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 24 Certification

Dates of Tests: June 12 ~ 17, 2004
Test Report S/N:DR50110406J
Test Site : DIGITAL EMC CO., LTD.

Model No. **RFLACW1XT1900**

APPLICANT **Axess Telecom Co., Ltd**

Classification	:	**Licensed Portable Transmitter Held to Ear (PCE)**
FCC Rule Part(s)	:	**§24(E), §15, §2**
EUT Type	:	**CDMA WIRELESS LOCAL LOOP TERMINAL**
Brand name / Model name	:	**AXESSTELECOM / ACW-1xT1900**
Serial number	:	**1879663171**
Buyer Name / Model Name	:	**Brightstar Corporation / STARTEL 1900xt**
TX Frequency Range	:	**1851.25 ~1908.75 MHz (PCS CDMA)**
RX Frequency Range	:	**1931.25~1988.75MHz (PCS CDMA)**
Max. RF Output Power	:	**0. 881W EIRP PCS CDMA (29.45 dBm) - With the Battery**
		0.923W EIRP PCS CDMA (29.65dBm) - With Charger
Max. SAR Measurement	:	**1.080W/kg PCS CDMA Body SAR - With the Battery**
		1.070W/kg PCS CDMA Body SAR - With Charger
Emission Designators:	:	**1M25F9W**
Date of Issue	:	**June 18, 2004**

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.

NVLAP LAB CODE 200559-0

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: AXESS TELECOM CO., LTD.

Address: 7F, SEONGDO BUILDING, 587-23, SINSA-DONG, GANGNAM-GU, SEOUL, KOREA

Attention: Kyung Suk Jung **(Project Manager)**

- FCC ID: RFLACW1X1900
- Quantity: The mass product
- Emission Designators: 1M25F9W (CDMA)
- Tx Freq. Range: 1851.25 ~1908.75 MHz (PCS CDMA)
- Rx Freq. Range: 1931.25~1988.75MHz (PCS CDMA)
- Max. Power Rating: 0. 881W EIRP PCS CDMA (29.45 dBm) - With the Battery
  0.923W EIRP PCS CDMA (29.65dBm) - With Charger
- FCC Classification(s): Licensed Portable Transmitter Held to Ear (PCE)
- Equipment (EUT) Type: CDMA WIRELESS LOCAL LOOP TERMINAL
- Modulation(s): CDMA
- Frequency Tolerance: ± 0.00025 % (2.5ppm)
- FCC Rule Part(s): §24(E), §15, §2
- Dates of Tests: June 12 ~ 17, 2004
- Place of Tests: DIGITAL EMC
- Test Report S/N: DR50110406J

2.1. General information's

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 : demc@unitel.co.kr
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
June 18, 2004	Kyung-Taek LEE	

Report Reviewed By: manager

Data	Name	Signature
June 18, 2004	Dong –Min JUNG	

Ordering party:

Company name	:	AXESS TELECOM CO., LTD.
Address	:	7F, SEONGDO BUILDING, 587-23, SINSA-DONG, GANGNAM-GU,
Zipcode	:	135-747
City/town	:	SEOUL
Country	:	KOREA
Date of order	:	June 09, 2004

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+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.

4.3 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.

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.

4.1 DESCRIPTION OF TESTS (CONTINUED)

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.

4.1 DESCRIPTION OF TESTS (CONTINUED)

4.8 Radiated Emission

Final test was performed according to ANSI C63.4-2001 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.

4.9 Conducted Emission

The power line conducted interference measurements were performed according to ANSI C63.4-2001 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.

5.1 TEST DATA

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

Radiated measurements at 3 meters

Supply Voltage: **3.7**

Modulation: **CDMA**

Freq. Tuned (MHz)	**REF. LEVEL** (dBm)	**POL** (H/V)	**ERP** (W)	**ERP** (dBm)	**BATTERY**
1851.25	-14.14	V	0.708	28.50	Standard
1880.00	-13.94	V	0.723	28.59	Standard
1908.75	**-13.70**	**V**	**0.881**	**29.45**	**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 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.

