TEST REPORT

OF

FCC Part 22H, Part 24E and Part 15

FCC ID : UFSINK650D

Equipment Under Test	:	Wireless Router
Model Name	:	CDM-650PRO
Serial No.	:	N/A
Applicant	:	INEW DIGITAL COMPANY
Manufacturer	:	INEW DIGITAL COMPANY
Date of Test(s)	:	2007-05-10 ~ 2007-06-04
Date of Issue	:	2007-07-06

In the configuration tested, the EUT complied with the standards specified above.

Tested By: **Date:** **2007-07-06**

Feel Jeong

Approved By: **Date:** **2007-07-06**

Denny Ham

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1. General Information

1-1. Testing Laboratory

SGS Testing Korea Co., Ltd.
Wireless Div. 2FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040
www.electrolab.kr.sgs.com
Telephone : +82 +31 428 5700
FAX : +82 +31 427 2371

1-2. Details of Applicant

Applicant	: INEW DIGITAL COMPANY
Address	: Supply Bureau 3th floor KT&G #203-1, Pyong chon-dong, Daedeog-gu, Daejeon, Korea
Contact Person	: Yeon-Ha Lee
Phone No.	: 82-42-933-7328
Fax No.	: 82-42-934-4829

1-3. Description of EUT

Kind of Product	Wireless Router
Model Name	CDM-650PRO
Serial Number	N/A
Power Supply	AC 110 V
Frequency Range	TX: 824.70 ~ 848.31 MHz, 1851.25 ~ 1908.75 MHz RX: 869.70 ~ 893.31 MHz, 1931.25 ~ 1988.75 MHz
Transmit Power	CDMA : ERP 20.35 dBm (108.39 mW) US PCS :EIRP 20.08 dBm (101.86 mW)
Modulation Technique	OQPSK, QPSK
Number of Channels	20 CH for CDMA, 48 CH for US PCS
Emission Designation	CDMA, PCS
Operating Conditions	-30℃~60℃
Antenna Type	Monopole Type

1-4. Details of modification

-N/A

1.5. Test Equipment List

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Signal Generator	Agilent	E4438C	May 2008
Spectrum Analyzer	Agilent	E4440A	May 2008
Spectrum Analyzer	H.P	8593E	Sep. 2007
Power Meter	Agilent	E4416A	May 2008
Power Sensor	Agilent	E9327A	May 2008
DC Power Supply	Agilent	6674A	May 2008
Attenuator	Agilent	8494B	May 2008
Two-Line V-Network	NNB 41	Schaffner	Sep. 2007
Test Receiver	Rohde & Schwarz	ESVS10	May 2008
Test Receiver	Rohde & Schwarz	ESHS10	Aug. 2007
Ultra-Broadband Antenna	Rohde & Schwarz	HL562	Sep. 2007
Horn Antenna	Electro-Metrics	RGA-60	Dec. 2007
Horn Antenna	SCHWARZBECK	BBHA9120D(0600)	Jul. 2008
Dipole Antenna	VHAP/UHAP	975/958	Jun. 2008
Communication Antenna	AR	AT 4002	N.C.R
Band Reject Filter	Wainwright	WRCG824/849-814/85960/10SS	May 2008
Highpass Filter	Wainwright	WHK3.0/18G-10SS	Dec.2007
Mobile Test Unit	Agilent	E5515C	May 2008

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Pulse Limiter	Rohde & Schwarz	EHS3-Z2	Jan.2008
Preamplifier	Agilent	8449B	May 2008
Preamplifier	Agilent	8447F	Jun.2008
Dual Directional Coupler	Agilent	778D	Dec. 2007
Anechoic Chamber	SY Corporation	L x W x H 9.6 x 6.4 x 6.4	Aug. 2008

1.6. Summary of Test Results

Description of Test	FCC Rule	Result
AC Power Line Conducted Emissions	§15.107	Complied
Field Strength of Radiated Emission	§15.109(a)	Complied
Spurious Radiated Emission	§22.917(a) §24.238(a)	Complied
RF Radiated Output Power	§2.1046 §22.913(a) §24.232(c)	Complied
RF Exposure	15.247(i) 1.1307(b)(1)	Compiled

1.7. Description of Support Units

Product	Model No.	Serial No.	Manufacturer
Note PC	R40e	99-F1442	LG IBM

2. AC Power Line Conducted Emissions

2.1. Limit

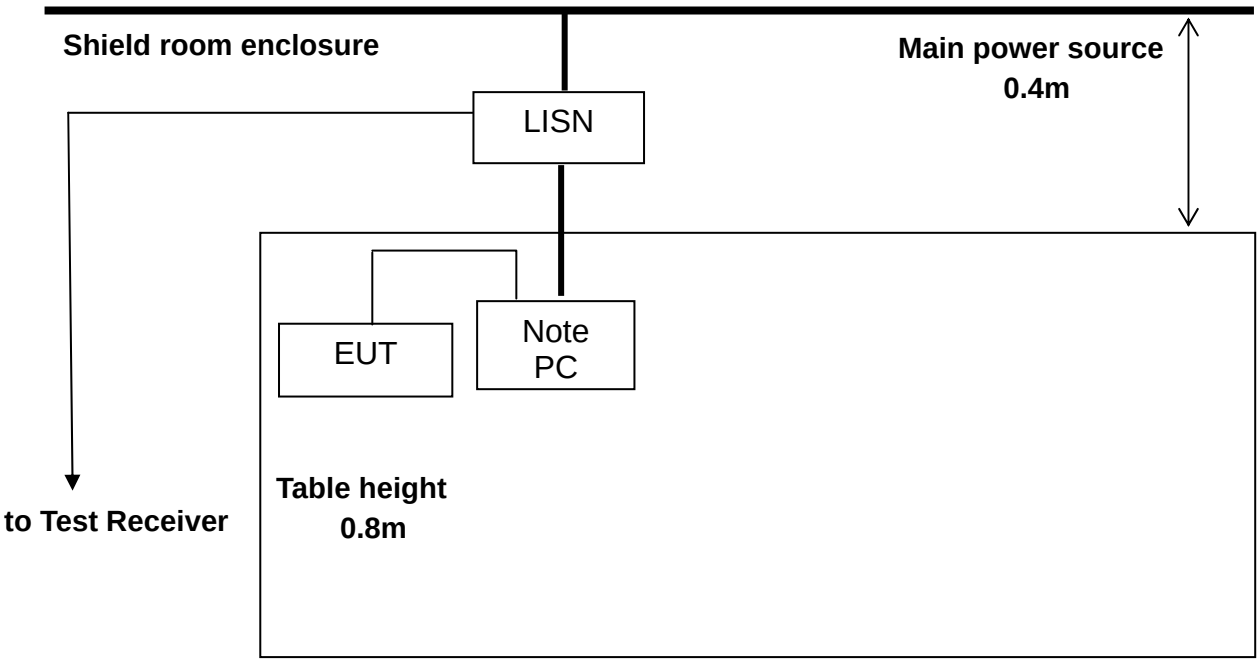
According to §15.107(a) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 uH/50 ohm line impedance stabilization network(LISN).
Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted limit (dBμV)	
	Qausi-peak	Average
0.15 – 0.50	66-56*	56-46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

