

# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LICENSED TRANSMITTER

Test Report No. : E123R-066

AGR No. : A122A-154

Applicant : SOLiD, Inc.

Address : 10,9th Floor, SOLiD Space, Pangyoyeok-ro 220, Bundang-gu, Seongnam-si,  
Gyeonggi-do, 463-400, Korea

Manufacturer : SOLiD, Inc.

Address : 10,9th Floor, SOLiD Space, Pangyoyeok-ro 220, Bundang-gu, Seongnam-si,  
Gyeonggi-do, 463-400, Korea

Type of Equipment : RDU MODULE (AWS-1)

FCC ID. : W6UHAWS1

Model Name : AWS-1 RDU44.5

Serial number : N/A

Total page of Report : 72 pages (including this page)

Date of Incoming : February 06, 2012

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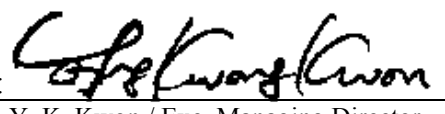
## SUMMARY

The equipment complies with the regulation; **FCC 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.

Prepared by:   
Ki-Hong, Nam / Senior Engineer  
ONETECH Corp.

Reviewed by:   
Y. K. Kwon / Exe. Managing Director  
ONETECH Corp.

## CONTENTS

	PAGE
<b>1. VERIFICATION OF COMPLIANCE .....</b>	<b>5</b>
<b>2. TEST SUMMARY .....</b>	<b>6</b>
2.1 TEST ITEMS AND RESULTS .....	6
2.2 ADDITIONS, DEVIATIONS, EXCLUSIONS FROM STANDARDS .....	6
2.3 RELATED SUBMITTAL(S) / GRANT(S) .....	6
2.4 PURPOSE OF THE TEST .....	6
2.5 TEST METHODOLOGY .....	6
2.6 TEST FACILITY .....	6
<b>3. GENERAL INFORMATION.....</b>	<b>7</b>
3.1 PRODUCT DESCRIPTION .....	7
3.2 ALTERNATIVE TYPE(S)/MODEL(S); ALSO COVERED BY THIS TEST REPORT. ....	7
3.3 PERIPHERAL EQUIPMENT .....	8
3.4 MODE OF OPERATION DURING THE TEST.....	8
<b>4. EUT MODIFICATIONS .....</b>	<b>8</b>
<b>5. RF POWER OUTPUT AT ANTENNA TERMINAL .....</b>	<b>9</b>
5.1 OPERATING ENVIRONMENT .....	9
5.2 TEST SET-UP .....	9
5.3 TEST EQUIPMENT USED .....	9
5.4 TEST DATA .....	10
<b>6. OCCUPIED BANDWIDTH .....</b>	<b>11</b>
6.1 OPERATING ENVIRONMENT .....	11
6.2 TEST SET-UP .....	11
6.3 TEST EQUIPMENT USED .....	11
6.4 TEST DATA .....	12
<b>7. SPURIOUS EMISSION AT ANTENNA TERMINAL.....</b>	<b>37</b>
7.1 OPERATING ENVIRONMENT .....	37
7.2 TEST SET-UP FOR CONDUCTED MEASUREMENT.....	37
7.3 TEST EQUIPMENT USED .....	37
7.4 TEST DATA .....	38

<b>8. BAND EDGE MEASUREMENT.....</b>	<b>51</b>
8.1 OPERATING ENVIRONMENT .....	51
8.2 TEST SET-UP FOR CONDUCTED MEASUREMENT.....	51
8.3 TEST EQUIPMENT USED .....	51
8.4 TEST DATA .....	52
<b>9. INTERMODULATION TEST .....</b>	<b>57</b>
9.1 OPERATING ENVIRONMENT .....	57
9.2 TEST SET-UP .....	57
9.3 TEST EQUIPMENT USED .....	57
9.4 TEST DATA .....	58
9.4.1 Test Result for peak power .....	58
9.4.2 Test Result for Spurious emission.....	62
<b>10. FIELD STRENGTH OF SPURIOUS RADIATION .....</b>	<b>66</b>
10.1 OPERATING ENVIRONMENT .....	66
10.2 TEST SET-UP .....	66
10.3 TEST EQUIPMENT USED .....	66
10.4 TEST DATA .....	67
<b>11. FREQUENCY STABILITY WITH TEMPERATURE VARIATION.....</b>	<b>68</b>
11.1 OPERATING ENVIRONMENT .....	68
11.2 TEST SET-UP .....	68
11.3 TEST EQUIPMENT USED .....	68
11.4 TEST DATA .....	69
<b>12. FREQUENCY STABILITY WITH VOLTAGE VARIATION.....</b>	<b>70</b>
12.1 OPERATING ENVIRONMENT .....	70
12.2 TEST SET-UP .....	70
12.3 TEST EQUIPMENT USED .....	70
12.4 TEST DATA .....	71
<b>13. MAXIMUM PERMISSIBLE EXPOSURE.....</b>	<b>72</b>
13.1 RF EXPOSURE CALCULATION .....	72
13.2 CALCULATED MPE SAFE DISTANCE.....	72

### Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
E123R-066	March 26, 2012	Initial Issue	All

## 1. VERIFICATION OF COMPLIANCE

APPLICANT : SOLiD, Inc.  
ADDRESS : 10,9th Floor, SOLiD Space, Pangyoyeok-ro 220, Bundang-gu, Seongnam-si, Gyeonggi-do,  
463-400, Korea  
CONTACT PERSON : Mr. Kangyeob, Bae / Director  
TELEPHONE NO : +82-31-627-6292  
FCC ID : W6UHAWS1  
MODEL NAME : AWS-1 RDU44.5  
SERIAL NUMBER : N/A  
DATE : March 26, 2012

EQUIPMENT CLASS	PCB - PCS Licensed Transmitter
EQUIPMENT DESCRIPTION	RDU MODULE (AWS-1)
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.4: 2009, EIA/TIA-603-C
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC Part 27 Subpart C
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 m 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), 27.50(d)	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	Band Edge	Met the Limit / PASS
2.1051, 27.53(h)	Spurious Emissions at Antenna Terminals	Met the Limit / PASS
2.1053, 27.53(h)	Field strength of Spurious Radiation	Met the Limit / PASS
2.1055, 27.54	Frequency Stability with Temperature variation	Met the requirement / PASS
2.1055, 27.54	Frequency stability with primary voltage variation	Met the requirement / PASS
1.1307(b), 27.52	RF Safety	PASS (See Note 2)

Note 1: The Equipment under Test (EUT) is a repeater which reproduces the modulated input signal, so the EUT meets the requirement

Note2: End users and/or 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 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, Inc., Models AWS-1 RDU44.5 (referred to as the EUT in this report) is RDU MODULE (AWS-1) that shall be plugged in RDU (Remote Drive Unit).

RDU devices are varied for each frequency band, including the following:

No	Unit naming	Description	Frequency	
			TX	RX
1	1900PCS RDU44.5	Single band	1 930-1995 MHz	1 850-1 915 MHz
2	850CEL RDU44.5	Single band	869-894 MHz	824-849 MHz
3	700LTE RDU44.5	Single band	728-756 MHz	698-716 MHz 777-787 MHz
4	AWS-1 RDU44.5	Single band	2 110-2155 MHz	1 710-1 755 MHz
5	700PS RDU44.5	Single band	758-775 MHz	788-805 MHz
6	800I/PS RDU44.5	Single band	851-869 MHz	806-824 MHz
7	900I RDU44.5	Single band	929-941 MHz	896-902 MHz

When receiving TX signals from each band through Remote Optic, RDU filters the signals and amplifies them with High Power Amplifier. The unit also filters RX signals given through cavity filter and amplifies them to send the signals to Remote Optic. In the unit, there is ATT to adjust gain. RDU consist of RFU, PAU and cavity duplexer and all modules are merged with one package. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	RDU MODULE (AWS-1)
LIST OF EACH OSC. or CRY. FREQ.(FREQ. >= 1 MHz)	14.745 6 MHz, 8 MHz
EMISSION DESIGNATOR	F9W(CDMA, EVDO, WCDMA), D7W(LTE)
OPERATING FREQUENCY	2 110 MHz ~ 2 155 MHz
CHANNEL SEPARATION	CDMA(1.25 MHz), EVDO(1.25 MHz), WCDMA(5 MHz), LTE(5 MHz)
RF OUTPUT POWER	44.5 dBm
DC VOLTAGE & CURRENT INTO FINAL AMPLIFIER	28 V, 12 A
ELECTRICAL RATING	AC 120 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
AWS-1 RDU44.5	SOLiD Technologies	W6UHAWS1	RDU MODULE (AWS-1) (EUT)	Signal Generator
SMJ100A	Rohde & Schwarz	N/A	Vector 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.

For the above testing, following frequencies per channel were selected for each modulation.

Modulation	Channel	Frequency (MHz)	Modulation	Channel	Frequency (MHz)	Modulation	Channel	Frequency (MHz)
CDMA/ 1xEVDO	Low	2 111.25	WCDMA	Low	2 112.40	LTE	Low	2 115.00
	Middle	2 132.50		Middle	2 132.50		Middle	2 132.50
	High	2 153.75		High	2 152.60		High	2 150.00

## 4. EUT MODIFICATIONS

-. None



## 5. RF POWER OUTPUT at ANTENNA TERMINAL

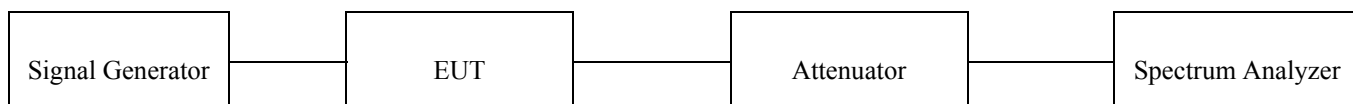
### 5.1 Operating environment

Temperature : 23 °C  
Relative humidity : 50 %R.H.

### 5.2 Test set-up

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

RF output power was measured by channel power measurement function of the spectrum analyzer with rms detector mode.



### 5.3 Test equipment used

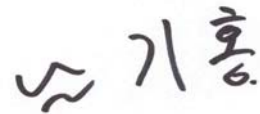
	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
□ -	E4432B	HP	Signal Generator	US38440950	June 10, 2011 (1Y)
■ -	SMJ100A	R/S	Signal Generator	101038	Feb. 02, 2012 (1Y)
■ -	FSP	R/S	Spectrum Analyzer	100017	Mar. 15, 2011 (1Y)
□ -	8564E	HP	Spectrum Analyzer	3650A00756	Jun. 10, 2011 (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

- Test Date : February 27, 2012
- Measurement Function : Channel Power
- Detector Mode : RMS detector
- Test Result : Pass

Modulation	Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (W)
CDMA	Low	2 111.25	-9.80	44.50	28.183 829	100.00
	Middle	2 132.50	-9.90	44.50		
	High	2 153.75	-9.70	44.50		
1xEVDO	Low	2 111.25	-9.80	44.50	28.183 829	
	Middle	2 132.50	-9.80	44.50		
	High	2 153.75	-9.70	44.50		
WCDMA	Low	2 112.40	-9.90	44.50	28.183 829	
	Middle	2 132.50	-9.70	44.50		
	High	2 152.60	-9.70	44.50		
LTE	Low	2 115.00	-9.80	44.50	28.183 829	
	Middle	2 132.50	-9.80	44.50		
	High	2 150.00	-9.90	44.50		



Tested by: Ki-Hong, Nam / Senior Engineer

## 6. OCCUPIED BANDWIDTH

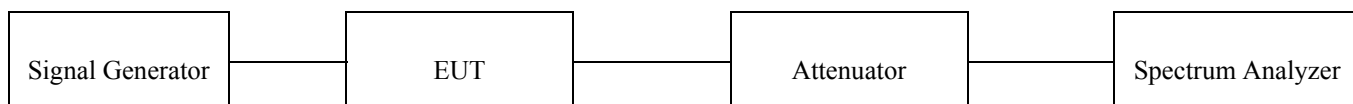
### 6.1 Operating environment

Temperature : 23 °C  
Relative humidity : 50 %R.H.

