



RF TEST REPORT

Applicant ZTE Coporation
FCC ID SRQ-Z815
Product LTE/WCDMA/GSM Multi-Mode Digital
Mobile Phone
Model Z815
Report No. RXC1512-0230RF03R2
Issue Date March 15, 2016

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2014)/ FCC CFR47 Part 27C (2014)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Lingling Kang

Reviewed by: *lingling Kang*

Kai Xu

Approved by: *Kai Xu*



TA Technology (Shanghai) Co., Ltd.

No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China

TEL: +86-021-50791141/2/3

FAX: +86-021-50791141/2/3-8000



Table of Contents

1	Test Laboratory.....	4
1.1	Notes of the Test Report.....	4
1.2	Test facility.....	4
1.3	Testing Location.....	5
2	General Description of Equipment under Test.....	6
2.1	Applied Standards.....	7
3	Test Configuration.....	8
4	Test Information.....	10
4.1	RF Power Output.....	10
4.2	Effective Isotropic Radiated Power.....	17
4.3	Occupied Bandwidth.....	23
4.4	Band Edge Compliance.....	37
4.5	Peak-to-Average Power Ratio (PAPR).....	56
4.6	Frequency Stability.....	59
4.7	Spurious Emissions at Antenna Terminals.....	64
4.8	Radiates Spurious Emission.....	82
5	Main Test Equipment.....	101
	ANNEX A: The EUT Appearance and Test Configuration.....	102
	A.1 EUT Appearance.....	102
	A.2 Test Setup.....	104



Summary of Measurement Results

Number	Test Case	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Isotropic Radiated power	27.50(d)(4)/ 27.50(c)(10)	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	27.53(h)/ 27.53(g)	PASS
5	Peak-to-Average Power Ratio	27.50(a)/KDB971168 D01(5.7)	PASS
6	Frequency Stability	2.1055 / 27.54	PASS
7	Spurious Emissions at Antenna Terminals	2.1051 / 27.53(h) / 27.53(g)	PASS
8	Radiates Spurious Emission	2.1053 /27.53(h) / 27.53(g)	PASS
Date of Testing: January 5, 2016~ February 7, 2016 and March 8, 2016			
Note: PASS: The EUT complies with the essential requirements in the standard. FAIL: The EUT does not comply with the essential requirements in the standard.			



1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of TA technology (shanghai) co., Ltd. The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above. This report must not be used by the client to claim product certification, approval, or endorsement by CNAS or any government agencies.

1.2 Test facility

CNAS (accreditation number:L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (recognition number is 428261)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.



1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
City: Shanghai
Post code: 201201
Country: P. R. China
Contact: Xu Kai
Telephone: +86-021-50791141/2/3
Fax: +86-021-50791141/2/3-8000
Website: <http://www.ta-shanghai.com>
E-mail: xukai@ta-shanghai.com

2 General Description of Equipment under Test

Client Information

Applicant	ZTE Coporation
Applicant address	ZTE Plaza, #55 Keji Road South, Hi-Tech, Industrial Park, Nanshan District
Manufacturer	ZTE Coporation
Manufacturer address	ZTE Plaza, #55 Keji Road South, Hi-Tech, Industrial Park, Nanshan District

General information

Model:	Z815		
IMEI:	869278020003663		
Hardware Version:	u50A		
Software Version:	Z815V0.0.0B01		
Power Supply:	Battery/AC adapter		
Antenna Type:	Internal Antenna		
Test Mode(s):	WCDMA Band IV; LTE Band 4; LTE Band 12;		
WCDMA Downlink UE Category:	14		
WCDMA Uplink UE Category:	6		
Maximum E.I.R.P./ E.R.P.	WCDMA Band IV: 22.87dBm LTE Band 4: 23.33dBm LTE Band 12: 21.14dBm		
Rated Power Supply Voltage:	3.84V		
Extreme Voltage:	Minimum: 3.6V Maximum: 4.4V		
Extreme Temperature:	Lowest: -10°C Highest: +60°C		
Operating Frequency Range(s)	Mode	Tx (MHz)	Rx (MHz)
	WCDMA Band IV	1710 ~ 1755	2110 ~ 2155
	LTE Band 4	1710 ~ 1755	2110 ~ 2155
	LTE Band 12	699 ~ 716	729 ~ 746
EUT Accessory			
Battery	Manufacturer: SCUD(FUJIAN)ELECTRONICS Model: Li3922T44P6h903546 Power Rating: DC 3.84V, Li-ion		
Adapter	Manufacturer: RUIDE Model: STC-A51A-Z		
Note: 1. The information of the EUT is declared by the manufacturer. Please refer to the specifications or user manual for details.			



2.1 Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards

FCC CFR47 Part 2 (2014)

FCC CFR47 Part 27C (2014)

ANSI/TIA-603-D(2010)

KDB 971168 D01 Power Meas License Digital Systems v02r02

3 Test Configuration

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes. EUT stand-up position (Z axis), lie-down position (X, Y axis). Receiver antenna polarization (horizontal and vertical), the worst emission was found in position (Z axis, vertical polarization) and the worst case was recorded.

All mode and data rates and positions and RB size and modulations were investigated. Subsequently, only the worst case emissions are reported.

The following testing in WCDMA/LTE is set based on the maximum RF Output Power.

The following testing in different Bandwidth is set to detail in the following table:

Test modes are chosen to be reported as the worst case configuration below for WCDMA Band IV:

	Test items	Modes	Modulation
Conducted Test cases	RF power output	WCDMA Band IV	RMC/HSDPA/HSUPA/DC-HSDPA
	Effective Isotropic Radiated power	WCDMA Band IV	RMC
	Occupied Bandwidth	WCDMA Band IV	RMC
	Band Edge Compliance	WCDMA Band IV	RMC
	Peak-to-Average Power Ratio	WCDMA Band IV	RMC
	Frequency Stability	WCDMA Band IV	RMC
	Spurious Emissions at Antenna Terminals	WCDMA Band IV	RMC
Radiated Test cases	Radiates Spurious Emission	WCDMA Band IV	RMC



Test modes are chosen to be reported as the worst case configuration below for LTE Band 4/7/28:

Test items	Modes	Bandwidth (MHz)						Modulation		RB			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF power output	LTE 4	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	LTE 12	-	-	O	O	-	-	O	O	O	O	O	O	O	O
Effective Isotropic Radiated power	LTE 4	O	O	O	O	O	O	O	O	-	-	O	O	O	O
	LTE 12	-	-	O	O	-	-	O	O	-	-	O	O	O	O
Occupied Bandwidth	LTE 4	O	O	O	O	O	O	O	O	-	-	O	O	O	O
	LTE 12	-	-	O	O	-	-	O	O	-	-	O	O	O	O
Band Edge Compliance	LTE 4	O	O	O	O	O	O	O	O	O	-	O	O	-	O
	LTE 12	-	-	O	O	-	-	O	O	O	-	O	O	-	O
Peak-to-Average Power Ratio	LTE 4	O	O	O	O	O	O	O	O	-	-	O	O	O	O
	LTE 12	-	-	O	O	-	-	O	O	-	-	O	O	O	O
Frequency Stability	LTE 4	O	O	O	O	O	O	O	O	-	-	O	-	O	-
	LTE 12	-	-	O	O	-	-	O	O	-	-	O	-	O	-
Spurious Emissions at Antenna Terminals	LTE 4	O	O	O	O	O	O	O	-	O	-	-	O	O	O
	LTE 12	-	-	O	O	-	-	O	-	O	-	-	O	O	O
Radiates Spurious Emission	LTE 4	O	O	O	O	O	O	O	-	O	-	-	O	O	O
	LTE 12	-	-	O	O	-	-	O	-	O	-	-	O	O	O
Note	1. The mark "O" means that this configuration is chosen for testing. 2. The mark "-" means that this configuration is not testing.														

4 Test Information

4.1 RF Power Output

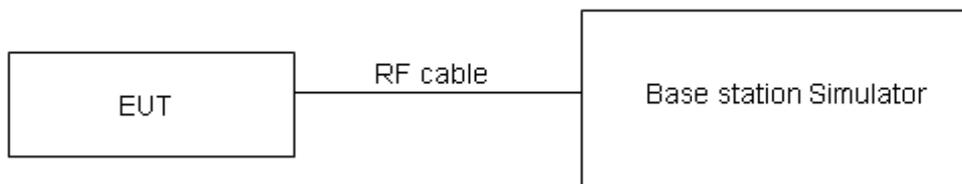
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

During the process of the testing, The EUT is controlled by the Base Station Simulator to ensure max power transmission and proper modulation.

Test Setup



The loss between RF output port of the EUT and the input port of the tester has been taken into consideration.

Limits

No specific RF power output requirements in part 2.1046.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U=0.4$ dB.



Test Results

WCDMA Band IV		Conducted Power(dBm)		
		Channel 1312	Channel 1413	Channel 1513
		1712.4 (MHz)	1732.6 (MHz)	1752.6(MHz)
RMC		23.71	23.52	23.61
HSDPA	Sub - Test 1	23.60	23.44	23.61
	Sub - Test 2	23.68	23.39	23.67
	Sub - Test 3	23.71	23.61	23.61
	Sub - Test 4	23.62	23.67	23.62
HSUPA	Sub - Test 1	22.59	22.53	22.42
	Sub - Test 2	21.27	21.23	21.11
	Sub - Test 3	22.01	21.84	21.59
	Sub - Test 4	21.30	21.32	21.06
	Sub - Test 5	22.65	22.56	22.58
DC-HSDPA	Sub - Test 1	23.53	23.32	23.47
	Sub - Test 2	23.47	23.28	23.42
	Sub - Test 3	23.31	23.09	23.32
	Sub - Test 4	23.34	23.13	23.35
HSDPA+	Sub - Test 1	23.37	23.23	23.43
	Sub - Test 2	23.41	23.14	23.51
	Sub - Test 3	23.21	23.08	23.11
	Sub - Test 4	23.11	23.10	23.14
HSUPA+	Sub - Test 1	22.60	22.55	22.43
	Sub - Test 2	21.29	21.31	21.13
	Sub - Test 3	22.04	21.89	21.58
	Sub - Test 4	21.30	21.38	21.06
	Sub - Test 5	22.66	22.59	22.59
Note:				
1) The maximum RF Output Power numbers are marks in bold.				
2) The following testing in RMC based on the maximum RF Output Power.				



LTE TDD Band 4				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19957/1710.7	20175/1732.5	20393/1754.3
1.4MHz	QPSK	1	0	23.68	23.89	23.84
		1	2	23.87	23.52	23.85
		1	5	23.48	23.78	23.78
		3	0	22.65	22.65	22.69
		3	2	22.55	22.51	22.59
		3	3	22.51	22.73	22.61
		6	0	22.66	22.66	22.73
	16QAM	1	0	22.76	22.32	22.84
		1	2	22.57	22.69	22.53
		1	5	22.58	22.10	22.12
		3	0	22.15	22.23	22.29
		3	2	22.19	22.09	22.22
		3	3	22.16	22.19	22.29
		6	0	21.76	21.50	21.65
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19965/1711.5	20175/1732.5	20385/1753.5
3MHz	QPSK	1	0	23.55	23.76	23.71
		1	7	23.74	23.39	23.72
		1	14	23.35	23.65	23.65
		8	0	22.52	22.52	22.56
		8	4	22.42	22.42	22.50
		8	7	22.38	22.63	22.53
		15	0	22.53	22.53	22.60
	16QAM	1	0	22.63	22.19	22.71
		1	7	22.44	22.56	22.40
		1	14	22.45	21.97	21.99
		8	0	21.40	21.48	21.54
		8	4	21.44	21.34	21.47
		8	7	21.41	21.44	21.54
		15	0	21.63	21.37	21.52
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19975/1712.5	20175/1732.5	20375/1752.5
5MHz	QPSK	1	0	23.57	23.78	23.73
		1	13	23.76	23.41	23.74
		1	24	23.37	23.67	23.67
		12	0	22.54	22.54	22.58
		12	6	22.44	22.44	22.52
		12	13	22.40	22.65	22.55
		25	0	22.55	22.55	22.62
	16QAM	1	0	22.65	22.21	22.73



		1	13	22.46	22.58	22.42
		1	24	22.47	21.99	22.01
		12	0	21.42	21.50	21.56
		12	6	21.46	21.36	21.49
		12	13	21.43	21.46	21.56
		25	0	21.65	21.39	21.54
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20000/1715	20175/1732.5	20350/1750
10MHz	QPSK	1	0	23.61	23.82	23.77
		1	25	23.80	23.45	23.78
		1	49	23.41	23.71	23.71
		25	0	22.58	22.58	22.62
		25	13	22.48	22.48	22.56
		25	25	22.44	22.69	22.59
		50	0	22.59	22.59	22.66
	16QAM	1	0	22.69	22.25	22.77
		1	25	22.50	22.62	22.46
		1	49	22.51	22.03	22.05
		25	0	21.46	21.54	21.60
		25	13	21.50	21.40	21.53
		25	25	21.47	21.50	21.60
		50	0	21.69	21.43	21.58
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20025/1717.5	20175/1732.5	20325/1747.5
15MHz	QPSK	1	0	23.64	23.85	23.80
		1	38	23.83	23.48	23.81
		1	74	23.44	23.74	23.74
		36	0	22.61	22.61	22.65
		36	18	22.51	22.51	22.59
		36	39	22.47	22.72	22.62
		75	0	22.62	22.62	22.69
	16QAM	1	0	22.72	22.28	22.80
		1	38	22.53	22.65	22.49
		1	74	22.54	22.06	22.08
		36	0	21.49	21.57	21.63
		36	18	21.53	21.43	21.56
		36	39	21.50	21.53	21.63
		75	0	21.72	21.46	21.61
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20050/1720	20175/1732.5	20300/1745
20MHz	QPSK	1	0	23.66	23.87	23.82
		1	50	23.85	23.50	23.83
		1	99	23.46	23.76	23.76



		50	0	22.63	22.63	22.67
		50	25	22.53	22.53	22.61
		50	50	22.49	22.74	22.64
		100	0	22.64	22.64	22.71
	16QAM	1	0	22.74	22.30	22.82
		1	50	22.55	22.67	22.51
		1	99	22.56	22.08	22.10
		50	0	21.51	21.59	21.65
		50	25	21.55	21.45	21.58
		50	50	21.52	21.55	21.65
		100	0	21.74	21.48	21.63

Note:

1) The following testing in worst case based on the maximum RF Output Power.



LTE TDD Band 12				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23017/699.7	23095/707.5	23173/715.3
1.4MHz	QPSK	1	0	23.99	23.94	24.40
		1	2	24.30	24.71	24.22
		1	5	24.29	24.00	24.16
		3	0	23.51	23.59	23.67
		3	2	23.82	23.70	23.51
		3	3	23.97	23.68	23.60
	16QAM	6	0	23.09	23.03	23.12
		1	0	22.49	22.65	23.30
		1	2	22.17	22.84	23.89
		1	5	22.87	22.59	23.50
		3	0	22.13	22.03	22.36
		3	2	22.29	22.12	22.28
		3	3	22.34	22.11	22.11
		6	0	22.04	22.07	22.21
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23025/700.5	23095/707.5	23165/714.5
3MHz	QPSK	1	0	23.94	23.89	24.35
		1	7	24.25	24.66	24.17
		1	14	24.24	23.95	24.11
		8	0	22.95	23.03	23.11
		8	4	22.86	22.04	22.95
		8	7	23.11	23.12	23.04
		15	0	23.04	22.98	23.07
	16QAM	1	0	22.44	22.60	23.25
		1	7	22.12	22.79	23.84
		1	14	22.82	22.54	23.45
		8	0	22.08	21.98	22.31
		8	4	22.24	22.07	22.23
		8	7	22.29	22.06	22.06
		15	0	21.99	22.02	22.16
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23035/701.5	23095/707.5	23155/713.5
5MHz	QPSK	1	0	23.95	23.90	24.36
		1	13	24.26	24.67	24.18
		1	24	24.25	23.96	24.12
		12	0	22.96	23.04	23.12
		12	6	22.87	22.05	22.96
		12	13	23.12	23.13	23.05
		25	0	23.05	22.99	23.08
	16QAM	1	0	22.45	22.61	23.26



Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			
				23060/704	23095/707.5	23130/711	
10MHz	QPSK	1	13	22.13	22.80	23.85	
		1	24	22.83	22.55	23.46	
		12	0	22.09	21.99	22.32	
		12	6	22.25	22.08	22.24	
		12	13	22.30	22.07	22.07	
		25	0	22.00	22.03	22.17	
	16QAM	16QAM	1	0	23.98	23.93	24.39
			1	25	24.29	24.70	24.21
			1	49	24.28	23.99	24.15
			25	0	22.99	23.07	23.15
			25	13	22.90	22.08	22.99
			25	25	23.15	23.16	23.08
			50	0	23.08	23.02	23.11
			50	0	22.48	22.64	23.29

4.2 Effective Isotropic Radiated Power

Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Methods of Measurement

The measurement procedures in TIA- 603-D are used.

1. The EUT was placed on a turntable with 1.5 meter height in a fully anechoic chamber.
2. The EUT was set at 3 meters from the receiving antenna, which was mounted on the antennatower.
- 3.UMTS operating modes: Set RBW= 100 KHz, VBW= 300 KHz, RMS detector over frame, and use channel power option with bandwidth=5MHz, per section 4.0 of KDB 971168 D01.
4. The table was rotated 360 degrees to determine the position of the highest radiated power.
5. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
6. Taking the record of maximum ERP/EIRP.
7. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
8. The conducted power at the terminal of the dipole antenna is measured.
9. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.

$$10. ERP/EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$$

P_s (dBm) : Input power to substitution antenna.

