HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.

PRODUCT COMPLIANCE DIVISION
SAN 136-1, AMI-RI , BUBAL-EUP, ICHEON-SI, KYOUNGKI-DO, 467-701, KOREA
TEL: +82 31 639 8518 FAX : +82 31 639 8525 www.hct.co.kr

CERTIFICATE OF COMPLIANCE

FCC Part 24 & 22 Certification

PANTECH&CURITEL COMMUNICATIONS, INC.

110-1, ONGJEONG-RI, TONGJIN-EUP, GIMPO-SI,
GYOUNGGI-DO, 415-865, KOREA

Date of Issue: October 17, 2006
Test Report No.: HCT-SAR06-1002
Test Site: HYUNDAI CALIBRATION & CERTIFICATION TECHNOLOGIES CO., LTD.
FRN: 0005866421

FCC ID : **PP4PN-310**

APPLICANT : PANTECH&CURITEL COMMUNICATIONS, INC.

EUT Type:	Dual-Band CDMA Phone (CDMA/PCS)- Prototype
Tx Frequency:	824.70 — 848.31 MHz (CDMA)
	1851.25 — 1908.75 MHz (PCS CDMA)
Rx Frequency:	869.70 — 893.31 MHz (CDMA)
	1931.25 — 1988.75 MHz (PCS CDMA)
Max. RF Output Power:	0.305W ERP CDMA (24.9dBm)
	0.286W EIRP PCS CDMA (24.6dBm)
Trade Name/Model(s):	PANTECH&CURITEL / PN-310
FCC Classification:	Licensed Portable Transmitter Held to Ear (PCE)
Application Type:	Certification
FCC Rule Part(s):	§24(E), §22(H), §2
Maximum SAR:	1.43 W/kg CDMA Brain SAR / 0.727W/kg CDMA Body SAR
	1.32 W/kg PCS CDMA Brain SAR / 0.889 W/kg PCS CDMA Body SAR
Antenna Specifications:	Manufacturer: EMW Antenna Co. Ltd.
	PN: PN-310 (HRH-34601-0000AA) (Length= 93.7 mm)
Emission Designator(s):	1M25F9W

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ∮ 2.947.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Hyundai C-Tech Co., Ltd. Certifies that no party to this application has been denied FCC benefits pursuant to section 5301 of the Anti- Drug Abuse Act of 1998, 21 U.S. C. 853(a)

Ki Soo Kim

Report prepared by: Ki-Soo Kim

Manager of Product Compliance Team

Table of Contents

ATTACHMENT A: COVER LETTER(S)

ATTACHMENT B: ATTESTATION STATEMENT(S)

ATTACHMENT C: TEST REPORT

1.1 SCOPE ---------- 3

2.1 INTRODUCTION ---------- 4

3.1 INSERTS PER §2.1033(d) ---------- 5

4.1 DESCRIPTION OF TESTS---------- 6-13

5.1 EFFECTIVE RADIATED POWER OUTPUT ---------- 14

6.1 EQUIVALENT ISOTROPIC RADIATED POWER---------- 15

7.1 RADIATED MEASUREMENTS---------- 16-21

8.1 FREQUENCY STABILITY ---------- 22-23

9.1 PLOTS OF EMISSIONS---------- 24

10.1 LIST OF TEST EQUIPMENT ---------- 25

11.1 SAMPLE CALCULATIONS ---------- 26

12.1 CONCLUSION---------- 27

ATTACHMENT D: TEST PLOTS

ATTACHMENT E: FCC ID LABEL & LOCATION

ATTACHMENT F: TEST SETUP PHOTOGRAPHS

ATTACHMENT G: EXTERNAL PHOTOGRAPHS

ATTACHMENT H: INTERNAL PHOTOGRAPHS

ATTACHMENT I: BLOCK DIAGRAM (S)

ATTACHMENT J: CIRCUIT DIAGRAMS & DESCRIPTION

ATTACHMENT K: PARTS LIST

ATTACHMENT L: OPERATIONAL DESCRIPTION

ATTACHMENT M: USER'S MANUAL

ATTACHMENT N: SAR MEASUREMENT REPORT

ATTACHMENT O: SAR TEST DATA

ATTACHMENT P: SAR TEST SETUP PHOTOGRAPHS

ATTACHMENT Q: DIPOLE VALIDATION

ATTACHMENT R: PROBE CALIBRATION

ATTACHMENT S: DIPOLE CALIBRATION

MEASUREMENT REPORT

1.1 SCOPE

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

General Information

Company Name:	PANTECH&CURITEL COMMUNICATION, INC.
Address:	110-1, ONGJEONG-RI, TONGJIN-EUP, GIMPO-SI, GYOUNGGI-DO, 415-865, KOREA
Attention:	Ki Yeoul, LEE
Tel. / Fax :	+82-31-999-8801 / +82-31-984-9771
E-Mail :	leekiyeoul@pantech.com

- FCC ID: PP4PN-310
- Quantity: Quantity production is planned
- EUT Type: Dual-Band CDMA Phone (CDMA/PCS)- Prototype
- Trade Name: PANTECH&CURITEL
- Model(s): PN-310
- Serial Number(s): PP4 PN310-20061001
- Emission Designator(s): 1M25F9W
- Tx Frequency: 824.70 – 848.31 MHz (CDMA)
  1851.25 – 1908.75 MHz (PCS CDMA)
- Rx Frequency: 869.70 – 893.31 MHz (CDMA)
  1931.25 – 1988.75 MHz (PCS CDMA)
- Application Type: Certification
- FCC Classification: Licensed Portable Transmitter Held to Ear (PCE)
- FCC Rule Part(s): §24(E), §22(H), §2
- Modulation(s): CDMA/ PCS CDMA
- Antenna Type: Retractable (Retracted/Extended)
- Date(s) of Tests: October 10, 2006 - October 11, 2006
- Place of Tests: Hyundai C-Tech. EMC Lab.
  Icheon, Kyounki-Do, KOREA
- Report Serial No.: HCT-SAR06-1002

2.1 INTRODUCTION

EUT DESCRIPTION

The PANTECH&CURITEL. PN-310 Dual-Band (CDMA/ PCS CDMA) phone. Its basic purpose is used for communications. It transmits from CDMA (824.70~848.31), PCS CDMA (1851.25~1908.75) MHz and receives from CDMA (869.70~893.31), PCS CDMA (1931.25~1988.75) MHz. The RF power is rated at CDMA(0.305W), PCS CDMA(0.286W).

MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

Test Facility

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1, Maekok-Ri, Hobup-Myun, Ichon-Si, Kyoungki-Do, 467-701, KOREA. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 6, 2006(Registration Number: 90661)

3.1 INSERTS

Function of Active Devices (Confidential)

The Function of active devices are shown in Attachment K.

Block/Circuit Diagrams & Description (Confidential)

The circuit diagrams & description are shown in Attachment J, and the block diagrams are shown in Attachment I.

Operating Instructions

The instruction manual is shown in Attachment M.

Parts List & Tune-Up Procedure (Confidential)

The parts list & tune-up procedure are shown in Attachment L.

Description of Freq. Stabilization Circuit (Confidential)

The description of frequency stabilization circuit is shown in Attachment K.

Description for Suppression of Spurious Radiation, for Limiting Modulation, and Harmonic Suppresion Circuits (Confidential)

The description of suppression stabilization circuits are shown in Attachment K

4.1 DESCRIPTION OF TESTS

Out power Variation

Test condition to measure the Output power

This device was tested under all R.C.s and worst case is reported with RC3/SO55, with “All Up” power control bits.

The following procedures were followed according to FCC "SAR Measurement Procedures for 3G Devices", May 2006

1. If the mobile station supports Reverse TCH RC 1 and Forward TCH RC 1, set up a call using Fundamental Channel Test Mode 1 (RC=1/1) with 9600 bps data rate only.
2. Under RC1, C.S0011 Table 4.4.5.2-1 (Table 1) parameters were applied.
3. If the MS supports the RC 3 Reverse FCH, RC3 Reverse SCH0 and demodulation of RC 3, 4, or 5, set up a call using Supplemental Channel Test Mode 3 (RC 3/3) with 9600 bps Fundamental Channel and 9600 bps SCH0 data rate Channel and 9600 bps SCH0 data rate.
4. Under RC3, C.S0011 Table 4.4.5.2-2(Table 2) was applied.
5. FCHs were configured at full rate for maximum SAR with “All Up” power control bits.

Parameters for Max. Power for RC1

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1.23 MHz	-104
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

Table. 1

Parameters for Max. Power for RC3

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1.23 MHz	-86
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

Table. 2

Maximum Power Output table for FCC ID: PP4PN-310

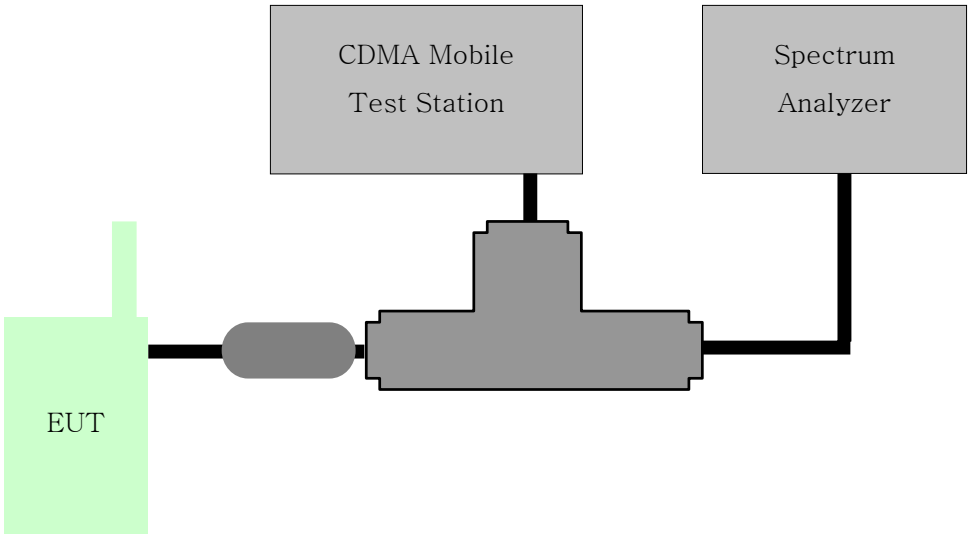
Band	Channel	SO2	SO2	SO55	SO55	TDSO SO32	1xEvDO Rev.0	1xEvDO Rev.0
		RC1/1	RC3/3	RC1/1	RC3/3	RC3/3	(FTAP)	(RTAP)
CDMA	1013	24.09	25.02	25.08	24.98	24.96	-	-
	384	25.06	24.93	25.04	24.95	24.95	-	-
	777	24.96	24.85	24.76	24.86	24.90	-	-
PCS	25	25.03	24.95	25.04	24.97	24.98	-	-
	600	24.87	24.85	24.89	24.88	24.89	-	-
	1175	24.86	24.75	24.78	24.77	24.78	-	-

