RF MEASUREMENT REPORT

CERIFICATION OF COMPLIANCE

PRODUCT	:	Dual Band Home Repeater
MODEL/TYPE NO	:	HRD-CP0819
FCC ID	:	SW5HRD-CP0819
TRADE NAME	:	Hyon
APPLICANT	:	Hyon Corp Co,.Ltd
FCC RULE PART(S)	:	FCC Part 2, Part 22H & Part 24E
FCC PROCEDURE	:	Certification
FCC CLASSIFICATION	:	Licensed Non-Broadcast Station Transmitter (TNB)
EMISSION DESIGNATOR	:	F9W (CDMA), GXW (GSM)
FREQUENCY RANGE	:	US-PCS / Downlink (1930 MHz – 1990 MHz) US-PCS / Uplink (1850 MHz – 1910 MHz) CDMA800 / Downlink (869 MHz – 894 MHz) CDMA800 / Uplink (824 MHz – 849 MHz)
RF OUTPUT POWER	:	US-PCS 7 dBm / Total , 4 dBm / Tone CDMA800 7 dBm / Total , 7 dBm / 1FA
DATES OF TEST	:	January 23, 2006 ~ February 6, 2006
DATES OF ISSUE	:	February 6, 2006
TEST REPORT No.	:	BWS-06-RF-0002
TEST LAB.		BWS Tech., Inc. (Registration No. : 553281)

This product has been tested in accordance with the measurement procedures specified CFR 47 Part 2.947 and ANSI C63.4-2003 at the BWS TECH/RF Test Laboratory and has been shown to be complied with the FCC Technical Specification described above.
I attest to the accuracy of data. All measurement 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. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tae Hyun, Nam
Chief of Laboratory Division

BWS TECH Inc.

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#611-1 Maesan-Ri, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 449-853, Korea
TEL: +82 31 333 5997 FAX: +82 31 333 0017

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TABLE OF CONTENTS

	Pages
1. General Information	3
2. Description of Attachments	4
3. Introduction	5
4. Product Information	6
5. Test Results	7
6. Test Data	8~42
6.1 Power Line Conducted Emission	8~14
6.2 RF Power Output (Conducted)	15~20
6.3 Occupied Bandwidth	21~26
6.4 Spurious Emission of Antenna Terminals	27~40
6.5 Field Strength of Spurious Emission	41~42
7. Test Equipment List	43

Appendix 1. FCC ID Label and Location
Appendix 2. Test Setup Photos
Appendix 3. External Photos
Appendix 4. Internal Photos
Appendix 5. Block Diagram
Appendix 6. Schematics
Appendix 7. Operational description
Appendix 8. Part List
Appendix 9. User Manual
Appendix 10. RF Exposure statement

RF TEST REPORT

Scope – Measurement and determination of radio frequency devices including intentional radiators and/or unintentional radiators for compliance with the technical rules and regulations of relevant international standard

1. General Information

Applicant Information

Company Name	:	Hyon Corp Co,.Ltd
Company Address	:	504-29, JAS B/D. Younnam-Dong, Mapo-Gu, Seoul, 121-869 South Korea
Phone/Fax	:	Phone : 82-2-330-5865 Fax : 82-2-3143-5849

Other Information

● EUT Type	:	Dual Band Home Repeater
● Model Name	:	HRD-CP0819
● FCC Identifier	:	SW5HRD-CP0819
● Brand Name	:	Hyon Corp Co,.Ltd
● S/N	:	ProtoType
● Freq. Range	:	US-PCS / Downlink (1930 MHz – 1990 MHz) US-PCS / Uplink (1850 MHz – 1910 MHz) CDMA800 / Downlink (869 MHz – 894 MHz) CDMA800 / Uplink (824 MHz – 849 MHz)
● Max. Power Output	:	US-PCS 7 dBm / Total , 4 dBm / Tone CDMA800 7 dBm / Total , 7 dBm / 1FA
● Emission Designator	:	F9W (CDMA), GXW (GSM)
● FCC Classfication	:	Licensed Non-Broadcast Station Transmitter (TNB)
● Rule Part(s)	:	FCC Part 2, Part 22H & Part 24E
● Test Procedure	:	Certification
● Dates of Tests	:	January 23, 2006 ~ February 6, 2006
● Place of Tests	:	BWS TECH Inc. #611-1 Maesan-Ri, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 449-853, Korea (FCC Registration Number : 553281) TEL: +82 31 333 5997 FAX: +82 31 333 0017
● Test Report No.	:	BWS-06-RF-0002

2. DESCRIPTION OF ATTACHMENTS

Appendix 1. FCC ID Label and Location
-. Sample FCC ID Label and location information is shown

Appendix 2. Test Setup Photos
-. Radiated Emission Test setup photos are shown

Appendix 3. External Photos
-. External photos are shown

Appendix 4. Internal Photos
-. Internal photos are shown

Appendix 5. Block Diagram
-. The block diagram is shown

Appendix 6. Schematics
-. The circuit diagrams are shown

Appendix 7. Operational description
-. The operational description are shown.

Appendix 8. Part List
-. The part lists are shown.

Appendix 9. User Manual
-. The user operating manual is shown.

Appendix 10. RF Exposure statement
-. The RF exposure statement is shown.

3. INTRODUCTION

The measurement tests were conducted at the open area test site of BWS TECH Inc. facility located at #611-1 Maesan-Ri, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 449-853, Korea.
The measurement facilities were constructed in conformance with the requirements of the ANSI C63.4-2003 and CISPR Publication 16. The BWS has site descriptions on file with the FCC for 3 and 10 meter site configurations. Detailed description of test facility was found to be in compliance with the requirements of Section 2.948 FCC Rules according to the ANSI C63.4-2003 and registered to the Federal Communications Commission(Registration Number : 553281).
All measurements contained in this application were conducted in accordance with FCC Rules and regulations CFR 47and American National Standard Method of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C.63.4-2003).

Measurement Procedure

The radiated and spurious measurements were made outdoors at a 3-meter test range.
The equipment under testing was placed on a wooden turntable, 3-meters from the receive antenna. The receive antenna height and turntable rotations 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 level was recorded.
For readings above 1 GHZ, the above procedure would be repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.

4. PRODUCT INFORMATION

4.1 Equipment Description

Dual Band Home Repeater (HRD-CP0819) is designed to improve wireless receptions, for both CDMA & PCS, in poor indoor coverage areas. Targeted as a cost effective solution for indoor coverage areas from 2,000-sq. ft. to 3,000-sq. ft., Jas Dual Band Home Repeater will allow users to operate handsets within a building or weak coverage area while maintaining call clarity and quality.

4.2 Technical Specification

No.	Parameters		Specifications		Remarks
			Downlink	Uplink	
1	Frequency Range	US-PCS	1930~1990 MHz	1850 ~ 1910 MHz	B.W :60MHz
		CDMA800	869 ~ 894 MHz	824 ~ 849 MHz	B.W :25MHz
2	Input Power Range		-60 ~ -40dBm	-102 ~ -60dBm	
3	Max. Output Power	US-PCS	+7dBm / Total		@+4dBm/ Tone
		CDMA800	+7dBm / Total		@+7dBm/ 1FA
4	Max. Gain	US-PCS	50dB ±2dB		
		CDMA800	50dB ±2dB		
5	IMD Products (ETS300 609-4 /GSM11.26)	US-PCS	≤ -36dBm/3KHz		In Band
			9KHz~1GHz : ≤ -36dBm/3KHz		Out Band
			1GHz~12.75GHz : ≤ -30dBm/3KHz		
6	Spurious Emission	CDMA800	≥45 dB @ fo±750KHz (Δmarker : 29dB), RBW : 30KHz ≥60dB @ fo±1.98MHz (Δmarker: 44dB), RBW : 30KHz		@+7dBm/ 1FA
7	Shut Down Level		≥ +9.0dBm		Auto Recovery
8	V.S.W.R		≤ 2.0 : 1[Max]		
9	Impedance		50Ω		
10	RF Connector		SMA-Type (Female)		Up/Down Link Port
11	Power Supply		5V / 1.2A		External Adapter
12	Operating Temperature		-5℃ ~ +60℃		
13	Operating Humidity		5% ~ 85%		
14	Dimension (WxHxD)		121mm x 90mm x 46mm		Without Connector

4.3 Variations covered by this report

Model Difference : N/A

Technical Deviation : N/A

4.4 Additional information related to Testing

☑ **Note.**

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☑ **Note.**

Please refer to the duties and responsibilities of the Responsible Party attached.

5. TEST RESULTS

5.1 Summary of Test Results

The measurement results were obtained with the EUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum emission of the EUT are reported.

FCC Rules Section	Description	Test Result
Part 15.207	Power Line Conducted Spurious	☒ **Pass** ☐ Fail
Part 2.1046	RF Power Output	☒ **Pass** ☐ Fail
Part 2.1047	Modulation characteristics	N/A
Part 2.1049	Occupied Bandwidth	☒ **Pass** ☐ Fail
Part 2.1051	Spurious Emission at Antenna Terminal	☒ **Pass** ☐ Fail
Part 2.1053	Field Strength of Spurious Emission	☒ **Pass** ☐ Fail
Part 2.1055	Frequency Stability	N/A

The data collected shows that the product complies with technical requirements of the FCC Rule Part 2.947 and Part 22 & Part 24 related technical specification.

5.2 Modification to EUT

The device tested is not modified anything, mechanical or circuits to improve EMI status during a measurement. No EMI suppression device(s) was added and/or modified during testing.

6. TEST DATA

6.1 Power Line Conducted Emission

6.1.1 Specification

FCC Rules Part 15 Subpart C, Section 15.207

6.1.2 Method of Measurement

ANSI/TIA-603-B-2002 Section 2.1.3

6.1.3 Measurement Set-Up

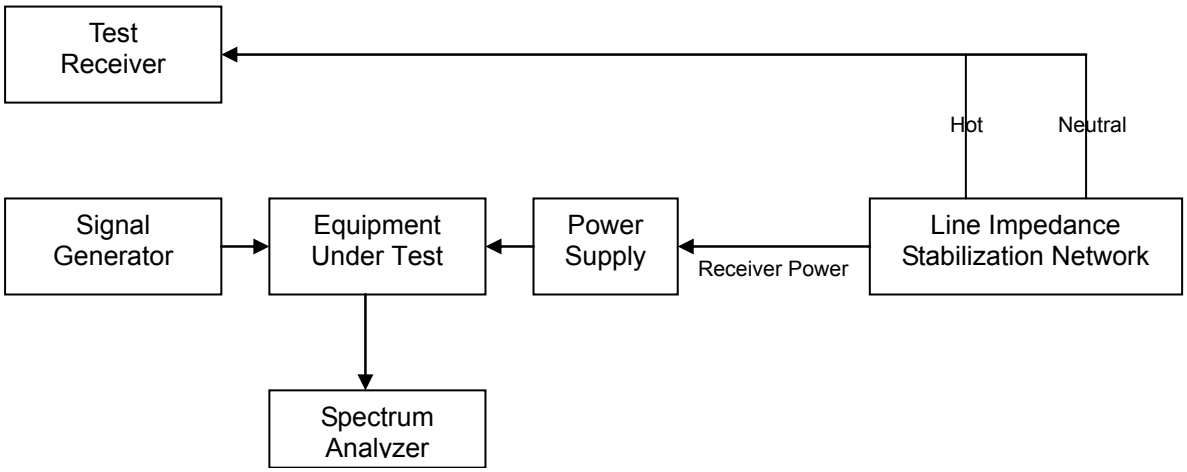


Fig.1

6.1.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	HRD-CP0819	Hyon Corp Co,.Ltd
Power Adaptor	KSAFC0500150W1US	Ktec Eiectronis Co.,Ltd.
Signal Generator	E4432B	AGILENT
Directional Coupler	778D	AGILENT
Spectrum Analyzer	8594E	AGILENT
LISN	L1-115	Com-Power
Test Receiver	PMM9000	PMM

6.1.5 Test Procedure

-. The unit was turn-up in accordance with the alignment procedure stated in the FIG. 1, and was loaded into a 50 Ω resistive termination.
-. Connect a spectrum analyzer of nominal 50 Ω impedance to one terminal of the line impedance stabilization network.
-. Tune the Test Receiver to search for spurious outputs from 150 kHz to 30 MHz. Record all spurious outputs found. – “Step 1”
-. Connect the Test Receiver to the other terminal of the line impedance stabilization network and repeat "step 1 – “Step 2”
-. The power line conducted spurious output voltage is the largest reading obtained in “step 1” and “step 2”.
-. The measurements were performed at the shielded room with environmental conditions of 19ºC, 29%RH.

6.1.6 Test Result

6.1.6.1. CDMA800 / Downlink

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line.

Power Line Conducted Emission Test Data

Freq [MHz]	Correcton		Phase [H/N]	Quasi-Peak Mode			Aberage Mode		
	AMN	C.L		Limit	Reading	Emission Level	Limit	Reading	Emission Level
				[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.158	0.06	0.03	N	65.90	52.90	52.99	55.90	29.20	29.29
0.175	0.06	0.03	H	65.30	52.60	52.69	55.30	43.50	43.59
0.193	0.06	0.03	N	64.90	52.60	52.69	54.90	38.00	38.09
1.993	0.03	0.54	H	56.00	44.30	44.87	46.00		
2.056	0.03	0.55	N		44.80	45.38			
2.186	0.03	0.56	H		44.60	45.19			
2.252	0.03	0.56	H		45.70	46.29		32.10	32.69
9.390	0.07	1.01	H	60.00	48.80	49.88	50.00		
9.520	0.07	1.02	H		49.00	50.09		41.10	42.19
9.650	0.07	1.02	H		48.90	49.99			
9.970	0.08	1.03	H		47.90	49.01			

6.1.6.2. CDMA800 / Uplink

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line.

Power Line Conducted Emission Test Data

Freq [MHz]	Correcton		Phase [H/N]	Quasi-Peak Mode			Aberage Mode		
	AMN	C.L		Limit	Reading	Emission Level	Limit	Reading	Emission Level
				[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.155	0.06	0.03	N	65.90	54.50	54.59	55.90	31.20	31.29
0.172	0.06	0.03	H	65.40	51.60	51.69	55.40	43.80	43.89
0.194	0.06	0.03	N	64.90	53.20	53.29	54.90	39.40	39.49
0.261	0.07	0.16	H	62.90	45.80	46.03	52.90		
2.059	0.03	0.55	N	56.00	44.10	44.68	46.00		
2.187	0.03	0.56	N		43.30	43.89			
2.253	0.03	0.56	H		44.20	44.79			
2.318	0.03	0.57	H		43.80	44.40			
9.460	0.07	1.01	H	60.00	50.10	51.18	50.00	42.20	43.28
9.590	0.07	1.02	H		49.60	50.69		41.70	42.79
9.910	0.08	1.03	H		49.90	51.01		42.00	43.11
10.230	0.07	1.04	H		49.50	50.61		41.60	42.71

6.1.6.3. US-PCS / Downlink

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line.

Power Line Conducted Emission Test Data

Freq [MHz]	Correcton		Phase [H/N]	Quasi-Peak Mode			Aberage Mode		
	AMN	C.L		Limit	Reading	Emission Level	Limit	Reading	Emission Level
				[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.154	0.06	0.03	N	66.00	53.10	53.19	56.00	29.20	29.29
0.163	0.06	0.03	H	65.70	48.40	48.49	55.70	26.10	26.19
0.171	0.06	0.03	H	65.40	49.90	49.99	55.40	43.60	43.69
0.192	0.06	0.03	H	64.90	51.60	51.69	54.90	37.50	37.59
1.800	0.03	0.52	H	56.00	43.90	44.45	46.00		
1.993	0.03	0.54	N		44.40	44.97			
2.058	0.03	0.55	N		45.10	45.68			
2.186	0.03	0.56	H		45.00	45.59			
2.251	0.03	0.56	H		45.70	46.29			
9.390	0.07	1.01	N	60.00	48.30	49.38	50.00		
9.840	0.08	1.02	H		47.90	49.00			
10.290	0.07	1.04	N		46.70	47.81			

