RF TEST REPORT

Test item	:	LTE/CDMA(EVDO) Wireless Modem Module
Model No.	:	LTD-VL1000
Order No.	:	DEMC1406-02530
Date of receipt	:	2014-06-24
Test duration	:	2014-07-09 ~ 2014-07-31
Date of issue	:	2014-08-18
Use of report	:	FCC Original Grant

Applicant : LG Innotek Co.,Ltd.
978-1, Jangduk-dong, Gwangsan-gu, Gwangju-City, South Korea

Test laboratory : DT&C Co., Ltd.
42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935

Test specification	:	§22(H), §24(E)
Test environment	:	See appended test report
Test result	:	☒ Pass ☐ Fail

Tested by:

Engineer
JaeJin Lee

Reviewed by:

General Manager
Geunki Son

Test Report Version

Test Report No.	Date	Description
DRTFCC1408-1006	Aug. 05. 2014	Initial issue
DRTFCC1408-1006(1)	Aug. 18. 2014	Revised the Effective Radiated Power

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1. GENERAL INFORMATION

Applicant Name: **LG Innotek Co.,Ltd.**

Address: **978-1, Jangduk-dong, Gwangsan-gu, Gwangju-City, South Korea**

FCC ID	:	YZP-VL1000	
FCC Classification	:	PCS Licensed Transmitter (PCB)	
EUT	:	LTE/CDMA(EVDO) Wireless Modem Module	
Model Name	:	LTD-VL1000	
Add Model Name	:	N/A	
Supplying power	:	DC 3.8V	
Antenna Type	:	Cellular & PCS band for CDMA 1x EVDO(Rev. A) : External type LTE for Band 13 and Band 4 : External type	
Tx Frequency	:	Cellular band CDMA 1x	824.70 MHz ~ 848.31 MHz
		Cellular band CDMA 1x EVDO(Rev. A):	824.70 MHz ~ 848.31 MHz
		PCS band CDMA 1x	1851.25 MHz ~ 1908.75 MHz
		PCS band CDMA 1x EVDO(Rev. A):	1851.25 MHz ~ 1908.75 MHz
Rx Frequency	:	Cellular band CDMA 1x	869.70 MHz ~ 893.31 MHz
		Cellular band CDMA 1x EVDO(Rev. A):	869.70 MHz ~ 893.31 MHz
		PCS band CDMA 1x	1931.25 MHz ~ 1988.75 MHz
		PCS band CDMA 1x EVDO(Rev. A):	1931.25 MHz ~ 1988.75 MHz
Max. Conducted Output Power	:	Cellular band CDMA 1x	0.274 W (24.38 dBm)
		Cellular band CDMA 1x EVDO(Rev. A):	0.273 W (24.36 dBm)
		PCS band CDMA 1x	0.278 W (24.44 dBm)
		PCS band CDMA 1x EVDO(Rev. A):	0.274 W (24.38 dBm)
Emission Designator(s)	:	Cellular band CDMA 1x	1M28F9W
		Cellular band CDMA 1x EVDO(Rev. A):	1M28F9W
		PCS band CDMA 1x	1M28F9W
		PCS band CDMA 1x EVDO(Rev. A):	1M28F9W

2. INTRODUCTION

2.1. EUT DESCRIPTION

The Equipment Under Test(EUT) supports CDMA and EVDO(Rev. A) of Cellular/PCS bands and LTE(Band 4, 13). The EUT has below 2 transceivers.

1. CDMA 1x/ EVDO(Rev. A)
2. LTE

2.2. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.3. TEST FACILITY

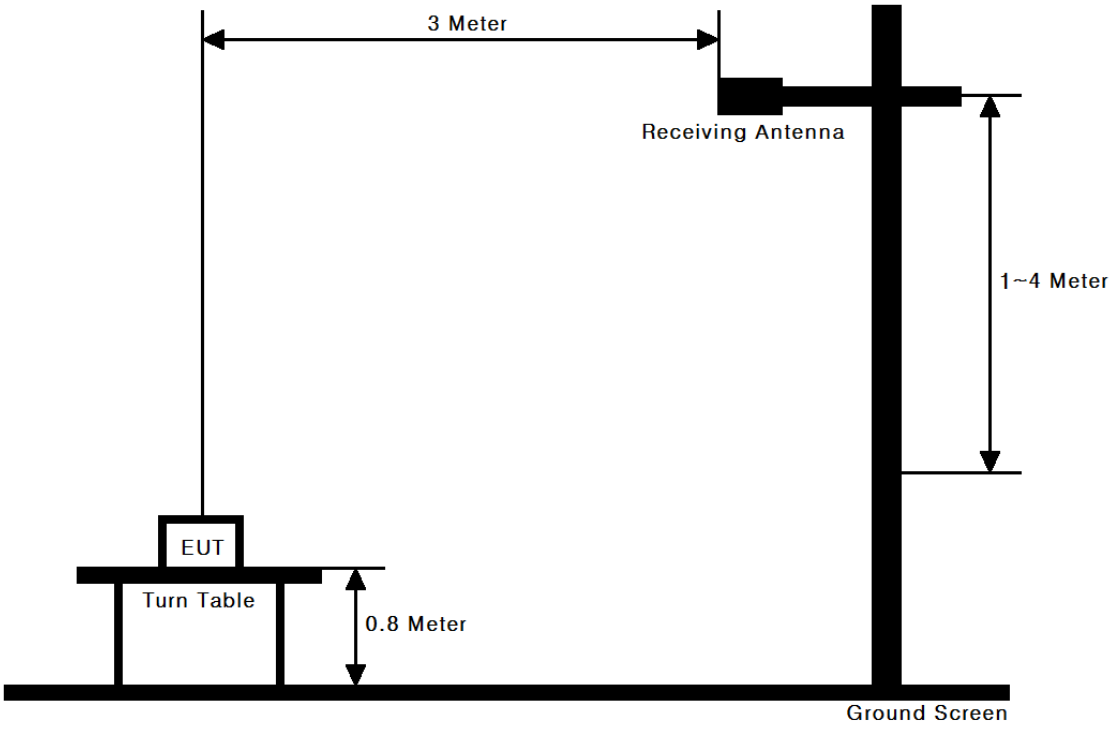
The 3&10m test site and conducted measurement facility used to collect the radiated data are located at the 38, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935. The site is constructed in conformance with the requirements.

- 3&10m test site registration Number: 678747

3. DESCRIPTION OF TESTS

3.1 ERP & EIRP
(Effective Radiated Power & Equivalent Isotropic Radiated Power)

Test Set-up



These measurements were performed at 3&10m test site. The equipment under test is placed on a non-conductive turntable 0.8-meters above the ground plane and 3-meters from the receive antenna.

The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminal of the substitute antenna is measured. The ERP/EIRP is calculated using the following formula,

ERP/EIRP = The conducted power at the substitute antenna`s terminal + substitute antenna gain

For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.

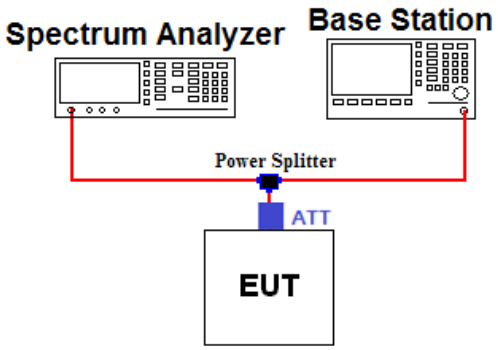
Test Procedure

- **ANSI/TIA-603-C-2004 - Section 2.2.17**
- **KDB971168 v02r01- Section 5.2.1**

1. Set span to at least 1.5 times the OBW.
2. Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
3. Set VBW ≥ 3 x RBW.
4. Set number of points in sweep ≥ 2 × span / RBW.
5. Sweep time = auto-couple.
6. Detector = RMS (power averaging).
7. If the EUT can be configured to transmit continuously (i.e., burst duty cycle ≥ 98%), then set the trigger to free run.
8. If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle < 98 %), then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep.
   Ensure that the sweep time is less than or equal to the transmission burst duration.
9. Trace average at least 100 traces in power averaging (i.e., RMS) mode.
10. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with the band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

3.2 PEAK TO AVERAGE RATIO

Test set-up



Test Procedure

A peak to average ratio measurement is performed using the following procedure**.**

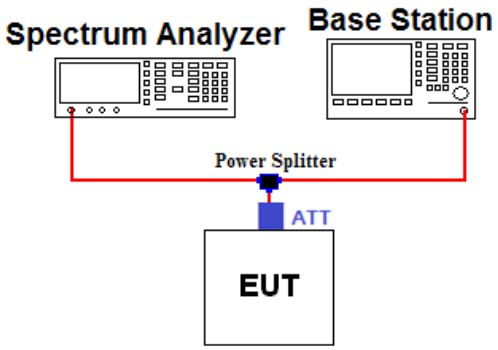
▣CCDF Procedure

- **KDB971168 v02r01-Section 5.7.1**

1. Set resolution/measurement bandwidth ≥ signal`s occupied bandwidth
2. Set the number of counts to a value that stabilizes the measured CCDF curve
3. Set the measurement interval as follows:
   1) For continuous transmissions, set to 1 ms
   2) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
4. Record the maximum PAPR level associated with a probability of 0.1%

3.3 OCCUPIED BANDWIDTH.

Test set-up



Offset value information

Frequency (MHz)	Offset Value (dB)	Frequency (MHz)	Offset Value (dB)
824.70	18.72	1851.25	18.97
836.52	18.76	1880.00	19.04
848.31	18.80	1908.75	19.06
-	-	-	-

Note. 1: The offset values from EUT to Spectrum analyzer were measured and used for test.
Offset value = Cable A + Splitter +ATT

Test Procedure

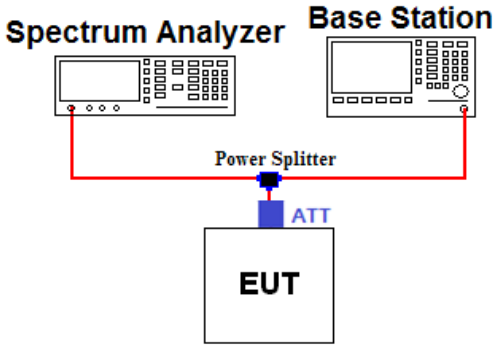
- **KDB971168 v02r01-Section 4.2**

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power of a given emission.

1. The signal analyzer`s automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 ~ 5% of the expected OBW
3. VBW ≥ 3 X RBW
4. Detector = Peak
5. Trance mode = Max hold
6. Sweep = Auto couple
7. The trace was allowed to stabilize
8. If necessary, step 2 ~ 7 were repeated after changing the RBW such that it would be within 1 ~ 5% of the 99% occupied bandwidth observed in step 7.

3.4 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL.

Test set-up



Offset value information

Frequency (MHz)	Offset Value (dB)	Frequency (MHz)	Offset Value (dB)	Frequency (MHz)	Offset Value (dB)
823.0	18.72	1849.0	18.96	5000.0	20.24
824.0	18.72	1850.0	18.96	10000.0	20.89
849.0	18.81	1910.0	19.07	15000.0	21.30
850.0	18.81	1911.0	19.07	20000.0	22.28

Note. 1: The offset value from EUT to Spectrum analyzer was measured and used for test.
Offset value = Cable A + Splitter +ATT

Test Procedure

- **KDB971168 v02r01 - Section 6.0**

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer.
The EUT was setup to maximum output power at its lowest channel. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic.

1. RBW = 1MHz & VBW ≥ 3MHz
2. Detector = RMS
3. Trace mode = Max hold
4. Sweep time = Auto
5. The trace was allowed to stabilize

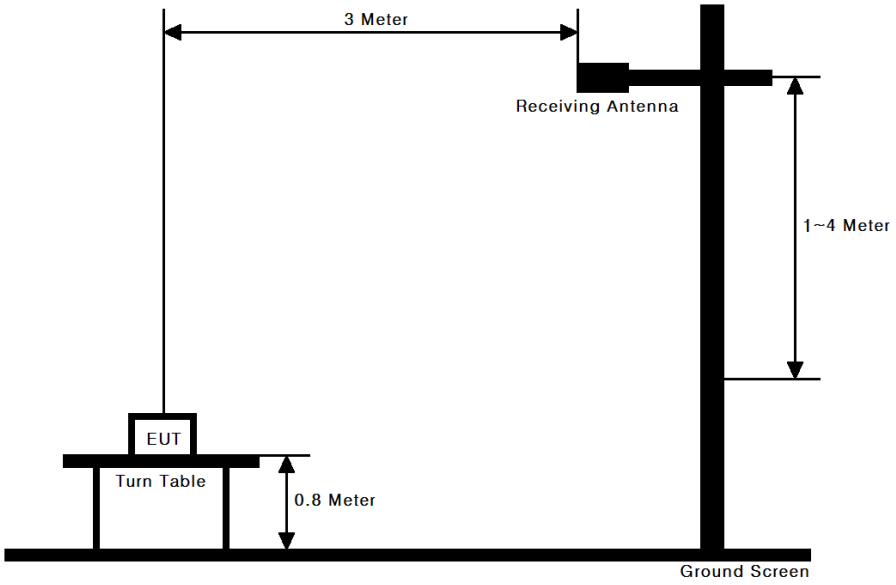
The highest, lowest and a middle channel were tested for out of band measurements.
The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.

Note 1: In the 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter was employed to measure the out of band Emissions.

Note 2: Compliance with the applicable limits is based on the use of measurement instrumentation employing a RBW of 100 KHz or greater for Part 22 and 1 MHz or greater for Part24.

3.5 RADIATED SPURIOUS EMISSIONS

Test Set-up



Test Procedure

- **ANSI/TIA-603-C-2004 - Section 2.2.12**
- **KDB971168 v02r01 - Section 5.8**

This measurement was performed at 3-meter test range. The equipment under test is placed on a non-conductive turntable 0.8-meters above the ground plane and 3-meters from the receive antenna.

The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

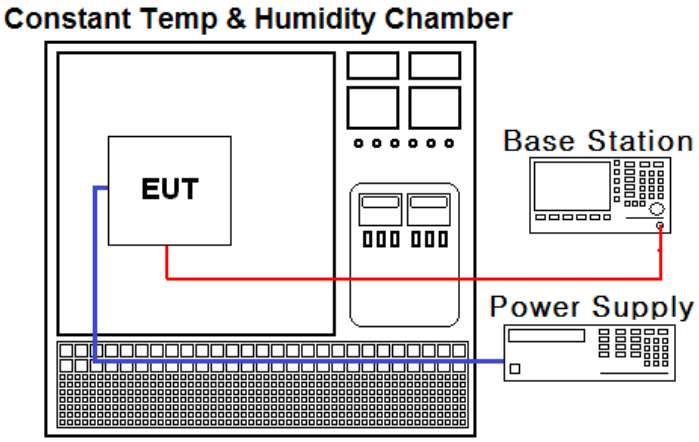
For radiated power measurements below 1GHz, a half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading.

For radiated power measurements above 1GHz, a Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. The difference between the gain of the horn and an isotropic antenna are taken into consideration.

This measurement was performed with the EUT oriented in 3 orthogonal axis.

3.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

Test Set-up



Test Procedure

- **ANSI/TIA-603-C-2004**

The frequency stability of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from battery end point to 115 % of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification – For part 24, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For part 22, the frequency stability of the transmitter shall be maintained within ± 0.000 25 %(± 2.5 ppm) of the center frequency.

Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature. (25°C to provide a reference).

2. The equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.

3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

4. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal. Date (yy/mm/dd)	S/N
PXA Signal Analyzer	Agilent	N9030A	13/10/29	14/10/29	MY53310140
MXA Signal Analyzer	Agilent	N9020A	13/09/24	14/09/24	MY50200867
Digital Multimeter	H.P	34401A	14/02/27	15/02/27	3146A13475
Dynamic Measurement DC Source	Agilent	66332A	13/09/24	14/09/24	US37473627
Temp & Humi Test Chamber	SJ Science	TEMI2500	13/10/22	14/10/22	SJ-TH-S50-130930
Power Splitter	Anritsu	K241B	13/10/22	14/10/22	1701061
Attenuator(3dB)	SMAJK	SMAJK-2-3	13/10/22	14/10/22	3
Attenuator(10dB)	SMAJK	SMAJK-50-10	13/10/23	14/10/23	2-50-10
Thermohygrometer	BODYCOM	BJ5478	14/03/03	15/03/03	1209
Dipole Antenna	Schwarzbeck	VHA9103	13/10/24	15/10/24	2116
Dipole Antenna	Schwarzbeck	VHA9103	14/04/01	16/04/01	2117
Dipole Antenna	Schwarzbeck	UHA9105	13/10/24	15/10/24	2261
Dipole Antenna	Schwarzbeck	UHA9105	14/04/01	16/04/01	2262
Bilog Antenna	SCHAFFNER	CBL6112B	12/11/06	14/11/06	2737
HORN ANT	ETS	3115	14/02/26	16/02/26	6419
HORN ANT	ETS	3115	13/02/28	15/02/28	00021097
HORN ANT	A.H.Systems	SAS-574	13/03/20	15/03/20	154
HORN ANT	A.H.Systems	SAS-574	13/05/27	15/05/27	155
Amplifier (22dB)	H.P	8447E	14/01/07	15/01/07	2945A02865
Amplifier (30dB)	Agilent	8449B	14/02/27	15/02/27	3008A00370
High-pass filter	Wainwright	WHKX1.0	13/09/12	14/09/12	9
High-Pass Filter	Wainwright	WHNX2.1	13/09/12	14/09/12	1
8960 Series 10 Wireless Comms Test Set	Agilent	E5515C	14/02/28	15/02/28	GB43461134
Universal Radio Communication Tester	Rohde Schwarz	CMU200	14/02/28	15/02/28	106760
Vector Signal Generator	Rohde Schwarz	SMBV100A	14/01/08	15/01/08	255571
Signal Generator	Rohde Schwarz	SMF100A	14/07/01	15/07/01	102341
Amplifier	EMPOWER	BBS3Q7ELU	13/09/12	14/09/12	1020

5. SUMMARY OF TEST RESULTS

FCC Part Section(s)	RSS Section(s)	Parameter	Status Note 1
2.1046	RSS-132 (5.4) RSS-133 (4.1)	Conducted Output Power	C
22.913(a) 24.232(c)	RSS-132 (5.4) [SRSP-503(5.1.3)] RSS-133 (6.4) [SRSP-510(5.1.2)]	Effective Radiated Power Equivalent Isotropic Radiated Power	C
2.1049	RSS-Gen (4.6.1)	Occupied Bandwidth	C
22.917(a) 24.238(a) 2.1051	RSS-132 (5.5) RSS-133 (6.5)	Band Edge Spurious and Harmonic Emissions at Antenna Terminal	C
24.232(d)	RSS-133 (6.4)	Peak to Average Ratio	C
22.917(a) 24.238(a) 2.1053	RSS-132 (5.5) RSS-133 (6.5)	Radiated Spurious and Harmonic Emissions	C
22.355 24.235 2.1055	RSS-132 (5.3) RSS-133 (6.3)	Frequency Stability	C

Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable
Note 2: This test report is for CDMA 1x and CDMA 1x EVDO(Rev. A) functions.

