



FCC

RF Test Report

Product Name: LTE/UMTS Smart Phone

**Model Number: HUAWEI Y301-A2, Y301-A2, HUAWEI Y301A2,
Y301A2**

Report No: SYBH(Z-RF)014052013-2001

FCC ID: QISY301-A2

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2. The laboratory has Passed the accreditation by The American Association for Laboratory Accreditation (A2LA). The accreditation number is 2174.01.
3. The laboratory has been listed by the US Federal Communications Commission to perform electromagnetic emission measurements. The site recognition number is 97456.
4. The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 6369A-2.
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Applicant: Huawei Technologies Co., Ltd.
Address: Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
 Bantian, Longgang District, Shenzhen, 518129, P.R.C

Date of Receipt Sample: 2013-05-22
Start Date of Test: 2013-05-24
End Date of Test: 2013-06-03

Test Result: Pass

Approved by Senior Engineer:	2013-06-08	Dai Linjun	
	Date	Name	Signature

Prepared by:	2013-06-08	Zhang Guocai	
	Date	Name	Signature



Modification Record

No.	Last Report No.	Modification Description
1		First report.



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1 General Information

1.1 Applied Standard

Applied Rules: 47 CFR FCC Part 02:2012
47 CFR FCC Part 22: 2012
47 CFR FCC Part 24: 2012
47 CFR FCC Part 27: 2012

Test Method: FCC KDB 971168 D01 Power Meas License Digital Systems v01
FCC KDB 662911 D01 Multiple Transmitter Output v02r01

1.2 Test Location

Test Location 1: Reliability Laboratory of Huawei Technologies Co., Ltd.
Address: Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
Bantian, Longgang District, Shenzhen, 518129, P.R.C

1.3 Test Environment Condition

Ambient Temperature: 19.5 to 25 °C
Ambient Relative Humidity: 40 to 55 %
Atmospheric Pressure: Not applicable



2 Test Summary

2.1 Cellular Band (824-849 MHz paired with 869-894 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §22.913	ERP \leq 7 W.	Appendix A	Pass
Modulation Characteristics	§2.1047	Digital modulation	Appendix C	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Appendix D	Pass
Band Edges Compliance	§2.1051, §22.917	\leq -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Appendix E	Pass
Spurious Emission at Antenna Terminals	§2.1051, §22.917	\leq -13 dBm/100 kHz, from 9 kHz to 10 th harmonics but outside authorized operating frequency ranges.	Appendix F	Pass
Field Strength of Spurious Radiation	§2.1053, §22.917	\leq -13 dBm/100 kHz.	Appendix G	Pass
Frequency Stability	§2.1055, §22.355	\leq \pm 2.5ppm.	Appendix H	Pass



2.2 PCS Band (1850-1915 MHz paired with 1930-1995 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §24.232	EIRP \leq 2 W	Appendix A	Pass
Peak-Average Ratio	§2.1046, §24.232	Limit \leq 13 dB	Appendix B	Pass
Modulation Characteristics	§2.1047	Digital modulation	Appendix C	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Appendix D	Pass
Band Edges Compliance	§2.1051, §24.238	\leq -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Appendix E	Pass
Spurious Emission at Antenna Terminals	§2.1051, §24.238	\leq -13 dBm/1 MHz, from 9 kHz to 10 th harmonics but outside authorized operating frequency ranges.	Appendix F	Pass
Field Strength of Spurious Radiation	§2.1053, §24.238	\leq -13 dBm/1 MHz.	Appendix G	Pass
Frequency Stability	§2.1055, §24.235	FCC: within authorized frequency block.	Appendix H	Pass



2.3 AWS Band (1710-1755 MHz paired with 2110-2155 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(d)	EIRP ≤ 1 W;	Appendix A	Pass
Peak-Average Ratio	§2.1046, §27.50(d)	Limit ≤ 13 dB	Appendix B	Pass
Modulation Characteristics	§2.1047	Digital modulation	Appendix C	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Appendix D	Pass
Band Edges Compliance	§2.1051, §27.53(h)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Appendix E	Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.53(h)	≤ -13 dBm/1 MHz, from 9 kHz to 10 th harmonics but outside authorized operating frequency ranges.	Appendix F	Pass
Frequency Stability	§2.1055, §27.54	Within authorized bands of operation/frequency block.	Appendix G	Pass
Radiated spurious emission	§2.1053, §27.53(h)	≤ -13 dBm/1 MHz.	Appendix H	Pass



3 Description of the Equipment under Test (EUT)

3.1 General Description

HUAWEI Y301-A2, Y301-A2, HUAWEI Y301A2, Y301A2 is subscriber equipment in the LTE/UMTS system. The HSPA/UMTS frequency band is Band II and Band IV and Band V. The LTE frequency band is Band 4. The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900. The Mobile Phone implements such functions as RF signal receiving/transmitting, LTE/HSPA/UMTS and GSM/GPRS/EDGE protocol processing, voice, video MMS service, GPS, AGPS and WIFI etc. Externally it provides micro SD card interface, earphone port(to provide voice service) and Micro-SIM Card interface. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

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		
Description	Hardware Version	Software Version
Main Board	HL1Y301A2M	Y301-A2 V100R001C85B115

3.3 Technical Specification

Characteristics	Description	
Radio System Type	<input checked="" type="checkbox"/> GSM <input checked="" type="checkbox"/> UMTS <input checked="" type="checkbox"/> LTE	
Supported Frequency Range	GSM850/ WCDMA850	Transmission (TX): 824 to 849 MHz
		Receiving (RX): 869 to 894 MHz
	GSM1900/ WCDMA1900	Transmission (TX): 1850 to 1910 MHz
		Receiving (RX): 1930 to 1990 MHz
	WCDMA1700	Transmission (TX): 1710 to 1755 MHz
		Receiving (RX): 2110 to 2155 MHz
LTE BAND4	Transmission (TX): 1710 to 1755 MHz	
	Receiving (RX): 2110 to 2155 MHz	
TX and RX Antenna Ports	TX & RX port:	1
	TX-only port:	0
	RX-only port:	1
Target TX Output Power	GSM850: 32.5dBm GSM1900 30dBm UMTS850 24dBm UMTS1900: 24dBm UMTS1700 23.5dBm LTE system: 23dBm	
Supported Channel Bandwidth	GSM system:	<input checked="" type="checkbox"/> 200 kHz
	UMTS system:	<input checked="" type="checkbox"/> 5 MHz
	LTE band 4	<input checked="" type="checkbox"/> 1.4 MHz, <input checked="" type="checkbox"/> 3 MHz, <input checked="" type="checkbox"/> 5 MHz, <input checked="" type="checkbox"/> 10 MHz, <input checked="" type="checkbox"/> 15 MHz, <input checked="" type="checkbox"/> 20 MHz
Designation of Emissions (Note: the necessary bandwidth of which is the worst value from the measured occupied bandwidths for each type of channel bandwidth configuration.)	GSM850:	247KGXW, 248KG7W
	GSM1900:	247KGXW, 244KG7W
	UMTS850:	4M16F9W
	UMTS1900:	4M16F9W
	UMTS1700:	4M16F9W
	LTE BAND4:	1M10G7D (1.4 MHz QPSK modulation), 1M10W7D (1.4 MHz 16QAM modulation) 2M70G7D (3 MHz QPSK modulation), 2M70W7D (3 MHz 16QAM modulation) 4M51G7D (5 MHz QPSK modulation), 4M50W7D (5 MHz 16QAM modulation) 8M98G7D (10 MHz QPSK modulation), 8M96W7D (10 MHz 16QAM modulation) 13M5G7D (15 MHz QPSK modulation), 13M5W7D (15 MHz 16QAM modulation) 18M0G7D (20 MHz QPSK modulation), 18M0W7D (20 MHz 16QAM modulation)



4 General Test Conditions / Configurations

4.1 Test Modes

NOTE: The test mode(s) are selected according to relevant radio technology specifications.

Test Mode	Test Modes Description
GSM/TM1	GSM system, GSM/GPRS, GMSK modulation
GSM/TM2	GSM system, EDGE, 8PSK modulation
UMTS/TM1	WCDMA system, QPSK modulation
UMTS/TM2	HSDPA system, QPSK modulation
UMTS/TM3	HSUPA system, QPSK modulation
LTE/TM1	LTE system, QPSK modulation
LTE/TM2	LTE system, 16QAM modulation

NOTE: HSPA+ implementation of this device, 16QAM is not used for uplink. The uplink Category and release number is same as HSUPA, RF test is not required.

DC-HSDPA implementation of this device, the uplink parameters are the same as HSDPA. No additional channels and modulations (16QAM and 64QAM) are supported in uplink. The difference is only down link parameters. HSDPA setting were used on uplink.

4.2 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Temperature	TN	Ambient
Voltage	VL	3.6V
	VN	3.7V
	VH	4.2V

NOTE: VL= lower extreme test voltage
VN= nominal voltage
VH= upper extreme test voltage
TN= normal temperature

4.3 Test Frequency

Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
GSM850	TX	Channel 128	Channel 190	Channel 251
		824.2MHz	836.6MHz	848.8MHz
	RX	Channel 128	Channel 190	Channel 251
		869.2MHz	881.6MHz	893.8MHz
WCDMA850	TX	Channel 4132	Channel 4182	Channel 4233
		826.4MHz	836.4MHz	846.6MHz
	RX	Channel 4357	Channel 4407	Channel 4458
		871.4MHz	881.4MHz	891.6MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
GSM1900	TX	Channel 512	Channel 661	Channel 810
		1850.2MHz	1880.0MHz	1909.8MHz
	RX	Channel 512	Channel 661	Channel 810
		1930.2 MHz	1960.0 MHz	1989.8 MHz
WCDMA1900	TX	Channel 9262	Channel9400	Channel9538
		1852.4MHz	1880.0MHz	1907.6MHz
	RX	Channel 9662	Channel 9800	Channel 9938
		1932.4 MHz	1960.0 MHz	1987.6 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
WCDMA1700	TX	Channel1312	Channel1413	Channel1513
		1712.4MHz	1732.6MHz	1752.6MHz



Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
	RX	Channel 1537	Channel 1638	Channel 1738
		2112.4 MHz	2132.6 MHz	2152.6 MHz

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 4	TX (1.4M)	Channel 19957	Channel 20175	Channel 20393
		1710.7 MHz	1732.5 MHz	1754.3 MHz
	TX (3M)	Channel 19965	Channel 20175	Channel 20385
		1711.5 MHz	1732.5 MHz	1753.5 MHz
	TX (5M)	Channel 19975	Channel 20175	Channel 20375
		1712.5 MHz	1732.5 MHz	1752.5 MHz
	TX (10M)	Channel 20000	Channel 20175	Channel 20350
		1715 MHz	1732.5 MHz	1750 MHz
	TX (15M)	Channel 20025	Channel 20175	Channel 20325
		1717.5 MHz	1732.5 MHz	1747.5 MHz
	TX (20M)	Channel 20050	Channel 20175	Channel 20300
		1720 MHz	1732.5 MHz	1745 MHz
	RX (1.4M)	Channel 1957	Channel 2175	Channel 2393
		2110.7 MHz	2132.5 MHz	2154.3 MHz
	RX (3M)	Channel 1965	Channel 2175	Channel 2385
		2111.5 MHz	2132.5 MHz	2153.5 MHz
	RX (5M)	Channel 1975	Channel 2175	Channel 2375
		2112.5 MHz	2132.5 MHz	2152.5 MHz
	RX (10M)	Channel 2000	Channel 2175	Channel 2350



Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
		2115 MHz	2132.5 MHz	2150 MHz
	RX (15M)	Channel 2025	Channel 2175	Channel 2325
		2117.5 MHz	2132.5 MHz	2147.5 MHz
	RX (20M)	Channel 2050	Channel 2175	Channel 2300
		2120 MHz	2132.5 MHz	2145 MHz

4.4 DESCRIPTION OF TESTS

4.4.1 Radiated Power and Radiated Spurious Emissions

Radiated spurious emissions are investigated indoors in a semi-anechoic chamber to determine the frequencies producing the worst case emissions. Final measurements for radiated power and radiated spurious emissions are performed on the 3 meter OATS per the guidelines of ANSI/TIA-603-C-2004. The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Emissions are also investigated with the receive antenna horizontally and vertically polarized.

A portable or small unlicensed wireless device shall be placed on a non-metallic test fixture or other non-metallic support during testing. The supporting fixture shall permit orientation of the EUT in each of three orthogonal (x, y, z) axis positions such that emissions from the EUT are maximized. Measure the EUT maximum RF power and record the result.

A half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

$$P_d \text{ [dBm]} = P_g \text{ [dBm]} - \text{cable loss [dB]} + \text{antenna gain [dBd/dBi]}$$

Where, P_d is the dipole equivalent power, P_g is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to $P_g \text{ [dBm]} - \text{cable loss [dB]}$.

The calculated P_d levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of $43 + 10\log_{10}(\text{Power}_{\text{[Watts]}})$.

Note: Reference test setup 3

4.4.2 Occupied Bandwidth

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 radiated by a given emission shall be measured. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1 percent of the selected span as is possible without being below 1 percent. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual. The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 percent of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.

Note: Reference test setup 1.

4.4.3 Spurious and Harmonic Emissions at Antenna Terminal

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

Note: Reference test setup 1.

4.4.4 Peak-Average Ratio

A peak to average ratio measurement is performed at the conducted port of the EUT. For WCDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level. For GSM signals, an average and a peak trace are used on a spectrum analyzer to determine the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth. The traces are generated with the spectrum analyzer set to zero span mode.

Note: Reference test setup 1.

4.4.5 Frequency Stability / Temperature Variation

Frequency stability testing is performed in accordance with the guidelines of 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 in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Specification – The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency.

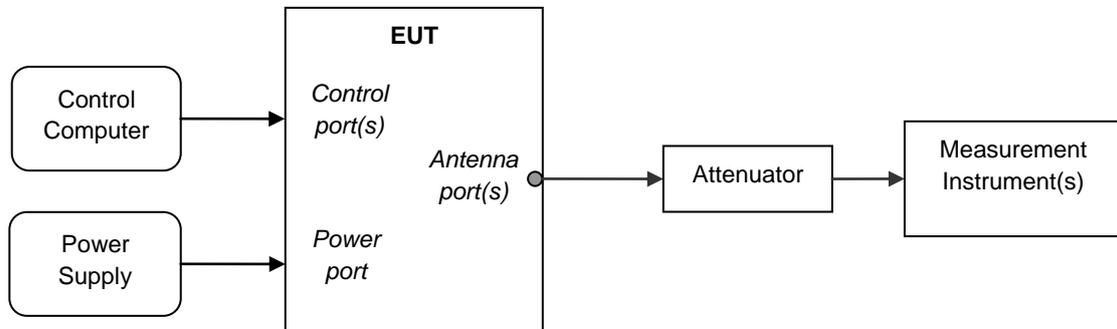
Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes 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.

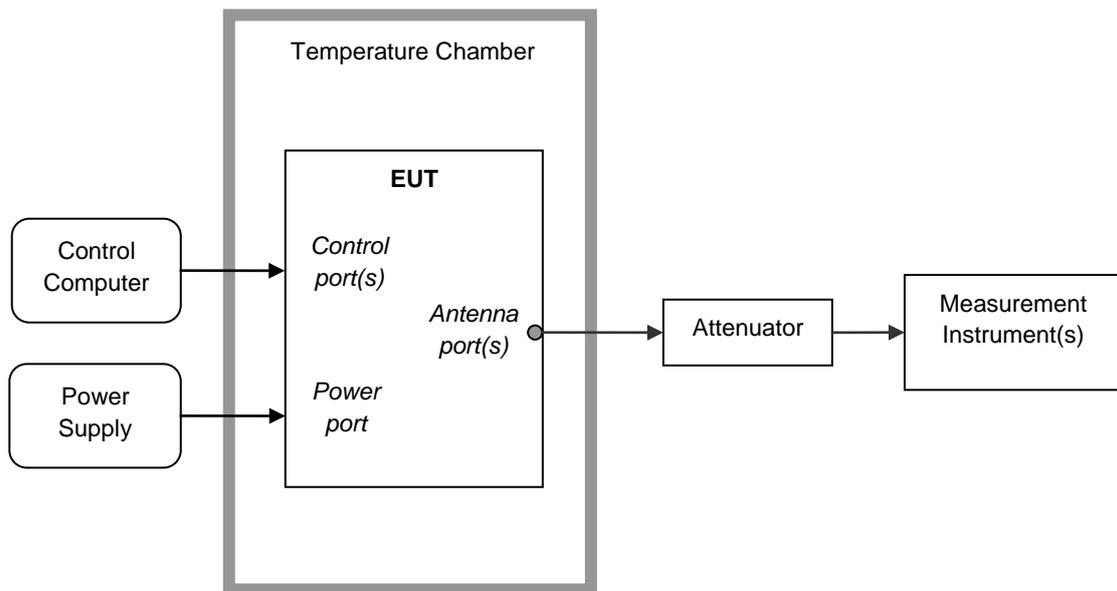
Note: Reference test setup 2.

4.5 Test Setups

4.5.1 Test Setup 1



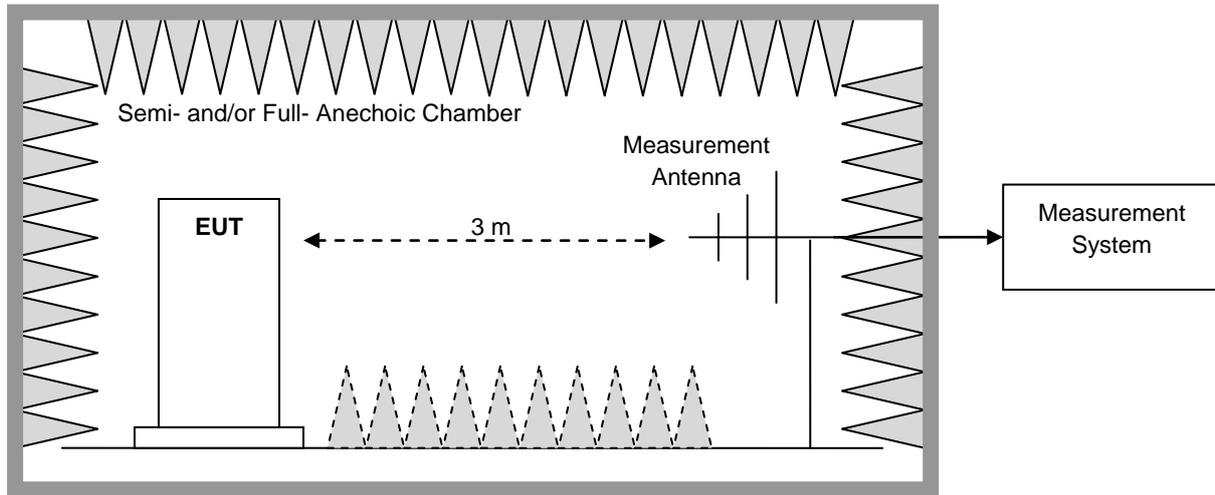
4.5.2 Test Setup 2



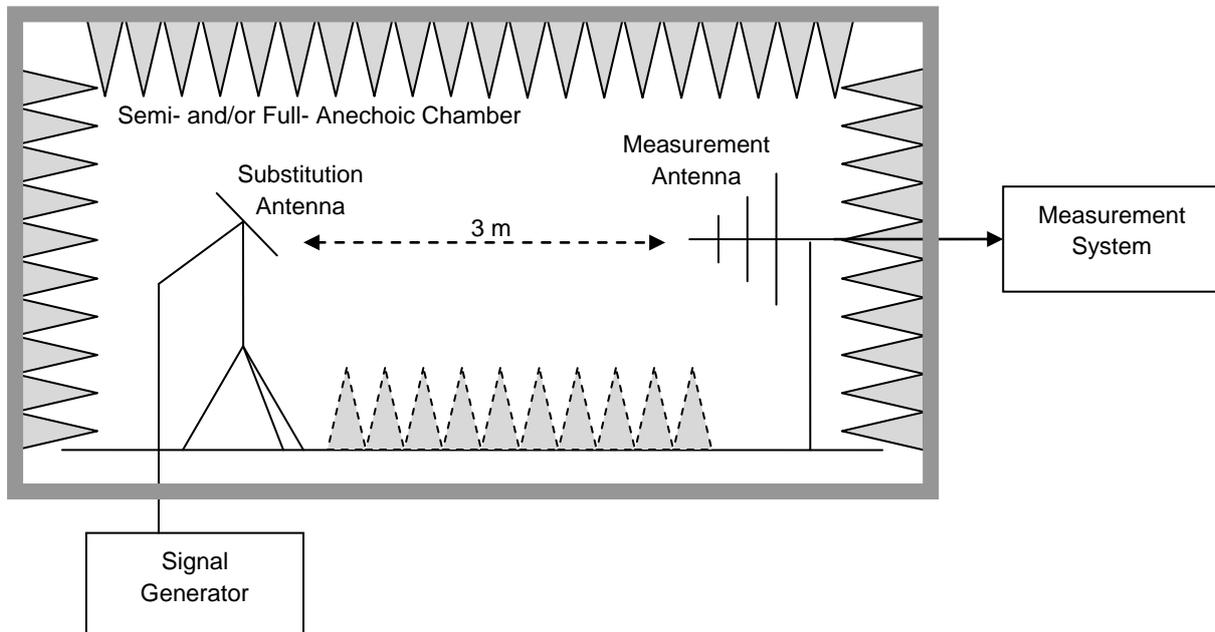
4.5.3 Test Setup 3

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

4.5.3.1 Step 1: Pre-test



4.5.3.2 Step 2: Substitution method to verify the maximum ERP



4.6 Test Conditions

Test Case		Test Conditions	
Transmit Output Power Data	Average Power, Total	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2
	Average Power, Spectral Density (if required)	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2
	Peak-to-Average Ratio (if required)	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2
Modulation Characteristics		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		RF Channels (TX)	M (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2
Bandwidth	Occupied Bandwidth	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2
	Emission Bandwidth (if required)	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2
Band Edges Compliance		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2
Spurious Emission at Antenna Terminals		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)



Test Case	Test Conditions	
	Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2
Field Strength of Spurious Radiation	Test Env.	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 3
	Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1/TM2/TM3,LTE/TM1,LTE/TM2 NOTE: If applicable, the EUT conf. that has maximum power density (based on the equivalent power level) is selected.
	RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
Frequency Stability	Test Env.	(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
	RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
	Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2



5 Main Test Instruments

Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal. Due
Power supply	KEITHLEY	2303	1288003	2012.11.19	2014.11.18
Universal Radio Communication Tester	R&S	CMU200	123299	2012-09-20	2013.09.19
Universal Radio Communication Tester	Agilent	E5515C	MY50260239	2012.11.09	2013.11.08
Spectrum Analyzer	Agilent	E4440A	MY49420179	2012.08.20	2013.08.19
Signal Analyzer	R&S	FSQ31	200021	2012.11.09	2013.11.08
Temperature Chamber	WEISS	WKL64	56246002940010	2013.1.29	2014.01.28
Signal generator	Agilent	E8257D	MY49281095	2012.09.14	2013.09.13
Spectrum analyzer	R&S	FSU3	200474	2013.01.29	2014.01.28
Spectrum analyzer	R&S	FSU43	100144	2013.01.29	2014.01.28
Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100304	2013.02.02	2014.02.01
Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100391	2011.10.12	2013.10.11
Trilog Broadband Antenna (30M~3GHz)	SCHWARZBEC K	VULB 9163	9163-521	2011.12.09	2013.12.08
Pyramidal Horn Antenna(26GHz-40GHz)	ETS-Lindgren	3160-10	00123940	2011.02.28	2014.02.27
Pyramidal Horn Antenna(18GHz-26.5GHz)	ETS-Lindgren	3160-09	00125912	2011.02.28	2014.02.27
Universal Radio Communication Tester	R & S	CMW500	126855	2012.08.06	2013.08.05



6 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
Transmit Output Power Data	Power [dBm]	U = 0.39 dB
Bandwidth	Magnitude [%]	U = 0.2%
Band Edge Compliance	Disturbance Power [dBm]	U = 2.0 dB
Spurious Emissions, Conducted	Disturbance Power [dBm]	U = 2.0 dB
Field Strength of Spurious Radiation	ERP [dBm]	For 3 m Chamber: U = 4.6 dB (30 MHz to 1GHz) U = 3.0 dB (above 1 GHz) For 10 m Chamber: U = 4.6 dB (30 MHz to 1GHz) U = 3.0 dB (above 1 GHz)
Frequency Stability	Frequency Accuracy [ppm]	U = 0.21 ppm

END



Appendix for Test report



1 Appendix_A: Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	ERP [dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	32.82	31.18	38.5	PASS
		MCH	32.66	31.06	38.5	PASS
		HCH	32.98	31.22	38.5	PASS
	GSM/TM2	LCH	26.73	25.03	38.5	PASS
		MCH	26.73	25.07	38.5	PASS
		HCH	26.77	25.14	38.5	PASS
WCDMA850	UMTS/TM1	LCH	24.44	22.61	38.5	PASS
		MCH	24.27	22.68	38.5	PASS
		HCH	24.27	22.60	38.5	PASS
Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.95	30.39	33	PASS
		MCH	29.86	30.35	33	PASS
		HCH	30.24	30.86	33	PASS



Test Band	Test Mode	Test Channel	Conducted Power [dBm]	ERP [dBm]	Limit [dBm]	Verdict
	GSM/TM2	LCH	24.72	25.34	33	PASS
		MCH	24.72	25.40	33	PASS
		HCH	24.66	25.32	33	PASS
WCDMA1900	UMTS/TM1	LCH	24.25	24.91	33	PASS
		MCH	24.06	24.37	33	PASS
		HCH	24.19	24.84	33	PASS
Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
WCDMA1700	UMTS/TM1	LCH	24.00	25.51	30	PASS
		MCH	24.06	25.78	30	PASS
		HCH	24.25	25.64	30	PASS

Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
BAND4	LTE/TM1	1.4	LCH	RB1#0	22.6	24.11	30	PASS
				RB1#3	22.67	24.35	30	PASS
				RB1#5	22.67	24.37	30	PASS
				RB3#0	22.63	24.27	30	PASS



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
				RB3#2	22.65	24.18	30	PASS
				RB3#3	22.63	24.03	30	PASS
				RB6#0	21.62	23.34	30	PASS
			MCH	RB1#0	22.47	23.97	30	PASS
				RB1#3	22.55	24.00	30	PASS
				RB1#5	22.5	23.94	30	PASS
				RB3#0	22.49	24.05	30	PASS
				RB3#2	22.51	23.96	30	PASS
				RB3#3	22.58	24.33	30	PASS
				RB6#0	21.46	23.01	30	PASS
			HCH	RB1#0	22.91	24.37	30	PASS
				RB1#3	22.92	24.60	30	PASS
				RB1#5	22.91	24.31	30	PASS
				RB3#0	22.89	24.32	30	PASS
				RB3#2	22.96	24.40	30	PASS
				RB3#3	22.93	24.73	30	PASS