Table. 3

4.1 DESCRIPTION OF TESTS

4.1 Conducted RF Power Test

Test Set-up



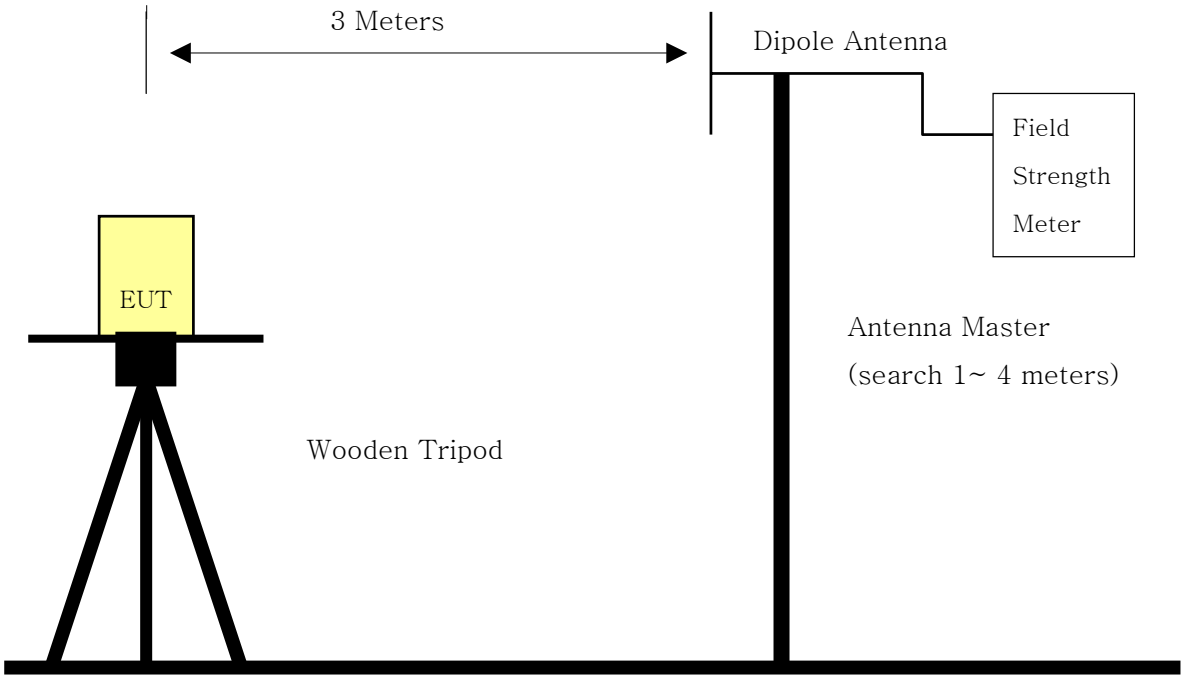
Test Procedure

According to FCC §2.1046 (A), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

1) The EUT was coupled to the spectrum analyzer and the base station simulator through a power divider. The radio frequency load attached to the EUT antenna terminal was 50 Ohm. The lost of the cables the test system is calibrated to correct the reading.
2) The spectrum analyzer was set to Maxpeak Detector function and Maximum hold mode.
3) The resolution banswidth of the spectrum analyzer was comparable to the emission bandwidth. For GSM signal, VBW=RBM= 1MHz; for CDMA signal, VBW=RBW= 3MHz.

4.2 Effective Radiated Power.

Test Set-up



Open Field Test Site

Test Procedure

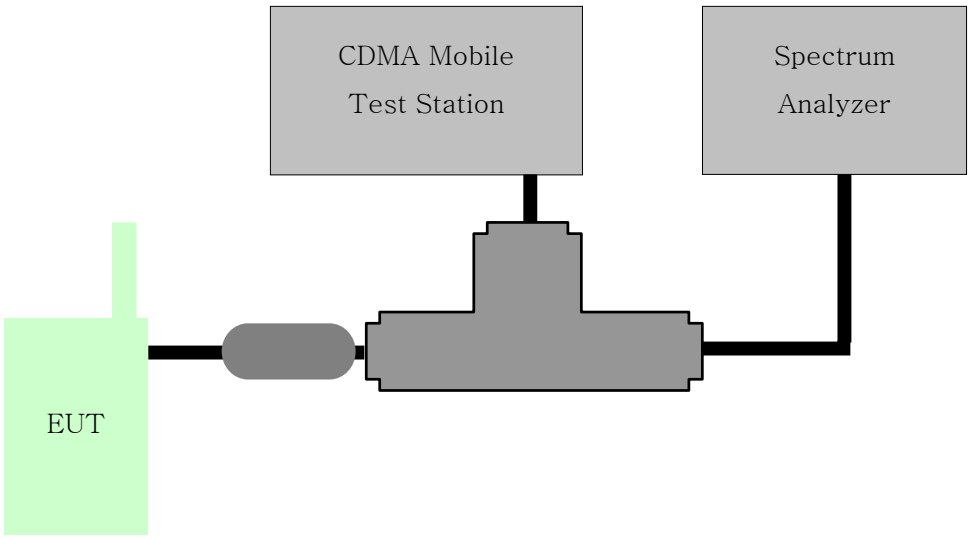
The measurement facilities used for this test have been documented in previous filings with the commission pursuant to section 2.948.

The open field test site is situated in open field with ground screen whose site attenuation characteristics meet ANSI C63.4 –2003. A mast capable of lifting the receiving antenna from a height of one to four meters is used together with a rotable wooden platform mounted at three from the antenna mast.

