

# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR PCS LICENSED TRANSMITTER

**Test Report No.** : E126R-013  
**AGR No.** : A125A-116  
**Applicant** : SOLiD Technologies, Inc.  
**Address** : 110,9th Floor, SOLiD Space, Pangyoyeok-ro 220, Bundang-gu,  
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**Manufacturer** : SOLiD Inc.  
**Address** : 110,9th Floor, SOLiD Space, Pangyoyeok-ro 220, Bundang-gu,  
Seongnam-si, Gyeonggi-do, 463-400, Korea  
**Type of Equipment** : RDU MODULE (700LTEF/850C)  
**FCC ID.** : W6U700LTEF850C  
**Model Name** : RDU 700LTEF+850C  
**Serial number** : N/A  
**Total page of Report** : 129 pages (including this page)  
**Date of Incoming** : May 16, 2012  
**Date of issue** : June 08, 2012

## SUMMARY

The equipment complies with the regulation; **FCC Part 22 Subpart H and Part 27 Subpart C.**

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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## 1. VERIFICATION OF COMPLIANCE

APPLICANT : SOLiD Technologies, Inc.  
ADDRESS : 110,9th Floor, SOLiD Space, Pangyoyeok-ro 220, Bundang-gu, Seongnam-si, Gyeonggi-do, 463-400, Korea  
CONTACT PERSON : Mr. Kangyeob, Bae / Director  
TELEPHONE NO : +82-31-784-8557  
FCC ID : W6U700LTEF850C  
MODEL NAME : RDU 700LTEF850C  
SERIAL NUMBER : N/A  
DATE : June 08, 20122

EQUIPMENT CLASS	PCB - PCS Licensed Transmitter
EQUIPMENT DESCRIPTION	RDU MODULE (700LTEF/850C)
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.4: 2009, 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 and PART 27 Subpart C
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), 27.50(c)	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	Band Edge	Met the Limit / PASS
2.1051, 22.917, 27.53(c)	Spurious Emissions at Antenna Terminals	Met the Limit / PASS
2.1053, 22.917, 27.53(c)	Field strength of Spurious Radiation	Met the Limit / PASS
2.1055, 22.355, 27.54	Frequency Stability with Temperature variation	Met the requirement / PASS
2.1055, 22.355, 27.54	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 signal booster which reproduces the modulated input signal, which was received by optic cable, so the EUT meets the requirement.

Note2: 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: 2009 & EIA/TIA-603-C: 2004 and was performed at a distance of 3 m 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)

301-14, Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862, Korea. The Onetech Corp. has been accredited as a Conformity Assessment Body (CAB) with designation number KR0013.

### 3. GENERAL INFORMATION

#### 3.1 Product Description

The SOLiD Technologies, Inc., Model RDU 700LTEF+850C (referred to as the EUT in this report) is a RDU MODULE (700LTEF/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 RCPUs (Remote Central Processor Unit), a R-Optic (Remote Optic), a SIU (System Interface Unit) and a Multiplexer. The System, 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 700LTEF+850C, FCC ID:

W6U700LTEF850C 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 (700LTEF/850C)
LIST OF EACH OSC. or CRY. FREQ.(FREQ.>=1 MHz)		14.74 MHz
EMISSION DESIGNATOR		F9W(CDMA, EVDO, WCDMA), G7W(GSM, EDGE), D7W(LTE),
OPERATING FREQUENCY	850C	Tx: 869 MHz ~ 894 MHz, Rx: 824 MHz ~ 849 MHz
	700LTE_F	Tx: 728 MHz ~ 757 MHz, Rx: 698 ~ 716MHz / 777 ~ 787MHz
RF OUTPUT POWER		30 dBm
CHANNEL SEPARATION		GSM(200 kHz), EDGE(200 kHz), CDMA(1.25 MHz) EVDO(1.25 MHz), WCDMA(5 MHz), LTE(5 MHz, 10 MHz)
DC VOLTAGE & CURRENT INTO FINAL AMPLIFIER		DC 27 V, 2 A
ELECTRICAL RATING		AC 120 V, 0.97 A and DC -48 V, 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 700LTEF+850C	SOLiD Inc.	W6U700LTEF850C	RDU MODULE (700LTEF/850C) (EUT)	-
SMJ100A	Rohde & Schwarz	N/A	Signal Generator	EUT

### 3.4 Mode of operation during the test

The EUT was received signal form signal generator and then each modulation 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

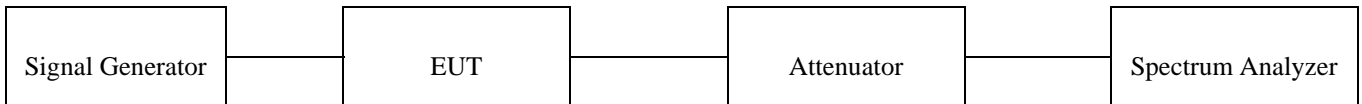
### 5.1 Operating environment

Temperature : 24 °C  
Relative humidity : 50 % R.H.

### 5.2 Test set-up

The RF signal from the signal generator(s) was injected to the EUT by 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 10, 2011 (1Y)
■ -	SMJ100A	R/S	Signal Generator	101038	Feb. 02, 2012 (1Y)
■ -	FSP	R/S	Spectrum Analyzer	100017	Mar. 12, 2012 (1Y)
□ -	8564E	HP	Spectrum Analyzer	3650A00756	Jun. 10, 2011 (1Y)
■ -	FSV30	R/S	Spectrum Analyzer	101372	Aug. 29, 2011 (1Y)
■ -	67-30-43	Aeroflex Weinschel	Power Attenuator	CA5760	Nov. 30, 2011 (1Y)

All test equipment used is calibrated on a regular basis.

**5.4 Test data**

**5.4.1 Test Result for Part 22 H**

-. Test Date : May 18, 2012

-. Test Result : Pass

Modulation	Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (W)
GSM	Low	869.20	-14.90	30.00	1.00	500.00
	Middle	881.60	-14.80	30.00		
	High	893.80	-14.90	30.00		
EDGE	Low	869.20	-14.70	30.00	1.00	500.00
	Middle	881.60	-14.90	30.00		
	High	893.80	-14.90	30.00		
CDMA	Low	870.25	-14.80	30.00	1.00	500.00
	Middle	881.50	-14.70	30.00		
	High	892.75	-14.80	30.00		
1xEVDO	Low	870.25	-14.90	30.00	1.00	500.00
	Middle	881.50	-14.70	30.00		
	High	892.75	-14.80	30.00		
WCDMA	Low	871.40	-14.90	30.00	1.00	500.00
	Middle	881.00	-14.80	30.00		
	High	891.60	-14.90	30.00		

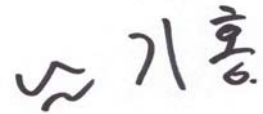


**Tested by: Ki-Hong, Nam / Project Engineer**

**5.4.2 Test Result for Part 27 C**

-. Test Date : May 16, 2012  
 -. Test Result : Pass

Modulation	Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (W)
LTE (5 MHz)	Low	730.50	-14.80	30.00	1.00	500.00
	Middle	742.50	-14.90	30.00		
	High	754.50	-14.80	30.00		
LTE (10 MHz)	Low	733.00	-14.70	30.00	1.00	500.00
	Middle	742.50	-14.90	30.00		
	High	752.00	-14.90	30.00		



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

## 6. OCCUPIED BANDWIDTH

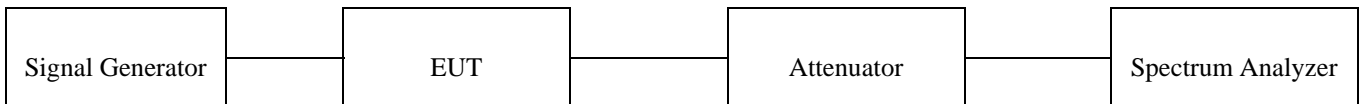
### 6.1 Operating environment

Temperature : 24 °C  
 Relative humidity : 50 % R.H.

### 6.2 Test set-up

The RF signal from the signal generator(s) was injected to the EUT by 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.
■ -	E4432B	HP	Signal Generator	US38440950	June 10, 2011 (1Y)
■ -	SMJ100A	R/S	Signal Generator	101038	Feb. 02, 2012 (1Y)
■ -	FSP	R/S	Spectrum Analyzer	100017	Mar. 12, 2012 (1Y)
□ -	8564E	HP	Spectrum Analyzer	3650A00756	Jun. 10, 2011 (1Y)
■ -	FSV30	R/S	Spectrum Analyzer	101372	Aug. 29, 2011 (1Y)
■ -	67-30-43	Aeroflex Weinschel	Power Attenuator	CA5760	Nov. 30, 2011 (1Y)

All test equipment used is calibrated on a regular basis.

## 6.4 Test data

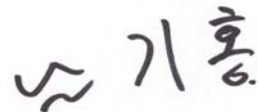
### 6.4.1 Test Result for Part 22 H

-. Test Date : May 18, 2012

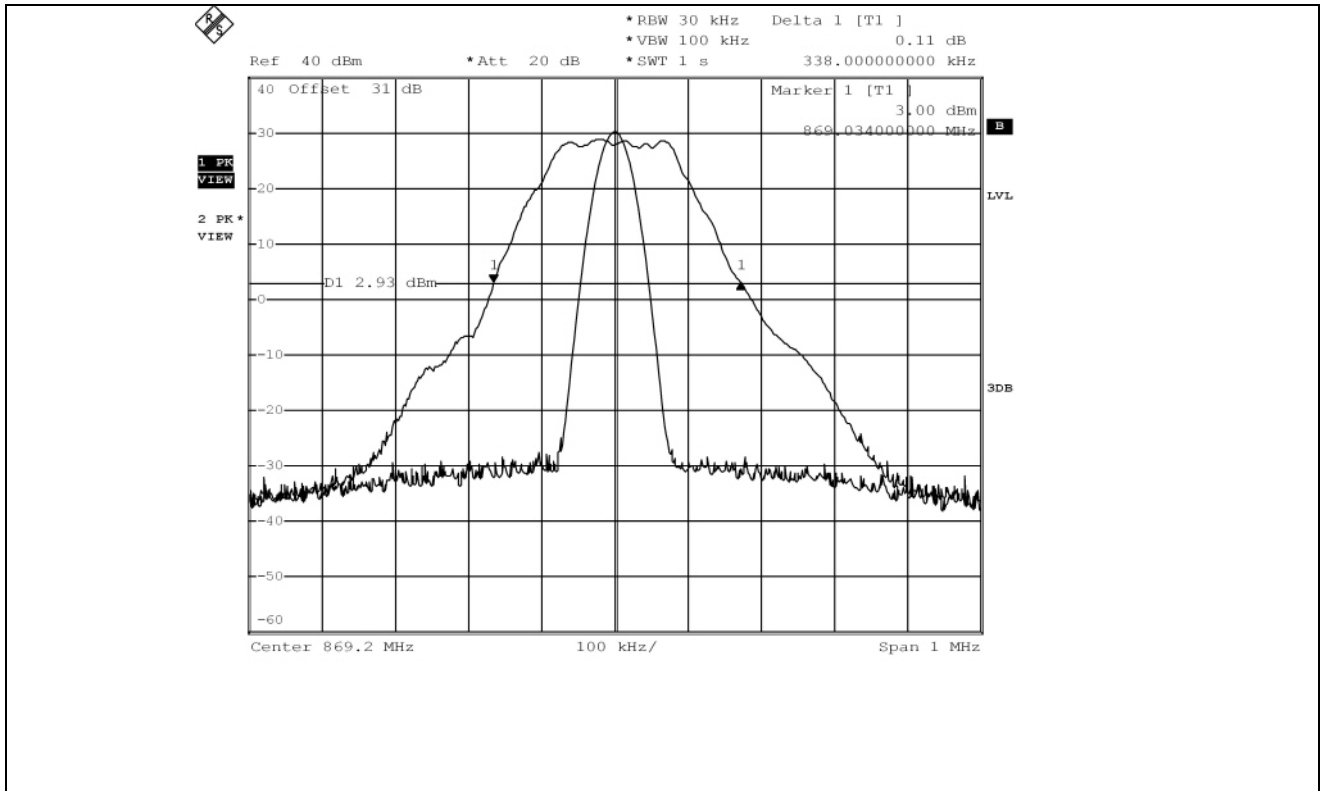
-. Test Result : Pass

Modulation	Channel	26 dB Bandwidth (kHz)	99 % Occupied Bandwidth (kHz)
GSM	Low	338.0	250.0
	Middle	338.0	250.0
	High	338.0	248.0
EDGE	Low	328.0	252.0
	Middle	326.0	252.0
	High	326.0	252.0
CDMA	Low	1 520	1 320
	Middle	1 520	1 320
	High	1 520	1 320
1xEVDO	Low	1 520	1 330
	Middle	1 520	1 320
	High	1 520	1 320
WCDMA	Low	4 680	4 160
	Middle	4 680	4 180
	High	4 680	4 160

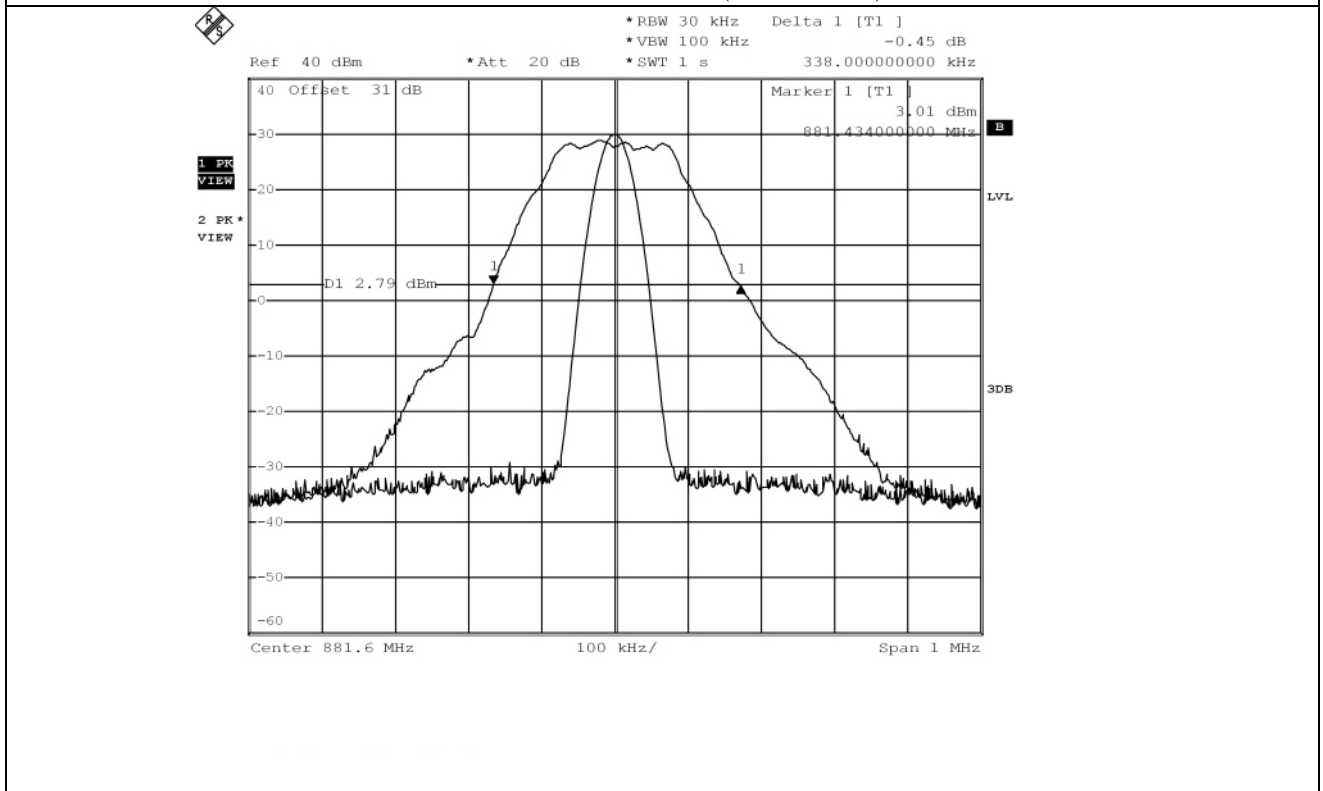
Remark: According to above result, the carrier frequency shall be within the frequency block edges.



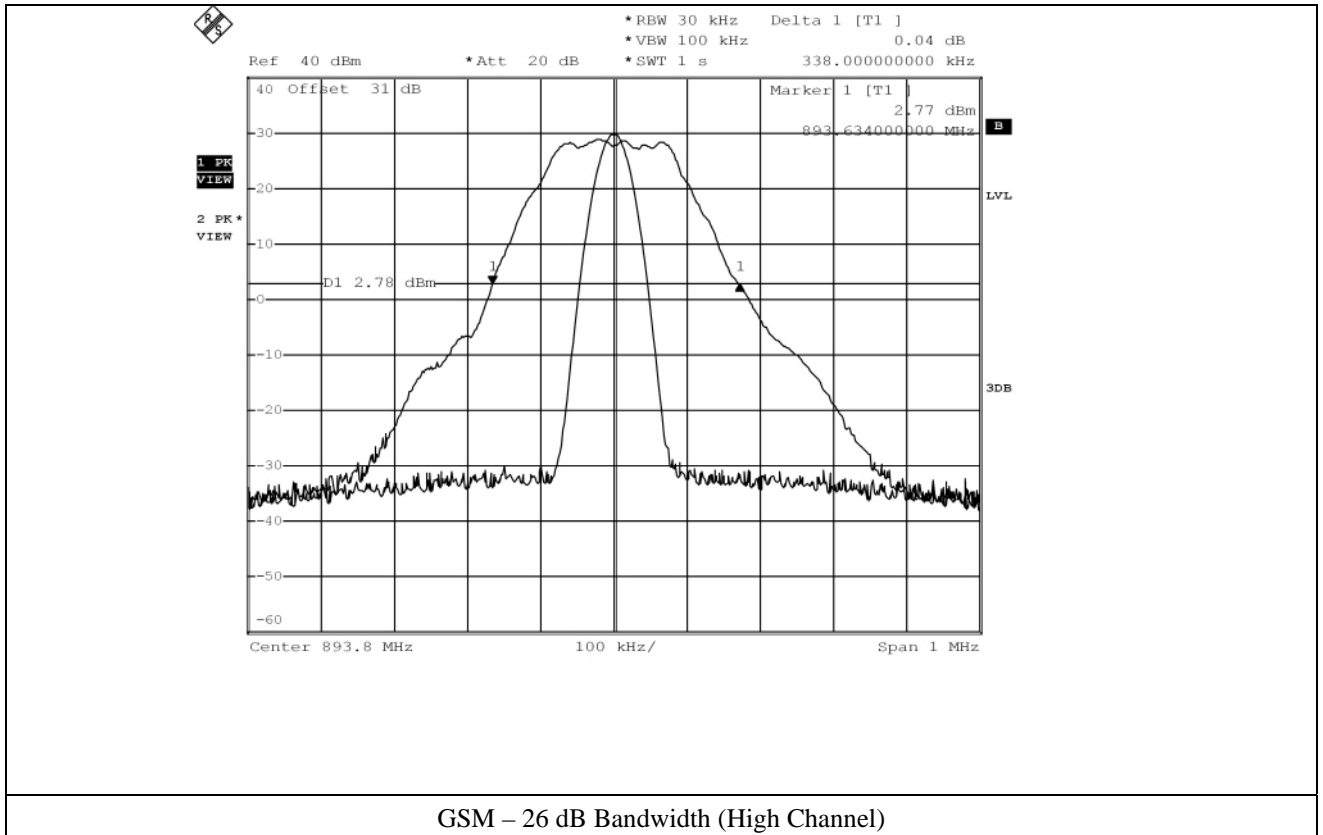
Tested by: Ki-Hong, Nam / Project Engineer



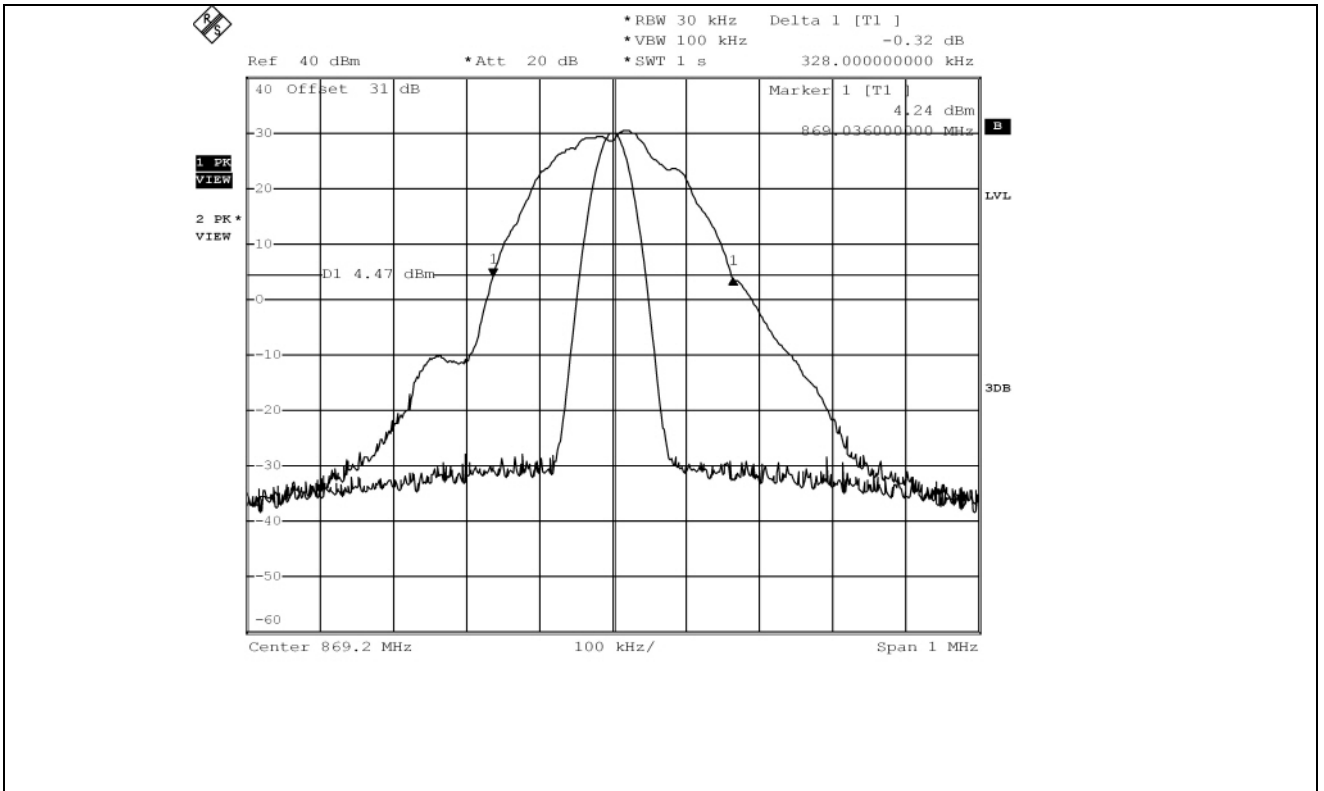
GSM – 20 dB Bandwidth (Low Channel)



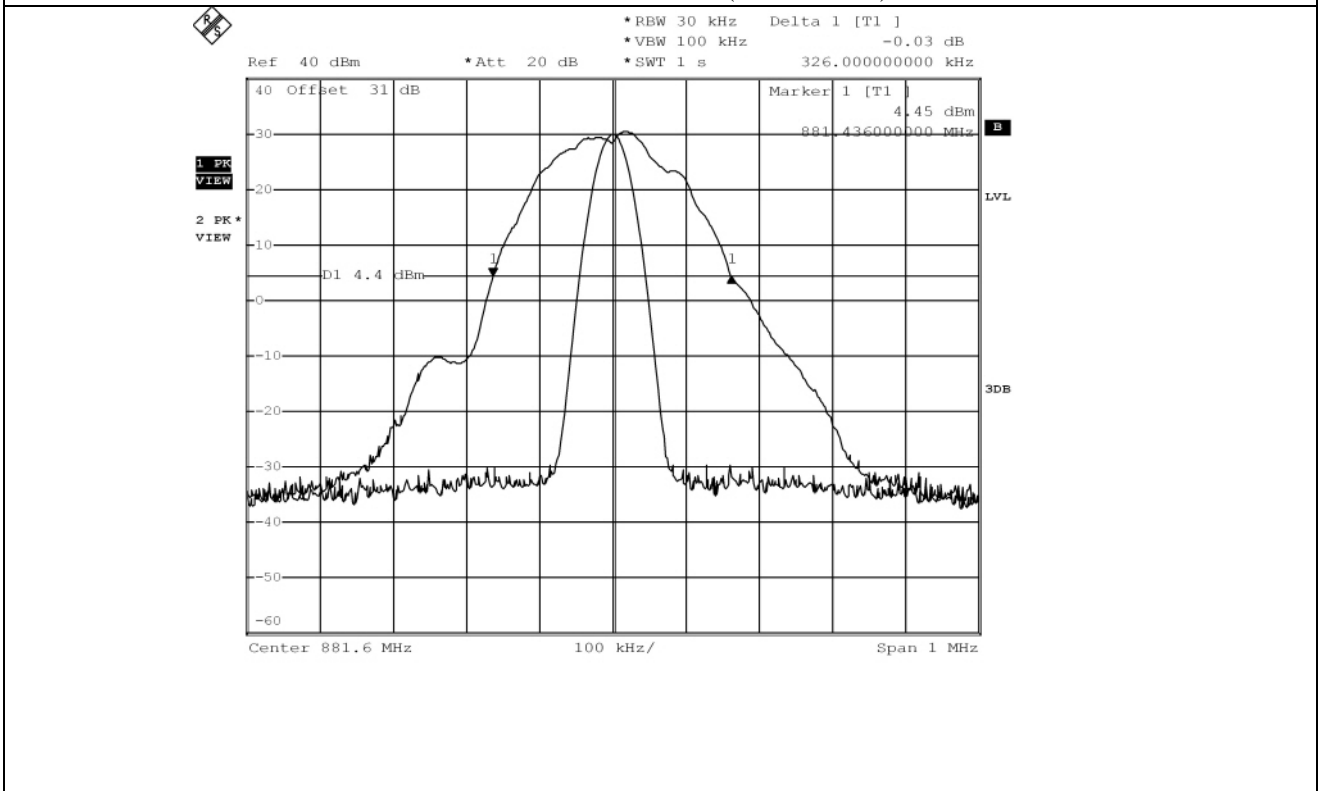
GSM – 26 dB Bandwidth (Middle Channel)



