



**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.



<b>TEST REPORT For FCC ID</b>	
<b>47 CFR PART 15 OCT, 2009</b>	
<b>Report Reference No.</b> .....	CGZ3100607-02061-O
<b>Date of issue</b> .....	17 July 2010
<b>Testing Laboratory Name</b> .....	<b>CETRE OF TESTING SERVICE CO., LTD</b>
<b>Address</b> .....	Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China.
<b>Testing location/ procedure</b> .....	Full application of Harmonised standards <input checked="" type="checkbox"/> Partial application of Harmonised standards <input type="checkbox"/> Other standard testing method <input type="checkbox"/>
<b>Applicant's name</b> .....	CHOICELORED LIMITED
<b>Address</b> .....	15/F.Commercial Building 478 Nathan Road Kowloon, Hong Kong
<b>Test specification</b> .....	
<b>Standard</b> .....	<b>47 CFR PART 15 OCT, 2009</b>
<b>Test Report Form No.</b> .....	CTSEMC-1.0
<b>TRF Originator</b> .....	CENTRE OF TESTING SERVICE CO., LTD
<b>Master TRF</b> .....	Dated 2009-01
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<b>Test item description</b> .....	Wireless Controller
<b>Trade Mark</b> .....	/
<b>Manufacturer</b> .....	Heshan Lide Electronic Enterprise Co.,Ltd
<b>Model/Type reference</b> .....	FRC-4
<b>Ratings</b> .....	DC 12V
<b>Operating Frequency</b> .....	315.00MHz/ MSK
<b>Result</b> .....	<b>Positive</b>

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

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

Type / Model.....	Wireless Controller
EUT.....	FRC-4
<b>Applicant.....</b>	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
<b>Manufacturer.....</b>	Heshan Lide Electronic Enterprise Co.,Ltd
Address.....	Gunghe Town 529728,Heshan City,Guangdon
Telephone.....	/
Fax.....	/
Contact.....	/
<b>Test report holder.....</b>	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

**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

- - fulfils 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)

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### 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	$\pm 1.22\text{dB}$	(1)
Power disturbance	30MHz~300MHz	$\pm 1.38\text{dB}$	(1)
Radiation emission (3m)	30MHz~300MHz	$\pm 3.14\text{dB}$	(1)
	300MHz~1000MHz	$\pm 3.18\text{dB}$	(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

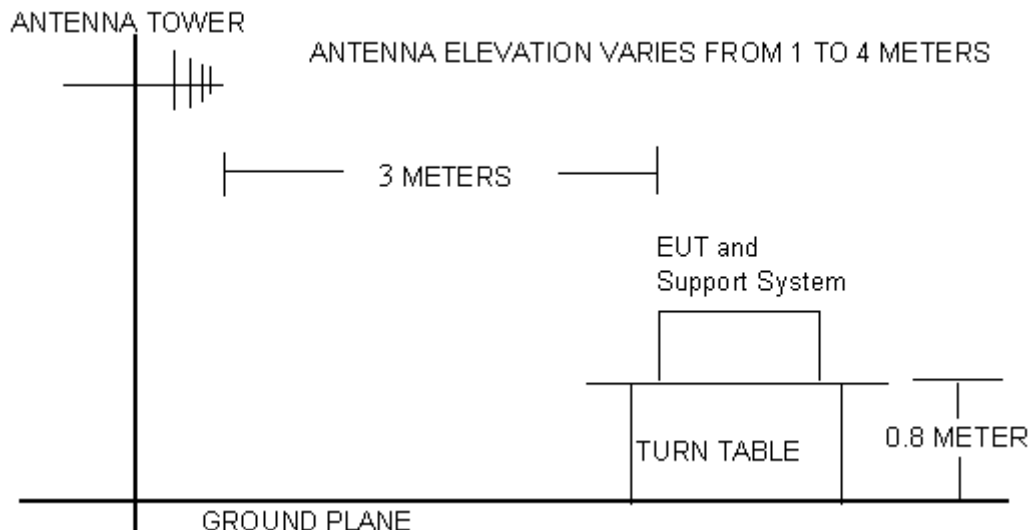
### 7.2. Block Diagram of Test Setup

#### 7.2.1 Block Diagram of connection between EUT and simulators



(EUT: Wireless Controller)