* Decreases with the logarithm of the frequency.

2.2. Test Procedure

The test procedure is performed in a 6.5*3.6*3.6(L×W×H) shielded room. The EUT along with its peripherals were placed on a 1.0m(W)× 1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.



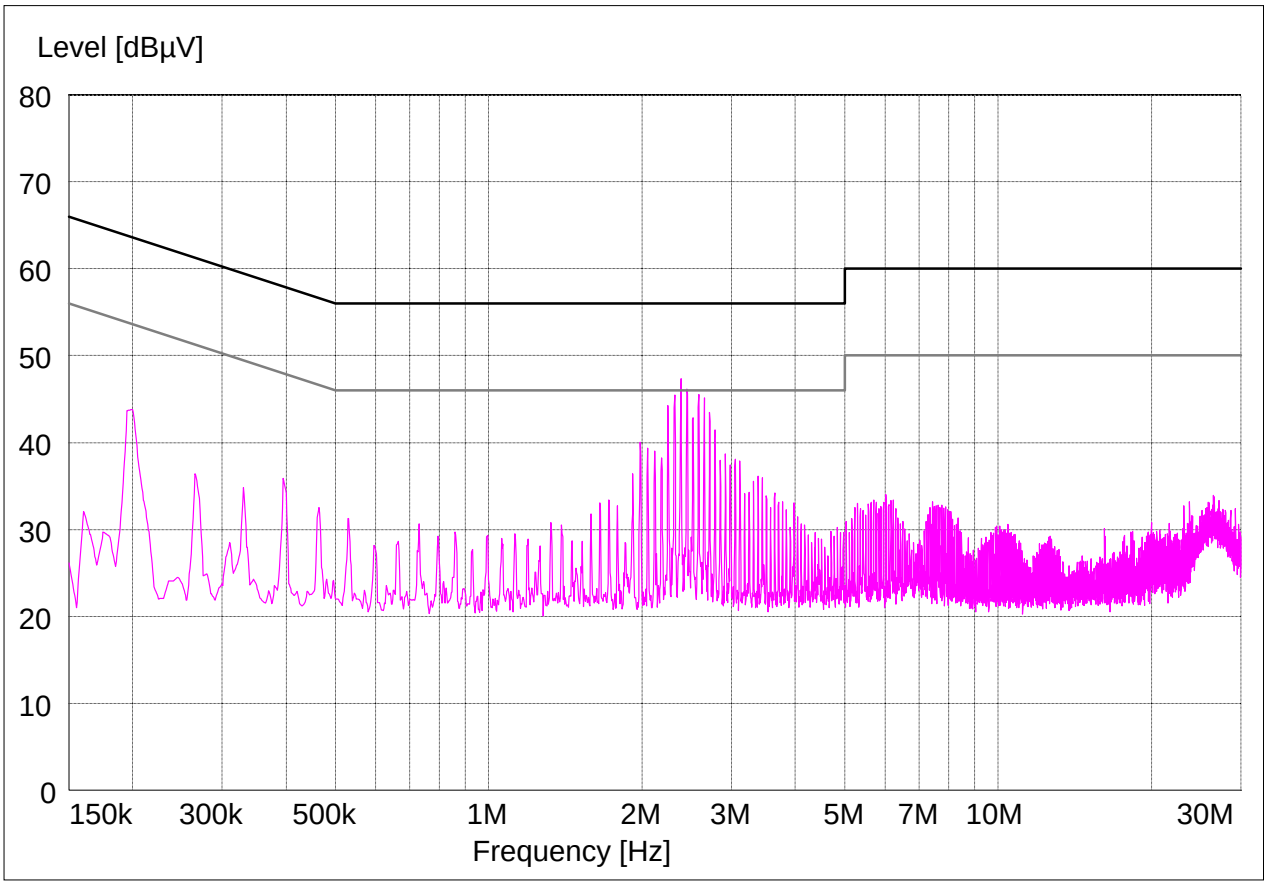
2.3. Test Result

CDMA 800

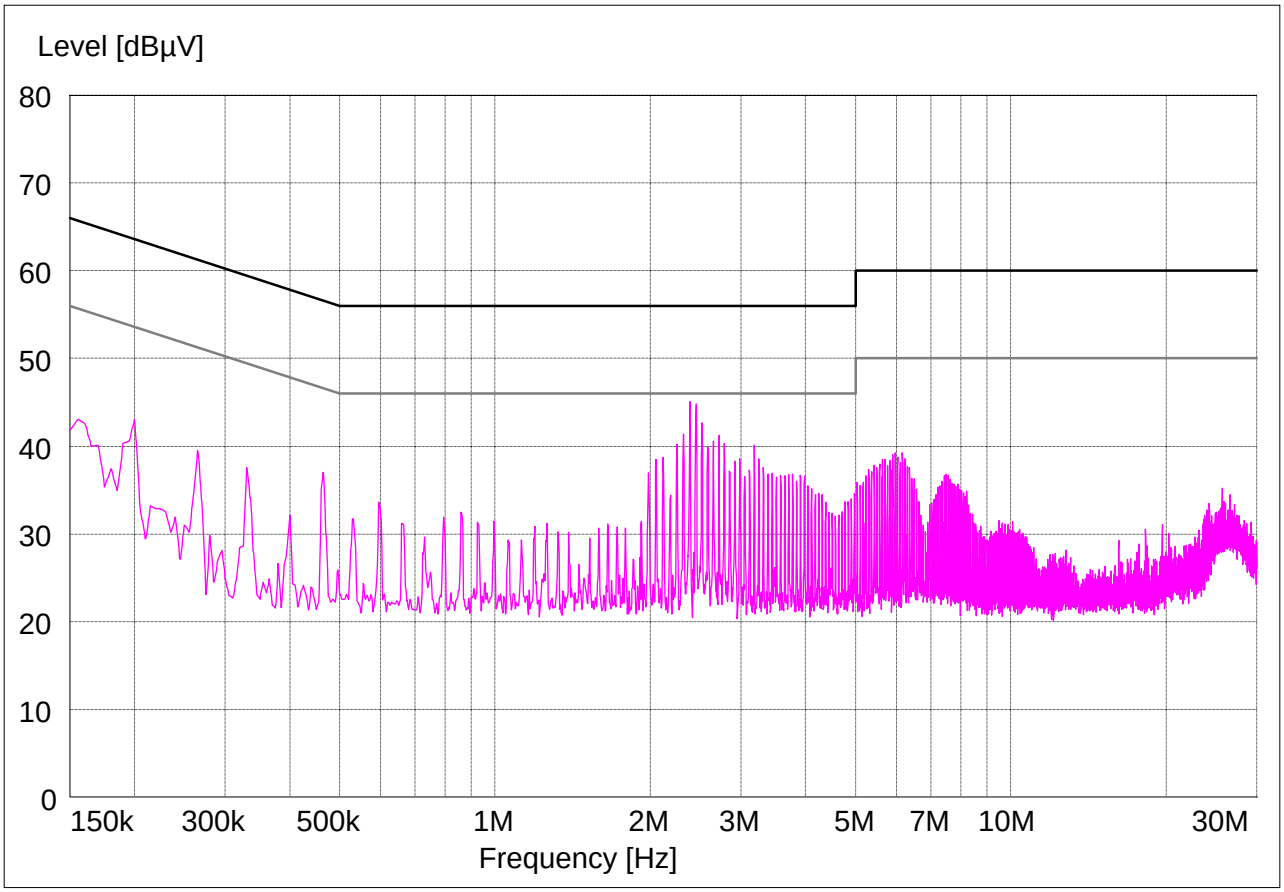
FREQ. (MHz)	LEVEL(dB μV)		LINE	LIMIT(dB μV)		MARGIN(dB)	
	Q-Peak	Average	LINE	Q-Peak	Average	Q-Peak	Average
0.15	31.30	14.80	H	66.00	56.00	34.70	41.20
0.20	41.90	35.80	H	63.61	53.61	21.71	17.81
0.27	37.70	33.80	H	61.24	51.24	23.54	17.44
2.38	43.30	36.20	H	56.00	46.00	12.70	9.80
5.89	37.40	34.30	H	60.00	50.00	22.60	15.70
7.49	34.70	32.00	H	60.00	50.00	25.30	18.00
0.20	43.20	32.50	N	63.69	53.69	20.49	21.19
0.26	34.80	24.90	N	56.00	46.00	21.20	21.10
0.40	34.50	31.40	N	56.00	46.00	21.50	14.60
2.32	44.50	35.10	N	56.00	46.00	11.50	10.90
2.38	45.80	36.90	N	56.00	46.00	10.20	9.10
2.45	44.20	35.00	N	56.00	46.00	11.80	11.00

Please refer to the following plots.