1) The EUT mounted on a wooden tripod is 0.8 meter above test site ground level.
2) During the test , the turn table is rotated and the antenna height is also varied from 1 to 4 meters until the maximum signal is found.
3) Record the field strength meter's level.
4) Replace the EUT with λ / 2 dipole antenna that is connected to a calibrated signal generator.
5) Increase the signal generator output till the field strength meter's level is equal to the item(4).
6) The signal generator output level is the rating of effective radiated power(ERP).
7) The instrument settings used (RBW/ VBW) during ERP/ EIRP output power measurement are as Belows ;
   -. Below 1GHz : RBW 3MHz, VBW 3MHz
   -. Above 1GHz : RBW 3MHz, VBW 3MHz

4.3 Occupied bandwidth.

Test Set-up

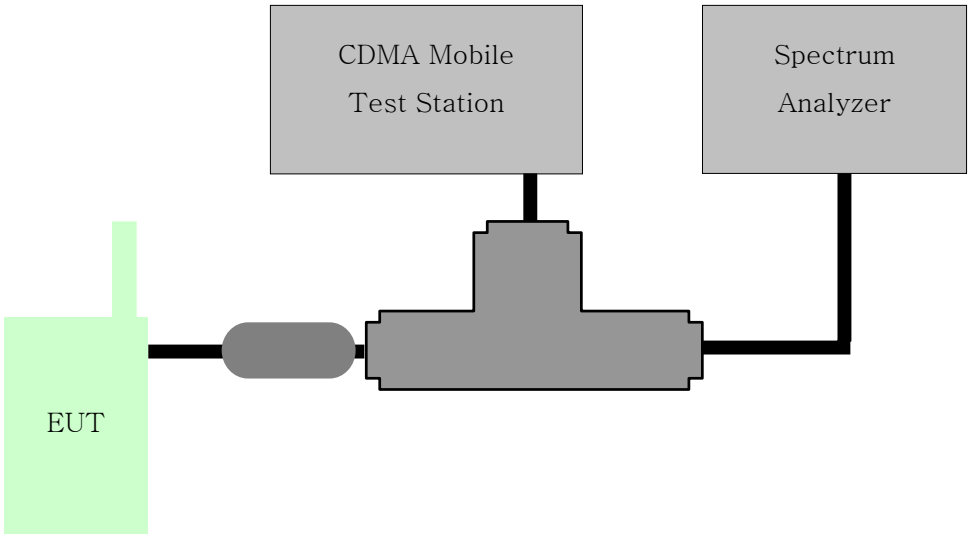


Test Procedure

The EUT was setup to maximum output power at its lowest channel. The occupied bandwidth was measured using a spectrum analyzer. The measurements are repeated for the highest and a middle channel. The EUT's occupied bandwidth is measured as the width of the signal between two points, one below the carrier center frequency and one above the carrier frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power. Plots of the EUT's occupied bandwidth are shown herein.

4.4 Spurious and Harmonic Emissions at Antenna Terminal.

Test Set-up

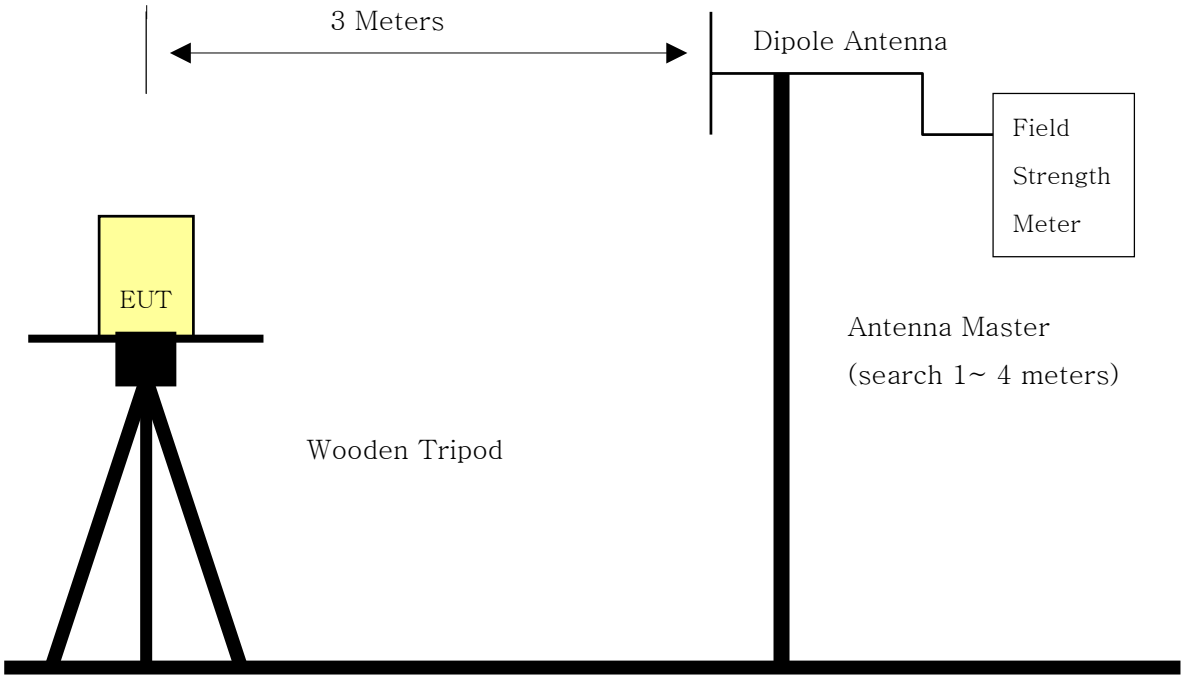


Test Procedure

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to 10 GHz. The transmitter is modulated with a 2500Hz tone at a level of 16dB greater than that required to provided 50% modulation. At the input terminals of the spectrum an analyzer, an isolator (RF circulator with on port terminated with 50 ohms) and an 870 MHz to 890 MHz bandpass filter is connected between the test transceiver (for conducted tests) or the receive antenna (for radiated tests) and the analyzer. The rejection of the bandpass filter to signals in the 825 — 845 MHz range is adequate to limit the transmit energy from the test transceiver which appears to a level which will allow the analyzer to measure signals less than —90dBm. Calibration of the test receiver is performed in the 870 — 890 MHz range to insure accuracy to allow variation in the bandpass filter insertion loss to be calibrated.

4.5 Field strength of spurious radiation .

Test Set-up



Open Field Test Site

Test Procedure

The measurement facilities used for this test have been documented in previous filings with the commission pursuant to section 2.948.
The open field test site is situated in open field with ground screen whose site attenuation characteristics meet ANSI C63.4 –2003. A mast capable of lifting the receiving antenna from a height of one to four meters is used together with a rotable wooden platform mounted at three from the antenna mast.