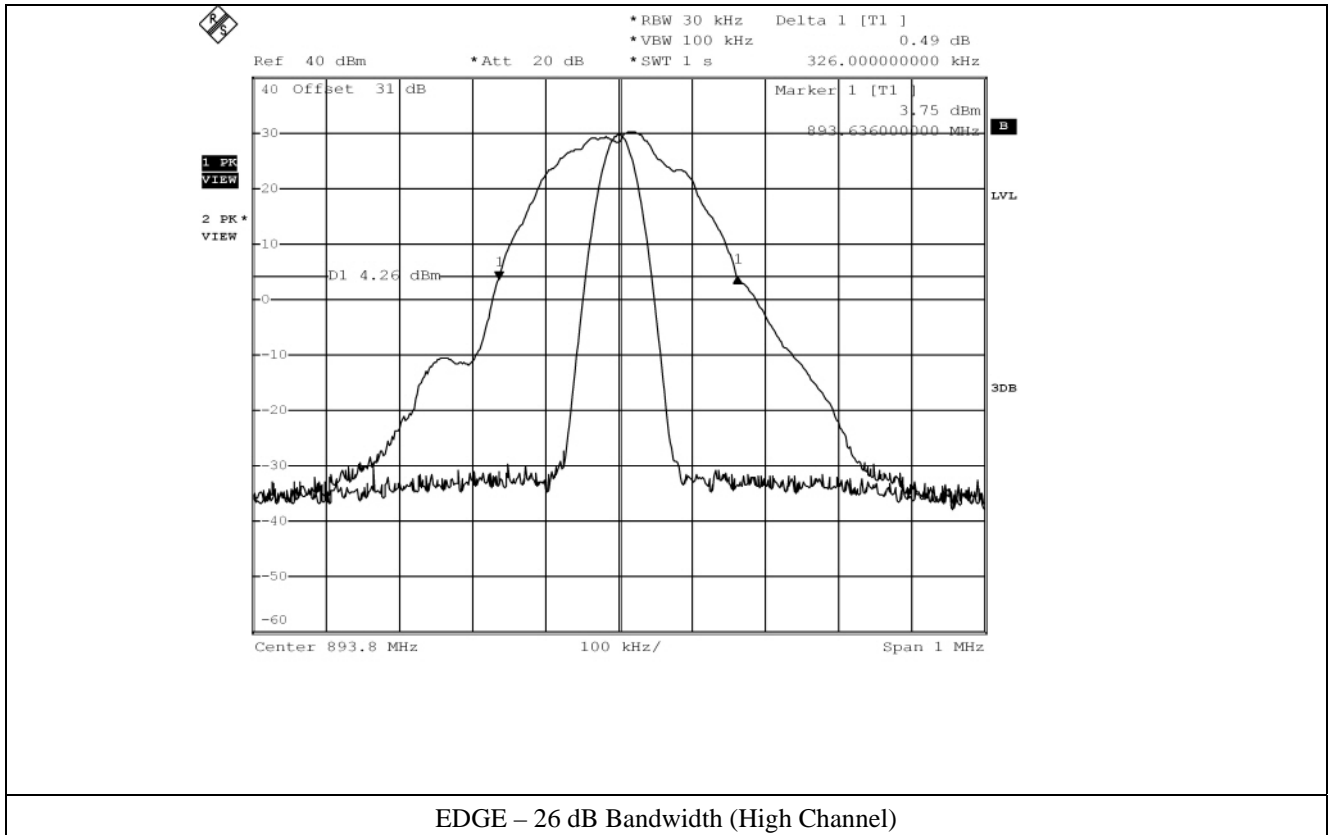




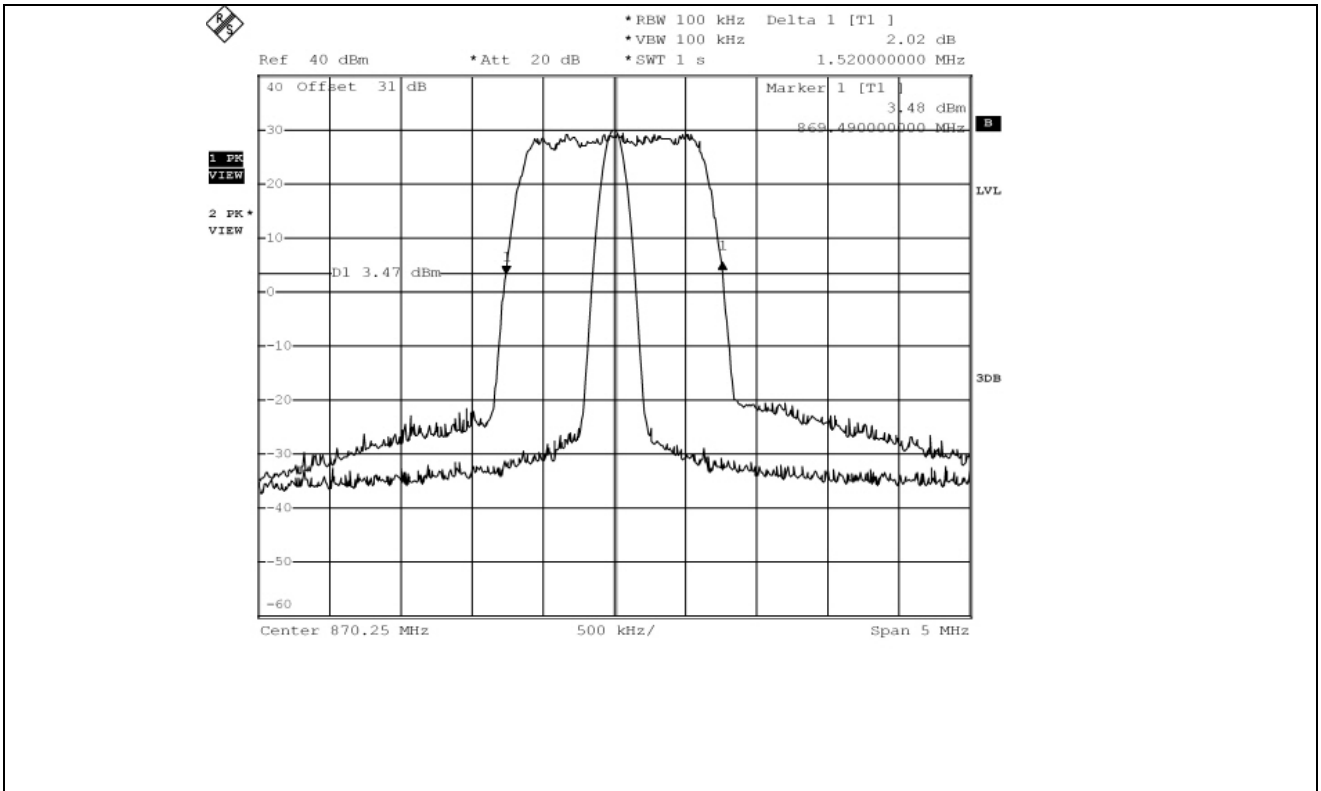
EDGE – 26 dB Bandwidth (Low Channel)



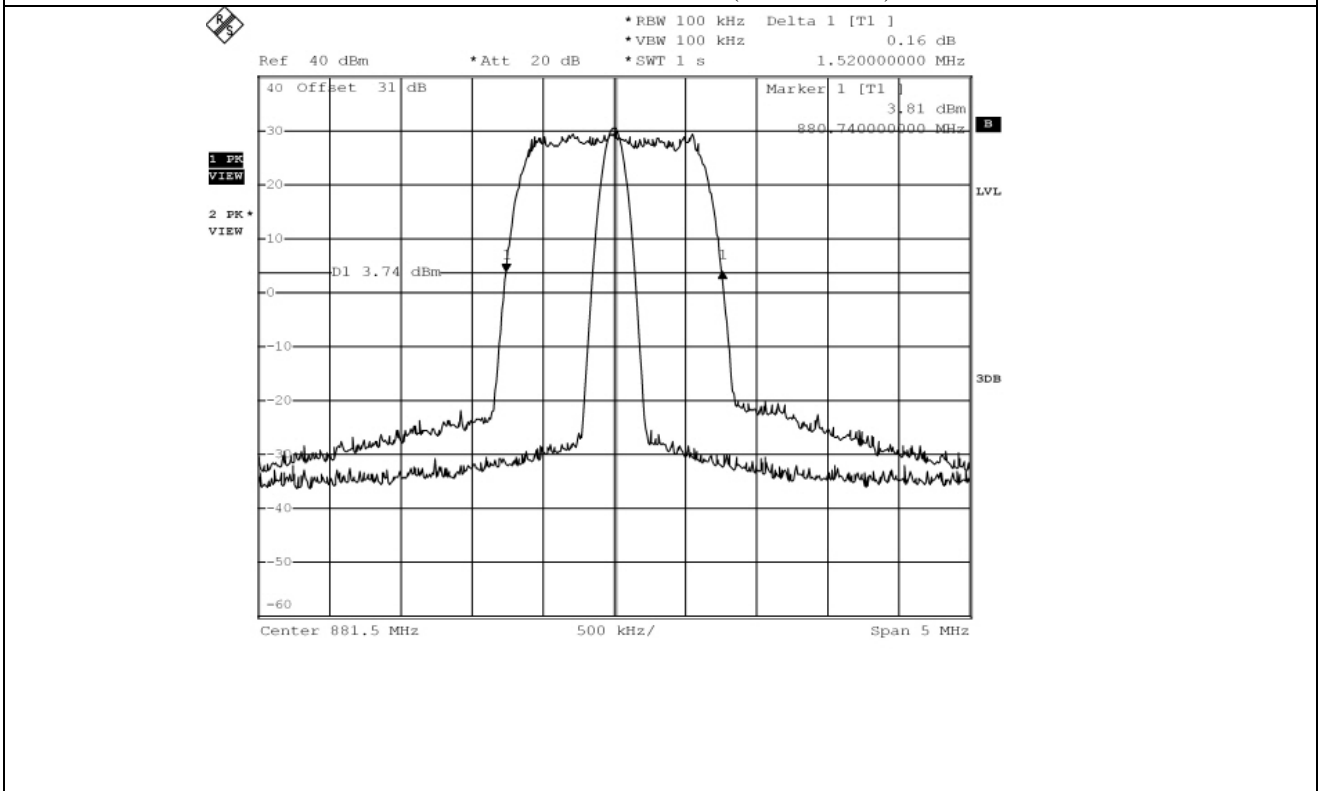
EDGE – 26 dB Bandwidth (Middle Channel)



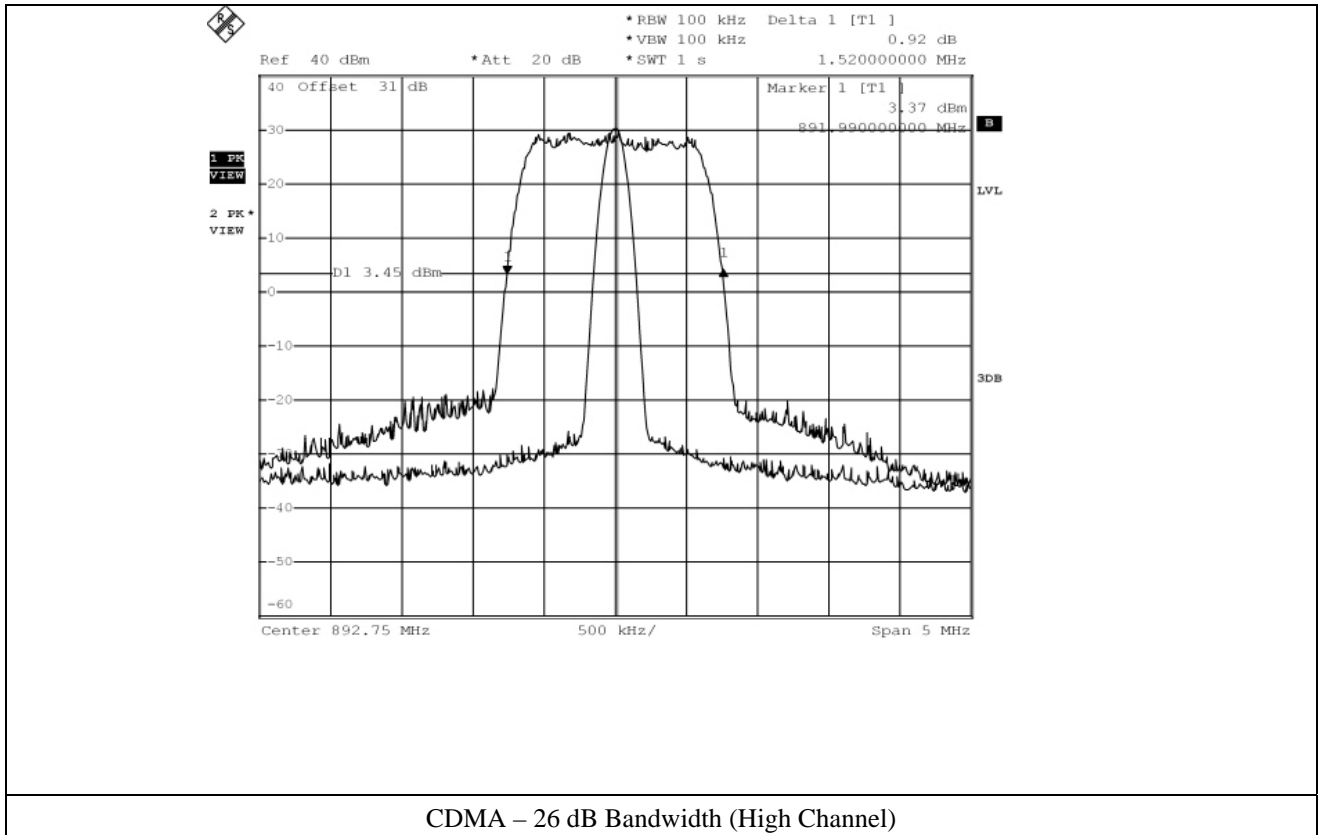
EDGE - 26 dB Bandwidth (High Channel)

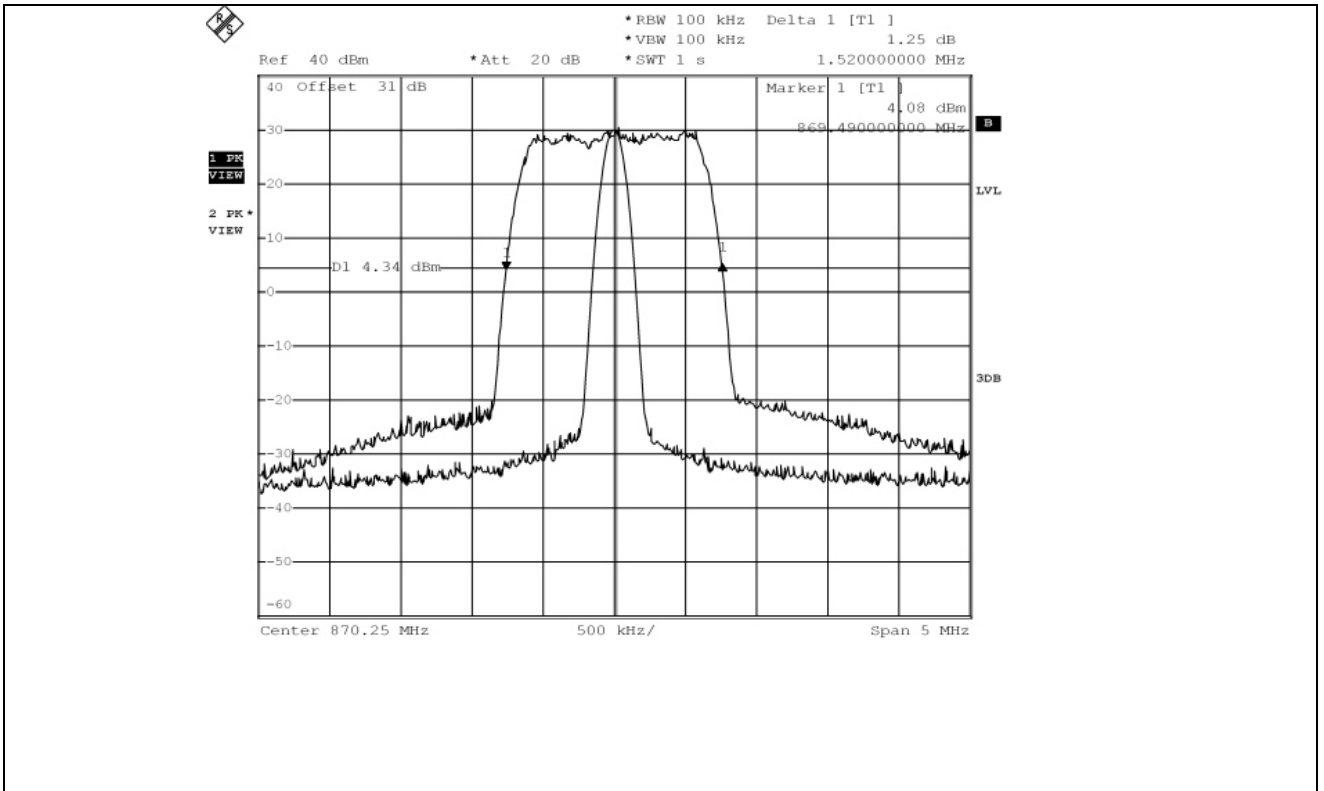


CDMA – 26 dB Bandwidth (Low Channel)

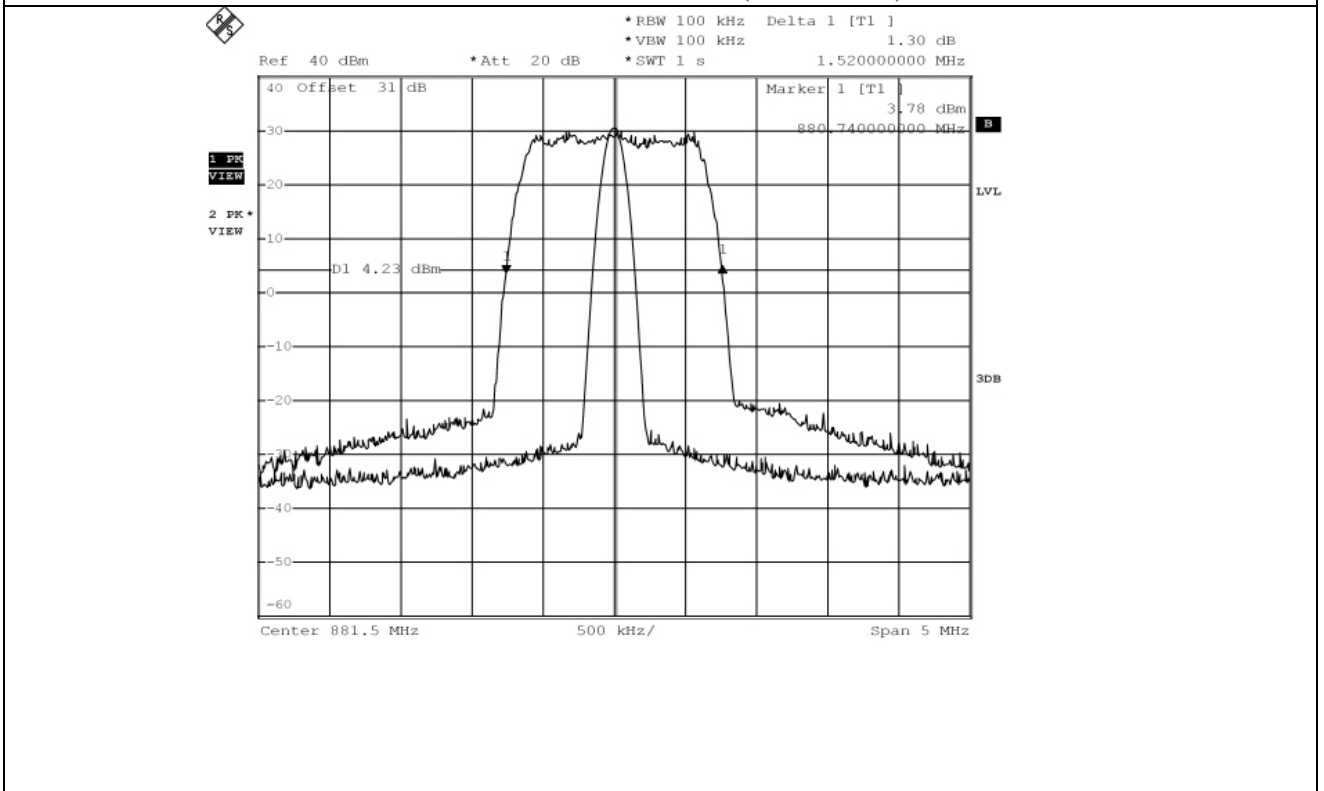


CDMA – 26 dB Bandwidth (Middle Channel)

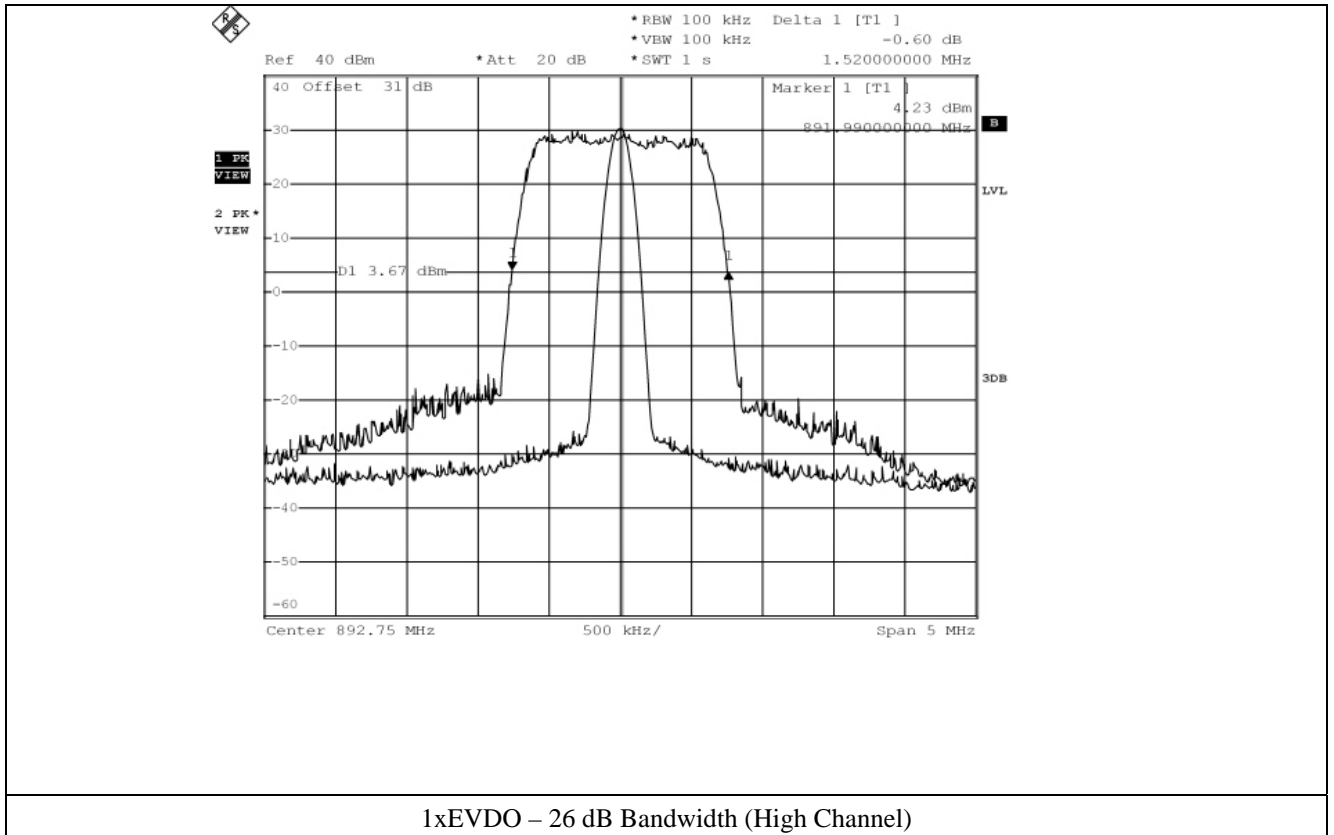




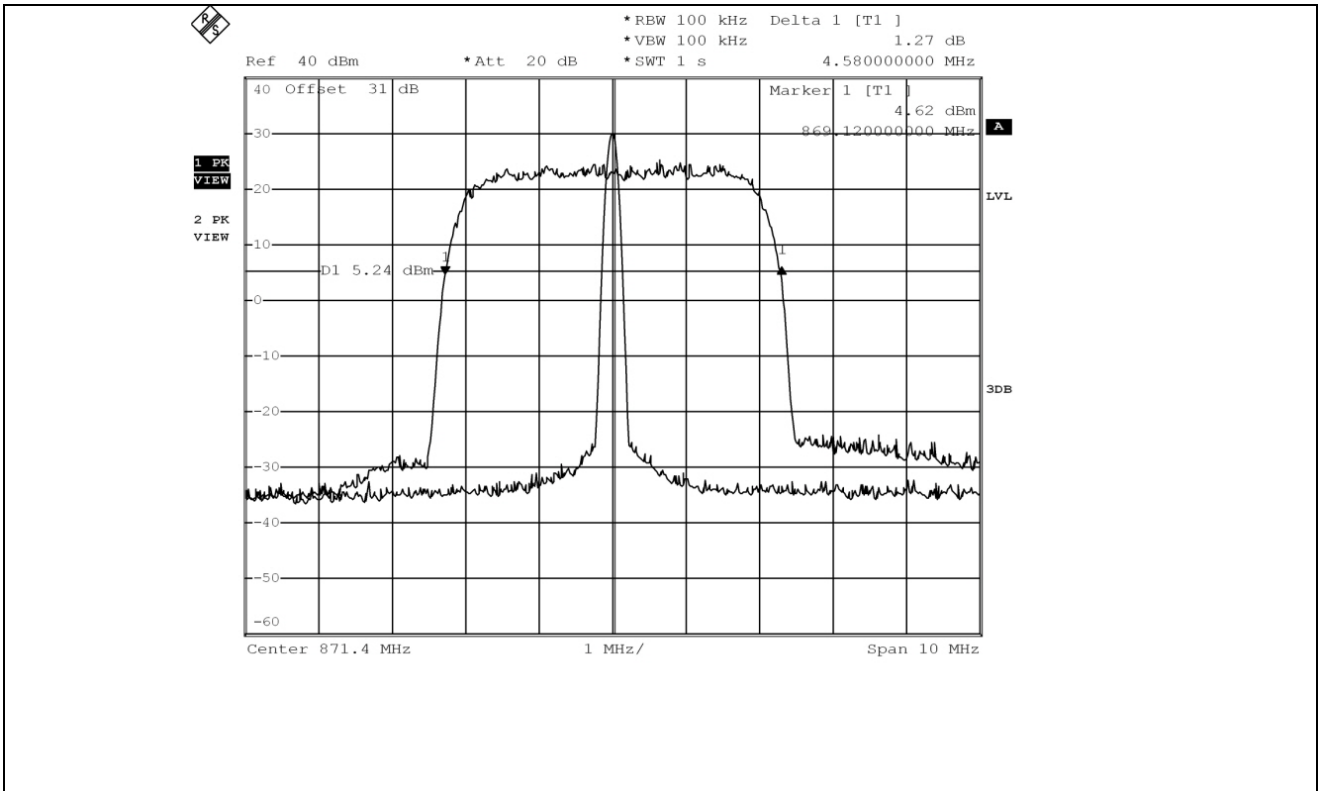
1xEVDO – 26 dB Bandwidth (Low Channel)



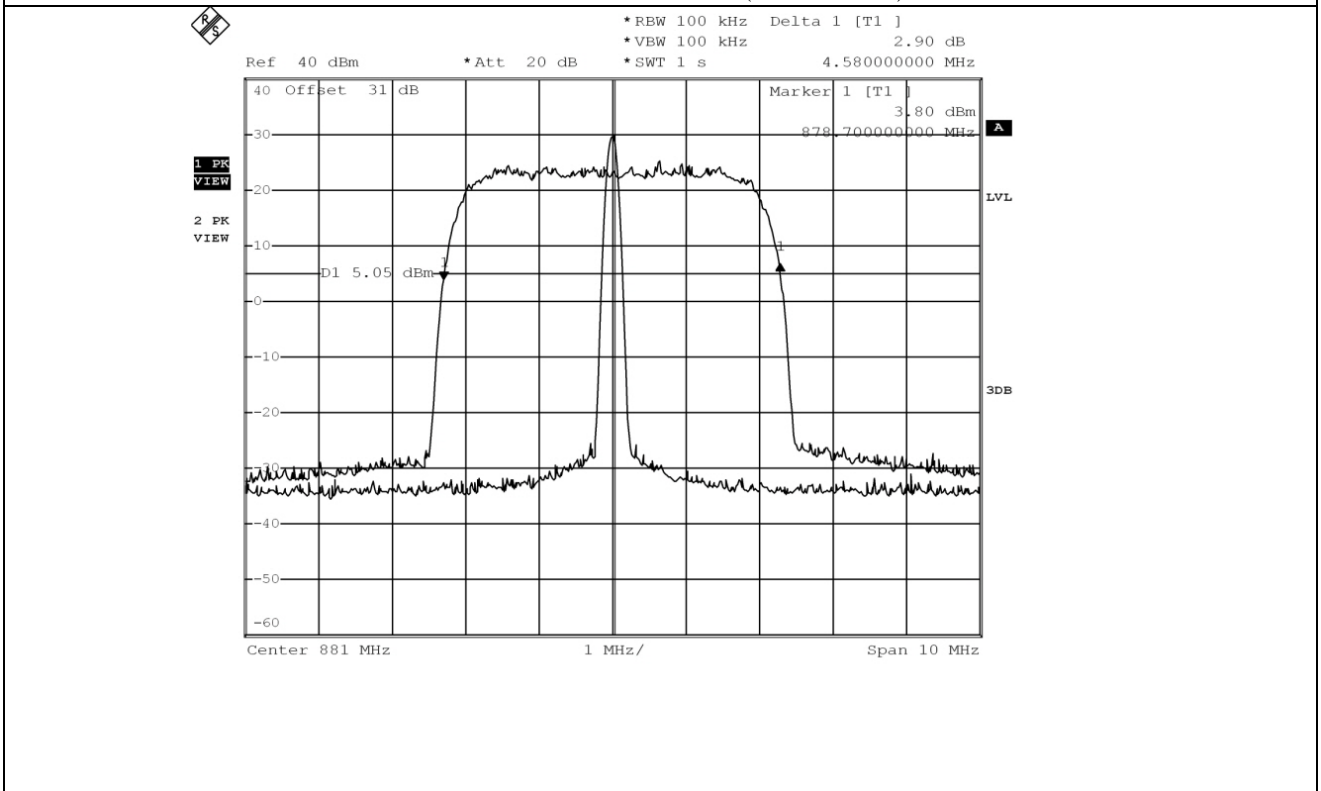
1xEVDO – 26 dB Bandwidth (Middle Channel)



