LG Electronics Inc.
Quality & Reliability Center

36, Munlae-dong, 6-ga, Youngdungpo-gu, Seoul 150-096, Korea
Tel: + 82 2 2630 3090~3, Fax: +82 2 2635 5543

CERTIFICATION OF COMPLIANCE
Class II Permissive Change

Date of Issue: January 20, 2004 **Test Report No: 00431-4529-C4007**

Applicant:	LG Electronics Inc.
Regulation:	FCC Part 22 , Part2
Test procedure:	ANSI C63.4-2001, TIA/EIA603
Equipment Class:	Intentional Radiators
EUT Type:	Single Band, Single Mode CDMA Mobile Phone
FCC ID:	BEJRD5130
Class II Permissive Change	Added Hitachi antenna

Trade Name(s):	Model No.:
LG	***LG-RD5130***

This device has been verified to comply with the applicable requirements in the FCC Part 22 & Part2 and was tested in accordance with the measurement procedures specified in ANSI C63.4-2001, TIA/EIA 603.

I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Kyeom-Soon Kim / General Manager
Quality and Reliability Center
LG Electronics Inc.

REPORT FOR AN INTENTIONAL RADIATORS

U.S. Responsible Party:	LG Electronics USA Inc.
Address:	6133 North River Road, Suite 1100 (Riverway Plasza) Rosemont, IL 60018, USA
Contact Person:	P. H. Byun, General Manager
Telephone No.:	(847) 692-4630 EXT.329
Manufacturer:	LG Electronics Inc.
Address:	459-9, Kasan-Dong, Kunchon-Gu, Seoul, 153-023, Korea
FCC ID No.:	BEJRD5130
EUT Class:	Intentional Radiators
EUT Type:	Single Band, Single Mode CDMA Mobile Phone
Trade Name:	LG
Model No.:	LG-RD5130
Rule Part:	FCC Part 22, Part2
Test Procedure:	ANSI C63.4-2001, TIA/EIA603
Date of Test:	January 5 ~ 19, 2004
Date of Receipt of EUT:	January 5, 2004
Date of Issue:	January 30, 2004
Test Report No.:	00431-4529-C4007
Test Result:	**Positive**

Tested by: 

Y. S. Lee / Senior Research Engineer
Quality and Reliability Center
LG Electronics Inc.

Reviewed by: 

J. C. Lee / Senior Research Engineer
Quality and Reliability Center
LG Electronics Inc.

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CONTENTS

Page

LG Electronics Inc. Q & R Center, 36, Munlae-dong, 6-ga, Youngdungpo-gu, Seoul, Korea Tel:+82-2-2630-3090~3, Fax:+82-2-2635-5543

1. GENERAL INFORMATION

1.1 Descriptions of equipment under test (EUT)

1.1.1 Manufacturer: LG Electronics Inc.
459-9, Kasan-Dong, Kunchon-Gu, Seoul, 153-023, Korea

1.1.2 EUT Type: Single Band, Single Mode CDMA Mobile Phone

1.1.3 Model No.: LG-RD5130

1.1.4 Serial No.: N/A

1.1.5 Trade Name: LG

1.1.6 FCC ID No.: BEJRD5130

1.1.7 System characteristic and descriptions

1) Output power: 24.3dBm (ERP)
2) Antenna type: Fixed Type (Chip-Type-Antenna-Module) 50 ohms
3) Transmitting of frequency range: 824 ~ 849 MHz.

1.2 Regulations applied to EUT

FCC Part 22 ; Part2

1.3 Measurement procedure

ANSI C63.4-2001, TIA/EIA603

Both conducted and radiated testing were performed according to the procedures documented on chapter 13 of ANSI C63.4 and TIA/EIA603

1.4 Measurement place

LG Electronics Inc. Quality and Reliability Center
36, Munlae-dong, 6-ga, Youngdungpo-gu, Seoul 150-096, Korea

2. TEST SITE

Anechoic chamber

The test facilities used to perform radiated and conducted emissions tests are accredited by Nation Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200040-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.

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2.2 A shielded enclosure

The measurement of conducted spurious emissions was made in a shielded enclosure providing sufficient shielding effectiveness.