G_s (dBi or dBd) : Substitution antenna Gain.

$$E_t = R_t + AF$$

$$E_s = R_s + AF$$

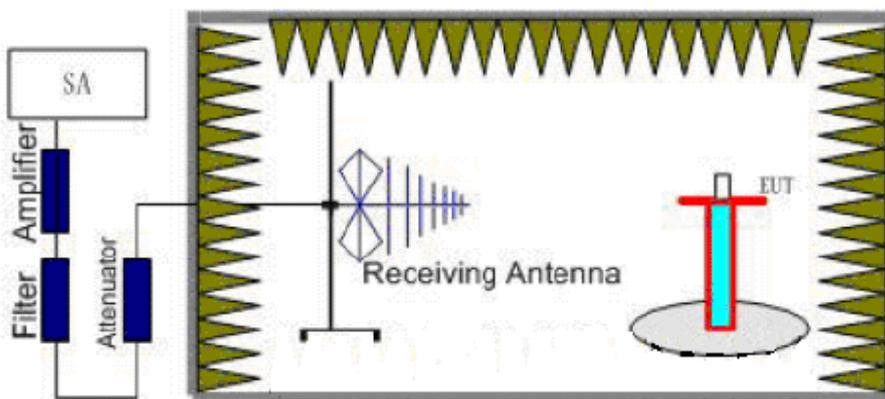
AF (dB/m) : Receive antenna factor

R_t : The highest received signal in spectrum analyzer for EUT.

R_s : The highest received signal in spectrum analyzer for substitution antenna.

$$EIRP = E.R.P + 2.15$$

Test Setup





Limits

Rule Part 27.50(d)(4) specifies that " Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP", Rule Part 27.50(c)(10) specifies that " Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP"

Rule Part 27.50(d)(6) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage".

Limit (EIRP)	$\leq 1\text{ W}$ (30 dBm)
Limit (ERP)	$\leq 3\text{ W}$ (34.77 dBm)

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2, U = 1.19\text{ dB}$



Test Results

WCDMA Band IV							
Frequency (MHz)	Ant Pot (H/V)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	Conclusion
1712.4	H	-35.18	-54.98	0	1.44	21.24	Pass
1732.6	H	-34.42	-55.10	0	1.63	22.31	Pass
1752.6	H	-34.61	-55.31	0	1.78	22.48	Pass
1712.4	V	-34.07	-55.50	0	1.44	22.87	Pass
1732.6	V	-34.13	-55.26	0	1.63	22.76	Pass
1752.6	V	-34.77	-55.65	0	1.78	22.66	Pass

LTE Band 4								
Bandwidth	Frequency (MHz)	Ant Pot (H/V)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	Conclusion
1.4MHz (QPSK)	1710.7	H	-33.68	-54.30	0	1.41	22.03	Pass
	1732.5	H	-33.41	-54.32	0	1.56	22.47	Pass
	1754.3	H	-33.66	-54.10	0	1.67	22.11	Pass
	1710.7	V	-32.49	-54.35	0	1.41	23.27	Pass
	1732.5	V	-32.64	-54.41	0	1.56	23.33	Pass
	1754.3	V	-32.89	-54.52	0	1.67	23.30	Pass
1.4MHz (16QAM)	1710.7	H	-34.67	-54.30	0	1.41	21.04	Pass
	1732.5	H	-34.47	-54.32	0	1.56	21.41	Pass
	1754.3	H	-34.65	-54.10	0	1.67	21.12	Pass
	1710.7	V	-34.40	-54.35	0	1.41	21.36	Pass
	1732.5	V	-34.49	-54.41	0	1.56	21.48	Pass
	1754.3	V	-34.61	-54.52	0	1.67	21.58	Pass
3MHz (QPSK)	1711.5	H	-34.03	-54.33	0	1.38	21.68	Pass
	1732.5	H	-34.59	-54.32	0	1.56	21.29	Pass
	1753.5	H	-33.95	-54.11	0	1.69	21.85	Pass
	1711.5	V	-32.84	-54.35	0	1.38	22.89	Pass
	1732.5	V	-32.91	-54.41	0	1.56	23.06	Pass
	1753.5	V	-33.06	-54.48	0	1.69	23.11	Pass
3MHz (16QAM)	1711.5	H	-35.35	-54.33	0	1.38	20.36	Pass
	1732.5	H	-35.10	-54.32	0	1.56	20.78	Pass
	1753.5	H	-35.05	-54.11	0	1.69	20.75	Pass
	1711.5	V	-34.10	-54.35	0	1.38	21.63	Pass
	1732.5	V	-34.44	-54.41	0	1.56	21.53	Pass
	1753.5	V	-34.72	-54.48	0	1.69	21.45	Pass
5MHz (QPSK)	1712.5	H	-34.24	-54.34	0	1.40	21.50	Pass
	1732.5	H	-33.77	-54.32	0	1.56	22.11	Pass
	1752.5	H	-35.72	-54.13	0	1.70	20.11	Pass
	1712.5	V	-33.09	-54.38	0	1.40	22.69	Pass
	1732.5	V	-33.18	-54.41	0	1.56	22.79	Pass



	1752.5	V	-34.40	-54.47	0	1.70	21.77	Pass
5MHz (16QAM)	1712.5	H	-35.29	-54.34	0	1.40	20.45	Pass
	1732.5	H	-34.77	-54.32	0	1.56	21.11	Pass
	1752.5	H	-36.38	-54.13	0	1.70	19.45	Pass
	1712.5	V	-34.00	-54.38	0	1.40	21.78	Pass
	1732.5	V	-34.50	-54.41	0	1.56	21.47	Pass
	1752.5	V	-35.98	-54.47	0	1.70	20.19	Pass
	10MHz (QPSK)	1715	H	-34.50	-54.33	0	1.45	21.28
1732.5		H	-35.04	-54.32	0	1.56	20.84	Pass
1750		H	-35.12	-54.12	0	1.65	20.65	Pass
1715		V	-32.66	-54.32	0	1.45	23.11	Pass
1732.5		V	-33.47	-54.41	0	1.56	22.50	Pass
1750		V	-33.59	-54.52	0	1.65	22.58	Pass
10MHz (16QAM)	1715	H	-35.64	-54.33	0	1.45	20.14	Pass
	1732.5	H	-36.40	-54.32	0	1.56	19.48	Pass
	1750	H	-36.25	-54.12	0	1.65	19.52	Pass
	1715	V	-34.41	-54.32	0	1.45	21.36	Pass
	1732.5	V	-34.49	-54.41	0	1.56	21.48	Pass
	1750	V	-35.03	-54.52	0	1.65	21.14	Pass
15MHz (QPSK)	1717.5	H	-34.66	-54.35	0	1.42	21.11	Pass
	1732.5	H	-35.02	-54.32	0	1.56	20.86	Pass
	1747.5	H	-34.89	-54.17	0	1.68	20.96	Pass
	1717.5	V	-32.78	-54.39	0	1.42	23.03	Pass
	1732.5	V	-33.74	-54.41	0	1.56	22.23	Pass
	1747.5	V	-34.16	-54.51	0	1.68	22.03	Pass
15MHz (16QAM)	1717.5	H	-35.65	-54.35	0	1.42	20.12	Pass
	1732.5	H	-36.63	-54.32	0	1.56	19.25	Pass
	1747.5	H	-36.49	-54.17	0	1.68	19.36	Pass
	1717.5	V	-33.64	-54.39	0	1.42	22.17	Pass
	1732.5	V	-34.76	-54.41	0	1.56	21.21	Pass
	1747.5	V	-35.01	-54.51	0	1.68	21.18	Pass
20MHz (QPSK)	1720	H	-33.32	-54.37	0	1.43	22.35	Pass
	1732.5	H	-33.22	-54.32	0	1.56	22.66	Pass
	1745	H	-33.41	-54.23	0	1.66	22.48	Pass
	1720	V	-32.58	-54.44	0	1.43	23.29	Pass
	1732.5	V	-32.72	-54.41	0	1.56	23.25	Pass
	1745	V	-33.15	-54.59	0	1.66	23.10	Pass
20MHz (16QAM)	1720	H	-34.48	-54.37	0	1.43	21.32	Pass
	1732.5	H	-34.36	-54.32	0	1.56	21.52	Pass
	1745	H	-34.75	-54.23	0	1.66	21.14	Pass
	1720	V	-33.59	-54.44	0	1.43	22.28	Pass
	1732.5	V	-33.62	-54.41	0	1.56	22.35	Pass
	1745	V	-34.11	-54.59	0	1.66	22.14	Pass



LTE Band 12								
Bandwidth	Frequency (MHz)	Ant Pot (H/V)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	ERP (dBm)	Conclusion
1.4MHz (QPSK)	699.7	H	-28.90	-49.12	0	2.04	20.11	Pass
	707.5	H	-29.27	-49.39	0	2.03	20.01	Pass
	715.3	H	-29.30	-49.76	0	1.99	20.30	Pass
	699.7	V	-45.33	-48.91	0	2.04	3.48	Pass
	707.5	V	-43.19	-49.12	0	2.03	5.81	Pass
	715.3	V	-42.47	-49.43	0	1.99	6.81	Pass
1.4MHz (16QAM)	699.7	H	-29.77	-49.12	0	2.04	19.24	Pass
	707.5	H	-29.95	-49.39	0	2.03	19.33	Pass
	715.3	H	-30.16	-49.76	0	1.99	19.44	Pass
	699.7	V	-46.75	-48.91	0	2.04	2.06	Pass
	707.5	V	-44.17	-49.12	0	2.03	4.83	Pass
	715.3	V	-43.98	-49.43	0	1.99	5.30	Pass
3MHz (QPSK)	700.5	H	-28.28	-49.15	0	2.04	20.76	Pass
	707.5	H	-28.37	-49.39	0	2.03	20.91	Pass
	714.5	H	-29.08	-49.73	0	2.00	20.50	Pass
	700.5	V	-44.53	-48.94	0	2.04	4.30	Pass
	707.5	V	-43.13	-49.12	0	2.03	5.87	Pass
	714.5	V	-43.62	-49.37	0	2.00	5.60	Pass
3MHz (16QAM)	700.5	H	-29.85	-49.15	0	2.04	19.19	Pass
	707.5	H	-30.42	-49.39	0	2.03	18.86	Pass
	714.5	H	-30.28	-49.73	0	2.00	19.30	Pass
	700.5	V	-45.56	-48.94	0	2.04	3.27	Pass
	707.5	V	-43.60	-49.12	0	2.03	5.40	Pass
	714.5	V	-44.93	-49.37	0	2.00	4.29	Pass
5MHz (QPSK)	701.5	H	-29.24	-49.17	0	2.04	19.83	Pass
	707.5	H	-28.73	-49.39	0	2.03	20.55	Pass
	713.5	H	-30.40	-49.72	0	2.01	19.17	Pass
	701.5	V	-45.78	-48.95	0	2.04	3.06	Pass
	707.5	V	-43.61	-49.12	0	2.03	5.39	Pass
	713.5	V	-43.82	-49.35	0	2.01	4.18	Pass
5MHz (16QAM)	701.5	H	-30.76	-49.17	0	2.04	18.31	Pass
	707.5	H	-29.89	-49.39	0	2.03	19.39	Pass
	713.5	H	-31.36	-49.72	0	2.01	18.21	Pass
	701.5	V	-46.47	-48.95	0	2.04	2.37	Pass
	707.5	V	-44.31	-49.12	0	2.03	4.69	Pass
	713.5	V	-44.52	-49.35	0	2.01	2.99	Pass
10MHz	704	H	-28.75	-49.25	0	2.04	20.39	Pass



(QPSK)	707.5	H	-28.14	-49.39	0	2.03	21.14	Pass
	711	H	-30.02	-49.65	0	2.02	19.50	Pass
	704	V	-44.79	-49.00	0	2.04	4.10	Pass
	707.5	V	-42.11	-49.12	0	2.03	6.89	Pass
	711	V	-42.82	-49.33	0	2.02	6.37	Pass
10MHz (16QAM)	704	H	-29.65	-49.25	0	2.04	19.49	Pass
	707.5	H	-29.89	-49.39	0	2.03	19.39	Pass
	711	H	-30.69	-49.65	0	2.02	18.83	Pass
	704	V	-45.50	-49.00	0	2.04	3.39	Pass
	707.5	V	-42.99	-49.12	0	2.03	6.01	Pass
	711	V	-44.10	-49.33	0	2.02	5.09	Pass

Note: 1. EIRP= E.R.P+2.15

4.3 Occupied Bandwidth

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.

RBW is set to 51 kHz, VBW is set to 160 kHz for WCDMA Band IV.

RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4/12 (1.4MHz).

RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 4/12 (3MHz).

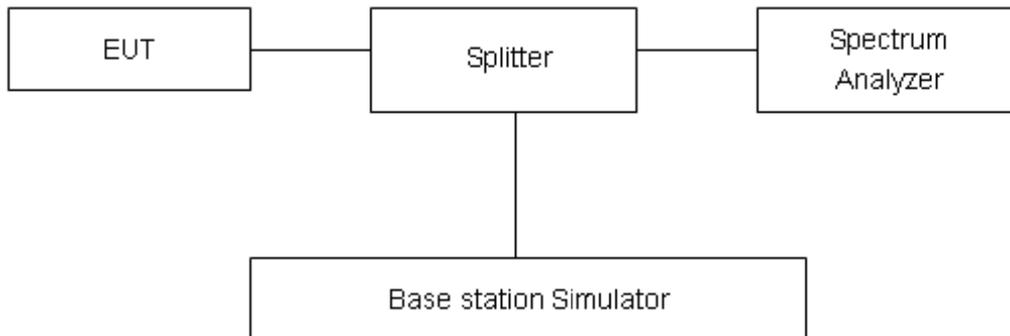
RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 4/12 (5MHz).

RBW is set to 300 kHz, VBW is set to 1MHz for LTE Band 4/12 (10MHz).

RBW is set to 300 kHz, VBW is set to 1MHz for LTE Band 4 (15MHz/20MHz) on spectrum analyzer.

99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

No specific occupied bandwidth requirements in part 2.1049.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2, U=624\text{Hz}$.



Test Result

Mode	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
WCDMA Band IV (RMC)	1312	1712.4	4.1682	4.717
	1413	1732.6	4.1580	4.713
	1513	1752.6	4.1484	4.677

LTE Band 4						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	19957	1710.7	1.1353	1.380
			20175	1732.5	1.1271	1.360
			20393	1754.3	1.1220	1.387
		3	19965	1711.5	2.7491	3.045
			20175	1732.5	2.7504	3.062
			20385	1753.5	2.7463	3.085
		5	19975	1712.5	4.5215	5.035
			20175	1732.5	4.5303	5.047
			20375	1752.5	4.5337	5.059
		10	20000	1715	9.0382	10.040
			20175	1732.5	9.0619	10.190
			20350	1750	9.0638	10.070
		15	20025	1717.5	13.482	14.78
			20175	1732.5	13.534	14.78
			20325	1747.5	13.488	14.67
		20	20050	1720	17.906	19.48
			20175	1732.5	17.917	19.27
			20300	1745	17.889	19.28
	16QAM	1.4	19957	1710.7	1.1203	1.341
			20175	1732.5	1.1207	1.369
			20393	1754.3	1.1210	1.321
		3	19965	1711.5	2.7396	3.051
			20175	1732.5	2.7509	3.076
			20385	1753.5	2.7531	3.050
5		19975	1712.5	4.5208	5.039	
		20175	1732.5	4.5366	5.040	
		20375	1752.5	4.5251	5.007	
10		20000	1715	9.0085	10.01	

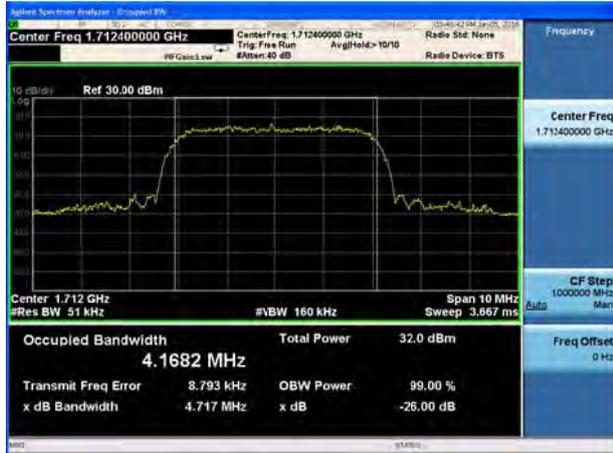


		15	20175	1732.5	9.0449	10.07
			20350	1750	9.0626	10.16
			20025	1717.5	13.496	14.73
		20	20175	1732.5	13.481	14.77
			20325	1747.5	13.471	14.78
			20050	1720	17.908	19.26
			20175	1732.5	17.934	19.29
			20300	1745	17.905	19.22

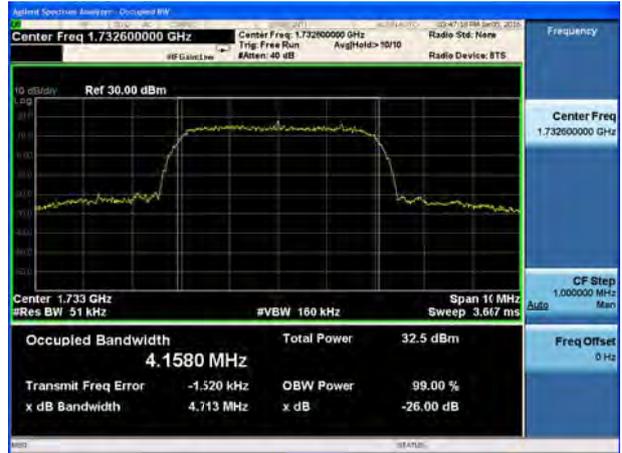
LTE Band 12						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	23017	699.7	1.1297	1.372
			23095	707.5	1.1269	1.353
			23173	715.3	1.1368	1.355
		3	23025	700.5	2.7521	3.045
			23095	707.5	2.7427	3.072
			23165	714.5	2.7469	3.070
		5	23035	701.5	4.5239	5.035
			23095	707.5	4.5308	5.009
			23155	713.5	4.5134	5.033
		10	23060	704	9.0223	10.06
			23095	707.5	9.0590	10.14
			23130	711	9.0536	10.12
	16QAM	1.4	23017	699.7	1.1308	1.341
			23095	707.5	1.1165	1.315
			23173	715.3	1.1191	1.372
		3	23025	700.5	2.7398	3.054
			23095	707.5	2.7635	3.030
			23165	714.5	2.7352	3.073
		5	23035	701.5	4.5322	5.039
			23095	707.5	4.5111	4.984
			23155	713.5	4.5407	5.040
		10	23060	704	9.0264	10.03
			23095	707.5	9.0391	10.01
			23130	711	9.0574	10.07



