

# FCC Test Report

**EQUIPMENT** : Point of Sales Terminal  
**BRAND NAME** : VeriFone  
**MODEL NAME** : VX610  
**FCC ID** : B32VX610EVDO  
**STANDARD** : 47 CFR Part 2, 22(H), 24(E)  
**CLASSIFICATION** : PCS Licensed Transmitter (PCB)  
**Tx/Rx FREQUENCY RANGE** : CDMA2000 Cellular : 824.70 ~ 848.31 MHz /  
869.70 ~ 893.31 MHz  
CDMA2000 PCS : 1851.25 ~ 1908.75 MHz /  
1931.25 ~ 1988.75 MHz  
**MAX. ERP/EIRP POWER** : CDMA2000 Cellular : 0.19 W for EVDO Rev. 0  
CDMA2000 PCS : 0.13 W for EVDO Rev. A  
**EMISSION DESIGNATOR** : 1M28F9W  
**APPLICANT** : VeriFone Inc.  
1400 West Stanford Ranch Road, Suite 200, Rocklin CA  
95765, USA

The product sample received on Feb. 20, 2009 and completely tested on Mar. 10, 2009. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.



Reviewed by: Roy Wu / Manager



## SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1<sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



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### SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result
3.1	§2.1046	N/A	Conducted Output Power	N/A	PASS
3.2	§22.913(a)(2)	RSS-132(4.4) SRSP-503(5.1.3)	Effective Radiated Power	< 7 Watts for FCC (<6.3 Watts for IC)	PASS
3.3	§24.232(c)	RSS-133 (6.4) SRSP-510(5.1.2)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS
3.4	§2.1049 §22.917(a) §24.238(a)	N/A	Occupied Bandwidth	N/A	PASS
3.5	§2.1051 §22.917(a) §24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Band Edge Measurement	< 43+10log <sub>10</sub> (P[Watts])	PASS
3.6	§2.1051 §22.917(a) §24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Conducted Emission	< 43+10log <sub>10</sub> (P[Watts])	PASS
3.7	§2.1053 §22.917(a) §24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Field Strength of Spurious Radiation	< 43+10log <sub>10</sub> (P[Watts])	PASS
3.8	§2.1055 §22.355 §24.235	RSS-132(4.3) RSS-133(6.3)	Frequency Stability for Temperature & Voltage	< 2.5 ppm	PASS



# 1 General Description

## 1.1 Applicant

VeriFone Inc.

1400 West Stanford Ranch Road, Suite 200, Rocklin CA 95765, USA

## 1.2 Manufacturer

Sanmina-SCI Systems (Kunshan) Co.,Ltd.

312, Qing Yang South Road, Economics and Technical Development Zone, Kunshan, Jiangsu Province, China 215300

## 1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Point of Sales Terminal
Brand Name	VeriFone
Model Name	VX610
FCC ID	B32VX610EVDO
Tx Frequency	CDMA2000 Cellular : 824 MHz ~ 849 MHz CDMA2000 PCS : 1850 MHz ~1910 MHz
Rx Frequency	CDMA2000 Cellular : 869 MHz ~ 894 MHz CDMA2000 PCS : 1930 MHz ~ 1990 MHz
Maximum Output Power to Antenna	CDMA2000 Cellular (1xRTT) : 23.21 dBm CDMA2000 Cellular (1xEV-DO Rev. 0) : 23.27 dBm CDMA2000 Cellular (1xEV-DO Rev. A) : 23.07 dBm CDMA2000 PCS (1xRTT) : 22.33 dBm CDMA2000 PCS (1xEV-DO Rev. 0) : 22.35 dBm CDMA2000 PCS (1xEV-DO Rev. A) : 22.48 dBm
Maximum ERP/EIRP	CDMA2000 Cellular : 0.19 W (22.89 dBm) for 1xEV-DO Rev. 0 CDMA2000 PCS : 0.13 W (20.99 dBm) for 1xEV-DO Rev. A
Antenna Type	Dipole Antenna
HW Version	EVT-3
SW Version	OS:QB011013
Type of Modulation	QPSK
Type of Emission	1M28F9W
EUT Stage	Identical Prototype

**List of Accessory:**

<b>Specification of Accessory</b>		
<b>AC Adapter 1</b>	<b>Brand Name</b>	VeriFone
	<b>Model Name</b>	AU1360903n
	<b>Power Rating</b>	I/P:100-240Vac, 50-60Hz, 2A; O/P: 9Vdc, 4A
	<b>AC Power Cord Type</b>	1.8 meter non-shielded cable with ferrite core
<b>AC Adapter 2</b>	<b>Brand Name</b>	VeriFone
	<b>Model Name</b>	GC99D036009
	<b>Power Rating</b>	I/P:100-240Vac, 50-60Hz, 1200mA; O/P: 9Vdc, 4A
	<b>AC Power Cord Type</b>	1.8 meter non-shielded cable with ferrite core
<b>Battery</b>	<b>Brand Name</b>	VeriFone
	<b>Model Name</b>	23326-04-R
	<b>Power Rating</b>	7.2Vdc, 1800mAh
	<b>Type</b>	Li-ion

**Remark:**

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. For accessories equipped with this EUT, please refer to the appendix of the external photo.
3. For other wireless features of this EUT, the test report will be issued separately.

### 1.4 Testing Site

<b>Test Site</b>	SPORTON INTERNATIONAL INC.		
<b>Test Site Location</b>	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		<b>FCC/IC Registration No.</b>
	TH02-HY	03CH07-HY	TW1022/4086B-1

### 1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ Preliminary Guidance for Receiving Applications for Certification of 3G Device. May 9, 2006.
- ♦ 47 CFR Part 2, 22(H), 24(E)
- ♦ ANSI C63.4-2003
- ♦ ANSI / TIA / EIA-603-C-2004
- ♦ IC RSS-132 Issue 2
- ♦ IC RSS-133 Issue 5

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

### 1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	System Simulator	Agilent	E5515C	N/A	N/A	Unshielded, 1.8 m

## 2 Test Configuration of Equipment Under Test

### 2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Frequency range investigated for radiated emission is as follows:

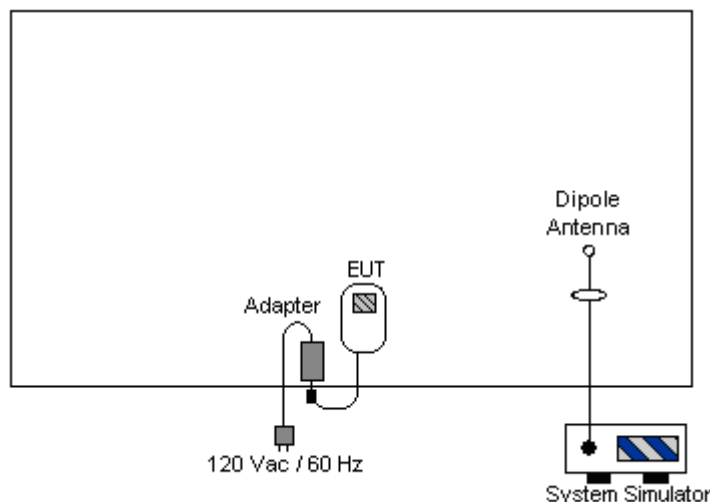
1. 30 MHz to 9000 MHz for CDMA2000 Cellular
2. 30MHz to 19000 MHz for CDMA2000 PCS.

