

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 27 SUBPART C & SUBPART L AND INDUSTRY CANADA RSS-130 and RSS-139 REQUIREMENT

OF

Product Name: LM63S1
Marketing Name: LM63S1
Brand Name: N/A
Model No.: LM63S1
Model Difference: N/A
FCC ID: 2AAGMLM63S1
IC: 12732A-LM63S1
Report No.: ER/2015/40058
Issue Date: May. 12, 2015
FCC Rule Part: 2 , 27C & L
IC Rule Part: RSS 130 Issue 1 Oct. 2013 & RSS 139 Issue 2 Feb. 2009
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VERIFICATION OF COMPLIANCE

Applicant: Sequans Communications
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Product Name: LM63S1

Marketing Name: LM63S1

Brand Name: N/A

Model No.: LM63S1

Model Difference: N/A

FCC ID: 2AAGMLM63S1

IC: 12732A-LM63S1

Report No.: ER/2015/40058


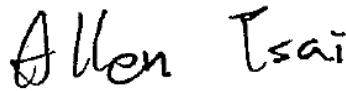

Date of test: Apr. 10, 2015 ~ May. 12, 2015

Date of EUT Received: Apr. 10, 2015

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-C-2004 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

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Revision History

Report Number	Revision	Description	Issue Date
ER/2015/40058	Rev.00	Initial creation of document	May. 12, 2015

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1. GENERAL PRODUCT INFORMATION

1.1. Product Description

General:

Product Name:	LM63S1
Marketing Name:	LM63S1
Brand Name:	N/A
Model No.:	LM63S1
Model Difference:	N/A
Product SW/HW Ver.:	3.3.3-18888 / Rev01
Radio SW/HW Ver.:	3.3.3-18888 / Rev01
Test SW Version	N/A , no test SW was used during testing.
RF power setting in TEST SW	N/A , RF power setting was not able to alter during testing
Power Supply:	3.3 VDC from AC/DC power supply.
IMEI:	357498060000180

LTE:

Cellular Phone Standards Frequency Range and Power	Operating Frequency		Rated Power
	LTE-Band 4 (Bandwidth 5MHz)	1712.5MHz – 1752.5MHz	23dBm
	LTE-Band 4 (Bandwidth 10MHz)	1715.0MHz – 1750.0MHz	23dBm
	LTE-Band 4 (Bandwidth 15MHz)	1717.5MHz – 1747.5MHz	23dBm
	LTE-Band 4 (Bandwidth 20MHz)	1720.0MHz – 1745.0MHz	23dBm
	LTE-Band 13 (Bandwidth 5MHz)	779.5MHz – 784.5MHz	23 dBm
	LTE-Band 13 (Bandwidth 10MHz)	782.0MHz – 782.0MHz	23 dBm

LTE-Band 4 (Bandwidth 5MHz) QPSK	4M52G7D
LTE-Band 4 (Bandwidth 5MHz) 16QAM	4M52D7W
LTE-Band 4 (Bandwidth 10MHz) QPSK	9M02G7D
LTE-Band 4 (Bandwidth 10MHz) 16QAM	9M03D7W
LTE-Band 4 (Bandwidth 15MHz) QPSK	13M5G7D
LTE-Band 4 (Bandwidth 15MHz) 16QAM	13M5D7W
LTE-Band 4 (Bandwidth 20MHz) QPSK	18M1G7D
LTE-Band 4 (Bandwidth 20MHz) 16QAM	18M1D7W
LTE-Band 13 (Bandwidth 5MHz) QPSK	4M53G7D
LTE-Band 13 (Bandwidth 5MHz) 16QAM	4M53D7W
LTE-Band 13 (Bandwidth 10MHz) QPSK	8M96G7D
LTE-Band 13 (Bandwidth 10MHz) 16QAM	8M98D7W

Max ERP/EIRP measurement result:

LTE Band 4/5MMz /QPSK RB 1 Offset 0	27.61	EIRP	0.577
LTE Band 4/5MMz /16QAM RB 1 Offset 0	27.47	EIRP	0.558
LTE Band 4/10MMz /QPSK RB 1 Offset 49	27.29	EIRP	0.536
LTE Band 4/10MMz /16QAM RB 1 Offset 49	27.39	EIRP	0.548
LTE Band 4/15MMz /QPSK RB 1 Offset 74	27.70	EIRP	0.589
LTE Band 4/15MMz /16QAM RB 1 Offset 74	27.97	EIRP	0.627
LTE Band 4/20MMz /QPSK RB 1 Offset 0	28.15	EIRP	0.653
LTE Band 4/20MMz /16QAM RB 1 Offset 0	28.20	EIRP	0.661
LTE Band 13/5MMz /QPSK RB 1 Offset 24	21.77	ERP	0.150
LTE Band 13/5MMz /16QAM RB 1 Offset 24	22.16	ERP	0.164
LTE Band 13/10MMz /QPSK RB 1 Offset 0	21.42	ERP	0.139
LTE Band 13/10MMz /16QAM RB 1 Offset 0	21.68	ERP	0.147

1.2. Product Feature of Equipment Under Test

The equipment under Test (Hereafter Called: EUT) is Tablet PC supporting LTE features, and below is details of information.

Product Feature	
Product Name:	LM63S1
Marketing Name:	LM63S1
Brand Name:	N/A
Model No.:	LM63S1
Model Difference:	N/A
FCC ID	2AAGMLM63S1
IC:	12732A-LM63S1
LTE Operating Band(s)	FCC Band 4 / 13
LTE Rel. Version	Rel.9

Note: The above EUT information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.3. Test Methodology of Applied Standards

FCC 47 CFR Part 2, 27.

ANSI / TIA / EIA 603C-C-2004

KDB971168 D01 Power Meas license Digital System v02r01

TS 151 010-1 is used to set, and measure the output power.

RSS 130 Issue 1 Oct. 2013 & RSS 139 Issue 2 Feb. 2009

Note:

1. All test items have been performed and record as per the above standards.
2. The composite system is compliance with FCC Subpart B is authorized under the certification procedure.

1.4. Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan. (TAF code 0513)

FCC Registration Numbers are: 990257

Canada Registration Number: 4620A-5

1.5. Special Accessories

No special accessories were used during testing.

1.6. Equipment Modifications

There were no modifications incorporated into the EUT.

2. SYSTEM TEST CONFIGURATION

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT (Transmitter) was operated in the continuous transmission mode employed with the simulator of the Base Station that fixates at test default channels to fix the Tx frequency which was for the purpose of the measurements.

2.3. Test Procedure

2.3.1 Conducted Measurement at Antenna Port

According to measurement procured TIA/EIA 603C, the EUT is placed on a turn table which is 0.8 m above ground plane. A low loss of RF cable was used to connect the antenna port of EUT to measurement equipment.

2.3.2 Radiated Emissions (ERP/EIRP)

According to measurement procured TIA/EIA 603C, The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both Horizontal and Vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna according to the requirements in Section 8 and 13.

2.4. Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

Note:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Following shows an offset computation example with cable loss and attenuator.

Low Band: Offset = RF cable loss (dB) + attenuation factor (dB) = 13.9(dB)

High Band: Offset = RF cable loss (dB) + attenuation factor (dB) = 14.4(dB)

2.5. Final Amplifier Voltage and Current Information:

Test Mode	DC voltage (V)	DC current (mA)
LTE Band 4	3.3V	828
LTE Band 13	3.3V	779

2.6. Configuration of Tested System

Fig. 2-1 Configuration of Tested System (Fixed Channel-Conducted)

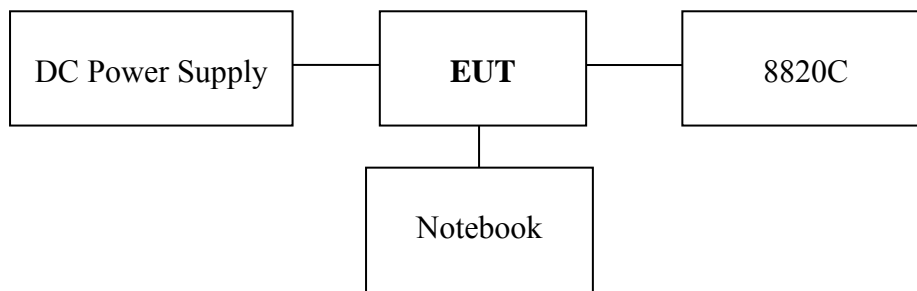


Fig. 2-2 Configuration of Tested System (Fixed Channel-Radiated)

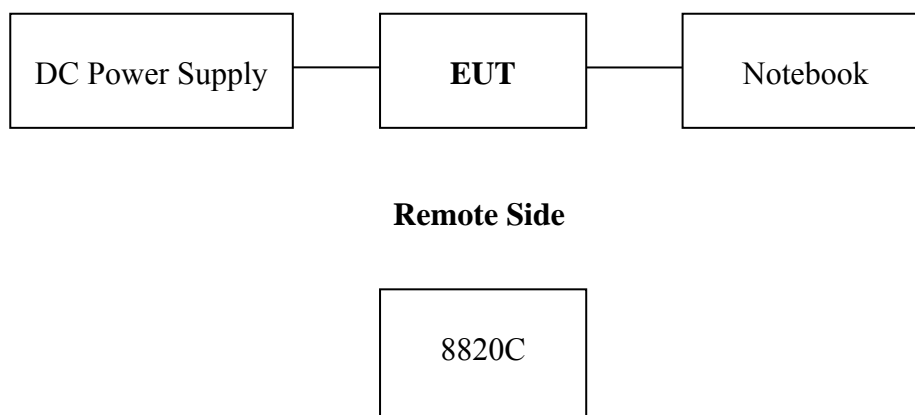


Table 2-1 Equipment Used in

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	Radio Communication Analyzer	Anritsu	8820C	6201107337	shielded	Un-shielded
2.	DC Power Supply	Agilent	E3640A	MY53140006	shielded	Un-shielded
3.	Test Software	DRTU	N/A	N/A	N/A	N/A
4.	Notebook	Lenovo	L420	LR-7HXZA	shielded	Un-shielded

3. SUMMARY OF TEST RESULTS

FCC Rules	IC Rules	Description Of Test	Result
§2.1046(a)	N/A	RF Power Output	Compliant
§2.1046(a) §27.50(b)(9)	§4.8 (RSS-Gen Issue 3) §4.4 (RSS-130) §6.4 (RSS-139)	ERP/ EIRP measurement	Compliant
§2.1049(h)	§4.6.1 (RSS-Gen Issue 3) §4.6 (RSS-130) §2.3 (RSS-139)	99% Occupied Bandwidth	Compliant
§2.1051 §27.50(c)(5) §27.53(g), §27.53(h) §27.53(m)(4) §27.53(m)(6)	§4.9 (RSS-Gen Issue 3) §4.6 (RSS-130) §6.5 (RSS-139)	Out of Band Emissions at Antenna Terminals and Band Edge	Compliant
§2.1053 §27.50(c)(2), §27.50(c)(5) §27.53(g), §27.53(h) §27.53(f), §27.53(m)(4)	§4.9 (RSS-Gen Issue 3) §4.6 (RSS-130) §6.5 (RSS-139)	Field Strength of Spurious Radiation	Compliant
§24.232(d) §27.53(d) (5) §27.50(i) (B)	§4.4 (RSS-130) §6.4 (RSS-139)	Peak to Average Ratio	Compliant
§2.1055(a)(1) §27.54	§4.7 (RSS-Gen Issue 3) §4.3 (RSS-130) §6.3 (RSS-139)	Frequency Stability	Compliant

4. DESCRIPTION OF TEST MODES

4.1. The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found as listed below. Following channel(s) was (were) selected for the final test as listed below:

BAND	ERP/EIRP	RADIATED EMISSION
LTE Band 4 / 13	E2-plan	E2-plan

LTE Band 4 MODE

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
EIRP	19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	1 RB/ 0,24 RB Offset
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	1 RB/ 0,49 RB Offset
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	1 RB/ 0,74 RB Offset
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	1 RB/ 0,99 RB Offset
FREQUENCY STABILITY	20000 to 20350	20175	10MHz	QPSK,	Full RB
OCCUPIED BANDWIDTH	19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	Full RB
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	Full RB
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	Full RB
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	Full RB
PEAK TO AVERAGE RATIO	19975 to 20375	19975, 20175, 20375	5MHz	16QAM	Full RB
	20000 to 20350	20000, 20175, 20350	10MHz	16QAM	Full RB
	20025 to 20325	20025, 20175, 20325	15MHz	16QAM	Full RB
	20050 to 20300	20050, 20175, 20300	20MHz	16QAM	Full RB
BAND EDGE	19975 to 20375	19975, 20375	5MHz	QPSK,	1 RB/ 0,24 RB Offset Full RB
	20000 to 20350	20000, 20350	10MHz	QPSK,	1 RB/ 0,49 RB Offset Full RB
	20025 to 20325	20025, 20325	15MHz	QPSK,	1 RB/ 0,74 RB Offset Full RB
	20050 to 20300	20050, 20300	20MHz	QPSK,	1 RB/ 0,99 RB Offset Full RB
CONDUCTED EMISSION	19975 to 20375	19975, 20175, 20375	5MHz	QPSK,	1 RB, 0 RB Offset
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK,	1 RB, 0 RB Offset
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK,	1 RB, 0 RB Offset
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK,	1 RB, 0 RB Offset
RADIATED EMISSION	20050 to 20300	20050, 20175, 20300	20MHz	16QAM,	1 RB/ 0 RB Offset

LTE Band 13 MODE

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
ERP	23205 to 23255	23205, 23230, 23255	5MHz	QPSK, 16QAM	1 RB/ 0,24 RB Offset
	23230	23230	10MHz	QPSK, 16QAM	1 RB/ 0,49 RB Offset
FREQUENCY STABILITY	23230	23230	10MHz	QPSK,	Full RB
OCCUPIED BANDWIDTH	23205 to 23255	23205, 23230, 23255	5MHz	QPSK, 16QAM	Full RB
	23230	23230	10MHz	QPSK, 16QAM	Full RB
PEAK TO AVERAGE RATIO	23205 to 23255	23205, 23230, 23255	5MHz	16QAM	Full RB
	23230	23230	10MHz	16QAM	Full RB
BAND EDGE	23205 to 23255	23205, 23255	5MHz	QPSK,	1 RB/ 0,24 RB Offset Full RB
	23230	23230	10MHz	QPSK,	1 RB/ 0,49 RB Offset Full RB
CONDUCTED EMISSION	23205 to 23255	23205, 23230, 23255	5MHz	QPSK,	1 RB, 0 RB Offset
	23230	23230	10MHz	QPSK,	1 RB, 0 RB Offset
RADIATED EMISSION	23205 to 23255	23205, 23230, 23255	5MHz	16QAM,	1 RB, 0 RB Offset

5. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
RF Power Output	+/- 1.10 dB
ERP/ EIRP measurement	Vertical Polarization = +/- 4.74dB Horizontal Polarization = +/- 4.62dB
99% Occupied Bandwidth	+/- 5.19 Hz
Out of Band Emissions at Antenna Terminals and Band Edge	+/- 0.70 dB
Peak to Average Ratio	+/- 0.70 dB
Frequency Stability vs. Temperature	+/- 5.19 Hz
Frequency Stability vs. Voltage	+/- 5.19 Hz
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC= +/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : Vertical)	30MHz - 180MHz: +/- 3.37dB
	180MHz - 417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : Horizontal)	30MHz - 167MHz: +/- 4.22dB
	167MHz - 500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

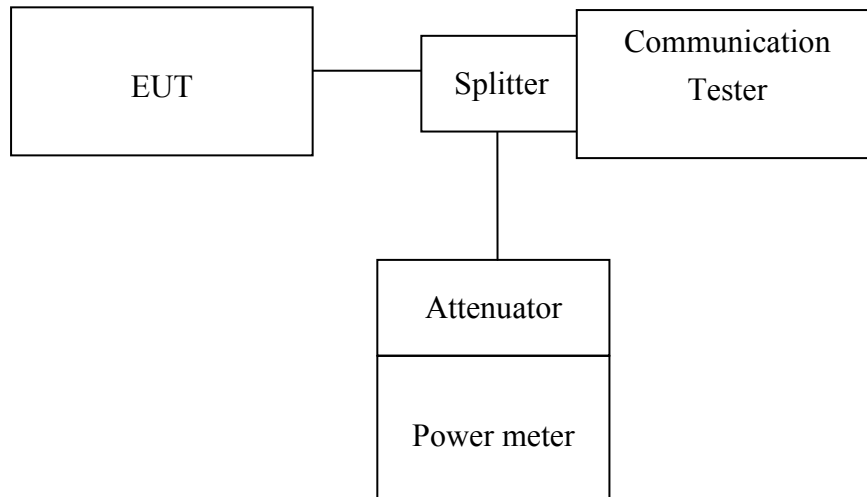
This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

6. RF CONDUCTED OUTPUT POWER MEASUREMENT

6.1. Standard Applicable

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals.

6.2. Test Set-up



Note: Measurement setup for testing on Antenna connector

6.3. Measurement Procedure

The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the power meter reading. TS 151 010-1 is reference to conduct the test measurement of output power.

The Procedure of KDB941225 (SAR Measurement Procedures for 3G devices, (WCDMA/HSPA) was used for EUT and Base station setting. RMC 12.2kps is used for this testing, and KDB 971168 D01 Power Meas License Digital System as the supplemental test methodology to adjust the proper setting obtaining the measurement results

6.4. Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	10/08/2014	10/09/2015
Temperature Chamber	TERCHY	MHG-120LF	911009	05/06/2015	05/05/2016
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016
Splitter	Agilent	11636B	N/A	01/02/2015	01/01/2016
DC Power Supply	Agilent	E3640A	MY52410006	11/10/2014	11/09/2015

6.5. Measurement Result

RF Conducted Output Power

LTE Result:

LTE Band 4

LTE Band 4_Uplink frequency band : 1710 to 1755 MHz								
BW (MHz)	RB Size	RB Offset	Conducted power (dBm)					
			QPSK			16QAM		
			Channel (Low) 19975	Channel (Mid) 20175	Channel (High) 20375	Channel (Low) 19975	Channel (Mid) 20175	Channel (High) 20375
5	1	0	23.84	23.89	23.78	23.87	23.93	23.45
	1	24	23.61	23.96	23.27	23.82	23.99	23.45
	12	6	23.68	23.83	23.37	23.63	23.55	23.42
	25	0	23.64	23.81	23.40	23.69	23.93	23.42

LTE Band 4_Uplink frequency band : 1710 to 1755 MHz								
BW (MHz)	RB Size	RB Offset	Conducted power (dBm)					
			QPSK			16QAM		
			Channel (Low) 20000	Channel (Mid) 20175	Channel (High) 20350	Channel (Low) 20000	Channel (Mid) 20175	Channel (High) 20350
10	1	0	23.50	23.80	23.83	23.88	23.71	23.91
	1	49	23.52	23.87	23.36	23.66	23.85	23.62
	25	12	23.45	23.81	23.66	23.57	23.90	23.72
	50	0	23.50	23.84	23.62	23.61	23.89	23.67

LTE Band 4_Uplink frequency band : 1710 to 1755 MHz								
BW (MHz)	RB Size	RB Offset	Conducted power (dBm)					
			QPSK			16QAM		
			Channel (Low) 20025	Channel (Mid) 20175	Channel (High) 20325	Channel (Low) 20025	Channel (Mid) 20175	Channel (High) 20325
15	1	0	23.17	23.67	23.59	23.35	23.58	23.33
	1	74	23.35	23.18	23.44	22.80	22.91	23.12
	36	19	23.41	22.81	22.81	23.47	23.04	23.46
	75	0	23.55	22.81	22.82	22.86	22.89	22.91

LTE Band 4_Uplink frequency band : 1710 to 1755 MHz								
BW (MHz)	RB Size	RB Offset	Conducted power (dBm)					
			QPSK			16QAM		
			Channel (Low) 20050	Channel (Mid) 20175	Channel (High) 20300	Channel (Low) 20050	Channel (Mid) 20175	Channel (High) 20300
20	1	0	22.98	22.81	23.23	23.55	22.86	23.15
	1	99	22.68	23.14	23.17	22.32	22.68	22.63
	50	25	23.36	22.80	22.86	23.43	22.89	22.92
	100	0	23.58	22.79	22.80	23.50	22.86	22.92

LTE Band 13

LTE Band 13_Uplink frequency band : 777 to 787 MHz								
BW (MHz)	RB Size	RB Offset	Conducted power (dBm)					
			QPSK			16QAM		
			Channel (Low) 23205	Channel (Mid) 23230	Channel (High) 23255	Channel (Low) 23205	Channel (Mid) 23230	Channel (High) 23255
5	1	0	22.51	23.06	23.48	22.50	23.49	23.81
	1	24	23.49	23.33	23.24	22.73	23.44	23.50
	12	6	22.58	23.02	23.28	23.63	23.18	23.34
	25	0	22.54	23.05	23.26	22.53	23.20	23.40

LTE Band 13_Uplink frequency band : 777 to 787 MHz								
BW (MHz)	RB Size	RB Offset	Conducted power (dBm)					
			QPSK			16QAM		
			Channel 23230			Channel 23230		
10	1	0	22.59			22.93		
	1	49	23.14			23.10		
	25	12	23.07			23.18		
	50	0	23.00			23.05		

7. EFFECTIVE RADIATED POWER AND EQUIVALENT ISOTROPIC RADIATED POWER MEASUREMENT

7.1. Standard Applicable

FCC 27, 50(b)(9) Control stations and mobile stations transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands and fixed stations transmitting in the 787-788 MHz and 805-806 MHz bands are limited to 30 watts ERP.

FCC 27, 50(d)(4) Fixed, mobile, and portable (hand-held) stations are limited to 1W.

According to IC RSS-130 §4.4

The e.i.r.p. of transmitters operating in the band 698-756 MHz and 777-787 MHz shall not exceed 50 W for mobile equipment or for outdoor fixed subscriber equipment, nor shall it exceed 5 W for portable equipment or for indoor fixed subscriber equipment.

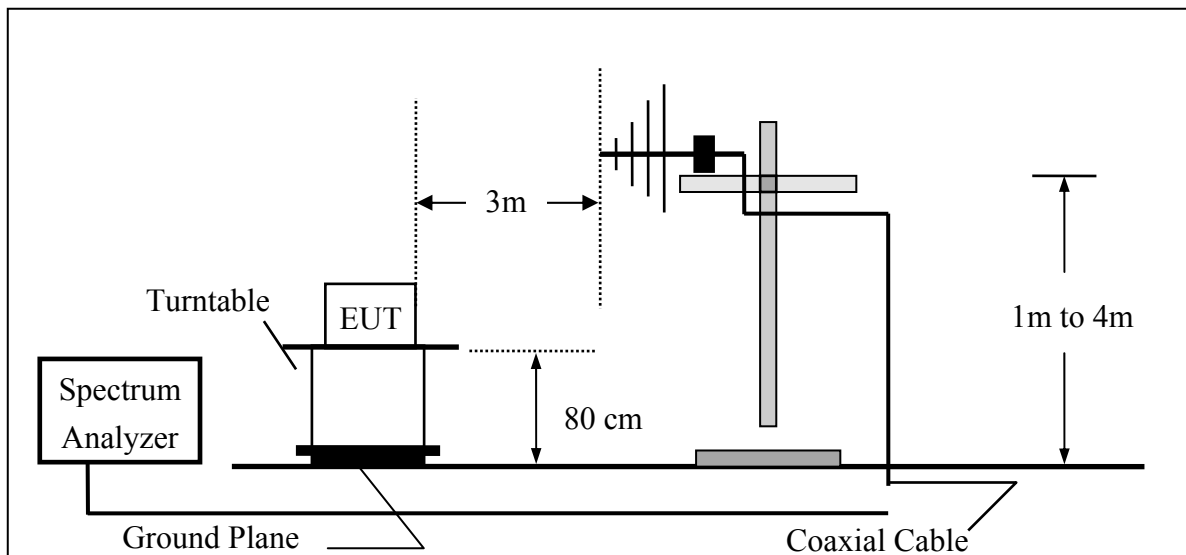
According to RSS 139 issue 2

section 6.4 The transmitter output power shall not exceed the limits 1W given in SRSP-513.

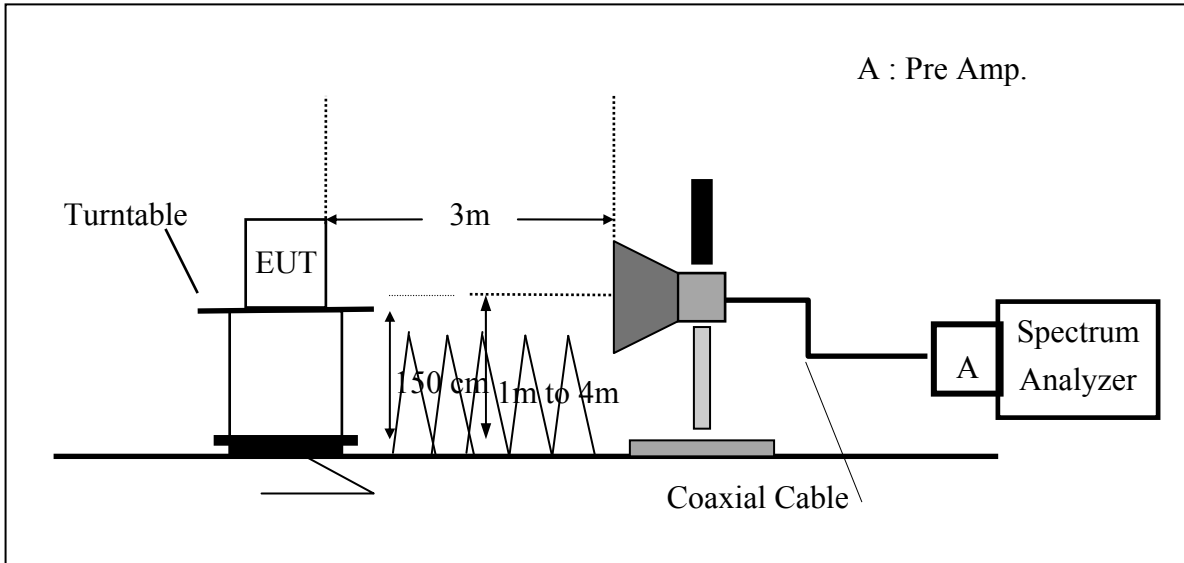
The average equivalent isotropically radiated power (e.i.r.p.) for fixed, mobile and portable transmitters in the 1710-1755 MHz shall not exceed 1 watt.

7.2. Test SET-UP

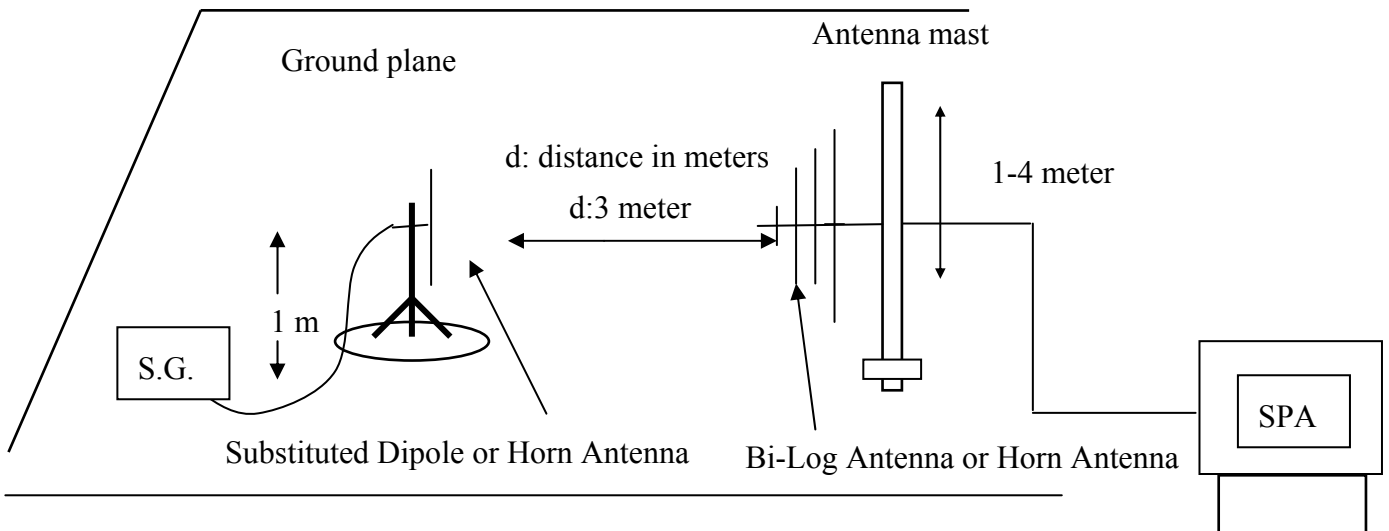
(A) Radiated Power Test Set-Up, Frequency Below 1000MHz



(B) Radiated Power Test Set-UP Frequency Over 1 GHz



(C) Substituted Method Test Set-UP



7.3. Measurement Procedure

1. The testing follows the Measurement Procedure of FCC KDB 971168 D01
2. The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
3. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated
4. The testing follows the Measurement Procedure of FCC KDB 971168 D01
5. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step b. Record the power level of S.G.
6. $ERP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBd)} + \text{Cable Loss (dB)}$
7. $EIRP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBi)} + \text{Cable Loss (dB)}$
8. Spectrum setting:

(1) Detector = Peak, marker the highest value of the detector by maximum hold, set RBW wide enough to capture the entire signal of emission, and $VBW \geq 3 \times RBW$.

(2) KDB 971168 D01 is adopted, and the procedure as lists under item 4, Measurement of the Average Power over the Fundamental Signal Bandwidth, is followed to set correspondingly for the acquisition of proper measurement data.

Set frequency = nominal signal center frequency;

Set span = 2 X occupied BW;

Set RBW \approx 1~5% of the span, not to exceed 1 MHz

Set VBW = 3 x RBW;

Select average power (RMS) detector

Set sweep time and number of measurement points to achieve a minimum of 1 millisecond/pt integration time (ex. Point = 601points, then sweep time = $601 \times 10^{-3} = 6s$).

Activate trace averaging routine over a minimum of 10 sweeps;

Activate marker/span pair and set span = signal or channel bandwidth;

Activate the band/interval power marker function;

Record the band power level;

Record adjusted value as the average signal power level. Then activate the occupied bandwidth measurement function.

The proper adjustment due to limitation of spectrum capability is given compensated to spectrum with conversion factor of $10 \times \log(TBW/RBW)$, where TBW is the transmission of UE exceeding the maximum BW UE can extends, and RBW is the resolution BW in UE.

7.4. Measurement Equipment Used

SGS 966 Chamber No.C					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	12/22/2014	12/21/2015
Spectrum Analyzer	R&S	FSV-30	101398	10/07/2014	10/06/2015
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/23/2014	12/22/2015
Bilog Antenna	SCHWAZBECK	VULB9160	3158	10/31/2014	10/30/2015
Horn antenna	ETS.LINDGREN	3117	123995	05/19/2014	05/18/2015
Horn antenna	ETS.LINDGREN	3117	123991	12/19/2014	12/18/2015
Horn Antenna	Schwarzbeck	BBHA9170	184	12/25/2014	12/24/2015
Horn Antenna	Schwarzbeck	BBHA9170	185	07/29/2014	07/28/2015
Network Analyze	Anritsu	MS4644A	1216312	05/24/2014	05/23/2015
Signal Generator	Agilent	E4438C	MY45093613	08/06/2014	08/05/2015
Pre-Amplifier	Agilent	8447D	1937A02834	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	004	01/02/2015	01/01/2016
Radio Communication Analyzer	R&S	CMU200	102189	02/11/2015	02/10/2016
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	10/08/2014	10/09/2015
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	966_Tx	10m	01/02/2015	01/01/2016
Low Loss Cable	HUBER+SUHNER	966_Rx	3m	01/02/2015	01/01/2016
Filter 800-1000	Micro-Tronics	EWT	M2	01/02/2015	01/01/2016
Filter 1800-2000	Micro-Tronics	EWT	M2	01/02/2015	01/01/2016
Filter 1700-1800	Micro-Tronics	BRC15751	001	01/02/2015	01/01/2016
1GHz High Pass Filter	Micro-Tronics	HPM50108	32	01/02/2015	01/01/2016
2GHz High Pass Filter	Micro-Tronics	HPM50110	36	01/02/2015	01/01/2016
3m Site NSA	SGS	966 chamber	N/A	07/15/2014	07/14/2015

7.5. Measurement Result: (Peak) –using option of peak measurement

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBi	dB	dBm	dBm
BAND 4 BW: 5M QPSK RB: 1,0	1712.5	19975	V	26.44	5.09	-4.29	27.24	30.00
			H	21.69	5.09	-4.29	22.49	30.00
	1732.5	20175	V	24.33	5.05	-4.31	25.07	30.00
			H	20.85	5.05	-4.31	21.60	30.00
	1752.5	20375	V	26.97	5.01	-4.37	27.61	30.00
			H	20.77	5.01	-4.37	21.41	30.00
BAND 4 BW: 5M QPSK RB: 1,24	1712.5	19975	V	26.49	5.01	-4.37	27.13	30.00
			H	20.51	5.08	-4.29	21.31	30.00
	1732.5	20175	V	25.74	5.08	-4.29	26.53	30.00
			H	20.50	5.05	-4.32	21.22	30.00
	1752.5	20375	V	25.56	5.05	-4.32	26.29	30.00
			H	20.17	5.01	-4.37	20.80	30.00
BAND 4 BW: 5M 16QAM RB: 1,0	1712.5	19975	V	26.47	5.09	-4.29	27.27	30.00
			H	21.74	5.09	-4.29	22.55	30.00
	1732.5	20175	V	24.10	5.05	-4.31	24.84	30.00
			H	21.09	5.05	-4.31	21.84	30.00
	1752.5	20375	V	26.82	5.02	-4.36	27.47	30.00
			H	20.78	5.02	-4.36	21.43	30.00
BAND 4 BW: 5M 16QAM RB: 1,24	1712.5	19975	V	25.99	5.08	-4.29	26.78	30.00
			H	20.93	5.09	-4.29	21.72	30.00
	1732.5	20175	V	25.69	5.05	-4.32	26.42	30.00
			H	20.63	5.05	-4.32	21.36	30.00
	1752.5	20375	V	26.69	5.01	-4.37	27.32	30.00
			H	20.37	5.01	-4.37	21.00	30.00

Remark :

- (1) The RBW,VBW of SPA for frequency RBW= 8MHz , VBW= 8MHz

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBi	dB	dBm	dBm
BAND 4 BW: 10M QPSK RB: 1,0	1715.0	20000	V	26.38	5.09	-4.29	27.18	30.00
			H	20.94	5.09	-4.29	21.74	30.00
	1732.0	20175	V	25.56	5.06	-4.30	26.32	30.00
			H	21.24	5.06	-4.30	21.99	30.00
	1750.0	20350	V	26.59	5.03	-4.35	27.26	30.00
			H	20.88	5.03	-4.35	21.56	30.00
BAND 4 BW: 10M QPSK RB: 1,49	1715.0	20000	V	24.75	5.07	-4.30	25.53	30.00
			H	20.45	5.07	-4.30	21.23	30.00
	1732.0	20175	V	26.57	5.04	-4.33	27.29	30.00
			H	19.40	5.04	-4.32	20.12	30.00
	1750.0	20350	V	26.07	5.01	-4.37	26.71	30.00
			H	20.82	5.01	-4.37	21.46	30.00
BAND 4 BW: 10M 16QAM RB: 1,0	1715.0	20000	V	26.47	5.09	-4.29	27.27	30.00
			H	20.99	5.09	-4.29	21.80	30.00
	1732.0	20175	V	25.98	5.05	-4.31	26.72	30.00
			H	21.58	5.06	-4.30	22.34	30.00
	1750.0	20350	V	26.66	5.03	-4.35	27.33	30.00
			H	20.93	5.03	-4.35	21.61	30.00
BAND 4 BW: 10M 16QAM RB: 1,49	1715.0	20000	V	24.96	5.07	-4.30	25.74	30.00
			H	20.61	5.07	-4.30	21.39	30.00
	1732.0	20175	V	26.68	5.04	-4.33	27.39	30.00
			H	20.18	5.04	-4.32	20.89	30.00
	1750.0	20350	V	26.39	5.01	-4.37	27.03	30.00
			H	21.09	5.01	-4.37	21.72	30.00

Remark :

- (1) The RBW,VBW of SPA for frequency RBW= 8MHz , VBW= 8MHz

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBi	dB	dBm	dBm
BAND 4 BW: 15M QPSK RB: 1,0	1717.5	20025	V	26.09	5.09	-4.29	26.89	30.00
			H	21.83	5.09	-4.29	22.63	30.00
	1732.5	20175	V	24.40	5.06	-4.30	25.16	30.00
			H	18.99	5.06	-4.30	19.76	30.00
	1747.5	20325	V	26.97	5.03	-4.34	27.67	30.00
			H	21.02	5.03	-4.34	21.72	30.00
BAND 4 BW: 15M QPSK RB: 1,74	1717.5	20025	V	23.39	5.07	-4.30	24.15	30.00
			H	19.09	5.06	-4.30	19.85	30.00
	1732.5	20175	V	26.99	5.04	-4.33	27.70	30.00
			H	21.24	5.04	-4.33	21.94	30.00
	1747.5	20325	V	25.57	5.01	-4.37	26.21	30.00
			H	20.64	5.01	-4.37	21.28	30.00
BAND 4 BW: 15M 16QAM RB: 1,0	1717.5	20025	V	26.20	5.09	-4.29	26.99	30.00
			H	21.89	5.09	-4.29	22.69	30.00
	1732.5	20175	V	24.64	5.06	-4.30	25.40	30.00
			H	19.23	5.06	-4.30	19.99	30.00
	1747.5	20325	V	26.99	5.03	-4.34	27.69	30.00
			H	21.09	5.03	-4.34	21.79	30.00
BAND 4 BW: 15M 16QAM RB: 1,74	1717.5	20025	V	23.61	5.06	-4.30	24.37	30.00
			H	19.29	5.06	-4.30	20.05	30.00
	1732.5	20175	V	27.26	5.04	-4.33	27.97	30.00
			H	21.34	5.04	-4.33	22.04	30.00
	1747.5	20325	V	25.78	5.01	-4.37	26.41	30.00
			H	20.93	5.01	-4.37	21.57	30.00

Remark :

- (1) The RBW,VBW of SPA for frequency RBW= 8MHz , VBW= 8MHz

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBi	dB	dBm	dBm
BAND 4 BW: 20M QPSK RB: 1,0	1720.0	20050	V	26.02	5.09	-4.29	26.82	30.00
			H	21.86	5.09	-4.29	22.66	30.00
	1732.5	20175	V	24.08	5.07	-4.30	24.85	30.00
			H	21.57	5.07	-4.30	22.34	30.00
	1745.0	20300	V	27.43	5.04	-4.32	28.15	30.00
			H	22.21	5.04	-4.32	22.93	30.00
BAND 4 BW: 20M QPSK RB: 1,99	1720.0	20050	V	24.24	5.06	-4.30	24.99	30.00
			H	19.75	5.06	-4.30	20.50	30.00
	1732.5	20175	V	26.91	5.03	-4.34	27.61	30.00
			H	19.72	5.03	-4.34	20.41	30.00
	1745.0	20300	V	25.92	5.01	-4.37	26.56	30.00
			H	20.07	5.01	-4.37	20.71	30.00
BAND 4 BW: 20M 16QAM RB: 1,0	1720.0	20050	V	24.26	5.07	-4.30	25.03	30.00
			H	21.93	5.09	-4.29	22.73	30.00
	1732.5	20175	V	26.02	5.09	-4.29	26.82	30.00
			H	21.75	5.07	-4.30	22.51	30.00
	1745.0	20300	V	27.48	5.04	-4.32	28.20	30.00
			H	22.25	5.04	-4.32	22.97	30.00
BAND 4 BW: 15M 16QAM RB: 1,99	1720.0	20050	V	24.46	5.06	-4.30	25.21	30.00
			H	20.04	5.06	-4.30	20.79	30.00
	1732.5	20175	V	26.96	5.03	-4.34	27.65	30.00
			H	19.77	5.03	-4.33	20.47	30.00
	1745.0	20300	V	26.07	5.01	-4.37	26.71	30.00
			H	20.21	5.01	-4.37	20.84	30.00

Remark :

- (1) The RBW,VBW of SPA for frequency RBW= 8MHz , VBW= 8MHz

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
BAND 13 BW: 5M QPSK RB: 1,0	779.5	23205	V	19.67	3.37	-2.77	20.27	44.77
			H	10.68	3.37	-2.77	11.28	44.77
	782.0	23230	V	20.48	3.38	-2.78	21.08	44.77
			H	10.80	3.38	-2.78	11.40	44.77
	784.5	23255	V	20.34	3.38	-2.79	20.94	44.77
			H	10.58	3.39	-2.79	11.18	44.77
BAND 13 BW: 5M QPSK RB: 1,24	779.5	23205	V	21.01	3.38	-2.78	21.61	44.77
			H	11.44	3.38	-2.79	12.04	44.77
	782.0	23230	V	19.35	3.39	-2.79	19.95	44.77
			H	8.86	3.39	-2.79	9.45	44.77
	784.5	23255	V	21.17	3.40	-2.80	21.77	44.77
			H	10.06	3.40	-2.80	10.66	44.77
BAND 13 BW: 5M 16QAM RB: 1,0	779.5	23205	V	19.97	3.37	-2.77	20.57	44.77
			H	10.81	3.37	-2.77	11.41	44.77
	782.0	23230	V	20.75	3.37	-2.77	21.35	44.77
			H	11.09	3.37	-2.78	11.69	44.77
	784.5	23255	V	20.76	3.38	-2.79	21.35	44.77
			H	11.11	3.39	-2.79	11.70	44.77
BAND 13 BW: 5M 16QAM RB: 1,24	779.5	23205	V	21.50	3.38	-2.78	22.10	44.77
			H	11.90	3.38	-2.79	12.50	44.77
	782.0	23230	V	19.76	3.39	-2.79	20.36	44.77
			H	8.86	3.39	-2.80	9.46	44.77
	784.5	23255	V	21.56	3.40	-2.80	22.16	44.77
			H	10.58	3.40	-2.80	11.17	44.77

Remark :

- (1) The RBW,VBW of SPA for frequency RBW= 8MHz , VBW= 8MHz

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
BAND 13 BW: 10M QPSK RB: 1,0	782.0	23230	V	20.82	3.38	-2.78	21.42	44.77
			H	11.28	3.38	-2.78	11.88	44.77
BAND 13 BW: 10M QPSK RB: 1,49	782.0	23230	V	19.25	3.40	-2.80	19.85	44.77
			H	9.08	3.40	-2.80	9.68	44.77
BAND 13 BW: 10M 16QAM RB: 1,0	782.0	23230	V	21.08	3.38	-2.78	21.68	44.77
			H	11.49	3.38	-2.78	12.09	44.77
BAND 13 BW: 10M 16QAM RB: 1,49	782.0	23230	V	20.24	3.39	-2.79	20.84	44.77
			H	9.59	3.40	-2.80	10.18	44.77

Remark :

- (1) The RBW,VBW of SPA for frequency RBW= 8MHz , VBW= 8MHz

7.6. Measurement Result: (Average) –using option of peak measurement

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBi	dB	dBm	dBm
BAND 4 BW: 5M QPSK RB: 1,0	1712.5	19975	V	22.99	5.09	-4.29	23.79	30.00
			H	18.61	5.09	-4.29	19.41	30.00
	1732.5	20175	V	20.71	5.05	-4.31	21.45	30.00
			H	17.46	5.05	-4.31	18.20	30.00
	1752.5	20375	V	23.15	5.01	-4.37	23.79	30.00
			H	17.23	5.01	-4.37	17.87	30.00
BAND 4 BW: 5M QPSK RB: 1,24	1712.5	19975	V	23.16	5.01	-4.37	23.80	30.00
			H	16.89	5.08	-4.29	17.68	30.00
	1732.5	20175	V	21.99	5.08	-4.29	22.78	30.00
			H	17.47	5.05	-4.32	18.20	30.00
	1752.5	20375	V	22.50	5.05	-4.32	23.23	30.00
			H	16.25	5.01	-4.37	16.89	30.00
BAND 4 BW: 5M 16QAM RB: 1,0	1712.5	19975	V	23.21	5.09	-4.29	24.01	30.00
			H	18.00	5.09	-4.29	18.80	30.00
	1732.5	20175	V	20.82	5.05	-4.31	21.56	30.00
			H	17.14	5.05	-4.31	17.88	30.00
	1752.5	20375	V	23.11	5.02	-4.36	23.77	30.00
			H	17.44	5.02	-4.36	18.10	30.00
BAND 4 BW: 5M 16QAM RB: 1,24	1712.5	19975	V	22.30	5.08	-4.29	23.09	30.00
			H	17.90	5.09	-4.29	18.70	30.00
	1732.5	20175	V	22.55	5.05	-4.32	23.28	30.00
			H	17.27	5.05	-4.32	18.00	30.00
	1752.5	20375	V	22.91	5.01	-4.37	23.55	30.00
			H	17.15	5.01	-4.37	17.79	30.00

Remark :

- (1) The RBW,VBW of SPA for frequency RBW= 8MHz , VBW= 8MHz

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBi	dB	dBm	dBm
BAND 4 BW: 10M QPSK RB: 1,0	1715.0	20000	V	22.79	5.09	-4.29	23.59	30.00
			H	17.59	5.09	-4.29	18.39	30.00
	1732.0	20175	V	21.90	5.06	-4.30	22.66	30.00
			H	17.83	5.06	-4.30	18.59	30.00
	1750.0	20350	V	23.48	5.03	-4.35	24.16	30.00
			H	17.37	5.03	-4.35	18.05	30.00
BAND 4 BW: 10M QPSK RB: 1,49	1715.0	20000	V	21.61	5.07	-4.30	22.38	30.00
			H	16.76	5.07	-4.30	17.53	30.00
	1732.0	20175	V	23.22	5.04	-4.33	23.93	30.00
			H	15.85	5.04	-4.32	16.57	30.00
	1750.0	20350	V	22.79	5.01	-4.37	23.43	30.00
			H	17.67	5.01	-4.37	18.31	30.00
BAND 4 BW: 10M 16QAM RB: 1,0	1715.0	20000	V	22.84	5.09	-4.29	23.64	30.00
			H	17.76	5.09	-4.29	18.56	30.00
	1732.0	20175	V	22.71	5.05	-4.31	23.45	30.00
			H	18.34	5.06	-4.30	19.10	30.00
	1750.0	20350	V	23.38	5.03	-4.35	24.06	30.00
			H	17.30	5.03	-4.35	17.98	30.00
BAND 4 BW: 10M 16QAM RB: 1,49	1715.0	20000	V	21.19	5.07	-4.30	21.96	30.00
			H	16.98	5.07	-4.30	17.75	30.00
	1732.0	20175	V	23.17	5.04	-4.33	23.88	30.00
			H	16.46	5.04	-4.32	17.18	30.00
	1750.0	20350	V	23.03	5.01	-4.37	23.67	30.00
			H	17.72	5.01	-4.37	18.36	30.00

Remark :

- (1) The RBW,VBW of SPA for frequency RBW= 8MHz , VBW= 8MHz

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBi	dB	dBm	dBm
BAND 4 BW: 15M QPSK RB: 1,0	1717.5	20025	V	22.78	5.09	-4.29	23.58	30.00
			H	18.20	5.09	-4.29	19.00	30.00
	1732.5	20175	V	21.04	5.06	-4.30	21.80	30.00
			H	15.38	5.06	-4.30	16.14	30.00
	1747.5	20325	V	23.47	5.03	-4.34	24.16	30.00
			H	17.90	5.03	-4.34	18.59	30.00
BAND 4 BW: 15M QPSK RB: 1,74	1717.5	20025	V	20.28	5.07	-4.30	21.05	30.00
			H	15.80	5.06	-4.30	16.56	30.00
	1732.5	20175	V	23.03	5.04	-4.33	23.74	30.00
			H	18.05	5.04	-4.33	18.76	30.00
	1747.5	20325	V	21.72	5.01	-4.37	22.36	30.00
			H	17.45	5.01	-4.37	18.09	30.00
BAND 4 BW: 15M 16QAM RB: 1,0	1717.5	20025	V	22.98	5.09	-4.29	23.78	30.00
			H	18.29	5.09	-4.29	19.09	30.00
	1732.5	20175	V	20.70	5.06	-4.30	21.46	30.00
			H	15.81	5.06	-4.30	16.57	30.00
	1747.5	20325	V	23.69	5.03	-4.34	24.38	30.00
			H	17.93	5.03	-4.34	18.62	30.00
BAND 4 BW: 15M 16QAM RB: 1,74	1717.5	20025	V	20.22	5.06	-4.30	20.98	30.00
			H	15.63	5.06	-4.30	16.39	30.00
	1732.5	20175	V	24.10	5.04	-4.33	24.81	30.00
			H	17.98	5.04	-4.33	18.69	30.00
	1747.5	20325	V	22.72	5.01	-4.37	23.36	30.00
			H	17.07	5.01	-4.37	17.71	30.00

Remark :

- (1) The RBW,VBW of SPA for frequency RBW= 8MHz , VBW= 8MHz

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBi	dB	dBm	dBm
BAND 4 BW: 20M QPSK RB: 1,0	1720.0	20050	V	22.14	5.09	-4.29	22.94	30.00
			H	18.48	5.09	-4.29	19.28	30.00
	1732.5	20175	V	20.99	5.07	-4.30	21.76	30.00
			H	18.40	5.07	-4.30	19.17	30.00
	1745.0	20300	V	24.31	5.04	-4.32	25.03	30.00
			H	18.24	5.04	-4.32	18.96	30.00
BAND 4 BW: 20M QPSK RB: 1,99	1720.0	20050	V	20.82	5.06	-4.30	21.58	30.00
			H	16.16	5.06	-4.30	16.92	30.00
	1732.5	20175	V	23.36	5.03	-4.34	24.05	30.00
			H	16.69	5.03	-4.34	17.38	30.00
	1745.0	20300	V	22.13	5.01	-4.37	22.77	30.00
			H	16.81	5.01	-4.37	17.45	30.00
BAND 4 BW: 20M 16QAM RB: 1,0	1720.0	20050	V	21.03	5.07	-4.30	21.80	30.00
			H	18.03	5.09	-4.29	18.83	30.00
	1732.5	20175	V	22.97	5.09	-4.29	23.77	30.00
			H	18.31	5.07	-4.30	19.08	30.00
	1745.0	20300	V	23.60	5.04	-4.32	24.32	30.00
			H	18.27	5.04	-4.32	18.99	30.00
BAND 4 BW: 15M 16QAM RB: 1,99	1720.0	20050	V	20.49	5.06	-4.30	21.25	30.00
			H	16.51	5.06	-4.30	17.27	30.00
	1732.5	20175	V	23.23	5.03	-4.34	23.92	30.00
			H	15.88	5.03	-4.33	16.58	30.00
	1745.0	20300	V	22.09	5.01	-4.37	22.73	30.00
			H	17.21	5.01	-4.37	17.85	30.00

Remark :

- (1) The RBW,VBW of SPA for frequency RBW= 8MHz , VBW= 8MHz

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
BAND 13 BW: 5M QPSK RB: 1,0	779.5	23205	V	16.23	3.37	-2.77	16.83	44.77
			H	7.25	3.37	-2.77	7.85	44.77
	782.0	23230	V	17.40	3.38	-2.78	18.00	44.77
			H	7.27	3.38	-2.78	7.87	44.77
	784.5	23255	V	17.16	3.38	-2.79	17.75	44.77
			H	6.70	3.39	-2.79	7.30	44.77
BAND 13 BW: 5M QPSK RB: 1,24	779.5	23205	V	17.46	3.38	-2.78	18.06	44.77
			H	8.38	3.38	-2.79	8.97	44.77
	782.0	23230	V	16.25	3.39	-2.79	16.85	44.77
			H	5.42	3.39	-2.79	6.02	44.77
	784.5	23255	V	17.89	3.40	-2.80	18.49	44.77
			H	6.72	3.40	-2.80	7.32	44.77
BAND 13 BW: 5M 16QAM RB: 1,0	779.5	23205	V	16.29	3.37	-2.77	16.89	44.77
			H	7.65	3.37	-2.77	8.25	44.77
	782.0	23230	V	16.91	3.37	-2.77	17.51	44.77
			H	7.43	3.37	-2.78	8.02	44.77
	784.5	23255	V	17.76	3.38	-2.79	18.35	44.77
			H	7.61	3.39	-2.79	8.21	44.77
BAND 13 BW: 5M 16QAM RB: 1,24	779.5	23205	V	17.85	3.38	-2.78	18.45	44.77
			H	8.88	3.38	-2.79	9.47	44.77
	782.0	23230	V	16.69	3.39	-2.79	17.29	44.77
			H	5.18	3.39	-2.80	5.77	44.77
	784.5	23255	V	18.01	3.40	-2.80	18.61	44.77
			H	7.02	3.40	-2.80	7.62	44.77

Remark :

- (1) The RBW,VBW of SPA for frequency RBW= 8MHz , VBW= 8MHz

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
BAND 13 BW: 10M QPSK RB: 1,0	782.0	23230	V	17.27	3.38	-2.78	17.87	44.77
			H	7.76	3.38	-2.78	8.36	44.77
BAND 13 BW: 10M QPSK RB: 1,49	782.0	23230	V	16.05	3.40	-2.80	16.65	44.77
			H	5.65	3.40	-2.80	6.25	44.77
BAND 13 BW: 10M 16QAM RB: 1,0	782.0	23230	V	17.78	3.38	-2.78	18.38	44.77
			H	8.36	3.38	-2.78	8.96	44.77
BAND 13 BW: 10M 16QAM RB: 1,49	782.0	23230	V	17.10	3.39	-2.79	17.70	44.77
			H	6.59	3.40	-2.80	7.19	44.77

Remark :

- (1) The RBW,VBW of SPA for frequency RBW= 8MHz , VBW= 8MHz

8. OCCUPIED BANDWIDTH MEASUREMENT

8.1. Standard Applicable

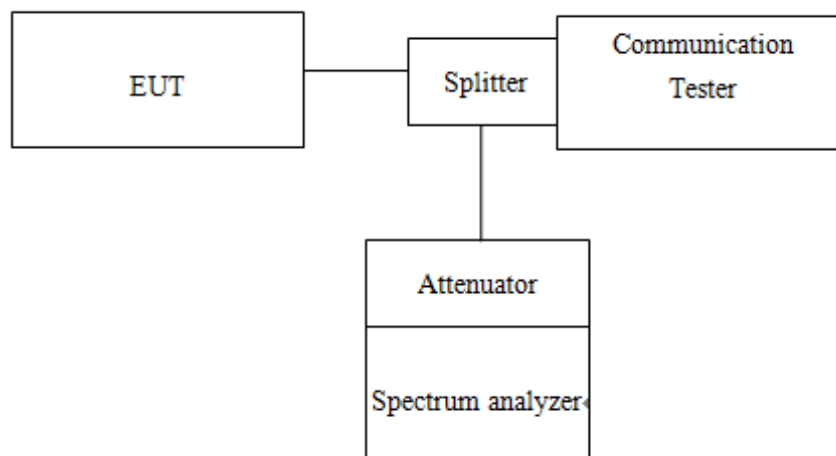
The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power.

According to §FCC 2.1049 (99%)

According to IC RSS-132 §5.5

According to IC RSS-139 §2.3 (20dB)

8.2. Test Set-up



8.3. Measurement Procedure

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% of emission BW, VBW= 3 times RBW, -20dBc display line was placed on the screen (or 20dB bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace. Then set RBW to 99% bandwidth, RBW= 1%, VBW= 3 RBW, with span > 2 * Signal BW, set % Power = 99%.

NOTE: For the plot of bandwidth measurement, the marker of the 99% bandwidth is diamond-shape while the marker of the 20dB BW is arrow-mark

8.4. Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	10/08/2014	10/09/2015
Temperature Chamber	TERCHY	MHG-120LF	911009	05/06/2015	05/05/2016
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016
Splitter	Agilent	11636B	N/A	01/02/2015	01/01/2016
DC Power Supply	Agilent	E3640A	MY52410006	11/10/2014	11/09/2015

8.5. Measurement Result

99% Bandwidth

LTE BAND 4							
Channel bandwidth: 5MHz				Channel bandwidth: 10MHz			
Frequency (MHz)	CH	99% Bandwidth (MHz)		Frequency (MHz)	CH	99% Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
1712.5	19957	4.5176	4.5098	1715.0	20000	9.0194	9.0189
1732.5	20175	4.5028	4.5200	1732.5	20175	9.0239	9.0135
1752.5	20375	4.5204	4.5224	1750.0	20350	9.0026	9.0317

LTE BAND 4							
Channel bandwidth: 15MHz				Channel bandwidth: 20MHz			
Frequency (MHz)	CH	99% Bandwidth (MHz)		Frequency (MHz)	CH	99% Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
1717.5	20025	13.4991	13.5261	1720.0	20050	18.0693	18.1185
1732.5	20175	13.4738	13.4534	1732.5	20175	17.8615	17.9377
1747.5	20325	13.4627	13.4828	1745.0	20300	17.8801	17.9222

LTE BAND 13							
Channel bandwidth: 5MHz				Channel bandwidth: 10MHz			
Frequency (MHz)	CH	99% Bandwidth (MHz)		Frequency (MHz)	CH	99% Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
779.5	23205	4.4902	4.4810	23230	782	8.9626	8.9758
782.0	23230	4.5269	4.5214				
784.5	23255	4.5309	4.5313				

26dB Bandwidth

LTE BAND 4							
Channel bandwidth: 5MHz				Channel bandwidth: 10MHz			
Frequency (MHz)	CH	26 Bandwidth (MHz)		Frequency (MHz)	CH	26 Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
1712.5	19957	5.014	5.004	1715.0	20000	9.999	10.096
1732.5	20175	4.980	4.989	1732.5	20175	9.895	9.743
1752.5	20375	5.048	4.994	1750.0	20350	9.900	9.767

LTE BAND 4							
Channel bandwidth: 15MHz				Channel bandwidth: 20MHz			
Frequency (MHz)	CH	26 Bandwidth (MHz)		Frequency (MHz)	CH	26 Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
1717.5	20025	15.107	15.142	1720.0	20050	19.813	19.795
1732.5	20175	14.974	15.016	1732.5	20175	19.761	19.704
1747.5	20325	15.226	15.054	1745.0	20300	19.934	19.746

LTE BAND 13							
Channel bandwidth: 5MHz				Channel bandwidth: 10MHz			
Frequency (MHz)	CH	26 Bandwidth (MHz)		Frequency (MHz)	CH	26 Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
779.5	23205	5.000	4.978	23230	782	9.925	10.037
782.0	23230	5.017	5.029				
784.5	23255	5.004	5.021				

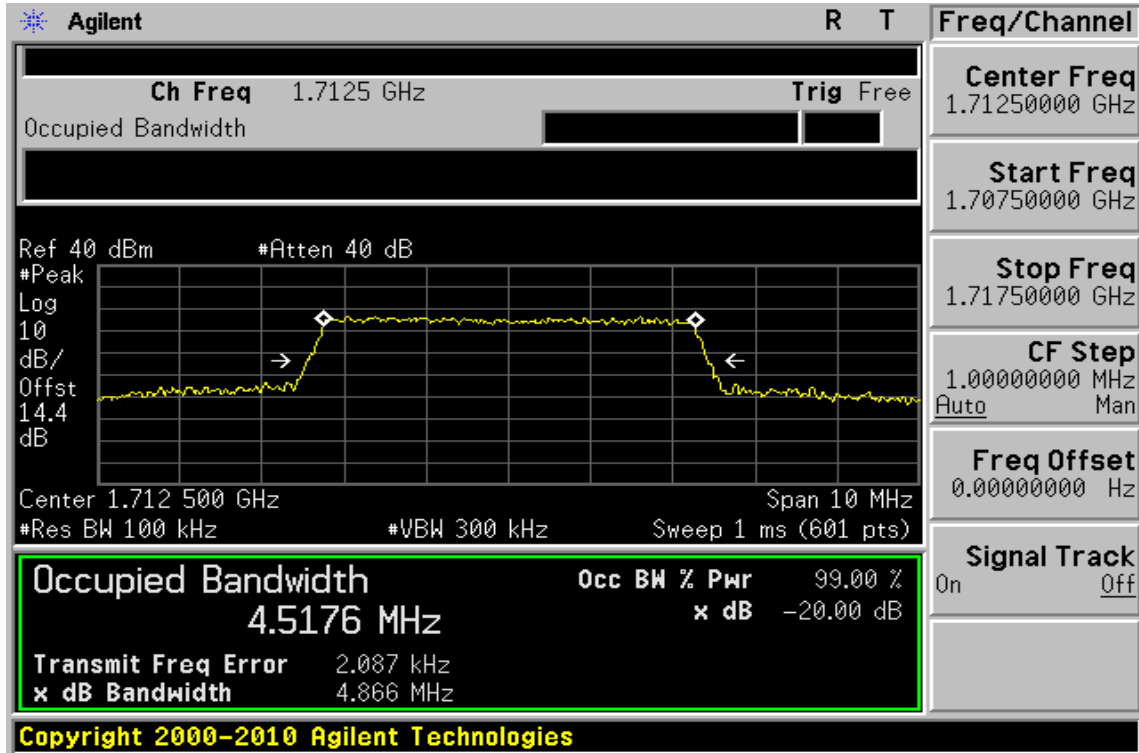
20dB Bandwidth

LTE BAND 4							
Channel bandwidth: 5MHz				Channel bandwidth: 10MHz			
Frequency (MHz)	CH	20dB Bandwidth (MHz)		Frequency (MHz)	CH	20dB Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
1712.5	19957	4.866	4.872	1715.0	20000	9.636	9.656
1732.5	20175	4.834	4.852	1732.5	20175	9.652	9.643
1752.5	20375	4.803	4.819	1750.0	20350	9.511	9.654

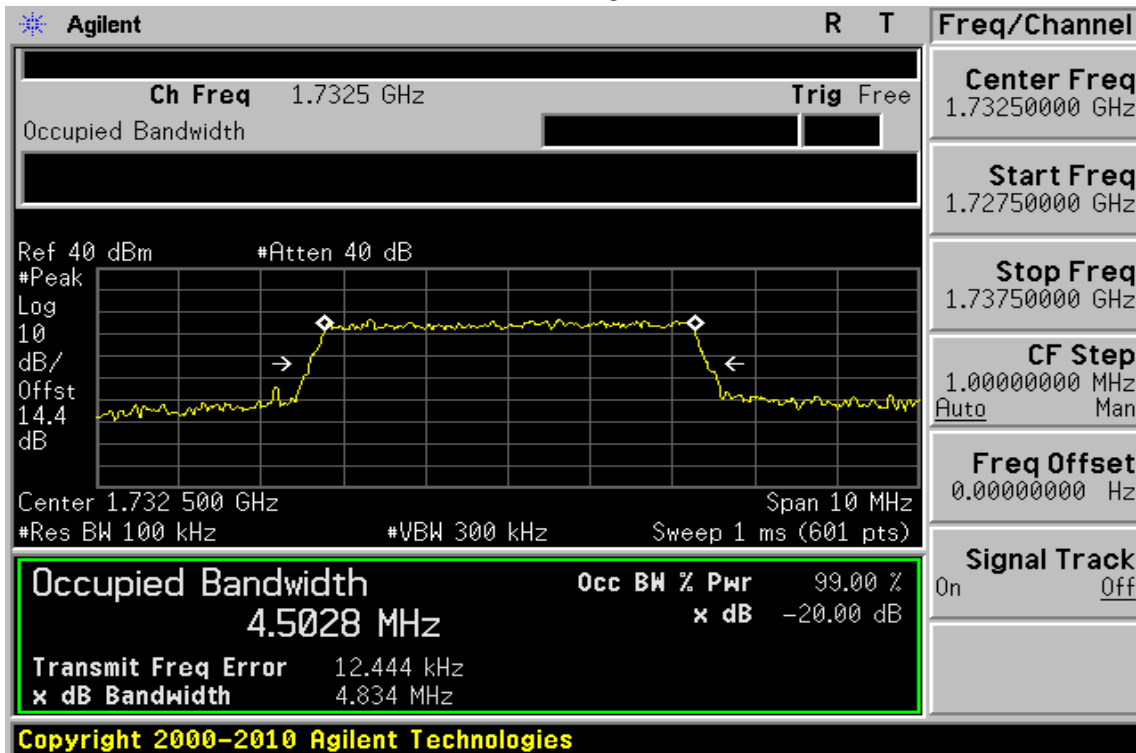
LTE BAND 4							
Channel bandwidth: 15MHz				Channel bandwidth: 20MHz			
Frequency (MHz)	CH	20dB Bandwidth (MHz)		Frequency (MHz)	CH	20dB Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
1717.5	20025	14.536	14.562	1720.0	20050	18.977	19.225
1732.5	20175	14.448	14.182	1732.5	20175	18.945	19.087
1747.5	20325	14.228	14.508	1745.0	20300	18.967	19.174

