



Part 24

TEST REPORT

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

TA Technology (Shanghai) Co., Ltd.

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

Report No.: RHA1209-0083RF02R1

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GENERAL SUMMARY

Product Name	CDMA/LTE smartphone	Model Name	M931
FCC ID	QISM931		
Report No.	RHA1209-0083RF02R1		
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 24E (2010-12) Personal 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 初伟中
Director

Revised by 徐凯
RF Manager

Performed by 王号
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
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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:	CDMA/LTE smartphone																	
IMEI:	99000135008304																	
Hardware Version:	Ver.D																	
Software Version:	M931V100R001C177B107																	
Antenna Type:	Internal Antenna																	
Device Operating Configurations:																		
Operating Mode(s):	CDMA PCS; (tested); LTE Band 2; (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; (LT E Band 2)QPSK, 16QAM																	
Maximum E.I.R.P.	CDMA PCS: 22.98 dBm LTE Band 2: 24.54 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)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">25 – 600 – 1175</td> <td style="width: 30%;">(CDMA PCS)</td> <td style="width: 40%;">(tested)</td> </tr> <tr> <td>18607-18900-19193</td> <td>(LTE Band 2, 1.4M)</td> <td>(tested)</td> </tr> <tr> <td>18615-18900-19185</td> <td>(LTE Band 2, 3M)</td> <td>(tested)</td> </tr> <tr> <td>18625-18900-19175</td> <td>(LTE Band 2, 5M)</td> <td>(tested)</td> </tr> <tr> <td>18650-18900-19150</td> <td>(LTE Band 2, 10M)</td> <td>(tested)</td> </tr> </table>			25 – 600 – 1175	(CDMA PCS)	(tested)	18607-18900-19193	(LTE Band 2, 1.4M)	(tested)	18615-18900-19185	(LTE Band 2, 3M)	(tested)	18625-18900-19175	(LTE Band 2, 5M)	(tested)	18650-18900-19150	(LTE Band 2, 10M)	(tested)
25 – 600 – 1175	(CDMA PCS)	(tested)																
18607-18900-19193	(LTE Band 2, 1.4M)	(tested)																
18615-18900-19185	(LTE Band 2, 3M)	(tested)																
18625-18900-19175	(LTE Band 2, 5M)	(tested)																
18650-18900-19150	(LTE Band 2, 10M)	(tested)																
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)															
	CDMA PCS	1851.25 ~ 1908.75	1931.25 ~ 1988.75															

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	LTE Band 2(1.4MHz)	1850.7 ~1909.3	1930.7~1989.3
	LTE Band 2(3MHz)	1851.5~1908.5	1931.5~1988.5
	LTE Band 2(5MHz)	1852.5~1907.5	1932.5~1987.5
	LTE Band 2(10 MHz)	1855.0~1905.0	1935.0~1985.0

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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 is tested CDMA PCS and LTE Band 2 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	24.232	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	24.238	PASS
5	Frequency Stability	2.1055 / 24.235	PASS
6	Spurious Emissions at Antenna Terminals	2.1051 / 24.238	PASS
7	Radiates Spurious Emission	2.1053 / 24.238	PASS

2.2. RF Power Output

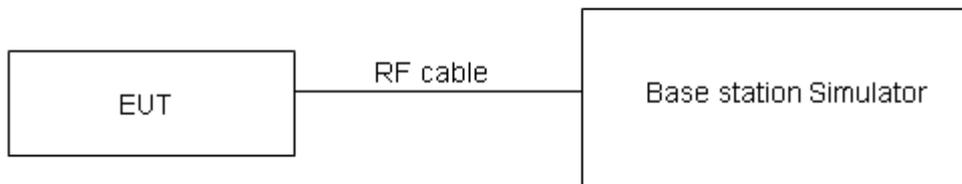
Ambient condition

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 PCS		Average Conducted Power(dBm)		
		Channel 25	Channel 600	Channel 1175
		1851.25 (MHz)	1880 (MHz)	1908.75 (MHz)
RC3	SO55(Loopback)	23.81	23.82	23.88
	SO2(Loopback)	23.85	23.84	23.89
RC1	SO55(Loopback)	23.84	23.82	23.84
	SO2(Loopback)	23.85	23.84	23.87
RC3	SO32(+FCH-SCH)	23.82	23.81	23.87
	SO32(+SCH)	23.81	23.82	23.89
EV-DO (Rev.0)		23.84	23.76	23.85
EV-DO (Rev.A)		23.83	23.74	23.83
1X Advance	SO75(Loopback)	23.51	23.78	23.64
	SO73(Voice)	23.43	23.79	23.56

LTE Band 2				Average Conducted Power (dBm)		
Bandwidth	Modulation	RB	RB Start	Channel 18607	Channel 18900	Channel 19193
1.4MHz	QPSK	1	0	23.83	23.77	23.64
		1	5	23.61	23.61	23.67
		3	2	23.66	23.66	23.54
		6	0	22.59	22.63	22.68
	16QAM	1	0	22.55	22.83	22.62
		1	5	22.73	22.71	22.82
		3	2	22.59	22.68	22.46
		6	0	21.77	21.71	21.51
Bandwidth	Modulation	RB	RB Start	Channel 18615	Channel 18900	Channel 19185
3MHz	QPSK	1	0	23.65	23.73	23.53
		1	14	23.93	23.62	23.36
		8	4	22.75	22.62	22.55
		15	0	22.77	22.61	22.58
	16QAM	1	0	22.61	22.63	22.66
		1	14	22.98	22.59	22.57
		8	4	21.66	21.69	21.57

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Bandwidth	Modulation	RB	RB Start	Channel 18625	Channel 18900	Channel 19175
5MHz	QPSK	15	0	21.78	21.66	21.55
		1	0	23.53	23.67	23.79
		1	24	23.79	23.77	23.54
		12	6	22.88	22.51	22.64
	16QAM	25	0	22.77	22.44	22.52
		1	0	22.62	22.58	22.68
		1	24	22.71	22.76	22.48
		12	6	21.81	21.62	21.55
10MHz	QPSK	25	0	21.75	21.56	21.57
		1	0	23.72	23.84	23.79
		1	49	23.74	23.74	23.61
		25	13	22.76	22.58	22.87
	16QAM	50	0	22.74	22.53	22.67
		1	0	22.73	22.84	22.97
		1	49	22.71	22.79	22.74
		25	13	21.98	21.47	21.96
		50	0	21.64	21.49	21.69

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

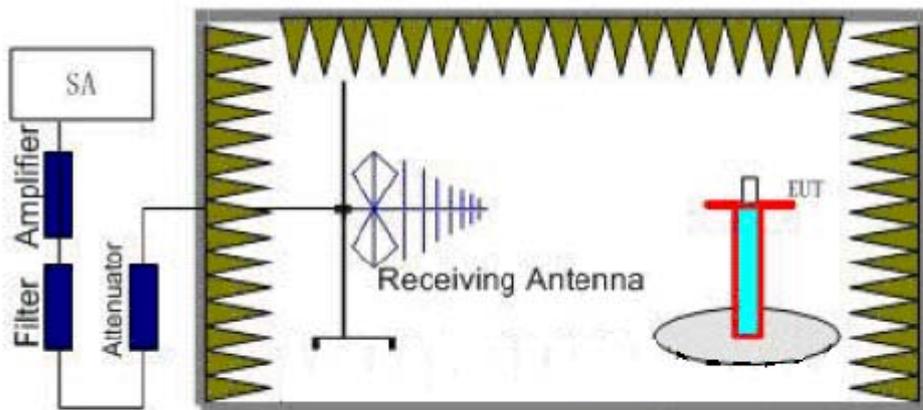
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

The measurement procedures in TIA- 603C are used.

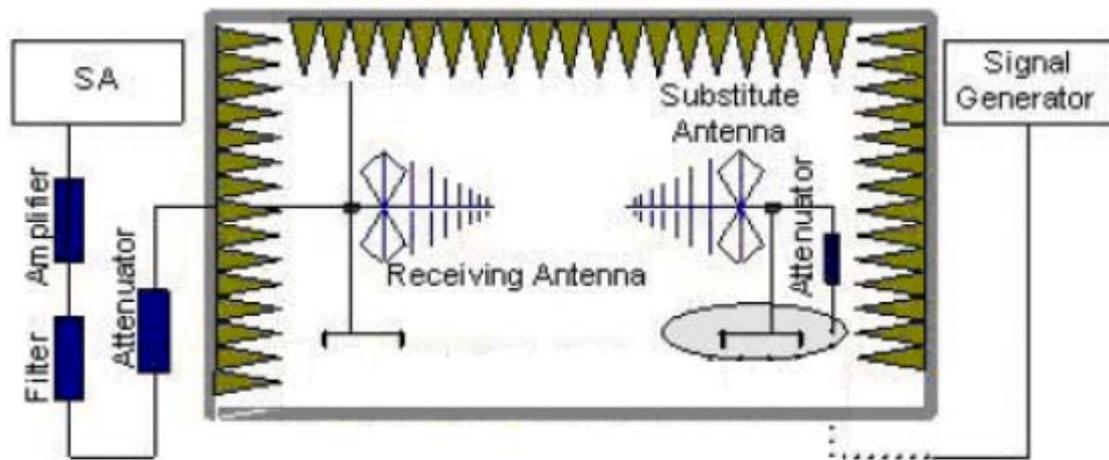
Step 1:

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 a 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.



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

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

Limits

Rule Part 24.232(b) specifies that "Mobile/portable stations are limited to 2 watts EIRP. Peak power" and Rule Part 24.232(c) 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)	$\leq 2 \text{ W (33 dBm)}$
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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 PCS	Channel	Polarization	LVL (dBm)	SG+30 (dBm)	Gain (dBi)	Cable Loss (dBm)	E.I.R.P. (dBm)
RC3 SO55(Loopback)	25	Vertical	-27.15	37.84	1.92	18.18	21.58
	600	Vertical	-26.37	36.87	1.94	18.27	20.54
	1175	Vertical	-24.56	37.19	1.9	18.30	20.79
RC3 SO32(+FCH-SCH)	25	Vertical	-26.98	37.83	1.92	18.18	21.57
	600	Vertical	-26.02	36.26	1.94	18.27	19.93
	1175	Vertical	-24.19	36.84	1.9	18.30	20.44
EVDO (Rev.0)	25	Vertical	-27.23	37.87	1.92	18.18	21.61
	600	Vertical	-26.17	36.7	1.94	18.27	20.37
	1175	Vertical	-24.68	36.51	1.9	18.30	20.11
EVDO (Rev.A)	25	Vertical	-26.77	38.04	1.92	18.18	21.78
	600	Vertical	-26.81	37.01	1.94	18.27	20.68
	1175	Vertical	-24.32	36.84	1.9	18.30	20.44
1X Advance (SO75)	25	Vertical	-25.57	39.78	1.92	18.18	22.98
	600	Vertical	-25.77	39.57	1.94	18.27	22.79
	1175	Vertical	-24.66	38.57	1.9	18.30	22.76

LTE Band 2										
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	18607	Vertical	-25.94	40.33	1.92	18.18	24.07	
			18900	Vertical	-23.96	40.45	1.94	18.27	24.12	
			19193	Vertical	-26.66	40.61	1.9	18.30	24.21	
		3	18615	Vertical	-25.45	40.38	1.92	18.18	24.12	
			18900	Vertical	-23.26	40.51	1.94	18.27	24.18	
			19185	Vertical	-26.45	40.65	1.9	18.30	24.25	
		5	18625	Vertical	-25.67	40.57	1.92	18.18	24.31	
			18900	Vertical	-23.54	40.76	1.94	18.27	24.43	
			19175	Vertical	-26.45	40.64	1.9	18.30	24.24	
		10	18650	Vertical	-25.65	40.41	1.92	18.18	24.15	
			18900	Vertical	-23.34	40.87	1.94	18.27	24.54	
			19150	Vertical	-26.23	40.63	1.9	18.30	24.23	
		16QAM	1.4	18607	Vertical	-25.56	40.13	1.92	18.18	23.87

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			18900	Vertical	-23.23	40.3	1.94	18.27	23.97
			19193	Vertical	-26.87	40.26	1.9	18.30	23.86
		3	18615	Vertical	-25.23	40.15	1.92	18.18	23.89
			18900	Vertical	-23.54	40.25	1.94	18.27	23.92
			19185	Vertical	-26.65	40.33	1.9	18.30	23.93
		5	18625	Vertical	-25.34	40	1.92	18.18	23.74
			18900	Vertical	-23.45	40.12	1.94	18.27	23.79
			19175	Vertical	-26.34	40.08	1.9	18.30	23.68
		10	18650	Vertical	-25.23	39.75	1.92	18.18	23.49
			18900	Vertical	-23.65	40.19	1.94	18.27	23.86
			19150	Vertical	-26.56	40.16	1.9	18.30	23.76

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

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

2.4. Occupied Bandwidth

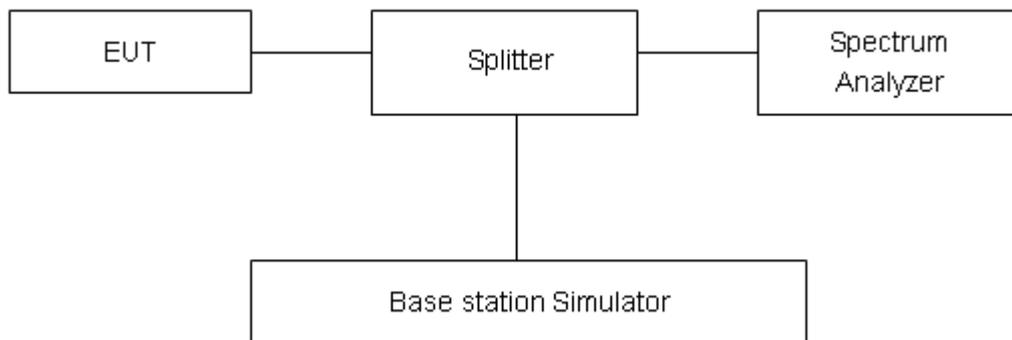
Ambient condition

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 $k = 2$, $U = 624\text{Hz}$.

Test Result

CDMA PCS	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
RC3 SO55(Loopback)	25	1851.25	1.29	1.457
	600	1880.0	1.2836	1.455
	1175	1908.75	1.2815	1.456
RC3 SO32(+FCH-SCH)	25	1851.25	1.288	1.467
	600	1880.0	1.2796	1.456
	1175	1908.75	1.2852	1.455
EVDO (Rev.0)	25	1851.25	1.285	1.448

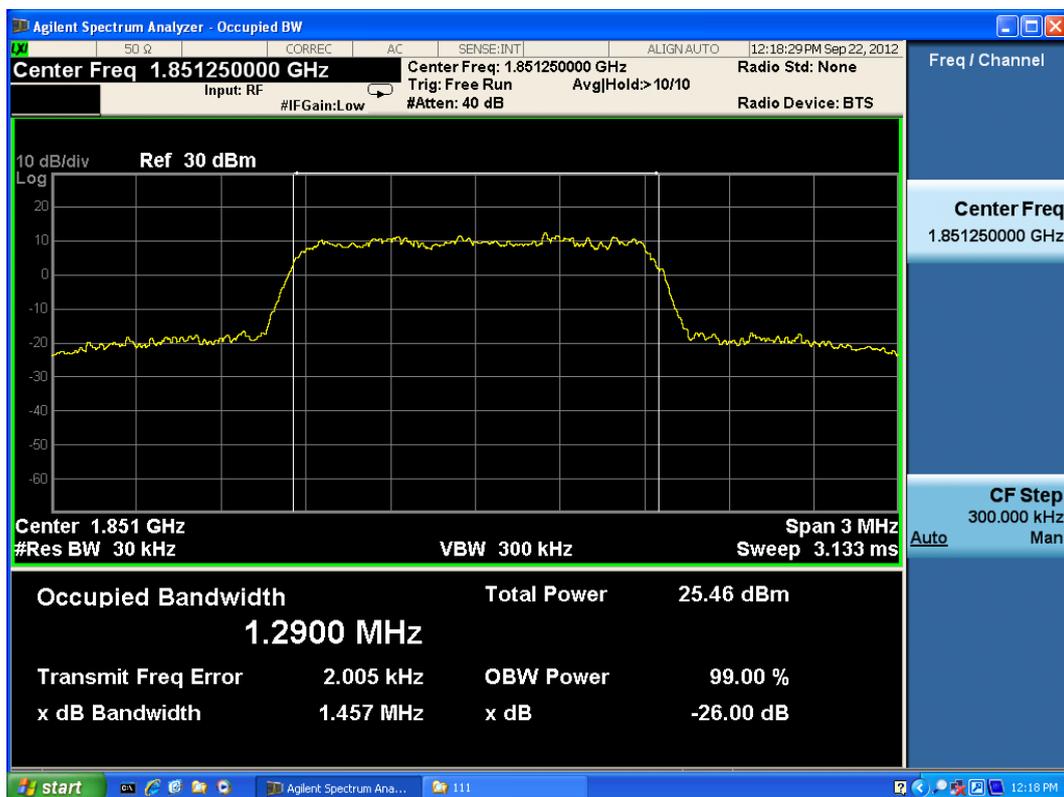
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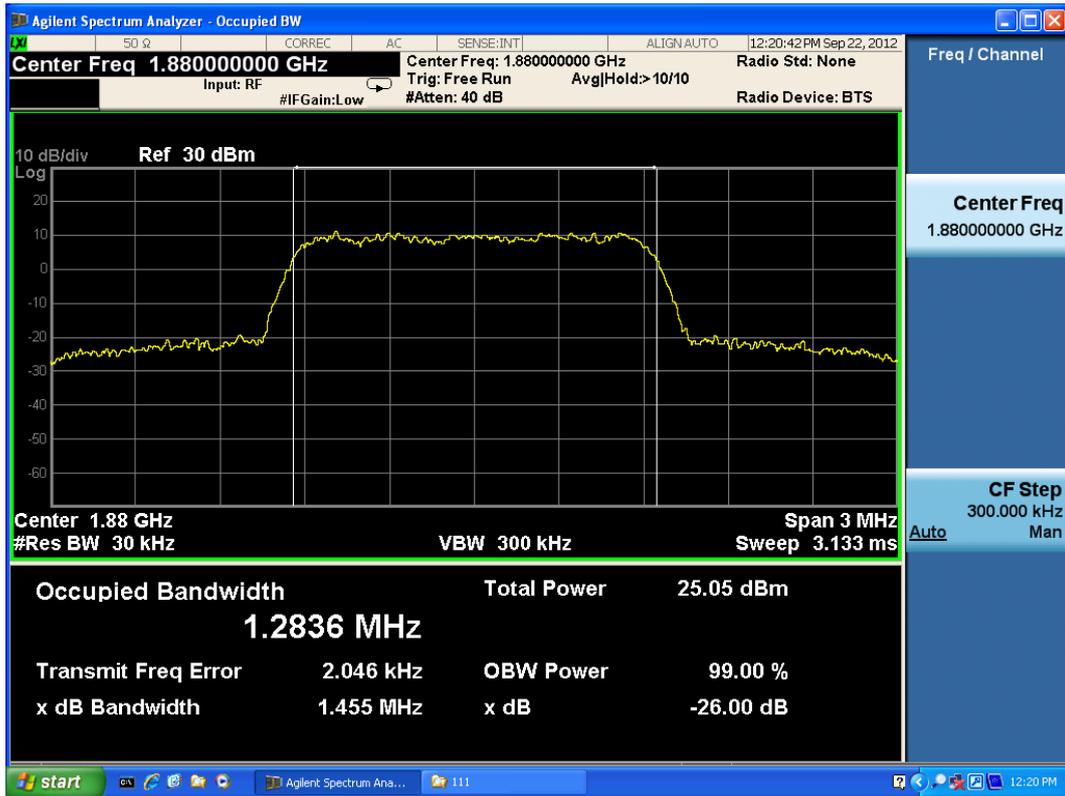
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	600	1880.0	1.2773	1.442
	1175	1908.75	1.2881	1.453
EVDO (Rev.A)	25	1851.25	1.2834	1.466
	600	1880.0	1.2810	1.455
	1175	1908.75	1.2759	1.452
1X Advance SO75	25	1851.25	1.2788	1.444
	600	1880.0	1.2731	1.435
	1175	1908.75	1.2747	1.441

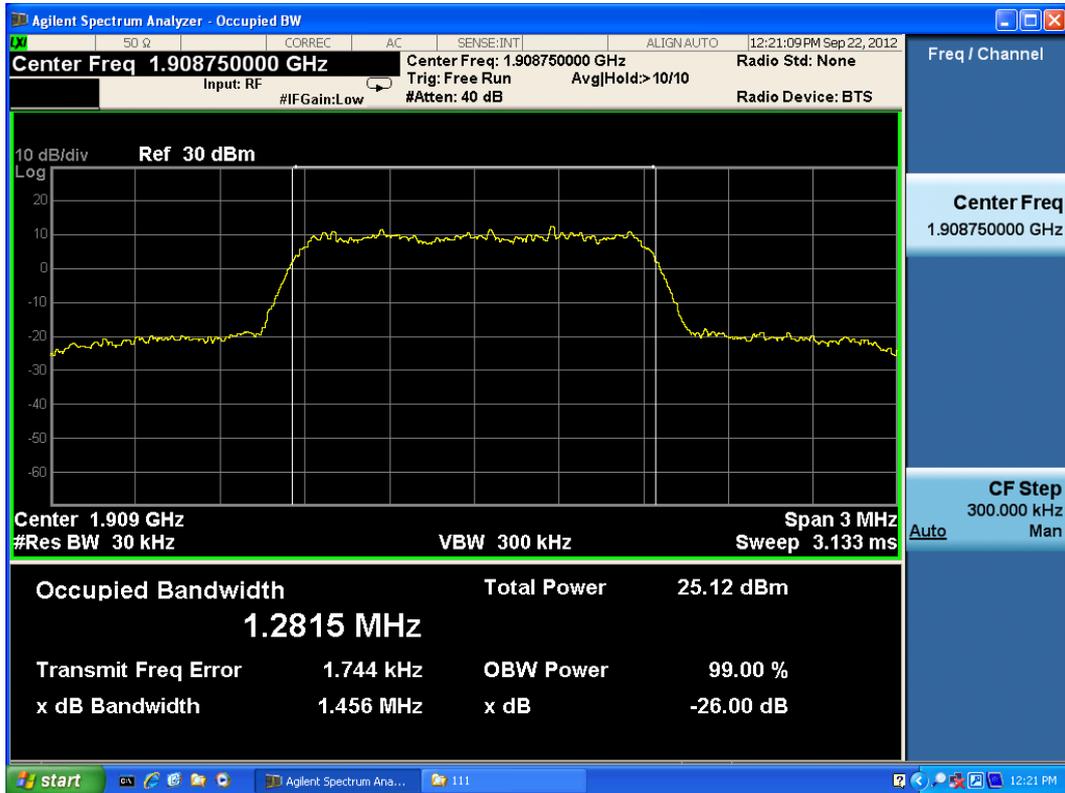


CDMA PCS SO55 CH25 Occupied Bandwidth

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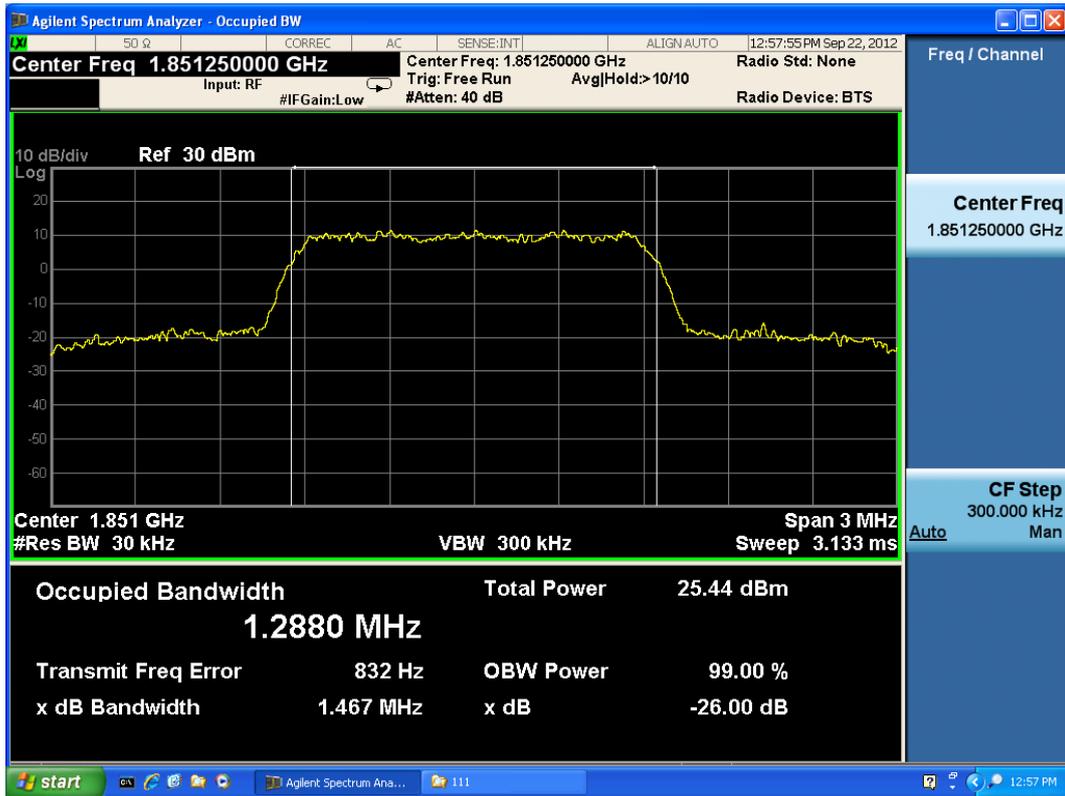


CDMA PCS SO55 CH600 Occupied Bandwidth

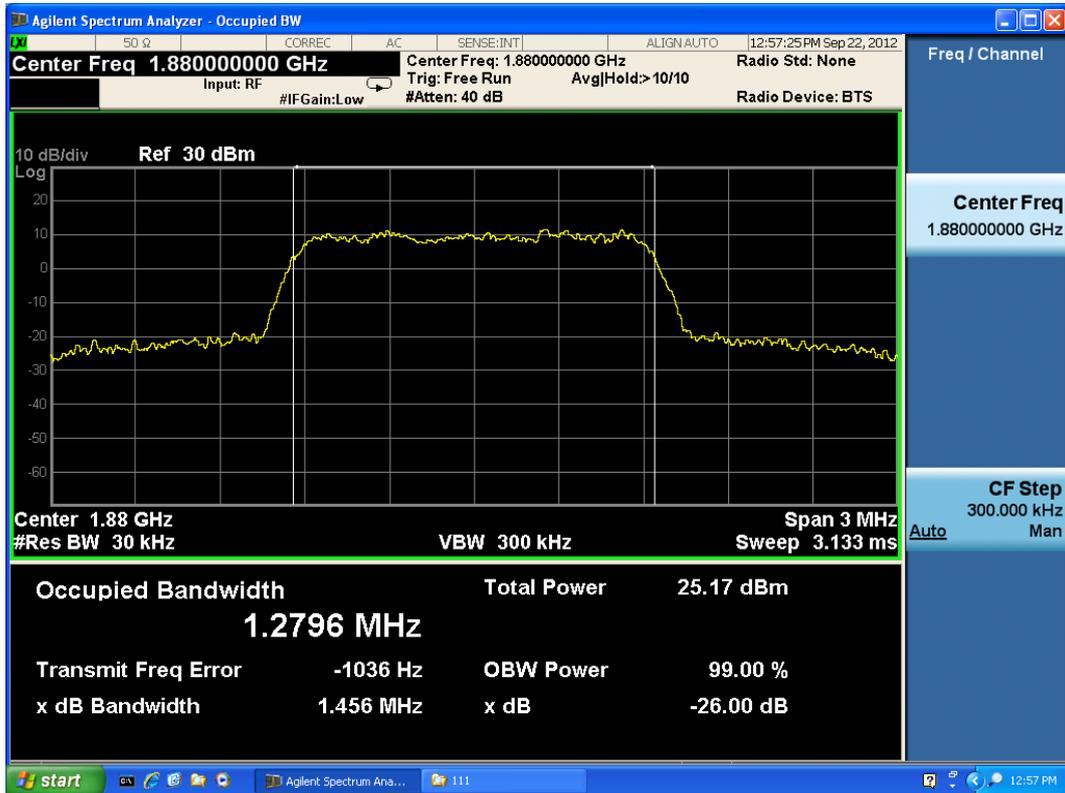


CDMA PCS SO55 CH1175 Occupied Bandwidth

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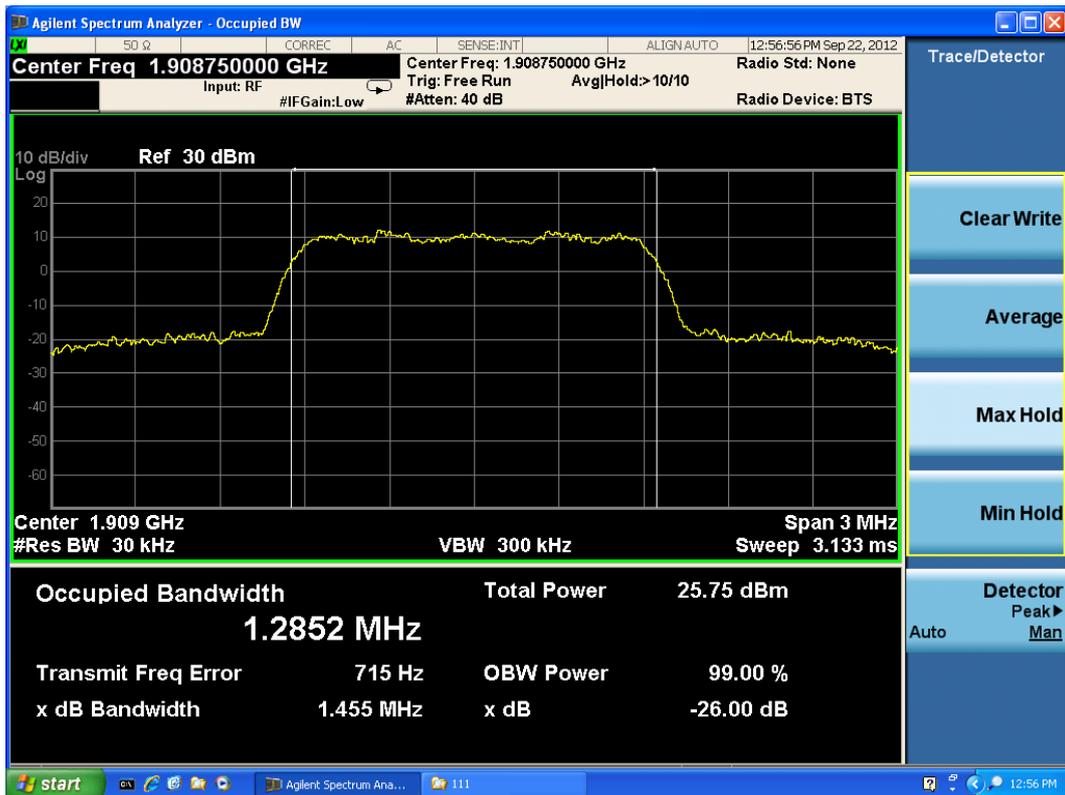


CDMA PCS SO32 CH25 Occupied Bandwidth

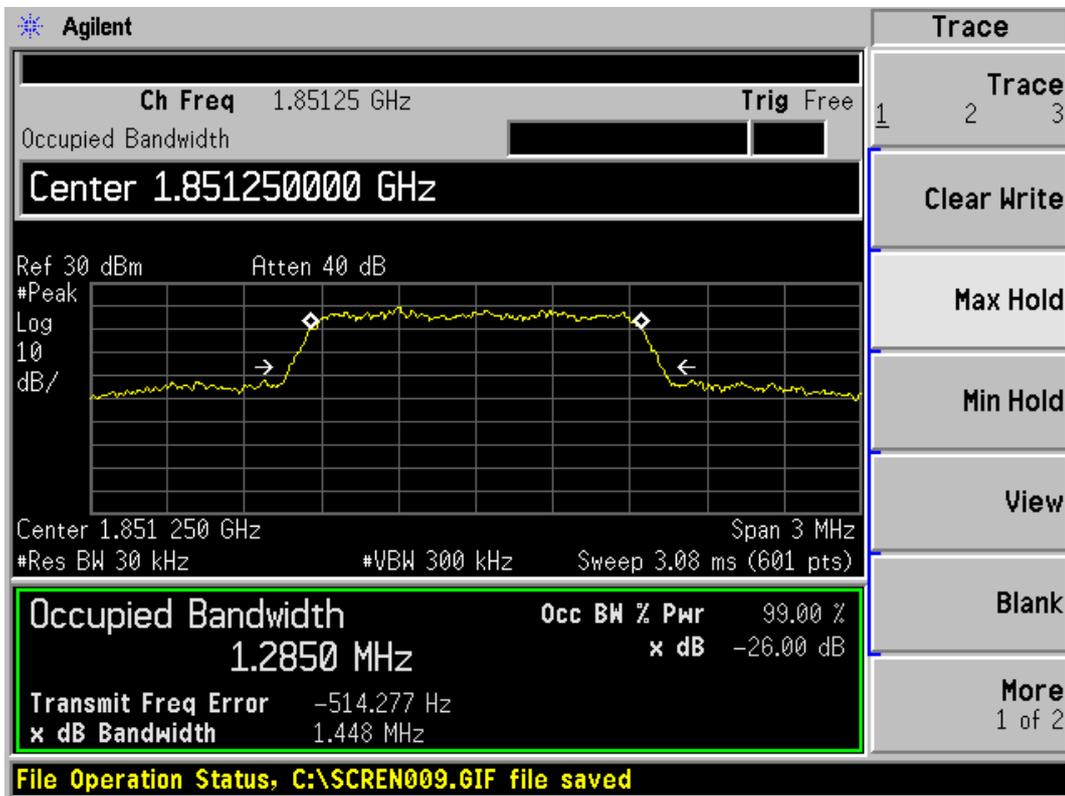


CDMA PCS SO32 CH600 Occupied Bandwidth

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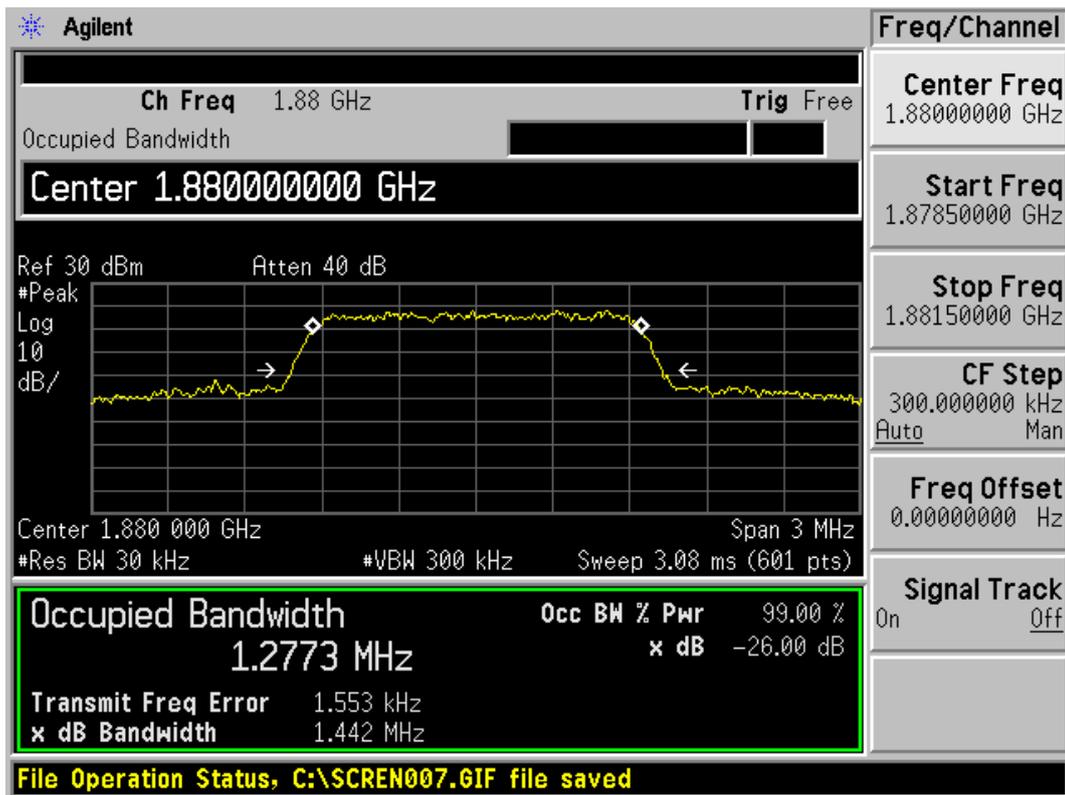


CDMA PCS SO32 CH1175 Occupied Bandwidth

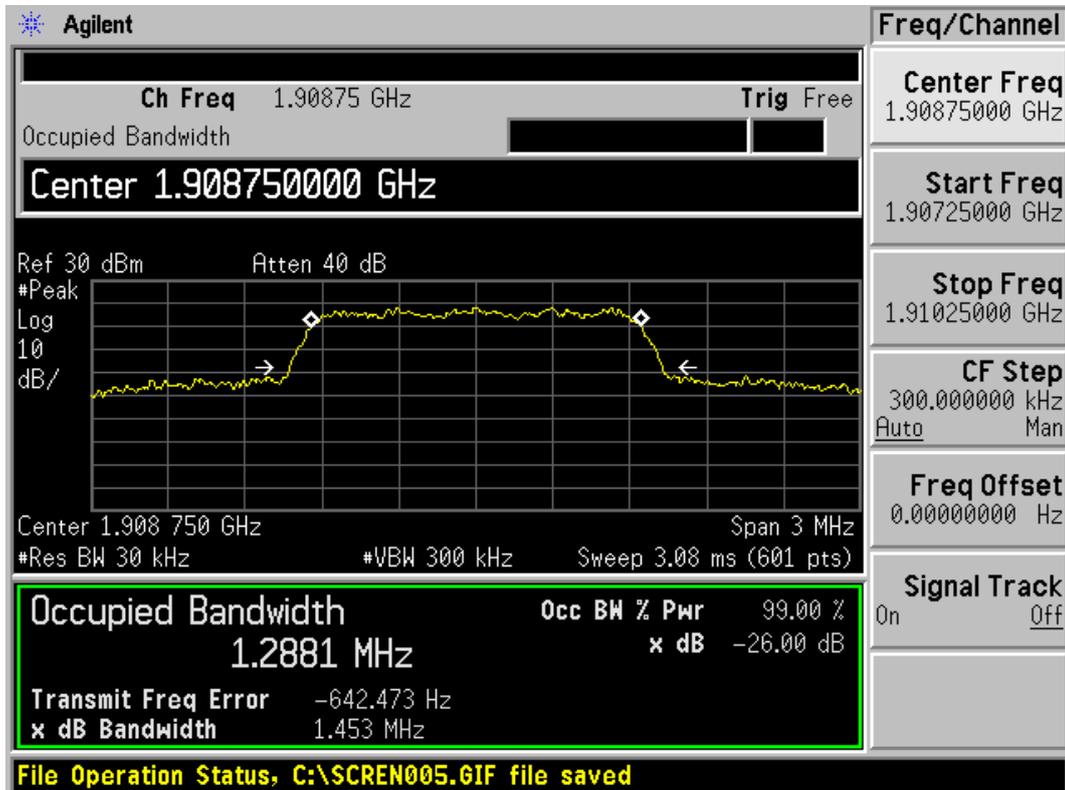


CDMA PCS EVDO (Rev.0) CH25 Occupied Bandwidth

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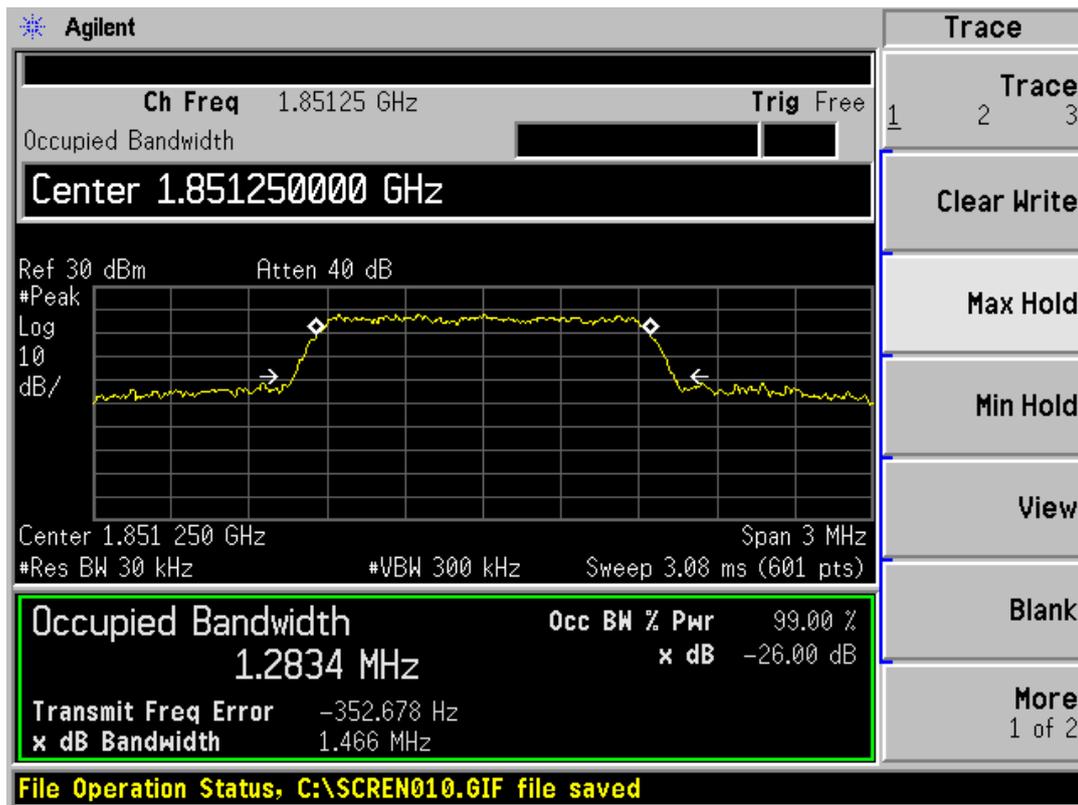


