DIGITAL EMC CO., LTD.

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CERTIFICATE OF COMPLIANCE
FCC Part 24 & 22 Certification

MODOTTEL Co.,Ltd.
2F.,DongNam B/D,448-16,Shingil-5Dong,
YoungDeungPo-Ku,Seoul 150-851,Korea
Attn:Joong-Ill Hwang(Principle Engineer)

Dates of Tests: September 4 ~ 8, 2003
Test Report S/N:DR50110309D
Test Site : DIGITAL EMC CO., LTD.

FCC ID **POQWTE-320**

APPLICANT **MODOTTEL Co.,Ltd.**

Classification:	**Licensed Portable Transmitter Held to Ear (PCE)**
FCC Rule Part(s):	**§24(E), §22(H), §22.901(d), §2**
EUT Type:	**Tri-Mode Dual-Band Analog/PCS Phone (AMPS/CDMA)**
Model(s):	**WTE-320**
TX Frequency Range:	**824.04 ~ 848.97 MHz (AMPS) / 824.70 ~ 848.31 MHz (CDMA)** **1851.25 ~ 1908.75 MHz (PCS CDMA)**
RX Frequency Range:	**869.04 ~ 893.97 MHz (AMPS) / 869.70 ~893.31 MHz (CDMA)** **1931.25 ~ 1988.75 MHz (PCS CDMA)**
Max. RF Output Power:	**0.386W ERP AMPS (25.87dBm) / 0.315W ERP CDMA (24.98dBm)** **0.378W ERP PCS CDMA (25.77dBm)**
Max. SAR Measurement:	**1.46W/kg AMPS Head SAR; 0.875W/kg AMPS Body SAR** **1.32W/kg CDMA Head SAR; 0.740W/kg CDMA Body SAR** **1.20W/kg PCS CDMA Head SAR; 0.517W/kg PCS CDMA Body SAR**
Emission Designators:	**40K0F8W / 40K0F1D(AMPS), 1M25F9W(CDMA)**
Test Device Serial No.:	**Identical prototype**

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.

D.M.JUNG (Manager)

TABLE OF CONTENTS

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.

§2.1033 General Information

Applicant: MODOTTEL Co.,Ltd.
Address : 2F.,DongNam B/D,448-16,Shingil-5Dong, YoungDeungPo-Ku,Seoul 150-851,Korea
Attention: Joong-Ill Hwang(Principle Engineer)

FCC ID:	**POQWTE-320**
Quantity:	Quantity production is planned
Emission Designators:	40K0F8W / 40K0F1D(AMPS), 1M25F9W(CDMA)
Tx Freq. Range:	824.04 ~ 848.97 MHz (AMPS) 824.70 ~848.31 MHz (CDMA) 1851.25 ~ 1908.75 MHz (PCS CDMA)
Rx Freq. Range:	869.04 ~ 893.97 MHz (AMPS) 869.70 - 893.31 MHz (CDMA) 1931.25 ~ 1988.75 MHz (PCS CDMA)
Max. Power Rating:	0.386W ERP AMPS(25.87dBm) / 0.315W ERP CDMA(24.98dBm) 0.378W ERP PCS CDMA (25.77dBm)
FCC Classification(s):	Licensed Portable Transmitter Held to Ear (PCE)
Equipment (EUT) Type:	Tri-Mode Dual-Band Analog/PCS Phone (AMPS/CDMA)
Modulation(s):	APMS / CDMA
Frequency Tolerance:	± 0.00025 % (2.5ppm)
FCC Rule Part(s):	§24(E), §22(H), §22.901(d), §2
Dates of Tests:	September 4 ~ 8, 2003
Place of Tests:	DIGITAL EMC
Test Report S/N:	DR50110309D

2.1 INTRODUCTION

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competents of calibration and testing laboratory".

This laboratory is accredited by NVLAP for NVLAP Lab. Code : 200559-0.

DIGITAL EMC CO., LTD.

Address : 683-2, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080

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3.1 INSERTS

Function of Active Devices (Confidential)

The Function of active devices are shown in Attachment K.

Block & Schematic Diagrams (Confidential)

The block diagrams are shown in Attachment I, and the schematic diagrams are shown in Attachment J.

Operating Instructions

The instruction manual is shown in Attachment M.

Parts List & Tune-Up Procedure (Confidential)

The parts list & tune-up procedure is 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 is shown in Attachment K.

4.1 DESCRIPTION OF TESTS

4.2 Transmitter Audio Frequency Response

The frequency response of the audio modulating circuit over the frequency range 100-5000Hz is measured. The audio signal generator is connected to the audio input circuit/microphone of the EUT. The audio signal input is adjusted to obtain 50% modulation at 1㎑ and this point is taken as the 0dB reference. With the input held constant and below the limit at all frequency, the audio signal generator is varied from 100 to 50㎑.

4.3 Audio Low Pass Filter Frequency Response

The response in dB relative to 1㎑ is measured using the HP8901 a Modulation Analyzer. For the frequency response of the audio low-pass filter, the audio input is connected at the input to the modulation limiter and the modulated stage. The audio output is connected at the output of the modulated stage. The corresponding plots are shown herein.

4.4 Modulation Limiting

The audio signal generator is connected to the audio put circuit/microphone of the EUT. The modulation response is measured for each of the three modulating frequencies(300Hz, 1000Hz and 3000Hz), and the input voltage is varied form 30% modulation (±3.6㎑ deviation) to at least 20dB higher than the saturation point. Measurements of modulation and the plots are attached herein . Measurements were performed for ST, SAT and wide-band data modulations. The corresponding results are shown herein.