5.1 TEST DATA (CONTINUED)

5.3 Effective Radiated Power Output

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	-14.04	V	0.740	28.69	With Charger
1880.00	-13.72	V	0.741	28.70	With Charger
1908.75	**-13.40**	**V**	**0.923**	**29.65**	**With Charger**

Note: Charger 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 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.

6.1 TEST DATA

6.2 PCS CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1851.25 MHz

CHANNEL: 0025(Low)

MEASURED OUTPUT POWER: 29.65 dBm = 0.923 W

MODULATION SIGNAL: CDMA (Internal)

DISTANCE: 3 meters

LIMIT: 43 + 10 $\log_{10}$ (W) = 42.65 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
3702.5	-42.2	9.3	-32.9	V	62.55
5553.75	-55.1	10.8	-44.3	V	73.95
-	-	-	-	-	-

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 PCS CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1880.00 MHz

CHANNEL: 0600(Mid)

MEASURED OUTPUT POWER: 29.65 dBm = 0.923 W

MODULATION SIGNAL: CDMA (Internal)

DISTANCE: 3 meters

LIMIT: 43 + 10 $\log_{10}$ (W) = 42.65 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
3760	-48.2	9.3	-38.9	V	68.55
5640	-53.1	10.8	-42.3	V	71.95
-	-	-	-	-	-

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 PCS CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1908.75 MHz

CHANNEL: 1175(High)

MEASURED OUTPUT POWER: 29.65 dBm = 0.923 W

MODULATION SIGNAL: CDMA (Internal)

DISTANCE: 3 meters

LIMIT: 43 + 10 $\log_{10}$ (W) = 42.65 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
3817.5	-40.5	9.3	-31.2	V	60.85
5726.25	-53.5	10.8	-42.7	V	72.35
-	-	-	-	-	-

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

7.2 Frequency Stability (CDMA)

OPERATING FREQUENCY: 1,879,999,400 Hz

CHANNEL: 0600

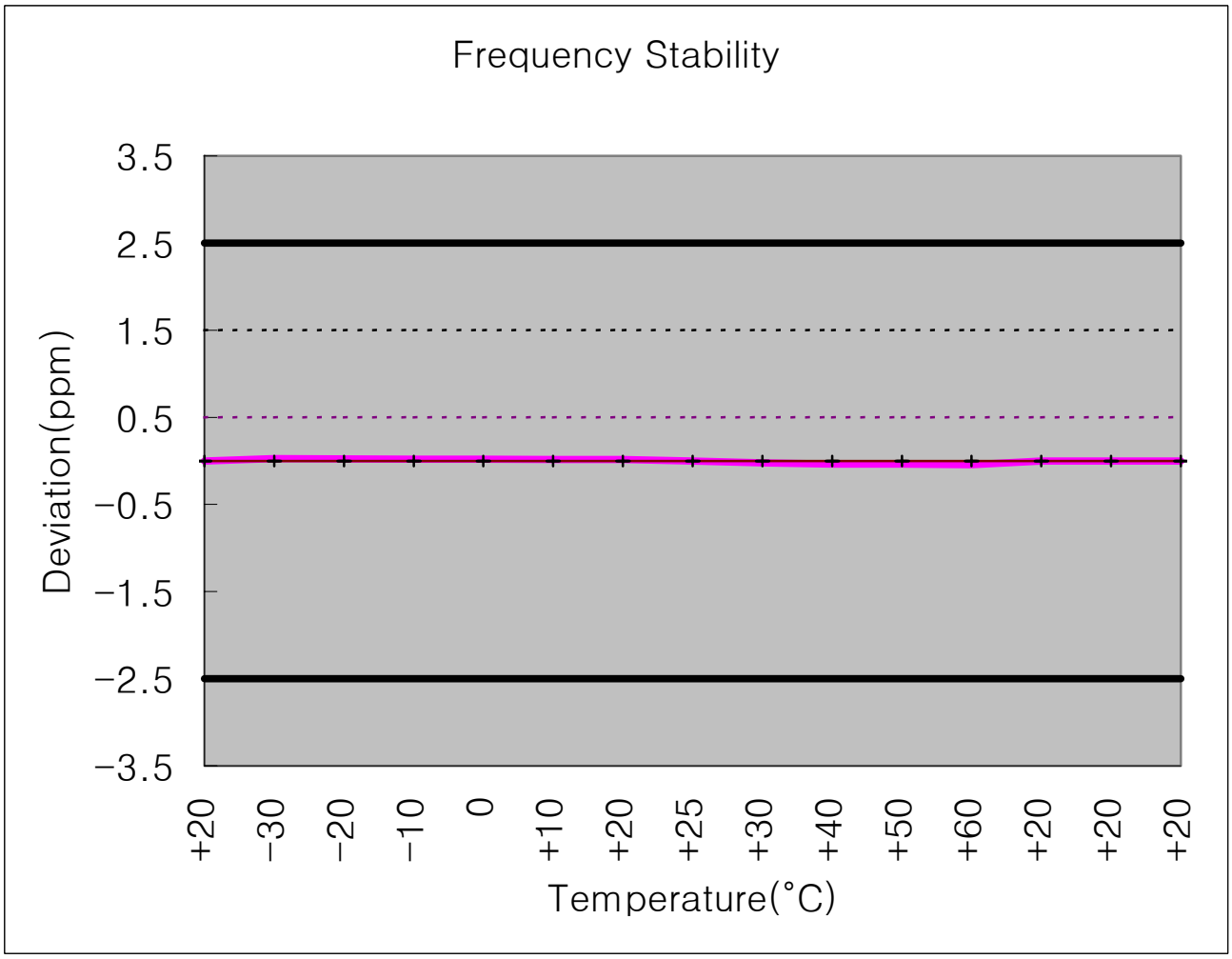
REFERENCE VOLTAGE: 3.7 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5ppm