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict	
				RB6#0	21.9	23.30	30	PASS	
		3	LCH	RB1#0	22.78	24.49	30	PASS	
				RB1#7	22.56	24.17	30	PASS	
				RB1#14	22.66	24.22	30	PASS	
				RB8#0	21.56	23.08	30	PASS	
				RB8#4	21.51	23.01	30	PASS	
				RB8#7	21.57	23.24	30	PASS	
				RB15#0	21.56	23.12	30	PASS	
			MCH	RB1#0	22.53	24.07	30	PASS	
				RB1#7	22.52	24.05	30	PASS	
				RB1#14	22.39	23.89	30	PASS	
				RB8#0	21.48	23.28	30	PASS	
				RB8#4	21.46	23.13	30	PASS	
				RB8#7	21.42	23.03	30	PASS	
					RB15#0	21.39	23.13	30	PASS
				HCH	RB1#0	22.83	24.30	30	PASS



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict			
				RB1#7	22.84	24.52	30	PASS			
				RB1#14	22.89	24.49	30	PASS			
				RB8#0	21.73	23.51	30	PASS			
				RB8#4	21.76	23.44	30	PASS			
				RB8#7	21.86	23.66	30	PASS			
				RB15#0	21.76	23.36	30	PASS			
		5	LCH	RB1#0	22.79	24.21	30	PASS			
				RB1#13	22.78	24.42	30	PASS			
				RB1#24	22.7	24.38	30	PASS			
				RB12#0	21.57	23.02	30	PASS			
				RB12#6	21.62	23.16	30	PASS			
				RB12#13	21.61	23.36	30	PASS			
			MCH	RB25#0	21.64	23.36	30	PASS			
				RB1#0	22.57	24.12	30	PASS			
				RB1#13	22.64	24.06	30	PASS			
							RB1#24	22.4	23.98	30	PASS



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict	
				RB12#0	21.45	22.99	30	PASS	
				RB12#6	21.44	22.94	30	PASS	
				RB12#13	21.33	22.94	30	PASS	
				RB25#0	21.3	22.87	30	PASS	
			HCH	RB1#0	22.94	24.47	30	PASS	
				RB1#13	22.89	24.41	30	PASS	
				RB1#24	22.87	24.35	30	PASS	
				RB12#0	21.73	23.25	30	PASS	
				RB12#6	21.76	23.16	30	PASS	
				RB12#13	21.79	23.24	30	PASS	
				RB25#0	21.82	23.26	30	PASS	
			10	LCH	RB1#0	22.73	24.49	30	PASS
					RB1#25	22.68	24.40	30	PASS
					RB1#49	22.69	24.29	30	PASS
		RB25#0			21.52	22.95	30	PASS	
		RB25#13			21.59	23.03	30	PASS	



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
				RB25#25	21.62	23.36	30	PASS
				RB50#0	21.45	22.90	30	PASS
			MCH	RB1#0	22.45	24.21	30	PASS
				RB1#25	22.59	24.28	30	PASS
				RB1#49	22.43	23.97	30	PASS
				RB25#0	21.45	23.19	30	PASS
				RB25#13	21.39	22.81	30	PASS
				RB25#25	21.42	22.93	30	PASS
				RB50#0	21.38	23.08	30	PASS
				HCH	RB1#0	22.66	24.39	30
			RB1#25		22.81	24.55	30	PASS
			RB1#49		22.94	24.48	30	PASS
			RB25#0		21.64	23.28	30	PASS
			RB25#13		21.64	23.32	30	PASS
			RB25#25		21.6	23.30	30	PASS
			RB50#0		21.62	23.39	30	PASS



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
		15	LCH	RB1#0	22.72	24.33	30	PASS
				RB1#38	22.56	24.29	30	PASS
				RB1#74	22.51	24.25	30	PASS
				RB38#0	21.62	23.16	30	PASS
				RB38#19	21.54	23.21	30	PASS
				RB38#39	21.54	23.06	30	PASS
				RB75#0	21.49	23.27	30	PASS
			MCH	RB1#0	22.46	24.15	30	PASS
				RB1#38	22.51	23.97	30	PASS
				RB1#74	22.43	24.19	30	PASS
				RB38#0	21.41	22.94	30	PASS
				RB38#19	21.35	22.94	30	PASS
				RB38#39	21.37	22.89	30	PASS
				RB75#0	21.33	23.00	30	PASS
			HCH	RB1#0	22.46	24.26	30	PASS
				RB1#38	22.76	24.39	30	PASS



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict	
				RB1#74	22.94	24.52	30	PASS	
				RB38#0	21.47	23.20	30	PASS	
				RB38#19	21.58	23.05	30	PASS	
				RB38#39	21.62	23.40	30	PASS	
				RB75#0	21.51	23.11	30	PASS	
		20	LCH	RB1#0	22.72	24.44	30	PASS	
				RB1#50	22.57	24.23	30	PASS	
				RB1#99	22.46	23.95	30	PASS	
				RB50#0	21.39	22.98	30	PASS	
				RB50#25	21.49	23.00	30	PASS	
				RB50#50	21.34	22.83	30	PASS	
				RB100#0	21.42	23.18	30	PASS	
				MCH	RB1#0	22.42	24.02	30	PASS
					RB1#50	22.53	23.97	30	PASS
		RB1#99	22.37		24.04	30	PASS		
		RB50#0	21.41		22.94	30	PASS		



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
				RB50#25	21.35	22.98	30	PASS
				RB50#50	21.32	22.74	30	PASS
				RB100#0	21.45	23.20	30	PASS
			HCH	RB1#0	22.28	24.04	30	PASS
				RB1#50	22.56	24.11	30	PASS
				RB1#99	22.89	24.30	30	PASS
				RB50#0	21.38	22.86	30	PASS
				RB50#25	21.5	23.28	30	PASS
				RB50#50	21.51	23.20	30	PASS
				RB100#0	21.55	23.03	30	PASS
				LCH	RB1#0	21.02	22.60	30
			RB1#3		21.04	22.61	30	PASS
			RB1#5		21.04	22.62	30	PASS
			RB3#0		21.85	23.34	30	PASS
			RB3#2		21.81	23.42	30	PASS
RB3#3	21.83	23.57	30		PASS			



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
			MCH	RB6#0	20.81	22.46	30	PASS
				RB1#0	21.64	23.32	30	PASS
				RB1#3	21.61	23.08	30	PASS
				RB1#5	21.55	23.08	30	PASS
				RB3#0	21.42	22.96	30	PASS
				RB3#2	21.34	22.86	30	PASS
				RB3#3	21.49	23.07	30	PASS
				RB6#0	20.32	22.07	30	PASS
			HCH	RB1#0	22.01	23.68	30	PASS
				RB1#3	21.99	23.76	30	PASS
				RB1#5	21.92	23.68	30	PASS
				RB3#0	21.81	23.49	30	PASS
				RB3#2	21.84	23.39	30	PASS
				RB3#3	21.77	23.48	30	PASS
				RB6#0	20.74	22.31	30	PASS
3	LCH	RB1#0	21.76	23.33	30	PASS		



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict			
				RB1#7	21.65	23.34	30	PASS			
				RB1#14	21.77	23.53	30	PASS			
				RB8#0	20.71	22.17	30	PASS			
				RB8#4	20.59	22.30	30	PASS			
				RB8#7	20.62	22.07	30	PASS			
				RB15#0	20.75	22.33	30	PASS			
			MCH	RB1#0	21.57	23.19	30	PASS			
				RB1#7	21.63	23.21	30	PASS			
				RB1#14	21.52	23.28	30	PASS			
				RB8#0	20.48	22.05	30	PASS			
				RB8#4	20.46	22.26	30	PASS			
				RB8#7	20.5	22.11	30	PASS			
			HCH	RB15#0	20.51	21.97	30	PASS			
				RB1#0	21.83	23.33	30	PASS			
				RB1#7	21.85	23.49	30	PASS			
							RB1#14	21.94	23.66	30	PASS



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict	
				RB8#0	20.77	22.53	30	PASS	
				RB8#4	20.87	22.42	30	PASS	
				RB8#7	20.88	22.60	30	PASS	
				RB15#0	20.97	22.60	30	PASS	
		5	LCH	RB1#0	21.76	23.51	30	PASS	
				RB1#13	21.78	23.33	30	PASS	
				RB1#24	21.74	23.42	30	PASS	
				RB12#0	20.7	22.27	30	PASS	
				RB12#6	20.71	22.50	30	PASS	
				RB12#13	20.71	22.40	30	PASS	
				RB25#0	20.65	22.15	30	PASS	
				MCH	RB1#0	21.59	23.08	30	PASS
					RB1#13	21.61	23.33	30	PASS
					RB1#24	21.39	22.86	30	PASS
					RB12#0	20.54	22.25	30	PASS
					RB12#6	20.44	21.98	30	PASS



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
				RB12#13	20.43	21.87	30	PASS
				RB25#0	20.49	21.90	30	PASS
			HCH	RB1#0	21.84	23.26	30	PASS
				RB1#13	21.85	23.52	30	PASS
				RB1#24	21.95	23.50	30	PASS
				RB12#0	20.93	22.50	30	PASS
				RB12#6	20.84	22.26	30	PASS
				RB12#13	20.93	22.39	30	PASS
		RB25#0	20.73	22.20	30	PASS		
		10	LCH	RB1#0	21.68	23.22	30	PASS
				RB1#25	21.69	23.29	30	PASS
				RB1#49	21.68	23.15	30	PASS
				RB25#0	20.69	22.47	30	PASS
				RB25#13	20.6	22.29	30	PASS
				RB25#25	20.65	22.26	30	PASS
				RB50#0	20.5	22.02	30	PASS



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
			MCH	RB1#0	21.48	23.02	30	PASS
				RB1#25	21.58	23.18	30	PASS
				RB1#49	21.47	23.12	30	PASS
				RB25#0	20.49	22.07	30	PASS
				RB25#13	20.39	21.85	30	PASS
				RB25#25	20.35	21.84	30	PASS
				RB50#0	20.35	22.07	30	PASS
			HCH	RB1#0	21.84	23.43	30	PASS
				RB1#25	22.07	23.51	30	PASS
				RB1#49	22.05	23.81	30	PASS
				RB25#0	20.69	22.13	30	PASS
				RB25#13	20.76	22.55	30	PASS
				RB25#25	20.75	22.42	30	PASS
		RB50#0		20.73	22.17	30	PASS	
15	LCH	RB1#0	21.83	23.37	30	PASS		
		RB1#38	21.81	23.52	30	PASS		



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
				RB1#74	21.72	23.45	30	PASS
				RB38#0	20.57	22.10	30	PASS
				RB38#19	20.6	22.27	30	PASS
				RB38#39	20.59	22.16	30	PASS
				RB75#0	20.47	21.99	30	PASS
			MCH	RB1#0	21.59	23.19	30	PASS
				RB1#38	21.65	23.20	30	PASS
				RB1#74	21.54	23.18	30	PASS
				RB38#0	20.52	22.18	30	PASS
				RB38#19	20.4	22.02	30	PASS
				RB38#39	20.38	21.88	30	PASS
				RB75#0	20.33	21.93	30	PASS
			HCH	RB1#0	21.66	23.28	30	PASS
				RB1#38	21.91	23.70	30	PASS
				RB1#74	22.1	23.68	30	PASS
				RB38#0	20.5	22.17	30	PASS



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
		20		RB38#19	20.7	22.49	30	PASS
				RB38#39	20.74	22.47	30	PASS
				RB75#0	20.56	22.23	30	PASS
			LCH	RB1#0	21.84	23.50	30	PASS
				RB1#50	21.78	23.36	30	PASS
				RB1#99	21.72	23.39	30	PASS
				RB50#0	20.43	22.03	30	PASS
				RB50#25	20.43	21.96	30	PASS
				RB50#50	20.34	21.86	30	PASS
		RB100#0	20.39	21.90	30	PASS		
		MCH	RB1#0	21.64	23.16	30	PASS	
			RB1#50	21.74	23.18	30	PASS	
			RB1#99	21.64	23.14	30	PASS	
			RB50#0	20.38	22.08	30	PASS	
			RB50#25	20.31	21.72	30	PASS	
RB50#50	20.3		21.94	30	PASS			



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
				RB100#0	20.35	22.09	30	PASS
			HCH	RB1#0	21.55	23.29	30	PASS
				RB1#50	21.75	23.38	30	PASS
				RB1#99	22.05	23.66	30	PASS
				RB50#0	20.35	21.76	30	PASS
				RB50#25	20.47	22.13	30	PASS
				RB50#50	20.55	22.27	30	PASS
				RB100#0	20.51	22.19	30	PASS

Note1: a, For getting the ERP (Efficient Radiated Power) or EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should be taken to calculate it,

$$\text{ERP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBd]}$$

$$\text{EIRP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBi]}$$

b, SGP=Signal Generator Level

Note2: RBW > emission bandwidth, VBW > 3 x RBW.



2Appendix_B: Peak-to-Average Ratio

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
GSM1900	GSM/TM1	LCH	0.16	13	PASS
		MCH	0.19	13	PASS
		HCH	0.24	13	PASS
	GSM/TM2	LCH	3.21	13	PASS
		MCH	3.13	13	PASS
		HCH	3.26	13	PASS
Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
WCDMA1700	UMTS/TM1	LCH	3.44	13	PASS
		MCH	3.28	13	PASS
		HCH	3.11	13	PASS
WCDMA1900	UMTS/TM1	LCH	3.19	13	PASS
		MCH	3.27	13	PASS
		HCH	2.9	13	PASS



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Measured[dB]	Limit [dB]	Verdict
BAND4	LTE/TM1	1.4	LCH	RB1#0	4.79	13	PASS
				RB1#3	4.82	13	PASS
				RB1#5	4.88	13	PASS
				RB3#0	5.62	13	PASS
				RB3#2	5.56	13	PASS
				RB3#3	5.54	13	PASS
			RB6#0	5.85	13	PASS	
			MCH	RB1#0	4.72	13	PASS
				RB1#3	4.64	13	PASS
				RB1#5	4.73	13	PASS
				RB3#0	5.07	13	PASS
				RB3#2	5.06	13	PASS
				RB3#3	4.98	13	PASS
			HCH	RB1#0	4.31	13	PASS
				RB1#3	4.24	13	PASS
				RB1#5	4.33	13	PASS
				RB3#0	4.49	13	PASS
				RB3#2	4.47	13	PASS
		RB3#3		4.66	13	PASS	
		3	LCH	RB1#0	4.93	13	PASS
				RB1#7	4.94	13	PASS
				RB1#14	5	13	PASS
				RB8#0	5.81	13	PASS
				RB8#4	5.89	13	PASS
				RB8#7	6.04	13	PASS
			MCH	RB15#0	6.18	13	PASS
				RB1#0	4.74	13	PASS
				RB1#7	4.68	13	PASS
				RB1#14	4.72	13	PASS
				RB8#0	5.53	13	PASS
RB8#4	5.47			13	PASS		
HCH	RB8#7	5.54	13	PASS			
	RB15#0	5.52	13	PASS			
	RB1#0	4.1	13	PASS			
				RB1#7	4.25	13	PASS
				RB1#14	4.28	13	PASS



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Measured[dB]	Limit [dB]	Verdict
		5		RB8#0	4.99	13	PASS
				RB8#4	4.77	13	PASS
				RB8#7	5.17	13	PASS
				RB15#0	5.34	13	PASS
			LCH	RB1#0	4.75	13	PASS
				RB1#13	4.7	13	PASS
				RB1#24	4.86	13	PASS
				RB12#0	6.08	13	PASS
				RB12#6	6.08	13	PASS
				RB12#13	6.12	13	PASS
			RB25#0	6.22	13	PASS	
			MCH	RB1#0	4.6	13	PASS
		RB1#13		4.53	13	PASS	
		RB1#24		4.61	13	PASS	
		RB12#0		5.67	13	PASS	
		RB12#6		5.64	13	PASS	
		RB12#13		5.71	13	PASS	
		RB25#0	5.81	13	PASS		
		HCH	RB1#0	3.98	13	PASS	
			RB1#13	4.05	13	PASS	
			RB1#24	4.16	13	PASS	
			RB12#0	4.98	13	PASS	
			RB12#6	4.85	13	PASS	
			RB12#13	5.35	13	PASS	
		RB25#0	5.48	13	PASS		
		10	LCH	RB1#0	4.96	13	PASS
				RB1#25	4.97	13	PASS
				RB1#49	5.03	13	PASS
				RB25#0	6.36	13	PASS
				RB25#13	6.41	13	PASS
				RB25#25	6.42	13	PASS
			RB50#0	6.24	13	PASS	
MCH	RB1#0		4.87	13	PASS		
	RB1#25		4.65	13	PASS		
	RB1#49		4.68	13	PASS		
	RB25#0		5.91	13	PASS		
	RB25#13		5.82	13	PASS		
	RB25#25	5.93	13	PASS			
RB50#0	5.87	13	PASS				



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Measured[dB]	Limit [dB]	Verdict
		15	HCH	RB1#0	4.31	13	PASS
				RB1#25	4.1	13	PASS
				RB1#49	4.34	13	PASS
				RB25#0	5.3	13	PASS
				RB25#13	5.06	13	PASS
				RB25#25	5.2	13	PASS
				RB50#0	5.4	13	PASS
			LCH	RB1#0	4.84	13	PASS
				RB1#38	4.89	13	PASS
				RB1#74	4.9	13	PASS
				RB38#0	6.29	13	PASS
				RB38#19	6.38	13	PASS
				RB38#39	6.33	13	PASS
				RB75#0	6.42	13	PASS
		MCH	RB1#0	4.81	13	PASS	
			RB1#38	4.51	13	PASS	
			RB1#74	4.51	13	PASS	
			RB38#0	5.92	13	PASS	
			RB38#19	5.83	13	PASS	
			RB38#39	5.78	13	PASS	
			RB75#0	6.16	13	PASS	
		HCH	RB1#0	4.41	13	PASS	
			RB1#38	4.06	13	PASS	
			RB1#74	4.16	13	PASS	
			RB38#0	5.4	13	PASS	
			RB38#19	5.09	13	PASS	
			RB38#39	5.19	13	PASS	
			RB75#0	5.74	13	PASS	
		20	LCH	RB1#0	4.94	13	PASS
				RB1#50	4.9	13	PASS
RB1#99	4.92			13	PASS		
RB50#0	6.42			13	PASS		
RB50#25	6.31			13	PASS		
RB50#50	6.39			13	PASS		
RB100#0	6.28		13	PASS			
MCH	RB1#0		4.99	13	PASS		
	RB1#50		4.58	13	PASS		
	RB1#99		4.45	13	PASS		
	RB50#0		5.87	13	PASS		



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Measured[dB]	Limit [dB]	Verdict	
				RB50#25	5.81	13	PASS	
				RB50#50	5.77	13	PASS	
				RB100#0	6.12	13	PASS	
			HCH	RB1#0	4.67	13	PASS	
				RB1#50	4.27	13	PASS	
				RB1#99	4.29	13	PASS	
				RB50#0	5.61	13	PASS	
				RB50#25	5.29	13	PASS	
				RB50#50	5.28	13	PASS	
				RB100#0	5.66	13	PASS	
				LCH	RB1#0	5.98	13	PASS
					RB1#3	5.97	13	PASS
			RB1#5		6.05	13	PASS	
			RB3#0		6.23	13	PASS	
			RB3#2		6.14	13	PASS	
	RB3#3	6.27	13		PASS			
	RB6#0	6.4	13		PASS			
	MCH	RB1#0	5.72	13	PASS			
		RB1#3	5.52	13	PASS			
		RB1#5	5.65	13	PASS			
		RB3#0	5.82	13	PASS			
		RB3#2	5.65	13	PASS			
		RB3#3	5.7	13	PASS			
		RB6#0	6.26	13	PASS			
	HCH	RB1#0	4.89	13	PASS			
		RB1#3	4.83	13	PASS			
		RB1#5	4.96	13	PASS			
		RB3#0	5.42	13	PASS			
		RB3#2	5.32	13	PASS			
		RB3#3	5.52	13	PASS			
RB6#0		6.1	13	PASS				
		3	LCH	RB1#0	5.69	13	PASS	
				RB1#7	5.75	13	PASS	
				RB1#14	5.78	13	PASS	
				RB8#0	6.69	13	PASS	
				RB8#4	6.8	13	PASS	
				RB8#7	6.81	13	PASS	
		MCH	RB15#0	6.39	13	PASS		
		MCH	RB1#0	5.36	13	PASS		



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Measured[dB]	Limit [dB]	Verdict	
				RB1#7	5.24	13	PASS	
				RB1#14	5.31	13	PASS	
				RB8#0	6.47	13	PASS	
				RB8#4	6.41	13	PASS	
				RB8#7	6.48	13	PASS	
				RB15#0	6.2	13	PASS	
			HCH	RB1#0	4.78	13	PASS	
				RB1#7	4.84	13	PASS	
				RB1#14	4.88	13	PASS	
				RB8#0	5.99	13	PASS	
				RB8#4	5.75	13	PASS	
				RB8#7	5.86	13	PASS	
			5	LCH	RB1#0	5.98	13	PASS
					RB1#13	5.92	13	PASS
		RB1#24			6.14	13	PASS	
		RB12#0			6.37	13	PASS	
		RB12#6			6.34	13	PASS	
		RB12#13			6.43	13	PASS	
		MCH		RB25#0	6.85	13	PASS	
				RB1#0	5.59	13	PASS	
				RB1#13	5.48	13	PASS	
				RB1#24	5.66	13	PASS	
				RB12#0	6.12	13	PASS	
				RB12#6	6.07	13	PASS	
		HCH		RB12#13	6.13	13	PASS	
				RB25#0	6.79	13	PASS	
			RB1#0	4.85	13	PASS		
			RB1#13	4.77	13	PASS		
			RB1#24	5.16	13	PASS		
			RB12#0	5.62	13	PASS		
		10	LCH	RB12#6	5.46	13	PASS	
				RB12#13	5.56	13	PASS	
RB25#0	6.39			13	PASS			
RB1#0	5.82			13	PASS			
RB1#25	5.82			13	PASS			
				RB1#49	5.91	13	PASS	
				RB25#0	6.67	13	PASS	
				RB25#13	6.72	13	PASS	



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Measured[dB]	Limit [dB]	Verdict	
				RB25#25	6.79	13	PASS	
				RB50#0	7.03	13	PASS	
			MCH	RB1#0	5.58	13	PASS	
				RB1#25	5.34	13	PASS	
				RB1#49	5.34	13	PASS	
				RB25#0	6.5	13	PASS	
				RB25#13	6.4	13	PASS	
				RB25#25	6.5	13	PASS	
			RB50#0	6.76	13	PASS		
			HCH	RB1#0	4.77	13	PASS	
				RB1#25	4.71	13	PASS	
				RB1#49	4.94	13	PASS	
				RB25#0	5.77	13	PASS	
				RB25#13	5.63	13	PASS	
		RB25#25		5.92	13	PASS		
		RB50#0	6.21	13	PASS			
		15	LCH		RB1#0	5.8	13	PASS
					RB1#38	5.92	13	PASS
					RB1#74	5.87	13	PASS
					RB38#0	6.91	13	PASS
					RB38#19	6.96	13	PASS
					RB38#39	6.96	13	PASS
					RB75#0	6.93	13	PASS
			MCH	RB1#0	5.63	13	PASS	
				RB1#38	5.33	13	PASS	
				RB1#74	5.26	13	PASS	
				RB38#0	6.81	13	PASS	
				RB38#19	6.63	13	PASS	
				RB38#39	6.48	13	PASS	
				RB75#0	6.77	13	PASS	
			HCH	RB1#0	5.09	13	PASS	
		RB1#38		4.7	13	PASS		
		RB1#74		4.91	13	PASS		
RB38#0	6.14	13		PASS				
RB38#19	5.8	13		PASS				
RB38#39	6.06	13		PASS				
RB75#0	6.25	13		PASS				
20	LCH	RB1#0	5.75	13	PASS			
		RB1#50	5.8	13	PASS			



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Measured[dB]	Limit [dB]	Verdict
				RB1#99	5.72	13	PASS
				RB50#0	6.94	13	PASS
				RB50#25	6.92	13	PASS
				RB50#50	7.01	13	PASS
				RB100#0	7.1	13	PASS
			MCH	RB1#0	5.88	13	PASS
				RB1#50	5.3	13	PASS
				RB1#99	5.05	13	PASS
				RB50#0	6.72	13	PASS
				RB50#25	6.47	13	PASS
				RB50#50	6.62	13	PASS
				RB100#0	6.84	13	PASS
			HCH	RB1#0	5.29	13	PASS
				RB1#50	4.81	13	PASS
				RB1#99	4.92	13	PASS
				RB50#0	6.31	13	PASS
				RB50#25	6.01	13	PASS
				RB50#50	6.11	13	PASS
				RB100#0	6.48	13	PASS

3Appendix_C: Modulation Characteristics

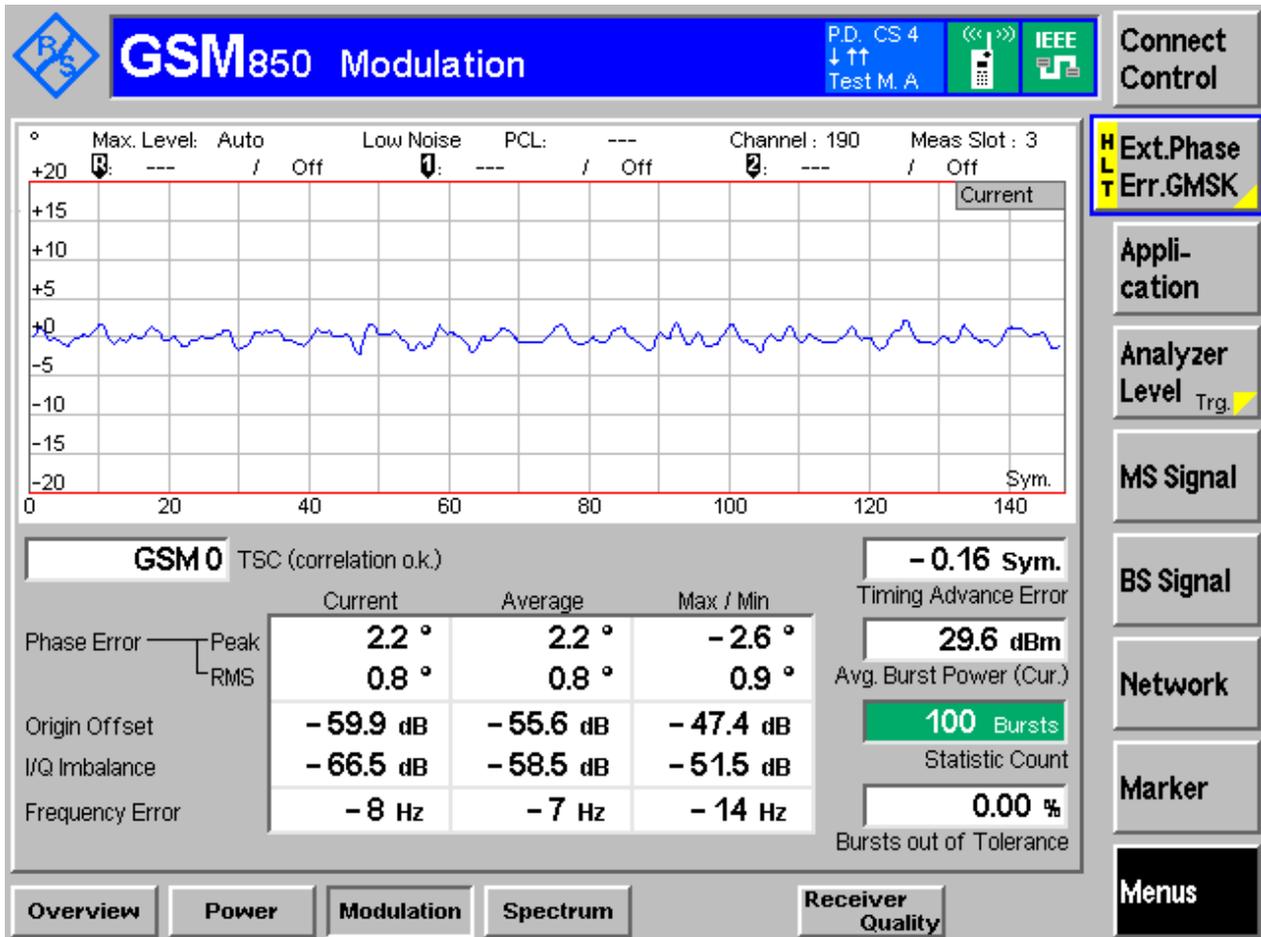
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

