683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080
Tel: +82-31-321-2664 Fax: +82-31-321-1664
http://www.digitalemc.com

CERTIFICATE OF COMPLIANCE
FCC Part 22 Certification

Dates of Tests: November 1 ~8, 2006
Test Report S/N: DR50110611F
Test Site : DIGITAL EMC CO., LTD.

Model No. **R2NSXP-2080**

APPLICANT **SUNGIL TELECOM CO., LTD.**

Classification	:	**Licensed Non-Broadcast Station Transmitter (TNB)**
FCC Rule Part(s)	:	**§22(H), §2**
EUT Type	:	**CDMA 2000 1x WLL Terminal**
Model name	:	**SXP-2080**
Serial number	:	**Identical prototype**
TX Frequency Range	:	**824.70 ~848.31 MHz (CDMA)**
RX Frequency Range	:	**869.70 ~893.31 MHz (CDMA)**
Max. RF Output Power	:	**0.413W ERP CDMA (26.16 dBm)**
Max. SAR Measurement	:	**1.17W/kg CDMA Body SAR**
Emission Designators:	:	**1M28F9W**
Date of Issue	:	**November 9, 2006**

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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: SUNGIL TELECOM CO., LTD.
Address: Lordland EZ Tower #511, 153, Gumi-Dong, Bundang-Gu,
SEONGNAMCITY, GYUNGGI, KOREA
Attention: Woo Won Choung

- FCC ID: **R2NSXP-2080**
- Quantity: Quantity production is planned
- Emission Designators: 1M28F9W (CDMA)
- Tx Freq. Range: 824.70 ~848.31 MHz (CDMA)
- Rx Freq. Range: 869.70 - 893.31 MHz (CDMA)
- Max. Power Rating: 0.413W ERP CDMA (26.16 dBm)
- FCC Classification(s): Licensed Non-Broadcast Station Transmitter (TNB)
- Equipment (EUT) Type: CDMA 2000 1x WLL Terminal
- Modulation(s): CDMA
- Frequency Tolerance: ± 0.00025 % (2.5ppm)
- FCC Rule Part(s): §22(H), §2
- Dates of Tests: November 1 ~ 8, 2006
- Place of Tests: DIGITAL EMC
- Test Report S/N: DR50110611F

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2.1. General Information

This report contains the result of tests performed by:

DIGITAL EMC CO., LTD.
Address : 683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080
http://www.digitalemc.com E-mail : harveysung@digitalemc.com
Tel: +82-31-321-2664 Fax: +82-31-321-1664

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.

Test operator: engineer

Data	Name	Signature
November 9, 2006	Won-Jung LEE	

Report Reviewed By: manager

Data	Name	Signature
November 9, 2006	Harvey Sung	

Ordering party:

Company name	:	SUNGIL TELECOM CO., LTD.
Address	:	Loadland EZ Tower #511, 513, Gumi-dong, Bundang-Gu,
Zipcode	:	463-500
City/town	:	SEONGNAM-CITY, KYUNGGI
Country	:	KOREA
Date of order	:	October 30, 2006

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3.1 DESCRIPTION OF TESTS

3.1.1 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.

3.1.2 Occupied Bandwidth

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

3.1.3 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 band pass filter is connected between the test transceiver(for conducted tests)or the receive antenna(for radiated tests) and the analyzer . The rejection of the band pass 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 band pass filter insertion loss to be calibrated.

3.1.4 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 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.

3.1.5 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.

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3.1 DESCRIPTION OF TESTS (Continued…)

3.1.6 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 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.

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3.1 DESCRIPTION OF TESTS (Continued…)

3.1.7 Radiated Emission

Final test was performed according to ANSI C63.4-2003 at the open field test site. There are no deviations from the standard.
The EUT was placed in a 0.8m high table along with the peripherals. The turn table was separated from the antenna distance 3meters. Cables were placed in a position to produce maximum emissions as determined by experimentation, and operation mode was selected for maximum.
The frequencies and amplitudes of maximum emission were measured at varying azimuths, antenna heights and antenna polarities. Reported are maximized emission levels.
These tests were performed at 120kHz of 6dB bandwidth.

