



Part 27

TEST REPORT

Product Name	CDMA/LTE smartphone
FCC ID	M931
Model	QISM931
Applicant	Huawei Technologies Co., Ltd.

TA Technology (Shanghai) Co., Ltd.

TA Technology (Shanghai) Co., Ltd.

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GENERAL SUMMARY

Product Name	CDMA/LTE smartphone	Model	M931
FCC ID	QISM931	Report No.	RHA1209-0083RF03R1
Client	Huawei Technologies Co., Ltd.		
Manufacturer	Huawei Technologies Co., Ltd.		
Reference Standard(s)	<p>FCC CFR47 Part 2 (2010-12) Frequency Allocations And Radio Treaty Matters; General Rules And Regulations</p> <p>FCC CFR47 Part 27C (2010-12) MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES</p> <p>ANSI/TIA-603-C(2004) Land mobile FM or PM Communications Equipment Measurements and Performance Standards.</p> <p>KDB 971168 D01 Power Meas License Digital Systems v01 Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems</p>		
Conclusion	<p>This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 2 of this test report are below limits specified in the relevant standards.</p> <p>General Judgment: Pass</p> <div style="text-align: right;">  <p>(Stamp) Date of issue: December 14th, 2012</p> </div>		
Comment	The test result only responds to the measured sample.		

Approved by 杨伟中
Director

Revised by 徐凯
RF Manager

Performed by [Signature]
RF Engineer

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1. General Information

1.1. Notes of the test report

TA Technology (Shanghai) Co., Ltd. guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

TA Technology (Shanghai) Co., Ltd. is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the items under test and the results of the test. This report only refers to the item that has undergone the test.

This report standalone dose not constitute or imply by its own an approval of the product by the certification Bodies or competent Authorities. This report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of **TA Technology (Shanghai) Co., Ltd.** and the Accreditation Bodies, if it applies.

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L2264.

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 428261.

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 8510A.

If the electrical report is inconsistent with the printed one, it should be subject to the latter.

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1.2. Testing laboratory

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

1.3. Applicant Information

Company: Huawei Technologies Co., Ltd.
Address: Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian,
Longgang District
City: Shenzhen
Postal Code: 518129
Country: P.R. China

1.4. Manufacturer Information

Company: Huawei Technologies Co., Ltd.
Address: Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian,
Longgang District
City: Shenzhen
Postal Code: 518129
Country: P.R.China

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1.5. Information of EUT

General information

Name of EUT:	GSM /WCDMA dual mode mobile phone		
IMEI:	99000135008304		
Hardware Version:	Ver.D		
Software Version:	M931V100R001C177B107		
Antenna Type:	Internal Antenna		
Device Operating Configurations:			
Operating Mode(s):	CDMA AWS: (tested) ; LTE Band 4 : (tested) ;		
Bandwidth(s):	CDMA System: 1.25MHz LTE System: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz		
Designation of Emissions:	CDMA System: 1M28F9W; LTE System: 1M09G7D (1.4 MHz ,QPSK modulation), 1M10W7D (1.4 MHz ,16QAM modulation), 2M69G7D (3.0 MHz QPSK modulation), 2M69W7D (3.0 MHz 16QAM modulation), 4M49G7D (5.0MHz QPSK modulation), 4M50W7D (5.0MHz 16QAM modulation), 8M97G7D (10 MHz QPSK modulation), 8M97W7D (10 MHz 16QAM modulation),		
Test Modulation:	(CDMA)QPSK; (LTE Band 4)QPSK, 16QAM		
Maximum E.I.R.P.	CDMA AWS: 23.43 dBm LTE Band 4: 24.33 dBm		
Power Supply:	Battery or Charger		
Rated Power Supply Voltage:	3.8V		
Extreme Voltage:	Minimum: 3.5V Maximum: 4.2V		
Extreme Temperature:	Lowest: -10°C Highest: +55°C		
Test Channel: (Low - Middle - High)	25 – 450 – 875	(CDMA AWS)	(tested)
	19957-20175-20393	(LTE Band 4, 1.4M)	(tested)
	19965-20175-20385	(LTE Band 4, 3M)	(tested)
	19975-20175-20375	(LTE Band 4, 5M)	(tested)
	20000-20175-20350	(LTE Band 4, 10M)	(tested)
Operating Frequency Range(s)	Mode	Tx (MHz)	Rx (MHz)

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	CDMA Band AWS	1711.25 ~ 1753.75	2111.25 ~ 2153.75
	LTE Band 4(1.4MHz)	1710.7 ~1754.3	2110.7~2154.3
	LTE Band 4(3MHz)	1711.5~1753.5	2111.5~2153.5
	LTE Band 4(5MHz)	1712.5~1752.5	2112.5~2152.5
	LTE Band 4(10 MHz)	1715.0~1750.0	2115~2150

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Auxiliary equipment details

AE1: Battery

Model: HB5N1HA
Manufacturer: Huawei Technologies Co., Ltd.
S/N: /

Equipment Under Test (EUT) is CDMA/LTE smartphone with internal antenna. The EUT supports CDMA AWS and LTE Band 4 in this report.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

1.6. Test Date

The test is performed from September 20, 2012 to December 2, 2012.

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2. Test Information

2.1. Summary of test results

Number	Test Case	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Isotropic Radiated power	27.50	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	27.53	PASS
5	Frequency Stability	2.1055 / 27.54	PASS
6	Spurious Emissions at Antenna Terminals	2.1051 / 27.53	PASS
7	Radiates Spurious Emission	2.1053 / 27.53	PASS

2.2. RF Power Output

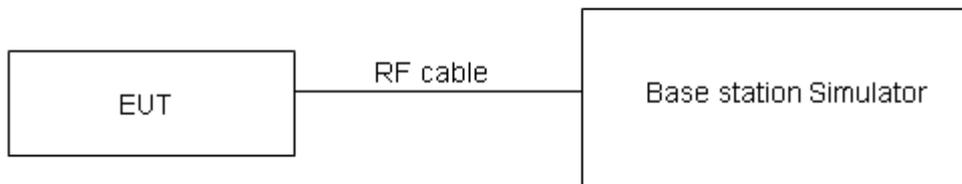
Ambient condition

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 proper test configuration.

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.

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Test Results

CDMA AWS		Average Conducted Power(dBm)		
		Channel 25	Channel 450	Channel 875
		1711.25 (MHz)	1732.5 (MHz)	1753.75 (MHz)
RC3	SO55(Loopback)	24.24	24.28	24.35
	SO2(Loopback)	24.24	24.28	24.33
RC1	SO55(Loopback)	24.28	24.28	24.32
	SO2(Loopback)	24.26	24.33	24.35
RC3	SO32(+FCH-SCH)	24.24	24.26	24.32
	SO32(+SCH)	24.23	24.27	24.32
EV-DO (Rev.0)		24.15	24.12	24.17
EV-DO (Rev.A)		24.13	24.12	24.16
1X Advance	SO75(Loopback)	24.08	24.07	24.02
	SO73(Voice)	24.08	24.08	24.01

LTE Band 4				Average Conducted Power (dBm)			
Bandwidth	Modulation	RB	RB Start	Channel 19957	Channel 20175	Channel 20393	
1.4MHz	QPSK	1	0	23.72	23.64	23.72	
		1	5	23.72	23.64	23.72	
		3	2	23.71	23.78	23.65	
		6	0	22.79	22.88	22.76	
	16QAM	1	0	22.47	22.68	22.97	
		1	5	22.67	22.58	22.69	
		3	2	22.61	22.71	22.54	
		6	0	21.87	21.95	21.74	
3MHz	QPSK	1	0	23.66	23.58	23.73	
		1	14	23.79	23.82	23.64	
		8	4	22.65	22.87	22.87	
		15	0	22.67	22.78	22.85	
	16QAM	1	0	22.64	22.61	22.92	
		1	14	22.61	22.86	22.69	
		8	4	21.82	21.93	21.96	
		15	0	21.63	21.92	21.69	
	5MHz	QPSK	1	0	23.67	23.69	23.72
			1	24	23.77	23.81	23.69
			12	6	22.97	22.84	22.64

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		25	0	22.65	22.74	22.69
	16QAM	1	0	22.56	22.45	22.56
		1	24	22.69	22.82	22.67
		12	6	21.96	21.72	21.65
		25	0	21.73	21.87	21.72
Bandwidth		Modulation	RB	RB Start	Channel 20000	Channel 20175
10MHz	QPSK	1	0	23.76	23.78	23.75
		1	49	23.78	23.98	23.92
		25	13	22.83	22.78	22.78
		50	0	22.76	22.72	22.86
	16QAM	1	0	22.67	22.33	22.45
		1	49	22.66	22.76	22.67
		25	13	21.75	21.88	21.85
		50	0	21.73	21.63	21.73

1) The maximum RF Output Power numbers are marks in bold.

2) The following testing based on the maximum RF Output Power.

2.3. Effective Isotropic Radiated Power

Ambient condition

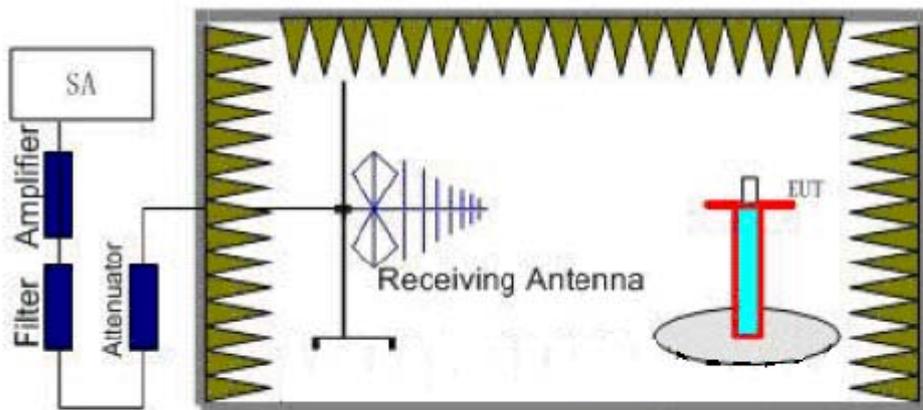
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

The measurement procedures in TIA- 603C are used.

Step 1:

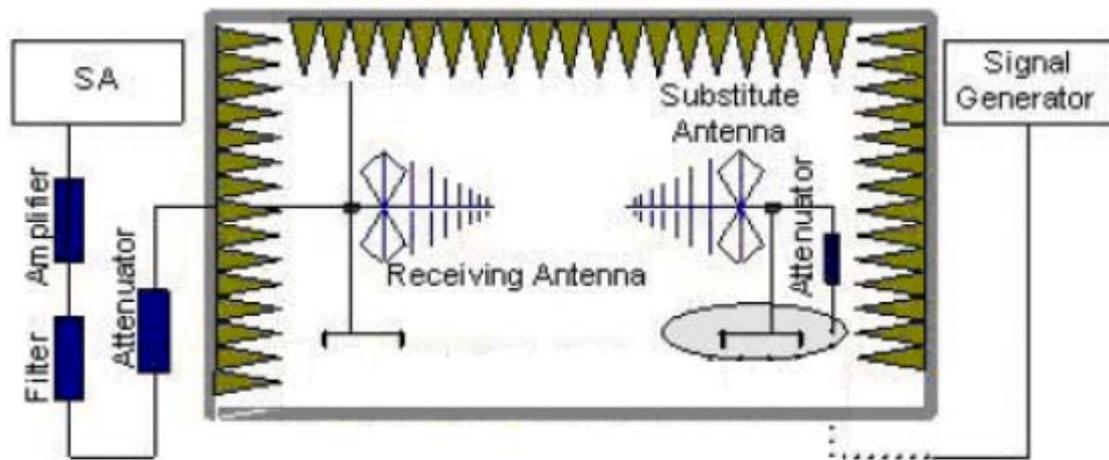
The measurement is carried out in the semi-anechoic chamber. EUT was placed on a 0.8 meters high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used while RBW and VBW are both set to 3MHz. During the measurement, the highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna moved up and down over a range from 1 to 4 meters in both horizontally and vertically polarized orientations. The test setup refers to figure below.



Step 2:

A dipole antenna shall be substituted in place of the EUT. The antenna will be driven by a signal generator with an adjustable S.G. applied through a 30dB amplifier and a Tx cable. Then the Analyzer reading which is equal to LVL is recorded while the antenna was moving up and down. The E.R.P. /E.I.R.P. of the EUT can be calculated through the level of the signal generator, Tx cable loss and the gain of the substitution antenna. The test setup refers to figure below.

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$$E.R.P = S.G + 30. - Tx \text{ Cable loss} + \text{Substitution antenna gain} - 2.15.$$

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

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" and 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)
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Measurement Uncertainty

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

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Test Results: Pass

CDMA AWS	Channel	Polarization	LVL (dBm)	SG+30 (dBm)	Gain (dBi)	Cable Loss (dBm)	E.I.R.P. (dBm)
RC3 SO2(Loopback)	25	Vertical	-29.66	36.82	1.44	17.06	21.20
	450	Vertical	-27.63	36.55	1.57	17.08	21.04
	875	Vertical	-25.75	36.48	1.72	17.10	21.10
RC3 SO32(+FCH-SCH)	25	Vertical	-28.55	36.8	1.44	17.06	21.18
	450	Vertical	-27.23	36.72	1.57	17.08	21.21
	875	Vertical	-25.54	36.25	1.72	17.10	20.87
EVDO (Rev.0)	25	Vertical	-27.09	38.3	1.44	17.06	22.68
	450	Vertical	-26.27	38.7	1.57	17.08	23.19
	875	Vertical	-26.91	37.93	1.72	17.10	22.55
EVDO (Rev.A)	25	Vertical	-27.88	38.4	1.44	17.06	22.78
	450	Vertical	-25.39	38.94	1.57	17.08	23.43
	875	Vertical	-26.07	38.15	1.72	17.10	22.77
1X Advance SO75	25	Vertical	-26.33	37.18	1.44	17.06	23.01
	450	Vertical	-25.54	37.09	1.57	17.08	22.16
	875	Vertical	-25.17	37.34	1.72	17.10	23.03

LTE Band 4									
RB	Modulation	Bandwidth (MHz)	Channel	Polarization	LVL (dBm)	SG+30 (dBm)	Gain (dBi)	Cable Loss (dBm)	E.I.R.P. (dBm)
1	QPSK	1.4	19957	Vertical	-26.63	39.95	1.44	17.06	24.33
			20175	Vertical	-24.52	39.69	1.57	17.08	24.18
			20393	Vertical	-25.78	39.61	1.72	17.10	24.23
		3	19965	Vertical	-25.41	39.84	1.44	17.06	24.22
			20175	Vertical	-25.67	39.79	1.57	17.08	24.28
			20385	Vertical	-24.83	39.59	1.72	17.10	24.21
		5	19975	Vertical	-25.53	39.76	1.44	17.06	24.14
			20175	Vertical	-23.54	39.92	1.57	17.08	24.41
			20375	Vertical	-26.93	39.63	1.72	17.10	24.25
		10	20000	Vertical	-25.43	39.76	1.44	17.06	24.14
			20175	Vertical	-23.26	39.7	1.57	17.08	24.19
			20350	Vertical	-26.57	39.7	1.72	17.10	24.32

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16QAM	1.4	19957	Vertical	-26.78	39.09	1.44	17.06	23.47
		20175	Vertical	-24.93	39.43	1.57	17.08	23.92
		20393	Vertical	-25.36	39.34	1.72	17.10	23.96
	3	19965	Vertical	-26.87	39.31	1.44	17.06	23.69
		20175	Vertical	-24.63	39.04	1.57	17.08	23.53
		20385	Vertical	-25.86	39.17	1.72	17.10	23.79
	5	19975	Vertical	-26.81	39.49	1.44	17.06	23.87
		20175	Vertical	-24.62	39.46	1.57	17.08	23.95
		20375	Vertical	-25.44	39.35	1.72	17.10	23.97
	10	20000	Vertical	-26.65	39.41	1.44	17.06	23.79
		20175	Vertical	-24.62	39.49	1.57	17.08	23.98
		20350	Vertical	-25.36	39.16	1.72	17.10	23.78

Note: 1. This device was tested under all configurations and the worst case radiated power is reported while transmitting with the maximum number of resource blocks in each channel bandwidth.

2. $E.R.P = S.G + 30$. - Tx Cable loss + Substitution antenna gain – 2.15.

3. $E.I.R.P = E.R.P + 2.15$

2.4. Occupied Bandwidth

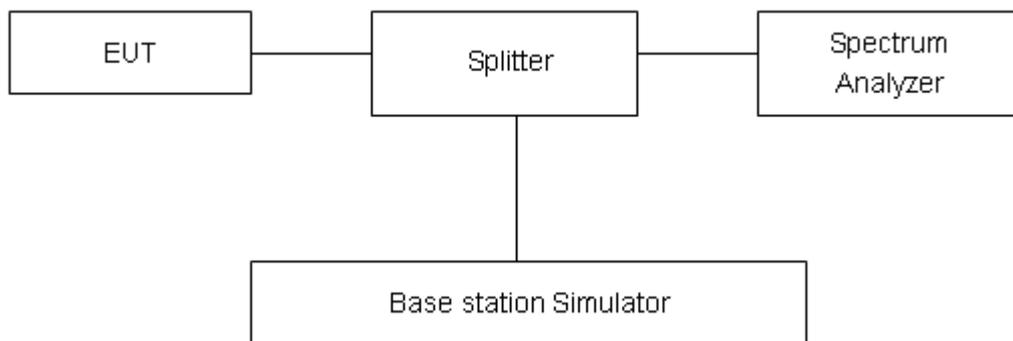
Ambient condition

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. The RBW is set larger than 1% of 26dB bandwidth. 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

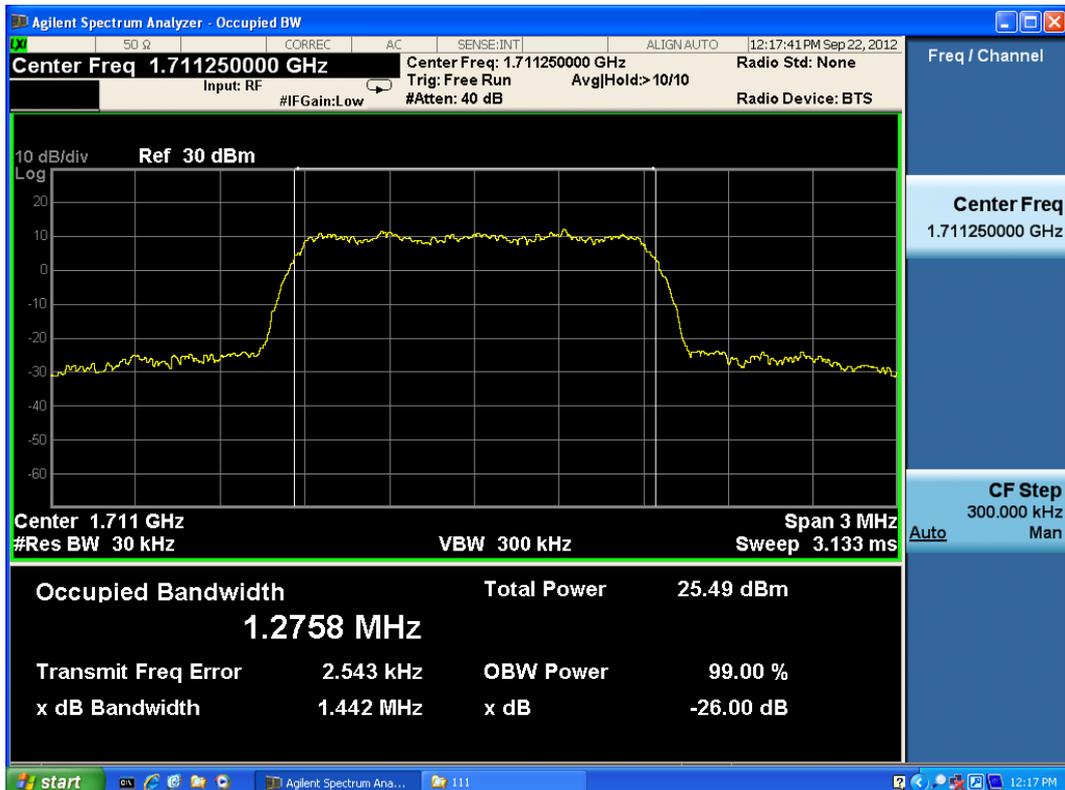
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 624\text{Hz}$.

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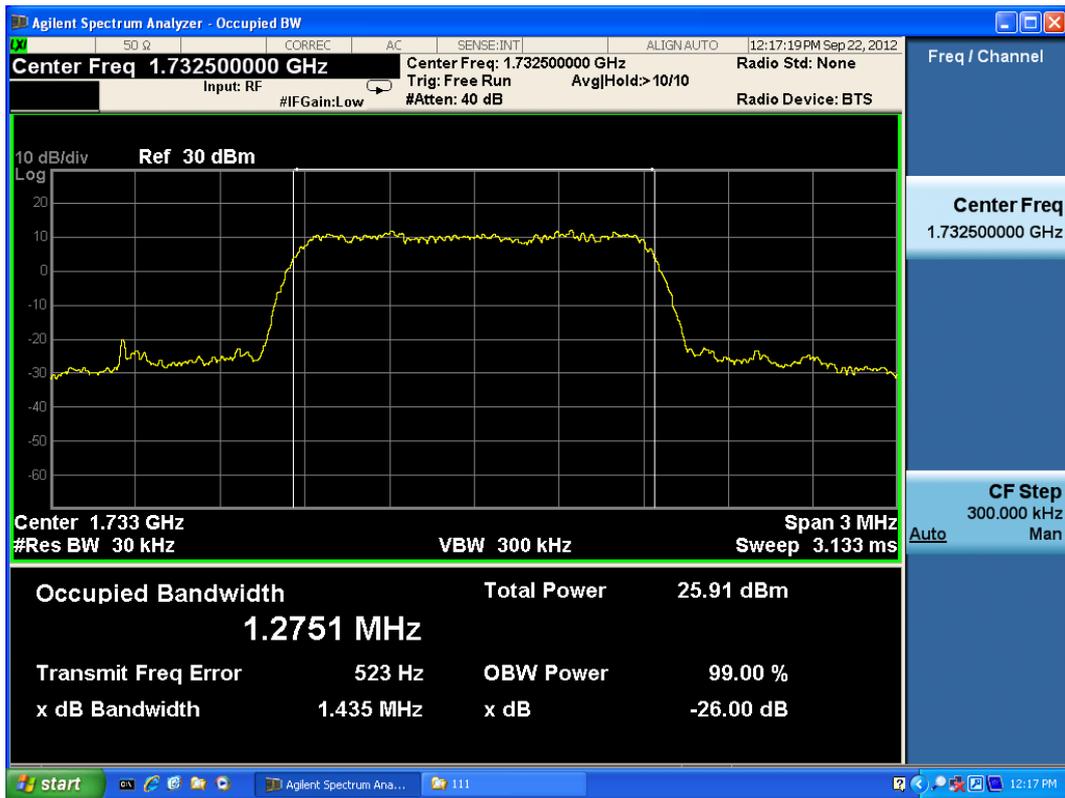
Test Result

CDMA AWS	Channel	Frequency (MHz)	99% Power Bandwidth (kHz)	-26dBc Bandwidth(kHz)
RC3 SO2(Loopback)	25	1711.25	1.2758	1.442
	450	1732.5	1.2751	1.435
	875	1753.75	1.2803	1.436
RC3 SO32(+FCH-SCH)	25	1711.25	1.2773	1.446
	450	1732.5	1.2740	1.429
	875	1753.75	1.2753	1.444
EVDO (Rev.0)	25	1711.25	1.2797	1.437
	450	1732.5	1.2820	1.434
	875	1753.75	1.2737	1.430
EVDO (Rev.A)	25	1711.25	1.2724	1.435
	450	1732.5	1.2673	1.430
	875	1753.75	1.2717	1.437
1X Advance SO75	25	1711.25	1.2767	1.426
	600	1732.5	1.2735	1.428
	1175	1753.75	1.2781	1.427

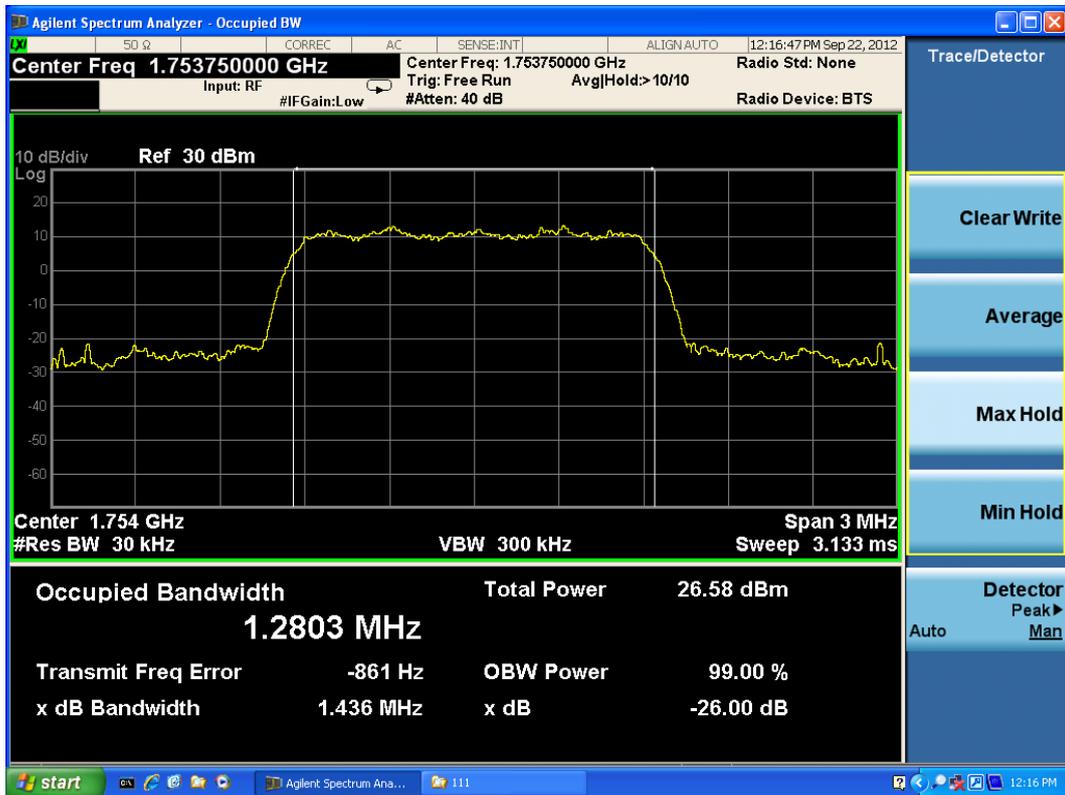


CDMA AWS SO2 CH25 Occupied Bandwidth

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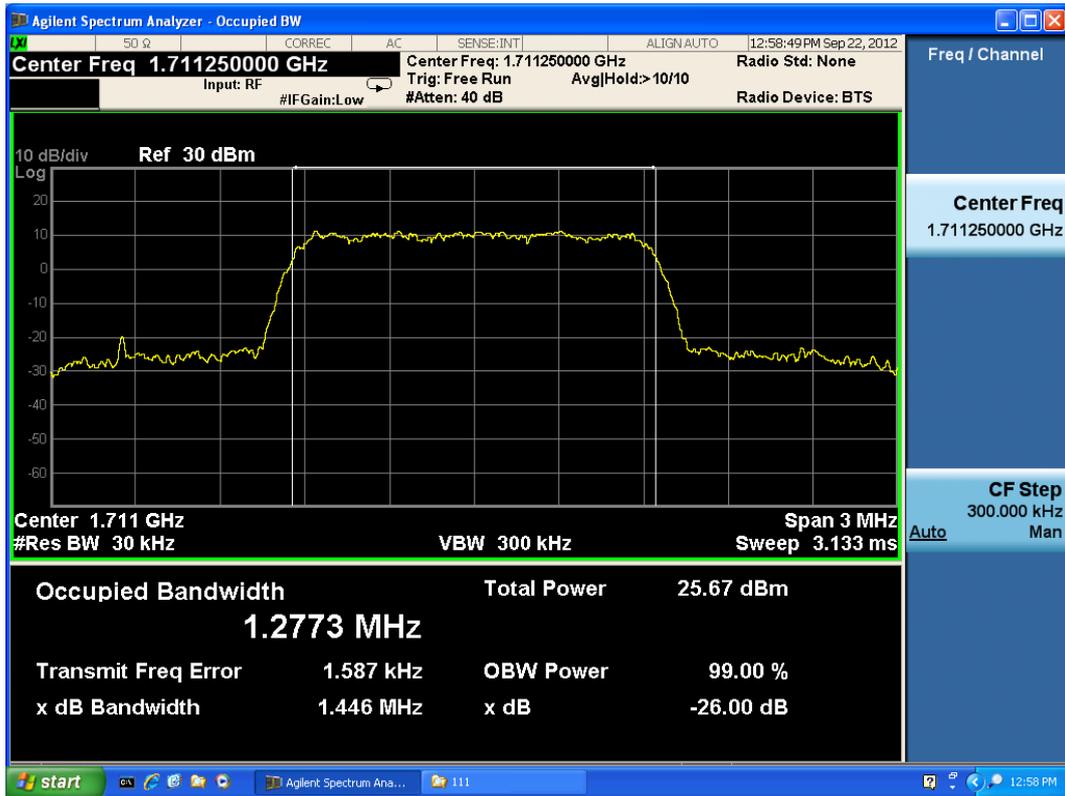


CDMA AWS SO2 CH450 Occupied Bandwidth

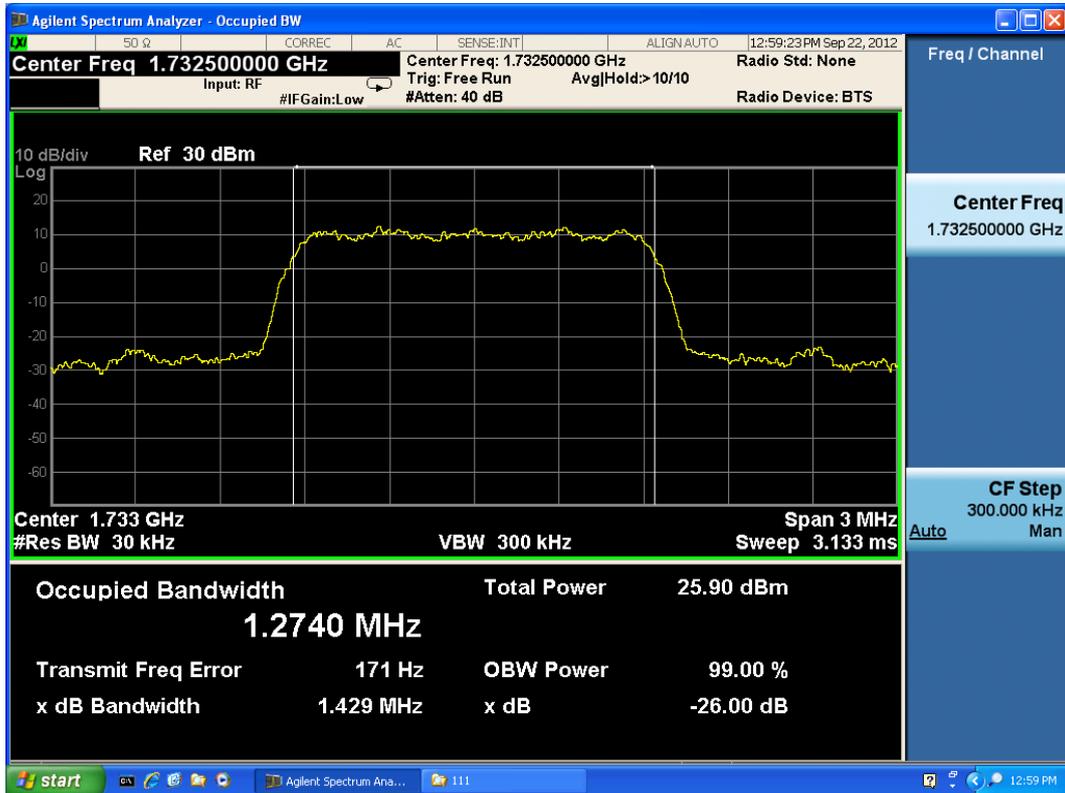


CDMA AWS SO2 CH875 Occupied Bandwidth

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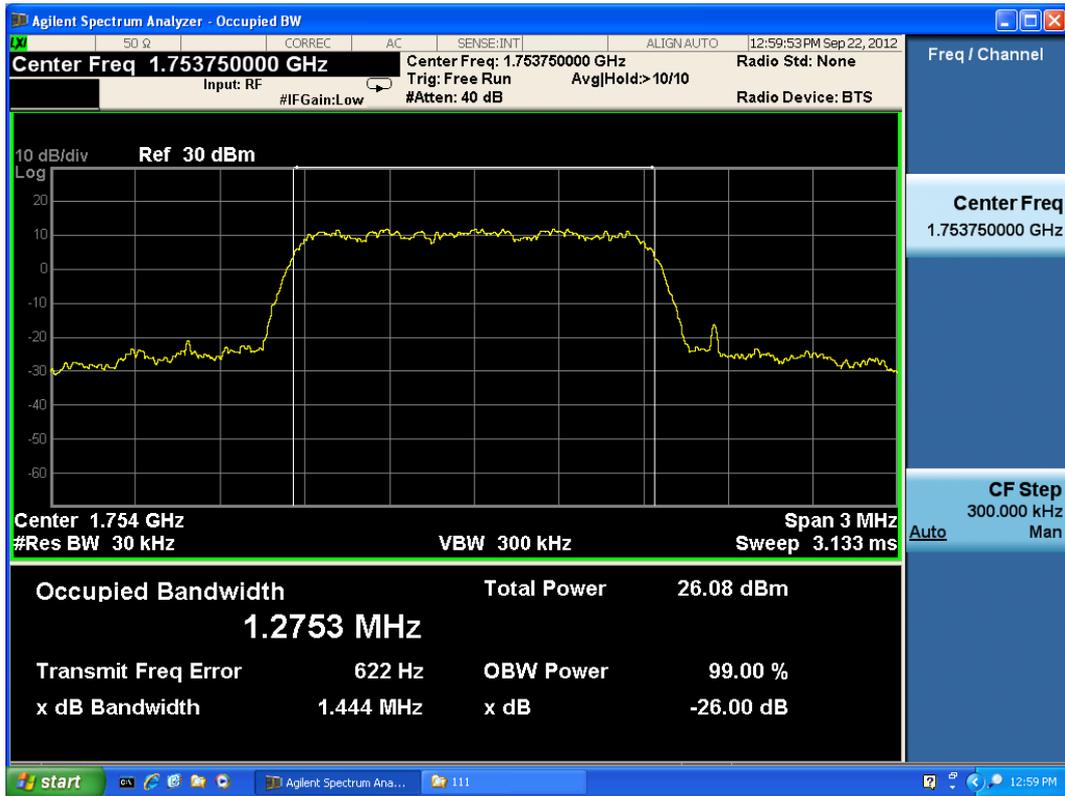


CDMA AWS SO32 CH25 Occupied Bandwidth

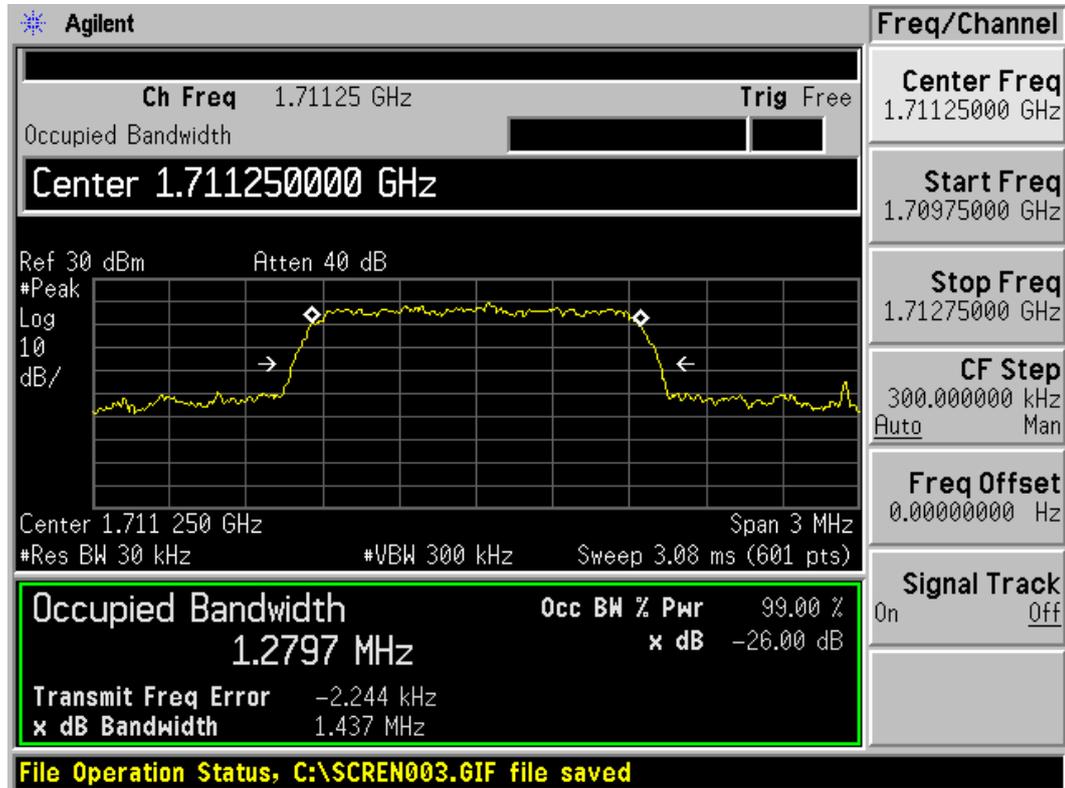


CDMA AWS SO32 CH450 Occupied Bandwidth

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CDMA AWS SO32 CH875 Occupied Bandwidth

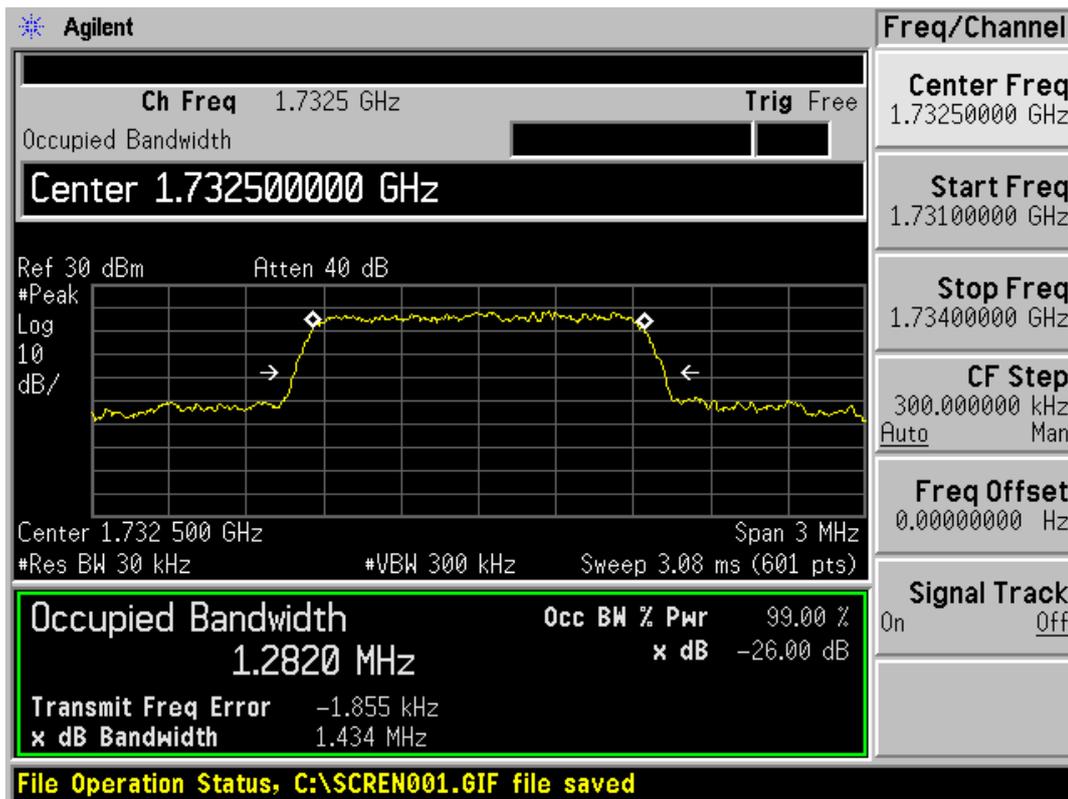


CDMA AWS EVDO (Rev.0) CH25 Occupied Bandwidth

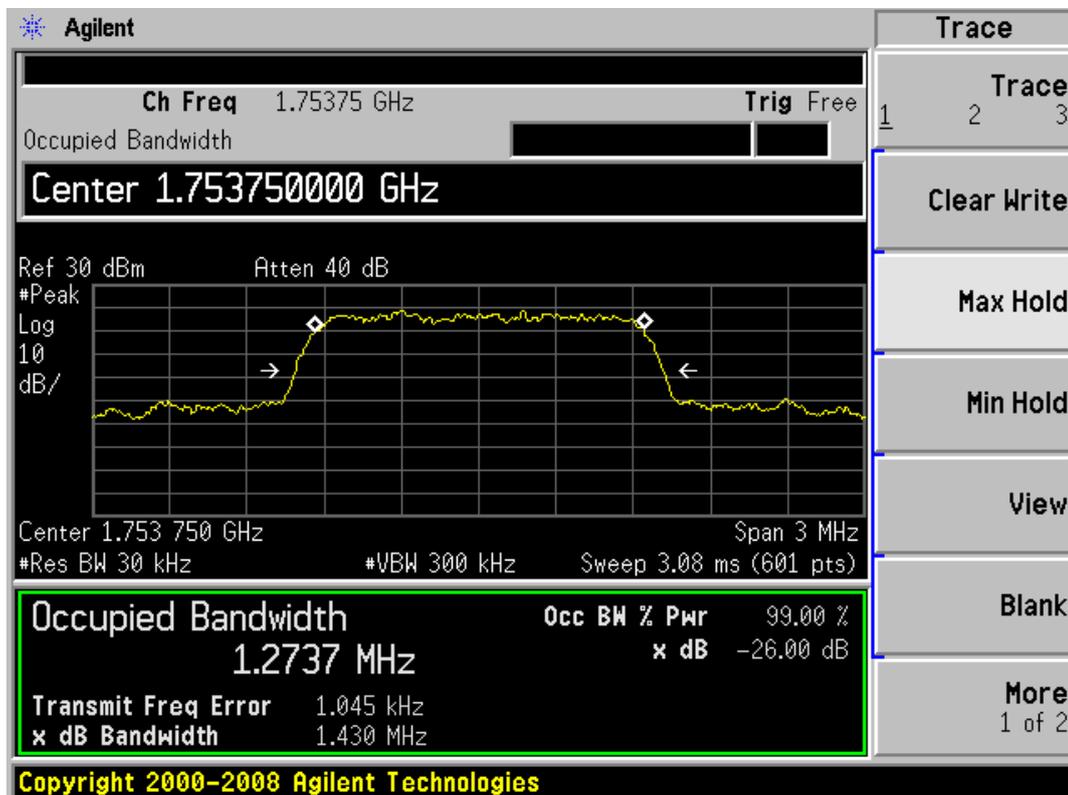
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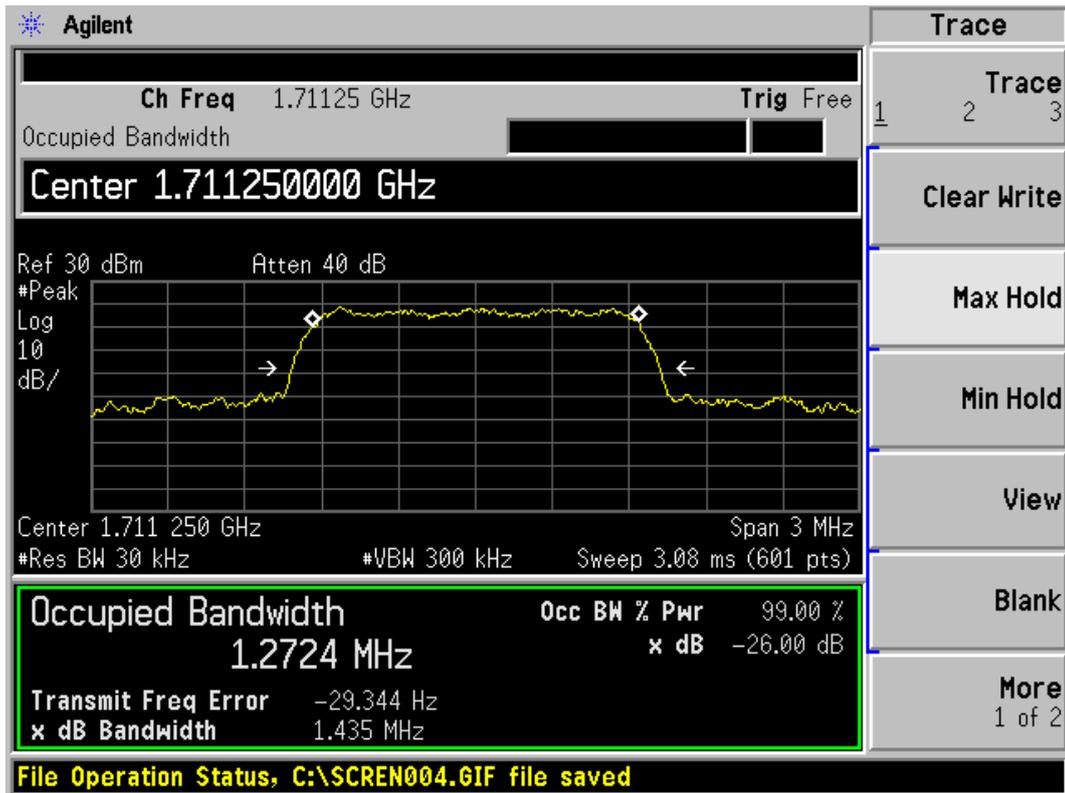


