Variant FCC RF Test Report

APPLICANT	**:**	**Montage**
EQUIPMENT	**:**	**Traxit X 2G GPS Tracker**
BRAND NAME	**:**	**Montage Asia**
MODEL NAME	**:**	**TXXL1G2**
FCC ID	**:**	**N69-831000**
STANDARD	**:**	**FCC 47 CFR Part 2, 22(H), 24(E)**
CLASSIFICATION	**:**	**PCS Licensed Transmitter (PCB)**

This is variant report which is only valid together with the original test report. The product was received on Jul. 08, 2013 and completely tested on Jul. 25, 2013. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-C-2004 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (SHENZHEN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory
2353

SPORTON INTERNATIONAL (SHENZHEN) INC.
No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C.

TABLE OF CONTENTS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG370804	Rev. 01	This is a variant report for TXXL1G2. The product equality declaration could be referred to Appendix B. All the test cases were performed on the original test report which can be referred to SGS Report Number SZEM120500259401. Based on the original test report, only the conducted power, ERP/EIRP and radiated spurious emissions were verified for the differences.	Aug. 01, 2013

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	N/A	PASS	-
3.2	§22.913(a)(2)	Effective Radiated Power	< 7 Watts	PASS	-
3.2	§24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
3.3	§2.1053 §22.917(a) §24.238(a)	Field Strength of Spurious Radiation	< 43+10log$_{10}$(P[Watts])	PASS	Under limit 13.15 dB at 5855.000 MHz

1 General Description

1.1 Applicant

Montage
Flat J, 13/F, Tower C, NEO Enterprise Avenue, 6009 Shennan Mid Road, Futian, Shenzhen, CHINA 518048

1.2 Manufacturer

Montage
Flat J, 13/F, Tower C, NEO Enterprise Avenue, 6009 Shennan Mid Road, Futian, Shenzhen, CHINA 518048

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Traxit X 2G GPS Tracker
Brand Name	Montage Asia
Model Name	TXXL1G2
FCC ID	N69-831000
EUT supports Radios application	GPRS
HW Version	IONX_V16
SW Version	M5216_V1.6.8
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx Frequency	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8MHz
Rx Frequency	GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz
Maximum Output Power to Antenna	GSM850 : 31.45 dBm GSM1900 : 28.60 dBm
Antenna Type	Dipole Antenna
Antenna Gain	-1dBi for GSM850 1dBi for GSM1900
Type of Modulation	GPRS: GMSK

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Maximum ERP/EIRP Power

FCC Rule	System	Type of Modulation	Maximum ERP/EIRP (W)
Part 22	GSM850 GPRS class 8	GMSK	0.4113
Part 24	GSM1900 GPRS class 8	GMSK	0.5117

1.7 Testing Site

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.		
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755- 3320-2398		
Test Site No.	**Sporton Site No.**		**FCC/IC Registration No.**
	TH01-SZ	03CH01-SZ	831040/4086F-1

1.8 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC 47 CFR Part 2, 22(H), 24(E)
- ANSI / TIA / EIA-603-C-2004
- FCC KDB 971168 D01 Power Meas. License Digital Systems v02

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission. (Z plane)

Frequency range investigated for radiated emission is as follows:

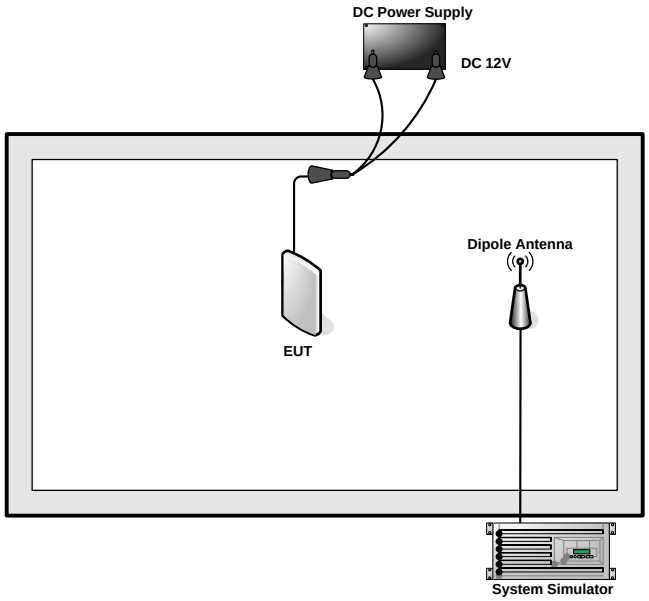
1. 30 MHz to 9000 MHz for GSM850.
2. 30 MHz to 19000 MHz for GSM1900.