3.1.8 Conducted Emission

The power line conducted interference measurements were performed according to ANSI C63.4-2003 in a shielded enclosure with peripherals placed on a table, 0.8m high over a metal floor. It was located more than required distance away from the shielded enclosure wall. There are no deviations from the standard.
The EUT was plugged into the LISN and the frequency range of interest scanned.
Reported are maximized emission levels.
These tests were performed at 9kHz of 6dB bandwidth.

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4.1 TEST DATA

4.1.1 Conducted Output Power

The output power was measured under all R.C.s and S.O.s which are listed below measurement data.
The worst case output power is reported with RC1 and SO55.
Therefore this device was tested under RC1 and SO55.

SAR Measurement Procedures for 3G Devices(Released June 2006)

- verify maximum output power
  - on high, middle and low channels
  - according to 3GPP2 C.S0011 / TIA-98-E, Sec. 4.4.5
- Power measurement configurations
  - Test Mode 1(C.S0011 Table 4.4.5.2-1), SO55, RC1, Traffic Channel @9600bps
  - Test Mode 3(C.S0011 Table 4.4.5.2-2), SO55 or SO32, RC3, FCH @9600bps
  - Test Mode 3(C.S0011 Table 4.4.5.2-2), SO32, RC3, FCH+SCH @9600bps
  - other configurations supported by the DUT
  - power control
    - Bits Hold for FCH+SCH
    - otherwise ALL Bits Up

- Measurement data

Band	Channel	RC1	RC1	RC3	RC3	RC3
		SO2	SO55	SO2	SO55	SO32 (TDSO)
Cellular	1013	24.11	**24.19**	24.05	24.11	Note.1
	384	23.95	**23.91**	23.89	23.85	Note.1
	777	23.97	**24.03**	23.94	23.96	Note.1

Note.1 This device does not support TDSO mode.

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4.1.2 Effective Radiated Power Output

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

Freq. Tuned (MHz)	**REF. LEVEL** (dBm)	**POL** (H/V)	**ERP** (W)	**ERP** (dBm)	**Supplied Power**
824.70	**-11.98**	**V**	**26.16**	**0.413**	**Adaptor**
836.52	-12.76	V	25.15	0.327	Adaptor
848.31	-12.84	V	25.12	0.325	Adaptor

Note: The internal battery of this device is for emergency back up.

NOTES:

Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden 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.

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4.1.3 CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY : 824.7 MHz
CHANNEL : 1013(Low)
MEASURED OUTPUT POWER : 26.16 dBm = 0.413 W
MODULATION SIGNAL : CDMA (Internal)
DISTANCE : 3 meters
LIMIT : 43 + 10 $\log_{10}$ (W) = 39.16 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1649.40	-34.06	5.74	-28.32	V	54.48
2474.10	-35.16	6.94	-28.22	V	54.38
3298.80	-35.29	7.37	-27.92	V	54.08
4123.50	-40.28	7.76	-32.52	V	58.68
4948.20	-49.76	8.54	-41.22	V	67.38

NOTE

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

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.

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4.1.3 CDMA Radiated Measurements (Continued…)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY : 836.52 MHz
CHANNEL : 384(Mid)
MEASURED OUTPUT POWER : 25.15 dBm = 0.327 W
MODULATION SIGNAL : CDMA (Internal)
DISTANCE : 3 meters
LIMIT : 43 + 10 $\log_{10}$ (W) = 38.15 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1673.04	-34.69	5.81	-28.88	V	54.03
2509.56	-37.35	6.97	-30.38	V	55.53
3346.08	-39.97	7.39	-32.58	V	57.73
4182.60	-44.69	7.81	-36.88	V	62.03
5019.12	-50.49	8.61	-41.88	V	67.03

NOTE

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

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.

