

### HCT CO., LTD.

**Product Compliance Division** 

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## **CERTIFICATE OF COMPLIANCE**

### FCC Certification

Applicant Name: AXESSTEL INC.	Date of Issue: June 17, 2009 Location:
Address:	HCT CO., LTD., Sa
6815 Flanders Drive Ste.210 San Diego, CA 92121, U.S.A.	Kvunaki-do. Kore

June 17, 2009 Location: HCT CO., LTD., San 136-1 Ami-ri, Bubal-eup, Icheon-si, Kyungki-do, Korea Test Report No.: HCT-RF09-0619 HCT FRN: 0005866421

IC Recognition No.: IC 5944A-1

## FCC ID : PH7PX430

## **APPLICANT** : AXESSTEL INC.

Model(s):	PX430, PX430R
EUT Type:	PCS CDMA Fixed Wireless Cordless Phone
Tx Frequency:	1 851.25 — 1 908.75 MHz (PCS CDMA)
Rx Frequency:	1 931.25 — 1 988.75 MHz (PCS CDMA)
Max. RF Output Power:	0.843 W EIRP PCS CDMA (29.26 dBm)
Emission Designator(s):	1M27F9W (PCS CDMA)
FCC Classification:	Licensed Portable Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§24, §2

The measurements shown in this report were made in accordance with the procedures specified in §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. **HCT CO., LTD.** Certifies that no party to this application has been denied FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

Jong Seok Lee

Report prepared by : Jong Seok Lee Test engineer of RF Team

Approved by : Sang Jun Lee Manager of RF Team

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## **MEASUREMENT REPORT**

## **1. GENERAL INFORMATION**

Applicant Name:	AXESSTEL INC.
Address:	6815 Flanders Drive Ste.210 San Diego, CA 92121, U.S.A.
Contact:	TEL :+858-625-2100 / FAX : +858-625-2110
FCC ID:	PH7PX430
Application Type:	Certification
FCC Classification:	Licensed Portable Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§24, §2
EUT Type:	PCS CDMA Fixed Wireless Cordless Phone
Model(s): Model Name: Battery Power Rating: Type: Tx Frequency:	PX430, PX430R HLP053048A 3.7 V, 700 mh Li-ion Battery(Standard) 1 851.25 — 1 908.75 MHz (PCS CDMA)
Rx Frequency:	1 931.25 — 1 988.75 MHz (PCS CDMA)
Max. RF Output Power:	0.843 W EIRP PCS CDMA (29.26 dBm)
Emission Designator(s):	1M27F9W (PCS CDMA)
Antenna Specification	Manufacturer: DYKTX Antenna type: Printed Planner Inverted F Antenna on PCB Peak Gain: -1.440 dBi
Date(s) of Tests:	June 12, 2009 ~ June 13, 2009

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## 2. INTRODUCTION

## 2.1. EUT DESCRIPTION

The PX430, PX430R PCS CDMA Fixed Wireless Cordless Phone consists of PCS CDMA.

### 2.2. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 2.3. TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1, Maekok-Ri, Hobup-Myun, Ichon-Si, Kyoungki-Do, 467-701, KOREA. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated June 10, 2009(Registration Number: 90661)

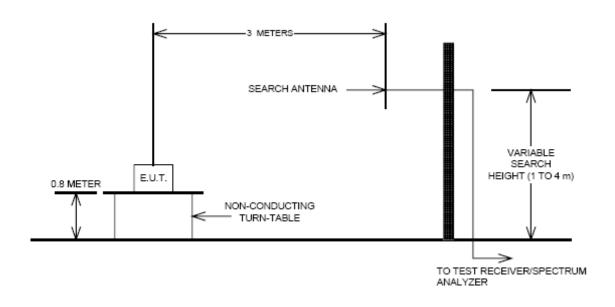
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## **3. DESCRIPTION OF TESTS**

## 3.1 Effective Radiated Power/Equivalent Isotropic Radiated Power

### Test Set-up



#### Test Procedure

Radiated emission measurements were performed at an open Site.