### 6.2 Test set-up

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

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. (Interval)
□ -	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. 15, 2011 (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

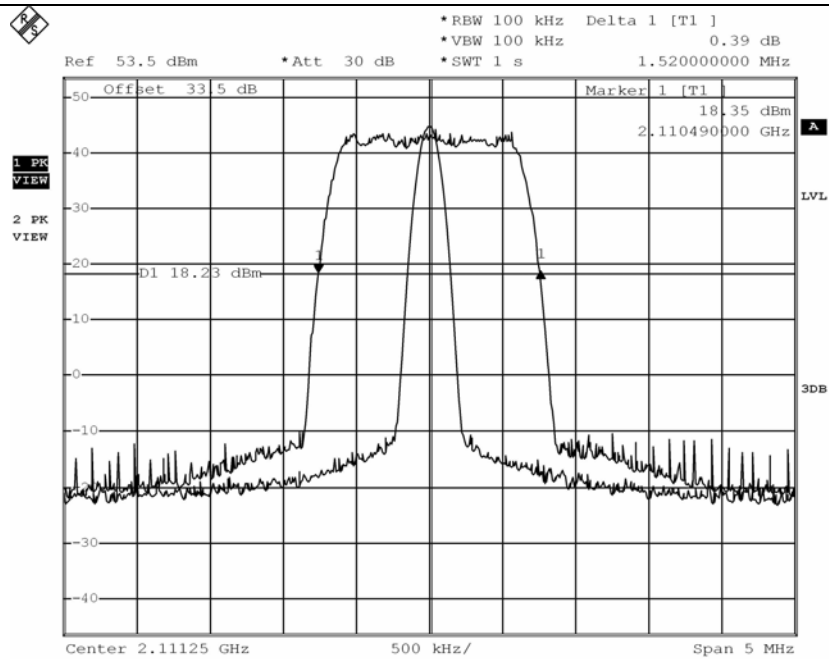
- Test Date : February 27, 2012  
- Test Result : Pass

Modulation	Channel	26 dB Bandwidth (kHz)	99 % Occupied Bandwidth (kHz)
CDMA	Low	1 520	1 320
	Middle	1 520	1 330
	High	1 520	1 320
1xEVDO	Low	1 520	1 320
	Middle	1 530	1 320
	High	1 520	1 330
WCDMA	Low	4 680	4 180
	Middle	4 680	4 160
	High	4 680	4 180
LTE	Low	9 840	9 000
	Middle	9 840	9 000
	High	9 840	8 960

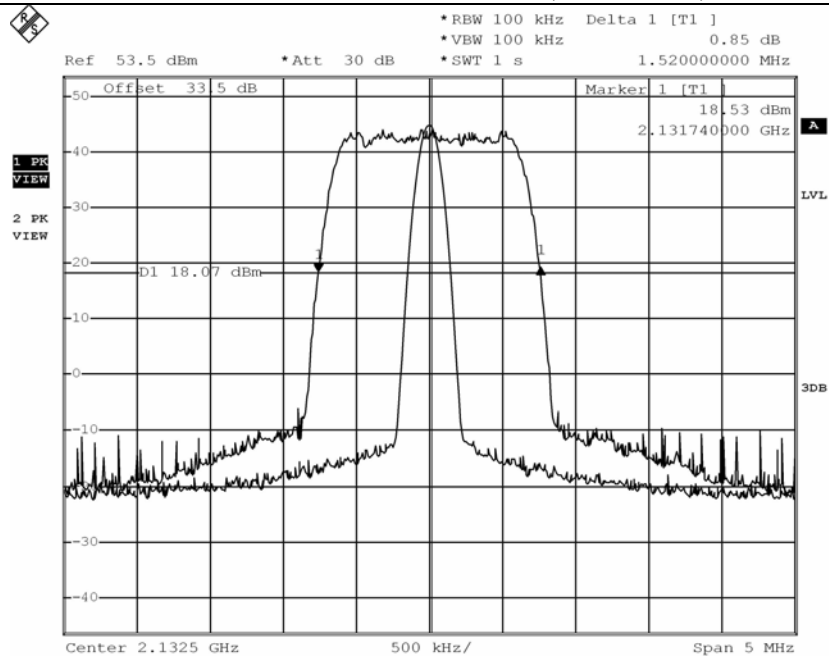
Remark: According to above result, the carrier frequency shall be within the frequency block edges.



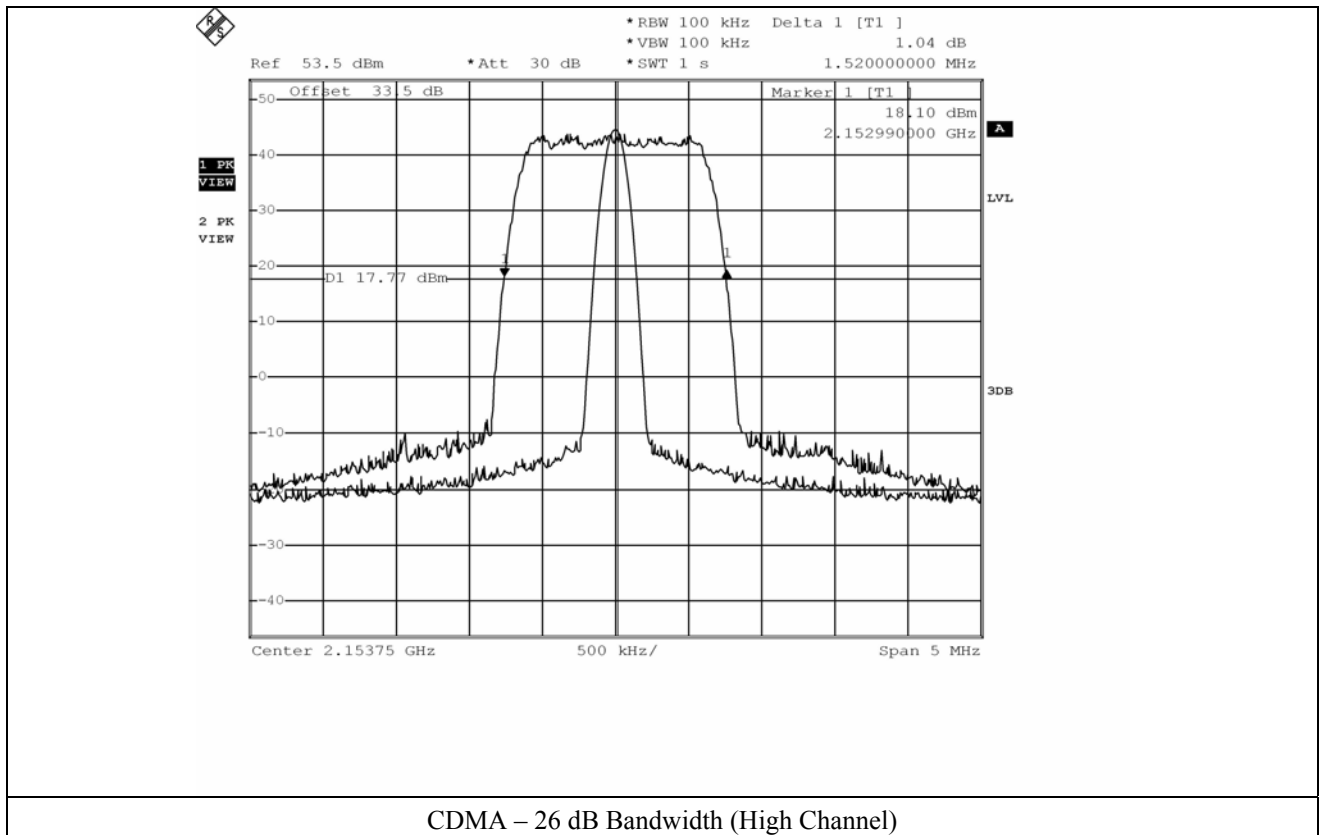
Tested by: Ki-Hong, Nam / Senior Engineer

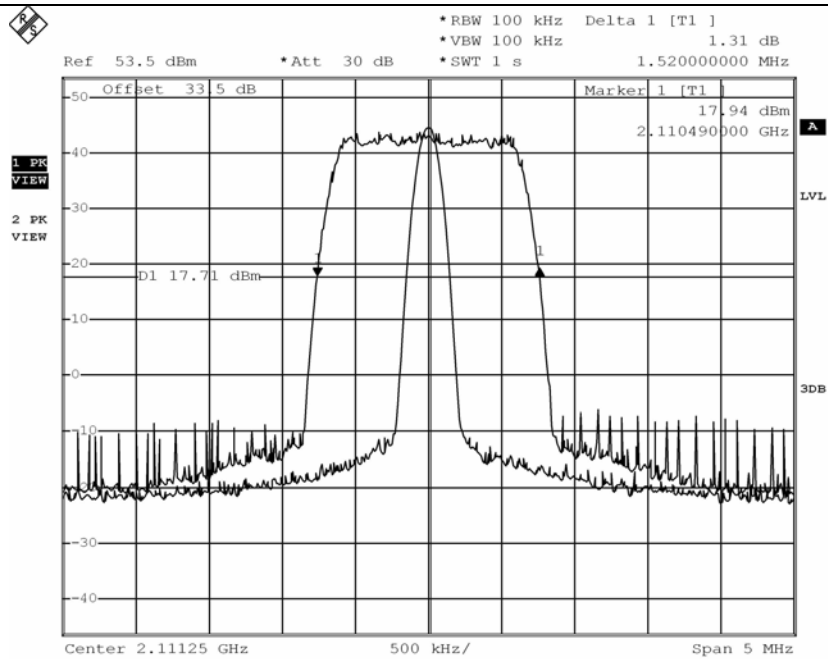


CDMA – 26 dB Bandwidth (Low Channel)

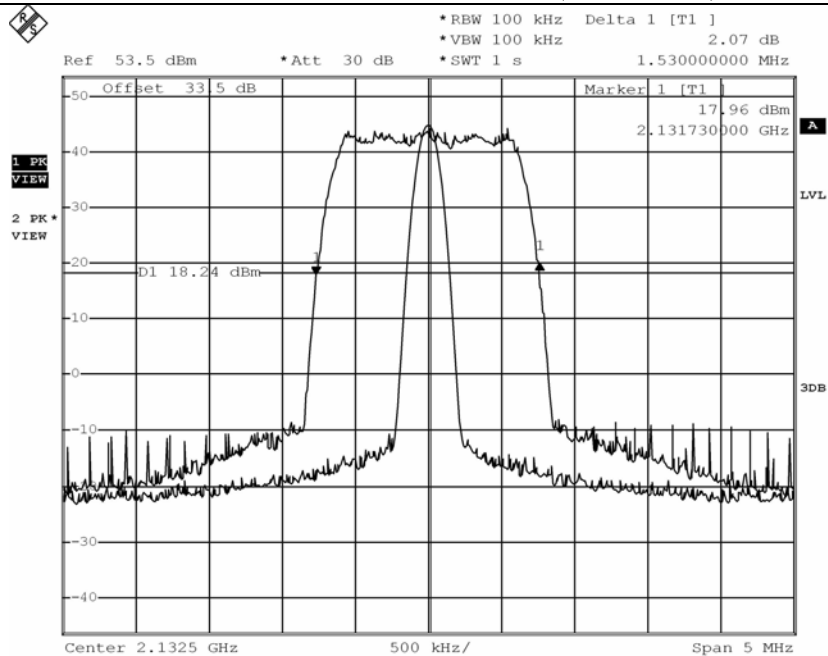


CDMA – 26 dB Bandwidth (Middle Channel)

