

PCTEST Engineering Laboratory, Inc.

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CERTIFICATE OF COMPLIANCE FCC Part 22 Certification

SK TELETECH CO., LTD. 21th FL, Startower, 737 Yeoksam-dong, Kangnam-gu Seoul, 135-984 KOREA Dates of Tests: July 12-13, 2004 Test Report S/N: 22.240712429.OL6

Test Site: PCTEST Lab, Columbia MD U.S.A.

FCC ID

OL6SK-6100

APPLICANT

SK TELETECH CO., LTD.

Classification: Non-Broadcast Transmitter Held to Ear (TNE)

FCC Rule Part(s): §22H

EUT Type: Single-Mode Cellular Phone (CDMA)

Model: *SK-6100*

Tx Frequency Range: 824.70 - 848.31MHz (CDMA)
Rx Frequency Range: 869.70 - 893.31MHz (CDMA)
Max. RF Output Power: 0.297 W ERP CDMA (24.723 dBm)

Max. SAR Measurement: 1.22 W/kg CDMA Head SAR; 1.15 W/kg CDMA Body SAR

Emission Designator(s): 1M25F9W

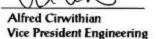
Test Device Serial No. Identical Prototype [S/N: #80)

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.

Grant conditions: Power output listed is ERP. SAR compliance for body- worn operating configuration is based on a separation distance of 1.5 cm between the back of the unit and the body of the user. End-users must be informed of the body-worn operating requirements for satisfying RF exposure compliance. Belt clips or holsters may not contain metallic components.

PCTEST certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.





PCTESTÔ PT. 22 REPORT	FCC MEASUREMENT REPORT		Reviewed By: Quality Manager	
Test Report S/N:	Test Dates:	Phone Type:	FCC ID:	Page 1 of 18
22.240712429.OL6	July 12-13, 2004	Single-Mode CDMA	OL6SK-6100	





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 5 4.1 DESCRIPTION OF TESTS 6-8 **5.1 EFFECTIVE RADIATED POWER OUTPUT** 9 **6.1 RADIATED MEASUREMENTS** 10-12 7.1 FREQUENCY STABILITY 13-14 **8.1 PLOTS OF EMISSIONS** 15 9.1 LIST OF TEST EQUIPMENT 16 **10.1 SAMPLE CALCULATIONS** 17 11.1 CONCLUSION 18

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: SCHEMATIC DIAGRAM(S)

ATTACHMENT K: OPERATIONAL / CIRCUIT DESCRIPTION

ATTACHMENT L: PARTS LIST/TUNE UP PROCEDURE

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

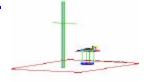
ATTACHMENT R: PROBE CALIBRATION

PCTESTÔ PT. 22 REPORT	PCTEST			Reviewed By: Quality Manager
Test Report S/N:	Test Dates:	Phone Type:	FCC ID:	Page 2 of 18
22.240712429.OL6	July 12-13, 2004	Single-Mode CDMA	OL6SK-6100	



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 Name: SK TELETECH CO., LTD.

Address: 21th FL, Startower, 737 Yeoksam-dong, Kangnam-gu

Seoul, 135-984 KOREA

• FCC ID: **OL6SK-6100**

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: 0.297 W ERP CDMA (24.723 dBm)

FCC Classification(s): Non-Broadcast Transmitter Held to Ear (TNE)

Equipment (EUT) Type: Single-Mode Cellular Phone (CDMA)

Modulation(s): CDMA

• Frequency Tolerance: ± 0.00025% (2.5 ppm)

• FCC Rule Part(s): §22H

Dates of Tests: July 12-13, 2004

Place of Tests:
 PCTEST Lab, Columbia, MD U.S.A.