The equipment under test is placed on a wooden turntable 3-meters from the receive antenna.

A wooden turntable was rotated 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the previously recorded signal was duplicated.

The maximum EIRP was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. 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.

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#### 3.2 Peak- to- Average Ratio

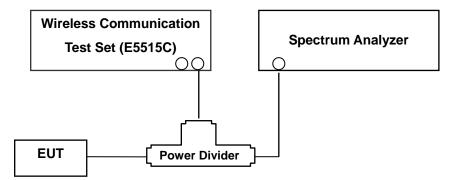
A peak to average ratio measurement is performed at the conducted port of the EUT. For CDMA and WCDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level. For GSM signals, an average and a peak trace are used on a spectrum analyzer to determine the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth. Plots of the EUT's Peak- to- Average Ratio are shown herein.

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### 3.3 Occupied bandwidth.

#### Test set-up



(Configuration of conducted Emission measurement) Test Procedure

The EUT was setup to maximum output power at its lowest channel. The occupied bandwidth was measured using a spectrum analyzer. The measurements are repeated for the highest and a middle channel. The EUT's occupied bandwidth is measured as the width of the signal between two points, one below the carrier center frequency and one above the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Plots of the EUT's occupied bandwidth are shown herein.

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### 3.4 Spurious and Harmonic Emissions at Antenna Terminal.

**Test Procedure** 

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer.

The EUT was setup to maximum output power at its lowest channel. The Resolution BW of the analyzer is set to 1 % of the emission bandwidth to show compliance with the – 13 dBm limit, in the 1 MHz bands immediately outside and adjacent to the edge of the frequency block. The 1 MHz RBW was used to scan from 30 MHz to 10 GHz. (PCS CDMA Mode: 30 MHz to 20 GHz). A display line was placed at – 13 dBm to show compliance. The high, lowest and a middle channel were tested for out of band measurements.

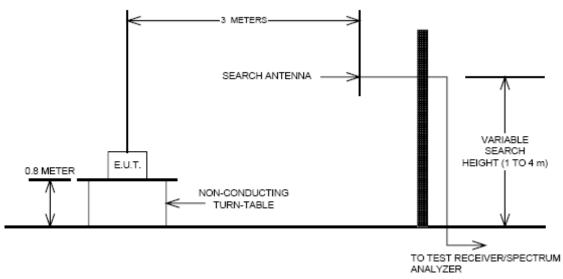
- Band Edge Requirement : In the 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions. Limit, -13dBm.

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## 3.5 Radiated Spurious and Harmonic Emissions

## Test Set-up



The measurement facilities used for this test have been documented in previous filings with the commission pursuant to section § 2.948. The open field test site is situated in open field with ground screen whose site attenuation characteristics meet ANSI C63.4 –2003. A mast capable of lifting the receiving antenna from a height of one to four meters is used together with a rotatable wooden platform mounted at three from the antenna mast.

- 1) The unit mounted on a wooden table 1.5 m × 1.0 m × 0.80 m is 0.8 meter above test site ground level.
- 2) During the emission test, the turntable is rotated and the EUT is manipulated to find the configuration resulting in maximum emission under normal condition of installation and operation.
- 3) The antenna height and polarization are also varied from 1 to 4 meters until the maximum signal is found.
- 4) The spectrum shall be scanned up to the 10<sup>th</sup> harmonic of the fundamental frequency.

#### Test Procedure

The equipment under test is placed on a wooden turntable 3-meters from the receive antenna.

A wooden turntable was rotated 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the previously recorded signal was duplicated.

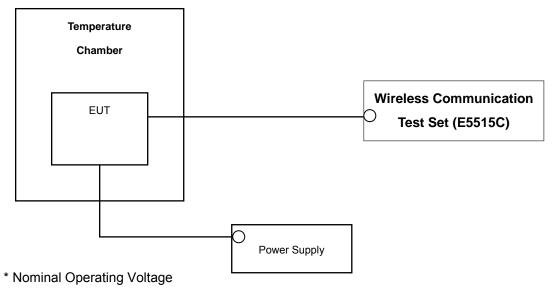
The maximum EIRP was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.