Note: ST, SAT and wide-band data were internally generated by the EUT.

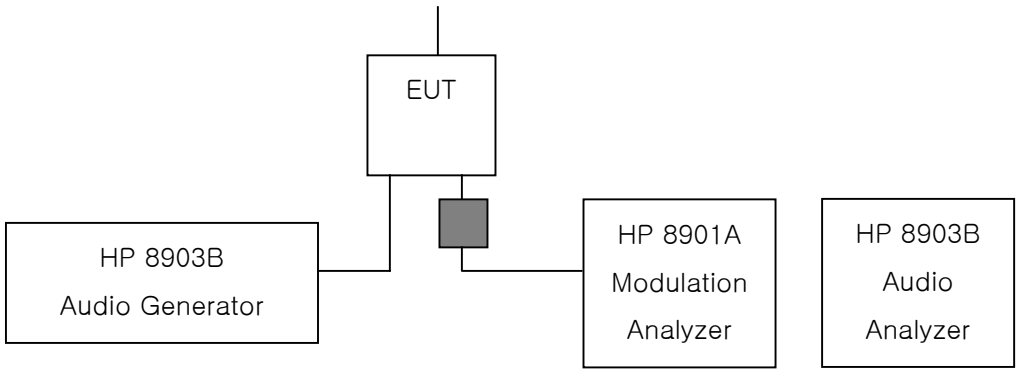


Fig.3. Transmitter Audio Frequency & Tone Test Setup.

4.5 Occupied Bandwidth Emission Limits

(a) On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43+10log(P) dB.

(b) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1㎒ or greater. However, in the 1㎒ bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26dB below the transmitter power.

(c) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

(d) The measurement of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

BLOCK	Freq.Range(㎒) Transmitter(Tx)	Freq.Range(㎒) Receiver(Rx)
A	1850-1865	1930-1945
B	1870-1885	1950-1965
C	1895-1910	1975-1990
D	1865-1870	1945-1950
E	1885-1890	1965-1970
F	1890-1895	1970-1975

Table 1. Broadband PCS Service Frequency Blocks.

4.6 Occupied Bandwidth

The audio signal generator is adjusted to 1㎑. The output level is set to ±6㎑ deviation. With the level constant, the frequency is set to 2500Hz. Then the audio signal level is increased by 16dB. The occupied bandwidth data is obtained for the SAT(Supervisory Audio Tone), ST(Signaling Tone), WBD(Wideband data), and DTMF(Dual Tone Multi Frequencies). The results are shown on the attached graphs.

Specified Limits:

a. On any frequency removed form the assigned carrier frequency by more 20㎑, up to and including 45㎑, the sideband is at least 26dB below the carrier.
b. On any frequency removed form the assigned carrier frequency by more 45㎑, up to and including 90㎑, the sideband is at least 45dB below the carrier.
c. On any frequency removed form the assigned carrier frequency by more 90㎑, up to and multiple of the carrier frequency, the sideband is at least 60dB below the carrier or $40+\log_{10}$(mean power output in Watts)dB, whichever is the smaller attenuation.

4.7 Spurious and Harmonic Emissions at Antenna Terminal

The level of carrier and the various conducted spurious and harmonics 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㎓. 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 analyzer, an isolator (RF circulator with on port terminated with 50ohms)and an 870㎒ to 890㎒ 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㎒ 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㎒ range to insure accuracy to allow variation in the bandpass filter insertion loss to be calobrated.

4.8 Frequencies

At the input terminals of the spectrum analyzer, an isolator (RF pad) and a high-pass filter are connected between the test transceiver (for conducted tests) or the receive antenna (for radiated tests) and the analyzer. The high-pass filter(signals below 1.6㎓)is to limit the fundamental frequency from interfering with the measurement of low-level spurious and harmonic emissions and to ensure that the preamplifier is not saturated.

4.9 Radiation Spurious and Harmonic Emissions

Radiation and harmonic emission are measured outdoors at our 3-meter test range. The equipment under test is placed on a wooden turntable 3-meters form the receive antenna. The receive antenna height and turntable rotation were adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in lace of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1㎓, 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.

4.10 Frequency Stability / Temperature Variation.

The frequency stability of the transmitter is measured by:

a) Temperature: The temperature is varied from -30℃ to +60℃ using an environmental chamber.

b) Primary Supply Voltage: The primary supply voltage is varied from 85% to 1150% 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 ± 0.00025(±2.5ppm) 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℃ to 27℃ to provide a reference).
2. The equipment is subjected to an overnight "soak" at -30℃ without power applied.
3. After the overnight "soak" at 30℃(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℃ 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 measurements are at 10 intervals starting at 30℃ up to +50℃ allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after re-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.

5.1 Test Data

5.2 Effective Radiated Power Output

A. POWER: **High (Analog Mode)**

Freq. Tuned (MHz)	**REF. LEVEL** (dBm)	**POL** (H/V)	**ERP** (W)	**ERP** (dBm)	**BATTERY**
824.04	-13.17	H	0.352	25.47	Standard
836.52	-13.83	H	0.296	25.71	Standard
848.97	-12.67	H	0.386	25.87	Standard

Note: Standard battery is 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. 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.

