# FCC PART 22H, PART 24E

# TEST REPORT

For

## Latitude Limited

7/F, Southeast Industrial Building, 611-619 Castle Peak Road, N.T., Hong Kong

**FCC ID: WM4728**

| **Report Type:** | **Product Type:** |
|---|---|
| Original Report | GPS Pet Tracking Device |

| | |
|---|---|
| **Test Engineer:** | Gardon Zhang |
| **Report Number:** | RSZ130321003-00 |
| **Report Date:** | 2013-06-05 |
| **Reviewed By:** | Alvin Huang<br>RF Leader |
| **Prepared By:** | Bay Area Compliance Laboratories Corp. (Shenzhen)<br>6/F, the 3rd Phase of WanLi Industrial Building<br>ShiHua Road, FuTian Free Trade Zone<br>Shenzhen, Guangdong, China<br>Tel: +86-755-33320018<br>Fax: +86-755-33320008<br>www.baclcorp.com.cn |

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# GENERAL INFORMATION

## Product Description for Equipment under Test (EUT)

The *Latitude Limited*'s product, model number: *IC00220 (FCC ID: WM4728)* or the "EUT" in this report was a *GPS Pet Tracking Device,* which was measured approximately: 5.2 cm (L) x 4.1 cm (W) x 1.5 cm (H), rated input voltage: DC 3.7 V Li-ion battery.

**All measurement and test data in this report was gathered from production sample serial number: 1303070 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2013-03-21.*

## Objective

This test report is prepared on behalf of *Latitude Limited* in accordance with Part 2-Subpart J, Part 22-Subpart H and Part 24-Subpart E of the Federal Communication Commissions rules.

The objective is to determine the compliance of the EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, spurious emission at antenna terminal, spurious radiated emission, frequency stability and band edge.

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

No related submittal.

## Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2-Subpart J as well as the following parts:

Part 22 Subpart H - Public Mobile Services
Part 24 Subpart E - Personal Communication Services

Applicable Standards: TIA/EIA 603-D, ANSI C63.4-2009.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

## 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 December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

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

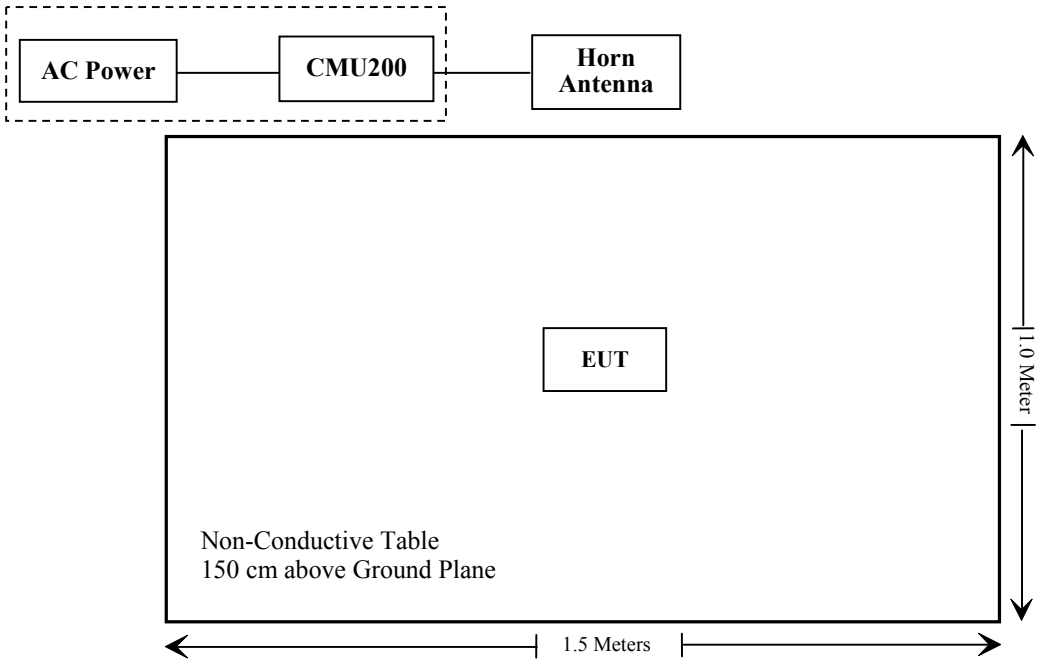
The EUT was configured for testing according to TIA/EIA-603-D.