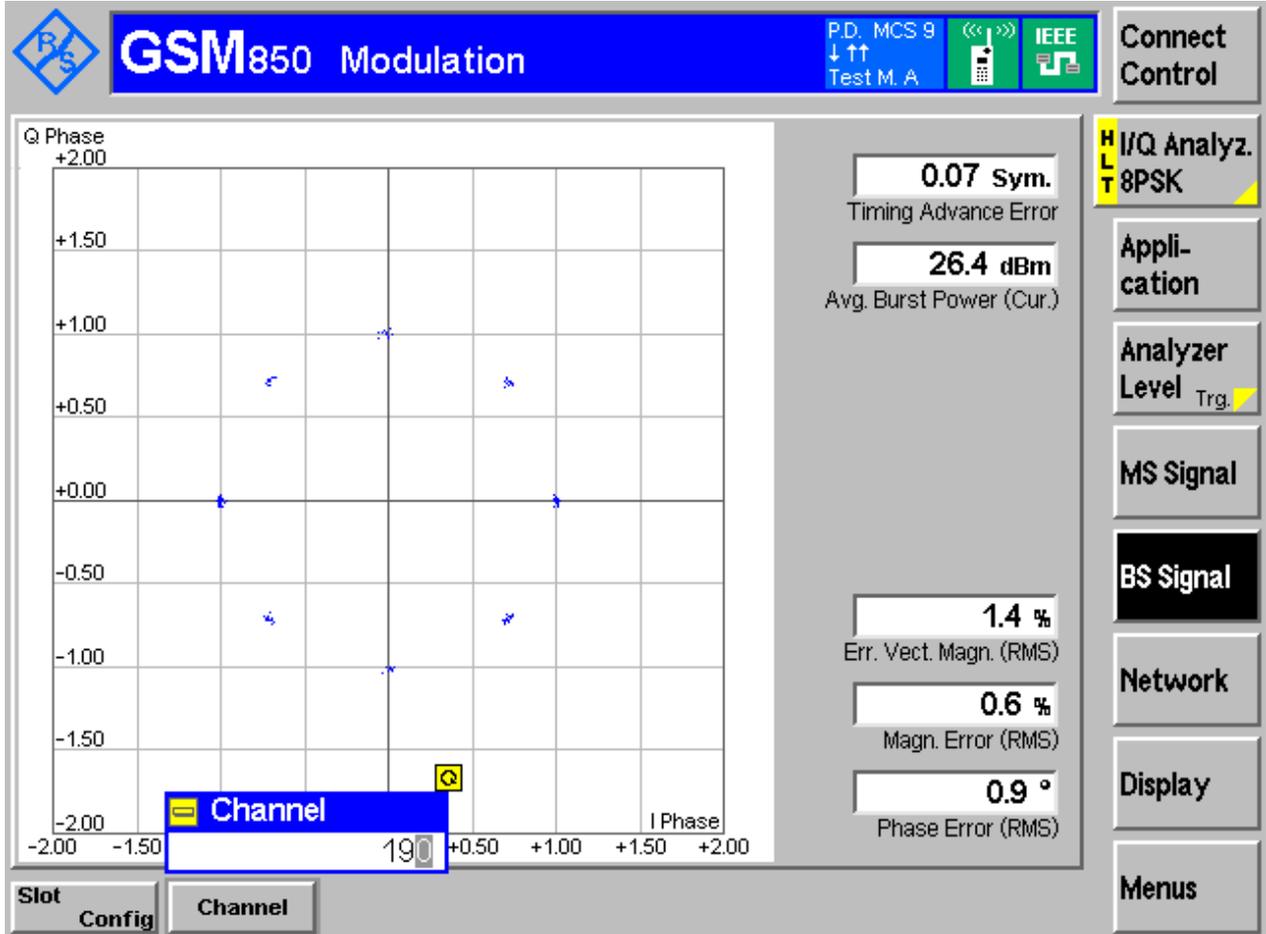
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

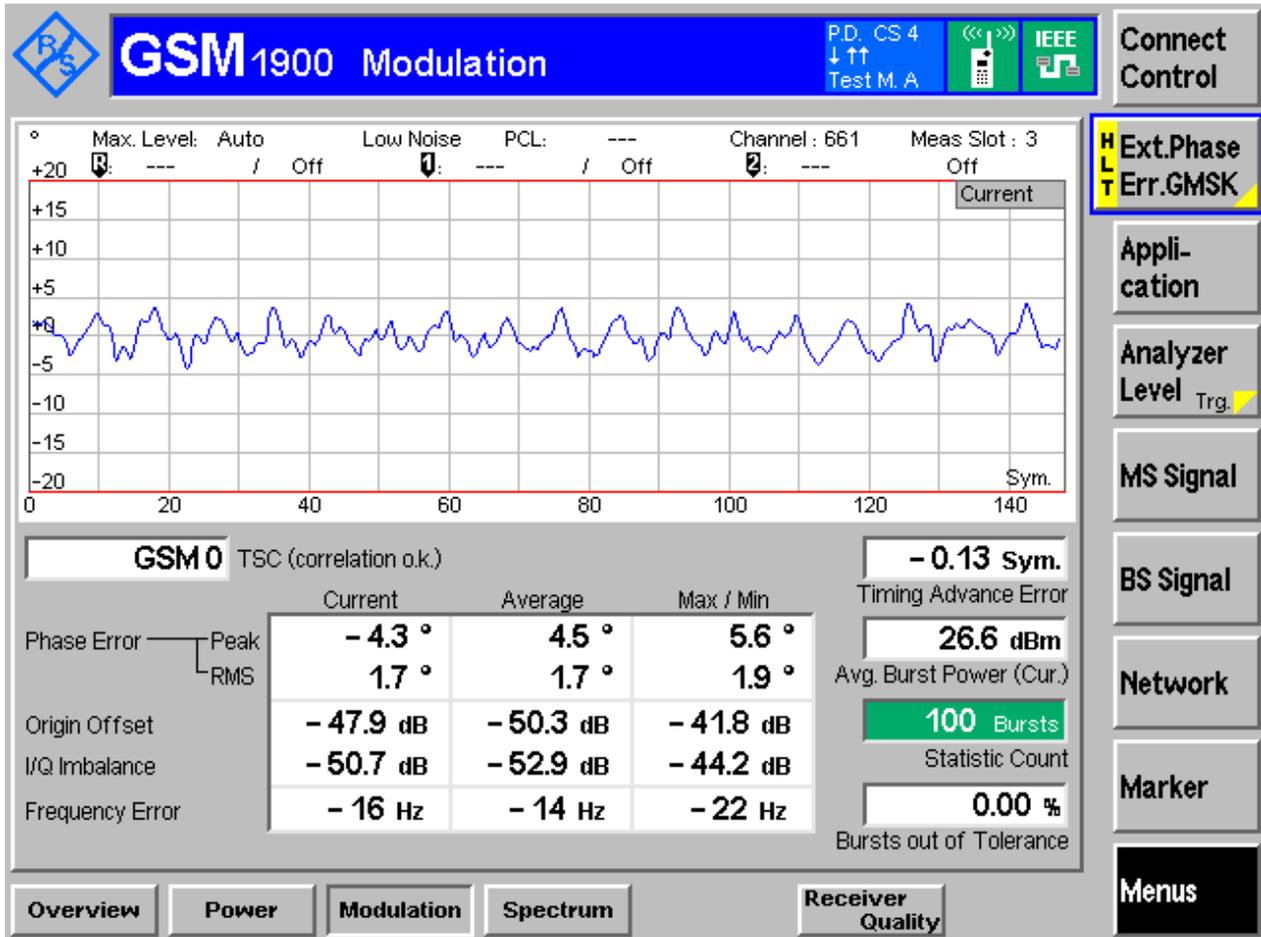
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

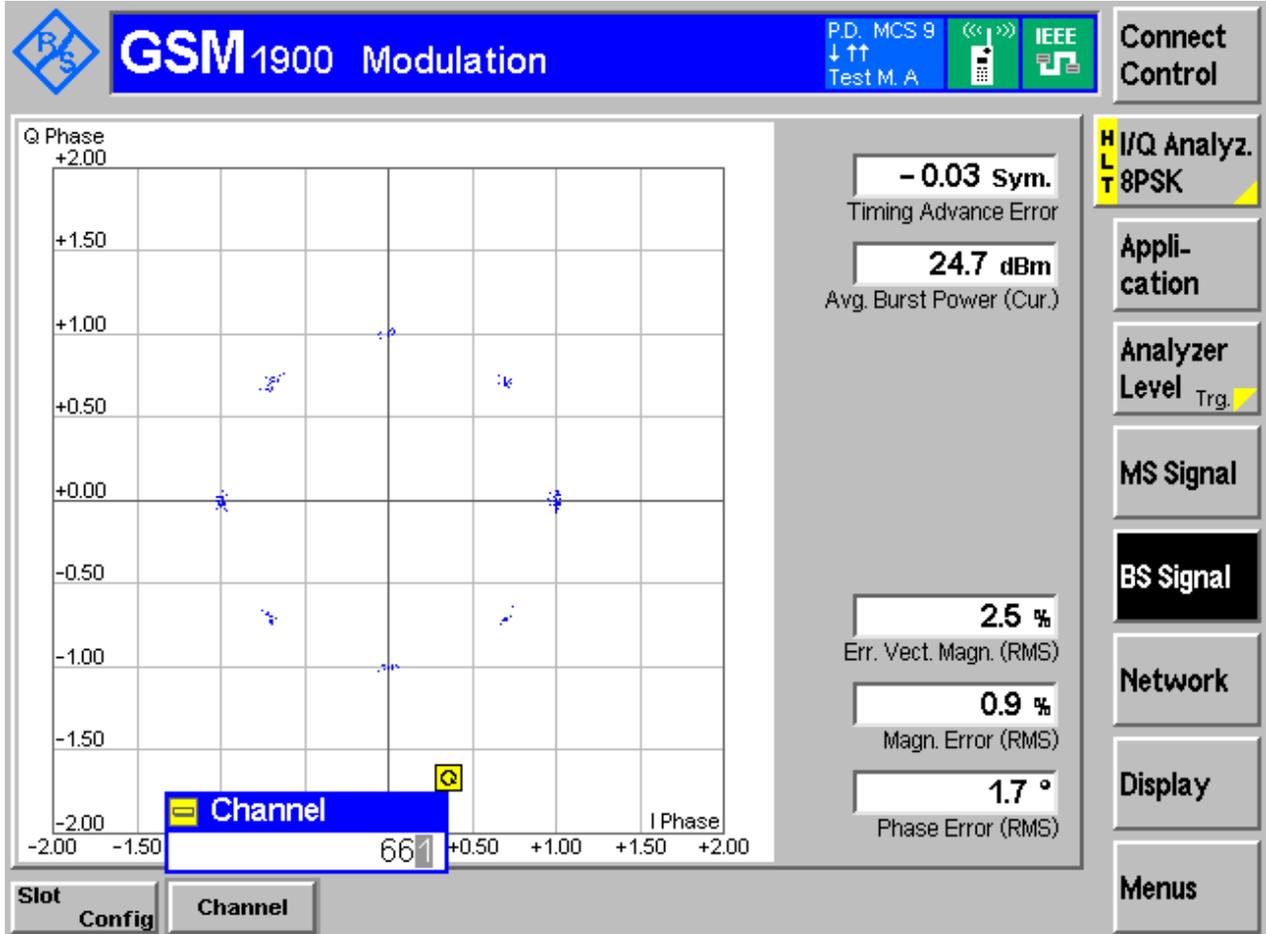
3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH