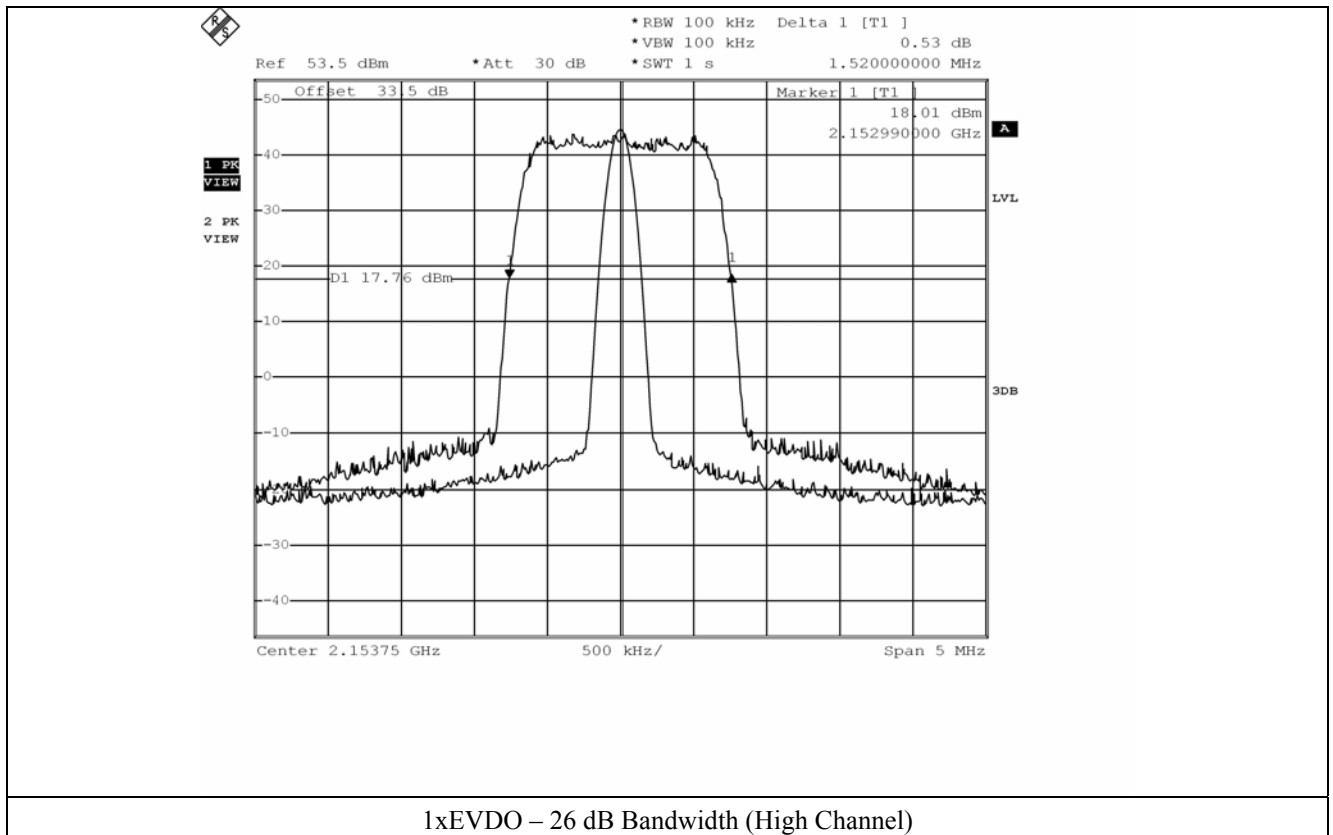




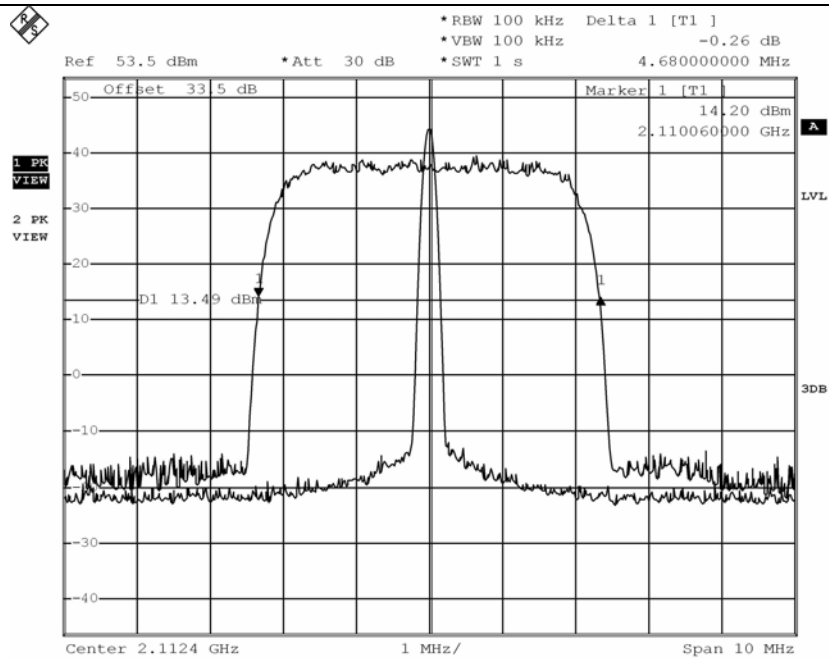
1xEVDO – 26 dB Bandwidth (Low Channel)



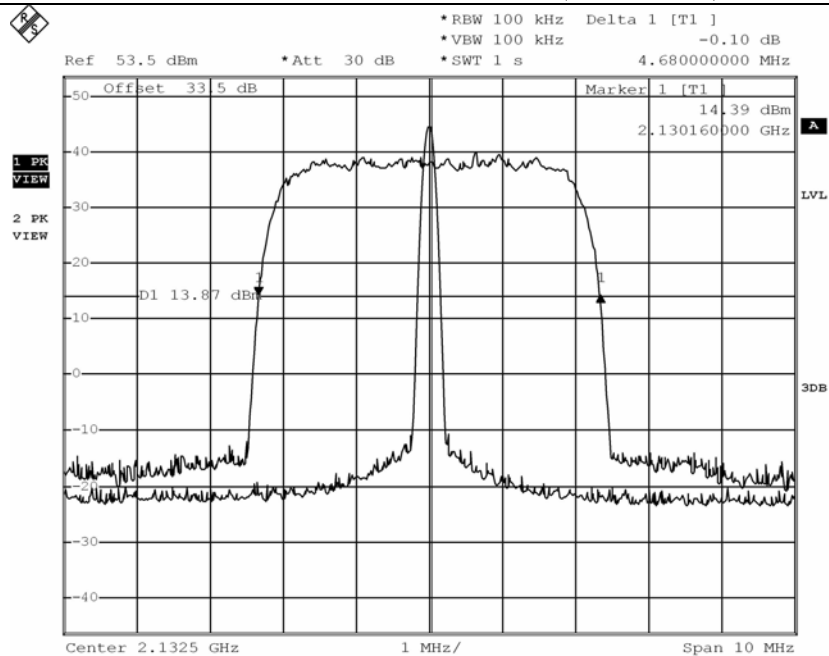
1xEVDO – 26 dB Bandwidth (Middle Channel)



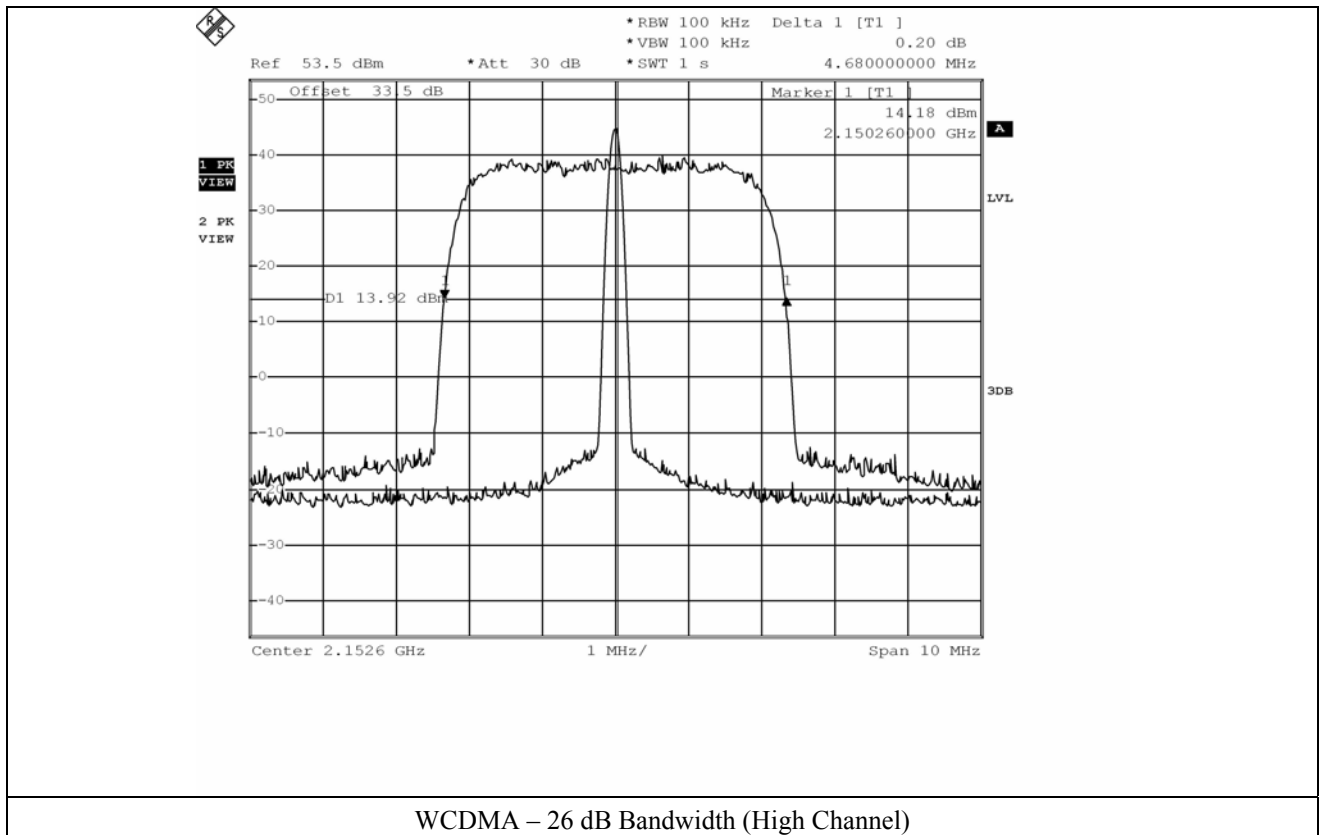


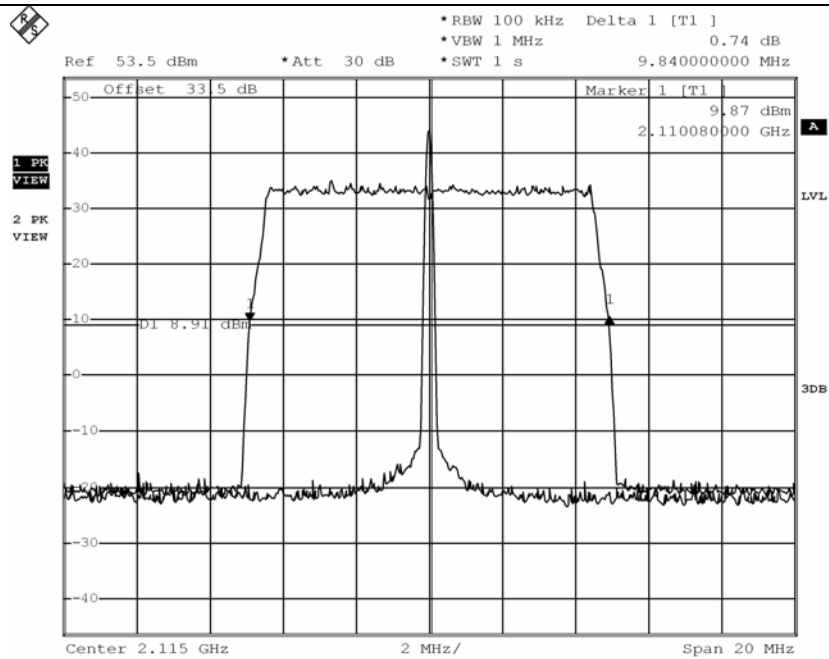


WCDMA – 26 dB Bandwidth (Low Channel)

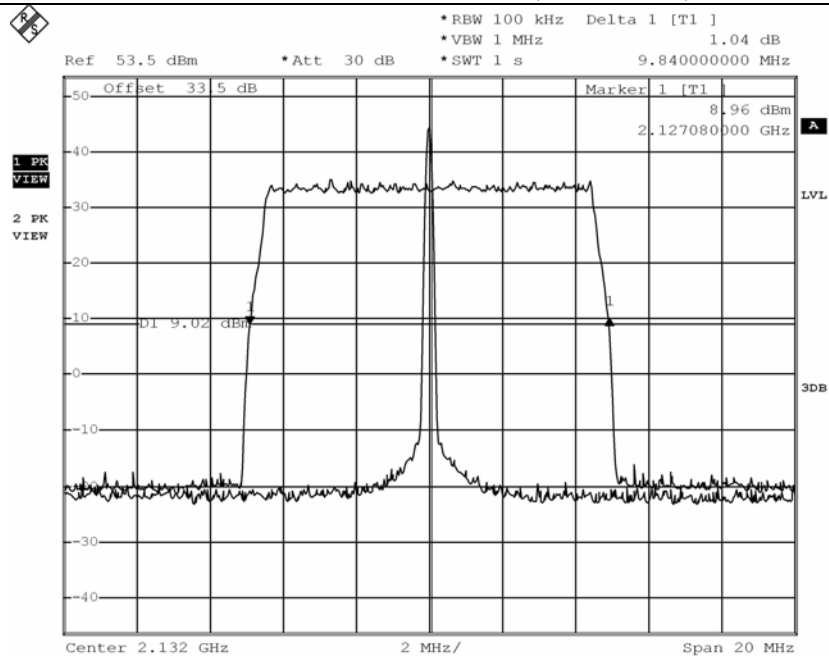


WCDMA – 26 dB Bandwidth (Middle Channel)

