

RF Test Report

Product Name: Multi-Mode Transceiver

Product Model: CRFUD-AWS-CL

Report Number: SYBH(R)012112011EB-1

FCC ID: QISCRFUD-AWS-CL

IC ID: 6369A-CRFUDAWS

Reliability Laboratory of Huawei Technologies Co., Ltd.

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Applicant: Huawei Technologies Co., Ltd.
Address: Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R. China
Product Name: Multi-Mode Transceiver
Product Model: CRFUD-AWS-CL
Version: CDMA:V400R008<E:V100R005

Date of Receipt Sample: 2011-11-21
Start Date of Test: 2011-11-23
End Date of Test: 2011-12-09

Test Result: Pass

Approved by Senior Engineer:	2011-12-12	Zhang Xinghai	<i>Zhang Xing hai</i>
	Date	Name	Signature

Prepared by:	2011-12-12	Liang changguan	<i>Liang Changguan</i>
	Date	Name	Signature



CONTENT

1	General Information	5
1.1	Applied Standard	5
1.2	Test Location	5
1.3	Test Environment Condition	5
2	Test Summary	6
3	Description of the Equipment under Test (EUT)	7
3.1	General Description	7
3.2	EUT Identity	7
3.3	Technical Description	8
4	General Test Conditions / Configurations	9
4.1	Test Modes	9
4.2	RF Channels under Test	9
4.3	Test Environments	11
4.4	Test Setups	12
4.5	Test Conditions	14
5	Test Results	17
6	Main Test Instruments	18
7	Measurement Uncertainty	19



1 General Information

1.1 Applied Standard

Applied Rules: 47 CFR FCC Part 2, Subpart J (10-1-10 Edition)
47 CFR FCC Part 27, Subpart C (10-1-10 Edition)
IC RSS-Gen (Issue 3, December 2010)
IC RSS-139 (Issue 2, February 2009)

1.2 Test Location

Test Location 1: Reliability Laboratory of Huawei Technologies Co., Ltd.
Address: Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R. China

1.3 Test Environment Condition

Ambient Temperature: 20 to 25 °C
Ambient Relative Humidity: 40 to 67 %
Atmospheric Pressure: Not applicable



2 Test Summary

Test Case	FCC Part No.	Requirements	Result
AWS Band			
Transmitter Output Power	2.1046 & 27.50(d)	EIRP not exceed 1640 W	Pass
Modulation Characteristics	2.1047	Digital modulation	Pass
Occupied Bandwidth	2.1049	(Not specified)	Pass
Band Edges Compliance	2.1051 & 27.53(h)	Below -13 dBm/1%*EBW, in 1 MHz range	Pass
Spurious Emission at Antenna Terminals	2.1051 & 27.53(h)	Below -13 dBm/1 kHz, 9 kHz to 150 kHz Below -13 dBm/10 kHz, 150 kHz to 30 MHz Below -13 dBm/1 MHz, 30 MHz to 10 th harmonics	Pass
Field Strength of Spurious Radiation	2.1053 & 27.53(h)	Below -13 dBm/1 MHz	Pass
Frequency Stability	2.1055 & 27.54	Stay within the authorized bands of operation	Pass

Test Case	IC Standard No.	Requirements	Result
AWS Band			
Transmitter Output Power	RSS-Gen, §4.8; RSS-139, §6.4	EIRP not exceed 1640 Watts (EBW ≤1MHz) EIRP not exceed 1640 Watts/MHz (EBW > 1MHz) Peak-to-average ratio not exceed 13 dB	Pass
Modulation Characteristics	RSS-139, §6.2	Digital modulation	Pass
Occupied Bandwidth	RSS-Gen, §4.6	(Not specified)	Pass
Band Edges Compliance	RSS-Gen, §4.9; RSS-139, §6.5	Below -13 dBm/1%*EBW, in 1 MHz range	Pass
Spurious Emission at Antenna Terminals	RSS-Gen, §4.9; RSS-139, §6.5	Below -13 dBm/1 kHz, 9 kHz to 150 kHz Below -13 dBm/10 kHz, 150 kHz to 30 MHz Below -13 dBm/1 MHz, 30 MHz to 5 th harmonics	Pass
Field Strength of Spurious Radiation	RSS-Gen, §4.9; RSS-139, §6.5	Below -13 dBm/1 MHz	Pass
Frequency Stability	RSS-Gen, §4.7; RSS-139, §6.3	Stay within the authorized frequency block	Pass
Receiver Spurious Emissions (Conducted)	RSS-Gen, §4.10; RSS-Gen, §6; RSS-139, §6.6	Below 2 nW/4 kHz (-57 dBm/4 kHz), for 30 MHz - 1000 MHz Below 5 nW/MHz (-53 dBm/MHz), for above 1 GHz	Pass



3 Description of the Equipment under Test (EUT)

3.1 General Description

The BTS3900A and BTS3900 are indoor macro base station developed by Huawei. The BTS3901A and BTS3900Verc mainly consist of the BBU and the RFUs. Compared with traditional BTSSs, the BTS3901A and BTS3900Verc feature simpler structure and higher integration.

The RFC is a new generation outdoor distributed macro RF Unit Cabinet. Designed on the basis of industry-leading design where multiple products use uniform modules, it is small sized and easy to be installed. In addition, it has large capacity while low power consumption.

The RFU is named as CRFUD, CRFUD is Multi-Mode Transceiver Unit for CDMA/LTE model, It can be installed in the BTS3901A, BTS3900Verc, BTS3900Averc. It is designed on the basis of industry-leading design where multiple products use uniform modules. It is small sized and easy to be installed. In addition, it has large capacity while low power consumption.

3.2 EUT Identity

NOTE: Unless otherwise noted in the report, the functional boards installed in the units shall be selected from the below list, but not means all the functional boards listed below shall be installed in one unit.

3.2.1 Board

Board		
Board Name	Hardware Version	Description
CRFUD	VER.C	Multi-Mode Transceiver Unit

3.2.2 Sub-Assembly

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
LMPT	---	Huawei	LTE baseband Processing Unit
LBBP	---	Huawei	LTE Main Processing & Transmission Unit
CMPT	---	Huawei	CDMA2000 baseband Processing Unit
HCPM	---	Huawei	CDMA2000 1X Main Processing & Transmission Unit
HECM	---	Huawei	CDMA2000 EVDO Main Processing & Transmission Unit



3.3 Technical Description

3.3.1 Supported Frequency Range

Characteristics	Description
Downlink	2110MHz to 2155MHz
Uplink	1710MHz to 1755MHz

3.3.2 Transmitter / Receiver Characteristics

Characteristics	Description		
System Type	☐ GSM ☒ CDMA ☐ UMTS ☐ WiMAX ☒ LTE		
TX and RX Antenna Ports	2 * TRX		
Multiple Carrier Supported	6		
TX Output Power (per Antenna Port)	CDMA system	LTE system	CDMA<E system
	1 * 20 W,40W,60W	1*40W (1.4/3/5M)	20W(1C)+10W(1L:5/10/15/20M)
	2 * 20 W and 2 * 30W	1*60W (10/15/20M)	20W(1C)+20W(1L:5/10/15/20M)
	3 * 20 W	2* 30W (5/10/15/20M)	20W(1C)+30W(1L:5/10/15/20M)
	4 * 15 W	1*20W (5M)+1*40W (10M)	30W(1C)+30W(1L:5/10/15/20M)
	5* 10 W	1*15W (5M)+1*45W (15M)	20W(1C)+40W(1L:5/10/15/20M)
	6 * 10W	1*12W (5M)+1*48W (20M)	40W(1C)+20W(1L:5/10/15/20M)
		1*24W (10M)+1*36W (15M)	20W(2C)+20W(1L:5/10/15/20M)
		1*20W (10M)+1*40W (20M)	20W(2C)+10W(1L:5/10/15/20M)
		1*26W (15M)+1*34W (20M)	15W(3C)+15W(1L:5/10/15/20M)
		10W(4C)+20W(1L:5/10/15/20M)	
Channel Spacing(s) / Bandwidth(s)	CDMA system: LTE system:	1.25MHz 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz	
Designation of Emissions	CDMA system: LTE system:	1M25F9W 1M40D9W , 3M00D9W , 5M00D9W , 10M0D9W , 15M0D9W , 20M0D9W ,	

3.3.3 Power Supply

Specification	Description
Power Supply Type	Directly Connected to DC /AC Power Supply
Input to EUT (DC power)	DC Voltage Nominal: -48 V DC Voltage Range: -38.4 V to -57 V



3.3.4 Environmental Requirements

Specification	Description
Minimum temperature:	-40 °C
Maximum temperature:	+55 °C
Relative Humidity:	5% to 100% RH

4 General Test Conditions / Configurations

4.1 Test Modes

Test Mode	Test Modes Description
TM 0	CDMA2000 1x RC1
TM 1	CDMA2000 1x RC3
TM 2	CDMA2000 1x EV-DO
E-TM 1.1	3GPP TS 36.141, clause 6.1.1, E-TM 1.1
E-TM 1.2	3GPP TS 36.141, clause 6.1.1, E-TM 1.2
E-TM 2.0	3GPP TS 36.141, clause 6.1.1, E-TM 2.0
E-TM 3.1	3GPP TS 36.141, clause 6.1.1, E-TM 3.1
E-TM 3.2	3GPP TS 36.141, clause 6.1.1, E-TM 3.2
E-TM 3.3	3GPP TS 36.141, clause 6.1.1, E-TM 3.3

4.2 RF Channels under Test

CDMA:

Operating Band(TX)	Multi-Carriers	Channels No.		
		Channel B	Channel M	Channel T
CDMA AWS band	1	No.25 2111.25MHz	No.450 2132.5MHz	No.875 2153.75MHz
	2	No.25/50 2111.25/2112.5MHz	No.450/475 2132.5/2133.75MHz	No.875/850 2153.75/2152.5MHz
	3	No.25/50/75 2111.25/2112.5/ 2113.75MHz	No.425/450/475 2131.25/2132.5 /2133.75MHz	No.875/850/825 2153.75/2152.5 /2151.25MHz
	4	No.25/50/75/100 2111.25/2112.5/ 2113.75/2115MHz	No.400/425/450/475 2130/2131.25/2132.5 /2133.75MHz	No.875/850/825/800 2153.75/2152.5 /2151.25/2150MHz



	5	No.25/50/75/100/125 2111.25/2112.5/2113.75/ 2115/2116.25MHz	No.400/425/450/475/500 2130/2131.25/2132.5 /2133.75/2135MHz	No.875/850/825/800/775 2153.75/2152.5/2151.25/ 2150/2148.75MHz
	6	No.25/50/75/100/125/150 2111.25/2112.5/2113.75/ 2115/2116.25/2117.5MHz	No.400/425/450/475/500 2128.75/2130/2131.25/ 2132.5/2133.75/2135MHz	No.875/850/825/800/775/750 2153.75/2152.5/2151.25/ 2150/2148.75/2147.5MHz

LTE:

Operating Band (TX)	Multi- Carriers	Channels No.		
		Channel B	Channel M	Channel T
LTE AWS band (1.4MHz bandwidth)	1	No.1957 2110.7MHz	No.2175 2132.5MHz	No.2393 2154.3MHz
LTE AWS band (3MHz bandwidth)	1	No.1965 (B) 2111.5MHz	No.2175 (M) 2132.5MHz	No.2385 (T) 2153.5MHz
LTE AWS band (5MHz bandwidth)	1	No.1975 (B) 2112.5MHz	No.2175 (M) 2132.5MHz	No.2375 (T) 2152.5MHz
LTE AWS band (10MHz bandwidth)	1	No.2000 (B) 2115MHz	No.2175 (M) 2132.5MHz	No.2350 (T) 2150MHz
LTE AWS band (15MHz bandwidth)	1	No.2025 (B) 2117.5MHz	No.2175 (M) 2132.5MHz	No.2325 (T) 2147.5MHz
LTE AWS band (20MHz bandwidth)	1	No.2050 (B) 2120MHz	NA	No.2300 (T) 2145MHz
LTE AWS band (5MHz+20MHz bandwidth)	2	No.1975/2100 (B) 2112.5/2125MHz	NA	No.2175/2300 (T) 2132.5/2145MHz
LTE AWS band (10MHz+20MHz bandwidth)	2	No.2000/2150 (B) 2115/2130MHz	NA	No.2150/2300 (T) 2130/2145MHz
LTE AWS band (15MHz+20MHz bandwidth)	2	No.2025/2200 (B) 2117.5/2135MHz	NA	No.2125/2300 (T) 2127.5/2145MHz
LTE AWS band (20MHz+20MHz bandwidth)	2	No.2050/2250 (B) 2120/2140MHz	NA	No.2100/2300 (T) 2125/2145MHz

CDMA/LTE:

Operating Band	Multi- Carriers	Channels No.		
		Channel B	Channel M	Channel T
C/L AWS band (1.25/5MHz bandwidth)	1C1L	No.25/2000 2111.25/2115MHz	No.375/2175 (M) 2128.75/2132.5MHz	No.775/2375 2148.75/2152.5MHz
C/L AWS band (1.25/10MHz bandwidth)	1C1L	No.25/2025 2111.25/2117.5MHz	No.325/2175 (M) 2126.25/2132.5MHz	No.675/2350 2143.75/2150MHz
C/L AWS band (1.25/15MHz bandwidth)	1C1L	No.25/2050 2111.25/2120MHz	No.275/2175 (M) 2123.75/2132.5MHz	No.575/2325 2138.75/2147.5MHz



C/L AWS band (1.25/20MHz bandwidth)	1C1L	No.25/2075 2111.25/2122.5MHz	NA	No.475/2300 2133.75/2145MHz
C/L AWS band (11.25/20MHz bandwidth)	2C1L	No.25/50/2085 2111.25/2112.5/2123.5MHz	NA	No.450/475/2300 2132.5/2133.75/2145MHz
C/L AWS band (1.25/20MHz bandwidth)	3C1L	No.25/50/75/2100 2111.25/2112.5/ 2113.75/2125MHz	NA	No.425/450/475/2300 2131.25/2132.5/ 2133.75/2145MHz
C/L AWS band (1.25/20MHz bandwidth)	4C1L	No.25/50/75/100/2100 2111.25/2112.5/2113.75/ 2115/2126MHz	NA	No.400/425/450/475/2300 2130/2131.25/2132.5/ 2133.75/2145MHz

Operating Band (RX)	Multi- Carriers	Channels No.		
		Channel B	Channel M	Channel T
CDMA AWS band RX	1.25M(60W)	NA	No.450 1732.5MHz	NA
LTE AWS band RX	5M(60W)	NA	No.2175(M) 1732.5MHz	NA
CDMA<E AWS band RX	1C1L-5M(30+30W)	NA	No.375/2175(M) 1728.75/1732.5MHz	NA

4.3 Test Environments

Environment Parameter	Selected Values During Tests		
	Temperature	Voltage	Relative Humidity
Ambient Climate	Ambient	---	Ambient
Rated Voltage	---	48 VDC	---

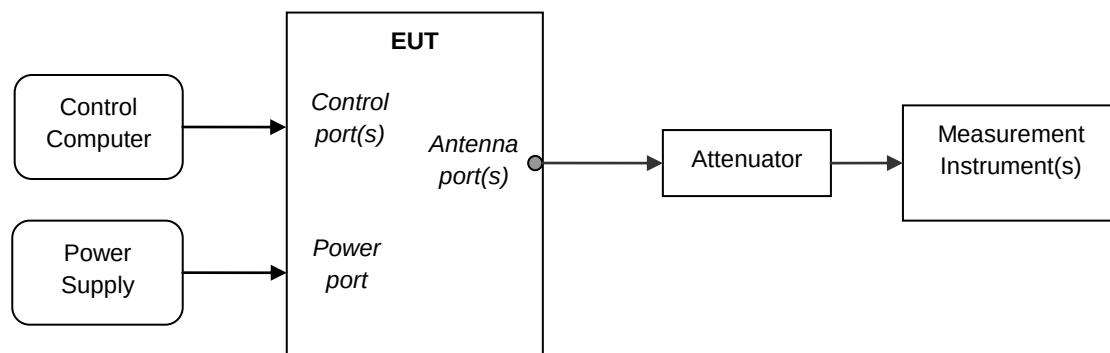
4.4 Test Setups

NOTE: See Appendix I for practical Test Setup Photos.

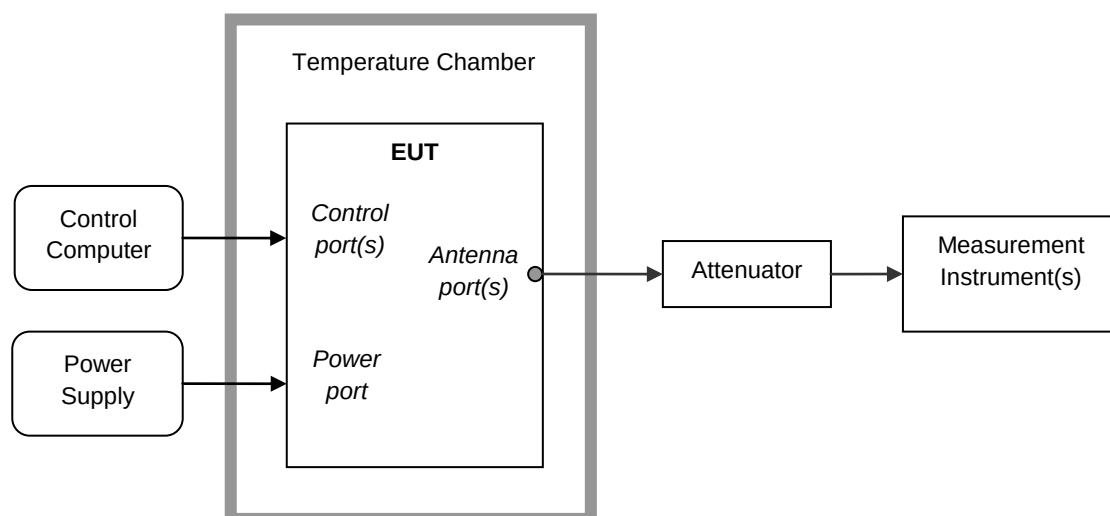
4.4.1 General Test Setup Configurations

Configuration	Description
Test Antenna Ports	Until otherwise declared, all TX tests are ONLY performed at the main Transmitter antenna port (e.g. TRXA, TXA and so on) of the EUT, and all RX tests are ONLY performed at the main Receiver antenna port (e.g. TRXA, RXA and so on) of the EUT.
Multiple RF Sources	Other than the tested RF source of the EUT, other RF source(s) are disabled or shutdown during measurements.

4.4.2 Test Setup 1



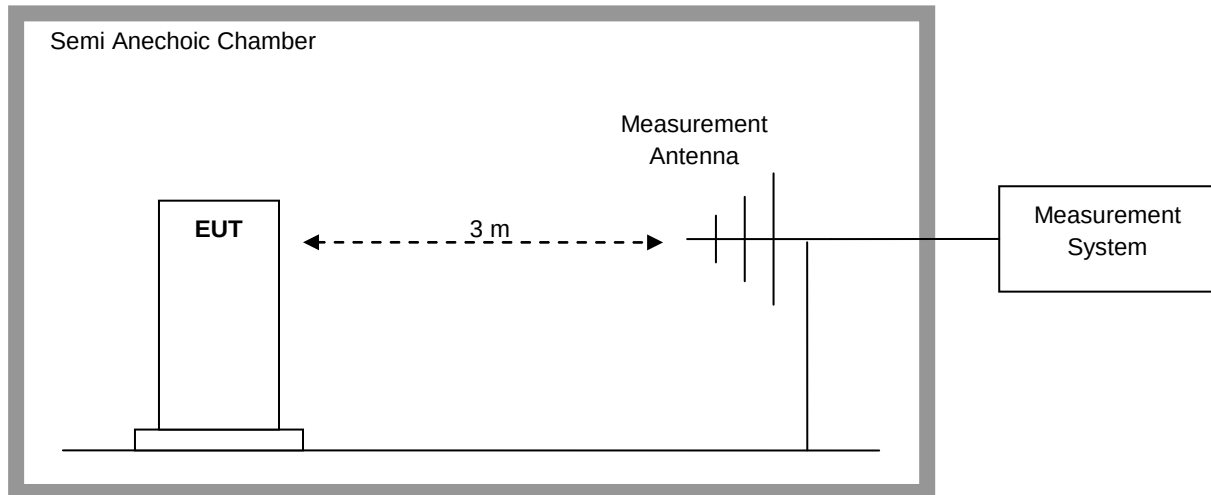
4.4.3 Test Setup 2



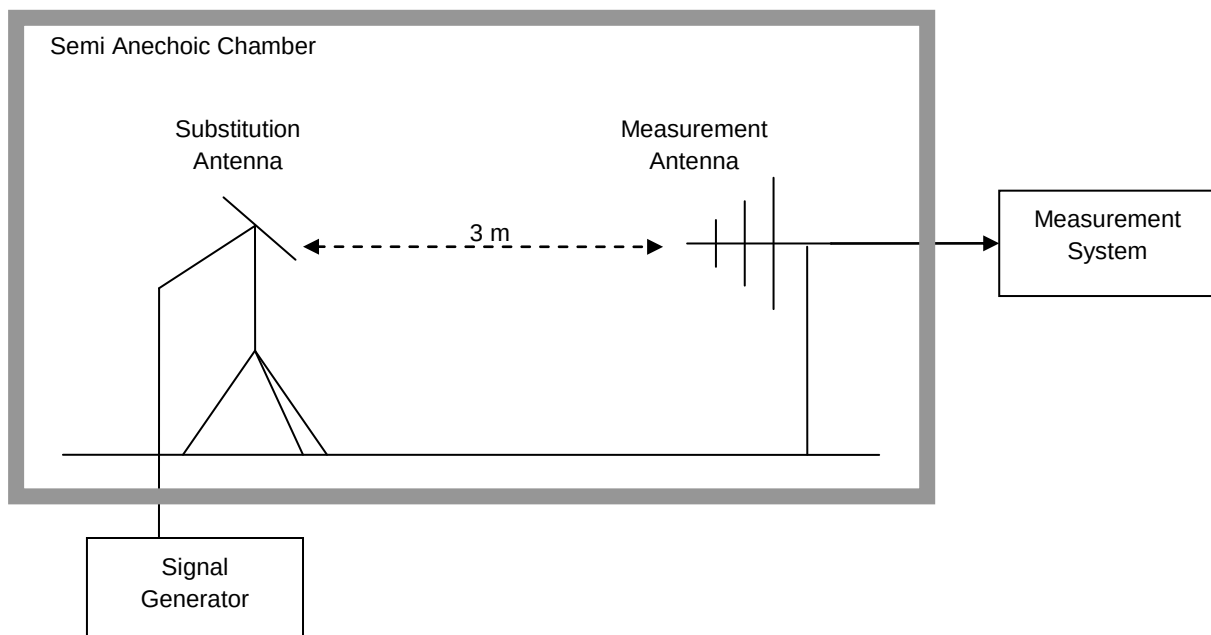
4.4.4 Test Setup 3

NOTE: Effective radiated power (ERP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.

