FCC TEST REPORT

For

Mobile Phone

Model Number: MAXIM PRO

FCC ID: 2ABBT-MXMPROW7

Report Number : WT158001022

Test Laboratory	:	Shenzhen Academy of Metrology and Quality Inspection National Digital Electronic Product Testing Center
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Test report declaration

Applicant	:	XOX Technology Limited
Address	:	7/F, Goldin Financial Global Square, 7 Wang Tai Road, Kowloon Bay, Hong Kong, China
Manufacturer	:	XOX Technology Limited
Address	:	7/F, Goldin Financial Global Square, 7 Wang Tai Road, Kowloon Bay, Hong Kong, China
EUT Description	:	Mobile Phone
Model No	:	MAXIM PRO
Trade mark	:	XOX
Serial Number	:	/
FCC ID	:	2ABBT-MXMPROW7

Test Standards:

FCC PART 22H AND 24E (2014)

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the maximum emissions from the EUT. Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory is assumed full responsibility for the accuracy of the test results. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with FCC Rules Part 22H AND 24E.

The test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.

Project Engineer:	(Chen Silin 陈司林)	Date:	Apr.14.2015
Checked by:	(Yang Dongping 杨东平)	Date:	Apr.14.2015
Approved by:	(Lin Bin 林斌)	Date:	Apr.14.2015

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TEST Results SUmmary

Table 1 Test Results Summary

FCC Measurement Specification	FCC Limits Part(s)	Description	Result
2.1046	22.913 24.232	Effective Radiated Power of Transmitter	PASS
2.1046	22.913 24.232(b)	Conducted Power of Transmitter	PASS
2.1046	24.232(d)	Peak to Average Radio	PASS
2.1047	/	Modulation Characteristics	PASS
2.1049	22.917(b) 24.238(b)	Occupied Bandwidth	PASS
2.1051	22.917 24.238	Spurious Emission at Antenna Terminal	PASS
2.1053	22.917 24.238	Radiated Spurious Emissions	PASS
2.1055	22.355 24.235	Frequency Stability	PASS

CFR 47 (FCC) part 24 subpart E

Remark: “N/A” means “Not applicable.”

The tests documented in this report were performed in accordance with TIA-603-C, FCC CFR 47 Part 2, FCC CFR 47 Part 22 Part 24.

1. GENERAL INFORMATION

1.1. Report information

1.1.1. This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that SMQ approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that SMQ in any way guarantees the later performance of the product/equipment.

1.1.2. The sample/s mentioned in this report is/are supplied by Applicant, SMQ therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

1.1.3. Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through SMQ, unless the applicant has authorized SMQ in writing to do so.

1.2. Laboratory Accreditation and Relationship to Customer

The testing report were performed by the Shenzhen Academy of Metrology and quality Inspection EMC Laboratory (Guangdong EMC compliance testing center), in their facilities located at Bldg. of Metrology & Quality Inspection, Longzhu Road, Nanshan District, Shenzhen, Guangdong, China. At the time of testing, Laboratory is accredited by the following organizations:

China National Accreditation Service for Conformity Assessment (CNAS) accredits the Laboratory for conformance to FCC standards, EMC international standards and EN standards. The Registration Number is CNAS L0579.
The Laboratory is listed in the United States of American Federal Communications Commission (FCC), and the registration number are 446246 806614 994606(semi anechoic chamber).

The Laboratory is listed in Voluntary Control Council for Interference by Information Technology Equipment (VCCI), and the registration number are R-1974(open area test site) , R-1966(semi anechoic chamber),C-2117(mains ports conducted interference measurement) and T-180(telecommunication ports conducted interference measurement).

The Laboratory is registered to perform emission tests with Industry Canada (IC), and the registration number is IC4174.

TUV Rhineland accredits the Laboratory for conformance to IEC and EN standards, the registration number is E2024086Z02.

1.3. Measurement Uncertainty

Conducted Emission
9kHz~30MHz 3.5dB

Radiated Emission
30MHz~1000MHz 4.5dB
1GHz~26.5GHz 4.6dB

2. PRODUCT DESCRIPTION

2.1. EUT Description

Table 2 Specification of the Equipment under Test

Product Type:	Mobile Phone
Hardware Version:	M7209_V1.2
Software Version :	MX-S45028W5-20150203-v01
FCC-ID:	2ABBT-MXMPROW7
Frequency:	GSM850/PCS1900MHz/WCDMA850MHz Wifi:2412MHz-2462MHz; Bluetooth: 2402MHz-2480MHz BLE: 2402MHz~2480MHz
Type(s) of Modulation:	GSM850/PCS1900MHz :GMSK WCDMA850MHz:QPSK 802.11b: DSSS (DBPSK / DQPSK / CCK) 802.11g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) Bluetooth: GFSK, pi/4DQPSK, 8DPSK BLE: GFSK
Antenna Type:	PIFA Antenna
Operating voltage:	Internal battery, 120V AC Adapter; 3.5V (Low)/3.8V (Nominal)/ 4.2V (Max)

Remark:

Table 3 Identification of the Equipment Under Test (EUT)

EUT	Serial Number/IMEI	HW Version	SW Version	Notes
1	351811065364635	M7209_ V1.2	MX-S45028W5-20150203-v01	Conducted testing sample.
2	351811065357415	M7209_ V1.2	MX-S45028W5-20150203-v01	Radiated testing sample.

Table 4 Identification of Accessory equipment

AE #	Type	Manufacturer	Model	Serial Number
1	AC Adapter	Shenzhen Ruihaite Digital., LTD	LBT-020	N/A
2	Battery	XOX Technology Limited	MAXIM PRO 3.7V 1700mAh	N/A
3	Earphone	XOX Technology Limited	JS-EJ150319A01	N/A

2.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **2ABBT-MXMPROW7** filing to comply with FCC PART 22H AND 24E.

2.3. Block Diagram of EUT Configuration

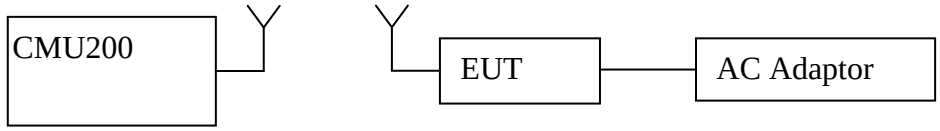

Figure 1 EUT setup of test mode 1&2

2.4. Operating Condition of EUT

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission (X plane).

TM1: GPRS/GSM/EGPRS Mode with GMSK Modulation
TM2: WCDMA Mode with QPSK Modulation

The maximum power levels are GSM mode for GMSK link, RMC 12.2Kbps mode for WCDMA, only these modes were used for all tests.
The conducted power tables are as follows:

Band: GSM850	Conducted Power (dBm)		
Channel	**128**	**190**	**251**
Frequency (MHz)	**824.2**	**836.6**	**848.8**
GSM (GMSK, 1 Tx slot)	32.49	32.60	32.58
GPRS (GMSK, 1 Tx slot)	32.47	32.60	32.56
GPRS (GMSK, 2 Tx slots)	31.49	31.60	31.55
GPRS (GMSK, 3 Tx slots)	28.83	28.92	28.88
GPRS (GMSK, 4 Tx slots)	27.96	28.01	24.89

Band: GSM1900	Conducted Power (dBm)		
Channel	**512**	**661**	**810**
Frequency (MHz)	**1850.2**	**1880**	**1909.8**
GSM (GMSK, 1 Tx slot)	29.74	29.80	29.65
GPRS (GMSK, 1 Tx slot)	29.73	29.80	29.66
GPRS (GMSK, 2 Tx slots)	28.74	28.80	28.69
GPRS (GMSK, 3 Tx slots)	26.32	26.38	26.26
GPRS (GMSK, 4 Tx slots)	25.64	25.60	25.65

Band		WCDMA Band V	
Channel	**4,132**	**4,182**	**4,233**
Frequency (MHz)	**826.4**	**836.4**	**846.6**
RMC 12.2K	22.81	22.90	22.38
HSDPA Subtest-1	21.86	21.76	21.48
HSDPA Subtest-2	21.86	21.77	21.47
HSDPA Subtest-3	21.38	21.29	21.00
HSDPA Subtest-4	21.36	21.26	20.99
HSUPA Subtest-1	19.87	19.74	19.38
HSUPA Subtest-2	19.84	19.77	19.39
HSUPA Subtest-3	20.85	20.73	20.42
HSUPA Subtest-4	19.30	19.29	18.92
HSUPA Subtest-5	20.86	20.75	20.42

2.5. Support Equipment List

Table 5 Support Equipment List

Name	Model No	S/N	Manufacturer
N/A			

2.6. Test Conditions

Date of test：Mar 18,2015-Apr 07, 2015
Date of EUT Receive：Mar 18,2015
Temperature: 21-24 ℃

Relative Humidity: 48-54%

2.7. Special Accessories

Not available for this EUT intended for grant.

2.8. Equipment Modifications

Not available for this EUT intended for grant.

3. TEST EQUIPMENT USED

Table 6 Test Equipment

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB2603	EMI Test Receiver	Rohde & Schwarz	ESCS30	Jan.19, 2015	1 Year
SB3321	AMN	Rohde & Schwarz	ESH2-Z5	Jan.19, 2015	1 Year
SB2604	AMN	Rohde & Schwarz	ESH3-Z5	Jan.19, 2015	1 Year
SB8501/09	EMI Test Receiver	Rohde & Schwarz	ESU40	May.16, 2014	1 Year
SB8501/04	Bilog Antenna	Schwarzbeck	VULB9163	May 13, 2014	1 Year
SB5472/02	Bilog Antenna	Schwarzbeck	VULB9163	Jan.19, 2015	1 Year
SB3435	Horn Antenna	Rohde & Schwarz	HF906	Jan.19, 2015	1 Year
SB3434	Horn Antenna	Rohde & Schwarz	HF906	Jan.19, 2015	1 Year
SB3435/01	Amplifier(1-18GHz)	Rohde & Schwarz	---	Jan.19, 2015	1 Year
SB3435/02	Amplifier(18-40GHz)	Rohde & Schwarz	---	May.16, 2014	1 Year
SB5392/02	Horn Antenna	Amplifier Research	AT4560	May.16, 2014	1 Year
SB3450/01	3m Semi-anechoic chamber	Albatross Projects	9X6X6	Oct.11, 2014	2 Years
SB8501/02	Communication Test Unit	Rohde & Schwarz	CMU200	Jan.6, 2015	1 Year
SB9721/02	Signal Analyzer	Agilent	N9020A	Feb.2, 2015	1 Year
SB3611	DC Power Supply	KENWOOD	PDS36-10	May.16, 2014	1 Year
SB6691	Climatic Chamber	NANYA	DW-0150	Apr 13, 2014	1 Year
SB9721/03	Signal Generator	Agilent	E4438C	Feb 3, 2014	1 Year
---	Conducted Emissions Cable set	HUBER+SUHNER	---	Sept 3.2014	1 Year
----	Conducted Emissions Cable set	HUBER+SUHNER	---	Sept 3.2014	1 Year
----	Radiated Emissions Cable set	HUBER+SUHNER	---	Jan.19, 2015	1 Year
---	Radiated Emissions Cable set	HUBER+SUHNER	---	Jan.19, 2015	1 Year

4. TEST RESULTS

4.1. RF Power Output

4.1.1.Test Standard

FCC: CFR Part 2.1046, CFR Part 22.913, CFR Part 24.232

4.1.2.Test Limit

FCC 22.913 (a) Effective radiated power limits.
The effective radiated power (ERP) of mobile transmitters must not exceed 7 Watts.