6.1.6.4. US-PCS / Uplink

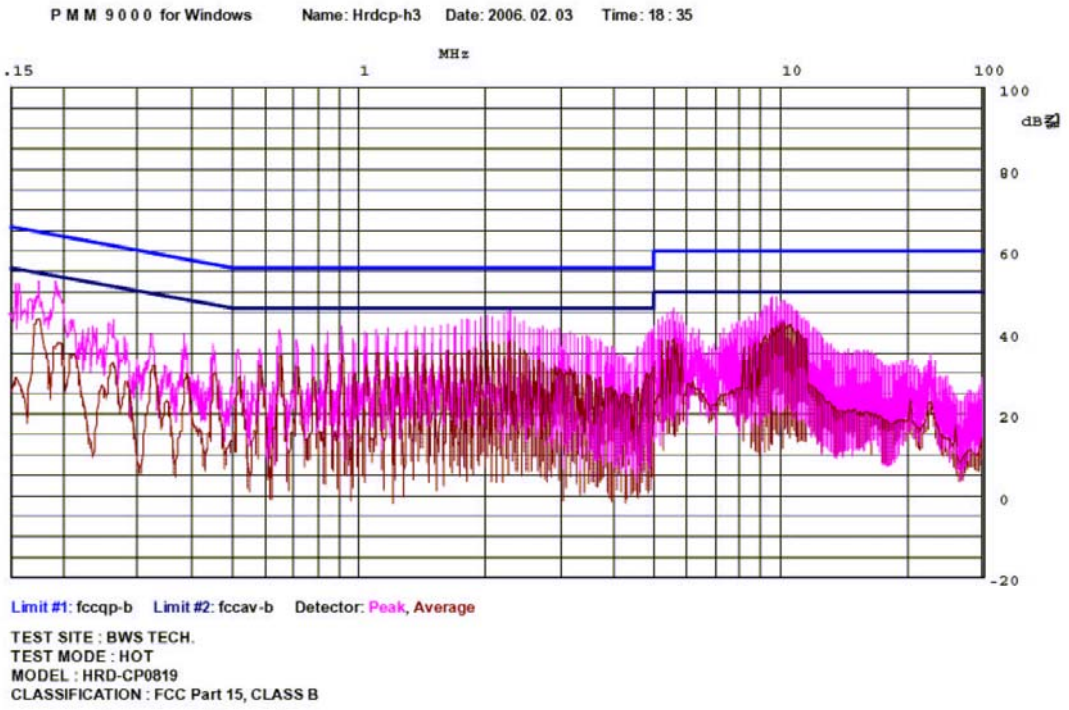
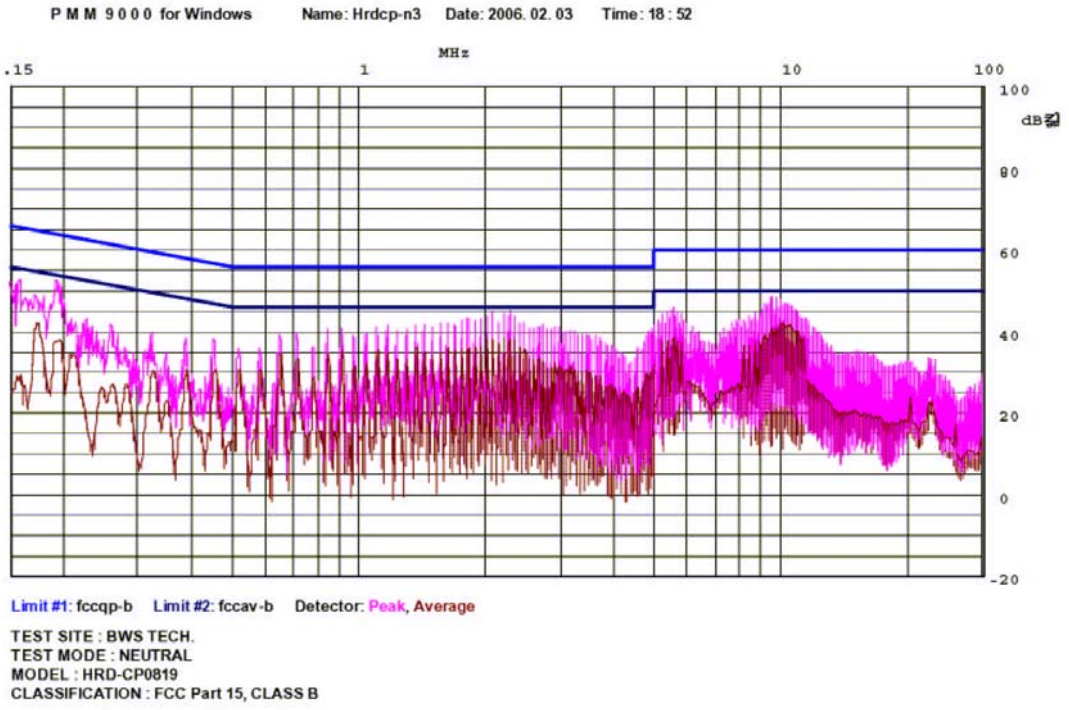
The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line.

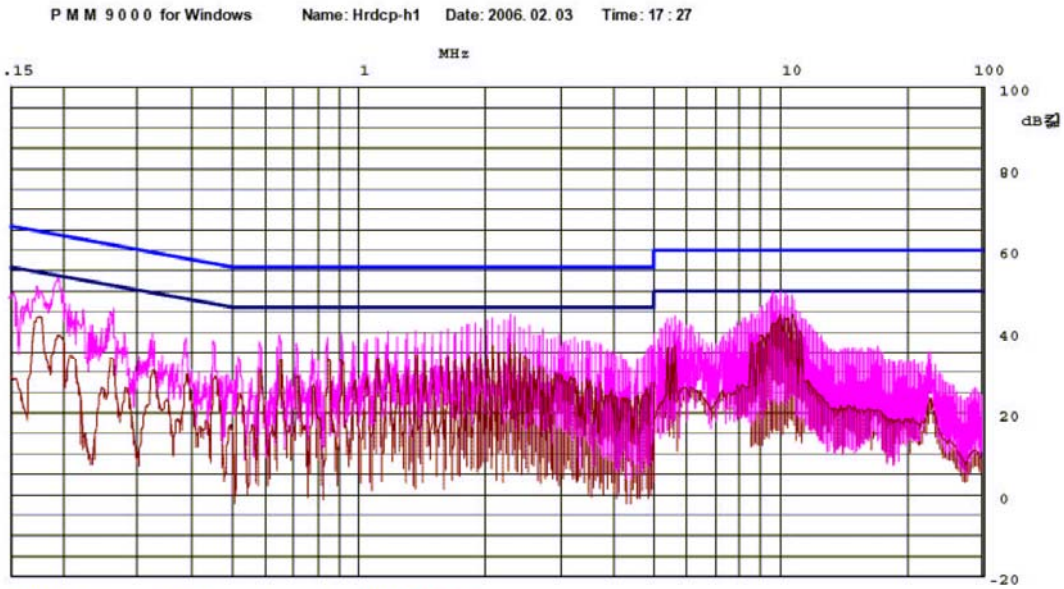
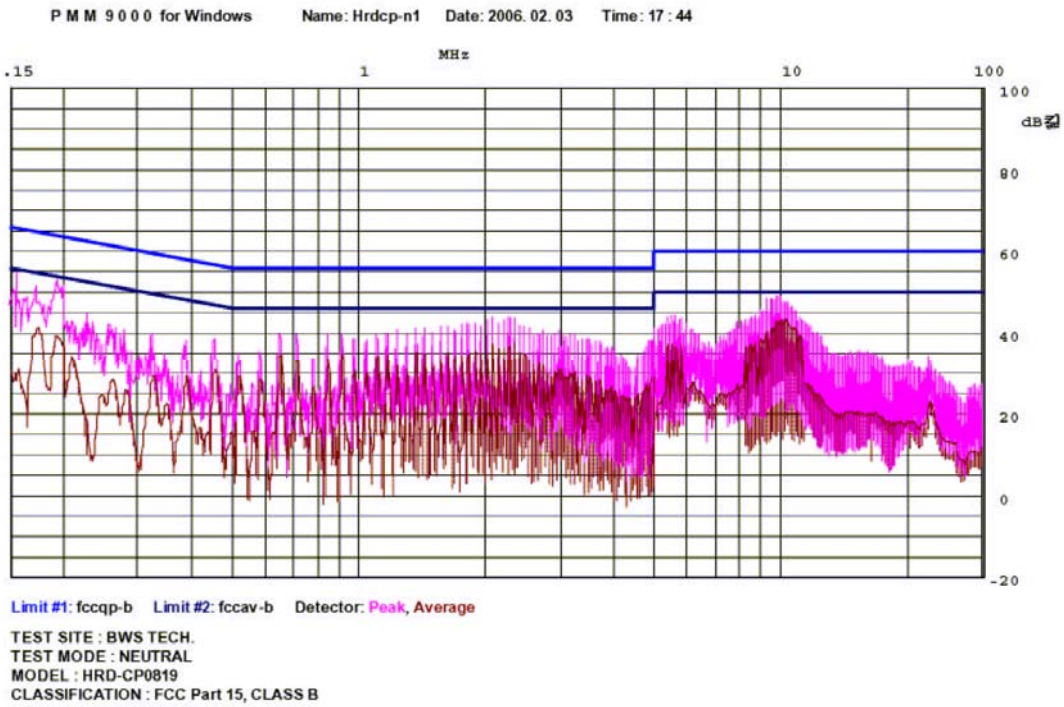
Power Line Conducted Emission Test Data

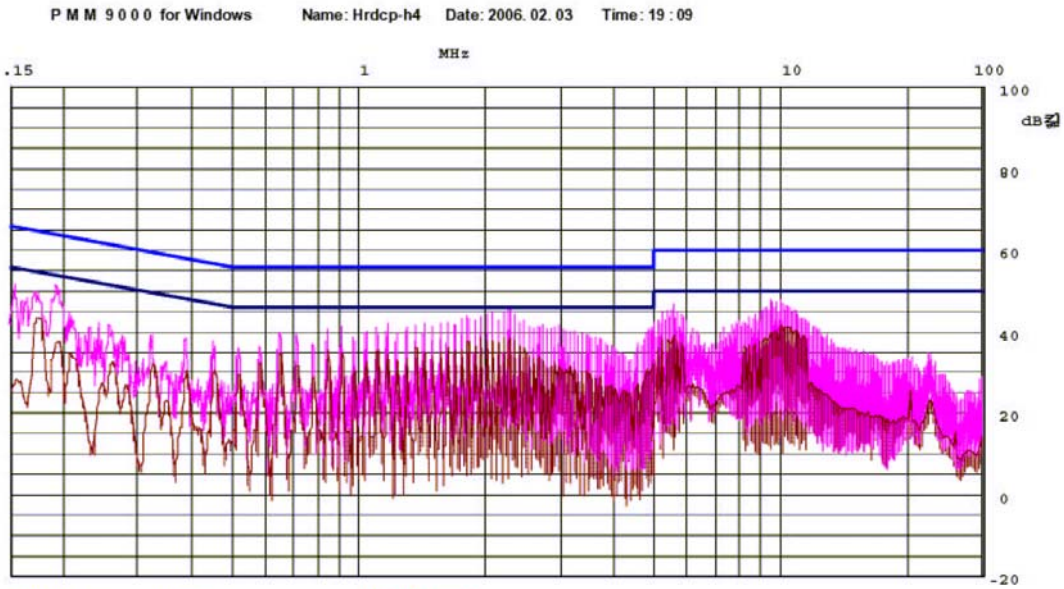
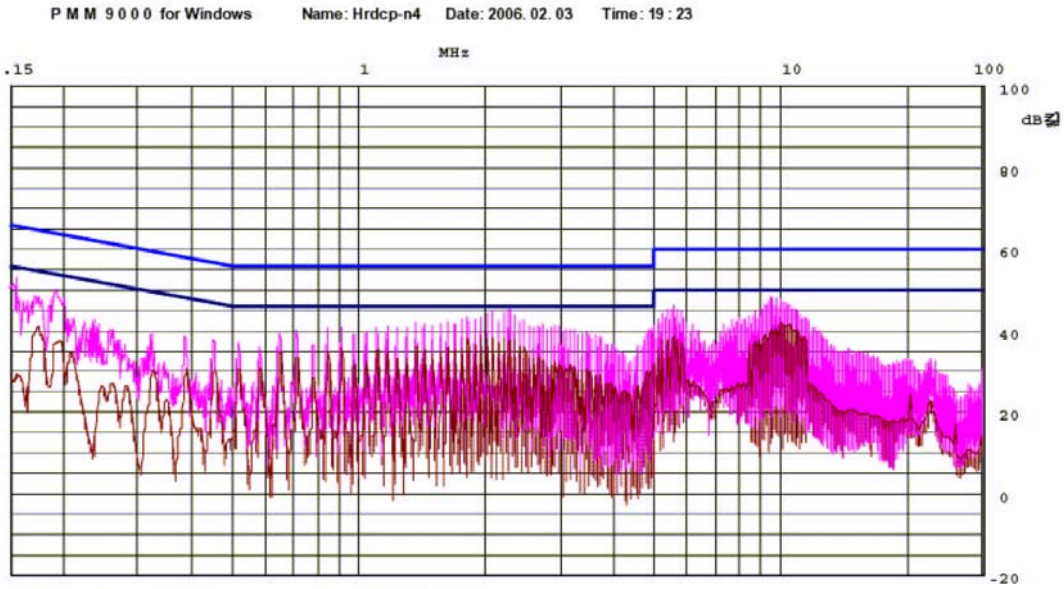
Freq [MHz]	Correcton		Phase [H/N]	Quasi-Peak Mode			Aberage Mode		
	AMN	C.L		Limit	Reading	Emission Level	Limit	Reading	Emission Level
				[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.152	0.06	0.03	N	66.00	54.70	54.79	56.00	31.20	31.29
0.173	0.06	0.03	H	65.40	50.00	50.09	55.40	43.50	43.59
0.195	0.06	0.03	N	64.70	53.90	53.99	54.70	39.10	39.19
1.995	0.03	0.54	H	56.00	44.20	44.77	46.00		
2.060	0.03	0.55	H		44.60	45.18			
2.251	0.03	0.56	H		45.30	45.89			
2.315	0.03	0.57	H		45.10	45.70			
9.650	0.07	1.02	H	60.00	49.80	50.89	50.00	41.90	42.99
9.710	0.07	1.02	H		49.50	50.59		41.60	42.69
9.970	0.08	1.03	H		49.40	50.51		41.50	42.61

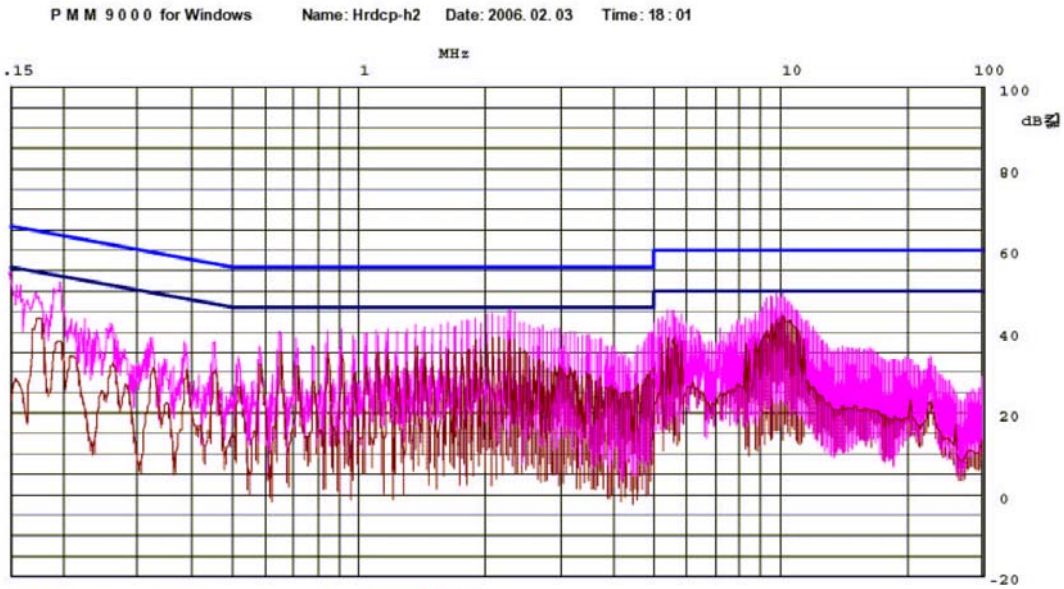
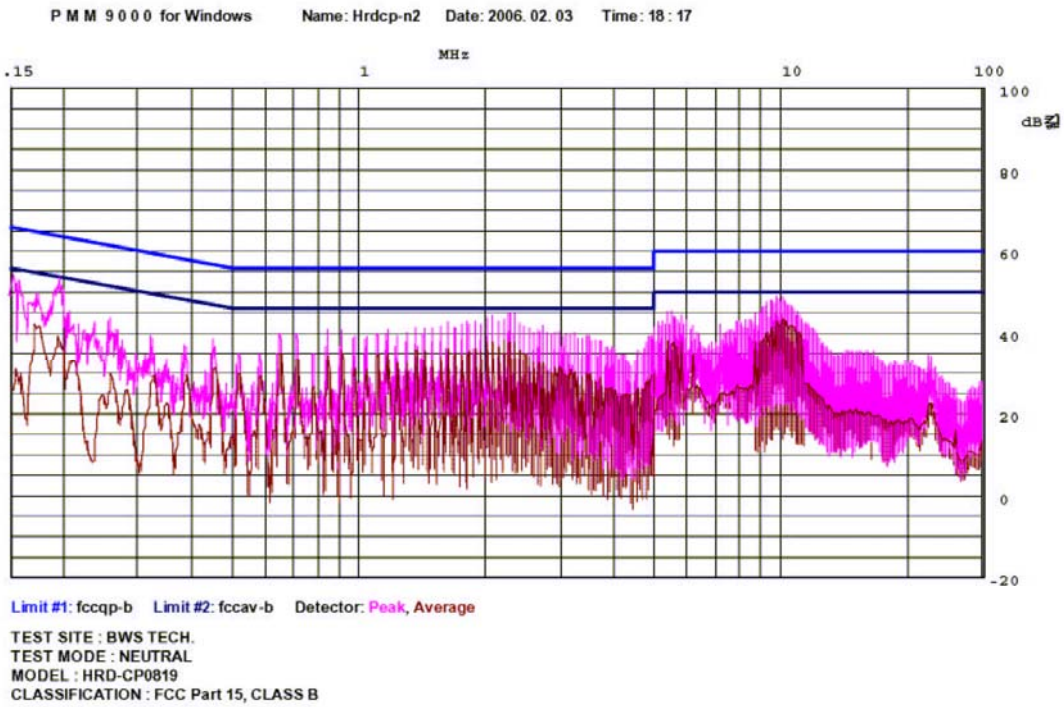
Tested by ***Choi, Chang Young***

6.1.7 Test Plot

Mode	CDMA800 / Downlink
Hot	
Neutral	

Mode	CDMA800 / Uplink
Hot	
Neutral	

Mode	US-PCS / Downlink
Hot	 Limit #1: fcc qp-b Limit #2: fccav-b Detector: Peak, Average TEST SITE : BWS TECH. TEST MODE : HOT MODEL : HRD-CP0819 CLASSIFICATION : FCC Part 15, CLASS B
Neutral	 Limit #1: fccqp-b Limit #2: fccav-b Detector: Peak, Average TEST SITE : BWS TECH. TEST MODE : NEUTRAL MODEL : HRD-CP0819 CLASSIFICATION : FCC Part 15, CLASS B

Mode	US-PCS / Uplink
Hot	
Neutral	

6. TEST DATA

6.2 RF Power Output (Conducted)

6.2.1 Specification

FCC Rules Part 2, Section 2.1046
FCC Rules Part 22 Subpart H, Section 22.913
FCC Rules Part 24 Subpart E, Section 24.232