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## 3.6 Frequency stability / variation of ambient temperature

## Test Set-up



#### Test Procedure

The frequency stability of the transmitter is measured by:

a.) Temperature: The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from battery end point 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  $\pm$  0.000 25 %( $\pm$  2.5 ppm) of the center frequency.

#### Time Period and Procedure:

The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).

1. 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 is made within one minute after applying power to the transmitter.

2. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one halfhour is provided to allow stabilization of the equipment at each temperature level. **NOTE: The EUT is tested down to the battery endpoint.** 

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## **4. LIST OF TEST EQUIPMENT**

Manufacture	Model/ Equipment	Serial Number	Calibration Interval	Calibration Due
R&S	ESI40/ EMI TEST Receiver	831564/003	Annual	10/31/2009
Agilent	E4416A/ Power Meter	GB41291412	Annual	01/21/2010
Agilent	E9327A/ Power Sensor	MY4442009	Annual	07/28/2009
Agilent	8960 (E5515C)/ Base Station	GB44400269	Annual	02/10/2010
MITEQ	AMF-60-0010 1800-35-20P / AMP	1200937	Annual	05/20/2010
Wainwright	WHK1.2/15G-10EF/H.P.F	2	Annual	06/28/2009
Wainwright	WHK3.3/18G-10EF/H.P.F	1	Annual	06/28/2009
Agilent	775D/ Dual Directional Coupler	12922	Annual	12/24/2009
Agilent	11636B/ Power Divider	11377	Annual	12/24/2009
Digital	EP-3010/ Power Supply	3110117	Annual	01/07/2010
Schwarzbeck	UHAP/ Dipole Antenna	585	Annual	02/13/2011
Schwarzbeck	UHAP/ Dipole Antenna	558	Annual	02/13/2011
Korea Engineering	KR-1005L / Chamber	KRAB07063-2CH	Annual	12/31/2009
Schwarzbeck	BBHA 9120D/ Horn Antenna	147	Biennial	03/26/2010
Agilent	E4440A/Spectrum Analyzer	US45303008	Annual	12/23/2009

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## **5. SUMMARY OF TEST RESULTS**

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result
2.1049, 24.238(a),	Occupied Bandwidth	N/A		PASS
2.1051, 24.238(a)	Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	< 43 + 10log <sub>10</sub> (P[Watts]) at Band Edge and for all out-of-band emissions	CONDUCTED	PASS
2.1046	Conducted Output Power	N/A		PASS
24.232(d),	Peak- to- Average Ratio	< 13 dB		PASS
2.1055, 24.235	Frequency stability / variation of ambient temperature	< 2.5 ppm		PASS
24.232(c),	Effective Radiated Power	< 7 Watts max. ERP		PASS
24.202(0),	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP	RADIATED	PASS
2.1053, 24.238(a)	Radiated Spurious and Harmonic Emissions	< 43 +10log <sub>10</sub> (P[Watts]) for all out-of band emissions		PASS

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## **6. SAMPLE CALCULATION**

### A. ERP Sample Calculation

Mode	Ch./ Freq.		Measured	Substitude	Ant Gain	Ant. Gain C.L	C	Pol.	EF	RP
Wode	channel	Freq.(MHz)	Level(dBm)	LEVEL(dBm)	U.L		F01.	w	dBm	
CDMA	384	836.52	-10.96	24.81	2.50	1.19	Н	0.41	26.12	

#### ERP = SubstitudeLEVEL(dBm) + Ant. Gain – CL(Cable Loss)

1) The EUT mounted on a wooden tripod is 0.8 meter above test site ground level.

2) During the test, the turn table is rotated and the antenna height is also varied from 1 to 4 meters until the maximum signal is found.

3) Record the field strength meter's level.

4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.

5) Increase the signal generator output till the field strength meter's level is equal to the item (3).