FCC 24.232 (b)(c) Power limits.
(b) Mobile/portable stations are limited to 2 Watts effective isotropic radiated power (EIRP). (c) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms equivalent voltage. The measurement results shall be properly adjusted for any limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement over the full bandwidth of the channel.

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4.1.3.Test Procedure

Radiated Output Power Measurement procedure
Ref: TIA-603C 2004 -2.2.17.2 Effective Radiated Power (ERP) or Effective Isotropic
1. Connect the equipment as shown in the above diagram with the EUT's antenna in a vertical orientation.
2. Adjust the settings of the Universal Radio Communication Tester (CMU) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to the channel frequency. Set the analyzer to measure peak hold with the required settings.
4. Rotate the EUT 360 . Record the peak level in dBm (LVL).
5. Replace the EUT with a vertically polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (LOSS). LOSS = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the ERP using the following equation:
ERP (dBm) = LVL (dBm) + LOSS (dB)
8. Determine the EIRP using the following equation:
EIRP (dBm) = ERP (dBm) + 2.15 (dB)
9. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

4.1.4.Test Data

Table 7 Substitution Results

Test Mode	Freq. [MHz]	SG. Level [dBm]	Cable Loss [dB]	Antenna Gain [dBd]	Substitution Level (ERP) [dBm]	Limit [dBm]	Result
TM1	824.2	19.47	0.5	5.28	24.25	38.5	Pass
TM1	836.6	21.32	0.5	5.28	26.10	38.5	Pass
TM1	848.8	22.88	0.5	5.28	27.66	38.5	Pass
TM2	826.4	14.07	0.5	5.28	18.85	38.5	Pass
TM2	836.6	14.29	0.5	5.28	19.07	38.5	Pass
TM2	846.6	14.37	0.5	5.28	19.15	38.5	Pass

Table 8 Substitution Results

Test Mode	Freq. [MHz]	SG. Level [dBm]	Cable Loss [dB]	Antenna Gain [dBi]	Substitution Level (EIRP) [dBm]	Limit [dBm]	Result
TM1	1850.2	19.58	0.97	8.92	27.53	33	Pass
TM1	1880	19.22	0.97	8.92	27.17	33	Pass
TM1	1909.8	18.69	0.97	8.92	26.64	33	Pass

4.2. Peak to Average Radio

4.2.1. Test Standard

CFR 47 (FCC) part 24 subpart E

4.2.2. Test Limit

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

4.2.3. Test Procedure

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

4.2.4. Test Data

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
GSM1900	GSM/TM1	1850.2	3.71	13	PASS
		1880	3.43	13	PASS
		1909.8	3.67	13	PASS

4.3. Modulation Characteristics

4.3.1.Test Standard

CFR 47 (FCC) part 2.1047, part 22 subpart H and par 24 subpart E

4.3.2.Test Limit

2.1047 (d) Other types of equipment. A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

4.3.3.Test Procedure

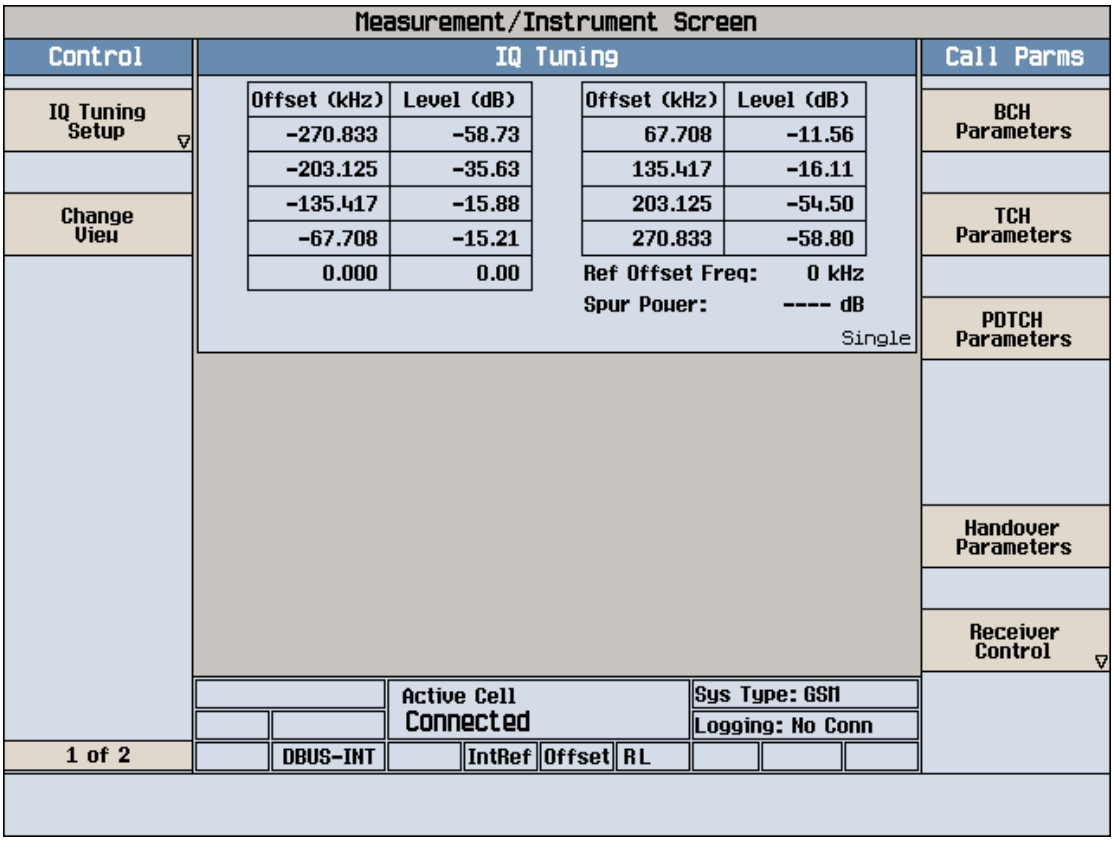
Connect the EUT to Universal Radio Communication Tester CMU200 via the antenna connector. The frequency band is set as US celluar; the EUT's output is matched with 50 Ω load, test method was according to 3GPP TS 51.010 and 3GPP TS 34.121. The waveform quality and constellation of the Mobile Phone was tested.

4.3.4.Test Arrangement

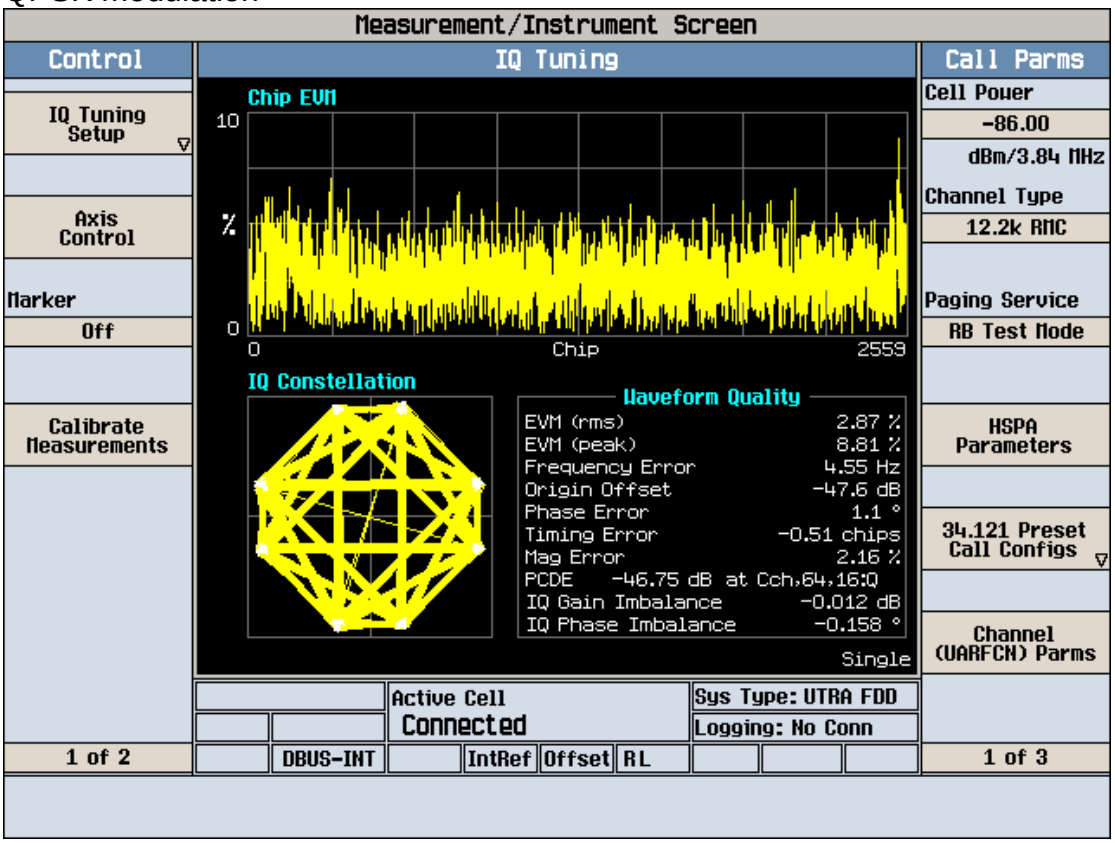
The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

4.3.5.Test Data

GMSK modulation



QPSK modulation



4.4. Occupied Bandwidth/Emission Bandwidth

4.4.1. Test Standard

FCC: CFR Part 2.1049, CFR Part 22.917, CFR Part 24.238

4.4.2. Test Limit

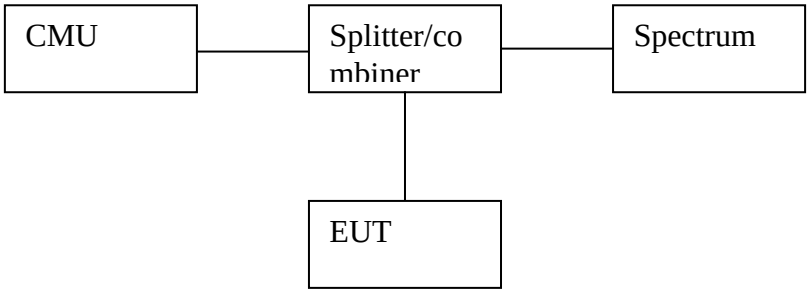
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable.
(h) Transmitters employing digital modulation techniques-when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated.