Test Modes		
Band	**Radiated TCs**	**Conducted TCs**
GSM 850	■ GPRS class 8 Link	■ GPRS class 8 Link
GSM 1900	■ GPRS class 8 Link	■ GPRS class 8 Link

The conducted power tables are as follows:

Conducted Power (*Unit: dBm)						
Band	**GSM850**			**GSM1900**		
Channel	**128**	**189**	**251**	**512**	**661**	**810**
Frequency	**824.2**	**836.4**	**848.8**	**1850.2**	**1880.0**	**1909.8**
GPRS (GMSK, 1 Tx slot) – CS1	**31.45**	31.39	31.37	28.15	28.38	**28.60**
GPRS (GMSK, 2 Tx slots) – CS1	31.07	31.02	31.02	27.87	28.14	28.37
GPRS (GMSK, 4 Tx slots) – CS1	29.16	29.14	29.08	26.00	26.29	26.53

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Agilent	E5515C	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	TOPWORD	3303DR	N/A	N/A	Unshielded, 1.8 m

3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

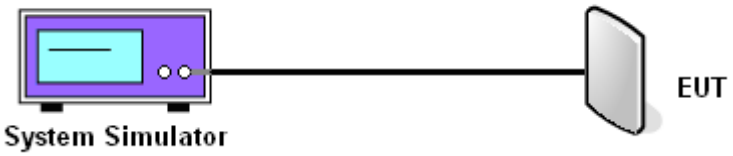
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

Cellular Band			
Modes	**GSM850 (GPRS class 8)**		
Channel	**128 (Low)**	**189 (Mid)**	**251 (High)**
Frequency (MHz)	**824.2**	**836.4**	**848.8**
Conducted Power (dBm)	31.45	31.39	31.37
Conducted Power (Watts)	1.40	1.38	1.37

PCS Band			
Modes	**GSM1900 (GPRS class 8)**		
Channel	**512 (Low)**	**661 (Mid)**	**810 (High)**
Frequency (MHz)	**1850.2**	**1880.0**	**1909.8**
Conducted Power (dBm)	28.15	28.38	28.60
Conducted Power (Watts)	0.65	0.69	0.72

Note: maximum burst average power for GSM.

3.2 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

3.2.1 Description of the ERP/EIRP Measurement

The substitution method, in ANSI / TIA / EIA-603-C-2004, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