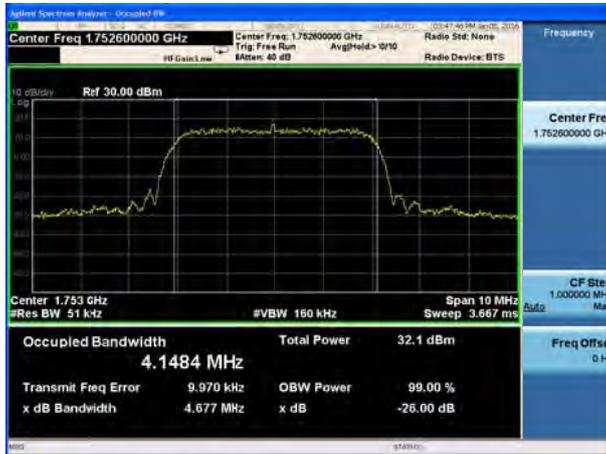
WCDMA Band IV CH1312 Occupied Bandwidth



WCDMA Band IV CH1413 Occupied Bandwidth

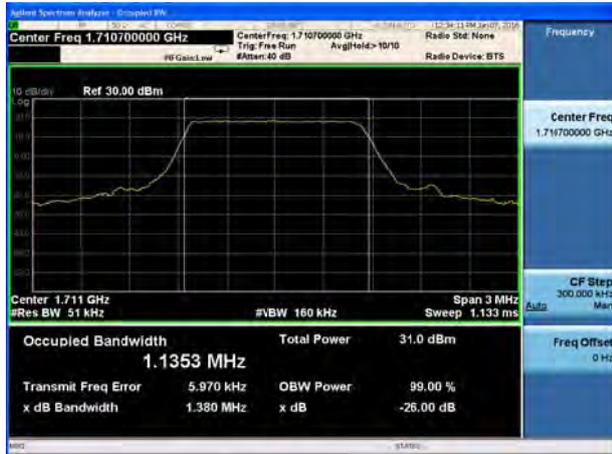


WCDMA Band IV CH1513 Occupied Bandwidth

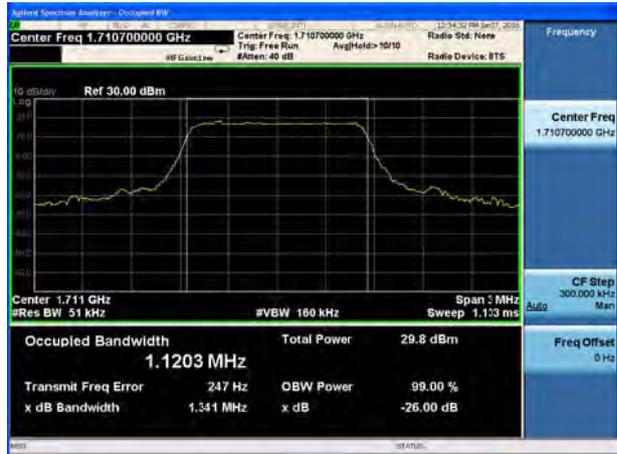




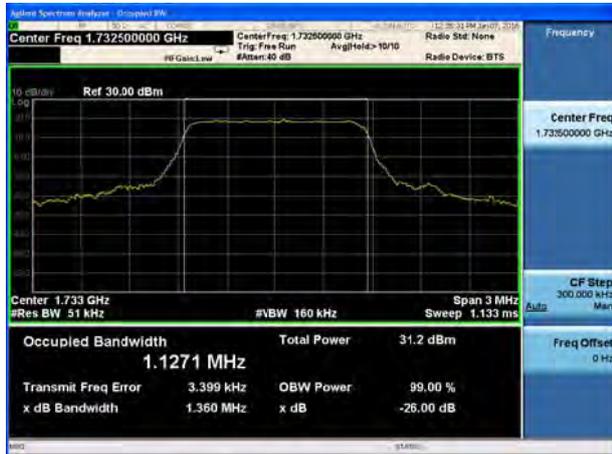
LTE Band 4 QPSK Bandwidth = 1.4MHz
CH19957 Occupied Bandwidth



LTE Band 4 16QAM Bandwidth = 1.4MHz
CH19957 Occupied Bandwidth



LTE Band 4 QPSK Bandwidth = 1.4MHz
CH20175 Occupied Bandwidth



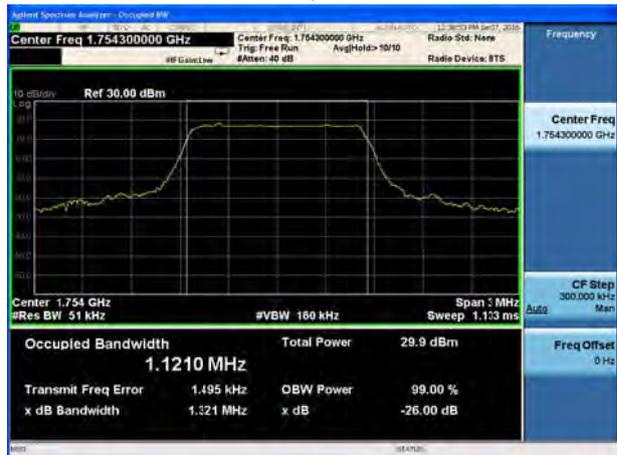
LTE Band 4 16QAM Bandwidth = 1.4MHz
CH20175 Occupied Bandwidth



LTE Band 4 QPSK Bandwidth = 1.4MHz
CH20393 Occupied Bandwidth



LTE Band 4 16QAM Bandwidth = 1.4MHz
CH20393 Occupied Bandwidth





LTE Band 4 QPSK Bandwidth = 3MHz CH19965 Occupied Bandwidth



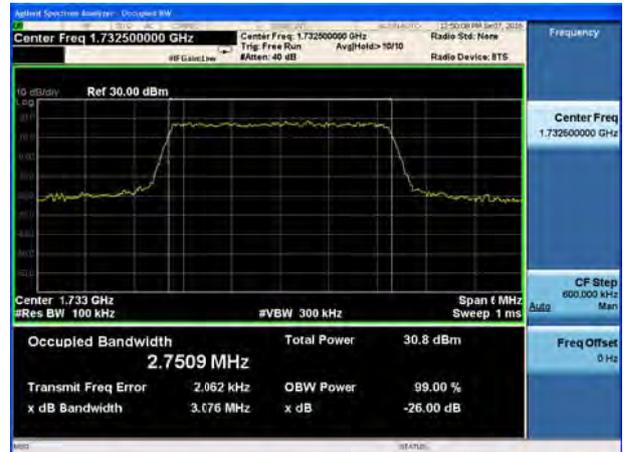
LTE Band 4 16QAM Bandwidth = 3MHz CH19965 Occupied Bandwidth



LTE Band 4 QPSK Bandwidth = 3MHz CH20175 Occupied Bandwidth



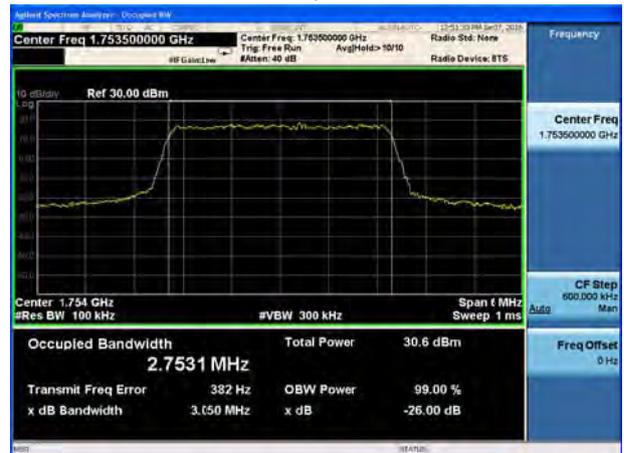
LTE Band 4 16QAM Bandwidth = 3MHz CH20175 Occupied Bandwidth



LTE Band 4 QPSK Bandwidth = 3MHz CH20385 Occupied Bandwidth



LTE Band 4 16QAM Bandwidth = 3MHz CH20385 Occupied Bandwidth

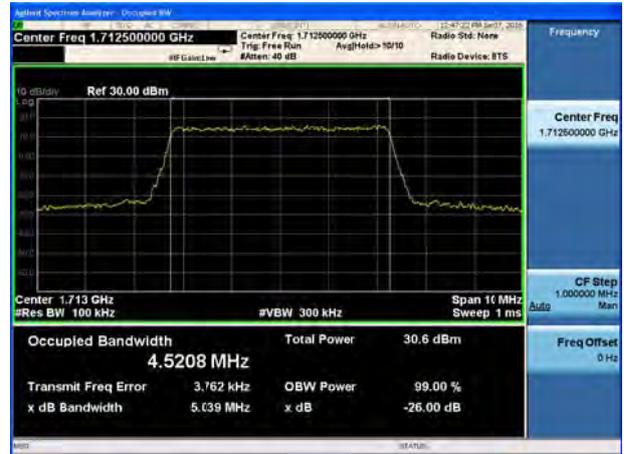




LTE Band 4 QPSK Bandwidth = 5MHz CH19975 Occupied Bandwidth



LTE Band 4 16QAM Bandwidth = 5MHz CH19975 Occupied Bandwidth



LTE Band 4 QPSK Bandwidth = 5MHz CH20175 Occupied Bandwidth



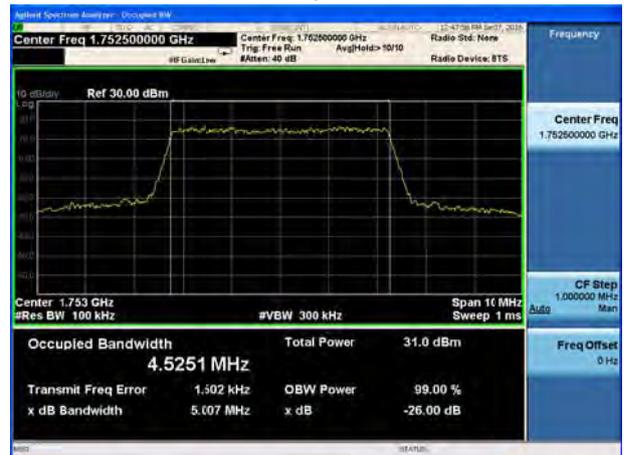
LTE Band 4 16QAM Bandwidth = 5MHz CH20175 Occupied Bandwidth



LTE Band 4 QPSK Bandwidth = 5MHz CH20375 Occupied Bandwidth

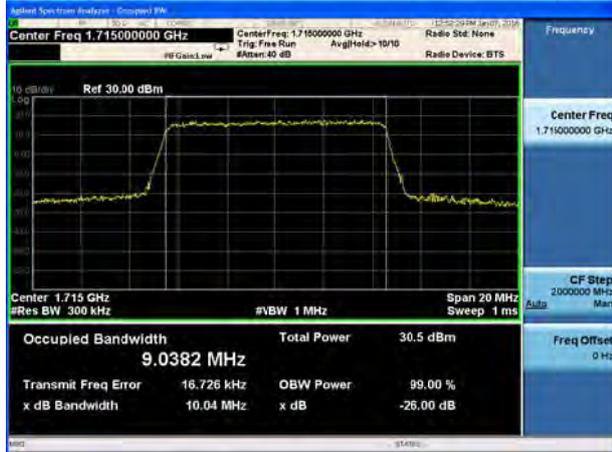


LTE Band 4 16QAM Bandwidth = 5MHz CH20375 Occupied Bandwidth

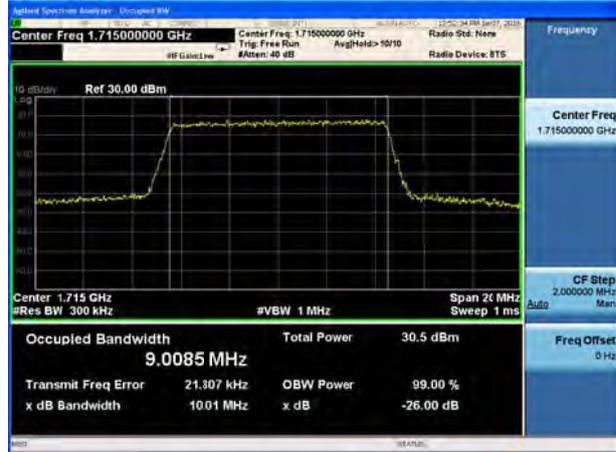




LTE Band 4 QPSK Bandwidth = 10MHz
CH20000 Occupied Bandwidth



LTE Band 4 16QAM Bandwidth = 10MHz
CH20000 Occupied Bandwidth



LTE Band 4 QPSK Bandwidth = 10MHz
CH20175 Occupied Bandwidth



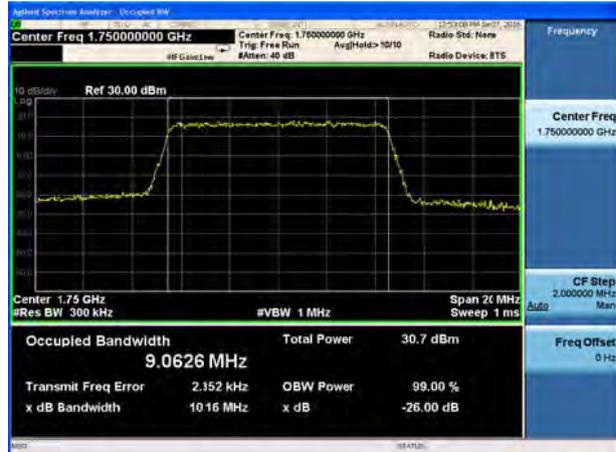
LTE Band 4 16QAM Bandwidth = 10MHz
CH20175 Occupied Bandwidth



LTE Band 4 QPSK Bandwidth = 10MHz
CH20350 Occupied Bandwidth

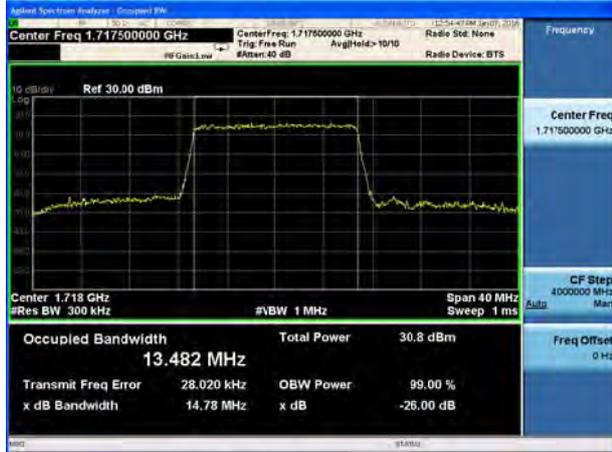


LTE Band 4 16QAM Bandwidth = 10MHz
CH20350 Occupied Bandwidth

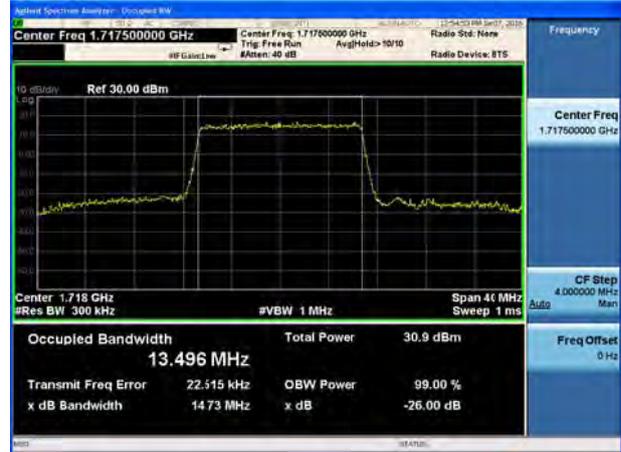




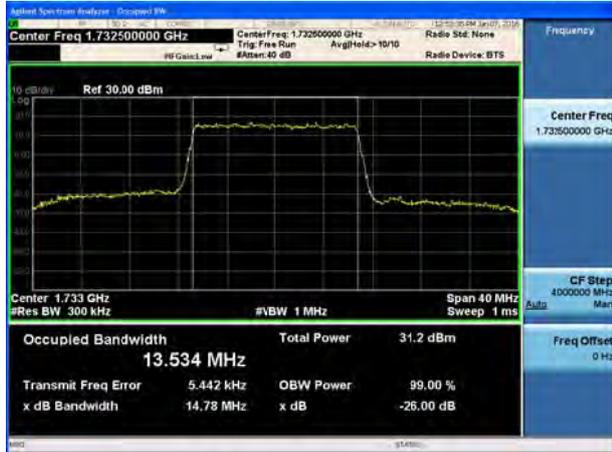
LTE Band 4 QPSK Bandwidth = 15MHz
CH20025 Occupied Bandwidth



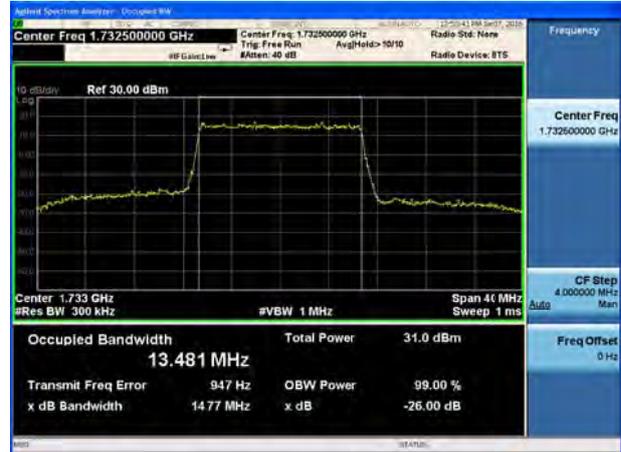
LTE Band 4 16QAM Bandwidth = 15MHz
CH20025 Occupied Bandwidth