3. CALIBRATIONS OF MEASURING INSTRUMENTS

All measurements were made with instruments calibrated according to the recommendation by manufacturer. Measurement of radiated emissions and conducted emissions were made with instruments conforming to American National Standards Institute, ANSI C63.4-2001. The calibration of measuring instrument, including any accessories that may affect test results, were performed according to the recommendation by manufacturer.

4. DESCRIPTION OF TEST CONDITION

4.1 RF Power Output

1) On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.
2) The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the frequency of the transmitter.
3) The output of the test antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
4) The transmitter shall be switched on, if possible, without the modulation and the measurement 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 than be 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.

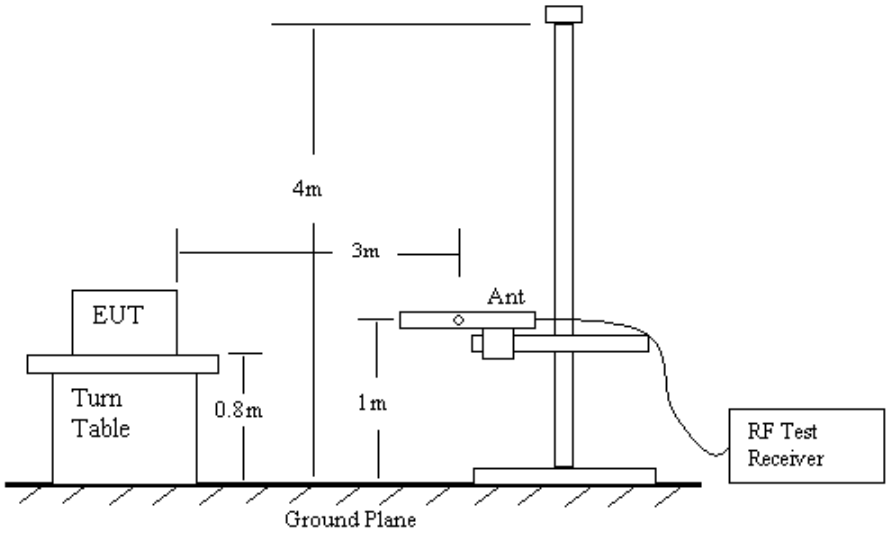

Figure1. Radiated Emission Measurement 30 to 1000 MHz

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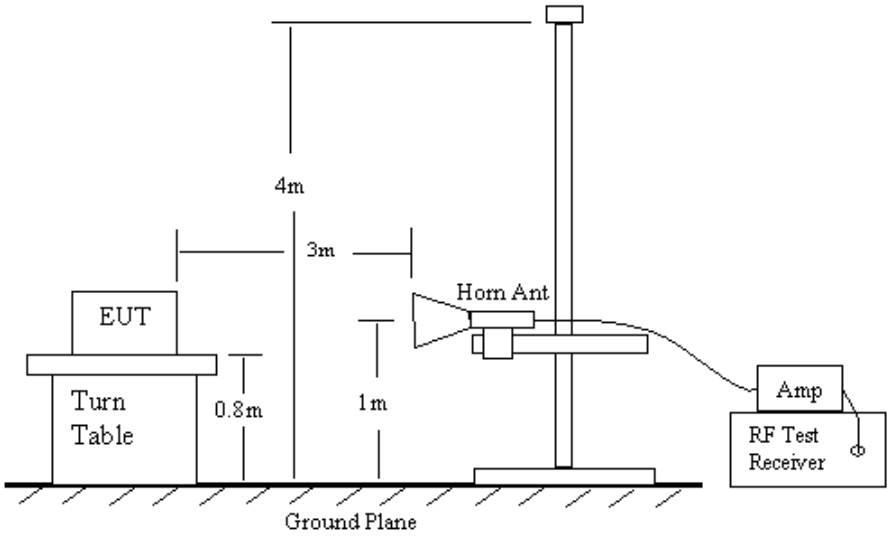

Figure2. Radiated Emission Above 1000 MHz

9) The transmitter shall be replaced by a tuned dipole (substitution antenna).

10) The substitution antenna shall be oriented 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) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

13) The test antenna shall be raised and lowered through the specified range of the 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 receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation 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 oriented for horizontal polarization.

17) The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.

