Variant FCC RF Test Report

APPLICANT	:	**Lenovo Mobile Communication Technology Ltd.**
EQUIPMENT	:	**Mobile Cellular Phone**
BRAND NAME	:	**Lenovo**
MODEL NAME	:	**Lenovo K33b36, Lenovo K33b37**
FCC ID	:	**YCNK33B36**
STANDARD	:	**FCC 47 CFR Part 2, 22(H), 24(E), 27(L)**
CLASSIFICATION	:	**PCS Licensed Transmitter Held to Ear (PCE)**

This is a variant report which is only valid together with the original test report. The product was received on Oct. 24, 2016 and testing was completed on Dec. 08, 2016. We, SPORTON INTERNATIONAL (KUNSHAN) 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Prepared by: James Huang / Manager

Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China

TABLE OF CONTENTS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG662816-04	Rev. 01	This is a variant report for Lenovo K33b36, K33b37. The product equality declaration could be referred to Appendix D. Based on the similarity between two models, only the worst cases of EIRP, and all Band Conducted Power, and worst cases Spurious Emission from original test report (Sporton Report Number FG662816) were verified for the differences.	Dec. 21, 2016

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§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 43.95 dB at 7518.000 MHz

1 General Description

1.1 Applicant

Lenovo Mobile Communication Technology Ltd.
No.999, Qishan North 2nd Road, Information & Optoelectronics Park, Torch Hi-tech Industry Development Zone, Xiamen, P.R.China

1.2 Manufacturer

Motorola Mobility LLC
222 W. Merchandise Mart Plaza, Chicago IL 60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Lenovo
Model Name	Lenovo K33b36, Lenovo K33b37
FCC ID	YCNK33B36
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/ HSPA+ (16QAM uplink is not supported)/LTE WLAN 2.4GHz 802.11b/g/n HT20 Bluetooth v3.0+EDR/Bluetooth v4.0 LE Bluetooth v4.2 LE
IMEI Code	Conducted: 861577030015874/861577030015882 Radiation: 861577030041250/861577030041268 ERP/EIRP: 861577030041250/861577030041268
HW Version	82937_1_13
SW Version	K33_S009_1607022329_ROW
EUT Stage	Identical Prototype

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. After pre-scan two SIM cards power, we found test result of the SIM1 was the worse, so we chose dual SIM1 card to perform all tests.
3. There are two types of EUT sample 1 and sample 2, the differences between two samples are only for SIM slot, sample 1 is dual SIM slot, sample 2 is single SIM slot. According to the difference, we evaluate is not affect RF performance, so only choose sample 1 to perform RF test.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	**GSM/GPRS/EDGE:** 850: 824.2 MHz ~ 848.8 MHz 1900: 1850.2 MHz ~ 1909.8MHz **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	**GSM/GPRS/EDGE:** 850: 869.2 MHz ~ 893.8 MHz 1900: 1930.2 MHz ~ 1989.8 MHz **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	**GSM/GPRS/EDGE:** 850: 33.09 dBm 1900: 30.05 dBm **WCDMA:** Band V: 23.19 dBm Band II: 23.01 dBm Band IV: 22.83 dBm
Antenna Type	LDS Antenna
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA : BPSK (Uplink) HSDPA/DC-HSDPA : QPSK (Uplink) HSUPA : QPSK (Uplink) HSPA+ : 16QAM (16QAM uplink is not supported) DC-HSDPA : 64QAM