CDMA PCS EVDO (Rev.0) CH600 Occupied Bandwidth

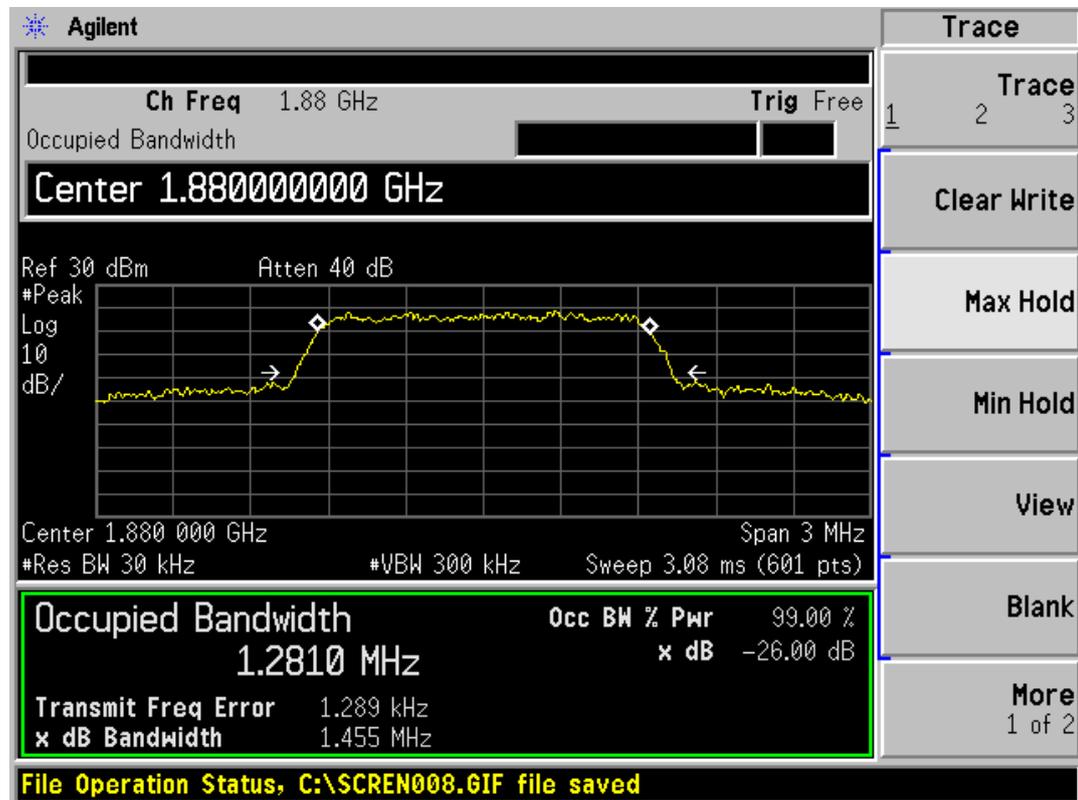


CDMA PCS EVDO (Rev.0) CH1175 Occupied Bandwidth

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



CDMA PCS EVDO (Rev.A) CH25 Occupied Bandwidth

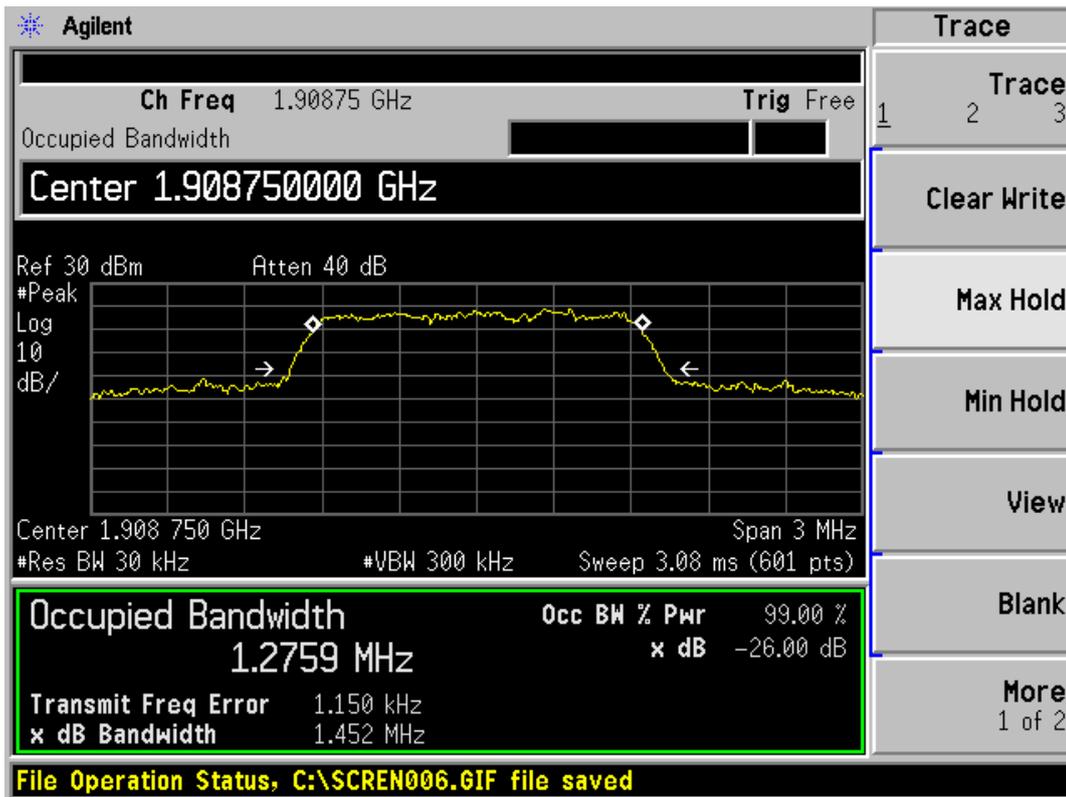


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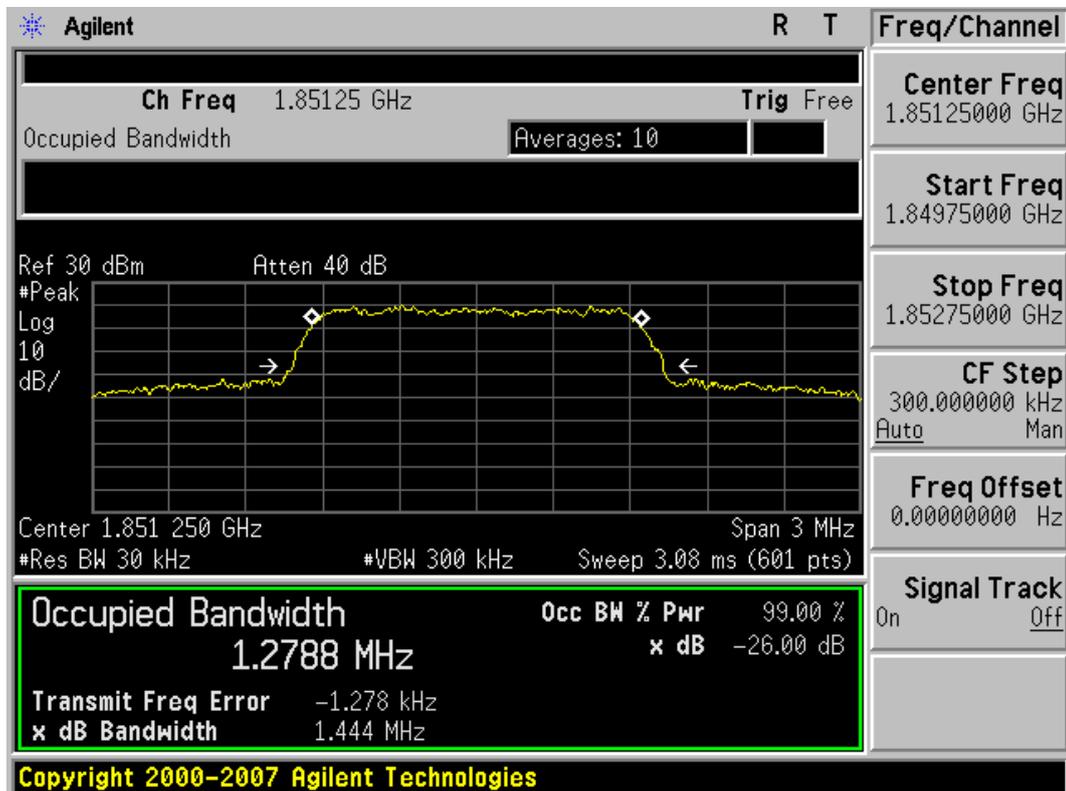
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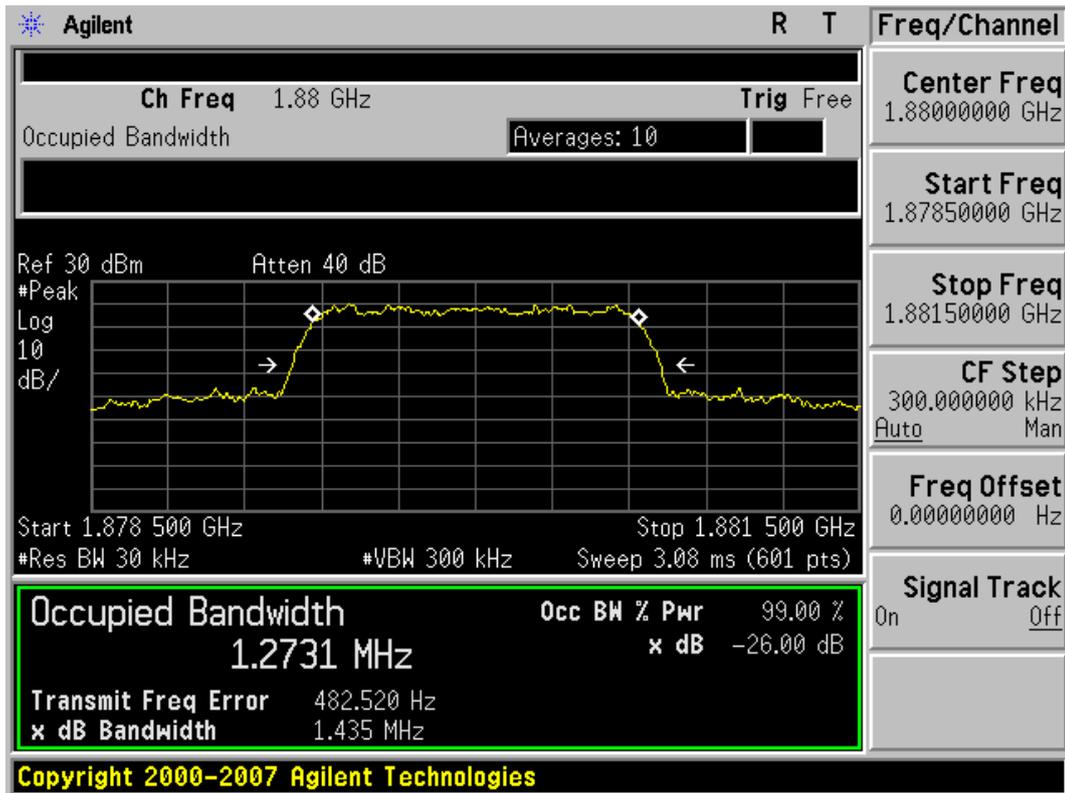


CDMA PCS EVDO (Rev.A) CH1175 Occupied Bandwidth

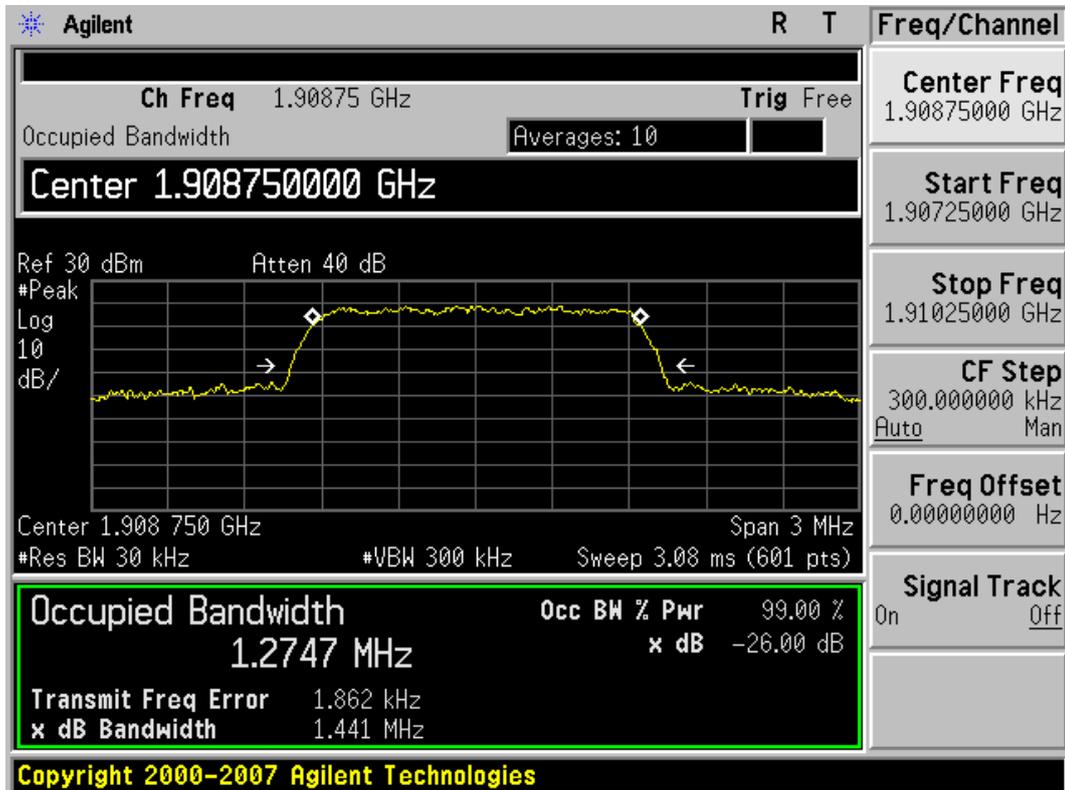


CDMA PCS 1XAdvance CH25 Occupied Bandwidth

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CDMA PCS 1XAdvance CH600 Occupied Bandwidth



CDMA PCS 1XAdvance CH1175 Occupied Bandwidth

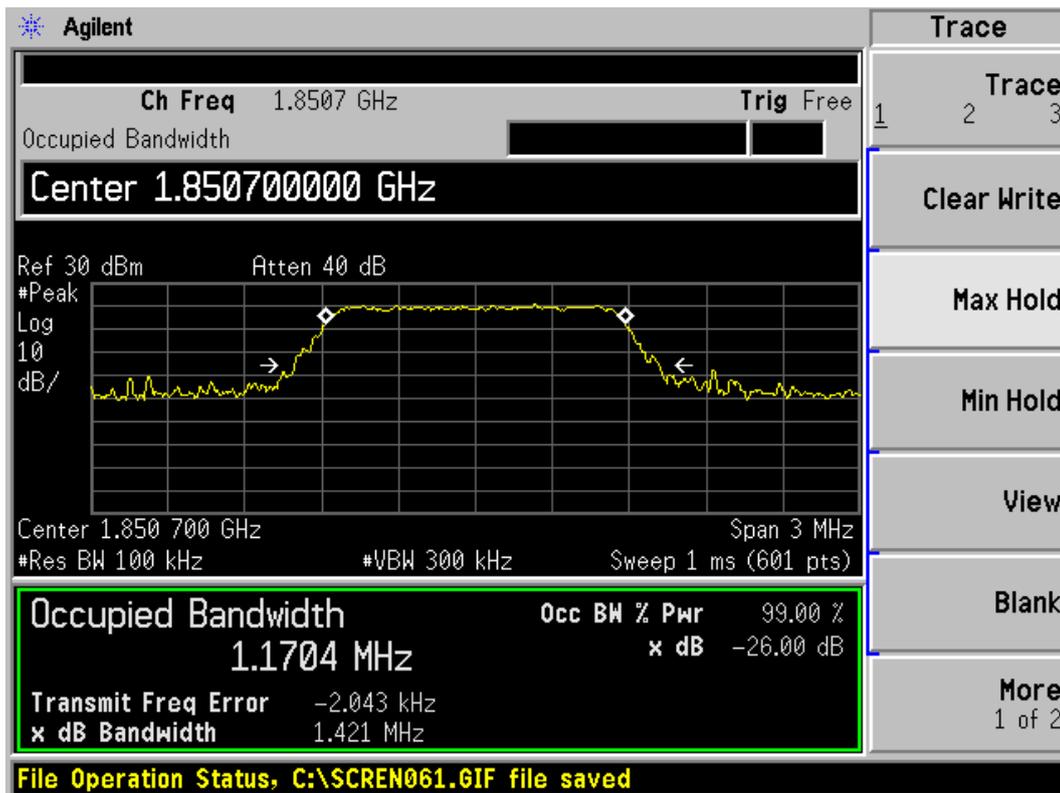
TA Technology (Shanghai) Co., Ltd.
Test Report

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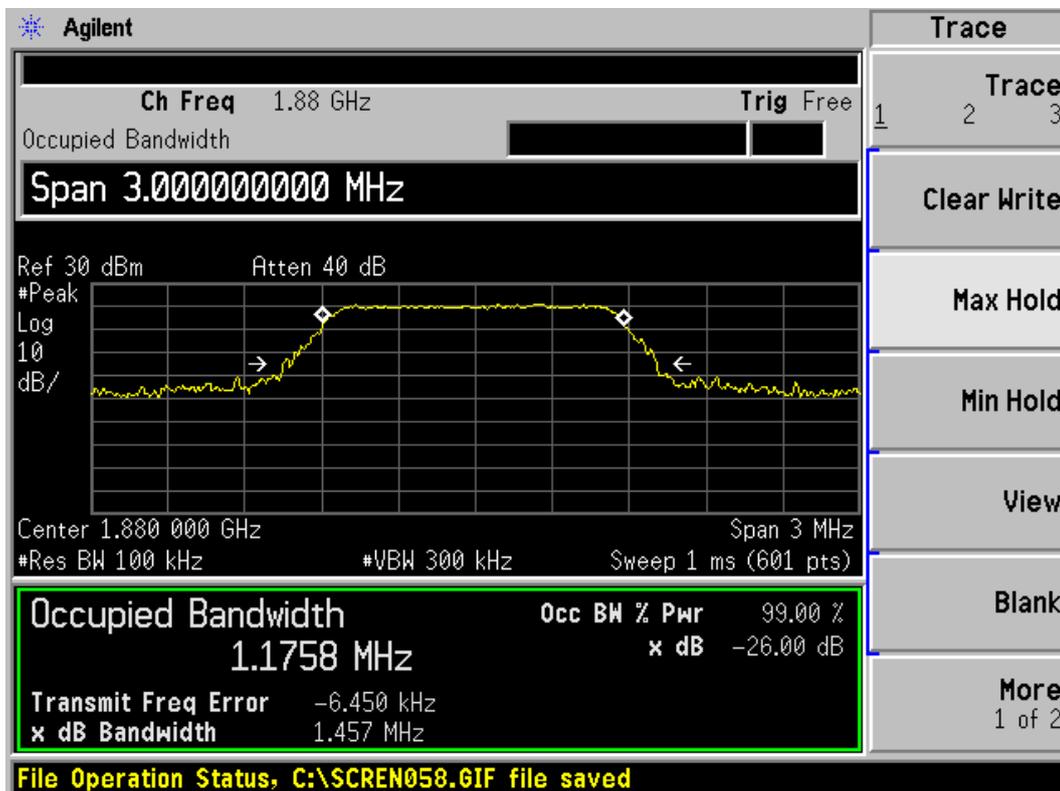
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LTE Band 2						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth (kHz)	-26dBc Bandwidth(kHz)
1	QPSK	1.4	18607	1850.7	1.1704	1.421
			18900	1880.0	1.1758	1.457
			19193	1909.3	1.1832	1.446
		3	18615	1851.5	2.7576	3.147
			18900	1880.0	2.7343	3.106
			19185	1908.5	2.7601	3.138
		5	18625	1852.5	4.5219	5.038
			18900	1880.0	4.5186	5.083
			19175	1907.5	4.5232	5.075
		10	18650	1855.0	9.0122	10.065
			18900	1880.0	9.0361	10.026
			19150	1905.0	9.0193	9.996
	16QAM	1.4	18607	1850.7	1.1711	1.449
			18900	1880.0	1.1744	1.434
			19193	1909.3	1.1858	1.429
		3	18615	1851.5	2.7439	3.099
			18900	1880.0	2.7376	3.137
			19185	1908.5	2.7575	3.118
		5	18625	1852.5	4.5531	5.082
			18900	1880.0	4.5086	5.053
			19175	1907.5	4.5048	5.056
		10	18650	1855.0	9.0042	9.949
			18900	1880.0	9.0649	10.029
			19150	1905.0	9.0429	10.052

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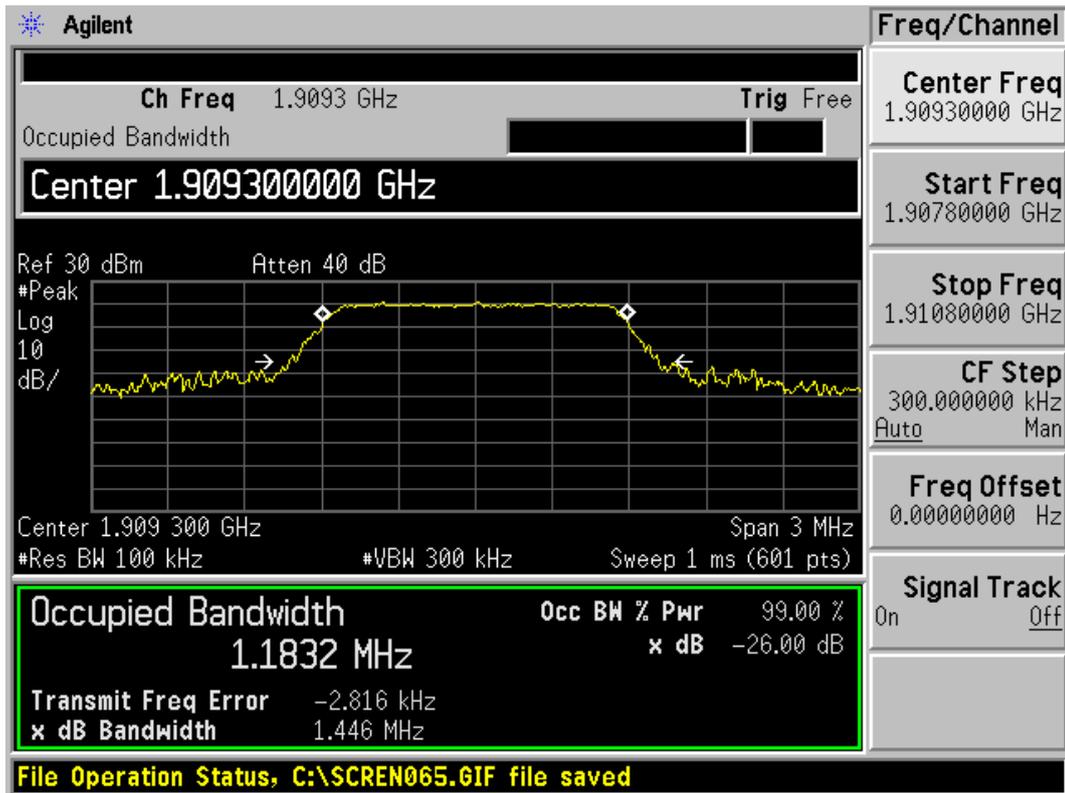


LTE Band 2 QPSK Bandwidth = 1.4MHz CH18607 Occupied Bandwidth

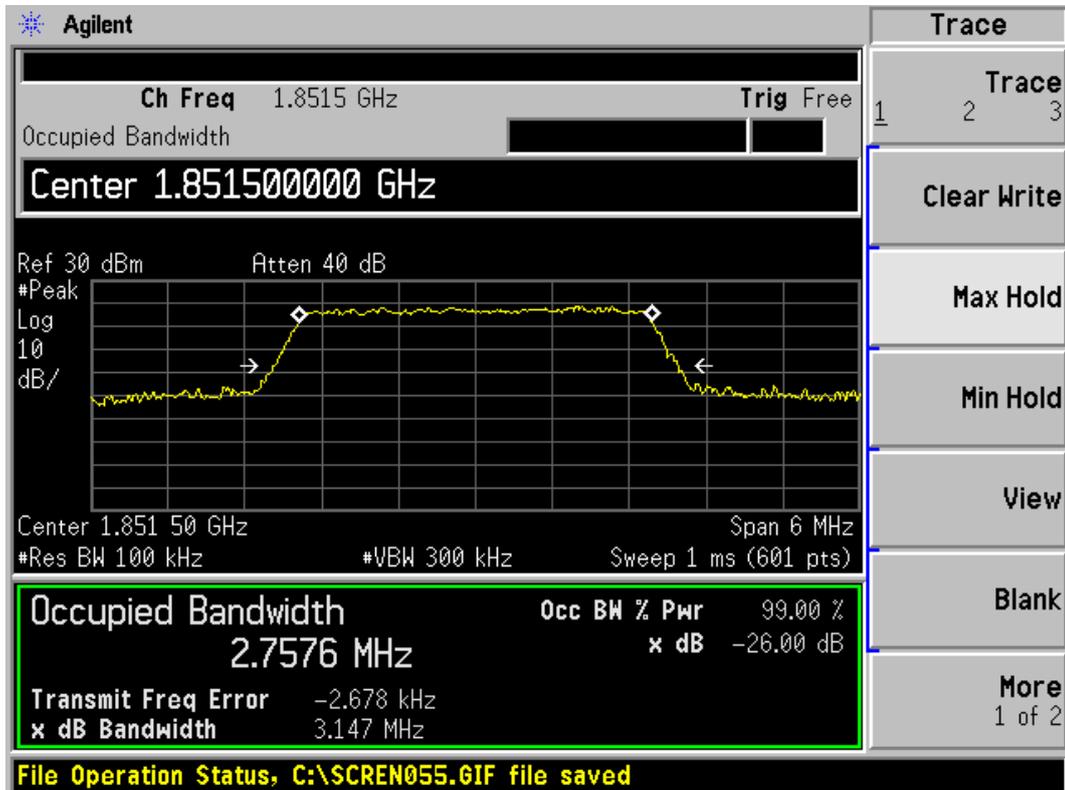


LTE Band 2 QPSK Bandwidth = 1.4MHz CH18900 Occupied Bandwidth

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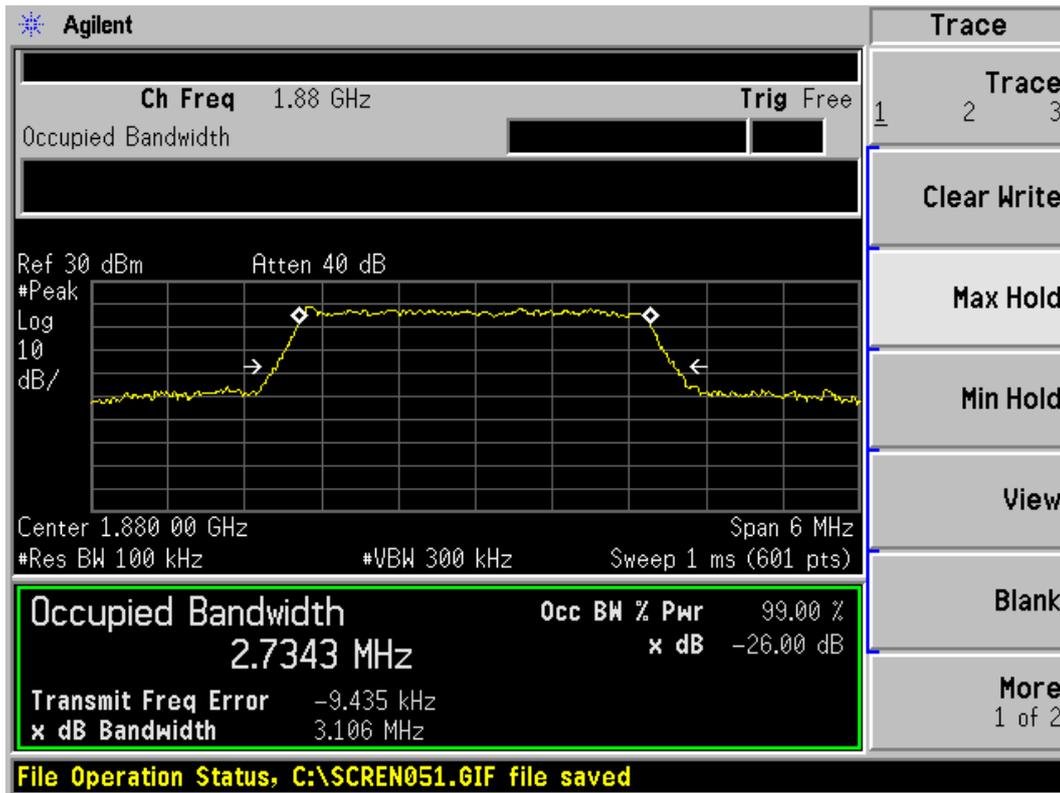


LTE Band 2 QPSK Bandwidth = 1.4MHz CH19193 Occupied Bandwidth

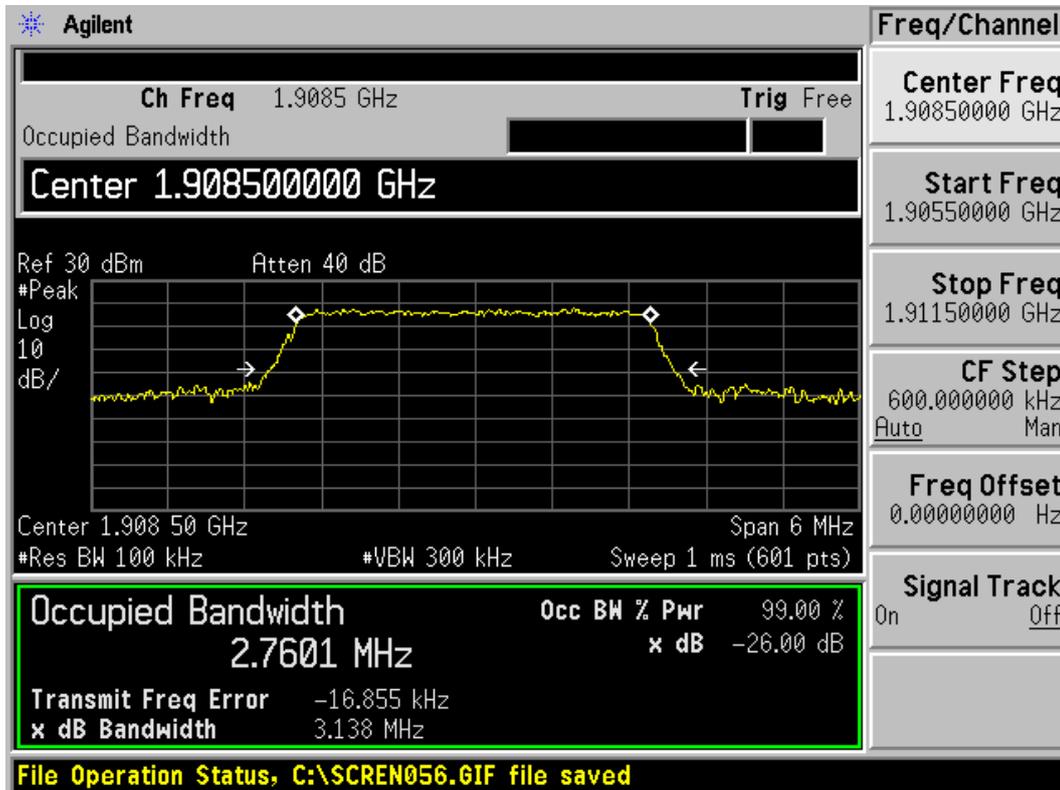


LTE Band 2 QPSK Bandwidth = 3MHz CH18615 Occupied Bandwidth

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LTE Band 2 QPSK Bandwidth = 3MHz CH18900 Occupied Bandwidth

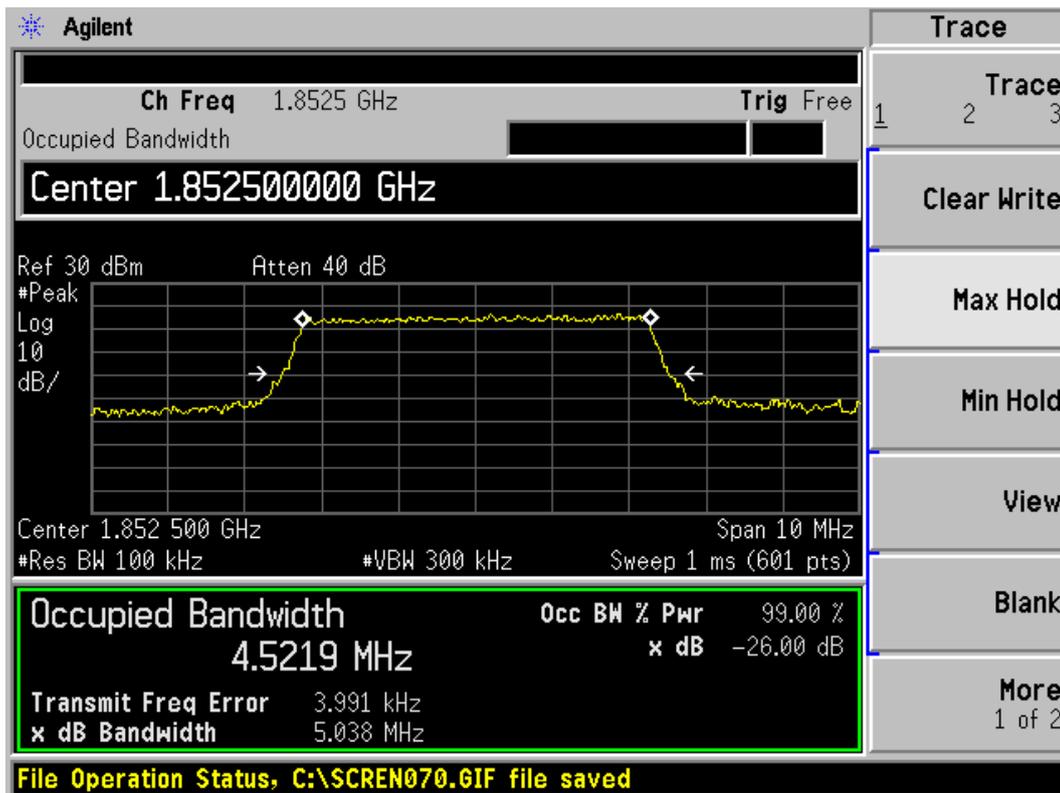


LTE Band 2 QPSK Bandwidth = 3MHz CH19185 Occupied Bandwidth

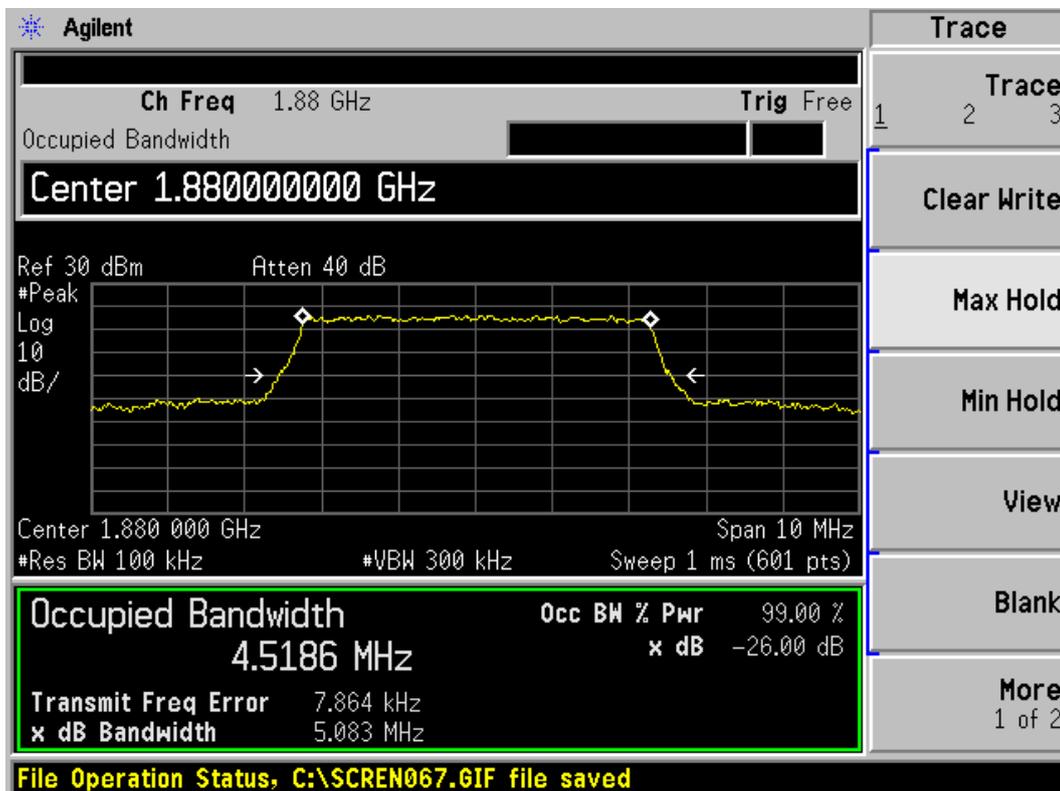
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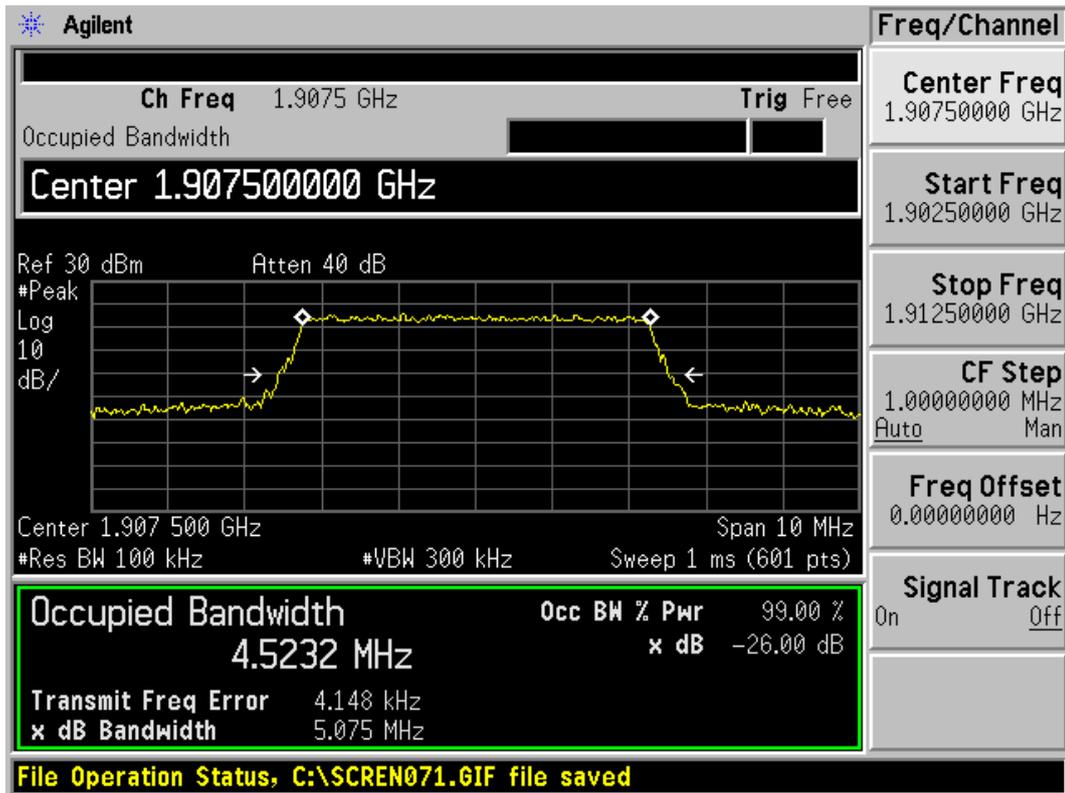


LTE Band 2 QPSK Bandwidth = 5MHz CH18625 Occupied Bandwidth

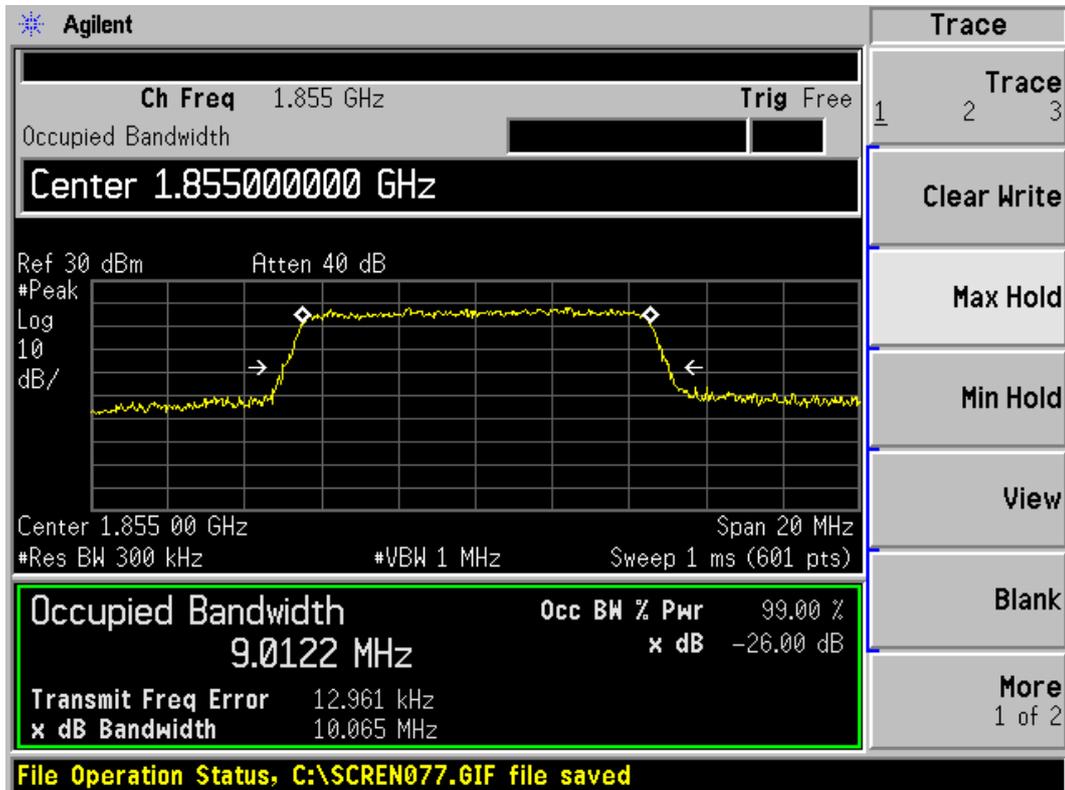


LTE Band 2 QPSK Bandwidth = 5MHz CH18900 Occupied Bandwidth

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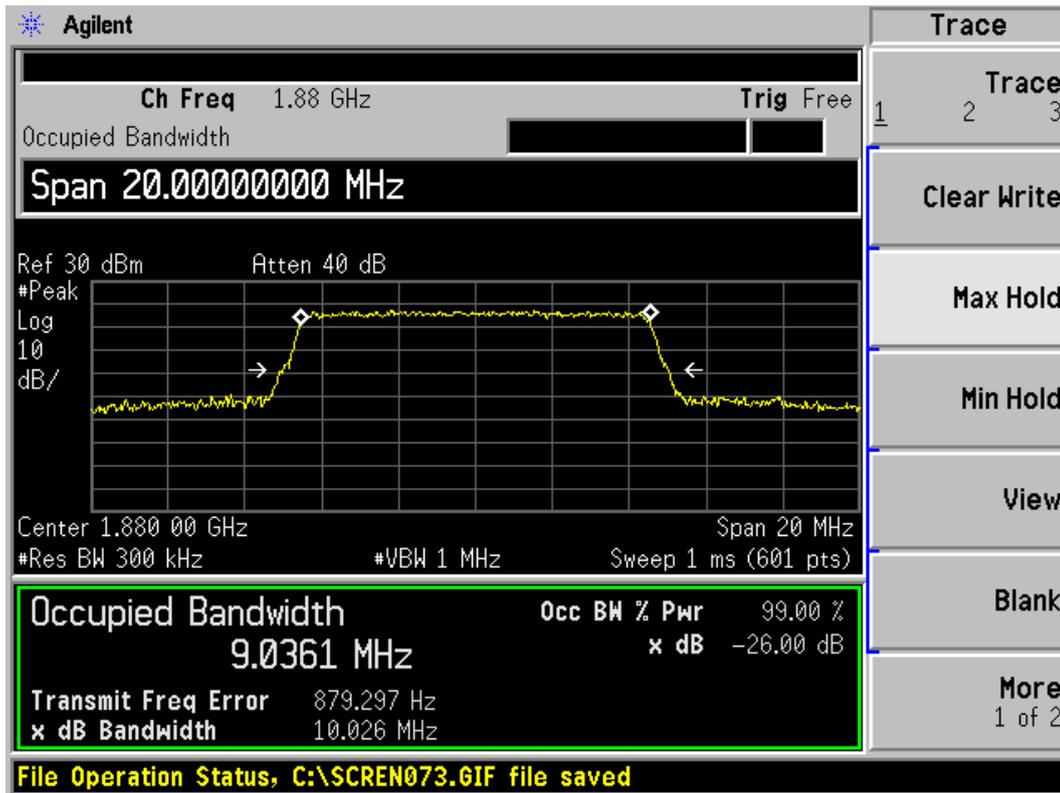