Neutral



HOT

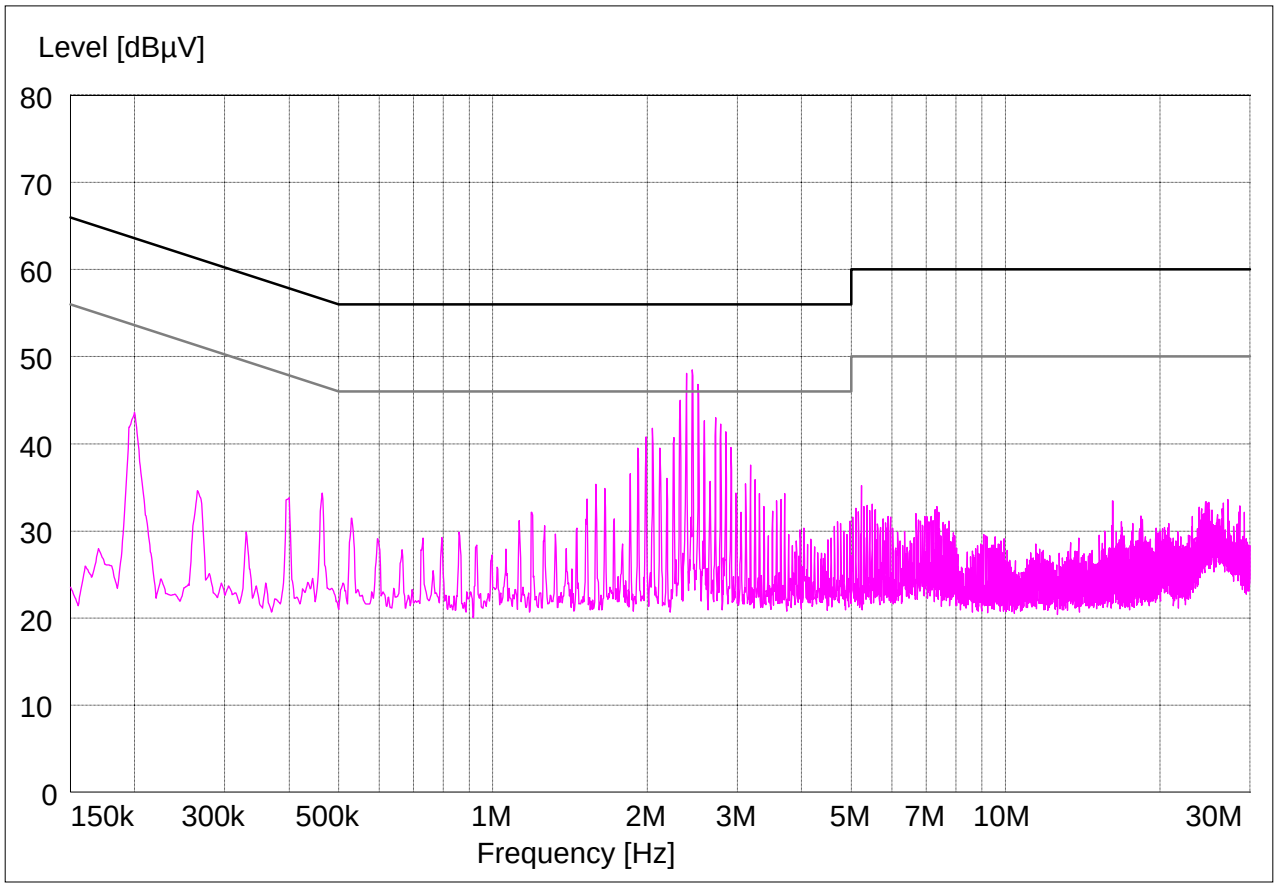


PCS 1900

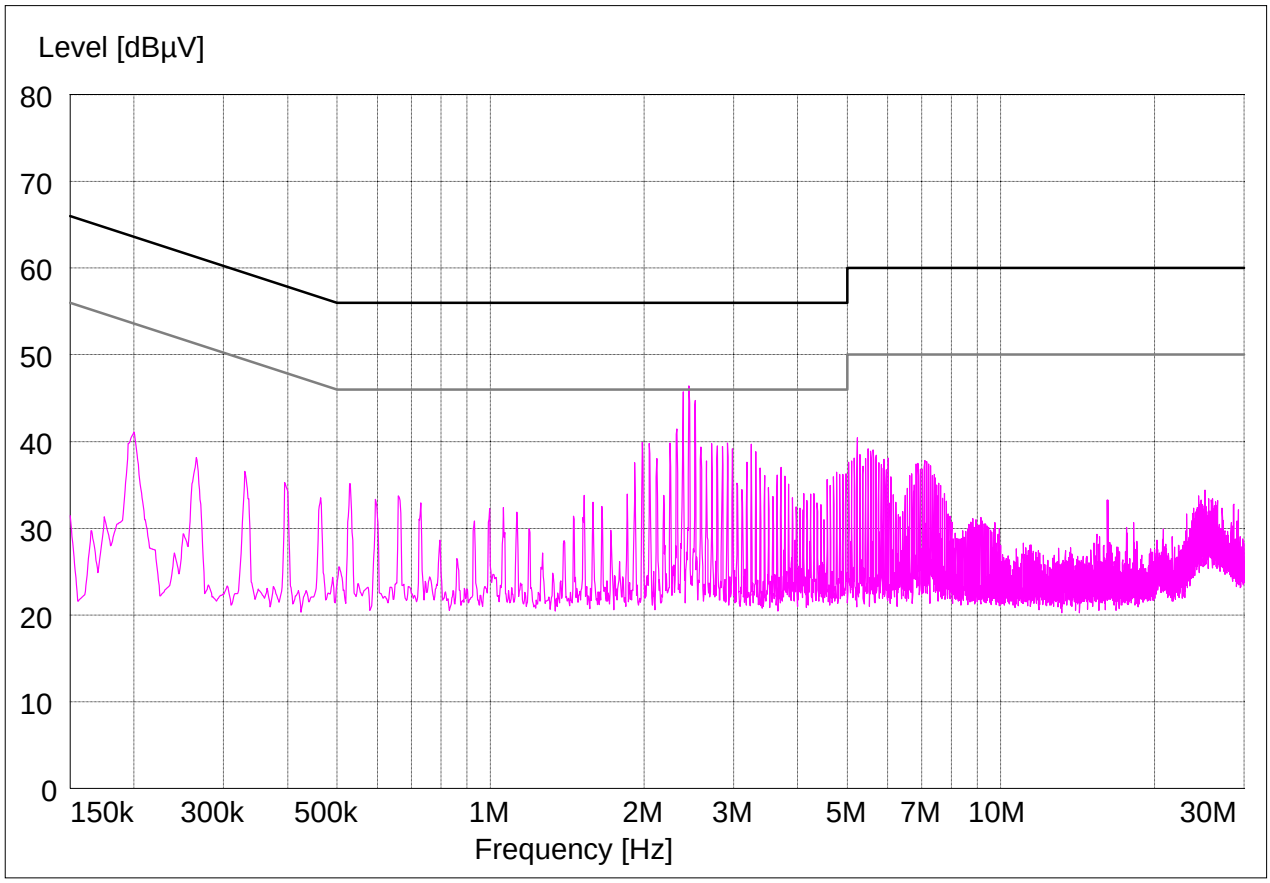
FREQ. (MHz)	LEVEL(dB μV)		LINE	LIMIT(dB μV)		MARGIN(dB)	
	Q-Peak	Average	LINE	Q-Peak	Average	Q-Peak	Average
0.20	40.50	35.40	H	63.61	53.61	23.11	18.21
0.26	37.00	33.10	H	61.43	51.43	24.43	18.33
1.98	36.80	31.70	H	56.00	46.00	19.20	14.30
2.45	45.60	38.90	H	56.00	46.00	10.40	7.10
5.23	38.20	33.30	H	60.00	50.00	21.80	16.70
7.09	35.40	31.80	H	60.00	50.00	24.60	18.20
0.20	42.60	33.00	N	63.69	53.69	21.09	20.69
0.26	32.70	23.40	N	56.00	46.00	23.30	22.60
2.05	39.30	32.10	N	56.00	46.00	16.70	13.90
2.45	47.90	39.50	N	56.00	46.00	8.10	6.50
2.71	41.10	31.30	N	56.00	46.00	14.90	14.70
5.23	33.10	29.20	N	60.00	50.00	26.90	20.80

Please refer to the following plots.