5.1 Test Data

5.3 Effective Radiated Power Output

A. POWER: **High (CDMA Mode)**

Freq. Tuned (MHz)	**REF. LEVEL** (dBm)	**POL** (H/V)	**ERP** (W)	**ERP** (dBm)	**BATTERY**
824.70	-12.67	H	0.281	24.48	Standard
836.52	-12.83	H	0.270	24.32	Standard
848.31	-12.17	H	0.315	24.98	Standard

Note: Standard battery is 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. 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

6.2 Equivalent Isotropic Radiated Power (E.I.R.P)

Radiated measurements at 3 meters

Supply Voltage: **3.7**

Modulation: **PCS CDMA**

Freq. Tuned (MHz)	**REF. LEVEL** (dBm)	**POL** (H/V)	**ERP** (W)	**ERP** (dBm)	**BATTERY**
1851.25	-19.79	V	0.254	24.05	Standard
1880.00	-19.09	V	0.378	25.77	Standard
1908.75	-19.83	V	0.252	24.01	Standard

Note: Standard battery is 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. 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

7.2 AMPS Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 824.04 MHz

CHANNEL: 0991(Low)

MEASURED OUTPUT POWER: 25.87 dBm = 0.386 W

MODULATION SIGNAL: FM (Internal)

DISTANCE: 3 meters

LIMIT: 43 + 10 $\log_{10}$ (W) = 38.87 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1648.08	-41.4	8.2	-33.2	H	59.0
2472.12	-44.8	9.4	-35.4	H	61.2
3296.16	-49.6	9.4	-40.2	H	66.0
4120.20	-55.3	9.4	-45.9	H	71.7

NOTE

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. 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

7.3 AMPS Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 836.52 MHz

CHANNEL: 0384(Mid)

MEASURED OUTPUT POWER: 25.87 dBm = 0.386 W

MODULATION SIGNAL: FM (Internal)

DISTANCE: 3 meters

LIMIT: 43 + 10 $\log_{10}$ (W) = 38.87 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1673.04	-42.2	8.2	-34.0	H	59.8
2509.56	-44.8	9.4	-35.4	H	61.2
3346.08	-47.6	9.4	-38.2	H	64.0
4182.60	-55.4	9.4	-46.0	H	71.8

NOTE

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. 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

7.4 AMPS Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 848.97 MHz

CHANNEL: 0799(High)

MEASURED OUTPUT POWER: 25.87 dBm = 0.386 W

MODULATION SIGNAL: FM (Internal)

DISTANCE: 3 meters

LIMIT: 43 + 10 $\log_{10}$ (W) = 38.87 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1697.94	-42.0	8.2	-33.8	H	59.6
2546.91	-48.1	9.4	-38.7	H	64.5
3395.88	-51.5	9.4	-42.1	H	67.9
-	-	9.4	-	-	-

NOTE

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. 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 CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 824.70 MHz

CHANNEL: 1013(Low)

MEASURED OUTPUT POWER: 24.98 dBm = 0.315 W

MODULATION SIGNAL: CDMA (Internal)

DISTANCE: 3 meters

LIMIT: 43 + 10 $\log_{10}$ (W) = 37.98 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1649.40	-42.0	8.2	-33.8	H	58.7
2474.10	-45.3	9.4	-35.9	H	60.8
3298.80	-50.7	9.4	-41.3	H	66.2
4123.50	-53.3	9.4	-43.9	H	68.8

NOTE

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. 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 CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 836.52 MHz

CHANNEL: 0384(Mid)

MEASURED OUTPUT POWER: 24.98 dBm = 0.315 W

MODULATION SIGNAL: CDMA (Internal)

DISTANCE: 3 meters

LIMIT: 43 + 10 $\log_{10}$ (W) = 37.98 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1673.04	-41.8	8.2	-33.6	H	58.5
2509.56	-46.0	9.4	-36.6	H	61.4
3346.08	-49.2	9.4	-39.8	H	64.6
4182.60	-51.3	9.4	-41.9	H	66.7

NOTE

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. 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 CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 848.31 MHz

CHANNEL: 0777(High)

MEASURED OUTPUT POWER: 24.98 dBm = 0.315 W

MODULATION SIGNAL: CDMA (Internal)

DISTANCE: 3 meters

LIMIT: 43 + 10 $\log_{10}$ (W) = 37.98 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1696.62	-41.5	8.2	-33.3	H	58.1
2544.93	-44.2	9.4	-34.8	H	59.6
3393.24	-51.7	9.4	-42.3	H	67.1
4241.55	-55.5	9.4	-46.1	H	70.9
-	-	-	-	-	-

NOTE

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. 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)

7.8 PCS CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1851.25 MHz

CHANNEL: 0025(Low)

MEASURED OUTPUT POWER: 25.77 dBm = 0.378 W

MODULATION SIGNAL: CDMA (Internal)

DISTANCE: 3 meters

LIMIT: 43 + 10 $\log_{10}$ (W) = 38.77 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
3702.50	-46.2	9.3	-36.9	V	62.6
5553.75	-50.1	10.8	-39.3	V	65.0
-	-	-	-	-	-

NOTE

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. 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)

7.8 PCS CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1880.00 MHz

CHANNEL: 0600(Mid)

MEASURED OUTPUT POWER: 25.77 dBm = 0.378 W

MODULATION SIGNAL: CDMA (Internal)

DISTANCE: 3 meters

LIMIT: 43 + 10 $\log_{10}$ (W) = 38.77 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
3760.00	-38.2	9.3	-28.9	V	54.6
5640.00	-43.1	10.8	-32.3	V	58.0
7520.00	-52.5	10.3	-42.2	V	67.9
-	-	-	-	-	-

NOTE

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. 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)

7.8 PCS CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1908.75 MHz

CHANNEL: 1175(High)