6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power (**ERP**).

## B. Emission Designator CDMA Emission Designator

#### Emission Designator = 1M27F9W

CDMA BW = 1.27 MHz (Measured at the 99% power bandwidth)

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

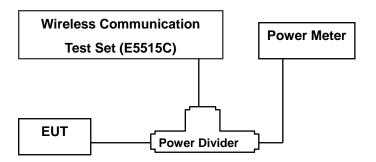
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## 7. TEST DATA

## 7.1 Conducted Output Power

A base station simulator was used to establish communication with The EUT. The base station simulator parameters were set to produce the maximum power from the EUT. This device was tested under all configurations and the highest power is reported. Conducted Output Powers of EUT are reported below.



			SO2	SO55	SO55
Band	Band Channel	RC1/1	RC3/3	RC1/1	RC3/3
		(dBm)	(dBm)	(dBm)	(dBm)
	25	24.93	24.80	24.90	24.74
PCS	600	25.00	24.85	24.98	24.80
	1175	24.55	24.45	24.51	24.47

(Maximum Conducted Output Powers)

Note : This EUT can't support a TDSO Mode.

#### 7.2 Peak-to-Average Ratio

- Plots of the EUT's Peak- to- Average Ratio are shown Page 21

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## 7.3 Occupied Bandwidth

Band	Channel	Frequency(MHz)	Data (kHz)
	25	1851.25	1.2705
PCS	600	1880.00	1.2651
	1175	1908.75	1.2664

- Plots of the EUT's Occupied Bandwidth are shown Page 20 ~ 21.

## 7.4 Conducted Spurious Emissions

Band	Channel	Frequency of Maximum Harmonic (GHz)	Maximum Data (dBm)
	25	13.3070	-37.84
PCS	600	3.7620	-33.75
	1175	3.8150	-25.89

- Plots of the EUT's Conducted Spurious Emissions are shown Page 24 ~ 26.

#### 7.4.1 Band Edge

- Plots of the EUT's Band Edge are shown Page 22 ~ 23.

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## 7.5 Equivalent Isotropic Radiated Power (E.I.R.P.) (PCS CDMA)

#### (PCS CDMA Mode)

Mode	Ch./ Freq.		I Measured Sub	I Substitude	Ant. Gain	C.L	Pol.	EIRP	
	channel	Freq.(MHz)	Level(dBm)	LEVEL (dBm)	Ant. Gain	U.L	F OI.	W	dBm
	25	1,851.25	-12.18	19.43	10.05	1.91	Н	0.57	27.56
PCS	600	1,880.00	-10.66	21.16	10.05	1.95	Н	0.84	29.26
	1175	1,908.75	-11.83	20.07	10.06	1.97	Н	0.65	28.16

Note: Standard batteries are the only options for this phone

#### NOTES:

# Equivalent Isotropic Radiated Power 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. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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.

This device was tested under all configurations and the highest power is reported.

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## 7.6 Radiated Spurious Emissions

#### 7.6.1 Radiated Spurious Emissions(PCS CDMA Mode)

- MEASURED OUTPUT POWER: 29.26 dBm = 0.843 W
- MODULATION SIGNAL:
  PCS CDMA
- DISTANCE:
- 3 meters
- LIMIT: (43 + 10 log10 (W)) = \_\_\_\_\_ 42.26 dBc

Ch.	Freq.(MHz)	<u>Measured Level</u> [dBm]	Ant. Gain	<u>Substitute</u> Level [dBm]	C.L	Pol.	ERP (dBm)	dBc
	3,702.50	-45.82	12.46	-47.24	2.73	Н	-37.51	-66.77
25	5,553.75	-41.71	12.70	-39.05	3.60	Н	-29.95	-59.21
	7,405.00	-52.26	11.36	-38.77	3.88	Н	-31.29	-60.55
	3,760.00	-40.12	12.47	-41.01	2.73	Н	-31.26	-60.52
600	5,640.00	-37.26	12.75	-34.76	3.60	Н	-25.61	-54.87
	7,520.00	-54.18	11.33	-40.41	3.88	Н	-32.96	-62.22
	3,817.50	-36.58	12.49	-37.36	2.73	Н	-27.60	-56.86
1175	5,726.25	-36.59	12.80	-33.85	3.60	Н	-24.65	-53.91
	7,635.00	-55.76	11.30	-41.70	3.88	Н	-34.28	-63.54

