

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR PCS LICENSED TRANSMITTER

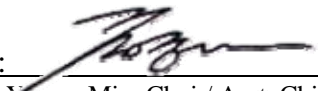
Test Report No. : E093R-033
AGR No. : A092A-147
Applicant : SOLiD Technologies, Inc.
Address : 18th Floor, KINS Tower, 25-1 Jeongja-Dong, Bundang-Gu, Seongnam-Si,
Gyeonggi-Do 463-811, Korea
Manufacturer : SOLiD Technologies, Inc.
Address : 18th Floor, KINS Tower, 25-1 Jeongja-Dong, Bundang-Gu, Seongnam-Si,
Gyeonggi-Do 463-811, Korea
Type of Equipment : RDU MODULE(850C)
FCC ID. : W6U850C
Model Name : RDU 850C
Serial number : N/A
Total page of Report : 121 pages (including this page)
Date of Incoming : February 20, 2009
Date of issue : March 16, 2009


SUMMARY

The equipment complies with the regulation; **FCC Part 22 Subpart H.**

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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EMC/RF Center
ONETECH Corp.

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Y. K. Kwon / Managing Director
EMC/RF Center
ONETECH Corp.

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1. VERIFICATION OF COMPLIANCE

APPLICANT : SOLiD Technologies, Inc.
ADDRESS : 18th Floor, KINS Tower, 25-1 Jeongja-Dong, Bundang-Gu, Seongnam-Si,
 Gyeonggi-Do 463-811, Korea
CONTACT PERSON : Mr. Kangyeob, Bae / Director
TELEPHONE NO : +82-31-784-8585
FCC ID : W6U850C
MODEL NAME : RDU 850C
SERIAL NUMBER : N/A
DATE : March 16, 2009

EQUIPMENT CLASS	PCB - PCS Licensed Transmitter
EQUIPMENT DESCRIPTION	RDU MODULE(850C)
THIS REPORT CONCERNS	Original Grant
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 22 Subpart H
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(a), 22.913(a)	RF Power Output at Antenna Terminals	Met the Limit / PASS
2.1047	Modulation Characteristics	PASS (See Note 1)
2.1049	Occupied Bandwidth, Bandwidth Limitation	Met the Limit / PASS
2.1049, 22.917(a)	Band Edge	Met the Limit / PASS
2.1051, 22.917(a)	Spurious Emissions at Antenna Terminals	Met the Limit / PASS
2.1053, 22.917(a)	Field strength of Spurious Radiation	Met the Limit / PASS
2.1055, 22.355	Frequency Stability with Temperature variation	Met the requirement / PASS
2.1055, 22.355	Frequency stability with primary voltage variation	Met the requirement / PASS
2.1093	RF Exposure	See Note 2

Note1: The Equipment under Test (EUT) is a repeater which reproduces the modulated input signal, so the EUT meets the requirement.

Note 2: End Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance, because the applicant does not provide an antenna for sale with the EUT.

2.2 Additions, deviations, exclusions from standards

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

2.3 Related Submittal(s) / Grant(s)

Original Grant

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 open area test site and conducted measurement facilities are located on at 307-51 Daessangryung-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862, Korea. Description details of test facilities were submitted to the Commission on August 21, 2008. (Registration Number: 340658)

3. GENERAL INFORMATION

3.1 Product Description

The SOLiD Technologies, Inc., Model RDU 850C (referred to as the EUT in this report) is a RDU MODULE(850C) that shall be plugged in ROU (Remote Optic Unit). The ROU can be equipped with up to 3 RDUs (Remote Drive Unit), a RPSU (Remote Power Supply Unit), a RCPU (Remote Central Processor Unit), a R-Optic (Remote Optic), a SIU (System Interface Unit) and a Multiplexer. The System, Model No: SMDR-NH124 consists of ROU, BIU (BTS Interface Unit), ODU (Optic Distribution Unit), and OEU (Optic Expansion Unit). Except for ROU, the RF output ports of other units are connected to coaxial cable each other. ROU receives TX optical signals from ODU or OEU and converts them into RF signals. The converted RF signals are amplified through High Power Amp in a corresponding RDU, combined with multiplexer module and then radiated to the antenna port.

When receiving RX signals through the antenna port, this unit filters out-of-band signals in a corresponding RDU and sends the results to Remote Optic Module to make electronic-optical conversion of them. After converted, the signals are sent to an upper device of ODU or OEU. ROU can be equipped with up to three RDUs (Remote Drive Unit) and the module is composed of maximal Dual Band, but this report only covers RDU 850C, FCC ID: W6U850C and other modules shall be issued with other test report number. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	RDU MODULE(850C)
LIST OF EACH OSC. or CRY. FREQ.(FREQ.>=1 MHz)	14.74 MHz
EMISSION DESIGNATOR	F9W(CDMA, EVDO, WCDMA), DXW(TDMA), G7W(GSM, EDGE)
OPERATING FREQUENCY	869 MHz ~ 894 MHz
RF OUTPUT POWER	23 dBm
CHANNEL SEPARATION	TDMA(30 kHz), GSM(200 kHz), EDGE(200 kHz), CDMA(1.25 MHz) EVDO(1.25 MHz), WCDMA(5 MHz)
DC VOLTAGE & CURRENT INTO FINAL AMPLIFIER	DC 27 V, 1 A
ELECTRICAL RATING	AC 120 V, 0.97 A, DC – 48 V
OPERATING TEMPERATURE	-10 °C ~ 50 °C

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

-. None

3.3 Peripheral equipment

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

Model	Manufacturer	FCC ID	Description	Connected to
RDU 850C	SOLiD Technologies, Inc.	W6U850C	RDU MODULE(850C) (EUT)	-
SMJ100A	Rohde & Schwarz	N/A	Vector Signal Generator	EUT
SMDR-NH124	SOLiD Technologies, Inc.	N/A	ODU (Optic Distribution Unit)	EUT
SMDR-NH124	SOLiD Technologies, Inc.	N/A	BIU (BTS Interface Unit)	EUT
105-10ST	Dong Yang	N/A	DC Power Supply	EUT

3.4 Mode of operation during the test

The EUT was received signal form signal generator and then each modulation, TDMA, CDMA, GSM, EDGE, EVDO and WCDMA 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.

4. EUT MODIFICATIONS

-. None

5. RF POWER OUTPUT at ANTENNA TERMINAL

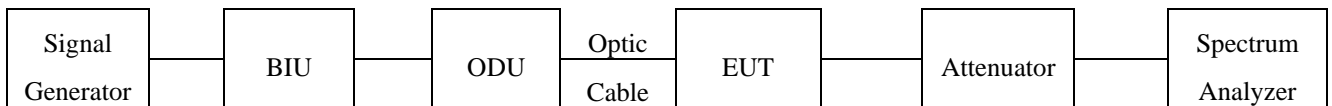
5.1 Operating environment

Temperature : 22.5 °C
Relative humidity : 48 %R.H.

5.2 Test set-up

The RF signal from the signal generator(s) was injected to BIU (BTS Interface Unit) and then output signal from the BIU was injected to the input of ODU (Optic Distribution Unit) by coaxial cable and then the output port of the ODU was connected to the input of the EUT by optic cable. The amplified RF signal at the output of the EUT was connected to the power meter or spectrum analyzer. The test was performed at three frequencies (low, middle, and high channels) at each band using all applicable modulation.

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



5.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ - E4432B	HP	Signal Generator	US38440950	June 16, 2008
■ - SMJ100A	R/S	Vector Signal Generator	100698	June 16, 2008
■ - FSP	R/S	Spectrum Analyzer	100017	Mar. 11, 2008
□ - 8564E	HP	Spectrum Analyzer	3650A00756	June 16, 2008

All test equipment used is calibrated on a regular basis.

5.4 Test data

- Test Date : March 04~05, 2009
- Test Result : Pass

Modulation	Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (W)
TDMA	Low	869.03	-18.60	23.00	0.199 526	100.00
	Middle	881.50	-18.80	23.00		
	High	893.97	-18.90	23.00		
GSM	Low	869.20	-18.90	23.00	0.199 526	100.00
	Middle	881.60	-18.80	23.00		
	High	893.80	-18.80	23.00		
EDGE	Low	869.20	-18.70	23.00	0.199 526	100.00
	Middle	881.60	-18.80	23.00		
	High	893.80	-18.70	23.00		
CDMA	Low	870.25	-18.90	23.00	0.199 526	100.00
	Middle	881.50	-18.70	23.00		
	High	892.75	-18.90	23.00		
1xEVDO	Low	870.25	-18.80	23.00	0.199 526	100.00
	Middle	881.50	-18.90	23.00		
	High	892.75	-18.80	23.00		
WCDMA	Low	871.40	-18.70	23.00	0.199 526	100.00
	Middle	881.00	-18.90	23.00		
	High	891.60	-18.70	23.00		

Ki-Hong

Tested by: Ki-Hong, Nam / Project Engineer

6. OCCUPIED BANDWIDTH

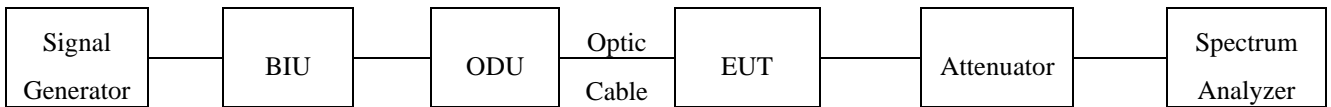
6.1 Operating environment

Temperature : 22.5 °C
Relative humidity : 48 %R.H.

6.2 Test set-up

The RF signal from the signal generator(s) was injected to BIU (BTS Interface Unit) and then output signal from the BIU was injected to the input of ODU (Optic Distribution Unit) by coaxial cable and then the output port of the ODU was connected to the input of the EUT by optic cable. The amplified RF signal at the output of the EUT was connected to the power meter or spectrum analyzer. The test was performed at three frequencies (low, middle, and high channels) at each band using all applicable modulation.

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.



6.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■	8564E	HP	Spectrum Analyzer	3650A00756	June 16, 2008
■	E4432B	HP	Signal Generator	US38440950	June 16, 2008
■	SMJ100A	R/S	Vecter Signal Generator	100698	June 16, 2008
□	FSP	R/S	Spectrum Analyzer	100017	Mar. 11, 2008

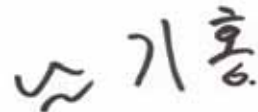
All test equipment used is calibrated on a regular basis.

6.4 Test data

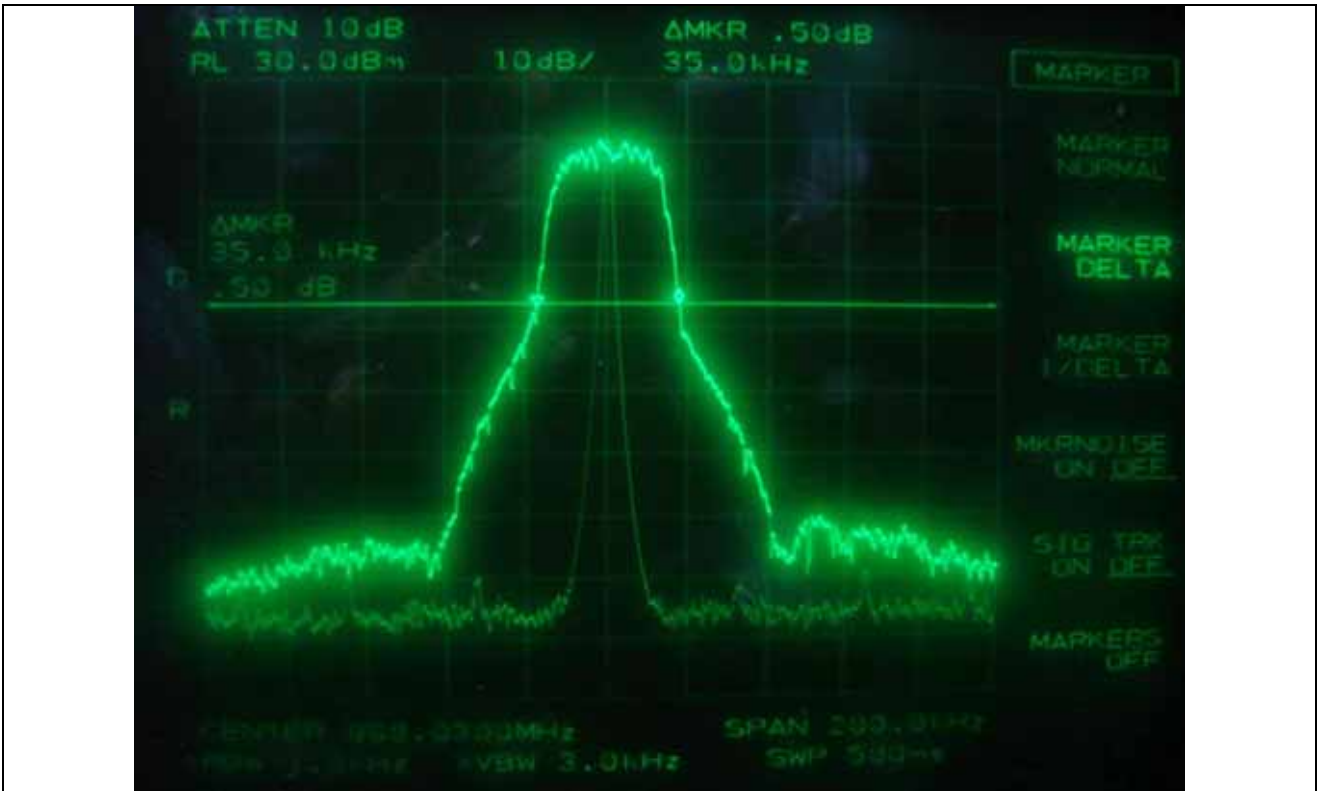
-. Test Date : March 04~05, 2009
-. Test Result : Pass

Modulation	Channel	26 dB Bandwidth (kHz)	99 % Occupied Bandwidth (kHz)
TDMA	Low	35	29
	Middle	35.3	29
	High	35	29.33
GSM	Low	347	251.7
	Middle	347	253.3
	High	347	253.3
EDGE	Low	333	251.7
	Middle	335	253.3
	High	335	253.3
CDMA	Low	1 583	1 333
	Middle	1 592	1 333
	High	1 592	1 333
1xEVDO	Low	1 592	1 342
	Middle	1 592	1 342
	High	1 583	1 342
WCDMA	Low	4 670	4 150
	Middle	4 680	4 167
	High	4 670	4 133

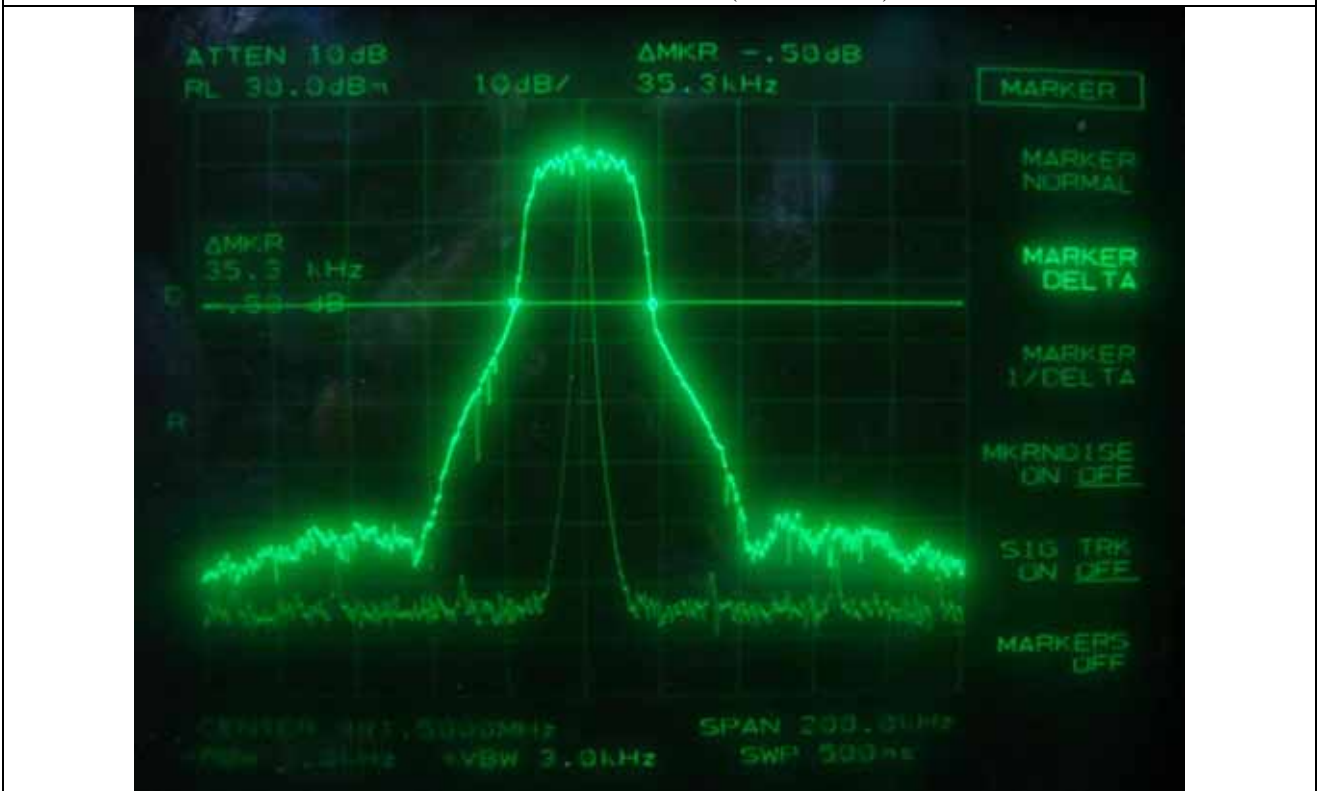
Remark: According to above result, the carrier frequency shall be within the frequency block edges.



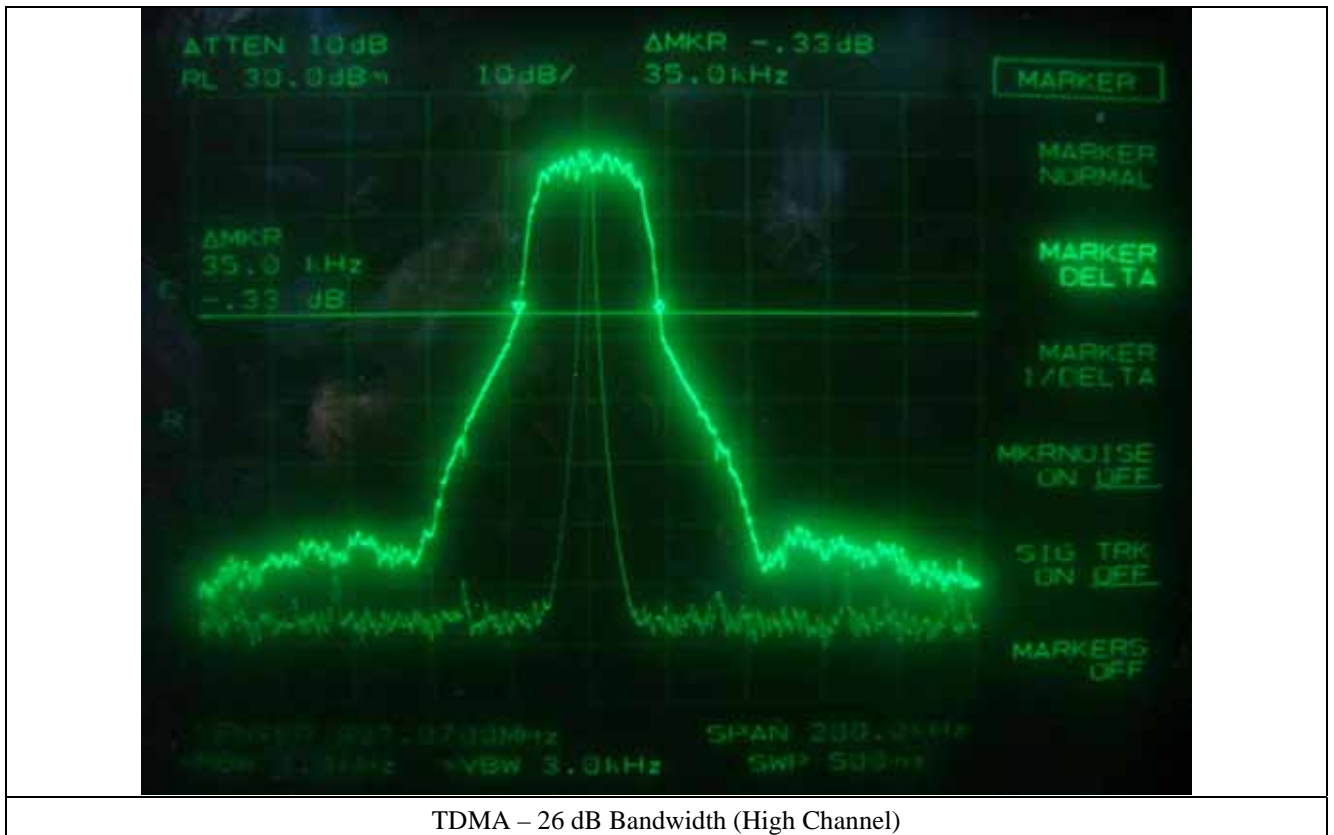
Tested by: Ki-Hong, Nam / Project Engineer

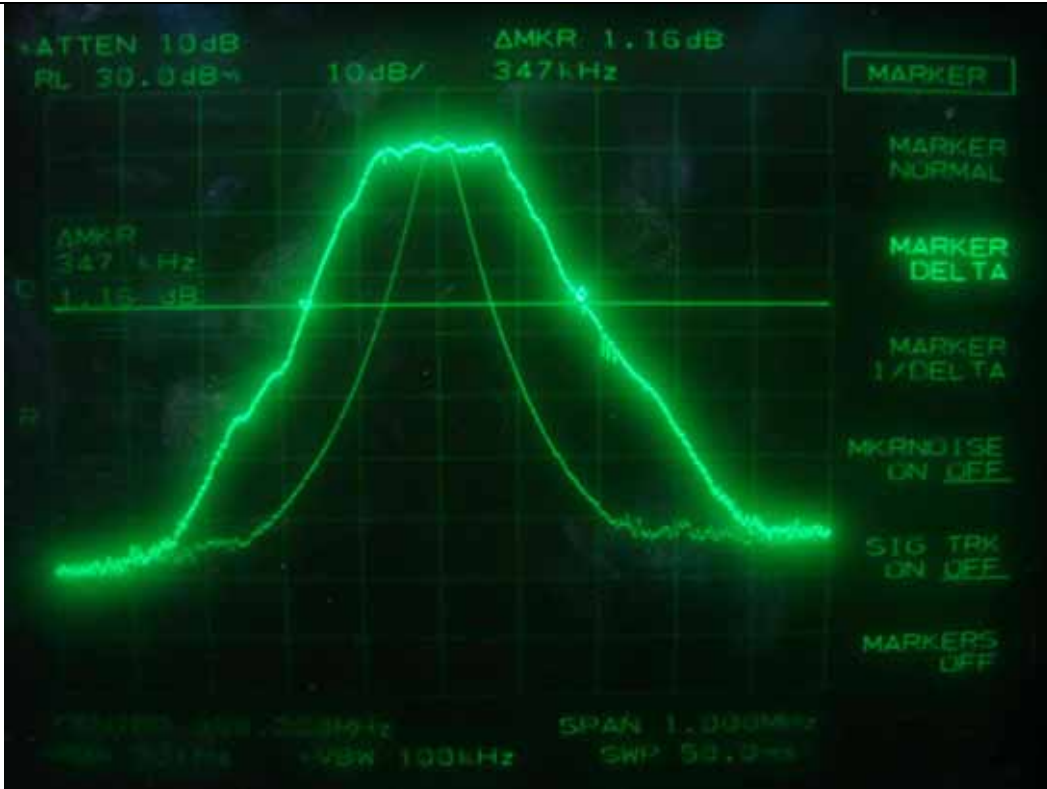


TDMA – 26 dB Bandwidth (Low Channel)

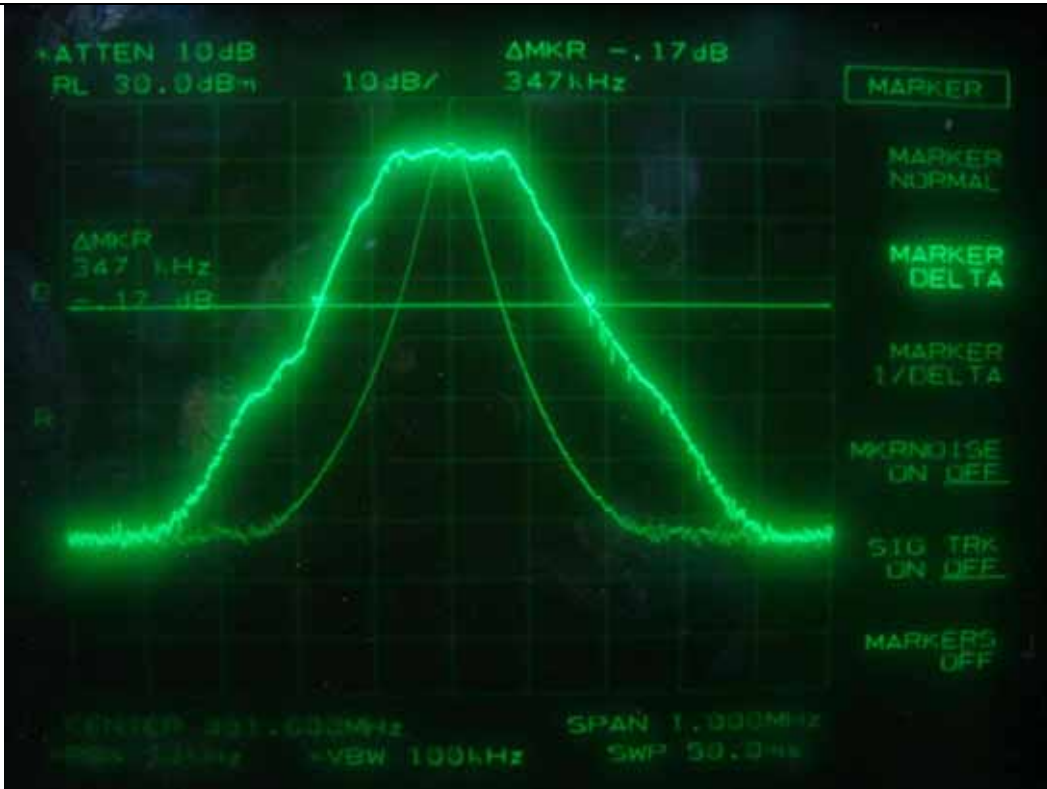


TDMA – 26 dB Bandwidth (Middle Channel)

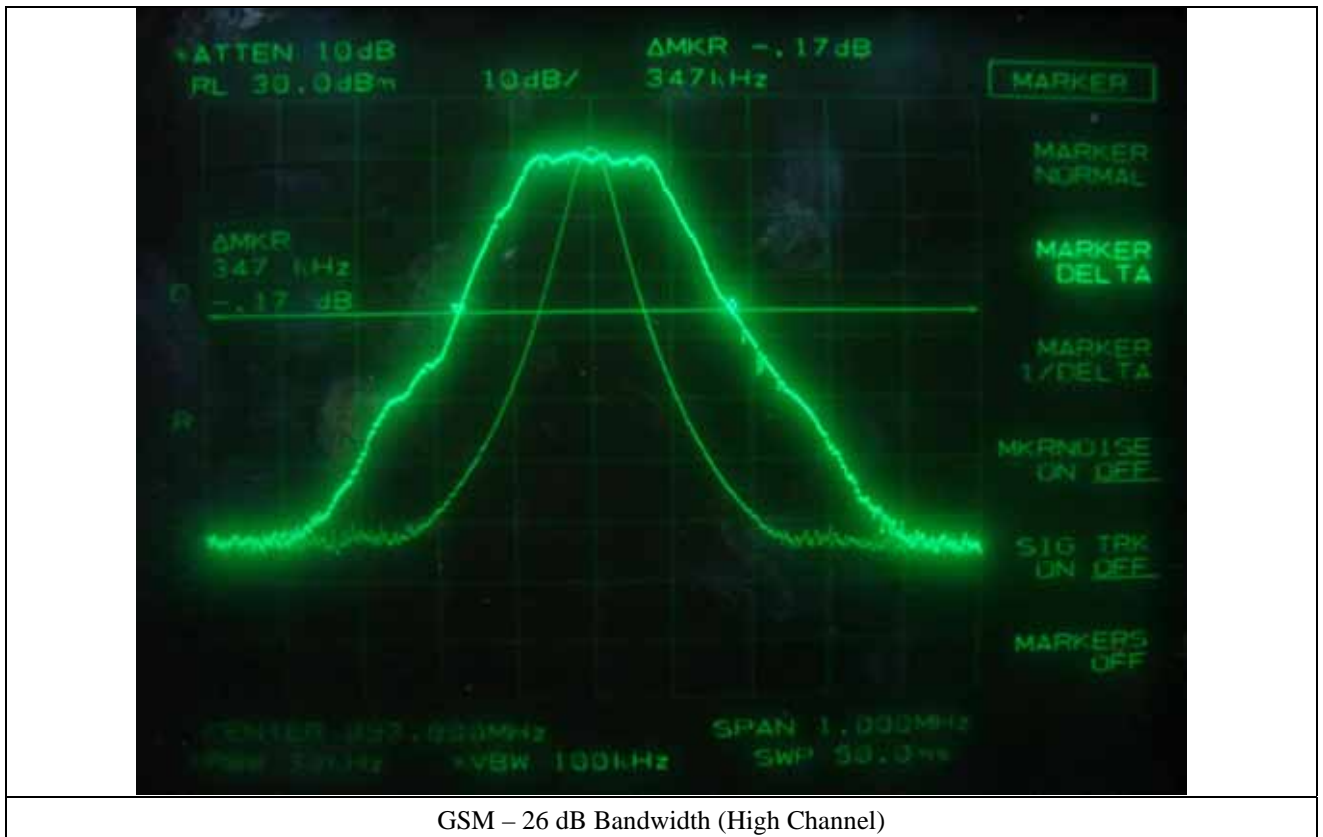


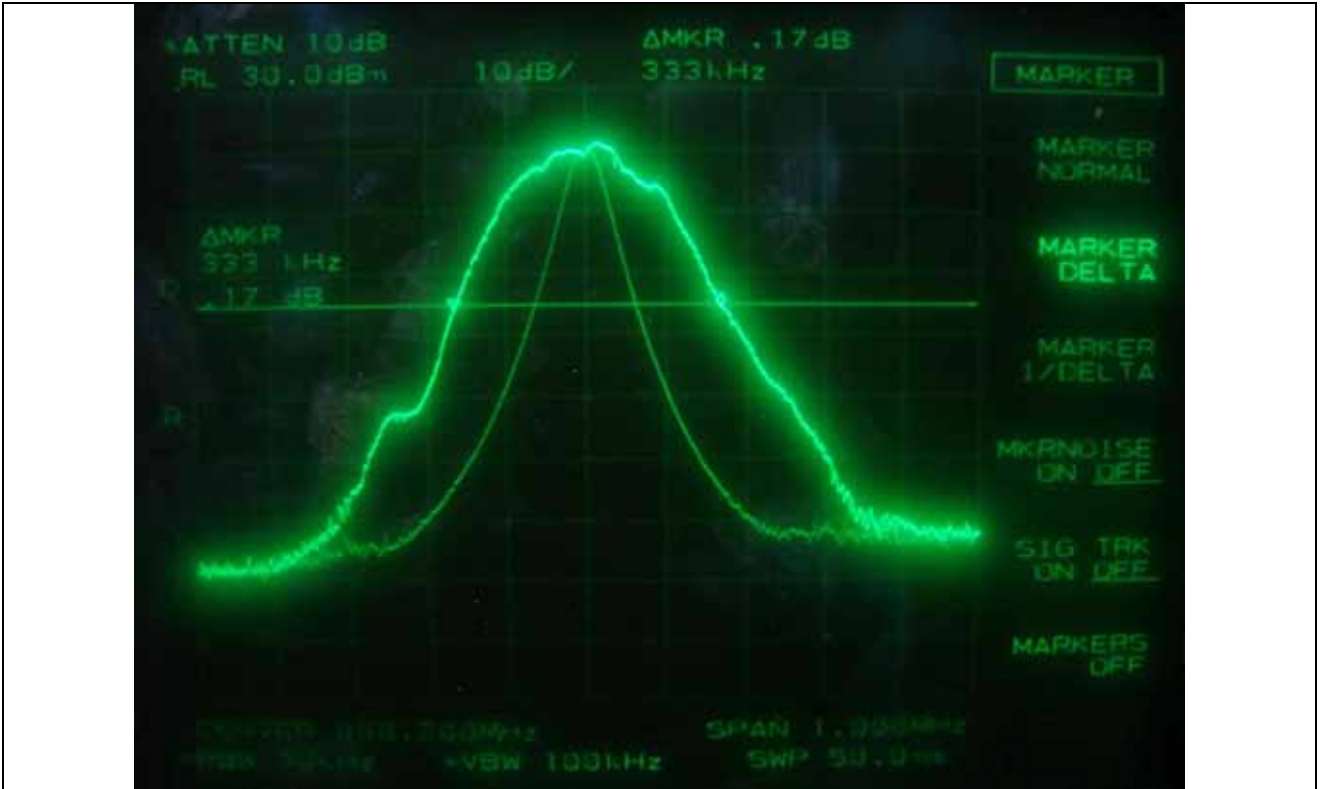


GSM – 26 dB Bandwidth (Low Channel)

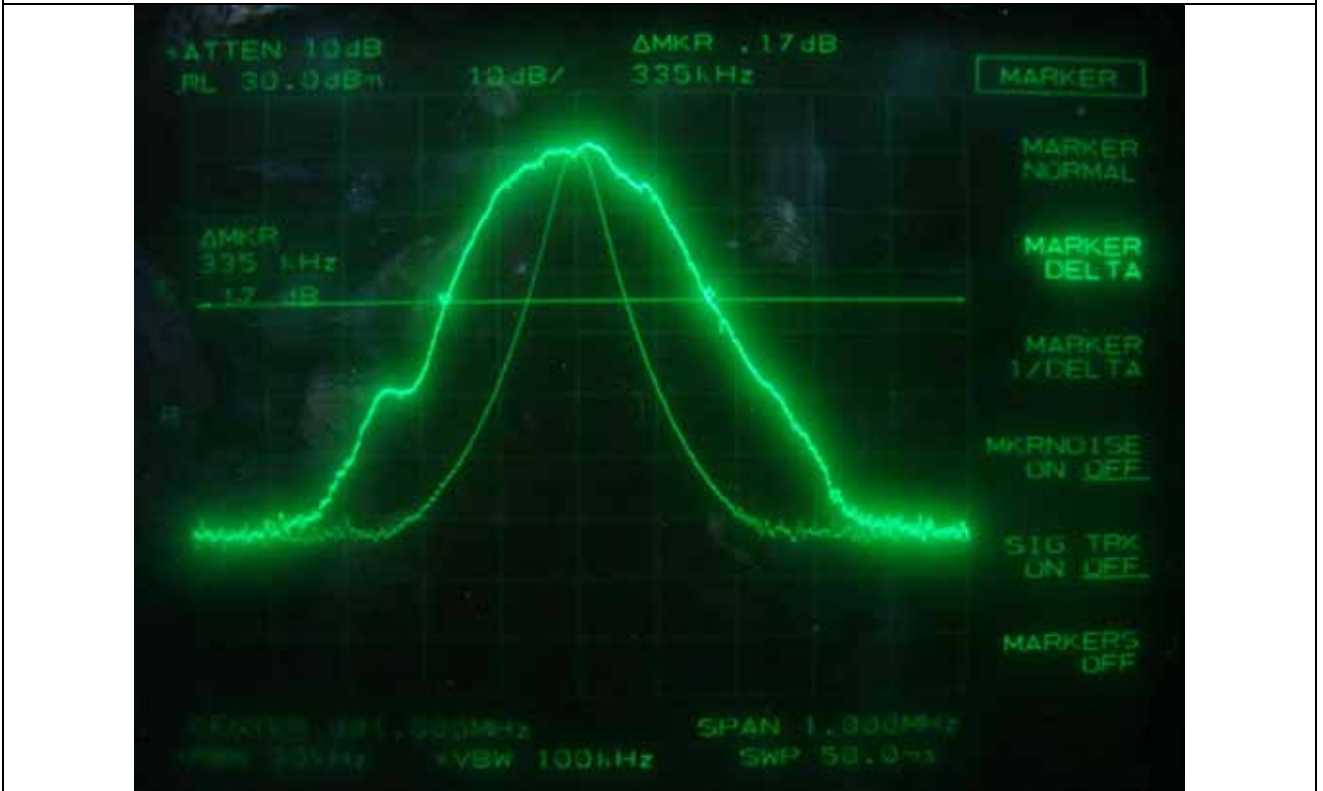


GSM – 26 dB Bandwidth (Middle Channel)

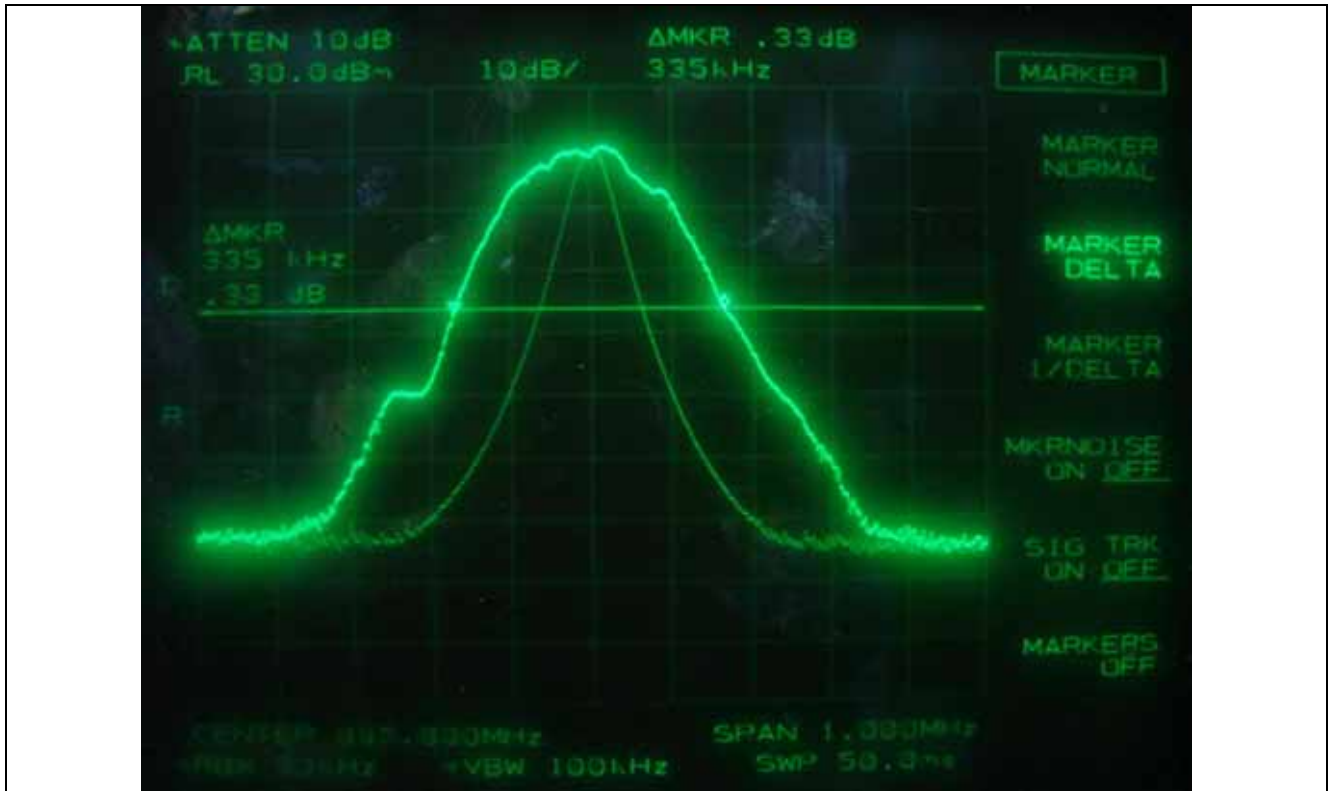




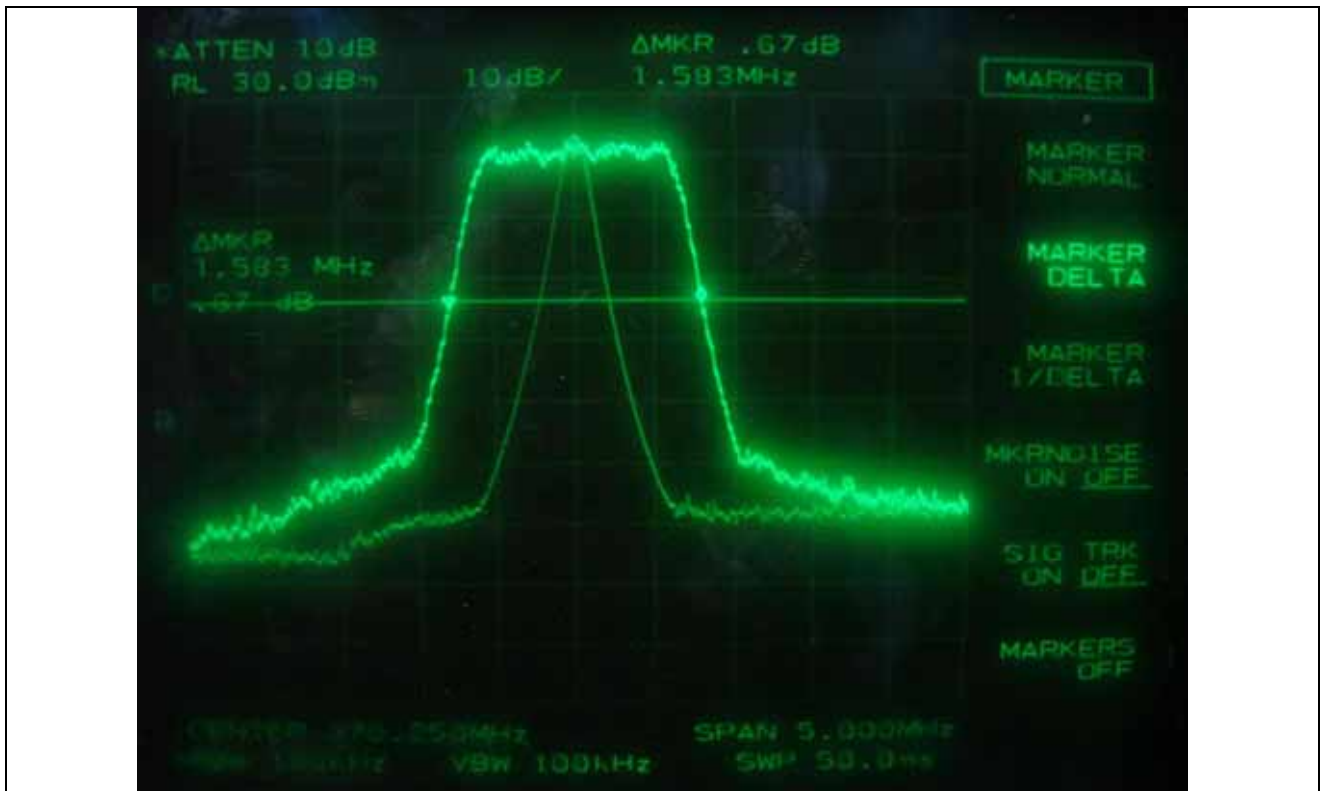
EDGE – 26 dB Bandwidth (Low Channel)



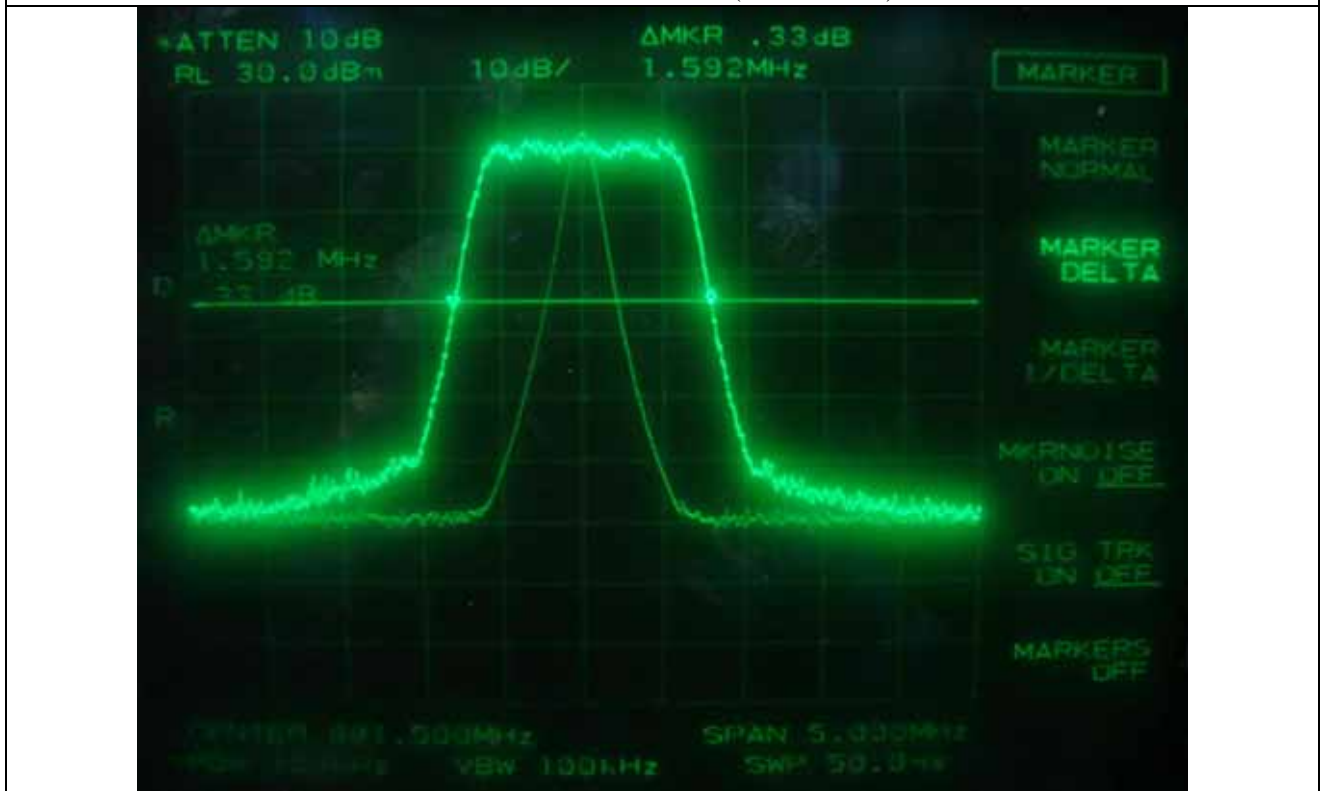
EDGE – 26 dB Bandwidth (Middle Channel)



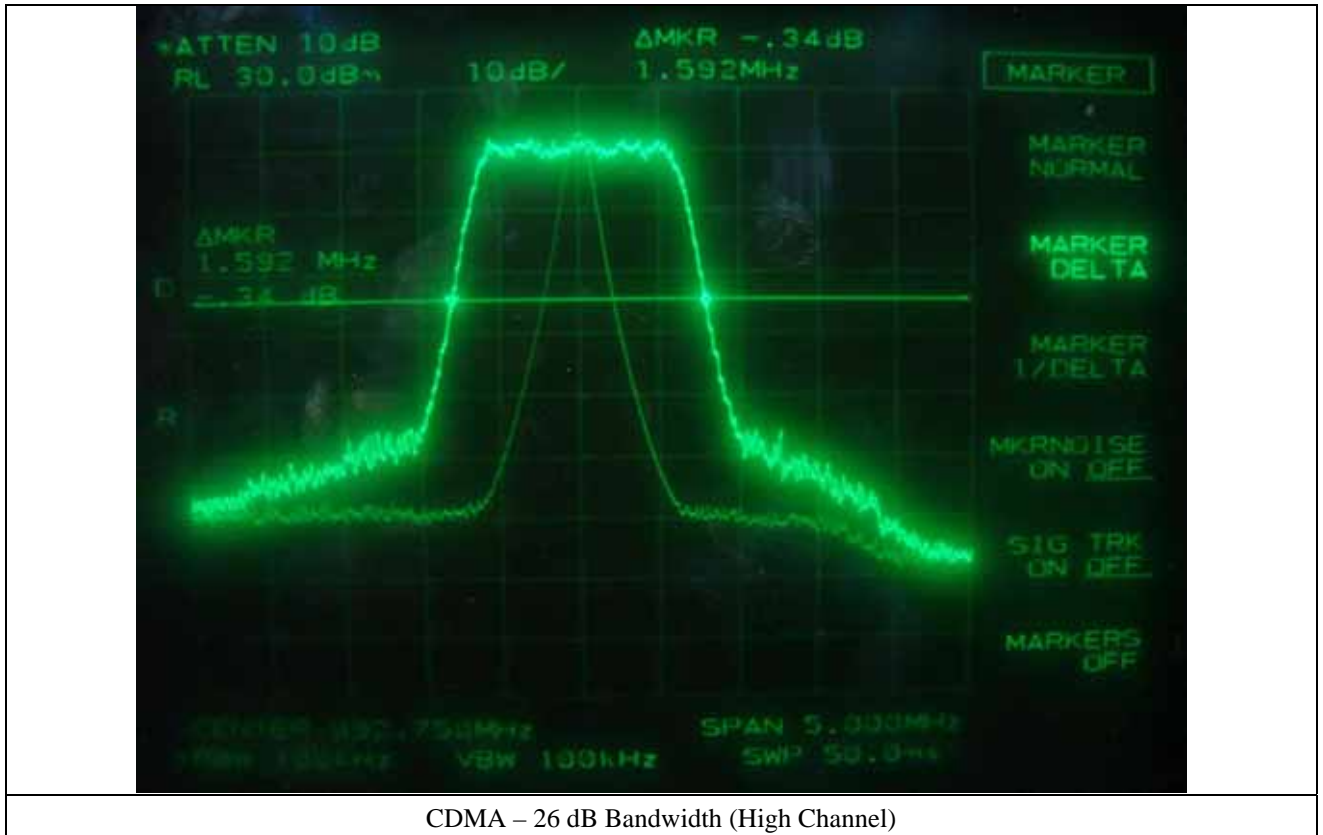
EDGE – 26 dB Bandwidth (High Channel)