CDMA AWS EVDO (Rev.0) CH450 Occupied Bandwidth

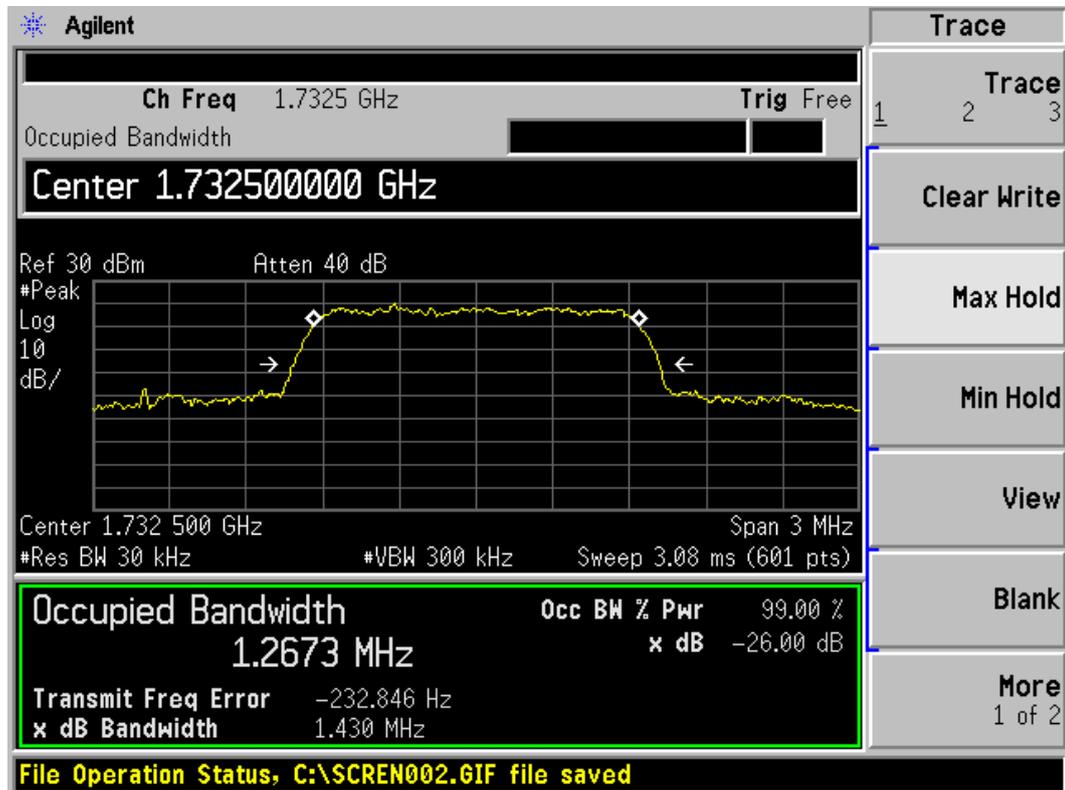


CDMA AWS EVDO (Rev.0) CH875 Occupied Bandwidth

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CDMA AWS EVDO (Rev.A) CH25 Occupied Bandwidth

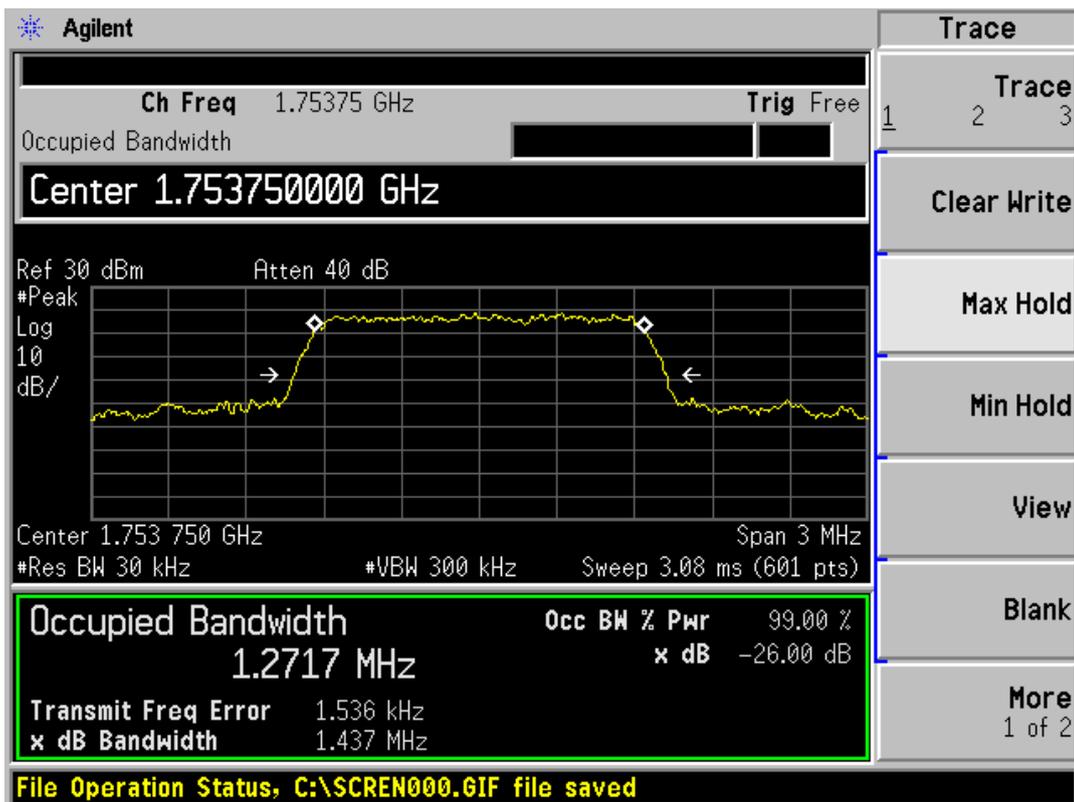


CDMA AWS EVDO (Rev.A) CH450 Occupied Bandwidth

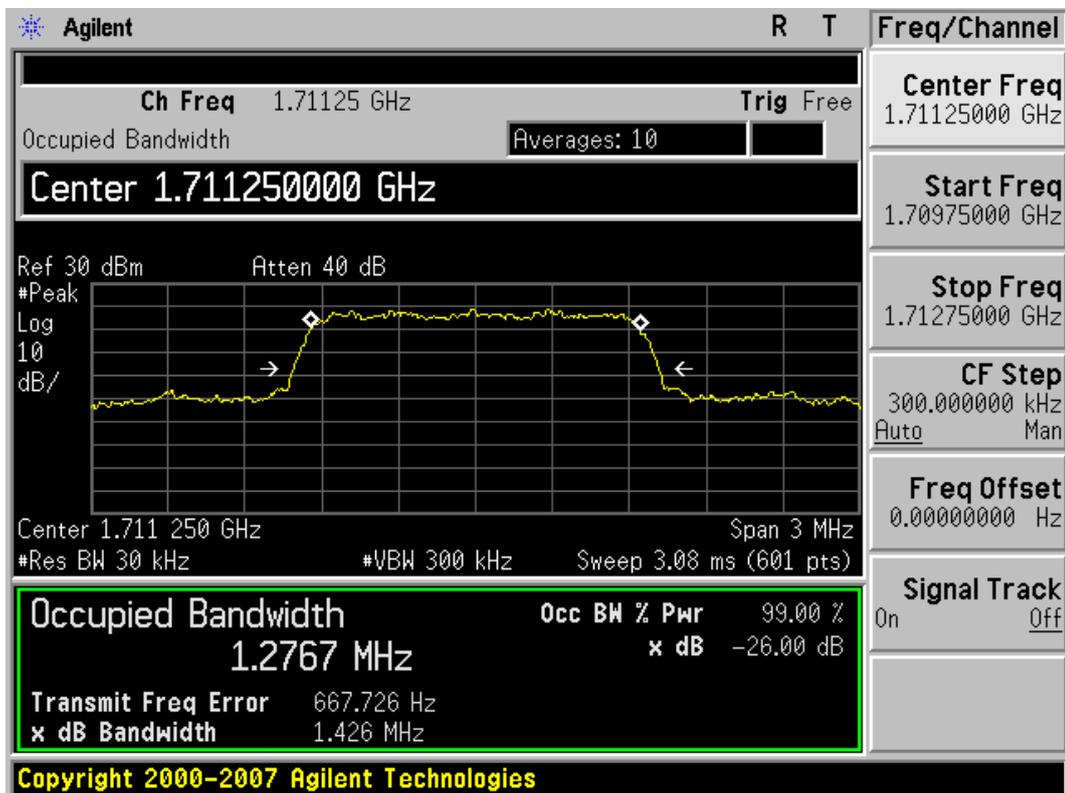
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CDMA AWS EVDO (Rev.A) CH875 Occupied Bandwidth

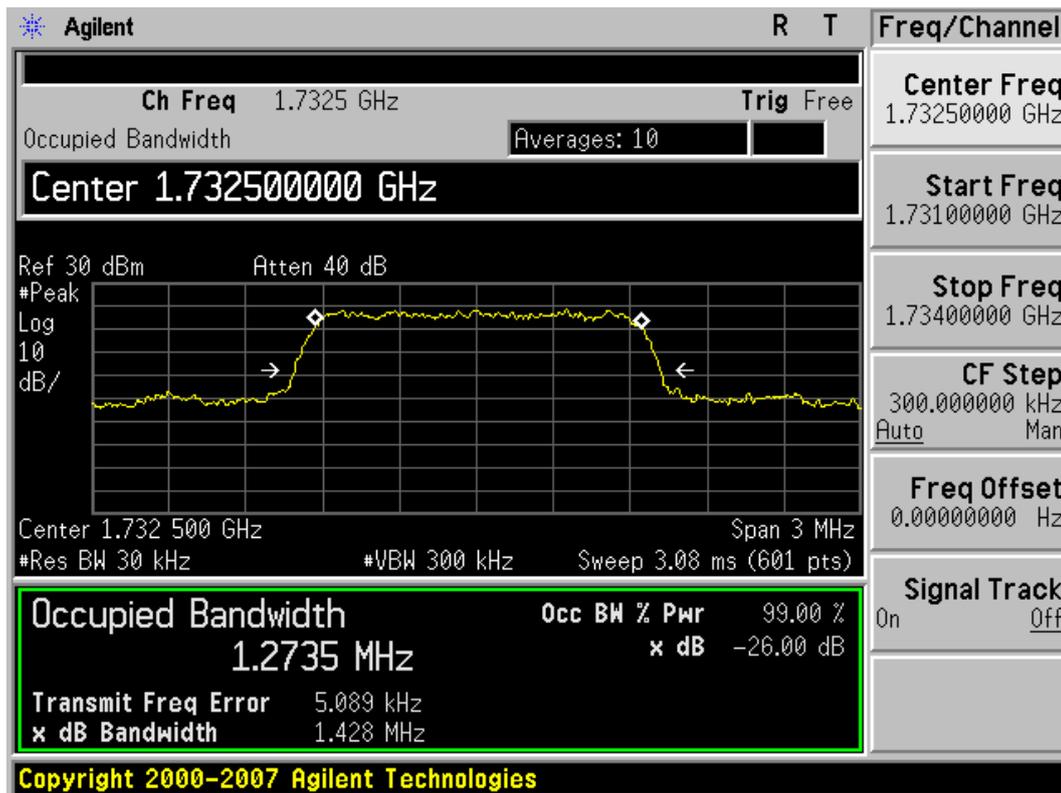


1X Advance CH25 Occupied Bandwidth

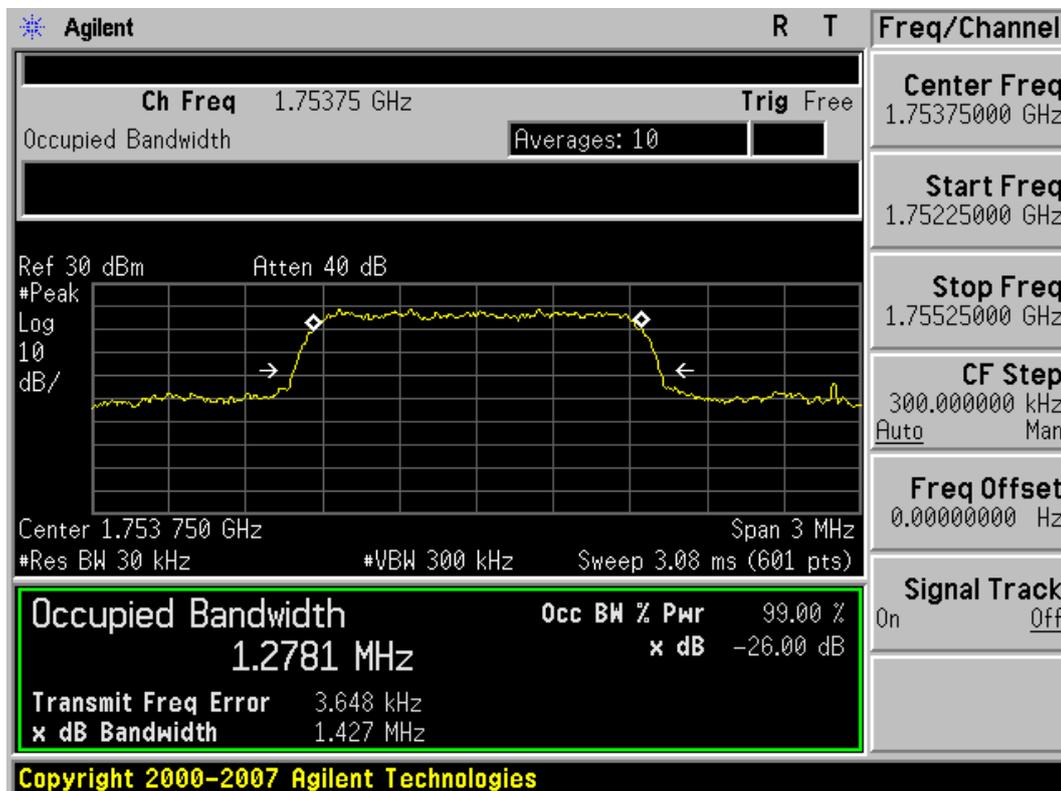
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1X Advance CH450 Occupied Bandwidth



1X Advance CH875 Occupied Bandwidth

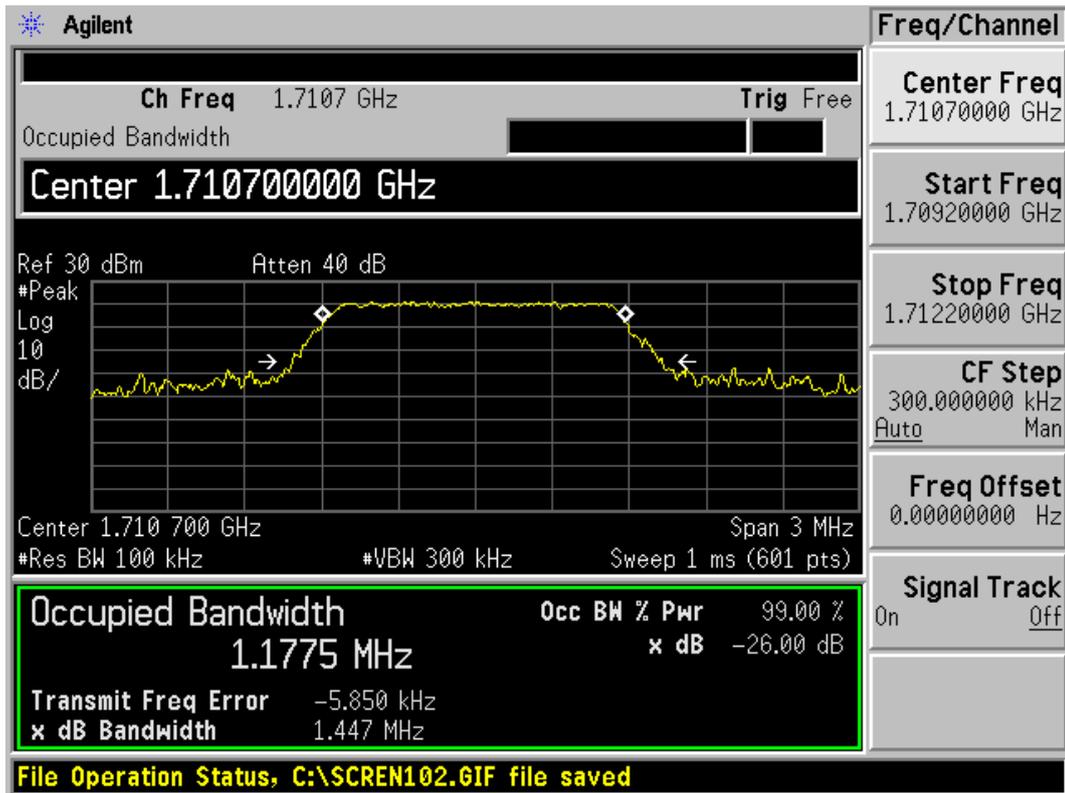
TA Technology (Shanghai) Co., Ltd.
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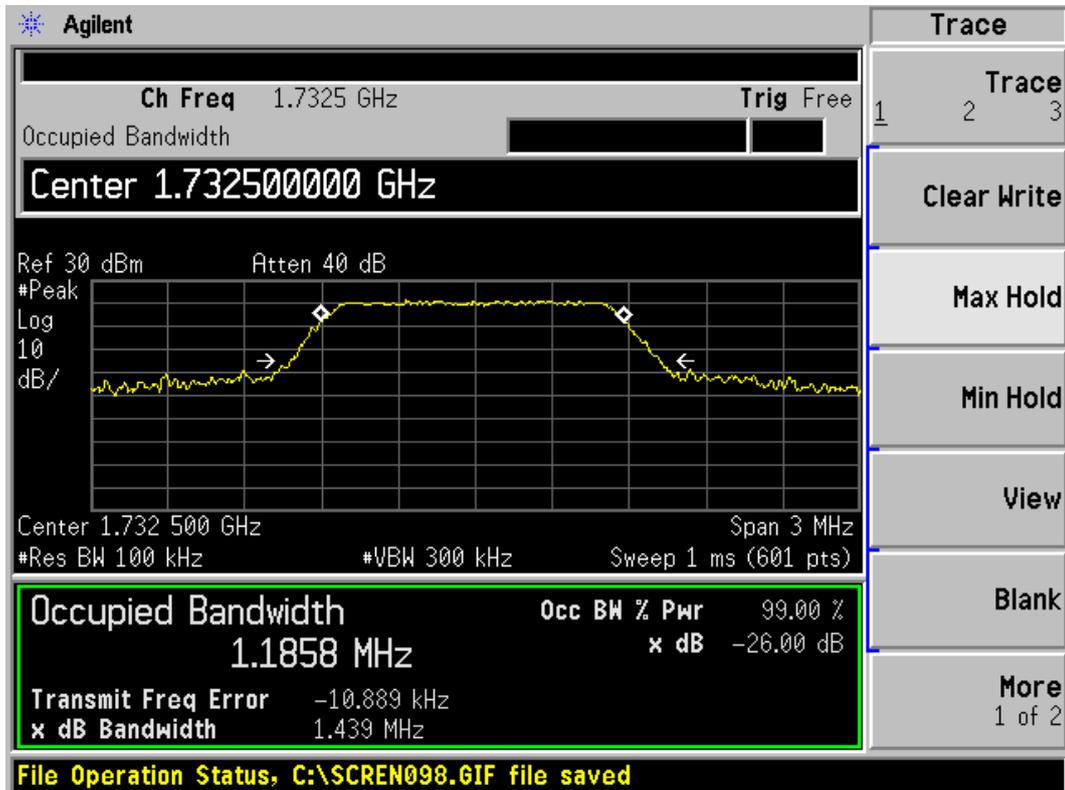
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LTE Band 4						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth (kHz)	-26dBc Bandwidth(kHz)
1	QPSK	1.4	19957	1710.7	1.1775	1.447
			20175	1732.5	1.1858	1.439
			20393	1754.3	1.1839	1.431
		3	19965	1711.5	2.7423	3.148
			20175	1732.5	2.7406	3.082
			20385	1753.5	2.7517	3.113
		5	19975	1712.5	4.5027	5.028
			20175	1732.5	4.5320	5.059
			20375	1752.5	4.5351	5.113
		10	20000	1715	9.0446	10.111
			20175	1732.5	9.0524	10.046
			20350	1750	9.0253	10.068
	16QAM	1.4	19957	1710.7	1.1747	1.401
			20175	1732.5	1.1776	1.494
			20393	1754.3	1.1878	1.554
		3	19965	1711.5	2.7403	3.057
			20175	1732.5	2.7456	3.080
			20385	1753.5	2.7373	3.103
		5	19975	1712.5	4.5144	5.032
			20175	1732.5	4.5200	5.041
			20375	1752.5	4.5093	5.092
		10	20000	1715	9.0327	10.010
			20175	1732.5	9.0376	10.028
			20350	1750	9.0671	10.021

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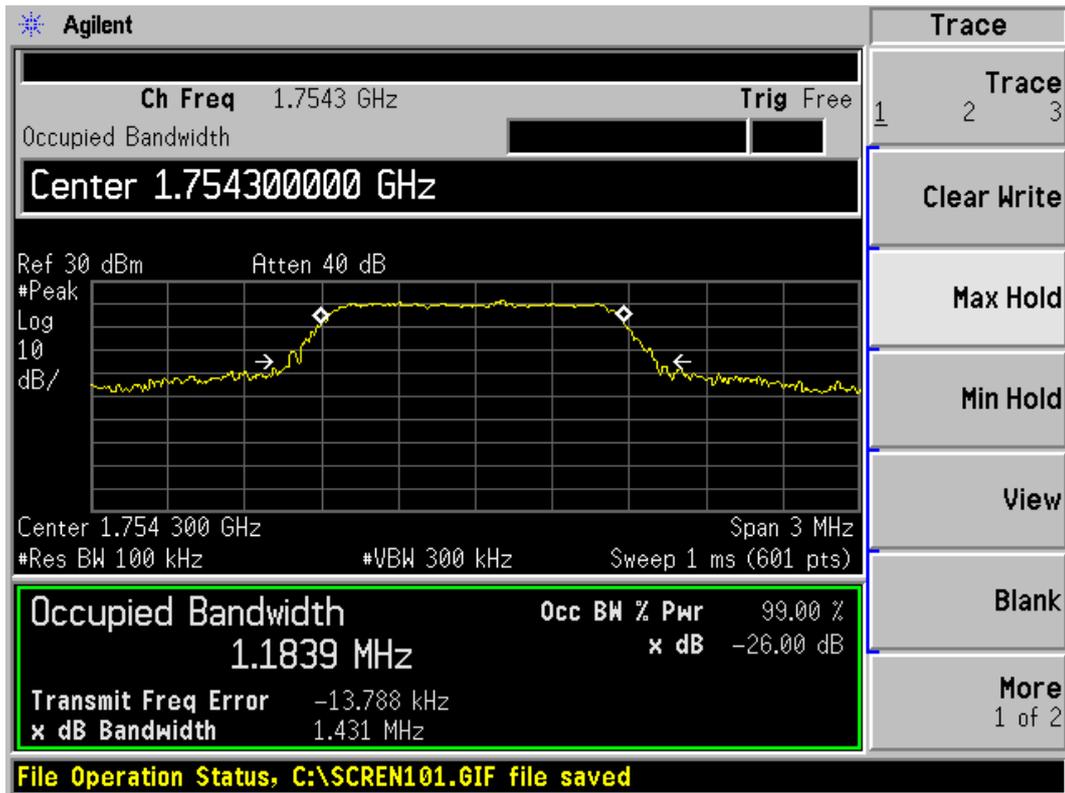


LTE Band 4 QPSK Bandwidth = 1.4MHz CH19957 Occupied Bandwidth

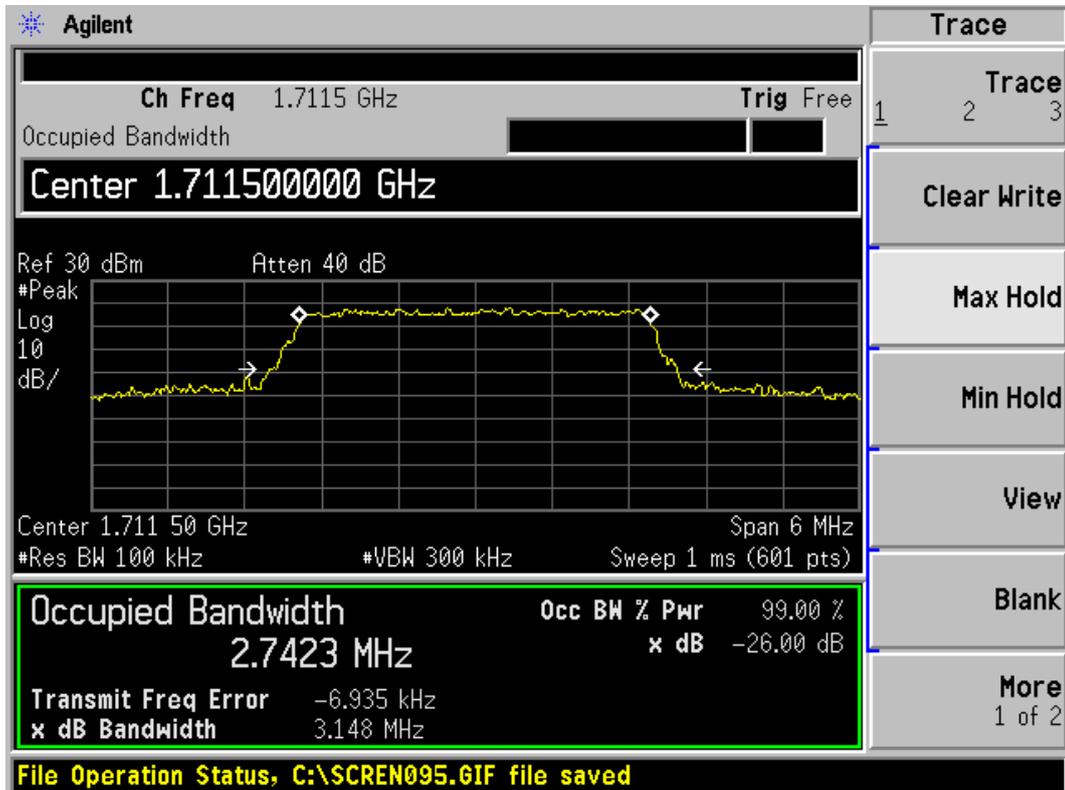


LTE Band 4 QPSK Bandwidth = 1.4MHz CH20175 Occupied Bandwidth

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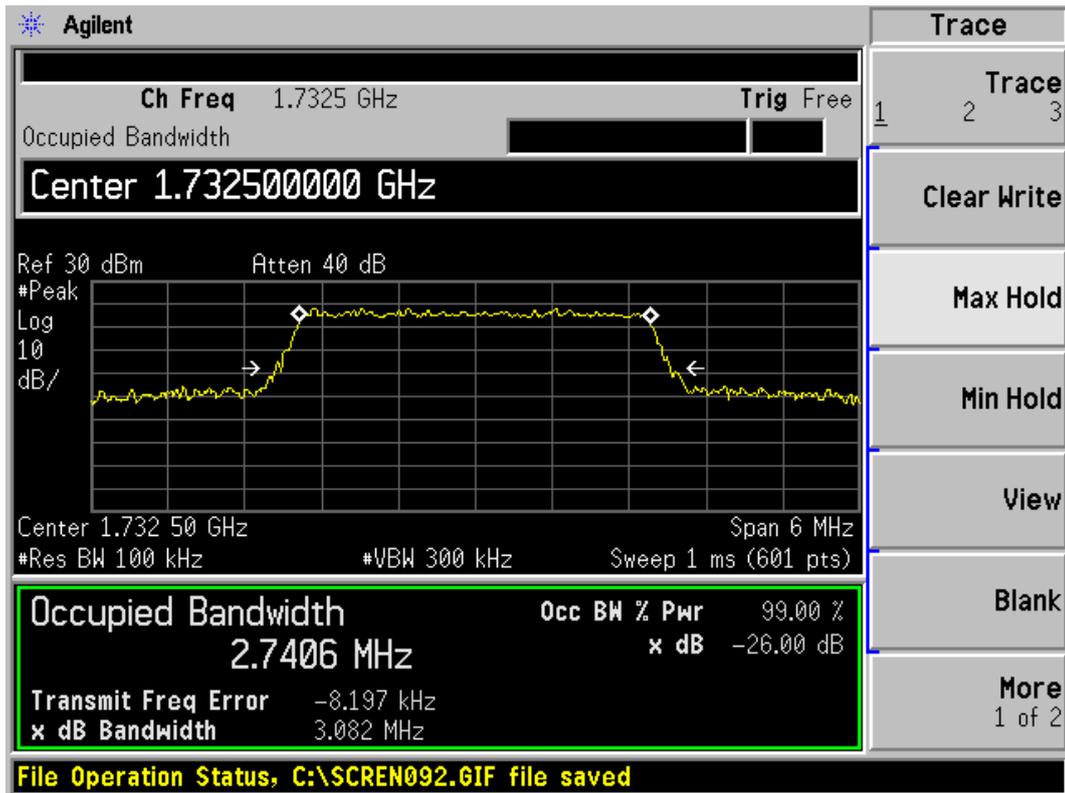


LTE Band 4 QPSK Bandwidth = 1.4MHz CH20393 Occupied Bandwidth

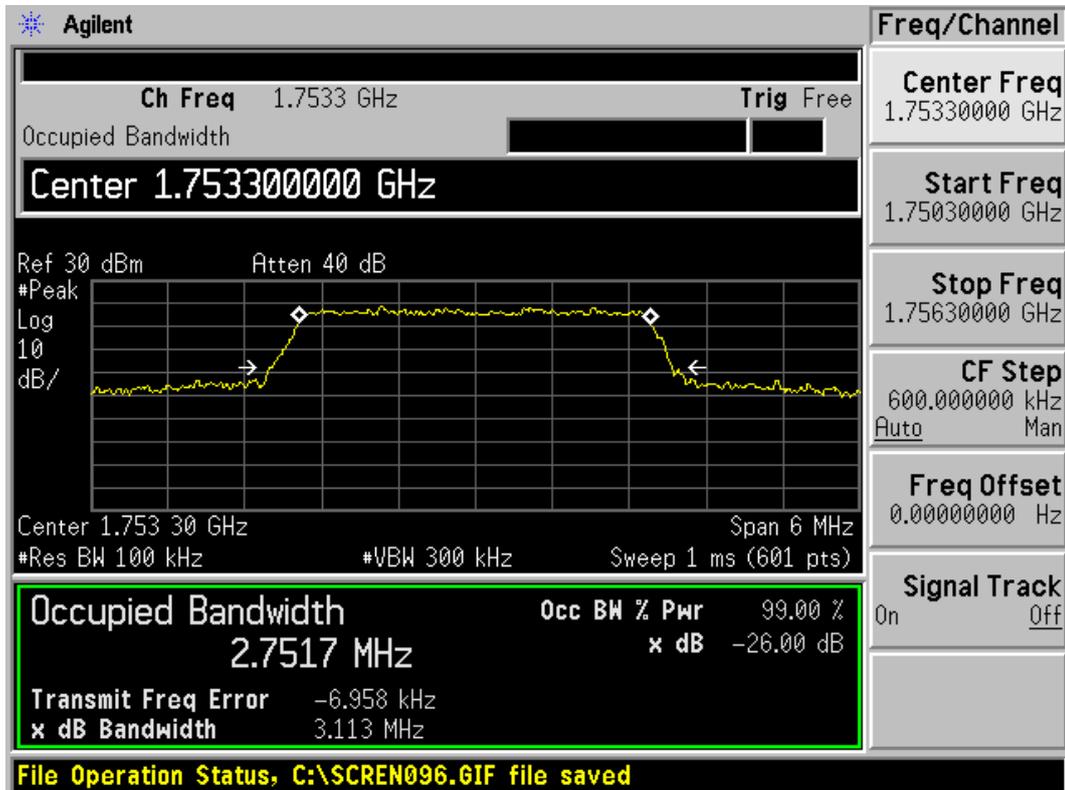


LTE Band 4 QPSK Bandwidth = 3MHz CH19965 Occupied Bandwidth

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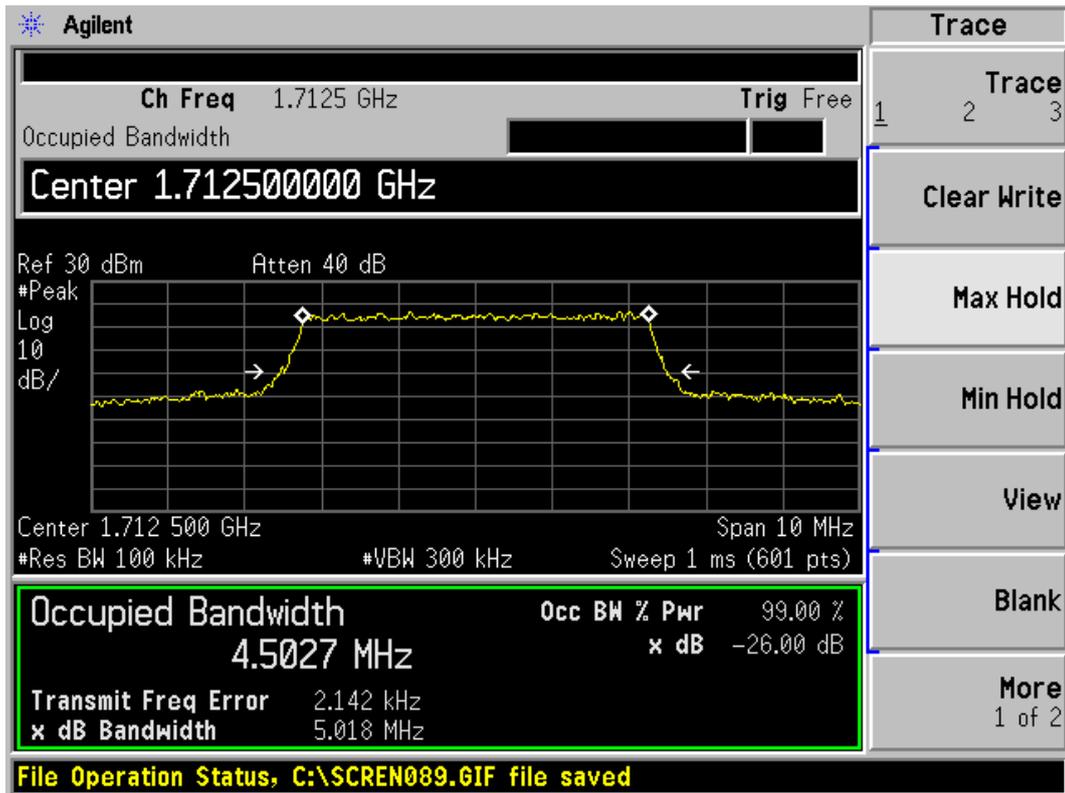


LTE Band 4 QPSK Bandwidth = 3MHz CH20175 Occupied Bandwidth

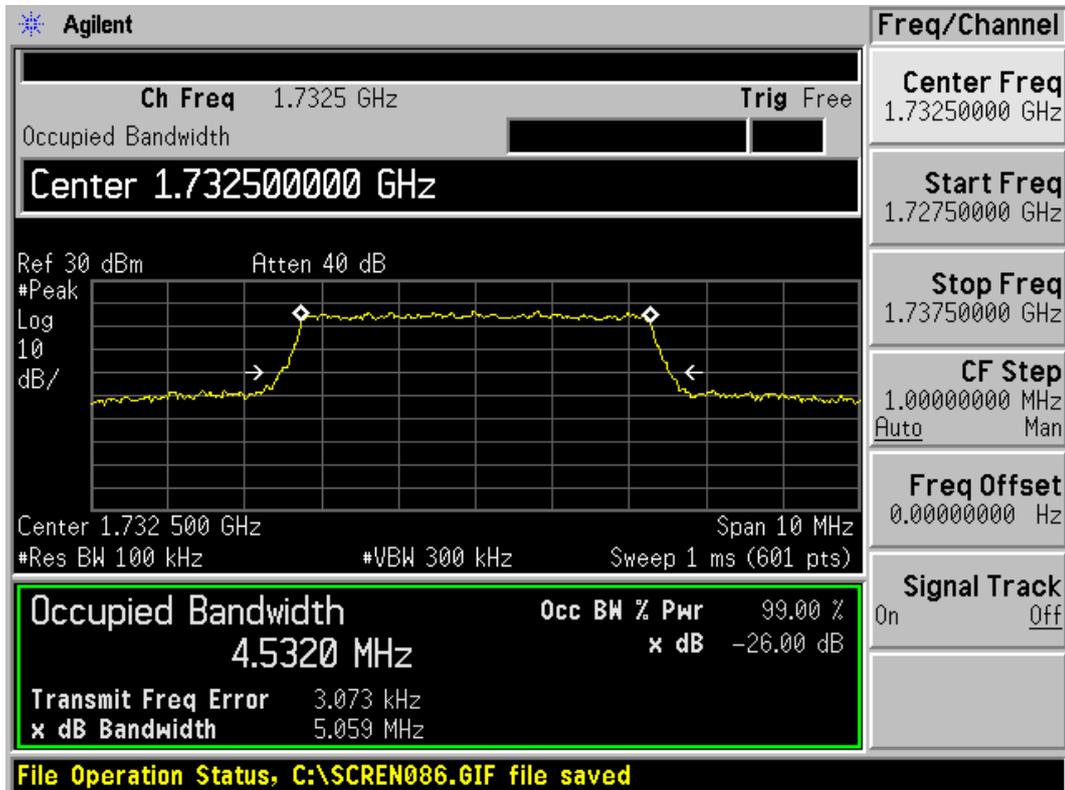


LTE Band 4 QPSK Bandwidth = 3MHz CH20385 Occupied Bandwidth

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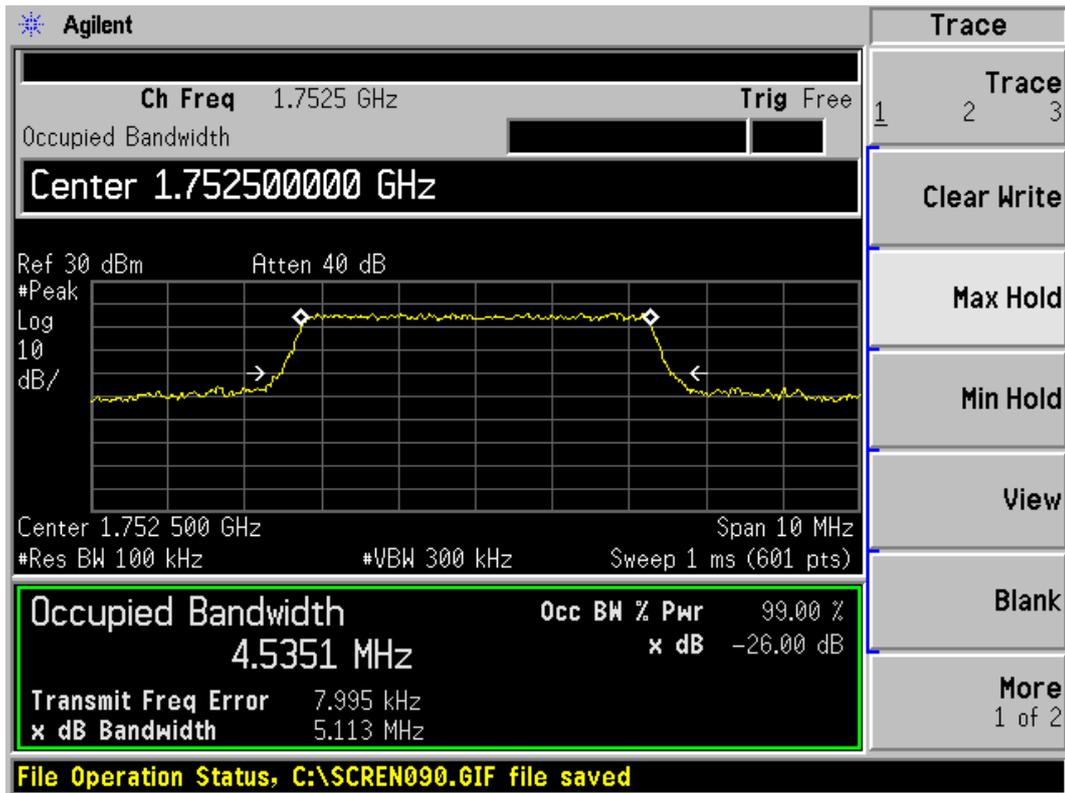


LTE Band 4 QPSK Bandwidth = 5MHz CH19975 Occupied Bandwidth

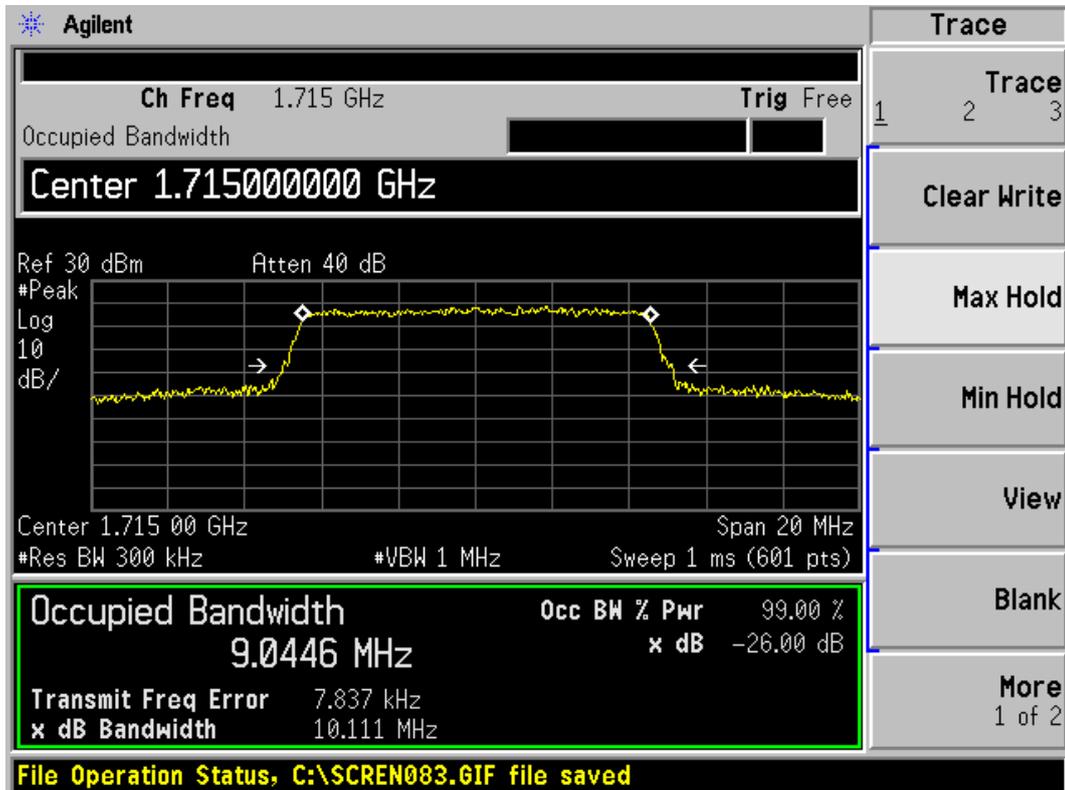


LTE Band 4 QPSK Bandwidth = 5MHz CH20175 Occupied Bandwidth

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LTE Band 4 QPSK Bandwidth = 5MHz CH20375 Occupied Bandwidth

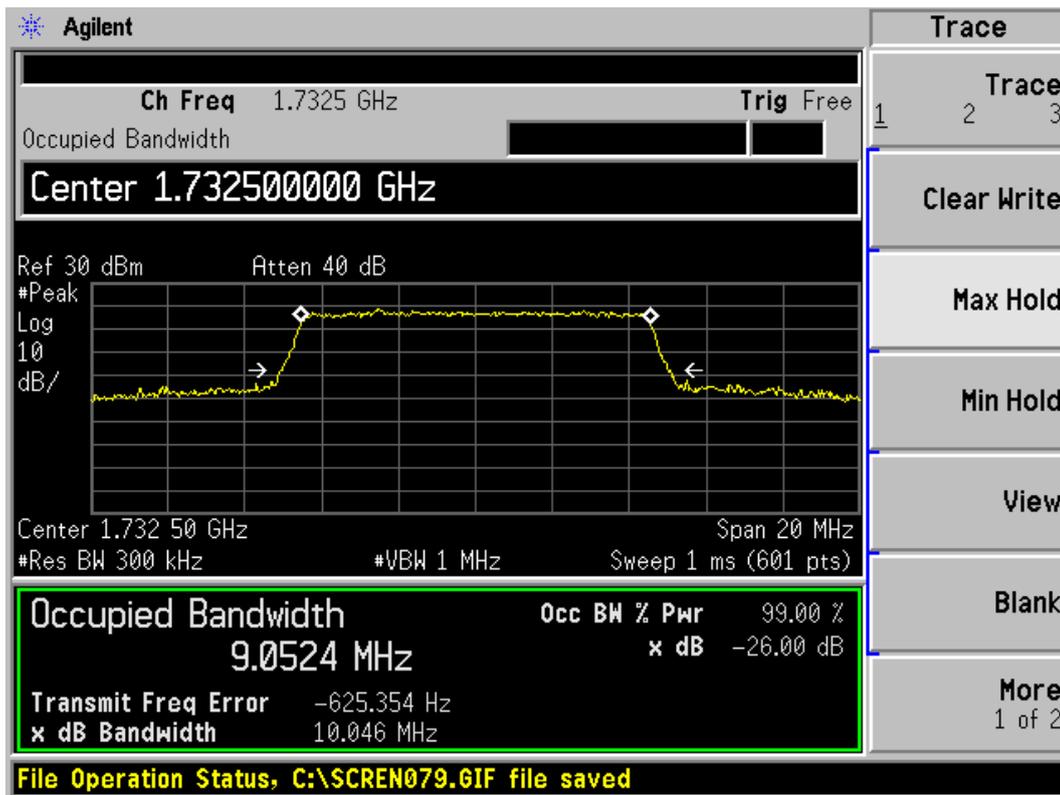


LTE Band 4 QPSK Bandwidth = 10MHz CH20000 Occupied Bandwidth

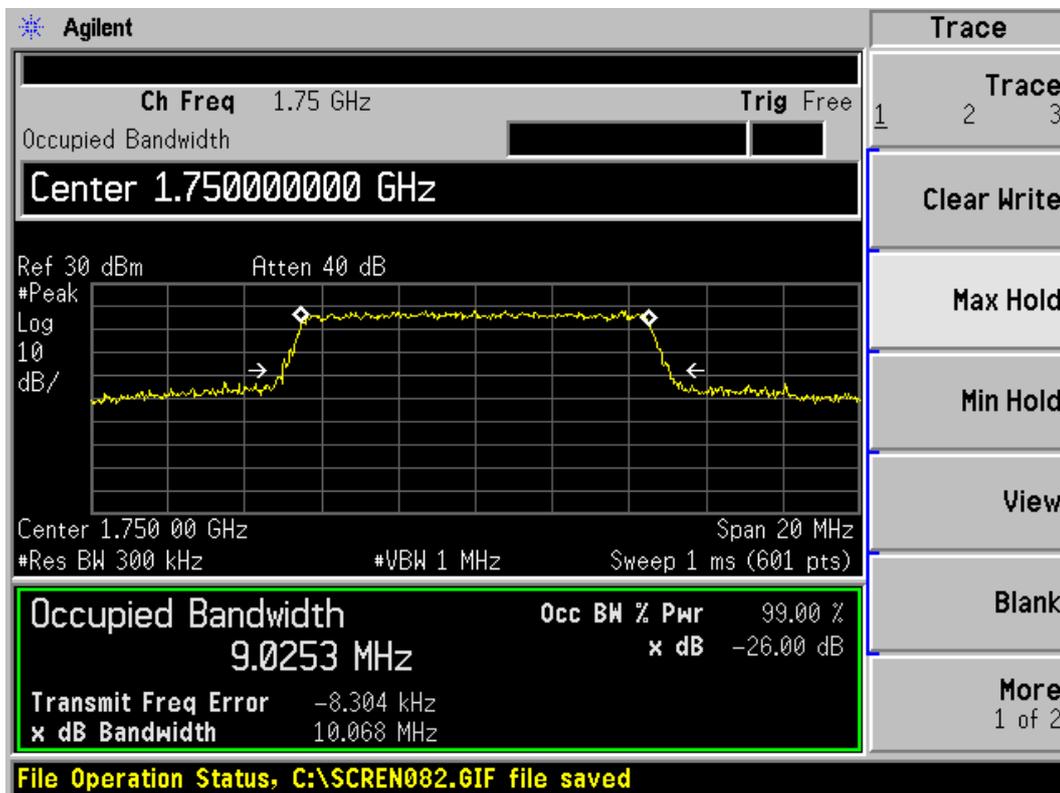
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LTE Band 4 QPSK Bandwidth = 10MHz CH20175 Occupied Bandwidth