### 7.2.2 Anechoic Chamber Setup Diagram



### 7.3. Radiated Emission Limit Standard: FCC 15.231

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
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 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

- Remark:
- (1) Emission level  $\text{dB}\mu\text{V} = 20 \log$  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 an 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	<b>Roy</b>
MODEL NO	FRC-4

Fundamental and Harmonics Average Result					
Frequency (MHz)	Peak Level (dBμV/m)	PDCF(dBμV/m) (See section 11)	Average Level (dBμV/m)	Limit(dBμV/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 [dBμV]		Limit [dBμV]		Dlimit [dBμV]	
	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 [dBμV]		Limit [dBμV]		Dlimit [dBμV]	
	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:	315.00MMHz	Result:	<input checked="" type="checkbox"/> - passed
Test point:	Horizontal		<input type="checkbox"/> - not passed
Frequency range:	1GHz-5GHz		

Frequency [MHz]	Result [dBμV]		Limit [dBμV]		Dlimit [dBμV]	
	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	<b>Roy</b>
MODEL NO	FRC-4

Fundamental and Harmonics Average Result					
Frequency (MHz)	Peak Level (dB $\mu$ V/m)	PDCF(dB $\mu$ V/m) (See section 11)	Average Level (dB $\mu$ V/m)	Limit(dB $\mu$ 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 $\mu$ V]		Limit [dB $\mu$ V]		Dlimit [dB $\mu$ 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 $\mu$ V]		Limit [dB $\mu$ V]		Dlimit [dB $\mu$ 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 [dBμV]		Limit [dBμV]		Dlimit [dBμV]	
	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

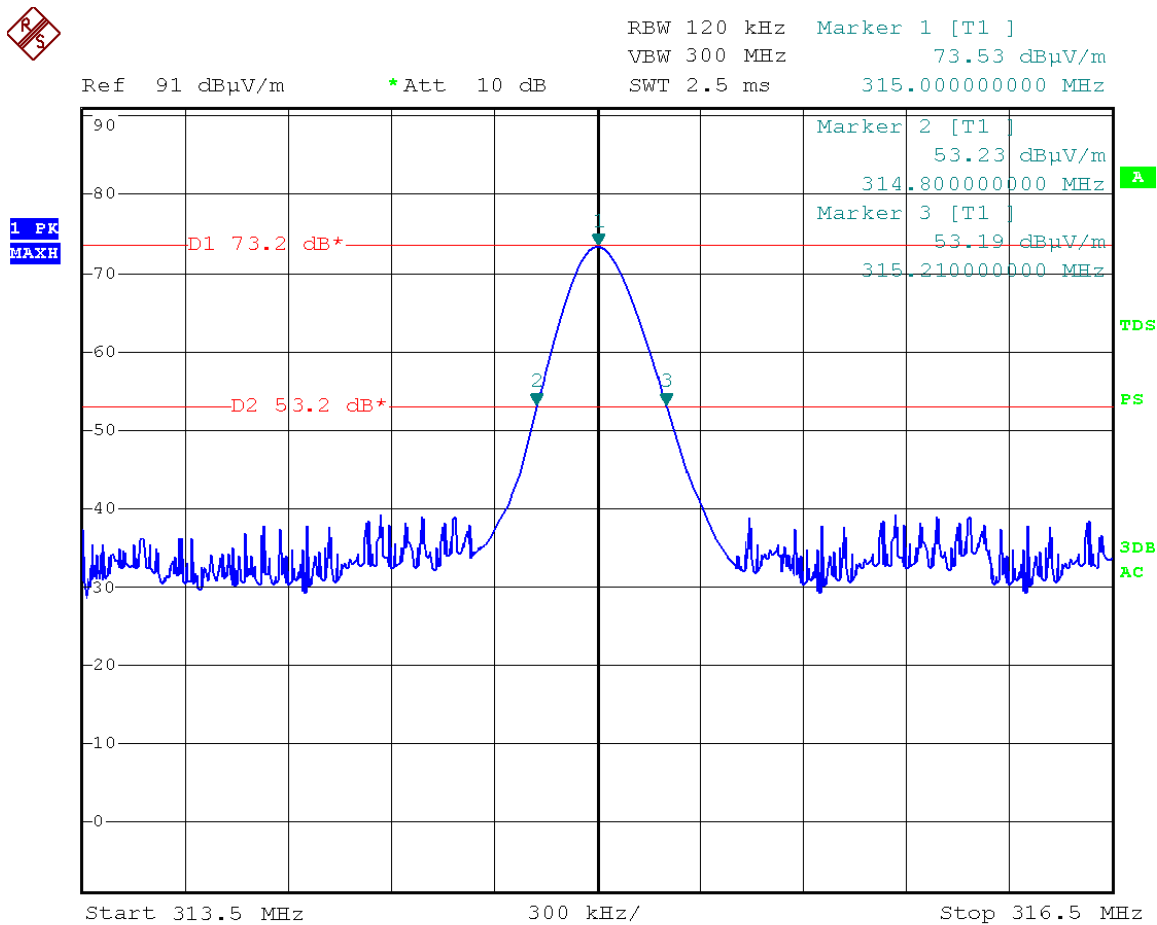
EUT:	Wireless Controller
M/N:	FRC-4
Firm Name:	Choicelored Limited
Power supply:	DC 12V
Test Condition:	Ambient Temperature: 25°C Humidity: 56%
Test standard:	FCC PART 15C: 15.231
Test mode:	Transmitting
Test Frequency:	315.00MHz
Test Date:	14 June~16 July 2010
Test By:	Roy