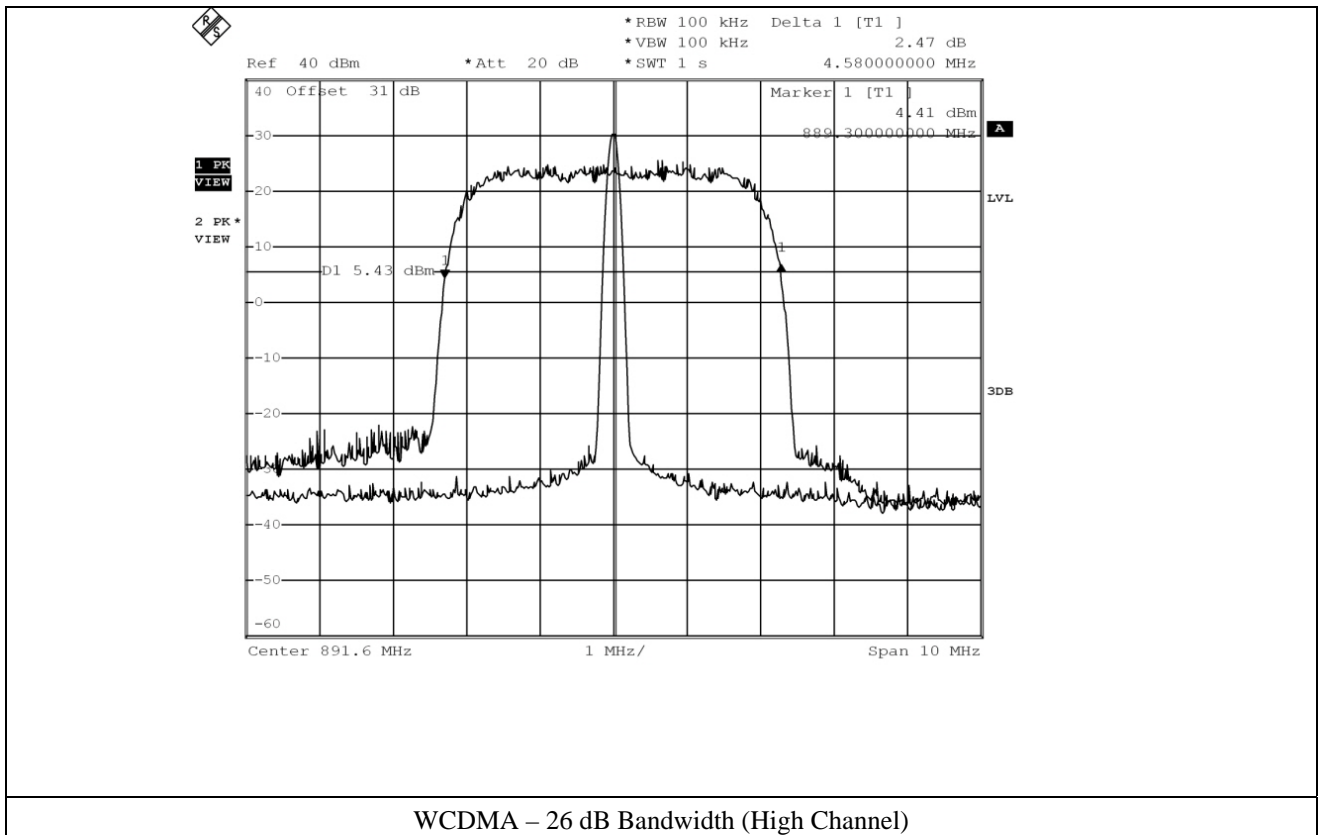
1xEVDO – 26 dB Bandwidth (High Channel)



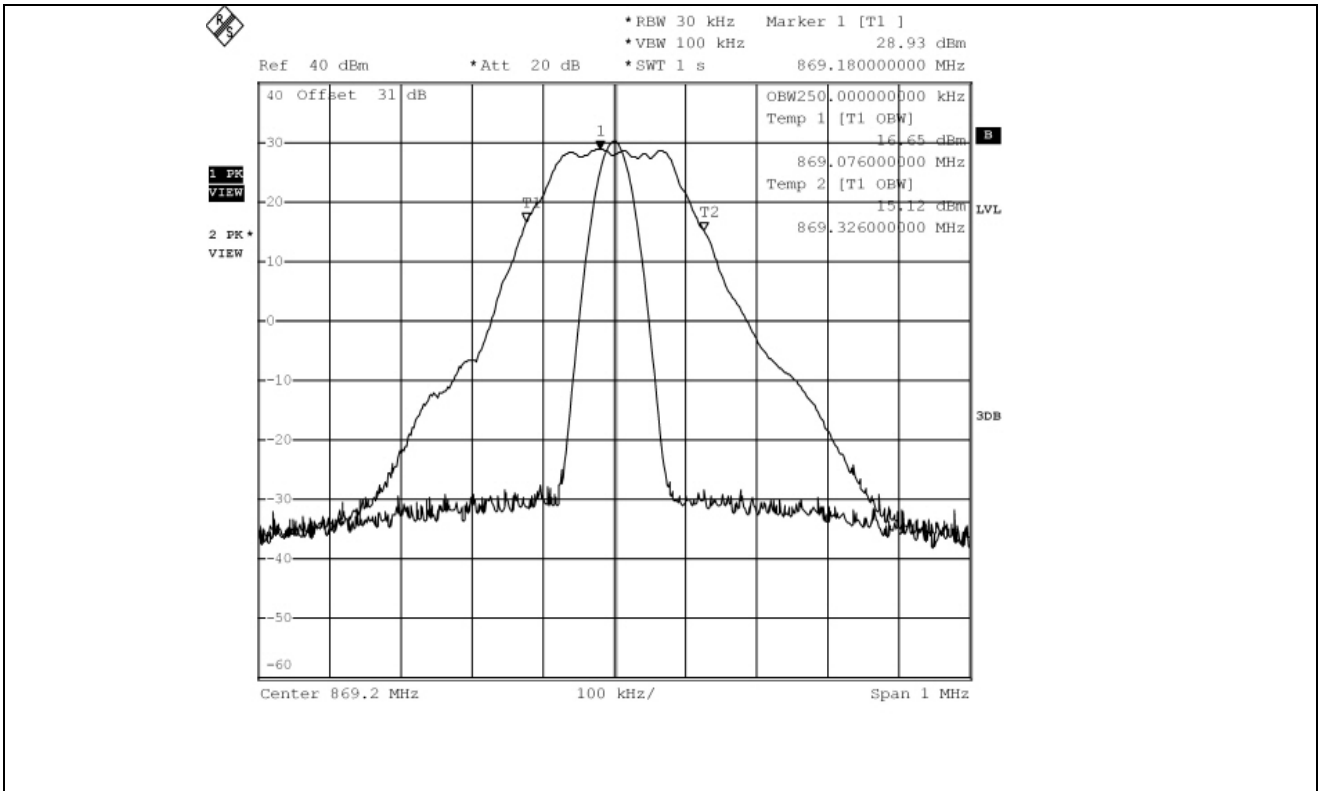
WCDMA – 26 dB Bandwidth (Low Channel)



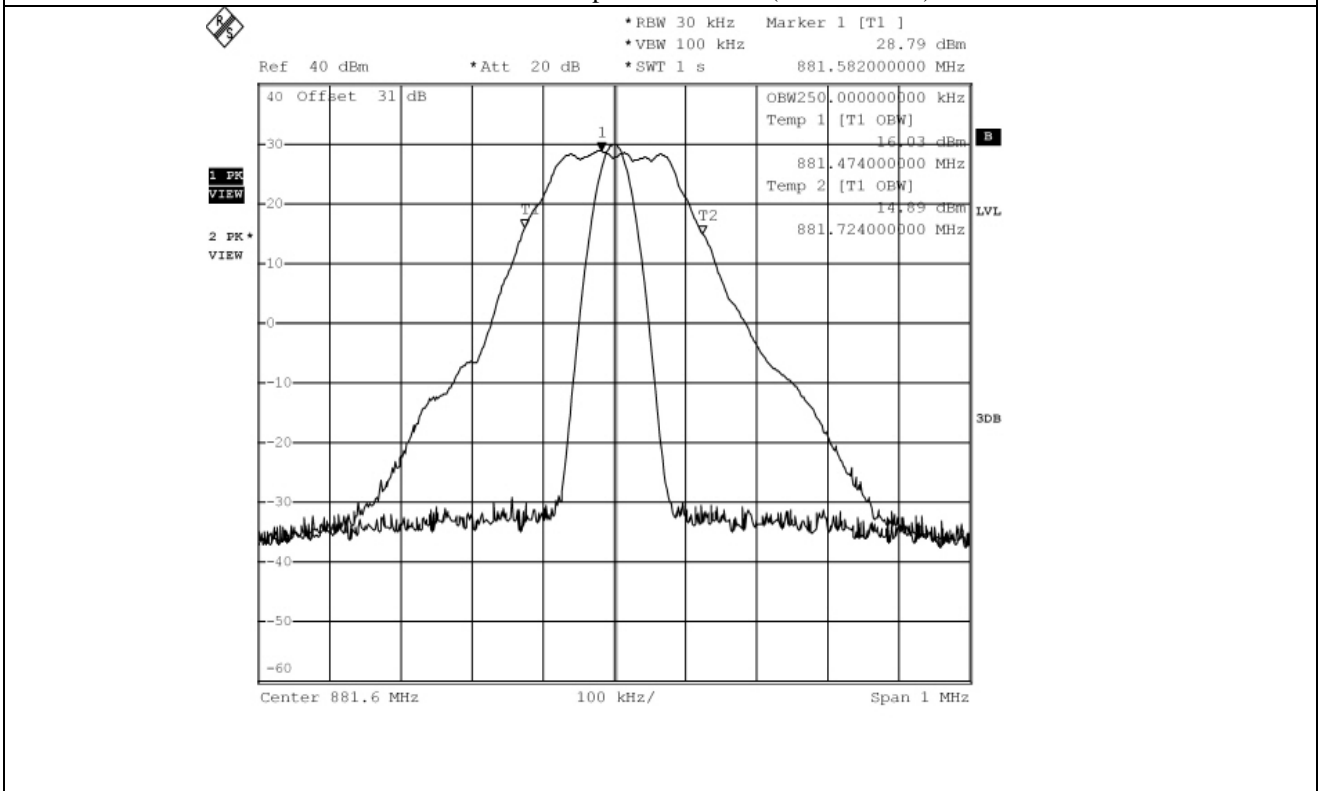
WCDMA – 26 dB Bandwidth (Middle Channel)



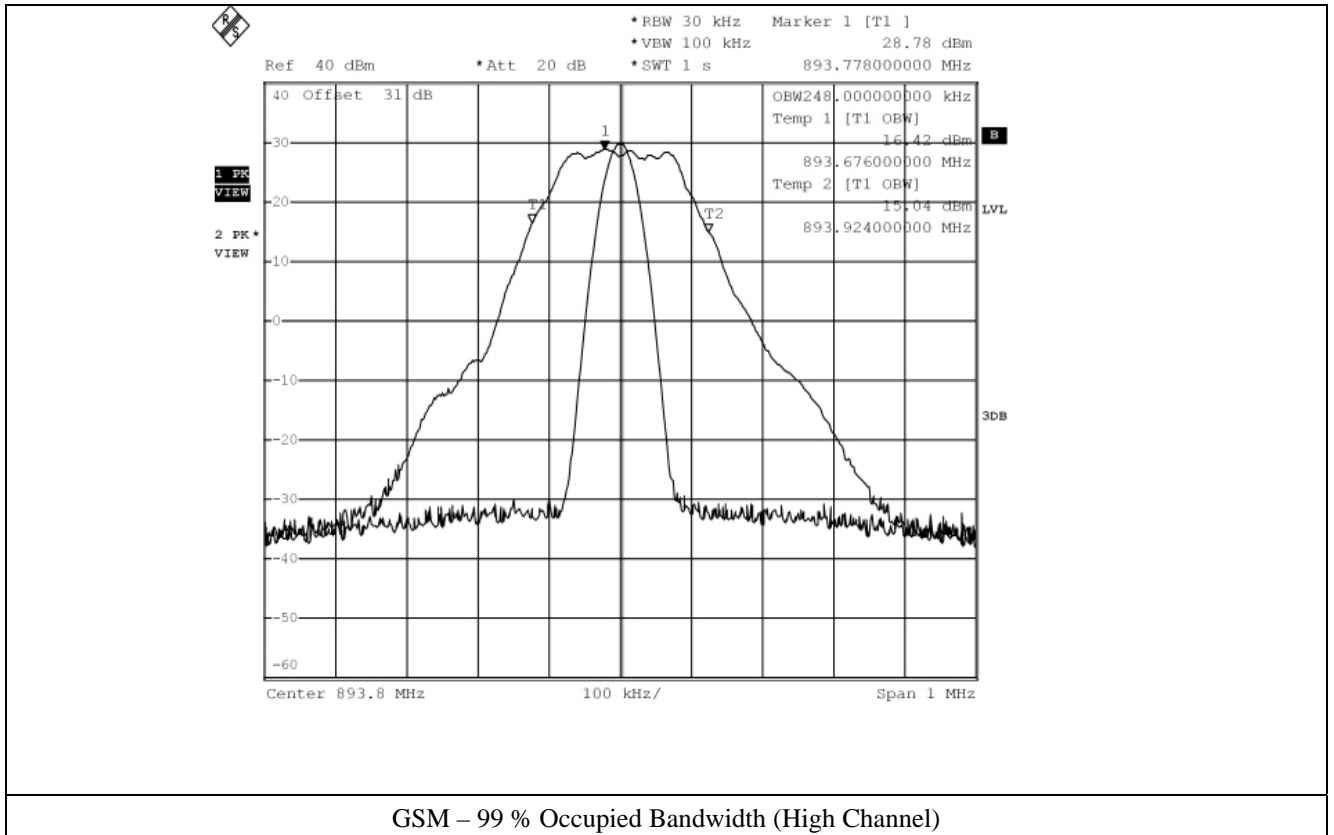


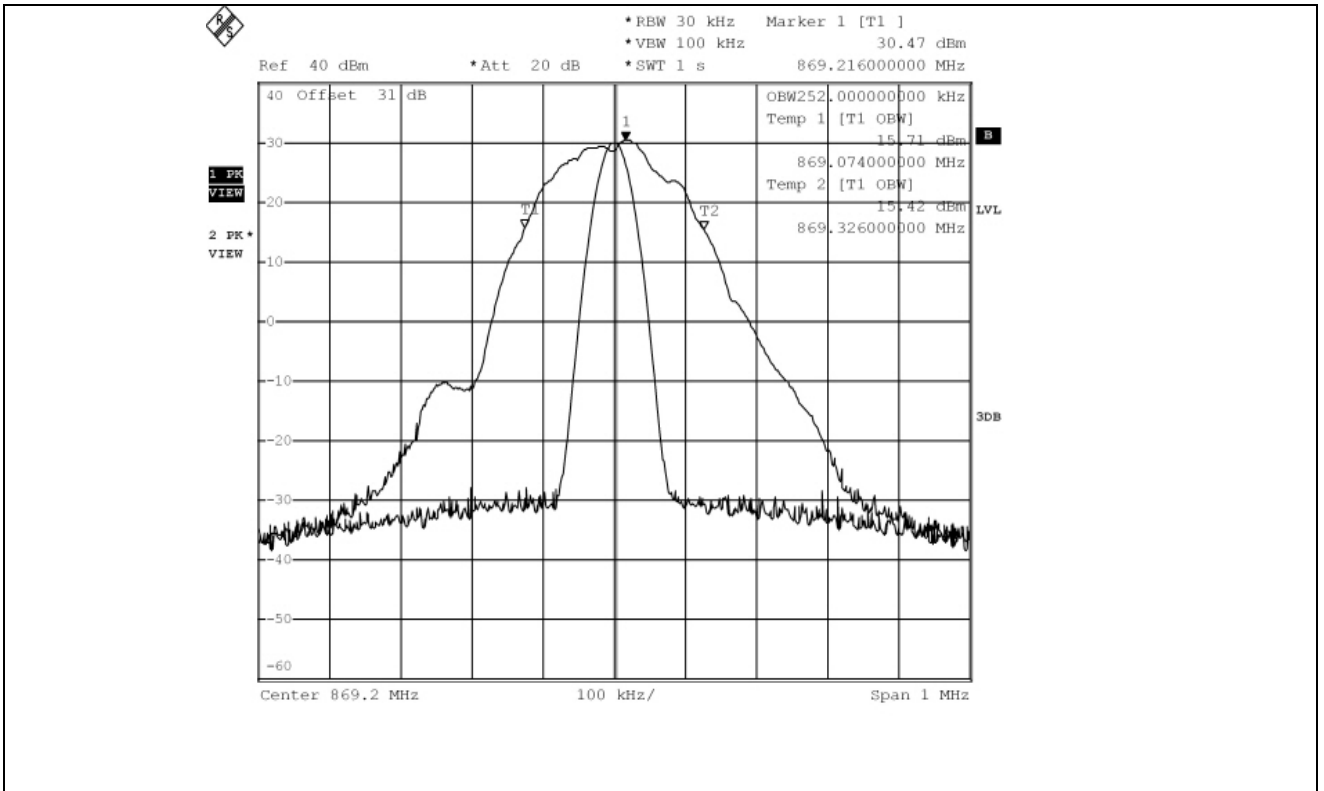


GSM – 99 % Occupied Bandwidth (Low Channel)

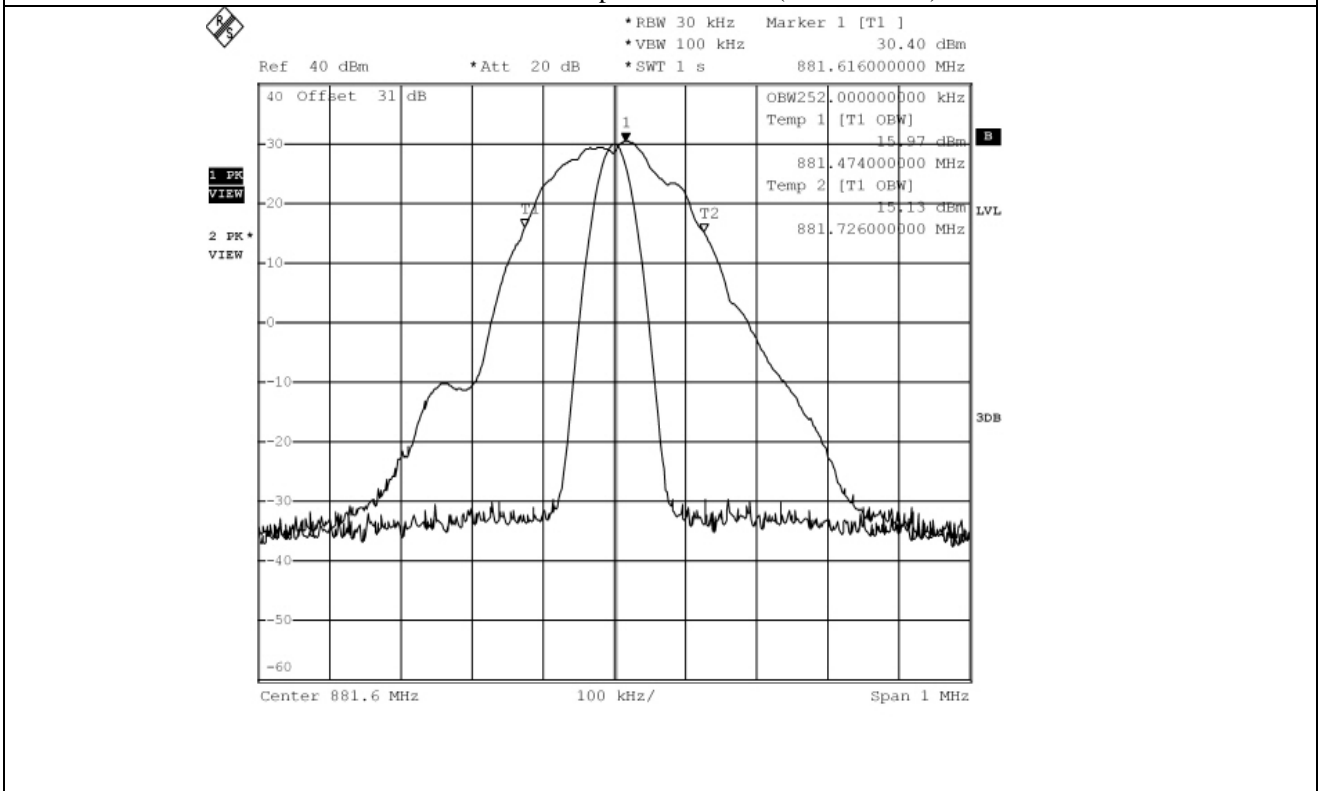


GSM – 99 % Occupied Bandwidth (Middle Channel)

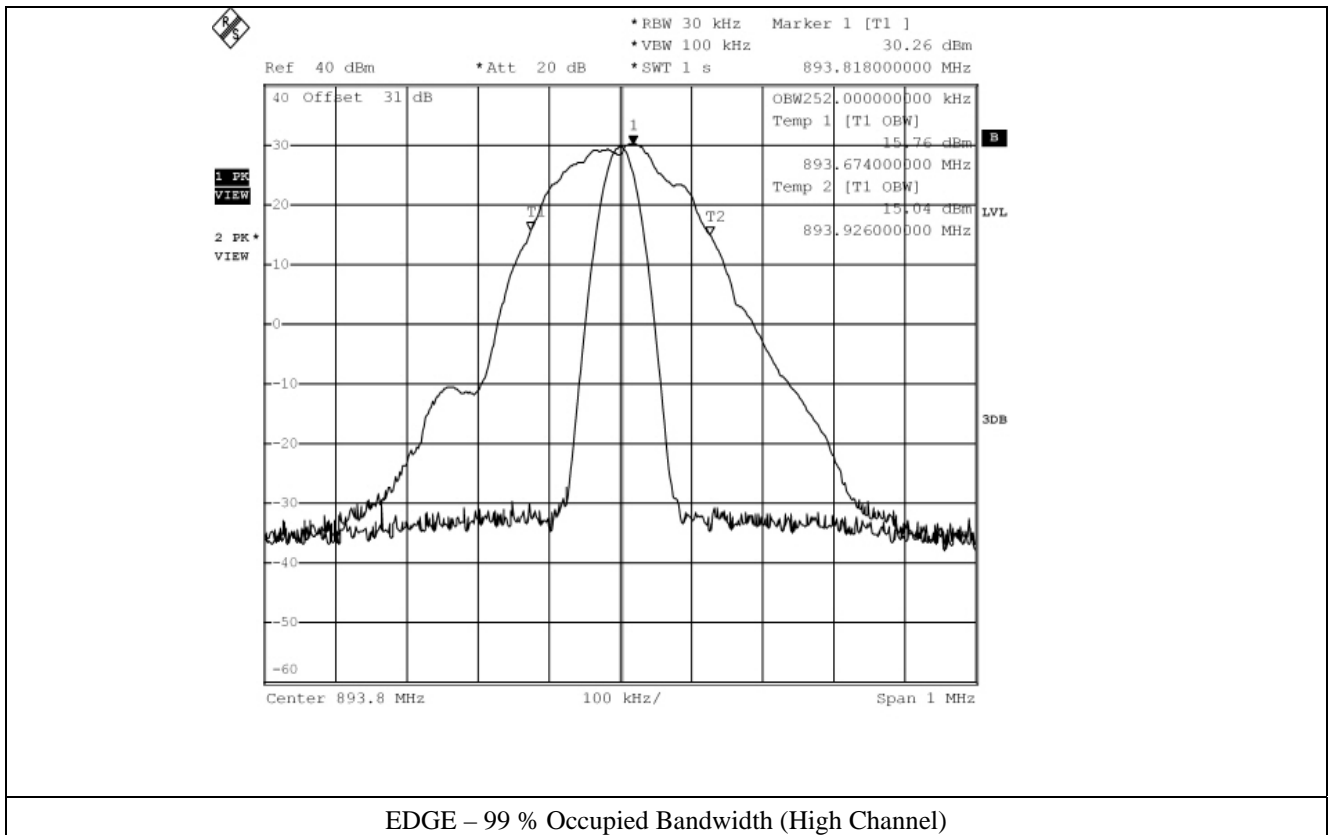


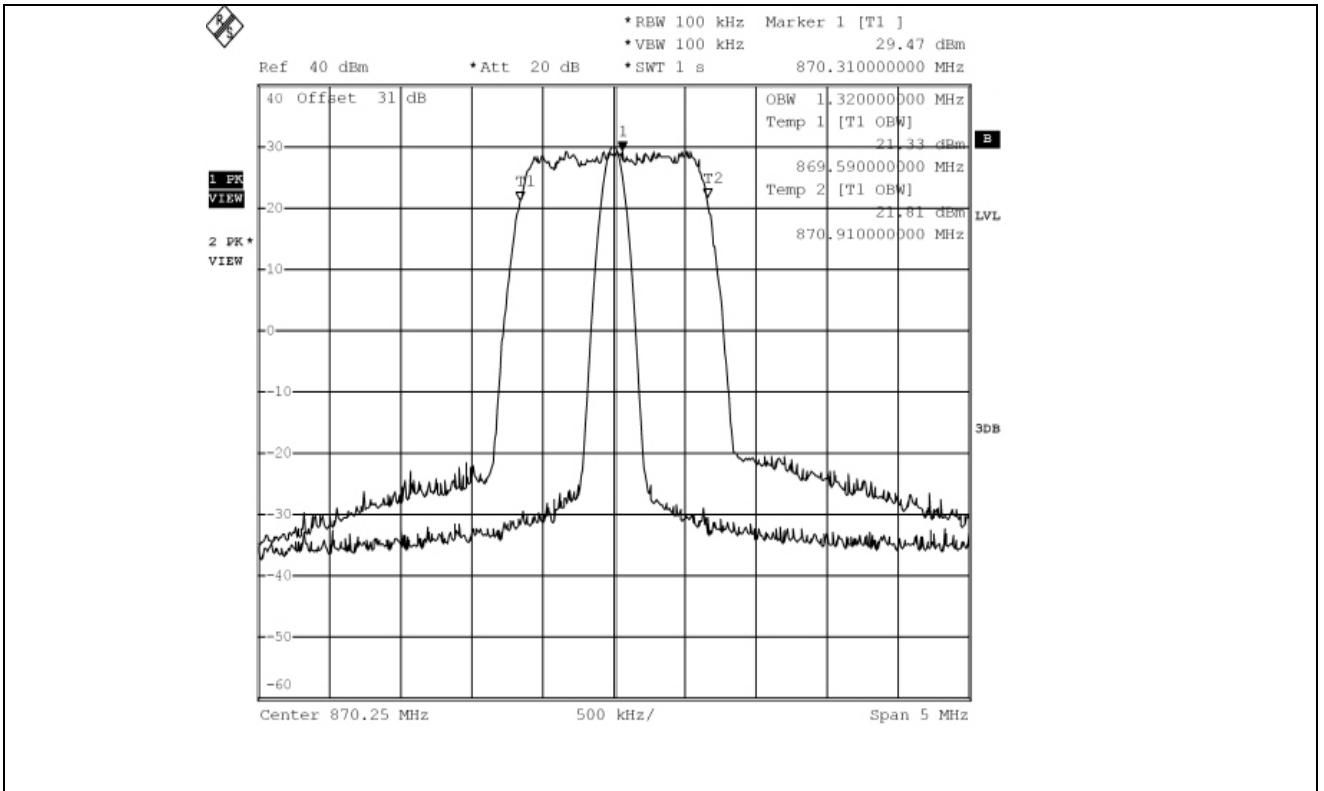


EDGE – 99 % Occupied Bandwidth (Low Channel)

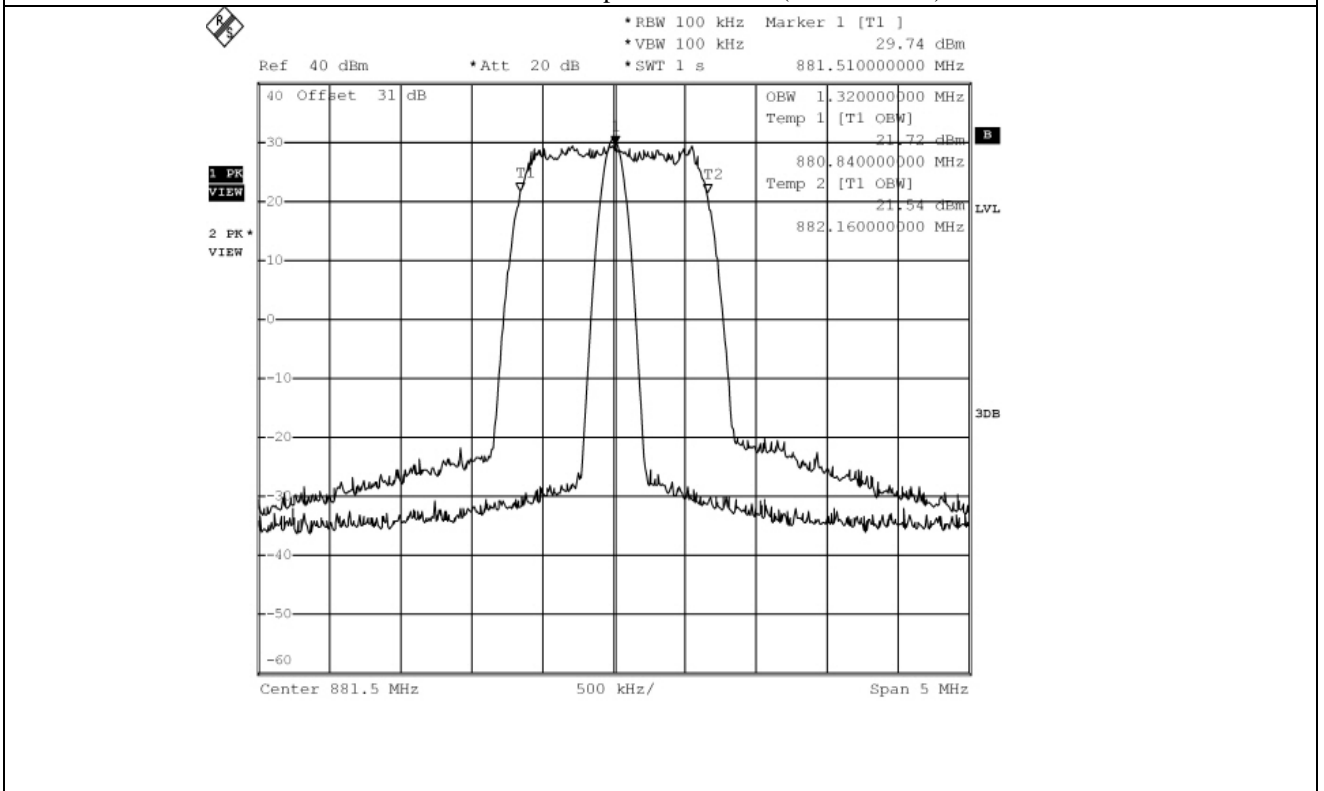


EDGE – 99 % Occupied Bandwidth (Middle Channel)