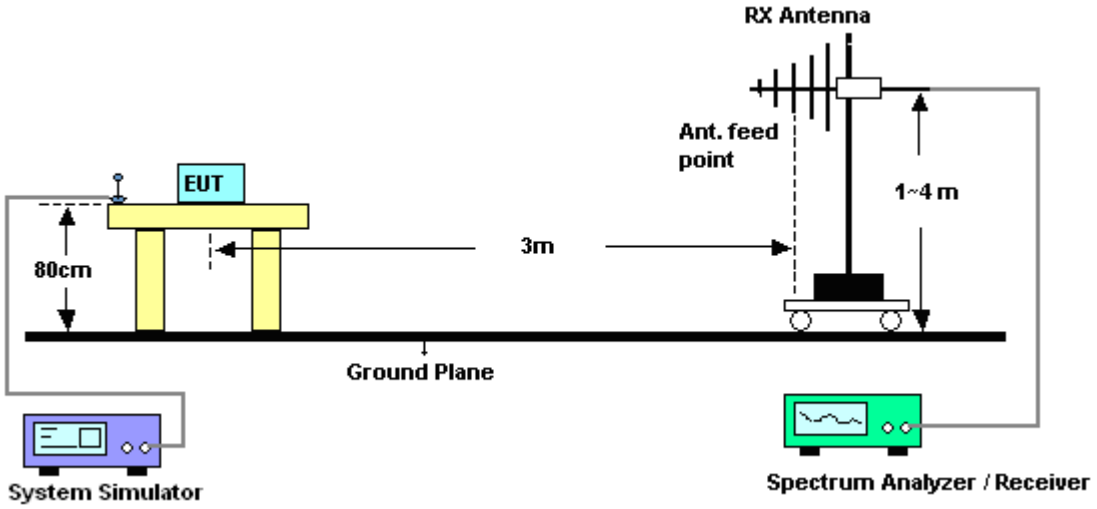
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The EUT was placed on an non-conductive rotating platform with 0.8 meter height in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RBW= 1MHz, VBW= 3MHz for GSM, RBW= 100 kHz, VBW= 300 kHz, used channel power option with bandwidth=5MHz for WCDMA, and RMS detector settings per KDB 971168 D01.
2. During the measurement, the EUT was enforced in maximum power and linked with a base station. The highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
3. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by dipole antenna (substitution antenna) at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor, EIRP= LVL + Correction factor and ERP = EIRP – 2.15 .

3.2.4 Test Setup



3.2.5 Test Result of ERP

GSM850 (GPRS class 8) Radiated Power ERP				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
824.2	-1.37	28.798	25.28	0.3371
836.4	-1.51	28.577	24.92	0.3102
848.8	-1.53	28.064	24.38	0.2744
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
824.2	-5.59	32.596	24.86	0.3059
836.4	-3.66	31.952	26.14	0.4113
848.8	-6.42	31.561	22.99	0.1991

* ERP = LVL (dBm) + Correction Factor (dB) – 2.15

3.2.6 Test Result of EIRP

GSM1900 (GPRS class 8) Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
1850.2	-15.79	42.33	26.54	0.4508
1880.0	-16.94	43.26	26.32	0.4285
1909.8	-16.02	43.11	27.09	0.5117
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
1850.2	-19.92	44.96	25.04	0.3192
1880.0	-20.74	45.13	24.39	0.2748
1909.8	-21.77	45.77	24.00	0.2512

* EIRP = LVL (dBm) + Correction Factor (dB)

3.3 Field Strength of Spurious Radiation Measurement

3.3.1 Description of Field Strength of Spurious Radiated Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.3.2 Measuring Instruments

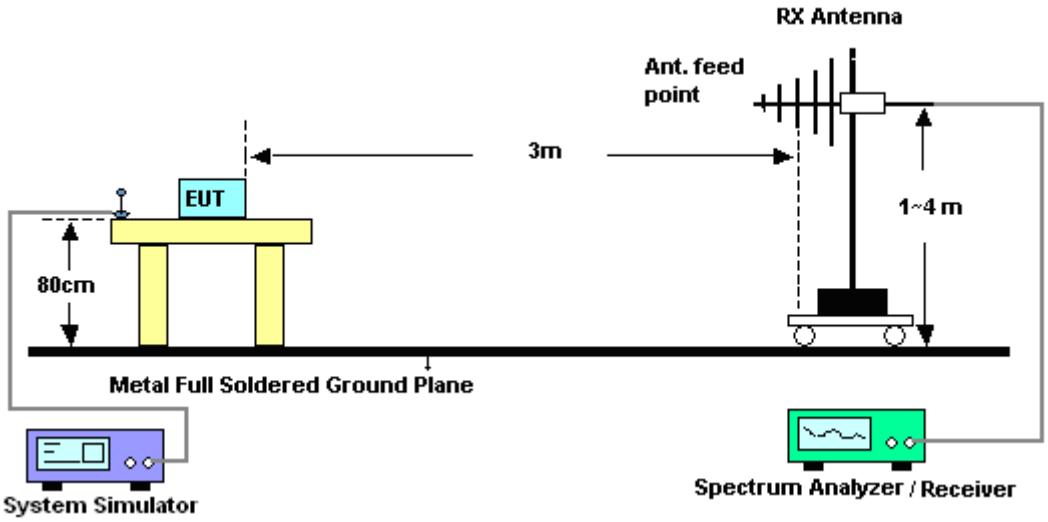
See list of measuring instruments of this test report.