Test Modes		
Band	Radiated TCs	Conducted TCs
CDMA2000 Cellular	<ul style="list-style-type: none"> <li>■ 1xEV-DO Rev. 0 Link Mode_CH1013</li> <li>■ 1xEV-DO Rev. 0 Link Mode_CH384</li> <li>■ 1xEV-DO Rev. 0 Link Mode_CH777</li> </ul>	<ul style="list-style-type: none"> <li>■ 1xRTT Link Mode</li> <li>■ 1xEV-DO Rev. 0 Link Mode</li> <li>■ 1xEV-DO Rev. A Link Mode</li> </ul>
CDMA2000 PCS	<ul style="list-style-type: none"> <li>■ 1xEV-DO Rev. A Link Mode_CH25</li> <li>■ 1xEV-DO Rev. A Link Mode_CH600</li> <li>■ 1xEV-DO Rev. A Link Mode_CH1175</li> </ul>	<ul style="list-style-type: none"> <li>■ 1xRTT Link Mode</li> <li>■ 1xEV-DO Rev. 0 Link Mode</li> <li>■ 1xEV-DO Rev. A Link Mode</li> </ul>

Note:

1. For CDMA2000 Cellular, the RF output power of 1xEV-DO Rev. 0 is larger than 1xRTT and 1xEV-DO Rev. A. Therefore, the 1xEV-DO Rev.0 mode was used for ERP and RSE testing.
2. For CDMA2000 PCS, the RF output power of 1xEV-DO Rev. A is larger than 1xRTT and 1xEV-DO Rev. 0. Therefore, the 1xEV-DO Rev. A mode was used for EIRP and RSE testing.

### 2.2 Connection Diagram of Test System





### 3 Test Result

#### 3.1 Conducted Output Power Measurement

##### 3.1.1 Description of the Conducted Output Power Measurement

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

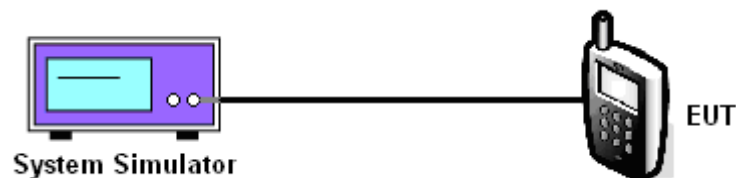
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedures

1. The transmitter output port was connected to base station.
2. Set EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.

##### 3.1.4 Test Setup





3.1.5 Test Result of Conducted Output Power

CDMA2000 Cellular					
Test Mode	Test Status	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watts)
CDMA 2000 1xRTT	FCH_RC1	1013 (Low)	824.70	23.08	0.20
		384 (Mid)	836.52	22.63	0.18
		777 (High)	848.31	22.41	0.17
	FCH_RC3	1013 (Low)	824.70	23.21	0.21
		384 (Mid)	836.52	22.82	0.19
		777 (High)	848.31	22.35	0.17
	FCH+SCH_RC3	1013 (Low)	824.70	22.32	0.17
		384 (Mid)	836.52	21.85	0.15
		777 (High)	848.31	21.63	0.15
CDMA 2000 1xEV-DO (Rev. 0)	RTAP_9.6Kbps	1013 (Low)	824.70	22.85	0.19
		384 (Mid)	836.52	22.54	0.18
		777 (High)	848.31	22.62	0.18
	RTAP_38.4Kbps	1013 (Low)	824.70	22.97	0.20
		384 (Mid)	836.52	22.70	0.19
		777 (High)	848.31	22.83	0.19
	RTAP_153.6Kbps	1013 (Low)	824.70	23.27	0.21
		384 (Mid)	836.52	22.82	0.19
		777 (High)	848.31	22.81	0.19
CDMA 2000 1xEV-DO (Rev. A)	RETAP_128Kbps	1013 (Low)	824.70	22.64	0.18
		384 (Mid)	836.52	22.18	0.17
		777 (High)	848.31	22.14	0.16
	RETAP_2048Kbps	1013 (Low)	824.70	23.07	0.20
		384 (Mid)	836.52	22.63	0.18
		777 (High)	848.31	22.62	0.18
	RETAP_12288Kbps	1013 (Low)	824.70	22.02	0.16
		384 (Mid)	836.52	21.55	0.14
		777 (High)	848.31	21.54	0.14



CDMA2000 PCS					
Test Mode	Test Status	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watts)
CDMA 2000 1xRTT	FCH_RC1	25 (Low)	1851.25	21.50	0.14
		600 (Mid)	1880.00	22.30	0.17
		1175 (High)	1908.75	21.53	0.14
	FCH_RC3	25 (Low)	1851.25	21.51	0.14
		600 (Mid)	1880.00	22.33	0.17
		1175 (High)	1908.75	21.48	0.14
	FCH+SCH_RC3	25 (Low)	1851.25	20.88	0.12
		600 (Mid)	1880.00	21.57	0.14
		1175 (High)	1908.75	20.83	0.12
CDMA 2000 1xEV-DO (Rev. 0)	RTAP_9.6Kbps	25 (Low)	1851.25	21.46	0.14
		600 (Mid)	1880.00	22.06	0.16
		1175 (High)	1908.75	21.47	0.14
	RTAP_38.4Kbps	25 (Low)	1851.25	21.56	0.14
		600 (Mid)	1880.00	22.25	0.17
		1175 (High)	1908.75	21.54	0.14
	RTAP_153.6Kbps	25 (Low)	1851.25	21.80	0.15
		600 (Mid)	1880.00	22.35	0.17
		1175 (High)	1908.75	21.91	0.16
CDMA 2000 1xEV-DO (Rev. A)	RETAP_128Kbps	25 (Low)	1851.25	21.19	0.13
		600 (Mid)	1880.00	21.85	0.15
		1175 (High)	1908.75	21.17	0.13
	RETAP_2048Kbps	25 (Low)	1851.25	21.60	0.14
		600 (Mid)	1880.00	22.32	0.17
		1175 (High)	1908.75	21.67	0.15
	RETAP_12288Kbps	25 (Low)	1851.25	21.78	0.15
		600 (Mid)	1880.00	22.48	0.18
		1175 (High)	1908.75	21.15	0.13

## 3.2 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

### 3.2.1 Description of the ERP/EIRP Measurement

ERP/EIRP is measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

1. The EUT was placed on a turntable with 1.0 meter height in a fully anechoic chamber.
2. The EUT was set at 1.2 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiated power.
4. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
5. Taking the record of maximum ERP/EIRP.
6. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
7. The conducted power at the terminal of the dipole antenna is measured.
8. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
9.  $ERP/EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$

$P_s$  (dBm) : Input power to substitution antenna.

$G_s$  (dBi or dBd) : Substitution antenna Gain.