The final qualification test was performed with the EUT operating at normal mode.

## Equipment Modifications

No modification was made to the EUT.

## Block Diagram of Test Setup



# SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test | Result |
|---|---|---|
| §1.1307 (b)(1), §2.1091 | Maximum Permissible exposure (MPE) | Compliance |
| §2.1046;<br>§22.913 (a); §24.232 (c) | RF Output Power | Compliance |
| §2.1047 | Modulation Characteristics | Not Applicable |
| §2.1049; §22.905<br>§22.917; §24.238 | Occupied Bandwidth | Compliance* |
| §2.1051,<br>§22.917 (a); §24.238 (a) | Spurious Emissions at Antenna Terminal | Compliance* |
| §2.1053<br>§22.917 (a); §24.238 (a) | Field Strength of Spurious Radiation | Compliance |
| §22.917 (a); §24.238 (a) | Out of band emission, Band Edge | Compliance* |
| §2.1055<br>§22.355; §24.235 | Frequency stability vs. temperature<br>Frequency stability vs. voltage | Compliance* |

Note: Compliance*: The RF module was test in CETECOM GmbH with FCC ID: XPYLEONG100 granted on 2009-10-13.

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

## Applicable Standard

According to FCC 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 General Population/Uncontrolled Exposure

| Limits for General Population/Uncontrolled Exposure | | | | |
|---|---|---|---|---|
| **Frequency Range (MHz)** | **Electric Field Strength (V/m)** | **Magnetic Field Strength (A/m)** | **Power Density ($mW/cm^2$)** | **Averaging Time (Minutes)** |
| 0.3-1.34 | 614 | 1.63 | *(100) | 30 |
| 1.34-30 | 824/f | 2.19/f | *($180/f^2$) | 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

## Result

### Calculated Formulary

Predication of MPE limit at a given distance

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

S = power density (in appropriate units, e.g. mW/cm2)
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)

| **Frequency (MHz)** | **Antenna Gain** | | **Conducted Power** | | **Evaluation Distance (cm)** | **Power Density ($mW/cm^2$)** | **MPE Limit ($mW/cm^2$)** |
|---|---|---|---|---|---|---|---|
| | **(dBi)** | **(numeric)** | **(dBm)** | **(mW)** | | | |
| 824.2 | 0 | 1 | 32.6 | 1819.7 | 20 | 0.362 | 0.549 |
| 836.6 | 0 | 1 | 32.8 | 1905.46 | 20 | 0.379 | 0.558 |
| 848.8 | 0 | 1 | 32.6 | 1819.7 | 20 | 0.362 | 0.566 |
| 1850.2 | 0 | 1 | 30.6 | 1148.15 | 20 | 0.229 | 1 |
| 1880 | 0 | 1 | 30.6 | 1148.15 | 20 | 0.229 | 1 |
| 1909.8 | 0 | 1 | 30.2 | 1047.13 | 20 | 0.208 | 1 |

Note: To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20 cm from nearby persons.

**Result: Compliance**

# FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

# FCC § 2.1046, § 22.913 (a) & § 24.232 (c) - RF OUTPUT POWER

## Applicable Standard

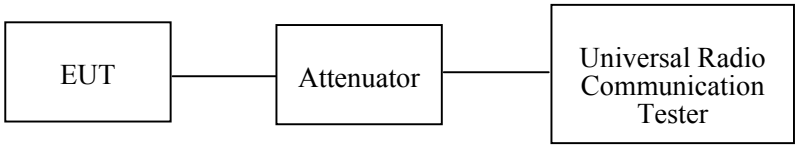
According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (C), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications..

## Test Procedure

*Conducted method:*

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.




