



# Part 22

## TEST REPORT

<b>Product Name</b>	CDMA vehicle tracking device
<b>Model Name</b>	SC2000/ SC2000-B
<b>FCC ID</b>	2AAQ6TALONCV001
<b>Client</b>	MONTAGE SYSTEMS, INC.
<b>Manufacturer</b>	Asiatelco Technologies Co.
<b>Date of issue</b>	January 22, 2015

**TA Technology (Shanghai) Co., Ltd.**

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RXA1412-0277RF01R3

Page 2 of 20

**GENERAL SUMMARY**

<b>Reference Standard(s)</b>	<p><b>FCC CFR47 Part 2 (2013)</b>    Frequency Allocations And Radio Treaty Matters; General Rules And Regulations</p> <p><b>FCC CFR 47 Part 22H (2013)</b>        Public Mobile Services(850MHz)</p> <p><b>ANSI/TIA-603-C(2004)</b>    Land mobile FM or PM Communications Equipment Measurements and Performance Standards.</p> <p><b>KDB 971168 D01 Power Meas License Digital Systems v02r02</b>    Measurement Guidance for Certification of Licensed Digital Transmitters</p>
<b>Conclusion</b>	<p>This fixed equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 2 of this test report are below limits specified in the relevant standards.</p> <p>General Judgment: <b>Pass</b></p>
<b>Comment</b>	<p>The test result only responds to the measured sample.</p>

Approved by Kai Xu  
Kai Xu  
Director

Revised by Lingling Kang  
Lingling Kang  
RF Manager

Performed by Changxu Wan  
Changxu Wan  
RF Engineer

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RXA1412-0277RF01R3

Page 3 of 20

## **TABLE OF CONTENT**

1. General Information .....	4
1.1. Notes of the test report .....	4
1.2. Testing laboratory .....	5
1.3. Applicant Information .....	5
1.4. Manufacturer Information .....	5
1.5. Information of EUT .....	6
1.6. Test Date .....	7
2. Test Information .....	8
2.1. Summary of test results .....	8
2.2. RF Power Output .....	9
2.3. Effective Radiated Power .....	11
2.4. Radiates Spurious Emission .....	13
3. Main Test Instruments .....	17
ANNEX A: EUT Appearance and Test Setup .....	18
A.1 EUT Appearance .....	18
A.2 Test Setup .....	19
ANNEX B: Product Change Description .....	20

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RXA1412-0277RF01R3

Page 4 of 20

---

## 1. General Information

### 1.1. Notes of the test report

**TA Technology (Shanghai) Co., Ltd.** has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L2264.

**TA Technology (Shanghai) Co., Ltd.** has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 428261.

**TA Technology (Shanghai) Co., Ltd.** has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 8510A.

**TA Technology (Shanghai) Co., Ltd.** guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

**TA Technology (Shanghai) Co., Ltd.** is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the items under test and the results of the test. The sample under test was selected by the Client. This report only refers to the item that has undergone the test.

This report standalone does not constitute or imply by its own an approval of the product by the certification Bodies or competent Authorities. This report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of **TA Technology (Shanghai) Co., Ltd.** and the Accreditation Bodies, if it applies.

If the electrical report is inconsistent with the printed one, it should be subject to the latter.

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RXA1412-0277RF01R3

Page 5 of 20

---

### 1.2. Testing laboratory

Company: TA Technology (Shanghai) Co., Ltd.  
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong  
City: Shanghai  
Post code: 201201  
Country: P. R. China  
Contact: Xu Kai  
Telephone: +86-021-50791141/2/3  
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Website: <http://www.ta-shanghai.com>  
E-mail: [xukai@ta-shanghai.com](mailto:xukai@ta-shanghai.com)

### 1.3. Applicant Information

Company: MONTAGE SYSTEMS, INC.  
Address: 65 ENTERPRISE  
City: ALISO VIEJO  
Postal Code: 92656  
Country: UNITED STATES