1) The unit mounted on a wooden table 1.5m × 1.0m × 0.80 is 0.8 meter above test site ground level.
2) During the emission test , the turntable is rotated and the EUT is manipulated to find the configuration resulting in maximum emission under normal condition of installation and operation.
3) The antenna height and polarization are also varied from 1 to 4 meters until the maximum signal is found.
4) The spectrum shall be scanned up to the 10^{th} harmonic of the fundamental frequency.
5) The instrument settings used (RBW/ VBW) during ERP/ EIRP output power measurement are as belows ;

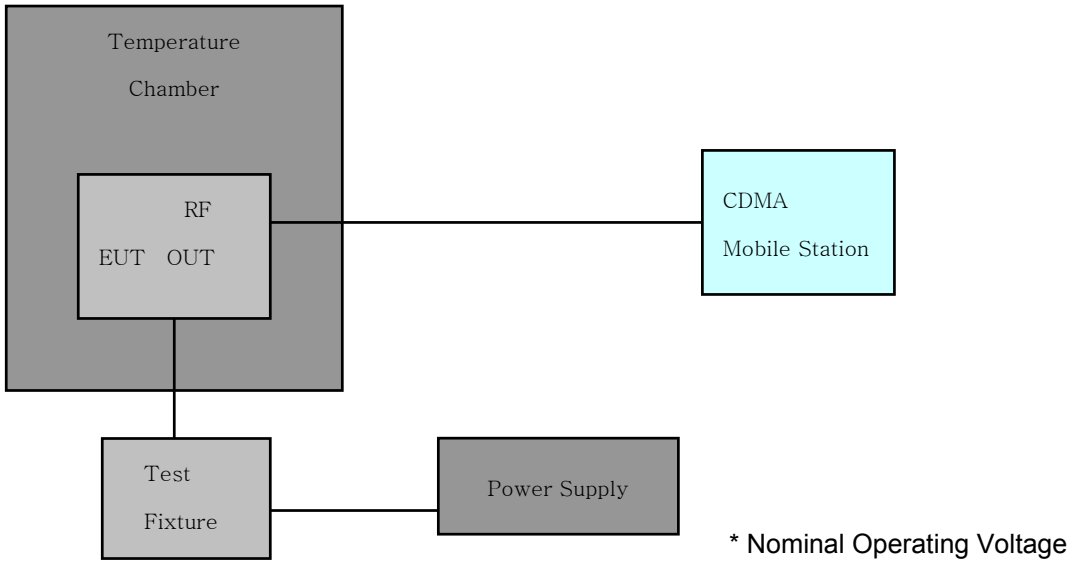
   -. Below 1GHz : RBW 3MHz, VBW 3MHz

   -. Above 1GHz : RBW 3MHz, VBW 3MHz

4.6 Frequency stability .

4.6.1 Frequency stability with variation of ambient temperature.

Test Set-up



Test Procedure

The frequency stability of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from -30 °C to +50 °C using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification **—** The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.0001 (±1 ppm) of the center frequency.

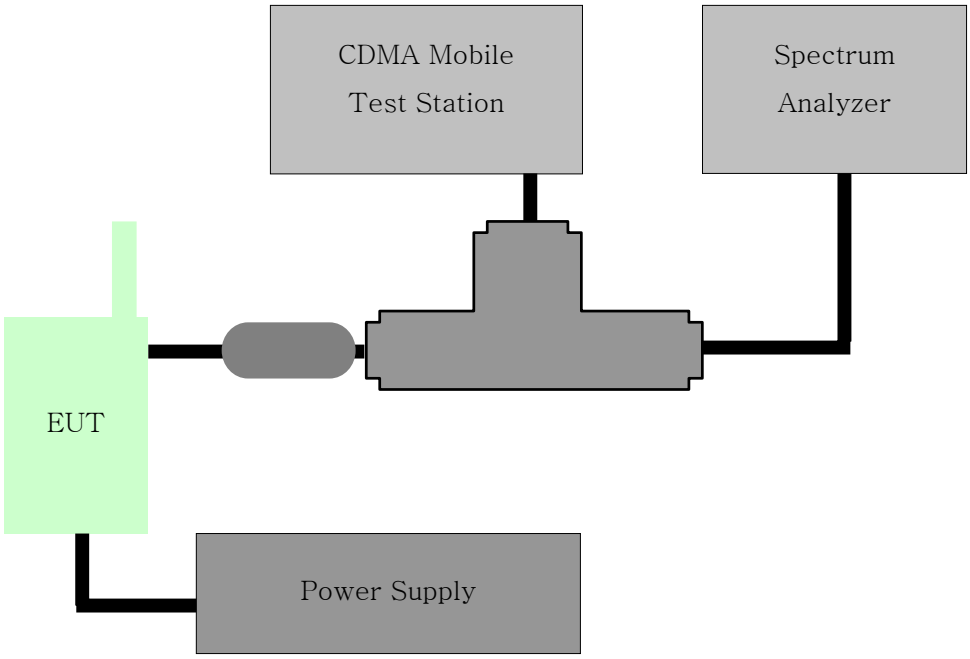
Time Period and Procedure:

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (25 °C to 27 °C to provide a reference).
2. The equipment is subjected to an overnight “soak” at -30 °C without any power applied.
3. After the overnight “soak” at 30 °C (usually 14-16 hours), the equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements are made at 10 °C interval up to room temperature. At least a period of one and one half-hour is provided to allow stabilization of the equipment at each temperature level.
5. Again the transmitter carrier frequency and the individual oscillators is measured at room temperature to begin measurement of the upper temperature levels.
6. Frequency were made at 10 intervals starting at 30 °C up to +50 °C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

NOTE: The EUT is tested down to the battery endpoint.