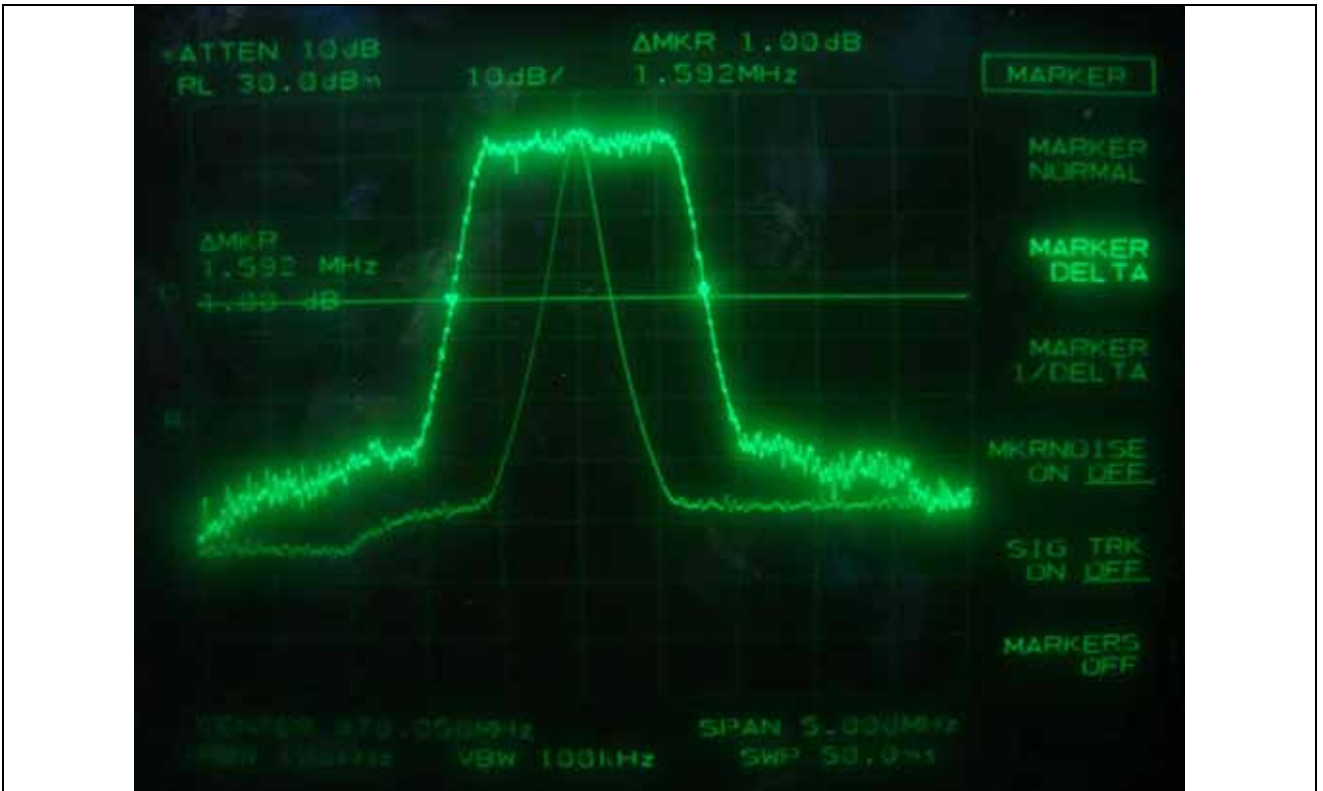


CDMA – 26 dB Bandwidth (Low Channel)

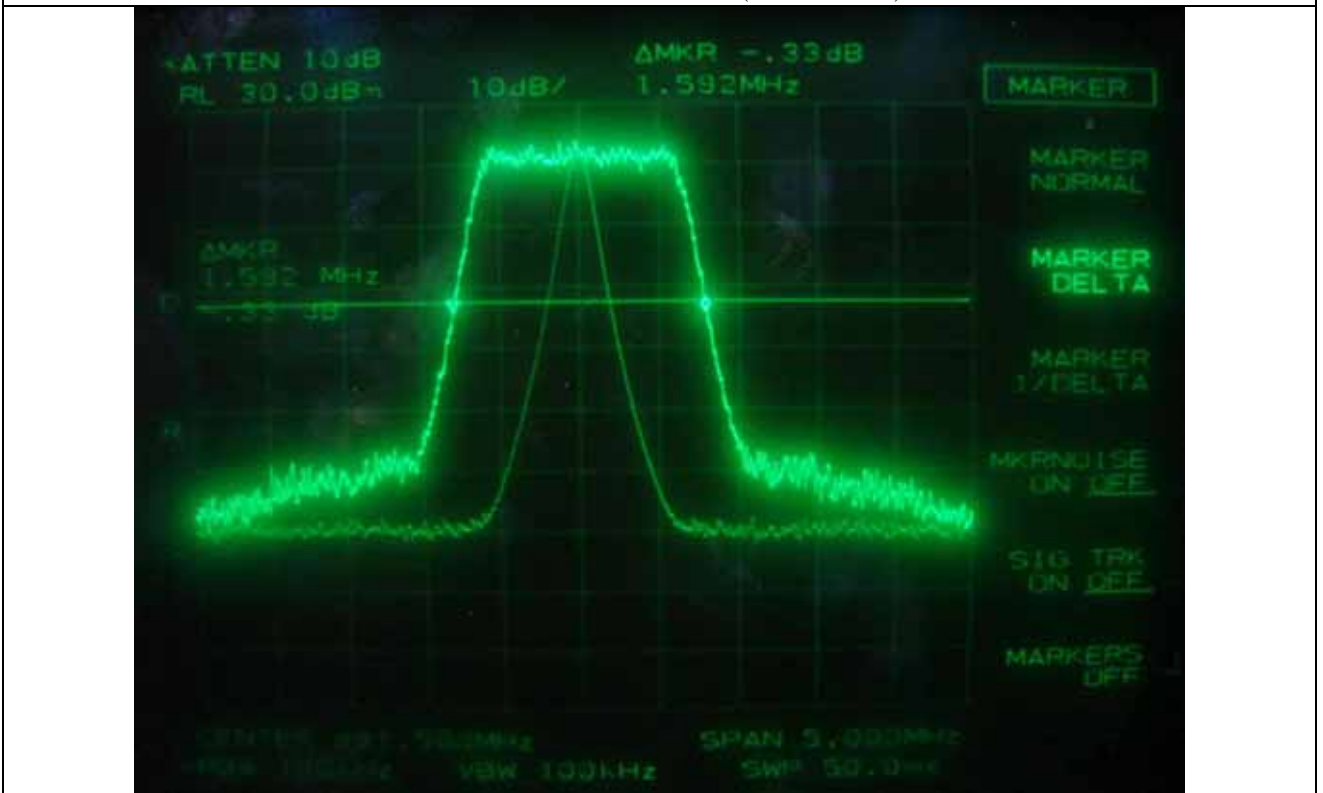


CDMA – 26 dB Bandwidth (Middle Channel)

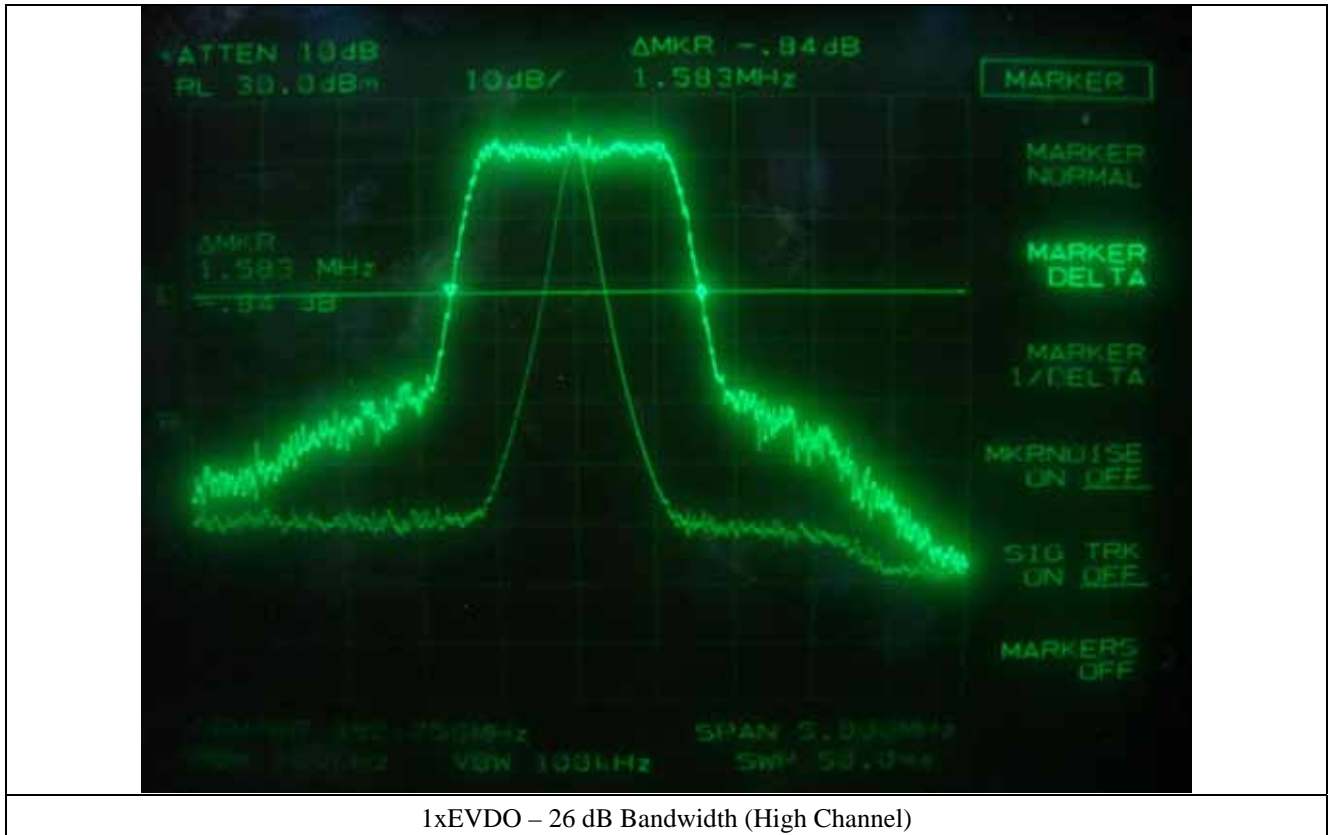


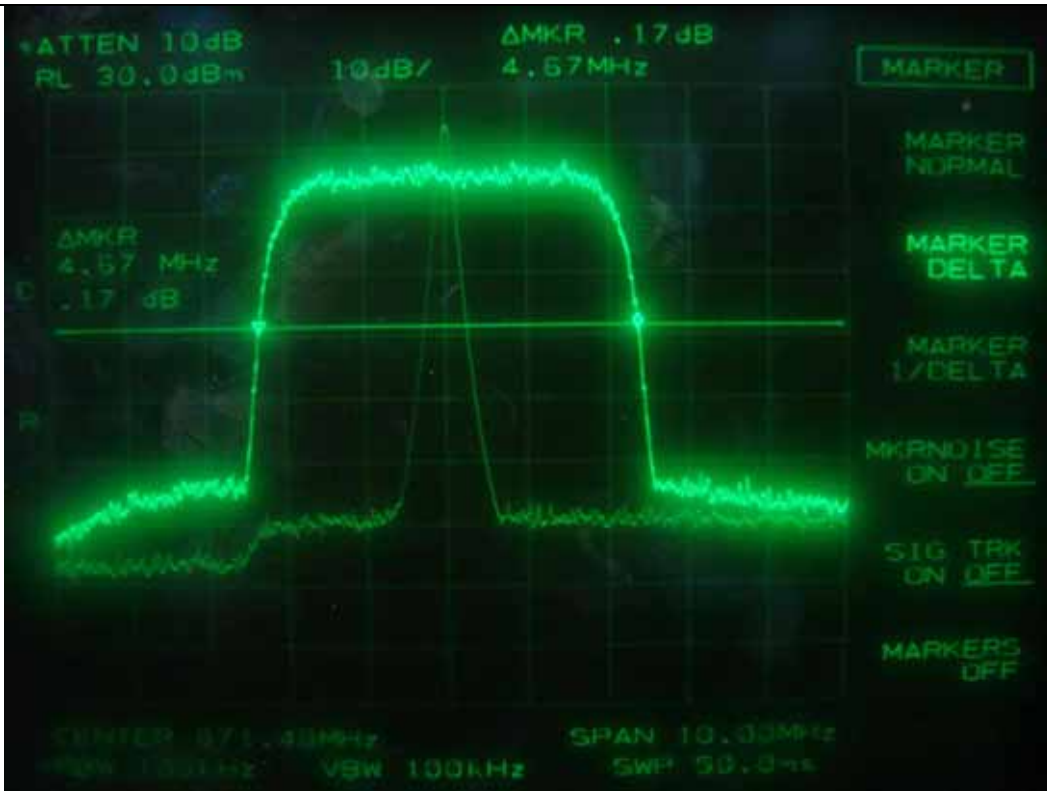


1xEVDO – 26 dB Bandwidth (Low Channel)

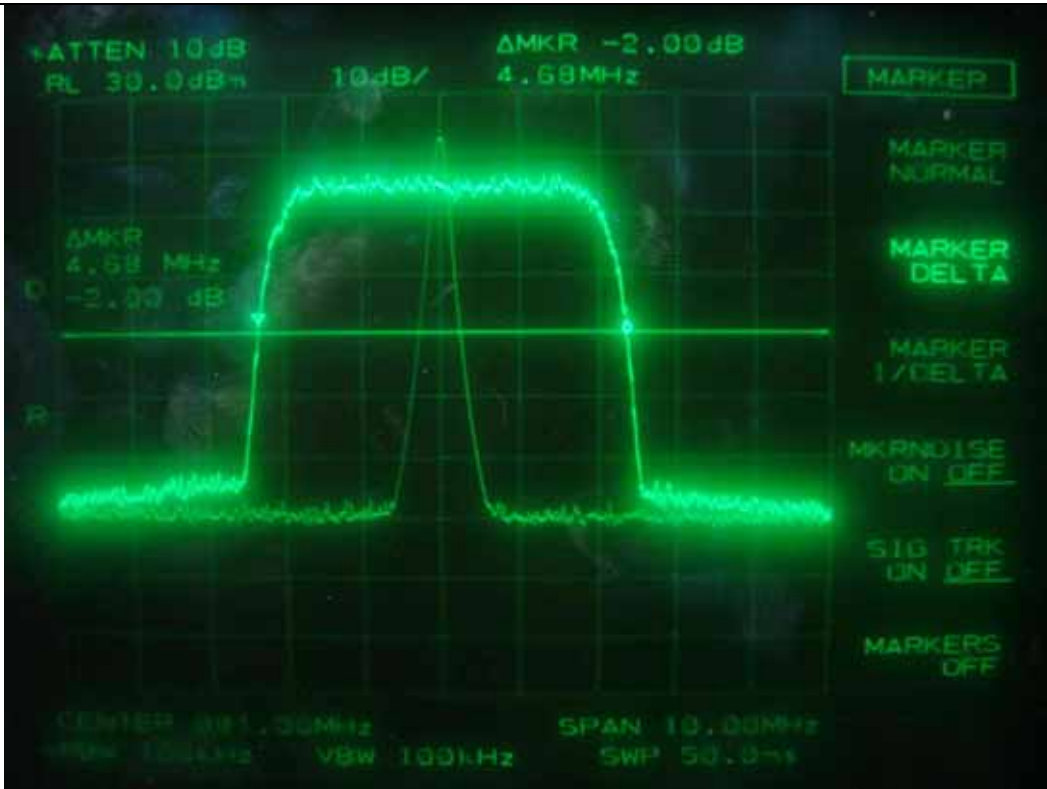


1xEVDO – 26 dB Bandwidth (Middle Channel)

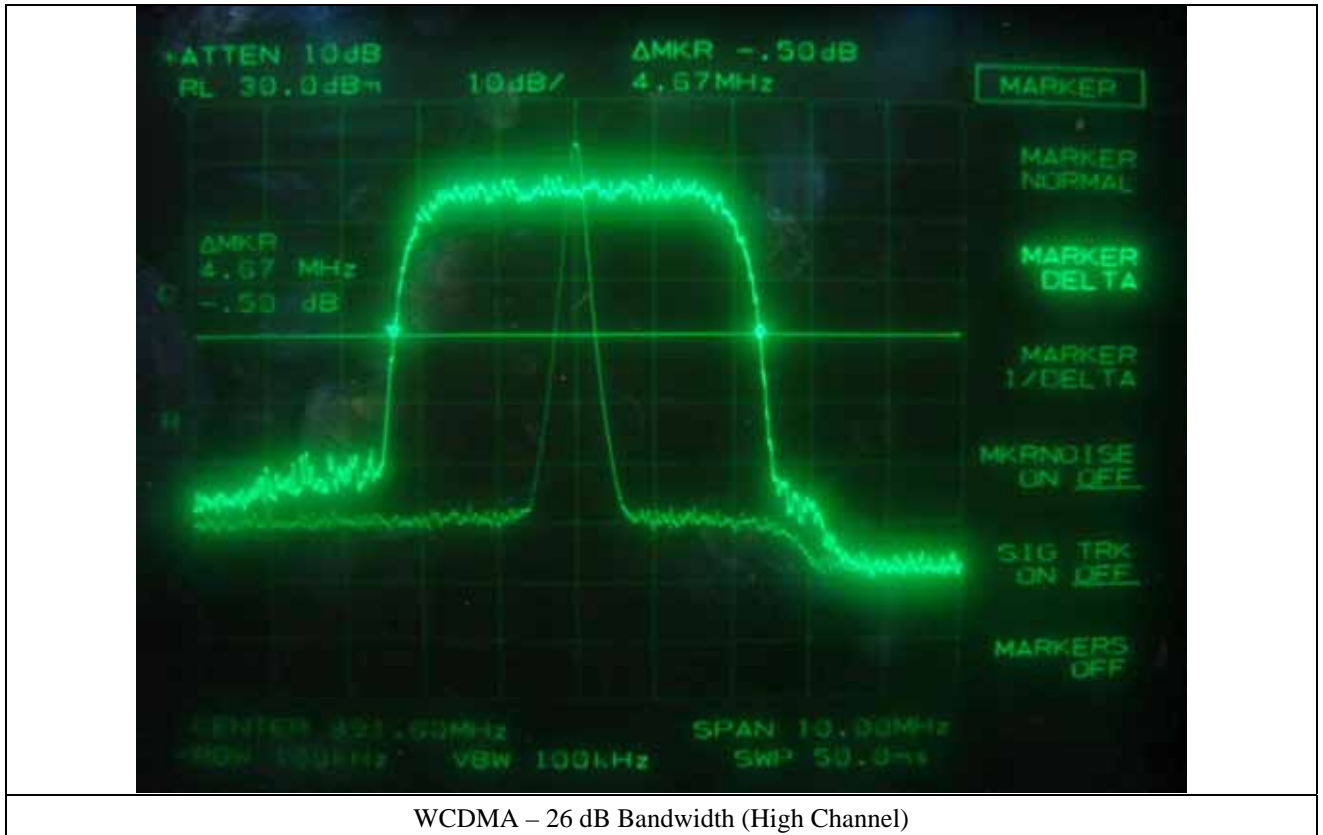




WCDMA – 26 dB Bandwidth (Low Channel)

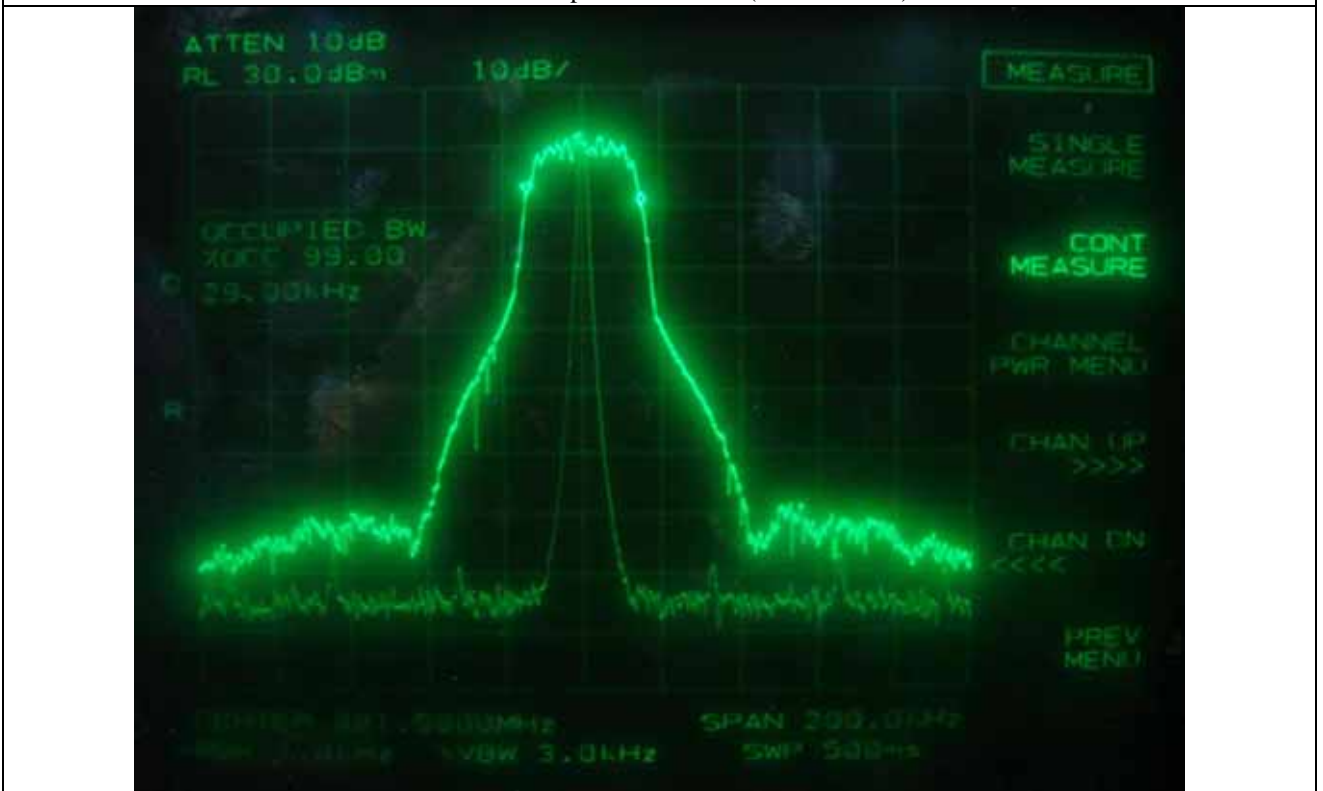


WCDMA – 26 dB Bandwidth (Middle Channel)

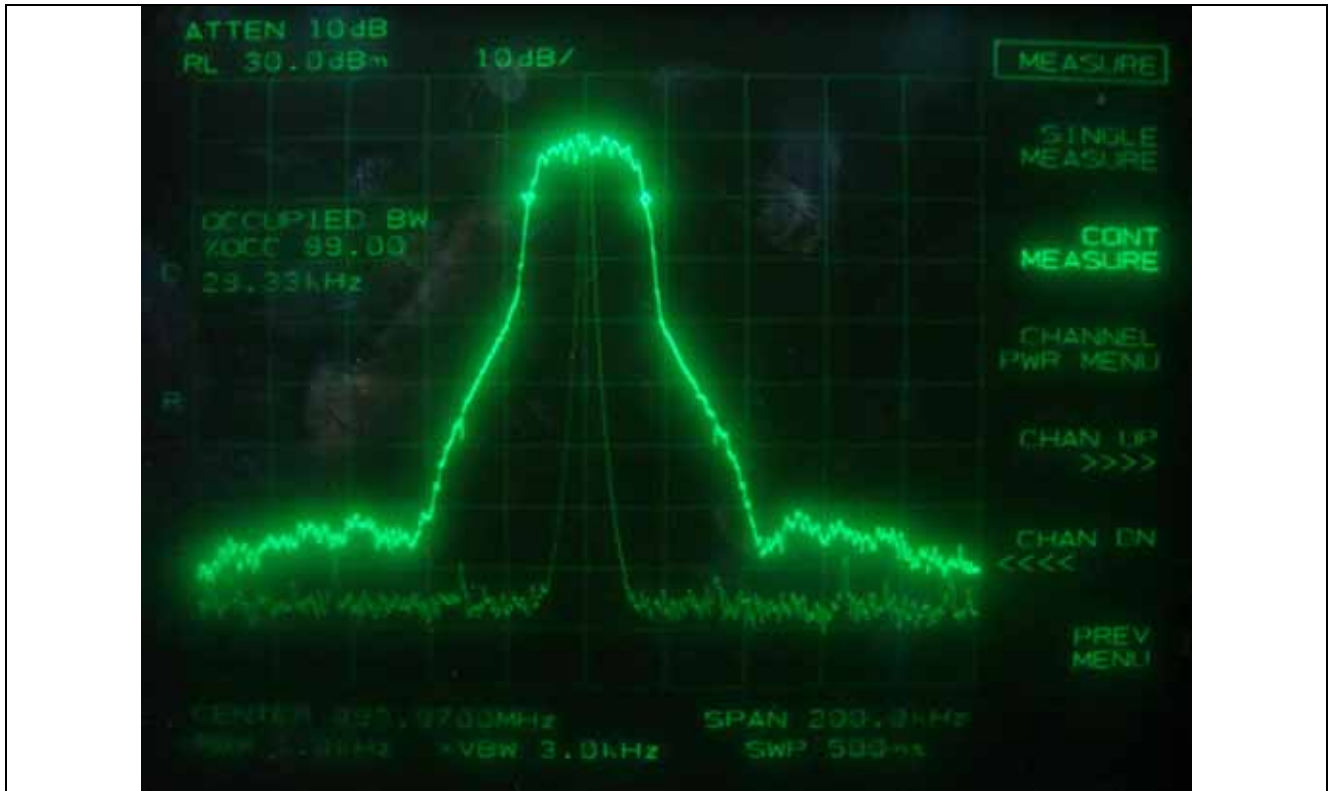




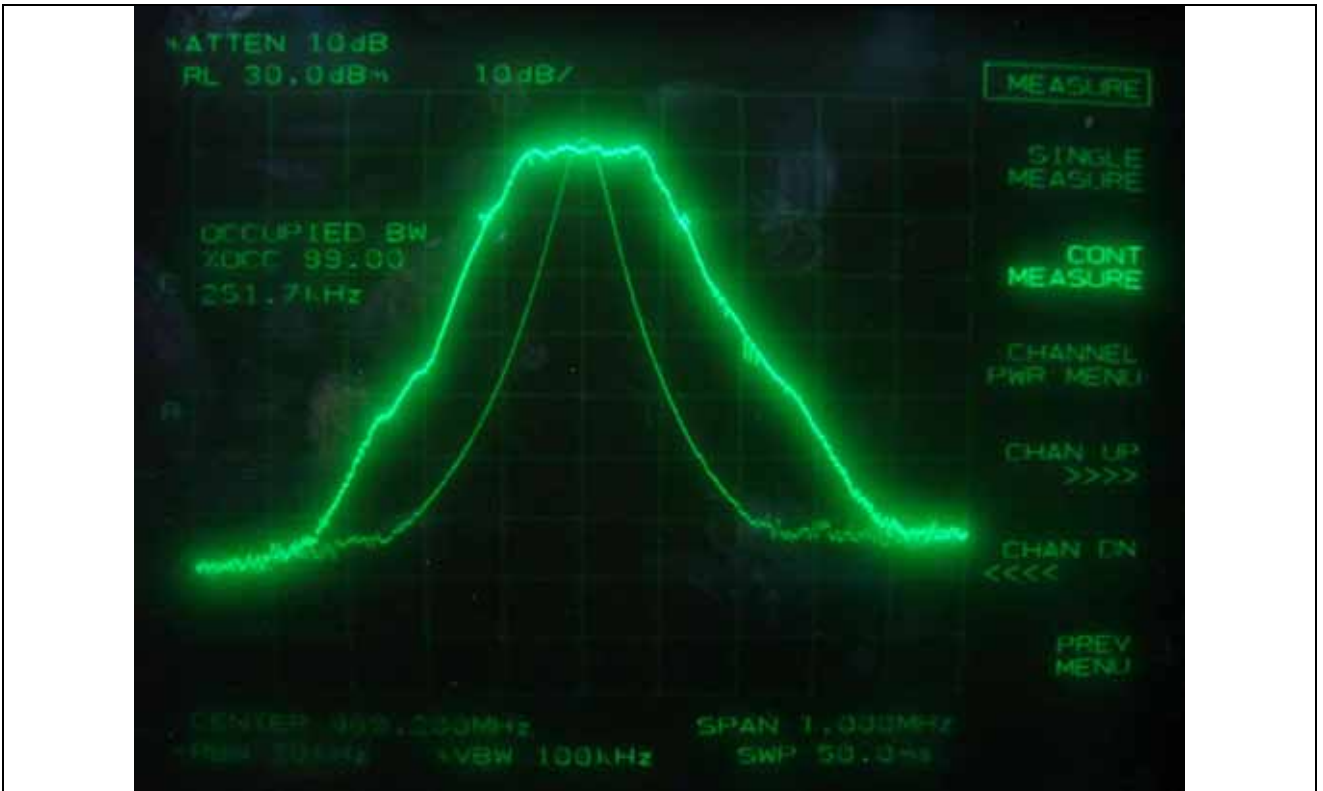
TDMA – Occupied Bandwidth (Low Channel)



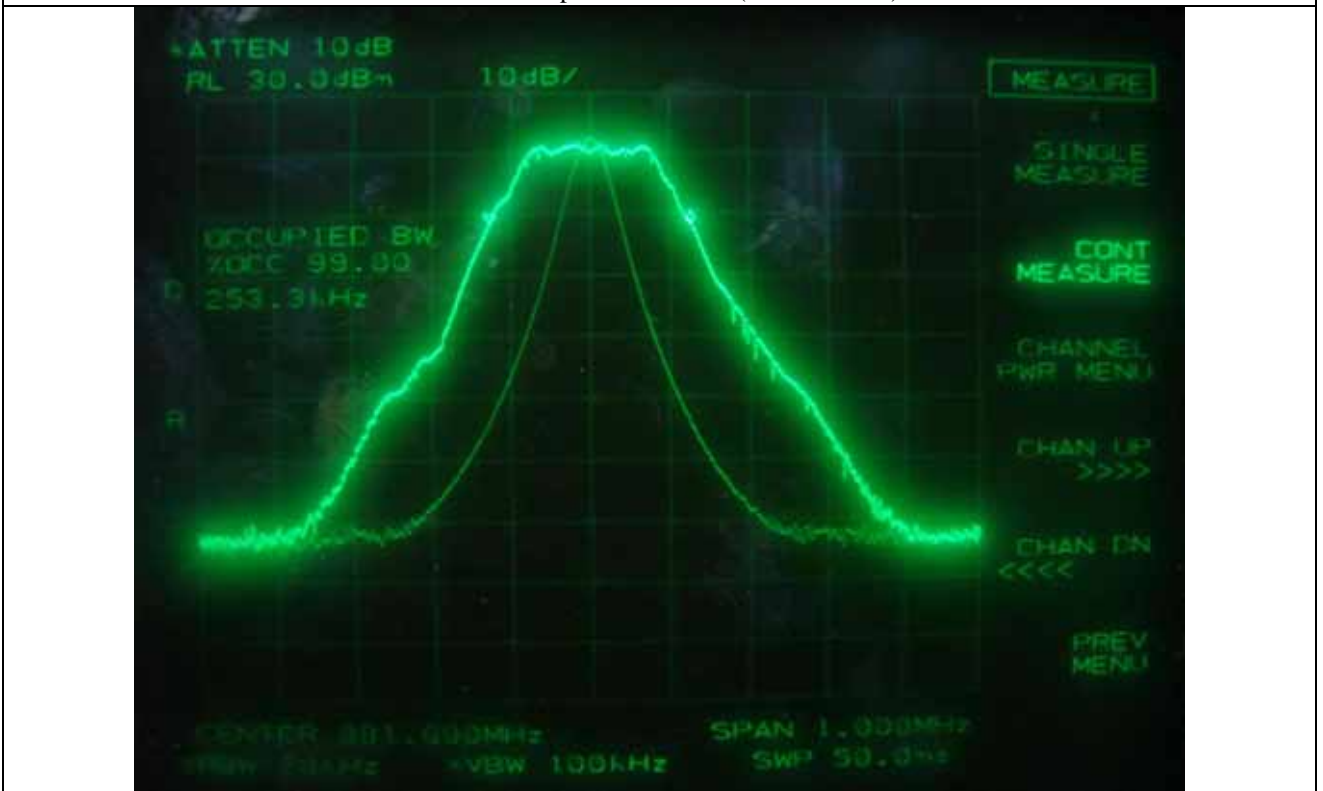
TDMA – Occupied Bandwidth (Middle Channel)



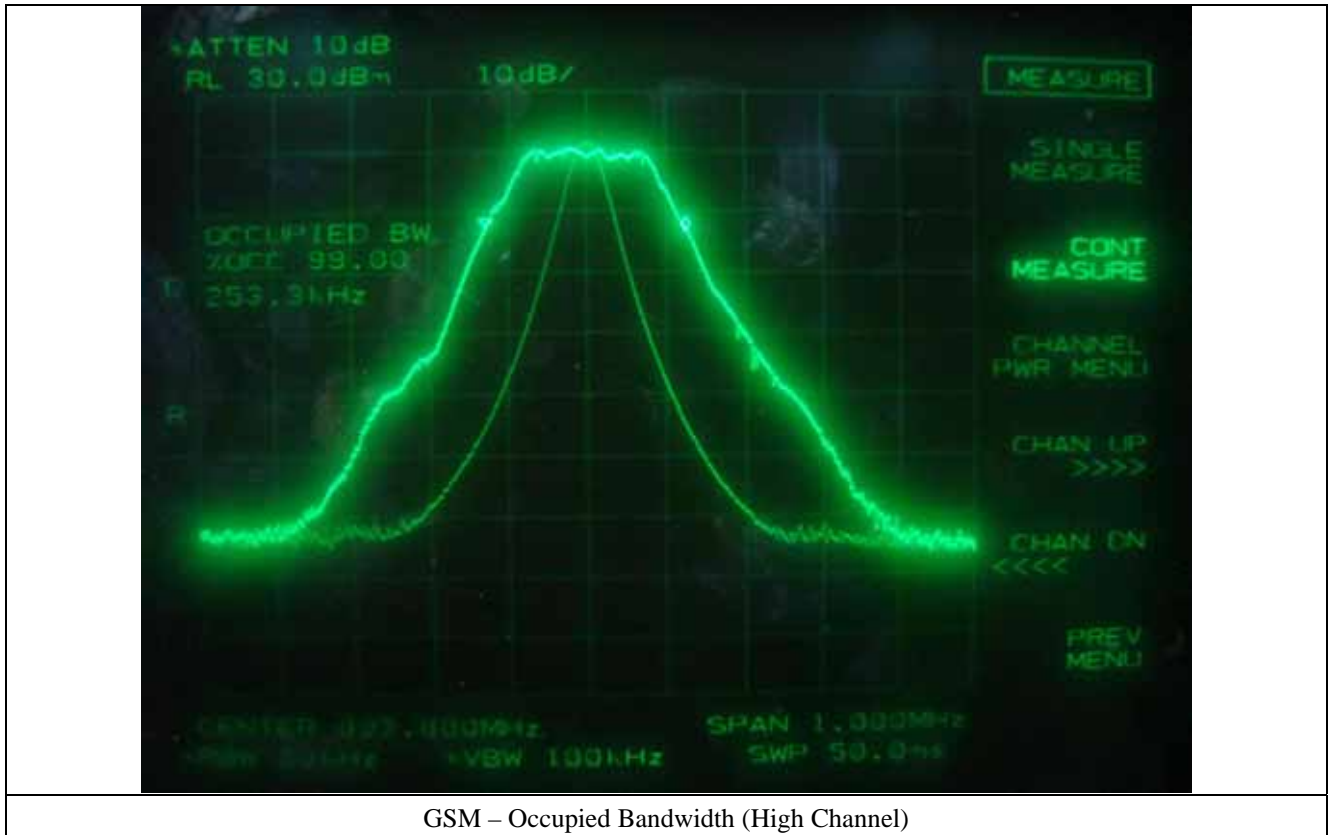
TDMA – Occupied Bandwidth (High Channel)

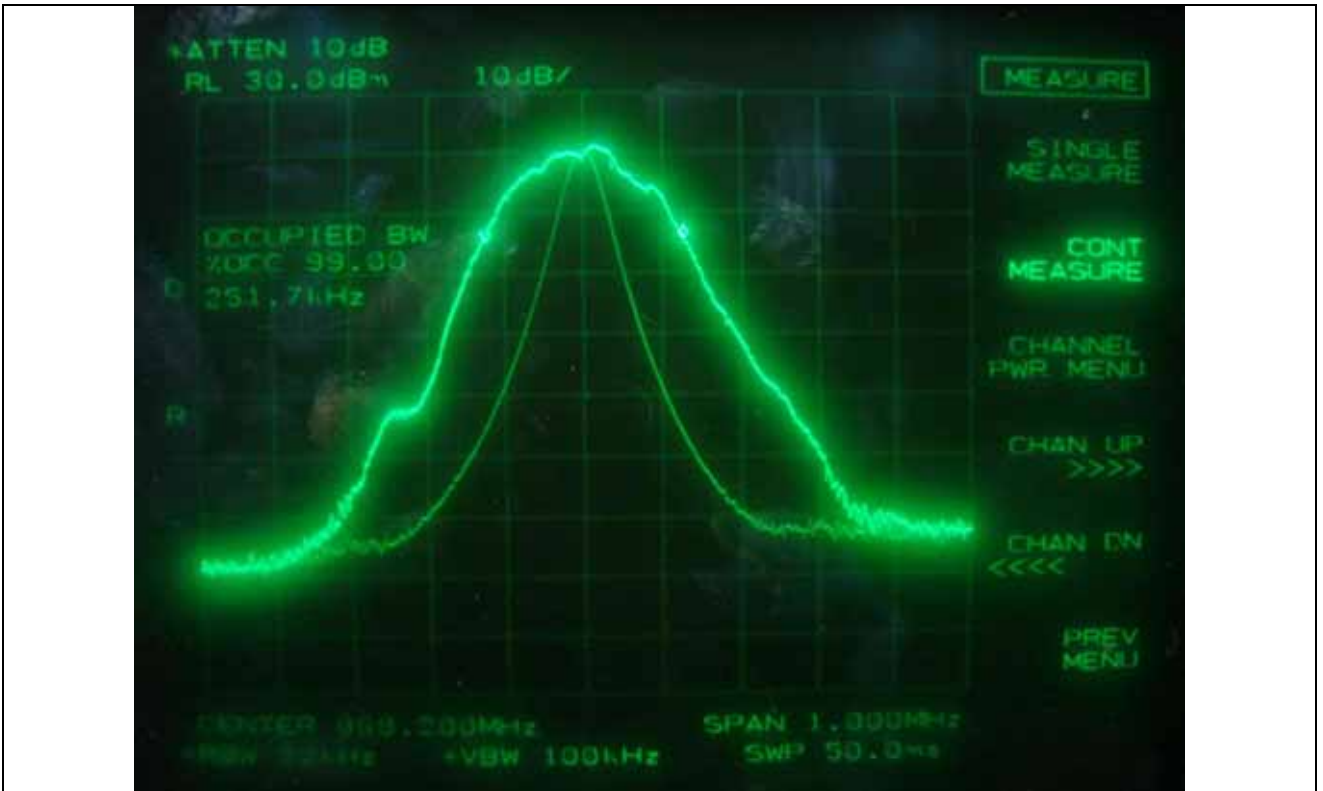


GSM – Occupied Bandwidth (Low Channel)

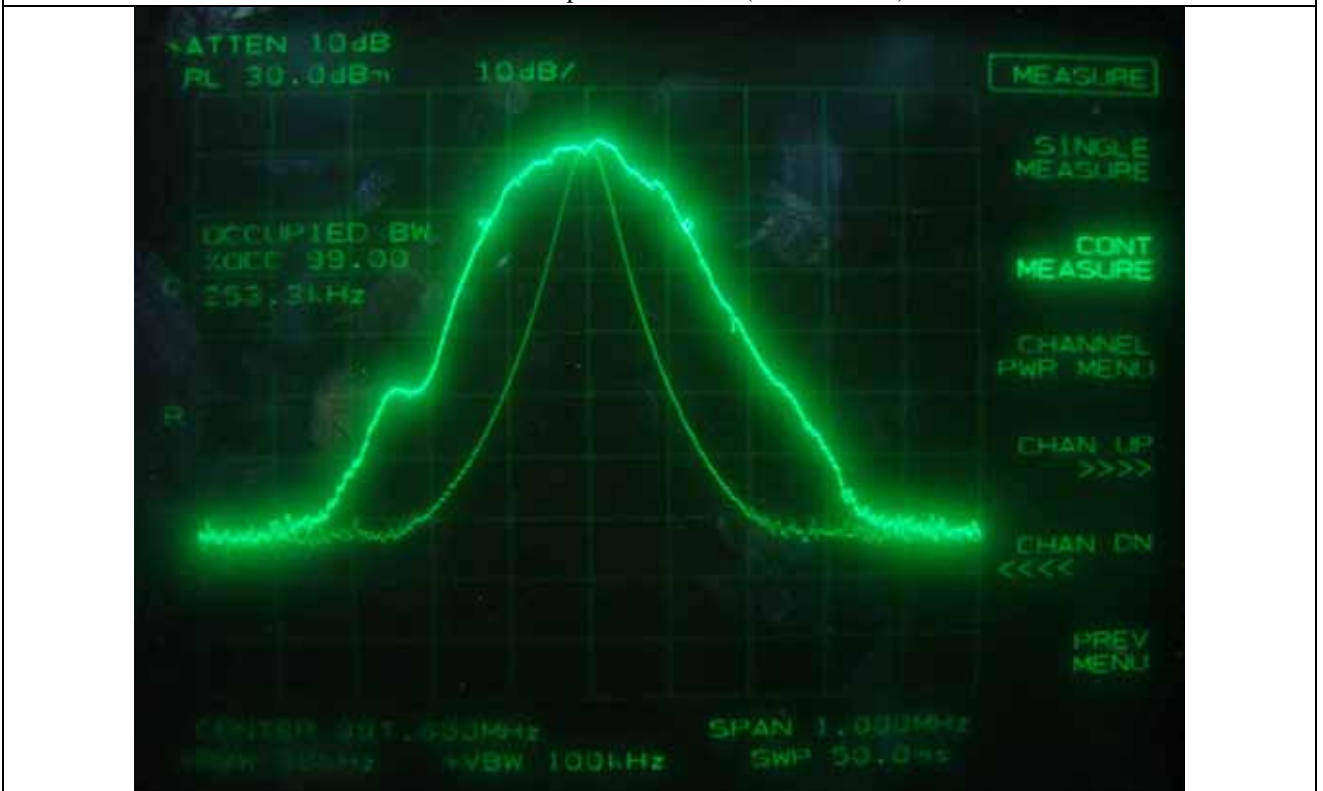


GSM – Occupied Bandwidth (Middle Channel)

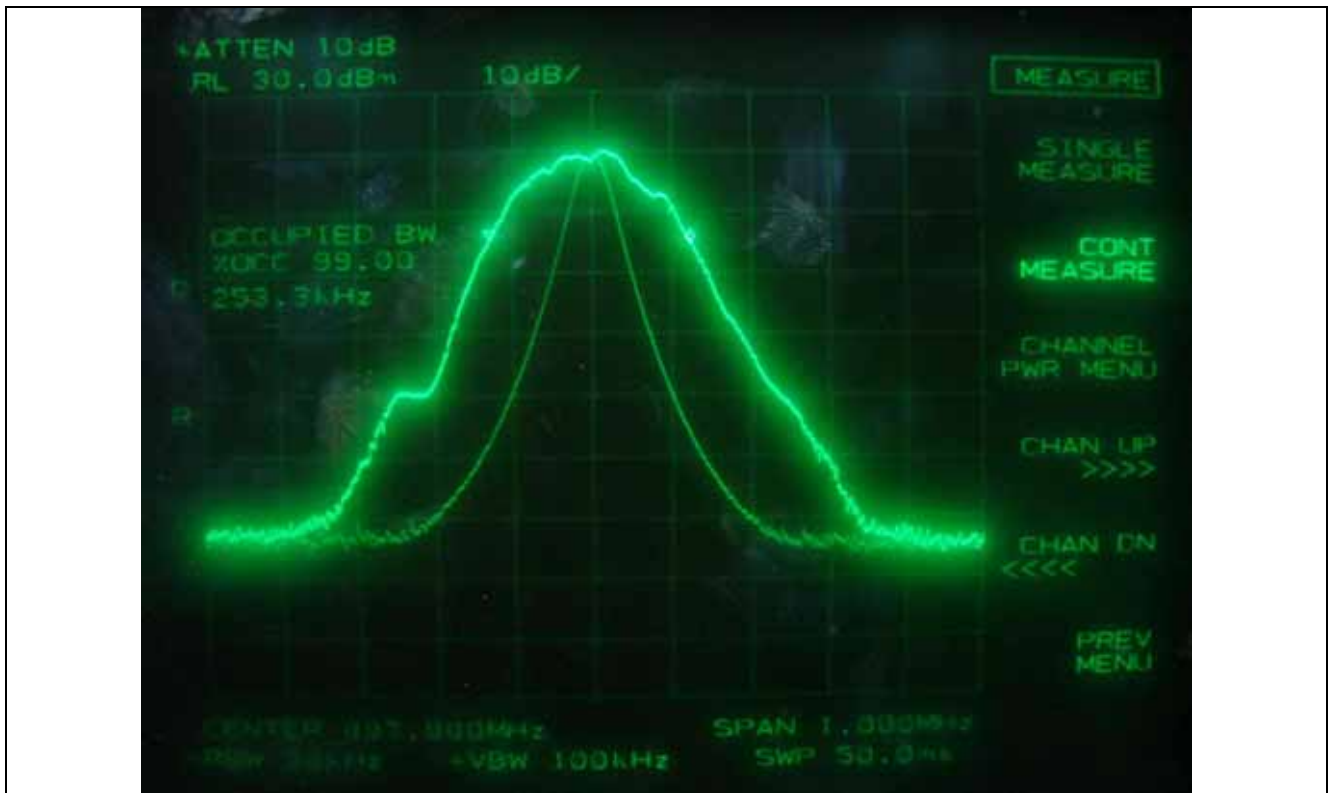




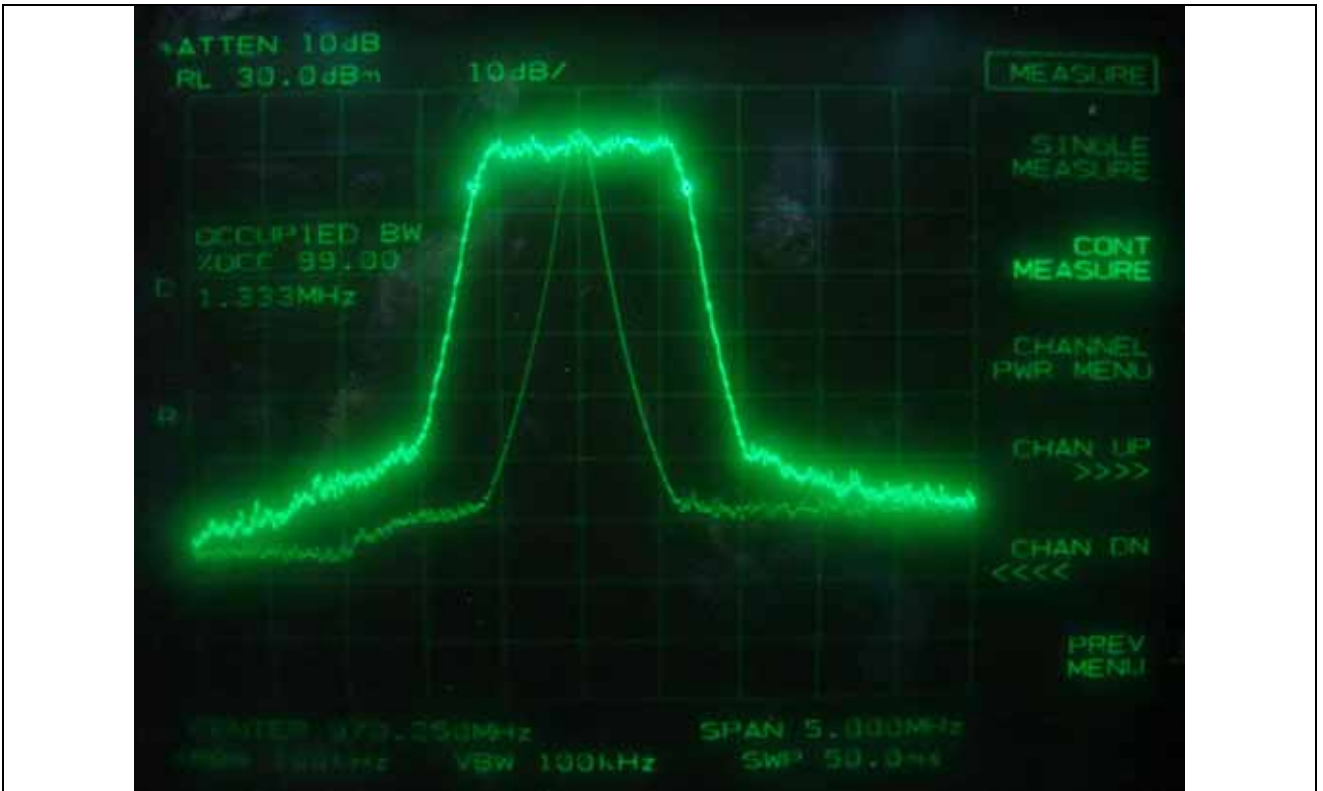
EDGE – Occupied Bandwidth (Low Channel)



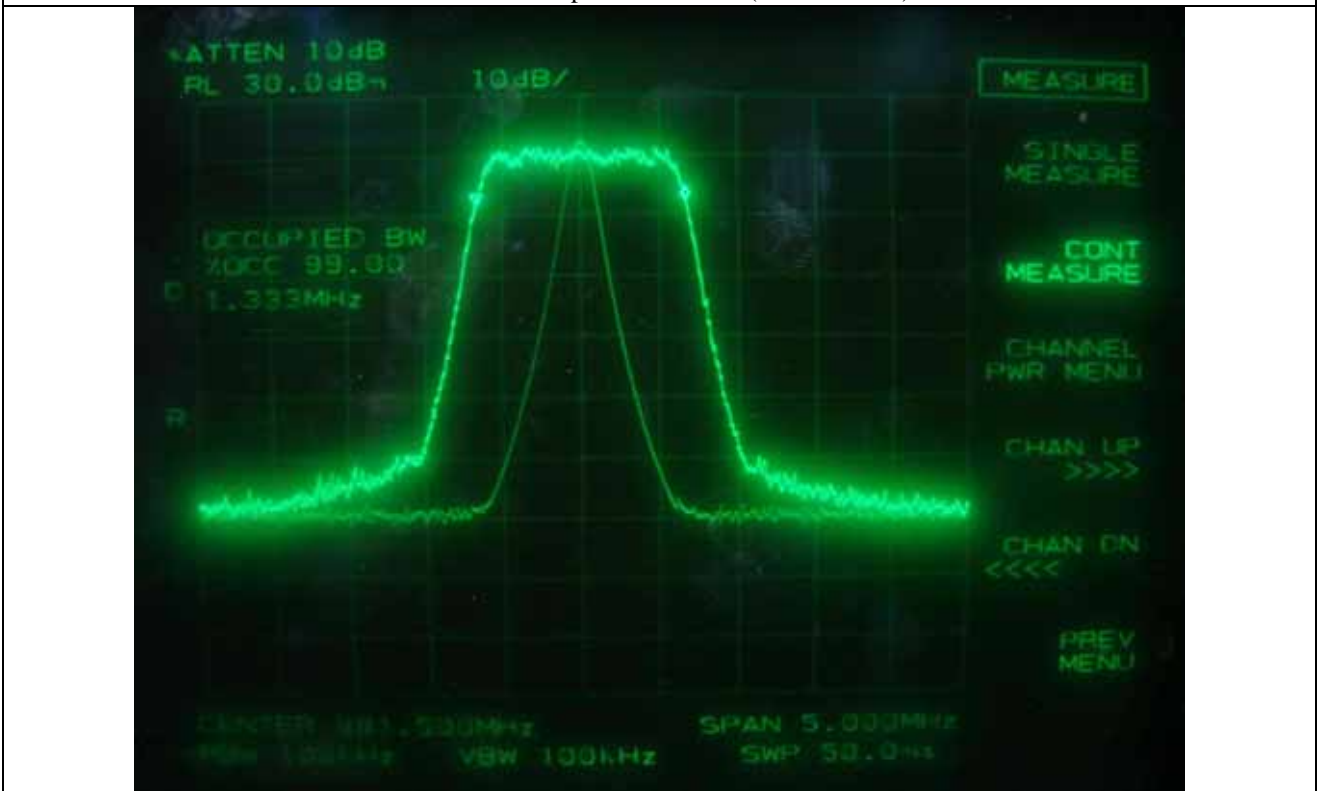
EDGE – Occupied Bandwidth (Middle Channel)