MEASURED OUTPUT POWER: 25.77 dBm = 0.378 W

MODULATION SIGNAL: CDMA (Internal)

DISTANCE: 3 meters

LIMIT: 43 + 10 $\log_{10}$ (W) = 38.77 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
3817.5	-42.5	9.3	-33.2	V	58.9
5726.25	-52.5	10.8	-41.7	V	67.4
7635.00	-51.1	10.3	-40.8	V	66.5
-	-	-	-	-	-

NOTE

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. 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 (AMPS)

OPERATING FREQUENCY: 836,520,027 Hz

CHANNEL: 384

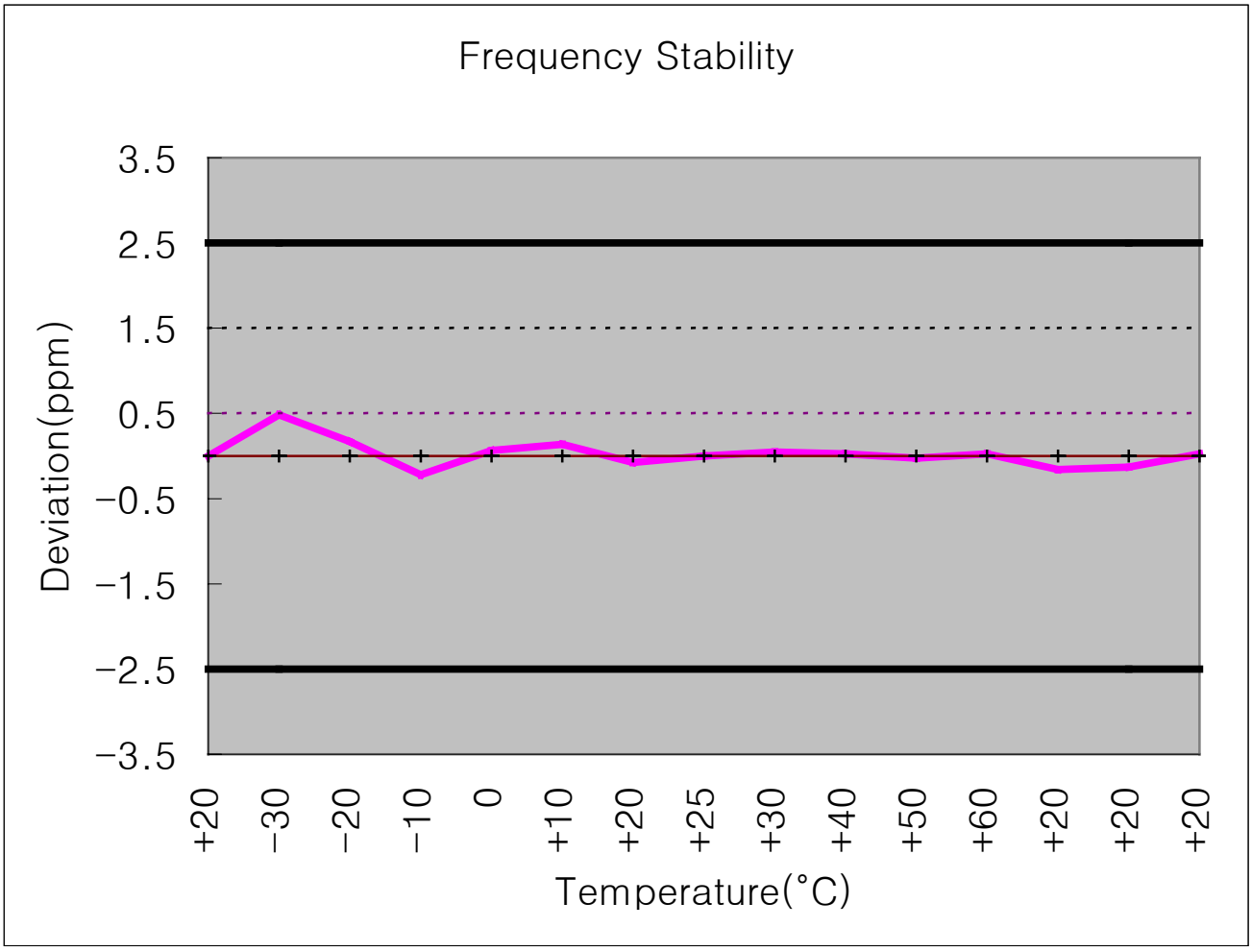
REFERENCE VOLTAGE: 3.7 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5ppm

VOLTAGE (%)	**POWER** (VDC)	TEMP (dB)	**FREQ** (Hz)	**Deviation** (%)
100%	3.70	+20(Ref)	836,520,027	0.000000
100%		-30	836,519,623	0.000048
100%		-20	836,519,886	0.000017
100%		-10	836,520,210	-0.000022
100%		0	836,519,973	0.000006
100%		+10	836,519,913	0.000014
100%		+20	836,520,090	-0.000008
100%		+25	836,520,027	0.000000
100%		+30	836,519,987	0.000005
100%		+40	836,520,006	0.000003
100%		+50	836,520,047	-0.000002
100%		+60	836,520,005	0.000003
85%	3.17	+20	836,520,161	-0.000016
115%	4.26	+20	836,520,135	-0.000013
BATT.ENDPOINT	2.98	+20	836,520,005	0.000003