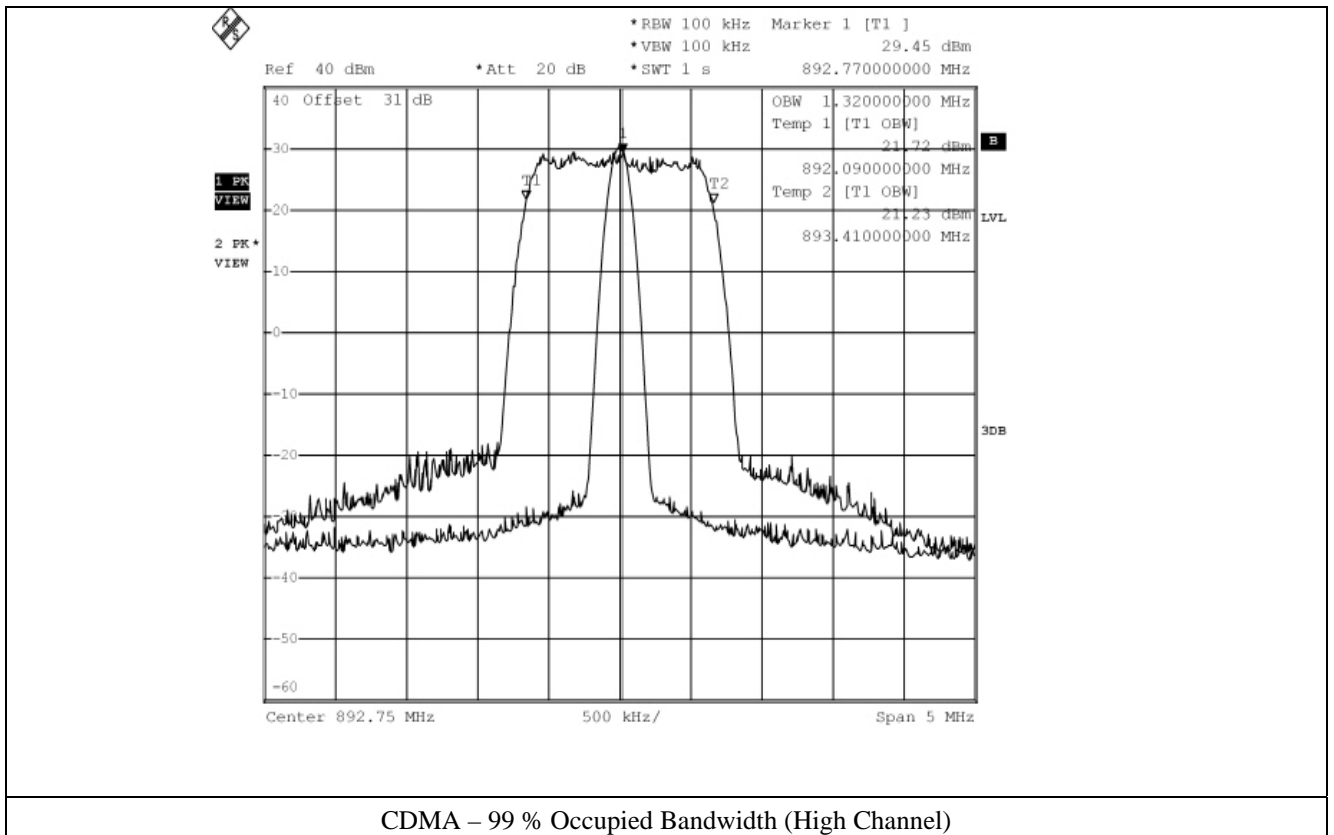


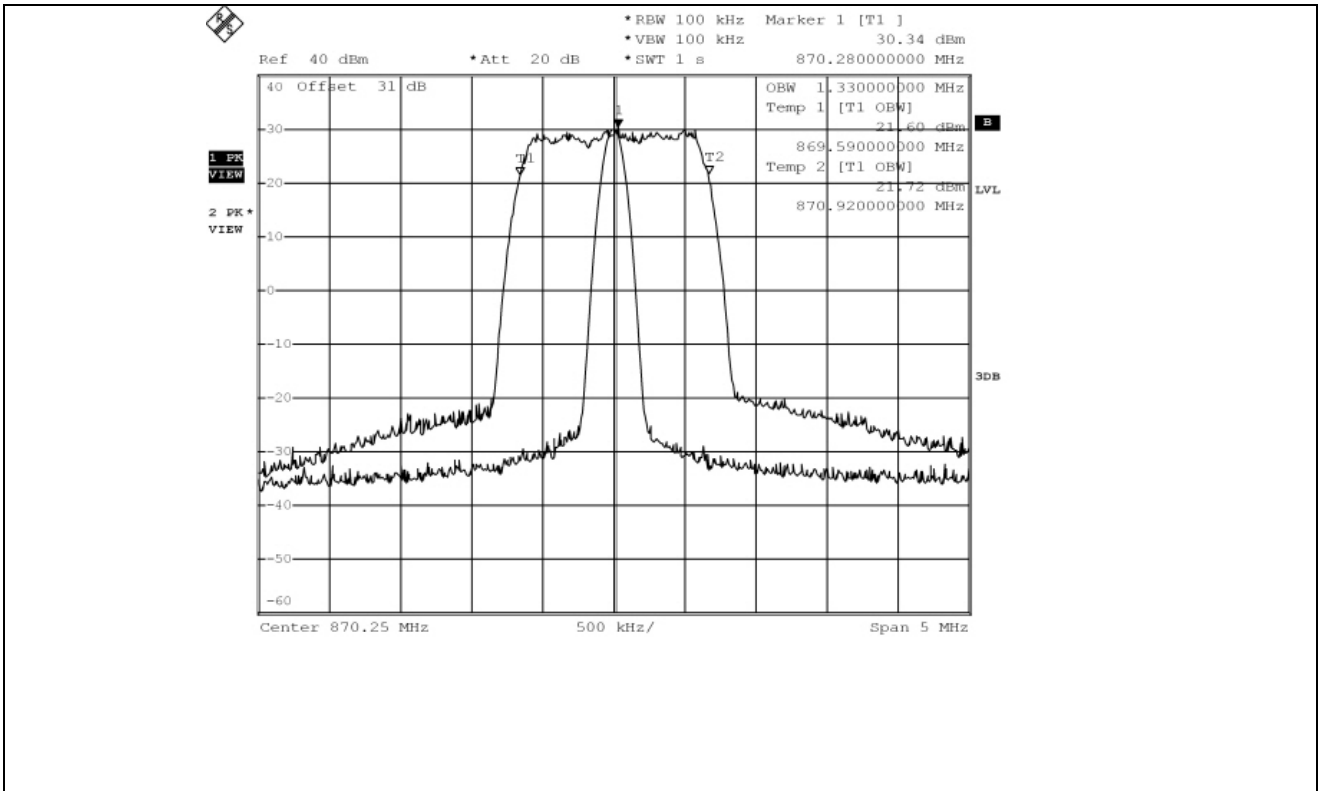


CDMA – 99 % Occupied Bandwidth (Low Channel)

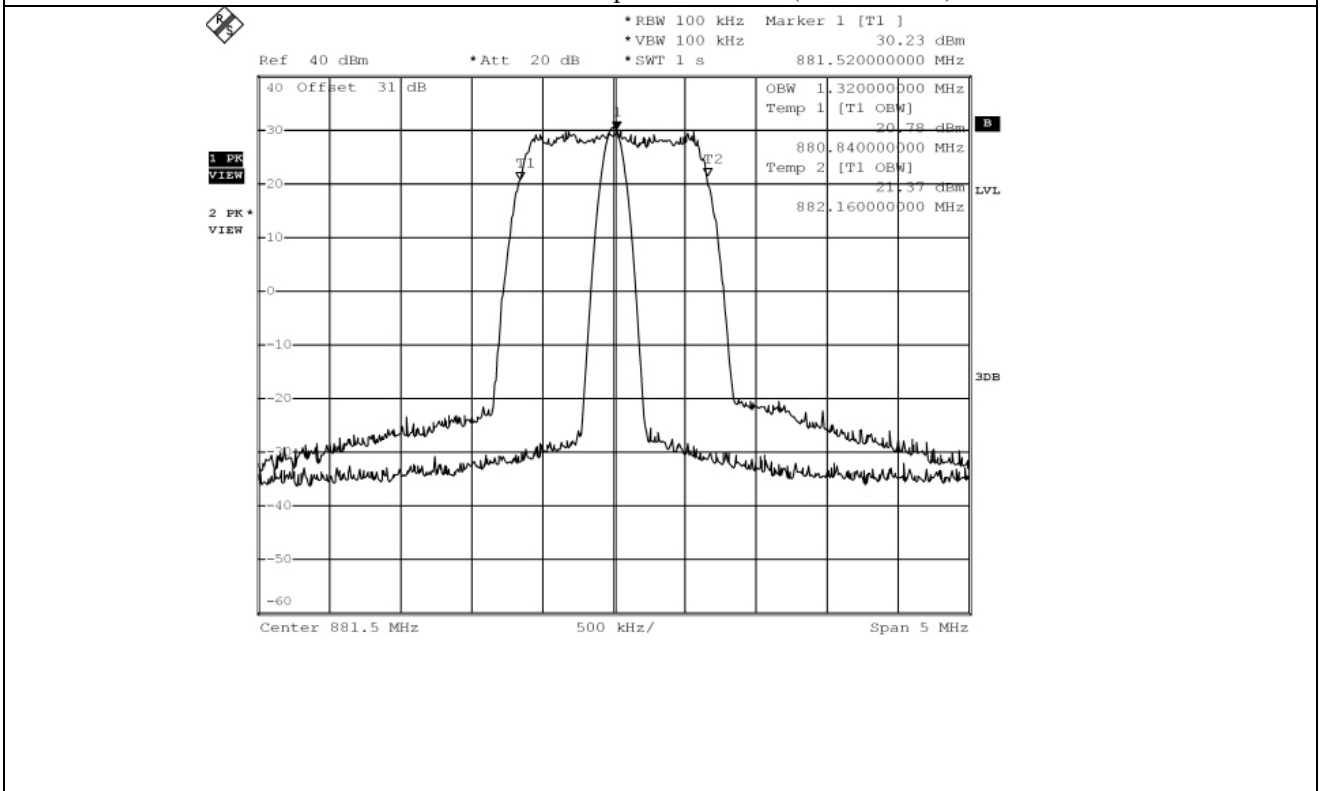


CDMA – 99 % Occupied Bandwidth (Middle Channel)





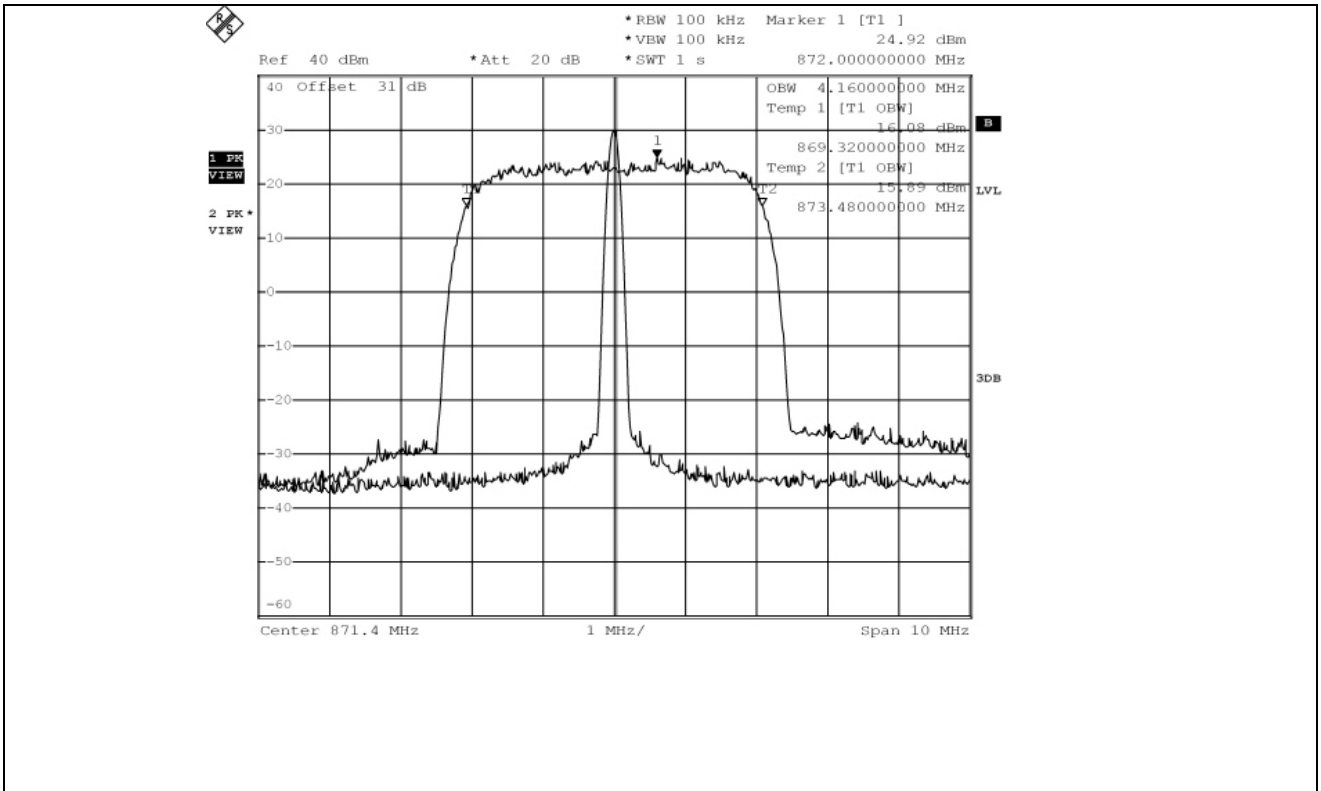
1xEVDO – 99 % Occupied Bandwidth (Low Channel)



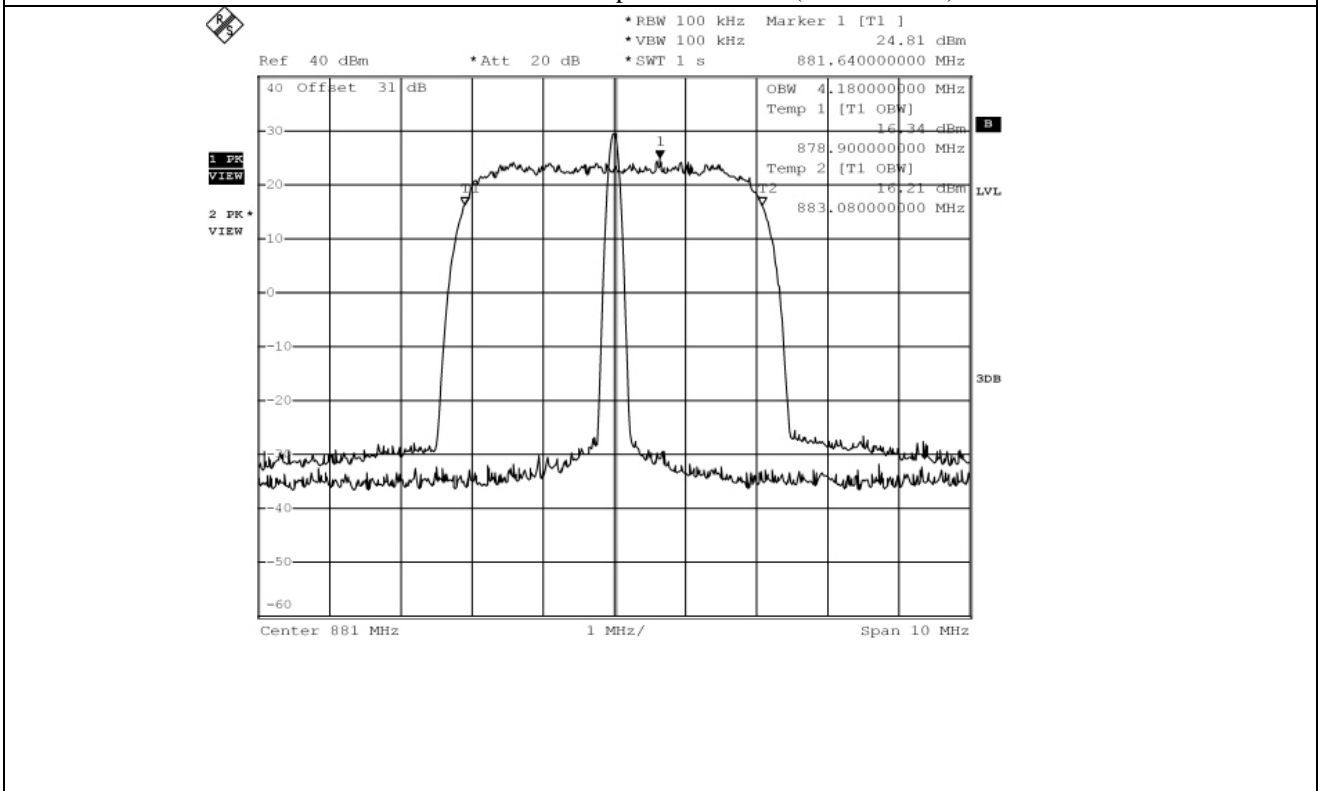
1xEVDO – 99 % Occupied Bandwidth (Middle Channel)



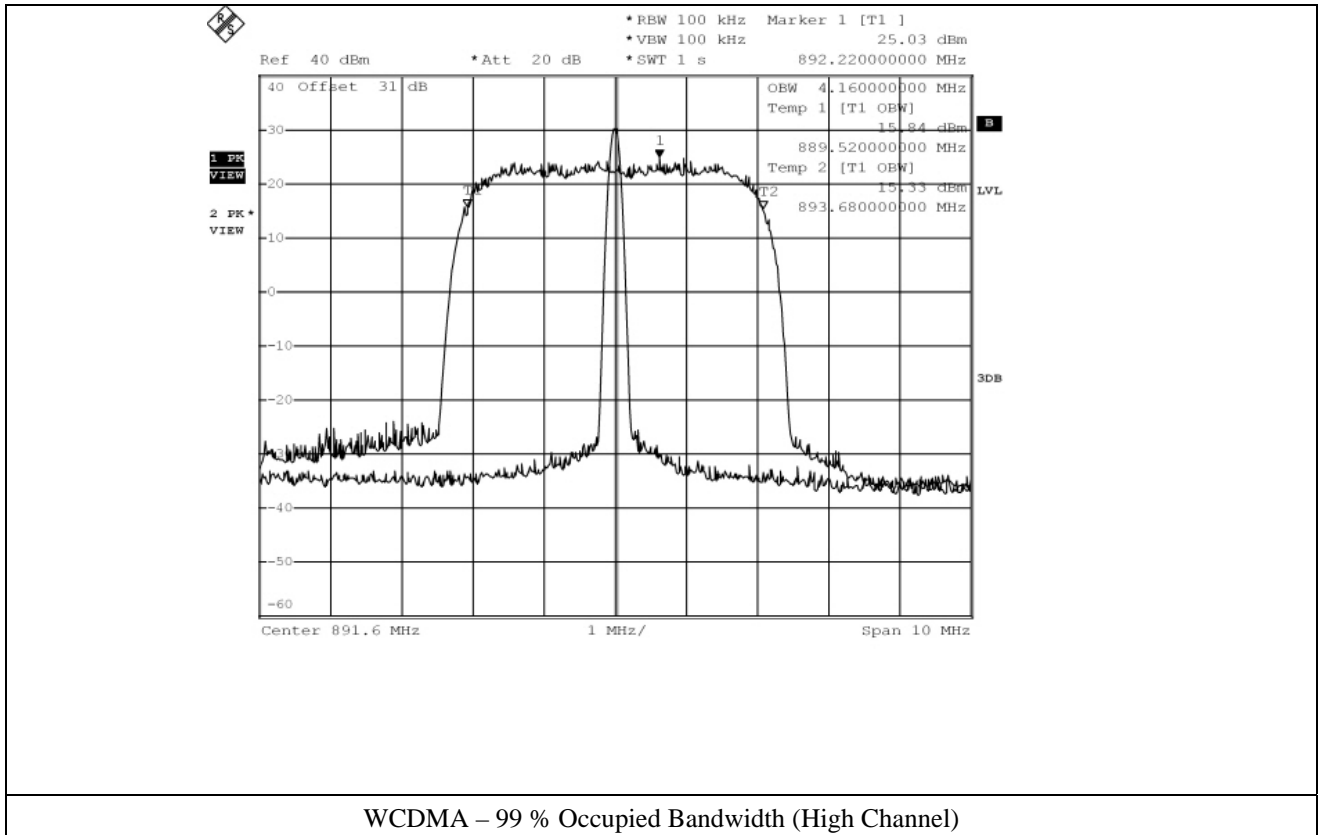


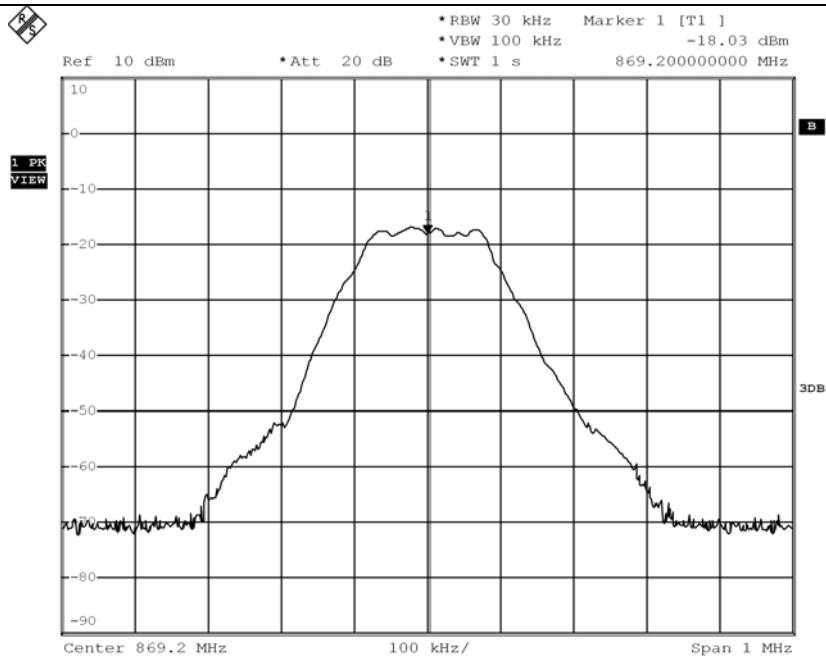


WCDMA – 99 % Occupied Bandwidth (Low Channel)

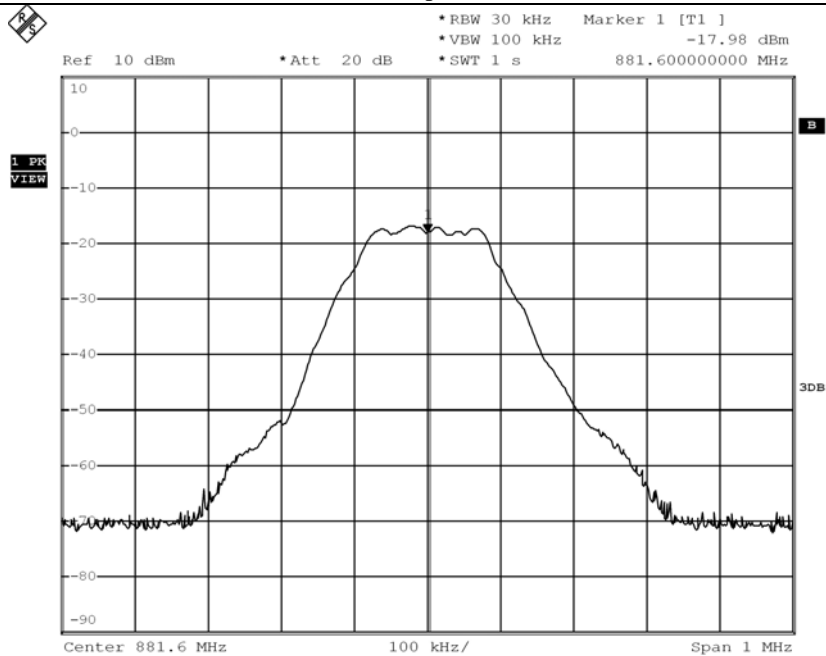


WCDMA – 99 % Occupied Bandwidth (Middle Channel)

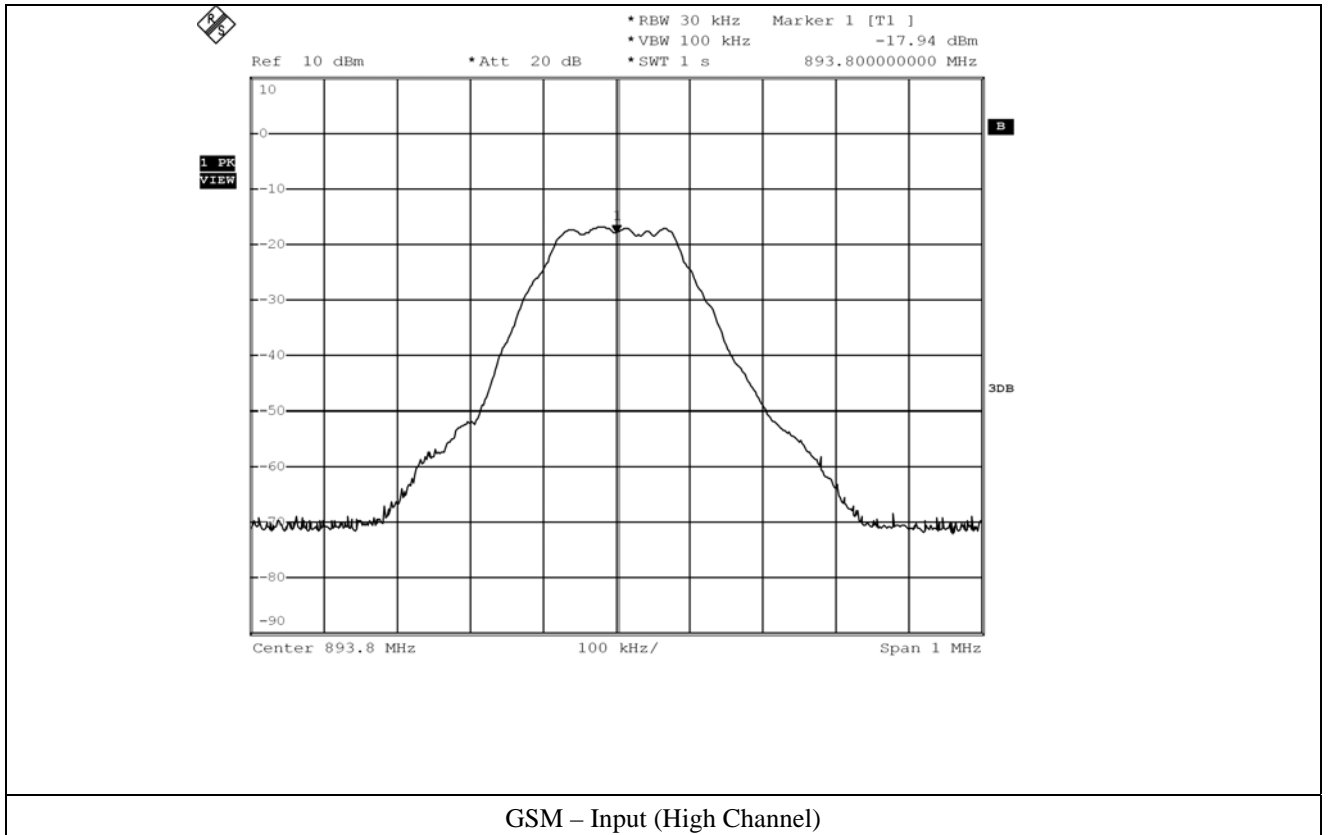


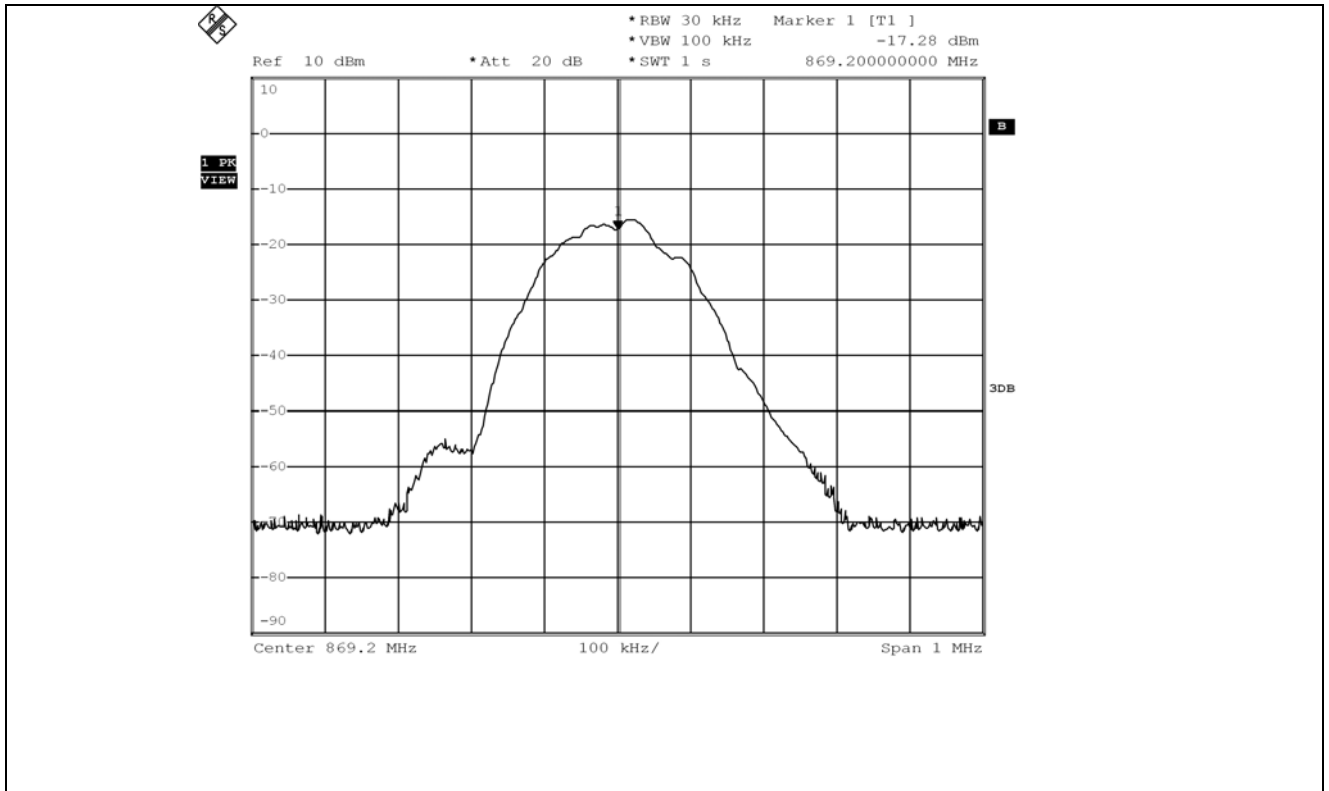


GSM – Input (Low Channel)