Neutral



HOT



3. RF Radiated Output Power

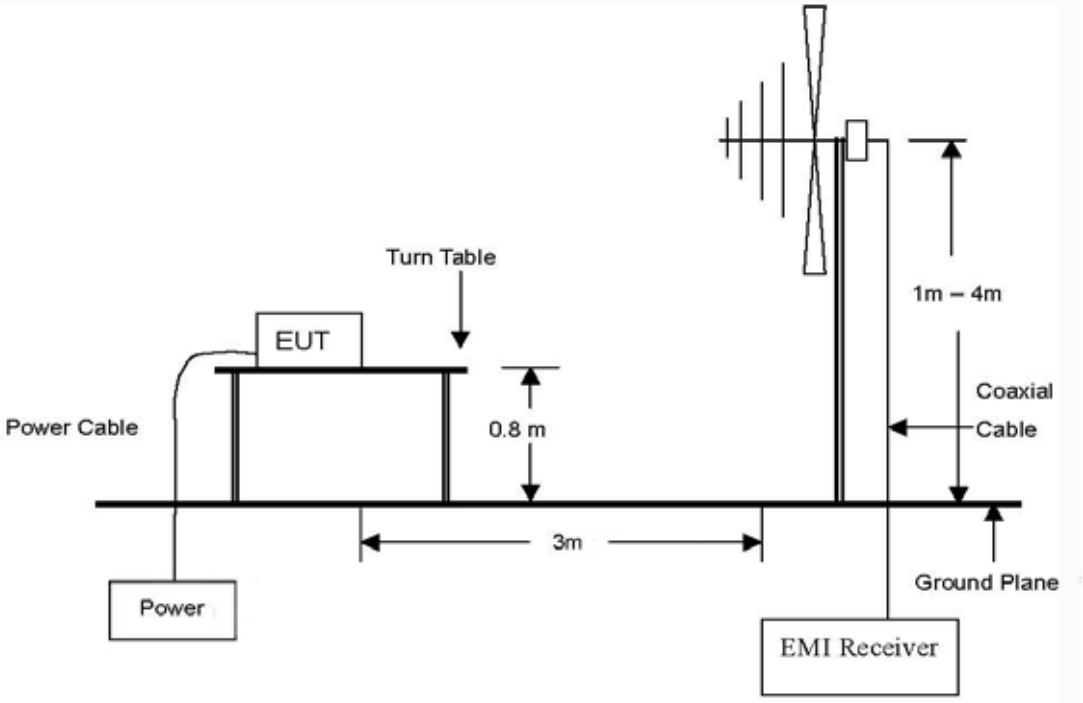
3.1. Limit

FCC §22.913(a), the ERP of mobile transmitters must not exceed 7 watts. FCC §24.232(c) Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

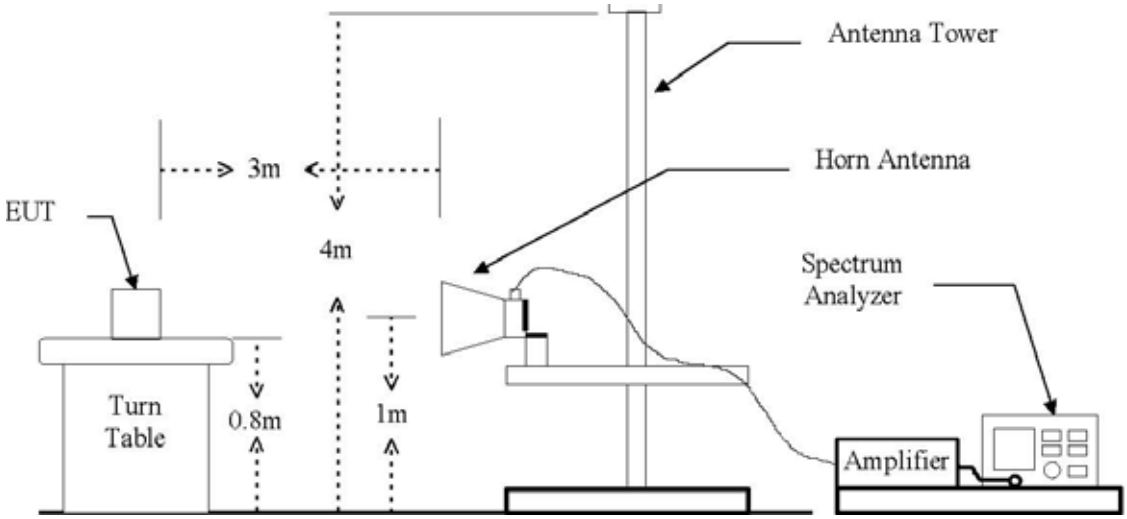
3.2. Test Procedure: Based on TIA-603C 2004

1. On a test site, the EUT shall be placed at 80cm height on a turn table, and in the position closest to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 4m from EUT to correspond to the frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. The transmitter shall be switched on, the measuring receiver shall be tuned to the frequency of the transmitter under test.
5. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
6. The transmitter shall then the rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
7. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
8. The maximum signal level detected by the measuring receiver shall be noted.
9. The transmitter shall be replaced by a horn (substitution antenna).
10. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
11. The substitution antenna shall be connected to a calibrated signal generator.
12. In necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase he sensitivity of the measuring receiver.
13. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
14. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring received, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
15. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
16. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
17. The measure of the effective radiated power is the large of the two levels recorded, at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
18. The ERP/EIPR test under RC5/SO55.