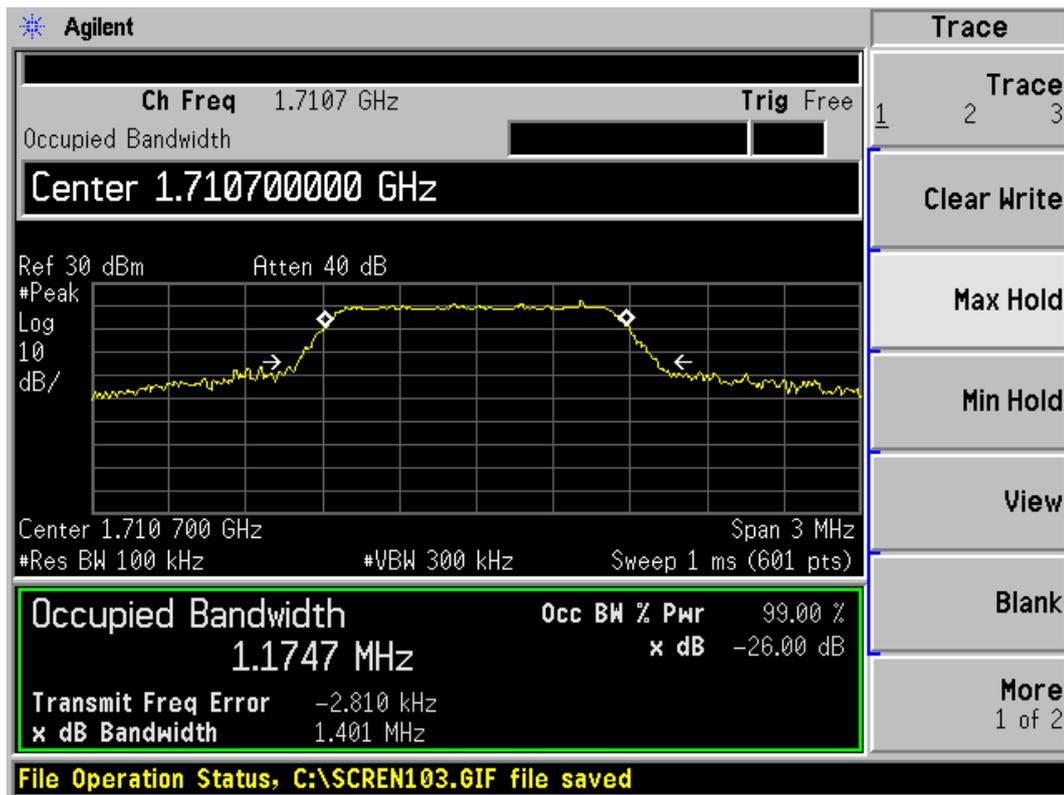


LTE Band 4 QPSK Bandwidth = 10MHz CH20350 Occupied Bandwidth

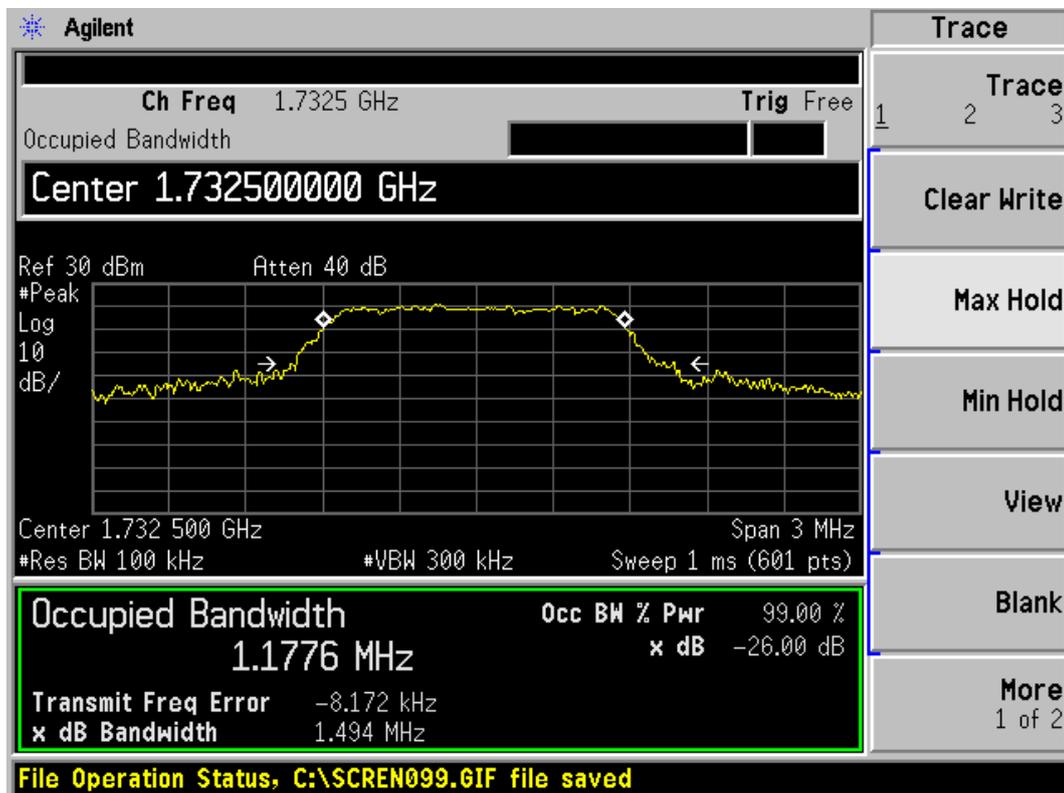
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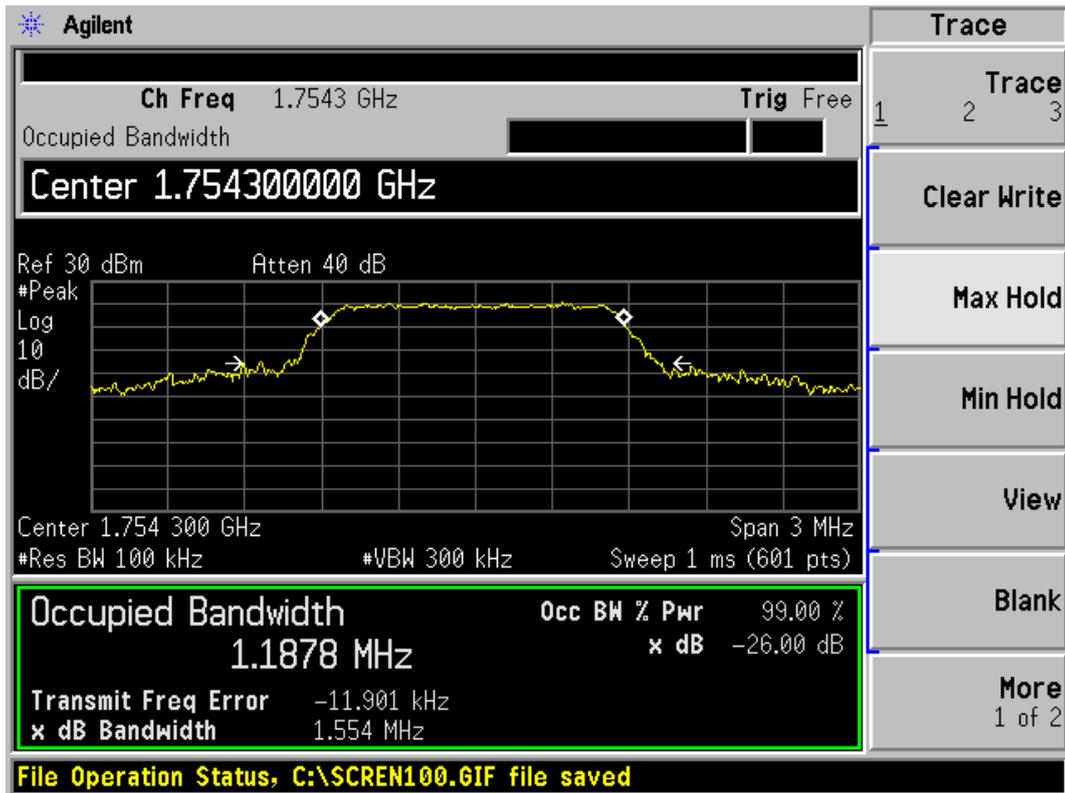


LTE Band 4 16QAM Bandwidth = 1.4MHz CH19957 Occupied Bandwidth

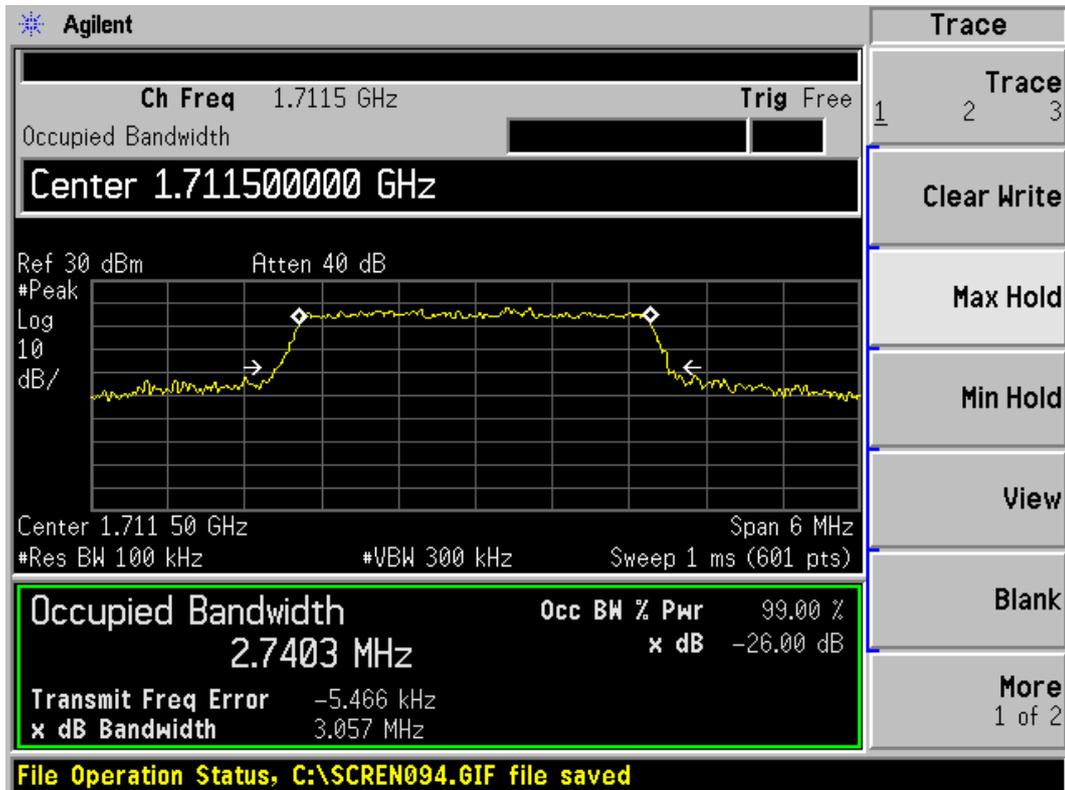


LTE Band 4 16QAM Bandwidth = 1.4MHz CH20175 Occupied Bandwidth

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

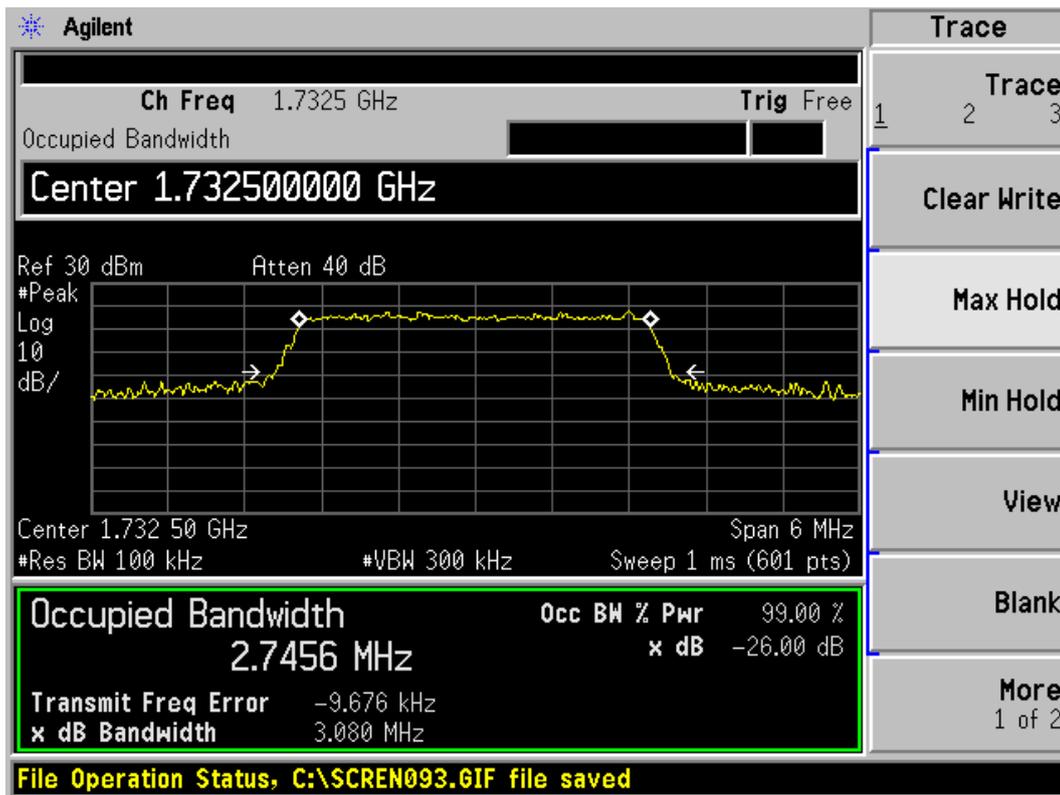


LTE Band 4 16QAM Bandwidth = 3MHz CH19965 Occupied Bandwidth

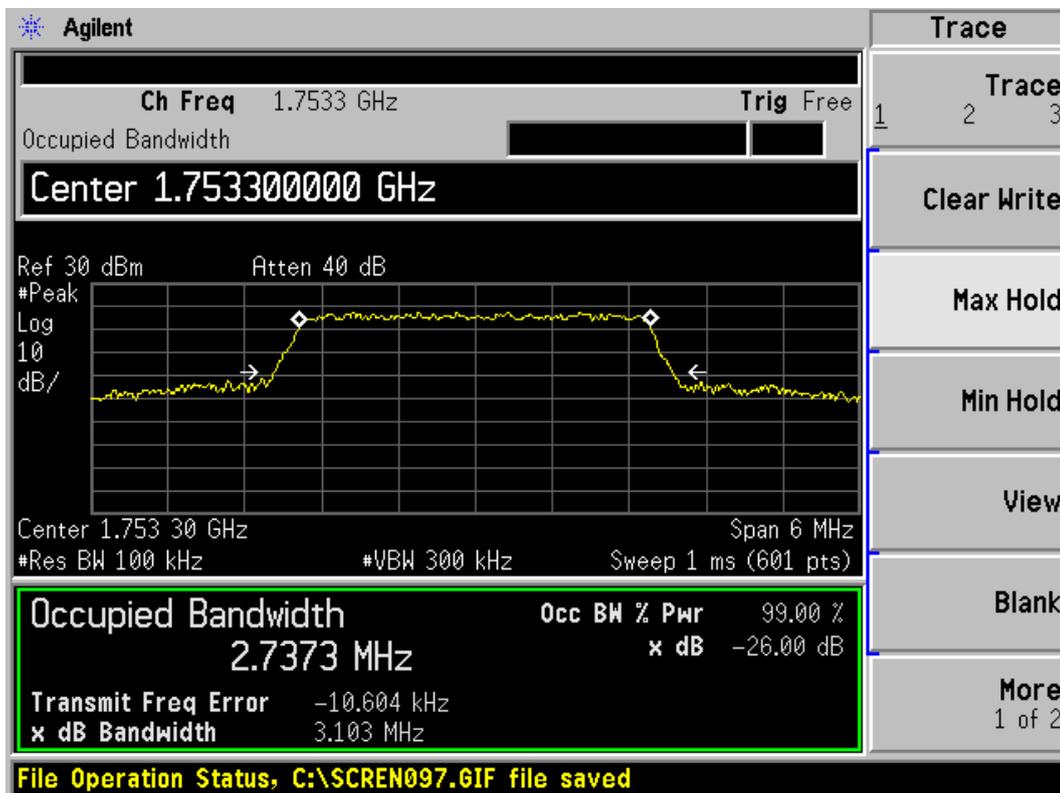
TA Technology (Shanghai) Co., Ltd. Test Report

Report No.: RHA1209-0083RF03R1

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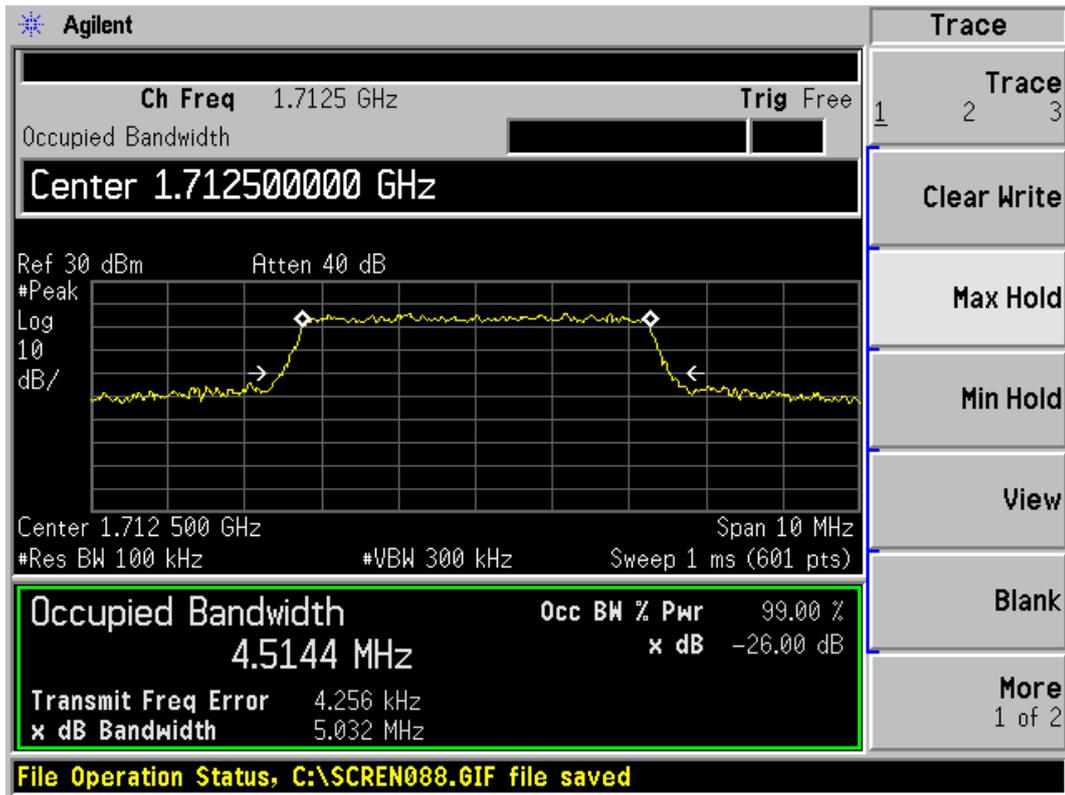


LTE Band 4 16QAM Bandwidth = 3MHz CH20175 Occupied Bandwidth

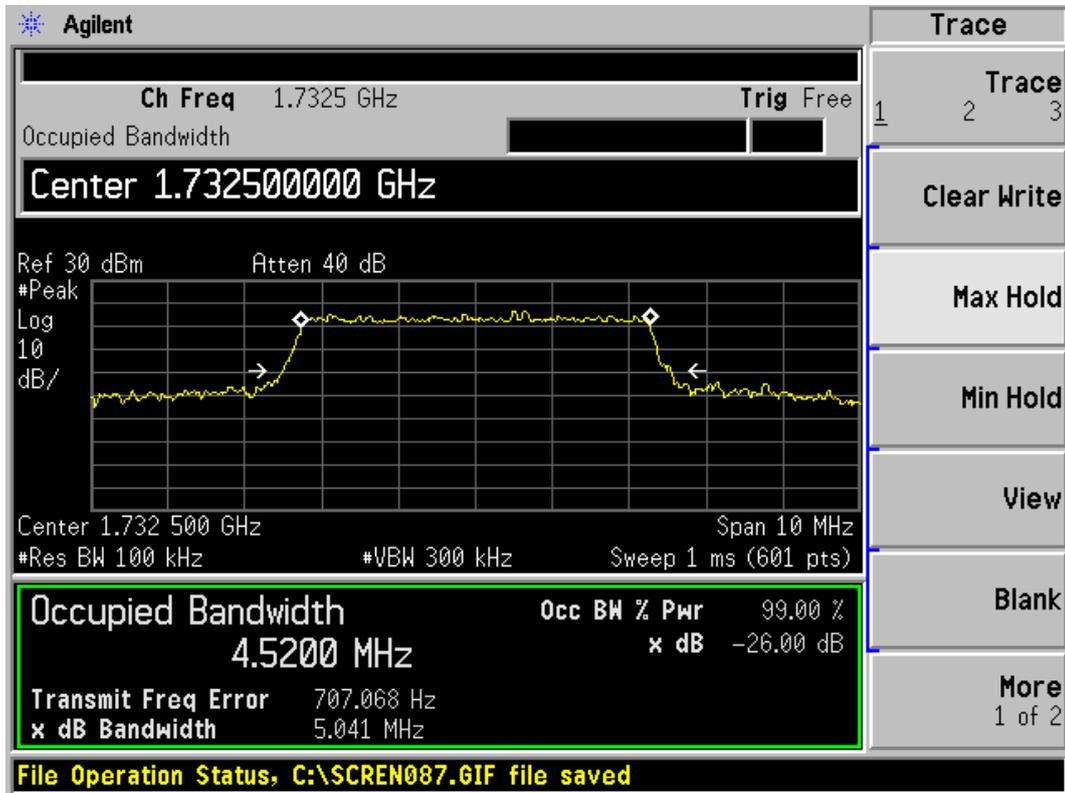


LTE Band 4 16QAM Bandwidth = 3MHz CH20385 Occupied Bandwidth

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

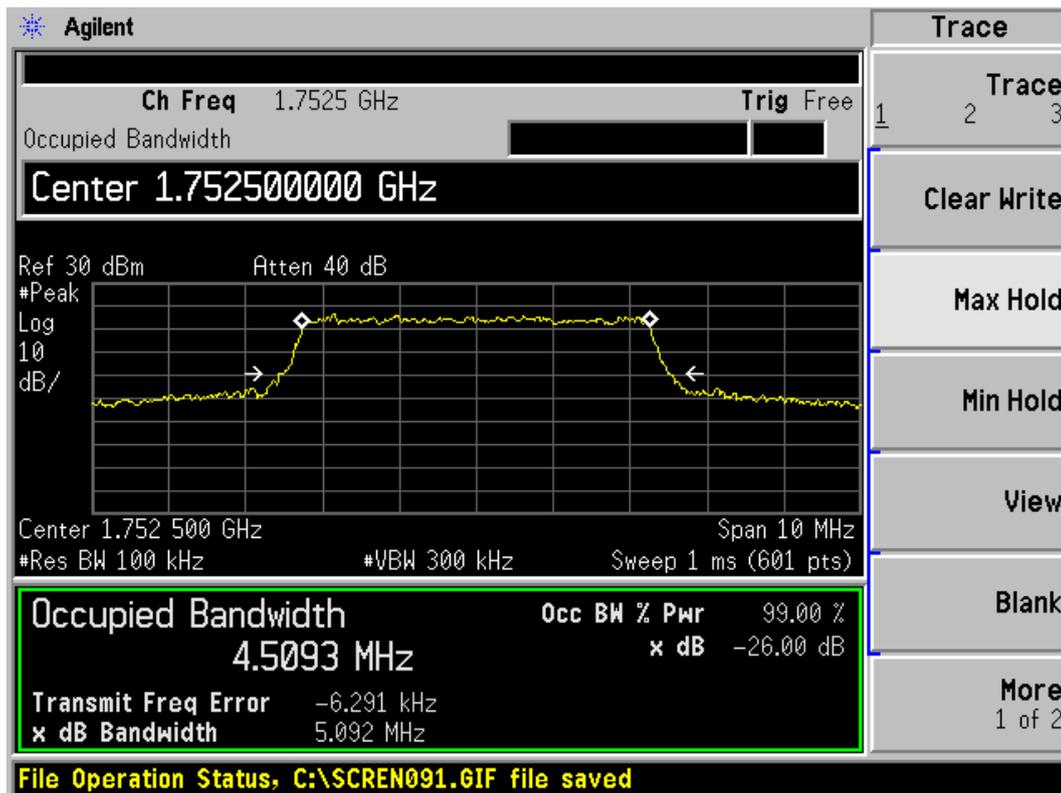


LTE Band 4 16QAM Bandwidth = 5MHz CH20175 Occupied Bandwidth

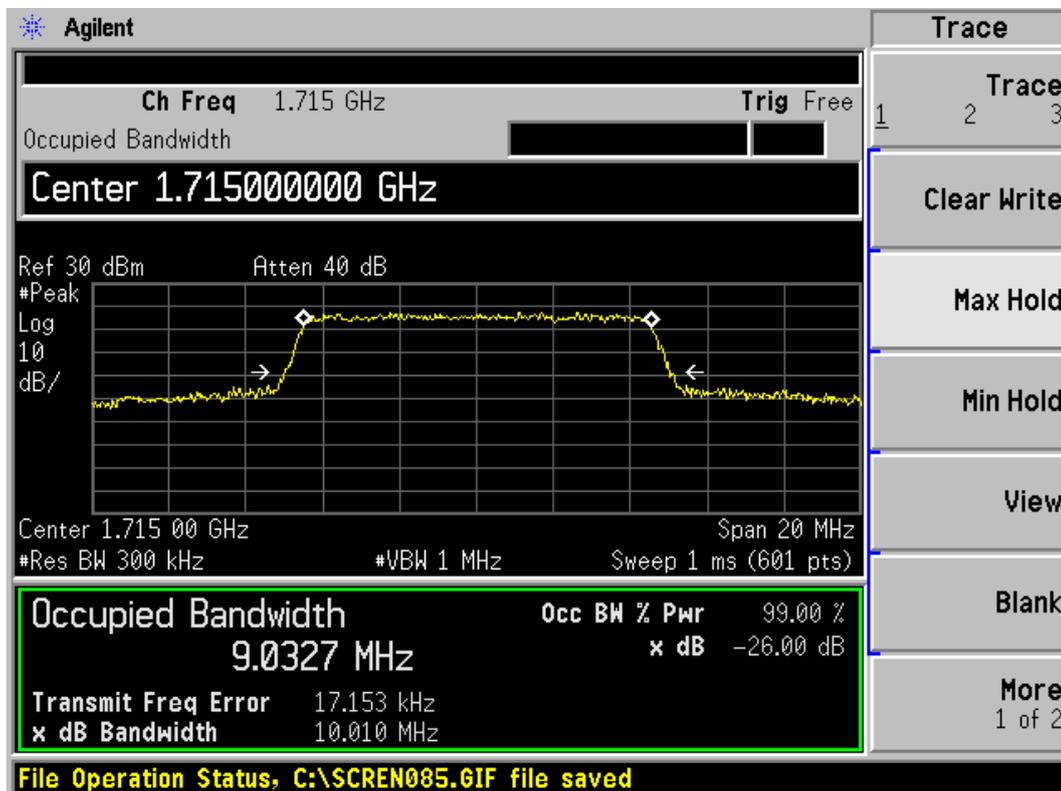
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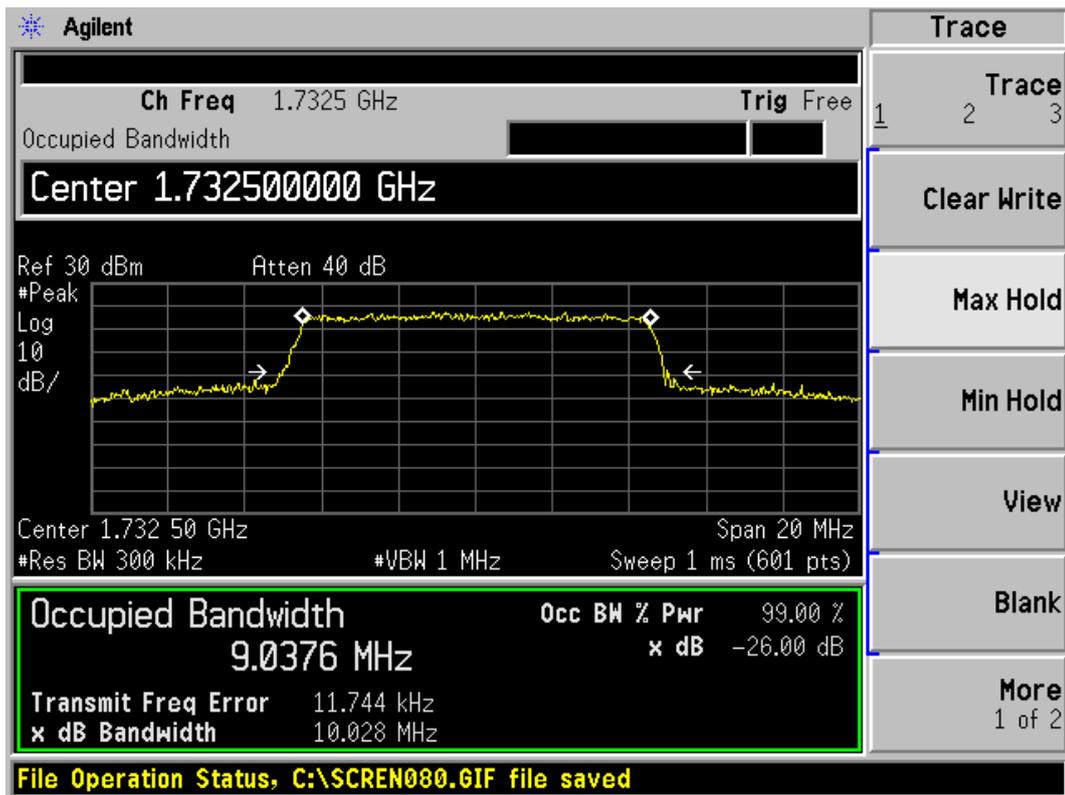


LTE Band 4 16QAM Bandwidth = 5MHz CH20375 Occupied Bandwidth

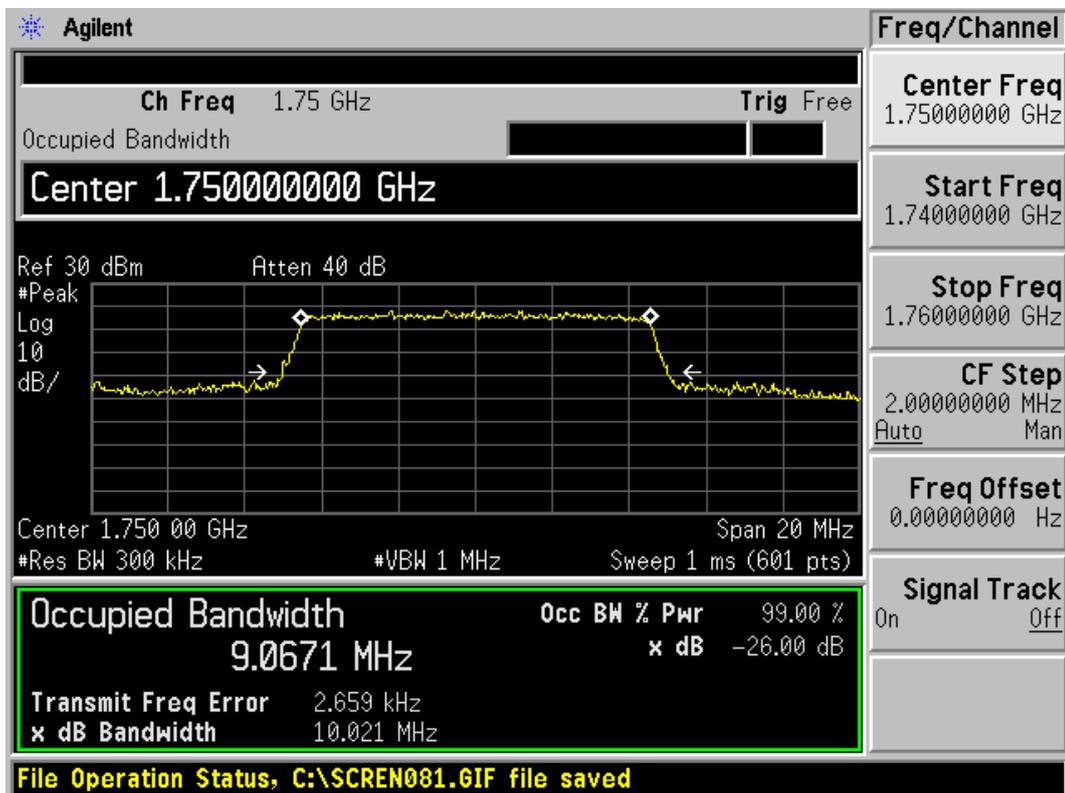


LTE Band 4 16QAM Bandwidth = 10MHz CH20000 Occupied Bandwidth

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



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

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2.5. Band Edge Compliance

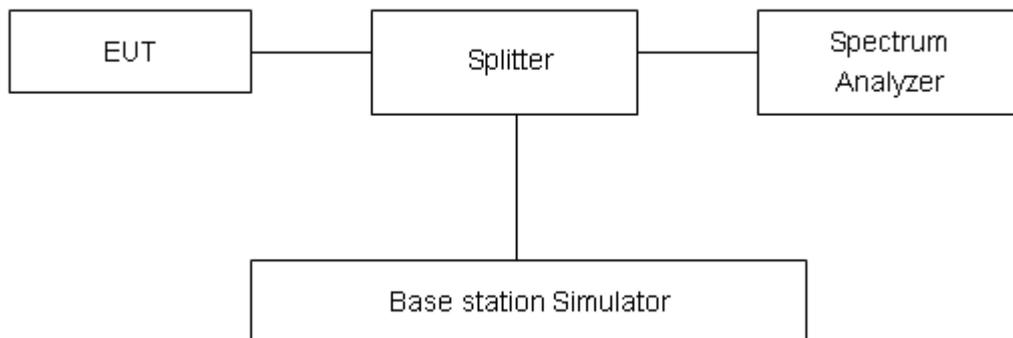
Ambient condition

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 RBW is set larger than 1% of 26dB bandwidth. The Average detector is used. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

Rule Part 27.53(h) specifies that “the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10} (P)$ dB.”

Limit	-13 dBm
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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.

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Test Result:

CDMA AWS	Carrier frequency (MHz)	Reference value (dBm)	Limit	Conclusion
RC3 SO2(Loopback)	1710	-20.669	-13	PASS
	1755	-19.153	-13	PASS
RC3 SO32(+FCH-SCH)	1710	-20.273	-13	PASS
	1755	-19.258	-13	PASS
EVDO (Rev.0)	1710	-22.47	-13	PASS
	1755	-21.72	-13	PASS
EVDO (Rev.A)	1710	-23.35	-13	PASS
	1755	-22.63	-13	PASS
1X Advance SO75	1710	-19.68	-13	PASS
	1755	-19.38	-13	PASS



CDMA AWS SO2 25 Channel

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CDMA AWS SO2 875 Channel

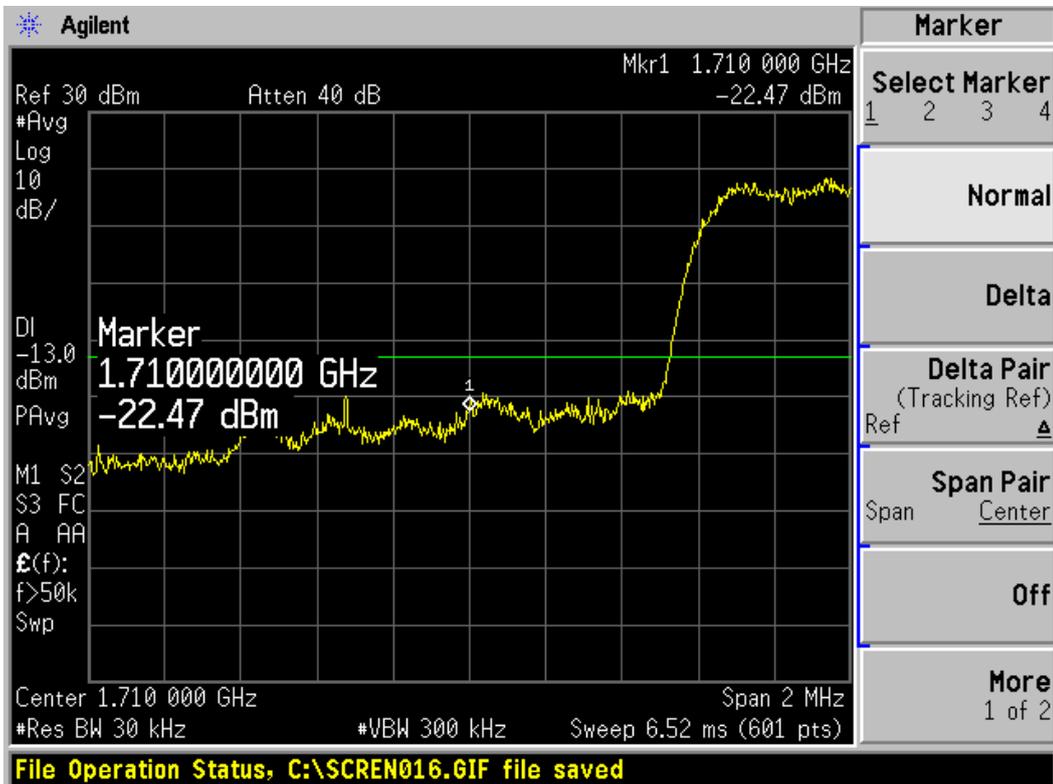


CDMA AWS SO32 25 Channel

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CDMA AWS SO32 875 Channel

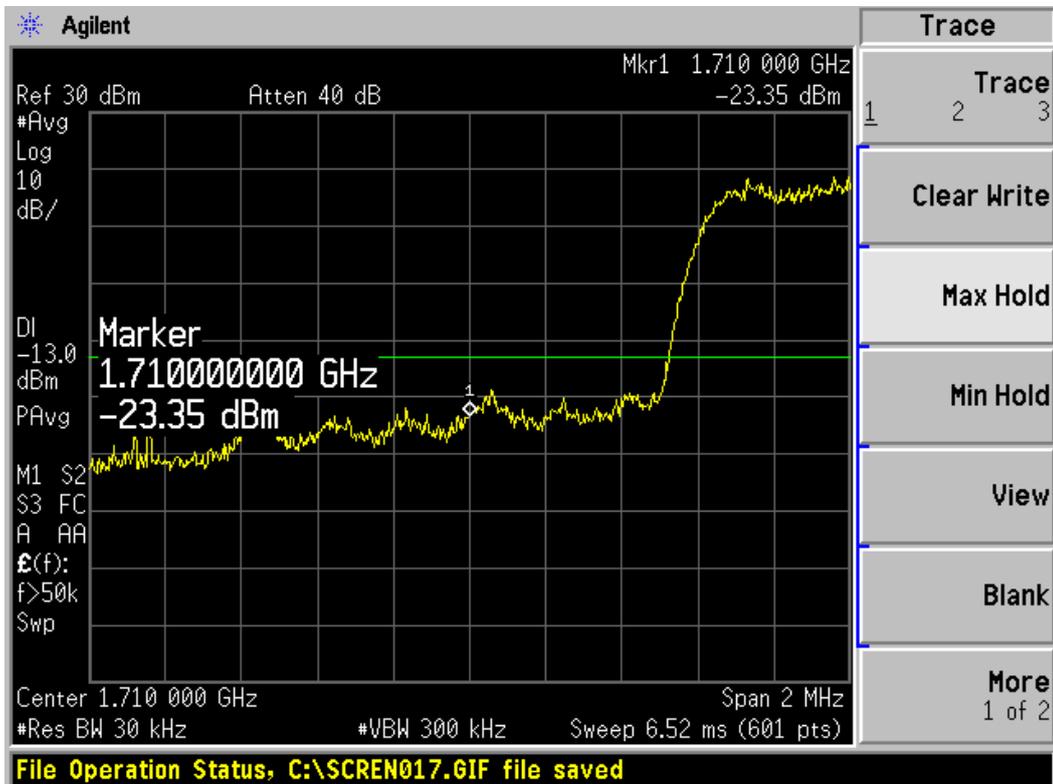


CDMA AWS EV-DO(Rev.0) 25 Channel

TA Technology (Shanghai) Co., Ltd. Test Report

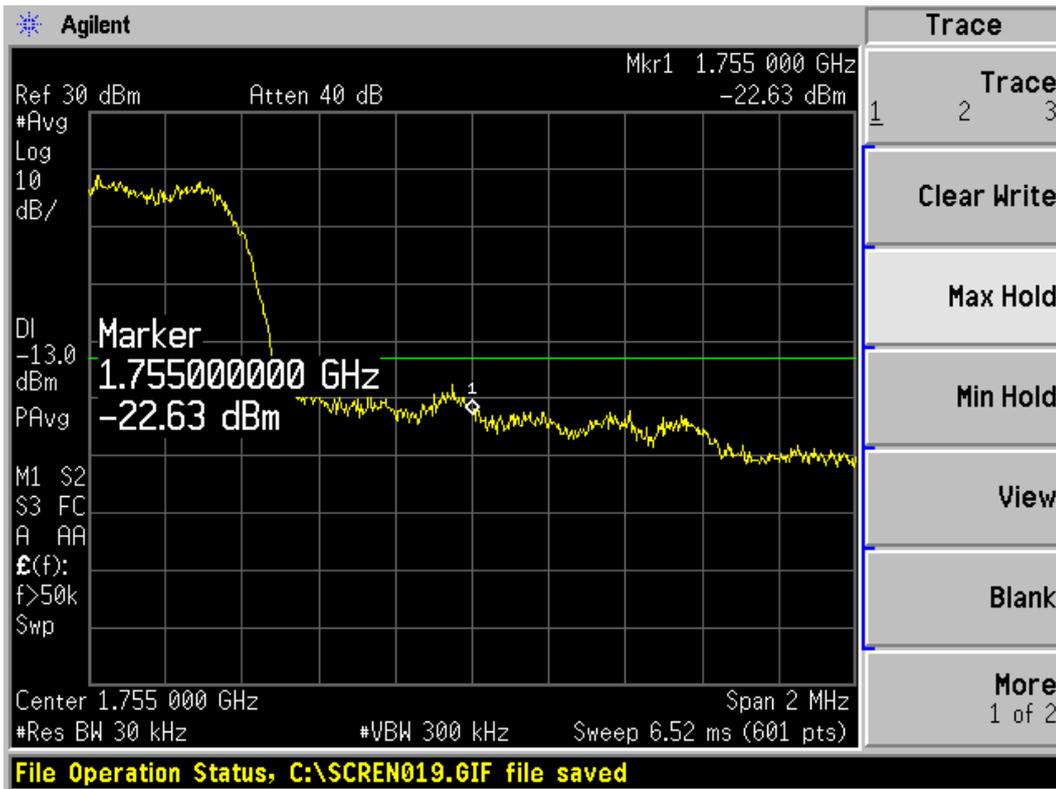


CDMA AWS EV-DO(Rev.0) 875 Channel

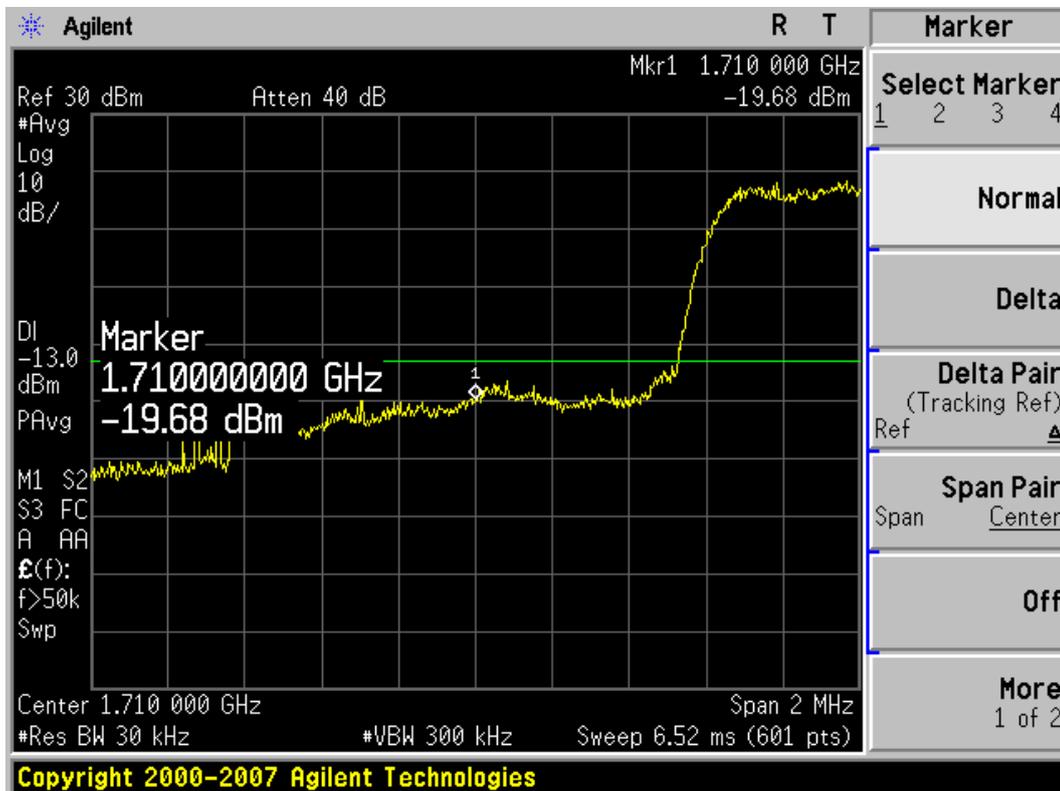


CDMA AWS EV-DO(Rev.A) 25 Channel

TA Technology (Shanghai) Co., Ltd. Test Report



CDMA AWS EV-DO(Rev.A) 875 Channel



CDMA AWS 1XAdvance 25 Channel

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CDMA AWS 1XAdvance 875 Channel