LTE Band 2 QPSK Bandwidth = 5MHz CH19175 Occupied Bandwidth

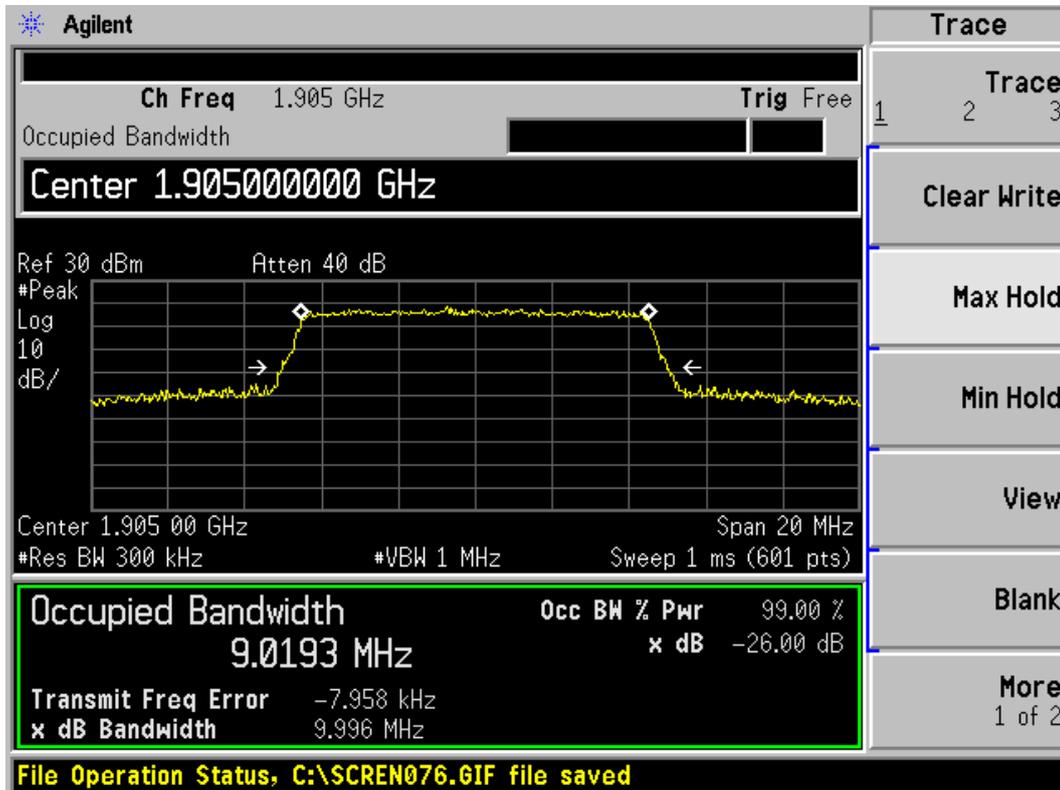


LTE Band 2 QPSK Bandwidth = 10MHz CH18650 Occupied Bandwidth

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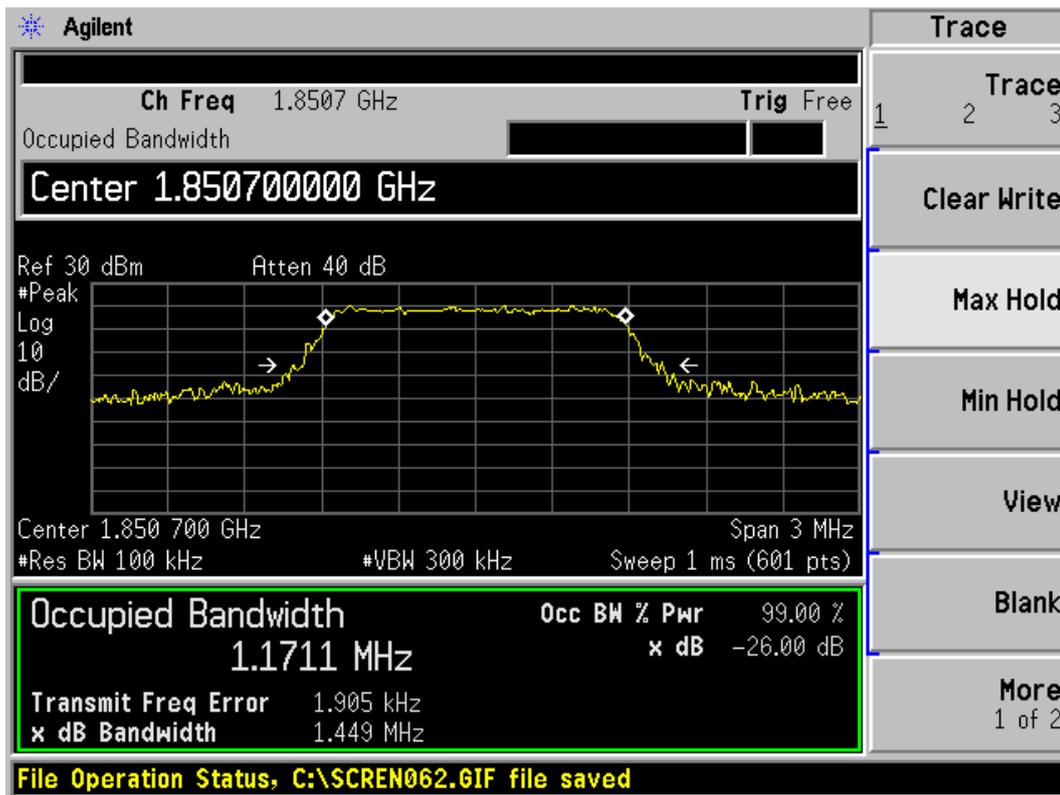


LTE Band 2 QPSK Bandwidth = 10MHz CH18900 Occupied Bandwidth

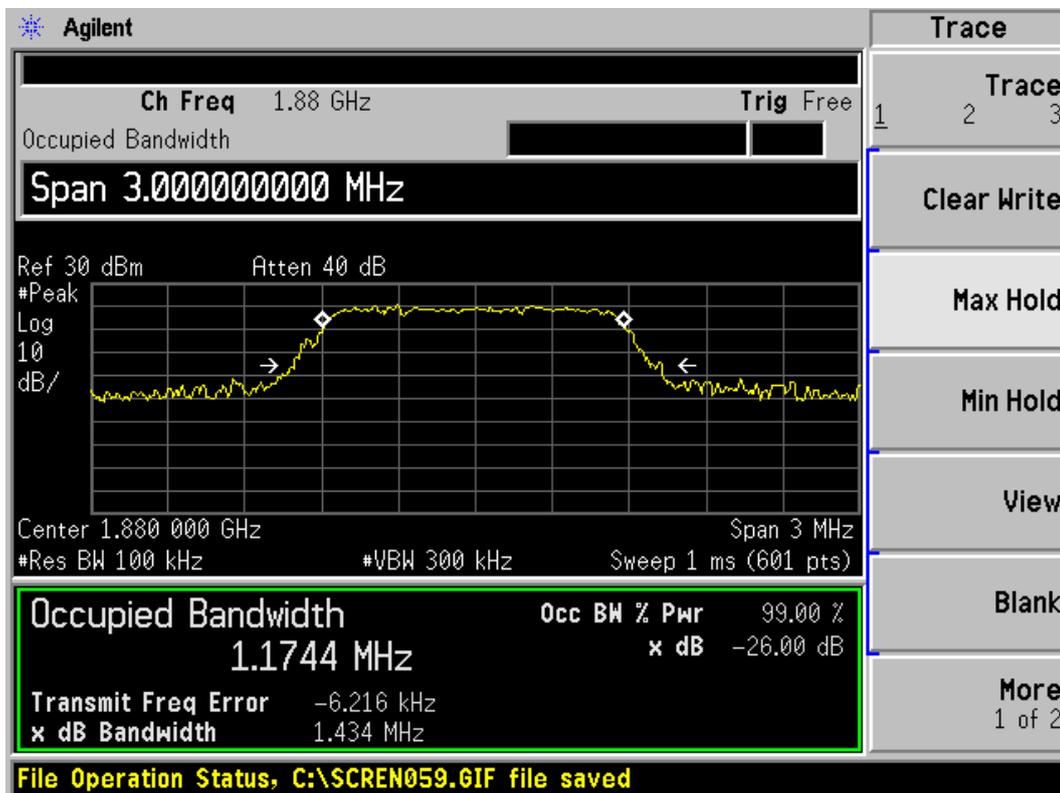


LTE Band 2 QPSK Bandwidth = 10MHz CH19150 Occupied Bandwidth

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

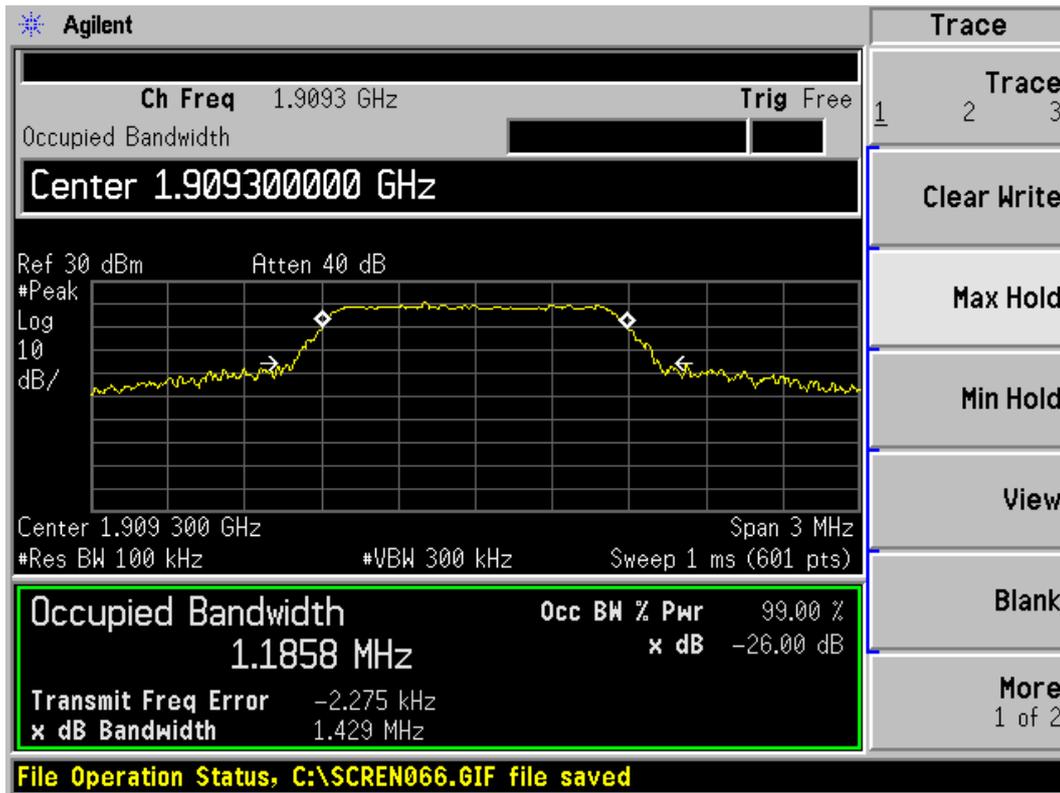


LTE Band 2 16QAM Bandwidth = 1.4MHz CH18607 Occupied Bandwidth

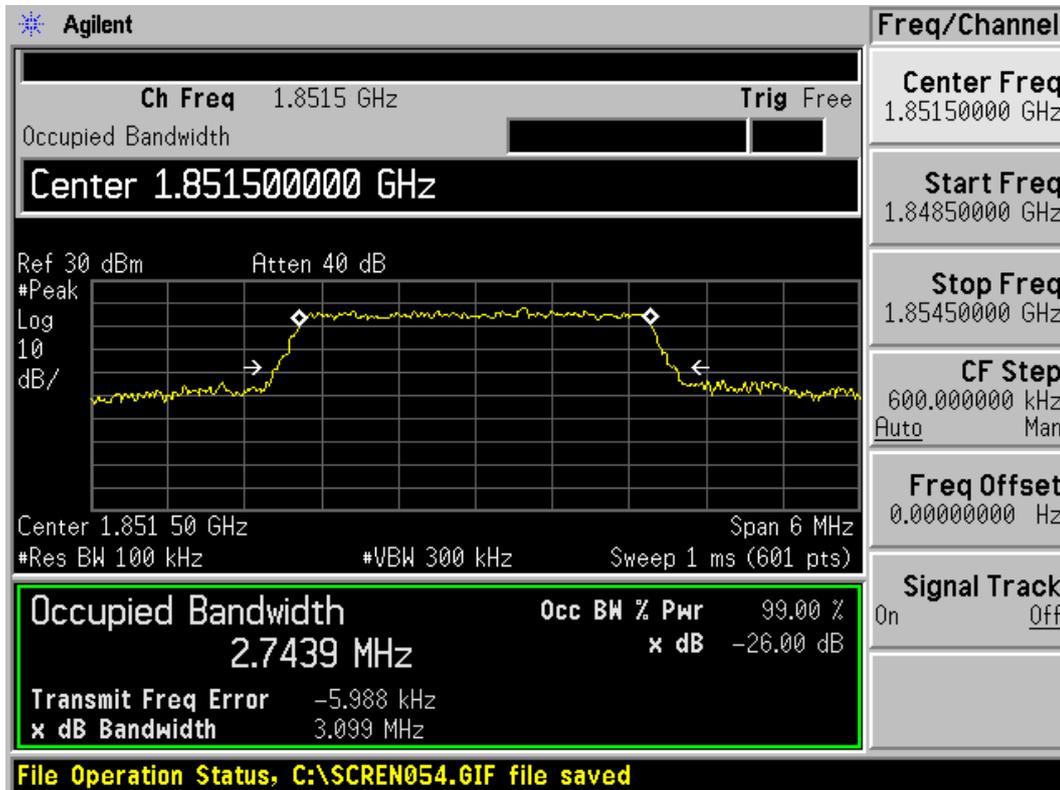


LTE Band 2 16QAM Bandwidth = 1.4MHz CH18900 Occupied Bandwidth

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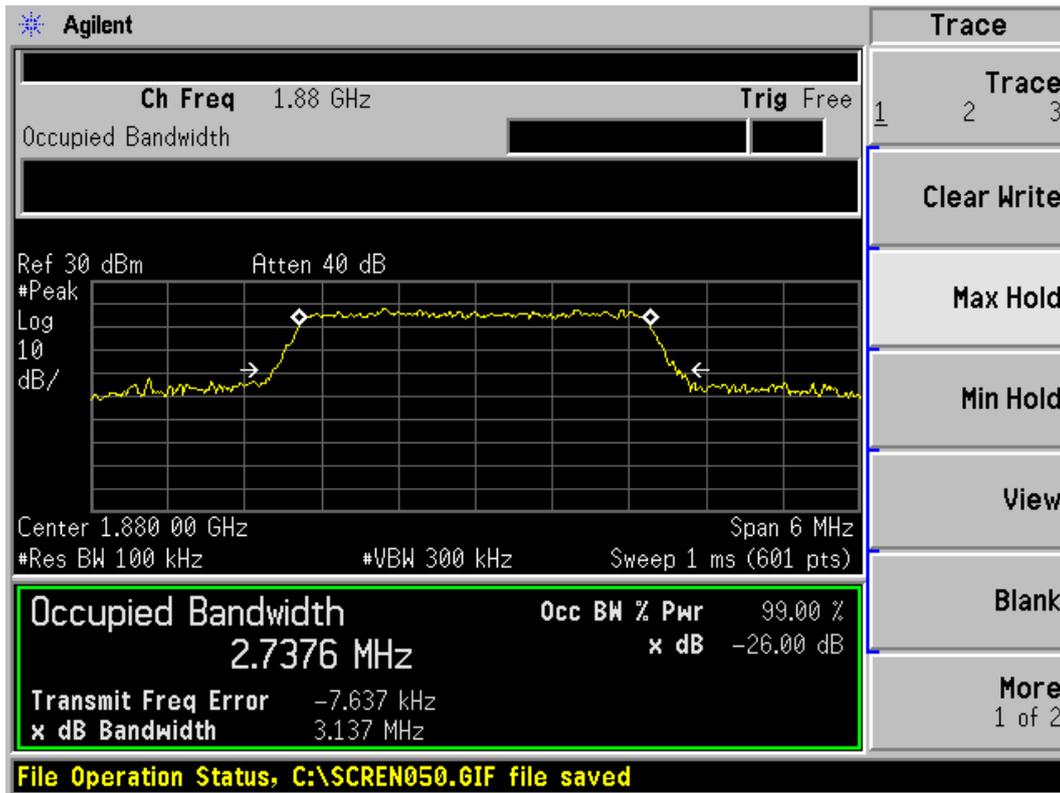


LTE Band 2 16QAM Bandwidth = 1.4MHz CH19193 Occupied Bandwidth

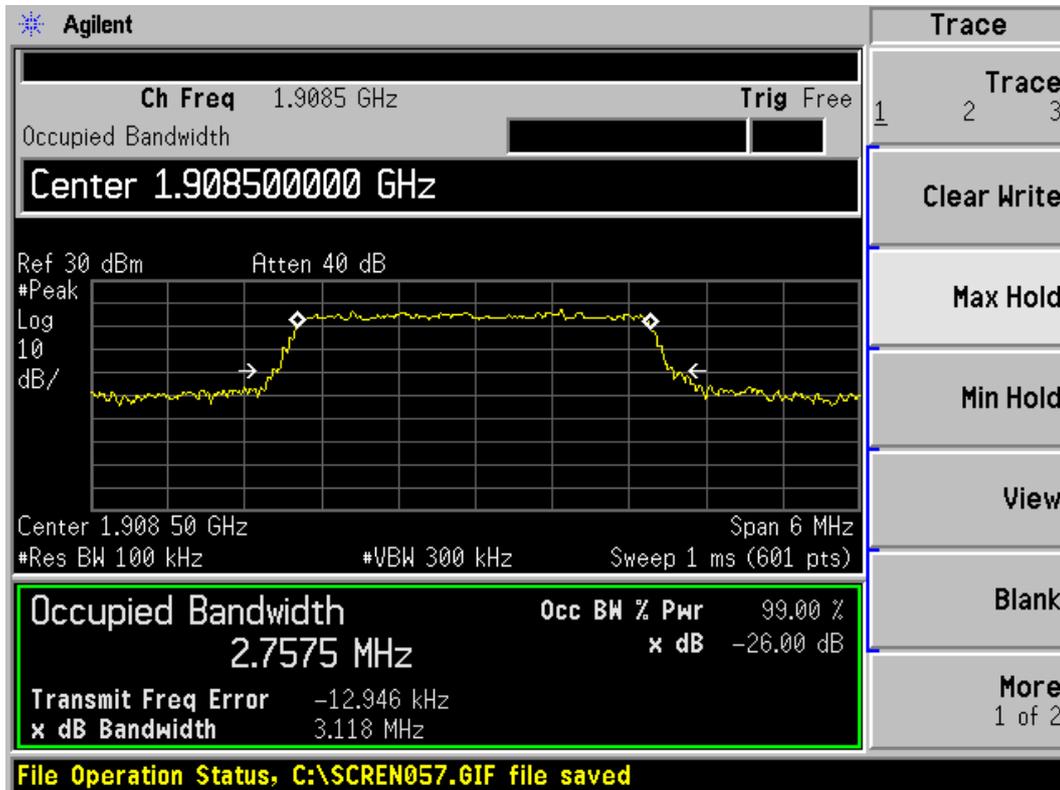


LTE Band 2 16QAM Bandwidth = 3MHz CH18615 Occupied Bandwidth

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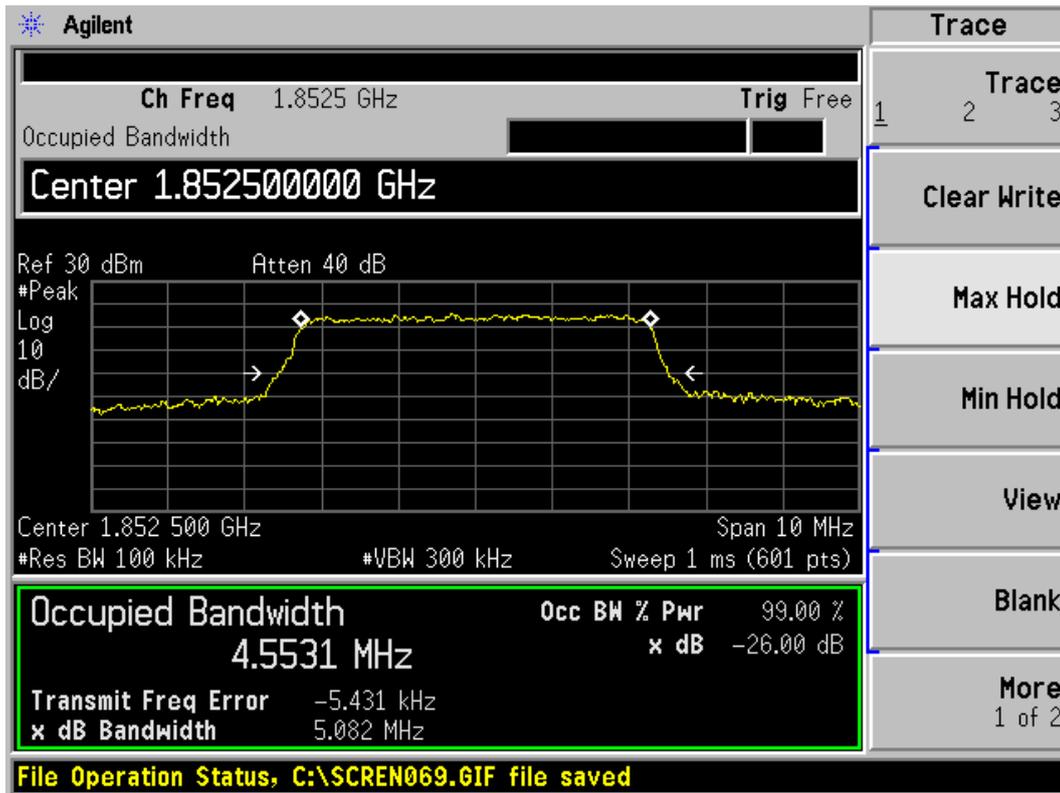


LTE Band 2 16QAM Bandwidth = 3MHz CH18900 Occupied Bandwidth

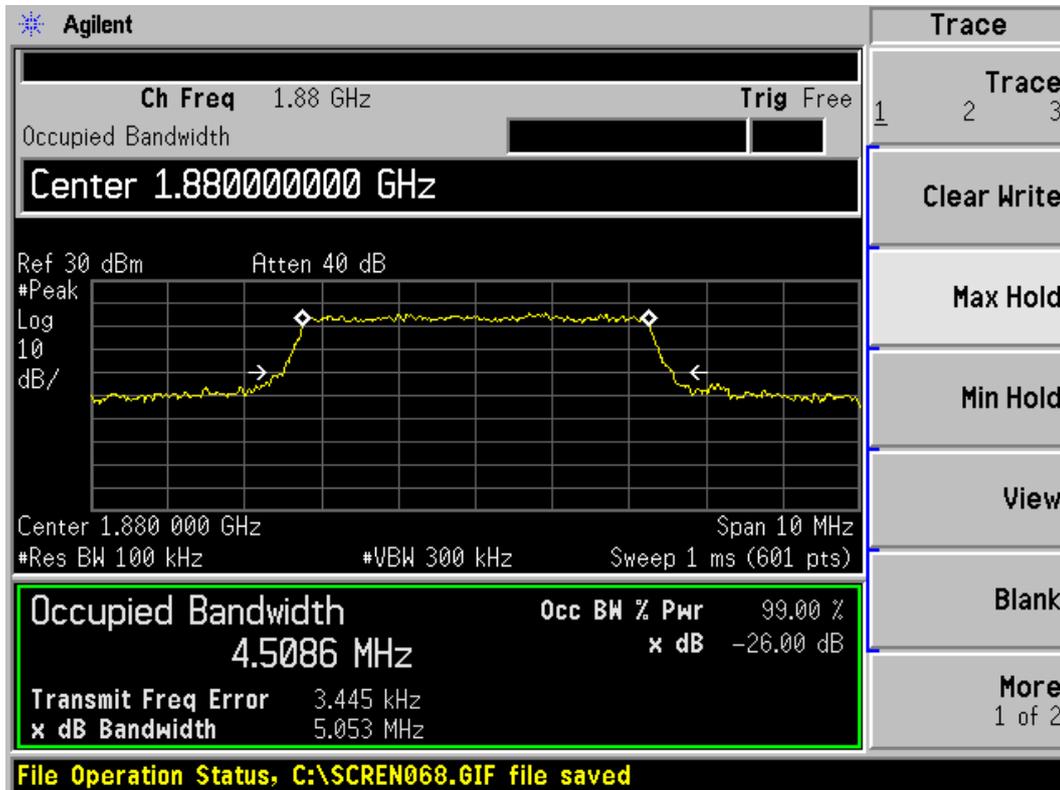


LTE Band 2 16QAM Bandwidth = 3MHz CH19185 Occupied Bandwidth

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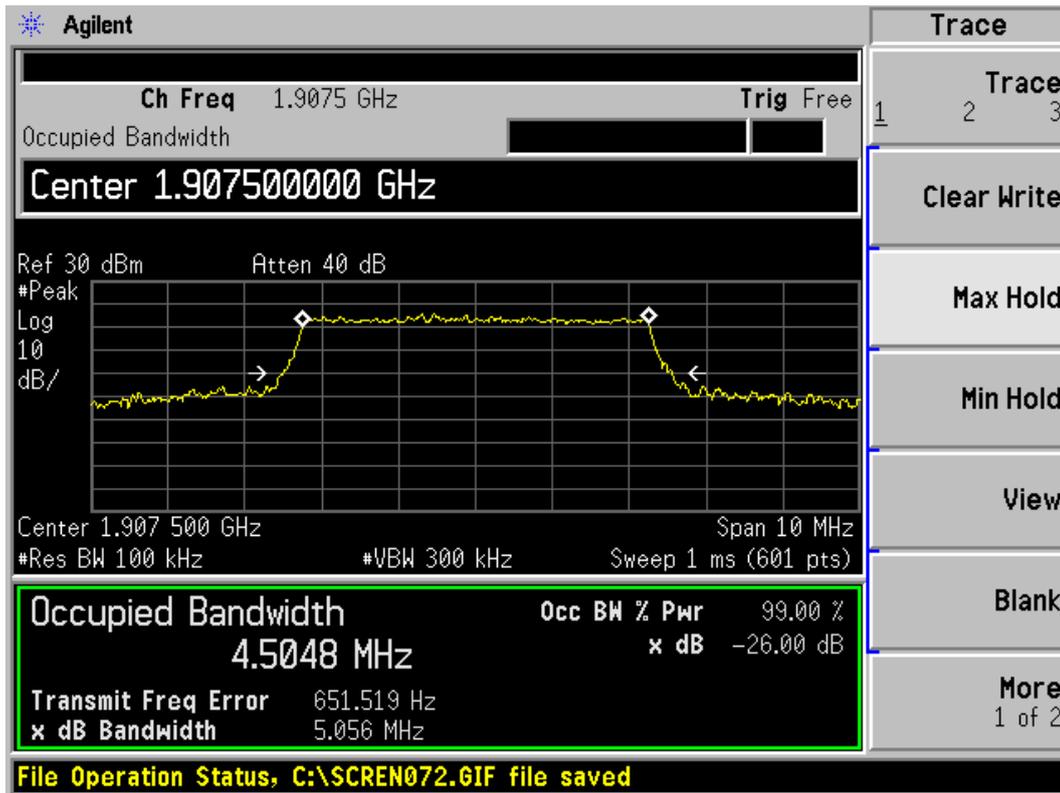


LTE Band 2 16QAM Bandwidth = 5MHz CH18625 Occupied Bandwidth

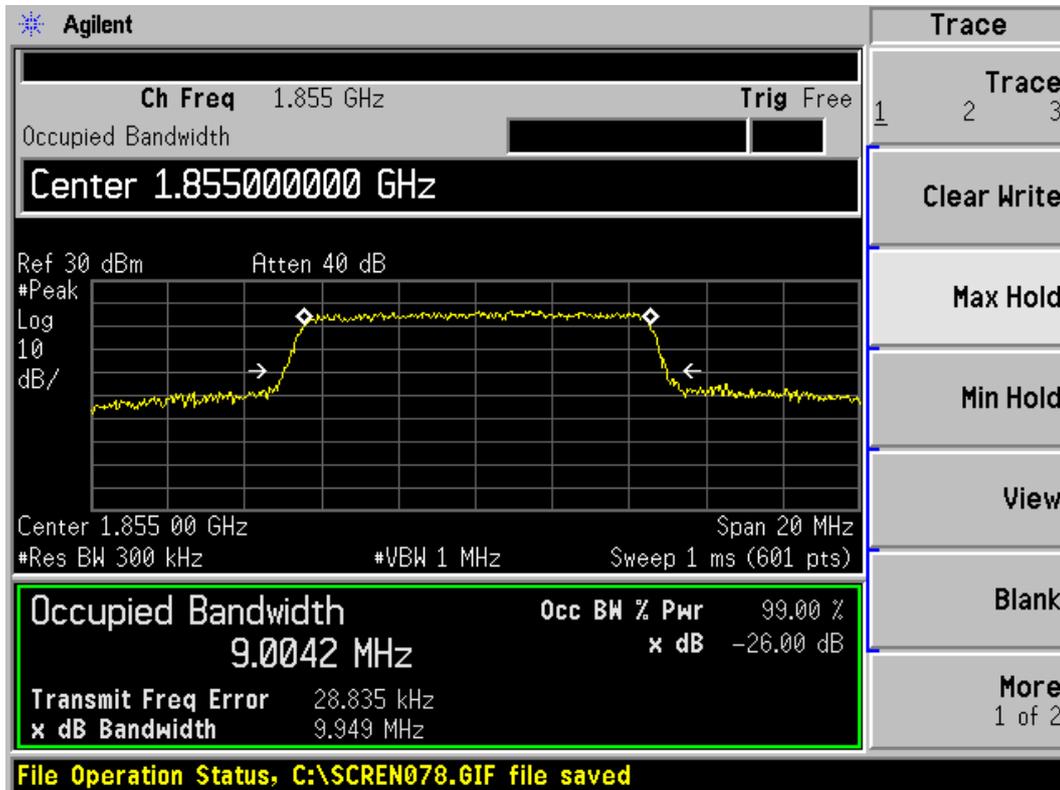


LTE Band 2 16QAM Bandwidth = 5MHz CH18900 Occupied Bandwidth

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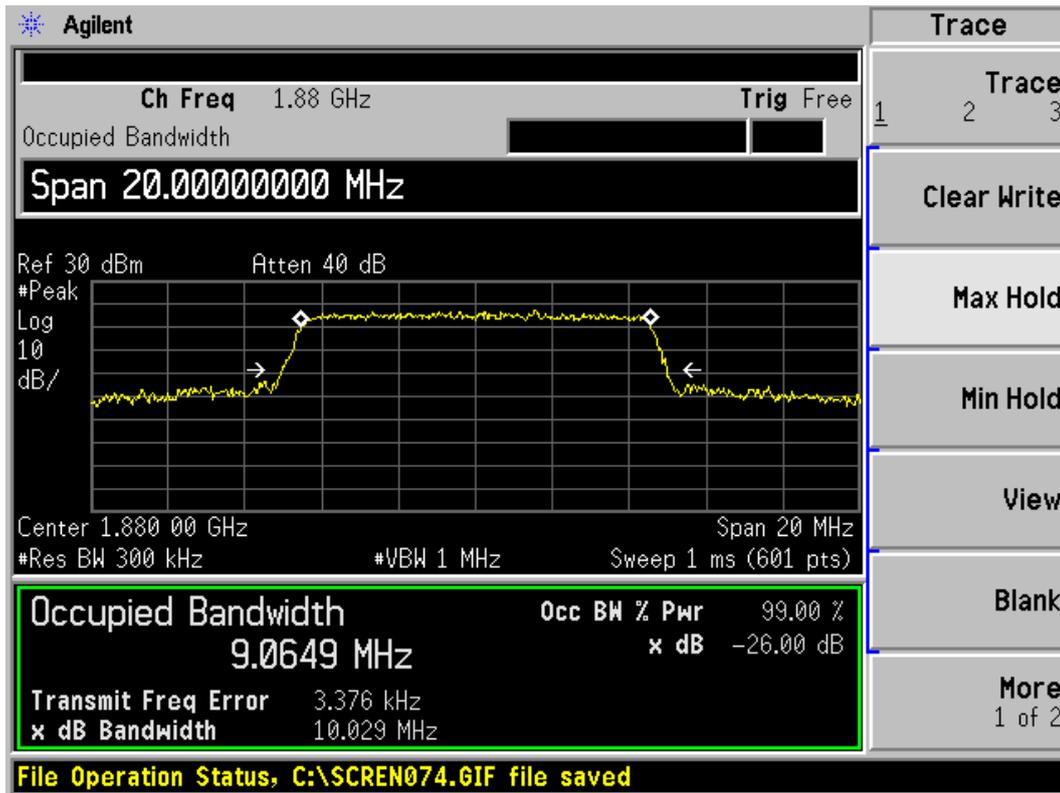


LTE Band 2 16QAM Bandwidth = 5MHz CH19175 Occupied Bandwidth

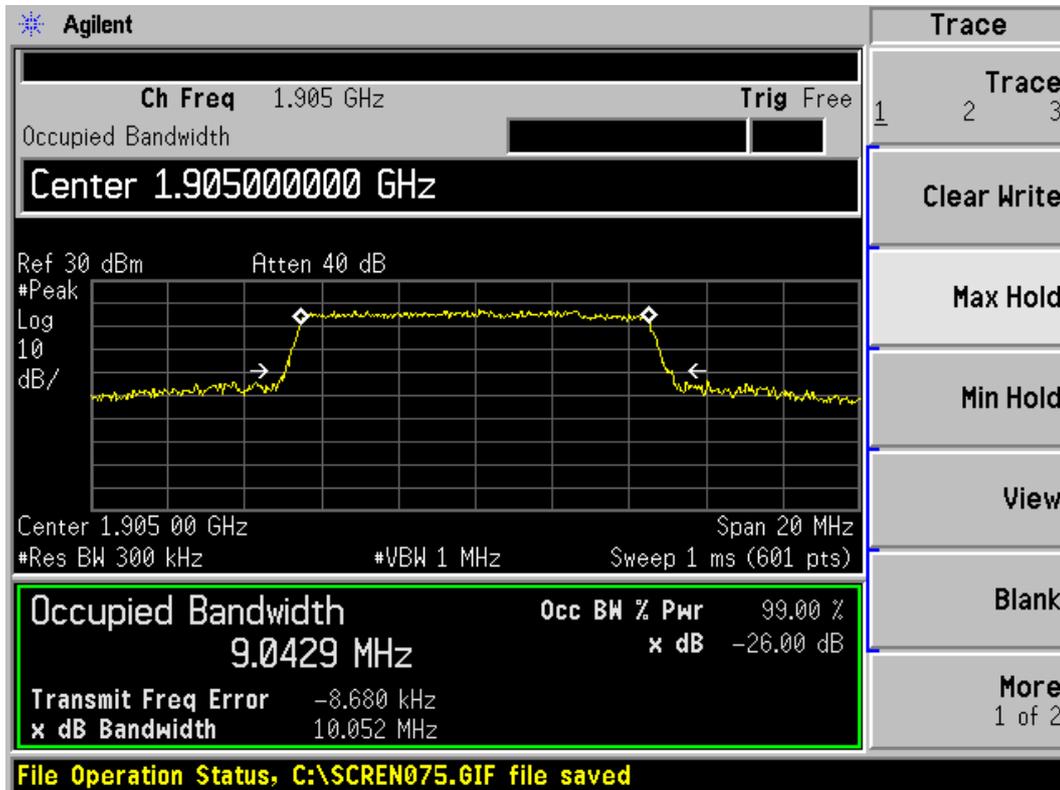


LTE Band 2 16QAM Bandwidth = 10MHz CH18650 Occupied Bandwidth

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LTE Band 2 16QAM Bandwidth = 10MHz CH18900 Occupied Bandwidth



LTE Band 2 16QAM Bandwidth = 10MHz CH19150 Occupied Bandwidth

2.5. Band Edge Compliance

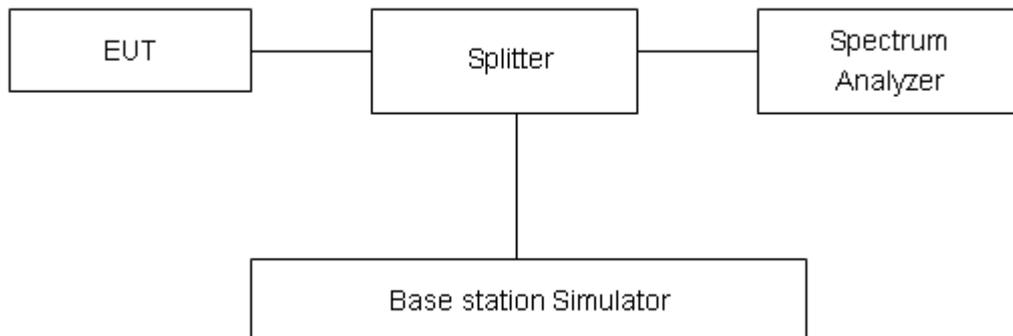
Ambient condition

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 band edge of the lowest and highest channels were measured. 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 24.238(a) specifies that “on any frequency outside a licensee’s frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10} (P)$ 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 PCS	Carrier frequency (MHz)	Reference value (dBm)	Limit	Conclusion
RC3 SO55(Loopback)	1850.0	-14.784	-13	PASS
	1910.0	-18.823	-13	PASS
RC3 SO32(+FCH-SCH)	1850.0	-14.743	-13	PASS
	1910.0	-15.181	-13	PASS
EVDO (Rev.0)	1850.0	-15.96	-13	PASS
	1910.0	-15.51	-13	PASS
EVDO (Rev.A)	1850.0	-17.14	-13	PASS
	1910.0	-16.08	-13	PASS
1X Advance SO75	1850.0	-18.28	-13	PASS
	1910.0	-20.92	-13	PASS



CDMA PCS SO55 25 Channel

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CDMA PCS SO55 1175 Channel



CDMA PCS SO32 25 Channel

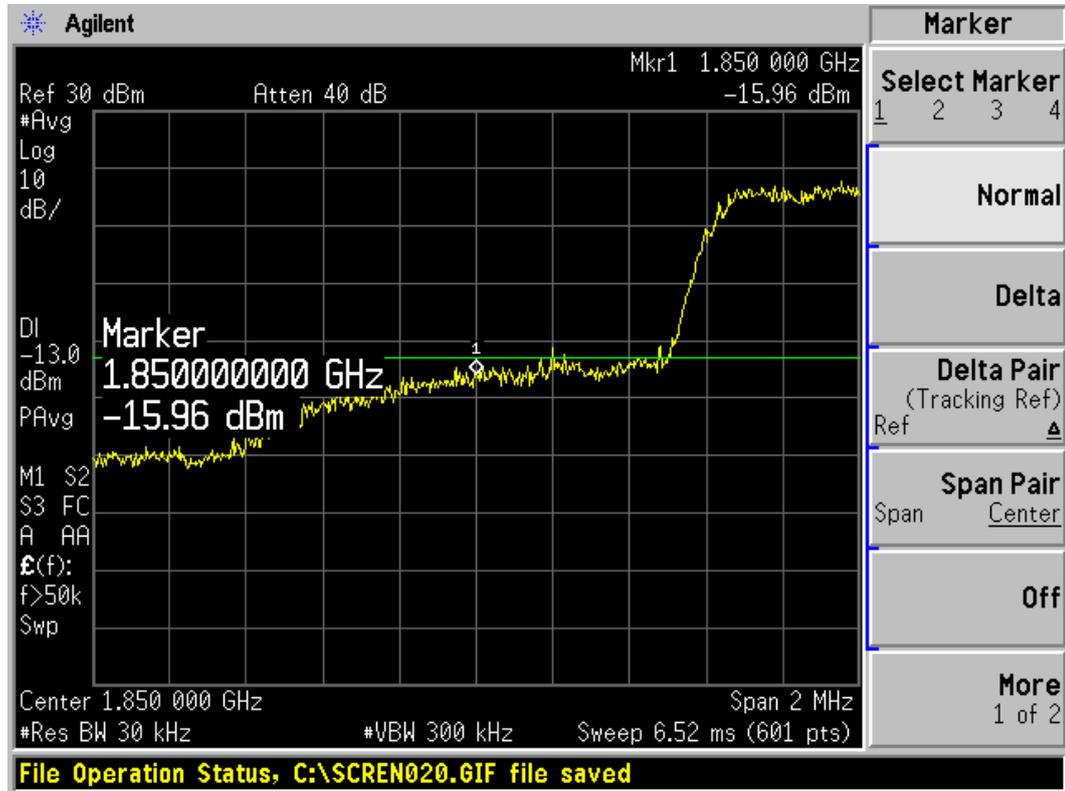
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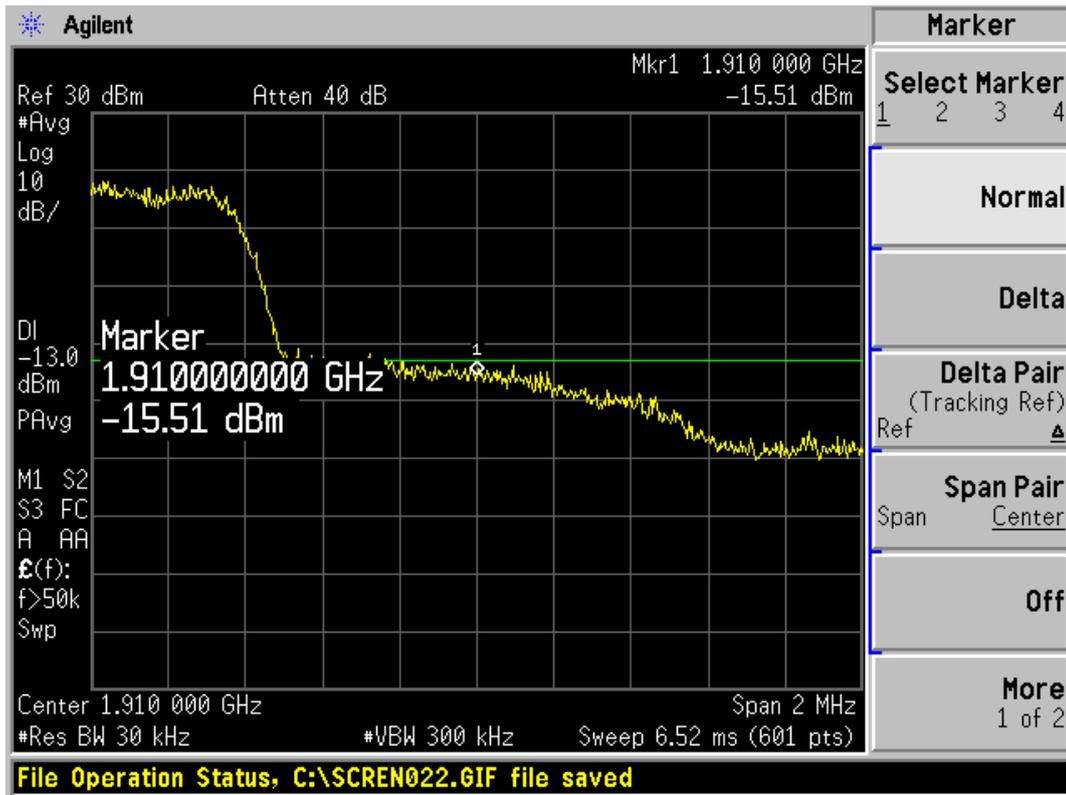