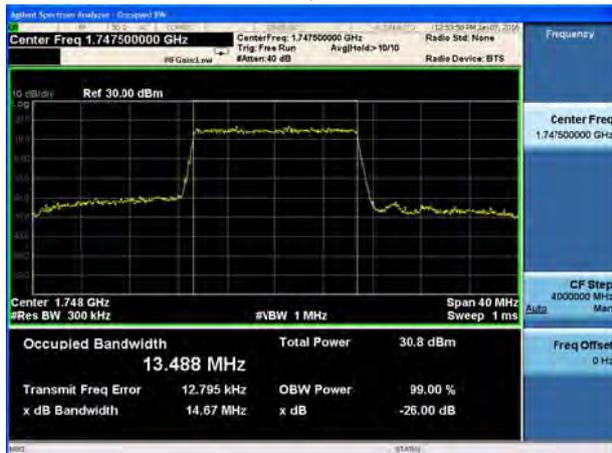
LTE Band 4 QPSK Bandwidth = 15MHz
CH20175 Occupied Bandwidth



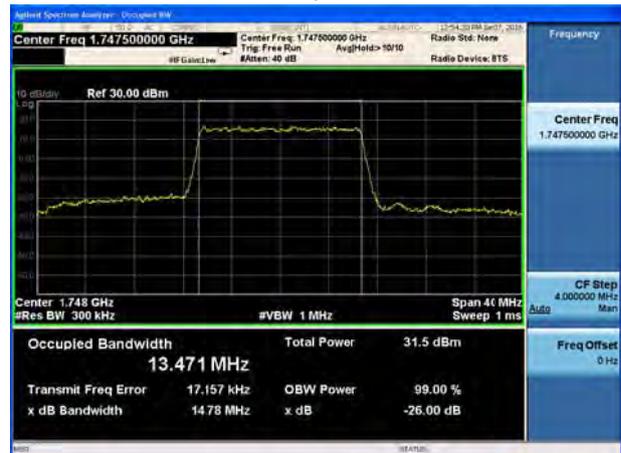
LTE Band 4 16QAM Bandwidth = 15MHz
CH20175 Occupied Bandwidth



LTE Band 4 QPSK Bandwidth = 15MHz
CH20325 Occupied Bandwidth

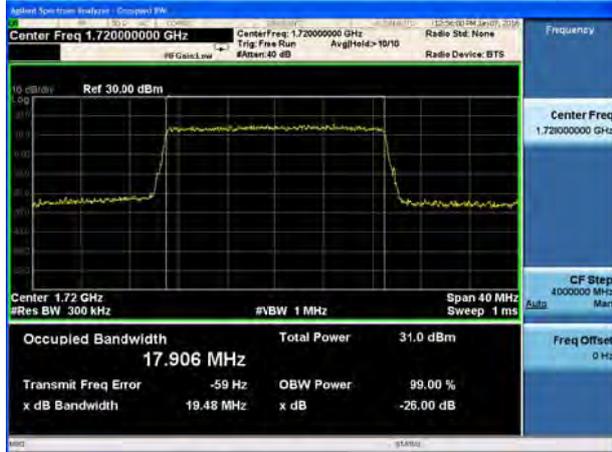


LTE Band 4 16QAM Bandwidth = 15MHz
CH20325 Occupied Bandwidth

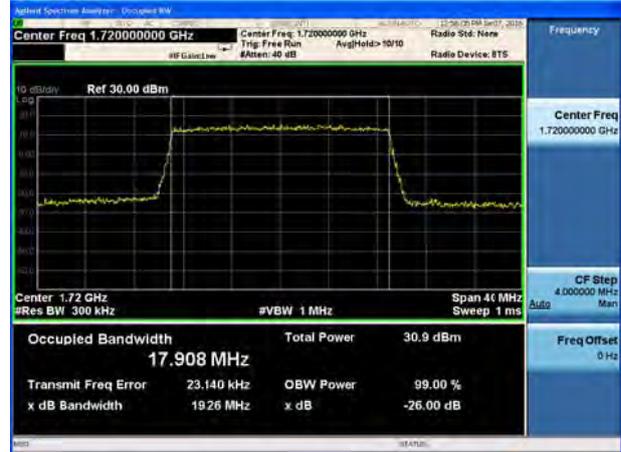




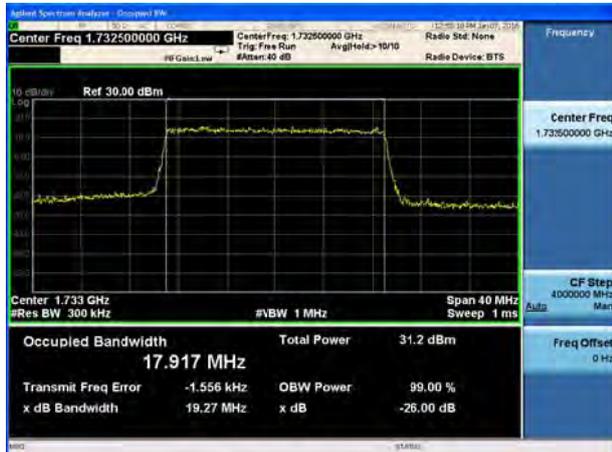
LTE Band 4 QPSK Bandwidth = 20MHz
CH20050 Occupied Bandwidth



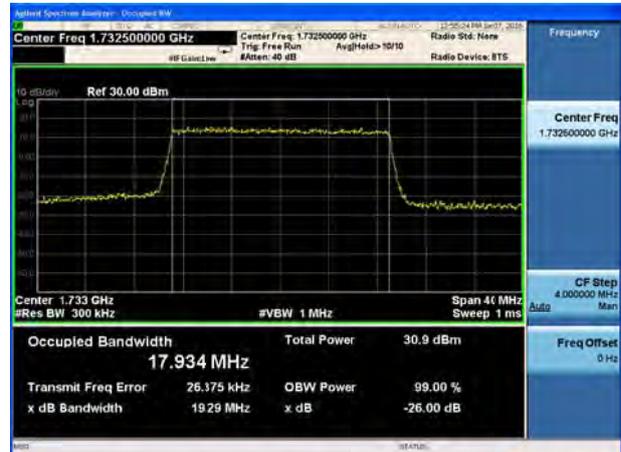
LTE Band 4 16QAM Bandwidth = 20MHz
CH20050 Occupied Bandwidth



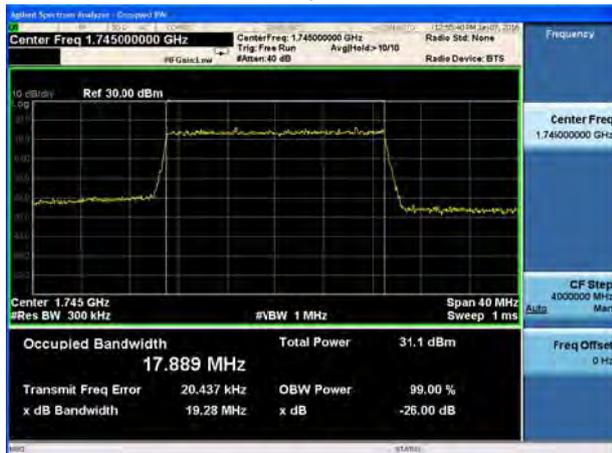
LTE Band 4 QPSK Bandwidth = 20MHz
CH20175 Occupied Bandwidth



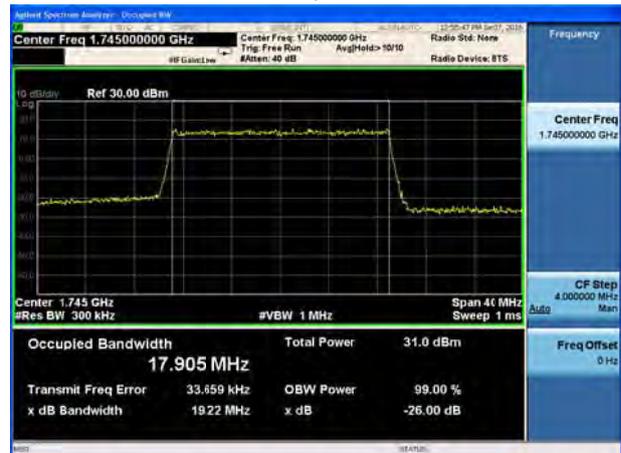
LTE Band 4 16QAM Bandwidth = 20MHz
CH20175 Occupied Bandwidth



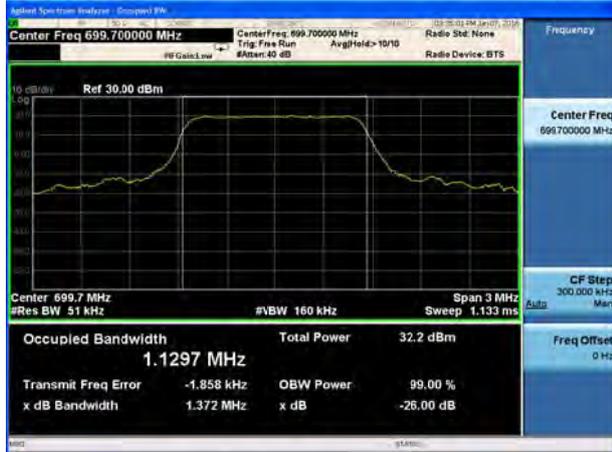
LTE Band 4 QPSK Bandwidth = 20MHz
CH20300 Occupied Bandwidth



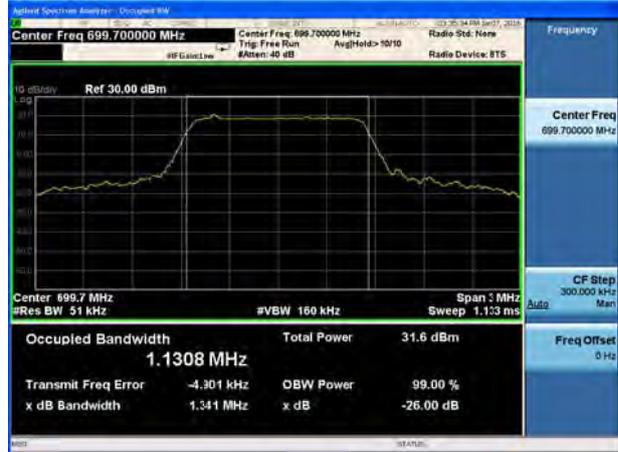
LTE Band 4 16QAM Bandwidth = 20MHz
CH20300 Occupied Bandwidth



LTE Band 12 QPSK Bandwidth = 1.4MHz
CH23017 Occupied Bandwidth



LTE Band 12 16QAM Bandwidth = 1.4MHz
CH23017 Occupied Bandwidth



LTE Band 12 QPSK Bandwidth = 1.4MHz
CH23095 Occupied Bandwidth



LTE Band 12 16QAM Bandwidth = 1.4MHz
CH23095 Occupied Bandwidth



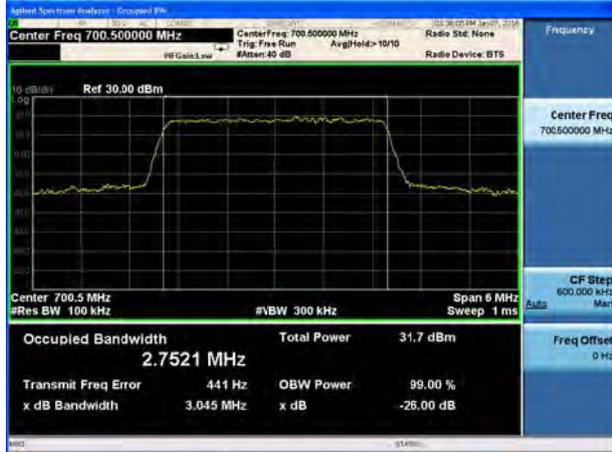
LTE Band 12 QPSK Bandwidth = 1.4MHz
CH23173 Occupied Bandwidth



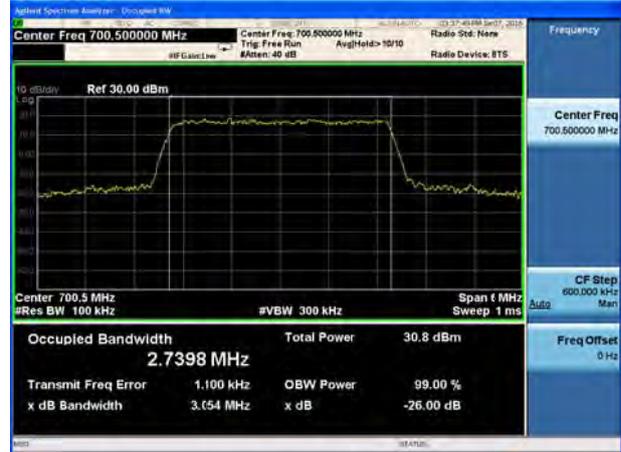
LTE Band 12 16QAM Bandwidth = 1.4MHz
CH23173 Occupied Bandwidth



LTE Band 12 QPSK Bandwidth = 3MHz
CH23025 Occupied Bandwidth



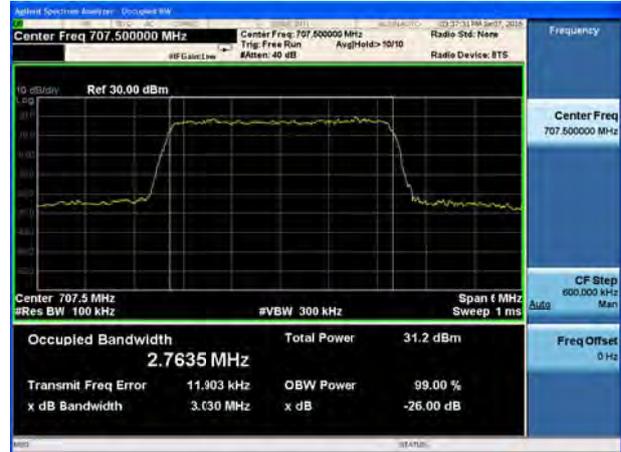
LTE Band 12 16QAM Bandwidth = 3MHz
CH23025 Occupied Bandwidth



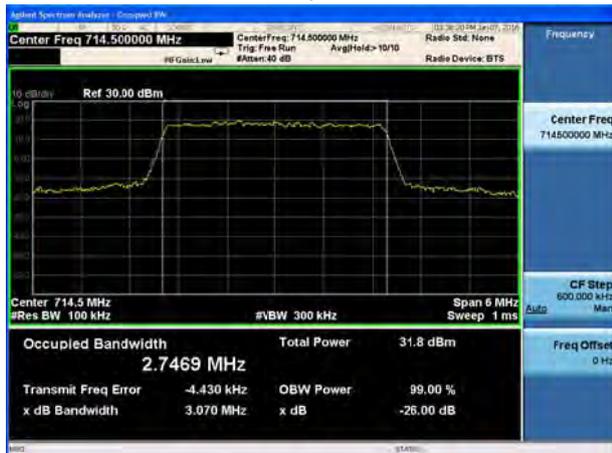
LTE Band 12 QPSK Bandwidth = 3MHz
CH23095 Occupied Bandwidth



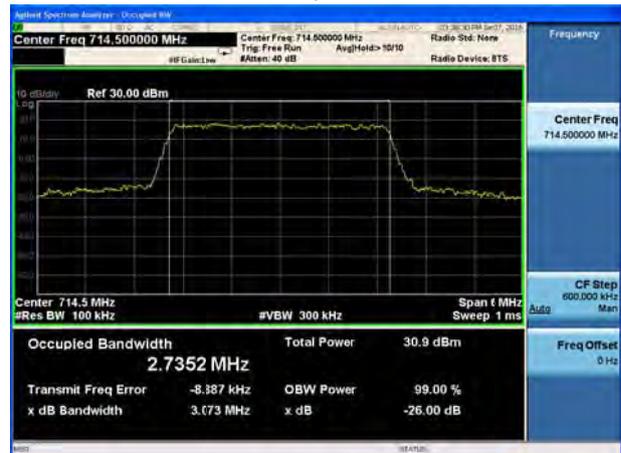
LTE Band 12 16QAM Bandwidth = 3MHz
CH23095 Occupied Bandwidth



LTE Band 12 QPSK Bandwidth = 3MHz
CH23165 Occupied Bandwidth

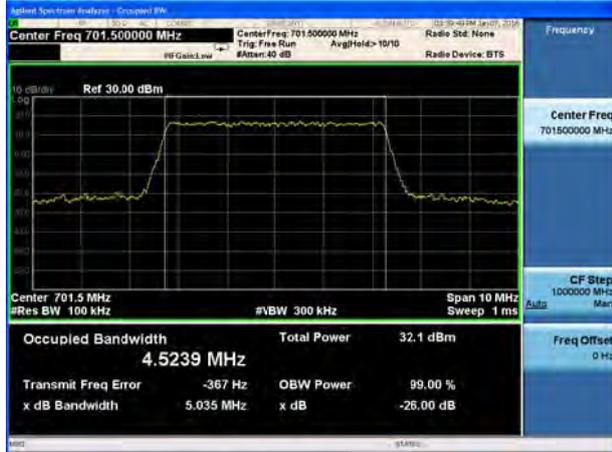


LTE Band 12 16QAM Bandwidth = 3MHz
CH23165 Occupied Bandwidth

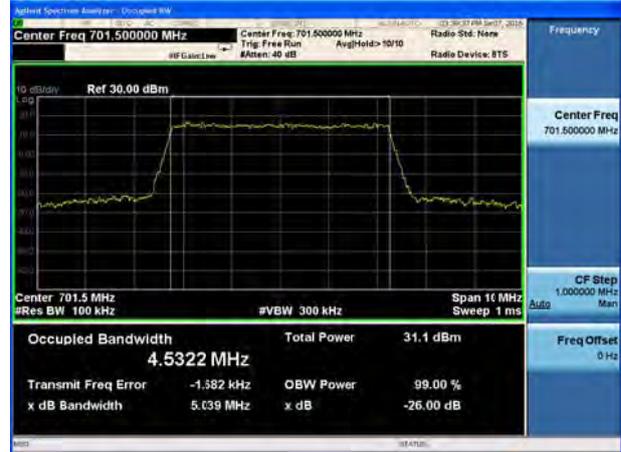




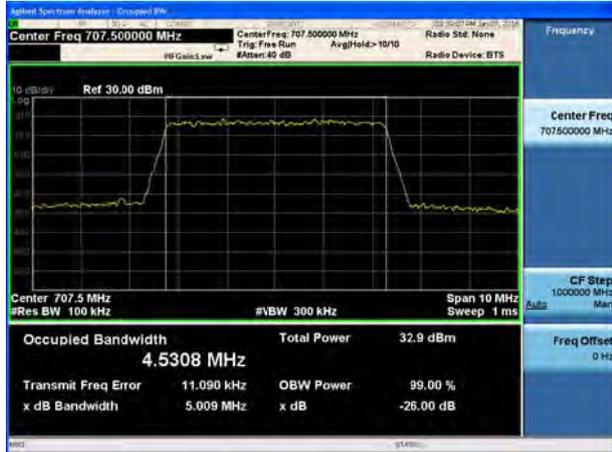
LTE Band 12 QPSK Bandwidth = 5MHz
CH23035 Occupied Bandwidth