### 1.4. Manufacturer Information

Company: Asiatelco Technologies Co.  
Address: #289 Bisheng Road, Buidling-8,3F,Zhangjiang Hi-tech Park, Pudong, Shanghai  
China 201204  
City: Shanghai  
Postal Code: 201204  
Country: P. R. China

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RXA1412-0277RF01R3

Page 6 of 20

### 1.5. Information of EUT

#### General information

Name of EUT:	Module		
Permissive Change:	class II		
MEID :	A100003C55D565		
Hardware Version:	P3		
Software Version:	MC891G_NC_1.0.4T		
Antenna Type:	Internal Antenna		
Device Operating Configurations:			
Operating Mode(s):	CDMA Cellular:(tested)		
Support mode:	1x RTT		
Test Modulation:	QPSK		
Maximum E.R.P.	21.41 dBm		
Rated Power Supply Voltage:	12V		
Extreme Voltage:	Minimum: 10V      Maximum: 14V		
Extreme Temperature:	Lowest: -40°C      Highest: +85°C		
Test Channel: (Low - Middle - High)	1013 - 384 - 777      (tested)		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	CDMA Cellular	824.7 ~ 848.31	869.7 ~ 893.31

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RXA1412-0277RF01R3

Page 7 of 20

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SC2000/ SC2000-B is a variant model of TALONCV001. RF values duplicated from TALONCV001 for SC2000/ SC2000-B, the report number of TALONCV001 is RXA1307-0096RF01R1. This report changes Model Name. The detailed product change description please refers to the ANNEX B.

#### **1.6. Test Date**

The test is performed on December 9, 2014.

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RXA1412-0277RF01R3

Page 8 of 20

## **2. Test Information**

### **2.1. Summary of test results**

<b>Number</b>	<b>Test Case</b>	<b>Clause in FCC rules</b>	<b>Verdict</b>
1	RF power output	2.1046	PASS
2	Effective Radiated Power	22.913(a)(2)	PASS
3	Radiates Spurious Emission	2.1053 / 22.917 (a)	PASS

PASS: The EUT complies with the essential requirements in the standard.

FAIL: The EUT does not comply with the essential requirements in the standard.



# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RXA1412-0277RF01R3

Page 9 of 20

### 2.2. RF Power Output

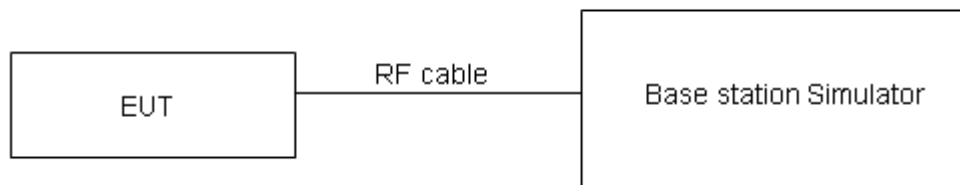
#### Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

#### Methods of Measurement

During the process of the testing, The EUT is controlled by the Base Station Simulator to ensure max power transmission and proper modulation.

#### Test Setup



The loss between RF output port of the EUT and the input port of the tester has been taken into consideration.

#### Limits

No specific RF power output requirements in part 2.1046.

#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 0.4$  dB.

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RXA1412-0277RF01R3

Page 10 of 20

### Test Results

#### Original

CDMA Cellular			Conducted Power(dBm)		
			Channel 1013	Channel 384	Channel 777
			824.7(MHz)	836.52(MHz)	848.31(MHz)
1x RTT	RC1	SO55(Loopback)	23.24	23.23	23.17
		SO2(Loopback)	23.25	23.21	23.22
	RC3	SO55(Loopback)	23.23	23.22	23.21
		SO2(Loopback)	23.26	23.26	23.23
		SO32(+FCH-SCH)	23.13	23.12	23.10
		SO32(+SCH)	23.11	23.11	23.08