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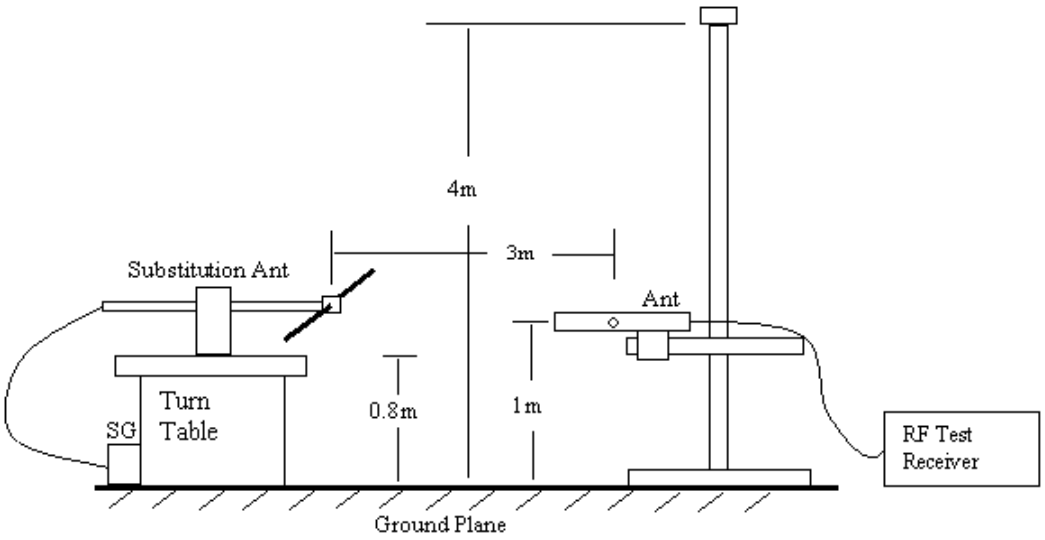

Figure3. Radiated Emission – Substitution Method

4.2 Modulation Characteristics

According to CFR 47 section 2.1047 (a), for Voice Modulated Communication Equipment, the frequency response of the audio modulation circuit over a range of 100 to 5000 Hz shall be measured.

According to CFR 47 section 22.915: A unit that transmits emission type F3E must not exceed a peak frequency deviation of ±5 kHz, and the audio frequency response shall not exceed 3.125 kHz.

According to CFR 47 section 22.915: Audio Frequency Low Pass Filter between the modulation limiter & the modulation stage of the transmitter. At any frequency (f in kHz) between 3 and 20 kHz, the filter must have an attenuation of at least 60 $\log_{10}$(f/3)dB greater than the attenuation at 1 kHz. Above 20 kHz, it must have an attenuation of at least 50 dB greater than the attenuation at 1 kHz.

4.2.1 Modulation Limit

1) Configure the EUT as shown below, adjust the audio input for 60% of rated system deviation at 1 kHz using this level as a reference (0 dB) and vary the input level from –20 to + 20 dB. Record the frequency deviation obtained as a function of the input level.
2) Repeat step 1 with input frequency changing to 300, 1004 and 2500 Hz in sequence.

4.2.2. Audio Frequency Response

1) Configure the EUT as shown below.
2) Adjust the audio input for 20% of rated system deviation at 1 kHz using this level as a reference (0 dB).
3) Vary the audio frequency from 100 Hz to 10 kHz and record the frequency deviation.
4) Audio frequency response = 20 $\log_{10}$(Deviation of test frequency / Deviation of 1 kHz reference).

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4.2.3 Audio Low Pass Filter Response

1) Configure The EUT as shown below.

2) Connect the audio frequency generator as close as possible the input of the post limiter low pass filter within the transmitter under test.

3) Connect the audio spectrum analyzer to the output of the post limiter low pass filter within the transmitter under test.

4) Apply 1000 Hz tone from the audio frequency generator and adjust the level per manufacturer's specifications.

5) Record the dB level of the 1000 Hz spectral line on the audio spectrum analyzer as LEV_{REF}.

6) Set the audio frequency generator to the desired test frequency between 3000 Hz and the upper low pass filter limit.

7) Record audio spectrum analyzer levels, at the frequency in step 6).

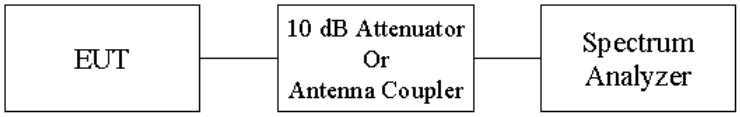
8) Record the dB level on the audio spectrum analyzer as LEV_{FREQ}.