The sample was tested according to the following specification:
ANSI/TIA/EIA-603-C-2004 and KDB 971168 D01 v02r01

6. SAMPLE CALCULATION

A. Emission Designator

Cellular CDMA1x

Emission Designator = **1M28F9W**
CDMAOBW = 1.2779 MHz
(Measured at the 99.75% power bandwidth)
F = Frequency Modulation
9 = Composite Digital Information
W = Combination (Audio/Data)

Cellular CDMA 1x EVDO(Rev. A)

Emission Designator = **1M28F9W**
CDMAOBW = 1.2759 MHz
(Measured at the 99.75% power bandwidth)
F = Frequency Modulation
9 = Composite Digital Information
W = Combination (Audio/Data)

PCS CDMA1x

Emission Designator = **1M28F9W**
CDMAOBW = 1.2780 MHz
(Measured at the 99.75% power bandwidth)
F = Frequency Modulation
9 = Composite Digital Information
W = Combination (Audio/Data)

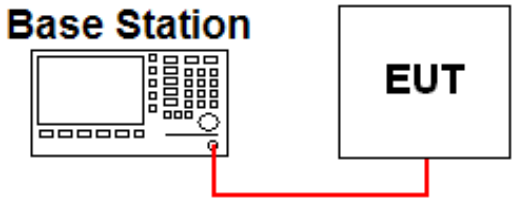
PCS CDMA 1x EVDO(Rev. A)

Emission Designator = **1M28F9W**
CDMAOBW = 1.2771 MHz
(Measured at the 99.75% power bandwidth)
F = Frequency Modulation
9 = Composite Digital Information
W = Combination (Audio/Data)

7. TEST DATA

7.1 CONDUCTED OUTPUT POWER

A base station simulator was used to establish communication with the EUT. The base station simulator parameters were set to produce the maximum power from the EUT. This device was tested under all configurations and the highest power is reported. Conducted Output Powers of EUT are reported below.



The output power was measured using the Agilent E5515C

▪CDMA

Band	CH.	CDMA 1x						EVDO	
		RC1		RC3				Rev. 0	Rev. A
		SO 2	SO55	SO 2	SO55	SO32 (SCH)	SO32 (F-SCH)	RTAP	RETAP
Cellular	**1013**	24.28	24.22	24.25	24.27	24.26	24.26	24.13	24.18
	384	**24.38**	24.34	24.28	24.37	24.28	24.34	24.35	24.36
	777	24.32	24.30	24.18	24.12	24.14	24.19	24.33	24.20
PCS	**25**	24.34	24.34	24.24	24.22	24.22	24.28	24.23	24.27
	600	**24.44**	24.40	24.36	24.32	24.28	24.33	24.37	24.38
	1175	24.28	24.20	24.16	24.14	24.14	24.17	24.22	24.29

7.2 PEAKTOAVERAGERATIO

- Plots of the EUT's Peak- to- Average Ratio are shown in Clause 8.1

7.3 OCCUPIED BANDWIDTH

Band	Mode	Channel	Test Result(KHz)
Cellular	CDMA 1x	1013	1273.90
		384	1274.10
		777	***1277.90***
	CDMA 1x EVDO	1013	1272.50
		384	1271.80
		777	***1275.90***
PCS	CDMA 1x	25	1277.00
		600	***1278.00***
		1175	1276.30
	CDMA 1x EVDO	25	1273.80
		600	***1277.10***
		1175	1270.60

- Plots of the EUT's Occupied Bandwidth are shown in Clause 8.2

7.4 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL

- Plots of the EUT's Conducted Spurious Emissions are shown in Clause 8.3

7.5 BAND EDGE

- Plots of the EUT's Band Edge are shown in Clause 8.4

7.6 EFFECTIVE RADIATED POWER

Band	Mode	Maximum Output Power(dBm)	Antenna Gain (dBd)	ERP (dBm)	LIMIT (dBm)
Cellular	CDMA 1X	26.00	3.35	29.35	38.45
Cellular	CDMA 1X EVDO	26.00	3.35	29.35	38.45

Note.
The maximum output power used max tune-up power.
Available max Antenna gain is 5.50dBi in cellular band of CDMA, and compliant with MPE requirement.

7.7 EQUIVALENT ISOTROPIC RADIATED POWER

Band	Mode	Maximum Output Power(dBm)	Antenna Gain (dBi)	EIRP (dBm)	LIMIT (dBm)
PCS	CDMA 1X	26.00	7.00	33.00	33.01
PCS	CDMA 1X EVDO	26.00	7.00	33.00	33.01

Note.
The maximum output power used max tune-up power.
Available max Antenna gain is 7.00dBi in pcs band of CDMA, and compliant with MPE requirement.

7.8 RADIATED SPURIOUS EMISSIONS

7.8.1 RADIATED SPURIOUS EMISSIONS (Cellular CDMA 1x)

Channel	Freq. (MHz)	EUT Position (Axis)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBd)	Correct Generator Level (dBm)	Margin (dB)	Limit (dBm)
1013	1649.35	X	H	-65.65	6.50	-59.15	46.15	-13.00
	2474.14	Z	H	-52.30	7.54	-44.76	31.76	
	-	-	-	-	-	-	-	
384	1673.06	X	H	-63.68	6.53	-57.15	44.15	
	2509.64	Z	H	-53.39	7.57	-45.82	32.82	
	-	-	-	-	-	-	-	
777	1696.77	X	H	-63.18	6.56	-56.62	43.62	
	2544.97	Z	H	-54.90	7.59	-47.31	34.31	
	-	-	-	-	-	-	-	

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

NOTES:

This EUT was tested under all configurations and the highest power is reported and CDMA 1x mode used a Power control bits of “All up”. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.

7.8.2 RADIATED SPURIOUS EMISSIONS (Cellular CDMA 1x EVDO (Rev. A))

Channel	Freq. (MHz)	EUT Position (Axis)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBd)	Correct Generator Level (dBm)	Margin (dB)	Limit (dBm)
1013	1649.51	X	H	-64.16	6.50	-57.66	44.66	-13.00
	2474.23	Z	H	-52.53	7.54	-44.99	31.99	
	-	-	-	-	-	-	-	
384	1673.05	X	H	-63.09	6.53	-56.56	43.56	
	2509.50	Z	H	-53.36	7.57	-45.79	32.79	
	-	-	-	-	-	-	-	
777	1696.60	X	H	-64.66	6.56	-58.10	45.10	
	2545.12	Z	H	-53.85	7.59	-46.26	33.26	
	-	-	-	-	-	-	-	

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

NOTES:

This EUT was tested under all configurations and the highest power is reported and CDMA 1x EVDO mode used a Power control bits of “All up”. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.

7.8.3 RADIATED SPURIOUS EMISSIONS (PCS CDMA 1x)

Channel	Freq. (MHz)	EUT Position (Axis)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBi)	Correct Generator Level (dBm)	Margin (dB)	Limit (dBm)
25	3702.33	Y	V	-44.78	9.78	-35.00	22.00	-13.00
	5553.80	Z	H	-46.89	11.05	-35.84	22.84	
	-	-	-	-	-	-	-	
600	3760.54	Y	V	-45.78	9.72	-36.06	23.06	
	5640.17	Z	H	-48.97	11.14	-37.83	24.83	
	-	-	-	-	-	-	-	
1175	3817.69	Y	V	-45.67	9.66	-36.01	23.01	
	5726.37	Z	H	-43.67	11.23	-32.44	19.44	
	-	-	-	-	-	-	-	

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

NOTES:

This EUT was tested under all configurations and the highest power is reported and CDMA 1x mode used a Power control bits of “All up”. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.

7.8.4 RADIATED SPURIOUS EMISSIONS (PCS CDMA 1x EVDO (Rev. A))

Channel	Freq. (MHz)	EUT Position (Axis)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBi)	Correct Generator Level (dBm)	Margin (dB)	Limit (dBm)
25	3702.48	Y	V	-46.32	9.78	-36.54	23.54	-13.00
	5552.95	Z	H	-47.76	11.05	-36.71	23.71	
	-	-	-	-	-	-	-	
600	3760.52	Y	V	-46.93	9.72	-37.21	24.21	
	5640.22	Z	H	-48.35	11.14	-37.21	24.21	
	-	-	-	-	-	-	-	
1175	3817.86	Y	V	-46.89	9.66	-37.23	24.23	
	5726.95	Z	H	-45.74	11.23	-34.51	21.51	
	-	-	-	-	-	-	-	

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

NOTES:

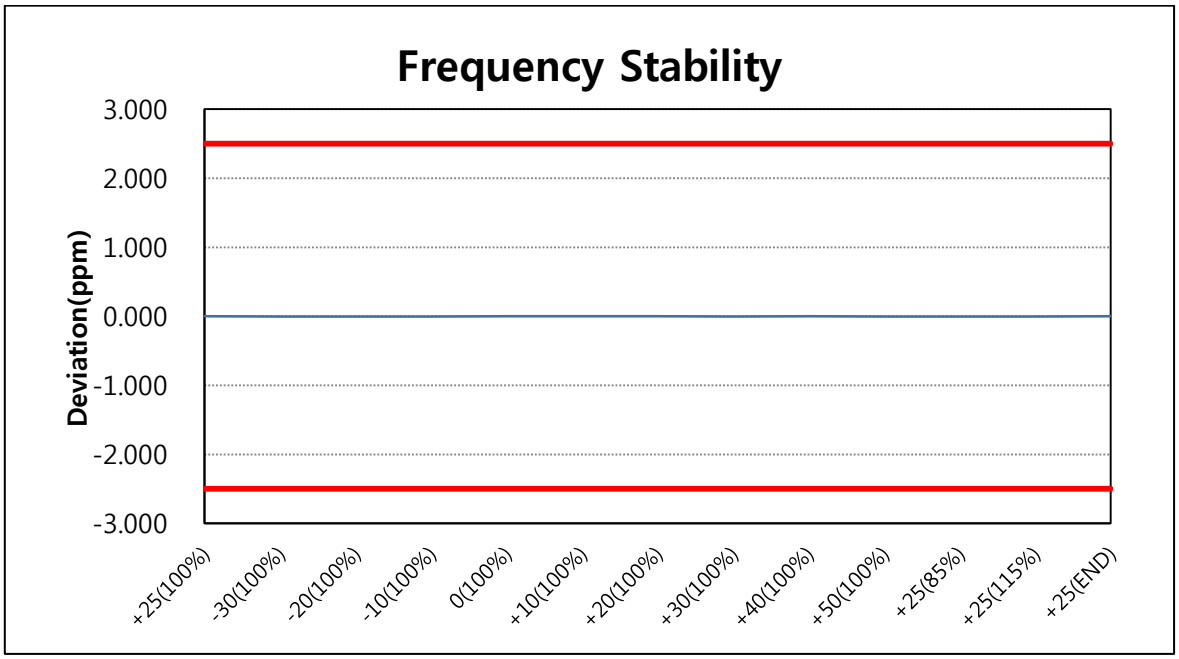
This EUT was tested under all configurations and the highest power is reported and CDMA 1x EVDO mode used a Power control bits of “All up”. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.
The worst case data is reported.

7.9 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

7.9.1 FREQUENCY STABILITY (Cellular CDMA 1x)

OPERATING FREQUENCY : 836,519,994 Hz
CHANNEL : 384 (Mid)
REFERENCE VOLTAGE : 3.800 V DC
DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

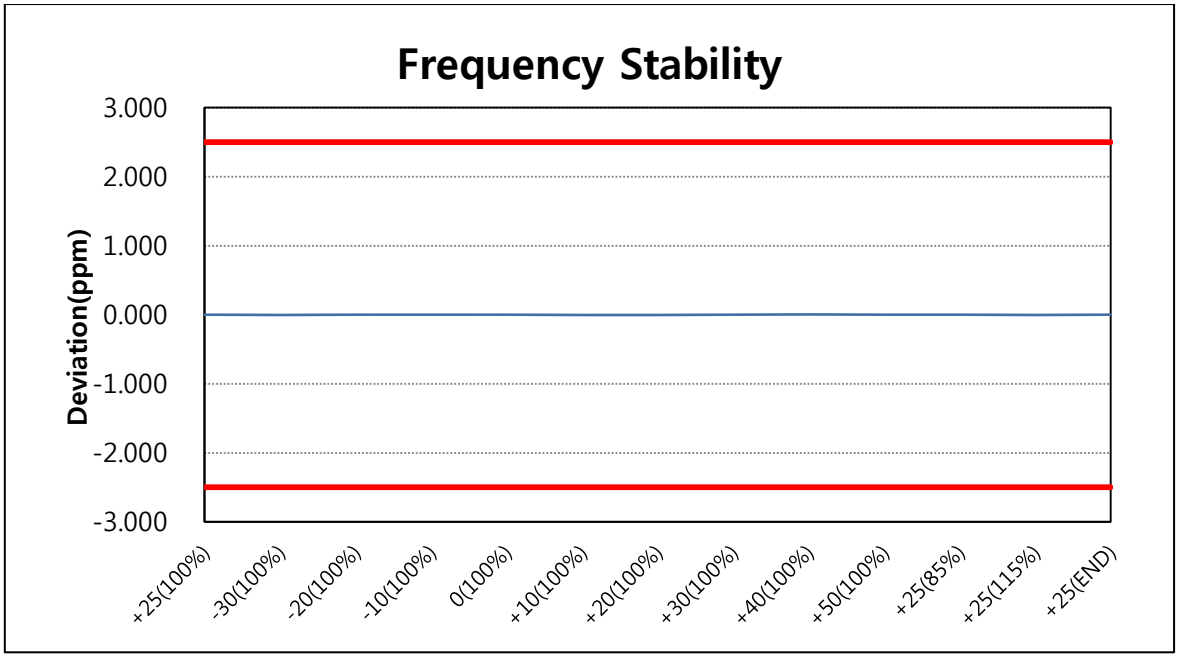
VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQ (Hz)	Deviation	
				(ppm)	(%)
100%	3.800	+25(Ref)	836,519,994	0.000	0.00000000
100%		-30	836,519,992	-0.002	-0.00000024
100%		-20	836,519,992	-0.002	-0.00000024
100%		-10	836,519,993	-0.001	-0.00000012
100%		0	836,519,995	0.001	0.00000012
100%		+10	836,519,994	0.000	0.00000000
100%		+20	836,519,996	0.002	0.00000024
100%		+30	836,519,992	-0.002	-0.00000024
100%		+40	836,519,996	0.002	0.00000024
100%		+50	836,519,993	-0.001	-0.00000012
85 %	3.230	+25	836,519,993	-0.001	-0.00000012
115%	4.370	+25	836,519,992	-0.002	-0.00000024
BATT.ENDPOINT	N/A	-	-	-	-



7.9.2 FREQUENCY STABILITY (Cellular CDMA 1x EVDO (Rev. A))

OPERATING FREQUENCY : 836,519,993 Hz
CHANNEL : 384 (Mid)
REFERENCE VOLTAGE : 3.800 V DC
DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

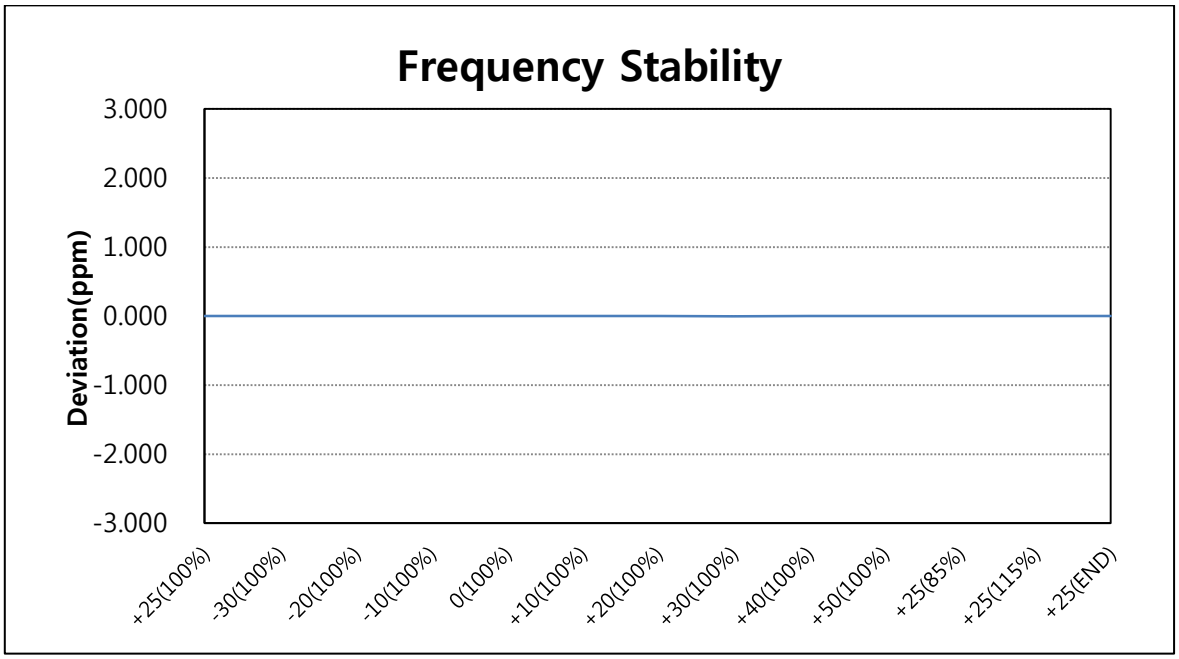
VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQ (Hz)	Deviation	
				(ppm)	(%)
100%	3.800	+25(Ref)	836,519,993	0.000	0.00000000
100%		-30	836,519,991	-0.002	-0.00000024
100%		-20	836,519,994	0.001	0.00000012
100%		-10	836,519,995	0.002	0.00000024
100%		0	836,519,996	0.004	0.00000036
100%		+10	836,519,992	-0.001	-0.00000012
100%		+20	836,519,991	-0.002	-0.00000024
100%		+30	836,519,994	0.001	0.00000012
100%		+40	836,519,997	0.005	0.00000048
100%		+50	836,519,995	0.002	0.00000024
85%	3.230	+25	836,519,993	0.000	0.00000000
115%	4.370	+25	836,519,992	-0.001	-0.00000012
BATT.ENDPOINT	N/A	-	-	-	-



7.9.3 FREQUENCY STABILITY (PCS CDMA 1x)

OPERATING FREQUENCY : 1,880,000,004 Hz
CHANNEL : 600 (Mid)
REFERENCE VOLTAGE : 3.800 V DC
LIMIT : The frequency stability shall be sufficient to ensure that the fundamental emission stays wthin the authorized frequency block.