NOTES:	1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method	
	according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:	

2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5<sup>th</sup> Harmonic for <u>all channel.</u>

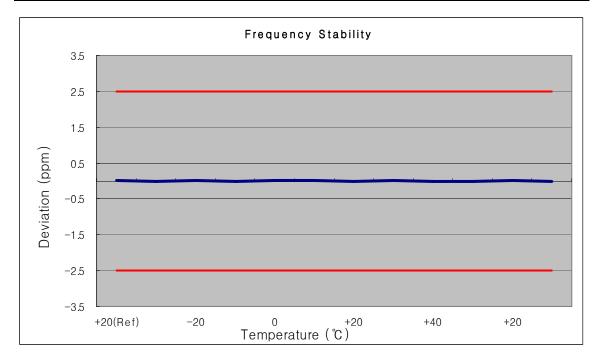
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## 7.7 Frequency stability / variation of ambient temperature 7.7.1 FREQUENCY STABILITY (PCS CDMA)

OPERATING FREQUENCY:	1880,000,000 Hz
CHANNEL:	600
REFERENCE VOLTAGE:	3.7 VDC
DEVIATION LIM IT:	± 0.000 25 % or 2.5 ppm

Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ppm
100%		+20(Ref)	1880 000 017	16.60	0.000 001	0.009
100%		-30	1879 999 986	-14.50	-0.000 001	-0.008
100%		-20	1880 000 009	9.15	0.000 000	0.005
100%		-10	1879 999 985	-15.43	-0.000 001	-0.008
100%	3.700	0	1880 000 014	14.14	0.000 001	0.008
100%	0.700	+10	1880 000 019	19.32	0.000 001	0.010
100%		+20	1879 999 984	-16.45	-0.000 001	-0.009
100%		+30	1880 000 018	18.22	0.000 001	0.010
100%		+40	1879 999 993	-7.12	0.000 000	-0.004
100%		+50	1879 999 983	-16.94	-0.000 001	-0.009
115%	4.255	+20	1880 000 007	6.61	0.000 000	0.004
Batt. Endpoint	3.400	+20	1879 999 988	-11.64	-0.000 001	-0.006



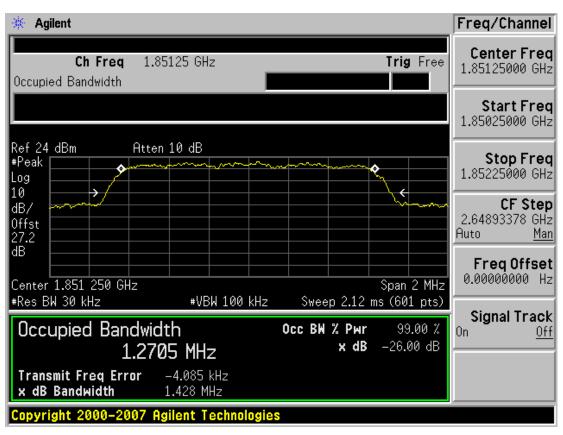
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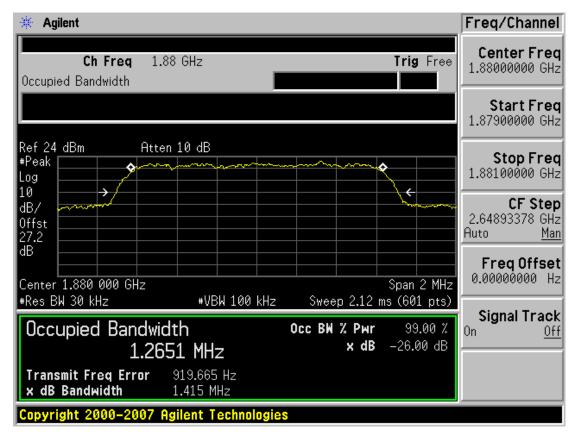
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#### PCS CDMA MODE (25 CH.) Occupied Bandwidth