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4.1.3 CDMA Radiated Measurements (Continued…)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY : 848.31 MHz
CHANNEL : 777(High)
MEASURED OUTPUT POWER : 25.12 dBm = 0.325 W
MODULATION SIGNAL : CDMA (Internal)
DISTANCE : 3 meters
LIMIT : 43 + 10 $\log_{10}$ (W) = 38.12 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1696.62	-40.50	5.87	-34.63	V	59.75
2544.93	-36.02	6.99	-29.03	V	54.15
3393.24	-44.04	7.41	-36.63	V	61.75
4241.55	-49.10	7.87	-41.23	V	66.35
5089.86	-51.10	8.67	-42.43	V	67.55

NOTE

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

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.

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4.1.4 Frequency Stability (CDMA)

OPERATING FREQUENCY : 836,519,979 Hz

CHANNEL : 0384(Mid)

REFERENCE VOLTAGE : 120 VAC

DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VAC)	TEMP (dB)	FREQ (Hz)	Deviation (%)
100%	120	+25(Ref)	836,519,979	0.000000
100%		-30	836,519,969	-0.000001
100%		-20	836,519,966	-0.000002
100%		-10	836,519,983	0.000000
100%		0	836,519,979	0.000000
100%		+10	836,519,981	0.000000
100%		+20	836,519,977	0.000000
100%		+25	836,519,979	0.000000
100%		+30	836,519,959	-0.000002
100%		+40	836,519,979	0.000000
100%		+50	836,519,980	0.000000
100%		+60	836,519,964	-0.000002
85%	102	+23	836,519,980	0.000000
115%	138	+23	836,519,979	0.000000
BATT.ENDPOINT	-	-	-	-