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQ (Hz)	Deviation	
				(ppm)	(%)
100%	3.800	+25(Ref)	1,880,000,004	0.000	0.00000000
100%		-30	1,880,000,007	0.002	0.00000016
100%		-20	1,880,000,005	0.001	0.00000005
100%		-10	1,880,000,003	-0.001	-0.00000005
100%		0	1,880,000,008	0.002	0.00000021
100%		+10	1,880,000,006	0.001	0.00000011
100%		+20	1,880,000,004	0.000	0.00000000
100%		+30	1,880,000,002	-0.001	-0.00000011
100%		+40	1,880,000,006	0.001	0.00000011
100%		+50	1,880,000,007	0.002	0.00000016
85%	3.230	+25	1,880,000,003	-0.001	-0.00000005
115%	4.370	+25	1,880,000,005	0.001	0.00000005
BATT.ENDPOINT	N/A	-	-	-	-

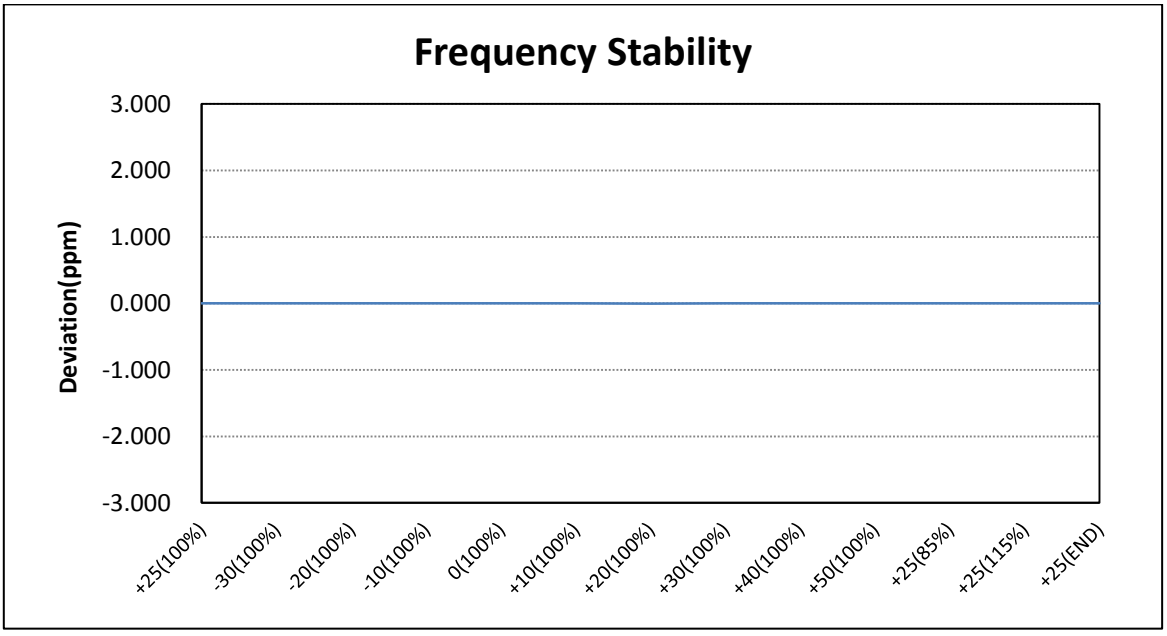


Note. Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. as such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

7.9.4 FREQUENCY STABILITY (PCS CDMA 1xEVDO (Rev. A))

OPERATING FREQUENCY : 1,880,000,005 Hz
CHANNEL : 600 (Mid)
REFERENCE VOLTAGE : 3.800 V DC
LIMIT : The frequency stability shall be sufficient to ensure that the fundamental emission stays wthin the authorized frequency block.

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQ (Hz)	Deviation	
				(ppm)	(%)
100%	3.800	+25(Ref)	1,880,000,005	0.000	0.00000000
100%		-30	1,880,000,004	-0.001	-0.00000005
100%		-20	1,880,000,006	0.001	0.00000005
100%		-10	1,880,000,004	-0.001	-0.00000005
100%		0	1,880,000,008	0.002	0.00000016
100%		+10	1,880,000,007	0.001	0.00000011
100%		+20	1,880,000,003	-0.001	-0.00000011
100%		+30	1,880,000,008	0.002	0.00000016
100%		+40	1,880,000,006	0.001	0.00000005
100%		+50	1,880,000,006	0.001	0.00000005
85 %	3.230	+25	1,880,000,005	0.000	0.00000000
115%	4.370	+25	1,880,000,009	0.002	0.00000021
BATT.ENDPOINT	N/A	-	-	-	-

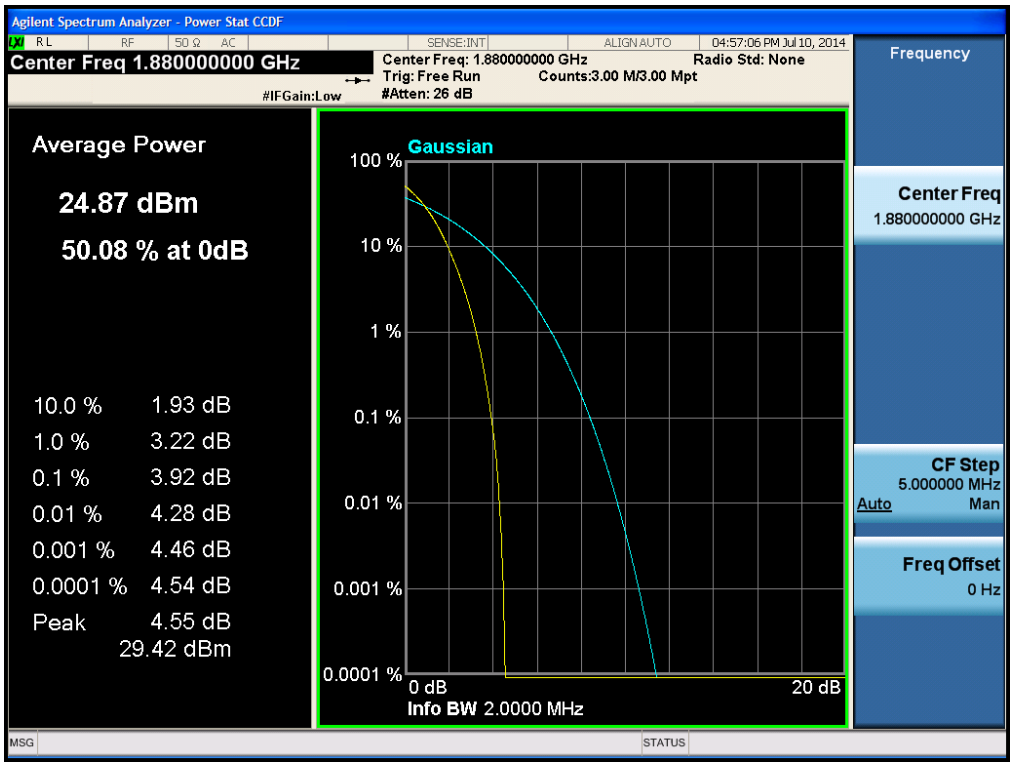


Note. Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. as such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