### 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	$315 \times 0.25\% = 787\text{kHz}$	PASSED



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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

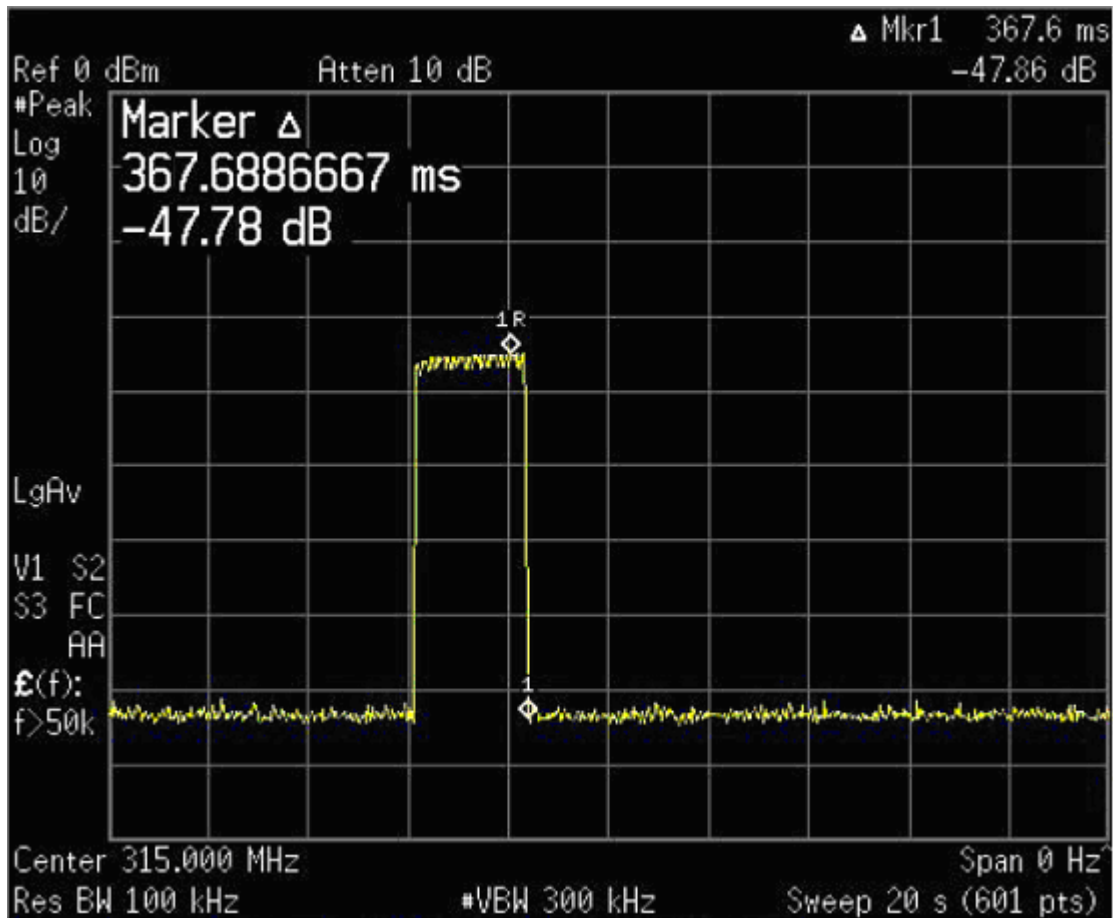
