

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR PCS LICENSED TRANSMITTER

Test Report No. : E07OR-013

AGR No. : A079A-090R

Applicant : INKEL Corporation

Address : 345-50, Gasan-dong, Geumcheon-gu, Seoul, Korea

Manufacturer : INKEL Corporation

Address : 399-1, Dujoung-dong, Chonan-city, Chungcheongnam-do, Korea

Type of Equipment : CDMA Fiber-Fed Repeater System

FCC ID. : P87JF43E1900CFN03

Model Name : JF43E1900CFN03

Serial number : N/A

Total page of Report : 57 pages (including this page)

Date of Incoming : September 05, 2007

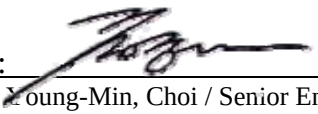
Date of issue : October 05, 2007

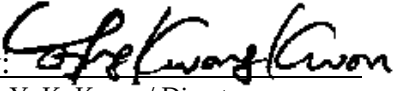
SUMMARY

The equipment complies with the regulation; **FCC Part 24 Subpart E.**

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

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ONETECH Corp.

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ONETECH Corp.

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1. VERIFICATION OF COMPLIANCE

APPLICANT : INKEL Corporation
ADDRESS : 345-50, Gasan-dong, Geumcheon-gu, Seoul, Korea
CONTACT PERSON : Mr. Ohvom, Kwon / Senior Research Engineer
TELEPHONE NO : +82-2-850-6362
FCC ID : P87JF43E1900CFN03
MODEL NAME : JF43E1900CFN03
SERIAL NUMBER : N/A
DATE : October 05, 2007

EQUIPMENT CLASS	PCB - PCS Licensed Transmitter
EQUIPMENT DESCRIPTION	CDMA Fiber-Fed Repeater System
THIS REPORT CONCERNS	Class II Permissive Change
MEASUREMENT PROCEDURES	ANSI C63.4: 2003, EIA/TAI 603B
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	PART 24 Subpart E
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER(S) OPEN AREA TEST SITE

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
2.1046, 24.232	RF Power Output at Antenna Terminals	Met the Limit / PASS
2.1047	Modulation Characteristics	Met the requirement / PASS
2.1049, 24.238	Occupied Bandwidth, Bandwidth Limitation	Met the Limit / PASS
2.1049	Band Edge	Met the Limit / PASS
2.1051, 24.238 (a)	Spurious Emissions at Antenna Terminals	Met the Limit / PASS
2.1053, 24.238 (a)	Field strength of Spurious Radiation	Met the Limit / PASS
2.1055(a)(1), 24.235	Frequency Stability with Temperature variation	Met the requirement / PASS
2.1055(d), 24.235	Frequency stability with primary voltage variation	Met the requirement / PASS
2.1093	RF Exposure	Met the Limit / PASS
15.209	Radiated Emission Limits, General Requirement	Met the Limit / PASS
15.207	Conducted Limits	Met the Limit / PASS

2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Related Submittal(s) / Grant(s)

-. Class II Permissive change

The system is consist of remote controller and donor unit and the system was certified on October 31, 2005, but following modification and/or changed items are implemented into a remote controller. No changes were made in Donor unit, so the test for donor unit was not performed.

	Before	Changed items on the unit
Power supply	SB-MO-4037	SB-MO-4037 or ETCA-ARB4
LPA	STA1900-45MM1	STA1900-45MM1 or LPA1900-030-SC01
LNA	NTL-LNA1880-07SB	NTL-LNA1880-07SB or ETL 1880 H36A
RSM	RSM	RSM(DHCP)

2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in section 2.1.

2.5 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.6 Test Facility

The Electromagnetic compatibility measurement facilities are located on at 307-51 Daessangryung-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-080, Korea. Description details of test facilities were submitted to the Federal Communications Commission on August 30, 2005 (Registration Number: 92819 and 340658), accredited by KOLAS (Korea Laboratory Accreditation Scheme, No: 85) and approved by TUV, DNV and MIC (Ministry of Information and Communications in Korea) according to the requirement of ISO17025.

3. GENERAL INFORMATION

3.1 Product Description

The INKEL Corporation, Model JF43E1900CFN03 (referred to as the EUT in this report) is a CDMA Fiber-Fed Repeater System that consists of remote controller and donor unit. This system is designed to cover blank spots of small office, hotel rooms, small parking lots, garages or small building. It helps to improve PCS communication signal and coverage by extending the coverage of a base station. Outdoor antenna receives signal from a PCS base station, then the product amplifies the signal. After amplification, the signal is passed through to the indoor antenna. Conversely, signals from handsets are amplified and retransmitted to the base station. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	PCS CDMA Repeater
EMISSION DESIGNATOR	1M28F9X
OPERATING FREQUENCY	1930~1990 MHz for Down link only
RF OUTPUT POWER	20 W (43dBm)
NUMBER OF LAYER	2 Layers
POWER REQUIREMENT	AC 65V-90V, 60Hz, 15A AC 115V/230V, 50/60Hz, 10A AC 115V, 50/60Hz, 6A
EXTERNAL CONNECTOR	UL_1, DL/UL_0, Battery, AC_IN

3.2 Alternative type(s)/model(s); also covered by this test report.

-. None

4. EUT MODIFICATIONS

-. None

5. SYSTEM TEST CONFIGURATION

5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
LNA	ETRONTEL	ETL 1880 H36A	N/A
LPA	BTI	LPA1900-030-SC01	N/A
OPTIC	INKEL Corp.	APOM4-2X321-RE	N/A
R-DL_UL-DRV	INKEL Corp.	SPT-ER20REM (REMOTE DL/UL MODULE)	N/A
R-LOCAL@MODEM	INKEL Corp.	SPT-ER20REM (REMOTE LOCAL(UL SAW) & MODEM MODULE)	N/A
RSM	SAT	RSM(DHCP)	N/A
R-UL-SAW	INKEL Corp.	SPT-ER20REM (REMOTE UL SAW MODULE)	N/A
PSU	TaeHyung Industrial Electronics	ETCA-ARB4	N/A

5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	FCC ID	Description	Connected to
JF43E1900CFN03	INKEL Corporation	P87JF43E1900CFN03	CDMA Fiber-Fed Repeater System (EUT)	-
HTF-5150-3-NF	N/A	N/A	Coaxial Resistor	EUT

5.3 Mode of operation during the test

The EUT was received signal form signal generator and then each mode, CDMA and EVDO was configured for maximum signal gain and bandwidth. The EUT was operated in a manner representative of the typical usage of the equipment. During all testing, system components were manipulated within the confines of typical usage to maximize each emission. The applicant does not supply antenna(s) with the system, so the dummy loads were connected to the RF output ports on the EUT for radiated spurious emission testing.

5.4 Modulation Characteristics

The EUT uses CDMA modulation, so the voice is digitized and coded into a bit stream. The test dose not performed and met the requirement.

6. RF POWER OUTPUT at ANTENNA TERMINAL

6.1 Operating environment

Temperature : 25.7 °C

Relative humidity : 44.7 %

6.2 Test set-up

The RF output port of the EUT was connected to the input of the spectrum analyzer. The software for RF control on the notebook PC was set to transmit maximum signal gain and bandwidth. The test was performed at three frequencies (low, middle, and high channels) using all modulation.

RF output power was measured by channel power measurement function of the spectrum analyzer.



6.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	437B	HP	Power Meter	3125U25121	June 19, 2007
■ -	8481A	HP	Power Sensor	1550A14928	Dec. 18, 2006
■ -	E4432B	HP	Signal Generator	US38440950	June 19, 2007
■ -	SMU 200A	R/S	Vecter Signal Generator	100722	June 19, 2007
■ -	FST13	R/S	Spectrum Analyzer	100637	June 19, 2007

All test equipment used is calibrated on a regular basis.

6.4 Test data

-. Test Date : September 17, 2007

-. Test Result : Pass

Modulation	Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (W)
CDMA	Low	1931.25	-6.60	43.00	19.953	100.00
	Middle	1960.00	-6.90	43.00		
	High	1988.75	-6.70	43.00		
EVDO	Low	1931.25	-6.70	43.00	19.953	
	Middle	1960.00	-6.90	43.00		
	High	1988.75	-6.60	43.00		

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Tested by: Ki-Hong, Nam / Test Engineer

7. OCCUPIED BANDWIDTH

7.1 Operating environment

Temperature : 25.7 °C

Relative humidity : 44.7 %

7.2 Test set-up

The RF output port of the EUT was connected to the input of the spectrum analyzer. The software for RF control on the notebook PC was set to transmit maximum signal gain and bandwidth. The test was performed at three frequencies (low, middle, and high channels).

For the testing, the RBW was set to 1 % to 3 % of the -26 dB bandwidth. The VBW is set to 3 times the RBW and sweep time is coupled.



7.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ - 8564E	HP	Spectrum Analyzer	3650A00756	June 19, 2007
■ - E4432B	HP	Signal Generator	US38440950	June 19, 2007
■ - SMU 200A	R/S	Vecter Signal Generator	100722	June 19, 2007
■ - FST13	R/S	Spectrum Analyzer	100637	June 19, 2007

All test equipment used is calibrated on a regular basis.

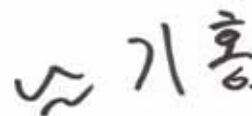
7.4 Test data

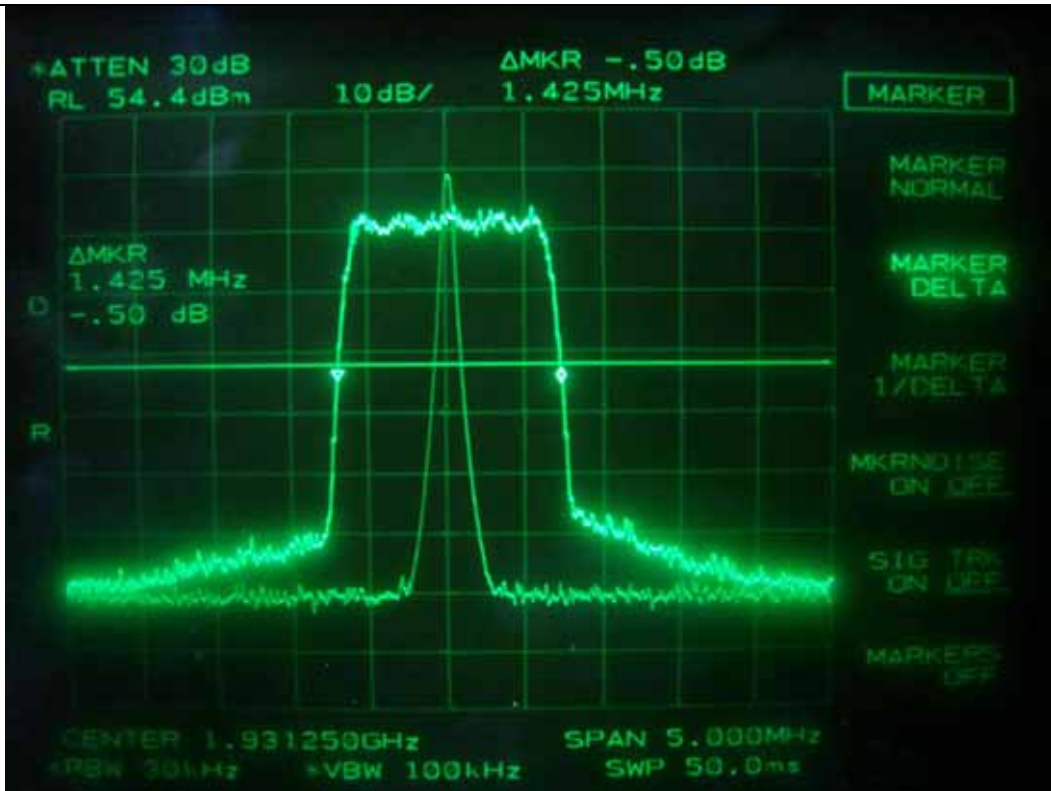
-. Test Date : September 17, 2007

-. Test Result : Pass

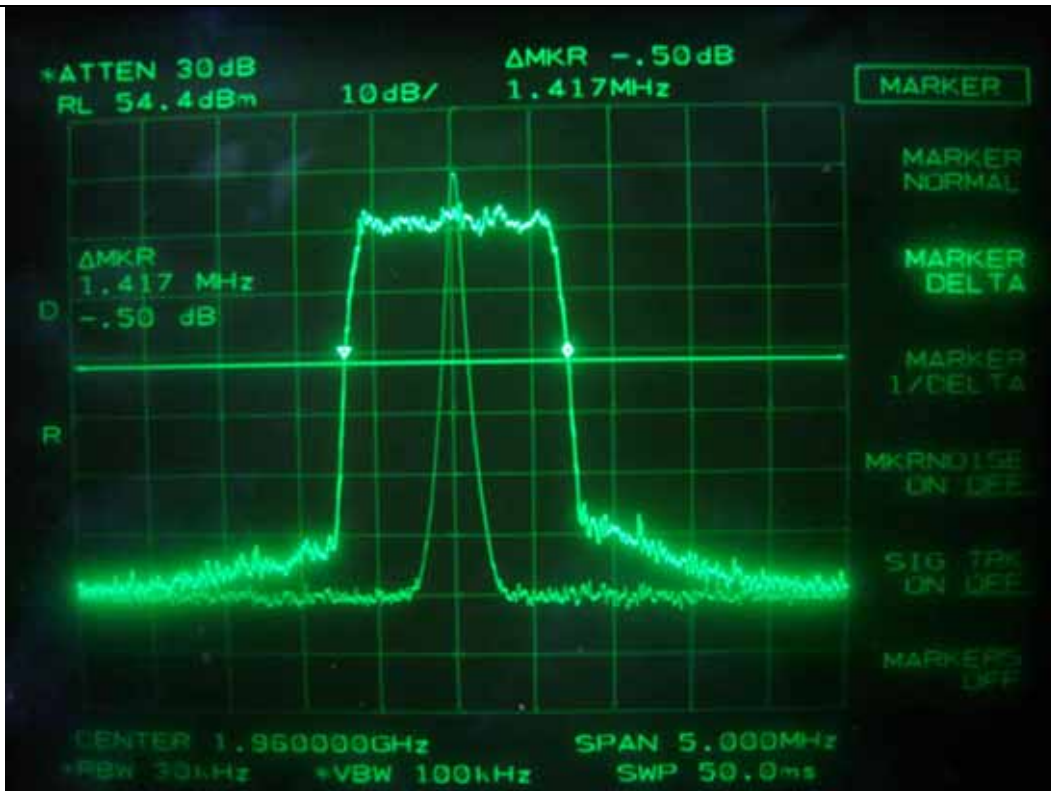
Modulation	Channel	26dB Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
CDMA	Low	1425	1275
	Middle	1417	1275
	High	1417	1267
EVDO	Low	1392	1258
	Middle	1383	1250
	High	1392	1250

Remark: According to above result, the carrier frequency shall be within the frequency block edges.

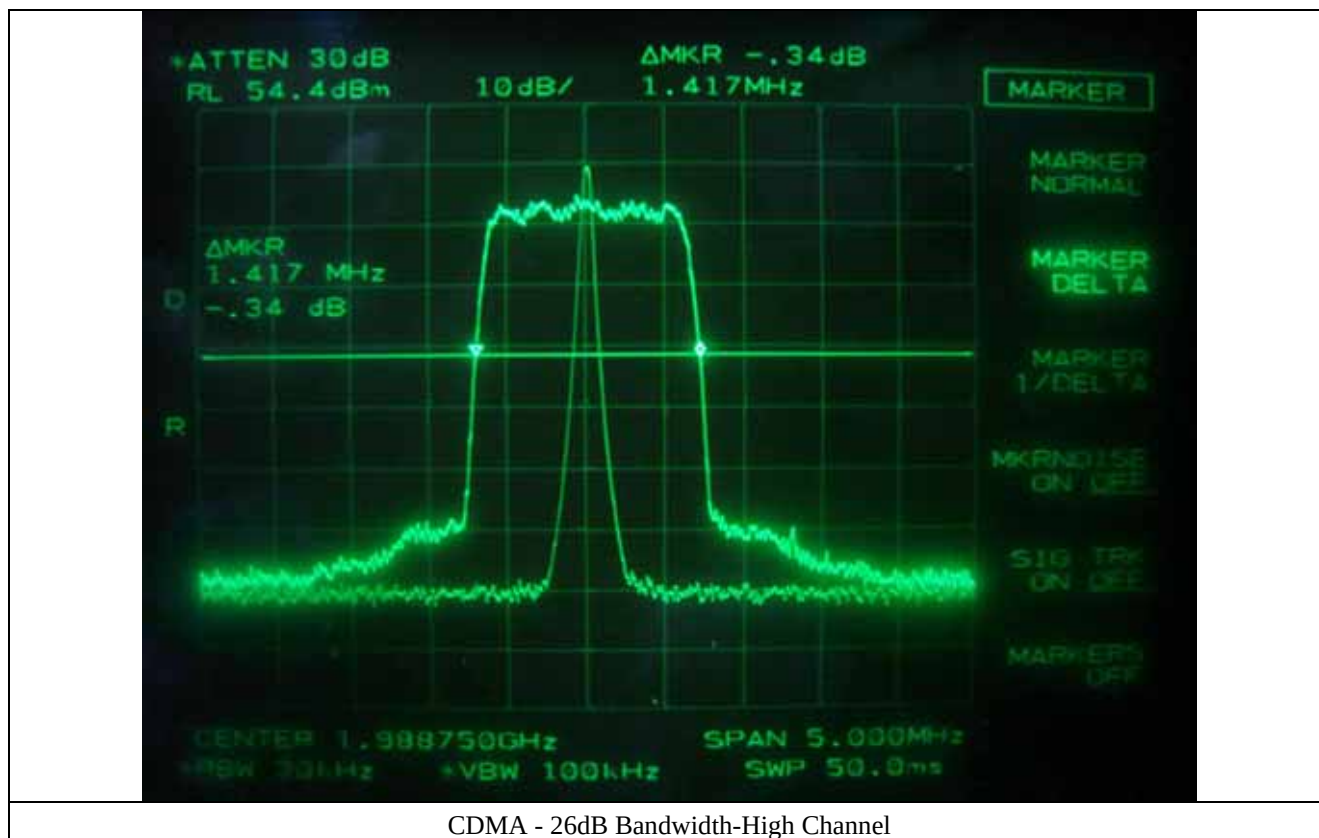
**Tested by: Ki-Hong, Nam / Test Engineer**