4.4.4.1 Step 1: Pre-test



4.4.4.2 Step 2: Substitution method to verify the maximum ERP





4.5 Test Conditions

CDMA

Test Case	Test Conditions	
Transmitter Output Power	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	Carrier Conf.	1 to 6
	RF Channels (TX)	B, M, T
	Test Mode	TM1 and TM2
Modulation Characteristics	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	Carrier Conf.	1
	RF Channels (TX)	M
	Test Mode	TM0, TM1 and TM2
Occupied Bandwidth	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	Carrier Conf.	1
	RF Channels (TX)	B, M, T
	Test Mode	TM1 and TM2
Band Edges Compliance	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	Carrier Conf.	1 and 6
	RF Channels (TX)	B, T
	Test Mode	TM1 and TM2
Spurious Emission at Antenna Terminals	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	Carrier Conf.	1 and 6
	RF Channels (TX)	B, M and T
	Test Mode	TM1 and TM2
Field Strength of Spurious Radiation	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 3
	Carrier Conf.	1
	RF Channels (TX)	M
	Test Mode	TM1
Frequency Stability	Test Configuration	(1) -30 °C to +50 °C with step 10 °C at Rated Voltage; (2) 85%, 100% and 115% of Rated Voltage at Ambient Climate.
	Test Setup	Test Seup 2
	Carrier Conf.	1
	RF Channels (TX)	M
	Test Mode	TM2
Receiver Spurious Emissions (Conducted) (Only for	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	Carrier Conf.	1



Test Case	Test Conditions	
IC requirement)	RF Channels (TX/RX)	M
	Test Mode	TM2

LTE

Test Case	Test Conditions	
Transmitter Output Power	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	Carrier Conf.	1 to 2
	RF Channels (TX)	B, M, T
	Test Mode	TM1 .1
Modulation Characteristics	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	Carrier Conf.	1
	RF Channels (TX)	M
	Test Mode	TM2.0, TM3.1, TM3.2 and TM3.3
Occupied Bandwidth	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	Carrier Conf.	1
	RF Channels (TX)	B, M, T
	Test Mode	TM1.1
Band Edges Compliance	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	Carrier Conf.	1 and 2
	RF Channels (TX)	B, T
	Test Mode	TM1.1
Spurious Emission at Antenna Terminals	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	Carrier Conf.	1 and 2
	RF Channels (TX)	B, M and T
	Test Mode	TM1.1
Field Strength of Spurious Radiation	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 3
	Carrier Conf.	1
	RF Channels (TX)	M
	Test Mode	TM1.1
Frequency Stability	Test Configuration	(1) -30 °C to +50 °C with step 10 °C at Rated Voltage; (2) 85%, 100% and 115% of Rated Voltage at Ambient Climate.
	Test Setup	Test Seup 2
	Carrier Conf.	1
	RF Channels (TX)	M
	Test Mode	TM3.1
Receiver Spurious Emissions	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1



Test Case	Test Conditions	
(Conducted) (Only for IC requirement)	Carrier Conf.	1
	RF Channels (TX/RX)	M
	Test Mode	TM1.1

CDMA<E

Test Case	Test Conditions	
Transmitter Output Power	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	Carrier Conf.	1C+1L,2C+1L,3C+1L and 4C+1L
	RF Channels (TX)	B, M, T
	Test Mode	TM2&TM1 .1
Band Edges Compliance	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	Carrier Conf.	1C+1L,2C+1L,3C+1L and 4C+1L
	RF Channels (TX)	B, T
	Test Mode	TM2&TM1 .1
Spurious Emission at Antenna Terminals	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	Carrier Conf.	1C+1L ,4C+1L
	RF Channels (TX)	B, M and T
	Test Mode	TM1.1
Field Strength of Spurious Radiation	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 3
	Carrier Conf.	1C+1L
	RF Channels (TX)	M
	Test Mode	TM1&TM1 .1
Receiver Spurious Emissions (Conducted) (Only for IC requirement)	Test Configuration	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	Carrier Conf.	1
	RF Channels (TX/RX)	M
	Test Mode	TM2&TM1.1



5 Test Results

No.	Test Item	Test Result
1	Transmitter Output Power	Appendix A
2	Modulation Characteristics	Appendix B
3	Occupied Bandwidth	Appendix C
4	Band Edges Compliance	Appendix D
5	Spurious Emission at Antenna Terminals	Appendix E
6	Field Strength of Spurious Radiation	Appendix F
7	Frequency Stability	Appendix G
8	Receiver Spurious Emissions (Conducted) (Only for IC requirement)	Appendix H



6 Main Test Instruments

Equipment Name	Manufacturer	Model	Serial Number	Cal. Due
Test Setup 1 & 2				
Spectrum Analyzer	R&S	FSQ40	100025	2012-10-20
Spectrum Analyzer	Agilent	N9030A	MY49431033	2012-04-16
Temperature Chamber	Envirotronics	WPH700-2-30-WC	01066463	2012-10-08
Test Setup 3				
3m Semi Anechoic Chamber	S+M	---	---	-----
EMI Test receiver	R&S	ESU	100144	2012-05-12
Broadband Antenna	SCHAFFNER	CBL6112B	2747	2011-12-10
Horn Antenna	R&S	HF906	359287/005	2012-05-07



7 Measurement Uncertainty

For a 95% confidence level ($k=2$), the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

Test Item		Extended Uncertainty
Transmitter Output Power	Power (dBm)	U =0.39 dB
Occupied Bandwidth	Magnitude (%)	U=0.2%
Band Edge Compliance	Disturbance Power (dBm)	U=2.0 dB
Conducted Spurious Emissions	Disturbance Power (dBm)	U=2.0 dB
Field Strength of Spurious Radiation	ERP (dBm)	U=4.6 dB (30 MHz – 1GHz) U=3.0 dB (above 1 GHz)
Frequency Stability	Frequency Accuracy (ppm)	U=0.21 ppm

END



Appendix A: Transmitter Output Power



1 Average Power (Total)

CDMA2000 1X

Test Mode	Carrier Conf.	RF Ch.	Average Power [dBm]	Average Power [W]	Average Power [W/MHz]	Verdict
TM1	1(20W)	B	42.94	19.68	---	Pass
		M	43.15	20.65	---	Pass
		T	42.69	18.58	---	Pass
TM1	1(40W)	B	45.93	39.17	---	Pass
		M	45.94	39.26	---	Pass
		T	45.75	37.58	---	Pass
TM1	1(60W)	B	47.60	57.54	---	Pass
		M	47.64	58.08	---	Pass
		T	47.46	55.72	---	Pass
TM1	2(2*20W)	B	45.84	38.37	---	Pass
		M	45.76	37.67	---	Pass
		T	45.6	36.31	---	Pass
TM1	3(3*20W)	B	47.53	56.62	---	Pass
		M	47.49	56.10	---	Pass
		T	47.44	55.46	---	Pass
TM1	4(4*15W)	B	47.57	57.15	---	Pass
		M	47.57	57.15	---	Pass
		T	47.64	58.08	---	Pass
TM1	5(5*10W)	B	46.63	46.03	---	Pass
		M	46.58	45.50	---	Pass
		T	46.63	46.03	---	Pass
TM1	6(6*60W)	B	47.67	58.48	---	Pass
		M	47.62	57.81	---	Pass
		T	47.63	57.94	---	Pass

CDMA2000 EVDO

Test Mode	Carrier Conf.	RF Ch.	Average Power [dBm]	Average Power [W]	Average Power [W/MHz]	Verdict
TM2	1(20W)	B	42.64	18.37	---	Pass
		M	42.64	18.37	---	Pass
		T	42.87	19.36	---	Pass
TM2	1(40W)	B	45.85	38.46	---	Pass
		M	45.9	38.90	---	Pass
		T	45.8	38.02	---	Pass
TM2	1(60W)	B	47.6	57.54	---	Pass
		M	47.6	57.54	---	Pass
		T	47.56	57.02	---	Pass
TM2	2(2*20W)	B	45.83	38.28	---	Pass
		M	45.56	35.97	---	Pass



Test Mode	Carrier Conf.	RF Ch.	Average Power [dBm]	Average Power [W]	Average Power [W/MHz]	Verdict
		T	45.59	36.22	---	Pass
TM2	3(3*20W)	B	47.84	60.81	---	Pass
		M	47.66	58.34	---	Pass
		T	47.78	59.98	---	Pass
TM2	4(4*15W)	B	47.69	58.75	---	Pass
		M	47.58	57.28	---	Pass
		T	47.69	58.75	---	Pass
TM2	5(5*10W)	B	47.03	50.47	---	Pass
		M	46.85	48.42	---	Pass
		T	46.86	48.53	---	Pass
TM2	6(6*60W)	B	47.67	58.48	---	Pass
		M	47.65	58.21	---	Pass
		T	47.6	57.54	---	Pass

LTE

Test Mode	Carrier Conf.	RF Ch.	Average Power [dBm]	Average Power [W]	Average Power [W/MHz]	Verdict
TM1.1	1.4M(40W)	B	45.27	33.65	---	Pass
		M	45.23	33.34	---	Pass
		T	45.14	32.66	---	Pass
TM1.1	3M(40W)	B	45.21	33.19	---	Pass
		M	45.37	34.43	---	Pass
		T	45.15	32.73	---	Pass
TM1.1	5M(60W)	B	47.56	57.02	---	Pass
		M	47.42	55.21	---	Pass
		T	47.19	52.36	---	Pass
TM1.1	10M(60W)	B	47.39	54.83	---	Pass
		M	47.27	53.33	---	Pass
		T	47.13	51.64	---	Pass
TM1.1	15M(60W)	B	47.22	52.72	---	Pass
		M	47.33	54.08	---	Pass
		T	46.96	49.66	---	Pass
TM1.1	20M(60W)	B	47.28	53.46	---	Pass
		T	47.05	50.70	---	Pass
TM1.1	5+5M(30+30W)	B	47.27	53.33	---	Pass
		M	47.23	52.84	---	Pass
		T	46.95	49.55	---	Pass
TM1.1	5+10M(20+40W)	B	47.24	52.97	---	Pass
		M	47.22	52.72	---	Pass
		T	46.93	49.32	---	Pass
TM1.1	5+20M(12+48W)	B	47.25	53.09	---	Pass
		T	46.91	49.09	---	Pass



Test Mode	Carrier Conf.	RF Ch.	Average Power [dBm]	Average Power [W]	Average Power [W/MHz]	Verdict
TM1.1	10+20M(20+40W)	B	47.15	51.88	---	Pass
		T	47.16	52.00	---	Pass
TM1.1	15+15M(30+30W)	B	47.39	54.83	---	Pass
		T	47.13	51.64	---	Pass
TM1.1	15+20M(26+34W)	B	47.47	55.85	---	Pass
		T	47.45	55.59	---	Pass
TM1.1	20+20M(30+30W)	B	47.28	53.46	---	Pass
		T	47.25	53.09	---	Pass

CDMA<E

Test Mode	Carrier Conf.	RF Ch.	Average Power [dBm]	Average Power [W]	Average Power [W/MHz]	Verdict
TM2&TM1.1	1C+1L (5M) (30+30W)	B	47.37	54.58	---	Pass
		M	47.24	52.97	---	Pass
		T	47.24	52.97	---	Pass
TM2&TM1.1	1C+1L (10M) (30+30W)	B	47.11	51.40	---	Pass
		M	47.12	51.52	---	Pass
		T	47.36	54.45	---	Pass
TM2&TM1.1	1C+1L (15M) (30+30W)	B	47.10	51.29	---	Pass
		M	47.12	51.52	---	Pass
		T	46.94	49.43	---	Pass
TM2&TM1.1	1C+1L (20M) (30+30W)	B	47.08	51.05	---	Pass
		T	47.12	51.52	---	Pass
TM2&TM1.1	1C+1L (20M) (20+40W)	B	47.15	51.88	---	Pass
		T	47.03	50.47	---	Pass
TM2&TM1.1	1C+1L (20M) (40+20W)	B	46.75	47.32	---	Pass
		T	46.83	48.19	---	Pass
TM2&TM1.1	2C+1L (20M) (2*20W+20W)	B	47.19	52.36	---	Pass
		T	47.08	51.05	---	Pass
TM2&TM1.1	3C+1L (20M) (3*15W+15W)	B	46.95	49.55	---	Pass
		T	46.98	49.89	---	Pass
TM2&TM1.1	4C+1L (20M) (4*10W+20W)	B	47.14	51.76	---	Pass
		T	47.10	51.29	---	Pass

2 Peak-to-Average Ratio

Test Mode	Carrier Conf.	RF Ch.	Peak-to-Average Ratio [dB]	Verdict
CDMA2000	1.25M(60W)	B	5.77	Pass
		M	6.23	Pass
		T	6.21	Pass
LTE-TM1.1	20M(60W)	B	7.45	Pass
		M	7.11	Pass
		T	7.54	Pass



Appendix B: Modulation Characteristics



1 Result Table

Test Mode	Digital modulation?	Verdict
TM 0/TM1/TM2	Yes	Pass
TM2.0/TM3.1/TM3.2/TM3.3	Yes	Pass



2 Test Plot

2.1 Test Mode = TM0 for CDMA2000 1X RC1

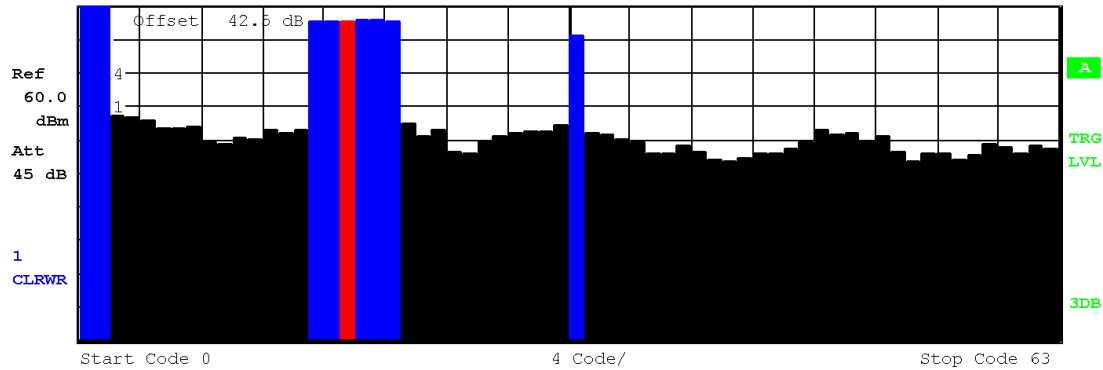


BS,1X,C0 :CODE POWER

SR 19.2 ksps

Chan 17.64

dB PICH CF 2.1325 GHz PCG 0



RESULT SUMMARY TABLE

SR 19.2 ksps

Chan 17.64

Offset 42.5 dB CF 2.1325 GHz PCG 0

RESULTS FOR SET 0 PCG 0:		GLOBAL RESULTS FOR SET 0:	
Total PWR	47.50 dBm	Carr Freq Error	-1.58 Hz
Pilot PWR	40.45 dBm	Carr Freq Error	-0.00 ppm
RHO	0.97873	Chip Rate Error	0.58 ppm
Composite EVM	14.74 %	Trg to Frame	44.345856 μs
Pk CDE (SF 64)	-30.14 dB	Active Channels	9
IQ Imbal/Offset	0.07/0.10 %		
CHANNEL RESULTS:		Modulation	
Symbol Rate	19.2 ksps	Timing Offset	-.-- ns
Channel.SF	17.64	Phase Offset	-.-- mrad
Channel Power Rel	-3.31 dB	Channel Power Abs	37.15 dBm
Symbol EVM	7.44 % rms	Symbol EVM	12.11 % Pk

Date: 1.DEC.2011 13:49:05



2.2 Test Mode = TM2 for CDMA2000 1X RC3



BS,1X,C0 :CODE POWER

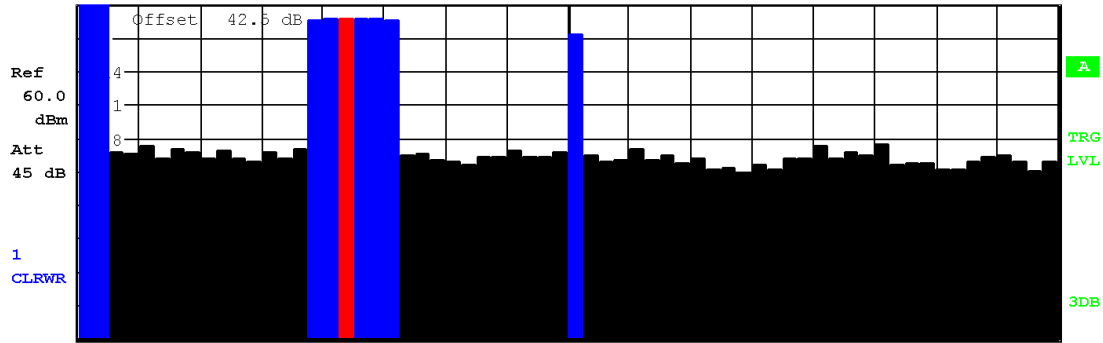
SR 19.2 ksps

Chan 17.64

dB PICH

CF 2.1325 GHz

PCG 0



Start Code 0 4 Code/ Stop Code 63

RESULT SUMMARY TABLE

SR 19.2 ksps

Chan 17.64

Offset 42.5 dB

CF 2.1325 GHz

PCG 0

EXT

RESULTS FOR SET 0 PCG 0:			GLOBAL RESULTS FOR SET 0:		
Total PWR	47.49	dBm	Carr Freq Error	1.65	Hz
Pilot PWR	40.47	dBm	Carr Freq Error	0.00	ppm
RHO	0.99194		Chip Rate Error	-0.09	ppm
Composite EVM	9.02	%	Trg to Frame	44.351549	µs
Pk CDE (SF 64)	-36.43	dB	Active Channels	9	
IQ Imbal/Offset	0.40/0.13	%			
CHANNEL RESULTS:			Modulation		
Symbol Rate	19.2	ksps	Timing Offset	---	ns
Channel.SF	17.64		Phase Offset	---	mrads
Channel Power Rel	-3.23	dB	Channel Power Abs	37.24	dBm
Symbol EVM	3.79	% rms	Symbol EVM	8.04	% Pk