8.1 Test Data(Continued)

8.3 FREQUENCY STABILITY (AMPS)



8.1 Test Data(Continued)

8.4 FREQUENCY STABILITY (CDMA)

OPERATING FREQUENCY: 836,519,865 Hz

CHANNEL: 384

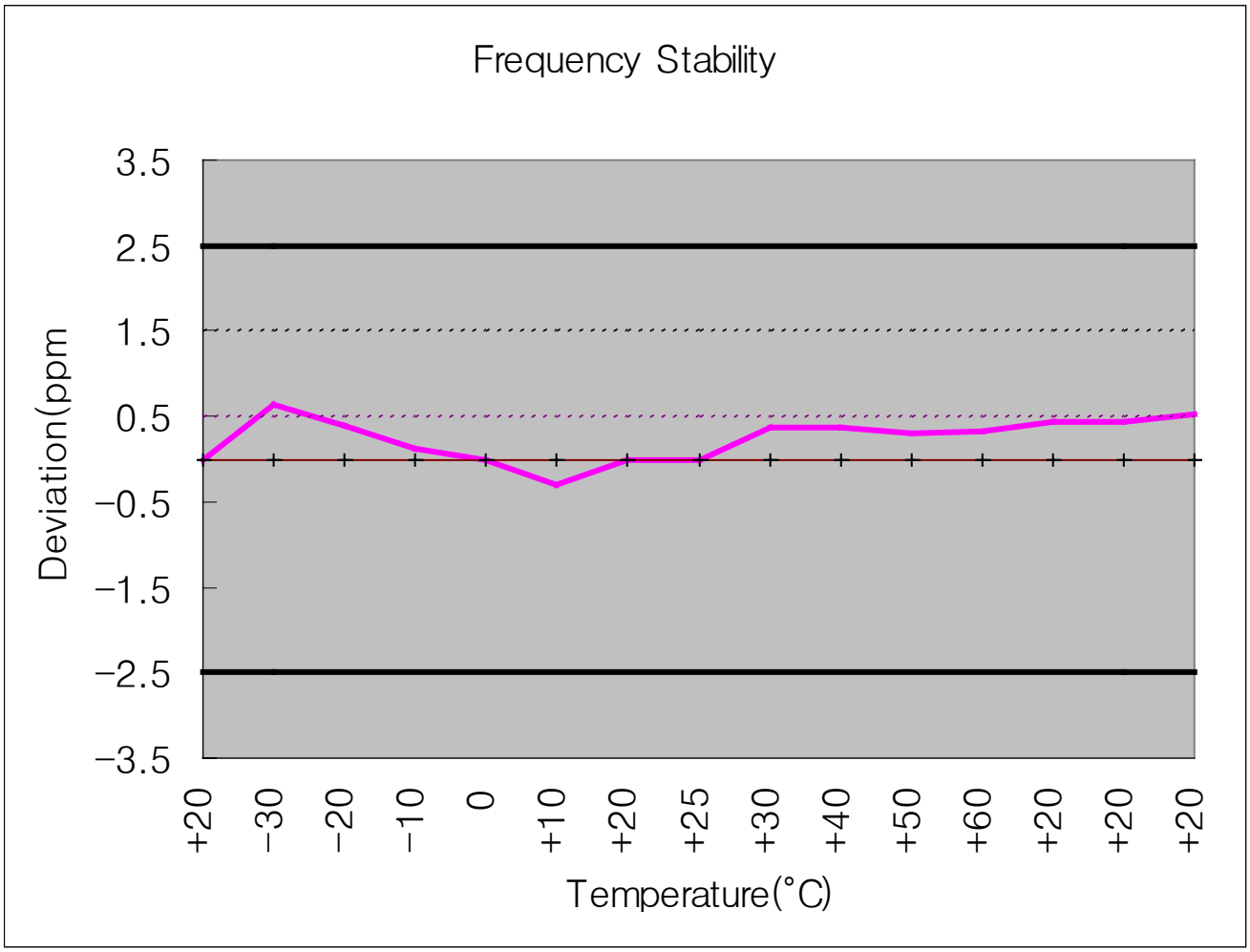
REFERENCE VOLTAGE: 3.7 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5ppm

VOLTAGE (%)	**POWER** (VDC)	TEMP (dB)	**FREQ** (Hz)	**Deviation** (%)
100%	3.70	+20(Ref)	836,519,865	0.000000
100%		-30	836,519,336	0.000063
100%		-20	836,519,536	0.000039
100%		-10	836,519,767	0.000012
100%		0	836,519,877	-0.000001
100%		+10	836,520,125	-0.000031
100%		+20	836,519,865	0.000000
100%		+25	836,519,865	0.000000
100%		+30	836,519,550	0.000038
100%		+40	836,519,563	0.000036
100%		+50	836,519,613	0.000030
100%		+60	836,519,587	0.000033
85%	3.17	+20	836,519,507	0.000043
115%	4.26	+20	836,519,493	0.000044
BATT.ENDPOINT	2.98	+20	836,519,429	0.000052