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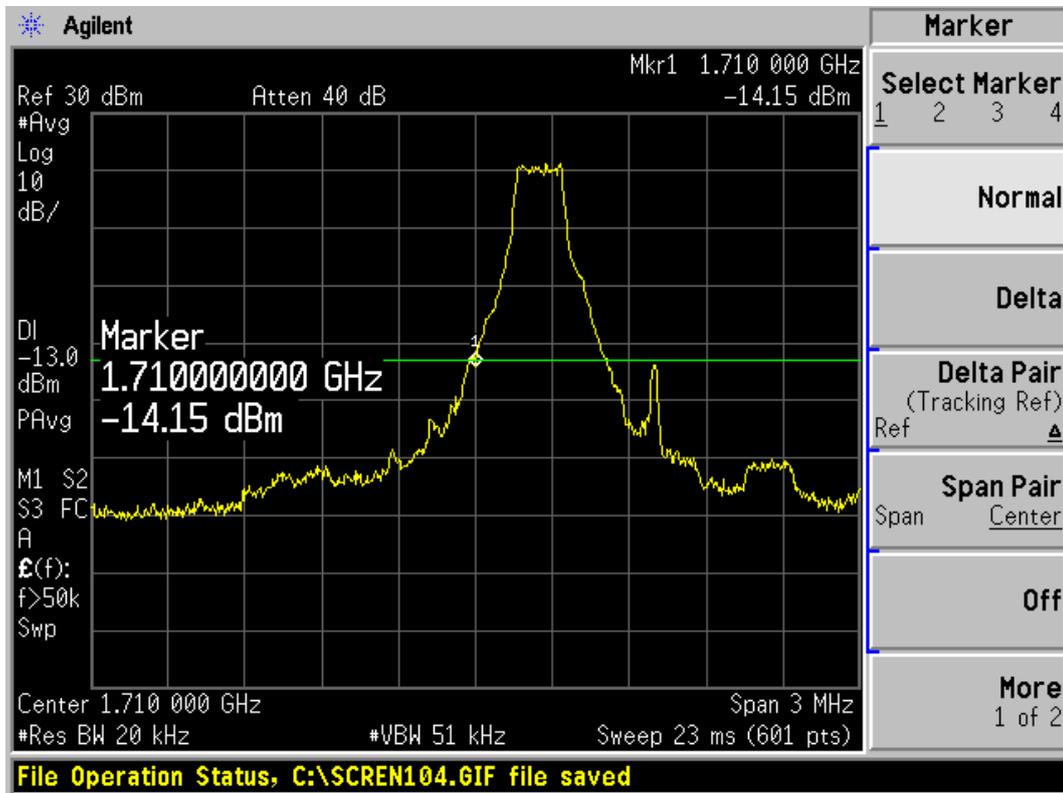
LTE Band 4							
Bandwidth	Modulation	Channel	RB	RB Start	Reference value (dBm)	Limit	Conclusion
1.4MHz	QPSK	CH19957	1	0	-14.15	-13	PASS
			3	0	-15.12	-13	PASS
			6	0	-18.89	-13	PASS
		CH20393	1	5	-14.89	-13	PASS
			3	3	-14.10	-13	PASS
			6	0	-21.54	-13	PASS
	16QAM	CH19957	1	0	-14.20	-13	PASS
			3	0	-14.04	-13	PASS
			6	0	-20.60	-13	PASS
		CH20393	1	5	-15.63	-13	PASS
			3	3	-14.43	-13	PASS
			6	0	-20.38	-13	PASS
3MHz	QPSK	CH19965	1	0	-14.62	-13	PASS
			8	0	-14.28	-13	PASS
			15	0	-15.47	-13	PASS
		CH20385	1	14	-26.64	-13	PASS
			8	7	-17.98	-13	PASS
			15	0	-20.03	-13	PASS
	16QAM	CH19965	1	0	-15.63	-13	PASS
			8	0	-13.08	-13	PASS
			15	0	-15.44	-13	PASS
		CH20385	1	14	-25.31	-13	PASS
			8	7	-18.43	-13	PASS
			15	0	-23.86	-13	PASS
5MHz	QPSK	CH19975	1	0	-14.52	-13	PASS
			12	0	-14.83	-13	PASS
			25	0	-15.93	-13	PASS
		CH20375	1	24	-15.19	-13	PASS
			12	13	-13.62	-13	PASS
			25	0	-14.42	-13	PASS
	16QAM	CH19975	1	0	-15.69	-13	PASS
			12	0	-14.27	-13	PASS

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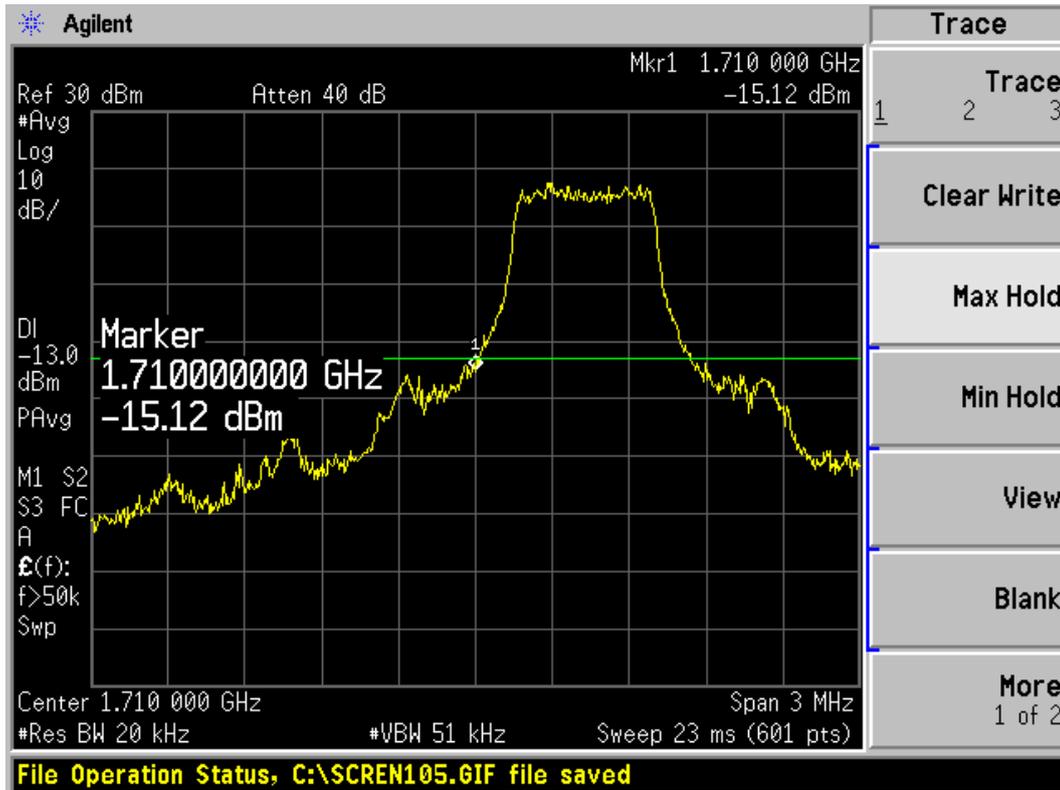
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10MHz	QPSK	CH20375	25	0	-17.35	-13	PASS
			1	24	-13.48	-13	PASS
			12	13	-14.41	-13	PASS
			25	0	-17.16	-13	PASS
	16QAM	CH20000	1	0	-13.11	-13	PASS
			25	0	-14.18	-13	PASS
			50	0	-17.48	-13	PASS
		CH20350	1	49	-14.48	-13	PASS
			25	25	-16.06	-13	PASS
			50	0	-17.31	-13	PASS
		CH20000	1	0	-13.32	-13	PASS
			25	0	-13.64	-13	PASS
50	0		-16.45	-13	PASS		
CH20350	1	49	-15.97	-13	PASS		
	25	25	-16.09	-13	PASS		
	50	0	-18.08	-13	PASS		

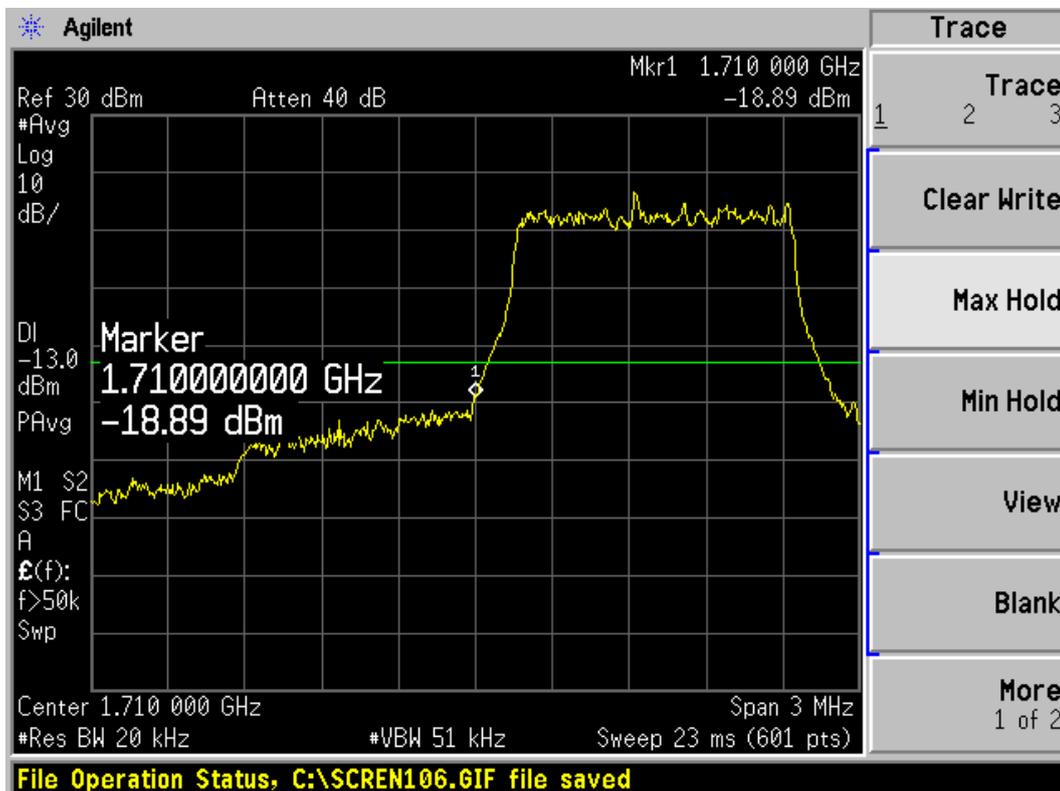


LTE Band 4 QPSK Bandwidth = 1.4MHz CH19957, RB 1

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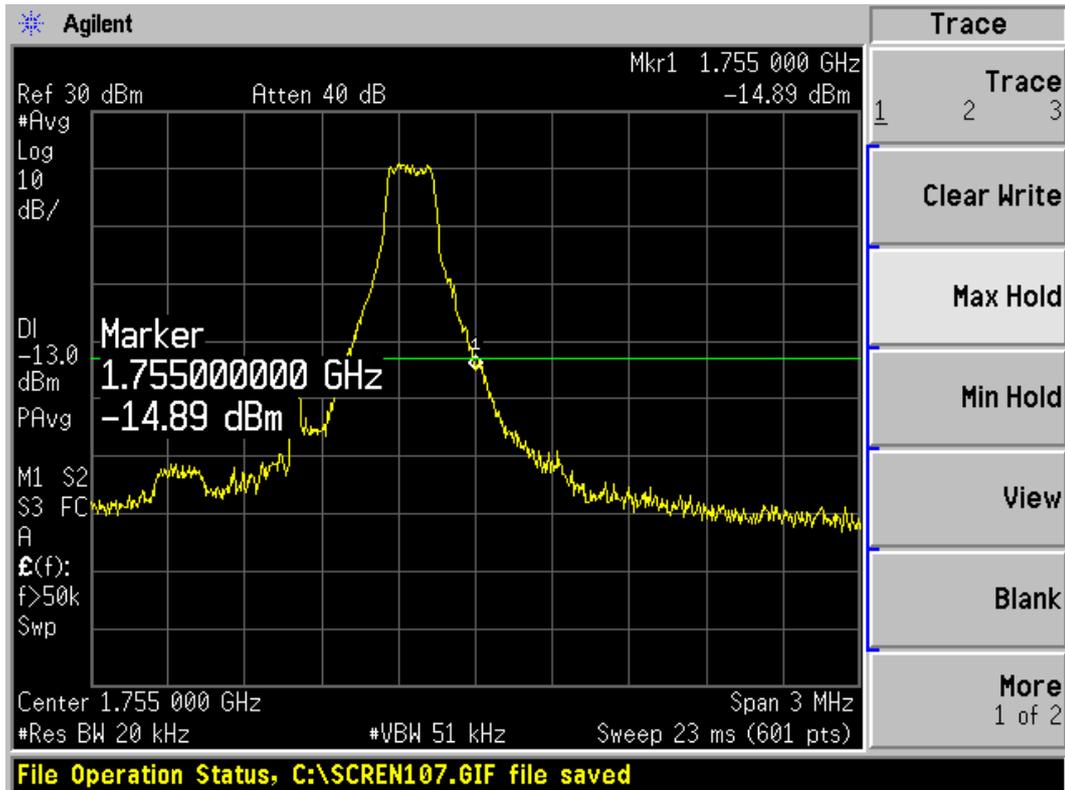


LTE Band 4 QPSK Bandwidth = 1.4MHz CH19957, RB 3

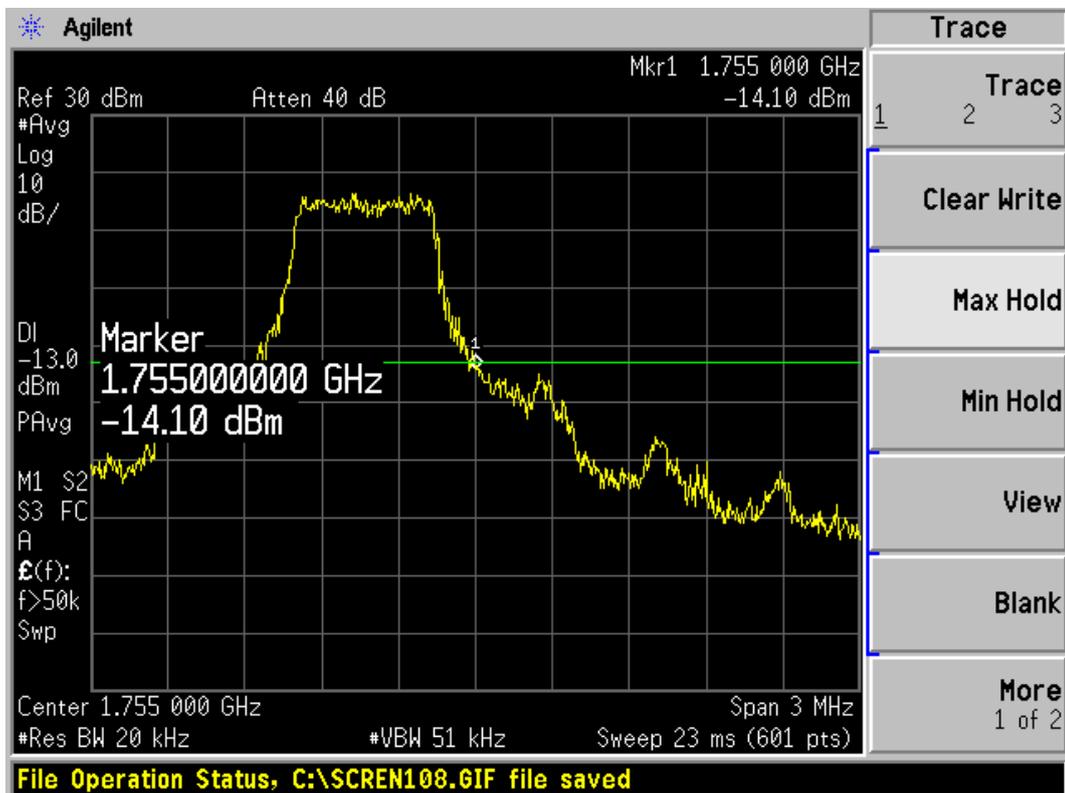


LTE Band 4 QPSK Bandwidth = 1.4MHz CH19957, RB 6

TA Technology (Shanghai) Co., Ltd.
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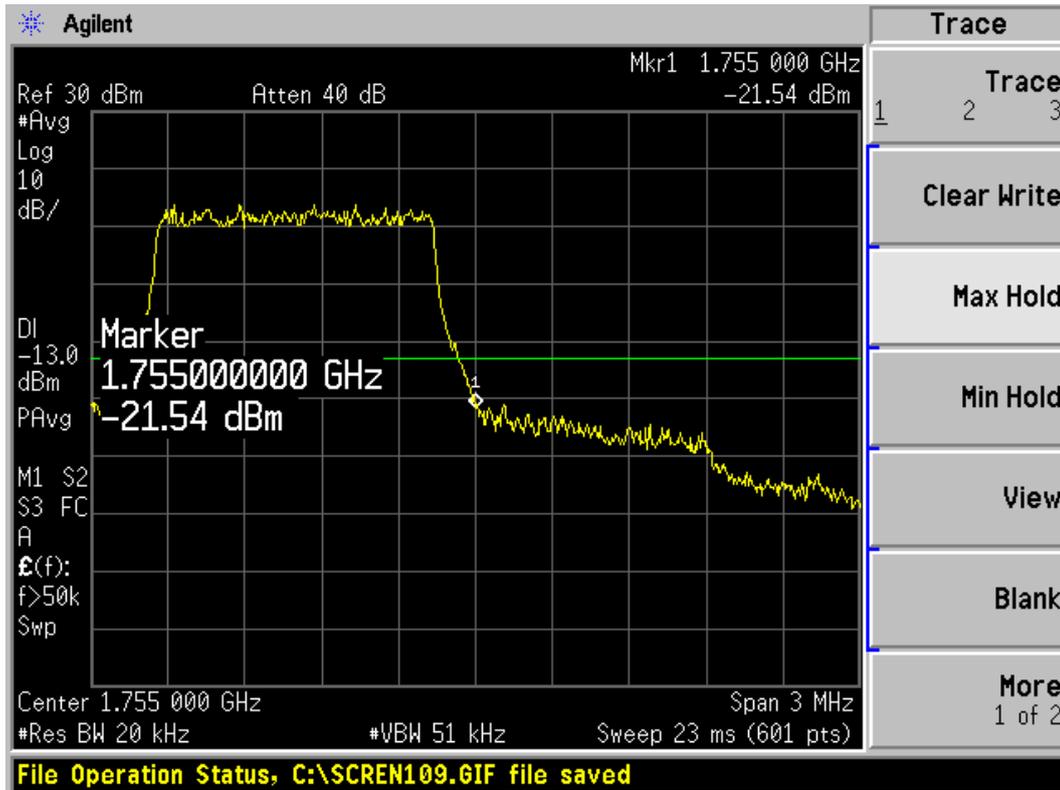


LTE Band 4 QPSK Bandwidth = 1.4MHz CH20393, RB 1

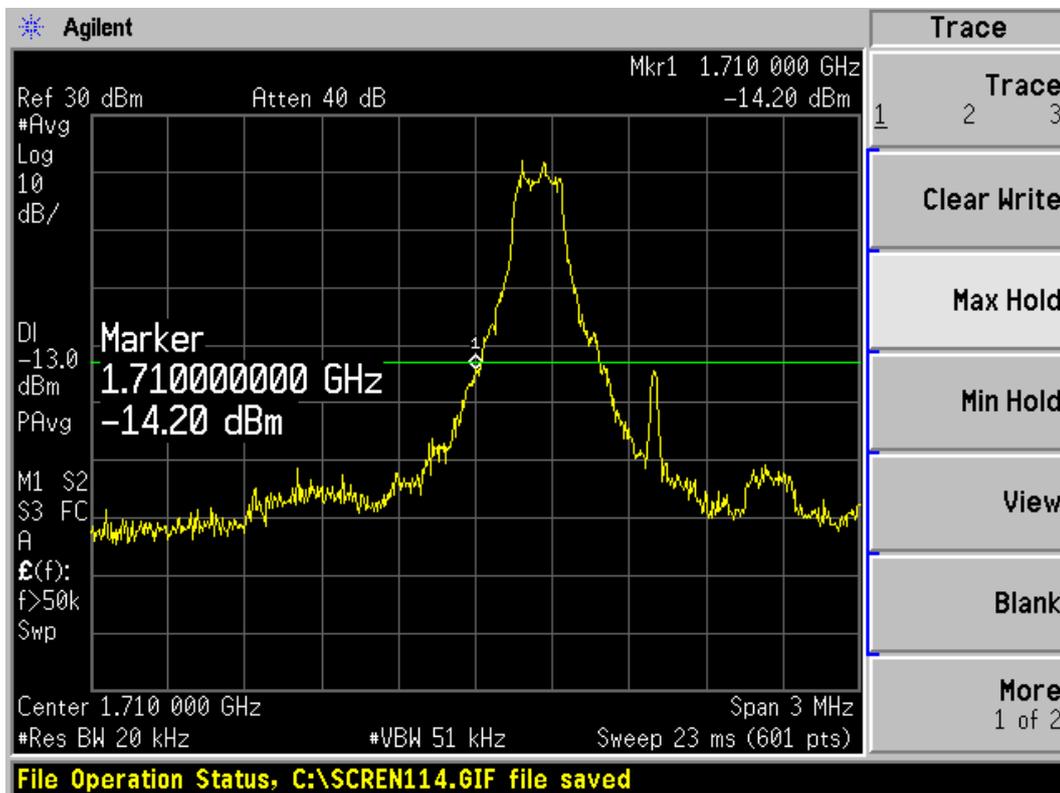


LTE Band 4 QPSK Bandwidth = 1.4MHz CH20393, RB 3

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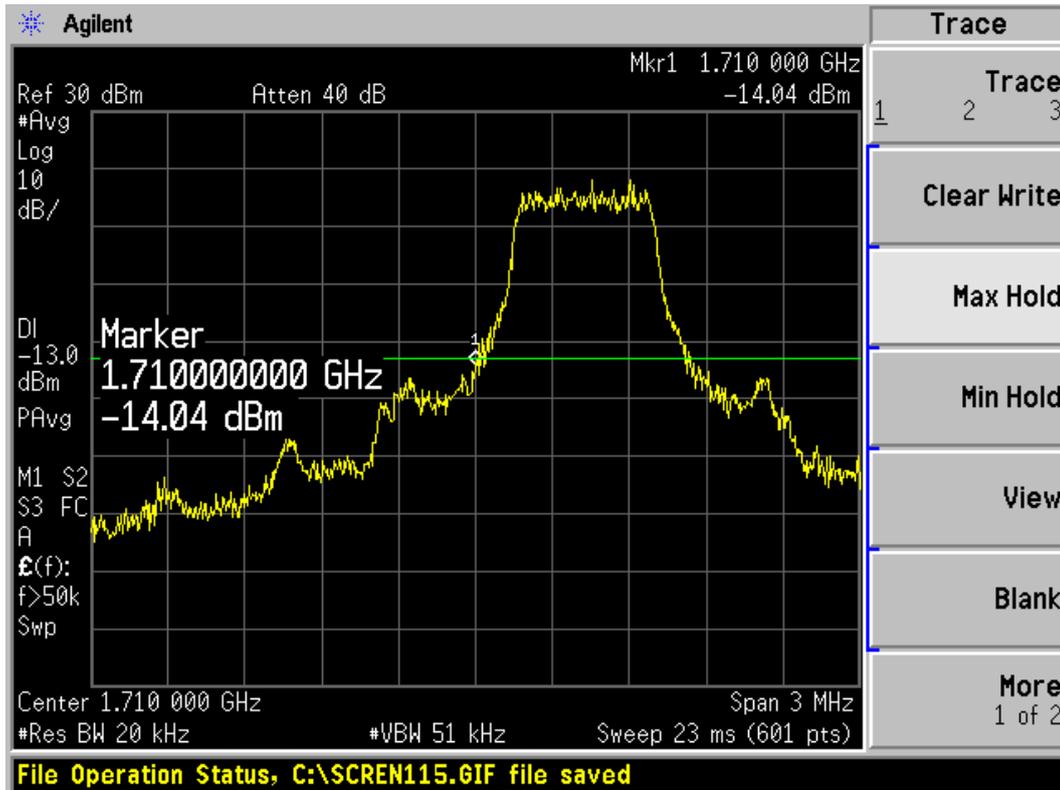


LTE Band 4 QPSK Bandwidth = 1.4MHz CH20393, RB 6

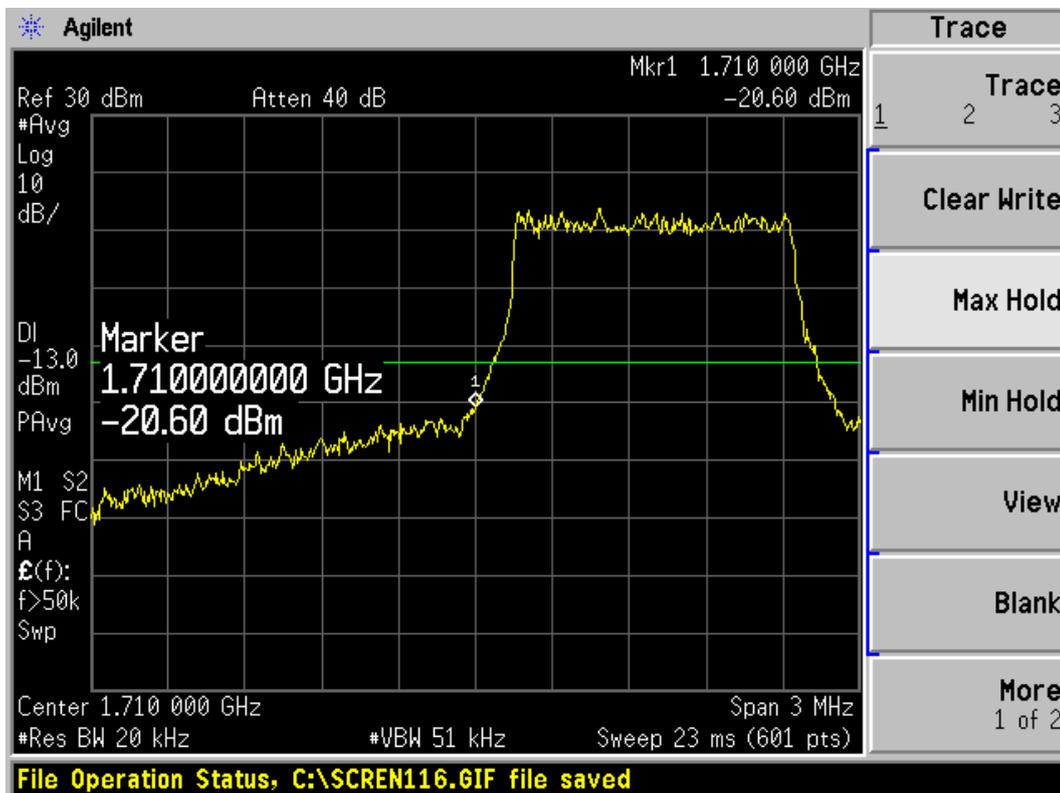


LTE Band 4 16QAM Bandwidth = 1.4MHz CH19957, RB 1

TA Technology (Shanghai) Co., Ltd. Test Report

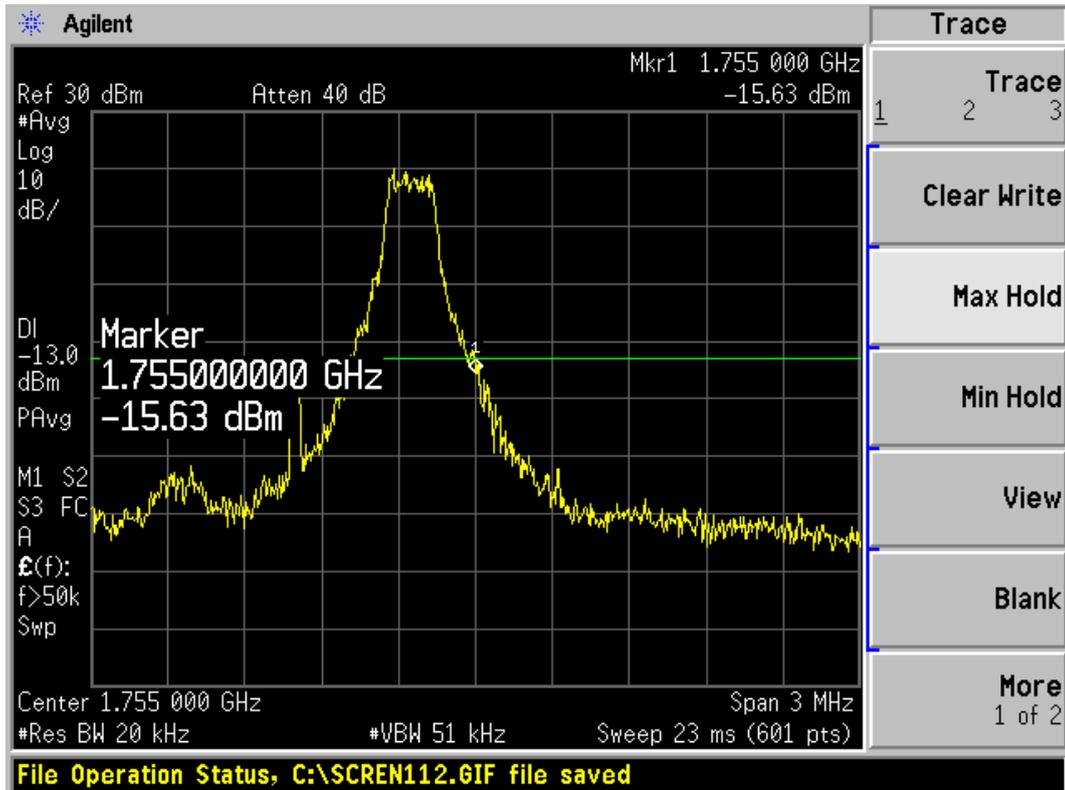


LTE Band 4 16QAM Bandwidth = 1.4MHz CH19957, RB 3

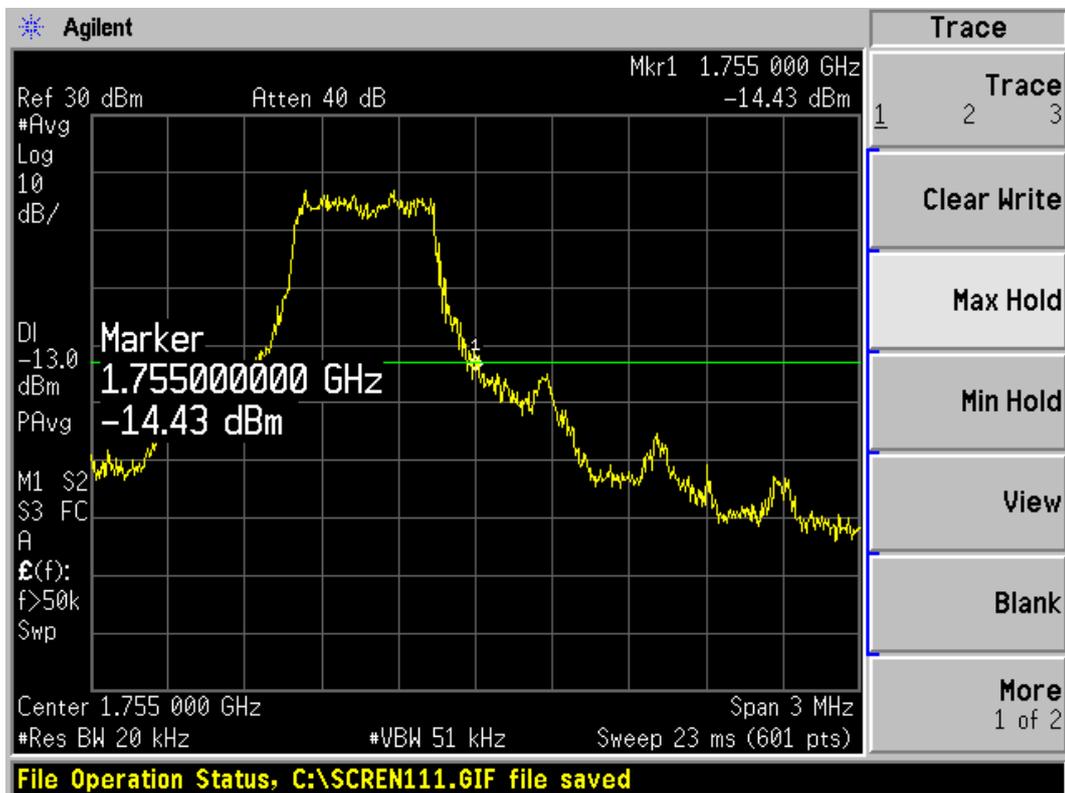


LTE Band 4 16QAM Bandwidth = 1.4MHz CH19957, RB 6

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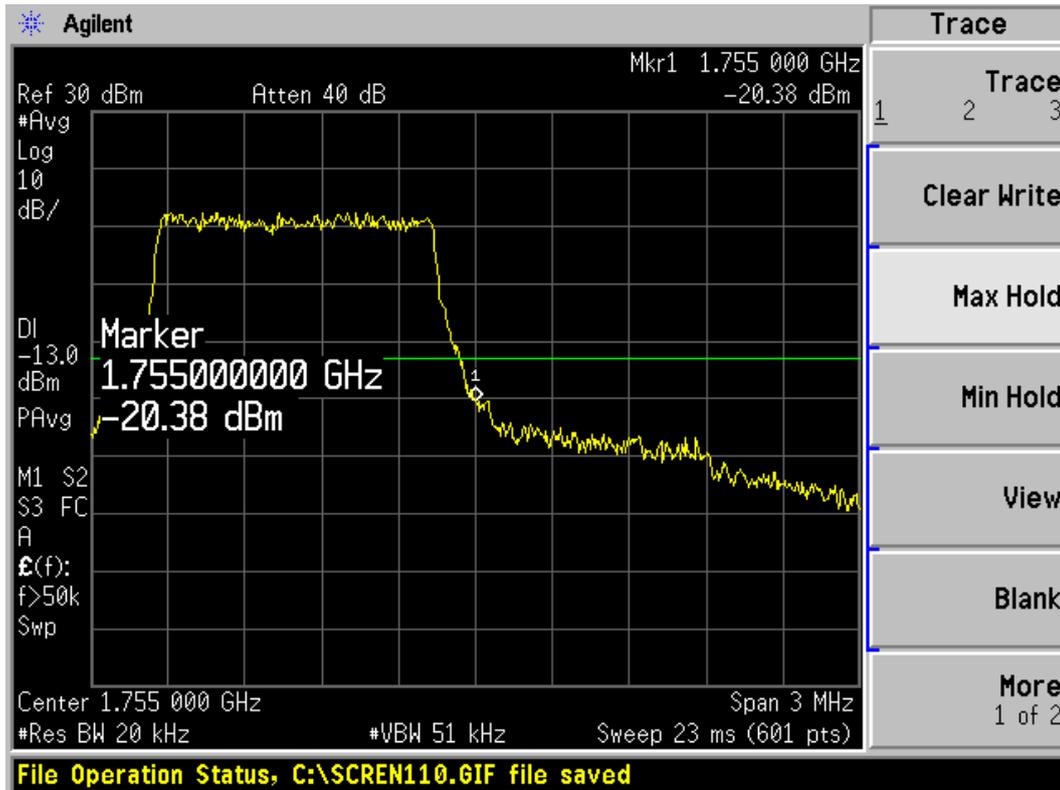


LTE Band 4 16QAM Bandwidth = 1.4MHz CH20393, RB 1

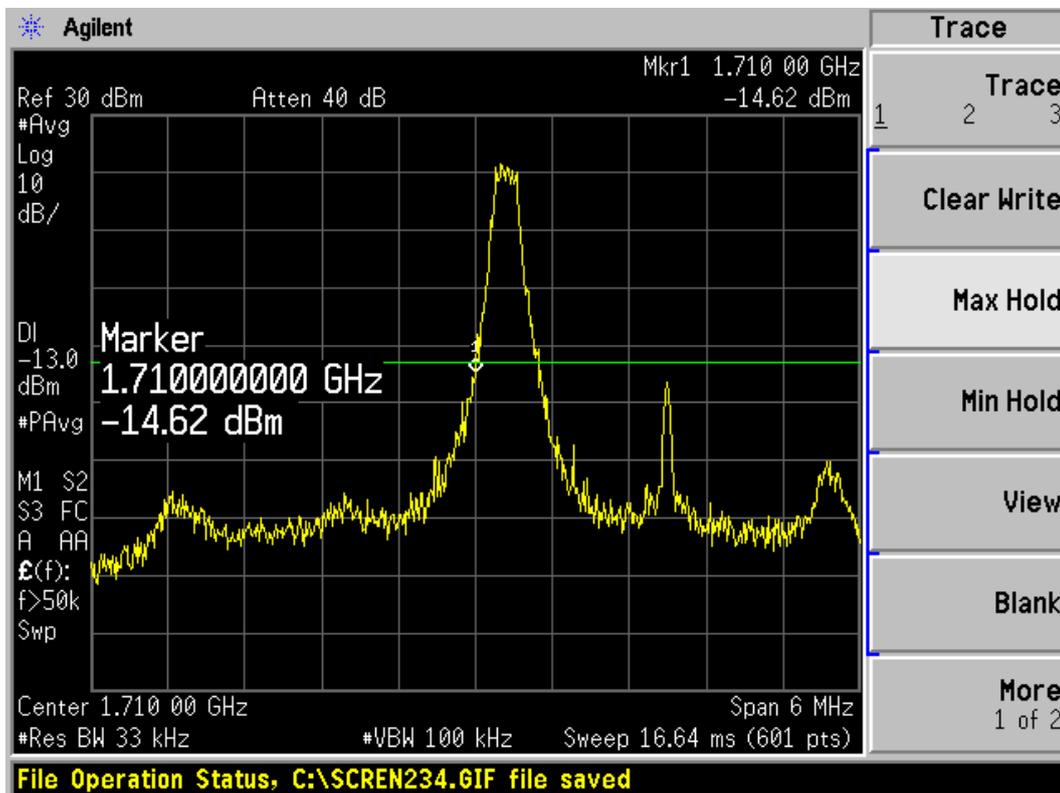


LTE Band 4 16QAM Bandwidth = 1.4MHz CH20393, RB 3

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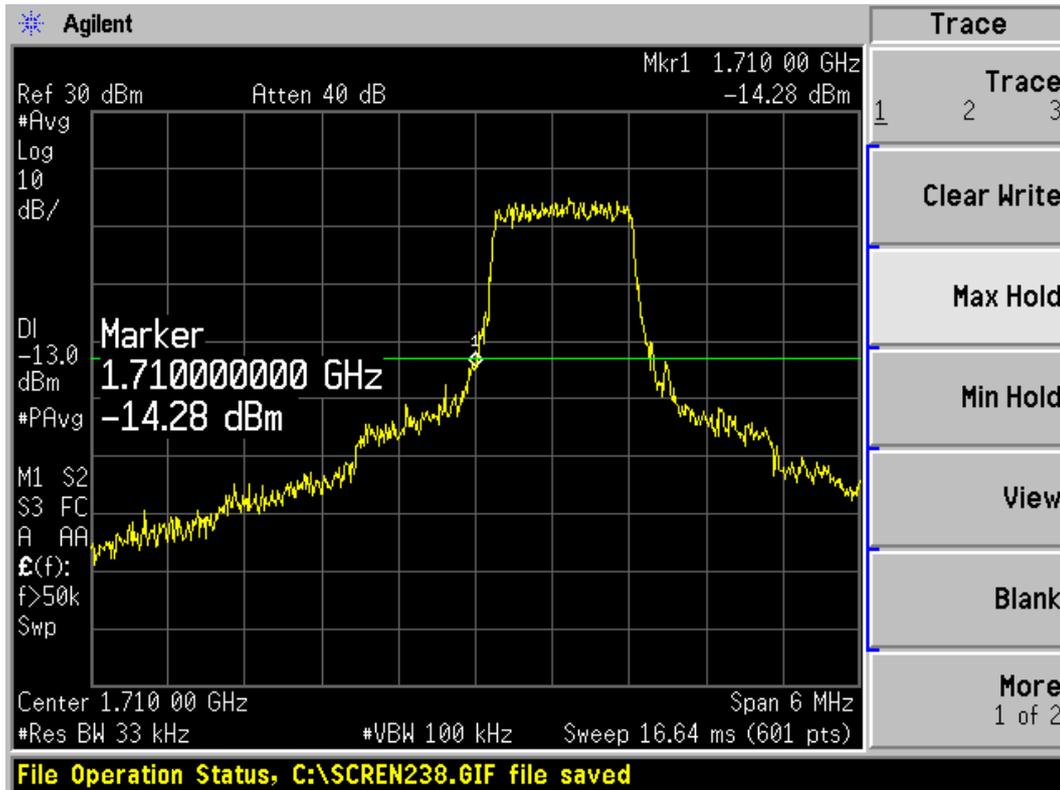


LTE Band 4 16QAM Bandwidth = 1.4MHz CH20393, RB 6

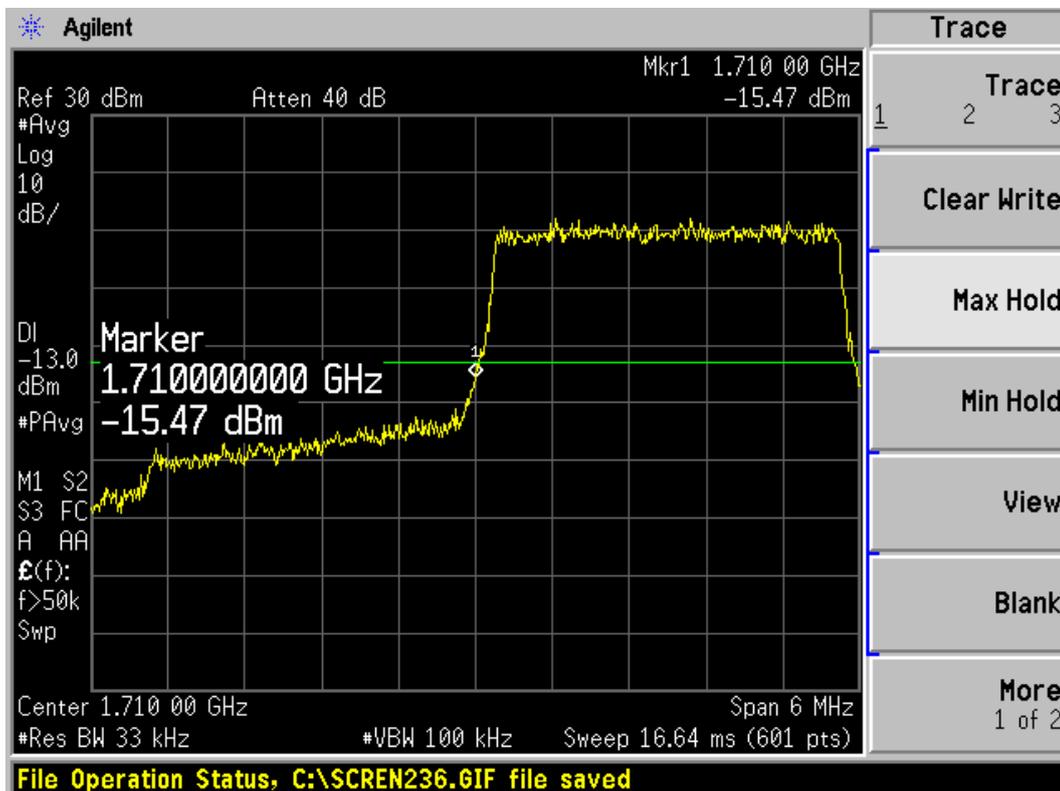


LTE Band 4 QPSK Bandwidth = 3MHz CH19965, RB 1

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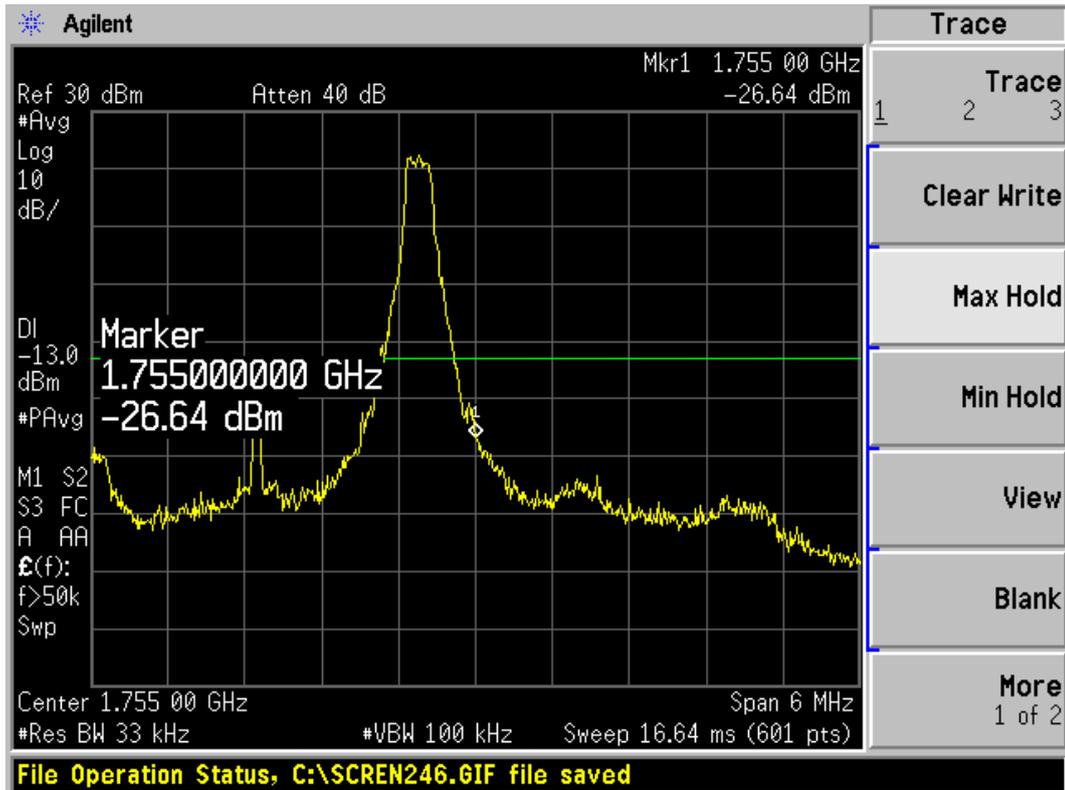