Test Report S/N: 22.240712429.OL6

PCTESTÔ PT. 22 REPORT	PCTEST			Reviewed By: Quality Manager
Test Report S/N:	Test Dates:	Phone Type:	FCC ID:	Page 3 of 18
22.240712429.OL6	July 12-13, 2004	Single-Mode CDMA	OL6SK-6100	



2.1 INTRODUCTION

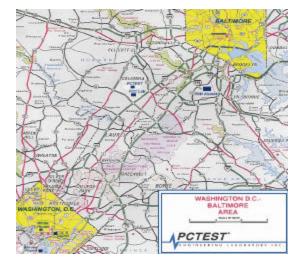
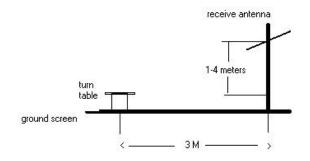


Figure 1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area.

Laboratory, Inc. facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4 on October 19, 1992.

These measurement tests were conducted at **PCTEST Engineering**

Open Area Test Site



Measurement Procedure

The radiated and spurious measurements were made outdoors at a 3-meter test range (see Figure 2). 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 halfwave 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 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 antenna are taken into consideration.

Figure 2. Diagram of 3-meter outdoor test range

PCTESTÔ PT. 22 REPORT				Reviewed By: Quality Manager
Test Report S/N:	Test Dates:	Phone Type:	FCC ID:	Page 4 of 18
22.240712429.OL6	July 12-13, 2004	Single-Mode CDMA	OL6SK-6100	



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.

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

The description of suppression stabilization circuits is shown in Attachment K.

PCTESTÔ PT. 22 REPORT	PCTEST	FCC MEASUREMENT REPORT		Reviewed By: Quality Manager
Test Report S/N: 22.240712429.OL6	Test Dates: July 12-13, 2004	Phone Type: Single-Mode CDMA	FCC ID: OL6SK-6100	Page 5 of 18



4.1 DESCRIPTION OF TESTS (CONTINUED)

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) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz 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 26 dB 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.

4.3 Cellular - Base Frequency Blocks



BLOCK 1: 869 – 880 MHz (A* Low + A) BLOCK 3: 890 – 891.5 MHz (A* High)

BLOCK 2: 880 – 890 MHz (B) BLOCK 4: 891.5 – 894 MHz (B*)

4.4 Cellular - Mobile Frequency Blocks



BLOCK 1: 824 – 835 MHz (A* Low + A) BLOCK 3: 845 – 846.5 MHz (A* High)

BLOCK 2: 835 – 845 MHz (B) BLOCK 4: 846.5 – 849 MHz (B*)

PCTESTÔ PT. 22 REPORT	PCTEST	FCC MEASUREMENT REPORT		Reviewed By: Quality Manager
Test Report S/N: 22.240712429.OL6	Test Dates: July 12-13, 2004	Phone Type: Single-Mode CDMA	FCC ID: OL6SK-6100	Page 6 of 18



4.1 DESCRIPTION OF TESTS (CONTINUED)

4.5 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. 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 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.

4.6 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.

4.7 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.

PCTESTÔ PT. 22 REPORT	FCC MEASUREMENT REPORT			Reviewed By: Quality Manager
Test Report S/N:	Test Dates:	Phone Type:	FCC ID:	Page 7 of 18
22.240712429.OL6	July 12-13, 2004	Single-Mode CDMA	OL6SK-6100	



5.0 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 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 (± 2.5 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 (22°C to 25°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 measurements are 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 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.

PCTESTÔ PT. 22 REPORT	POTEST	FCC MEASUREMENT REPORT		Reviewed By: Quality Manager
Test Report S/N: 22.240712429.OL6	Test Dates: July 12-13, 2004	Phone Type: Single-Mode CDMA	FCC ID: OL6SK-6100	Page 8 of 18



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	-16.550	Н	0.297	24.723	Standard
835.89	-16.750	Н	0.294	24.683	Standard
848.31	-16.950	Н	0.291	24.633	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.