$E_t = R_t + AF$

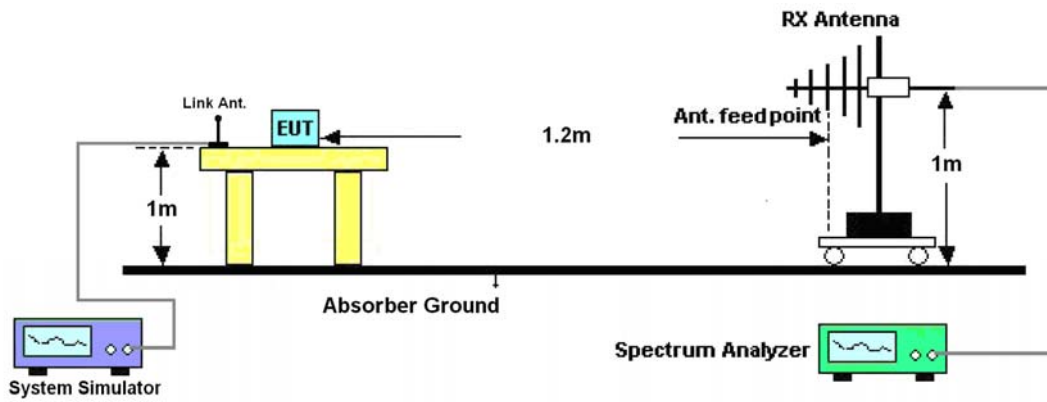
$E_s = R_s + AF$

AF (dB/m) : Receive antenna factor

$R_t$  : The highest received signal in spectrum analyzer for EUT.

$R_s$  : The highest received signal in spectrum analyzer for substitution antenna.

### 3.2.4 Test Setup





3.2.5 Test Result of ERP

CDMA2000 Cellular 1xEV-DO Rev. 0_153.6Kbps Radiated Power ERP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.70	-27.32	-48.12	0.00	-1.08	19.72	0.09
836.52	-27.75	-48.28	0.00	-0.93	19.60	0.09
848.31	-28.64	-48.35	0.00	-0.76	18.95	0.08
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.70	-24.00	-47.97	0.00	-1.08	22.89	0.19
836.52	-25.19	-48.01	0.00	-0.93	21.89	0.15
848.31	-26.29	-48.05	0.00	-0.76	21.00	0.13

3.2.6 Test Result of EIRP

CDMA2000 PCS 1xEV-DO Rev. A_RETAP_12288Kbps Radiated Power EIRP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1851.25	-32.85	-51.88	0.00	1.96	20.99	0.13
1880.00	-35.37	-52.99	0.00	2.00	19.62	0.09
1908.75	-36.04	-54.28	0.00	1.98	20.22	0.11
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1851.25	-34.07	-52.13	0.00	1.96	20.02	0.10
1880.00	-36.22	-53.17	0.00	2.00	18.95	0.08
1908.75	-37.97	-54.13	0.00	1.98	18.14	0.07

### 3.3 Occupied Bandwidth and Band Edge Measurement

#### 3.3.1 Description of Occupied Bandwidth and Band Edge Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43+10\log_{10}(P[\text{Watts}])$  dB.

The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

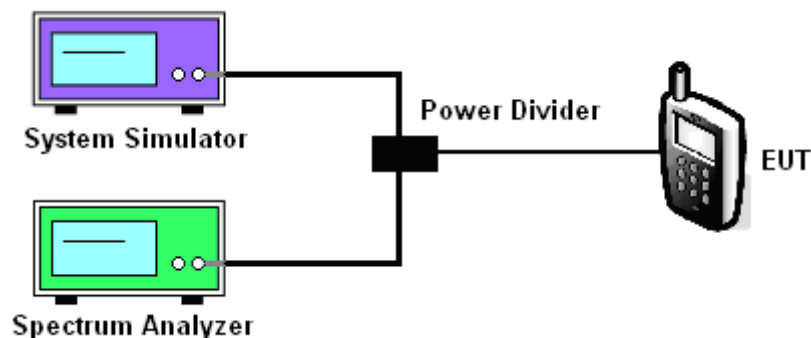
#### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The 99% and 26 dB occupied bandwidth (BW) of the middle channel for the highest RF powers were measured.
3. The band edges of low and high channels for the highest RF powers were measured. Setting RBW as roughly BW/100.
4. The RBW was replaced by 10 kHz, due to the spectrum analyzer IF-Filter including an excess of the limit. A worst case correction factor of  $10 \log (1\% \text{ BW}/\text{measurement RBW})$  was implemented.

#### 3.3.4 Test Setup

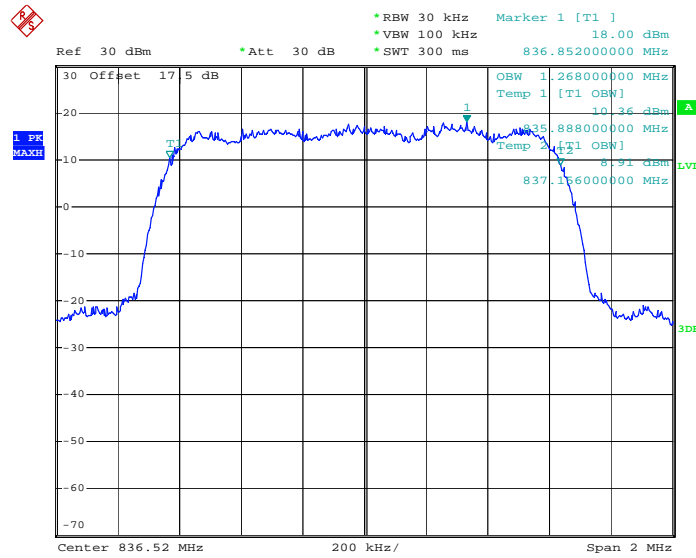




3.3.5 Test Result (Plots) of Occupied Bandwidth

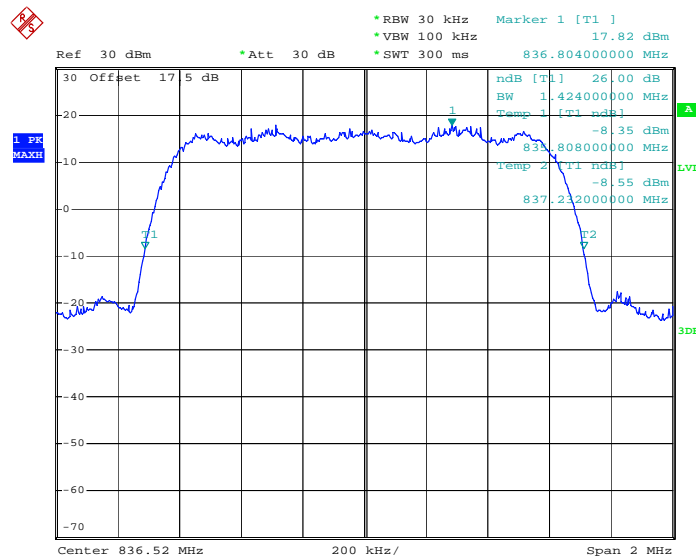
<b>Band :</b>	CDMA2000 Cellular	<b>Power Stage :</b>	High
<b>Test Mode :</b>	1xEV-DO Rev. 0_153.6Kbps		