Date: 1.DEC.2011 13:46:09

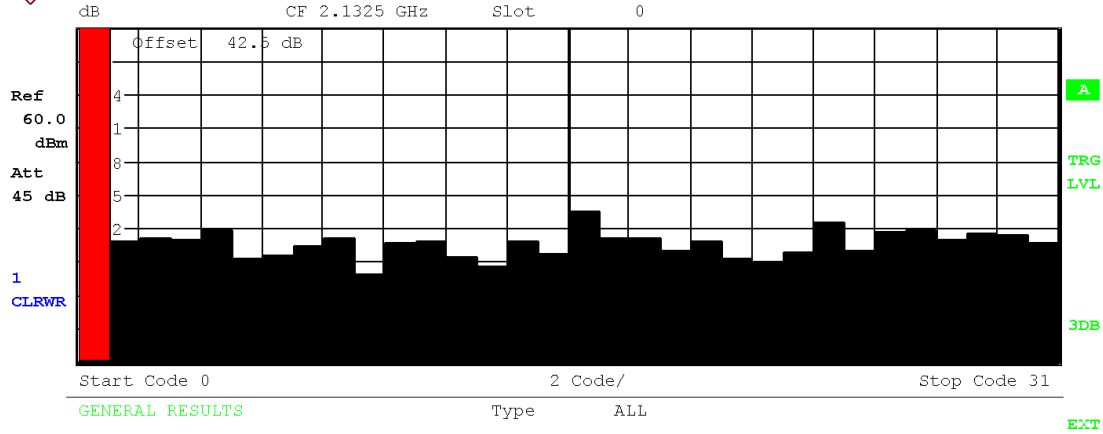


2.3 Test Mode = TM2 for CDMA2000 EVDO



BS,DO,C0 :CODE POWER

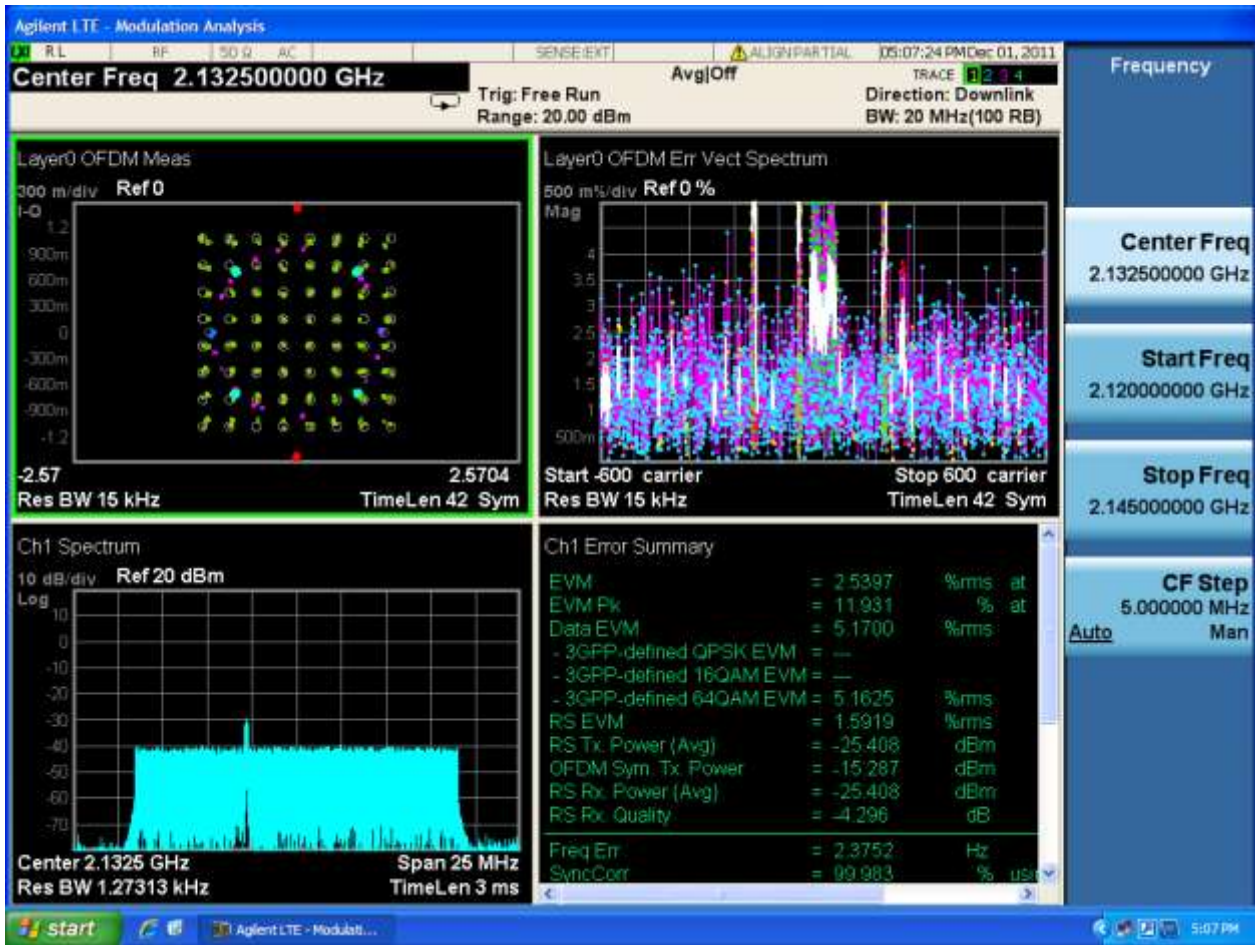
Type PILOT-I
Code 0.32
Slot 0



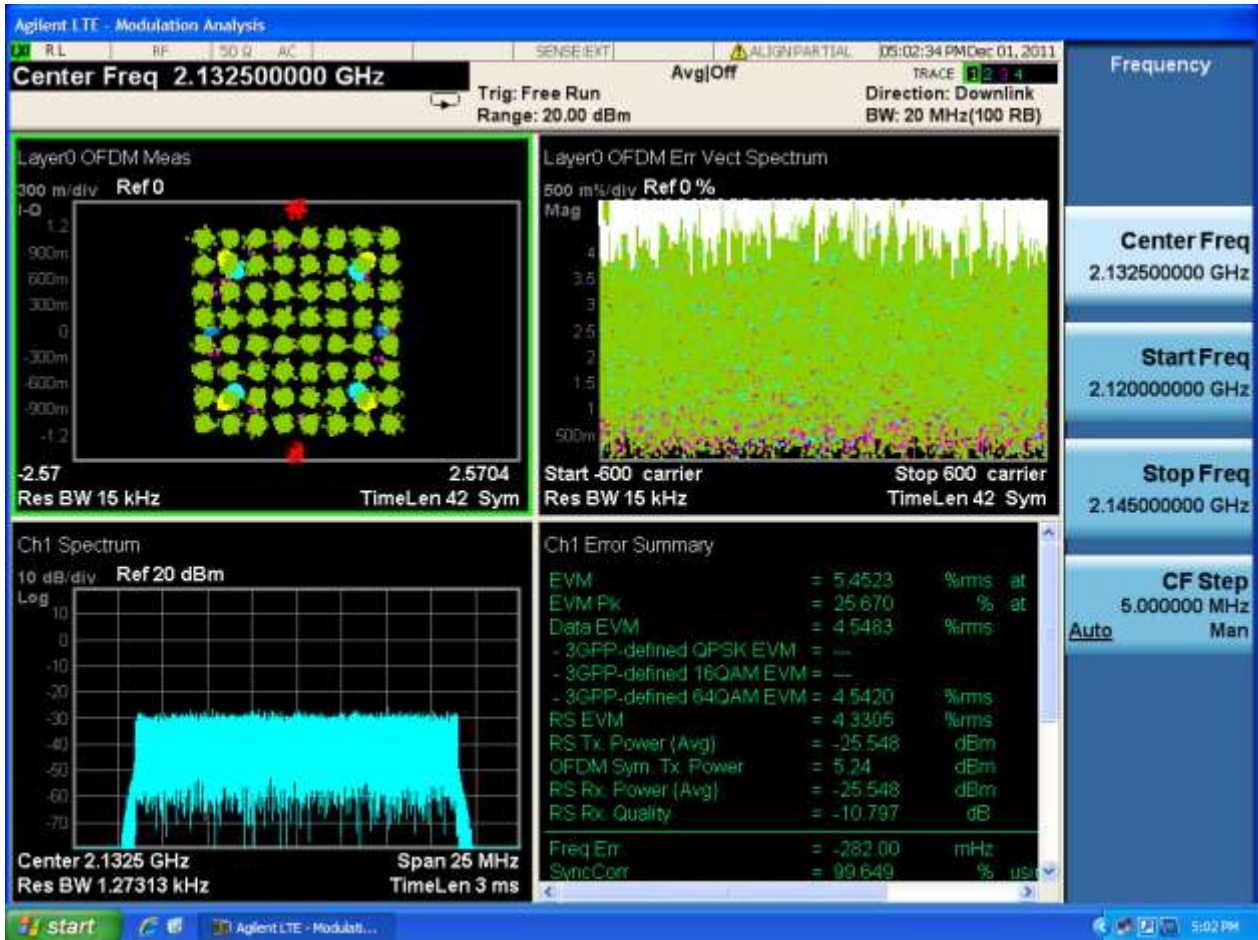
	Offset 42.5 dB		CF 2.1325 GHz		
	Global Results for Set 0:				
Ref 60.0 dBm	Carr Freq Error	-383.80 mHz	RHO Pilot	0.99777	B
	Carr Freq Error	-0.00 ppm	RHO ov-1/-2	0.99191/0.99250	
	Chip Rate Error	0.48 ppm	RHO MAC	0.99650	
	Trg to Frame	45.485693 μs	RHO DATA	0.99071	
Att 45 dB	Results for Set 0 / Slot 0:				LVL
	Power PILOT	47.84 dBm	Data Modulation Type	16-QAM	
	Power MAC	47.54 dBm	Act. MAC Channels	21	
	Power DATA	47.49 dBm	Act. DATA Channels	16	
1	Power PREAMBLE	47.93 dBm	Preamble Length	64 Chips	
CLRWR	Composite EVM	9.73 %	RHO	0.99063	
	Max. Pwr DATA	-14.38 dB	Max. inact. Pwr MAC	-40.16 dB	3DB
	Min. Pwr DATA	-16.08 dB			

Date: 1.DEC.2011 13:35:15

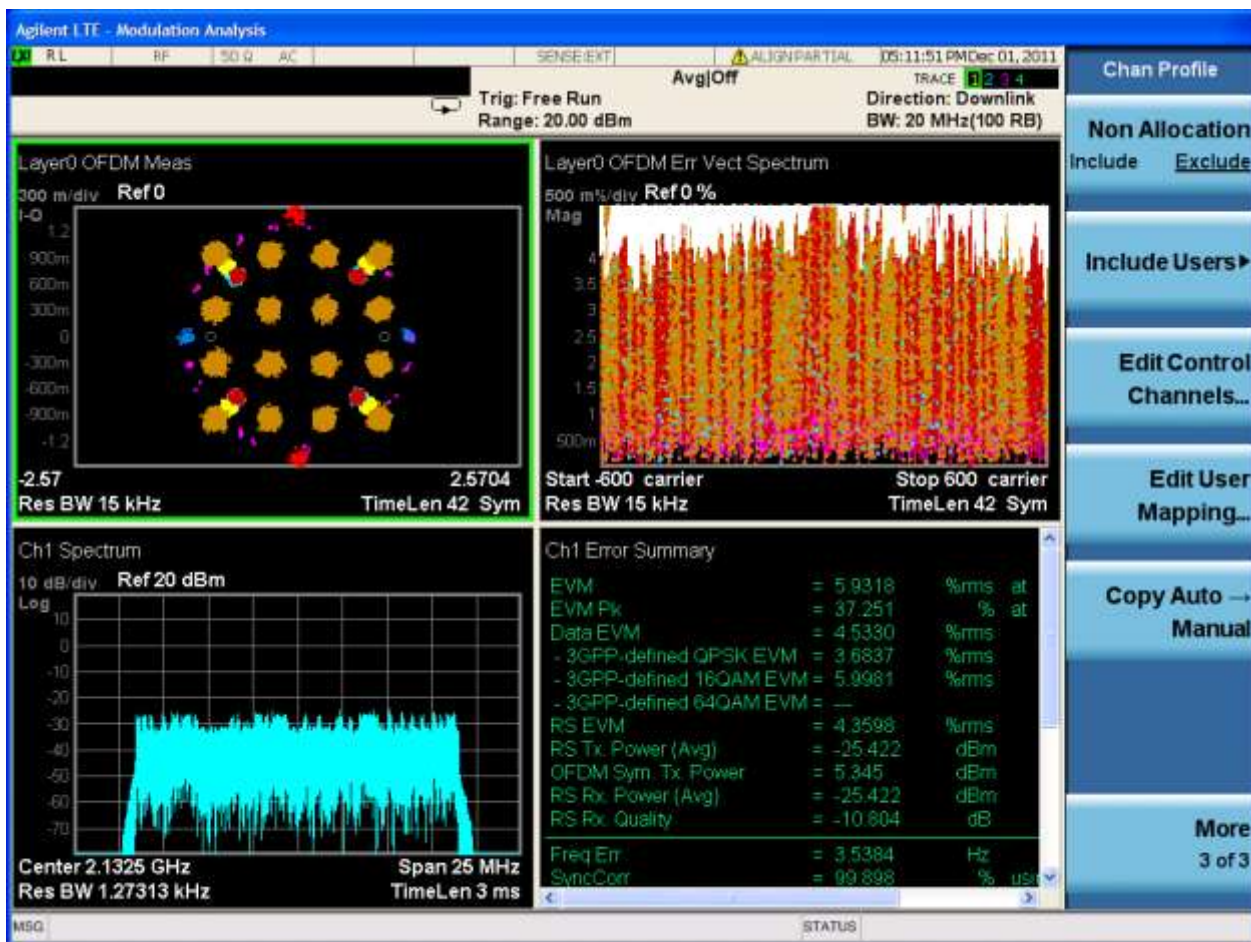
2.4 Test Mode = TM2.0 for LTE



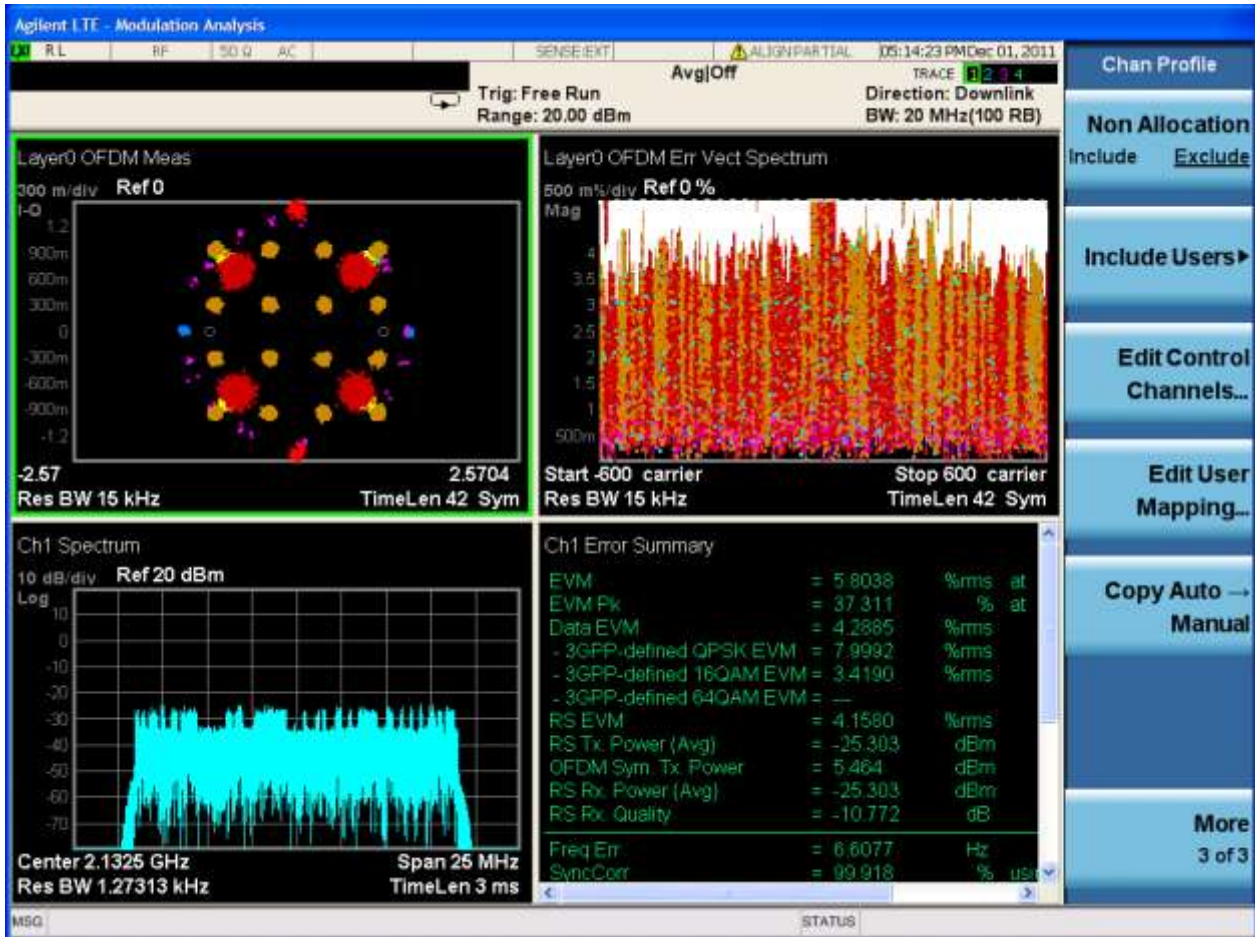
2.5 Test Mode = TM3.1 for LTE



2.6 Test Mode = TM3.2 for LTE



2.7 Test Mode = TM3.3 for LTE





Appendix C: Occupied Bandwidth



1 Result Table

Test Mode	Carrier Conf.	RF Ch.	Occupied Bandwidth [MHz]	Verdict
CDMA2000 1X	1.25M	B	1.245	Pass
		M	1.248	Pass
		T	1.247	Pass
CDMA2000 EVDO	1.25M	B	1.247	Pass
		M	1.247	Pass
		T	1.244	Pass
LTE	1.4M	B	1.098	Pass
		M	1.101	Pass
		T	1.096	Pass
LTE	3M	B	2.697	Pass
		M	2.702	Pass
		T	2.698	Pass
LTE	5M	B	4.478	Pass
		M	4.479	Pass
		T	4.485	Pass
LTE	10M	B	8.994	Pass
		M	8.920	Pass
		T	8.960	Pass
LTE	15M	B	13.399	Pass
		M	13.388	Pass
		T	13.443	Pass
LTE	20M	B	17.875	Pass
		T	17.883	Pass

