



FCC RF Test Report

APPLICANT : Wistron Corporation
EQUIPMENT : Tablet PC
BRAND NAME : Lenovo
MODEL NAME : TP00082AUC
FCC ID : PU5-TP00082AUC
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E), 27(L)
CLASSIFICATION : PCS Licensed Transmitter (PCB)

Equipment: AriPrime EM7455 and Intel 8260D2W tested inside of Lenovo Tablet PC.

This is a partial report which is included the conducted output power, ERP/EIRP, and radiated test items. The product was received on Dec. 04, 2015 and testing was completed on Jan. 28, 2016. We, SPORTON INTERNATIONAL 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 INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.

SPORTON INTERNATIONAL INC.

TEL : 886-3-327-3456

FAX : 886-3-328-4978

FCC ID : PU5-TP00082AUC

Page Number : 1 of 15

Report Issued Date : Feb. 02, 2016

Report Version : Rev. 01

Report Template No.: BU5-FG22/24/27 Version 1.1



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.....	6
1.7 Testing Location	7
1.8 Applicable Standards	7
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	8
2.1 Test Mode.....	8
2.2 Connection Diagram of Test System	9
2.3 Support Unit used in test configuration	9
3 CONDUCTED TEST RESULT	10
3.1 Measuring Instruments.....	10
3.2 Test Setup	10
3.3 Test Result of Conducted Test.....	10
3.4 Conducted Output Power and ERP/EIRP	11
4 RADIATED SPURIOUS EMISSION	12
4.1 Radiated Test Items	12
4.2 Field Strength of Spurious Radiation Measurement	13
5 LIST OF MEASURING EQUIPMENT	14
6 UNCERTAINTY OF EVALUATION	15
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
FG5N2711-01A	Rev. 01	Initial issue of report	Feb. 02, 2016

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§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	-
4.2	§2.1053 §22.917(a) §24.238(a) §27.53(h)	Field Strength of Spurious Radiation	< 43+10log10(P[Watts])	PASS	Under limit 30.46 dB at 6849.000 MHz



1 General Description

1.1 Applicant

Wistron Corporation

21F, No. 88, Sec. 1, Hsin Tai Wu Rd., Hsichih Dist, New Taipei City 221, Taiwan R.O.C.

1.2 Manufacturer

Wistron Corporation

21F, No. 88, Sec. 1, Hsin Tai Wu Rd., Hsichih Dist, New Taipei City 221, Taiwan R.O.C.

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Tablet PC
Brand Name	Lenovo
Model Name	TP00082AUC
FCC ID	PU5-TP00082AUC
EUT supports Radios application	WCDMA/HSPA/LTE/NFC WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth v4.1 EDR/LE
Integrated the WWAN Module	Brand Name: AriPrime Model Name: EM7455
Integrated the WLAN Module	Brand Name: Intel Model Name: 8260D2W
Integrated the NFC Module	Brand Name: Foxconn Model Name: T77H519
EUT Stage	Production Unit

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. Equipment: AriPrime EM7455 and Intel 8260D2W tested inside of Lenovo Tablet PC

EM7455			3G & LTE
Manufacturer	PULSE	Peak gain	3.03
Part number	025.900FA.0001	Antenna type	Monopole

1.4 Product Specification subjective to this standard

Product Specification subjective to this standard	
Tx Frequency	WCDMA: Band V: 826.4 MHz ~ 846.6 MHz Band II: 1852.4 MHz ~ 1907.6 MHz Band IV: 1712.4 MHz ~ 1752.6 MHz
Rx Frequency	WCDMA: Band V: 871.4 MHz ~ 891.6 MHz Band II: 1932.4 MHz ~ 1987.6 MHz Band IV: 2112.4 MHz ~ 2152.6 MHz
Maximum Output Power to Antenna	WCDMA: Band V: 22.97 dBm Band II: 22.88 dBm Band IV: 22.83 dBm
Antenna Gain	Cellular Band: -0.56 dBi PCS Band: 3.01 dBi AWS Band: 3.11 dBi
Type of Modulation	WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink)

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	WCDMA Band V RMC 12.2Kbps	QPSK	0.1062
Part 24	WCDMA Band II RMC 12.2Kbps	QPSK	0.3882
Part 27	WCDMA Band IV RMC 12.2Kbps	QPSK	0.3926

1.7 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	Sporton Site No.	
	TH03-HY	03CH07-HY

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
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.