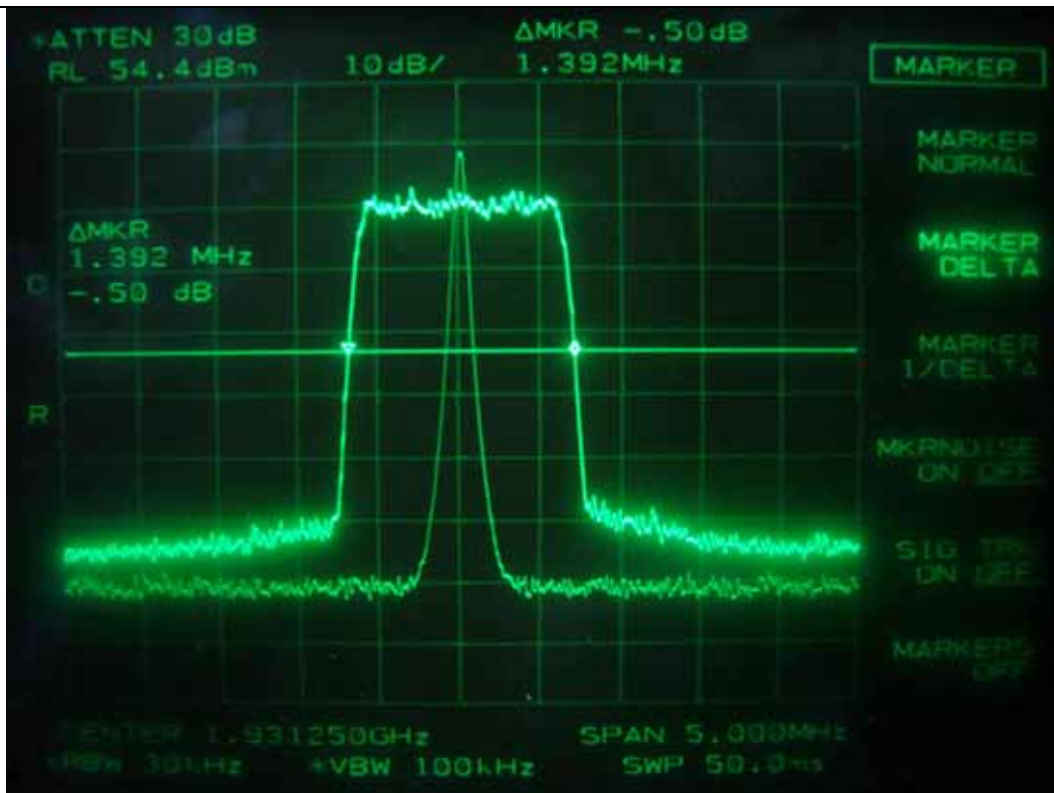


CDMA - 26dB Bandwidth-Low Channel

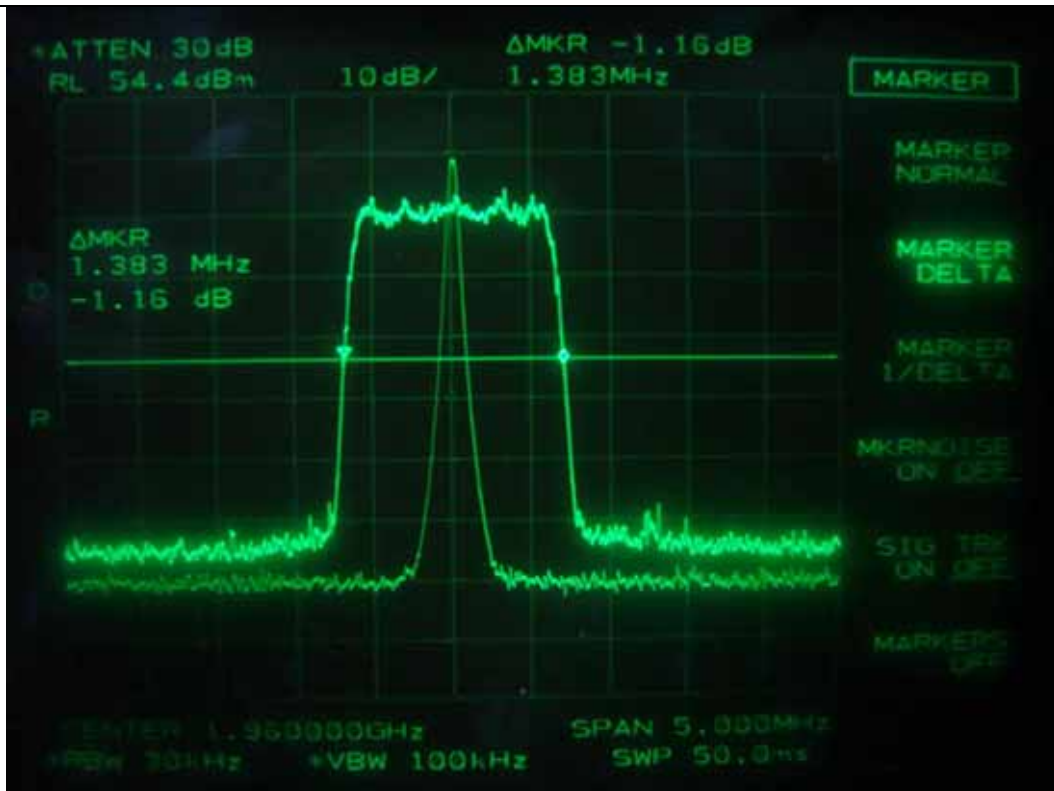


CDMA - 26dB Bandwidth-Middle Channel

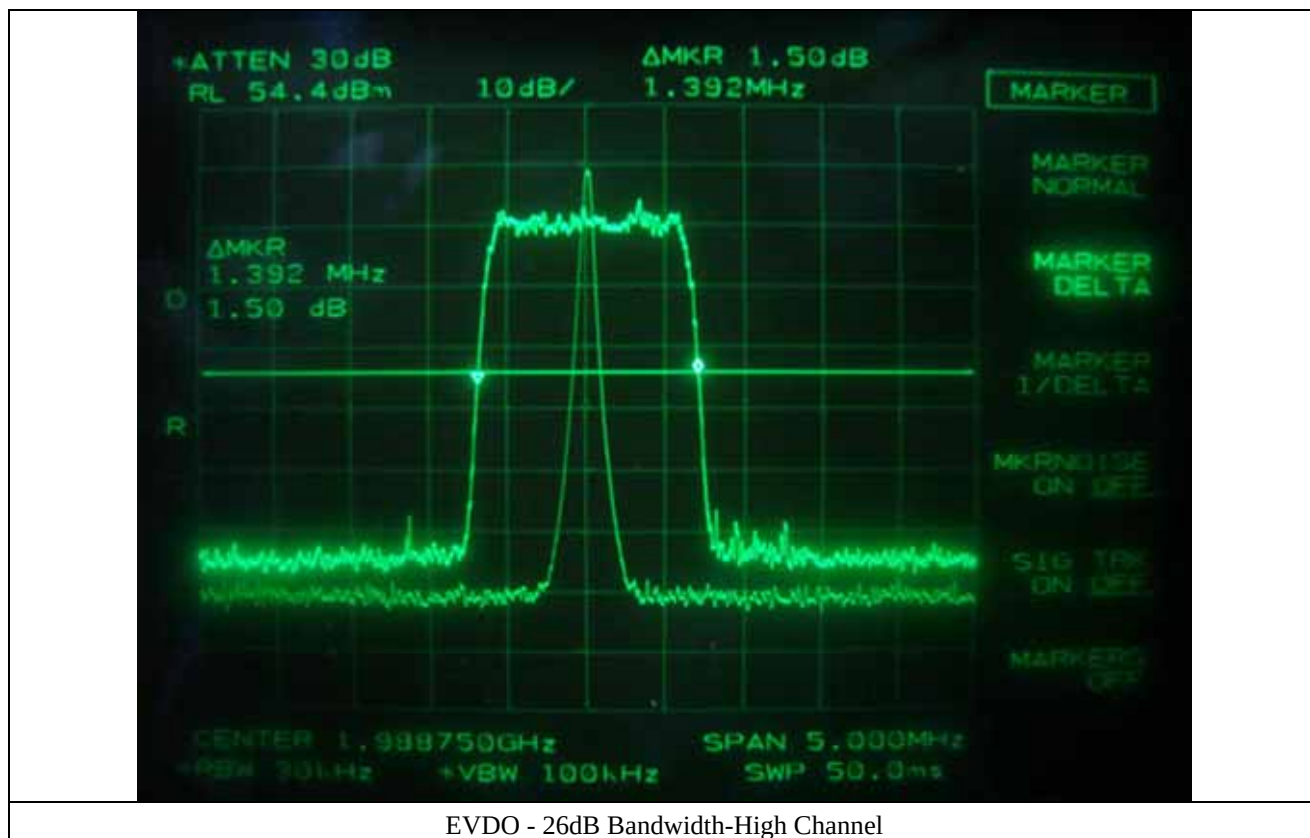


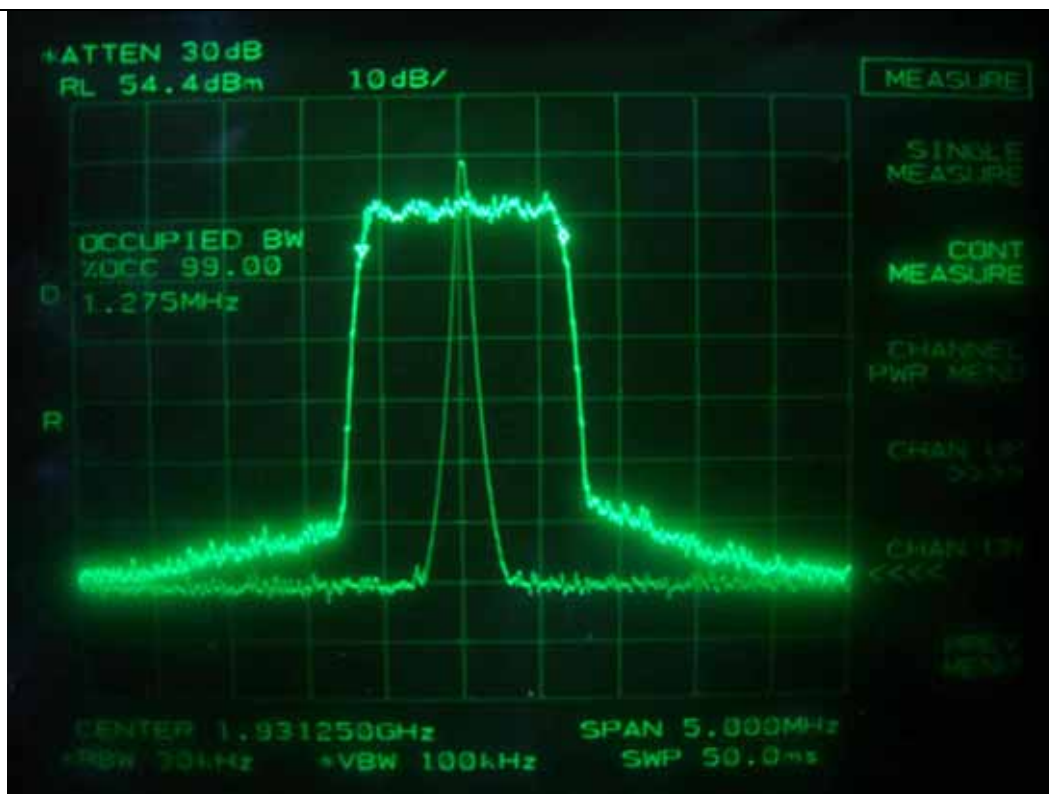


EVDO - 26dB Bandwidth-Low Channel

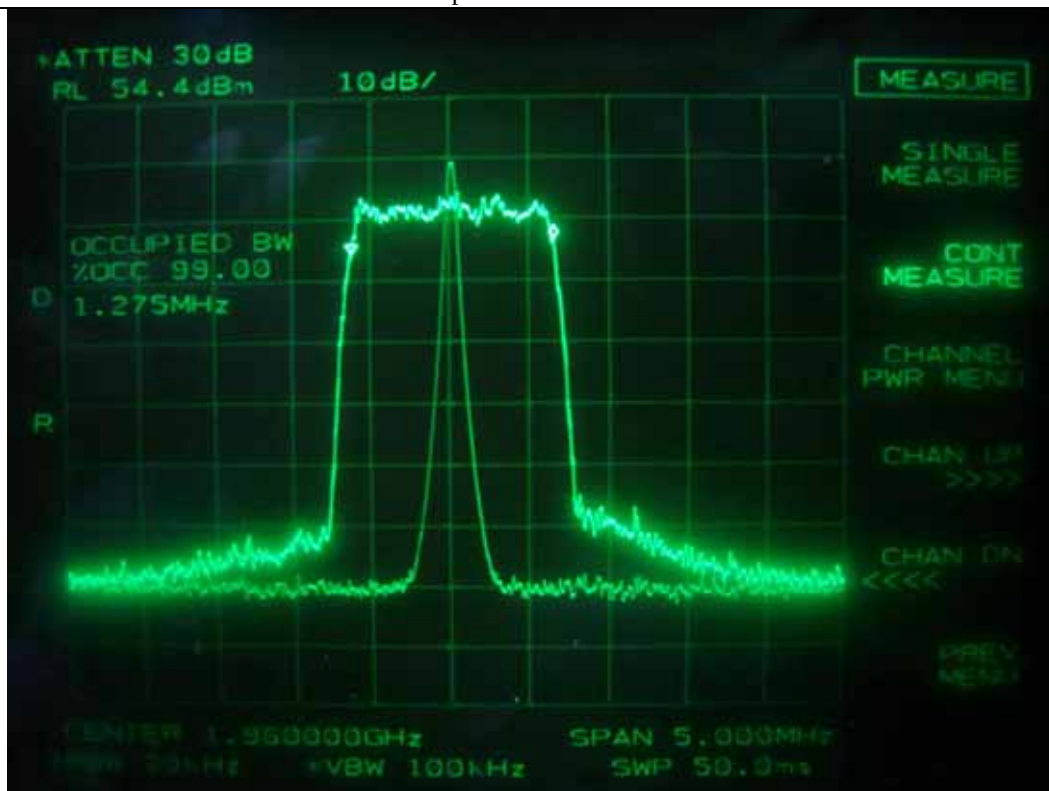


EVDO - 26dB Bandwidth-Middle Channel

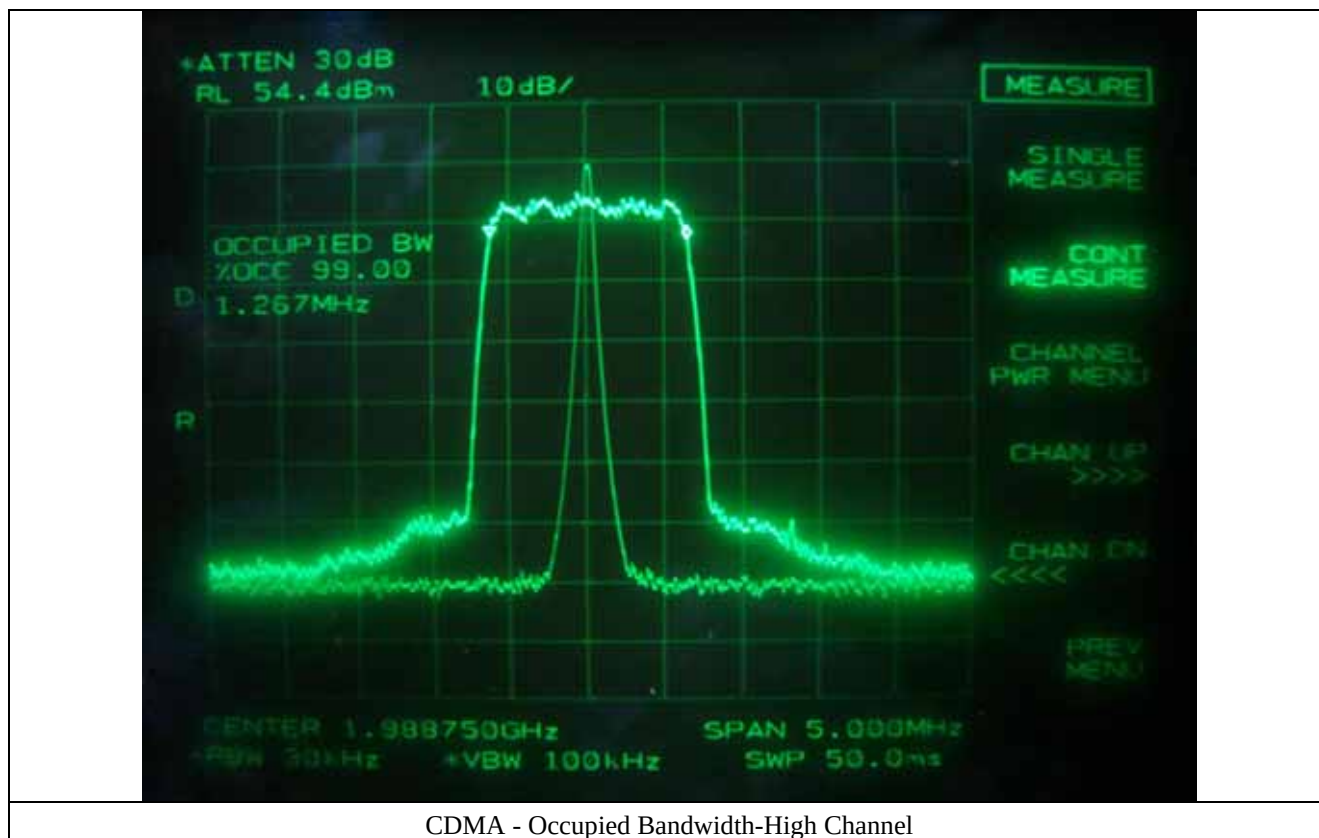




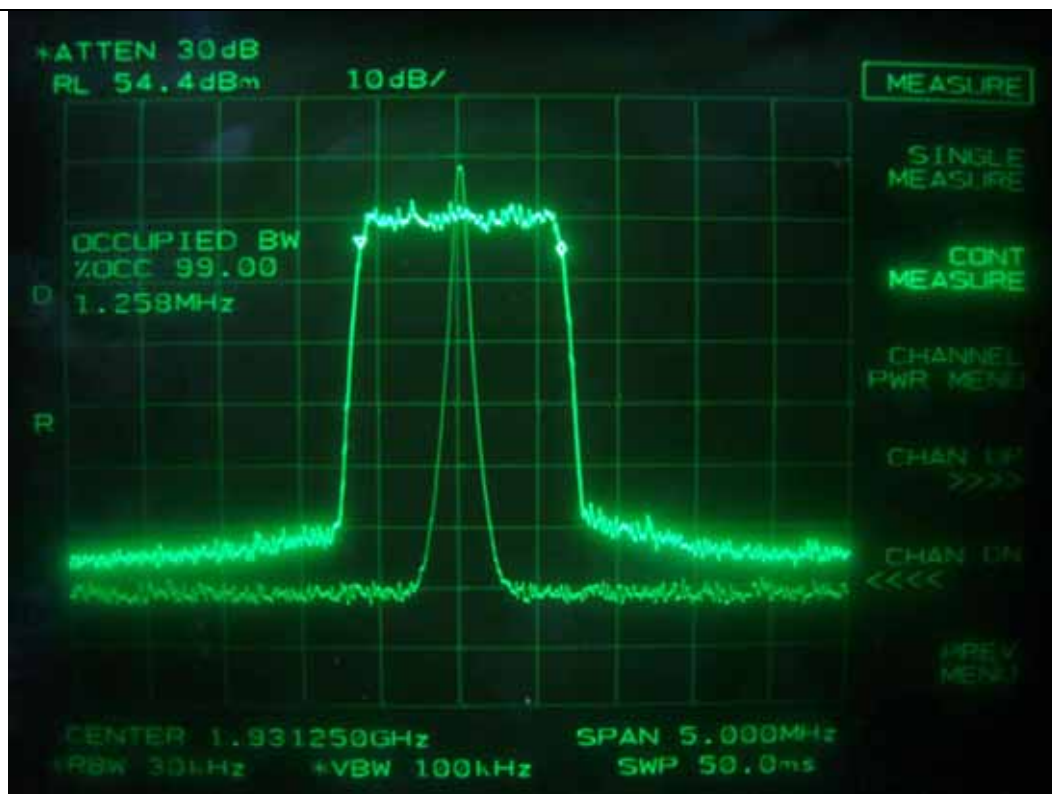
CDMA - Occupied Bandwidth-Low Channel



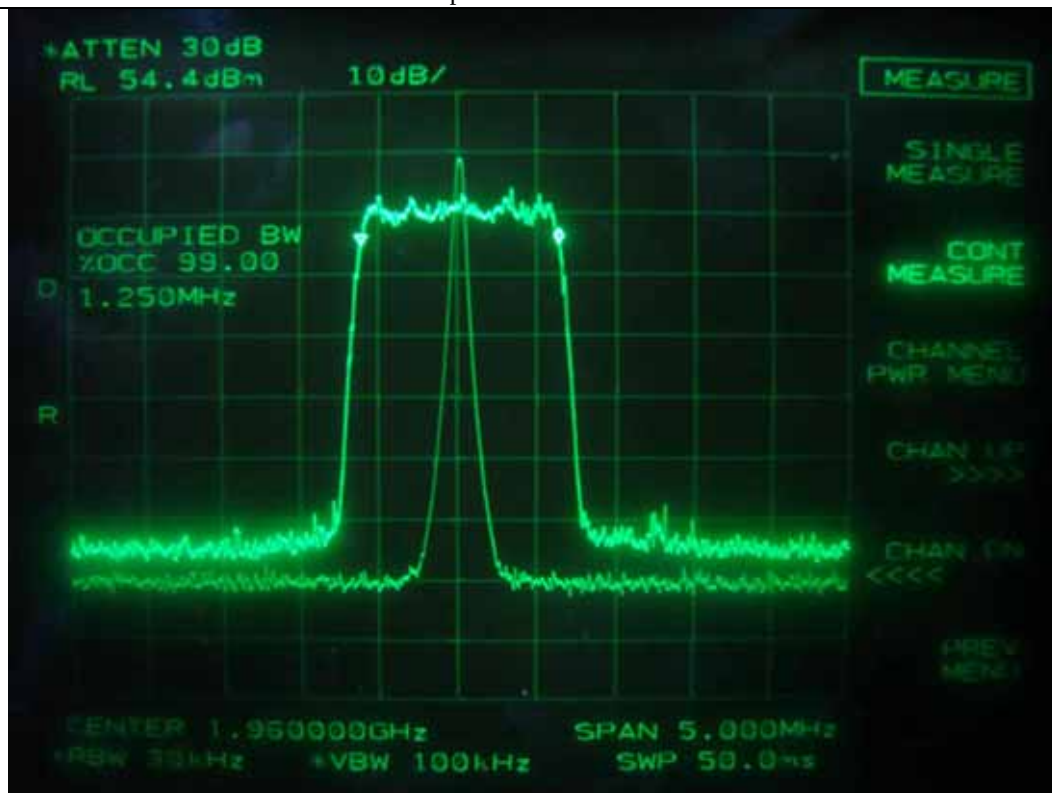
CDMA - Occupied Bandwidth-Middle Channel