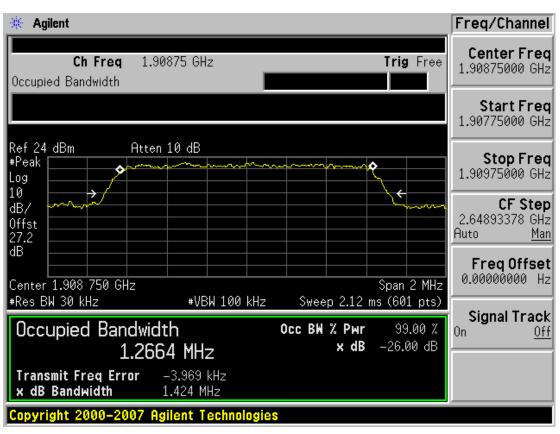
#### PCS CDMA MODE (600 CH.) Occupied Bandwidth



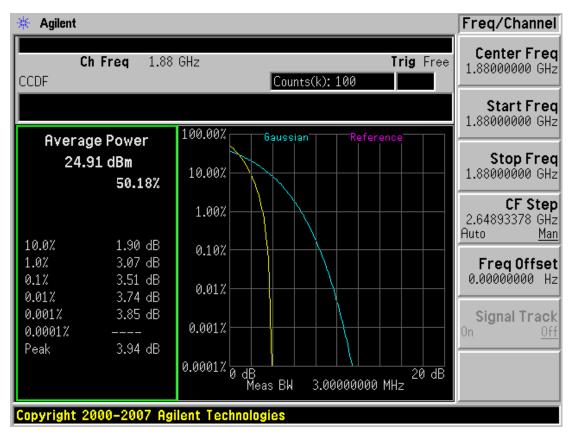
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#### PCS CDMA MODE (1175 CH.) Occupied Bandwidth

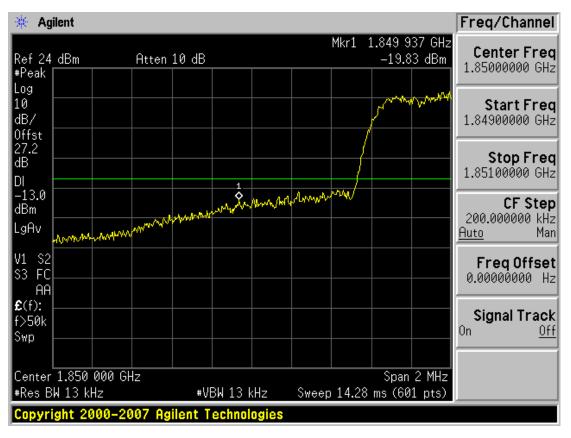


#### PCS CDMA MODE (600 CH.) Peak-to-Average Ratio



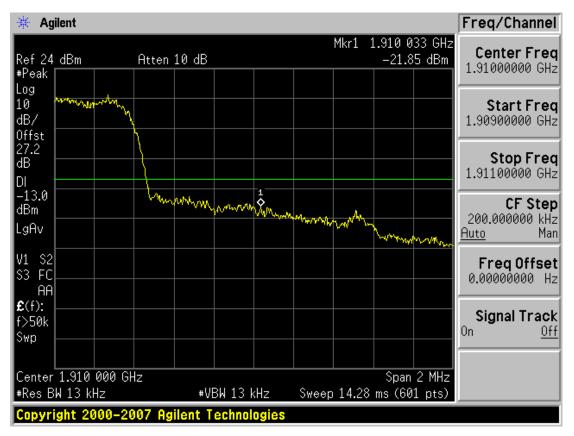
FCC CERTIFICATION REPORT				www.hct.co.kr
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#### ■ PCS CDMA MODE (25 CH.) Block Edge