9) Calculate the audio frequency response at the test frequency as:
Low pass filter response = $LEV_{FREQ} - LEV_{REF.}$

10) Repeat the 6) through 9) for all the desired test frequencies.

4.3 Occupied Bandwidth

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% of the Emission bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.



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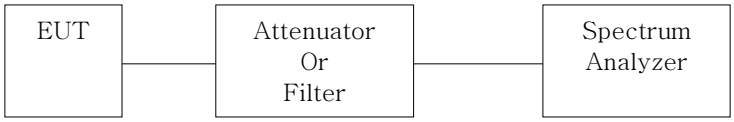
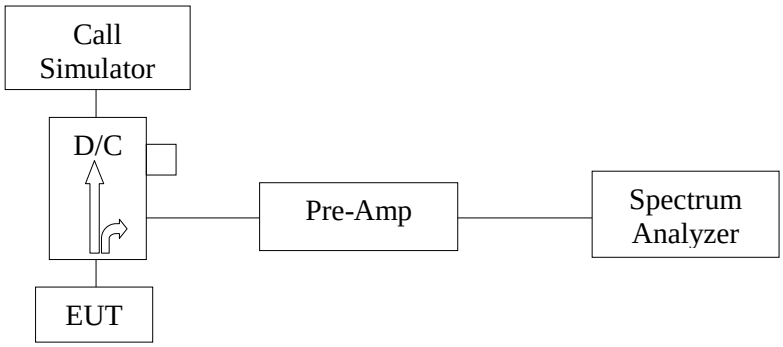
4.4 Spurious Emission at Antenna Terminal

1) EUT's RF output connector (made solely for the purpose of the test) is connected to the spectrum analyzer, and set as close as possible to the bottom of the block edge and one set as close as possible to the top of the block edge. Set the RES BW to 1% of the emission bandwidth to show compliance with the –13dBm limit, in the 1 MHz bands immediately outside and adjacent to the top and bottom edges of the frequency block.

2) For the Out-of-Band measurements a 1 MHz RES BW was used to scan from 30 MHz to 5xfo of the fundamental carrier for all frequency block. A display line was placed at –13dBm to show compliance for spurious, and harmonics.



3) 22.917(f): Mobile emissions in base frequency range. The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitter operated must be attenuated to a level not to exceed –80dBm at the transmit antenna connector.



4.5 Field Strength of Spurious Radiation

1) On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.

2) The test antenna shall be oriented initially for vertical polarization located 3 m from the EUT to correspond to the frequency of the transmitter.

3) The output of the test antenna shall be connected to the measuring receiver and either a peak or average detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.

4) The transmitter shall be switched on; if possible, without the modulation and the measurement 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 than be 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.

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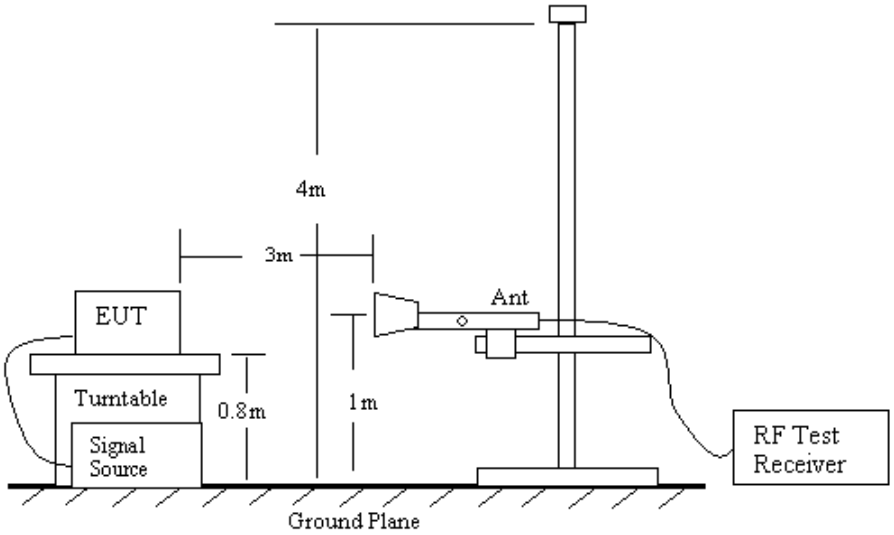

Figure4. Radiated Emission Measurement

9) The transmitter shall be replaced by a substitution antenna.