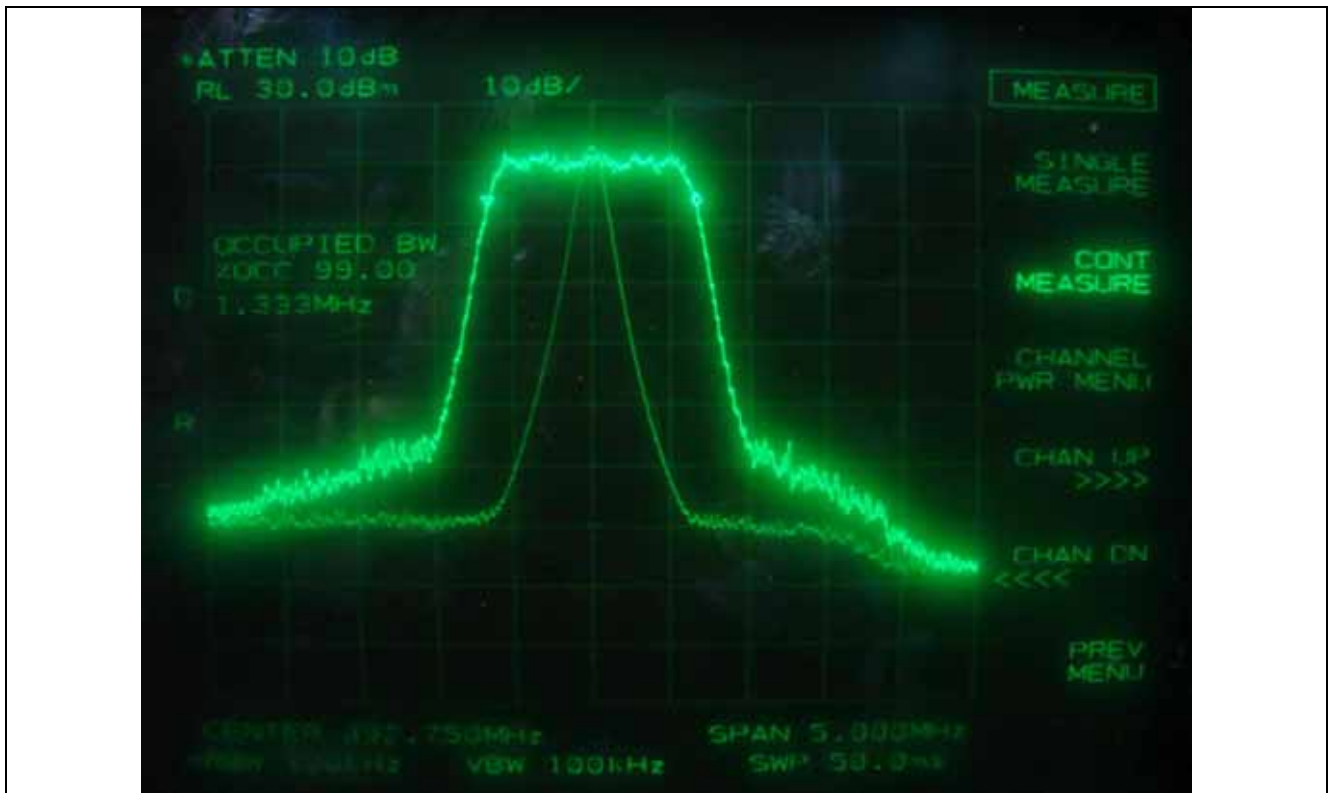
EDGE – Occupied Bandwidth (High Channel)



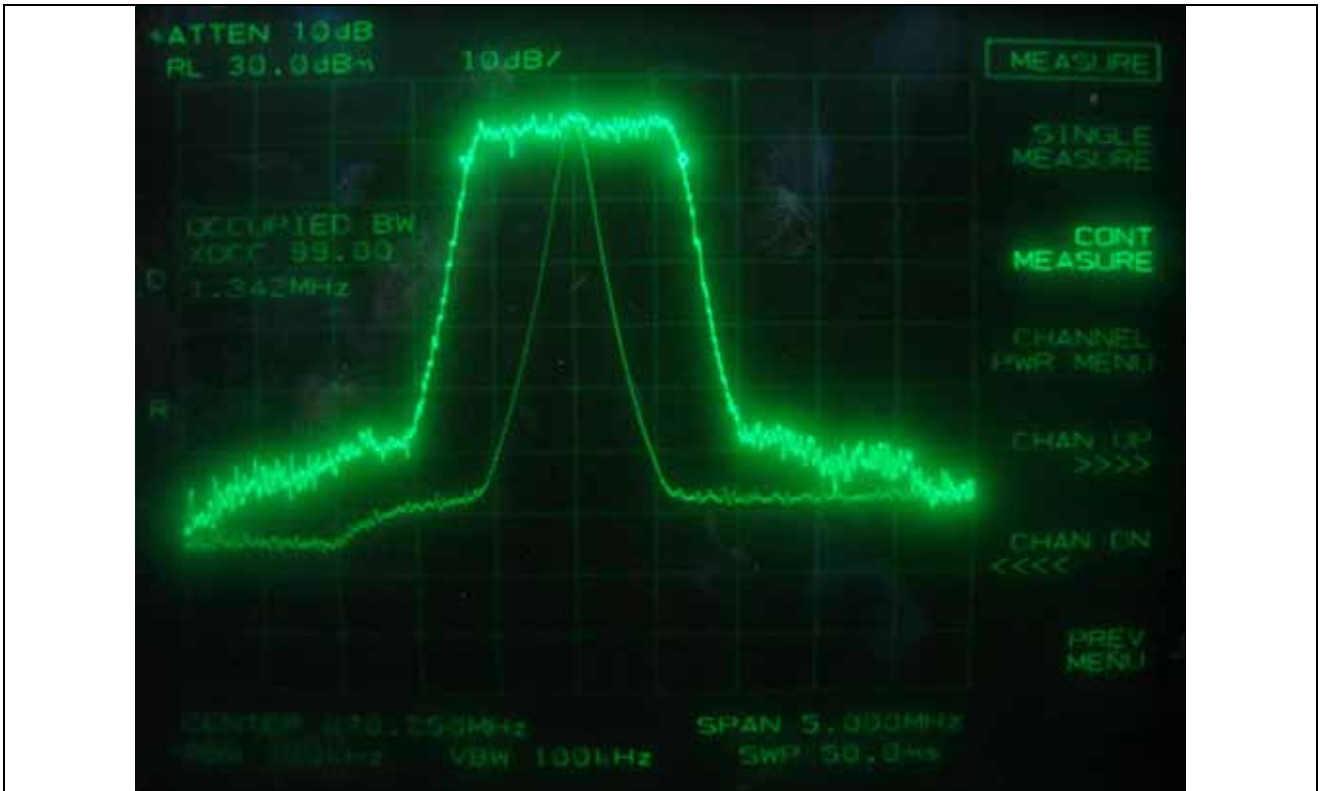
CDMA – Occupied Bandwidth (Low Channel)



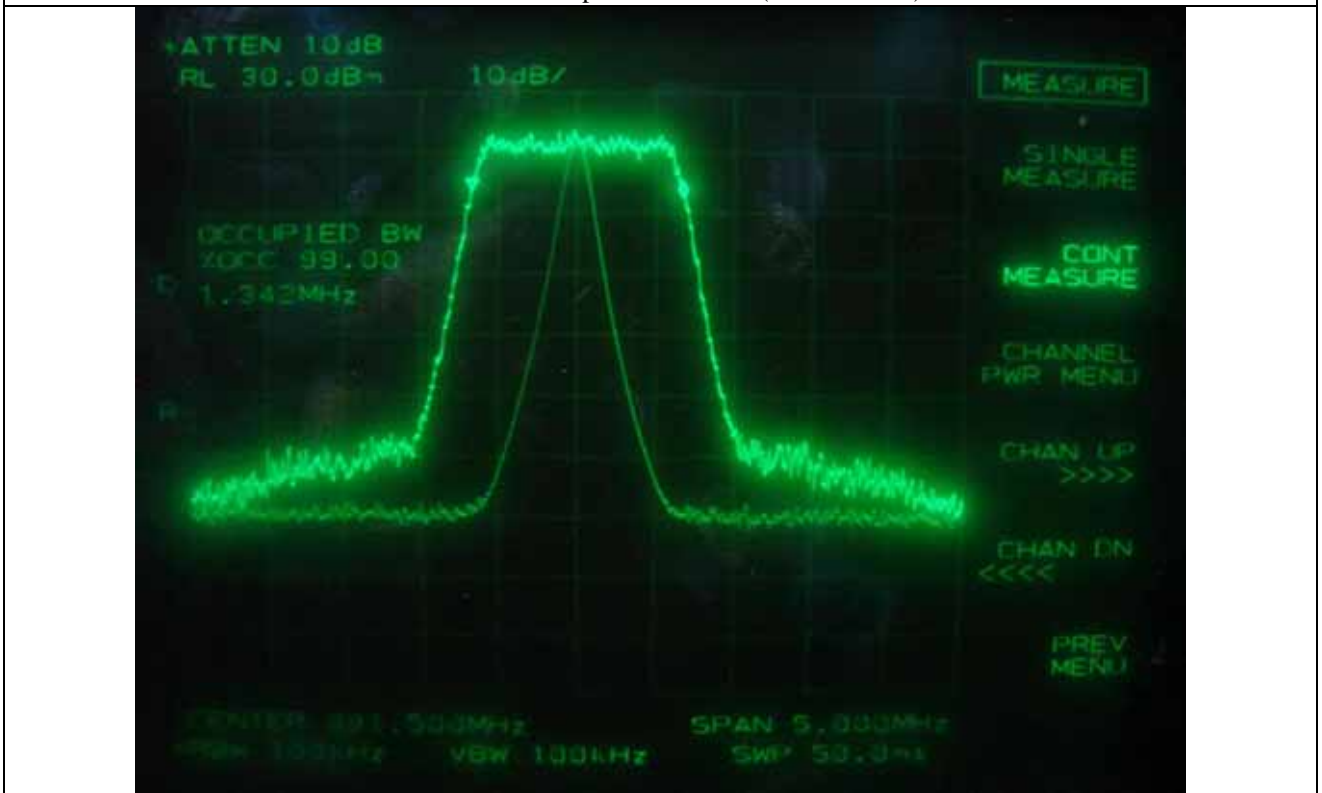
CDMA – Occupied Bandwidth (Middle Channel)



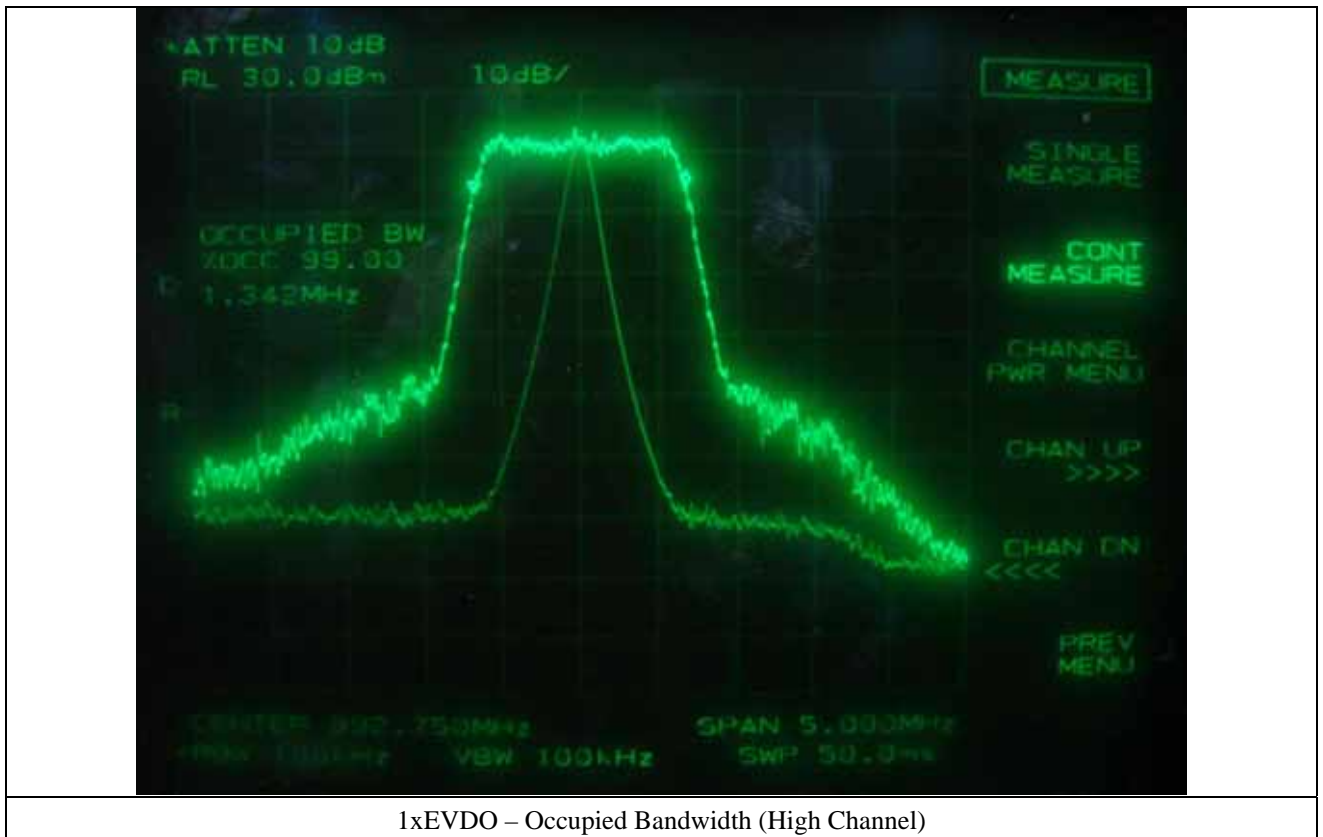
CDMA – Occupied Bandwidth (High Channel)

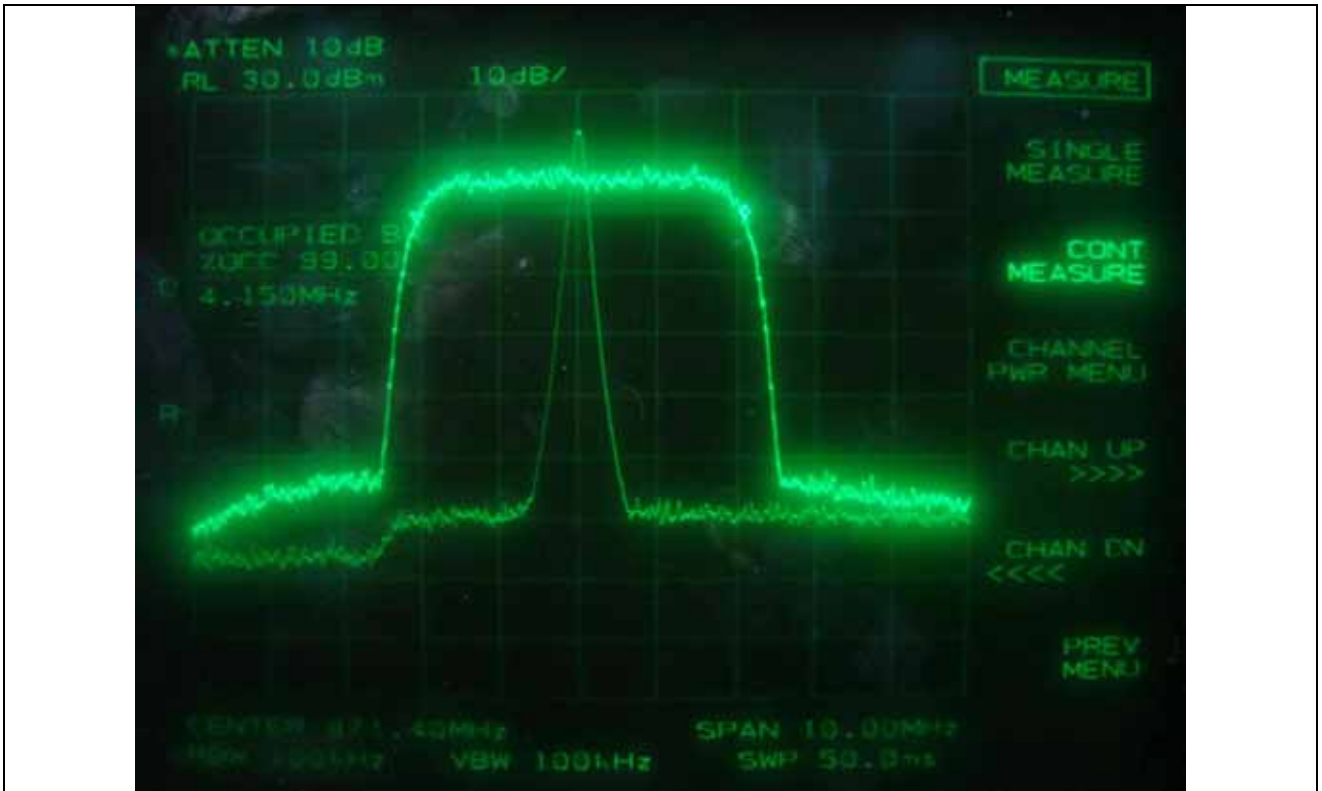


1xEVDO – Occupied Bandwidth (Low Channel)

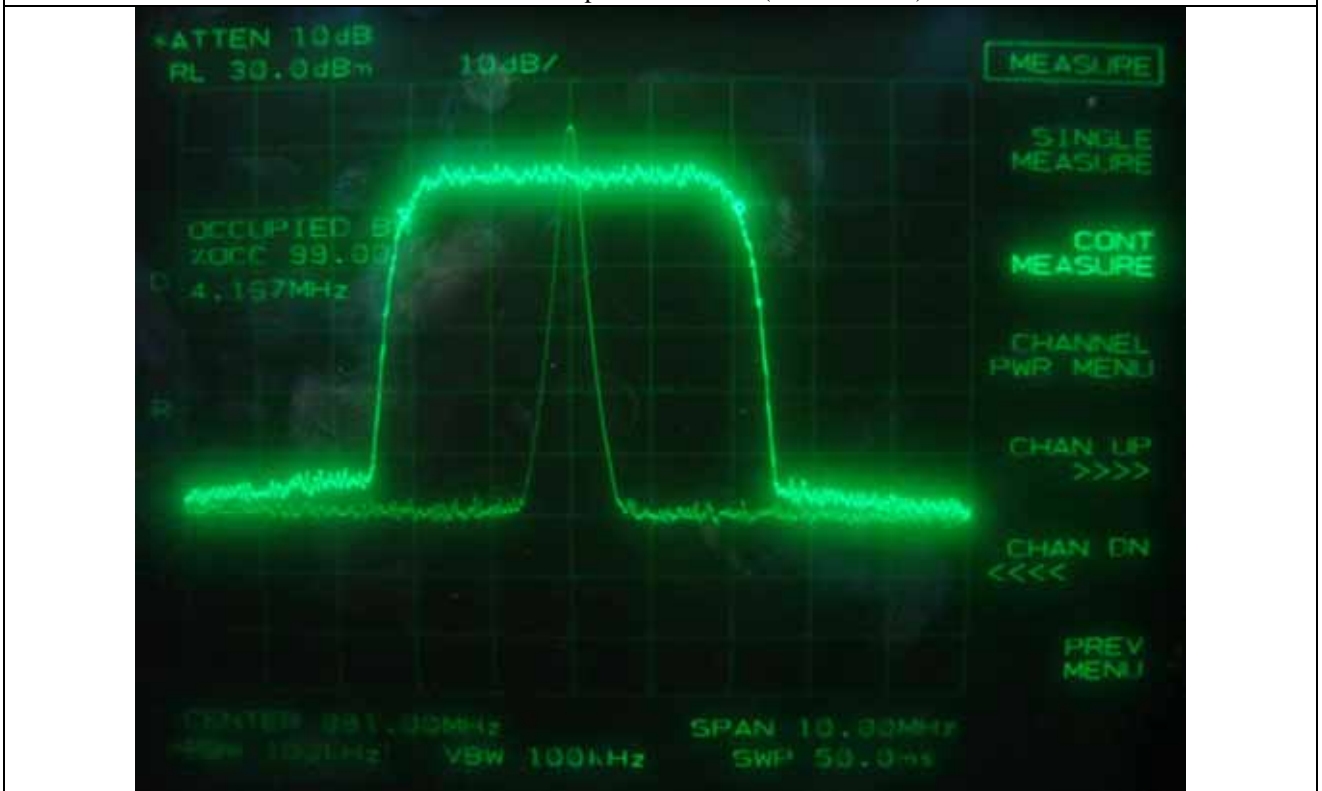


1xEVDO – Occupied Bandwidth (Middle Channel)

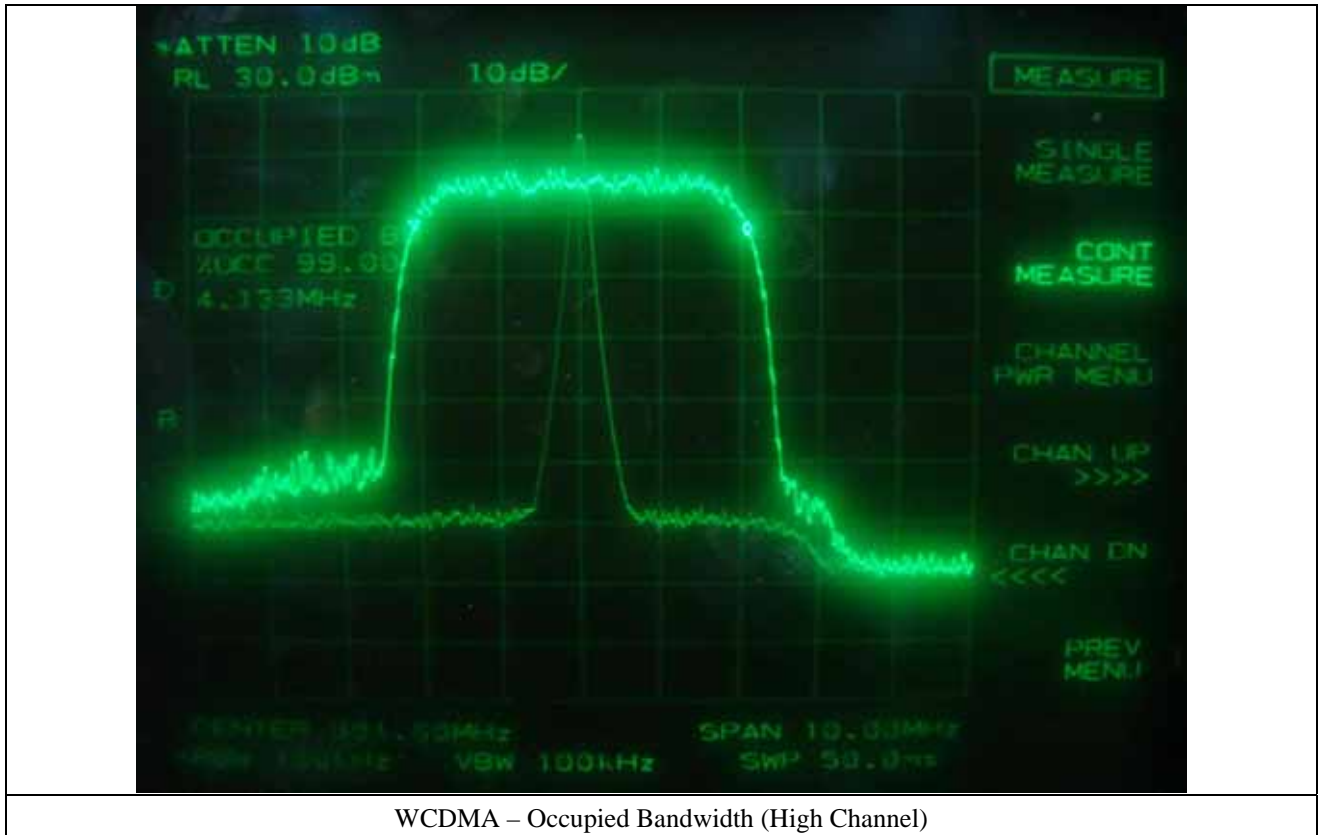


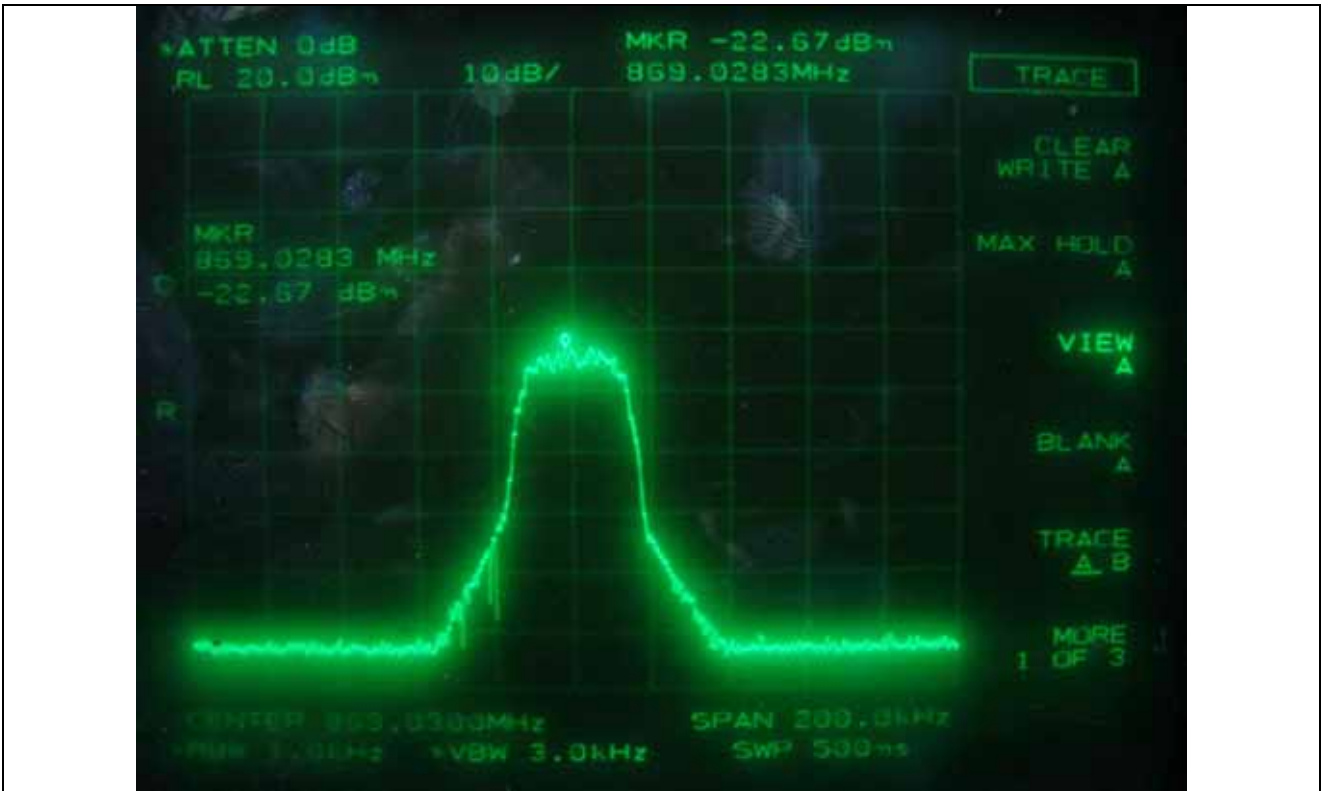


WCDMA – Occupied Bandwidth (Low Channel)

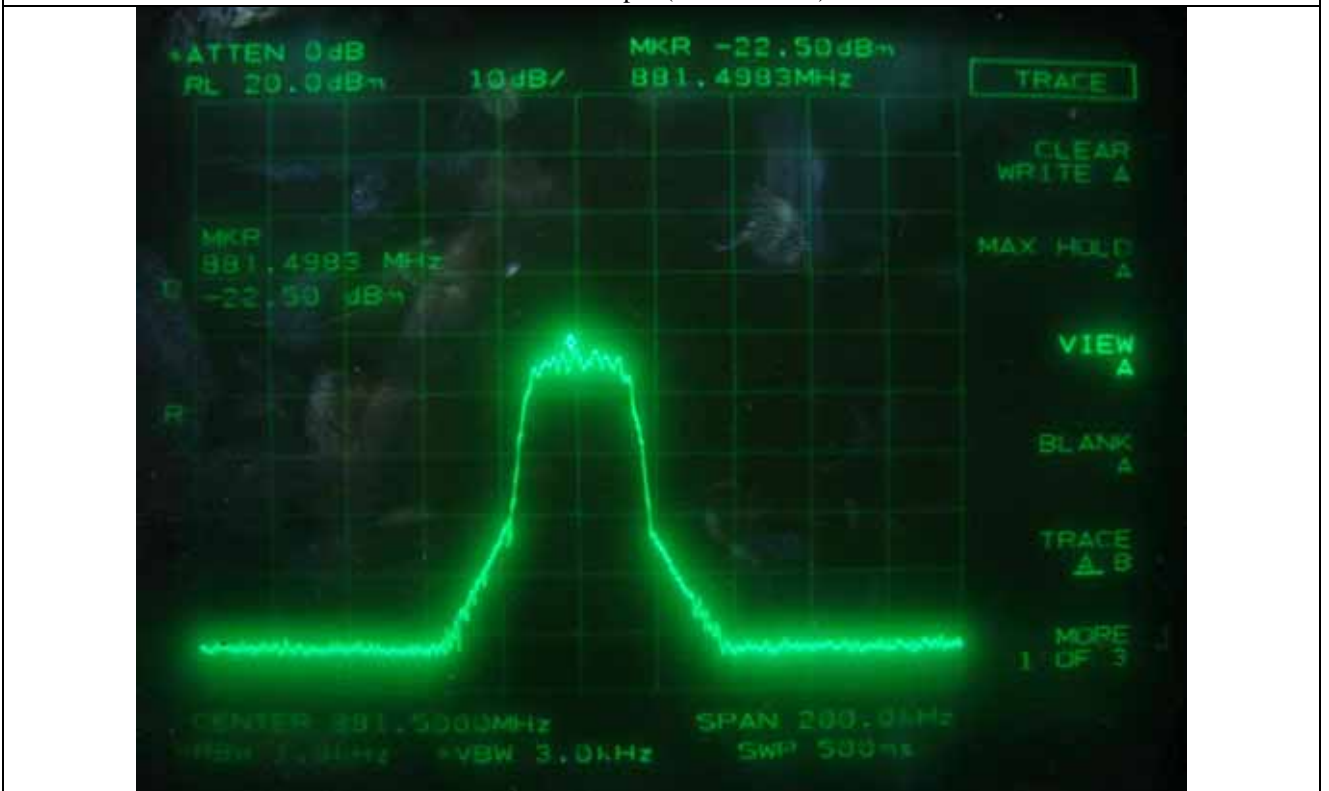


WCDMA – Occupied Bandwidth (Middle Channel)

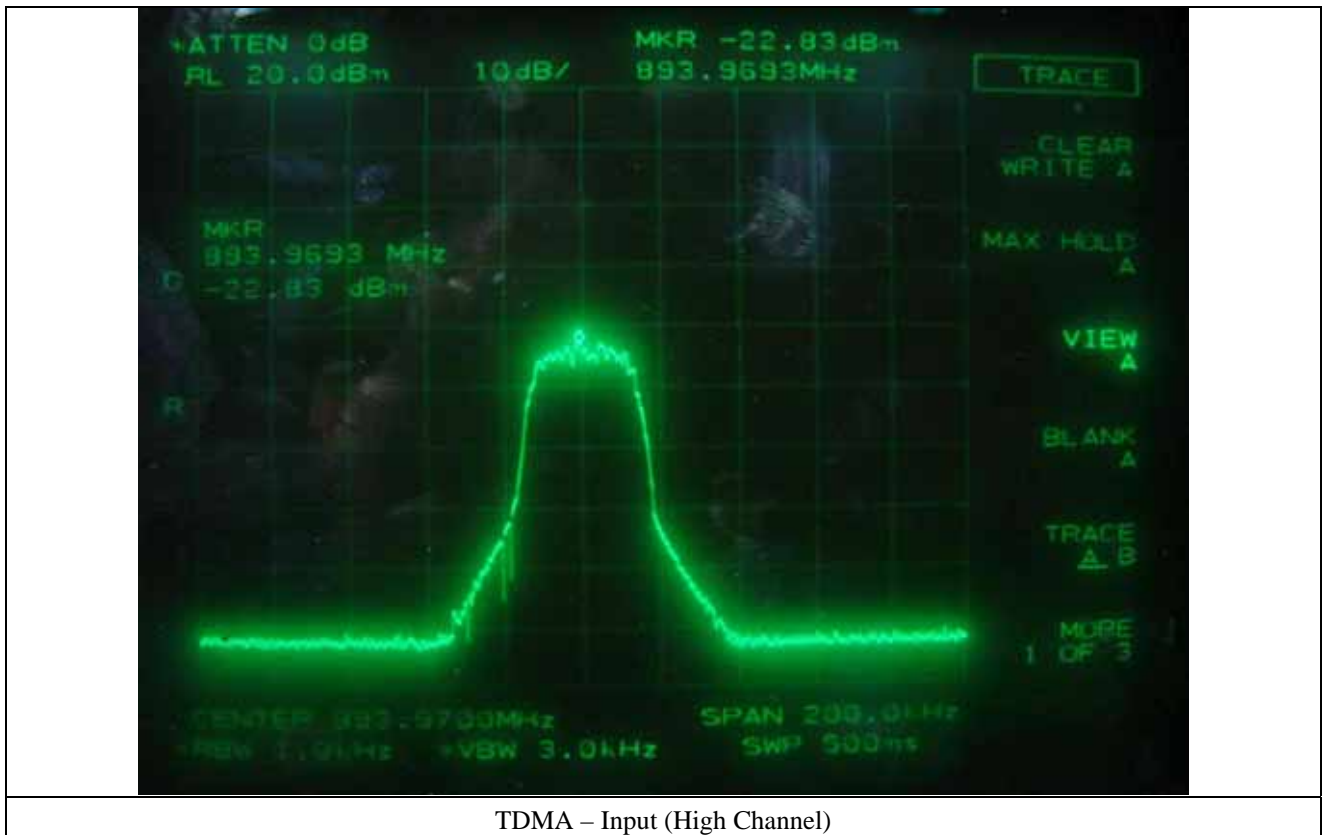




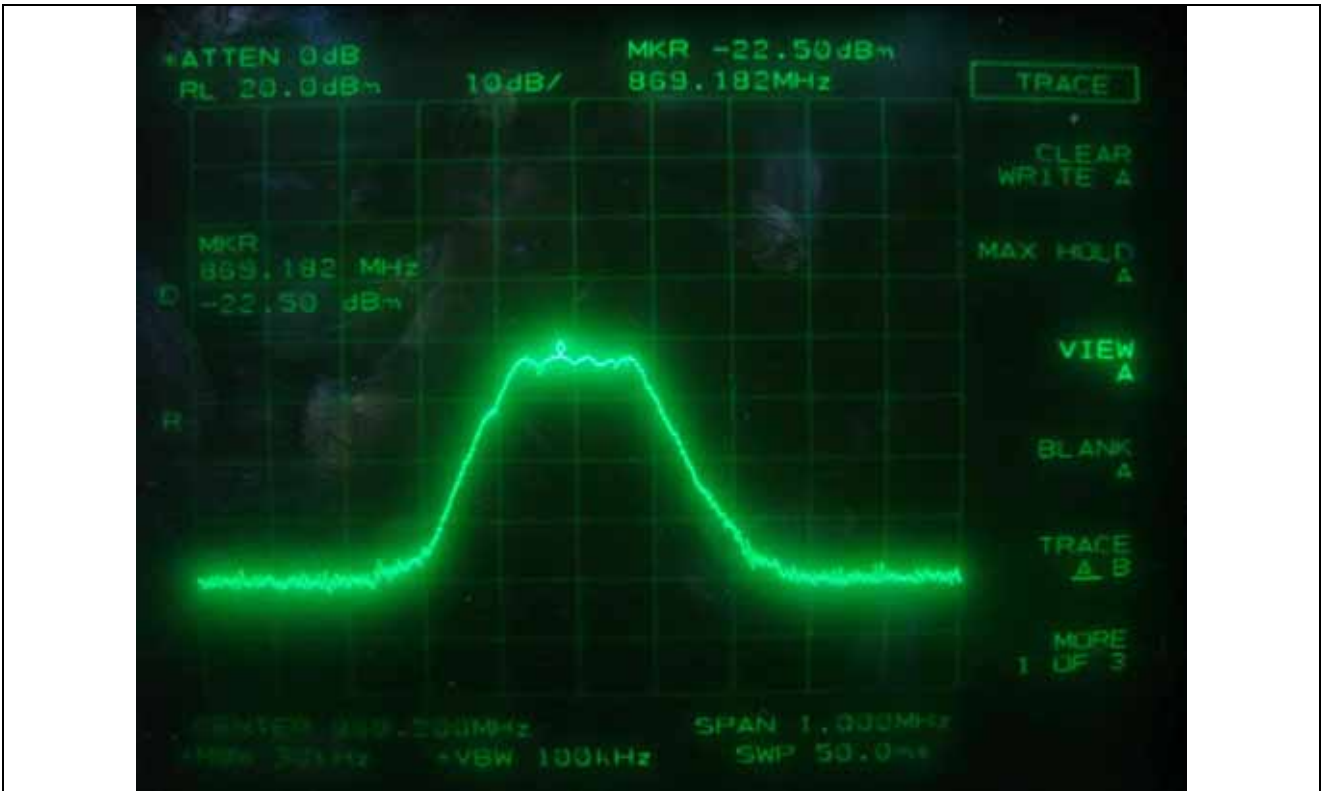
TDMA – Input (Low Channel)



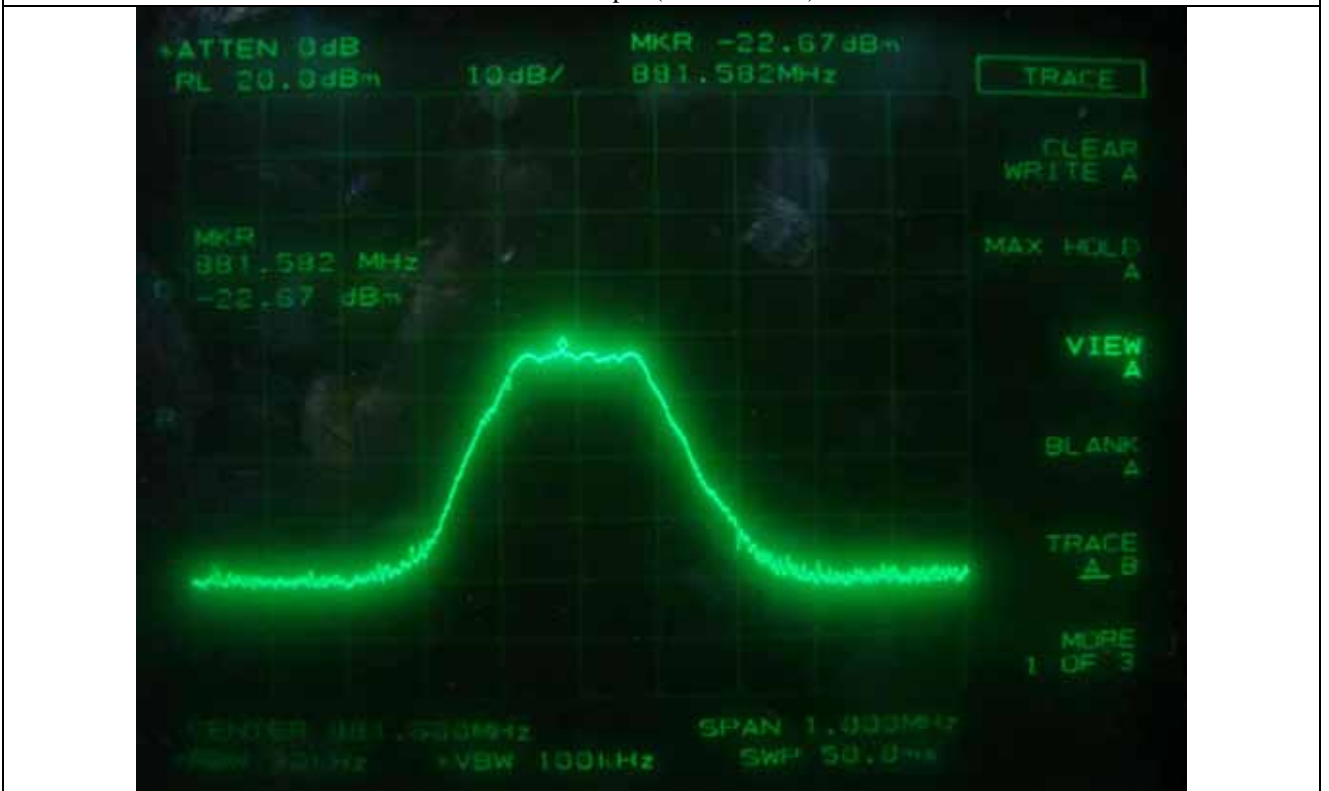
TDMA – Input (Middle Channel)



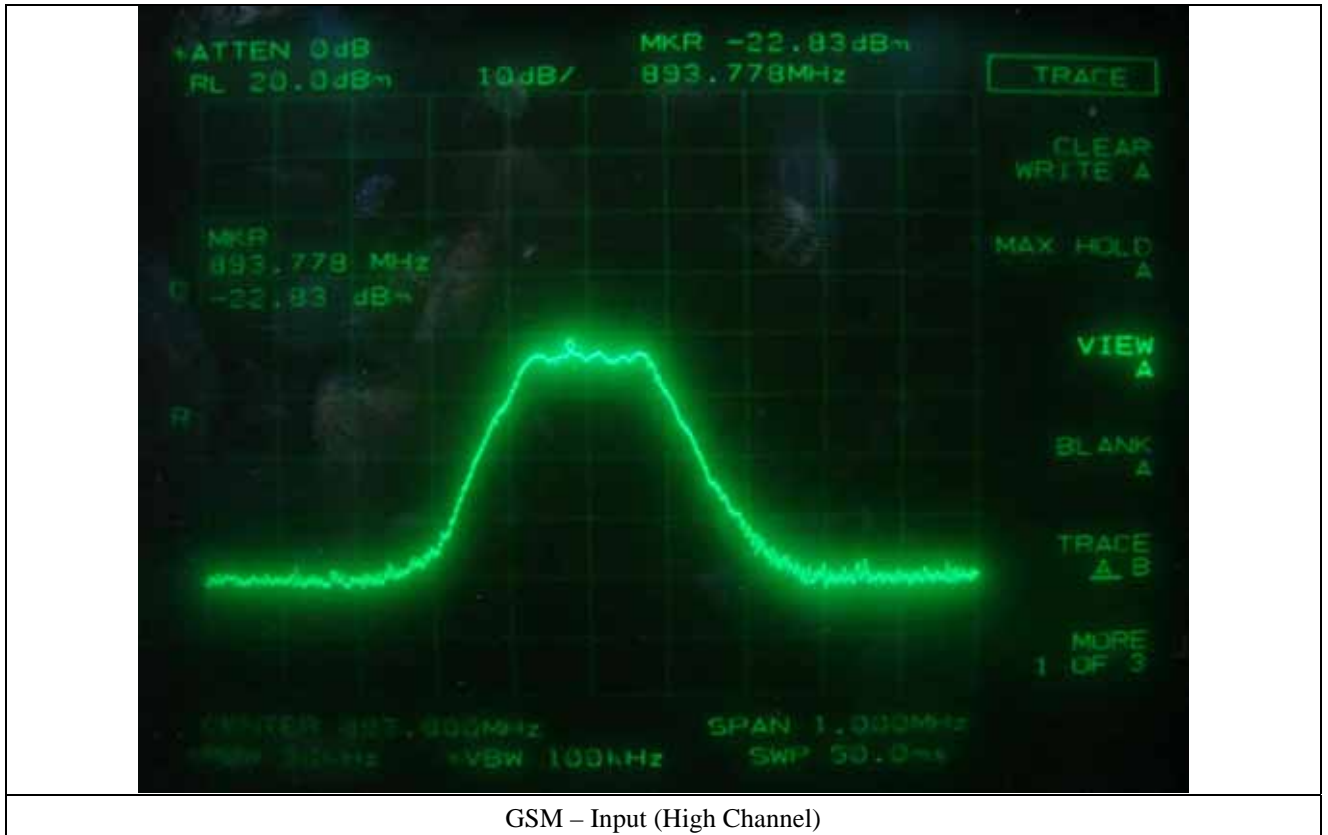
TDMA – Input (High Channel)

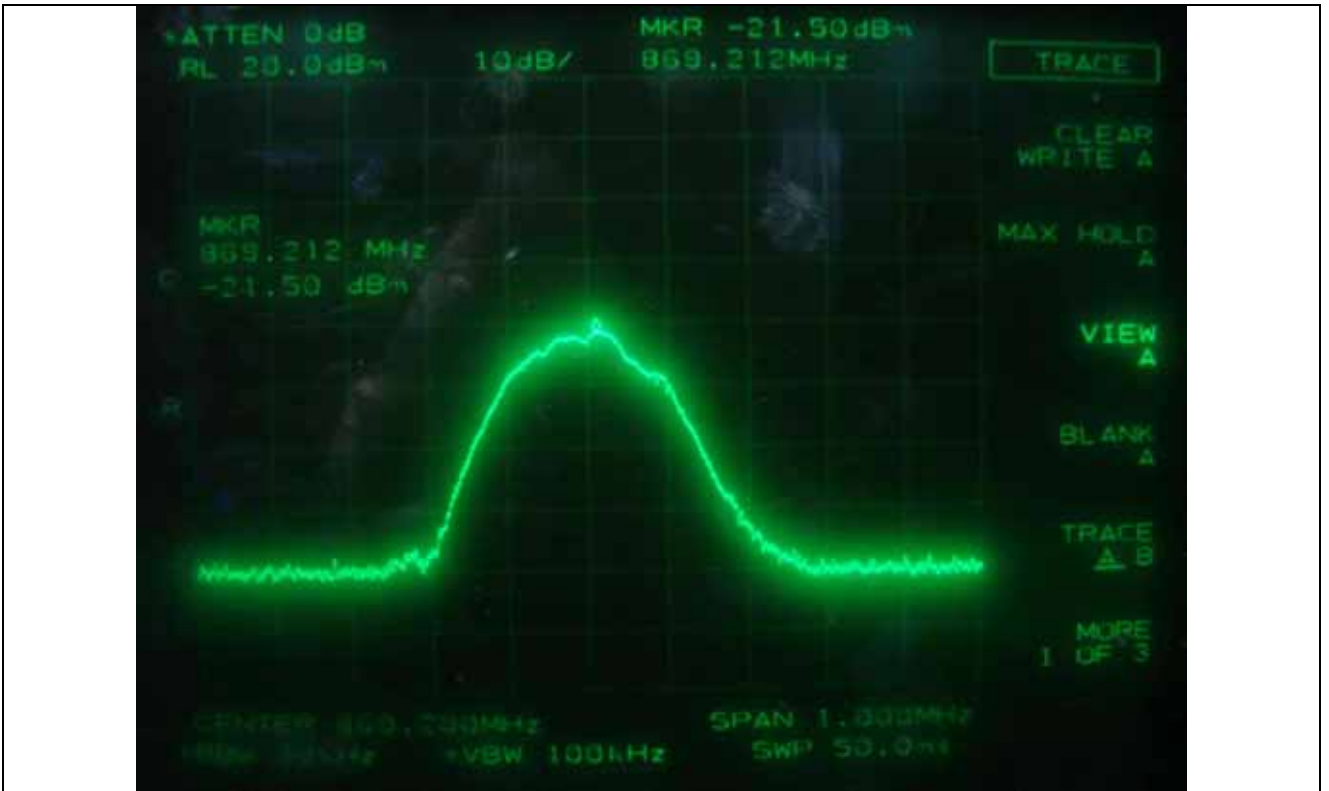


GSM – Input (Low Channel)

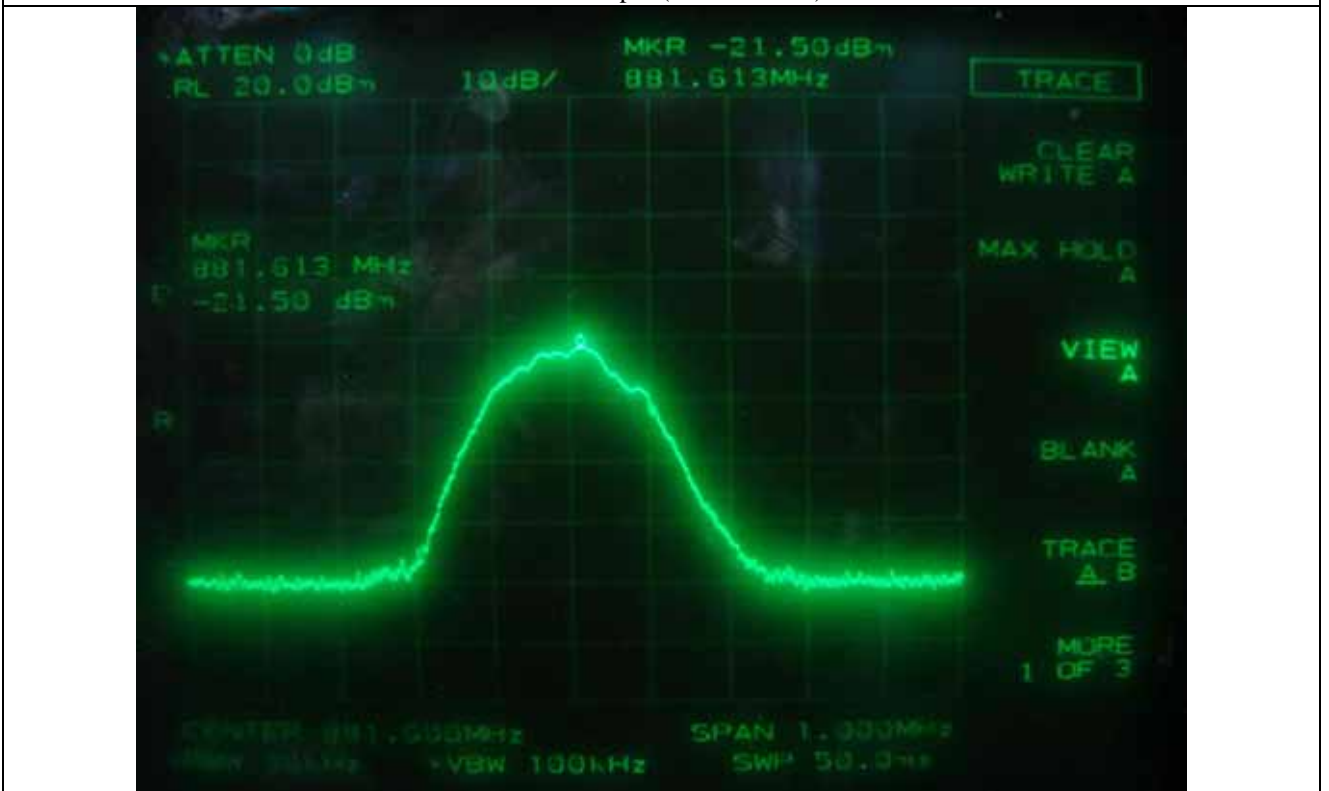


GSM – Input (Middle Channel)