1.5 Specification of Accessory

Specification of Accessory				
AC Adapter 1	**Brand Name**	Lenovo (Acbel)	**Model Name**	C-P35
	Power Rating	I/P: 100-240 Vac, 300mA, O/P: 5.2Vdc, 2000mA		
AC Adapter 2	**Brand Name**	Lenovo (Huntkey)	**Model Name**	C-P35
	Power Rating	I/P: 100-240Vac, 500mA, O/P: 5.2Vdc, 2000mA		
Battery	**Brand Name**	Lenovo (scud)	**Model Name**	BL267
	Power Rating	4.4Vdc, 3000mAh		
Earphone	**Brand Name**	Lenovo (cosonic)	**Model Name**	LS-118M-9
	Signal Line Type	1.2m non-shielded without core		
USB Cable 1	**Brand Name**	Lenovo(saibao)	**Model Name**	SWT-A053A
	Signal Line Type	1.0m shielded without core		
USB Cable 2	**Brand Name**	Lenovo(starw)	**Model Name**	XJ-007070
	Signal Line Type	1.0m shielded without core		
LCD Panel	**Brand Name**	tianma	**Model Name**	Black：TL050VVMP04-00 Golden：TL050VVMP06-00
Camera	**Brand Name**	Q Technology	**Model Name**	Front：FX219BQS Post：FX258BDS
CTP Module	**Brand Name**	O-FILM	**Model Name**	black：MCF-050-2585 Golden：MCF-050-2585-02 white：MCF-050-2585-01

1.6 Modification of EUT

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

1.7 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	Maximum ERP/EIRP (W)
Part 22H	GSM850 GSM	GMSK	0.573
Part 24E	WCDMA Band II RMC 12.2Kbps	QPSK	0.153
Part 27L	WCDMA Band IV RMC 12.2Kbps	QPSK	0.118

1.8 Testing Location

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.	
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
Test Site No.	**Sporton Site No.**	**FCC Registration No.**
	03CH02-KS	418269

Note: The test site complies with ANSI C63.4 2014 requirement.

1.9 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 GSM850.
2. 30 MHz to 10th harmonic for WCDMA Band IV.
3. 30 MHz to 10th harmonic for WCDMA Band II.

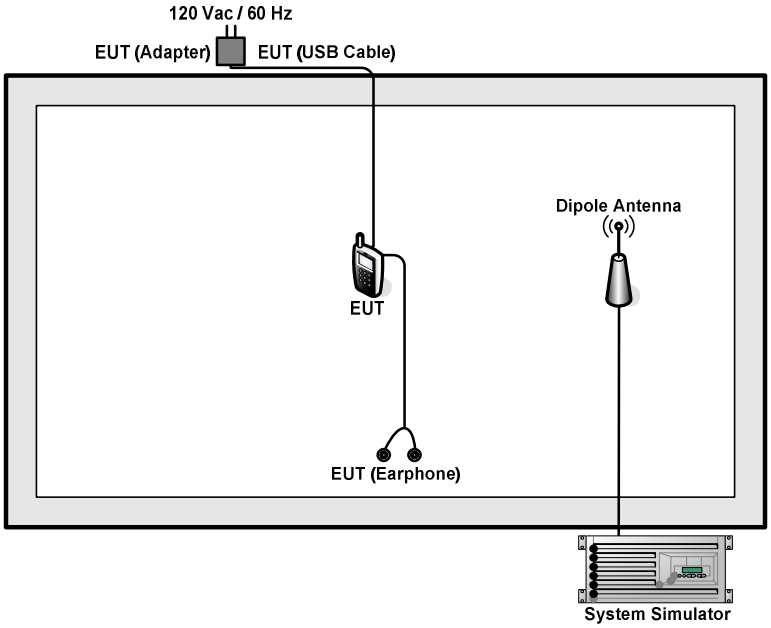
All modes and data rates and positions were investigated.