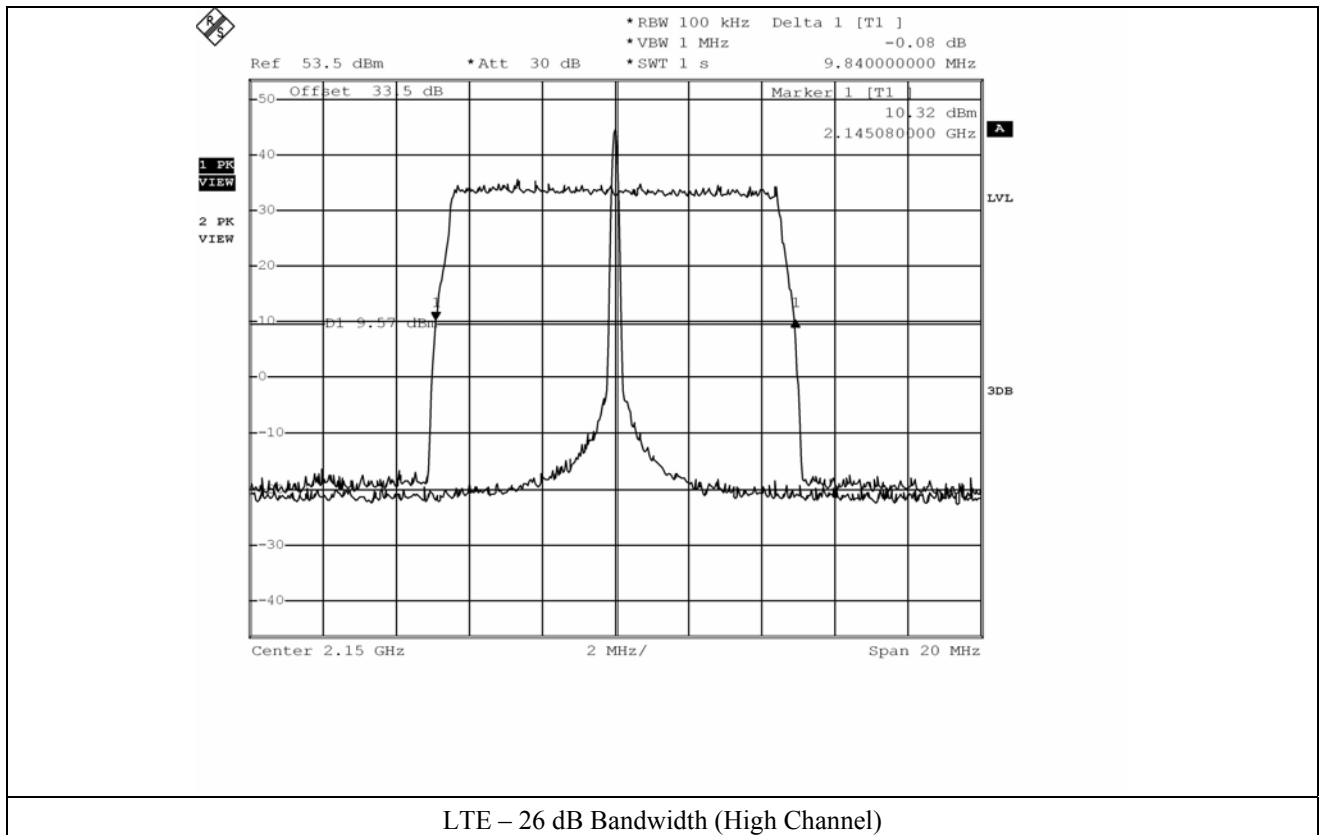


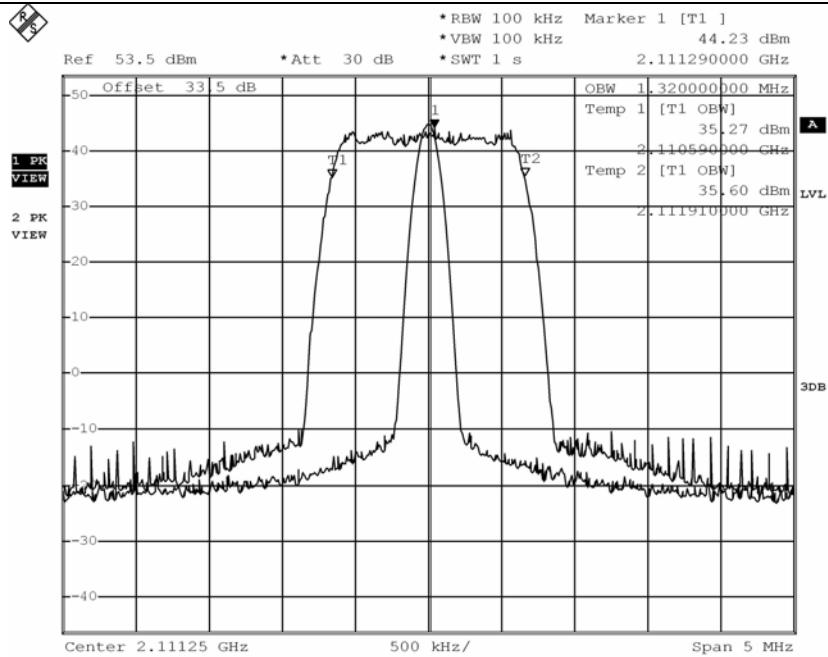


LTE – 26 dB Bandwidth (Low Channel)

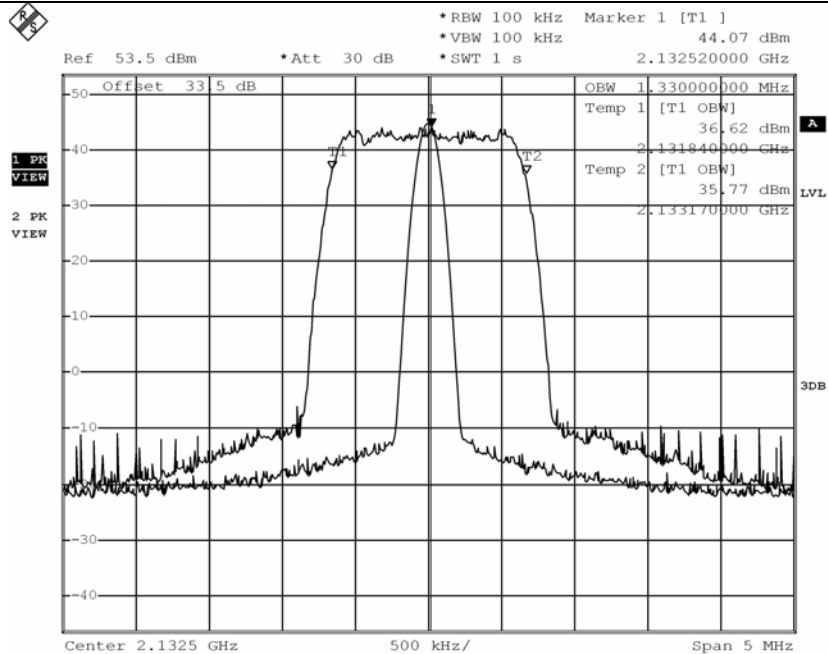


LTE – 26 dB Bandwidth (Middle Channel)

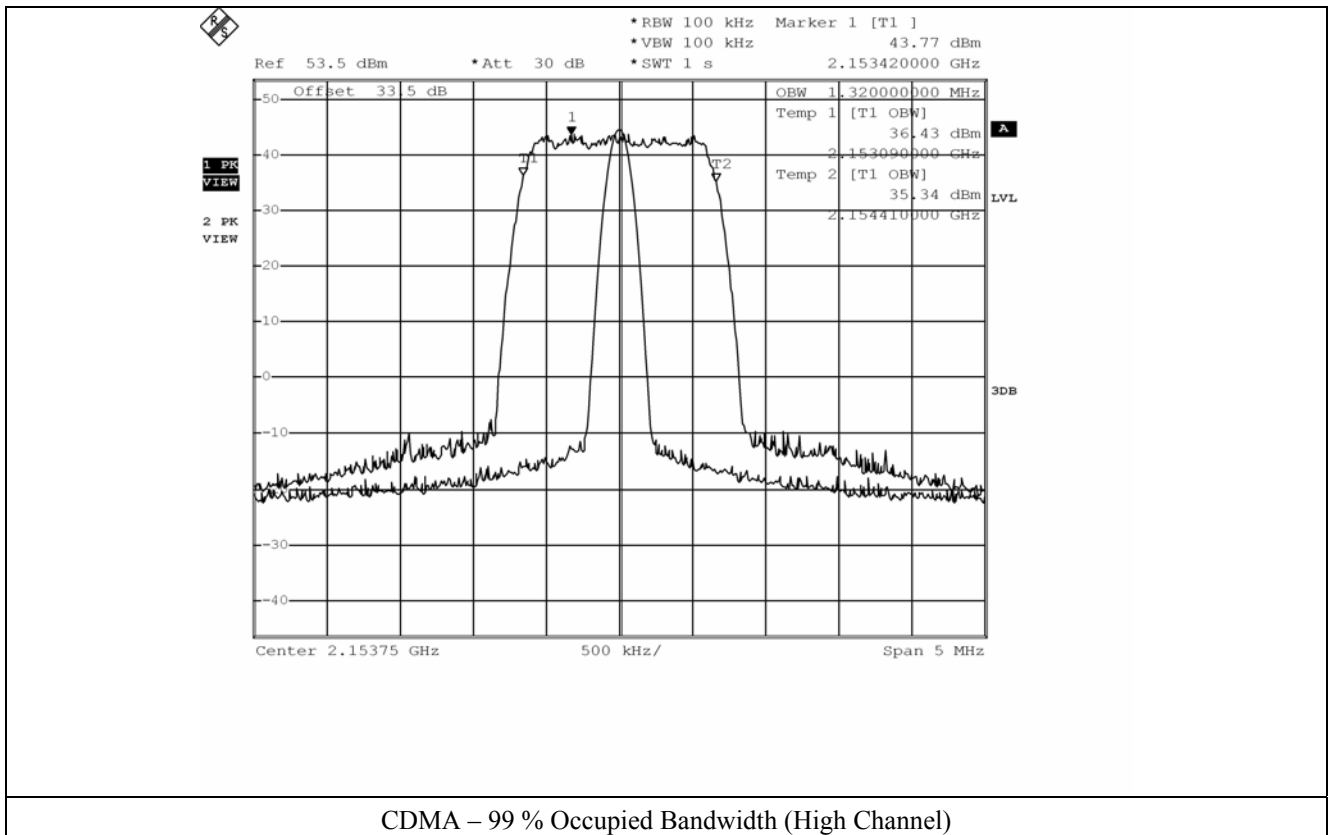


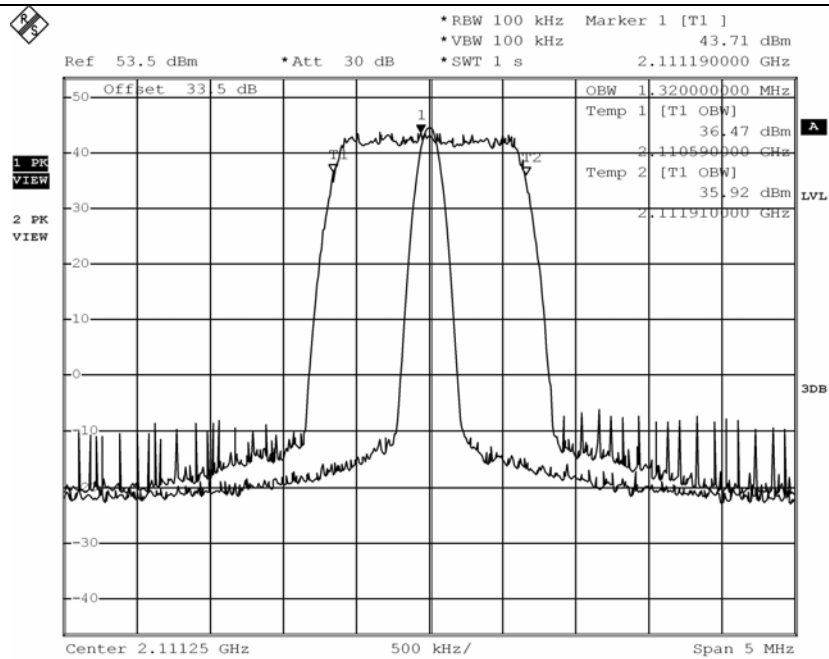


CDMA – 99 % Occupied Bandwidth (Low Channel)

