DIGITAL EMC CO., LTD.

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CERTIFICATE OF COMPLIANCE
FCC Part 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: July 24~29,2003
Test Report S/N:DR50110307H
Test Site : DIGITAL EMC CO., LTD.

FCC ID **POQWCE-100SU**

APPLICANT **MODOTTEL Co.,Ltd.**

Classification:	**Non-Broadcast Transmitter Held to Ear(TNE)**
FCC Rule Part(s):	**§22.901(d), §2**
EUT Type:	**Single-Band Cellular Phone (CDMA)**
Model(s):	**WCE-100SU**
TX Frequency Range:	**824.70 ~848.31 MHz (CDMA)**
RX Frequency Range:	**869.70 ~893.31 MHz (CDMA)**
Max. RF Output Power:	**0.333W ERP CDMA (25.23dBm)**
Max. SAR Measurement:	**1.46W/kg CDMA Head SAR (RUIM REAR COVER)**
	0.689W/kg CDMA Body SAR (RUIM REAR COVER)
	1.29W/kg CDMA Head SAR (Nomal REAR COVER)
	0.685W/kg CDMA Body SAR (Nomal REAR COVER)
Emission Designators:	**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:	**POQWCE-100SU**
Quantity:	Quantity production is planned
Emission Designators:	1M25F9W (CDMA)
Tx Freq. Range:	824.70 ~848.31 MHz (CDMA)
Rx Freq. Range:	869.70 - 893.31 MHz (CDMA)
Max. Power Rating:	0.333 ERP CDMA (25.23 dBm)
FCC Classification(s):	Non-Broadcast Transmitter Held to Ear(TNE)
Equipment (EUT) Type:	Single-Band Cellular Phone (CDMA)
Modulation(s):	CDMA
Frequency Tolerance:	± 0.00025 % (2.5ppm)
FCC Rule Part(s):	§22.901(d), §2
Dates of Tests:	July 24~29,2003
Place of Tests:	DIGITAL EMC
Test Report S/N:	DR50110307H

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.
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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 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 + 10 log(P) dB.

(b) 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.

(c) 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.

4.3 Occupied Bandwidth

The 99% power bandwidth was measured with a calibrated spectrum analyzer.

4.4 Spurious and Harmonic Emissions at Antenna Terminal

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.

At the input terminals of the spectrum analyzer, an isolator(RF circulator with on port terminated with 50ohms) 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 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 GHz) 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.

4.6 Radiation Spurious and Harmonic Emissions

Radiation and harmonic emissions are measured outdoors at our 3-meter test range. The equipment under test is placed on a wooden turntable 3-meters from the receive antenna. The receive antenna height and turntable rotations were 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 with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This 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.

4.7 Frequency Stability/Temperature Variation.

The frequency stability of the transmitter is measured by:

a) **Temperature** :The temperature is varied from -30°C to + 60°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 minimum frequency stability shall be +/- 0.00025% at any time during normal operation.

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°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 to the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements is 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 10intervals 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.

5.1 Test Data

5.2 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	-14.57	H	0.149	21.72	Standard
836.52	-13.10	H	0.179	22.52	Standard
848.31	-12.47	H	0.333	25.23	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 CELLULAR CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 824.7 MHz

CHANNEL: 1013(Low)

MEASURED OUTPUT POWER: 25.23 dBm = 0.333 W

MODULATION SIGNAL: CDMA (Internal)

DISTANCE: 3 meters

LIMIT: 43 + 10 $\log_{10}$ (W) = 38.22 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1649.40	-48.5	6.1	-42.4	H	67.6
2474.10	-48.9	7.3	-41.6	H	66.8
3298.80	-55.3	7.2	-48.1	H	73.3
	-130				

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.

6.1 Test Data (Continued)

6.3 CELLULAR CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 836.52 MHz

CHANNEL: 0384(Mid)

MEASURED OUTPUT POWER: 25.23 dBm = 0.333 W

MODULATION SIGNAL: CDMA (Internal)

DISTANCE: 3 meters

LIMIT: 43 + 10 $\log_{10}$ (W) = 38.22 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1673.04	-49.5	6.1	-43.4	H	68.6
2509.56	-48.1	7.3	-40.8	H	66.0
3346.08	-53.8	7.2	-46.6	H	71.8
4182.6	-60.1	7.4	-52.7	H	77.9
	-130				

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.

6.1 Test Data (Continued)

6.4 CELLULAR CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 848.31 MHz

CHANNEL: 0777(High)

MEASURED OUTPUT POWER: 25.23 dBm = 0.333 W

MODULATION SIGNAL: CDMA (Internal)

DISTANCE: 3 meters

LIMIT: 43 + 10 $\log_{10}$ (W) = 38.22 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1696.62	-46.6	6.1	-40.5	H	65.7
2544.93	-40.5	7.3	-33.2	H	58.4
3393.24	-44.2	7.2	-37.0	H	62.2
4241.55	-52.1	7.4	-44.7	H	69.3
	-130				

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)