6.2.2 Method of Measurement

ANSI/TIA-603-B-2002 Section 2.2.1

6.2.3 Measurement Set-Up

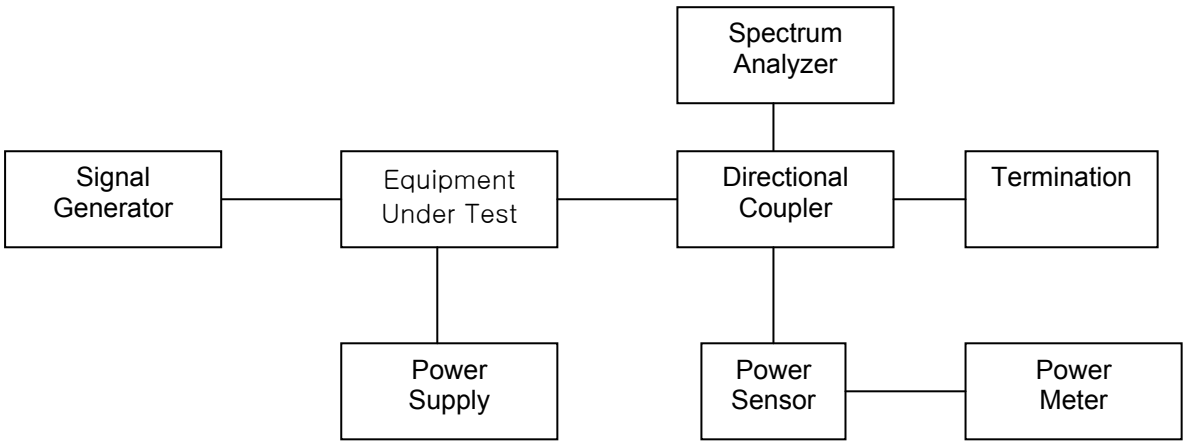


Fig.2

6.2.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	HRD-CP0819	Hyon Corp Co,.Ltd
Power Supply	IPS-30B03DD	INTERACT
Signal Generator	E4432B	AGILENT
Directional Coupler	778D	AGILENT
Termination	8173	BIRD
Power Sensor	8481A	AGILENT
Power Meter	E4418A	AGILENT
Spectrum Analyzer	E4404B	AGILENT

6.2.5 Test Procedure

-. The unit was turn-up in accordance with the alignment procedure stated in the FIG. 2, and was loaded into a 50 Ω resistive termination.
-. The input to the amplifier is tuned such that the output power is set to its maximum rated power.
-. The EUT was connected to a resistive coaxial attenuator having a 50 Ω load impedance, and the unmodulated RF output power(carrier) was measured by means of an R. F. Spectrum Analyzer.
-. The EUT was aligned for transmitter operation on three frequencies(Fo) at full rated power per the tune-up procedure outlined in the Product Specification. This represents frequencies at the low, mid and high end of the EUT operating frequency band.
-. The measurements were performed at the shielded room with environmental conditions of 22ºC, 42%RH.

6.2.6 Test Result

6.2.6.1. CDMA800

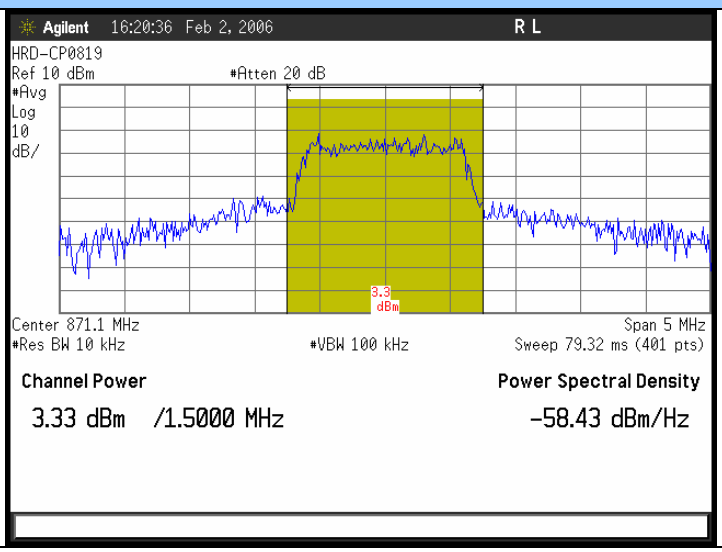
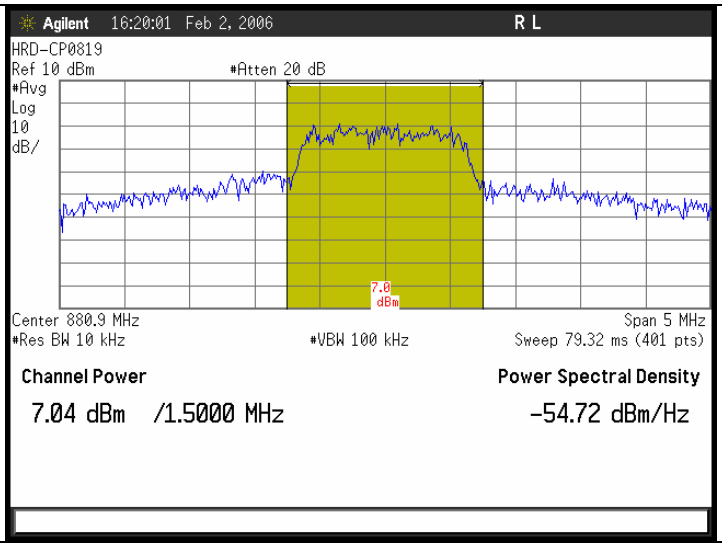
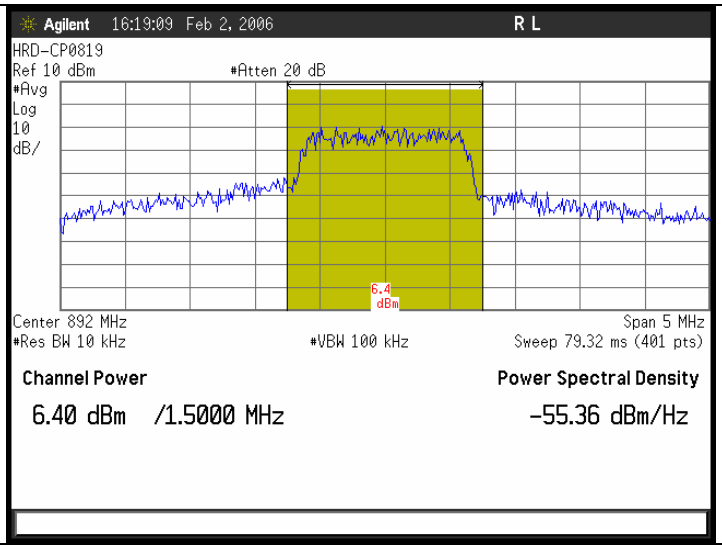
Transmitter Channel Setting	Frequency Tuned (MHz)	Measured Power (dBm)	Rated Power (mWatts)
Downlink			
Low	871.11	3.33	2.15
Mid	880.89	7.04	5.06
High	891.99	6.40	4.37
Uplink			
Low	826.11	6.80	4.79
Mid	835.89	7.04	5.06
High	846.99	3.86	2.43

6.2.6.2. US-PCS

Transmitter Channel Setting	Frequency Tuned (MHz)	Measured Power (dBm)	Rated Power (mWatts)
Downlink			
Low	1930.2	-0.93	0.81
Mid	1960.0	6.99	5.00
High	1989.8	6.96	4.97
Uplink			
Low	1850.2	7.02	5.04
Mid	1880.0	5.38	3.45
High	1909.8	-3.58	0.44

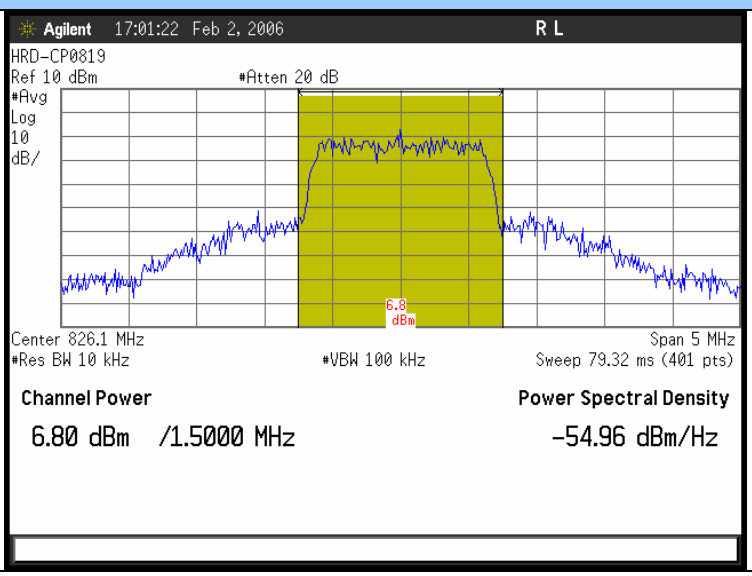
*Tested by **Choi, Chang Young***

6.2.7 Test Plot

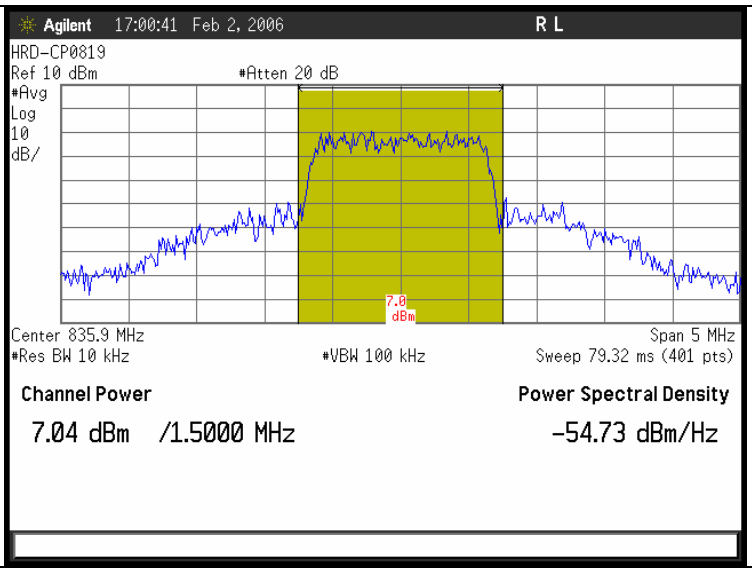
CDMA800 / Downlink	
Low Channel **871.11 MHz** **3.33 dBm**	
Middle Channel **880.89 MHz** **7.04 dBm**	
High Channel **891.99 MHz** **6.40 dBm**	