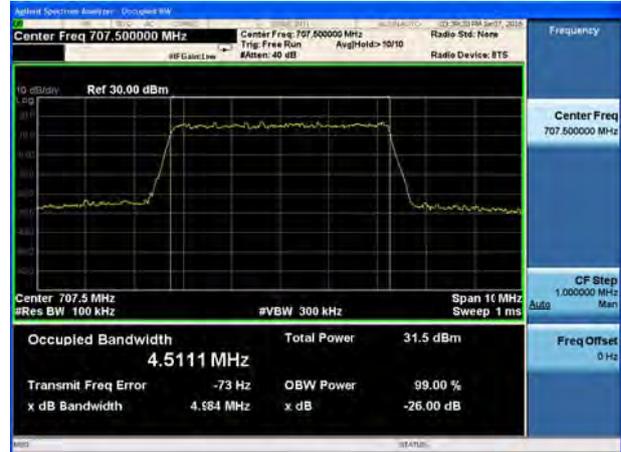
LTE Band 12 16QAM Bandwidth = 5MHz
CH23035 Occupied Bandwidth



LTE Band 12 QPSK Bandwidth = 5MHz
CH23095 Occupied Bandwidth



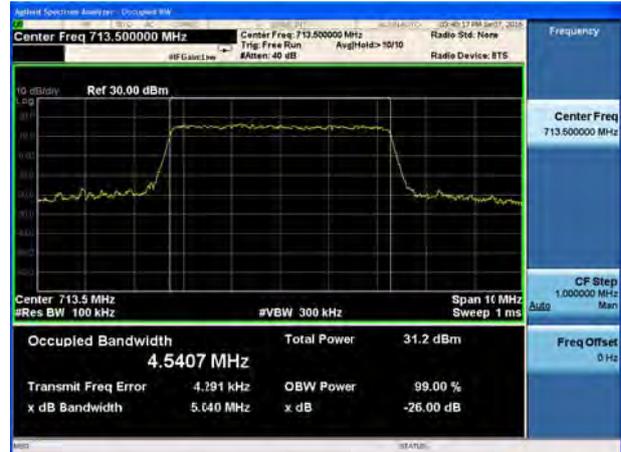
LTE Band 12 16QAM Bandwidth = 5MHz
CH23095 Occupied Bandwidth



LTE Band 12 QPSK Bandwidth = 5MHz
CH23155 Occupied Bandwidth

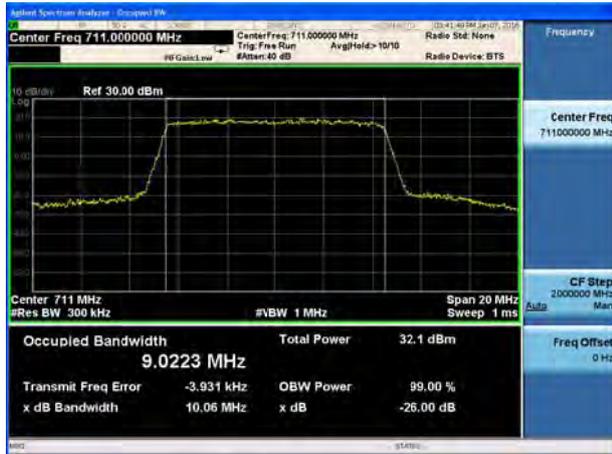


LTE Band 12 16QAM Bandwidth = 5MHz
CH23155 Occupied Bandwidth

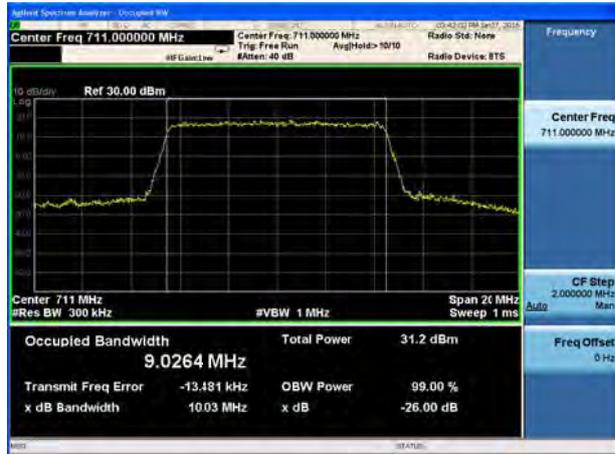




LTE Band 12 QPSK Bandwidth =10MHz
CH23060 Occupied Bandwidth



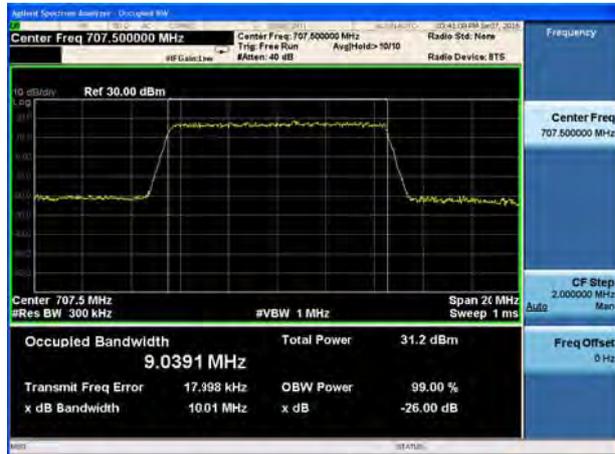
LTE Band 12 16QAM Bandwidth =10MHz
CH23060 Occupied Bandwidth



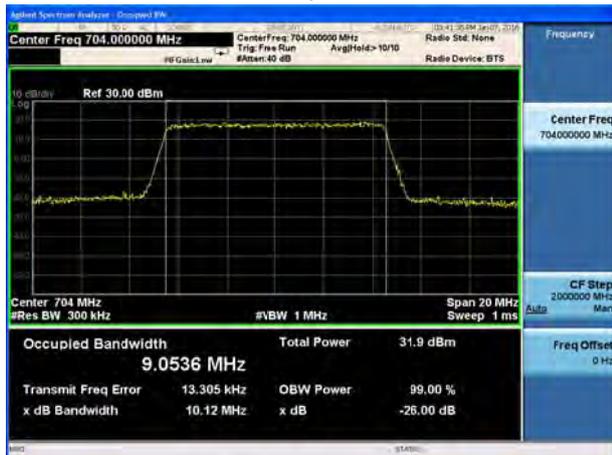
LTE Band 12 QPSK Bandwidth = 10MHz
CH23095 Occupied Bandwidth



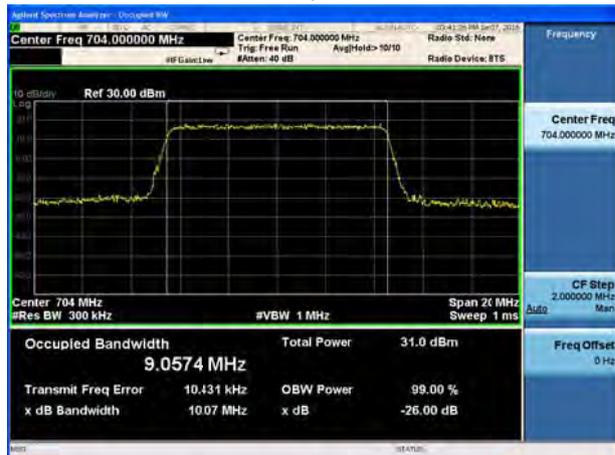
LTE Band 12 16QAM Bandwidth = 10MHz
CH23095 Occupied Bandwidth



LTE Band 12 QPSK Bandwidth = 10MHz
CH23130 Occupied Bandwidth



LTE Band 12 16QAM Bandwidth = 10MHz
CH23130 Occupied Bandwidth



4.4 Band Edge Compliance

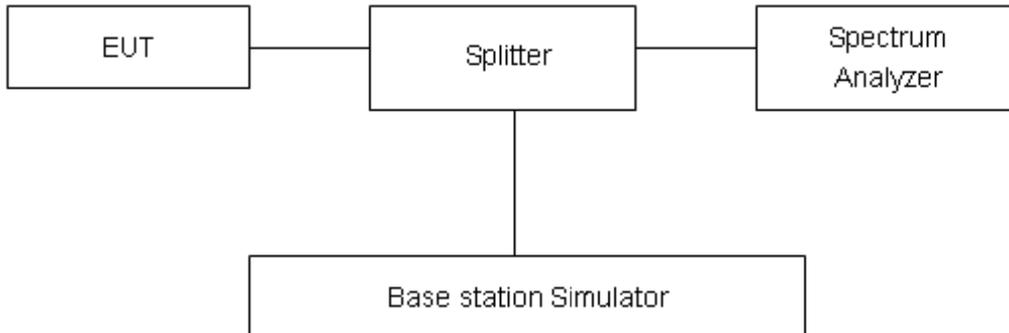
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured. The Average detector is used. RBW is set to 51 kHz, VBW is set to 160 kHz for WCDMA Band IV. RBW is set to 15 kHz, VBW is set to 51 kHz for LTE Band 4/12 (1.4MHz). RBW is set to 30 kHz, VBW is set to 100 kHz for LTE Band 4/12 (3MHz). RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4/12 (5MHz). RBW is set to 100kHz, VBW is set to 300kHz for LTE Band 4/12 (10MHz). RBW is set to 150kHz, VBW is set to 510 kHz for LTE Band 4 (15MHz). RBW is set to 200kHz, VBW is set to 620 kHz for LTE Band 4/41 (20MHz) on spectrum analyzer. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

Rule Part 27.53(h)/ Part 27.53(g) specifies that “the power of any emission outside a licensee’s frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log₁₀ (P) dB.”

Limit	-13 dBm
-------	---------

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U=0.684$ dB.



Test Result

WCDMA Band IV	Carrier frequency (MHz)	Reference value (dBm)	Limit(dBm)	Conclusion
RMC	1712.4	-25.316	-13	PASS
	1752.6	-24.470	-13	PASS

LTE Band 4							
Bandwidth	Modulation	Channel	RB	RB Start	Reference value (dBm)	Limit (dBm)	Conclusion
1.4MHz	QPSK	CH19957	1	0	-24.271	-13	PASS
			6	0	-26.828	-13	PASS
		CH20393	1	5	-25.441	-13	PASS
			6	0	-26.562	-13	PASS
	16QAM	CH19957	1	0	-24.408	-13	PASS
			6	0	-26.198	-13	PASS
		CH20393	1	5	-25.966	-13	PASS
			6	0	-27.097	-13	PASS
3MHz	QPSK	CH19965	1	0	-21.049	-13	PASS
			15	0	-26.880	-13	PASS
		CH20385	1	14	-22.916	-13	PASS
			15	0	-25.637	-13	PASS
	16QAM	CH19965	1	0	-21.620	-13	PASS
			15	0	-28.255	-13	PASS
		CH20385	1	14	-23.096	-13	PASS
			15	0	-26.499	-13	PASS
5MHz	QPSK	CH19975	1	0	-22.201	-13	PASS
			25	0	-28.996	-13	PASS
		CH20375	1	24	-22.269	-13	PASS
			25	0	-28.216	-13	PASS
	16QAM	CH19975	1	0	-23.593	-13	PASS
			25	0	-29.482	-13	PASS
		CH20375	1	24	-20.690	-13	PASS
			25	0	-27.804	-13	PASS
10MHz	QPSK	CH20000	1	0	-33.468	-13	PASS

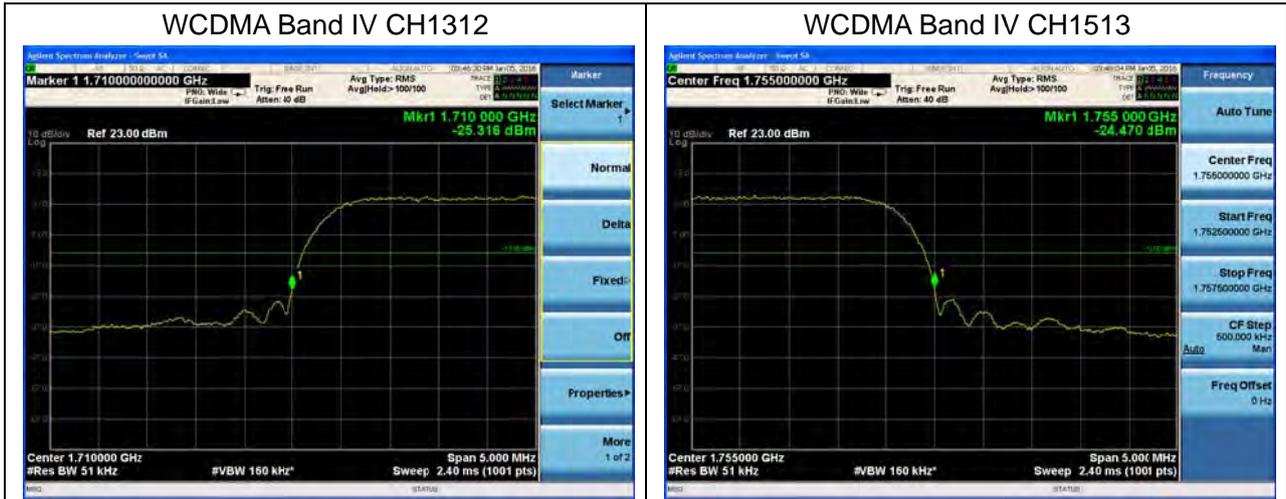


	16QAM	CH20350	50	0	-31.480	-13	PASS
			1	49	-32.437	-13	PASS
		CH20000	50	0	-31.635	-13	PASS
			1	0	-31.864	-13	PASS
			50	0	-31.366	-13	PASS
			1	49	-33.247	-13	PASS
CH20350	50	0	-30.763	-13	PASS		
15MHz	QPSK	CH20025	1	0	-29.413	-13	PASS
			75	0	-31.111	-13	PASS
		CH20325	1	74	-27.672	-13	PASS
			75	0	-31.136	-13	PASS
	16QAM	CH20025	1	0	-28.162	-13	PASS
			75	0	-30.370	-13	PASS
		CH20325	1	74	-28.375	-13	PASS
			75	0	-31.334	-13	PASS
20MHz	QPSK	CH20050	1	0	-32.376	-13	PASS
			100	0	-31.192	-13	PASS
		CH20300	1	99	-31.496	-13	PASS
			100	0	-32.944	-13	PASS
	16QAM	CH20050	1	0	-34.516	-13	PASS
			100	0	-31.372	-13	PASS
		CH20300	1	99	-31.616	-13	PASS
			100	0	-34.092	-13	PASS

LTE Band 12							
Bandwidth	Modulation	Channel	RB	RB Start	Reference value (dBm)	Limit (dBm)	Conclusion
1.4MHz	QPSK	CH23017	1	0	-23.515	-13	PASS
			6	0	-24.600	-13	PASS
		CH23173	1	5	-22.615	-13	PASS
			6	0	-26.620	-13	PASS
	16QAM	CH23017	1	0	-25.985	-13	PASS
			6	0	-25.908	-13	PASS
CH23173	1	5	-22.828	-13	PASS		

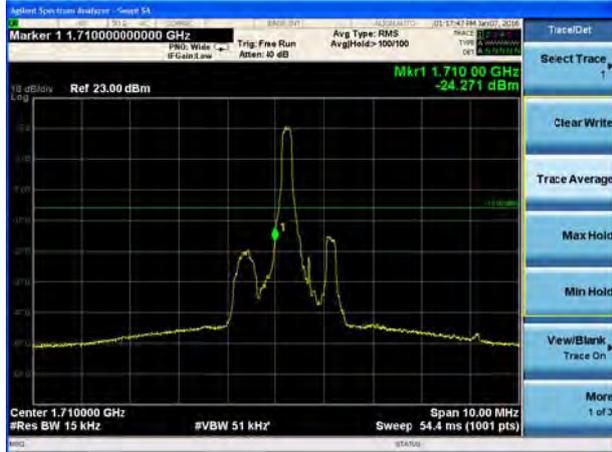


			6	0	-26.260	-13	PASS
3MHz	QPSK	CH23025	1	0	-18.816	-13	PASS
			15	0	-26.063	-13	PASS
		CH23165	1	14	-17.285	-13	PASS
			15	0	-25.883	-13	PASS
	16QAM	CH23025	1	0	-19.476	-13	PASS
			15	0	-27.270	-13	PASS
		CH23165	1	14	-17.588	-13	PASS
			15	0	-26.256	-13	PASS
5MHz	QPSK	CH23035	1	0	-20.096	-13	PASS
			25	0	-28.133	-13	PASS
		CH23155	1	24	-23.360	-13	PASS
			25	0	-26.694	-13	PASS
	16QAM	CH23035	1	0	-20.577	-13	PASS
			25	0	-27.174	-13	PASS
		CH23155	1	24	-22.516	-13	PASS
			25	0	-27.179	-13	PASS
10MHz	QPSK	CH23060	1	0	-31.705	-13	PASS
			50	0	-30.015	-13	PASS
		CH23130	1	49	-31.986	-13	PASS
			50	0	-30.706	-13	PASS
	16QAM	CH23060	1	0	-32.427	-13	PASS
			50	0	-30.004	-13	PASS
		CH23130	1	49	-28.374	-13	PASS
			50	0	-31.502	-13	PASS