#### Variant

CDMA Cellular			Conducted Power(dBm)		
			Channel 1013	Channel 384	Channel 777
			824.7(MHz)	836.52(MHz)	848.31(MHz)
1x RTT	RC1	SO55(Loopback)	22.90	22.95	22.94
		SO2(Loopback)	22.90	23.03	22.90
	RC3	SO55(Loopback)	23.04	23.01	22.99
		SO2(Loopback)	23.00	23.13	23.03
		SO32(+FCH-SCH)	22.96	23.10	22.99
		SO32(+SCH)	22.69	22.77	22.76

### 2.3. Effective Radiated Power

#### Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

#### Methods of Measurement

The measurement procedures in TIA- 603C are used.

1. The EUT was placed on a turntable with 1.5 meter height in a fully anechoic chamber.
2. The EUT was set at 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. GSM operating modes: Set RBW= 1MHz, VBW= 3MHz, RMS detector over burst;  
UMTS operating modes: Set RBW= 100 KHz, VBW= 300 KHz, RMS detector over frame, and use channel power option with bandwidth=5MHz, per section 4.0 of KDB 971168 D01.
4. The table was rotated 360 degrees to determine the position of the highest radiated power.
5. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
6. Taking the record of maximum ERP/EIRP.
7. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
8. The conducted power at the terminal of the dipole antenna is measured.
9. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
10.  $ERP/EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$

$P_s$  (dBm) : Input power to substitution antenna.

$G_s$  (dBi or dBd) : Substitution antenna Gain.

$E_t = R_t + AF$

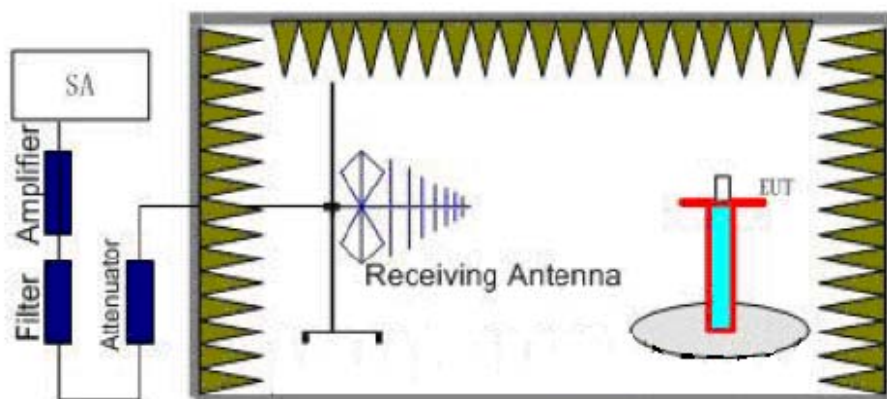
$E_s = R_s + AF$

$AF$  (dB/m) : Receive antenna factor

$R_t$  : The highest received signal in spectrum analyzer for EUT.

$R_s$  : The highest received signal in spectrum analyzer for substitution antenna.

#### Test Setup



**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RXA1412-0277RF01R3

Page 12 of 20

**Limits**

Rule Part 22.913(a) specifies that "Mobile/portable stations are limited to 7 watts ERP".

Limit	$\leq 7 \text{ W}$ (38.45 dBm)
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**Measurement Uncertainty**

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 1.19 \text{ dB}$

**Test Results: Pass**

**Original**

	Channel	Polarization	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	E.R.P. (dBm)
CDMA Cellular	1013	Vertical	-25.52	-45.69	0	1.06	19.08
	384	Vertical	-25.15	-45.46	0	1.24	19.40
	777	Vertical	-25.29	-45.19	0	1.68	19.43
	1013	Horizontal	-23.14	-45.53	0	1.06	21.30
	384	Horizontal	-22.95	-45.38	0	1.24	21.52
	777	Horizontal	-22.99	-45.07	0	1.68	21.61