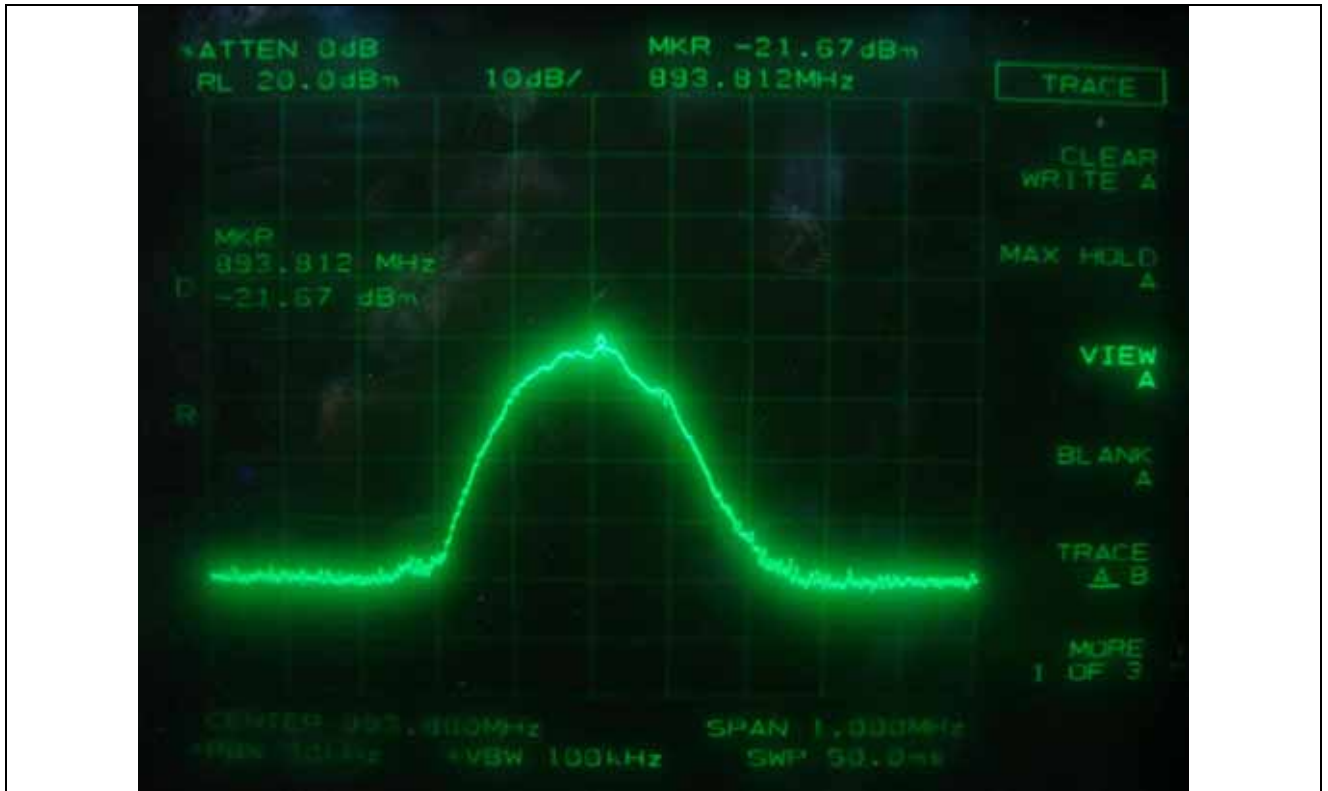




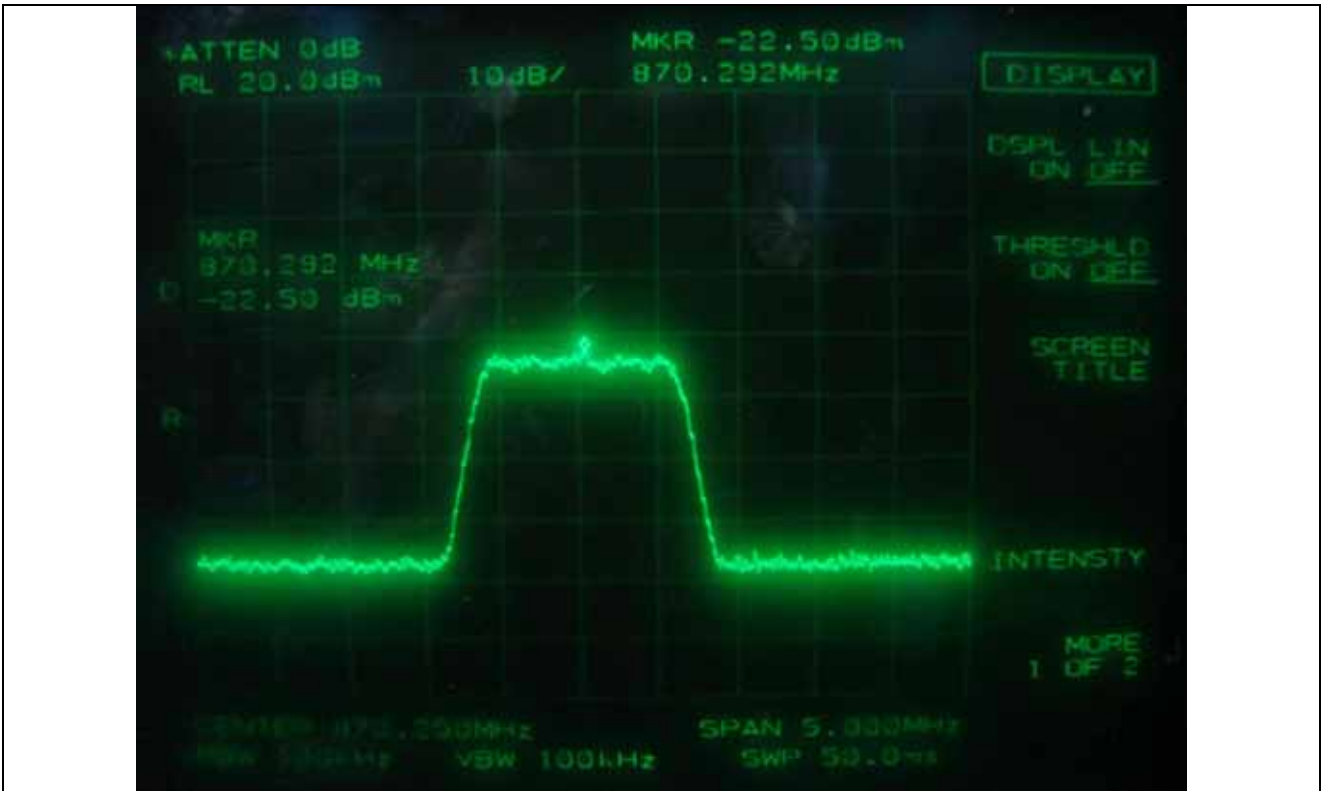
EDGE – Input (Low Channel)



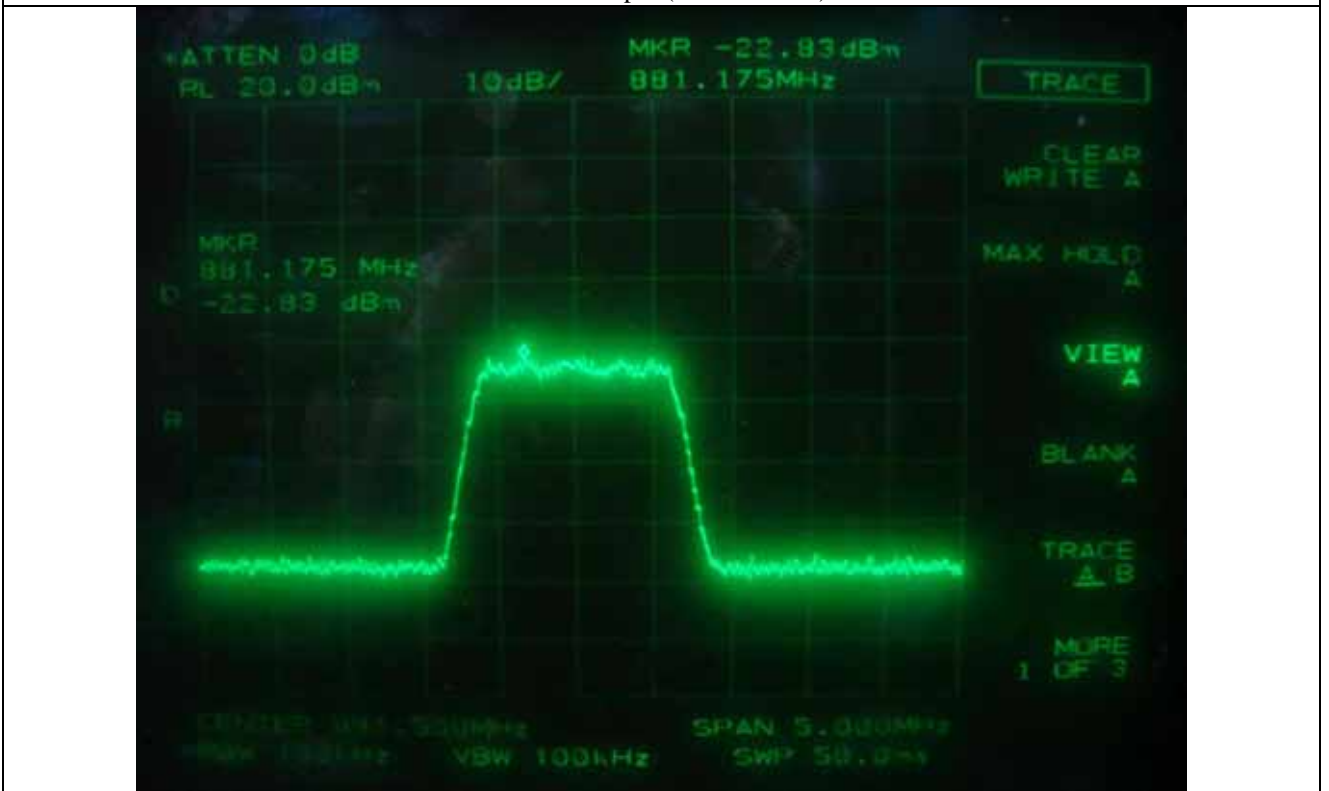
EDGE – Input (Middle Channel)



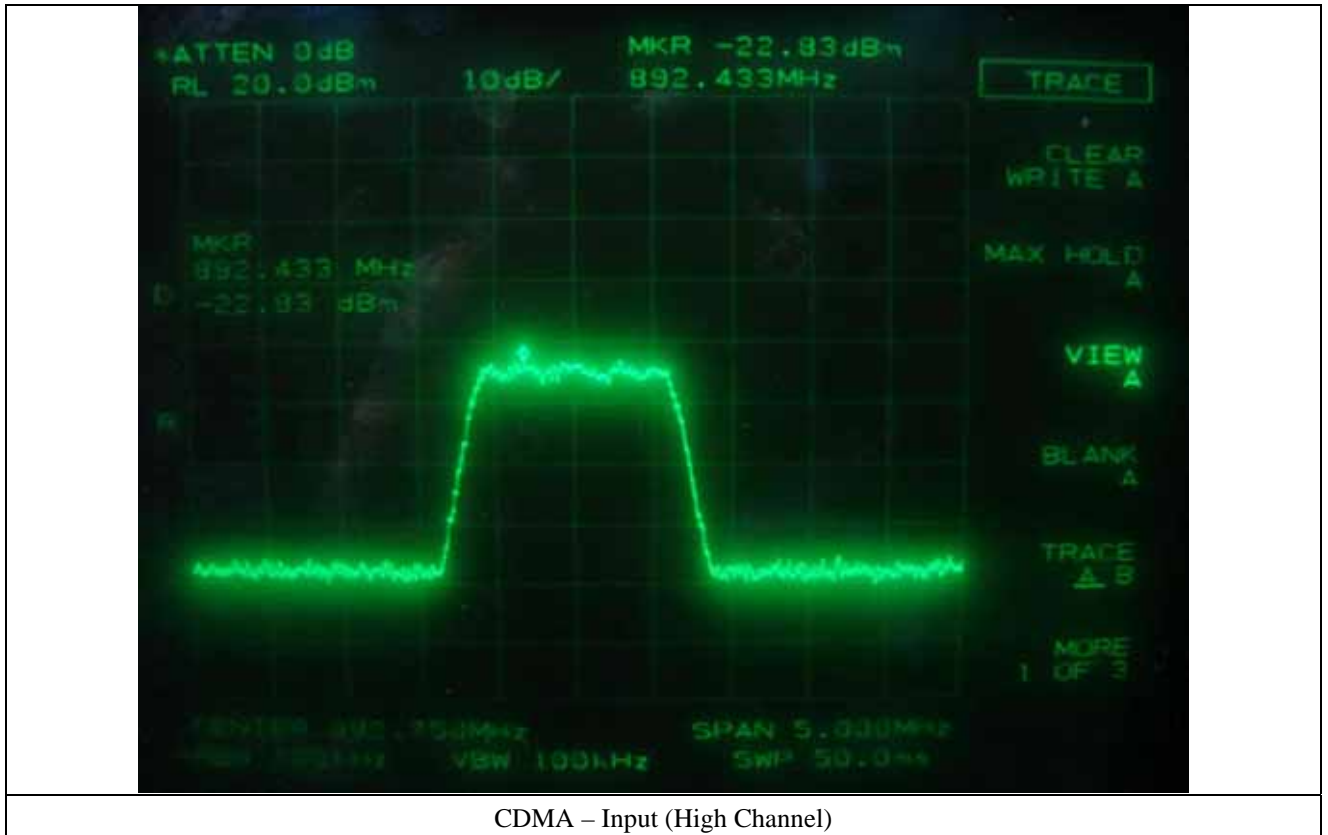
EDGE – Input (High Channel)



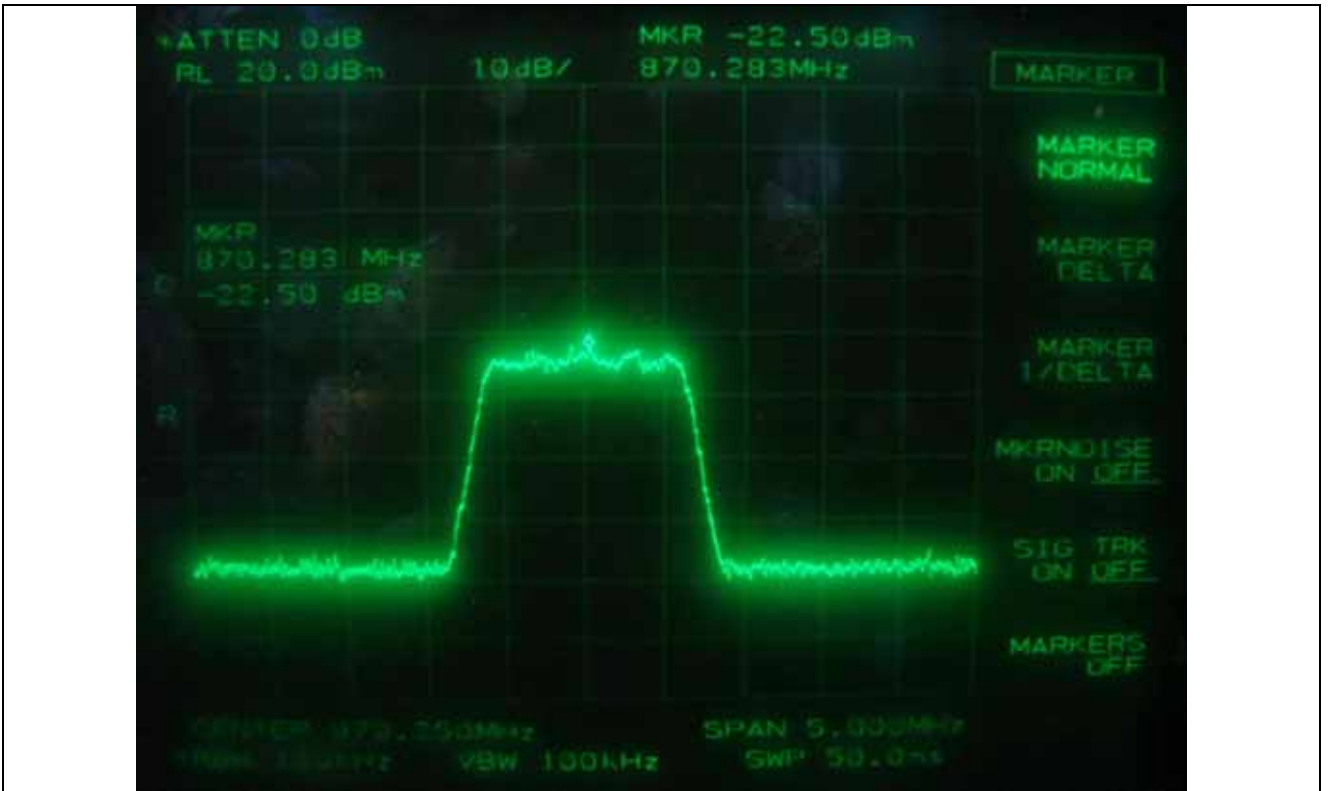
CDMA – Input (Low Channel)



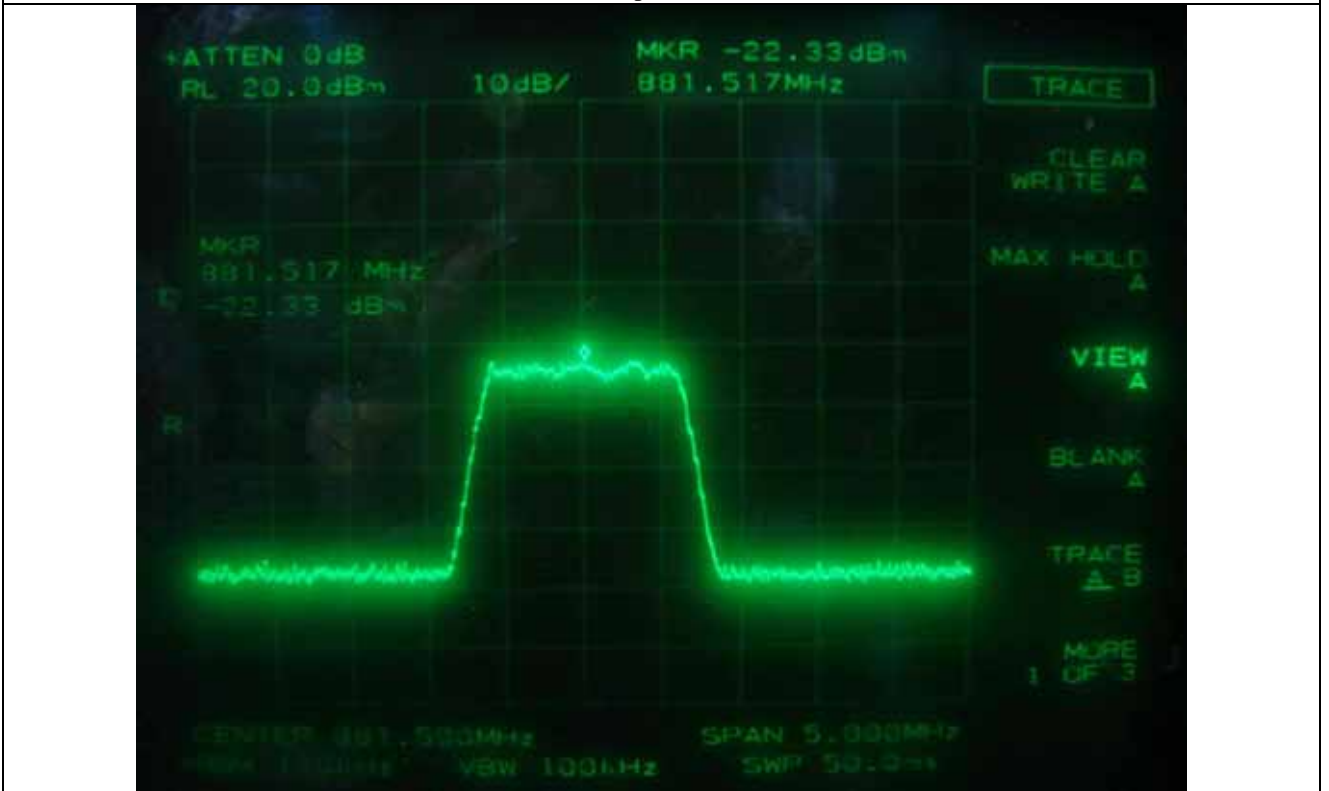
CDMA – Input (Middle Channel)



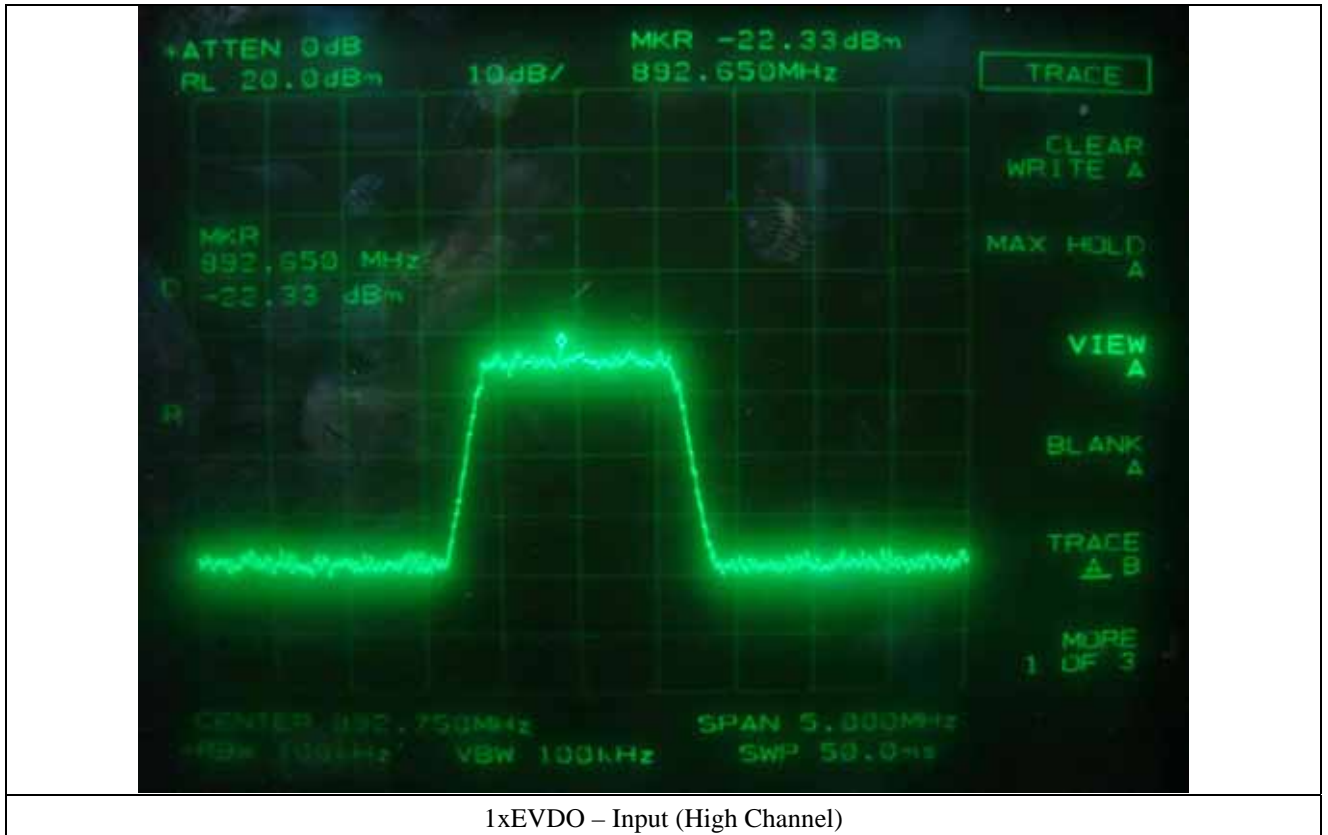
CDMA – Input (High Channel)



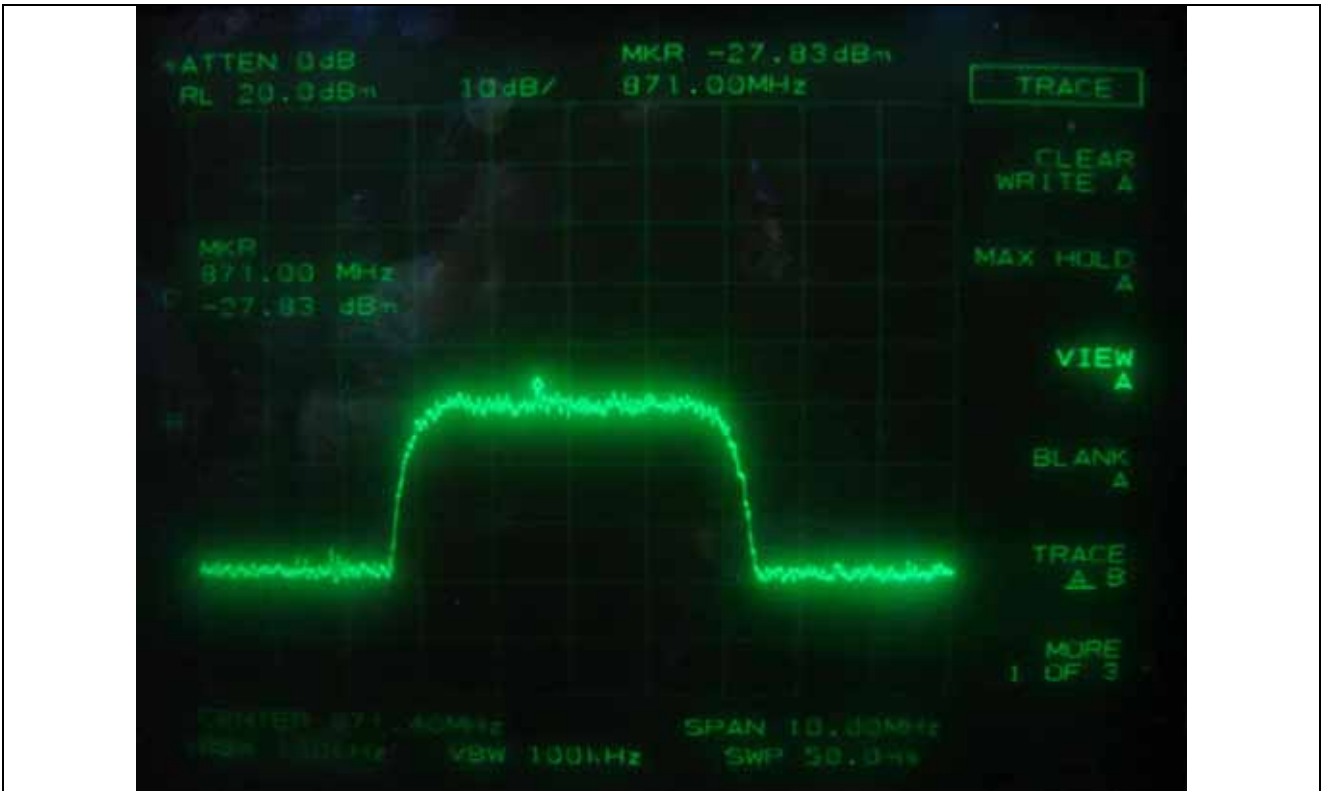
1xEVDO – Input (Low Channel)



1xEVDO – Input (Middle Channel)



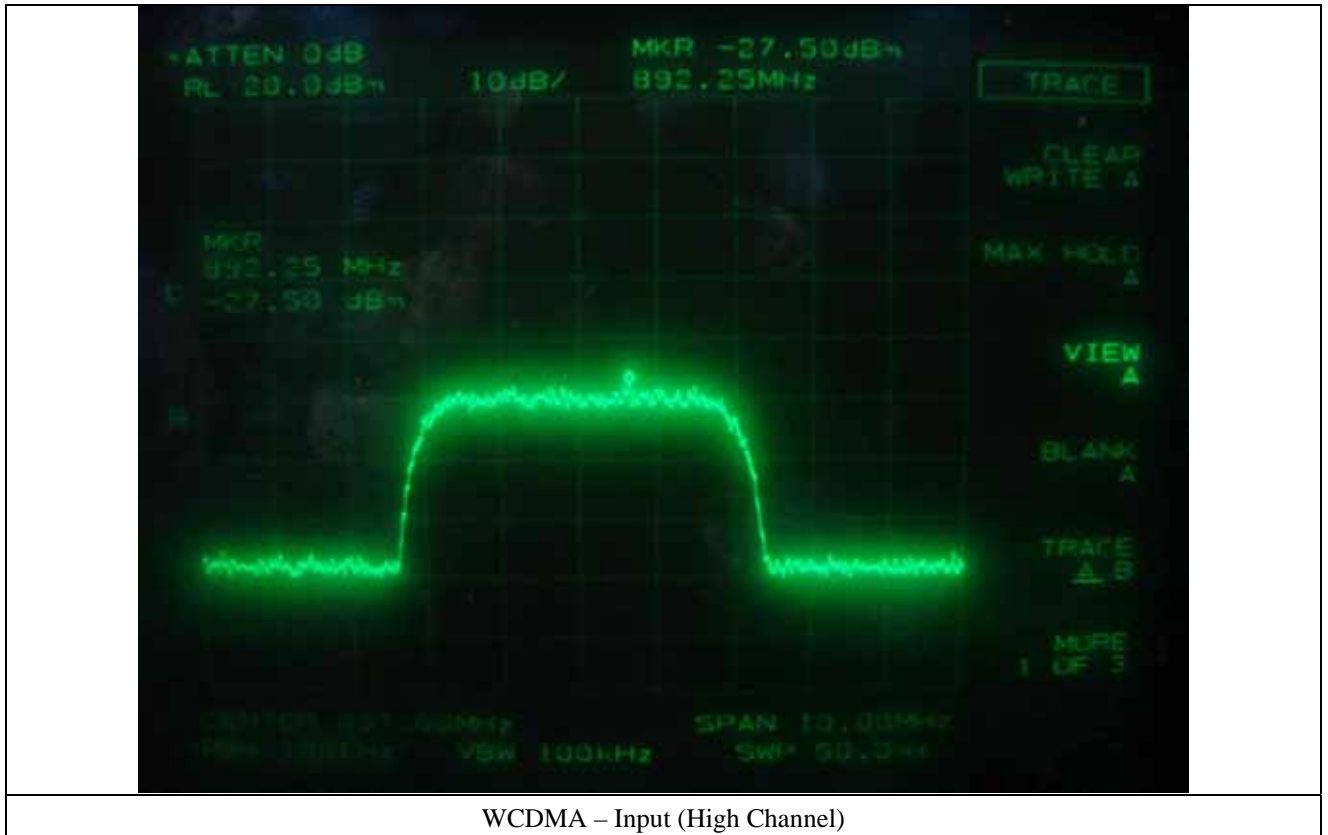
1xEVDO – Input (High Channel)



WCDMA – Input (Low Channel)



WCDMA – Input (Middle Channel)



7. SPURIOUS EMISSION AT ANTENNA TERMINAL

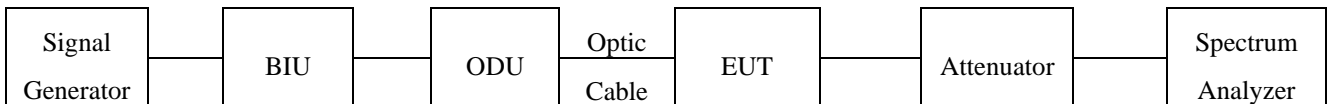
7.1 Operating environment

Temperature : 22.5 °C
Relative humidity : 48 %R.H.

7.2 Test set-up for conducted measurement

The RF signal from the signal generator(s) was injected to BIU (BTS Interface Unit) and then output signal from the BIU was injected to the input of ODU (Optic Distribution Unit) by coaxial cable and then the output port of the ODU was connected to the input of the EUT by optic cable. The amplified RF signal at the output of the EUT was connected to the spectrum analyzer. The test was performed at three frequencies (low, middle, and high channels) at each band using all applicable modulation.

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.



7.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ - 8564E	HP	Spectrum Analyzer	3650A00756	June 16, 2008
■ - E4432B	HP	Signal Generator	US38440950	June 16, 2008
■ - SMJ100A	R/S	Vecter Signal Generator	100698	June 16, 2008
□ - FSP	R/S	Spectrum Analyzer	100017	Mar. 11, 2008

All test equipment used is calibrated on a regular basis.

7.4 Test data

- . Test Date : March 04~05, 2009
- . Frequency range : 30 MHz ~ 20 GHz
- . Result : PASSED BY -13.66 dB at middle channel of WCDMA Mode

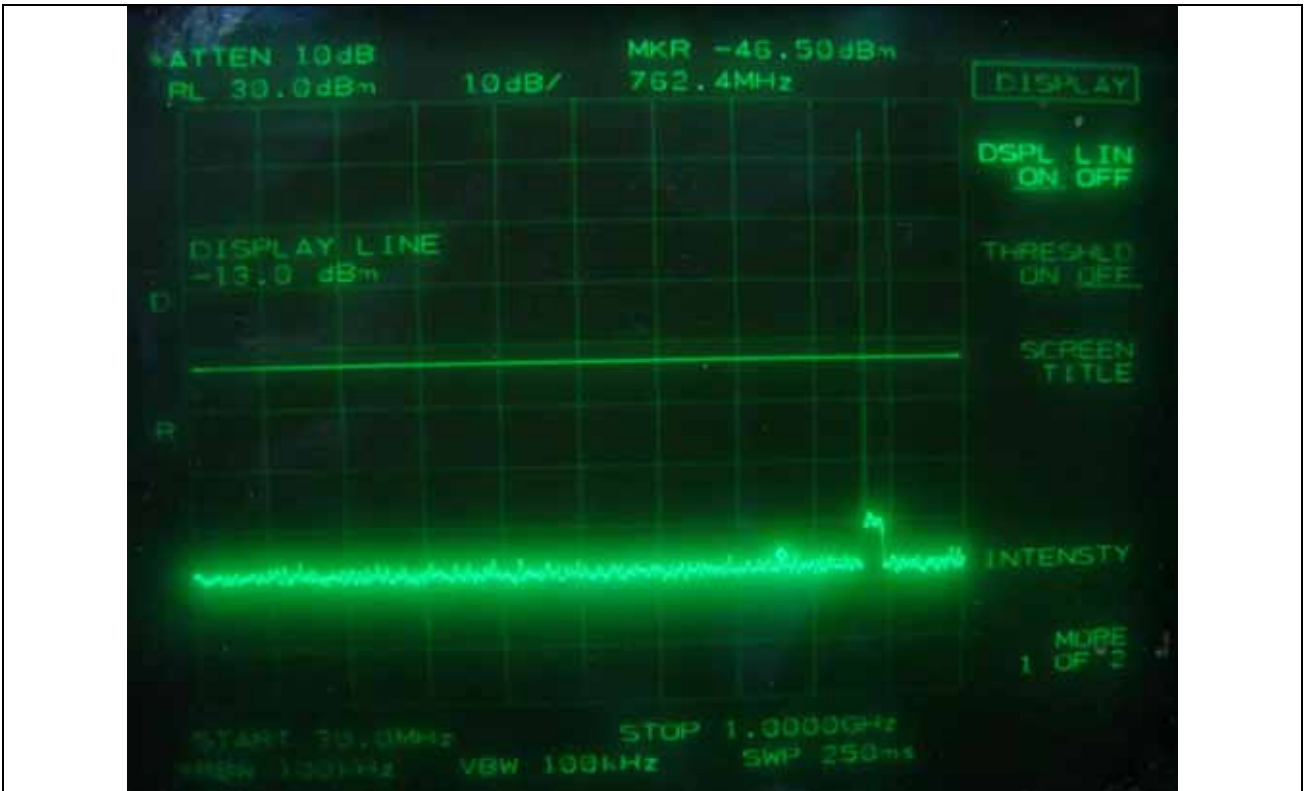
Modulation	Harmonic Frequency (MHz)	Measured Value (dBm)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)	
TDMA	Low	762.40	-46.50	0.50	-46.00	-13.00	-33.00
		2 110.00	-28.83	0.84	-27.99		-14.99
	Middle	764.00	-45.83	0.50	-45.33		-32.33
		2 110.00	-29.00	0.84	-28.16		-15.16
	High	765.60	-45.33	0.50	-44.83		-31.83
		2 060.00	-29.33	0.84	-28.49		-15.49
GSM	Low	765.60	-47.33	0.50	-46.83	-13.00	-33.83
		2 110.00	-28.33	0.84	-27.49		-14.49
	Middle	781.80	-46.33	0.50	-45.83		-32.83
		2 060.00	-28.00	0.84	-27.16		-14.16
	High	810.90	-45.67	0.50	-45.17		-32.17
		2 080.00	-28.83	0.84	-27.99		-14.99
EDGE	Low	788.20	-46.00	0.50	-45.50	-13.00	-32.50
		2 110.00	-28.83	0.84	-27.99		-14.99
	Middle	772.10	-45.33	0.50	-44.83		-31.83
		2 110.00	-29.00	0.84	-28.16		-15.16
	High	768.80	-46.83	0.50	-46.33		-33.33
		2 110.00	-28.67	0.84	-27.83		-14.83
CDMA	Low	836.70	-45.67	0.50	-45.17	-13.00	-32.17
		2 060.00	-28.83	0.84	-27.99		-14.99
	Middle	694.50	-46.00	0.50	-45.50		-32.50
		2 110.00	-29.17	0.84	-28.33		-15.33
	High	783.40	-46.00	0.50	-45.50		-32.50
		2 060.00	-28.83	0.84	-27.99		-14.99

Modulation	Harmonic Frequency (MHz)	Measured Value (dBm)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)	
1xEVDO	Low	744.60	-44.83	0.50	-44.33	-13.00	-31.33
		2 110.00	-29.33	0.84	-28.49		-15.49
	Middle	710.60	-45.83	0.50	-45.33		-32.33
		2 060.00	-29.17	0.84	-28.33		-15.33
	High	717.10	-46.83	0.50	-46.33		-33.33
		2 110.00	-28.83	0.84	-27.99		-14.99
WCDMA	Low	747.80	-47.33	0.50	-46.83	-13.00	-33.83
		2 110.00	-27.50	0.84	-26.66		-13.66
	Middle	796.30	-46.67	0.50	-46.17		-33.17
		2 110.00	-29.33	0.84	-28.49		-15.49
	High	825.40	-47.17	0.50	-46.67		-33.67
		2 110.00	-28.67	0.84	-27.83		-14.83

According to Part 22H, out of band emission shall be attenuated by $43 + 10 \log (P)$ dBc, equates to -13.0 dBm.

~ 기홍

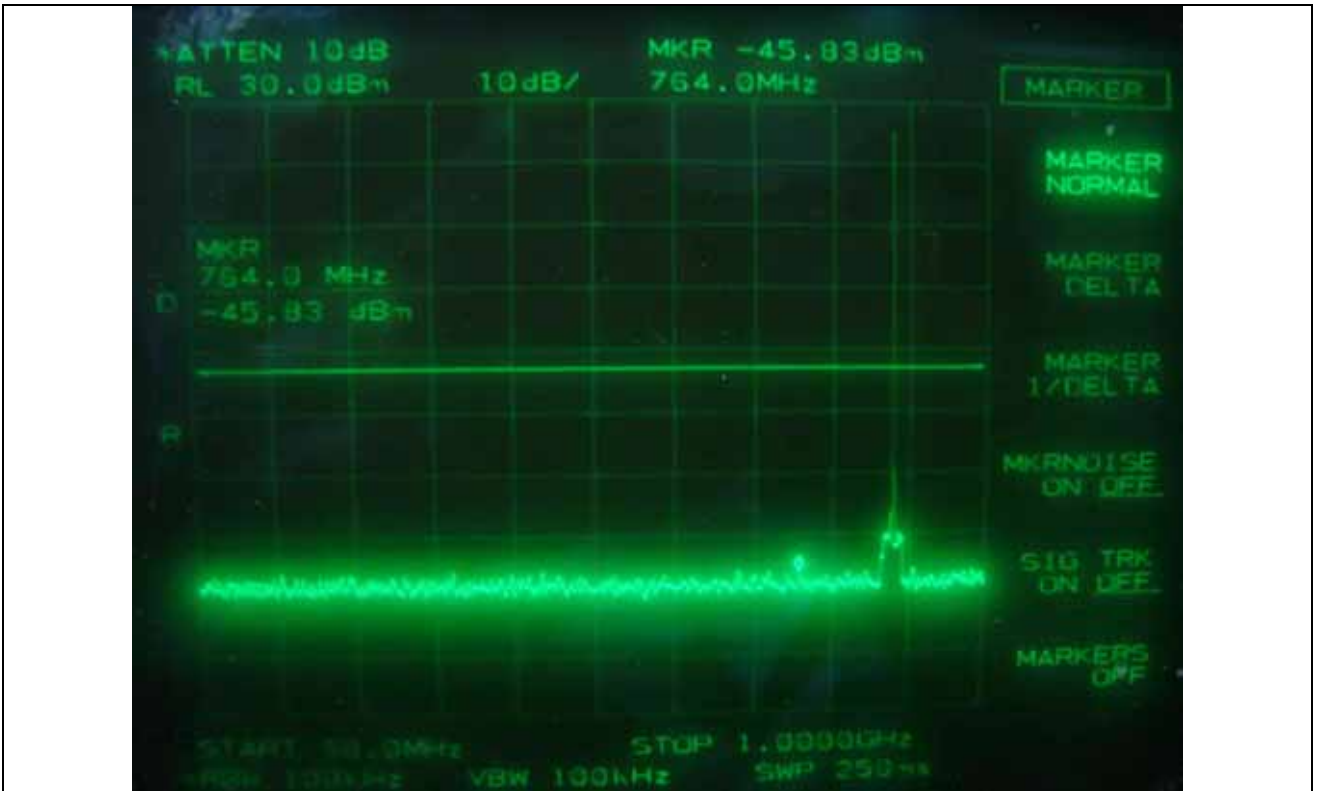
Tested by: Ki-Hong, Nam / Project Engineer