8.1 Test Data(Continued)

8.5 FREQUENCY STABILITY (CDMA)



8.1 Test Data(Continued)

8.6 FREQUENCY STABILITY (PCS CDMA)

OPERATING FREQUENCY: 1,879,999,400 Hz

CHANNEL: 0600

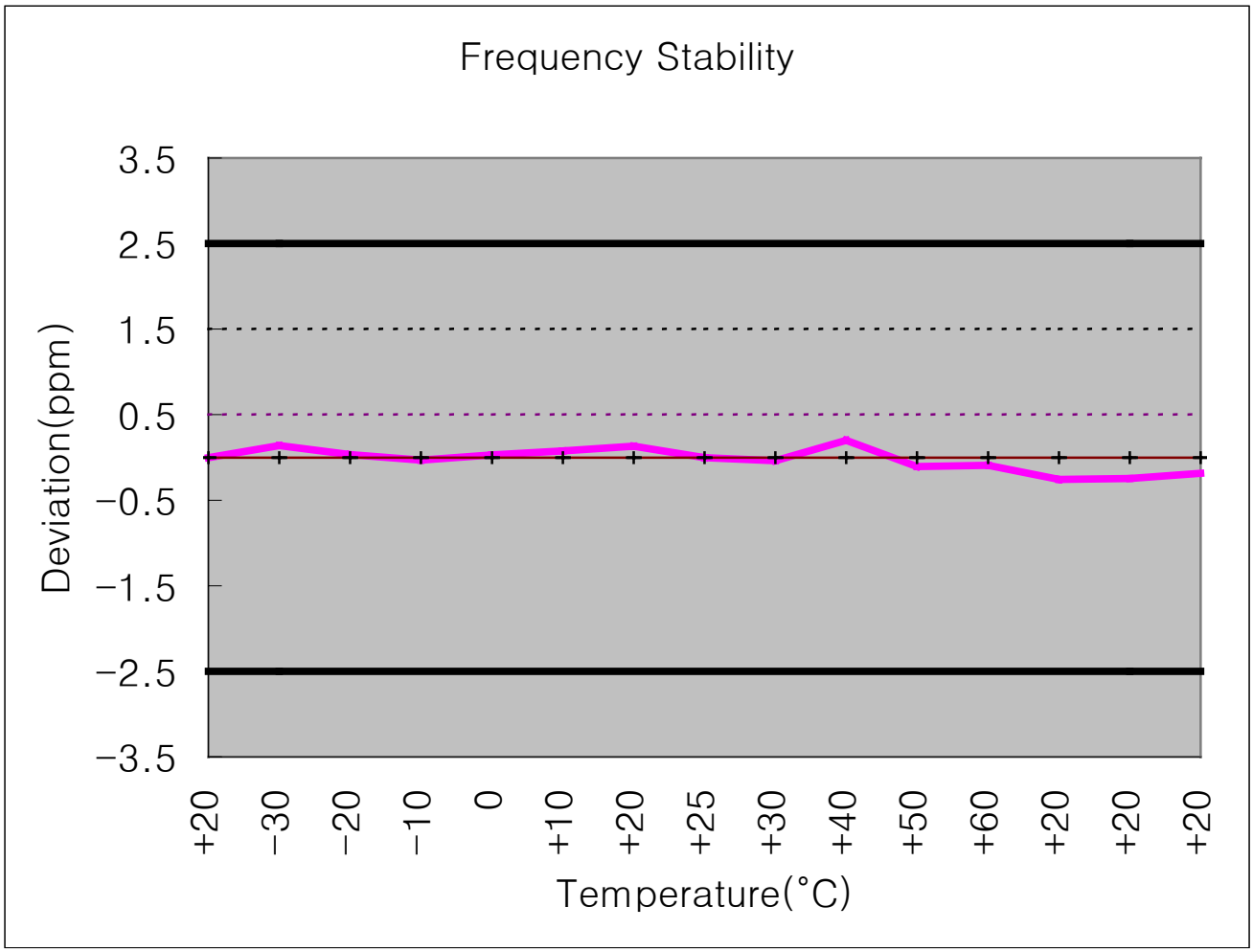
REFERENCE VOLTAGE: 3.7 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5ppm

VOLTAGE (%)	**POWER** (VDC)	TEMP (dB)	**FREQ** (Hz)	**Deviation** (%)
100%	3.70	+20(Ref)	1,879,999,400	0.000000
100%		-30	1,879,999,138	0.000014
100%		-20	1,879,999,338	0.000003
100%		-10	1,879,999,457	-0.000003
100%		0	1,879,999,341	0.000003
100%		+10	1,879,999,252	0.000008
100%		+20	1,879,999,153	0.000013
100%		+25	1,879,999,400	0.000000
100%		+30	1,879,999,472	-0.000004
100%		+40	1,879,999,023	0.000020
100%		+50	1,879,999,601	-0.000011
100%		+60	1,879,999,574	-0.000009
85%	3.17	+20	1,879,999,884	-0.000026
115%	4.26	+20	1,879,999,860	-0.000024
BATT.ENDPOINT	2.98	+20	1,879,999,750	-0.000019