CDMA800 / Uplink

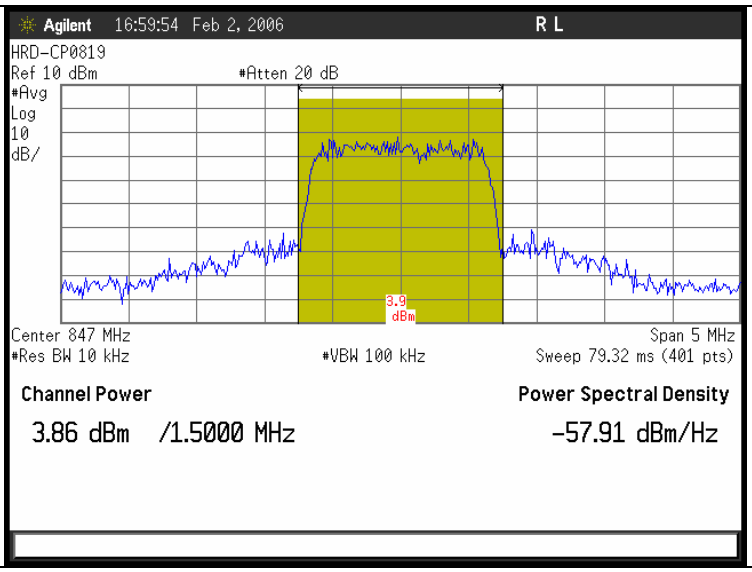
Low Channel
826.11 MHz
6.80 dBm



Middle Channel
835.89 MHz
7.04 dBm

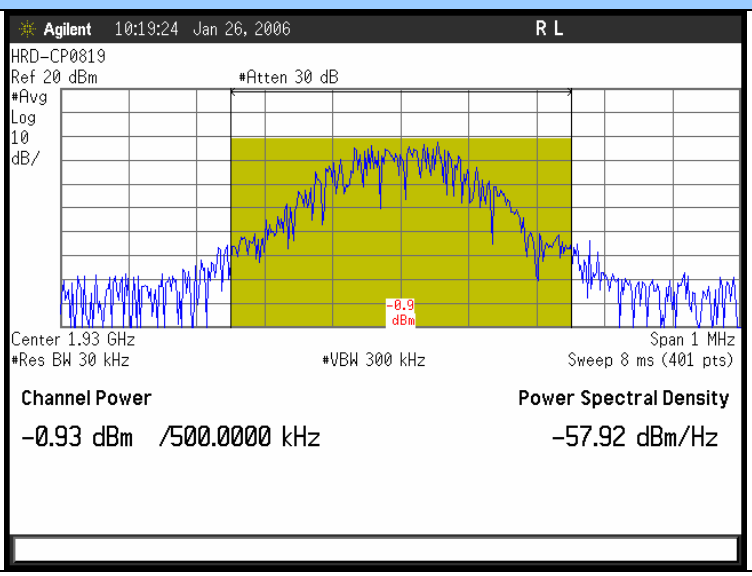


High Channel
846.99 MHz
3.86 dBm

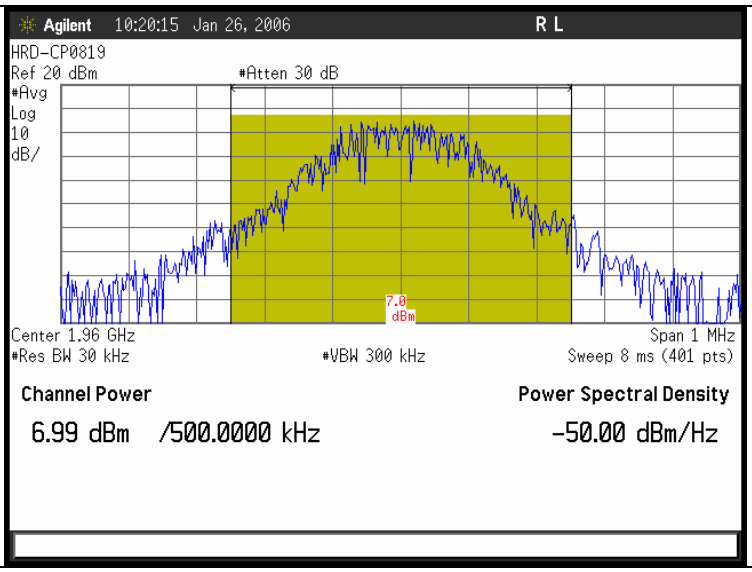


US-PCS / Downlink

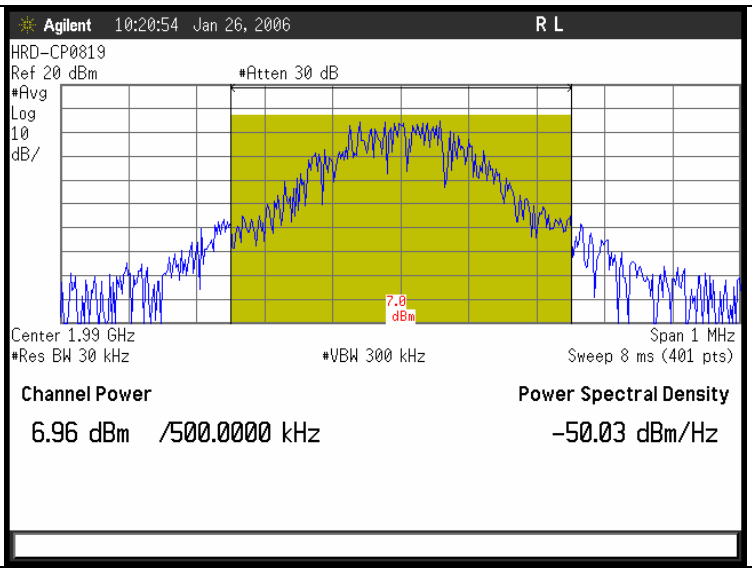
Low Channel
1930.2 MHz
-0.93 dBm



Middle Channel
1960.0 MHz
6.99 dBm

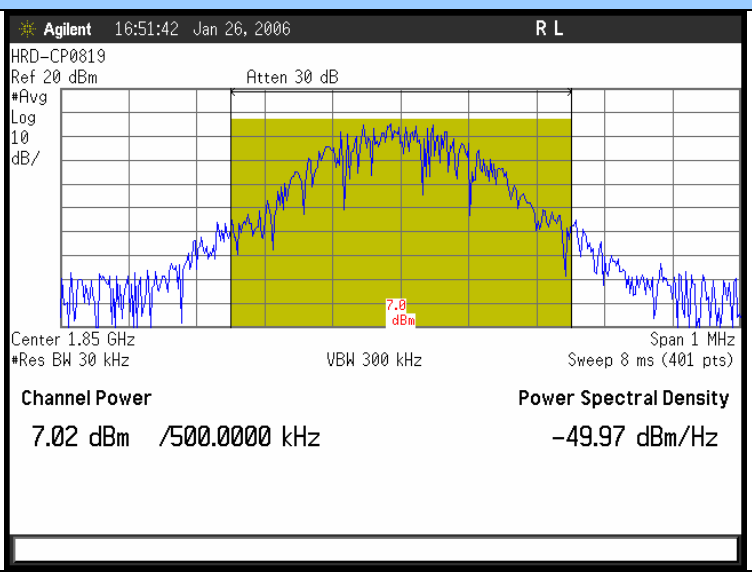


High Channel
1989.8 MHz
6.96 dBm

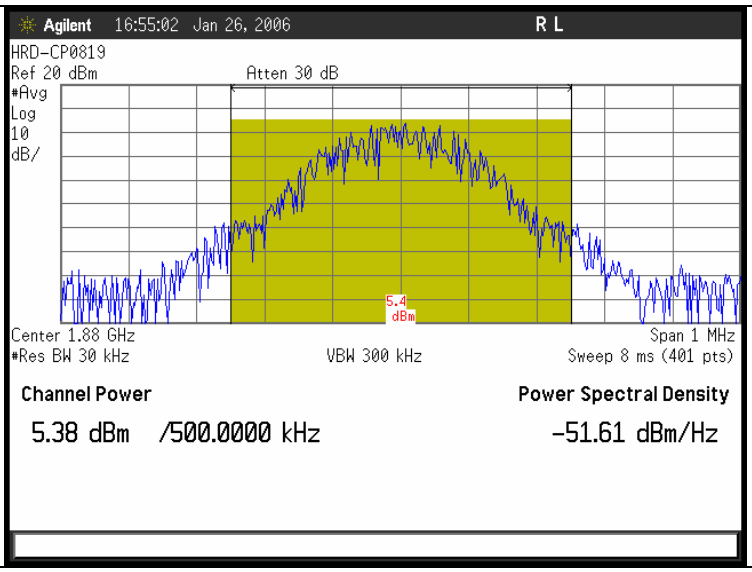


US-PCS / Uplink

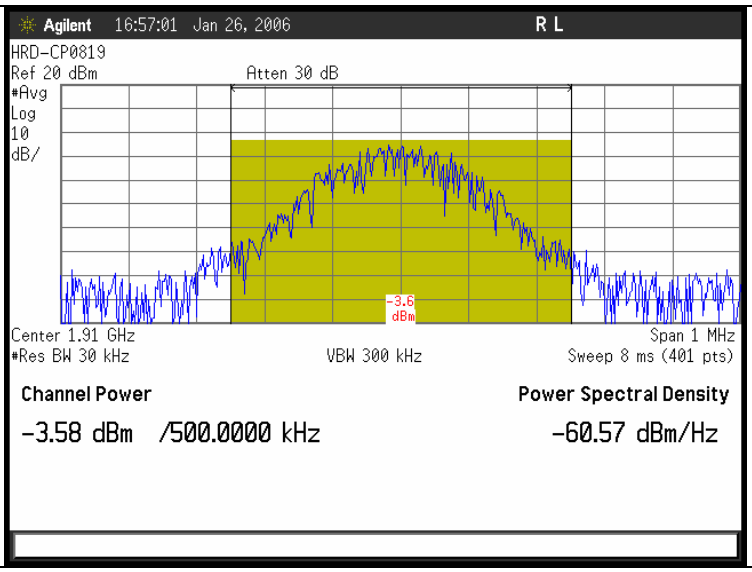
Low Channel
1850.2 MHz
7.02 dBm



Middle Channel
1880.0 MHz
5.38 dBm



High Channel
1909.8 MHz
-3.58 dBm



6. TEST DATA

6.3 Occupied Bandwidth

6.3.1 Specification

FCC Rules Part 2, Section 2.1049
FCC Rules Part 22 Subpart H, Section 22.917
FCC Rules Part 24 Subpart E, Section 24.238

6.3.2 Method of Measurement

ANSI/TIA-603-B-2002 Section 2.2.11

6.3.3 Measurement Set-Up

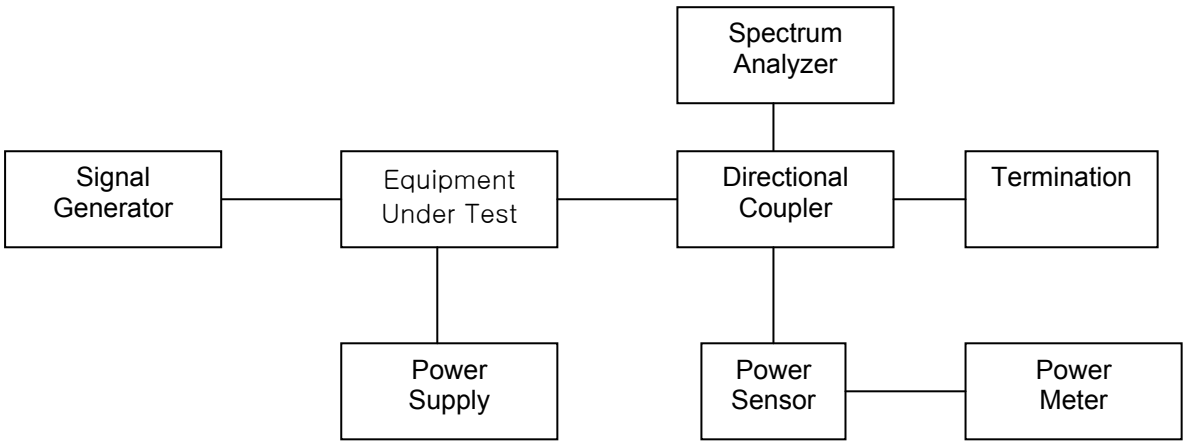


Fig.3

6.3.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	HRD-CP0819	Hyon Corp Co,.Ltd
Power Supply	IPS-30B03DD	INTERACT
Signal Generator	E4432B	AGILENT
Directional Coupler	778D	AGILENT
Termination	8173	BIRD
Power Sensor	8481A	AGILENT
Power Meter	E4418A	AGILENT
Spectrum Analyzer	E4404B	AGILENT

6.3.5 Test Procedure

-. The unit was turn-up in accordance with the alignment procedure stated in the FIG. 3, and was loaded into a 50 Ω resistive termination.
-. The input to the amplifier is tuned such that the output power is set to its maximum rated power.
-. The EUT was connected to a resistive coaxial attenuator having a 50 Ω load impedance, and the modulated Occupied Bandwidth was measured by means of an R. F. Spectrum Analyzer.
-. The spectrum analyzer for this measurement was set with RBW and VBW, as recorded in the plots.
-. The EUT was aligned for transmitter operation on three frequencies(Fo) at full rated power per the tune-up procedure outlined in the Product Specification. This represents frequencies at the low, mid and high end of the EUT operating frequency band.
-. The measurements were performed at the shielded room with environmental conditions of 22ºC, 42%RH.

6.3.6 Test Result

6.3.6.1. CDMA800

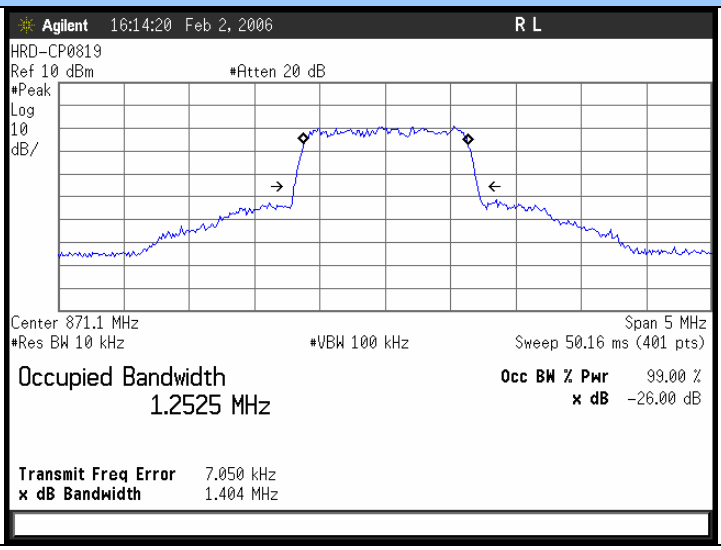
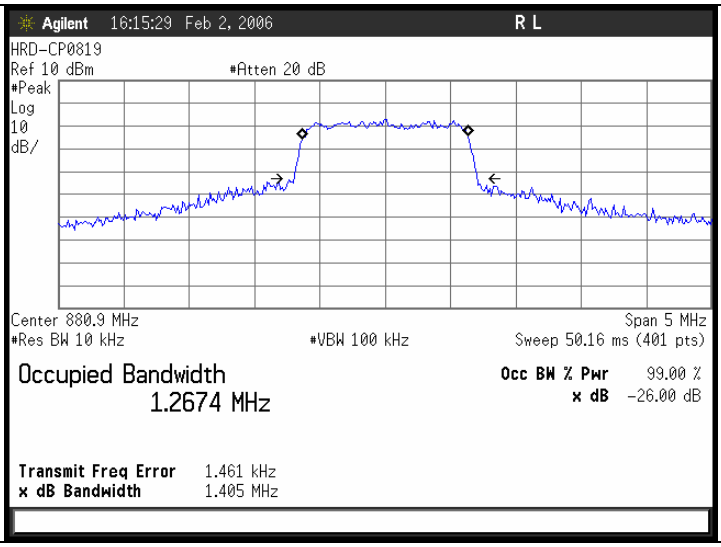
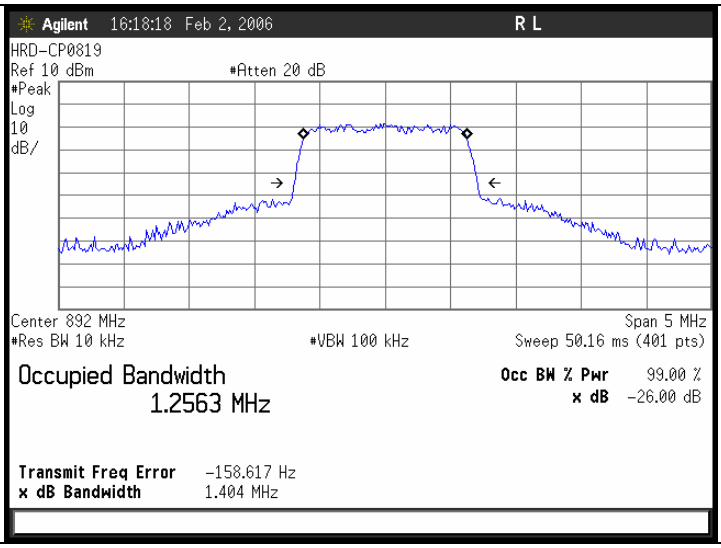
Transmitter Channel Setting	Frequency Tuned (MHz)	99% Bandwidth (kHz)	26 dB Bandwidth (kHz)
Downlink			
Low	871.11	1252.5	1404.0
Mid	880.89	1267.4	1405.0
High	891.99	1256.3	1404.0
Uplink			
Low	826.11	1254.7	1400.0
Mid	835.89	1256.0	1406.0
High	846.99	1255.8	1399.0

6.3.6.2. US-PCS

Transmitter Channel Setting	Frequency Tuned (MHz)	99% Bandwidth (kHz)	26 dB Bandwidth (kHz)
Downlink			
Low	1930.2	251.3	339.2
Mid	1960.0	251.7	338.3
High	1989.8	251.6	340.0
Uplink			
Low	1850.2	252.7	342.7
Mid	1880.0	253.7	342.4
High	1909.8	253.3	343.4

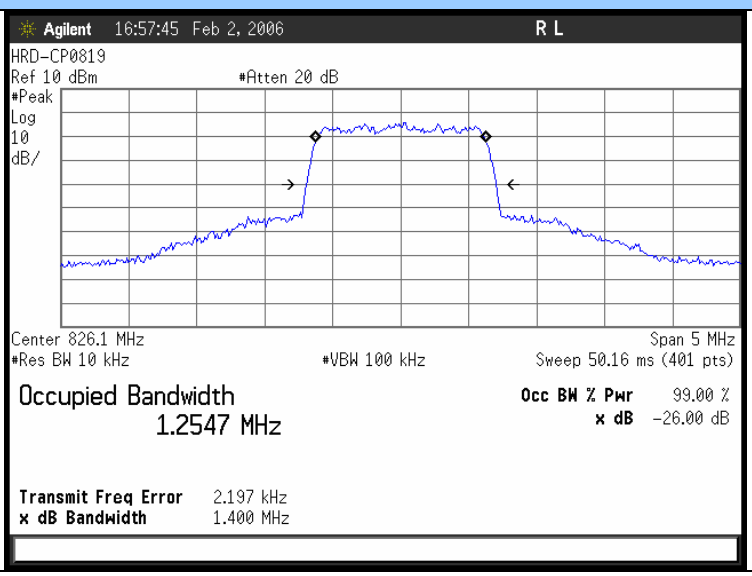
Tested by ***Choi, Chang Young***

6.3.7 Test Plot

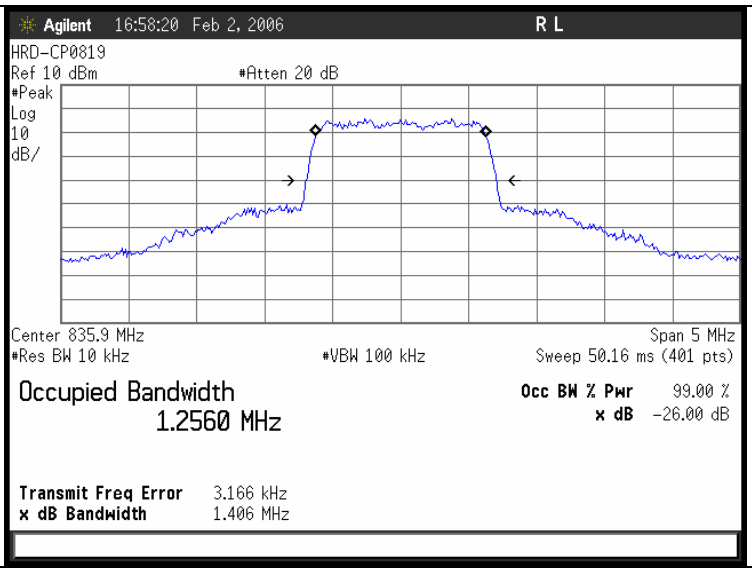
CDMA800 / Downlink	
Low Channel **871.11 MHz** **1.404 MHz**	
Middle Channel **880.89 MHz** **1.405 MHz**	
High Channel **891.99 MHz** **1.404 MHz**	