4.4.3. Test Procedure

1. Connect the equipment as shown in the above diagram.
2. Adjust the settings of the Universal Radio Communication Tester (CMU) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure the 99% occupied bandwidth. Record the value.
4. Set the spectrum analyzer to measure the -26 dB emission bandwidth. Record the value.
5. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

Spectrum analyzer settings: Measurement bandwidth of at least 1% of the occupied bandwidth.

4.4.4. Test Setup

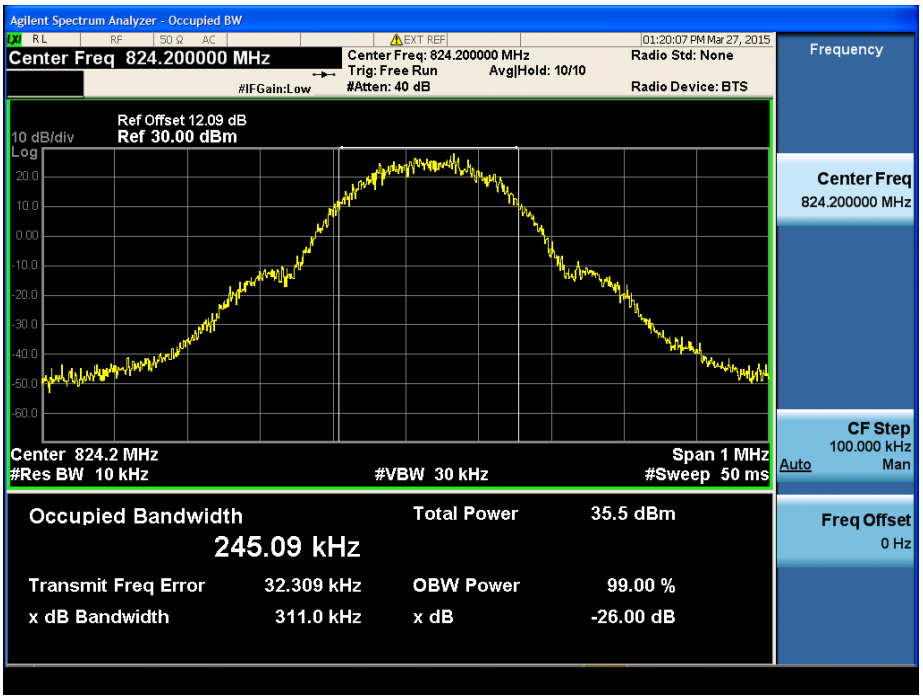


4.4.5.Test Data

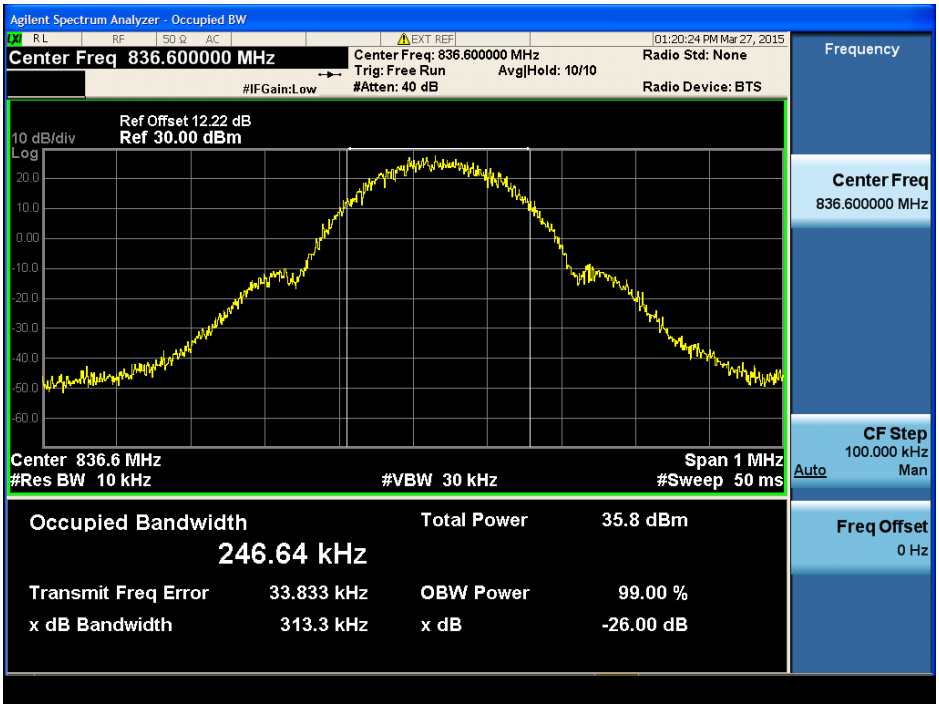
Table 9 Occupied Bandwidth Test Data

GSM 850: GMSK Mode		
CHANNEL FREQUENCY (MHz)	99% OBW (kHz)	26dBc BANDWIDTH (kHz)
824.2	245.09	315.00
836.6	246.64	307.91
848.8	246.88	315.60
UMTS 850		
CHANNEL FREQUENCY (MHz)	99% OBW (MHz)	26dBc BANDWIDTH (MHz)
826.4	4.1505	4.659
836.6	4.1600	4.681
846.6	4.1571	4.646
GSM 1900: GMSK Mode		
CHANNEL FREQUENCY (MHz)	99% OBW (kHz)	26dBc BANDWIDTH (kHz)
1850.2	246.91	314.70
1880.0	248.22	312.27
1909.8	239.83	305.57

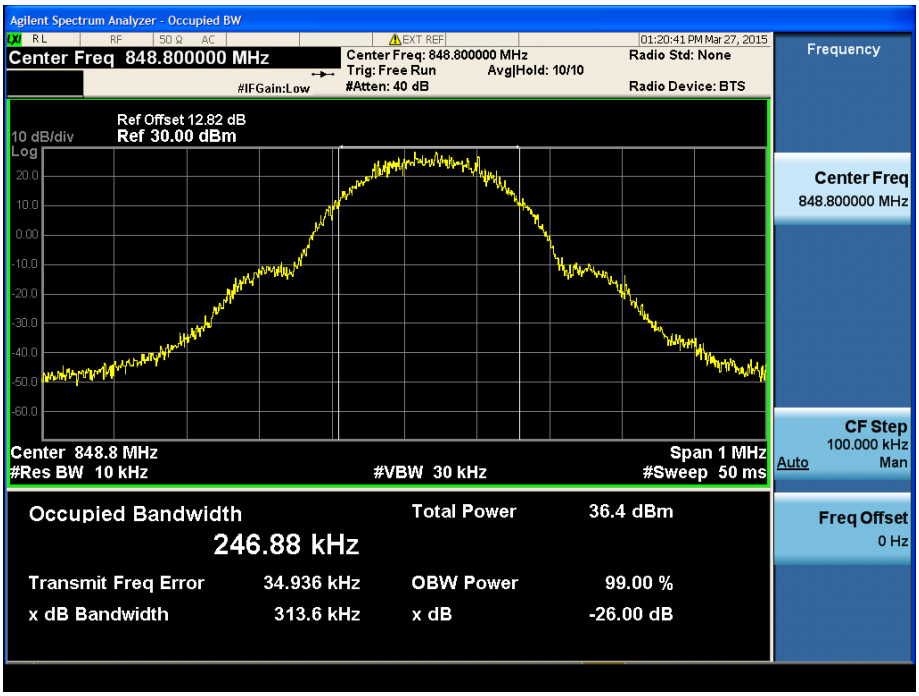
Test Band = GSM850
Test Mode = GSM/TM1
Test Channel = LCH



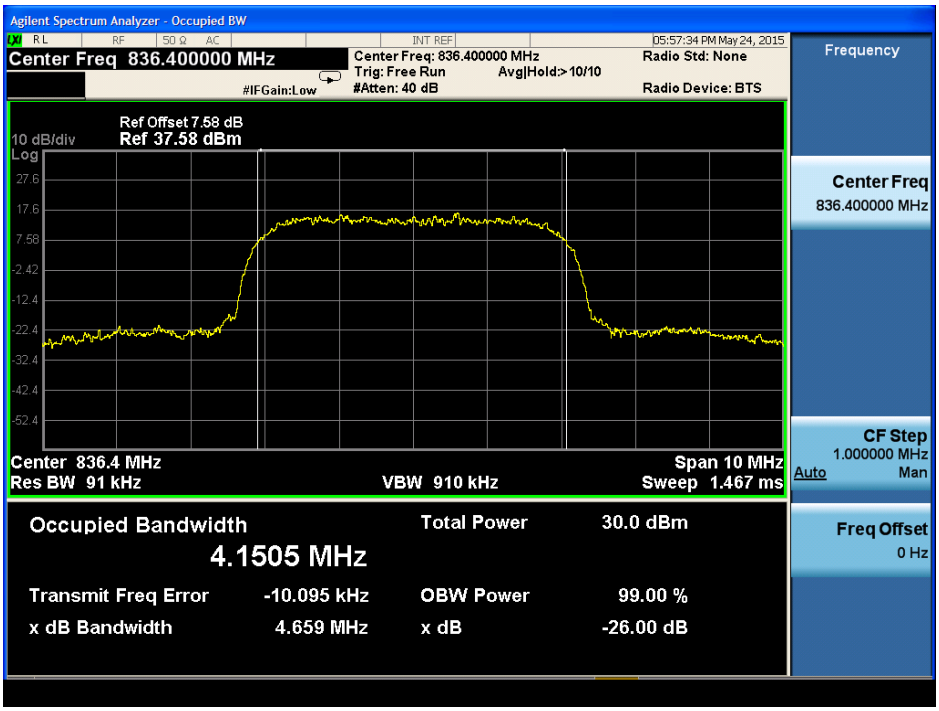
Test Band = GSM850
Test Mode = GSM/TM1
Test Channel = MCH