#### ■ PCS CDMA MODE (1175 CH.) Block Edge



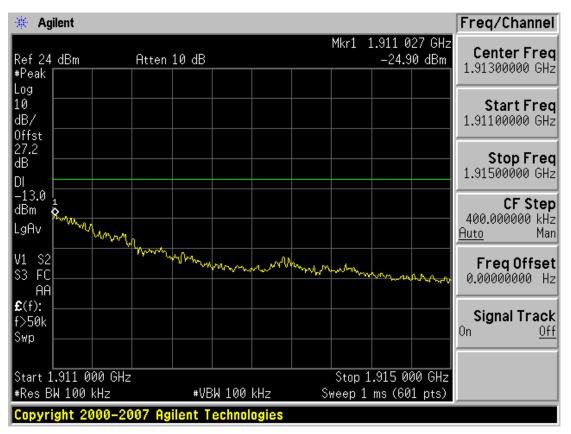
FCC CERTIFICATION REPORT				www.hct.co.kr
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🔆 Agi	ilent						Freq/Channel
Ref 24 #Peak	dBm	Atten	10 dB		Mkr1	1.848 920 GHz -21.72 dBm	Center Freq 1.84700000 GHz
Log 10 dB/ Offst							Start Freq 1.84500000 GHz
27.2 dB DI							<b>Stop Freq</b> 1.84900000 GHz
-13.0 dBm LgAv					D-6 -5-4	man	<b>CF Step</b> 400.000000 kHz <u>Auto</u> Man
V1 S2 S3 FC AA	manapul	want	mon	mmm	montelation		Freq Offset 0.00000000 Hz
<b>£</b> (f): f>50k Swp							<b>Signal Track</b> On <u>Off</u>
#Res B	.845 000 W 100 kH	z		00 kHz		.849 000 GHz ms (601 pts)	
Copyri	ght 200	0-2007 Aş	jilent Tech	nologies			

#### ■ PCS CDMA MODE (25 CH.) 4 MHz Span

#### ■ PCS CDMA MODE (1175 CH.) 4 MHz Span



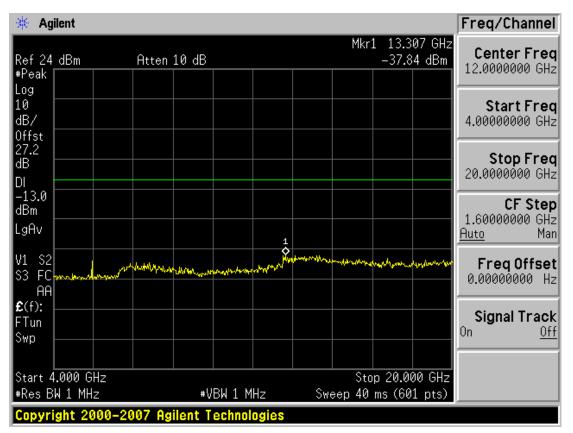
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🔆 Agilent			Freq/Channel
Ref 24 dBm Atten #Peak	10 dB	Mkr1 3.702 GH -42.26 dBr	Contor Lrog
Log 10 dB/ Offst			Start Freq 30.0000000 MHz
27.2 dB DI			<b>Stop Freq</b> 4.00000000 GHz
-13.0 dBm LgAv			<b>CF Step</b> 397.000000 MHz <u>Auto</u> Man
V1 S2 S3 FC AA	anterestinanting to a temperature of	with the mark of the state of the	FreqOffset 0.00000000 Hz
£(f): FTun Swp			Signal Track <sup>On <u>Off</u></sup>
Start 30 MHz #Res BW 1 MHz	#VBW 1 MHz	Stop 4.000 GH Sweep 6.64 ms (601 pts	
Copyright 2000-2007 Ag	ilent Technologies		