LTE Band 4 QPSK Bandwidth = 3MHz CH19965, RB 8

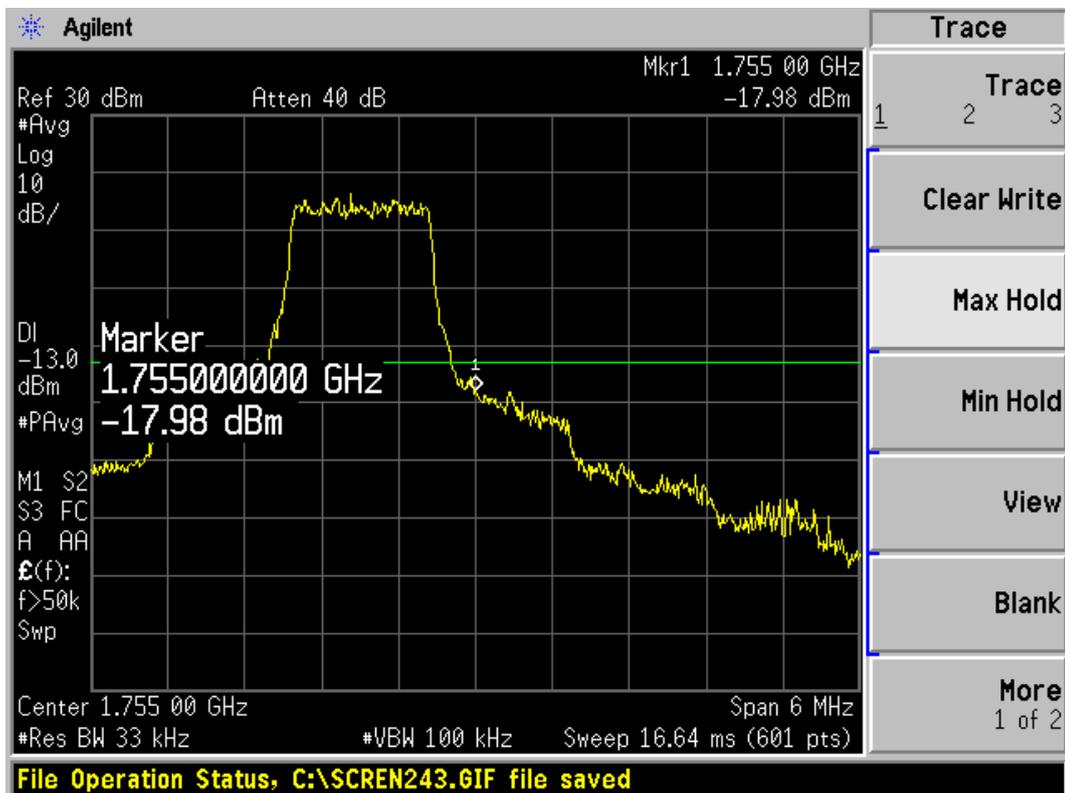


LTE Band 4 QPSK Bandwidth = 3MHz CH19965, RB 15

TA Technology (Shanghai) Co., Ltd.
Test Report

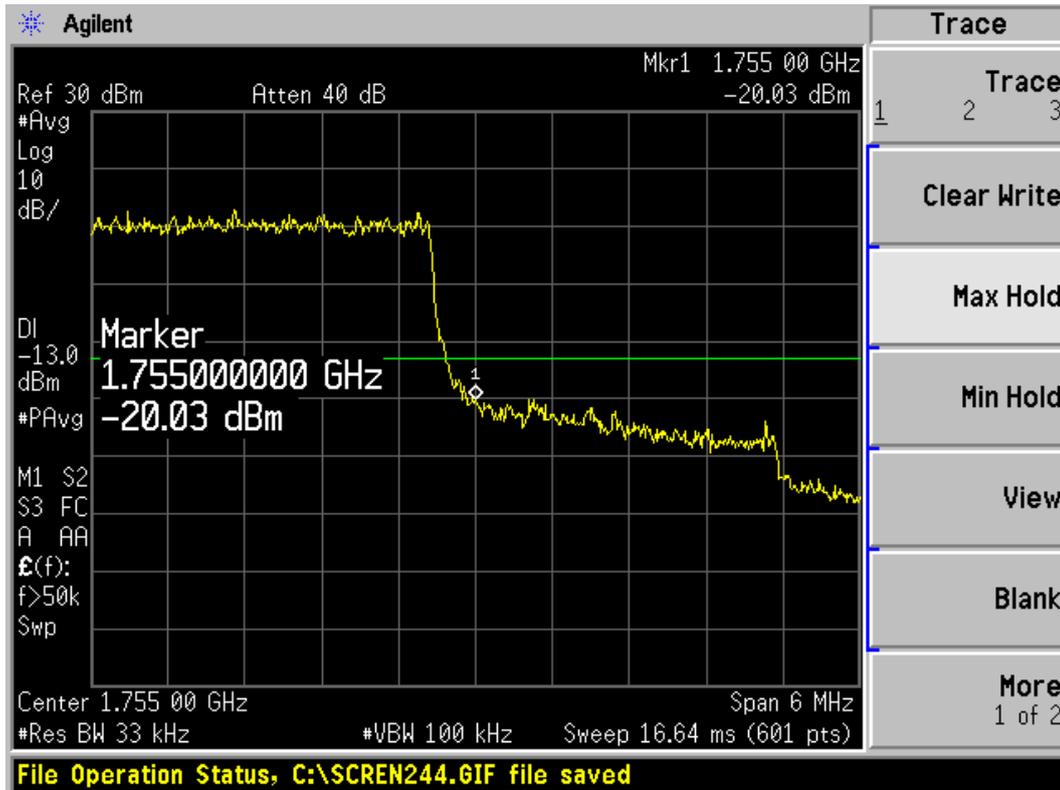


LTE Band 4 QPSK Bandwidth = 3MHz CH20385, RB 1

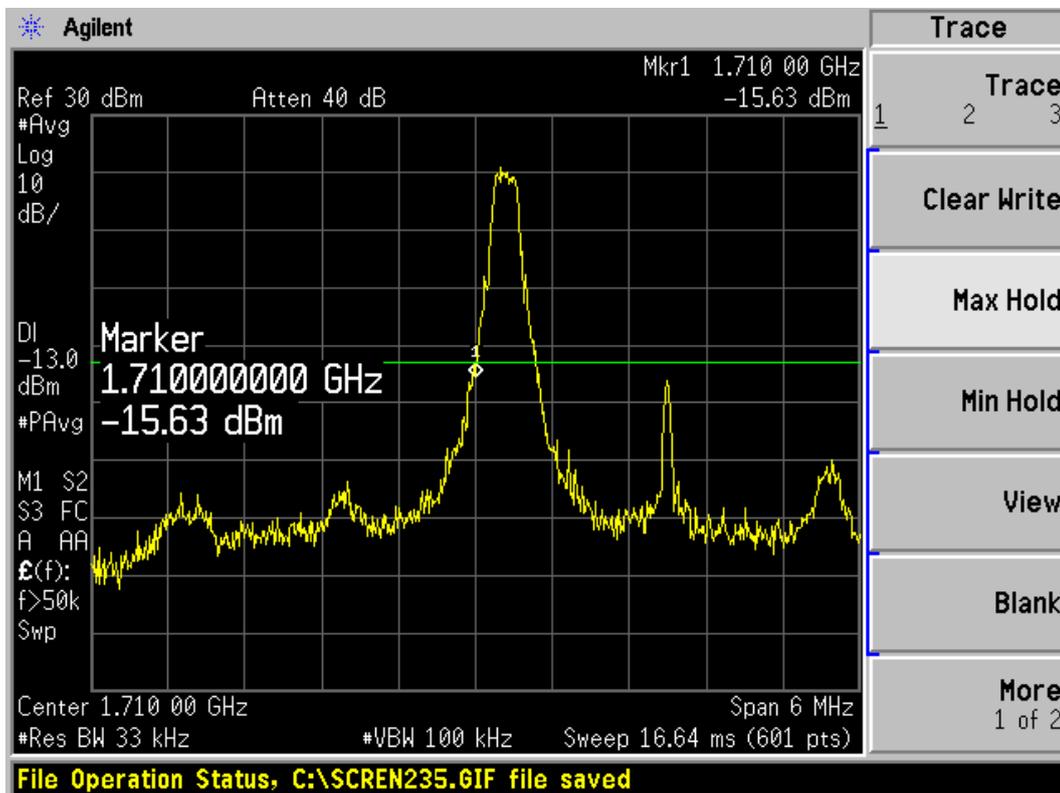


LTE Band 4 QPSK Bandwidth = 3MHz CH20385, RB 8

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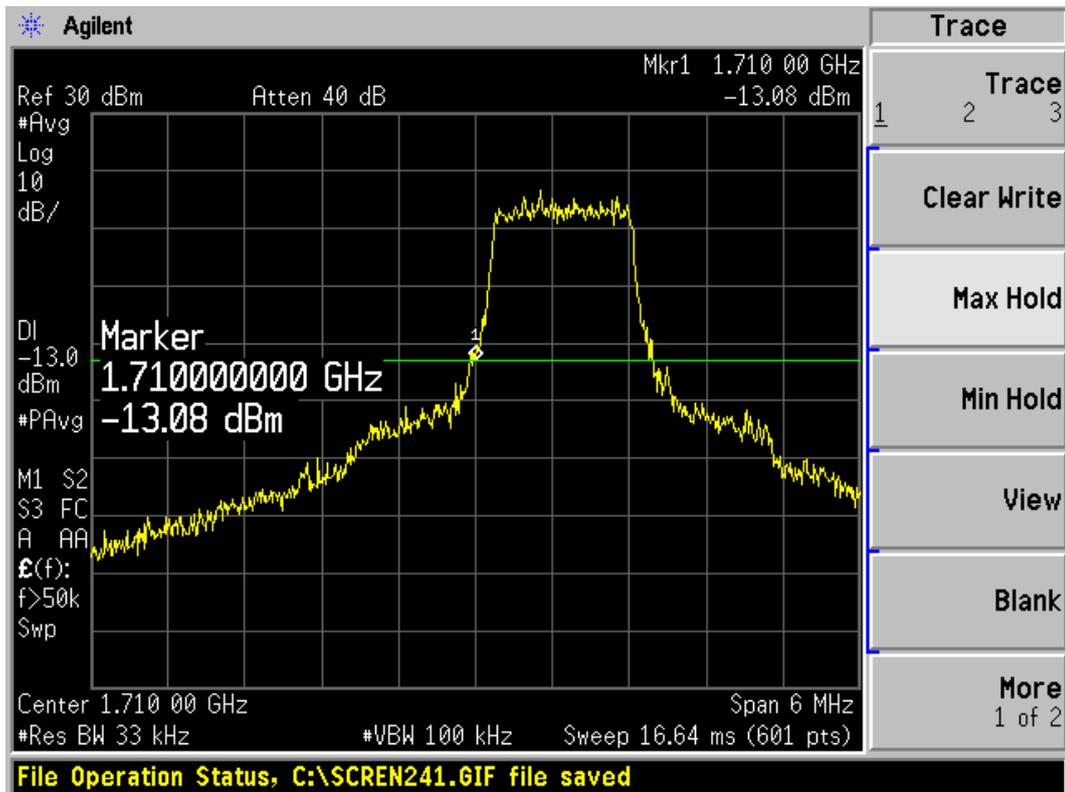


LTE Band 4 QPSK Bandwidth = 3MHz CH20385, RB 15

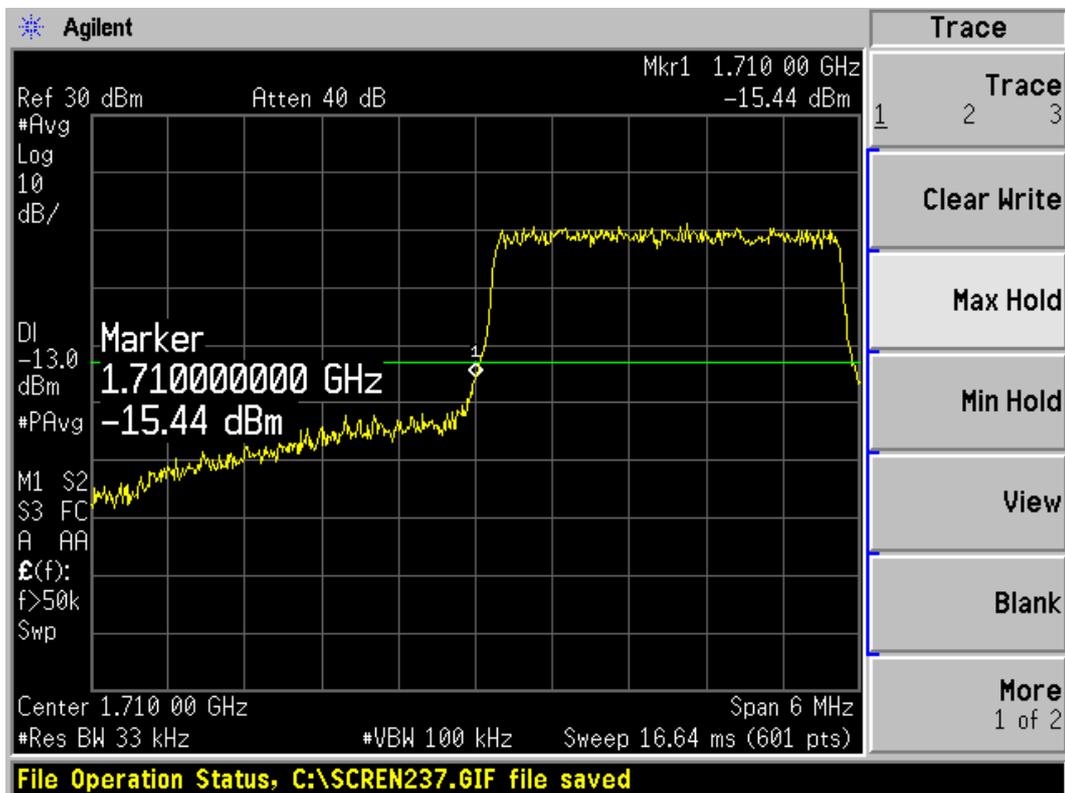


LTE Band 4 16QAM Bandwidth = 3MHz CH19965, RB 1

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Test Report

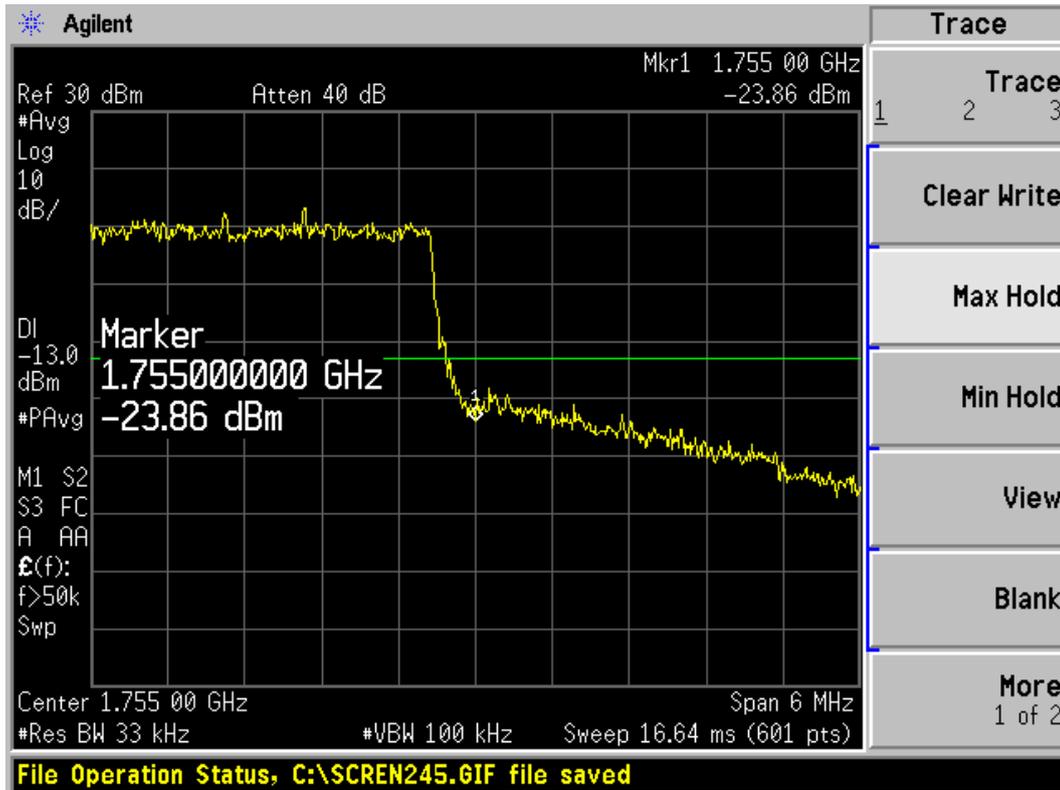


LTE Band 4 16QAM Bandwidth = 3MHz CH19965, RB 8

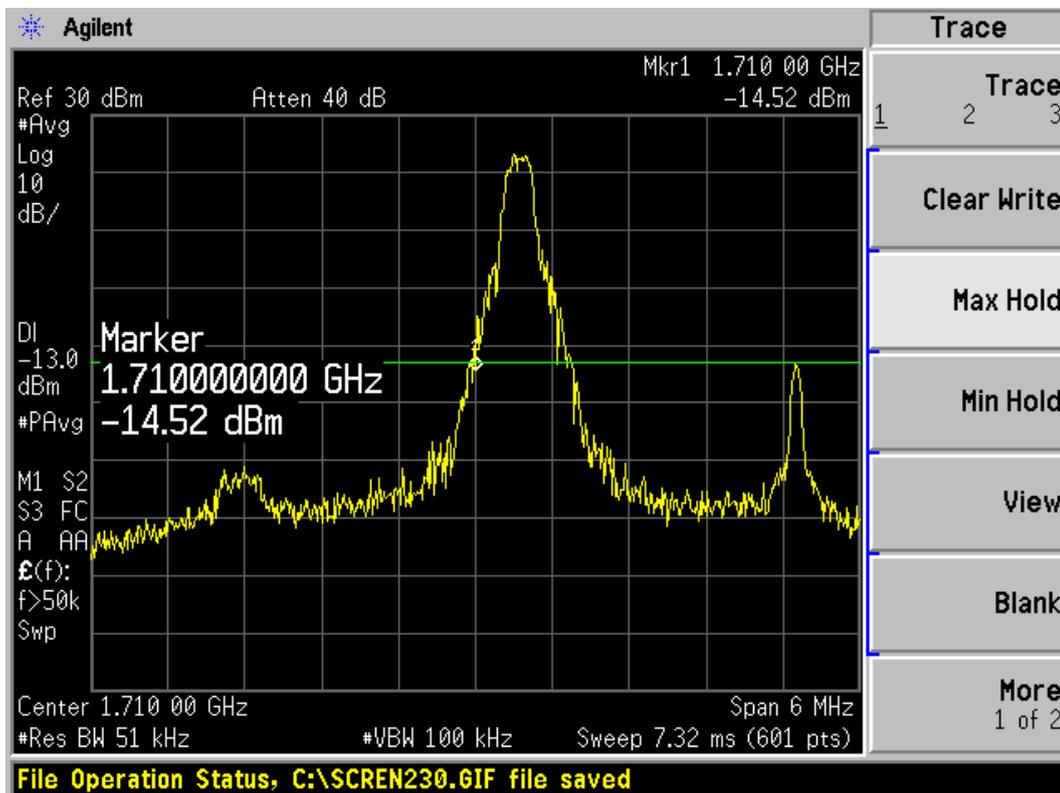


LTE Band 4 16QAM Bandwidth = 3MHz CH19965, RB 15

TA Technology (Shanghai) Co., Ltd.
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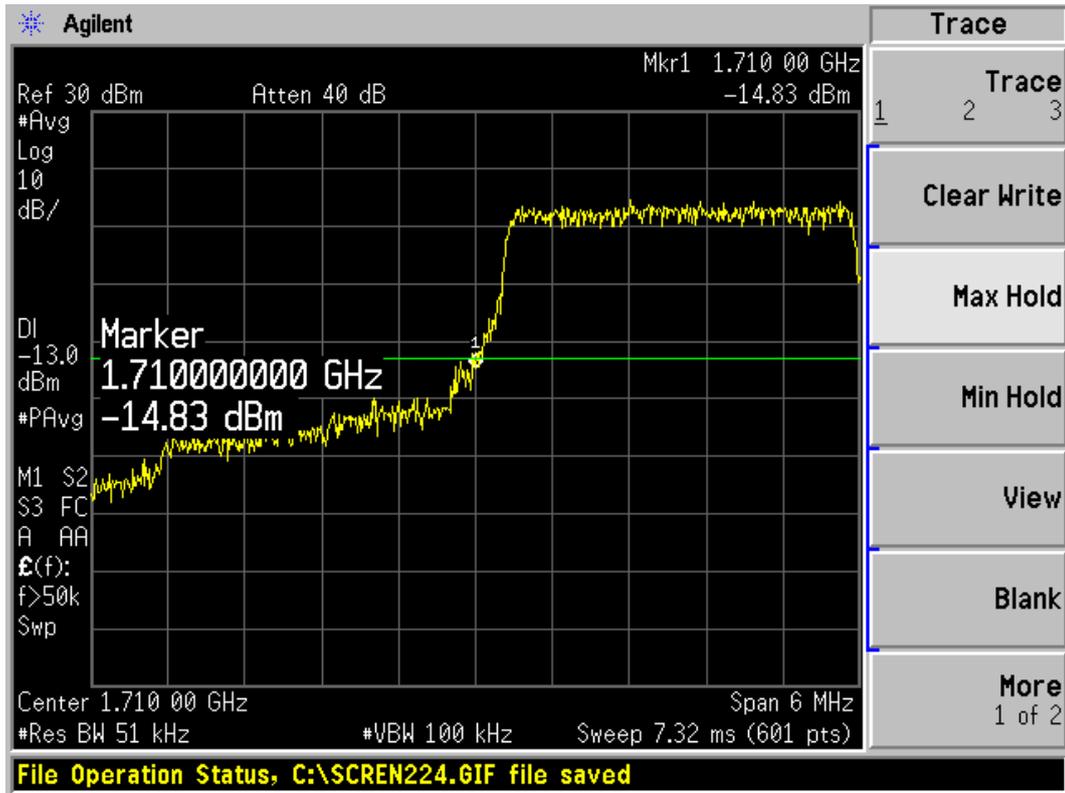


LTE Band 4 16QAM Bandwidth = 3MHz CH20385, RB 15

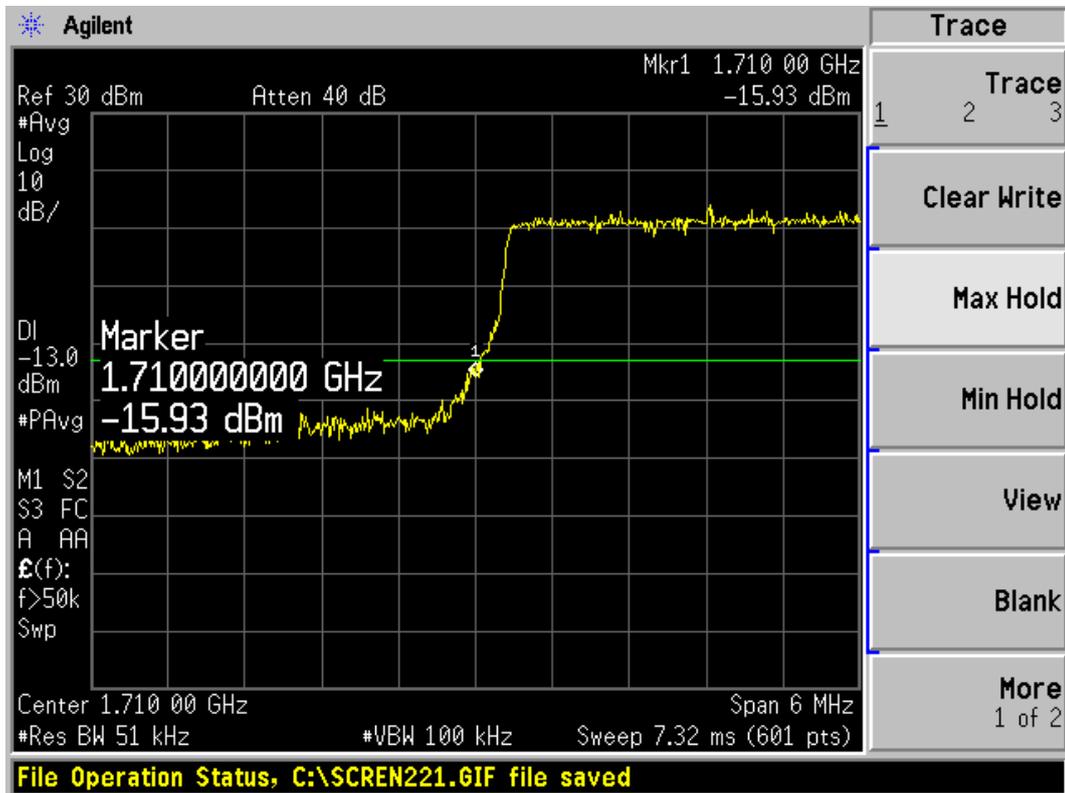


LTE Band 4 QPSK Bandwidth = 5MHz CH19975, RB 1

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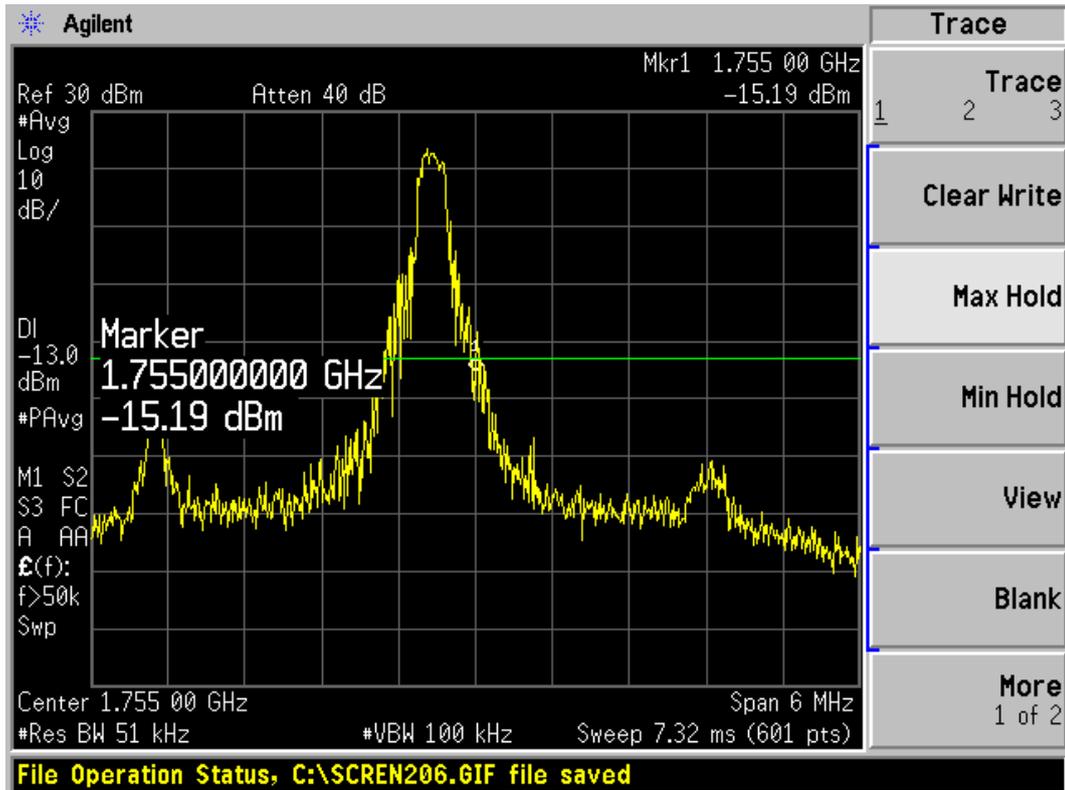


LTE Band 4 QPSK Bandwidth = 5MHz CH19975, RB 12

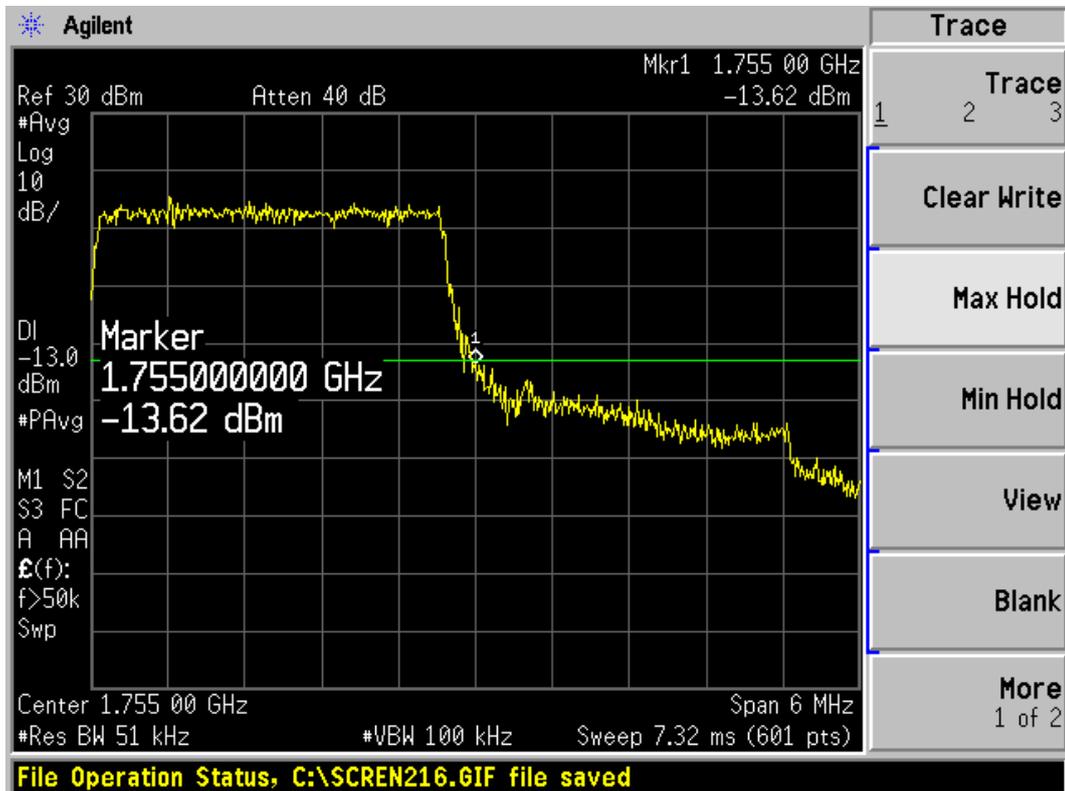


LTE Band 4 QPSK Bandwidth = 5MHz CH19975, RB 25

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

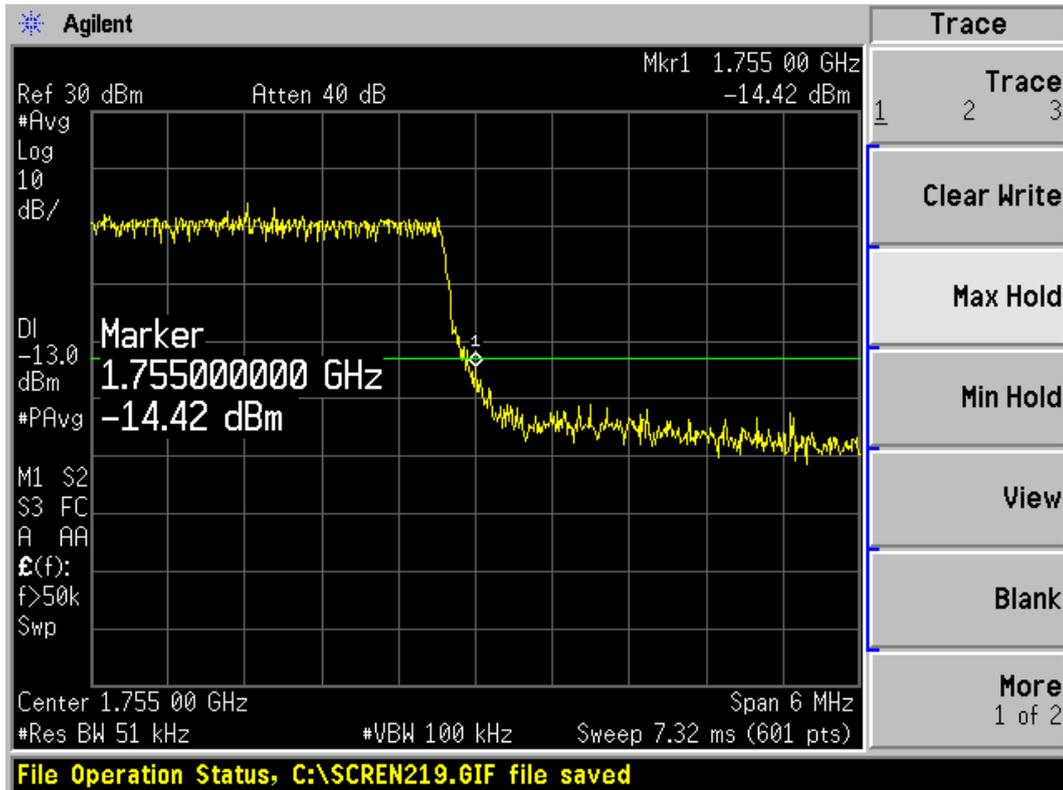


LTE Band 4 QPSK Bandwidth = 5MHz CH20375, RB 12

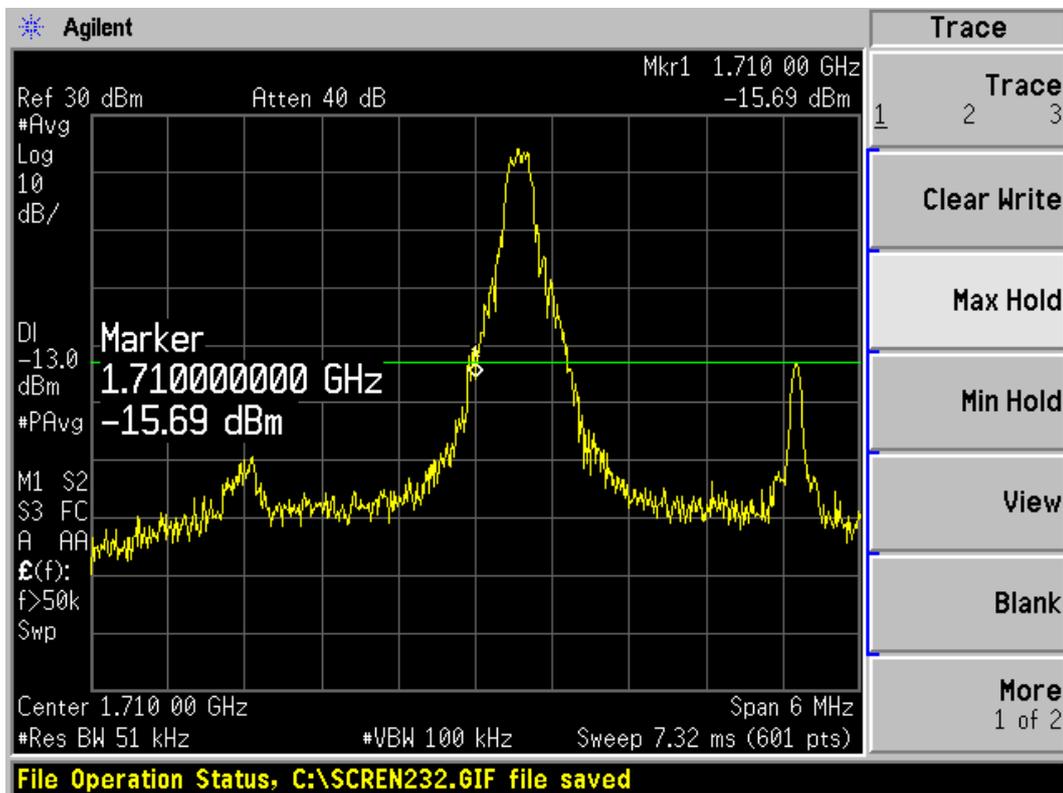
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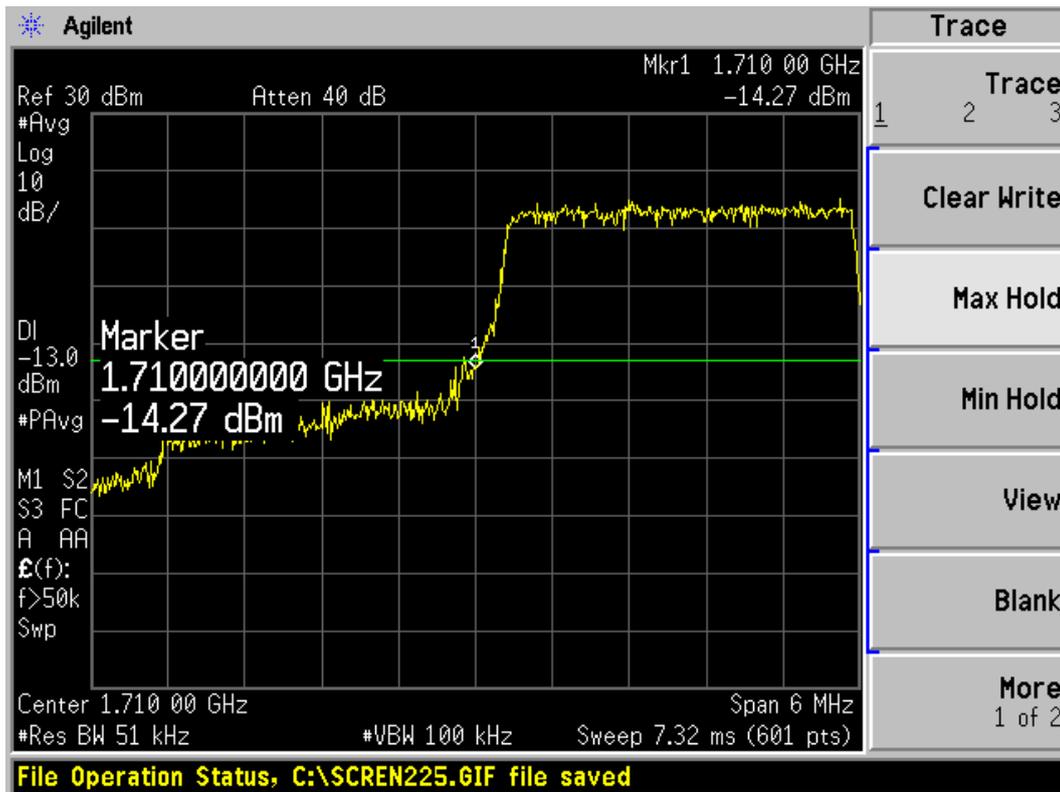


LTE Band 4 QPSK Bandwidth = 5MHz CH20375, RB 25

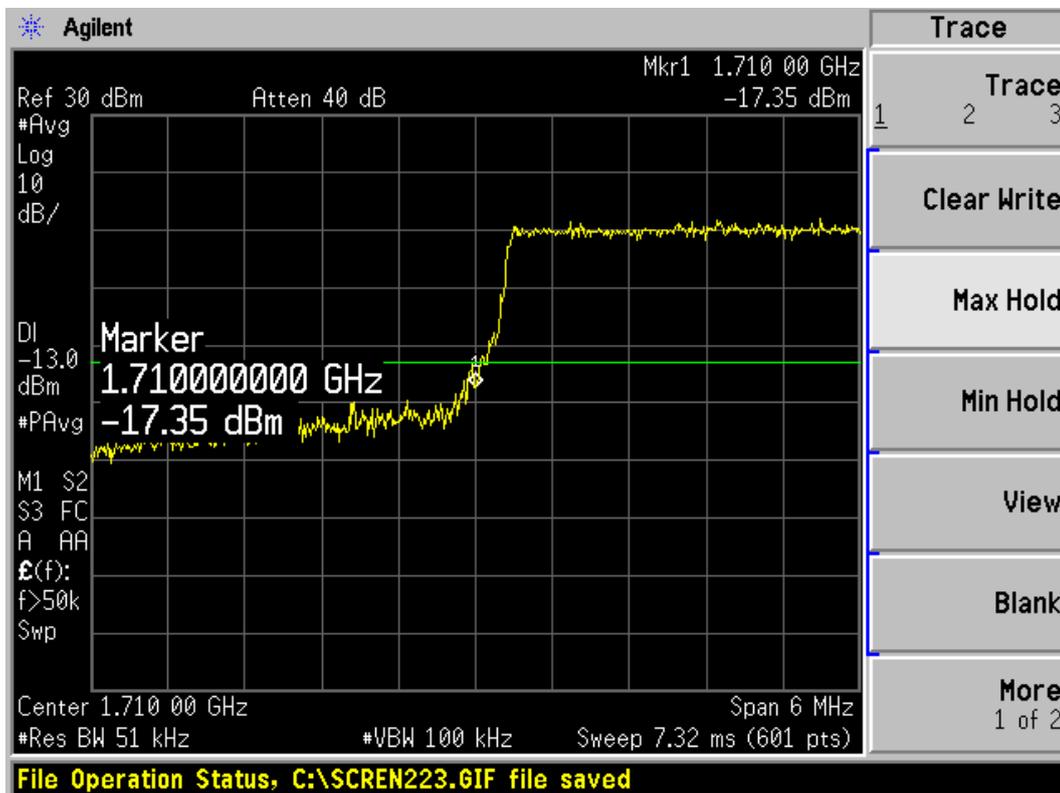


LTE Band 4 16QAM Bandwidth = 5MHz CH19975, RB 1

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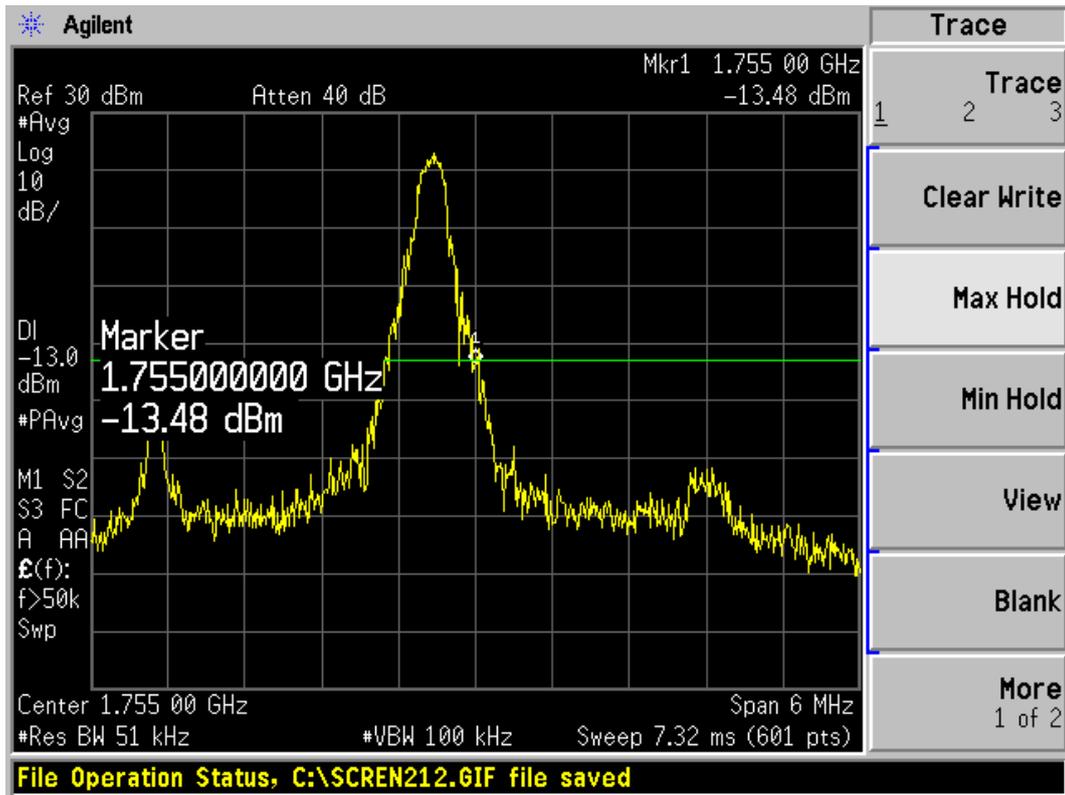


LTE Band 4 16QAM Bandwidth = 5MHz CH19975, RB 12

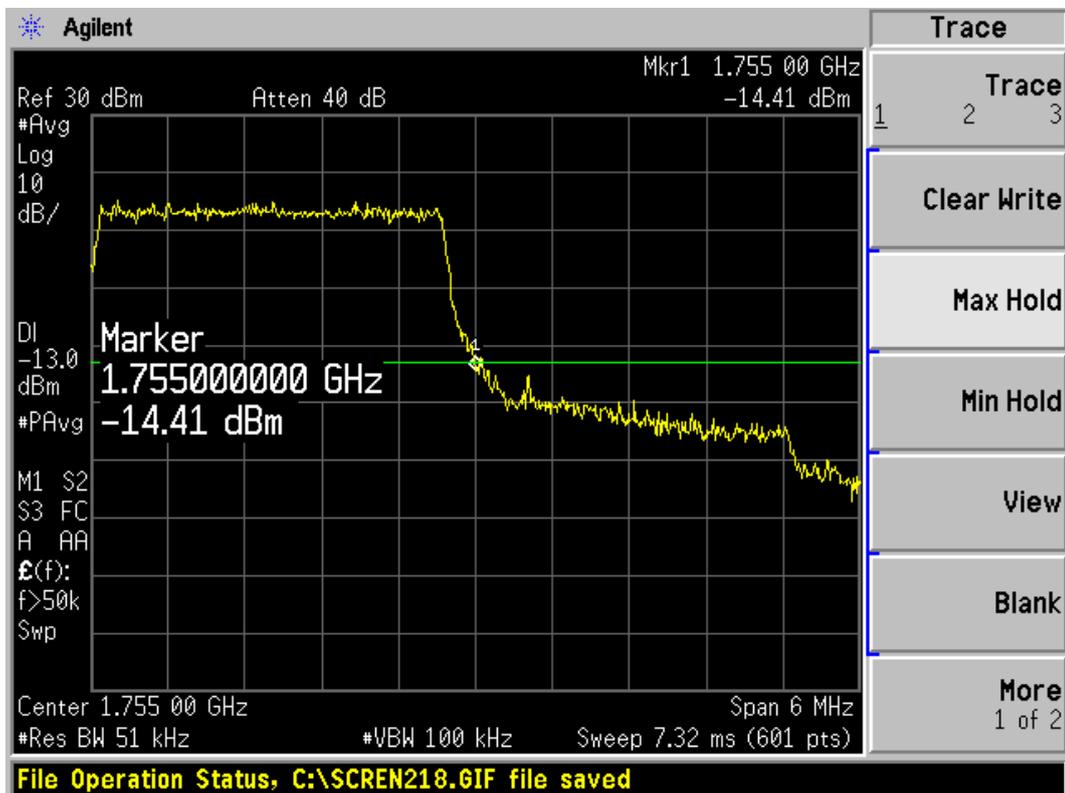


LTE Band 4 16QAM Bandwidth = 5MHz CH19975, RB 25

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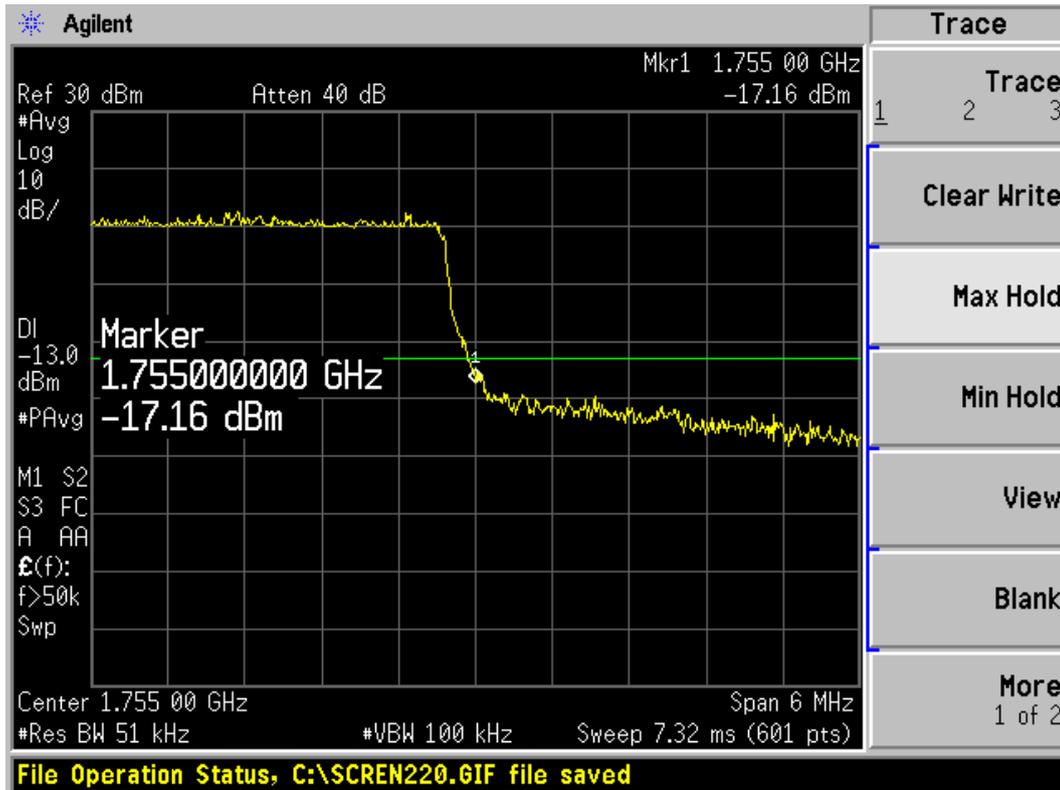