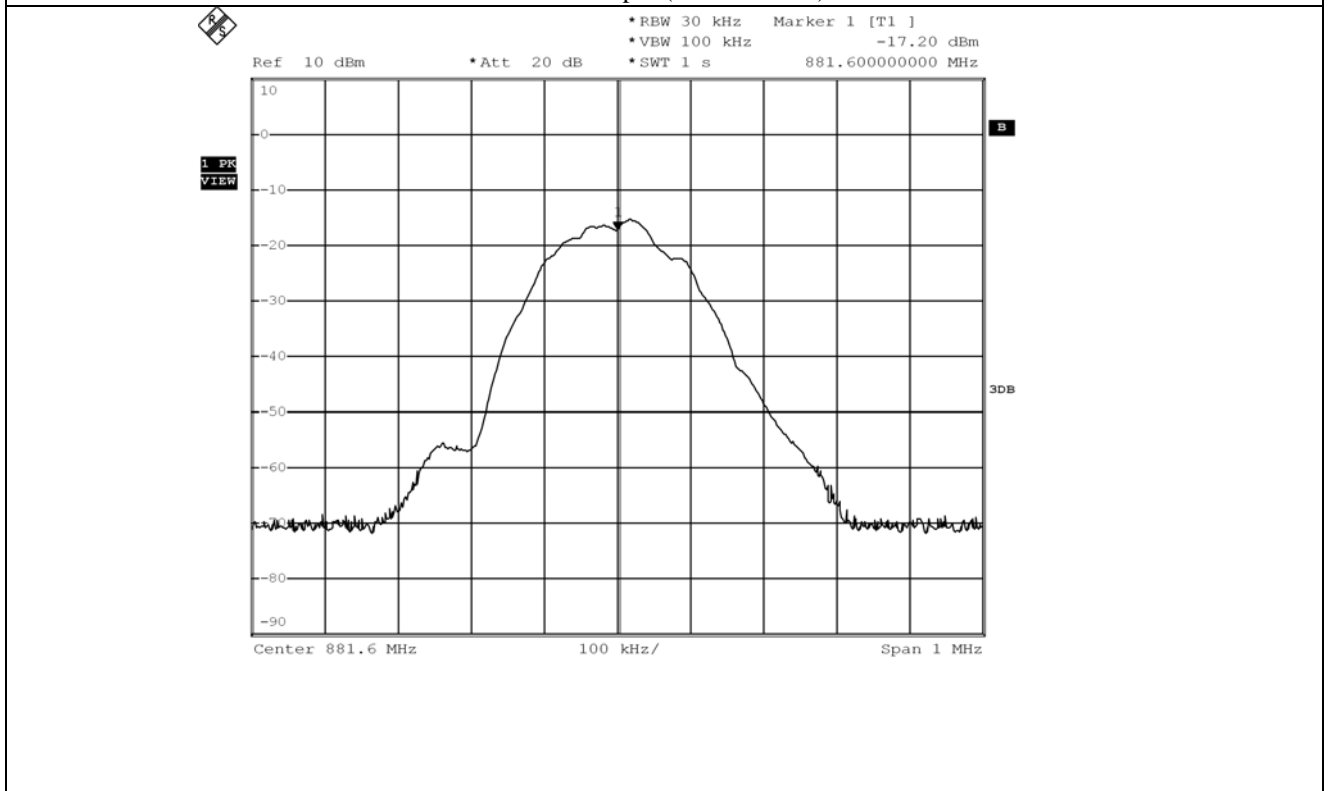


GSM – Input (Middle Channel)

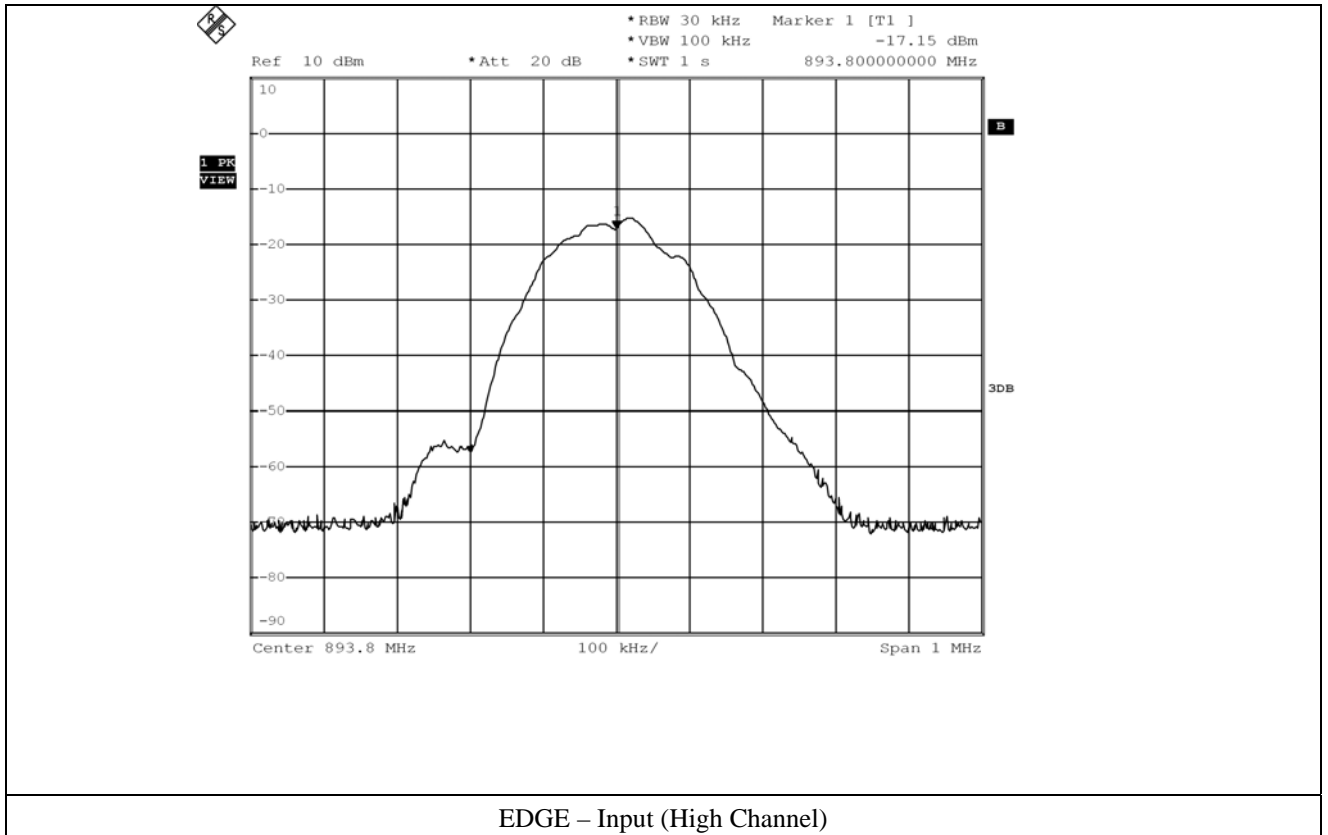


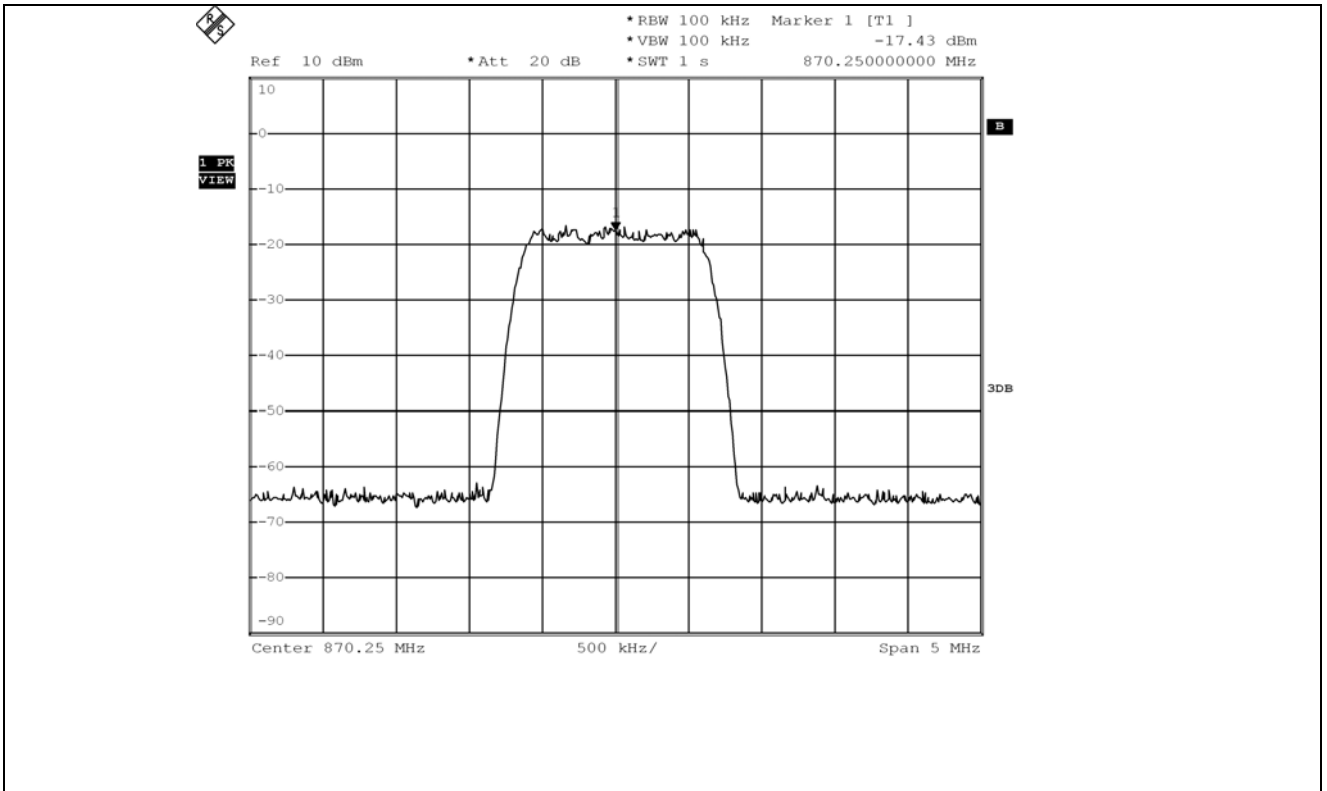


EDGE – Input (Low Channel)

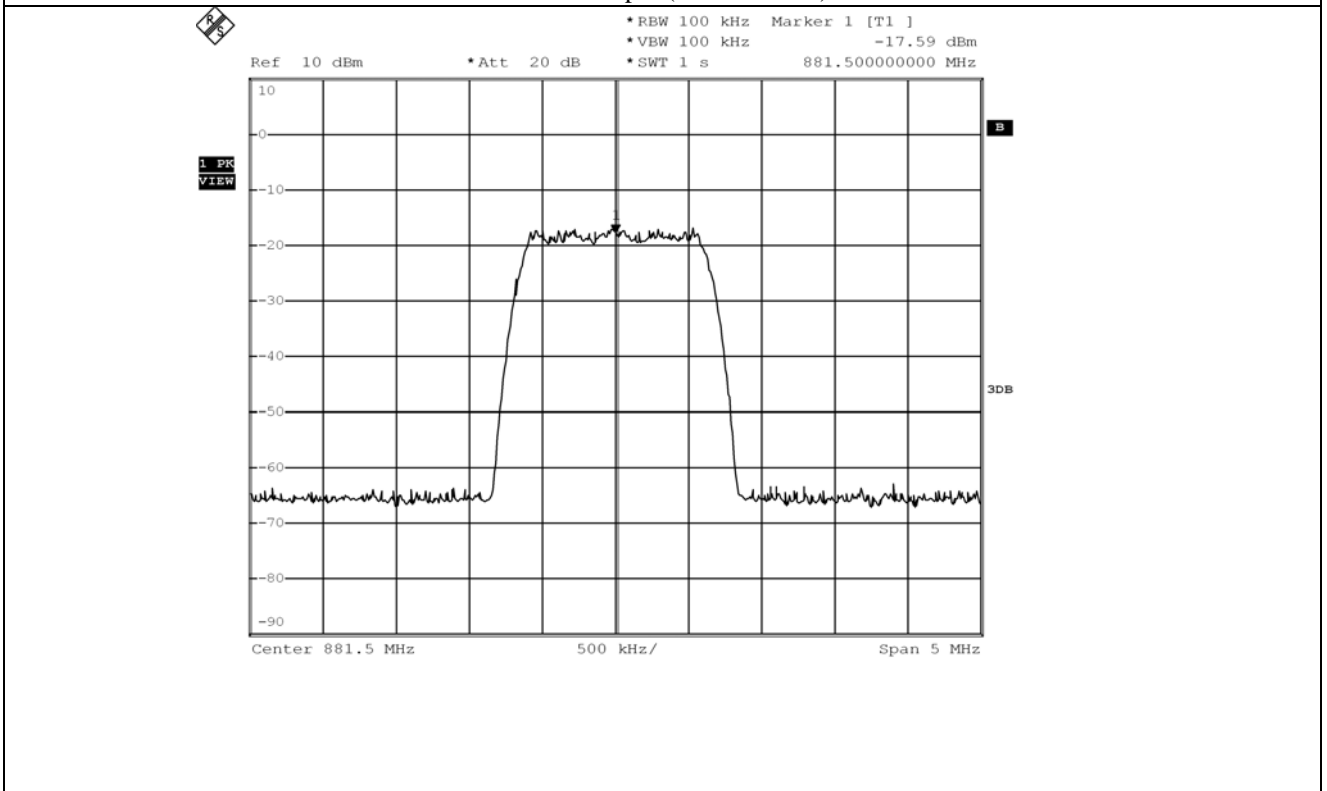


EDGE – Input (Middle Channel)

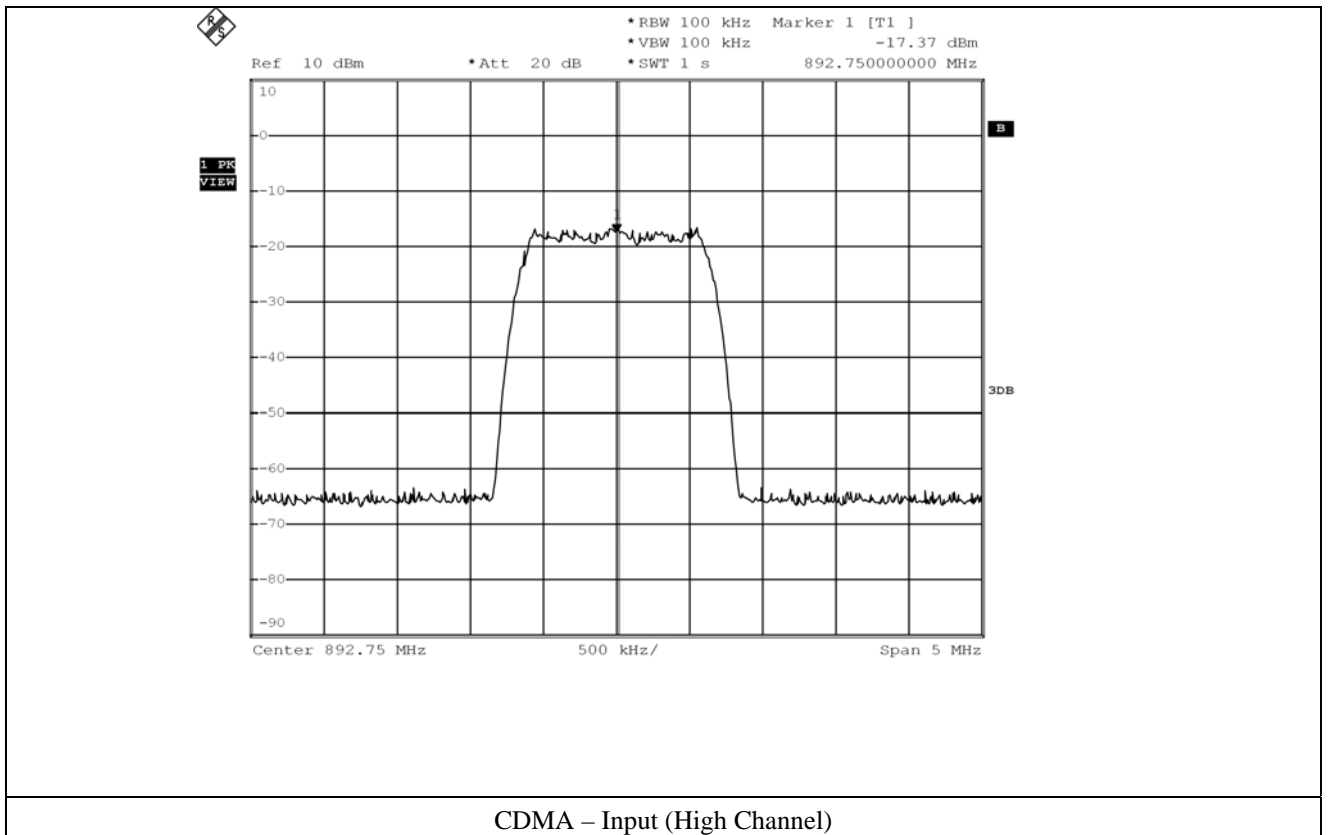




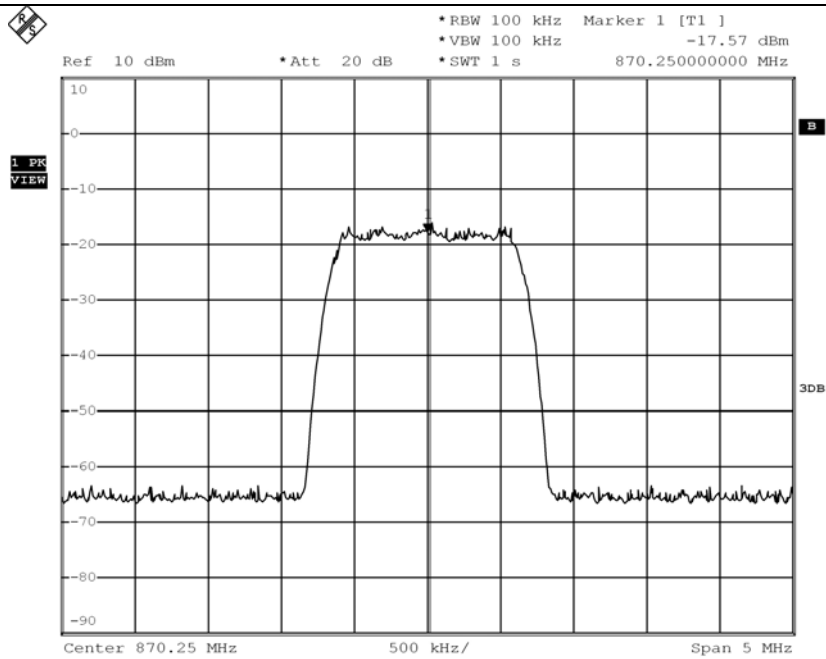
CDMA – Input (Low Channel)



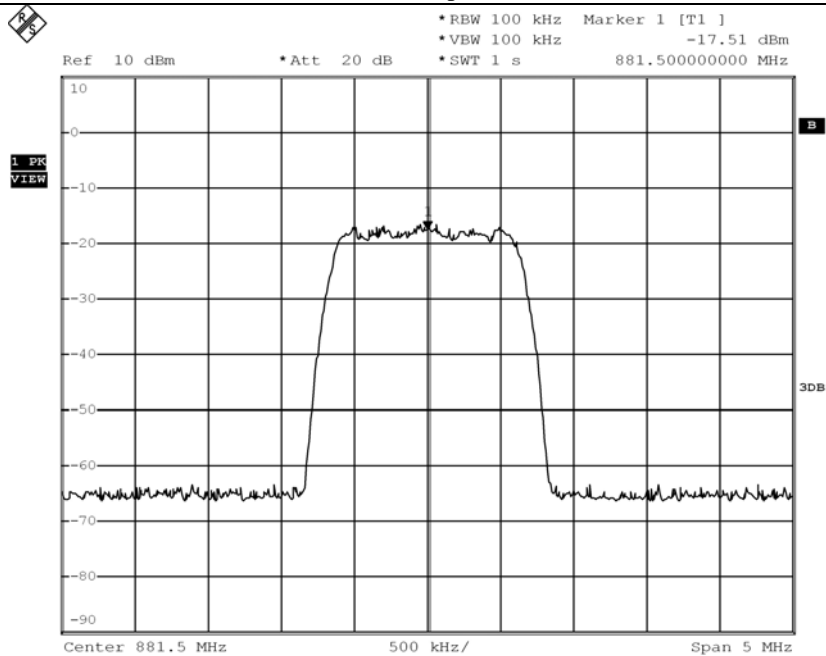
CDMA – Input (Middle Channel)



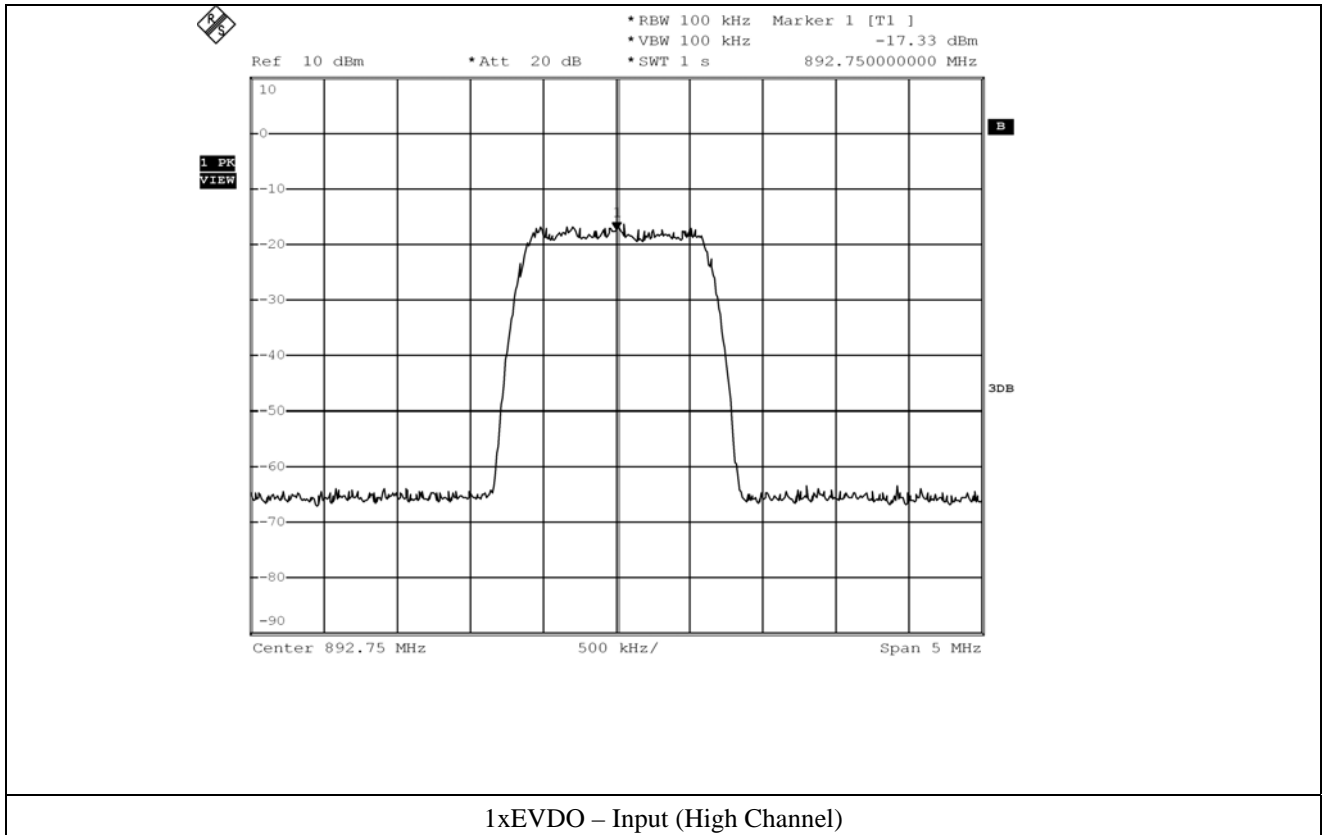


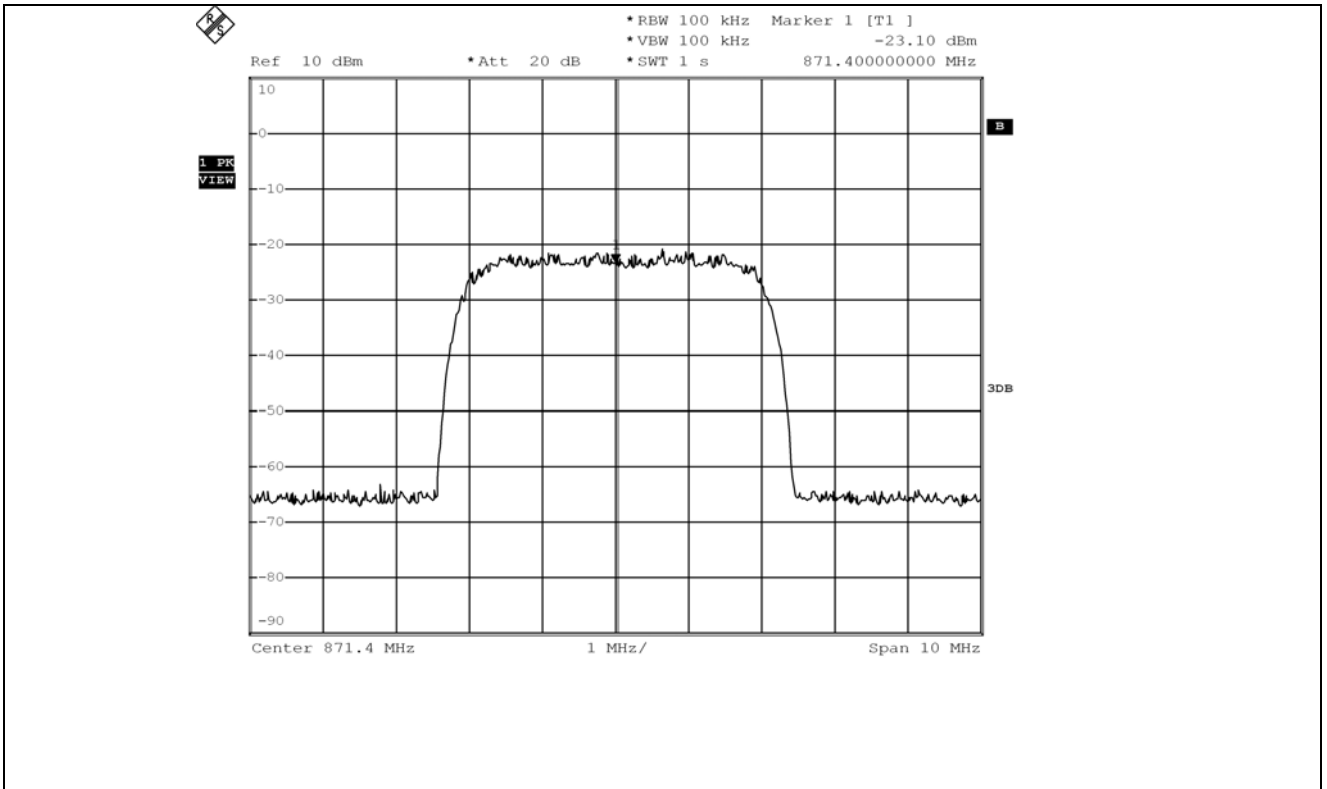


1xEVDO – Input (Low Channel)