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 18 GHz Emissions.



3.3. Test Results

ERP: CDMA 800

Frequency (MHz)	Ant. Pol. (H/V)	Amp-C.L (dB)	S.G. Reading (dBm)	Antenna Gain (dBd)	E. R. P.	
					(dBm)	(mW)
824.7	V	26.53	2.35	-8.53	20.35	108.39
	H	26.53	-2.66	-8.53	15.34	34.20
836.89	V	26.53	0.24	-8.52	18.25	66.83
	H	26.53	-4.16	-8.52	13.85	24.27
848.31	V	26.53	1.35	-8.50	19.38	86.70
	H	26.53	-3.09	-8.50	14.94	31.19

Remake: 1. ERP= SG Reading +Amp-C.L. +Gain

EIRP: PCS 1900

Frequency (MHz)	Ant. Pol. (H/V)	Amp-C.L (dB)	S.G. Reading (dBm)	Antenna Gain (dBi)	E. I. R. P.	
					(dBm)	(mW)
1851.25	V	30.82	-19.76	9.02	20.08	101.86
	H	30.82	-29.69	9.02	10.15	10.35
1880.00	V	30.82	-20.43	9.06	19.45	88.10
	H	30.82	-28.43	9.06	11.45	13.96
1908.75	V	30.82	-21.40	9.09	18.51	70.96
	H	30.82	-32.03	9.09	7.88	6.14

Remake: 1. EIRP= SG Reading +Amp-C.L. +Gain

4. Spurious Radiated Emission

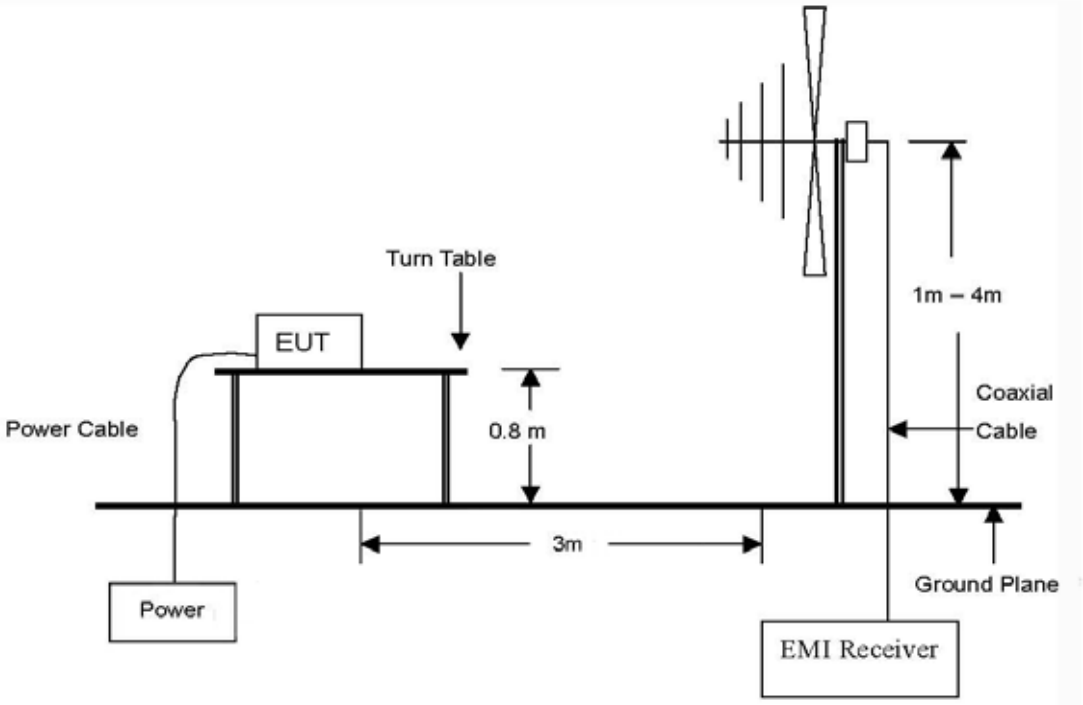
4.1. Limit

§ 22.917(a) and §24.238 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency must be attenuated below the transmitting (P) by a factor of at least 43+10log(P)dB.

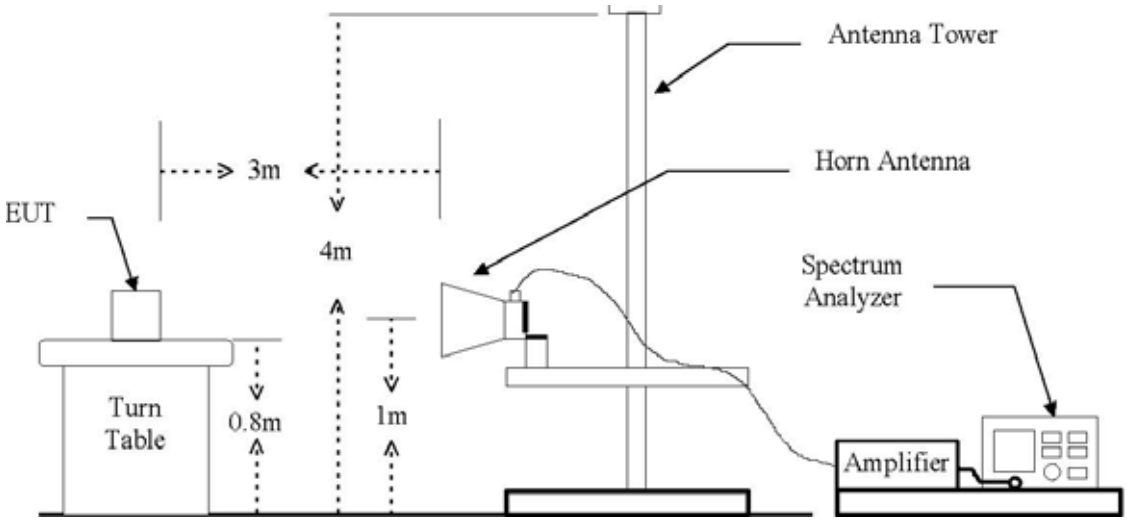
4.2. Test Procedure: Based on TIA-603C 2004