4.6.2 Frequency stability with variation of primary supply voltage.

Test Set-up



Test Procedure

1) The primary supply is varied in steps of 5% from 85 to 115% of the nominal supply voltage, or reduce primary supply voltage to the battery operating end point.
2) The frequency is recorded each 5% step.

5.1 Test Data (Continued)

5.2Effective Radiated Power Output (CDMA)

Radiated measurements at 3 meters

Modulation: CDMA

Freq. Tuned (MHz)	REF. LEVEL (dBm)	POL (H/V)	ERP (W)	ERP (dBm)	BATTERY
824.70	-22.4	V	0.299	24.8	Standard
835.89	-22.3	V	0.305	24.9	Standard
848.31	-22.6	V	0.285	24.6	Standard

Note: Standard batteries are the only options for this phone

NOTES:

Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

6.1 Test Data (Continued)

6.1 Equivalent Isotropic Radiated Power (E.I.R.P.) PCS CDMA

Radiated measurements at 3 meters

Modulation: PCS CDMA

Freq. Tuned (MHz)	RFF. LEVEL (dBm)	POL (H/V)	Azimuth (0 angle)	EIRP (W)	EIRP (dBm)	BATTERY
1851.25	-29.1	V	70	0.279	24.5	Standard
1880.00	-29.0	V	70	0.286	24.6	Standard
1908.75	-29.3	V	70	0.267	24.3	Standard

Note: Standard batteries are the only options for this phone

NOTES:

Equivalent Isotropic Radiated Power Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW=VBW=3MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW=VBW=1MHz. A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the Horn antenna is measured. The difference between the gain of the horn and an isotropic antenna is taken into consideration and the EIRP is recorded.

7.1 Test Data (Continued)

7.2 CELLULAR CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

- ▣ OPERATING FREQUENCY: 824.70 MHz
- ▣ CHANNEL: 1013 (Low)
- ▣ MEASURED OUTPUT POWER: 24.9 dBm = 0.305 W
- ▣ MODULATION SIGNAL: CDMA (Internal)
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: 43 + 10 $\log_{10}$ (W) = 37.84 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1649.40	-58.8	7.3	-51.5	V	-71.1
2474.10	-48.4	8.3	-40.1	V	-59.2
3298.80	-62.3	9.7	-52.6	V	-70.8

NOTES:

Radiated Spurious Emission Measurements by Substitution Method

according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW=VBW=3MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW=VBW=1MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

7.1 Test Data (Continued)

7.3 CELLULAR CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

- ▣ OPERATING FREQUENCY: 835.89 MHz
- ▣ CHANNEL: 0363 (Mid)
- ▣ MEASURED OUTPUT POWER: 24.9 dBm = 0.305 W
- ▣ MODULATION SIGNAL: CDMA (Internal)
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: 43 + 10 $\log_{10}$ (W) = 37.84 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1671.78	-57.5	7.3	-50.2	V	-69.8
2507.67	-50.9	8.3	-42.6	V	-61.7
3343.56	-63.0	9.7	-53.3	V	-71.5

NOTES:

Radiated Spurious Emission Measurements by Substitution Method

according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW=VBW=3MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW=VBW=1MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

7.1 Test Data (Continued)

7.4 CELLULAR CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

- ▣ OPERATING FREQUENCY: 848.31 MHz
- ▣ CHANNEL: 0777 (High)
- ▣ MEASURED OUTPUT POWER: 24.9 dBm = 0.305 W
- ▣ MODULATION SIGNAL: CDMA (Internal)
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: 43 + 10 $\log_{10}$ (W) = 37.84 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1696.62	-59.7	7.3	-52.4	V	-72.0
2544.93	-50.1	8.3	-41.8	V	-60.9
3393.24	-64.4	9.7	-54.7	V	-72.9

NOTES:

Radiated Spurious Emission Measurements by Substitution Method

according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW=VBW=3MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW=VBW=1MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

7.1 Test Data (Continued)

7.5 CELLULAR PCS CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

- ▣ OPERATING FREQUENCY: 1851.25 MHz
- ▣ CHANNEL: 0025 (Low)
- ▣ MEASURED OUTPUT POWER: 24.6dBm = 0.286 W
- ▣ MODULATION SIGNAL: CDMA (Internal)
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: 43 + 10 $\log_{10}$ (W) = 37.56dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3702.50	-58.2	12.4	-45.8	V	-61.0
5553.75	-60.3	11.7	-48.6	V	-65.0
7405.00	-63.2	11.5	-51.7	V	-68.8

NOTES:

Radiated Spurious Emission Measurements by Substitution Method

according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW=VBW=3MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW=VBW=1MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

7.1 Test Data (Continued)

7.6 CELLULAR PCS CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

- ▣ OPERATING FREQUENCY: 1880.00 MHz
- ▣ CHANNEL: 0600 (Middle)
- ▣ MEASURED OUTPUT POWER: 24.6dBm = 0.286 W
- ▣ MODULATION SIGNAL: CDMA (Internal)
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: 43 + 10 $\log_{10}$ (W) = 37.56dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-52.9	12.4	-40.5	V	-55.7
5640.00	-58.9	11.7	-47.2	V	-63.6
7520.00	-62.1	11.5	-50.6	V	-67.7

NOTES:

Radiated Spurious Emission Measurements by Substitution Method

according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW=VBW=3MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW=VBW=1MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

7.1 Test Data (Continued)

7.7 CELLULAR PCS CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

- ▣ OPERATING FREQUENCY: 1908.75 MHz
- ▣ CHANNEL: 1175 (High)
- ▣ MEASURED OUTPUT POWER: 24.6dBm = 0.286 W
- ▣ MODULATION SIGNAL: CDMA (Internal)
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: 43 + 10 $\log_{10}$ (W) = 37.56dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3817.50	-52.5	12.4	-40.1	V	-55.3
5726.25	-58.0	11.7	-46.3	V	-62.7
7635.00	-63.9	11.5	-52.4	V	-69.5