PCTESTÔ PT. 22 REPORT	POTEST	FCC MEASUREMENT REPORT		Reviewed By: Quality Manager
Test Report S/N: 22.240712429.OL6	Test Dates: July 12-13, 2004	Phone Type: Single-Mode CDMA	FCC ID: OL6SK-6100	Page 9 of 18



6.1 Test Data

6.2 CELLULAR CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 824.70 MHz

CHANNEL: 1013 (Low)

MEASURED OUTPUT POWER: 24.723 dBm = 0.297 W

MODULATION SIGNAL: CDMA (Internal)

DISTANCE: 3 meters

LIMIT: $\overline{43 + 10 \log_{10} (W)} = \underline{37.73}$ dBd

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1649.40	-42.68	6.10	-36.58	V	61.3
2474.10	-66.68	6.70	-59.98	V	84.7
3298.80	-64.78	6.80	-57.98	V	82.7

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 = 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. 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.

PCTESTÔ PT. 22 REPORT				Reviewed By: Quality Manager
Test Report S/N:	Test Dates:	Phone Type:	FCC ID:	Page 10 of 18
22.240712429.OL6	July 12-13, 2004	Single-Mode CDMA	OL6SK-6100	



6.1 Test Data (Continued)

6.3 CELLULAR CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 835.89 MHz

CHANNEL: <u>0363 (Mid)</u>

MEASURED OUTPUT POWER: 24.723 dBm = 0.297 W

MODULATION SIGNAL: CDMA (Internal)

DISTANCE: _____ meters

LIMIT: $43 + 10 \log_{10} (W) = 37.72$ dBc

FREQ.	LEVEL @ ANTENNA	SUBSTITUTE ANTENNA	CORRECT GENERATOR	POL	(-ID)
(MHz)	TERMINALS (dBm)	GAIN (dBd)	LEVEL (dBm)	(H/V)	(dBc)
	,	`			
1671.78	-49.38	6.10	-43.28	V	68.0
2507.67	-64.58	6.70	-57.88	V	82.6
3343.56	-62.98	6.80	-56.18	V	80.9

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 = 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. 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.

PCTESTÔ PT. 22 REPORT	POTEST	FCC MEASUREMENT R	EPORT SK	Reviewed By: Quality Manager
Test Report S/N:	Test Dates:	Phone Type:	FCC ID:	Page 11 of 18
22.240712429.OL6	July 12-13, 2004	Single-Mode CDMA	OL6SK-6100	



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: 24.723 dBm = 0.297 W

MODULATION SIGNAL: CDMA (Internal)

DISTANCE: 3 meters

LIMIT: $\overline{43 + 10 \log_{10} (W)} = \underline{37.72}$ dBd

FREQ.	LEVEL @ ANTENNA	SUBSTITUTE ANTENNA	CORRECT GENERATOR	POL	
(MHz)	TERMINALS	GAIN	LEVEL	(H/V)	(dBc)
	(dBm)	(dBd)	(dBm)		
1696.62	-52.68	6.10	-46.58	V	71.3
2544.93	-64.58	6.70	-57.88	V	82.6
3393.24	-63.28	6.80	-56.48	V	81.2

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 = 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. 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.

PCTESTÔ PT. 22 REPORT	PCTEST	FCC MEASUREMENT R	EPORT SK	Reviewed By: Quality Manager
Test Report S/N:	Test Dates:	Phone Type:	FCC ID:	Page 12 of 18
22.240712429.OL6	July 12-13, 2004	Single-Mode CDMA	OL6SK-6100	