### 9.3. Test Results

#### 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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## 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

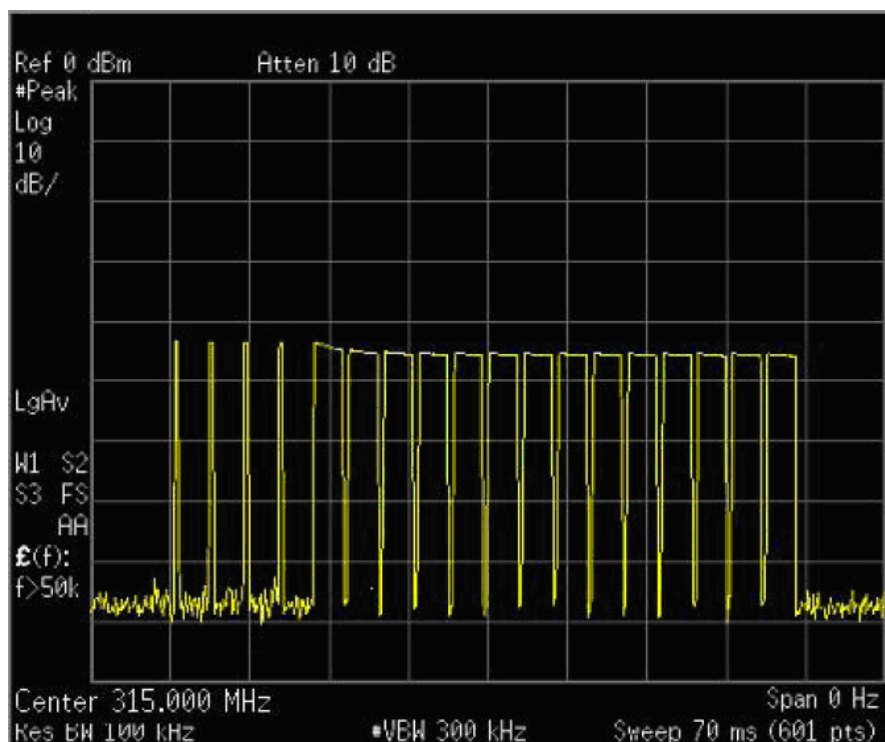
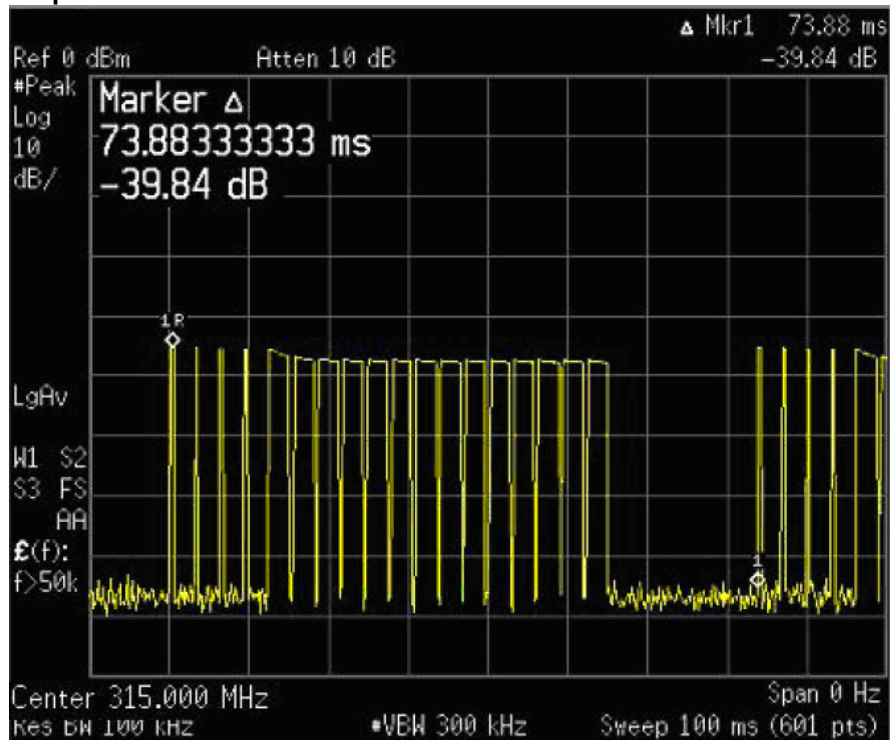
### 10.3. Test Results