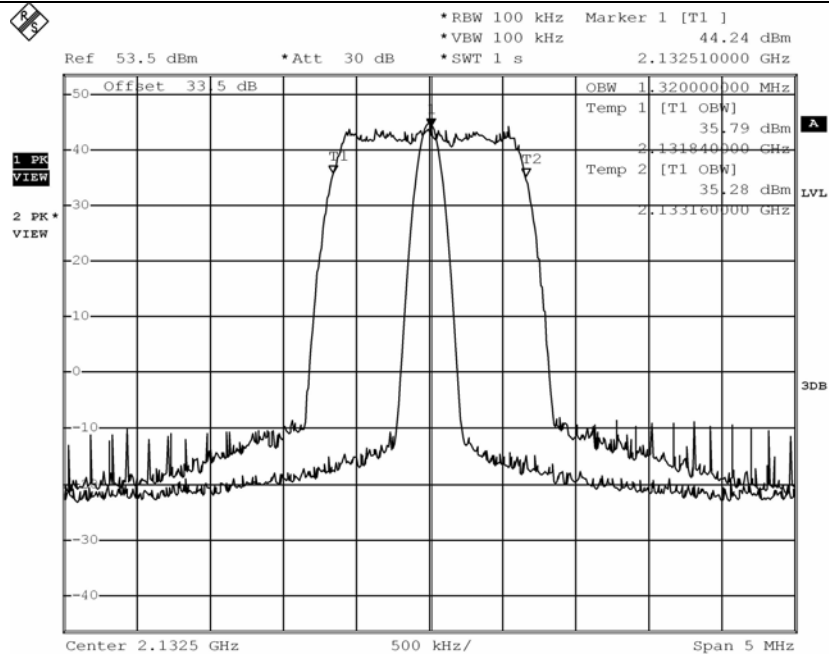


CDMA – 99 % Occupied Bandwidth (Middle Channel)

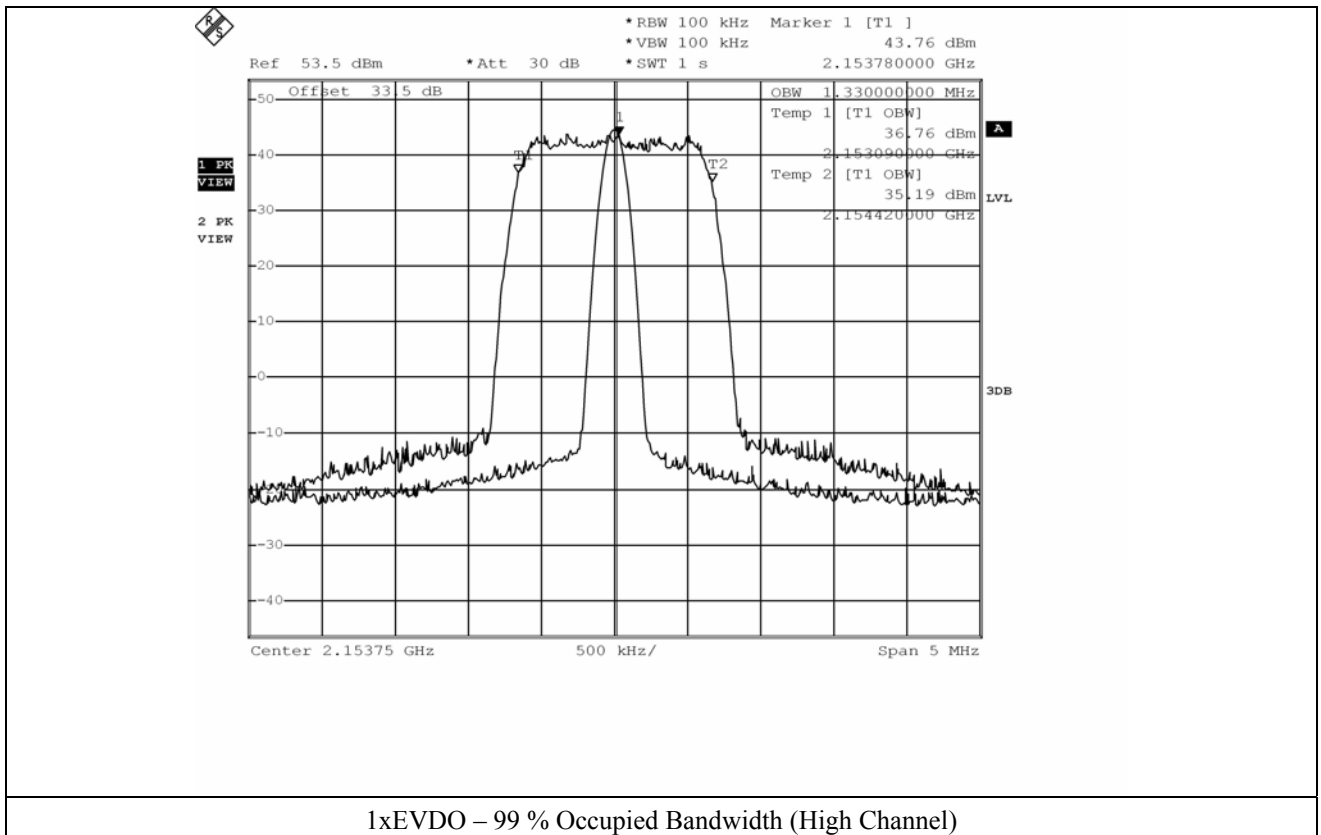




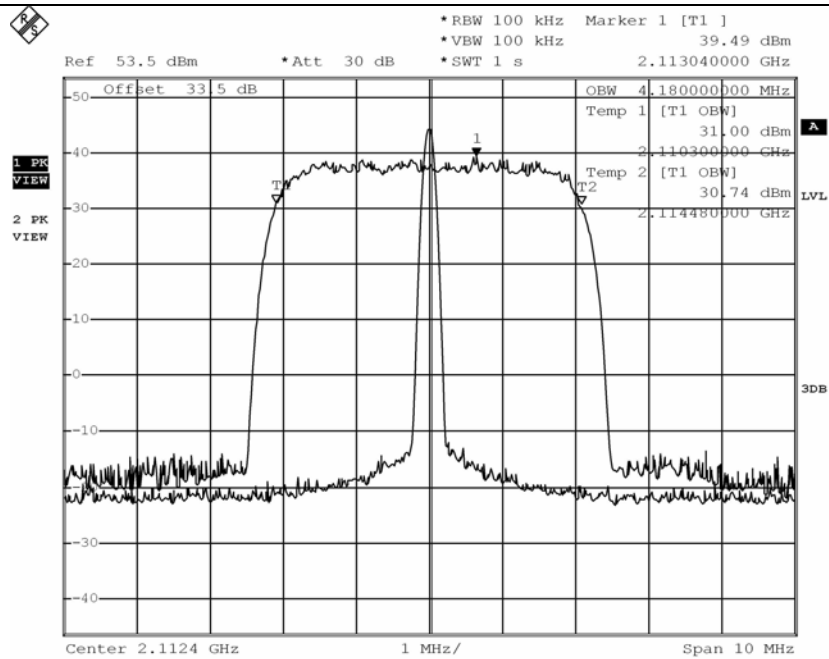
1xEVDO – 99 % Occupied Bandwidth (Low Channel)



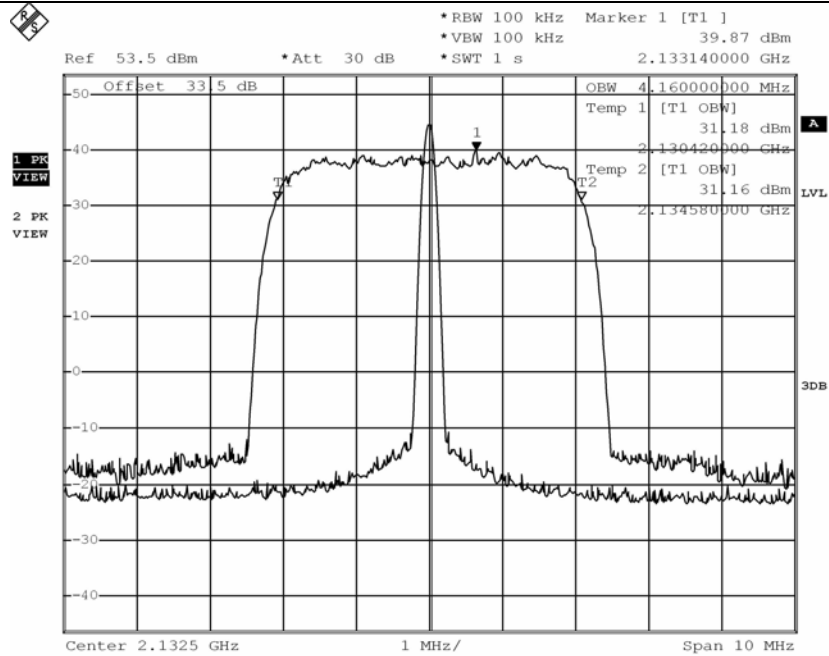
1xEVDO – 99 % Occupied Bandwidth (Middle Channel)