VOLTAGE (%)	**POWER** (VAC)	TEMP (dB)	**FREQ** (H/A)	**Deviation** (%)
100%	120	+20(Ref)	1,880,000,017	0.000000
100%		-30	1,879,999,965	0.000003
100%		-20	1,879,999,975	0.000002
100%		-10	1,879,999,984	0.000002
100%		0	1,879,999,981	0.000002
100%		+10	1,879,999,988	0.000002
100%		+20	1,879,999,988	0.000002
100%		+25	1,880,000,017	0.000000
100%		+30	1,880,000,062	-0.000002
100%		+40	1,880,000,086	-0.000004
100%		+50	1,880,000,087	-0.000004
100%		+60	1,880,000,102	-0.000005
85%	102	+20	1,880,000,017	0.000000
115%	138	+20	1,880,000,017	0.000000
BATT.ENDPOINT	N/A			

7.1 TEST DATA

7.2 Frequency Stability (CDMA)



8.1 EMISSION TEST DATA

8.2 Radiated Emission

Distance: 3m

Frequency [㎒]	ANT Pol.	Reading [dB㎶]	T.F [dB]	Results [dB㎶/m]	Limits [dB㎶/m]	Margin [dB]
	No emissions were detected at a level greater than 10dB below limit.					

NOTE

1. There is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated.
2. Measurements above 1GHz is performed using a minimum resolution bandwidth of 1MHz. The EUT was tested up to the 20GHz and no significant emission was found.

