



# FCC PART 90

## TEST REPORT

For

**Baicells Technologies Co., Ltd.**

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Beijing, China

**FCC ID: 2AG32CN6671**

<b>Report Type:</b> Original Report	<b>Product Type:</b> LTE Indoor CPE
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<b>Report Number:</b> <u>RSZ160525009-00C</u>	
<b>Report Date:</b> <u>2016-06-16</u>	
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**Note:** This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

The *Baicells Technologies Co., Ltd.*'s product, model number: *CN6671*(FCC ID: *2AG32CN6671*) or the "EUT" in this report was a *LTE Indoor CPE*, which was measured approximately: 188 mm (L) x 168 mm (W) x 75 mm (H), rated with input voltage: DC 12 V from adapter.

#### Adapter Information:

Model: RD1201000-C55-HMG

Input: 100-240V, 50/60Hz, 0.6A Max

Output: 12V-1A

*\* All measurement and test data in this report was gathered from production sample serial number: 1203000001156TP0069 (Assigned by Applicant). The EUT supplied by the applicant was received on 2016-05-25.*

### Objective

This test report is prepared on behalf of *Baicells Technologies Co., Ltd.* in accordance with Part 2, and Part 90 of the Federal Communication Commissions rules.

### Related Submittal(s)/Grant(s)

FCC Part 15B JBP and FCC Part 15.247 DTS submissions with FCC ID: 2AG32CN6671.

### Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of federal Regulations Title 47 Part 2, Sub-part Z as well as the following individual parts:

Part 90 – Wireless Broadband Services in the 3650-3700 MHz Band

Applicable Standards: TIA 603-D and ANSI 63.4-2014.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement uncertainty with radiated emission is 5.91 dB for 30MHz-1GHz and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

### Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on October 31, 2013. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in a test mode which has been done in the factory.

### Equipment Modifications

No modification was made to the EUT tested.

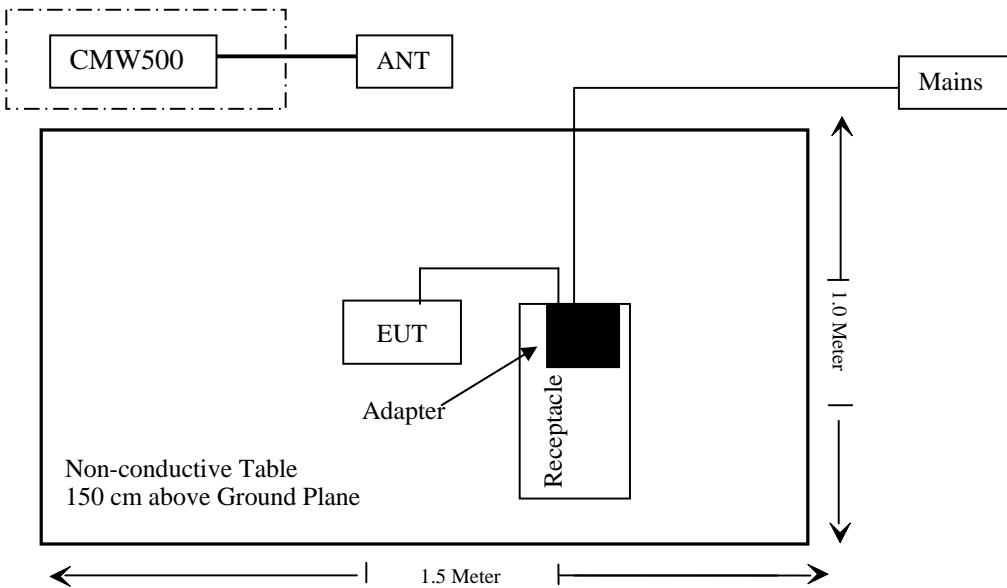
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	114772

### External I/O Cable

Cable Description	Length (m)	From Port	To
Un-shielding Detachable DC cable	1.5	EUT	Adapter