CDMA800 / Uplink

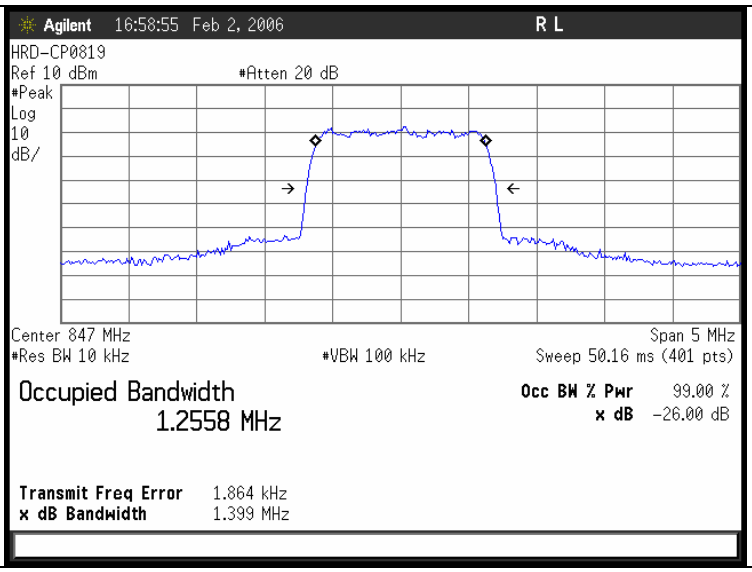
Low Channel
826.11 MHz
1.400 MHz



Middle Channel
835.89 MHz
1.406 MHz

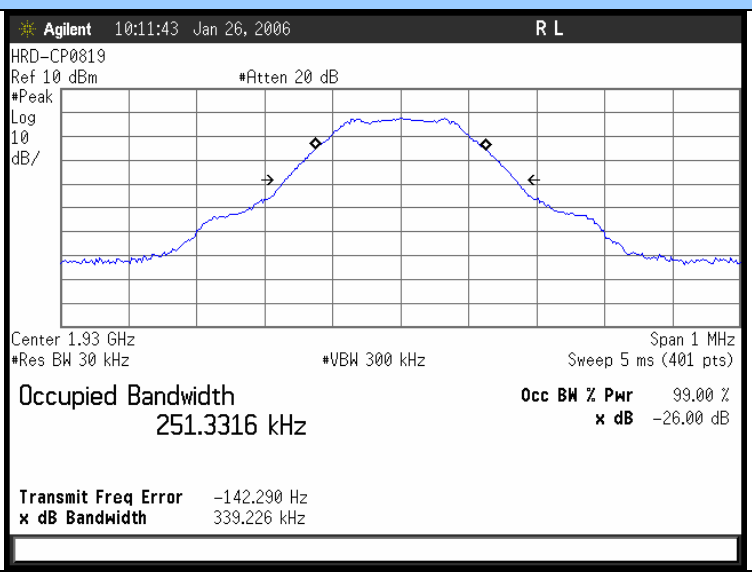


High Channel
846.99 MHz
1.399 MHz

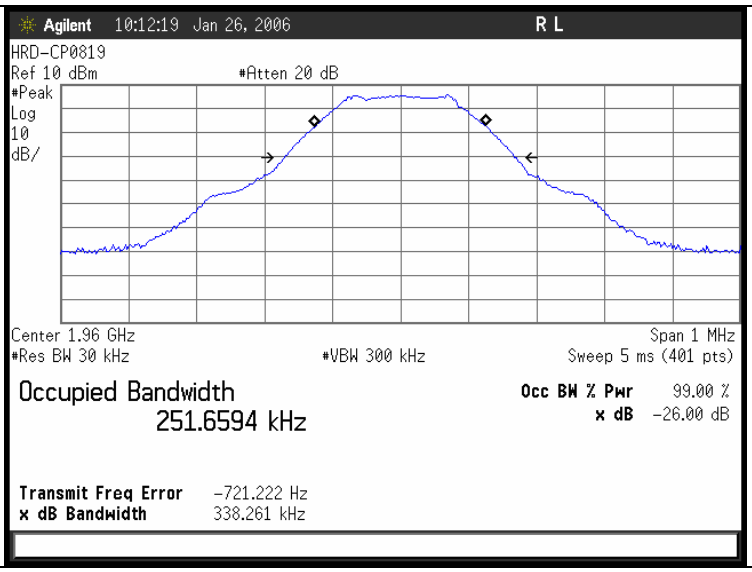


US-PCS / Downlink

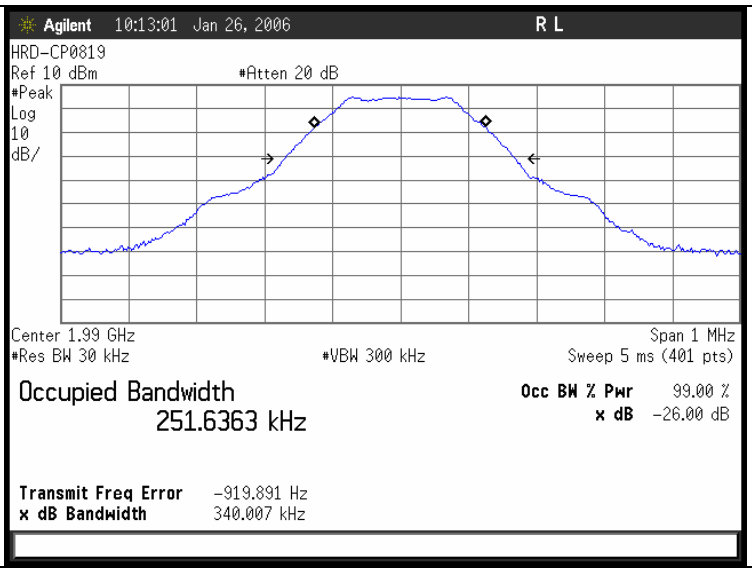
Low Channel
1930.2 MHz
339.226 kHz



Middle Channel
1960.0 MHz
338.261 MHz

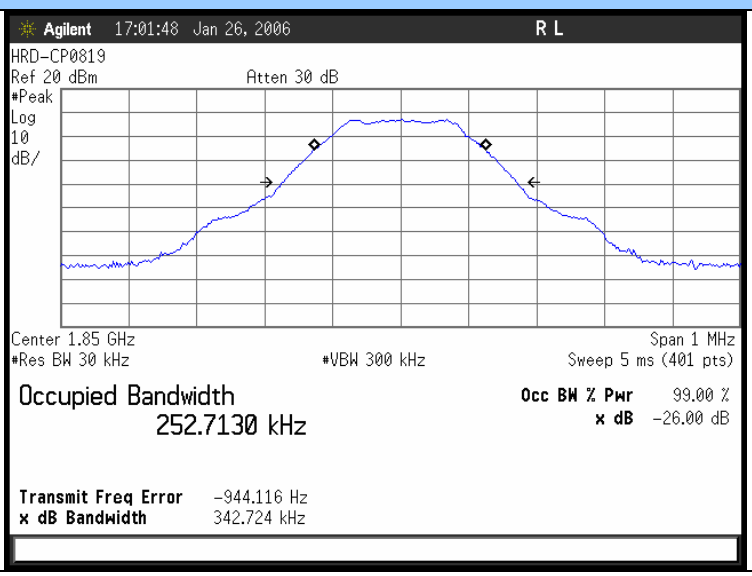


High Channel
1989.8 MHz
340.007 kHz

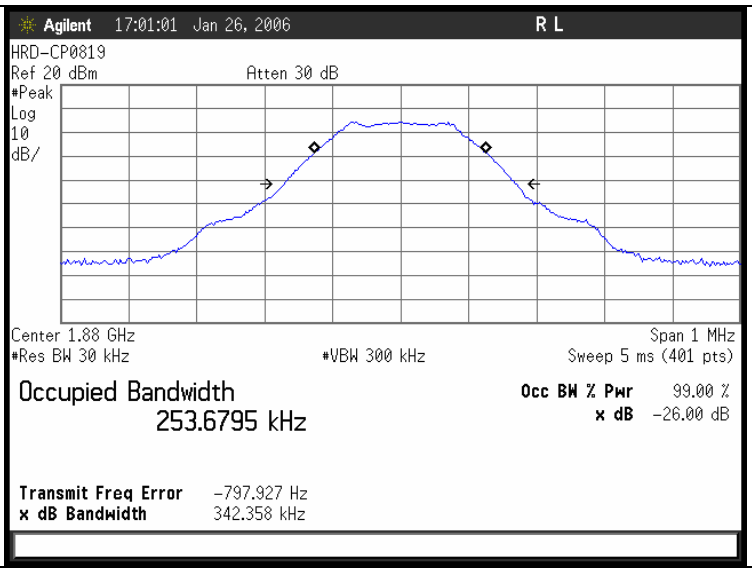


US-PCS / Uplink

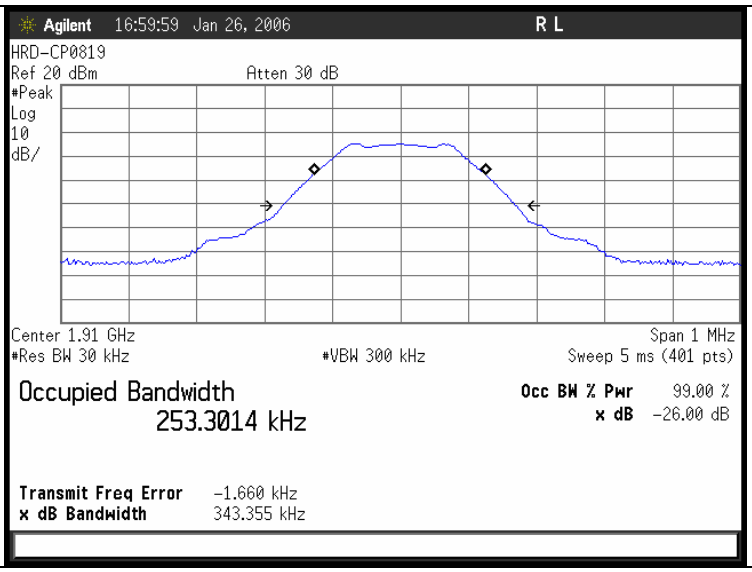
Low Channel
1850.2 MHz
342.724 kHz



Middle Channel
1880.0 MHz
342.358 MHz



High Channel
1909.8 MHz
343.355 kHz



6. TEST DATA

6.4 Spurious Emission of Antenna Terminals

6.4.1 Specification

FCC Rules Part 2, Section 2.1051
FCC Rules Part 22 Subpart H, Section 22.917
FCC Rules Part 24 Subpart E, Section 24.238

6.4.2 Method of Measurement

ANSI/TIA-603-B-2002 Section 2.2.11

6.4.3 Measurement Set-Up

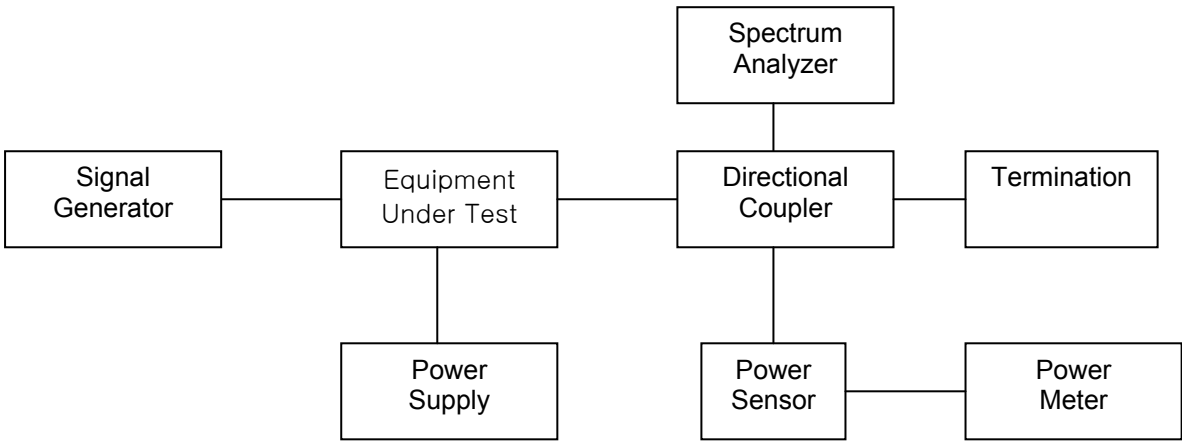


Fig.4

6.4.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	HRD-CP0819	Hyon Corp Co,.Ltd
Power Supply	IPS-30B03DD	INTERACT
Signal Generator	E4432B	AGILENT
Directional Coupler	778D	AGILENT
Termination	8173	BIRD
Power Sensor	8481A	AGILENT
Power Meter	E4418A	AGILENT
Spectrum Analyzer	E4404B	AGILENT

6.4.5 Test Procedure

-. The unit was turn-up in accordance with the alignment procedure stated in the FIG. 4, and was loaded into a 50 Ω resistive termination.
-. The input to the amplifier is CDMA & GSM modulated signal tuned such that the output power is set to its maximum rated output power.
-. The RF output ports were properly terminated by the RF load and were connected to the Spectrum analyzer through the directional coupler.
-. The spectrum analyzer for this measurement was set with the RBW 100kHz in the range of 30MHz ~1GHz, and RBW 1MHz in the range of 1GHz~26.5GHz, as recorded in the plots. The VBW was set the same as RBW.
-. Plots were taken with single input at low, mid, and high of the band. Plots were taken of the out-of-band emissions from 30MHz to the 10th harmonic of the carrier frequency.
-. The emissions shall not be more than 43 + 10 log (P) dBc below the mean power output, which is equivalent to –13 dBm.
-. The measurements were performed at the shielded room with environmental conditions of 22ºC, 42%RH.

6.4.6 Test Result

6.4.6.1. CDMA800

Transmitter Channel Setting	Frequency Range			Limit (dBm)
	30MHz < f_0 < 1GHz	1GHz < f_0 < 26.5GHz	Intermodulation	
Downlink				
Low	≪ -13 dBm *	-45.38 dBm	-27.70 dBm	-13
Mid	≪ -13 dBm *	-45.83 dBm	N/A	
High	≪ -13 dBm *	-45.60 dBm	-25.84 dBm	
Uplink				
Low	≪ -13 dBm *	-43.58 dBm	-28.64 dBm	-13
Mid	≪ -13 dBm *	-44.92 dBm	N/A	
High	≪ -13 dBm *	-45.00 dBm	-40.06 dBm	

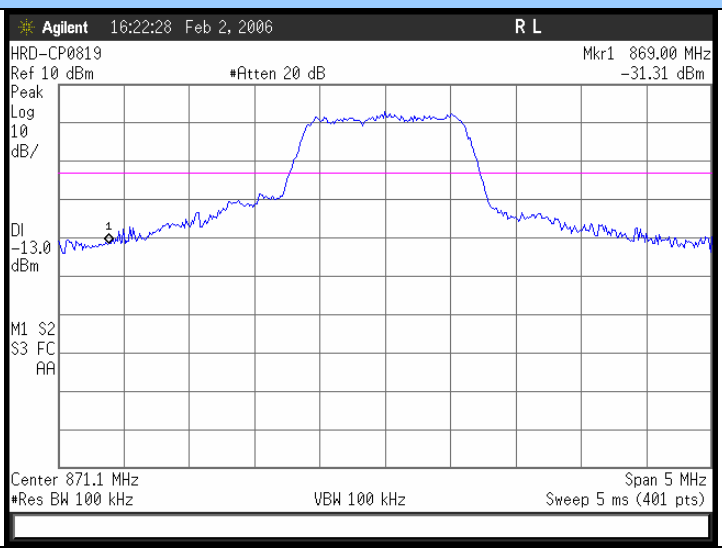
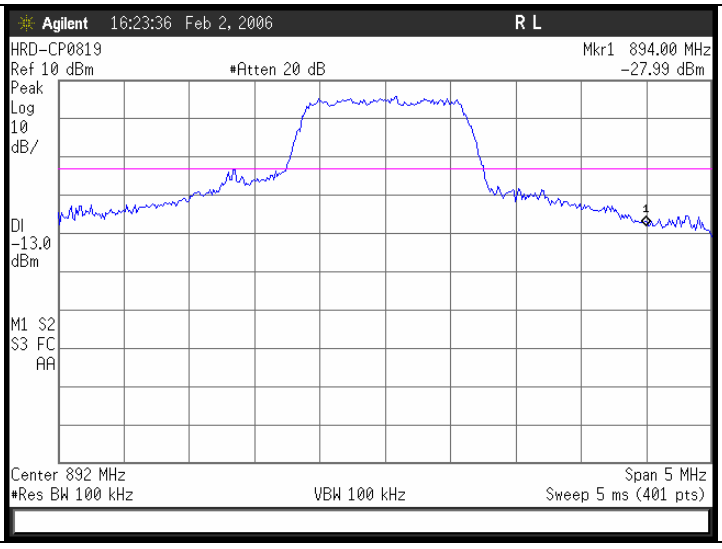
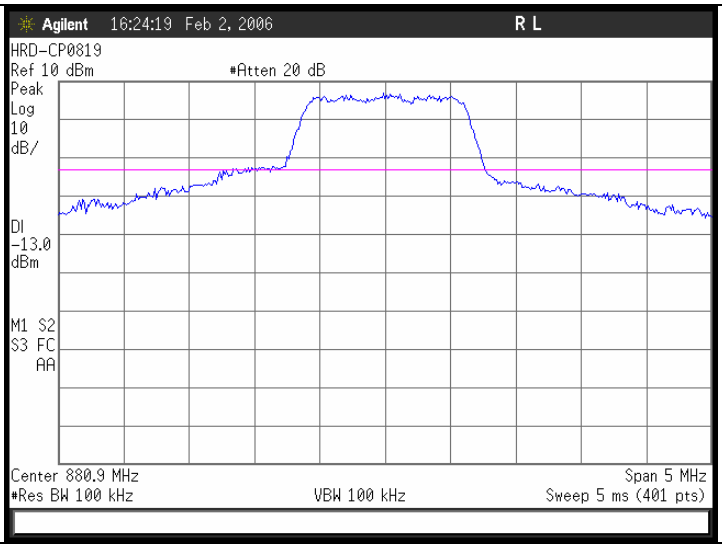
* This emissions level is below 20dB to limit.

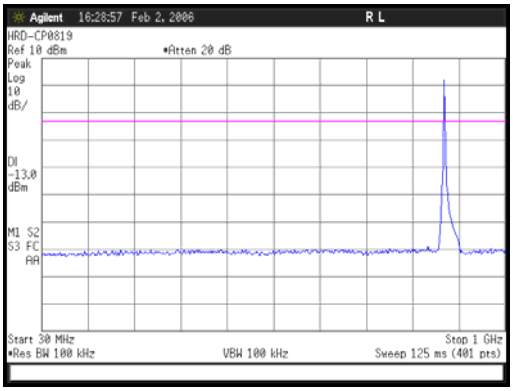
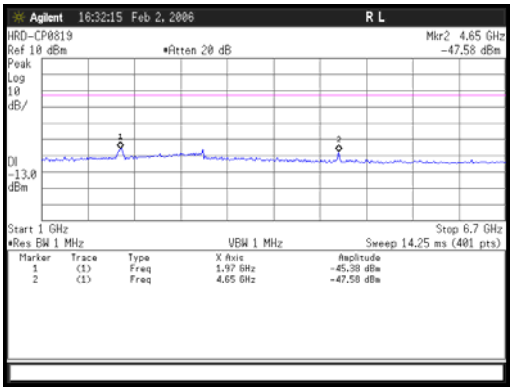
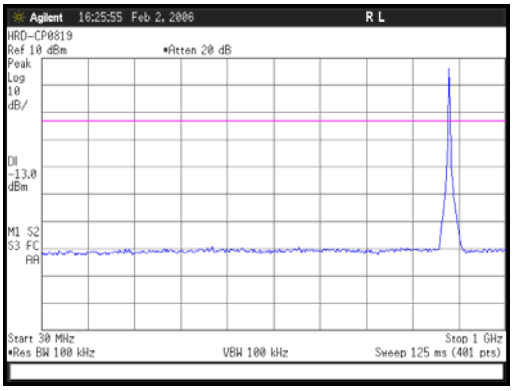
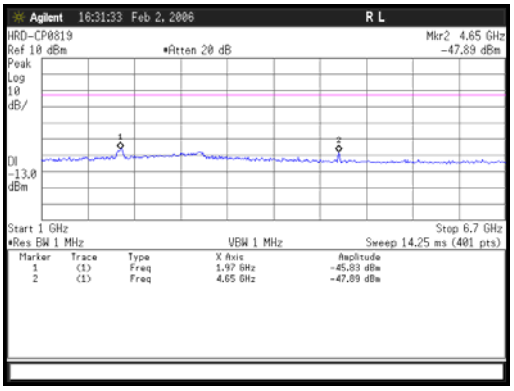
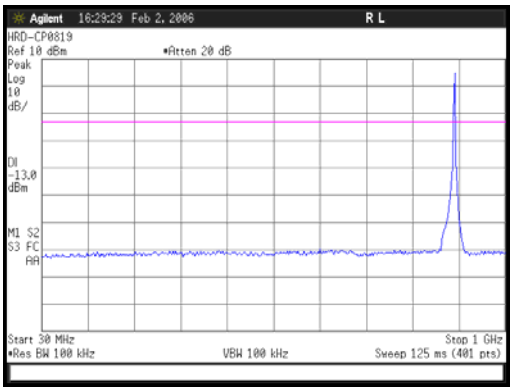
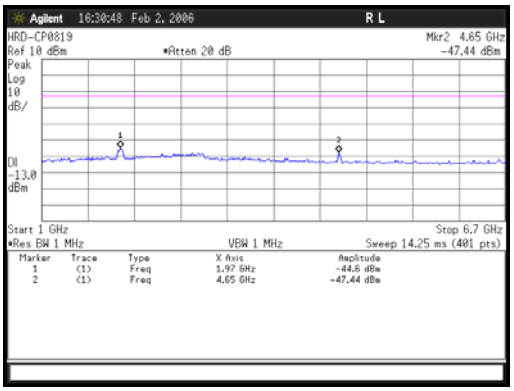
6.4.6.2. US-PCS