3.3.3 Test Procedures

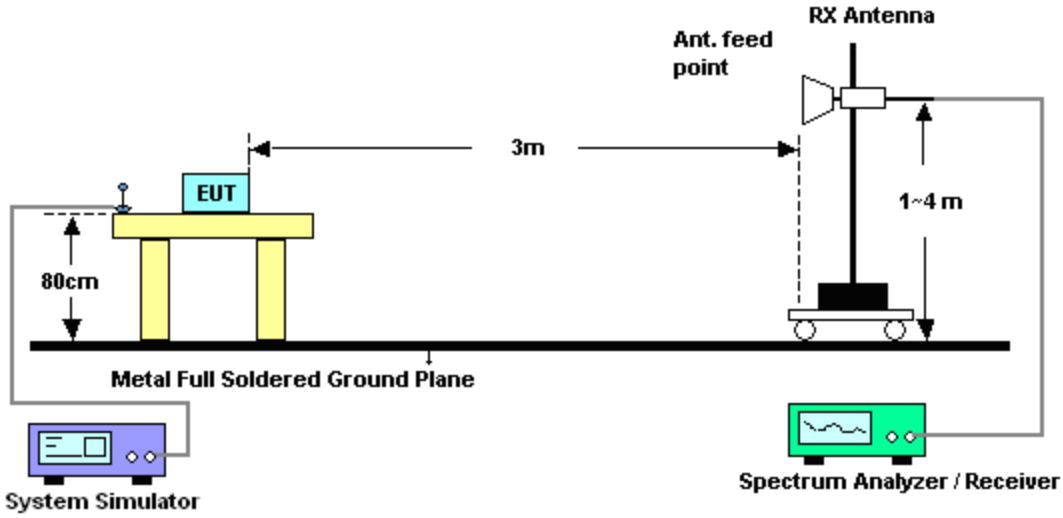
1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
11. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)
    = P(W) - [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
12. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
13. ERP (dBm) = EIRP - 2.15