3.1.2.2 Test Mode = GSM/TM2

3.1.2.2.1 Test Channel = MCH

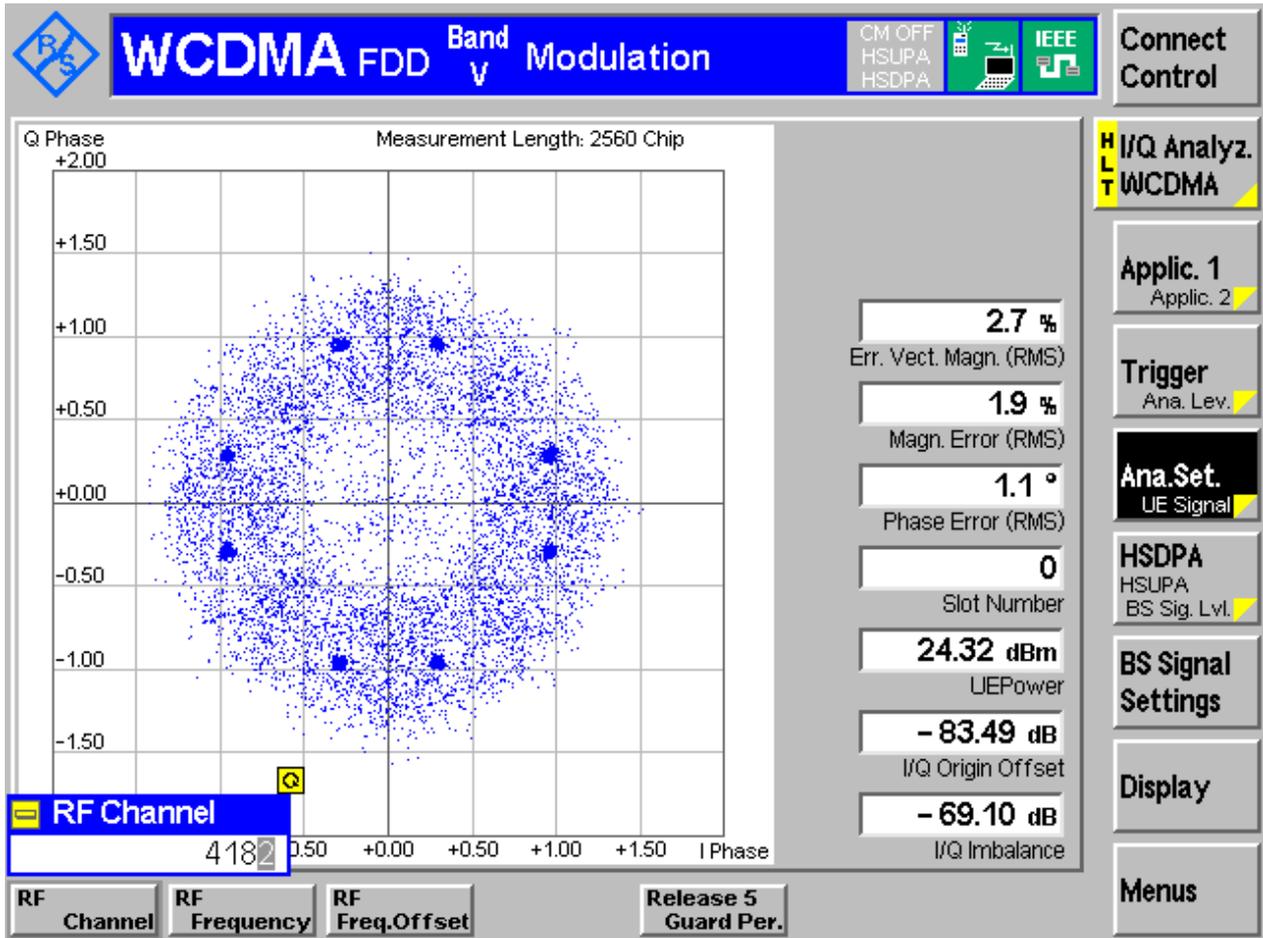


3.2 For UMTS

3.2.1 Test Band = WCDMA850

3.2.1.1 Test Mode = UMTS/TM1

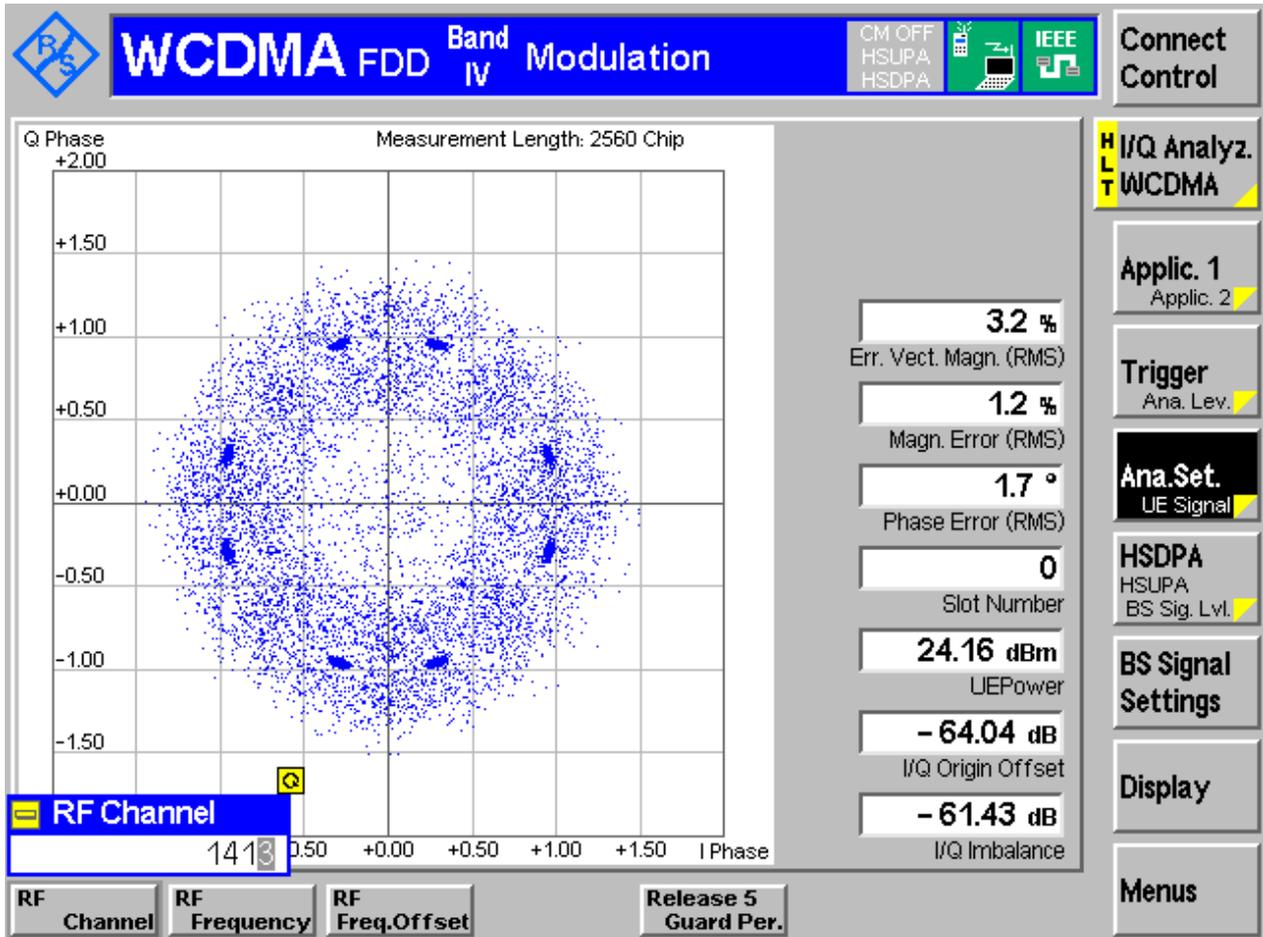
3.2.1.1.1 Test Channel = MCH



3.2.2 Test Band = WCDMA1700

3.2.2.1 Test Mode = UMTS/TM1

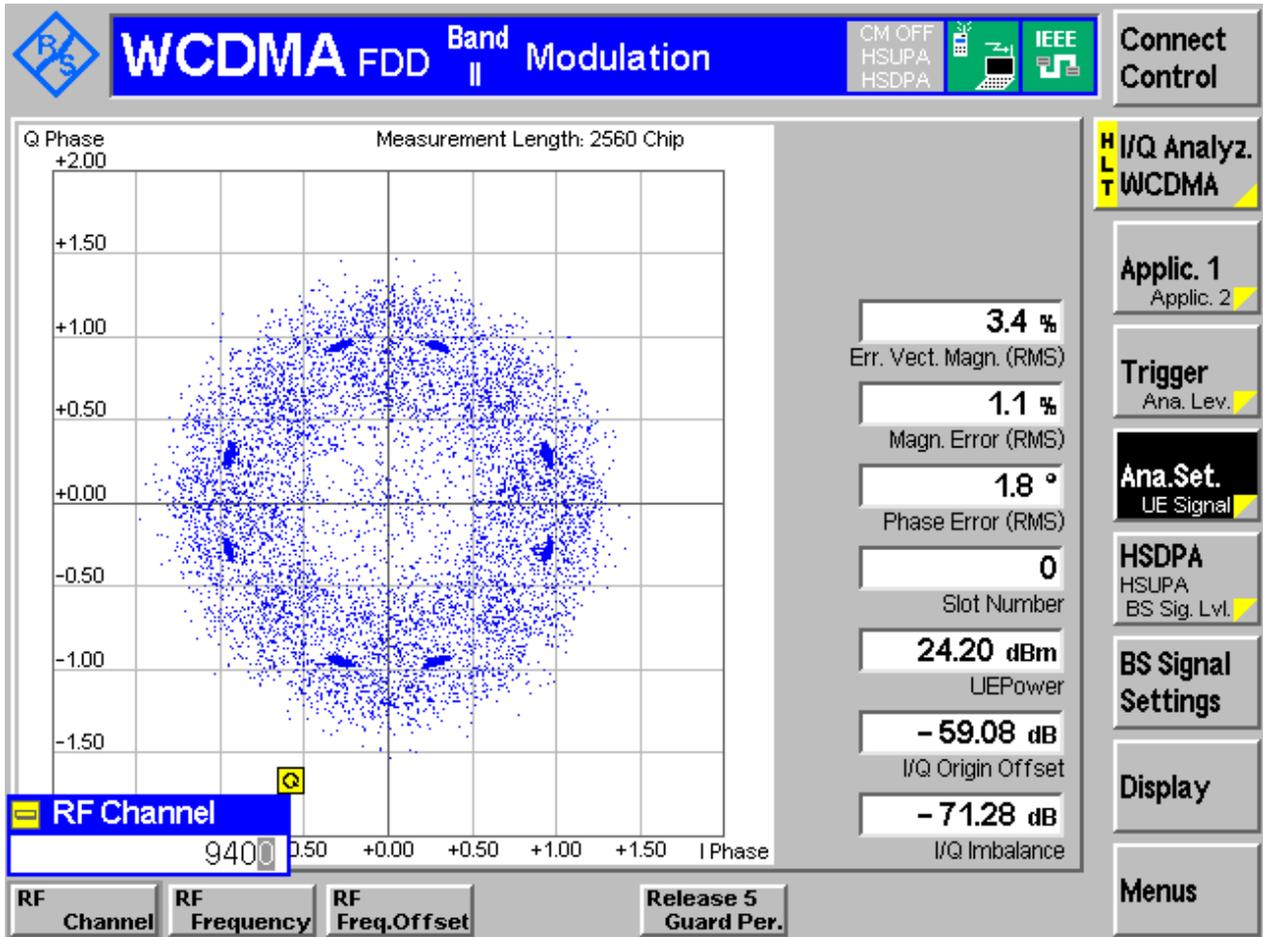
3.2.2.1.1 Test Channel = MCH



3.2.3 Test Band = WCDMA1900

3.2.3.1 Test Mode = UMTS/TM1

3.2.3.1.1 Test Channel = MCH



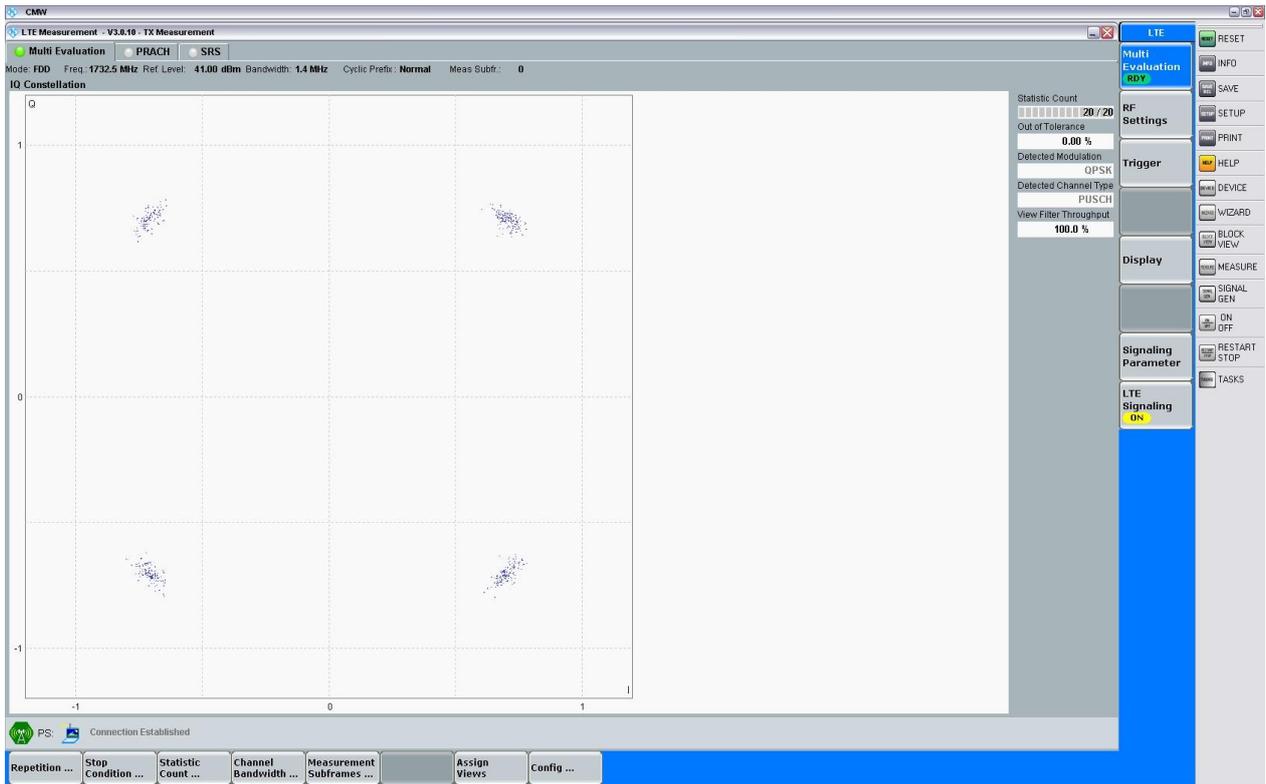
3.3.1 Test Band = BAND4

3.3.1.1 Test Mode = LTE/TM1

3.3.1.1.1 Test Bandwidth = 1.4

3.3.1.1.1.1 Test Channel = MCH

3.3.1.1.1.1.1 Test RB = RB6#0

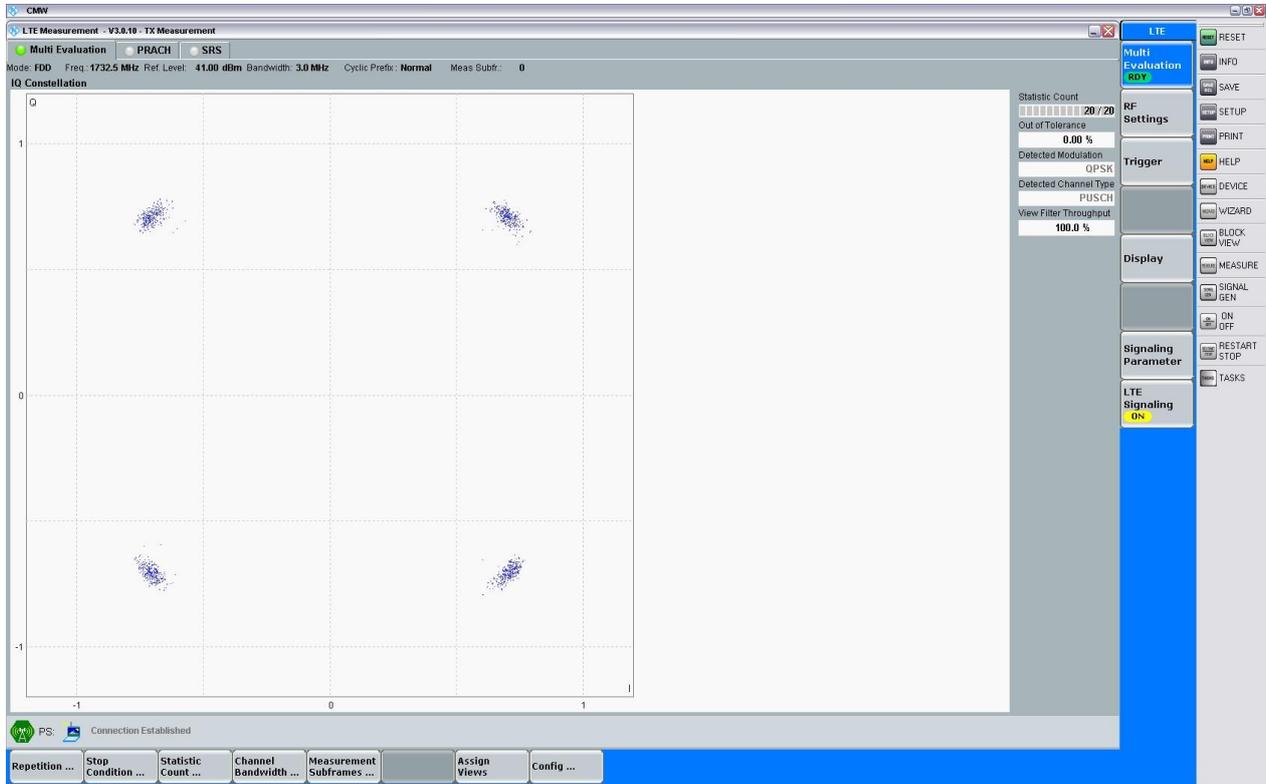




3.3.1.1.1 Test Bandwidth = 3

3.3.1.1.1.1 Test Channel = MCH

3.3.1.1.1.1.1 Test RB = RB15#0

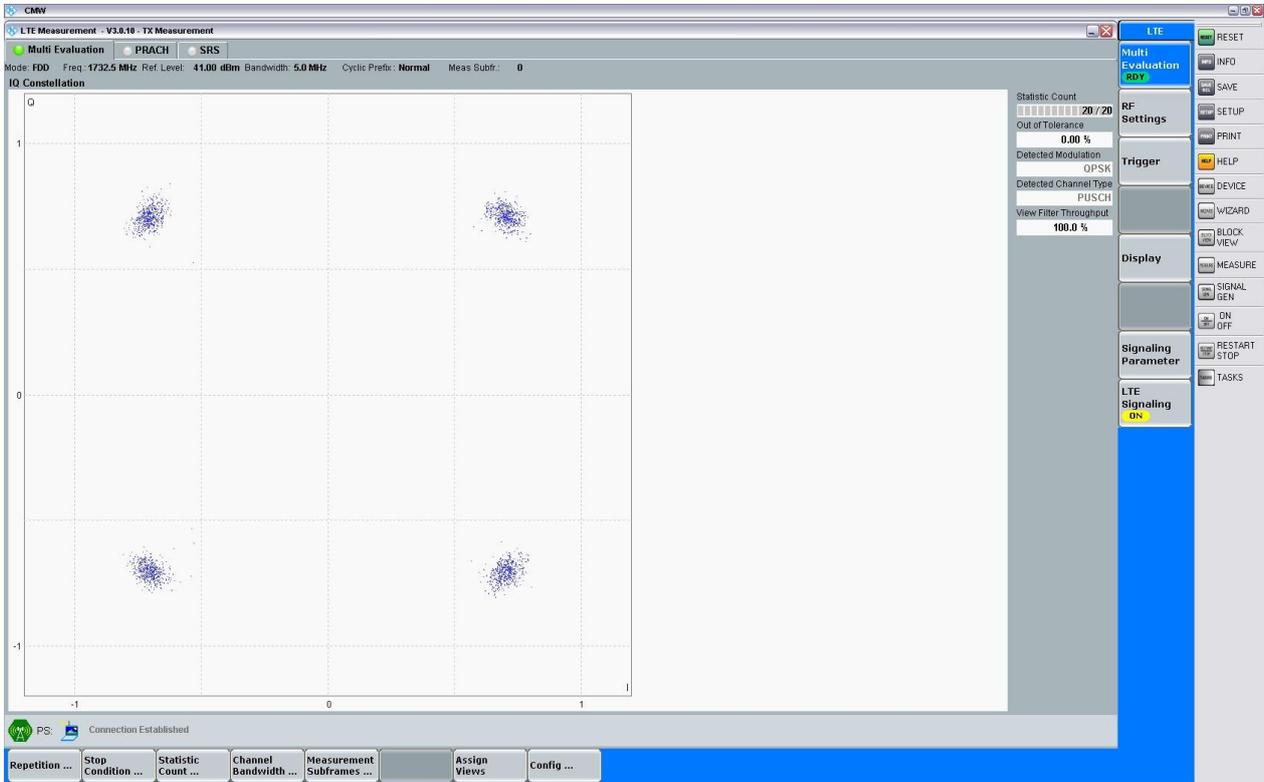




3.3.1.1.1 Test Bandwidth = 5

3.3.1.1.1.1 Test Channel = MCH

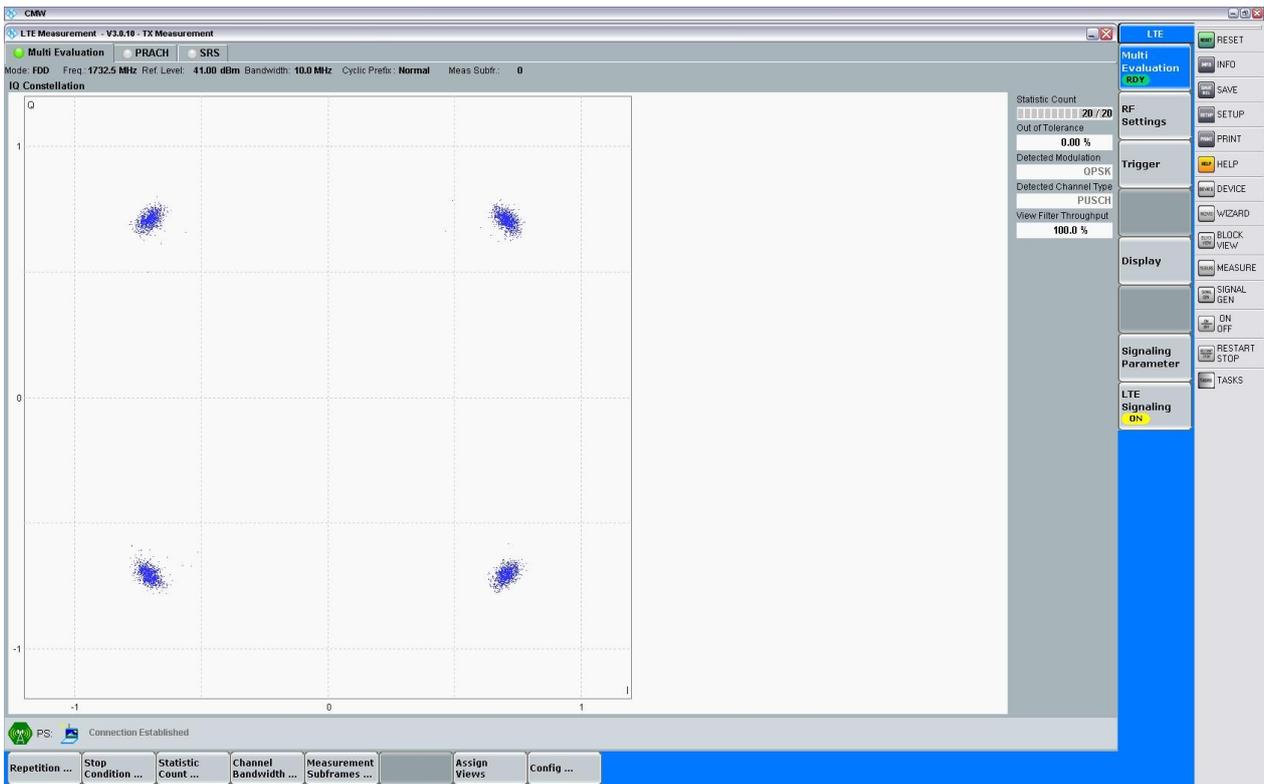
3.3.1.1.1.1.1 Test RB = RB25#0



3.3.1.1.2 Test Bandwidth = 10

3.3.1.1.2.1 Test Channel = MCH

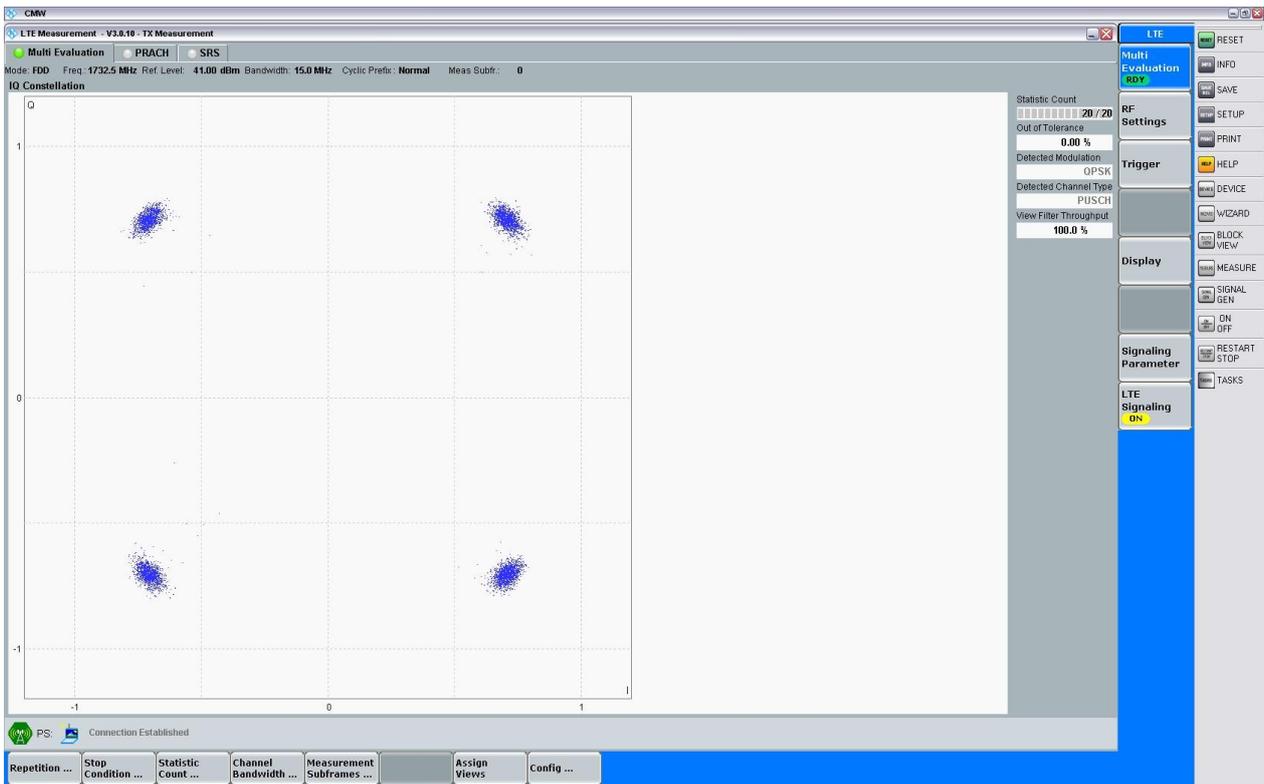
3.3.1.1.2.1.1 Test RB = RB50#0



3.3.1.1.3 Test Bandwidth = 15

3.3.1.1.3.1 Test Channel = MCH

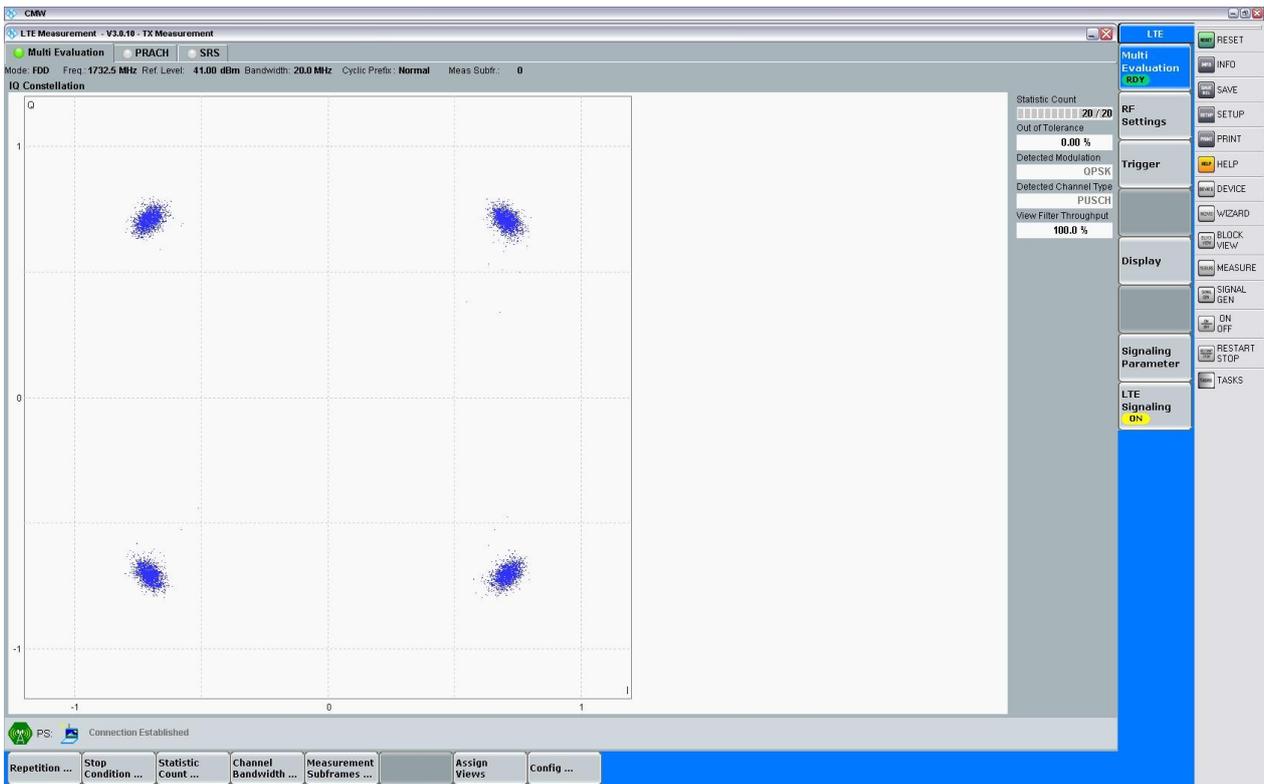
3.3.1.1.3.1.1 Test RB = RB75#0



3.3.1.1.4 Test Bandwidth = 20

3.3.1.1.4.1 Test Channel = MCH

3.3.1.1.4.1.1 Test RB = RB100#0



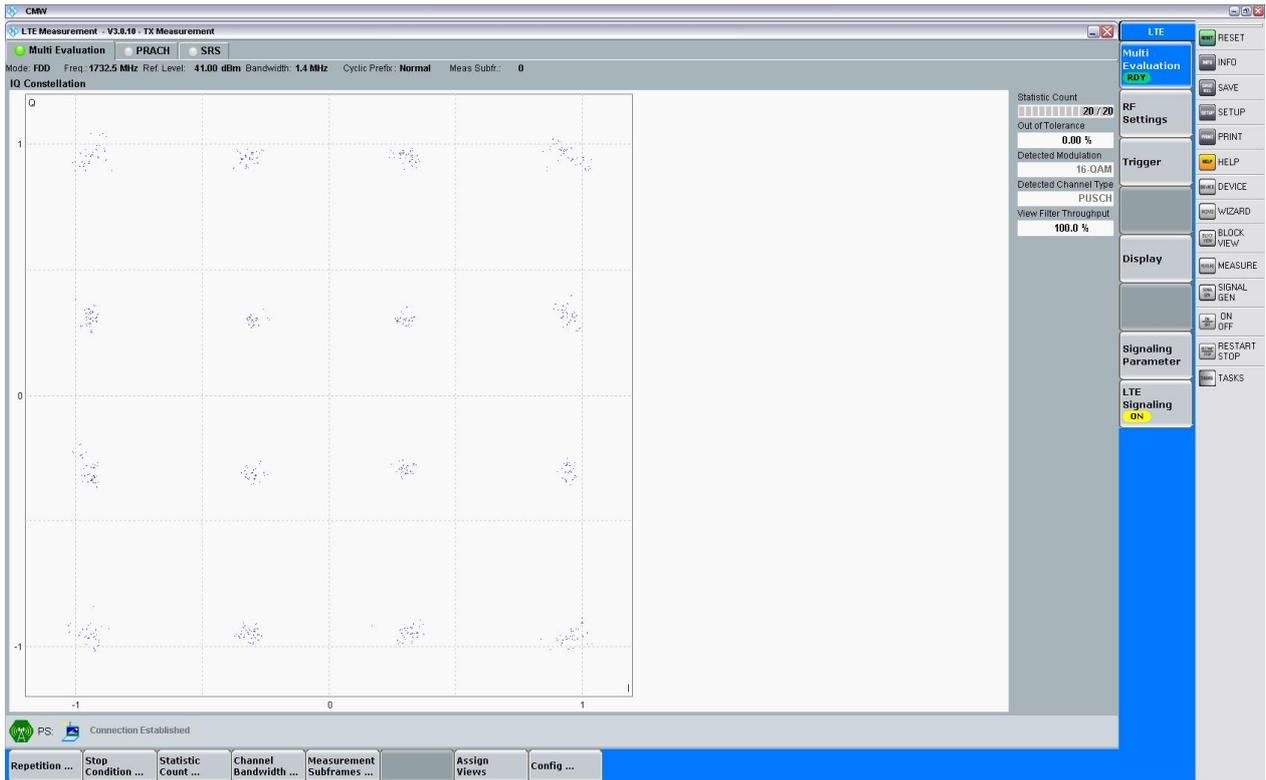


3.3.1.2 Test Mode = LTE/TM2

3.3.1.1.1 Test Bandwidth = 1.4

3.3.1.1.1.1 Test Channel = MCH

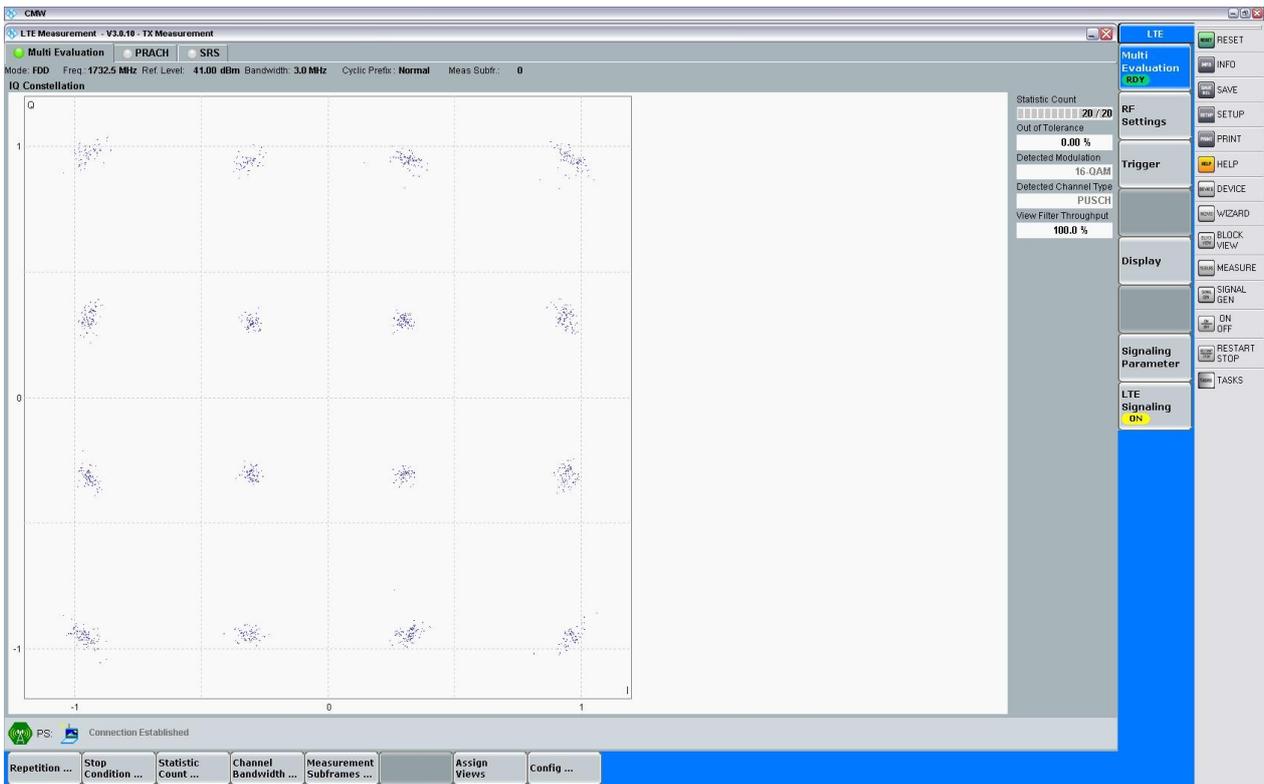
3.3.1.1.1.1.1 Test RB = RB6#0



3.3.1.1.1 Test Bandwidth = 3

3.3.1.1.1.1 Test Channel = MCH

3.3.1.1.1.1.1 Test RB = RB15#0

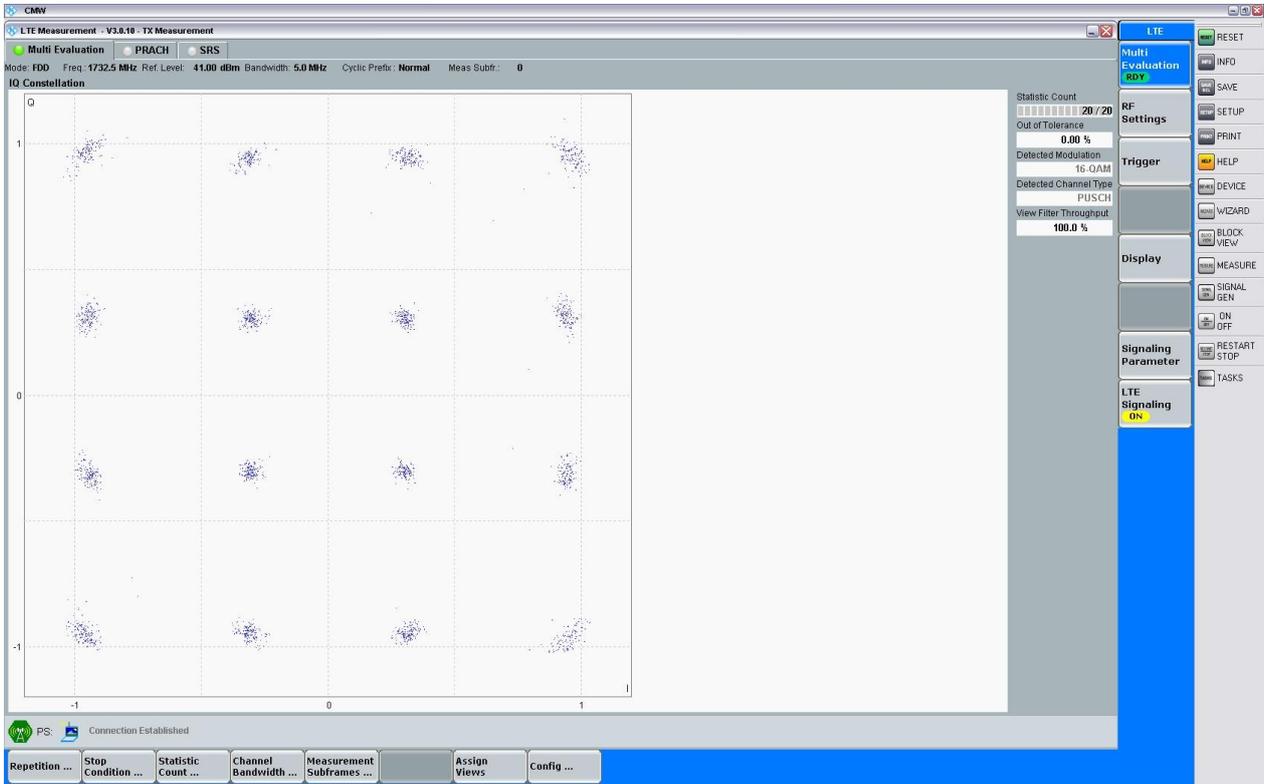




3.3.1.2.1 Test Bandwidth = 5

3.3.1.2.1.1 Test Channel = MCH

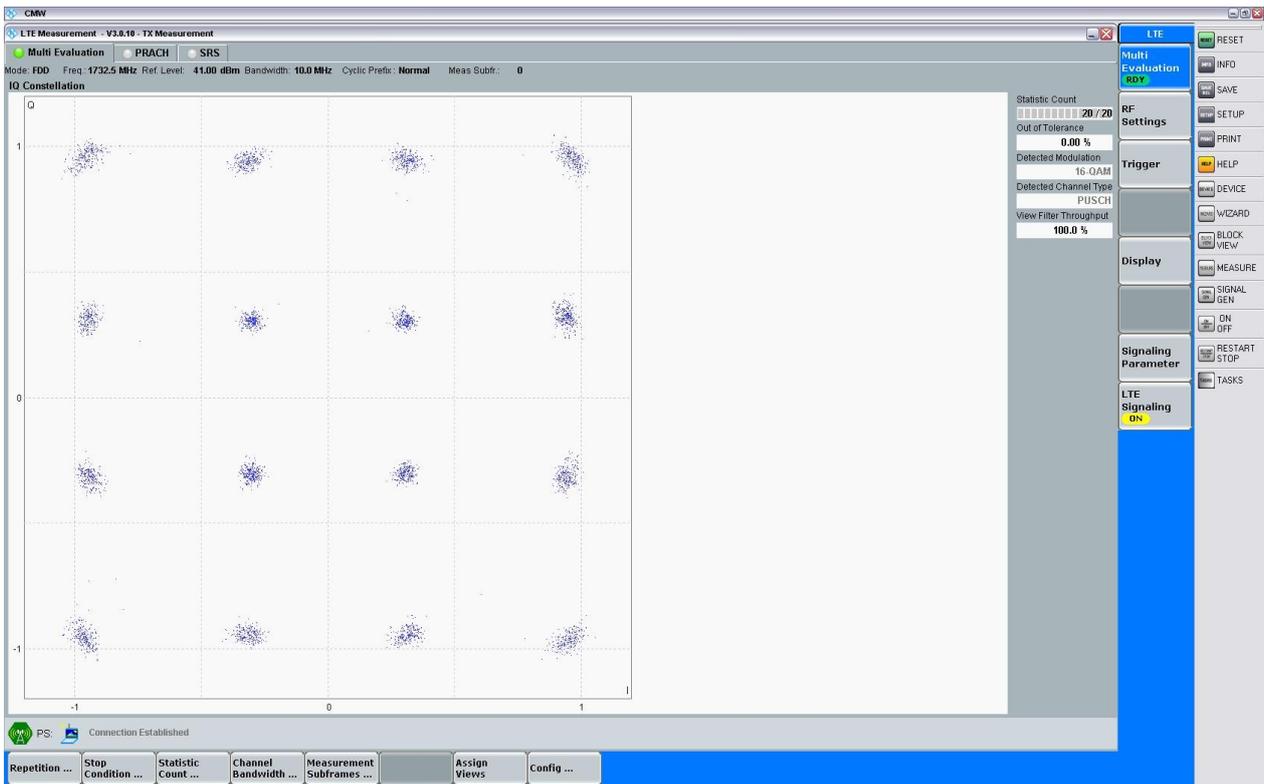
3.3.1.2.1.1.1 Test RB = RB25#0



3.3.1.2.2 Test Bandwidth = 10

3.3.1.2.2.1 Test Channel = MCH

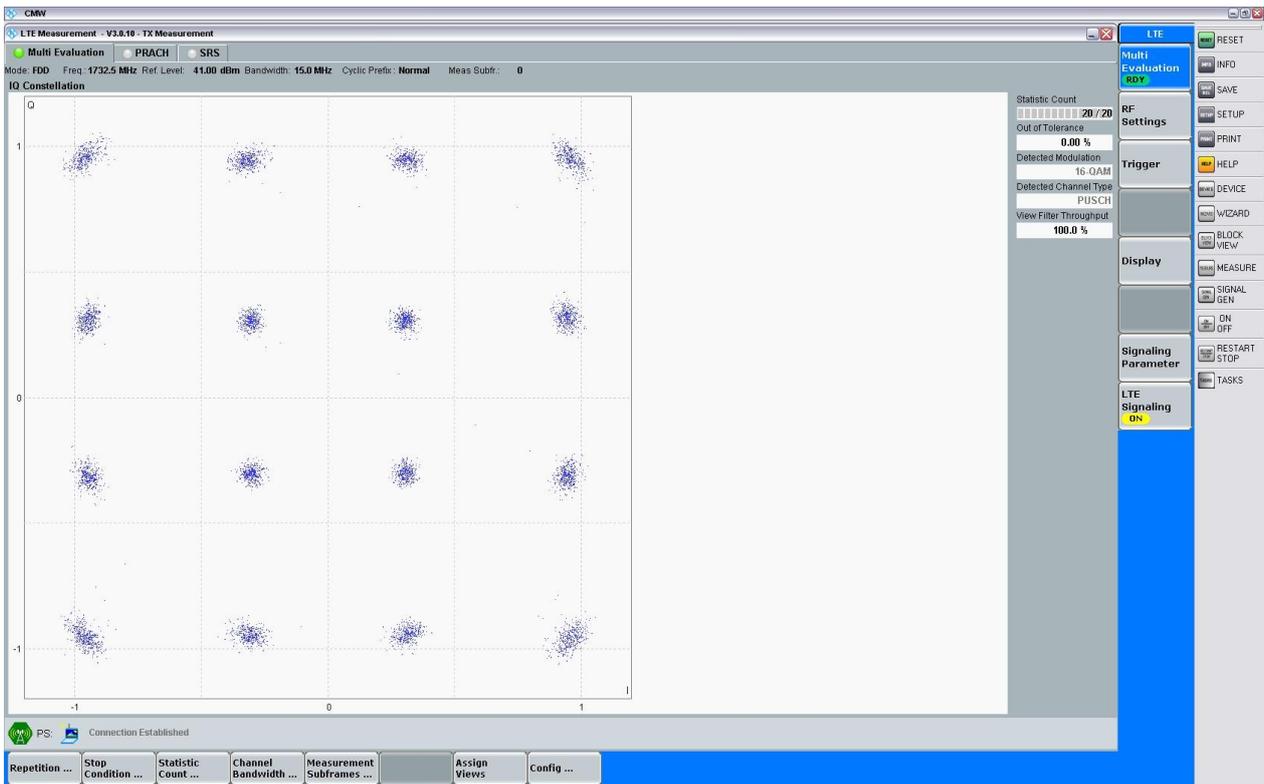
3.3.1.2.2.1.1 Test RB = RB50#0



3.3.1.2.3 Test Bandwidth = 15

3.3.1.2.3.1 Test Channel = MCH

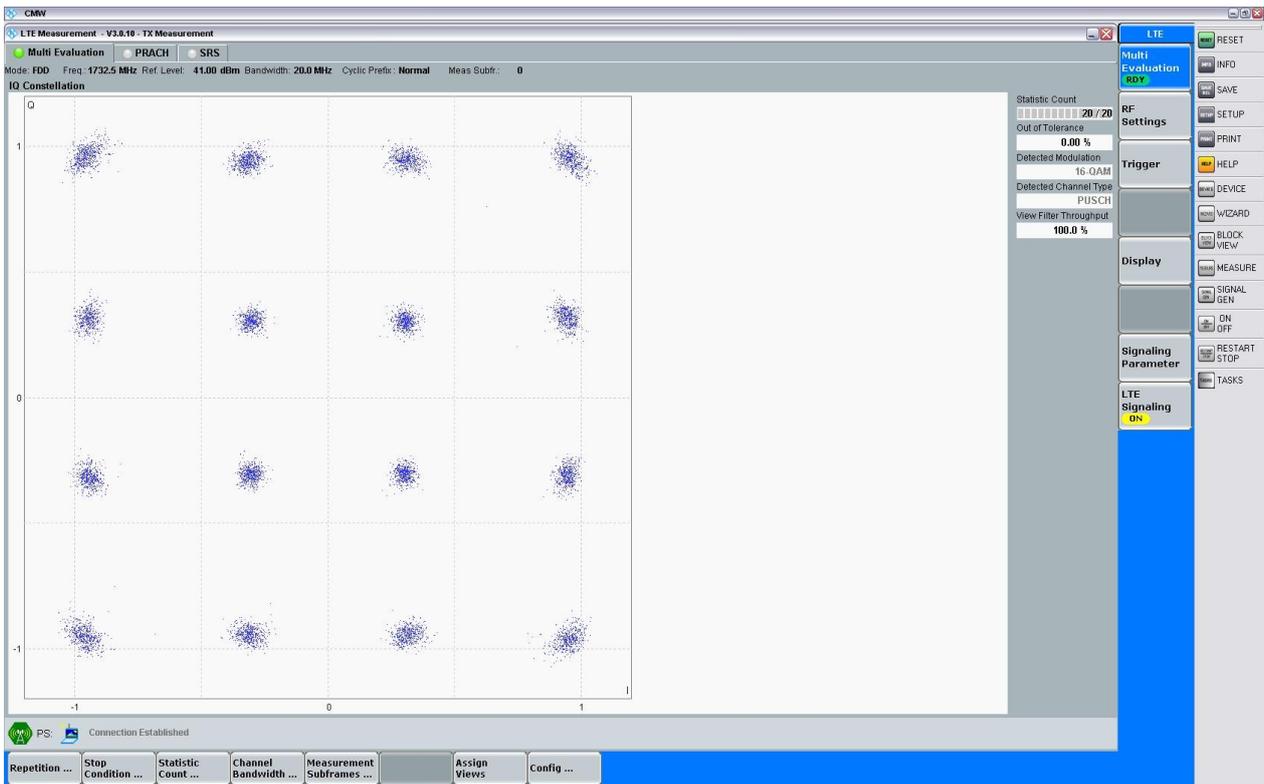
3.3.1.2.3.1.1 Test RB = RB75#0



3.3.1.2.4 Test Bandwidth = 20

3.3.1.2.4.1 Test Channel = MCH