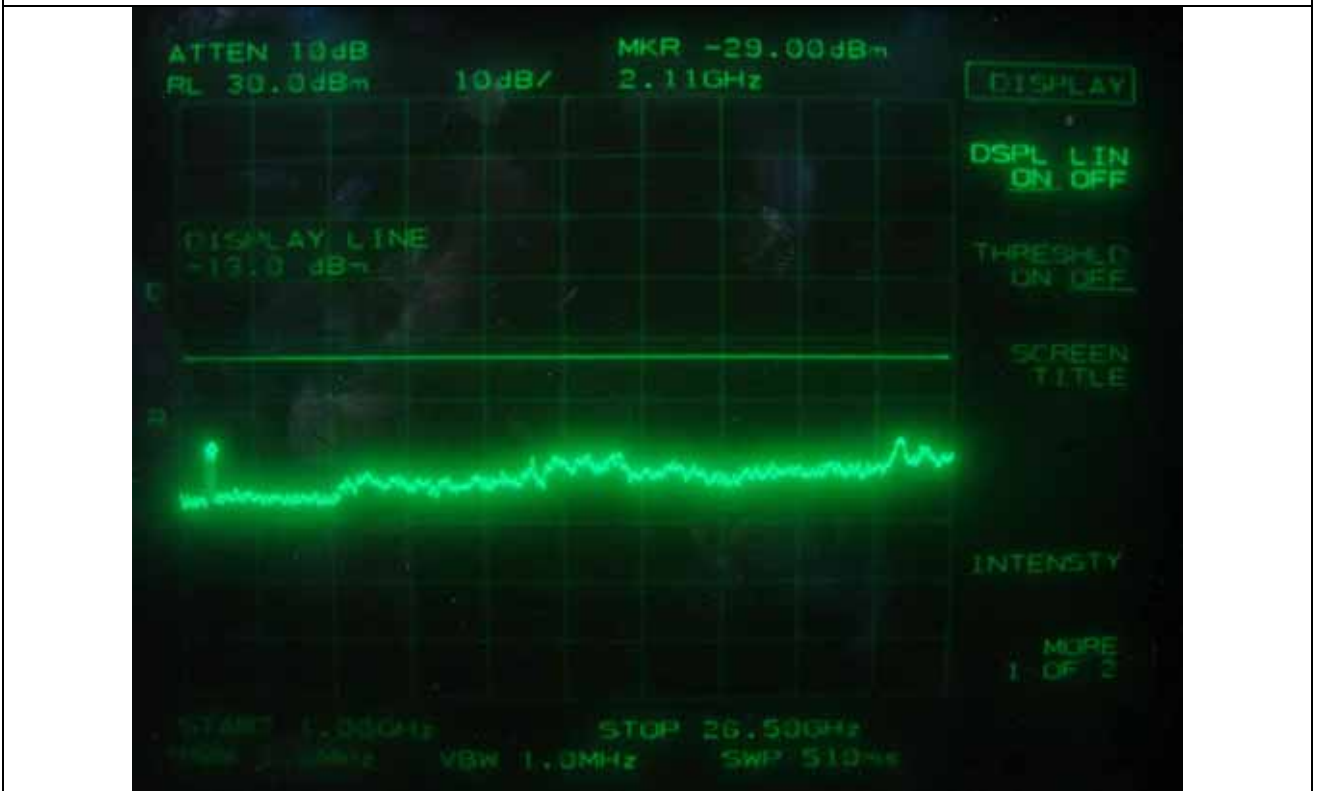
TDMA - Low Channel



TDMA - Low Channel



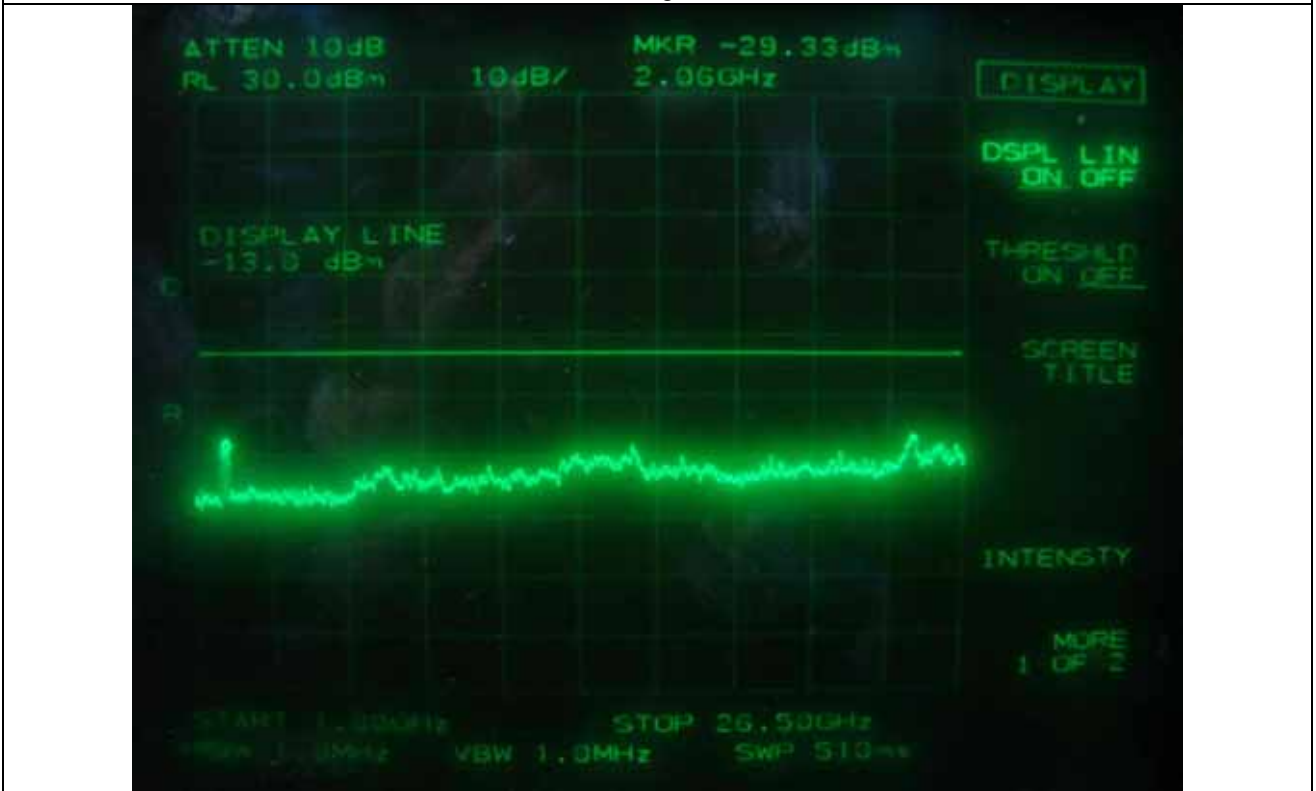
TDMA – Middle Channel



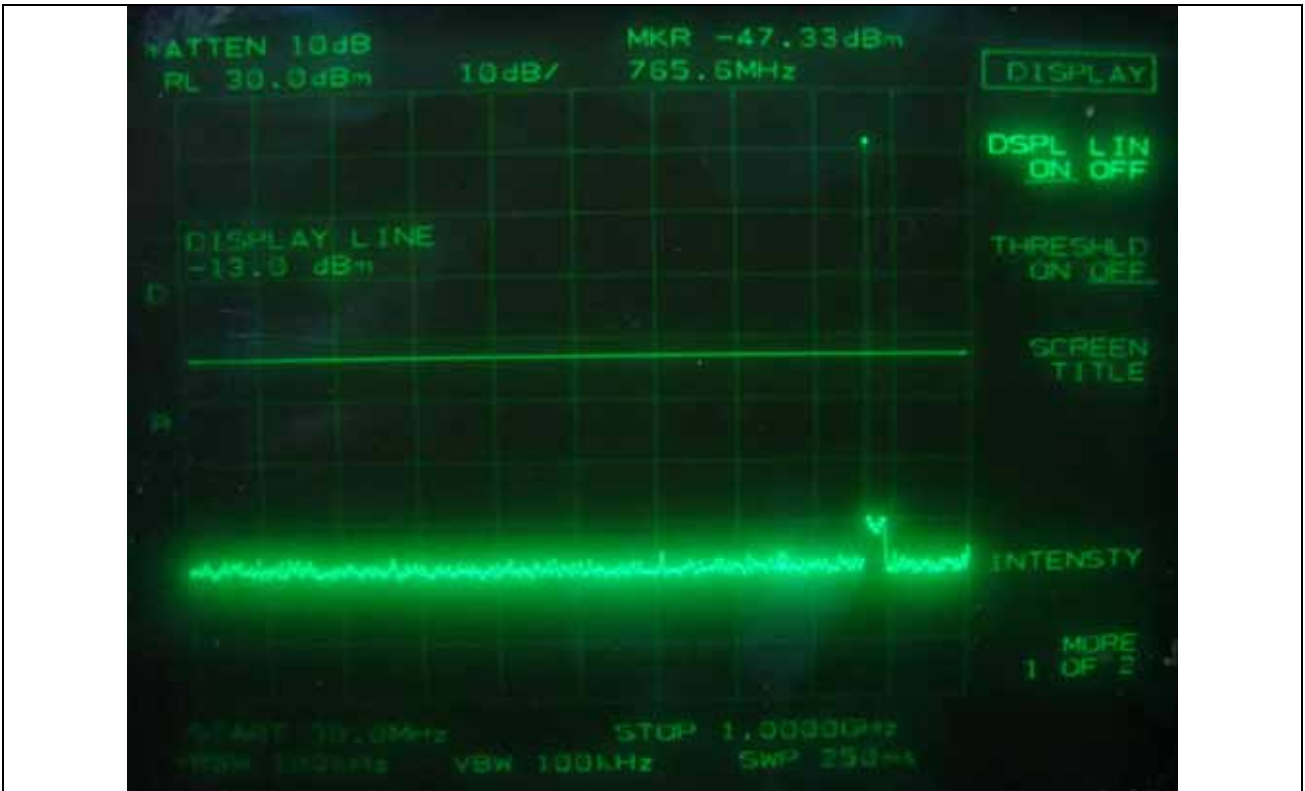
TDMA – Middle Channel



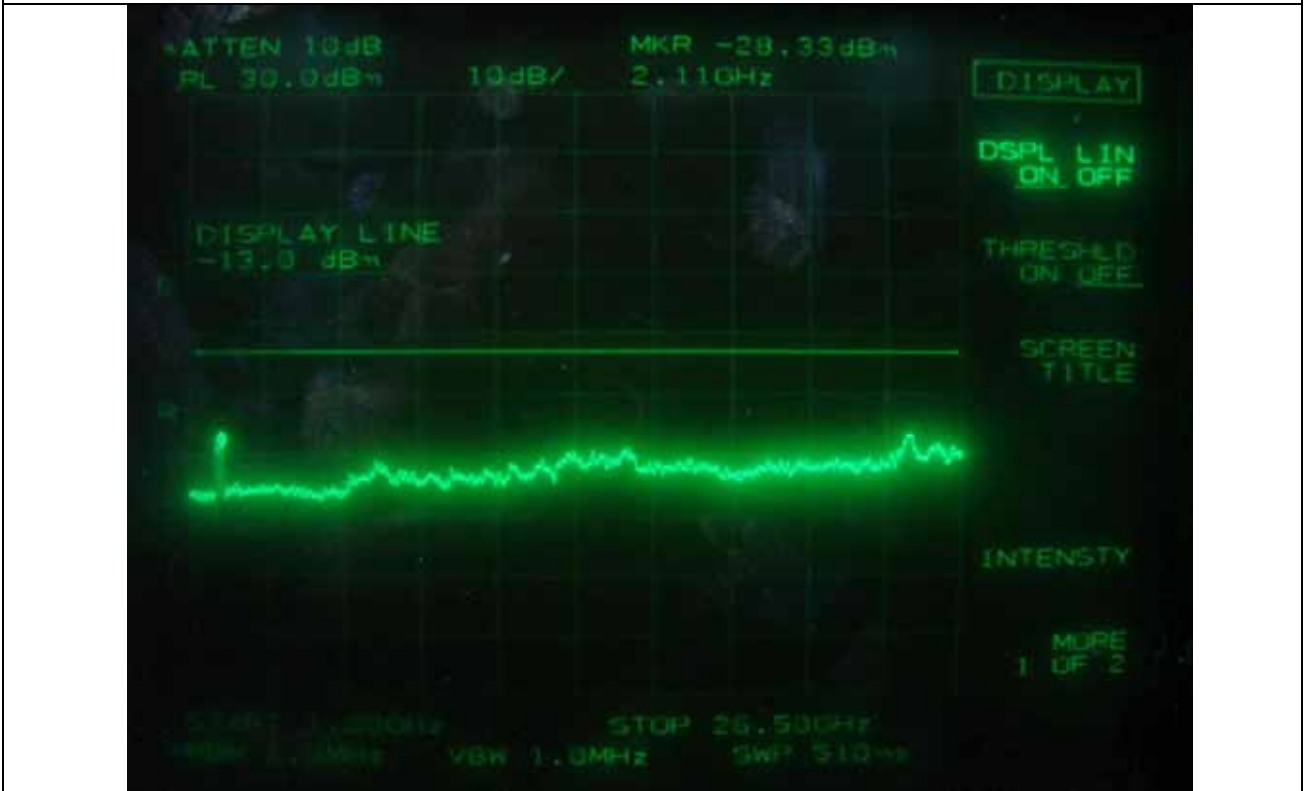
TDMA – High Channel



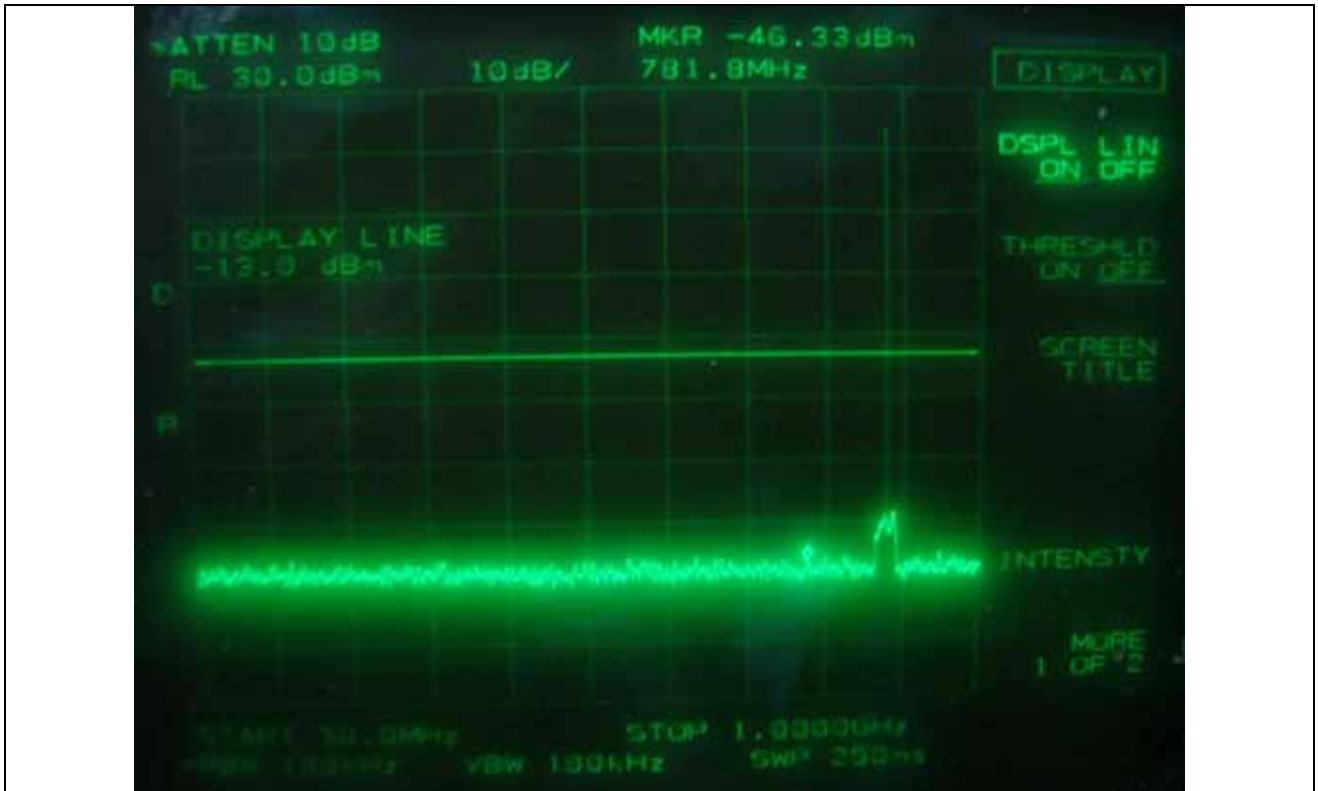
TDMA – High Channel



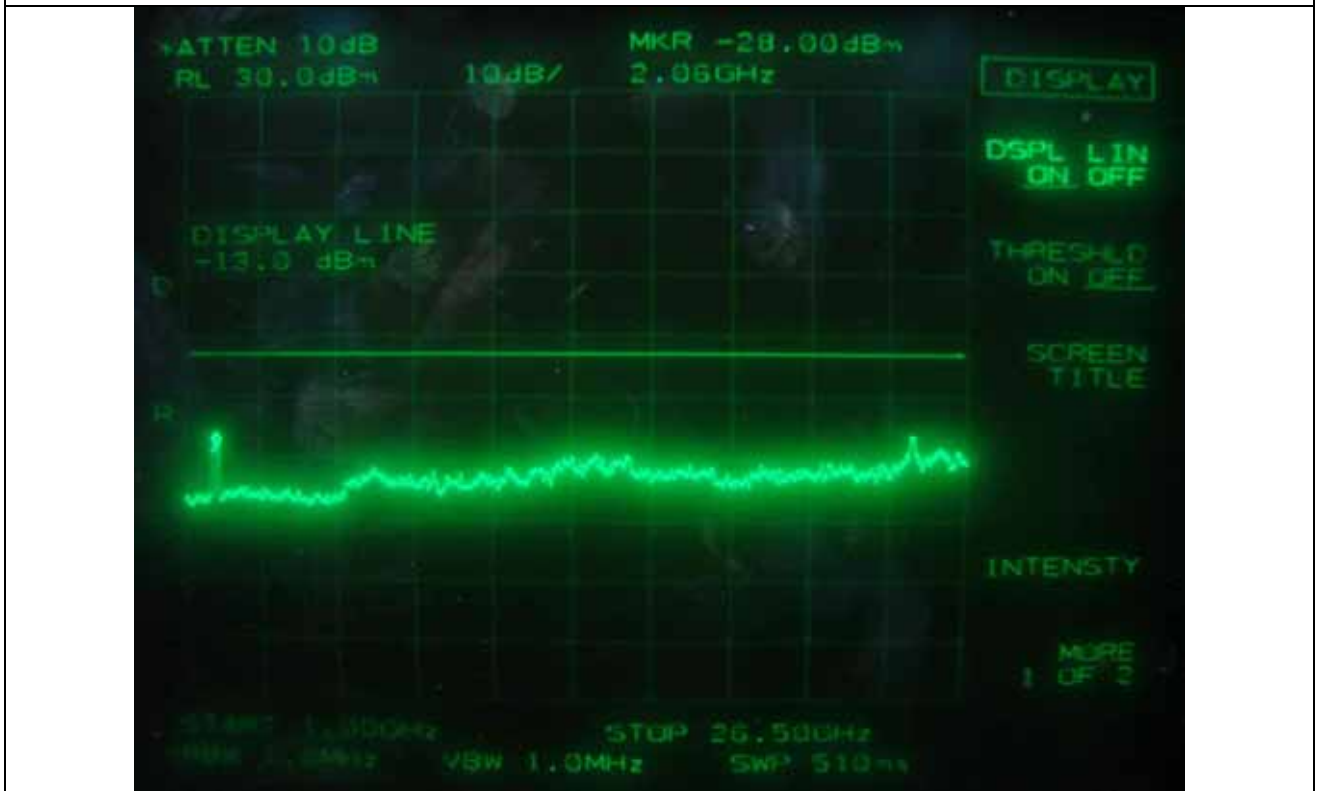
GSM - Low Channel



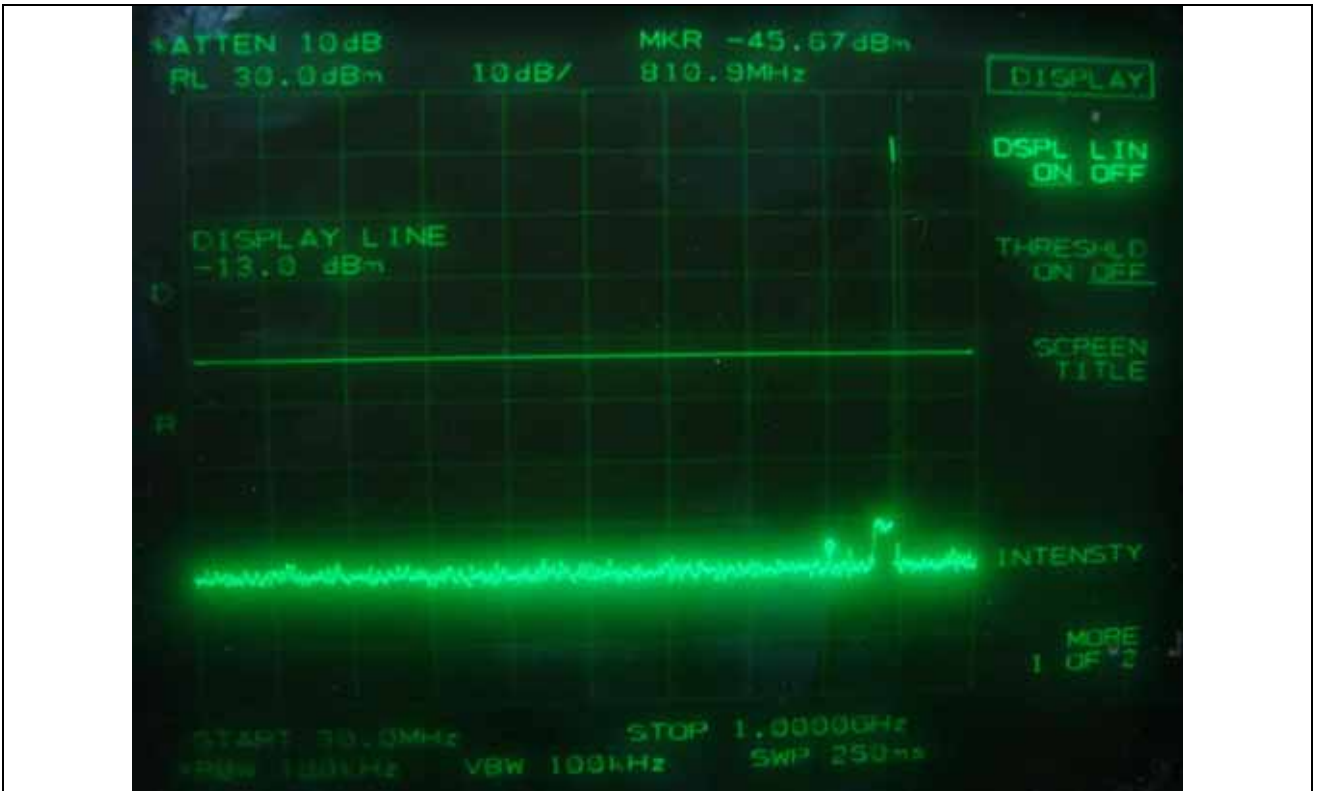
GSM - Low Channel



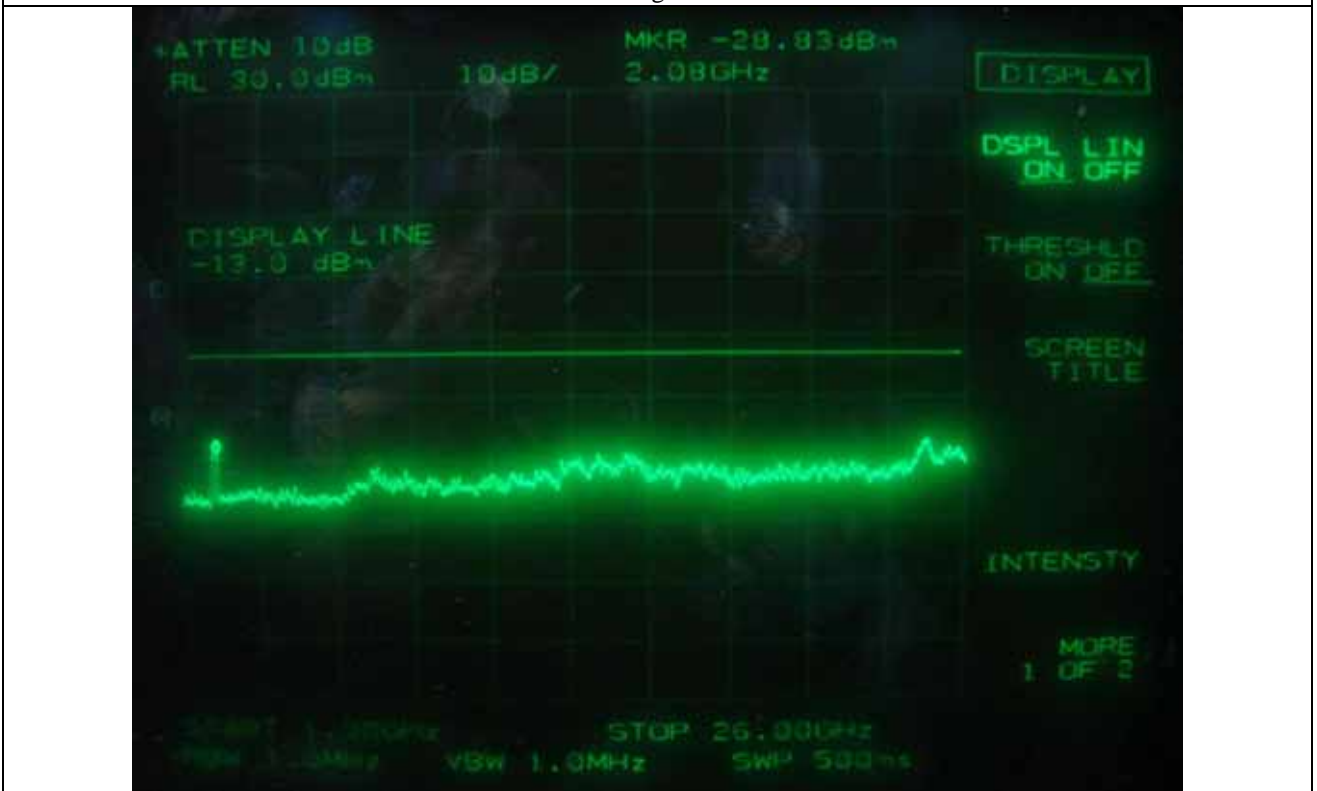
GSM – Middle Channel



GSM – Middle Channel



GSM – High Channel



GSM – High Channel



EDGE – Low Channel



EDGE – Low Channel



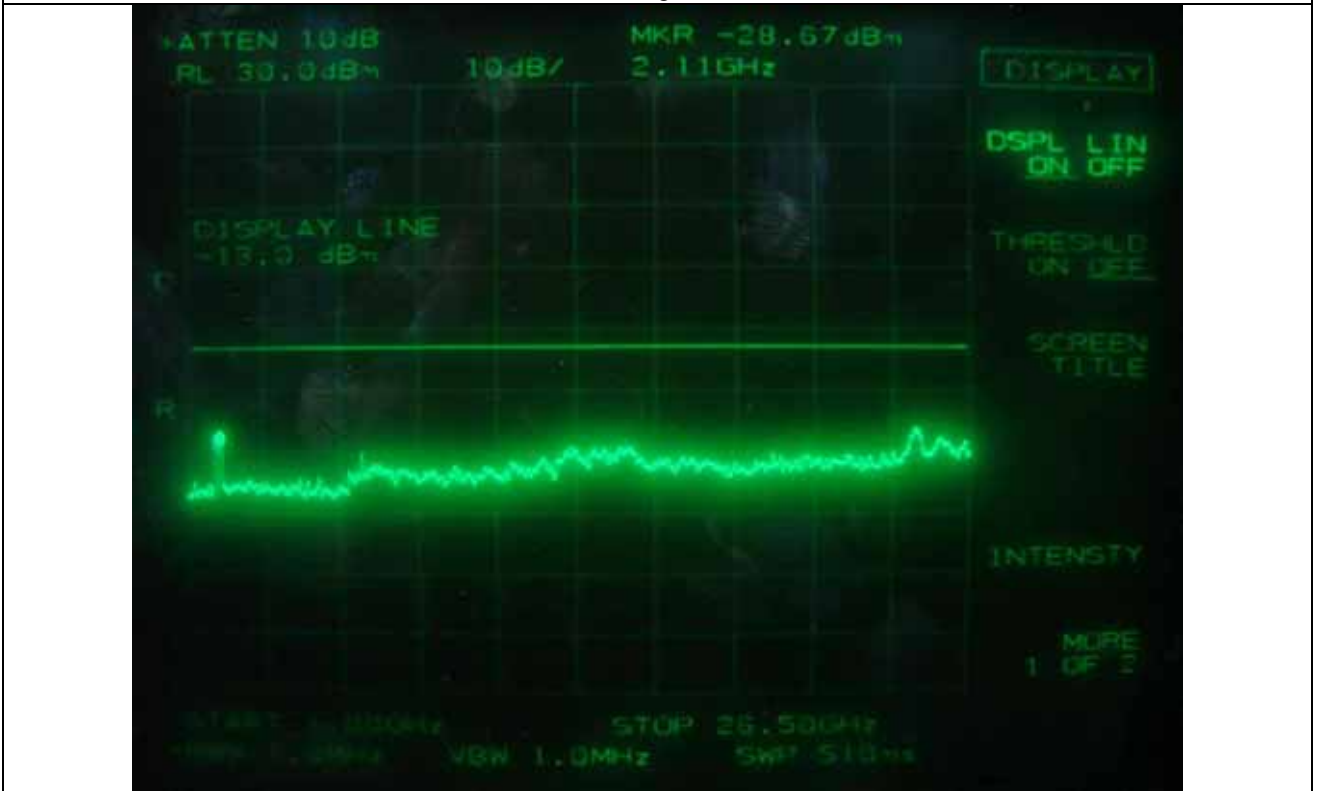
EDGE – Middle Channel



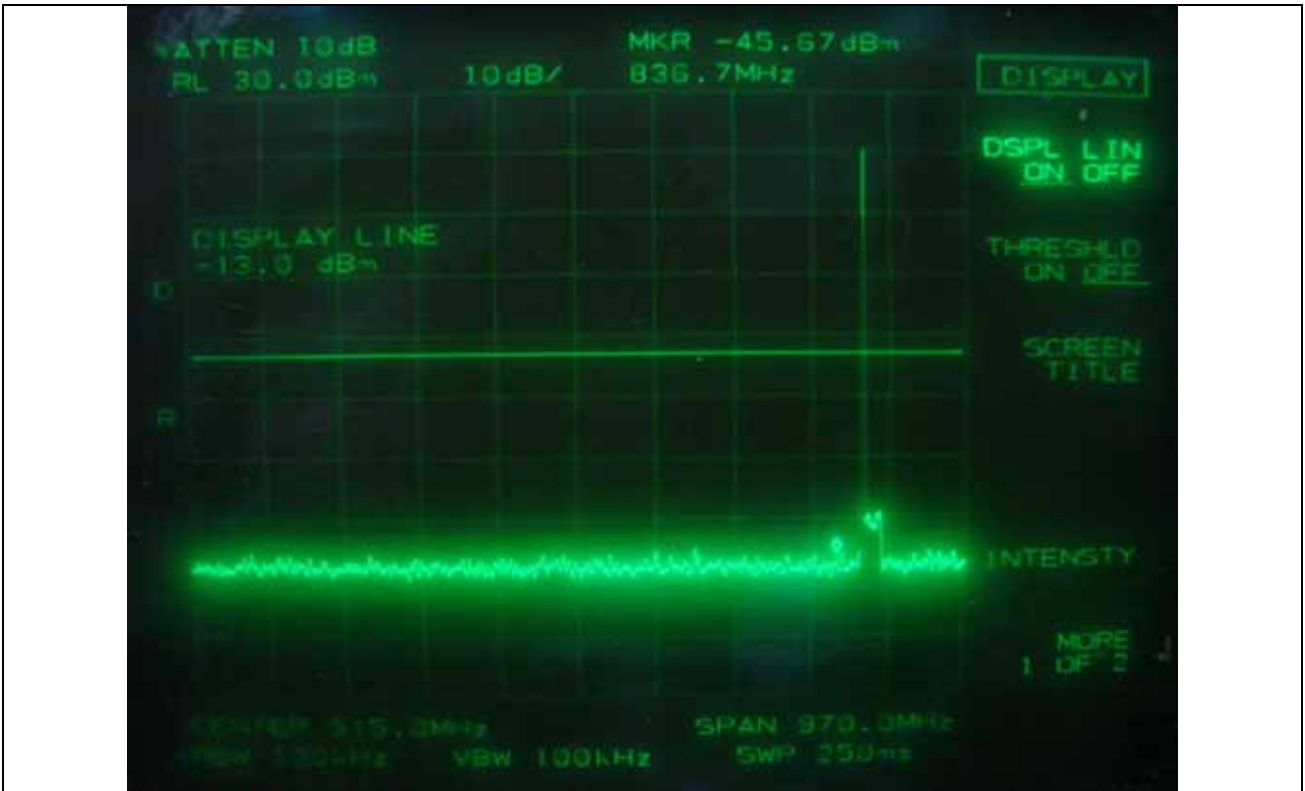
EDGE – Middle Channel



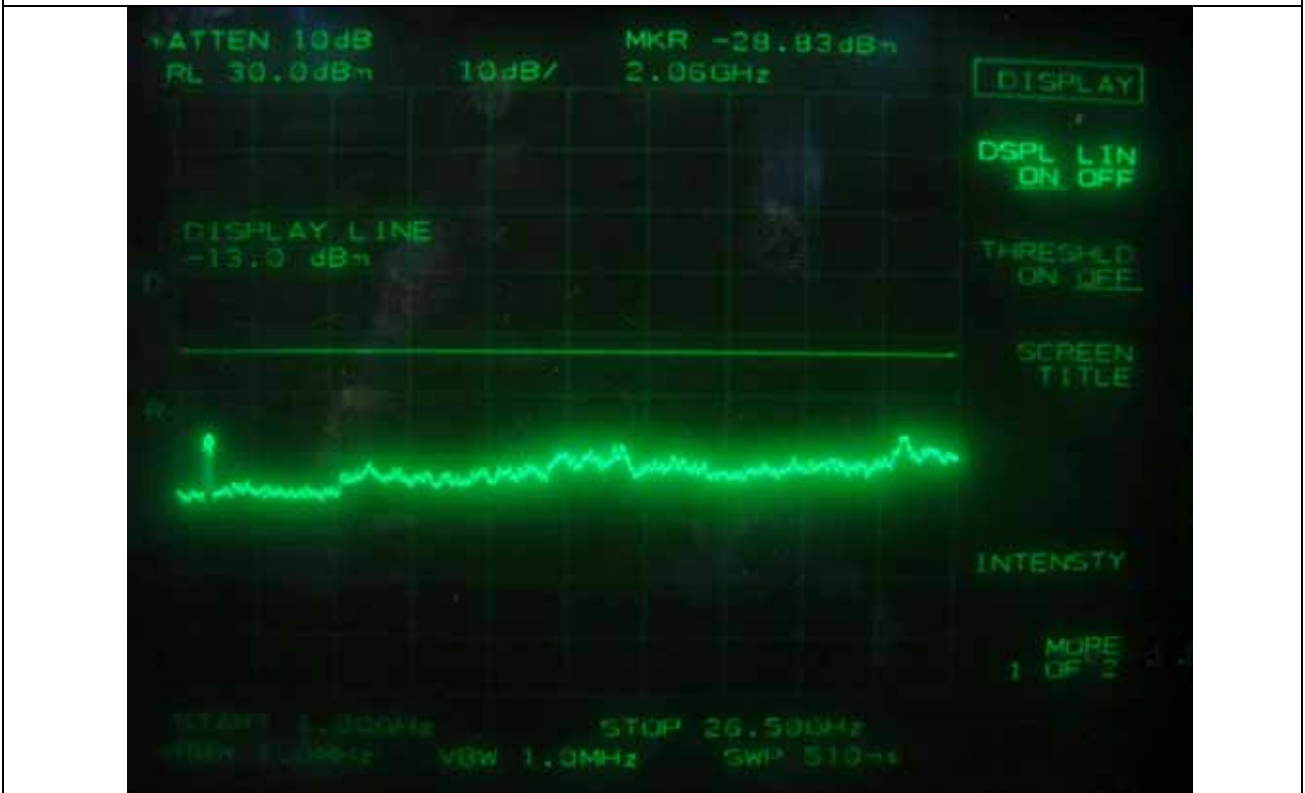
EDGE – High Channel



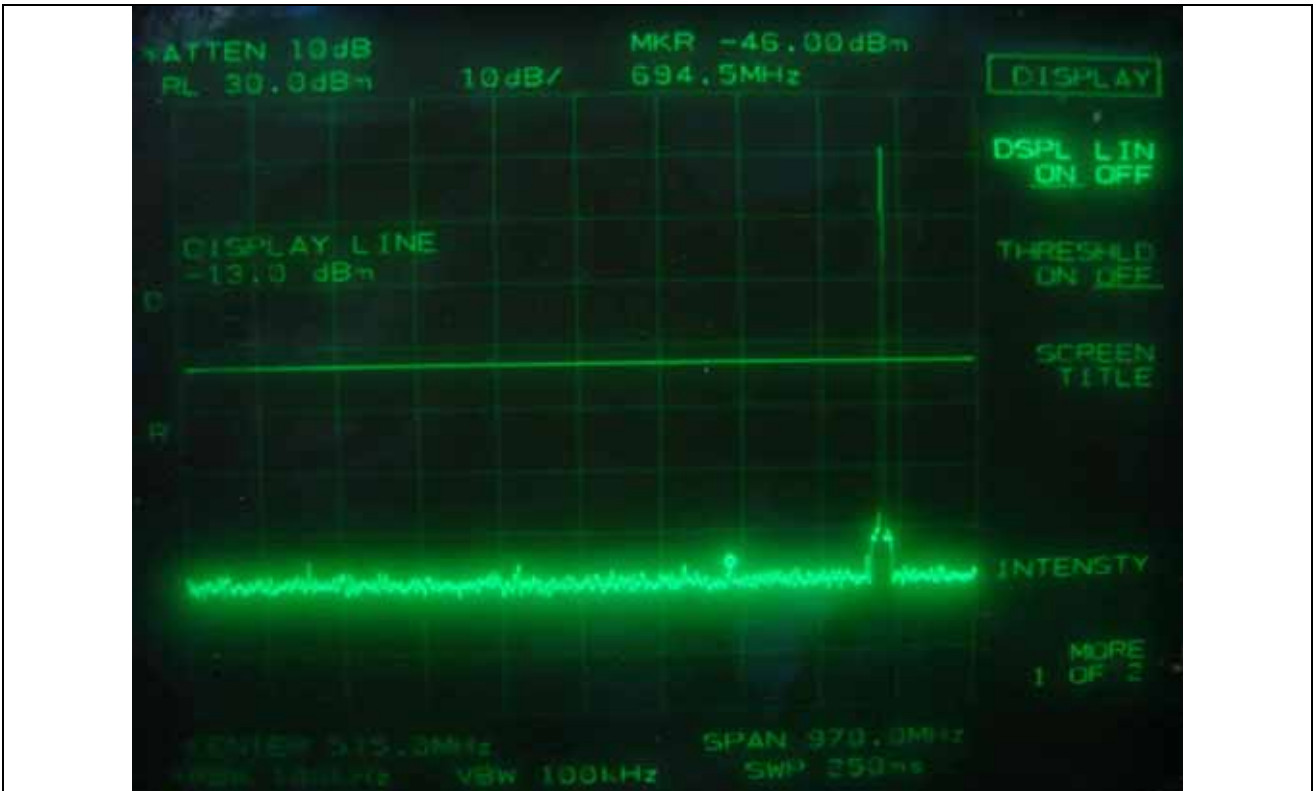
EDGE – High Channel



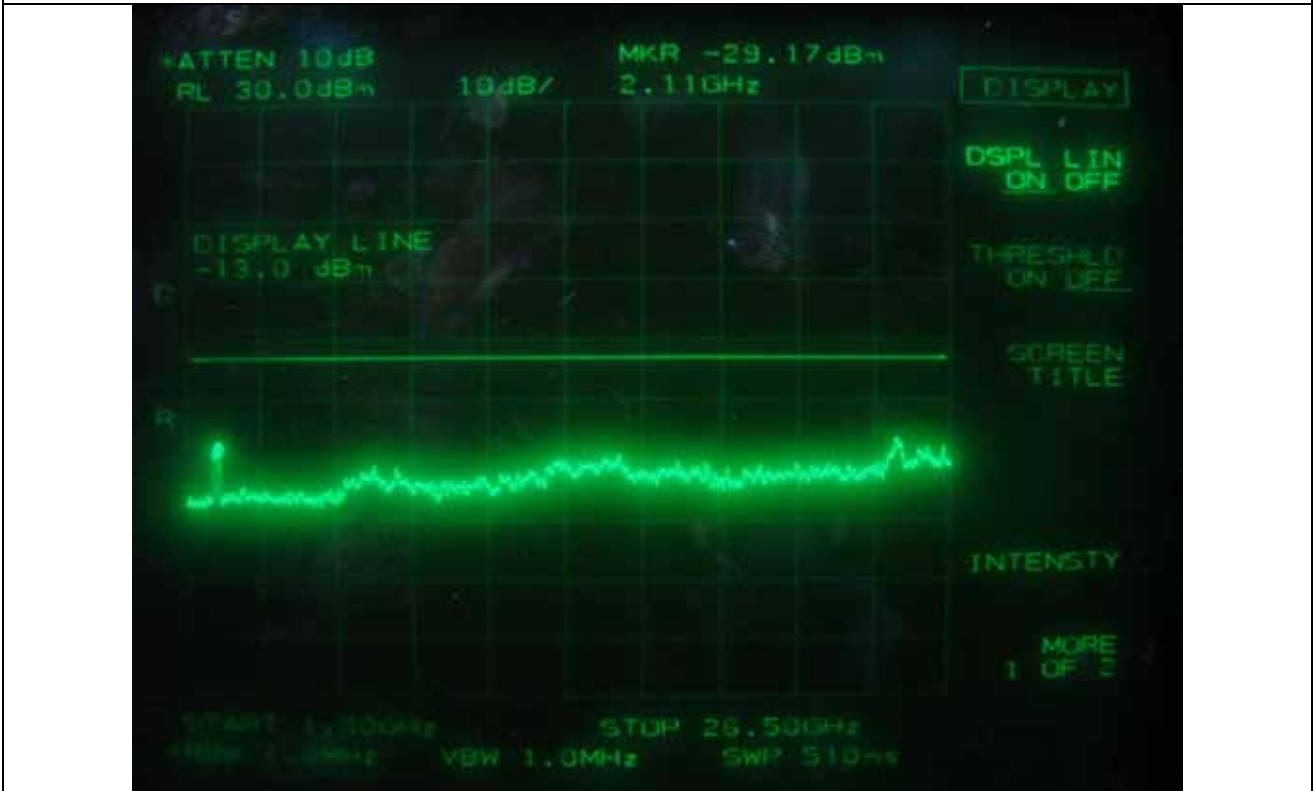
CDMA – Low Channel



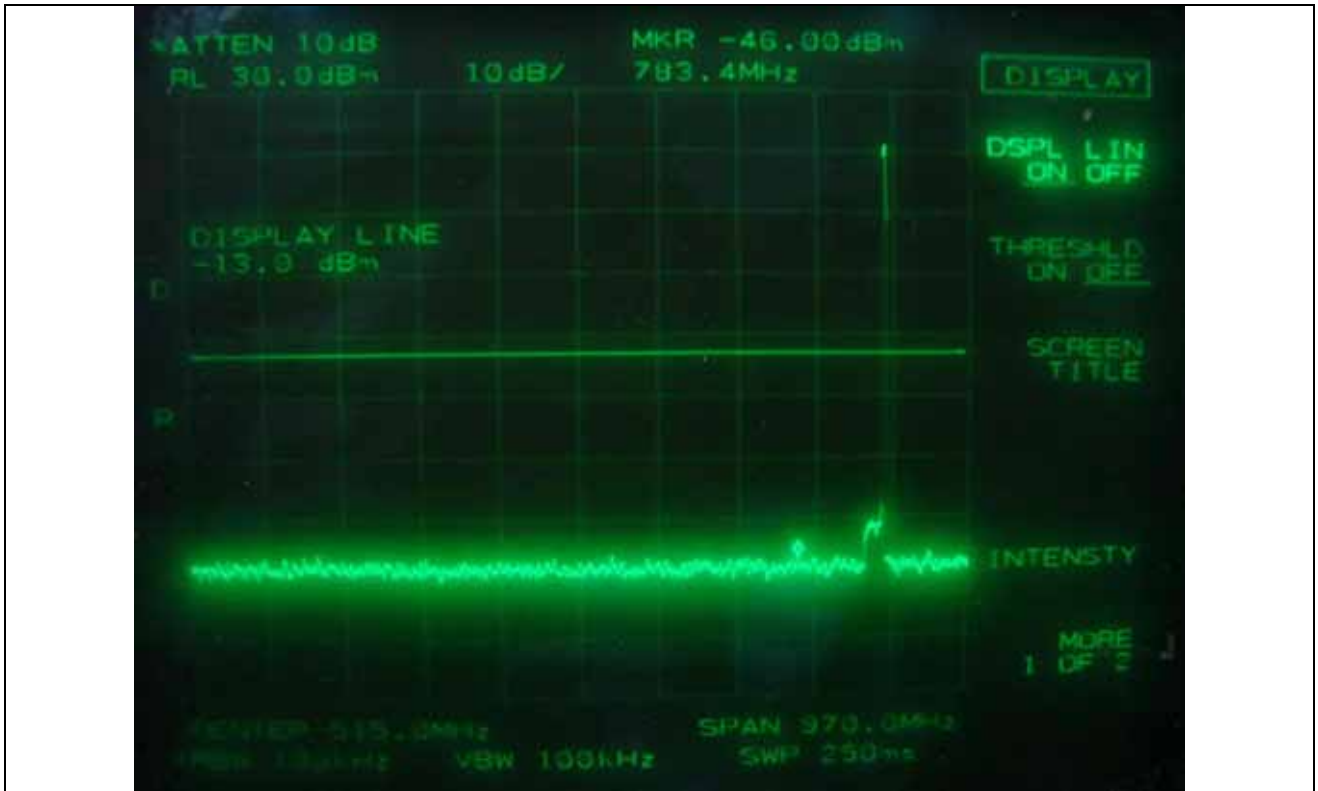
CDMA – Low Channel



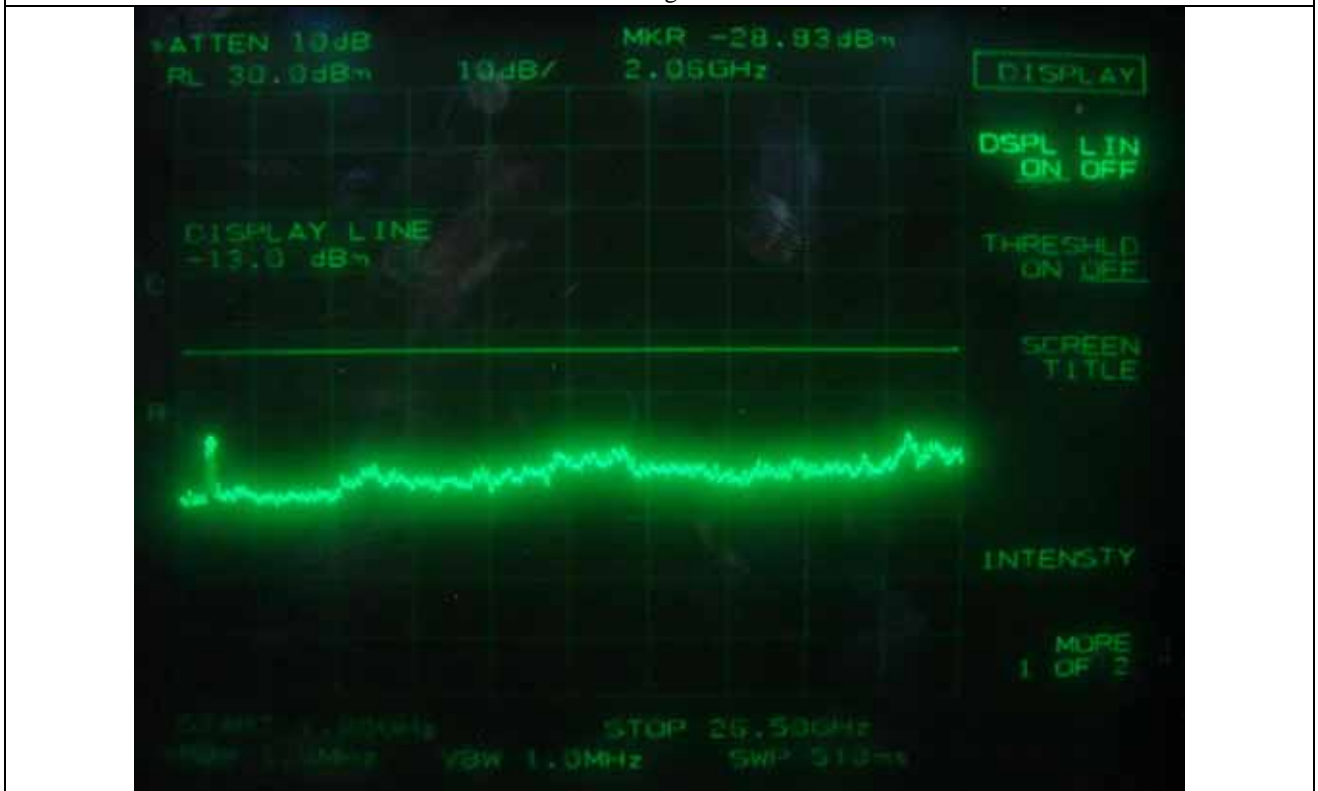
CDMA – Middle Channel



CDMA – Middle Channel



CDMA – High Channel



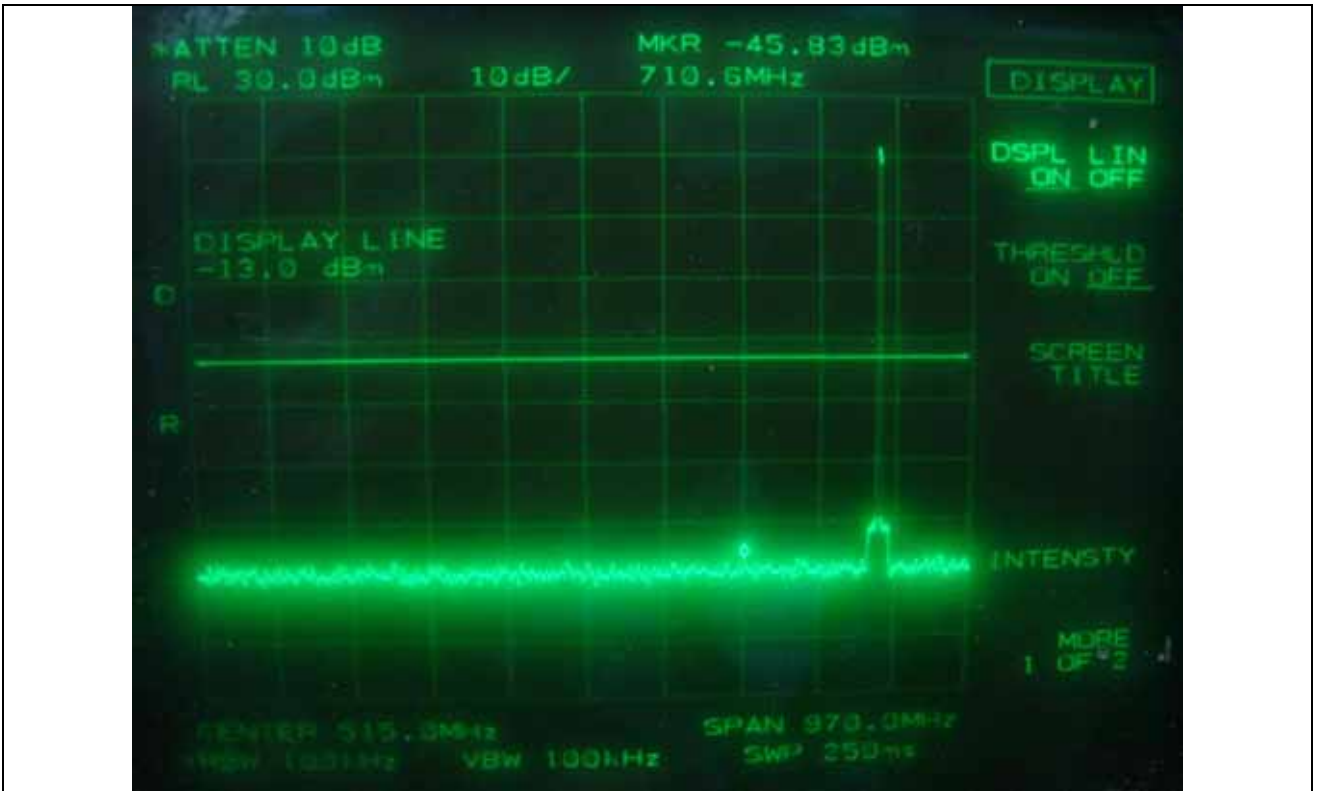
CDMA – High Channel



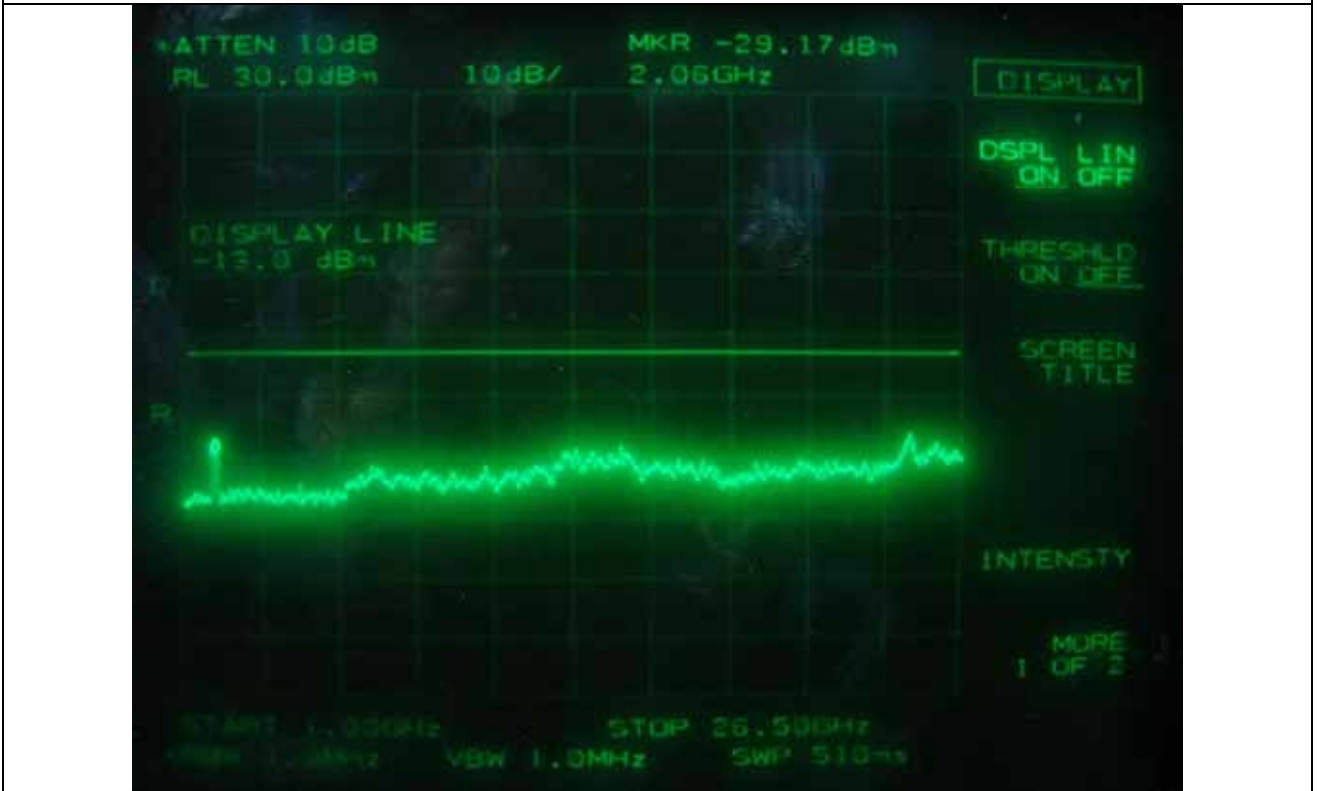
1xEVDO - Low Channel



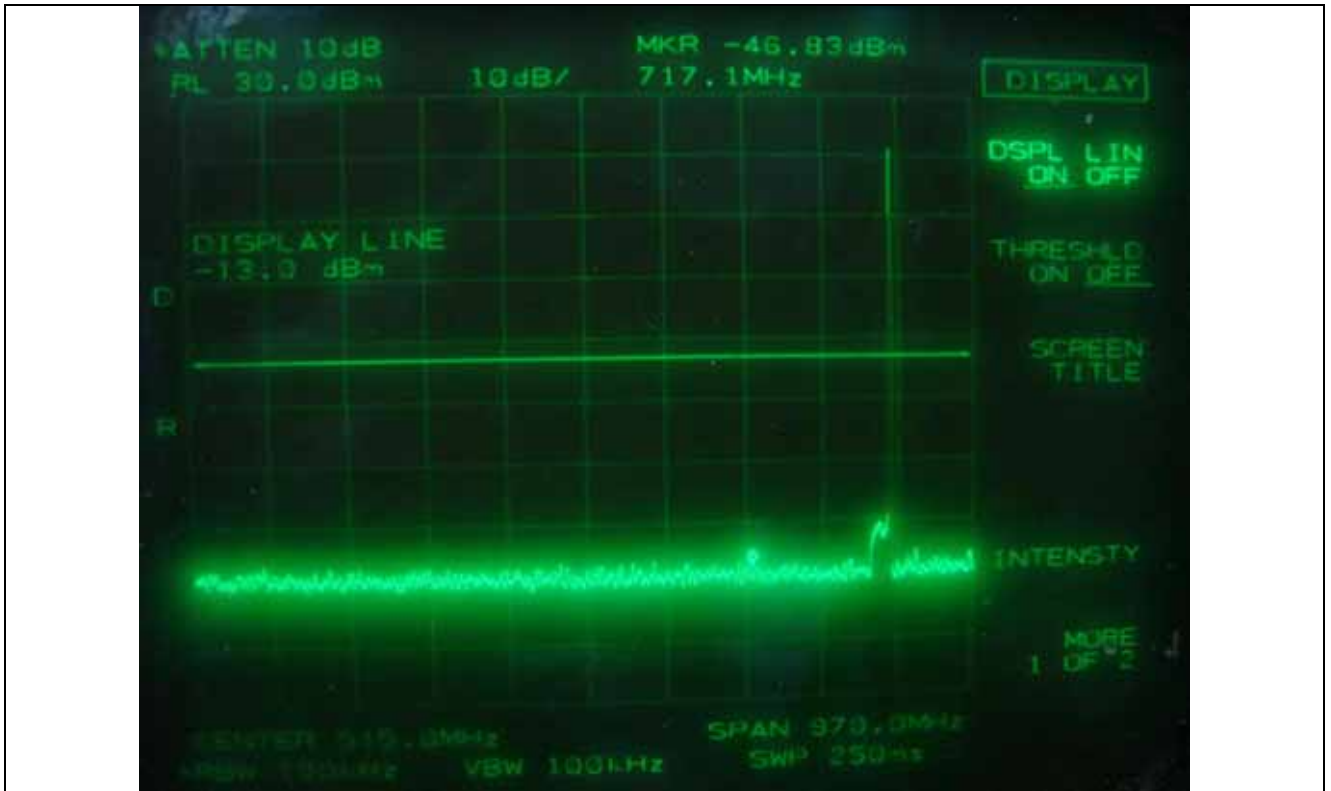
1xEVDO - Low Channel



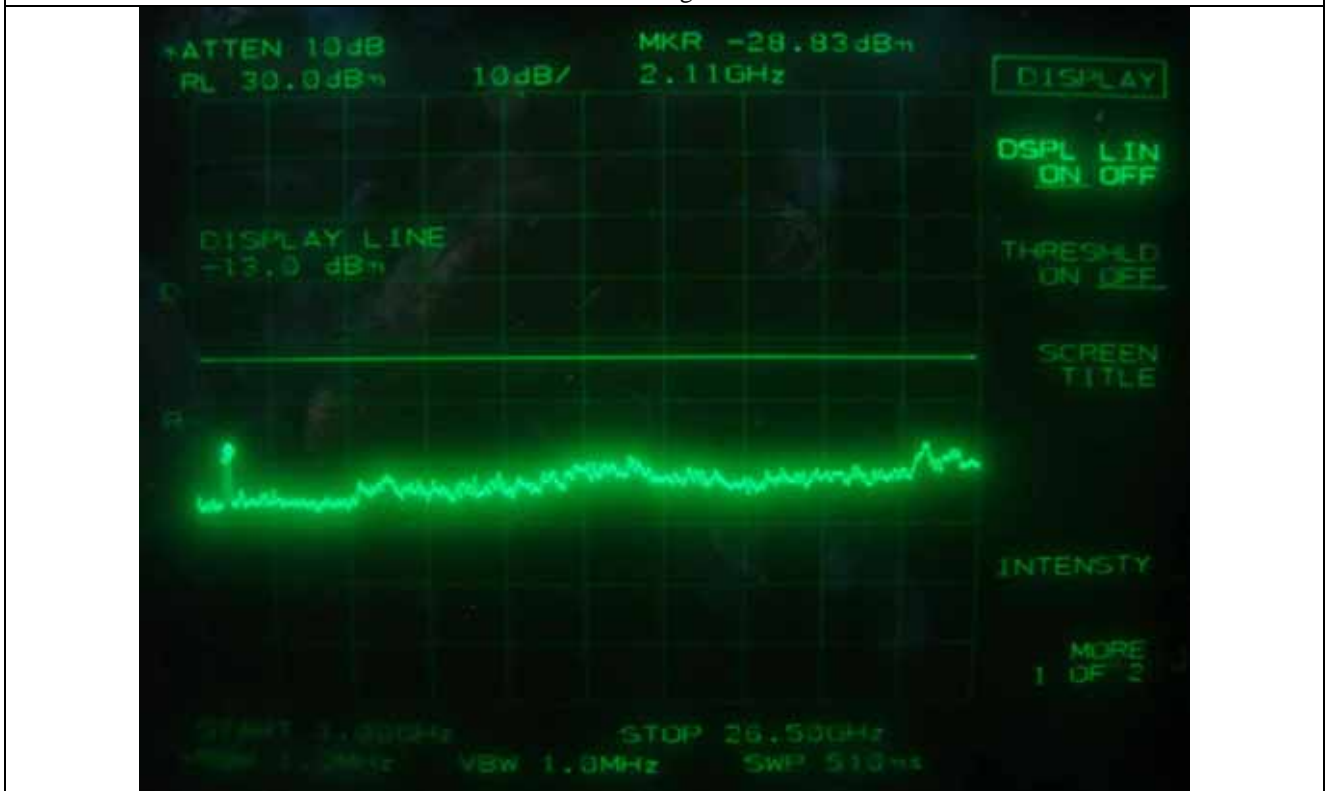
1xEVDO – Middle Channel



1xEVDO – Middle Channel



1xEVDO – High Channel



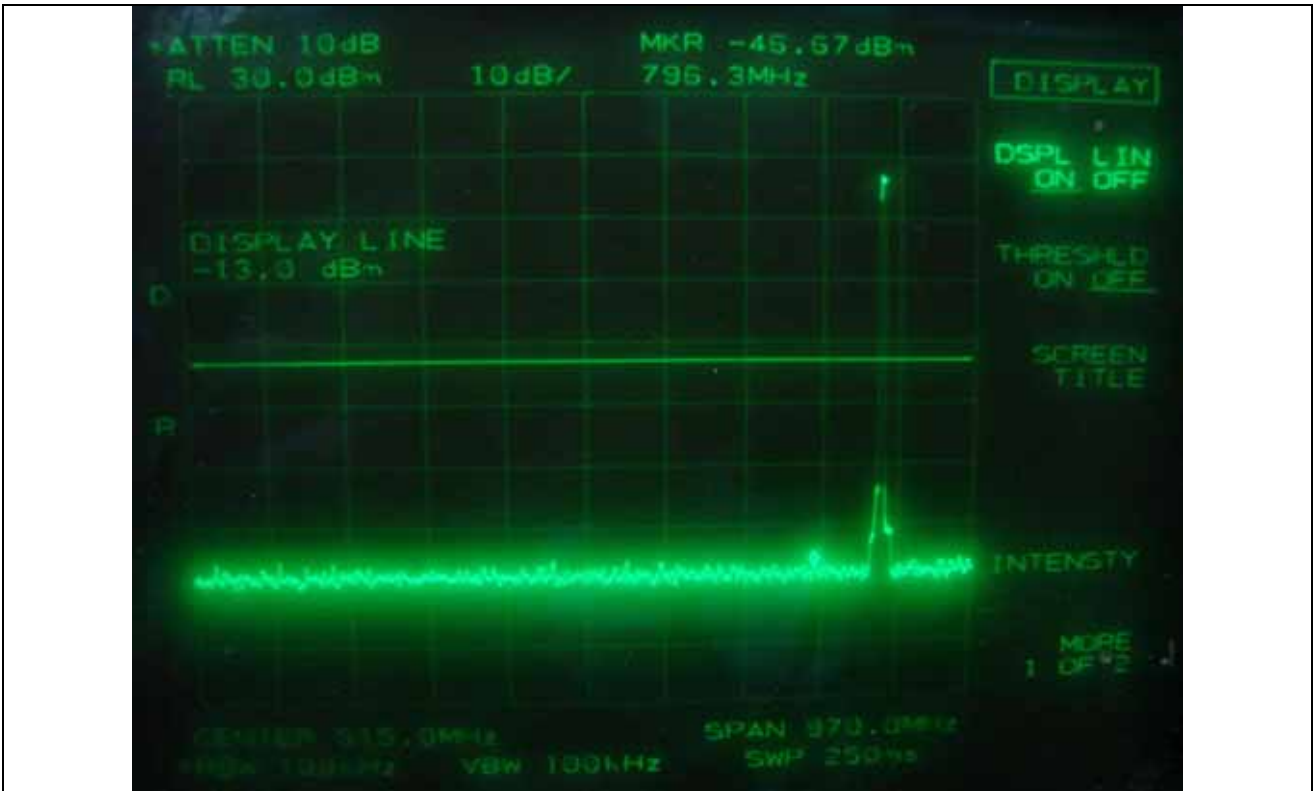
1xEVDO – High Channel



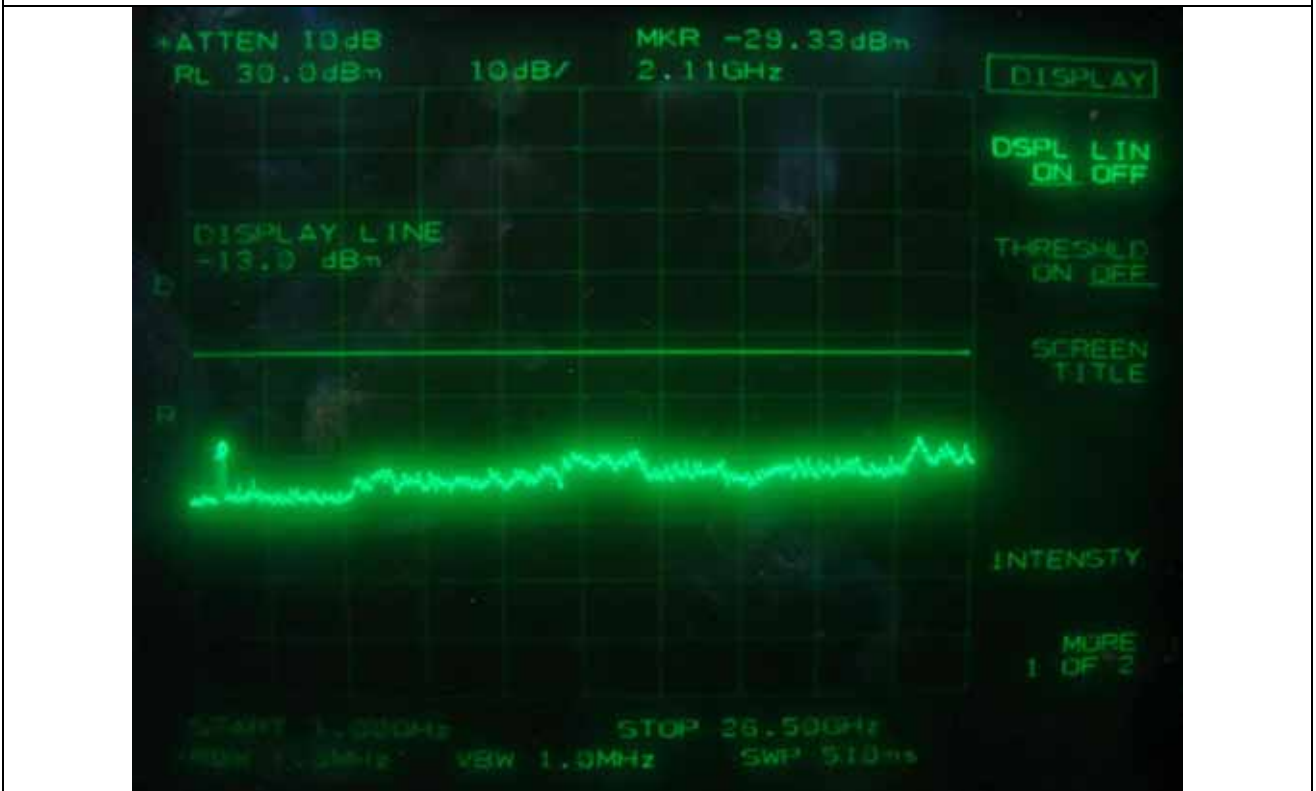
WCDMA - Low Channel



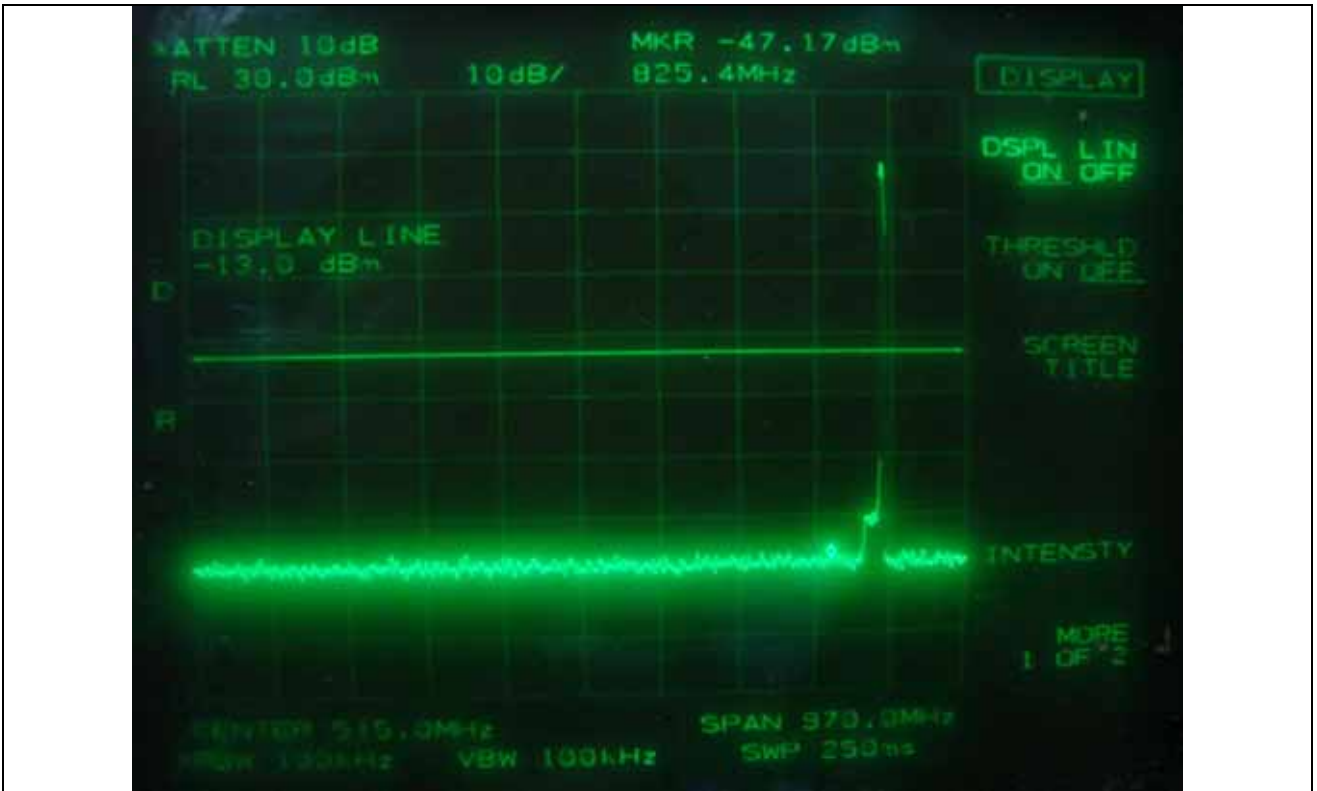
WCDMA - Low Channel



WCDMA – Middle Channel



WCDMA – Middle Channel



WCDMA – High Channel



WCDMA – High Channel

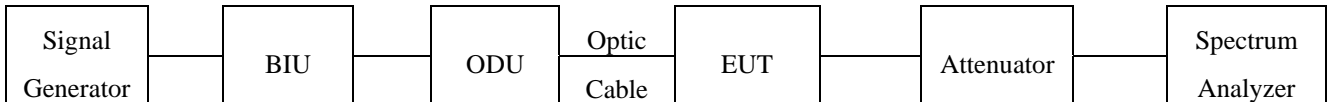
8. SPURIOUS EMISSION AT ANTENNA TERMINAL AT BLOCK EDGES ± 1 MHz

8.1 Operating environment

Temperature : 22 °C
Relative humidity : 47.6 %R.H.

8.2 Test set-up for conducted measurement

The RF signal from the signal generator(s) was injected to BIU (BTS Interface Unit) and then output signal from the BIU was injected to the input of ODU (Optic Distribution Unit) by coaxial cable and then the output port of the ODU was connected to the input of the EUT by optic cable. The amplified RF signal at the output of the EUT was connected to the spectrum analyzer. The test was performed at three frequencies (low, middle, and high channels) at each band using all applicable modulation.