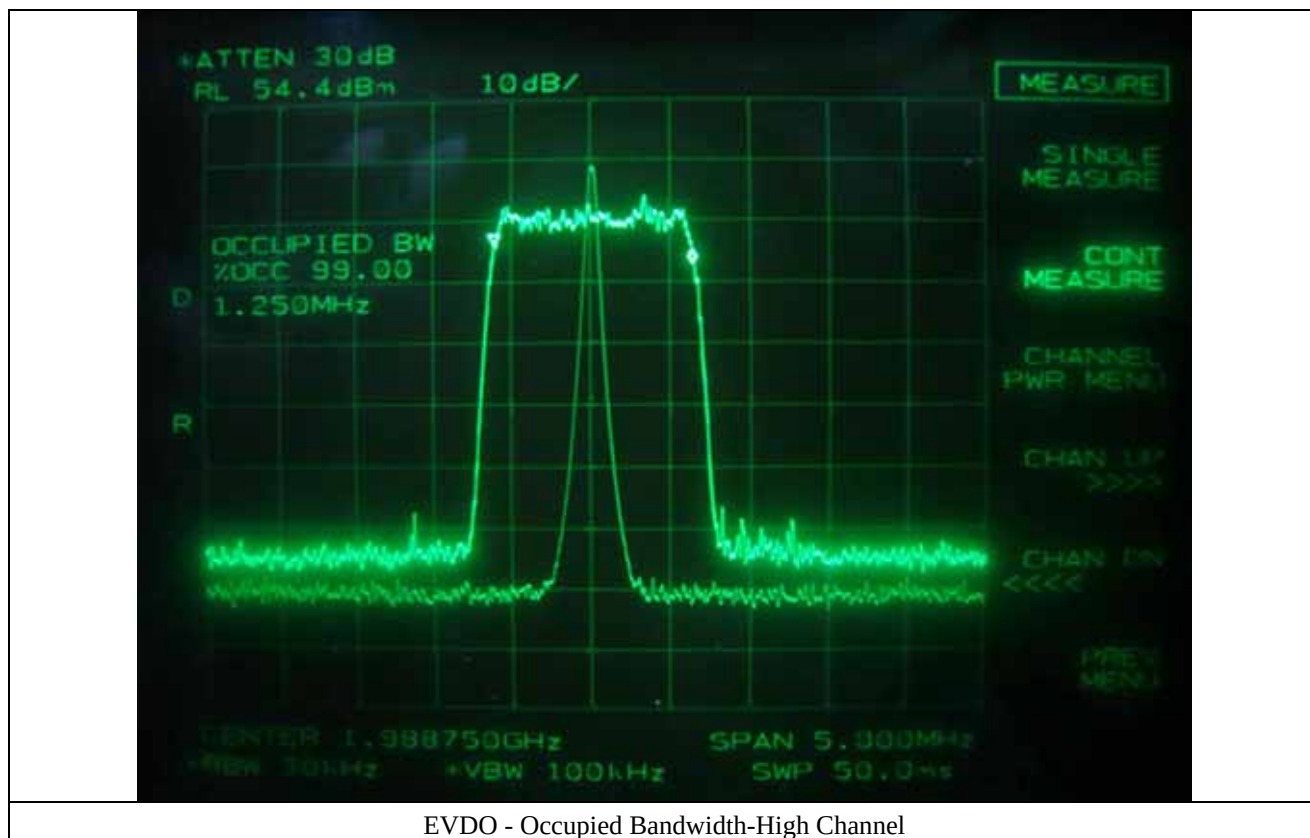
CDMA - Occupied Bandwidth-High Channel



EVDO - Occupied Bandwidth-Low Channel



EVDO - Occupied Bandwidth-Middle Channel

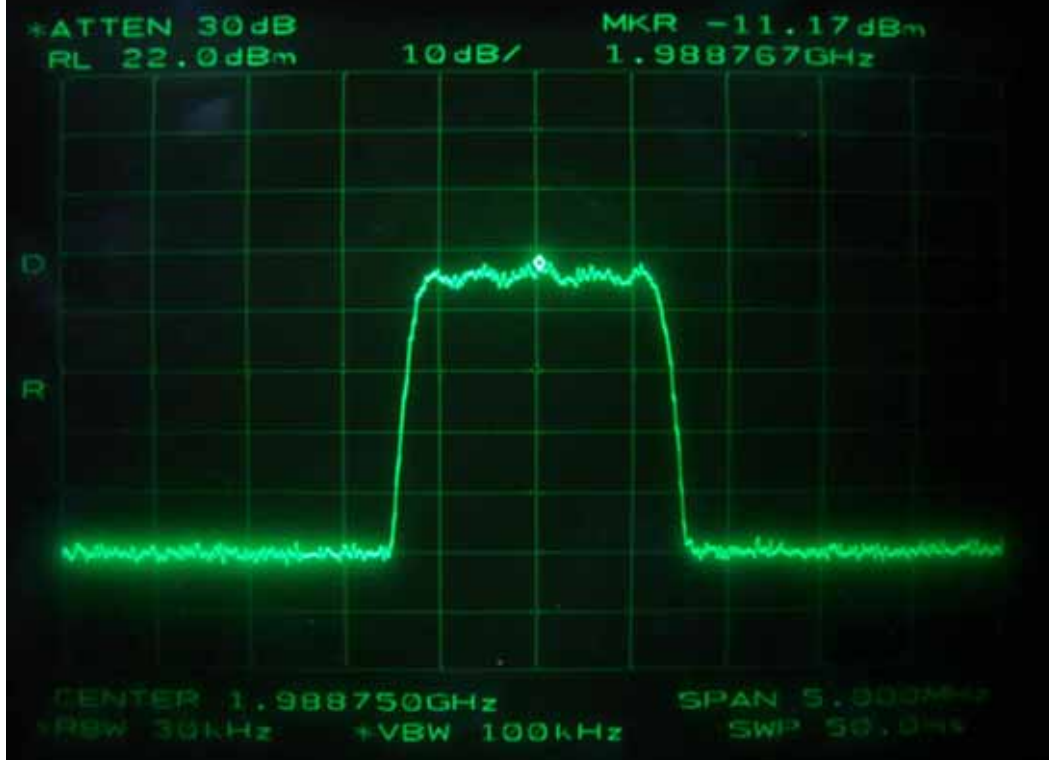




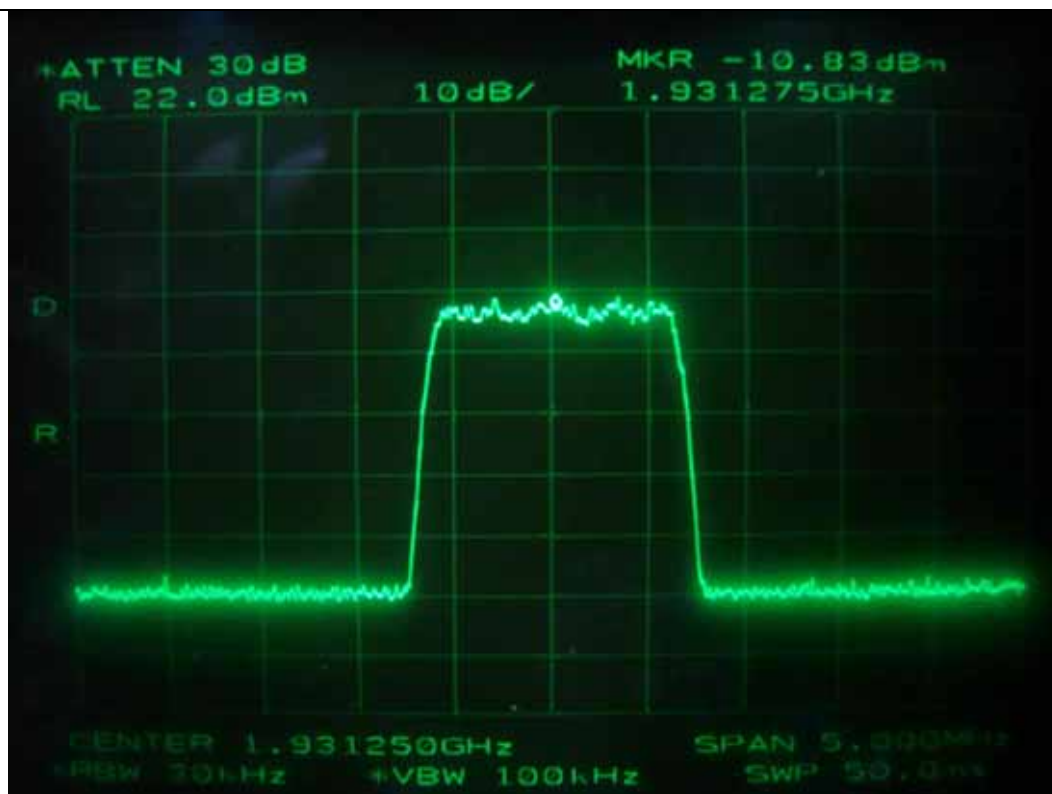
CDMA - Input-Low Channel



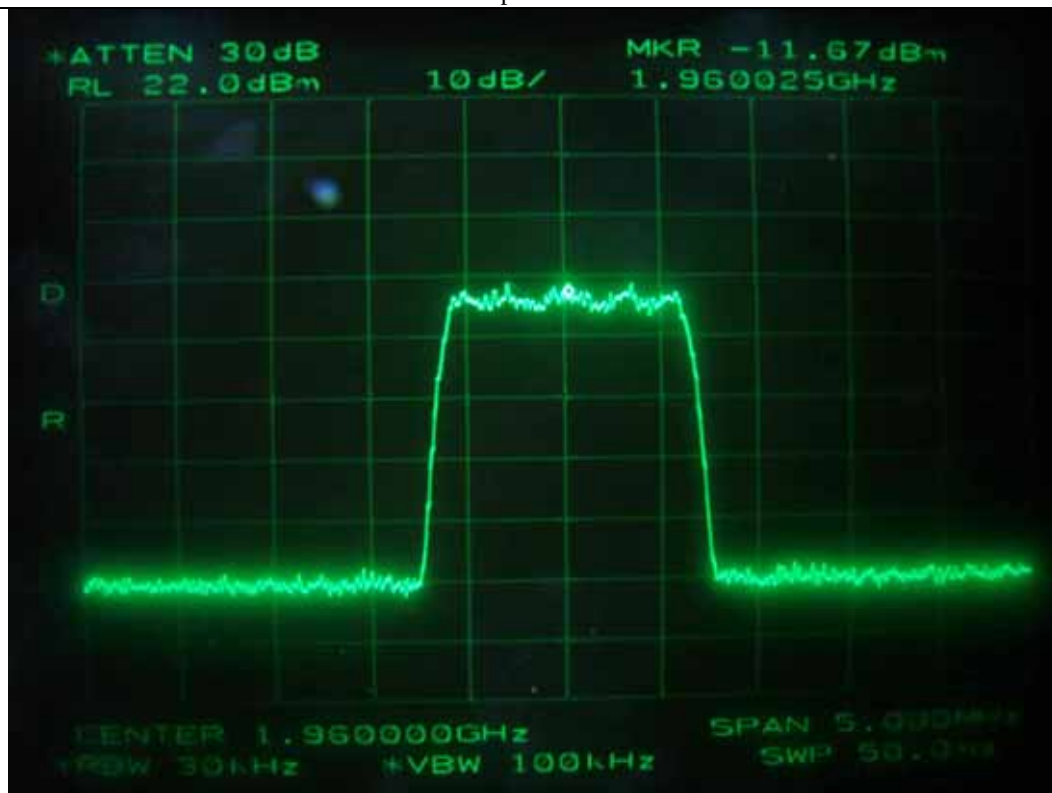
CDMA - Input-Middle Channel



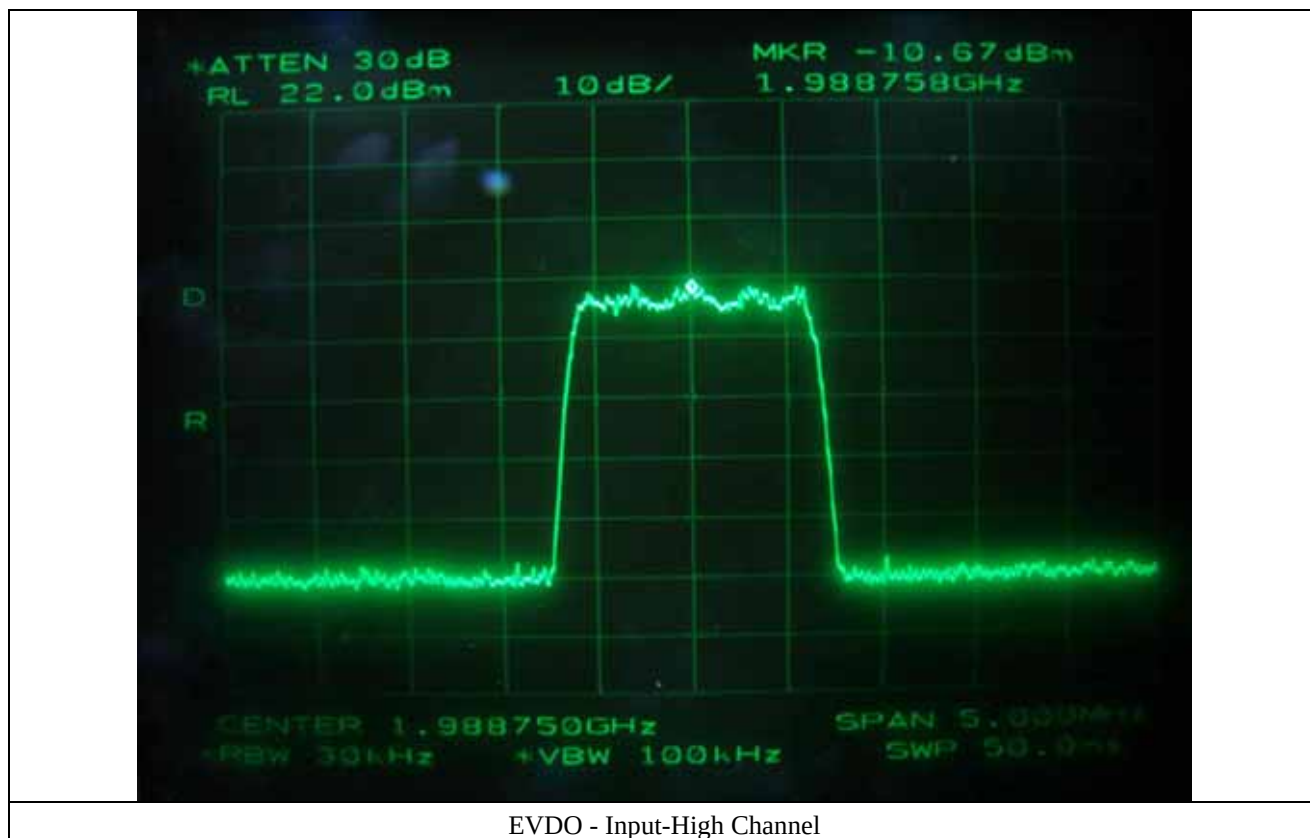
CDMA - Input-High Channel



EVDO - Input-Low Channel



EVDO - Input-Middle Channel



8. SPURIOUS EMISSION AT ANTENNA TERMINAL

8.1 Operating environment

Temperature : 24.5 °C

Relative humidity : 45 %

8.2 Test set-up for conducted measurement

The RF output port of the EUT was connected to the input of the spectrum analyzer. The resolution bandwidth and video bandwidth of the spectrum analyzer was set at 1 MHz and sufficient scans were taken to show any out of band emissions up to 20 GHz. The software for RF control on the notebook PC was set to zero



8.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	June 19, 2007
■ -	E4432B	HP	Signal Generator	US38440950	June 19, 2007
■ -	SMU 200A	R/S	Vecter Signal Generator	100722	June 19, 2007