7.1 Test Data

7.2 FREQUENCY STABILITY (CDMA)

OPERATING FREQUENCY: 836,490,003 Hz

CHANNEL: <u>383</u>

REFERENCE VOLTAGE: 3.7 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

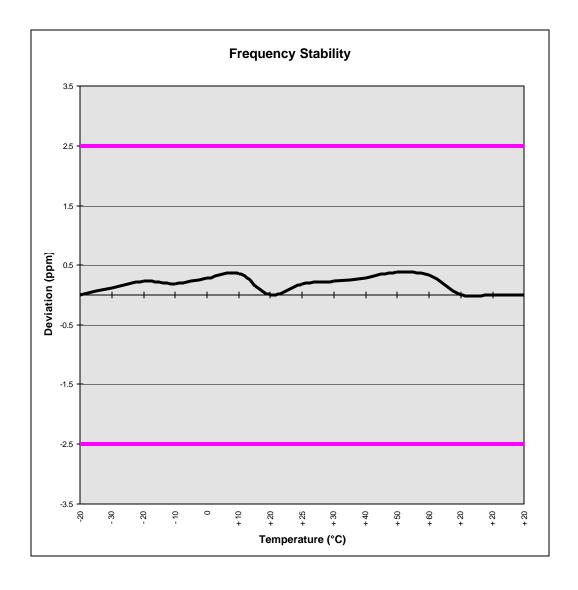
VOLTAGE	POWER	TEMP	FREQ.	Deviation
(%)	(VDC)	(°C)	(Hz)	(%)
100 %	3.70	+ 20 (Ref)	836,490,003	0.000000
100 %		- 30	836,489,903	0.000012
100 %		- 20	836,489,811	0.000023
100 %		- 10	836,489,844	0.000019
100 %		0	836,489,769	0.000028
100 %		+ 10	836,489,702	0.000036
100 %		+ 20	836,490,003	0.000000
100 %		+ 25	836,489,852	0.000018
100 %		+ 30	836,489,811	0.000023
100 %		+ 40	836,489,760	0.000029
100 %		+ 50	836,489,685	0.000038
100 %		+ 60	836,489,727	0.000033
85 %	3.15	+ 20	836,490,003	0.000000
115 %	4.26	+ 20	836,490,003	0.000000
BATT. ENDPOINT	2.98	+ 20	836,490,003	0.000000

PCTESTÔ PT. 22 REPORT	PCTEST	FCC MEASUREMENT R	EPORT SK	Reviewed By: Quality Manager
Test Report S/N:	Test Dates:	Phone Type:	FCC ID:	Page 13 of 18
22.240712429.OL6	July 12-13, 2004	Single-Mode CDMA	OL6SK-6100	



7.1 Test Data (Continued)

7.3 FREQUENCY STABILITY (CDMA)



PCTESTÔ PT. 22 REPORT	PCTEST	FCC MEASUREMENT REPORT		Reviewed By: Quality Manager
Test Report S/N:	Test Dates:	Phone Type:	FCC ID:	Page 14 of 18
22.240712429.OL6	July 12-13, 2004	Single-Mode CDMA	OL6SK-6100	



8.1 PLOT(S) OF EMISSIONS

(SEE ATTACHMENT D)

PCTESTÔ PT. 22 REPORT	PCTEST	FCC MEASUREMENT REPORT		Reviewed By: Quality Manager
Test Report S/N: 22.240712429.OL6	Test Dates: July 12-13, 2004	Phone Type: Single-Mode CDMA	FCC ID: OL6SK-6100	Page 15 of 18