### Block Diagram of Test Setup



## SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§1.1307 (b)(1), §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§2.1046; §90.1321(c)	RF Output Power	Compliance*
§90.1321(c);	Peak Power Spectral Density	Compliance*
§2.1049; §90.209	Occupied Bandwidth	Compliance*
§2.1051; §90.1323(a)	Spurious Emission at Antenna Terminal	Compliance*
§2.1053	Spurious Radiated Emissions	Compliance
§2.1055; §90.213	Frequency Stability	Compliance*

**Compliance\*:** CN6671 and EG7035 have the same LTE module. This module has the same operating frequency, single power supply and control software. In other words, their LTE launch parameters are the same. So all the conducted emission data was referred to EG7035.

The EG7035 has been certified on 2016-06-28 and the related information about EG7035 is listed below:

Product Model: EG7035

FCC ID: 2AG32EG7035

Frequency: 3650 MHz - 3700 MHz

## **FCC§1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

### **Applicable Standard**

According to subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
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

\* = Plane-wave equivalent power density

### **MPE Calculated :**

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

**MPE Results**

Tune-Up Power Including Tolerance:

Frequency (MHz)	Antenna Gain		Max Tune-up Power		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
	(dBi)	(numeric)	(dBm)	(mW)			
3650-3700	5	3.16	17.5	56.23	20	0.035	1.0
2412-2462	2	1.58	16.0	39.81	20	0.008	1.0

$$\sum_i \frac{S_i}{S_{Limit,i}} = 0.035 + 0.008 = 0.043 < 1.0$$

**Radiation Exposure Statement:**

To comply with FCC RF exposure requirements, a minimum separation distance of 20cm is required between the antenna and all public persons.

## FCC §2.1046, §90.1321(a) - RF OUTPUT POWER

### Applicable Standard

FCC §2.1046 and §90.1321

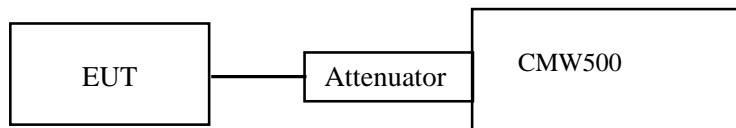
### Limit

According to FCC §90.1321:

(c) Mobile and portable stations are limited to 1 watt/25 MHz EIRP. In any event, the peak EIRP density shall not exceed 40 milliwatts in any one-megahertz slice of spectrum.

### Test Procedure

The EUT was connected to a CMW500 through an attenuator, the EUT power was adjusted to produce maximum output power as specified in the owner's manual, measurements were performed at the low, mid and high channels for each of the EUT's bandwidths and modulations.



### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	114772	2015-11-15	2016-11-14
Ducommun technologies	RF Cable	RG-214	3	2015-06-15	2016-06-15
WEINSCHEL	10dB Attenuator	5321	AU0709	2015-06-18	2016-06-18

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

### Test Data

#### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53 %
ATM Pressure:	101.0 kPa

*Test Mode: Transmitting*

**Test Result:** Compliance. Please refer to following table.

LTE Band: 3650-3700MHz-full RB

Modulation	Frequency (MHz)	(See Note 2) Output Power (dBm)	Antenna gain (dBi)	EIRP (dBm)	Limit (dBm)
QPSK(5MHz)	3652.5	16.88	5.0	21.88	23.01
	3675	16.78	5.0	21.78	
	3697.5	16.50	5.0	21.50	
16QAM(5MHz)	3652.5	17.02	5.0	22.02	23.01
	3675	16.92	5.0	21.92	
	3697.5	16.54	5.0	21.54	
QPSK(10MHz)	3655	16.85	5.0	21.85	26.02
	3675	16.79	5.0	21.79	
	3695	16.52	5.0	21.52	
16QAM(10MHz)	3655	16.92	5.0	21.92	26.02
	3675	16.82	5.0	21.82	
	3695	16.61	5.0	21.61	
QPSK(15MHz)	3657.5	16.67	5.0	21.67	27.78
	3675	16.53	5.0	21.53	
	3692.5	16.35	5.0	21.35	
16QAM(15MHz)	3657.5	16.73	5.0	21.73	27.78
	3675	16.56	5.0	21.56	
	3692.5	16.36	5.0	21.36	
QPSK(20MHz)	3660	16.19	5.0	21.19	29.03
	3675	16.09	5.0	21.09	
	3690	15.95	5.0	20.95	
16QAM(20MHz)	3660	16.21	5.0	21.21	29.03
	3675	16.11	5.0	21.11	
	3690	15.93	5.0	20.93	