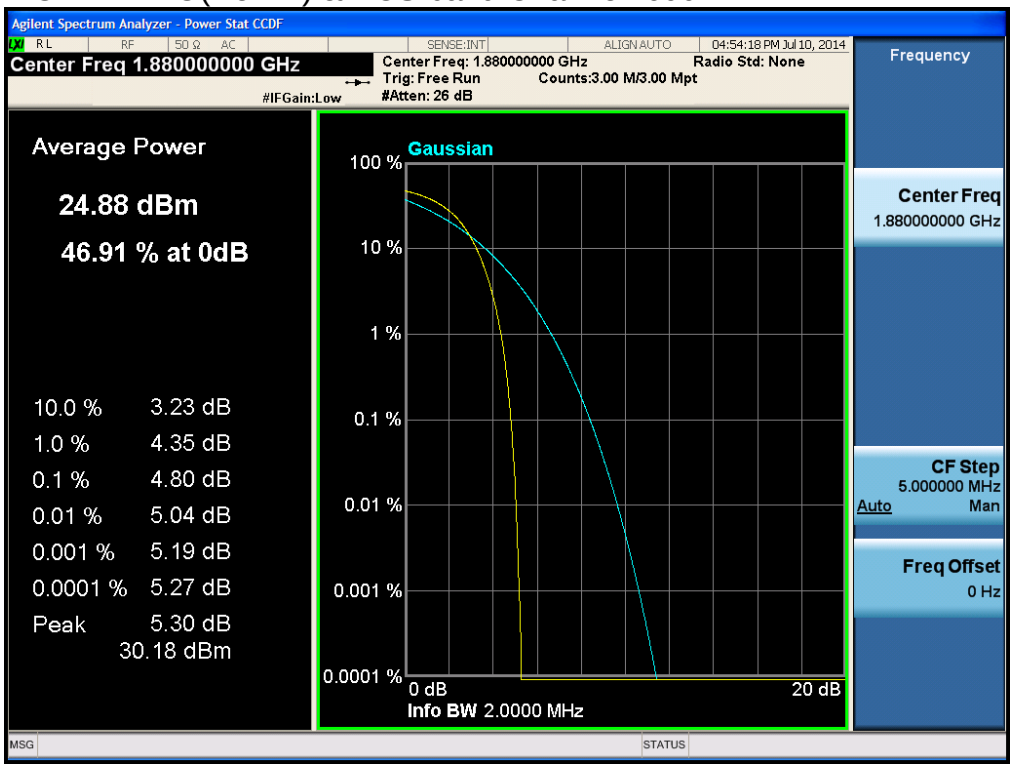
8. TEST PLOTS

8.1 Peak to Average Ratio

CDMA 1x & PCS band Channel: 600

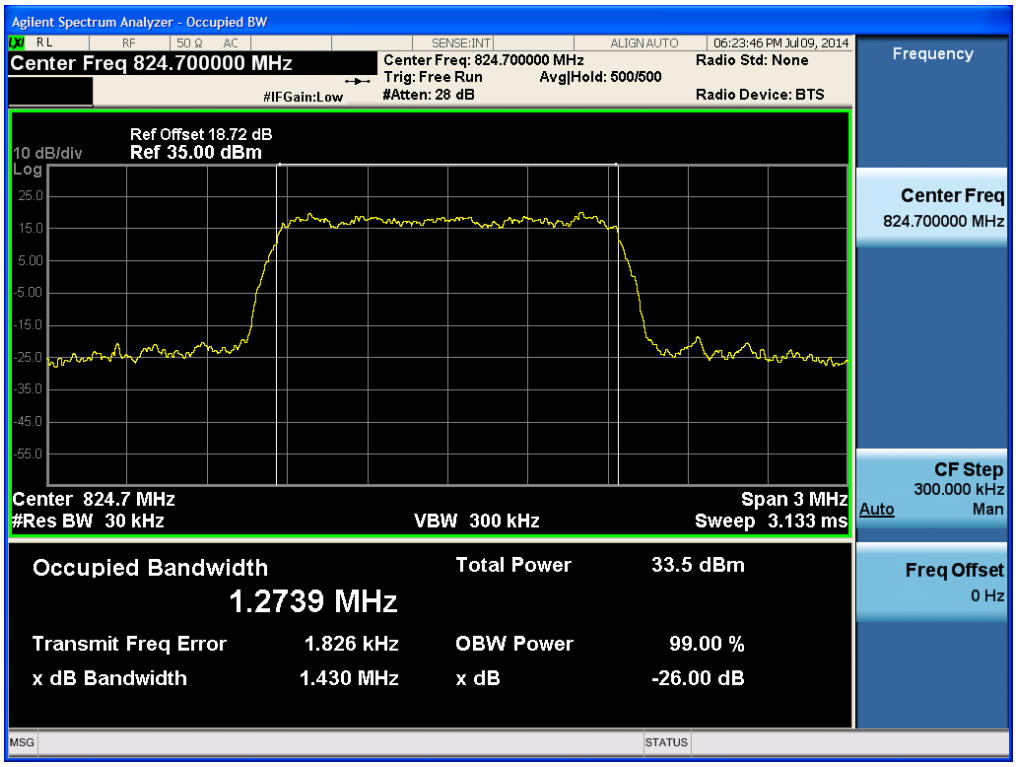


CDMA EVDO 1x EVDO(Rev. A) & PCS band Channel: 600

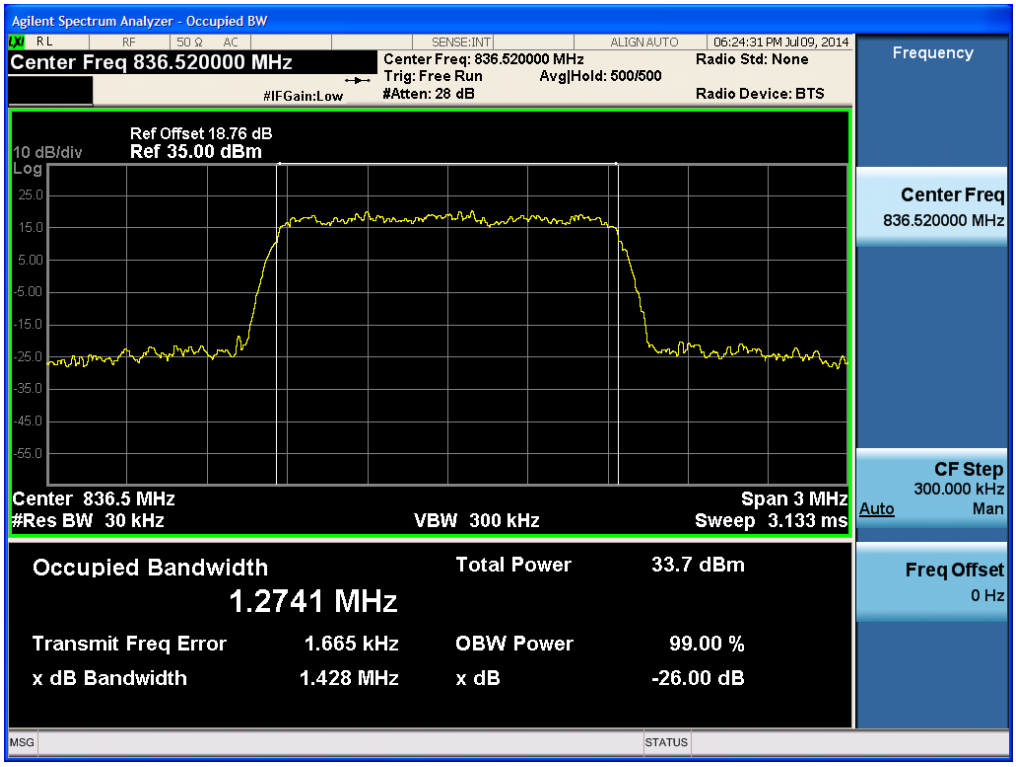


8.2 Occupied Bandwidth (99 % Bandwidth)

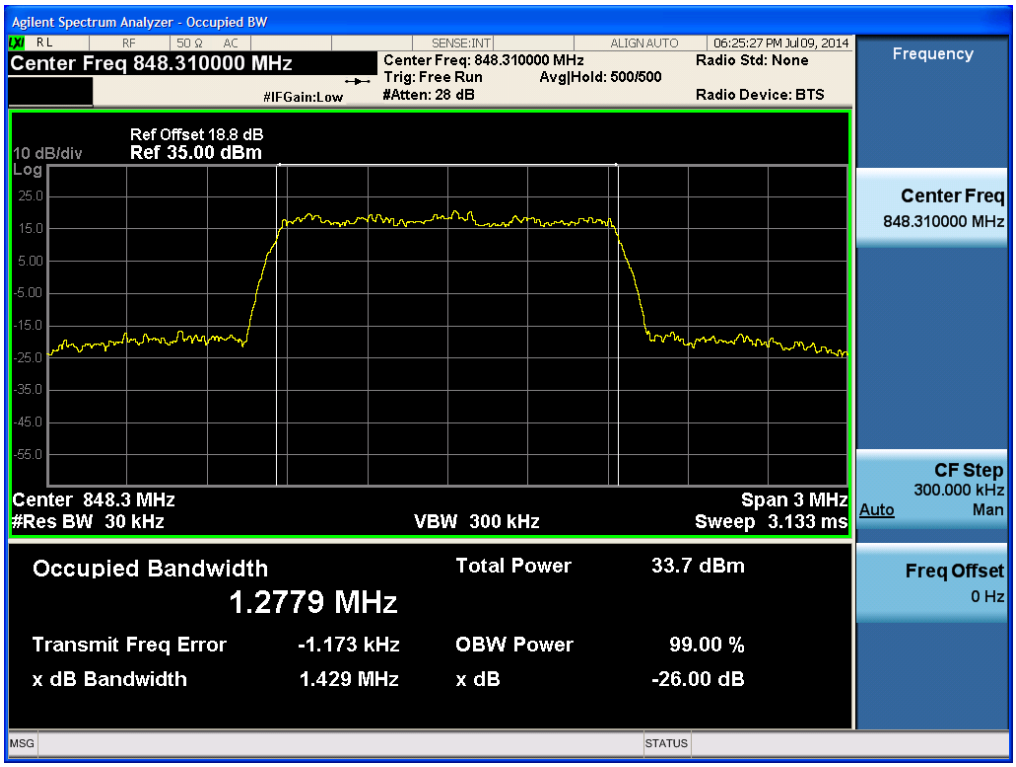
CDMA 1x & Cellular band Channel: 1013



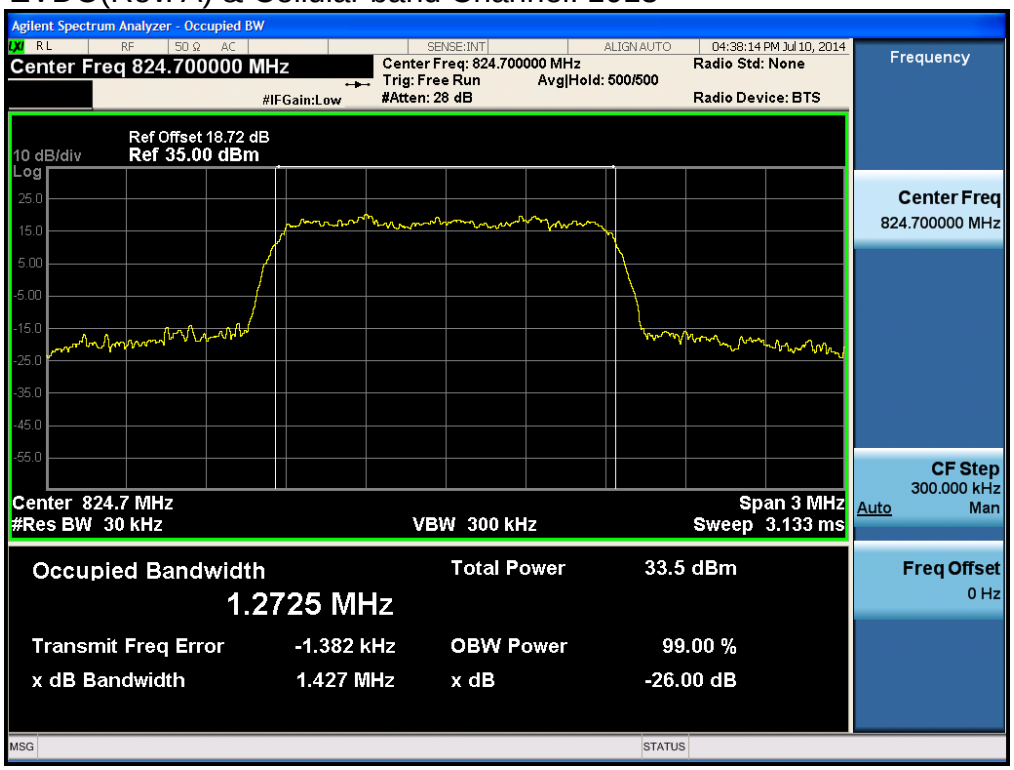
CDMA 1x & Cellular band Channel: 384



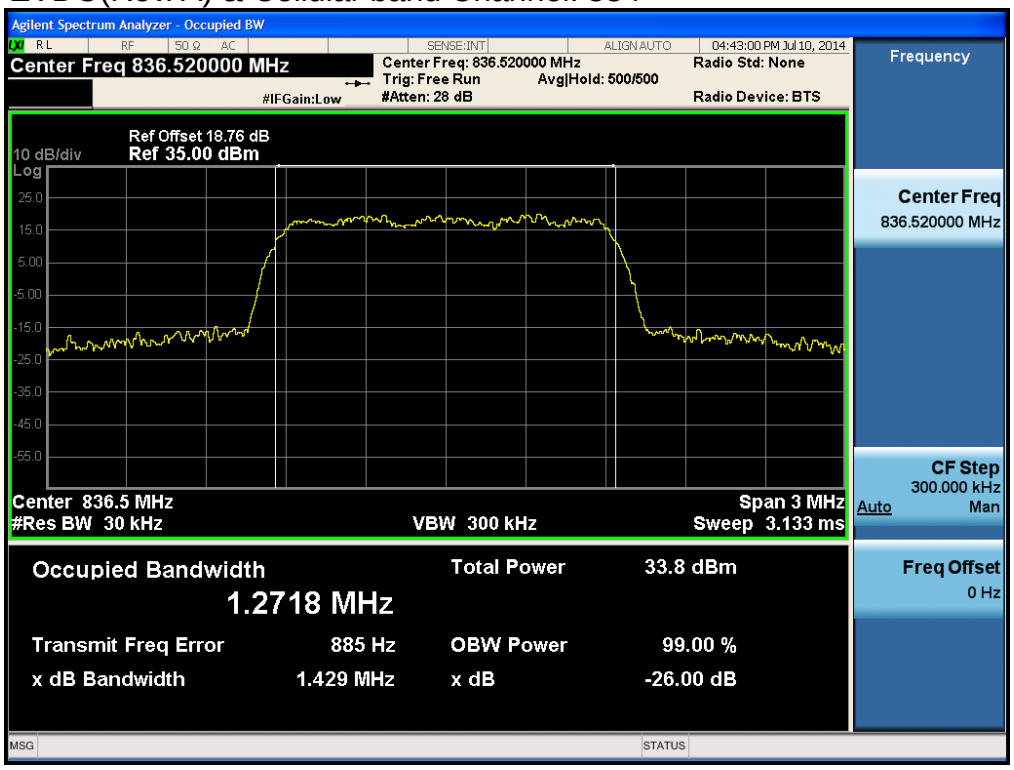
CDMA 1x & Cellular band Channel: 777



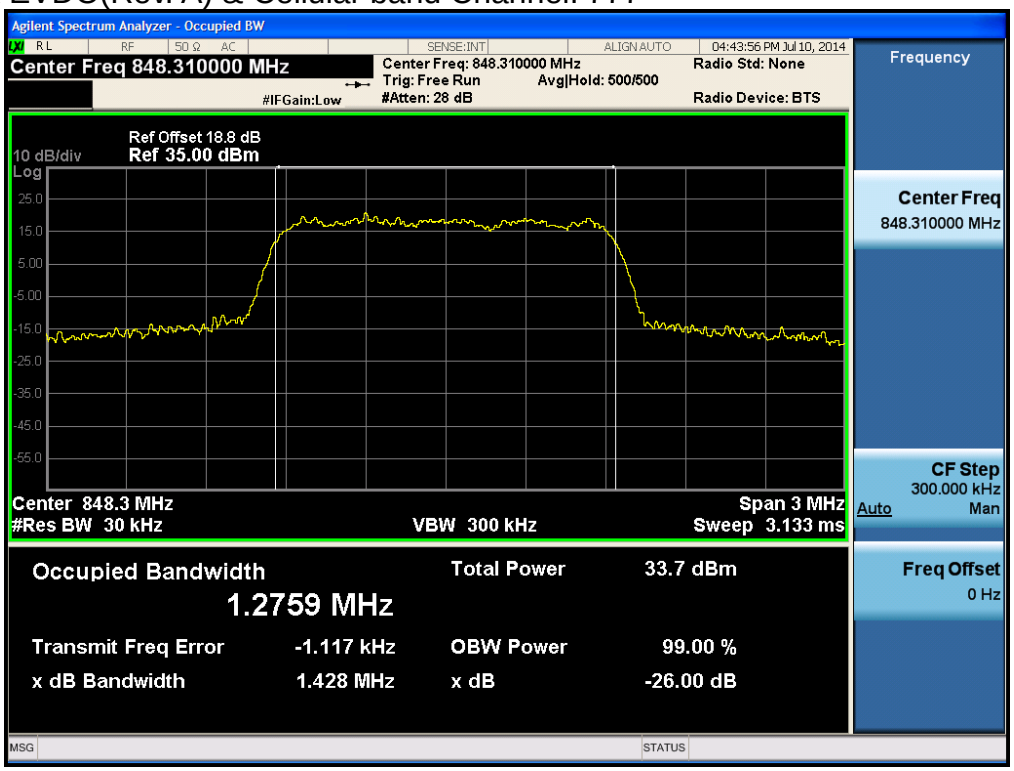
CDMA 1x EVDO(Rev. A) & Cellular band Channel: 1013



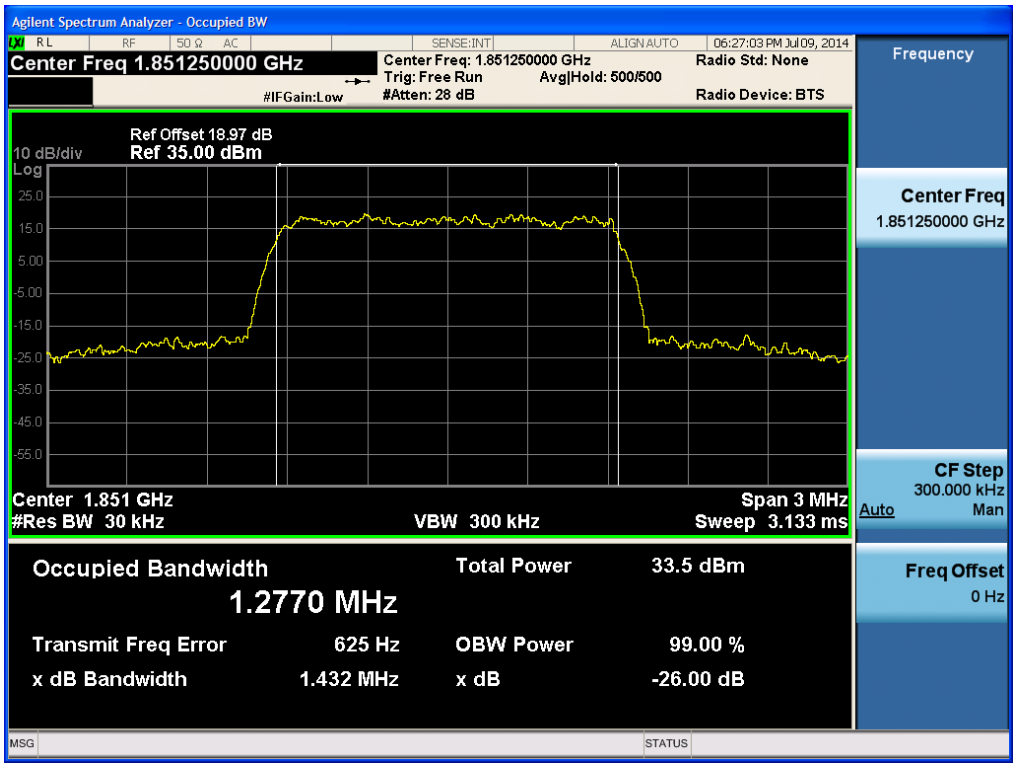
CDMA 1x EVDO(Rev. A) & Cellular band Channel: 384



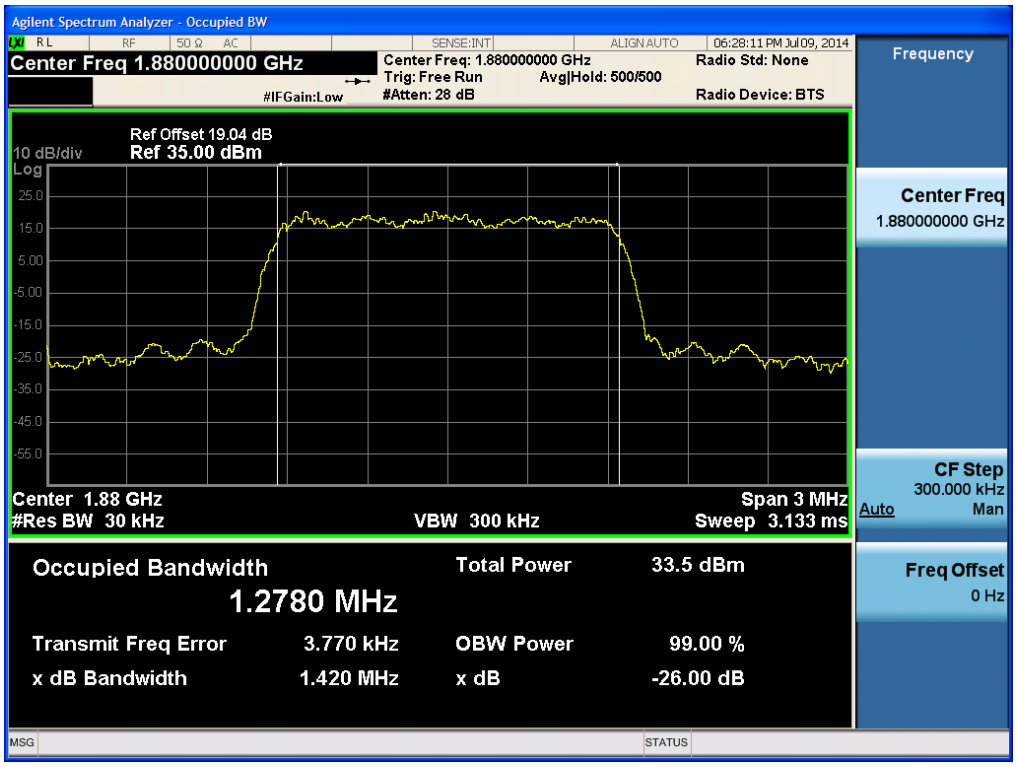
CDMA 1x EVDO(Rev. A) & Cellular band Channel: 777