Transmitter Channel Setting	Frequency Range			Limit (dBm)
	30MHz < f_0 < 1GHz	1GHz < f_0 < 26.5GHz	Intermodulation	
Downlink				
Low	-54.86 dBm	-47.73 dBm	-37.83 dBm	-13
Mid	-56.00 dBm	-47.74 dBm	N/A	
High	-55.68 dBm	-47.35 dBm	-31.68 dBm	
Uplink				
Low	-54.51 dBm	-60.38 dBm	-28.11 dBm	-13
Mid	-54.99 dBm	-60.85 dBm	N/A	
High	-54.56 dBm	-61.07 dBm	-41.64 dBm	

*Tested by **Choi, Chang Young***

6.4.7 Test Plot

CDMA800 / Downlink / In-band	
Low Channel **871.11 MHz**	
Middle Channel **880.89 MHz**	
High Channel **891.99 MHz**	

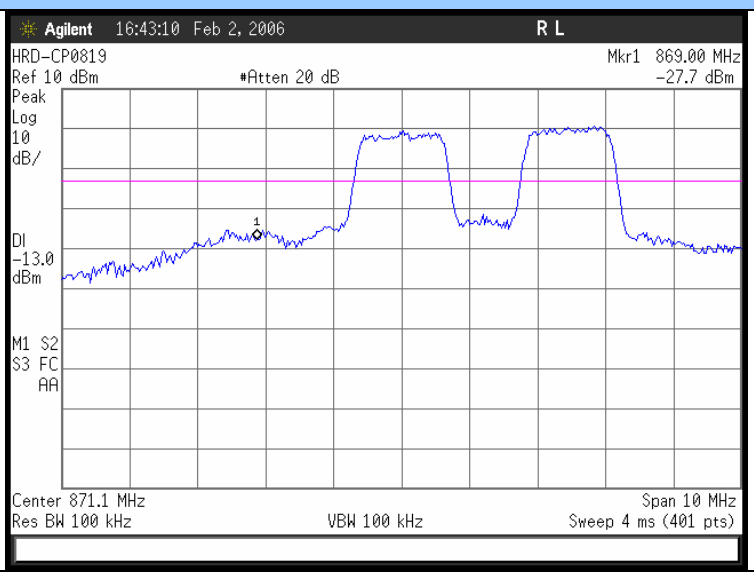
CDMA800 / Downlink / Out-Band		
Frequency	**Below 1 GHz**	**Above 1 GHz**
Low Frequency **871.11 MHz**	 	
	≪ -13 dBm	1.97 GHz / -45.38 dBm 4.65 GHz / -47.58 dBm
Middle Frequency **880.89 MHz**	 	
	≪ -13 dBm	1.97 GHz / -45.83 dBm 4.65 GHz / -47.89 dBm
High Frequency **891.99 MHz**	 	
	≪ -13 dBm	1.97 GHz / -45.60 dBm 4.65 GHz / -47.44 dBm

CDMA800 / Downlink / IMD

Lower Edge

871.11 MHz
873.57 MHz

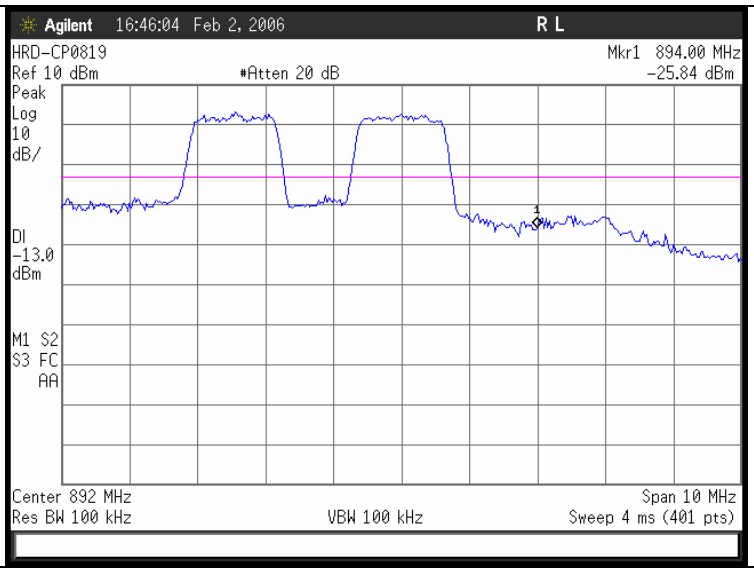
-27.70 dBm



Upper Edge

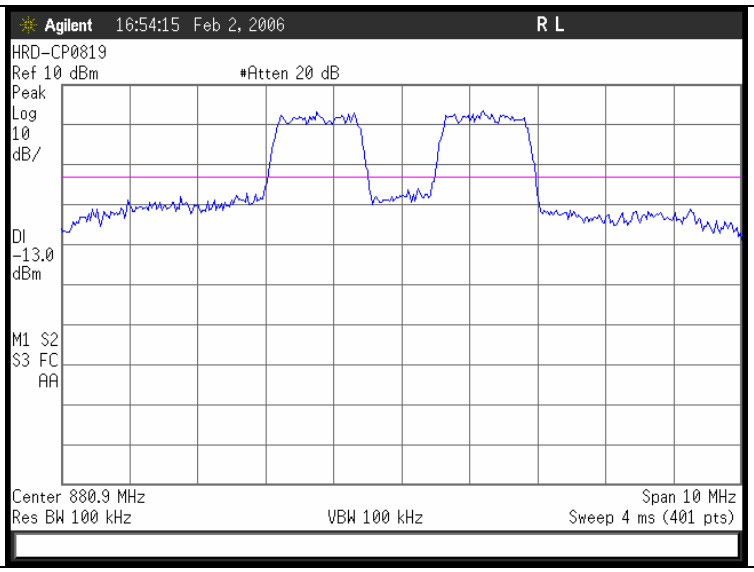
889.53 MHz
891.99 MHz

-25.84 dBm



Center

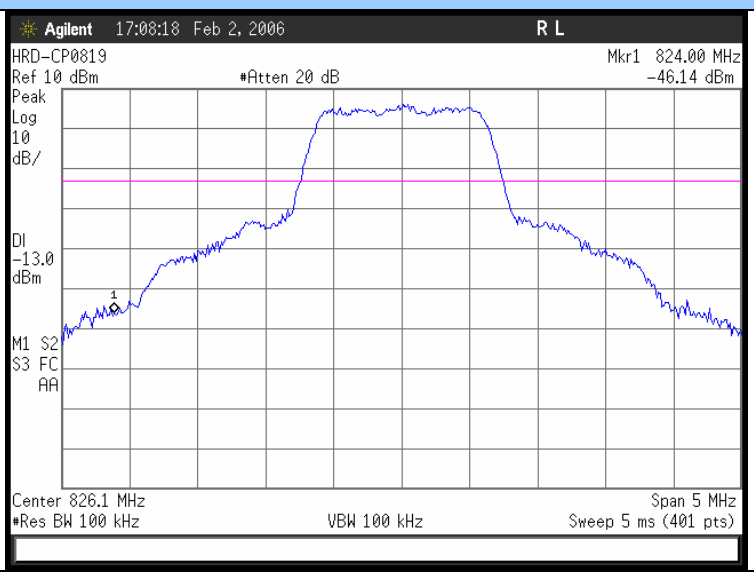
879.66 MHz
882.12 MHz



CDMA800 / Uplink / In-band

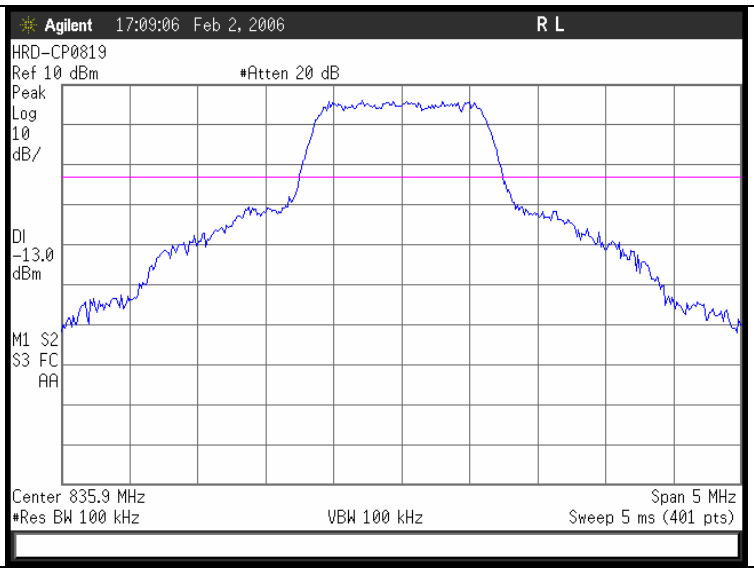
Low Channel

826.11 MHz



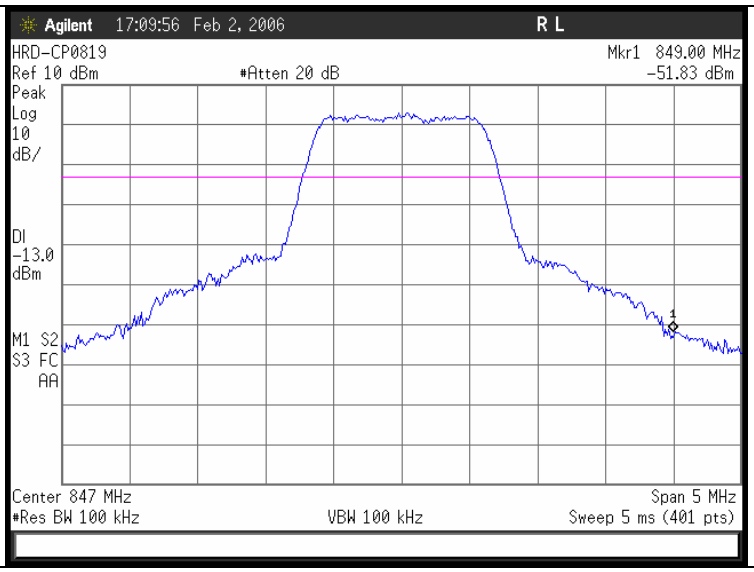
Middle Channel

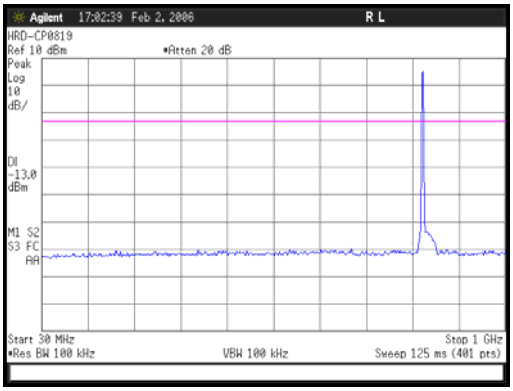
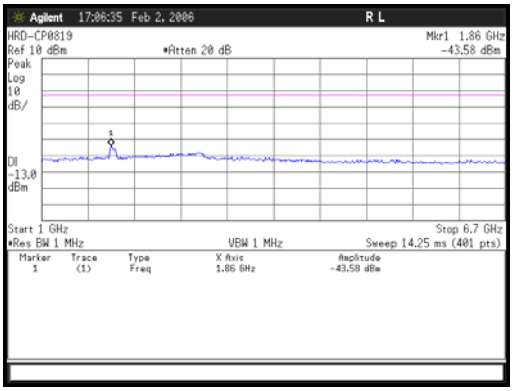
835.89 MHz



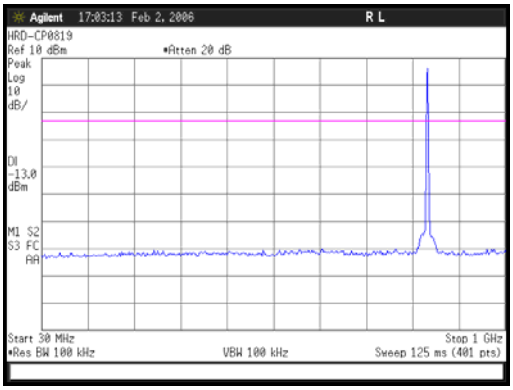
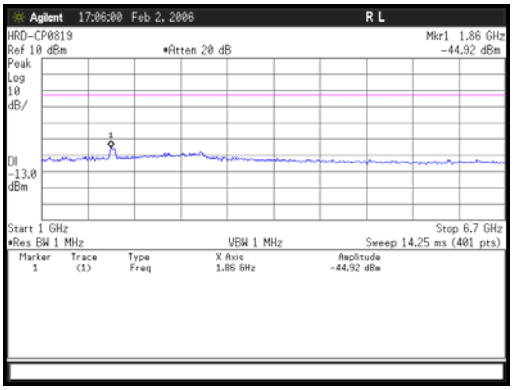
High Channel

846.99 MHz

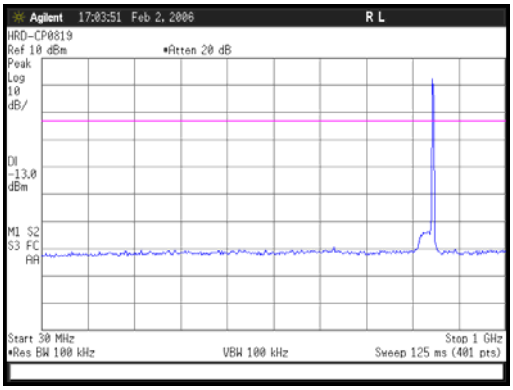
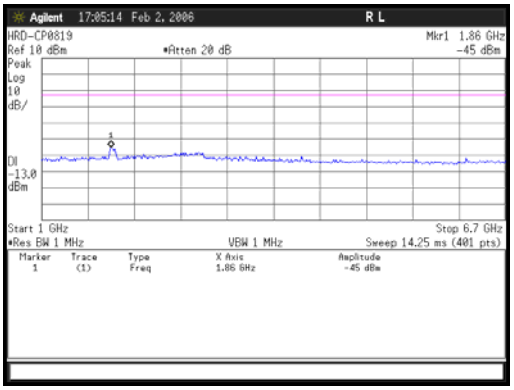


CDMA800 / Uplink / Out-Band		
Frequency	**Below 1 GHz**	**Above 1 GHz**
Low Frequency **826.11 MHz**		