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

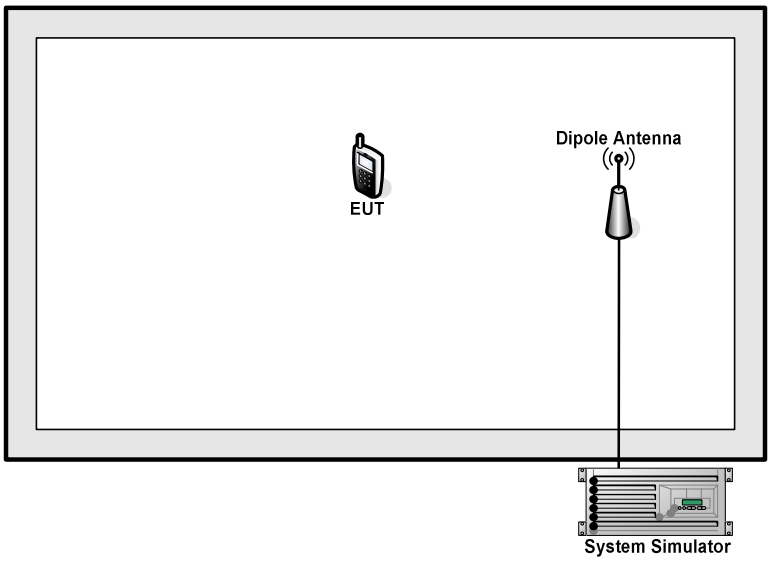
Test Modes		
Band	**Radiated TCs**	**Conducted TCs**
GSM 850	■ EDGE class 8 Link	■ GSM Link ■ EDGE class 8 Link
GSM 1900	-	■ GSM Link ■ EDGE class 8 Link
WCDMA Band V	-	■ RMC 12.2Kbps Link
WCDMA Band II	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
WCDMA Band IV	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link

2.2 Connection Diagram of Test System

For 22H, 24E



For 27L



2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	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

3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power

3.4.1 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.

3.4.2 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.