99% Bandwidth Test Data

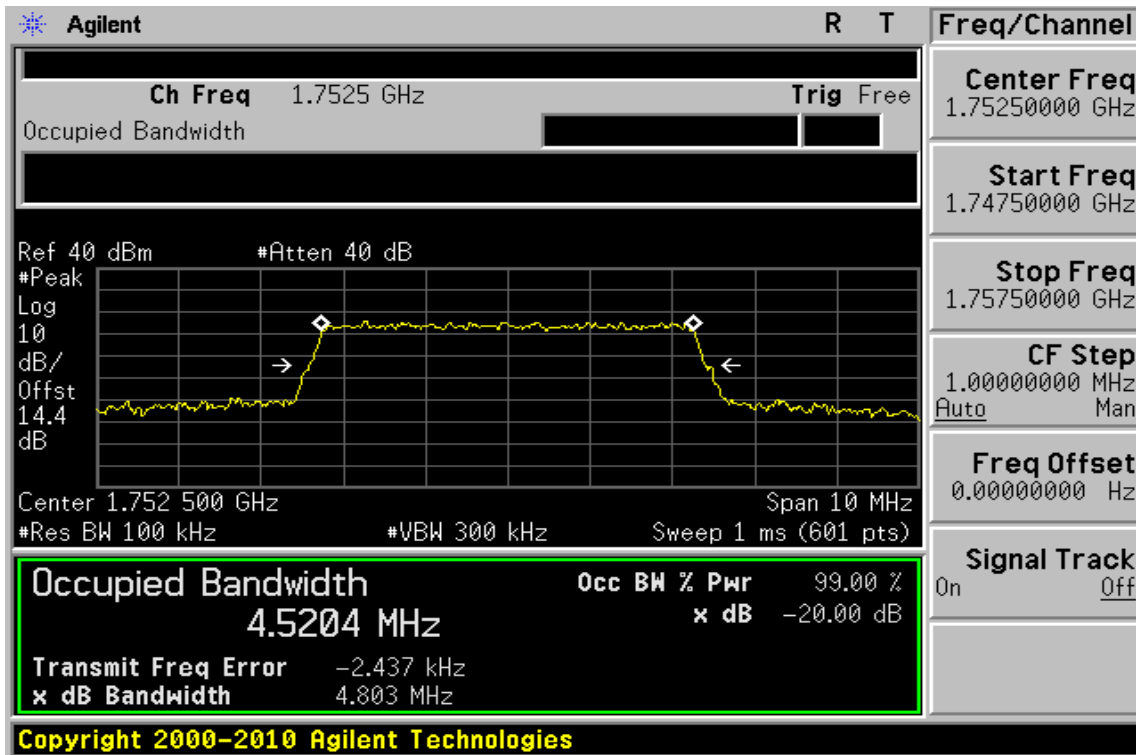
5MHz BW LTE-Band 4 QPSK Channel Low



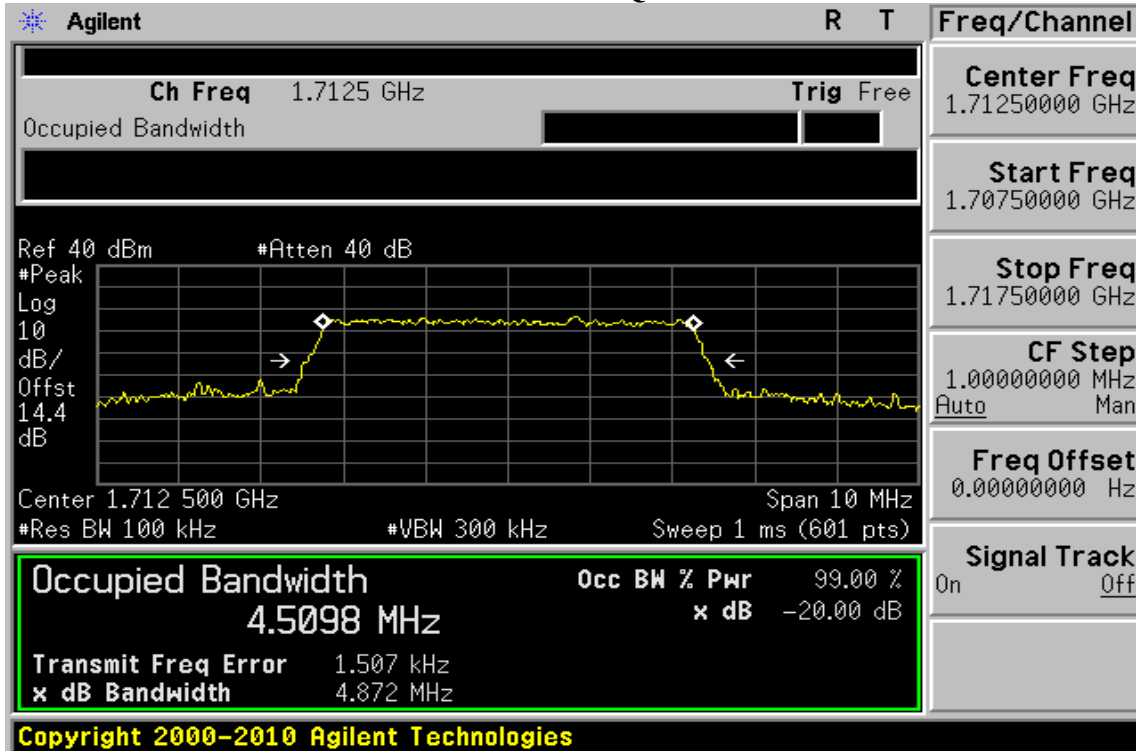
5MHz BW LTE-Band 4 QPSK Channel Mid



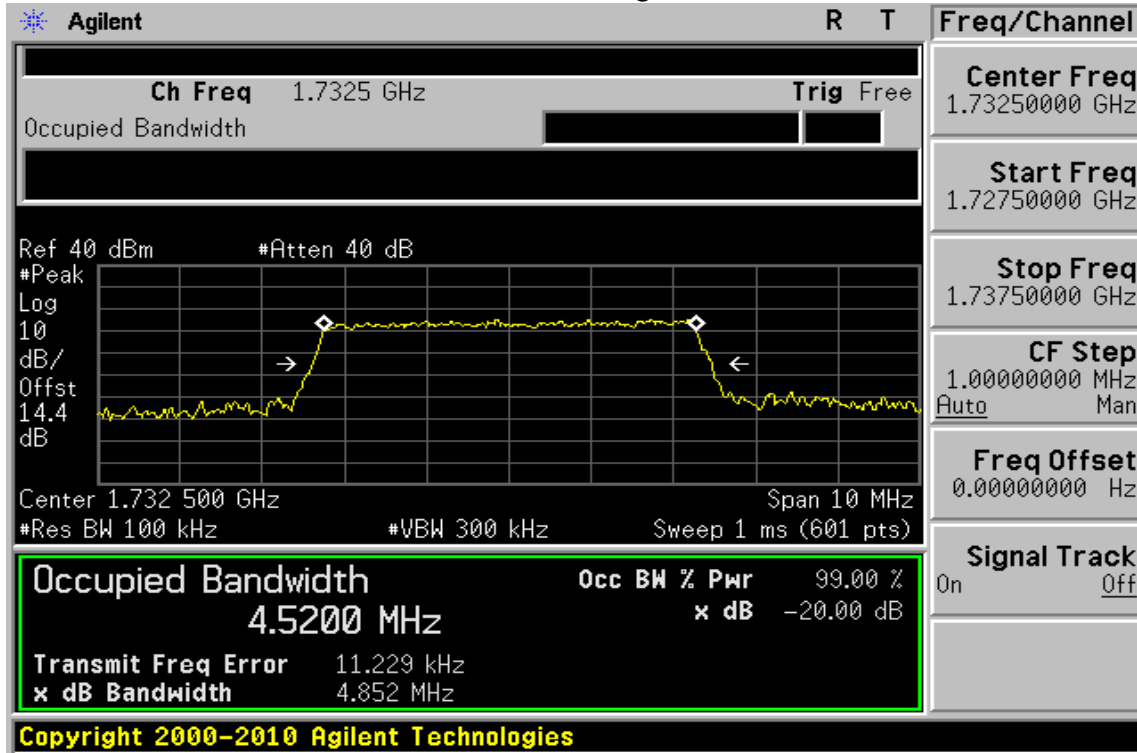
5MHz BW LTE-Band 4 QPSK Channel High



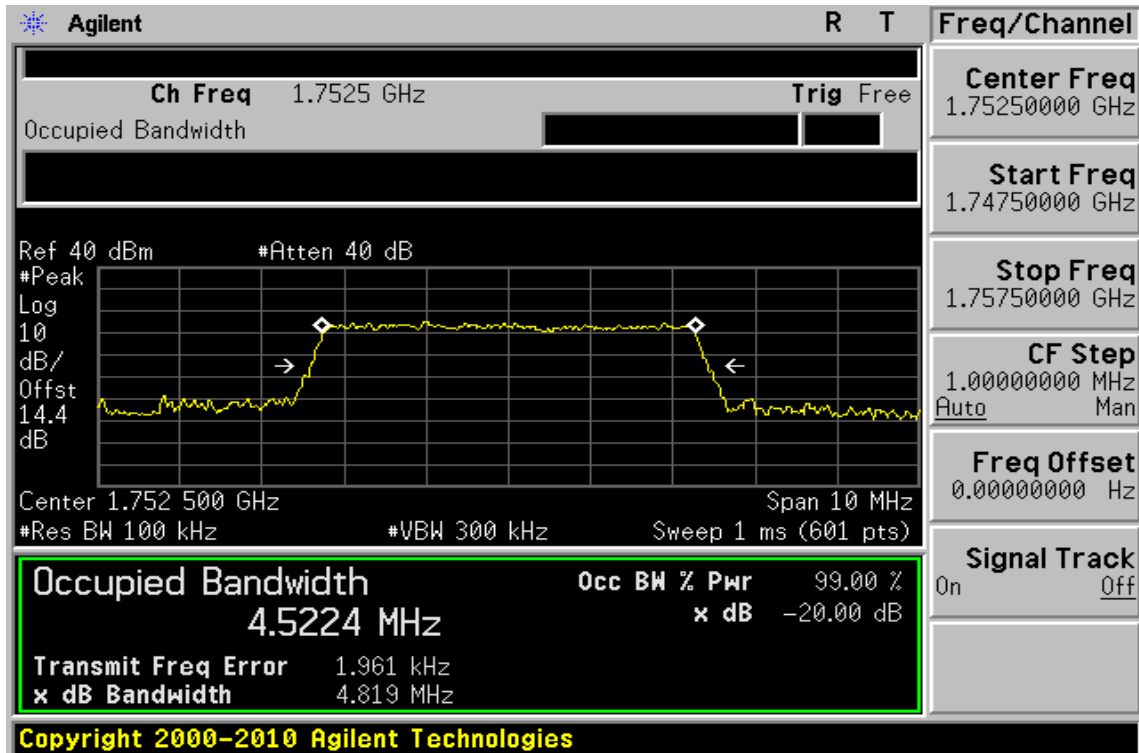
5MHz BW LTE-Band 4 16QAM Channel Low



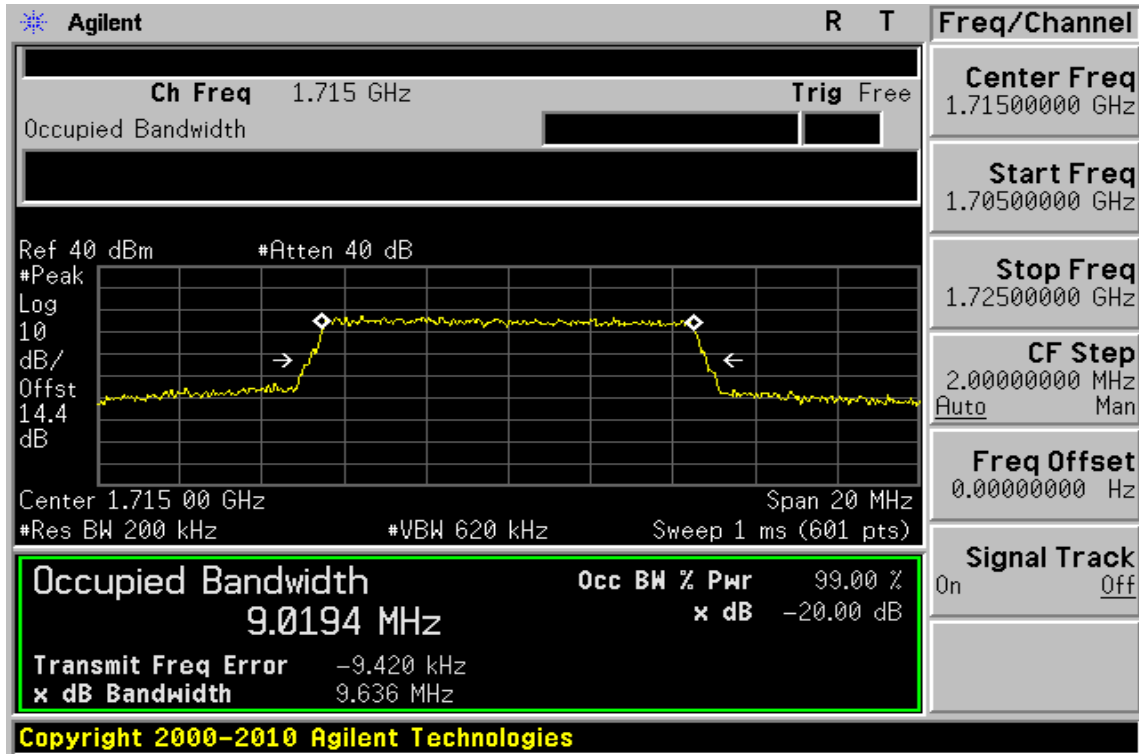
5MHz BW LTE-Band 4 16QAM Channel Mid



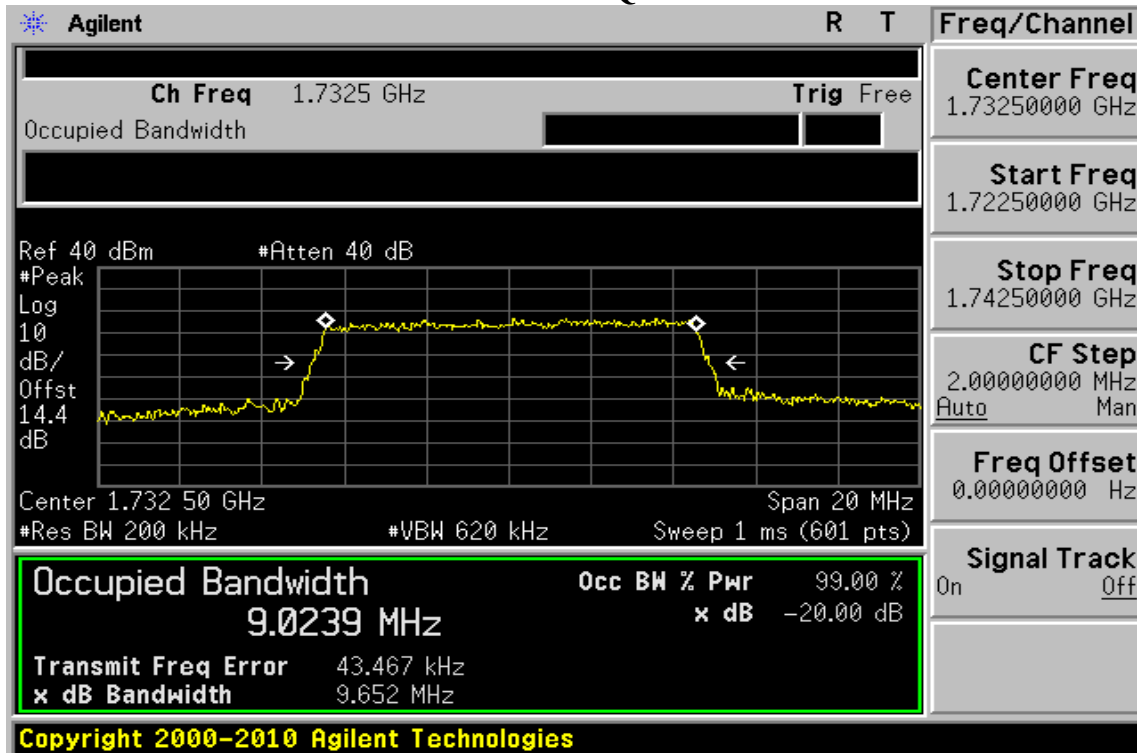
5MHz BW LTE-Band 4 16QAM Channel High



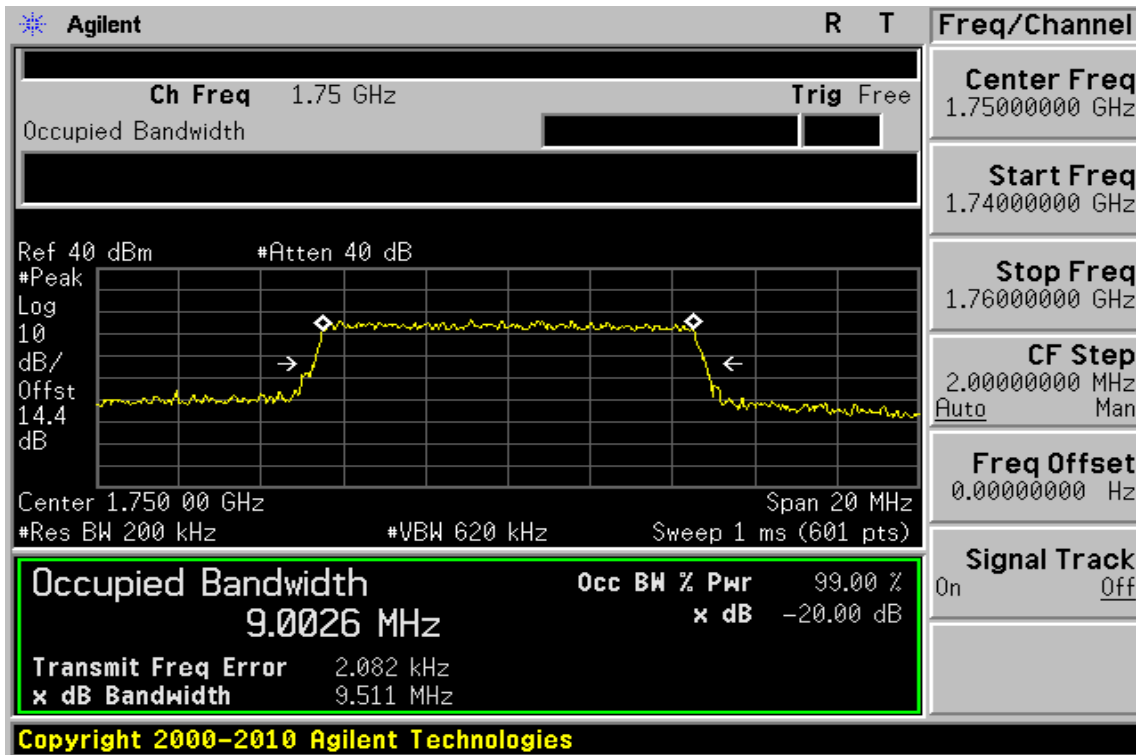
10MHz BW LTE-Band 4 QPSK Channel Low



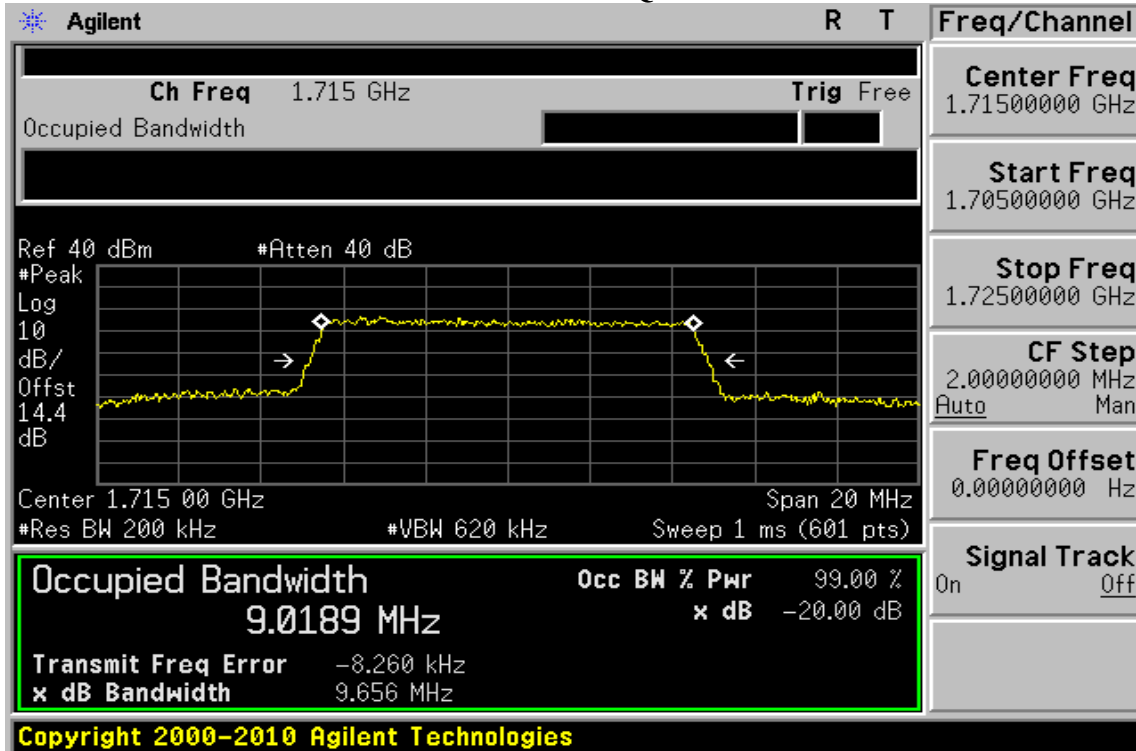
10MHz BW LTE-Band 4 QPSK Channel Mid



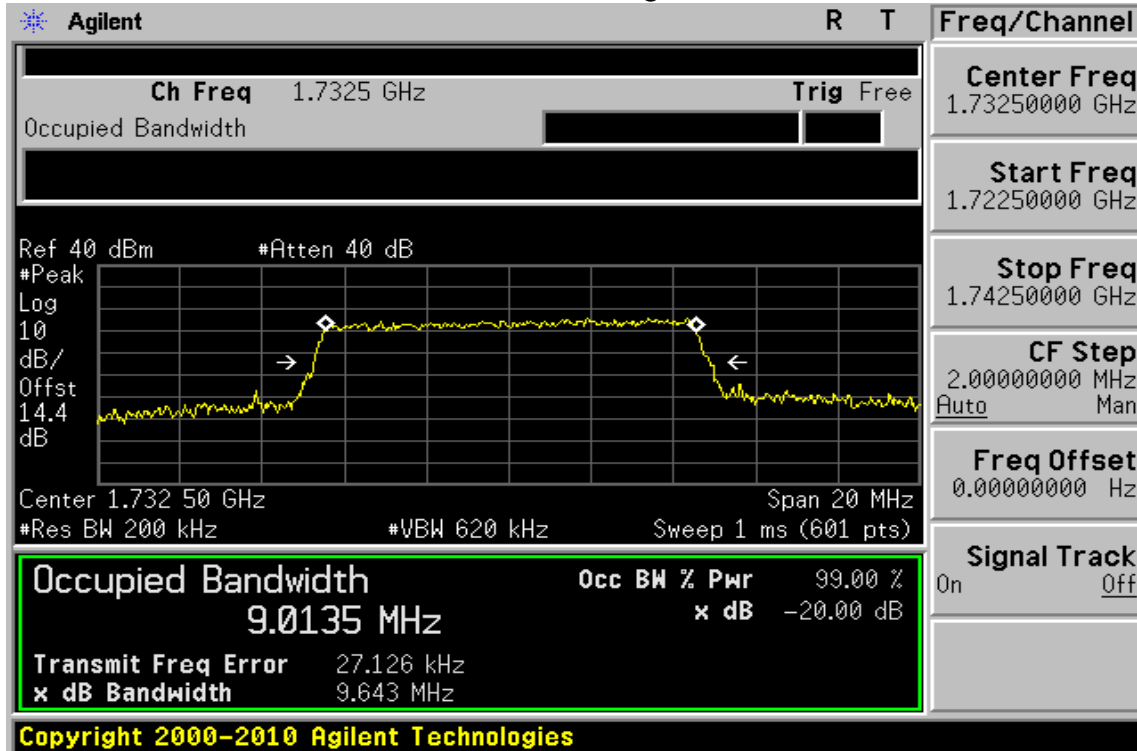
10MHz BW LTE-Band 4 QPSK Channel High



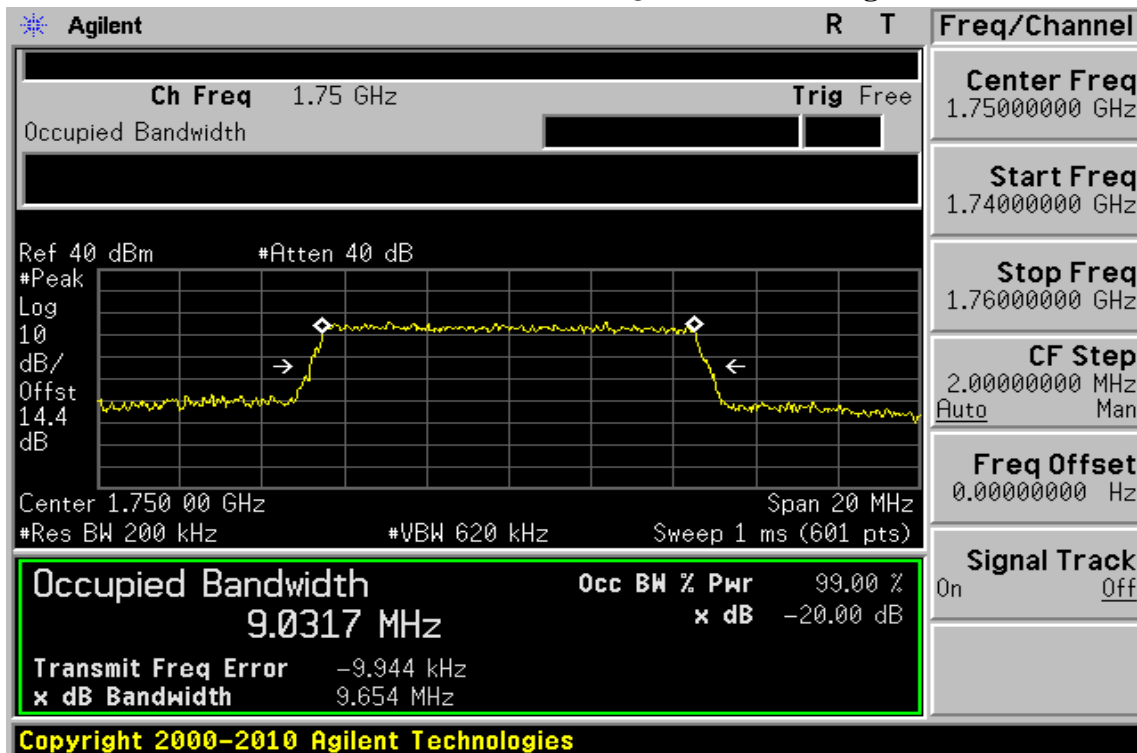
10MHz BW LTE-Band 4 16QAM Channel Low



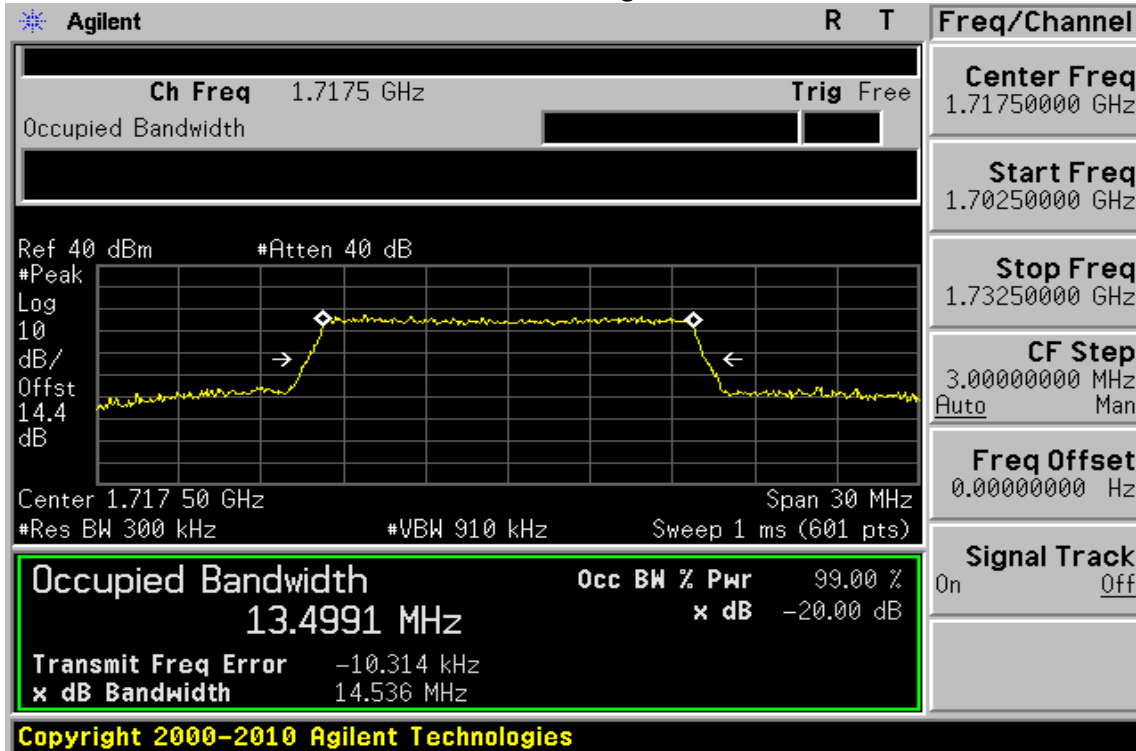
10MHz BW LTE-Band 4 16QAM Channel Mid



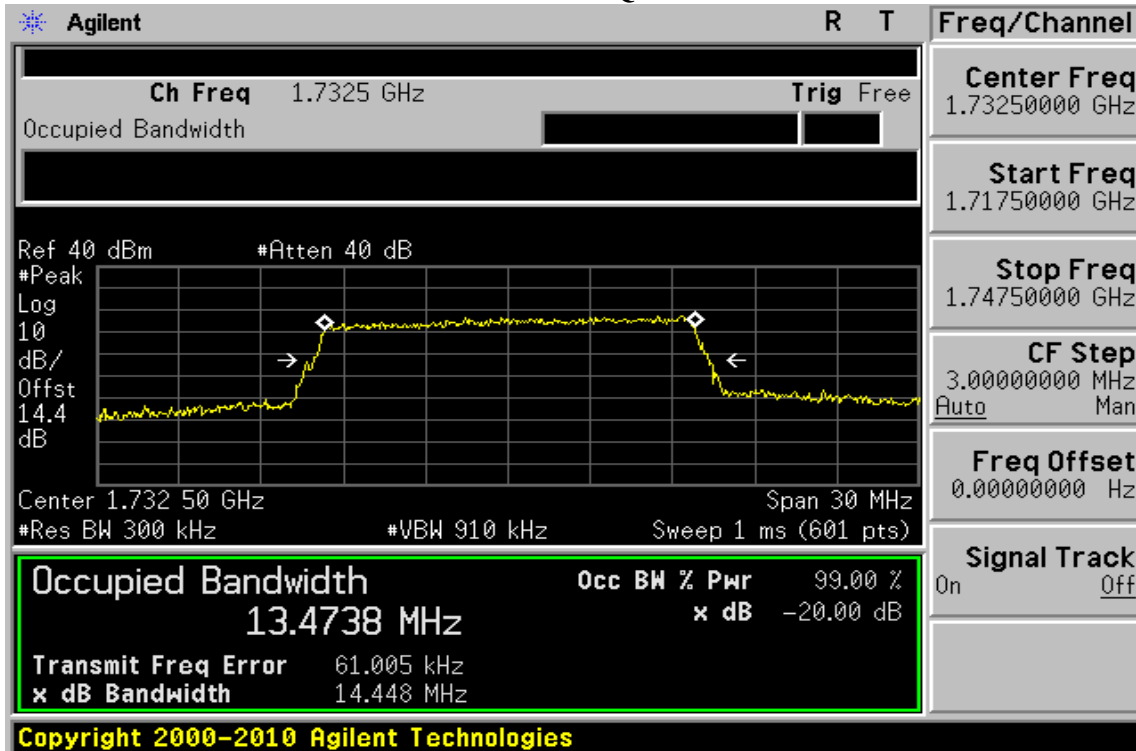
10MHz BW LTE-Band 4 16QAM Channel High



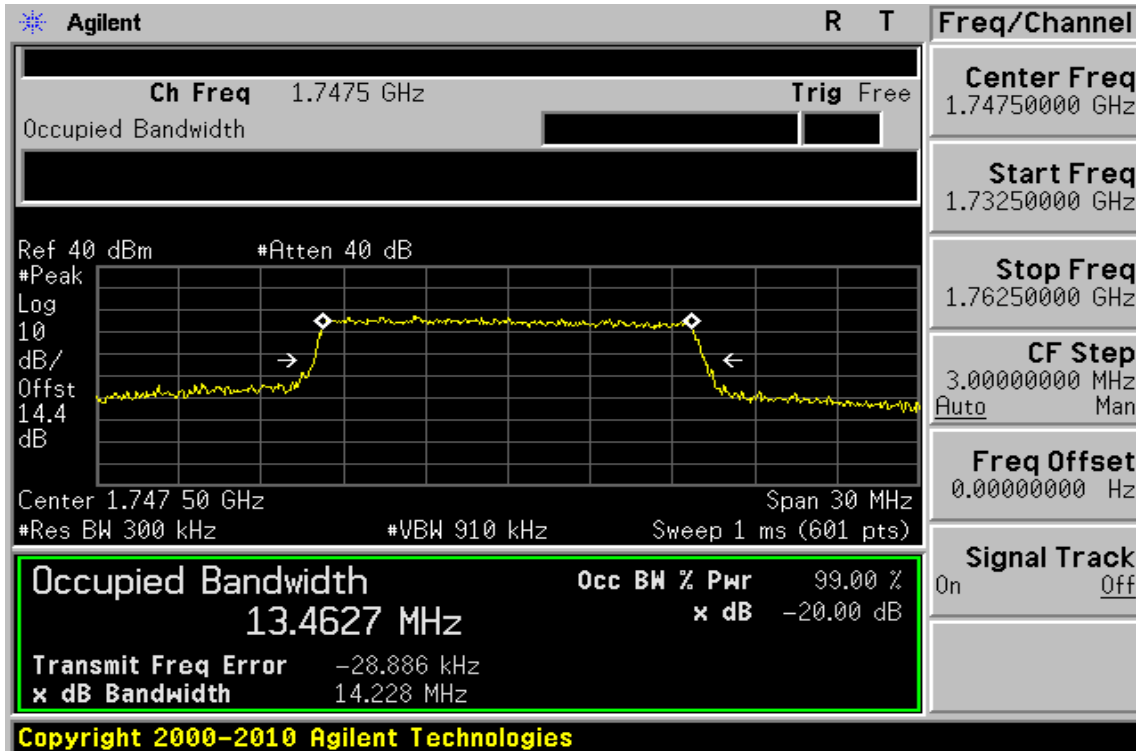
15MHz BW LTE-Band 4 QPSK Channel Low



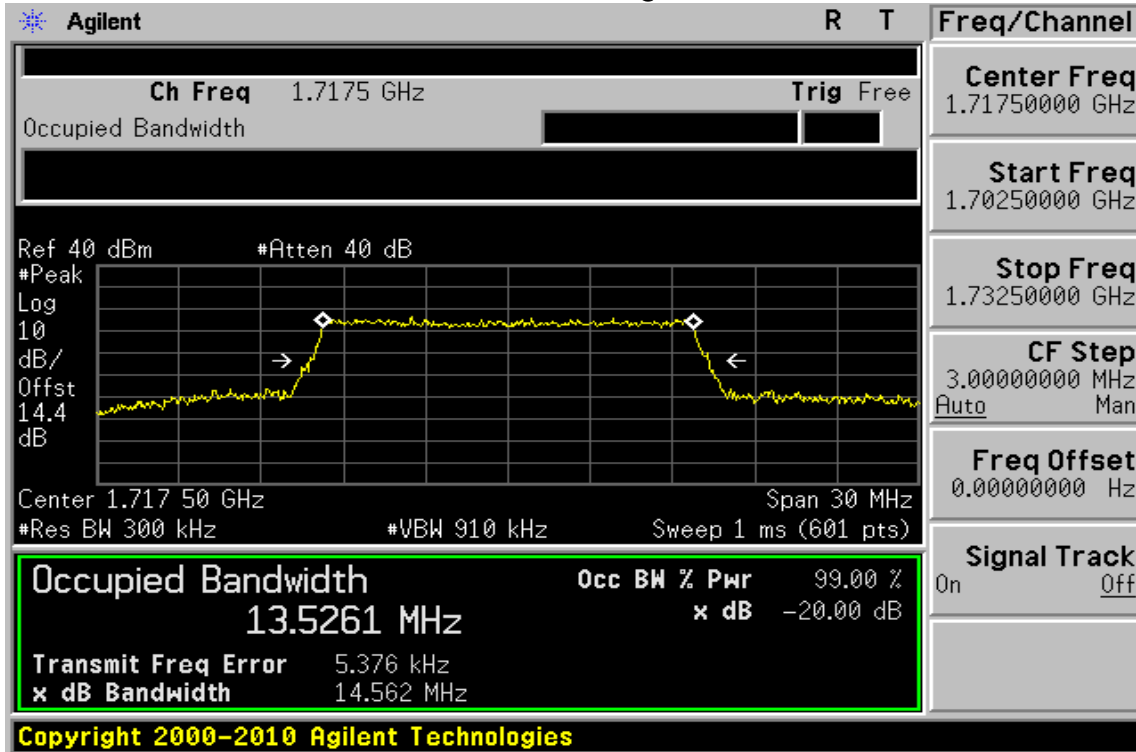
15MHz BW LTE-Band 4 QPSK Channel Mid



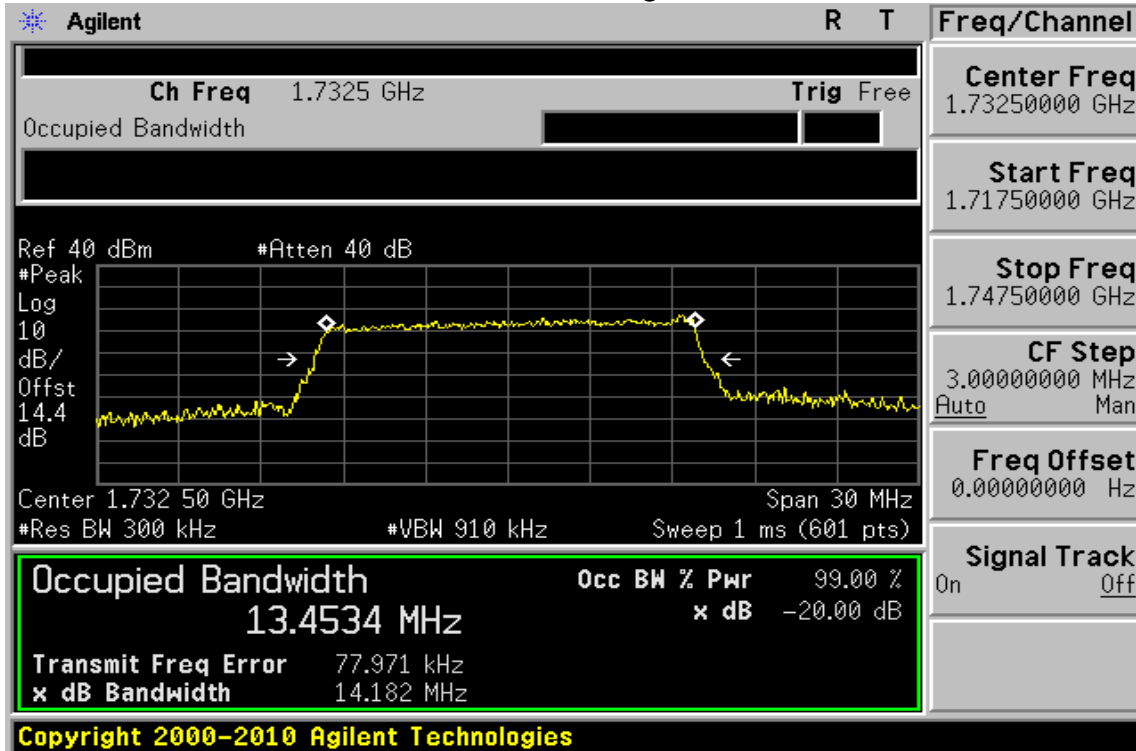
15MHz BW LTE-Band 4 QPSK Channel High



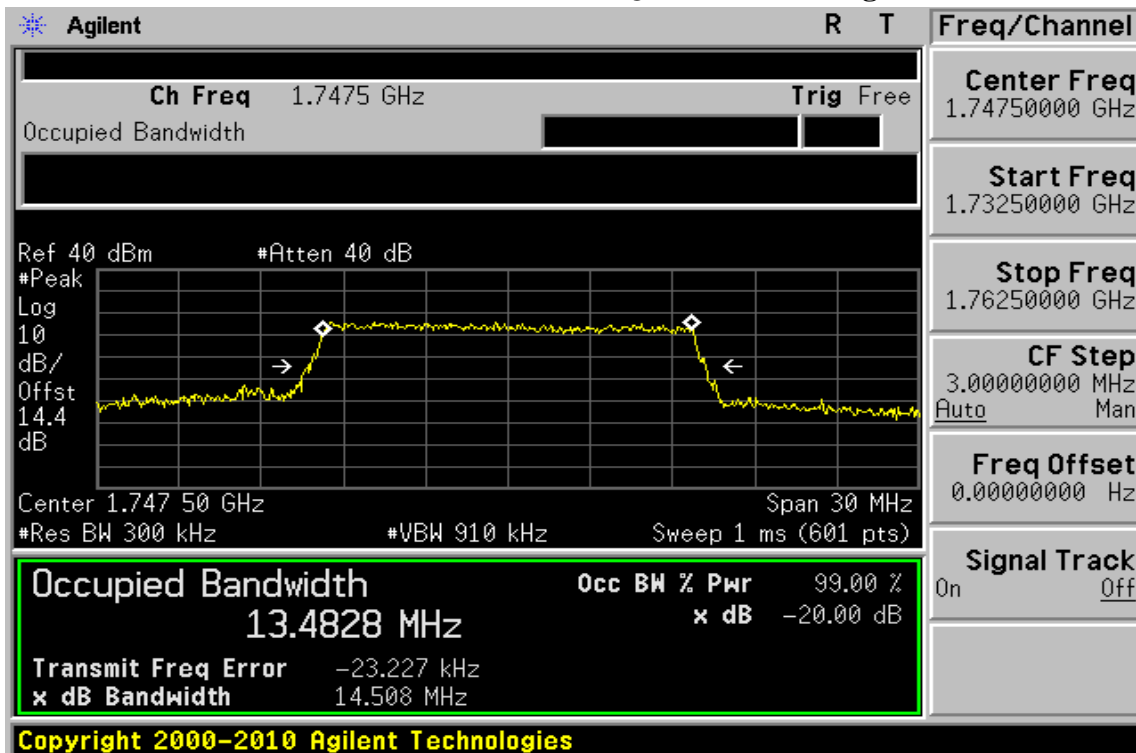
15MHz BW LTE-Band 4 16QAM Channel Low



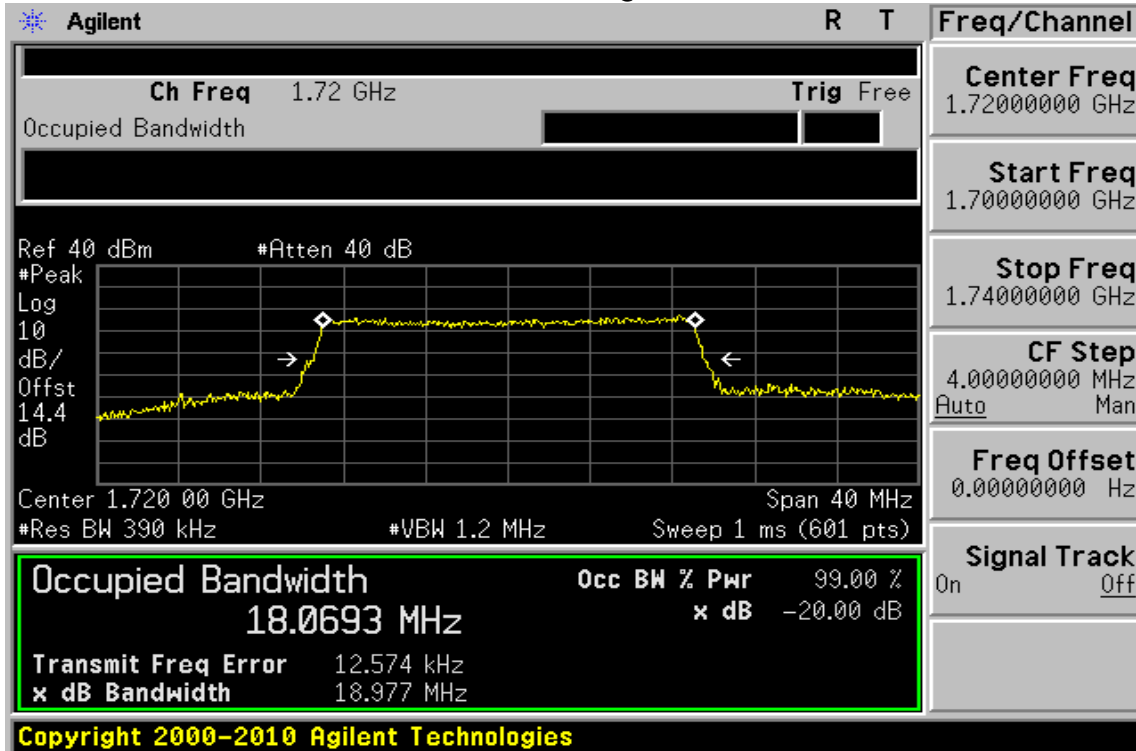
15MHz BW LTE-Band 4 16QAM Channel Mid



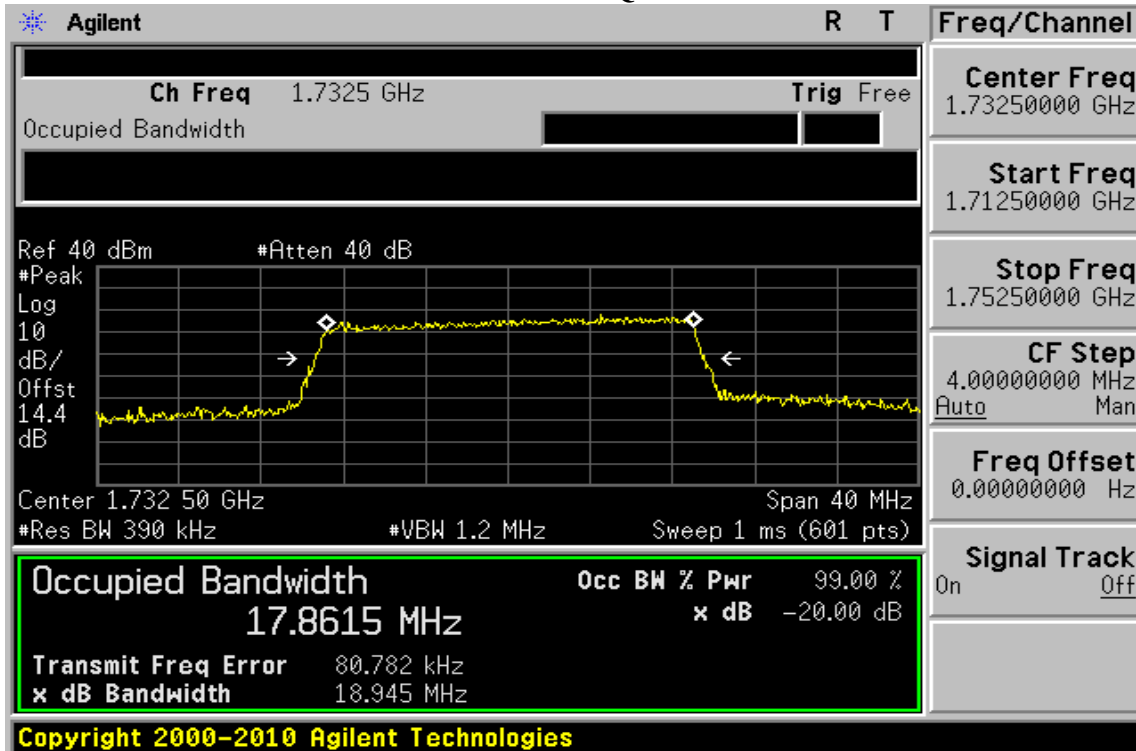
15MHz BW LTE-Band 4 16QAM Channel High



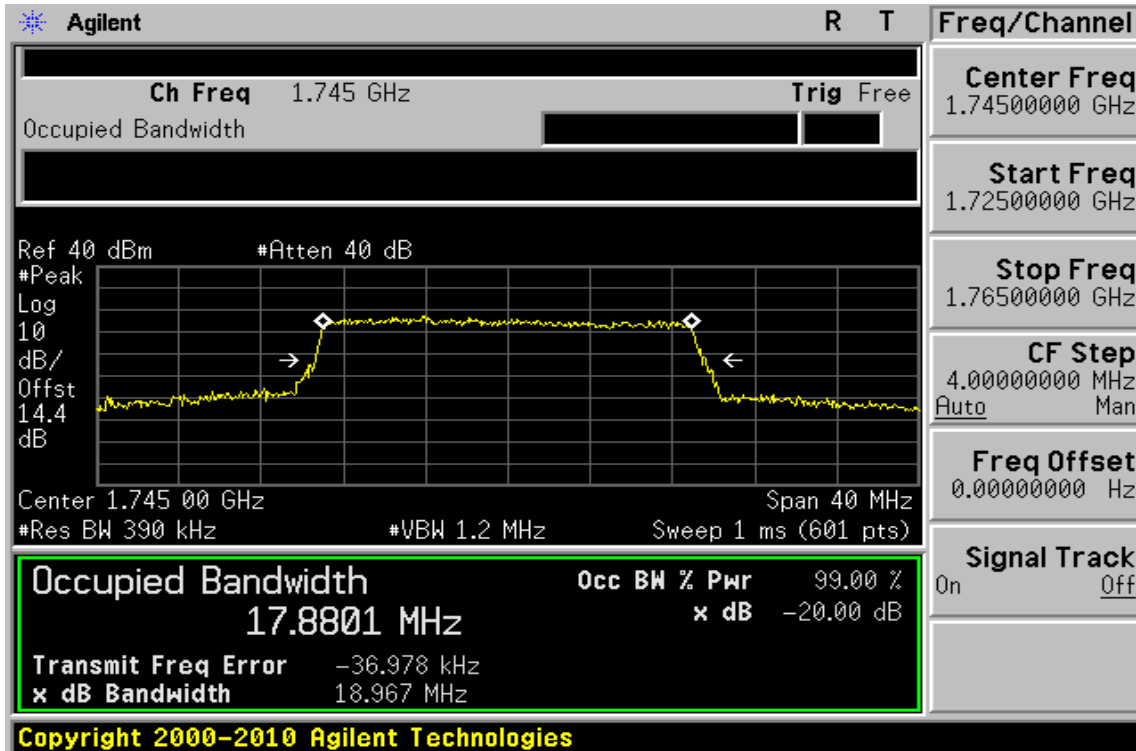
20MHz BW LTE-Band 4 QPSK Channel Low



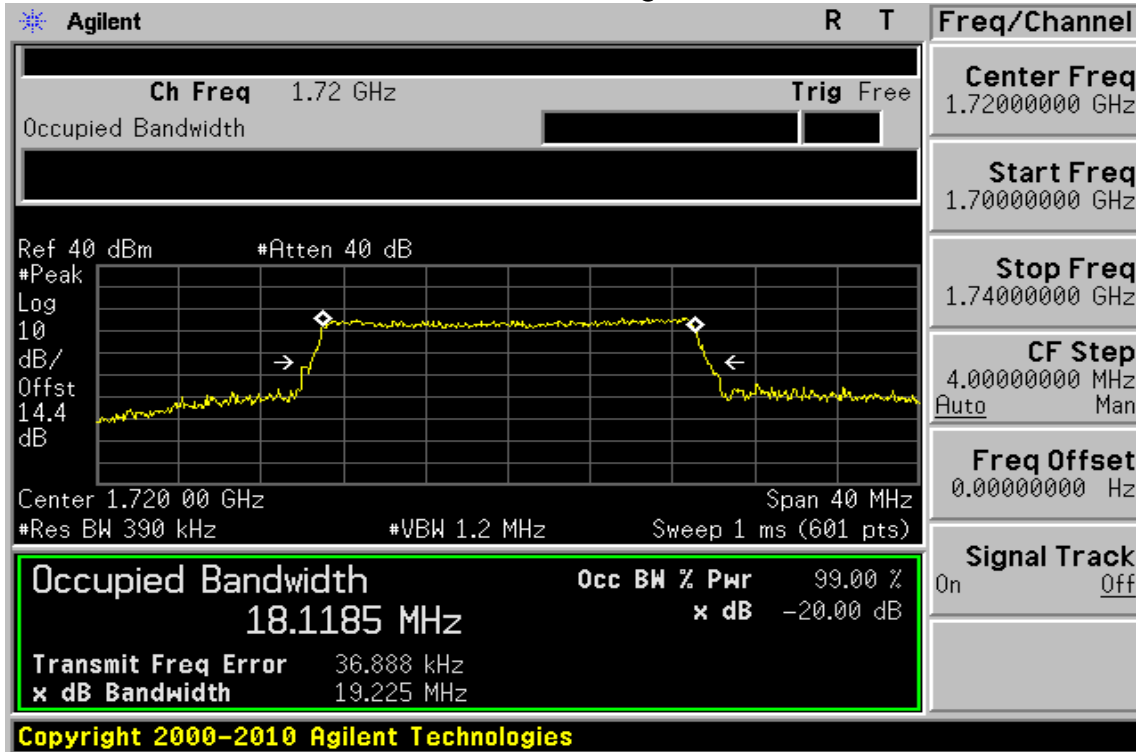
20MHz BW LTE-Band 4 QPSK Channel Mid



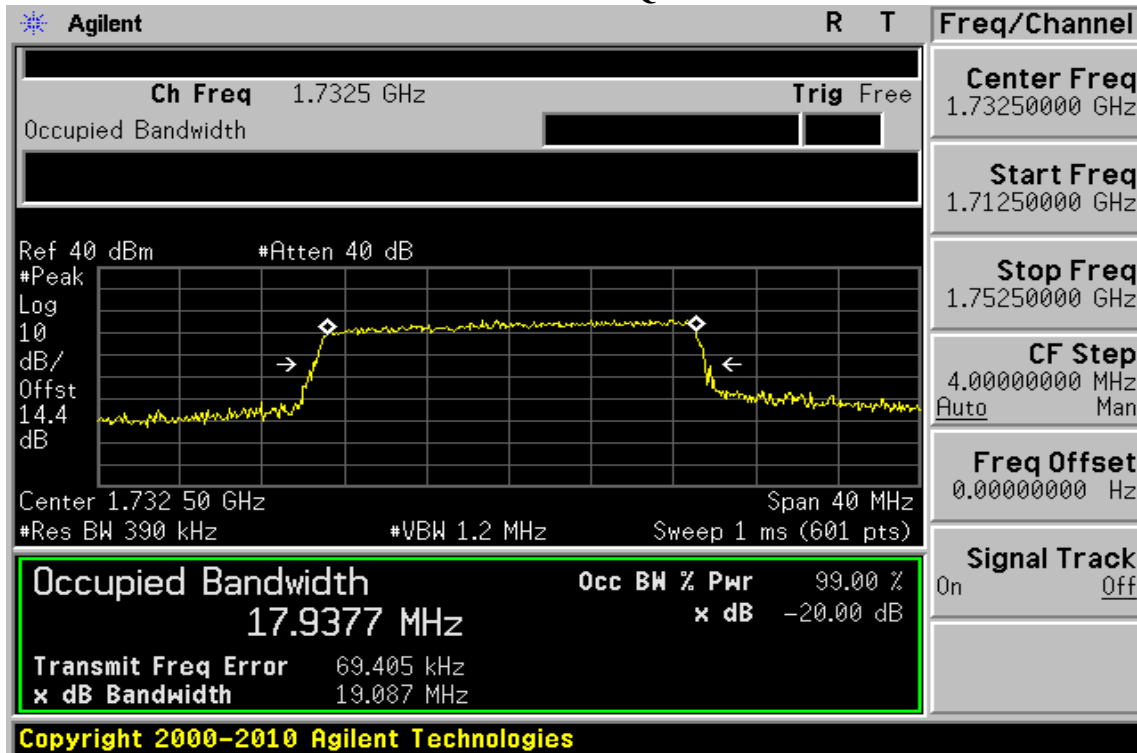
20MHz BW LTE-Band 4 QPSK Channel High