10) The substitution antenna shall be oriented for vertical polarization.

11) The substitution antenna shall be connected to a calibrated signal generator.

12) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

13) The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.

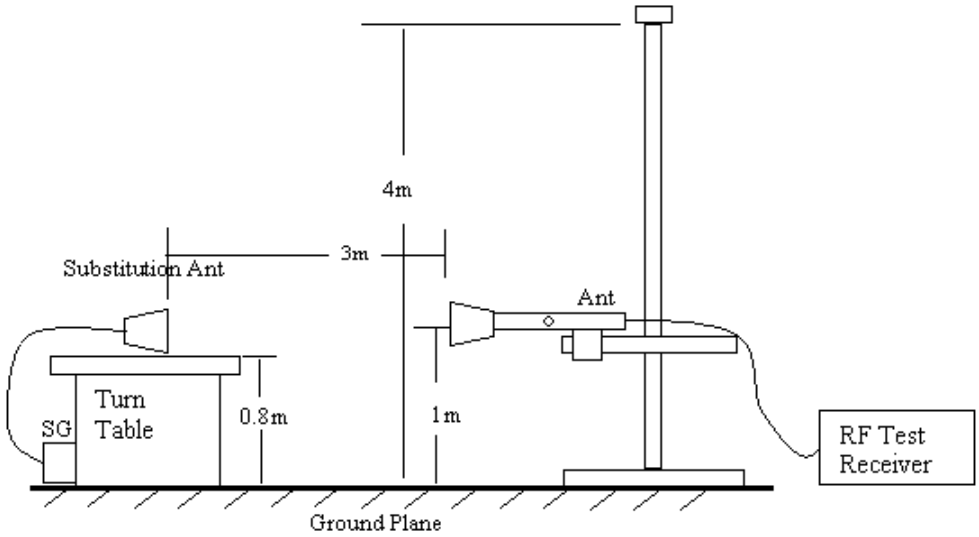

Figure5. Radiated Emission – Substitution Method set-up

14) The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.

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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 oriented for horizontal polarization.

17) The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.

4.6 Frequency Stability

4.6.1 Frequency stability versus environmental temperature

1) Setup the configuration per figure 6 for frequencies measurement inside the environmental chamber. Set the temperature of the chamber to 25°C. Set SA Resolution Bandwidth low enough to obtain the desired frequency resolution and measure the EUT 25°C operating frequency as reference frequency.

2) Turn EUT off and set Chamber temperature to -30°C.

3) Allow sufficient time (approximately 20 to 30 minus after chamber reach the assigned temperature) for EUT to stabilize. Turn on EUT and measure the EUT operating frequency. Turn off EUT after the measurement.

4) Repeat step 3 with a 10°C increased per stage until the highest temperature of +50°C reached, record all measured frequencies on each temperature step.

4.6.2 Frequency stability versus input voltage

1) Setup the configuration per figure 6 and set chamber temperature to 25°C. Use a variable power supply to power the EUT and set output voltage to EUT nominal input voltage. Set SA Resolution Bandwidth low enough to obtain the desired frequency resolution and measure the EUT 25°C operating frequency as reference frequency.

2) Slowly reduce the EUT input voltage to specified extreme voltage variation (±15%) and record the maximum frequency change.