Note: 1. EIRP= E.R.P+2.15

**Variant**

	Channel	Polarization	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	E.R.P. (dBm)
CDMA Cellular	1013	Vertical	-25.57	-45.69	0	1.06	19.03
	384	Vertical	-25.16	-45.46	0	1.24	19.39
	777	Vertical	-25.91	-45.19	0	1.68	18.81
	1013	Horizontal	-23.22	-45.53	0	1.06	21.22
	384	Horizontal	-23.06	-45.38	0	1.24	21.41
	777	Horizontal	-23.24	-45.07	0	1.68	21.36

Note: 1. EIRP= E.R.P+2.15

## 2.4. Radiates Spurious Emission

### Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

### Method of Measurement

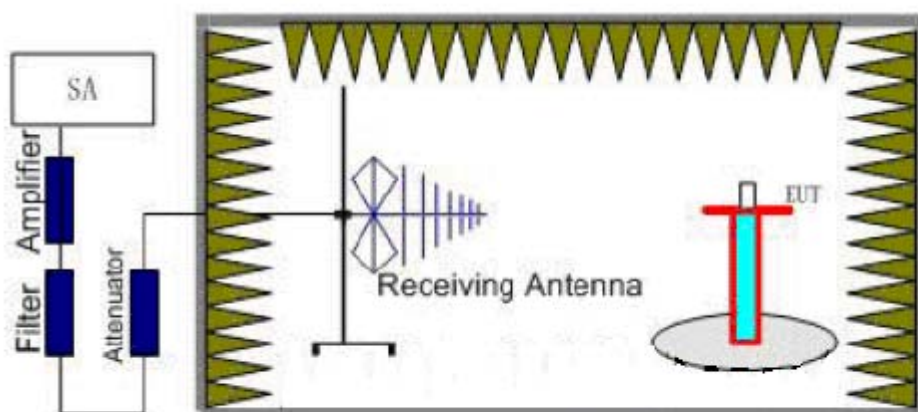
The measurements procedures in TIA -603C are used.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment.

The procedure of Radiates Spurious Emission is as follows:

#### Step 1:

The measurement is carried out in the semi-anechoic chamber. EUT was placed on a 1.5 meters high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used while RBW and VBW are both set to 3MHz. During the measurement, the highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna moved up and down over a range from 1 to 4 meters in both horizontally and vertically polarized orientations. The test setup refers to figure below.



#### Step 2:

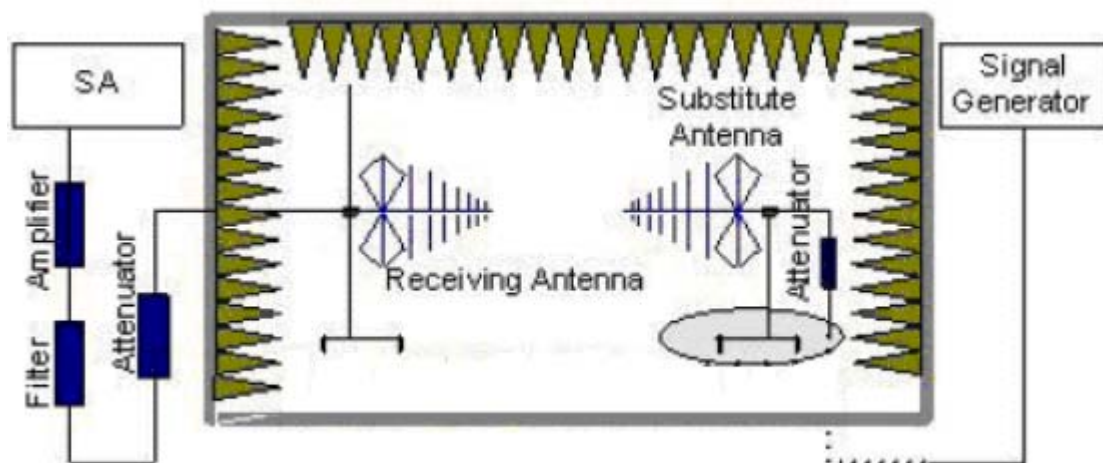
A dipole antenna shall be substituted in place of the EUT. The antenna will be driven by a signal generator with a adjustable S.G. applied through a Tx cable. Adjust the level of the signal generator output until the value of the receiver reach the previously recorded analyzer power level (LVL). Then The E.R.P. /E.I.R.P. of the EUT can be calculated through the level of the signal generator, Tx cable loss and the gain of the substitution antenna. The test setup refers to figure below.