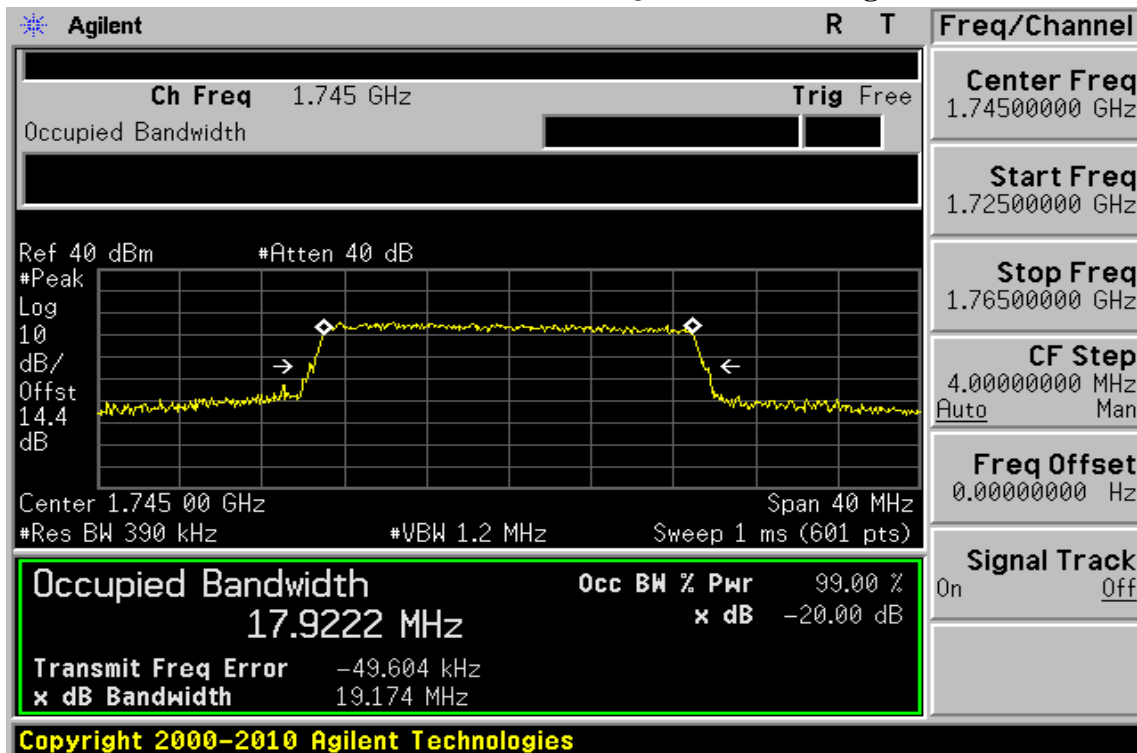
20MHz BW LTE-Band 4 16QAM Channel Low



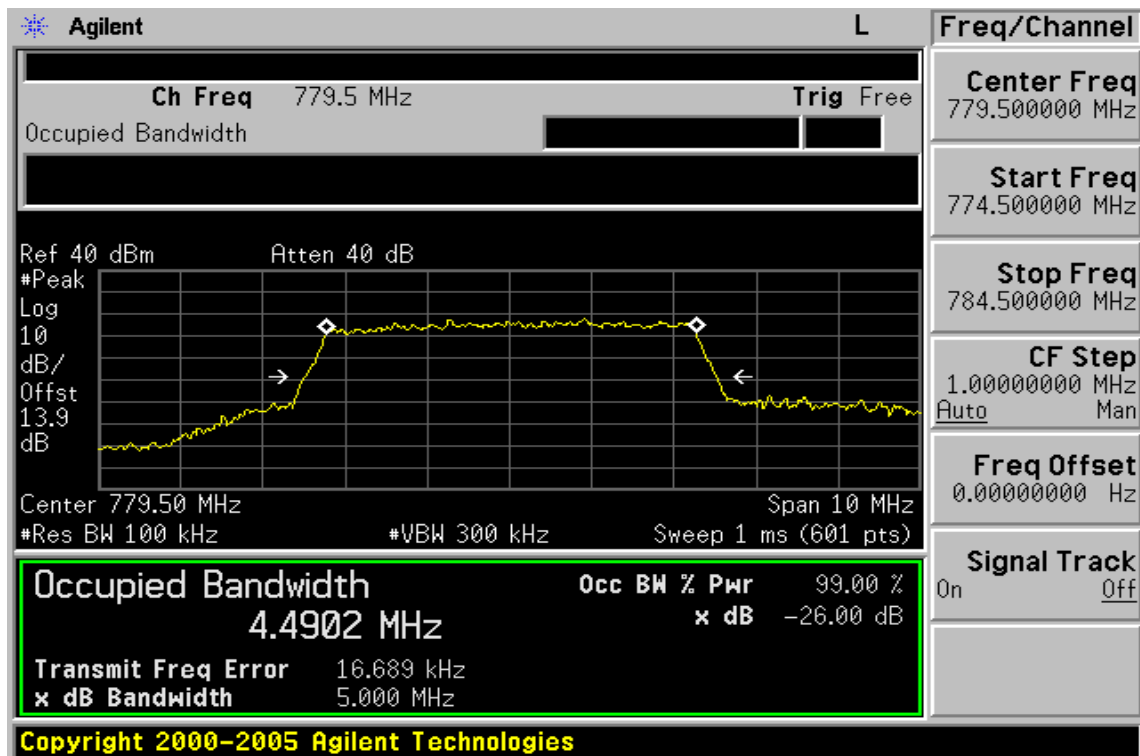
20MHz BW LTE-Band 4 16QAM Channel Mid



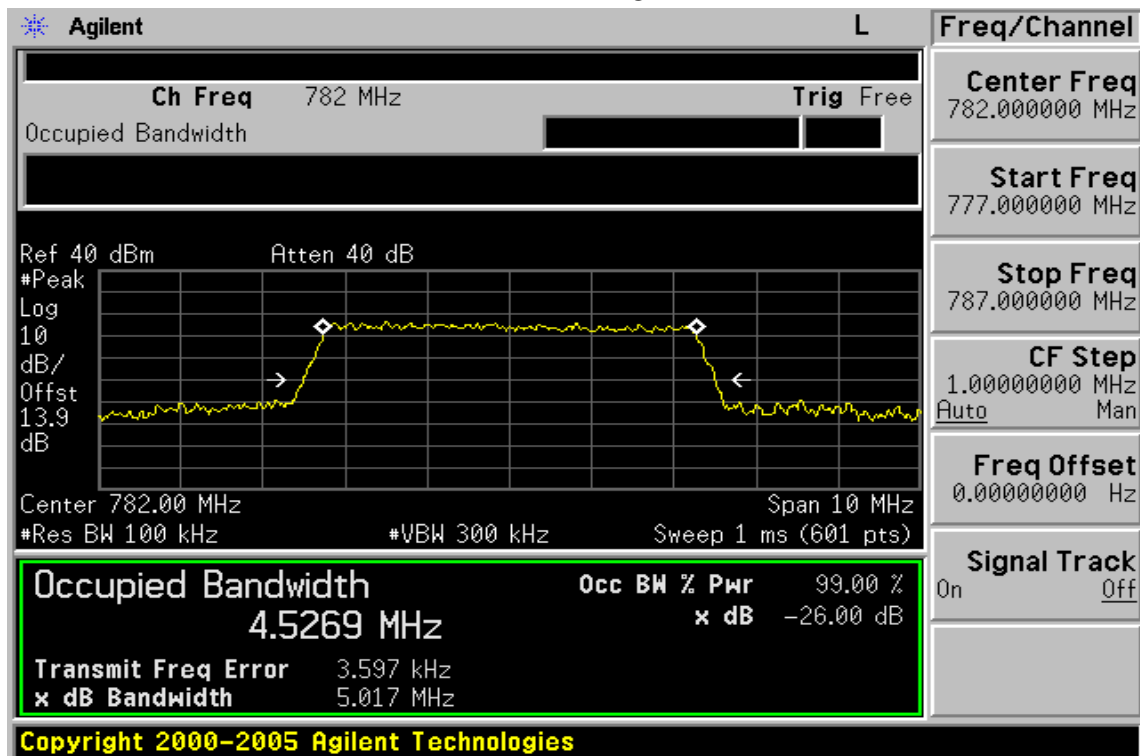
20MHz BW LTE-Band 4 16QAM Channel High



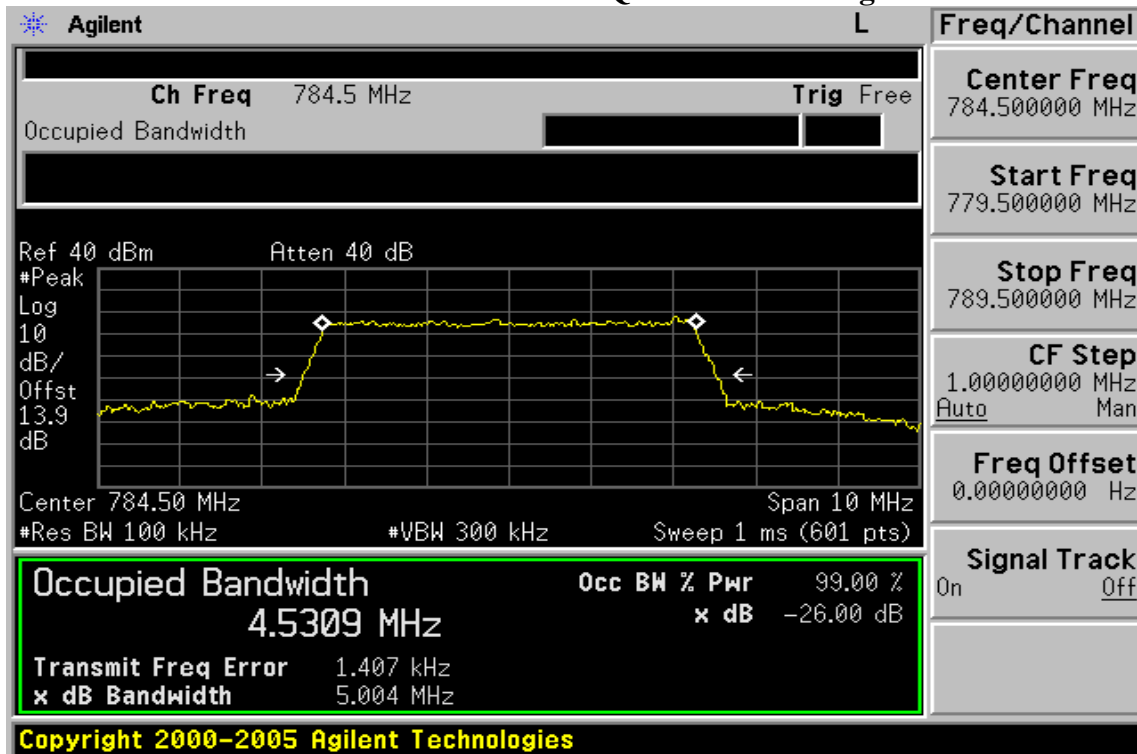
5MHz BW LTE-Band 13 QPSK Channel Low



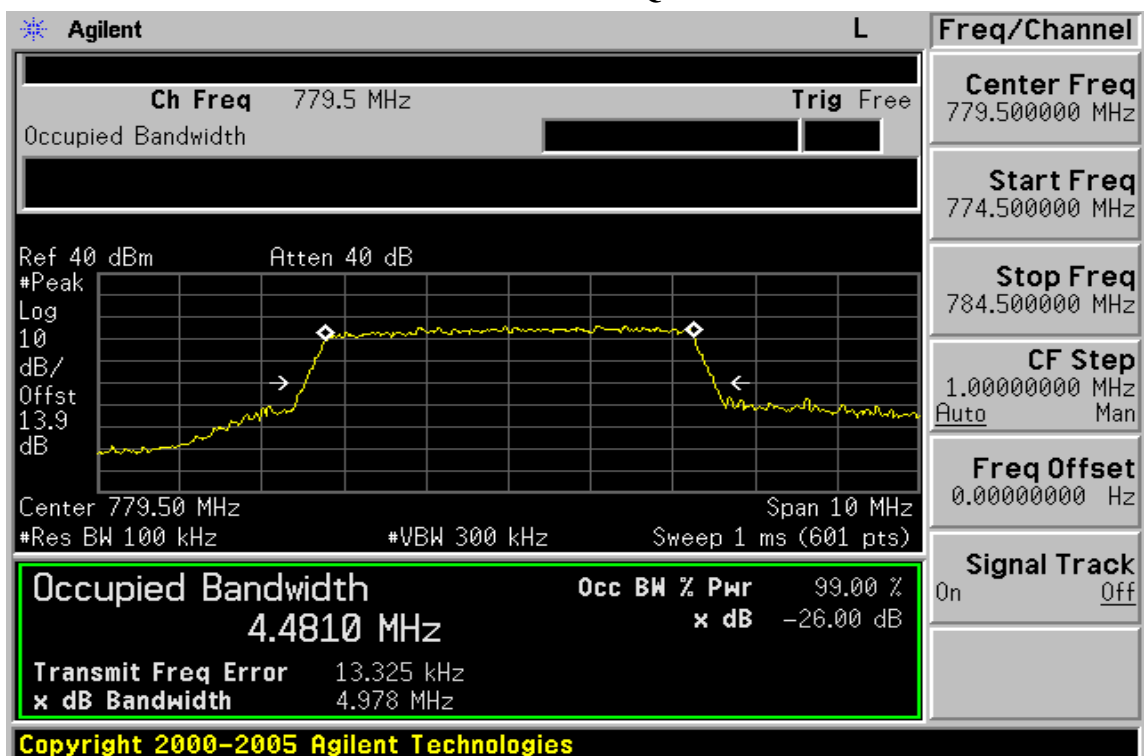
5MHz BW LTE-Band 13 QPSK Channel Mid



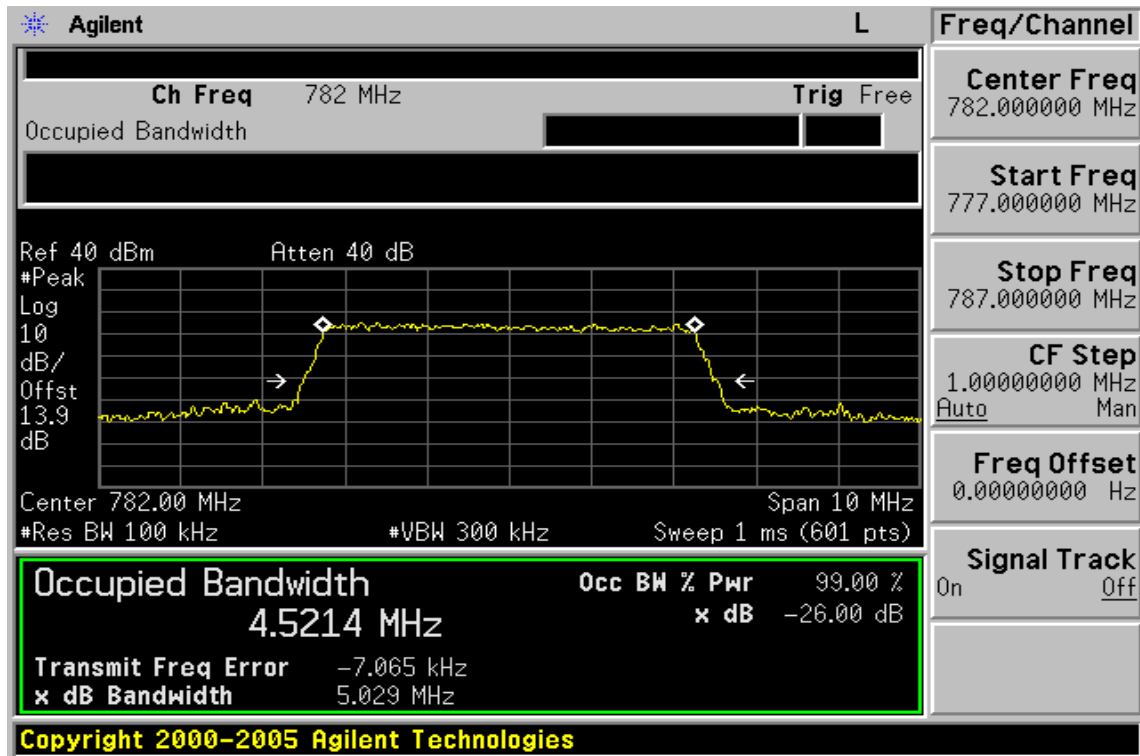
5MHz BW LTE-Band 13 QPSK Channel High



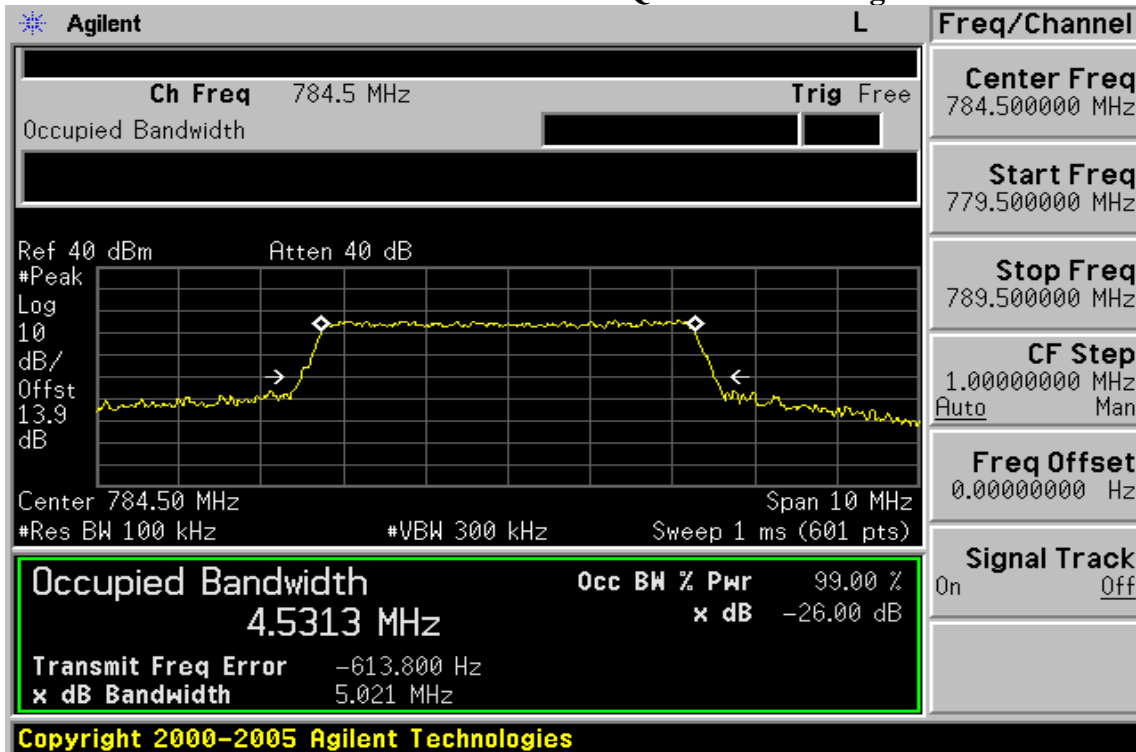
5MHz BW LTE-Band 13 16QAM Channel Low



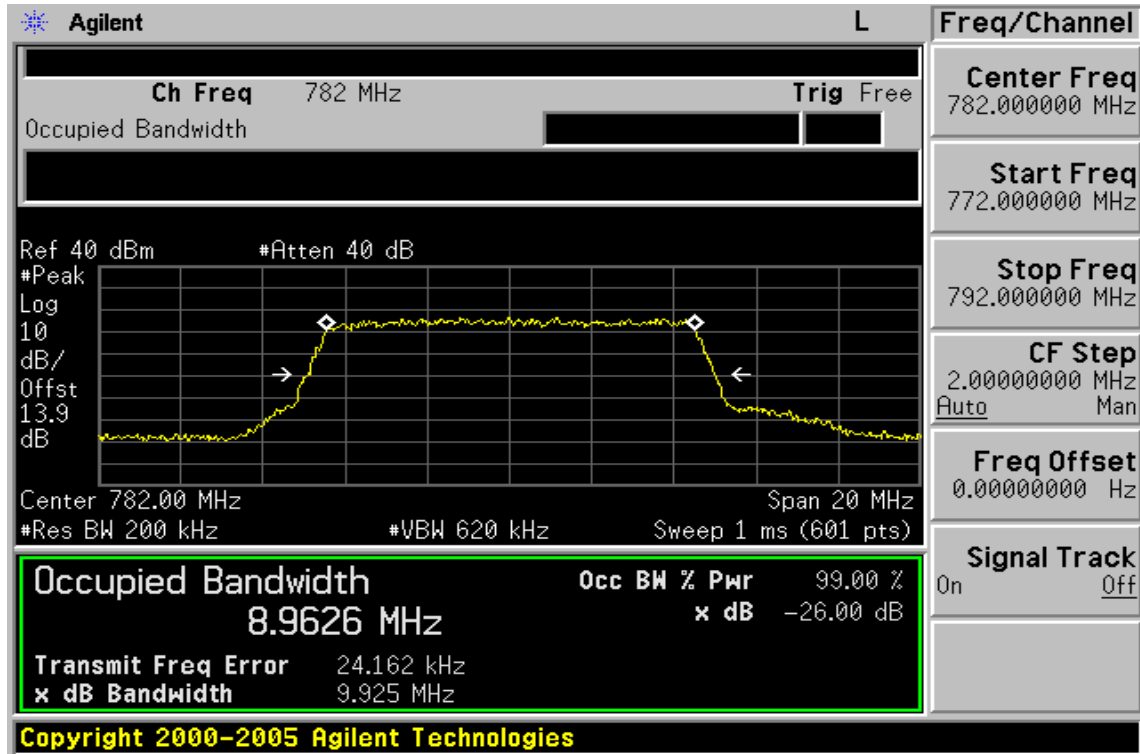
5MHz BW LTE-Band 13 16QAM Channel Mid



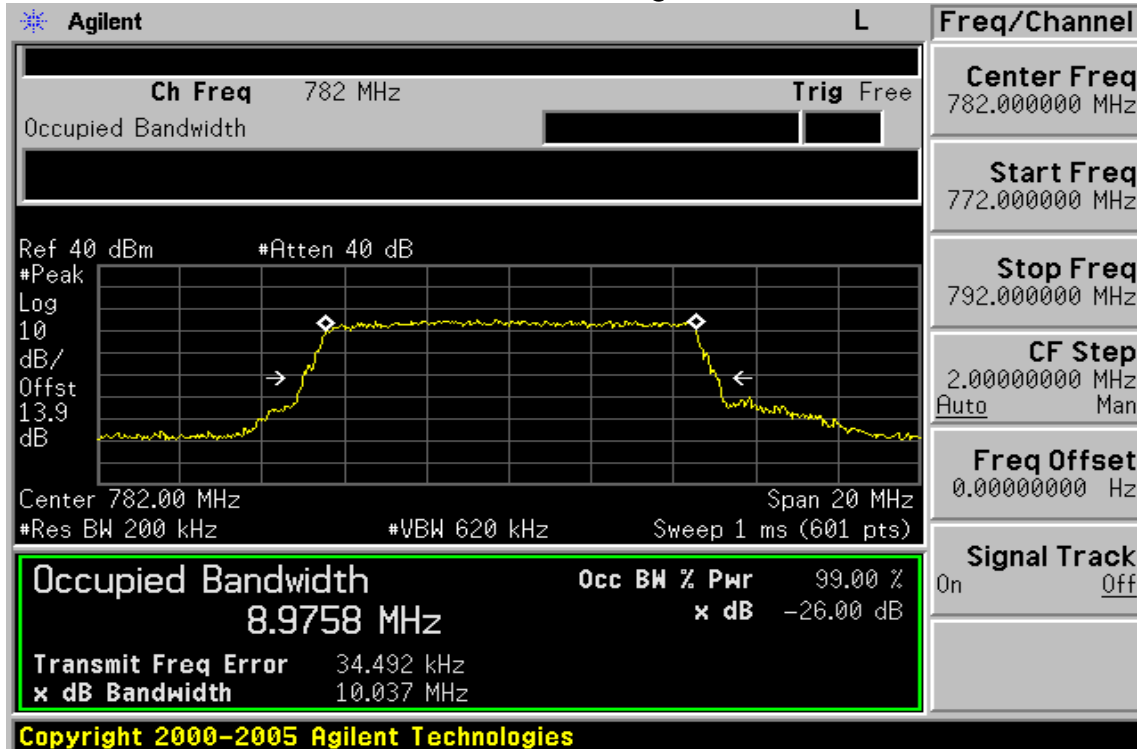
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10MHz BW LTE-Band 13 QPSK Channel Mid

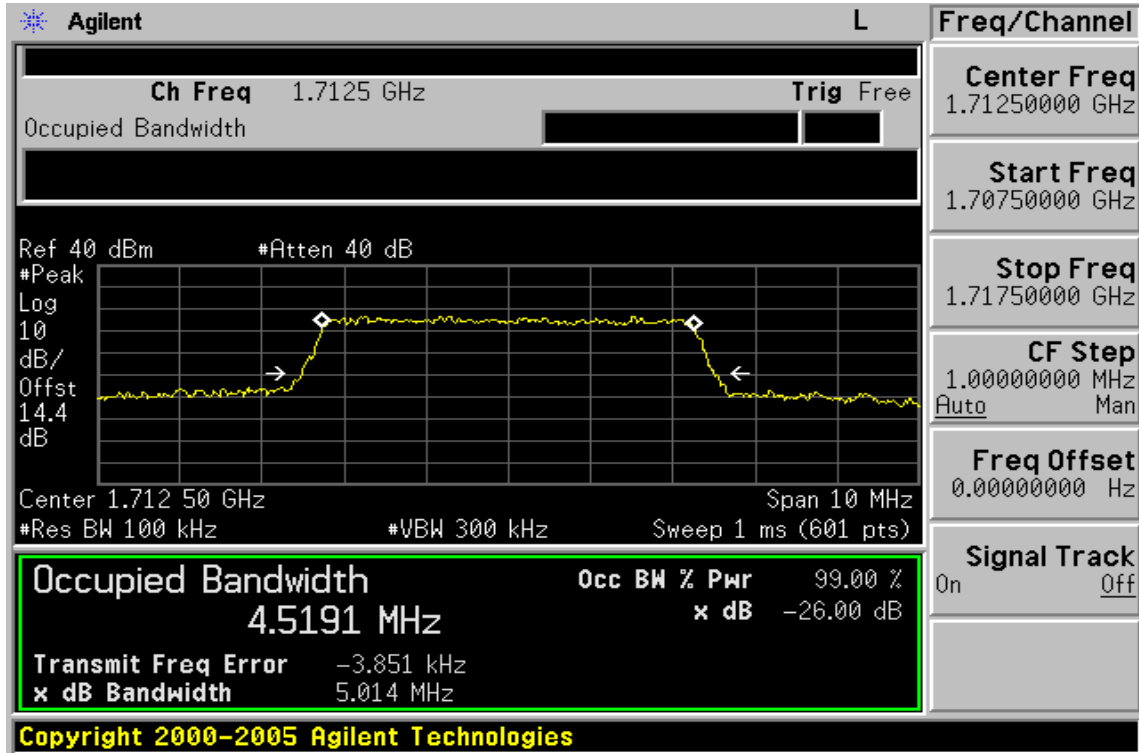


10MHz BW LTE-Band 13 16QAM Channel Mid

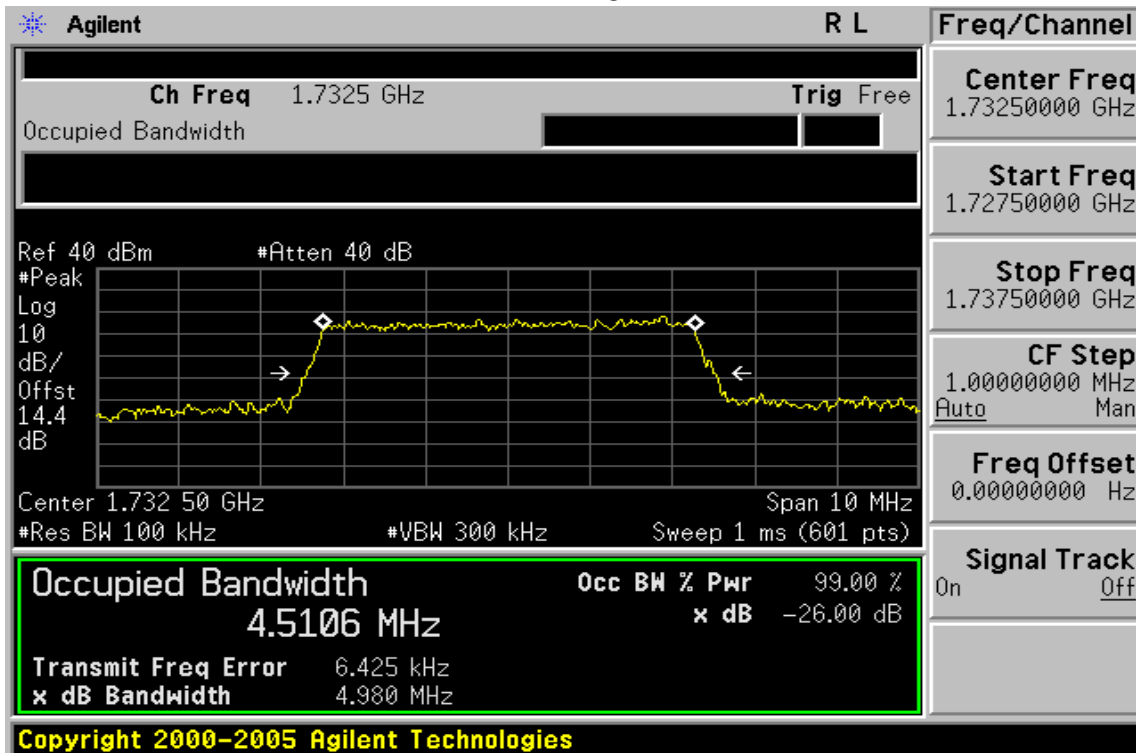


26dB Bandwidth Test Data

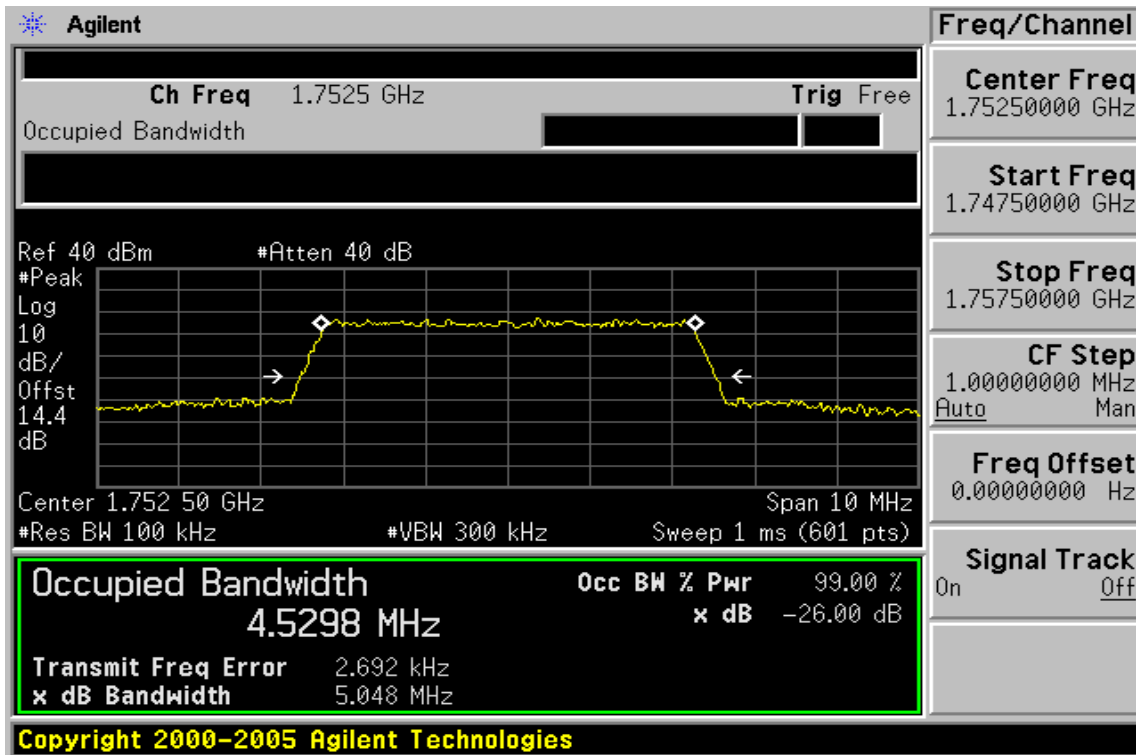
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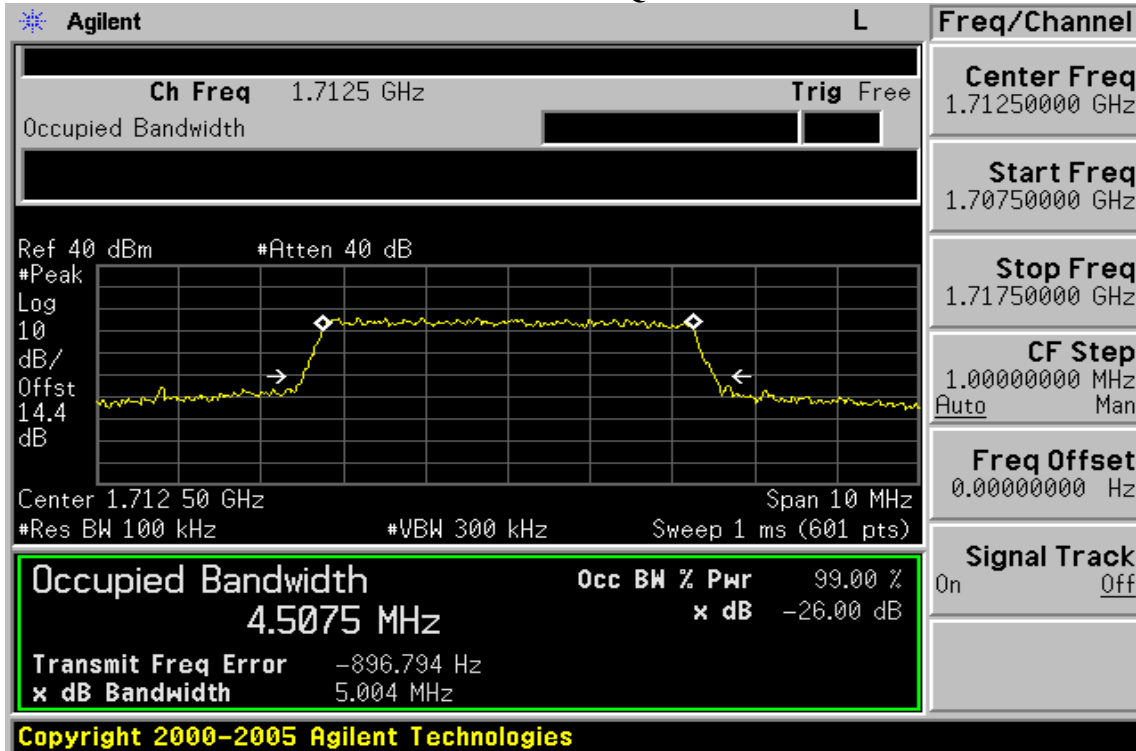
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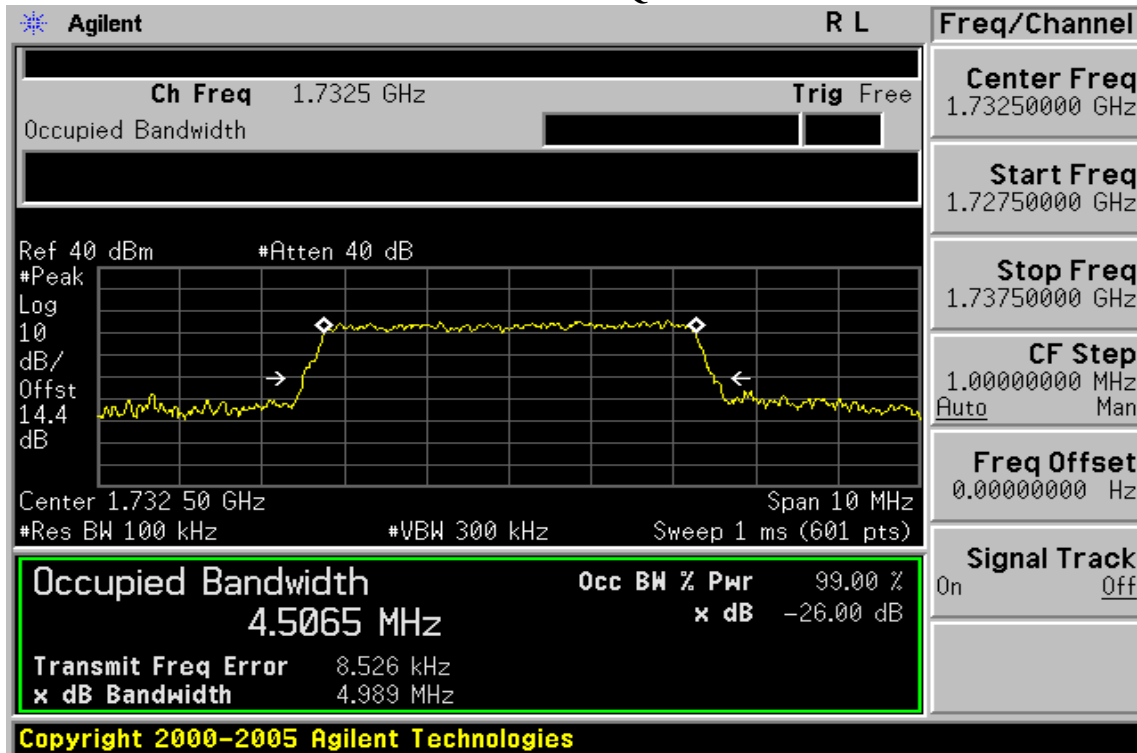
5MHz BW LTE-Band 4 QPSK Channel High



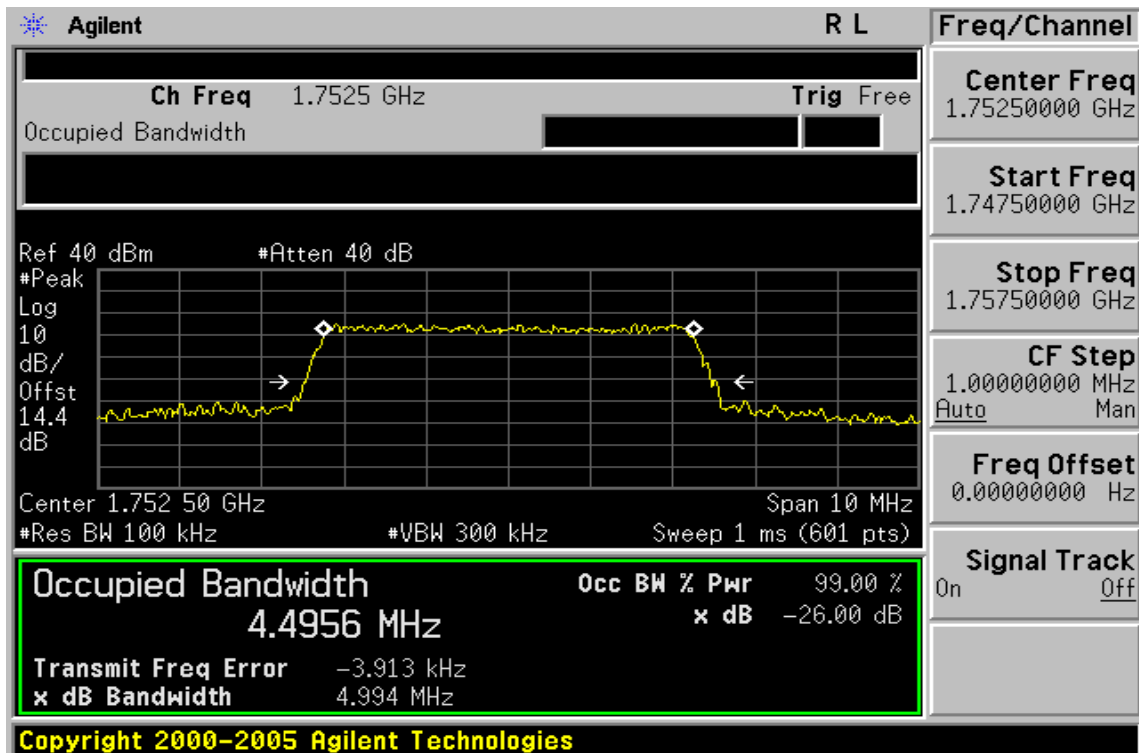
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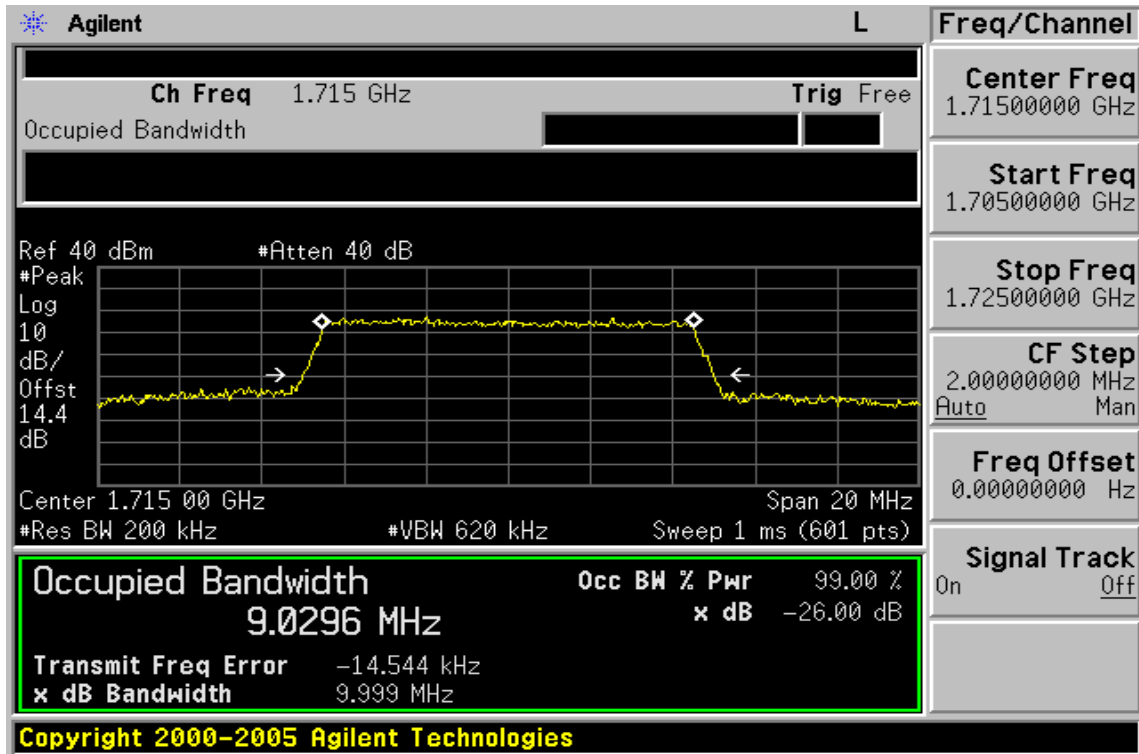
5MHz BW LTE-Band 4 16QAM Channel Mid



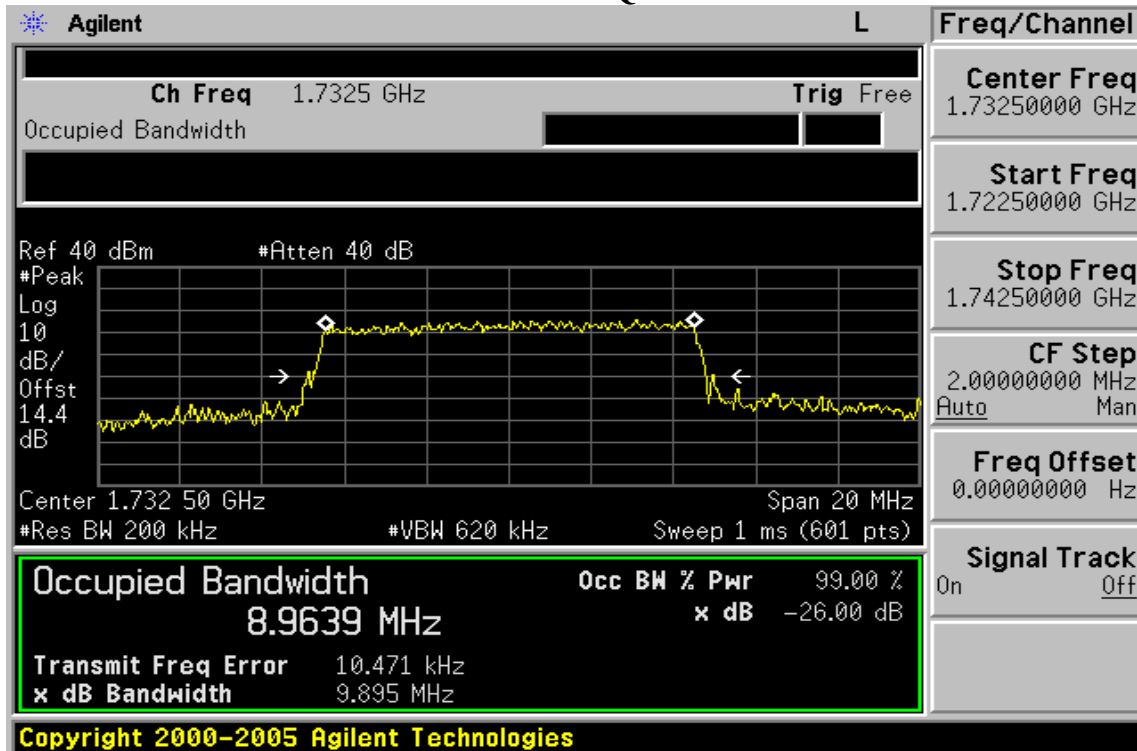
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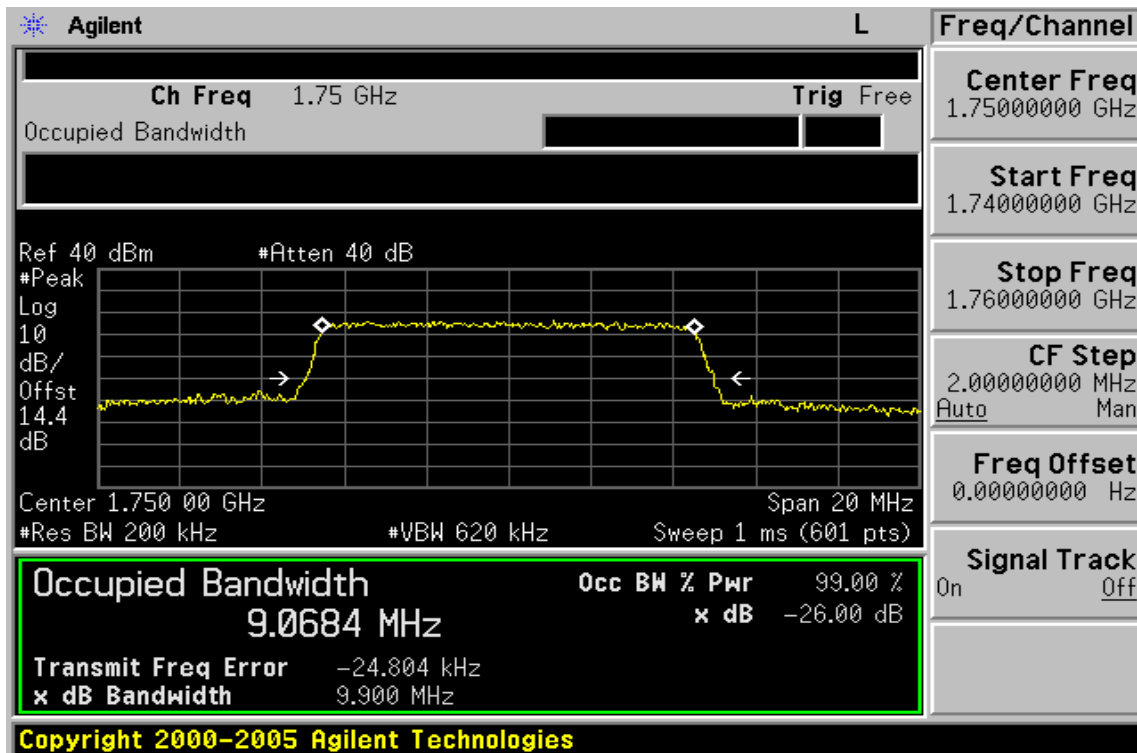
10MHz BW LTE-Band 4 QPSK Channel Low



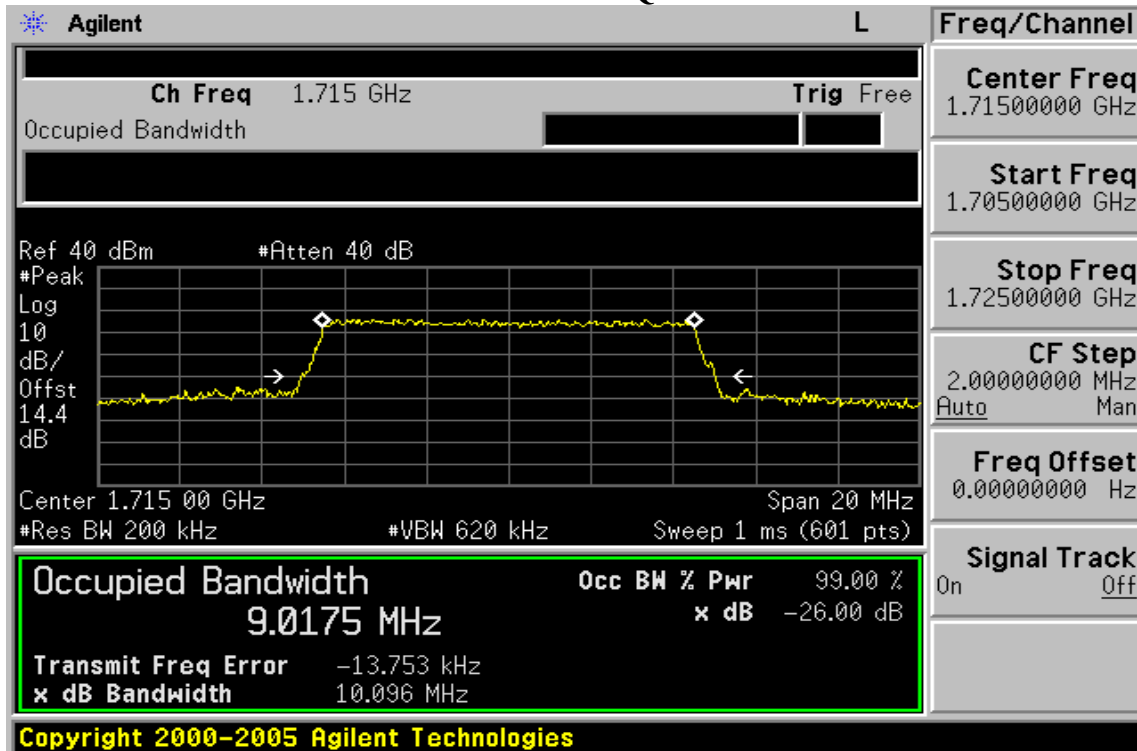
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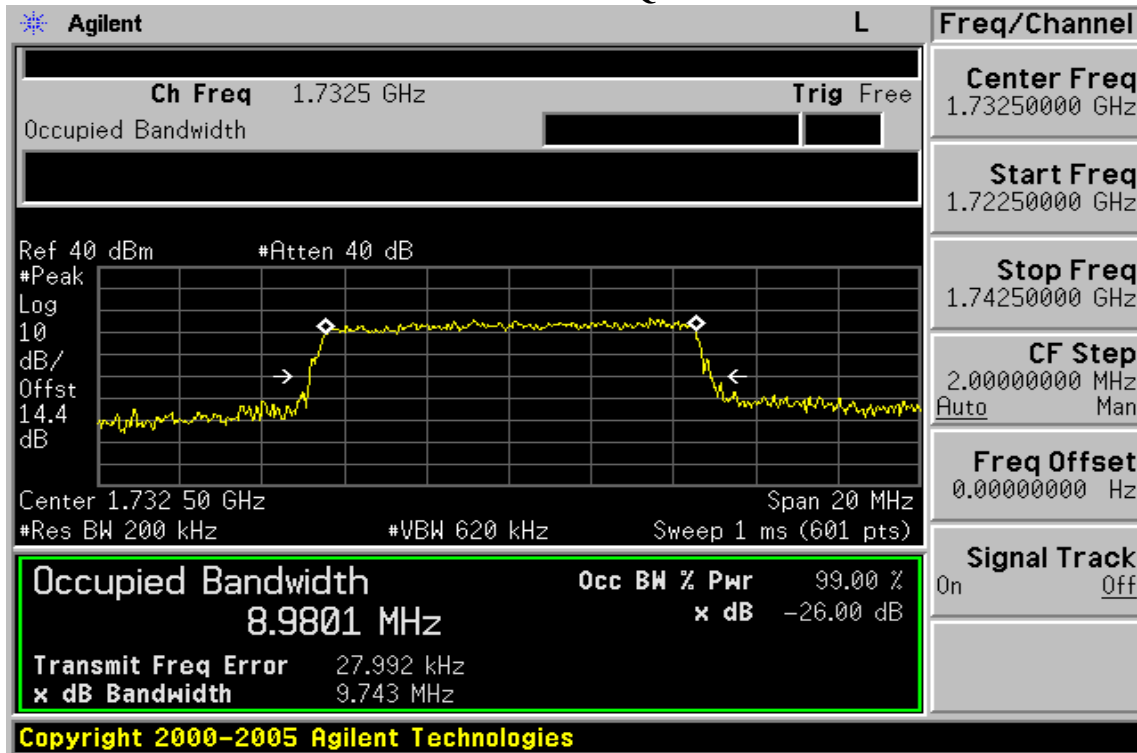
10MHz BW LTE-Band 4 QPSK Channel High