1. On a test site, the EUT shall be placed at 0.8cm height on a turn table, and in the position closest to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 4m from EUT to correspond to the frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. The transmitter shall be switched on, the measuring receiver shall be tuned to the frequency of the transmitter under test.
5. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
6. The transmitter shall then the rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
7. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
8. The maximum signal level detected by the measuring receiver shall be noted.
9. The transmitter shall be replaced by a horn (substitution antenna).
10. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
11. The substitution antenna shall be connected to a calibrated signal generator.
12. In necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase he sensitivity of the measuring receiver.
13. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
14. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring received, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
15. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
16. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
17. The measure of the effective radiated power is the large of the two levels recorded, at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary
18. Spurious radiated emission was tested under RC5/SO55.

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 18 GHz Emissions.



4.3. Test Result

CDMA 800

Frequency (MHz)	Ant.Pol. (H/V)	S.G. reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
TX LOW channel (824.700 MHz)								
1649.40	H	-28.73	4.92	8.95	6.80	-26.85	-13	13.85
	V	-24.42	4.92	8.95	6.80	-22.54	-13	9.54
2474.10	H	-40.90	6.50	10.15	8.00	-39.40	-13	26.40
	V	-40.01	6.50	10.15	8.00	-38.51	-13	25.51
TX MID Channel (836.52 MHz)								
1673.04	H	-31.55	4.81	8.97	6.82	-29.54	-13	16.54
	V	-33.01	4.81	8.97	6.82	-31.00	-13	18.00
2509.56	H	-42.11	5.48	10.20	8.05	-39.54	-13	26.54
	V	-40.71	5.48	10.20	8.05	-38.14	-13	25.14
TX HIGH Channel (848.31 MHz)								
1696.62	H	-29.55	4.75	9.00	6.85	-27.45	-13	14.45
	V	-25.08	4.75	9.00	6.85	-22.98	-13	9.98
2544.93	H	-34.25	5.92	10.18	8.03	-32.14	-13	19.14
	V	-35.99	5.92	10.18	8.03	-33.88	-13	20.88

Remake: 1. No more harmonic above 3rd harmonic for all channel.
2. ERP= SG Reading –Cable Loss +Gain

PCS 1900

Frequency (MHz)	Ant.Pol. (H/V)	S.G. reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
TX LOW channel (1851.25 MHz)								
3702.50	H	-38.33	7.02	9.94	7.79	-35.41	-13	22.41
	V	-41.47	7.02	9.94	7.79	-38.55	-13	25.55
5553.75	H	-30.05	9.15	11.05	8.90	-28.15	-13	15.15
	V	-31.45	9.15	11.05	8.90	-29.55	-13	16.55
TX MID Channel (1880.00 MHz)								
3760.00	H	-35.74	7.05	9.95	7.80	-34.99	-13	21.99
	V	-38.86	7.05	9.95	7.80	-38.11	-13	25.11
5640.00	H	-34.98	9.11	11.14	8.99	-35.10	-13	22.10
	V	-36.10	9.11	11.14	8.99	-36.22	-13	23.22
TX HIGH Channel (1908.75 MHz)								
3817.50	H	-34.81	6.98	9.94	7.79	-34.00	-13	21.00
	V	-34.93	6.98	9.94	7.79	-34.12	-13	21.12
5726.25	H	-35.19	9.00	11.23	9.08	-35.11	-13	22.11
	V	-34.23	9.00	11.23	9.08	-34.15	-13	21.15

Remake: 1. No more harmonic above 3rd harmonic for all channel.
2. ERP= SG Reading –Cable Loss +Gain

5. Field Strength of Radiated Emissions

5.1. Limit

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30 - 88	3	40.0	100
88 – 216	3	43.5	150
216 – 960	3	46.0	200
Above 960	3	54.0	500