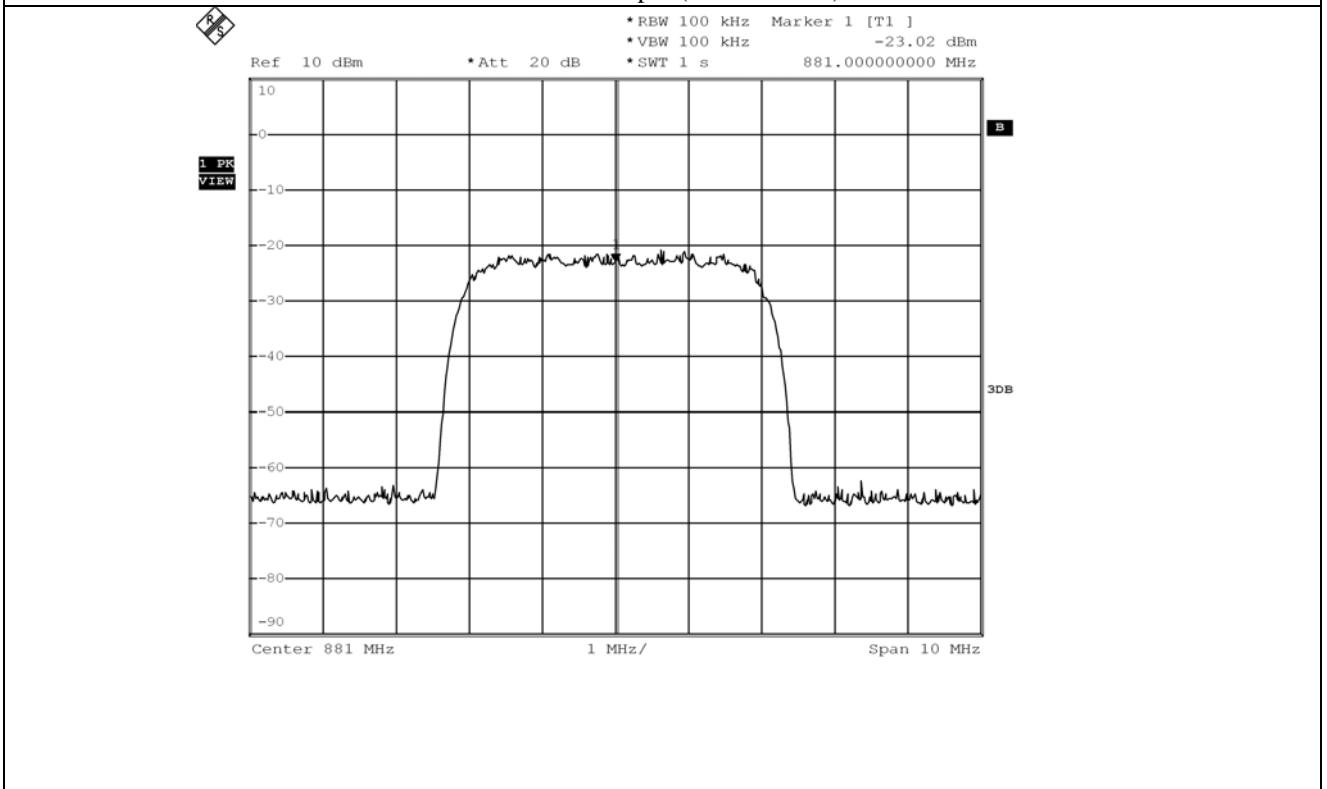


1xEVDO – Input (Middle Channel)

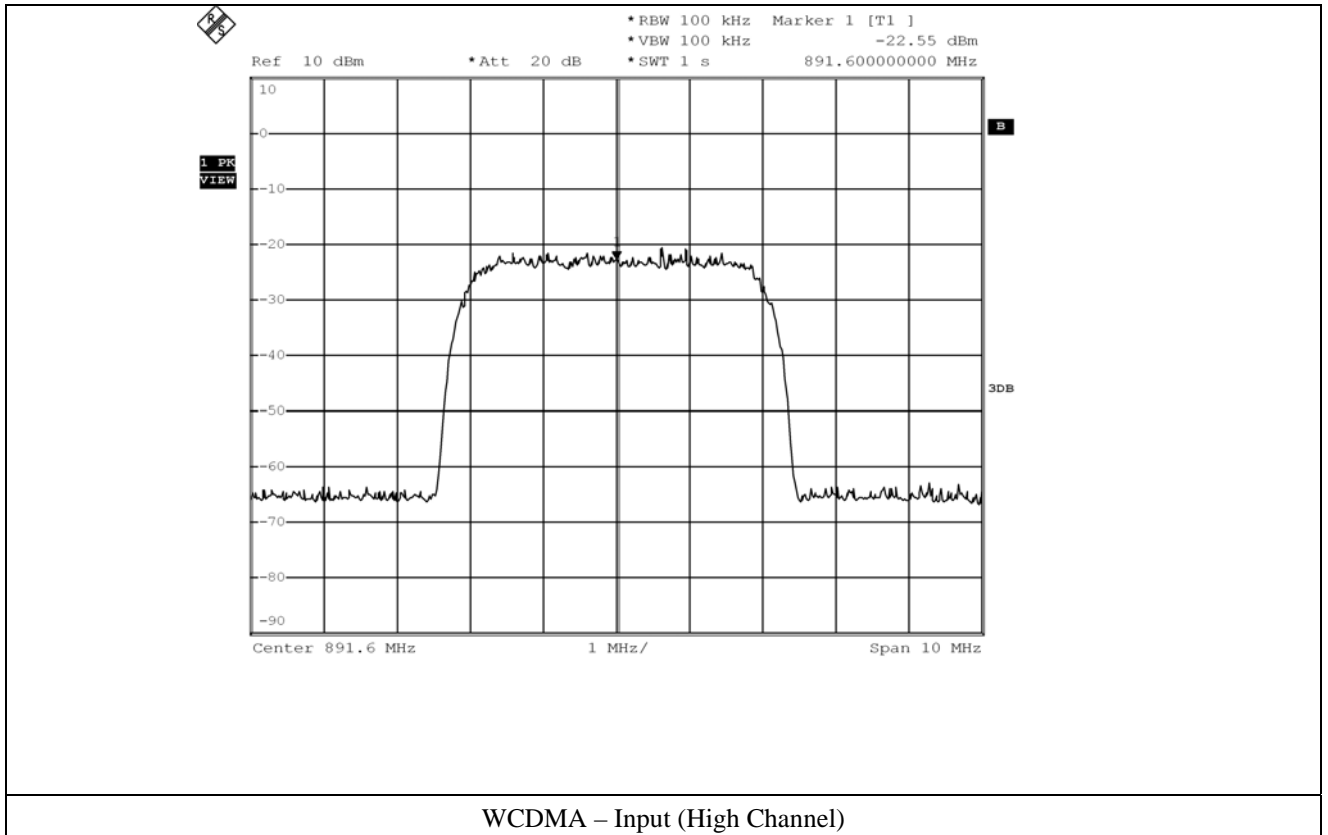




WCDMA – Input (Low Channel)



WCDMA – Input (Middle Channel)

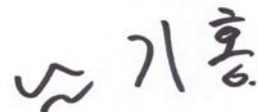


**6.4.2 Test Result for Part 27 C**

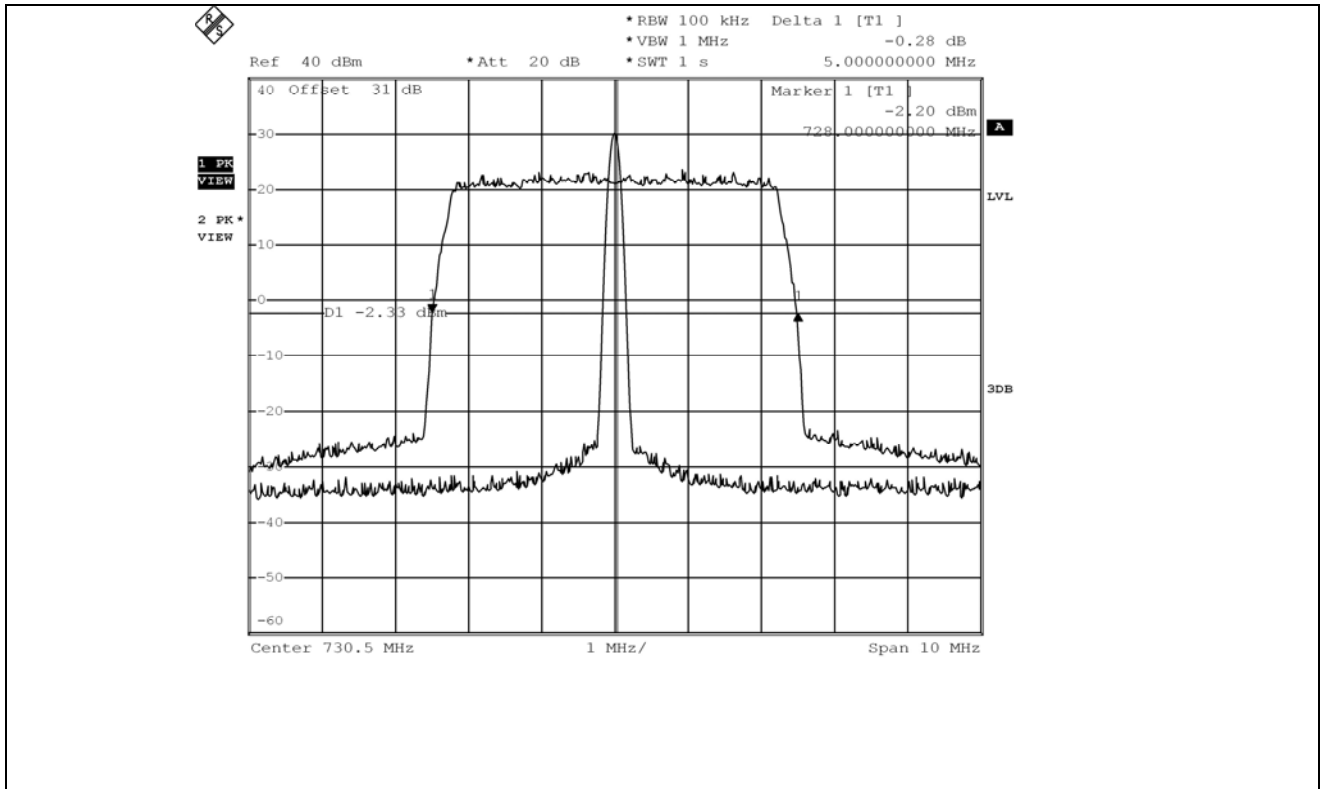
-. Test Date : May 16, 2012  
 -. Test Result : Pass

Modulation	Channel	20 dB Bandwidth (MHz)	99 % Occupied Bandwidth (kHz)
LTE (5 MHz)	Low	4.900	4.520
	Middle	4.900	4.540
	High	4.800	4.460
LTE (10 MHz)	Low	9.640	8.960
	Middle	9.640	9.000
	High	9.520	8.960

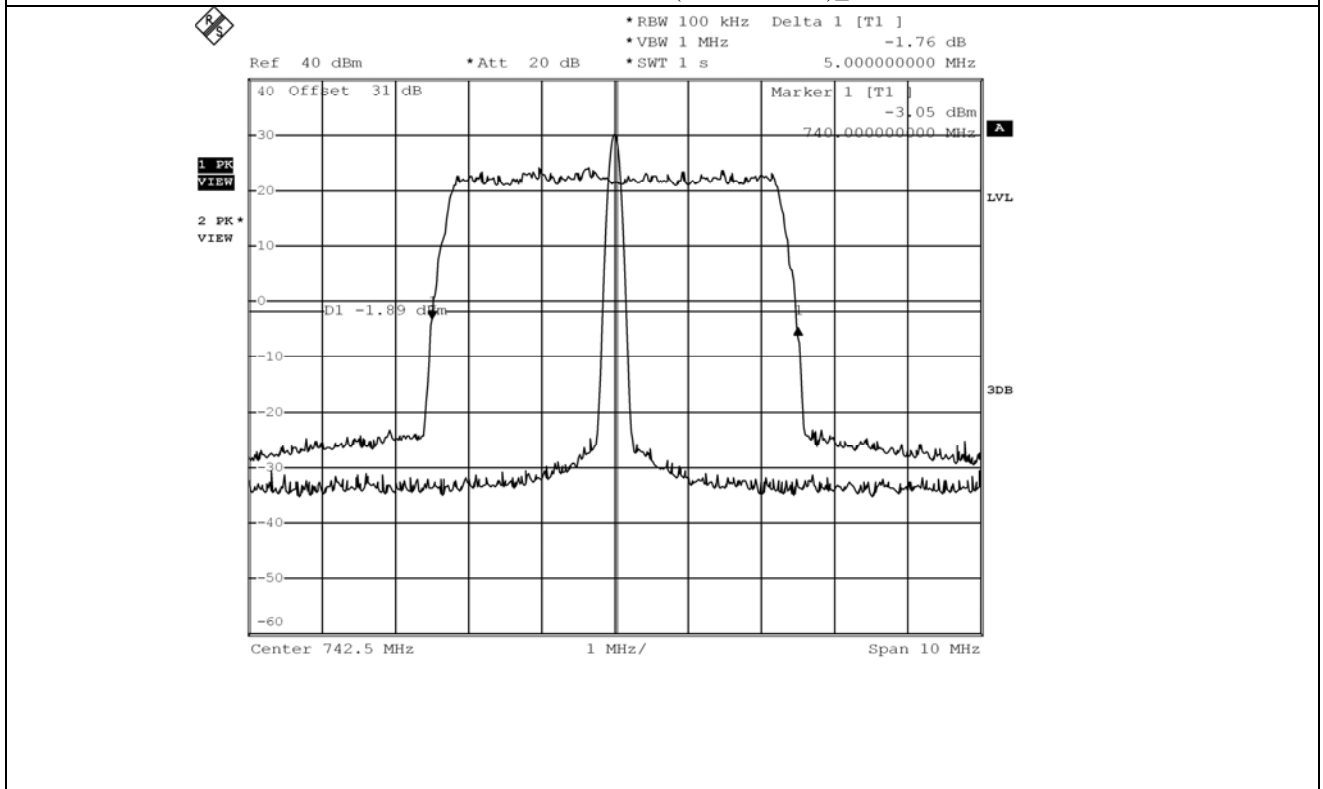
Remark: According to above result, the carrier frequency shall be within the frequency block edges.



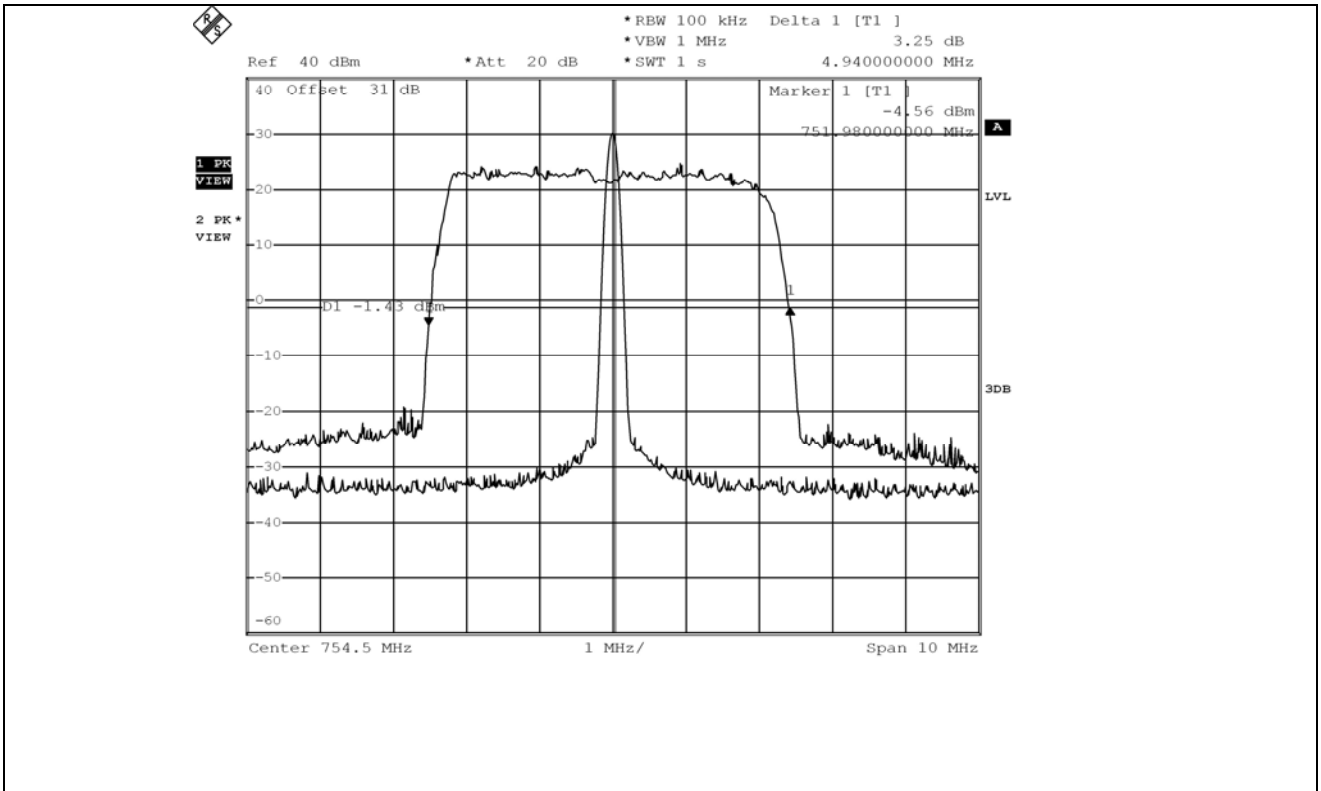
Tested by: **Ki-Hong, Nam / Project Engineer**



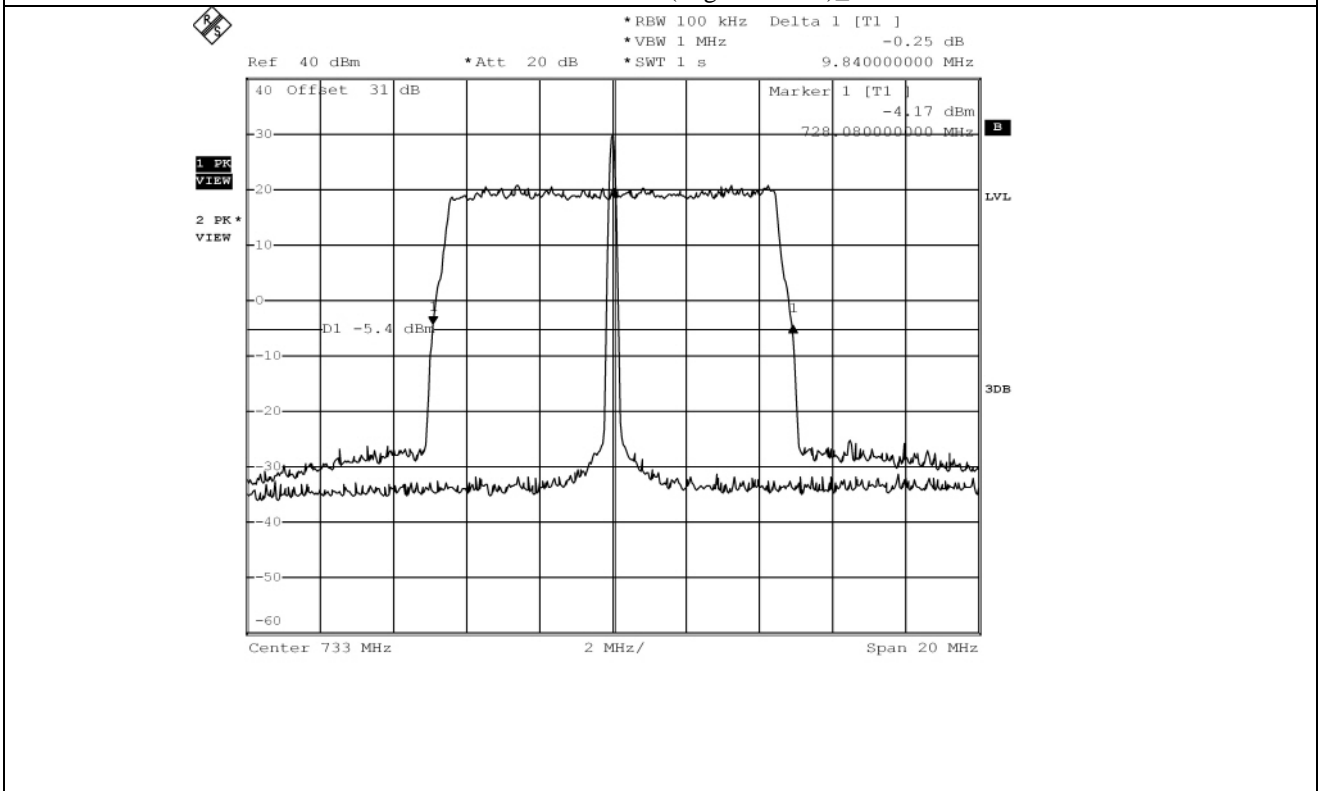
LTE – 26 dB Bandwidth (Low Channel)\_5 HMz



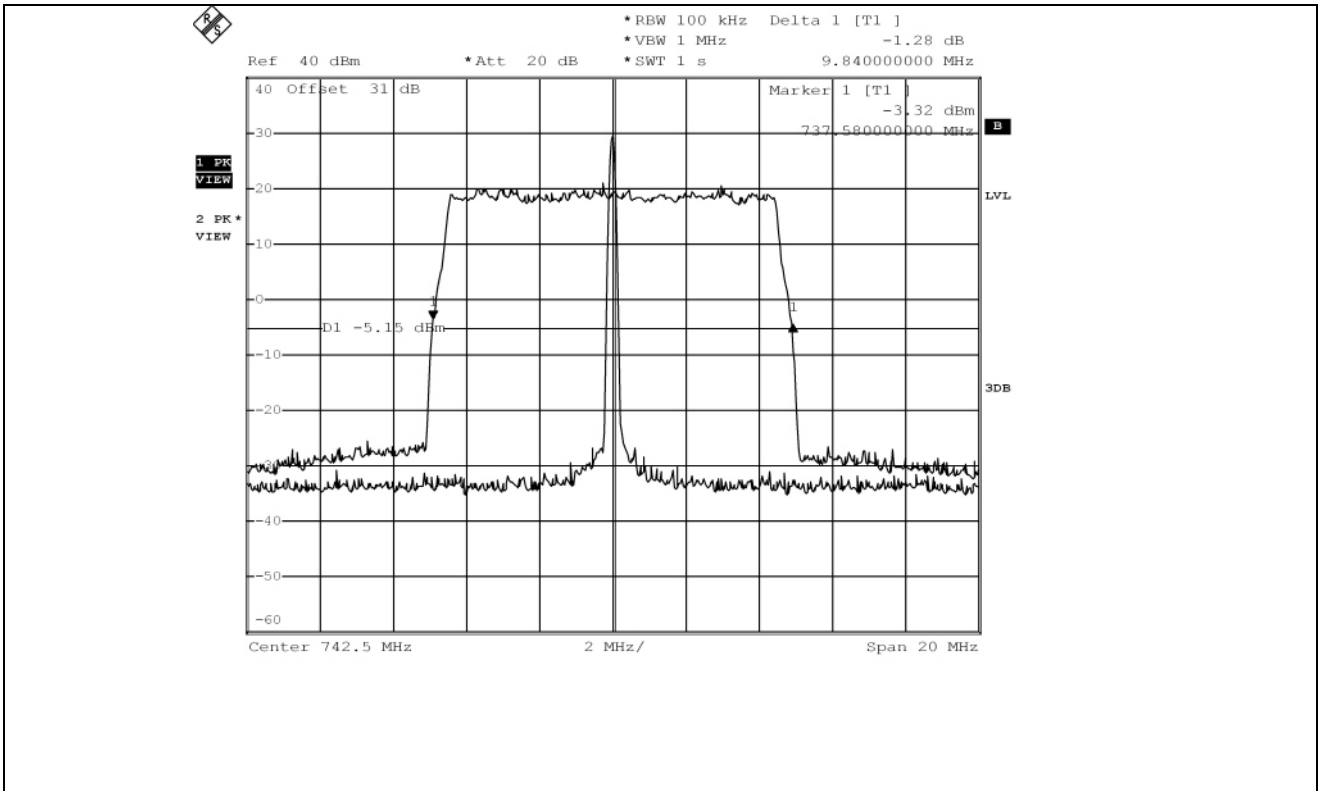
LTE – 26 dB Bandwidth (Middle Channel)\_5 HMz



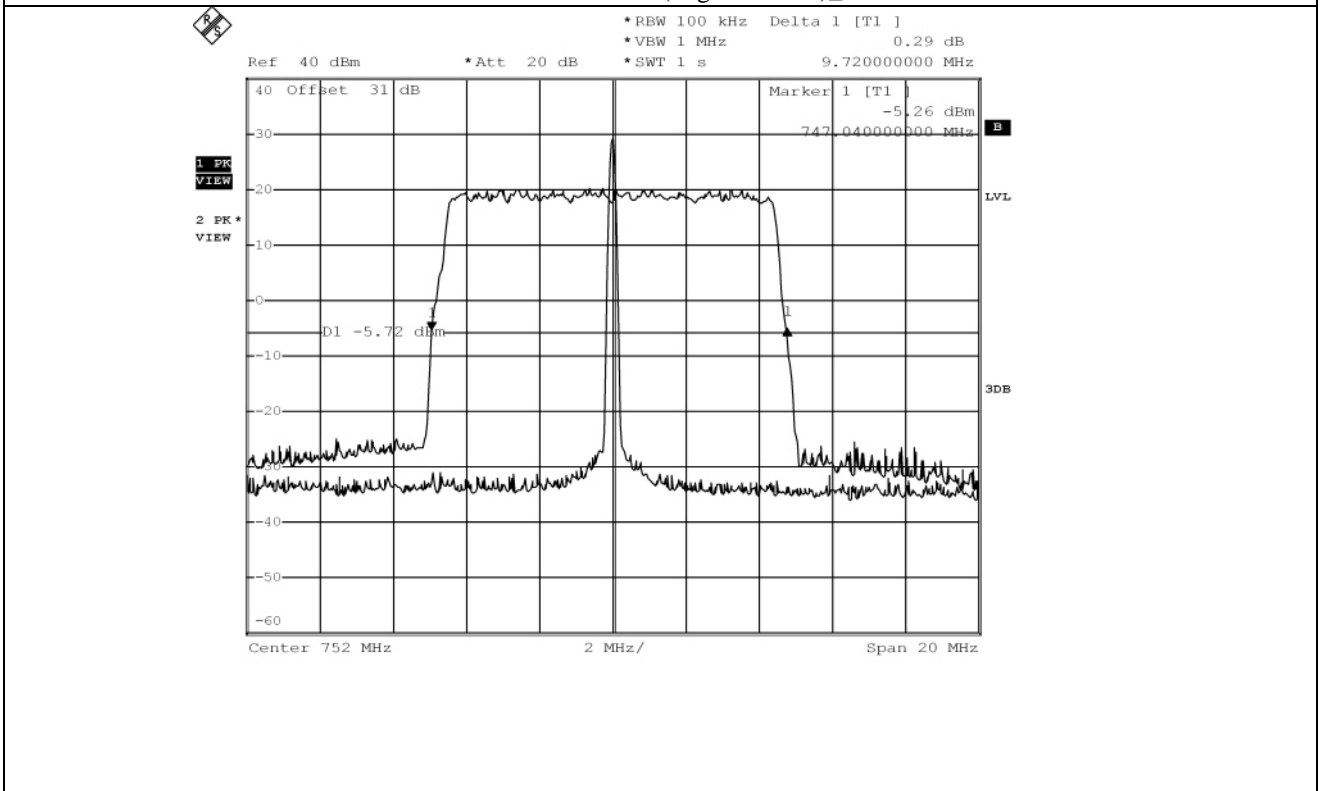
LTE – 26 dB Bandwidth (High Channel)\_5 HMz