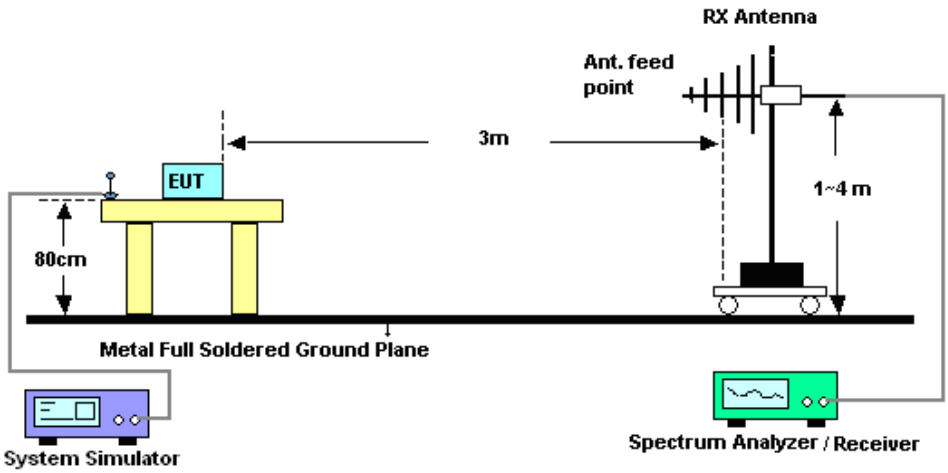
4 Radiated Test Items

4.1 Measuring Instruments

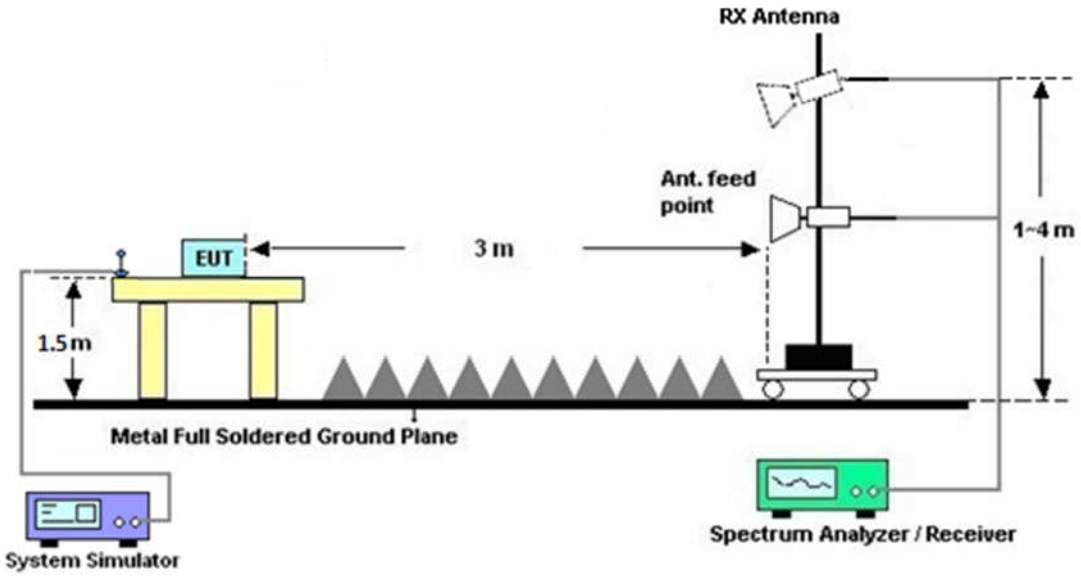
See list of measuring instruments of this test report.

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 for frequency below 1GHz and 1.5 meter for frequency above 1GHz) 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 + 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 for frequency below 1GHz and 1.5 meter for frequency above 1GHz 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 (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
12. ERP (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 + 10log(P) dB below the transmitter power P(Watts)

    = P(W) - [43 + 10log(P)] (dB)

    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

    = -13dBm.

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Aug. 09, 2016	Dec. 08, 2016	Aug. 08, 2017	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz~44GHz, MAX 30dB	Apr. 22, 2016	Dec. 08, 2016	Apr. 21, 2017	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30MHz~2GHz	Aug. 20, 2016	Dec. 08, 2016	Aug. 19, 2017	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 22, 2016	Dec. 08, 2016	Oct. 21, 2017	Radiation (03CH02-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 03, 2016	Dec. 08, 2016	Mar. 02, 2017	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1kHz~1000MHz / 32 dB	Apr. 22, 2016	Dec. 08, 2016	Apr. 21, 2017	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1~26.5GHz Gain 30dB	Oct. 13, 2016	Dec. 08, 2016	Oct. 12, 2017	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Dec. 08, 2016	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Dec. 08, 2016	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Dec. 08, 2016	NCR	Radiation (03CH02-KS)

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))	5.1dB

Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.5dB

Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.1dB

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

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
GSM	32.69	33.08	33.09	30.05	30.01	30.04
GPRS class 8	32.65	33.06	33.07	30.02	29.97	29.99
GPRS class 10	31.62	31.63	31.64	29.25	29.27	29.24
GPRS class 11	30.31	30.31	30.27	28.09	28.07	28.04
GPRS class 12	28.83	28.95	29.03	26.82	26.73	26.84
EGPRS class 8	25.72	25.59	25.63	25.24	25.18	24.95
EGPRS class 10	24.47	24.30	24.29	24.18	23.57	23.42
EGPRS class 11	23.45	23.30	23.33	22.89	22.70	22.58
EGPRS class 12	22.31	21.84	21.86	21.63	21.47	21.26