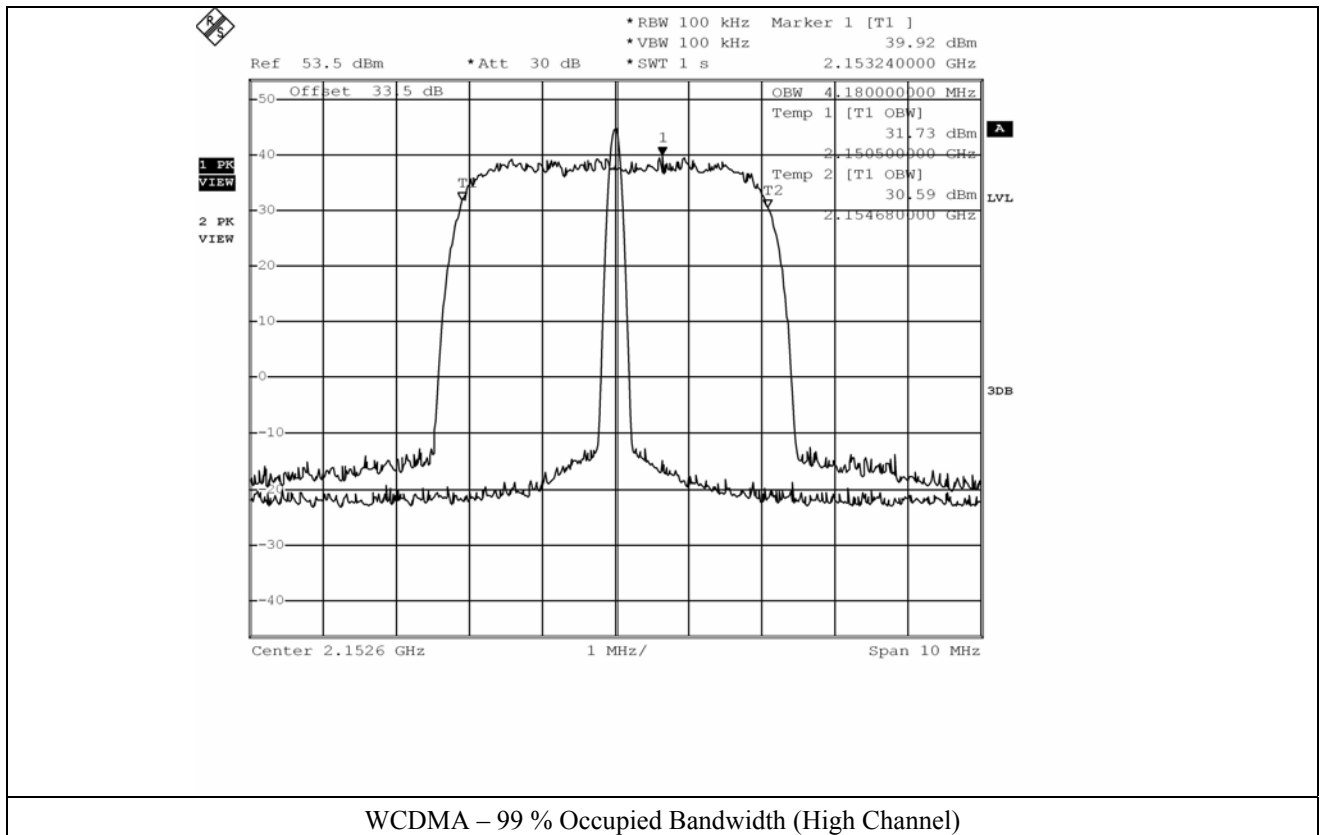


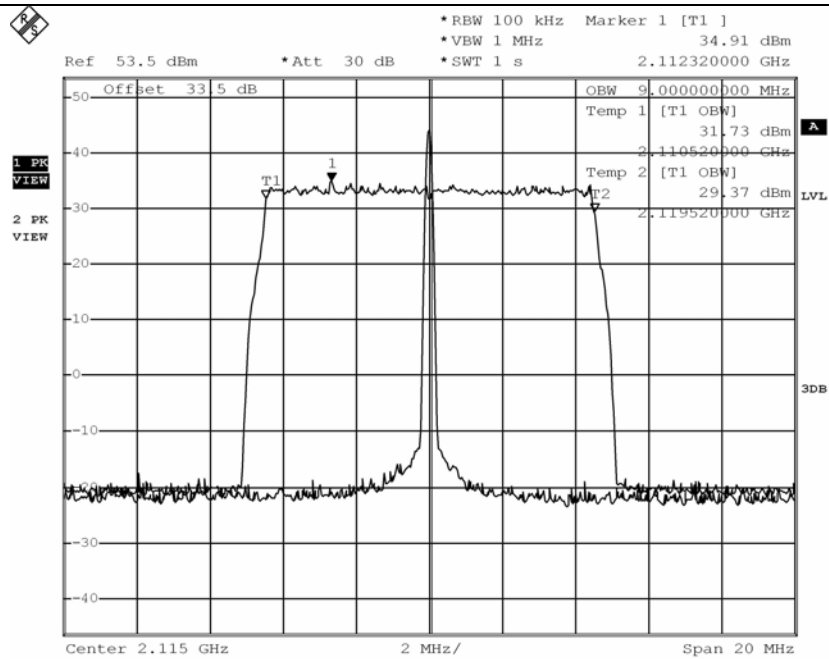


WCDMA – 99 % Occupied Bandwidth (Low Channel)

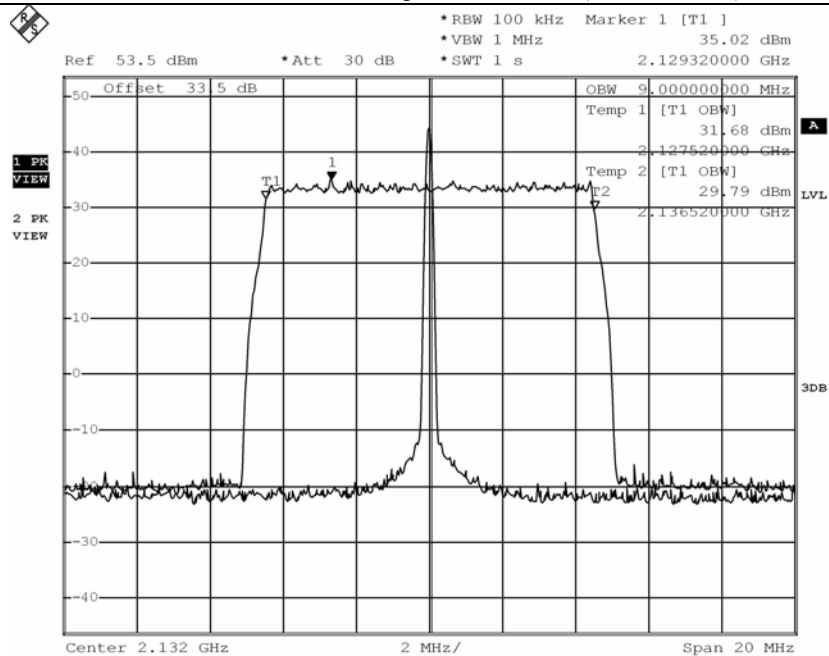


WCDMA – 99 % Occupied Bandwidth (Middle Channel)

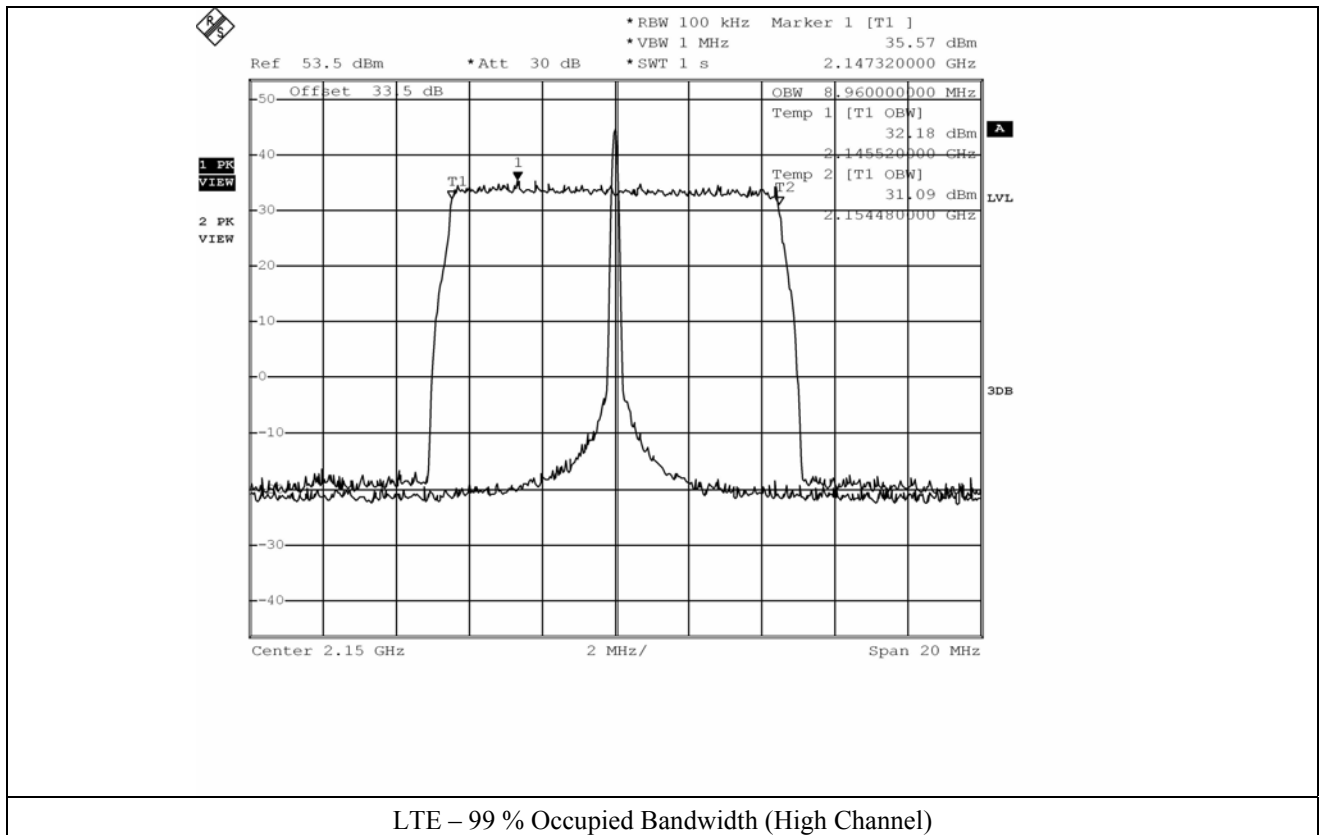




LTE – 99 % Occupied Bandwidth (Low Channel)

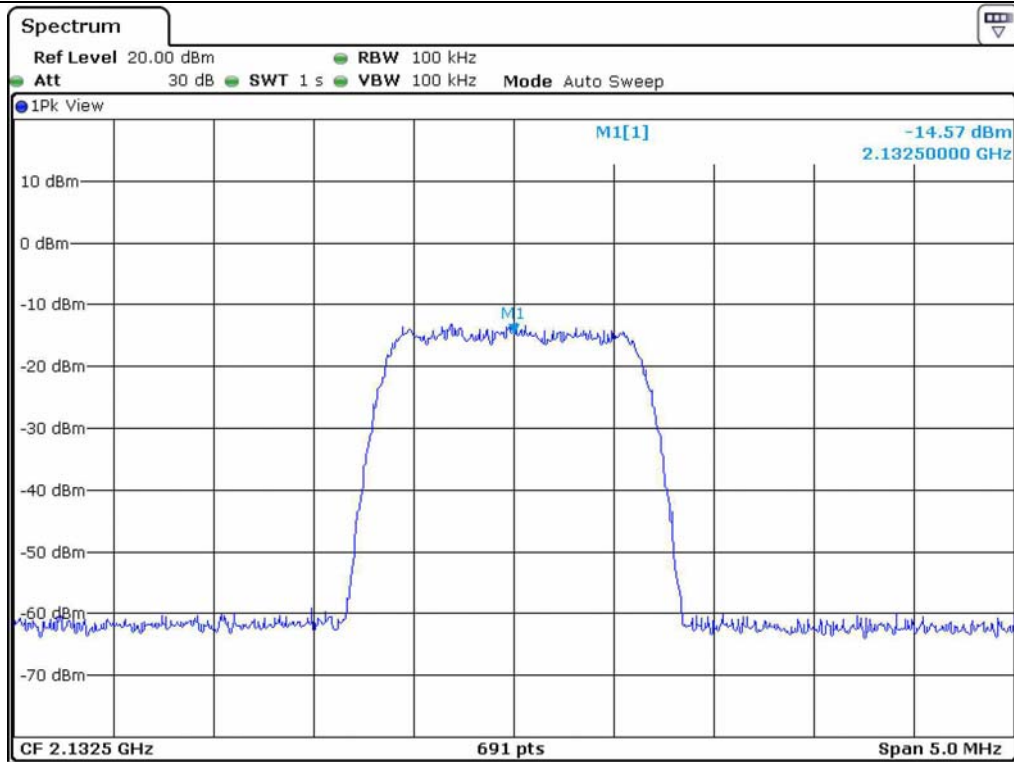


LTE – 99 % Occupied Bandwidth (Middle Channel)

