



# FCC RF Test Report

**APPLICANT** : PAX Technology Limited  
**EQUIPMENT** : Mobile Payment Terminal  
**BRAND NAME** : PAX  
**MODEL NAME** : S920  
**MARKETING NAME** : S920  
**FCC ID** : V5PS920FDD-LTE  
**STANDARD** : FCC 47 CFR Part 2, 22(H), 24(E), 27(L)  
**CLASSIFICATION** : PCS Licensed Transmitter (PCB)

The product was received on Dec. 23, 2015 and testing was completed on Jan. 11, 2016. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-D-2010 and has been in 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.

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## **SPORTON INTERNATIONAL (SHENZHEN) INC.**

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# TABLE OF CONTENTS

**REVISION HISTORY.....3**

**SUMMARY OF TEST RESULT .....4**

**1 GENERAL DESCRIPTION .....5**

    1.1 Applicant.....5

    1.2 Manufacturer .....5

    1.3 Product Feature of Equipment Under Test .....5

    1.4 Product Specification subjective to this standard .....6

    1.5 Modification of EUT .....6

    1.6 Maximum ERP/EIRP Power.....7

    1.7 Testing Location .....7

    1.8 Applicable Standards .....8

**2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST.....9**

    2.1 Test Mode.....9

    2.2 Connection Diagram of Test System .....10

    2.3 Support Unit used in test configuration .....10

**3 CONDUCTED TEST RESULT.....11**

    3.1 Measuring Instruments.....11

    3.2 Test Setup .....11

    3.3 Conducted Output Power .....11

**4 RADIATED TEST ITEMS .....12**

    4.1 Measuring Instruments.....12

    4.2 Test Setup .....12

    4.3 Test Result of Radiated Test.....12

    4.4 Effective Radiated Power and Effective Isotropic Radiated Power Measurement .....13

    4.5 Field Strength of Spurious Radiation Measurement .....15

**5 LIST OF MEASURING EQUIPMENT .....16**

**6 UNCERTAINTY OF EVALUATION .....17**

**APPENDIX A. TEST RESULTS OF CONDUCTED TEST**

**APPENDIX B. TEST RESULTS OF RADIATED TEST**

**APPENDIX C. TEST SETUP PHOTOGRAPHS**



### REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG5D2302A	Rev. 01	The device integrates a WWAN module ME909u-523 with FCC ID: QISME909U-523, no hardware changes are made on the module and only disabled some LTE bands by software, test cases of conducted items for WCDMA bands were leveraged from module FCC report which can refer to No. SYBH(Z-RF)010032014-2001	Jan. 21, 2016



### SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.3	§2.1046	Conducted Output Power	Reporting Only	PASS	-
4.4	§22.913(a)(2)	Effective Radiated Power	< 7 Watts	PASS	-
	§24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
	§27.50(d)(4)	Equivalent Isotropic Radiated Power	< 1 Watts	PASS	-
4.5	§2.1053 §22.917(a) §24.238(a) §27.53(h)	Field Strength of Spurious Radiation	< 43+10log10(P[Watts])	PASS	Under limit 27.74 dB at 3465.200 MHz



# 1 General Description

## 1.1 Applicant

**PAX Technology Limited**

Room 2416, 24/F., Sun Hung Kai Centre, 30 Harbour Road, Wanchai, Hong Kong

## 1.2 Manufacturer

**PAX Computer Technology (Shenzhen) Co., Ltd.**

4/F, No.3 Building, Software Park, Second Central Science-Tech Road, High-Tech industrial Park, Shenzhen, Guangdong, P.R.C.

## 1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Payment Terminal
Brand Name	PAX
Model Name	S920
Marketing Name	S920
FCC ID	V5PS920FDD-LTE
EUT supports Radios application	WCDMA/HSPA/HSPA+(16QAM uplink is not supported)/LTE/NFC WLAN2.4GHz 802.11b/g/n HT20 Bluetooth v3.0+EDR/Bluetooth v4.0 LE
IMEI Code	Conducted: 864669020066004 Radiation:864669020067085 ERP/EIRP: 864669020067473
HW Version	v01.01.01
SW Version	14.00.02
EUT Stage	Production Unit

**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 subjective to this standard

Product Specification subjective to this standard	
<b>Tx Frequency</b>	<b>WCDMA:</b> Band V: 826.4 MHz ~ 846.6 MHz Band II: 1852.4 MHz ~ 1907.6 MHz Band IV: 1712.4 MHz ~ 1752.6 MHz
<b>Rx Frequency</b>	<b>WCDMA:</b> Band V: 871.4 MHz ~ 891.6 MHz Band II: 1932.4 MHz ~ 1987.6 MHz Band IV: 2112.4 MHz ~ 2152.6 MHz
<b>Maximum Output Power to Antenna</b>	<b>WCDMA:</b> Band V: 23.10 dBm Band II: 22.64 dBm Band IV: 22.53 dBm
<b>Antenna Type</b>	PCB Antenna
<b>Type of Modulation</b>	WCDMA : QPSK (Uplink) HSDPA : QPSK (Uplink) HSUPA : QPSK (Uplink) HSPA+ : 16QAM uplink is not supported