7.2 FREQUENCY STABILITY (CDMA)

OPERATING FREQUENCY: 836,520,005 Hz

CHANNEL: 384

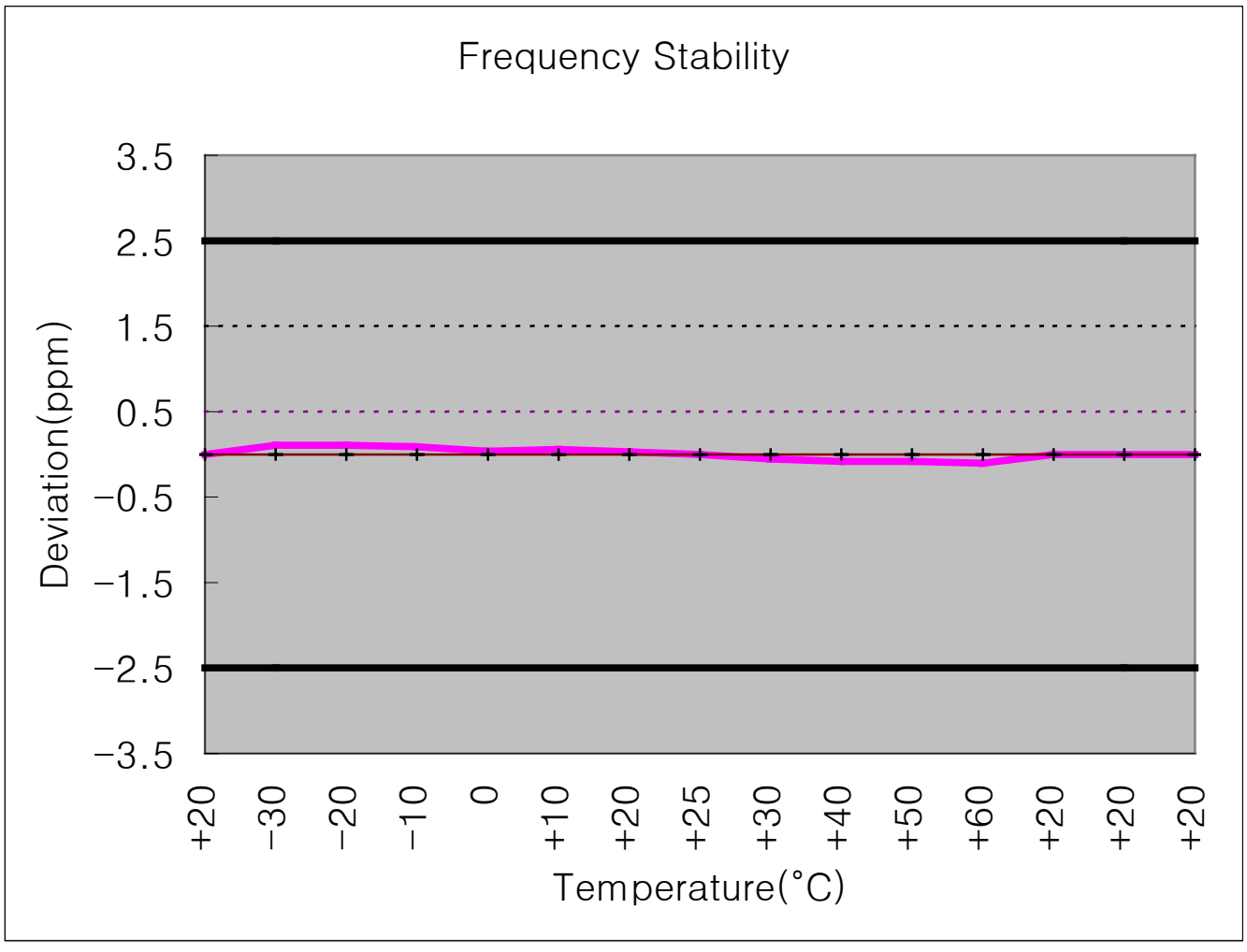
REFERENCE VOLTAGE: 3.7 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5ppm

VOLTAGE (%)	**POWER** (VDC)	TEMP (dB)	**FREQ** (H/A)	**Deviation** (%)
100%	3.70	+20(Ref)	836,520,004	0.000000
100%		-30	836,519,914	0.000011
100%		-20	836,519,915	0.000011
100%		-10	836,519,929	0.000009
100%		0	836,519,974	0.000004
100%		+10	836,519,955	0.000006
100%		+20	836,519,978	0.000003
100%		+25	836,520,004	0.000000
100%		+30	836,520,049	-0.000005
100%		+40	836,520,073	-0.000008
100%		+50	836,520,074	-0.000008
100%		+60	836,520,089	-0.000010
85%	3.17	+20	836,520,004	0.000000
115%	4.26	+20	836,520,004	0.000000
BATT.ENDPOINT	2.97	+20	836,520,004	0.000000

7.1 Test Data(Continued)

7.3 FREQUENCY STABILITY (CDMA)



8.1 PLOT(S) OF EMISSIONS

(SEE ATTACHMENT D)

9.1 TEST EQUIPMENT

Type	Model	Cal.Due.Date	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	09/08/03	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(9KHz-26.5GHz)	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

10.1 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)

11.1 CONCLUSION

The data collected shows that the Modottel Single-Mode Cellular Phone (CDMA) FCC ID: POQWCE-100SU complies with all the requirements of Parts 2 and 22 of the FCC rules.