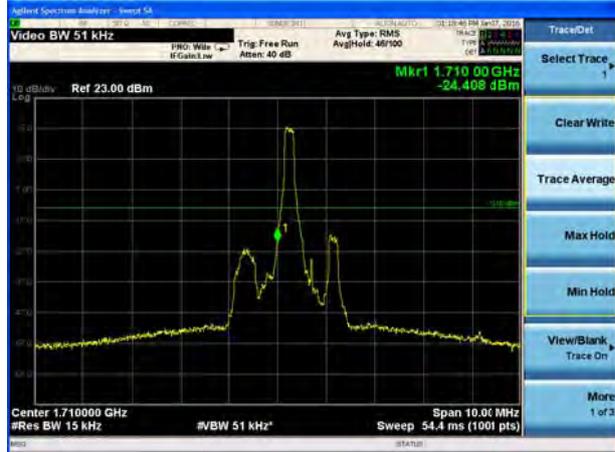




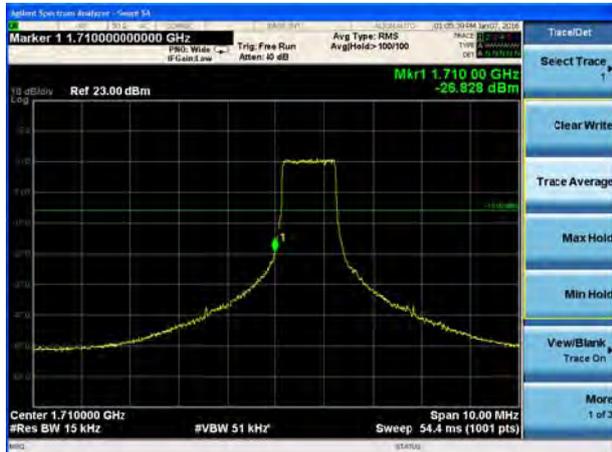
LTE Band 4 QPSK Bandwidth = 1.4MHz
CH19957, RB 1



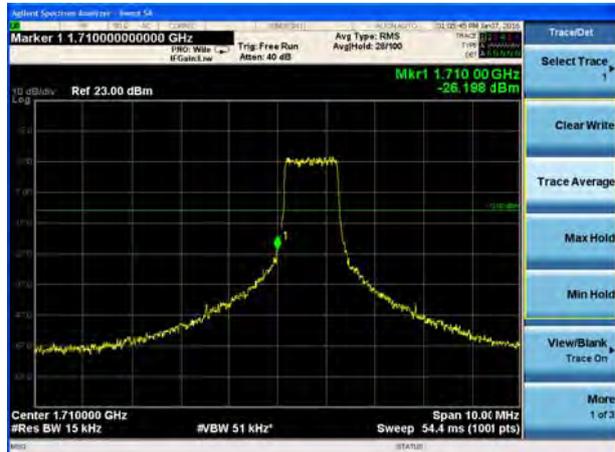
LTE Band 4 16QAM Bandwidth = 1.4MHz
CH19957, RB 1



LTE Band 4 QPSK Bandwidth = 1.4MHz
CH19957, RB 6



LTE Band 4 16QAM Bandwidth = 1.4MHz
CH19957, RB 6



LTE Band 4 QPSK Bandwidth = 1.4MHz
CH20393, RB 1

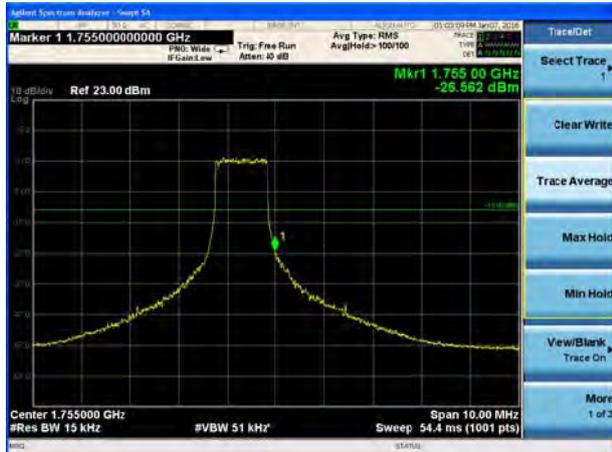


LTE Band 4 16QAM Bandwidth = 1.4MHz
CH20393, RB 1

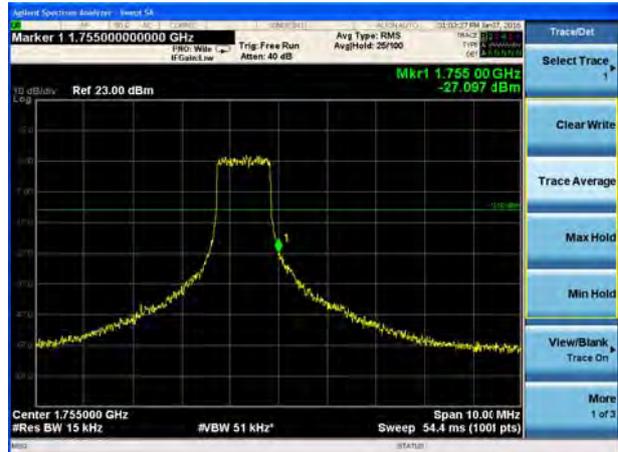




LTE Band 4 QPSK Bandwidth = 1.4MHz
CH20393, RB 6



LTE Band 4 16QAM Bandwidth = 1.4MHz
CH20393, RB 6



LTE Band 4 QPSK Bandwidth = 3MHz CH19965,
RB 1



LTE Band 4 16QAM Bandwidth = 3MHz
CH19965, RB 1



LTE Band 4 QPSK Bandwidth = 3MHz CH19965,
RB 15

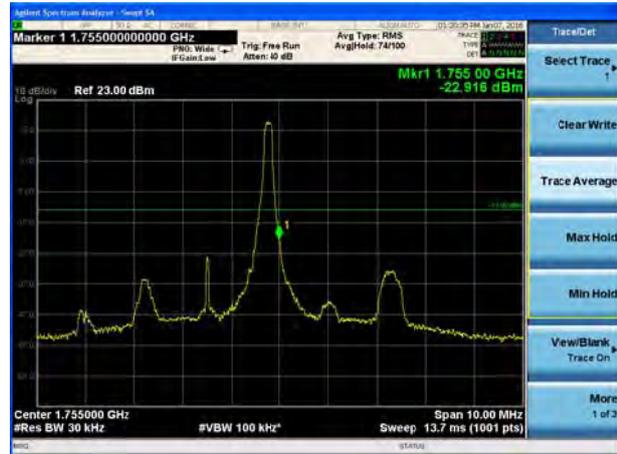


LTE Band 4 16QAM Bandwidth = 3MHz
CH19965, RB 15





LTE Band 4 QPSK Bandwidth = 3MHz CH20385, RB 1



LTE Band 4 16QAM Bandwidth = 3MHz CH20385, RB 1



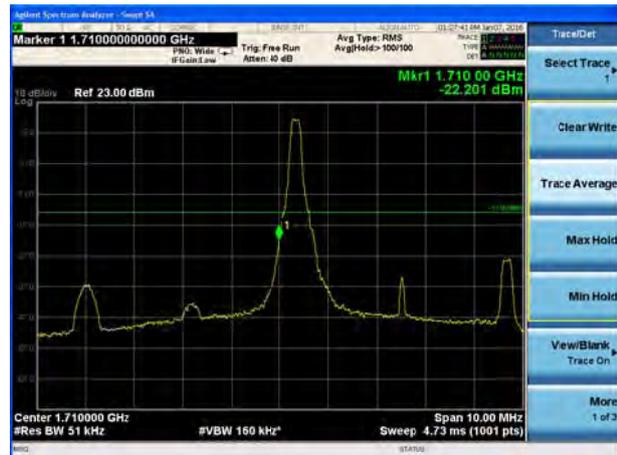
LTE Band 4 QPSK Bandwidth = 3MHz CH20385, RB 15



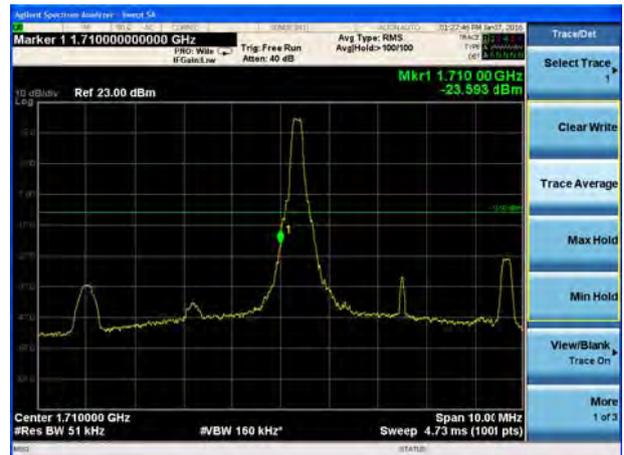
LTE Band 4 16QAM Bandwidth = 3MHz CH20385, RB 15



LTE Band 4 QPSK Bandwidth = 5MHz CH19975, RB 1



LTE Band 4 16QAM Bandwidth = 5MHz CH19975, RB 1





LTE Band 4 QPSK Bandwidth = 5MHz CH19975,
RB 25



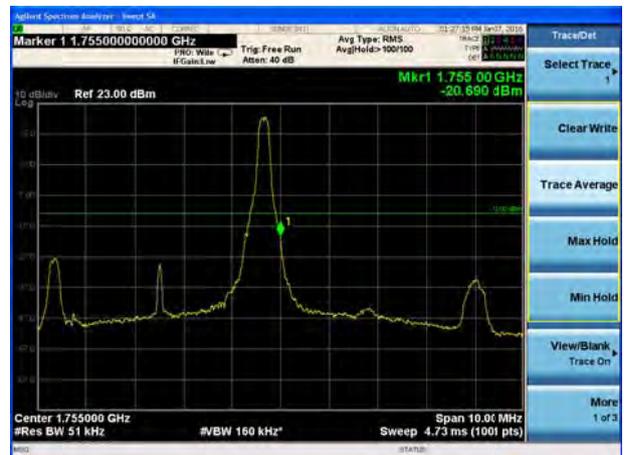
LTE Band 4 16QAM Bandwidth = 5MHz
CH19975, RB 25



LTE Band 4 QPSK Bandwidth = 5MHz CH20375,
RB 1



LTE Band 4 16QAM Bandwidth = 5MHz
CH20375, RB 1



LTE Band 4 QPSK Bandwidth = 5MHz CH20375,
RB 25

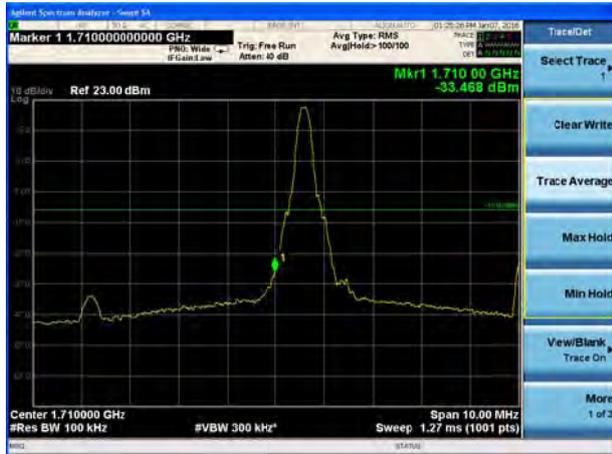


LTE Band 4 16QAM Bandwidth = 5MHz
CH20375, RB 25

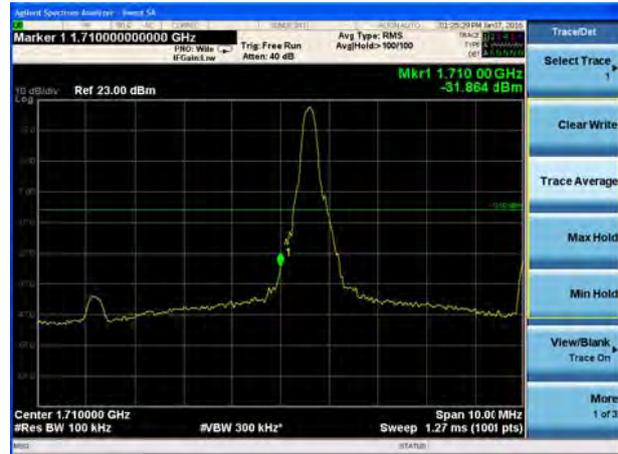




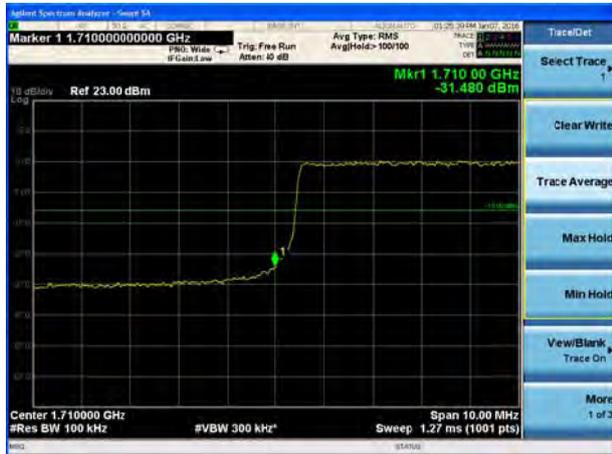
LTE Band 4 QPSK Bandwidth = 10MHz
CH20000, RB 1



LTE Band 4 16QAM Bandwidth = 10MHz
CH20000, RB 1



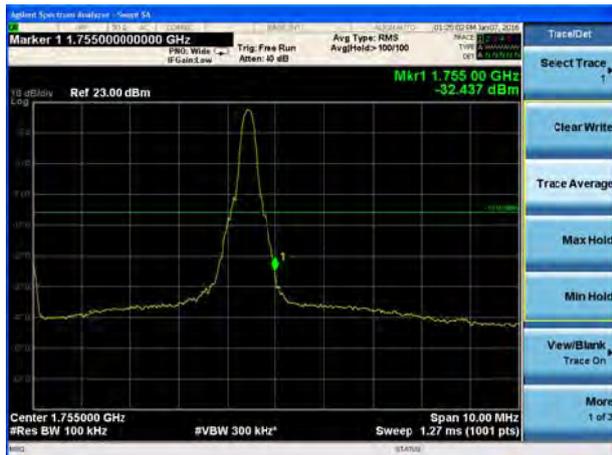
LTE Band 4 QPSK Bandwidth = 10MHz
CH20000, RB 50



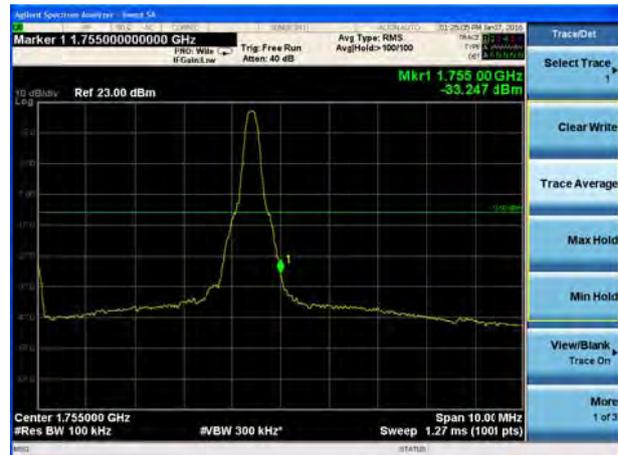
LTE Band 4 16QAM Bandwidth = 10MHz
CH20000, RB 50



LTE Band 4 QPSK Bandwidth = 10MHz
CH20350, RB 1



LTE Band 4 16QAM Bandwidth = 10MHz
CH20350, RB 1





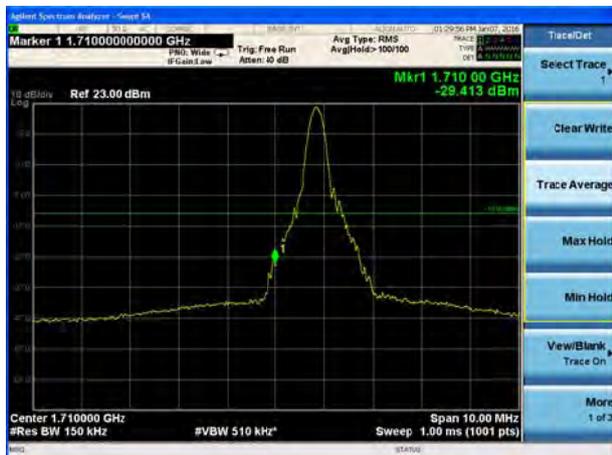
LTE Band 4 QPSK Bandwidth = 10MHz
CH20350, RB 50



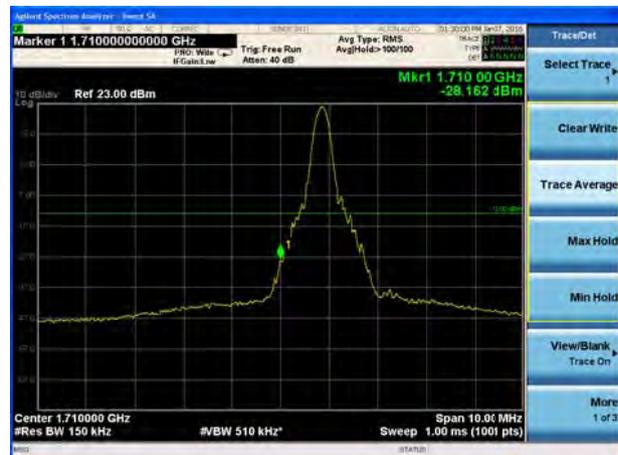
LTE Band 4 16QAM Bandwidth = 10MHz
CH20350, RB 50



