1. Test Equipment**

| Band Edge Compliance test | | | | | |
|---------------------------|-------------------|-----------------|-----------|------------|-----------|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | EMI Test Receiver | ROHDE & SCHWARZ | ESCI | 10868 | 200912 |
| 2 | Log per Antenna | ROHDE & SCHWARZ | HL223 | 100226 | 2009/12 |
| 3 | Signal analyzer | ROHDE & SCHWARZ | FSIQ26 | 100311 | 200912 |
| 4 | Spectrum | Agilent | E4446A | 44300459 | 200912 |

10.2. Test Information

| | |
|-----------------|---|
| EUT: | Wireless Controller |
| M/N: | FRC-4 |
| Firm Name: | Choicelored Limited |
| Power supply: | DC 12V |
| Test Condition: | Ambient Temperature: 25°C Humidity: 56% |
| Test standard: | FCC PART 15C: 15.231 |
| Test mode: | Transmitting |
| Test Frequency: | 315.00MHz |
| Test Date: | 14 June~16 July 2010 |
| Test By: | Roy |

10.3. Test Results**PASSED.**

The testing data was attached in the next pages.

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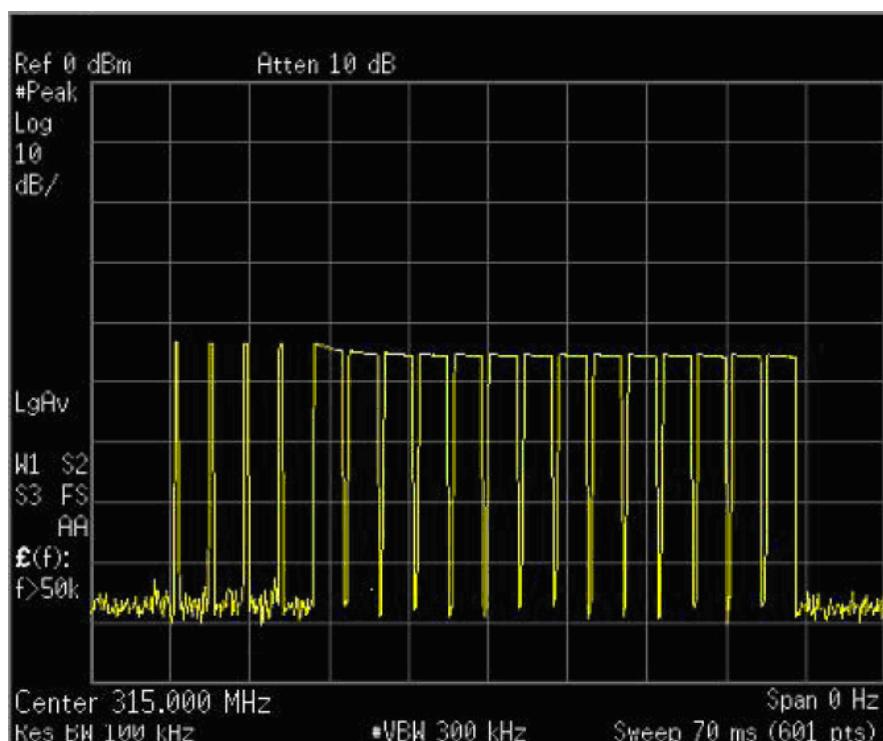
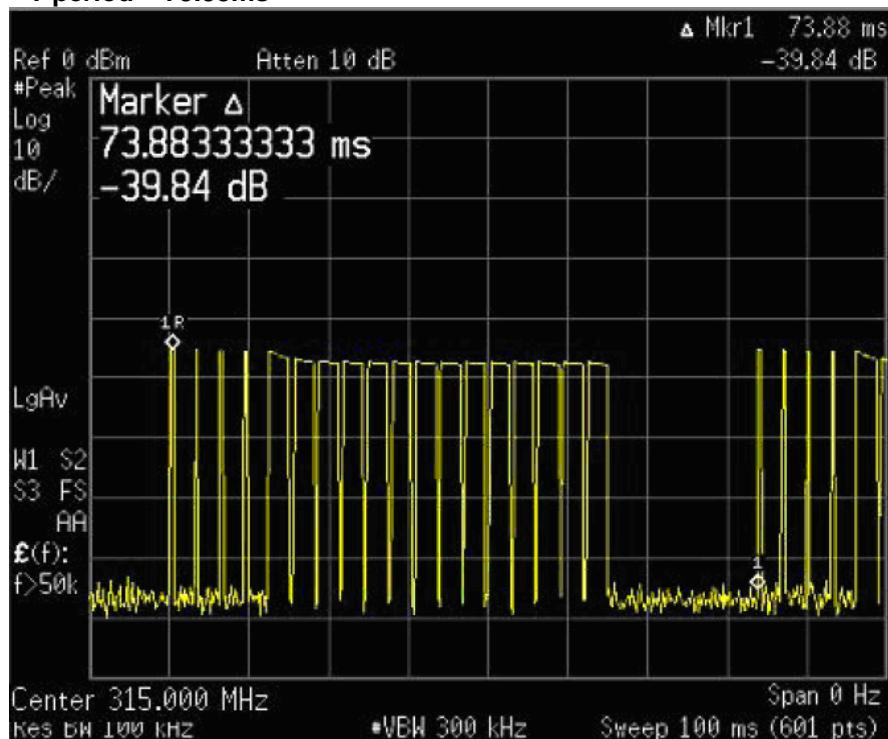
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T period = 73.88ms



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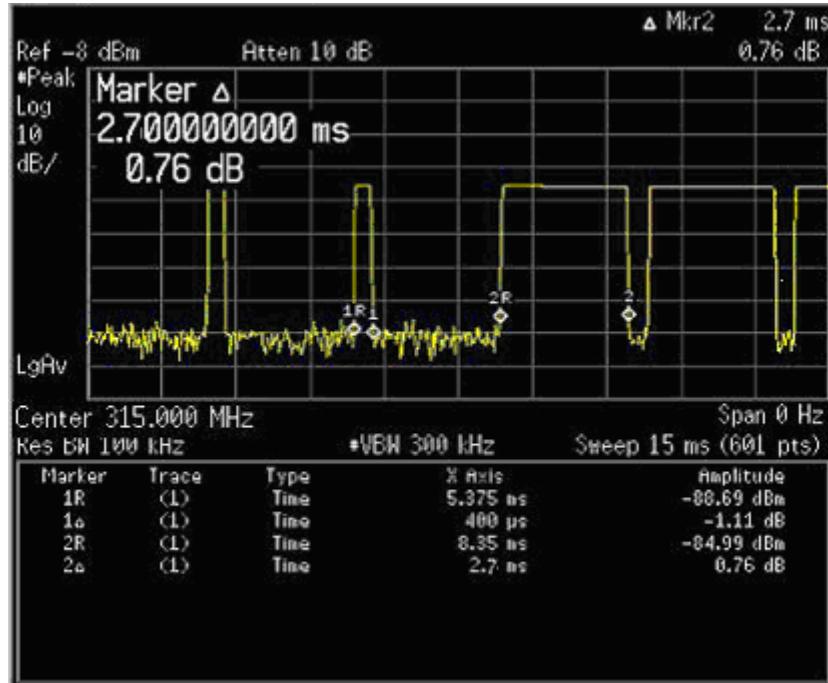
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Note: T ontime(assumed worse case)=14*2.7ms=38.5ms

Duty cycle= T ontime / T period=38.5ms / 73.88ms=0.521

PDCF=20*lg(Duty cycle)=20*lg(0.657)=-5.7

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11. Deviation to test specifications

[NONE]

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