99% Occupied Bandwidth Plot on Channel 384



HAC-189-E  
Date: 7.MAR.2009 17:01:32

26dB Bandwidth Plot on Channel 384



HAC-189-E  
Date: 7.MAR.2009 16:59:25



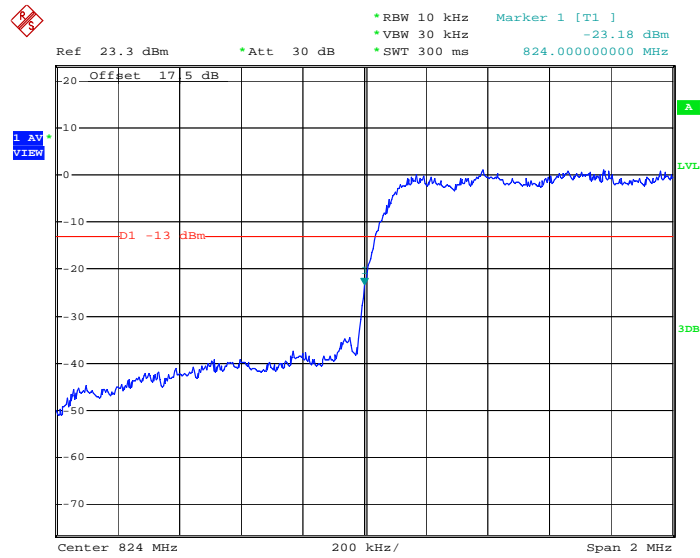




### 3.3.6 Test Result (Plots) of Conducted Band Edges

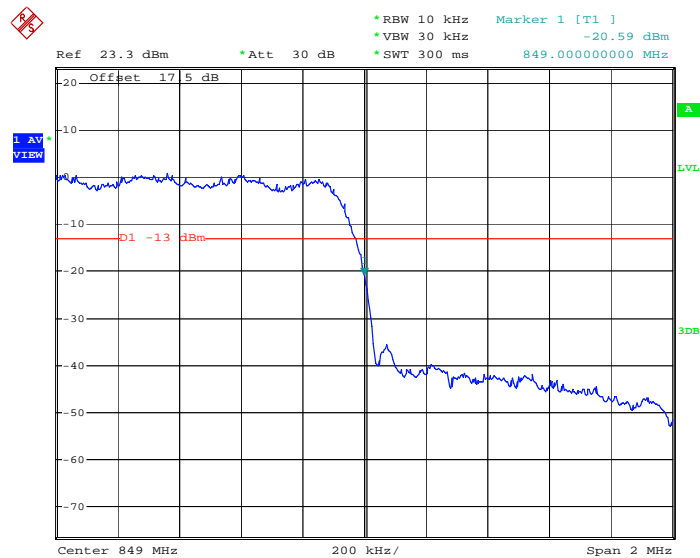
<b>Band :</b>	CDMA2000 Cellular	<b>Power Stage :</b>	High
<b>Test Mode :</b>	1xEV-DO Rev. 0_153.6Kbps		

Lower Band Edge Plot on Channel 1013



HAC-189-E  
Date: 7.MAR.2009 17:08:39

Higher Band Edge Plot on Channel 777

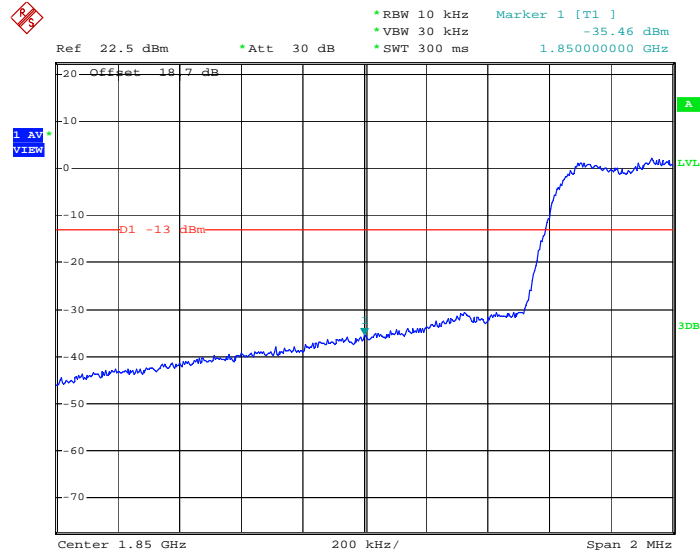


HAC-189-E  
Date: 7.MAR.2009 17:14:12



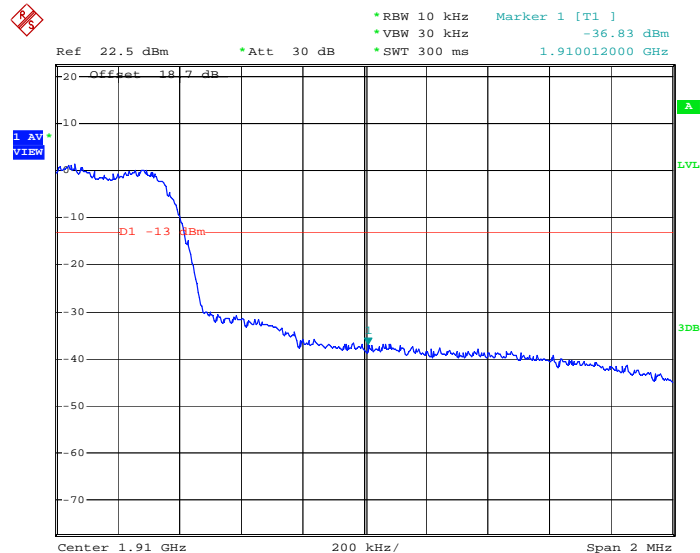
Band :	CDMA2000 PCS	Power Stage :	High
Test Mode :	1xEV-DO Rev. A_RETAP_12288Kbps		

Lower Band Edge Plot on Channel 25



HAC-189-E  
Date: 7.MAR.2009 18:05:54

Higher Band Edge Plot on Channel 1175



HAC-189-E  
Date: 7.MAR.2009 18:11:08

## 3.4 Conducted Emission Measurement

### 3.4.1 Description of Conducted Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10<sup>th</sup> harmonic.

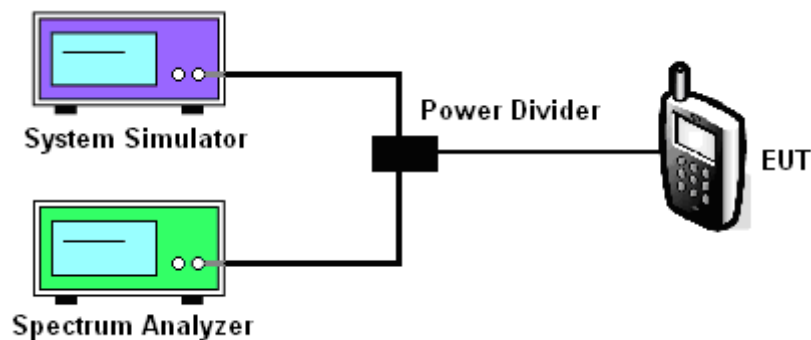
### 3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.4.3 Test Procedures

1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The middle channel for the highest RF power within the transmitting frequency was measured.
3. The conducted spurious emission for the whole frequency range was taken.