≪ -13 dBm 1.86 GHz / -43.58dBm

Middle Frequency **835.89 MHz**		

≪ -13 dBm 1.86 GHz / -44.92 dBm

High Frequency **846.99 MHz**		

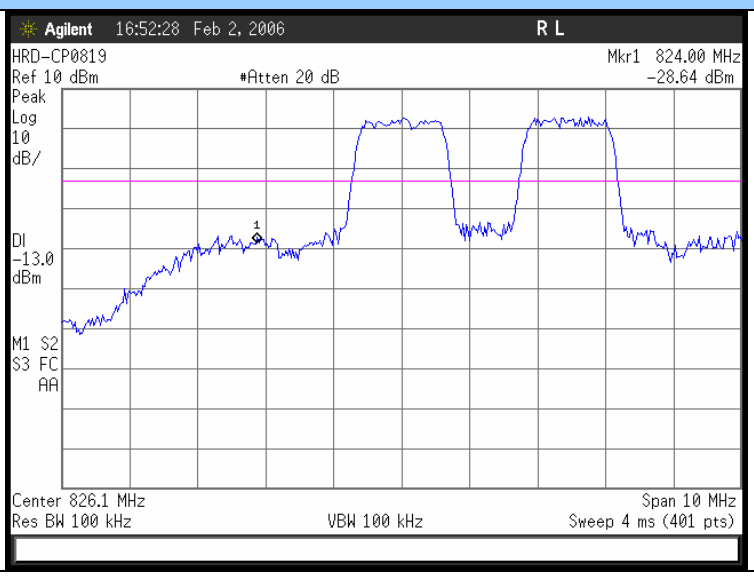
≪ -13 dBm 1.86 GHz / -45.00 dBm

CDMA800 / Uplink / IMD

Lower Edge

826.11 MHz
828.57 MHz

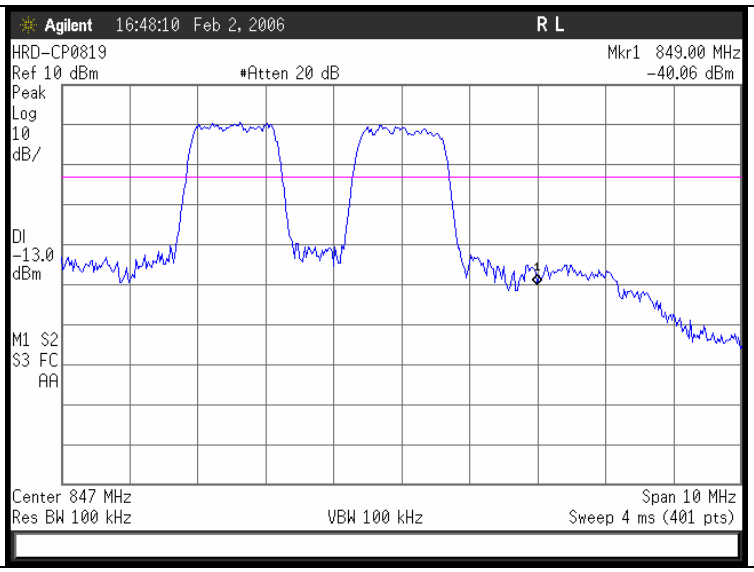
-28.64 dBm



Upper Edge

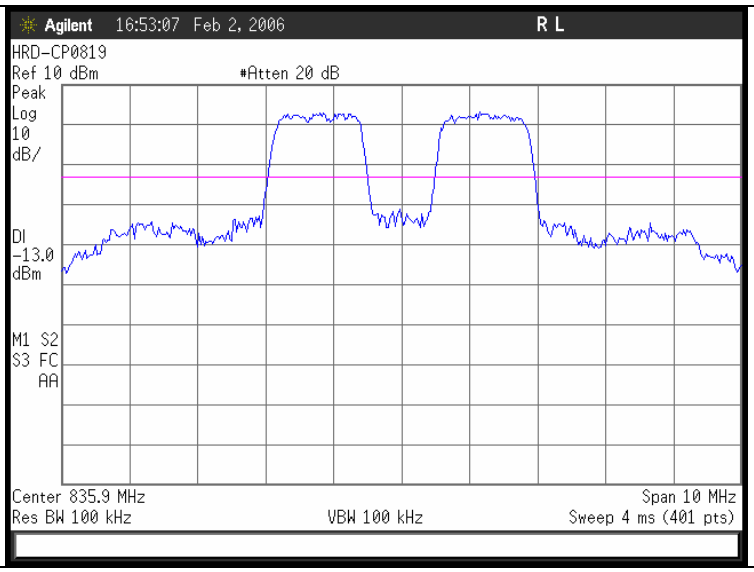
844.53 MHz
846.99 MHz

-40.06 dBm



Center

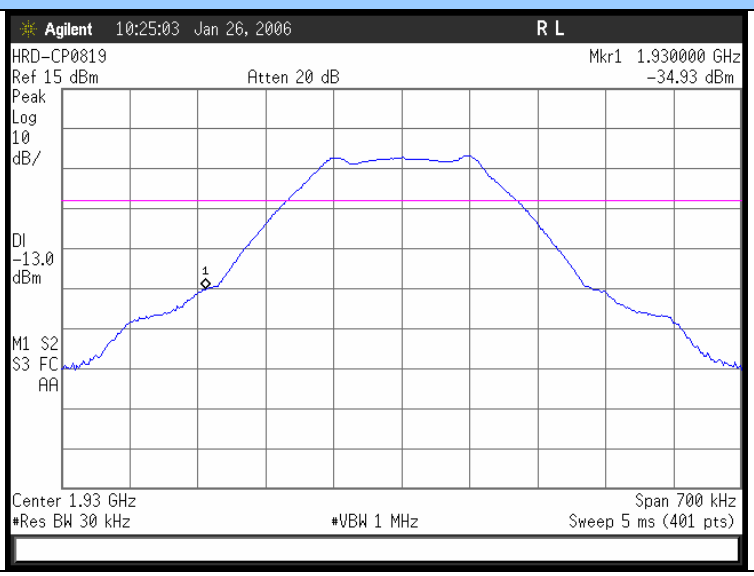
834.66 MHz
837.12 MHz



US-PCS / Downlink / In-band

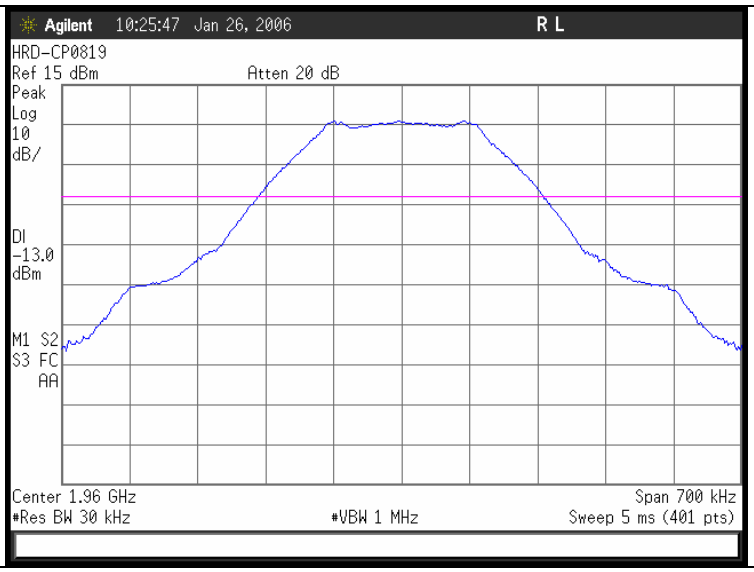
Low Channel

1930.2 MHz



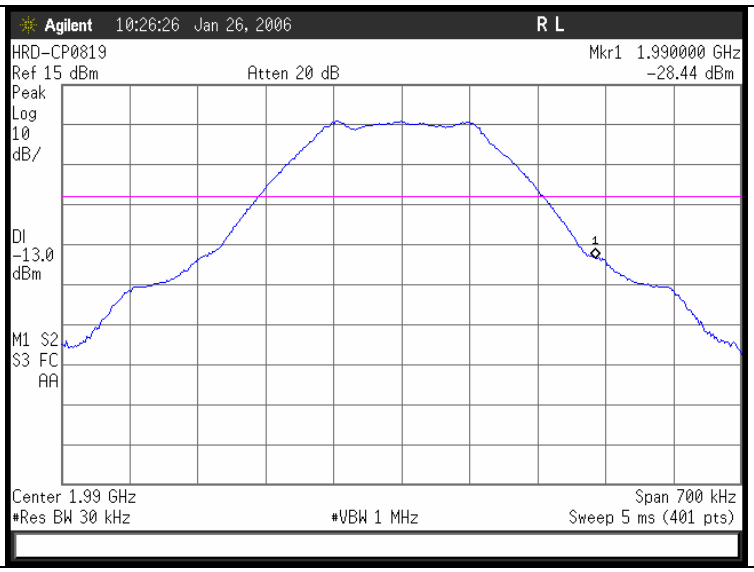
Middle Channel

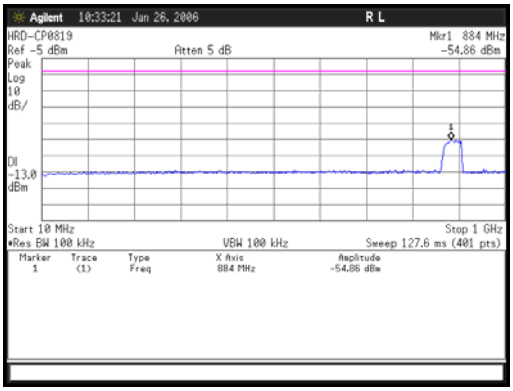
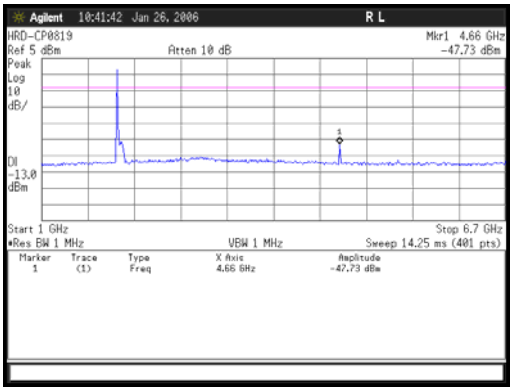
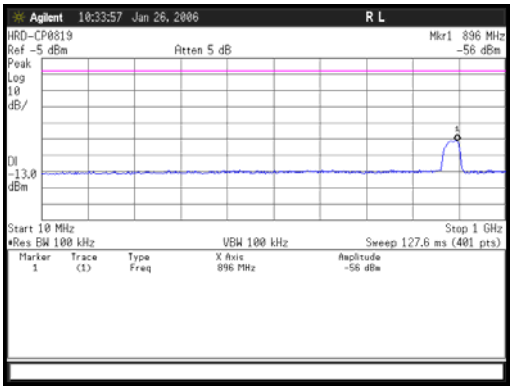
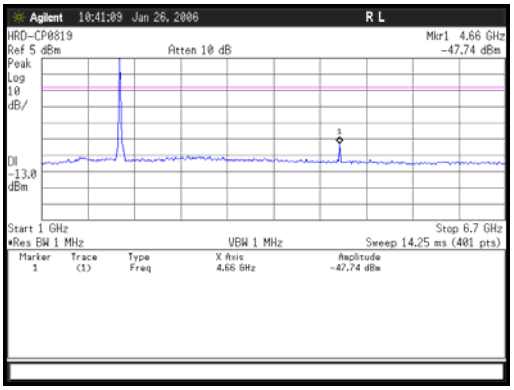
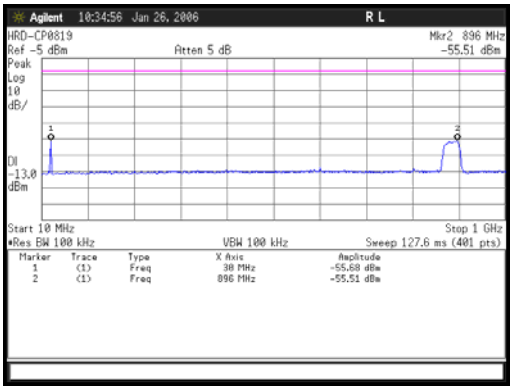
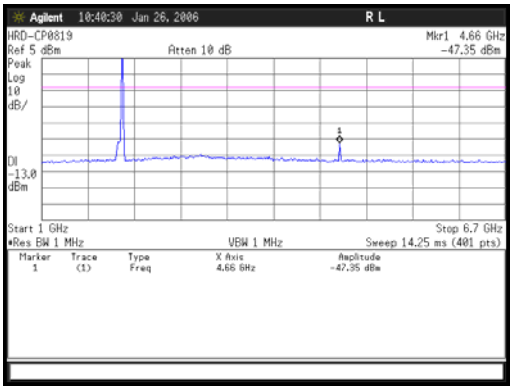
1960.0 MHz



High Channel

1989.8 MHz



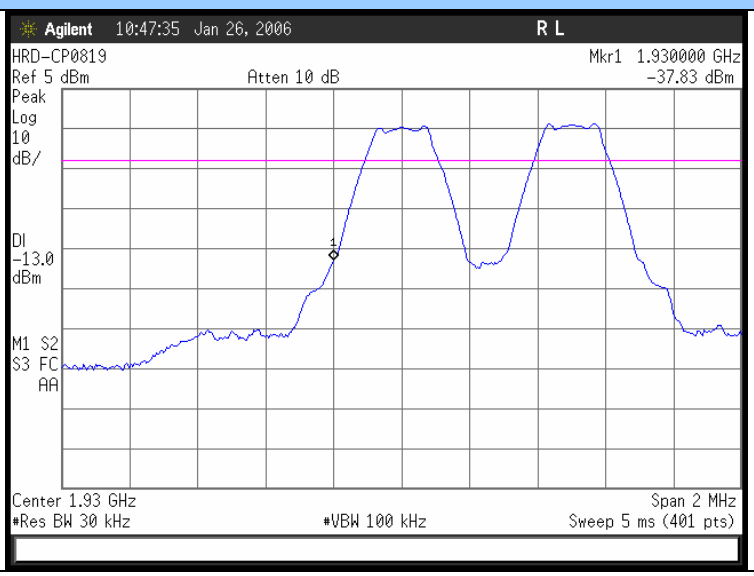
US-PCS / Downlink / Out-Band		
Frequency	**Below 1 GHz**	**Above 1 GHz**
Low Frequency **1930.2 MHz**		
	884 MHz / -54.86 dBm	**4.66 GHz / -47.73 dBm**
Middle Frequency **1960.0 MHz**		
	896 MHz / -56.00 dBm	**4.66 GHz / -47.74 dBm**
High Frequency **1989.8 MHz**		
	30 MHz / -55.68 dBm **896 MHz / -55.51 dBm**	**4.66 GHz / -47.35 dBm**