8.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ - 8564E	HP	Spectrum Analyzer	3650A00756	June 16, 2008
■ - E4432B	HP	Signal Generator	US38440950	June 16, 2008
■ - SMJ100A	R/S	Vecter Signal Generator	100698	June 16, 2008
■ - FSP	R/S	Spectrum Analyzer	100017	Mar. 11, 2008

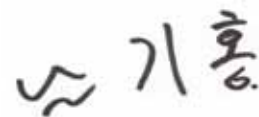
All test equipment used is calibrated on a regular basis.

8.4 Test data

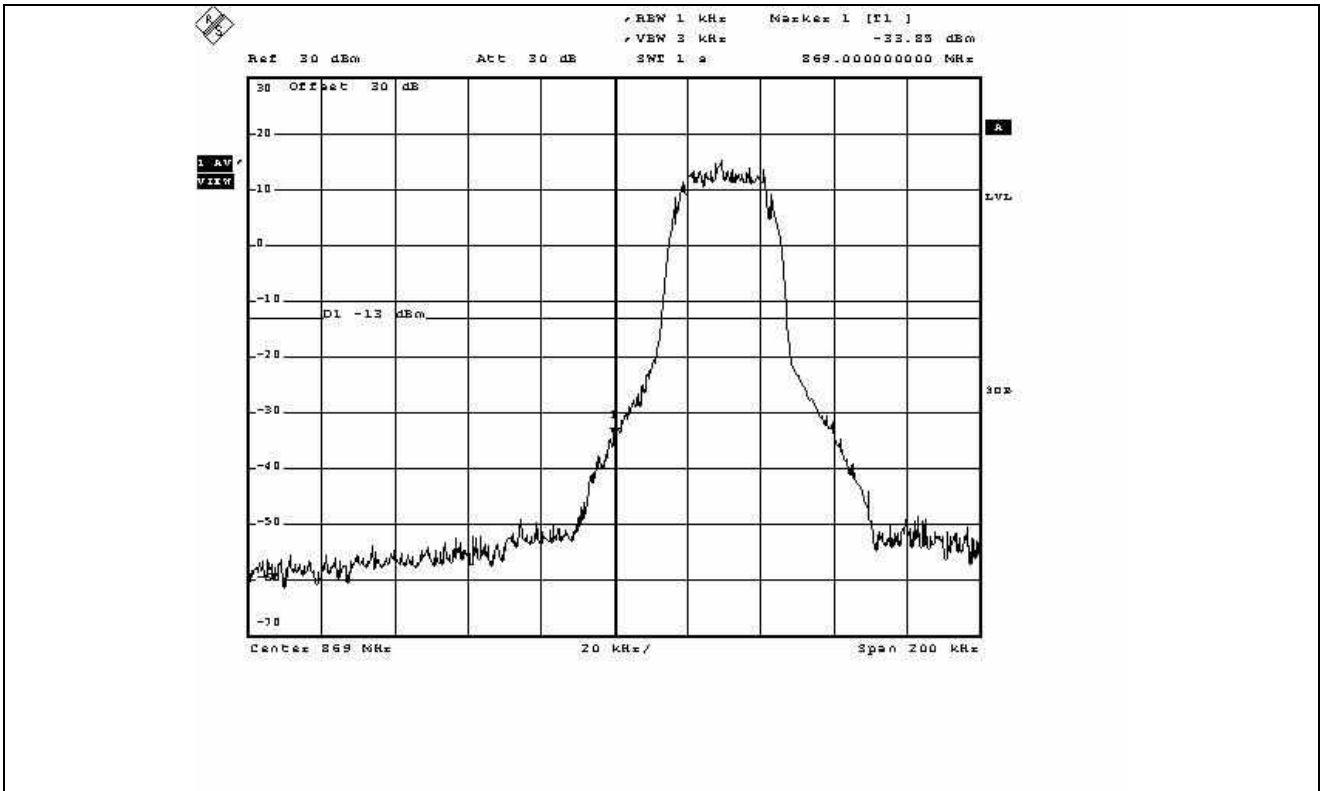
-. Test Date : March 04~05, 2009
-. Result : PASSED BY -17.19 dB at high channel of WCDMA Mode

Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
TDMA	Low	869.00	-33.85	-13.00
	High	894.00	-33.63	
GSM	Low	869.00	-34.26	
	High	894.02	-33.24	
EDGE	Low	868.96	-36.92	-13.00
	High	894.02	-34.48	
CDMA	Low	869.00	-40.25	
	High	894.00	-41.97	
1xEVDO	Low	869.00	-38.45	-13.00
	High	894.00	-39.82	
WCDMA	Low	869.00	-30.19	
	High	894.00	-30.97	

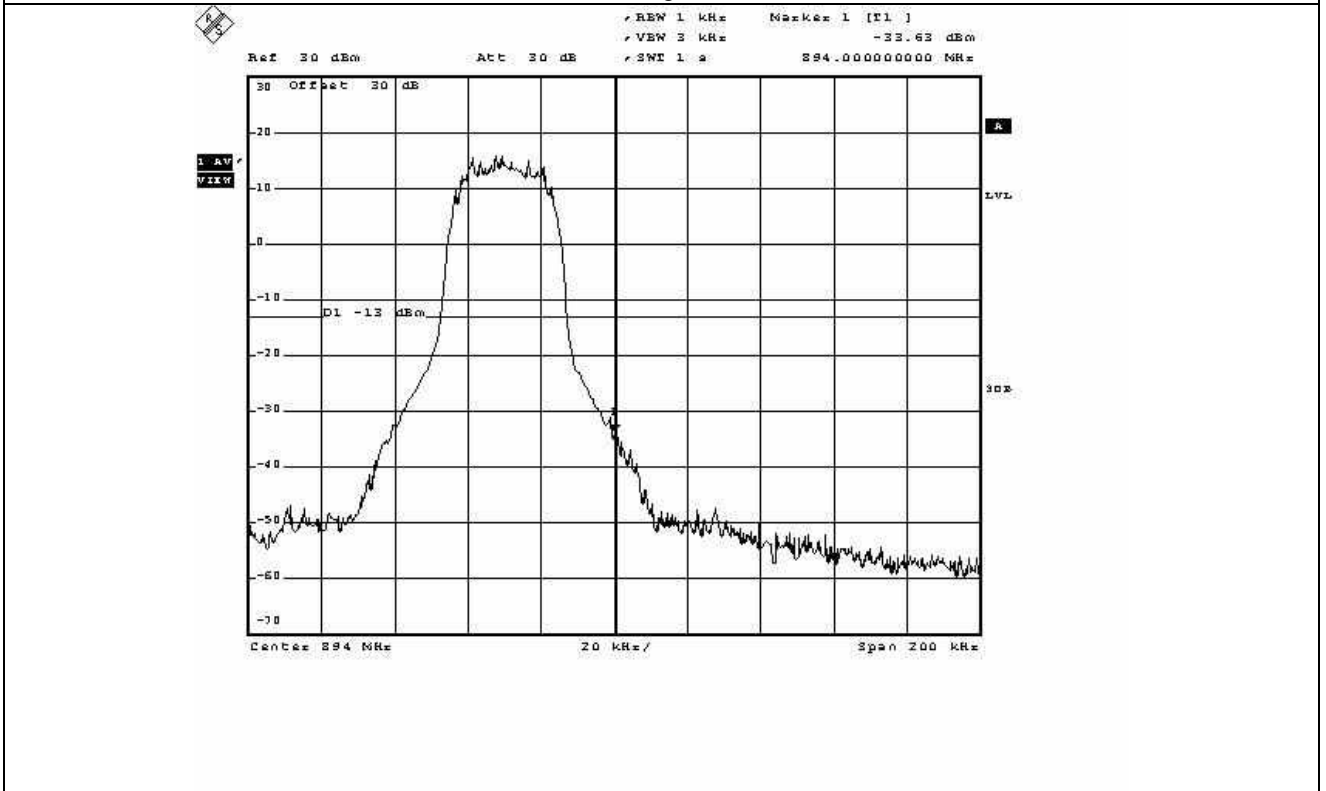
According to Part 22H, out of band emission shall be attenuated by $43 + 10 \log (P)$ dBc, equates to -13.0dBm.



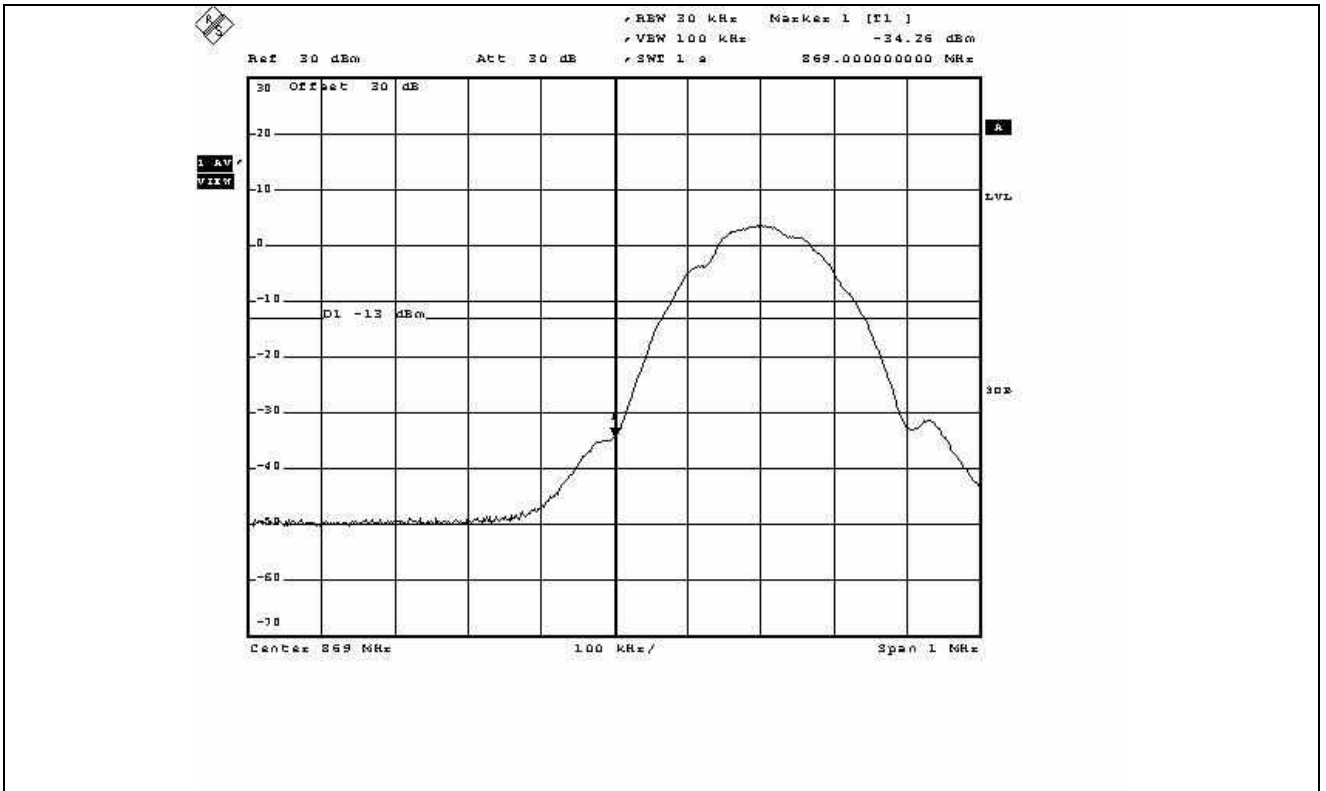
Tested by: Ki-Hong, Nam / Project Engineer



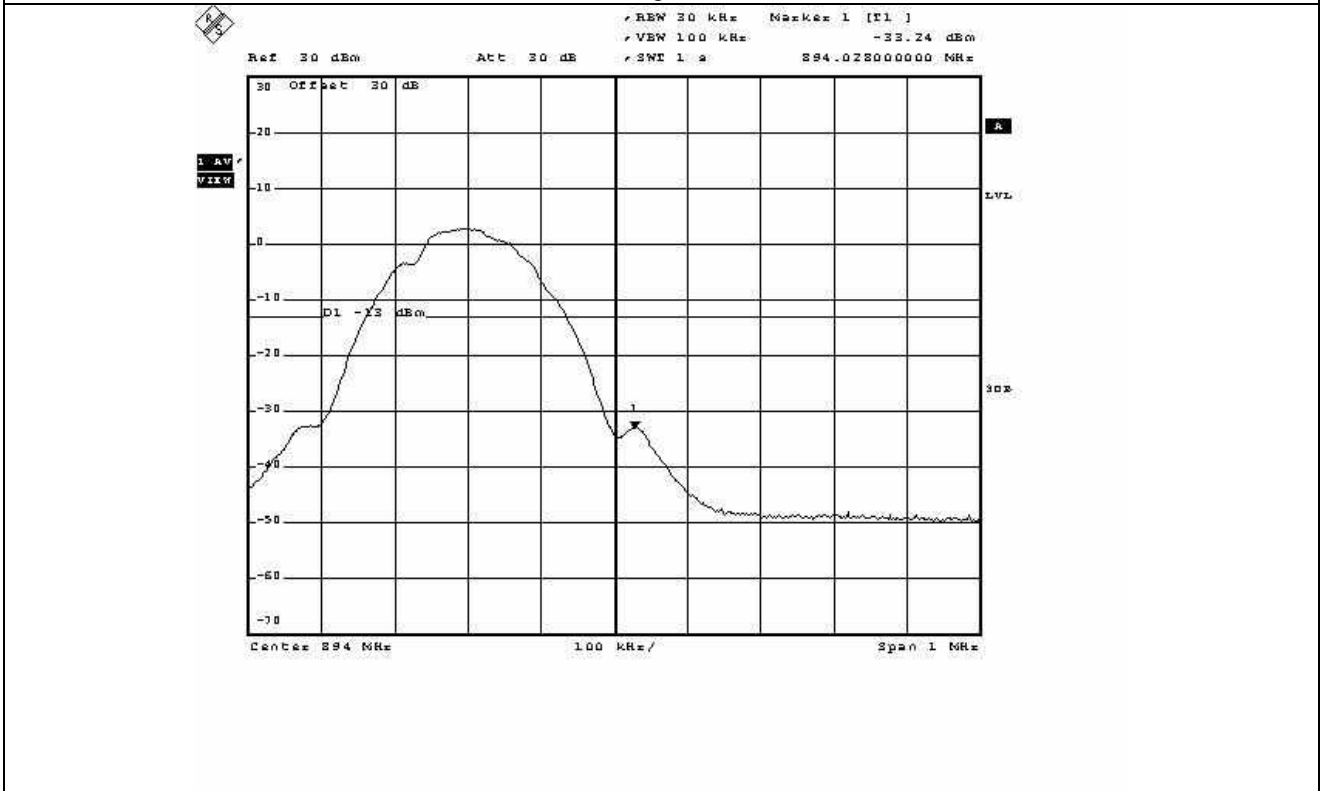
TDMA – Band Edge (Low Channel)



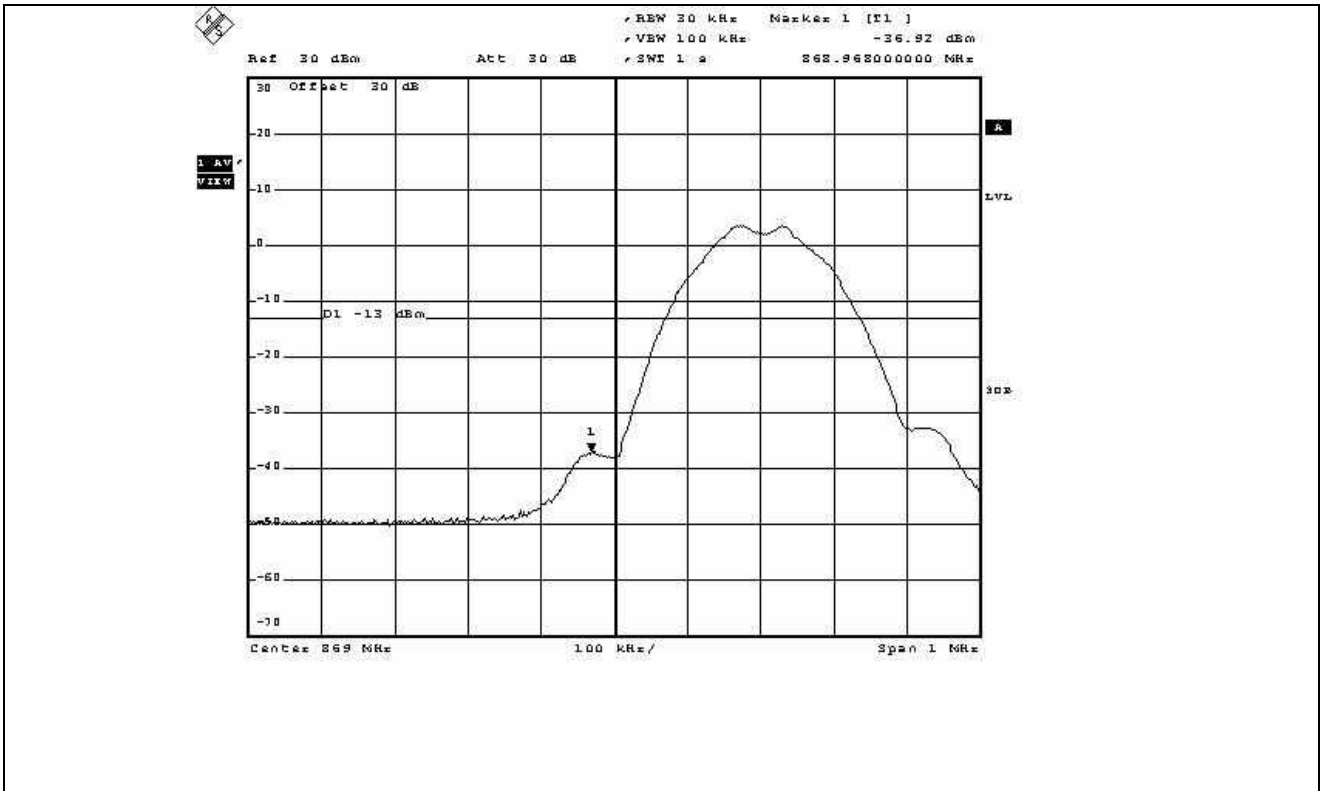
TDMA – Band Edge (High Channel)



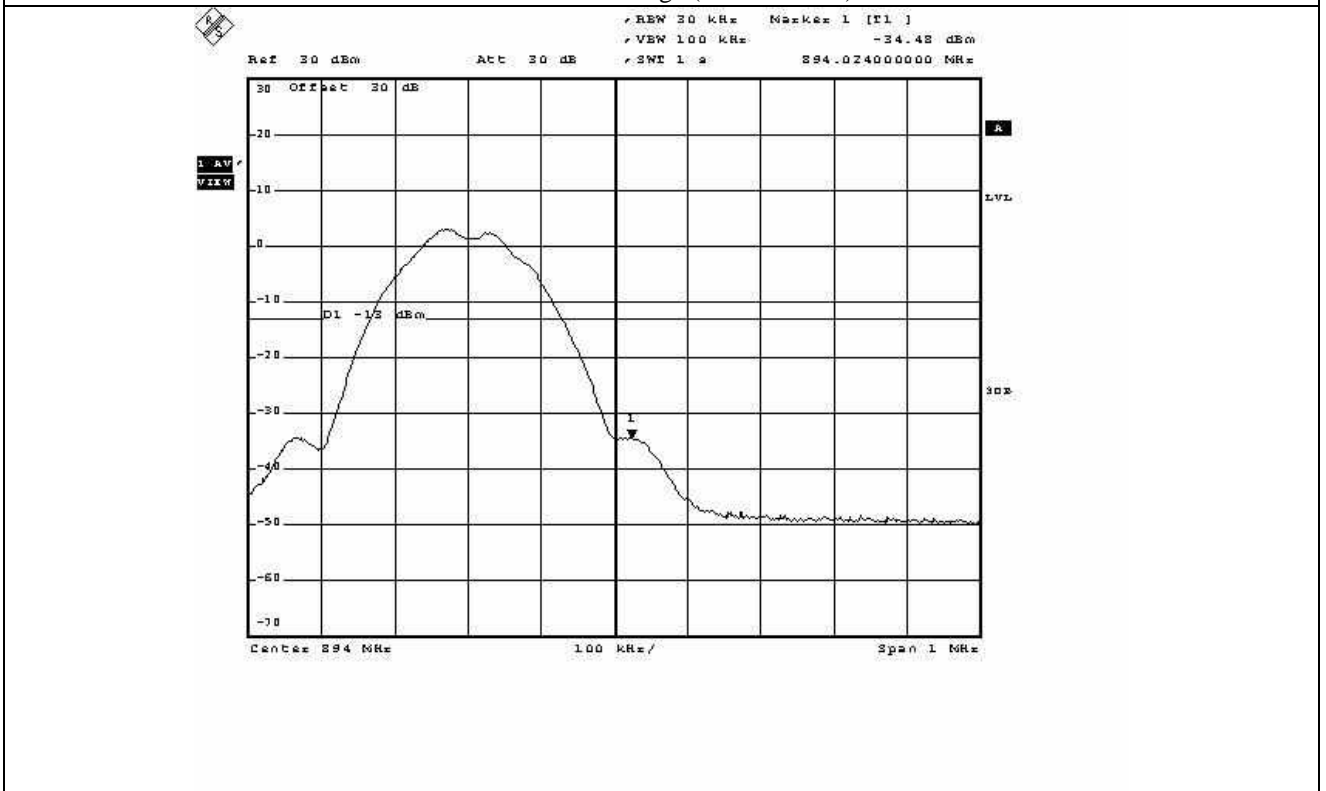
GSM – Band Edge (Low Channel)



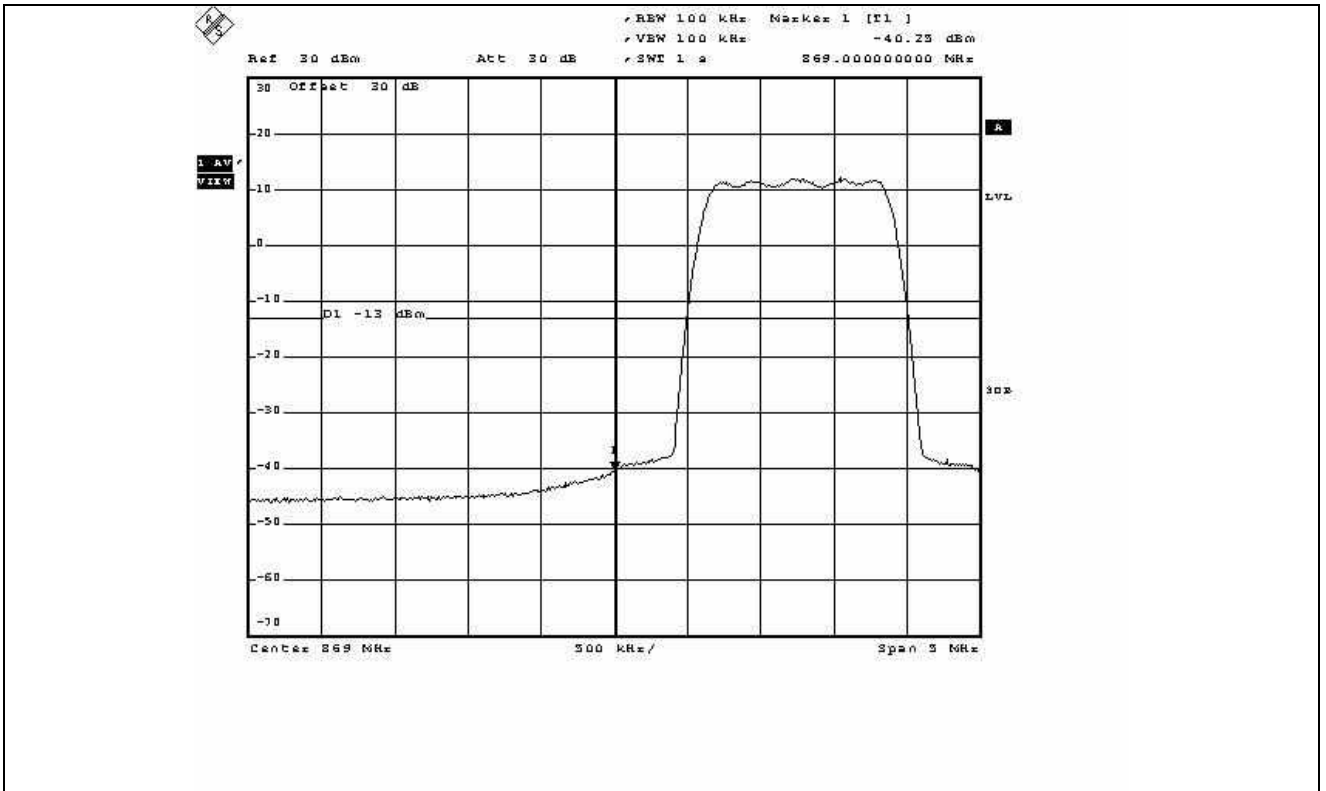
GSM – Band Edge (High Channel)



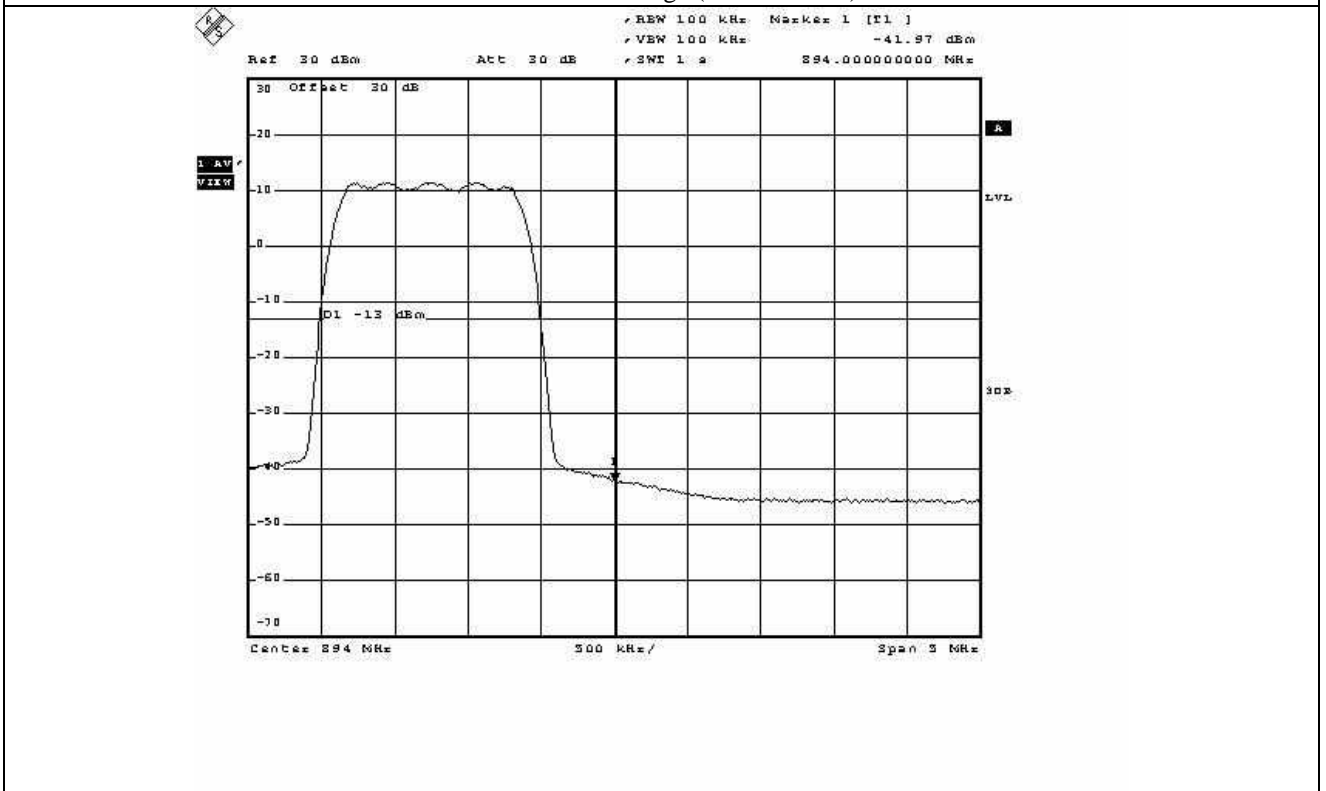
EDGE – Band Edge (Low Channel)



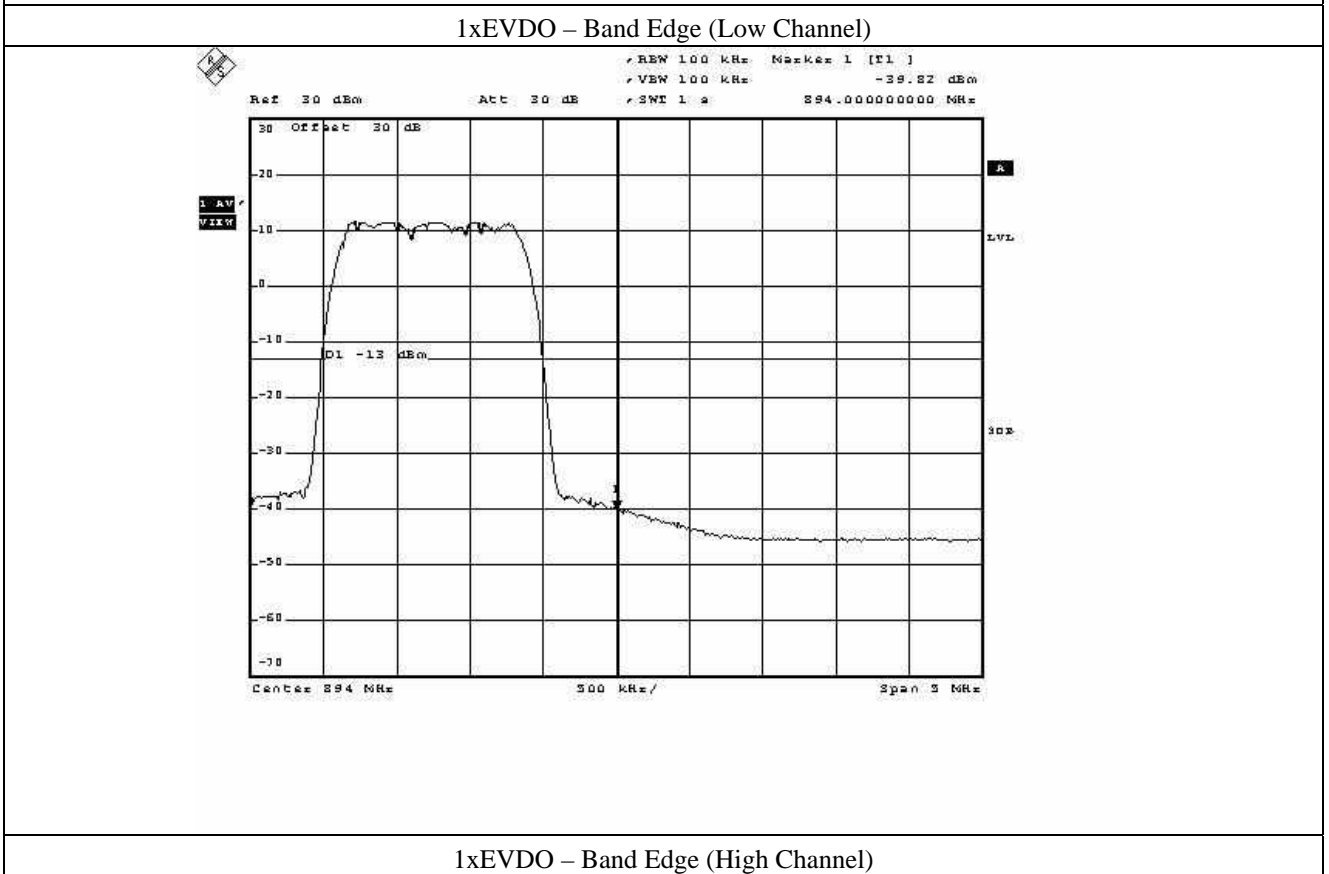
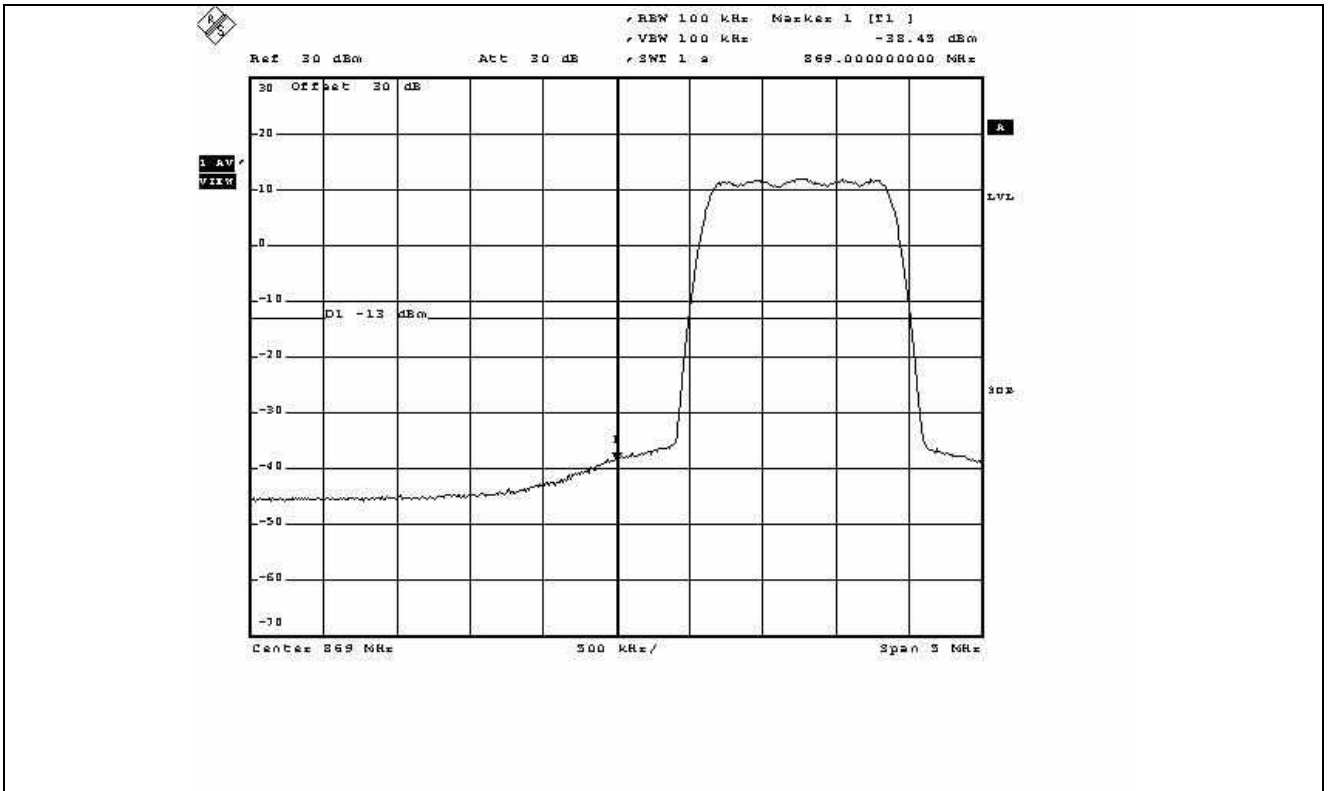
EDGE – Band Edge (High Channel)



CDMA – Band Edge (Low Channel)



CDMA – Band Edge (High Channel)

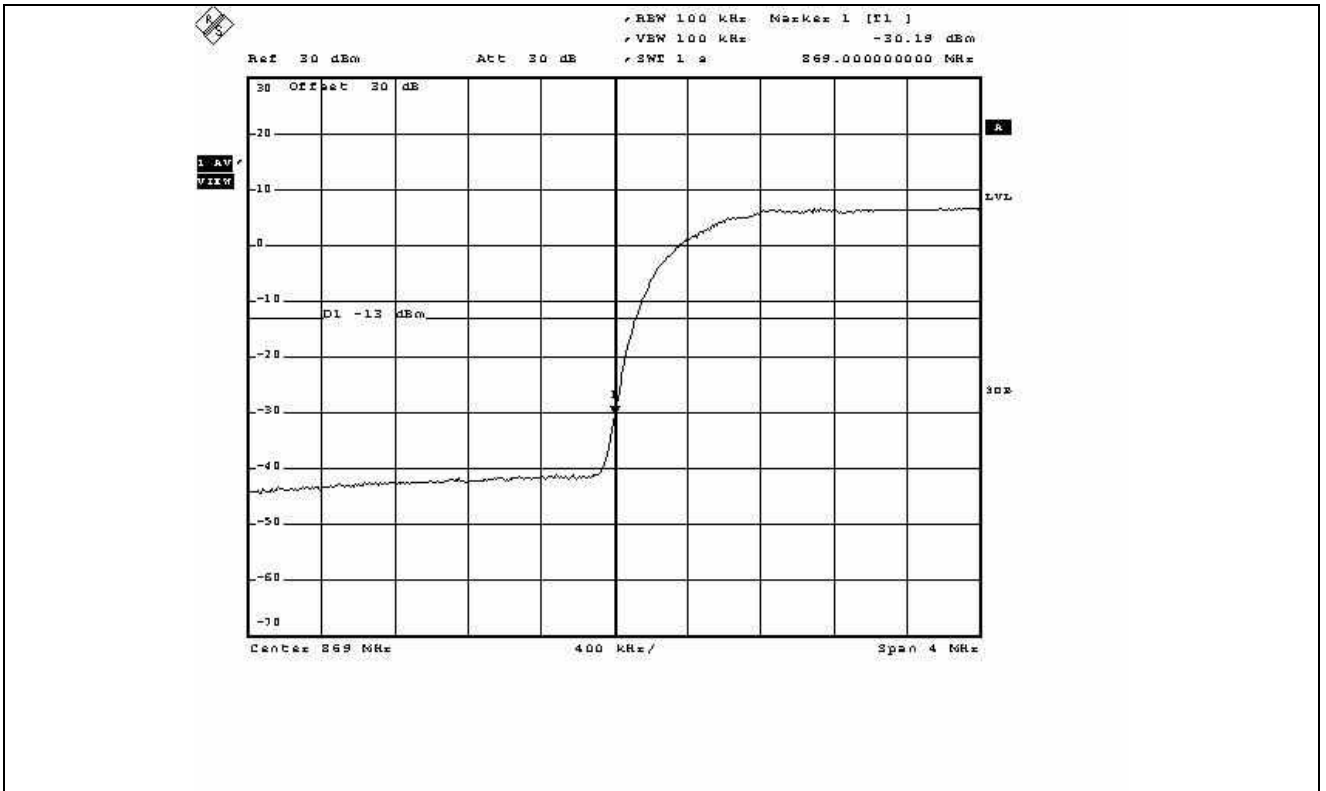


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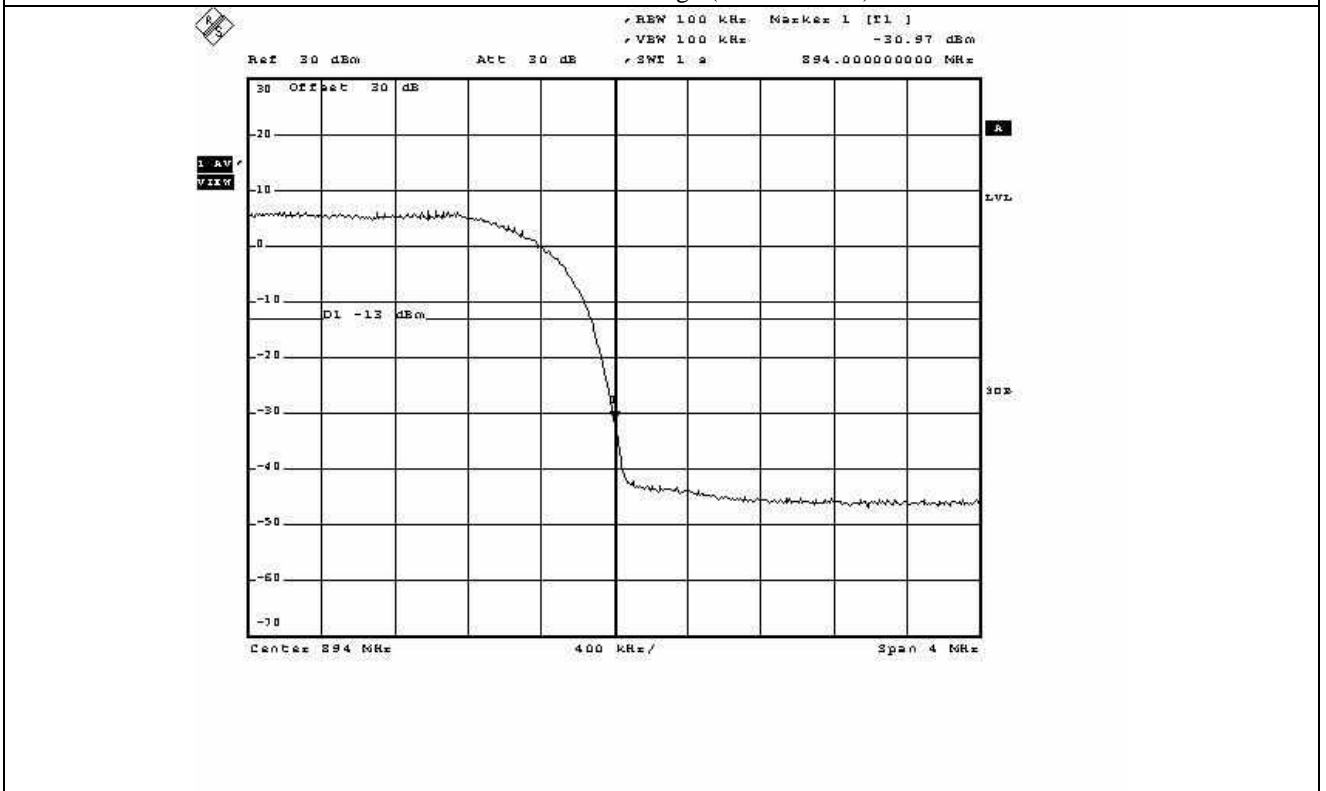
EMC-003 (Rev.1)

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(TEL: +82-31-746-8500, FAX: +82-31-746-8700)

EMC Testing Dept : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea. (TEL: +82-31-765-8289, FAX: +82-31-766-2904)



WCDMA – Band Edge (Low Channel)



WCDMA – Band Edge (High Channel)

9. INTERMODULATION TEST

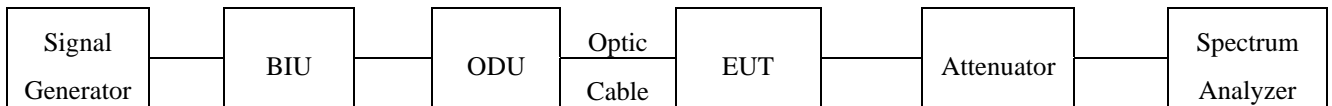
9.1 Operating environment

Temperature : 22 °C
Relative humidity : 47.6 %R.H.