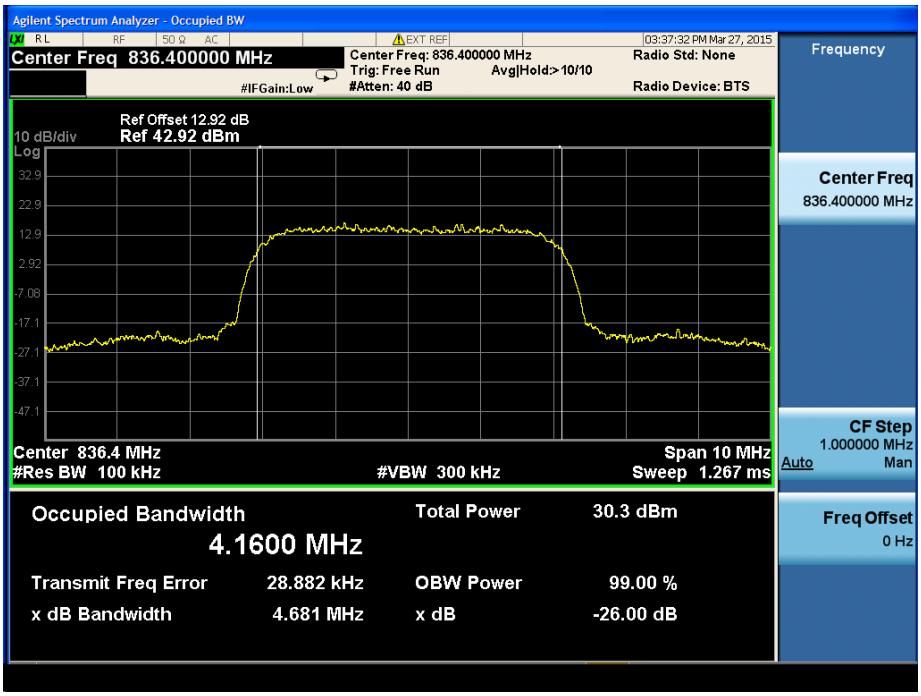
Test Band = GSM850
Test Mode = GSM/TM1
Test Channel = HCH



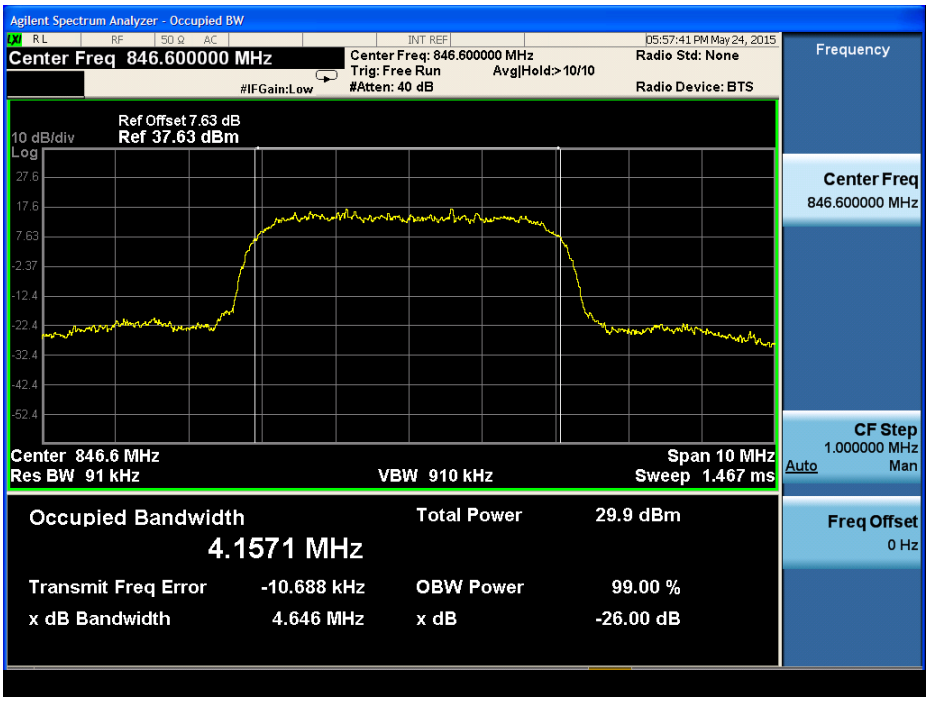
Test Band = WCDMA850
Test Mode = WCDMA/TM2
Test Channel = LCH



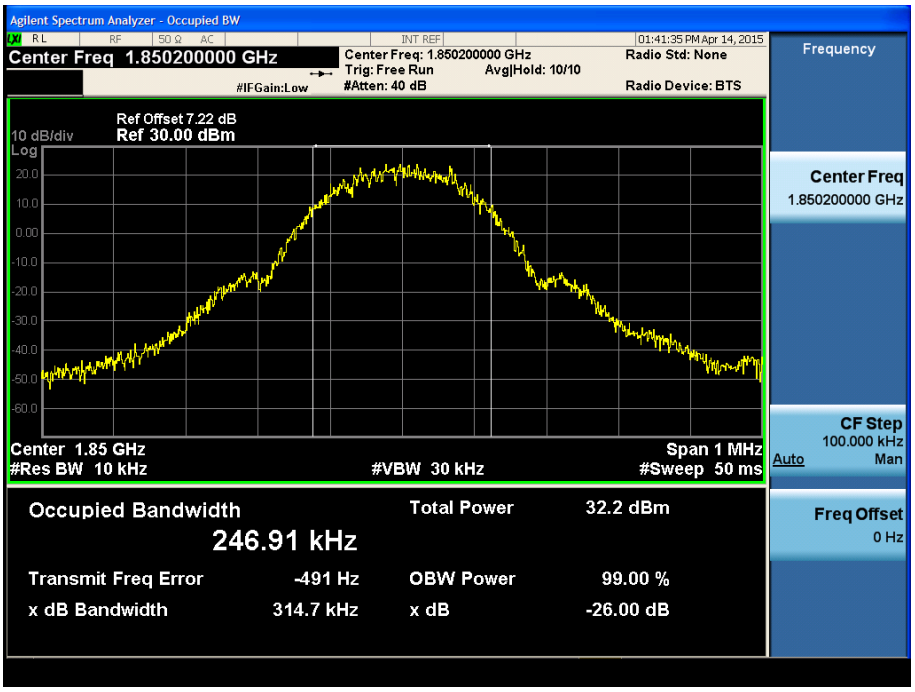
Test Band = WCDMA850
Test Mode = WCDMA /TM2
Test Channel = MCH



Test Band = WCDMA850
Test Mode = WCDMA /TM2
Test Channel = HCH



Test Band = GSM1900
Test Mode = GSM/TM1
Test Channel = LCH



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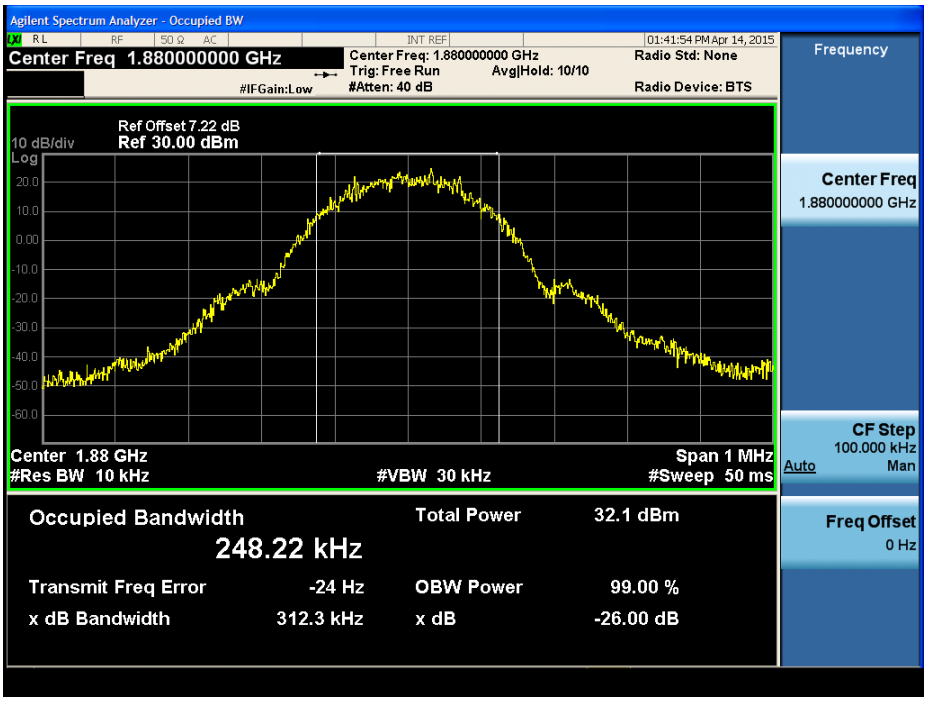
Test Mode = GSM /TM1
Test Channel = MCH



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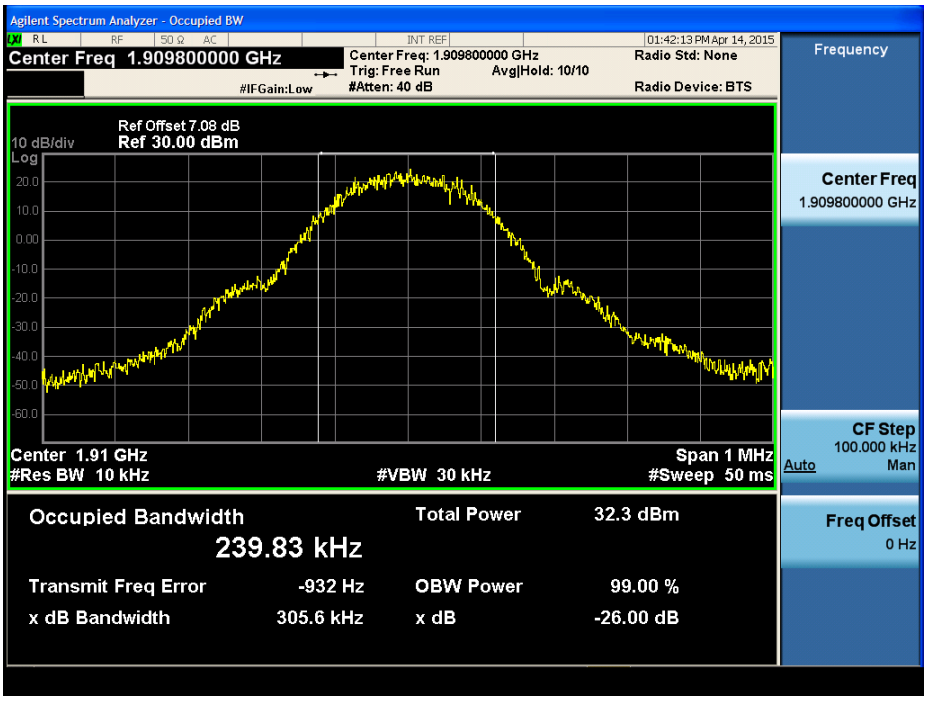
Test Mode = GSM /TM1
Test Channel = HCH



4.5. Spurious Emission at Antenna Terminal

4.5.1. Test Standard

FCC: CFR Part 2.1051, CFR Part 22.917, CFR Part 24.238

4.5.2. Test Limit

The radio frequency voltage or power generated within the equipment and appearing on a
spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in FCC 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.
(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. For all power levels +30dBm to 0dBm, this becomes a constant specification of -13dBm.

