

## FCC PART 90

## TEST REPORT

For

### Baicells Technologies Co., Ltd.

3F, Hui Yuan Development Building, No.1 Shangdi Information Industry Base, Haidian Dist.,  
Beijing, China

**FCC ID: 2AG32CN6671**

|  |  |
|--|--|
| <b>Report Type:</b><br>Original Report   | <b>Product Type:</b><br>LTE Indoor CPE |
| <b>Test Engineer:</b> Rocky Kang <i>Rocky Kang</i>   |  |
| <b>Report Number:</b> RSZ160525009-00C   |  |
| <b>Report Date:</b> 2016-06-16   |  |
| <b>Reviewed By:</b> RF Engineer <i>Bell Hu</i>   |  |
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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

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### 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.

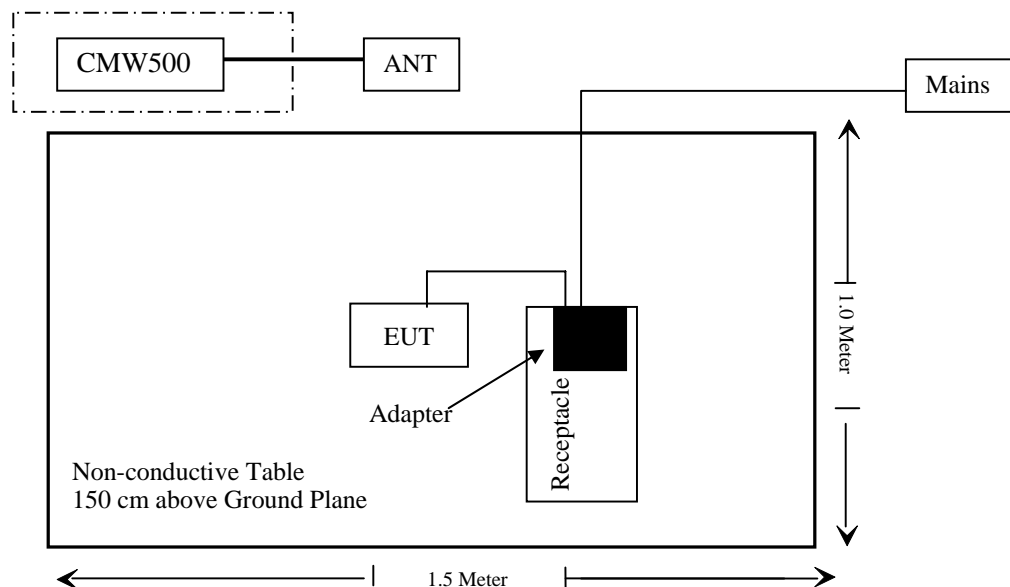
### Support Equipment List and Details

| 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)                            | 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<br>(MHz) | Antenna Gain |           | Max Tune-up Power |       | Evaluation<br>Distance<br>(cm) | Power<br>Density<br>(mW/cm <sup>2</sup> ) | MPE Limit<br>(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

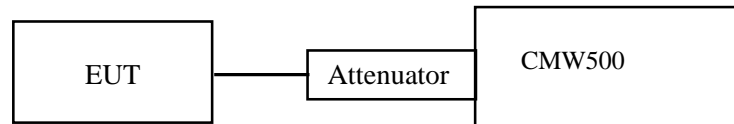
### Limit

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 a 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)<br>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      |             |
|  | 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      |             |
|  | 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      |             |
|  | 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      |             |
|  | 3675            | 16.11                              | 5.0                | 21.11      |             |
|  | 3690            | 15.93                              | 5.0                | 20.93      |             |
| <b>Note:</b><br>1. limit = 30dBm + 10Log (Bandwidth/25)<br>Eg: For 10 MHz Bandwidth, the limit =30dBm + 10Log (10/25) = 26.02 dBm<br>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**

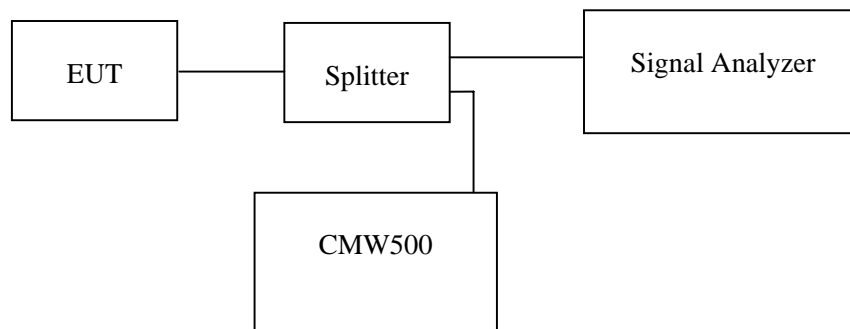
According to FCC §90.1321:

(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           |
| WEINSCHTEL            | 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**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 27°C      |
| <b>Relative Humidity:</b> | 50 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

*Test Mode: Transmitting***Result:** Compliance.

LTE Band: 3650-3700MHz

| Modulation   | Frequency (MHz) | (See Note 2)<br>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                          |                 |
| <b>Note:</b><br>1. Please refer to EG7035 (FCC ID: 2AG32EG7035) for the plots.<br>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<br>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**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25 °C     |
| <b>Relative Humidity:</b> | 53 %      |
| <b>ATM Pressure:</b>      | 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<br>(MHz)                    | Receiver<br>Reading<br>(dBμV) | Turn<br>Table<br>Angle<br>Degree | Rx Antenna    |                | Substituted          |                       |                         | Absolute<br>Level<br>(dBm) | FCC Part 90    |                |
|---------------------------------------|-------------------------------|----------------------------------|---------------|----------------|----------------------|-----------------------|-------------------------|----------------------------|----------------|----------------|
|                                       |                               |                                  | Height<br>(m) | Polar<br>(H/V) | SG<br>Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            | Limit<br>(dBm) | Margin<br>(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 \*\*\*\*\*