3.3.4 Test Setup

For radiated emissions from 30MHz to 1GHz

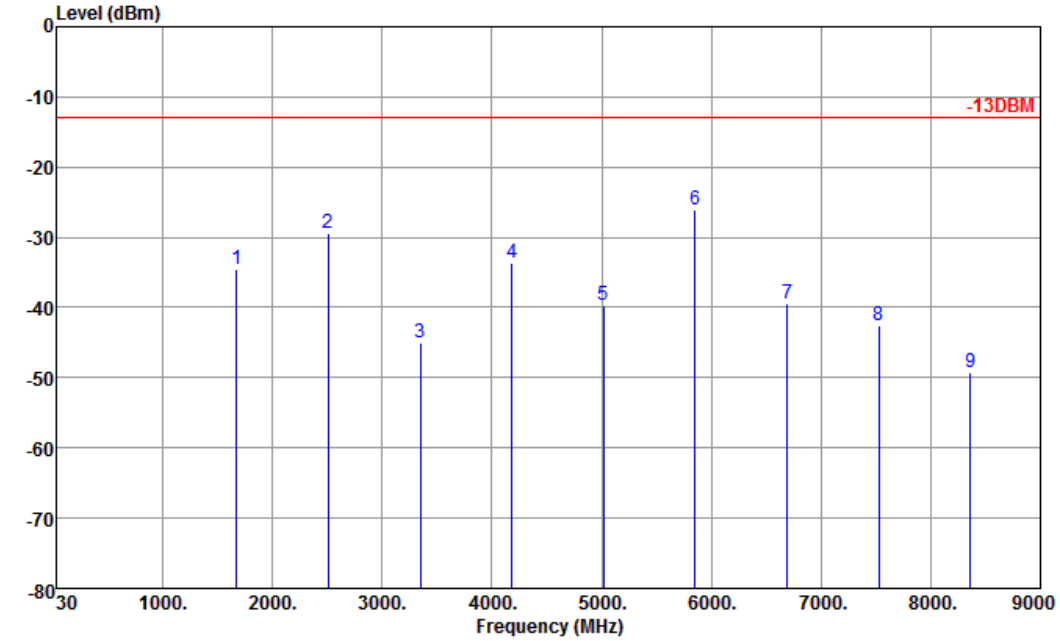


For radiated emissions above 1GHz



3.3.5 Test Result of Field Strength of Spurious Radiated

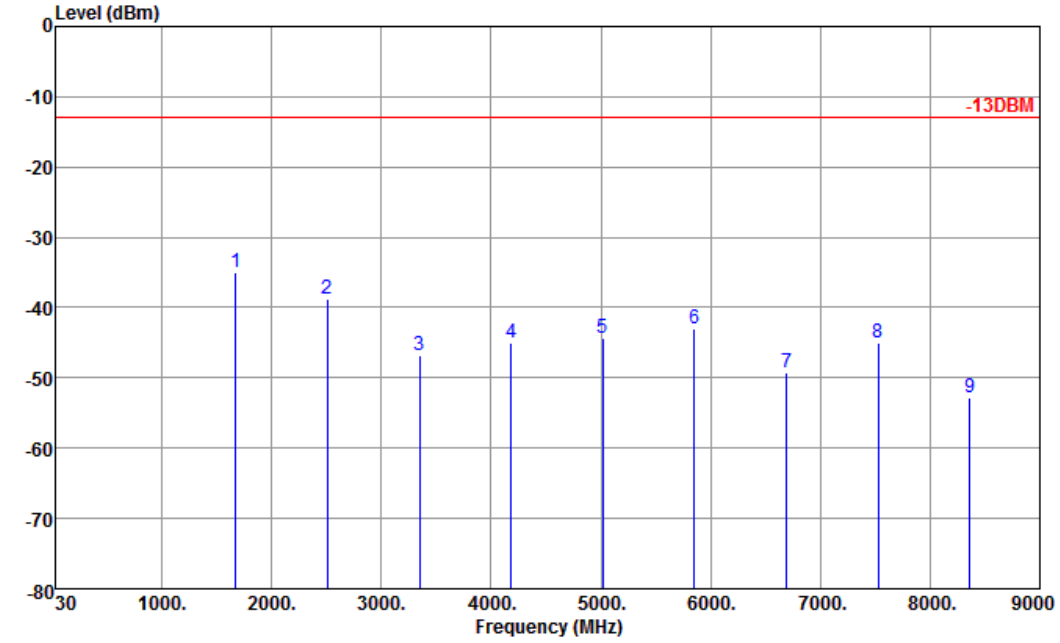
Band :	GSM850	Temperature :	23~25°C
Test Mode :	GPRS class 8 Link (GMSK)	Relative Humidity :	49~53%
Test Engineer :	Gavin Zhang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH01-SZ
Condition : -13DBM HF_EIRP_H_130101 HORIZONTAL
Project : (FG)370804

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-34.55	-13	-21.55	-51.41	-35.20	0.57	3.37	H	Pass
2510	-29.49	-13	-16.49	-54.87	-31.72	0.78	5.16	H	Pass
3346	-44.98	-13	-31.98	-56.81	-48.62	0.87	6.66	H	Pass
4180	-33.62	-13	-20.62	-49.84	-38.21	0.97	7.71	H	Pass
5018	-39.56	-13	-26.56	-58.21	-45.23	1.09	8.91	H	Pass
5855	-26.15	-13	-13.15	-46.60	-32.59	1.22	9.81	H	Pass
6691	-39.49	-13	-26.49	-60.96	-47.06	1.51	11.23	H	Pass
7528	-42.66	-13	-29.66	-65.51	-50.83	1.79	12.11	H	Pass
8364	-49.27	-13	-36.27	-72.77	-57.87	1.89	12.64	H	Pass