FCC 22.917 Emission limitations for cellular equipment.
The rules in this section govern the spectral characteristics of emissions in the Cellular
Radiotelephone Service.
(b) Measurement procedure. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

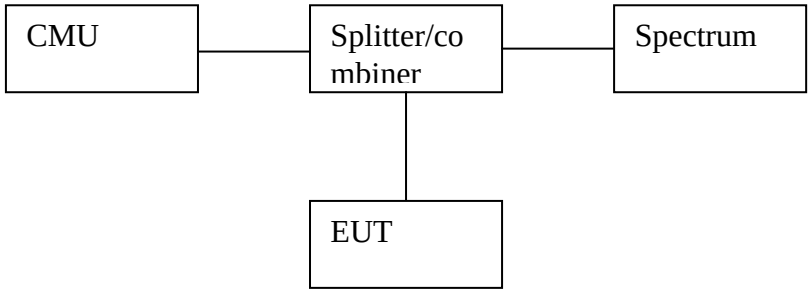
FCC 24.238 Emission limitations for Broadband PCS equipment.
The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.
(b) Measurement procedure. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

4.5.3.Test Procedure

1. Connect the equipment as shown in the above diagram.
2. Set the spectrum analyzer to measure peak hold with the required settings.
3. Set the signal generator to a known output power and record the path loss in dB (LOSS) for frequencies up to the tenth harmonic of the EUT's carrier frequency. \
LOSS = Generator Output Power (dBm) – Analyzer reading (dBm).
4. Replace the signal generator with the EUT.
5. Adjust the settings of the Universal Radio Communication Tester (CMU) to set the EUT to its maximum power at the required channel.
6. Set the spectrum analyzer to measure peak hold with the required settings. Offset the spectrum analyzer reference level by the path loss measured above.
7. Measure and record all spurious emissions up to the tenth harmonic of the carrier frequency.
8. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.
9. If necessary steps 6 and 7 may be performed with the spectrum analyzer set to average detector.

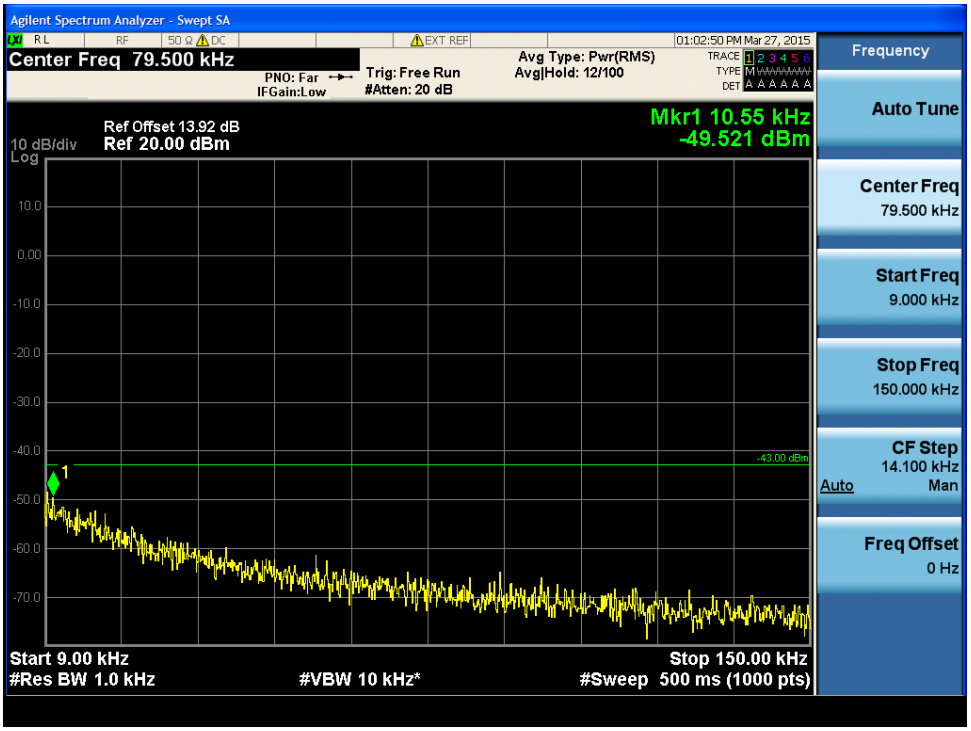
(Note: Step 3 above is performed prior to testing and LOSS is recorded by test software. Steps 2, 6, and 7 above are performed with test software.)