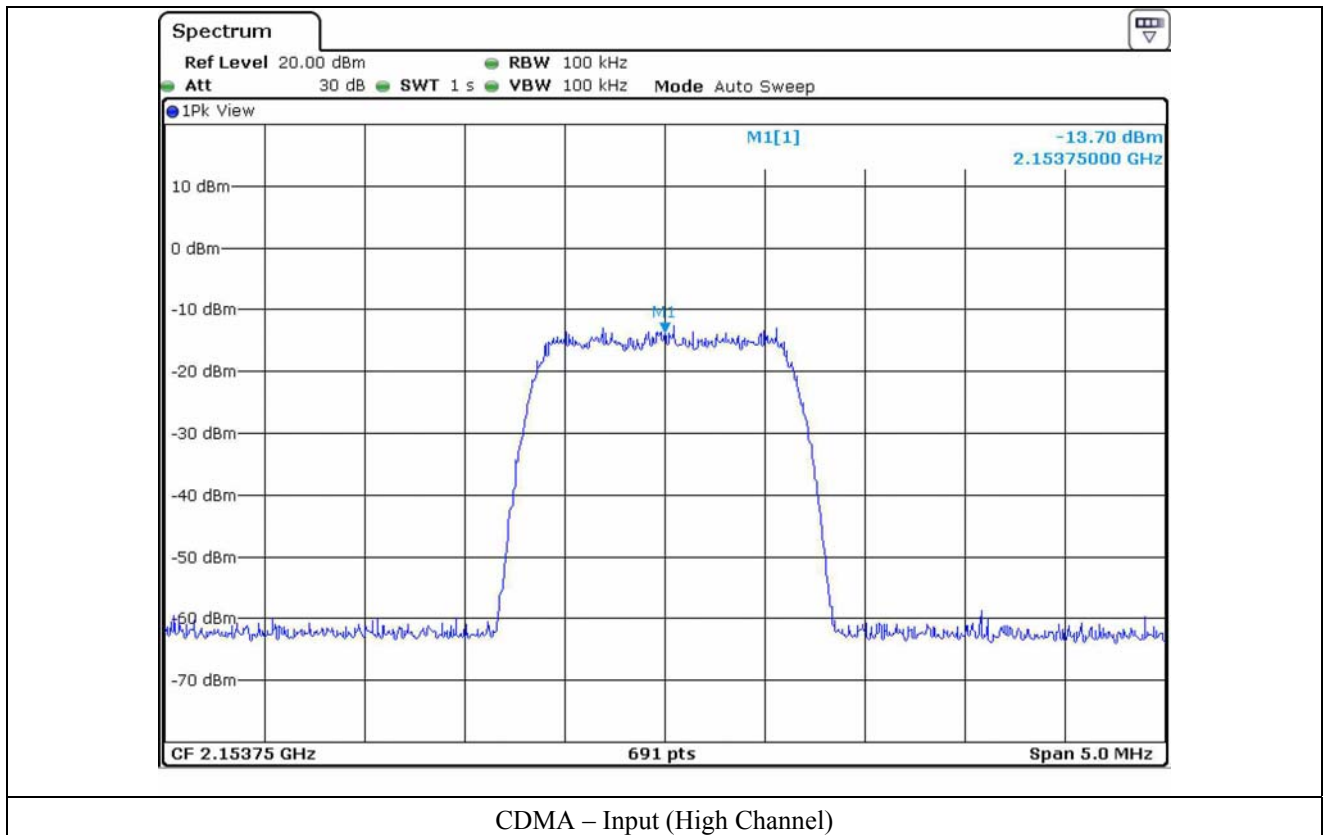


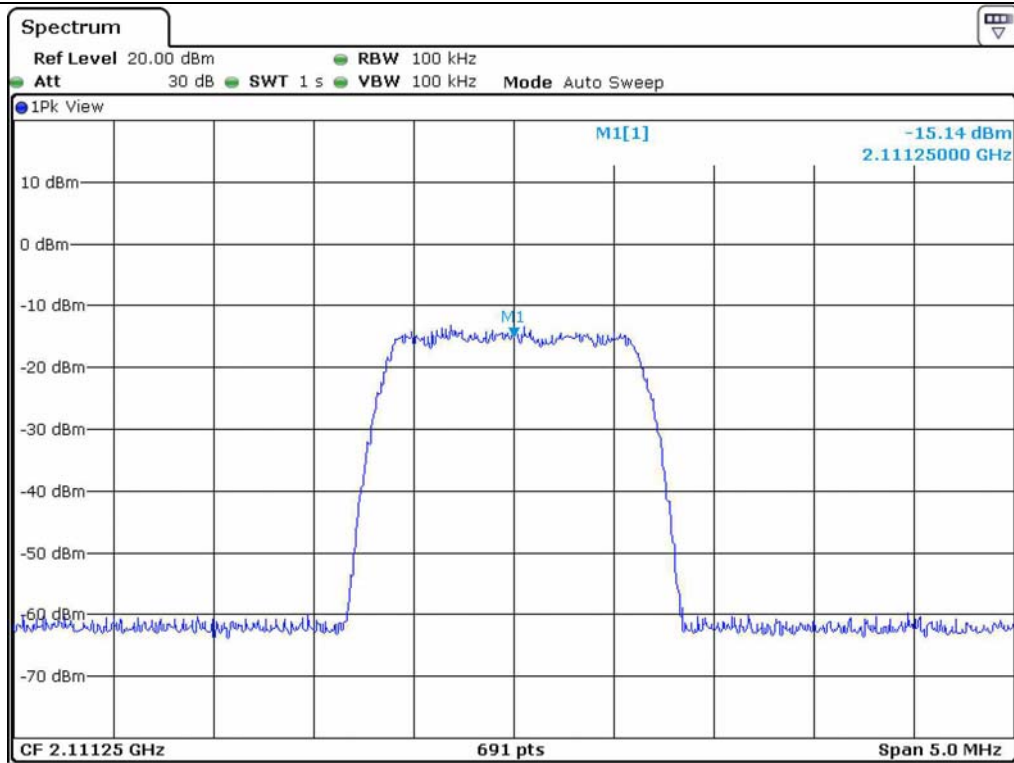


CDMA – Input (Low Channel)

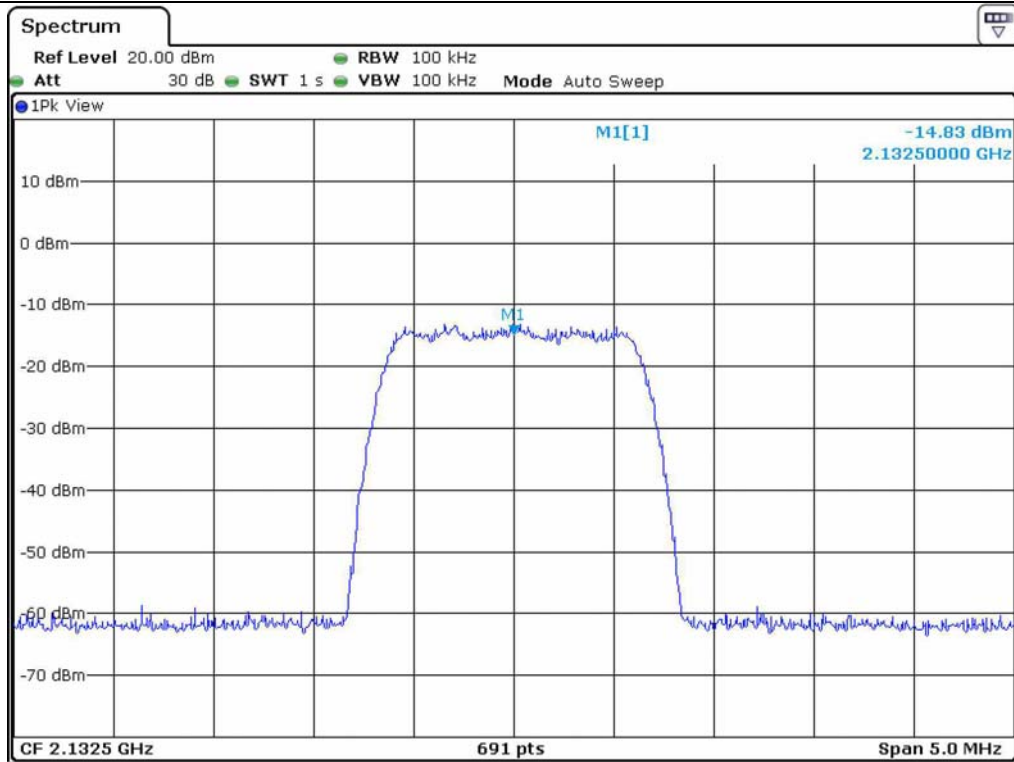


CDMA – Input (Middle Channel)

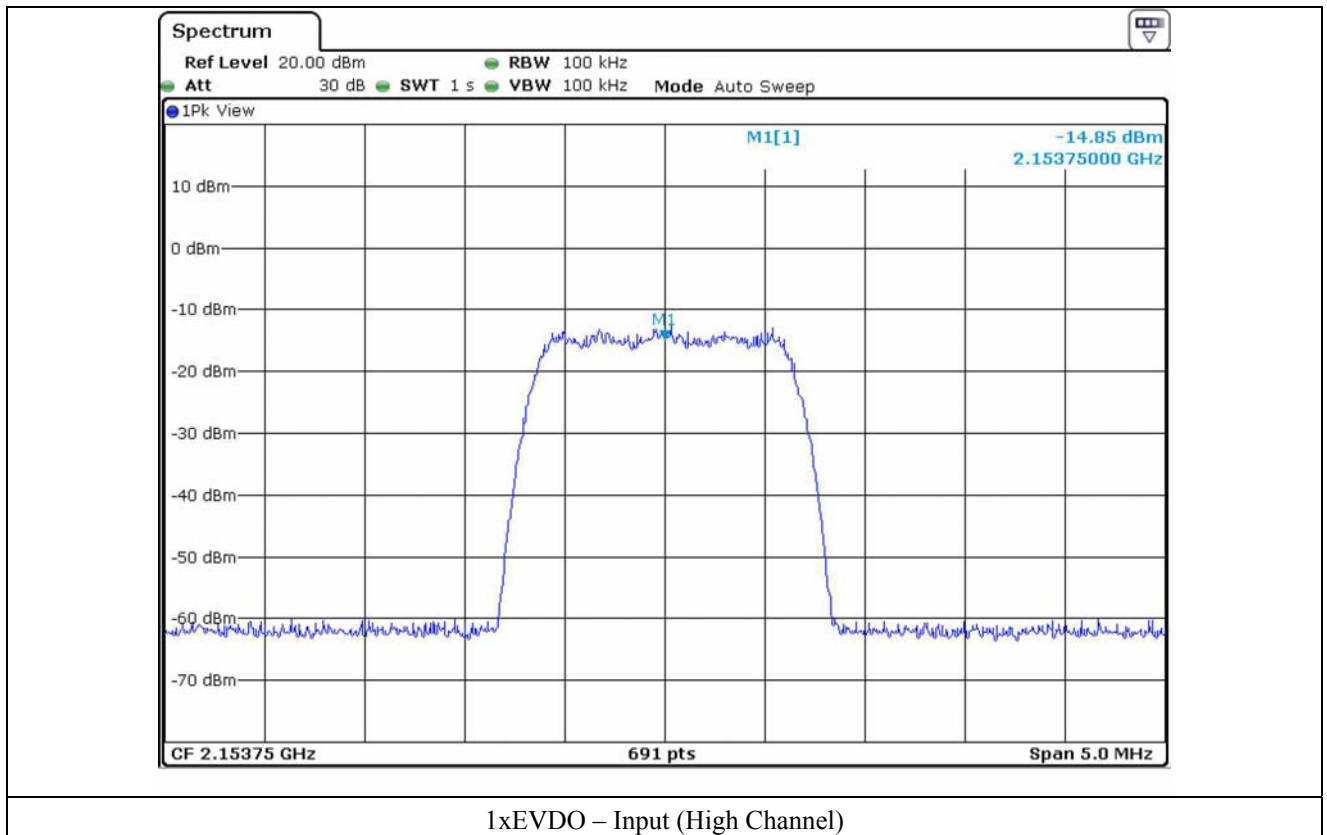




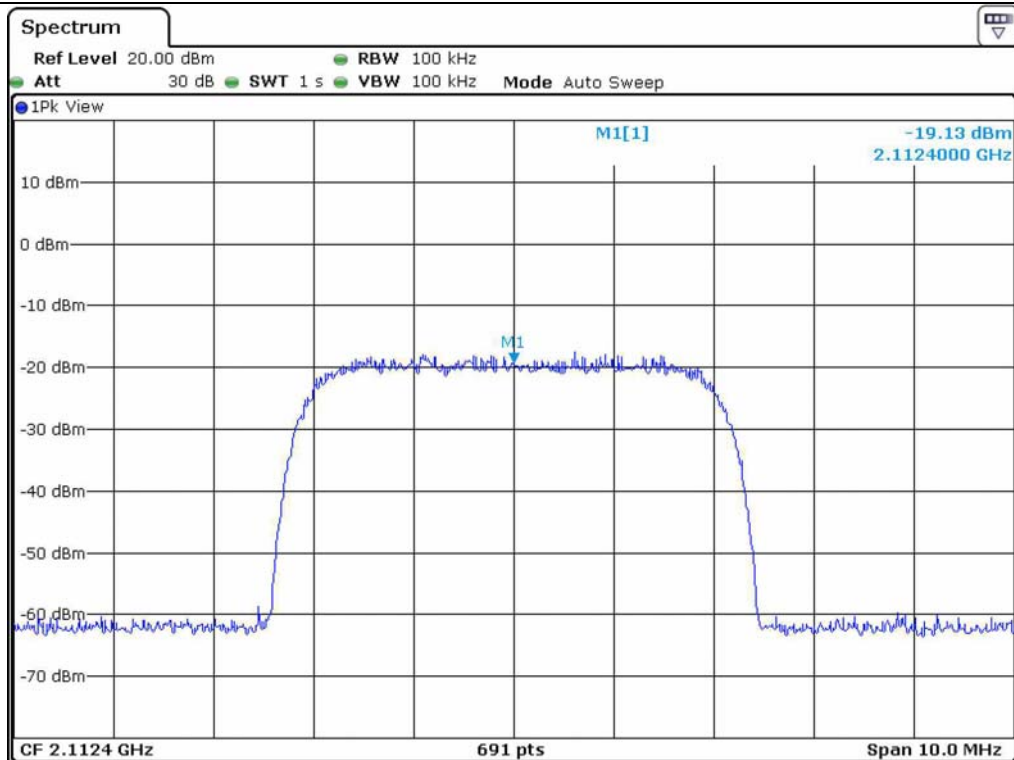
1xEVDO – Input (Low Channel)