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:

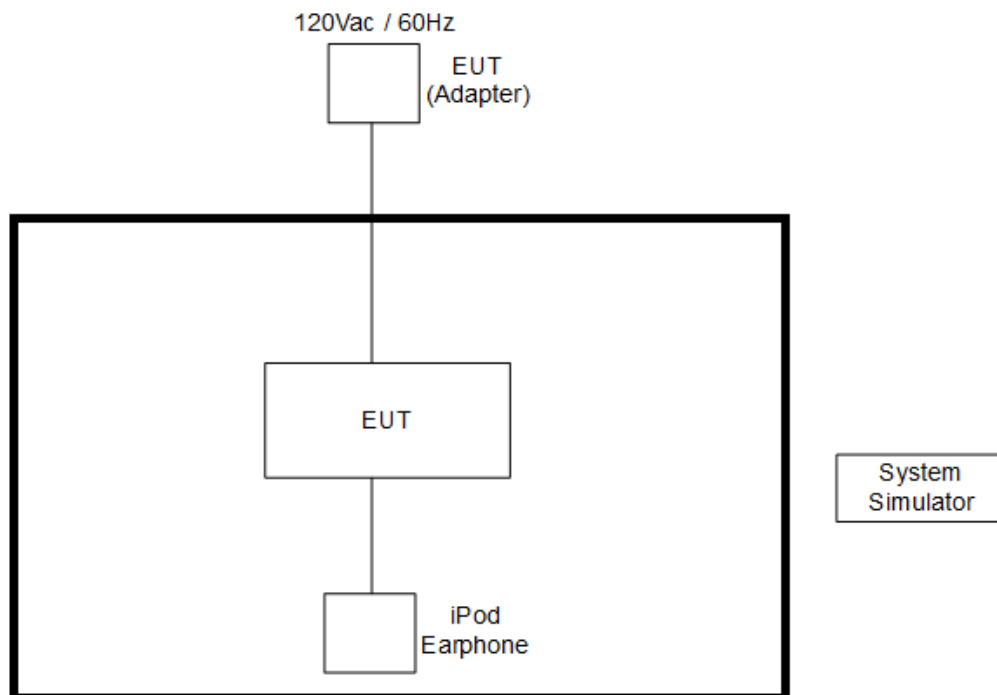
1. 30 MHz to 9000 MHz for WCDMA Band V.
2. 30 MHz to 18000 MHz for WCDMA Band IV.
3. 30 MHz to 19000 MHz for WCDMA Band II.

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	Conducted TCs
WCDMA Band V	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
WCDMA Band II	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
WCDMA Band IV	■ RMC 12.2Kbps Link	■ 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
2.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A

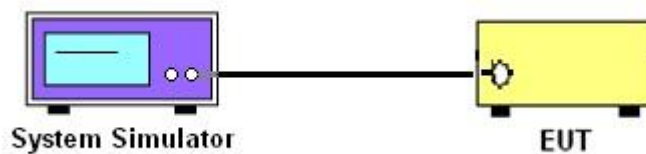
3 Conducted Test Result

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.2 Test Setup

3.2.1 Conducted Output Power



3.3 Test Result of Conducted Test

Please refer to Appendix A.



3.4 Conducted Output Power and ERP/EIRP

3.4.1 Description of the Conducted Output Power and ERP/EIRP

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.

The ERP of mobile transmitters must not exceed 7 Watts for GSM850 and WCDMA Band V.

The EIRP of mobile transmitters must not exceed 2 Watts for GSM1900 and WCDMA Band II.

The EIRP of mobile transmitters must not exceed 1 Watts for WCDMA Band IV.

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$, $ERP = EIRP - 2.15$, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.4.2 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 GSM and maximum average power for other modulation signal.