3.3.1.2.4.1.1 Test RB = RB100#0



4Appendix_D: Bandwidth

Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GSM850	GSM/TM1	LCH	246.53	323.60	Pass
		MCH	244.33	315.78	Pass
		HCH	243.32	316.98	Pass
	GSM/TM2	LCH	243.77	320.53	Pass
		MCH	245.86	306.89	Pass
		HCH	247.61	307.78	Pass
GSM1900	GSM/TM1	LCH	244.34	312.78	Pass
		MCH	244.67	316.07	Pass
		HCH	246.41	319.14	Pass
	GSM/TM2	LCH	242.78	315.11	Pass
		MCH	243.42	303.37	Pass
		HCH	242.30	315.62	Pass
Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
WCDMA850	UMTS/TM1	LCH	4.16	4.67	Pass
		MCH	4.15	4.67	Pass
		HCH	4.16	4.67	Pass
WCDMA1700	UMTS/TM1	LCH	4.16	4.66	Pass
		MCH	4.16	4.67	Pass
		HCH	4.16	4.66	Pass
WCDMA1900	UMTS/TM1	LCH	4.15	4.68	Pass
		MCH	4.16	4.68	Pass
		HCH	4.15	4.69	Pass



Test Band	Test Mode	Test Bandwidth	Test Channel	Test RB	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
BAND4	LTE/TM1	1.4	LCH	RB6#0	1.09	1.28	Pass
			MCH	RB6#0	1.09	1.26	Pass
			HCH	RB6#0	1.09	1.29	Pass
		3	LCH	RB15#0	2.70	2.94	Pass
			MCH	RB15#0	2.70	2.97	Pass
			HCH	RB15#0	2.70	2.96	Pass
		5	LCH	RB25#0	4.50	4.93	Pass
			MCH	RB25#0	4.51	4.94	Pass
			HCH	RB25#0	4.51	4.95	Pass
		10	LCH	RB50#0	8.98	9.57	Pass
			MCH	RB50#0	8.98	9.59	Pass
			HCH	RB50#0	8.98	9.58	Pass
		15	LCH	RB75#0	13.46	14.26	Pass
			MCH	RB75#0	13.46	14.29	Pass
			HCH	RB75#0	13.46	14.29	Pass
		20	LCH	RB100#0	17.93	18.98	Pass
			MCH	RB100#0	17.92	18.97	Pass
			HCH	RB100#0	17.93	19.02	Pass
	LTE/TM2	1.4	LCH	RB6#0	1.09	1.28	Pass
			MCH	RB6#0	1.09	1.29	Pass
			HCH	RB6#0	1.09	1.30	Pass
		3	LCH	RB15#0	2.70	2.98	Pass
			MCH	RB15#0	2.70	2.98	Pass
			HCH	RB15#0	2.70	2.97	Pass
		5	LCH	RB25#0	4.50	4.96	Pass
			MCH	RB25#0	4.50	4.95	Pass
			HCH	RB25#0	4.50	4.93	Pass
		10	LCH	RB50#0	8.96	9.55	Pass
			MCH	RB50#0	8.96	9.55	Pass
			HCH	RB50#0	8.96	9.55	Pass
		15	LCH	RB75#0	13.45	14.31	Pass
			MCH	RB75#0	13.45	14.33	Pass
			HCH	RB75#0	13.45	14.33	Pass
		20	LCH	RB100#0	17.93	19.00	Pass
			MCH	RB100#0	17.92	19.01	Pass
			HCH	RB100#0	17.93	19.01	Pass



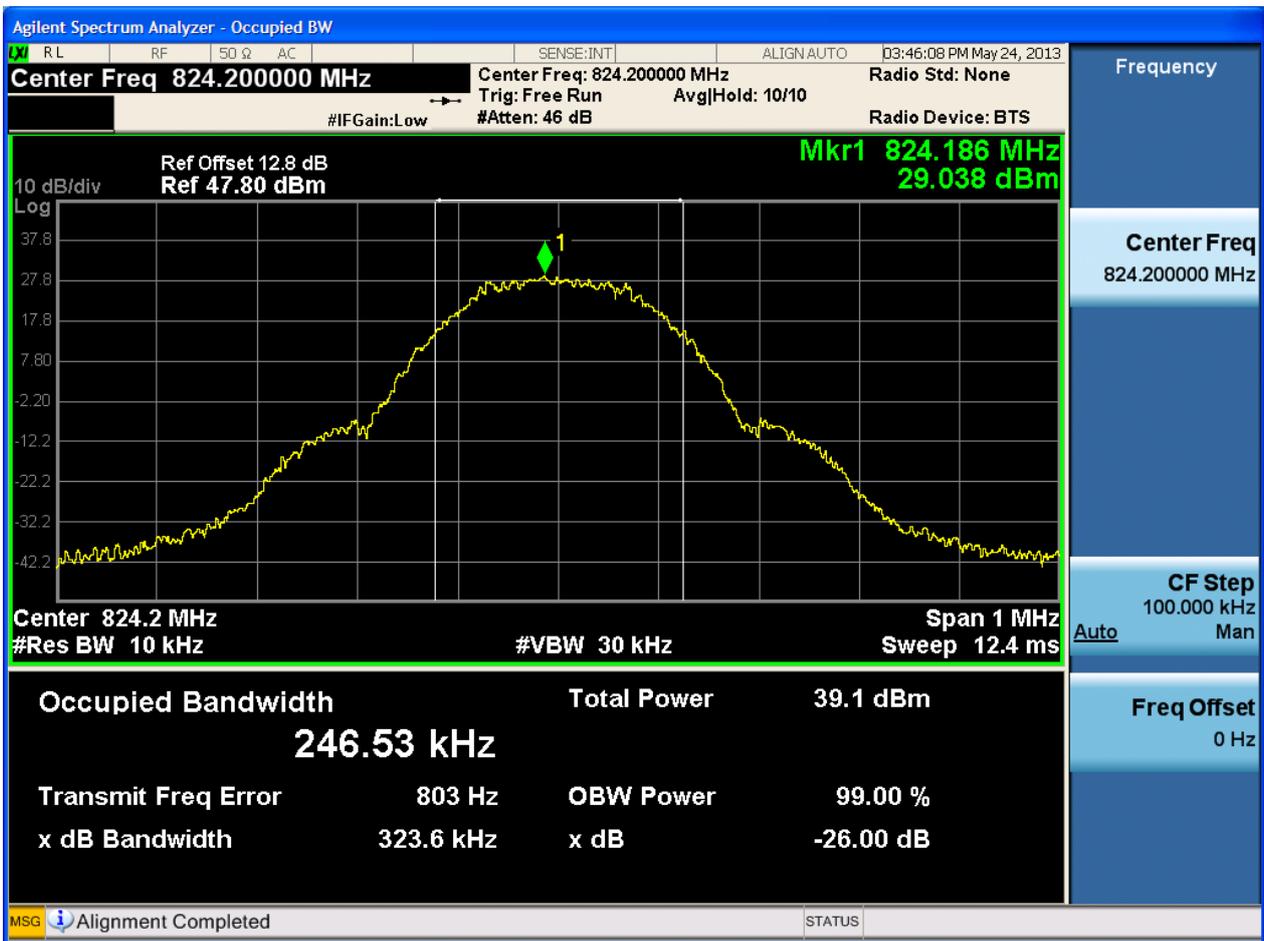
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

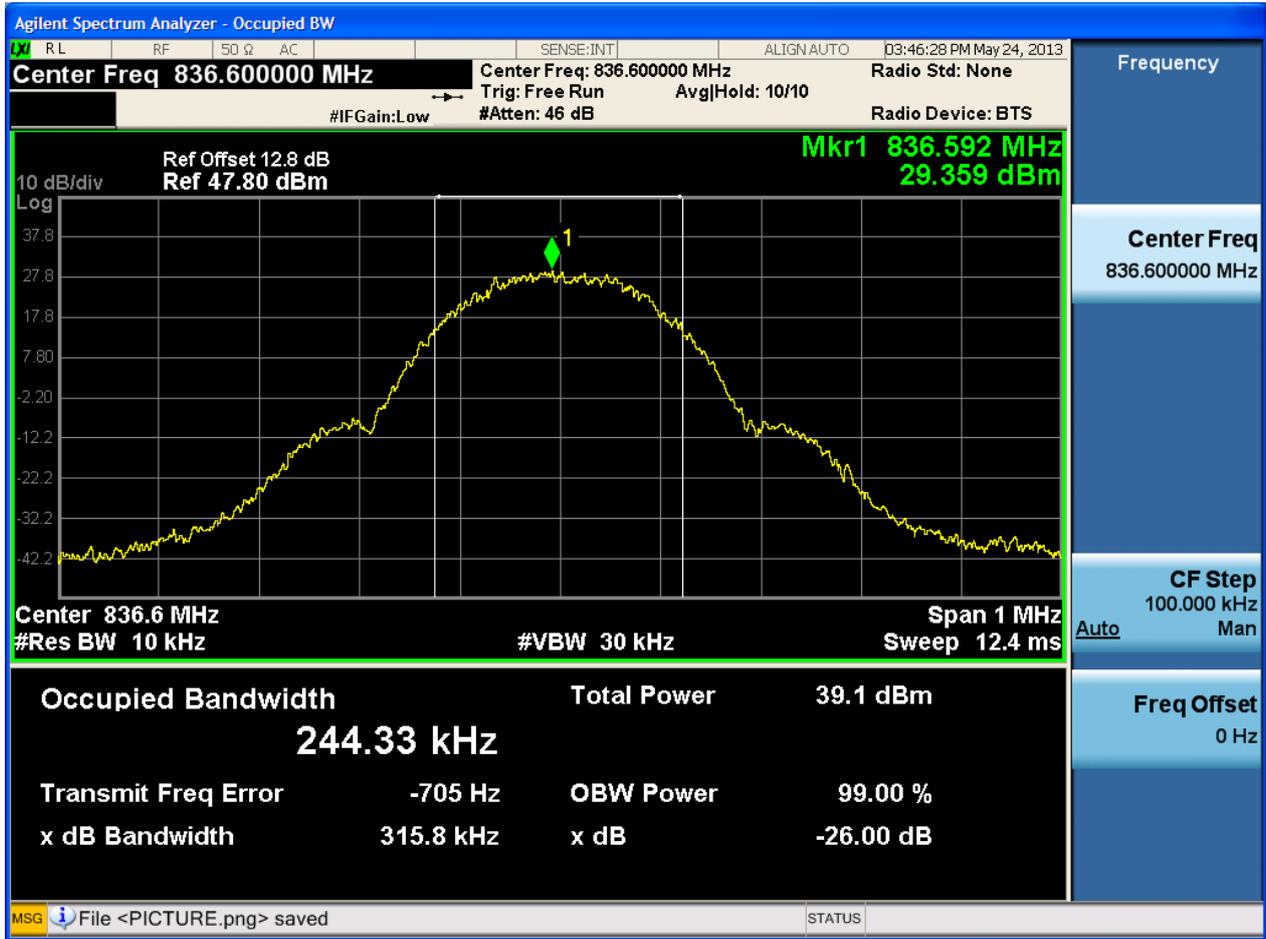
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