■ -	FST13	R/S	Spectrum Analyzer	100637	June 19, 2007

All test equipment used is calibrated on a regular basis.

8.4 Test data

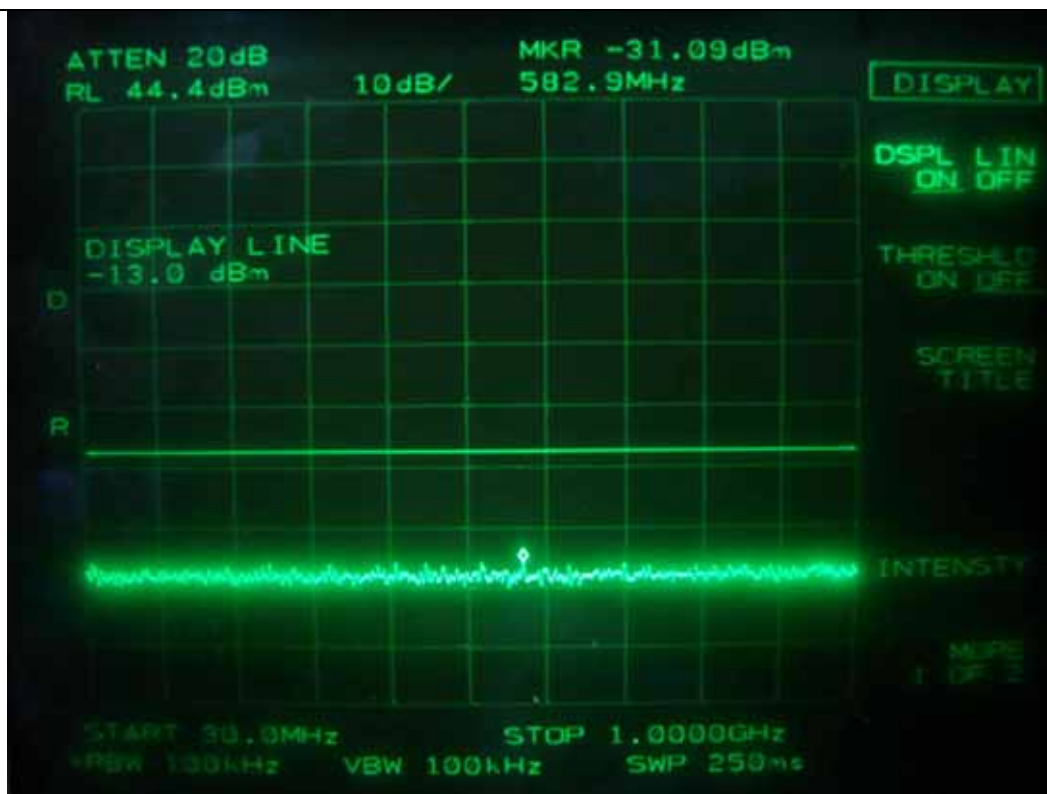
-. Test Date : October 01, 2007
 -. Frequency range : 30 MHz ~ 20 GHz
 -. Result : PASSED BY -14.59 dB at middle Channel of EVDO Mode

Modulation	Harmonic Frequency (MHz)		Measured Value (dBm)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
CDMA	Low	582.90	-31.09	0.16	-30.93	-13.0	-17.93
		3000.00	-29.76	0.83	-28.93		-15.93
	Middle	510.20	-32.26	0.16	-32.10		-19.10
		3720.00	-30.76	0.84	-29.92		-16.92
	High	717.10	-31.76	0.16	-31.60		-18.60
		2910.00	-29.42	0.75	-28.67		-15.67
EVDO	Low	477.80	-32.09	0.16	-31.93	-13.0	-18.93
		4360.00	-30.26	0.92	-29.34		-16.34
	Middle	762.40	-31.59	0.16	-31.43		-18.43
		6400.00	-28.92	1.33	-27.59		-14.59
	High	755.90	-31.42	0.16	-31.26		-18.26
		6400.00	-29.42	1.33	-28.09		-15.09

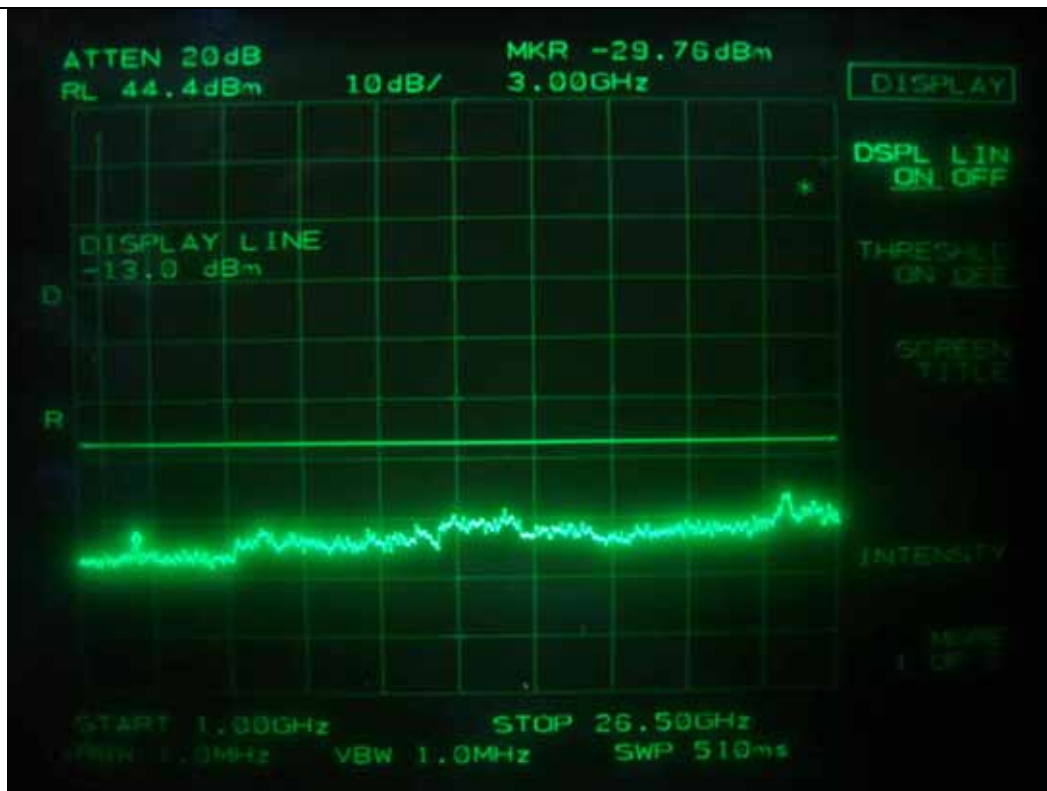
According to Part 24E, out of band emission shall be attenuated by $43 + 10 \log (P)$ dBc, equates to -13.0dBm.

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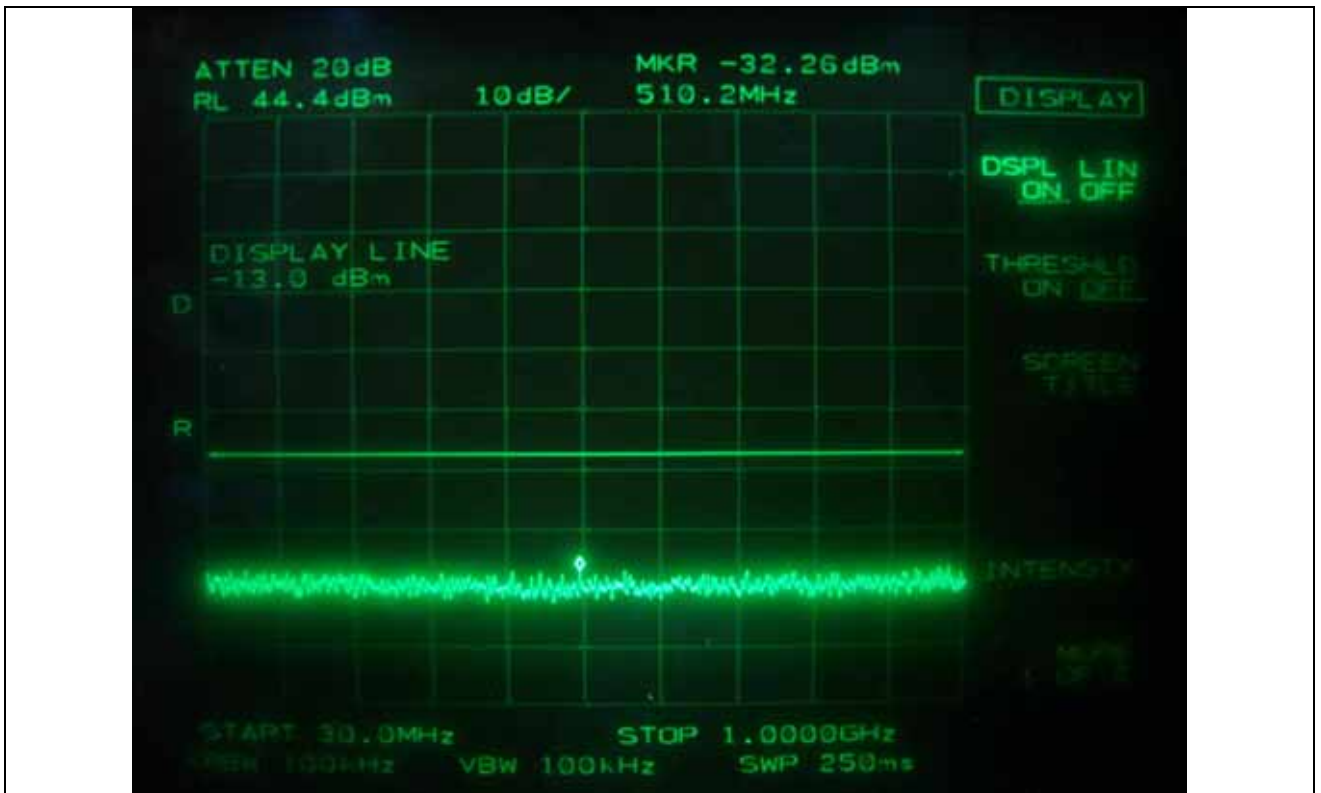
Tested by: Ki-Hong, Nam / Test Engineer