**Note:**

1. limit =  $30\text{dBm} + 10\text{Log}(\text{Bandwidth}/25)$   
Eg: For 10 MHz Bandwidth, the limit = $30\text{dBm} + 10\text{Log} (10/25) = 26.02 \text{ dBm}$
2. all the output power was derived from EG7035(FCC ID:2AG32EG7035)

## **FCC §90.1321 (a) - PEAK POWER SPECTRAL DENSITY**

### **Applicable Standard**

FCC §90.1321 (a);

### **Limit**

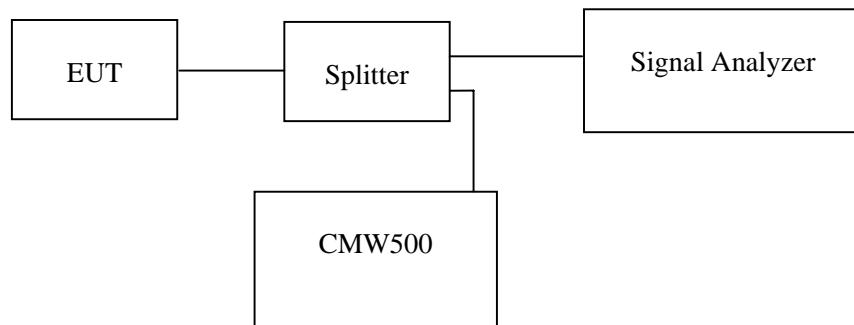
According to FCC §90.1321:

(c) Mobile and portable stations are limited to 1 watt/25 MHz EIRP. In any event, the peak EIRP density shall not exceed 40 milliwatts in any one-megahertz slice of spectrum.

### **Test Procedure**

The EUT was connected to a CMW500 & signal analyzer through a splitter, the EUT power was adjusted to produce maximum output power as specified in the owner's manual, measurements were performed at the low, mid and high channels for each of the EUT's bandwidths and modulations.

The resolution bandwidth of the spectrum analyzer was set at 1MHz.



### **Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-11-12	2016-11-12
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	114772	2015-11-15	2016-11-14
Ducommun technologies	RF Cable	RG-214	3	2015-06-15	2016-06-15
WEINSCHEL	3dB Attenuator	5321	AU0709	2015-06-18	2016-06-18

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

## Test Data

### Environmental Conditions

Temperature:	27°C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

*Test Mode: Transmitting*

**Result:** Compliance.

LTE Band: 3650-3700MHz

Modulation	Frequency (MHz)	(See Note 2) Power Density (dBm/MHz)	Antenna Gain (dBi)	EIRP Power Density (dBm/MHz)	Limit (dBm/MHz)
QPSK(5MHz)	3652.5	7.98	5.0	12.98	16.00
	3675	9.36	5.0	14.36	
	3697.5	7.78	5.0	12.78	
16QAM(5MHz)	3652.5	8.08	5.0	13.08	
	3675	9.58	5.0	14.58	
	3697.5	8.53	5.0	13.53	
QPSK(10MHz)	3655	5.80	5.0	10.80	
	3675	6.54	5.0	11.54	
	3695	5.56	5.0	10.56	
16QAM(10MHz)	3655	5.81	5.0	10.81	
	3675	6.29	5.0	11.29	
	3695	5.87	5.0	10.87	
QPSK(15MHz)	3657.5	3.64	5.0	8.64	
	3675	2.88	5.0	7.88	
	3692.5	3.75	5.0	8.75	
16QAM(15MHz)	3657.5	3.81	5.0	8.81	
	3675	2.79	5.0	7.79	
	3692.5	3.73	5.0	8.73	
QPSK(20MHz)	3660	2.06	5.0	7.06	
	3675	2.72	5.0	7.72	
	3690	1.94	5.0	6.94	
16QAM(20MHz)	3660	2.26	5.0	7.26	
	3675	2.85	5.0	7.85	
	3690	1.76	5.0	6.76	