9.2 Test set-up

The RF signal from the signal generator(s) was injected to BIU (BTS Interface Unit) and then output signal from the BIU was injected to the input of ODU (Optic Distribution Unit) by coaxial cable and then the output port of the ODU was connected to the input of the EUT by optic cable. The amplified RF signal at the output of the EUT was connected to the spectrum analyzer. The test was performed at three frequencies (low, middle, and high channels) at each band using all applicable modulation.

Two input signals are equal in level and were sent to the input of the EUT.



9.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	June 16, 2008
■ -	E4432B	HP	Signal Generator	US38440950	June 16, 2008
■ -	SMJ100A	R/S	Vecter Signal Generator	100698	June 16, 2008
■ -	FSP	R/S	Spectrum Analyzer	100017	Mar. 11, 2008

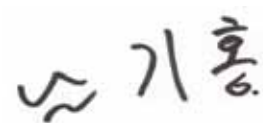
All test equipment used is calibrated on a regular basis.

9.4 Test data

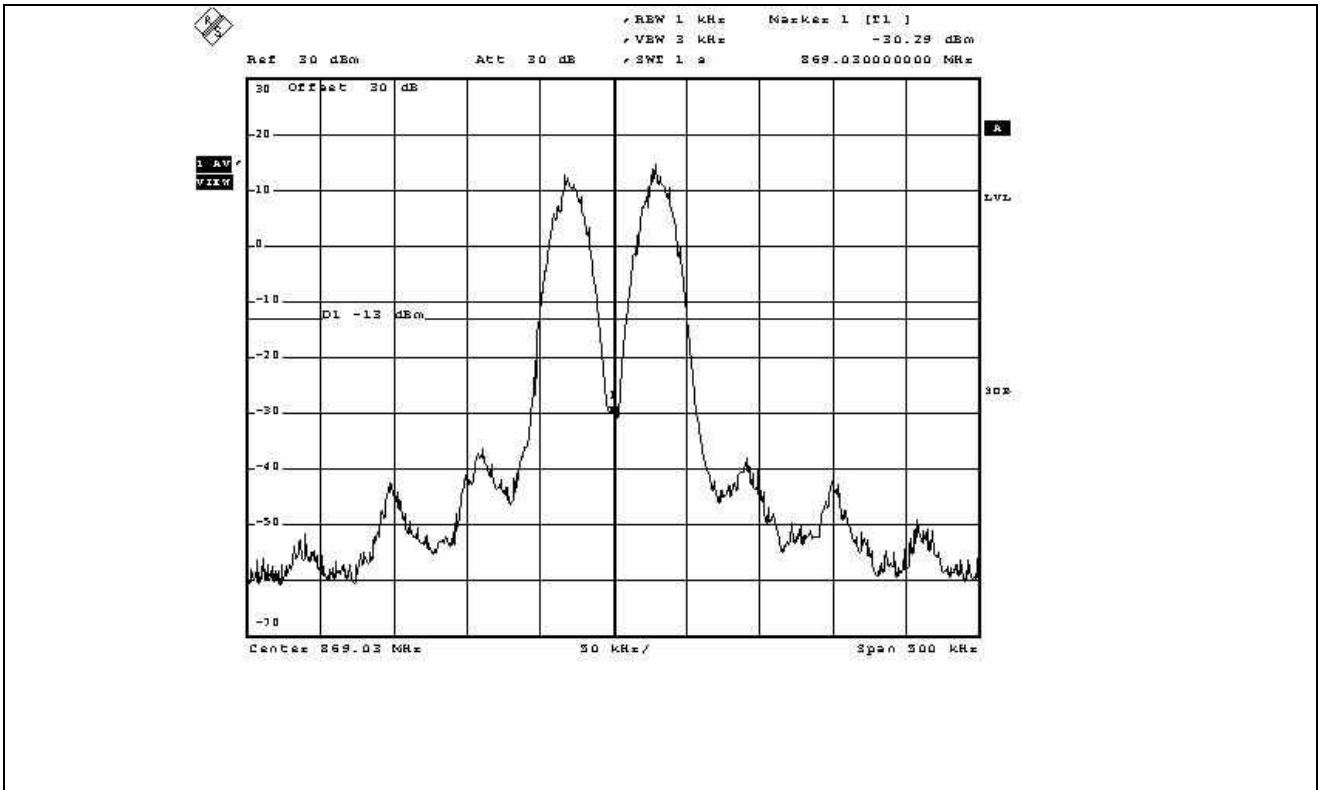
-. Test Date : March 04~05, 2009
-. Test Result : Pass

Modulation	Channel	Measured
TDMA	Low	< -13 dBm
	High	< -13 dBm
GSM	Low	< -13 dBm
	High	< -13 dBm
EDGE	Low	< -13 dBm
	High	< -13 dBm
CDMA	Low	< -13 dBm
	High	< -13 dBm
WCDMA	Low	< -13 dBm
	High	< -13 dBm
WCDMA	Low	< -13 dBm
	High	< -13 dBm

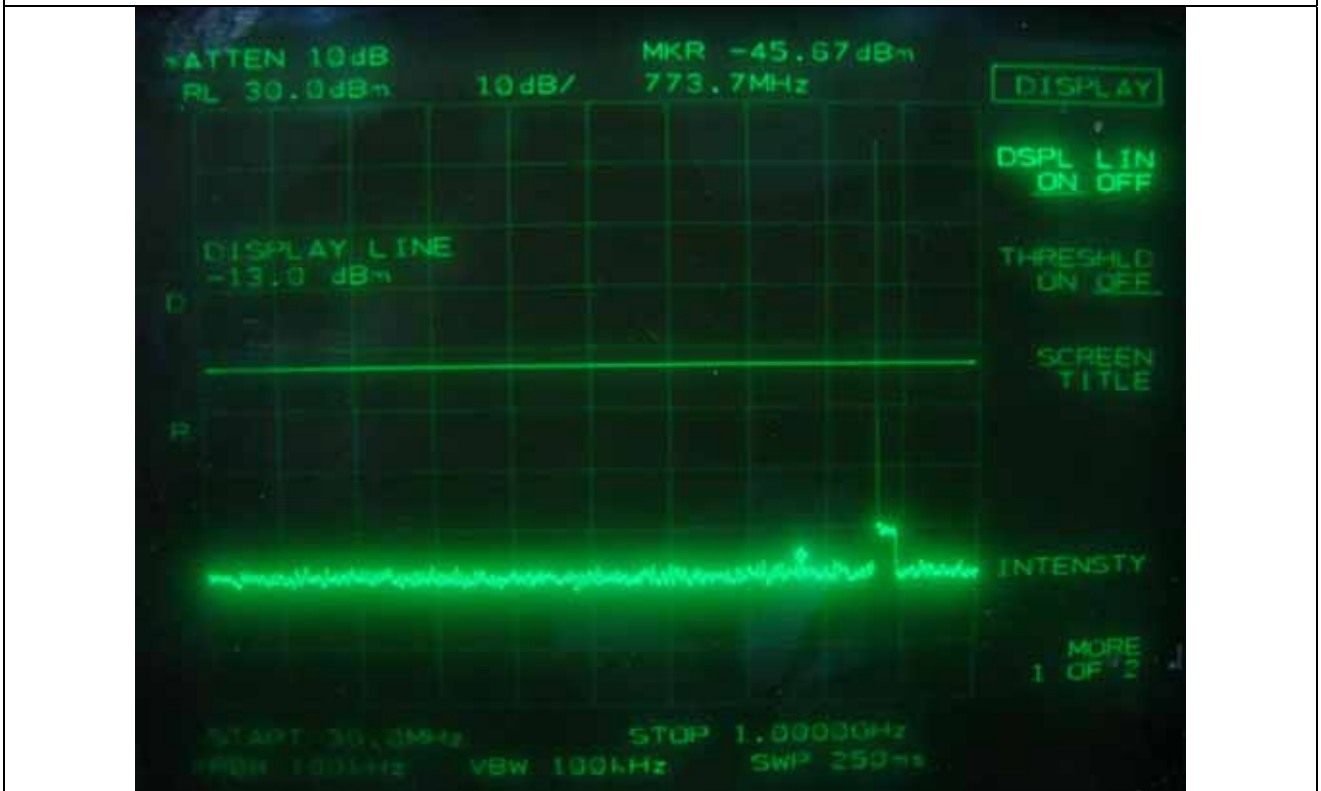
Remark: Intermodulation products must be attenuated below the rated power of the EUT at least $43 + 10\log(P_w)$, equivalent to -13dBm. Please refer to test data hereinafter.



Tested by: Ki-Hong, Nam / Project Engineer

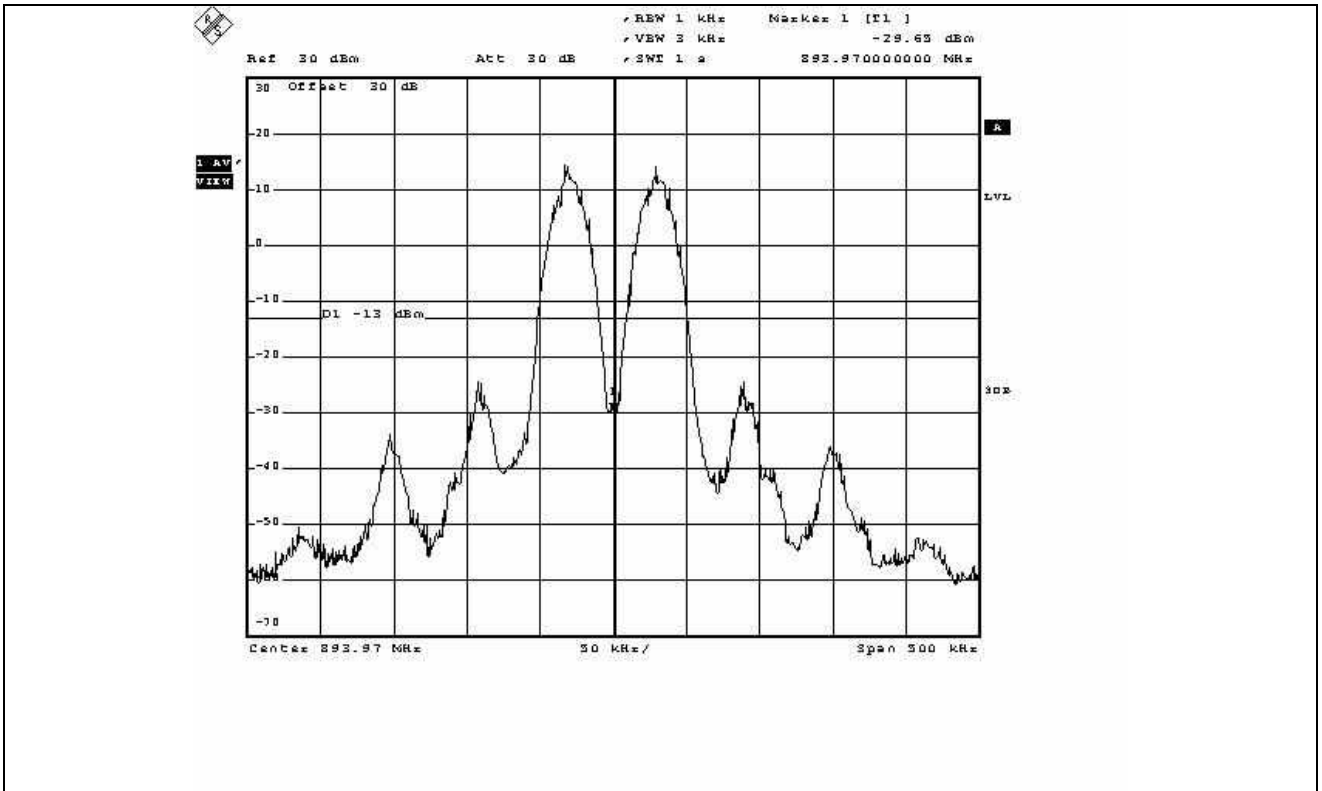


TDMA – Low Channel

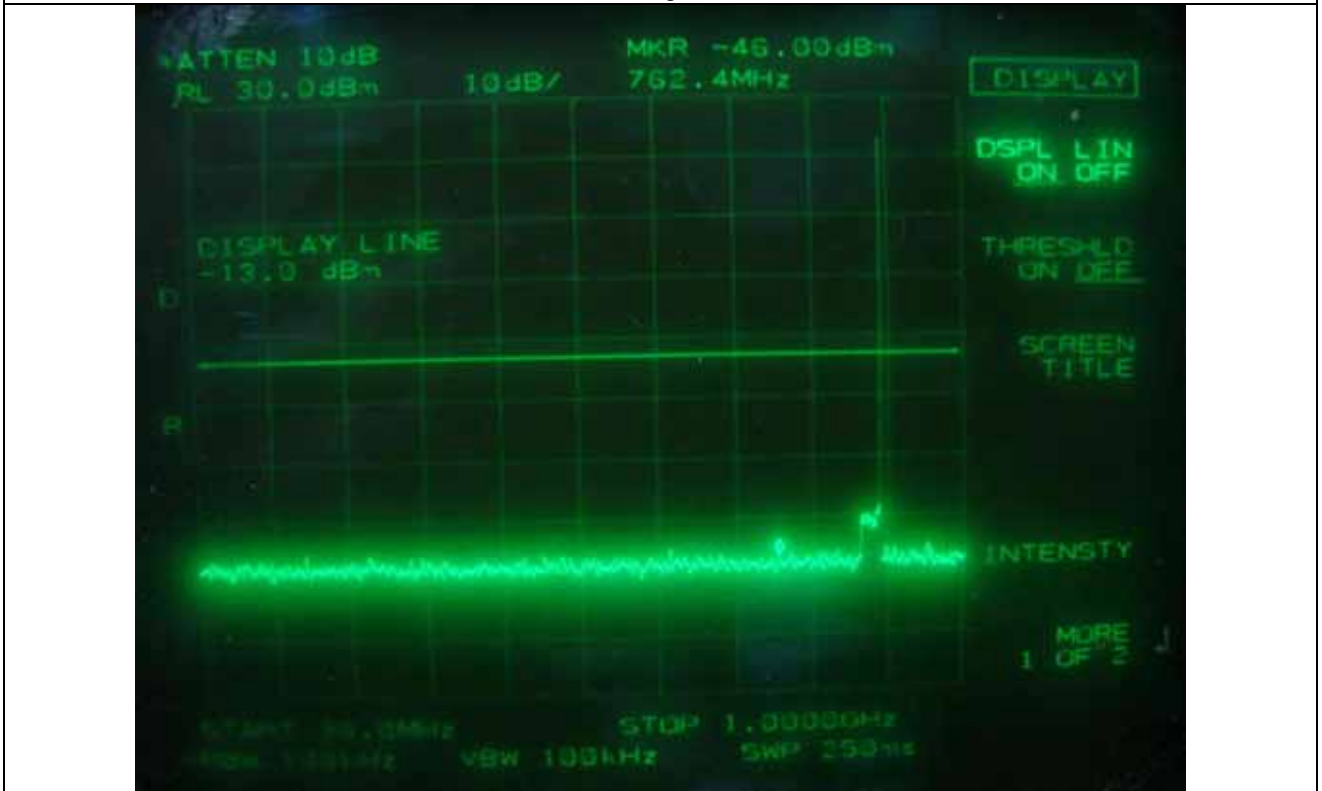


TDMA – Low Channel





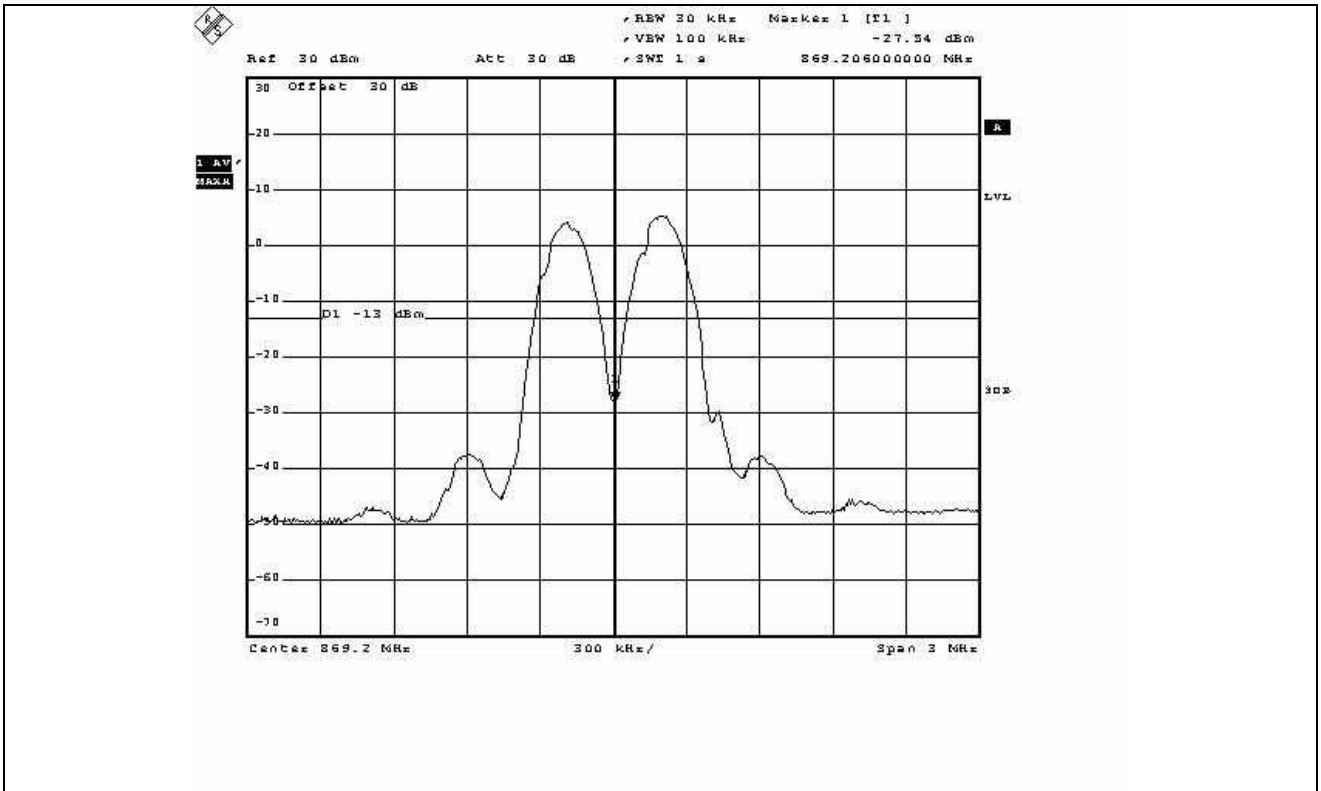
TDMA – High Channel



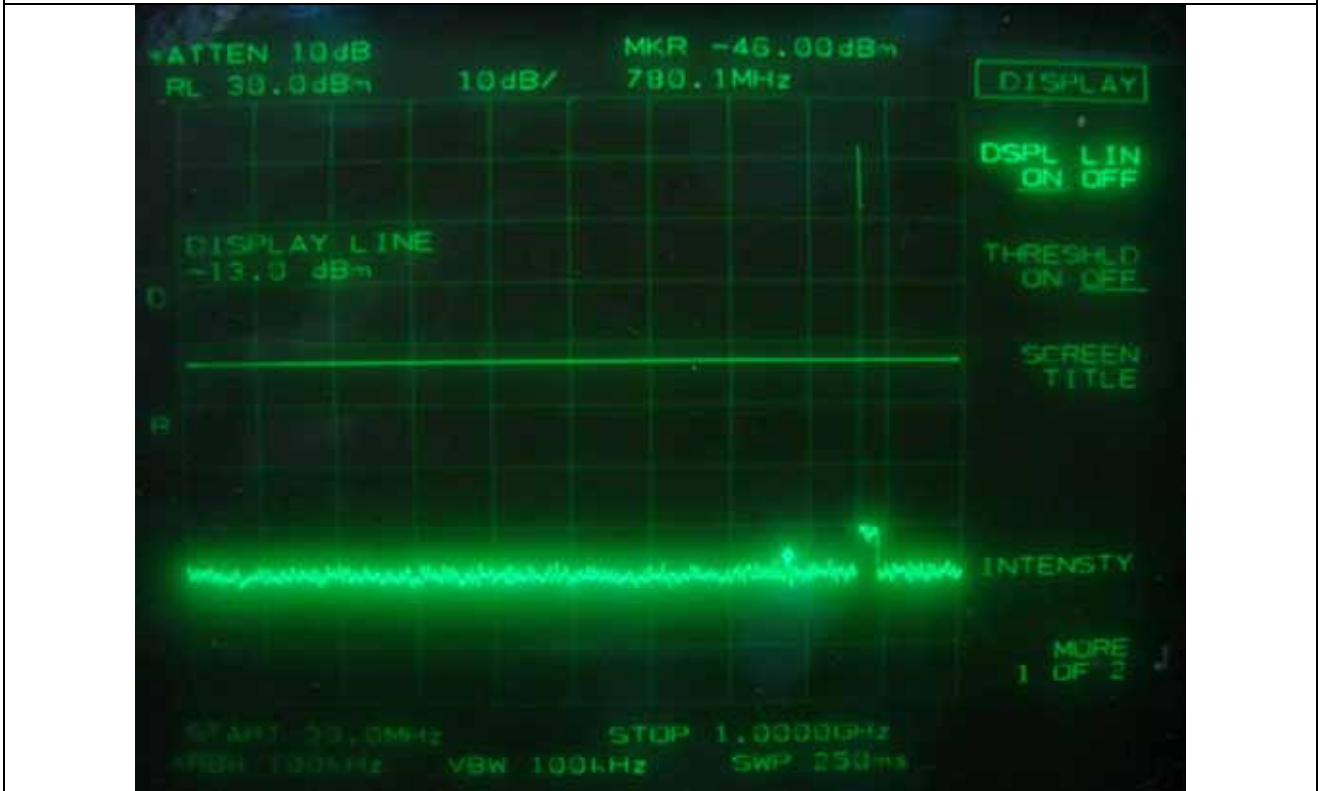
TDMA – High Channel



TDMA – High Channel



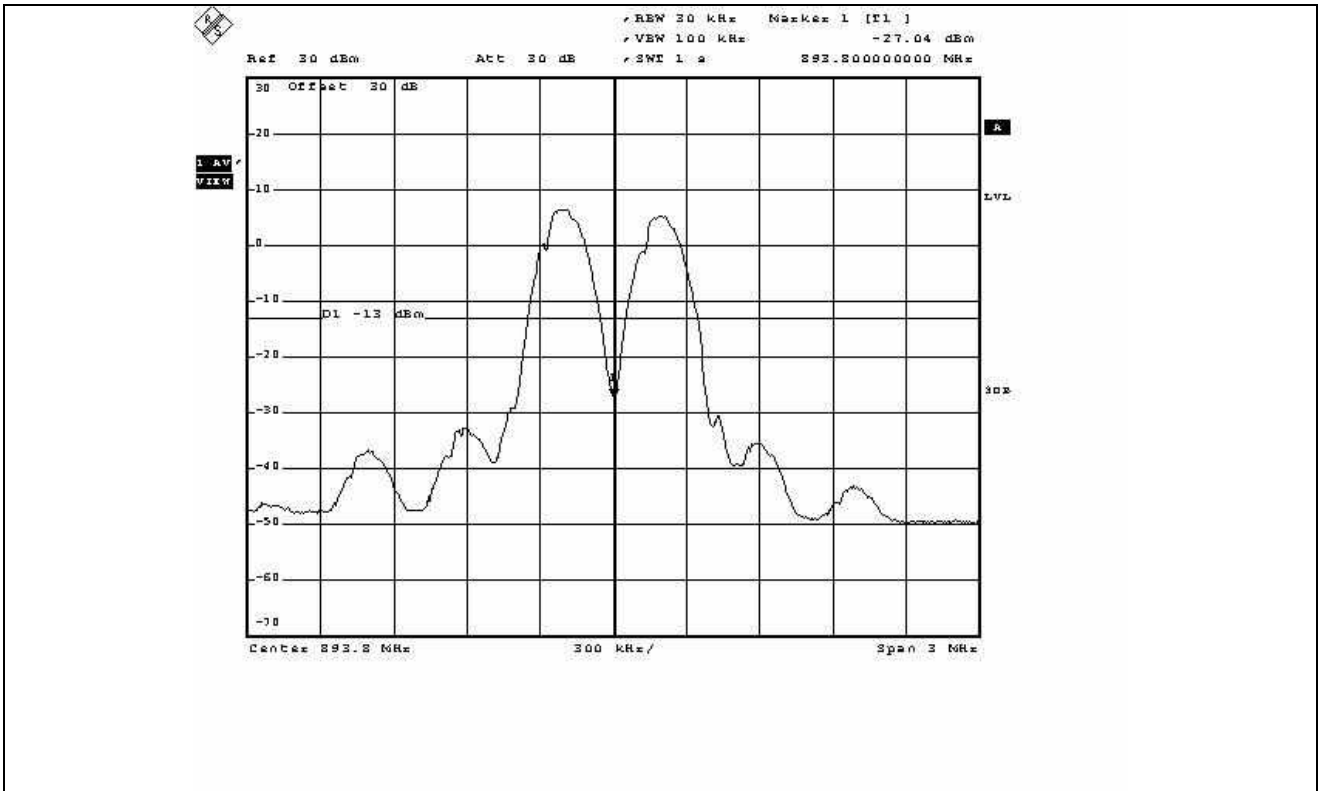
GSM – Low Channel



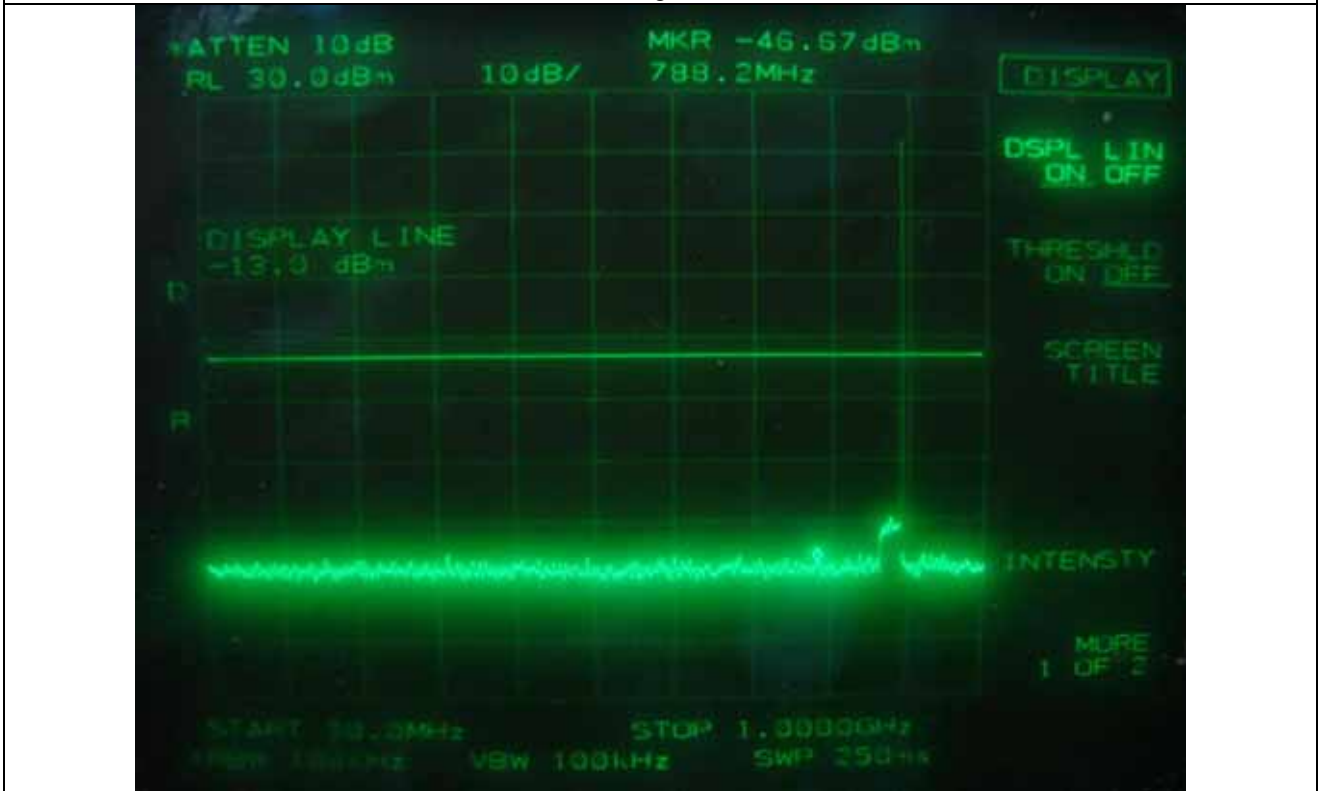
GSM – Low Channel



GSM – Low Channel



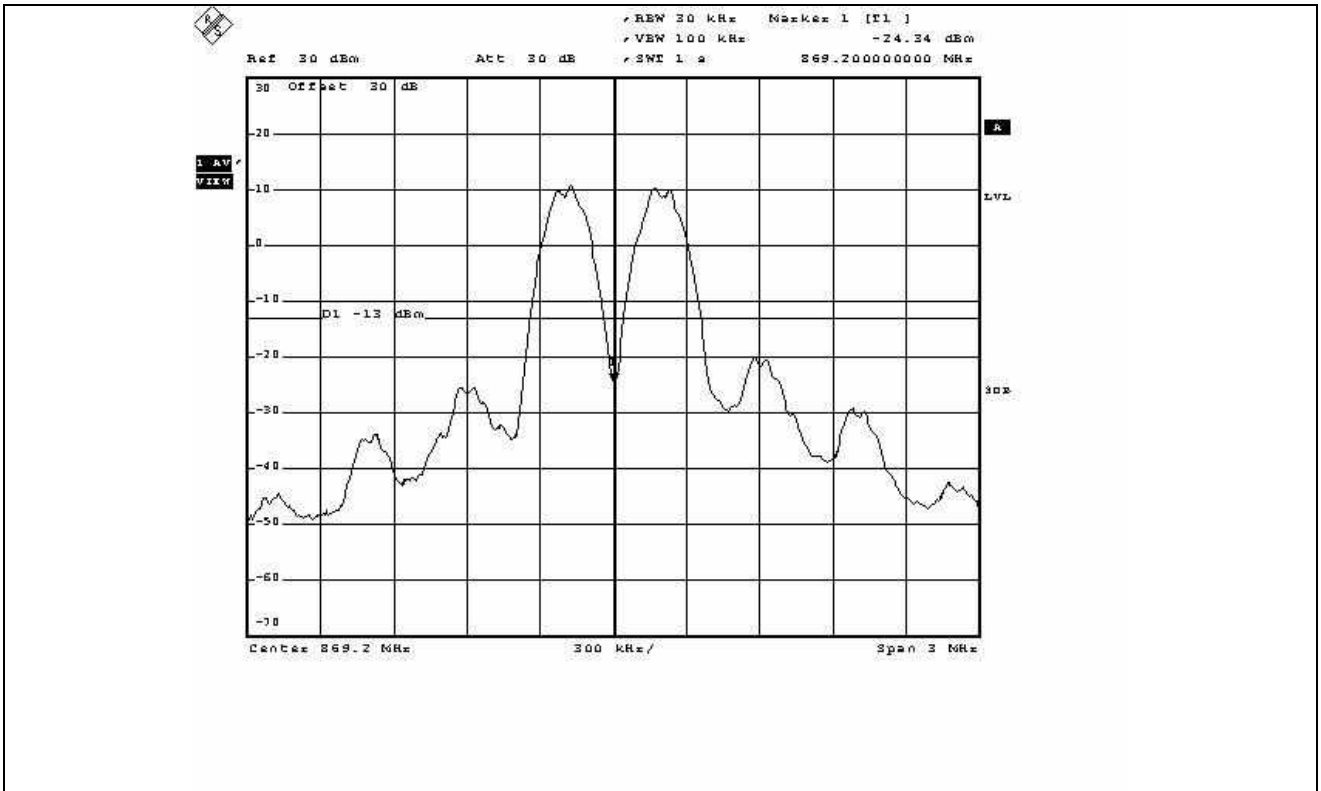
GSM – High Channel



GSM – High Channel



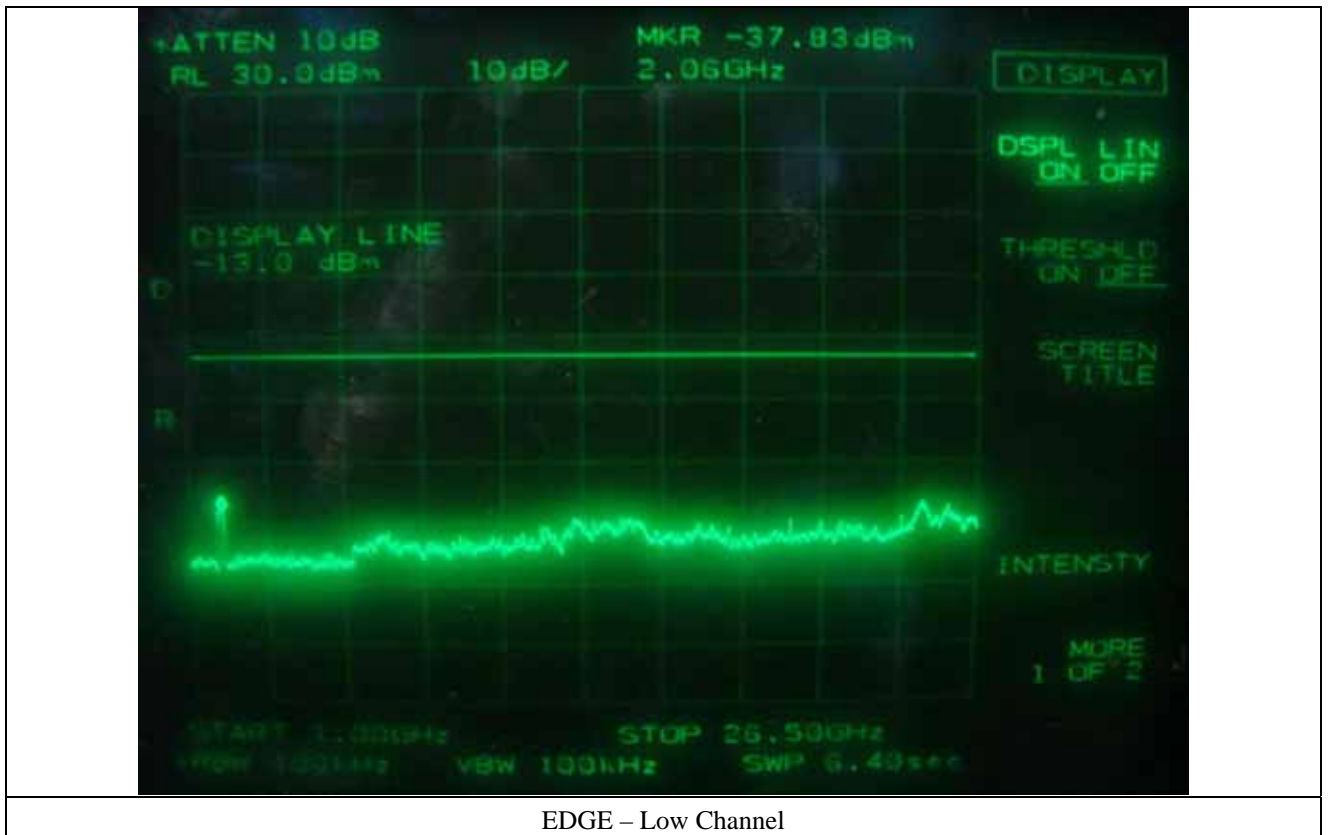
GSM - High Channel



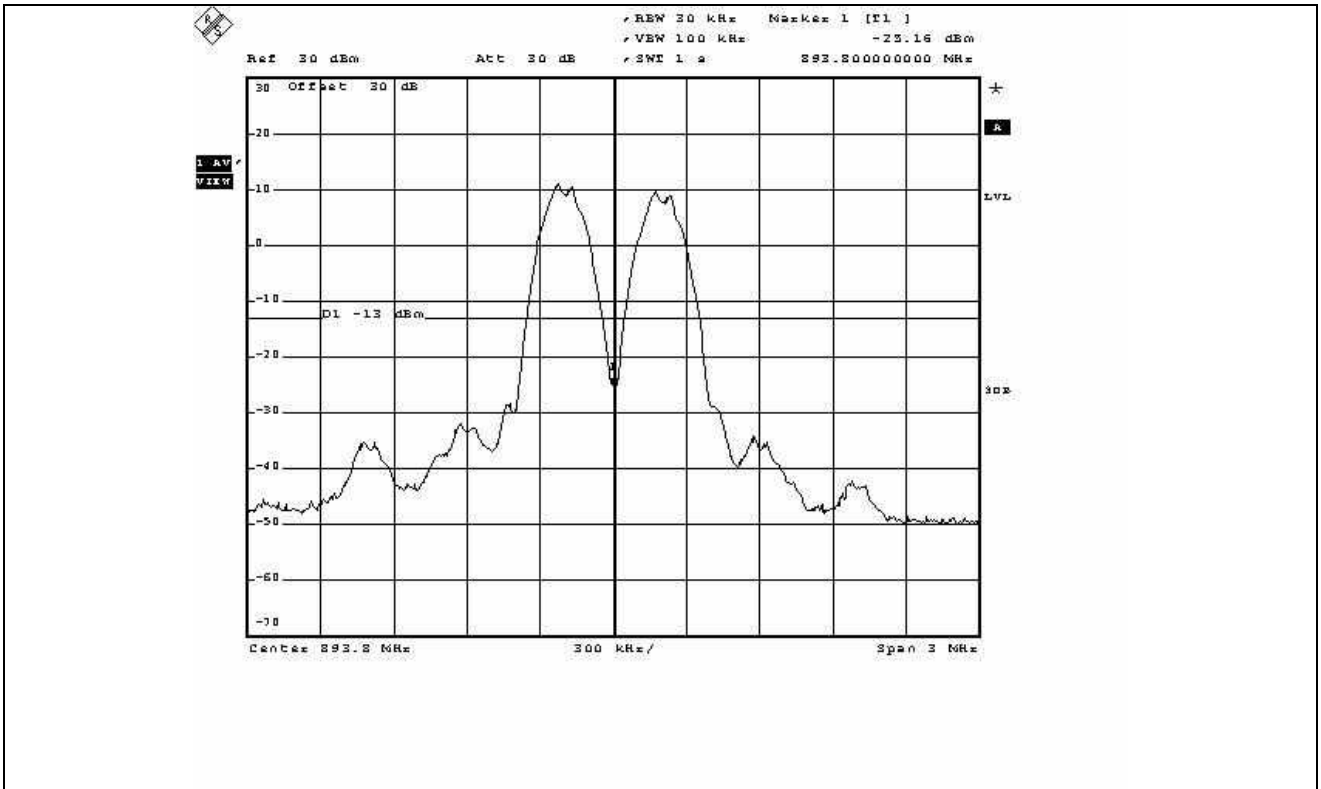
EDGE - Low Channel



EDGE - Low Channel



EDGE – Low Channel



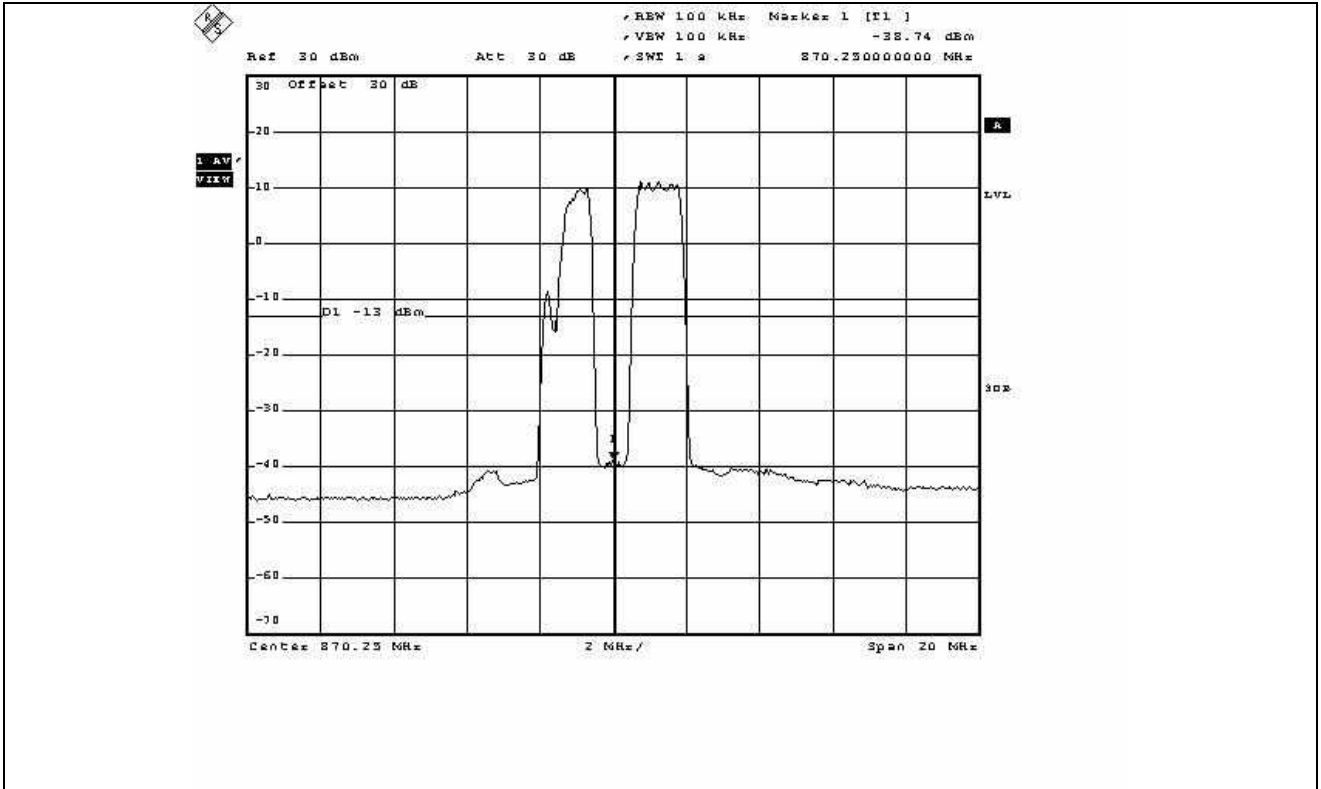
EDGE – High Channel



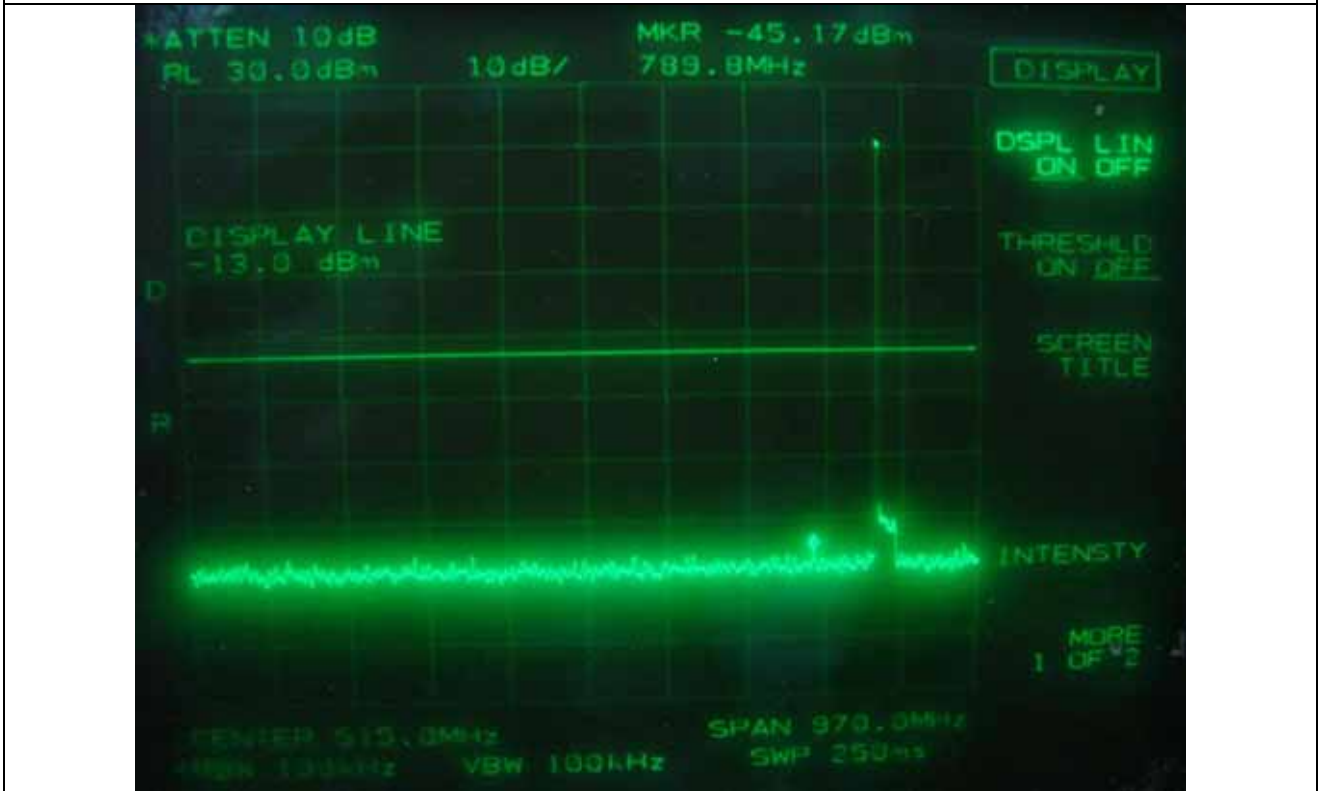
EDGE – High Channel



EDGE - High Channel

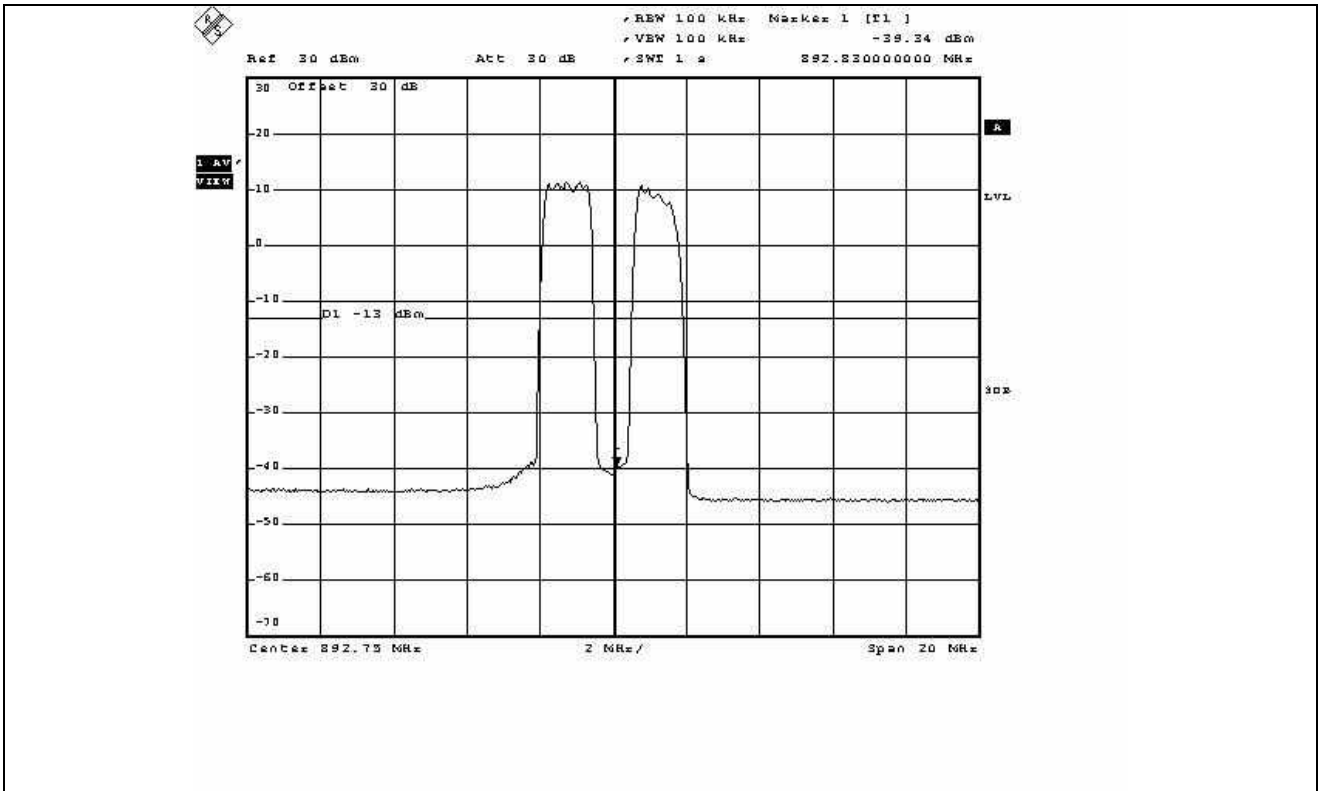


CDMA – Low Channel



CDMA – Low Channel





CDMA – High Channel



CDMA – High Channel

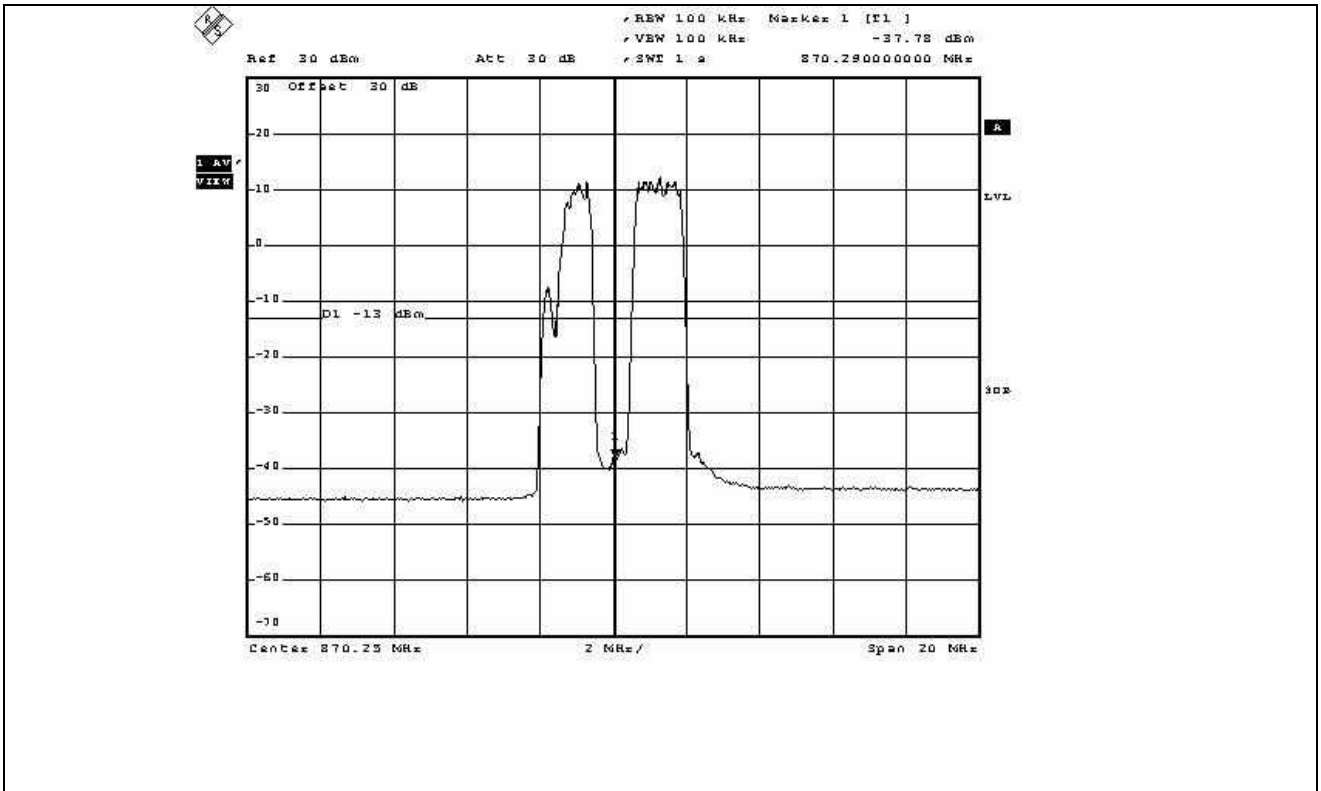
It should not be reproduced except in full, without the written approval of ONETECH.