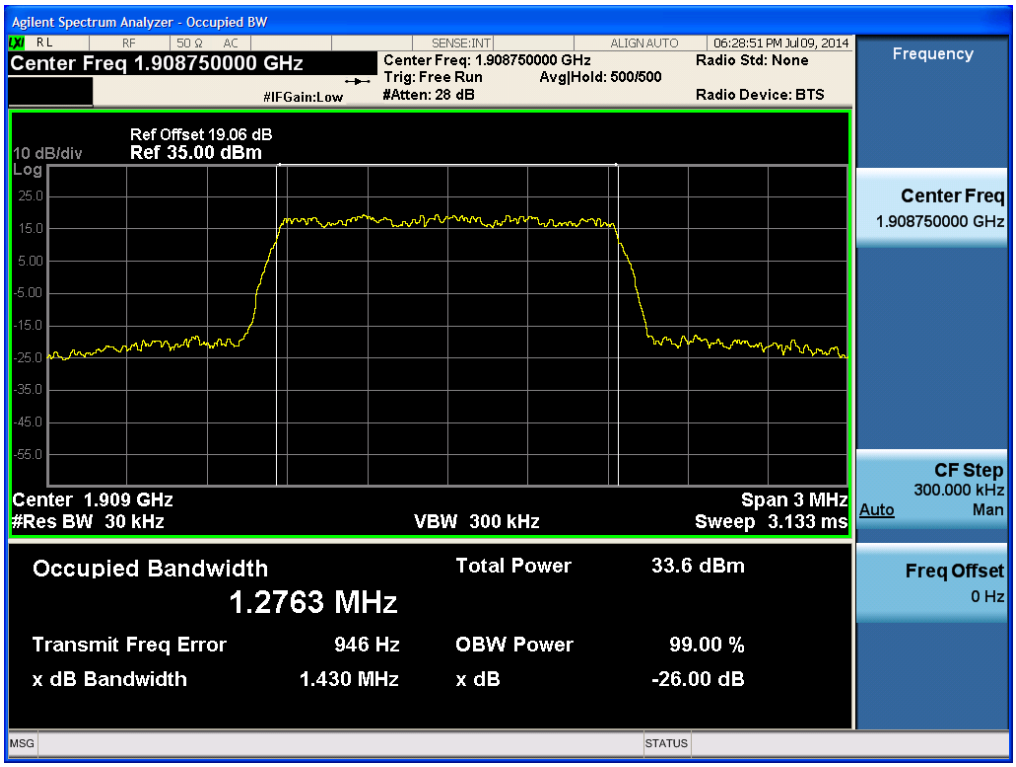
CDMA 1x & PCS band Channel: 25



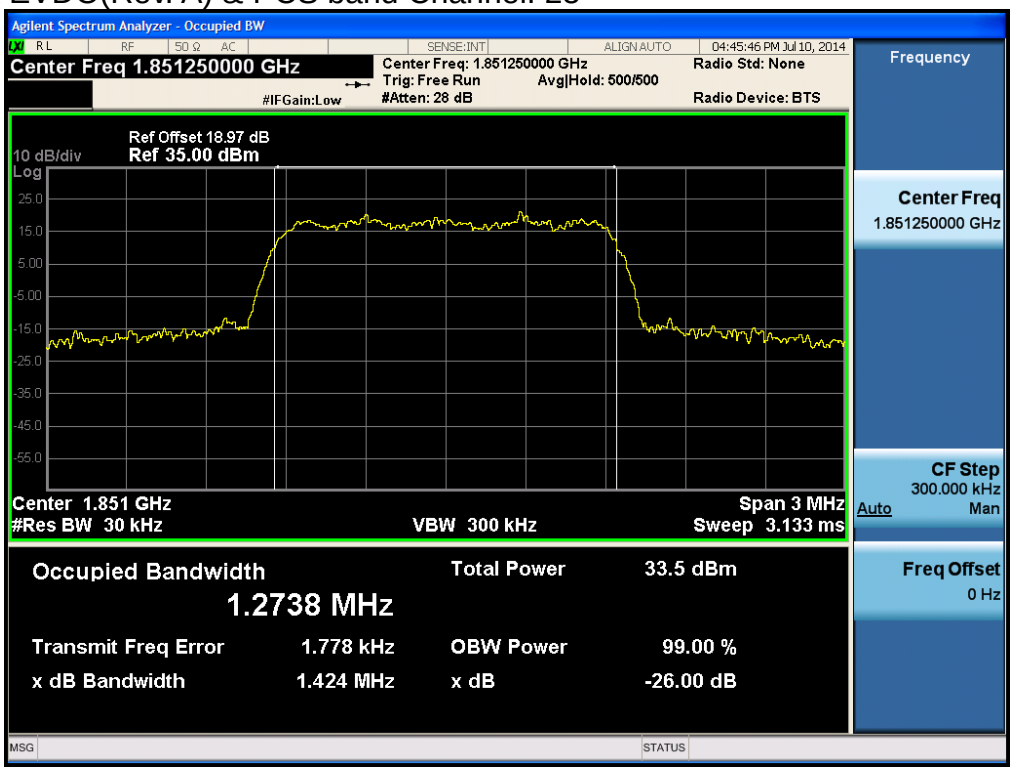
CDMA 1x & PCS band Channel: 600



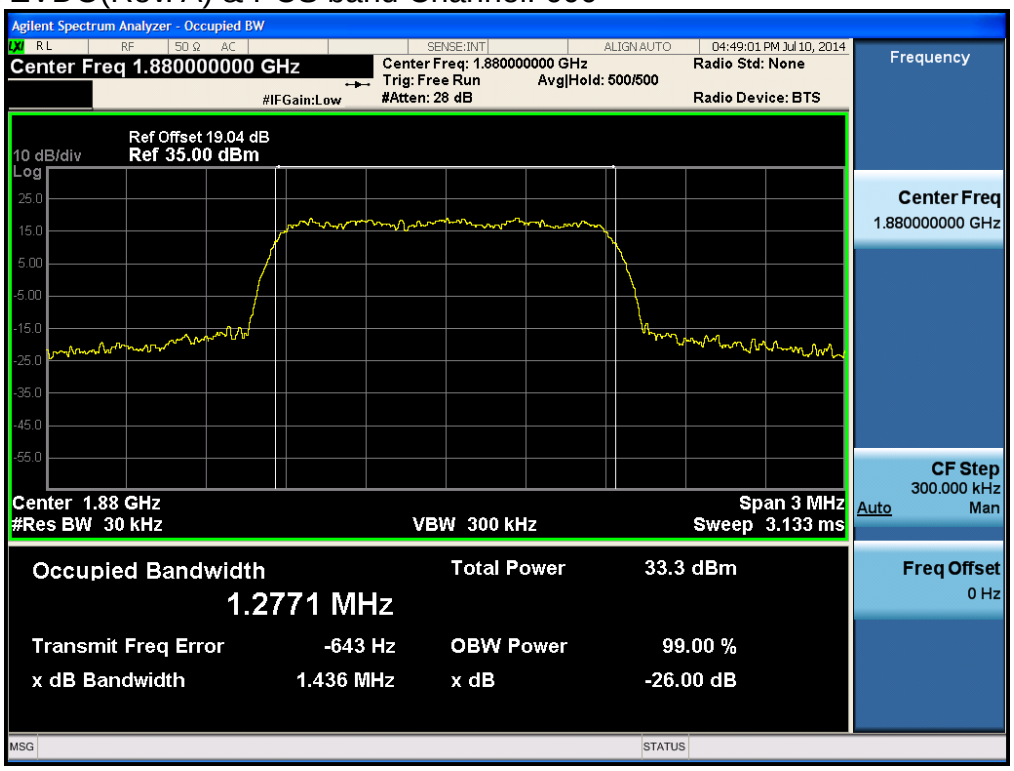
CDMA 1x & PCS band Channel: 1175



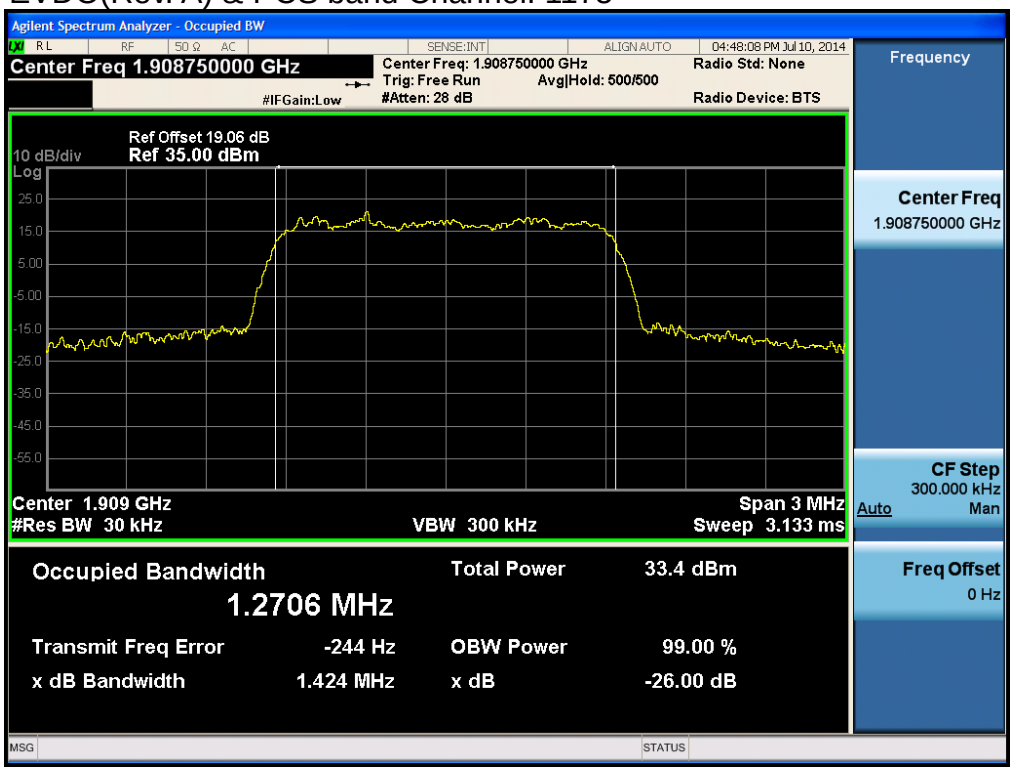
CDMA 1x EVDO(Rev. A) & PCS band Channel: 25



CDMA 1x EVDO(Rev. A) & PCS band Channel: 600

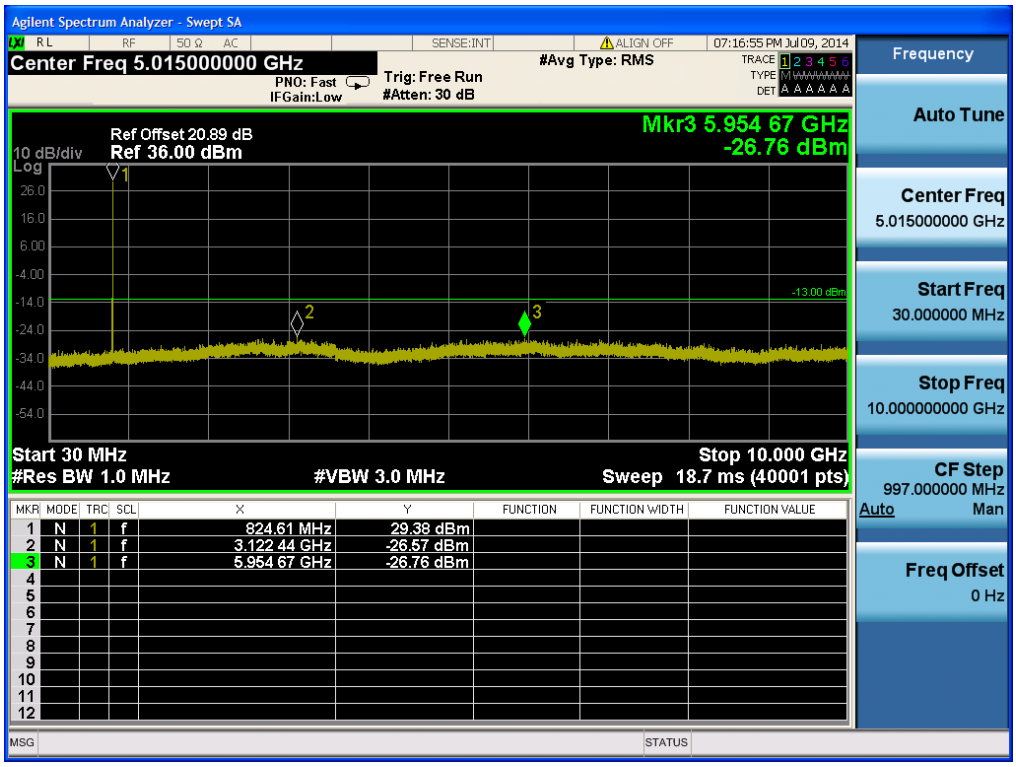


CDMA 1x EVDO(Rev. A) & PCS band Channel: 1175

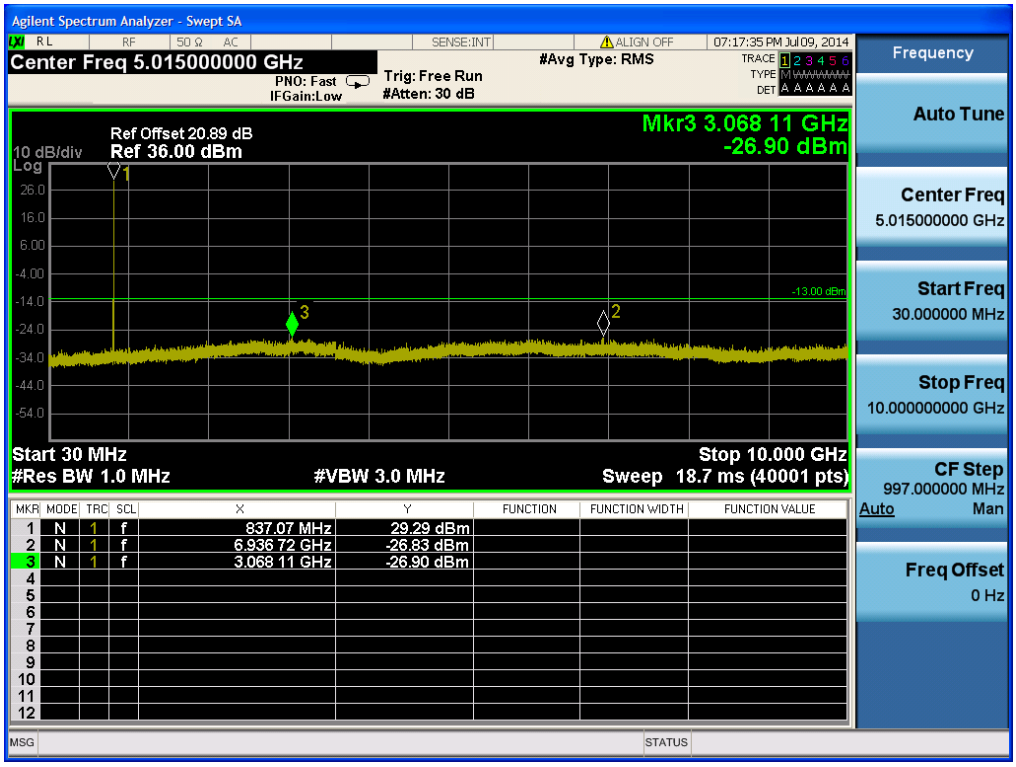


8.3 Spurious Emissions at Antenna Terminal

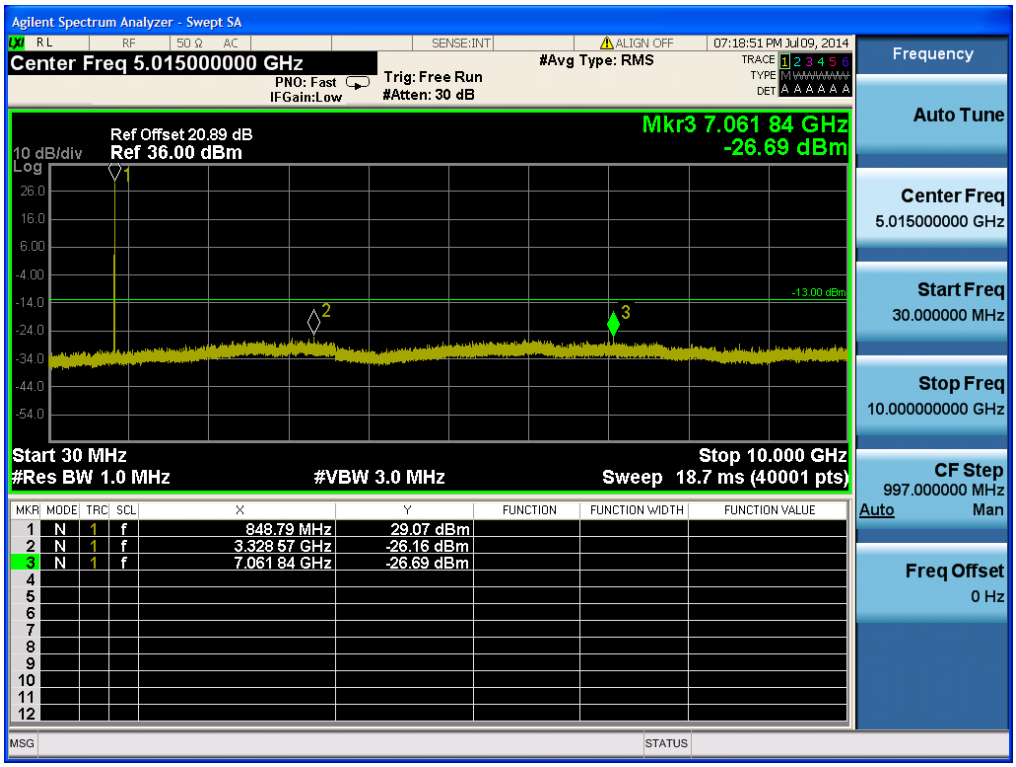
CDMA 1x & Cellular band Channel: 1013



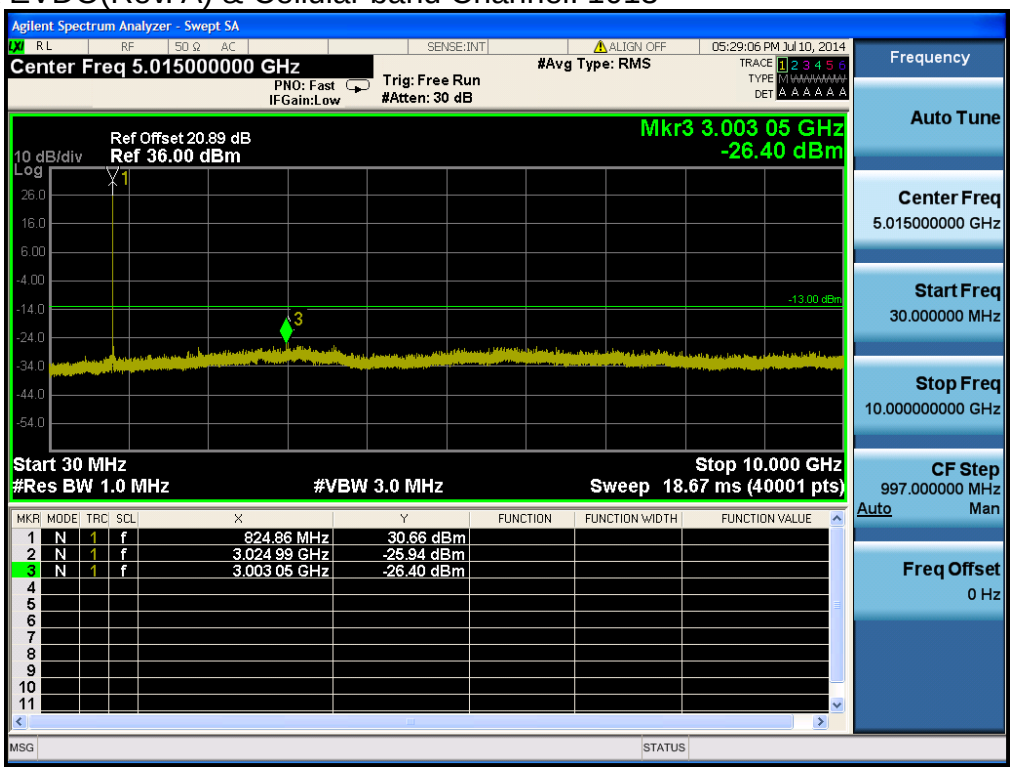
CDMA 1x & Cellular band Channel: 384



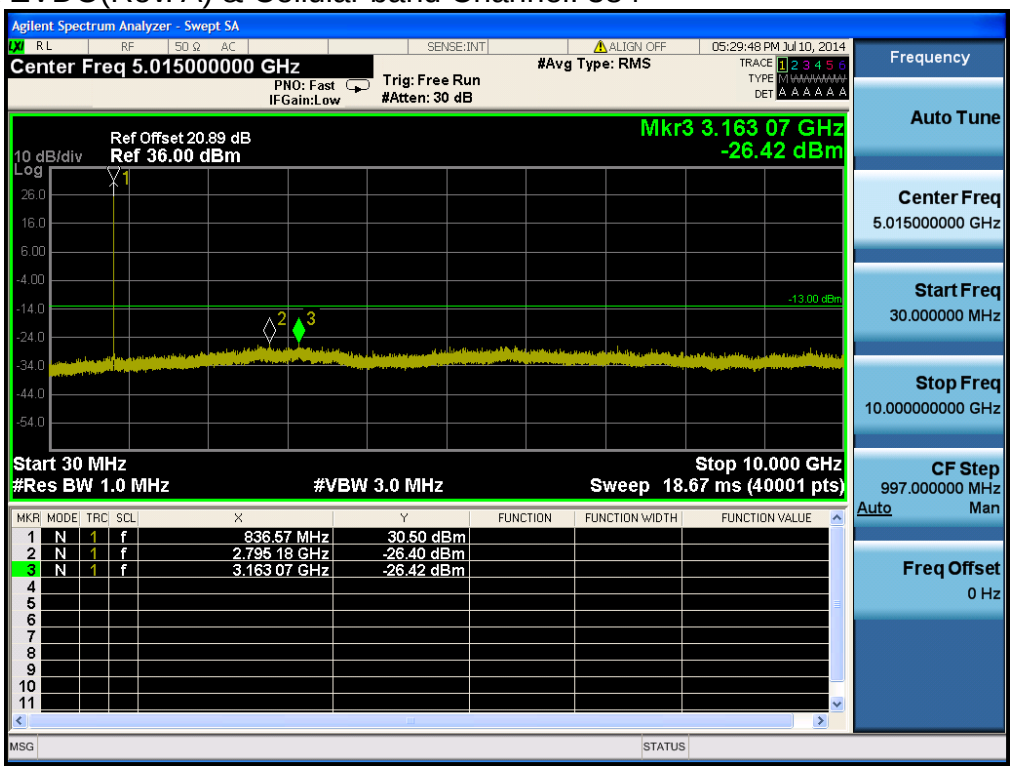
CDMA 1x & Cellular band Channel: 777



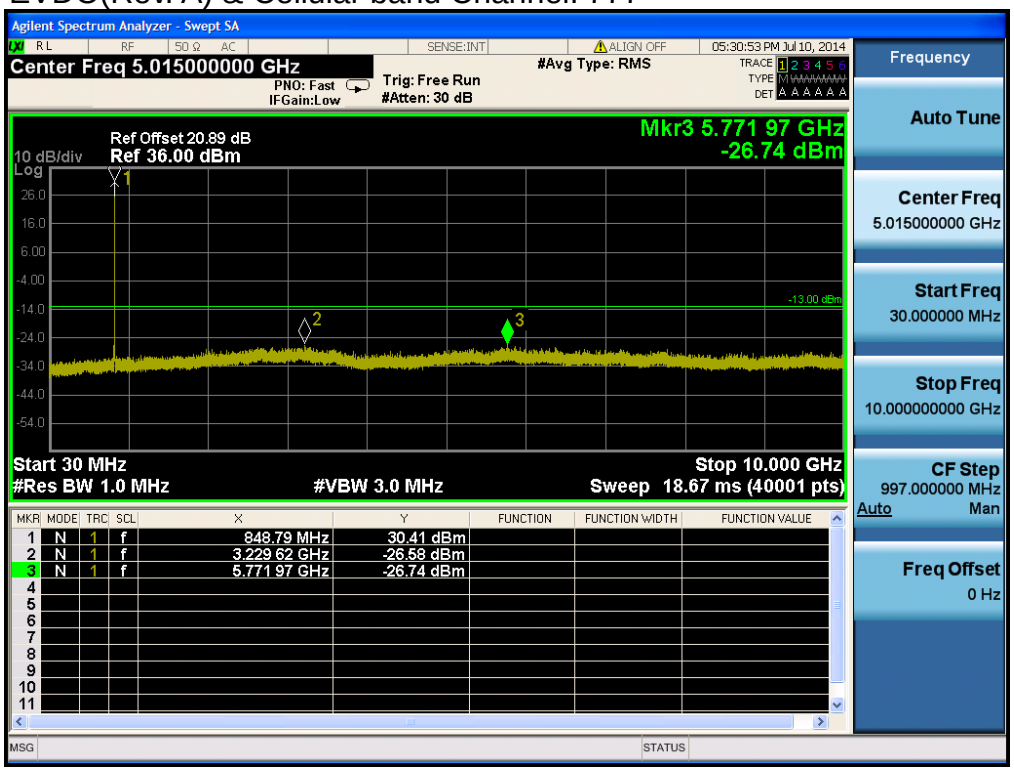
CDMA 1x EVDO(Rev. A) & Cellular band Channel: 1013