CDMA PCS SO32 1175 Channel

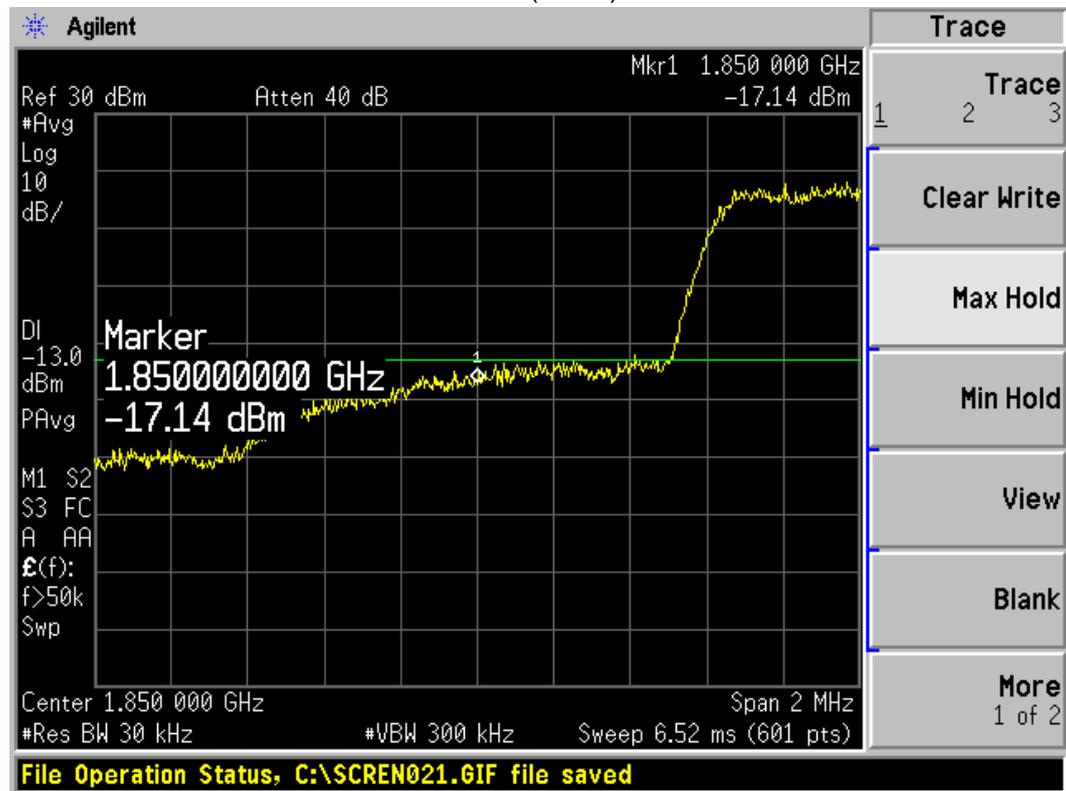


CDMA PCS EV-DO(Rev.0) 25 Channel

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CDMA PCS EV-DO(Rev.0) 1175Channel

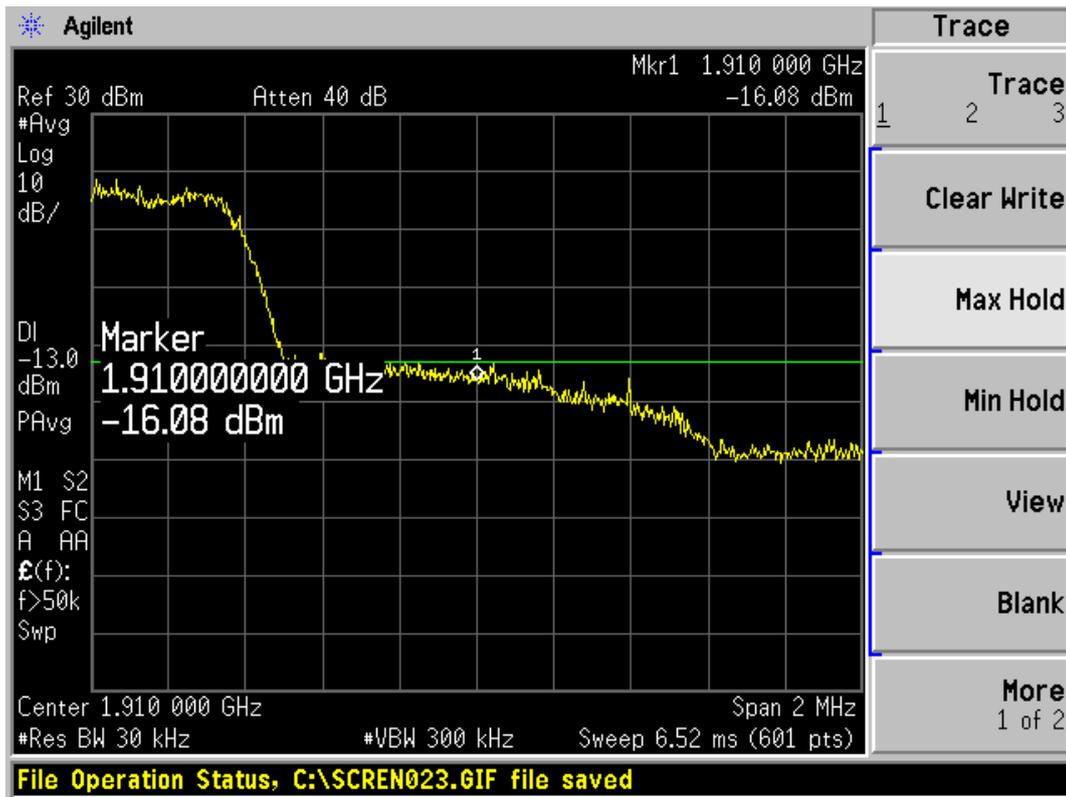


CDMA PCS EV-DO(Rev.A) 25 Channel

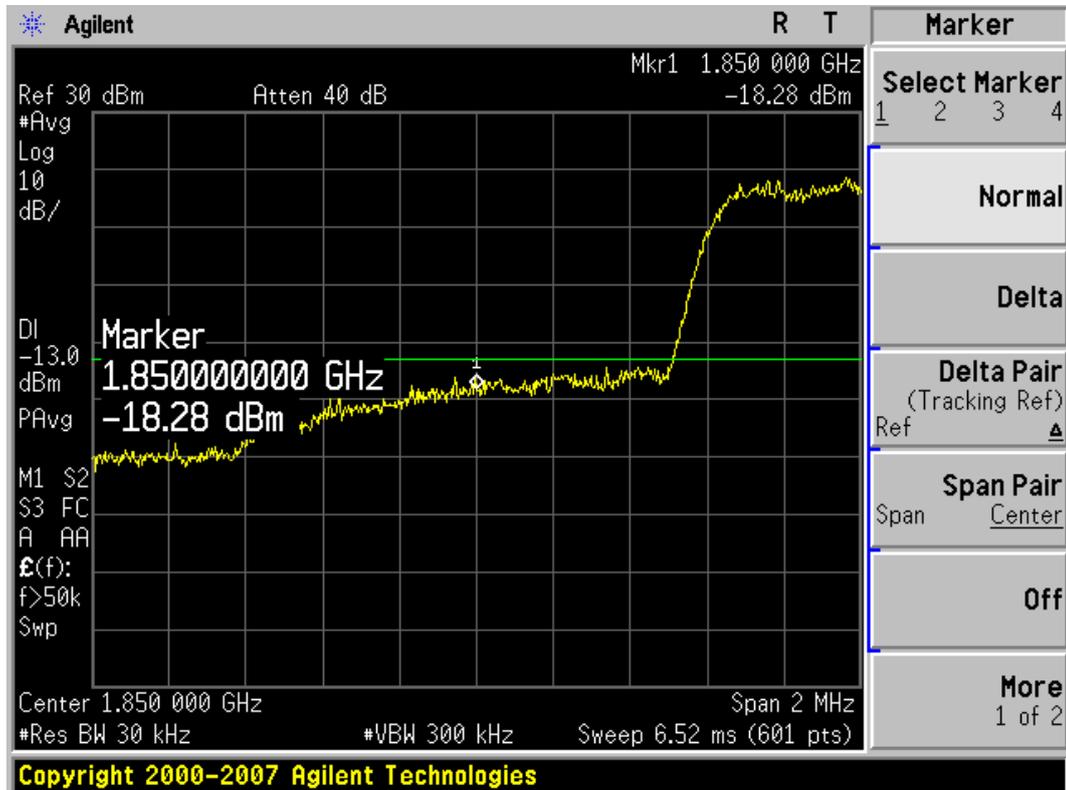
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CDMA PCS EV-DO(Rev.A) 1175Channel

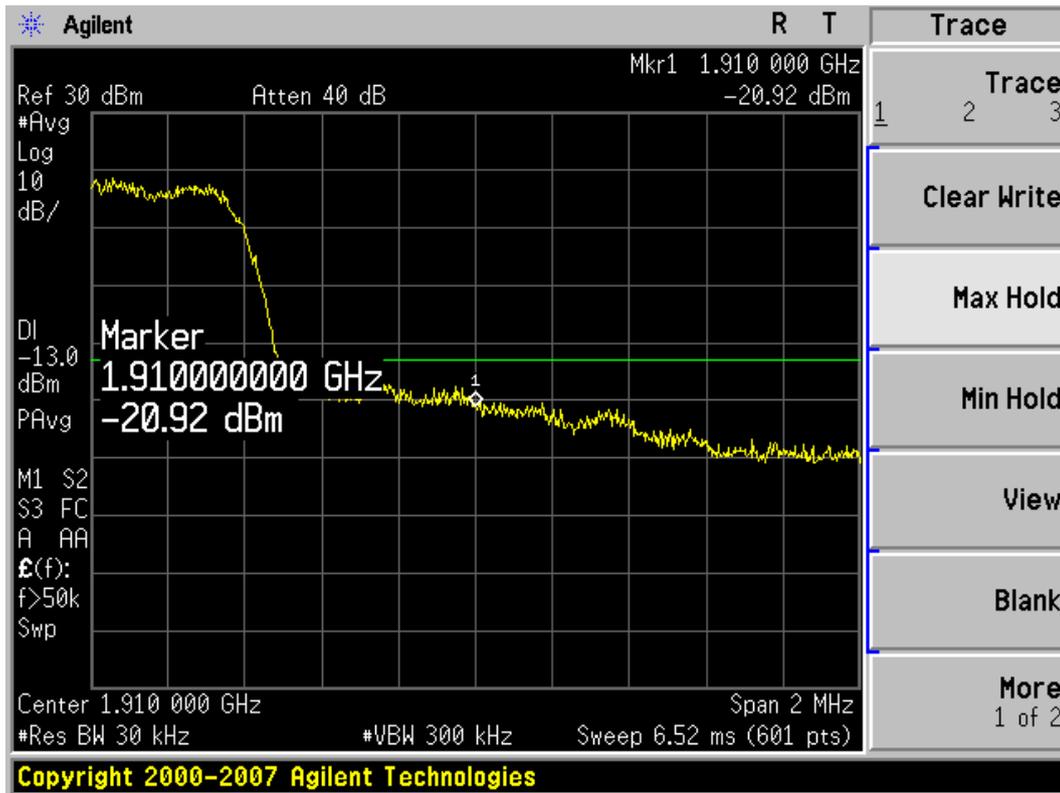


CDMA PCS 1X Advance 25 Channel

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CDMA PCS 1X Advance 1175Channel

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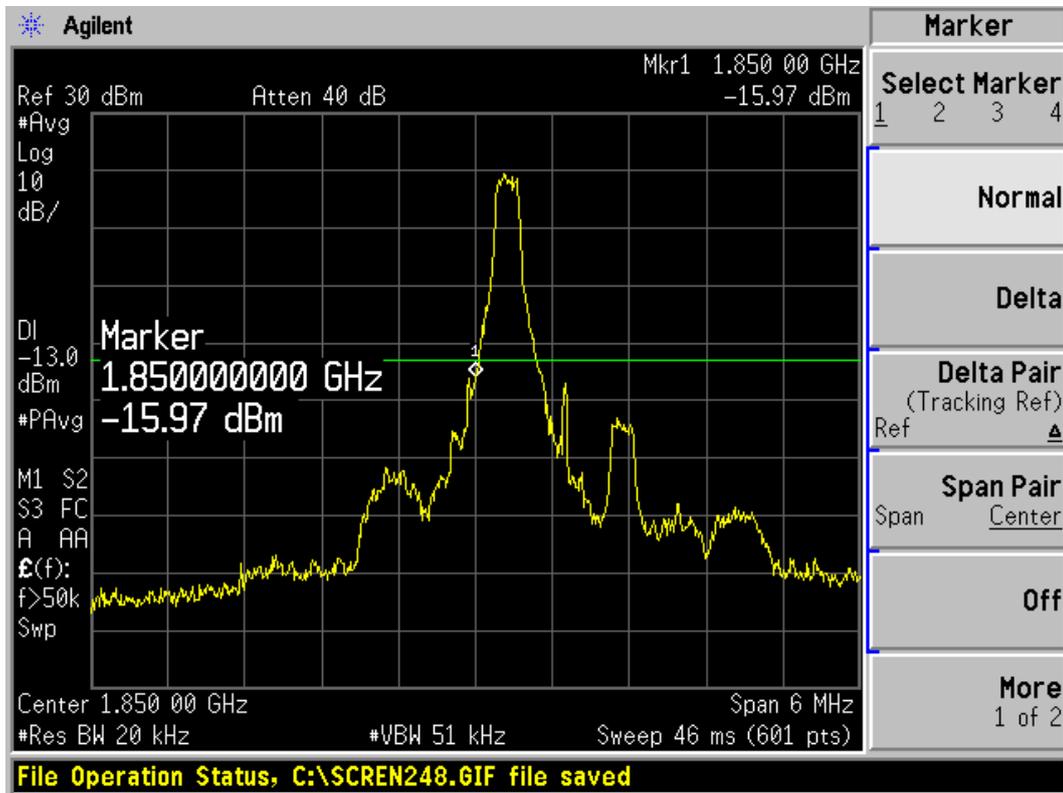
LTE Band 2							
Bandwidth	Modulation	Channel	RB	RB Start	Reference value (dBm)	Limit	Conclusion
1.4MHz	QPSK	CH18607	1	0	-15.97	-13	PASS
			3	0	-16.88	-13	PASS
			6	0	-20.08	-13	PASS
		CH19193	1	5	-15.69	-13	PASS
			3	3	-14.16	-13	PASS
			6	0	-23.03	-13	PASS
	16QAM	CH18607	1	0	-17.85	-13	PASS
			3	0	-17.12	-13	PASS
			6	0	-21.86	-13	PASS
		CH19193	1	5	-17.62	-13	PASS
			3	3	-15.85	-13	PASS
			6	0	-21.05	-13	PASS
3MHz	QPSK	CH18615	1	0	-15.04	-13	PASS
			8	0	-16.98	-13	PASS
			15	0	-21.45	-13	PASS
		CH19185	1	14	-15.86	-13	PASS
			8	7	-18.65	-13	PASS
			15	0	-22.42	-13	PASS
	16QAM	CH18615	1	0	-15.45	-13	PASS
			8	0	-17.04	-13	PASS
			15	0	-23.60	-13	PASS
		CH19185	1	14	-16.13	-13	PASS
			8	7	-18.28	-13	PASS
			15	0	-26.50	-13	PASS
5MHz	QPSK	CH18625	1	0	-14.75	-13	PASS
			12	0	-16.62	-13	PASS
			25	0	-21.70	-13	PASS
		CH19175	1	24	-14.99	-13	PASS
			12	13	-19.10	-13	PASS
			25	0	-22.98	-13	PASS
	16QAM	CH18625	1	0	-15.07	-13	PASS
			12	0	-18.80	-13	PASS

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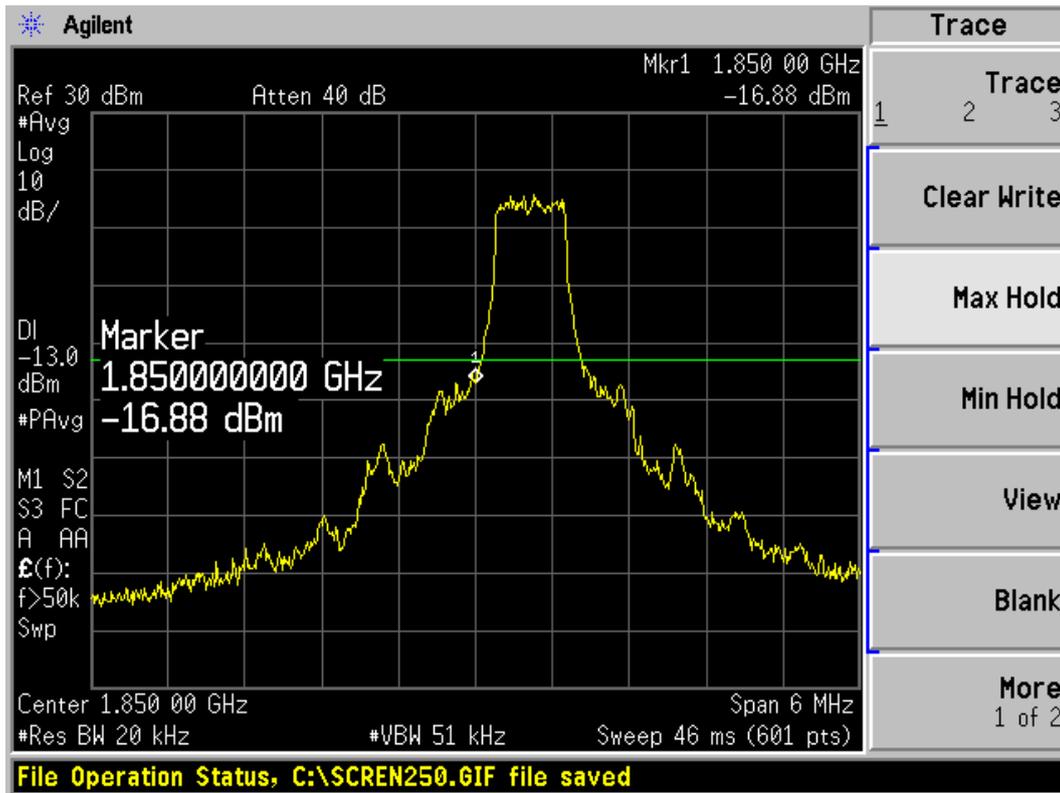
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10MHz	QPSK	CH19175	25	0	-21.02	-13	PASS
			1	24	-14.34	-13	PASS
			12	13	-21.01	-13	PASS
			25	0	-21.83	-13	PASS
	16QAM	CH18650	1	0	-20.31	-13	PASS
			25	0	-21.97	-13	PASS
			50	0	-25.33	-13	PASS
		CH19150	1	49	-19.58	-13	PASS
			25	25	-19.60	-13	PASS
			50	0	-23.16	-13	PASS
		CH18650	1	0	-22.57	-13	PASS
			25	0	-22.14	-13	PASS
50	0		-25.87	-13	PASS		
CH19150	1	49	-22.57	-13	PASS		
	25	25	-20.55	-13	PASS		
	50	0	-22.01	-13	PASS		

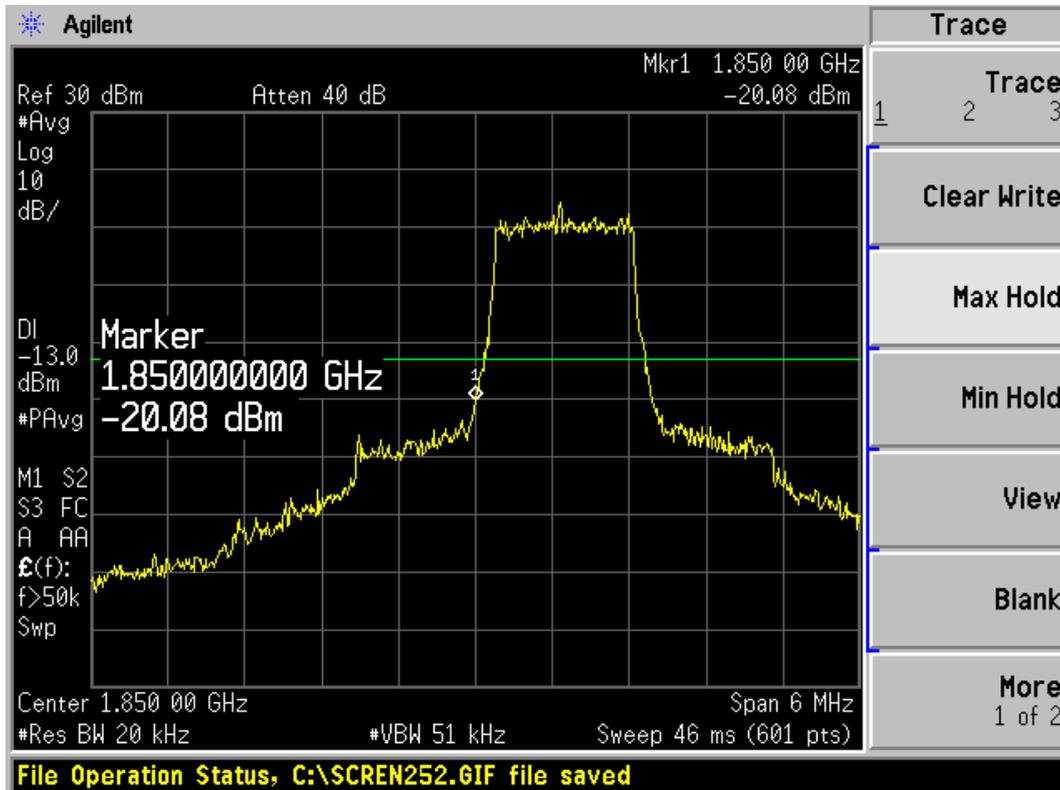


LTE Band 2 QPSK Bandwidth = 1.4MHz CH18607, RB 1

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LTE Band 2 QPSK Bandwidth = 1.4MHz CH18607,RB 3

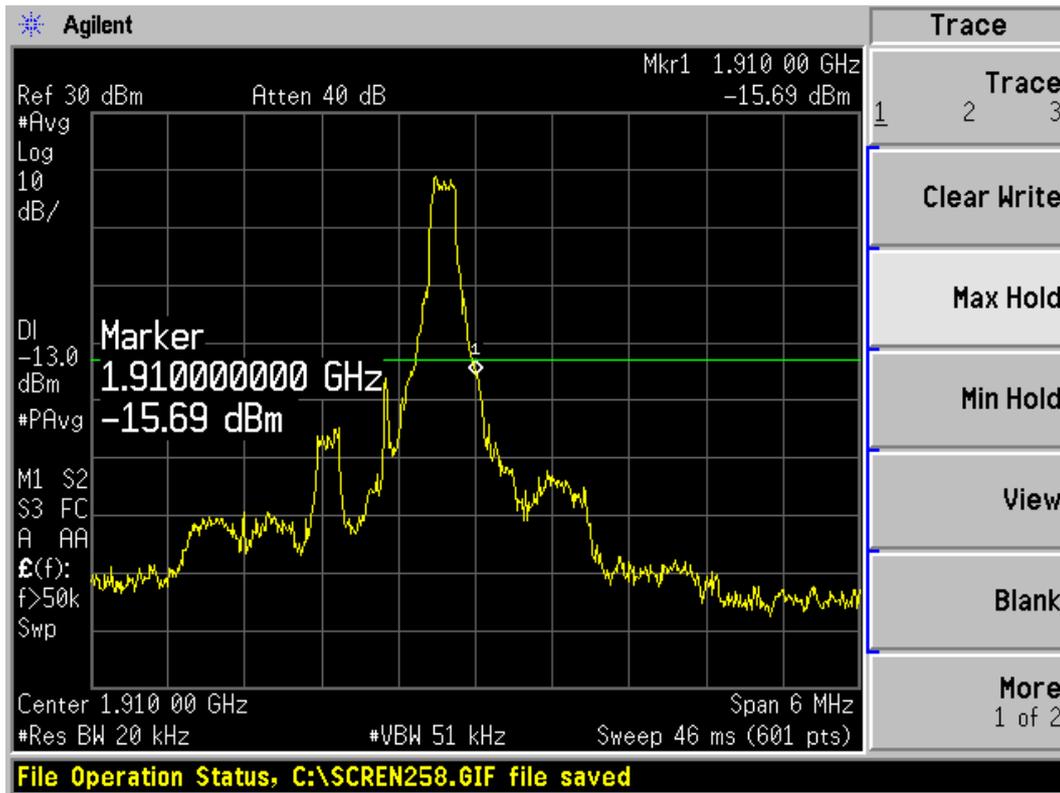


LTE Band 2 QPSK Bandwidth = 1.4MHz CH18607,RB 6

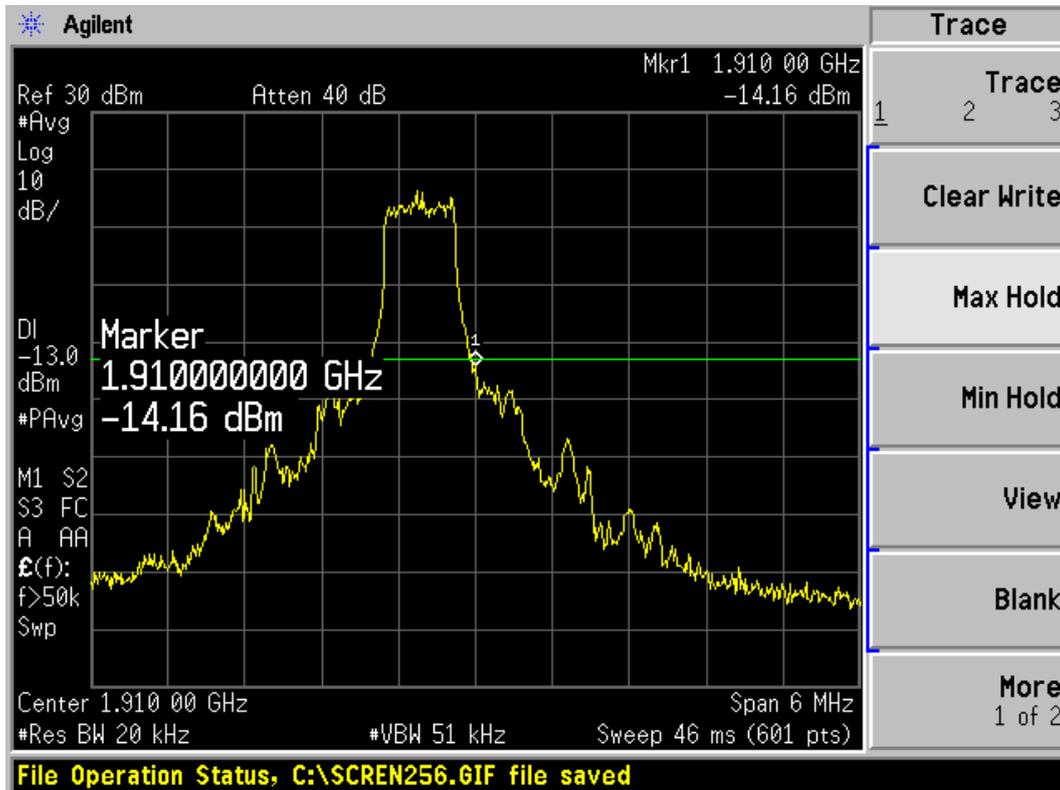
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LTE Band 2 QPSK Bandwidth = 1.4MHz CH19193,RB 1

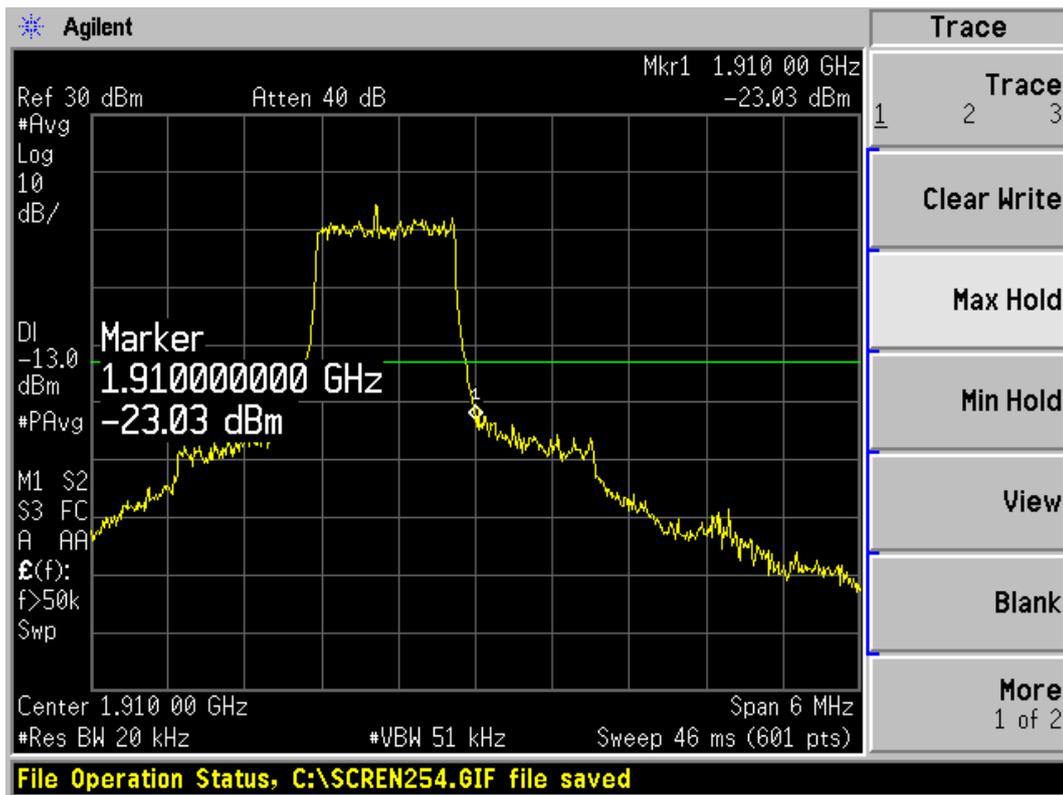


LTE Band 2 QPSK Bandwidth = 1.4MHz CH19193,RB 3

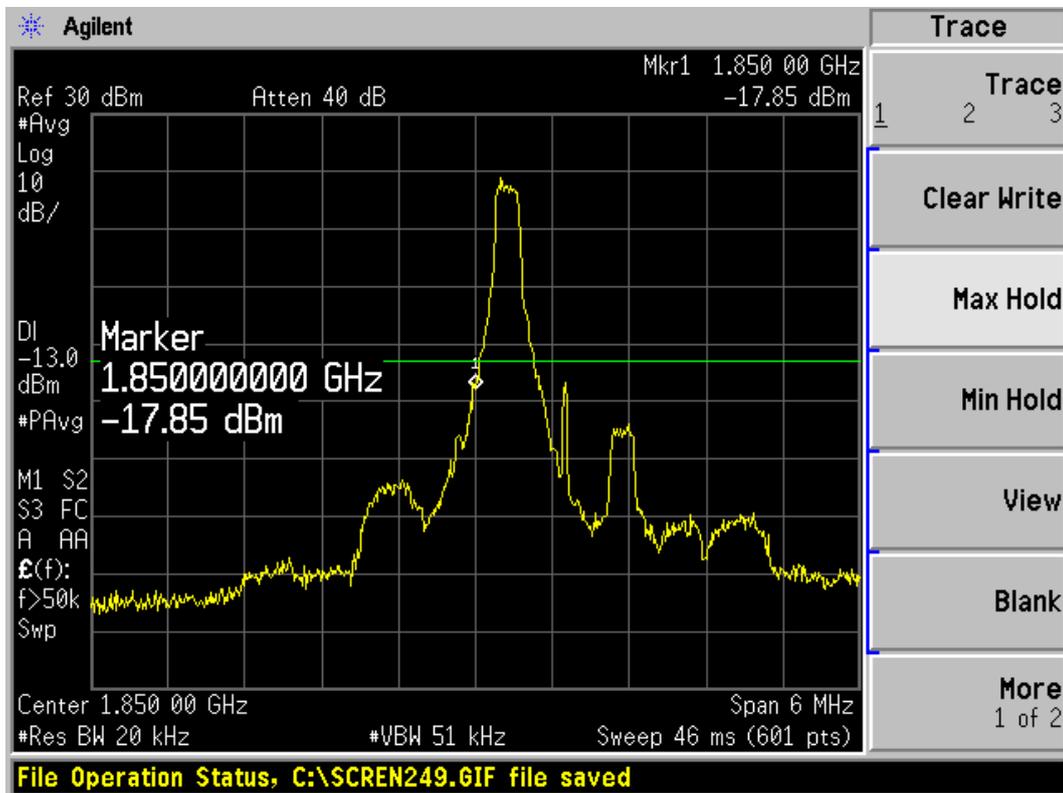
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LTE Band 2 QPSK Bandwidth = 1.4MHz CH19193, RB 6

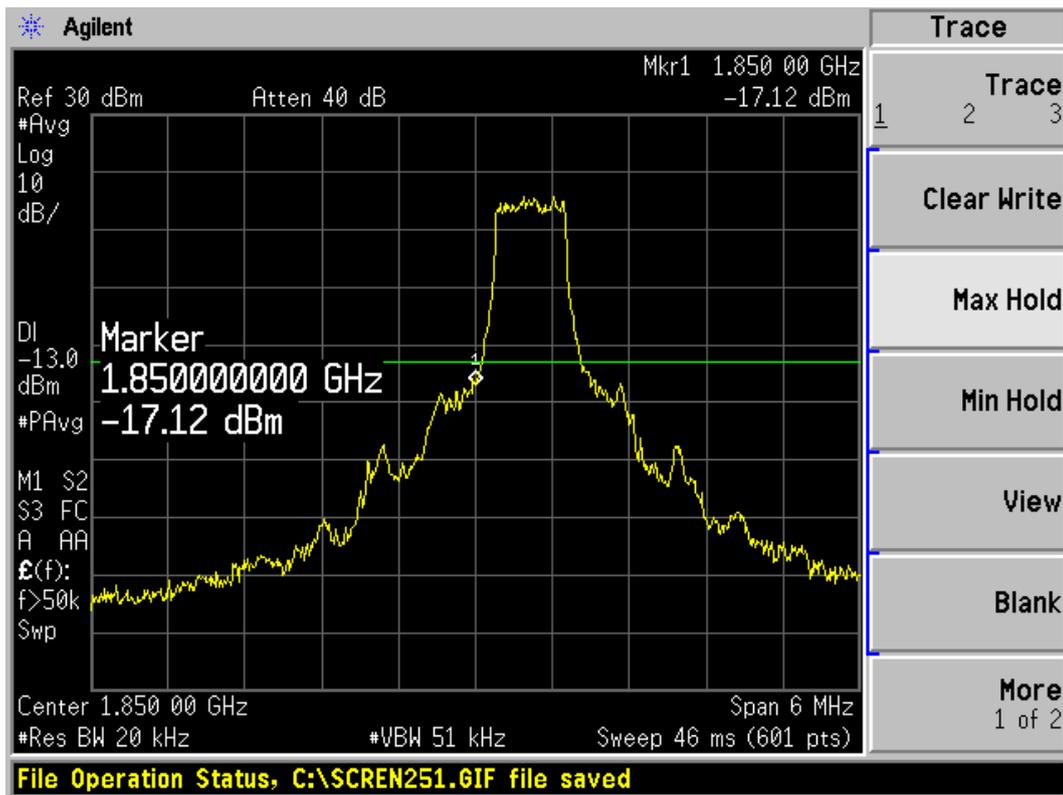


LTE Band 2 16QAM Bandwidth = 1.4MHz CH18607, RB 1

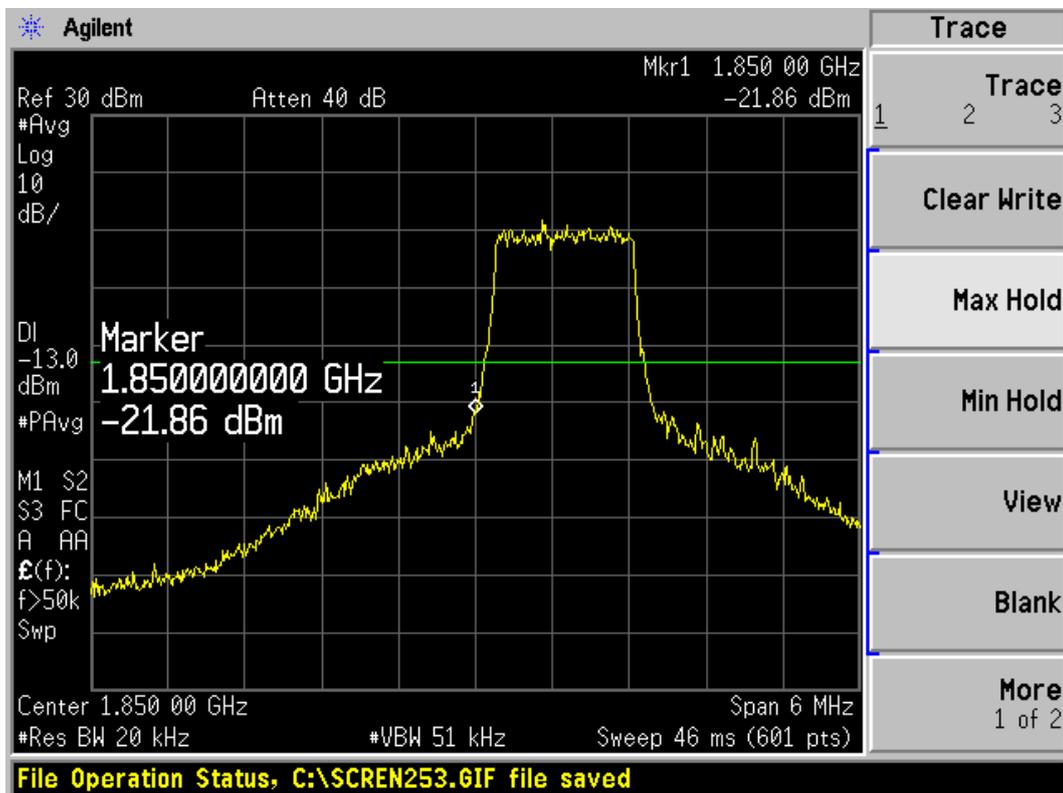
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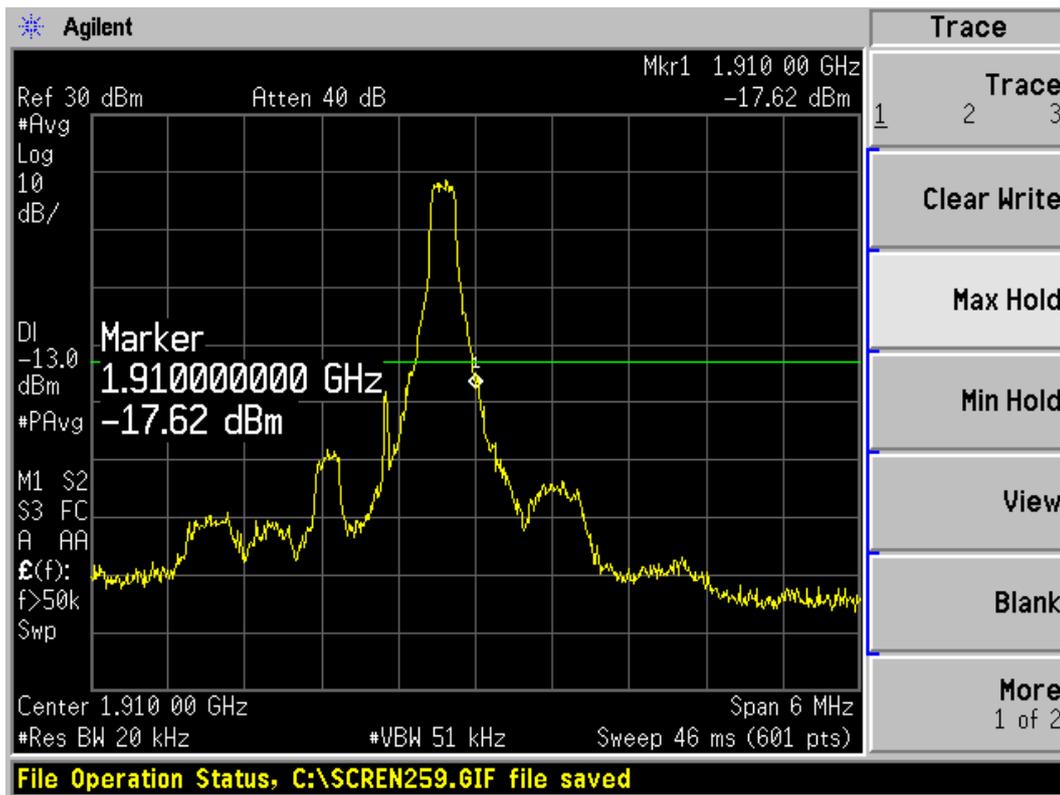


LTE Band 2 16QAM Bandwidth = 1.4MHz CH18607, RB 3

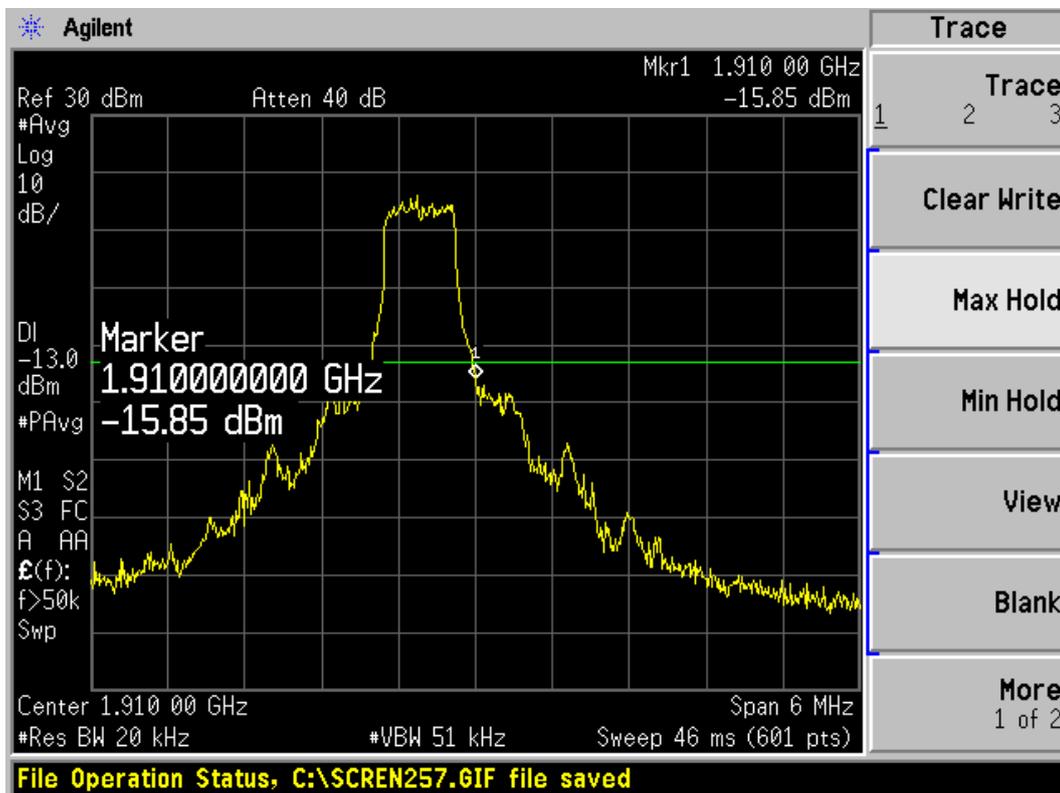


LTE Band 2 16QAM Bandwidth = 1.4MHz CH18607, RB 6

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LTE Band 2 16QAM Bandwidth = 1.4MHz CH19193,RB 1