8.1 Test Data(Continued)

8.7 FREQUENCY STABILITY (PCS CDMA)



9.1 Test Data

9.2 MODULATION DEVIATION LIMITING

OPERATING FREQUENCY: 836.52 MHz

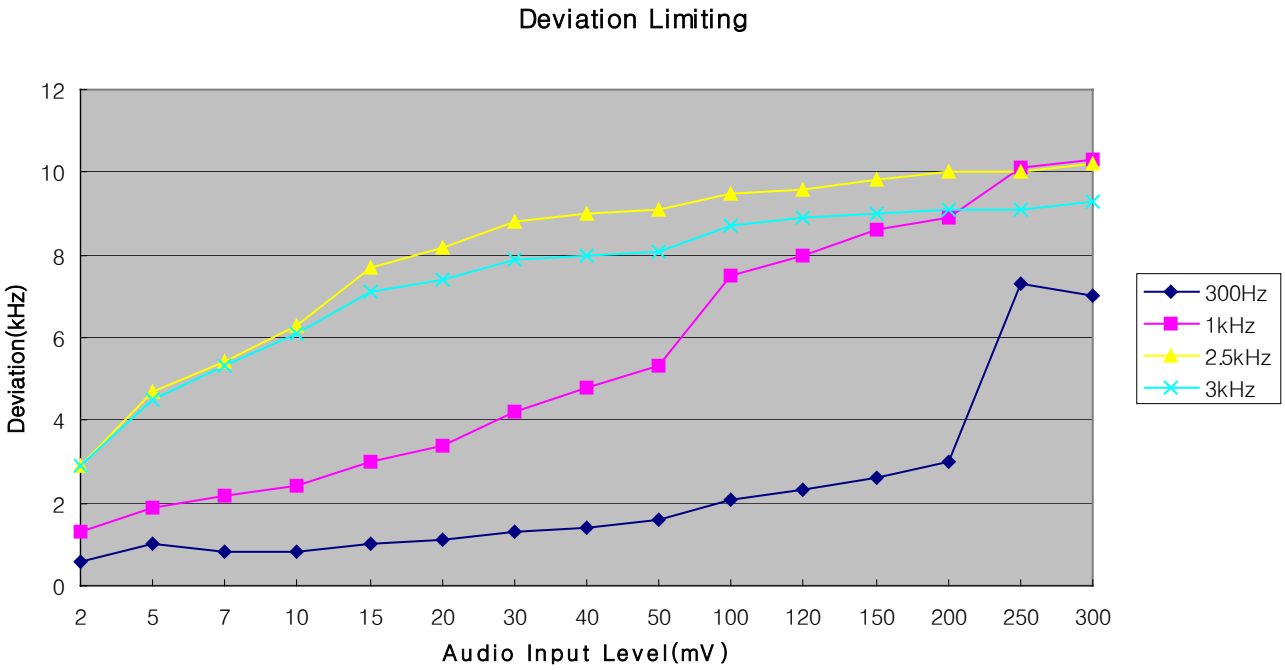
CHANNEL: 0384

DEVIATION LIMIT: 13.2 KHz

Input Level (mV)	FM Deviation in kHz at Indicated Modulating Frequency			
	300Hz	1KHz	2.5KHz	3KHz
2	0.6	1.3	2.9	2.9
5	1.0	1.9	4.7	4.5
7	0.8	2.2	5.4	5.3
10	0.8	2.4	6.3	6.1
15	1.0	3.0	7.7	7.1
20	1.1	3.4	8.2	7.4
30	1.3	4.2	8.8	7.9
40	1.4	4.8	9.0	8.0
50	1.6	5.3	9.1	8.1
100	2.1	7.5	9.5	8.7
120	2.3	8.0	9.6	8.9
150	2.6	8.6	9.8	9.0
200	3.0	8.9	10.0	9.1
250	7.3	10.1	10.0	9.1
300	7.0	10.3	10.2	9.3