■ PCS CDMA MODE (25 CH.) Conducted Spurious Emissions - 1

PCS CDMA MODE (25 CH.) Conducted Spurious Emissions - 2



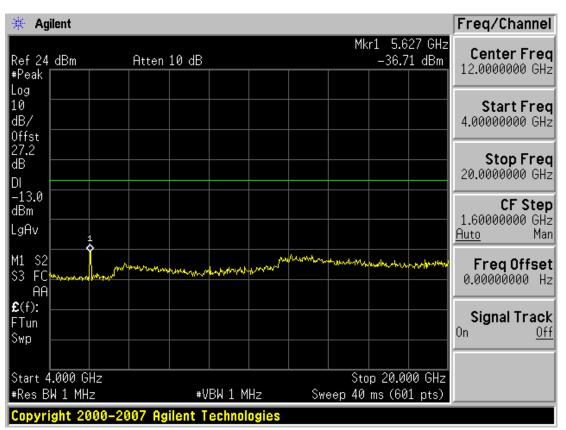
	www.hct.co.kr			
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🔆 Agi	ilent					Freq/Channel
Ref 24 #Peak	dBm	Atten 10 dB		Mk	r1 3.762 GH -33.75 dBm	Contor Lrog
Log 10 dB/ Offst						Start Freq 30.0000000 MHz
27.2 dB DI						<b>Stop Freq</b> 4.00000000 GHz
-13.0 dBm LgAv			1			<b>CF Step</b> 397.000000 MHz <u>Auto</u> Man
V1 S2 S3 FC AA	ynneluetetetetetetetetete	kanhanhharanhananan	town where the second	and the stand and the stand of the	mound	FreqOffset 0.00000000 Hz
€(f): FTun Swp						<b>Signal Track</b> <sup>On <u>Off</u></sup>
Start 3 #Res B	0 MHz W 1 MHz	#V	BW 1 MHz		op 4.000 GH: ms (601 pts)	
Copyri	ght 2000-2	007 Agilent T	echnologies			

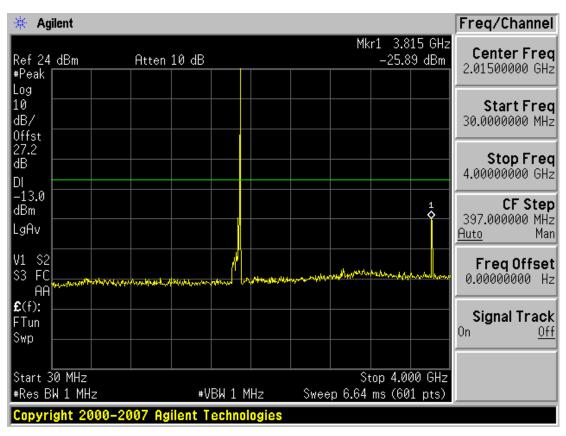
PCS CDMA MODE (600 CH.) Conducted Spurious Emissions - 1

PCS CDMA MODE (600 CH.) Conducted Spurious Emissions - 2



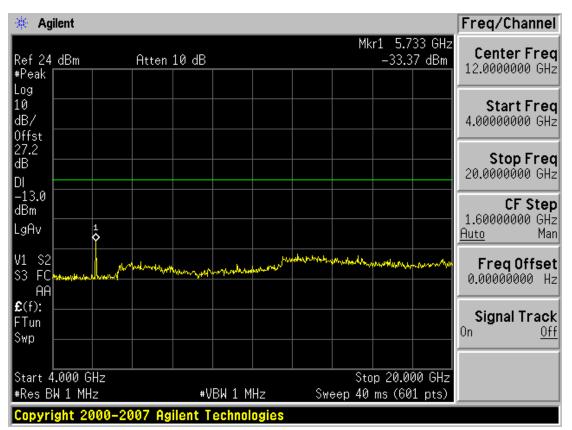
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#### ■ PCS CDMA MODE (1175 CH.) Conducted Spurious Emissions - 1

■ PCS CDMA MODE (1175 CH.) Conducted Spurious Emissions - 2



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