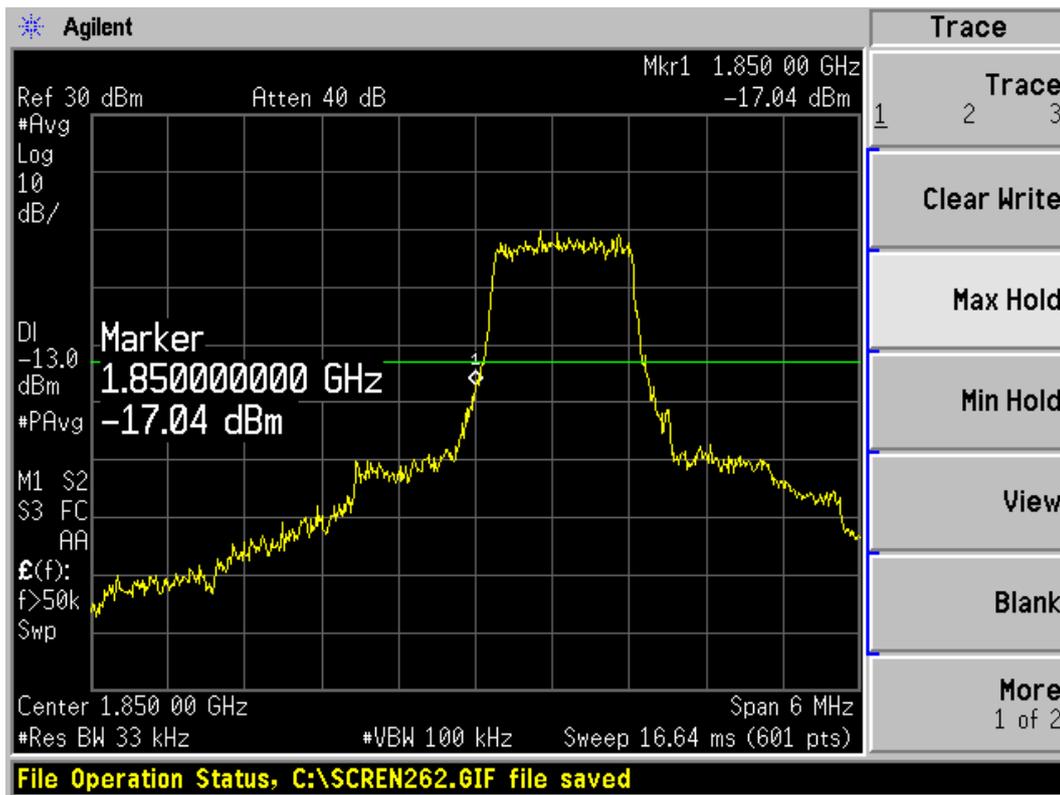


LTE Band 2 16QAM Bandwidth = 1.4MHz CH19193,RB 3

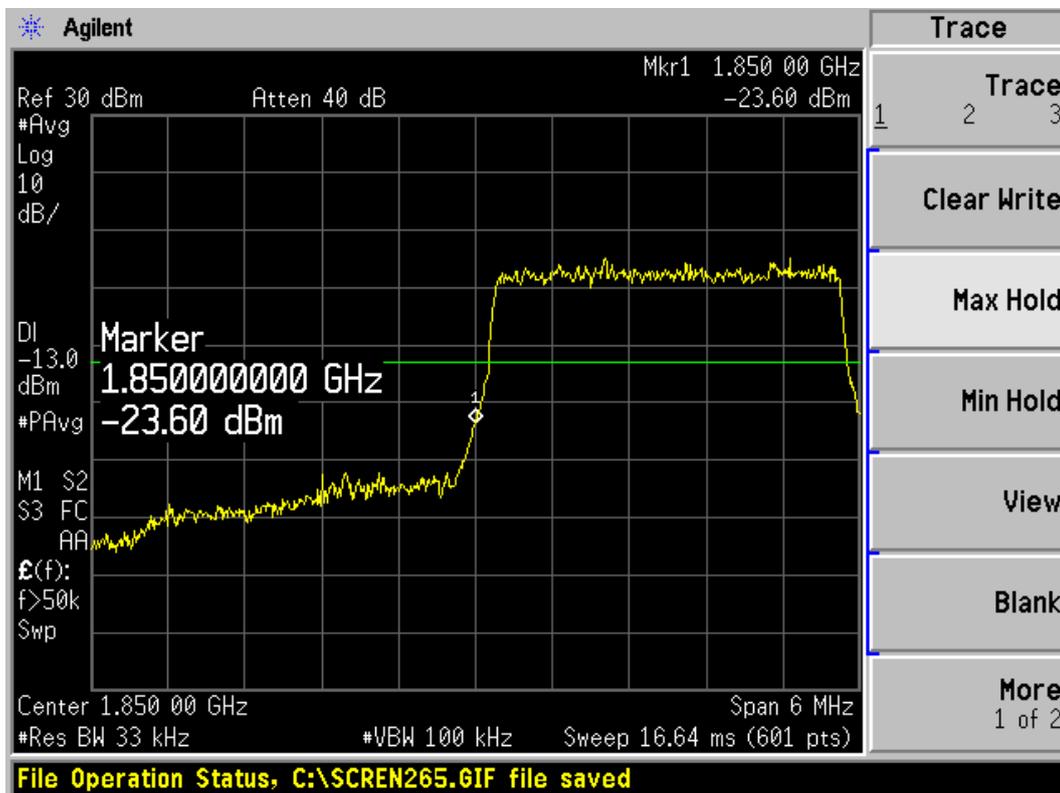
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LTE Band 2 16QAM Bandwidth = 3MHz CH18615, RB 8

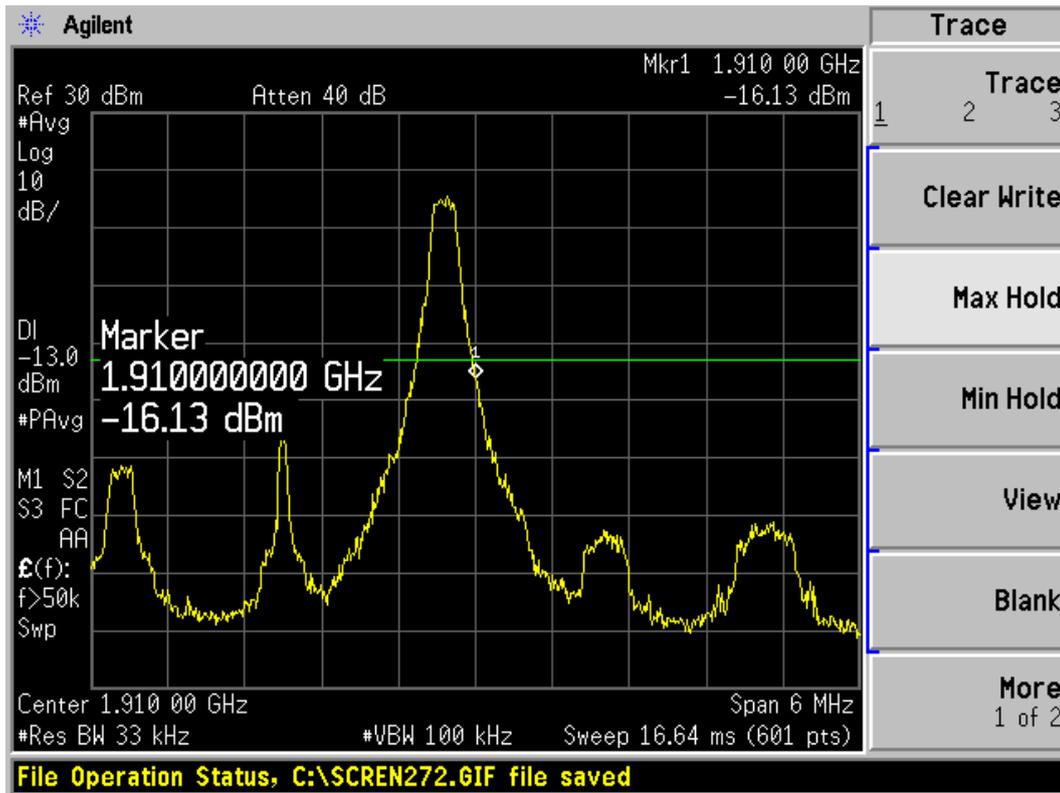


LTE Band 2 16QAM Bandwidth = 3MHz CH18615, RB 15

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LTE Band 2 16QAM Bandwidth = 3MHz CH19185, RB 1

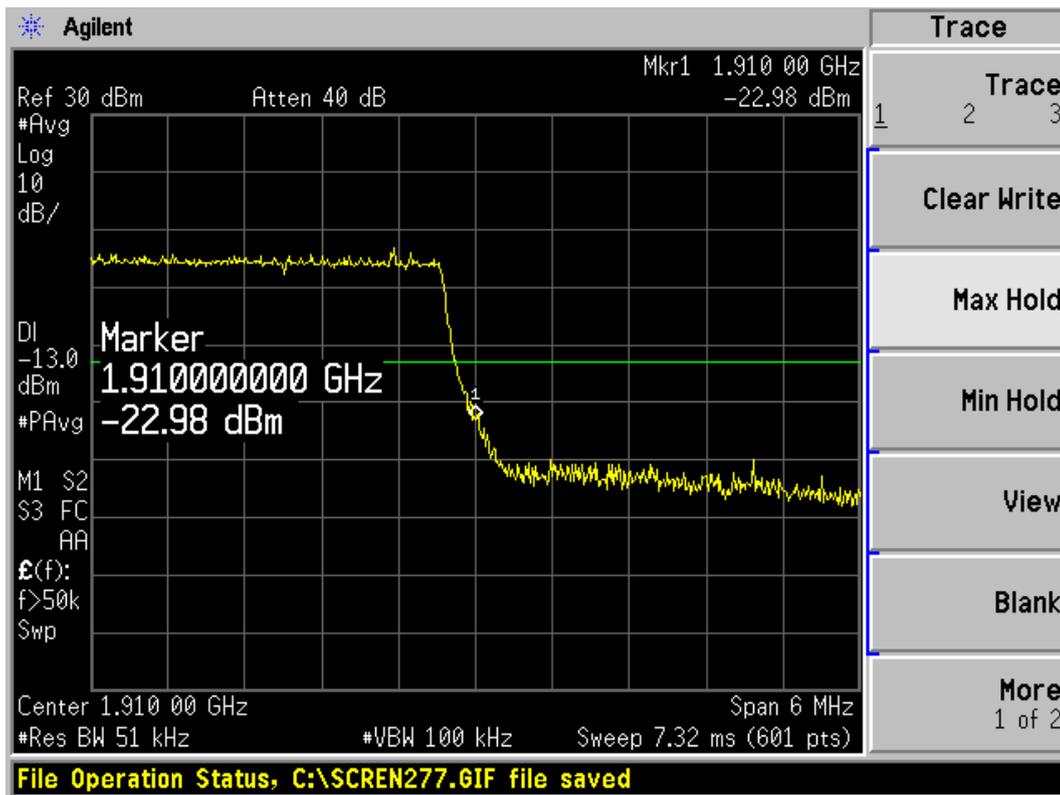


LTE Band 2 16QAM Bandwidth = 3MHz CH19185, RB 8

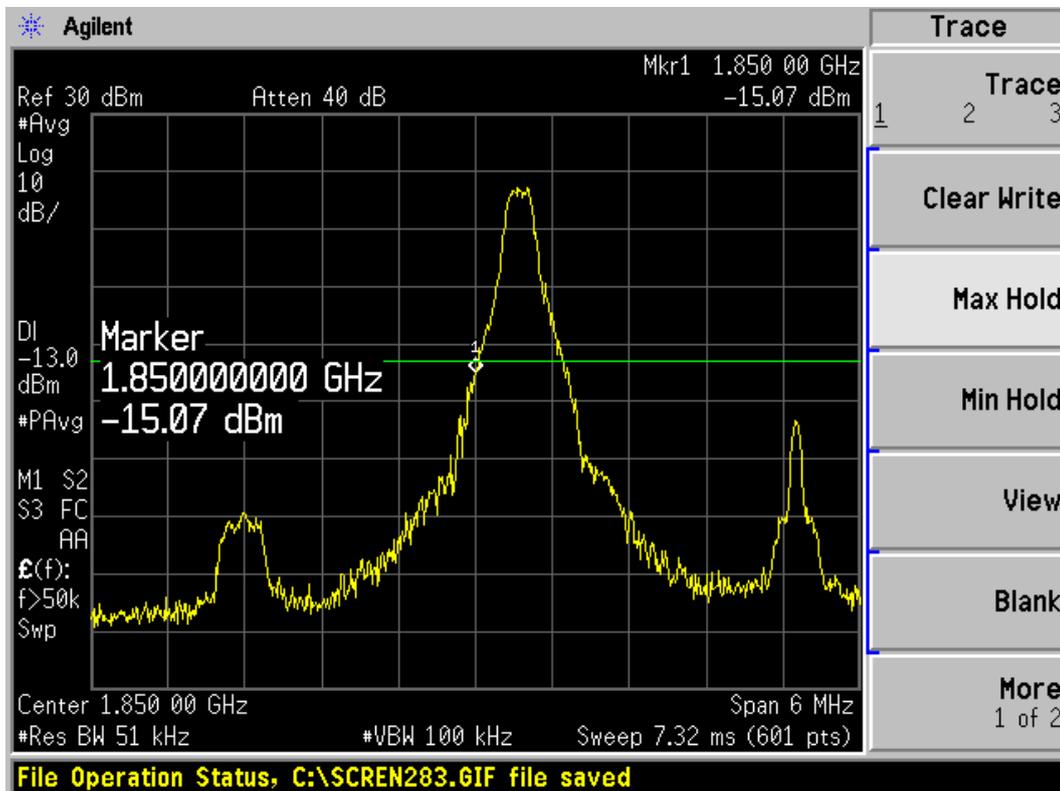
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LTE Band 2 QPSK Bandwidth = 5MHz CH19175, RB 25

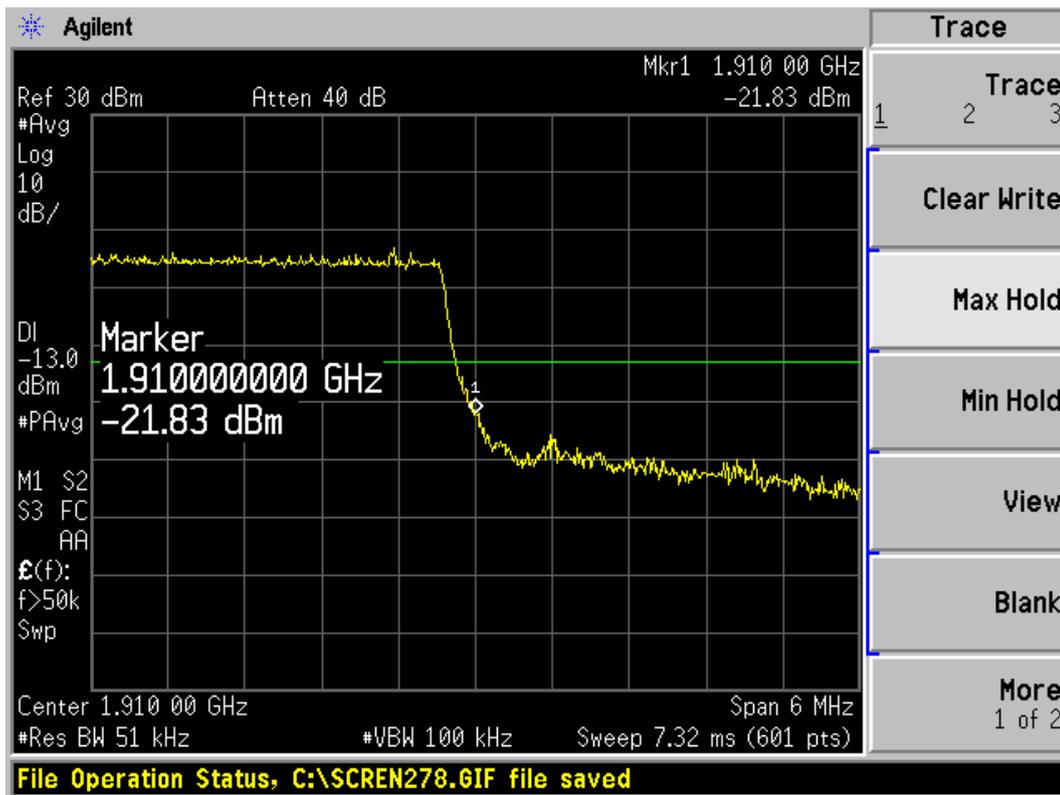


LTE Band 2 16QAM Bandwidth = 5MHz CH18625, RB 1

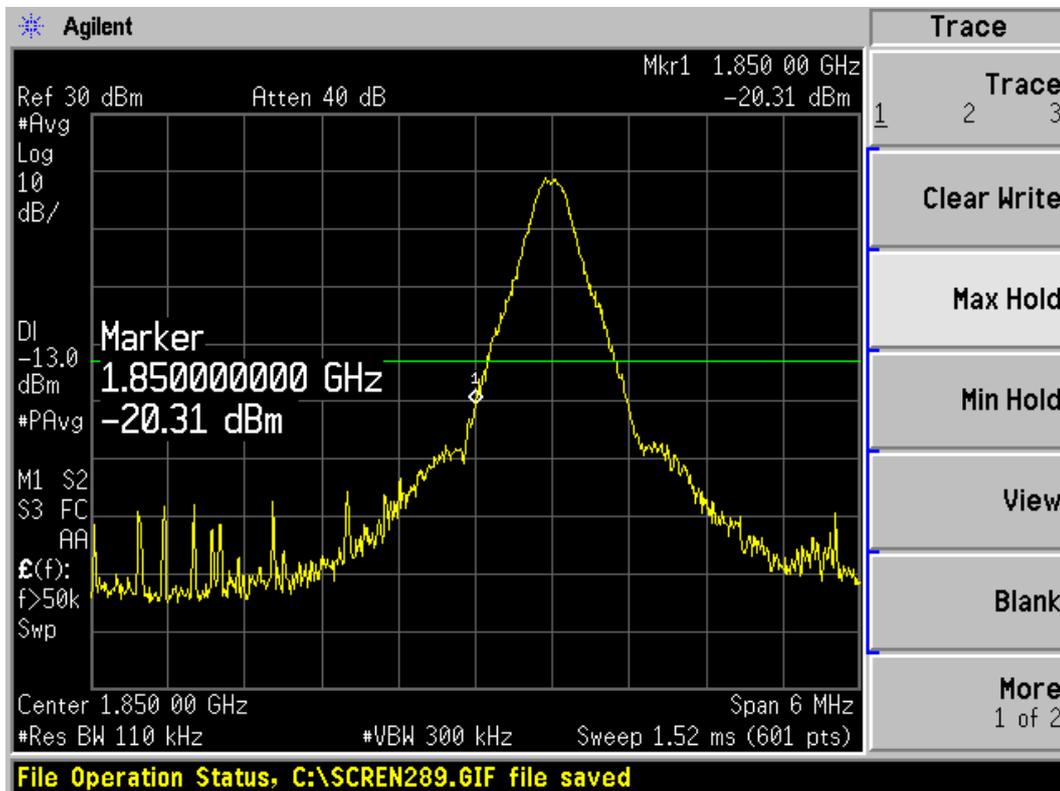
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LTE Band 2 16QAM Bandwidth = 5MHz CH19175,RB 25

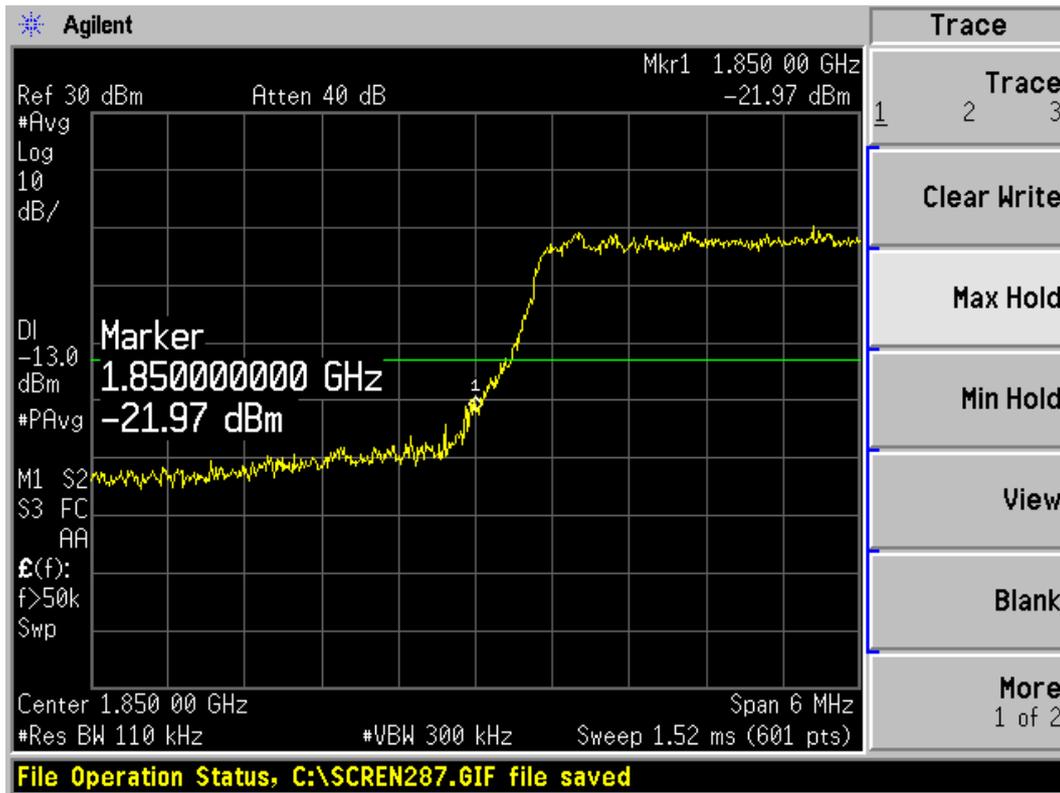


LTE Band 2 QPSK Bandwidth = 10MHz CH18650,RB 1

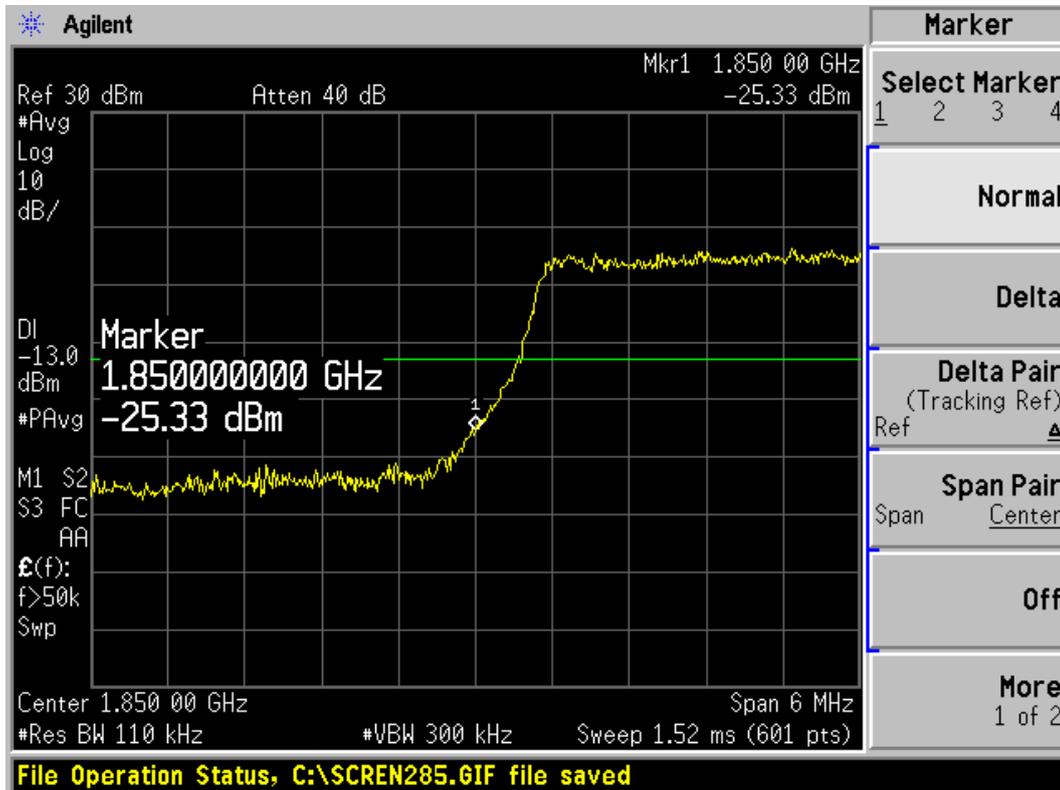
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LTE Band 2 QPSK Bandwidth = 10MHz CH18650,RB 25

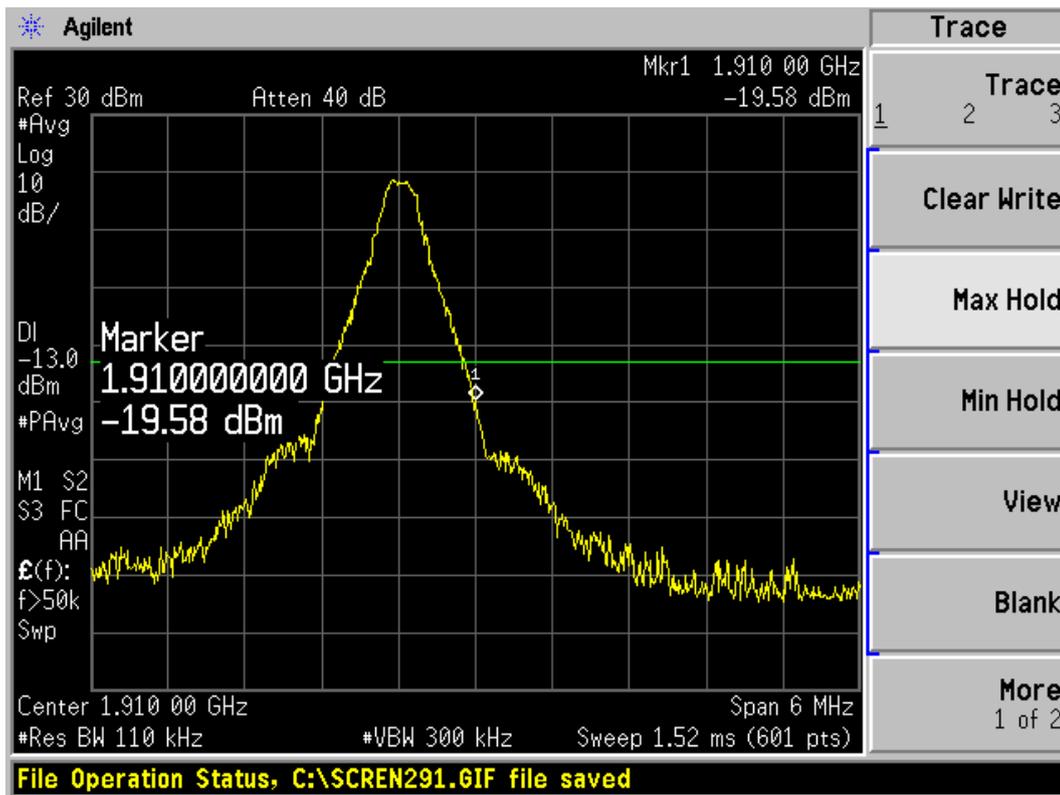


LTE Band 2 QPSK Bandwidth = 10MHz CH18650,RB 50

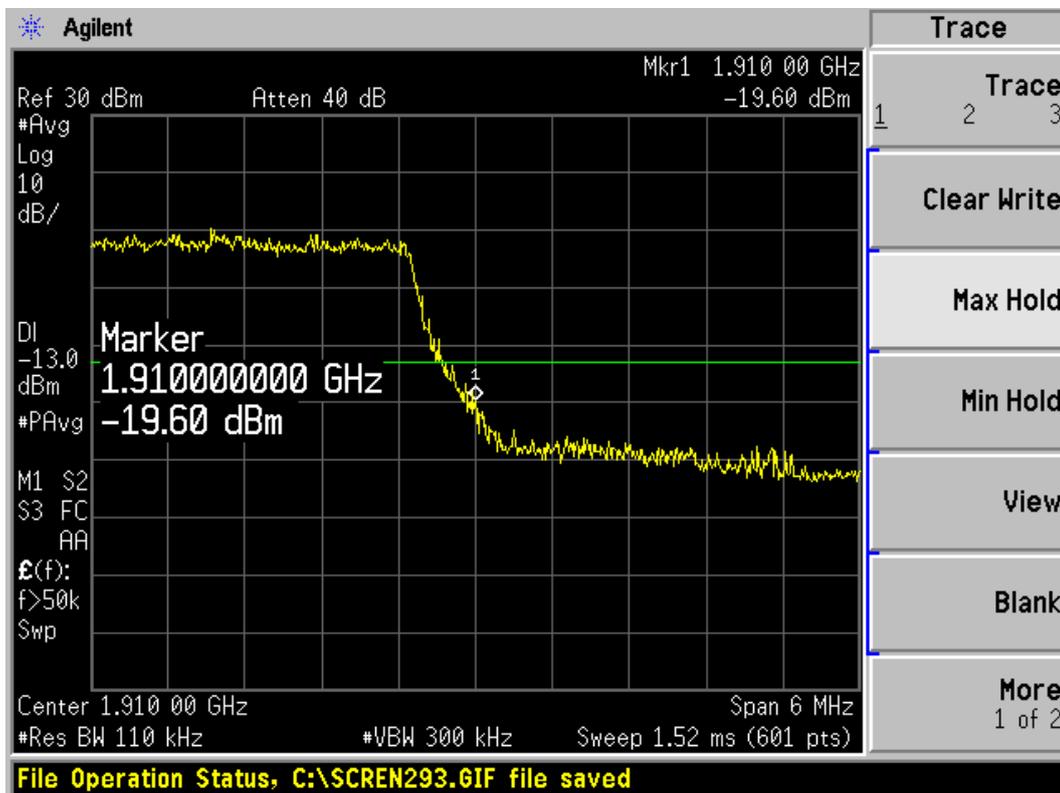
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LTE Band 2 QPSK Bandwidth = 10MHz CH19150, RB 1

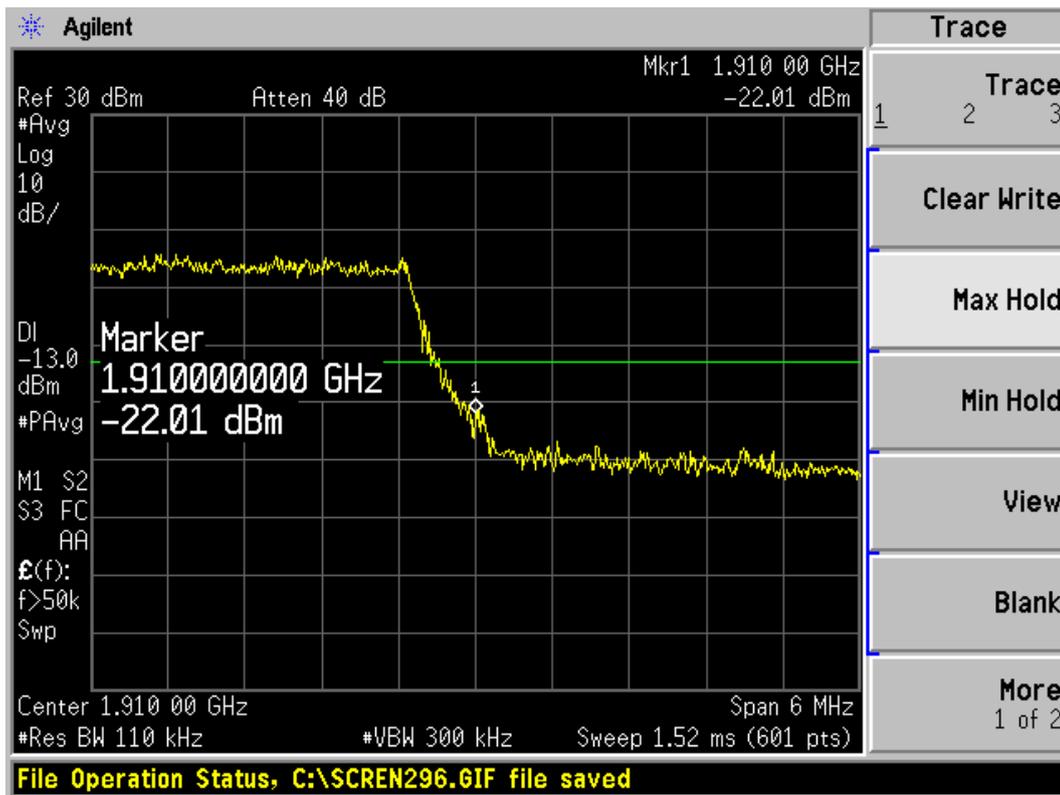


LTE Band 2 QPSK Bandwidth = 10MHz CH19150, RB 25

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LTE Band 2 16QAM Bandwidth = 10MHz CH19150, 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)

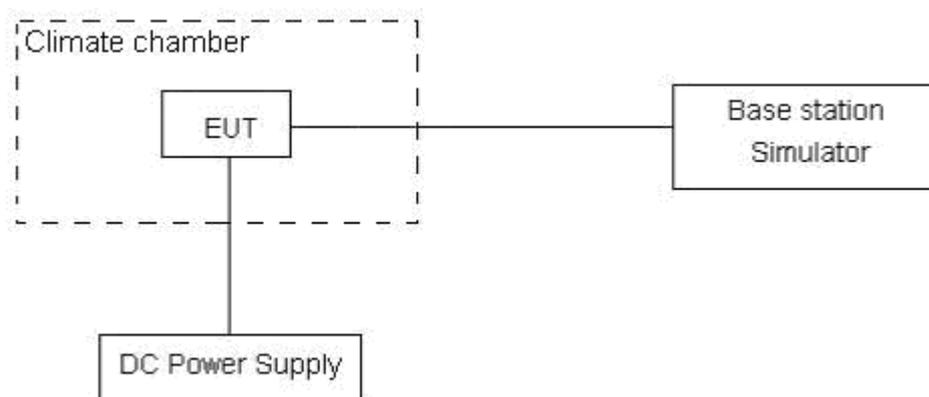
The frequency stability shall be measured with variation of primary supply voltage as follows:

(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



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Limits

No specific frequency stability requirements in part 24.235

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 PCS

Temperature (° C)	Test Results (ppm) / 3.8 V Power supply Channel 600				
	RC3 SO55(Loopback)	RC3 SO32(+FCH-SCH)	EV-DO Rev.0	EV-DO Rev.A	1X Advance
-30	0.0071	0.0057	0.0063	0.0065	0.0052
-20	0.0053	0.0047	0.0049	0.0051	0.0060
-10	0.0028	0.0055	0.0034	0.0060	0.0046
0	0.0037	0.0030	0.0044	0.0034	0.0034
10	0.0012	0.0015	0.0029	0.0028	0.0024
20	0.0018	0.0014	0.0017	0.0019	0.0012
30	0.0010	0.0006	0.0025	0.0017	0.0019
40	0.0016	0.0051	0.0031	0.0046	0.0033
50	0.0037	0.0058	0.0043	0.0052	0.0051

Voltage (V)	Test Results(ppm) / 20° C Channel 600				
	RC3 SO55(Loopback)	RC3 SO32(+FCH-SCH)	EV-DO Rev.0	EV-DO Rev.A	1X Advance
3.5	0.0036	0.0051	0.0038	0.0051	0.0044
3.8	0.0021	0.0048	0.0022	0.0045	0.0041
4.2	0.0031	0.0056	0.0036	0.0053	0.0046

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Test Report

LTE Band 2

Temperature (° C)	Test Results (ppm) / 3.8 V Power supply Channel 18900							
	QPSK, RB 1				16QAM, RB 1			
	Channel Bandwidth(MHz)				Channel Bandwidth(MHz)			
	1.4	3	5	10	1.4	3	5	10
-30	0.0076	0.0045	0.0026	0.0069	0.0098	0.0046	0.0032	0.0054
-20	0.0067	0.0058	0.0039	0.0087	0.0045	0.0046	0.0049	0.0064
-10	0.0046	0.0036	0.0067	0.0054	0.0025	0.0065	0.0054	0.0056
0	0.0045	0.0036	0.0034	0.0034	0.0063	0.0043	0.0034	0.0037
10	0.0086	0.0066	0.0084	0.0034	0.0035	0.0027	0.0097	0.0067
20	0.0027	0.0078	0.0067	0.0023	0.0075	0.0075	0.0065	0.0037
30	0.0066	0.0089	0.0077	0.0067	0.0027	0.0029	0.0085	0.0033
40	0.0035	0.0037	0.0037	0.0096	0.0056	0.0087	0.0085	0.0077
50	0.0076	0.0066	0.0085	0.0057	0.0064	0.0035	0.0084	0.0037

Voltage (V)	Test Results(ppm) / 20° C Channel 18900							
	QPSK, RB 1				16QAM, RB 1			
	Channel Bandwidth(MHz)				Channel Bandwidth(MHz)			
	1.4	3	5	10	1.4	3	5	10
3.5	0.0034	0.0057	0.0098	0.0086	0.0073	0.0054	0.0065	0.0085
3.8	0.0027	0.0078	0.0067	0.0023	0.0075	0.0075	0.0065	0.0037
4.2	0.0045	0.0069	0.0087	0.0097	0.0078	0.0076	0.0061	0.0065

2.7. Spurious Emissions at Antenna Terminals

Ambient condition

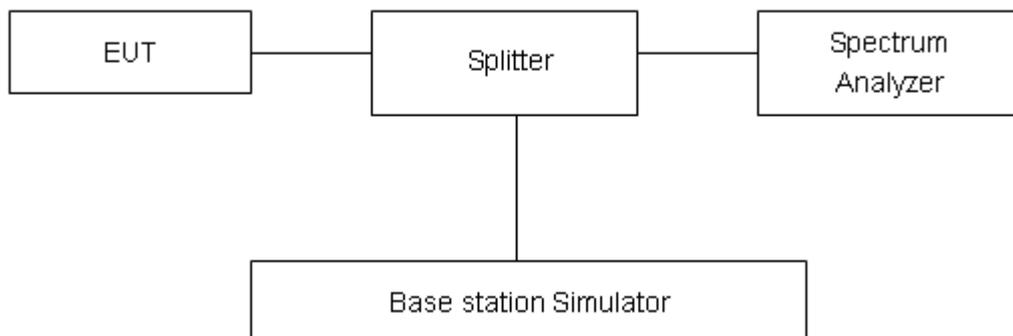
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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 PCS and LTE Band 2. The worst emission was recorded in the report.

Test setup



Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee’s frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.”