4 Radiated Spurious Emission

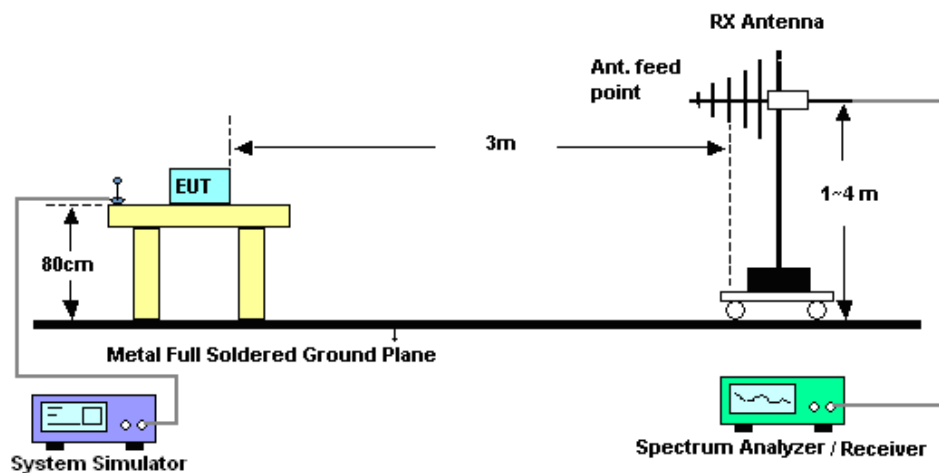
4.1 Radiated Test Items

4.1.1 Measuring Instruments

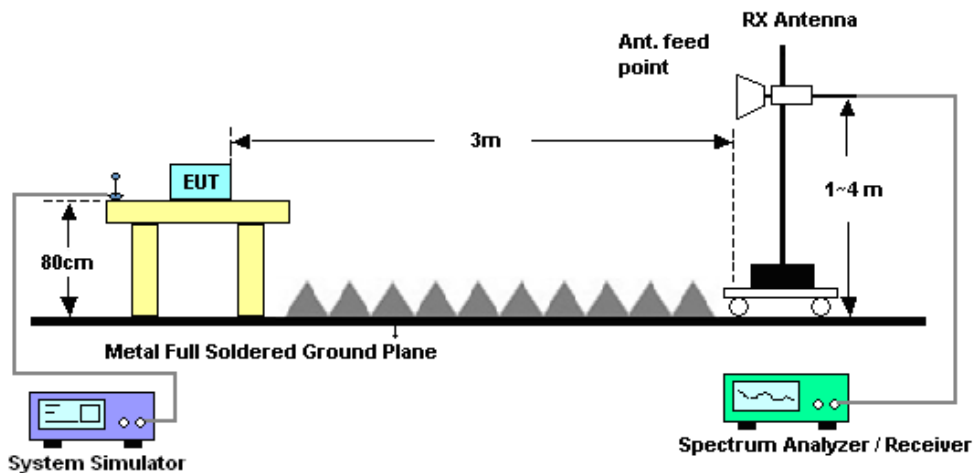
See list of measuring instruments of this test report.

4.1.2 Test Setup

For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



4.1.3 Test Result of Radiated Test

Please refer to Appendix B.



4.2 Field Strength of Spurious Radiation Measurement

4.2.1 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.

4.2.2 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
Bilog Antenna	TESEQ	CBL 6111D	35414	30MHz~1GHz	Nov. 17, 2015	Dec. 29, 2015~ Jan. 04, 2016	Nov. 16, 2016	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 21, 2015	Dec. 29, 2015~ Jan. 04, 2016	Aug. 20, 2016	Radiation (03CH07-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 25, 2015	Dec. 29, 2015~ Jan. 04, 2016	Aug. 24, 2016	Radiation (03CH07-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120D	9120D-115 6	1GHz ~ 18GHz	Aug. 21, 2015	Dec. 29, 2015~ Jan. 04, 2016	Aug. 20, 2016	Radiation (03CH07-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA9170 584	18GHz- 40GHz	Nov. 02, 2015	Dec. 29, 2015~ Jan. 04, 2016	Nov. 01, 2016	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1000MH z	Mar. 12, 2015	Dec. 29, 2015~ Jan. 04, 2016	Mar. 11, 2016	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A023 62	1GHz~ 26.5GHz	Oct. 19, 2015	Dec. 29, 2015~ Jan. 04, 2016	Oct. 18, 2016	Radiation (03CH07-HY)
Signal Analyzer	Rohde & Schwarz	FSV 30	101749	10Hz~30GHz	Mar. 10, 2015	Dec. 29, 2015~ Jan. 04, 2016	Mar. 09, 2016	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Dec. 29, 2015~ Jan. 04, 2016	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 degree	N/A	Dec. 29, 2015~ Jan. 04, 2016	N/A	Radiation (03CH07-HY)
Signal Generator	Rohde & Schwarz	SMF100A	101107	100kHz~40GHz	May 22, 2015	Dec. 29, 2015~ Jan. 04, 2016	Sep. 21, 2016	Radiation (03CH07-HY)
Base Station	Agilent	E5515C	MY502669 77	810MHz~2010M Hz	Jul. 13, 2015	Dec. 24, 2015~ Jan. 28, 2016	Jul. 12, 2016	Conducted (TH03-HY)