*Radiated method:*

TIA 603-D section 2.2.17

## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Sunol Sciences | Horn Antenna | DRH-118 | A052304 | 2011-12-01 | 2014-11-30 |
| Rohde & Schwarz | Signal Analyzer | FSIQ26 | 8386001028 | 2012-11-24 | 2013-11-23 |
| Sunol Sciences | Broadband Antenna | JB1 | A040904-2 | 2011-11-28 | 2014-11-27 |
| HP | Synthesized Sweeper | 8341B | 2624A00116 | 2013-05-09 | 2014-05-09 |
| COM POWER | Dipole Antenna | AD-100 | 041000 | 2012-06-06 | 2013-06-05 |
| A.H. System | Horn Antenna | SAS-200/571 | 135 | 2012-02-11 | 2015-02-10 |
| Rohde & Schwarz | Universal Radio Communication Tester | CMU200 | 106891 | 2012-12-01 | 2013-12-01 |

*** 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 ℃ |
| **Relative Humidity:** | 55 % |
| **ATM Pressure:** | 100.1 kPa |

*The testing was performed by Tiger Ye on 2013-05-17.*

### Conducted Power:

Test data is referred to FCC ID: XPYLEONG100 granted on 2009-10-13, report No.: 2-20773166b/09, which was tested by CETECOM GmbH.

### Radiated Power (Measured at Max. conducted power channel)

### ERP & EIRP

**ERP for Cellular Band (Part 22H)**

| Frequency (MHz) | Receiver Reading (dBμV) | Turn table Angle Degree | Rx Antenna | | Substituted | | | Absolute Level (dBm) | FCC Part 22H Limit (dBm) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Height (m) | Polar (H/V) | SG Level (dBm) | Cable Loss (dB) | Antenna Gain (dB) | | |
| Middle channel | | | | | | | | | |
| 836.6 | 97.65 | 251 | 1.3 | H | 24.5 | 0.5 | 0 | 24.0 | 38.45 |
| 836.6 | 101.00 | 136 | 1.5 | V | 29.2 | 0.5 | 0 | 28.7 | 38.45 |

**EIRP for PCS Band (Part 24E)**

| Frequency (MHz) | Receiver Reading (dBμV) | Turntable Angle Degree | Rx Antenna | | Substituted | | | Absolute Level (dBm) | FCC Part 24E Limit (dBm) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Height (m) | Polar (H/V) | SG Level (dBm) | Cable Loss (dB) | Antenna Gain (dB) | | |
| Middle channel | | | | | | | | | |
| 1880 | 95.56 | 254 | 1.3 | H | 14.7 | 1.5 | 6.2 | 19.4 | 33 |
| 1880 | 97.55 | 156 | 1.3 | V | 22.0 | 1.5 | 6.2 | 26.7 | 33 |

# FCC §2.1049, §22.917, §22.905 & §24.238 - BANDWIDTH

## Applicable Standard

FCC §2.1049, §22.917, §22.905 and §24.238.

## Test Data

Test data is referred to FCC ID: XPYLEONG100 granted on 2009-10-13, report No.: 2-20773166b/09, which was tested by CETECOM GmbH.

# FCC §2.1051, §22.917(a) & §24.238(a) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

## Applicable Standard

FCC §2.1051, §22.917(a) and §24.238(a).

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

## Test Data

Test data is referred to FCC ID: XPYLEONG100 granted on 2009-10-13, report No.: 2-20773166b/09, which was tested by CETECOM GmbH.

# FCC §2.1053, §22.917 & §24.238 - SPURIOUS RADIATED EMISSIONS

## Applicable Standard

FCC § 2.1053, §22.917 and § 24.238.

## 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 receiving 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 tenth 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 emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level

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

## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Sunol Sciences | Horn Antenna | DRH-118 | A052304 | 2011-12-01 | 2014-11-30 |
| Sunol Sciences | Broadband Antenna | JB1 | A040904-2 | 2011-11-28 | 2014-11-27 |
| Rohde & Schwarz | Signal Analyzer | FSIQ26 | 8386001028 | 2012-11-24 | 2013-11-23 |
| SUPER ULTRA | Amplifier | ZVA-213+ | N/A | 2012-11-24 | 2013-11-23 |
| HP | Amplifier | 8447E | 1937A01046 | 2012-08-09 | 2013-08-09 |
| HP | Synthesized Sweeper | 8341B | 2624A00116 | 2013-05-09 | 2014-05-09 |
| COM POWER | Dipole Antenna | AD-100 | 041000 | 2012-06-06 | 2013-06-05 |
| A.H. System | Horn Antenna | SAS-200/571 | 135 | 2012-02-11 | 2015-02-10 |
| Electro-Mechanics | Horn Antenna | 3116 | 9510-2270 | 2010-10-14 | 2013-10-13 |
| Rohde & Schwarz | Universal Radio Communication Tester | CMU200 | 106891 | 2012-12-01 | 2013-12-01 |