LTE Band 4 QPSK Bandwidth = 15MHz
CH20025, RB 1



LTE Band 4 16QAM Bandwidth = 15MHz
CH20025, RB 1



LTE Band 4 QPSK Bandwidth = 15MHz
CH20025, RB 75

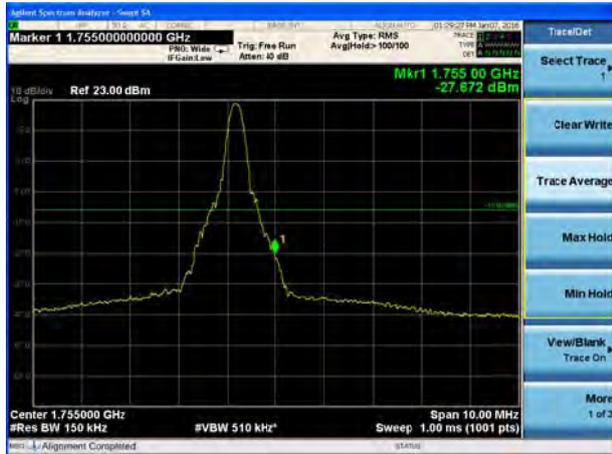


LTE Band 4 16QAM Bandwidth = 15MHz
CH20025, RB 75





LTE Band 4 QPSK Bandwidth = 15MHz
CH20325, RB 1



LTE Band 4 16QAM Bandwidth = 15MHz
CH20325, RB 1



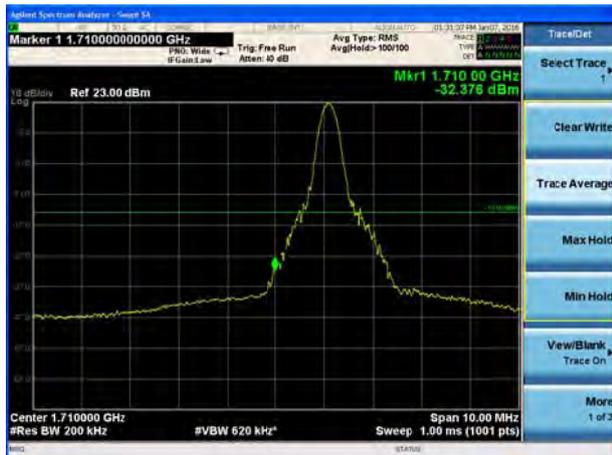
LTE Band 4 QPSK Bandwidth = 15MHz
CH20325, RB 75



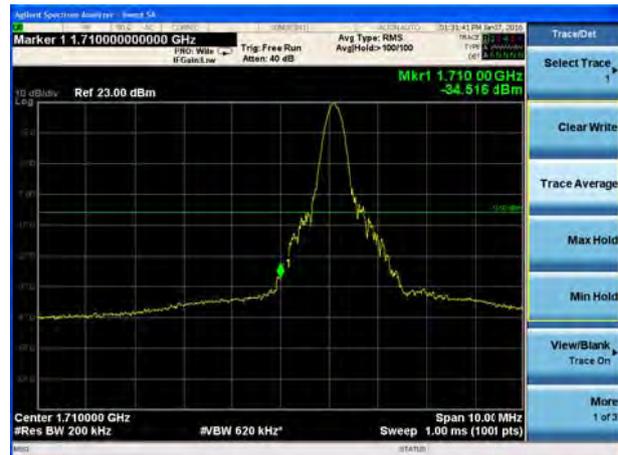
LTE Band 4 16QAM Bandwidth = 15MHz
CH20325, RB 75



LTE Band 4 QPSK Bandwidth = 20MHz
CH20050, RB 1

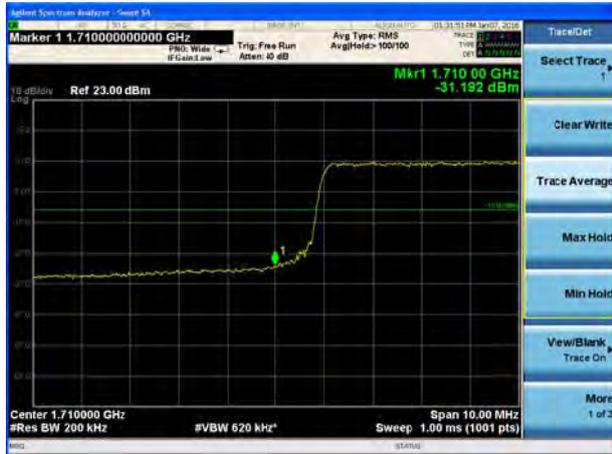


LTE Band 4 16QAM Bandwidth = 20MHz
CH20050, RB 1





LTE Band 4 QPSK Bandwidth = 20MHz
CH20050, RB 100



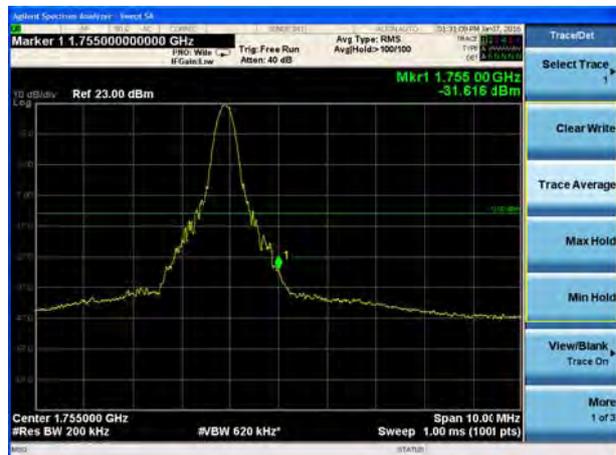
LTE Band 4 16QAM Bandwidth = 20MHz
CH20050, RB 100



LTE Band 4 QPSK Bandwidth = 20MHz
CH20300, RB 1



LTE Band 4 16QAM Bandwidth = 20MHz
CH20300, RB 1



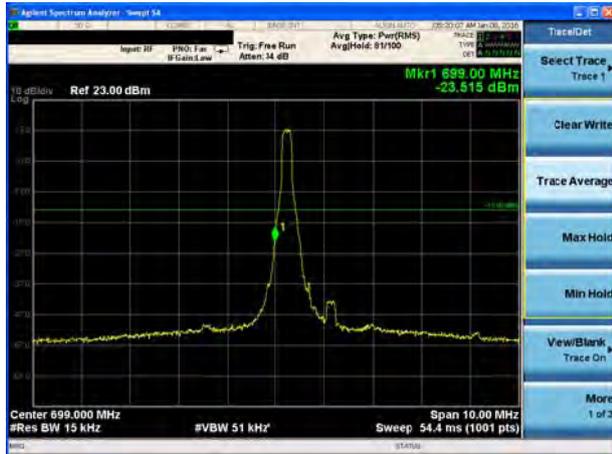
LTE Band 4 QPSK Bandwidth = 20MHz
CH20300, RB 100



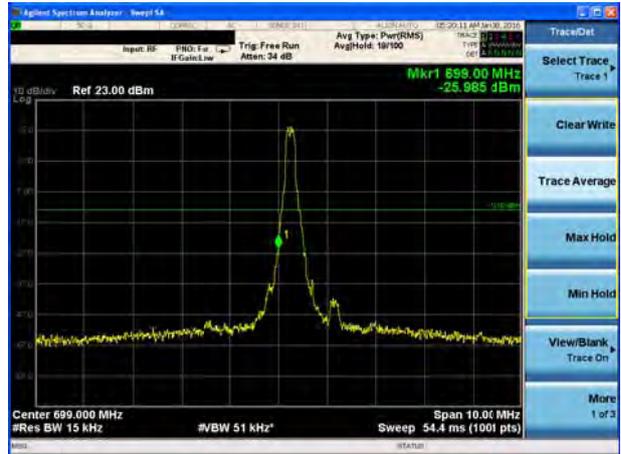
LTE Band 4 16QAM Bandwidth = 20MHz
CH20300, RB 100



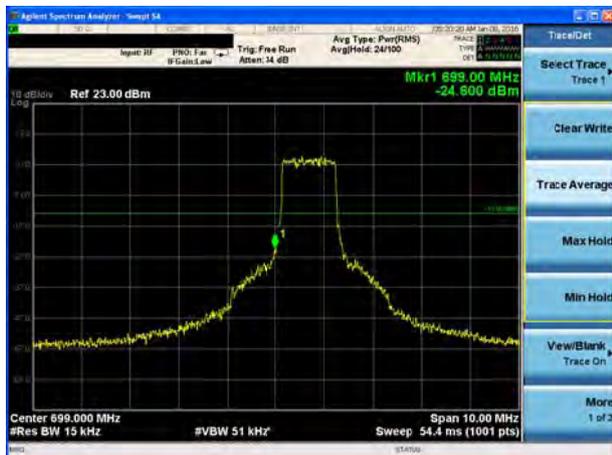
LTE Band 12 QPSK Bandwidth = 1.4MHz
CH23017, RB 1



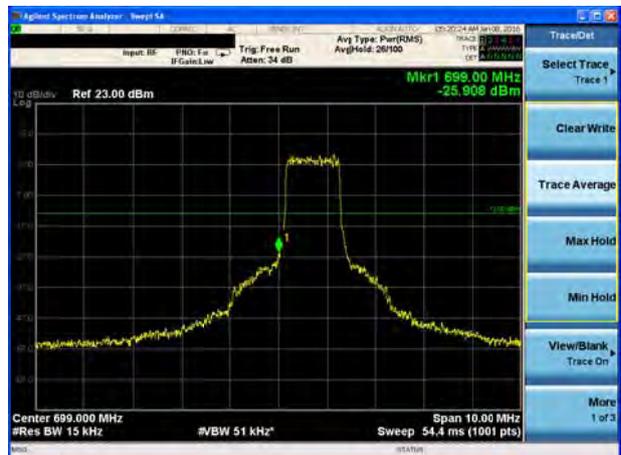
LTE Band 12 16QAM Bandwidth = 1.4MHz
CH23017, RB 1



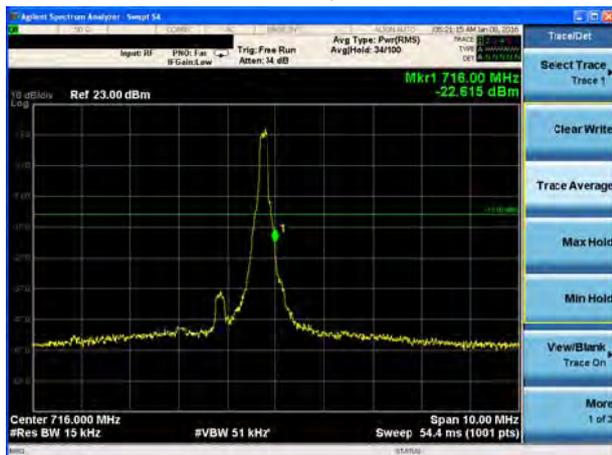
LTE Band 12 QPSK Bandwidth = 1.4MHz
CH23017, RB 6



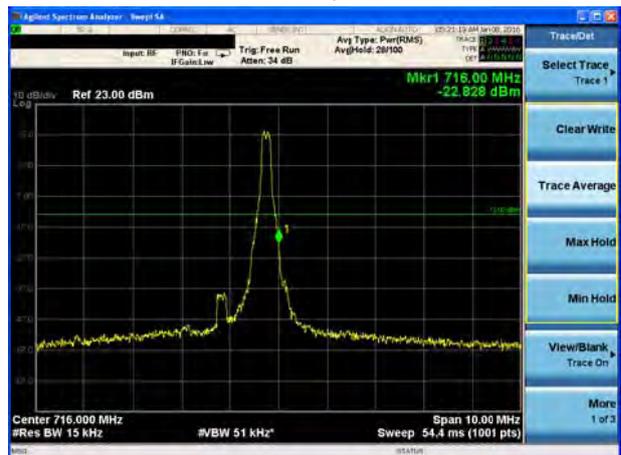
LTE Band 12 16QAM Bandwidth = 1.4MHz
CH23017, RB 6



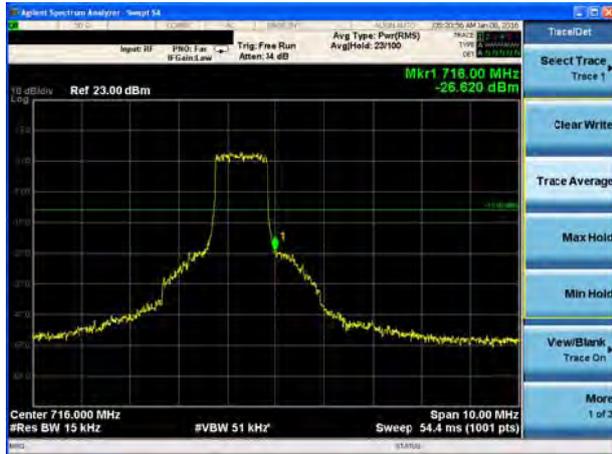
LTE Band 12 QPSK Bandwidth = 1.4MHz
CH23173, RB 1



LTE Band 12 16QAM Bandwidth = 1.4MHz
CH23173, RB 1



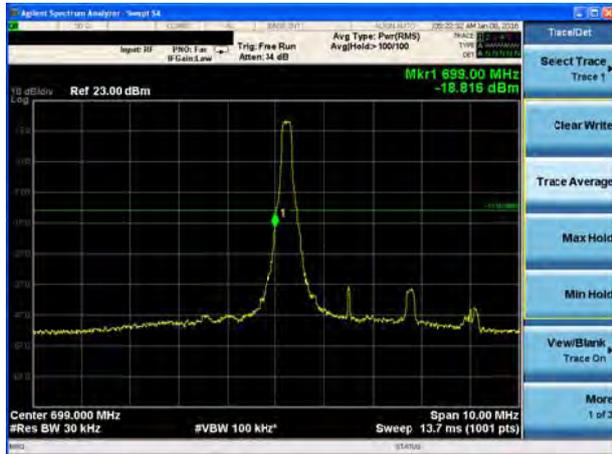
LTE Band 12 QPSK Bandwidth = 1.4MHz
CH23173, RB 6



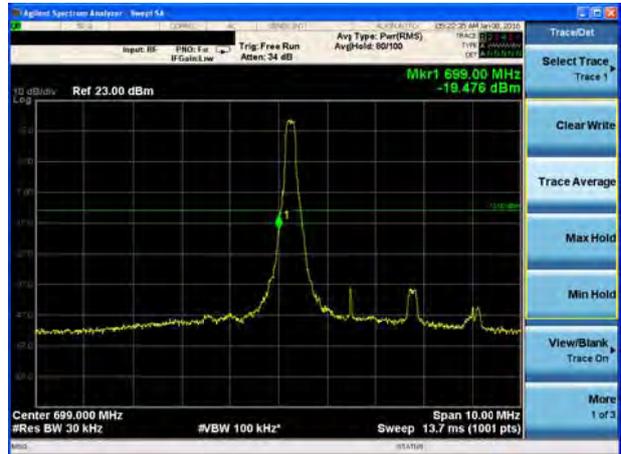
LTE Band 12 16QAM Bandwidth = 1.4MHz
CH23173, RB 6



LTE Band 12 QPSK Bandwidth = 3MHz
CH23025, RB 1



LTE Band 12 16QAM Bandwidth = 3MHz
CH23025, RB 1



LTE Band 12 QPSK Bandwidth = 3MHz
CH23025, RB 15

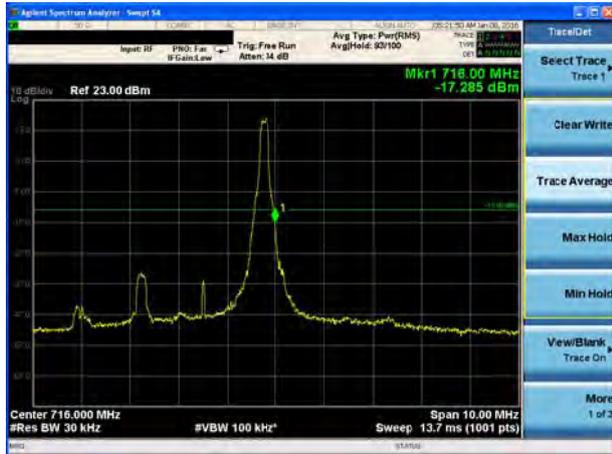


LTE Band 12 16QAM Bandwidth = 3MHz
CH23025, RB 15

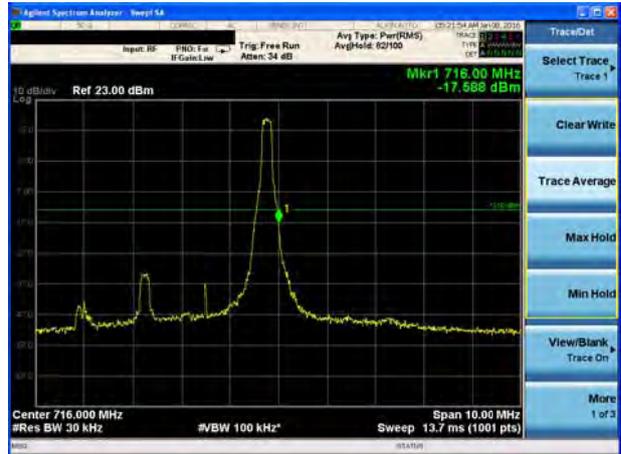




LTE Band 12 QPSK Bandwidth = 3MHz
CH23165, RB 1



LTE Band 12 16QAM Bandwidth = 3MHz
CH23165, RB 1



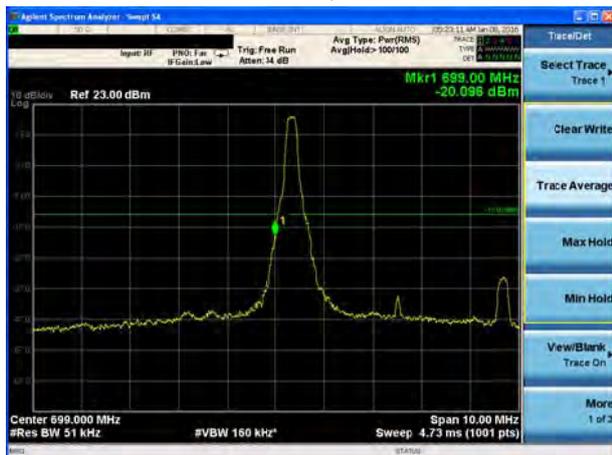
LTE Band 12 QPSK Bandwidth = 3MHz
CH23165, RB 15