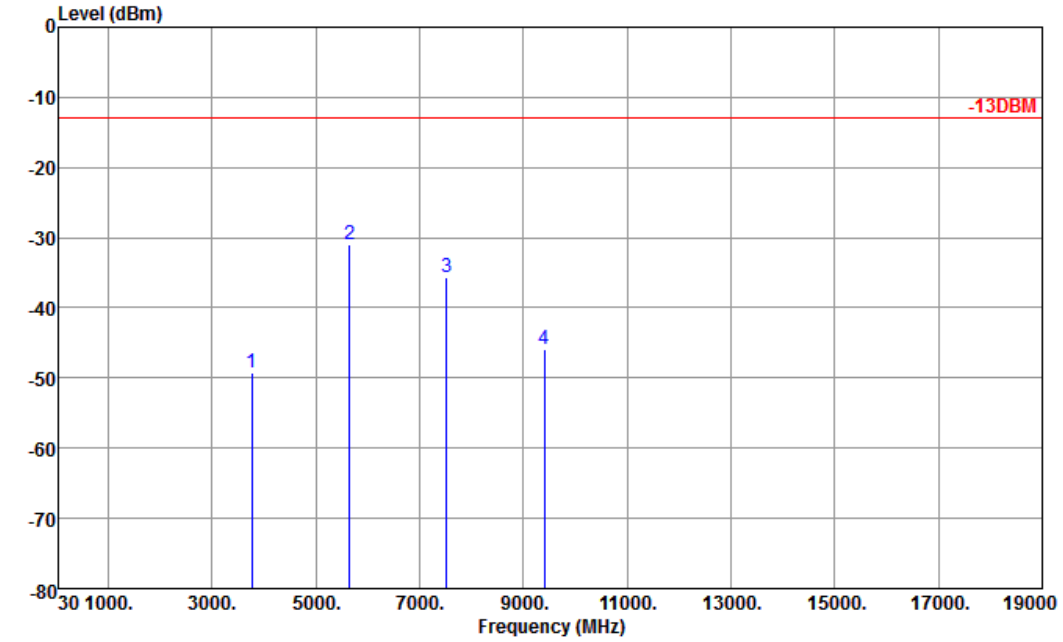
Band :	GSM850	Temperature :	23~25°C
Test Mode :	GPRS class 8 Link (GMSK)	Relative Humidity :	49~53%
Test Engineer :	Gavin Zhang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH01-SZ
Condition : -13DBM HF_EIRP_V_130101 VERTICAL
Project : (FG)370804

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-35.02	-13	-22.02	-49.05	-35.67	0.57	3.37	V	Pass
2510	-38.83	-13	-25.83	-61.21	-41.06	0.78	5.16	V	Pass
3346	-46.80	-13	-33.80	-59.68	-50.44	0.87	6.66	V	Pass
4182	-44.93	-13	-31.93	-60.49	-49.52	0.97	7.71	V	Pass
5018	-44.31	-13	-31.31	-61.99	-49.98	1.09	8.91	V	Pass
5855	-43.02	-13	-30.02	-60.92	-49.46	1.22	9.81	V	Pass
6690	-49.29	-13	-36.29	-70.25	-56.86	1.51	11.23	V	Pass
7528	-45.05	-13	-32.05	-67.21	-53.22	1.79	12.11	V	Pass
8364	-52.73	-13	-39.73	-75.68	-61.33	1.89	12.64	V	Pass