### 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 22H	WCDMA Band V RMC 12.2Kbps	QPSK	0.0867
Part 24E	WCDMA Band II RMC 12.2Kbps	QPSK	0.3251
Part 27L	WCDMA Band IV RMC 12.2Kbps	QPSK	0.2612

### 1.7 Testing Location

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. China TEL: +86-755- 3320-2398	
Test Site No.	Sporton Site No.	FCC Registration No.
	03CH01-SZ	831040



## **1.8 Applicable Standards**

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

- 47 CFR Part 2, 22(H), 24(E), 27(L)
- ANSI / TIA / EIA-603-D-2010
- FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

### **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

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

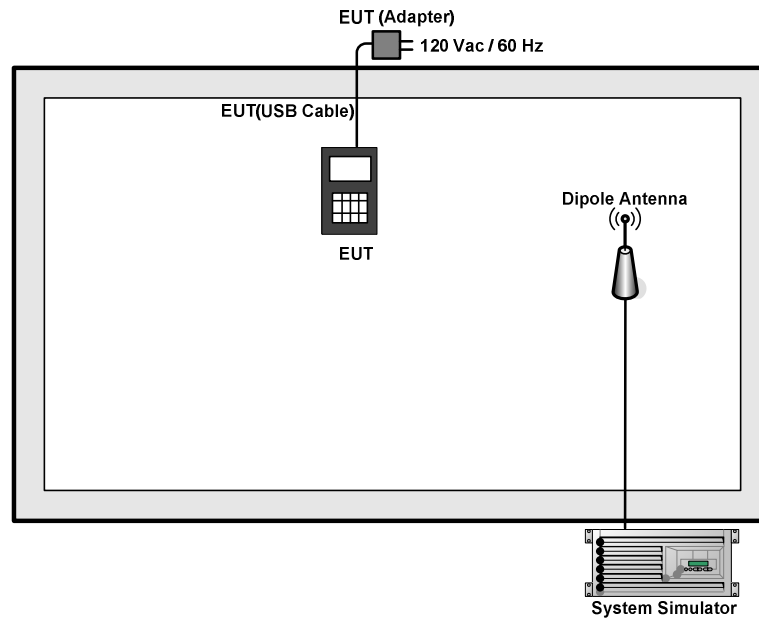
1. 30 MHz to 10th harmonic for WCDMA Band V.
2. 30 MHz to 10th harmonic for WCDMA Band IV.
3. 30 MHz to 10th harmonic for WCDMA Band II.

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Modes	
Band	Radiated TCs
WCDMA Band V	■ RMC 12.2Kbps Link
WCDMA Band II	■ RMC 12.2Kbps Link
WCDMA Band IV	■ RMC 12.2Kbps Link

## 2.2 Connection Diagram of Test System



## 2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m

### 3 Conducted Test Result

#### 3.1 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.2 Test Setup

##### 3.2.1 Conducted Output Power



Please refer to Appendix A.