6 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.80
---	------

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 12.2K	22.70	22.75	22.97	22.83	22.88	22.68	22.62	22.83	22.76
HSDPA Subtest-1	22.32	22.52	22.58	22.56	22.48	22.29	22.01	22.22	22.23
HSDPA Subtest-2	22.33	22.47	22.56	22.41	22.46	22.28	22.02	22.24	22.20
HSDPA Subtest-3	21.85	21.92	22.36	22.06	21.88	21.74	21.57	22.10	21.72
HSDPA Subtest-4	21.83	21.94	22.27	21.95	21.98	21.79	21.56	22.08	21.66
HSUPA Subtest-1	22.37	22.63	22.52	22.44	22.55	22.32	22.12	22.45	22.19
HSUPA Subtest-2	21.20	21.23	21.25	21.79	21.86	21.61	20.67	21.13	20.56
HSUPA Subtest-3	21.31	21.39	21.91	21.38	21.52	21.26	21.19	21.66	21.35
HSUPA Subtest-4	21.52	21.41	21.98	21.77	21.81	21.68	20.77	21.17	20.66
HSUPA Subtest-5	22.43	22.62	22.90	22.40	22.47	22.29	22.01	22.68	22.34

ERP/EIRP

Modes	WCDMA Band V (RMC 12.2Kbps)			WCDMA Band II (RMC 12.2Kbps)			WCDMA Band IV (RMC12.2Kbps)		
Channel	4132 (Low)	4182 (Mid)	4233 (High)	9262 (Low)	9400 (Mid)	9538 (High)	1312 (Low)	1413 (Mid)	1513 (High)
Frequency (MHz)	826.4	836.4	846.6	1852.4	1880	1907.6	1712.4	1732.6	1752.6
Conducted Power (dBm)	22.70	22.75	22.97	22.83	22.88	22.68	22.62	22.83	22.76
Conducted Power (Watts)	0.1862	0.1884	0.1982	0.1919	0.1941	0.1854	0.1828	0.1919	0.1888
EIRP(dBm)	19.99	20.04	20.26	25.84	25.89	25.69	25.73	25.94	25.87
EIRP(Watts)	0.0998	0.1009	0.1062	0.3837	0.3882	0.3707	0.3741	0.3926	0.3864