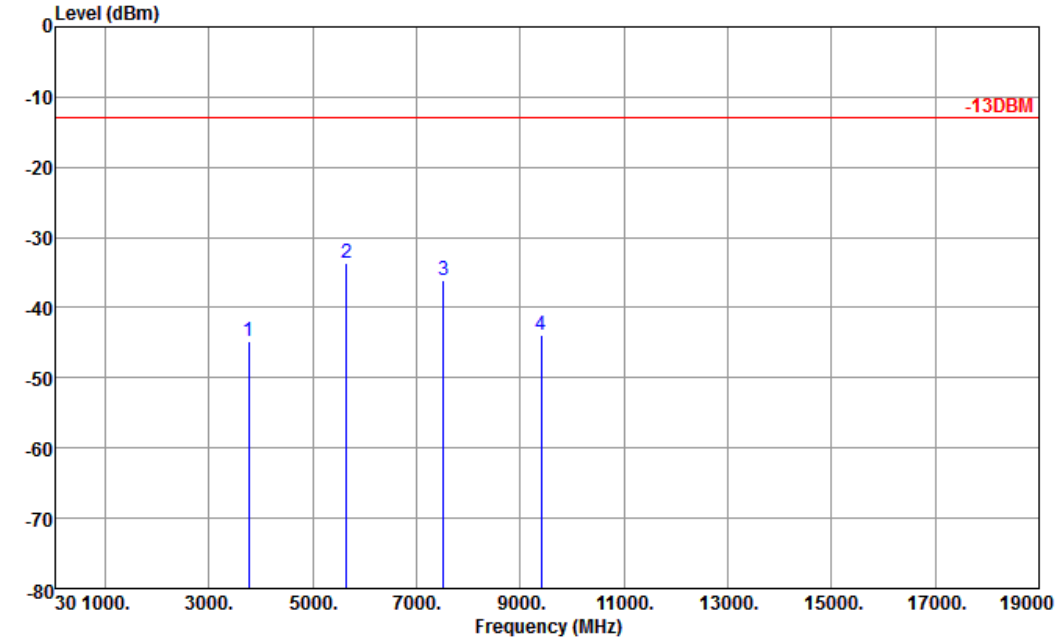
Band :	GSM1900	Temperature :	23~25°C
Test Mode :	GPRS class 8 Link (GMSK)	Relative Humidity :	49~53%
Test Engineer :	Gavin Zhang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH01-SZ
Condition : -13DBM HF_EIRP_H_130101 HORIZONTAL
Project : (FG)370804

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-49.34	-13	-36.34	-62.80	-56.08	1.28	8.02	H	Pass
5640	-30.96	-13	-17.96	-52.42	-39.38	1.58	10.00	H	Pass
7520	-35.69	-13	-22.69	-60.63	-46.01	1.78	12.10	H	Pass
9400	-45.91	-13	-32.91	-68.03	-56.69	2.22	13.00	H	Pass

Band :	GSM1900	Temperature :	23~25°C
Test Mode :	GPRS class 8 Link (GMSK)	Relative Humidity :	49~53%
Test Engineer :	Gavin Zhang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH01-SZ
Condition : -13DBM HF_EIRP_V_130101 VERTICAL
Project : (FG)370804

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-44.68	-13	-31.68	-60.78	-51.42	1.28	8.02	V	Pass
5640	-33.69	-13	-20.69	-54.12	-42.11	1.58	10	V	Pass
7520	-36.15	-13	-23.15	-60.12	-46.47	1.78	12.1	V	Pass
9400	-43.93	-13	-30.93	-67.55	-54.71	2.22	13	V	Pass

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP30	101400	9kHz~30GHz	Mar. 28, 2013	Jul. 25, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	N/A	Mar. 28, 2013	Jul. 25, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Power Sensor	Anritsu	MA2411B	1207253	N/A	Mar. 28, 2013	Jul. 25, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
ESCI TEST Receiver	R&S	ESCI	100724	9kHz~3GHz	Mar. 28, 2013	Jul. 24, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
Spectrum Analyzer	R&S	FSP30	101362	9kHz~30GHz	Oct. 11, 2012	Jul. 24, 2013	Oct. 10, 2013	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	00119436	1GHz~18GHz	Oct. 12, 2012	Jul. 24, 2013	Oct. 11, 2013	Radiation (03CH01-SZ)
Bilog Antenna	SCHAFFNER	CBL6112B	2614	30MHz~2GHz	Nov. 03, 2012	Jul. 24, 2013	Nov. 02, 2013	Radiation (03CH01-SZ)
Turn Table	EM Electronice	EM 1000	N/A	0 ~ 360 degree	N/A	Jul. 24, 2013	N/A	Radiation (03CH01-SZ)
Antenna Mast	EM Electronice	EM 1000	N/A	1 m - 4 m	N/A	Jul. 24, 2013	N/A	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz~3GHz Gain 30dB	Mar. 28, 2013	Jul. 24, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	Mar. 28, 2013	Jul. 24, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
SHF-EHF-Horn	Schwarzbeck	BBHA9170	BBHA9170249	14GHz~40GHz	Nov. 23, 2012	Jul. 24, 2013	Nov. 22, 2013	Radiation (03CH01-SZ)