#### 3.3 Conducted Output Power

##### 3.3.1 Description of the Conducted Output Power

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

##### 3.3.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure the maximum burst average power for WCDMA.

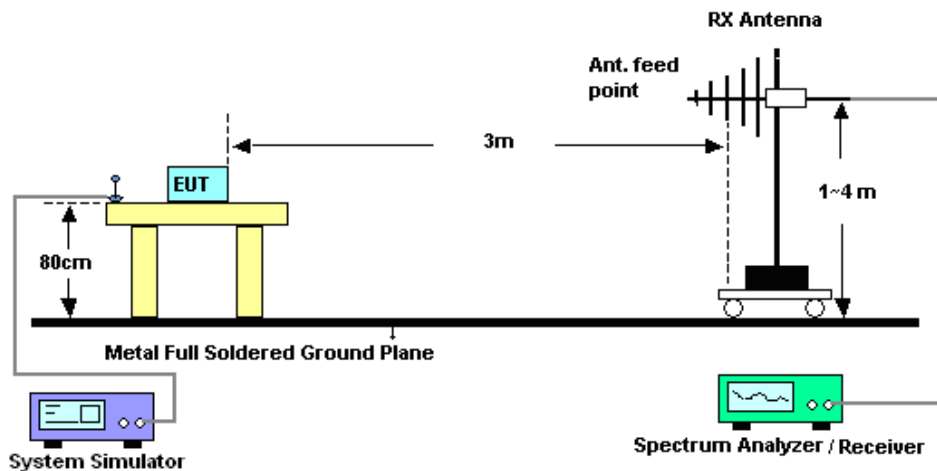
## 4 Radiated Test Items

### 4.1 Measuring Instruments

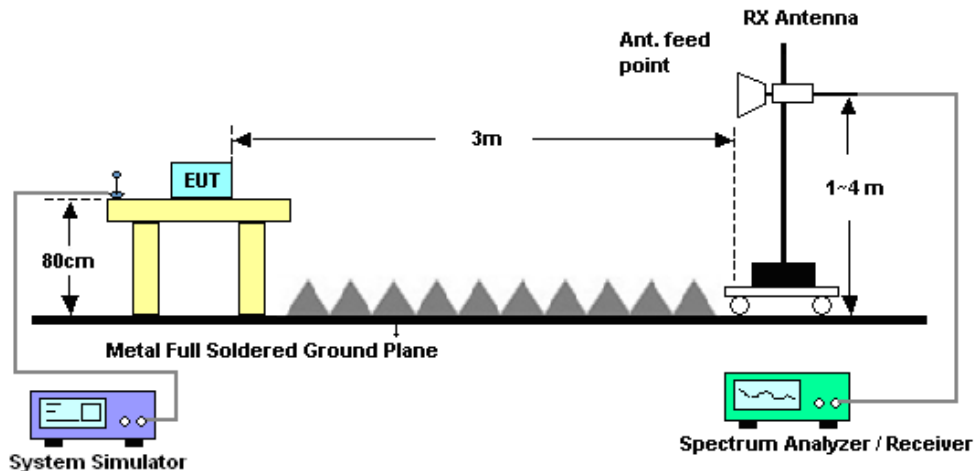
See list of measuring instruments of this test report.

### 4.2 Test Setup

#### 4.2.1 For radiated test from 30MHz to 1GHz



#### 4.2.2 For radiated test above 1GHz



### 4.3 Test Result of Radiated Test

Please refer to Appendix B.



## 4.4 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

### 4.4.1 Description of the ERP/EIRP Measurement

The substitution method, in ANSI / TIA / EIA-603-D-2010, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. The ERP of mobile transmitters must not exceed 7 Watts (Cellular Band) and the EIRP of mobile transmitters are limited to 2 Watts (PCS Band) and 1 Watts (AWS Band).

### 4.4.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v02r02 Section 5.2.1. (for CDMA/WCDMA), Section 5.2.2.2 (for GSM/GPRS/EDGE) and ANSI / TIA-603-D-2010 Section 2.2.17.
2. The EUT was placed on a non-conductive rotating platform 0.8 meters high 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 RMS detector per section 5. of KDB 971168 D01.
3. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power. The maximum 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.
4. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-D. The EUT was replaced by the 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,  $EIRP = LVL + \text{Correction factor}$  and  $ERP = EIRP - 2.15$ . Take the record of the output power at substitution antenna.



	GSM/GPRS/EDGE	WCDMA/HSPA
SPAN	500kHz	10MHz
RBW	10kHz	100kHz
VBW	30kHz	300kHz
Detector	RMS	RMS
Trace	Average	Average
Average Type	Power	Power
Sweep Count	100	100



## 4.5 Field Strength of Spurious Radiation Measurement

### 4.5.1 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.

### 4.5.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v02r02 Section 5.8 and ANSI / TIA-603-D-2010 Section 2.2.12.
2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11.  $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
12.  $ERP \text{ (dBm)} = EIRP - 2.15$
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)  
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$   
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$   
 $= -13\text{dBm}.$



## 5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz;Max 30dBm	Jun. 07, 2015	Jan. 11, 2016	Jun. 06, 2016	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	23188	30MHz-2GHz	Oct. 17, 2015	Jan. 11, 2016	Oct. 16, 2016	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1285	1GHz~18GHz	Jan. 20, 2015	Jan. 11, 2016	Jan. 19, 2016	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Aug.19, 2015	Jan. 11, 2016	Aug. 18, 2016	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz ~3000MHz / 30 dB	Jan. 28, 2015	Jan. 11, 2016	Jan. 27, 2016	Radiation (03CH01-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Jan. 28, 2015	Jan. 11, 2016	Jan. 27, 2016	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	May 05, 2015	Jan. 11, 2016	May 04, 2016	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Jan. 11, 2016	NCR	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jan. 11, 2016	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Jan. 11, 2016	NCR	Radiation (03CH01-SZ)

NCR: No Calibration Required





## 6 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.8 dB
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## Appendix A. Test Results of Conducted Test