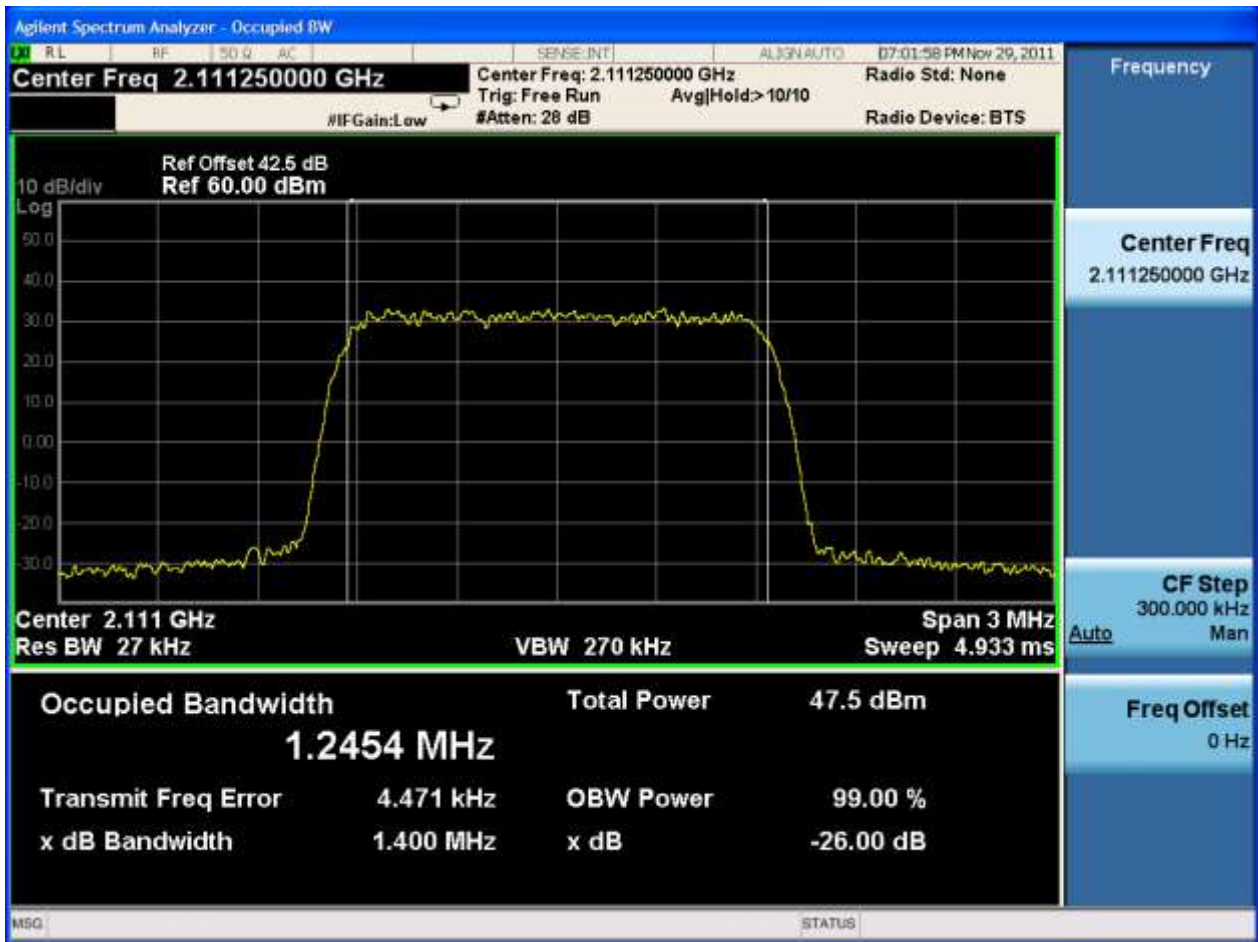


2 Test Plot

2.1 Test Mode = CDMA2000 1X

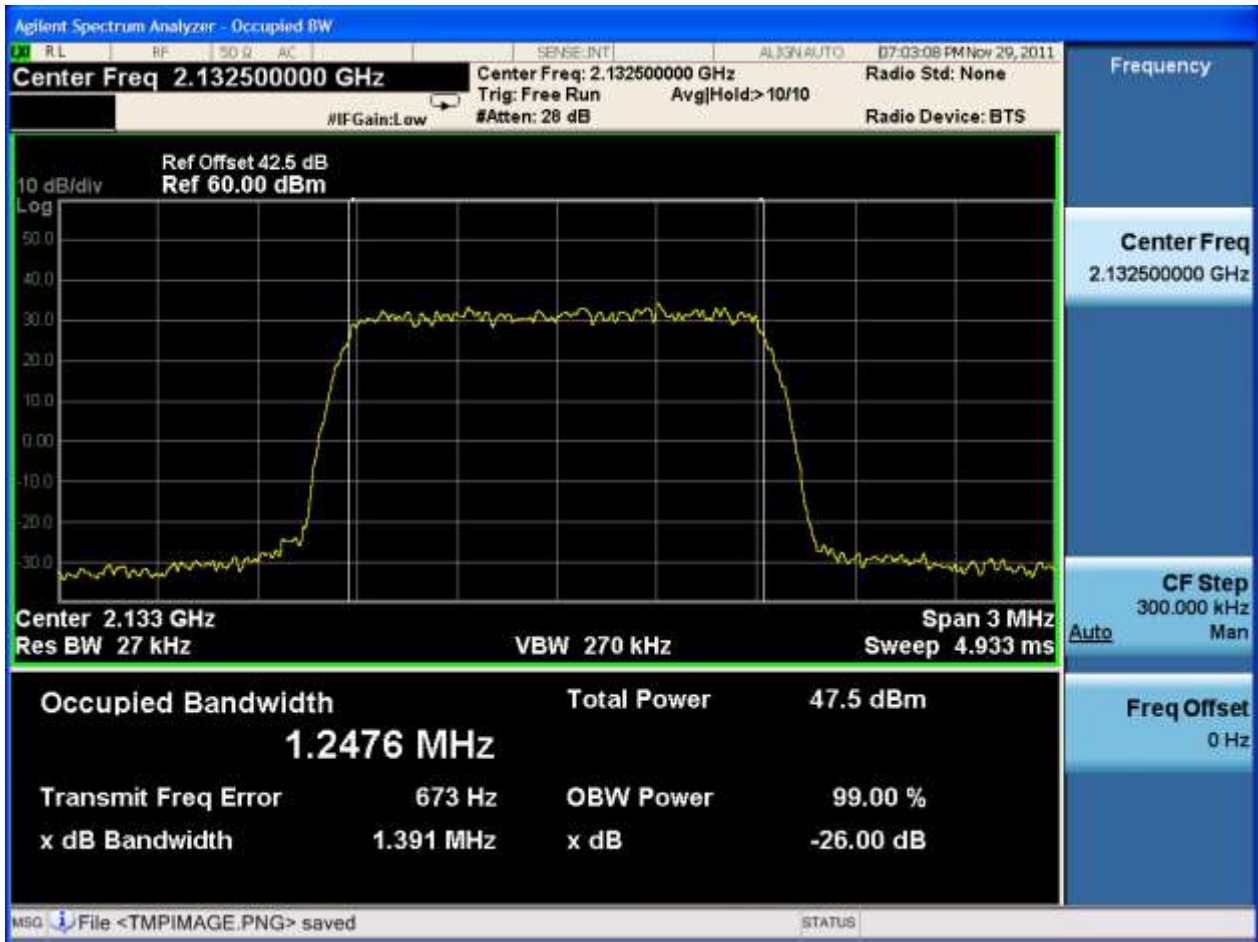
2.1.1 Carrier Conf. = 1.25M

2.1.1.1 Ch. B



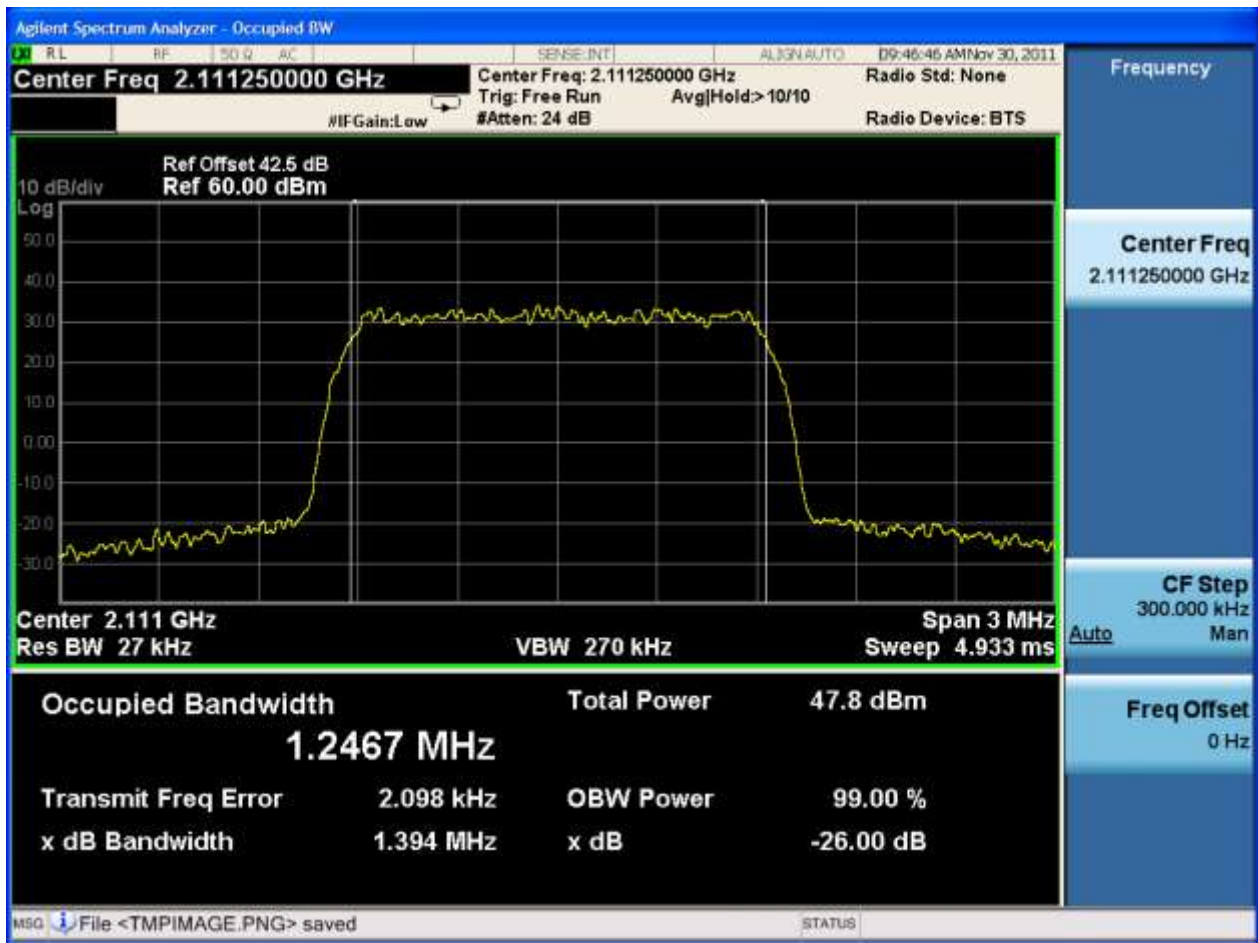


2.1.1.2 Ch. M





2.1.1.3 Ch. T

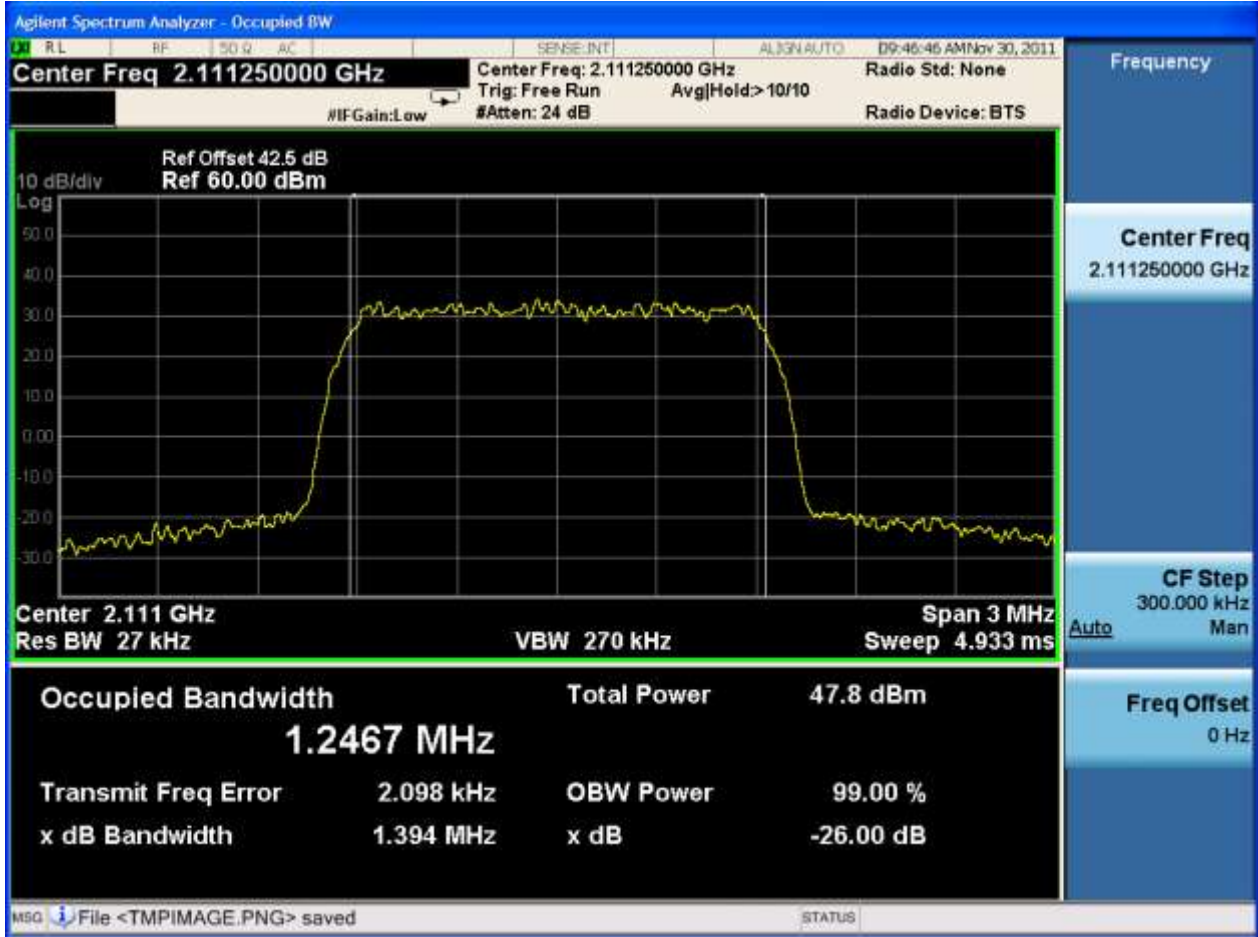




2.2 Test Mode = CDMA2000 EVDO

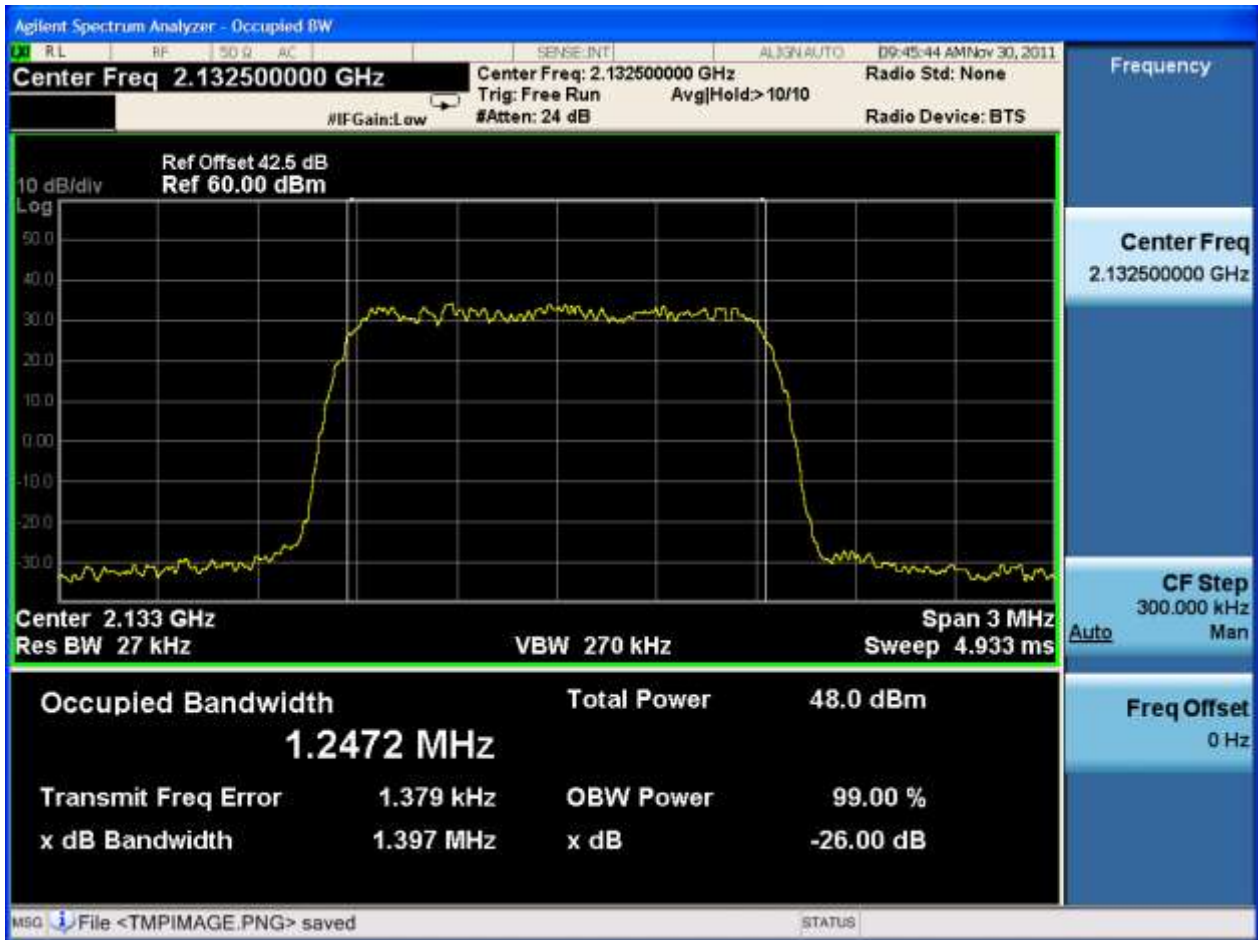
2.2.1 Carrier Conf. = 1.25M

2.2.1.1 Ch. B

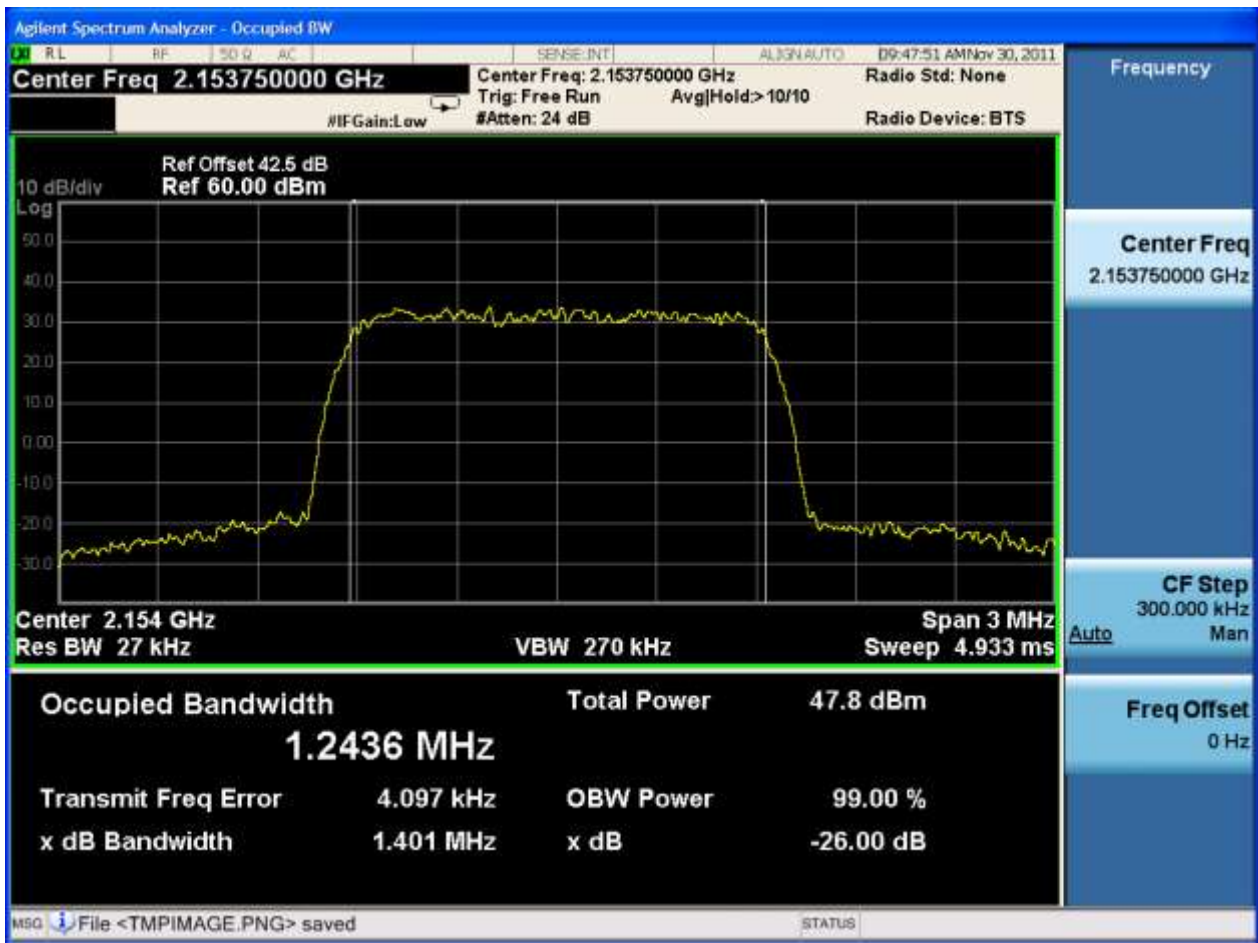




2.2.1.2 Ch. M



2.2.1.3 Ch. T





2.3 Test Mode = LTE

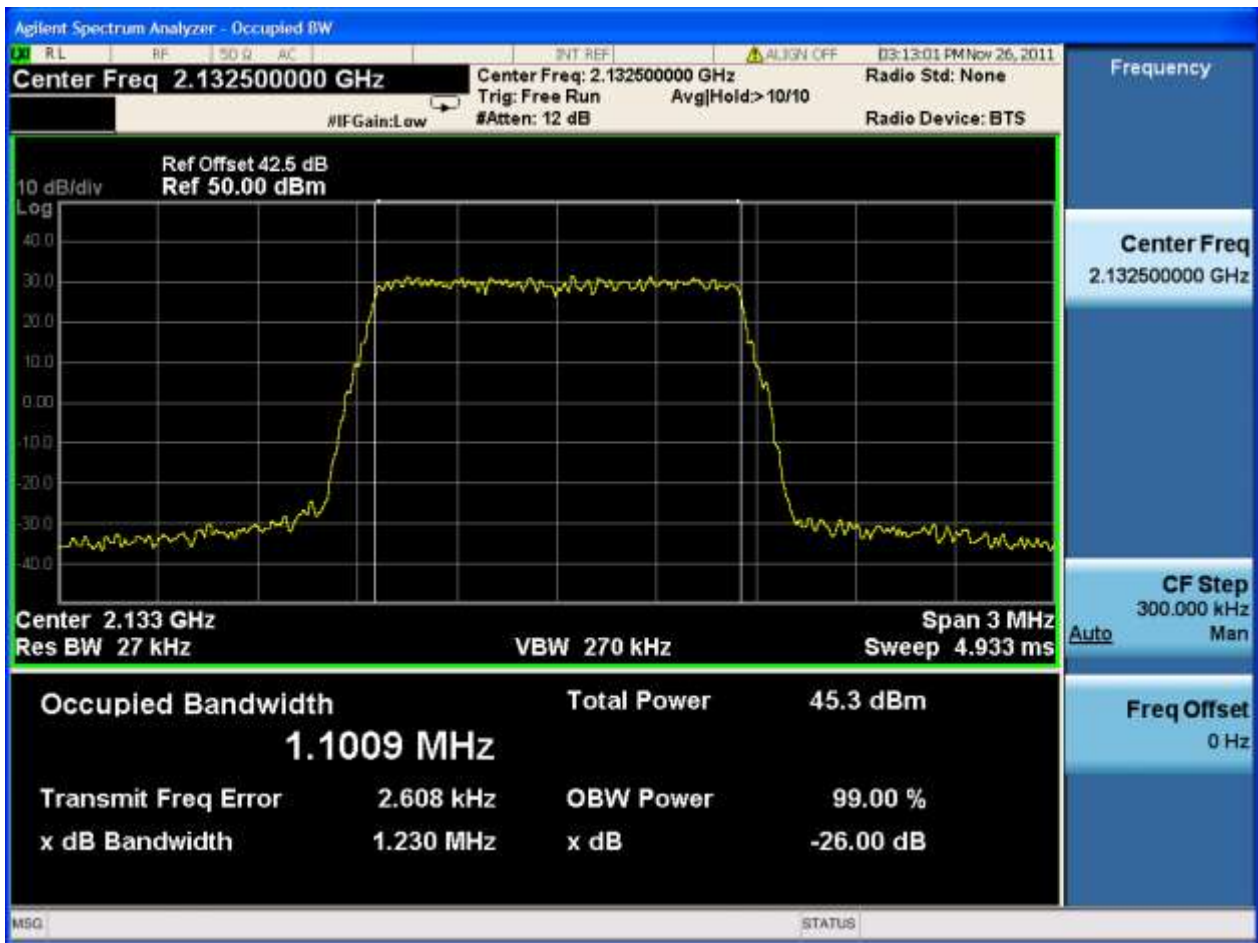
2.3.1 Carrier Conf. = 1.4M

2.3.1.1 Ch. B



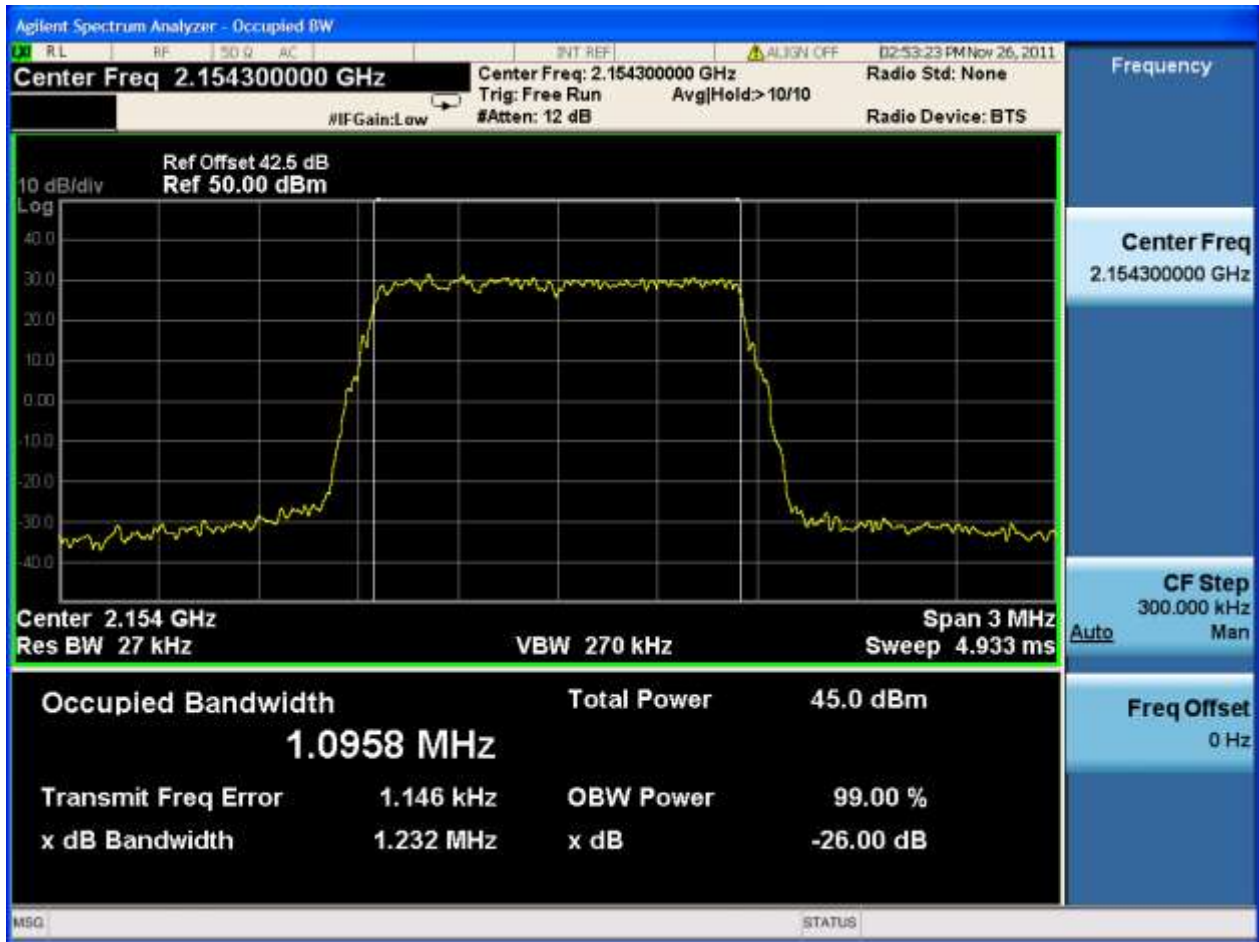


2.3.1.2 Ch. M





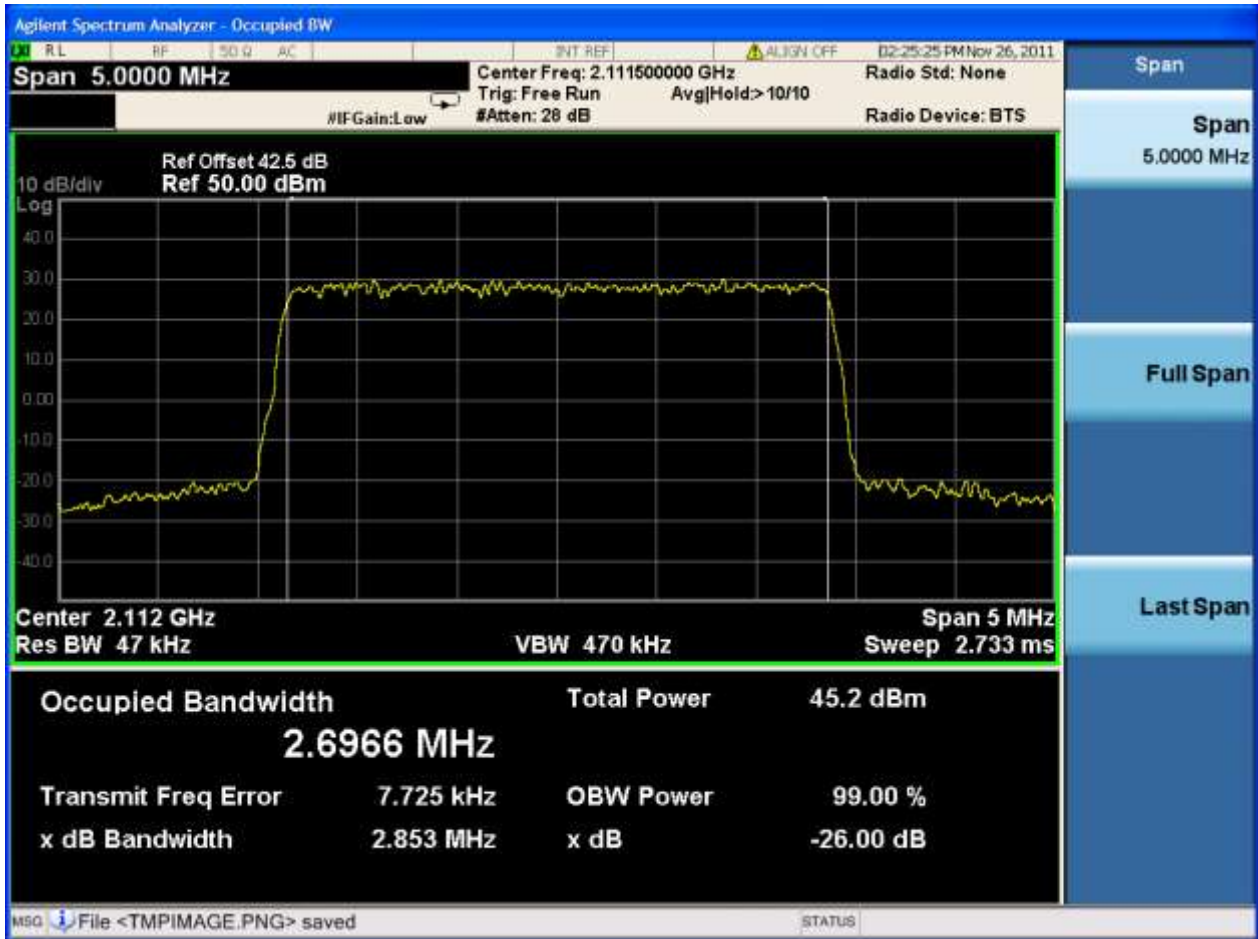
2.3.1.3 Ch. T



2.4 Test Mode = LTE

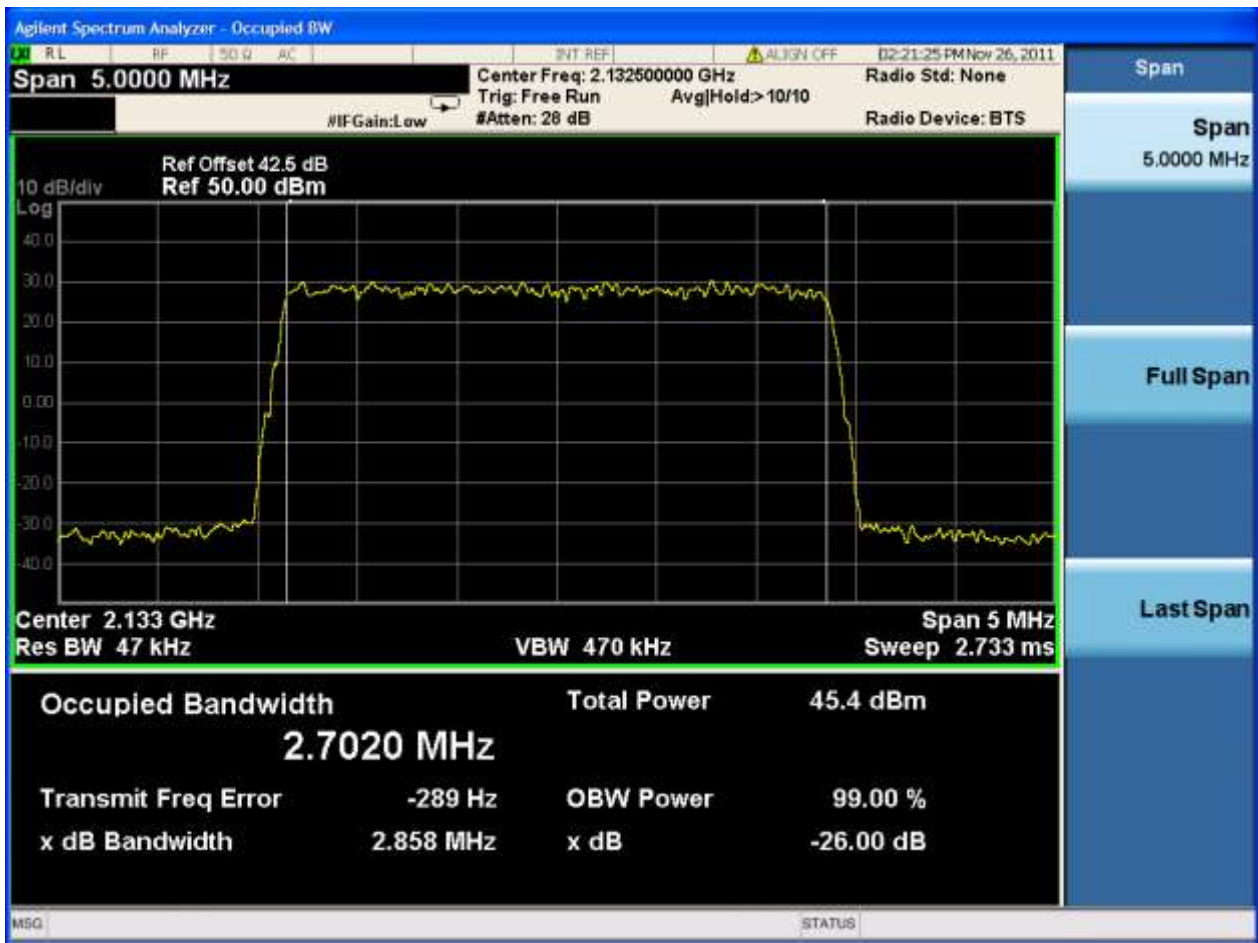
2.4.1 Carrier Conf. = 3M

2.4.1.1 Ch. B



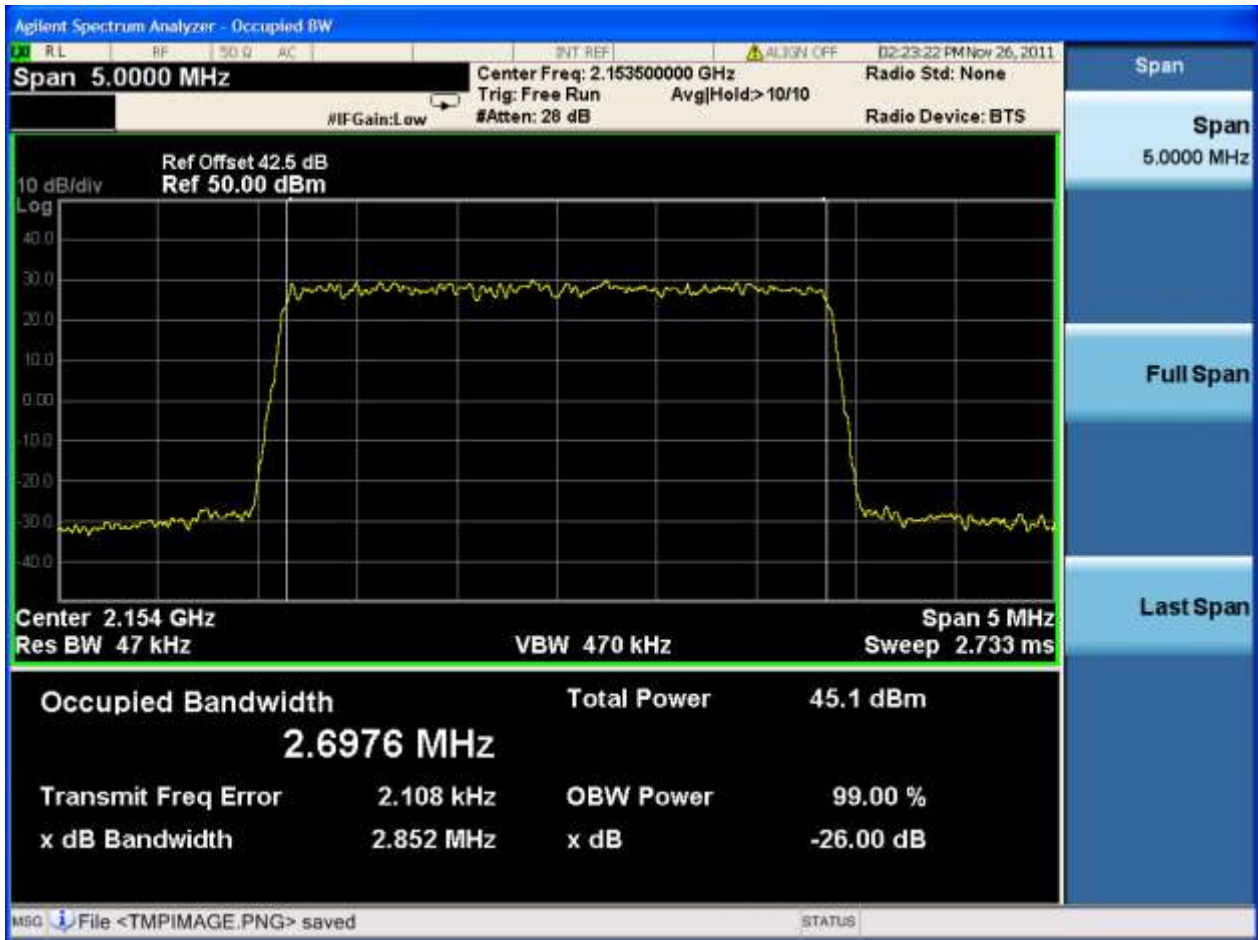


2.4.1.2 Ch. M





2.4.1.3 Ch. T

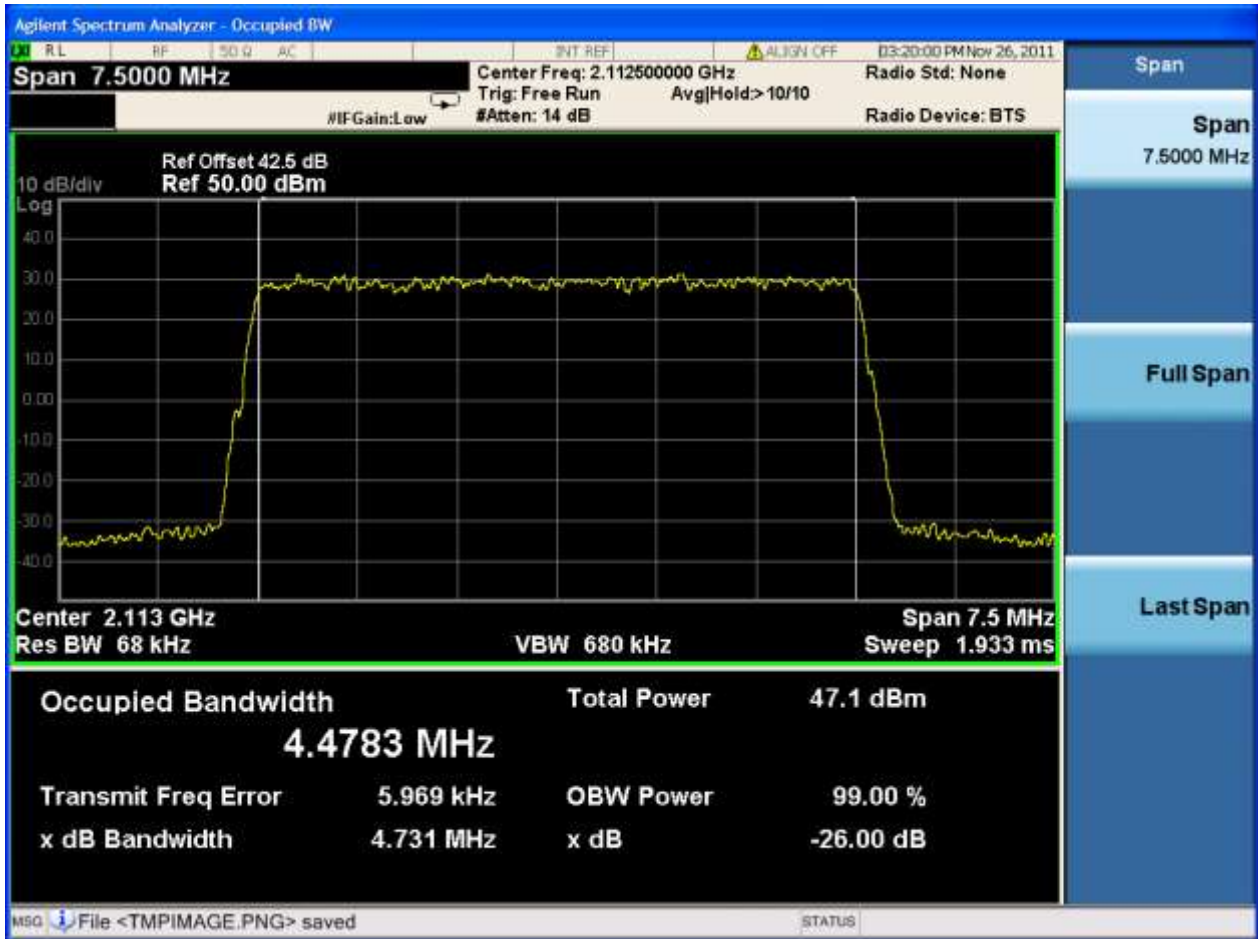




2.5 Test Mode = LTE

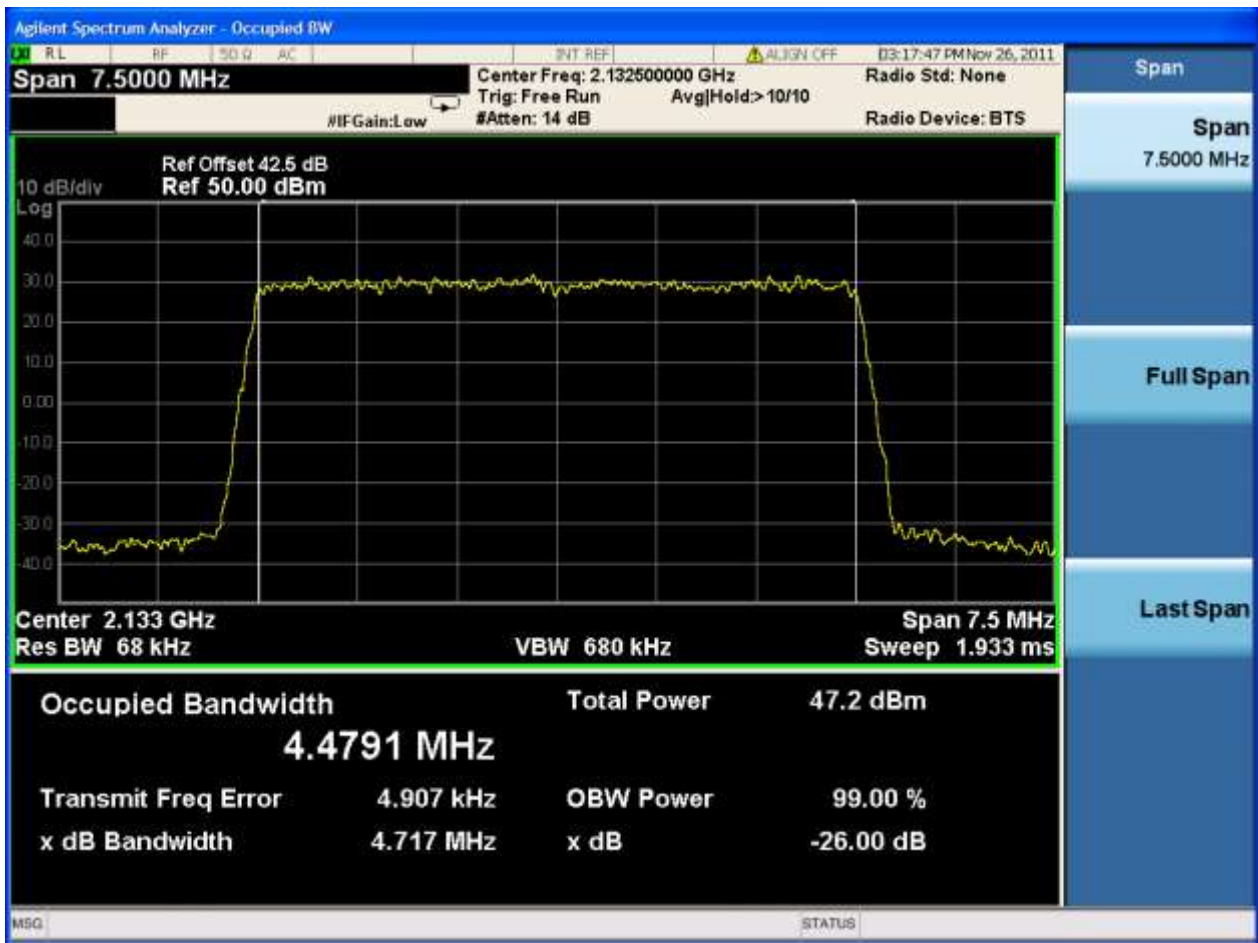
2.5.1 Carrier Conf. = 5M

2.5.1.1 Ch. B



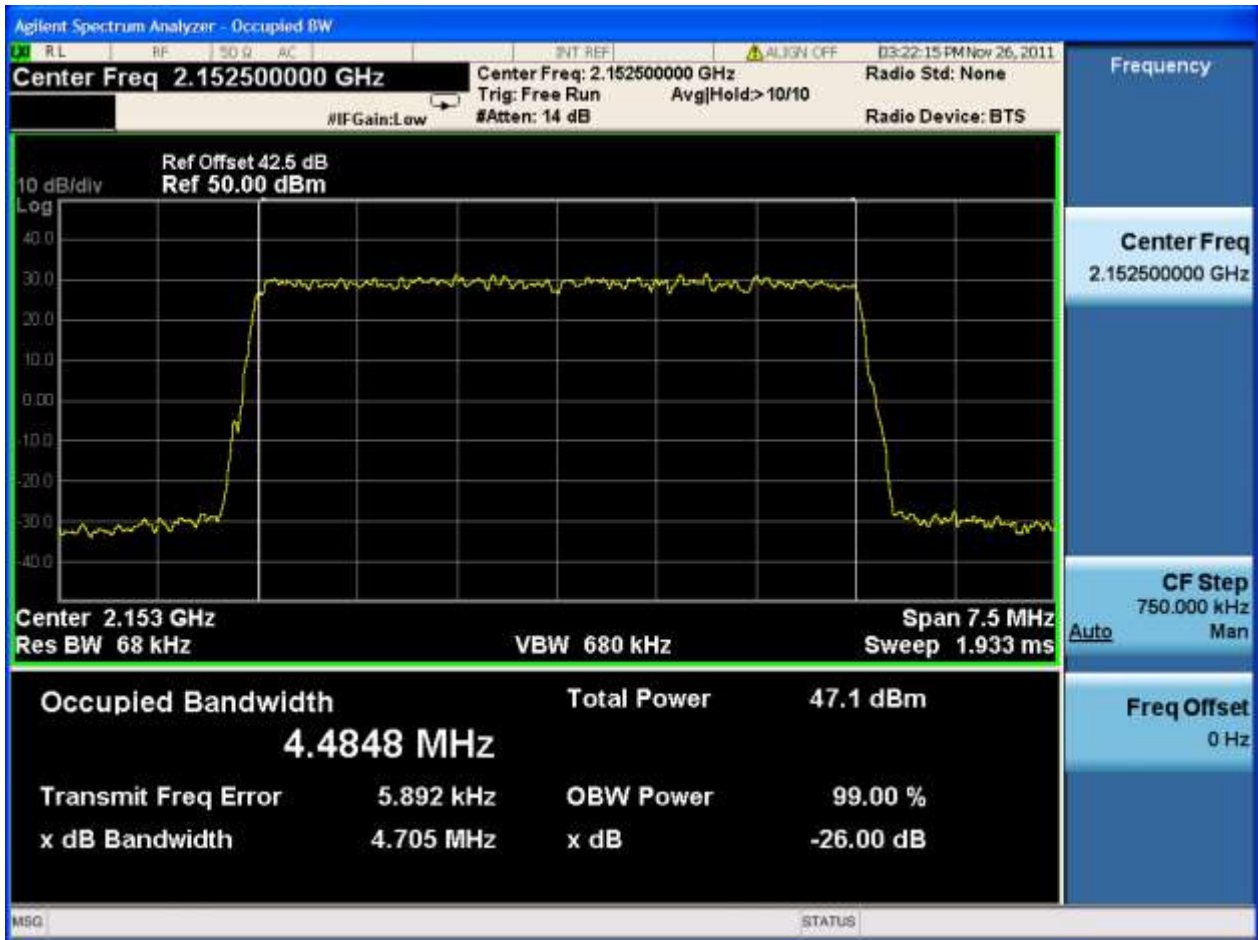


2.5.1.2 Ch. M





2.5.1.3 Ch. T

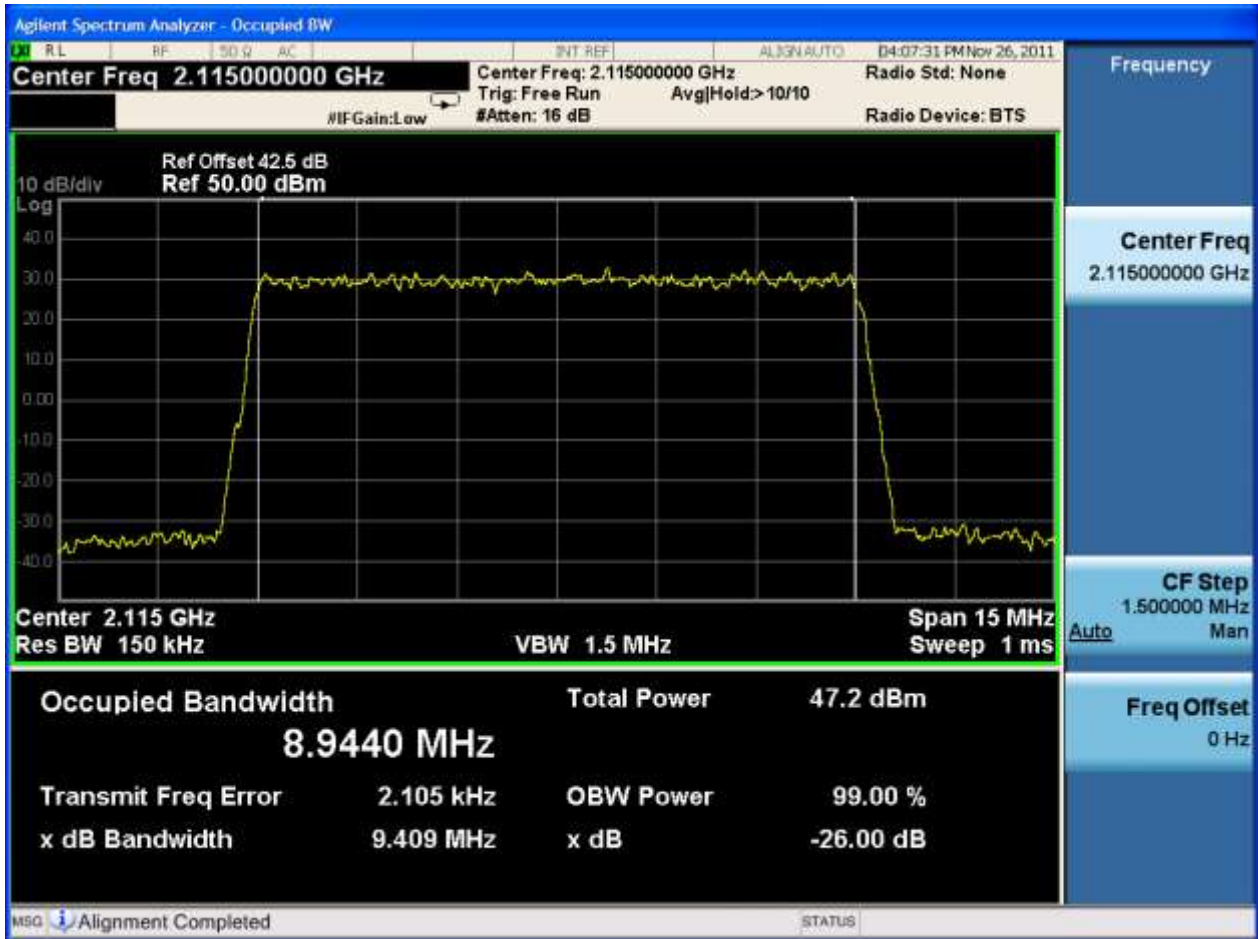




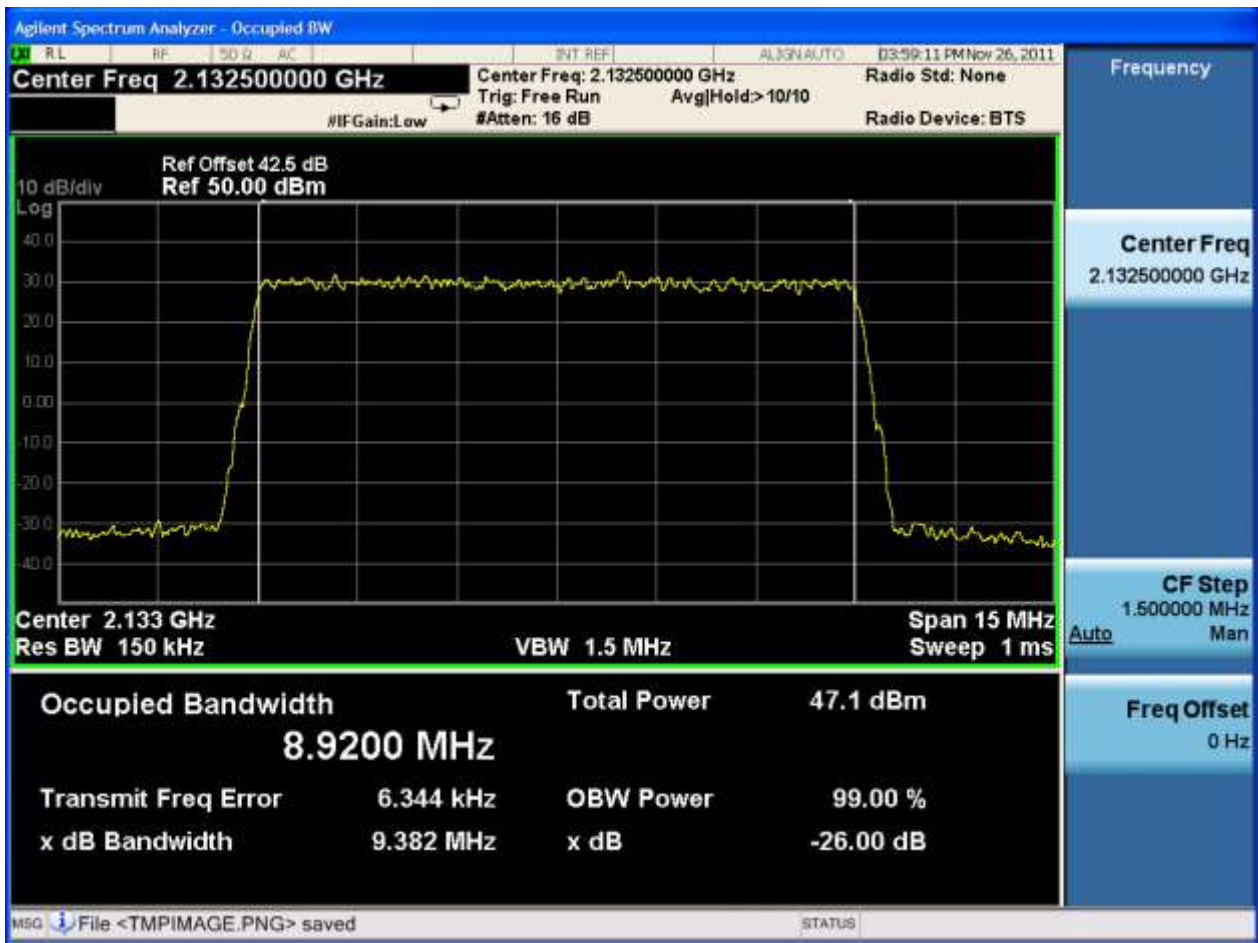
2.6 Test Mode = LTE

2.6.1 Carrier Conf. = 10M

2.6.1.1 Ch. B

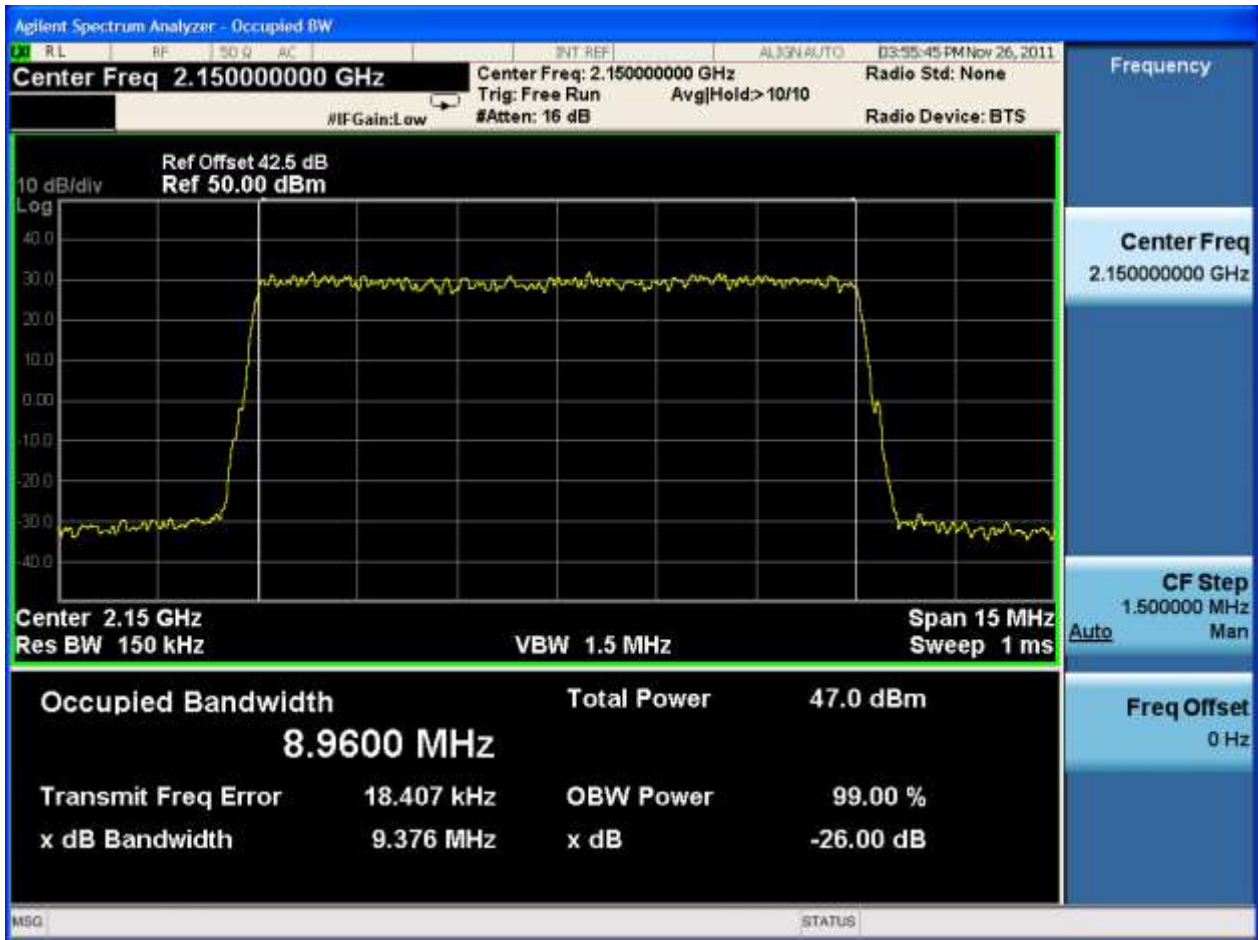


2.6.1.2 Ch. M





2.6.1.3 Ch. T