*** 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℃ |
| **Relative Humidity:** | 525% |
| **ATM Pressure:** | 100.1 kPa |

*The testing was performed by Gardon Zhang on 2013-05-17.*

*EUT operation mode: Transmitting (worst case)*

### 30 MHz ~ 10 GHz:

**Cellular Band (Part 22H)**

| Frequency (MHz) | Receiver Reading (dBμV) | Turntable Angle Degree | Rx Antenna | | Substituted | | | Absolute Level (dBm) | FCC Part 22H | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height (m) | Polar (H/V) | SG Level (dBm) | Cable Loss (dB) | Antenna Gain (dB) | | Limit (dBm) | Margin (dB) |
| Middle Channel | | | | | | | | | | |
| 3346.4 | 64.01 | 247 | 1.5 | V | -29.6 | 2.08 | 10.80 | -20.88 | -13 | 7.88 |
| 1673.2 | 70.27 | 56 | 1.3 | V | -30.2 | 0.97 | 9.40 | -21.77 | -13 | 8.77 |
| 1673.2 | 72.61 | 130 | 1.6 | H | -30.4 | 0.97 | 9.40 | -21.97 | -13 | 8.97 |
| 3346.4 | 60.04 | 39 | 1.8 | H | -34.4 | 2.08 | 10.80 | -25.68 | -13 | 12.68 |

### 30 MHz ~ 20 GHz:

**PCS Band (Part 24E)**

| Frequency (MHz) | Receiver Reading (dBμV) | Turntable Angle Degree | Rx Antenna | | Substituted | | | Absolute Level (dBm) | FCC Part 24E | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height (m) | Polar (H/V) | SG Level (dBm) | Cable Loss (dB) | Antenna Gain (dB) | | Limit (dBm) | Margin (dB) |
| Middle Channel | | | | | | | | | | |
| 3760.0 | 69.33 | 53 | 1.5 | H | -26.8 | 2.96 | 10.40 | -19.36 | -13 | 6.36 |
| 3760.0 | 67.44 | 238 | 1.4 | V | -27.3 | 2.96 | 10.40 | -19.86 | -13 | 6.86 |

Note:

Absolute Level = SG Level - Cable Loss + Antenna Gain

Margin = Limit- Absolute Level

# FCC §22.917(a) & §24.238(a) - BAND EDGES

## Applicable Standard

According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

## Test Data

Test data is referred to FCC ID: XPYLEONG100 granted on 2009-10-13, report No.: 2-20773166b/09, which was tested by CETECOM GmbH.

# FCC §2.1055, §22.355 & §24.235 - FREQUENCY STABILITY

## Applicable Standard

FCC § 2.1055, §22.355, §24.235

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

| Frequency Range (MHz) | Base, fixed (ppm) | Mobile ≤ 3 watts (ppm) | Mobile ≤ 3 watts (ppm) |
|---|---|---|---|
| 25 to 50 | 20.0 | 20.0 | 50.0 |
| 50 to 450 | 5.0 | 5.0 | 50.0 |
| 450 to 512 | 2.5 | 5.0 | 5.0 |
| 821 to 896 | 1.5 | 2.5 | 2.5 |
| 928 to 929. | 5.0 | N/A | N/A |
| 929 to 960. | 1.5 | N/A | N/A |
| 2110 to 2220 | 10.0 | N/A | N/A |

According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

## Test Data

Test data is referred to FCC ID: XPYLEONG100 granted on 2009-10-13, report No.: 2-20773166b/09, which was tested by CETECOM GmbH.

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