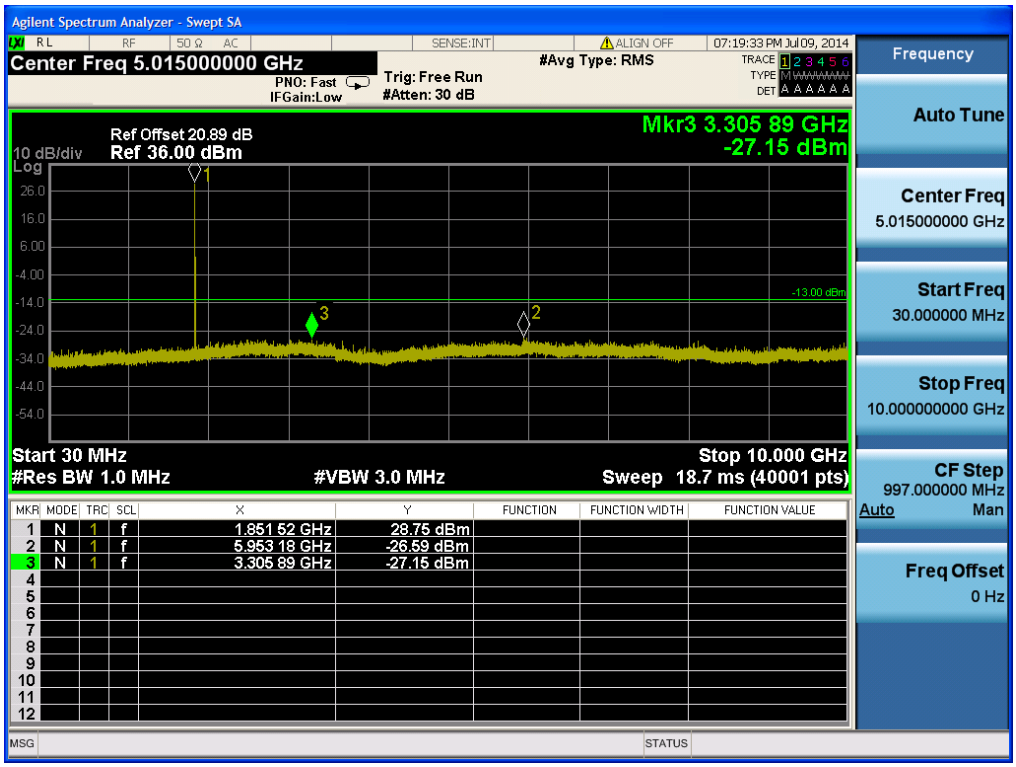
CDMA 1x EVDO(Rev. A) & Cellular band Channel: 384



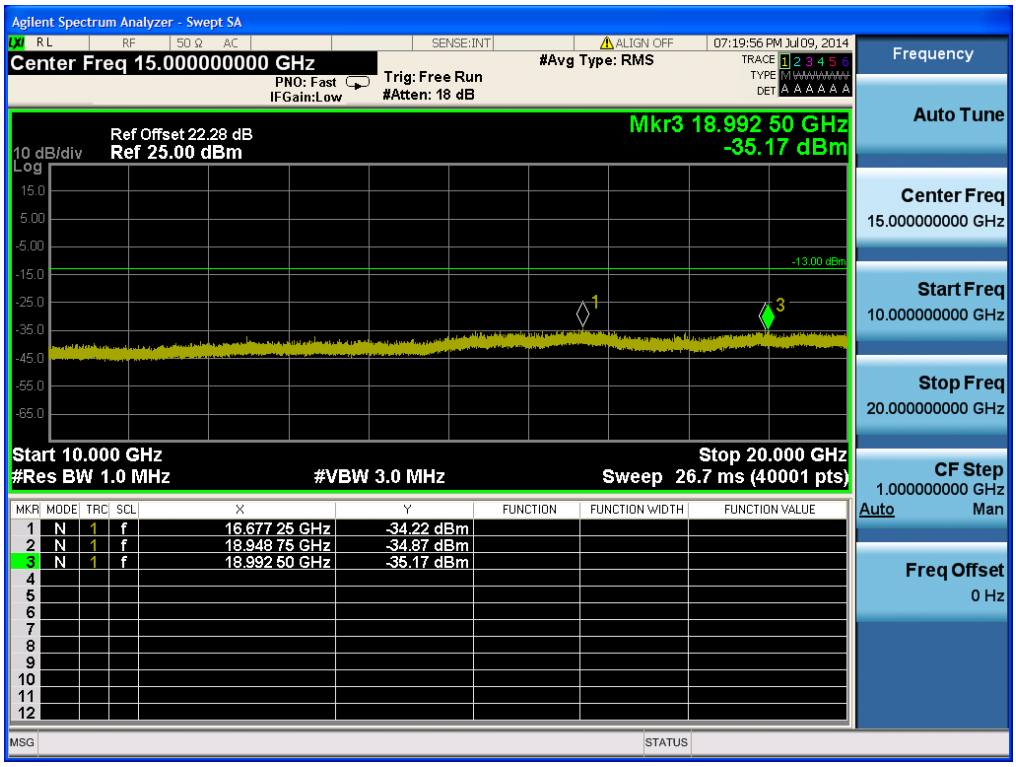
CDMA 1x EVDO(Rev. A) & Cellular band Channel: 777