NOTES:

Radiated Spurious Emission Measurements by Substitution Method

according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW=VBW=3MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW=VBW=1MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

8.1 Test Data

8.2 FREQUENCY STABILITY (CDMA)

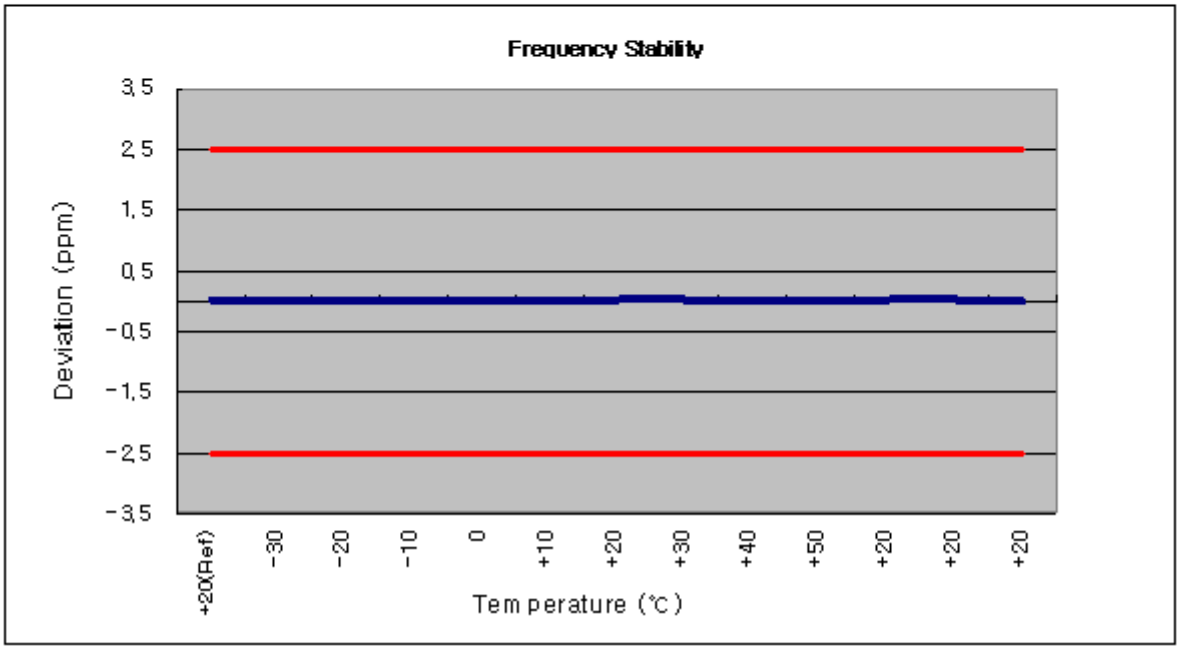
OPERATING FREQUENCY: 835,890,031 Hz

CHANNEL: 363

REFERENCE VOLTAGE: 3.7 VDC

DEVIATION LIM IT: ± 0.00025 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	835,890,031	31	0.000004	0.016
100%		-30	835,889,974	-26	-0.000003	-0.014
100%		-20	835,890,018	18	0.000002	0.010
100%		-10	835,889,971	-29	-0.000003	-0.015
100%		0	835,890,034	34	0.000004	0.018
100%		+10	835,889,969	-31	-0.000004	-0.016
100%		+20	835,890,028	28	0.000003	0.015
100%		+30	835,890,036	36	0.000004	0.019
100%		+40	835,889,968	-32	-0.000004	-0.017
100%		+50	835,889,962	-38	-0.000005	-0.020
85%	3.40	+20	835,890,027	27	0.000003	0.014
115%	4.26	+20	835,890,018	18	0.000002	0.010
Batt. Endpoint	3.12	+20	835,889,968	-32	-0.000004	-0.017