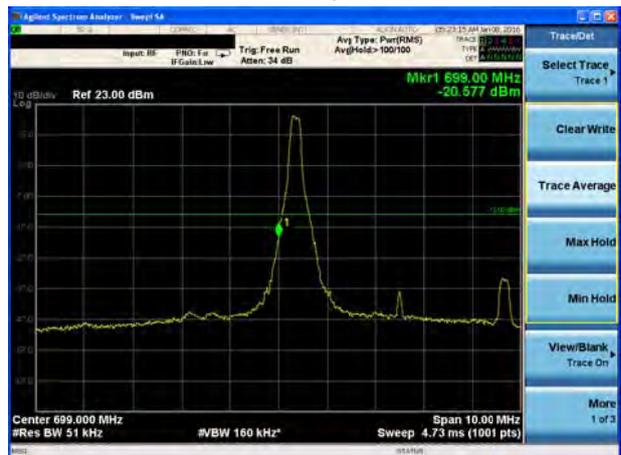
LTE Band 12 16QAM Bandwidth = 3MHz
CH23165, RB 15



LTE Band 12 QPSK Bandwidth = 5MHz
CH23035, RB 1



LTE Band 12 16QAM Bandwidth = 5MHz
CH23035, RB 1





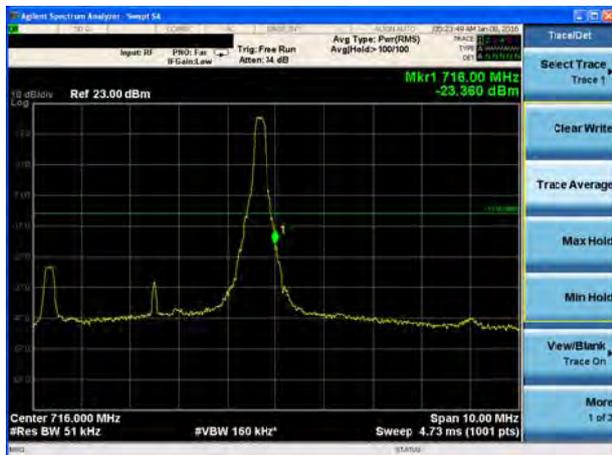
LTE Band 12 QPSK Bandwidth = 5MHz
CH23035, RB 25



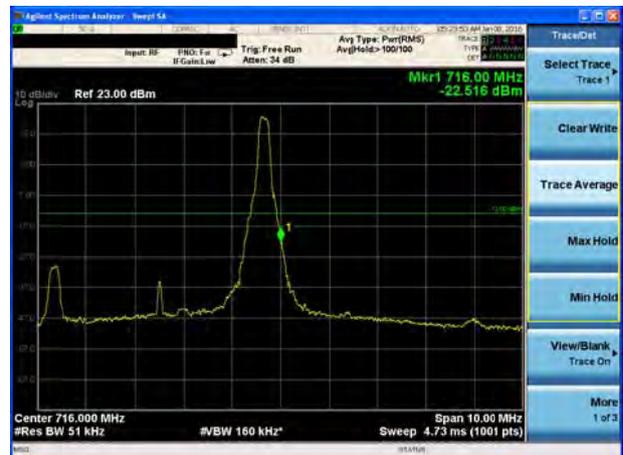
LTE Band 12 16QAM Bandwidth = 5MHz
CH23035, RB 25



LTE Band 12 QPSK Bandwidth = 5MHz
CH23155, RB 1



LTE Band 12 16QAM Bandwidth = 5MHz
CH23155, RB 1



LTE Band 12 QPSK Bandwidth = 5MHz
CH23155, RB 25

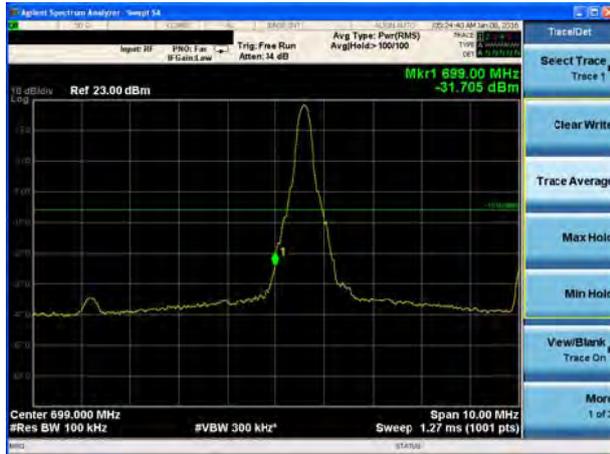


LTE Band 12 16QAM Bandwidth = 5MHz
CH23155, RB 25

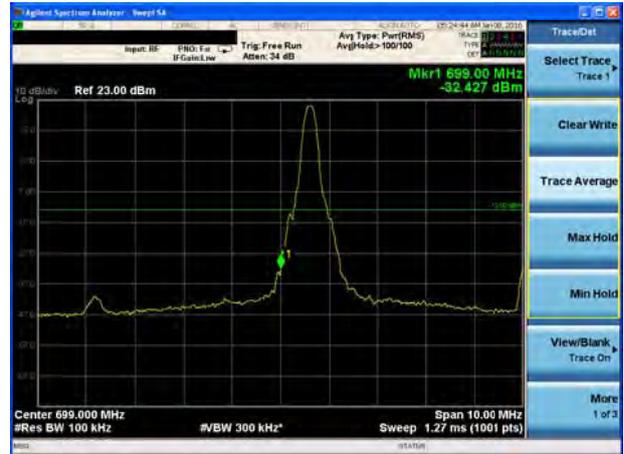




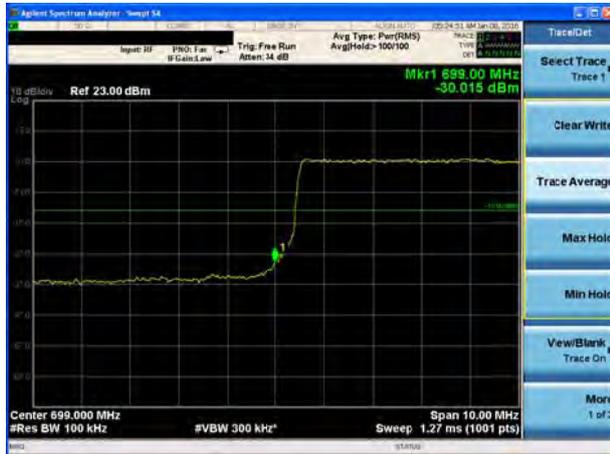
LTE Band 12 QPSK Bandwidth = 10MHz
CH23060, RB 1



LTE Band 12 16QAM Bandwidth = 10MHz
CH23060, RB 1



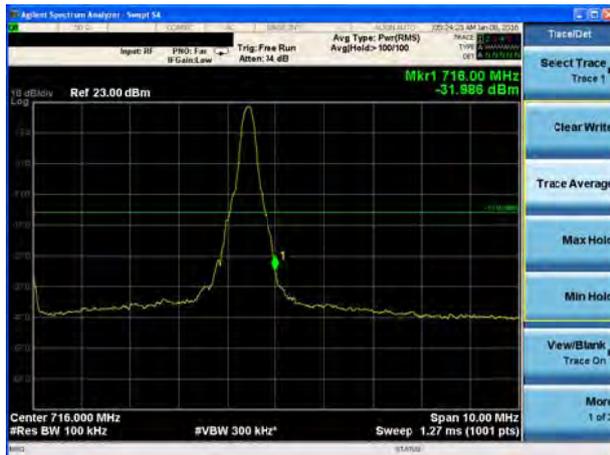
LTE Band 12 QPSK Bandwidth = 10MHz
CH23060, RB 50



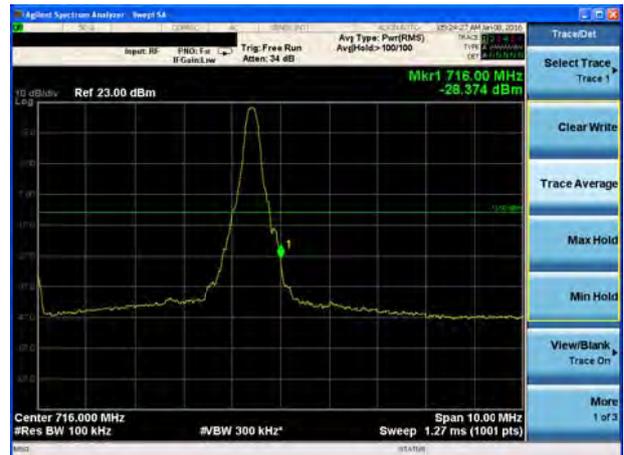
LTE Band 12 16QAM Bandwidth = 10MHz
CH23060, RB 50



LTE Band 12 QPSK Bandwidth = 10MHz
CH23130, RB 1



LTE Band 12 16QAM Bandwidth = 10MHz
CH23130, RB 1





LTE Band 12 QPSK Bandwidth = 10MHz
CH23130, RB 50



LTE Band 12 16QAM Bandwidth = 10MHz
CH23130, RB 50



4.5 Peak-to-Average Power Ratio (PAPR)

Ambient condition

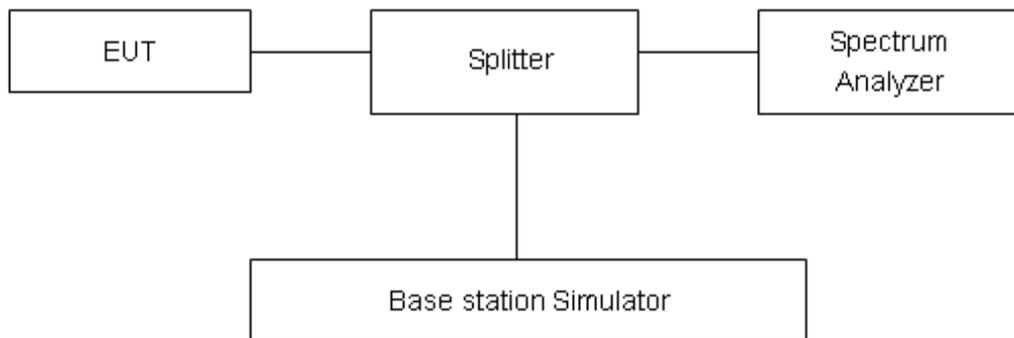
Temperature	Relative humidity
21°C ~25°C	40%~60%

Methods of Measurement

Measure the total peak power and record as PPk. And measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$PAPR (dB) = PPk (dBm) - PAvg (dBm).$$

Test Setup



Limits

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB in Part27.50(a).

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 0.4 dB.



Test Results

WCDMA Band IV	Channel	Frequency (MHz)	Peak(dBm)	Avg(dBm)	PAPR(dB)	Conclusion
RMC	1312	1712.4	26.73	23.71	3.02	PASS
	1413	1732.6	26.49	23.52	2.97	PASS
	1513	1752.6	26.70	23.61	3.09	PASS

LTE Band 4							
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Conclusion
QPSK	1.4	19957	1710.7	23.55	22.66	0.90	PASS
		20175	1732.5	23.1	22.66	0.44	PASS
		20393	1754.3	23.67	22.73	0.94	PASS
	3	19965	1711.5	23.47	22.53	0.95	PASS
		20175	1732.5	23.21	22.53	0.68	PASS
		20385	1753.5	23.51	22.60	0.91	PASS
	5	19975	1712.5	23.32	22.55	0.77	PASS
		20175	1732.5	23.03	22.55	0.48	PASS
		20375	1752.5	23.68	22.62	1.06	PASS
	10	20000	1715	23.65	22.59	1.07	PASS
		20175	1732.5	23.69	22.59	1.10	PASS
		20350	1750	23.37	22.66	0.71	PASS
	15	20025	1717.5	23.97	22.62	1.36	PASS
		20175	1732.5	23.78	22.62	1.16	PASS
		20325	1747.5	23.98	22.69	1.29	PASS
	20	20050	1720	23.81	22.64	1.18	PASS
		20175	1732.5	23.95	22.64	1.31	PASS
		20300	1745	24.03	22.71	1.32	PASS
16QAM	1.4	19957	1710.7	22.56	21.76	0.80	PASS
		20175	1732.5	22.38	21.50	0.88	PASS
		20393	1754.3	22.49	21.65	0.84	PASS
	3	19965	1711.5	22.43	21.63	0.80	PASS
		20175	1732.5	22.26	21.37	0.89	PASS
		20385	1753.5	22.34	21.52	0.82	PASS
	5	19975	1712.5	22.42	21.65	0.77	PASS
		20175	1732.5	22.52	21.39	1.13	PASS
		20375	1752.5	22.21	21.54	0.67	PASS
	10	20000	1715	22.83	21.69	1.14	PASS
		20175	1732.5	22.57	21.43	1.14	PASS
		20350	1750	22.75	21.58	1.17	PASS



	15	20025	1717.5	23.07	21.72	1.35	PASS
		20175	1732.5	22.71	21.46	1.25	PASS
		20325	1747.5	22.85	21.61	1.24	PASS
	20	20050	1720	22.91	21.74	1.17	PASS
		20175	1732.5	22.83	21.48	1.35	PASS
		20300	1745	22.85	21.63	1.22	PASS

LTE Band 12							
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Conclusion
QPSK	1.4	23017	699.7	23.47	23.09	0.38	PASS
		23095	707.5	24.02	23.03	0.99	PASS
		23173	715.3	23.50	23.12	0.38	PASS
	3	23025	700.5	23.39	23.04	0.35	PASS
		23095	707.5	23.93	22.98	0.95	PASS
		23165	714.5	23.84	23.07	0.77	PASS
	5	23035	701.5	24.22	23.05	1.17	PASS
		23095	707.5	24.17	22.99	1.18	PASS
		23155	713.5	24.36	23.08	1.28	PASS
	10	23060	704	24.56	23.08	1.48	PASS
		23095	707.5	24.28	23.02	1.26	PASS
		23130	711	24.40	23.11	1.29	PASS
16QAM	1.4	23017	699.7	22.50	22.04	0.46	PASS
		23095	707.5	22.62	22.07	0.55	PASS
		23173	715.3	23.32	22.21	1.11	PASS
	3	23025	700.5	22.72	21.99	0.73	PASS
		23095	707.5	22.84	22.02	0.82	PASS
		23165	714.5	22.63	22.16	0.47	PASS
	5	23035	701.5	23.21	22.00	1.21	PASS
		23095	707.5	23.28	22.03	1.25	PASS
		23155	713.5	23.33	22.17	1.16	PASS
	10	23060	704	23.32	22.03	1.29	PASS
		23095	707.5	23.32	22.06	1.26	PASS
		23130	711	23.56	22.20	1.36	PASS

4.6 Frequency Stability

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

1. Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -30°C to +50°C in 10°C step size.

(1)With all power removed, the temperature was decreased to -10°C and permitted to stabilize for three hours.

(2)Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

(3) Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

2. Frequency Stability (Voltage Variation)

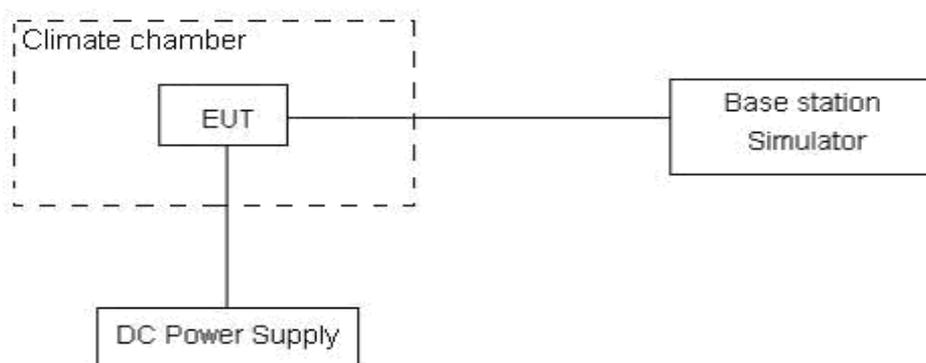
The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery-operating end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 3.6 V and 4.4 V, with a nominal voltage of 3.84V.

Test setup



Limits

No specific frequency stability requirements in part 27.54

Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 3, U=0.01\text{ppm}$.

**Test Result**

WCDMA Band IV

Test status	WCDMA Band IV Channel 1413 RMC	
	Test Results (ppm)	Conclusion
50°C/3.84 V	-0.00010	PASS
40°C/3.84 V	0.00006	PASS
30°C/3.84 V	0.00017	PASS
20°C/3.84 V	0.00020	PASS
10°C/3.84 V	0.00004	PASS
0°C/3.84 V	0.00036	PASS
-10°C/3.84 V	-0.00020	PASS
-20°C/3.84 V	0.00063	PASS
-30°C/3.84 V	-0.00014	PASS
20°C/4.4 V	0.00016	PASS
20°C/3.6 V	0.00027	PASS

	Test status	LTE Band 4 Channel 20175 Test Results (ppm)		
		QPSK	16QAM	Conclusion
Bandwidth	50°C/3.84 V	-0.00167	0.00612	PASS
	40°C/3.84 V	0.00566	0.00323	PASS
	30°C/3.84 V	-0.00517	0.00318	PASS
	20°C/3.84 V	-0.00222	0.00237	PASS
	10°C/3.84 V	-0.00026	0.00029	PASS
	0°C/3.84 V	-0.00234	0.00249	PASS
	-10°C/3.84 V	-0.00476	0.00520	PASS
	-20°C/3.84 V	0.00015	-0.00028	PASS
	-30°C/3.84 V	-0.00048	-0.00042	PASS
	20°C/4.4 V	-0.00199	0.00745	PASS
	20°C/3.6 V	0.00615	-0.00236	PASS
	50°C/3.84 V	0.00133	0.00358	PASS
	40°C/3.84 V	0.00332	-0.00253	PASS
	30°C/3.84 V	0.00696	-0.00219	PASS
	20°C/3.84 V	0.00476	-0.00138	PASS
	10°C/3.84 V	0.00326	-0.00346	PASS
	0°C/3.84 V	0.00297	-0.00421	PASS
	-10°C/3.84 V	0.00216	-0.00386	PASS
	-20°C/3.84 V	-0.00123	-0.00279	PASS
	-30°C/3.84 V	-0.00192	-0.00256	PASS