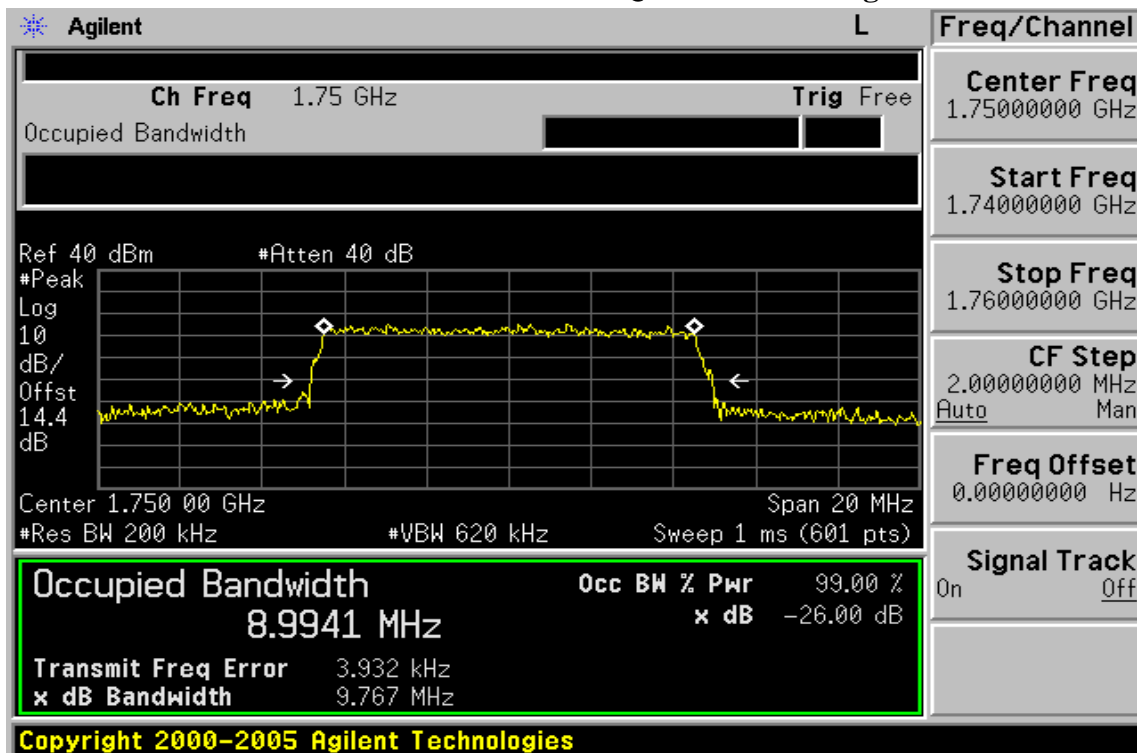
10MHz BW LTE-Band 4 16QAM Channel Low



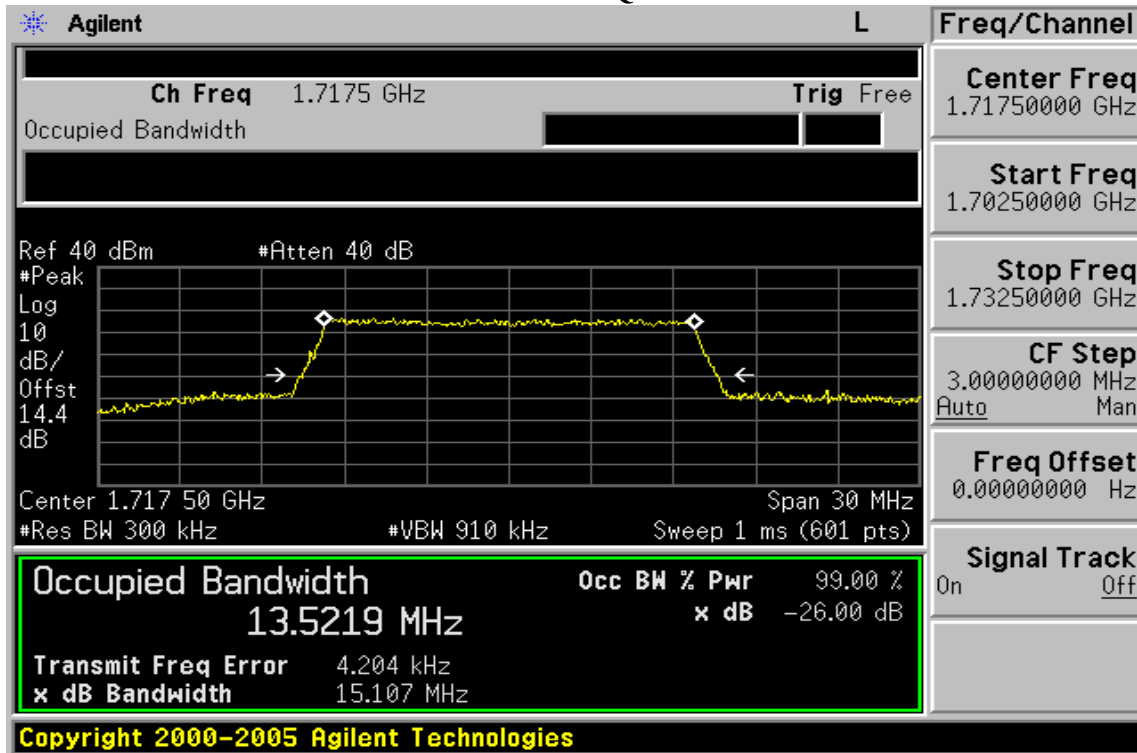
10MHz BW LTE-Band 4 16QAM Channel Mid



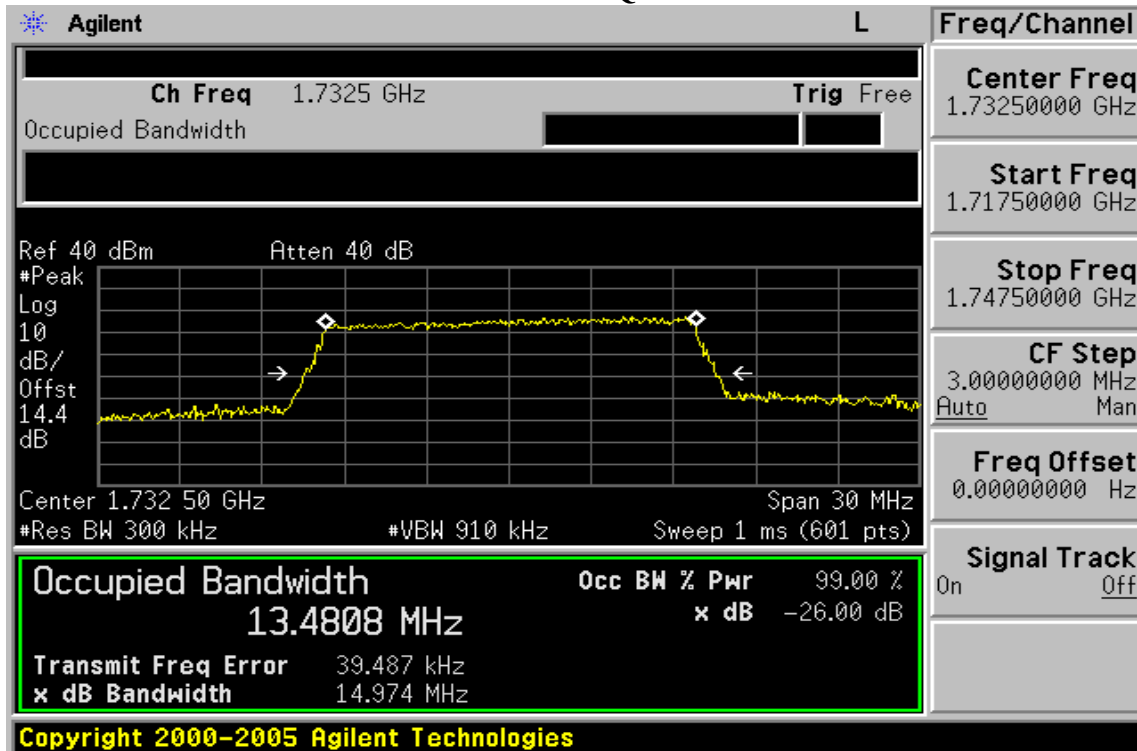
10MHz BW LTE-Band 4 16QAM Channel High



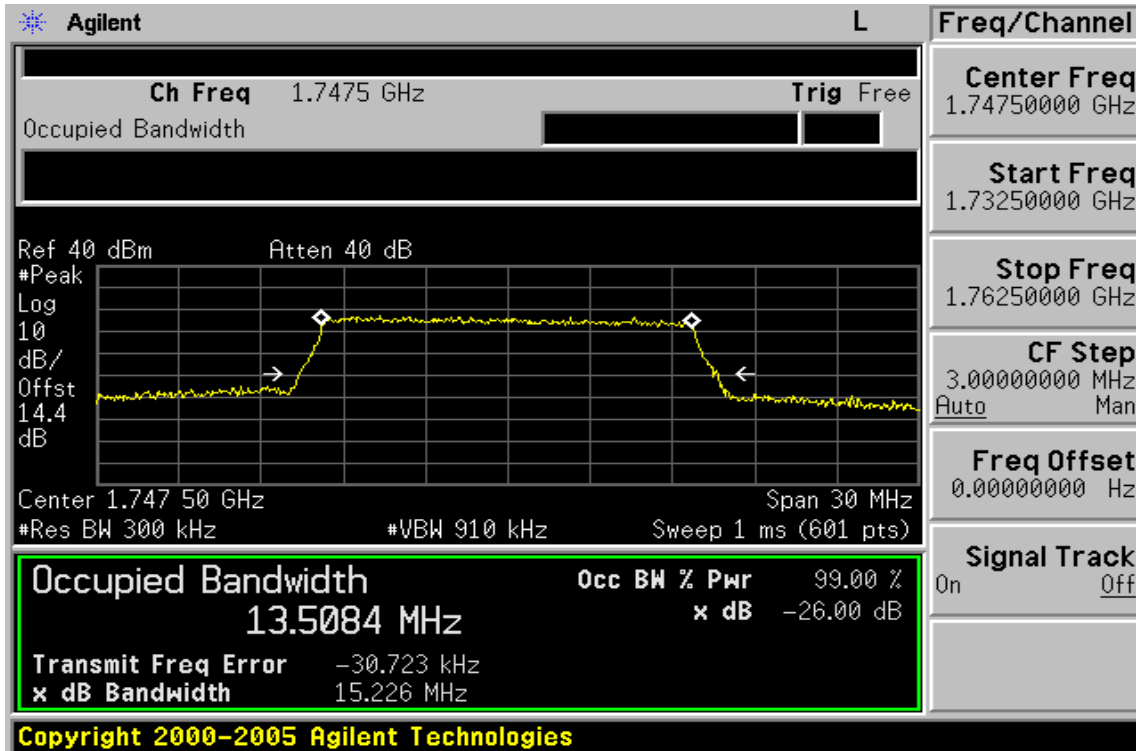
15MHz BW LTE-Band 4 QPSK Channel Low



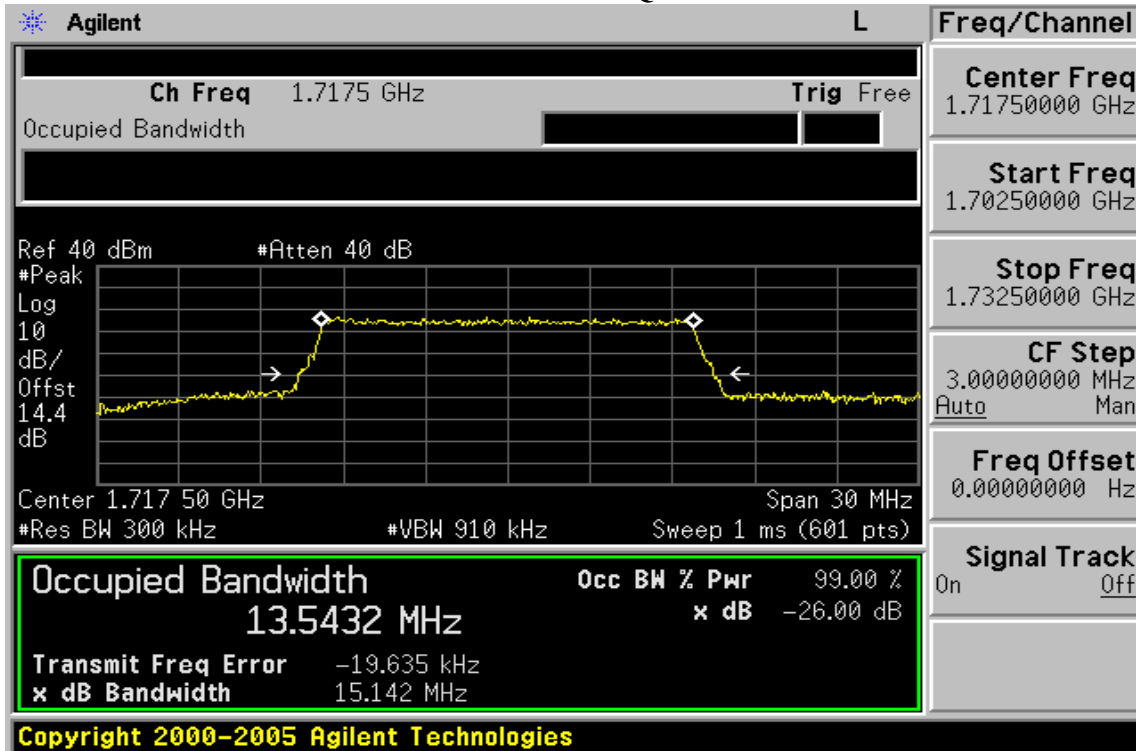
15MHz BW LTE-Band 4 QPSK Channel Mid



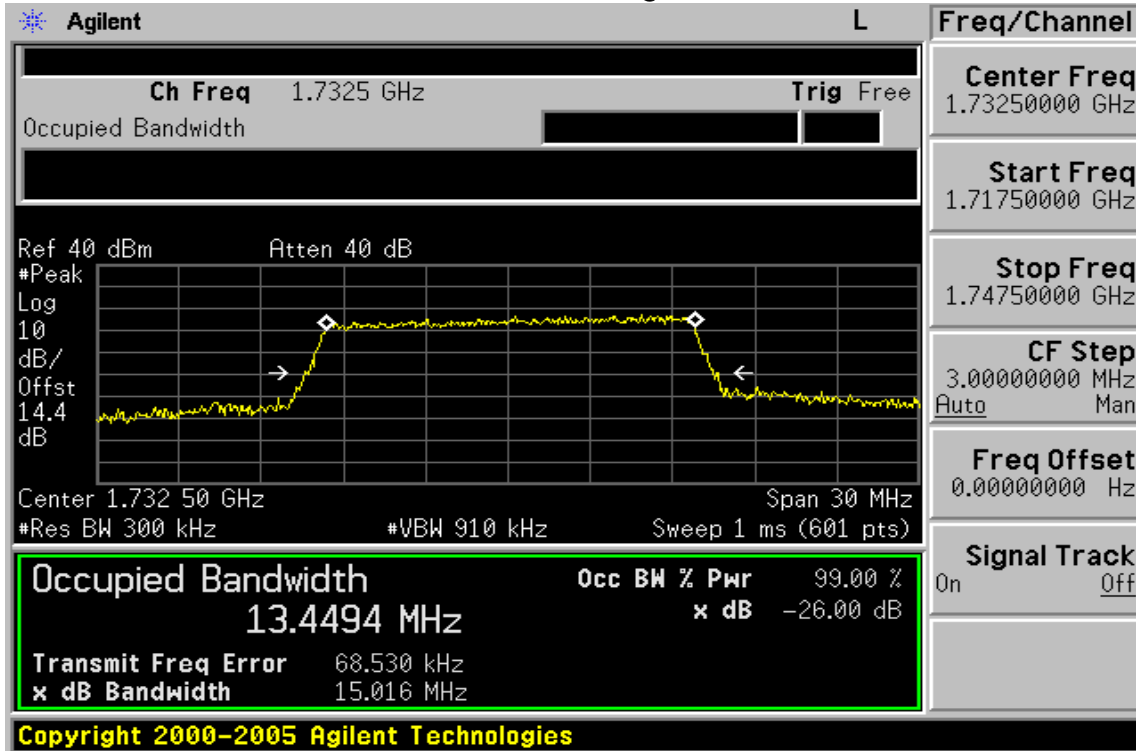
15MHz BW LTE-Band 4 QPSK Channel High



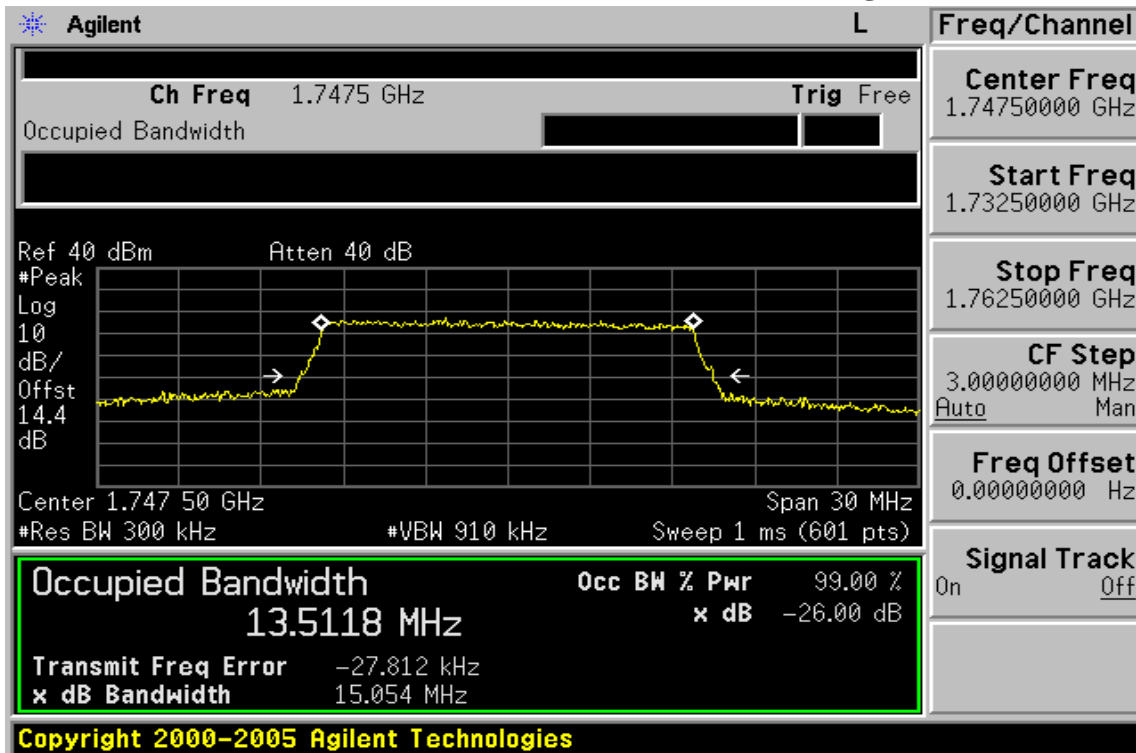
15MHz BW LTE-Band 4 16QAM Channel Low



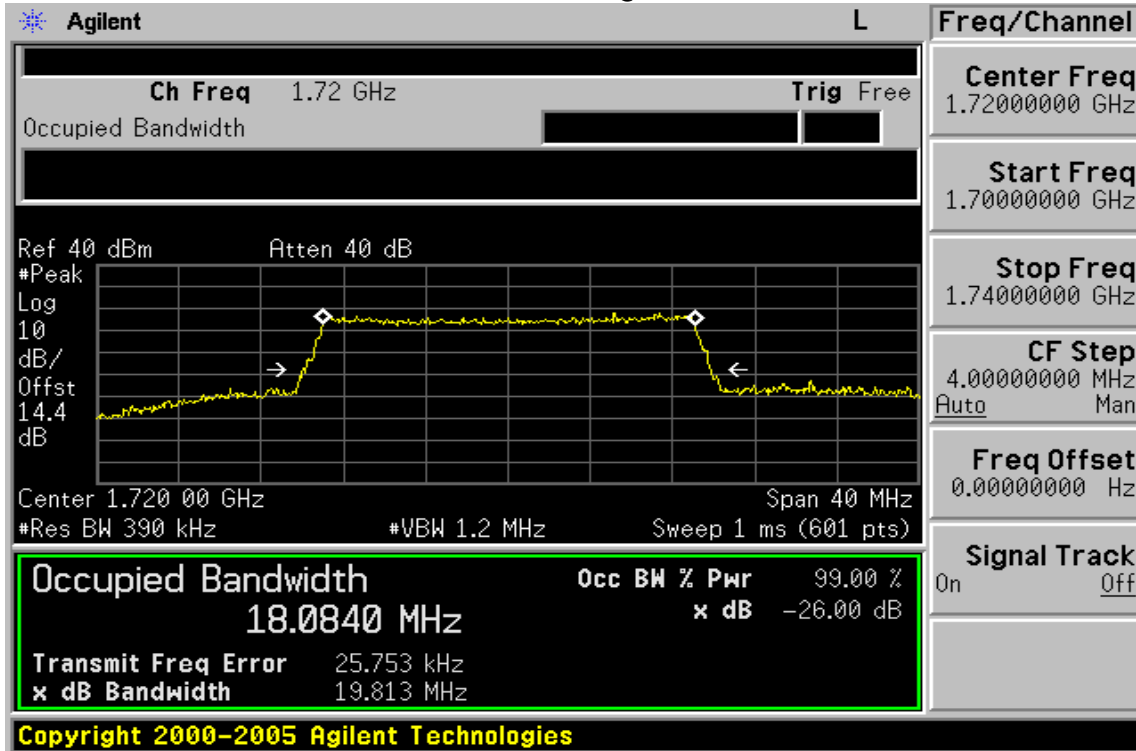
15MHz BW LTE-Band 4 16QAM Channel Mid



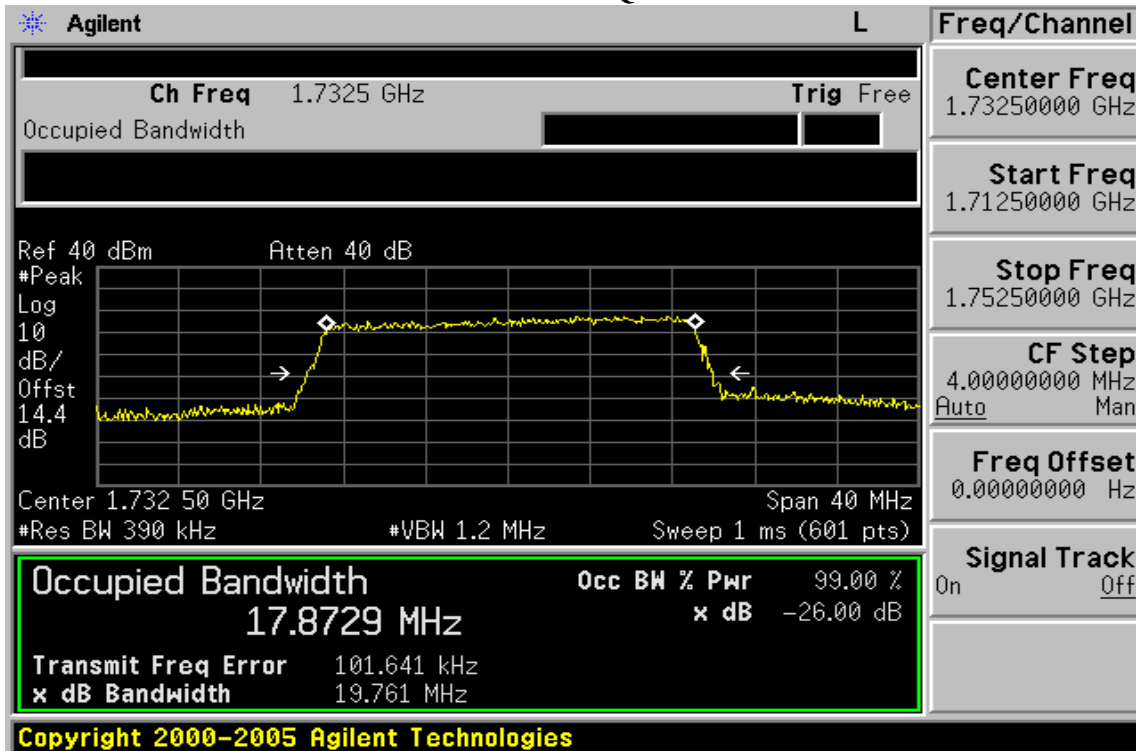
15MHz BW LTE-Band 4 16QAM Channel High



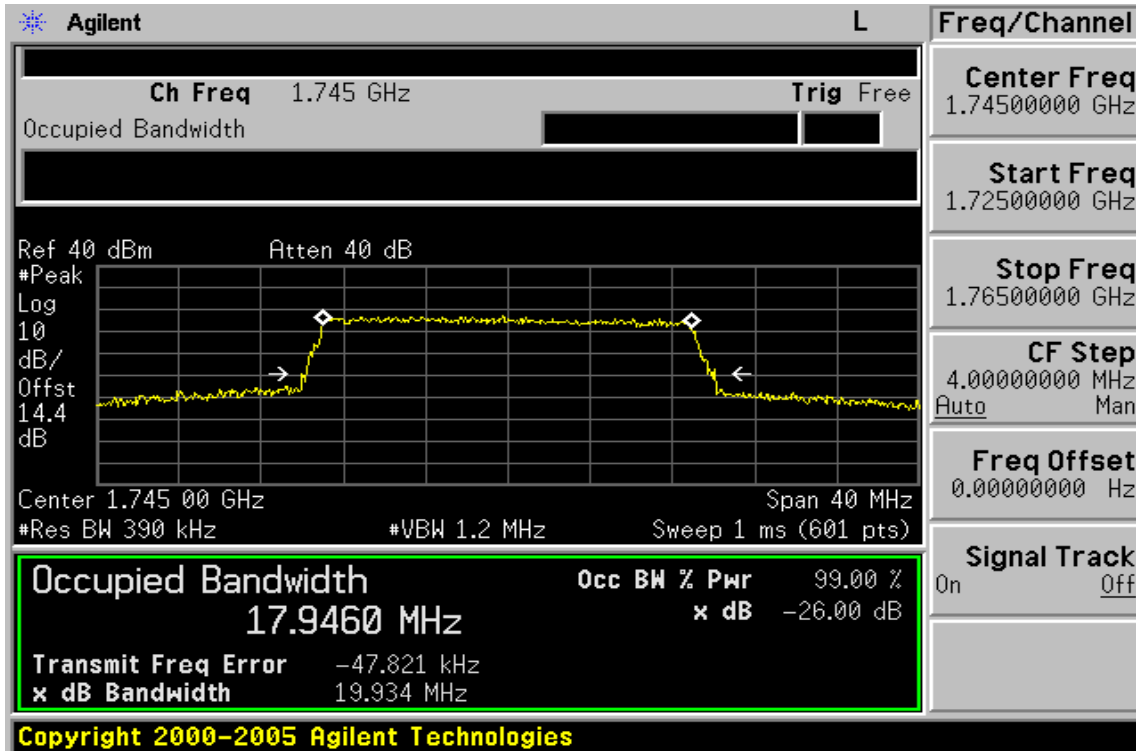
20MHz BW LTE-Band 4 QPSK Channel Low



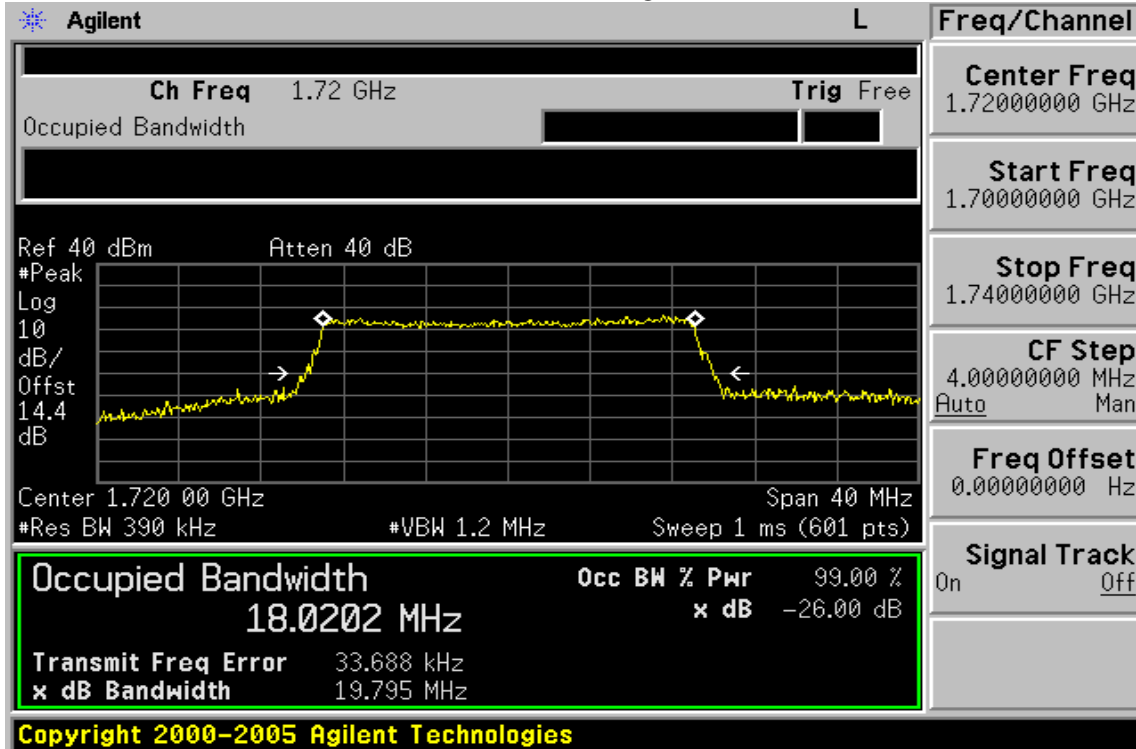
20MHz BW LTE-Band 4 QPSK Channel Mid



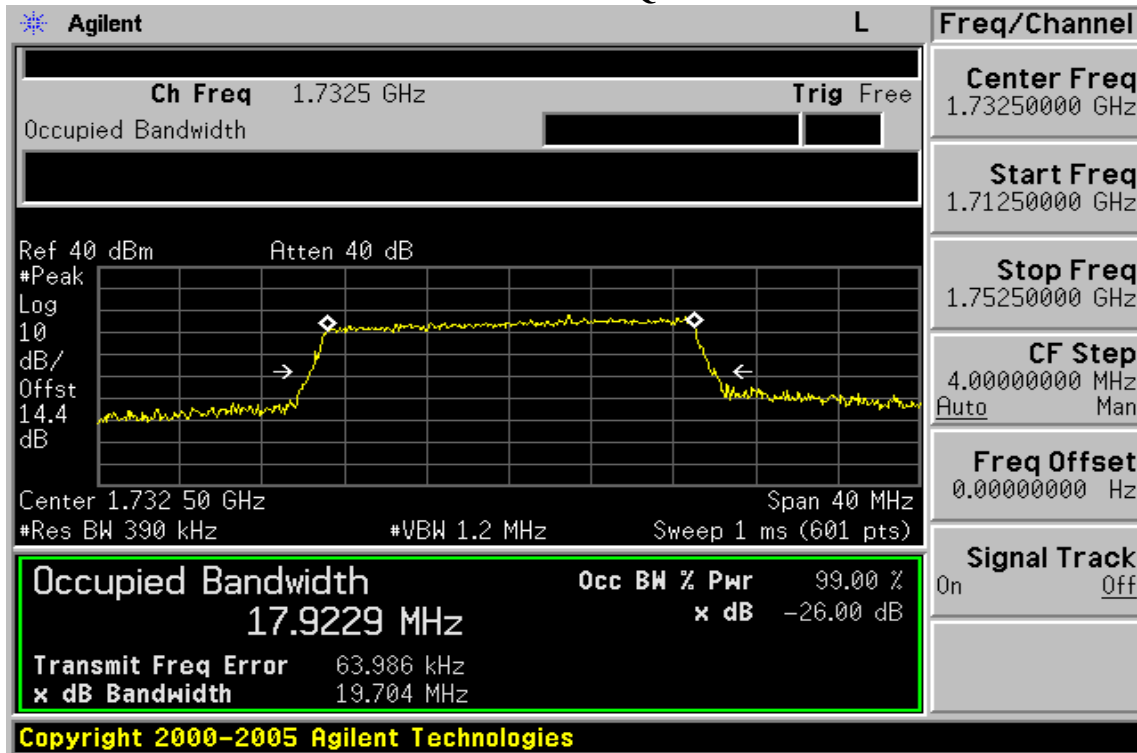
20MHz BW LTE-Band 4 QPSK Channel High



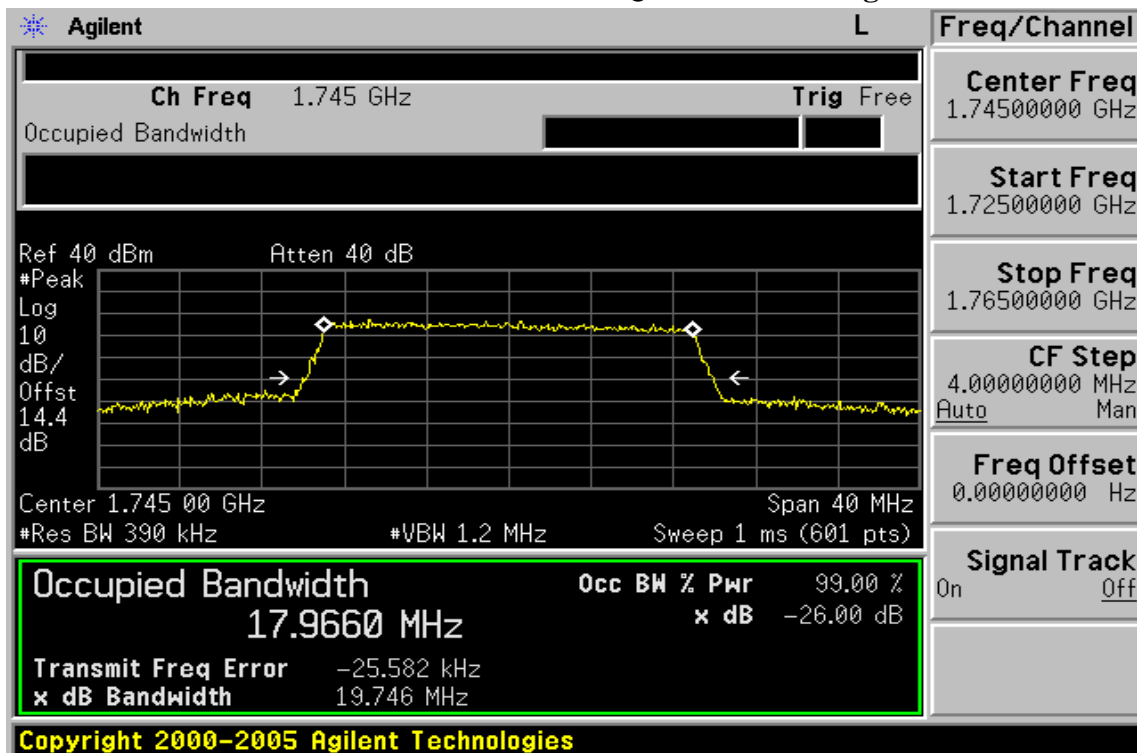
20MHz BW LTE-Band 4 16QAM Channel Low



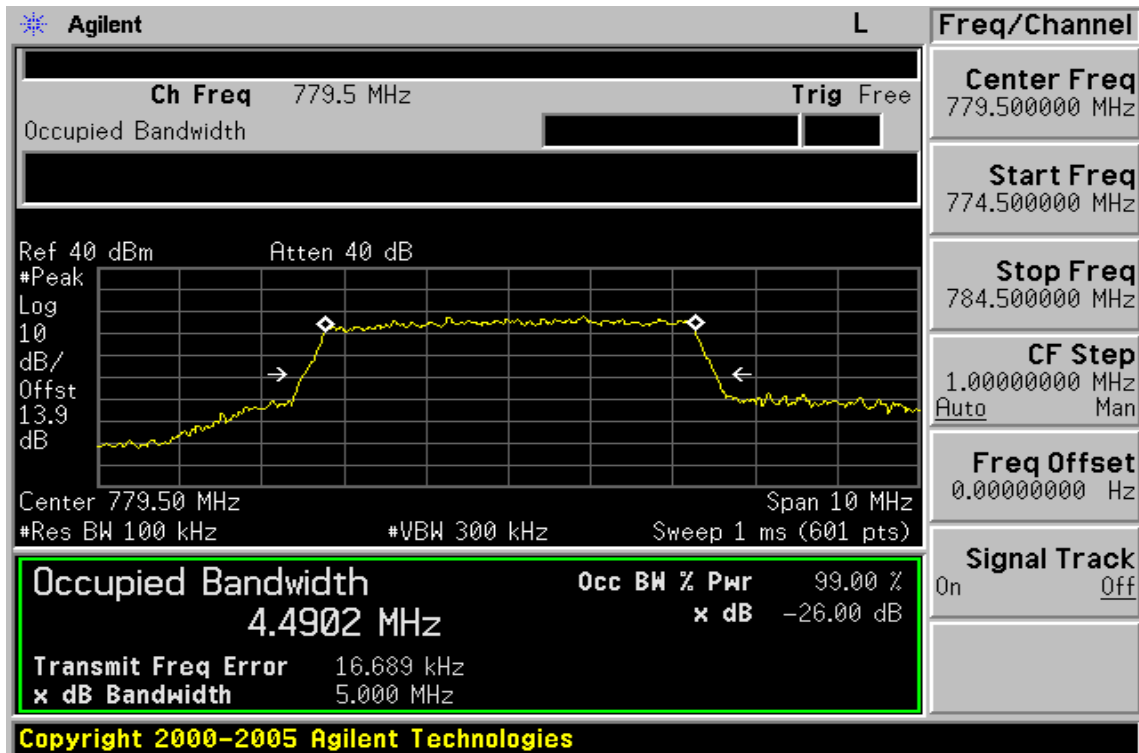
20MHz BW LTE-Band 4 16QAM Channel Mid



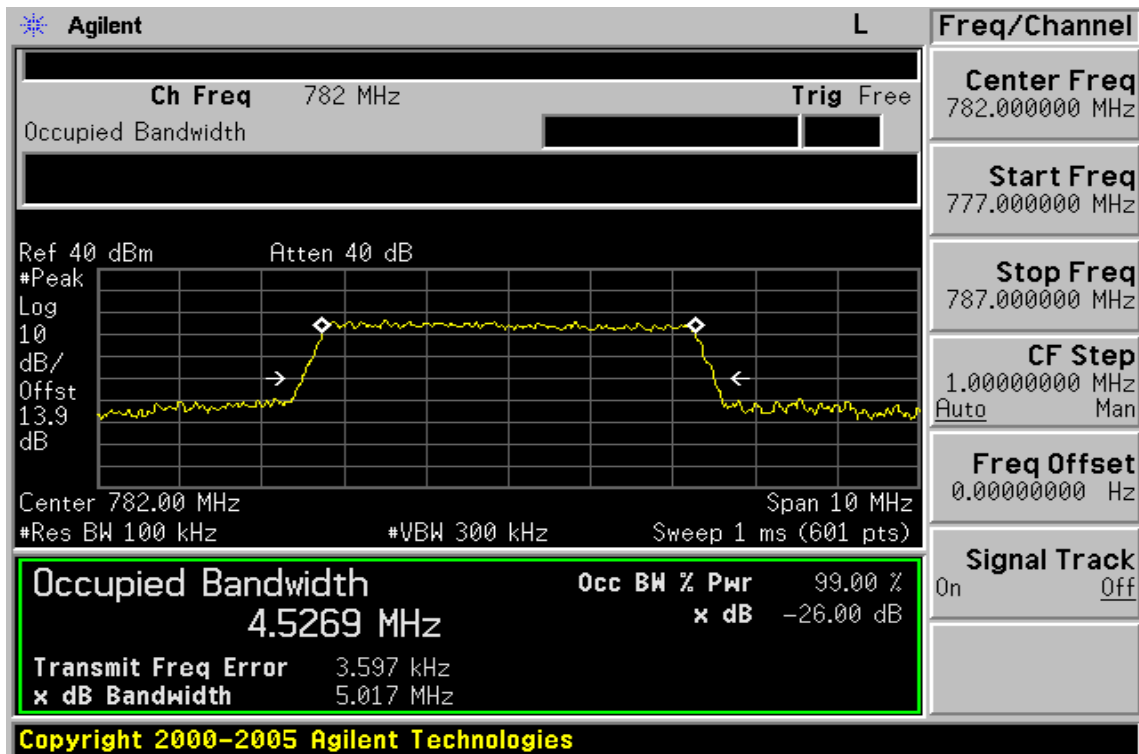
20MHz BW LTE-Band 4 16QAM Channel High



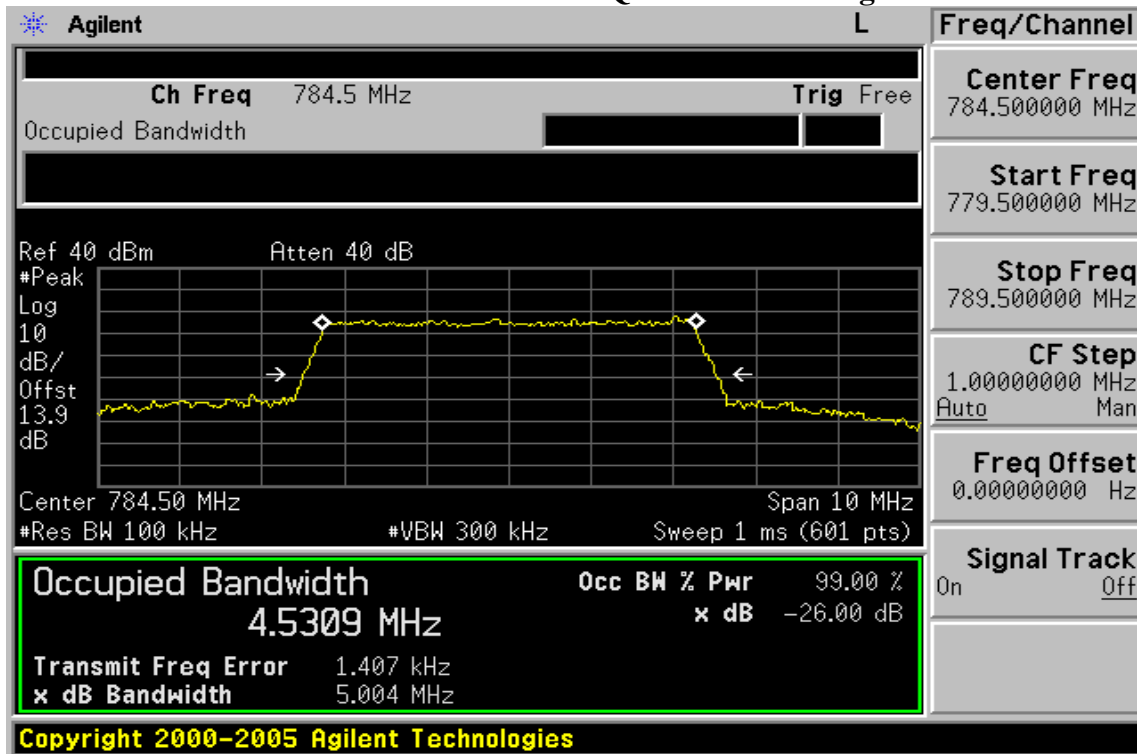
5MHz BW LTE-Band 13 QPSK Channel Low



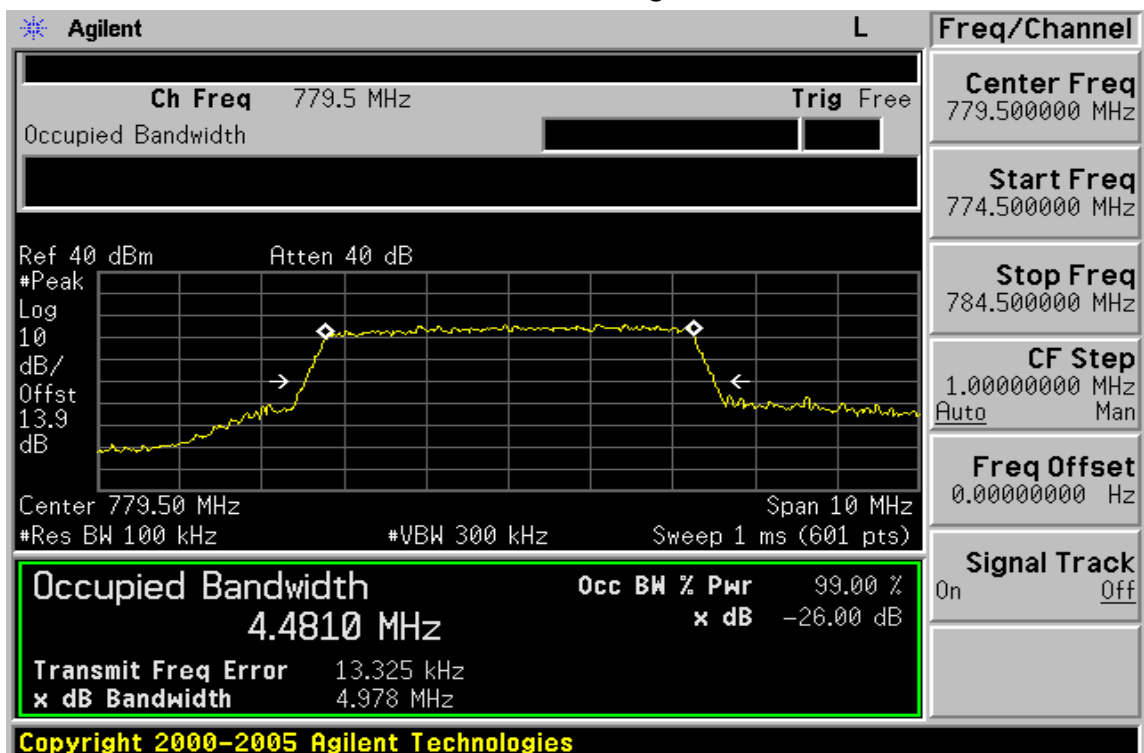
5MHz BW LTE-Band 13 QPSK Channel Mid



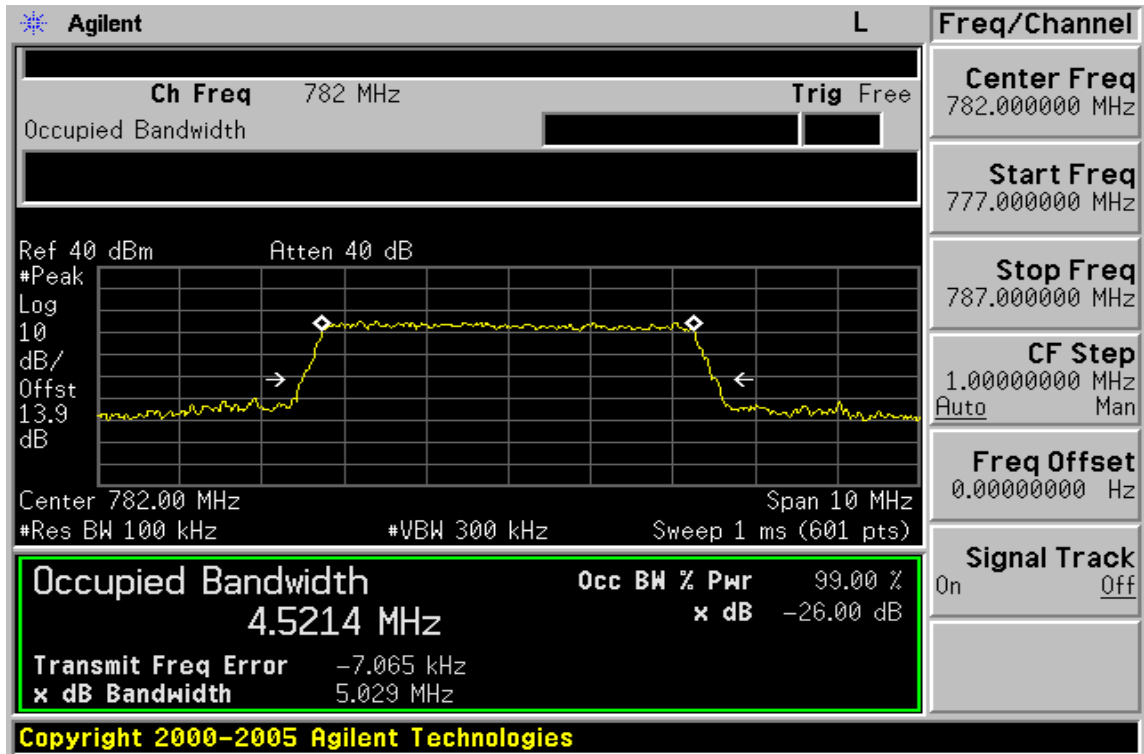
5MHz BW LTE-Band 13 QPSK Channel High



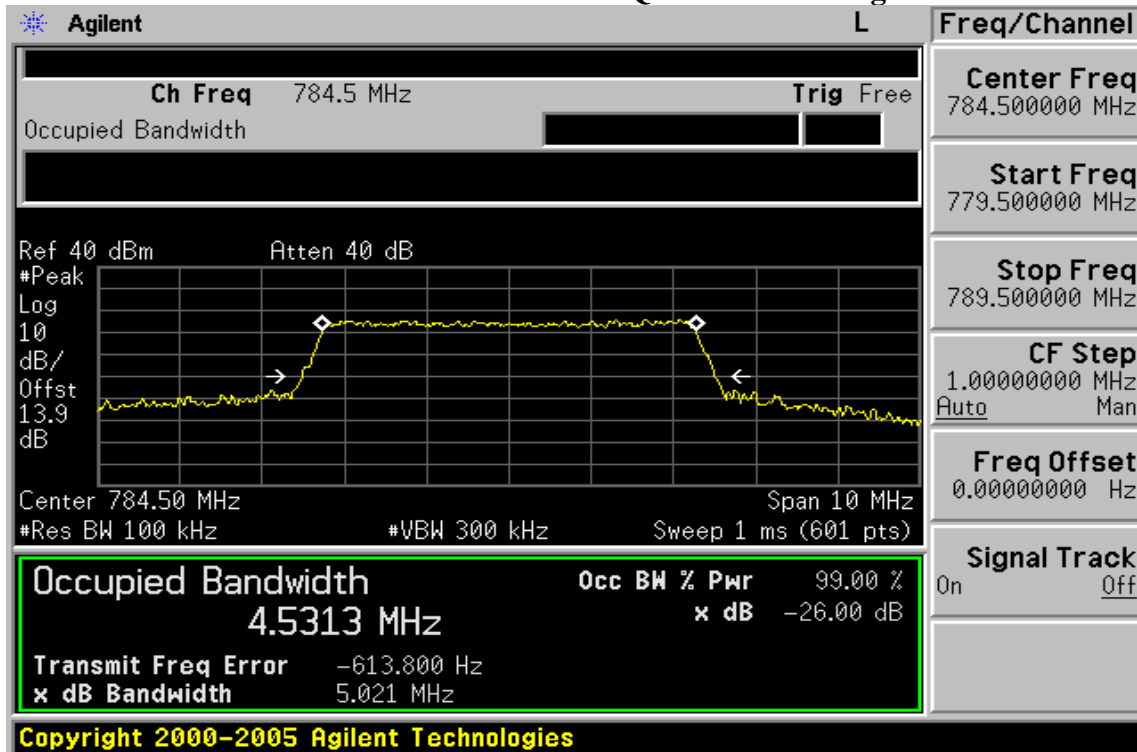
5MHz BW LTE-Band 13 16QAM Channel Low



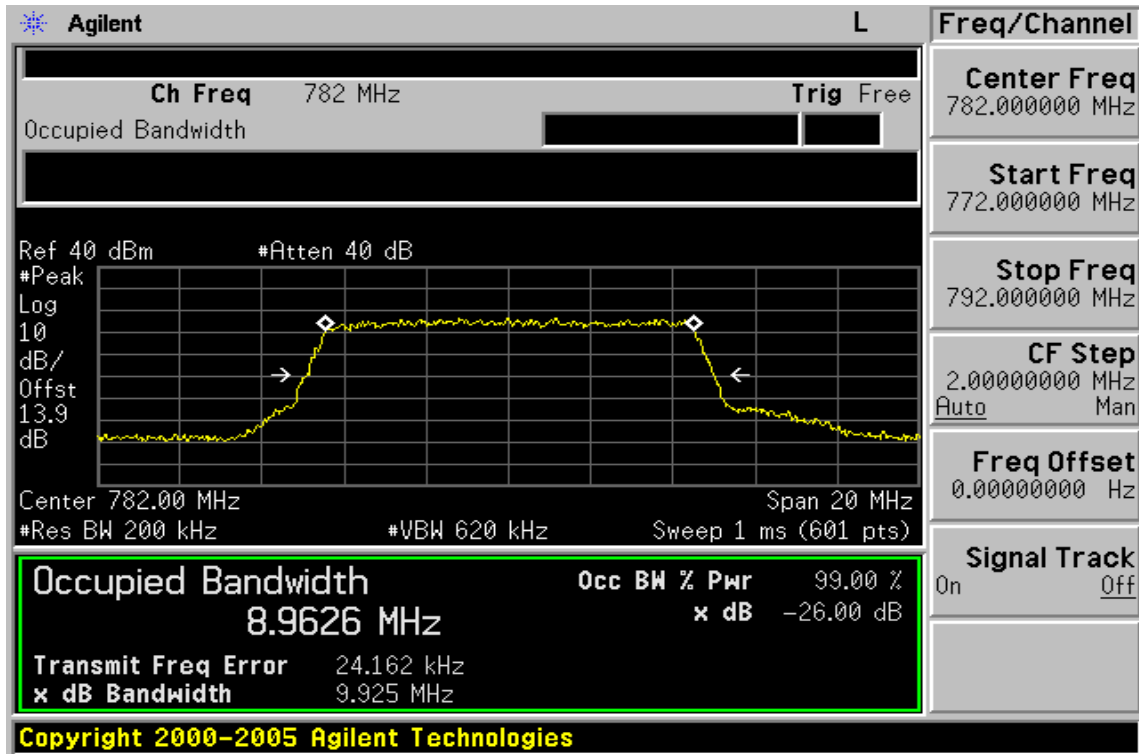
5MHz BW LTE-Band 13 16QAM Channel Mid



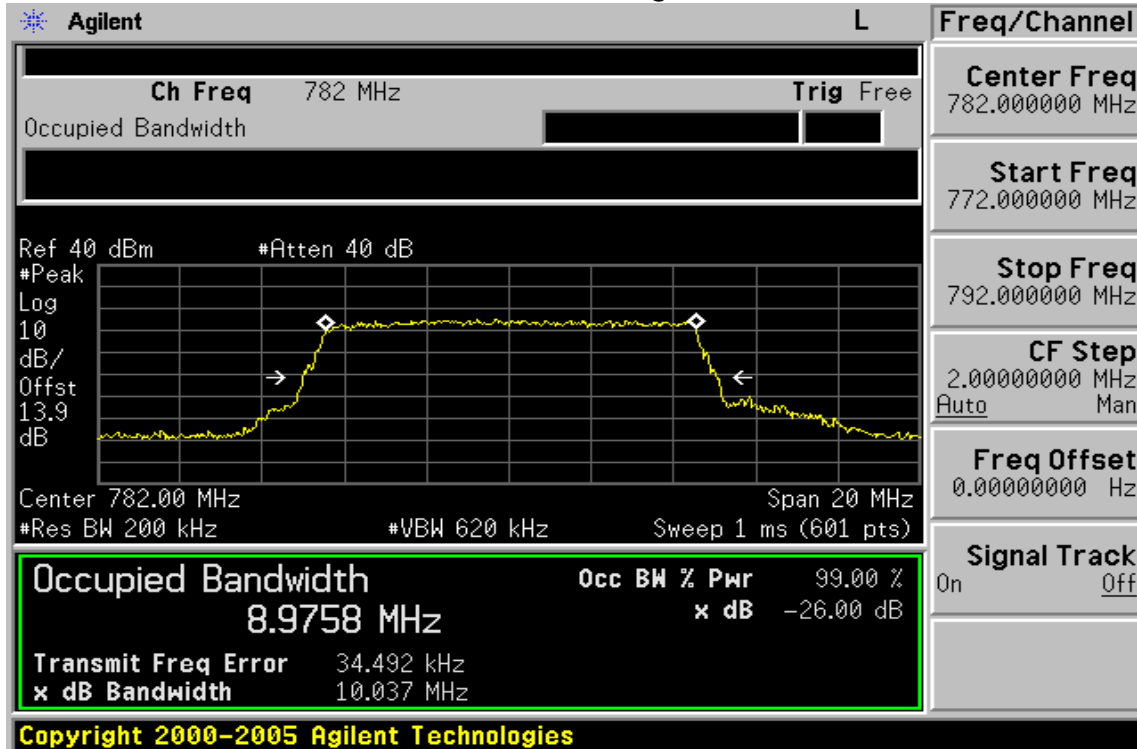
5MHz BW LTE-Band 13 16QAM Channel High



10MHz BW LTE-Band 13 QPSK Channel Mid



10MHz BW LTE-Band 13 16QAM Channel Mid



9. OUT OF BAND EMISSION AT ANTENNA TERMINALS

9.1. Standard Applicable

FCC §27.53(h) , §27.53(c)(2) the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than $43 + 10 \log$ (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm).

RSS-130 issue 1 Oct. 2013

4.6.1 The power of any unwanted emissions in any 100 kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$ (watts) (-13dBm), dB. However, in the 100 kHz band immediately outside the equipment's operating frequency range, a resolution bandwidth of 30 kHz may be employed.

RSS-139 issue 2 Oct. 2009

The average equivalent isotropically radiated power (e.i.r.p.) for fixed, mobile and portable transmitters in the 1710-1755 MHz shall not exceed 1 watt.

Band Edge Measurement:

FCC §27.53(c) (5) & FCC §27.53(g)

Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

FCC §27.53(h)

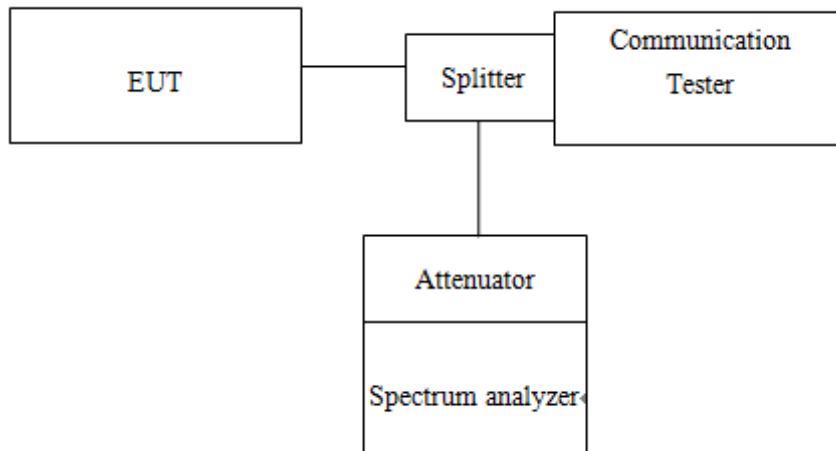
Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission 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 emissions are attenuated at least 26 dB below the transmitter power.

FCC §27.53(m) (4) (6)

For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in § 27.53(m)(6). In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz 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; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). 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 emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

9.2. Test SET-UP



9.3. Measurement Procedure

Conducted Emission

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

1. To connect Antenna Port of EUT to Spectrum.
2. Set RBW = 1MHz & VBW = 1MHz on Spectrum.
3. Allow trace to fully stabilize
4. Repeat above procedures until all default test channel measured were complete.

Band Edge

1. To connect Antenna Port of EUT to Spectrum.
2. The band edge of low and high channels for the highest RF powers was measured. Setting RBW \geq 1% EBW.
3. Allow trace to fully stabilize
4. Repeat above procedures until all default test channel measured were complete.

9.4. Measurement Equipment Used

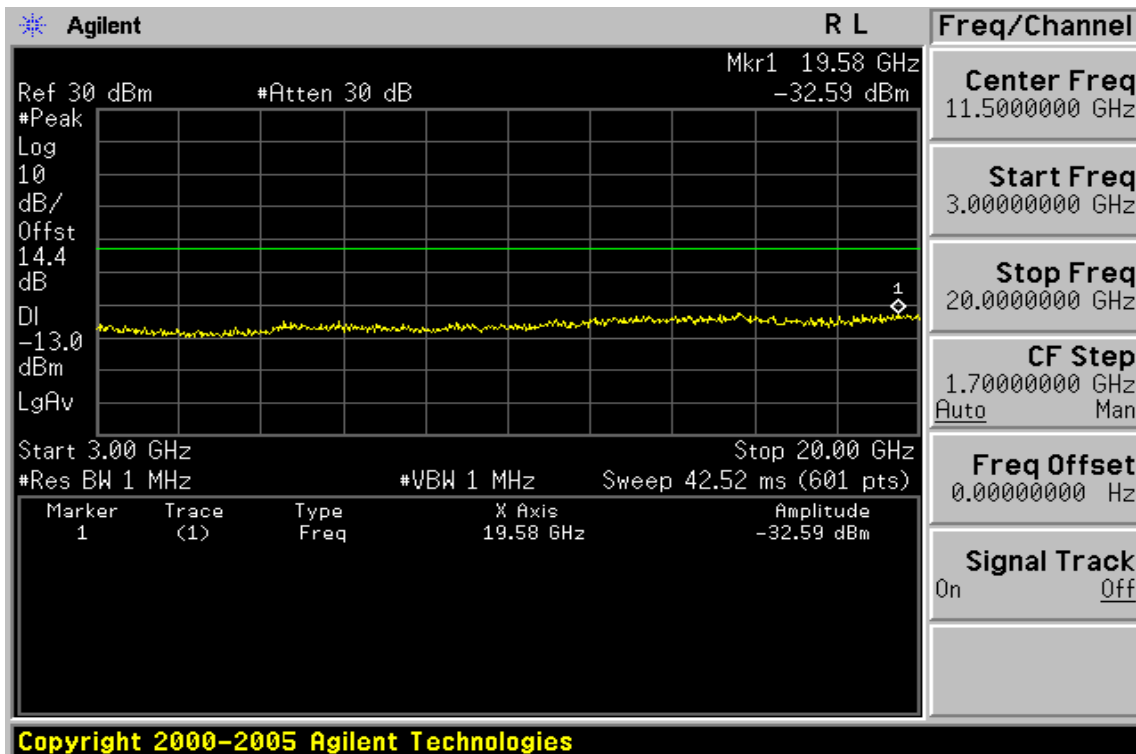
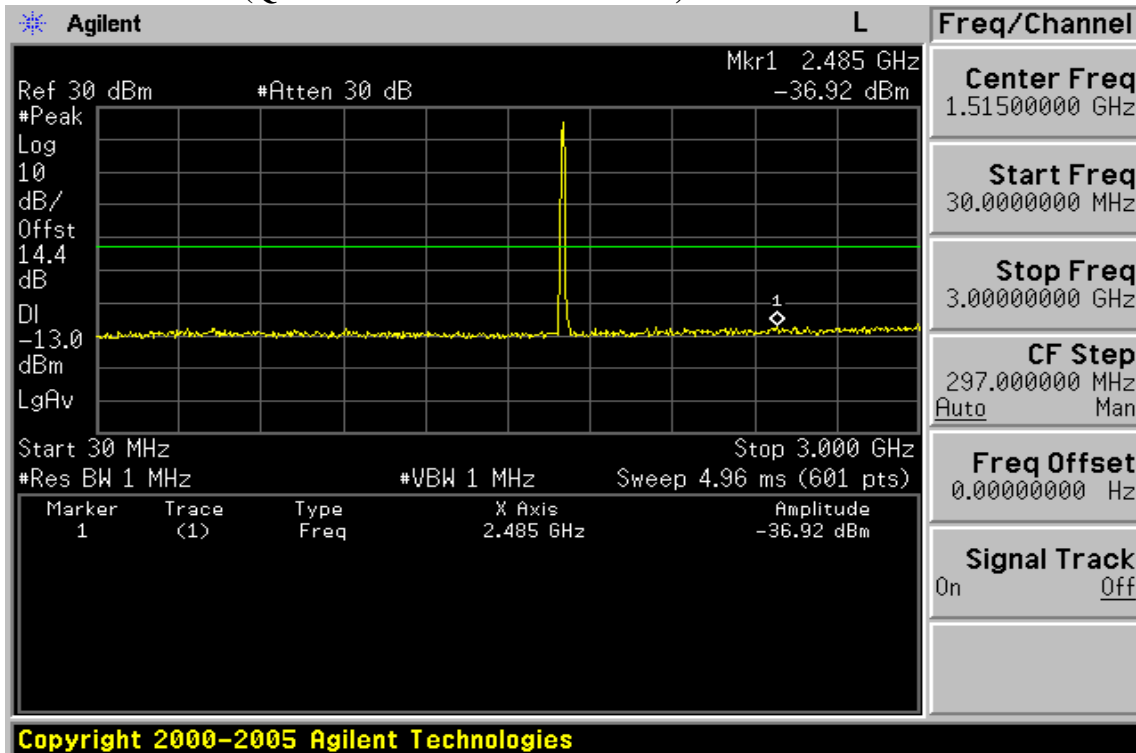
Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	10/08/2014	10/09/2015
Temperature Chamber	TERCHY	MHG-120LF	911009	05/06/2015	05/05/2016
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016
Splitter	Agilent	11636B	N/A	01/02/2015	01/01/2016
DC Power Supply	Agilent	E3640A	MY52410006	11/10/2014	11/09/2015

9.5. Measurement Result:

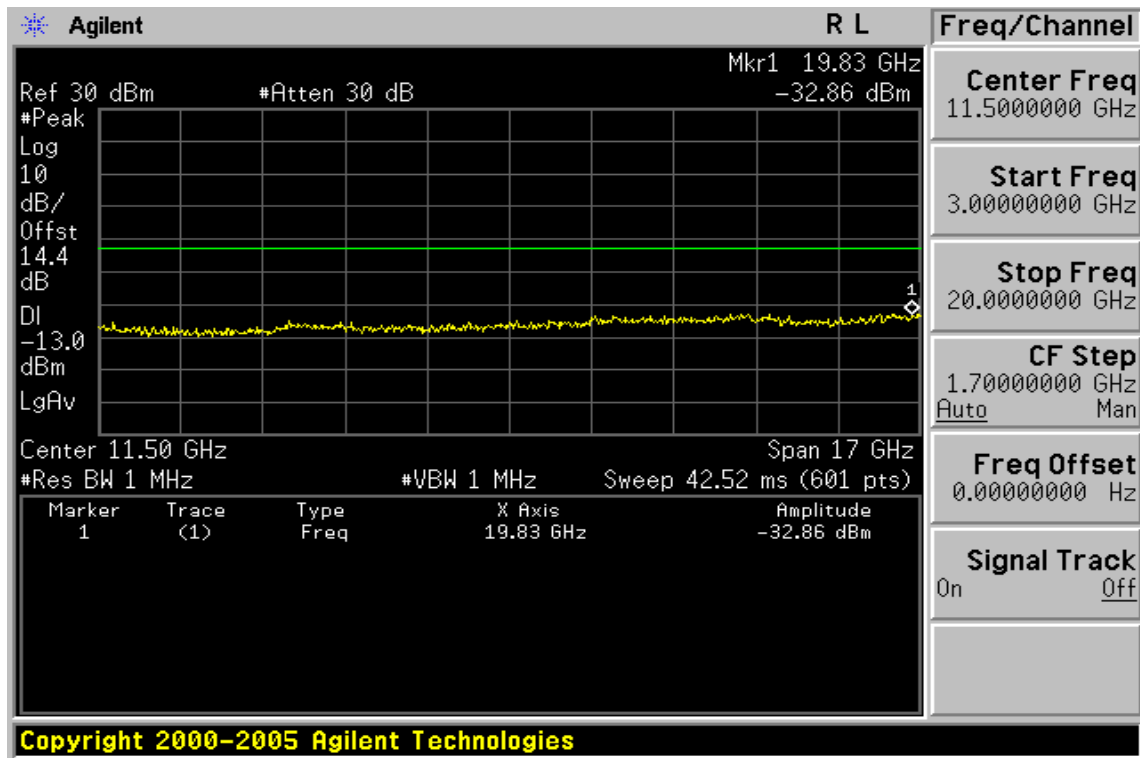
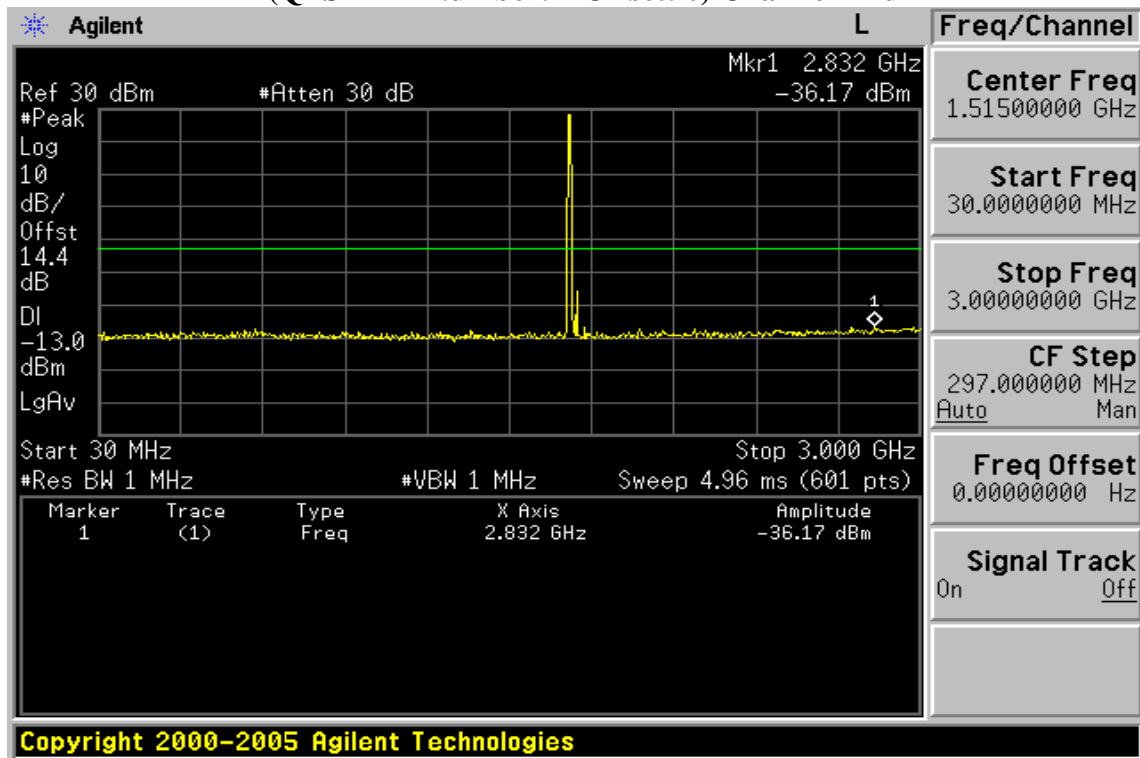
Refer to next pages.

NOTE: *The occurrence of the spike on the conducted emission is the signal of the fundamental emission.*

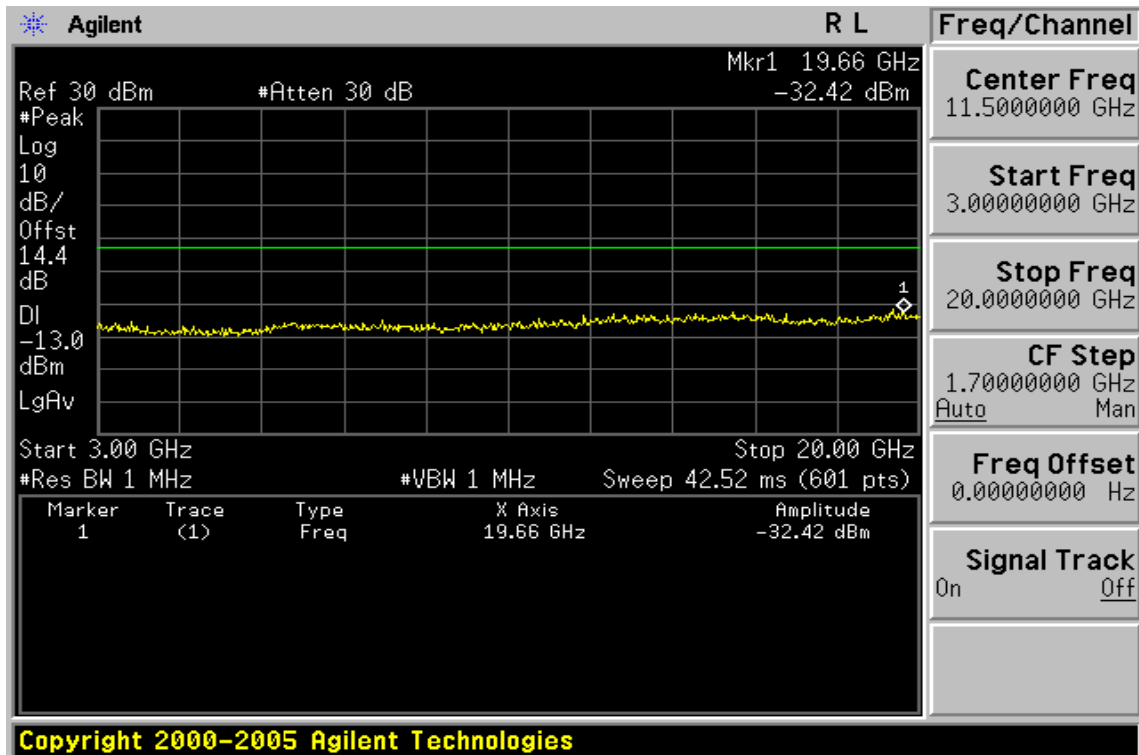
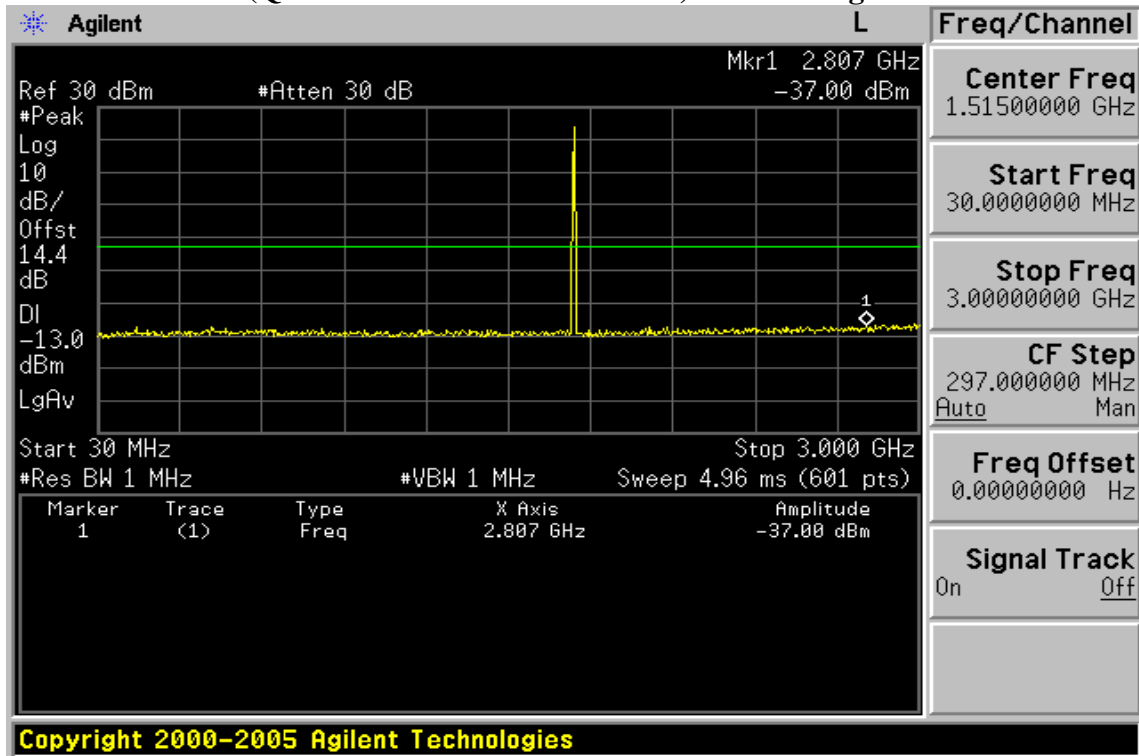
**Out of Band emission at antenna terminals-5MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 0)Channel Lowest**



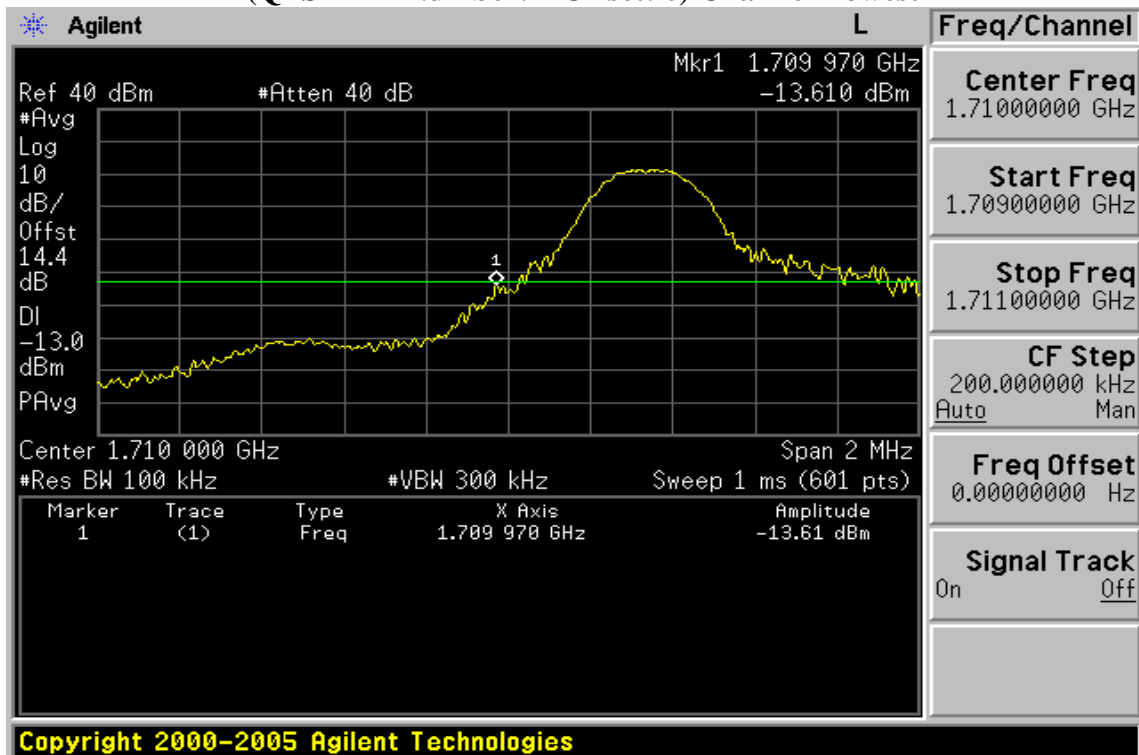
**Out of Band emission at antenna terminals –5MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 0) Channel Mid**



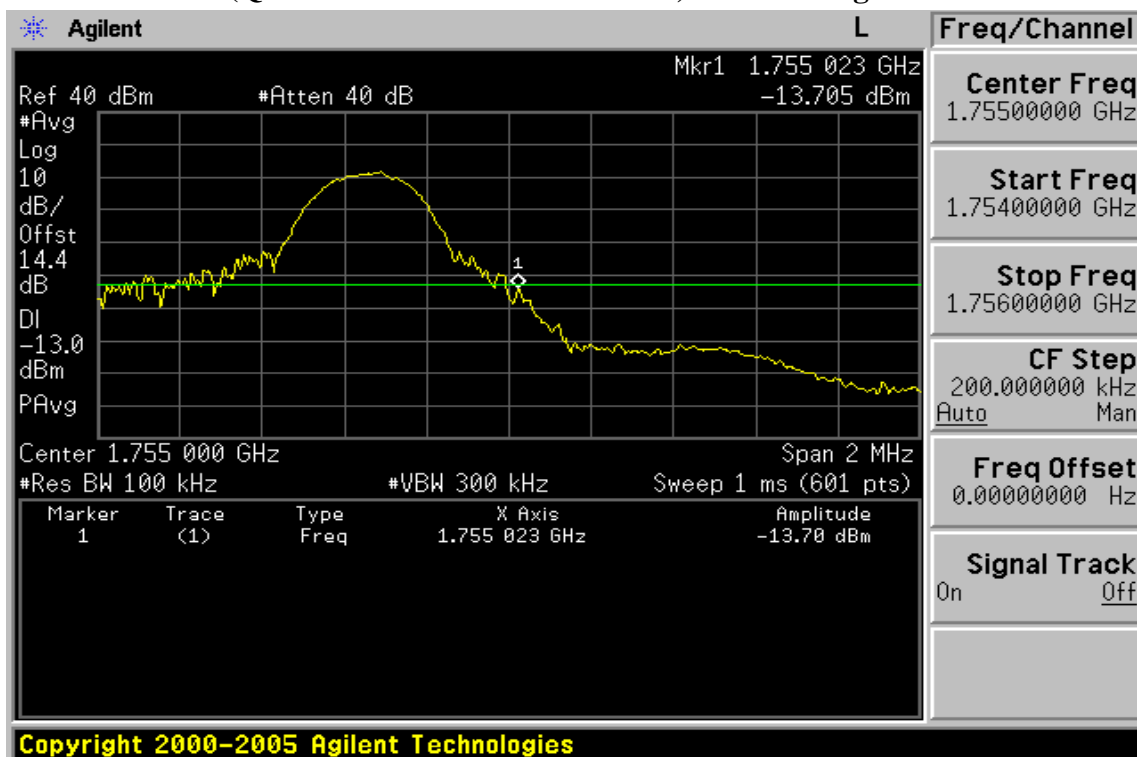
**Out of Band emission at antenna terminals–5MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 0)Channel Highest**



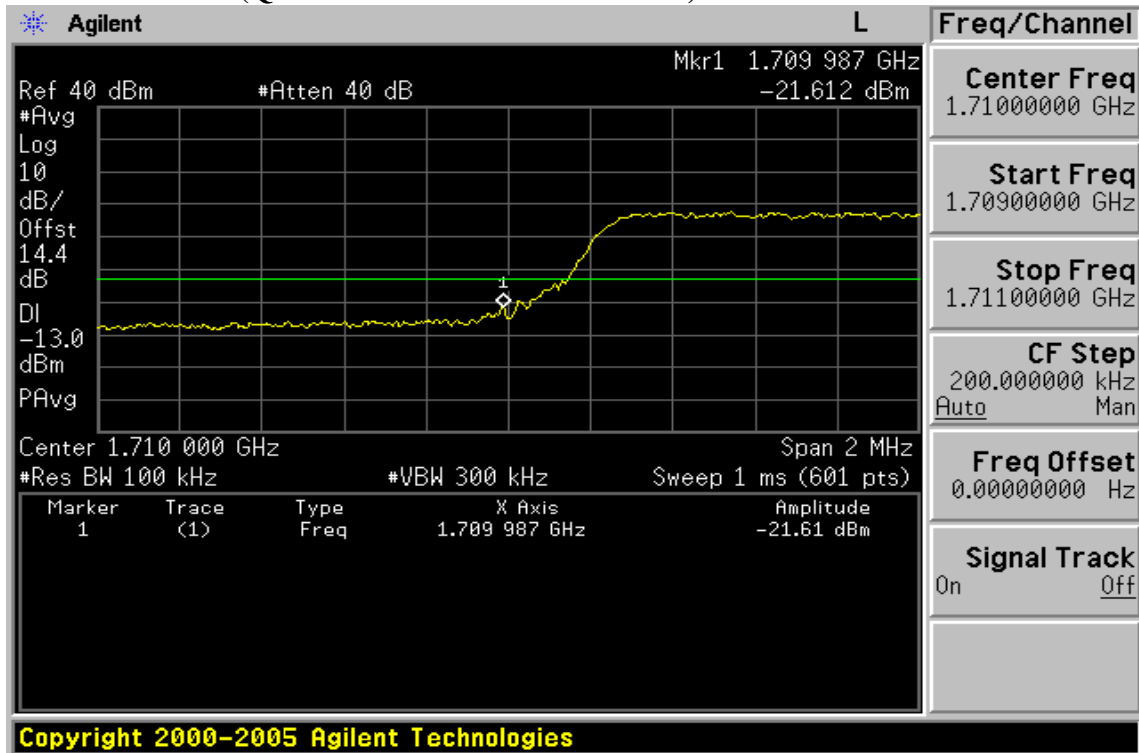
**Band edge emission at antenna terminals –5MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 0) Channel Lowest**



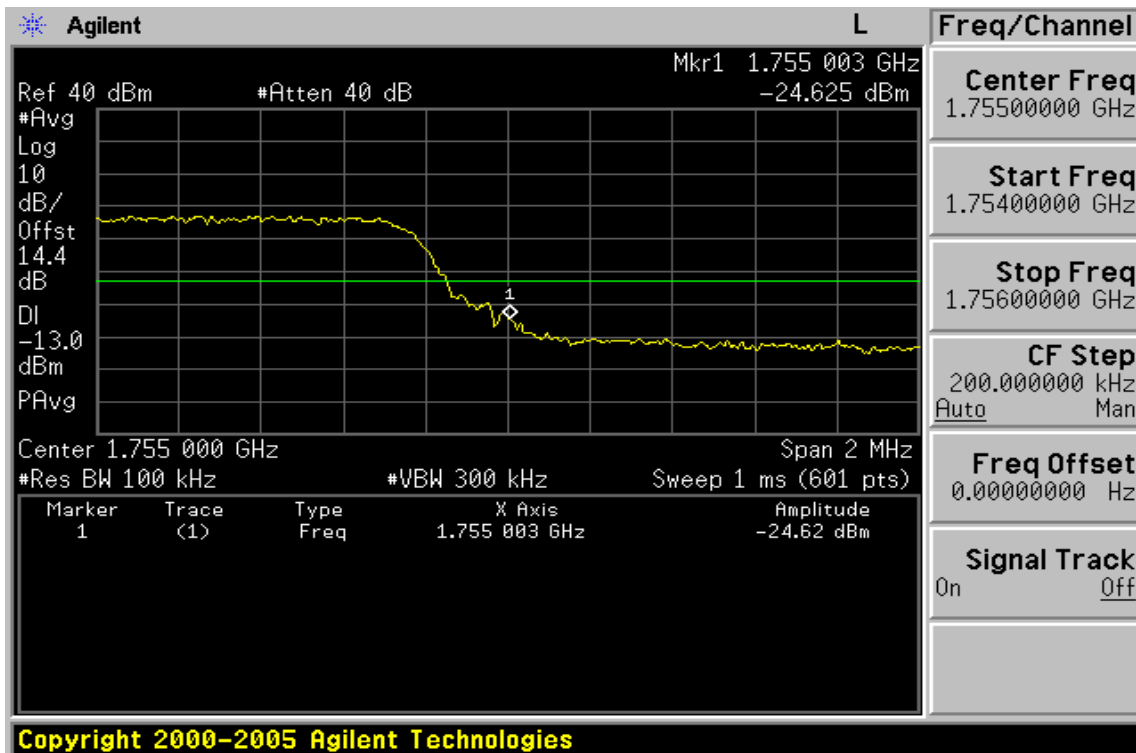
**Band edge emission at antenna terminals –5MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 24) Channel Highest**



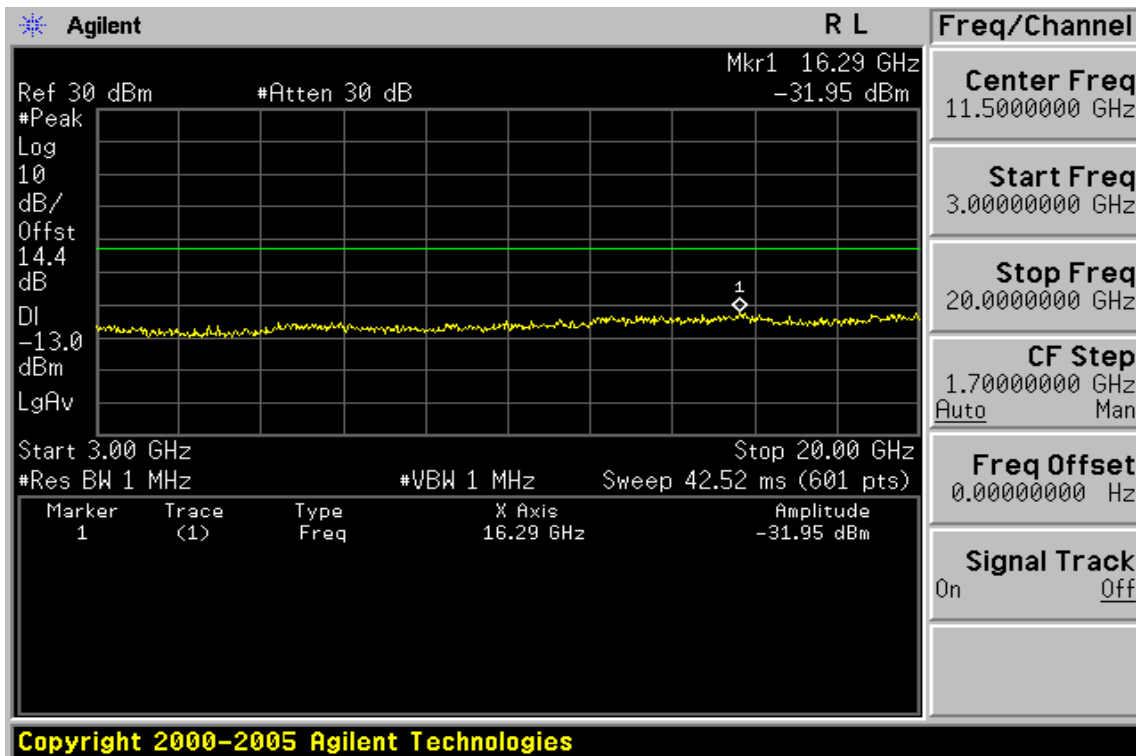
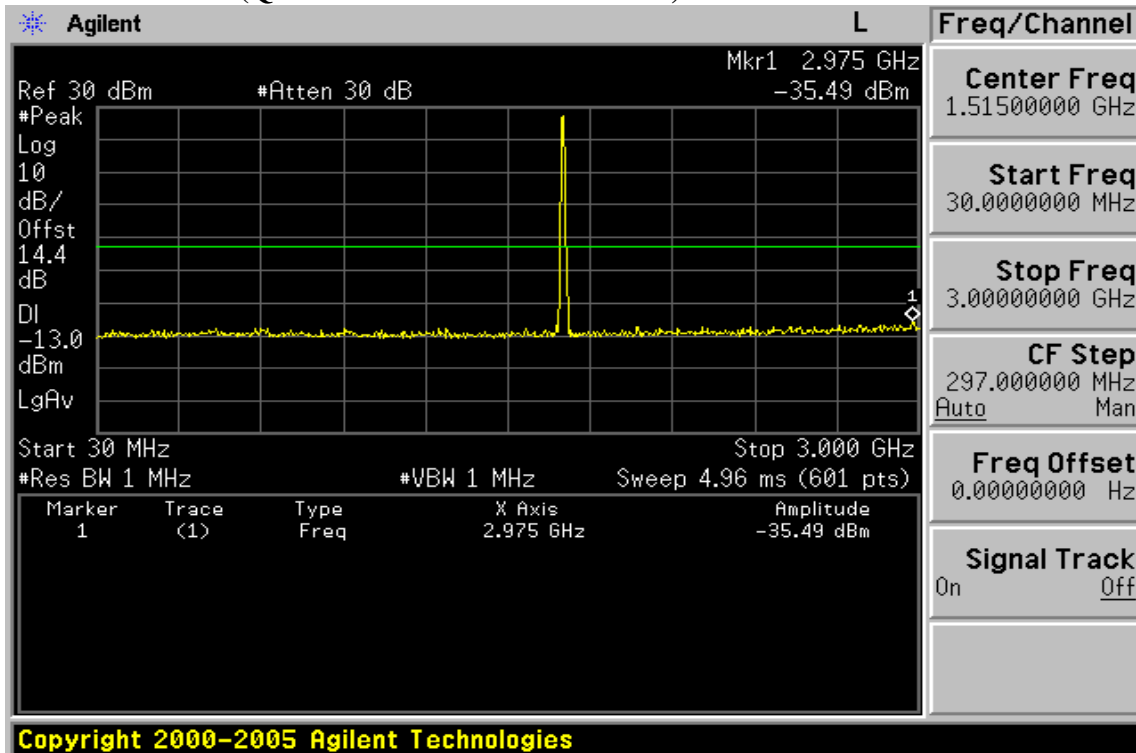
**Band edge emission at antenna terminals –5MHz BW LTE-Band 4
 (QPSK RB Number: 25 Offset: 0) Channel Lowest**