Appendix B. Test Results of Radiated Test

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)
Lowest	1656	-61.86	-13	-48.86	-72.76	-63.59	0.98	4.86	H
	2479	-57.43	-13	-44.43	-73.73	-59.33	1.28	5.34	H
	3305	-59.43	-13	-46.43	-76.74	-62.88	1.54	7.14	H
	1656	-63.63	-13	-50.63	-75.38	-65.36	0.98	4.86	V
	2479	-58.65	-13	-45.65	-76.38	-60.55	1.28	5.34	V
	3305	-58.43	-13	-45.43	-77.28	-61.88	1.54	7.14	V
Middle	1672	-63.65	-13	-50.65	-74.81	-65.33	0.99	4.82	H
	2512	-45.66	-13	-32.66	-62.25	-47.63	1.29	5.41	H
	3345	-59.83	-13	-46.83	-77.21	-63.44	1.56	7.32	H
	1672	-63.34	-13	-50.34	-75.13	-65.02	0.99	4.82	V
	2512	-47.82	-13	-34.82	-65.71	-49.79	1.29	5.41	V
	3345	-57.83	-13	-44.83	-76.82	-61.44	1.56	7.32	V
Highest	1696	-63.51	-13	-50.51	-75.18	-65.11	1.00	4.75	H
	2536	-53.01	-13	-40.01	-69.63	-54.99	1.30	5.43	H
	3386	-59.64	-13	-46.64	-77.16	-63.42	1.57	7.50	H
	1696	-63.45	-13	-50.45	-75.89	-65.05	1.00	4.75	V
	2536	-54.71	-13	-41.71	-72.83	-56.69	1.30	5.43	V
	3386	-58.27	-13	-45.27	-77.22	-62.05	1.57	7.50	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)
Lowest	3700	-53.57	-13	-40.57	-72.86	-60.14	1.67	8.24	H
	5548	-54.64	-13	-41.64	-79.52	-61.71	2.65	9.72	H
	7403	-54.39	-13	-41.39	-81.04	-63.54	2.46	11.61	H
	3700	-49.83	-13	-36.83	-70.07	-56.4	1.67	8.24	V
	5548	-53.74	-13	-40.74	-79.71	-60.81	2.65	9.72	V
	7403	-52.42	-13	-39.42	-80.81	-61.57	2.46	11.61	V
Middle	3763	-55.63	-13	-42.63	-75.44	-62.26	1.69	8.32	H
	5646	-53.17	-13	-40.17	-77.93	-60.22	2.71	9.76	H
	7522	-51.49	-13	-38.49	-78.44	-60.88	2.42	11.81	H
	3763	-56.96	-13	-43.96	-77.49	-63.59	1.69	8.32	V
	5646	-51.87	-13	-38.87	-77.71	-58.92	2.71	9.76	V
	7522	-49.72	-13	-36.72	-78.46	-59.11	2.42	11.81	V
Highest	3812	-51.74	-13	-38.74	-72.62	-58.41	1.70	8.37	H
	5723	-54.56	-13	-41.56	-79.48	-61.6	2.75	9.79	H
	7634	-52.96	-13	-39.96	-80.62	-62.45	2.39	11.88	H
	3812	-52.43	-13	-39.43	-73.74	-59.1	1.70	8.37	V
	5723	-53.78	-13	-40.78	-79.64	-60.82	2.75	9.79	V
	7634	-50.97	-13	-37.97	-80.3	-60.46	2.39	11.88	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)
Lowest	3420	-59.59	-13	-46.59	-77.15	-65.66	1.58	7.65	H
	5137	-55.77	-13	-42.77	-79.17	-63.05	2.42	9.70	H
	6849	-54.54	-13	-41.54	-80.88	-62.52	2.64	10.62	H
	3420	-58.59	-13	-45.59	-77.21	-64.66	1.58	7.65	V
	5137	-55.16	-13	-42.16	-79.71	-62.44	2.42	9.70	V
	6849	-43.46	-13	-30.46	-80.83	-51.44	2.64	10.62	V
Middle	3462	-54.64	-13	-41.64	-72.17	-60.88	1.59	7.83	H
	5198	-56.22	-13	-43.22	-79.65	-63.47	2.45	9.70	H
	6930	-54.34	-13	-41.34	-80.53	-62.44	2.61	10.72	H
	3462	-52.45	-13	-39.45	-71.51	-58.69	1.59	7.83	V
	5198	-55.14	-13	-42.14	-79.67	-62.39	2.45	9.70	V
	6930	-53.34	-13	-40.34	-80.57	-61.44	2.61	10.72	V
Highest	3504	-53.93	-13	-40.93	-71.68	-60.33	1.61	8.00	H
	5257	-53.84	-13	-40.84	-77.88	-61.05	2.49	9.70	H
	7010	-54.54	-13	-41.54	-80.58	-62.77	2.59	10.82	H
	3504	-52.36	-13	-39.36	-71.37	-58.76	1.61	8.00	V
	5257	-54.84	-13	-41.84	-79.81	-62.05	2.49	9.70	V
	7010	-53.19	-13	-40.19	-80.46	-61.422	2.59	10.82	V

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