### Conducted Output Power(Average power)

Conducted Power (*Unit: dBm)									
Band	WCDMA Band V			WCDMA Band II			WCDMA Band IV		
Channel	4132	4182	4233	9262	9400	9538	1312	1413	1513
Frequency	826.4	836.4	846.6	1852.4	1880	1907.6	1712.4	1732.6	1752.6
RMC 12.2Kbps	23.10	22.98	22.87	22.34	22.52	22.64	22.43	22.53	22.32
HSDPA Subtest-1	22.29	22.08	22.09	21.54	21.38	21.42	21.07	21.20	21.10
HSDPA Subtest-2	22.37	22.20	22.18	21.50	21.20	21.52	21.05	21.26	21.21
HSDPA Subtest-3	22.21	22.05	22.19	20.79	20.68	20.76	20.50	20.73	20.55
HSDPA Subtest-4	22.27	22.03	22.17	20.79	20.70	20.76	20.04	20.63	20.56
HSUPA Subtest-1	21.91	21.60	22.03	20.84	21.05	21.41	20.83	20.76	20.70
HSUPA Subtest-2	20.78	20.51	20.71	19.57	19.62	19.69	19.46	19.53	19.57
HSUPA Subtest-3	20.92	20.79	20.69	19.03	19.08	19.60	18.74	18.93	18.79
HSUPA Subtest-4	20.94	20.97	21.09	19.55	19.64	19.71	19.39	20.38	20.31
HSUPA Subtest-5	22.20	22.00	22.10	21.30	21.10	21.50	21.10	21.10	21.20



## Appendix B. Test Results of Radiated Test

### ERP/EIRP

Channel	Mode	Horizontal		Vertical	
		ERP(dBm)	ERP(W)	ERP(dBm)	ERP(W)
Lowest	WCDMA Band V RMC 12.2Kbps	19.38	0.0867	16.48	0.0445
Middle		17.72	0.0592	15.29	0.0338
Highest		16.29	0.0426	14.39	0.0275
Limit	ERP < 7W	Result		PASS	

Channel	Mode	Horizontal		Vertical	
		EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	WCDMA Band II RMC 12.2Kbps	23.44	0.2208	23.82	0.2410
Middle		25.08	0.3221	25.12	0.3251
Highest		24.56	0.2858	24.70	0.2951
Limit	EIRP < 2W	Result		PASS	

Channel	Mode	Horizontal		Vertical	
		EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	WCDMA Band IV RMC 12.2Kbps	23.76	0.2377	23.69	0.2339
Middle		23.80	0.2399	23.81	0.2404
Highest		24.17	0.2612	23.97	0.2495
Limit	EIRP < 1W	Result		PASS	



**Radiated Spurious Emission**

WCDMA Band V(RMC 12.2Kbps)									
Channel	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)
Middle	1672	-52.50	-13	-39.50	-55.54	-50.93	4.92	5.50	H
	2510	-58.34	-13	-45.34	-64.63	-55.88	6.11	5.80	H
	3346	-57.77	-13	-44.77	-66.49	-56.39	7.33	8.10	H
	1672	-52.48	-13	-39.48	-55.86	-50.91	4.92	5.50	V
	2510	-59.84	-13	-46.84	-65.42	-57.38	6.11	5.80	V
	3346	-57.93	-13	-44.93	-66.16	-56.55	7.33	8.10	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

WCDMA Band II(RMC 12.2Kbps)									
Channel	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)
Middle	3760	-47.20	-13	-34.20	-61.70	-47.57	7.73	8.10	H
	5640	-49.96	-13	-36.96	-67.97	-50.86	9.5	10.40	H
	7520	-46.32	-13	-33.32	-66.73	-46.94	11.08	11.70	H
	3760	-46.81	-13	-33.81	-61.9	-47.18	7.73	8.1	V
	5640	-49.50	-13	-36.50	-67.77	-50.40	9.5	10.4	V
	7520	-47.01	-13	-34.01	-67.51	-47.63	11.08	11.7	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

WCDMA Band IV(RMC 12.2Kbps)									
Channel	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)
Middle	3465.2	-40.74	-13	-27.74	-55.49	-46.01	7.33	12.60	H
	5197.8	-49.64	-13	-36.64	-67.64	-53.19	9.15	12.70	H
	6930.4	-48.56	-13	-35.56	-67.37	-49.62	10.64	11.70	H
	3465.2	-44.56	-13	-31.56	-57.22	-49.83	7.33	12.60	V
	5197.8	-54.77	-13	-41.77	-68.52	-58.32	9.15	12.70	V
	6930.4	-48.04	-13	-35.04	-66.13	-49.10	10.64	11.70	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.