5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.54**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95%(U = 2Uc(y))	**4.72**

Appendix B. Product Equality Declaration

Montage ASIA Electronic Co.,Ltd

Flat J, 13/F, Tower C, NEO Enterprise Avenue, 6009 Shennan Mid Road,Futian,
Shenzhen, CHINA 518048
Tel: +86-755-61288086 ; Fax: +86-755-61288087

Declaration of Hardware Differences in Tested Devices

We, Montage ASIA, declare on our sole responsibility for the product change of TXXL1G2 as below:

1. HW version changed from Main PCB: The difference between version V16 and V14 of IONX PCBA:

Change description: Main PCB :

(1) The position of Mounting SIM Socket in V14 be changed to Mounting Battery in V16

(2) Deleted some components of G-SENSOR inV14;and then added some components of battery manage in V16.

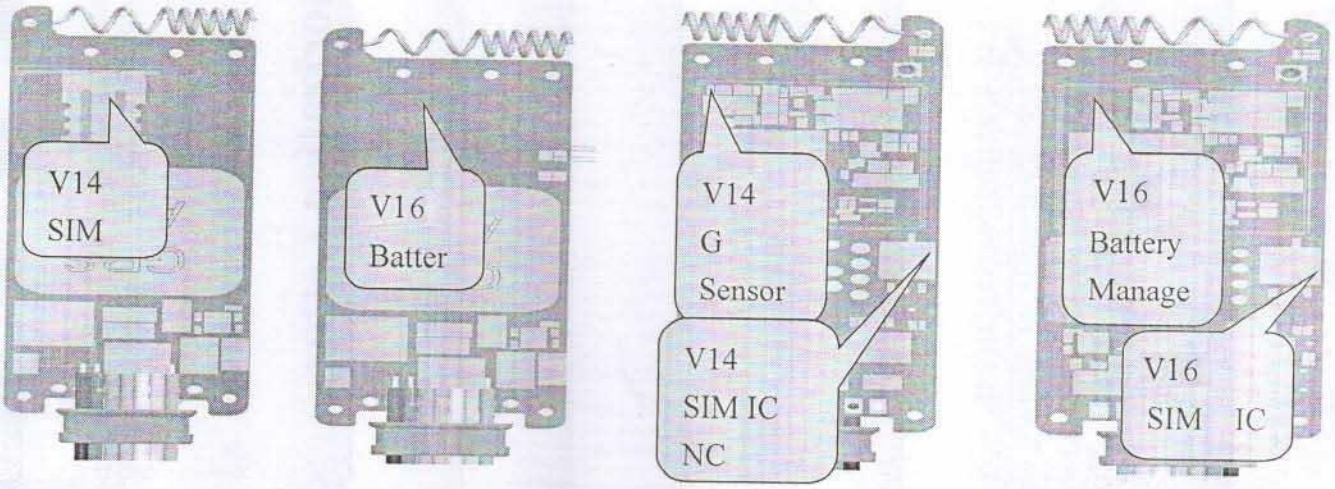
(3) It' s null in the position of SIM IC in V14, but the SIM IC is mounted in the same position in V16.

◆ Antenna gain changed

Antenna gain changed but remain the same type.

824MHz—849MHz is -1dBi

1920MHz—1980MHz is +1dBi



Except for the change above, no other modification is performed. Also, the change does not have any impact on the approved radio parameter such as power, frequency range, modulation etc.

All of these changes listed above have been applied to the samples used for lab tests.

Sincerely yours,

Contact Person: Chengshangzhen
Company: Montage
TEL: +86-755-86252579
FAX: +86-755-86258387
E-mail: chengshangzhen@eelink.com.cn

2013.8.01