### 3.4.4 Test Setup

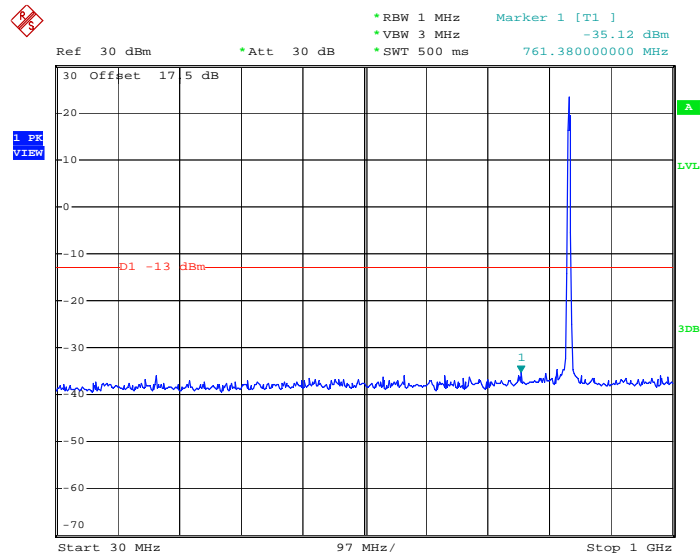




### 3.4.5 Test Result (Plots) of Conducted Emission

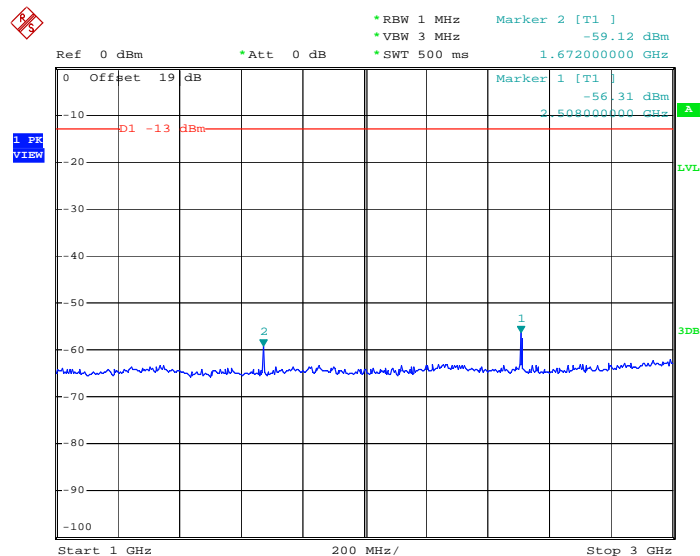
Band :	CDMA2000 Cellular	Power Stage :	High
Test Mode :	1xEV-DO Rev. 0_153.6Kbps		

Conducted Emission Plot between 30M-1G



HAC-189-E  
Date: 7.MAR.2009 17:23:00

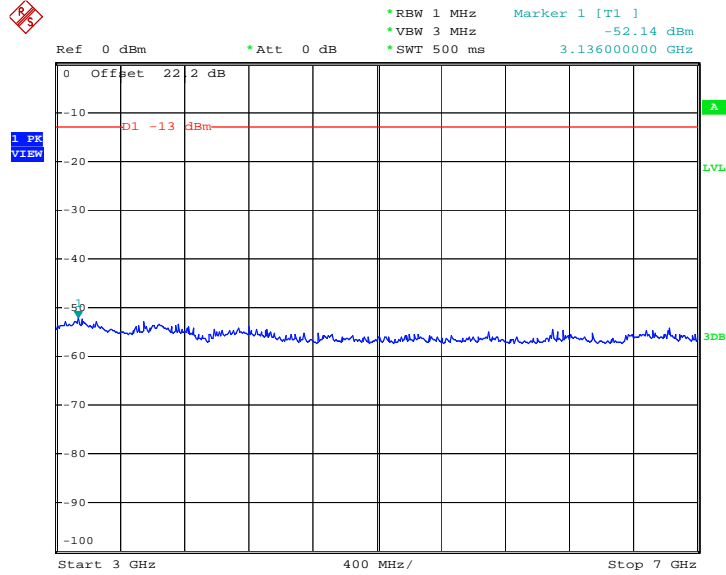
Conducted Emission Plot between 1GHz ~ 3GHz



HAC-189-E  
Date: 7.MAR.2009 17:24:36



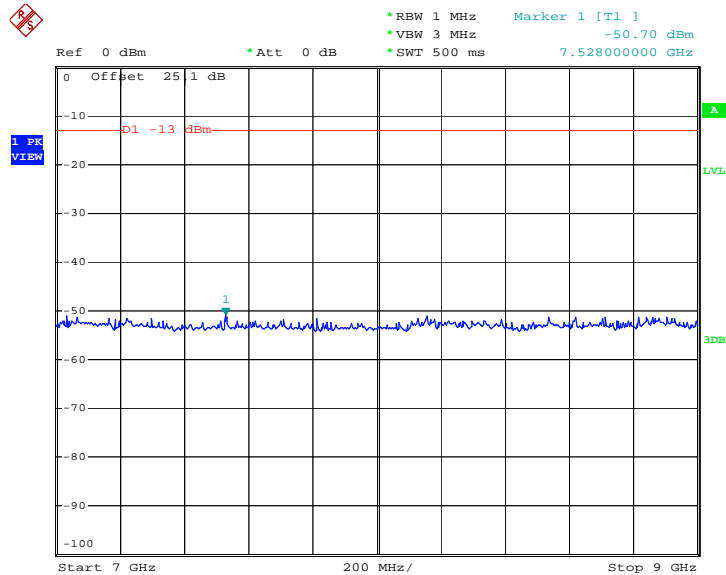
Conducted Emission Plot between 3GHz ~ 7GHz