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RXA1412-0277RF01R3

Page 14 of 20



$E.R.P \text{ (peak power)} = S.G. - Tx \text{ Cable loss} + \text{Substitution antenna gain} - 2.15.$

$EIRP = E.R.P + 2.15$

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the antenna is vertical.

Of those disturbances below (limit – 20 dB), the mark is not required for the EUT

### Limits

Rule Part 22.917(a) specifies that “The power of any emission 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.”

Limit	-13 dBm
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### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ ,  $U = 3.55$  dB.

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RXA1412-0277RF01R3

Page 15 of 20

### Test Result

CDMA Cellular CH1013 (Original)

Harmonic	TX ch.1013 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1649.6	-45.21	2	10.15	Vertical	-39.21	-13	26.21	45
3	2474.1	-66.74	2.51	11.35	Vertical	-60.05	-13	47.05	0
4	3298.8	-64.45	4.2	10.85	Vertical	-59.95	-13	46.95	180
5	4123.5	-62.89	5.2	11.35	Vertical	-58.89	-13	45.89	90
6	4948.2	-63.43	5.5	11.95	Vertical	-59.13	-13	46.13	0
7	5772.9	-61.76	5.7	13.55	Vertical	-56.06	-13	43.06	270
8	6597.6	-61.10	6.3	13.75	Vertical	-55.80	-13	42.80	180
9	7422.3	-61.08	6.8	13.85	Vertical	-56.18	-13	43.18	0
10	8247	-61.86	6.9	14.25	Vertical	-56.66	-13	43.66	180

CDMA Cellular CH384 (Original)

Harmonic	TX ch.384 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1672.5	-50.43	2	10.75	Vertical	-43.83	-13	30.83	225
3	2509.56	-62.78	2.51	11.05	Vertical	-56.39	-13	43.39	0
4	3346.08	-64.61	4.2	11.15	Vertical	-59.81	-13	46.81	180
5	4182.6	-62.67	5.2	11.15	Vertical	-58.87	-13	45.87	90
6	5019.12	-61.23	5.5	11.95	Vertical	-56.93	-13	43.93	0
7	5855.64	-62.70	5.7	13.55	Vertical	-57.00	-13	44.00	270
8	6692.16	-61.77	6.3	13.75	Vertical	-56.47	-13	43.47	180
9	7528.68	-60.26	6.8	13.85	Vertical	-55.36	-13	42.36	0
10	8365.2	-61.88	6.9	14.25	Vertical	-56.68	-13	43.68	90

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RXA1412-0277RF01R3

Page 16 of 20

CDMA Cellular CH777 (Original)

Harmonic	TX ch.777 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1695.9	-55.04	2	10.15	Vertical	-49.04	-13	36.04	0
3	2544.93	-56.6	2.51	11.05	Vertical	-50.21	-13	37.21	0
4	3393.24	-64.16	4.2	11.15	Vertical	-59.36	-13	46.36	0
5	4241.55	-61.50	5.2	11.15	Vertical	-57.70	-13	44.70	180
6	5089.86	-62.89	5.5	11.95	Vertical	-58.59	-13	45.59	90
7	5938.17	-63.04	5.7	13.55	Vertical	-57.34	-13	44.34	0
8	6786.48	-60.84	6.3	13.75	Vertical	-55.54	-13	42.54	270
9	7634.79	-60.52	6.8	13.85	Vertical	-55.62	-13	42.62	180
10	8483.1	-62.22	6.9	14.25	Vertical	-57.02	-13	44.02	0