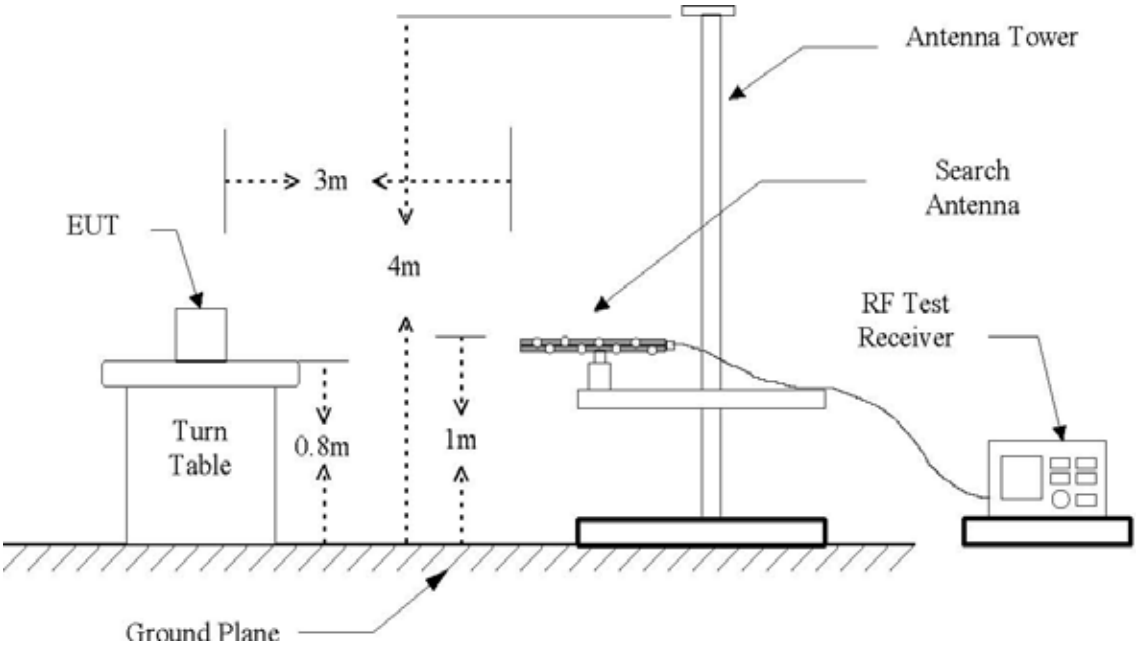
5.2. Test Procedure

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 1 meter away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

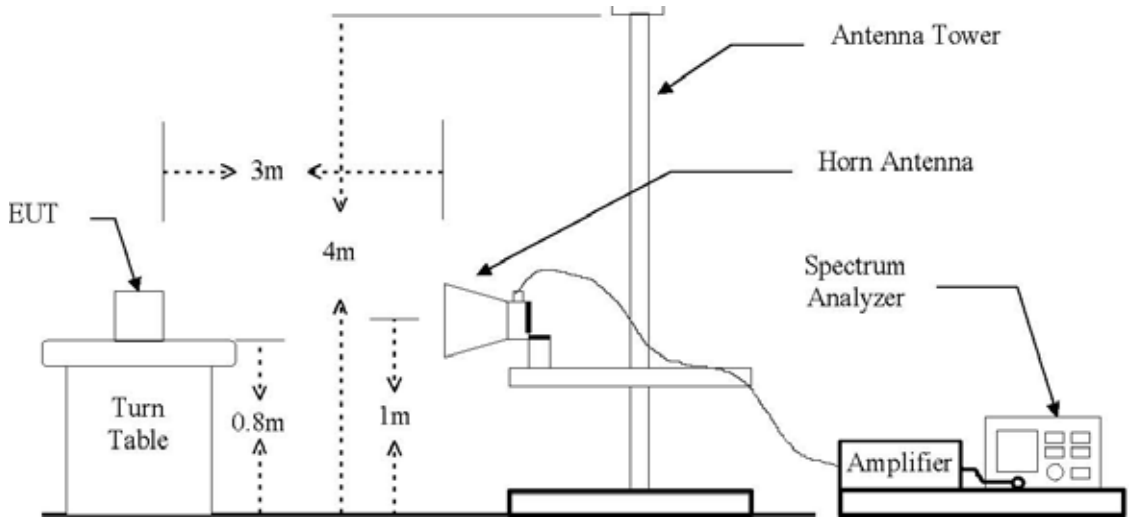
NOTE：

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz for Peak detection and frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1 GHz.

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 40 GHz Emissions.



Frequencies measured below 1 GHz configuration



Frequencies measured above 1 GHz configuration

5.3. Test Results

CDMA 800

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dBuV/m)	Q.P. Limit (dBuV/m)	Margin (dB)
124.995	25.7	Q.P.	V	9.28	1.43	36.41	43.5	7.09
456.750	22.8	Q.P.	V	14.73	2.87	4.40	46.0	5.60
660.775	13.0	Q.P.	V	18.01	3.44	34.45	46.0	11.55
817.390	16.8	Q.P.	H	19.67	3.91	40.38	46.0	5.62

PCS 1900

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
333.380	21.9	Q.P.	H	11.87	2.42	36.19	46.0	9.81
400.010	16.1	Q.P.	H	13.50	2.68	32.28	46.0	13.72
456.738	20.7	Q.P.	V	14.73	2.87	38.30	46.0	7.70
864.200	18.1	Q.P.	H	20.17	4.00	42.27	46.0	3.73

6. RF Exposure Evaluation

§FCC 1.1310 The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b)

6.1. LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength(V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time
(A) Limits for Occupational /Control Exposures				
300 – 1500	--	--	F/300	6
1500 - 100000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300 – 1500	--	--	F/1500	6
1500 - 100000	--	--	**1**	**30**

6.2. Friis transmission formula: Pd = (Pout*G)/(4*pi*R^2)

Where Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd the limit of MPE, 1 mW/cm^2. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

6.3. EUT Operating Condition

A software provided by client enabled the EUT to transmit and receive data at low, middle and high channel individually.

6.4. Test Result of RF Exposure Evaluation

Test Item : RF Exposure Evaluation Data
Test Mode : Normal Operation

6.4.1. Output Power into Antenna & RF Exposure Evaluation Distance

CDMA 800

Channel	Channel Frequency (MHz)	Output Peak Power to Antenna (dBm)	Antenna Gain (dBi)	Power Density at 20cm (mW/cm^2)	LIMITS (mW/cm^2)
Low	824.700	22.81	-3.5	0.01698	1
Middle	835.890	23.54	-3.5	0.02009	
High	848.310	22.30	-3.5	0.01510	

PCS 1900

Channel	Channel Frequency (MHz)	Output Peak Power to Antenna (dBm)	Antenna Gain (dBi)	Power Density at 20cm (mW/cm^2)	LIMITS (mW/cm^2)
Low	1851.25	22.20	-6.0	0.00830	1
Middle	1880.00	22.50	-6.0	0.00889	
High	1908.75	21.82	-6.0	0.00760	

NOTE :

The power density Pd (4th column) at a distance of 20cm calculated from the friis transmission formula is far below the limit of 1 mW/ cm^2.

Appendix A. Photos of AC Power Line Conducted Emissions Test

Front View of Conducted Emission

Rear View of Conducted Emission

Appendix B. Photos of Field Strength Radiated Emission Test

Appendix C. Photo of RF Rated output power & Spurious Emission Test