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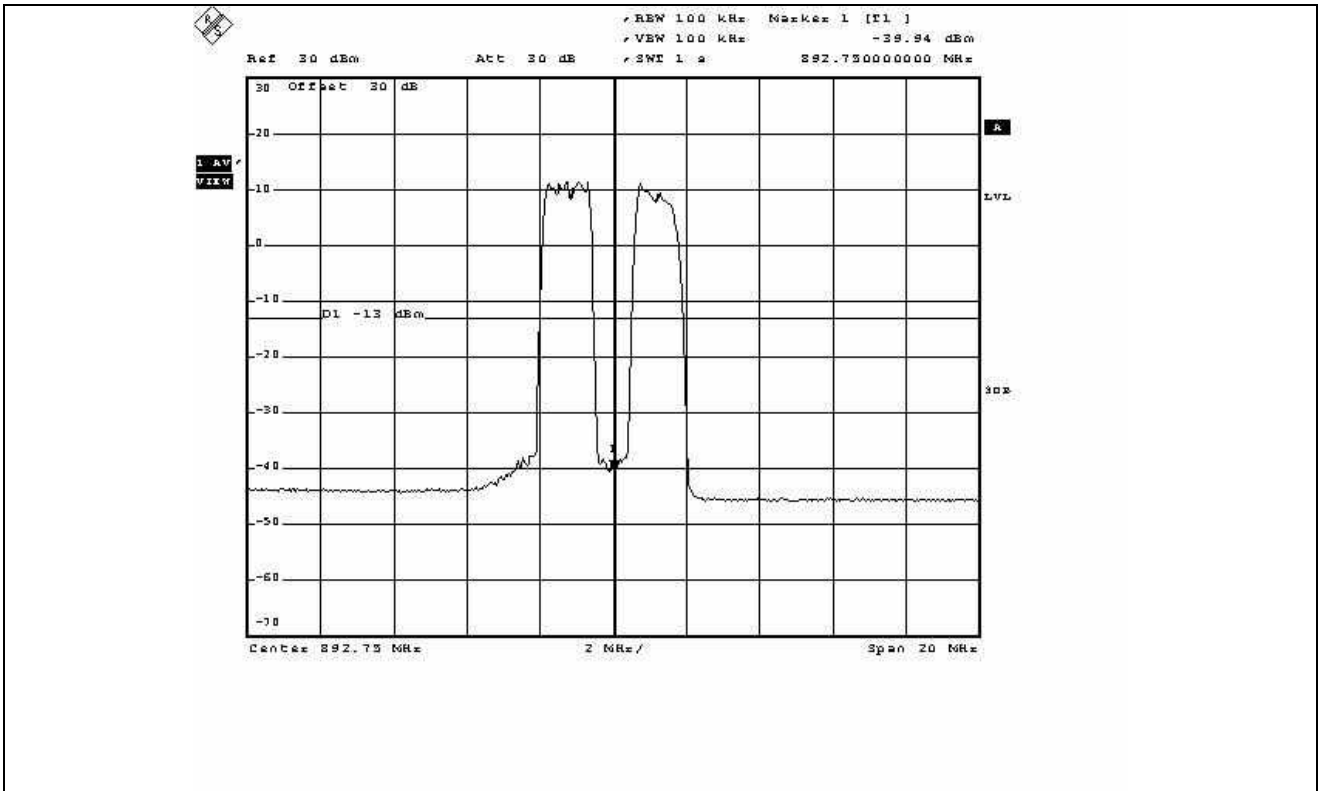
1xEVDO – Low Channel



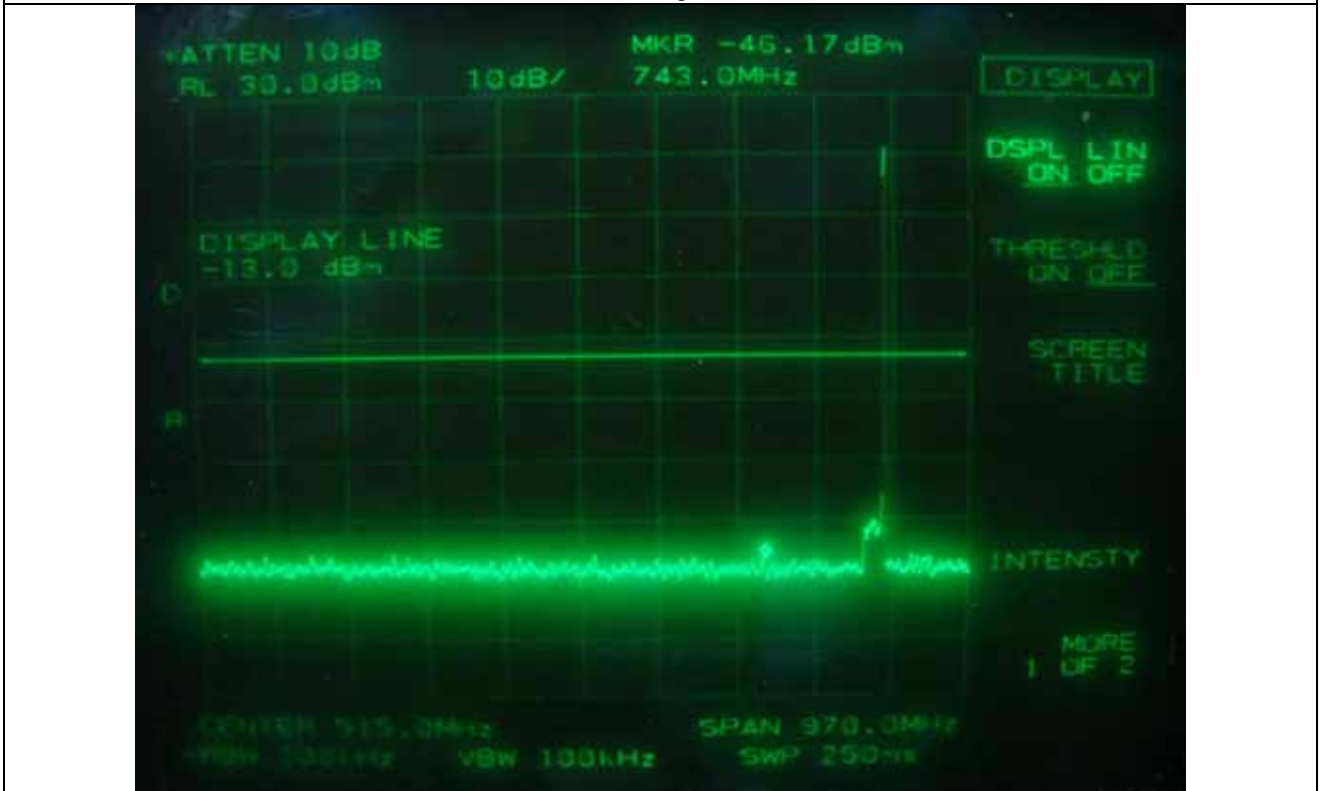
1xEVDO – Low Channel



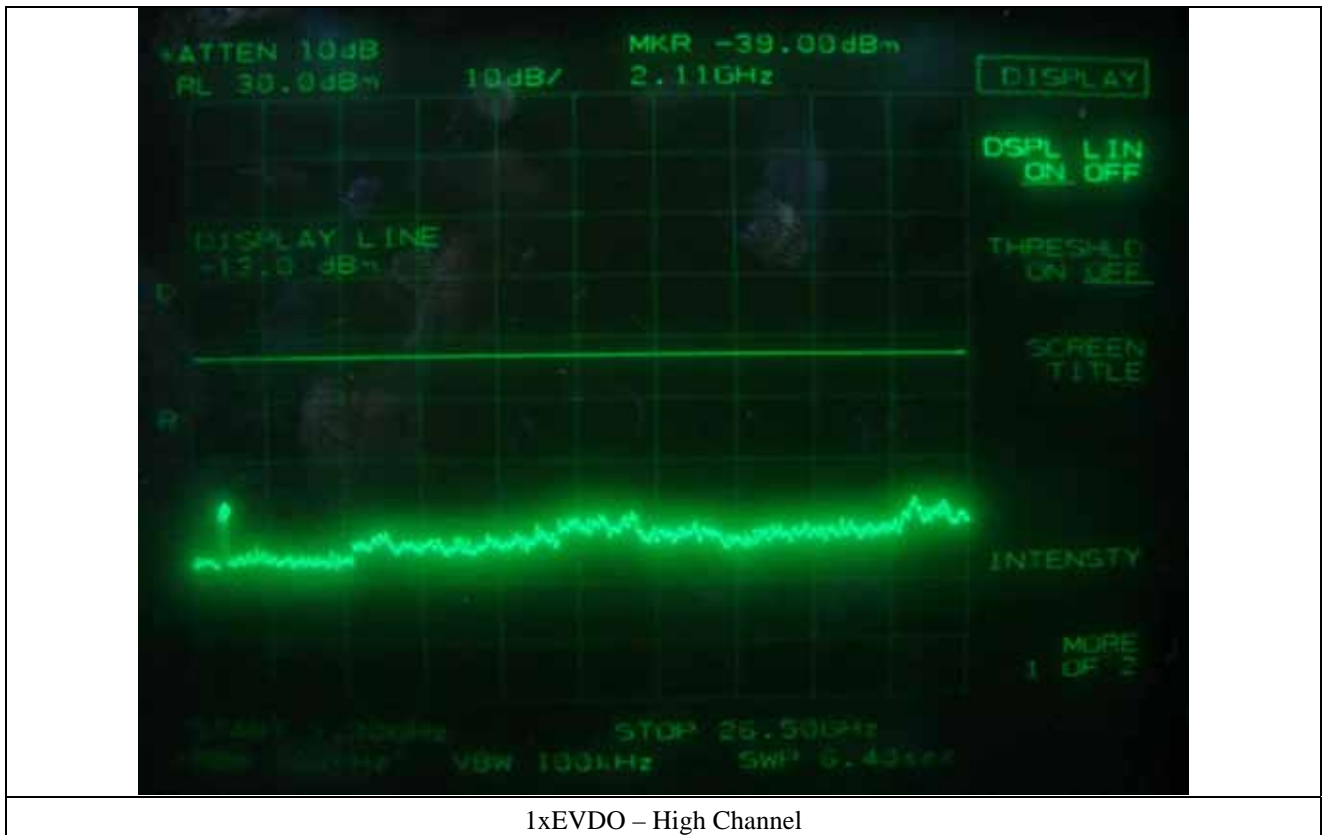
1xEVDO - Low Channel



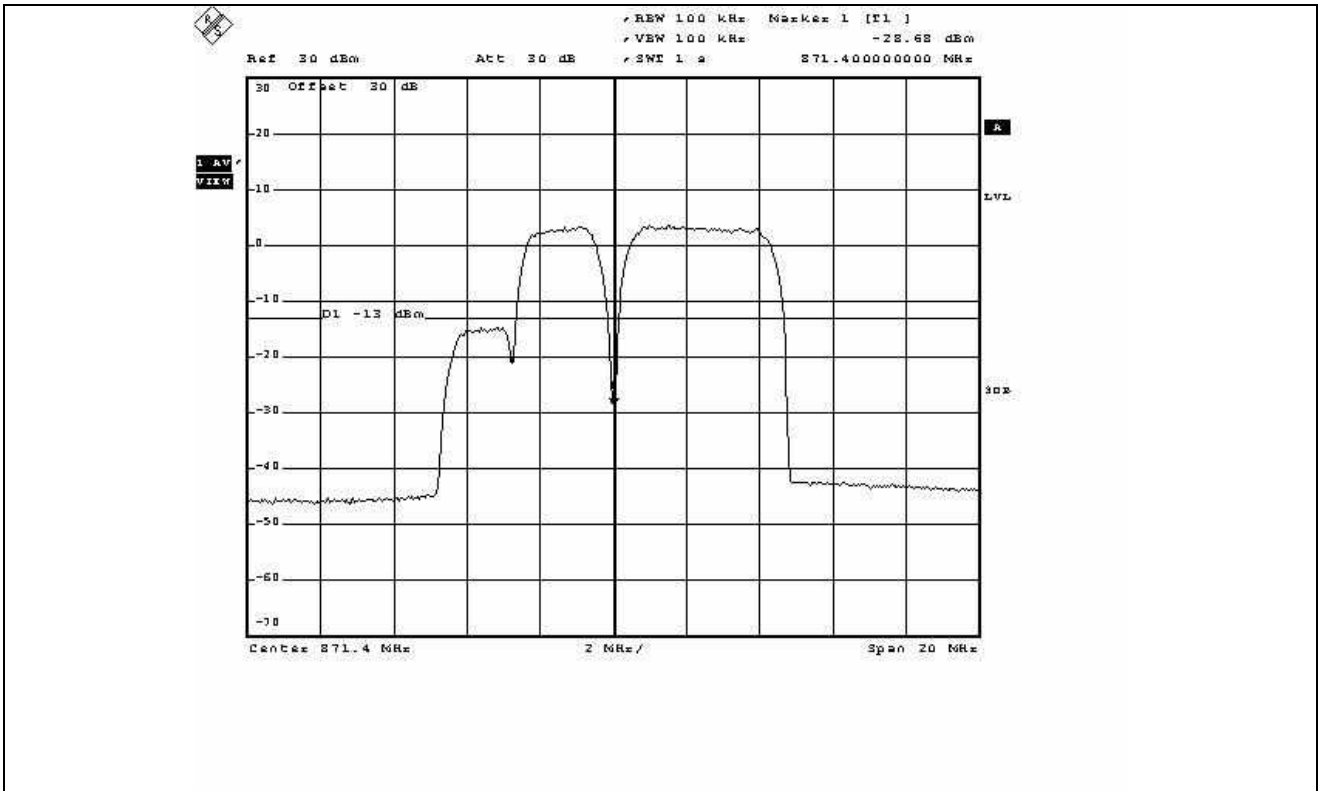
1xEVDO – High Channel



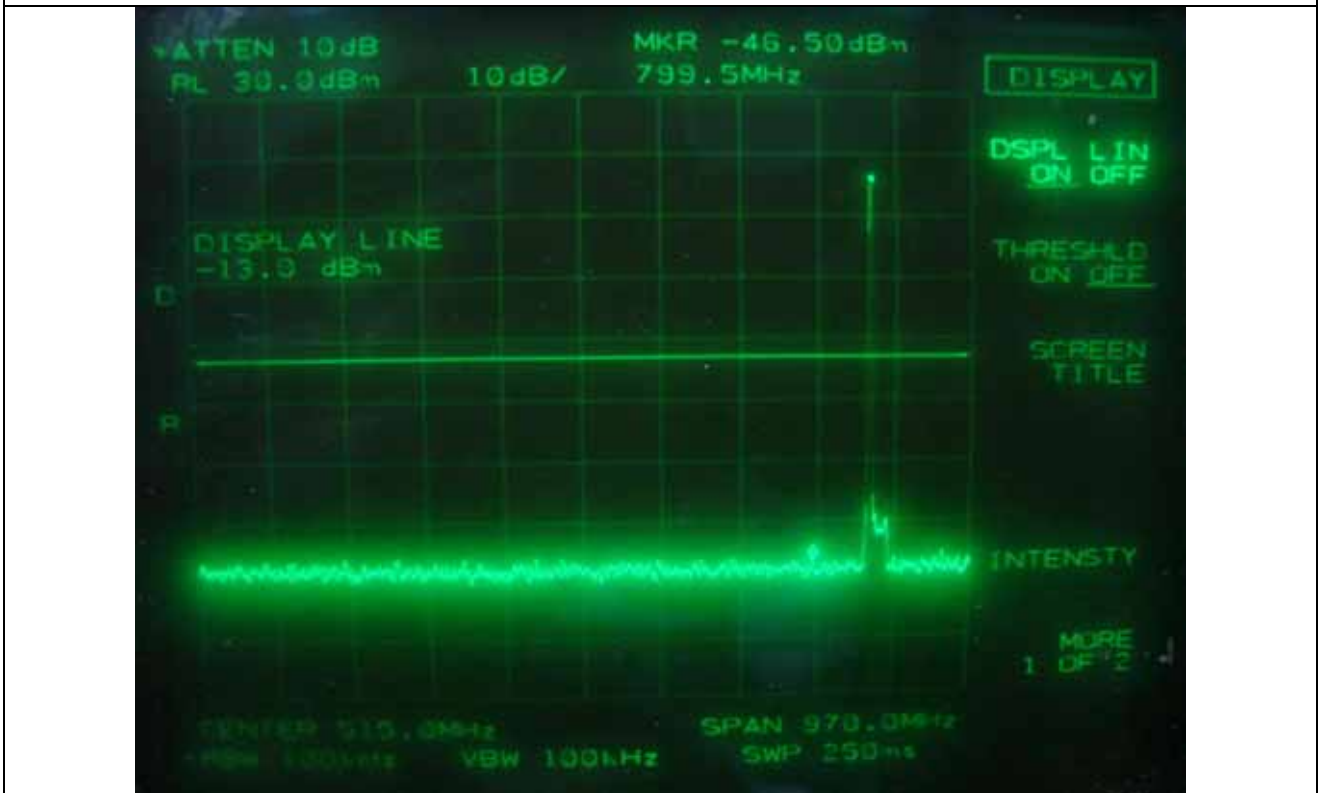
1xEVDO – High Channel



1xEVDO – High Channel

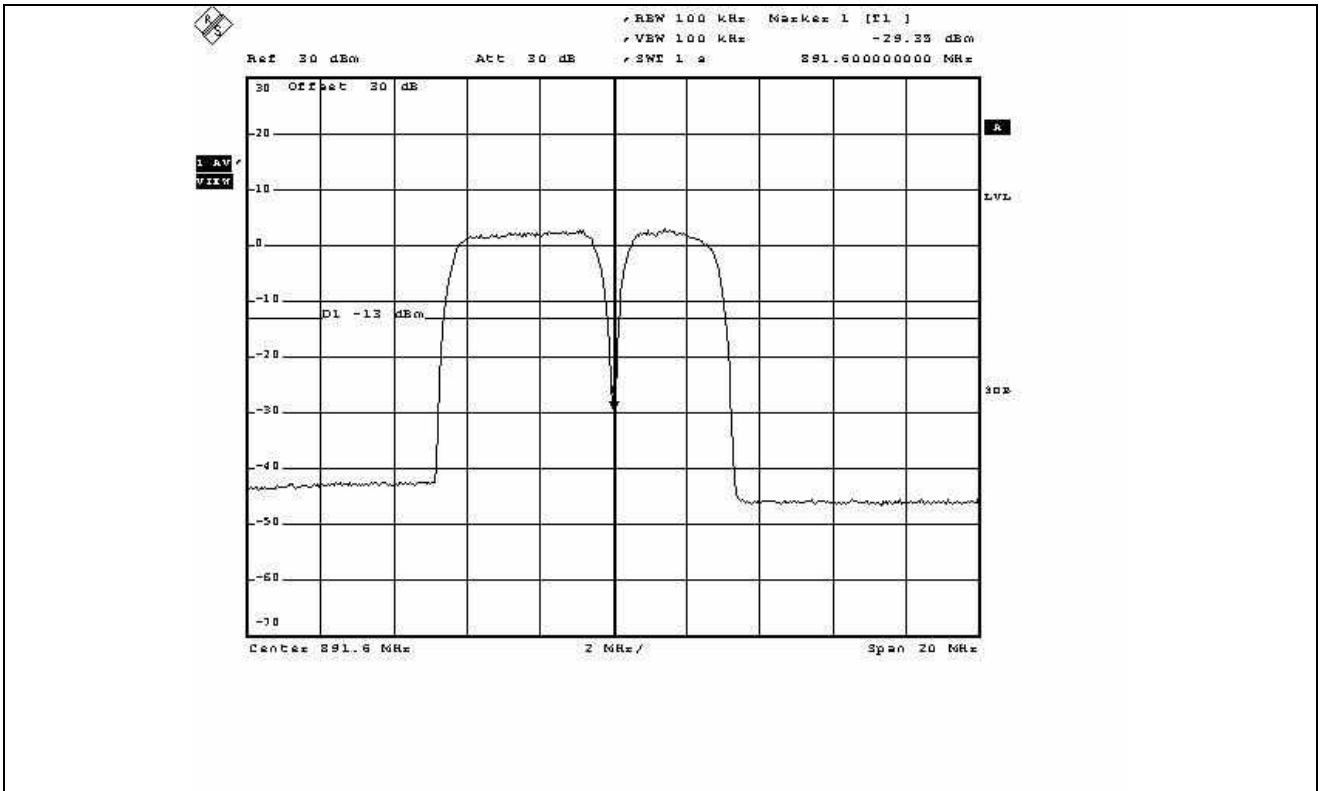


WCDMA – Low Channel

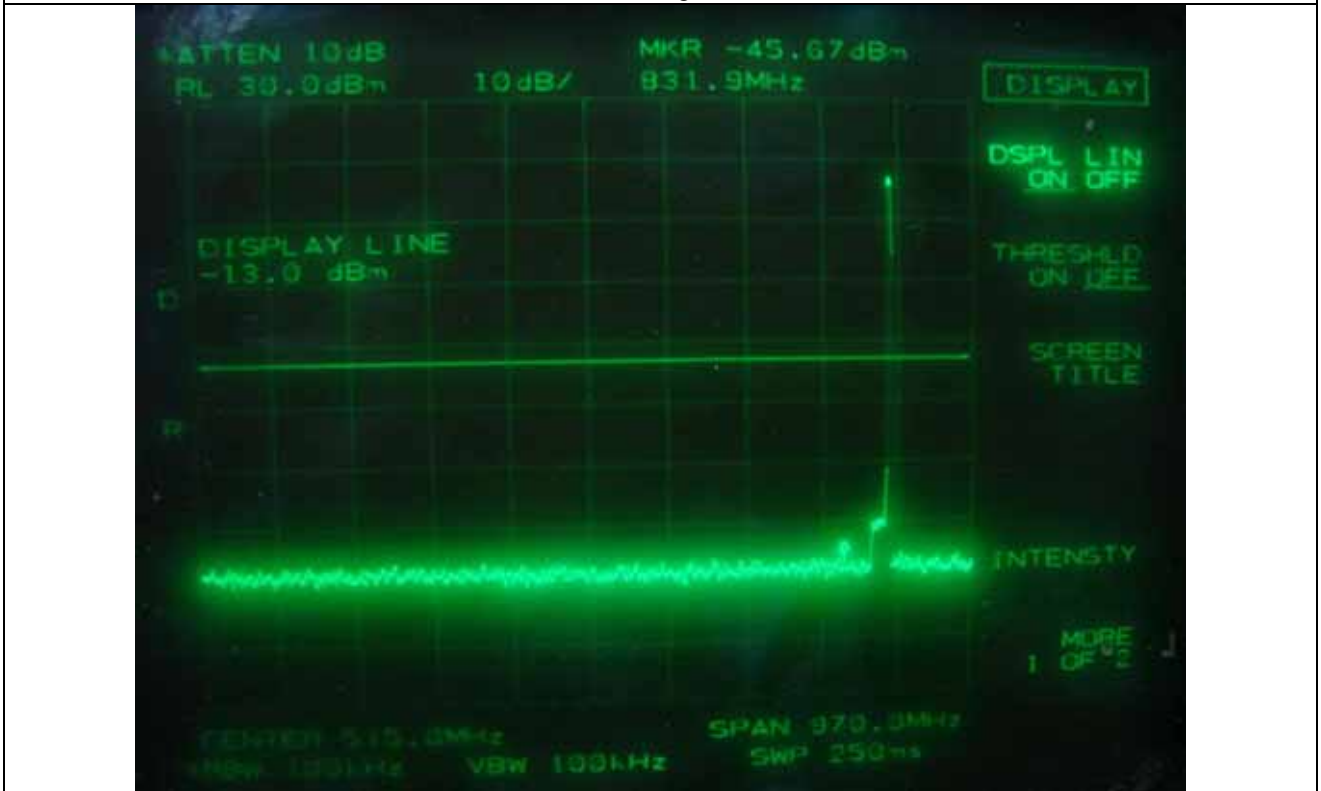


WCDMA – Low Channel





WCDMA – High Channel



WCDMA – High Channel



10. FIELD STRENGTH OF SPURIOUS RADIATION

10.1 Operating environment

Temperature : 12.8 °C
Relative humidity : 40 %R.H.

10.2 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 30 MHz 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.
■ - ESVD	Rohde & Schwarz	EMI Test Receiver	838453/018	Nov. 06, 2008
■ - 8564E	Hewlett-Packard	Spectrum Analyzer	3650A00756	June 16, 2008
■ - 83051A	Agilent	Preamplifier	3950M00201	June 16, 2008
■ - E4432B	Hewlett-Packard	Signal Generator	US38440950	June 16, 2008
■ - 83650L	Hewlett-Packard	Signal Generator	3844A00415	June 16, 2008
■ - BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D294	July 03, 2006(3Y)
■ - BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	July 04, 2006(3Y)
■ - SMJ100A	R/S	Vecter Signal Generator	100698	June 16, 2008
■ - FSP	R/S	Spectrum Analyzer	100017	Mar. 11, 2008

All test equipment used is calibrated on a regular basis.

10.4 Test data for radiated emission

10.4.1 Test result with AC 120V Power Supply

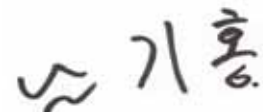
10.4.1.1 Modulated Input Signal: TDMA

- . Test Date : March 09, 2009
- . Resolution bandwidth : 1 MHz
- . Video bandwidth : 1 MHz
- . Frequency range : 1 GHz ~ 20 GHz
- . Measurement distance : 3 m
- . Result : PASSED BY -44.99 dB at 100.10 MHz

Frequency (MHz)	Spectrum Reading (dBμV)	Generator Reading (dBm)	Ant. Gain (dBi)	Ant. Pol. (H/V)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
Test Data for Low Channel								
869.03	61.00	-4.67	-0.18	H	1.62	-6.47	-	-
	61.12	-3.71		V		-5.51	-	-
Test Data for Middle Channel								
881.50	61.20	-4.59	-0.36	H	1.64	-6.59	-	-
	61.33	-3.26		V		-5.26	-	-
Test Data for High Channel								
893.97	61.17	-4.53	-0.53	H	1.66	-6.72	-	-
	61.10	-3.70		V		-5.89	-	-
100.10	26.22	-59.26	1.60	V	0.33	-57.99	-13.00	-44.99
110.40	24.64	-61.19	1.55	H	0.33	-59.31	-13.00	-46.31
262.20	22.40	-62.53	1.66	H	0.50	-60.37	-13.00	-47.37
858.10	23.72	-63.15	0.03	V	0.67	-62.45	-13.00	-49.45

Tabulated test data for Restricted Band

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



Tested by: Ki-Hong, Nam / Project Engineer

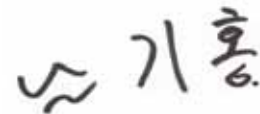
10.4.1.2 Modulated Input Signal: GSM

- . Test Date : March 09, 2009
- . Resolution bandwidth : 1 MHz
- . Video bandwidth : 1 MHz
- . Frequency range : 1 GHz ~ 20 GHz
- . Measurement distance : 3 m
- . Result : PASSED BY -44.88 dB at 100.10 MHz

Frequency (MHz)	Spectrum Reading (dBμV)	Generator Reading (dBm)	Ant. Gain (dBi)	Ant. Pol. (H/V)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
Test Data for Low Channel								
869.20	61.33	-4.34	-0.19	H	1.62	-6.15	-	-
	61.50	-3.33		V		-5.14	-	-
Test Data for Middle Channel								
881.60	61.27	-4.52	-0.36	H	1.64	-6.52	-	-
	61.42	-3.17		V		-5.17	-	-
Test Data for High Channel								
893.80	61.48	-4.22	-0.52	H	1.66	-6.40	-	-
	61.67	-3.13		V		-5.31	-	-
100.10	26.33	-59.15	1.60	V	0.33	-57.88	-13.00	-44.88
110.40	24.50	-61.33	1.55	H	0.33	-60.11	-13.00	-47.11
262.20	22.72	-62.21	1.66	H	0.50	-61.05	-13.00	-48.05
858.10	23.83	-63.04	0.03	V	0.67	-63.68	-13.00	-50.68

Tabulated test data for Restricted Band

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



Tested by: Ki-Hong, Nam / Project Engineer

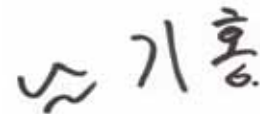
10.4.1.3 Modulated Input Signal: EDGE

- . Test Date : March 09, 2009
- . Resolution bandwidth : 1 MHz
- . Video bandwidth : 1 MHz
- . Frequency range : 1 GHz ~ 20 GHz
- . Measurement distance : 3 m
- . Result : PASSED BY -44.96 dB at 100.10 MHz

Frequency (MHz)	Spectrum Reading (dBμV)	Generator Reading (dBm)	Ant. Gain (dBi)	Ant. Pol. (H/V)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
Test Data for Low Channel								
869.20	61.17	-4.50	-0.19	H	1.62	-6.31	-	-
	61.33	-3.50		V		-5.31	-	-
Test Data for Middle Channel								
881.60	61.52	-4.27	-0.36	H	1.64	-6.27	-	-
	61.64	-2.95		V		-4.95	-	-
Test Data for High Channel								
893.80	61.27	-4.43	-0.52	H	1.66	-6.61	-	-
	61.48	-3.32		V		-5.50	-	-
100.10	26.25	-59.23	1.60	V	0.33	-57.96	-13.00	-44.96
110.40	24.33	-61.50	1.55	H	0.33	-60.28	-13.00	-47.28
262.20	22.83	-62.10	1.66	H	0.50	-60.94	-13.00	-47.94
858.10	23.53	-63.34	0.03	V	0.67	-63.98	-13.00	-50.98

Tabulated test data for Restricted Band

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



Tested by: Ki-Hong, Nam / Project Engineer

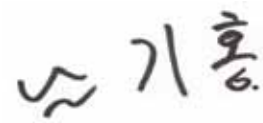
10.4.1.4 Modulated Input Signal: CDMA

- . Test Date : March 09, 2009
- . Resolution bandwidth : 1 MHz
- . Video bandwidth : 1 MHz
- . Frequency range : 1 GHz ~ 20 GHz
- . Measurement distance : 3 m
- . Result : PASSED BY -44.73 dB at 100.10 MHz

Frequency (MHz)	Spectrum Reading (dBμV)	Generator Reading (dBm)	Ant. Gain (dBi)	Ant. Pol. (H/V)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
Test Data for Low Channel								
870.25	61.27	-4.40	-0.20	H	1.62	-6.22	-	-
	61.48	-3.35		V		-5.17	-	-
Test Data for Middle Channel								
881.50	61.10	-4.69	-0.36	H	1.64	-6.69	-	-
	61.33	-3.26		V		-5.26	-	-
Test Data for High Channel								
892.75	61.57	-4.13	-0.51	H	1.66	-6.30	-	-
	61.72	-3.08		V		-5.25	-	-
100.10	26.48	-59.00	1.60	V	0.33	-57.73	-13.00	-44.73
110.40	24.73	-61.10	1.55	H	0.33	-59.88	-13.00	-46.88
262.20	22.55	-62.38	1.66	H	0.50	-61.22	-13.00	-48.22
858.10	23.48	-63.39	0.03	V	0.67	-64.03	-13.00	-51.03

Tabulated test data for Restricted Band

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



Tested by: Ki-Hong, Nam / Project Engineer

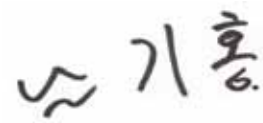
10.4.1.5 Modulated Input Signal: 1xEVDO

- . Test Date : March 09, 2009
- . Resolution bandwidth : 1 MHz
- . Video bandwidth : 1 MHz
- . Frequency range : 1 GHz ~ 20 GHz
- . Measurement distance : 3 m
- . Result : PASSED BY -44.88 dB at 100.10 MHz

Frequency (MHz)	Spectrum Reading (dBμV)	Generator Reading (dBm)	Ant. Gain (dBi)	Ant. Pol. (H/V)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
Test Data for Low Channel								
870.25	61.33	-4.34	-0.20	H	1.62	-6.16	-	-
	61.50	-3.33		V		-5.15	-	-
Test Data for Middle Channel								
881.50	61.23	-4.56	-0.36	H	1.64	-6.56	-	-
	61.46	-3.13		V		-5.13	-	-
Test Data for High Channel								
892.75	61.56	-4.14	-0.51	H	1.66	-6.31	-	-
	61.79	-3.01		V		-5.18	-	-
100.10	26.33	-59.15	1.60	V	0.33	-57.88	-13.00	-44.88
110.40	24.50	-61.33	1.55	H	0.33	-60.11	-13.00	-47.11
262.20	22.38	-62.55	1.66	H	0.50	-61.39	-13.00	-48.39
858.10	23.44	-63.43	0.03	V	0.67	-64.07	-13.00	-51.07

Tabulated test data for Restricted Band

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



Tested by: Ki-Hong, Nam / Project Engineer

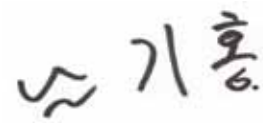
10.4.1.6 Modulated Input Signal: WCDMA

- . Test Date : March 09, 2009
- . Resolution bandwidth : 1 MHz
- . Video bandwidth : 1 MHz
- . Frequency range : 1 GHz ~ 20 GHz
- . Measurement distance : 3 m
- . Result : PASSED BY -44.94 dB at 100.10 MHz

Frequency (MHz)	Spectrum Reading (dBμV)	Generator Reading (dBm)	Ant. Gain (dBi)	Ant. Pol. (H/V)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
Test Data for Low Channel								
871.40	61.17	-4.50	-0.22	H	1.62	-6.34	-	-
	61.35	-3.48		V		-5.32	-	-
Test Data for Middle Channel								
881.00	61.62	-4.17	-0.35	H	1.64	-6.16	-	-
	61.83	-2.76		V		-4.75	-	-
Test Data for High Channel								
891.60	61.24	-4.46	-0.49	H	1.66	-6.61	-	-
	61.50	-3.30		V		-5.45	-	-
100.10	26.27	-59.21	1.60	V	0.33	-57.94	-13.00	-44.94
110.40	24.83	-61.00	1.55	H	0.33	-59.78	-13.00	-46.78
262.20	22.50	-62.43	1.66	H	0.50	-61.27	-13.00	-48.27
858.10	23.67	-63.20	0.03	V	0.67	-63.84	-13.00	-50.84

Tabulated test data for Restricted Band

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



Tested by: Ki-Hong, Nam / Project Engineer

10.4.2 Test result with DC - 48 V Power Supply

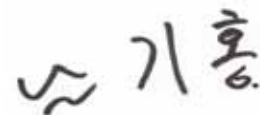
10.4.2.1 Modulated Input Signal: TDMA

- . Test Date : March 09, 2009
- . Resolution bandwidth : 1 MHz
- . Video bandwidth : 1 MHz
- . Frequency range : 1 GHz ~ 20 GHz
- . Measurement distance : 3 m
- . Result : PASSED BY -44.42 dB at 100.10 MHz

Frequency (MHz)	Spectrum Reading (dBμV)	Generator Reading (dBm)	Ant. Gain (dBi)	Ant. Pol. (H/V)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
Test Data for Low Channel								
869.03	61.33	-4.34	-0.18	H	1.62	-6.14	-	-
	61.78	-30.05		V		-31.85	-	-
Test Data for Middle Channel								
881.50	61.50	-4.29	-0.36	H	1.64	-6.29	-	-
	61.89	-2.70		V		-4.70	-	-
Test Data for High Channel								
893.97	61.24	-4.46	-0.53	H	1.66	-6.65	-	-
	61.48	-3.32		V		-5.51	-	-
100.10	26.33	-59.15	1.60	V	0.33	-57.88	-13.00	-44.88
110.40	24.78	-61.05	1.55	H	0.33	-59.83	-13.00	-46.83
262.20	22.67	-62.26	1.66	H	0.50	-61.10	-13.00	-48.10
858.10	23.25	-63.62	0.03	V	0.67	-64.26	-13.00	-51.26

Tabulated test data for Restricted Band

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



Tested by: Ki-Hong, Nam / Project Engineer

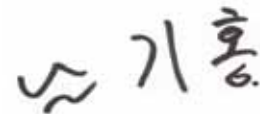
10.4.2.2 Modulated Input Signal: GSM

- . Test Date : March 09, 2009
- . Resolution bandwidth : 1 MHz
- . Video bandwidth : 1 MHz
- . Frequency range : 1 GHz ~ 20 GHz
- . Measurement distance : 3 m
- . Result : PASSED BY -44.79 dB at 100.10 MHz

Frequency (MHz)	Spectrum Reading (dBμV)	Generator Reading (dBm)	Ant. Gain (dBi)	Ant. Pol. (H/V)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
Test Data for Low Channel								
869.20	61.24	-4.43	-0.19	H	1.62	-6.24	-	-
	61.46	-3.37		V		-5.18	-	-
Test Data for Middle Channel								
881.60	61.33	-4.46	-0.36	H	1.64	-6.46	-	-
	61.52	-3.07		V		-5.07	-	-
Test Data for High Channel								
893.80	61.27	-4.43	-0.52	H	1.66	-6.61	-	-
	61.63	-3.17		V		-5.35	-	-
100.10	26.42	-59.06	1.60	V	0.33	-57.79	-13.00	-44.79
110.40	24.56	-61.27	1.55	H	0.33	-60.05	-13.00	-47.05
262.20	22.50	-62.43	1.66	H	0.50	-61.27	-13.00	-48.27
858.10	23.67	-63.20	0.03	V	0.67	-63.84	-13.00	-50.84

Tabulated test data for Restricted Band

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



Tested by: Ki-Hong, Nam / Project Engineer

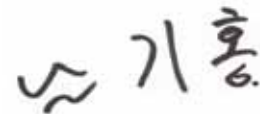
10.4.2.3 Modulated Input Signal: EDGE

- . Test Date : March 09, 2009
- . Resolution bandwidth : 1 MHz
- . Video bandwidth : 1 MHz
- . Frequency range : 1 GHz ~ 20 GHz
- . Measurement distance : 3 m
- . Result : PASSED BY -44.99 dB at 100.10 MHz

Frequency (MHz)	Spectrum Reading (dBμV)	Generator Reading (dBm)	Ant. Gain (dBi)	Ant. Pol. (H/V)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
Test Data for Low Channel								
869.20	61.56	-4.11	-0.19	H	1.62	-5.92	-	-
	61.72	-3.11		V		-4.92	-	-
Test Data for Middle Channel								
881.60	61.43	-4.36	-0.36	H	1.64	-6.36	-	-
	61.78	-2.81		V		-4.81	-	-
Test Data for High Channel								
893.80	61.39	-4.31	-0.52	H	1.66	-6.49	-	-
	61.57	-3.23		V		-5.41	-	-
100.10	26.22	-59.26	1.60	V	0.33	-57.99	-13.00	-44.99
110.40	24.50	-61.33	1.55	H	0.33	-60.11	-13.00	-47.11
262.20	22.83	-62.10	1.66	H	0.50	-60.94	-13.00	-47.94
858.10	23.42	-63.45	0.03	V	0.67	-64.09	-13.00	-51.09

Tabulated test data for Restricted Band

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



Tested by: Ki-Hong, Nam / Project Engineer

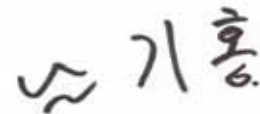
10.4.2.4 Modulated Input Signal: CDMA

- . Test Date : March 09, 2009
- . Resolution bandwidth : 1 MHz
- . Video bandwidth : 1 MHz
- . Frequency range : 1 GHz ~ 20 GHz
- . Measurement distance : 3 m
- . Result : PASSED BY -44.61 dB at 100.10 MHz

Frequency (MHz)	Spectrum Reading (dBμV)	Generator Reading (dBm)	Ant. Gain (dBi)	Ant. Pol. (H/V)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
Test Data for Low Channel								
870.25	61.28	-4.39	-0.20	H	1.62	-6.21	-	-
	61.43	-3.40		V		-5.22	-	-
Test Data for Middle Channel								
881.50	61.50	-4.29	-0.36	H	1.64	-6.29	-	-
	61.66	-2.93		V		-4.93	-	-
Test Data for High Channel								
892.75	61.35	-4.35	-0.51	H	1.66	-6.52	-	-
	61.49	-3.31		V		-5.48	-	-
100.10	26.17	-59.31	1.60	V	0.33	-58.04	-13.00	-45.04
110.40	24.33	-61.50	1.55	H	0.33	-60.28	-13.00	-47.28
262.20	22.78	-62.15	1.66	H	0.50	-60.99	-13.00	-47.99
858.10	23.33	-63.54	0.03	V	0.67	-64.18	-13.00	-51.18

Tabulated test data for Restricted Band

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



Tested by: Ki-Hong, Nam / Project Engineer

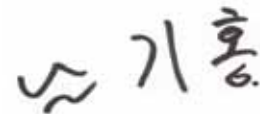
10.4.2.5 Modulated Input Signal: 1xEVDO

- . Test Date : March 09, 2009
- . Resolution bandwidth : 1 MHz
- . Video bandwidth : 1 MHz
- . Frequency range : 1 GHz ~ 20 GHz
- . Measurement distance : 3 m
- . Result : PASSED BY -44.87 dB at 100.10 MHz

Frequency (MHz)	Spectrum Reading (dBμV)	Generator Reading (dBm)	Ant. Gain (dBi)	Ant. Pol. (H/V)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
Test Data for Low Channel								
870.25	61.45	-4.22	-0.20	H	1.62	-6.04	-	-
	61.78	-3.05		V		-4.87	-	-
Test Data for Middle Channel								
881.50	61.34	-4.45	-0.36	H	1.64	-6.45	-	-
	61.51	-3.08		V		-5.08	-	-
Test Data for High Channel								
892.75	61.54	-4.16	-0.51	H	1.66	-6.33	-	-
	61.69	-3.11		V		-5.28	-	-
100.10	26.34	-59.14	1.60	V	0.33	-57.87	-13.00	-44.87
110.40	24.69	-61.14	1.55	H	0.33	-59.92	-13.00	-46.92
262.20	22.55	-62.38	1.66	H	0.50	-61.22	-13.00	-48.22
858.10	23.73	-63.14	0.03	V	0.67	-63.78	-13.00	-50.78

Tabulated test data for Restricted Band

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



Tested by: Ki-Hong, Nam / Project Engineer

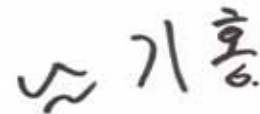
10.4.2.6 Modulated Input Signal: WCDMA

- . Test Date : March 09, 2009
- . Resolution bandwidth : 1 MHz
- . Video bandwidth : 1 MHz
- . Frequency range : 1 GHz ~ 20 GHz
- . Measurement distance : 3 m
- . Result : PASSED BY -44.71 dB at 100.10 MHz

Frequency (MHz)	Spectrum Reading (dBμV)	Generator Reading (dBm)	Ant. Gain (dBi)	Ant. Pol. (H/V)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
Test Data for Low Channel								
871.40	61.24	-4.43	-0.22	H	1.62	-6.27	-	-
	61.39	-3.44		V		-5.28	-	-
Test Data for Middle Channel								
881.00	61.19	-4.60	-0.35	H	1.64	-6.59	-	-
	61.35	-3.24		V		-5.23	-	-
Test Data for High Channel								
891.60	61.56	-4.14	-0.49	H	1.66	-6.29	-	-
	61.72	-3.08		V		-5.23	-	-
100.10	26.50	-58.98	1.60	V	0.33	-57.71	-13.00	-44.71
110.40	24.83	-61.00	1.55	H	0.33	-59.78	-13.00	-46.78
262.20	22.48	-62.45	1.66	H	0.50	-61.29	-13.00	-48.29
858.10	23.83	-63.04	0.03	V	0.67	-63.68	-13.00	-50.68

Tabulated test data for Restricted Band

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



Tested by: Ki-Hong, Nam / Project Engineer

11. FREQUENCY STABILITY WITH TEMPERATURE VARIATION

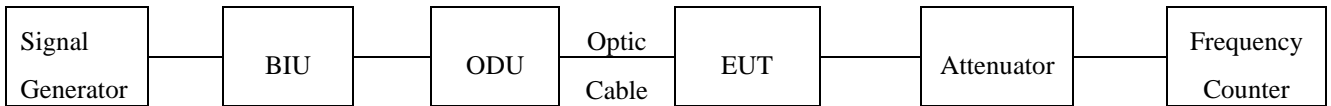
11.1 Operating environment

Temperature : 22.5 °C
Relative humidity : 48 %R.H.

11.2 Test set-up

The RF signal from the signal generator(s) was injected to BIU (BTS Interface Unit) and then output signal from the BIU was injected to the input of ODU (Optic Distribution Unit) by coaxial cable and then the output port of the ODU was connected to the input of the EUT by optic cable. The amplified RF signal at the output of the EUT was connected to the spectrum analyzer. The test was performed at three frequencies (low, middle, and high channels) at each band using all applicable modulation.

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.



11.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	June 16, 2008
■ -	53152A	HP	Frequency Counter	US39270295	Dec. 05, 2008
■ -	RO-23	Samkun	Chamber	-	Aug. 12, 2008
■ -	SMJ100A	R/S	Vecter Signal Generator	100698	June 16, 2008
■ -	FSP	R/S	Spectrum Analyzer	100017	Mar. 11, 2008

All test equipment used is calibrated on a regular basis.

11.4 Test data

11.4.1 Test Result with AC 120 V Power Supply

-. Test Date : March 04~05, 2009

-. Result : PASSED

Temperature (°C)	Input Freq. (Hz)	Measured Freq. (Hz)	Result (PPM)	Limit
-30	881 500 000	881 500 030	0.034 0	Within the Authorized Frequency block
-20		881 500 029	0.032 9	
-10		881 500 029	0.032 9	
0		881 500 030	0.034 0	
10		881 500 028	0.031 8	
20		881 500 029	0.032 9	
30		881 500 030	0.034 0	
40		881 500 031	0.035 2	
50		881 500 029	0.032 9	

남기홍

Tested by: Ki-Hong, Nam / Project Engineer

11.4.2 Test Result with DC - 48 V Power Supply

-. Test Date : March 04~05, 2009
-. Result : PASSED

Temperature (°C)	Input Freq. (Hz)	Measured Freq. (Hz)	Result (PPM)	Limit
-30	881 500 000	881 500 030	0.034 0	Within the Authorized Frequency block
-20		881 500 031	0.035 2	
-10		881 500 029	0.032 9	
0		881 500 030	0.034 0	
10		881 500 028	0.031 8	
20		881 500 031	0.035 2	
30		881 500 030	0.034 0	
40		881 500 028	0.031 8	
50		881 500 030	0.034 0	

스기홍

Tested by: Ki-Hong, Nam / Project Engineer

12. FREQUENCY STABILITY WITH VOLTAGE VARIATION

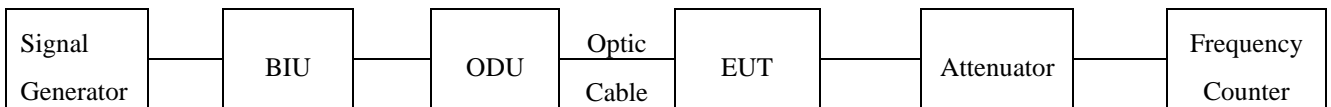
12.1 Operating environment

Temperature : 22.5 °C
Relative humidity : 48 %R.H.

12.2 Test set-up

The RF signal from the signal generator(s) was injected to BIU (BTS Interface Unit) and then output signal from the BIU was injected to the input of ODU (Optic Distribution Unit) by coaxial cable and then the output port of the ODU was connected to the input of the EUT by optic cable. The amplified RF signal at the output of the EUT was connected to the spectrum analyzer. The test was performed at three frequencies (low, middle, and high channels) at each band using all applicable modulation.

The RF output port of the EUT was connected to the input of the spectrum analyzer. The signal generator was set to center frequency for each band with an un-modulated 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.



12.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	June 16, 2008
■ -	53152A	HP	Frequency Counter	US39270295	Dec. 05, 2008
■ -	2350A	HP	30 dB Attenuator Assembly	2350A03133	June 16, 2008
■ -	SMJ100A	R/S	Vecter Signal Generator	100698	June 16, 2008
■ -	FSP	R/S	Spectrum Analyzer	100017	Mar. 11, 2008

All test equipment used is calibrated on a regular basis.

12.4 Test data

12.4.1 Test Result with AC 120 V Power Supply

- Test Date : March 04~05, 2009
- Rated Supply Voltage : 120 Vac
- Result : PASSED

Voltage (Vac)	Input Freq. (Hz)	Measured Freq. (Hz)	Result (PPM)	Limit
138 (115 %)	881 500 000	881 500 028	0.031 8	Within the Authorized Frequency block
120 (100 %)		881 500 029	0.032 9	
102 (85 %)		881 500 029	0.032 9	

기홍

Tested by: Ki-Hong, Nam / Project Engineer

12.4.2 Test Result with DC - 48 V Power Supply

- . Test Date : March 04~05, 2009
- . Rated Supply Voltage : - 48 Vdc
- . Result : PASSED

Voltage (Vdc)	Input Freq. (Hz)	Measured Freq. (Hz)	Result (PPM)	Limit
- 55.2 (115 %)	881 500 000	881 500 028	0.031 8	Within the Authorized Frequency block
- 48 (100 %)		881 500 031	0.035 2	
- 40.8 (85 %)		881 500 030	0.034 0	

기홍

Tested by: Ki-Hong, Nam / Project Engineer