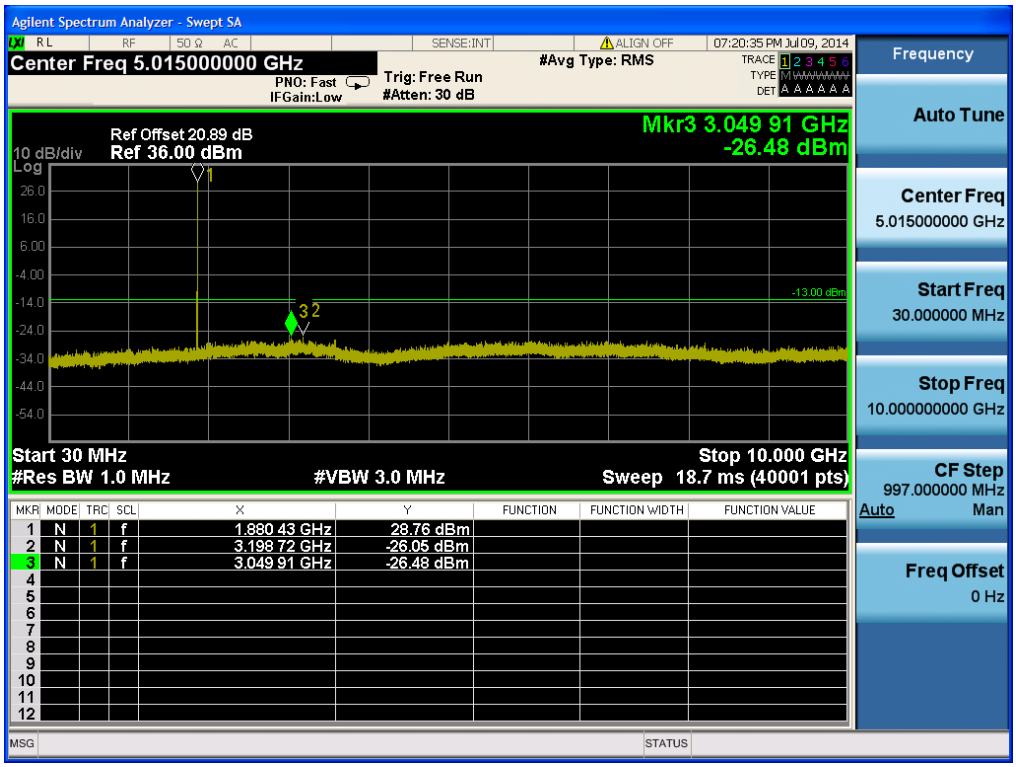
CDMA 1x & PCS band Channel: 25



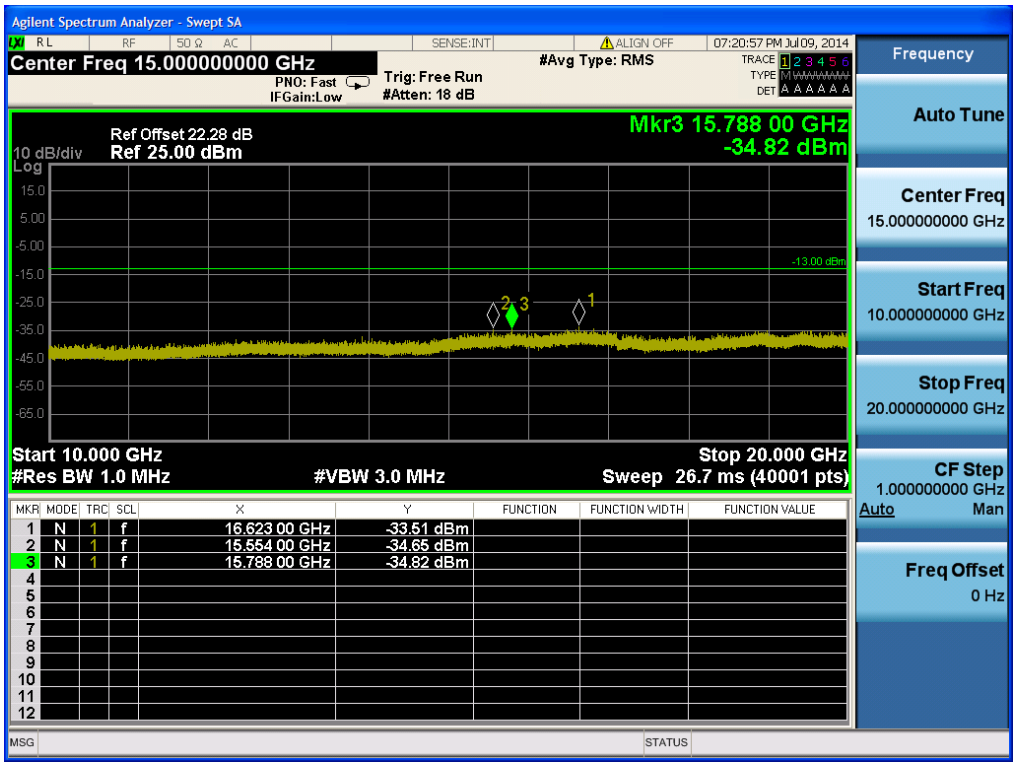
CDMA 1x & PCS band Channel: 25



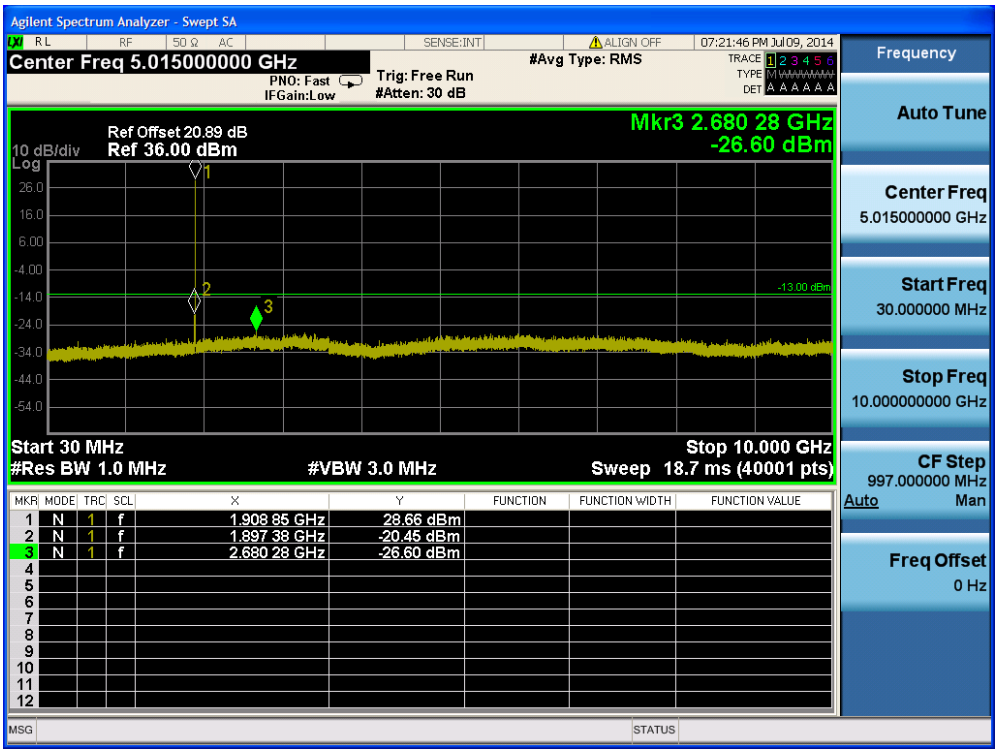
CDMA 1x & PCS band Channel: 600



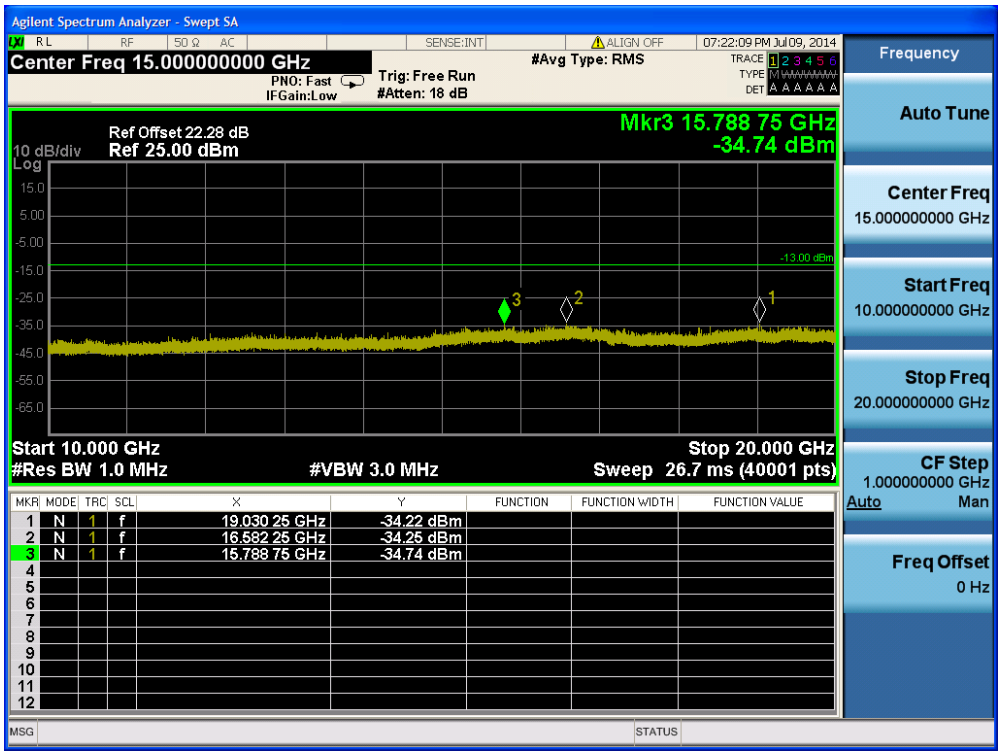
CDMA 1x & PCS band Channel: 600



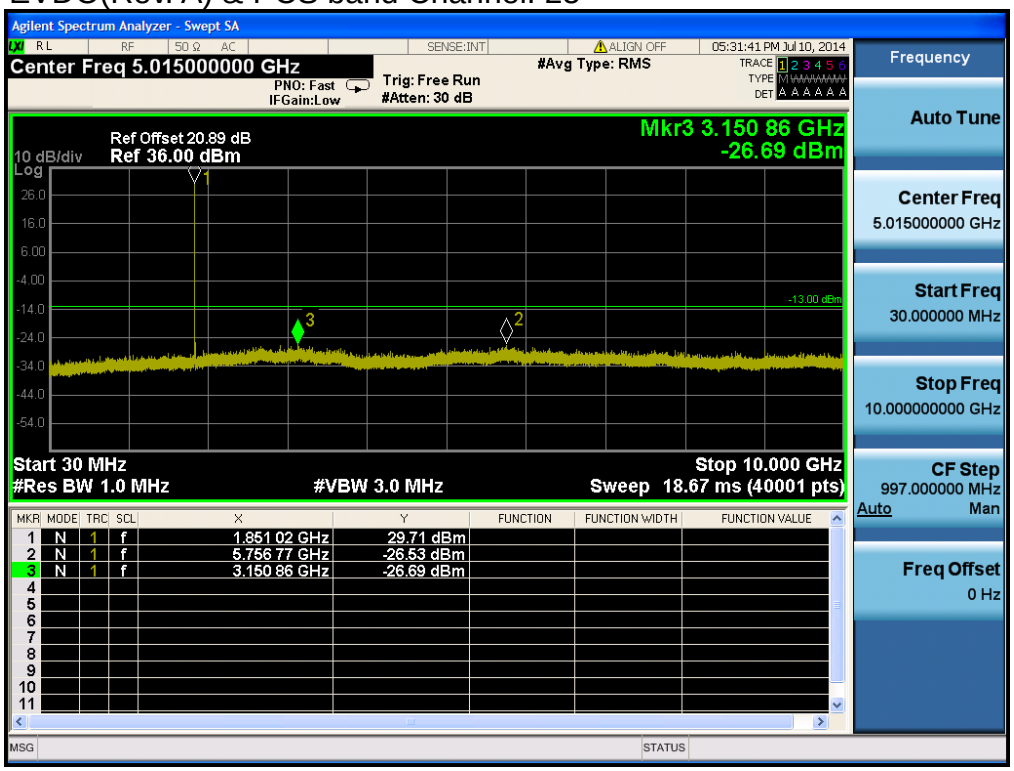
CDMA 1x & PCS band Channel: 1175



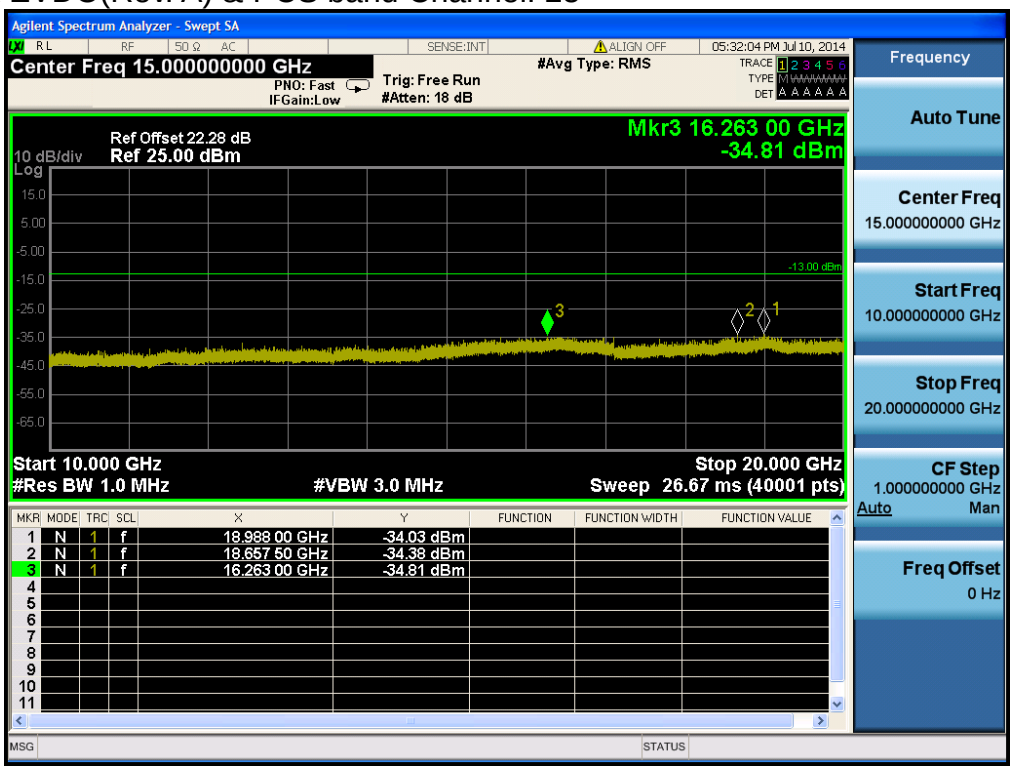
CDMA 1x & PCS band Channel: 1175



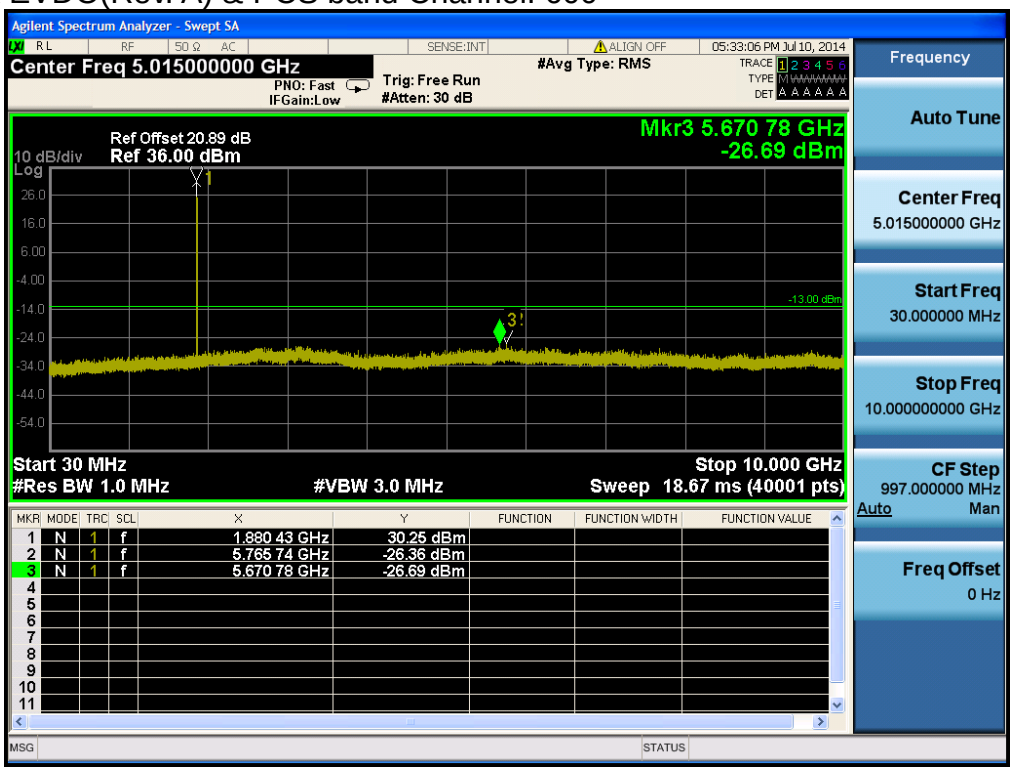
CDMA 1x EVDO(Rev. A) & PCS band Channel: 25



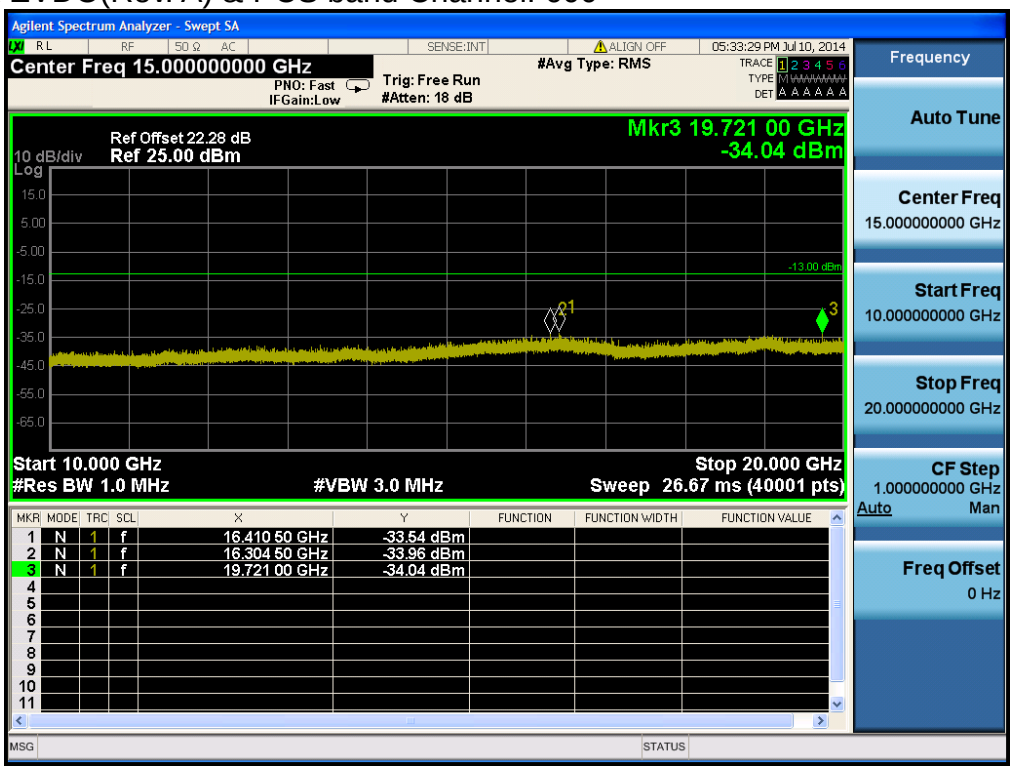
CDMA 1x EVDO(Rev. A) & PCS band Channel: 25



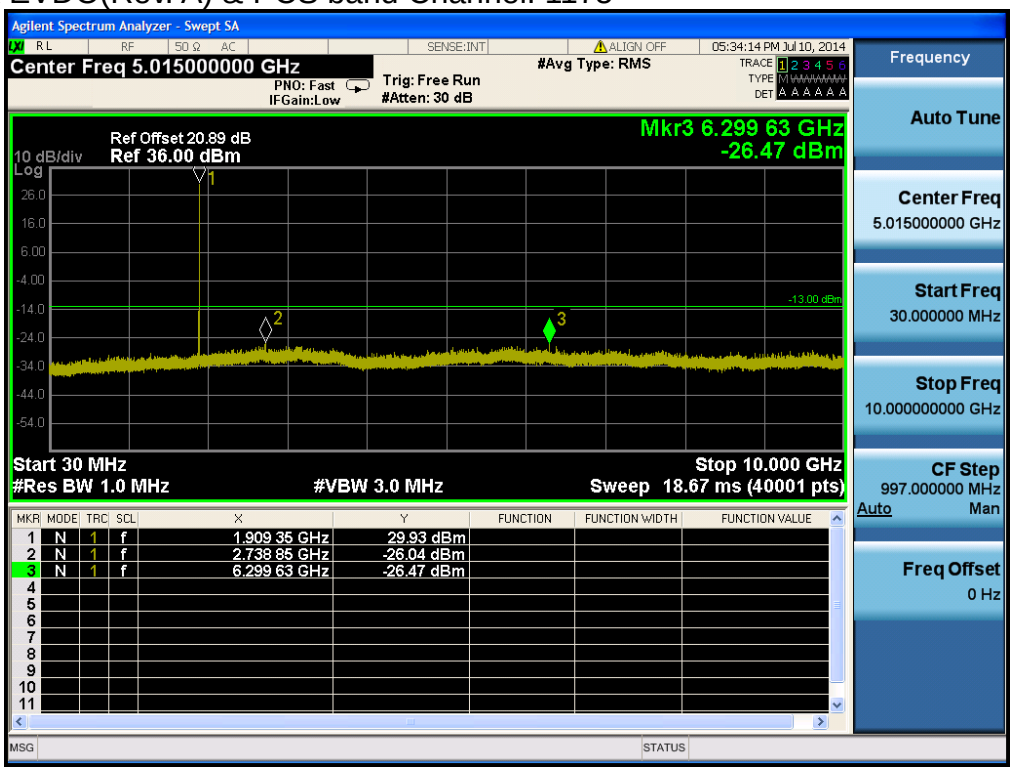
CDMA 1x EVDO(Rev. A) & PCS band Channel: 600



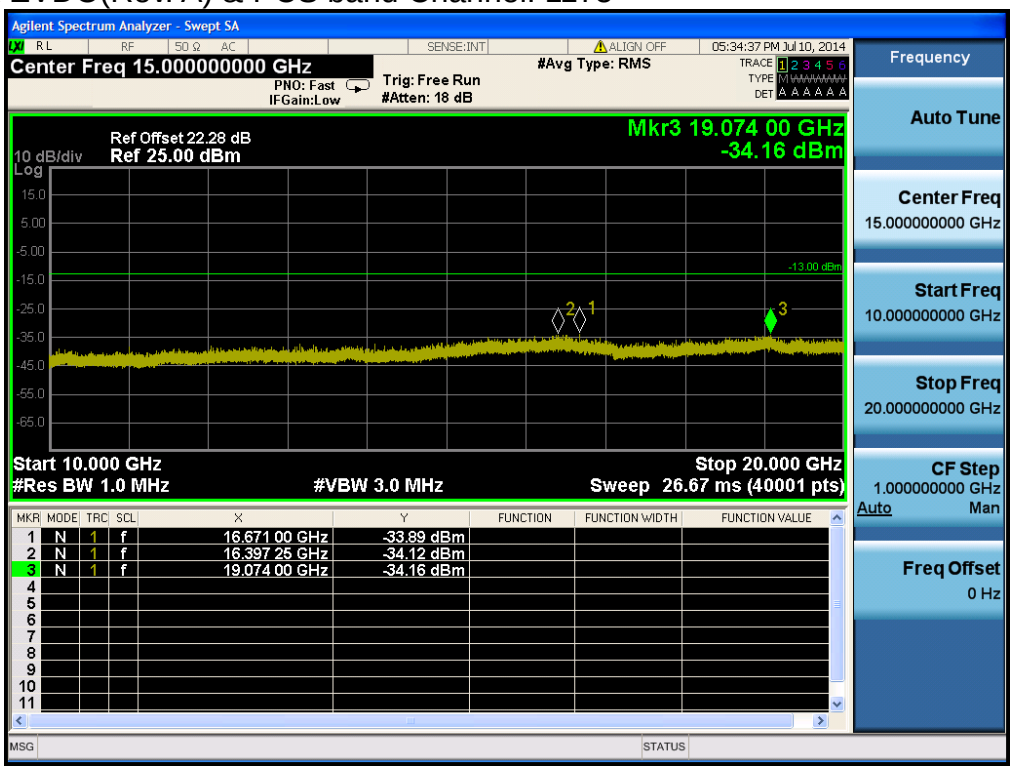
CDMA 1x EVDO(Rev. A) & PCS band Channel: 600