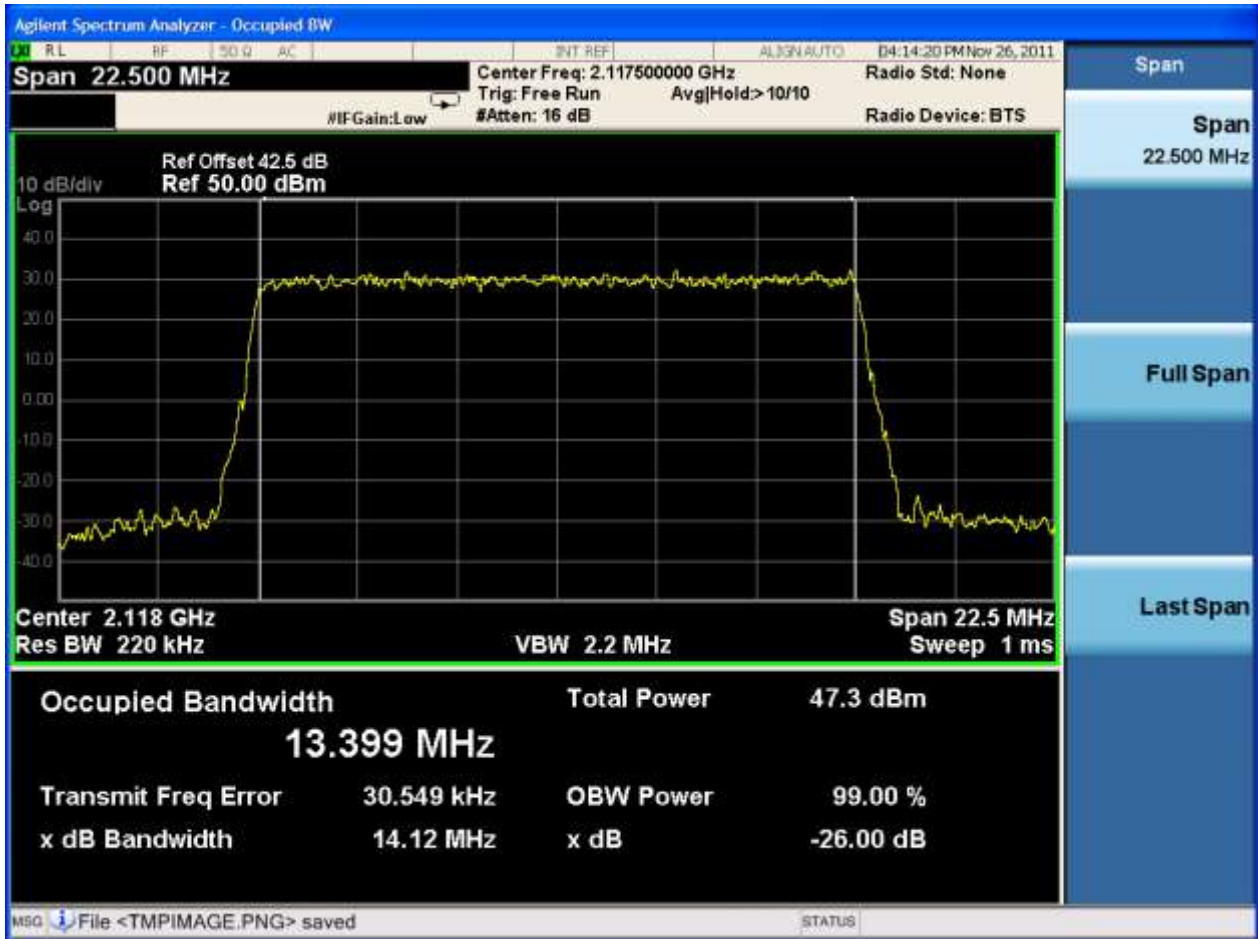




2.7 Test Mode = LTE

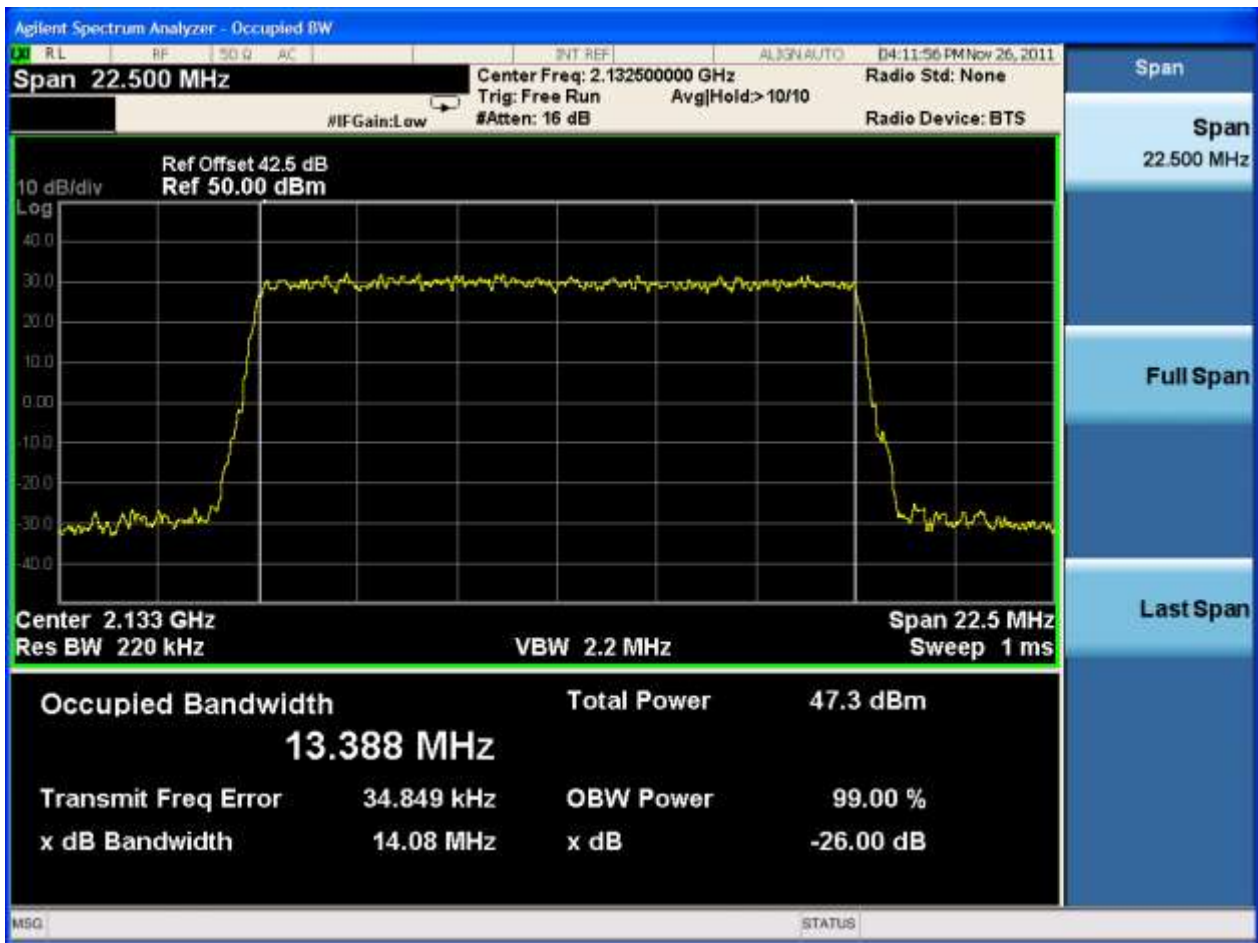
2.7.1 Carrier Conf. = 15M

2.7.1.1 Ch. B



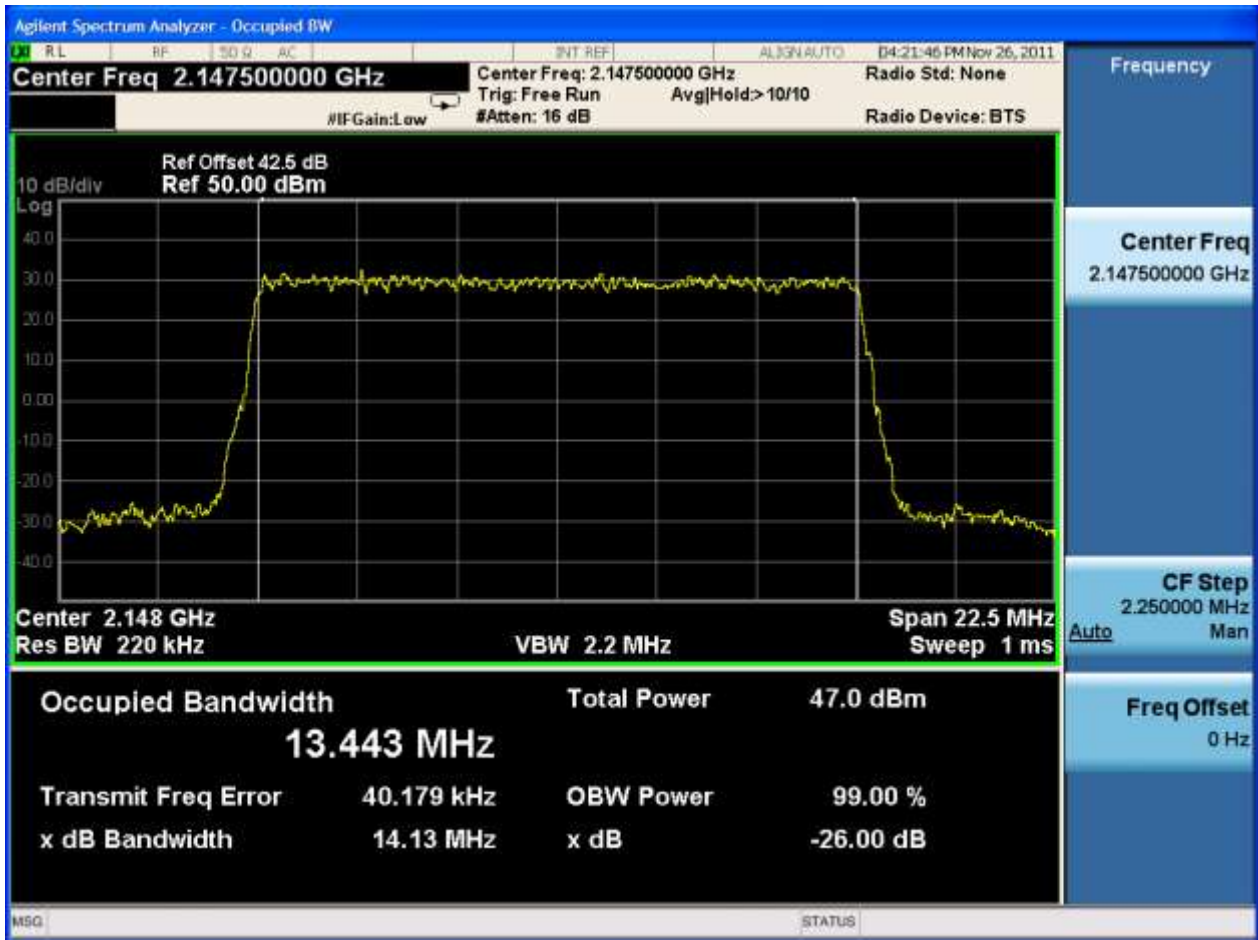


2.7.1.2 Ch. M





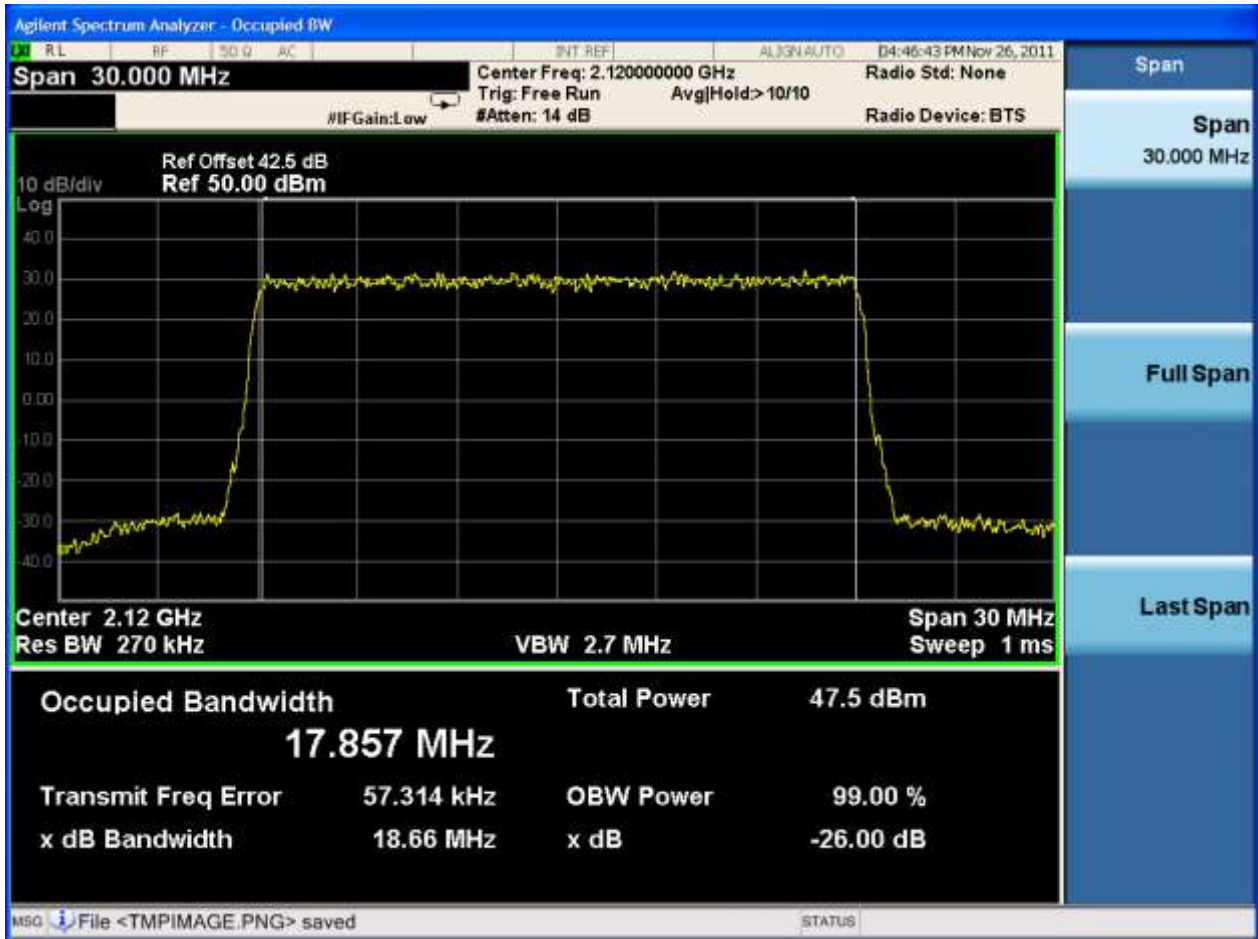
2.7.1.3 Ch. T



2.8 Test Mode = LTE

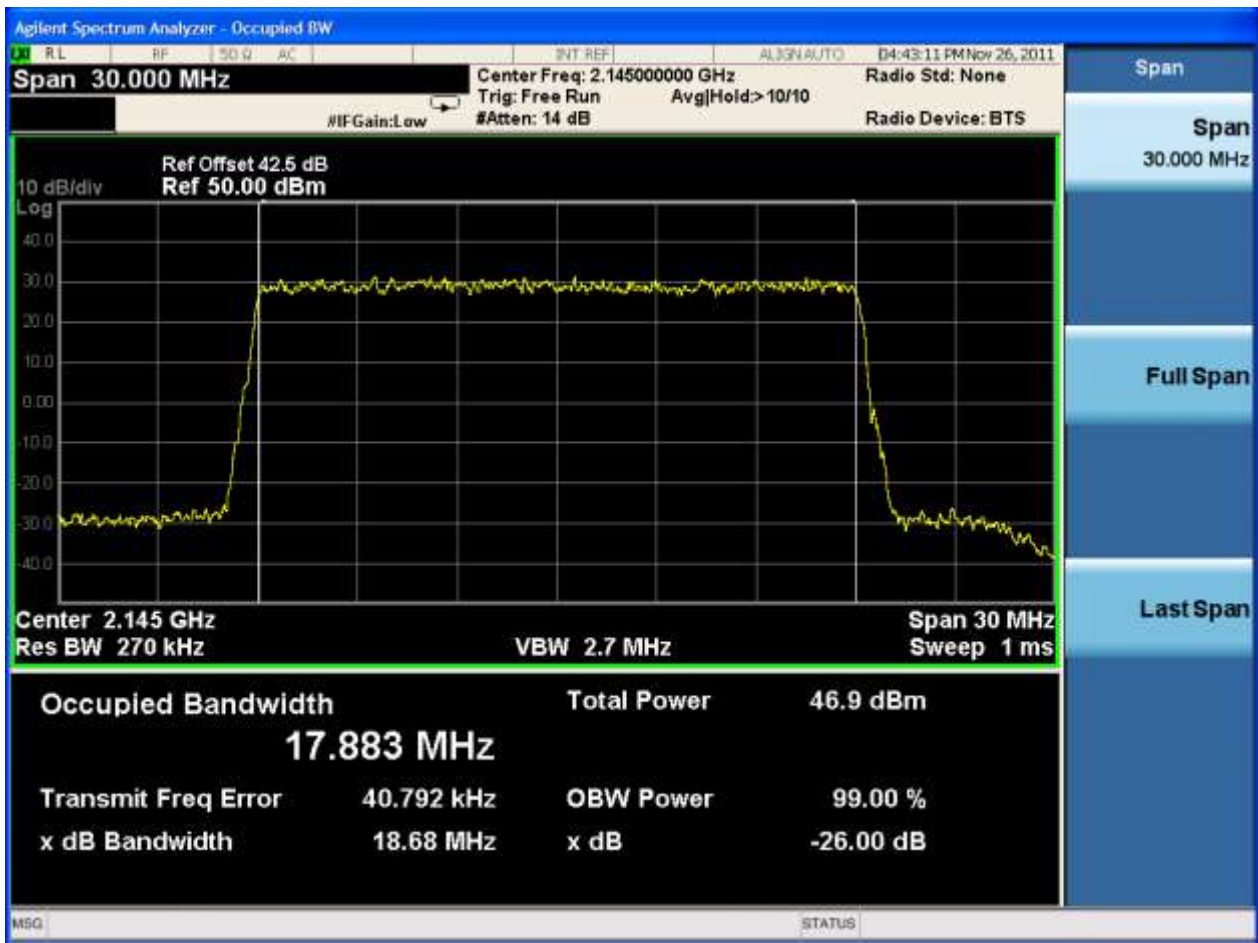
2.8.1 Carrier Conf. = 20M

2.8.1.1 Ch. B





2.8.1.2 Ch. T





Appendix D: Band Edges Compliance



1 Result Table

NOTE: The offset of measurement filter -3dB point may be considered when identifying the maximum emission for e.g. the CDMA, WCDMA, WiMAX, LTE systems.

Test Mode	Carrier Conf.	RF Ch.	Band Edges Emissions [dBm]	Verdict
CDMA2000 1X	1(60W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
	3(3*20)W	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
	4(4*15)W	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
	6(6*10)W	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
CDMA2000 EVDO	1(60W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
	3(3*20)W	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
	4(4*15)W	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
	6(6*10)W	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
LTE-1.4M	1(40W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
LTE-3M	1(40W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
LTE-5M	1(60W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
LTE-10M	1(60W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
LTE-15M	1(60W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
LTE-20M	1(60W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
LTE-5M+20M	2(12W+48W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
LTE-10M+20M	2(20W+40W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
LTE-15M+15M	2(30W+30W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
LTE-15M+20M	2(26W+34W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass



Test Mode	Carrier Conf.	RF Ch.	Band Edges Emissions [dBm]	Verdict
LTE-20M+20M	2(30W+30W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
1C+1L(5M)	2(30W+30W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
1C+1L(10M)	2(30W+30W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
1C+1L(15M)	2(30W+30W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
1C+1L(20M)	2(30W+30W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
1C+1L(20M)	2(20W+40W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
1C+1L(20M)	2(40W+20W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
2C+1L(20M)	3(2*20W+20W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
3C+1L(20M)	4(3*15W+15W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass
4C+1L(20M)	5(4*10W+20W)	B	Below -13dBm	Pass
		T	Below -13dBm	Pass