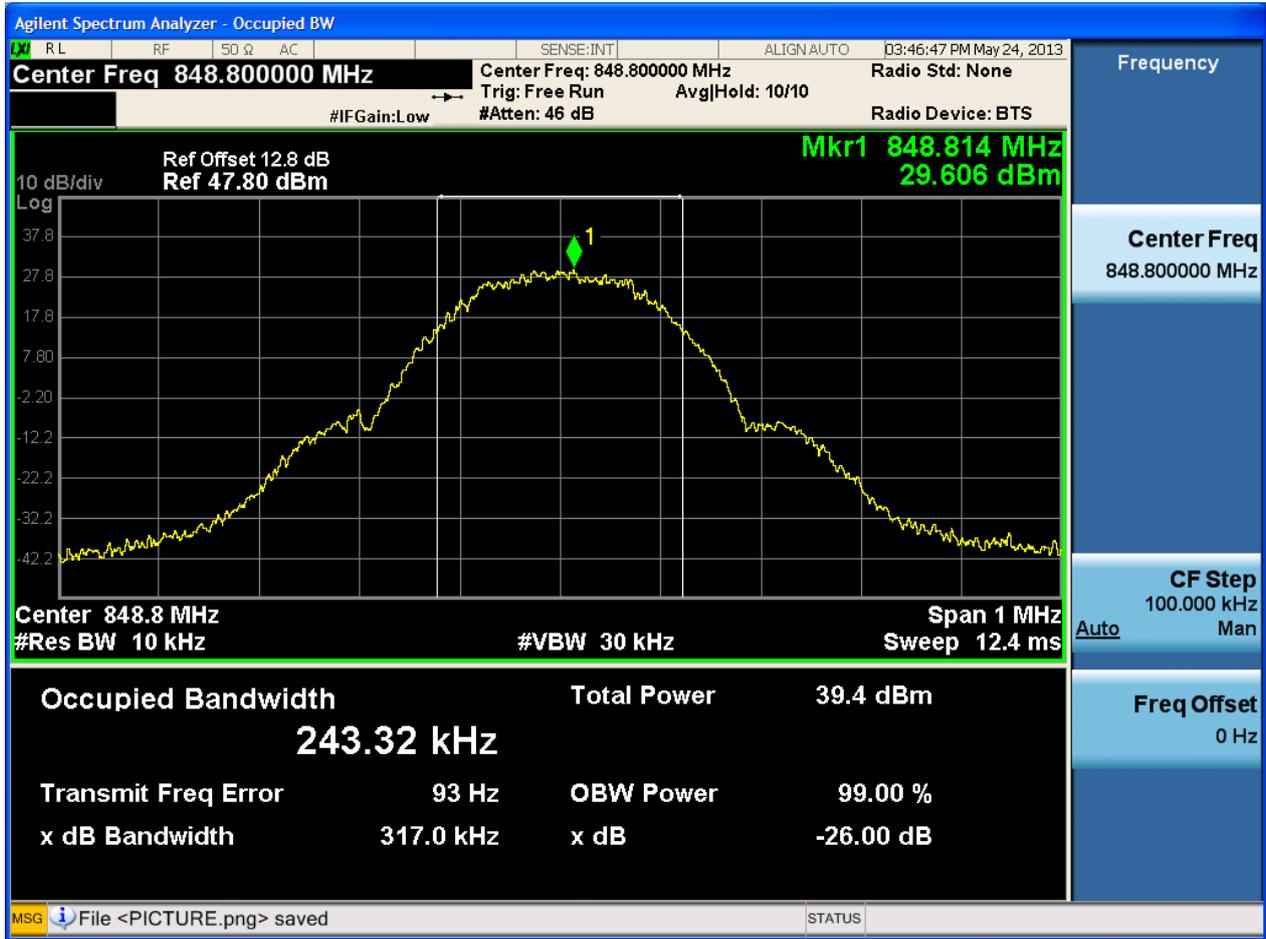


4.1.1.1.2 Test Channel = MCH





4.1.1.1.3 Test Channel = HCH





4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



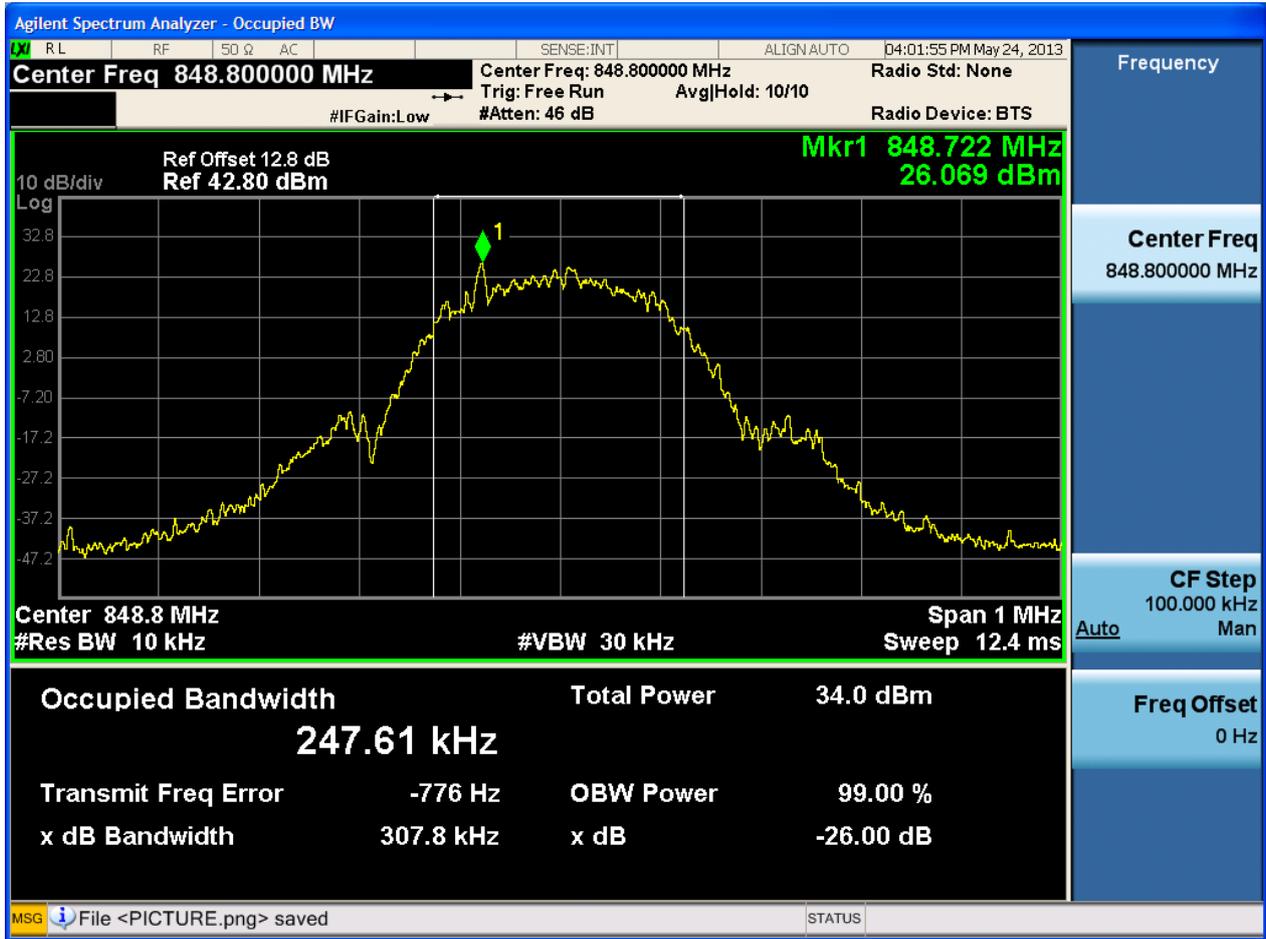


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

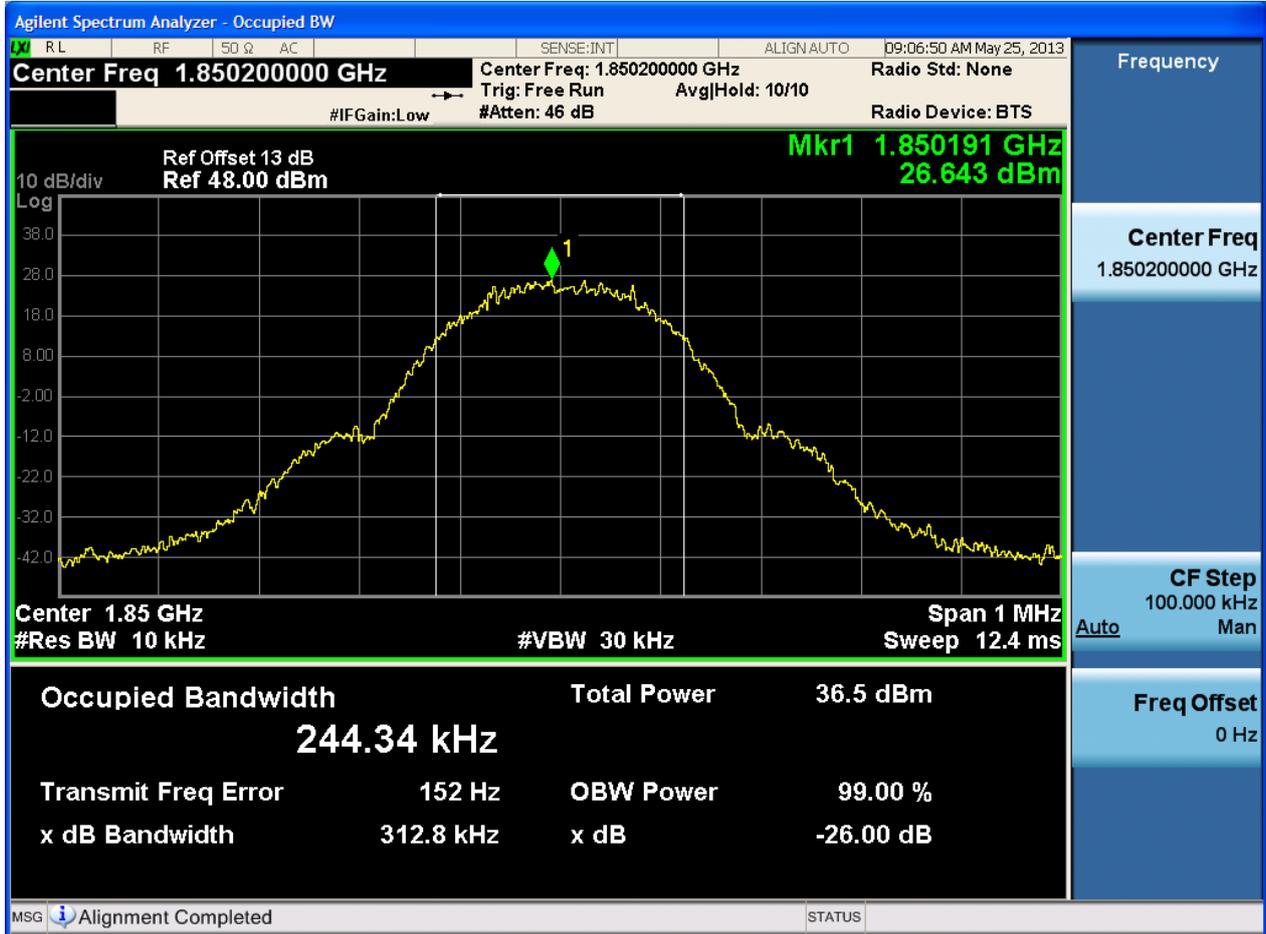




4.1.2 Test Band = GSM1900

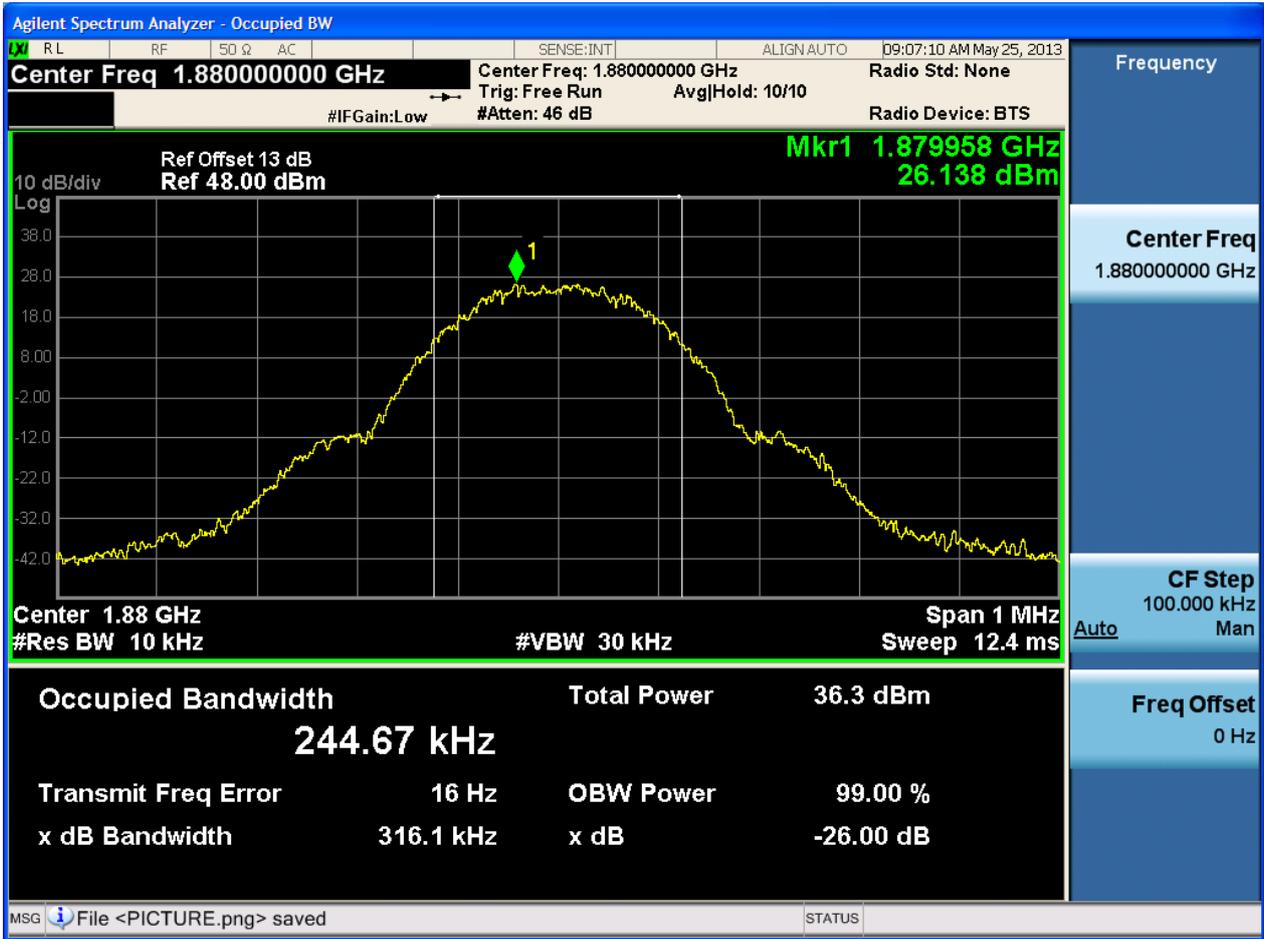
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



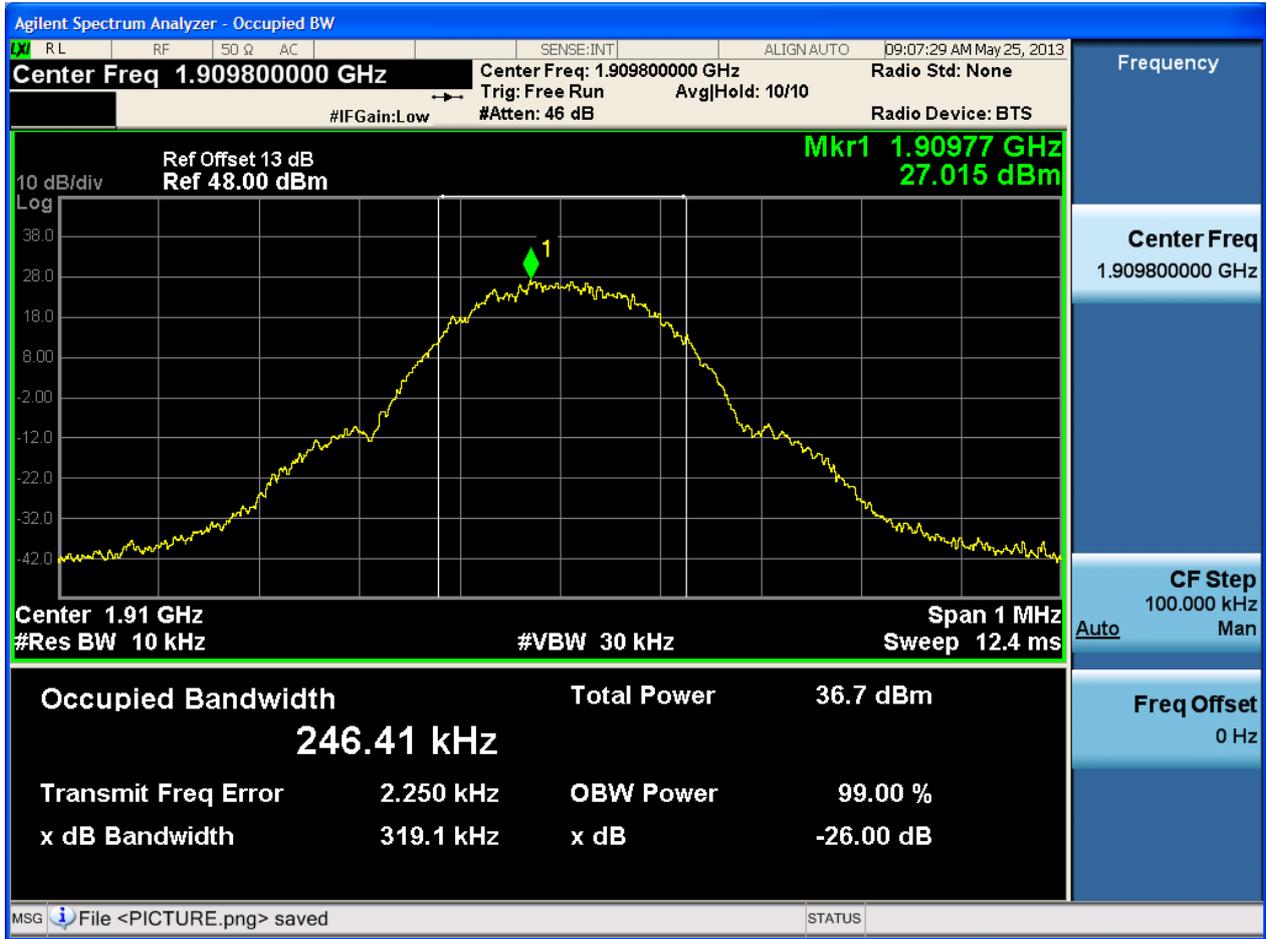


4.1.2.1.2 Test Channel = MCH





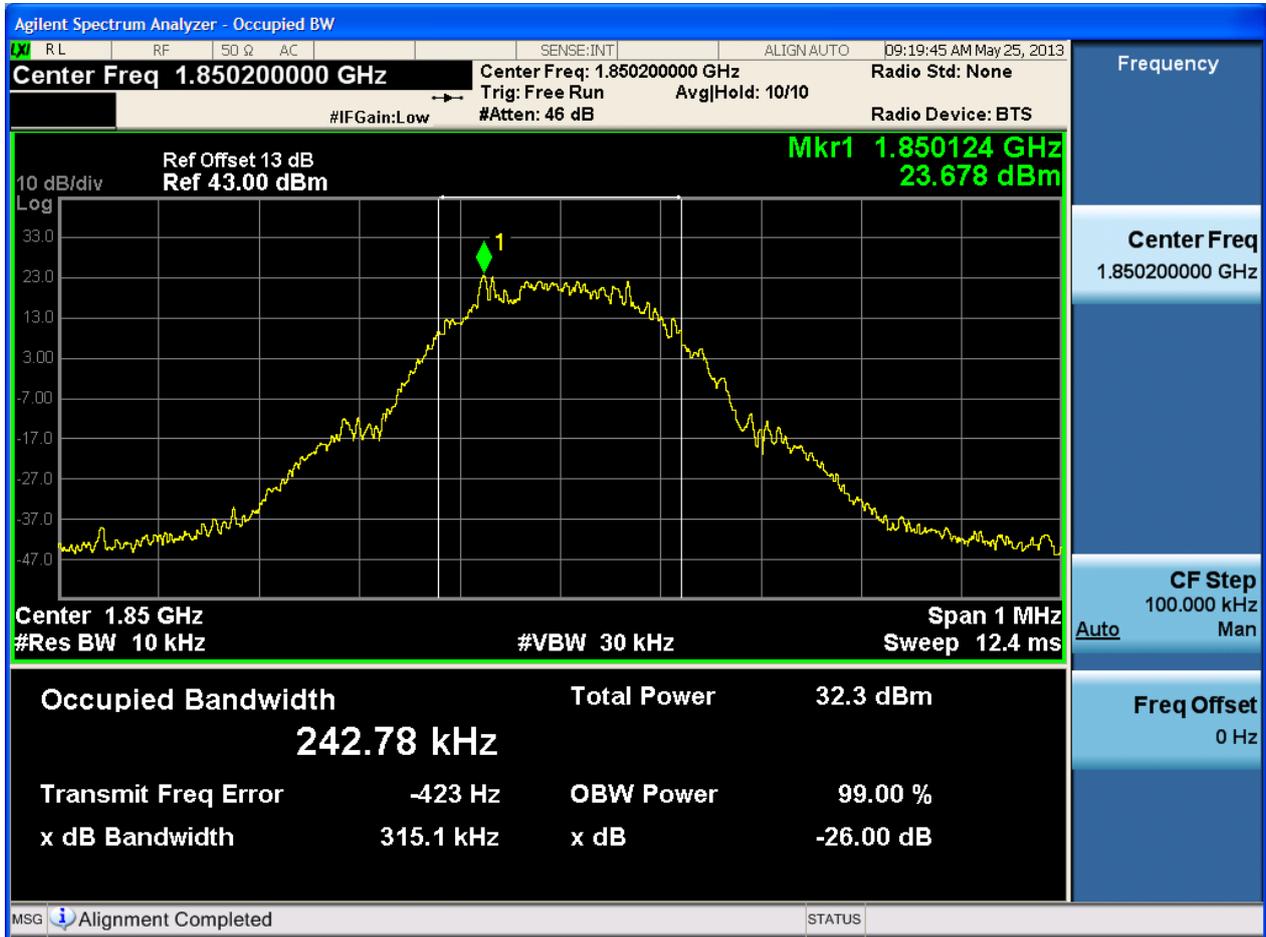
4.1.2.1.3 Test Channel = HCH





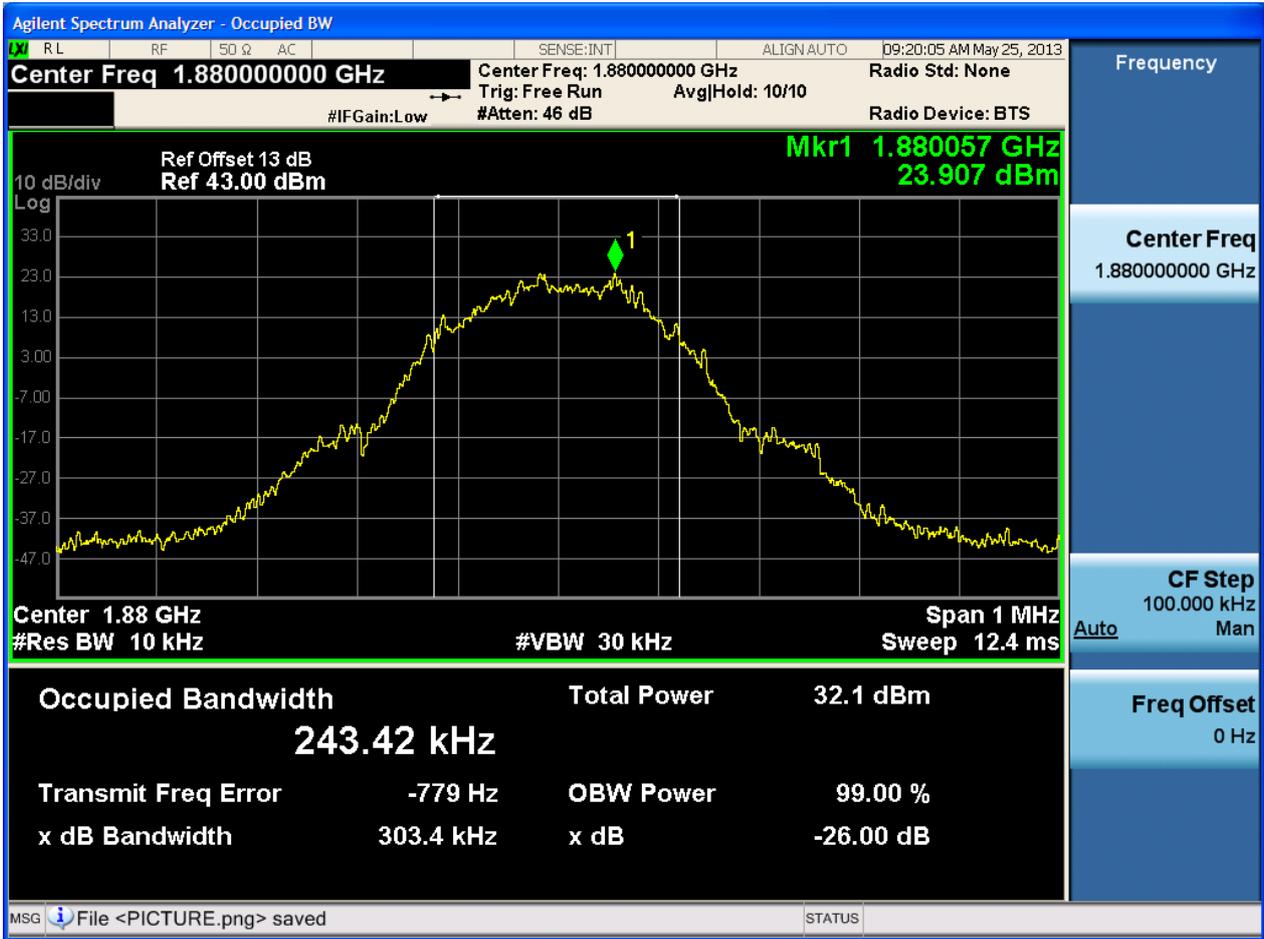
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