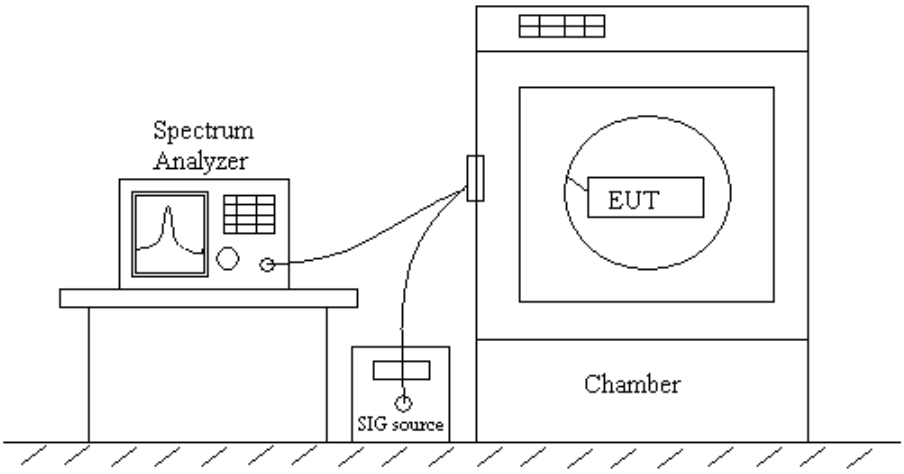

Figure6. Frequency Stability

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5. TEST DATA

5.1. RF Power Output (§ 2.1046)

Product: Single Band, Single Mode CDMA Mobile Phone Serial No.: N/A
Model: LG-RD5130 Test Date: January 12, 2004

CDMA Output Power (ERP)

Freq. (MHz)	SG Reading (dBm)	Amp. Gain(dB)	CL (dB)	Pol. (H/V)	Gain (dBi)	Ant. Impedance Matching(dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
Low Channel(CH#: 1013)									
824.70	-4.4	40.0	2.4	V	-	10.0	**23.2**	38.5	-15.3
Middle Channel(CH#: 363)									
835.89	-5.1	40.0	2.4	V	-	10.0	**22.5**	38.5	-16.0
High Channel(CH#: 777)									
848.31	-3.3	40.0	2.4	V	-	10.0	**24.3**	38.5	-14.2

NOTES: RBW = VBW = 3 MHz

Result: Positive

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5.2. Modulation Characteristics (§ 2.1047)

The EUT is single mode CDMA only.

Result: Not Applicable

5.3. Occupied Bandwidth / 26dB Emission Bandwidth(§ 2.1049)

Product: Single Band, Single Mode CDMA Mobile Phone Serial No.: N/A
Model: LG-RD5130 Test Date: January 9, 2004

Channel	Frequency (MHz)	Occupied BW (MHz)	26 dB Emission BW (MHz)
Low	824.70	1.275	1.480
Middle	835.89	1.272	1.455
High	848.17	1.282	1.445

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5.4. Spurious Emission at Antenna Terminal (§ 2.1051)

Product: Single Band, Single Mode CDMA Mobile Phone Serial No.: N/A
Model: LG-RD5130 Test Date: January 9, 2004

Band Edge

Channel	Frequency (MHz)	SA Reading (dBm)	CL (dB)	Level (dBm)	Limit (dBm)	Margin (dB)
Low	824.00	-15.3	0.5	**-15.3**	-13.0	-2.3
High	849.00	-13.6	0.5	**-13.6**	-13.0	-0.6

NOTES: RBW=14.8kHz(Low), 14.55kHz(High) (above 1% of 26 dB Emission Bandwidth)

Out-of-Band

Channel	Frequency (GHz)	SA Reading (dBm)	CL (dB)	Level (dBm)	Limit (dBm)	Margin (dB)
Low	1.664	-29.0	0.5	**-29.0**	-13.0	-16.0
Middle	1.685	-22.5	0.5	**-22.5**	-13.0	-9.5
High	1.714	-31.3	0.5	**-31.3**	-13.0	-18.3

NOTES: RBW = VBW = 1 MHz

CDMA Mobile Emission in Base Frequency Range

Channel	Frequency (MHz)	SA Reading (dBm)	CL (dB)	Amp Gain(dB)	Level (dBm)	Limit (dBm)	Margin (dB)
Low	876.00	-100.0	1.0	28.0	**-100.0**	-80.0	-20.0
Middle	876.00	-100.6	1.0	28.0	**-100.6**	-80.0	-20.6
High	872.19	-100.9	1.0	28.0	**-100.9**	-80.0	-20.9

NOTES: RBW = 100 kHz, VBW=300 kHz

Result: Positive

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5.5. Field Strength of Spurious Radiation (§ 2.1053)

Product: Single Band, Single Mode CDMA Mobile Phone Serial No.: N/A
Model: LG-RD5130 Test Date: January 16, 2004