2 Test Plot

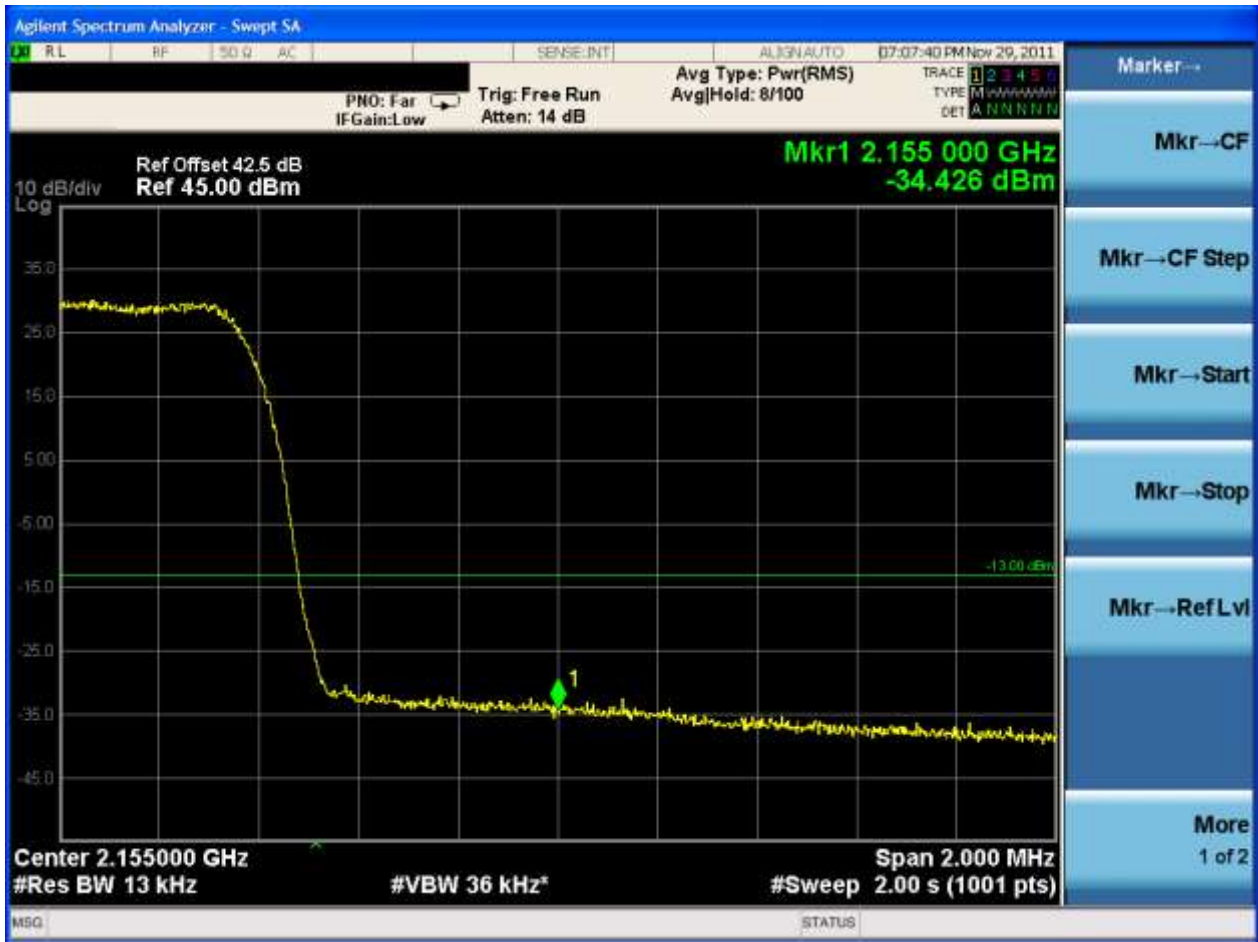
2.1 Test Mode = CDMA2000 1X

2.1.1 Carrier Conf. = 1(60W)

2.1.1.1 Ch. B

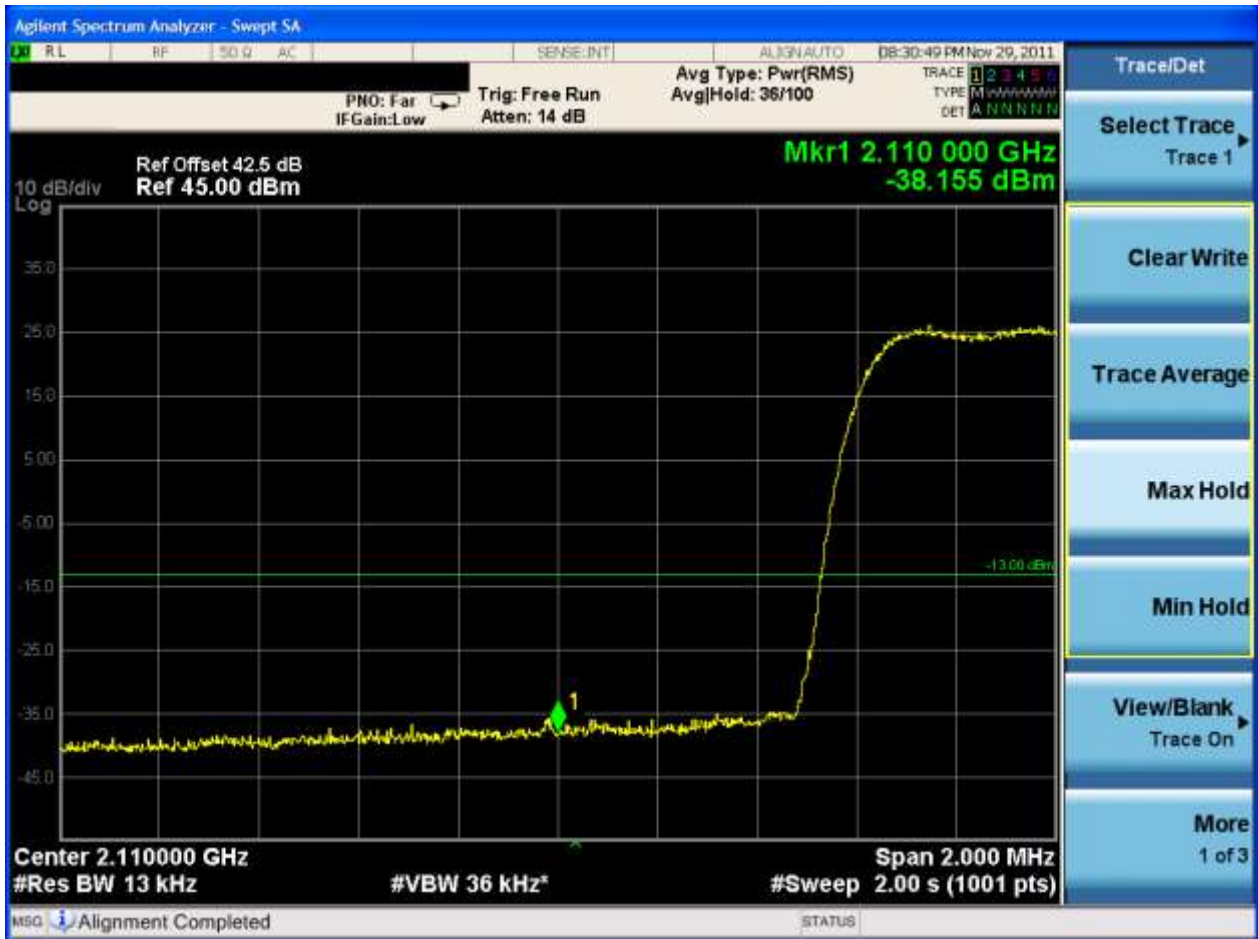


2.1.1.2 Ch. T



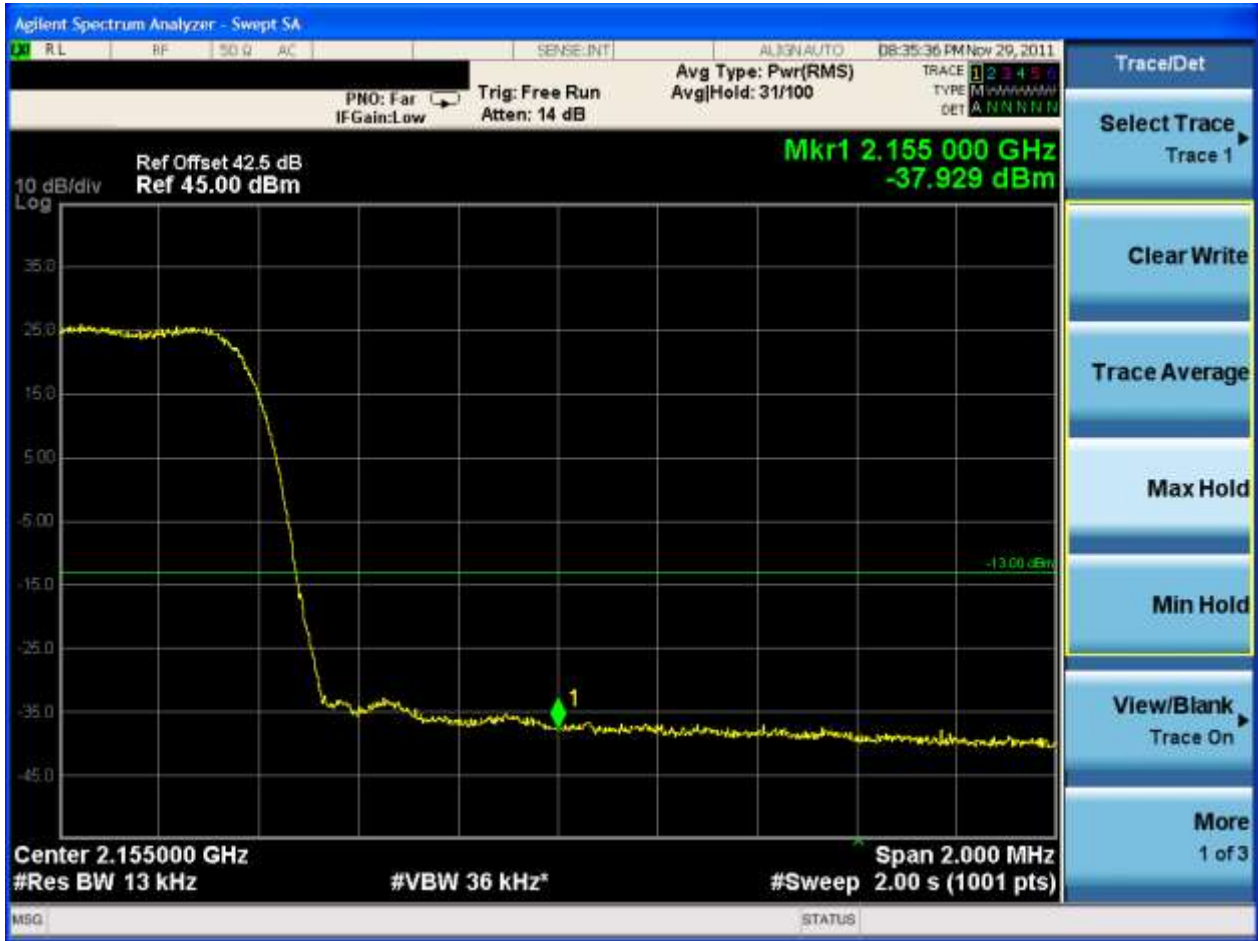
2.1.2 Carrier Conf. = $3(3 \times 20W)$

2.1.2.1 Ch. B





2.1.2.2 Ch. T

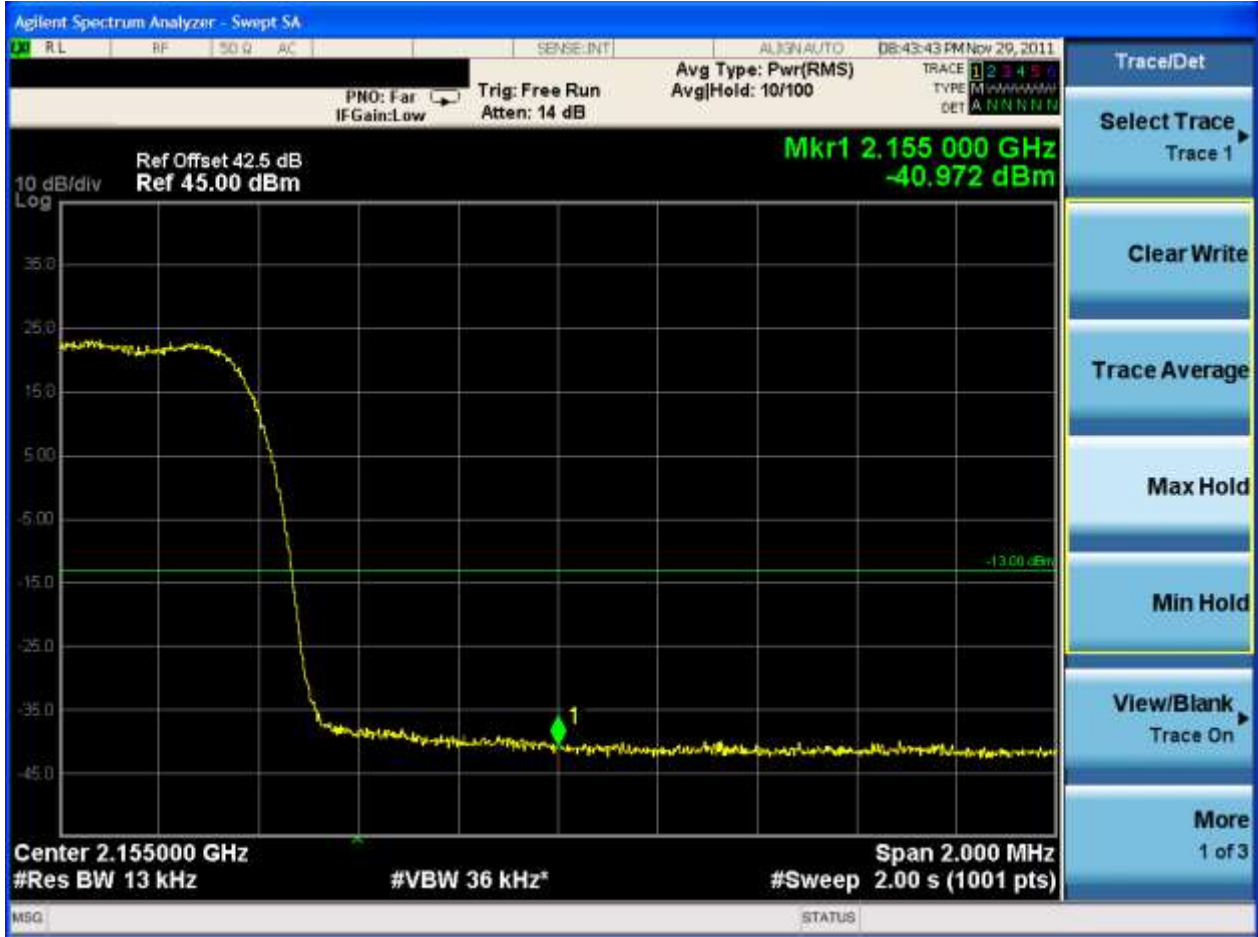


2.1.3 Carrier Conf. = 4(4*15W)

2.1.3.1 Ch. B



2.1.3.2 Ch. T



2.1.4 Carrier Conf. = 6(6*10W)

2.1.4.1 Ch. B





2.1.4.2 Ch. T



2.2 Test Mode = CDMA2000 EVDO

2.2.1 Carrier Conf. = 1(60W)

2.2.1.1 Ch. B

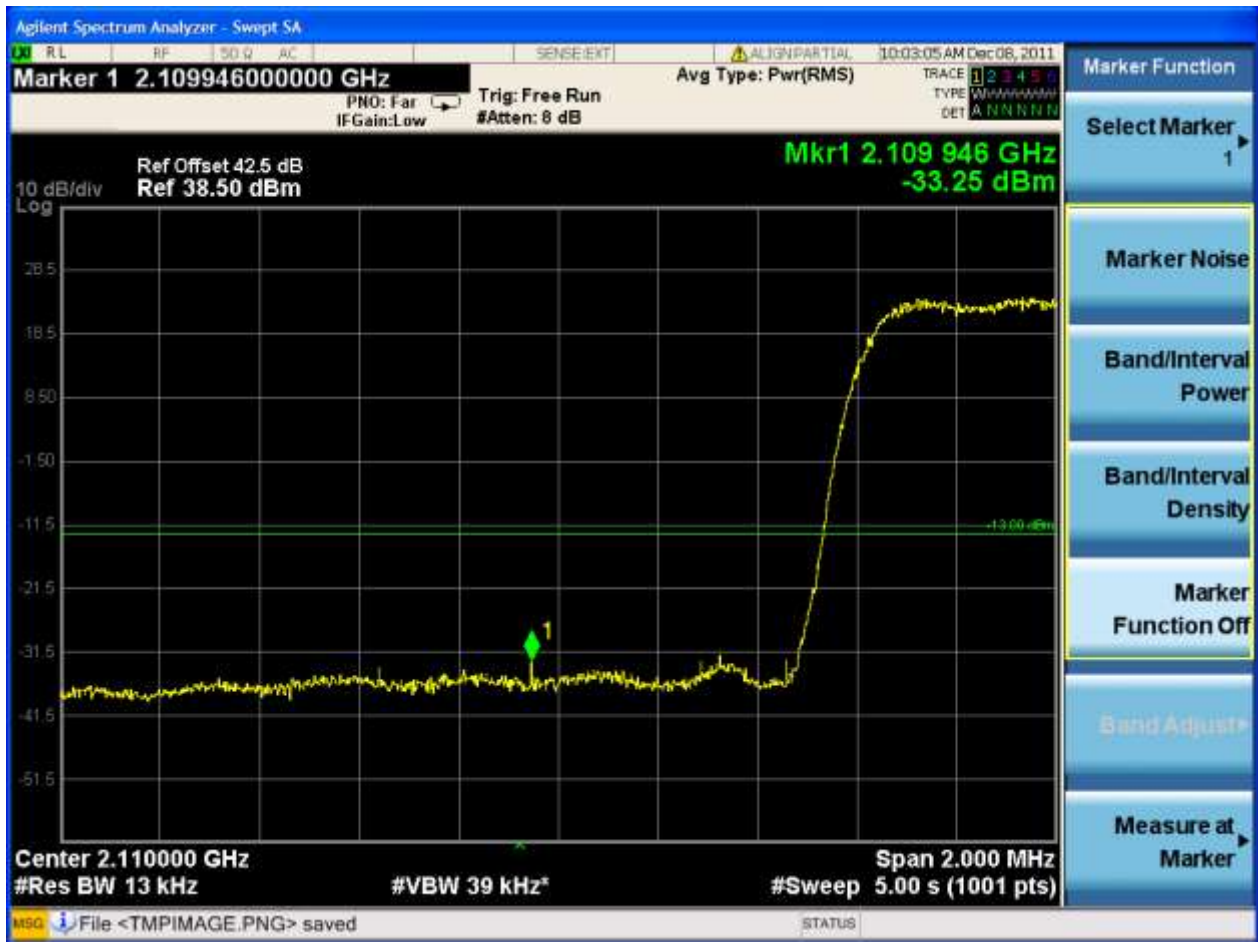


2.2.1.2 Ch. T



2.2.2 Carrier Conf. = $3(3*20W)$

2.2.2.1 Ch. B





2.2.2.2 Ch. T



2.2.3 Carrier Conf. = 4(4*15W)

2.2.3.1 Ch. B

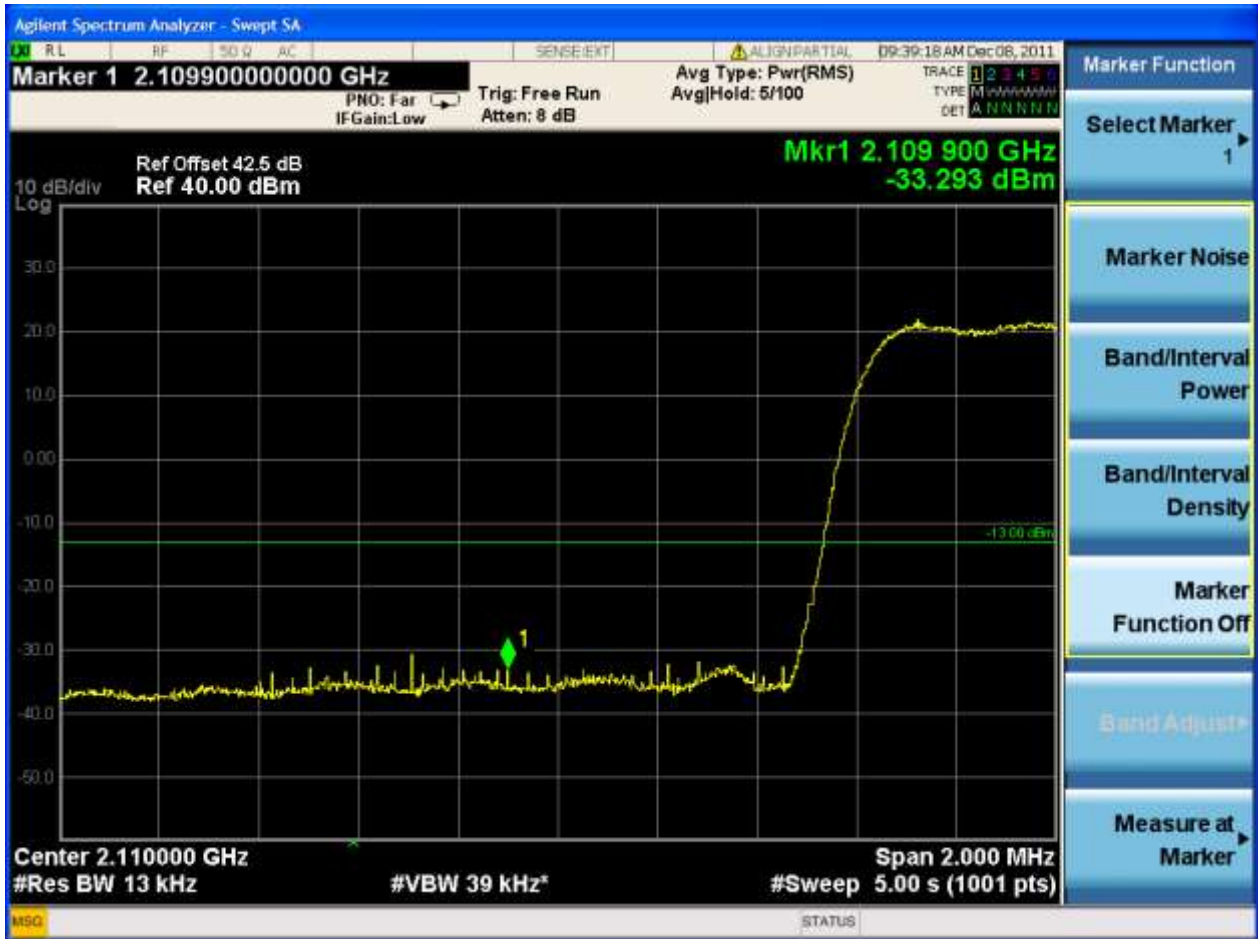


2.2.3.2 Ch. T



2.2.4 Carrier Conf. = 6(6*10W)

2.2.4.1 Ch. B



2.2.4.2 Ch. T



2.3 Test Mode = LTE

2.3.1 Carrier Conf. = 1.4M (40W)

2.3.1.1 Ch. B





2.3.1.2 Ch. T



2.3.2 Carrier Conf. = 3M(40W)

2.3.2.1 Ch. B





2.3.2.2 Ch. T



2.3.3 Carrier Conf. = 5M (60W)

2.3.3.1 Ch. B



2.3.3.2 Ch. T



2.3.4 Carrier Conf. = 10M (60W)

2.3.4.1 Ch. B



2.3.4.2 Ch. T



2.3.5 Carrier Conf. = 15M (60W)

2.3.5.1 Ch. B





2.3.5.2 Ch. T



2.3.6 Carrier Conf. = 20M (60W)

2.3.6.1 Ch. B





2.3.6.2 Ch. T