CDMA - Low Channel



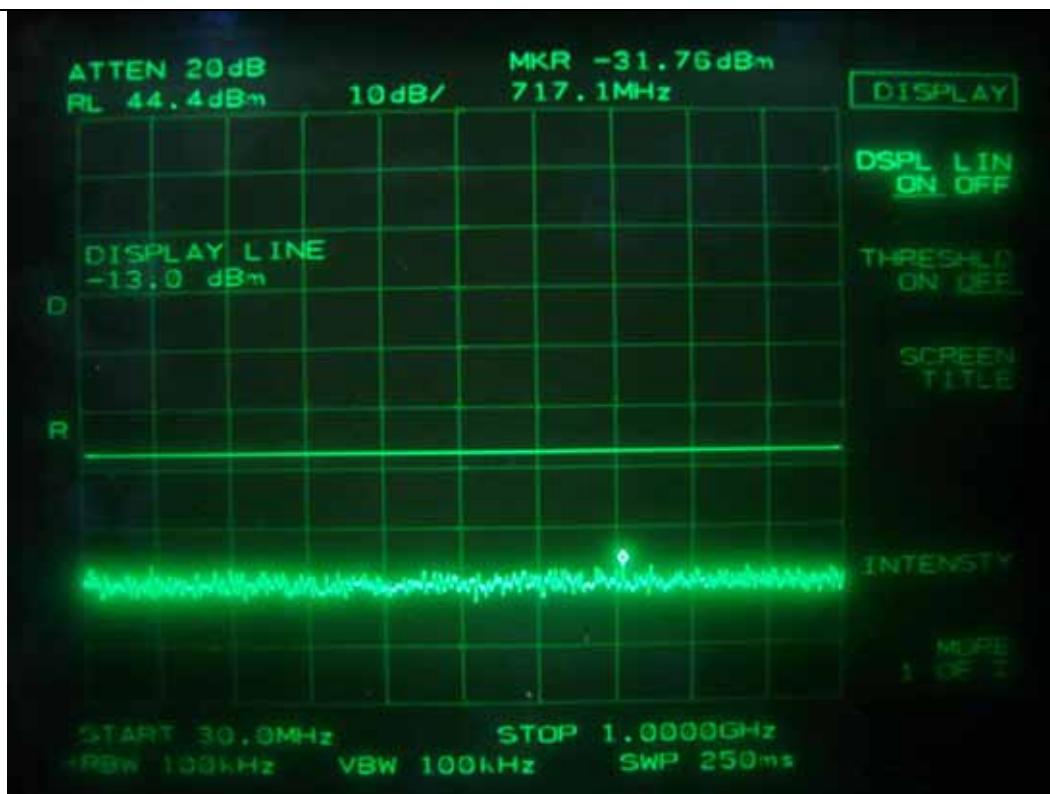
CDMA - Low Channel



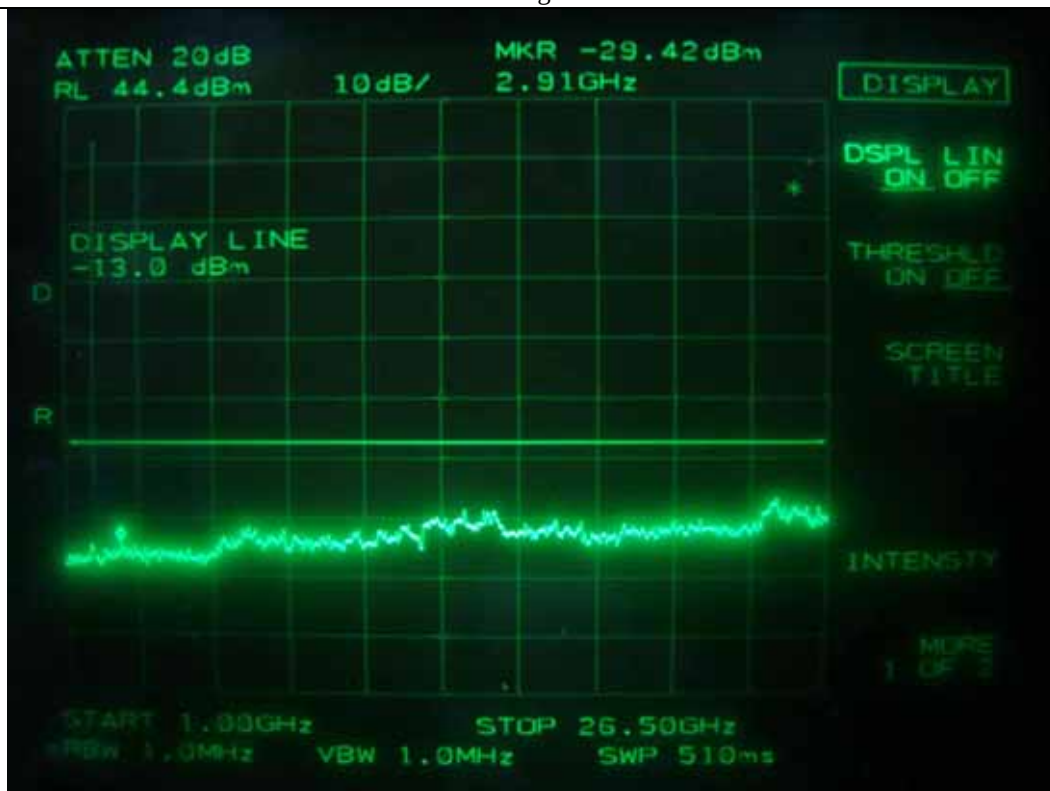
CDMA - Middle Channel



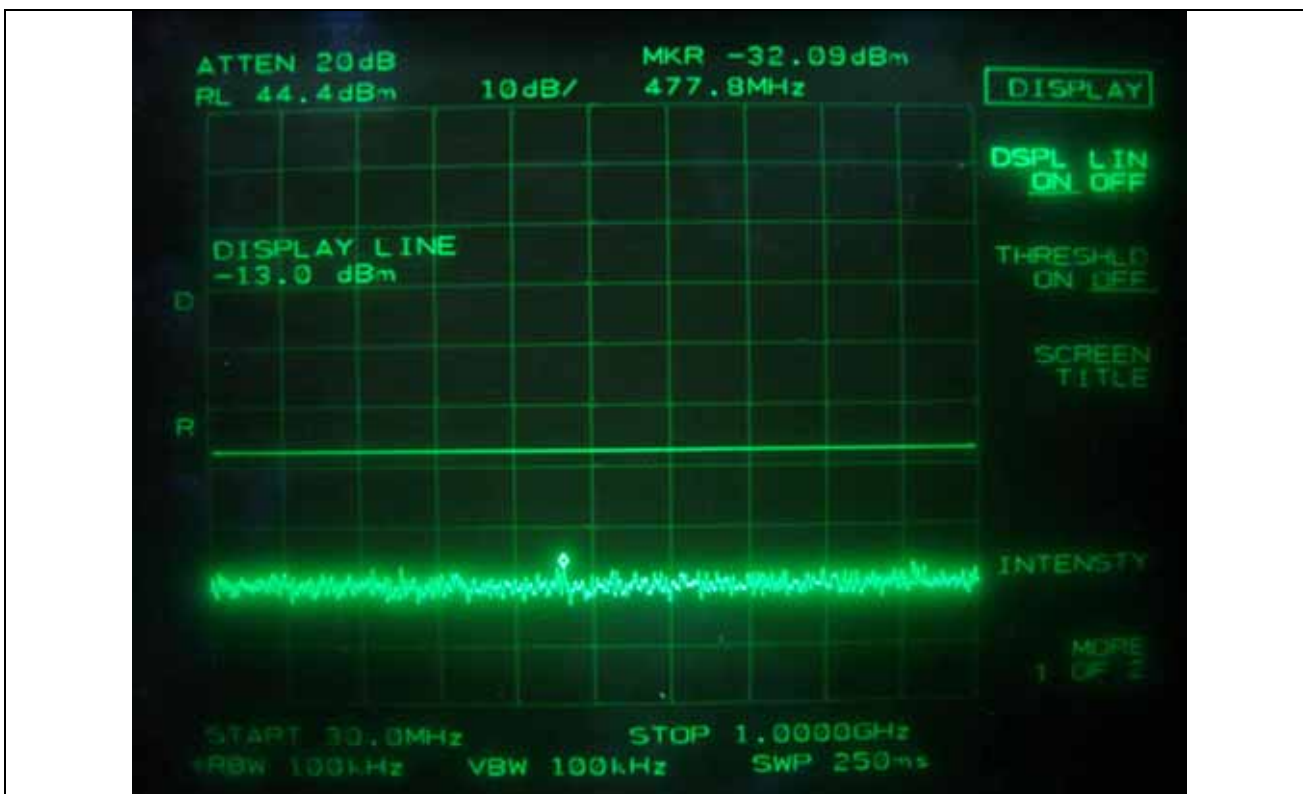
CDMA - Middle Channel



CDMA - High Channel



CDMA - High Channel



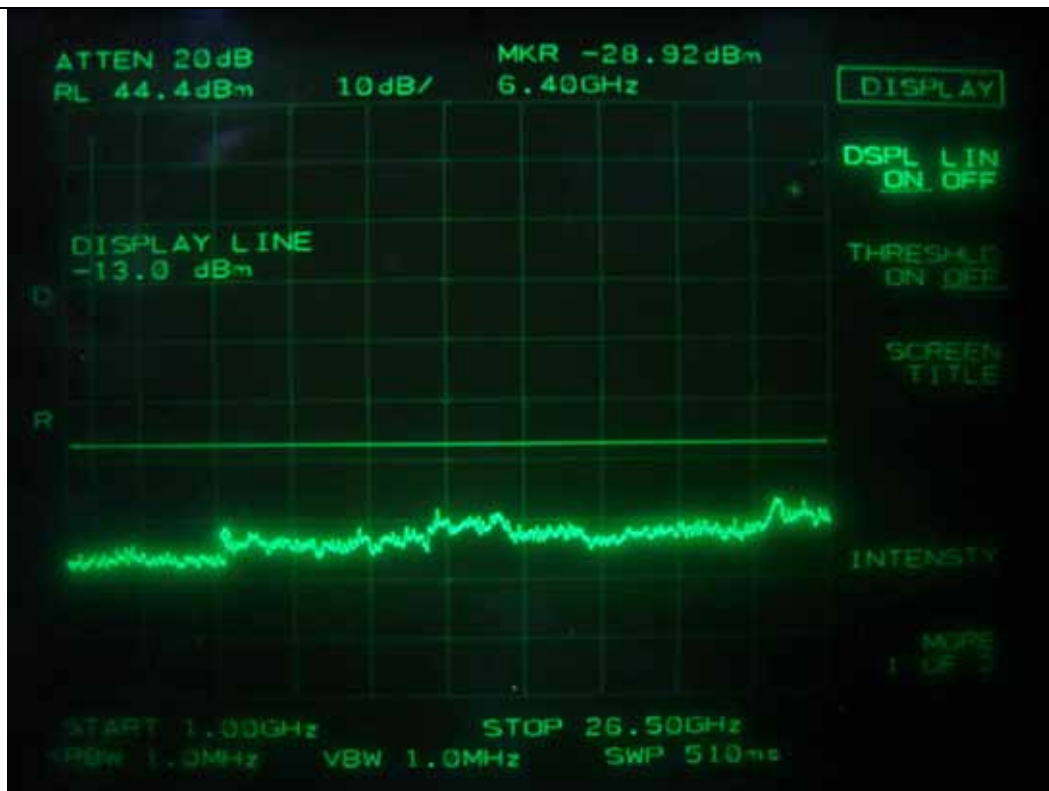
EVDO - Low Channel



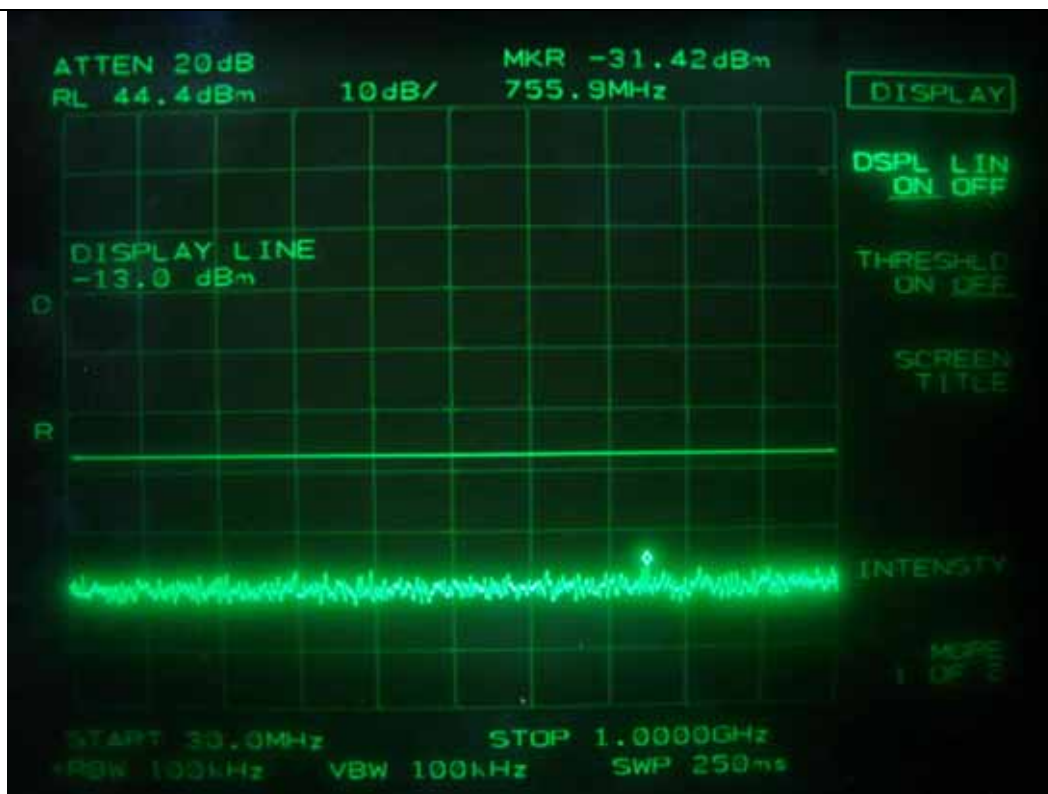
EVDO - Low Channel



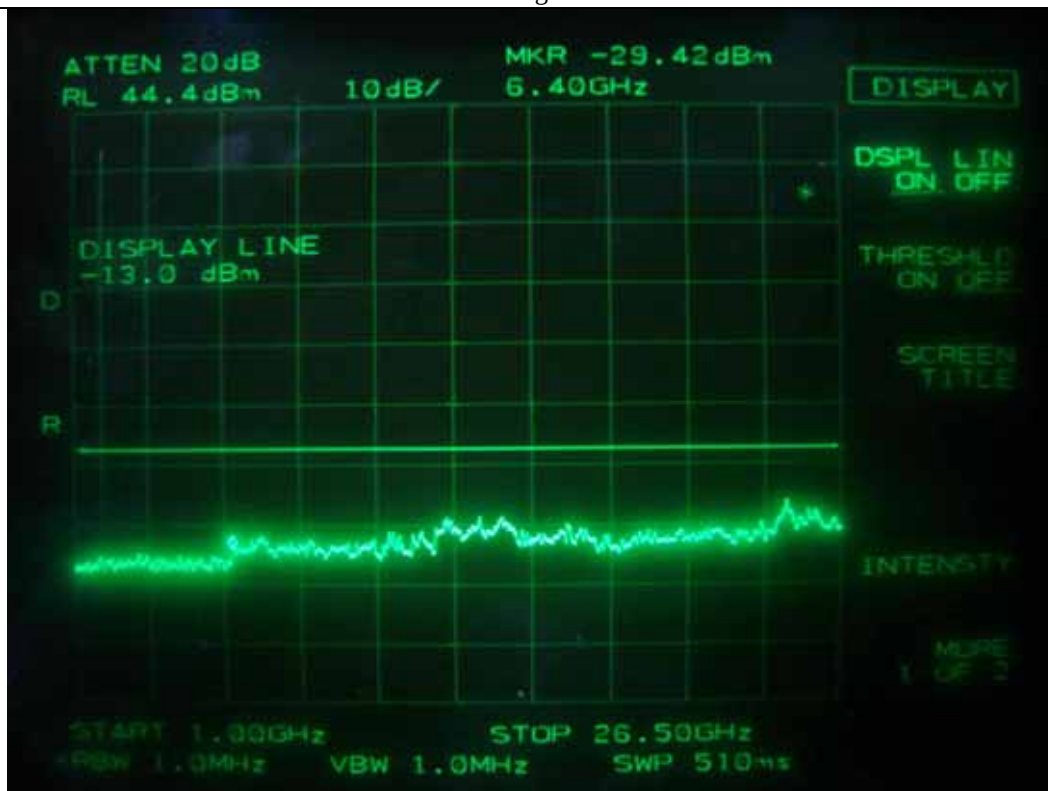
EVDO - Middle Channel



EVDO - Middle Channel



EVDO - High Channel



EVDO - High Channel

9. SPURIOUS EMISSION AT ANTENNA TERMINAL AT BLOCK EDGES ± 1 MHz

9.1 Operating environment

Temperature : 20 °C

Relative humidity : 50 %

9.2 Test set-up for conducted measurement

The RF output port of the EUT was connected to the input of the spectrum analyzer. The software for RF control on the notebook PC was set to transmit maximum signal gain and bandwidth. The test was performed at three frequencies (low, middle, and high channels).



9.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	June 22, 2006
■ -	E4432B	HP	Signal Generator	US38440950	June 22, 2006

All test equipment used is calibrated on a regular basis.

9.4 Test data

-. Test Date : September 17, 2007

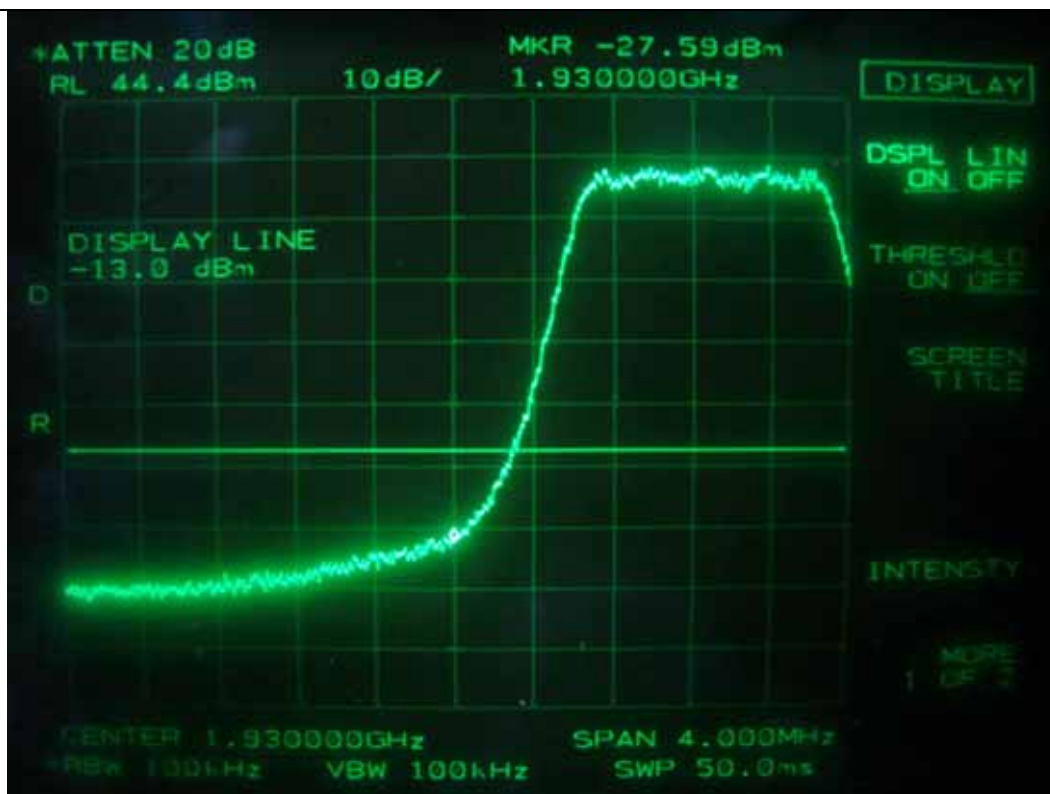
-. Result : PASSED BY -11.10 dB at High Channel of EVDO Mode

Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
CDMA	Low	1930.0	-27.59	-13.0
	High	1990.0	-24.76	
EVDO	Low	1930.0	-24.43	
	High	1990.0	-24.10	

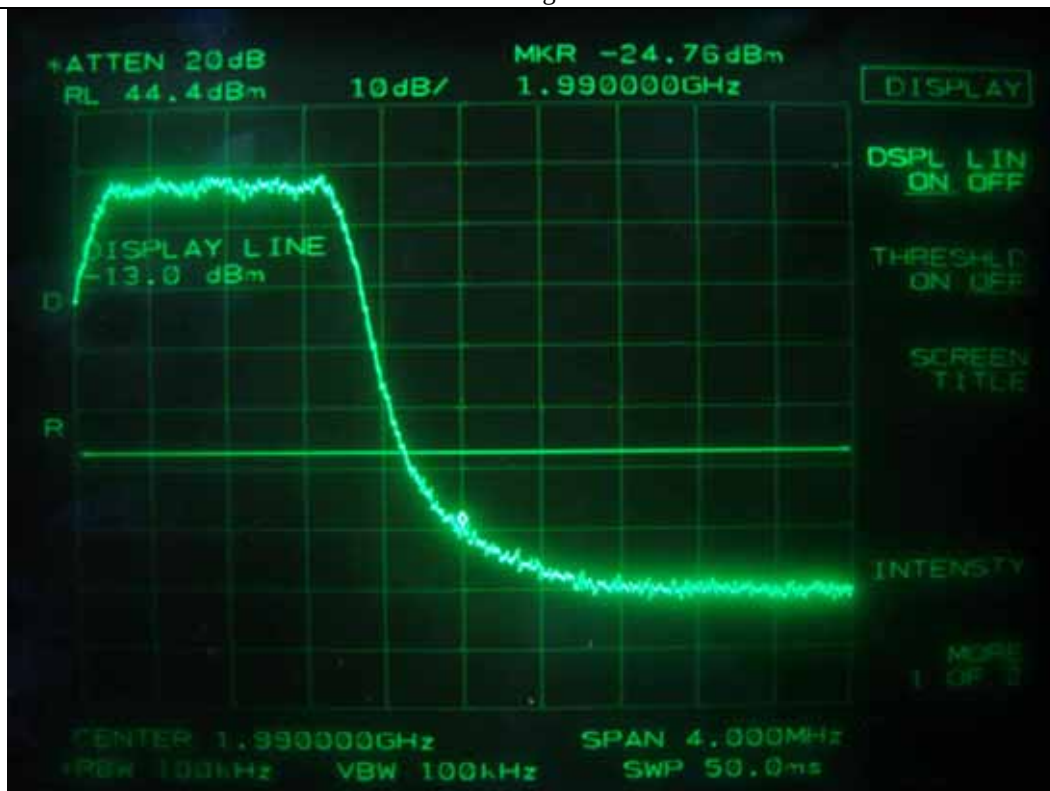
According to Part 24E, out of band emission shall be attenuated by $43 + 10 \log (P)$ dBc, equates to -13.0dBm.