Frequency (GHz)	SG Reading (dBm)	CL (dB)	Pol. (H/V)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Low Channel(CH#:1013)								
1.649	-40.3	4.1	V	8.1	6.0	**-38.5**	-13.0	-25.5
1.649	-48.1	4.1	H	8.1	6.0	**-46.3**	-13.0	-33.3
2.474	-58.4	5.2	V	9.4	7.3	**-56.4**	-13.0	-43.4
2.474	-56.8	5.2	H	9.4	7.3	**-54.8**	-13.0	-41.8
Middle Channel(CH#:363)								
1.672	-44.8	4.2	V	8.1	6.0	**-43.1**	-13.0	-30.1
1.672	-46.2	4.2	H	8.1	6.0	**-44.5**	-13.0	-31.5
2.508	-54.7	5.3	V	9.5	7.4	**-52.7**	-13.0	-39.7
2.508	-56.7	5.3	H	9.5	7.4	**-54.7**	-13.0	-41.7
High Channel(CH#:777)								
1.697	-39.9	4.2	V	8.2	6.1	**-38.1**	-13.0	-25.1
1.697	-44.0	4.2	H	8.2	6.1	**-42.2**	-13.0	-29.2
2.544	-51.1	5.3	V	9.5	7.4	**-49.1**	-13.0	-36.1
2.544	-56.1	5.3	H	9.5	7.4	**-54.1**	-13.0	-41.1

Result: Positive

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5.6. Frequency Stability (§ 2.1055)

Product: Single Band, Single Mode CDMA Mobile Phone Serial No.: N/A
Model: LG-RD5130 Test Date: January 19, 2004

Reference Frequency: CDMA Middle Channel 835.890034 MHz @ 25℃ limit: to stay ± 2.5 ppm = 2089.725 Hz				
Power Supply (Vdc)	Environment Temperature (℃)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.70	50	835.890042	-0.01	±2.5
3.70	40	835.890032	0.00	±2.5
3.70	30	835.889973	0.07	±2.5
3.70	***25***	***835.890034***	***0.00***	***±2.5***
3.70	20	835.889963	0.08	±2.5
3.70	10	835.889965	0.08	±2.5
3.70	0	835.890023	0.01	±2.5
3.70	-10	835.889965	0.08	±2.5
3.70	-20	835.889983	0.06	±2.5
3.70	-30	835.889977	0.07	±2.5
2.79 (End point)	25	835.889944	0.11	±2.5
3.15(-15%)	25	835.890030	0.00	±2.5
4.25(+15%)	25	835.890036	0.00	±2.5

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6. LIST OF INSTRUMENTS USED

Type	Maker	Model	Cal. Date	Cal. Due Date
Test receiver	R&S	ESI40	10-May-03	10-May-04
Spectrum Analyzer	HP	8593A	04-Apr.-03	04-Apr.-04
Wireless Communication Test Set	Agilent	E5515C	16-Mar.-03	16-Mar.-04
Transmitter Tester	Agilent	E4406A	04-Apr.-03	04-Apr.-04
Signal Generator	R&S	SMR40	25-Aug.-03	25-Aug.-04
Tuned dipole Antenna	S/B	UHAP	26-May-03	26-May-04
Biconical Antenna	S/B	VHAP	26-May-03	26-May-04
Log-periodic Antenna	S/B	VHALP9107	26-May-03	26-May-04
Tx Horn Antenna	EMCO	3115	13-Oct.-03	13-Oct.-04
Rx Horn Antenna	EMCO	3115	13-Oct.-03	13-Oct.-04
HFP	ANDECHS	WHK1.2/15G	26-Oct.-03	26-Oct.-04
HFP	ANDECHS	WHK2.0/18G	26-Oct.-03	26-Oct.-04
HFP	ANDECHS	WHK2.8/18G	26-Oct.-03	26-Oct.-04
Amplifier	MITQ	AMF-4D-001180-24-10P	21-Oct.-03	21-Oct.-04
Amplifier	EIN	603L	02-Jun.-03	02-Jun.-04
DC Power Supply	Testlink	AK-1205D	14-Oct.-03	14-Oct.-04
Temperature Chamber	ESPEC	SH-641	13-May-03	13-May-04
Duplexer	Telwave	5188-25BK	N/A	N/A
Step Attenuator	R&S	DPSP	22-Apr.-03	22-Apr.-04

R&S: Rohde & Schwarz S/B: Schwarzbeck
Cal. Date: Calibration date Cal Due Date: Next calibration due date

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