Limit	-13 dBm
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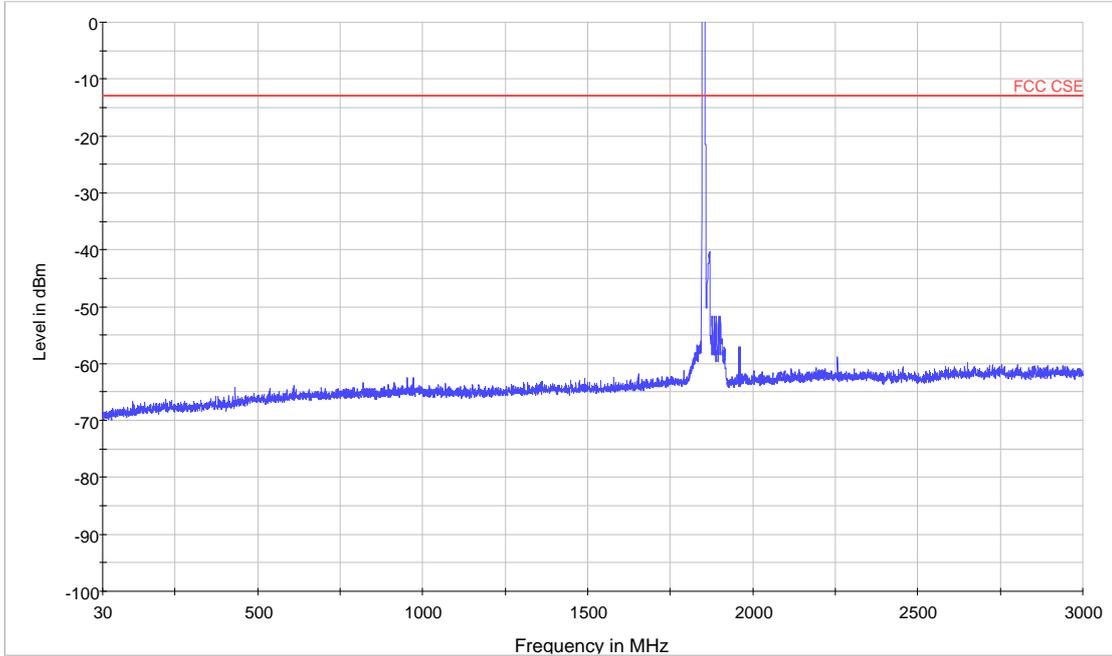
Measurement Uncertainty

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

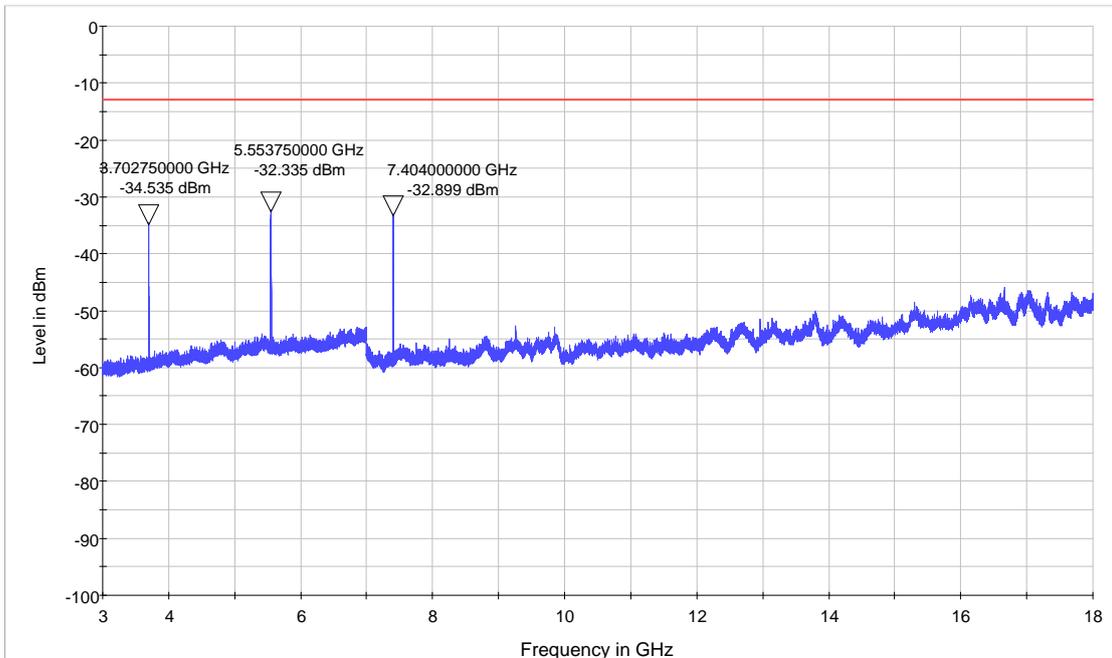
Frequency	Uncertainty
100kHz-2GHz	0.684 dB
Above 2GHz	1.407 dB

Test Result

CDMA PCS CH25



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

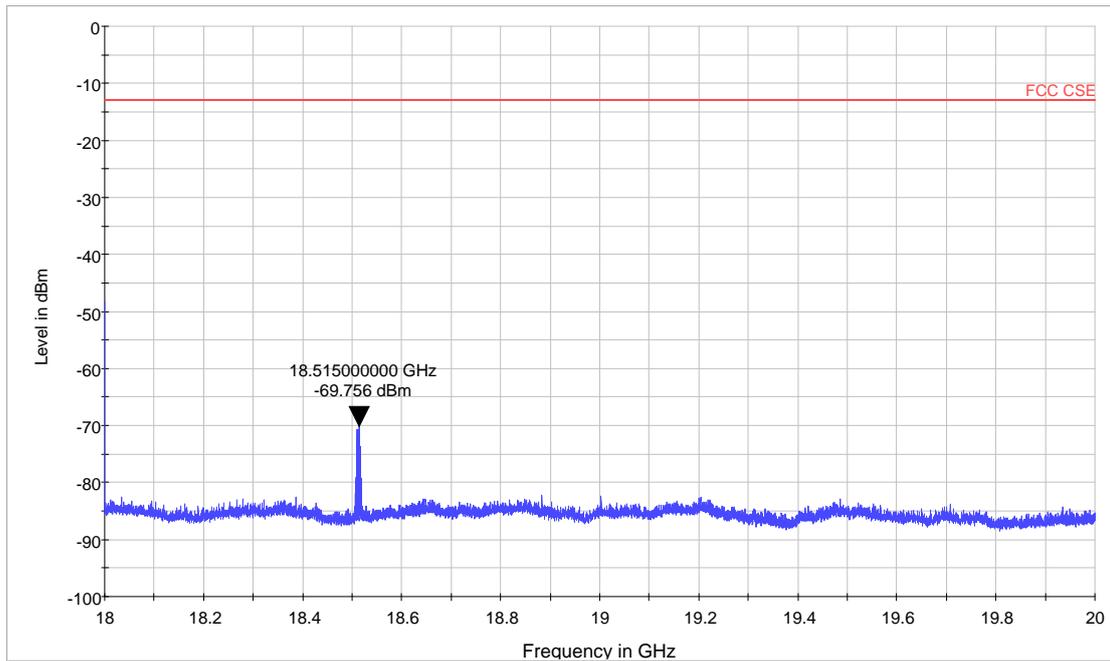


CDMA PCS 25 Channel 3GHz~18GHz

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CDMA PCS 25 Channel 18GHz~20GHz

Harmonic	TX ch.25 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3702.8	-34.54	-13	21.54
3	5553.8	-32.34	-13	19.34
4	7404.0	-32.90	-13	19.90
5	9257.3	Nf	-13	/
6	11107.5	Nf	-13	/
7	12958.75	Nf	-13	/
8	14810	Nf	-13	/
9	16661.25	-69.76	-13	56.76
10	18515	Nf	-13	/

Nf: noise floor

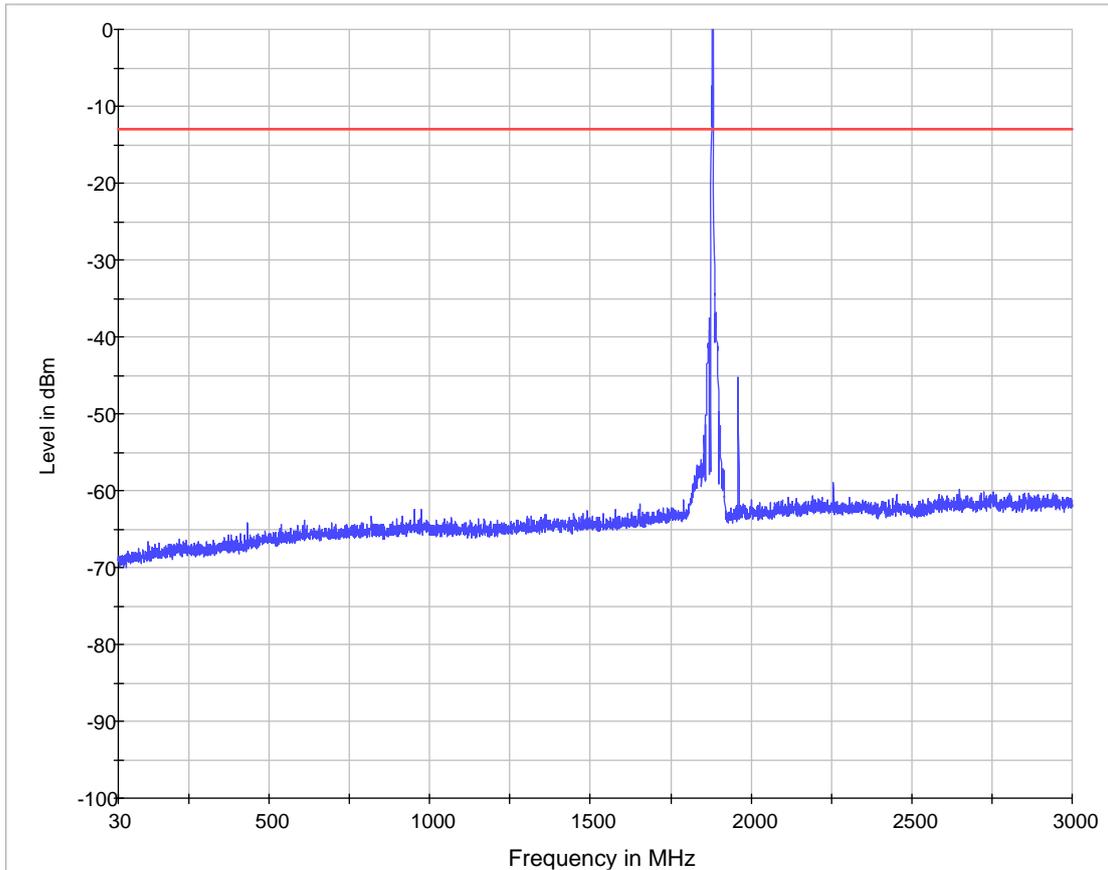
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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

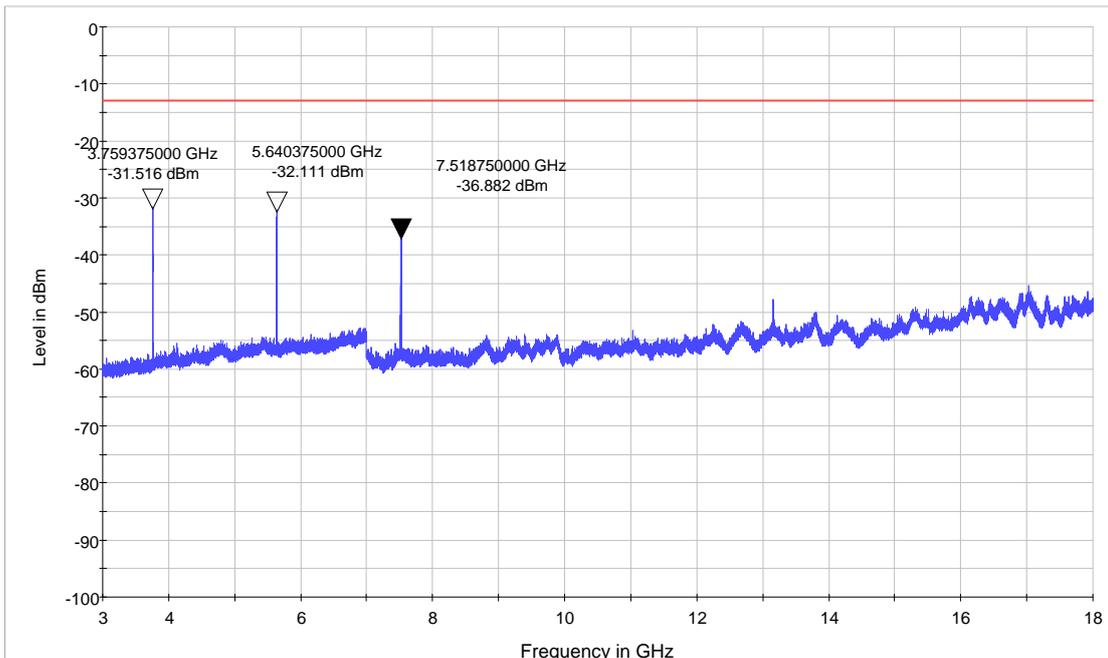
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CDMA PCS CH600



Note: The signal beyond the limit is carrier.
CDMA PCS 600 Channel 30MHz~3GHz



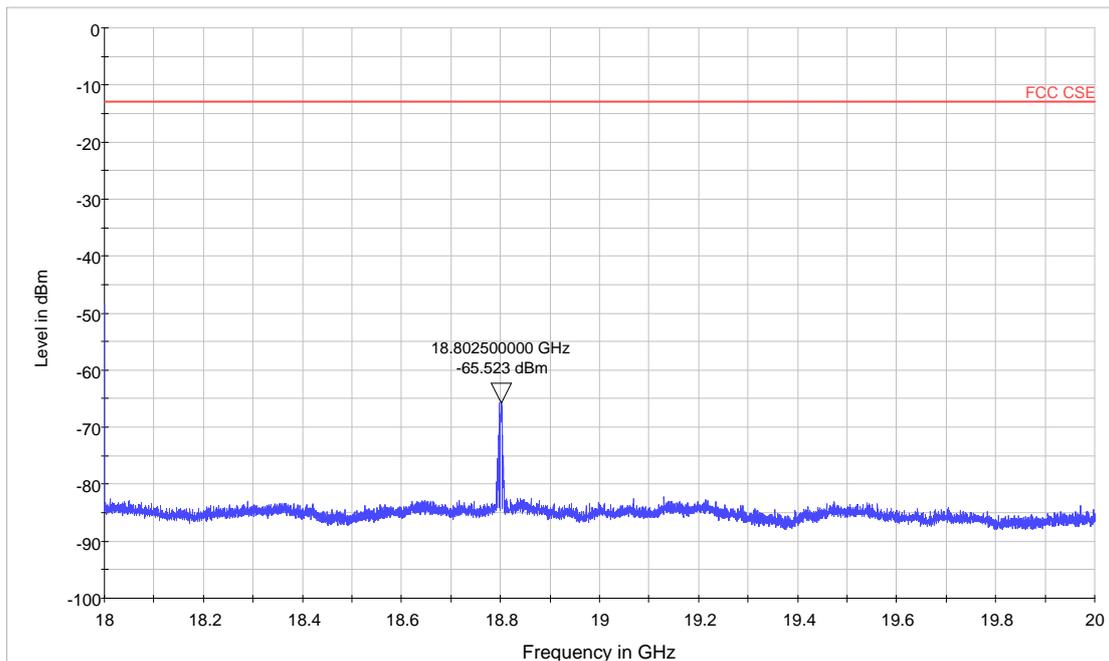
CDMA PCS 600 Channel 3GHz~18GHz

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CDMA PCS 600 Channel 18GHz~20GHz

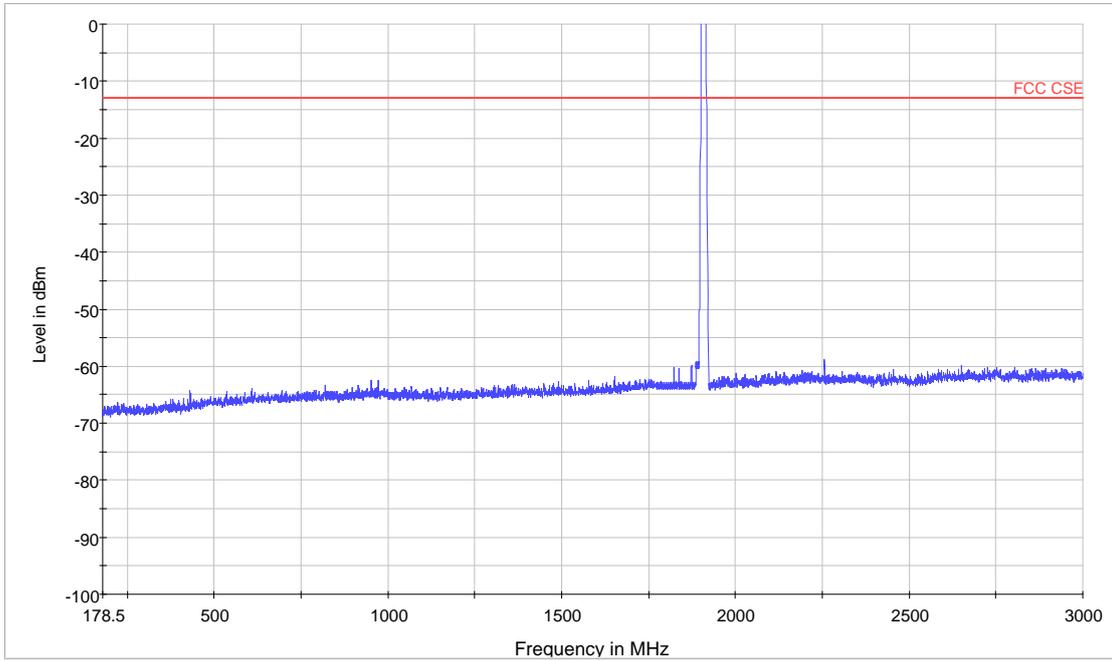
Harmonic	TX ch.600 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3759.4	-31.52	-13	18.52
3	5640.0	-32.11	-13	19.11
4	7518.7	-36.88	-13	23.88
5	9400	Nf	-13	/
6	11280	Nf	-13	/
7	13160	Nf	-13	/
8	15040	Nf	-13	/
9	16920	Nf	-13	/
10	18802.5	-65.52	-13	52.52

Nf: noise floor

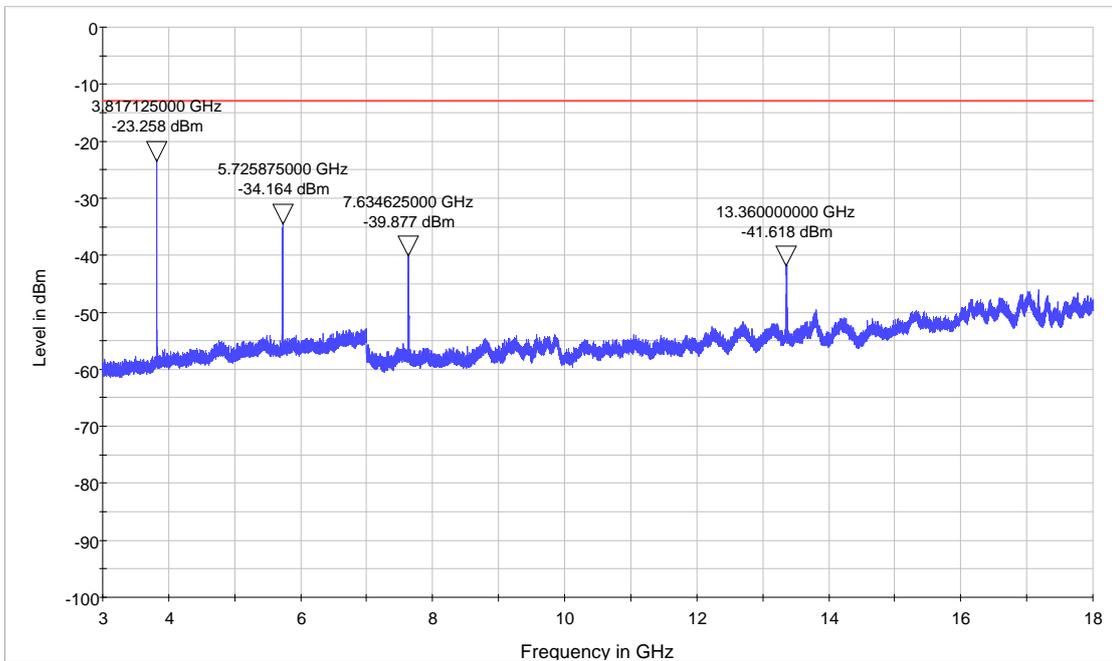
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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CDMA PCS CH 1175



Note: The signal beyond the limit is carrier.
CDMA PCS 1175 Channel 30MHz~3GHz



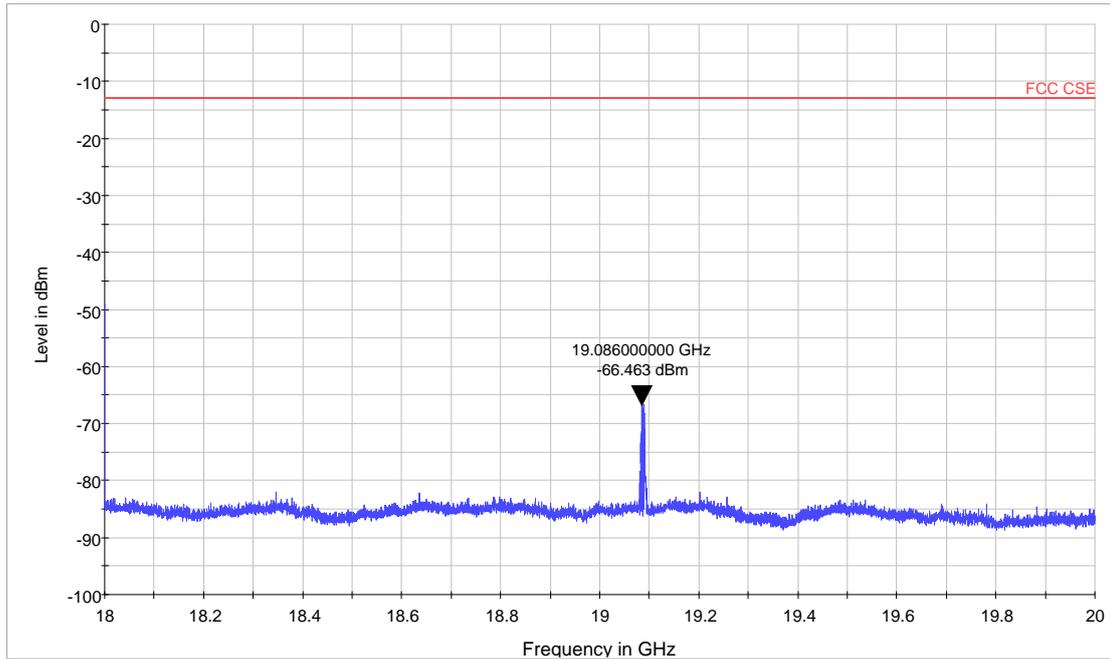
CDMA PCS 1175 Channel 3GHz~18GHz

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CDMA PCS 1175 Channel 18GHz~20GHz

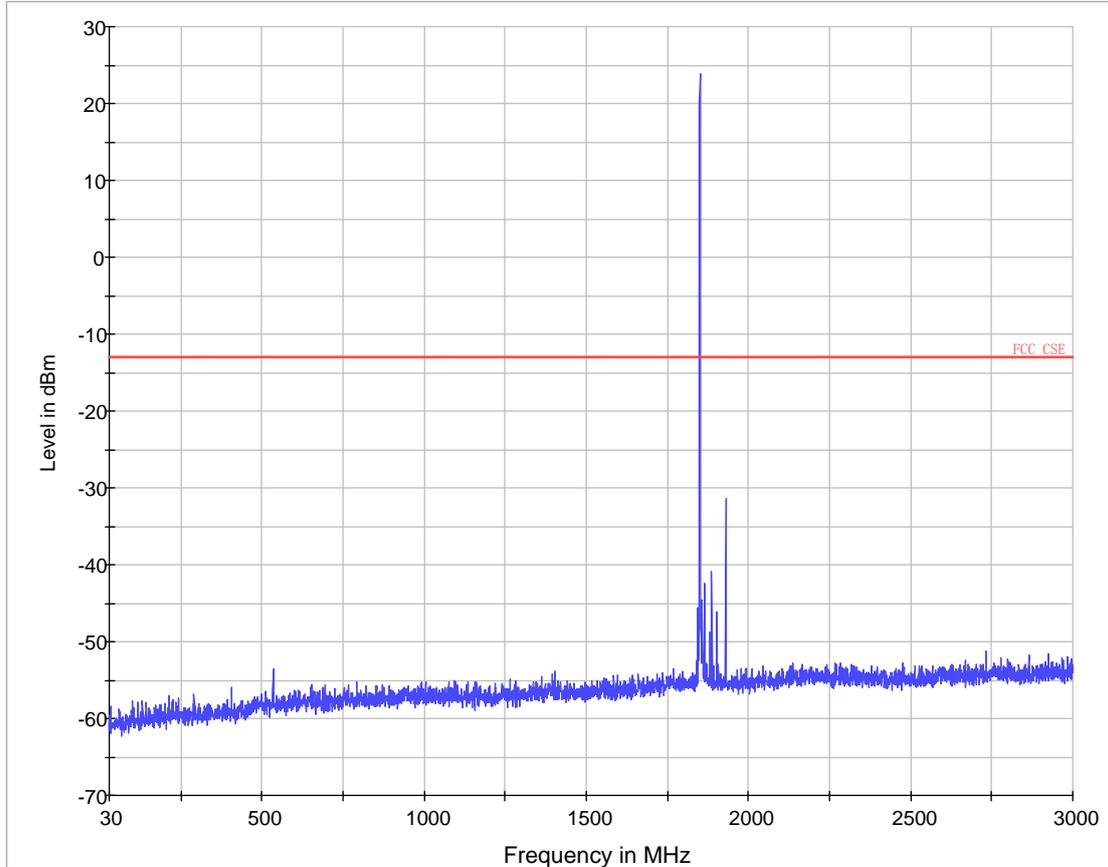
Harmonic	TX ch.1175 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3817.1	-23.26	-13	10.26
3	5725.9	-34.16	-13	21.16
4	7634.6	-39.88	-13	26.88
5	9543.75	Nf	-13	/
6	11452.5	Nf	-13	/
7	13360.0	-41.62	-13	28.62
8	15270	Nf	-13	/
9	17178.75	Nf	-13	/
10	19087.5	Nf	-13	/

Nf: noise floor

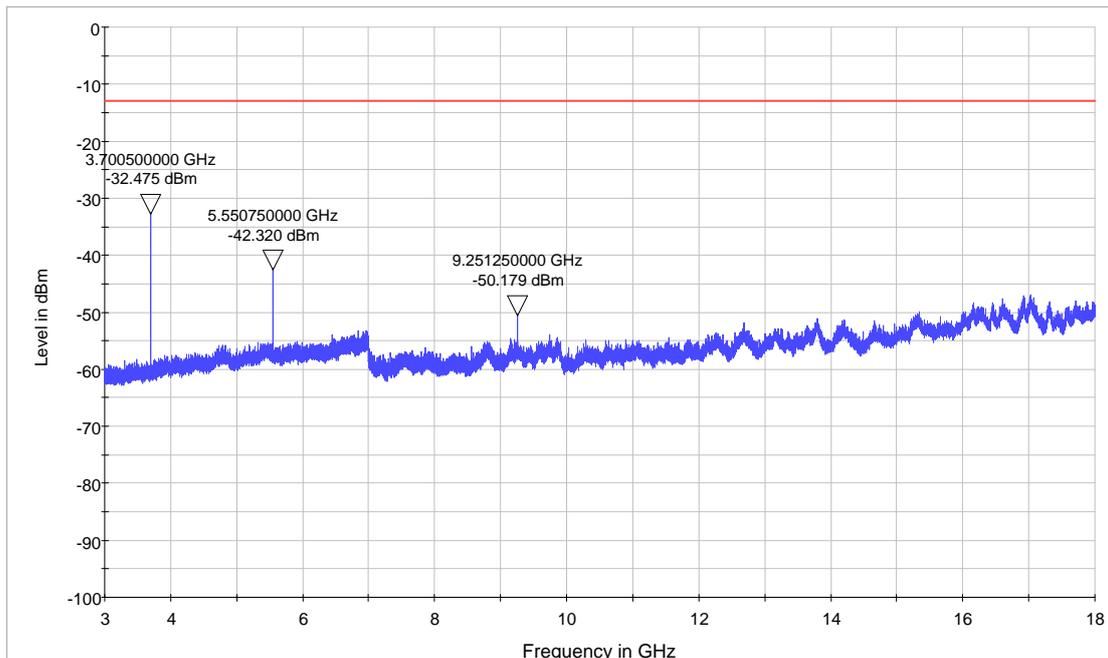
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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LTE Band 2 QPSK Bandwidth = 1.4MHz CH18607, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 2 18607 Channel 30MHz~3Gz



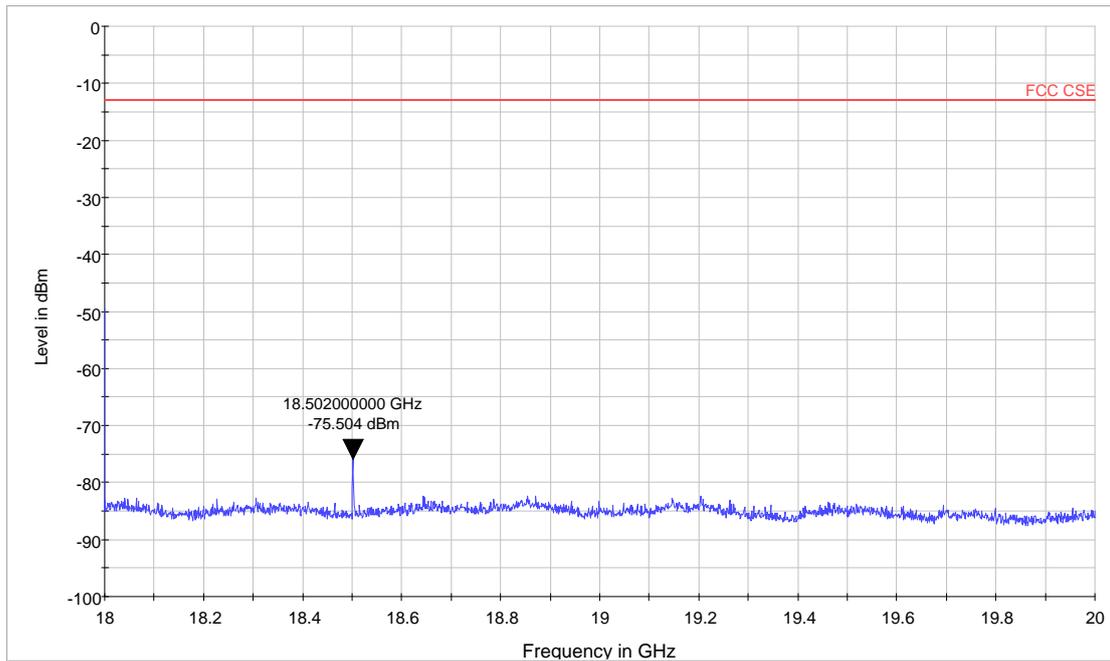
LTE Band 2 18607 Channel 3GHz~18GHz

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LTE Band 2 18607 Channel 18GHz~20GHz

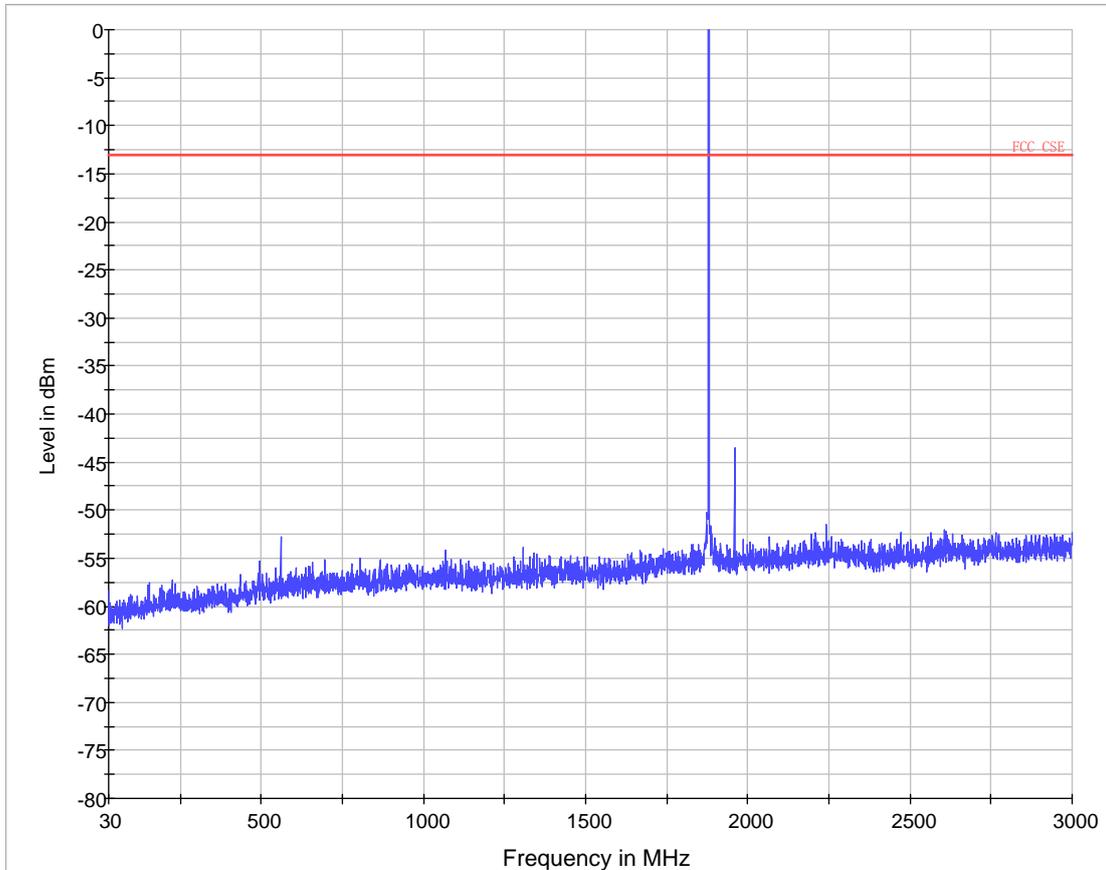
Harmonic	TX ch. 18607 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3700.1	-32.48	-13	19.48
3	5550.8	-42.32	-13	29.32
4	7402.8	Nf	-13	/
5	9251.3	-50.18	-13	37.18
6	11104.2	Nf	-13	/
7	12954.9	Nf	-13	/
8	14805.6	Nf	-13	/
9	16656.3	Nf	-13	/
10	18502.0	-75.50	-13	62.50

Nf: noise floor

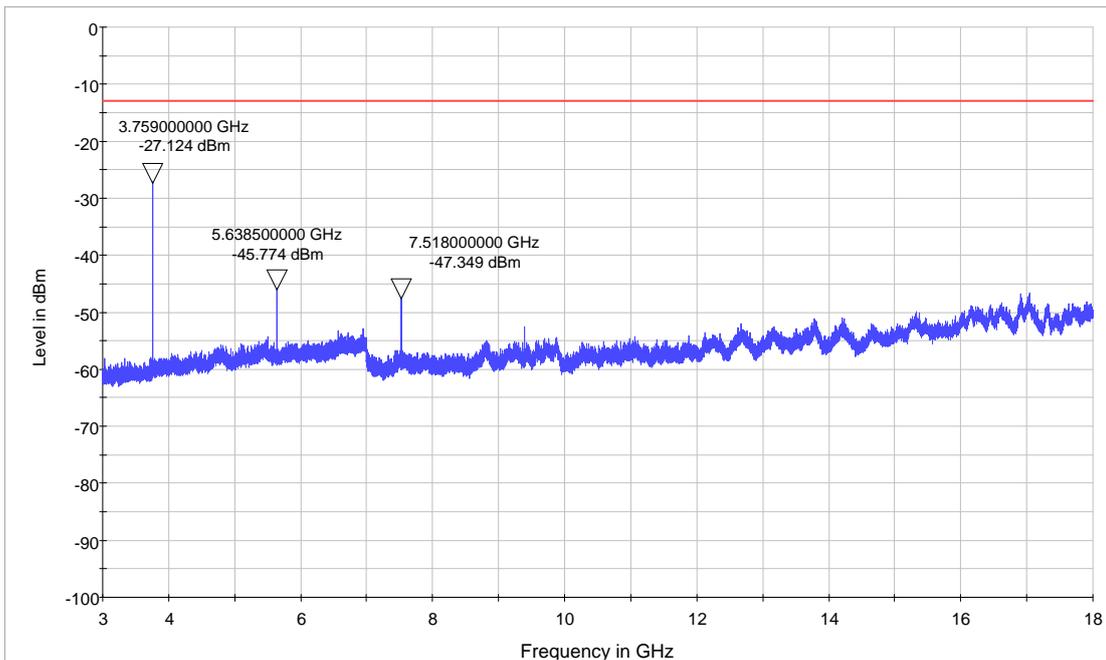
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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LTE Band 2 QPSK Bandwidth = 1.4MHz CH18900, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 2 18900 Channel 30MHz~3GHz



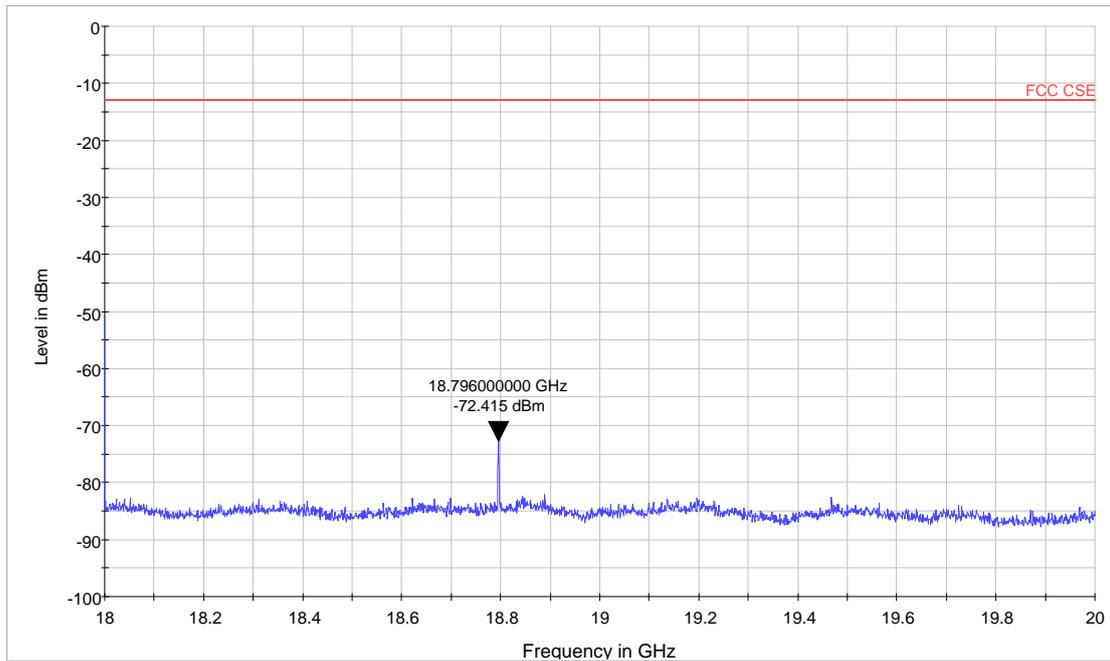
LTE Band 2 18900 Channel 3GHz~18GHz

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LTE Band 2 18900 Channel 18GHz~20GHz

Harmonic	TX ch. 18900 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3759.0	-27.12	-13	14.12
3	5638.5	-45.77	-13	32.77
4	7518.0	-47.35	-13	34.35
5	9400	Nf	-13	/
6	11280	Nf	-13	/
7	13160	Nf	-13	/
8	15040	Nf	-13	/
9	16920	Nf	-13	/
10	18796.0	-72.42	-13	59.42

Nf: noise floor

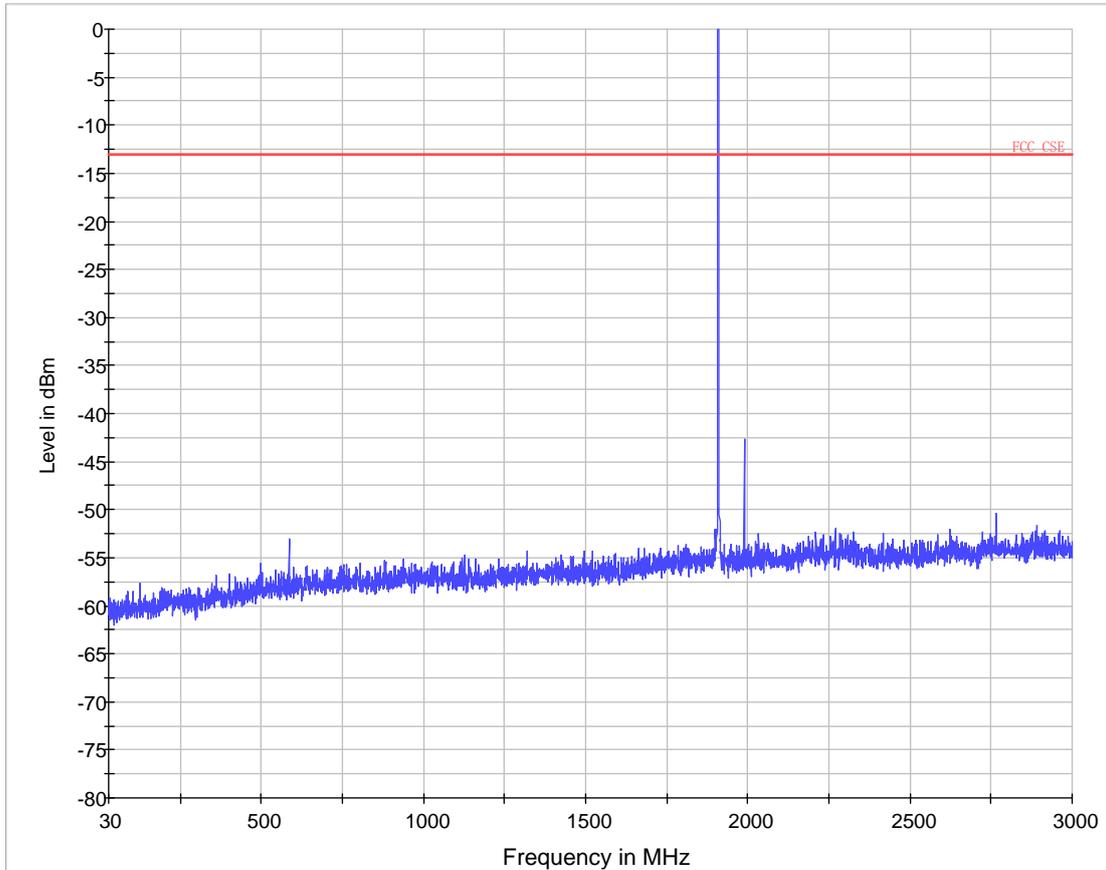
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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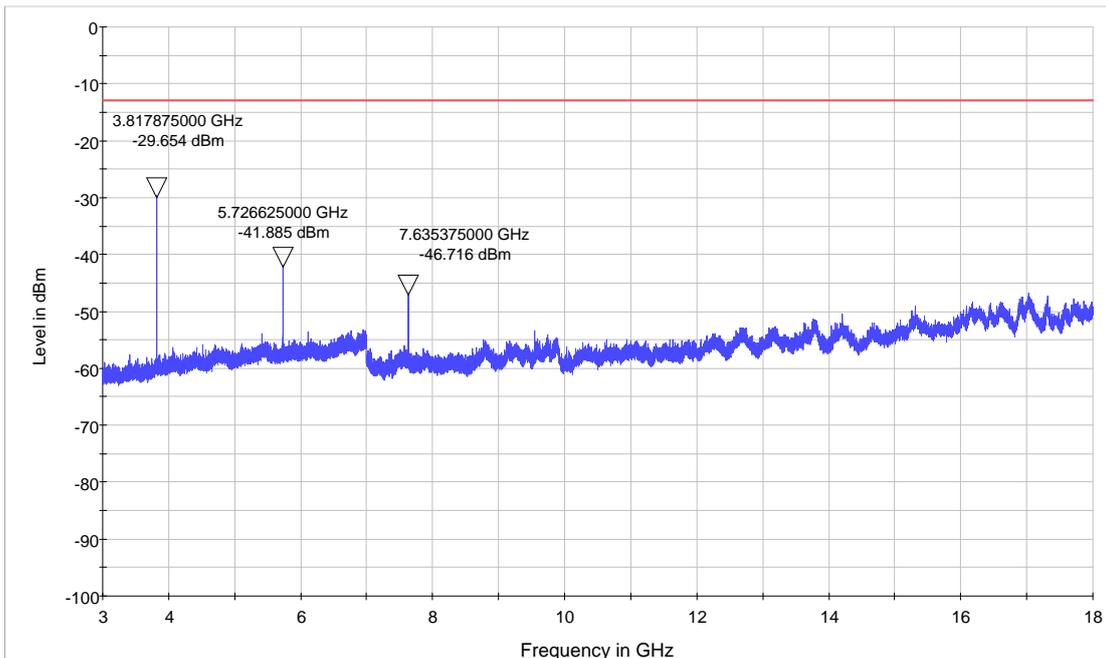
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LTE Band 2 QPSK Bandwidth = 1.4MHz CH19193, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 2 19193 Channel 30MHz~3GHz

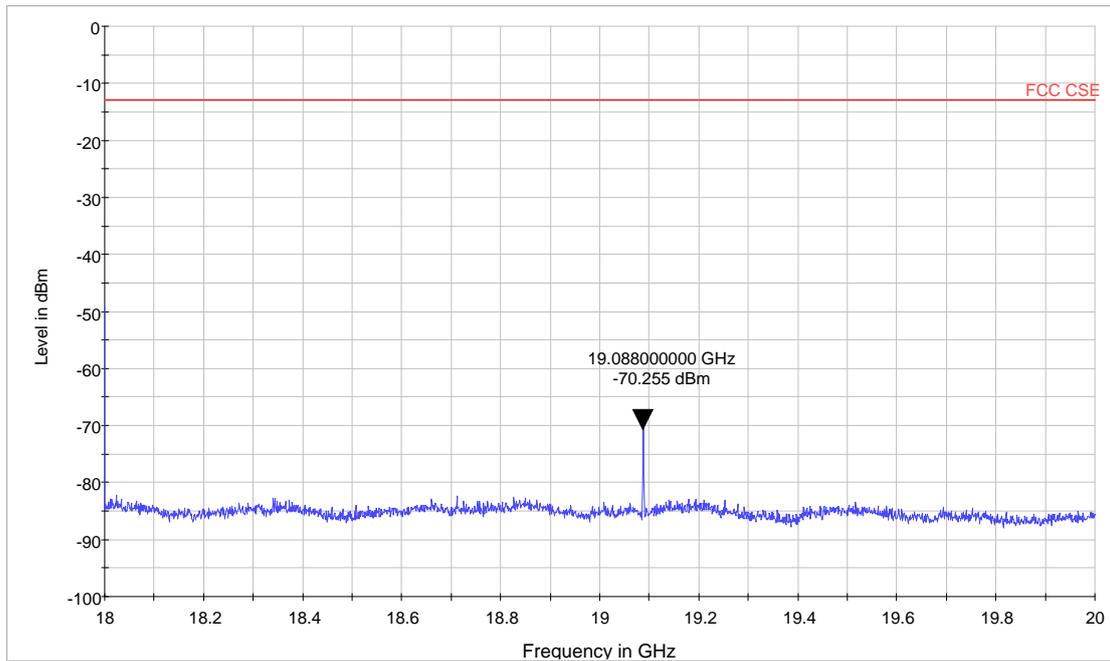


LTE Band 2 19193 Channel 3GHz~18GHz

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LTE Band 2 19193 Channel 18GHz~20GHz