LTE Band 4 16QAM Bandwidth = 5MHz CH20375, RB 1

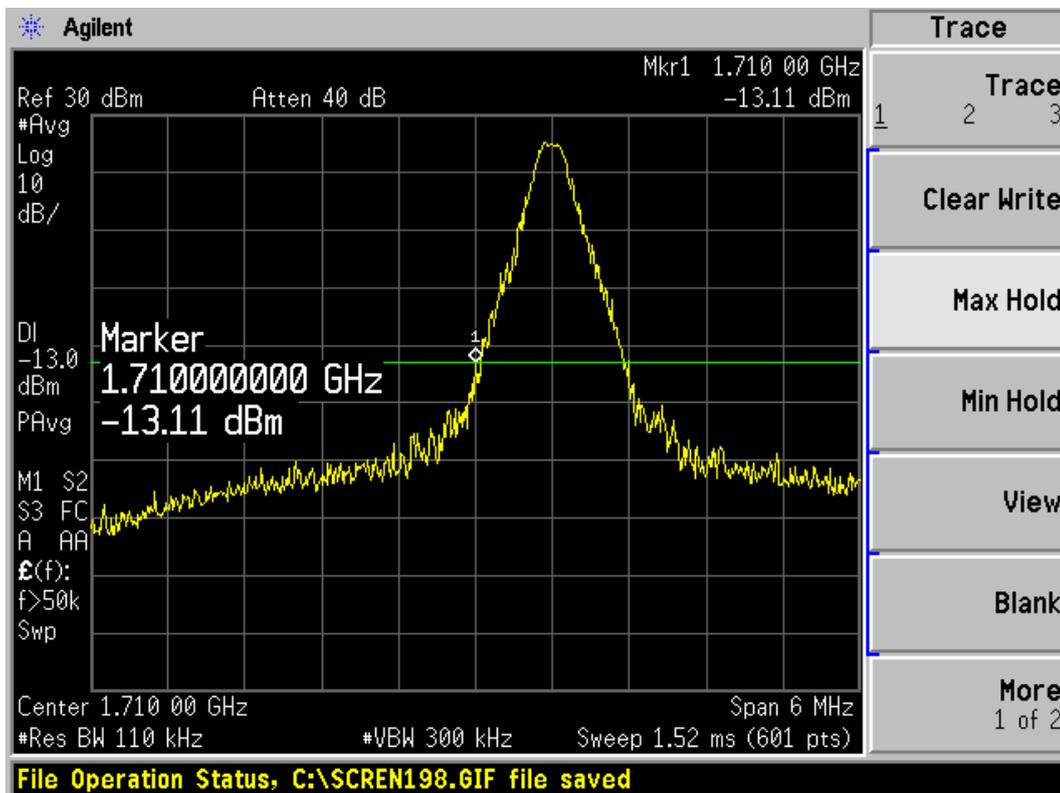


LTE Band 4 16QAM Bandwidth = 5MHz CH20375, RB 12

TA Technology (Shanghai) Co., Ltd.
Test Report

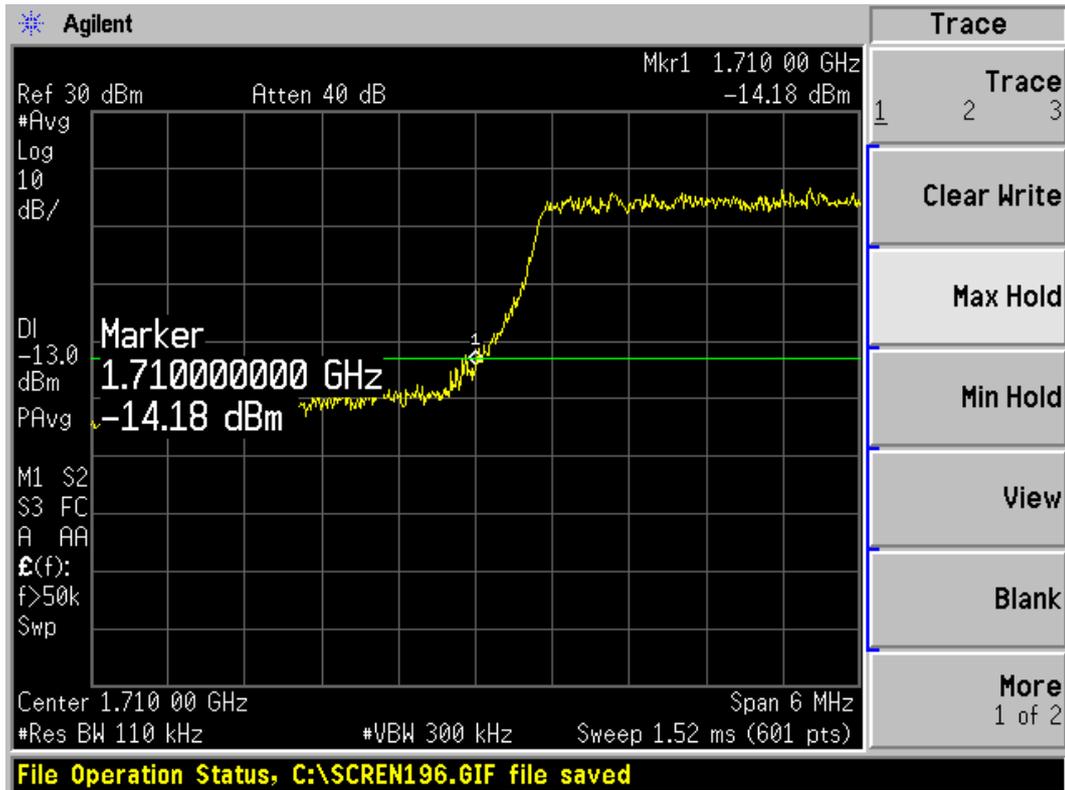


LTE Band 4 16QAM Bandwidth = 5MHz CH20375, RB 25

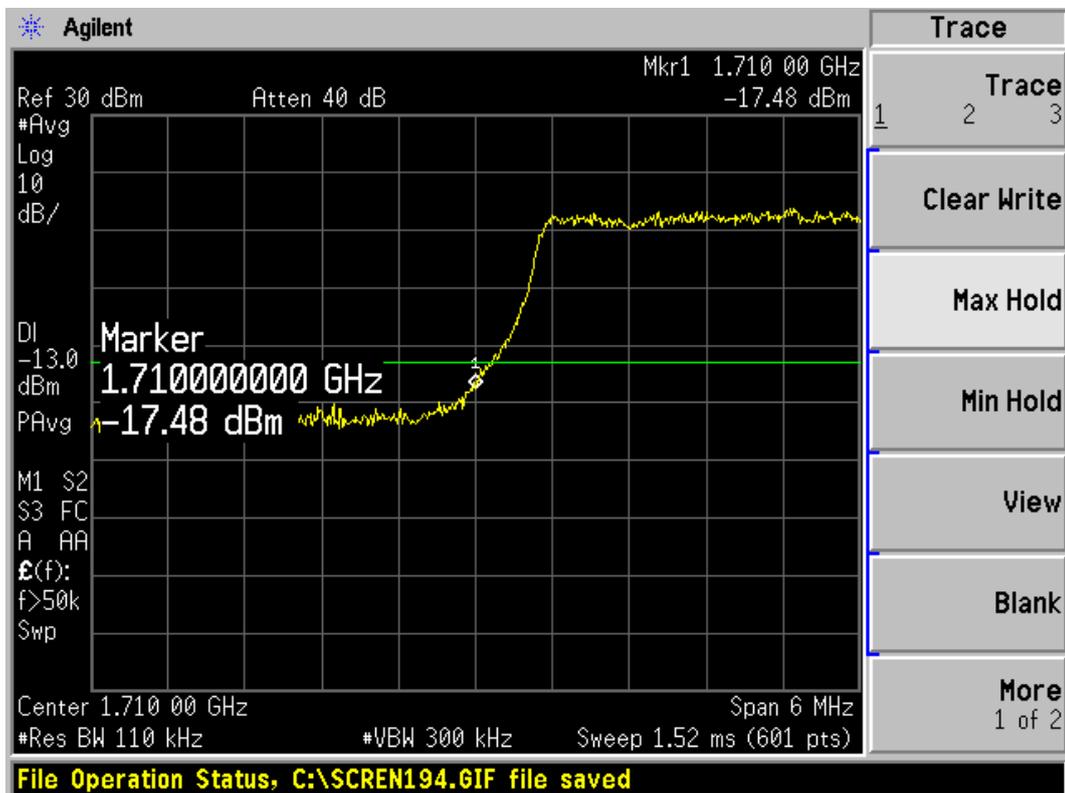


LTE Band 4 QPSK Bandwidth = 10MHz CH20000, RB 1

TA Technology (Shanghai) Co., Ltd. Test Report

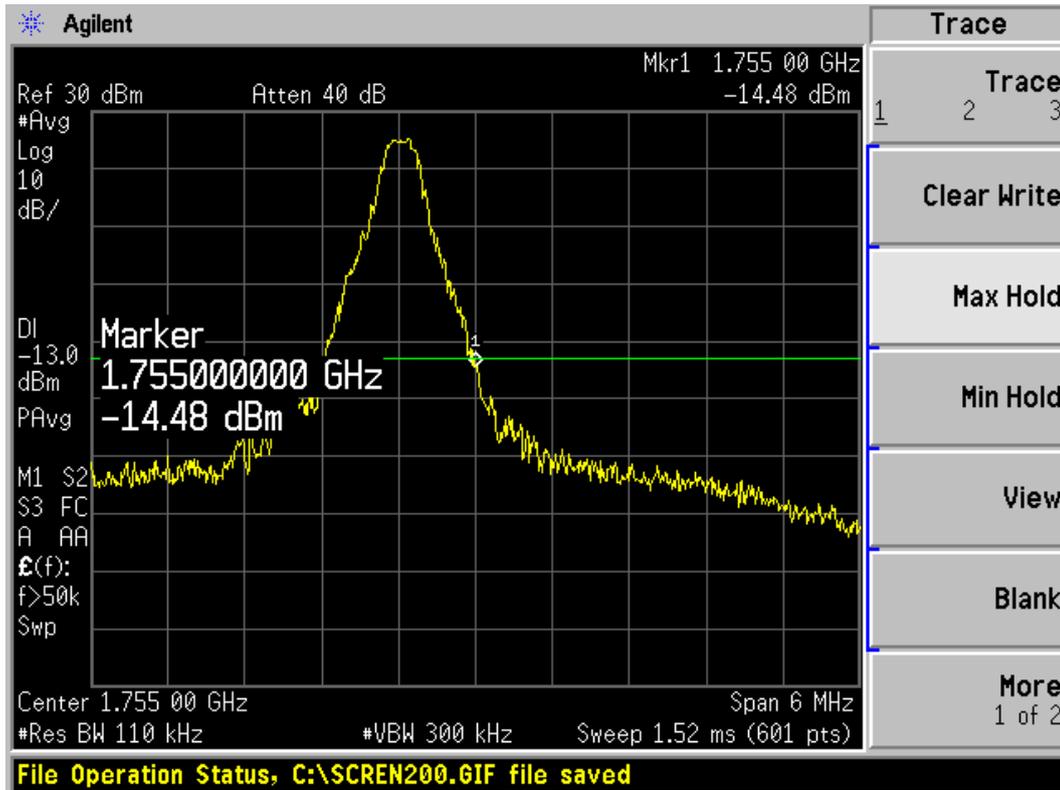


LTE Band 4 QPSK Bandwidth = 10MHz CH20000, RB 25

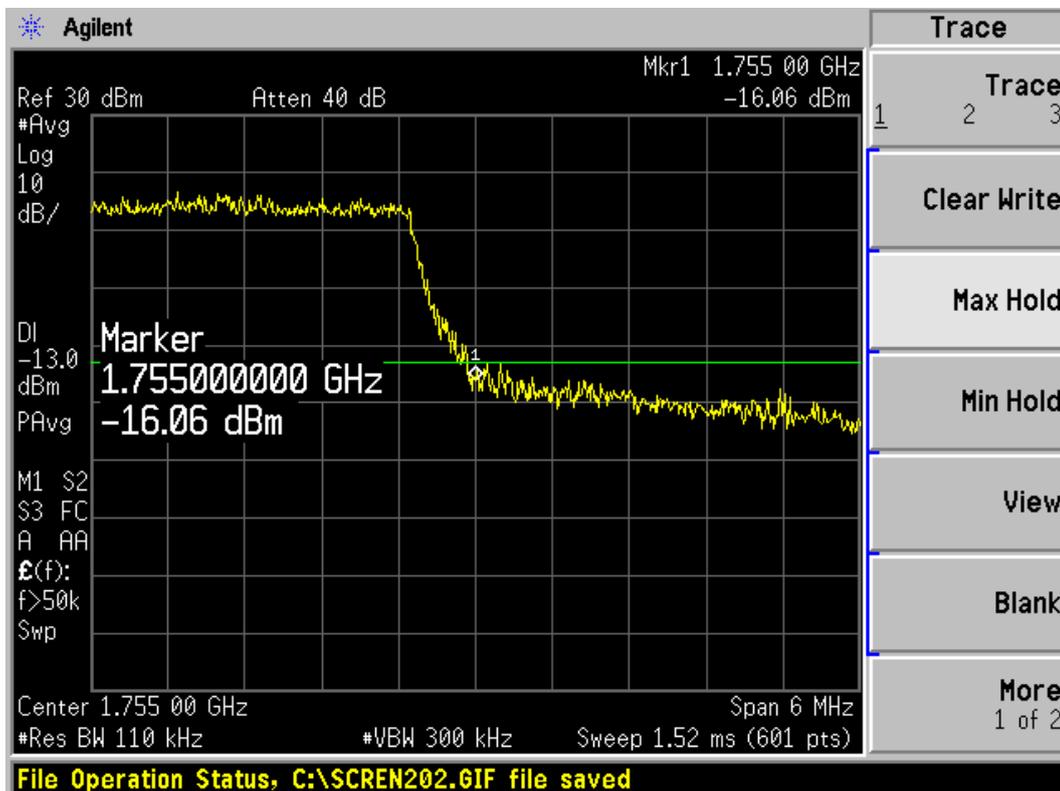


LTE Band 4 QPSK Bandwidth = 10MHz CH20000, RB 50

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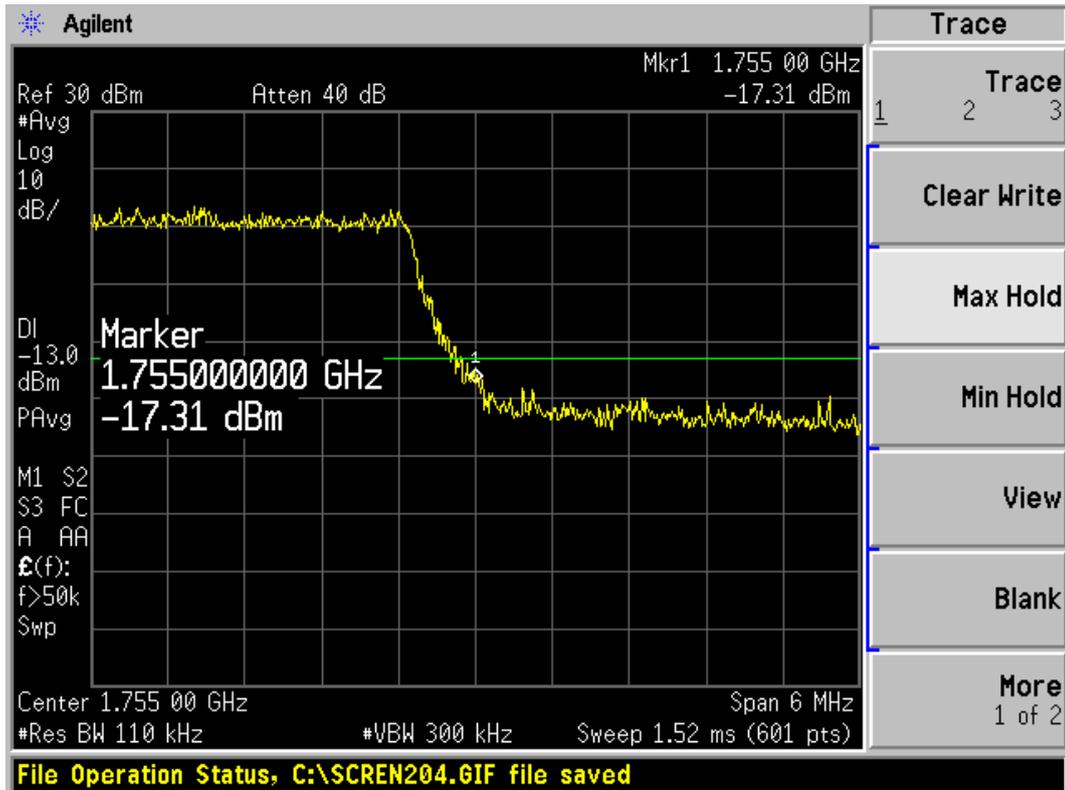


LTE Band 4 QPSK Bandwidth = 10MHz CH20350, RB 1

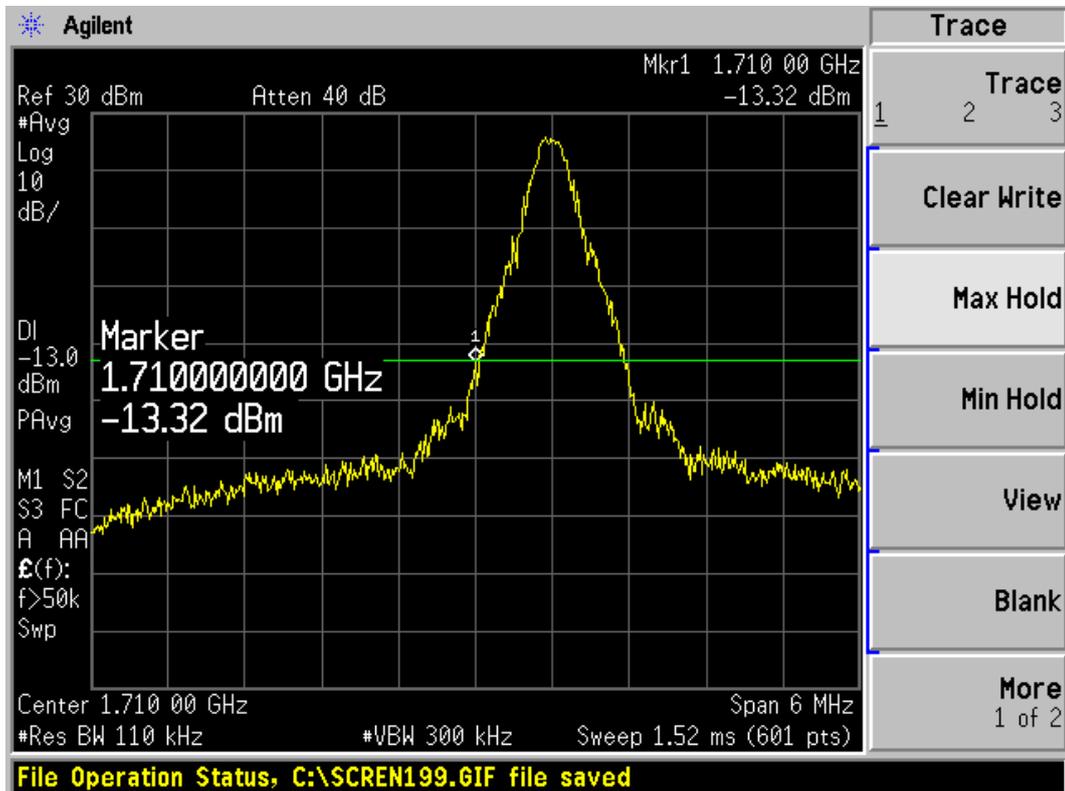


LTE Band 4 QPSK Bandwidth = 10MHz CH20350, RB 25

TA Technology (Shanghai) Co., Ltd.
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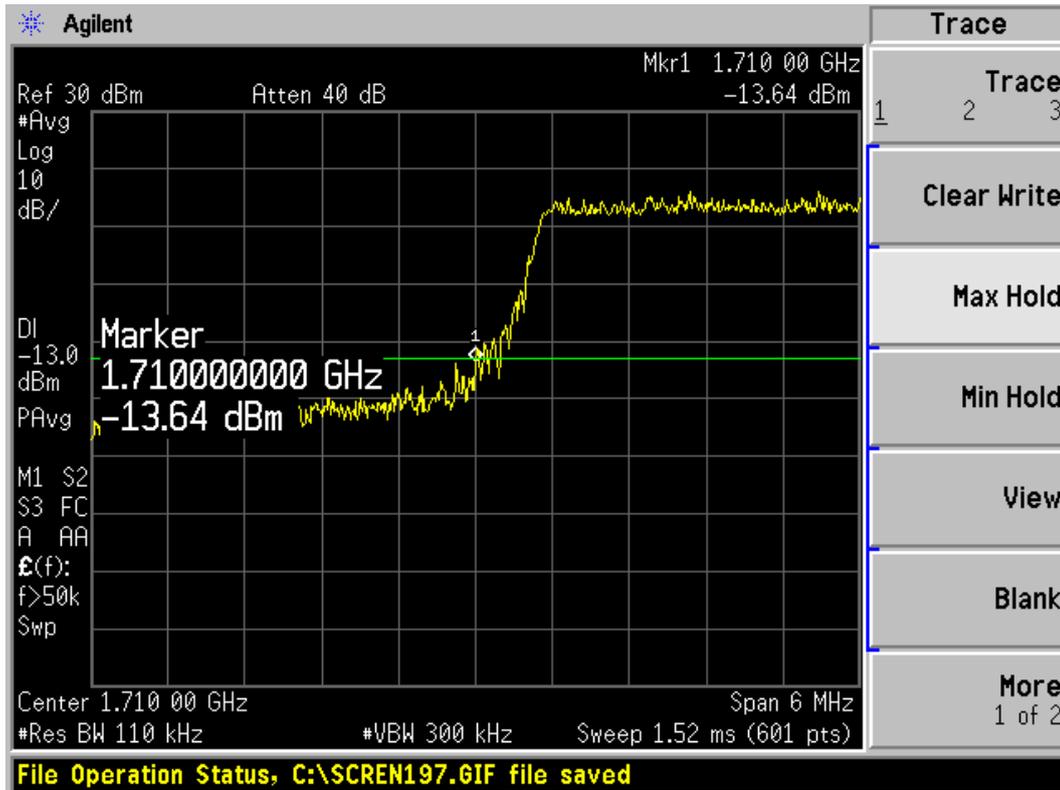


LTE Band 4 QPSK Bandwidth = 10MHz CH20350, RB 50

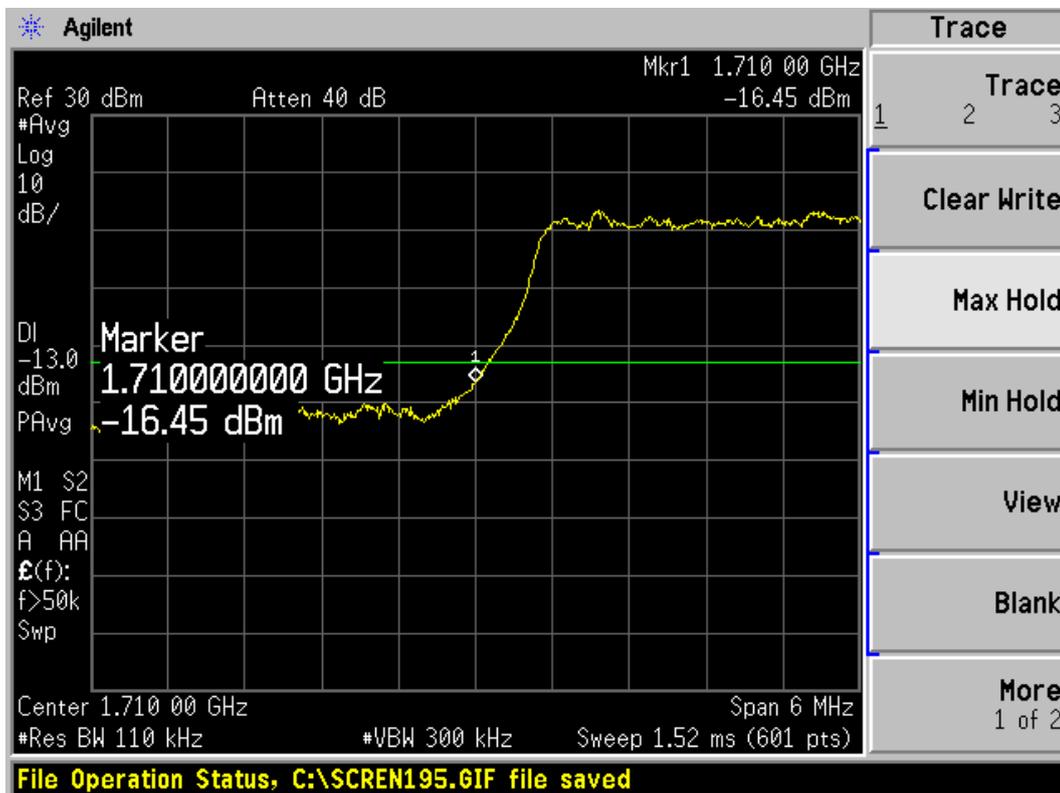


LTE Band 4 16QAM Bandwidth = 10MHz CH20000, RB 1

TA Technology (Shanghai) Co., Ltd. Test Report

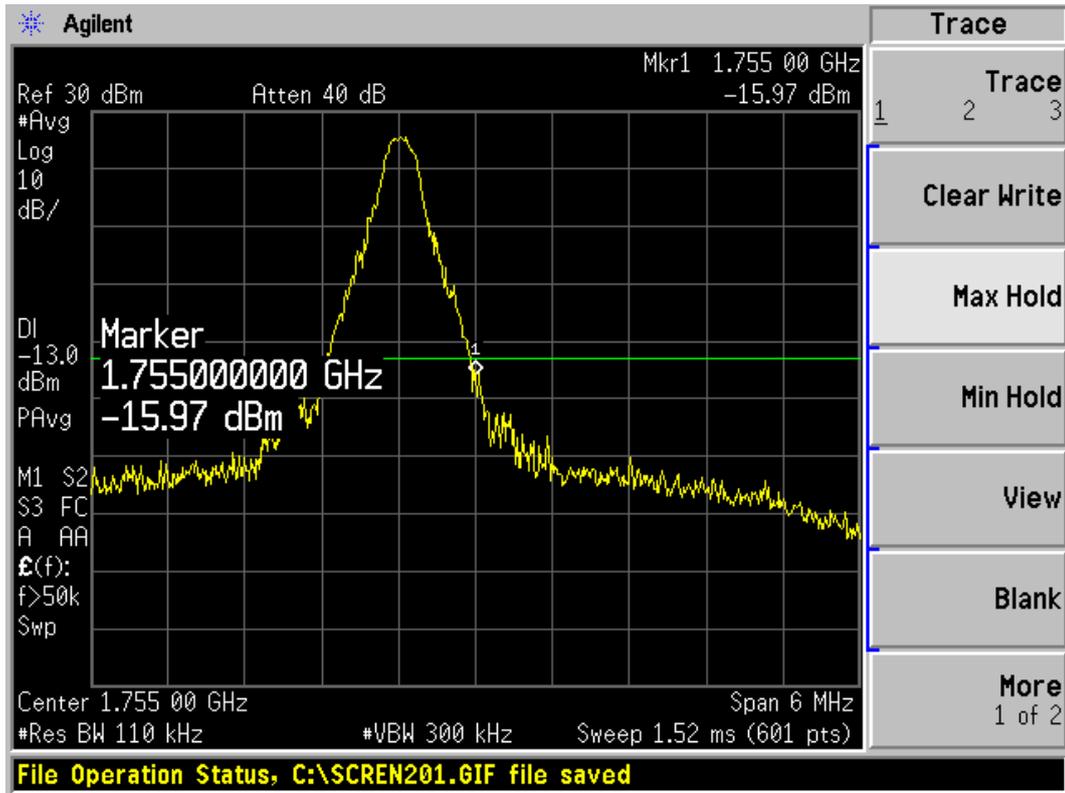


LTE Band 4 16QAM Bandwidth = 10MHz CH20000, RB 25

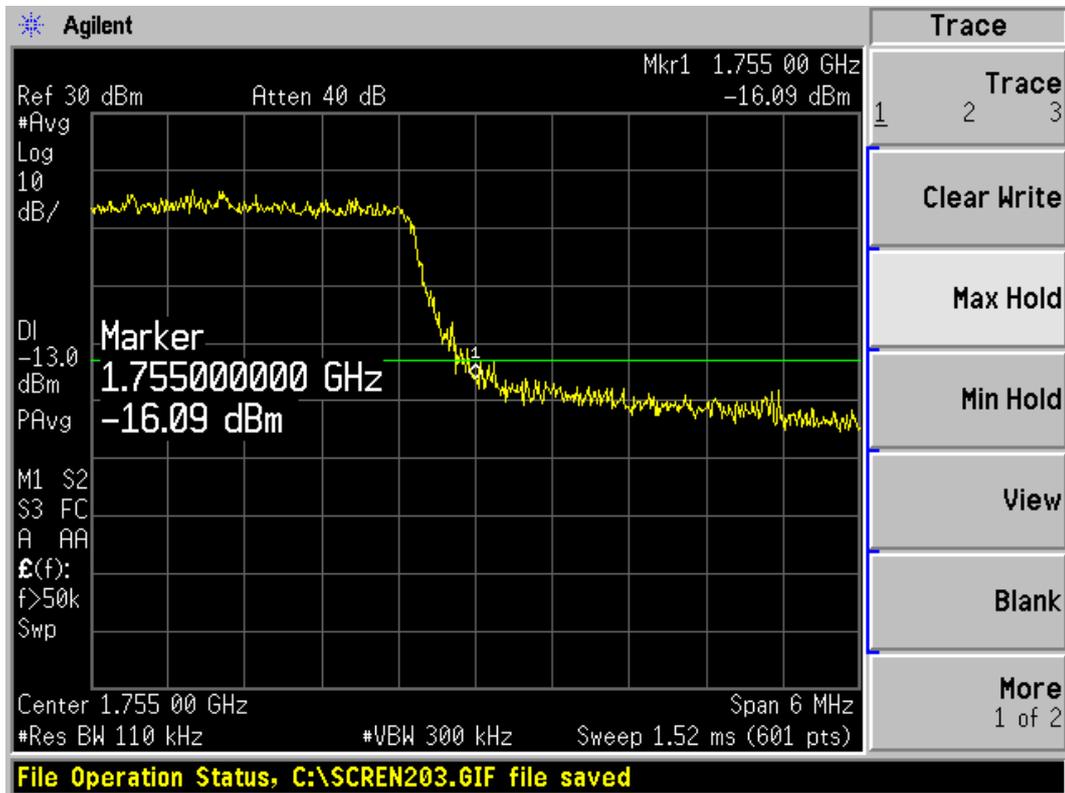


LTE Band 4 16QAM Bandwidth = 10MHz CH20000, RB 50

TA Technology (Shanghai) Co., Ltd. Test Report

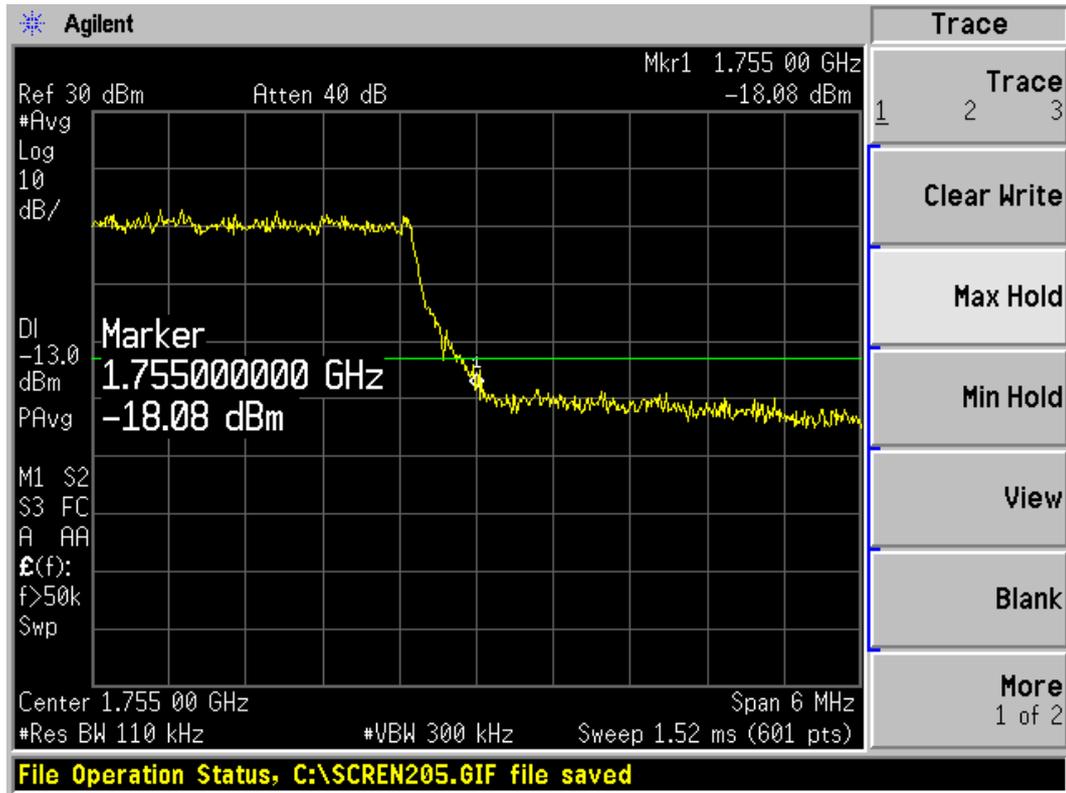


LTE Band 4 16QAM Bandwidth = 10MHz CH20350, RB 1



LTE Band 4 16QAM Bandwidth = 10MHz CH20350, RB 25

TA Technology (Shanghai) Co., Ltd.
Test Report



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

2.6. 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 -30°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)

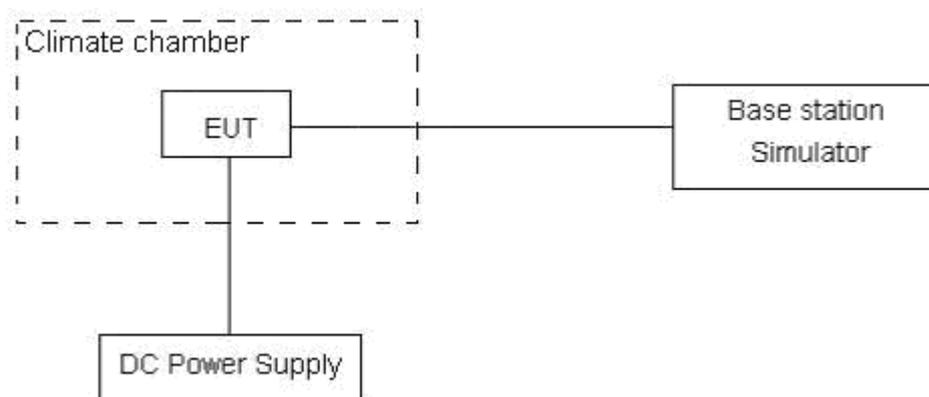
The frequency stability shall be measured with variation of primary supply voltage as follows:

(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 3.5 V and 4.2 V, with a nominal voltage of 3.8V.

Test setup



TA Technology (Shanghai) Co., Ltd.

Test Report

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

CDMA AWS

Temperature (°C)	Test Results (ppm) / 3.8 V Power supply Channel 450				
	RC3 SO55(Loopback)	RC3 SO32(+FCH-SCH)	EV-DO Rev.0	EV-DO Rev.A	1X Advance
-30	0.0066	0.0069	0.0075	0.0070	0.0060
-20	0.0054	0.0062	0.0061	0.0065	0.0057
-10	0.0036	0.0051	0.0043	0.0056	0.0044
0	0.0027	0.0046	0.0031	0.0048	0.0039
10	0.0031	0.0029	0.0022	0.0036	0.0039
20	0.0038	0.0038	0.0030	0.0042	0.0019
30	0.0023	0.0037	0.0036	0.0042	0.0026
40	0.0043	0.0045	0.0046	0.0038	0.0050
50	0.0057	0.0062	0.0006	0.0065	0.0056

Voltage (V)	Test Results(ppm) / 20°C Channel 450				
	RC3 SO55(Loopback)	RC3 SO32(+FCH-SCH)	EV-DO Rev.0	EV-DO Rev.A	1X Advance
3.5	0.0062	0.0074	0.0056	0.0067	0.0067
3.8	0.0035	0.0039	0.0035	0.0048	0.0060
4.2	0.0054	0.0056	0.0050	0.0053	0.0063

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LTE Band 4

Temperature (°C)	Test Results (ppm) / 3.8 V Power supply Channel 20175							
	QPSK, RB 1				16QAM, RB 1			
	Channel Bandwidth(MHz)				Channel Bandwidth(MHz)			
	1.4	3	5	10	1.4	3	5	10
-30	0.0037	0.0077	0.0067	0.0037	0.0078	0.0038	0.0071	0.0063
-20	0.0096	0.0097	0.0054	0.0094	0.0064	0.0094	0.0097	0.0067
-10	0.0038	0.0065	0.0037	0.0034	0.0065	0.0034	0.0064	0.0033
0	0.0068	0.0037	0.0074	0.0067	0.0065	0.0065	0.0062	0.0037
10	0.0086	0.0096	0.0098	0.0067	0.0096	0.0064	0.0094	0.0063
20	0.0027	0.0065	0.0037	0.0035	0.0064	0.0034	0.0035	0.0033
30	0.0066	0.0037	0.0078	0.0065	0.0065	0.0065	0.0023	0.0033
40	0.0035	0.0033	0.0063	0.0084	0.0073	0.0063	0.0085	0.0073
50	0.0076	0.0066	0.0093	0.0067	0.0037	0.0096	0.0084	0.0037

Voltage (V)	Test Results(ppm) / 20°C Channel 20175							
	QPSK, RB 1				16QAM, RB 1			
	Channel Bandwidth(MHz)				Channel Bandwidth(MHz)			
	1.4	3	5	10	1.4	3	5	10
3.5	0.0045	0.0065	0.0036	0.0078	0.0097	0.0075	0.0055	0.0075
3.8	0.0027	0.0065	0.0037	0.0035	0.0064	0.0034	0.0035	0.0033
4.2	0.0048	0.0053	0.0096	0.0054	0.0075	0.0077	0.0046	0.0034

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2.7. Spurious Emissions at Antenna Terminals

Ambient condition

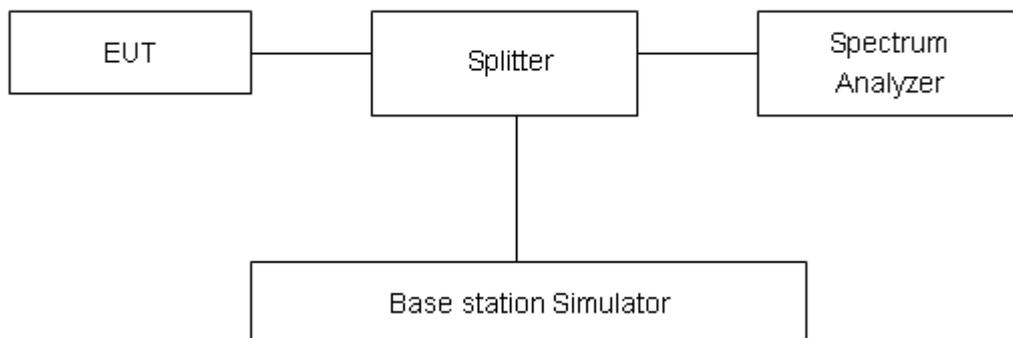
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to the 10th harmonic of the carrier. For below 1GHz, RBW and VBW are set to 100 kHz, Sweep is set to ATUO. For above 1GHz, RBW and VBW are set to 1MHz, Sweep is set to ATUO.

We tested all modes for CDMA AWS and LTE Band 4. The worst emission was recorded in the report.

Test setup



Limits

Rule Part 27.53(h) specifies that “the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.”