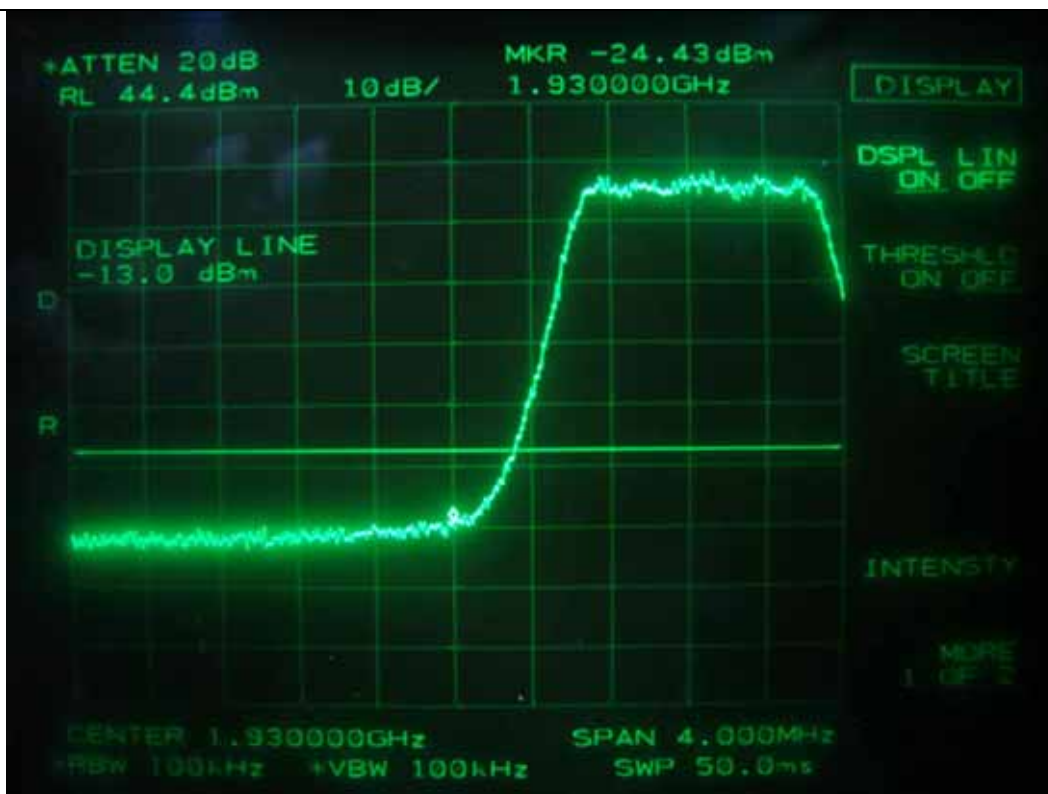
Tested by: Ki-Hong, Nam / Test Engineer



CDMA - Band Edge-Low Channel



CDMA - Bandedge-High Channel



EVDO - Bandedge-Low Channel



EVDO - Bandedge-High Channel

10. INTERMODULATION TEST

10.1 Operating environment

Temperature : 25.7 °C

Relative humidity : 44.7 %

10.2 Test set-up

The RF output port of the EUT was connected to the input of the spectrum analyzer. The resolution bandwidth, 100 kHz and video bandwidth, 100 kHz of the spectrum analyzer was set and sufficient scans were taken to show any out of band emissions up to 10th harmonic. The attenuator of the EUT was set to zero by the software for RF control on the notebook PC. Two input signals are equal in level and were sent to the input of the EUT.



10.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ - 8564E	HP	Spectrum Analyzer	3650A00756	June 19, 2007
■ - E4432B	HP	Signal Generator	US38440950	June 19, 2007
■ - SMU 200A	R/S	Vecter Signal Generator	100722	June 19, 2007
■ - FST13	R/S	Spectrum Analyzer	100637	June 19, 2007

All test equipment used is calibrated on a regular basis.

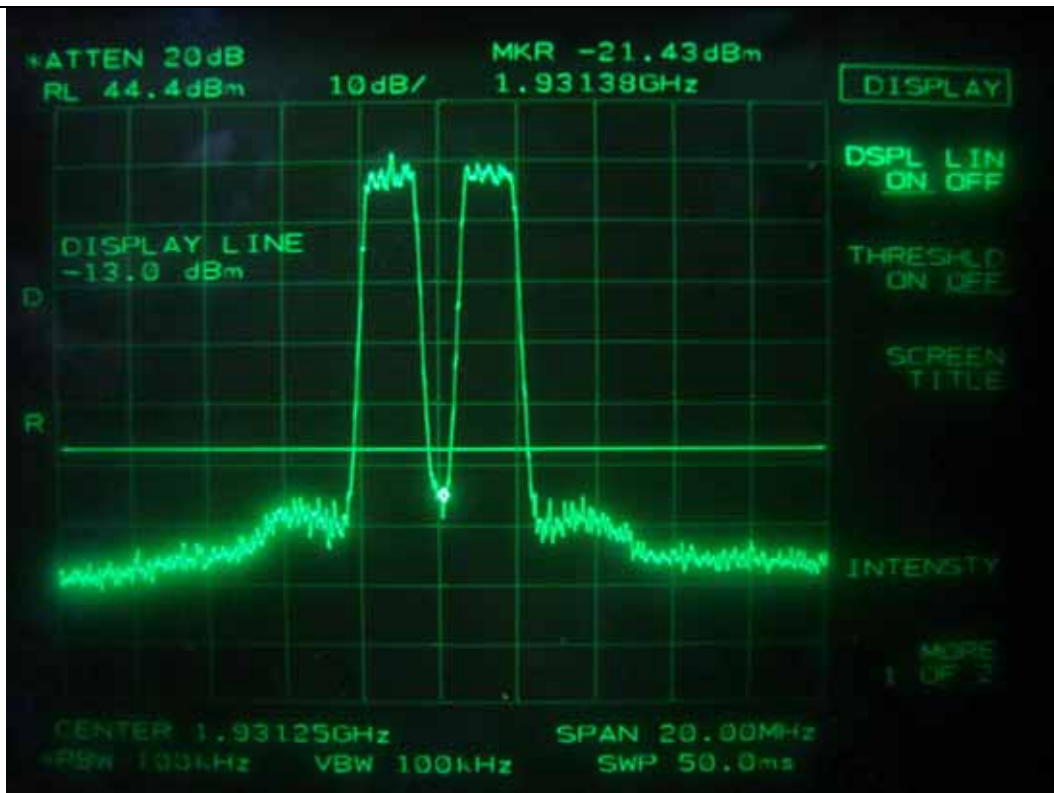
10.4 Test data

-. Test Date : September 17, 2007

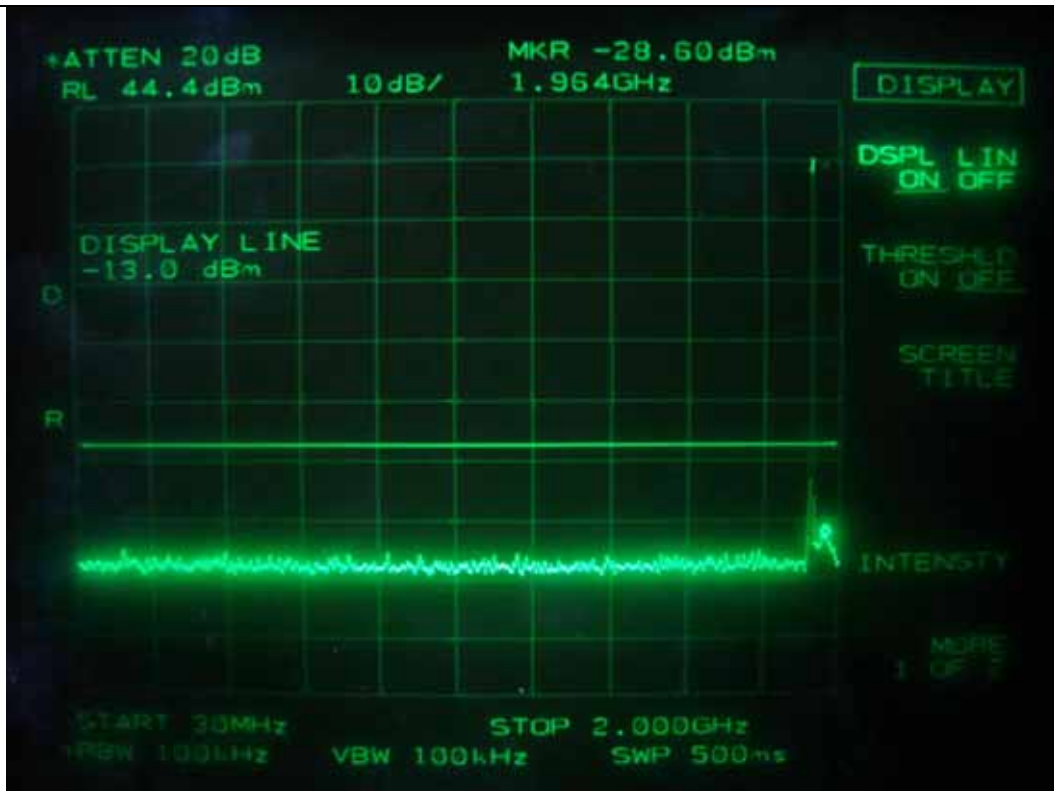
-. Test Result : Pass

Modulation	Channel	Measured
CDMA	Low	< -13dBm
	High	< -13dBm
EVDO	Low	< -13dBm
	High	< -13dBm

Remark: Intermodulation products must be attenuated below the rated power of the EUT at least 43 + 10log (Pw), equivalent to -13dBm. Please refer to test data hereinafter.