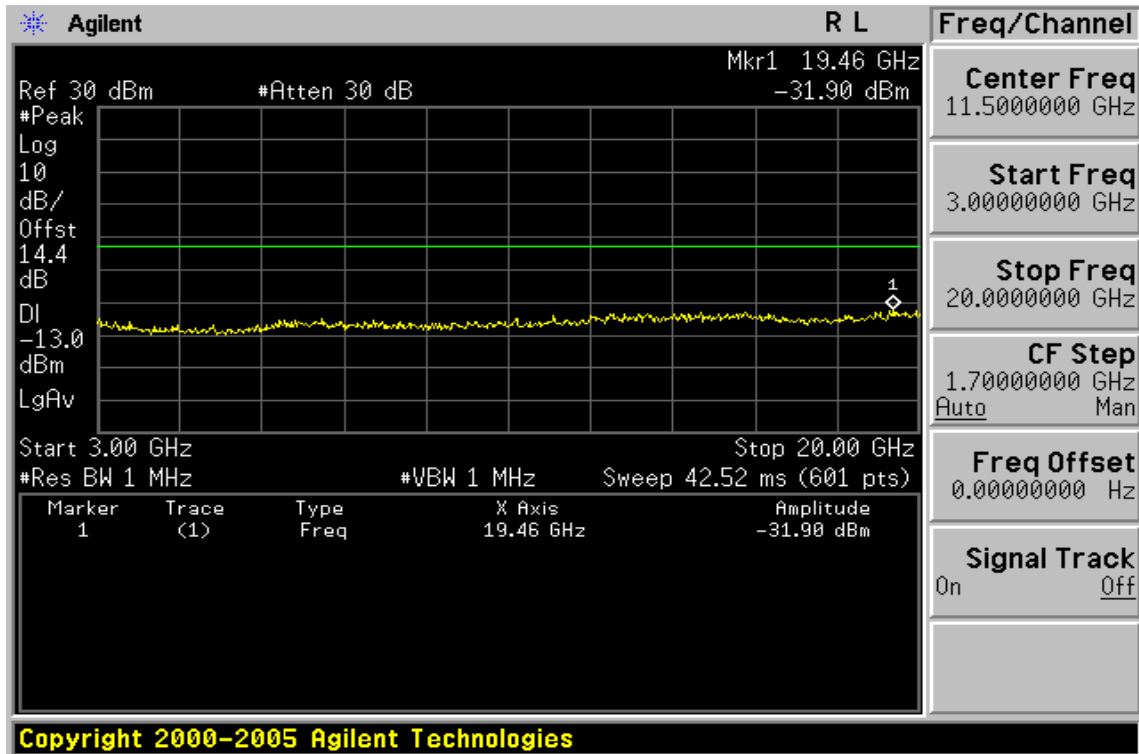
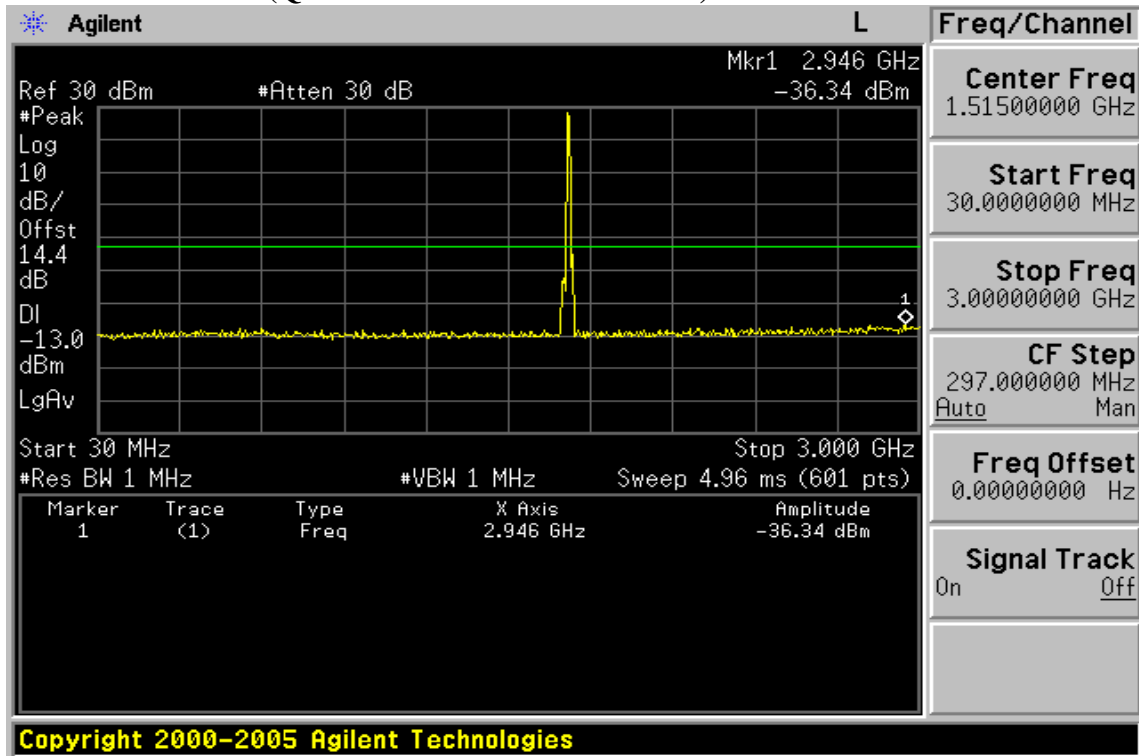
**Band edge emission at antenna terminals –5MHz BW LTE-Band 4
 (QPSK RB Number: 25 Offset: 0) Channel Highest**



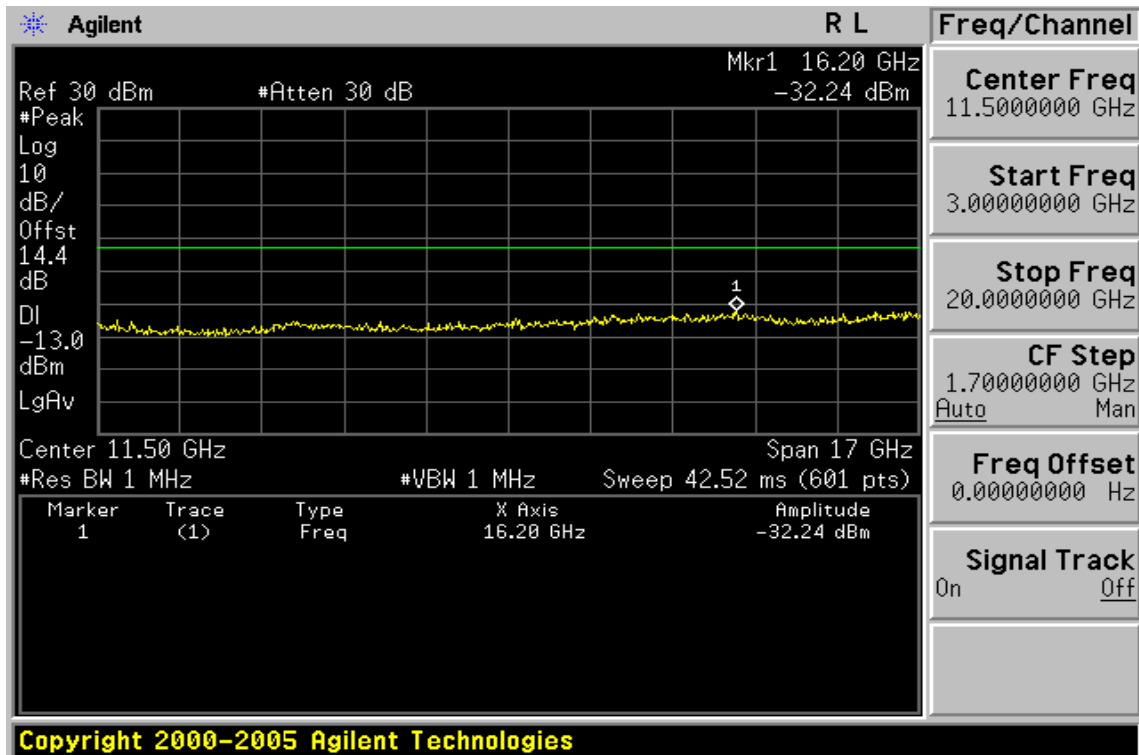
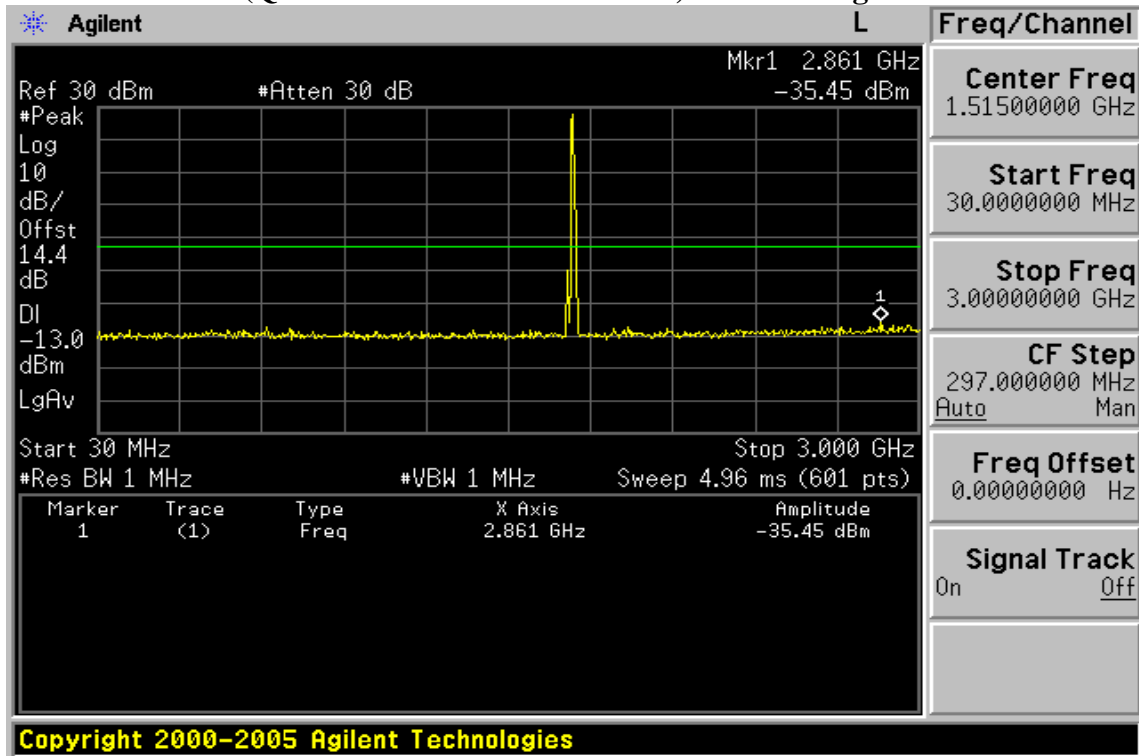
**Out of Band emission at antenna terminals–10MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 0) Channel Lowest**



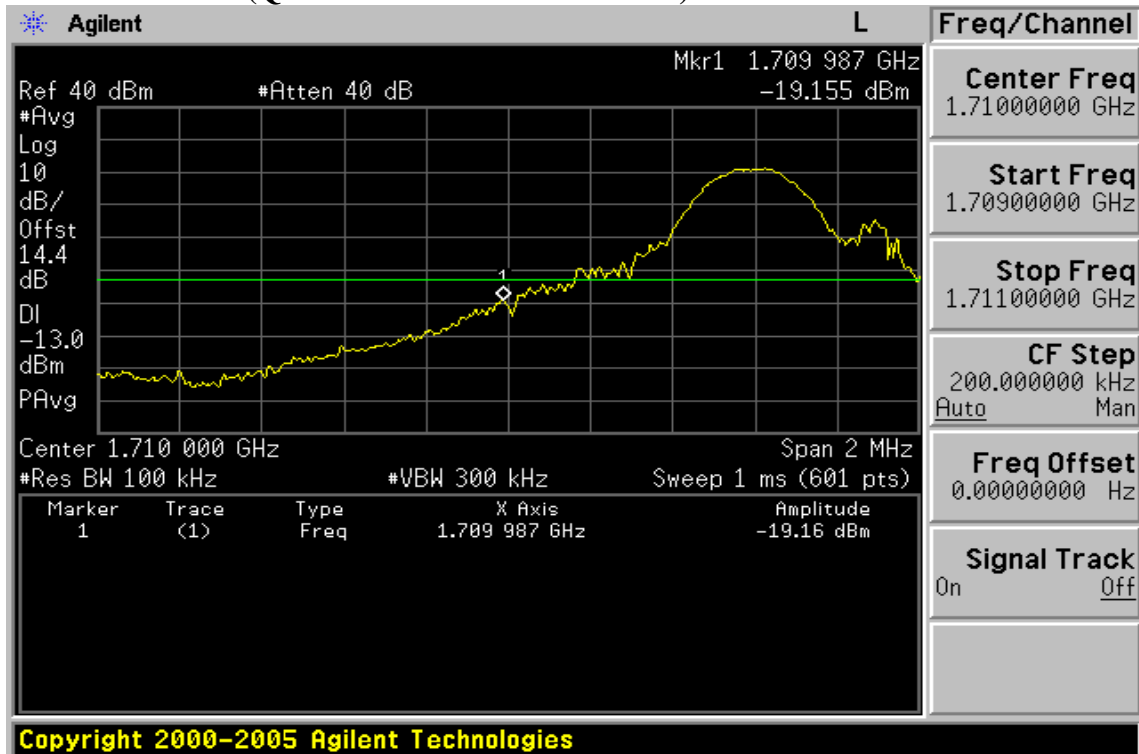
**Out of Band emission at antenna terminals –10MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 0) Channel Mid**



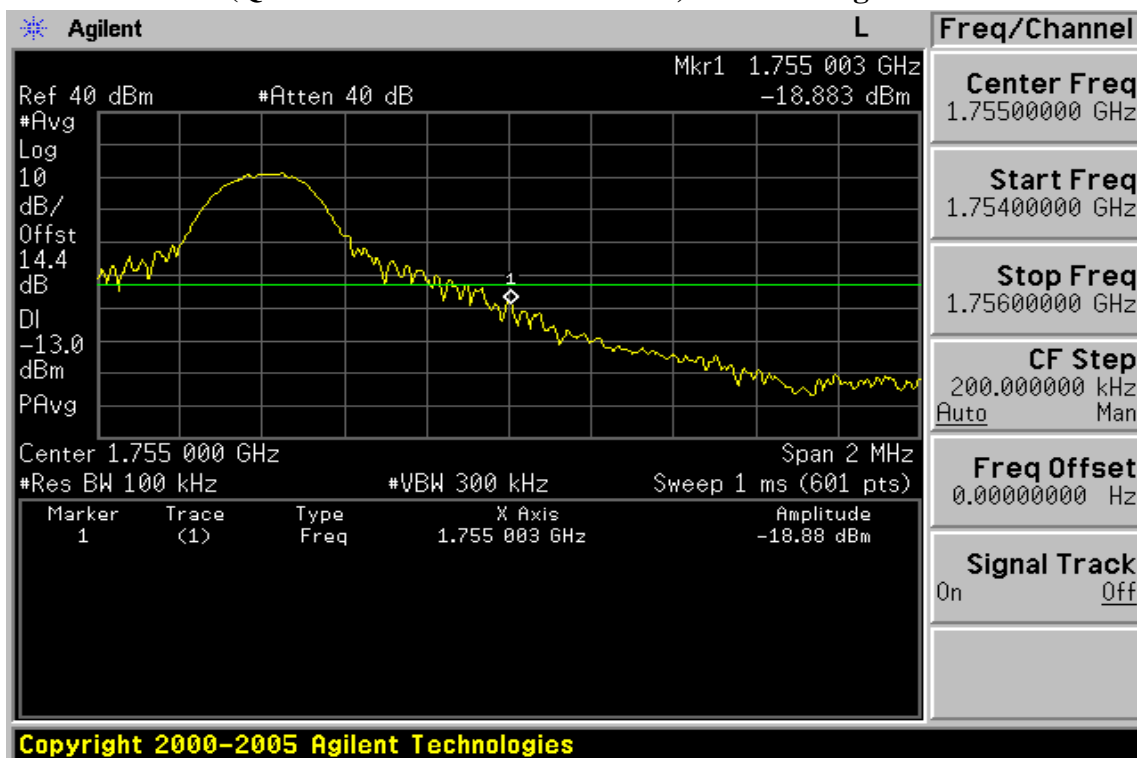
**Out of Band emission at antenna terminals–10MHz BW LTE-Band 4
(QPSK RB Number: 1 Offset: 0) Channel Highest**



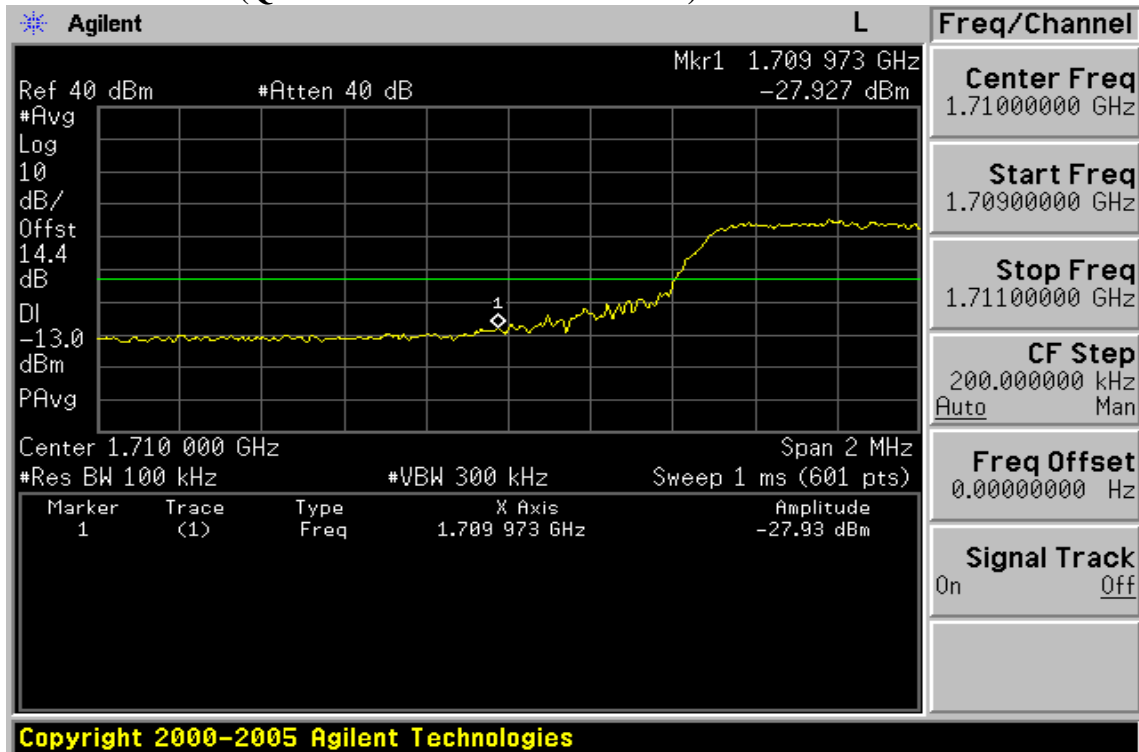
**Band edge emission at antenna terminals -10MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 0) Channel Lowest**



**Band edge emission at antenna terminals -10MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 49) Channel Highest**



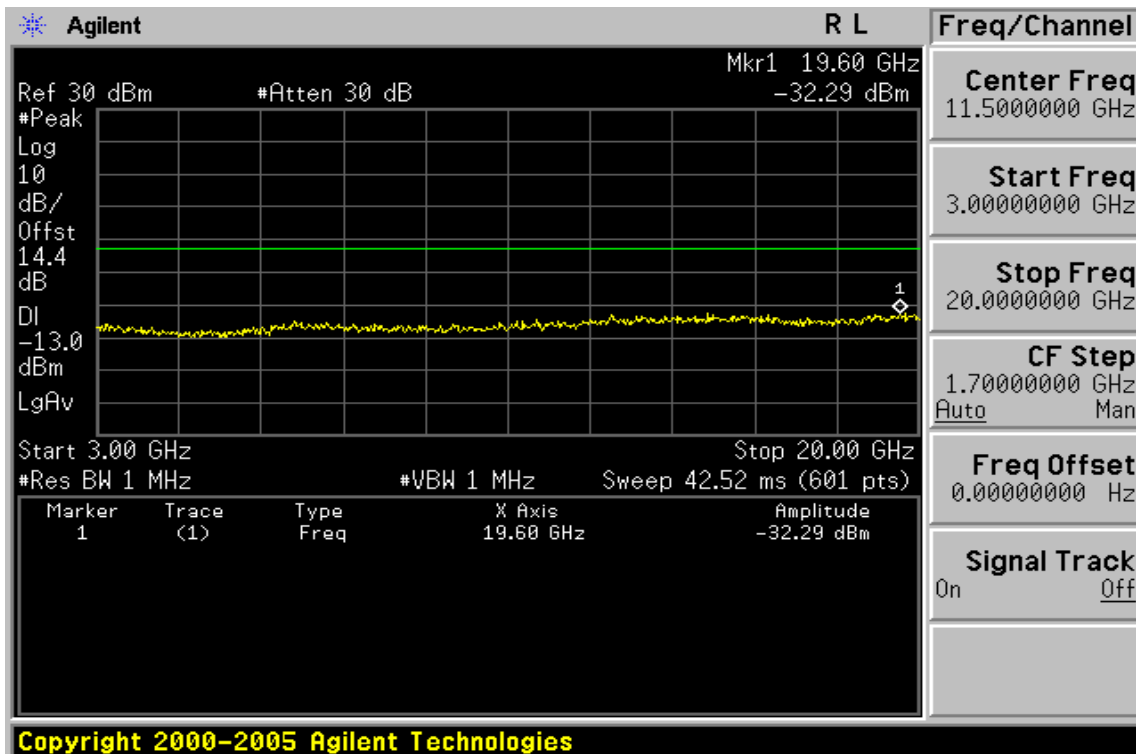
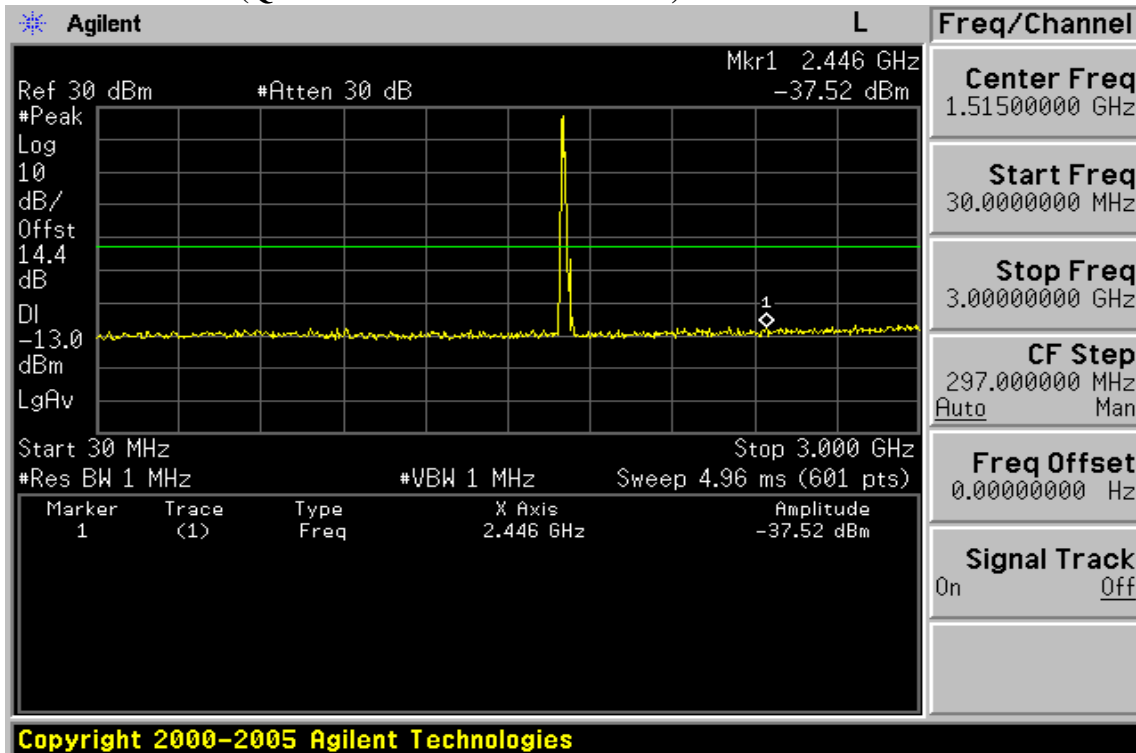
**Band edge emission at antenna terminals –10MHz BW LTE-Band 4
 (QPSK RB Number: 50 Offset: 0) Channel Lowest**



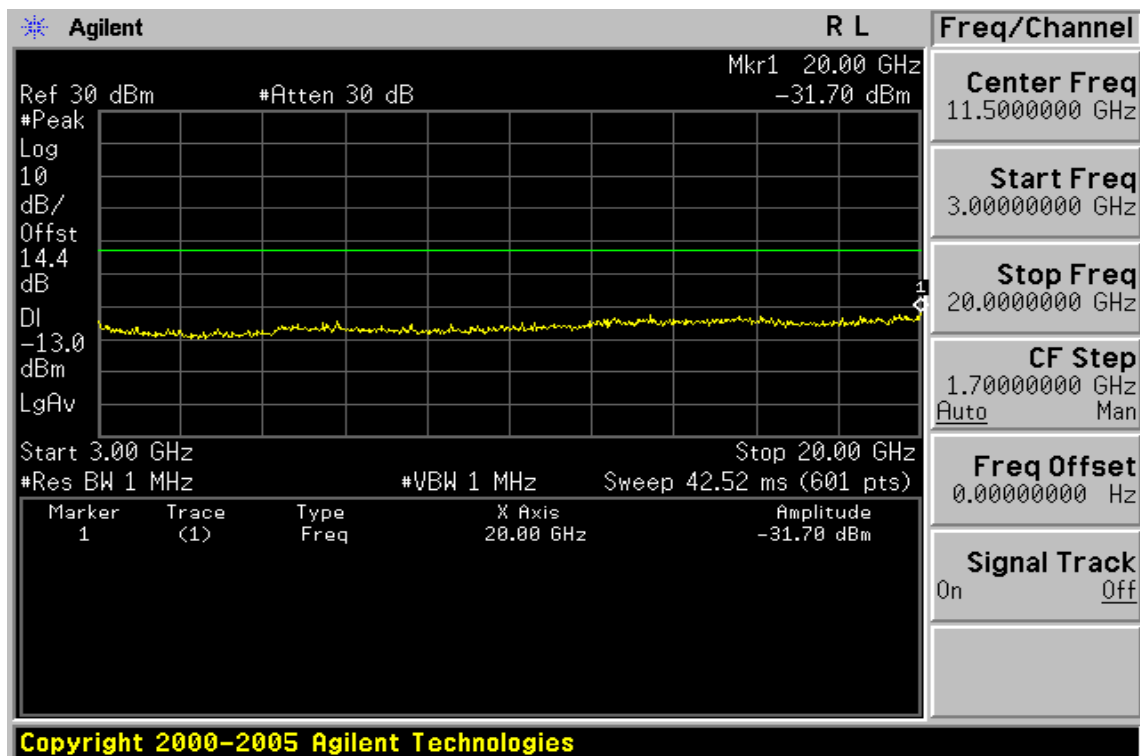
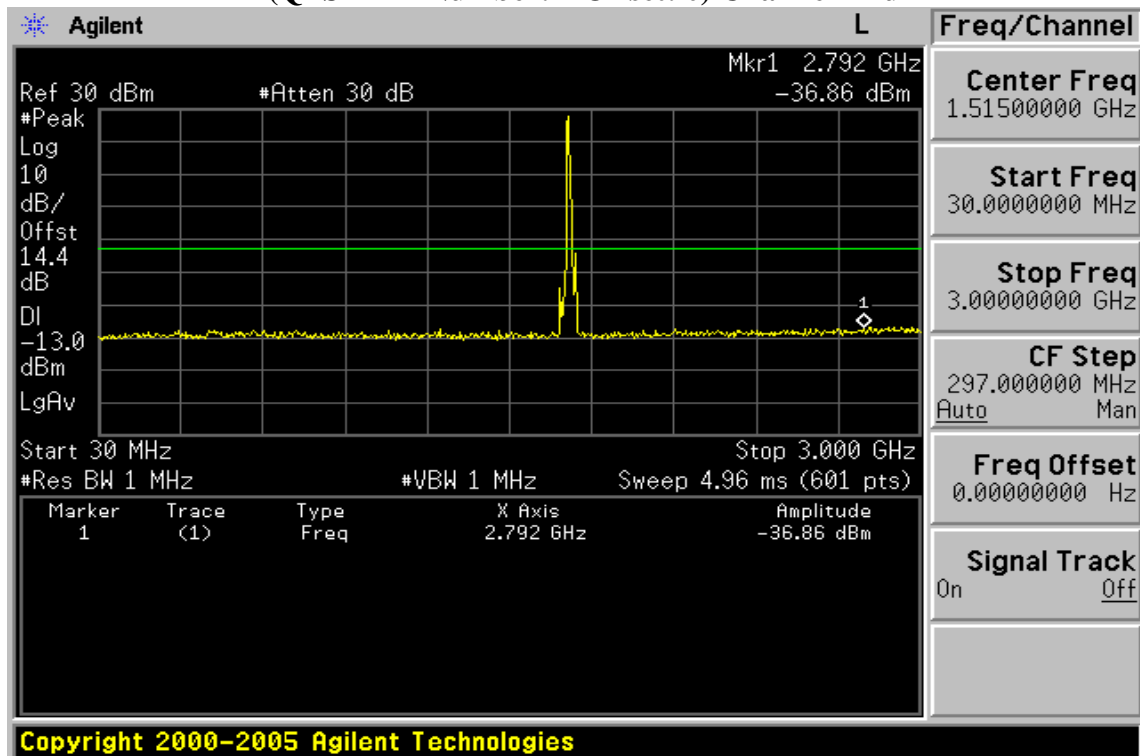
**Band edge emission at antenna terminals –10MHz BW LTE-Band 4
 (QPSK RB Number: 50 Offset:) Channel Highest**



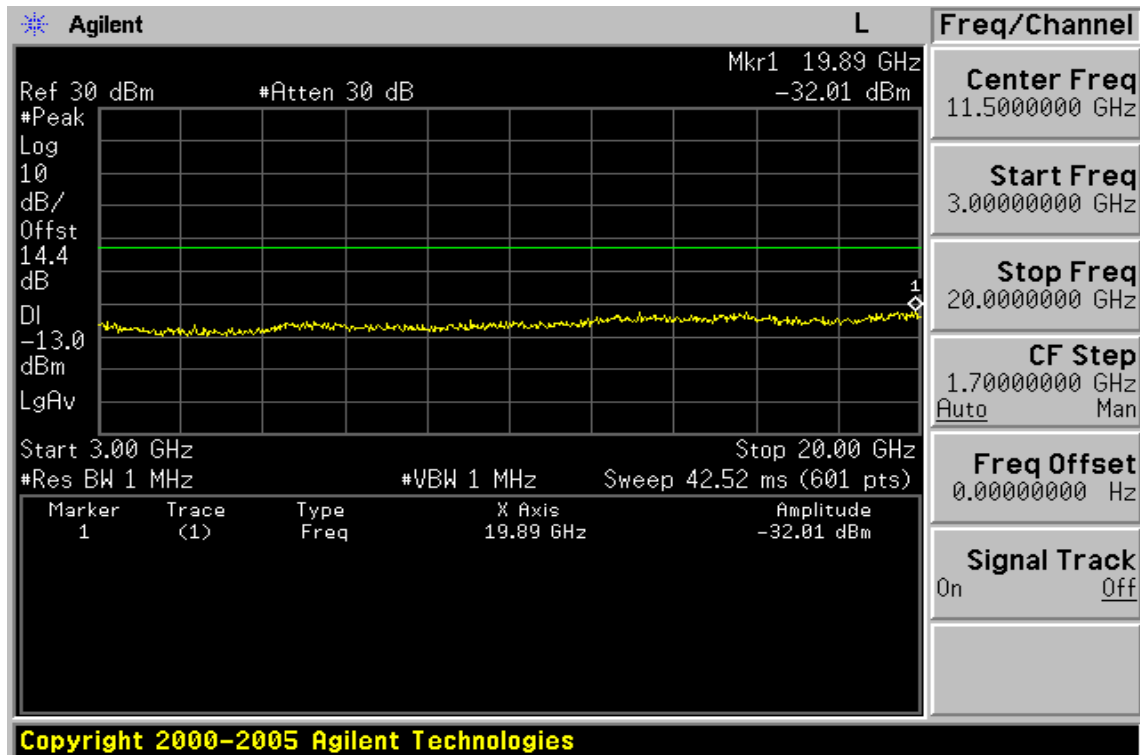
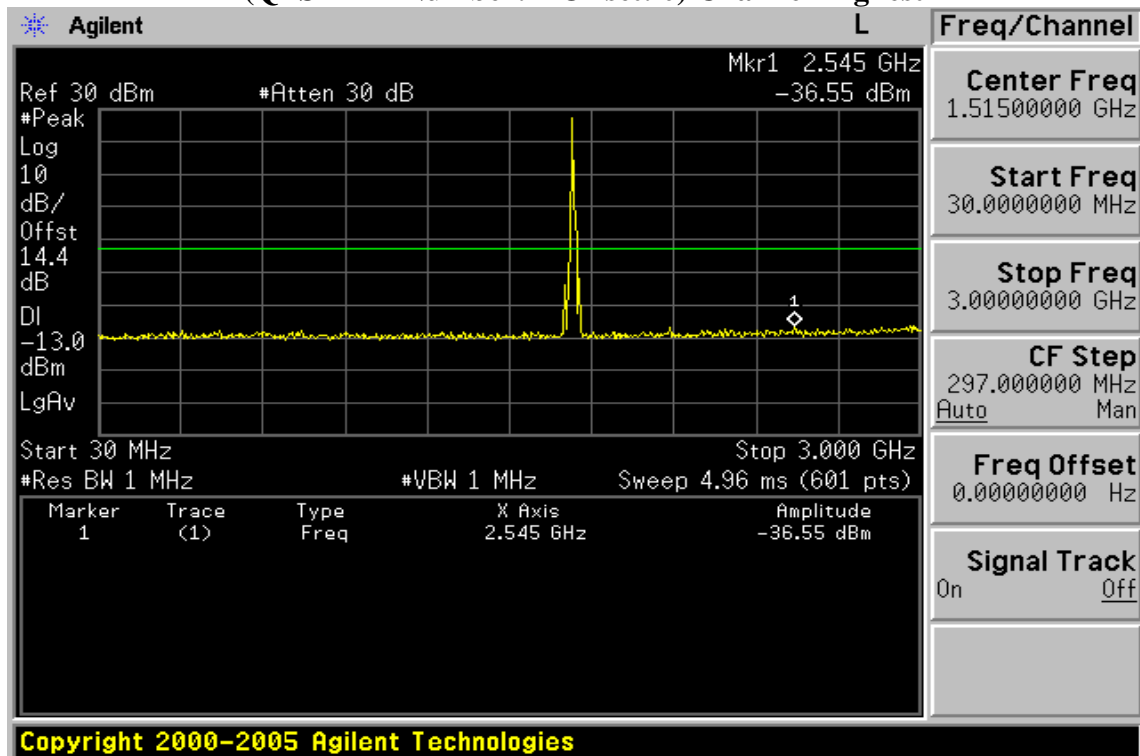
**Out of Band emission at antenna terminals–15MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 0) Channel Lowest**



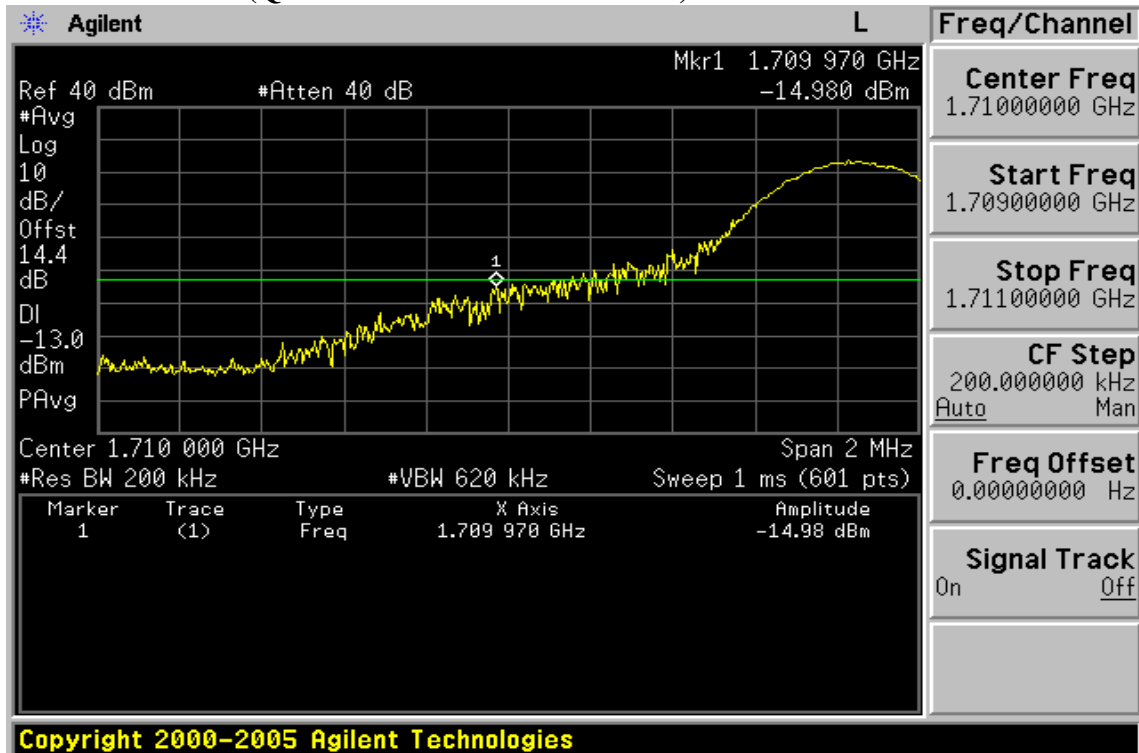
**Out of Band emission at antenna terminals –15MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 0) Channel Mid**



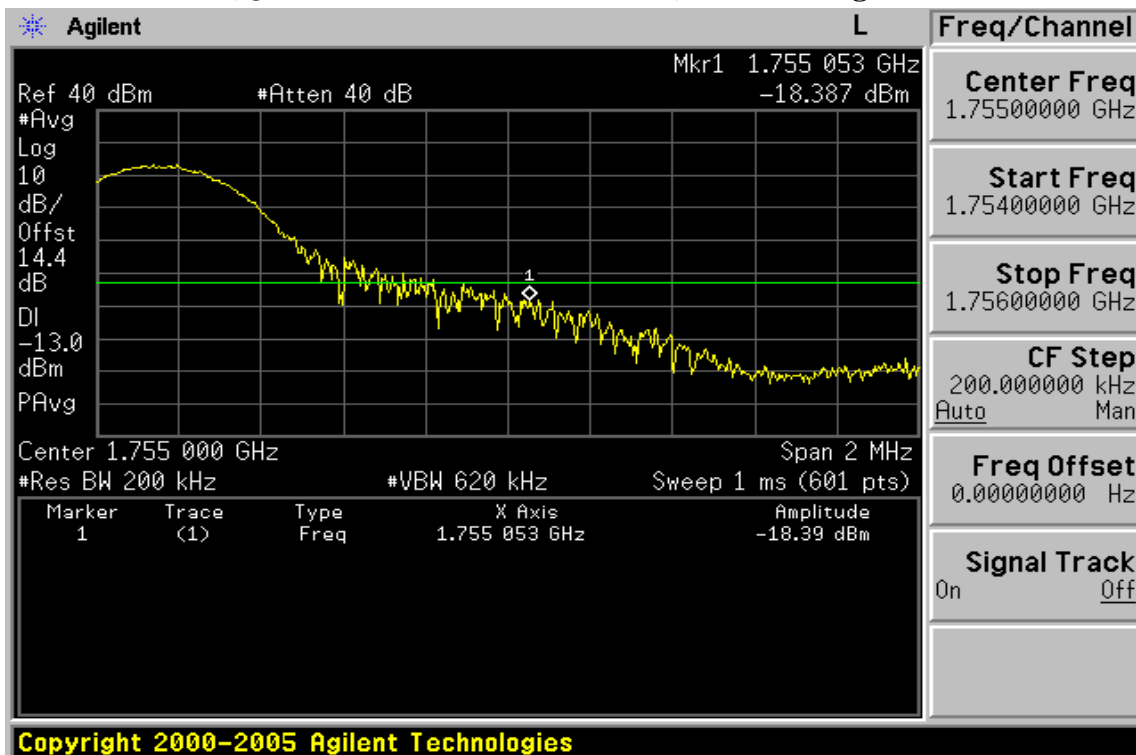
**Out of Band emission at antenna terminals–15MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 0) Channel Highest**



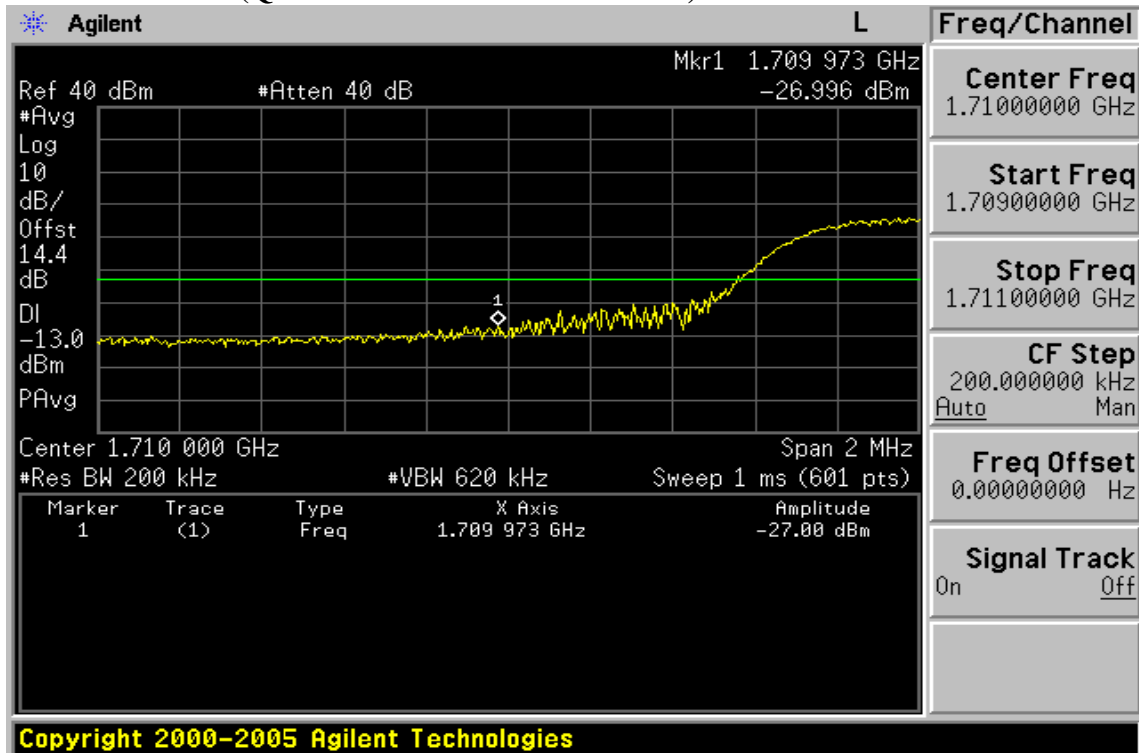
**Band edge emission at antenna terminals –15MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 0) Channel Lowest**



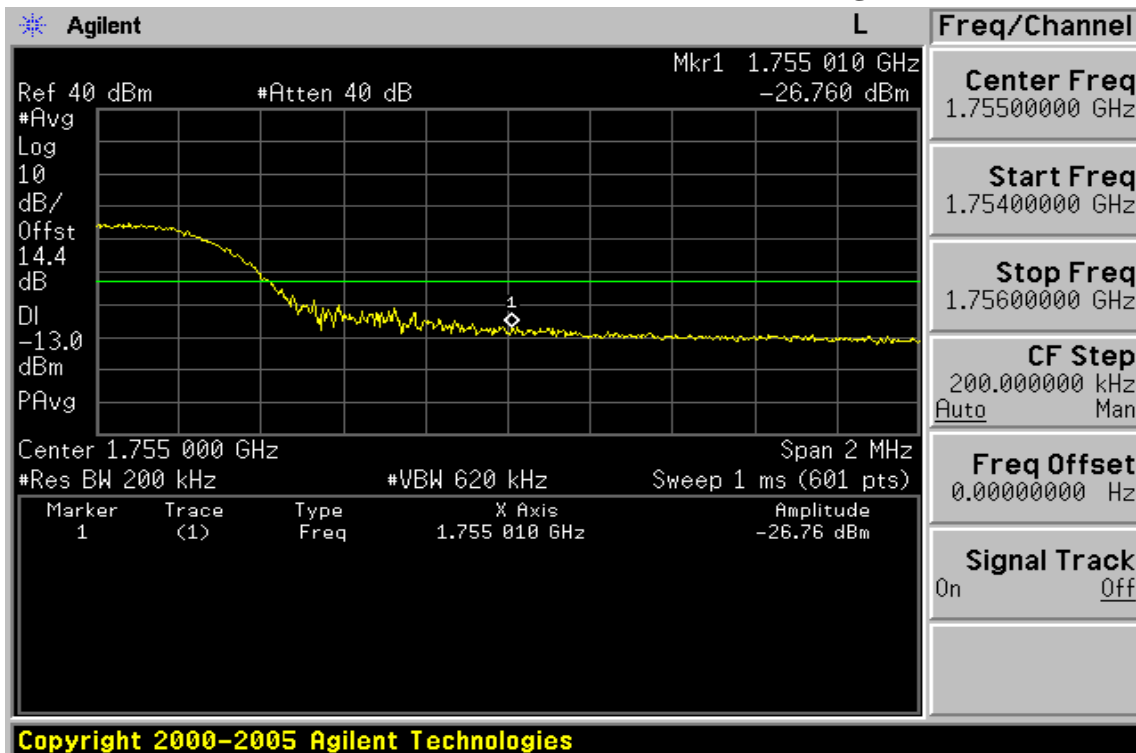
**Band edge emission at antenna terminals –15MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 74) Channel Highest**



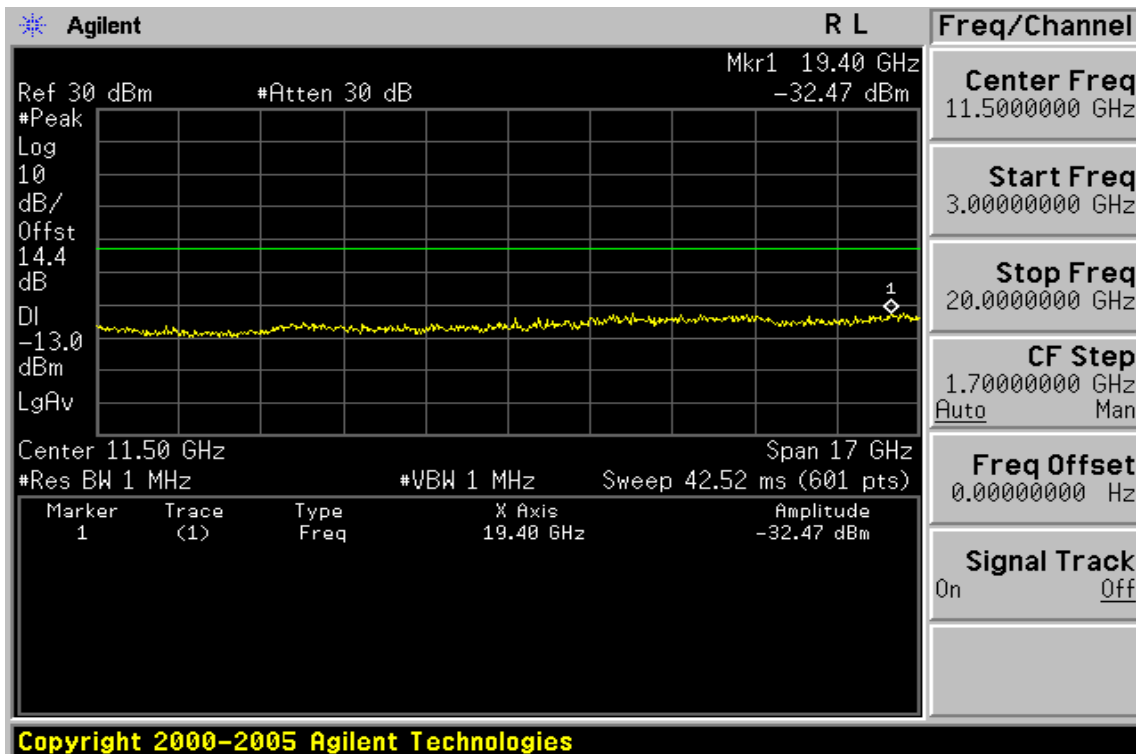
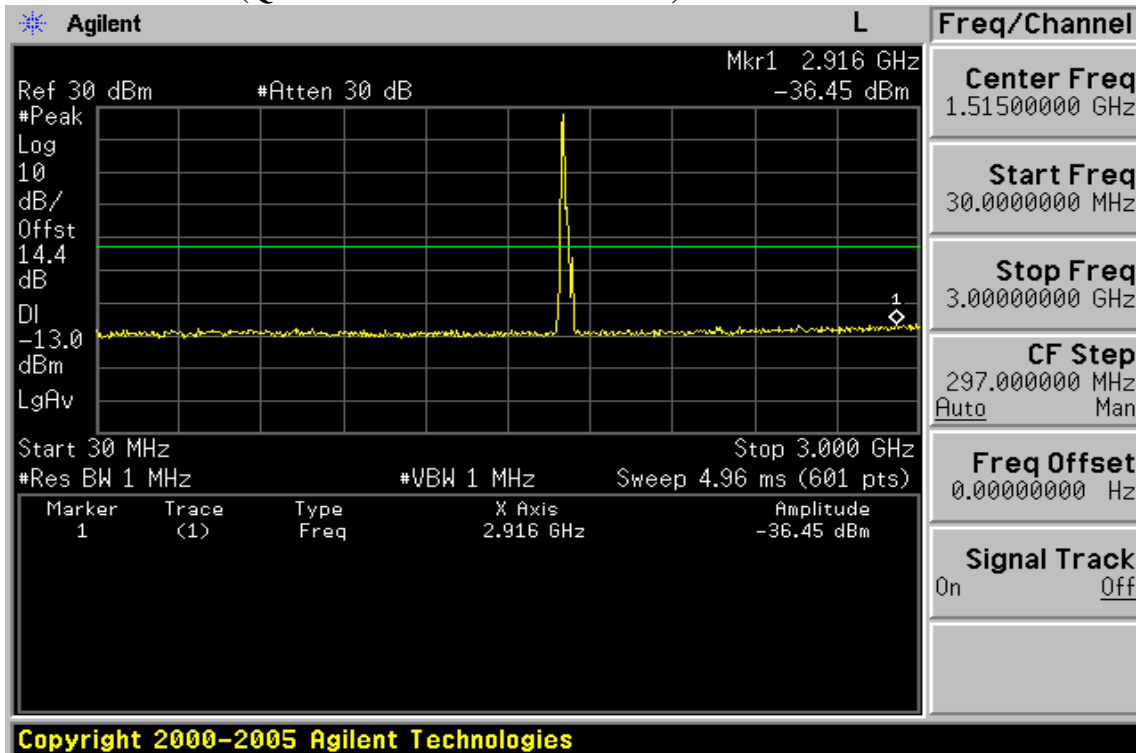
**Band edge emission at antenna terminals –15MHz BW LTE-Band 4
 (QPSK RB Number: 75 Offset: 0) Channel Lowest**



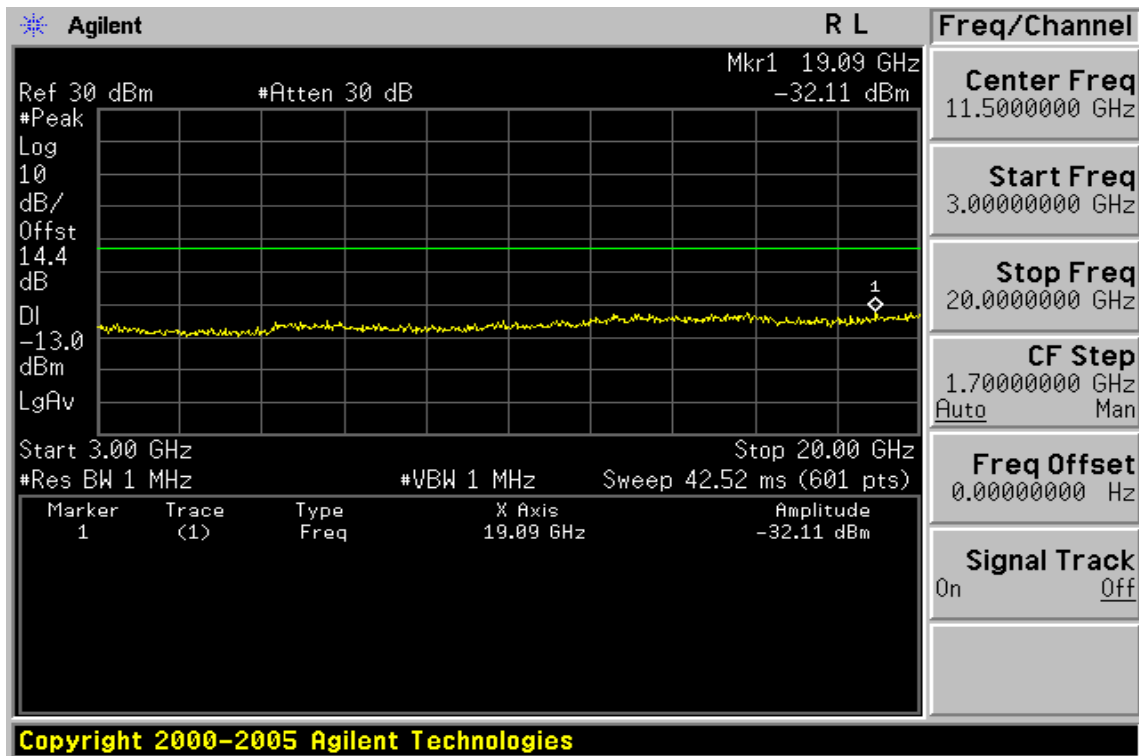
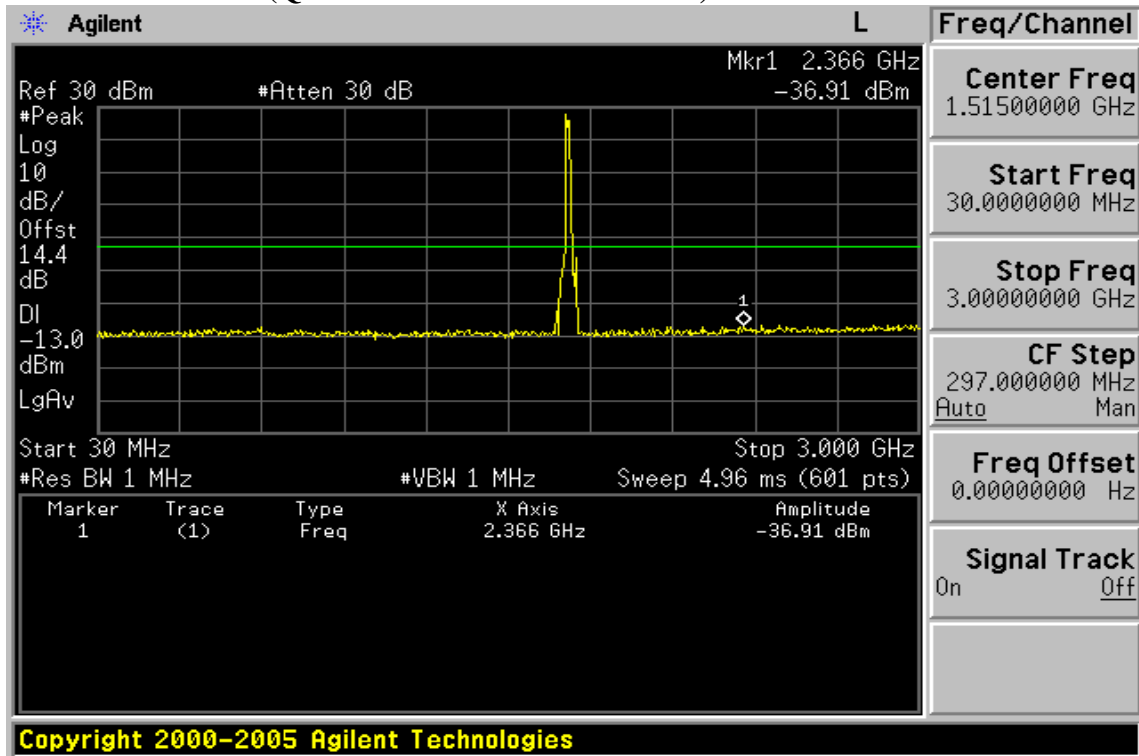
**Band edge emission at antenna terminals –15MHz BW LTE-Band 4
 (QPSK RB Number: 75 Offset: 0) Channel Highest**



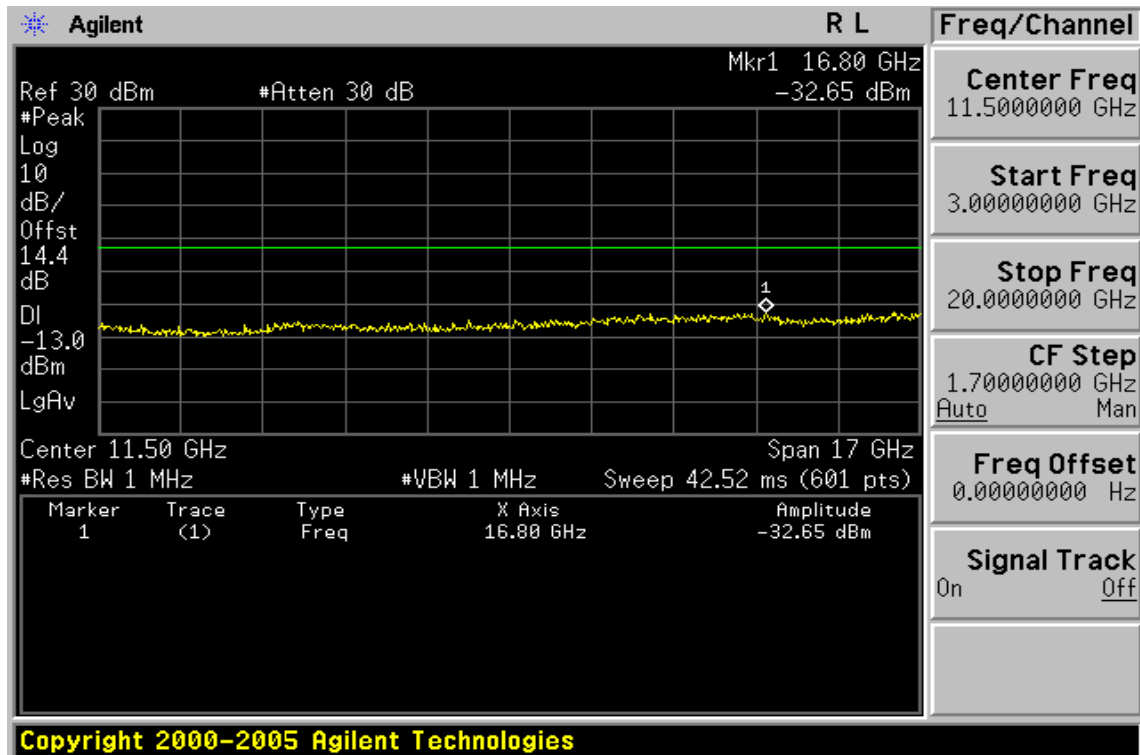
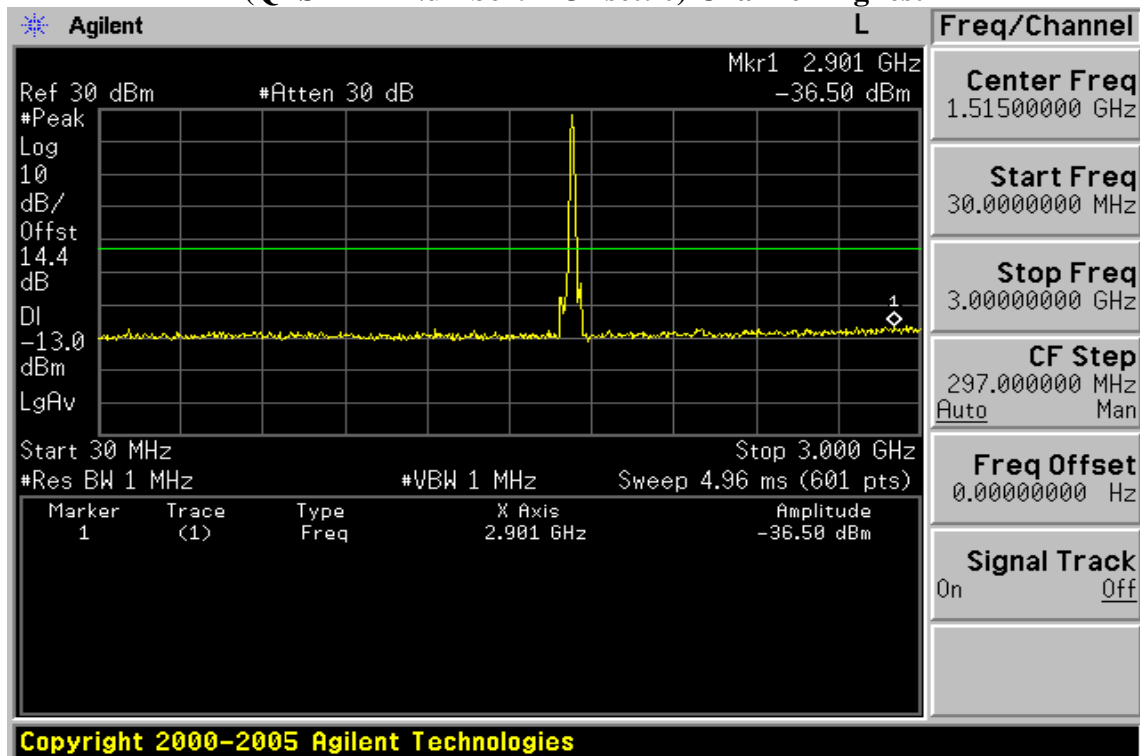
**Out of Band emission at antenna terminals–20MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 0) Channel Lowest**



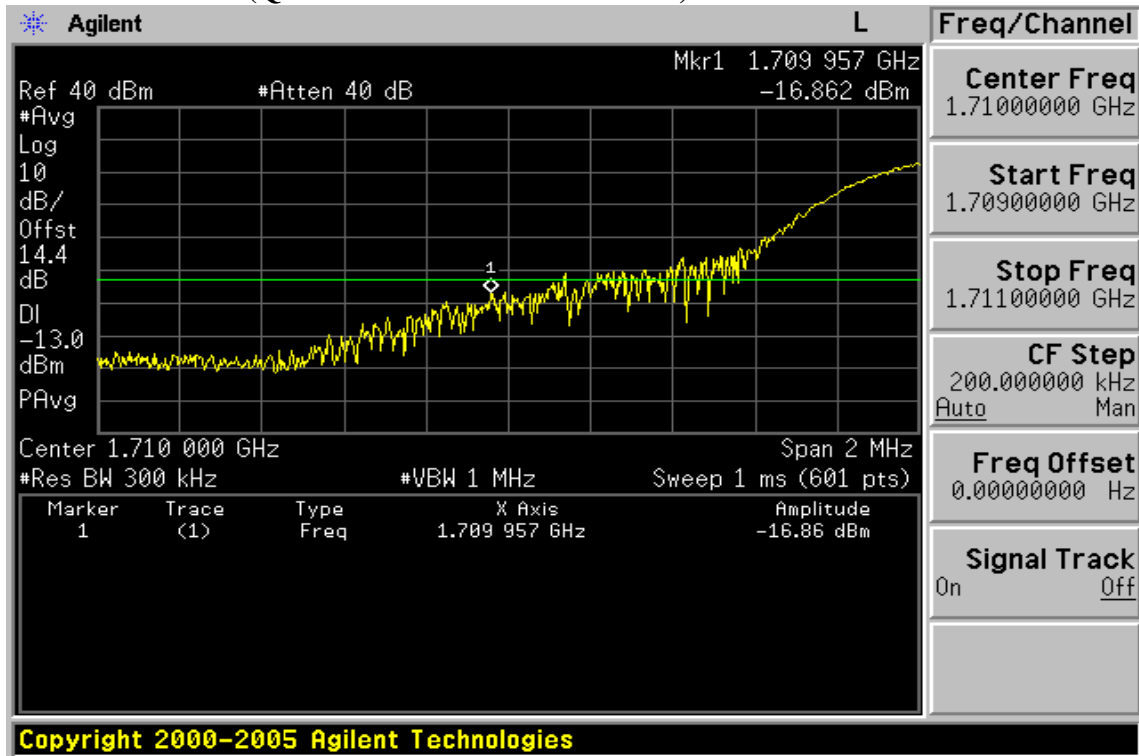
**Out of Band emission at antenna terminals –20MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 0) Channel Mid**