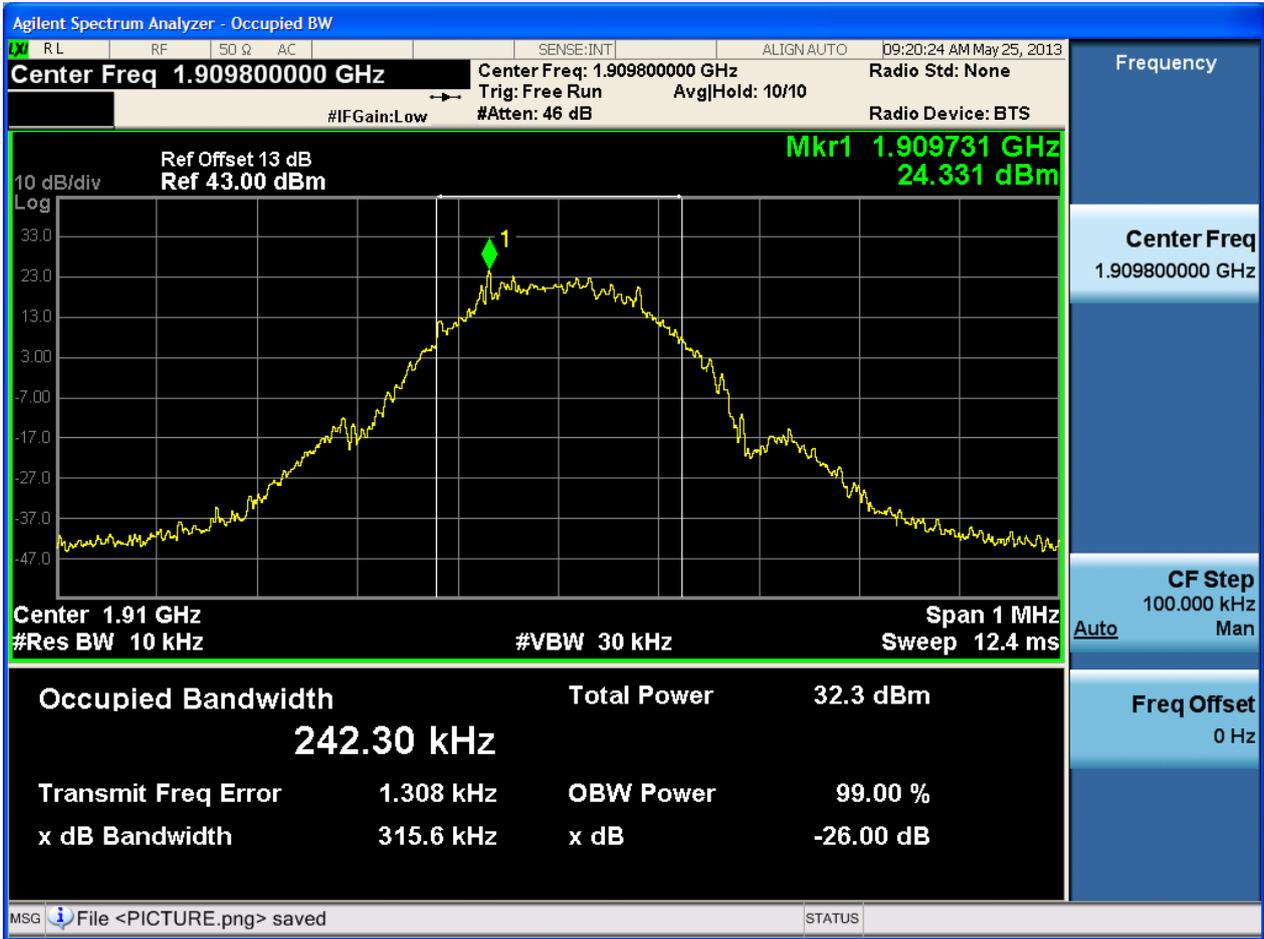


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH



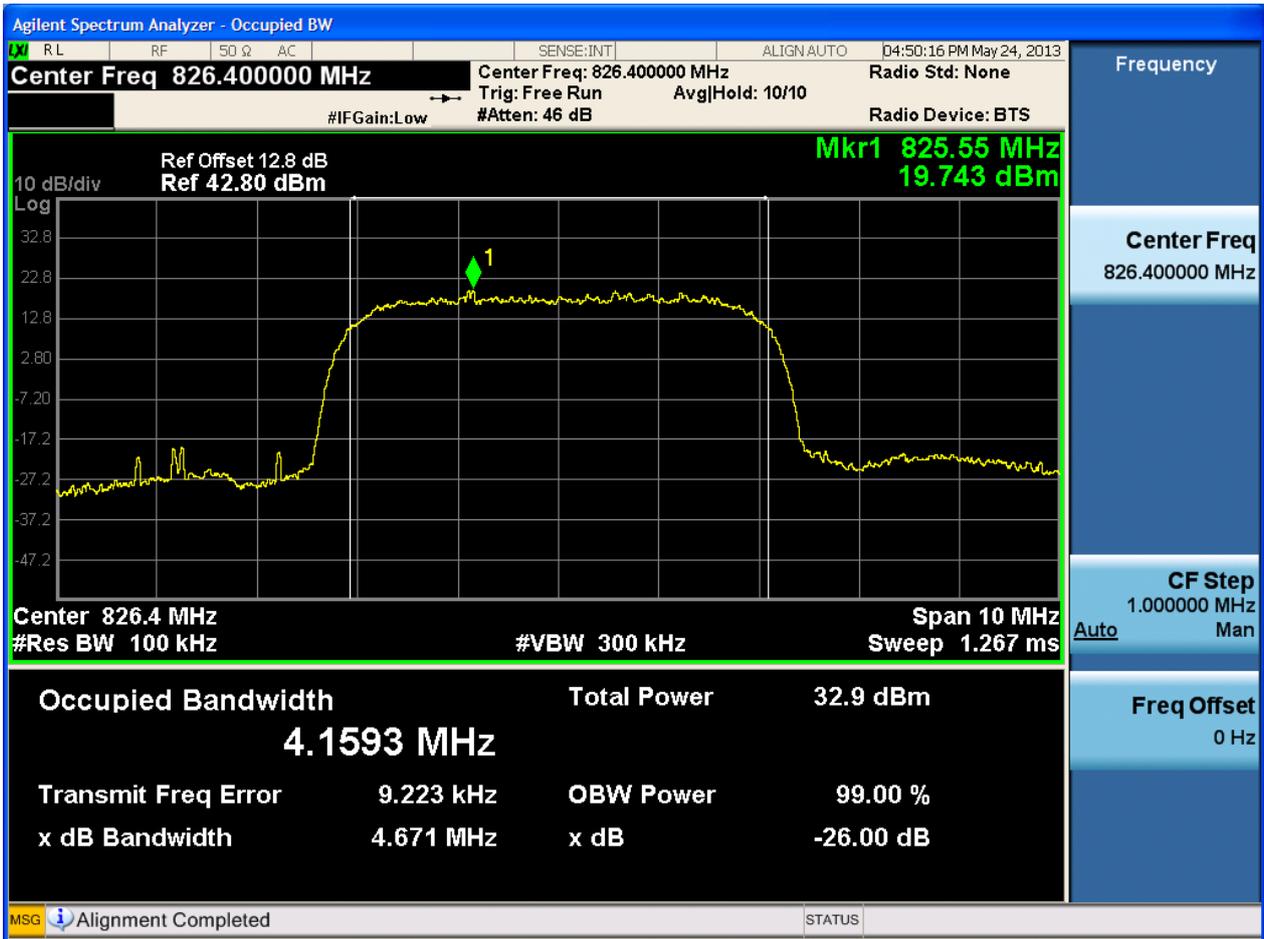


4.2 For UMTS

4.2.1 Test Band = WCDMA850

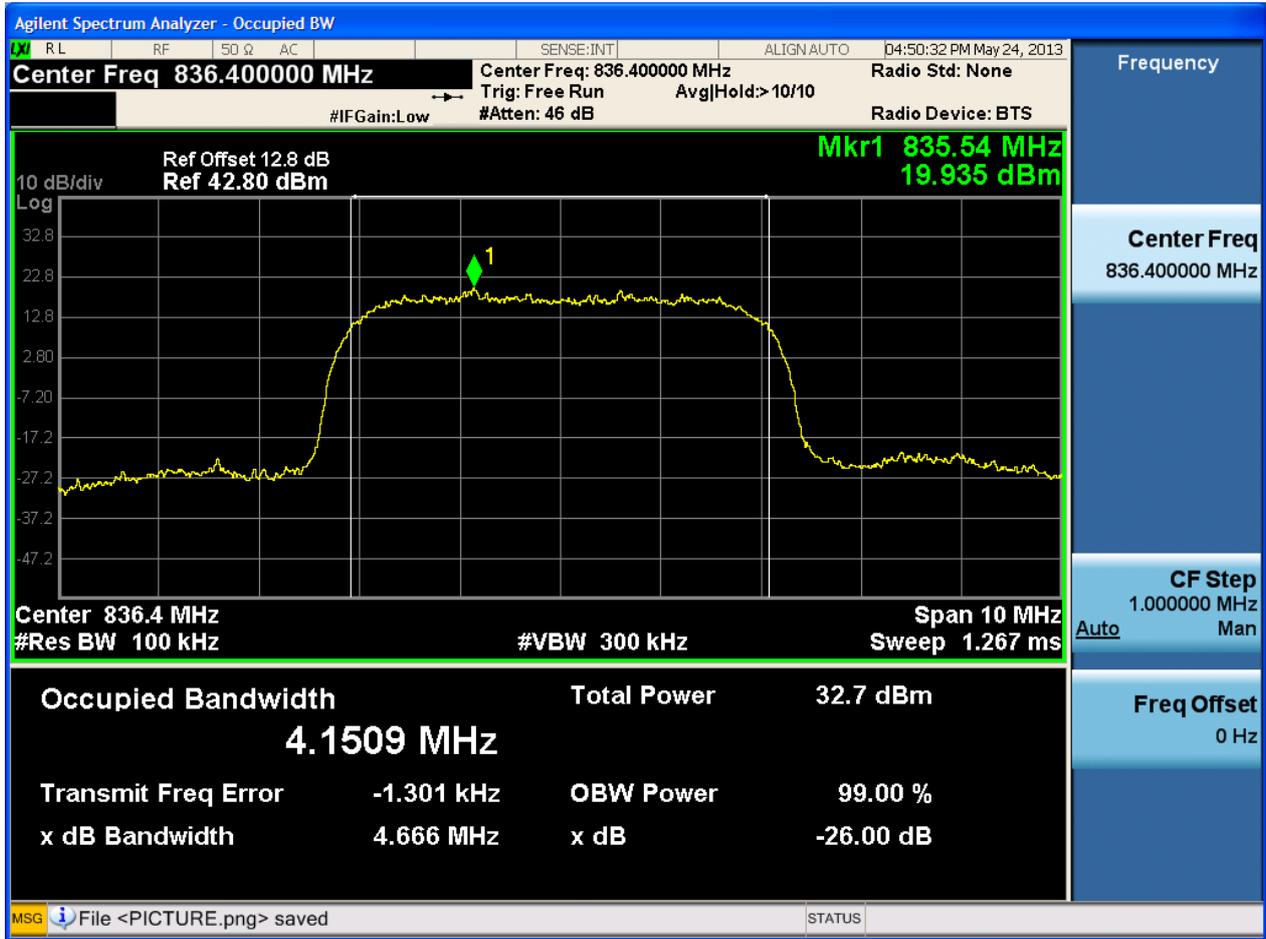
4.2.1.1 Test Mode = UMTS/TM1

4.2.1.1.1 Test Channel = LCH



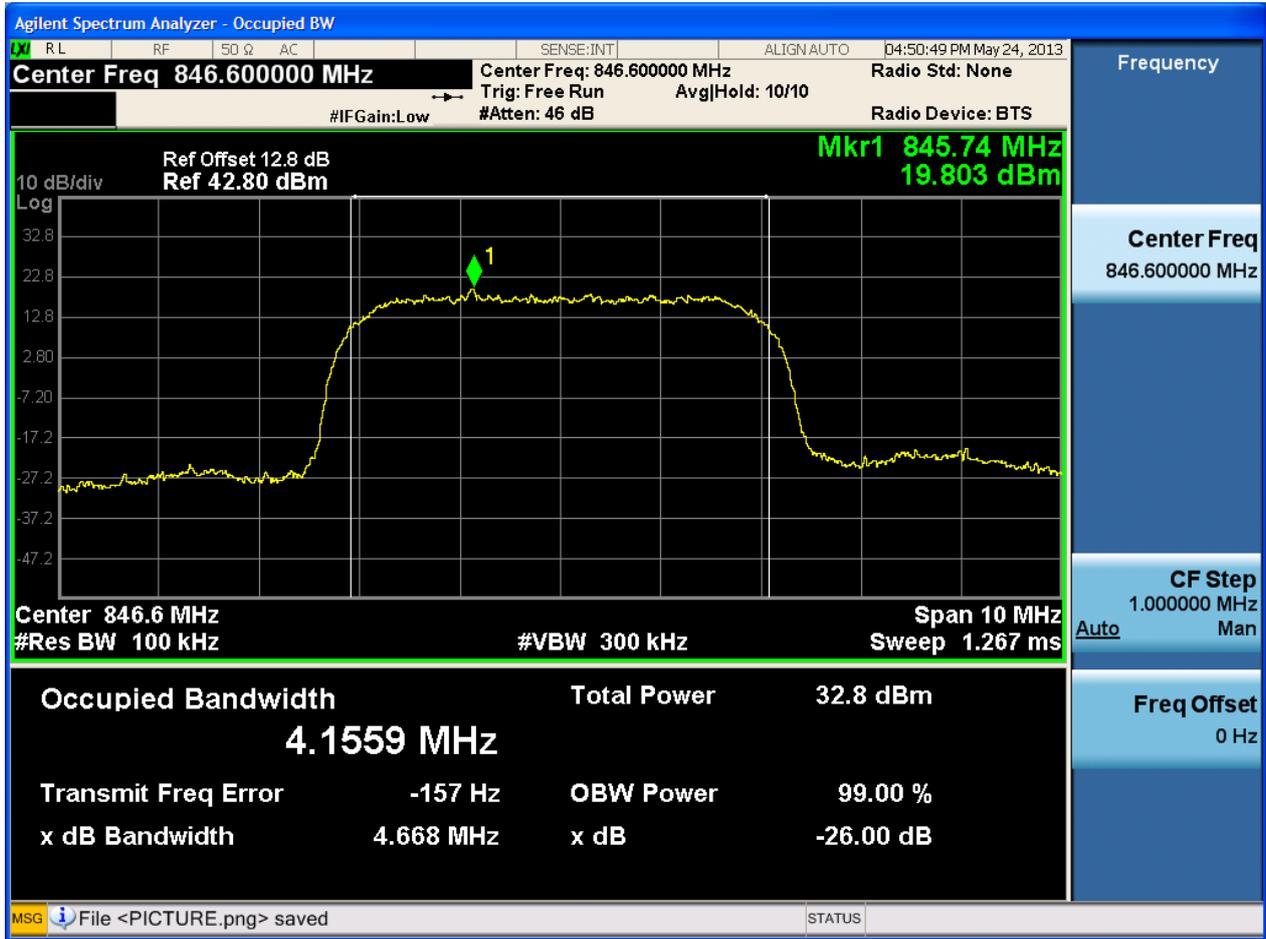


4.2.1.1.2 Test Channel = MCH





4.2.1.1.3 Test Channel = HCH

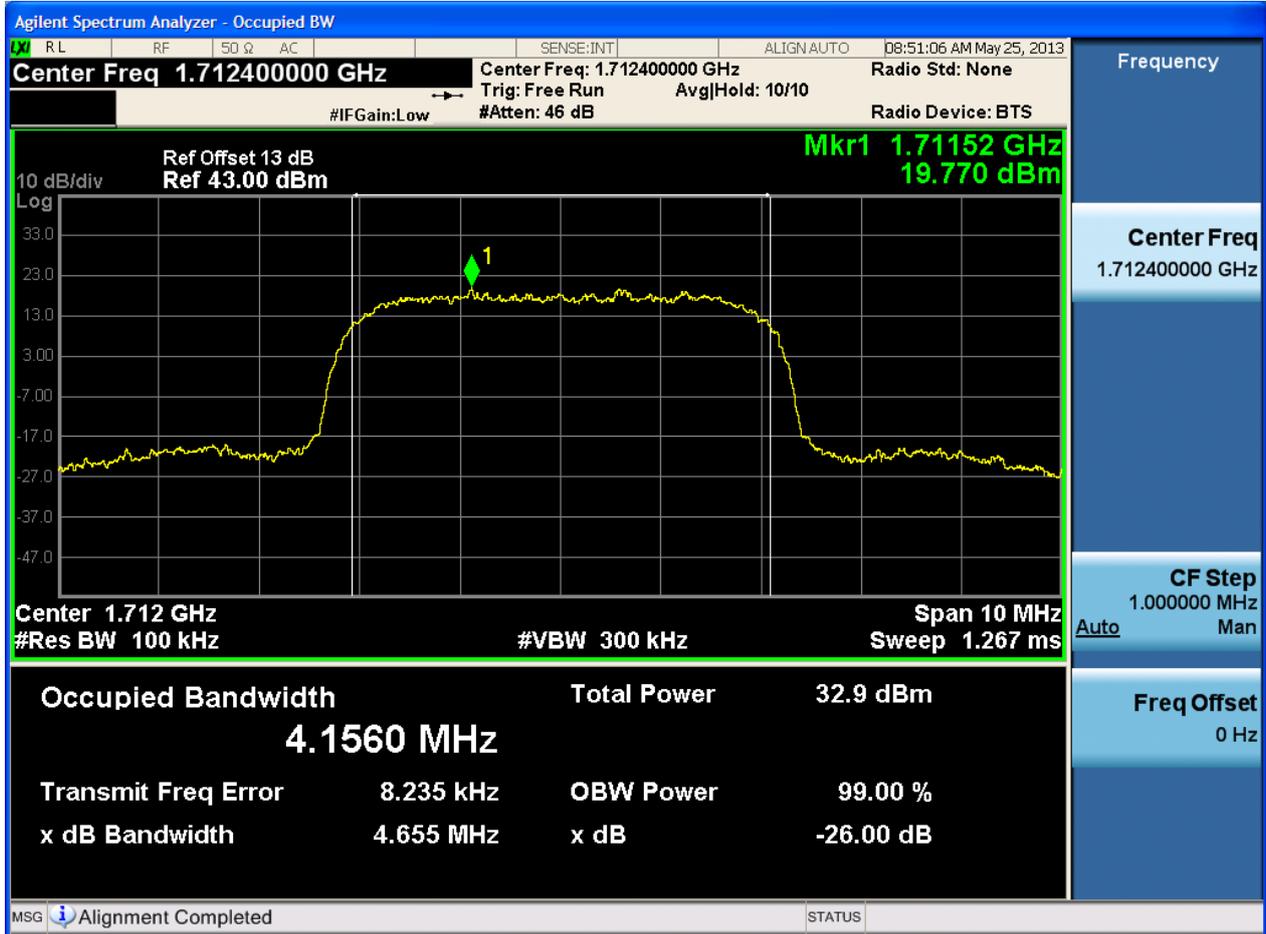




4.2.2 Test Band = WCDMA1700

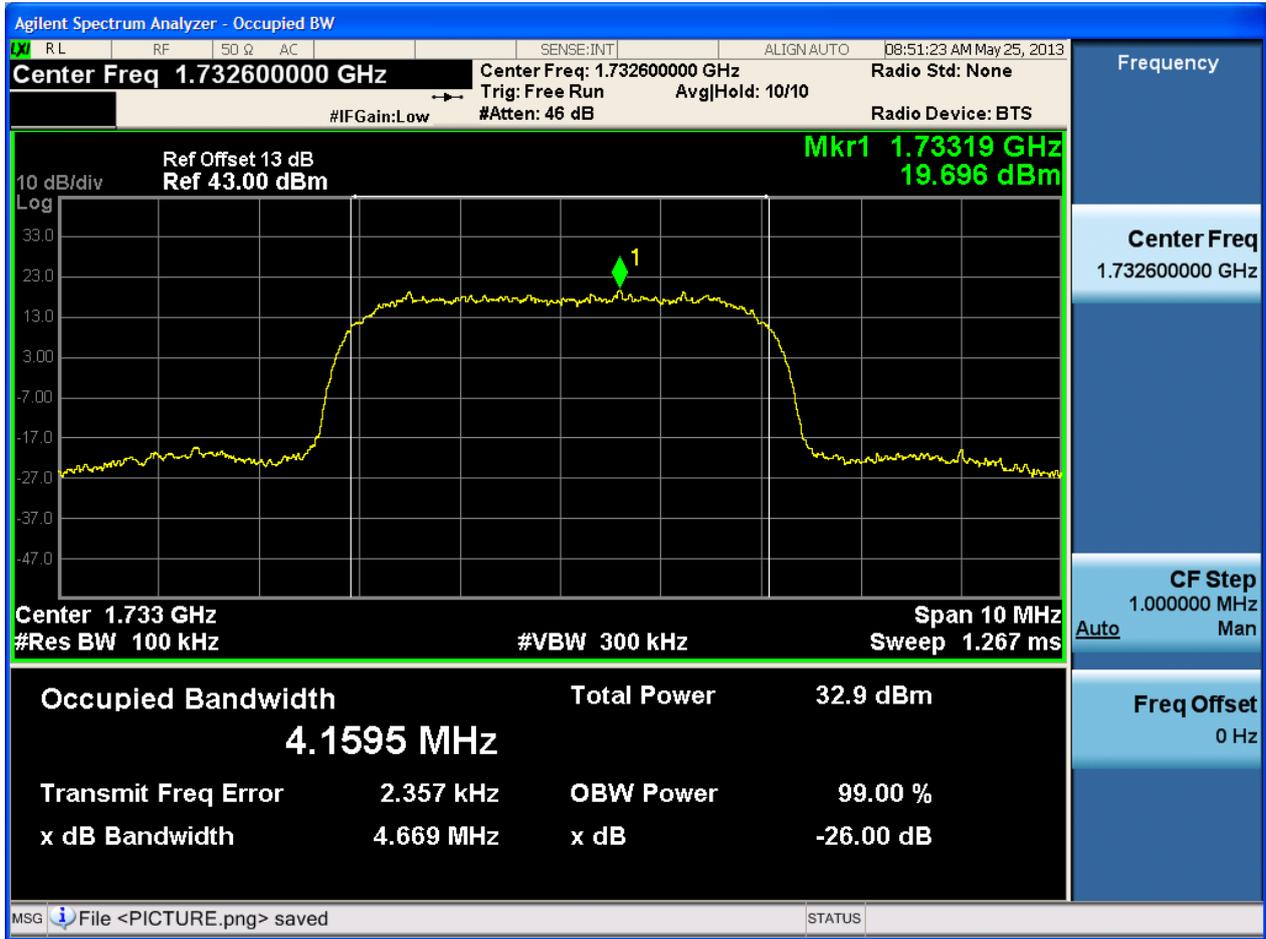
4.2.2.1 Test Mode = UMTS/TM1

4.2.2.1.1 Test Channel = LCH



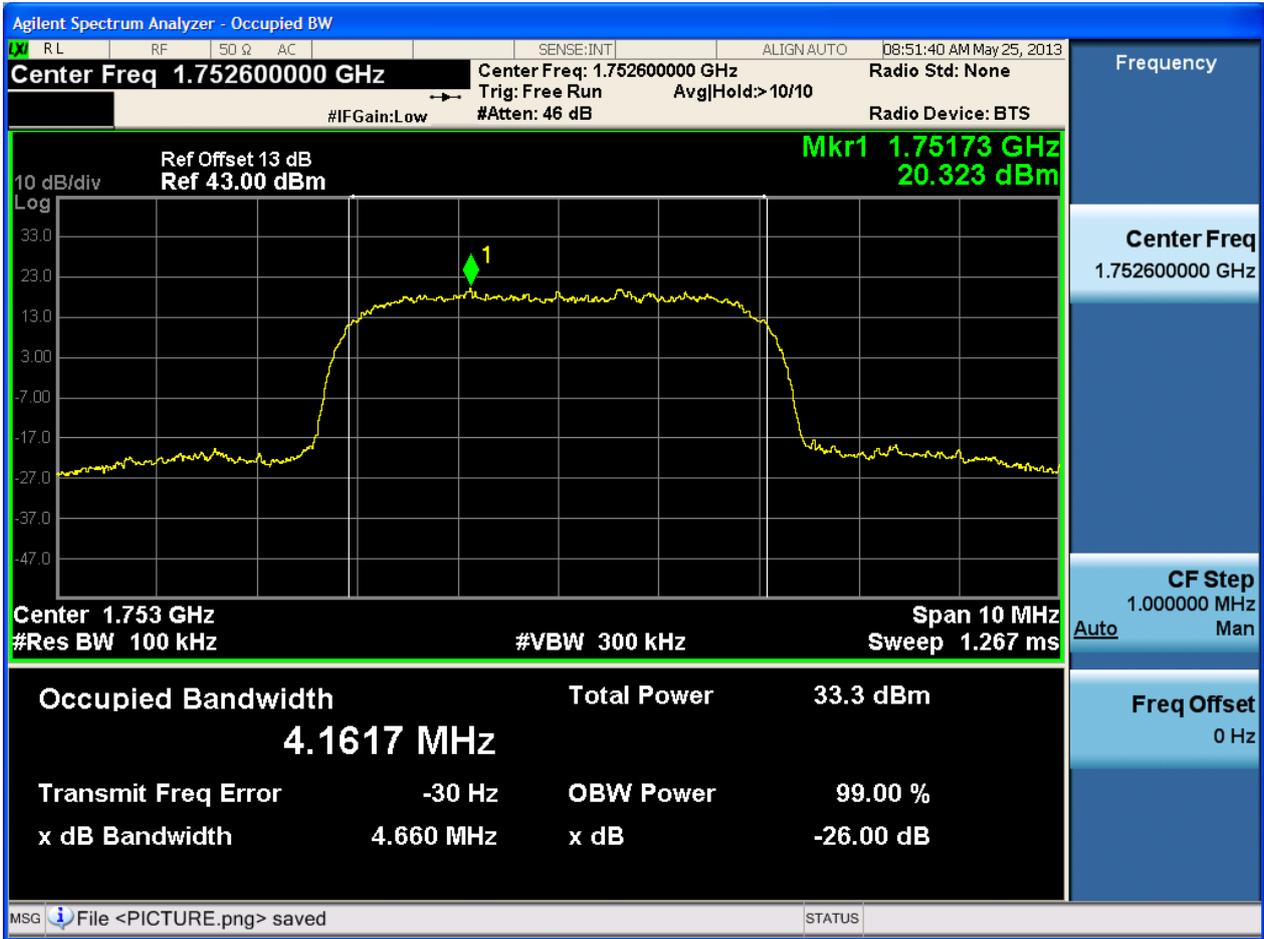


4.2.2.1.2 Test Channel = MCH





4.2.2.1.3 Test Channel = HCH

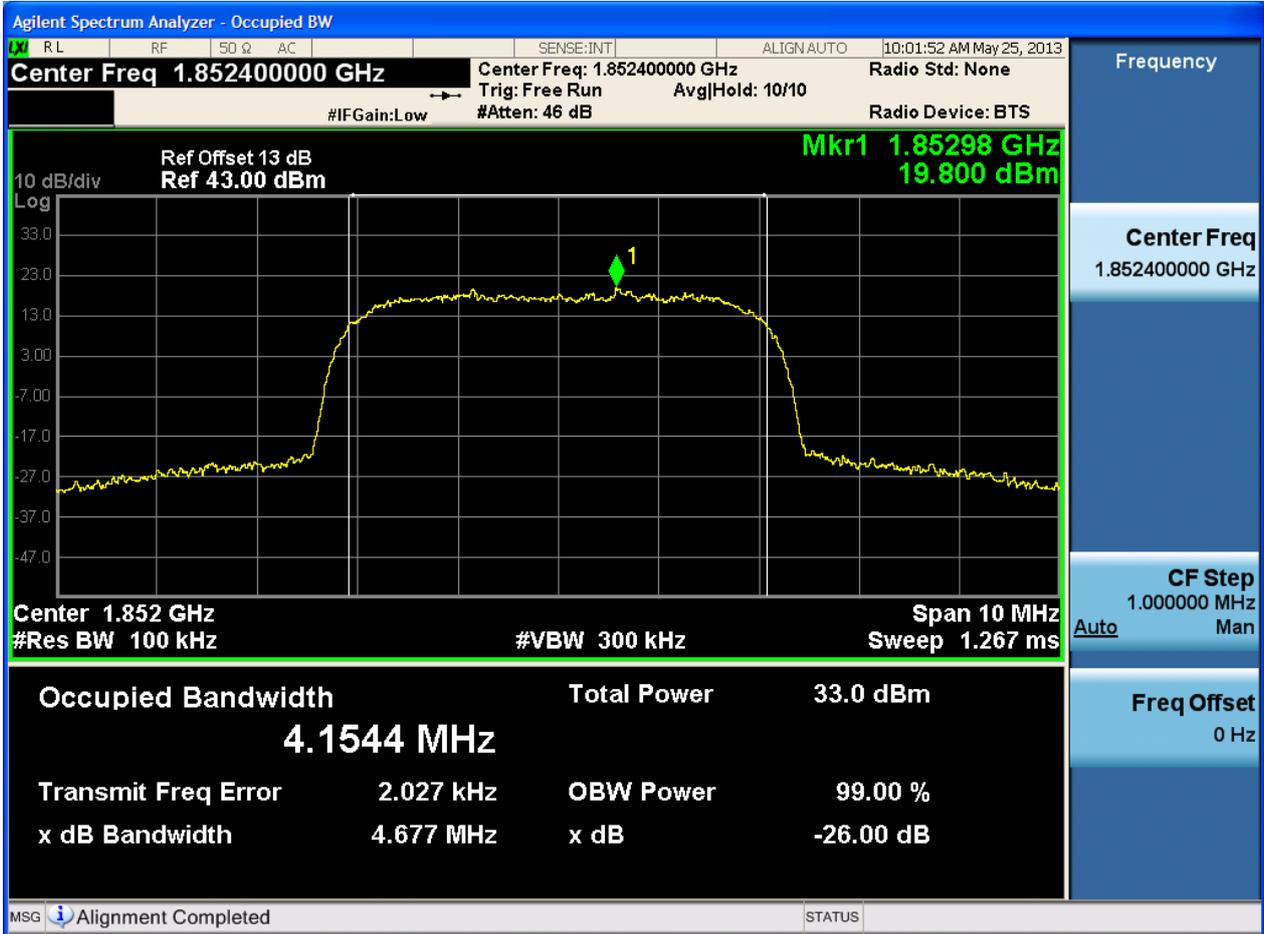




4.2.3 Test Band = WCDMA1900

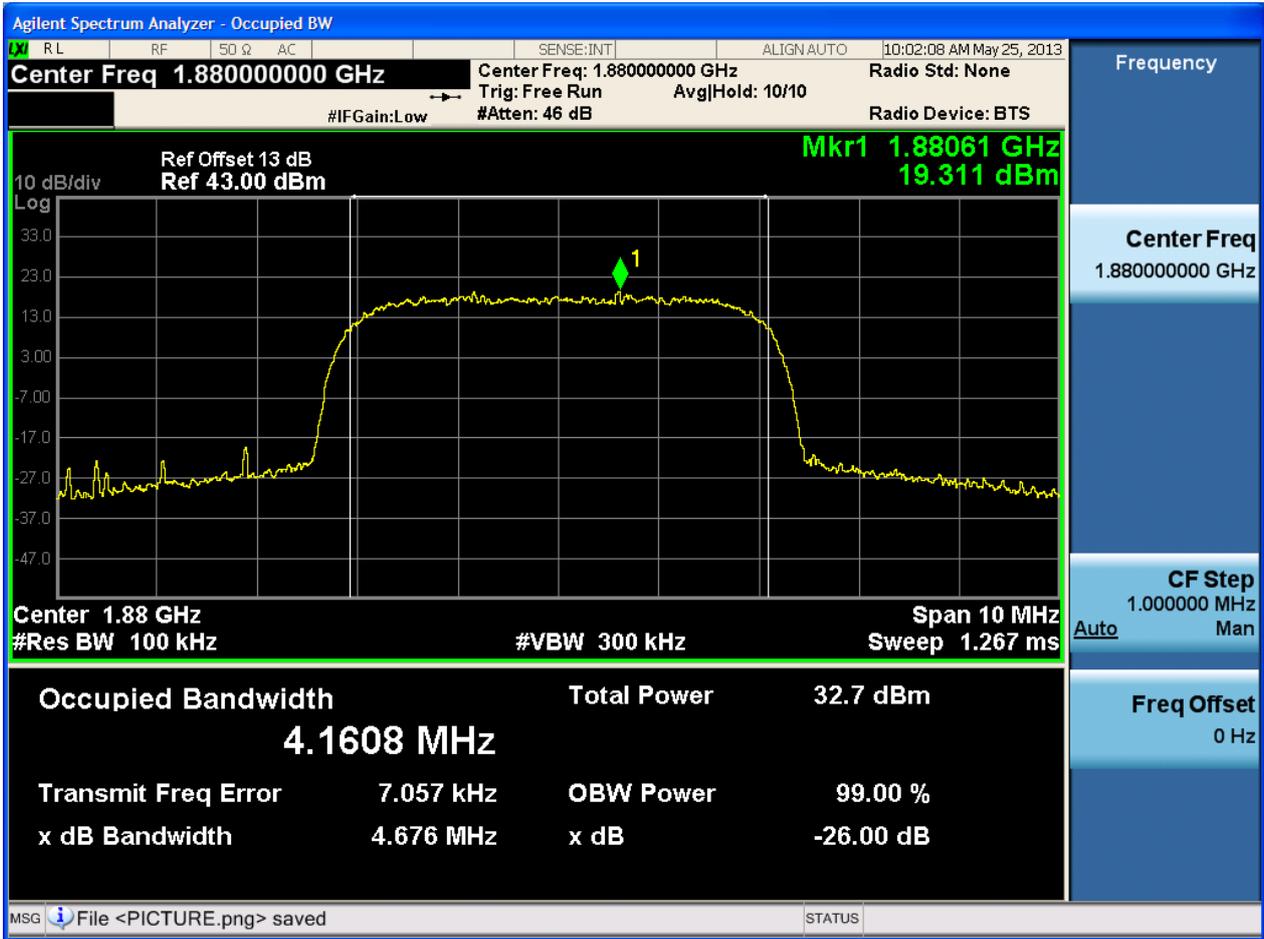
4.2.3.1 Test Mode = UMTS/TM1

4.2.3.1.1 Test Channel = LCH



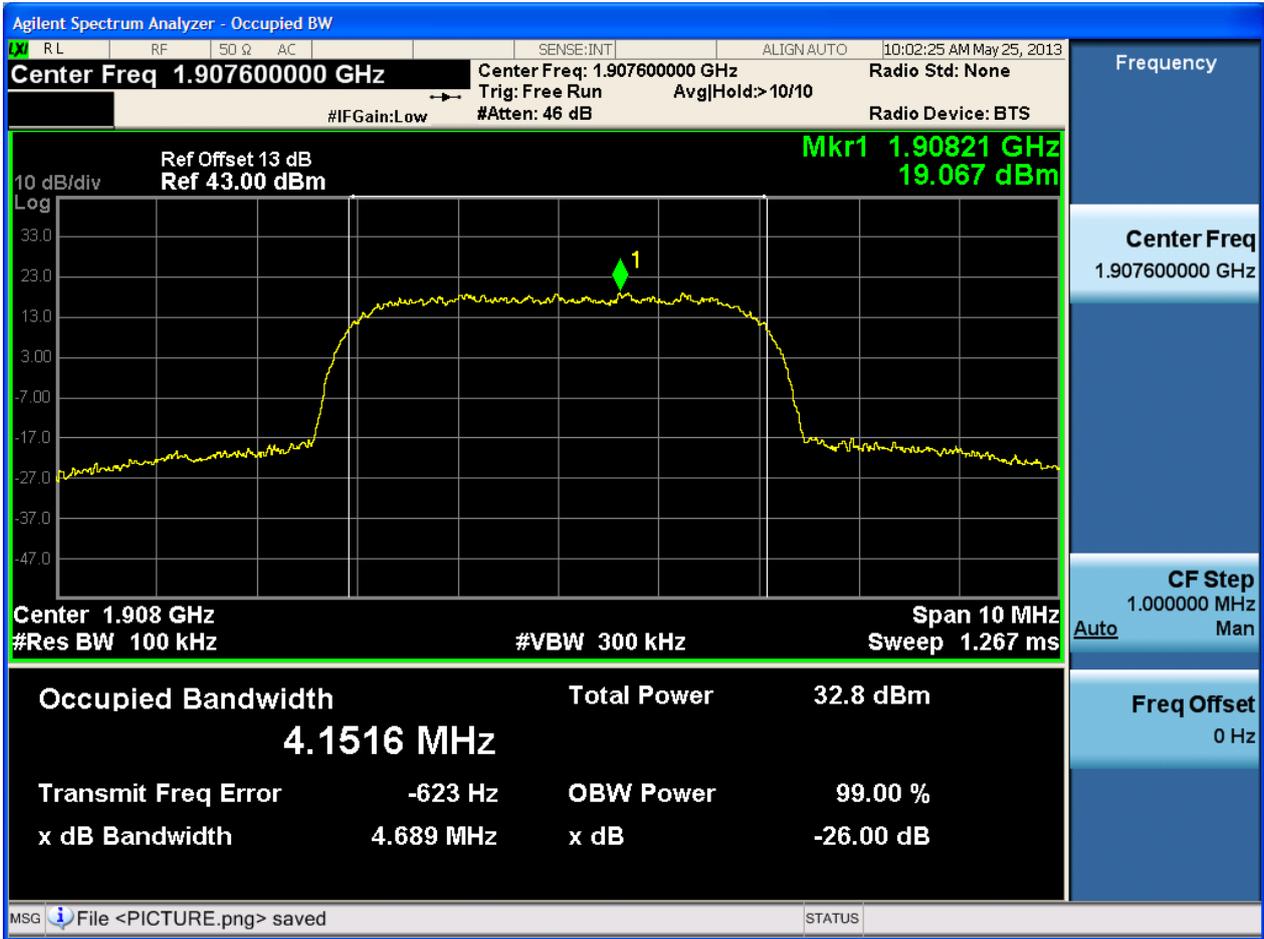


4.2.3.1.2 Test Channel = MCH