LTE – 26 dB Bandwidth (Low Channel)\_10 HMz

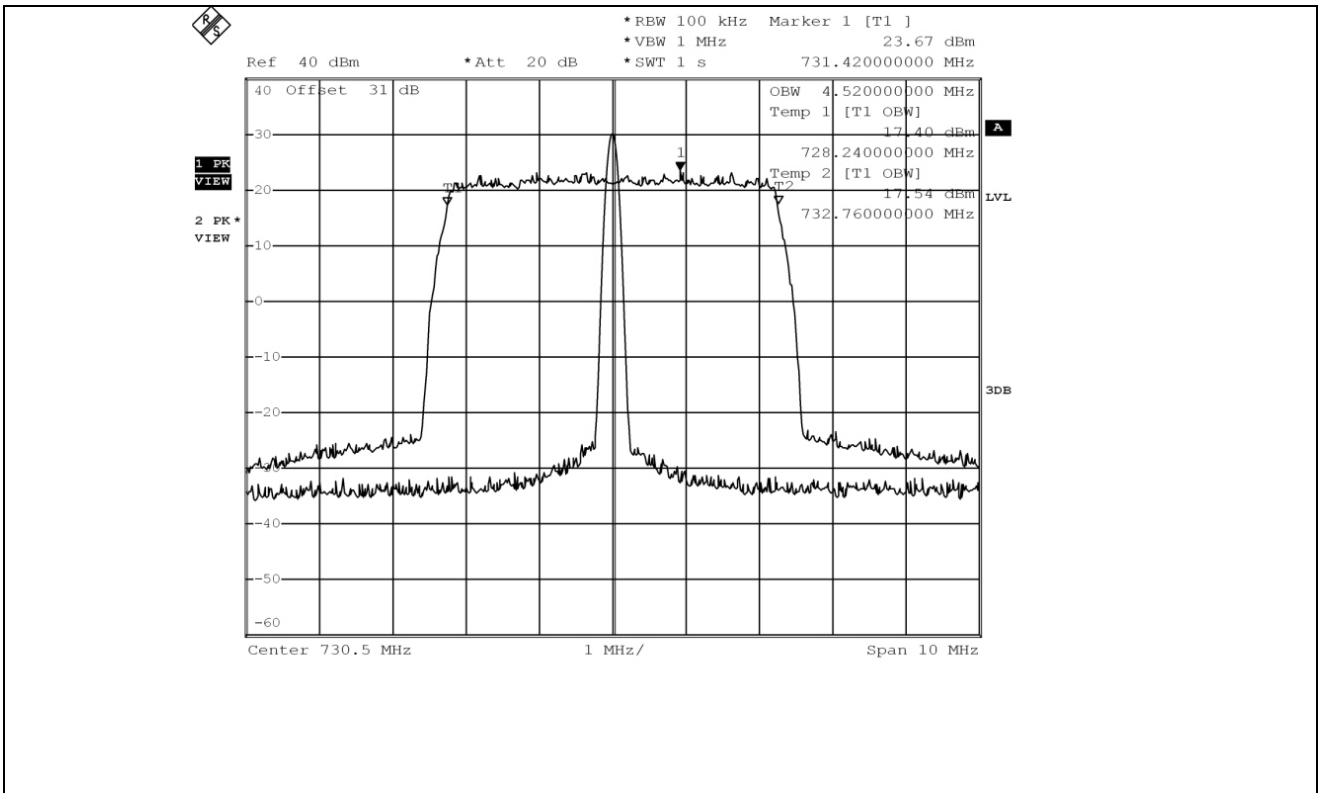


LTE – 26 dB Bandwidth (High Channel)\_10 HMz

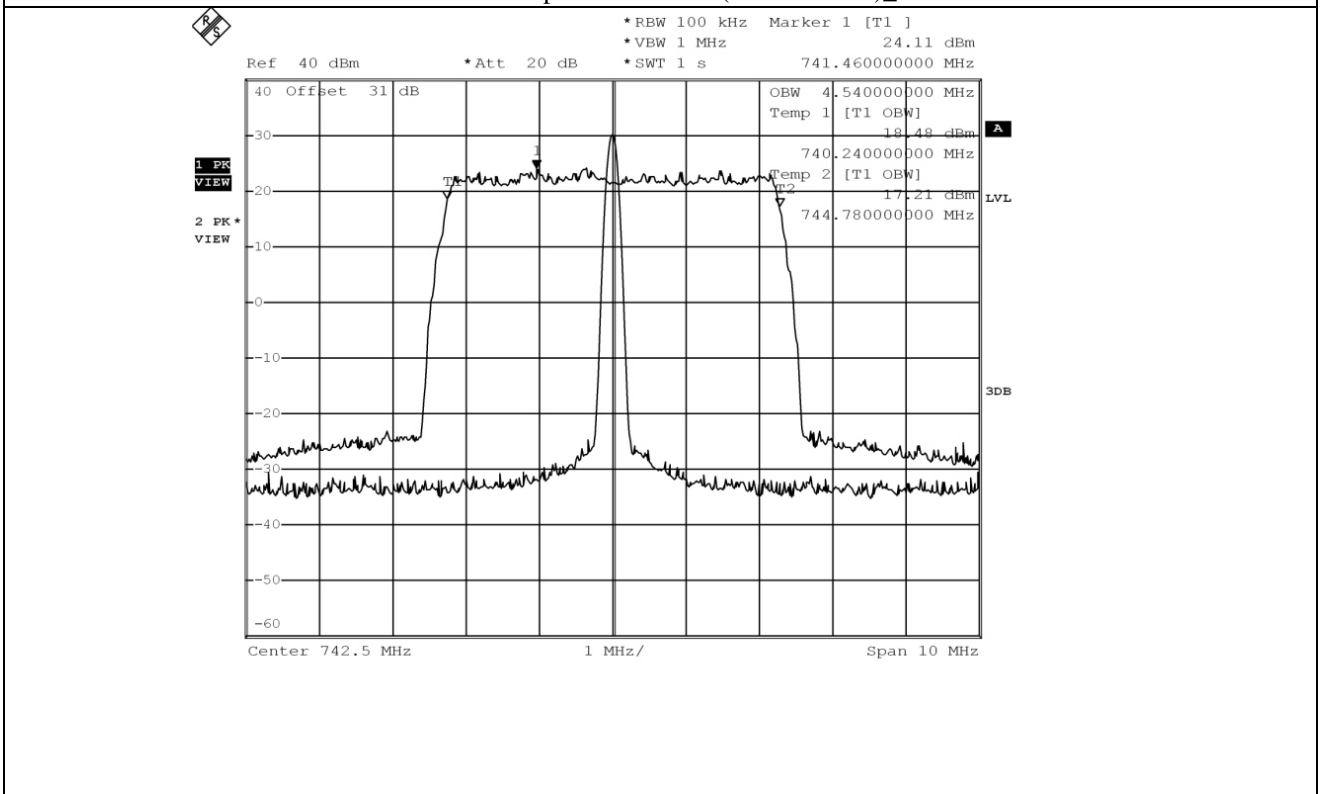


LTE – 26 dB Bandwidth (Low Channel)\_10 HMz

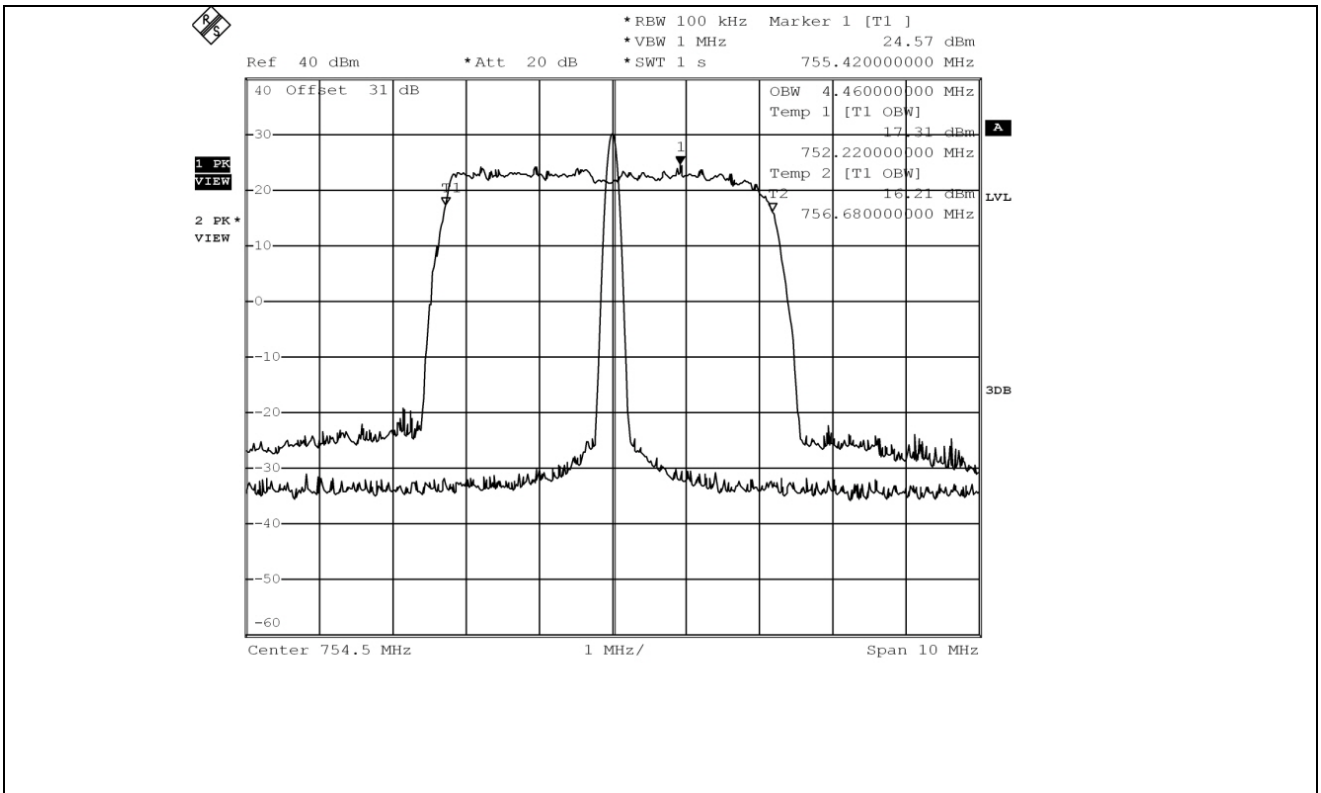




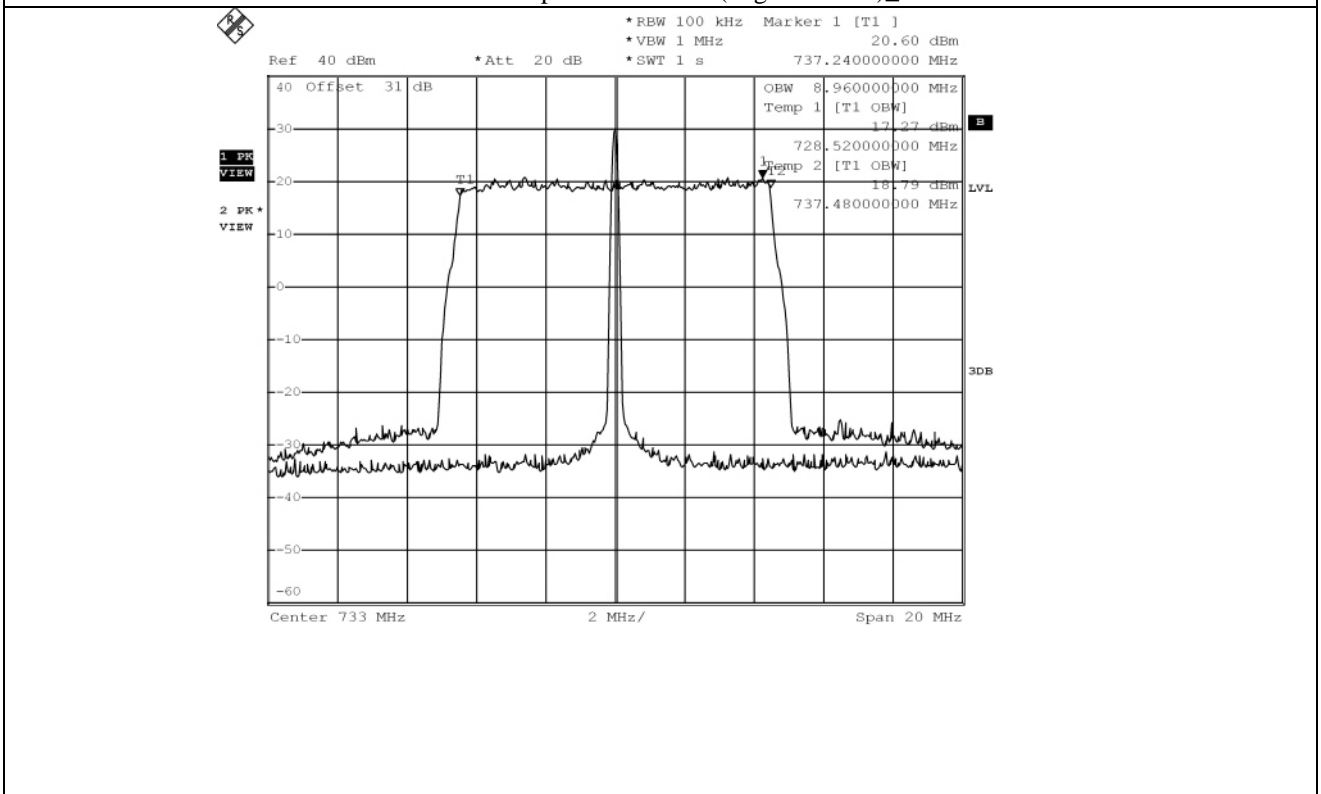
LTE – 99 % Occupied Bandwidth (Low Channel)\_5 HMz



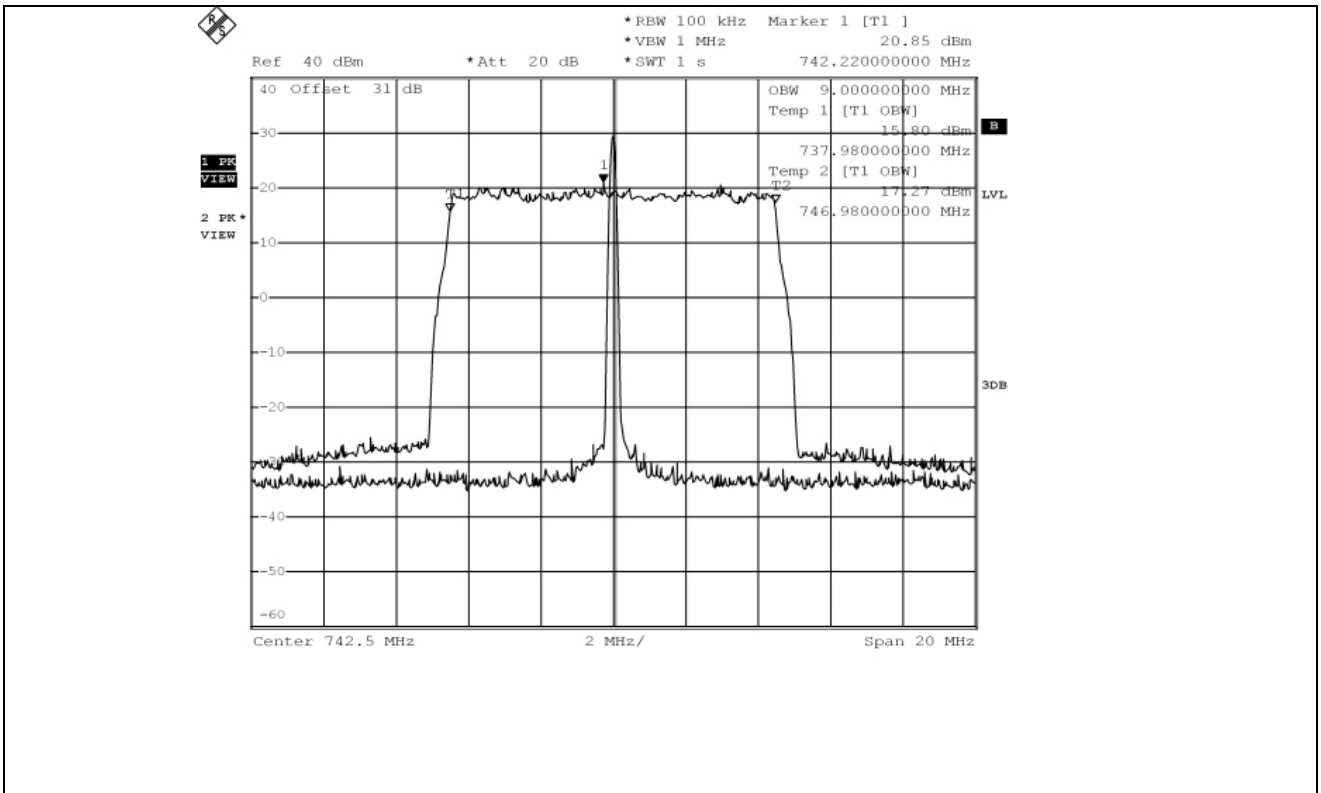
LTE – 99 % Occupied Bandwidth (Middle Channel)\_5 HMz



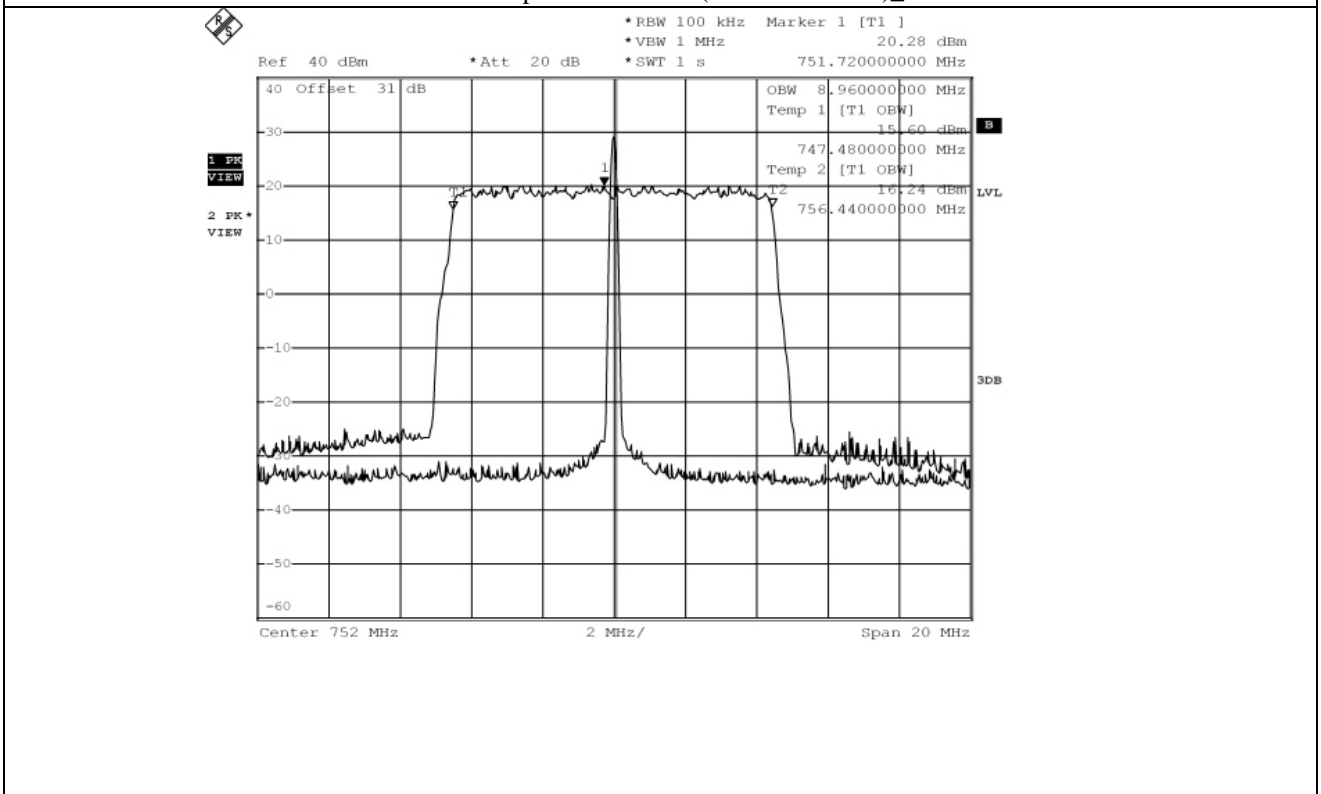
LTE – 99 % Occupied Bandwidth (High Channel)\_5 HMz



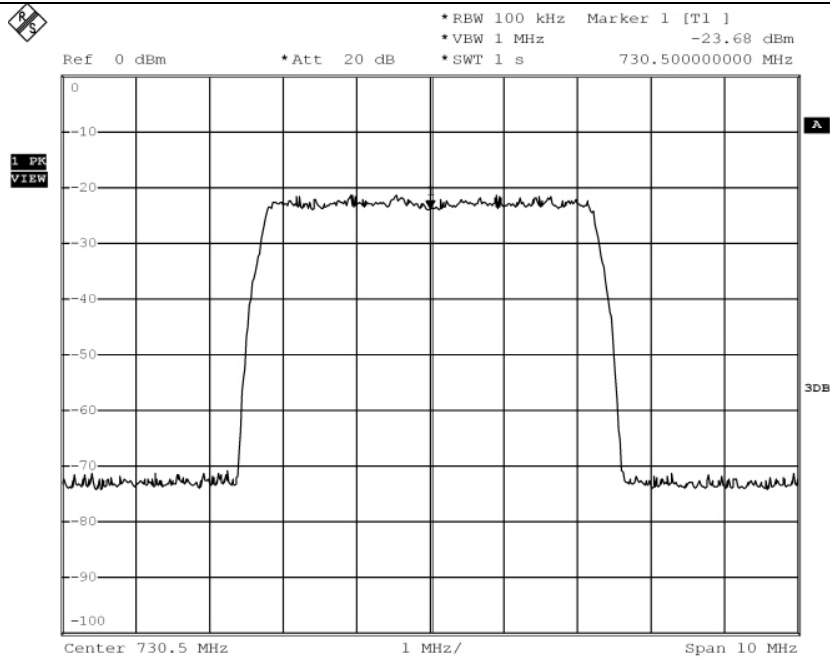
LTE – 99 % Occupied Bandwidth (Low Channel)\_10 HMz