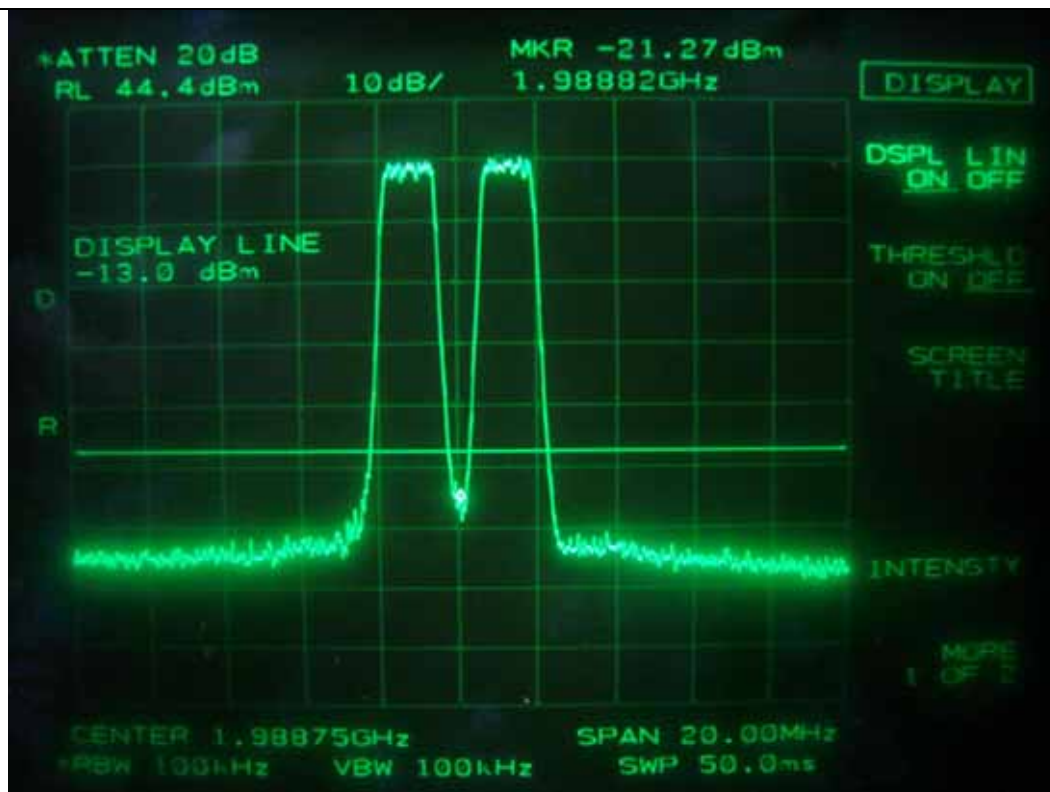


CDMA - Low Channel

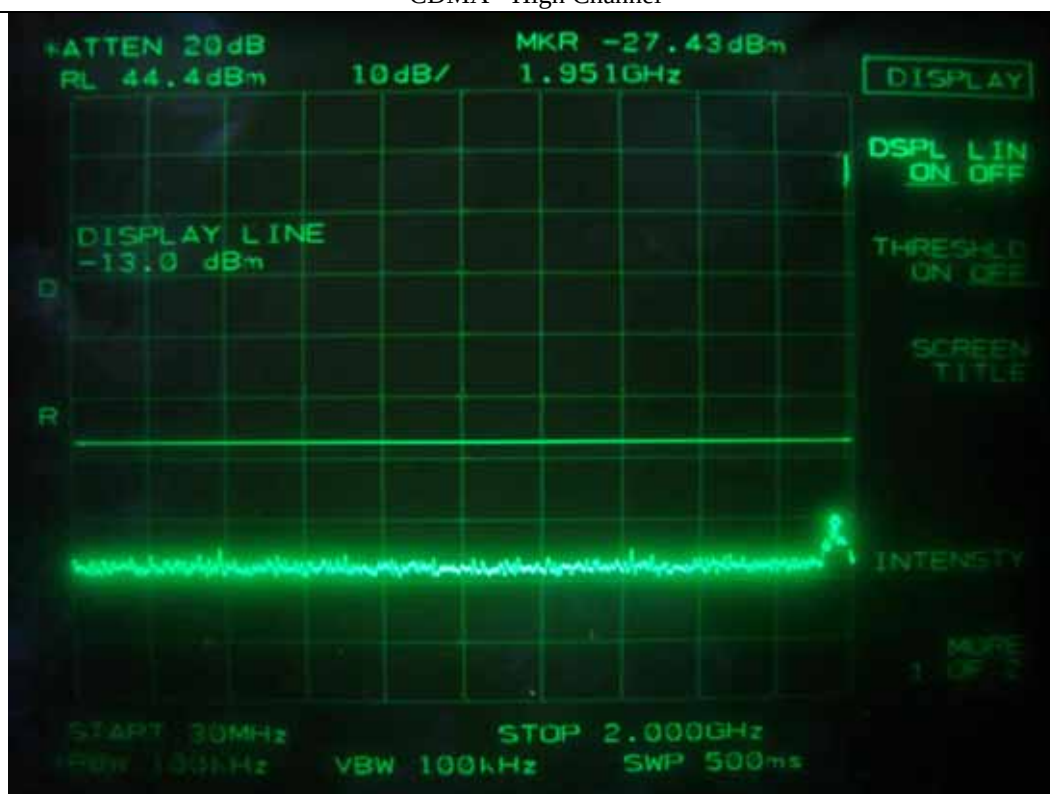


CDMA - Low Channel

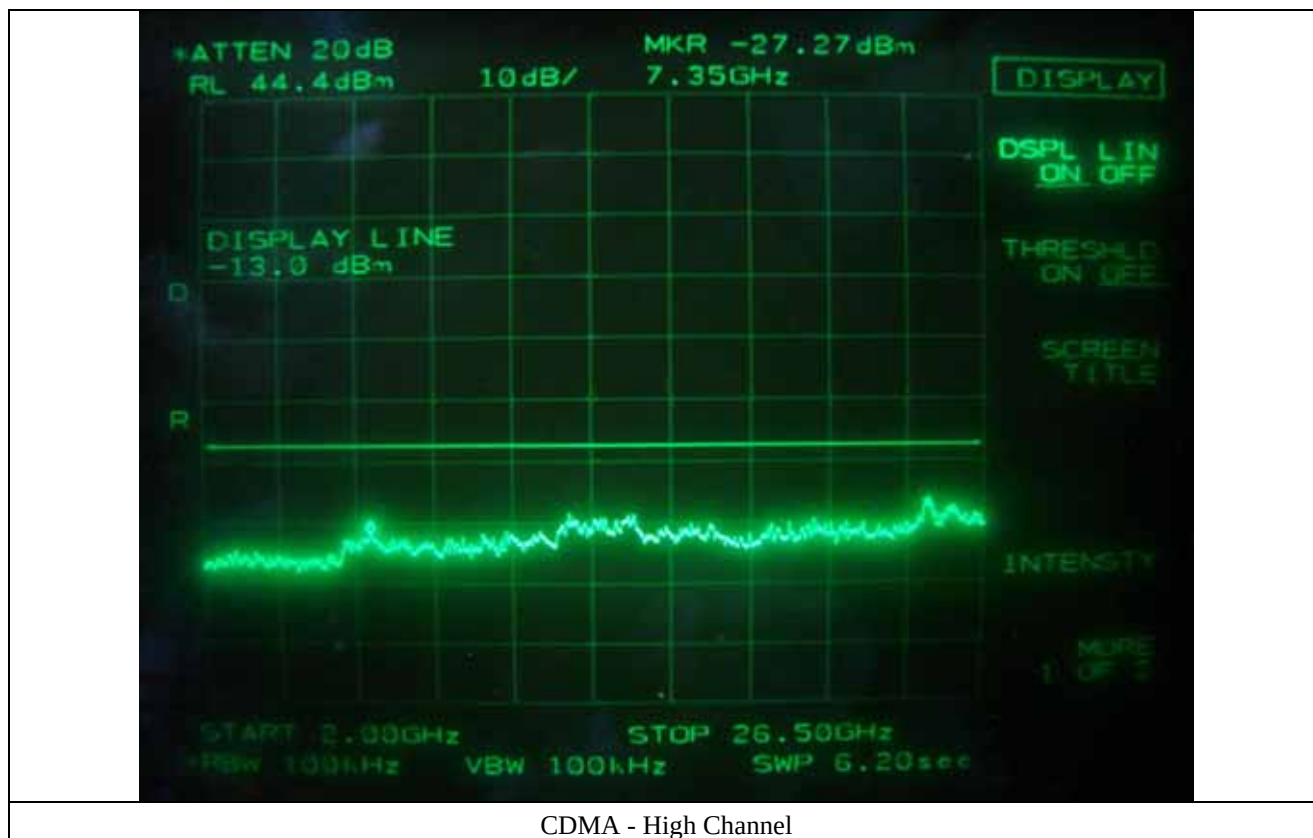


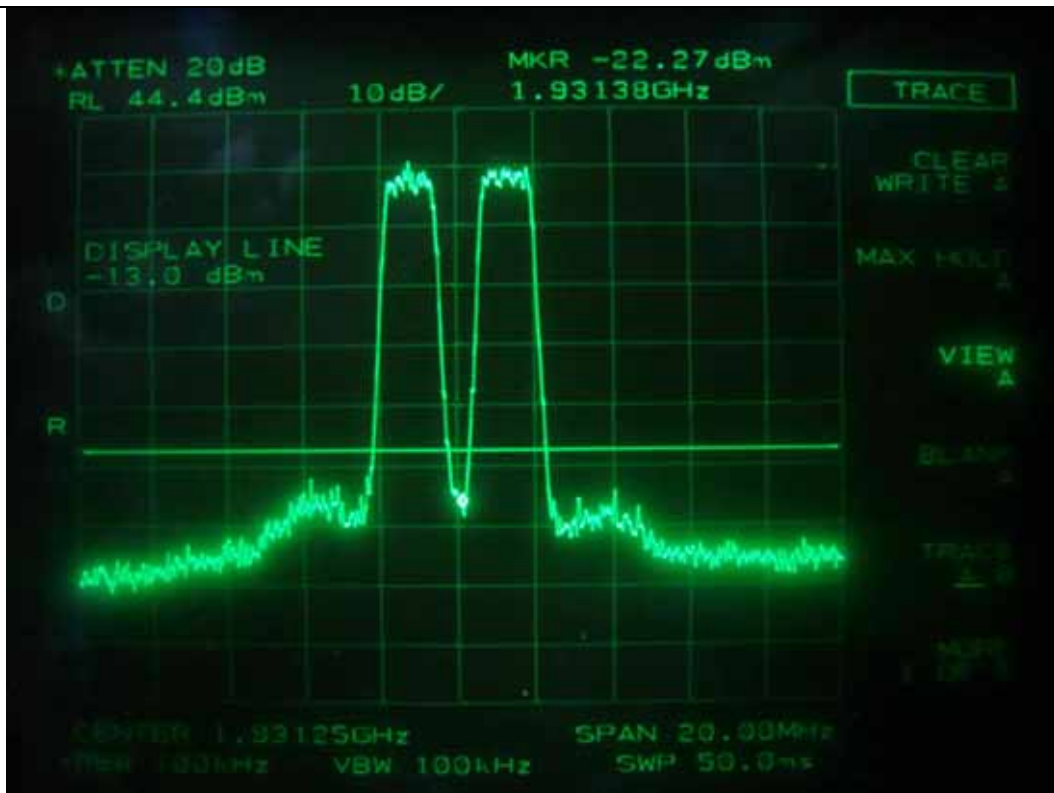


CDMA - High Channel

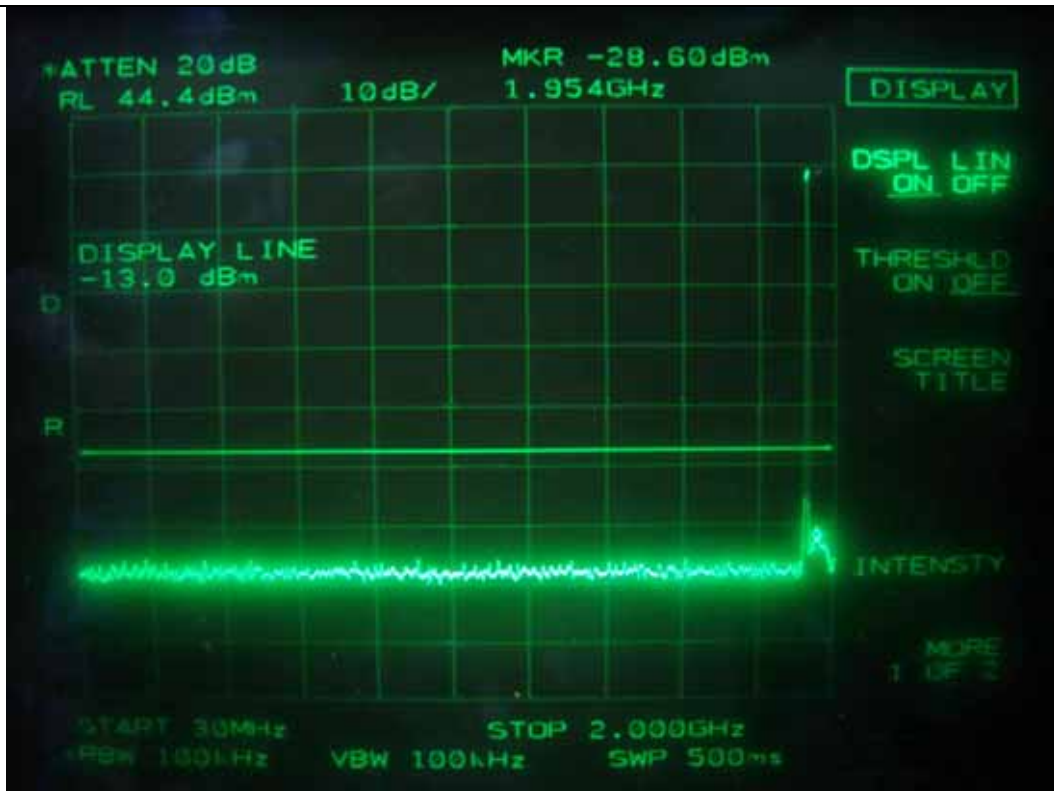


CDMA - High Channel



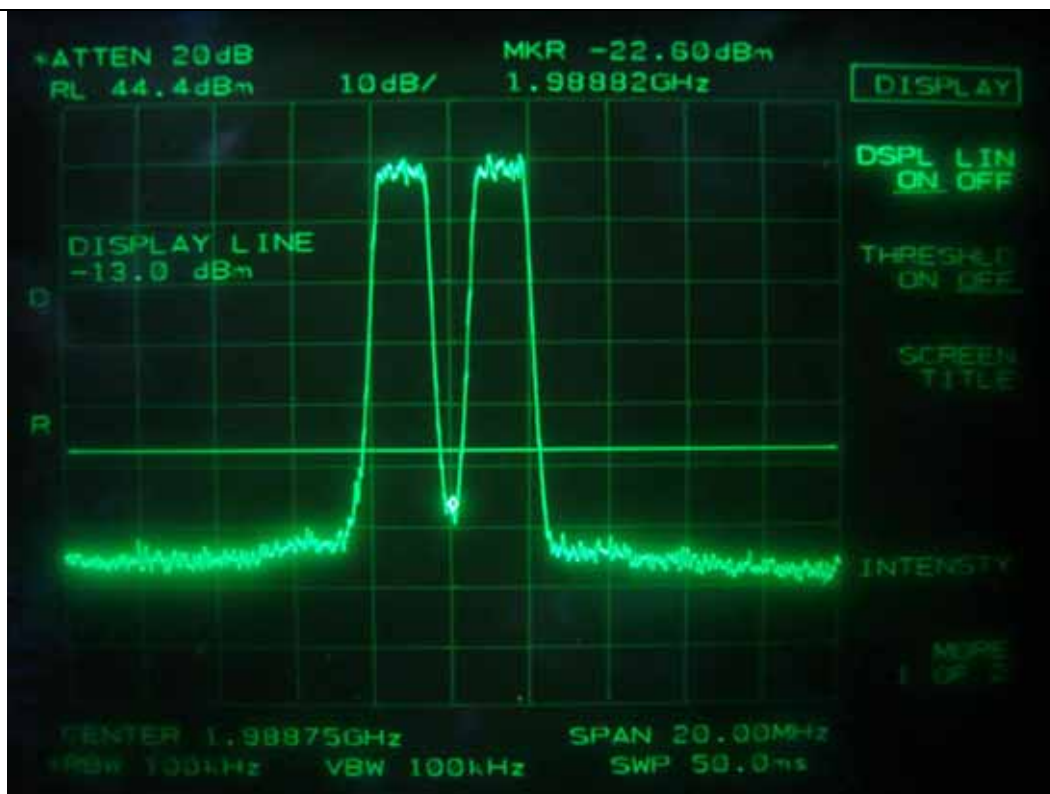


EVDO - Low Channel

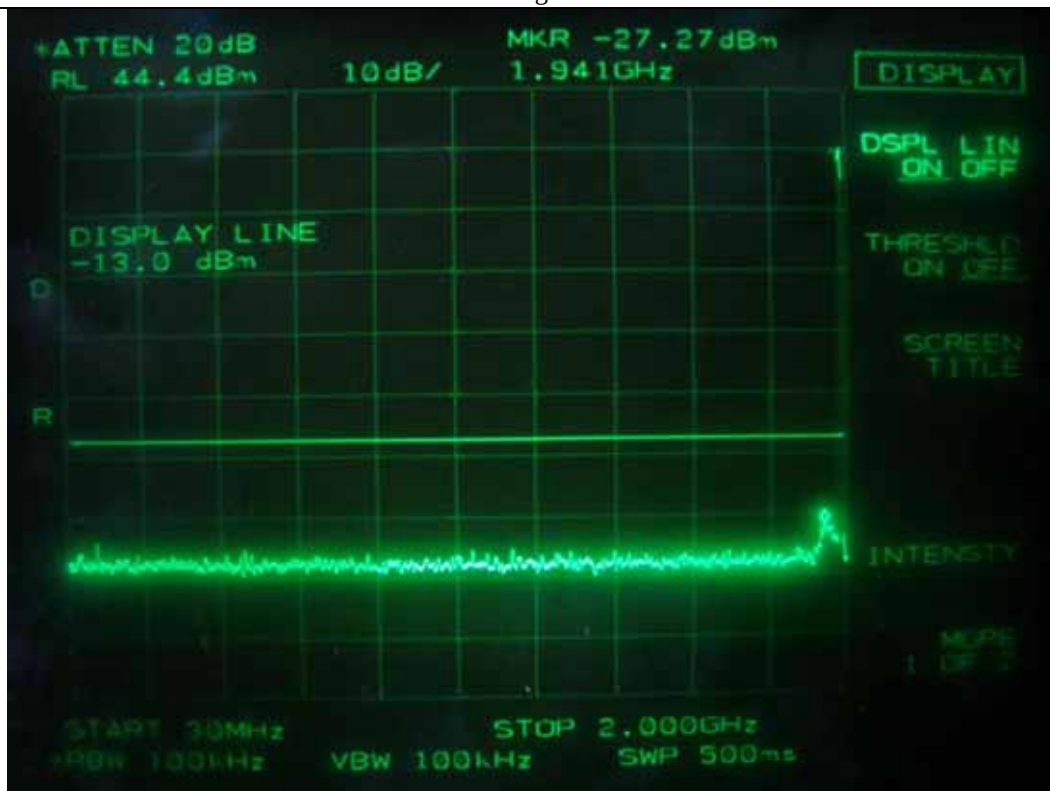


EVDO - Low Channel





EVDO - High Channel



EVDO - High Channel



11. FIELD STRENGTH OF SPURIOUS RADIATION

11.1 Operating environment

Temperature	:	23.7 °C
Relative humidity	:	55.7 %

11.2 Test set-up

The radiated emissions measurements were on the 3 meters, open-field test site. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30MHz to up to 10th harmonic of the fundamental frequency was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 and 4.0 meters in order to determine the maximum emission levels. The test was performed by placing the EUT on 3-orthogonal axis. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

The maximum radiated emission was recorded and used as reference for the effective radiated power measurement. The EUT was then replaced by a tuned dipole antenna or Horn antenna and was oriented for vertical polarization and then the length was adjusted to correspond to the frequency of the transmitter. The substitution antenna was connected to a signal generator with a coaxial cable. The receiving antenna height was raised and lowered again through the specified range of height until maximum signal level is detected by the measuring receiver. The signal to the substitution antenna was adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the EUT radiated power measured, corrected for the change of input attenuation setting of the measuring receiver. The signal generator level was recorded and corrected by the power loss in the cable between the signal generator and substitution antenna and further corrected for the gain of the dipole antenna or horn antenna used relative to an ideal tuned dipole antenna. The measurement was repeated with the test antenna and the substitution antenna oriented for horizontal polarization. The measure of the effective radiated power is the larger of the two levels recorded.

10.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	ESVS10	Rohde & Schwarz	EMI Test Receiver	827864/005	Dec. 21, 2006
■ -	8574B	Hewlett Packard	Quasi-Peak Adapter	2811A01432	June 20, 2007
■ -	8568B	Hewlett-Packard	Spectrum Analyzer	3109A05456	June 20, 2007
■ -	8564E	Hewlett-Packard	Spectrum Analyzer	3650A00756	June 19, 2007
■ -	83051A	Agilent	Preamplifier	3950M00201	June 20, 2007
■ -	E4432B	Hewlett-Packard	Signal Generator	US38440950	June 19, 2007
■ -	83650L	Hewlett-Packard	Signal Generator	3844A00415	June 19, 2007
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D294	July 03, 2006(2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	July 04, 2006(2Y)
■ -	SMU 200A	R/S	Vecter Signal Generator	100722	June 19, 2007
■ -	FST13	R/S	Spectrum Analyzer	100637	June 19, 2007

All test equipment used is calibrated on a regular basis.