**Note:**

1. Please refer to EG7035 (FCC ID: 2AG32EG7035) for the plots.
2. all the Power Density was derived from EG7035(FCC ID:2AG32EG7035)

## FCC §2.1053 - RADIATED SPURIOUS EMISSIONS

### Applicable Standard

FCC §2.1053

### Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to teeth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious attenuation limit in dB =  $43 + 10 \log_{10}$  (power out in Watts)

### Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052304	2015-12-01	2016-11-30
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2014-11-28	2017-11-27
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-11-12	2016-11-12
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2015-09-25	2016-09-25
HP	Amplifier	8447E	1937A01046	2015-09-30	2016-09-30
Mini	Amplifier	ZVA-183-S+	5969001149	2016-04-03	2017-04-03
HP	Signal Generator	8657A	3217A04699	2015-12-19	2016-12-18
A.H. System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
HP	Synthesized Sweeper	8341B	2624A00116	2016-05-09	2017-05-09
R & S	Wideband Radio Communication Tester	CMW500	114772	2015-11-15	2016-11-14
COM POWER	Dipole Antenna	AD-100	041000	NCR	NCR
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	104PEA	218124002	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	RG-214	1	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	RG-214	2	2015-06-15	2016-06-15

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

## Test Data

### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53 %
ATM Pressure:	101.0 kPa

The testing was performed by Rocky Kang on 2016-06-03

Test Mode: Transmitting

### 30MHz - 40GHz (The worst case is QPSK):

Frequency (MHz)	Receiver Reading (dB $\mu$ V)	Turn Table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 90	
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
QPSK(5MHz), Middle channel (3675MHz)										
159.5	39.29	345	1.8	H	-57.7	0.27	0	-57.97	-13	44.97
159.5	38.58	235	2.0	V	-58.4	0.27	0	-58.67	-13	45.67
7350.00	44.28	229	1.3	H	-47.0	2.70	10.70	-39.00	-13	26.00
7350.00	42.26	94	1.9	V	-49.5	2.70	10.70	-41.50	-13	28.50
QPSK(10MHz), Middle channel (3675MHz)										
159.5	38.65	187	2.0	H	-58.3	0.27	0	-58.57	-13	45.57
159.5	37.89	347	1.5	V	-59.1	0.27	0	-59.37	-13	46.37
7350.00	40.33	36	1.1	H	-51.0	2.70	10.70	-43.00	-13	30.00
7350.00	41.64	206	2.0	V	-50.2	2.70	10.70	-42.20	-13	29.20
QPSK(15MHz), Middle channel (3675MHz)										
159.5	39.46	134	1.6	H	-57.5	0.27	0	-57.77	-13	44.77
159.5	38.77	205	2.2	V	-58.2	0.27	0	-58.47	-13	45.47
7350.00	41.17	336	1.6	H	-50.1	2.70	10.70	-42.10	-13	29.10
7350.00	42.26	253	2.0	V	-49.5	2.70	10.70	-41.50	-13	28.50
QPSK(20MHz), Middle channel (3675MHz)										
159.5	41.13	271	1.9	H	-55.9	0.27	0	-56.17	-13	43.17
159.5	40.64	317	1.5	V	-56.4	0.27	0	-56.67	-13	43.67
7350.00	41.13	95	1.2	H	-50.2	2.70	10.70	-42.20	-13	29.20
7350.00	42.58	98	1.1	V	-49.2	2.70	10.70	-41.20	-13	28.20

Note:

Absolute Level = SG Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

\*\*\*\*\* END OF REPORT \*\*\*\*\*