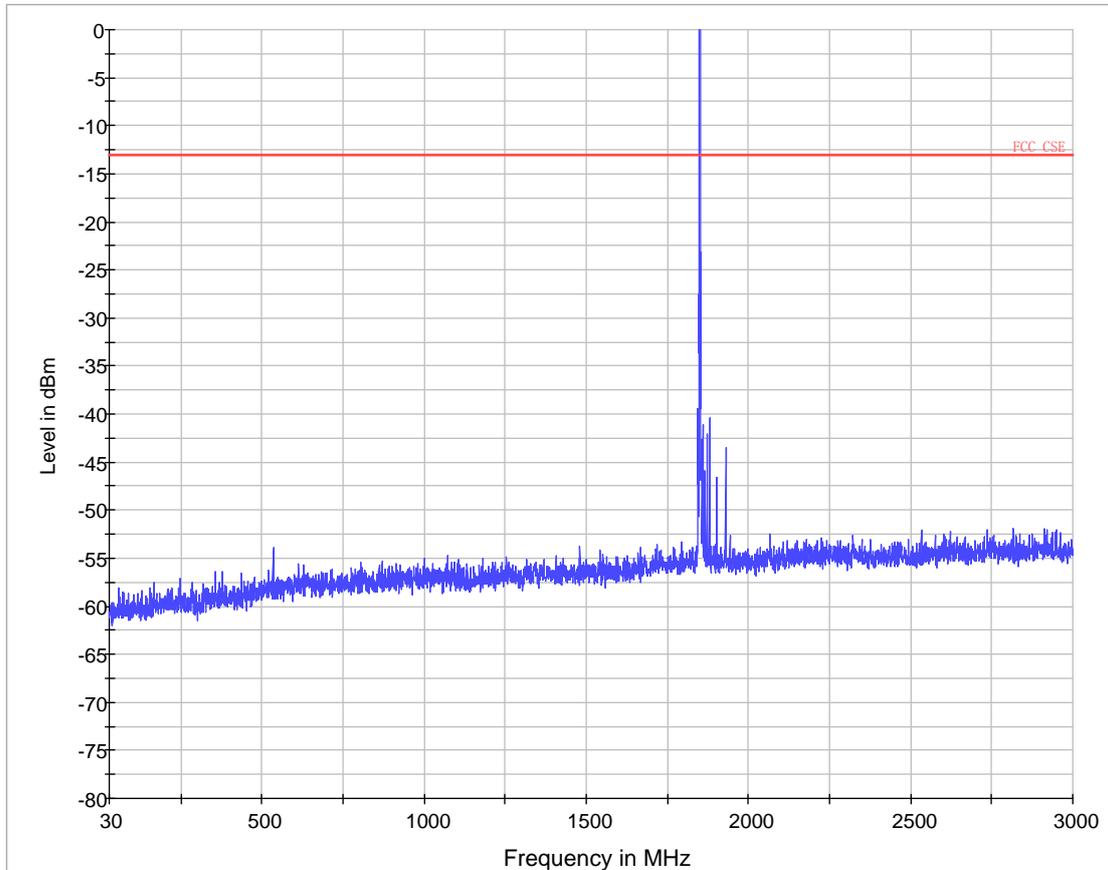
Harmonic	TX ch. 19193 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3817.8	-29.65	-13	16.65
3	5726.6	-41.89	-13	28.89
4	7635.4	-46.72	-13	33.72
5	9546.5	Nf	-13	/
6	11455.8	Nf	-13	/
7	13365.1	Nf	-13	/
8	15274.4	Nf	-13	/
9	17183.7	Nf	-13	/
10	19088.0	-70.26	-13	57.26

Nf: noise floor

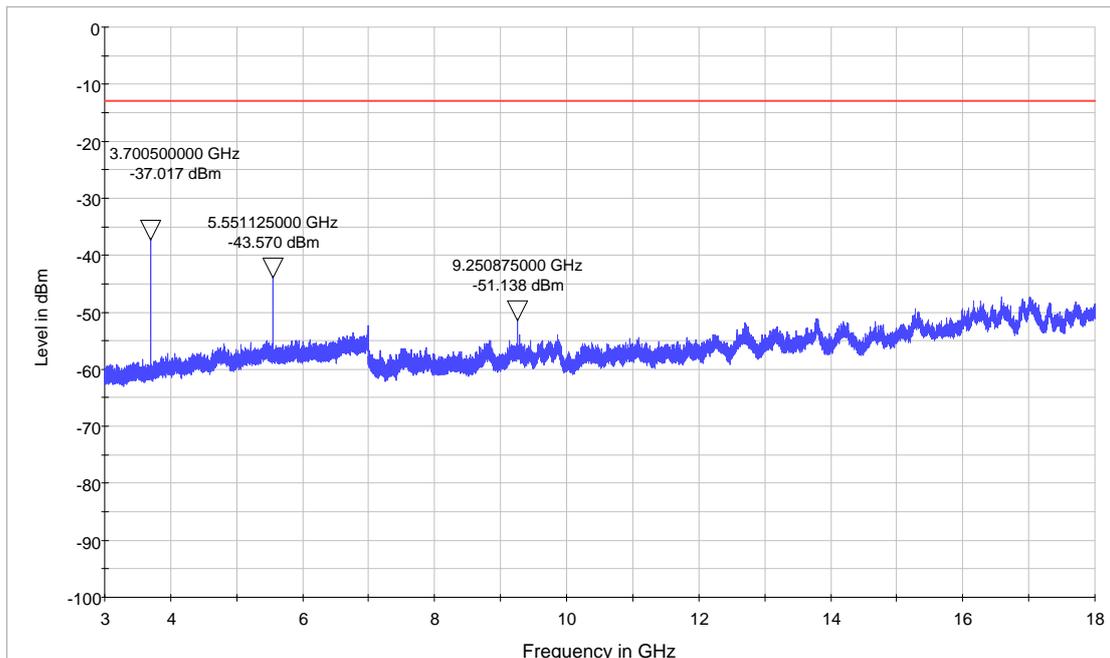
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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LTE Band 2 QPSK Bandwidth = 3MHz CH18615, RB 1



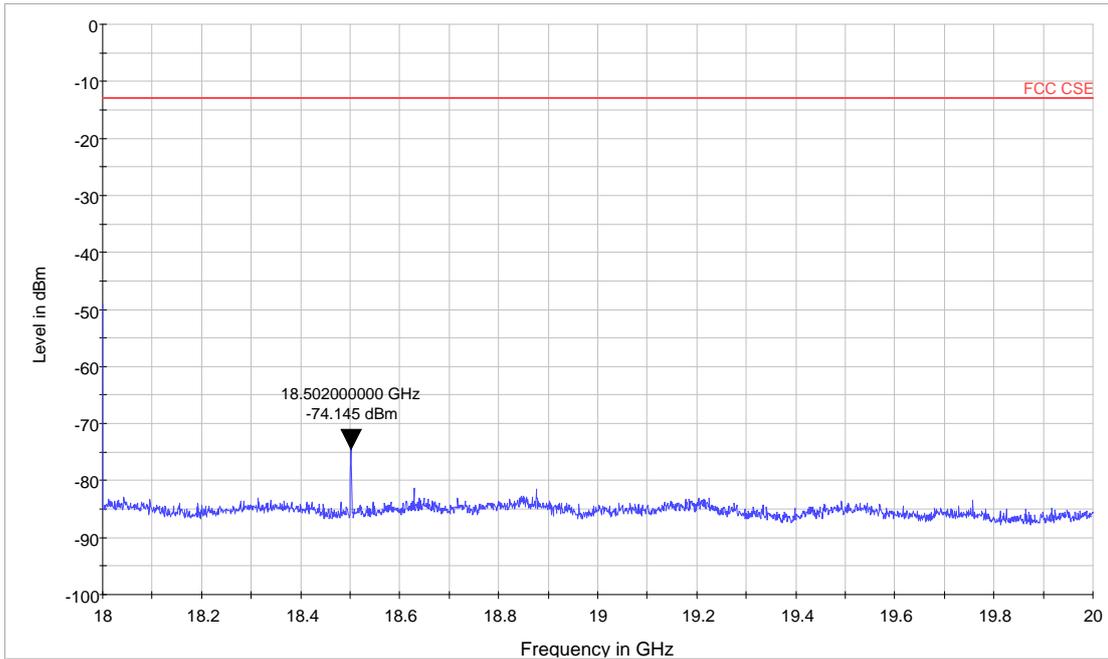
Note: The signal beyond the limit is carrier.
LTE Band 2 18615 Channel 30MHz~3GHz



LTE Band 2 18615 Channel 3GHz~18GHz

TA Technology (Shanghai) Co., Ltd.

Test Report



LTE Band 2 18615 Channel 18GHz~20GHz

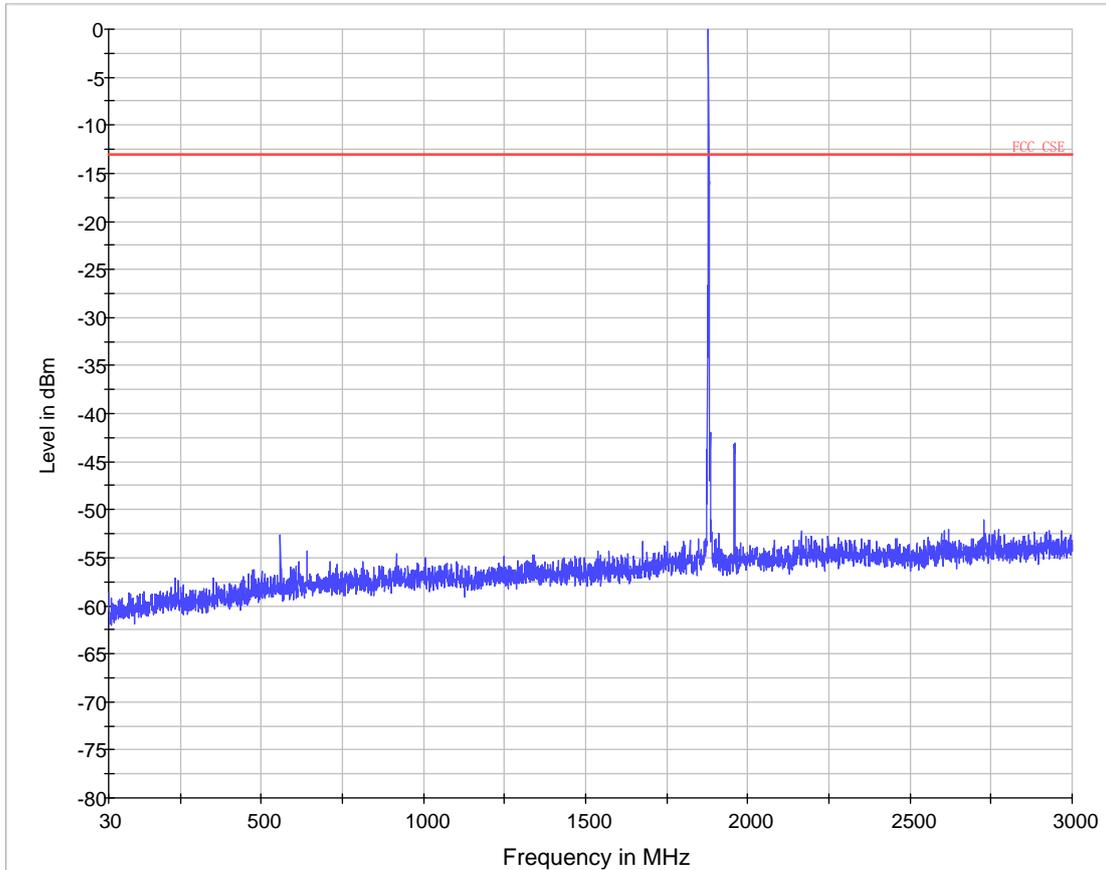
Harmonic	TX ch. 18615 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3700.5	-37.02	-13	24.02
3	5551.1	-43.57	-13	30.57
4	7406	Nf	-13	/
5	9250.9	-51.14	-13	38.14
6	11109	Nf	-13	/
7	12960.5	Nf	-13	/
8	14812	Nf	-13	/
9	16663.5	Nf	-13	/
10	18502.0	-74.15	-13	61.15

Nf: noise floor

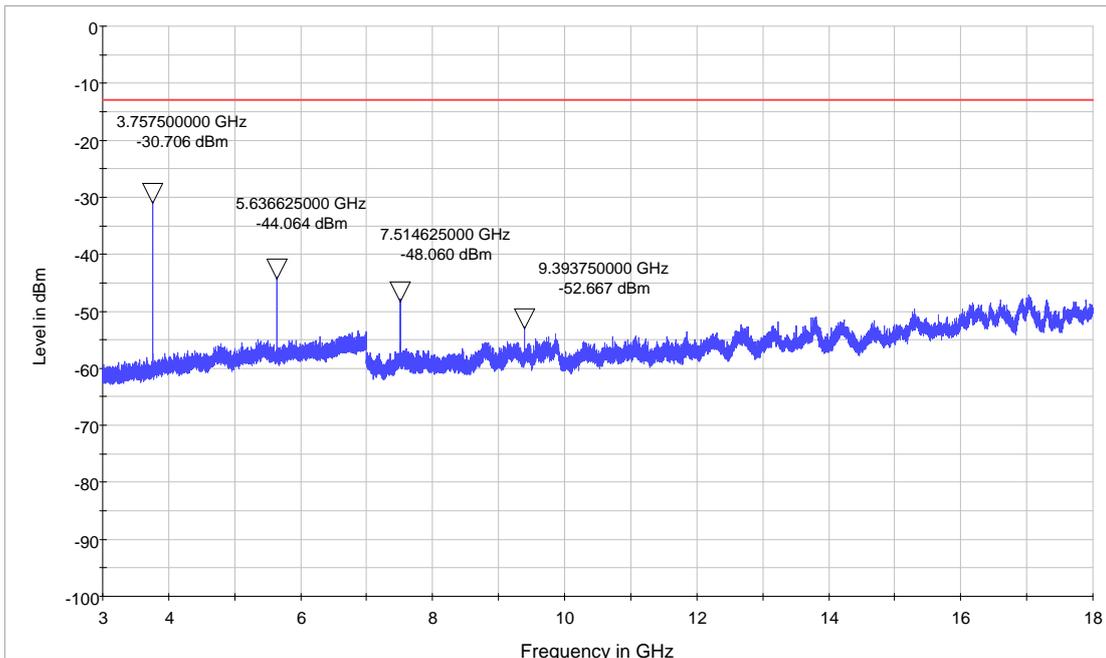
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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

LTE Band 2 QPSK Bandwidth = 3MHz CH18900, RB 1



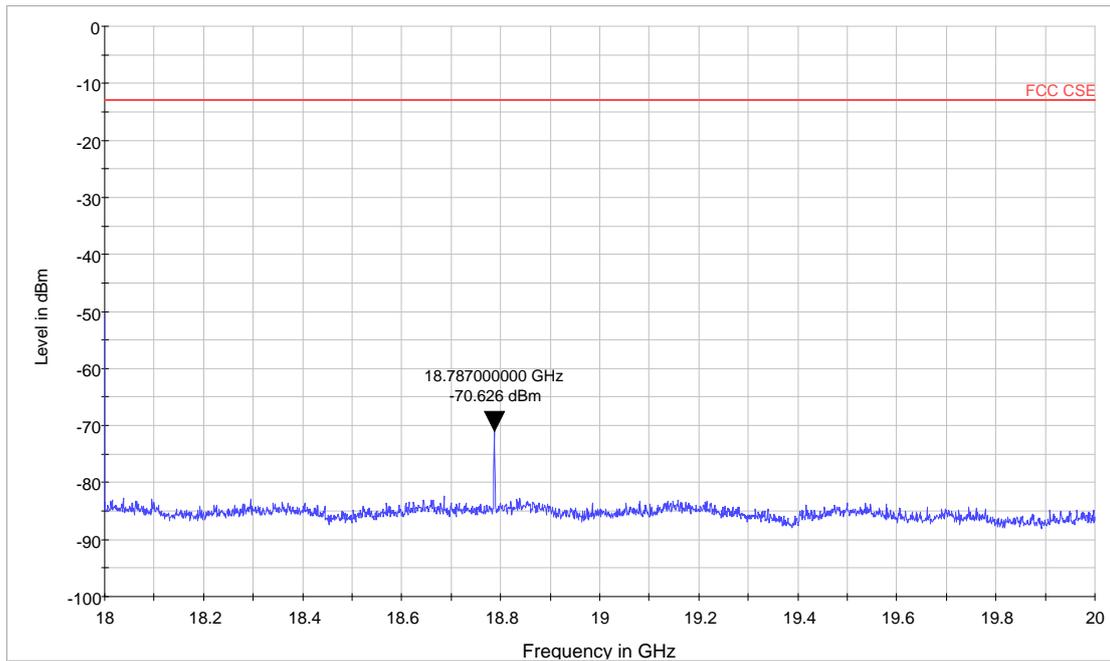
Note: The signal beyond the limit is carrier.
LTE Band 2 18900 Channel 30MHz~3GHz



LTE Band 2 18900 Channel 3GHz~18GHz

TA Technology (Shanghai) Co., Ltd.

Test Report



LTE Band 2 18900 Channel 18GHz~20GHz

Harmonic	TX ch. 18900 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3757.5	-30.71	-13	17.71
3	5636.6	-44.06	-13	31.06
4	7514.6	-48.06	-13	35.06
5	9393.8	-52.67	-13	39.67
6	11280	Nf	-13	/
7	13160	Nf	-13	/
8	15040	Nf	-13	/
9	16920	Nf	-13	/
10	18787.0	-70.63	-13	57.63

Nf: noise floor

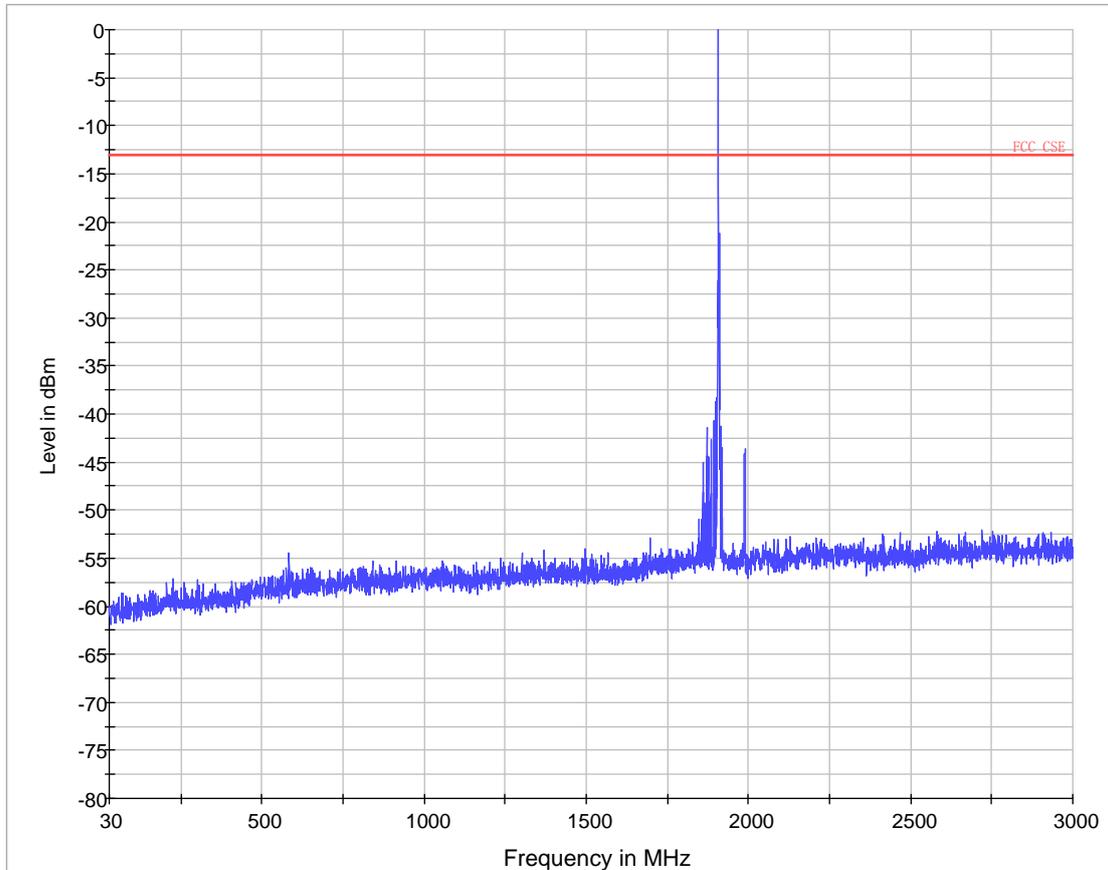
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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

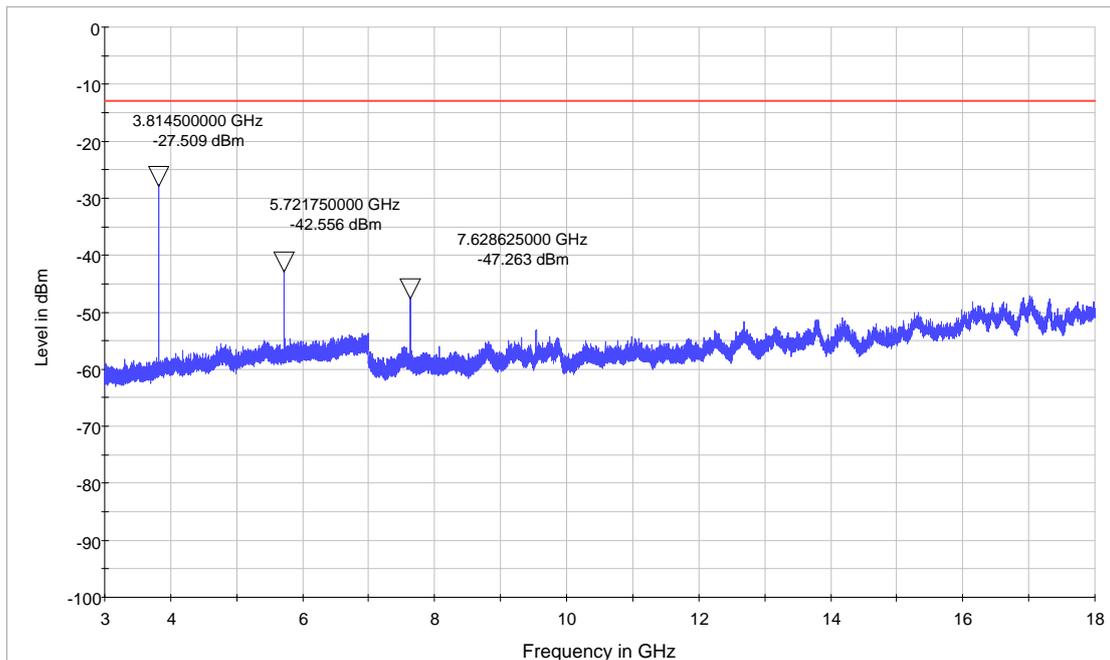
Report No.: RHA1209-0083RF02R1

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LTE Band 2 QPSK Bandwidth = 3MHz CH19185, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 2 19185 Channel 30MHz~3GHz



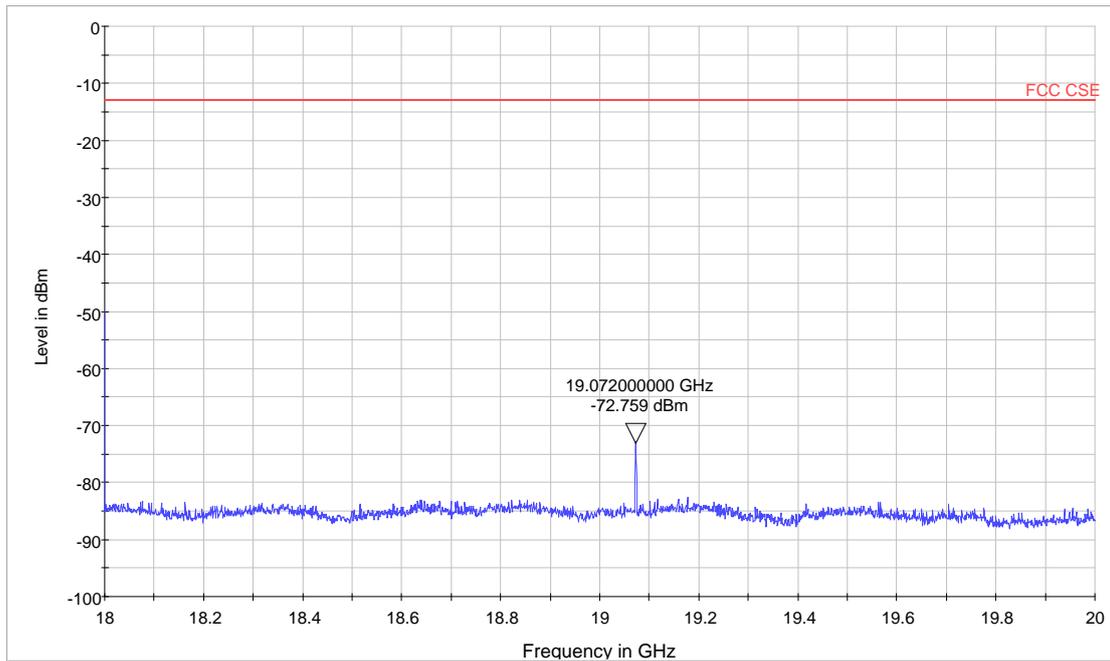
LTE Band 2 19185 Channel 3GHz~18GHz

TA Technology (Shanghai) Co., Ltd.

Test Report

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LTE Band 2 19185 Channel 18GHz~20GHz

Harmonic	TX ch. 19185 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3814.5	-27.51	-13	14.51
3	5721.8	-42.56	-13	29.56
4	7628.0	-47.26	-13	34.26
5	9542.5	Nf	-13	/
6	11451	Nf	-13	/
7	13359.5	Nf	-13	/
8	15268	Nf	-13	/
9	17176.5	Nf	-13	/
10	19072.0	-71.35	-13	58.35

Nf: noise floor

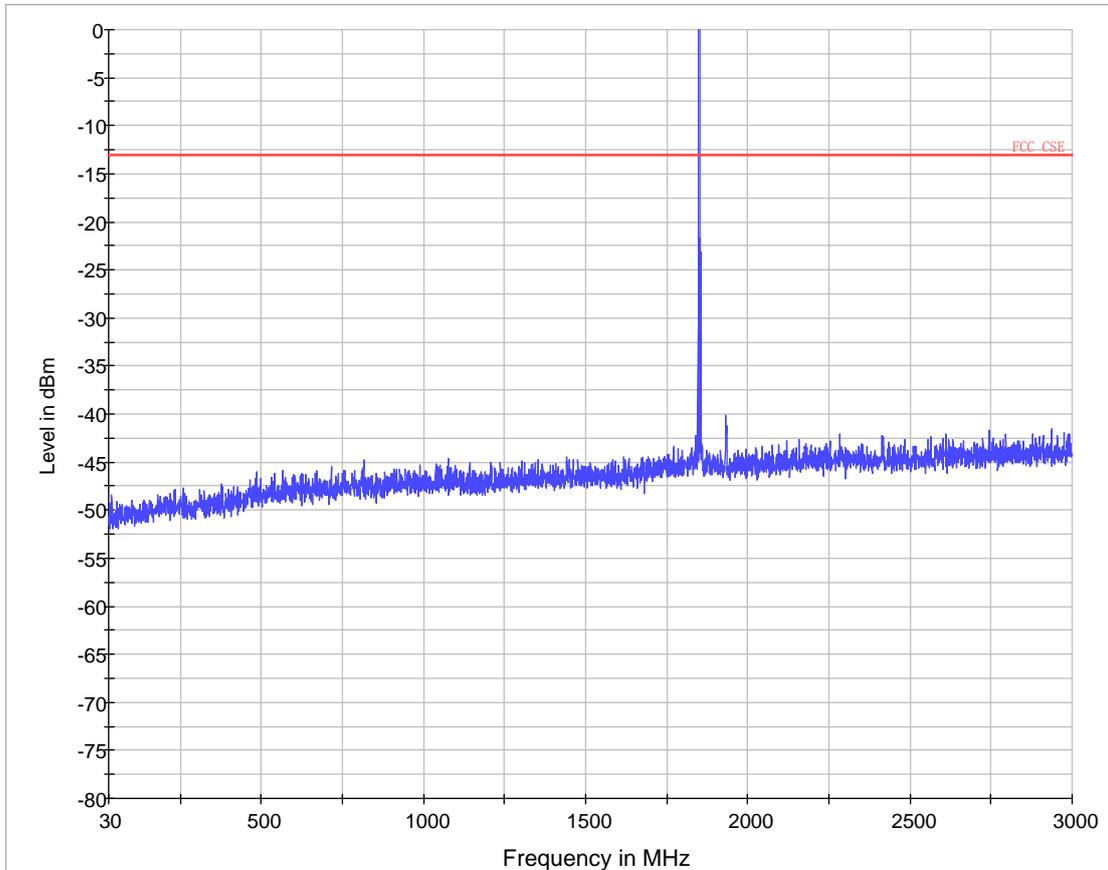
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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

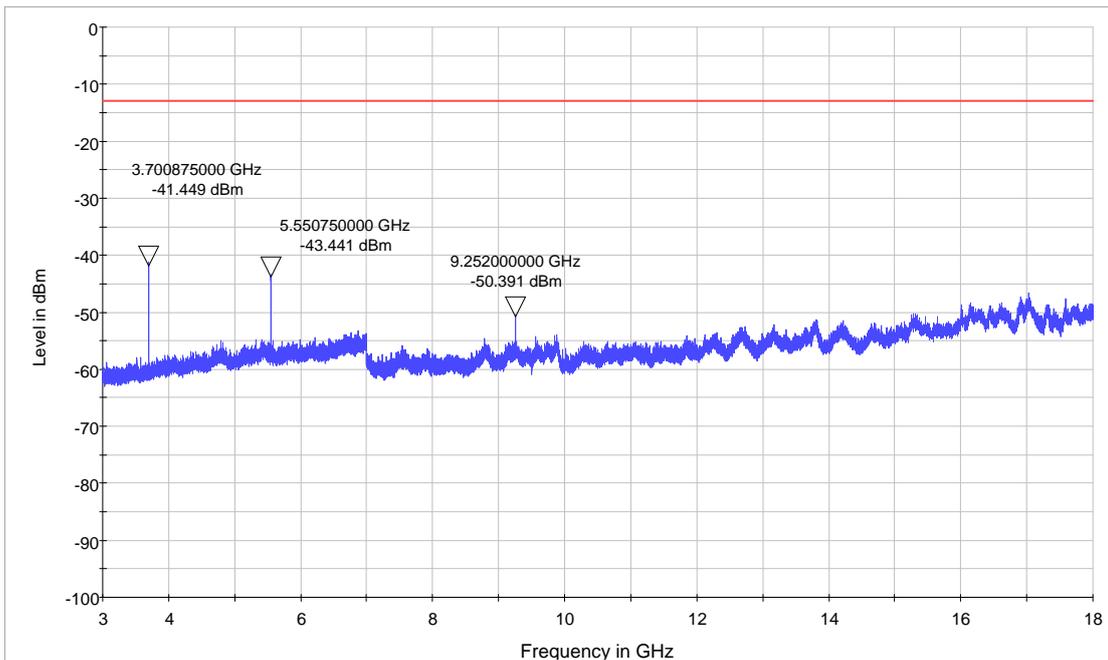
Report No.: RHA1209-0083RF02R1

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LTE Band 2 QPSK Bandwidth = 5MHz CH18625, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 2 18625 Channel 30MHz~3GHz



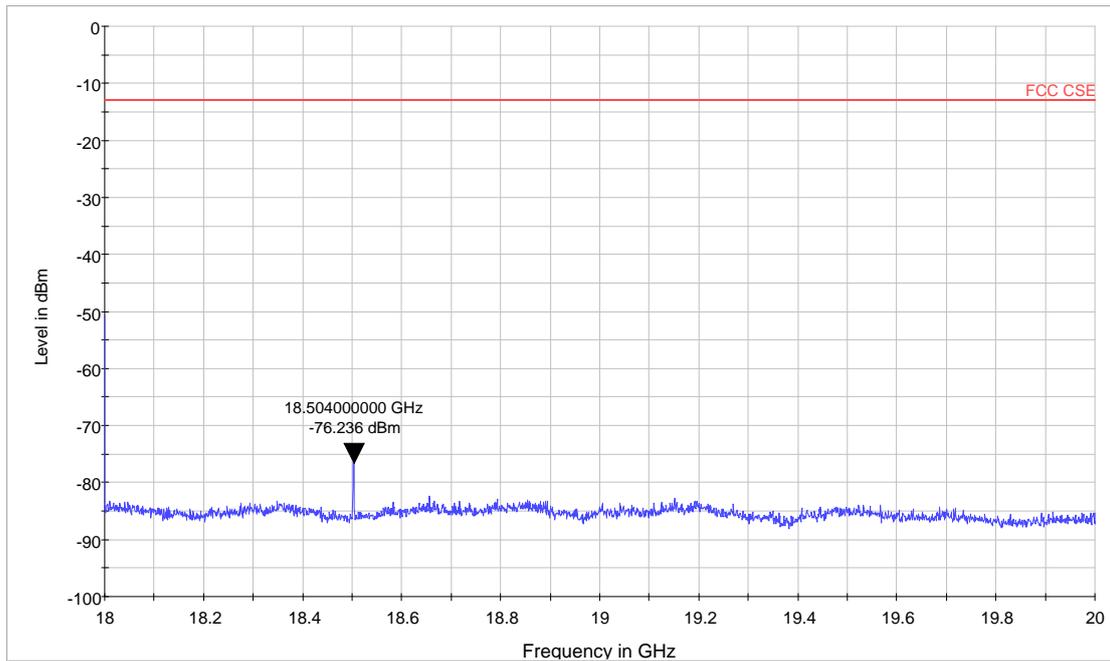
LTE Band 2 18625 Channel 3GHz~18GHz

TA Technology (Shanghai) Co., Ltd.

Test Report

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LTE Band 2 18625 Channel 18GHz~20GHz

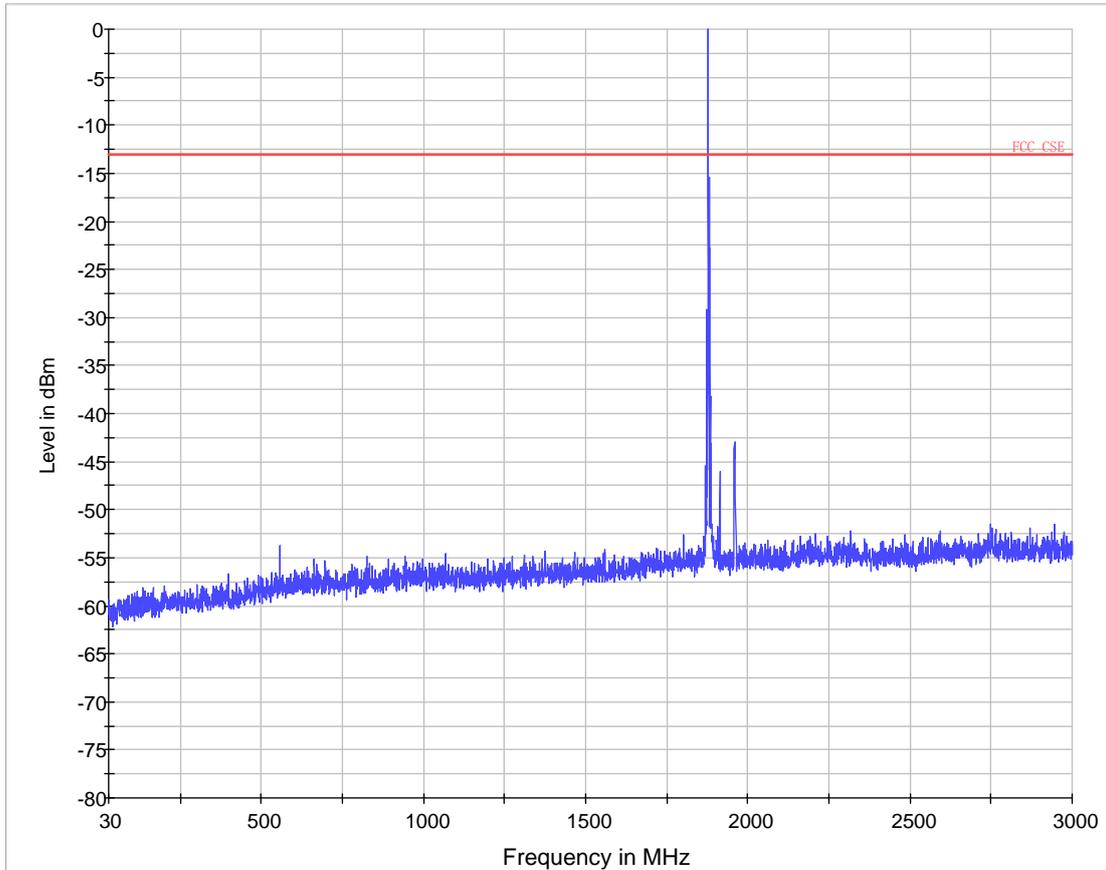
Harmonic	TX ch. 18625 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3700.9	-41.45	-13	28.45
3	5550.8	-43.44	-13	30.44
4	7410	Nf	-13	/
5	9252.0	-50.39	-13	37.39
6	11115	Nf	-13	/
7	12967.5	Nf	-13	/
8	14820	Nf	-13	/
9	16672.5	Nf	-13	/
10	18504.0	-76.24	-13	63.24

Nf: noise floor

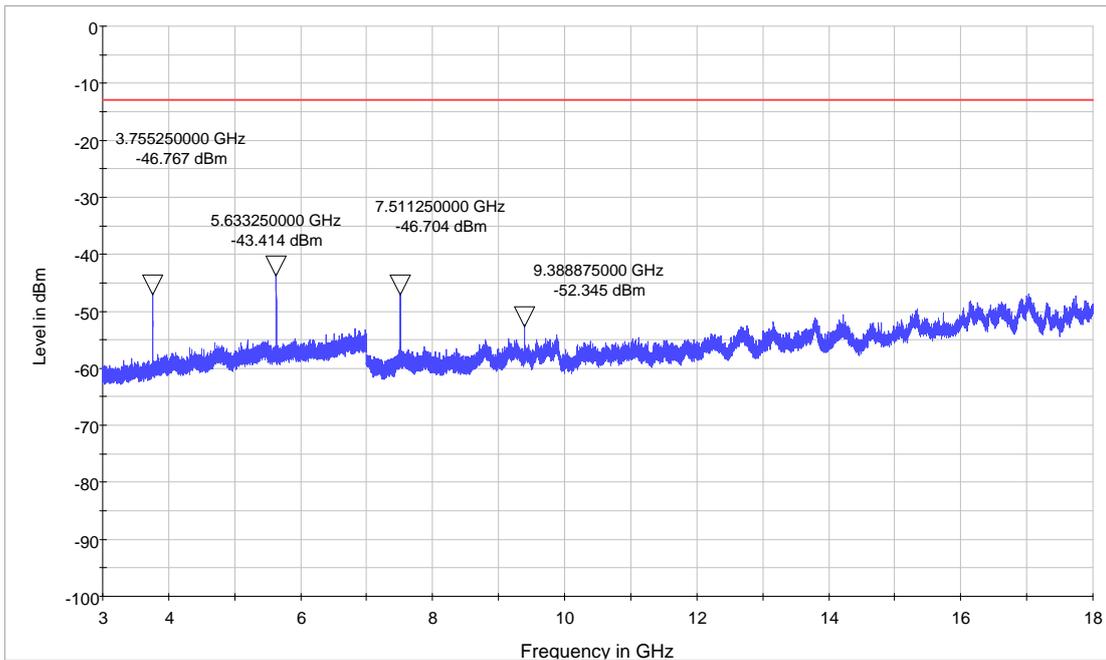
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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

LTE Band 2 QPSK Bandwidth = 5MHz CH18900, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 2 18900 Channel 30MHz~3GHz



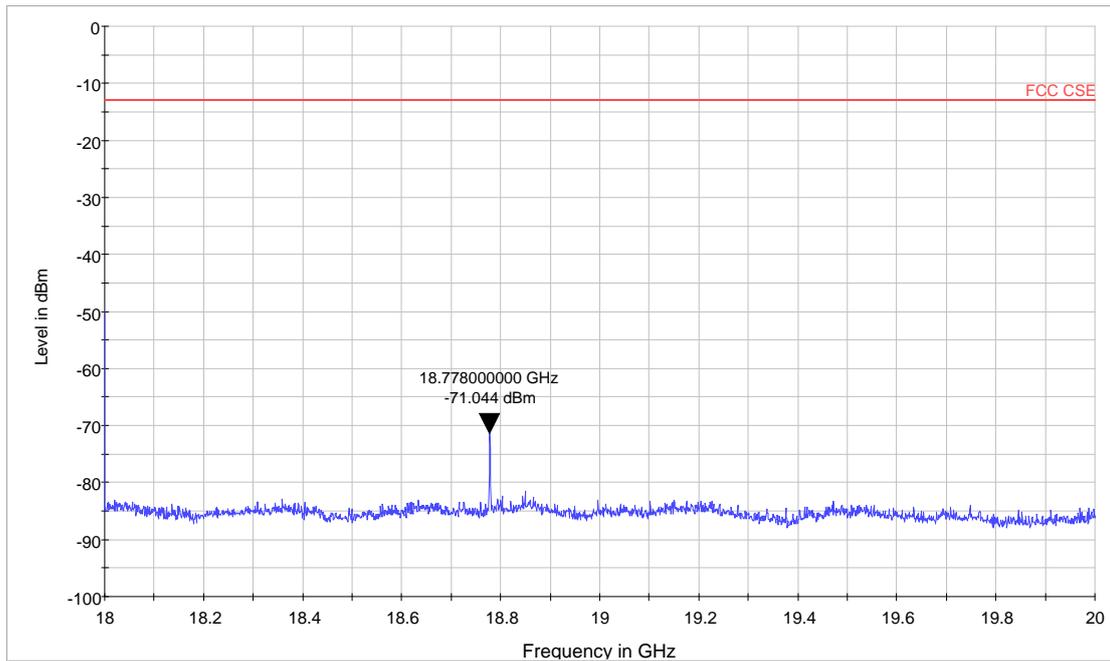
LTE Band 2 18900 Channel 3GHz~18GHz

TA Technology (Shanghai) Co., Ltd.