2.3.7 Carrier Conf. = 5+20M (12W+48W)

2.3.7.1 Ch. B





2.3.7.2 Ch. T





2.3.8 Carrier Conf. = 10+20M (20W+40W)

2.3.8.1 Ch. B





2.3.8.2 Ch. T



2.3.9 Carrier Conf. = 15+15M (30W+30W)

2.3.9.1 Ch. B





2.3.9.2 Ch. T



2.3.10 Carrier Conf. = 15+20M (26W+34W)

2.3.10.1 Ch. B



2.3.10.2 Ch. T



2.3.11 Carrier Conf. = 20+20M (30W+30W)

2.3.11.1 Ch. B





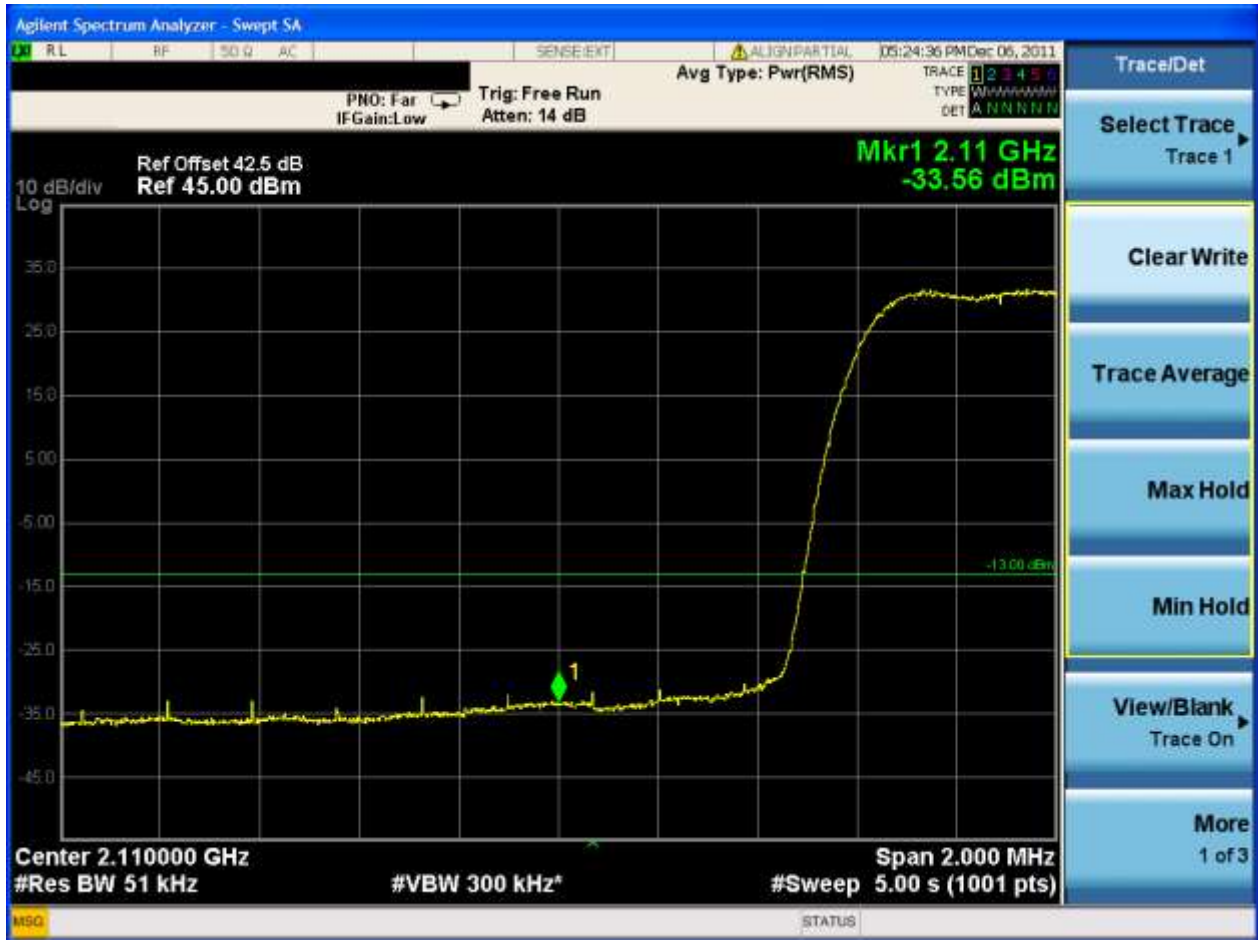
2.3.11.2 Ch. T



2.4 Test Mode = CDMA<E

2.4.1 Carrier Conf. = 1C+1L_5M (30W+30W)

2.4.1.1 Ch. B



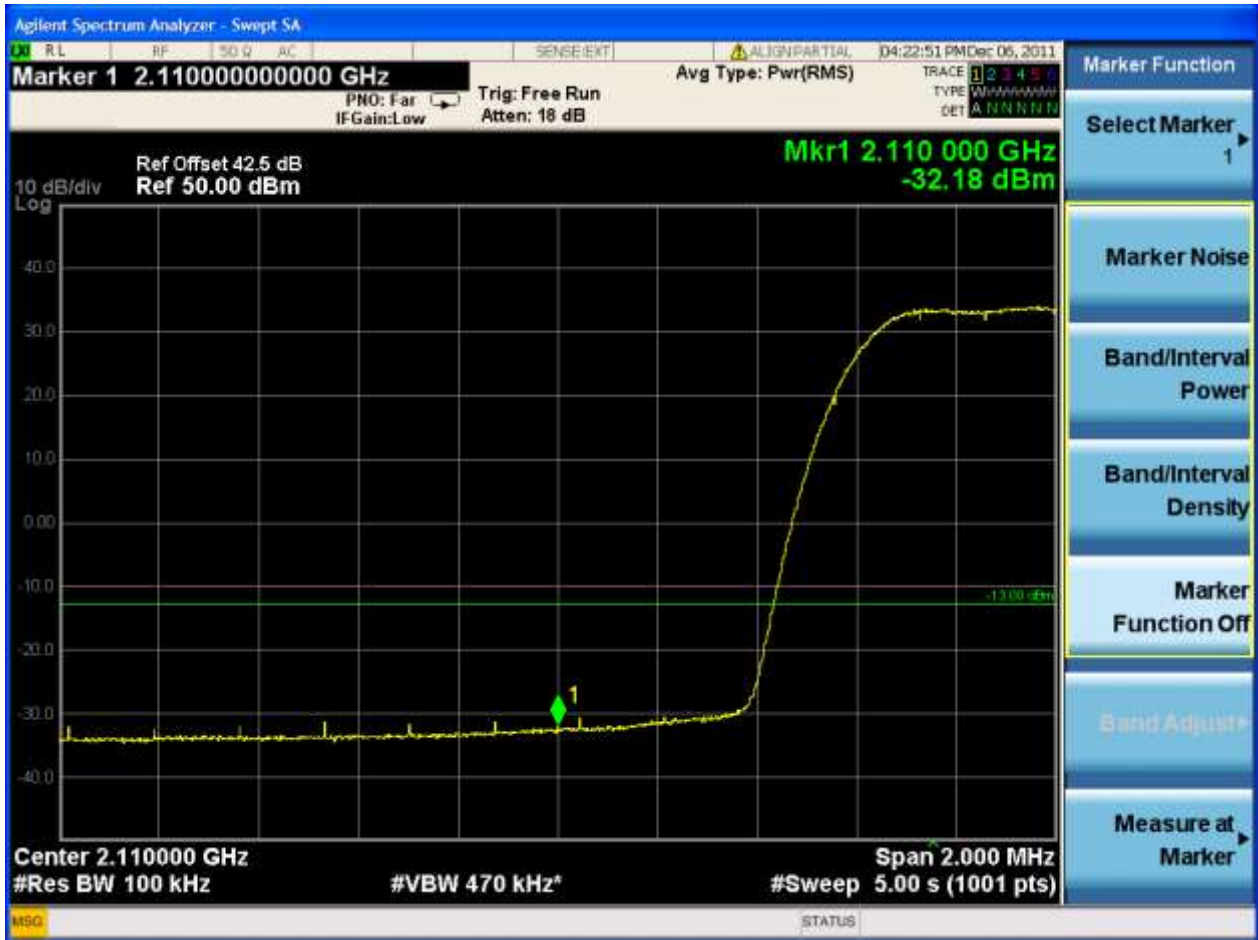


2.4.1.2 Ch. T



2.4.2 Carrier Conf. = 1C+1L_10M (30W+30W)

2.4.2.1 Ch. B





2.4.2.2 Ch. T



2.4.3 Carrier Conf. = 1C+1L_15M (30W+30W)

2.4.3.1 Ch. B





2.4.3.2 Ch. T



2.4.4 Carrier Conf. = 1C+1L_20M (30W+30W)

2.4.4.1 Ch. B



2.4.4.2 Ch. T



2.4.5 Carrier Conf. = 1C+1L_20M (20W+40W)

2.4.5.1 Ch. B



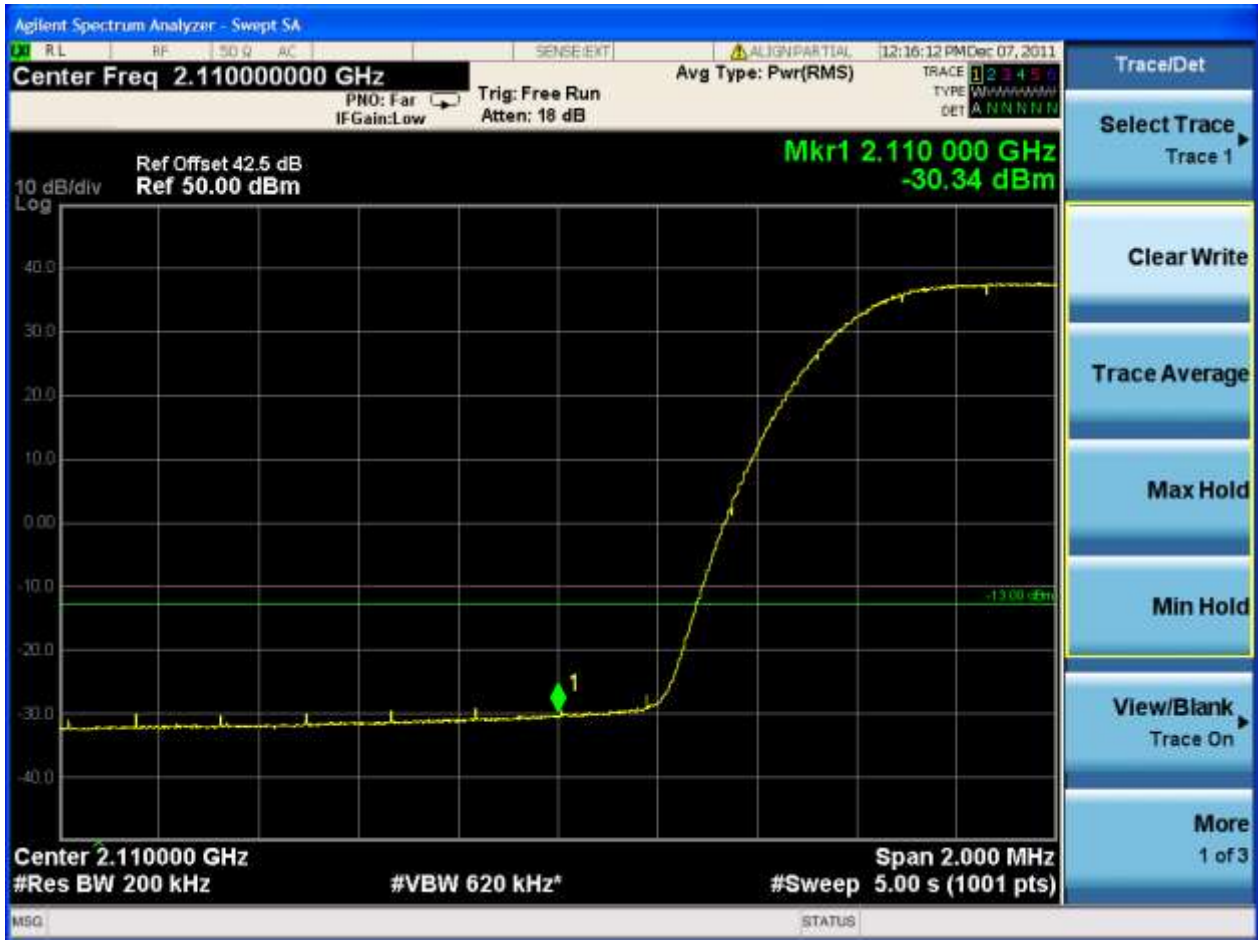


2.4.5.2 Ch. T



2.4.6 Carrier Conf. = 1C+1L_20M (40W+20W)

2.4.6.1 Ch. B





2.4.6.2 Ch. T



2.4.7 Carrier Conf. = 2C+1L_20M (2*20W+40W)

2.4.7.1 Ch. B





2.4.7.2 Ch. T



2.4.8 Carrier Conf. = 3C+1L_20M (3*15W+15W)

2.4.8.1 Ch. B



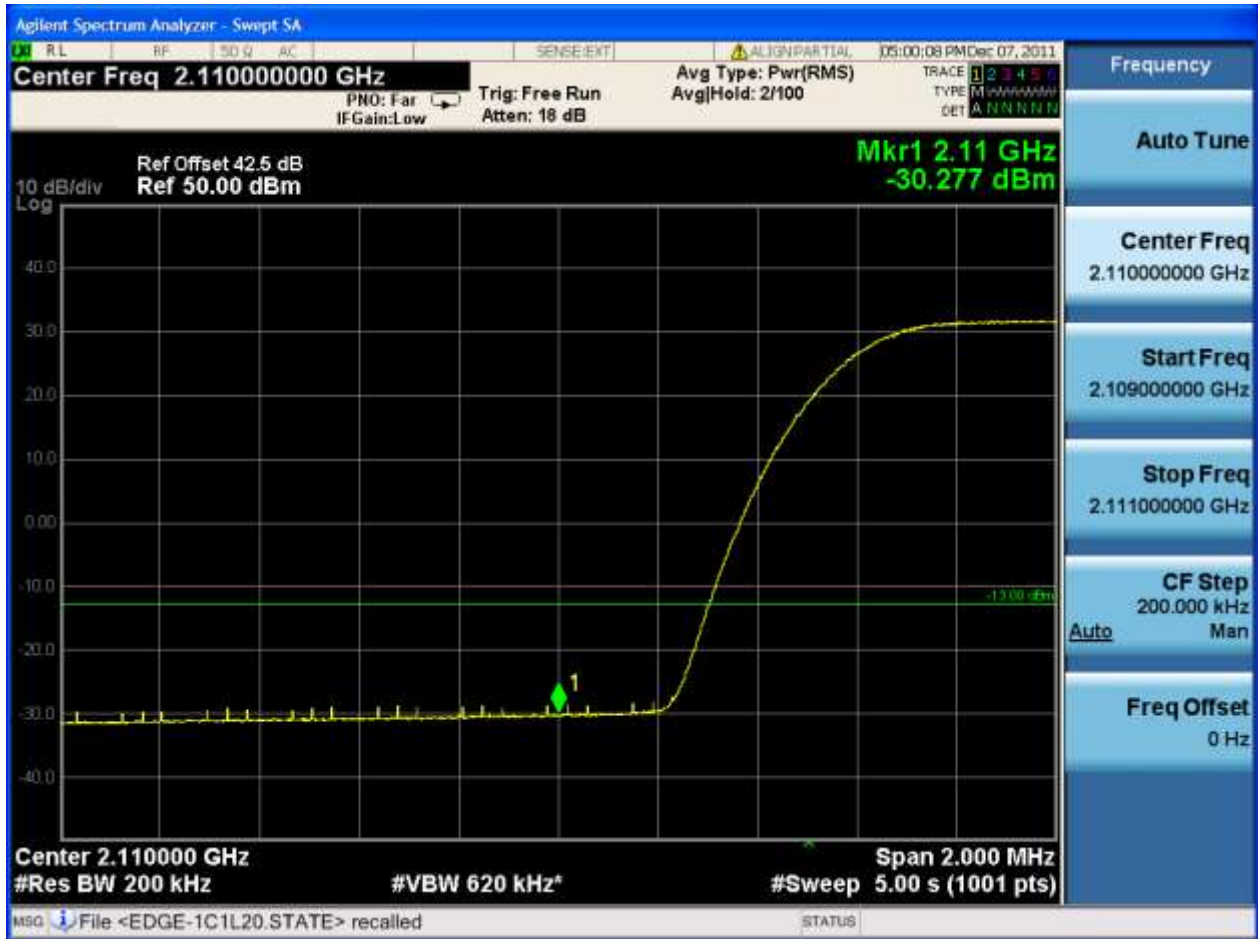


2.4.8.2 Ch. T



2.4.9 Carrier Conf. = 4C+1L_20M (4*10W+20W)

2.4.9.1 Ch. B





2.4.9.2 Ch. T