HAC-189-E

Date: 7.MAR.2009 17:25:26

Conducted Emission Plot between 7GHz ~ 9GHz



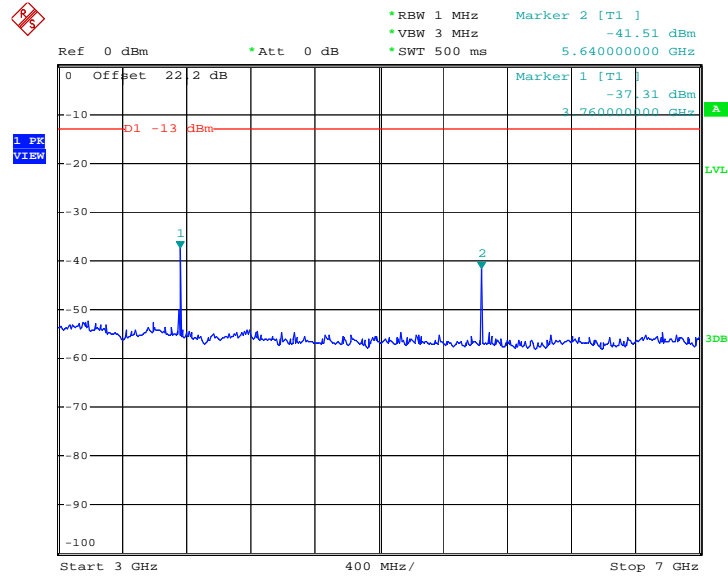
HAC-189-E

Date: 7.MAR.2009 17:26:53





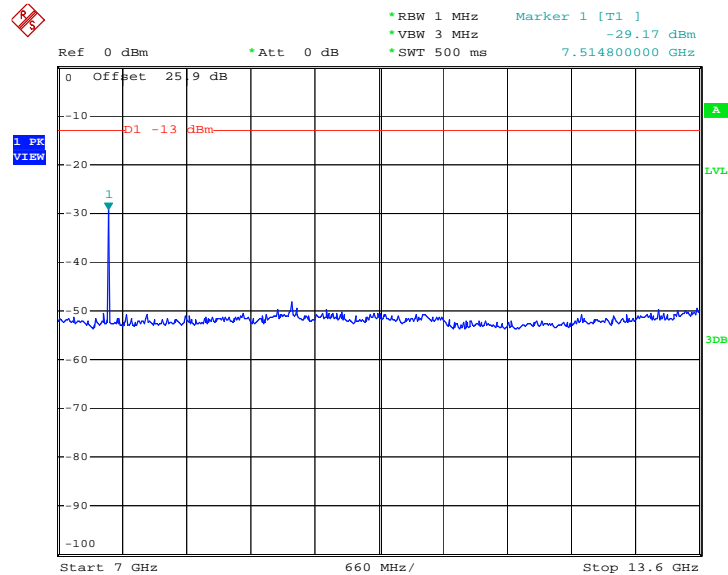
### Conducted Emission Plot between 3G-7G



HAC-189-E

Date: 7.MAR.2009 17:43:32

### Conducted Emission Plot between 7G-13.6G



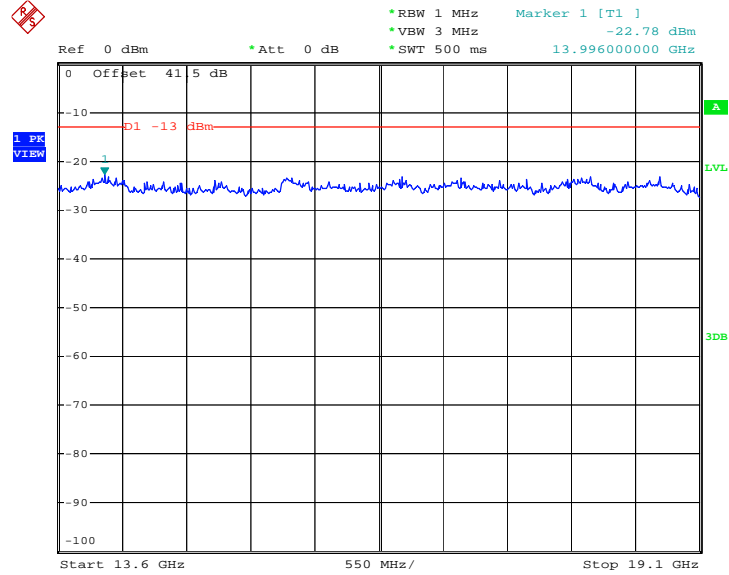
HAC-189-E

Date: 7.MAR.2009 17:42:26





Conducted Emission Plot between 13.6G-19.1G



HAC-189-E

Date: 7.MAR.2009 17:42:56

## 3.5 Field Strength of Spurious Radiation Measurement

### 3.5.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $43+10\log_{10}(P[\text{Watts}])$  dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

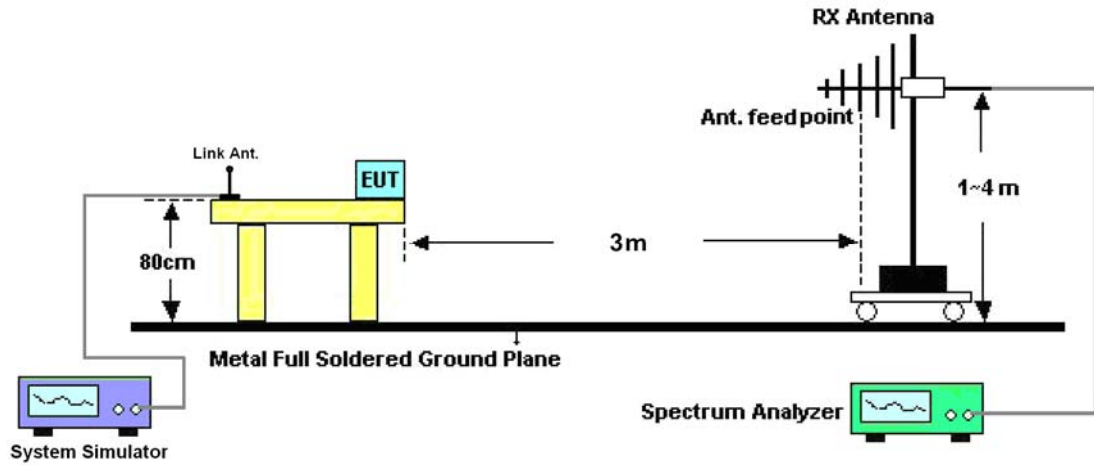
### 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.5.3 Test Procedures

1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. Emission level (dBm) = output power + substitution Gain.