9.1 Test Data

9.3 MODULATION DEVIATION LIMITING



10.1 Test Data

10.2 AUDIO FREQUENCY RESPONSE

OPERATING FREQUENCY: 836.52 MHz

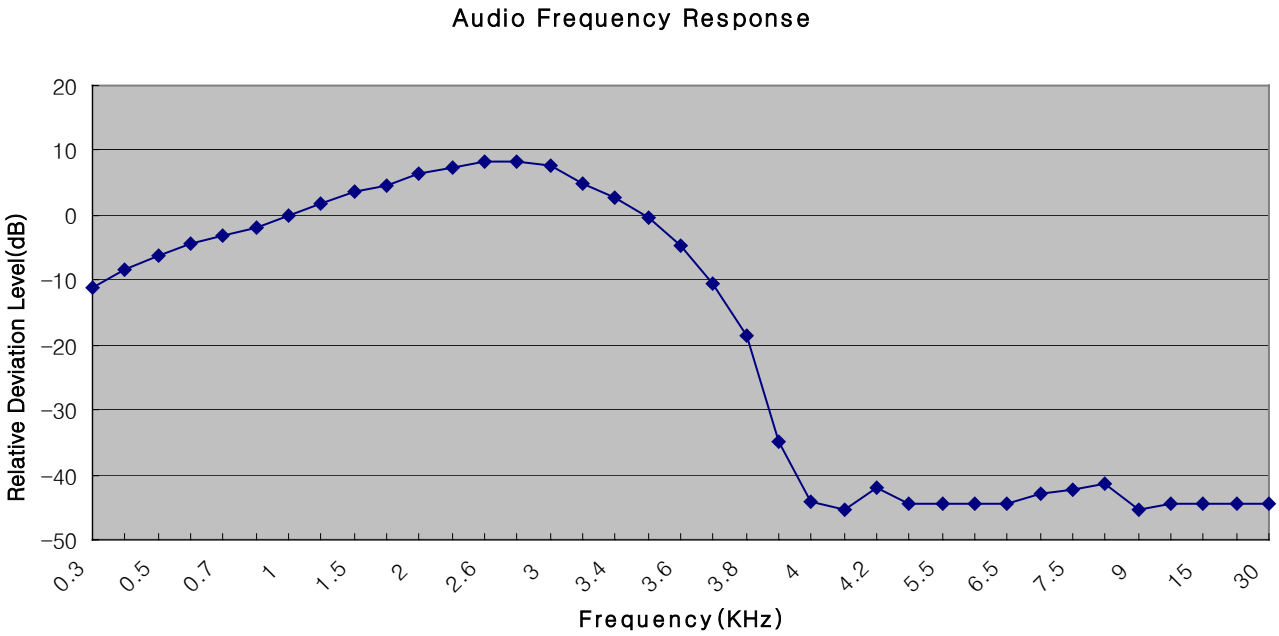
CHANNEL: 0384

Reference level: 0dB @ 1kHz

Audio Frequency Response					
Freq., kHz	**Level, dB**	**Freq., kHz**	**Level, dB**	**Freq., kHz**	**Level, dB**
0.3	-11.0	**3.3**	4.8	**7.5**	-42.3
0.4	-8.3	**3.4**	2.8	**8.0**	-41.5
0.5	-6.2	**3.5**	-0.5	**9.0**	-45.3
0.6	-4.5	**3.6**	-4.8	**10.0**	-44.5
0.7	-3.1	**3.7**	-10.5	**15.0**	-44.5
0.8	-1.9	**3.8**	-18.5	**20.0**	-44.5
1.0	0	**3.9**	-35.0	**30.0**	-44.5
1.2	1.7	**4.0**	-44.0		
1.5	3.8	**4.1**	-45.4		
1.7	4.7	**4.2**	-42.0		
2.0	6.3	**4.8**	-44.5		
2.3	7.5	**5.5**	-44.5		
2.6	8.4	**6.0**	-44.5		
2.8	8.3	**6.5**	-44.5		
3.0	7.6	**7.0**	-42.9		

10.1 Test Data

10.3 AUDIO FREQUENCY RESPONSE



11.1 PLOT(S) OF EMISSIONS

(SEE ATTACHMENT D)

12.1 TEST EQUIPMENT

Type	Model	Cal.Due.Date (dd/mm/yy)	S/N
CDMA MOBILE STATION TEST SET	8924C (500KHz-1GHz)	09/09/03	US35360688
PCS INTERRACE	83236B(1.7-2GHz)	09/09/03	3711J03014
SIGNAL GENERATOR	ESG-3000A(250KHz-3000MHz)	29/04/04	US37230529
SIGNAL GENERATOR	8673D	09/08/04	2844A00753
HORN ANTENNA	3115	22/02/04	6419
HORN ANTENNA	BBHA 9120A	19/03/04	322
DIPOLE (300MHz~1GHz)	UHA9105	04/10/03	91052261
DIPOLE (300MHz~1GHz)	UHA9105	04/10/03	91052262
HORN ANTENNA(18GHz~40GHz)	SAS-574	14/11/03	154
HORN ANTENNA(18GHz~40GHz)	SAS-574	27/11/03	155
SPECTRUM ANALYZER	8563E	07/07/04	3551A04634
POSITION CONTROLLER	5901T		014173
DRIVER	5902T		014174
SPECTRUM ANALYZER	E4411B	03/06/04	US41062735
BICONICAL ANTENNA	VHA9103	23/10/03	VHA91031946
LOG PERIODIC a ANTENNA	UHALP9108-A1	23/10/03	1098
AMPLIFIER	BBS3Q7ELU	16/07/04	1020 D/C 0221
COAXIAL CABLE	RG-214	04/12/03	
COAXIAL CABLE	HFC 12D	04/12/03	
NETWORK ANALYZER	8753D(30KHz~3GHz)	24/03/04	3410J01204
POWER METER	EPM-442A	16/07/04	GB37170413
CONSTANT TEMP & HUMIDITY CHAMBER	J-RHC2	14/09/03	021031
MODULATION ANALYZER	8901B	21/04/04	3028A03029
AUDIO ANALYZER	8904B	18/04/04	3011A04662

13.1 SAMPLE CALCULATIONS

A. Emission Designator

Emission Designator = 1M25F9W

CDMA BW = 1.25 MHz
F = Frequency Modulation
9 = Composite Digital Info
W = Combination (Audio/Data)
(Measured at the 99.75% power bandwidth)

Emission Designator=40K0F8W

Calculation: Voice+SAT
Modulation: Voice is 2.5㎑ and SAT is 6㎑-Maximum modulation is M=6㎑
Deviation: Voice is 12㎑ and SAT is 2㎑- Maximum deviation is D=12+2=14㎑
Bn= 2xM+2xDK with K=1
Bn= 40㎑

Calculation: Signaling Tone (ST)+SAT
Modulation: ST is 10㎑ and SAT is 6㎑-Maximum modulation is M=10㎑
Deviation: ST is 8㎑ and SAT is 2㎑- Maximum deviation is D=8+2=10㎑
Bn= 2xM+2xDK with K=1
Bn= 40㎑

Emission Designator=40K0F1D

Calculation: Voice + SAT
Modulation: Wideband Data is 10㎑ and SAT is 6㎑- Maximum modulation is M=10㎑
Deviation: Wideband Data is 8㎑ and SAT is 2㎑- Maximum deviation is D=8+2=10㎑
Bn= 2xM+2xDK with K=1
Bn= 40㎑

B. Spurious Radiated Emission - PCS Band

Example: Channel 25 PCS Mode 2nd Harmonic(3702.50㎒)
The receive analyzer reading at 3 meters with the EUT on the turntable was -81.0dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0dBm on the receive analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0dB at 3702.50㎒. So 6.1dB is added to the signal generator reading of -30.9dBm yielding -24.80dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501dBm-(-24.80)=50.3dBc.

14.1 CONCLUSION

The data collected shows that the **Modottel Tri-Mode Dual-Band Analog/PCS Phone (AMPS/CDMA) FCC ID: POQWTE-320** complies with all the requirements of Parts 2,22 and 24 of the FCC rules.