Test Report

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LTE Band 2 18900 Channel 18GHz~20GHz

Harmonic	TX ch. 18900 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3755.2	-46.77	-13	33.77
3	5633.3	-43.41	-13	30.41
4	7511.3	-46.70	-13	33.70
5	9388.9	-52.35	-13	39.35
6	11280	Nf	-13	/
7	13160	Nf	-13	/
8	15040	Nf	-13	/
9	16920	Nf	-13	/
10	18778.0	-71.04	-13	58.04

Nf: noise floor

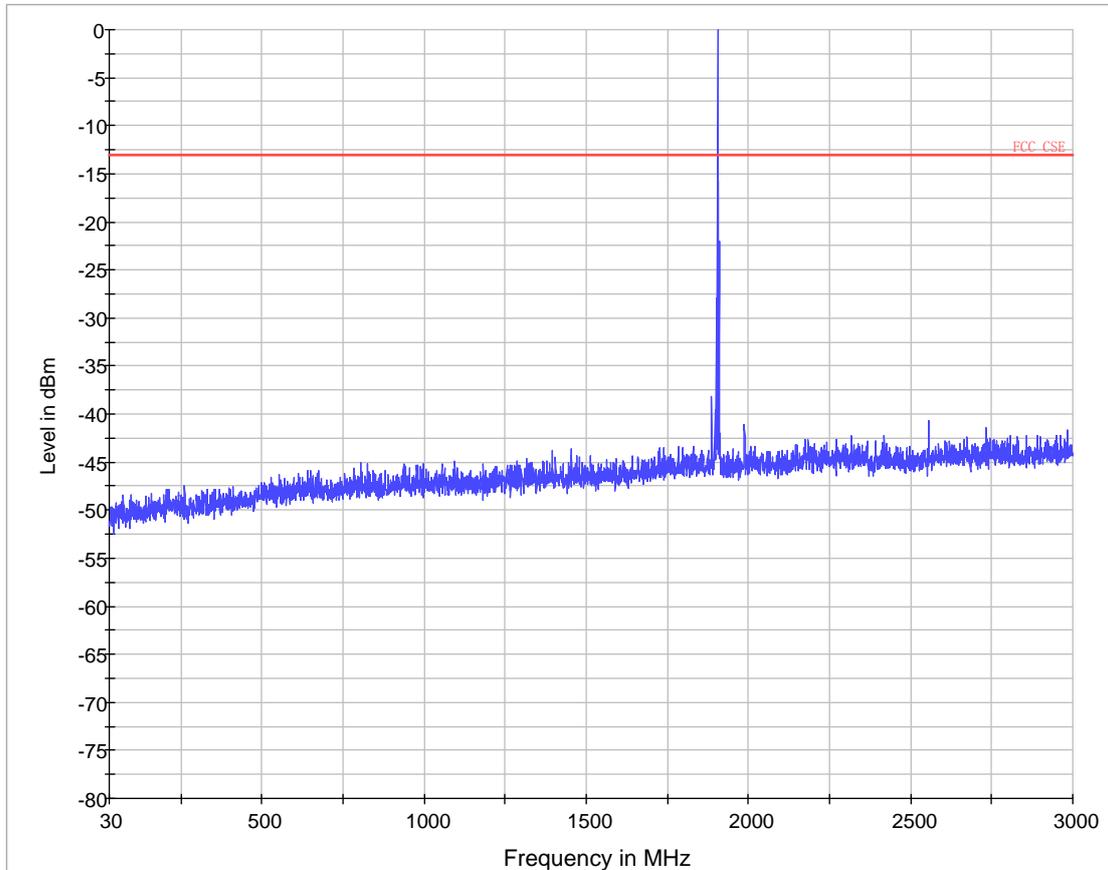
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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

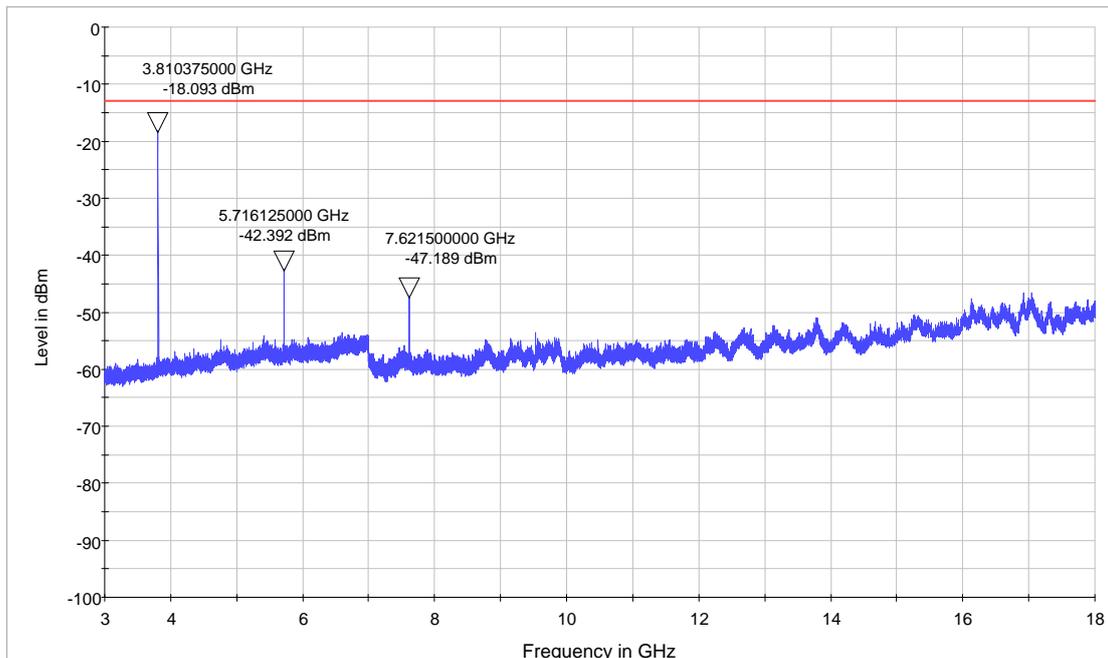
Report No.: RHA1209-0083RF02R1

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LTE Band 2 QPSK Bandwidth = 5MHz CH19175, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 2 19175 Channel 30MHz~3GHz



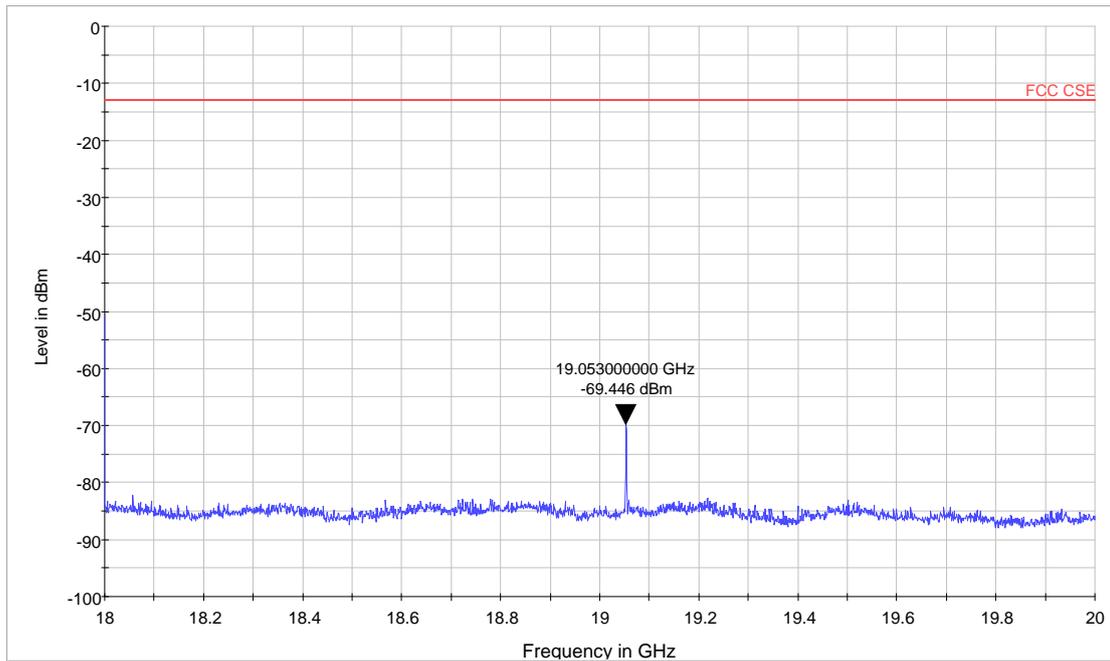
LTE Band 2 19175 Channel 3GHz~18GHz

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LTE Band 2 19175 Channel 18GHz~20GHz

Harmonic	TX ch. 19175 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3810.8	-18.09	-13	5.09
3	5716.1	-42.39	-13	29.39
4	7621.5	-47.19	-13	34.19
5	9537.5	Nf	-13	/
6	11445	Nf	-13	/
7	13352.5	Nf	-13	/
8	15260	Nf	-13	/
9	17167.5	Nf	-13	/
10	19053.0	-69.45	-13	56.45

Nf: noise floor

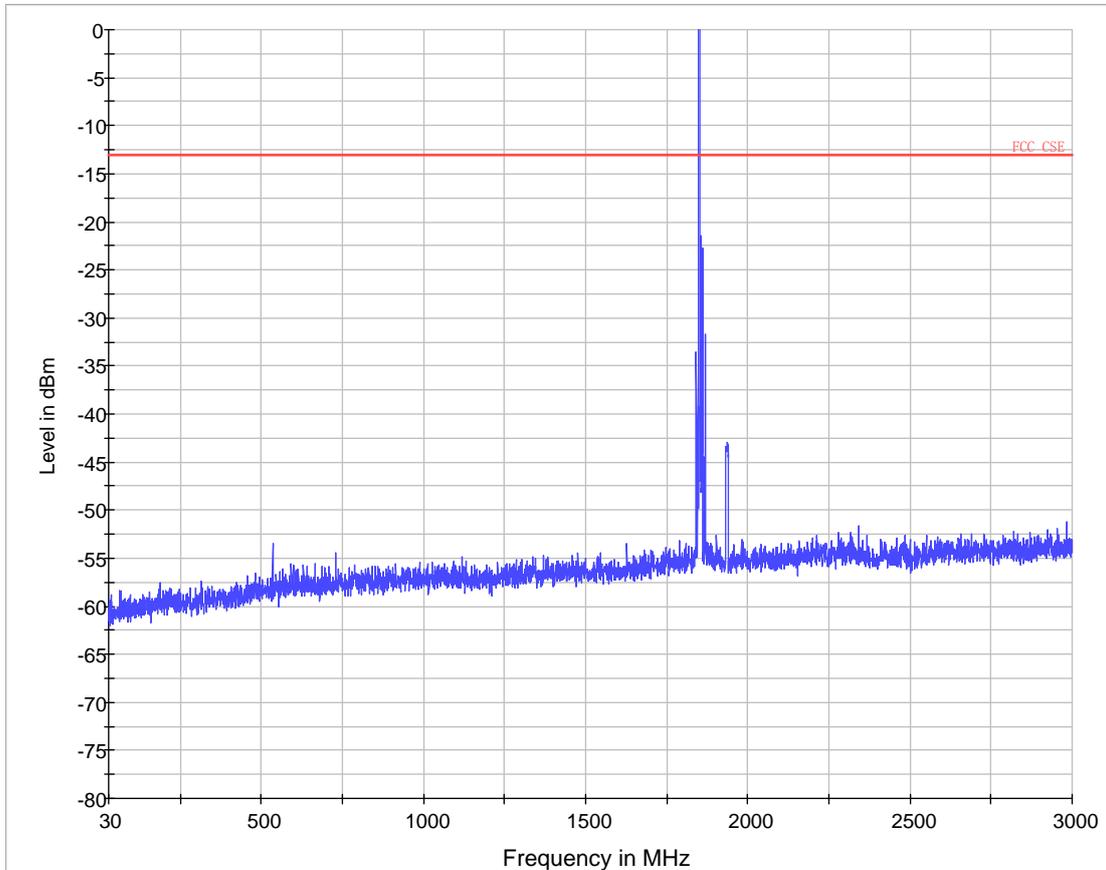
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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

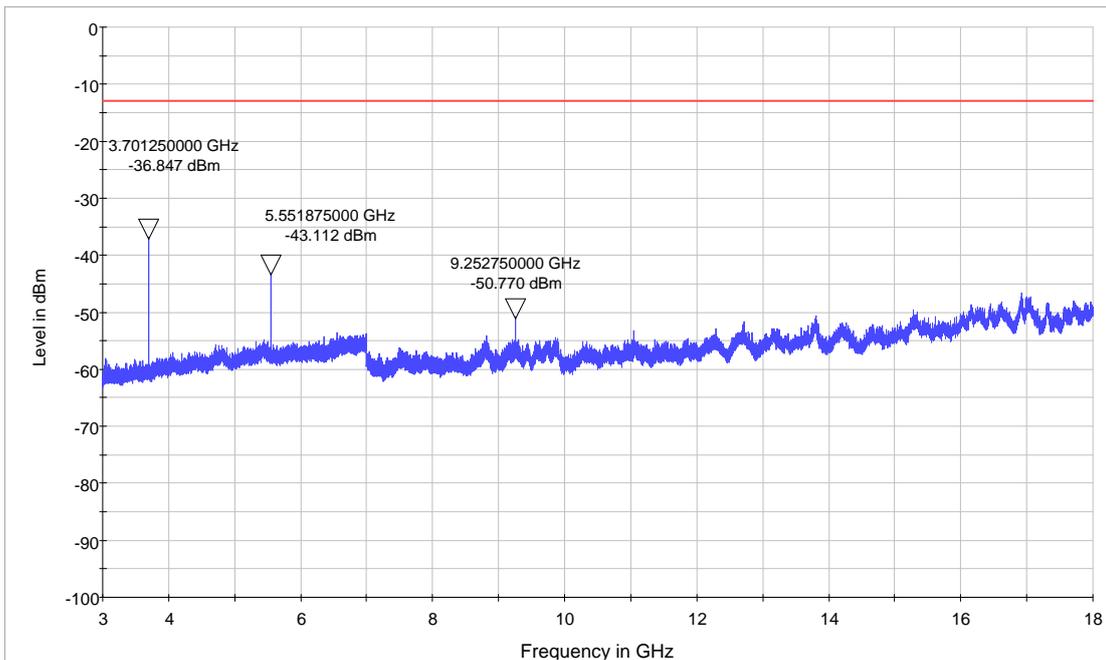
Report No.: RHA1209-0083RF02R1

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LTE Band 2 QPSK Bandwidth = 10MHz CH18650, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 2 18650 Channel 30MHz~3GHz



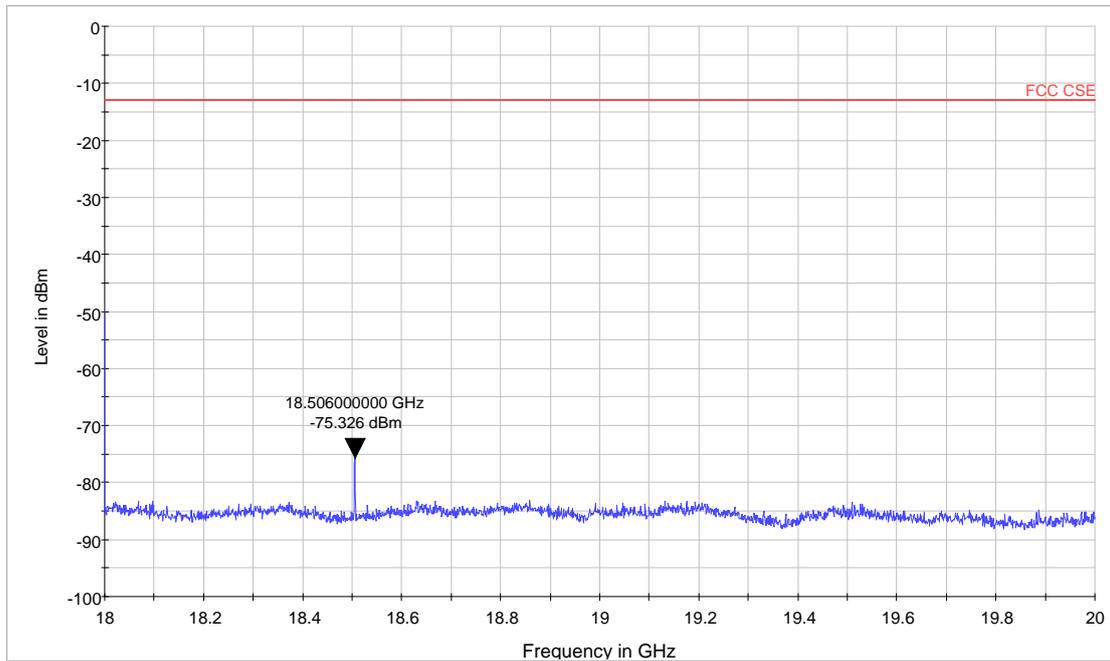
LTE Band 2 18650 Channel 3GHz~18GHz

TA Technology (Shanghai) Co., Ltd.

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LTE Band 2 18650 Channel 18GHz~20GHz

Harmonic	TX ch. 18650 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3701.2	-36.85	-13	23.85
3	5551.9	-43.11	-13	30.11
4	7420	Nf	-13	/
5	9252.8	-50.77	-13	37.77
6	11130	Nf	-13	/
7	12985	Nf	-13	/
8	14840	Nf	-13	/
9	16695	Nf	-13	/
10	18506.0	-75.33	-13	62.33

Nf: noise floor

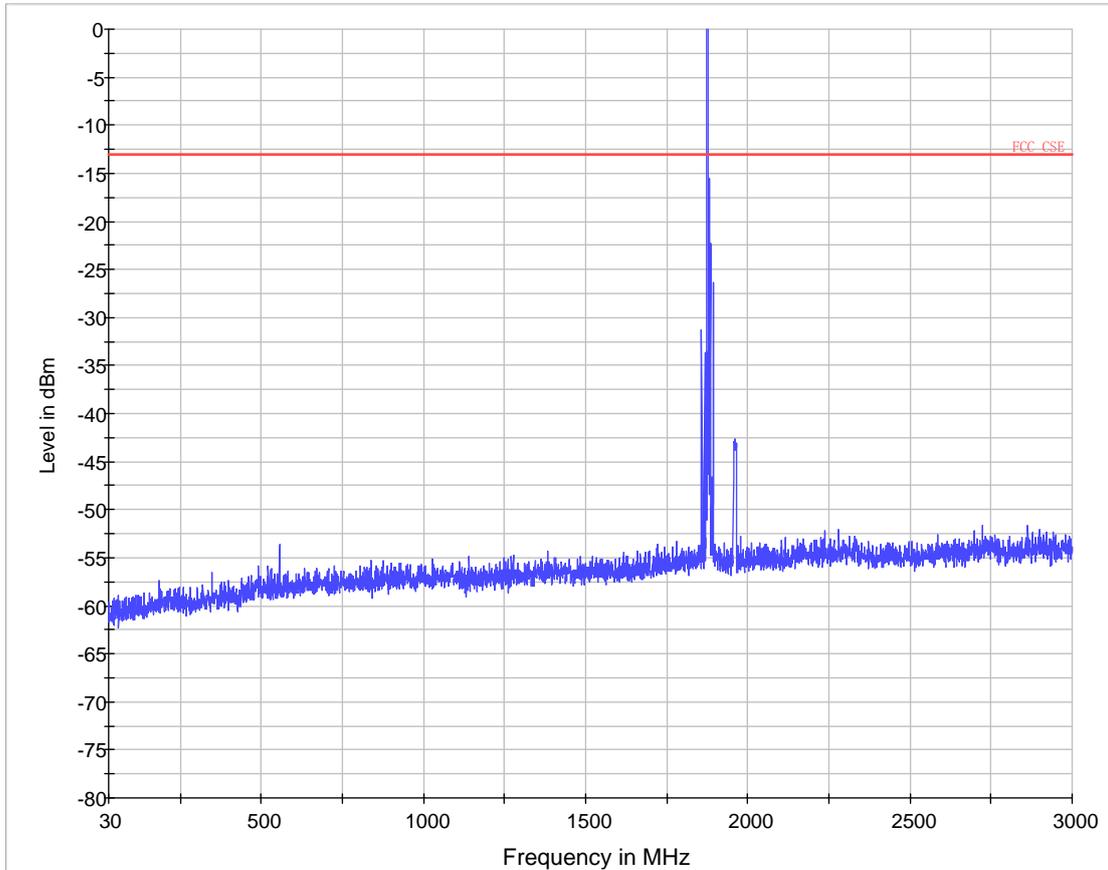
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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

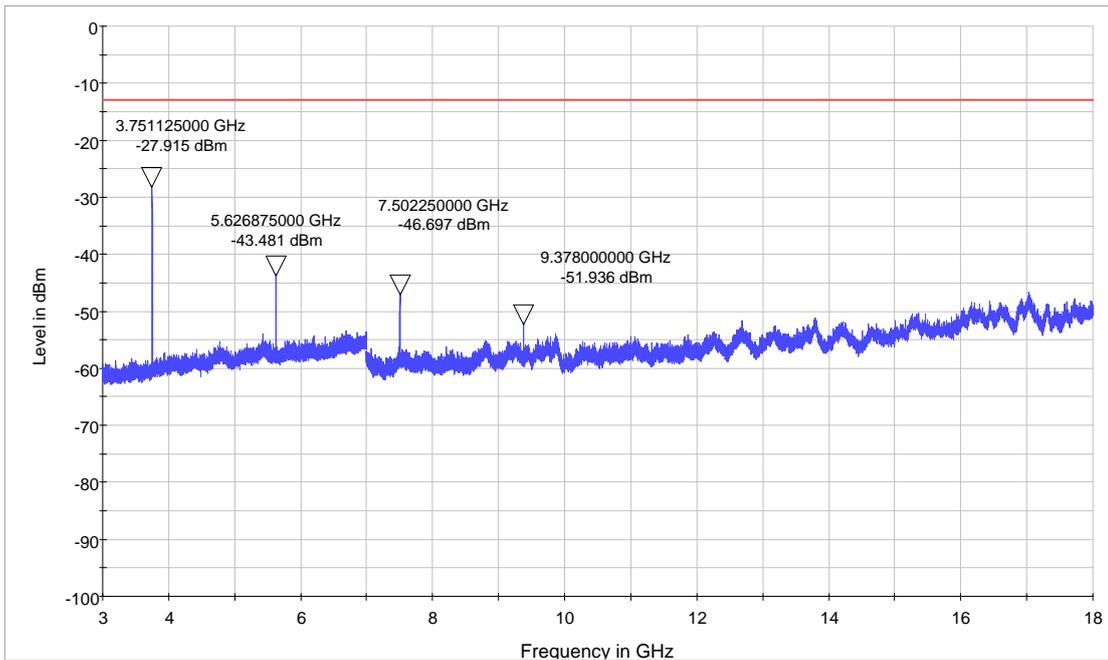
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LTE Band 2 QPSK Bandwidth = 10MHz CH18900,RB 1



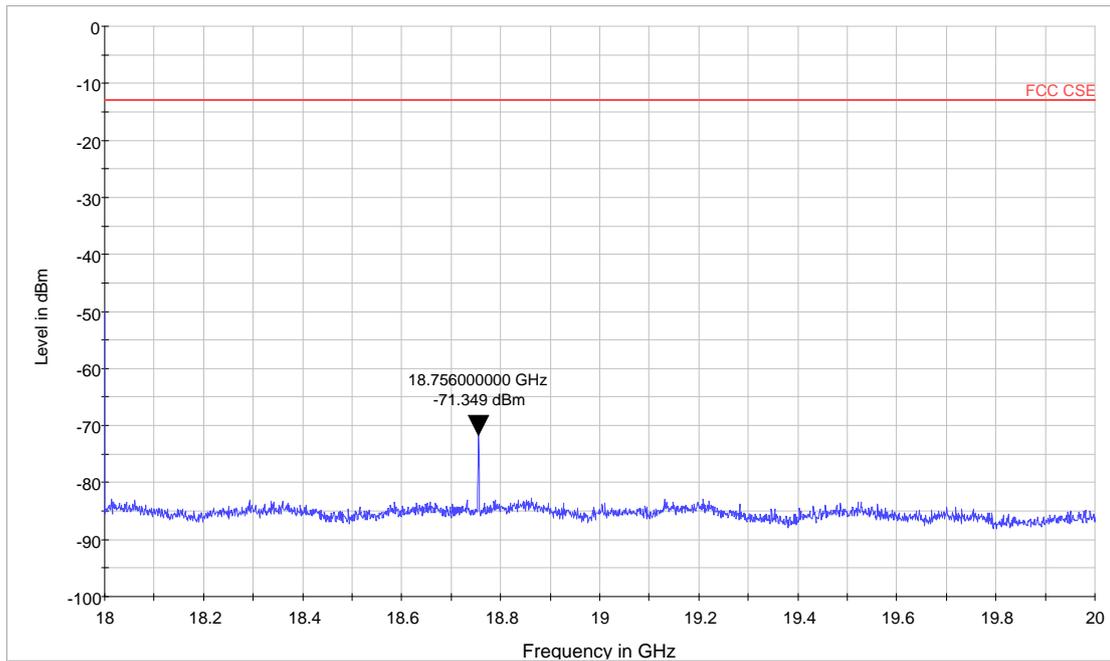
Note: The signal beyond the limit is carrier.
LTE Band 2 18900 Channel 30MHz~3GHz



LTE Band 2 18900 Channel 3GHz~18GHz

TA Technology (Shanghai) Co., Ltd.

Test Report



LTE Band 2 18900 Channel 18GHz~20GHz

Harmonic	TX ch. 18900 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3751.1	-27.92	-13	14.92
3	5626.9	-43.48	-13	30.48
4	7502.3	-46.70	-13	33.70
5	9378.0	-51.94	-13	38.94
6	11280	Nf	-13	/
7	13160	Nf	-13	/
8	15040	Nf	-13	/
9	16920	Nf	-13	/
10	18756.0	-71.35	-13	58.35

Nf: noise floor

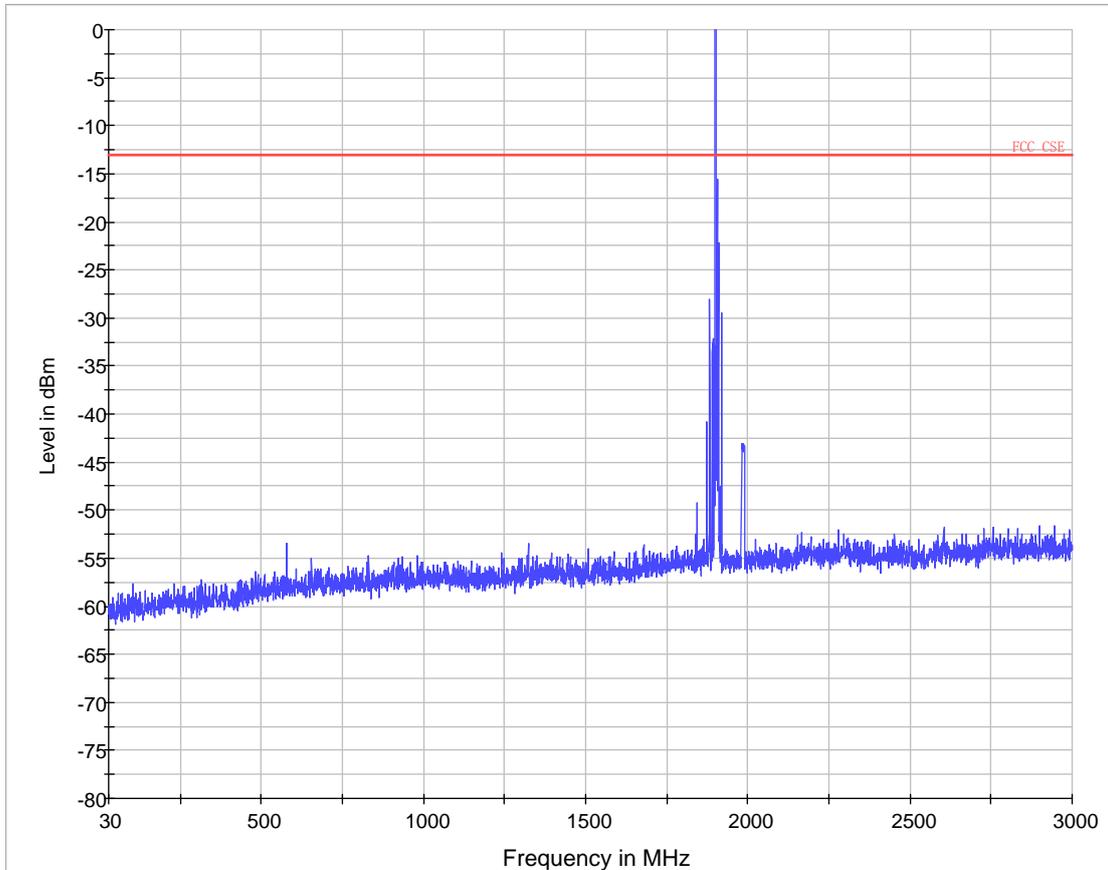
Note: The other Spurious RF conducted emissions level is no more than noise floor.

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

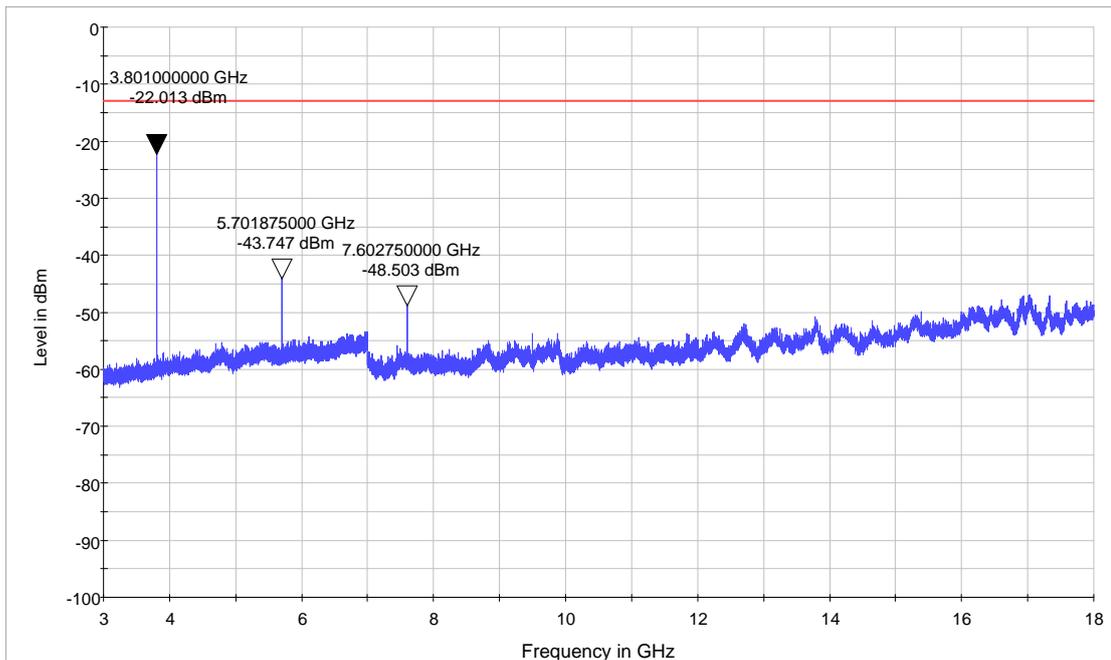
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LTE Band 2 QPSK Bandwidth = 10MHz CH19150, RB 1



Note: The signal beyond the limit is carrier.
LTE Band 2 19150 Channel 30MHz~3GHz



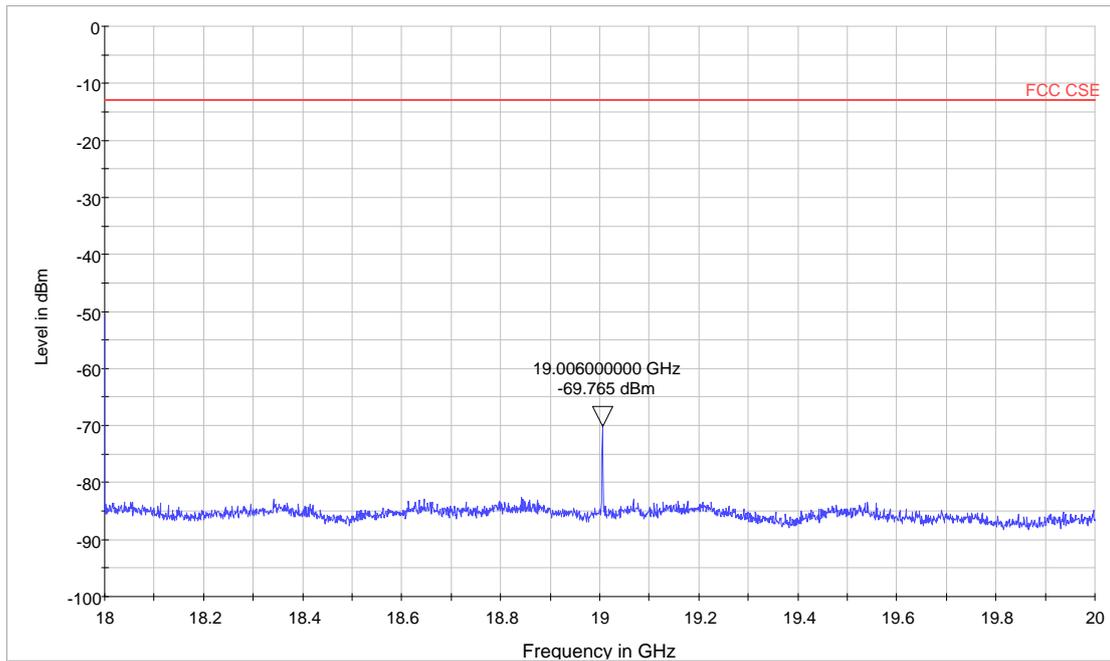
LTE Band 2 19150 Channel 3GHz~18GHz

TA Technology (Shanghai) Co., Ltd.

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LTE Band 2 19150 Channel 18GHz~20GHz

Harmonic	TX ch. 19150 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	3801.0	-22.01	-13	9.01
3	5701.9	-73.75	-13	60.75
4	7602.8	-48.50	-13	35.50
5	9503.3	-53.67	-13	40.67
6	11430	Nf	-13	/
7	13335	Nf	-13	/
8	15240	Nf	-13	/
9	17145	Nf	-13	/
10	19006.0	-69.77	-13	56.77

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

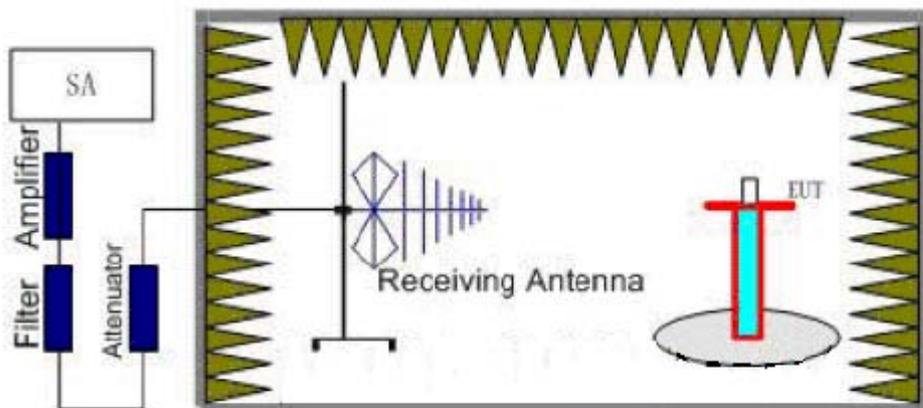
The measurements procedures in TIA -603C are used.

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:

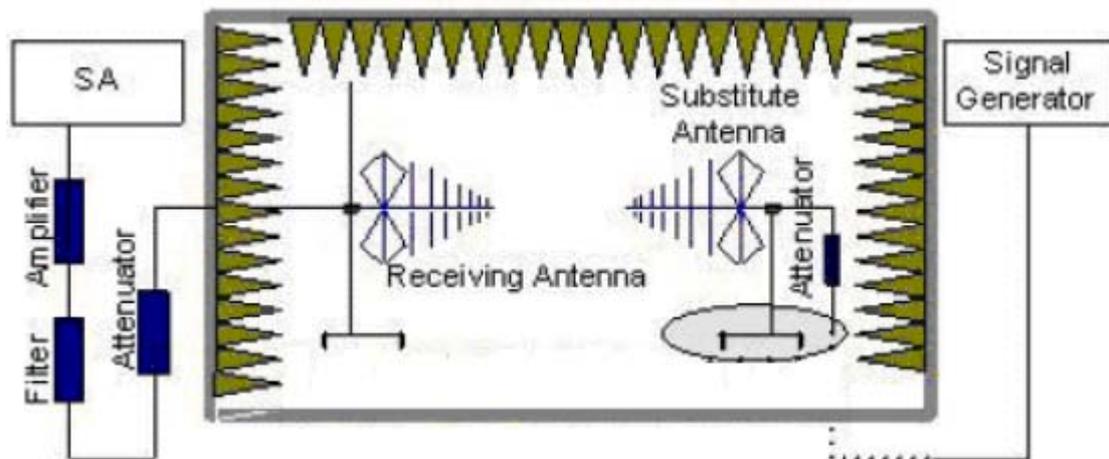
Step 1:

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.



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

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 PCS and LTE Band 2. The worst emission was recorded in the report.

Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee’s frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ 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 $k = 1.96$, $U = 3.55$ dB.

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

CDMA PCS CH25

Harmonic	TX ch.25 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3702.4	/	/	/	Nf	-13	/	/
3	5554.5	-52.06	5.70	13.55	-46.36	-13	33.36	135
4	7406.3	/	/	/	Nf	-13	/	/
5	9255.38	-46.66	6.90	14.25	-41.46	-13	28.46	180
6	11109	-51.08	7.50	14.70	-46.03	-13	33.03	225
7	12956.63	-50.99	7.80	14.90	-46.04	-13	33.04	225
8	14809.88	-44.36	8.10	15.20	-39.41	-13	26.41	225
9	16661.25	/	/	/	Nf	-13	/	/
10	18512.5	/	/	/	Nf	-13	/	/

Nf: noise floor

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

CDMA PCS CH 600

Harmonic	TX ch.600 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3759.75	-56.10	4.20	11.15	-51.30	-13	38.30	180
3	5640.75	-54.85	5.70	13.55	-49.15	-13	36.15	135
4	7520.3	/	/	/	Nf	-13	/	/
5	9399	-47.46	6.90	14.25	-42.26	-13	29.26	180
6	11278.88	-48.42	7.60	14.70	-43.47	-13	30.47	180
7	13161	-49.12	7.80	14.90	-44.17	-13	31.17	225
8	15041.25	-41.05	8.20	15.30	-36.10	-13	23.10	225
9	16920	/	/	/	Nf	-13	/	/
10	18800	/	/	/	Nf	-13	/	/

Nf: noise floor

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

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CDMA PCS CH 1175

Harmonic	TX ch.1175 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3816.75	-50.65	5.20	11.15	-46.85	-13	33.85	135
3	5726.25	-56.03	5.70	13.55	-50.33	-13	37.33	90
4	7636.13	-53.54	6.80	13.85	-48.64	-13	35.64	180
5	9544.88	-50.99	6.90	14.25	-45.79	-13	32.79	180
6	11451.38	-47.38	7.60	14.70	-42.43	-13	29.43	225
7	13360.13	-45.93	7.80	14.90	-40.98	-13	27.98	225
8	15269.63	-43.26	8.20	15.30	-38.31	-13	25.31	225
9	17178.75	/	/	/	Nf	-13	/	/
10	19087.5	/	/	/	Nf	-13	/	/

Nf: noise floor

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

LTE Band 2 QPSK Bandwidth = 1.4MHz CH18607, RB 1

Harmonic	TX ch. 18607 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3700.5	-49.7384	4.96	10.57	-46.2784	-13	33.2784	0
3	5552.1	/	/	/	Nf	-13	/	/
4	7402.8	/	/	/	Nf	-13	/	/
5	9253.5	/	/	/	Nf	-13	/	/
6	11104.2	/	/	/	Nf	-13	/	/
7	12954.9	/	/	/	Nf	-13	/	/
8	14805.6	/	/	/	Nf	-13	/	/
9	16656.3	/	/	/	Nf	-13	/	/
10	18507	/	/	/	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 2 QPSK Bandwidth = 1.4MHz CH18900, RB 1

Harmonic	TX ch. 18900 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.5	-50.78	5.1	11.05	-46.98	-13	33.98	135
3	5640	/	/	/	Nf	-13	/	/
4	7520	/	/	/	Nf	-13	/	/
5	9400	/	/	/	Nf	-13	/	/
6	11280	/	/	/	Nf	-13	/	/
7	13160	/	/	/	Nf	-13	/	/
8	15040	/	/	/	Nf	-13	/	/
9	16920	/	/	/	Nf	-13	/	/
10	18800	/	/	/	Nf	-13	/	/

Nf: noise floor

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

LTE Band 2 QPSK Bandwidth = 1.4MHz CH19193, RB 1

Harmonic	TX ch. 19193 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3818.625	-51.27	6.1	11.05	-48.47	-13	35.47	180
3	5727.9	/	/	/	Nf	-13	/	/
4	7637.2	/	/	/	Nf	-13	/	/
5	9546.5	/	/	/	Nf	-13	/	/
6	11455.8	/	/	/	Nf	-13	/	/
7	13365.1	/	/	/	Nf	-13	/	/
8	15274.4	/	/	/	Nf	-13	/	/
9	17183.7	/	/	/	Nf	-13	/	/
10	19093	/	/	/	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 2 QPSK Bandwidth = 3MHz CH18615, RB 1

Harmonic	TX ch. 18615 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3700.5	-48.79	4.96	10.57	-45.33	-13	32.33	0
3	5554.5	/	/	/	Nf	-13	/	/
4	7406	/	/	/	Nf	-13	/	/
5	9257.5	/	/	/	Nf	-13	/	/
6	11109	/	/	/	Nf	-13	/	/
7	12960.5	/	/	/	Nf	-13	/	/
8	14812	/	/	/	Nf	-13	/	/
9	16663.5	/	/	/	Nf	-13	/	/
10	18515	/	/	/	Nf	-13	/	/
Nf: noise floor								

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

LTE Band 2 QPSK Bandwidth = 3MHz CH18900, RB 1

Harmonic	TX ch. 18900 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3757.5	-50.48	5.1	11.05	-46.68	-13	33.68	90
3	5640	/	/	/	Nf	-13	/	/
4	7520	/	/	/	Nf	-13	/	/
5	9400	/	/	/	Nf	-13	/	/
6	11280	/	/	/	Nf	-13	/	/
7	13160	/	/	/	Nf	-13	/	/
8	15040	/	/	/	Nf	-13	/	/
9	16920	/	/	/	Nf	-13	/	/
10	18800	/	/	/	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 2 QPSK Bandwidth = 3MHz CH19185, RB 1

Harmonic	TX ch. 19185 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3817.125	-54.93	6.1	11.05	-52.13	-13	39.13	90
3	5725.5	/	/	/	Nf	-13	/	/
4	7634	/	/	/	Nf	-13	/	/
5	9542.5	/	/	/	Nf	-13	/	/
6	11451	/	/	/	Nf	-13	/	/
7	13359.5	/	/	/	Nf	-13	/	/
8	15268	/	/	/	Nf	-13	/	/
9	17176.5	/	/	/	Nf	-13	/	/
10	19085	/	/	/	Nf	-13	/	/

Nf: noise floor

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

LTE Band 2 QPSK Bandwidth = 5MHz CH18625, RB 1

Harmonic	TX ch. 18625 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3700.875	-51.98	4.96	10.57	-48.52	-13	35.52	0
3	5557.5	/	/	/	Nf	-13	/	/
4	7410	/	/	/	Nf	-13	/	/
5	9262.5	/	/	/	Nf	-13	/	/
6	11115	/	/	/	Nf	-13	/	/
7	12967.5	/	/	/	Nf	-13	/	/
8	14820	/	/	/	Nf	-13	/	/
9	16672.5	/	/	/	Nf	-13	/	/
10	18525	/	/	/	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 2 QPSK Bandwidth = 5MHz CH18900, RB 1

Harmonic	TX ch. 18900 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3757.5	-50.28	5.1	11.05	-46.48	-13	33.48	90
3	5640	/	/	/	Nf	-13	/	/
4	7520	/	/	/	Nf	-13	/	/
5	9400	/	/	/	Nf	-13	/	/
6	11280	/	/	/	Nf	-13	/	/
7	13160	/	/	/	Nf	-13	/	/
8	15040	/	/	/	Nf	-13	/	/
9	16920	/	/	/	Nf	-13	/	/
10	18800	/	/	/	Nf	-13	/	/
Nf: noise floor								

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

LTE Band 2 QPSK Bandwidth = 5MHz CH19175, RB 1

Harmonic	TX ch. 19175 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3816.75	-55.14	6.1	11.05	-52.34	-13	39.34	0
3	5725.5	/	/	/	Nf	-13	/	/
4	7634	/	/	/	Nf	-13	/	/
5	9542.5	/	/	/	Nf	-13	/	/
6	11451	/	/	/	Nf	-13	/	/
7	13359.5	/	/	/	Nf	-13	/	/
8	15268	/	/	/	Nf	-13	/	/
9	17176.5	/	/	/	Nf	-13	/	/
10	19085	/	/	/	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 2 QPSK Bandwidth = 10MHz CH18650, RB 1

Harmonic	TX ch. 18650 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3700.875	-52.72	5.2	10.76	-49.31	-13	36.31	0
3	5565	/	/	/	Nf	-13	/	/
4	7420	/	/	/	Nf	-13	/	/
5	9275	/	/	/	Nf	-13	/	/
6	11130	/	/	/	Nf	-13	/	/
7	12985	/	/	/	Nf	-13	/	/
8	14840	/	/	/	Nf	-13	/	/
9	16695	/	/	/	Nf	-13	/	/
10	18550	/	/	/	Nf	-13	/	/
Nf: noise floor								

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

LTE Band 2 QPSK Bandwidth = 10MHz CH18900, RB 1

Harmonic	TX ch. 18900 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3759.75	-55.94	5.5	11.05	-52.54	-13	39.54	90
3	5640	/	/	/	Nf	-13	/	/
4	7520	/	/	/	Nf	-13	/	/
5	9400	/	/	/	Nf	-13	/	/
6	11280	/	/	/	Nf	-13	/	/
7	13160	/	/	/	Nf	-13	/	/
8	15040	/	/	/	Nf	-13	/	/
9	16920	/	/	/	Nf	-13	/	/
10	18800	/	/	/	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 2 QPSK Bandwidth = 10MHz CH19150, RB 1

Harmonic	TX ch. 19150 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3801.375	-44.87	6.1	11.05	-42.07	-13	29.07	180
3	5702.25	-54.73	5.7	12.65	-49.93	-13	36.93	135
4	7620	/	/	/	Nf	-13	/	/
5	9525	/	/	/	Nf	-13	/	/
6	11430	/	/	/	Nf	-13	/	/
7	13335	/	/	/	Nf	-13	/	/
8	15240	/	/	/	Nf	-13	/	/
9	17145	/	/	/	Nf	-13	/	/
10	19050	/	/	/	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 *****