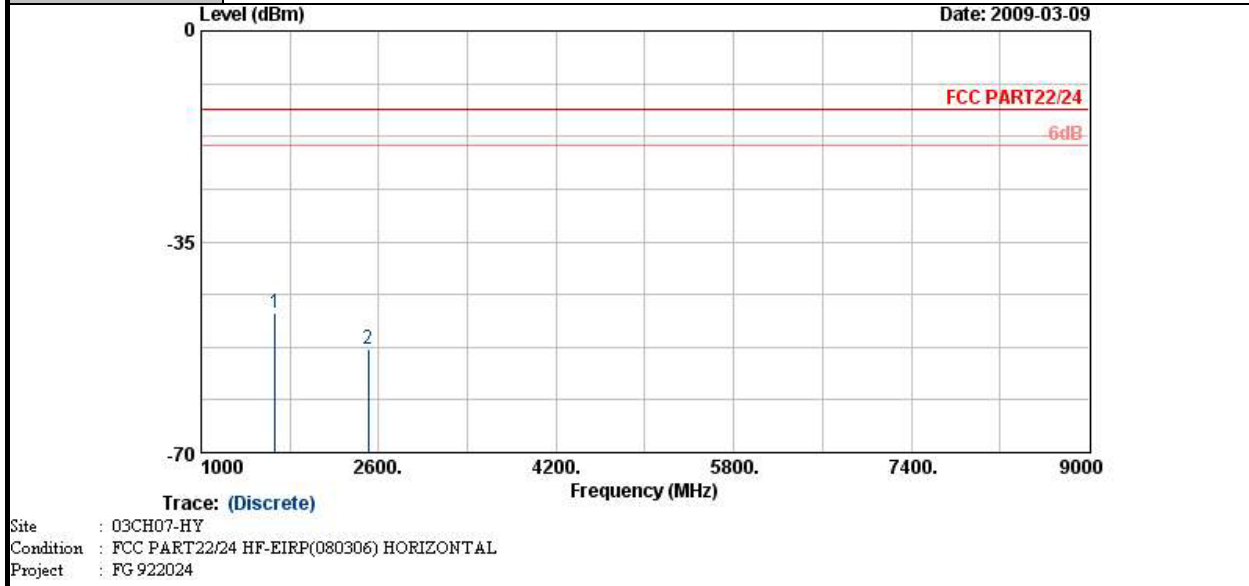
### 3.5.4 Test Setup





3.5.5 Test Result of Field Strength of Spurious Radiated

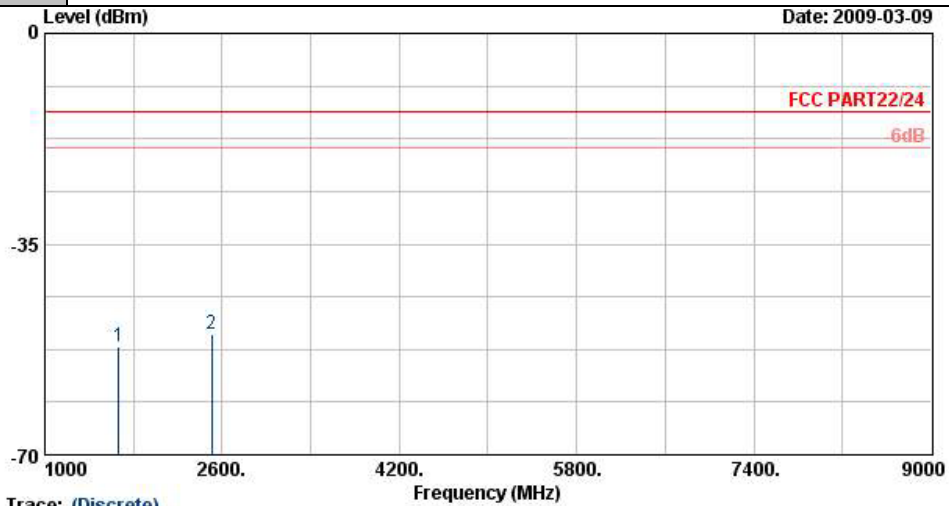
Band :	CDMA2000 Cellular	Temperature :	23~24°C
Test Mode :	1xEV-DO Rev. 0_153.6Kbps	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
1669	-46.90	-13	-33.90	-53.77	-45.91	3.39	4.55	H	Pass
2509	-52.75	-13	-39.75	-62.89	-52.81	3.71	5.92	H	Pass



<b>Band :</b>	CDMA2000 Cellular	<b>Temperature :</b>	23~24°C
<b>Test Mode :</b>	1xEV-DO Rev. 0_153.6Kbps	<b>Relative Humidity :</b>	43~44%
<b>Test Engineer :</b>	Elvis Chen	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

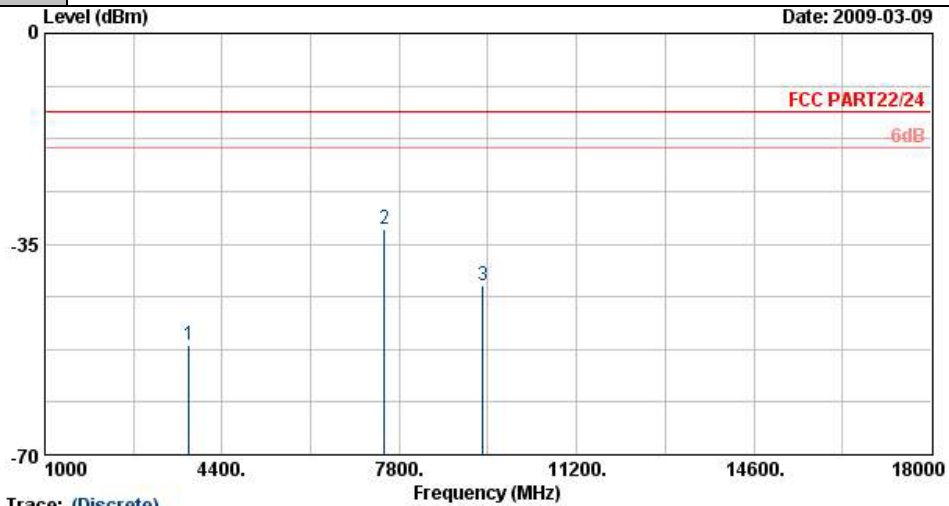


Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC PART22/24 HF-EIRP(080306) VERTICAL  
 Project : FG 922024

Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
1669	-51.96	-13	-38.96	-59.14	-50.58	3.39	4.16	V	Pass
2509	-50.07	-13	-37.07	-60.66	-49.93	3.71	5.72	V	Pass



<b>Band :</b>	CDMA2000 PCS	<b>Temperature :</b>	23~24°C
<b>Test Mode :</b>	1xEV-DO Rev. A_RETAP_12288Kbps	<b>Relative Humidity :</b>	43~44%
<b>Test Engineer :</b>	Elvis Chen	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

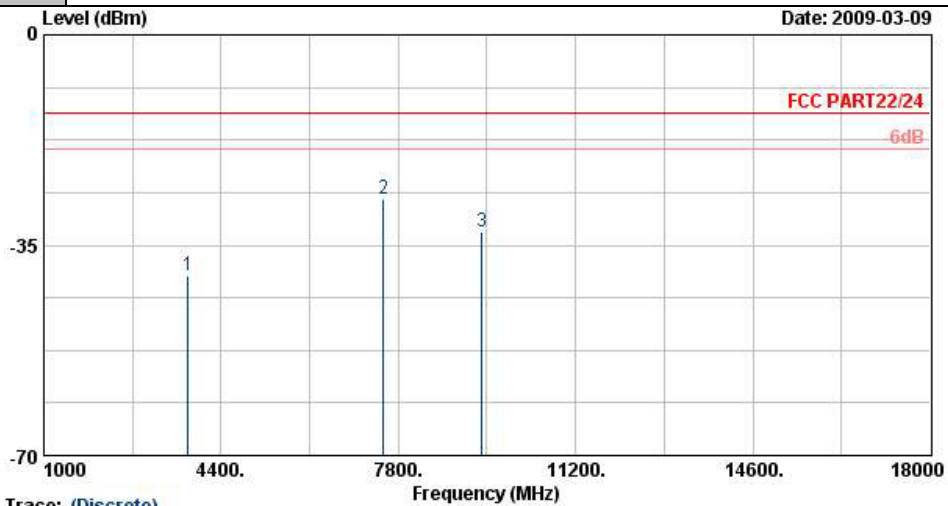


Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC PART22/24 HF-EIRP(080306) HORIZONTAL  
 Project : FG 922024

Frequency ( MHz )	EIRP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
3760	-51.72	-13	-38.72	-63.09	-55.09	4.03	7.40	H	Pass
7520	-32.43	-13	-19.43	-55.98	-36.31	5.83	9.71	H	Pass
9400	-41.78	-13	-28.78	-64.16	-46.48	6.02	10.72	H	Pass



<b>Band :</b>	CDMA2000 PCS	<b>Temperature :</b>	23~24°C
<b>Test Mode :</b>	1xEV-DO Rev. A_RETAP_12288Kbps	<b>Relative Humidity :</b>	43~44%
<b>Test Engineer :</b>	Elvis Chen	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC PART22/24 HF-EIRP(080306) VERTICAL  
 Project : FG 922024

Frequency ( MHz )	EIRP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
3760	-40.02	-13	-27.02	-57.25	-43.9	4.03	7.91	V	Pass
7520	-27.44	-13	-14.44	-51.49	-32.42	5.83	10.81	V	Pass
9400	-32.91	-13	-19.91	-61.93	-38.41	6.02	11.52	V	Pass