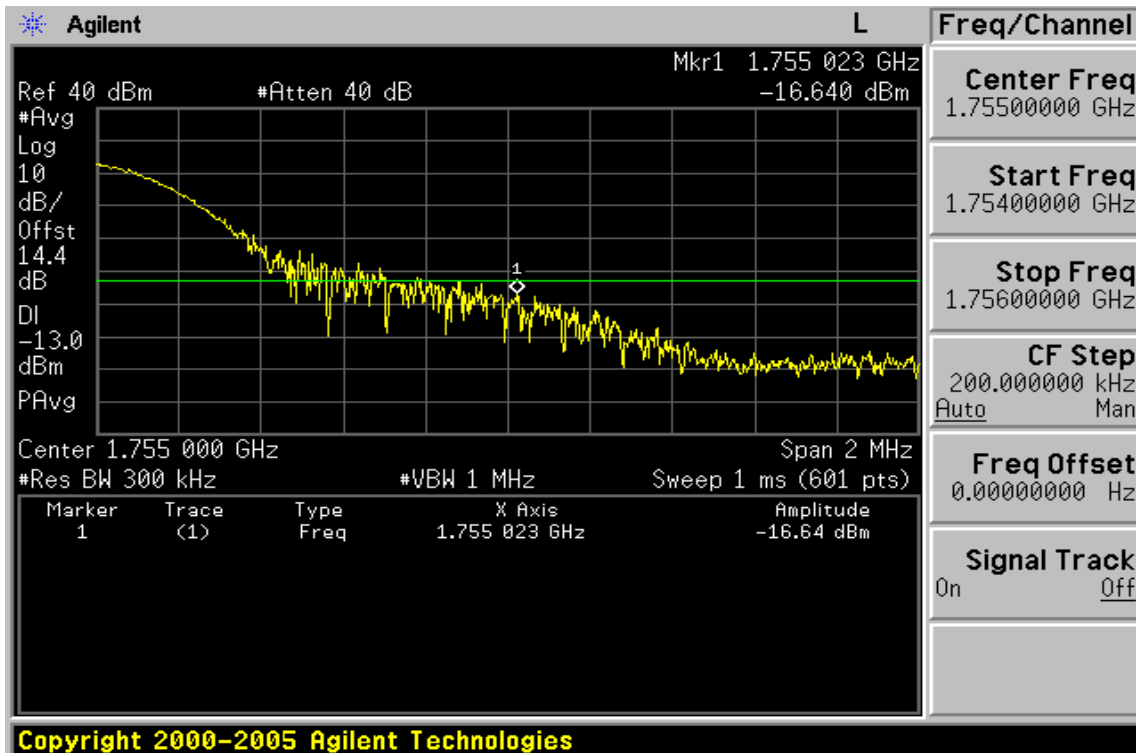
**Out of Band emission at antenna terminals–20MHz BW LTE-Band 4
(QPSK RB Number: 1 Offset: 0) Channel Highest**



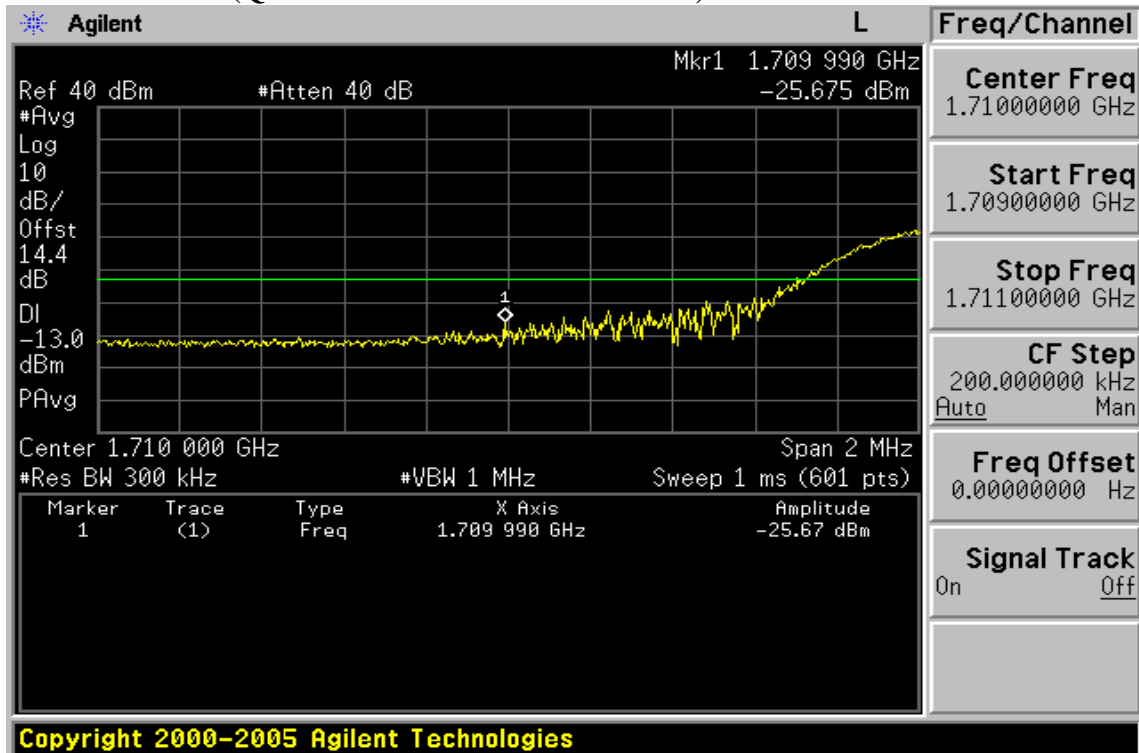
**Band edge emission at antenna terminals –20MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 0) Channel Lowest**



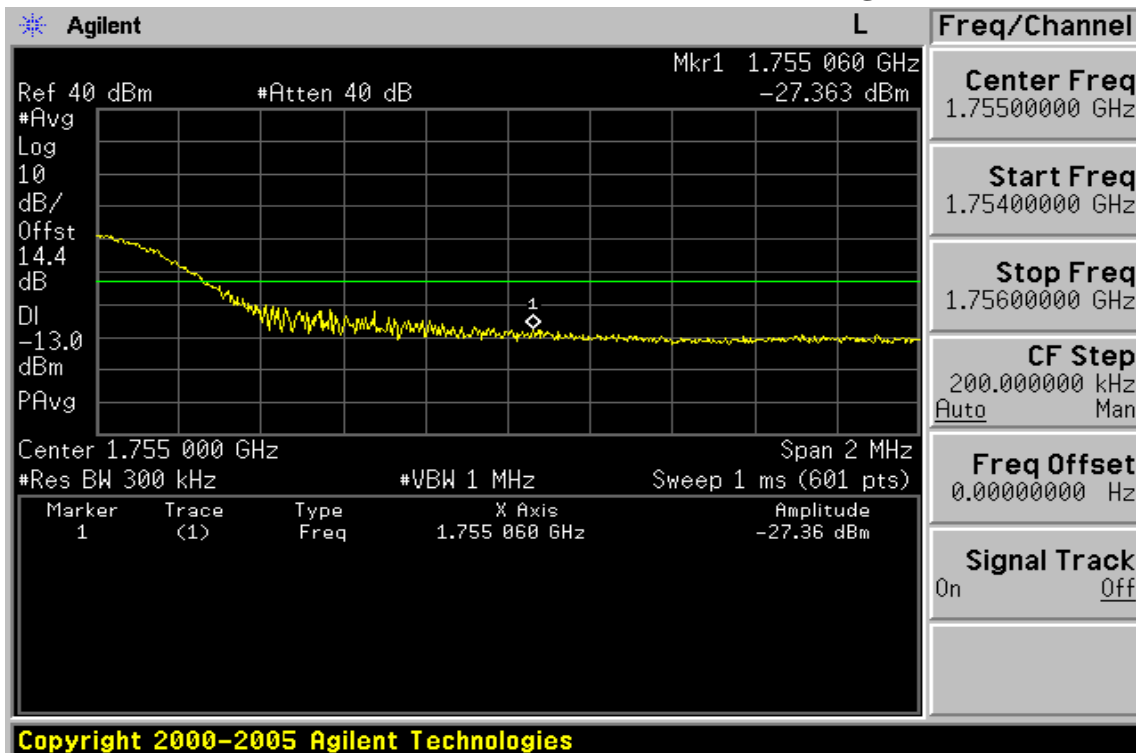
**Band edge emission at antenna terminals –20MHz BW LTE-Band 4
 (QPSK RB Number: 1 Offset: 99) Channel Highest**



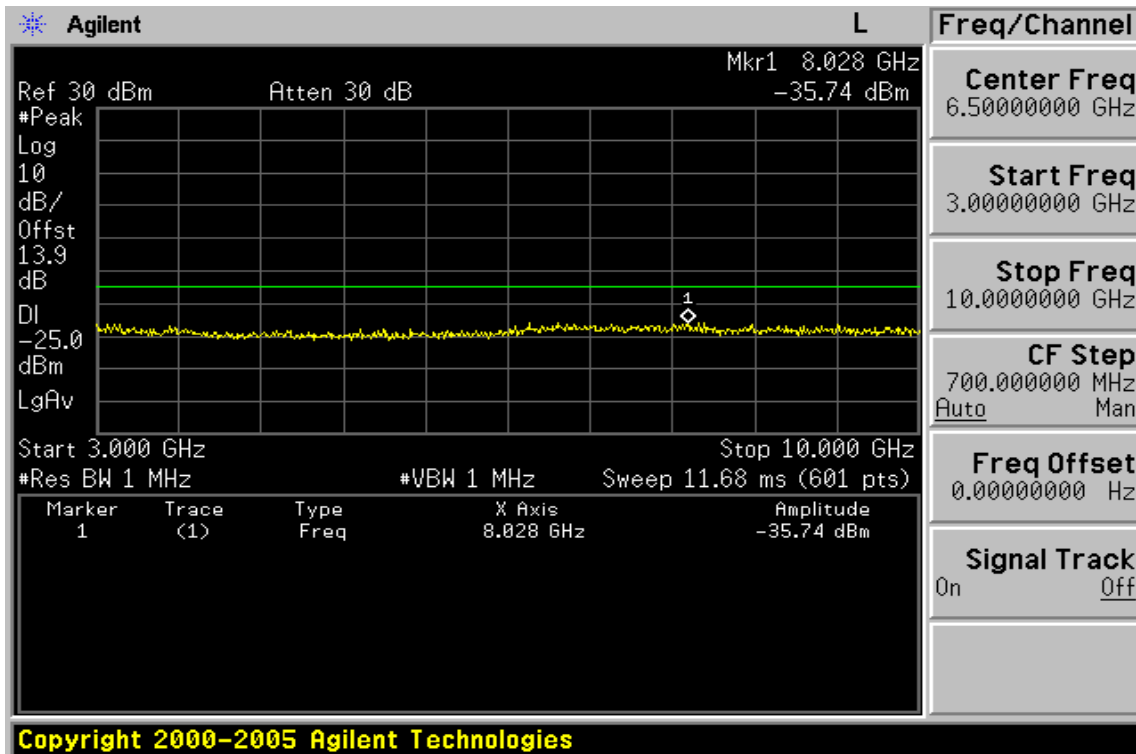
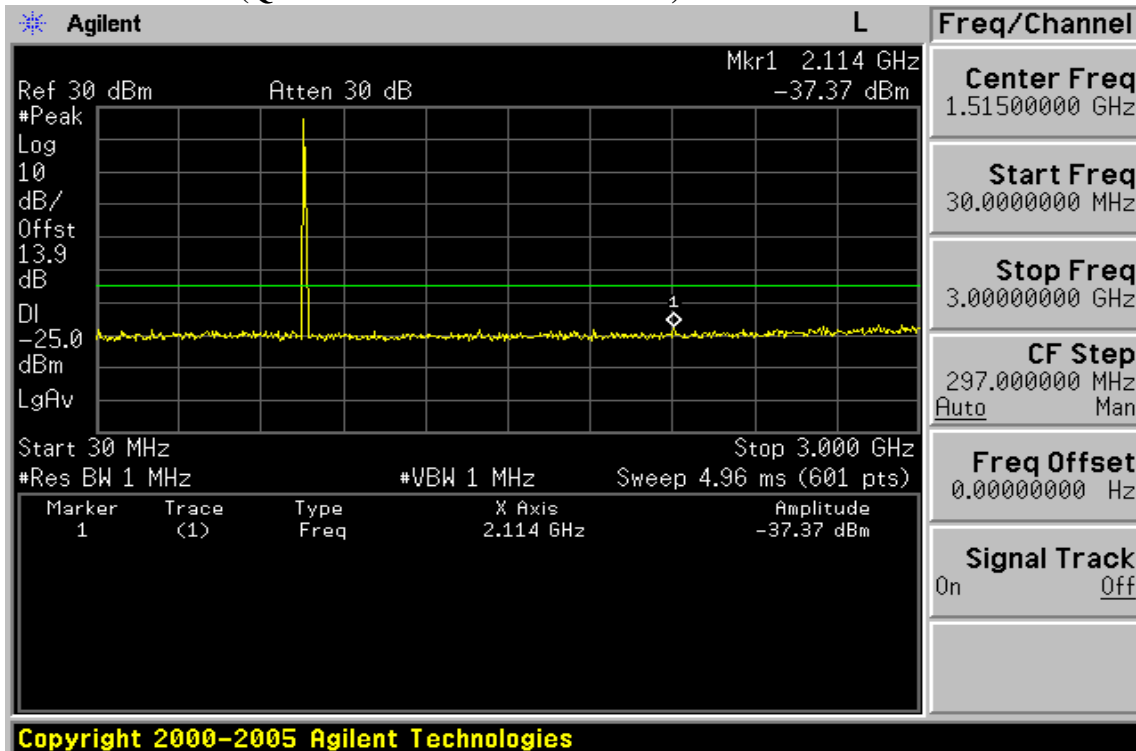
**Band edge emission at antenna terminals –20MHz BW LTE-Band 4
 (QPSK RB Number: 100 Offset: 0) Channel Lowest**



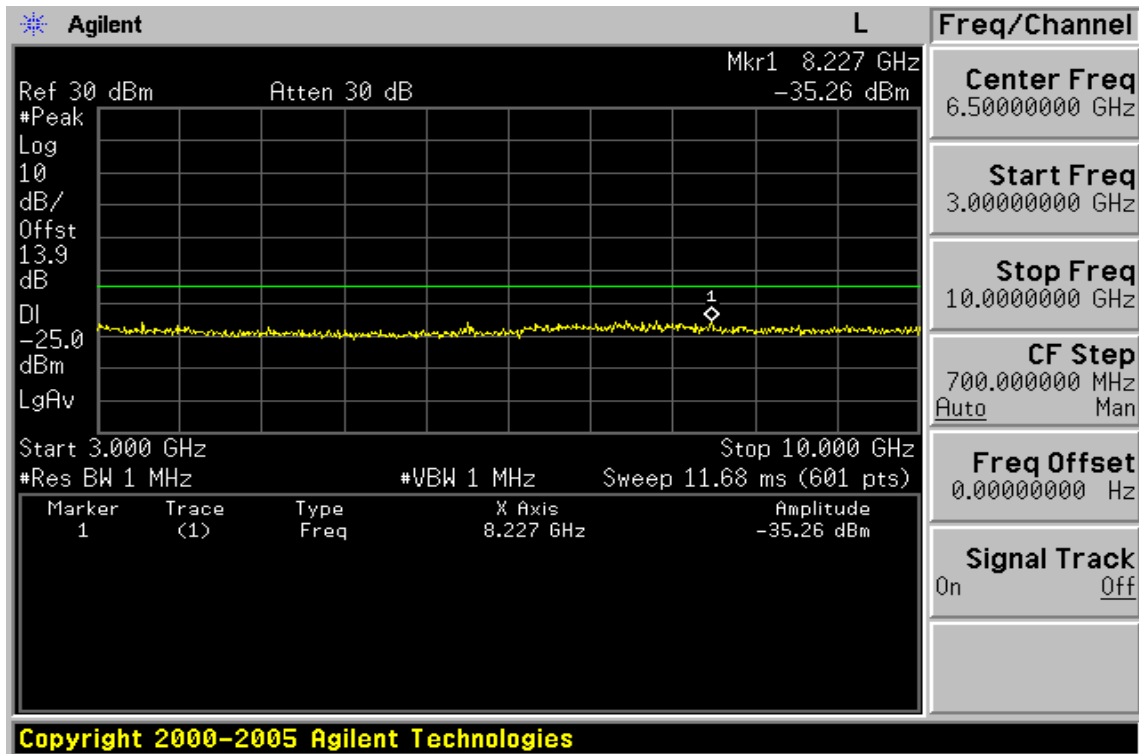
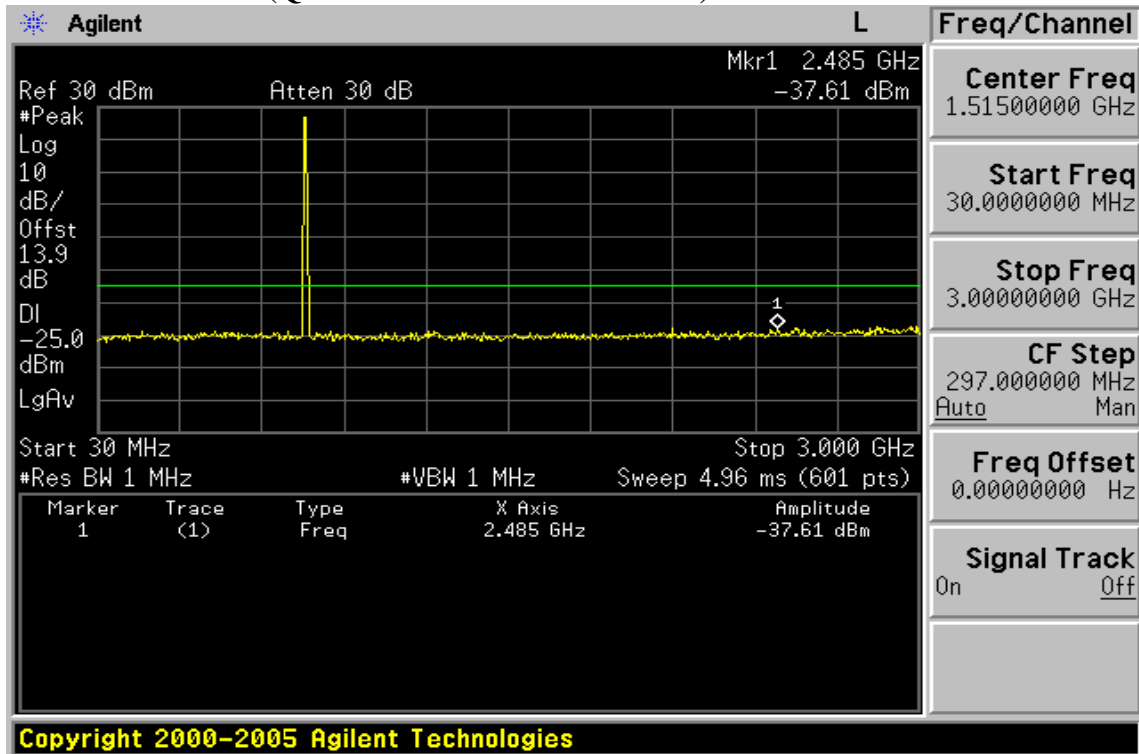
**Band edge emission at antenna terminals –20MHz BW LTE-Band 4
 (QPSK RB Number: 100 Offset: 0) Channel Highest**



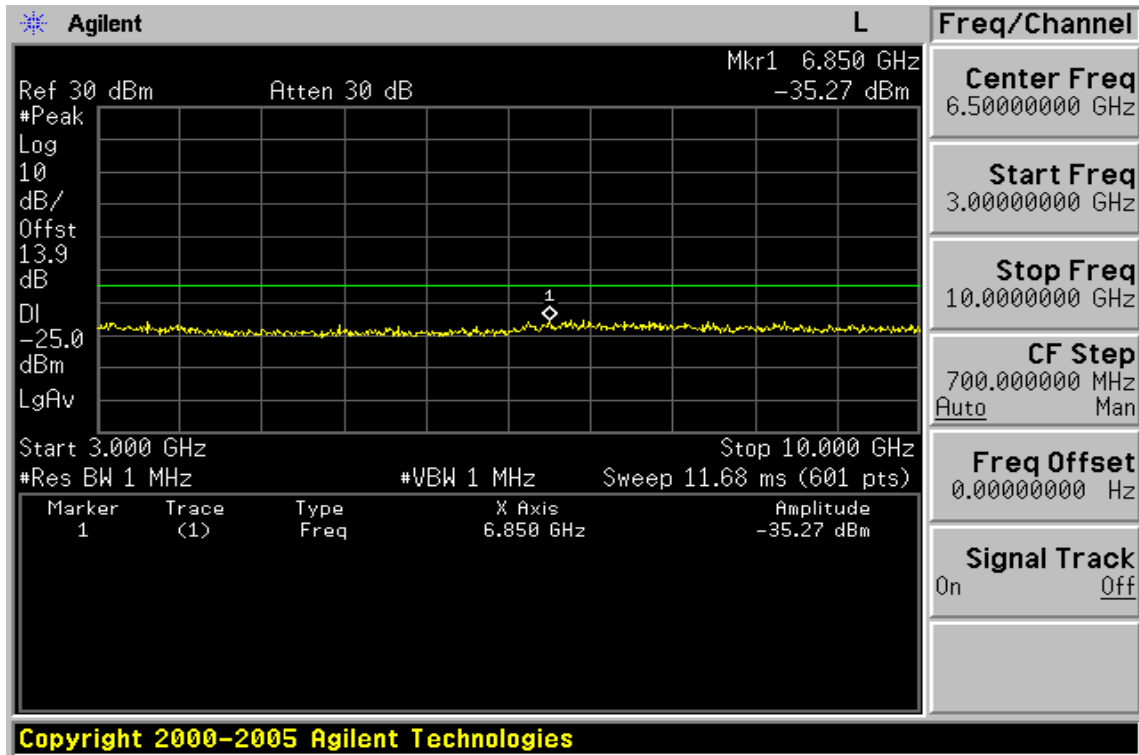
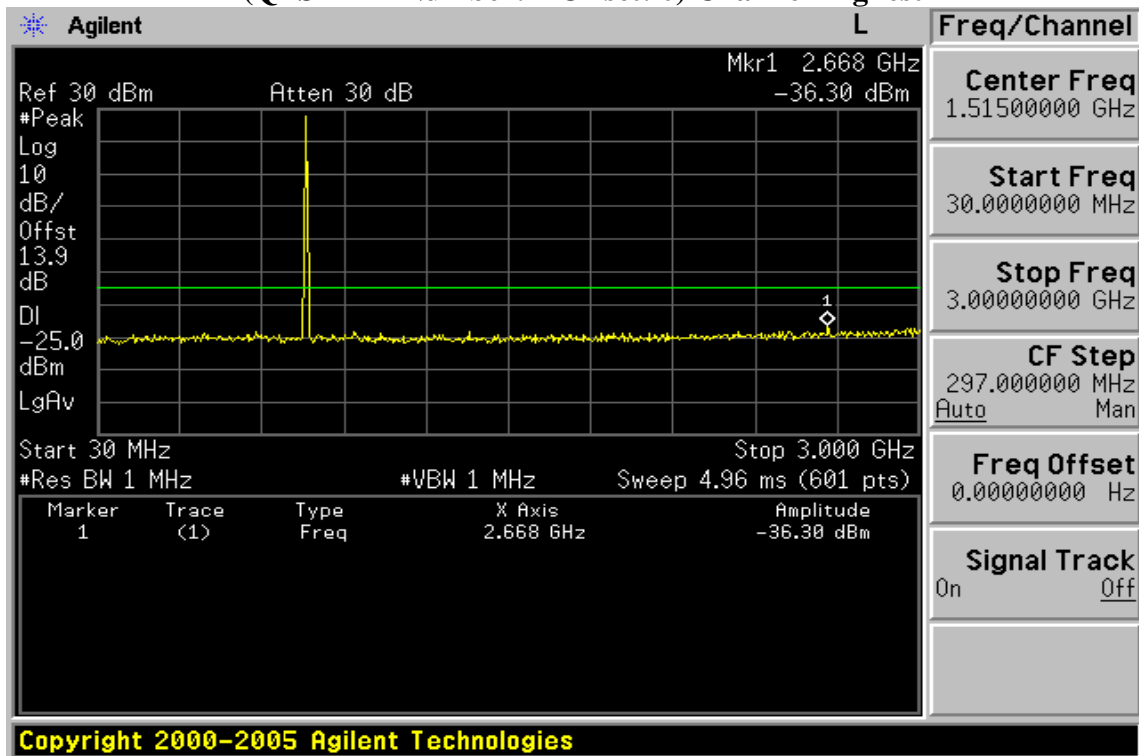
Out of Band emission at antenna terminals–5MHz BW LTE-Band 13
 (QPSK RB Number: 1 Offset: 0) Channel Lowest



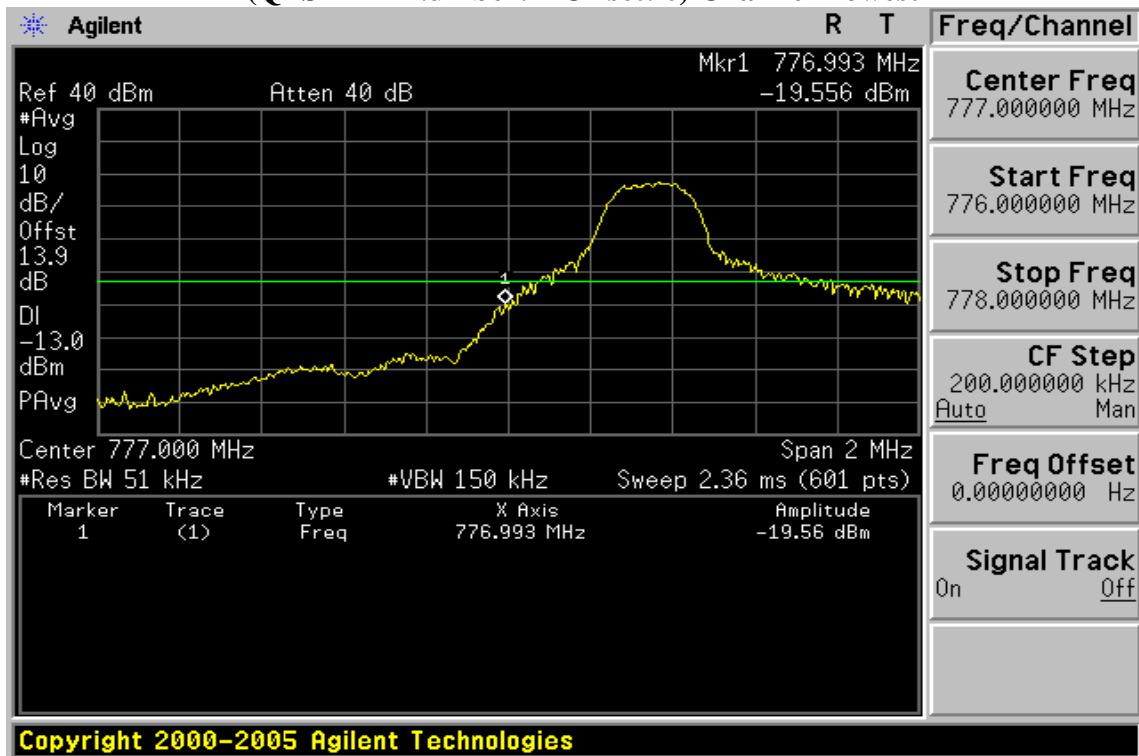
**Out of Band emission at antenna terminals –5MHz BW LTE-Band 13
 (QPSK RB Number: 1 Offset: 0) Channel Mid**



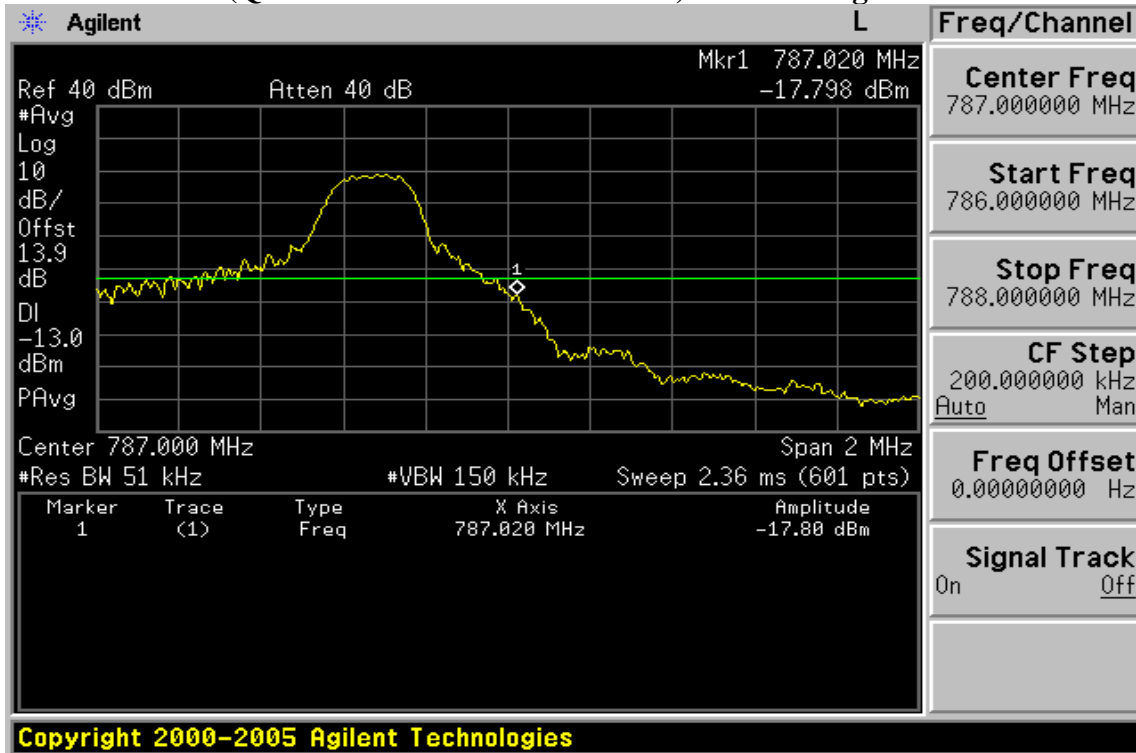
**Out of Band emission at antenna terminals–5MHz BW LTE-Band 13
 (QPSK RB Number: 1 Offset: 0) Channel Highest**



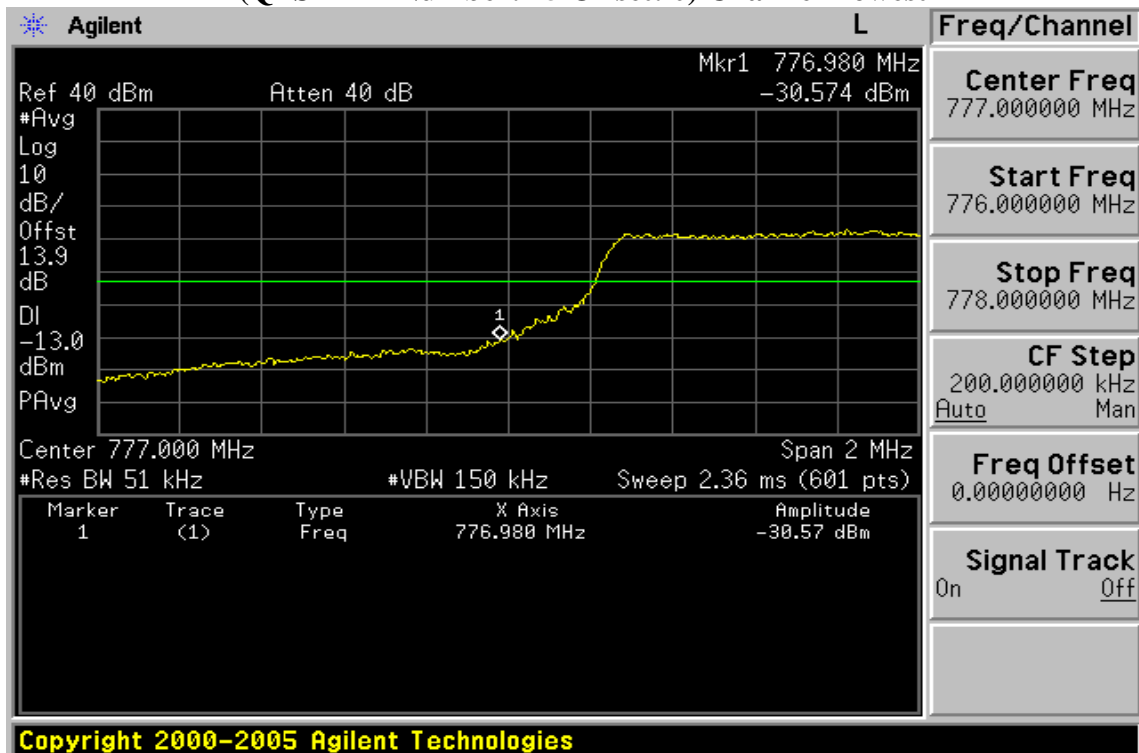
**Band edge emission at antenna terminals –5MHz BW LTE-Band 13
 (QPSK RB Number: 1 Offset: 0) Channel Lowest**



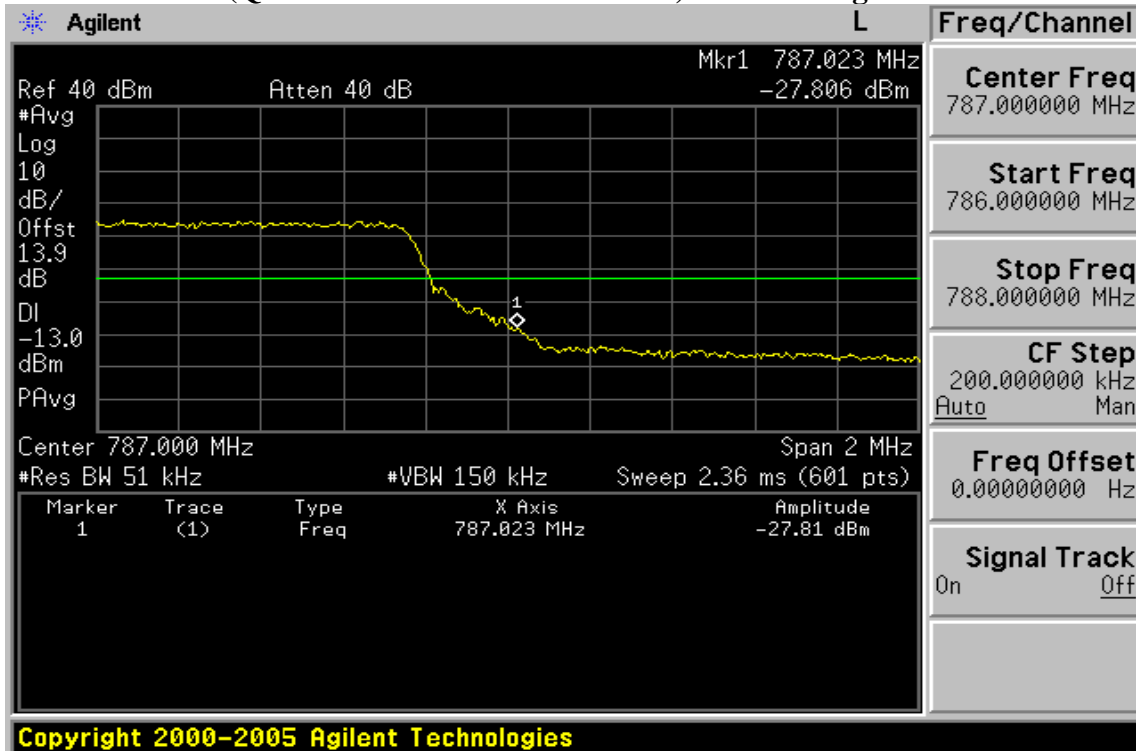
**Band edge emission at antenna terminals –5MHz BW LTE-Band 13
 (QPSK RB Number: 1 Offset: 24) Channel Highest**



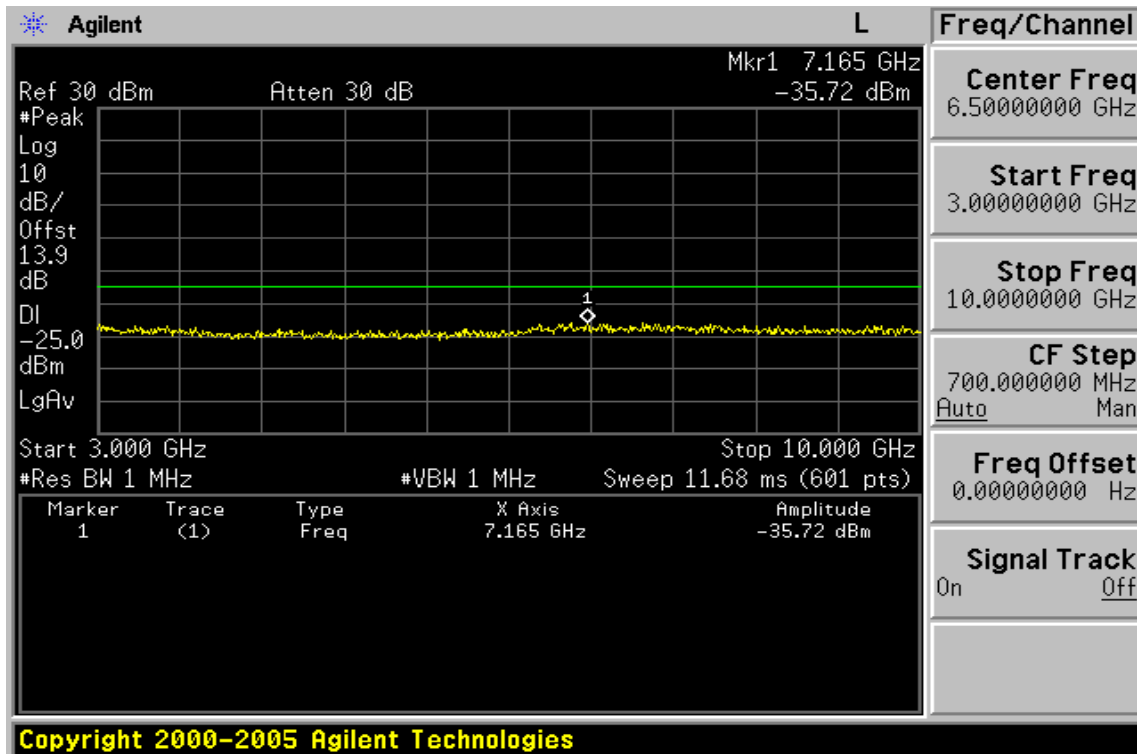
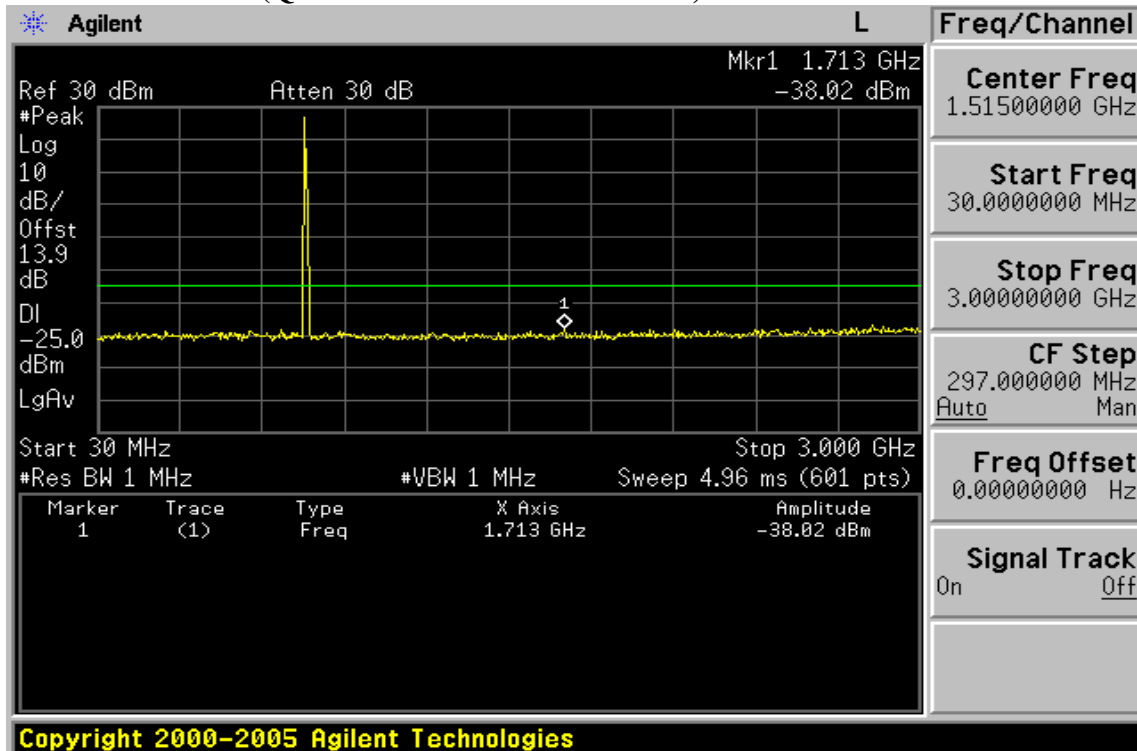
**Band edge emission at antenna terminals –5MHz BW LTE-Band 13
 (QPSK RB Number: 25 Offset: 0) Channel Lowest**



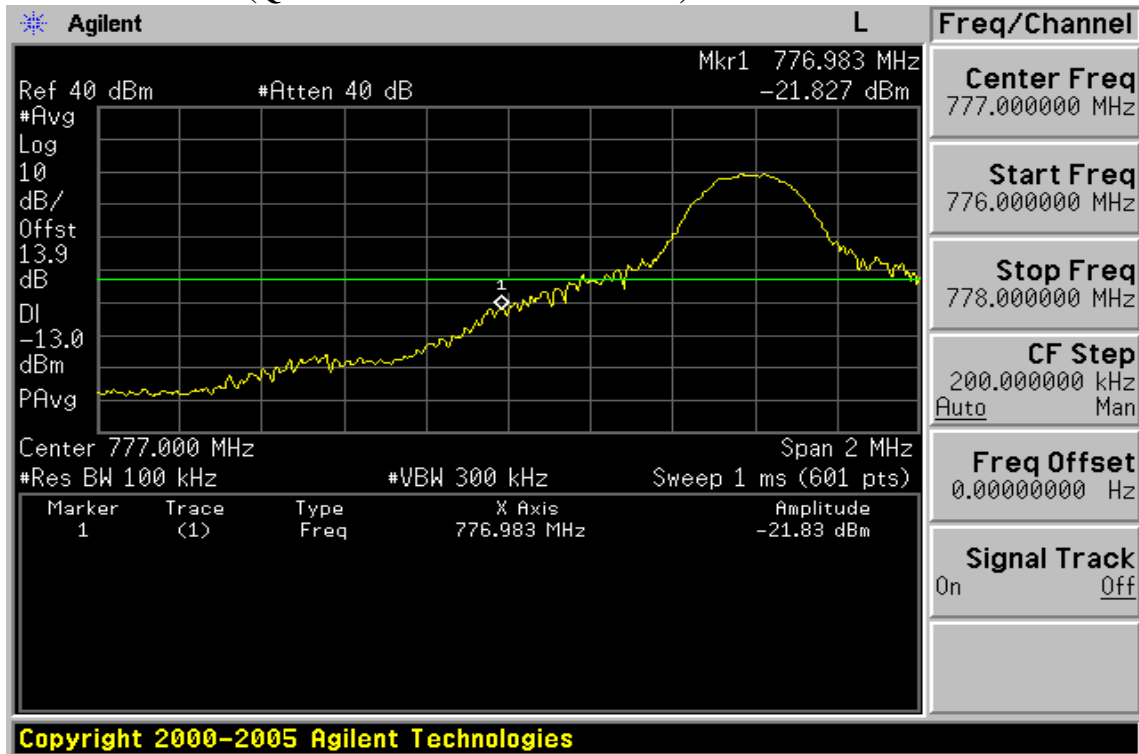
**Band edge emission at antenna terminals –5MHz BW LTE-Band 13
 (QPSK RB Number: 25 Offset: 0) Channel Highest**



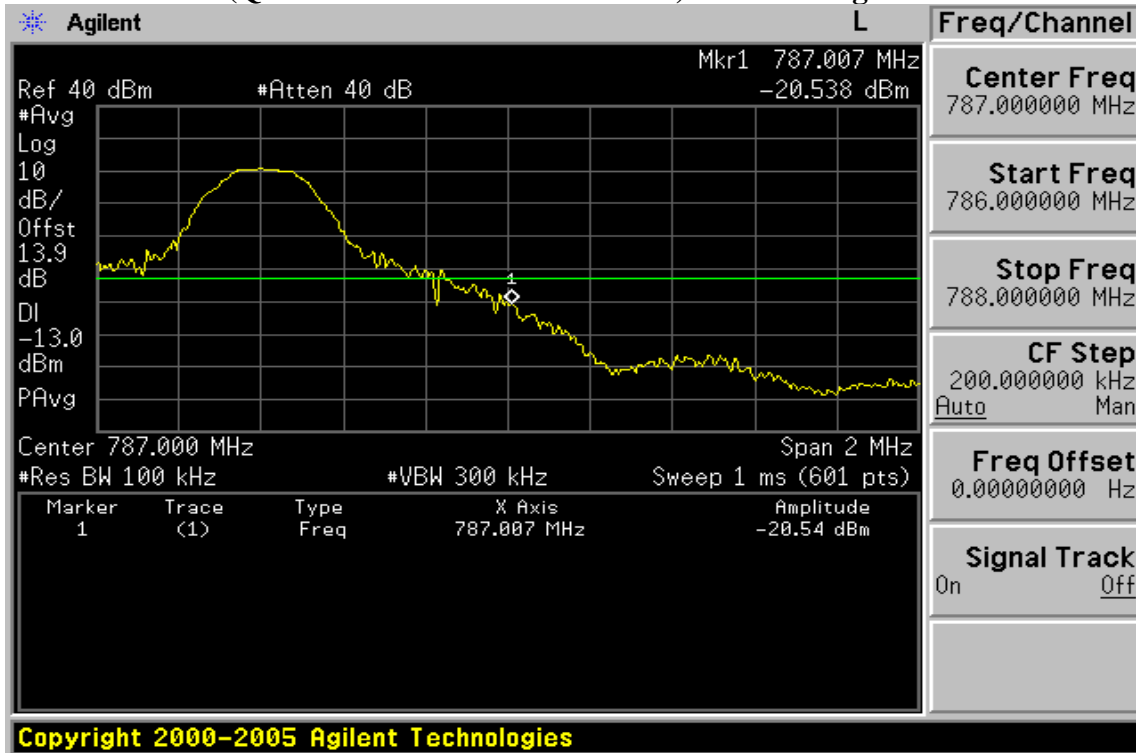
**Out of Band emission at antenna terminals–10MHz BW LTE-Band 13
 (QPSK RB Number: 1 Offset: 0) Channel Mid**



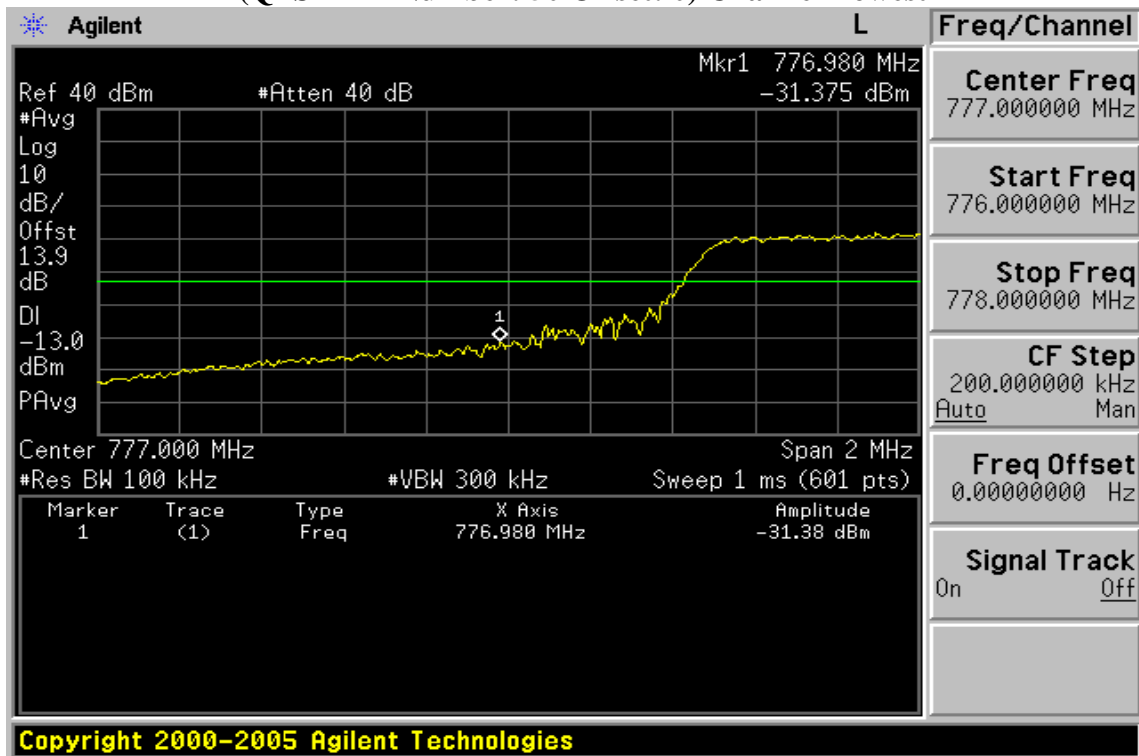
**Band edge emission at antenna terminals –10MHz BW LTE-Band 13
 (QPSK RB Number: 1 Offset: 0) Channel Lowest**



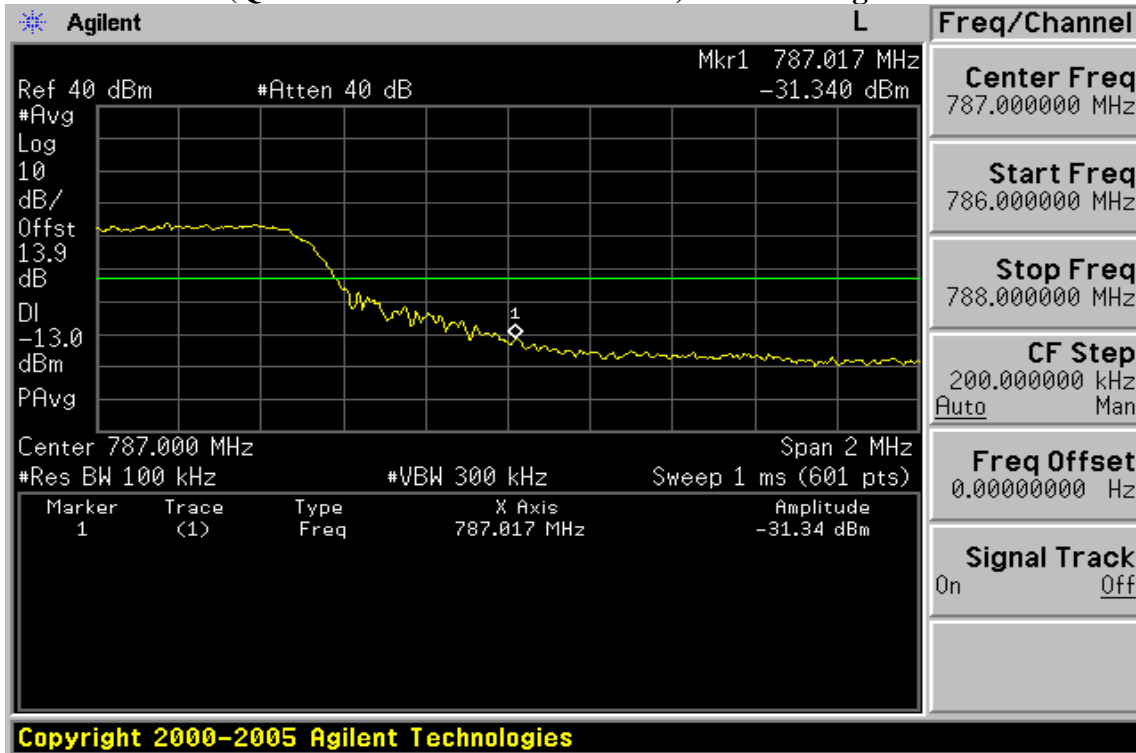
**Band edge emission at antenna terminals –10MHz BW LTE-Band 13
 (QPSK RB Number: 1 Offset: 49) Channel Highest**



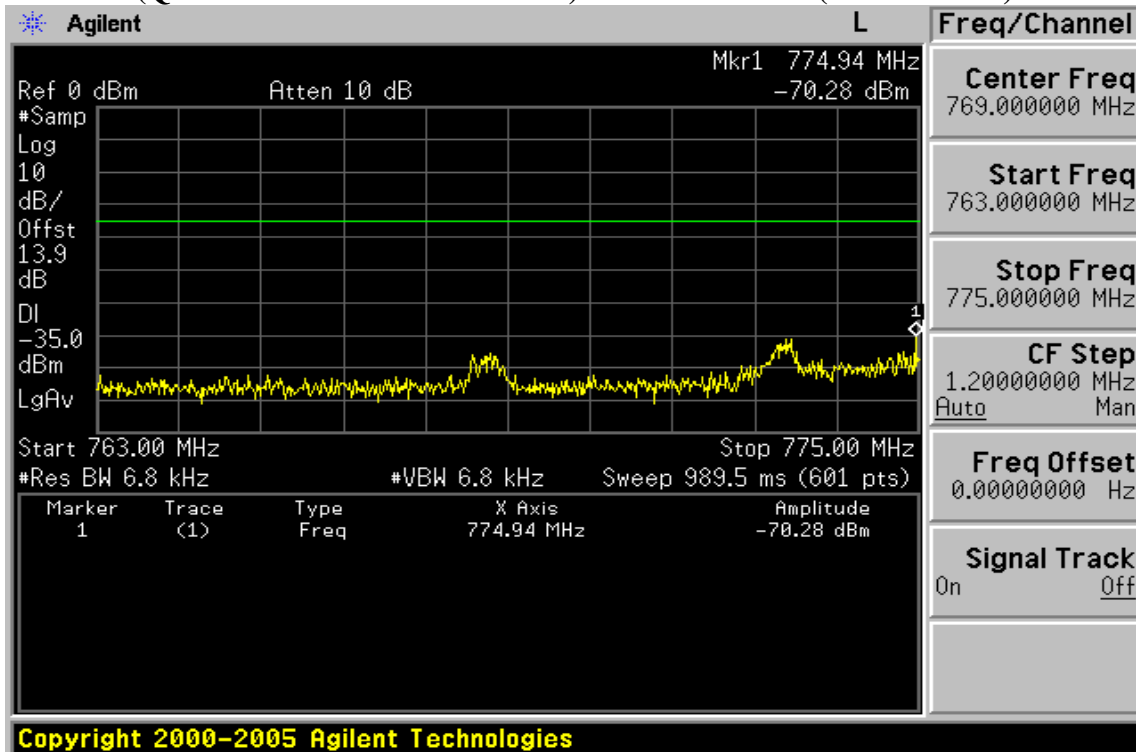
**Band edge emission at antenna terminals –10MHz BW LTE-Band 13
 (QPSK RB Number: 50 Offset: 0) Channel Lowest**



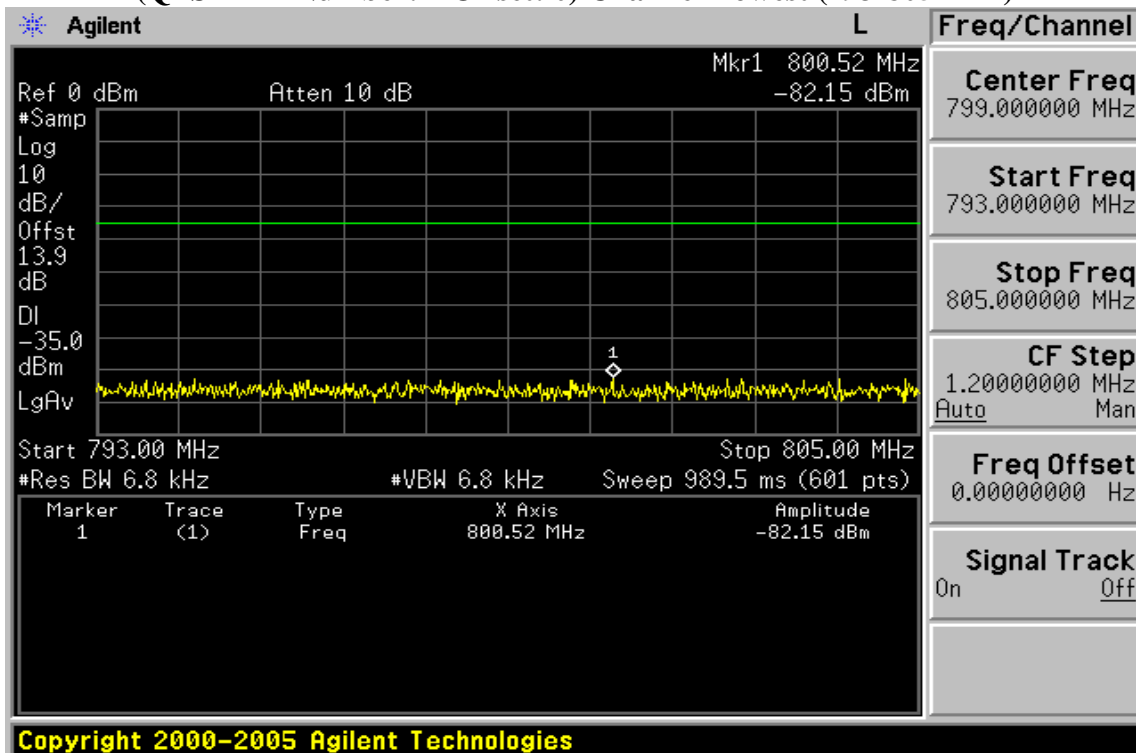
**Band edge emission at antenna terminals –10MHz BW LTE-Band 13
 (QPSK RB Number: 50 Offset: 0) Channel Highest**



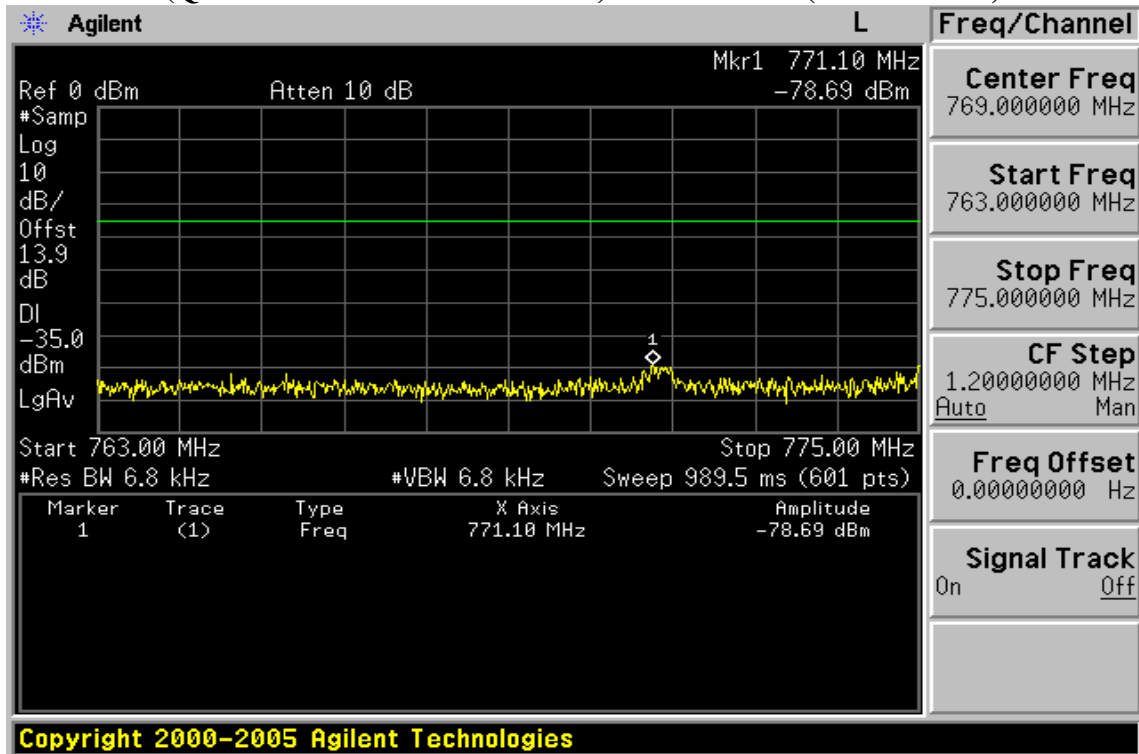
**Out of Band emission at antenna terminals–5MHz BW LTE-Band 13
 (QPSK RB Number: 1 Offset: 0) Channel Lowest (763-775MHz)**



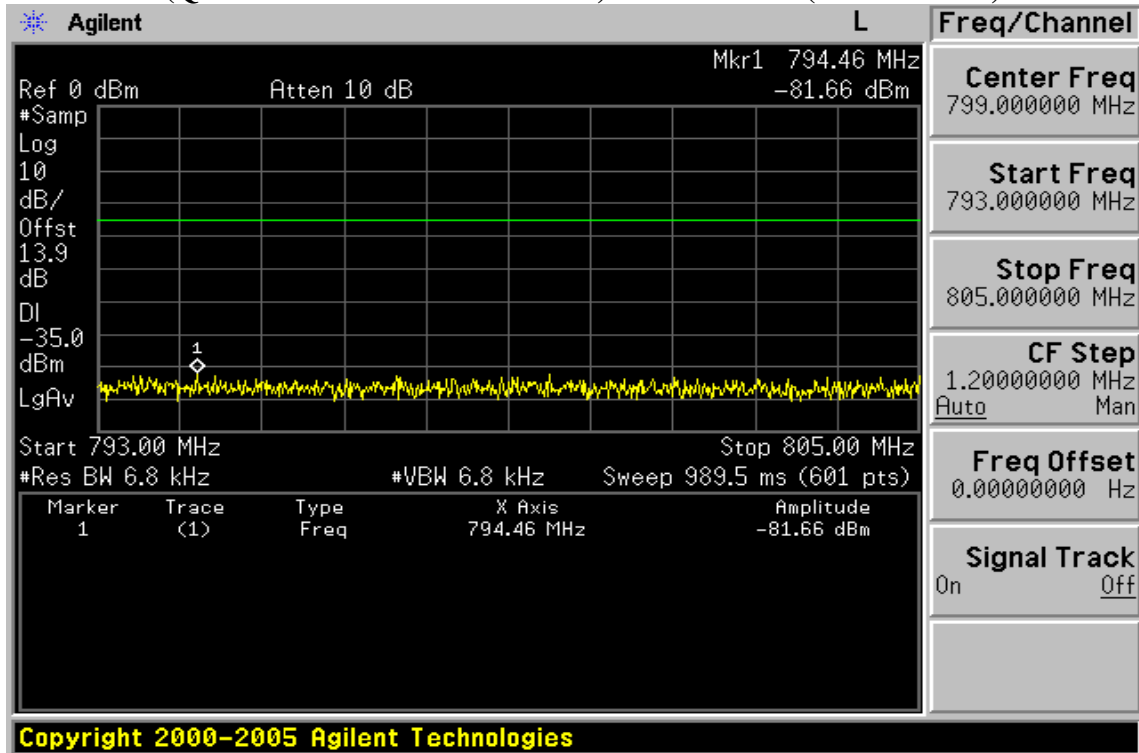
**Out of Band emission at antenna terminals–5MHz BW LTE-Band 13
 (QPSK RB Number: 1 Offset: 0) Channel Lowest (793-805MHz)**



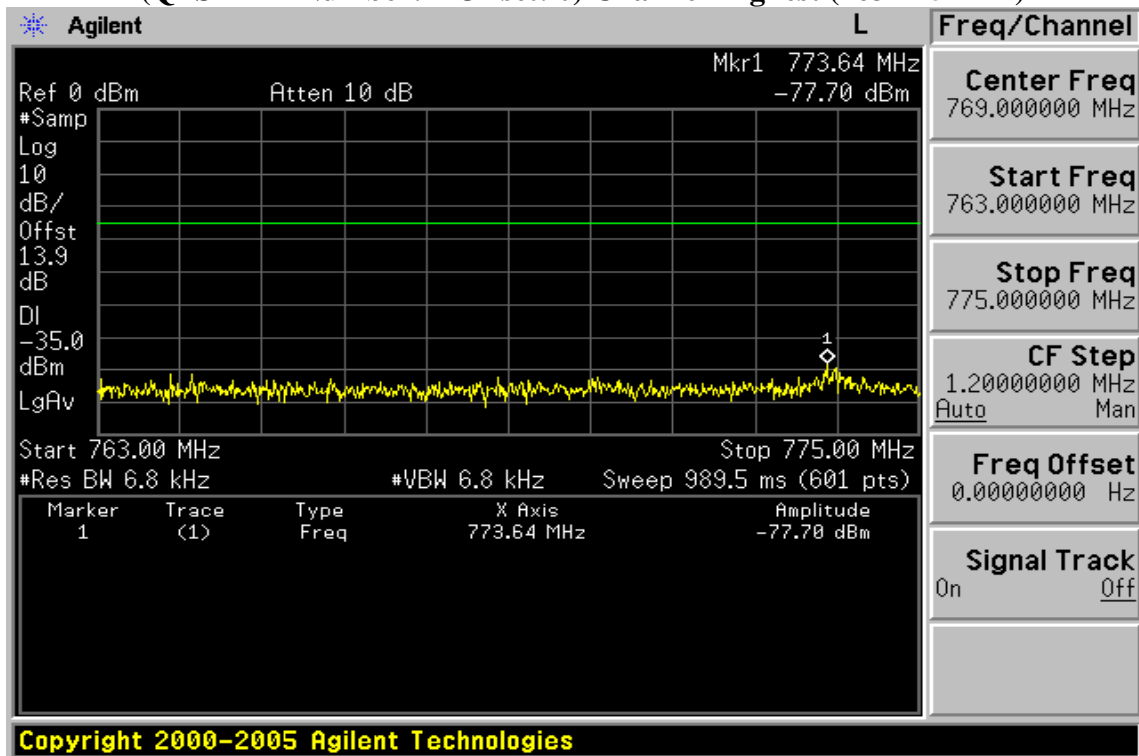
**Out of Band emission at antenna terminals –5MHz BW LTE-Band 13
(QPSK RB Number: 1 Offset: 0) Channel Mid (763-775MHz)**