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
AMR 12.2Kbps	22.93	22.94	23.16	22.96	22.95	23.00	22.76	22.78	22.81
RMC 12.2Kbps	22.96	22.95	23.19	22.98	22.96	23.01	22.78	22.79	22.83
HSDPA Subtest-1	22.05	22.12	22.03	21.69	22.11	22.16	21.32	22.18	22.53
HSDPA Subtest-2	22.13	22.28	22.06	21.83	22.20	22.25	21.38	22.24	22.61
HSDPA Subtest-3	21.64	21.79	21.68	21.32	21.71	21.78	20.89	21.77	22.13
HSDPA Subtest-4	21.65	21.80	21.69	21.33	21.71	21.78	20.89	21.77	22.13
DC-HSDPA Subtest-1	22.08	22.17	22.06	21.98	22.00	21.99	21.80	21.89	21.94
DC-HSDPA Subtest-2	22.07	22.12	21.97	21.94	22.06	21.99	21.81	21.92	21.89
DC-HSDPA Subtest-3	21.43	21.50	21.44	21.42	21.49	21.42	21.35	21.39	21.30
DC-HSDPA Subtest-4	21.49	21.56	21.42	21.38	21.46	21.46	21.22	21.34	21.30
HSUPA Subtest-1	21.75	21.48	21.68	20.98	21.37	22.15	21.65	21.75	22.63
HSUPA Subtest-2	21.09	21.14	21.11	20.80	21.13	20.75	20.39	20.68	21.52
HSUPA Subtest-3	20.69	20.72	20.93	20.59	20.69	20.34	19.97	21.10	21.23
HSUPA Subtest-4	21.27	21.30	21.30	21.07	21.19	21.69	20.77	21.11	21.86
HSUPA Subtest-5	22.00	22.20	22.00	21.80	22.10	22.20	21.40	22.20	22.60

Appendix B. Test Results of Radiated Test

ERP/EIRP

Channel	Mode	Horizontal		Vertical	
		ERP(dBm)	ERP(W)	ERP(dBm)	ERP(W)
Lowest	GSM850 GSM	27.44	0.555	16.47	0.044
Middle		27.58	0.573	16.54	0.045
Highest		27.42	0.552	16.24	0.042
Limit	ERP < 7W	Result		PASS	

Channel	Mode	Horizontal		Vertical	
		EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	WCDMA Band II RMC 12.2Kbps	21.86	0.153	21.17	0.131
Middle		21.41	0.138	20.77	0.119
Highest		21.15	0.130	20.80	0.120
Limit	EIRP < 2W	Result		PASS	

Channel	Mode	Horizontal		Vertical	
		EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	WCDMA Band IV RMC 12.2Kbps	18.70	0.074	17.36	0.054
Middle		19.61	0.091	18.34	0.068
Highest		20.71	0.118	19.37	0.086
Limit	EIRP < 1W	Result		PASS	

Radiated Spurious Emission

GSM850 (EDGE class 8)									
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	-67.93	-13	-54.93	-66.13	-69.75	1.23	5.20	H
	2512	-66.90	-13	-53.90	-71.75	-69.13	1.52	5.90	H
	3344	-66.88	-13	-53.88	-74.44	-69.66	1.77	6.70	H
	1672	-68.76	-13	-55.76	-66.71	-70.58	1.23	5.20	V
	2512	-63.70	-13	-50.70	-72.00	-65.93	1.52	5.90	V
	3344	-63.24	-13	-50.24	-74.34	-66.02	1.77	6.70	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	3762	-64.35	-13	-51.35	-73.36	-69.21	1.93	6.80	H
	5640	-58.73	-13	-45.73	-69.29	-66.03	2.40	9.70	H
	7518	-56.95	-13	-43.95	-71.99	-66.00	2.76	11.81	H
	3762	-64.28	-13	-51.28	-73.59	-69.15	1.93	6.80	V
	5640	-62.08	-13	-49.08	-70.03	-69.38	2.40	9.70	V
	7518	-59.24	-13	-46.24	-71.73	-68.29	2.76	11.81	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	-62.86	-13	-49.86	-74.34	-67.74	1.81	6.69	H
	5196	-60.04	-13	-47.04	-70.74	-66.99	2.19	9.14	H
	6930	-57.64	-13	-44.64	-69.98	-65.72	2.6	10.68	H
	3465	-62.78	-13	-49.78	-74.53	-67.66	1.81	6.69	V
	5196	-61.23	-13	-48.23	-70.73	-68.18	2.19	9.14	V
	6930	-57.80	-13	-44.80	-70.31	-65.88	2.6	10.68	V

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