Limit	-13 dBm
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

Frequency	Uncertainty
100kHz-2GHz	0.684 dB
Above 2GHz	1.407 dB

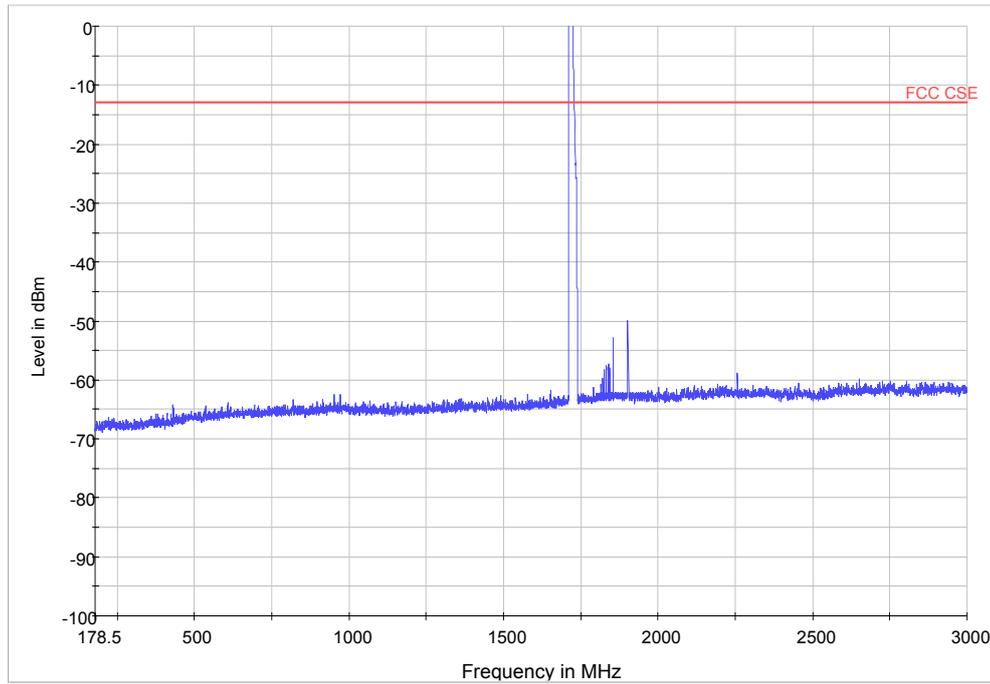
TA Technology (Shanghai) Co., Ltd. Test Report

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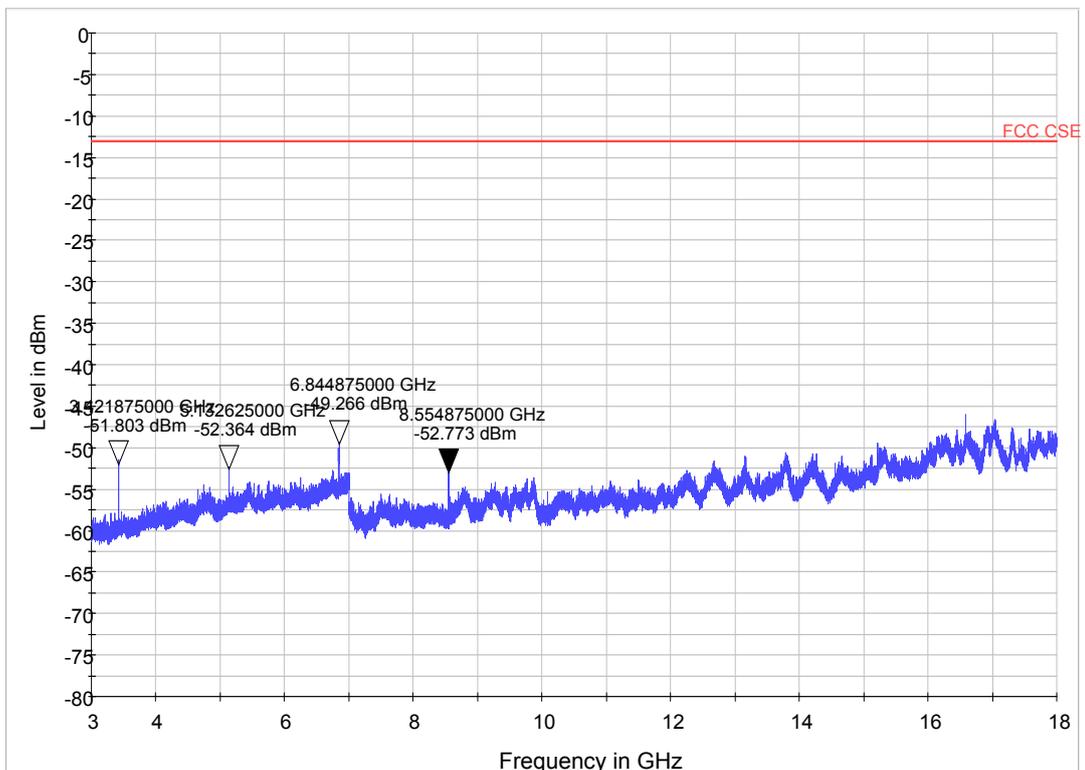
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Test Result: PASS

CDMA AWS CH25



Note: The signal beyond the limit is carrier.
CDMA AWS 25 Channel 30MHz~3GHz



CDMA AWS 25 Channel 3GHz~18GHz

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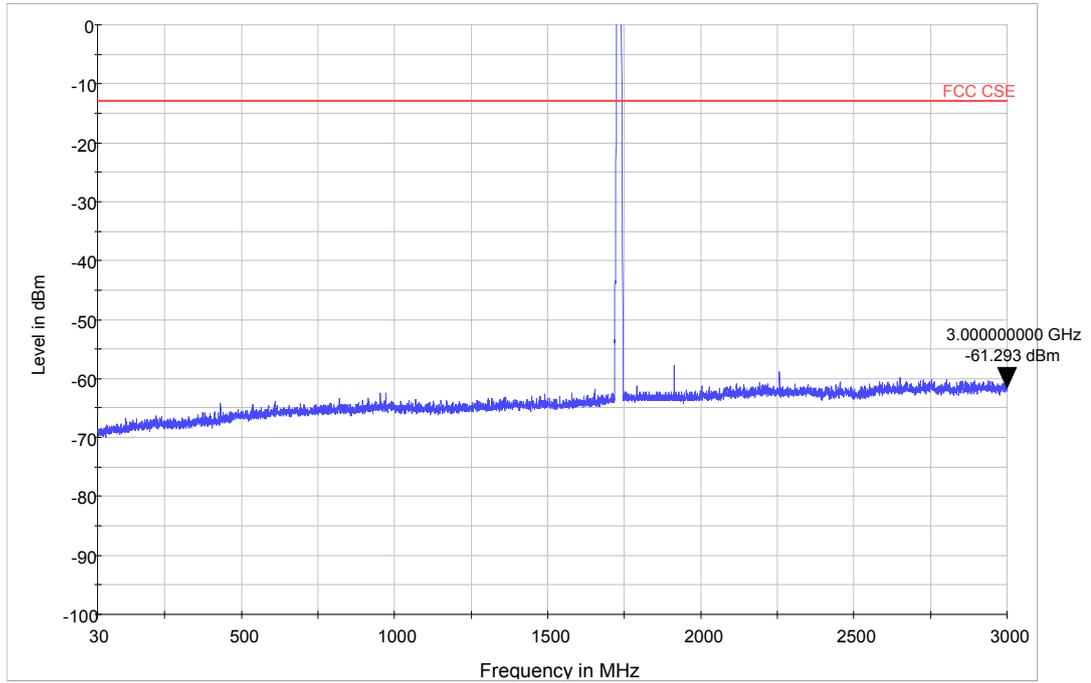
Harmonic	TX ch.25 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3422.5	-51.80	-13	38.80
3	5133.75	-52.36	-13	39.36
4	6845	-49.27	-13	36.27
5	8556.25	-52.77	-13	39.77
6	10267.5	Nf	-13	/
7	11978.75	Nf	-13	/
8	13690	Nf	-13	/
9	15401.25	Nf	-13	/
10	17112.5	Nf	-13	/

Nf: noise floor

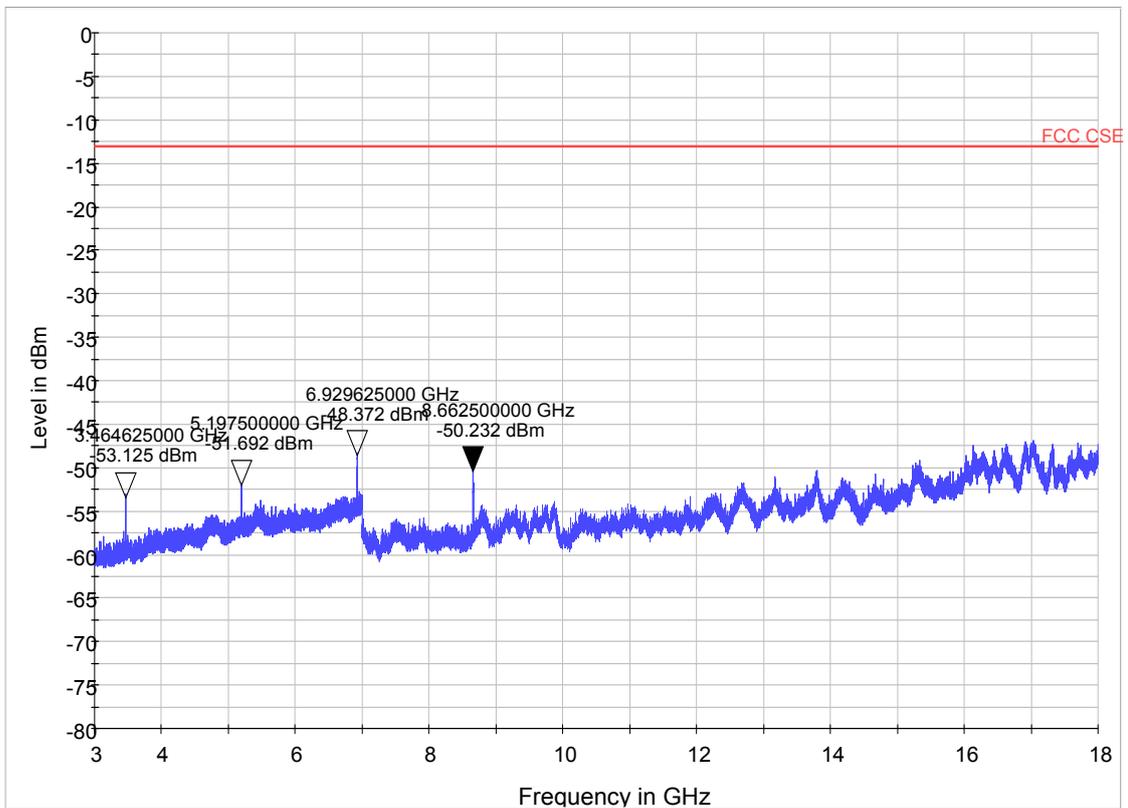
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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CDMA AWS CH450



Note: The signal beyond the limit is carrier.
CDMA AWS 450 Channel 30MHz~3GHz



CDMA AWS 450 Channel 3GHz~18GHz

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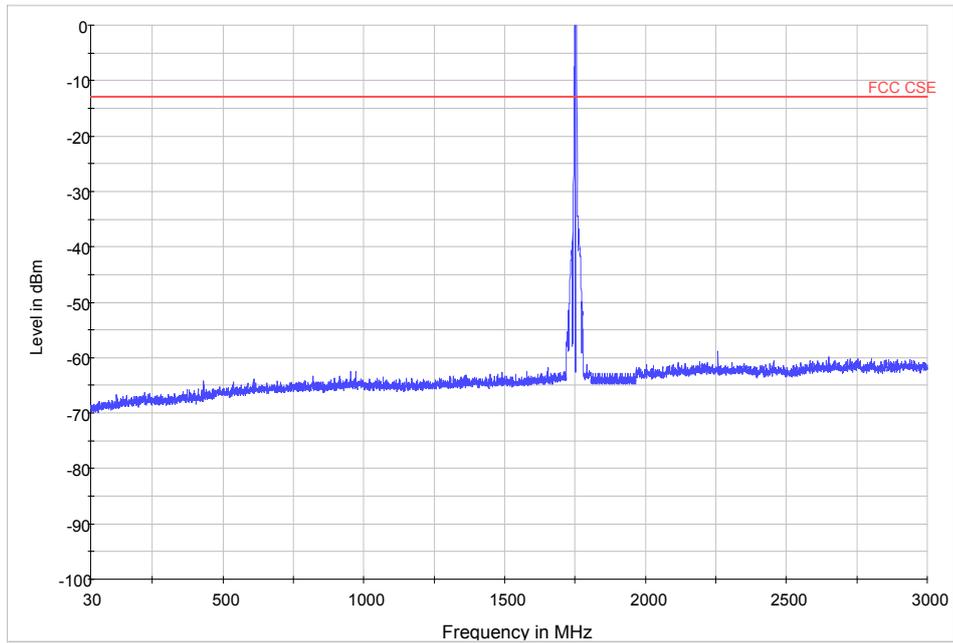
Harmonic	TX ch.450 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3465	-53.13	-13	40.13
3	5197.5	-51.69	-13	38.69
4	6930	-48.37	-13	35.37
5	8662.5	-50.23	-13	37.23
6	10395	Nf	-13	/
7	12127.5	Nf	-13	/
8	13860	Nf	-13	/
9	15592.5	Nf	-13	/
10	17325	Nf	-13	/

Nf: noise floor

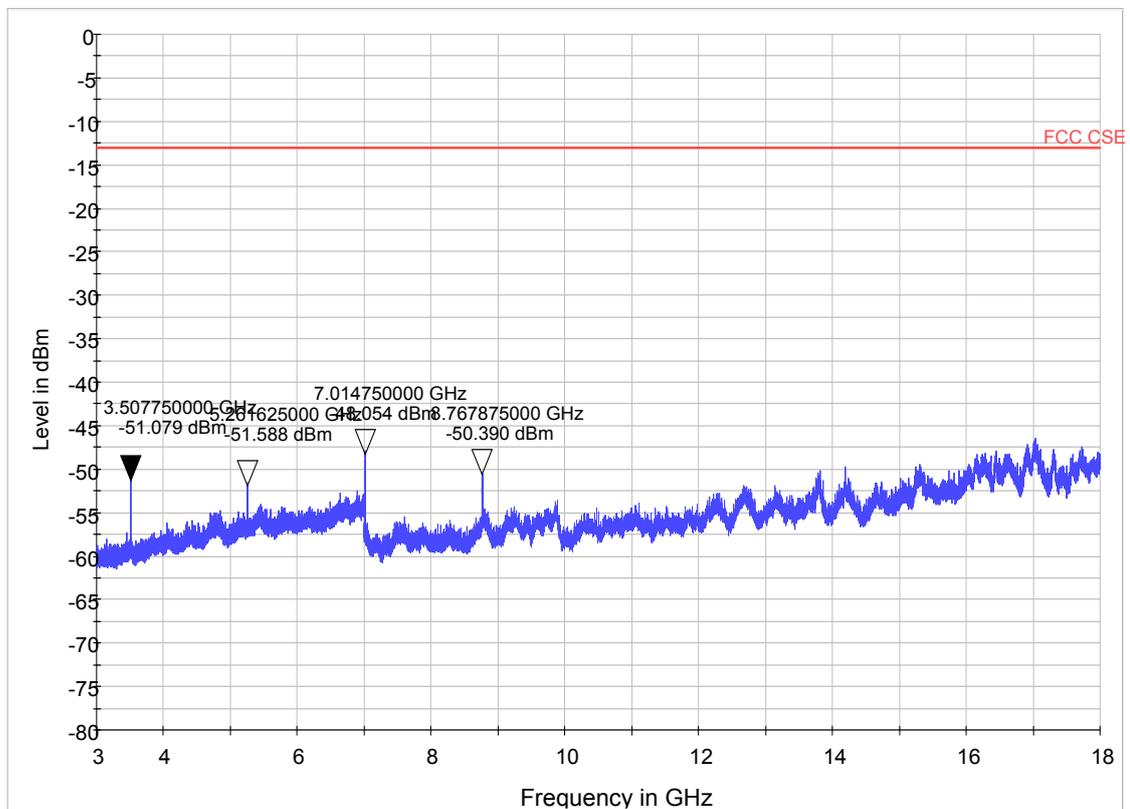
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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CDMA AWS CH875



Note: The signal beyond the limit is carrier.
CDMA AWS 875 Channel 30MHz~3GHz



CDMA AWS 875 Channel 3GHz~18GHz

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Harmonic	TX ch.875 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3507.5	-51.08	-13	38.08
3	5261.25	-51.59	-13	38.59
4	7015	-48.05	-13	35.05
5	8768.75	-50.39	-13	37.39
6	10522.5	Nf	-13	/
7	12276.25	Nf	-13	/
8	14030	Nf	-13	/
9	15783.75	Nf	-13	/
10	17537.5	Nf	-13	/

Nf: noise floor

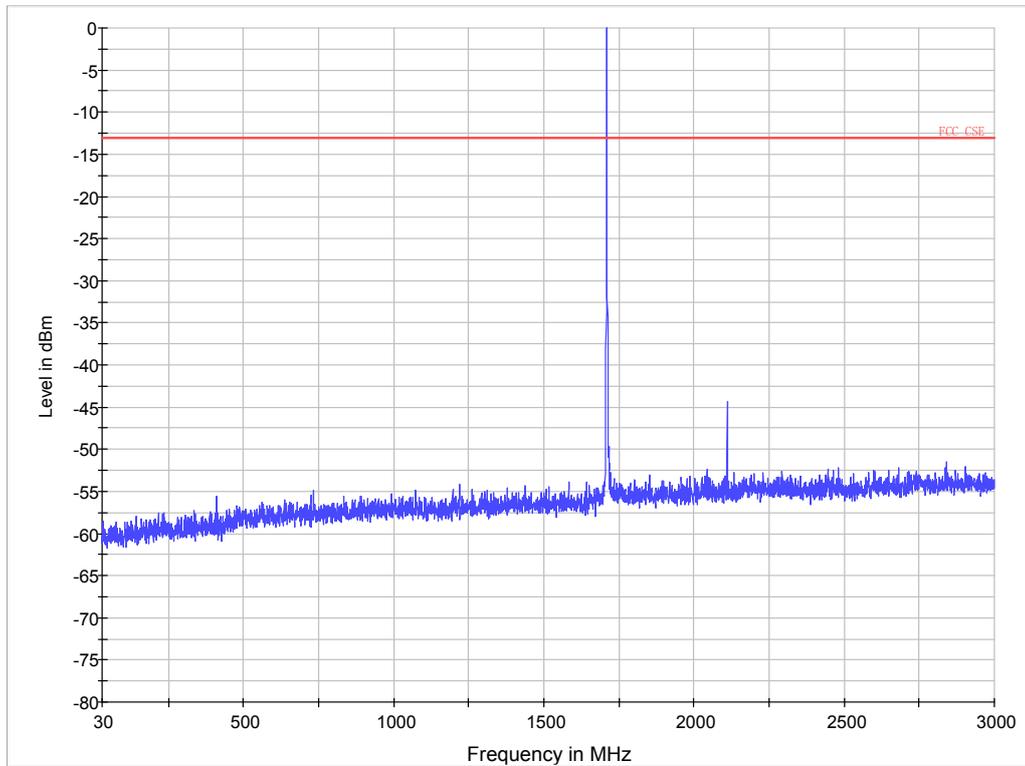
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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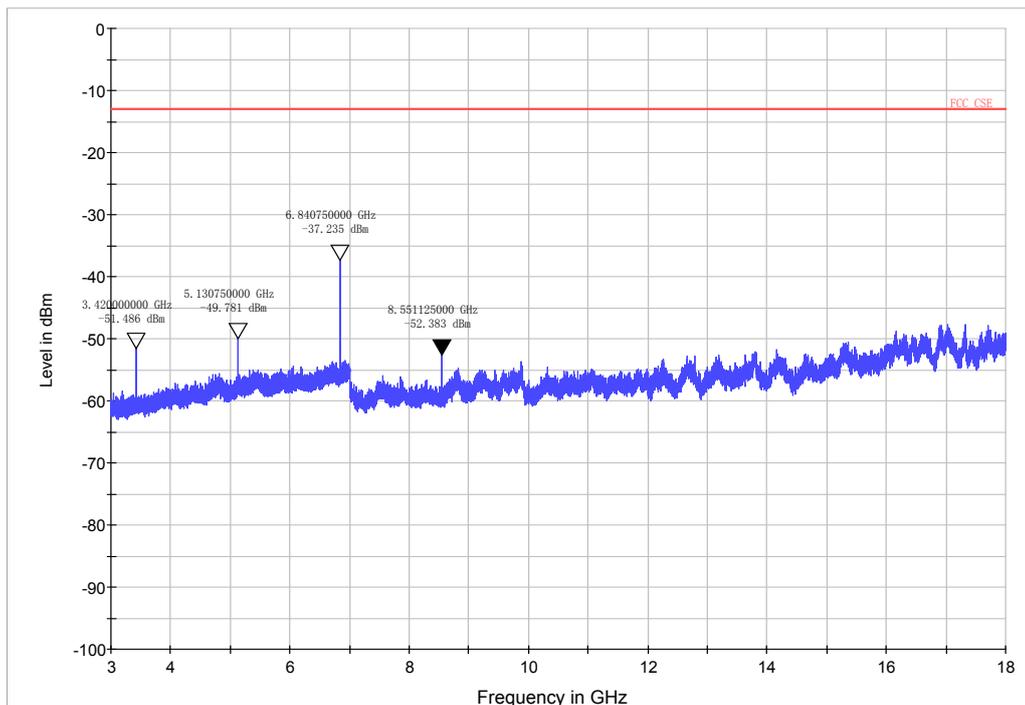
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LTE Band 4 QPSK Bandwidth = 1.4MHz CH19957, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 4 19957 Channel 30MHz~3GHz



LTE Band 4 19957 Channel 3GHz~18GHz

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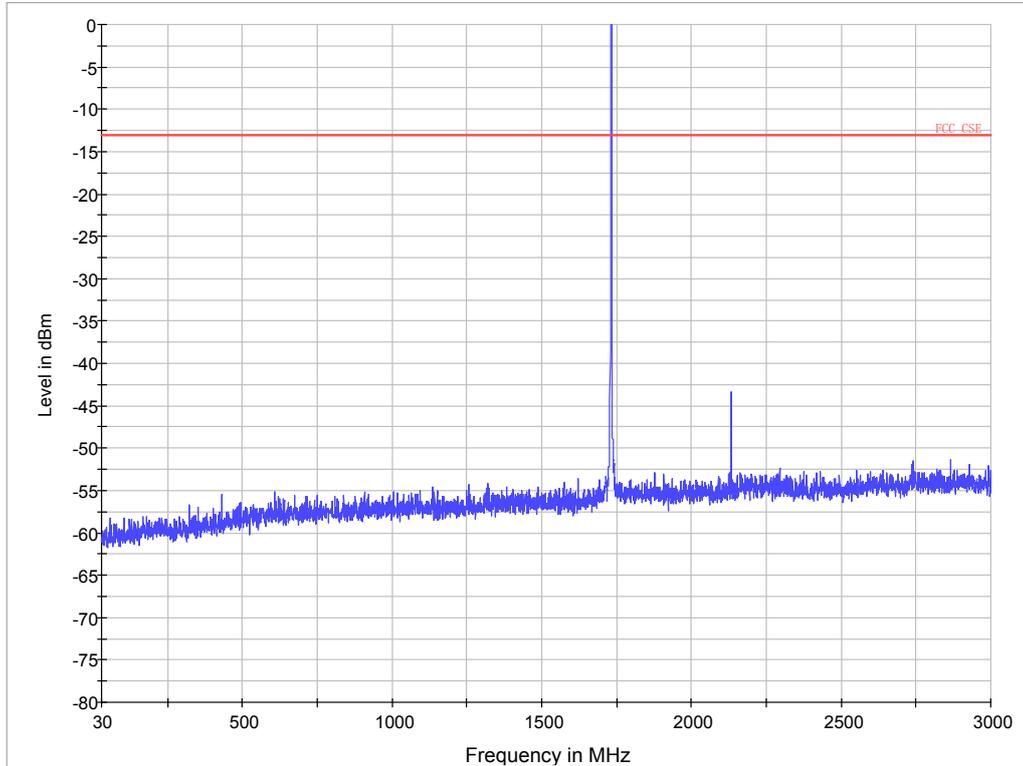
Harmonic	TX ch. 19957 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3421.4	-51.49	-13	38.49
3	5132.1	-49.78	-13	36.78
4	6842.8	-37.24	-13	24.24
5	8553.5	-52.38	-13	39.38
6	10264.2	Nf	-13	/
7	11974.9	Nf	-13	/
8	13685.6	Nf	-13	/
9	15396.3	Nf	-13	/
10	17107	Nf	-13	/

Nf: noise floor

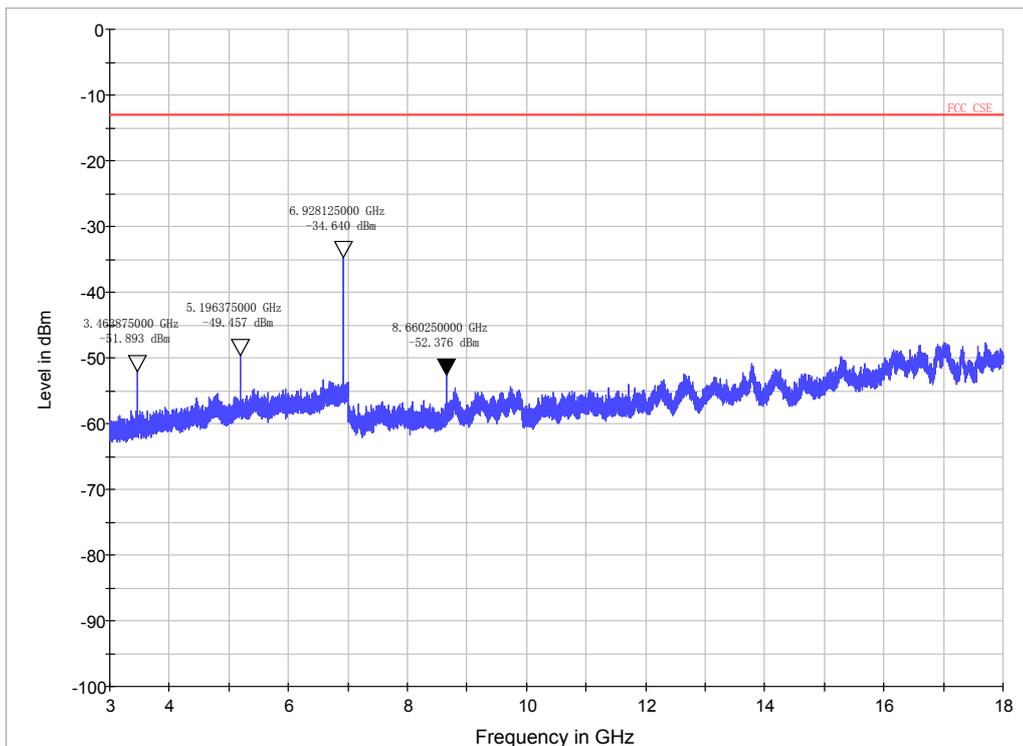
Note: The other Spurious RF conducted emissions level is no more than noise floor.

TA Technology (Shanghai) Co., Ltd. Test Report

LTE Band 4 QPSK Bandwidth = 1.4MHz CH20175, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 4 20175 Channel 30MHz~3GHz



LTE Band 4 20175 Channel 3GHz~18GHz

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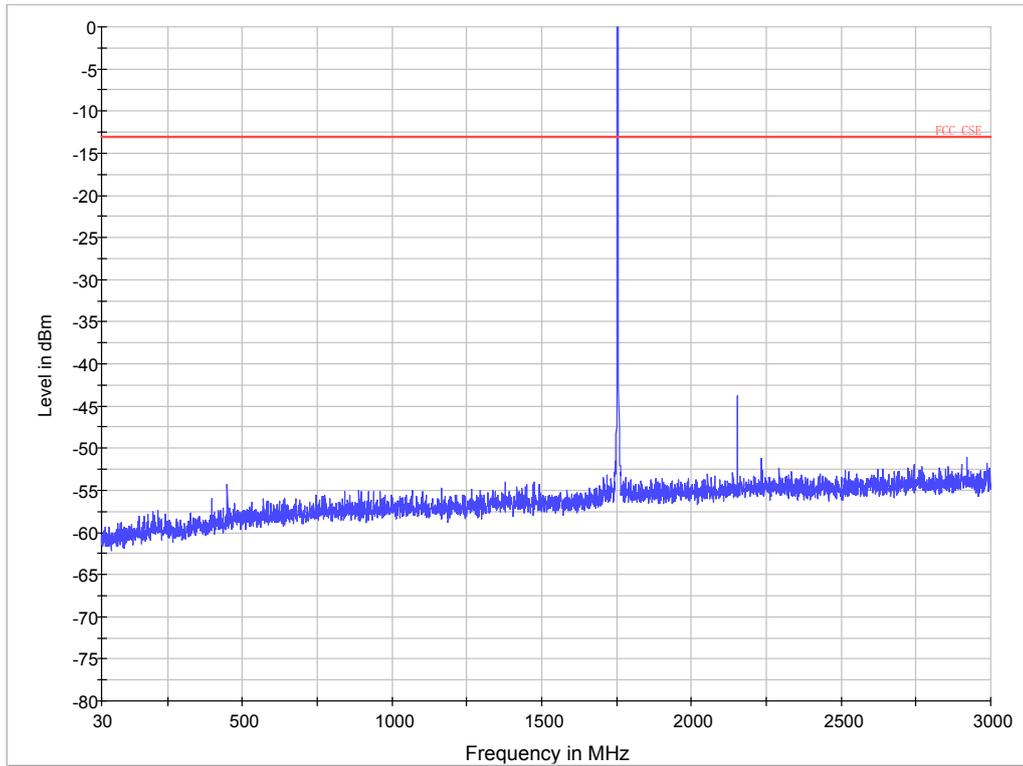
Harmonic	TX ch. 20175 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3465	-51.89	-13	38.89
3	5197.5	-49.46	-13	36.46
4	6930	-34.64	-13	21.64
5	8662.5	-52.38	-13	39.38
6	10395	Nf	-13	/
7	12127.5	Nf	-13	/
8	13860	Nf	-13	/
9	15592.5	Nf	-13	/
10	17325	Nf	-13	/

Nf: noise floor

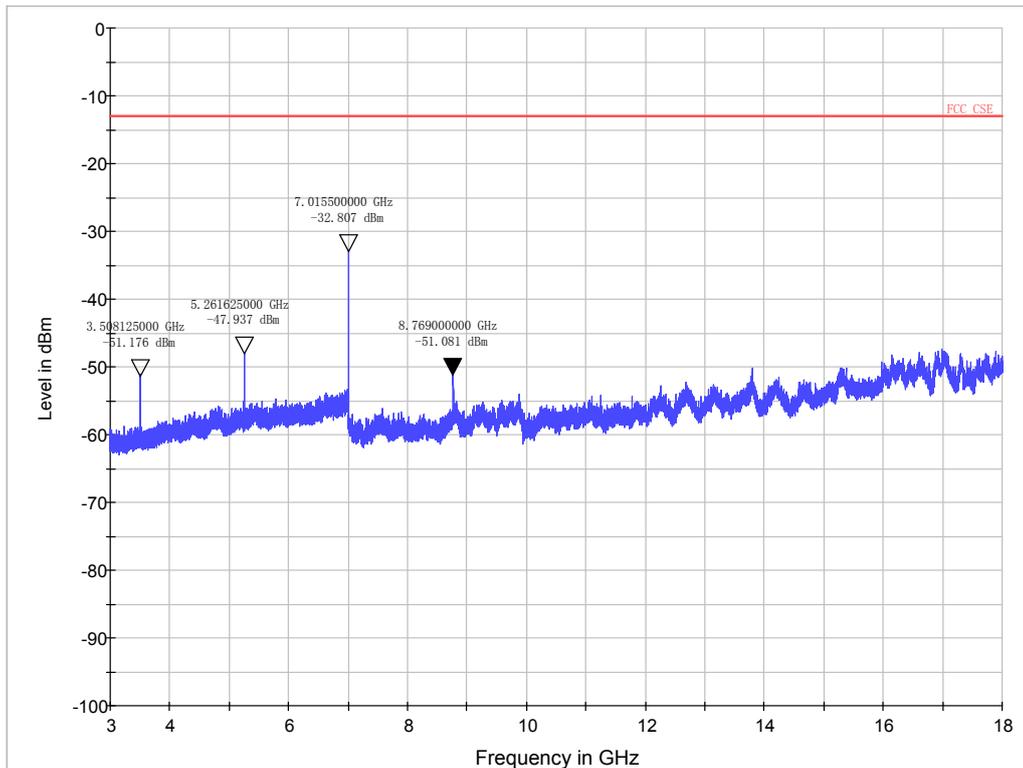
Note: The other Spurious RF conducted emissions level is no more than noise floor.

TA Technology (Shanghai) Co., Ltd. Test Report

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



Note: The signal beyond the limit is carrier.
LTE Band 4 20393 Channel 30MHz~3GHz



LTE Band 4 20393 Channel 3GHz~18GHz

TA Technology (Shanghai) Co., Ltd.
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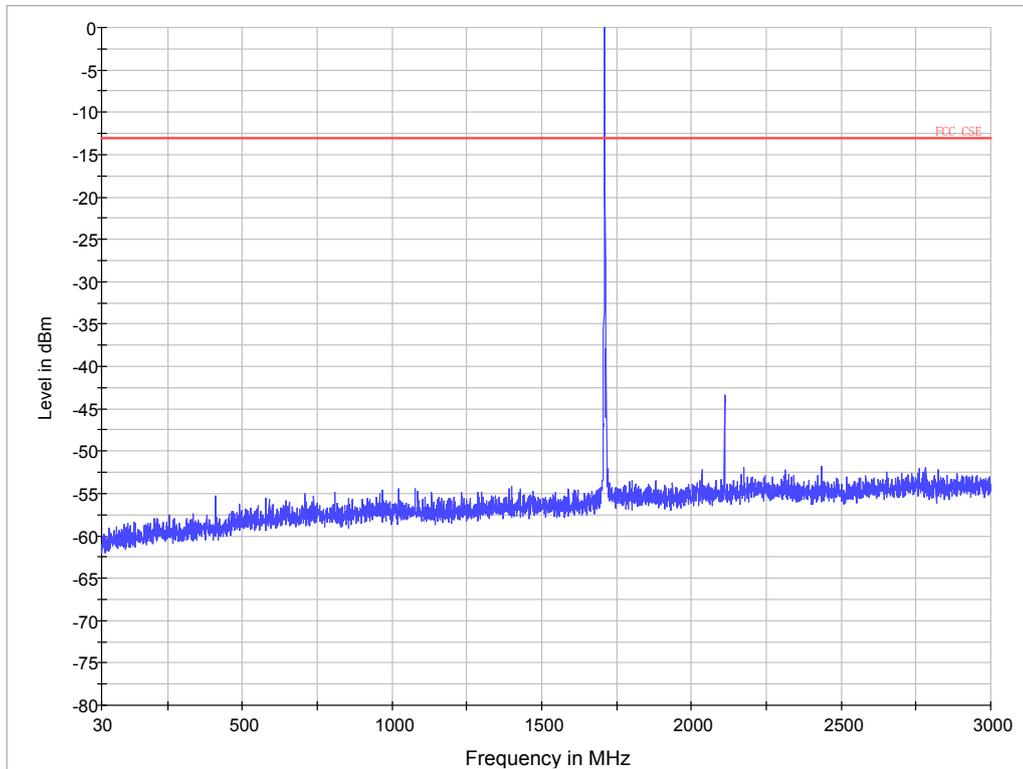
Harmonic	TX ch. 20393 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3508.6	-51.18	-13	38.18
3	5262.9	-47.94	-13	34.94
4	7017.2	-32.81	-13	19.81
5	8771.5	-51.08	-13	38.08
6	10525.8	Nf	-13	/
7	12280.1	Nf	-13	/
8	14034.4	Nf	-13	/
9	15788.7	Nf	-13	/
10	17543	Nf	-13	/

Nf: noise floor

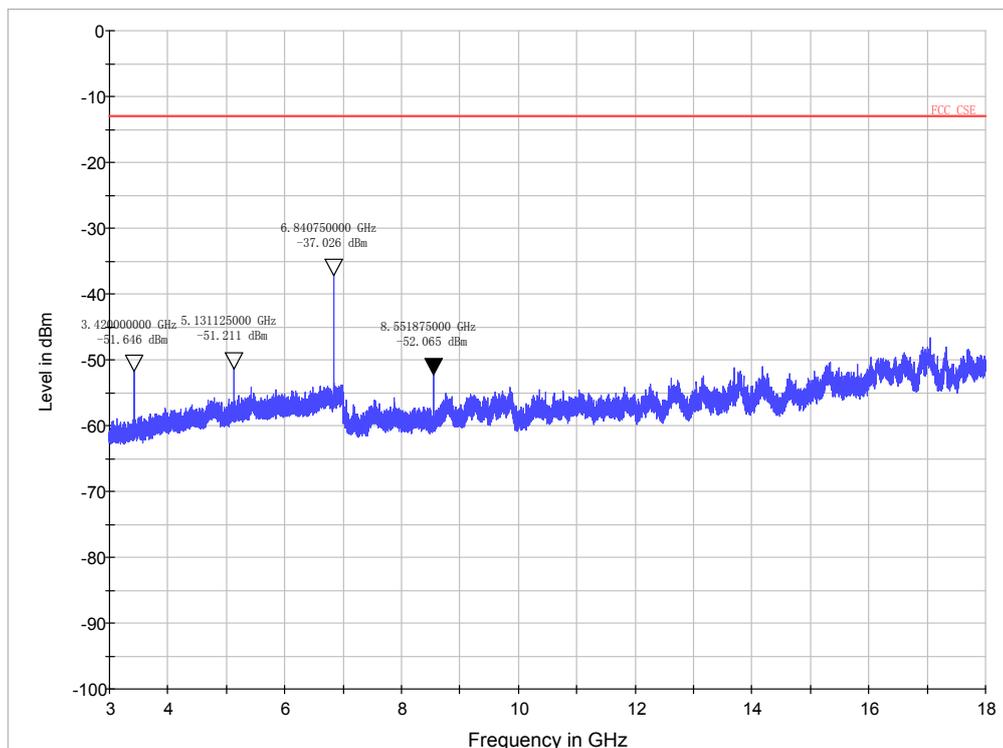
Note: The other Spurious RF conducted emissions level is no more than noise floor.

TA Technology (Shanghai) Co., Ltd. Test Report

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



Note: The signal beyond the limit is carrier.
LTE Band 4 19965 Channel 30MHz~3GHz



LTE Band 4 19965 Channel 3GHz~18GHz

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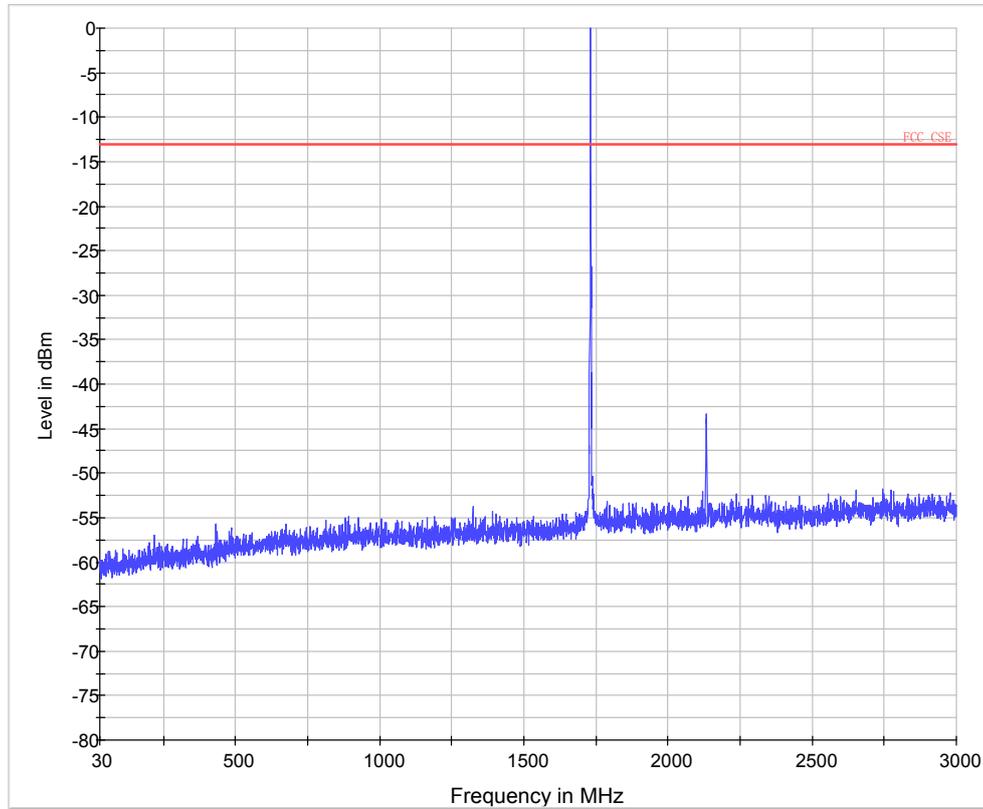
Harmonic	TX ch. 19965 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3423	-51.65	-13	38.65
3	5134.5	-51.21	-13	38.21
4	6846	-37.03	-13	24.03
5	8557.5	-52.07	-13	39.07
6	10269	Nf	-13	/
7	11980.5	Nf	-13	/
8	13692	Nf	-13	/
9	15403.5	Nf	-13	/
10	17115	Nf	-13	/

Nf: noise floor

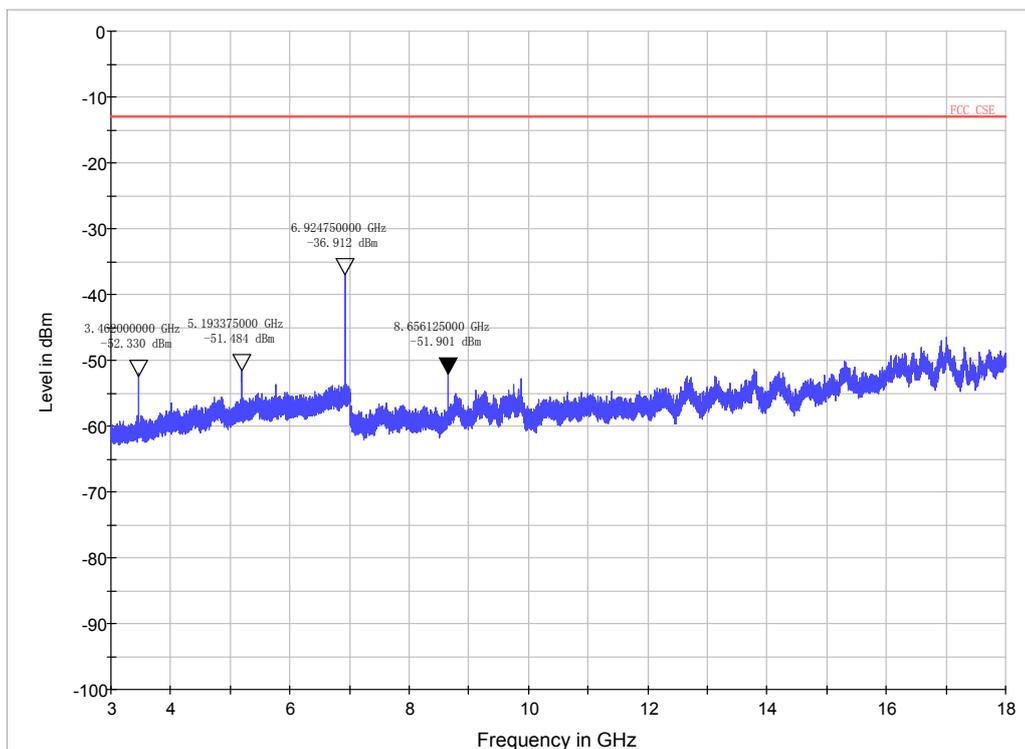
Note: The other Spurious RF conducted emissions level is no more than noise floor.

TA Technology (Shanghai) Co., Ltd. Test Report

LTE Band 4 QPSK Bandwidth = 3MHz CH20175, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 4 20175 Channel 30MHz~3GHz



LTE Band 4 20175 Channel 3GHz~18GHz

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Harmonic	TX ch. 20175 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3465	-52.33	-13	39.33
3	5197.5	-51.48	-13	38.48
4	6930	-36.91	-13	23.91
5	8662.5	-51.90	-13	38.90
6	10395	Nf	-13	/
7	12127.5	Nf	-13	/
8	13860	Nf	-13	/
9	15592.5	Nf	-13	/
10	17325	Nf	-13	/

Nf: noise floor

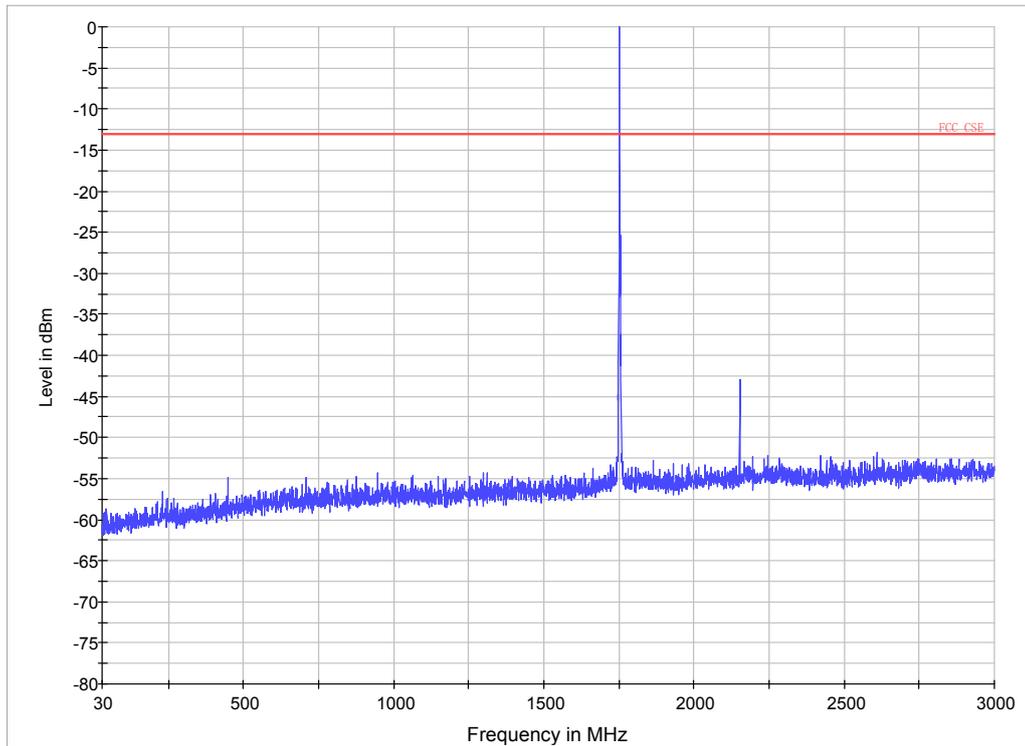
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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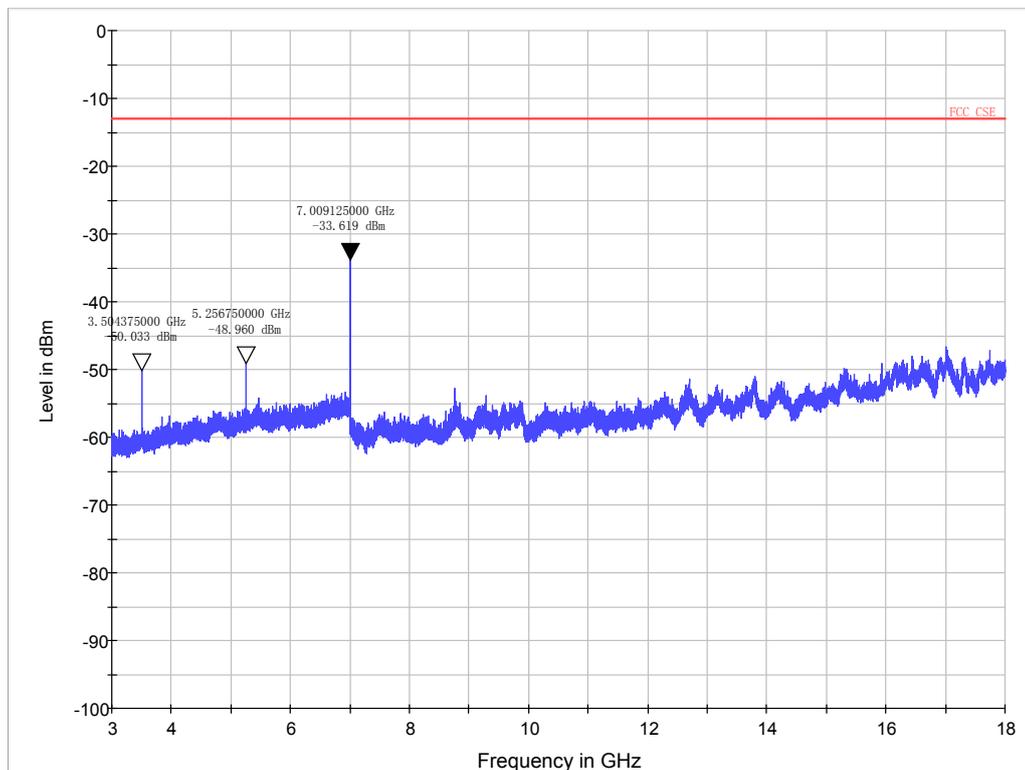
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LTE Band 4 QPSK Bandwidth = 3MHz CH20385, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 4 20385 Channel 30MHz~3GHz



LTE Band 4 20385 Channel 3GHz~18GHz

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Harmonic	TX ch. 20385 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3507	-50.03	-13	37.03
3	5260.5	-48.96	-13	35.96
4	7014	-33.62	-13	20.62
5	8767.5	Nf	-13	/
6	10521	Nf	-13	/
7	12274.5	Nf	-13	/
8	14028	Nf	-13	/
9	15781.5	Nf	-13	/
10	17535	Nf	-13	/

Nf: noise floor

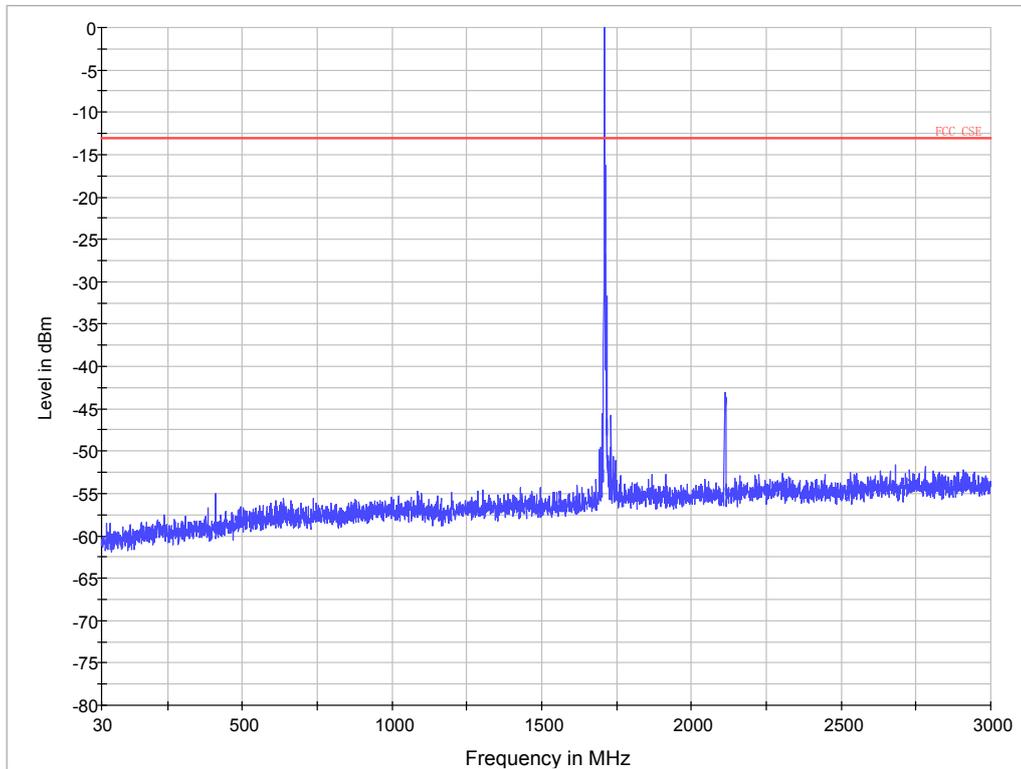
Note: The other Spurious RF conducted emissions level is no more than noise floor.