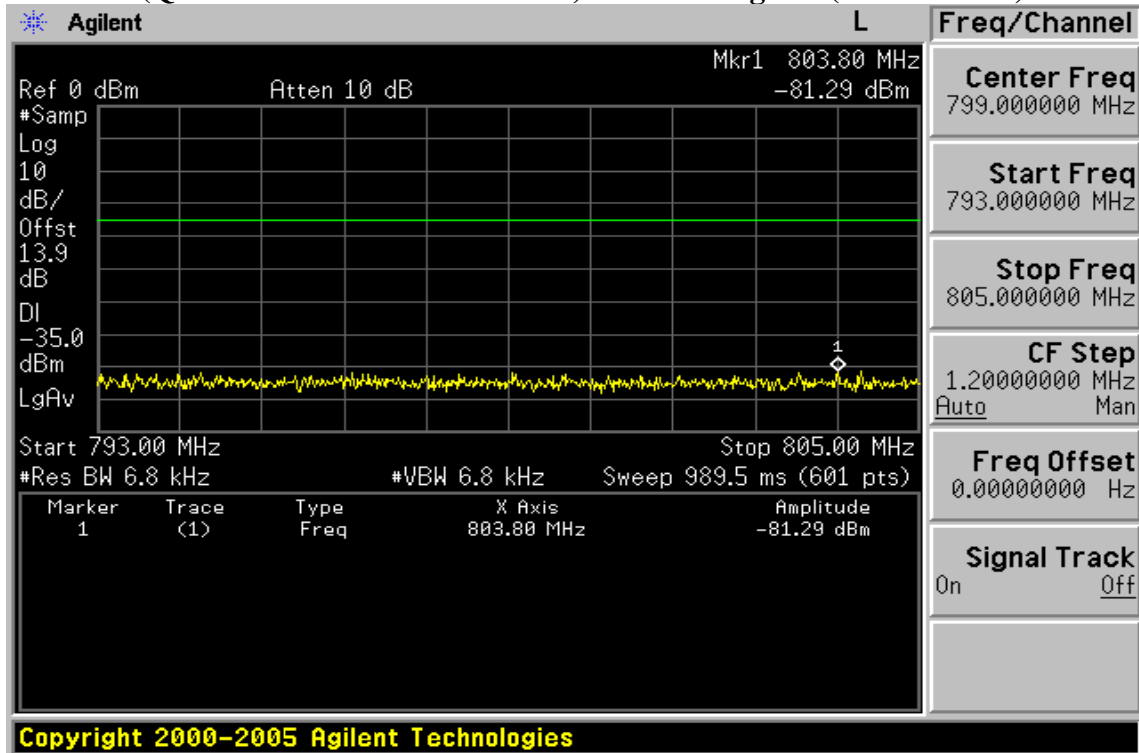
**Out of Band emission at antenna terminals –5MHz BW LTE-Band 13
(QPSK RB Number: 1 Offset: 0) Channel Mid (793-805MHz)**



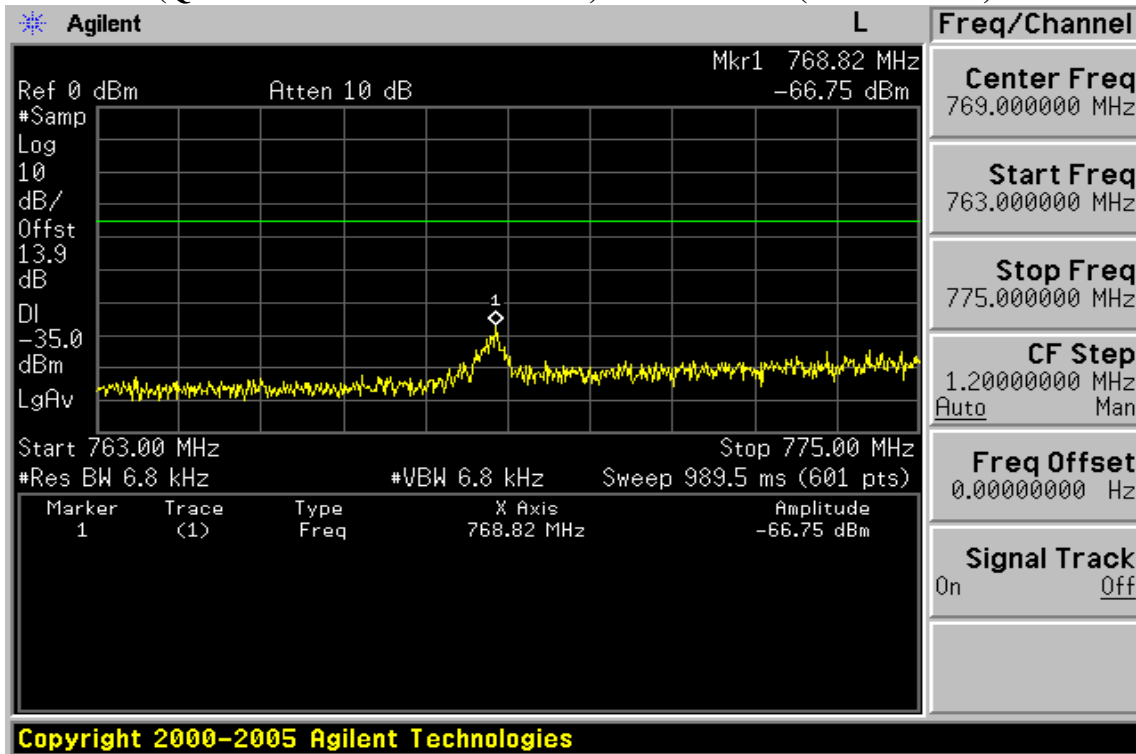
**Out of Band emission at antenna terminals–5MHz BW LTE-Band 13
 (QPSK RB Number: 1 Offset: 0) Channel Highest (763-775MHz)**



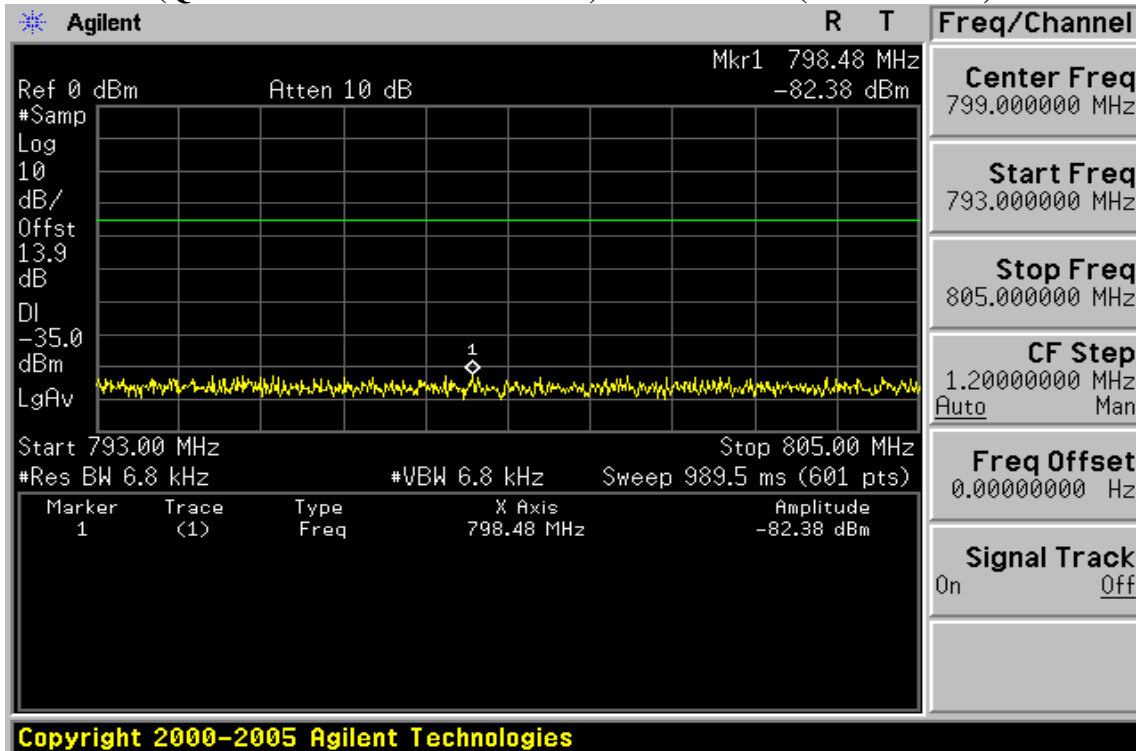
**Out of Band emission at antenna terminals–5MHz BW LTE-Band 13
 (QPSK RB Number: 1 Offset: 0) Channel Highest (793-805MHz)**



**Out of Band emission at antenna terminals–10MHz BW LTE-Band 13
 (QPSK RB Number: 1 Offset: 0) Channel Mid (763-775MHz)**



**Out of Band emission at antenna terminals–10MHz BW LTE-Band 13
 (QPSK RB Number: 1 Offset: 0) Channel Mid (793-805MHz)**



10. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

10.1. Standard Applicable

According to FCC §2.1053,

FCC §27.53(h) , §27.53(c)(2) the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than $43 + 10 \log$ (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm). §27.53 (m) (4) shall not be less than $55+10\log$ (mean output power in watt) dBc below the mean power output outside a license's frequency block (-25dBm).

RSS-130 issue 1 Oct. 2013

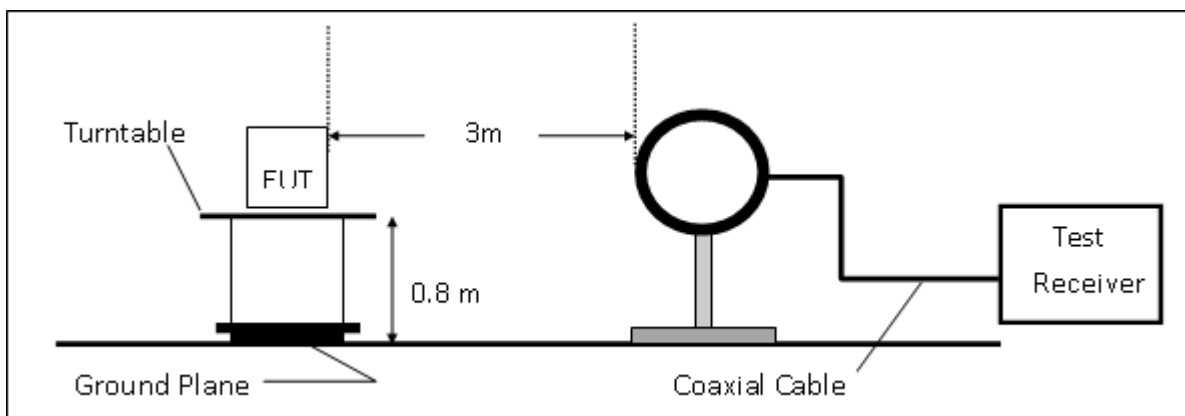
4.6.1 The power of any unwanted emissions in any 100 kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$ (watts) (-13dBm), dB. However, in the 100 kHz band immediately outside the equipment's operating frequency range, a resolution bandwidth of 30 kHz may be employed.

RSS-139 issue 2 Oct. 2009

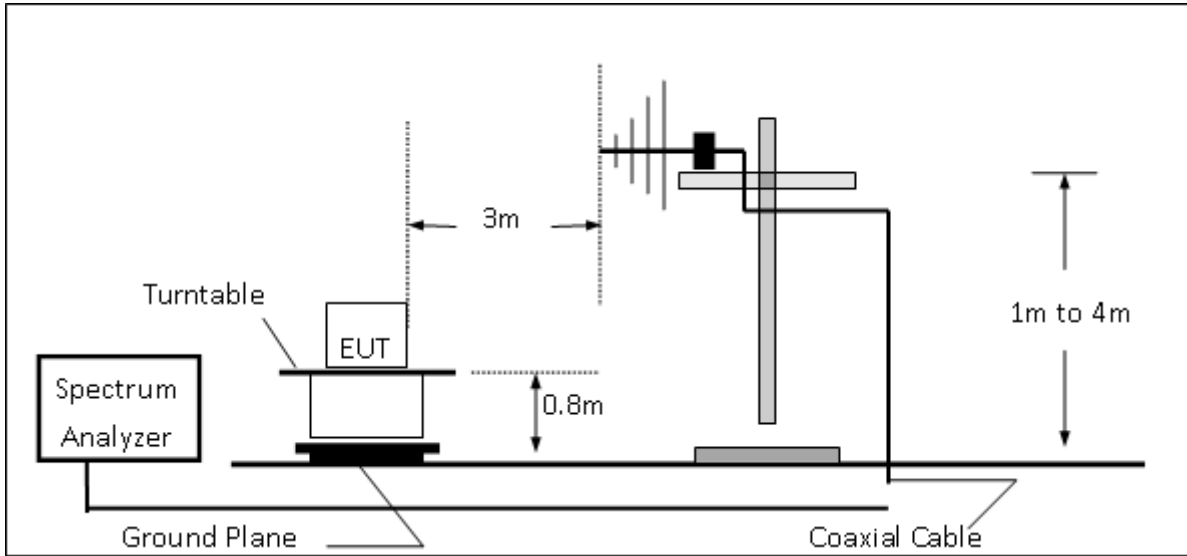
The average equivalent isotropically radiated power (e.i.r.p.) for fixed, mobile and portable transmitters in the 1710-1755 MHz shall not exceed 1 watt.

10.2. EUT Setup

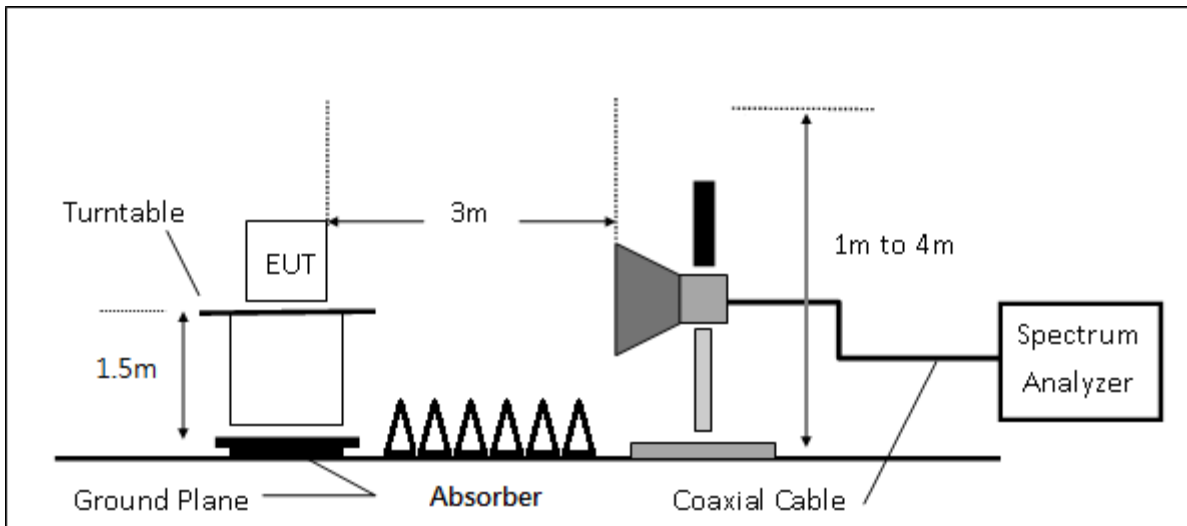
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



(C) Radiated Emission Test Set-UP Frequency Over 1 GHz



10.3. Measurement Procedure:

The EUT was placed on a non-conductive; the measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequencies (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

ERP= SG Level (dBm) + Antenna Gain (dBd) + Cable Loss (dB)

EIRP = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

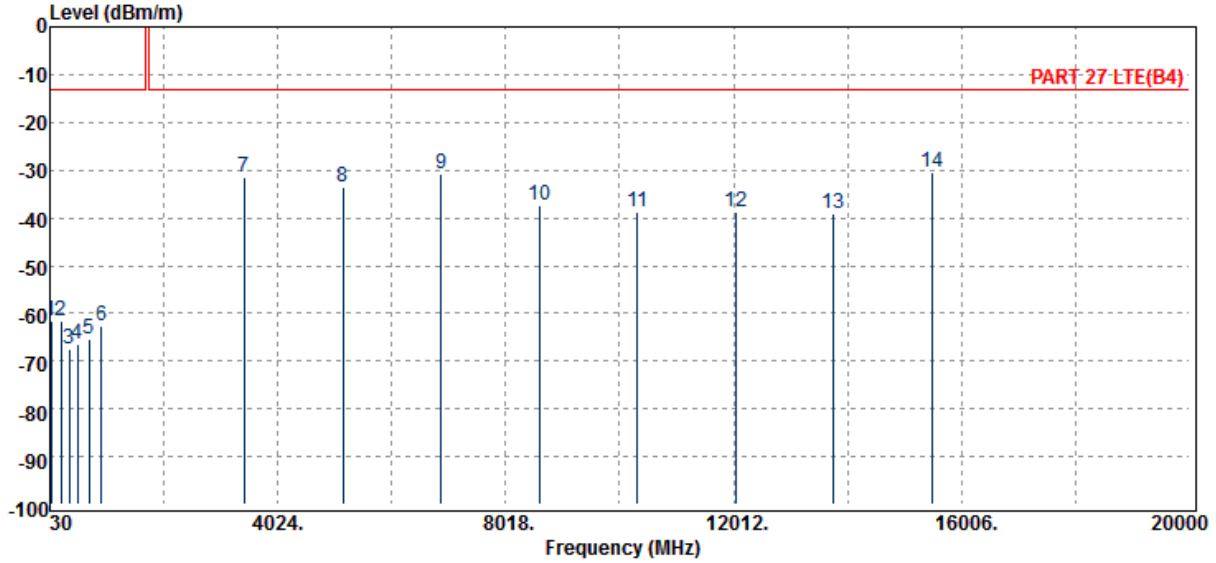
10.4. Measurement Equipment Used:

SGS 966 Chamber No.C					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	12/22/2014	12/21/2015
Spectrum Analyzer	R&S	FSV-30	101398	10/07/2014	10/06/2015
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/23/2014	12/22/2015
Bilog Antenna	SCHWAZBECK	VULB9160	3158	10/31/2014	10/30/2015
Horn antenna	ETS.LINDGREN	3117	123995	05/19/2014	05/18/2015
Horn antenna	ETS.LINDGREN	3117	123991	12/19/2014	12/18/2015
Horn Antenna	Schwarzbeck	BBHA9170	184	12/25/2014	12/24/2015
Horn Antenna	Schwarzbeck	BBHA9170	185	07/29/2014	07/28/2015
Network Analyze	Anritsu	MS4644A	1216312	05/24/2014	05/23/2015
Signal Generator	Agilent	E4438C	MY45093613	08/06/2014	08/05/2015
Pre-Amplifier	Agilent	8447D	1937A02834	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	004	01/02/2015	01/01/2016
Radio Communication Analyzer	R&S	CMU200	102189	02/11/2015	02/10/2016
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	10/08/2014	10/09/2015
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	966_Tx	10m	01/02/2015	01/01/2016
Low Loss Cable	HUBER+SUHNER	966_Rx	3m	01/02/2015	01/01/2016
Filter 800-1000	Micro-Tronics	EWT	M2	01/02/2015	01/01/2016
Filter 1800-2000	Micro-Tronics	EWT	M2	01/02/2015	01/01/2016
Filter 1700-1800	Micro-Tronics	BRC15751	001	01/02/2015	01/01/2016
1GHz High Pass Filter	Micro-Tronics	HPM50108	32	01/02/2015	01/01/2016
2GHz High Pass Filter	Micro-Tronics	HPM50110	36	01/02/2015	01/01/2016
3m Site NSA	SGS	966 chamber	N/A	07/15/2014	07/14/2015

10.5. Measurement Result:

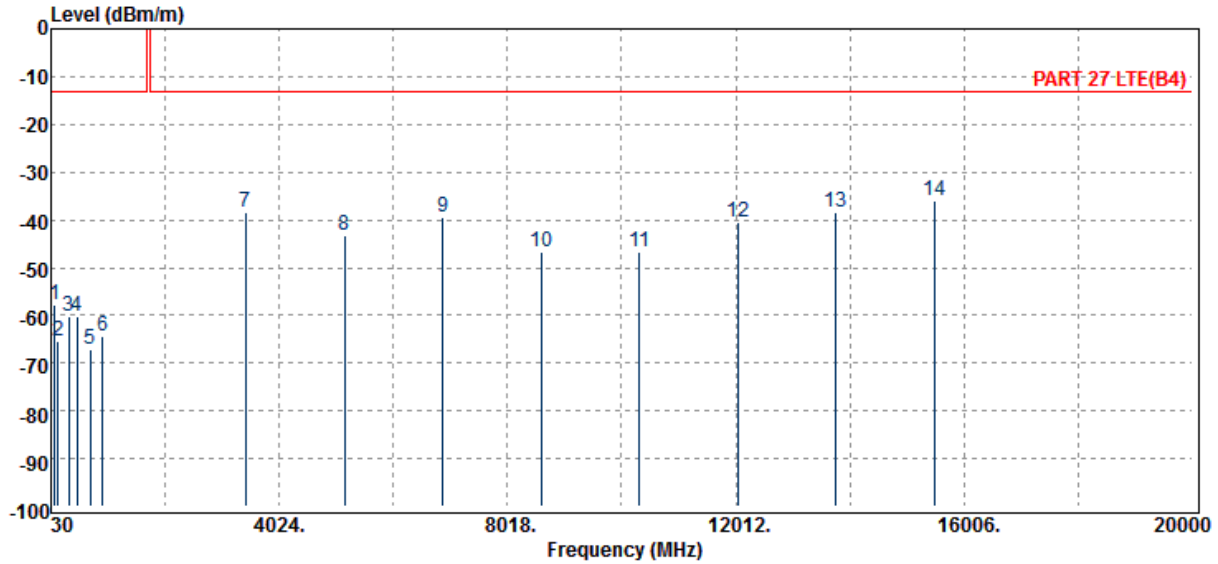
Radiated Spurious Emission Measurement Result: 20MHz BW LTE-Band 4 (The Worst Case)

ARFCN :16QAM BW 20 RB 1 0 Test Date :2015-04-18
 Operation Band :LTE B4 Temp./Humi. :22 deg_C / 51 RH
 Fundamental Frequency :1720.0 MHz Engineer :Tin
 Operation Mode :TX LOW
 EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL



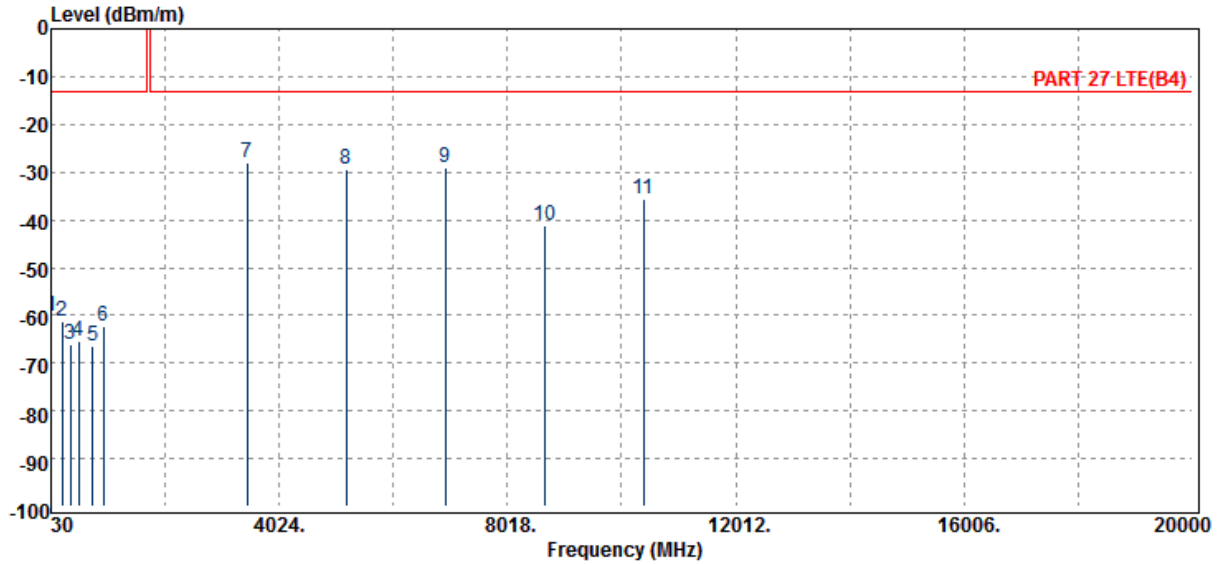
Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
48.43	S	-61.50	-51.03	-9.57	-0.90	-13.00	-48.50
228.85	S	-61.54	-65.43	5.47	-1.58	-13.00	-48.54
373.38	S	-67.39	-71.27	5.84	-1.96	-13.00	-54.39
516.94	S	-66.57	-70.03	5.85	-2.40	-13.00	-53.57
721.61	S	-65.52	-68.38	5.49	-2.63	-13.00	-52.52
937.92	S	-62.66	-64.87	5.39	-3.19	-13.00	-49.66
3440.00	H	-31.40	-32.99	8.13	-6.54	-13.00	-18.40
5160.00	H	-33.56	-34.98	9.90	-8.49	-13.00	-20.56
6880.00	H	-30.85	-32.60	11.01	-9.26	-13.00	-17.85
8600.00	H	-37.36	-39.60	12.72	-10.48	-13.00	-24.36
10320.00	H	-38.62	-39.56	12.66	-11.72	-13.00	-25.62
12040.00	H	-38.85	-38.85	12.82	-12.82	-13.00	-25.85
13760.00	H	-39.27	-39.12	14.06	-14.21	-13.00	-26.27
15480.00	H	-30.47	-29.10	13.50	-14.86	-13.00	-17.47

ARFCN	:16QAM BW 20 RB 1 0	Test Date	:2015-04-18
Operation Band	:LTE B4	Temp./Humi.	:22 deg_C / 51 RH
Fundamental Frequency	:1720.0 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



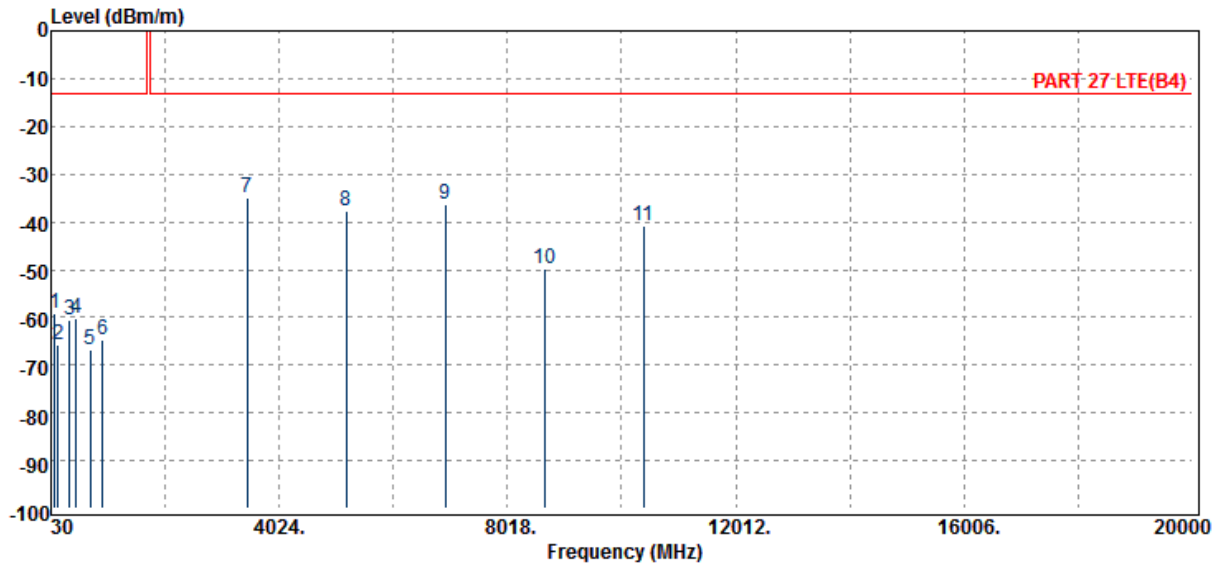
Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
95.96	S	-57.80	-57.75	1.05	-1.11	-13.00	-44.80
152.22	S	-65.41	-64.21	0.20	-1.40	-13.00	-52.41
347.19	S	-60.36	-64.30	5.90	-1.96	-13.00	-47.36
478.14	S	-60.10	-63.66	5.73	-2.17	-13.00	-47.10
723.55	S	-67.25	-70.10	5.48	-2.63	-13.00	-54.25
934.04	S	-64.50	-66.71	5.39	-3.18	-13.00	-51.50
3440.00	H	-38.25	-39.84	8.13	-6.54	-13.00	-25.25
5160.00	H	-43.24	-44.65	9.90	-8.49	-13.00	-30.24
6880.00	H	-39.36	-41.11	11.01	-9.26	-13.00	-26.36
8600.00	H	-46.65	-48.90	12.72	-10.48	-13.00	-33.65
10320.00	H	-46.57	-47.51	12.66	-11.72	-13.00	-33.57
12040.00	H	-40.36	-40.35	12.82	-12.82	-13.00	-27.36
13760.00	H	-38.45	-38.30	14.06	-14.21	-13.00	-25.45
15480.00	H	-36.07	-34.70	13.50	-14.86	-13.00	-23.07

ARFCN	:16QAM BW 20 RB 1 0	Test Date	:2015-04-18
Operation Band	:LTE B4	Temp./Humi.	:22 deg_C / 51 RH
Fundamental Frequency	:1732.5 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



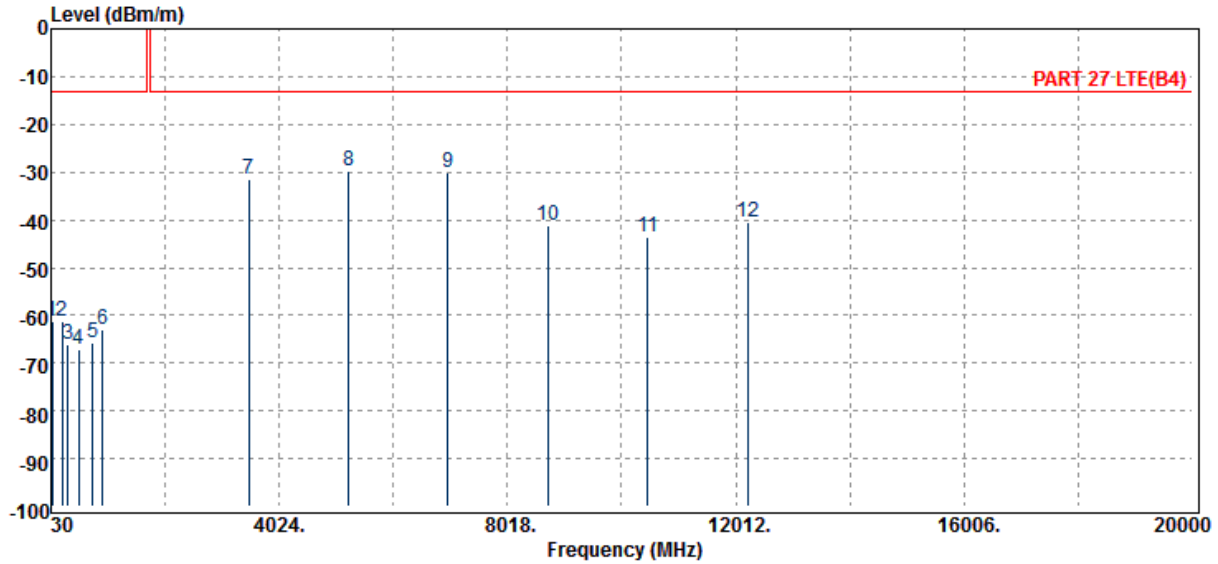
Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
31.94	S	-60.18	-47.20	-12.22	-0.75	-13.00	-47.18
228.85	S	-61.35	-65.24	5.47	-1.58	-13.00	-48.35
366.59	S	-66.24	-70.14	5.86	-1.96	-13.00	-53.24
518.88	S	-65.51	-68.95	5.84	-2.41	-13.00	-52.51
760.41	S	-66.52	-69.27	5.47	-2.72	-13.00	-53.52
943.74	S	-62.39	-64.58	5.39	-3.19	-13.00	-49.39
3465.00	H	-28.11	-29.78	8.20	-6.53	-13.00	-15.11
5197.50	H	-29.27	-30.70	9.92	-8.49	-13.00	-16.27
6930.00	H	-28.94	-30.72	11.09	-9.31	-13.00	-15.94
8662.50	H	-41.07	-43.25	12.73	-10.55	-13.00	-28.07
10395.00	H	-35.51	-36.47	12.68	-11.73	-13.00	-22.51

ARFCN	:16QAM BW 20 RB 1 0	Test Date	:2015-04-18
Operation Band	:LTE B4	Temp./Humi.	:22 deg_C / 51 RH
Fundamental Frequency	:1732.5 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



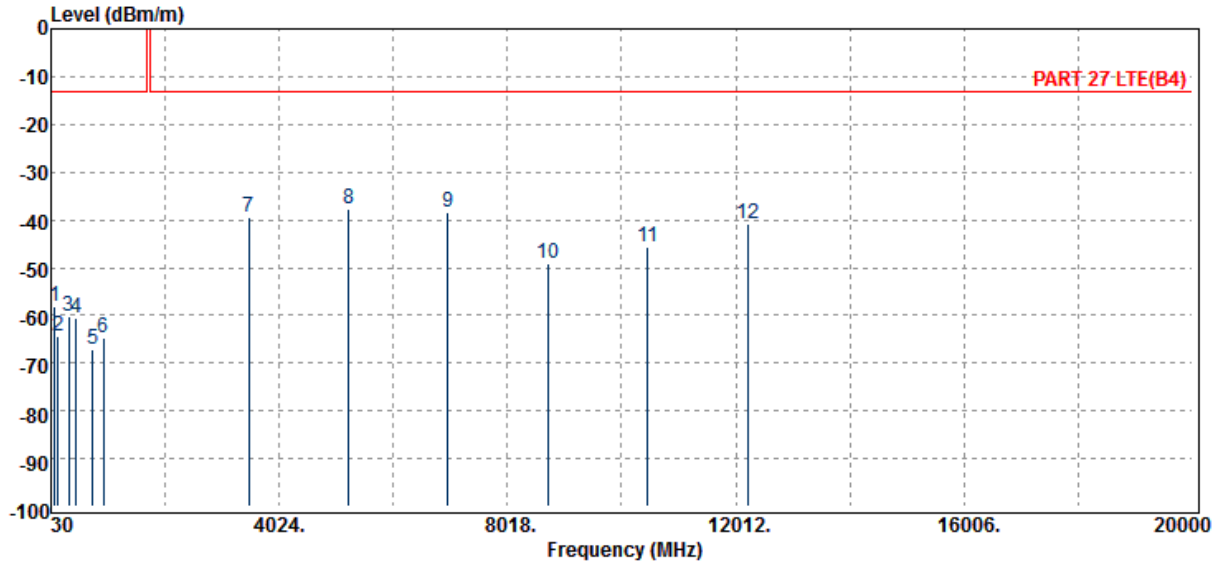
Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
93.05	S	-59.02	-59.30	1.37	-1.10	-13.00	-46.02
153.19	S	-65.80	-64.67	0.27	-1.40	-13.00	-52.80
353.98	S	-60.49	-64.42	5.90	-1.97	-13.00	-47.49
477.17	S	-60.33	-63.89	5.73	-2.17	-13.00	-47.33
720.64	S	-66.91	-69.77	5.49	-2.63	-13.00	-53.91
928.22	S	-64.56	-66.78	5.40	-3.17	-13.00	-51.56
3465.00	H	-35.03	-36.70	8.20	-6.53	-13.00	-22.03
5197.50	H	-37.76	-39.19	9.92	-8.49	-13.00	-24.76
6930.00	H	-36.38	-38.16	11.09	-9.31	-13.00	-23.38
8662.50	H	-49.81	-51.99	12.73	-10.55	-13.00	-36.81
10395.00	H	-40.78	-41.73	12.68	-11.73	-13.00	-27.78

ARFCN	:16QAM BW 20 RB 1 0	Test Date	:2015-04-18
Operation Band	:LTE B4	Temp./Humi.	:22 deg_C / 51 RH
Fundamental Frequency	:1745.0 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
48.43	S	-61.22	-50.76	-9.57	-0.90	-13.00	-48.22
226.91	S	-61.09	-64.98	5.47	-1.57	-13.00	-48.09
329.73	S	-65.98	-69.94	5.86	-1.90	-13.00	-52.98
514.03	S	-66.98	-70.46	5.86	-2.38	-13.00	-53.98
753.62	S	-65.66	-68.40	5.44	-2.70	-13.00	-52.66
937.92	S	-62.91	-65.11	5.39	-3.19	-13.00	-49.91
3490.00	H	-31.49	-33.15	8.27	-6.62	-13.00	-18.49
5235.00	H	-29.68	-31.09	9.94	-8.53	-13.00	-16.68
6980.00	H	-30.20	-32.01	11.17	-9.36	-13.00	-17.20
8725.00	H	-41.22	-43.42	12.75	-10.54	-13.00	-28.22
10470.00	H	-43.48	-44.50	12.69	-11.68	-13.00	-30.48
12215.00	H	-40.60	-40.49	12.89	-13.00	-13.00	-27.60

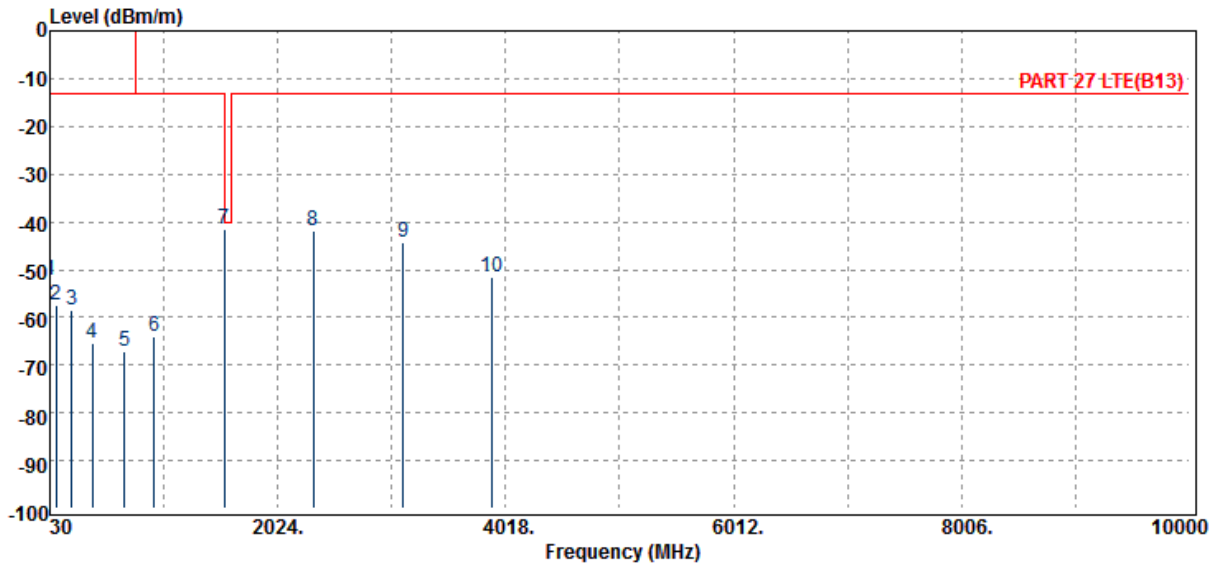
ARFCN	:16QAM BW 20 RB 1 0	Test Date	:2015-04-18
Operation Band	:LTE B4	Temp./Humi.	:22 deg_C / 51 RH
Fundamental Frequency	:1745.0 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
94.02	S	-58.11	-58.27	1.26	-1.10	-13.00	-45.11
154.16	S	-64.44	-63.37	0.33	-1.41	-13.00	-51.44
344.28	S	-60.27	-64.21	5.90	-1.95	-13.00	-47.27
476.20	S	-60.46	-64.02	5.72	-2.16	-13.00	-47.46
754.59	S	-67.22	-69.96	5.45	-2.71	-13.00	-54.22
954.41	S	-64.62	-66.50	5.09	-3.21	-13.00	-51.62
3490.00	H	-39.40	-41.06	8.27	-6.62	-13.00	-26.40
5235.00	H	-37.57	-38.98	9.94	-8.53	-13.00	-24.57
6980.00	H	-38.54	-40.35	11.17	-9.36	-13.00	-25.54
8725.00	H	-49.08	-51.28	12.75	-10.54	-13.00	-36.08
10470.00	H	-45.80	-46.81	12.69	-11.68	-13.00	-32.80
12215.00	H	-40.93	-40.82	12.89	-13.00	-13.00	-27.93

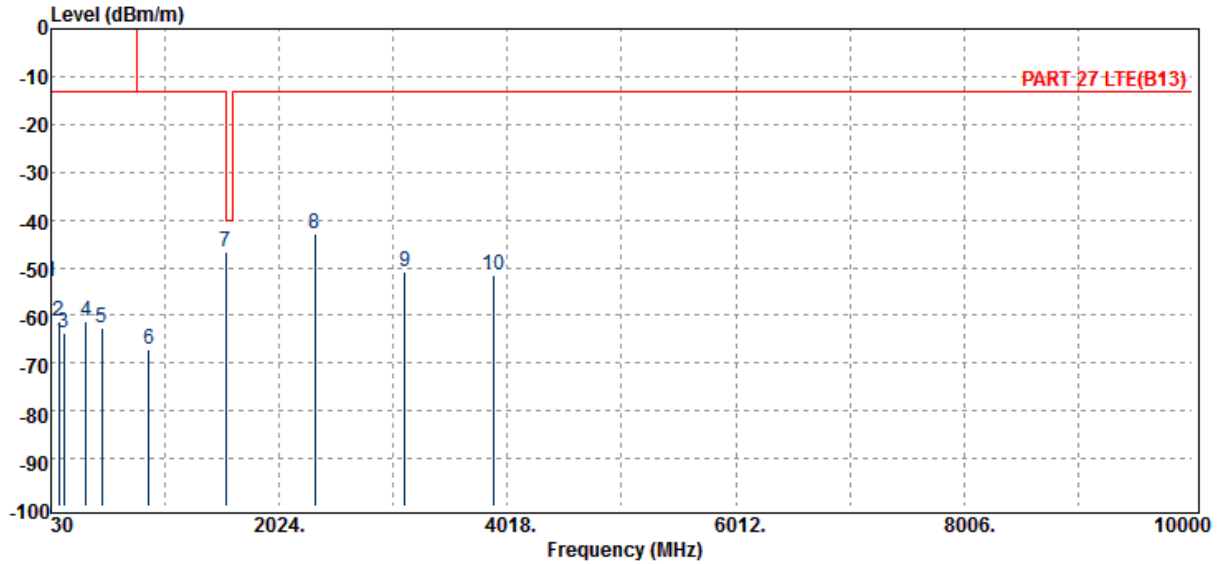
Radiated Spurious Emission Measurement Result: 5MHz BW LTE-Band 13 (The Worst Case)

ARFCN	:16QAM BW 5 RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:779.5 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



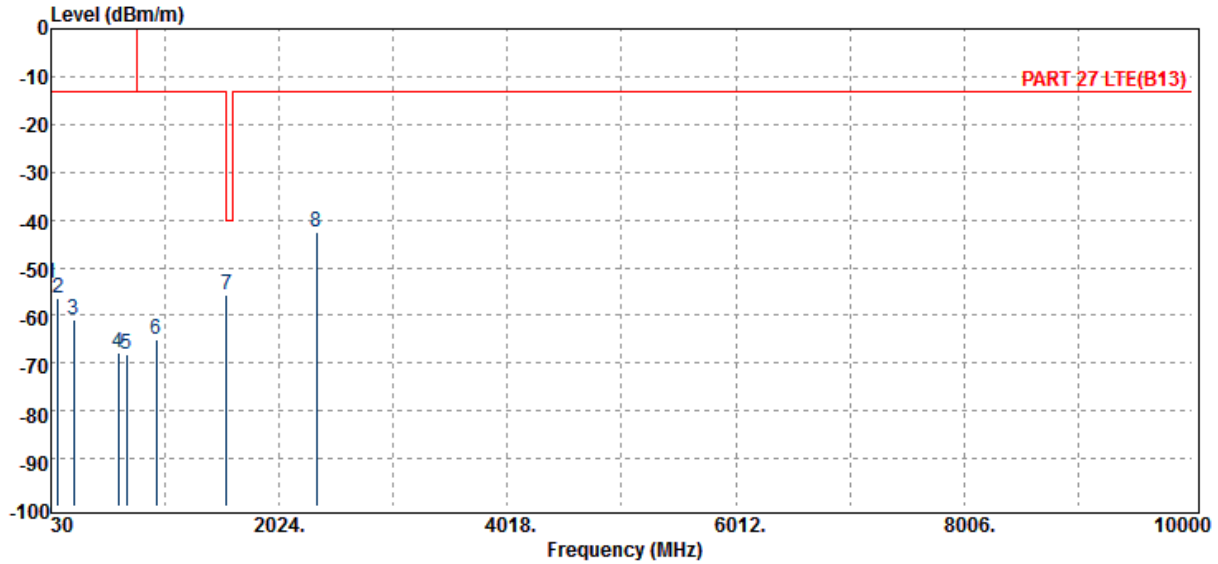
Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	S	-52.09	-37.97	-13.32	-0.80	-13.00	-39.09
87.23	S	-57.53	-55.40	-1.05	-1.08	-13.00	-44.53
223.03	S	-58.52	-60.28	3.32	-1.57	-13.00	-45.52
403.45	S	-65.24	-66.89	3.60	-1.94	-13.00	-52.24
685.72	S	-66.98	-67.81	3.45	-2.62	-13.00	-53.98
941.80	S	-63.94	-63.99	3.24	-3.19	-13.00	-50.94
1559.00	H	-41.54	-40.67	3.23	-4.11	-40.00	-1.54
2338.50	H	-41.70	-39.92	3.29	-5.08	-13.00	-28.70
3118.00	H	-44.20	-43.10	5.03	-6.13	-13.00	-31.20
3897.50	H	-51.54	-50.82	6.39	-7.11	-13.00	-38.54

ARFCN	:16QAM BW 5 RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:779.5 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



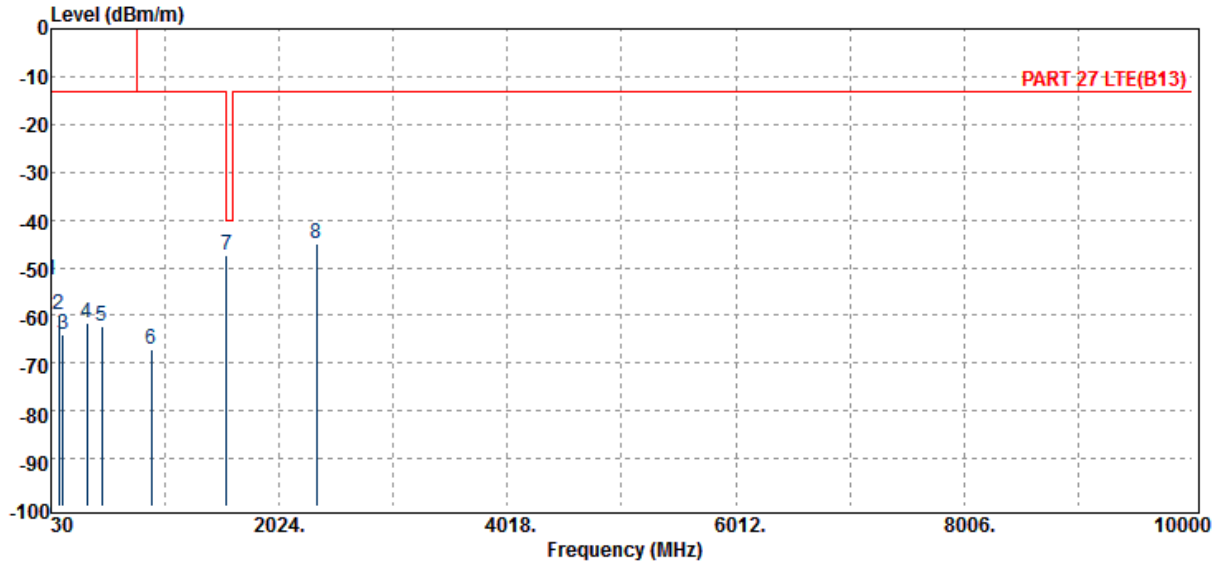
Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
35.82	S	-52.88	-38.60	-13.49	-0.79	-13.00	-39.88
96.93	S	-61.29	-58.98	-1.20	-1.11	-13.00	-48.29
140.58	S	-63.76	-59.85	-2.57	-1.34	-13.00	-50.76
335.55	S	-61.19	-63.00	3.72	-1.92	-13.00	-48.19
475.23	S	-62.62	-64.03	3.56	-2.15	-13.00	-49.62
887.48	S	-67.22	-67.43	3.31	-3.11	-13.00	-54.22
1559.00	H	-46.57	-45.69	3.23	-4.11	-40.00	-6.57
2338.50	H	-43.01	-41.22	3.29	-5.08	-13.00	-30.01
3118.00	H	-50.76	-49.66	5.03	-6.13	-13.00	-37.76
3897.50	H	-51.69	-50.97	6.39	-7.11	-13.00	-38.69

ARFCN	:16QAM BW 5 RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:782.0 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



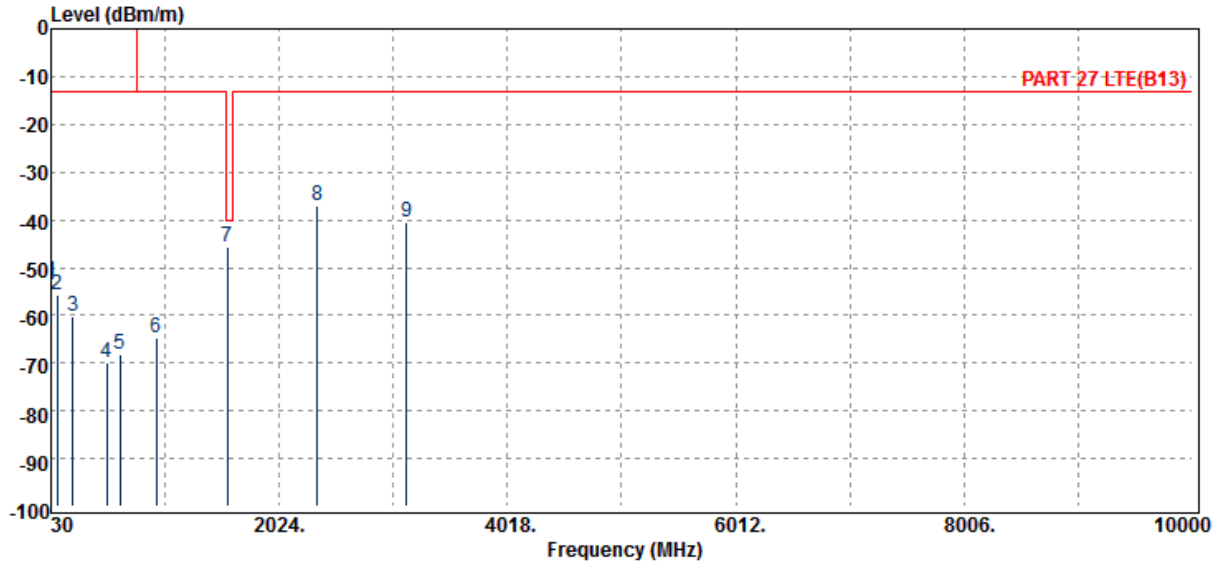
Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	S	-53.30	-39.18	-13.32	-0.80	-13.00	-40.30
88.20	S	-56.47	-54.55	-0.83	-1.08	-13.00	-43.47
229.82	S	-61.07	-62.81	3.31	-1.58	-13.00	-48.07
620.73	S	-67.94	-68.75	3.53	-2.71	-13.00	-54.94
687.66	S	-68.27	-69.10	3.44	-2.62	-13.00	-55.27
948.59	S	-64.91	-64.94	3.24	-3.20	-13.00	-51.91
1564.00	H	-55.64	-54.75	3.22	-4.11	-40.00	-15.64
2346.00	H	-42.62	-40.84	3.31	-5.09	-13.00	-29.62

ARFCN	:16QAM BW 5 RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:782.0 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



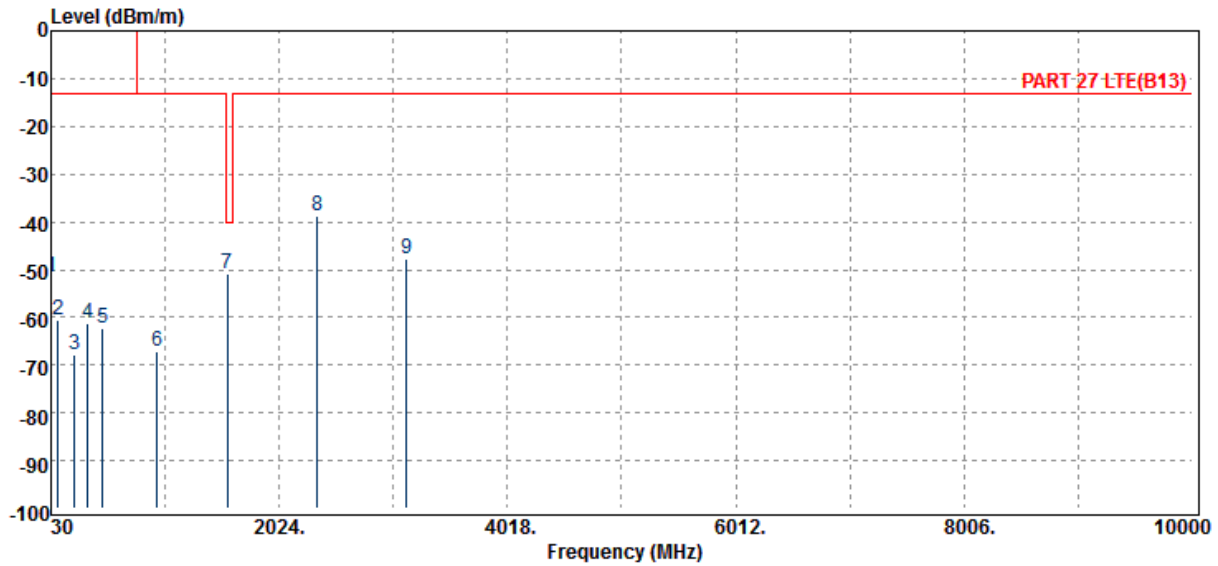
Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	S	-52.65	-38.54	-13.32	-0.80	-13.00	-39.65
94.99	S	-59.69	-57.59	-0.99	-1.11	-13.00	-46.69
133.79	S	-64.02	-60.16	-2.56	-1.30	-13.00	-51.02
345.25	S	-61.69	-63.49	3.75	-1.95	-13.00	-48.69
476.20	S	-62.36	-63.77	3.57	-2.16	-13.00	-49.36
906.88	S	-67.00	-67.12	3.26	-3.14	-13.00	-54.00
1564.00	H	-47.40	-46.51	3.22	-4.11	-40.00	-7.40
2346.00	H	-44.97	-43.19	3.31	-5.09	-13.00	-31.97

ARFCN	:16QAM BW 5 RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:784.5 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	S	-52.92	-38.81	-13.32	-0.80	-13.00	-39.92
86.26	S	-55.57	-53.22	-1.27	-1.08	-13.00	-42.57
223.03	S	-60.35	-62.11	3.32	-1.57	-13.00	-47.35
519.85	S	-69.80	-71.08	3.69	-2.41	-13.00	-56.80
635.28	S	-68.25	-69.15	3.58	-2.68	-13.00	-55.25
948.59	S	-64.67	-64.70	3.24	-3.20	-13.00	-51.67
1569.00	H	-45.56	-44.66	3.21	-4.11	-40.00	-5.56
2353.50	H	-37.09	-35.31	3.33	-5.11	-13.00	-24.09
3138.00	H	-40.37	-39.22	5.09	-6.24	-13.00	-27.37

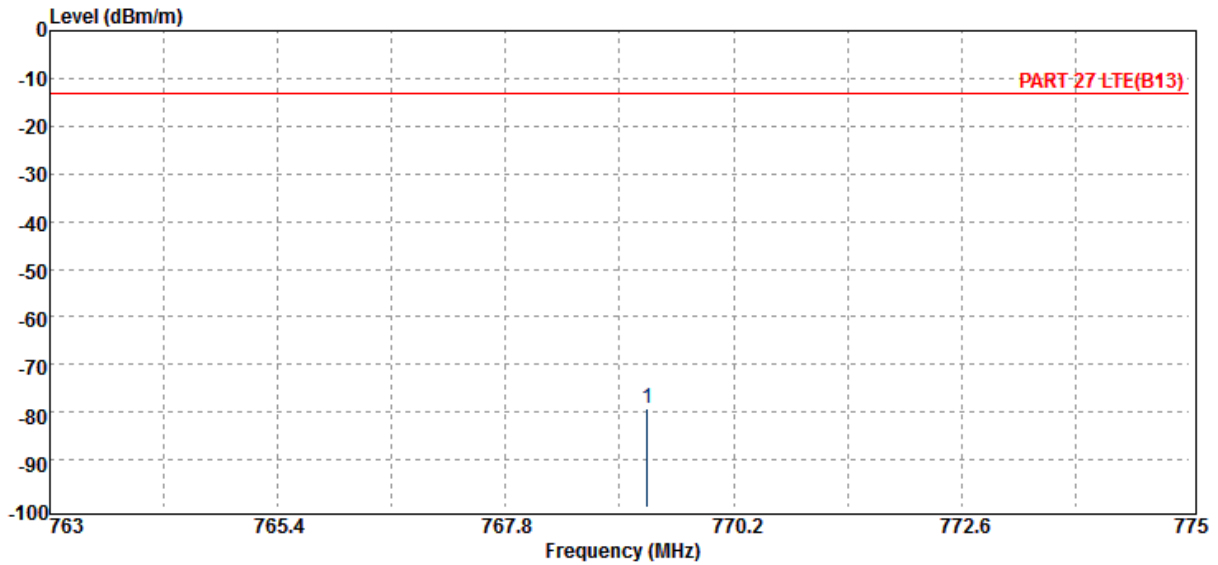
ARFCN	:16QAM BW 5 RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:784.5 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	S	-51.73	-37.61	-13.32	-0.80	-13.00	-38.73
92.08	S	-60.61	-58.84	-0.67	-1.10	-13.00	-47.61
234.67	S	-67.86	-69.56	3.30	-1.59	-13.00	-54.86
348.16	S	-61.27	-63.07	3.76	-1.96	-13.00	-48.27
478.14	S	-62.31	-63.72	3.58	-2.17	-13.00	-49.31
956.35	S	-67.28	-66.88	2.81	-3.21	-13.00	-54.28
1569.00	H	-50.86	-49.95	3.21	-4.11	-40.00	-10.86
2353.50	H	-38.74	-36.96	3.33	-5.11	-13.00	-25.74
3138.00	H	-47.83	-46.67	5.09	-6.24	-13.00	-34.83

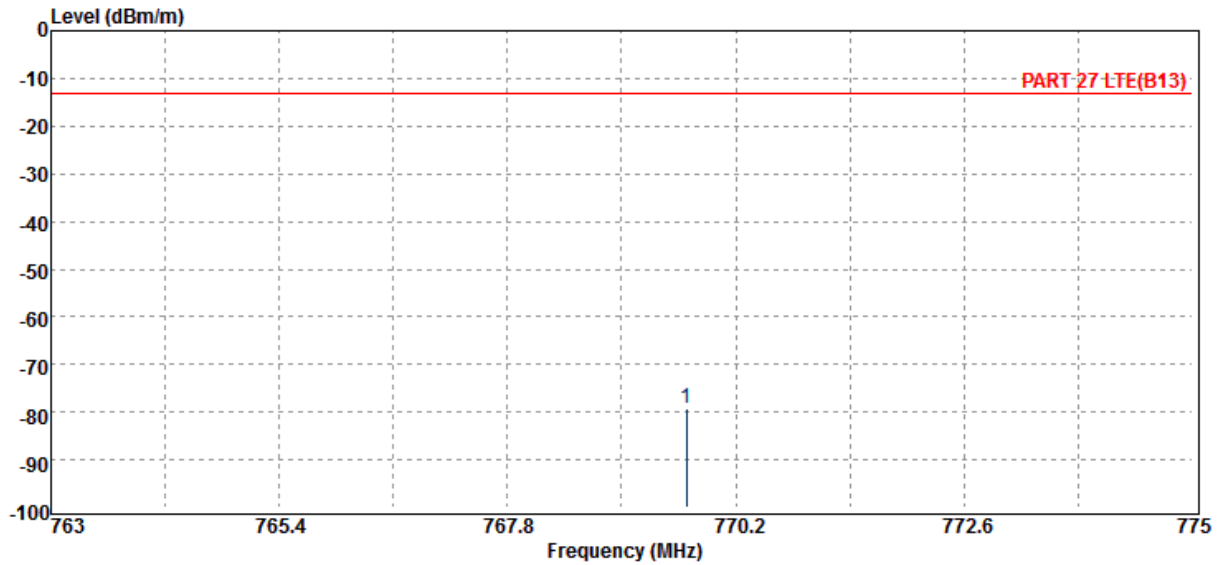
Radiated Spurious Emission Measurement Result: 10MHz BW LTE-Band 13(763MHz-755MHz)

ARFCN	:CH 23205 16QAM BW 5	RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH	
Fundamental Frequency	:779.5 MHz	Engineer	:Tin	
Operation Mode	:TX LOW	Measurement Antenna Pol.	:VERTICAL	
EUT Pol.	:E2 Plane			



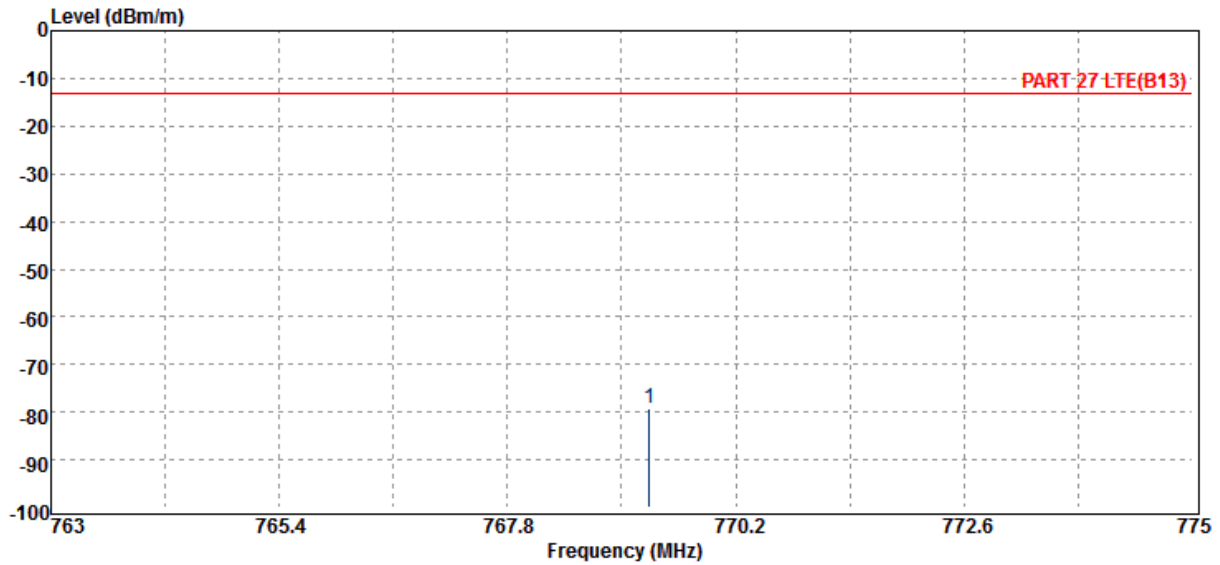
Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
769.29	S	-79.24	-79.84	3.34	-2.74	-13.00	-66.24

ARFCN	:CH 23205 16QAM BW 5 RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:779.5 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



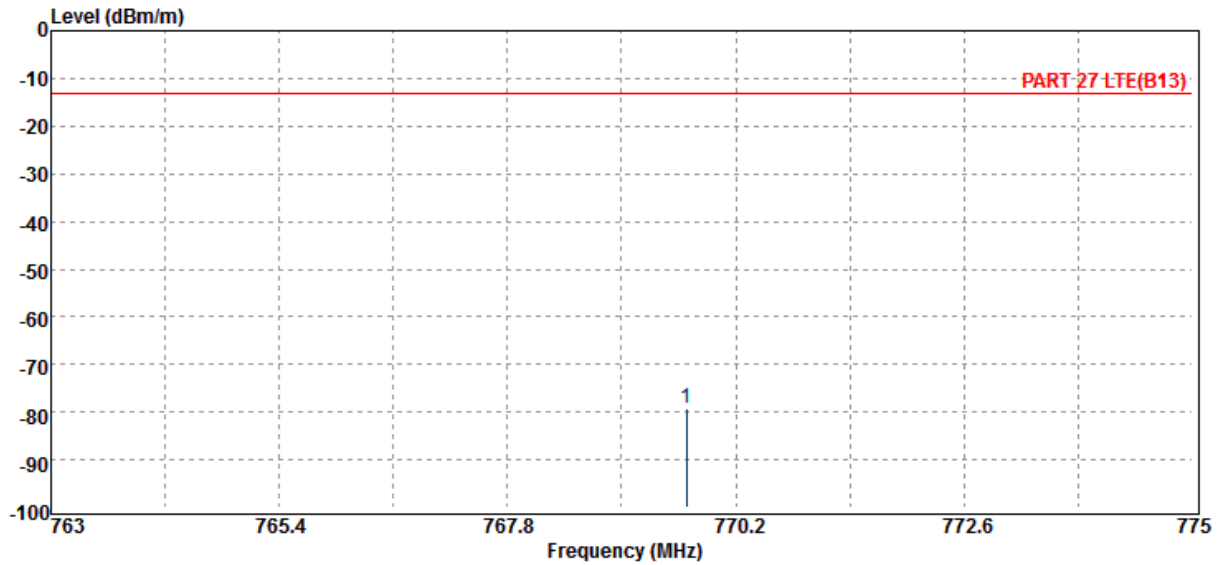
Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
769.68	S	-79.13	-79.74	3.35	-2.74	-13.00	-66.13