11.4. Test data for radiated emission

11.4.1. Test data for CDMA Mode

-. Test Date : October 04, 2007

-. Resolution bandwidth : 1 MHz

-. Video bandwidth : 1 MHz

-. Frequency range : 1 GHz ~ 20 GHz

-. Measurement distance : 3m

-. Result : PASSED BY -40.68 dB at Middle Channel

Frequency (GHz)	Spectrum Reading (dBuV)	Generator Reading (dBm)	Ant. Gain (dBi)	Ant. Pol. (H/V)	Dipole Gain (dB)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
Test Data for Low Channel									
1931.25	44.33	-28.79	10.03	H	26.1	4.12	-22.52	-	-
	47.83	-23.14		V			-16.87	-	-
3862.50	36.50	-64.55	11.88	H		5.17	-57.23	-13.00	-44.23
	36.83	-62.17		V			-54.85	-13.00	-41.85
Test Data for Middle Channel									
1960.00	44.50	-29.17	10.14	H	26.1	4.07	-22.95	-	-
	47.92	-23.41		V			-17.19	-	-
3920.00	36.83	-63.77	11.95	H		5.17	-56.45	-13.00	-43.45
	37.00	-61.00		V			-53.68	-13.00	-40.68
Test Data for High Channel									
1988.75	44.17	-28.67	10.27	H	26.1	4.02	-22.50	-	-
	47.70	-24.13		V			-17.96	-	-
3977.50	36.50	-65.58	12.04	H		5.17	-58.26	-13.00	-45.26
	36.67	-61.35		V			-54.03	-13.00	-41.03

Tabulated test data for Restricted Band

11.4.2. Test data for EVDO Mode

- . Test Date : October 04, 2007
- . Resolution bandwidth : 1 MHz
- . Video bandwidth : 1 MHz
- . Frequency range : 1 GHz ~ 20 GHz
- . Measurement distance : 3m
- . Result : PASSED BY -40.85 dB at Middle Channel

Frequency (MHz)	Spectrum Reading (dBuV)	Generator Reading (dBm)	Ant. Gain (dBi)	Ant. Pol. (H/V)	Dipole Gain (dB)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
Test Data for Low Channel									
1931.25	44.17	-28.95	10.03	H	2.15	4.12	-22.68	-	-
	47.67	-23.30		V			-17.03	-	-
3862.50	36.33	-64.72	11.88	H		5.17	-57.40	-13.00	-44.40
	36.50	-62.50		V			-55.18	-13.00	-42.18
Test Data for Middle Channel									
1960.00	44.67	-29.00	10.14	H	2.15	4.07	-22.78	-	-
	48.00	-23.33		V			-17.11	-	-
3920.00	36.67	-63.93	11.95	H		5.17	-56.61	-13.00	-43.61
	36.83	-61.17		V			-53.85	-13.00	-40.85
Test Data for High Channel									
1988.75	44.33	-28.51	10.27	H	2.15	4.02	-22.34	-	-
	47.83	-24.00		V			-17.83	-	-
3977.50	36.33	-65.75	12.04	H		5.17	-58.43	-13.00	-45.43
	36.67	-61.35		V			-54.03	-13.00	-41.03

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical,

Total = Generator Reading + Antenna Gain – Dipole Gain – Cable Loss

Margin = Total – Limit

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Tested by: Ki-Hong, Nam / Test Engineer

12. FREQUENCY STABILITY WITH TEMPERATURE VARIATION

12.1 Operating environment

Temperature : 24 °C

Relative humidity : 46 %

12.2 Test set-up

The RF output port of the EUT was connected to the input of the spectrum analyzer. The software for RF control on the notebook PC was set to transmit maximum signal gain and bandwidth. The test was performed at center frequency.

Turn EUT off and set chamber temperature to -30°C and then allow sufficient time (approximately 20 to 30 minutes after chamber reach the assigned temperature) for EUT to stabilize. Turn ON EUT and measure the EUT operating frequency and then turn off the EUT after the measurement. The temperature in the chamber was raised 10°C step from -30°C to +50°C. Repeat above method for frequency measurements every 10°C step and then record all measured frequencies on each temperature step.

12.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ - 8564E	HP	Spectrum Analyzer	3650A00756	July 19, 2007
■ - 53152A	HP	Frequency Counter	US39270295	Dec. 18, 2006
■ - EY-101	Tabai ESPEC Corp.	Chamber	5104390	N/A
■ - SMU 200A	R/S	Vecter Signal Generator	100722	June 19, 2007
■ - FST13	R/S	Spectrum Analyzer	100637	June 19, 2007

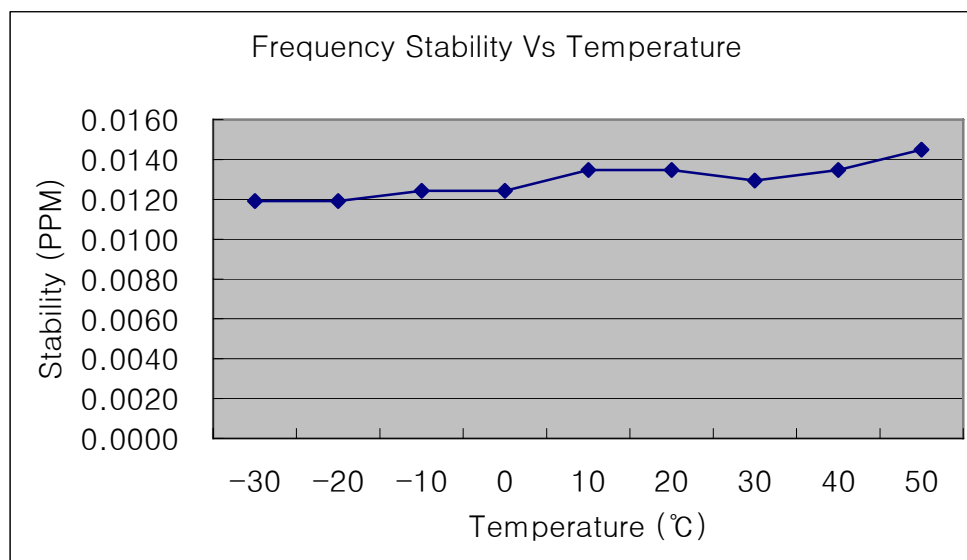
All test equipment used is calibrated on a regular basis.

12.4 Test data

-. Test Date : September 20, 2007

-. Result : PASSED

Temperature (°C)	Input Freq. (Hz)	Measured Freq. (Hz)	Result (PPM)	Limit
-30	1931250000	1931250023	0.0119	Within the Authorized Frequency block
-20		1931250023	0.0119	
-10		1931250024	0.0124	
0		1931250024	0.0124	
10		1931250026	0.0135	
20		1931250026	0.0135	
30		1931250025	0.0129	
40		1931250026	0.0135	
50		1931250028	0.0145	



기홍

Tested by: Ki-Hong, Nam / Test Engineer

13. FREQUENCY STABILITY WITH VOLTAGE VARIATION

13.1 Operating environment

Temperature : 24 °C

Relative humidity : 46 %

13.2 Test set-up

The RF output port of the EUT was connected to the input of the spectrum analyzer. The signal generator was set to 1931.25MHz with an unmodulated signal. The voltage of EUT set to 115% of the nominal value and then was reduced to 85% of nominal voltage. The output frequency was recorded at each step.

13.3 Test equipment used

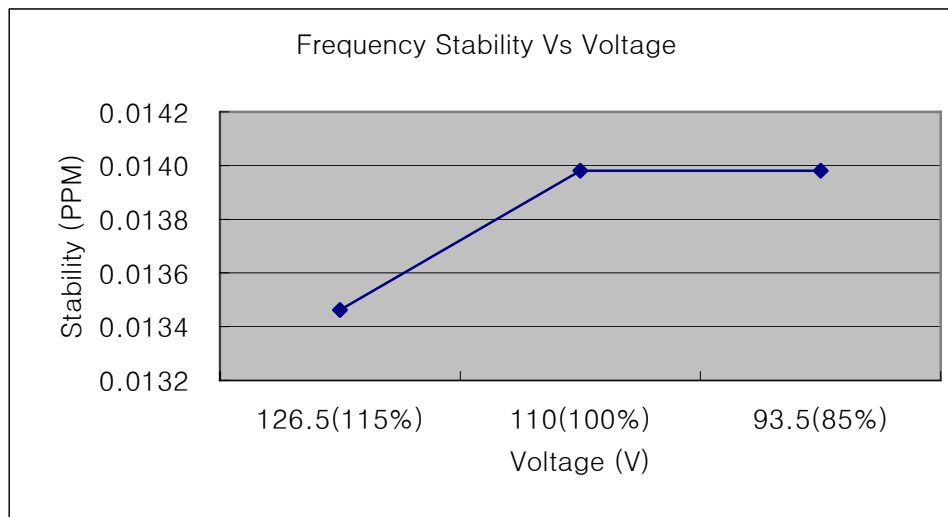
	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	July 19, 2007
■ -	53152A	HP	Frequency Counter	US39270295	Dec. 18, 2006
■ -	2350A	HP	30 dB Attenuator Assembly	2350A03133	July 19, 2007
■ -	3033B	B&J TMI	DC Power Supply	2056036	N/A
■ -	SMU 200A	R/S	Vecter Signal Generator	100722	June 19, 2007
■ -	FST13	R/S	Spectrum Analyzer	100637	June 19, 2007

All test equipment used is calibrated on a regular basis.

13.4 Test data

-. Test Date : September 20, 2007
-. Rated Supply Voltage : 110 Vac
-. Result : PASSED

Voltage (Vac)	Input Freq. (Hz)	Measured Freq. (Hz)	Result (PPM)	Limit
126.5(115%)	1931250000	1931250026	0.0135	Within the Authorized Frequency block
110(100%)		1931250027	0.0140	
93.5(85%)		1931250027	0.0140	



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Tested by: Ki-Hong, Nam / Test Engineer

14. RADIATED EMISSION TEST FOR GENERAL REQUIREMENT

14.1 Operating environment

Temperature : 15 °C

Relative humidity : 45 %

14.2 Test set-up

The radiated emissions measurements were on the 3 meters, open-field test site. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30MHz to 1000MHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 and 4.0 meters in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

The test set-up photos are included in appendix VI.

14.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ - ESVS10	Rohde & Schwarz	EMI Test Receiver	827864/005	Dec 20, 2005
■ - MA240	HD GmbH	Antenna Master	N/A	N/A
■ - HD100	HD GmbH	Position Controller	N/A	N/A
■ - DS420S	HD GmbH	Turn Table	N/A	N/A
■ - VHA9103	Schwarzbeck	Biconical Antenna	91031852	Feb 13, 2006
■ - 9108-A(494)	Schwarzbeck	Log Periodic Antenna	62281001	Feb 13, 2006

All test equipment used is calibrated on a regular basis.

14.4 Test data

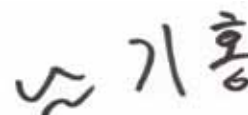
- . Test Date : September 10, 2007
- . Resolution bandwidth : 100 kHz
- . Video bandwidth : 300 kHz
- . Frequency range : 30MHz ~ 1000MHz
- . Measurement distance : 3m

Frequency (MHz)	Reading (dBuV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBuV/m)	Limits (dBuV/m)	Margin (dB)
38.45	15.20	V	15.29	1.50	31.99	40.00	-8.01
51.90	20.80	V	10.48	1.60	32.88	40.00	-7.12
93.61	21.90	V	9.21	2.40	33.51	43.52	-10.01
103.62	17.60	V	10.83	2.44	30.87	43.52	-12.65
190.90	16.70	V	16.11	2.95	35.76	43.52	-7.76

Tabulated test data for Radiated Electromagnetic Field

Remark: "H": Horizontal, "V": Vertical

Low, Middle and High channels for CDMA and EVDO modes were tested, but the worst emissions levels were recorded in this test report.



Tested by: Ki-Hong, Nam / Test Engineer

15. CONDUCTED EMISSION TEST

15.1 Operating environment

Temperature : 27 °C

Relative humidity : 44 %

15.2 Test set-up

The EUT was placed on a wooden table, 0.8 meters height above the floor. The EUT was connected to adaptor and the power line of adaptor was fed through a 50 ohm/ 50 uH + 5ohm Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

15.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	ESHS10	Rohde & Schwarz	EMI Test Receiver	834467/007	May 11, 2007
■ -	NSLK 8126	Schwarzbeck	AMN	8126-404	July 04, 2007
■ -	3825/2	EMCO	AMN	9109-1867	June 21, 2007
■ -	SMU 200A	R/S	Vecter Signal Generator	100722	June 19, 2007
■ -	FST13	R/S	Spectrum Analyzer	100637	June 19, 2007

All test equipment used is calibrated on a regular basis.

15.4 Test data

- . Test Date : September 05, 2007
- . Resolution bandwidth : 9 kHz
- . Frequency range : 0.15MHz ~ 30MHz
- . Operating Condition : CDMA Mode
- . Result : PASSED BY -13.74 dB at 0.19 MHz

Frequency (MHz)	Line	Peak (dBuV)			Margin (dB)	Average (dBuV)		Margin (dB)
		Emission level	Detector Mode	Limits		Emission level	Limits	
0.19	H	50.30	P	64.04	-13.74	-	-	-
0.23	N	41.71	P	62.27	-20.56	-	-	-
0.41	N	37.35	P	57.55	-20.20	-	-	-
0.56	N	35.87	P	56.00	-20.13	-	-	-
12.43	N	38.20	P	60.00	-21.80	-	-	-
15.33	N	37.52	P	60.00	-22.48	-	-	-

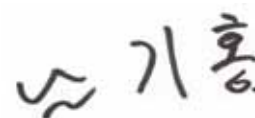
Line Conducted Emissions Tabulated Data

Remark : “H”: Hot Line, “N”: Neutral line, “P”: Peak detector.

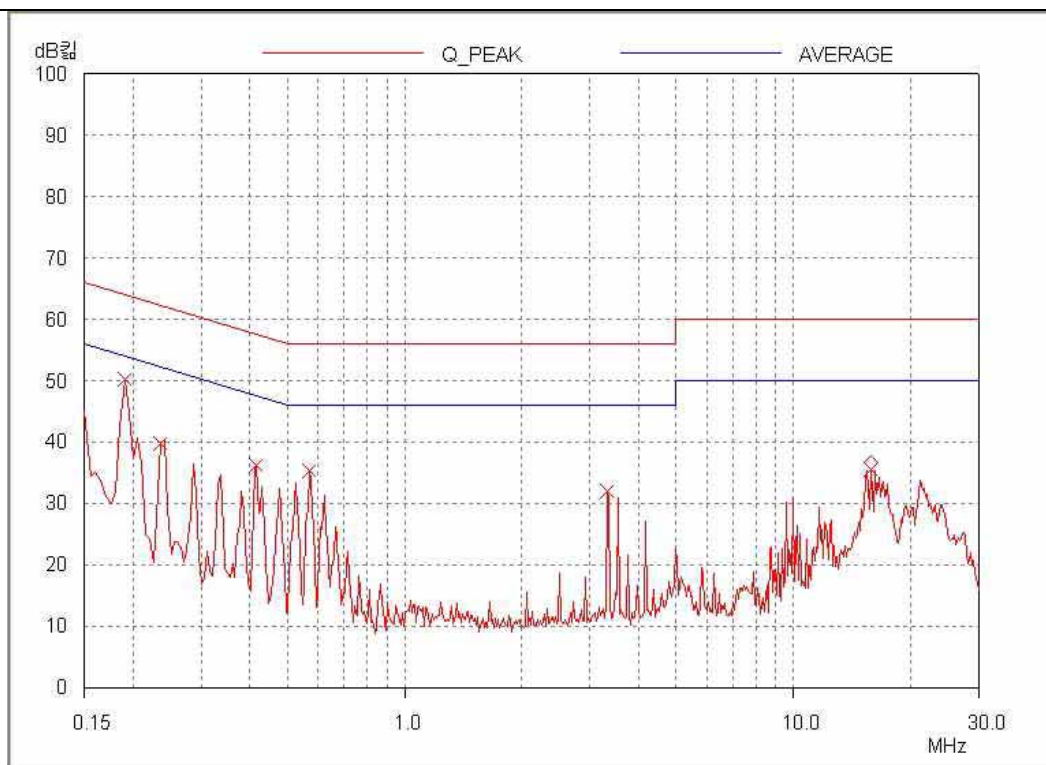
Average mode was not measured, because peak values were under the Average limit.

The test of CDMA and EVDO modes were performed, but the worst data was recorded in this report.

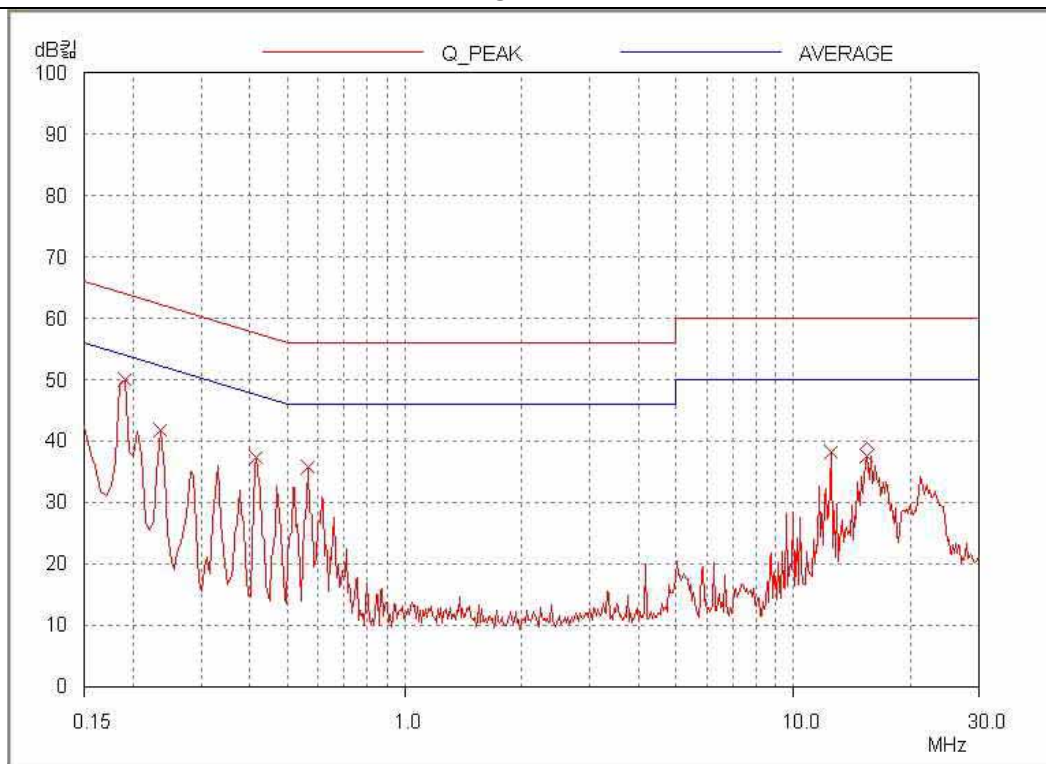
See next page for an overview sweep performed with peak detector.



Tested by: Ki-Hong, Nam / Test Engineer



HOT LINE



NEUTRAL LINE