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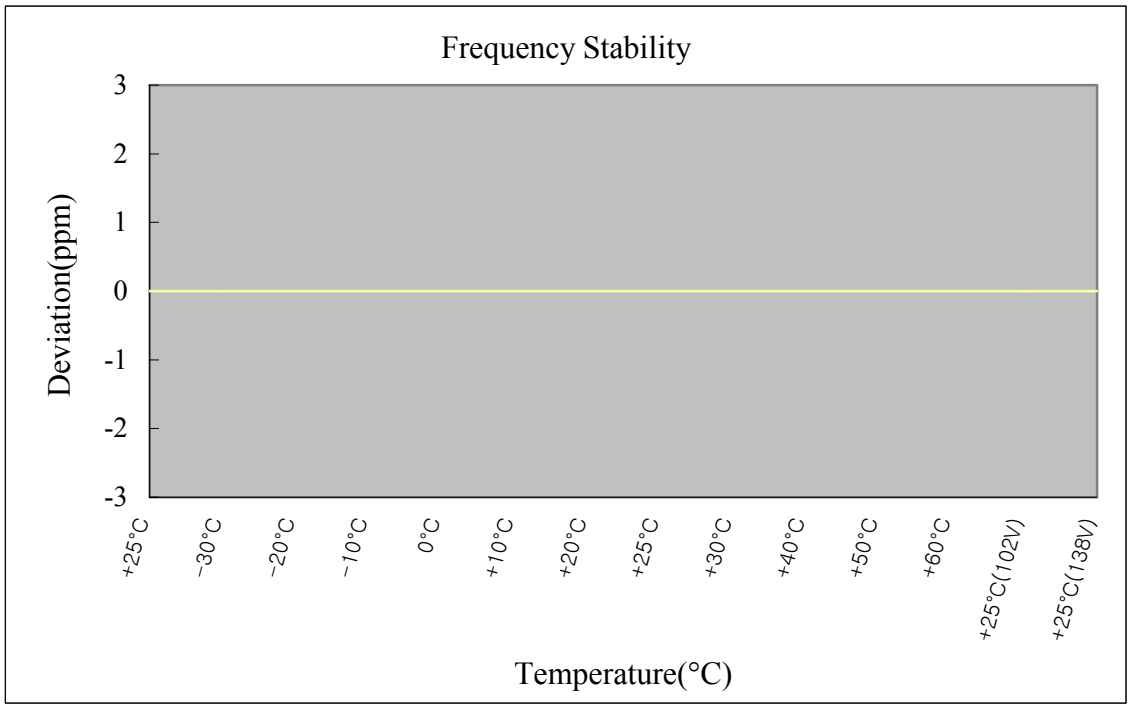
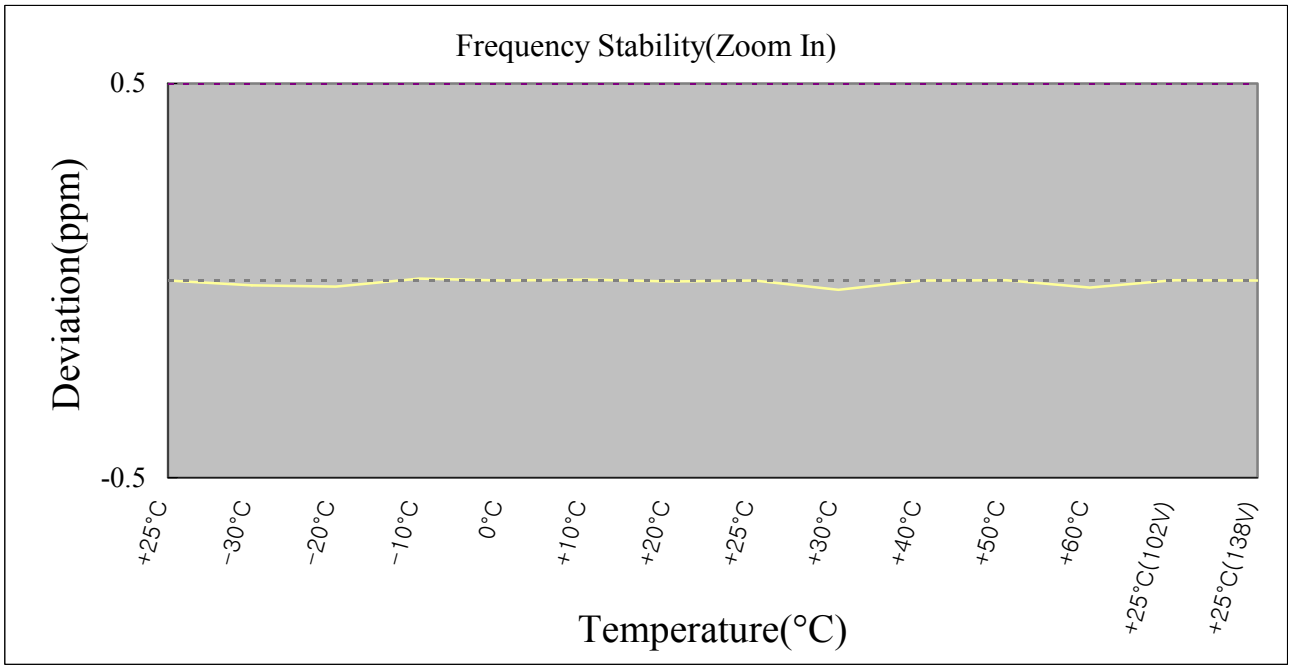
4.1.4 Frequency Stability (CDMA) (Continued…)





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5.1 PLOTS OF EMISSIONS

(SEE ATTACHMENT “Test Plots”)