8.1 Test Data(Continued)

8.3 FREQUENCY STABILITY (PCS CDMA)

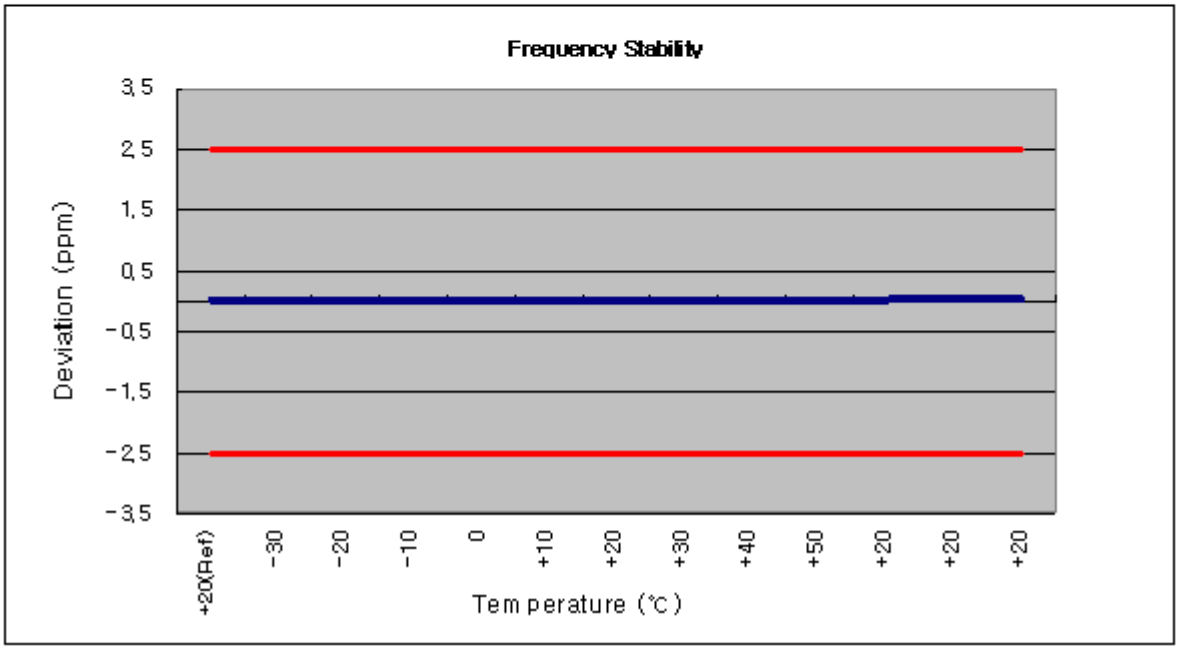
OPERATING FREQUENCY: 1,880,000,024 Hz

CHANNEL: 0600

REFERENCE VOLTAGE: 3.7 VDC

DEVIATION LIM IT: ± 0.00025 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	1,880,000,024	24	0.000001	0.013
100%		-30	1,879,999,969	-31	-0.000002	-0.016
100%		-20	1,879,999,975	-25	-0.000001	-0.013
100%		-10	1,880,000,037	37	0.000002	0.020
100%		0	1,879,999,965	-35	-0.000002	-0.019
100%		+10	1,879,999,972	-28	-0.000001	-0.015
100%		+20	1,879,999,970	-30	-0.000002	-0.016
100%		+30	1,880,000,035	35	0.000002	0.019
100%		+40	1,879,999,971	-29	-0.000002	-0.015
100%		+50	1,879,999,966	-34	-0.000002	-0.018
85%	3.40	+20	1,880,000,027	27	0.000001	0.014
115%	4.26	+20	1,880,000,041	41	0.000002	0.022
Batt Endpoint	3.12	+20	1,880,000,038	38	0.000002	0.020



9.1 PLOT(S) OF EMISSION

(SEE ATTACHMENT D)

10.1 LIST OF TEST EQUIPMENT

Type / Model	Calib. Date	S/N
Spectrum Analyzer (20Hz~40GHz) R&S ESI40	Dec. 05	1088.7410
Spectrum Analyzer (100Hz~26.5GHz) R3273	April 06	J04821
Signal Generator HP8373ED (10MHz ~ 20GHz)	July 06	US8710152
Power Meter E4416A	Jan. 06	GB41291412
Power Sensor E9327A	Jan. 06	US40440910
Network Analyzer 8753ES (30KHz ~ 6GHz)	April06	JP39240221
Modulation Analyzer HP8901A	June 06	3438A05231
Audio Analyzer HP 8903A	Feb.06	2433A04322
Function Generator HP 8116A	Feb.06	3001A08285
Base Station CMU200	March 06	110740
Base Station E5515C	May 06	US41070189
Base Station NJZ-2000	May 06	ET00117
Bluetooth Simulator TC-3000	Jan 06	3000A490112
AMF-4D-001180-26-10P (0.1~18GHz)	Feb.06	671009
AMF-4D-001180-26-10P (18~26.5GHz)	Feb.06	667624
AMF-4D-001180-26-10P (26~40GHz)	Feb.06	671314
High Pass Filter WHK1.2/15G	June 06	62079
High Pass Filter WHK3.3/18G	June 06	62079
High Pass Filter H18G26G1	June 06	3407
Power Divider 1506A	Jan. 06	MD793
Power Supply EP-3010	Dec. 06	3110117
Dipole Antenna UHAP	June 06	557
Dipole Antenna UHAP	June 06	558
TRILOG Antenna VULB9160 (25MHz~1800MHz)	May 05	3125
TRILOG Antenna VULB9160 (25MHz~1800MHz)	April 06	4150
Horn Antenna BBHA 9120D (1~18GHz)	June 06	1099
Horn Antenna BBHA 9120D (1~18GHz)	March 06	1201
Horn Antenna BBHA 9170 (15~40GHz)	Feb.06	BBHA9170124
Receiver ESCI (9KHz~3GHz)	Aug. 06	1166.5950k03
LISN EMCO 3825/2	July 06	9706-1070
LISN Rohde & Schwarz ESH2-Z5	July 06	9706-1071
Amplifier Hewlett-Packard 8447E	March 06	2805A03141
Antenna Position Tower HD240	N.A	3241
Turn Table EMCO 1060-06	N.A	1253A
AC Power Source PACIFIC Magnetic Module	N.A	45321
AC Power Source PACIFIC 360AMX	N.A	22B87

11.1 SAMPLE CALCULATIONS

A. ERP Sample Calculation

Freq. Tuned (MHz)	LEVEL(1) (dBm)	POL (H/V)	ERP (W)	ERP(2) (dBm)	BATTERY
824.70	-29.73	H	0.346	25.393	Standard

1) The EUT mounted on a wooden tripod is 0.8 meter above test site ground level.
2) During the test , the turn table is rotated and the antenna height is also varied from 1 to 4 meters until the maximum signal is found.
3) Record the field strength meter's level.(**LEVEL**)
4) Replace the EUT with dipole antenna that is connected to a calibrated signal generator.
5) Increase the signal generator output till the field strength meter's level is equal to the item(3).
6) The signal generator output level with cable loss is the rating of effective radiated power(**ERP**).
(Cable loss means the factor between Signal Generator and Transmitting Antenna.)

For more details, please refer to the test set-up procedure.

B. Emission Designator

Emission Designator = 1M28F9W
CDMA BW = 1.28 MHz
F = Frequency Modulation
9 = Composite Digital Info
W = Combination (Audio/Data)
(Measured at the 99.75% power bandwidth)

12.1 CONCLUSION

The data collected shows that the **Dual-Band CDMA Phone (CDMA/ PCS CDMA)**

FCC ID: PP4PN-310 complies with all the requirements of Parts 2 and 22, 24 of the FCC rules.