8.1 EMISSION TEST DATA (CONTINUED)

8.3 Conducted Emission

(SEE ATTACHMENT D)

9.1 PLOT(S) OF EMISSIONS

(SEE ATTACHMENT D)

10.1 TEST EQUIPMENT

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
01	Spectrum Analyzer	Agilent	E4404B	22/11/04	US41061134
02	Spectrum Analyzer	H.P	8563E	25/09/04	3551A04634
03	Power Meter	H.P	EPM-442A	16/07/04	GB37170413
04	Power Sensor	H.P	8481A	16/07/04	3318A96332
05	Frequency Counter	H.P	5342A	26/09/04	2119A04450
06	Multfunction Synthesizer	H.P	8904A	15/10/04	3633A08404
07	Signal Generator	H.P	8673D	26/09/04	2844A00753
08	Signal Generator	H.P	E4421A	29/04/05	US37230529
09	Signal Generator	H.P	8657A	26/05/05	3430U02049
10	Audio Analyzer	H.P	8903B	18/04/05	3011A0944B
11	Modulation Analyzer	H.P	8901B	21/04/05	3028A03029
12	Sensor Module	H.P	11722A	21/04/05	3111A04665
13	Oscilloscope	LeCroy	9314A	27/08/04	93144390
14	CDMA Mobile Station Test Set	H.P	8924C	09/09/04	US35360688
15	Power Splitter	WEINSCHEL	1593	23/04/05	332
16	BAND Reject Filter	Microwave circuits INC.	NO308372	22/12/04	3125-01DC0312
17	BAND Reject Filter	Wainwright	WRCG1750	19/08/04	SN2
18	AC Power supply	DAEKWANG	5KVA	03/04/05	N/A
19	DC Power Supply	H.P	6622A	24/03/05	465487
20	Attenuator (30dB)	H.P	8498A	23/05/05	50101
21	Attenuator (10dB)	WEINSCHEL	23-10-34	15/10/04	BP4387
22	HORN ANT	EMCO	3115	22/10/04	6419
23	HORN ANT	EMCO	3115	01/10/04	21097
24	HORN ANT	A.H.Systems	SAS-574	27/11/04	154
25	HORN ANT	A.H.Systems	SAS-574	14/11/04	155
26	Dipole Antenna	Schwarzbeck	VHA9103	04/10/04	2116

10.1 TEST EQUIPMENT (CONTINUED)

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
27	Dipole Antenna	Schwarzbeck	VHA9103	04/10/04	2117
28	Dipole Antenna	Schwarzbeck	UHA9105	04/10/04	2261
29	Dipole Antenna	Schwarzbeck	UHA9105	04/10/04	2262
30	RFI/FIELD Iintensity Meter	Kyorits	KNM-504D	25/07/04	SN-161-4
31	Frequency Converter	Kyorits	KCV-604C	25/07/04	4-230-3
32	TEMP & HUMIDITY Chamber	JISCO	J-RHC2	14/09/04	021031
33	Log Periodic Antenna	Schwarzbeck	UHALP9108A1	23/10/04	1098
34	Biconical Antenna	Schwarzbeck	VHA9103	23/10/04	VHA91031946
35	Digital Multimeter	H.P	34401A	15/10/04	3146A13475
36	Attenuator (10dB)	WEINSCHEL	23-10-34	15/10/04	BP4386
37	High-Pass Filter	ANRITSU	MP526	12/05/05	M27756
38	Attenuator (3dB)	Agilent	8491B	15/10/04	58177
39	Wireless communication test set	Agilent	8960	10/11/04	GB41321167
40	RFI/FIELD Intensity Meter	Kyorits	KNW-2402	25/07/04	4N-170-3
41	LISN	Kyorits	KNW-407	29/08/04	8-317-8
42	LISN	Kyorits	KNW-242	22/08/04	8-654-15
43	Spectrum Analyzer	H.P	8591E	23/05/05	3649A05889
44	Software	ToYo EMI	EP5/CE	N/A	Ver 2.0.801
45	CVCF	NF Electronic	4400	N/A	344536 4420064

11.1 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)

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 9.3 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 7.3dB is added to the signal generator reading of -30.9dBm yielding -23.60dBm. The fundamental EIRP was 25.501 dBm. so this harmonic was 25.501dBm-(-23.6)=49.1dBc.

12.1 CONCLUSION

The data collected shows that the **AXESS TELECOM CO., LTD.** CDMA FIXED WIRELESS TERMINAL **FCC ID: RFLACW1XT1900** complies with all the requirements of Parts 2 and 24 of the FCC rules.