6.1 LIST OF TEST EQUIPMENT

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
01	Spectrum Analyzer	Agilent	E4404B	21/03/07	US41061134
02	Spectrum Analyzer	Agilent	E4440A	05/10/07	MY45304199
03	Spectrum Analyzer	H.P	8563E	06/10/07	3551A04634
04	Power Meter	H.P	EPM-442A	06/07/07	GB37170413
05	Power Sensor	H.P	8481A	23/03/07	3318A96332
06	Frequency Counter	H.P	5342A	15/09/07	2119A04450
07	Multifunction Synthesizer	H.P	8904A	12/10/07	3633A08404
08	Signal Generator	Rohde Schwarz	SMR20	22/03/07	101251
09	Signal Generator	H.P	E4421A	06/07/07	US37230529
10	Audio Analyzer	H.P	8903B	06/07/07	3011A0944B
11	Modulation Analyzer	H.P	8901B	10/07/07	3028A03029
12	Oscilloscope	Tektronix	TDS3052	01/10/07	B016821
13	8960 Series 10 Wireless Comms Test Set	Agilent	Z5515C	13/06/08	GB43461134
14	Universal Radio Communication Test	Rohde Schwarz	CMU200	21/03/07	107631
15	CDMA Mobile Station Test Set	H.P	8924C	15/09/07	US35360688
16	PCS Interface	HP	83236B	15/09/07	3711J03014
17	Multi system Ue Tester	Japan Radid Co., Ltd	NJZ-2000	14/11/06	ET00095
18	Power Splitter	WEINSCHEL	1593	14/10/07	332
19	BAND Reject Filter	Microwave Circuits	N0308372	19/10/07	3125-01DC0312
20	BAND Reject Filter	Wainwright	WRCG1750	19/10/07	SN2
21	AC Power supply	DAEKWANG	5KVA	21/03/07	N/A
22	DC Power Supply	H.P	6622A	20/03/07	465487
23	HORN ANT	EMCO	3115	04/04/07	6419
24	HORN ANT	EMCO	3115	04/25/07	21097
25	HORN ANT	A.H.Systems	SAS-574	16/08/07	154
26	HORN ANT	A.H.Systems	SAS-574	16/08/07	155
27	Dipole Antenna	Schwarzbeck	VHA9103	18/11/06	2116
28	Dipole Antenna	Schwarzbeck	VHA9103	18/11/06	2117
29	Dipole Antenna	Schwarzbeck	UHA9105	18/11/06	2261
30	Dipole Antenna	Schwarzbeck	UHA9105	18/11/06	2262

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7.1 TEST EQUIPMENT (CONTINUED)

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
31	TEMP & HUMIDITY Chamber	JISCO	J-RHC2	13/09/07	021031
32	RFI/FIELD Intensity Meter	Kyorits	KNM-504D	21/07/07	4N-161-4
33	Frequency Converter	Kyorits	KCV-604C	21/07/07	4-230-3
34	Log Periodic Antenna	Schwarzbeck	UHALP9108A1	26/09/07	1098
35	Biconical Antenna	Schwarzbeck	VHA9103	12/09/07	2233
36	Digital Multimeter	H.P	34401A	18/04/07	3146A13475
37	Attenuator (10dB)	WEINSCHEL	23-10-34	26/01/07	BP4386
38	High-Pass Filter	ANRITSU	MP526	13/10/07	M27756
39	Attenuator (3dB)	Agilent	8491B	10/07/07	58177
40	Attenuator (10dB)	WEINSCHEL	23-10-34	26/01/07	BP4387
41	Attenuator (30dB)	H.P	8498A	17/10/07	50101
42	Amplifier (25dB)	Agilent	8447D	12/04/07	2944A10144
43	Amplifier (30dB)	Agilent	8449B	13/10/07	3008A01590
44	Position Controller	TOKIN	5901T	N/A	14173
45	Driver	TOKIN	5902T2	N/A	14174
46	Spectrum Analyzer	H.P	8591E	21/03/07	3649A05889
47	RFI/FIELD Intensity Meter	Kyorits	KNW-2402	11/07/07	4N-170-3
48	LISN	Kyorits	KNW-407	19/08/07	8-317-8
49	LISN	Kyorits	KNW-242	09/10/07	8-654-15
50	CVCF	NF Electronic	4400	N/A	344536 4420064
51	Software	ToYo EMI	EP5/RE	N/A	Ver 2.0.800
52	Software	ToYo EMI	EP5/CE	N/A	Ver 2.0.801
53	Software	AUDIX	e3	N/A	Ver 3.0
54	Software	Agilent	Benchlink	N/A	A.01.09 021211

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7.1 SAMPLE CALCULATIONS

A. Emission Designator

Emission Designator = 1M28F9W

CDMA BW = 1.2832 MHz
F = Frequency Modulation
9 = Composite Digital Info
W = Combination (Audio/Data)
(Measured at the 99.75% power bandwidth)

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8.1 CONCLUSION

The data collected shows that the **SUNGIL TELECOM CO., LTD.** CDMA 2000 1x WLL Terminal (**FCC ID: R2NSXP-2080)** complies with all the requirements of Parts 2 and 22 of the FCC rules.

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