4.2.3.1.3 Test Channel = HCH





4.3 For LTE

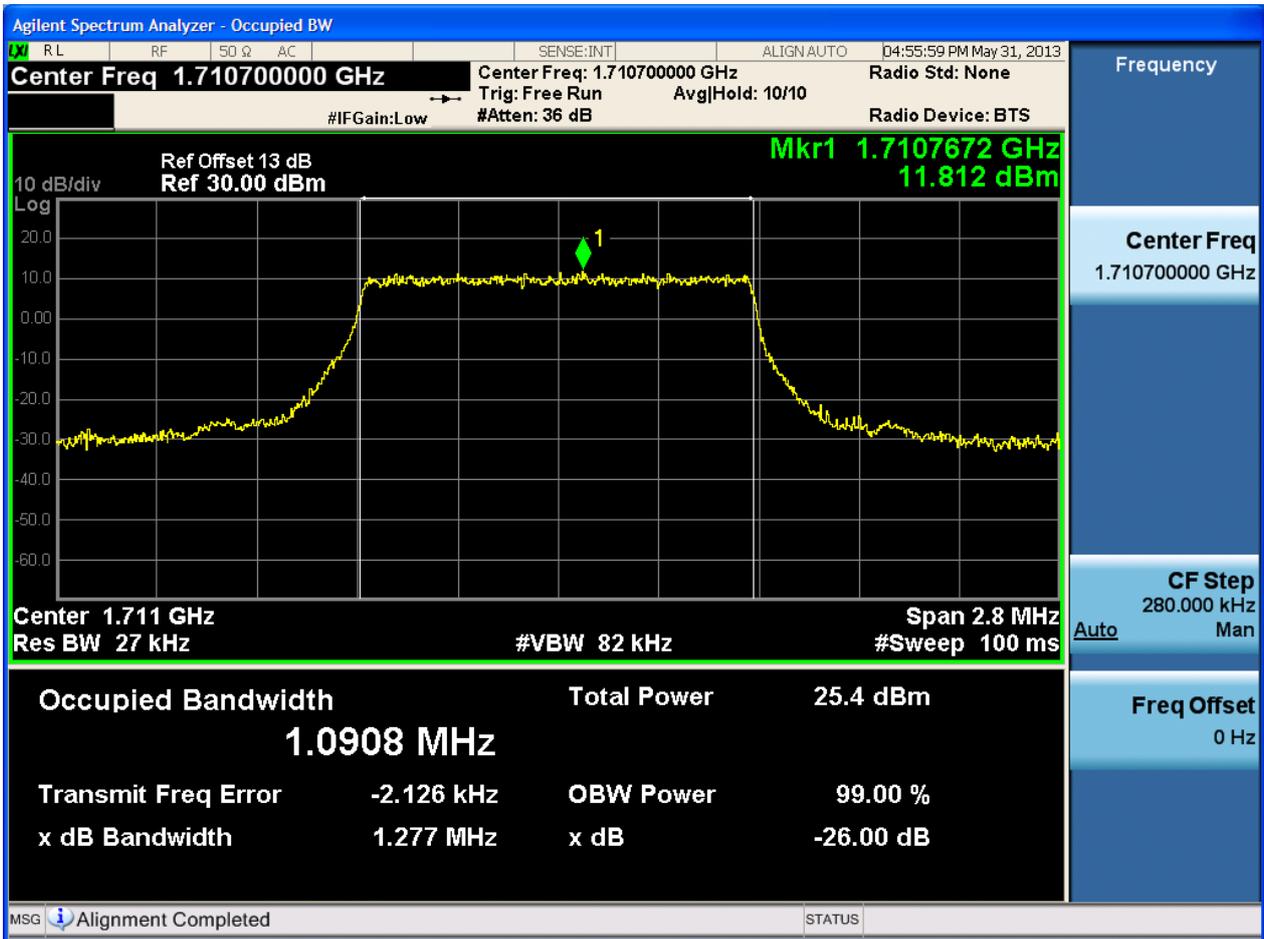
4.3.1 Test Band = BAND4

4.3.1.1 Test Mode = LTE/TM1

4.3.1.1.1 Test Bandwidth = 1.4

4.3.1.1.1.1 Test Channel = LCH

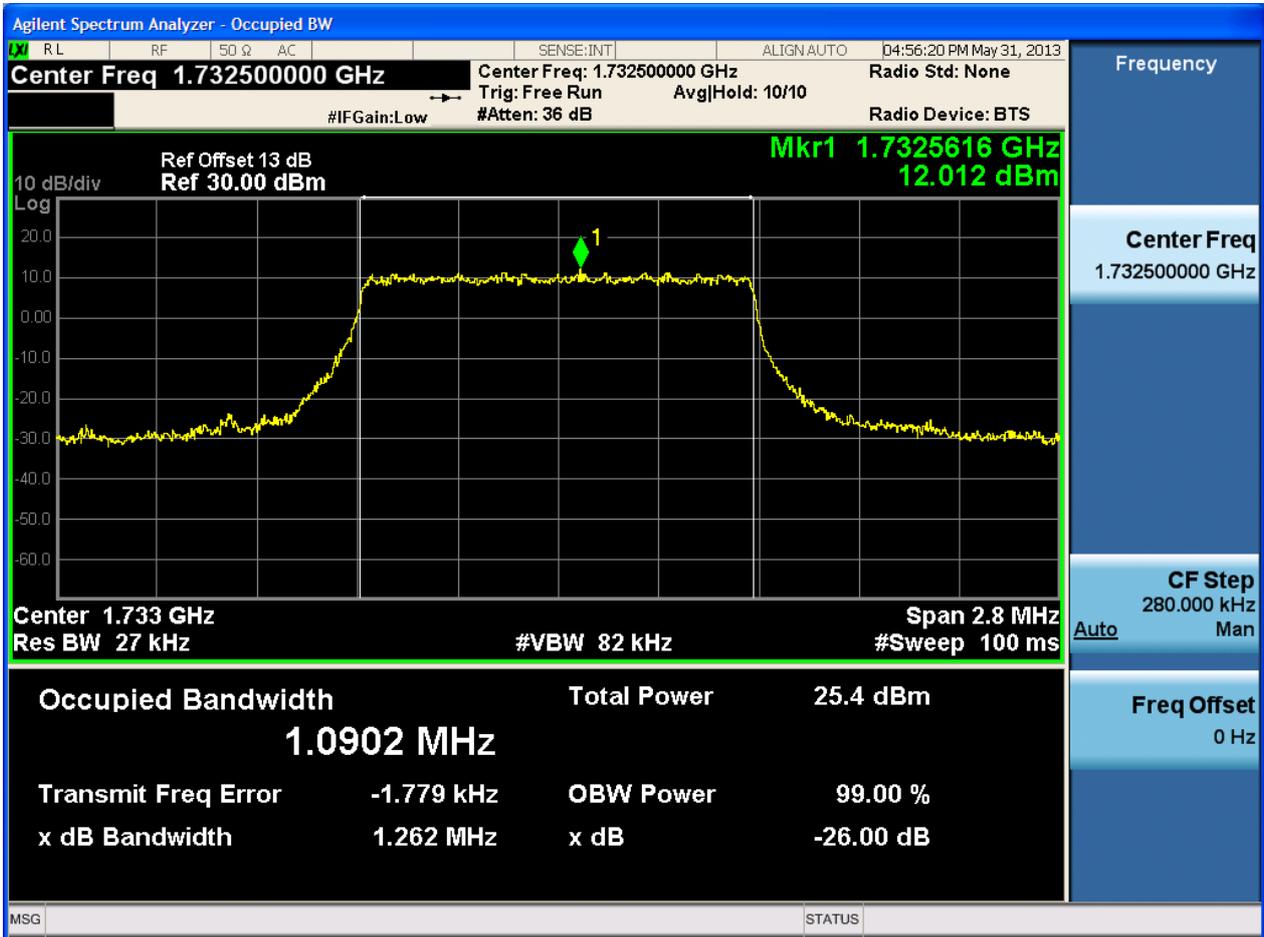
4.3.1.1.1.1.1 Test RB = RB6#0





4.3.1.1.1.2 Test Channel = MCH

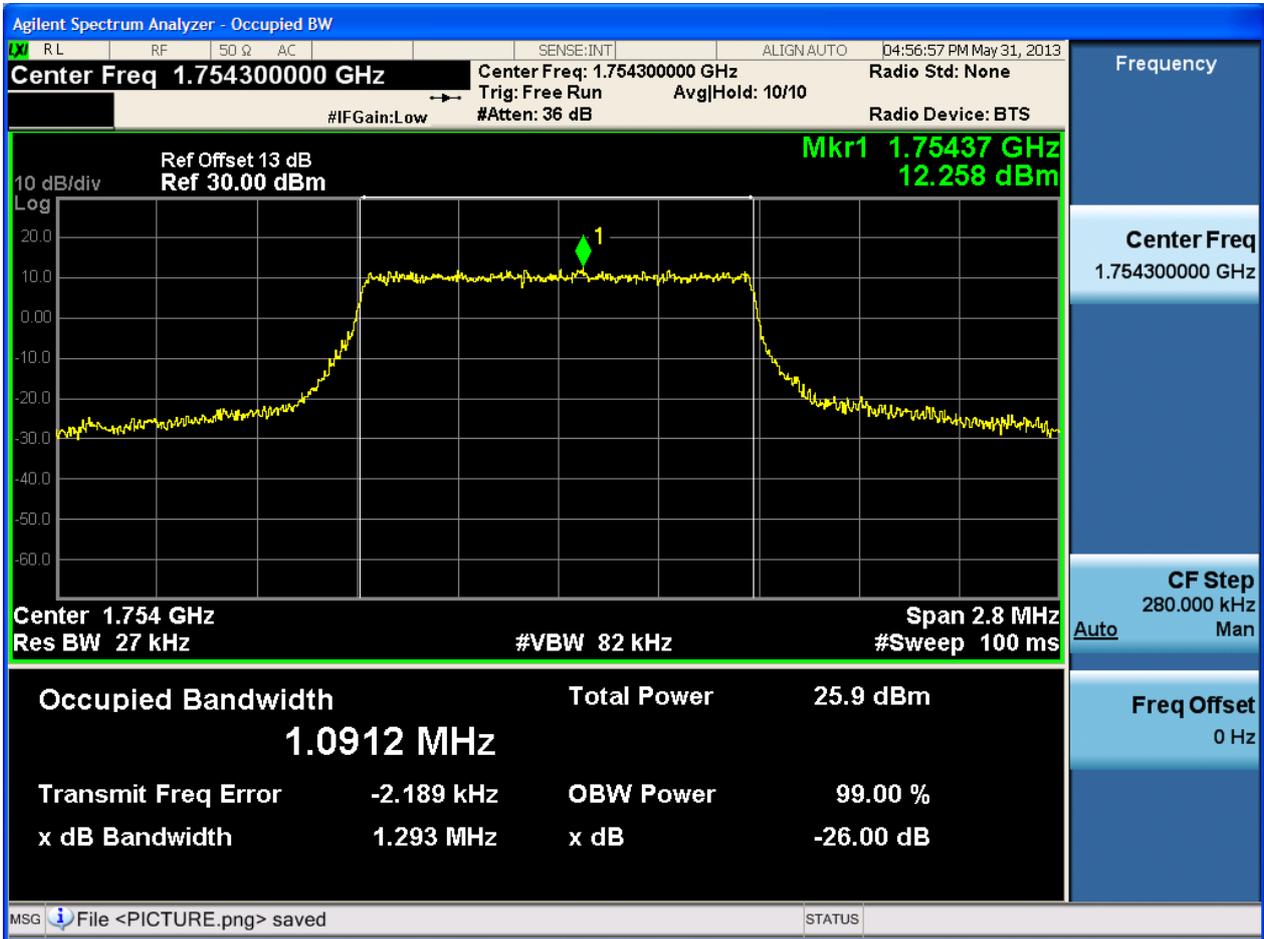
4.3.1.1.1.2.1 Test RB = RB6#0





4.3.1.1.1.3 Test Channel = HCH

4.3.1.1.1.3.1 Test RB = RB6#0

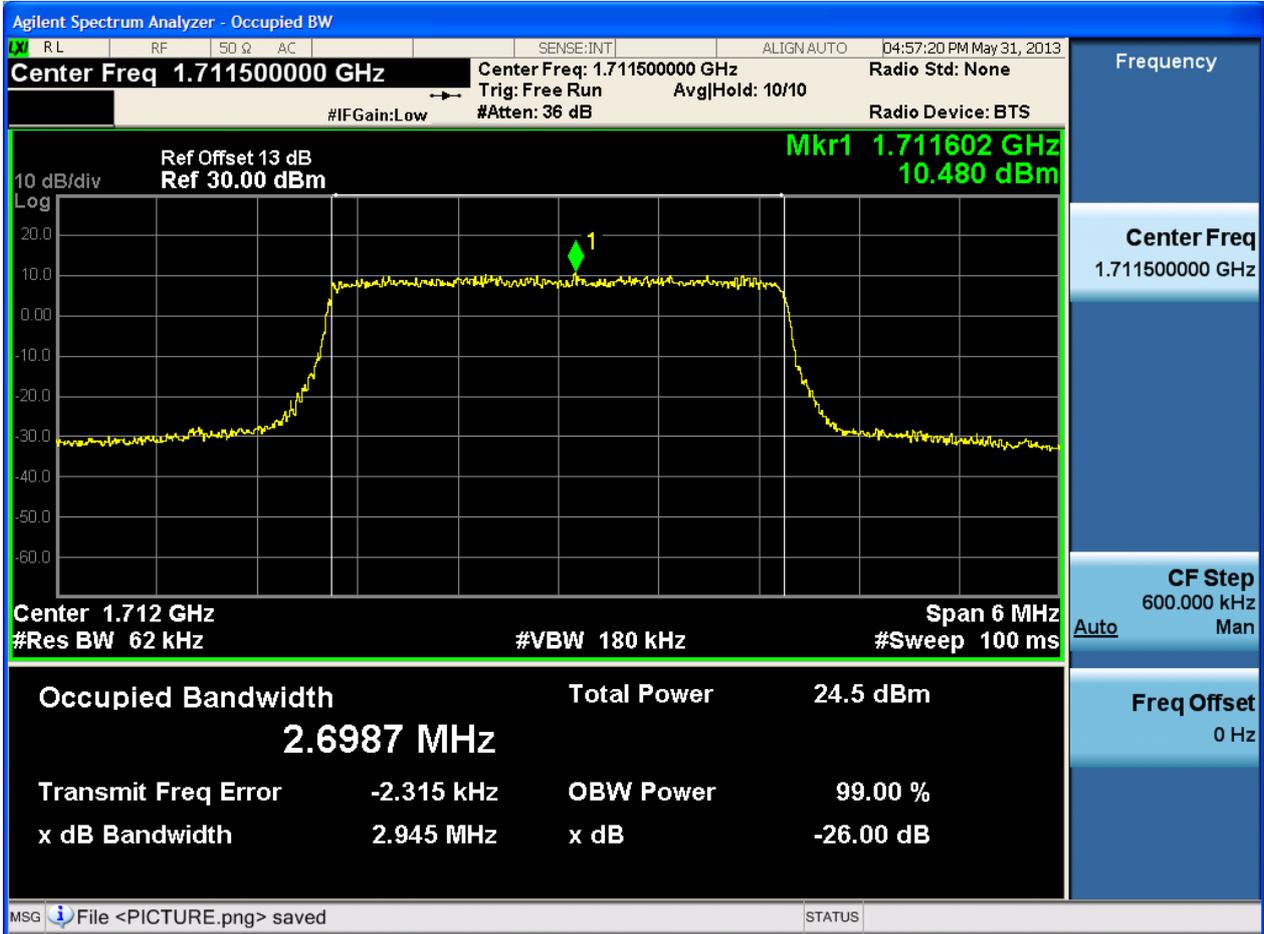




4.3.1.1.2 Test Bandwidth = 3

4.3.1.1.2.1 Test Channel = LCH

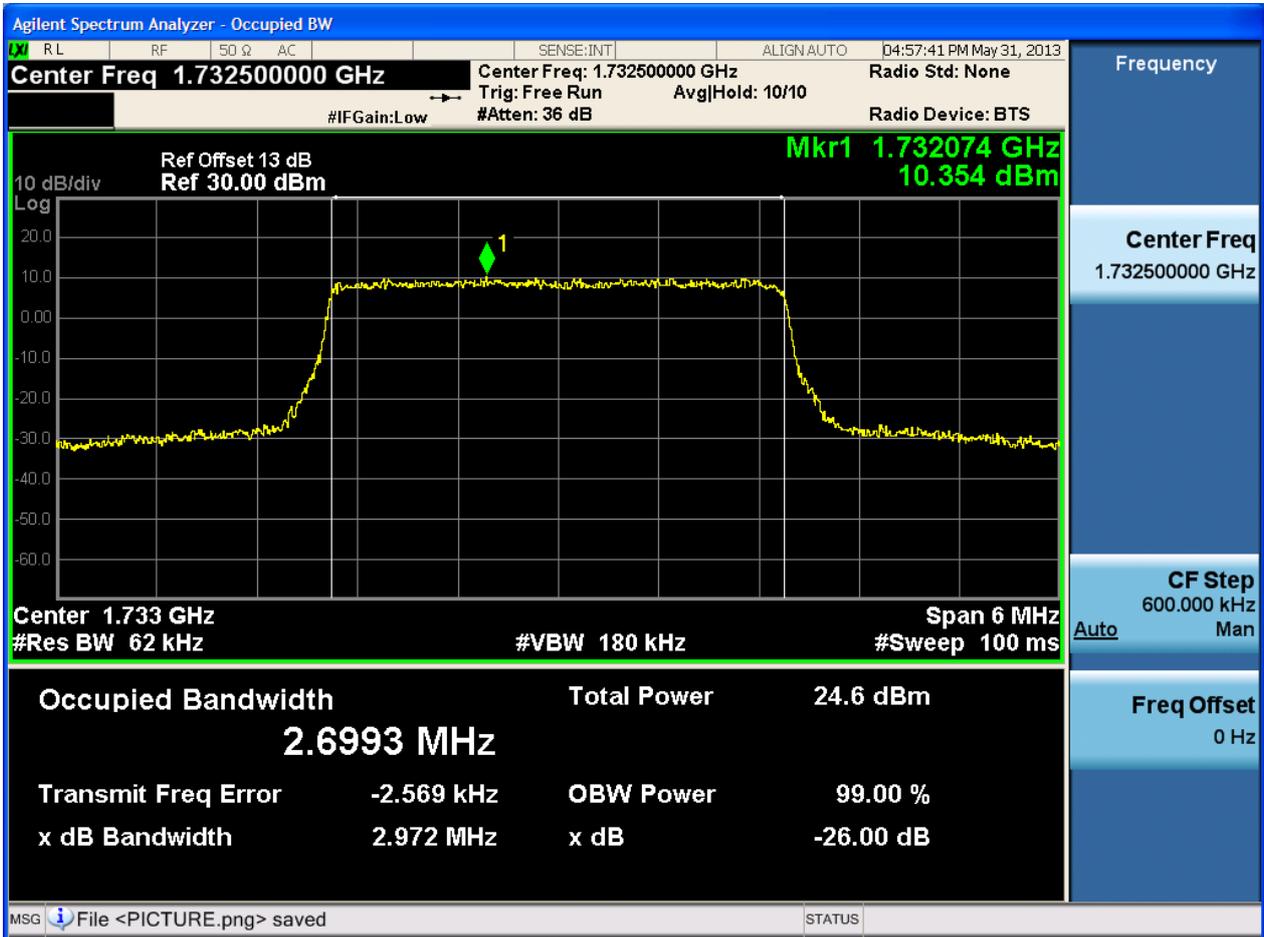
4.3.1.1.2.1.1 Test RB = RB15#0





4.3.1.1.2.2 Test Channel = MCH

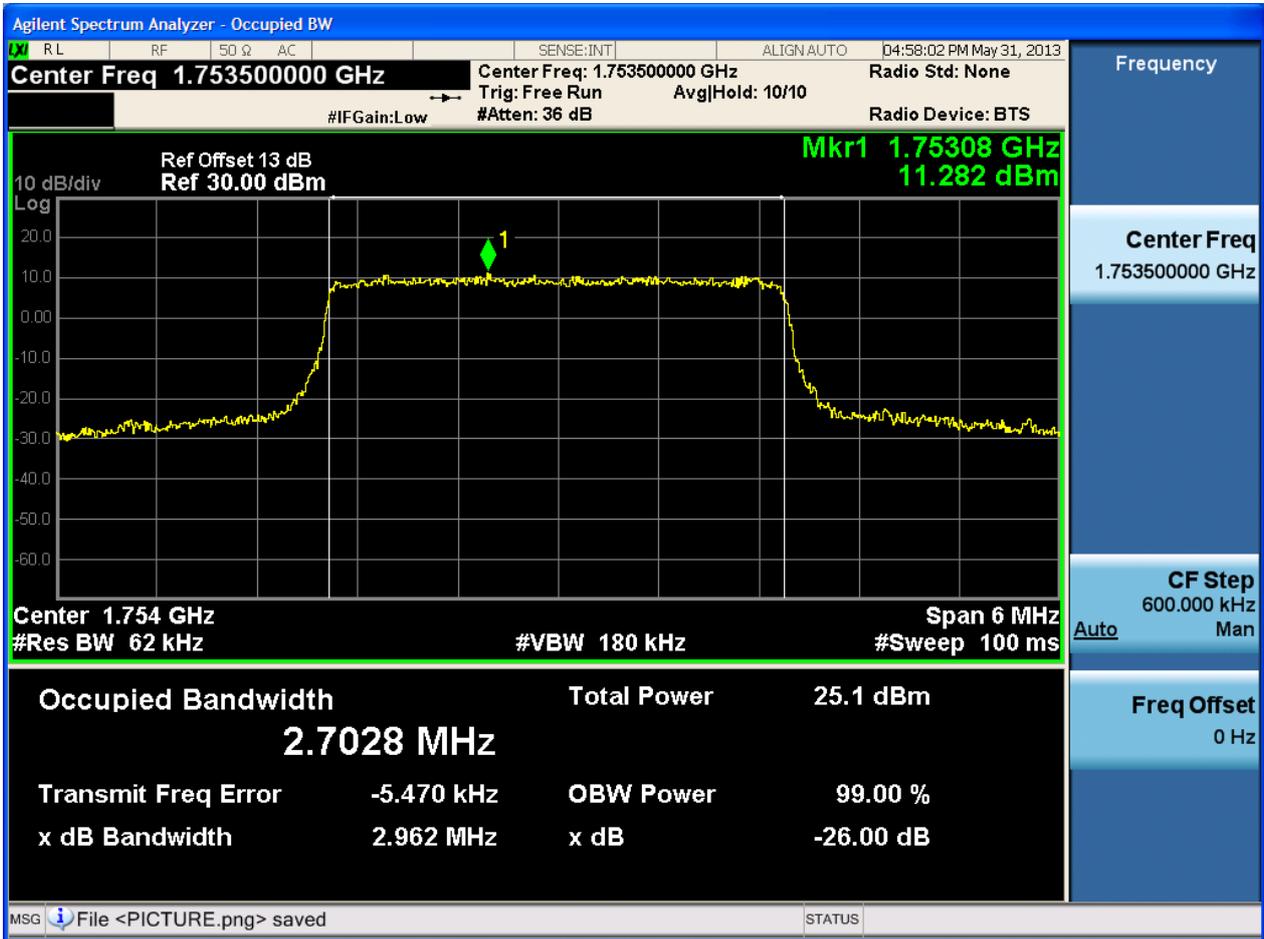
4.3.1.1.2.2.1 Test RB = RB15#0





4.3.1.1.2.3 Test Channel = HCH

4.3.1.1.2.3.1 Test RB = RB15#0





4.3.1.1.3 Test Bandwidth = 5

4.3.1.1.3.1 Test Channel = LCH

4.3.1.1.3.1.1 Test RB = RB25#0