ARFCN	:CH 23230 16QAM BW 5 RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:782.0 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



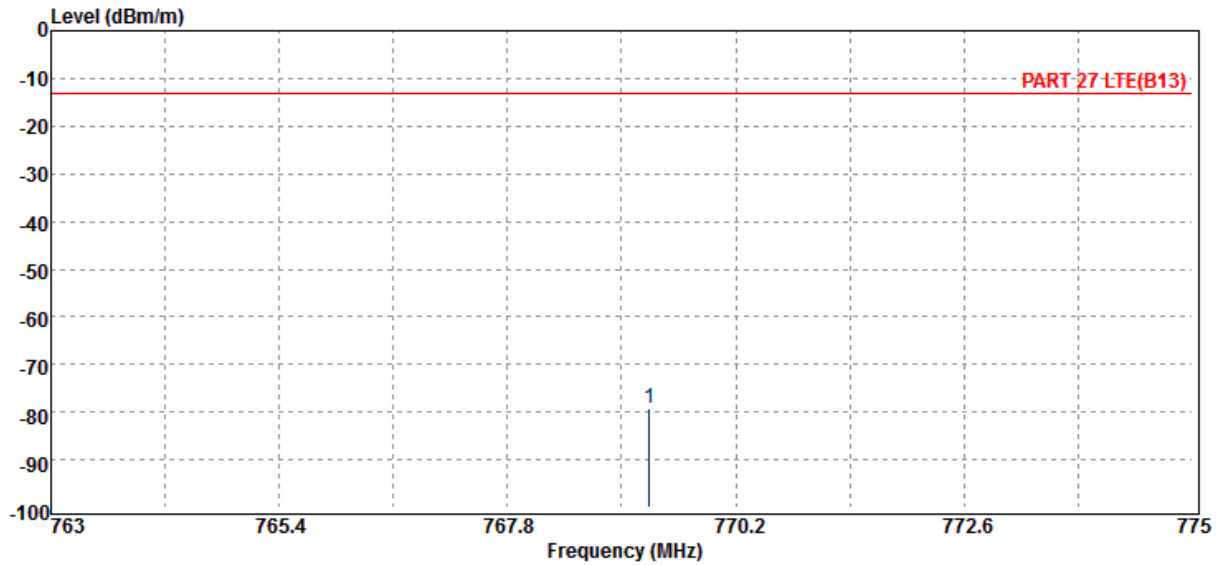
Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
769.29	S	-79.24	-79.84	3.34	-2.74	-13.00	-66.24

ARFCN	:CH 23230 16QAM BW 5 RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:782.0 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



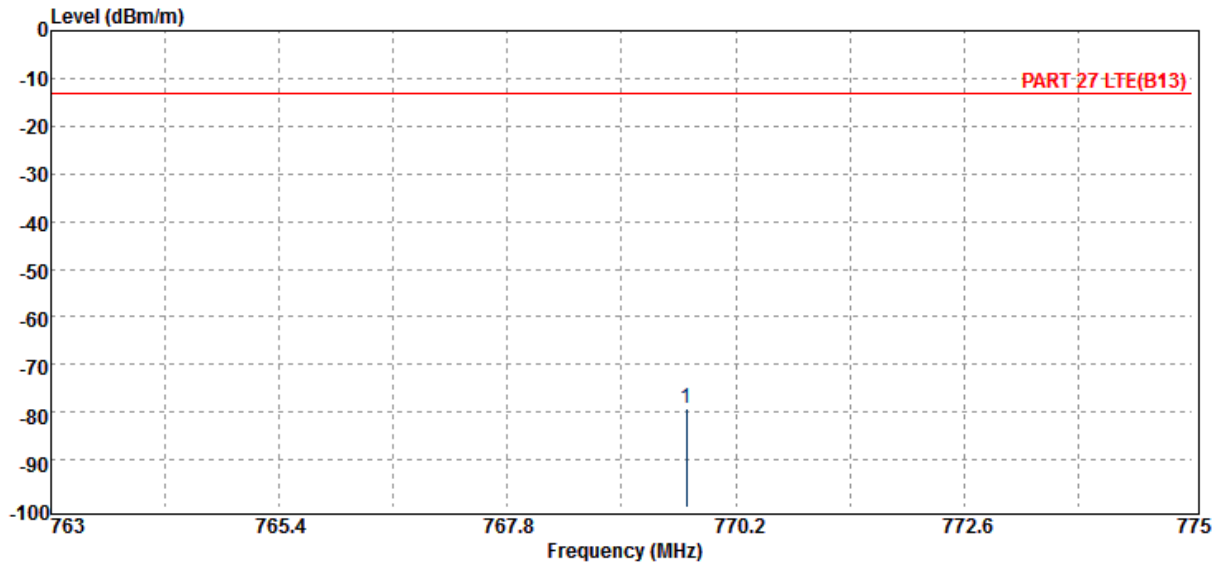
Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
769.68	S	-79.13	-79.74	3.35	-2.74	-13.00	-66.13

ARFCN	:CH 23255 16QAM BW 5 RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:784.5 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
769.29	S	-79.24	-79.84	3.34	-2.74	-13.00	-66.24

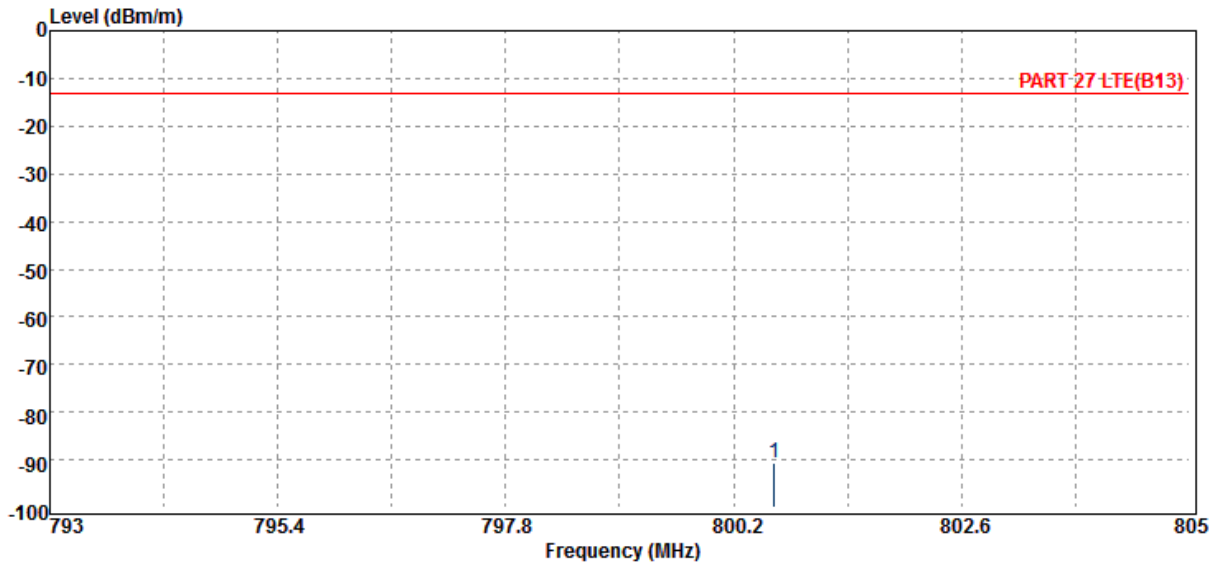
ARFCN	:CH 23255 16QAM BW 5 RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:784.5 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
769.68	S	-79.13	-79.74	3.35	-2.74	-13.00	-66.13

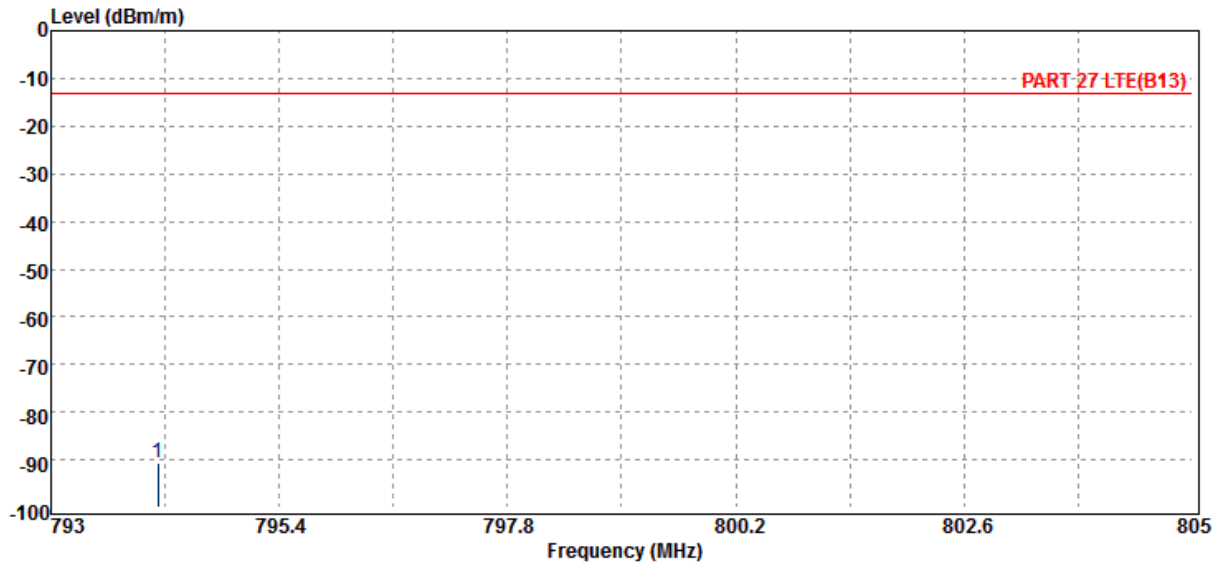
Radiated Spurious Emission Measurement Result: 10MHz BW LTE-Band 13(793MHz-805MHz)

ARFCN	:CH 23205 16QAM BW 5	Test Date	:2015-04-18
	RB1 24		
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:779.5 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



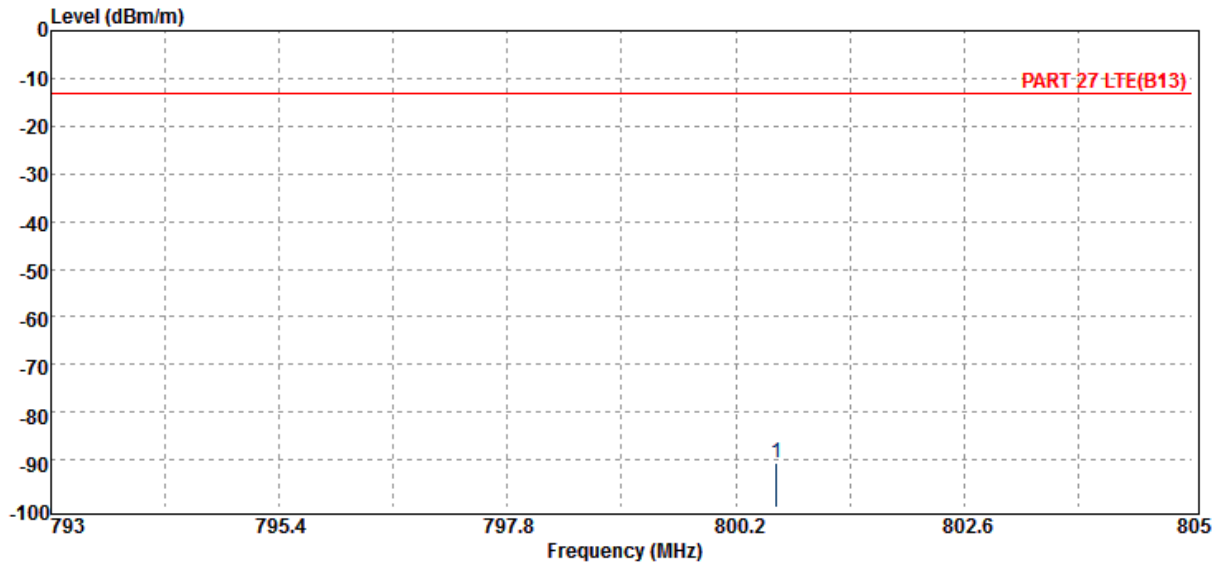
Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
800.63	S	-90.51	-91.10	3.44	-2.85	-13.00	-77.51

ARFCN	:CH 23205 16QAM BW 5 RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:779.5 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



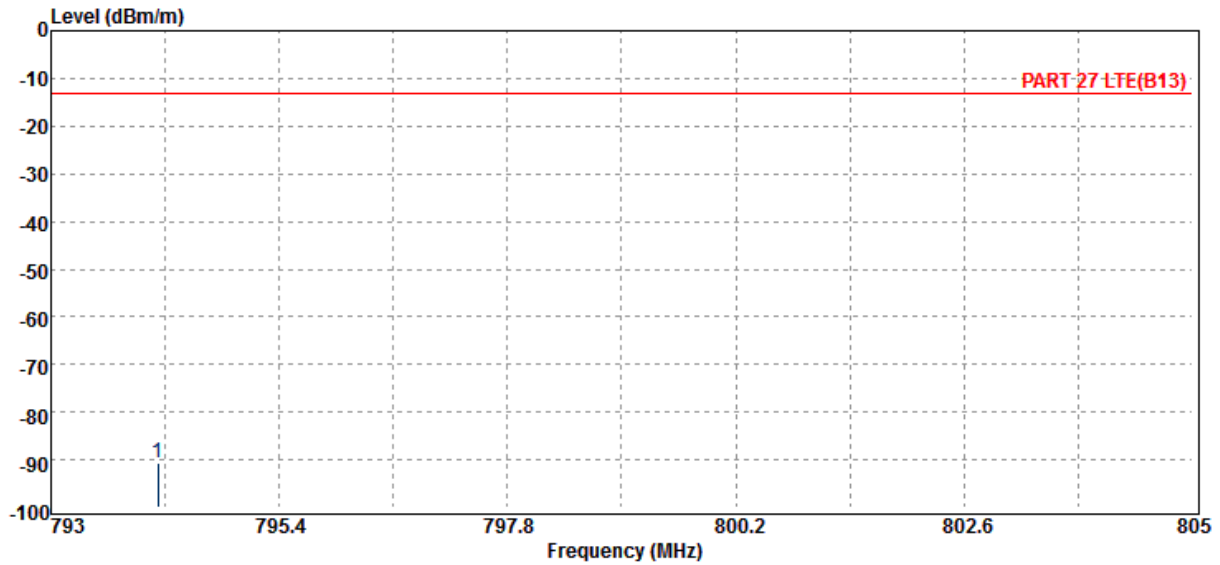
Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
794.13	S	-90.66	-91.25	3.42	-2.83	-13.00	-77.66

ARFCN	:CH 23230 16QAM BW 5 RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:782.0 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



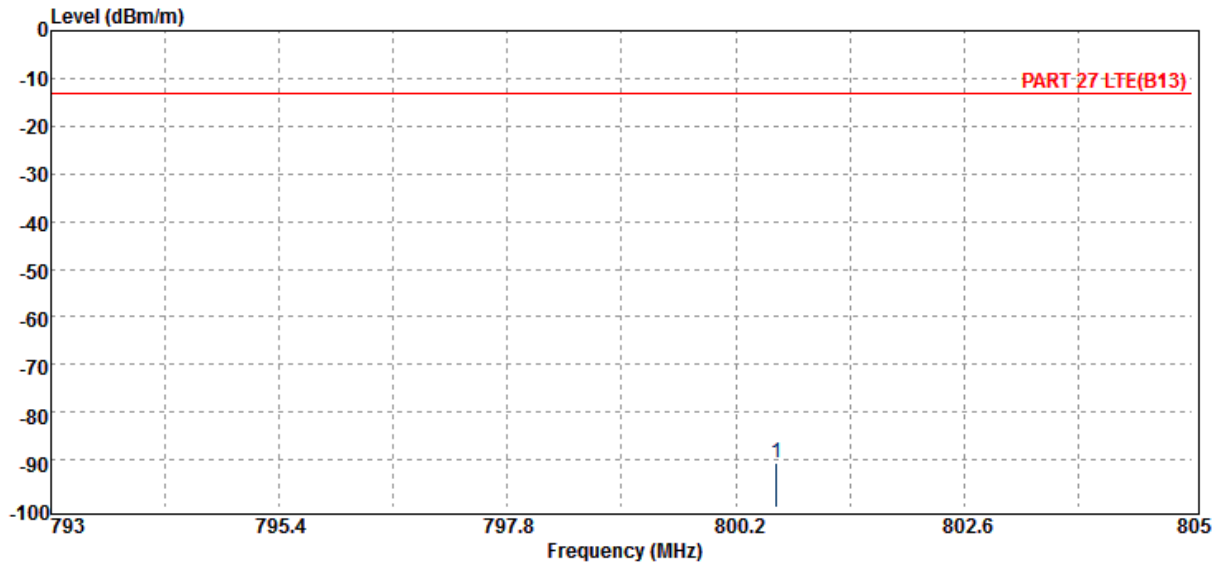
Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
800.63	S	-90.51	-91.10	3.44	-2.85	-13.00	-77.51

ARFCN	:CH 23230 16QAM BW 5 RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:782.0 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



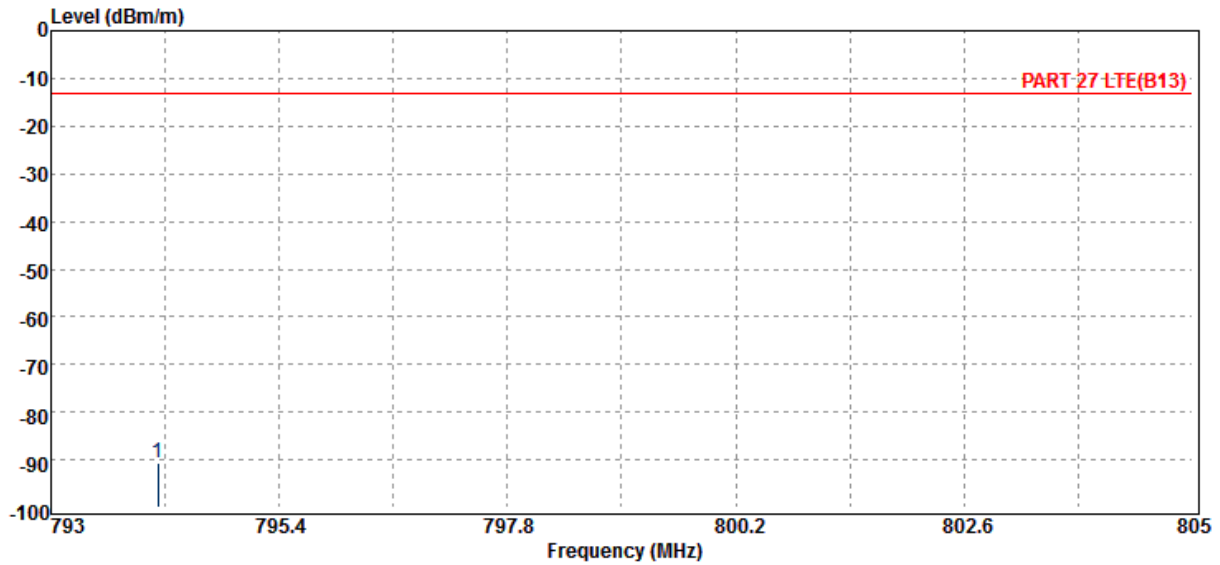
Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
794.13	S	-90.66	-91.25	3.42	-2.83	-13.00	-77.66

ARFCN	:CH 23255 16QAM BW 5 RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:784.5 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
800.63	S	-90.51	-91.10	3.44	-2.85	-13.00	-77.51

ARFCN	:CH 23255 16QAM BW 5 RB1 24	Test Date	:2015-04-18
Operation Band	:LTE B13	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:784.5 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



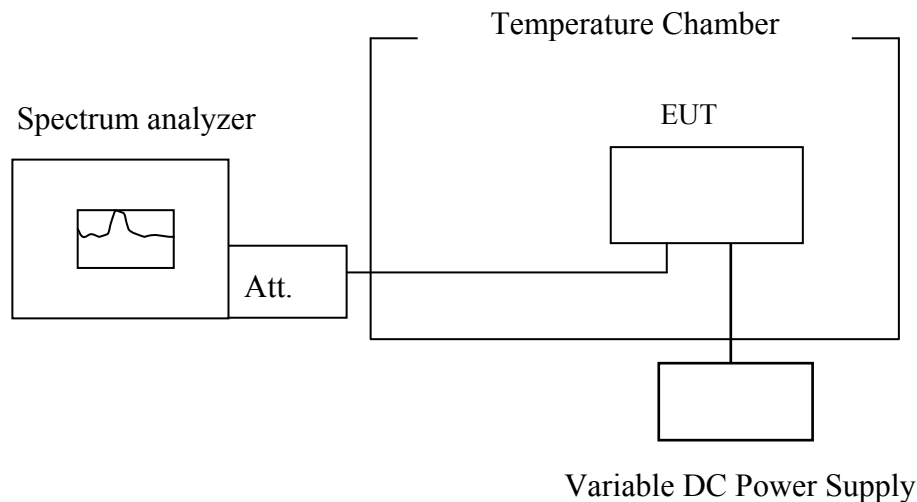
Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
794.13	S	-90.66	-91.25	3.42	-2.83	-13.00	-77.66

11. FREQUENCY STABILITY MEASUREMENT

11.1. Standard Applicable:

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

11.2. Test Set-up:



Note: Measurement setup for testing on Antenna connector

11.3. Measurement Procedure:

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

Set chamber temperature to 25 . Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint as declared by the manufacturer, record the maximum frequency change.

11.4. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	10/08/2014	10/09/2015
Temperature Chamber	TERCHY	MHG-120LF	911009	05/06/2015	05/05/2016
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016
Splitter	Agilent	11636B	N/A	01/02/2015	01/01/2016
DC Power Supply	Agilent	E3640A	MY52410006	11/10/2014	11/09/2015

11.5. Measurement Result:

FREQUENCY ERROR vs. VOLTAGE

Reference Frequency:		LTE B4 Mid Channel	1732.5	MHz	10M QPSK
					CH 20175
Limit: +/- 2.5 ppm					
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)	
Vdc	Temperature ()	(MHz)			
3.465	25	1732.499996	-9.10	4331	
3.300	25	1732.500005	0.00	4331	
3.135	25	1732.499996	-8.40	4331	
2.93 (End Point)	25	1732.499996	-8.80	4331	

FREQUENCY ERROR vs. TEMPERATURE

Reference Frequency:		LTE B4 Mid Channel	1732.5	MHz	10M QPSK
					CH 20175
Limit: +/- 2.5 ppm					
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)	
Vdc	Temperature ()	(MHz)			
3.3	-30	1732.499993	-11.70	4331	
3.3	-20	1732.499995	-9.80	4331	
3.3	-10	1732.500003	-1.60	4331	
3.3	0	1732.500006	1.70	4331	
3.3	10	1732.500004	-0.50	4331	
3.3	20	1732.500004	0.00	4331	
3.3	30	1732.499996	-8.60	4331	
3.3	40	1732.499995	-9.90	4331	
3.3	50	1732.499994	-10.70	4331	

FREQUENCY ERROR vs. VOLTAGE

Reference Frequency: LTE B13 Mid Channel			782.0	MHz	10M QPSK CH 23230
Limit: +/- 2.5 ppm					
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)	
Vdc	Temperature ()	(MHz)			
3.465	25	782.000003	5.90	1955	
3.300	25	781.999997	0.00	1955	
3.135	25	781.999997	-0.30	1955	
2.93 (End Point)	25	781.999995	-2.50	1955	

FREQUENCY ERROR vs. TEMPERATURE

Reference Frequency: LTE B13 Mid Channel			782.0	MHz	10M QPSK CH 23230
Limit: +/- 2.5 ppm					
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)	
Vdc	Temperature ()	(MHz)			
3.3	-30	782.000006	9.50	1955	
3.3	-20	782.000004	7.30	1955	
3.3	-10	782.000003	5.70	1955	
3.3	0	781.999996	-0.50	1955	
3.3	10	781.999997	0.30	1955	
3.3	20	781.999997	0.00	1955	
3.3	30	782.000002	5.50	1955	
3.3	40	782.000004	7.20	1955	
3.3	50	782.000004	6.80	1955	

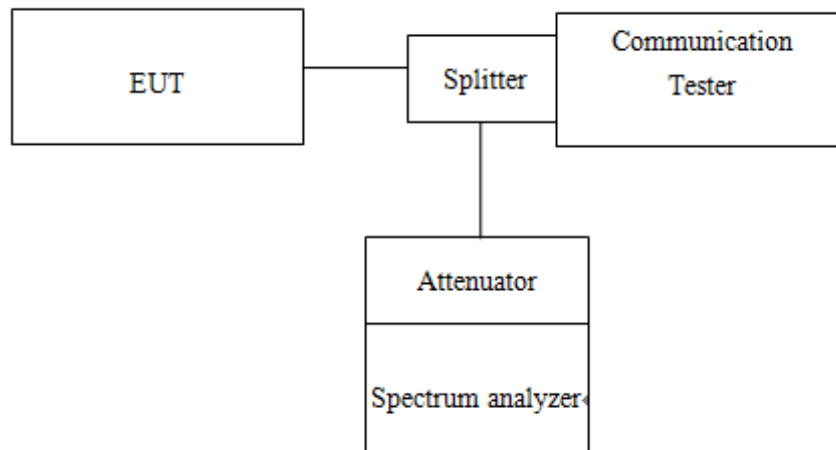
Note: The battery is rated 3.3Vdc.

12. PEAK TO AVERAGE RATIO

12.1. Standard Applicable

The peak-to-average ration (PAR) of the transmission may not exceed 13dB.

12.2. Test SET-UP



12.3. Measurement Procedure

1. KDB 971168 D01 is employed as the following procedure is proper adjusted accordingly:
2. Set resolution/measurement bandwidth \geq signal's occupied bandwidth; & internal =1ms
3. Set the number of counts to a value that stabilizes the measured CCDF curve.

12.4. Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	10/08/2014	10/09/2015
Temperature Chamber	TERCHY	MHG-120LF	911009	05/06/2015	05/05/2016
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016
Splitter	Agilent	11636B	N/A	01/02/2015	01/01/2016
DC Power Supply	Agilent	E3640A	MY52410006	11/10/2014	11/09/2015

12.5. Measurement Result

Tabular Results:

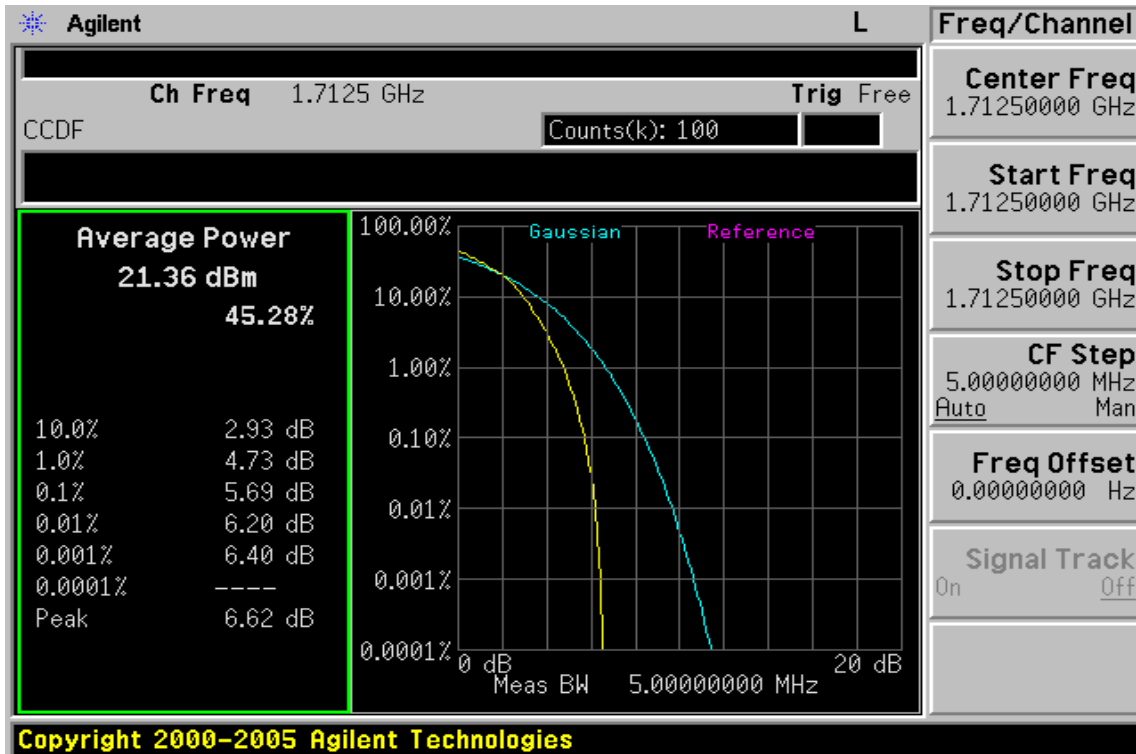
LTE BAND 4							
Channel bandwidth: 5MHz				Channel bandwidth: 10MHz			
Frequency (MHz)	CH	Peak-to-Average Ratio (dB)		Frequency (MHz)	CH	Peak-to-Average Ratio (dB)	
		16QAM	LIMIT			16QAM	LIMIT
1712.5	19957	5.69	13	1715.0	20000	6.01	13
1732.5	20175	6.00	13	1732.5	20175	6.22	13
1752.5	20375	5.94	13	1750.0	20350	6.13	13

LTE BAND 4							
Channel bandwidth: 15MHz				Channel bandwidth: 20MHz			
Frequency (MHz)	CH	Peak-to-Average Ratio (dB)		Frequency (MHz)	CH	Peak-to-Average Ratio (dB)	
		16QAM	LIMIT			16QAM	LIMIT
1717.5	20025	6.62	13	1720.0	20050	7.08	13
1732.5	20175	6.73	13	1732.5	20175	6.94	13
1747.5	20325	7.24	13	1745.0	20300	6.96	13

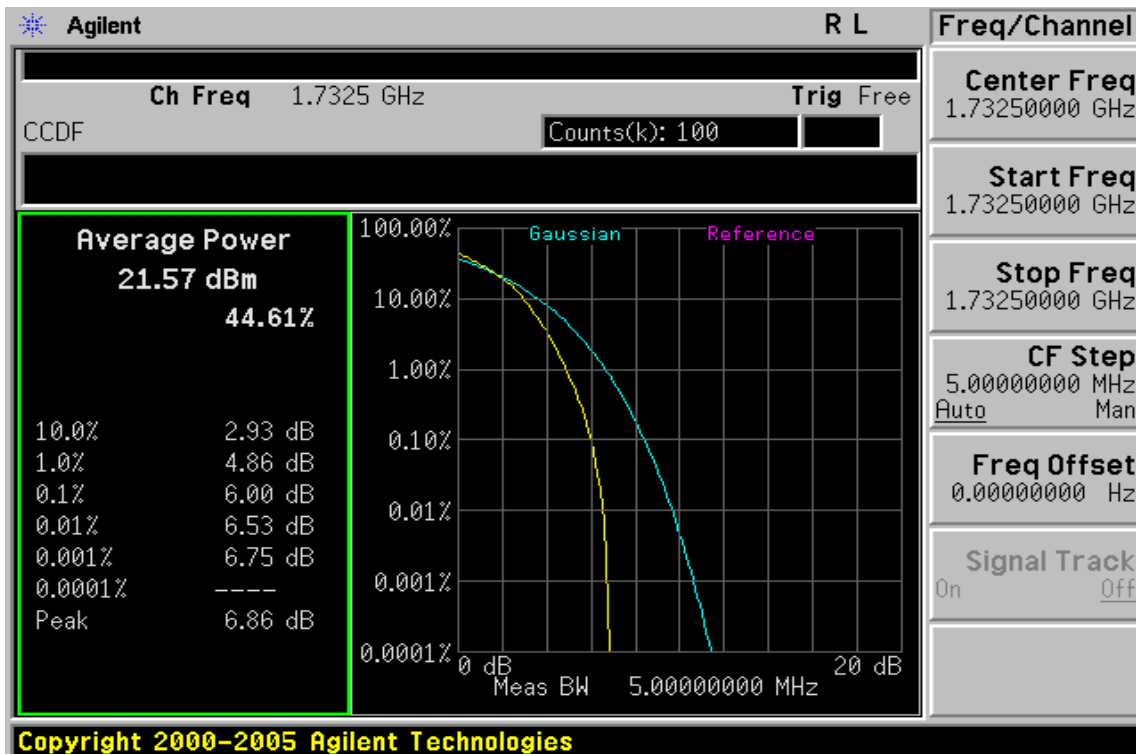
LTE BAND 13							
Channel bandwidth: 5MHz				Channel bandwidth: 10MHz			
Frequency (MHz)	CH	Peak-to-Average Ratio (dB)		Frequency (MHz)	CH	Peak-to-Average Ratio (dB)	
		16QAM	LIMIT			16QAM	LIMIT
779.5	23205	5.84	13	23230	782	5.06	13
782.0	23230	6.04	13				
782.0	23255	6.30	13				

Measurement Results:

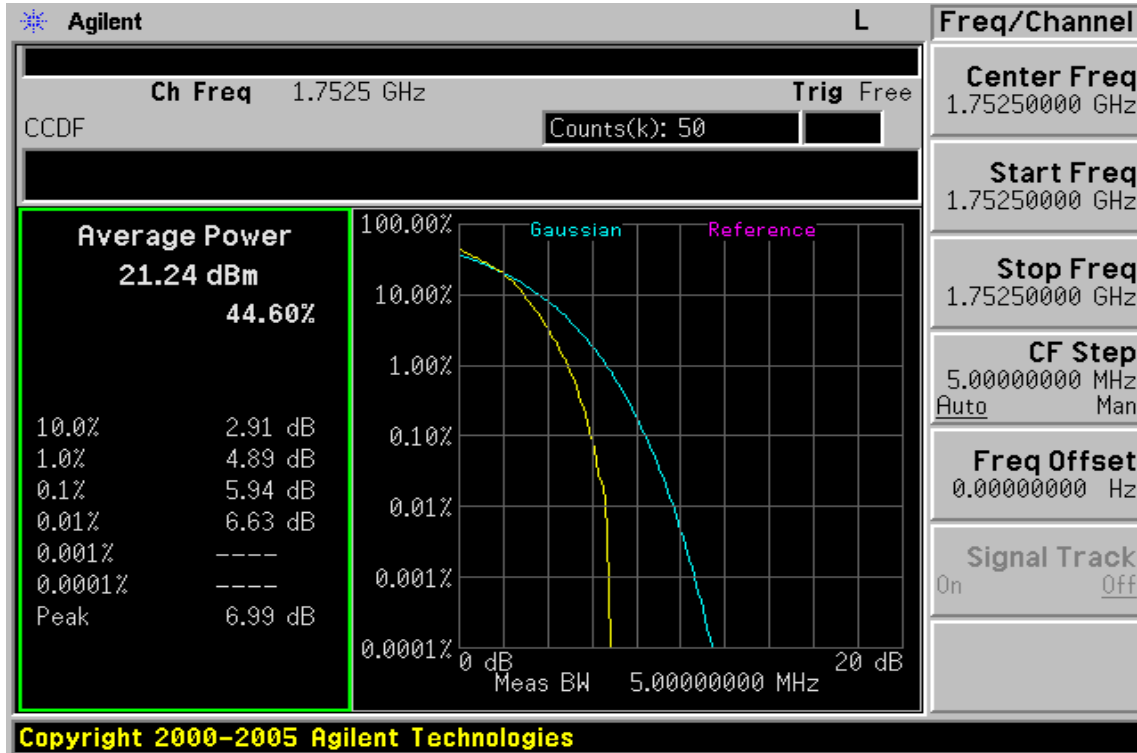
5MHz BW LTE-Band 4 16QAM Channel Low



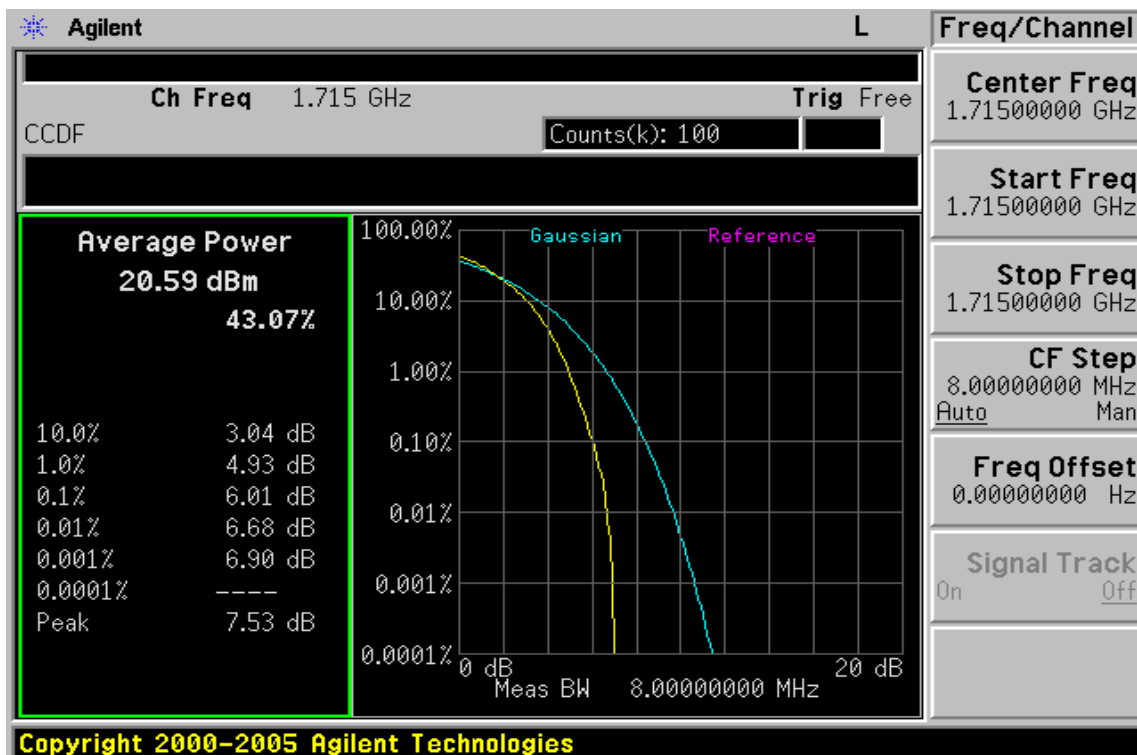
5MHz BW LTE-Band 4 16QAM Channel Mid



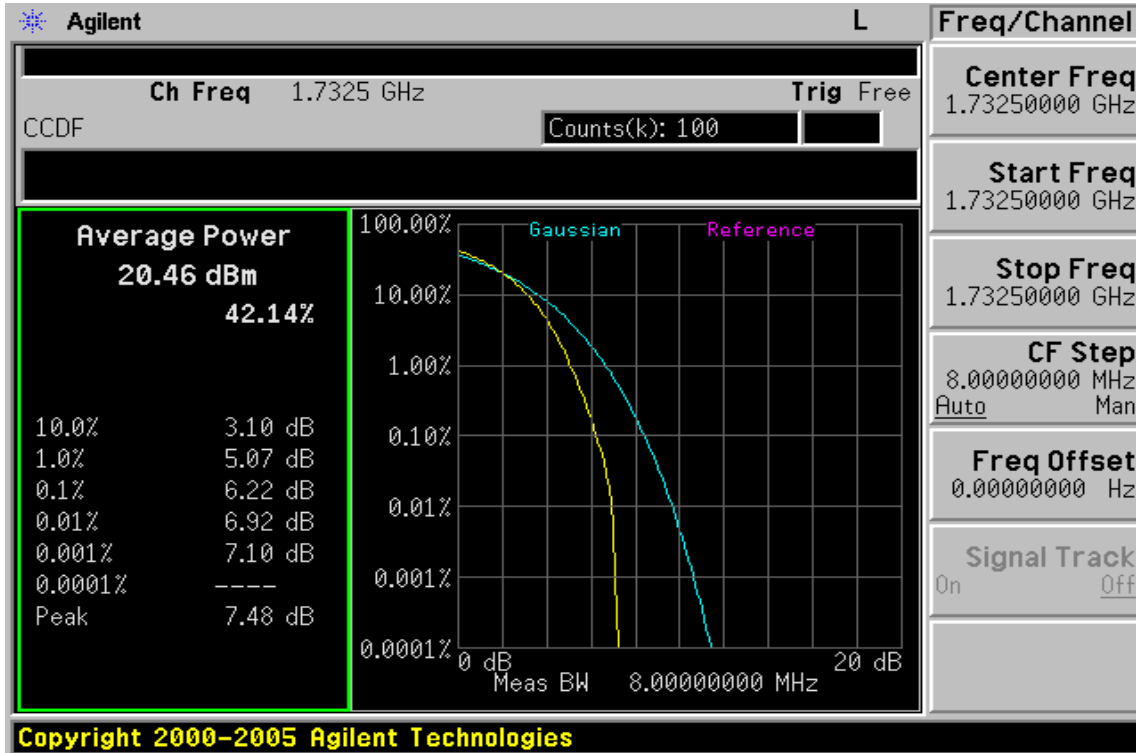
5MHz BW LTE-Band 4 16QAM Channel High



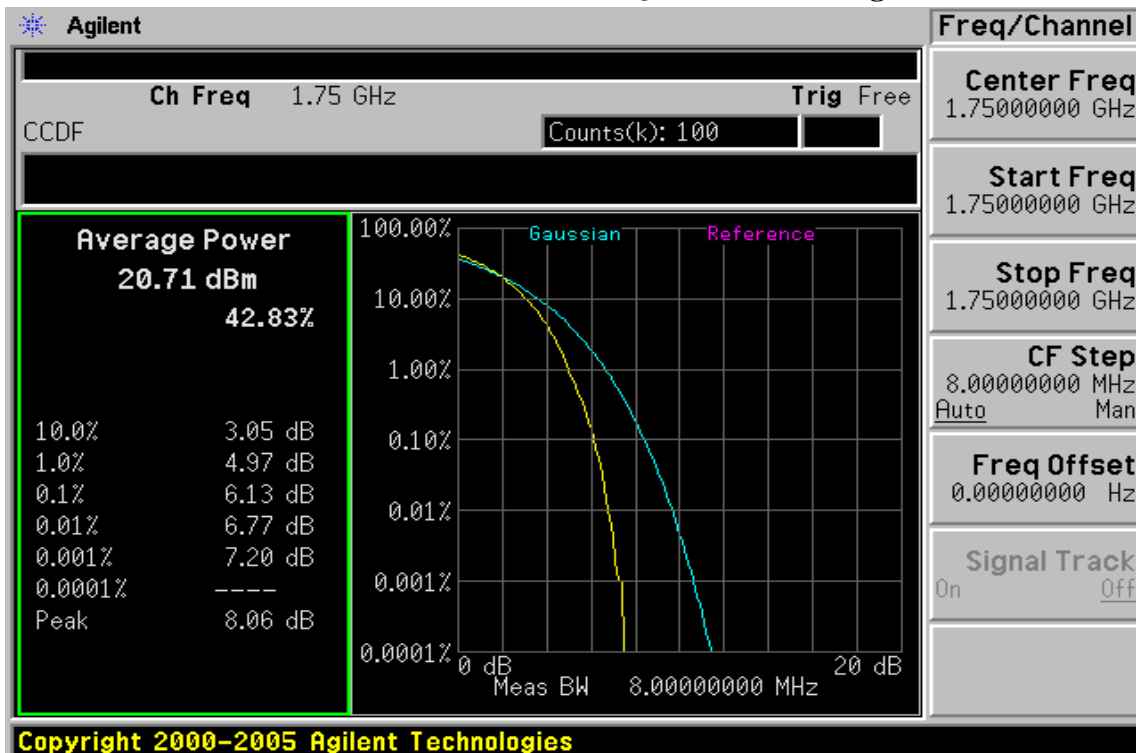
10MHz BW LTE-Band 4 16QAM Channel Low



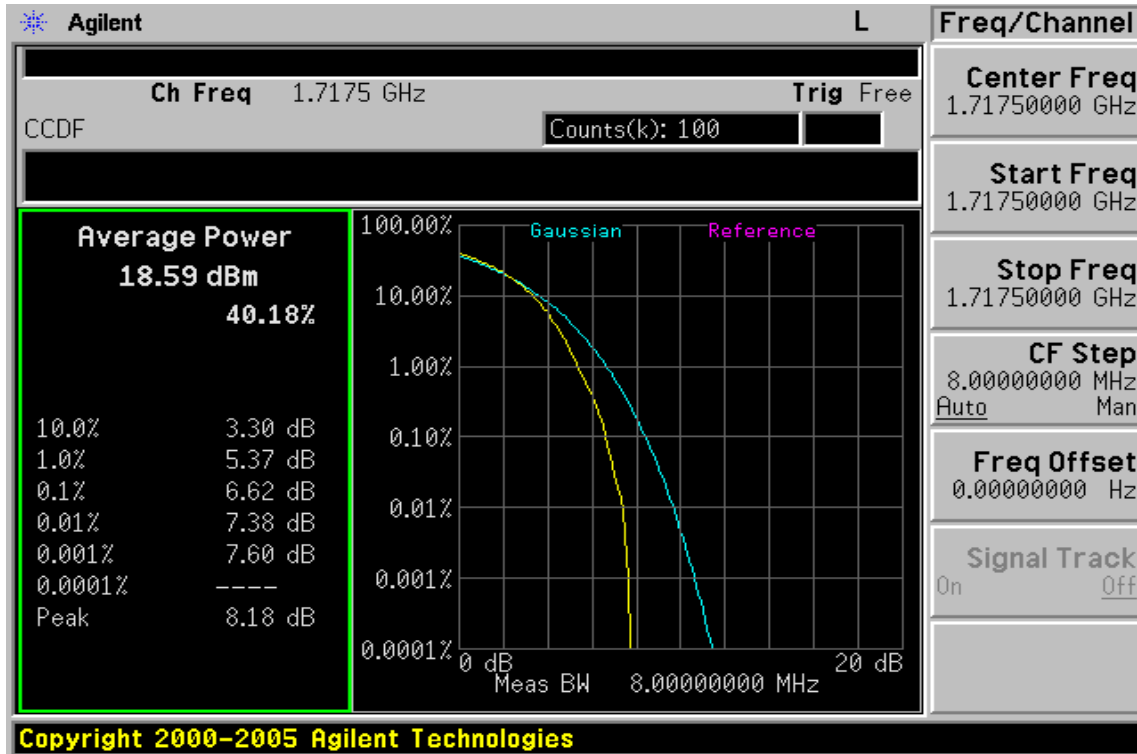
10MHz BW LTE-Band 4 16QAM Channel Mid



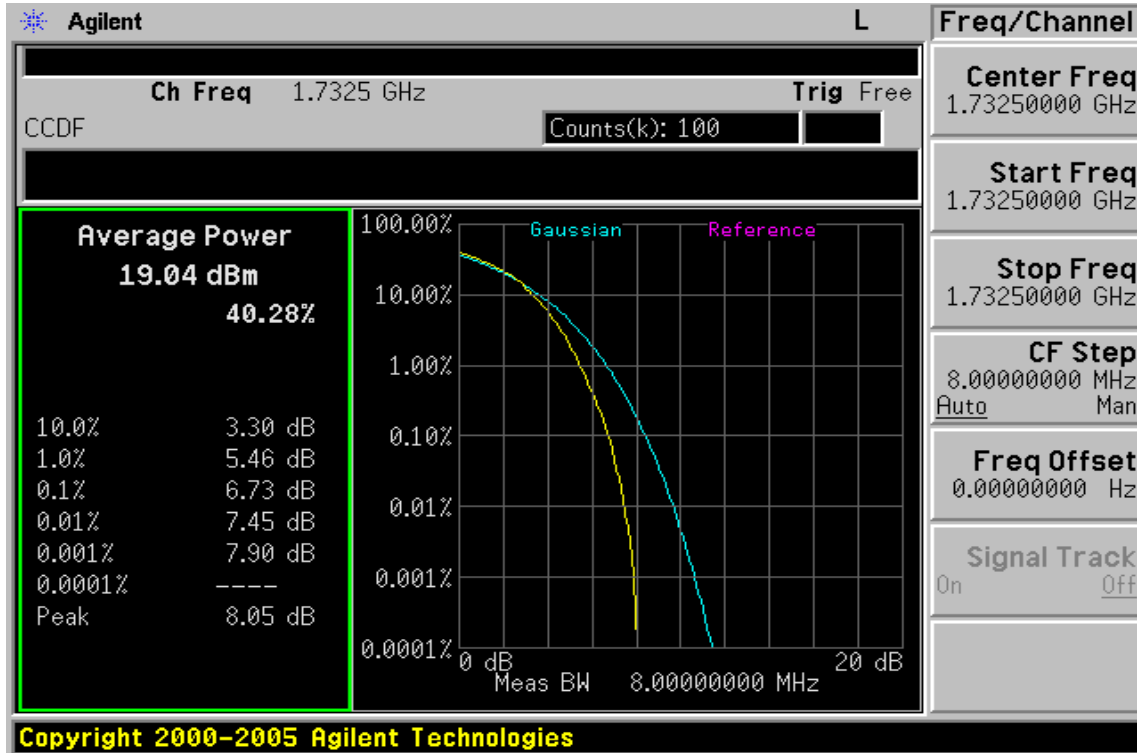
10MHz BW LTE-Band 4 16QAM Channel High



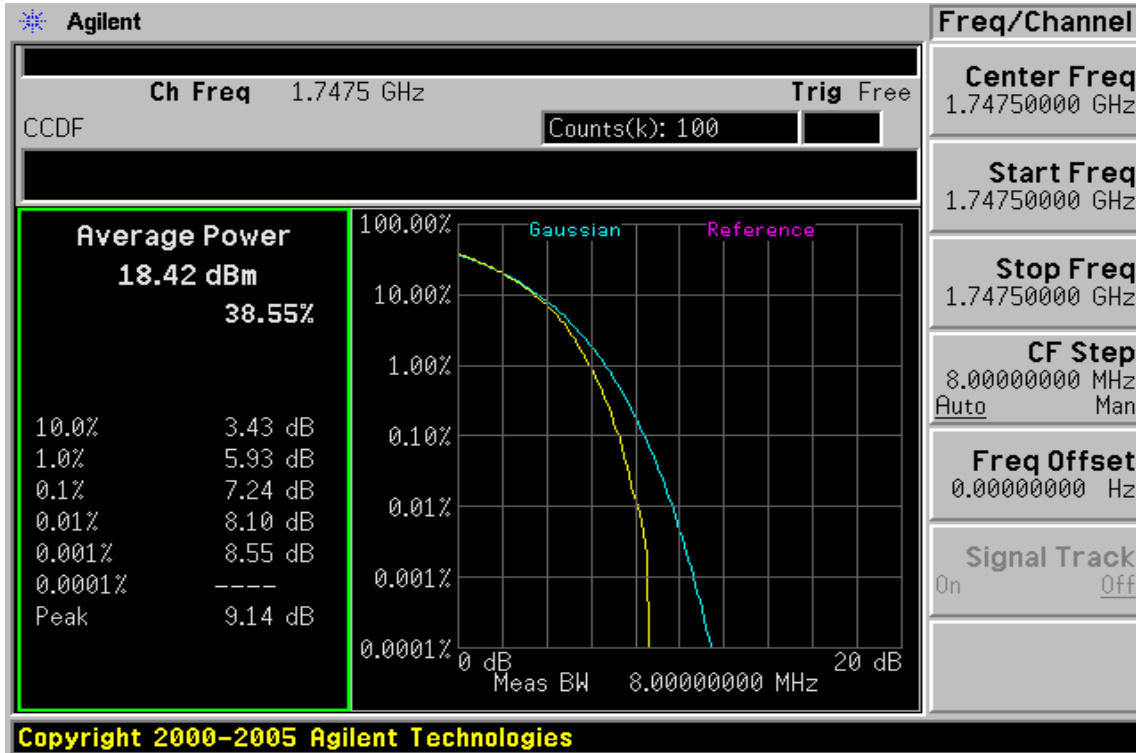
15MHz BW LTE-Band 4 16QAM Channel Low



15MHz BW LTE-Band 4 16QAM Channel Mid



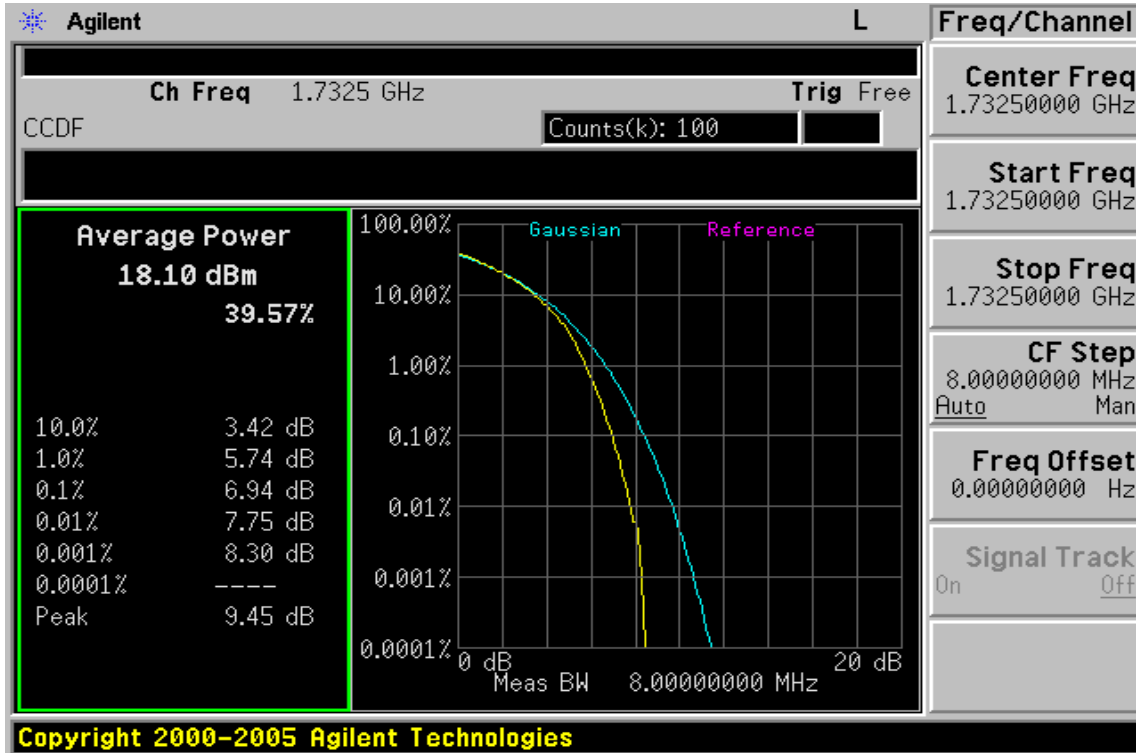
15MHz BW LTE-Band 4 16QAM Channel High



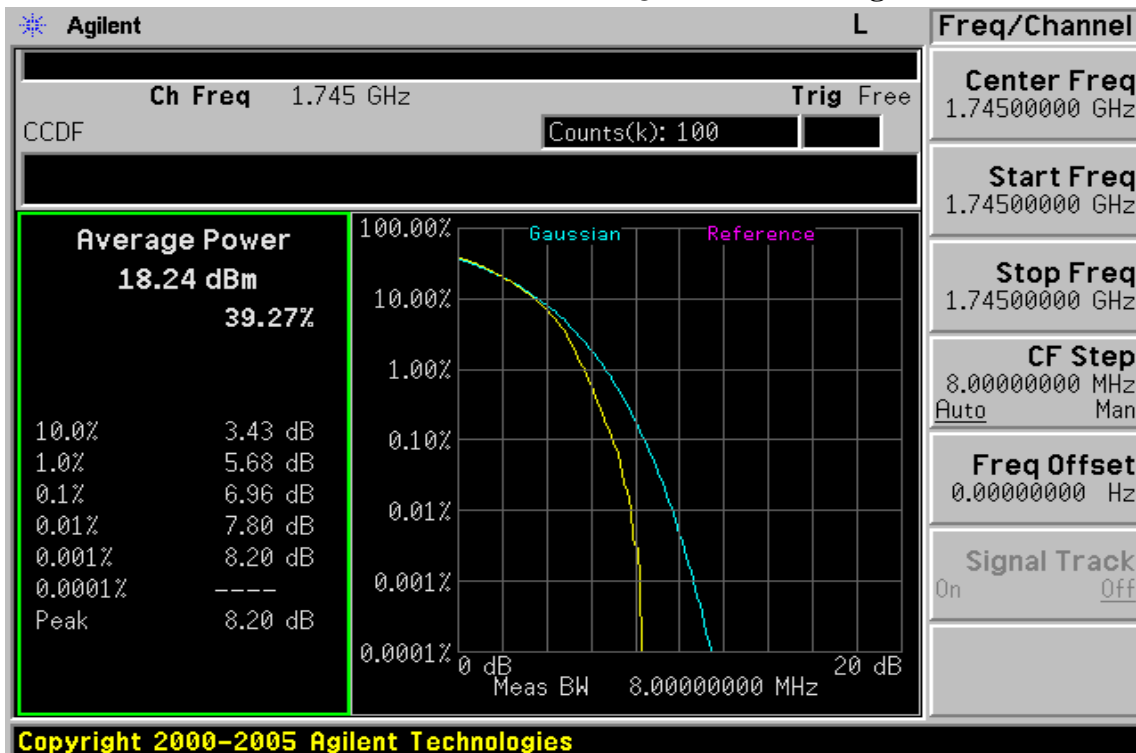
20MHz BW LTE-Band 4 16QAM Channel Low



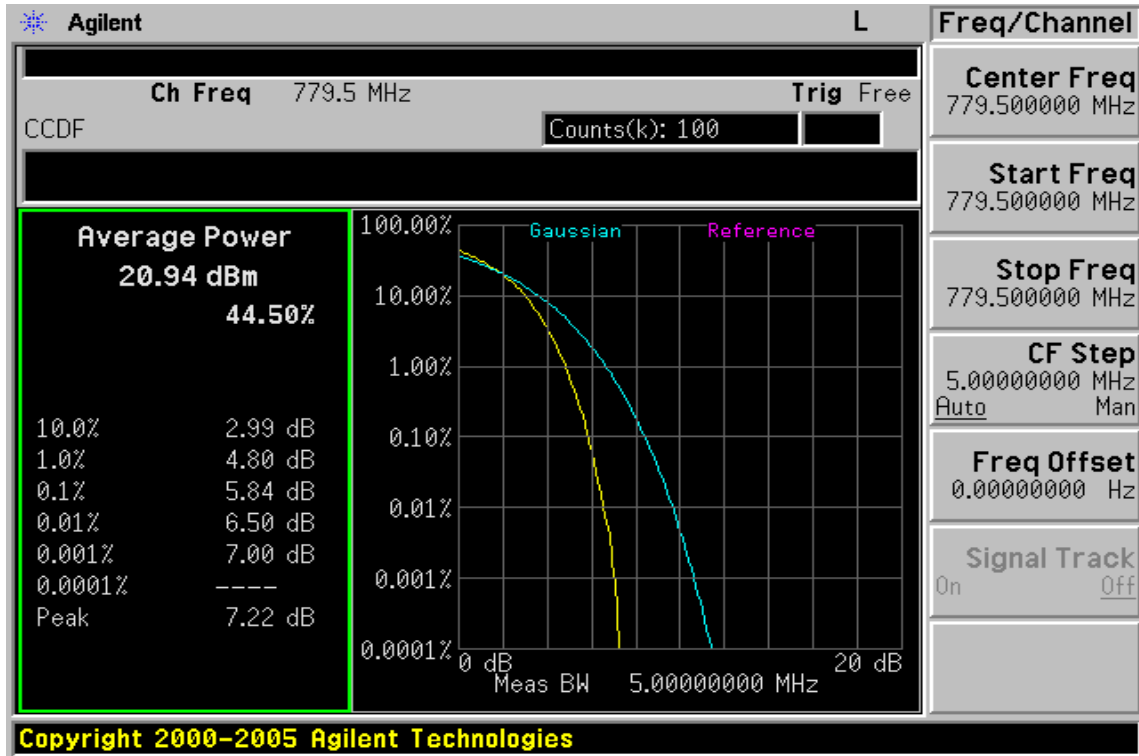
20MHz BW LTE-Band 4 16QAM Channel Mid



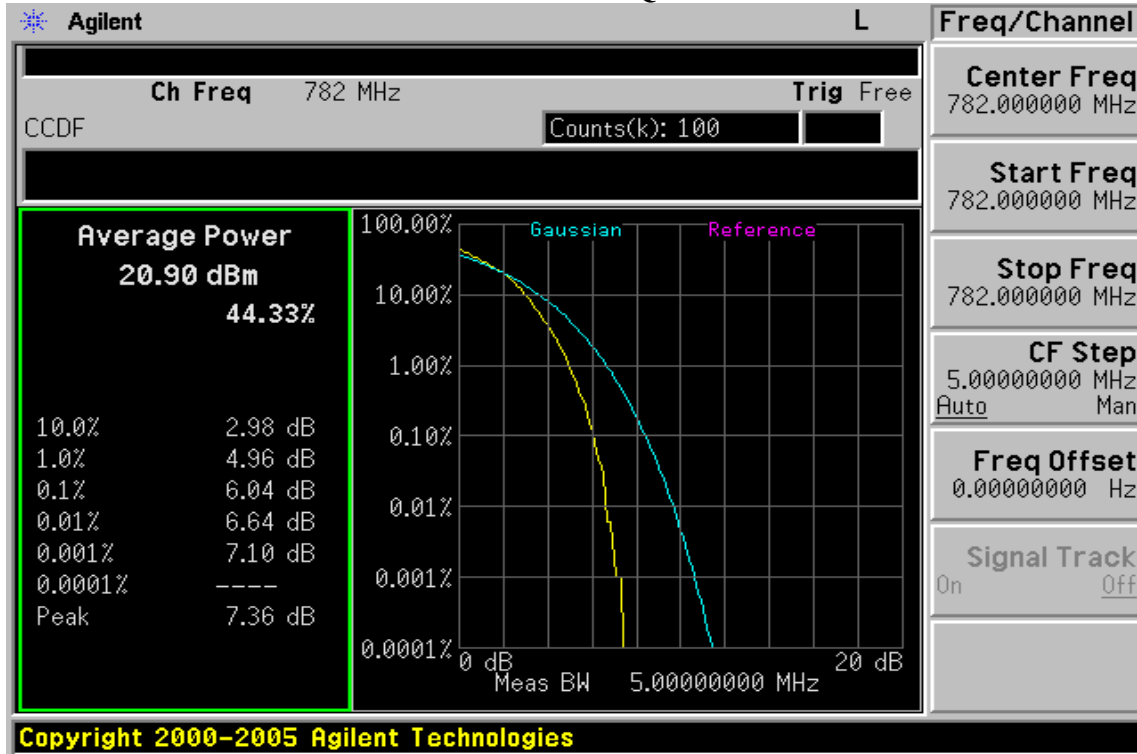
20MHz BW LTE-Band 4 16QAM Channel High



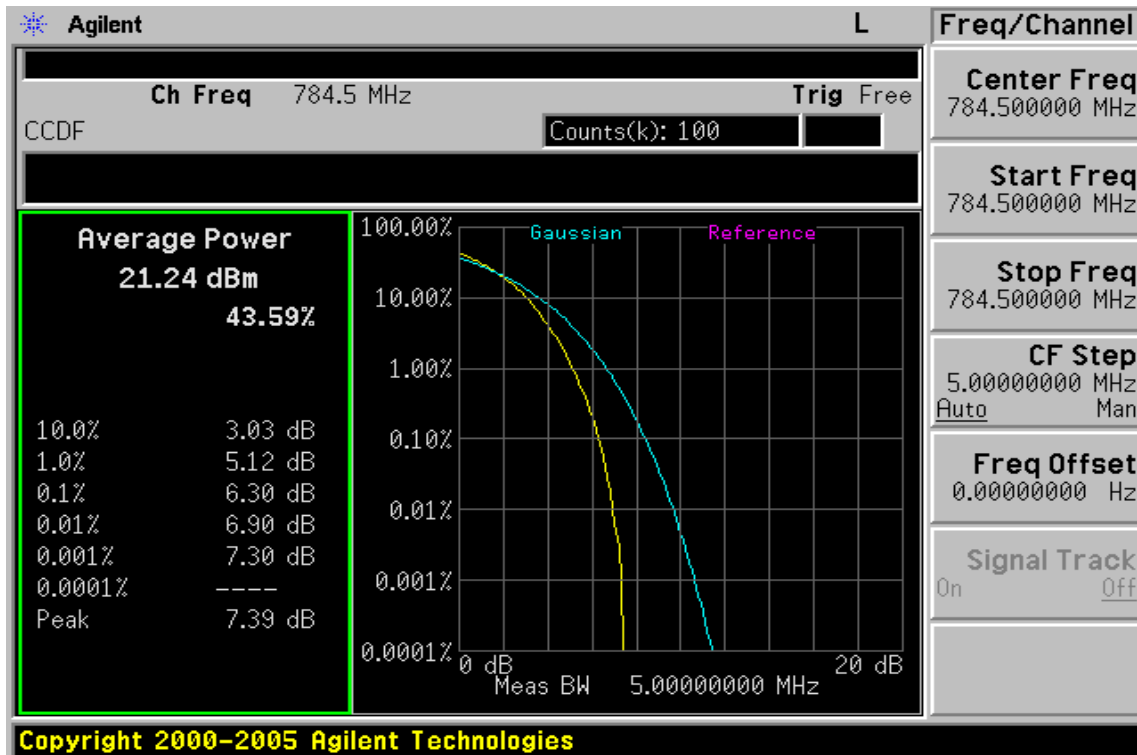
5MHz BW LTE-Band 13 16QAM Channel Low



5MHz BW LTE-Band 13 16QAM Channel Mid



5MHz BW LTE-Band 13 16QAM Channel High



10MHz BW LTE-Band 13 16QAM Channel Mid