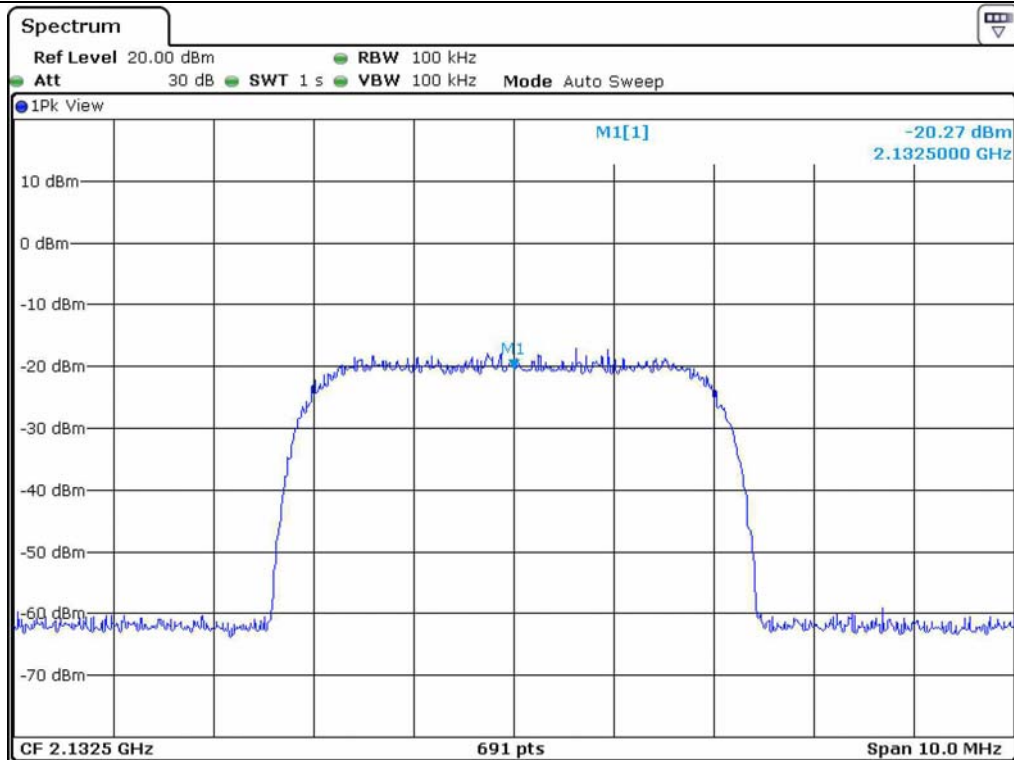
1xEVDO – Input (Middle Channel)



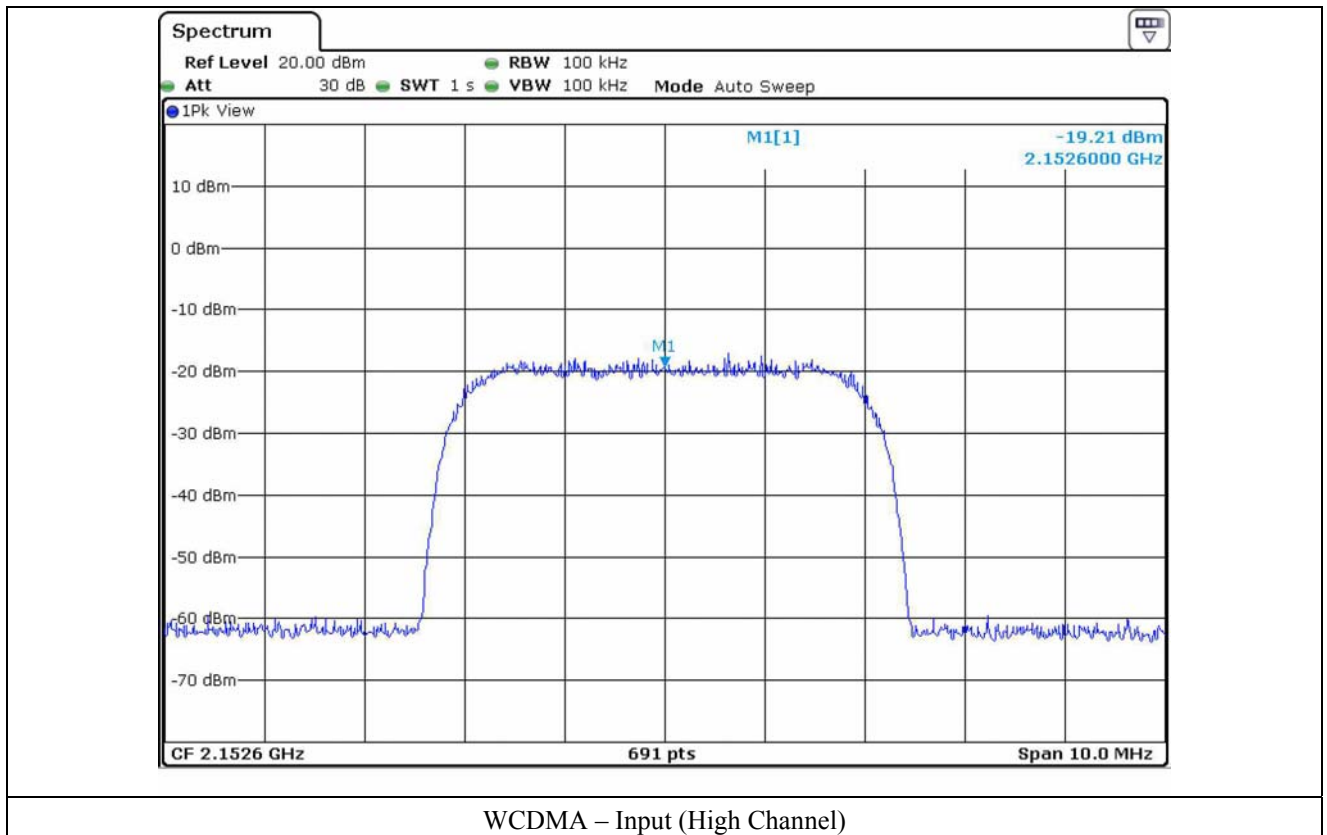


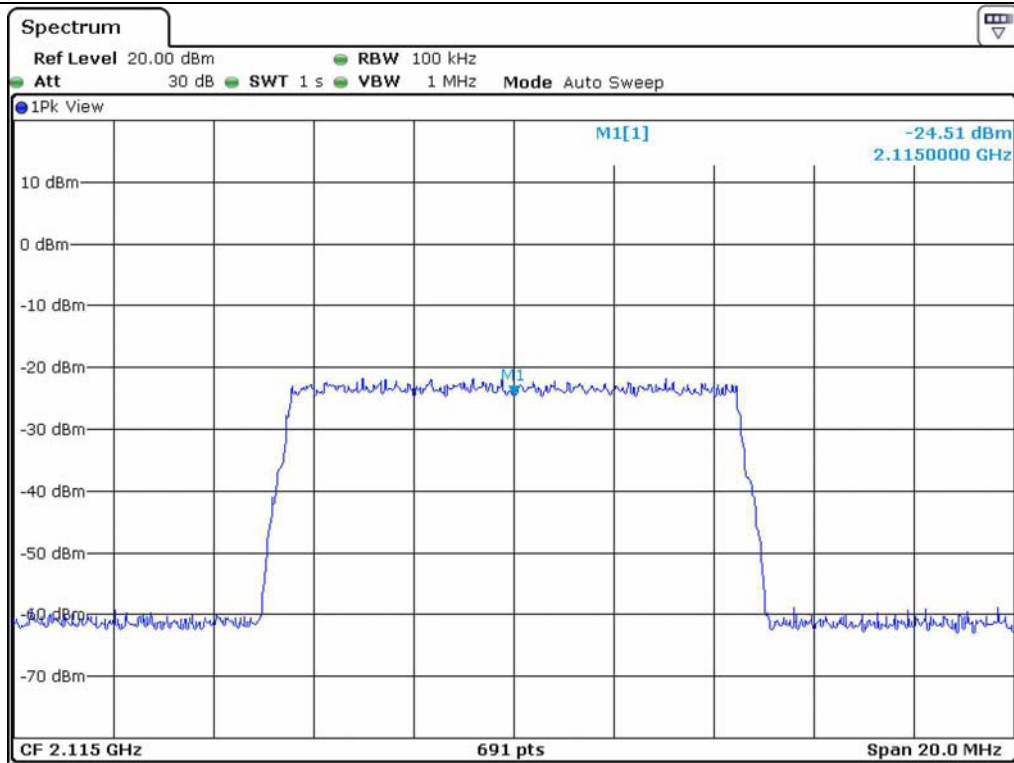


WCDMA – Input (Low Channel)

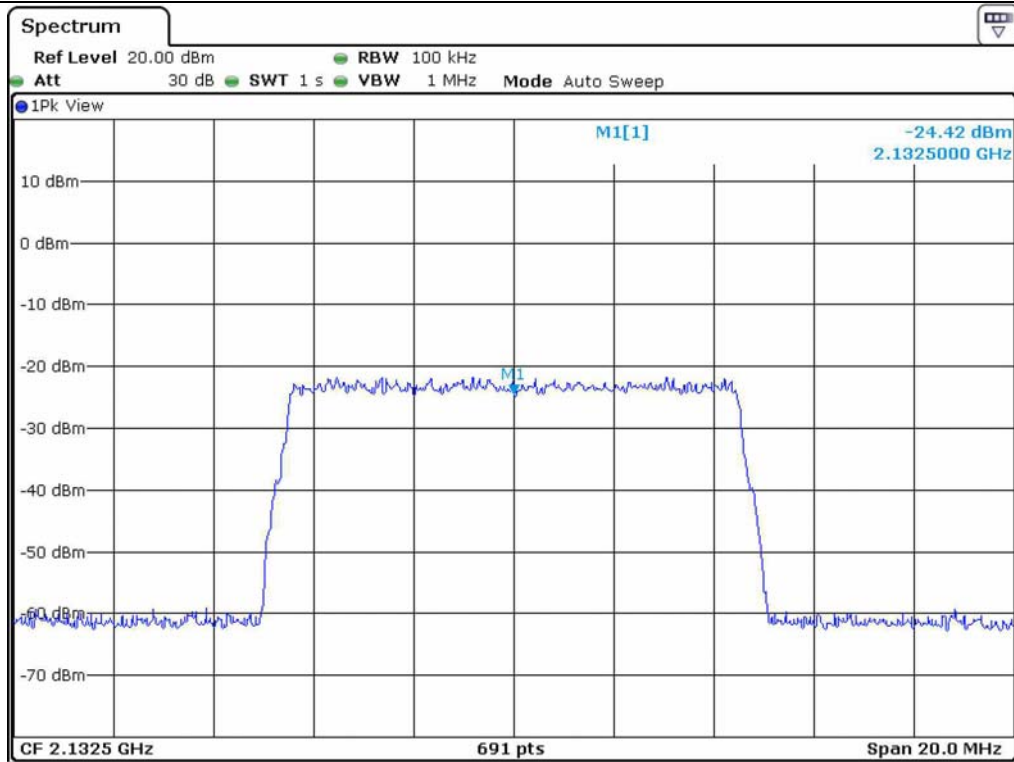


WCDMA – Input (Middle Channel)





LTE – Input (Low Channel)



LTE – Input (Middle Channel)