CDMA 1x EVDO(Rev. A) & PCS band Channel: 1175

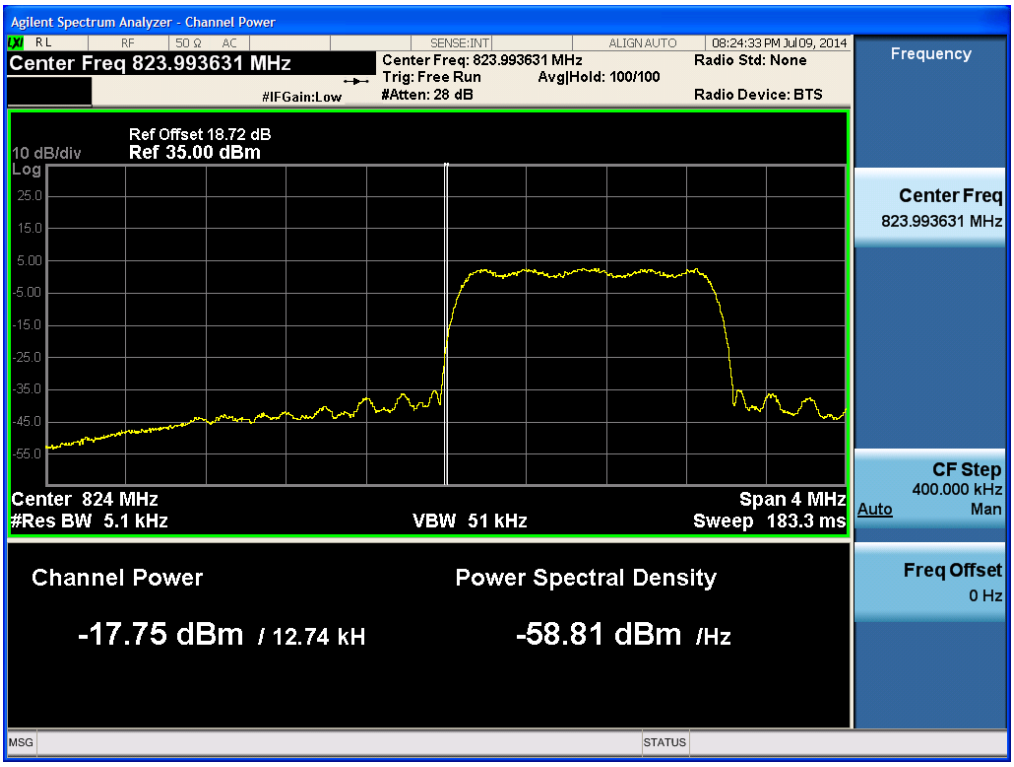


CDMA 1x EVDO(Rev. A) & PCS band Channel: 1175

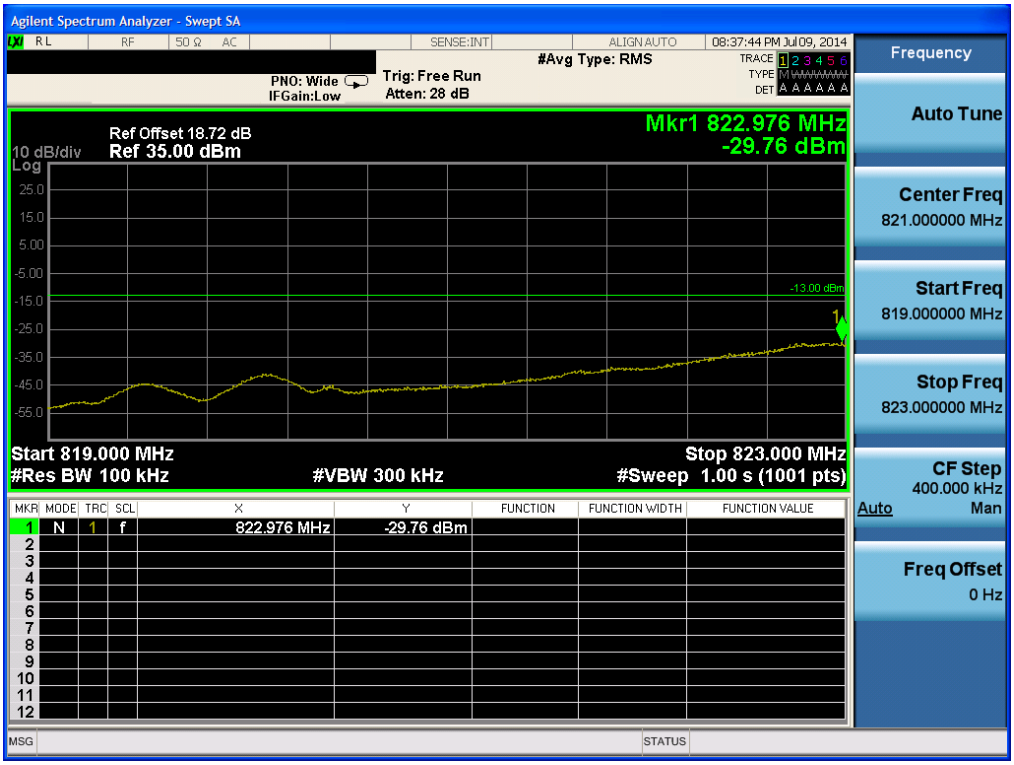


8.4 Band Edge

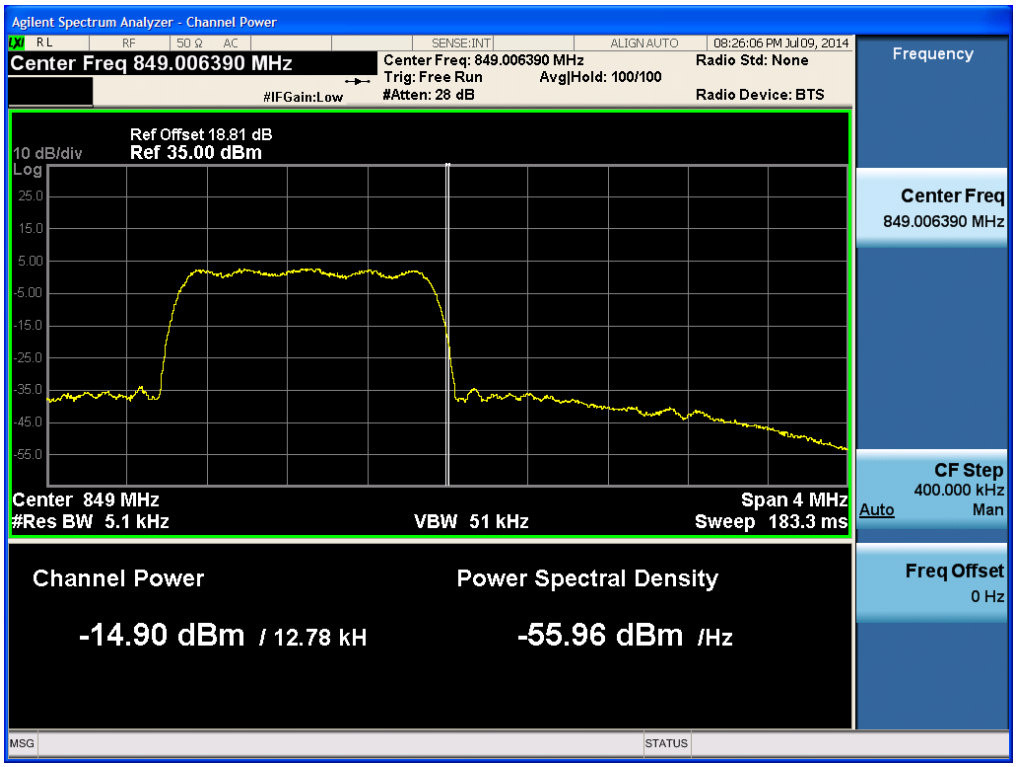
CDMA 1x & Cellular band Channel: 1013



CDMA 1x & Cellular band Channel: 1013

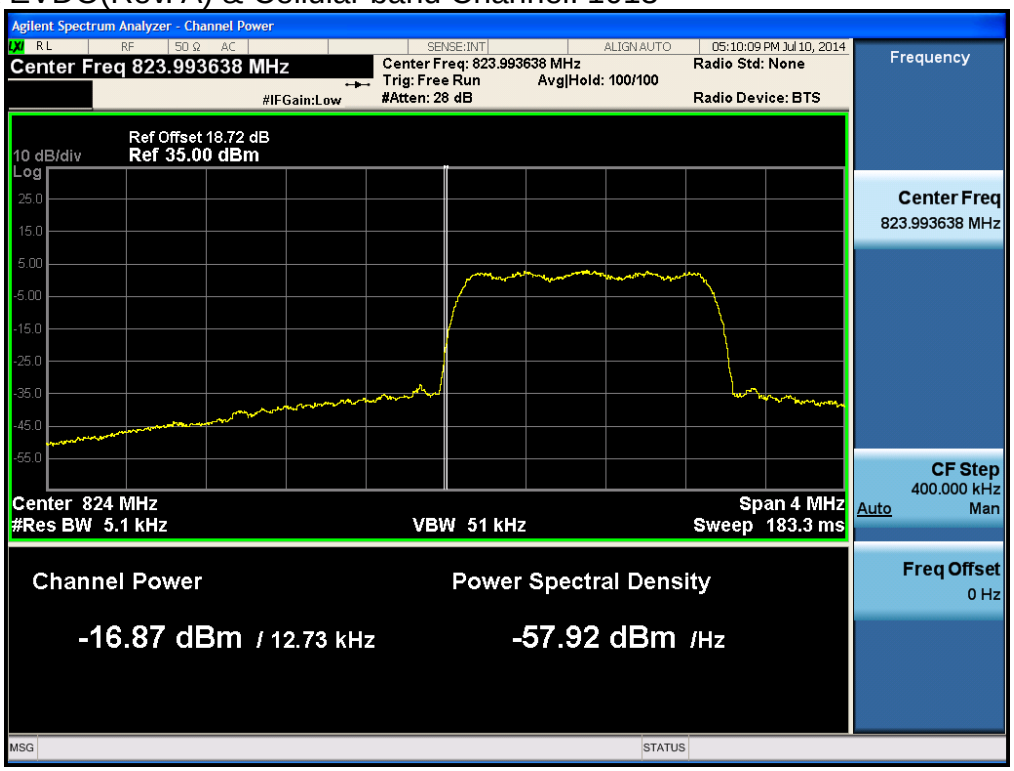


CDMA 1x & Cellular band Channel: 777

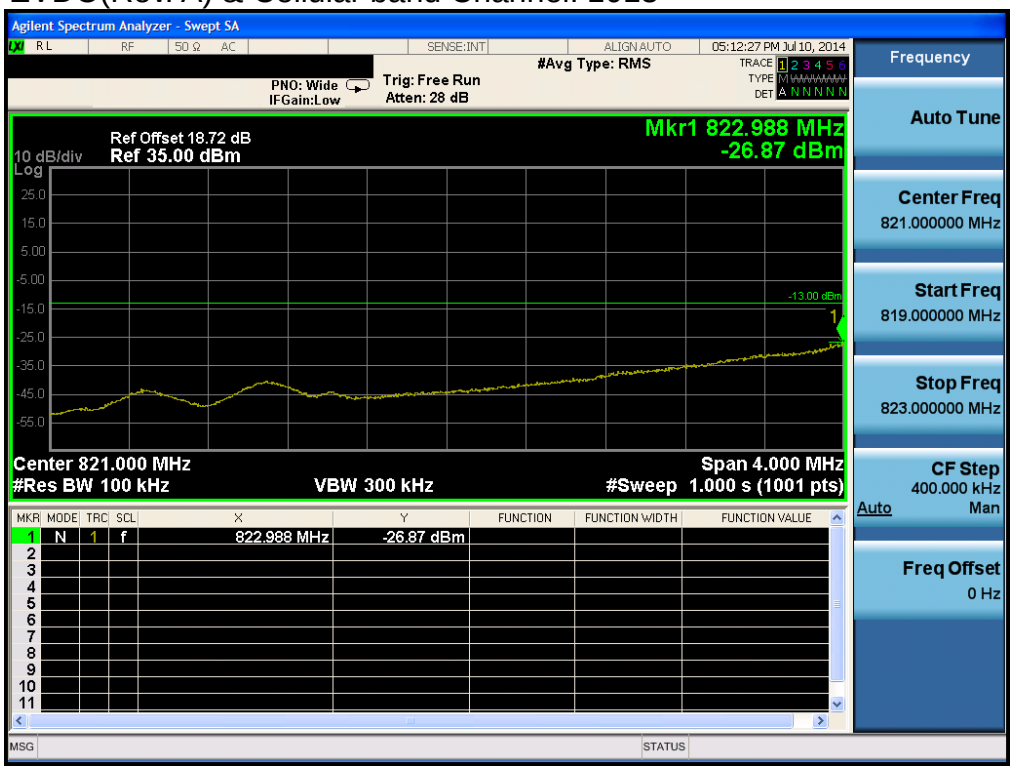


CDMA 1x & Cellular band Channel: 777

CDMA 1x EVDO(Rev. A) & Cellular band Channel: 1013



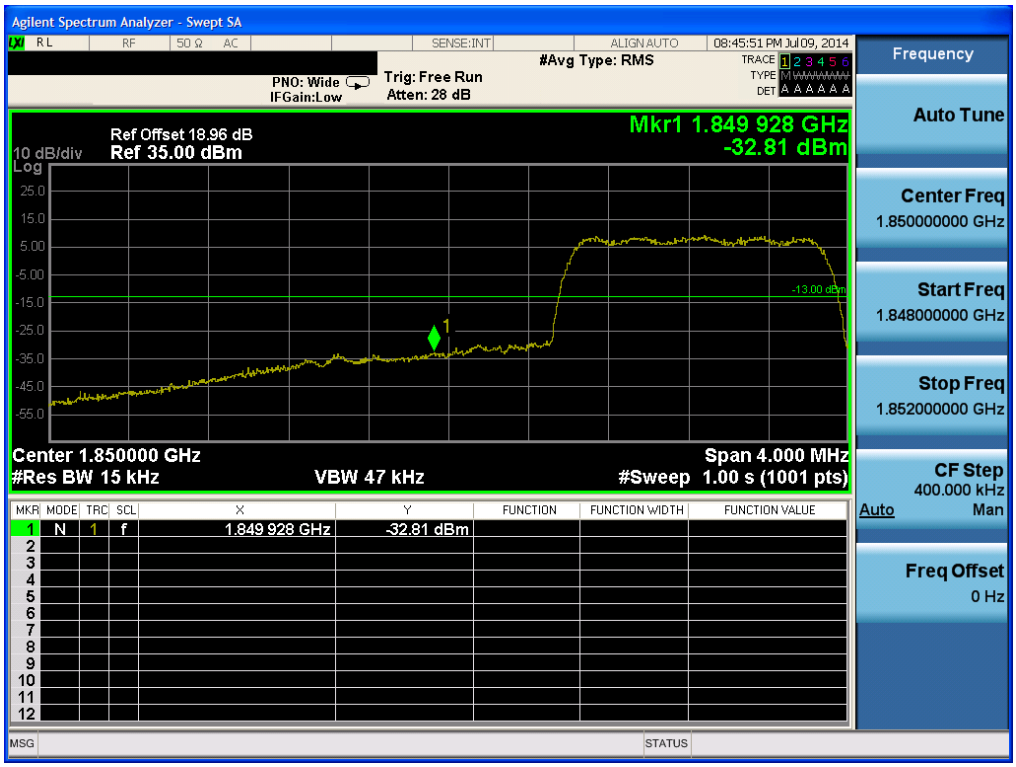
CDMA 1x EVDO(Rev. A) & Cellular band Channel: 1013



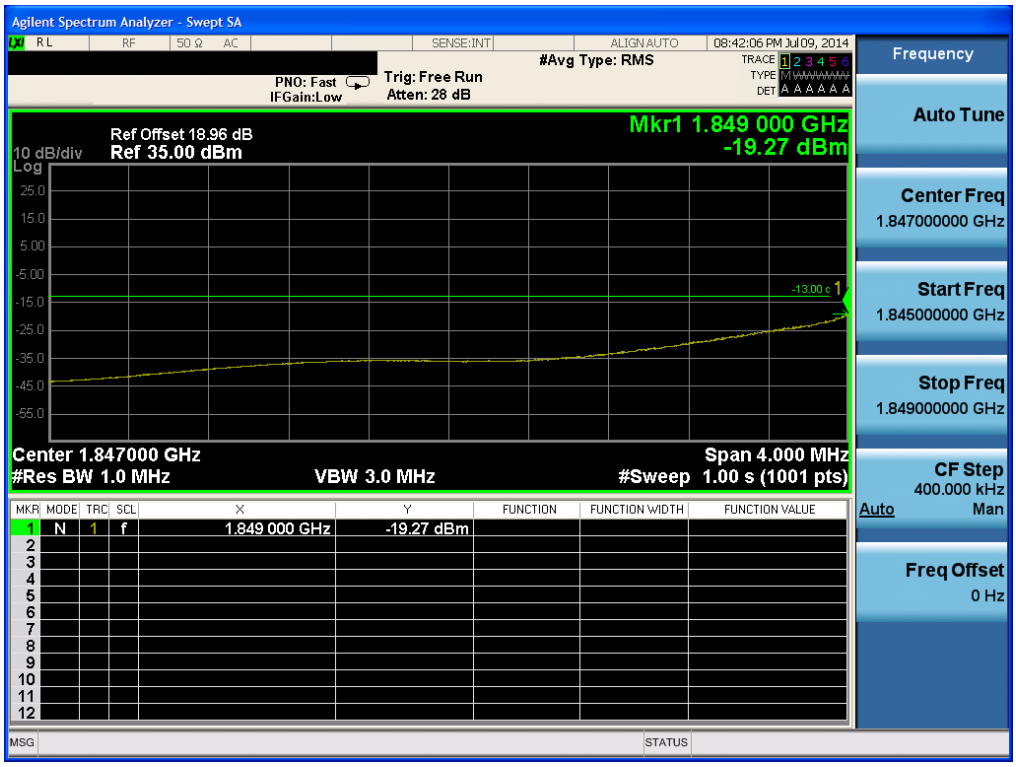
CDMA 1x EVDO(Rev. A) & Cellular band Channel: 777

CDMA 1x EVDO(Rev. A) & Cellular band Channel: 777

CDMA 1x & PCS band Channel: 25

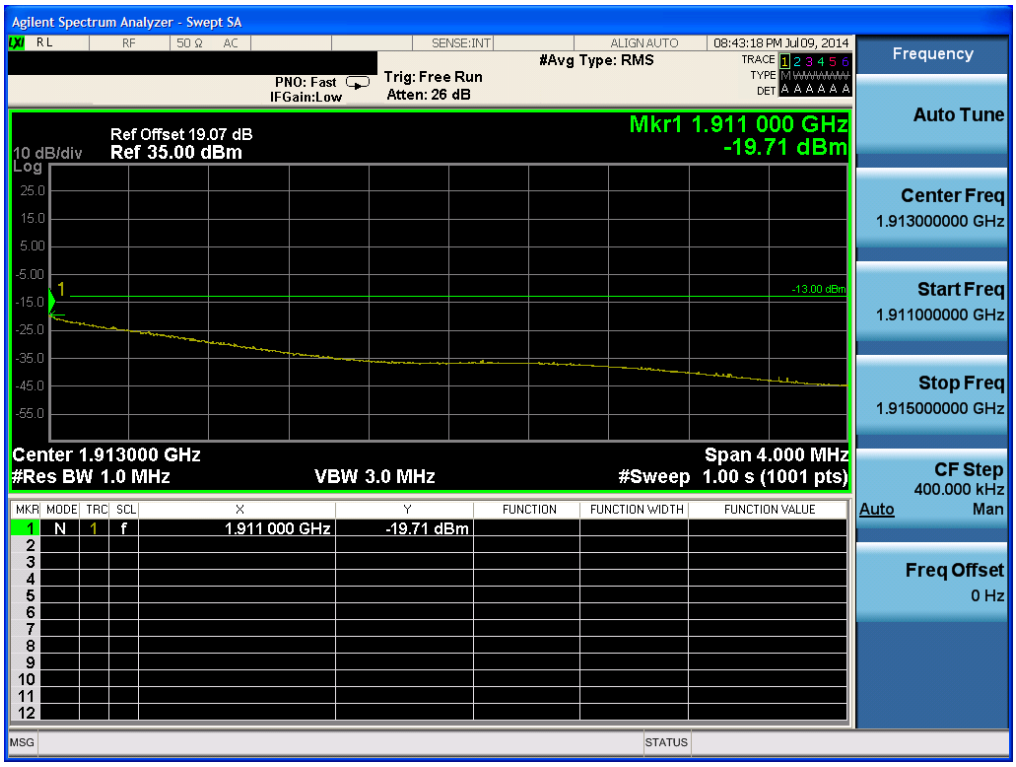


CDMA 1x & PCS band Channel: 25



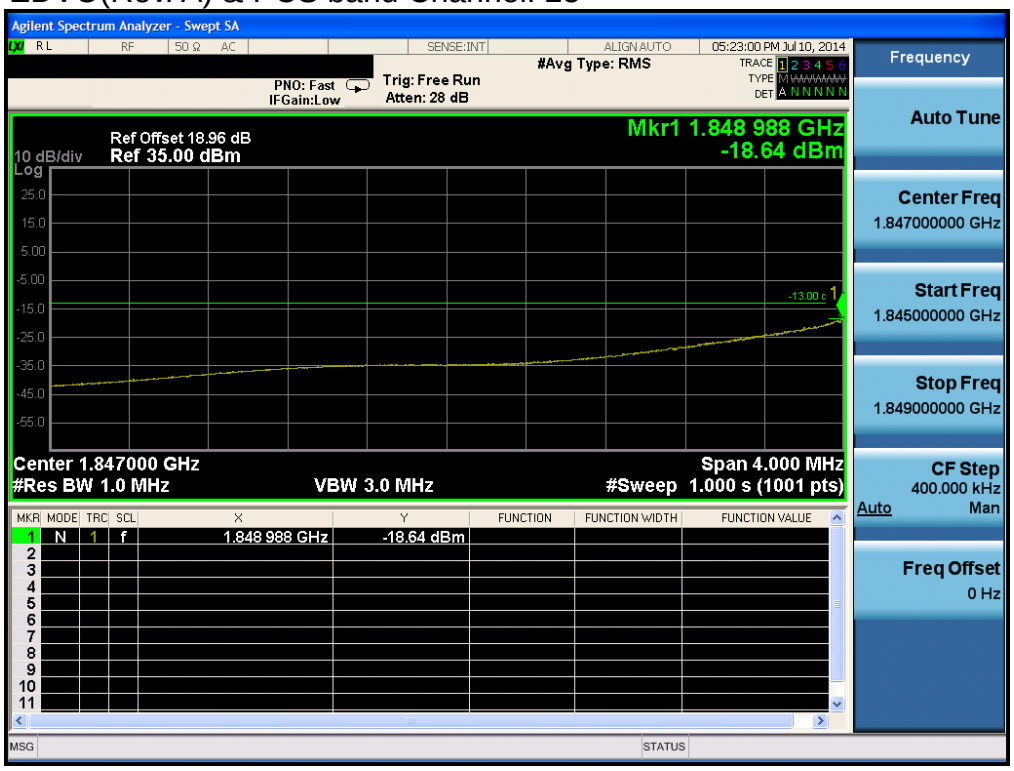
CDMA 1x & PCS band Channel: 1175

CDMA 1x & PCS band Channel: 1175



CDMA 1x EDVO(Rev. A) & PCS band Channel: 25

CDMA 1x EDVO(Rev. A) & PCS band Channel: 25



CDMA 1x EDVO(Rev. A) & PCS band Channel: 1175

CDMA 1x EDVO(Rev. A) & PCS band Channel: 1175