US-PCS / Downlink / IMD

Lower Edge

1930.2 MHz
1930.7 MHz

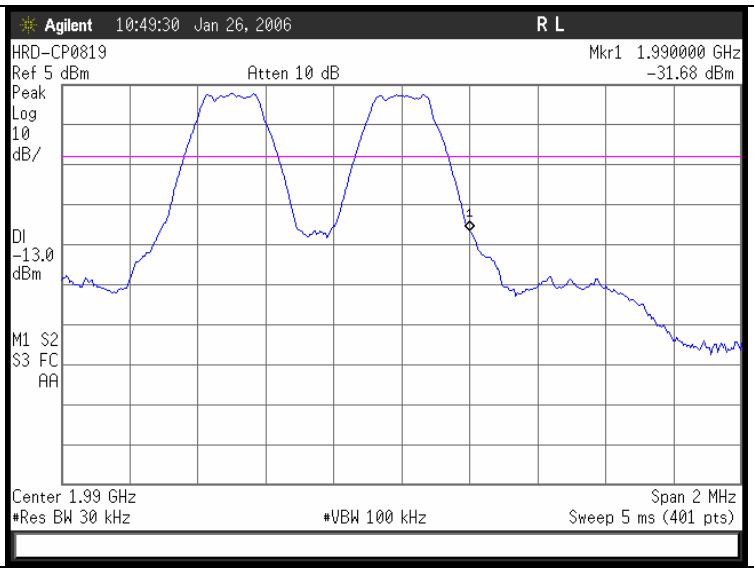
-37.83 dBm



Upper Edge

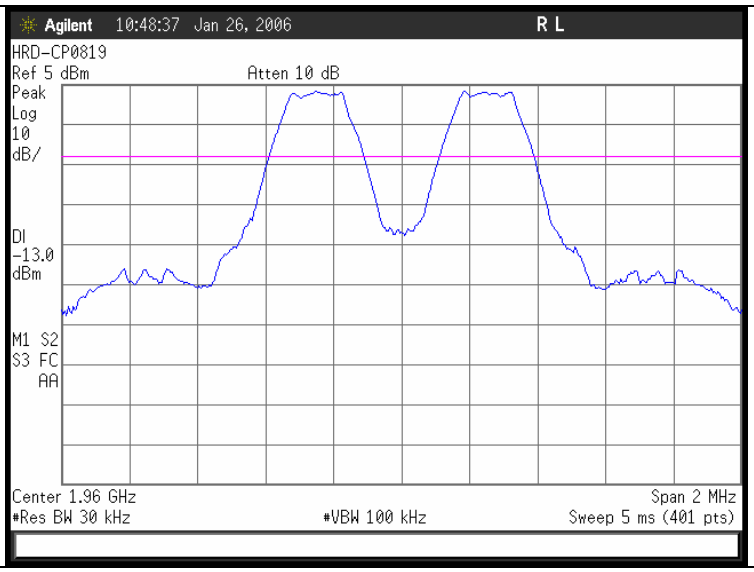
1989.3 MHz
1989.8 MHz

-31.68 dBm



Center

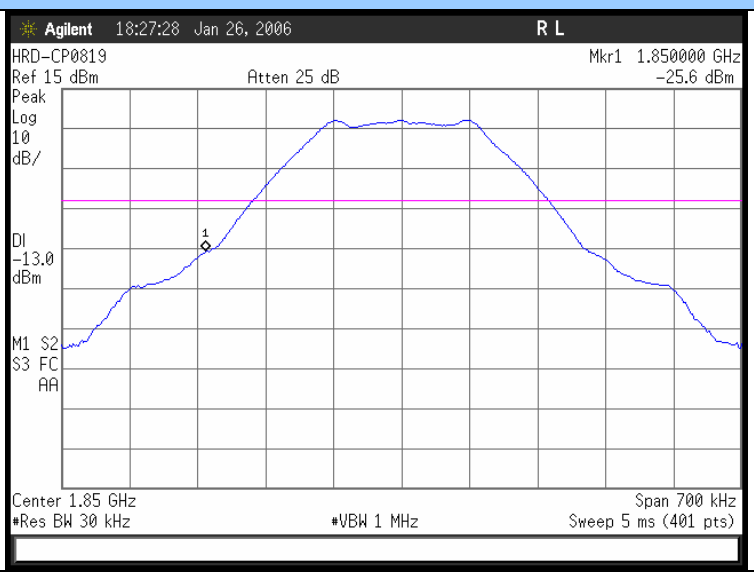
1959.75 MHz
1960.25 MHz



US-PCS / Uplink / In-band

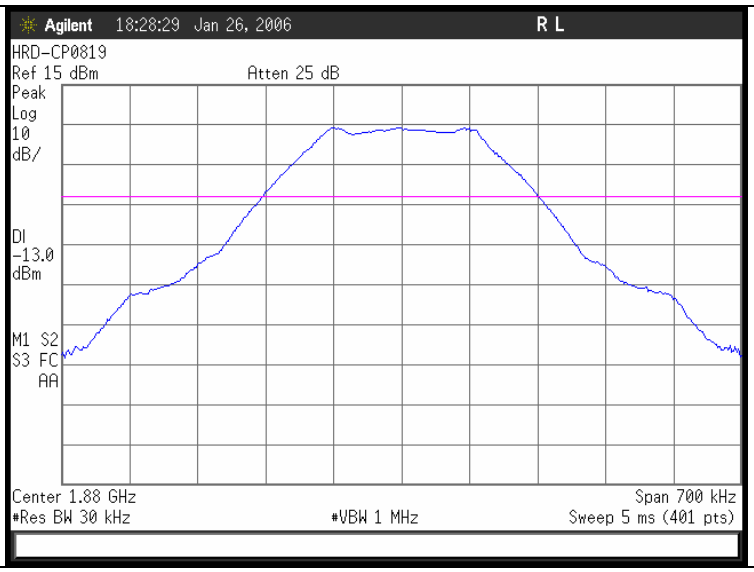
Low Channel

1850.2 MHz



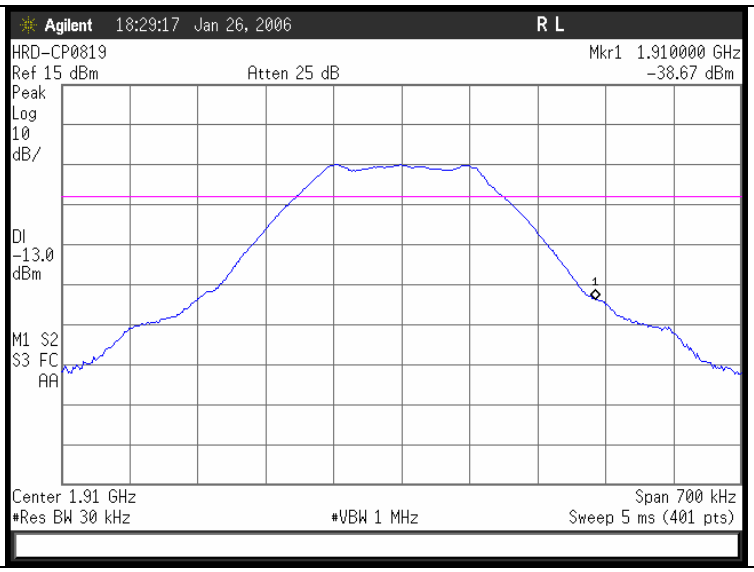
Middle Channel

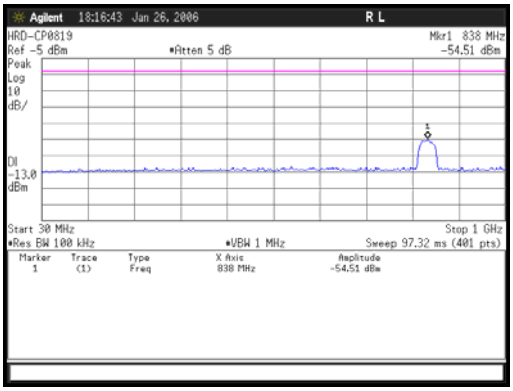
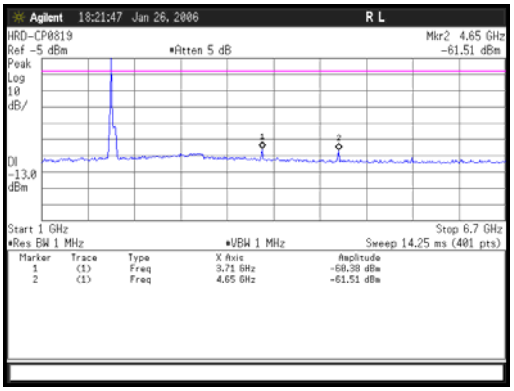
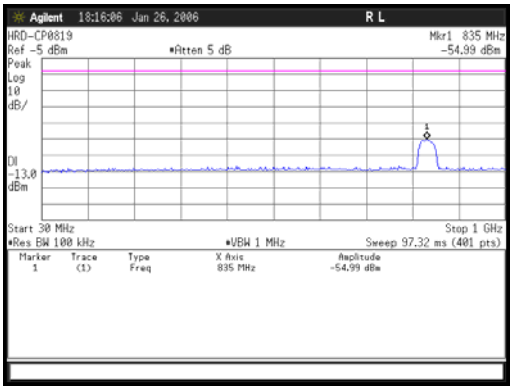
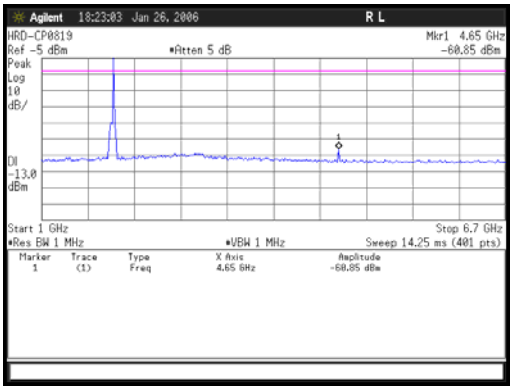
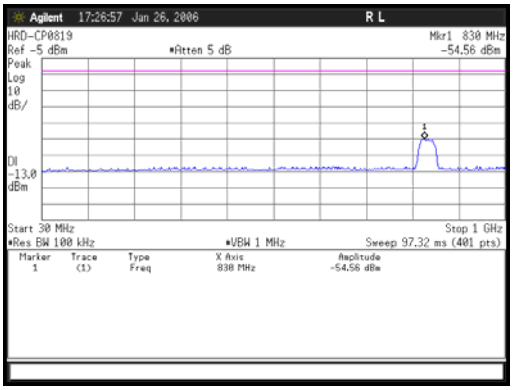
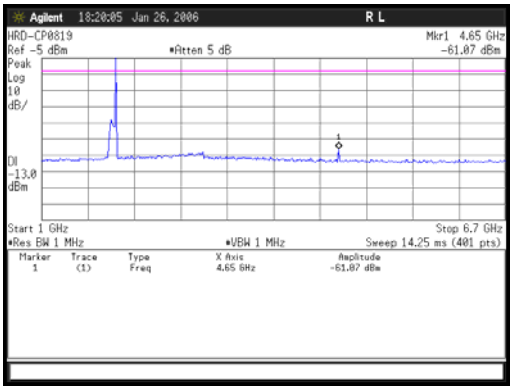
1880.0 MHz



High Channel

1909.8 MHz



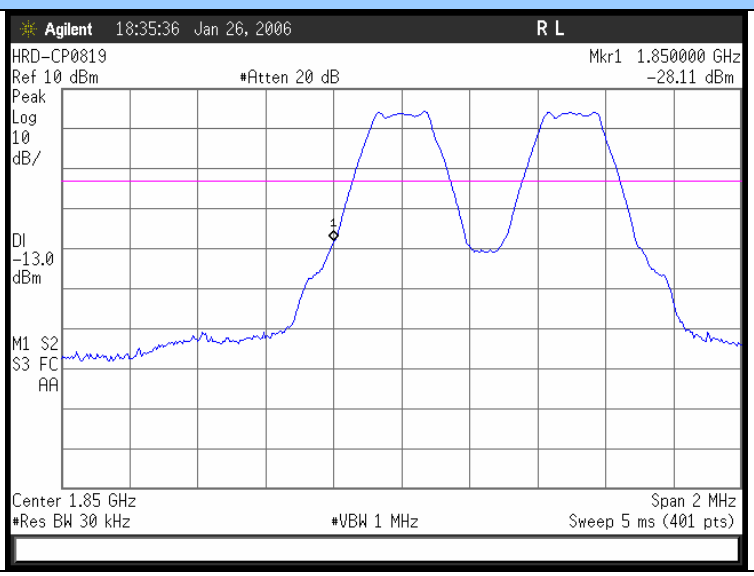
US-PCS / Uplink / Out-Band		
Frequency	**Below 1 GHz**	**Above 1 GHz**
Low Frequency **1850.2 MHz**		
	838 MHz / -54.51 dBm	**3.71 GHz / -60.38 dBm** **4.65 GHz / -61.51 dBm**
Middle Frequency **1880.0 MHz**		
	835 MHz / -54.99 dBm	**4.65 GHz / -60.85 dBm**
High Frequency **1909.8 MHz**		
	830 MHz / -54.56 dBm	**4.65 GHz / -61.07 dBm**

US-PCS / Uplink / IMD

Lower Edge

1850.2 MHz
1850.7 MHz

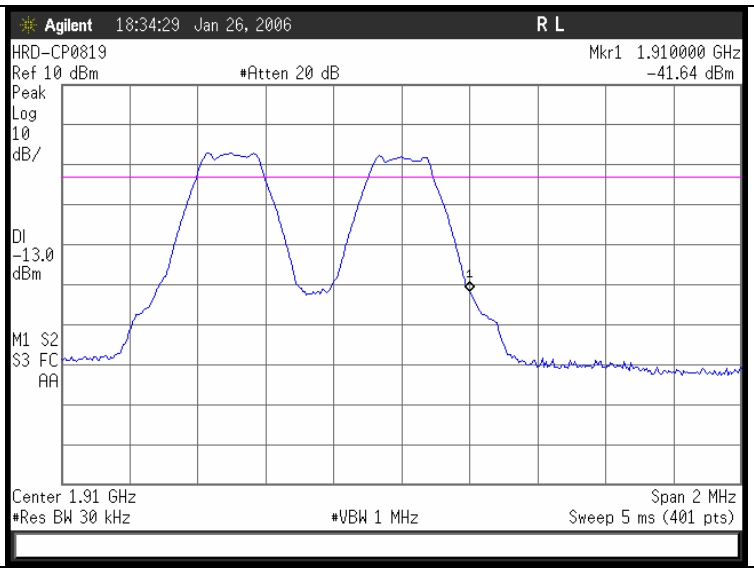
-28.11 dBm



Upper Edge

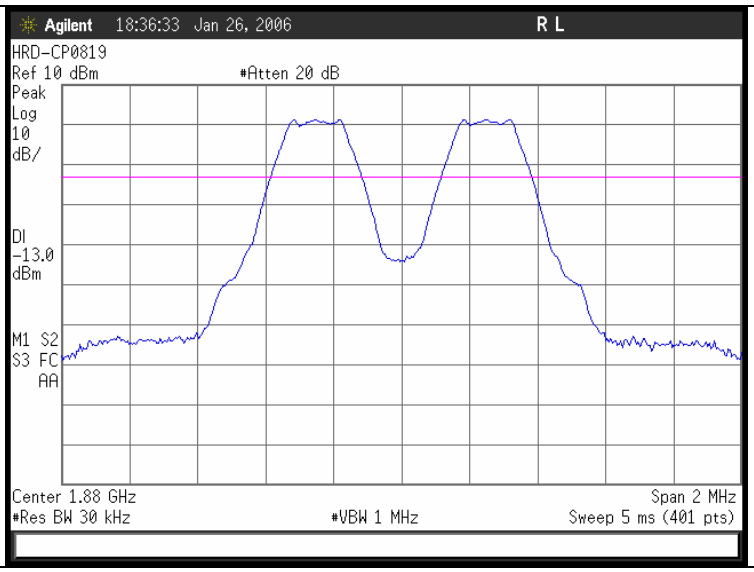
1909.3 MHz
1909.8 MHz

-41.64 dBm



Center

1879.75 MHz
1880.25 MHz



6. TEST DATA

6.5 Field Strength of Spurious Emission

6.5.1 Specification

FCC Rules Part 2, Section 2.1053
FCC Rules Part 22 Subpart H, Section 22.917
FCC Rules Part 24 Subpart E, Section 24.238

6.5.2 Method of Measurement

ANSI/TIA-603-B-2002 Section 2.2.12

6.5.3 Measurement Set-Up

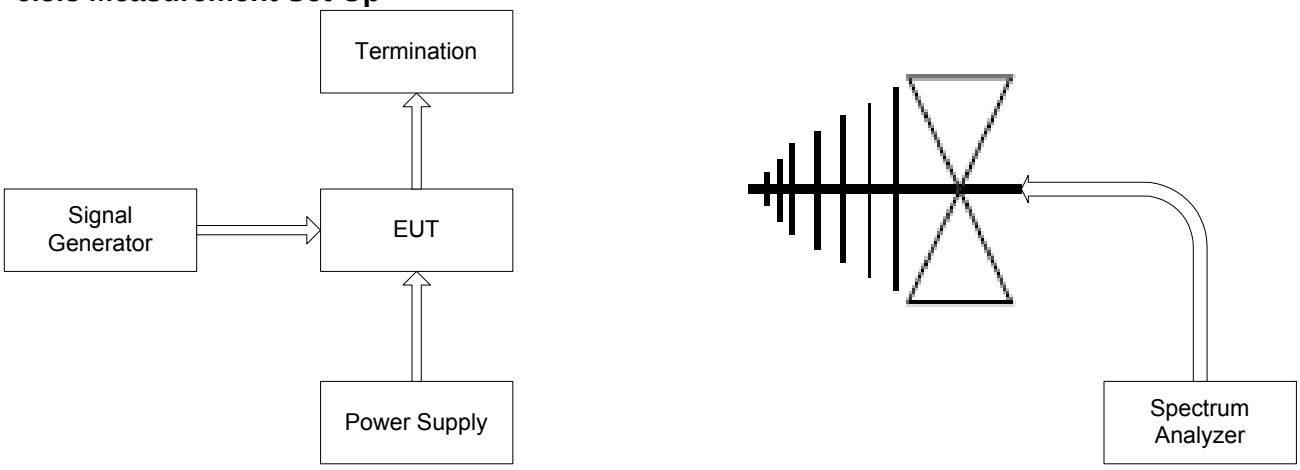


Fig.5

6.5.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	HRD-CP0819	Hyon Corp Co,.Ltd
Power Supply	IPS-30B03DD	INTERACT
Signal Generator	E4432B	AGILENT
Spectrum Analyzer	E7403A	AGILENT
Termination	8173	BIRD
Biconical Antenna	VHA9103(BBA9106)	SWALZBECK
Log Periodic Antenna	UPA6109	SCHAFFNER
Horn Antenna	BBHA 9120 D	SWALZBECK

6.5.5 Test Procedure

-. The unit was turn-up in accordance with the alignment procedure stated in the FIG. 5, and was loaded into a 50 Ω resistive termination.
-. The spectrum bandwidth was set to RBW 100 kHz (frequency up to 1GHz) and RBW 1 MHz(frequency above 1GHz).
-. Transmitter was set to the high power output condition.
-. The spectrum was checked from 30 MHz up to the 10th harmonic of the carrier frequency.
-. All emissions measured were not found to be more than 20dB below the limit.
-. The EUT was positioned through 3 orthogonal axis and worst-case are reported.
-. ERP measurements were performed using the standard battery with full charged condition.
-. The limit was applied according the $43+10\log_{10}$(P: mean power in Watts) dB.
-. The measurements were performed at the shielded room with environmental conditions of 16ºC, 39%RH.

6.5.6 Test Result

6.5.6.1. CDMA800

Transmitter Channel Setting	Frequency Range		Limit (dBm)
	30MHz < f_0 < 1GHz	1GHz < f_0 < 26.5GHz	
Downlink			
Low	≪ -13 dBm *	≪ -13 dBm *	-13
Mid	≪ -13 dBm *	≪ -13 dBm *	
High	≪ -13 dBm *	≪ -13 dBm *	
Uplink			
Low	≪ -13 dBm *	≪ -13 dBm *	-13
Mid	≪ -13 dBm *	≪ -13 dBm *	
High	≪ -13 dBm *	≪ -13 dBm *	

* This emissions level is below 20dB to limit.

6.5.6.2. US-PCS

Transmitter Channel Setting	Frequency Range		Limit (dBm)
	30MHz < f_0 < 1GHz	1GHz < f_0 < 26.5GHz	
Downlink			
Low	≪ -13 dBm *	≪ -13 dBm *	-13
Mid	≪ -13 dBm *	≪ -13 dBm *	
High	≪ -13 dBm *	≪ -13 dBm *	
Uplink			
Low	≪ -13 dBm *	≪ -13 dBm *	-13
Mid	≪ -13 dBm *	≪ -13 dBm *	
High	≪ -13 dBm *	≪ -13 dBm *	

* This emissions level is below 20dB to limit.

*Tested by **Choi, Chang Young***

7. TEST EQUIPMENT LIST

List of Test Equipments Used for Measurements

EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date
EMI Receiver	ESVS 10	Rohde&Schwarz	863247/019	05.25.2006
EMI Receiver	ESH3	Rohde&Schwarz	892580/014	12.16.2006
EMC Analyzer	E7403A	AGILENT	US39150108	05.18.2006
Loop Antenna	HFH2-Z2	Rohde&Schwarz	881056/6	08.19.2006
Dipole Antenna	VDA6116A / UHA9105	SCHAFFNER	1277/2168	03.23.2006
Dipole Antenna	FCC	AH system inc.	292	01.25.2007
Horn Antenna	BBHA 9120 D	SCHWARZBECK	BBHA 9170	02.07.2007
Horn Antenna	BBHA 9170	SCHWARZBECK	BBHA 9120D	02.07.2007
Horn Antenna	3115	ETS·LINDGREN	00055005	02.07.2007
Biconical Antenna	VHA9103(BBA9106)	SCHWARZBECK	D-6901	01.17.2007
Log Periodic Antenna	UPA6109	SCHAFFNER	1076	01.19.2007
Bilog Antenna	VULB 9160	SCHWARZBECK	9160-3052	03.18.2006
Bilog Antenna	CBL6140A	CHASE	1144	01.19.2007
Amplifier	8447E	AGILENT	2805A02893	12.12.2006
Amplifier	8449B	AGILENT	3008A00809	10.14.2006
Antenna Mast	JAC-3	DAIL EMC	N/A	N/A
Turntable Controller	JAC-2	JAEMC	N/A	N/A
Open Site Cable	OSC-30	N/A	BWS-01	N/A
Signal Generator	E4432B	AGILENT	US40053157	07.11.2006
Signal Generator	GT9000	GIGATRONICS	9604010	03.10.2006
Frequency Counter	R5372	ADVANTEST	41855204	03.11.2006
Power Meter	E4418A	AGILENT	GB38272621	03.10.2006
Power Sensor	8481A	AGILENT	3318A92101	03.10.2006
Spectrum Analyzer	E4404B	AGILENT	US41191262	07.25.2006
Spectrum Analyzer	8594E	AGILENT	3911A08040	11.14.2006
Modulation Analyzer	8901B	AGILENT	3028A03124	03.10.2006
Audio Analyzer	8903B	AGILENT	3011A09344	03.10.2006
Dual directional coupler	772D	AGILENT	2839A00395	11.14.2006
Dual directional coupler	778D	AGILENT	1144A08477	11.07.2006
Termination	8173	BIRD	2501	N/A
Termination	6515.19.A	SUHNER	-	N/A
Termination	M1426	WEINSCHEL	AX8888	N/A
Attenuator	33-30-33	WEINSCHEL	116594	03.10.2006
Oscilloscope	TDS3032	Tektronix	B081558	10.28.2006
Attenuator	33-30-33	WEINSCHEL	116594	03.10.2006
Attenuator	RFA500NMF30	BIRD	9522	03.10.2006
LISN	FCC-LISN-50-50-2-02	FCC	03074	11.02.2006
Signal Analyzer	PMM9000	PMM	3100570602	05.31.2006
Artificial Main Network	KNW-242C	KYORITSU	8-920-20	09.09.2006
Artificial Main Network	L3-25	PMM	1110K70403	05.20.2006
LISN multiline	L1-115	Com-Power	241017	11.11.2006
LISN multiline	L1-115	Com-Power	241018	11.02.2006