LTE – 99 % Occupied Bandwidth (Middle Channel)\_10 HMz

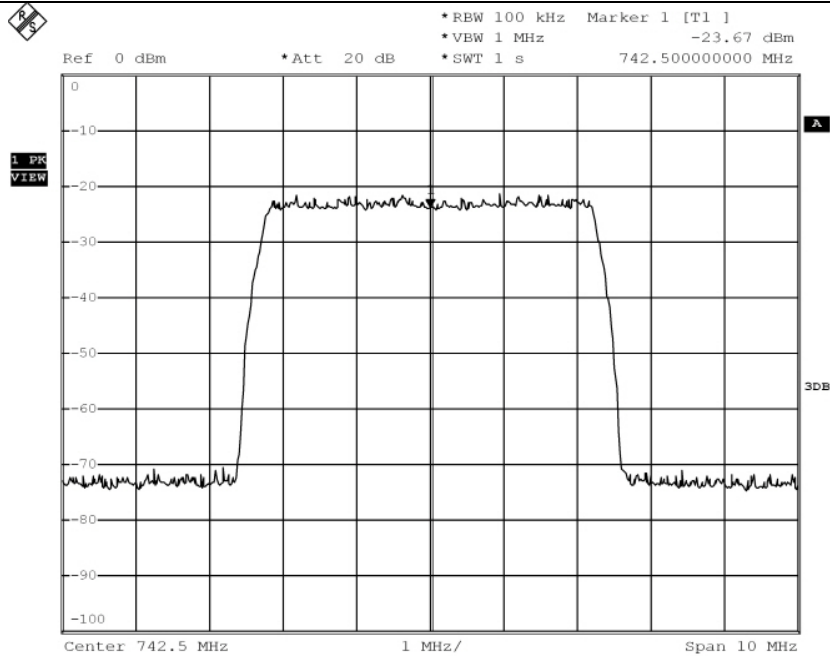


LTE – 99 % Occupied Bandwidth (High Channel)\_10 HMz



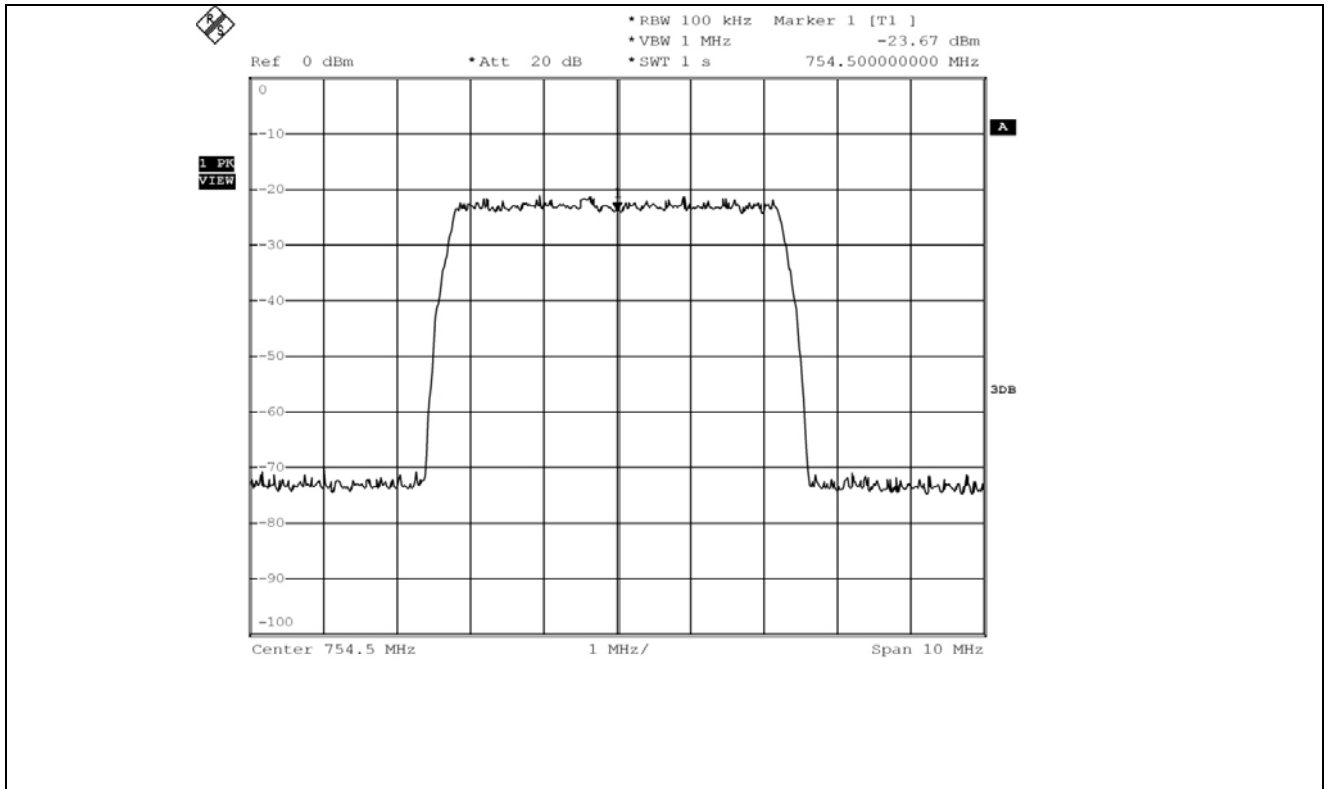
Date: 29.MAY.2012 14:47:38

**LTE – Input (Low Channel)\_5 HMz**

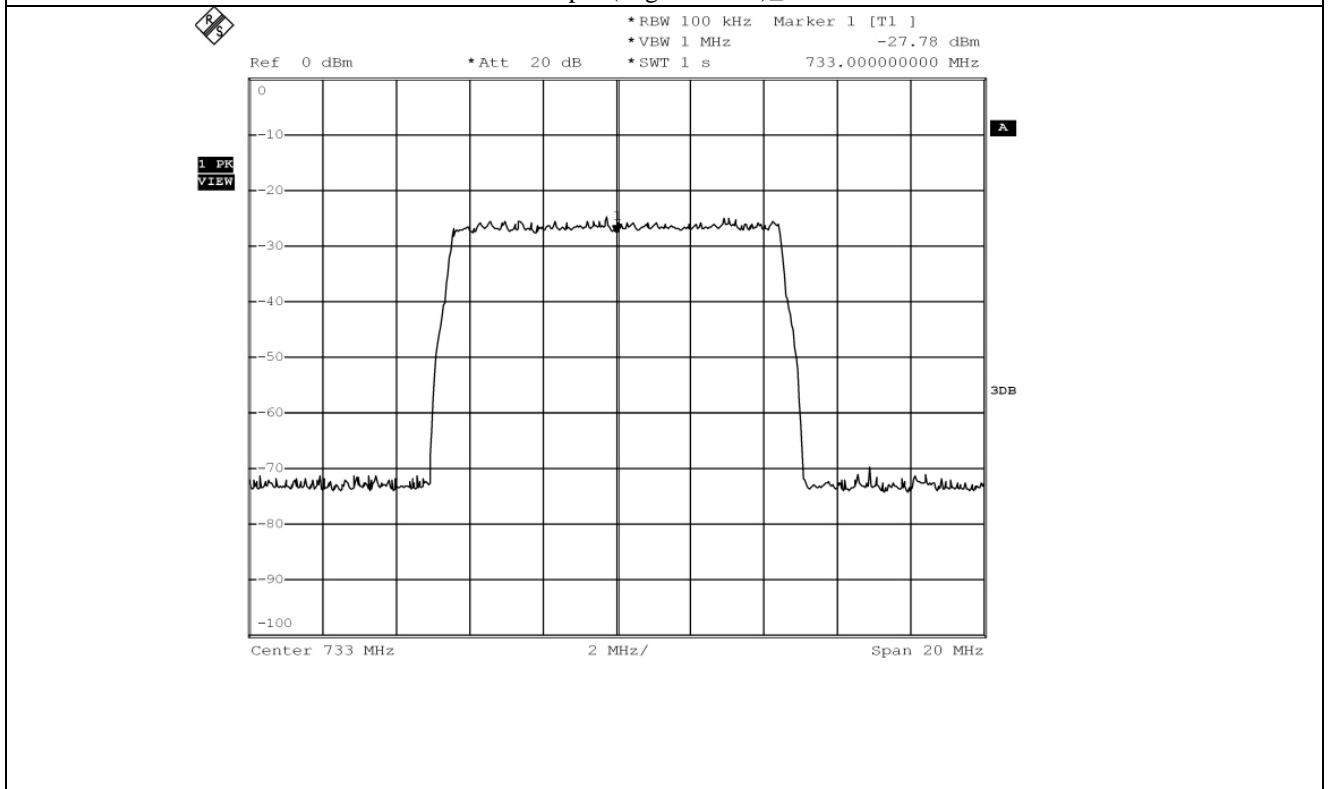


Date: 29.MAY.2012 14:47:58

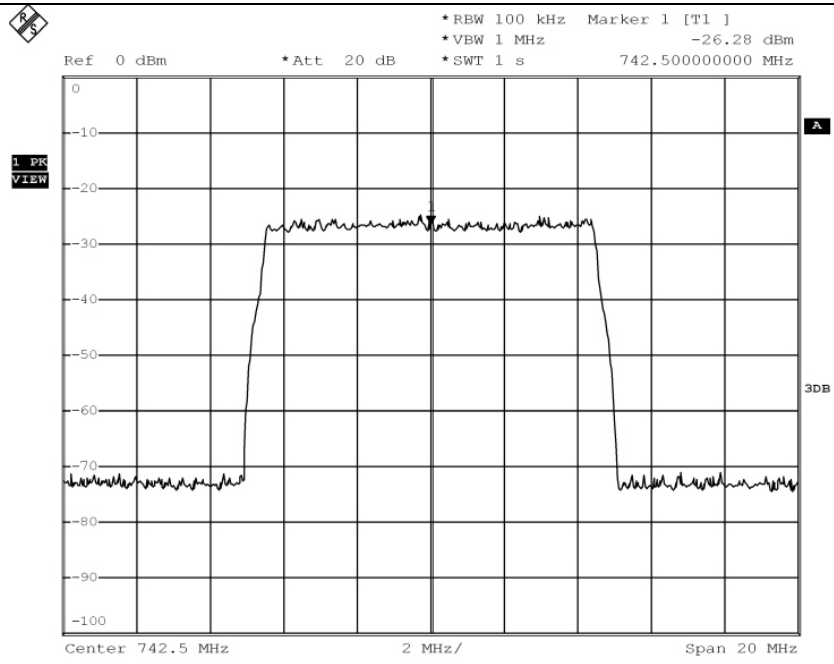
**LTE – Input (Middle Channe)\_5 HMz**



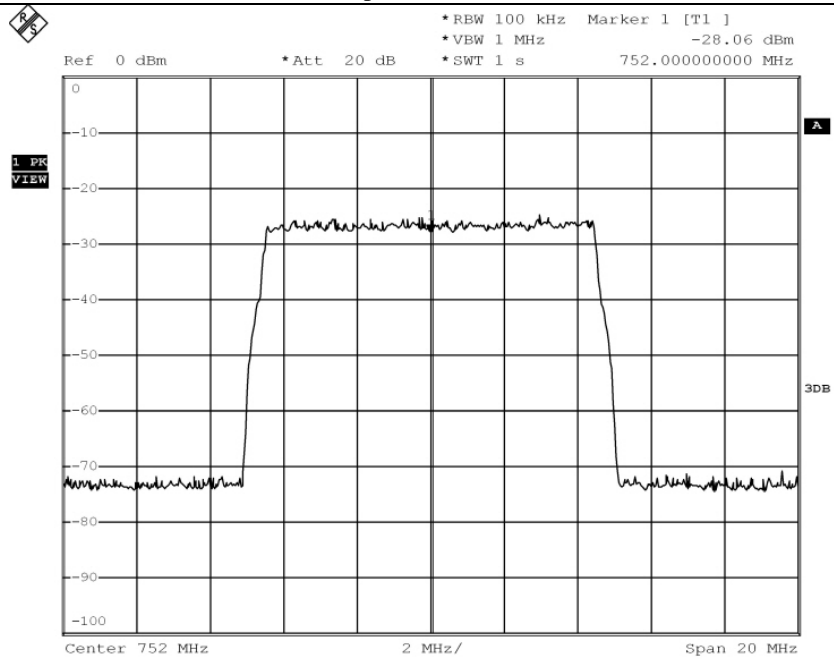
LTE – Input (High Channe)\_5 Hmz



LTE – Input (Low Channel)\_10 Hmz



LTE – Input (Middle Channe)\_10 HMz



LTE – Input (High Channe)\_10 HMz

## 7. SPURIOUS EMISSION AT ANTENNA TERMINAL

### 7.1 Operating environment

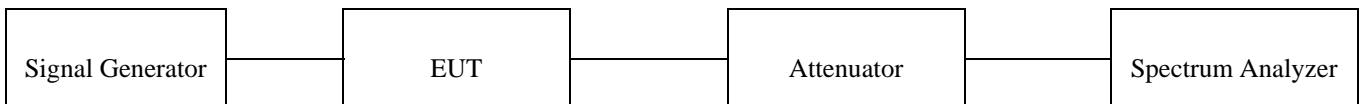
Temperature : 24 °C  
Relative humidity : 50 % R.H.

### 7.2 Test set-up for conducted measurement

The RF signal from the signal generator(s) was injected to the EUT by 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.

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 10 GHz.



### 7.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	E4432B	HP	Signal Generator	US38440950	June 10, 2011 (1Y)
■ -	SMJ100A	R/S	Signal Generator	101038	Feb. 01, 2012 (1Y)
□ -	FSP	R/S	Spectrum Analyzer	100017	Mar. 12, 2012 (1Y)
■ -	8564E	HP	Spectrum Analyzer	3650A00756	Jun. 10, 2011 (1Y)
□ -	FSV30	R/S	Spectrum Analyzer	101372	Aug. 29, 2011 (1Y)
■ -	67-30-43	Aeroflex Weinschel	Power Attenuator	CA5760	Nov. 30, 2011 (1Y)

All test equipment used is calibrated on a regular basis.

## 7.4 Test data

### 7.4.1 Test Result for Part 22 H

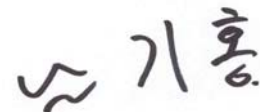
- . Test Date : May 18, 2012
- . Frequency range : 30 MHz ~ 10 GHz
- . Result : PASSED

Modulation	Harmonic Frequency (MHz)		Measured Value (dBm)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
GSM	Low	746.20	-37.17	0.50	-36.67	-13.00	-23.67
		7 090.00	-31.50	3.50	-28.00		-15.00
	Middle	746.20	-37.00	0.50	-36.50		-23.50
		7 390.00	-31.83	3.50	-28.33		-15.33
	High	743.00	-37.33	0.50	-36.83		-23.83
		7 210.00	-31.83	3.50	-28.33		-15.33
EDGE	Low	739.70	-36.67	0.50	-36.17	-13.00	-23.17
		7 330.00	-31.50	3.50	-28.00		-15.00
	Middle	739.70	-37.33	0.50	-36.83		-23.83
		7 420.00	-31.83	3.50	-28.33		-15.33
	High	738.10	-37.83	0.50	-37.33		-24.33
		7 285.00	-31.67	3.50	-28.17		-15.17
CDMA	Low	739.70	-37.50	0.50	-37.00	-13.00	-24.00
		7 225.00	-31.83	3.50	-28.33		-15.33
	Middle	747.80	-36.33	0.50	-35.83		-22.83
		7 540.00	-32.00	3.50	-28.50		-15.50
	High	746.20	-37.00	0.50	-36.50		-23.50
		7 525.00	-31.33	3.50	-27.83		-14.83

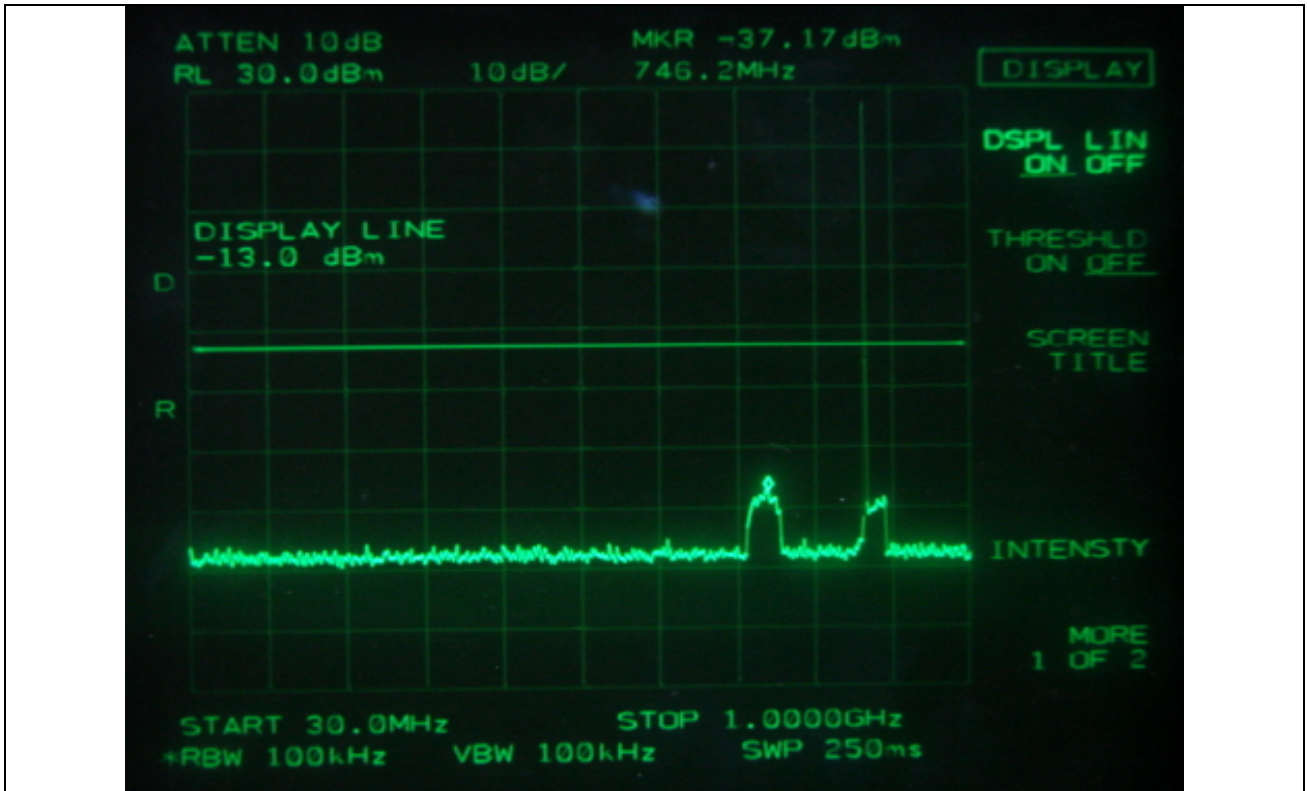


Modulation	Harmonic Frequency (MHz)	Measured Value (dBm)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)	
1xEVDO	Low	744.60	-36.00	0.50	-35.50	-13.00	-22.50
		7 360.00	-32.00	3.50	-28.50		-15.50
	Middle	747.80	-36.67	0.50	-36.17		-23.17
		7 390.00	-31.67	3.50	-28.17		-15.17
	High	746.20	-36.67	0.50	-36.17		-23.17
		7 465.00	-31.83	3.50	-28.33		-15.33
WCDMA	Low	746.20	-36.67	0.50	-36.17	-13.00	-23.17
		7 270.00	-31.33	3.50	-27.83		-14.83
	Middle	751.00	-36.33	0.50	-35.83		-22.83
		7 210.00	-31.67	3.50	-28.17		-15.17
	High	744.60	-36.17	0.50	-35.67		-22.67
		7 585.00	-32.00	3.50	-28.50		-15.50

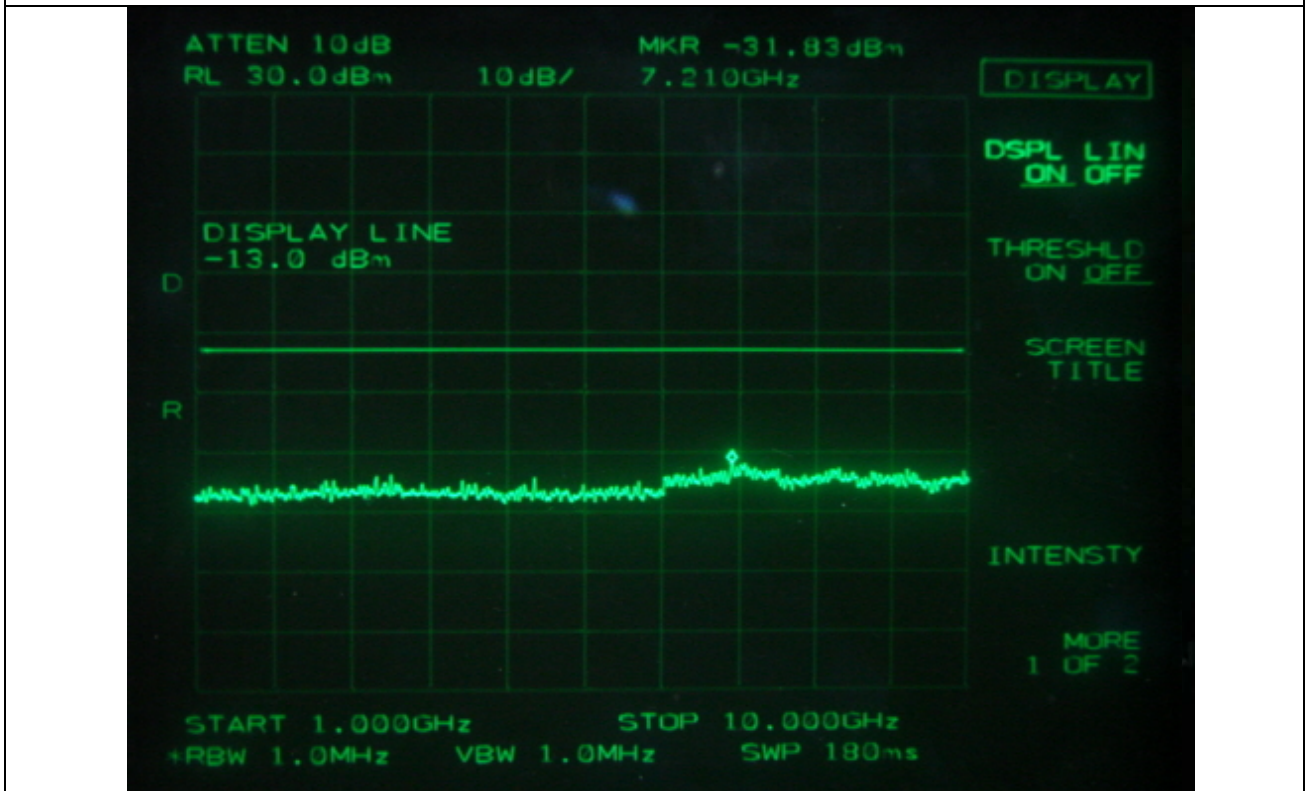
According to Part 22H, out of band emission shall be attenuated by  $43 + 10 \log (P)$  dBc, equates to -13.0 dBm.



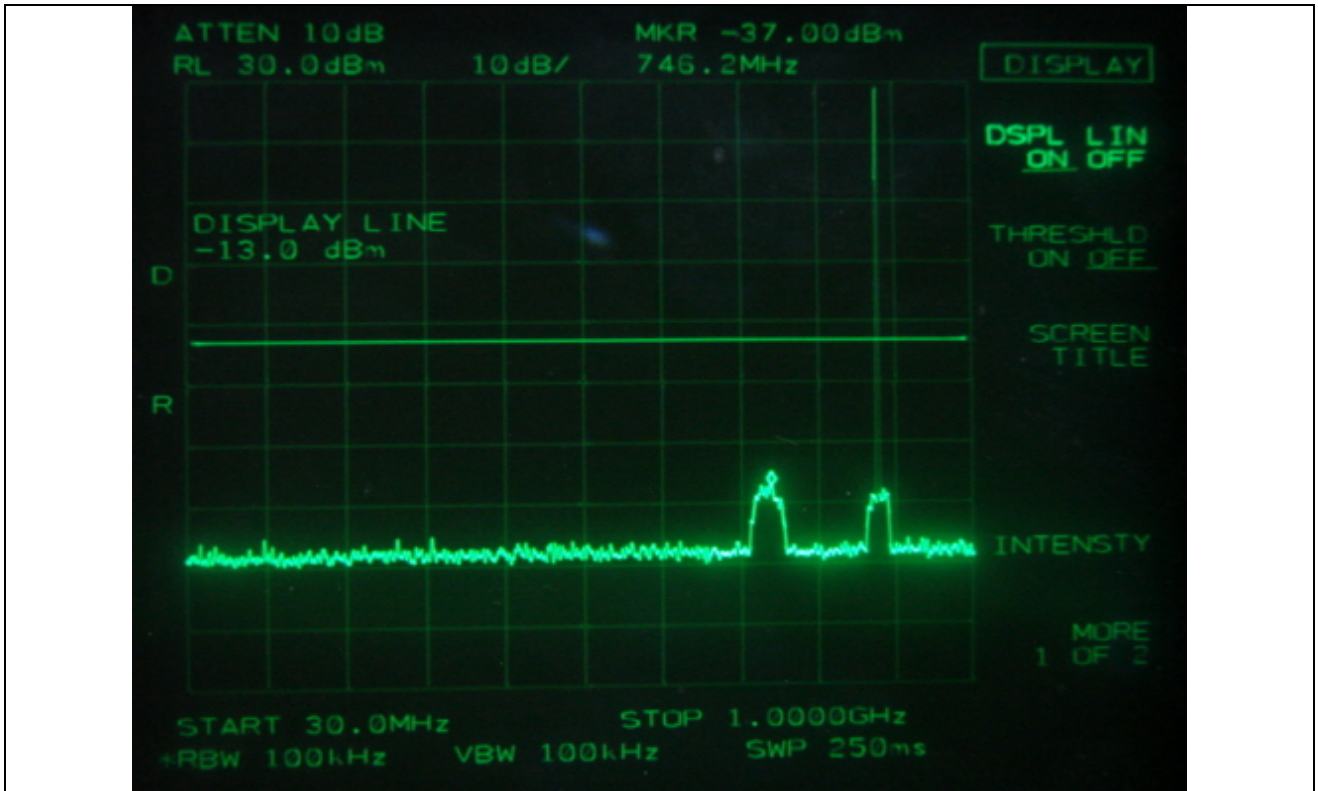
**Tested by: Ki-Hong, Nam / Project Engineer**



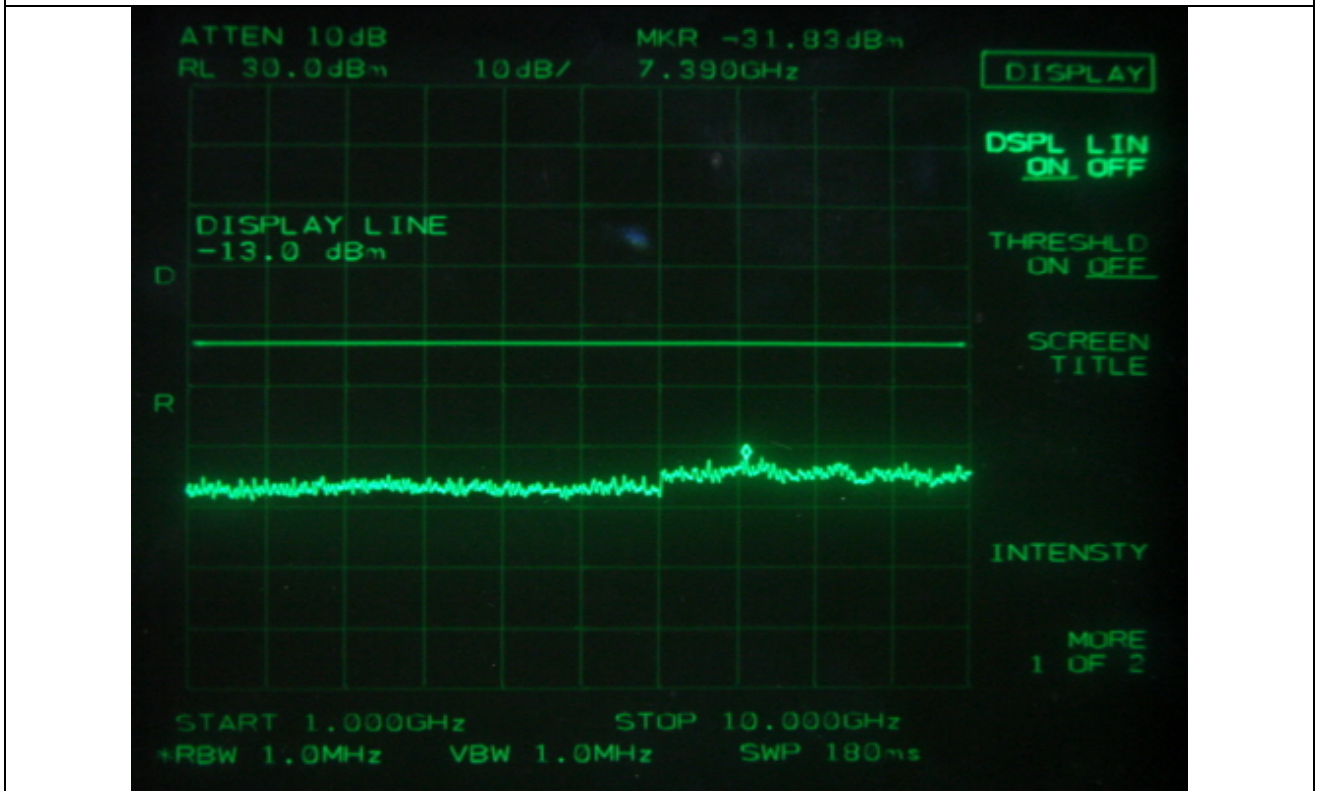
GSM - Low Channel



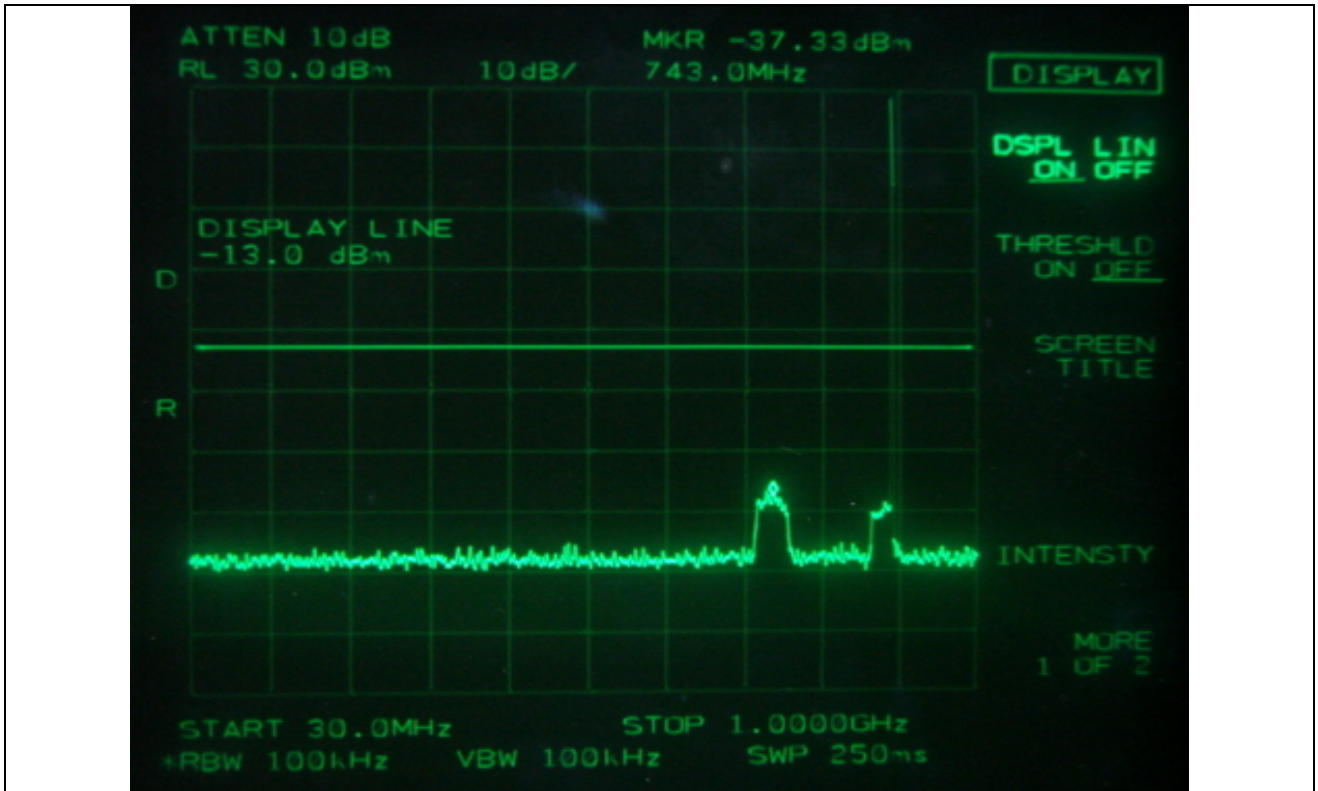
GSM - Low Channel



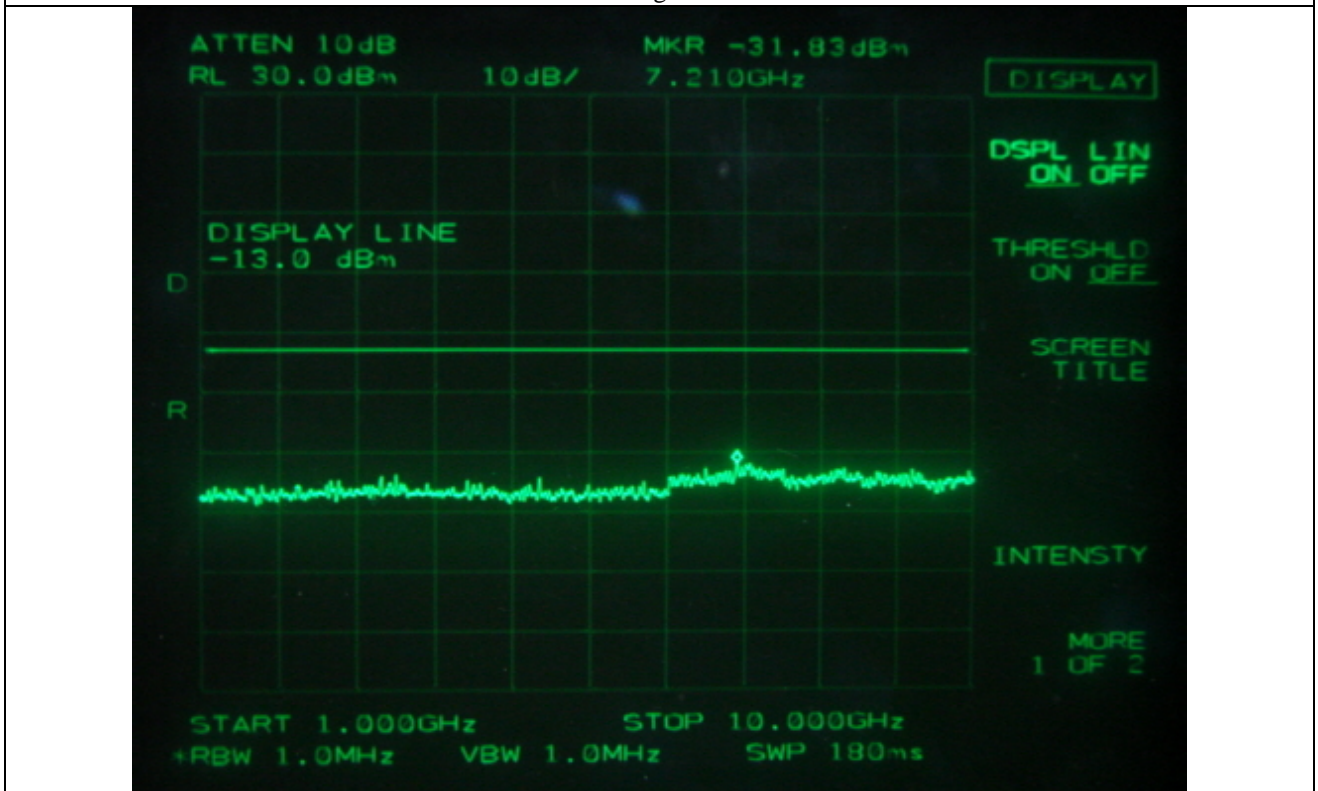
GSM – Middle Channel



GSM – Middle Channel



GSM – High Channel



GSM – High Channel