TA Technology (Shanghai) Co., Ltd. Test Report

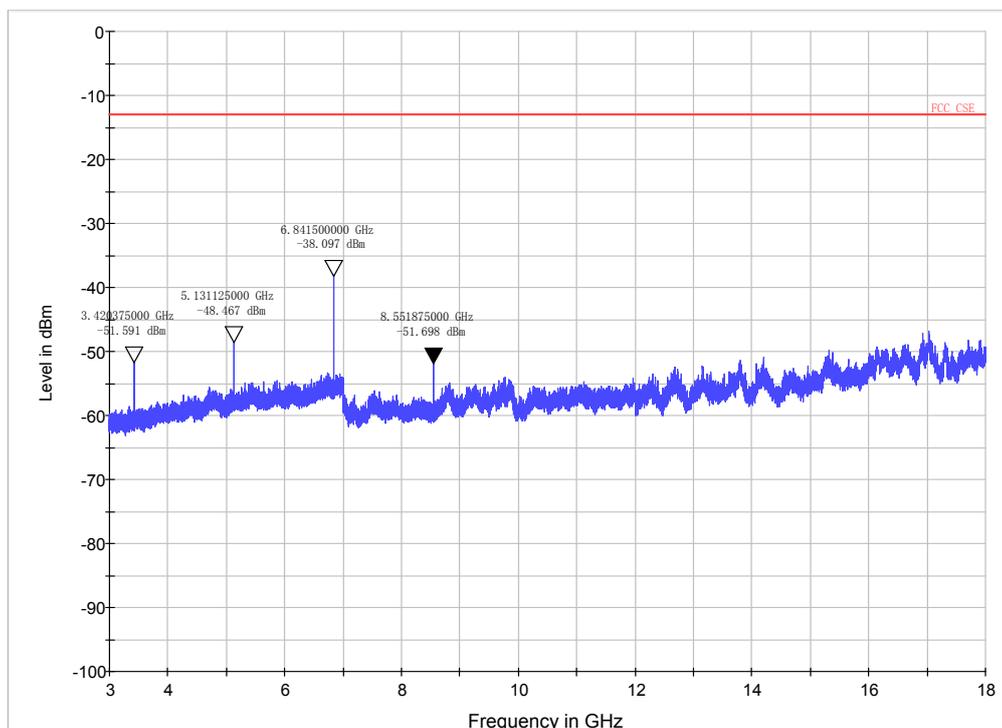
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LTE Band 4 QPSK Bandwidth = 5MHz CH19975, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 4 19975 Channel 30MHz~3GHz



LTE Band 4 19975 Channel 3GHz~18GHz

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Harmonic	TX ch. 19975 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3425	-51.59	-13	38.59
3	5137.5	-48.47	-13	35.47
4	6850	-38.10	-13	25.10
5	8562.5	-51.70	-13	38.70
6	10275	Nf	-13	/
7	11987.5	Nf	-13	/
8	13700	Nf	-13	/
9	15412.5	Nf	-13	/
10	17125	Nf	-13	/

Nf: noise floor

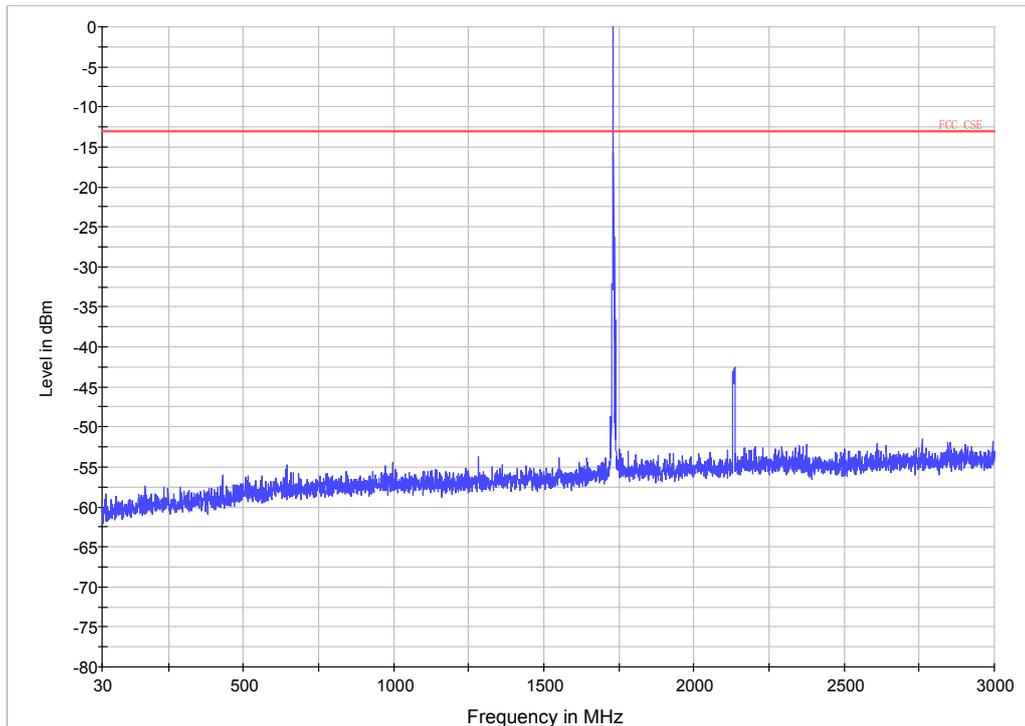
Note: The other Spurious RF conducted emissions level is no more than noise floor.

TA Technology (Shanghai) Co., Ltd. Test Report

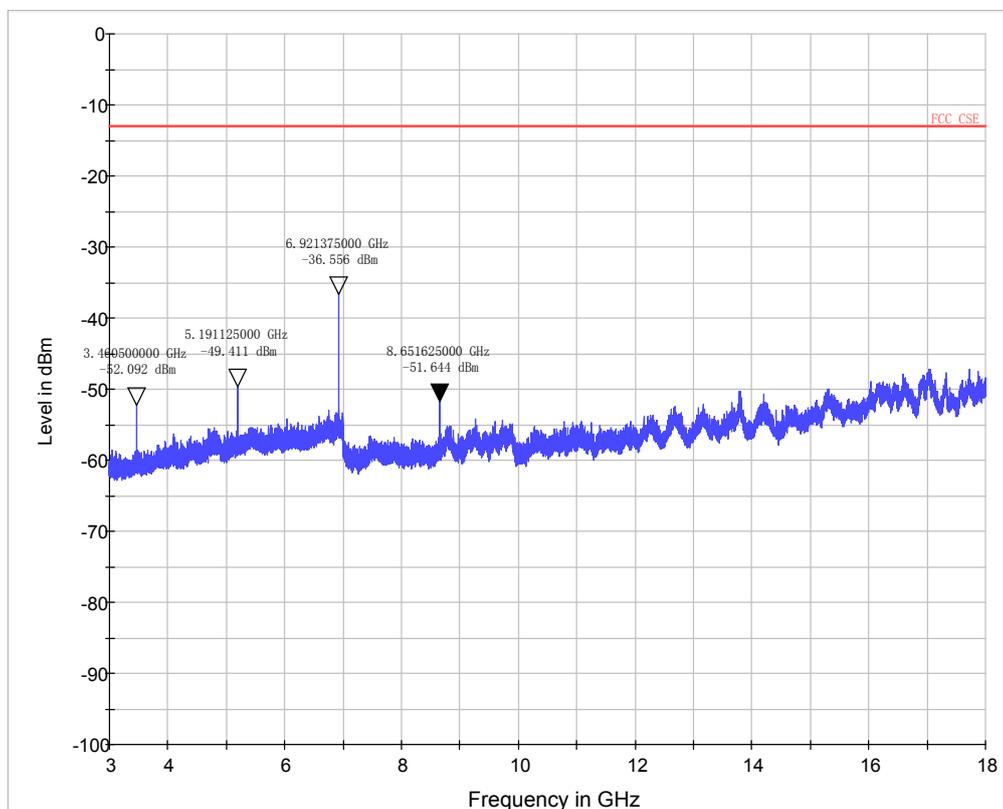
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LTE Band 4 QPSK Bandwidth = 5MHz CH20175, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 4 20175 Channel 30MHz~3GHz



LTE Band 4 20175 Channel 3GHz~18GHz

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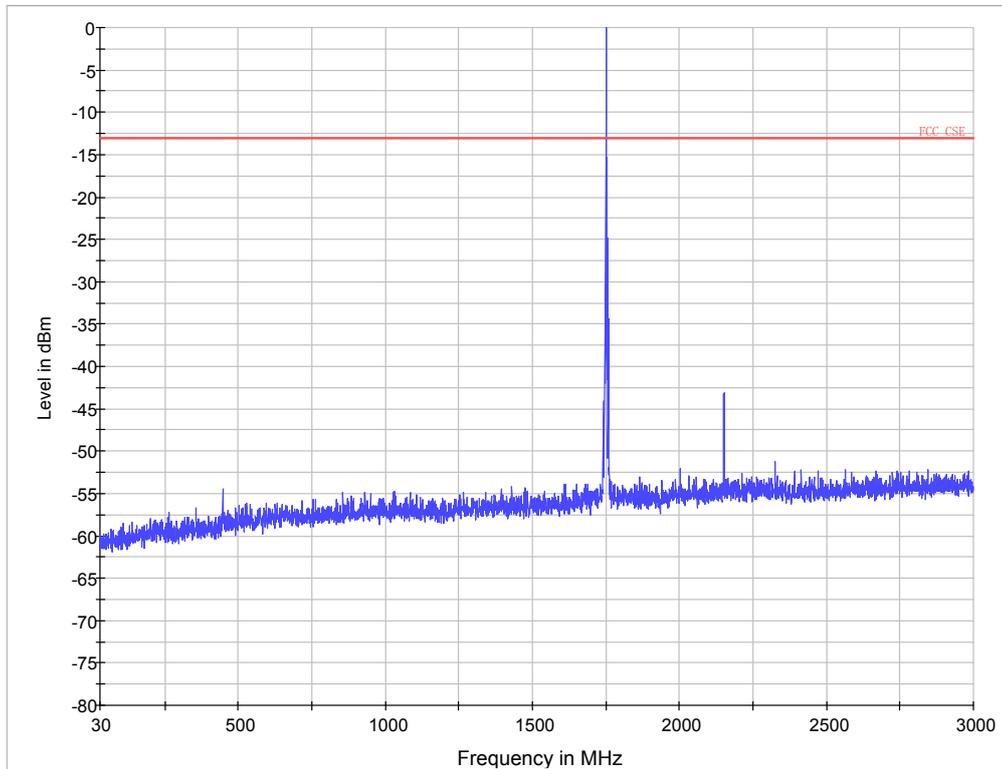
Harmonic	TX ch. 20175 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3465	-52.09	-13	39.09
3	5197.5	-49.41	-13	36.41
4	6930	-36.56	-13	23.56
5	8662.5	-51.64	-13	38.64
6	10395	Nf	-13	/
7	12127.5	Nf	-13	/
8	13860	Nf	-13	/
9	15592.5	Nf	-13	/
10	17325	Nf	-13	/

Nf: noise floor

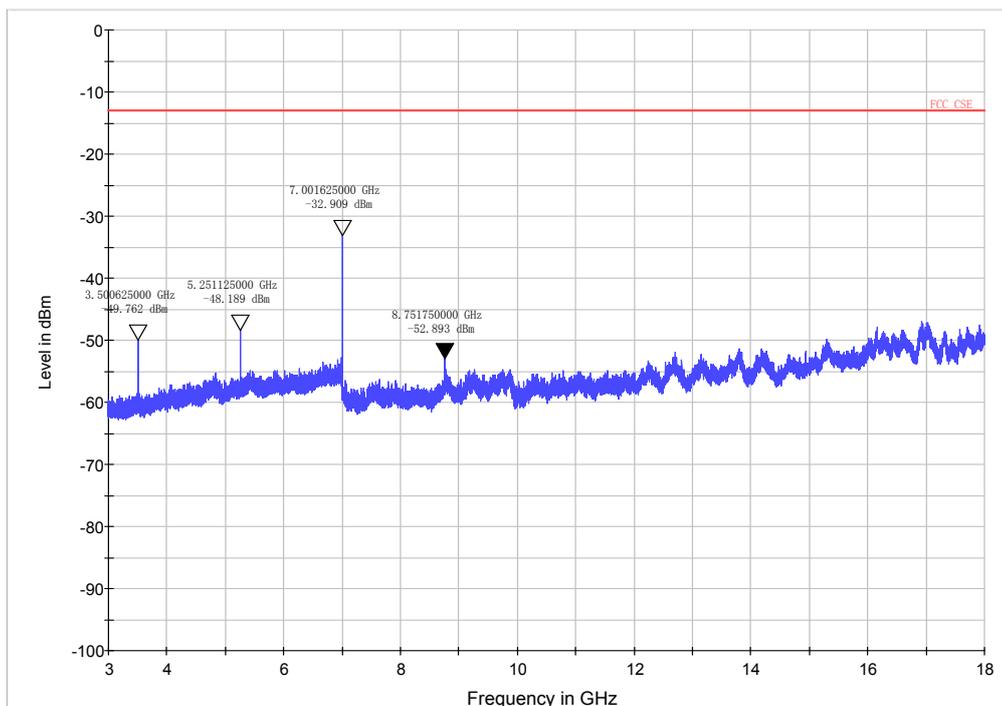
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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



Note: The signal beyond the limit is carrier.
LTE Band 4 20375 Channel 30MHz~3GHz



LTE Band 4 20375 Channel 3GHz~18GHz

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Harmonic	TX ch. 20375 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3505	-49.76	-13	36.76
3	5257.5	-48.19	-13	35.19
4	7010	-32.91	-13	19.91
5	8762.5	-52.89	-13	39.89
6	10515	Nf	-13	/
7	12267.5	Nf	-13	/
8	14020	Nf	-13	/
9	15772.5	Nf	-13	/
10	17525	Nf	-13	/

Nf: noise floor

Note: The other Spurious RF conducted emissions level is no more than noise floor.

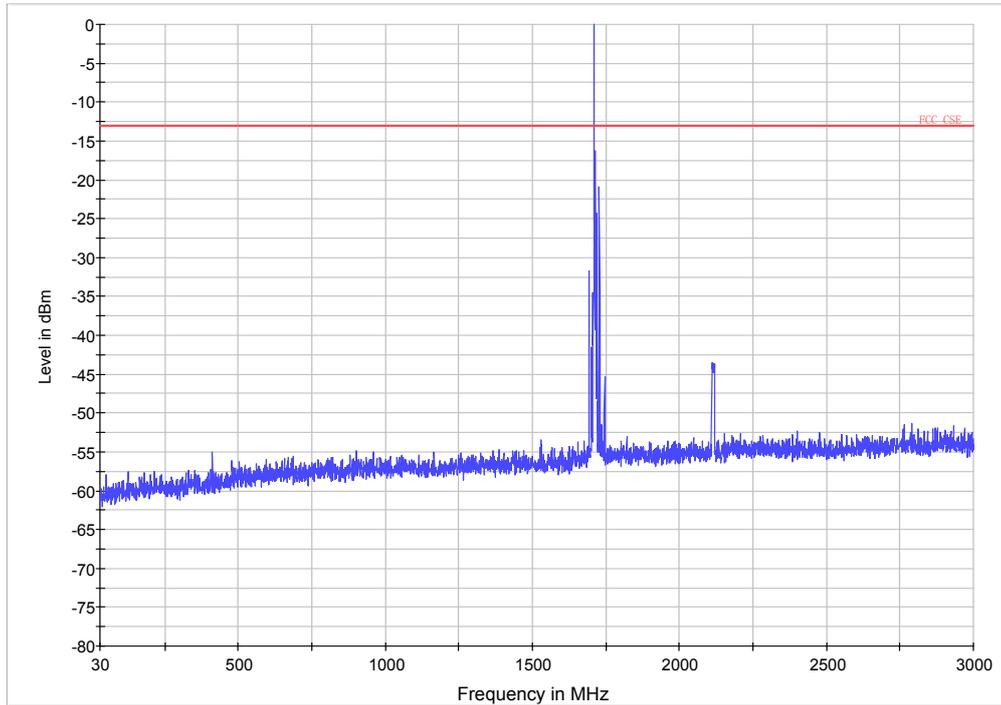
TA Technology (Shanghai) Co., Ltd. Test Report

Report No.: RHA1209-0083RF03R1

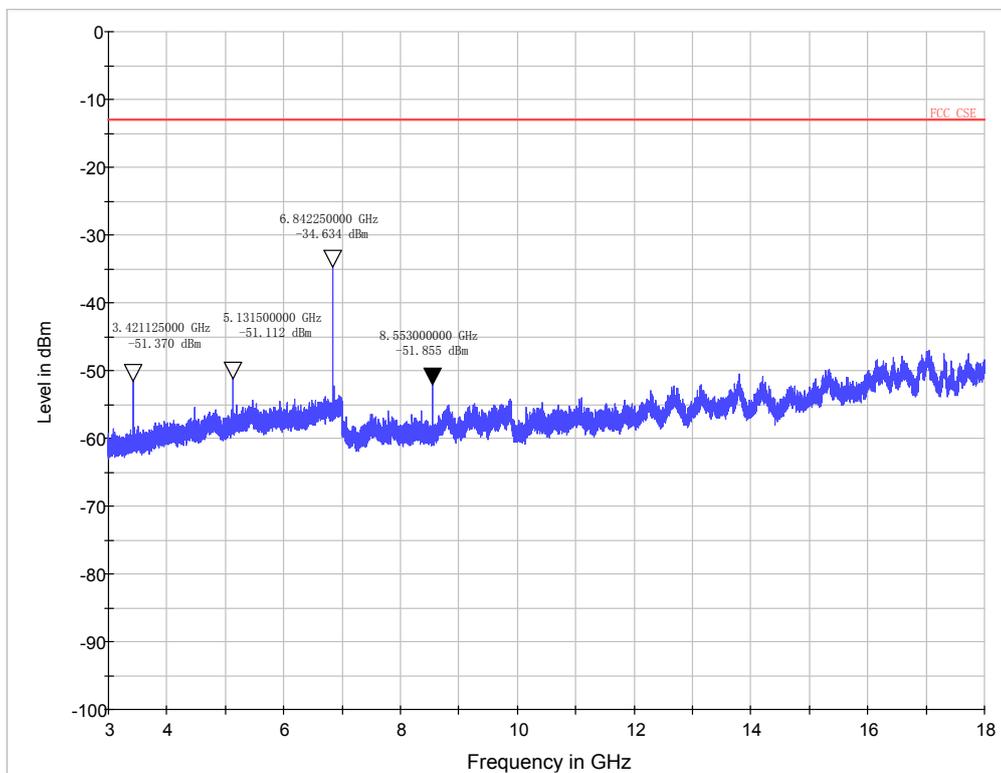
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LTE Band 4 QPSK Bandwidth = 10MHz CH20000, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 4 20000 Channel 30MHz~3GHz



LTE Band 4 20000 Channel 3GHz~18GHz

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Harmonic	TX ch. 20000 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3430	-51.37	-13	38.37
3	5145	-51.11	-13	38.11
4	6860	-34.63	-13	21.63
5	8575	-51.86	-13	38.86
6	10290	Nf	-13	/
7	12005	Nf	-13	/
8	13720	Nf	-13	/
9	15435	Nf	-13	/
10	17150	Nf	-13	/

Nf: noise floor

Note: The other Spurious RF conducted emissions level is no more than noise floor.

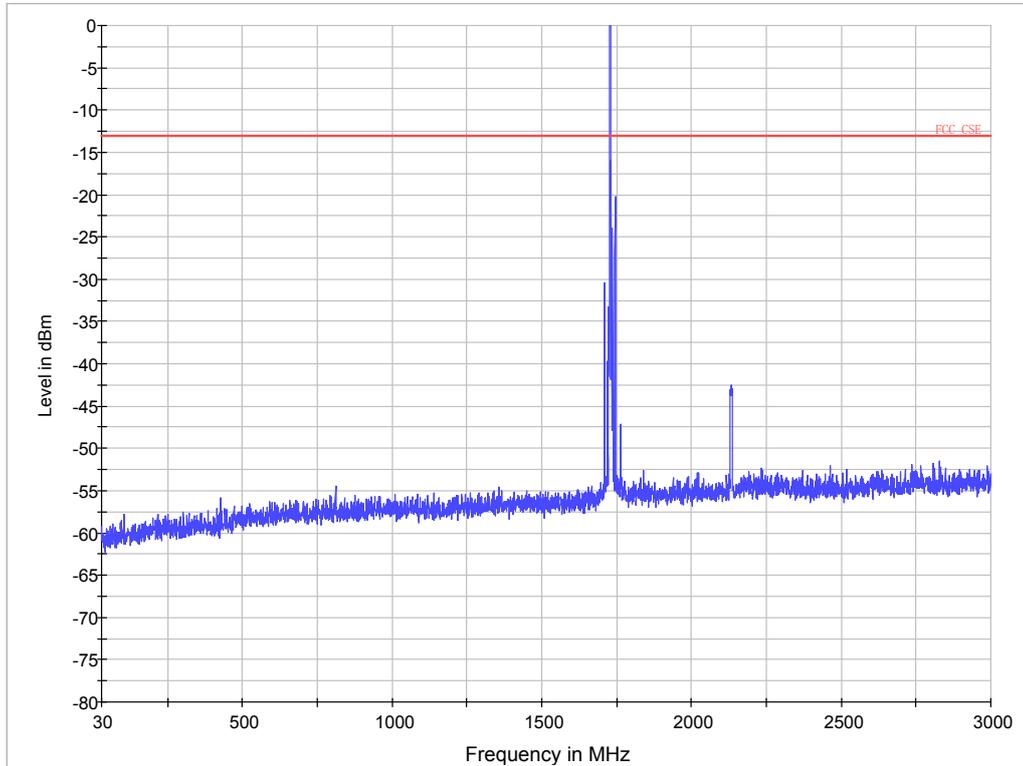
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Report No.: RHA1209-0083RF03R1

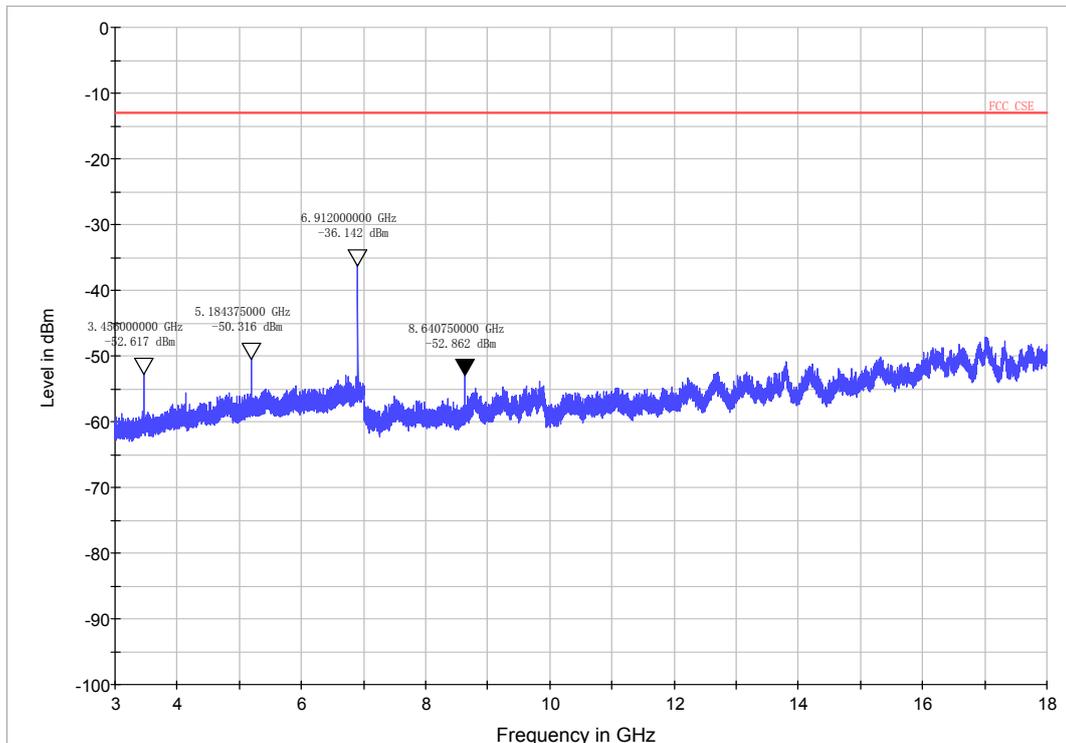
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LTE Band 4 QPSK Bandwidth = 10MHz CH20175, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 4 20175 Channel 30MHz~3GHz



LTE Band 4 20175 Channel 3GHz~18GHz

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Harmonic	TX ch. 20175 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3465	-52.62	-13	39.62
3	5197.5	-50.32	-13	37.32
4	6930	-36.14	-13	23.14
5	8662.5	-52.86	-13	39.86
6	10395	Nf	-13	/
7	12127.5	Nf	-13	/
8	13860	Nf	-13	/
9	15592.5	Nf	-13	/
10	17325	Nf	-13	/

Nf: noise floor

Note: The other Spurious RF conducted emissions level is no more than noise floor.

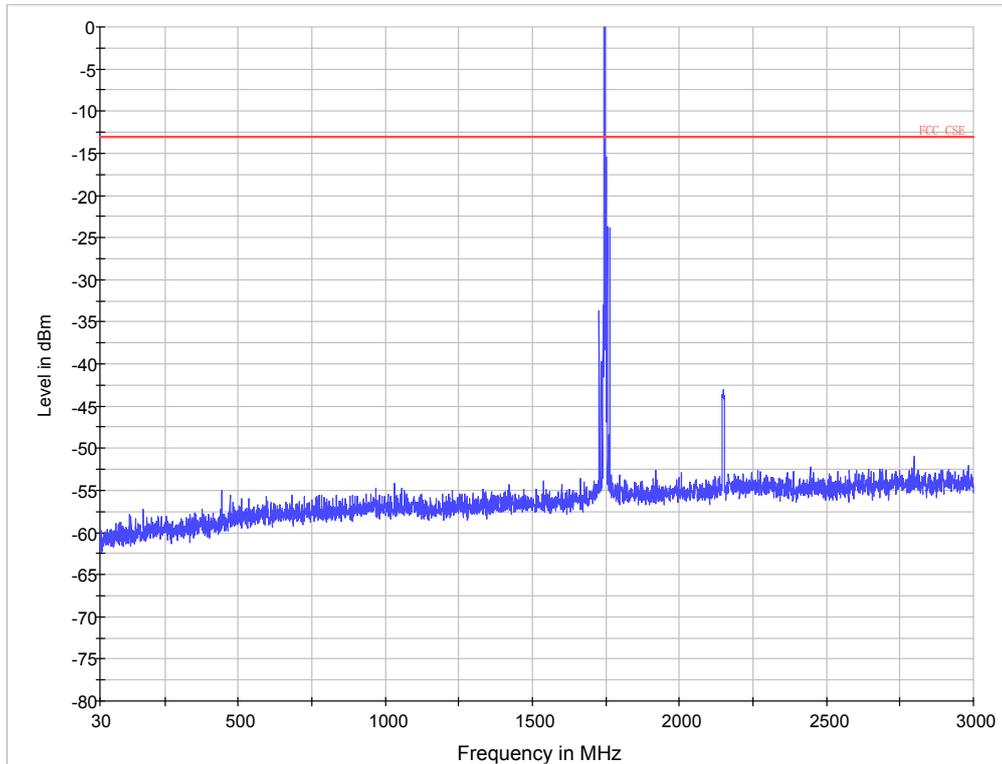
TA Technology (Shanghai) Co., Ltd. Test Report

Report No.: RHA1209-0083RF03R1

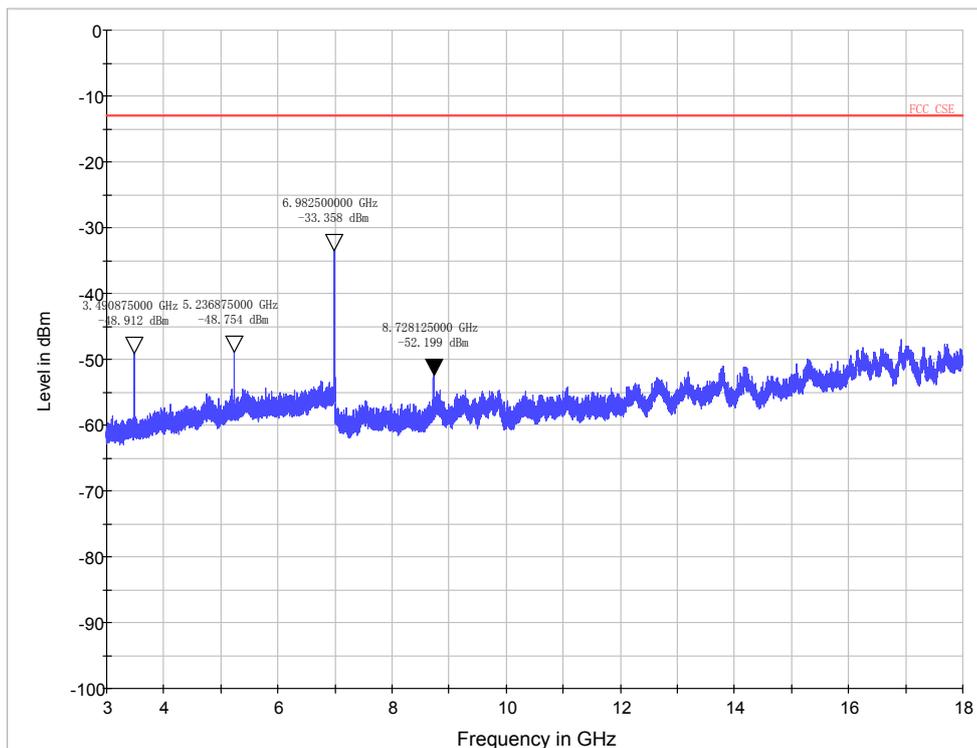
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LTE Band 4 QPSK Bandwidth = 10MHz CH20350, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 4 20350 Channel 30MHz~3GHz



LTE Band 4 20350 Channel 3GHz~18GHz

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Harmonic	TX ch. 20350 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3500	-48.91	-13	35.91
3	5250	-48.75	-13	35.75
4	7000	-33.36	-13	20.36
5	8750	-52.20	-13	39.20
6	10500	Nf	-13	/
7	12250	Nf	-13	/
8	14000	Nf	-13	/
9	15750	Nf	-13	/
10	17500	Nf	-13	/

Nf: noise floor

Note: The other Spurious RF conducted emissions level is no more than noise floor.

2.1. Radiates Spurious Emission

Ambient condition

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

Method of Measurement

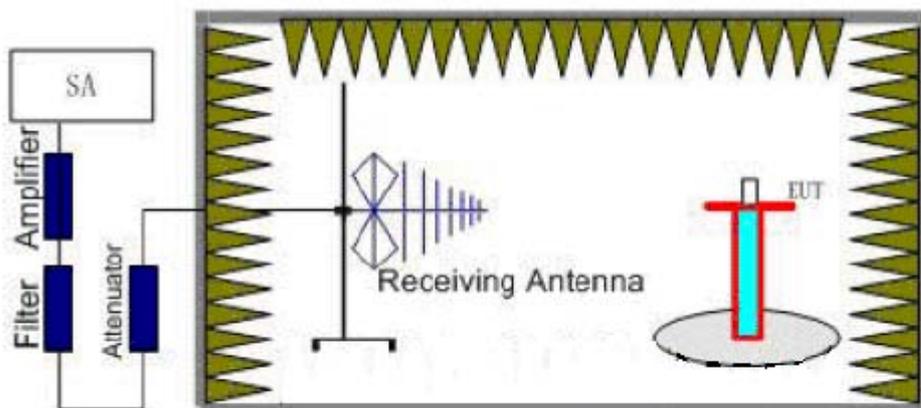
The measurements procedures in TIA -603C are used.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment.

The procedure of Radiates Spurious Emission is as follows:

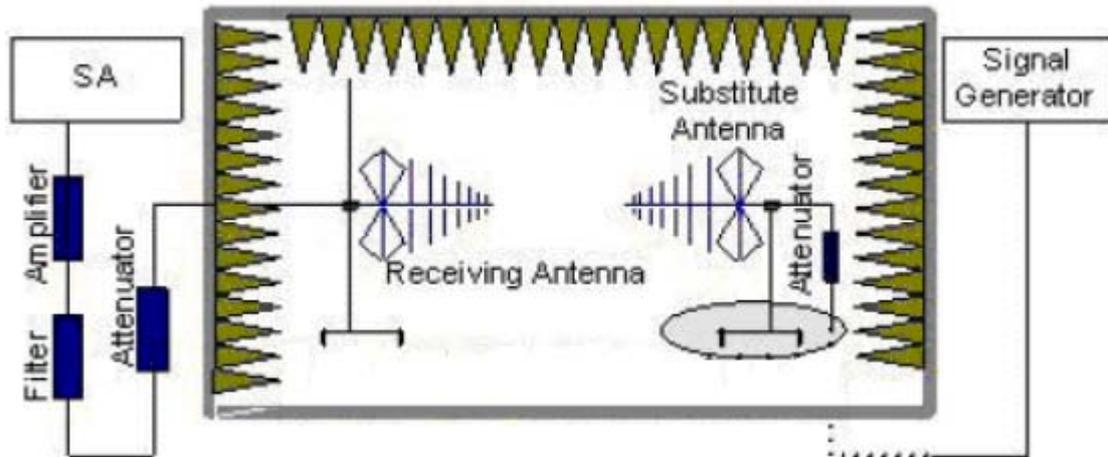
Step 1:

The measurement is carried out in the semi-anechoic chamber. EUT was placed on a 0.8 meters high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used while RBW and VBW are both set to 3MHz. During the measurement, the highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna moved up and down over a range from 1 to 4 meters in both horizontally and vertically polarized orientations. The test setup refers to figure below.



Step 2:

A dipole antenna shall be substituted in place of the EUT. The antenna will be driven by a signal generator with a adjustable S.G. applied through a Tx cable. Adjust the level of the signal generator output until the value of the receiver reach the previously recorded analyzer power level (LVL). Then The E.R.P. /E.I.R.P. of the EUT can be calculated through the level of the signal generator, Tx cable loss and the gain of the substitution antenna. The test setup refers to figure below.



$$\text{E.R.P (peak power)} = \text{S.G.} - \text{Tx Cable loss} + \text{Substitution antenna gain} - 2.15.$$

$$\text{EIRP} = \text{E.R.P} + 2.15$$

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the antenna is vertical.

We tested all modes for CDMA AWS and LTE Band 4. The worst emission was recorded in the report.

Limits

Rule Part 27.53(h) specifies that “the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.”

Limit	-13 dBm
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = \pm 1.96$, $U = \pm 3.55$ dB.

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Test Result

CDMA AWS CH25

Harmonic	TX ch.25 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3421.875	-48.9895	4.5	9.65	-45.9895	-13	32.9895	180
3	5133	-45.95862	4.63	10.8	-41.93862	-13	28.93862	135
4	6845.625	-48.39019	5.3	12.8	-43.040186	-13	30.04019	225
5	8556	-32.19361	6.2	13.5	-27.04361	-13	14.04361	180
6	10266.375	-50.41075	6.48	13.9	-45.14075	-13	32.14075	180
7	11978.75	/	/	/	Nf	-13	/	/
8	13690	/	/	/	Nf	-13	/	/
9	15401.25	/	/	/	Nf	-13	/	/
10	17112.5	/	/	/	Nf	-13	/	/

Nf: noise floor

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

CDMA AWS CH450

Harmonic	TX ch.450 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3464.625	-52.13564	4.6	11.05	-47.83564	-13	34.83564	180
3	5197.875	-50.21742	5.7	13.55	-44.51742	-13	31.51742	135
4	6930.75	-49.8837	5.6	13.35	-44.283702	-13	31.2837	225
5	8663.625	-32.12719	6.87	14.75	-26.39719	-13	13.39719	180
6	10393.875	-52.21334	7.48	15.95	-45.89334	-13	32.89334	180
7	12127.5	/	/	/	Nf	-13	/	/
8	13860	/	/	/	Nf	-13	/	/
9	15592.5	/	/	/	Nf	-13	/	/
10	17325	/	/	/	Nf	-13	/	/

Nf: noise floor

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

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CDMA AWS CH875

Harmonic	TX ch.875 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3507.375	-53.14622	4.6	11.05	-48.846217	-13	35.84622	180
3	5261.625	-53.18604	4.9	12.65	-47.586043	-13	34.58604	45
4	7014.75	-50.53201	5.8	13.85	-44.632014	-13	31.63201	180
5	8767.5	-30.62952	6.9	14.25	-25.429518	-13	12.42952	180
6	10522.875	-54.15188	7.54	15.95	-47.891876	-13	34.89188	225
7	12276.25	/	/	/	Nf	-13	/	/
8	14030	/	/	/	Nf	-13	/	/
9	15783.75	/	/	/	Nf	-13	/	/
10	17537.5	/	/	/	Nf	-13	/	/

Nf: noise floor

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

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

Harmonic	TX ch. 19957 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3421.4	-53.46667	4.5	9.65	-50.47	-13	37.46667	45
3	5132.1	/	/	/	Nf	-13	/	/
4	6842.8	/	/	/	Nf	-13	/	/
5	8553.5	/	/	/	Nf	-13	/	/
6	10264.2	/	/	/	Nf	-13	/	/
7	11974.9	/	/	/	Nf	-13	/	/
8	13685.6	/	/	/	Nf	-13	/	/
9	15396.3	/	/	/	Nf	-13	/	/
10	17107	/	/	/	Nf	-13	/	/

Nf: noise floor

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

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LTE Band 4 QPSK Bandwidth = 1.4MHz CH20175, RB 1

Harmonic	TX ch. 20175 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465	-55.44275	4.6	11.05	-51.14	-13	38.1427	90
3	5197.5	/	/	/	Nf	-13	/	/
4	6930	/	/	/	Nf	-13	/	/
5	8662.5	/	/	/	Nf	-13	/	/
6	10395	/	/	/	Nf	-13	/	/
7	12127.5	/	/	/	Nf	-13	/	/
8	13860	/	/	/	Nf	-13	/	/
9	15592.5	/	/	/	Nf	-13	/	/
10	17325	/	/	/	Nf	-13	/	/

Nf: noise floor

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

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

Harmonic	TX ch. 20393 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3508.6	-57.909	4.6	11.05	-53.61	-13	40.609	180
3	5262.9	/	/	/	Nf	-13	/	/
4	7017.2	/	/	/	Nf	-13	/	/
5	8771.5	/	/	/	Nf	-13	/	/
6	10525.8	/	/	/	Nf	-13	/	/
7	12280.1	/	/	/	Nf	-13	/	/
8	14034.4	/	/	/	Nf	-13	/	/
9	15788.7	/	/	/	Nf	-13	/	/
10	17543	/	/	/	Nf	-13	/	/

Nf: noise floor

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

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

Harmonic	TX ch. 19965 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3423	-53.92152	4.4	10.57	-49.90	-13	36.9015	315
3	5134.5	/	/	/	Nf	-13	/	/
4	6846	/	/	/	Nf	-13	/	/
5	8557.5	/	/	/	Nf	-13	/	/
6	10269	/	/	/	Nf	-13	/	/
7	11980.5	/	/	/	Nf	-13	/	/
8	13692	/	/	/	Nf	-13	/	/
9	15403.5	/	/	/	Nf	-13	/	/
10	17115	/	/	/	Nf	-13	/	/

Nf: noise floor

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

LTE Band 4 QPSK Bandwidth = 3MHz CH20175, RB 1

Harmonic	TX ch. 20175 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465	-55.21869	4.6	11	-50.97	-13	37.9687	315
3	5197.5	/	/	/	Nf	-13	/	/
4	6930	/	/	/	Nf	-13	/	/
5	8662.5	/	/	/	Nf	-13	/	/
6	10395	/	/	/	Nf	-13	/	/
7	12127.5	/	/	/	Nf	-13	/	/
8	13860	/	/	/	Nf	-13	/	/
9	15592.5	/	/	/	Nf	-13	/	/
10	17325	/	/	/	Nf	-13	/	/

Nf: noise floor

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

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

Harmonic	TX ch. 20385 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3507	-55.80545	4.6	11.05	-51.51	-13	38.5055	180
3	5260.5	/	/	/	Nf	-13	/	/
4	7014	/	/	/	Nf	-13	/	/
5	8767.5	/	/	/	Nf	-13	/	/
6	10521	/	/	/	Nf	-13	/	/
7	12274.5	/	/	/	Nf	-13	/	/
8	14028	/	/	/	Nf	-13	/	/
9	15781.5	/	/	/	Nf	-13	/	/
10	17535	/	/	/	Nf	-13	/	/

Nf: noise floor

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

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

Harmonic	TX ch. 19975 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3425	-53.39056	4.6	10.57	-49.57	-13	36.5706	315
3	5137.5	/	/	/	Nf	-13	/	/
4	6850	/	/	/	Nf	-13	/	/
5	8562.5	/	/	/	Nf	-13	/	/
6	10275	/	/	/	Nf	-13	/	/
7	11987.5	/	/	/	Nf	-13	/	/
8	13700	/	/	/	Nf	-13	/	/
9	15412.5	/	/	/	Nf	-13	/	/
10	17125	/	/	/	Nf	-13	/	/

Nf: noise floor

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

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LTE Band 4 QPSK Bandwidth = 5MHz CH20175, RB 1

Harmonic	TX ch. 20175 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465	-56.144	4.6	11.05	-51.84	-13	38.844	180
3	5197.5	/	/	/	Nf	-13	/	/
4	6930	/	/	/	Nf	-13	/	/
5	8662.5	/	/	/	Nf	-13	/	/
6	10395	/	/	/	Nf	-13	/	/
7	12127.5	/	/	/	Nf	-13	/	/
8	13860	/	/	/	Nf	-13	/	/
9	15592.5	/	/	/	Nf	-13	/	/
10	17325	/	/	/	Nf	-13	/	/

Nf: noise floor

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

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

Harmonic	TX ch. 20375 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3505	-55.13548	4.6	11.05	-50.84	-13	37.8355	180
3	5257.5	-56.51724	4.9	12.65	-50.92	-13	37.9172	45
4	7010	/	/	/	Nf	-13	/	/
5	8762.5	/	/	/	Nf	-13	/	/
6	10515	/	/	/	Nf	-13	/	/
7	12267.5	/	/	/	Nf	-13	/	/
8	14020	/	/	/	Nf	-13	/	/
9	15772.5	/	/	/	Nf	-13	/	/
10	17525	/	/	/	Nf	-13	/	/

Nf: noise floor

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

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

Harmonic	TX ch. 20000 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3430	-54.66194	4.6	10.76	-50.65	-13	37.6519	45
3	5145	/	/	/	Nf	-13	/	/
4	6860	/	/	/	Nf	-13	/	/
5	8575	/	/	/	Nf	-13	/	/
6	10290	/	/	/	Nf	-13	/	/
7	12005	/	/	/	Nf	-13	/	/
8	13720	/	/	/	Nf	-13	/	/
9	15435	/	/	/	Nf	-13	/	/
10	17150	/	/	/	Nf	-13	/	/

Nf: noise floor

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

LTE Band 4 QPSK Bandwidth = 10MHz CH20175, RB 1

Harmonic	TX ch. 20175 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465	-54.62094	4.6	11.05	-50.32	-13	37.3209	45
3	5197.5	/	/	/	Nf	-13	/	/
4	6930	/	/	/	Nf	-13	/	/
5	8662.5	/	/	/	Nf	-13	/	/
6	10395	/	/	/	Nf	-13	/	/
7	12127.5	/	/	/	Nf	-13	/	/
8	13860	/	/	/	Nf	-13	/	/
9	15592.5	/	/	/	Nf	-13	/	/
10	17325	/	/	/	Nf	-13	/	/

Nf: noise floor

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

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

Harmonic	TX ch. 20350 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3500	-54.934	4.6	11.05	-50.63	-13	37.634	90
3	5250	/	/	/	Nf	-13	/	/
4	7000	/	/	/	Nf	-13	/	/
5	8750	/	/	/	Nf	-13	/	/
6	10500	/	/	/	Nf	-13	/	/
7	12250	/	/	/	Nf	-13	/	/
8	14000	/	/	/	Nf	-13	/	/
9	15750	/	/	/	Nf	-13	/	/
10	17500	/	/	/	Nf	-13	/	/

Nf: noise floor

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

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3. Main Test Instruments

No.	Name	Type	Manufacturer	Serial Number	Calibration Date	Valid Period
01	Base Station Simulator	CMU200	R&S	118133	2012-06-30	One year
02	Power Splitter	SHX-GF2-2-13	Hua Xiang	10120101	NA	NA
03	Spectrum Analyzer	E4445A	Agilent	MY46181146	2012-06-30	One year
04	Universal Radio Communication Tester	E5515C	Agilent	MY48367192	2012-06-30	One year
05	Signal Analyzer	FSV30	R&S	100815	2012-06-30	One year
06	Signal generator	SMB 100A	R&S	102594	2012-06-30	One year
07	EMI Test Receiver	ESCI	R&S	100948	2012-06-30	One year
08	Trilog Antenna	VUBL 9163	SCHWARZB ECK	9163-201	2010-06-20	Three years
09	Horn Antenna	HF907	R&S	100126	2012-07-01	Three years
10	Climatic Chamber	PT-30B	Re Ce	20101891	2010-09-10	Three years
11	Semi-Anechoic Chamber	9.6*6.7*6.6m	ETS-Lindgren	NA	NA	NA
12	EMI test software	ES-K1	R&S	NA	NA	NA

*****END OF REPORT *****