**PASSED.**

The testing data was attached in the next pages.



T period = 73.88ms



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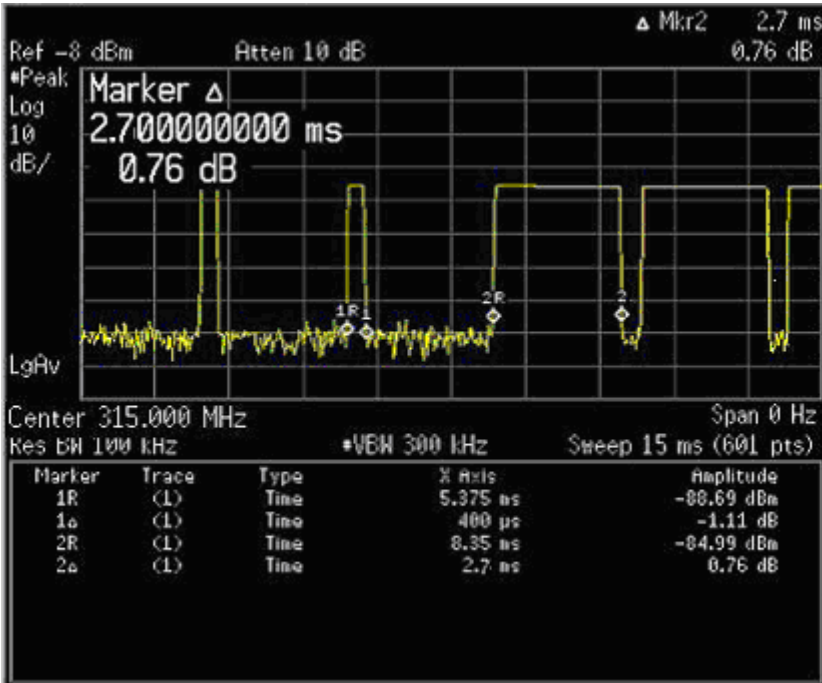
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Note: T ontime(assumed worse case)=14\*2.7ms=38.5ms  
Duty cycle= T ontime / T period=38.5ms / 73.88ms=0.521  
PDCF=20\*Ig(Duty cycle)=20\*Ig(0.657)=-5.7



## 11. Deviation to test specifications

[ NONE ]

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