9.1 TEST EQUIPMENT

Type	Model	Cal. Due Date	S/N
Microwave Spectrum Analyzer	8566B (100Hz-22GHz) HP	08/15/04	3638A08713
Microwave Spectrum Analyzer	HP 8566B (100Hz-22GHz)	04/17/05	2542A11898
Spectrum Analyzer/Tracking Gen.	HP 8591A (100Hz-1.8GHz)	08/10/04	3144A02458
Signal Generator*	HP 8640B (500Hz-1GHz)	06/03/05	2232A19558
Signal Generator*	HP 8640B (500Hz-1GHz)	06/03/05	1851A09816
Signal Generator*	Rohde & Schwarz (0.1-1000MHz)	09/11/04	894215/012
Ailtech/Ea ton Receiver	NM 37/57A-SL (30-1000MHz)	04/12/05	0792-032
Niltech/Eaton Receiver	NM 37/57A (30-1000MHz)	03/11/05	0805-03334
Ailtech/Eaton Receiver	NM 17/27A (O.1-32MHz)	09/17/04	0608-03241
Duasi-Peak Adapter	HP 85650A	08/15/04	2043A00301
Niltech/Eaton Adapter	CCA-7 CISPR/ANSI QP Adapter	03/11/05	0194-04082
Gigatronics Universal Power Meter	8657A		1835256
Gigatronics Power Sensor	80701A (0.05-18GHz)		1833460
Signal Generator	HP 8648D (9kHz-4GHz)		3613A00315
Amplifier Research	5S1G4 (5W, 800MHz-4.2GHz)		22322
, Network Analyzer	HP 8753E (30kHz-3GHz)		JP38020182
Audio Analyzer	HP 8903B		3011A09025
Modulation Analyzer	HP 8901A		2432A03467
Power Meter	HP 437B		3125U24437
Power Sensor	HP 8482H (3QuW-3W)		2237A02084
Harmonic/Flicker	Test System HP 6841A (IEC 555-2/3	3)	3531A00115
Broadband Amplifier (2)	HP 8447D	,	1145A00470, 1937A033
Broadband Amplifier	HP 8447F		2443A03784
Hom Antenna	EMCO Model 3115 (1-18GHz)		9704-5182
Hom Antenna	EMCO Model 3115 (1-18GHz)		9205-3874
Hom Antenna	EMCO Model 3116 (18-40GHz)		9203-2178
Biconical Antenna (4)	Eaton94455/Eaton94455-VSinger94455-	VCamalanceDesian	1295, 1332, 0355
.og-Spiral Antenna (3)	Ailtech/Eaton 93490-1	,	0608, 1103, 1104
Roberts Dipoles	Compliance Design (1 set)		
Ailtech Dipoles	DM-105A (1 set)		33448-111
EMCOLISN (6)	3816/2		1079
Microwave Preamplifier 40dB	Gain HP 83017A (0.5-26.5GHz)		3123A00181
Microwave Cables	MicroCoax (1.0-26.5GHz)		
Ailtech/Eaton Receiver	NM37/57A-SL		0792-03271
Spectrum Analyzer	HP 8594A		3051A00187
Spectrum Analyzer (2)	HP 8591A		3034A01395, 3108A02
Microwave Survey Meter	Holaday Model 1501 (2.450GHz)		80931
Digital Thermometer	Extech Instruments 421305		426966
Attenuator	HP 8495A (0-70dB) DC-4GHz		
Bi-Directional Coax Coupler	Narda 3020A (50-1000MHz)		
Shielded Screen Room	RF Lindgren Model 26-2/2-0		6710 (PCT270)
Shielded Semi-Anechoic Chamber	Ray Proof Model S81		R2437 (PCT278)
Enviromental Chamber	Associated Systems Model 1025 (Te	emperature/Humiditv)	PCT285
	ation traceable to the National Institute o		

PCTESTÔ PT. 22 REPORT	PCTEST	FCC MEASUREMENT R	EPORT SK	Reviewed By: Quality Manager
Test Report S/N:	Test Dates:	Phone Type:	FCC ID:	Page 16 of 18
22.240712429.OL6	July 12-13, 2004	Single-Mode CDMA	OL6SK-6100	



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)

PCTESTÔ PT. 22 REPORT	FCC MEASUREMENT REPORT		Reviewed By: Quality Manager	
Test Report S/N:	Test Dates:	Phone Type:	FCC ID:	Page 17 of 18
22.240712429.OL6	July 12-13, 2004	Single-Mode CDMA	OL6SK-6100	



11.1 CONCLUSION

The data collected shows that the **SK TELETECH Single-Mode Cellular Phone FCC ID: OL6SK-6100** complies with all the requirements of Parts 2 and 22 of the FCC rules.

PCTESTÔ PT. 22 REPORT	POTEST	FCC MEASUREMENT REPORT		Reviewed By: Quality Manager
Test Report S/N: 22.240712429.OL6	Test Dates: July 12-13, 2004	Phone Type: Single-Mode CDMA	FCC ID: OL6SK-6100	Page 18 of 18