CDMA Cellular CH1013 (Variant test in the worst case of original)

Harmonic	TX ch.1013 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1649.6	-46.37	2	10.15	Vertical	-40.37	-13	27.37	45
3	2474.1	-66.67	2.51	11.35	Vertical	-59.98	-13	46.98	0
4	3298.8	-64.77	4.2	10.85	Vertical	-60.27	-13	47.27	180
5	4123.5	-62.75	5.2	11.35	Vertical	-58.75	-13	45.75	90
6	4948.2	-63.25	5.5	11.95	Vertical	-58.95	-13	45.95	0
7	5772.9	-61.69	5.7	13.55	Vertical	-55.99	-13	42.99	270
8	6597.6	-61.08	6.3	13.75	Vertical	-55.78	-13	42.78	180
9	7422.3	-61.01	6.8	13.85	Vertical	-56.11	-13	43.11	0
10	8247	-61.79	6.9	14.25	Vertical	-56.59	-13	43.59	180



**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RXA1412-0277RF01R3

Page 17 of 20

### 3. Main Test Instruments

No.	Name	Type	Manufacturer	Serial Number	Calibration Date	Valid Period
01	Base Station Simulator	CMU200	R&S	118133	2014-06-29	One year
02	Power Splitter	SHX-GF2-2-13	Hua Xiang	10120101	NA	NA
03	Spectrum Analyzer	E4445A	Agilent	MY46181146	2014-05-26	One year
04	Trilog Antenna	VUBL 9163	SCHWARZB ECK	9163-201	2012-06-19	Three years
05	Horn Antenna	HF907	R&S	100126	2012-07-01	Three years
06	Climatic Chamber	PT-30B	Re Ce	20101891	2013-09-09	Three years
07	RF Cable	/	/	/	2014-11-03	Two months

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

## ANNEX A: EUT Appearance and Test Setup

### A.1 EUT Appearance



Original



Variant

Picture 1 EUT and Auxiliary

## **A.2 Test Setup**



Variant

**Picture 2: Radiated Spurious Emissions Test setup**

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RXA1412-0277RF01R3

Page 20 of 20

## ANNEX B: Product Change Description

MONTAGE SYSTEMS, INC.

### Product Change Description

We, MONTAGE SYSTEMS, INC., declare on our sole responsibility that the product,

SC2000 / SC2000-B

is the variant of the initial certified product,

TALONCV001

Except the following changes on the latest MODEL: SC2000 / SC2000-B

**SOFTWARE MODIFICATIONS:**

Protocol Stack changes: No

MMS/STK changes: No

JAVA changes: No

Other changes detailed: No

**HARDWARE MODIFICATION:**

Band changes: No

Power Amplifier changes: No

Antenna changes: No

PCB Layout changes: No

Components on PCB changes:

LCD changes: No

Speaker changes: No

Camera changes: No

Vibrator changes: No

Bluetooth changes: No

FM changes: No

Other changes: No

**MECHANICAL MODIFICATIONS:**

Use new housing front/back cover:

Mechanical shell changes: Change the shape and size of the enclosure

Other changes detailed: No

**ACCESSORY MODIFICATIONS:**

Battery changes: No

AC Adaptor changes: No

Earphone changes: No

External Accessory: Add Buzzer Module

Signature: 

Print name: MANNY HERNANDEZ

Date: 15 Jan 2015

Company: MONTAGE SYSTEMS, INC.

Address: 65 Enterprise, Aliso Viejo, CA 92656, USA

Tel. (949) 478-1555