## 3.6 Frequency Stability Measurement

### 3.6.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5\text{ppm}$ ) of the center frequency.

### 3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

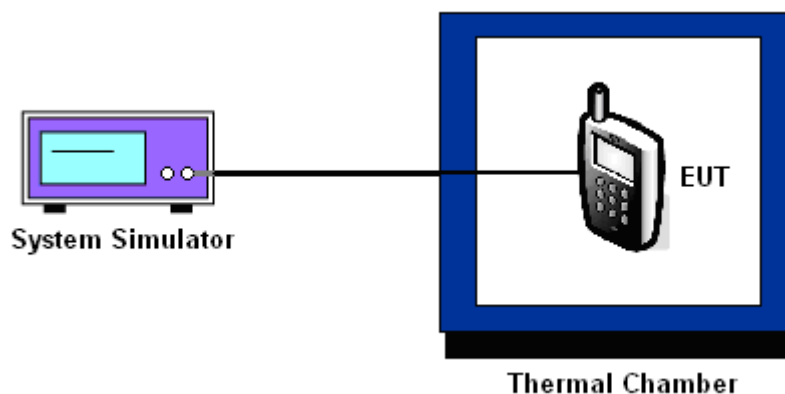
### 3.6.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the base station.
2. With power OFF, the temperature was decreased to  $-30^{\circ}\text{C}$  and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in  $10^{\circ}\text{C}$  step up to  $50^{\circ}\text{C}$ . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.
4. If the EUT can not be turned on at  $-30^{\circ}\text{C}$ , the testing lowest temperature will be raised in  $10^{\circ}\text{C}$  step until the EUT can be turned on.

### 3.6.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at  $25\pm 5^{\circ}\text{C}$  and connected with the base station.
2. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

### 3.6.5 Test Setup







3.6.6 Test Result of Temperature Variation

<b>Band :</b>	CDMA2000 Cellular	<b>Channel :</b>	384
<b>Test Mode :</b>	1xEV-DO Rev. 0_153.6Kbps	<b>Limit (ppm) :</b>	2.5

Temperature (°C)	Freq. Dev. (Hz)	Deviation (ppm)	Result
-30	13	0.02	PASS
-20	-7	-0.01	
-10	11	0.01	
0	-6	-0.01	
10	-7	-0.01	
20	-10	-0.01	
30	6	0.01	
40	-9	-0.01	
50	-10	-0.01	

<b>Band :</b>	CDMA2000 PCS	<b>Channel :</b>	600
<b>Test Mode :</b>	1xEV-DO Rev. A_RETAP_12288Kbps	<b>Limit (ppm) :</b>	2.5

Temperature (°C)	Freq. Dev. (Hz)	Deviation (ppm)	Result
-30	11	0.01	PASS
-20	19	0.01	
-10	13	0.01	
0	-11	-0.01	
10	-15	-0.01	
20	-12	-0.01	
30	13	0.01	
40	12	0.01	
50	-16	-0.01	



3.6.7 Test Result of Voltage Variation

Band & Channel	Mode	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
CDMA2000 Cellular CH384	1xEV-DO Rev. 0 153.6Kbps	7.2	-6	-0.01	2.5	PASS
		BEP	-7	-0.01		
		8.3	5	0.01		
CDMA2000 PCS CH600	1xEV-DO Rev. A RETAP_12288Kbps	7.2	-13	-0.01	2.5	PASS
		BEP	14	0.01		
		8.3	13	0.01		

Remark:

- 1. Normal Voltage = 7.2V.
- 2. Battery End Point (BEP) = 6.1 V.



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
System Simulator	R&S	CMU200	105934	N/A	Nov. 08, 2008	Nov. 07, 2009	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 26, 2008	Jun. 25, 2009	Conducted (TH02-HY)
Thermal Chamber	TEN BILLION	TTH-D35P	TBN-930701	N/A	Aug. 01, 2008	Jul. 31, 2009	Conducted (TH02-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz~1GHz	Nov. 20, 2008	Nov. 19, 2009	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9kHz~30GHz	Dec. 02, 2008	Dec. 01, 2009	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	75962	1G~18GHz	Aug. 13, 2008	Aug. 12, 2009	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1G~26.5GHz	Dec. 17, 2008	Dec. 16, 2009	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10~1000MHz. 32dB.GAIN	Mar. 31, 2008	Mar. 30, 2009	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	66584	1G~18GHz	Aug. 06, 2008	Aug. 05, 2009	Radiation (03CH07-HY)
System Simulator	Agilent	E5515C	GB46311195	N/A	Jan. 07, 2009	Jan. 06, 2011	Radiation (03CH07-HY)
System Simulator	R&S	CMU200	103937	N/A	Nov. 19, 2008	Nov. 18, 2009	Radiation (03CH07-HY)

## 5 Uncertainty of Evaluation

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of $x_i$		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.41	Normal(k=2)	0.21
Antenna factor calibration	0.83	Normal(k=2)	0.42
Cable loss calibration	0.25	Normal(k=2)	0.13
Pre Amplifier Gain calibration	0.27	Normal(k=2)	0.14
RCV/SPA specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site imperfection	1.43	Rectangular	0.83
Mismatch	+0.39/-0.41	U-shaped	0.28
<b>Combined standard uncertainty Uc(y)</b>	<b>1.27</b>		
<b>Measuring uncertainty for a level of confidence of 95% U=2Uc(y)</b>	<b>2.54</b>		

### Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Contribution	Uncertainty of $x_i$		$u(x_i)$	$C_i$	$C_i * u(x_i)$
	dB	Probability Distribution			
Receiver reading	±0.10	Normal(k=1)	0.10	1	0.10
Antenna factor calibration	±1.70	Normal(k=2)	0.85	1	0.85
Cable loss calibration	±0.50	Normal(k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20 \log(1 - \Gamma_1 * \Gamma_2)$	+0.34/-0.35	U-shaped	0.244	1	0.244
<b>Combined standard uncertainty Uc(y)</b>	<b>2.36</b>				
<b>Measuring uncertainty for a level of confidence of 95% U=2Uc(y)</b>	<b>4.72</b>				

## 6 Certification of TAF Accreditation



Certificate No. : I.1190-081212

財團法人全國認證基金會  
Taiwan Accreditation Foundation

### Certificate of Accreditation

This is to certify that

**Sporton International Inc.**  
**EMC & Wireless Communications Laboratory**  
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,  
Taiwan, R.O.C.

**is accredited in respect of laboratory**

<b>Accreditation Criteria</b>	: ISO/IEC 17025:2005
<b>Accreditation Number</b>	: 1190
<b>Originally Accredited</b>	: December 15, 2003
<b>Effective Period</b>	: January 10, 2007 to January 09, 2010
<b>Accredited Scope</b>	: Testing Field, see described in the Appendix
<b>Specific Accreditation Program</b>	: Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory Accreditation Program for BSMI Mutual Recognition Arrangement with Foreign Authorities



Jay-San Chen  
President, Taiwan Accreditation Foundation  
Date : December 12, 2008

PI, total 18 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix



## **Appendix A. Photographs of EUT**

Please refer to Sporton report number EP922024 as below.