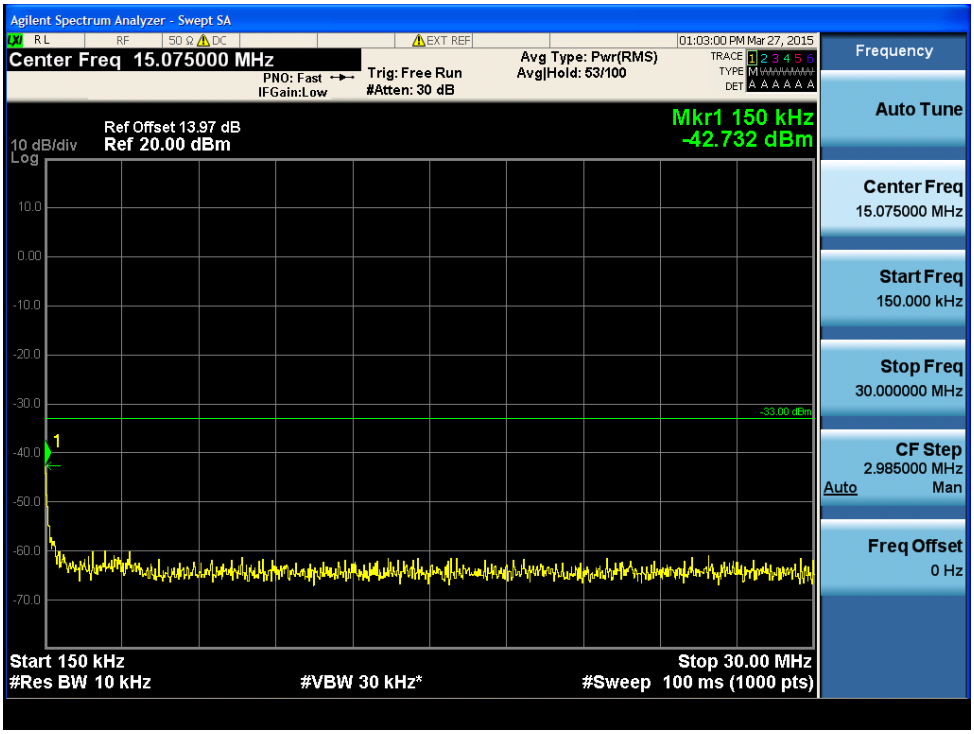
4.5.4.Test Setup

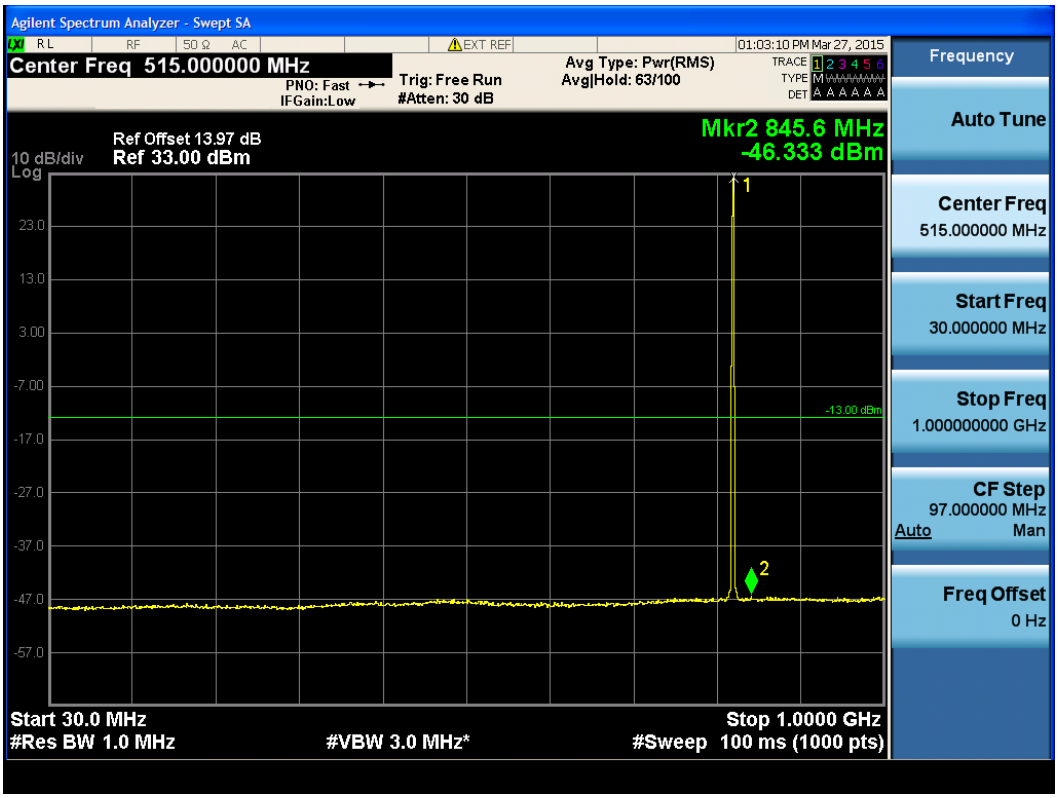


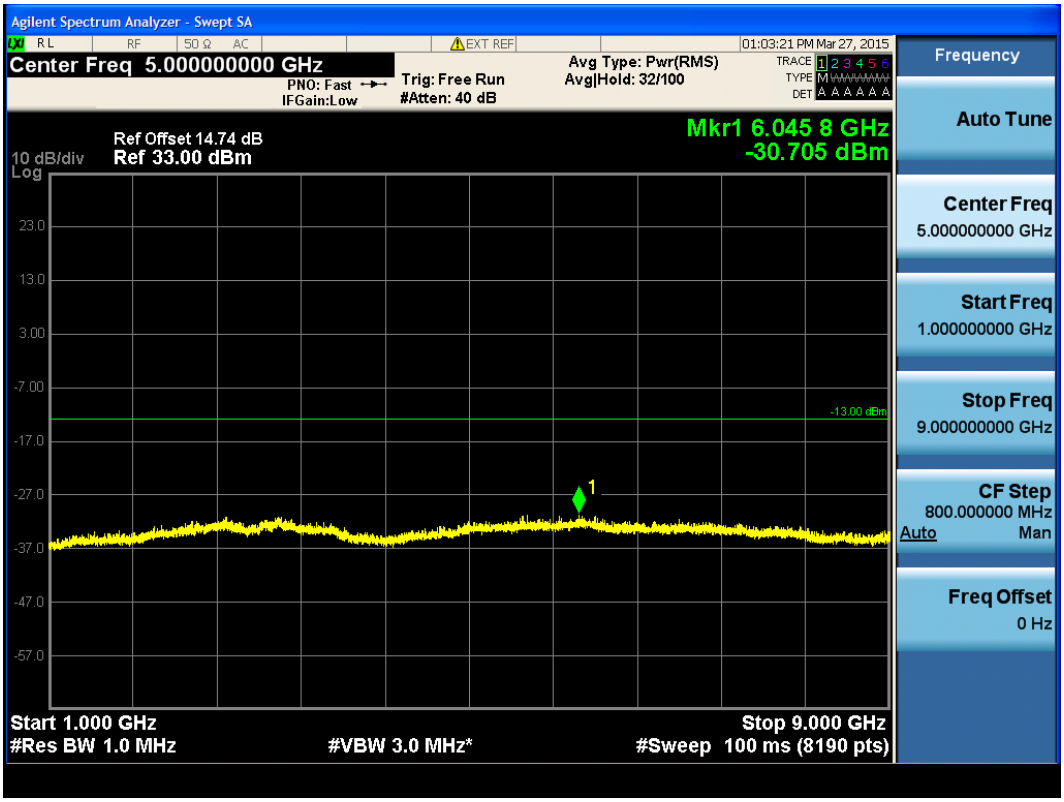
4.5.5.Test Data

Out of band measurement
Test Band = GSM850
Test Mode = GSM /TM1
Test Channel = LCH

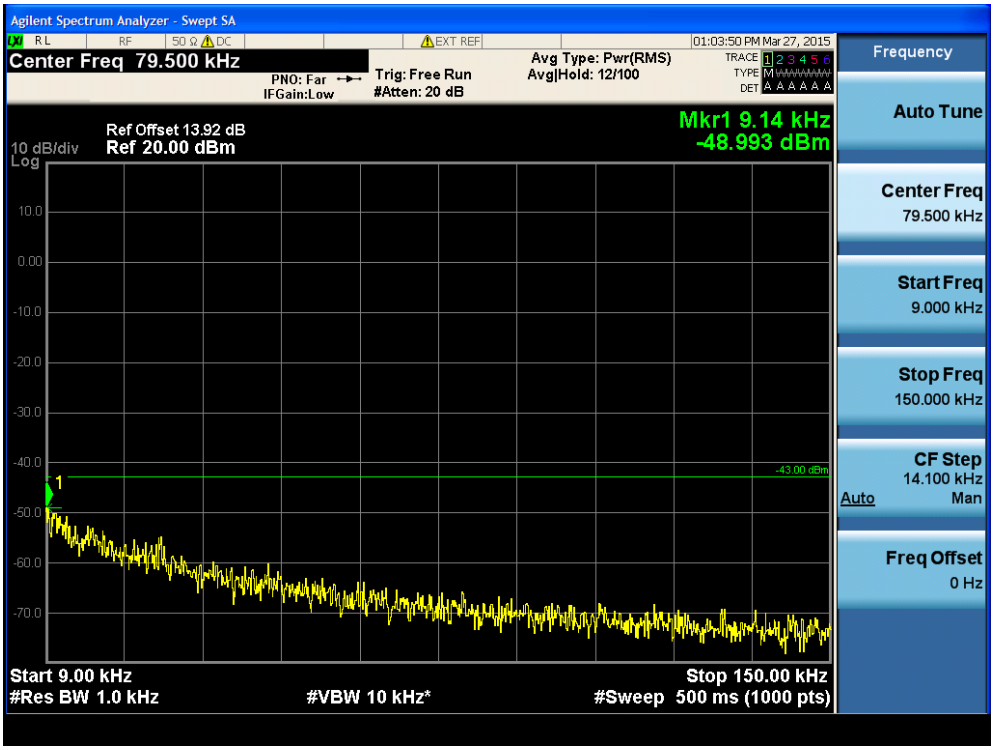


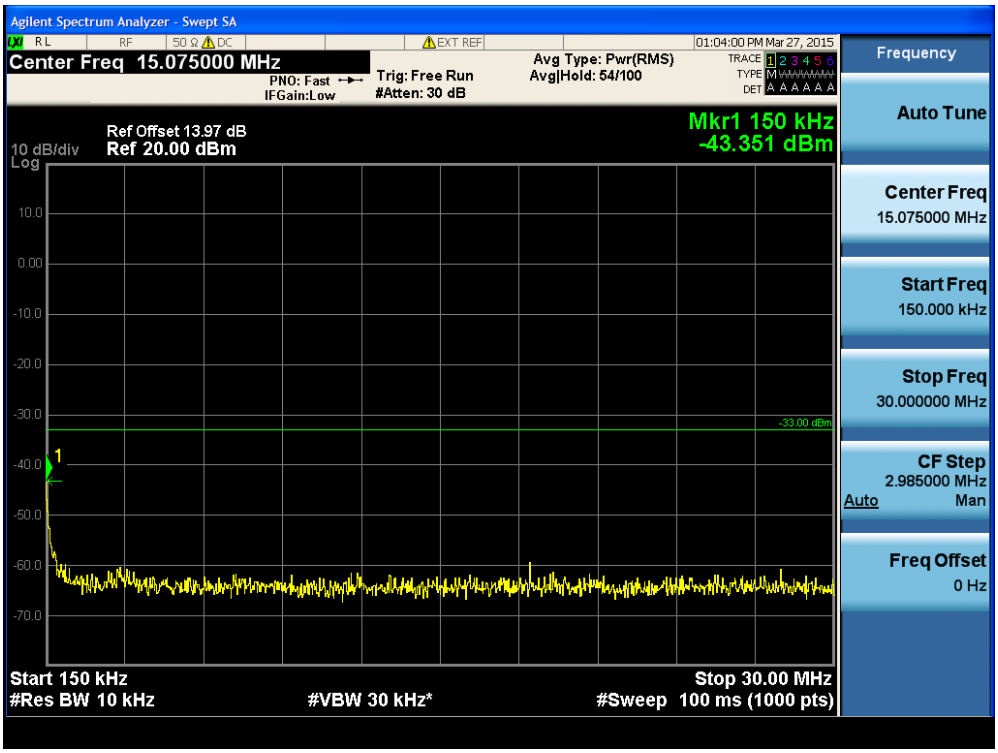


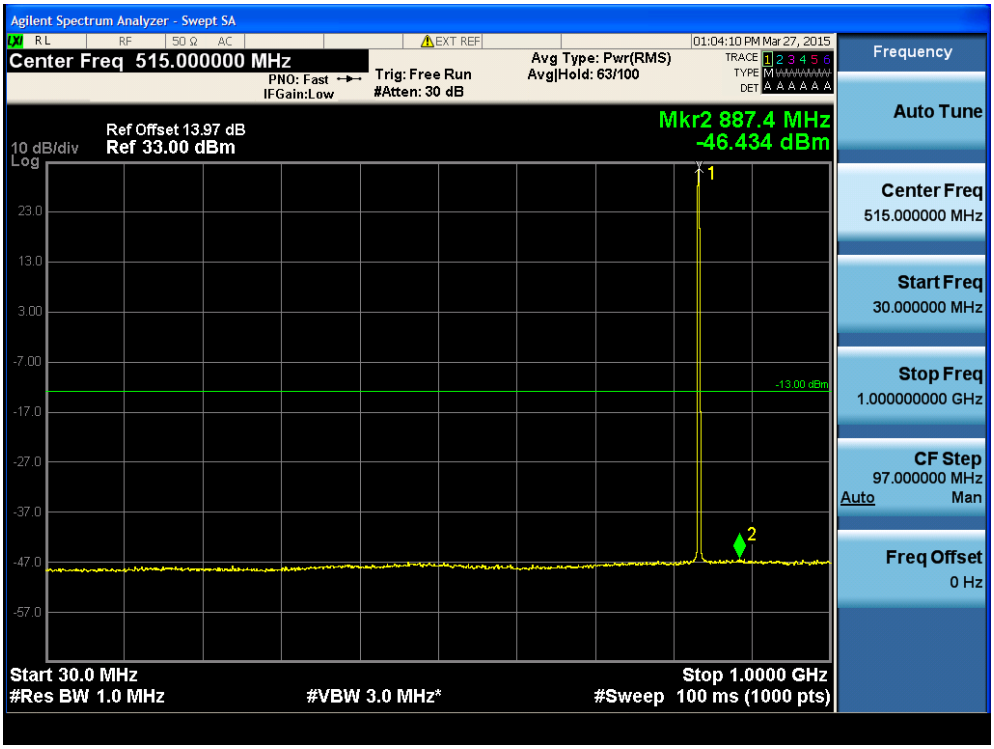

Agilent Spectrum Analyzer - Swept SA
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Pwr(RMS)
Avg|Hold: 63/100
01:03:10 PM Mar 27, 2015
Ref Offset 13.97 dB
10 dB/div
Ref 33.00 dBm
Mkr2 845.6 MHz
-46.333 dBm
-13.00 dBm
Start 30.0 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 1.0000 GHz
#Sweep 100 ms (1000 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz

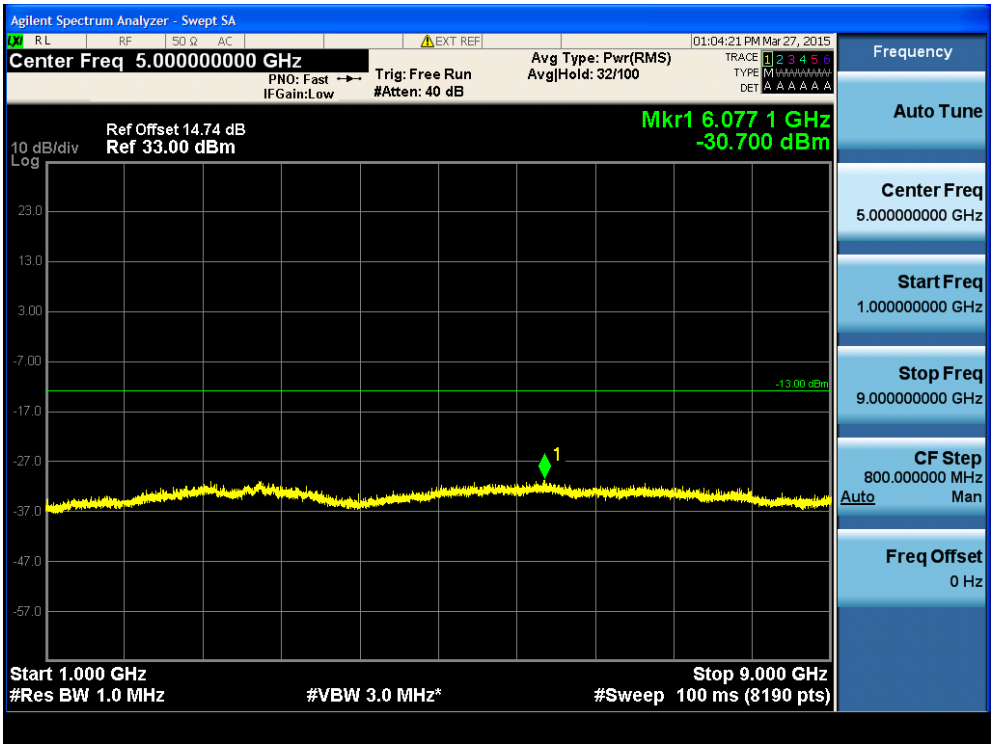

Agilent Spectrum Analyzer - Swept SA
Center Freq 5.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Pwr(RMS)
Avg|Hold: 32/100
01:03:21 PM Mar 27, 2015
Ref Offset 14.74 dB
10 dB/div
Ref 33.00 dBm
Mkr1 6.045 8 GHz
-30.705 dBm
-13.00 dBm
Start 1.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 9.000 GHz
#Sweep 100 ms (8190 pts)
Frequency
Auto Tune
Center Freq
5.000000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
9.000000000 GHz
CF Step
800.000000 MHz
Auto
Man
Freq Offset
0 Hz

Out of band measurement
Test Band = GSM850
Test Mode = GSM /TM1
Test Channel = MCH

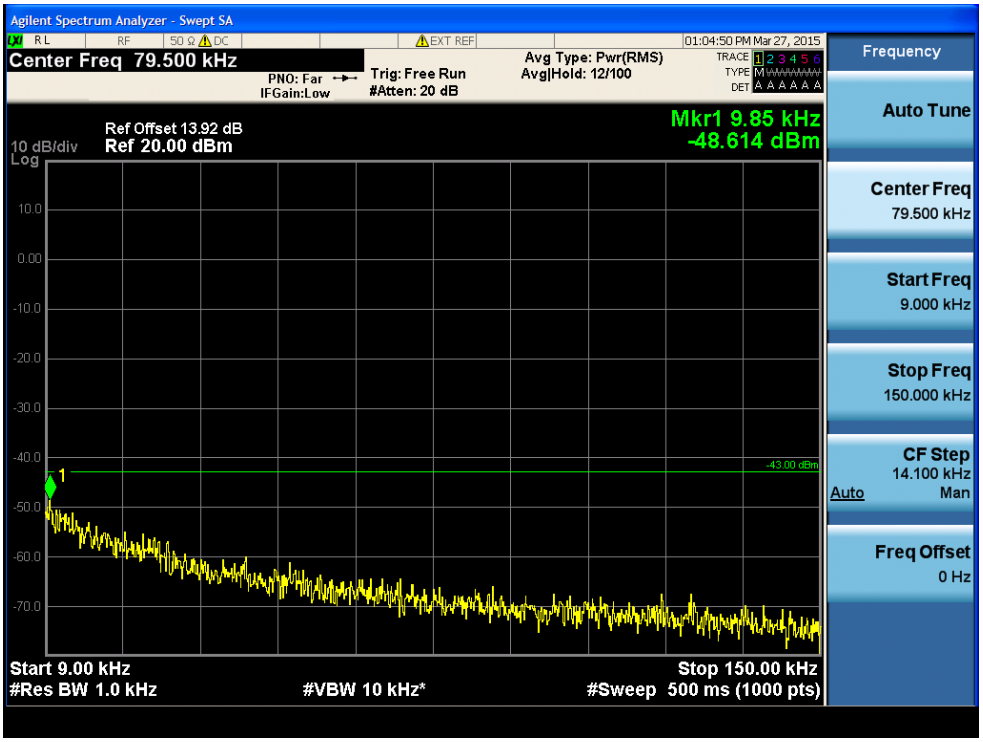


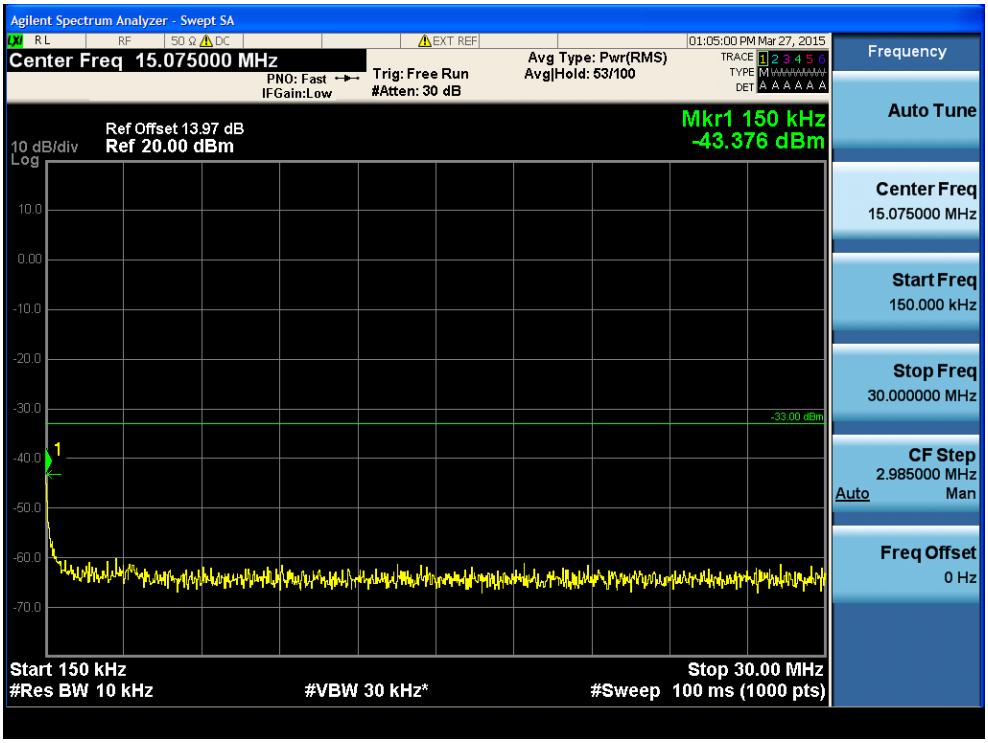


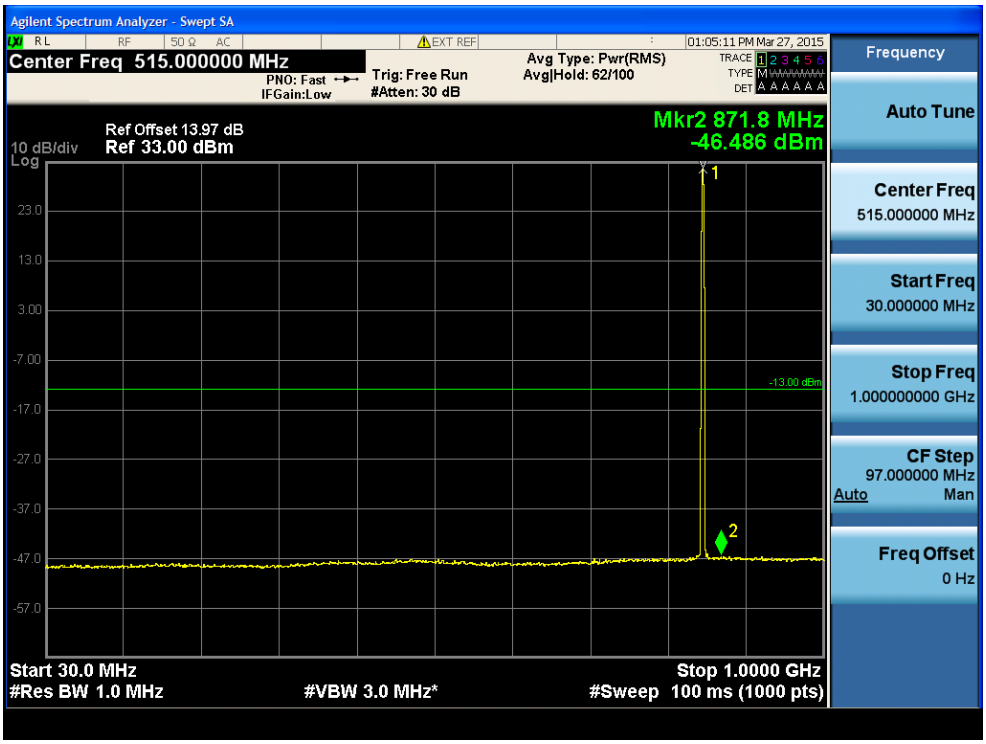

Agilent Spectrum Analyzer - Swept SA
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Pwr(RMS)
Avg|Hold: 63/100
01:04:10 PM Mar 27, 2015
Ref Offset 13.97 dB
10 dB/div
Log
Ref 33.00 dBm
Mkr2 887.4 MHz
-46.434 dBm
-13.00 dBm
Start 30.0 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 1.0000 GHz
#Sweep 100 ms (1000 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz

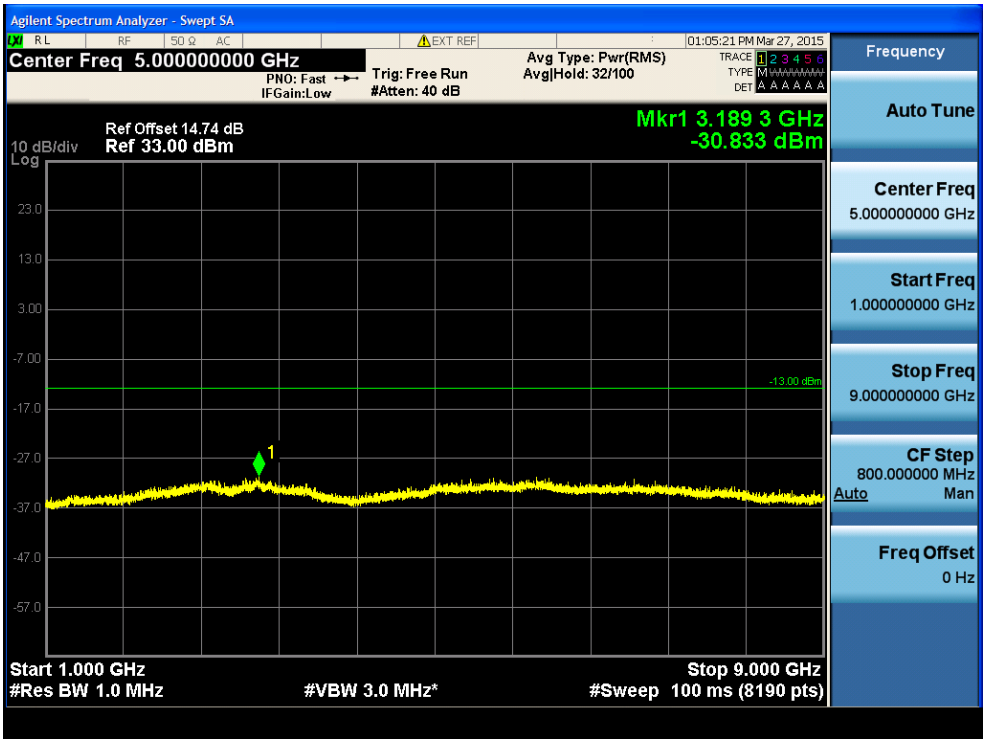

Agilent Spectrum Analyzer - Swept SA
Center Freq 5.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Pwr(RMS)
Avg|Hold: 32/100
01:04:21 PM Mar 27, 2015
Ref Offset 14.74 dB
10 dB/div
Log
Ref 33.00 dBm
Mkr1 6.077 1 GHz
-30.700 dBm
-13.00 dBm
Start 1.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 9.000 GHz
#Sweep 100 ms (8190 pts)
Frequency
Auto Tune
Center Freq
5.000000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
9.000000000 GHz
CF Step
800.000000 MHz
Auto
Man
Freq Offset
0 Hz

Out of band measurement
Test Band = GSM850
Test Mode = GSM /TM1
Test Channel = HCH

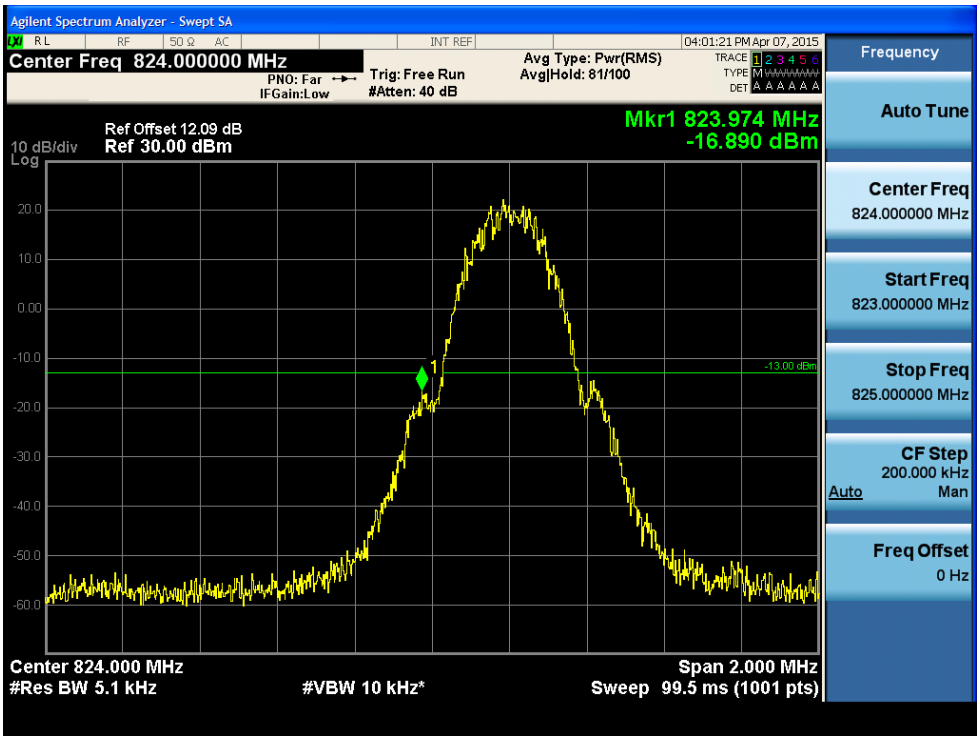


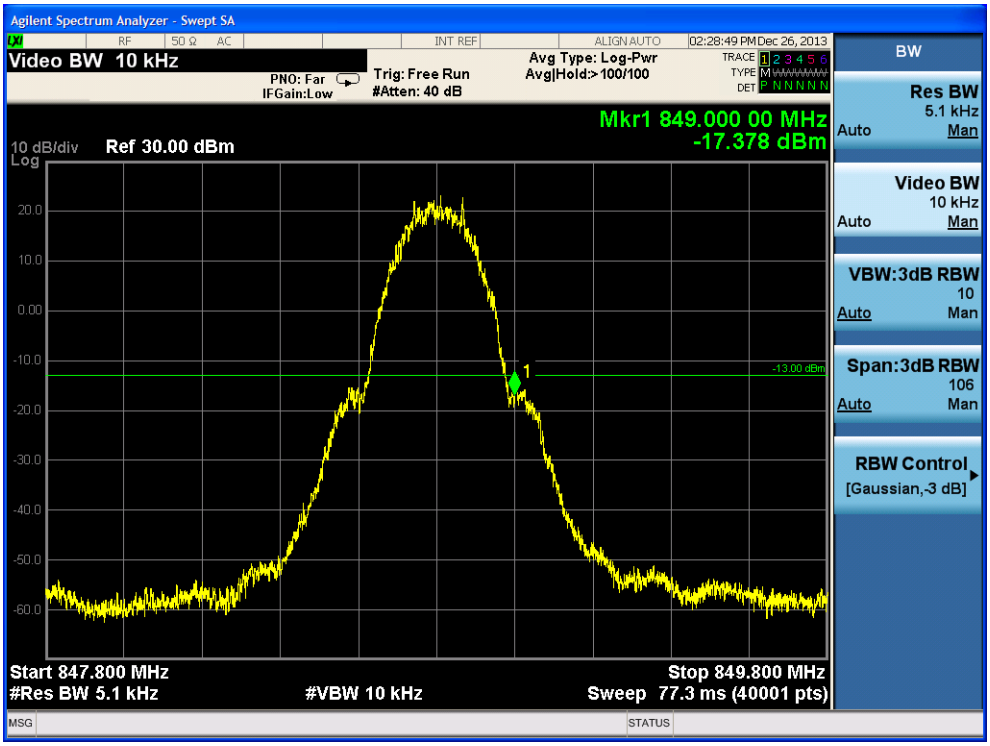



Agilent Spectrum Analyzer - Swept SA
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Pwr(RMS)
Avg|Hold: 62/100
01:05:11 PM Mar 27, 2015
Ref Offset 13.97 dB
10 dB/div
Log
Ref 33.00 dBm
Mkr2 871.8 MHz
-46.486 dBm
-13.00 dBm
Start 30.0 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 1.0000 GHz
#Sweep 100 ms (1000 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz

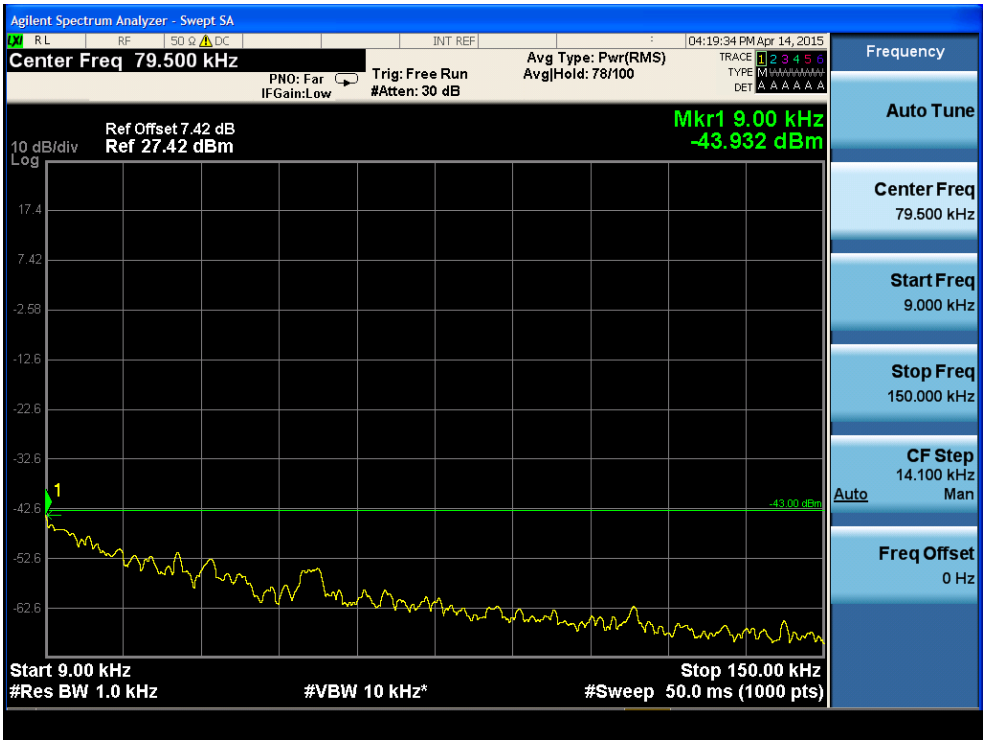

Agilent Spectrum Analyzer - Swept SA
Center Freq 5.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Pwr(RMS)
Avg|Hold: 32/100
01:05:21 PM Mar 27, 2015
Ref Offset 14.74 dB
10 dB/div
Log
Ref 33.00 dBm
Mkr1 3.189 3 GHz
-30.833 dBm
-13.00 dBm
Start 1.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 9.000 GHz
#Sweep 100 ms (8190 pts)
Frequency
Auto Tune
Center Freq
5.000000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
9.000000000 GHz
CF Step
800.000000 MHz
Auto
Man
Freq Offset
0 Hz

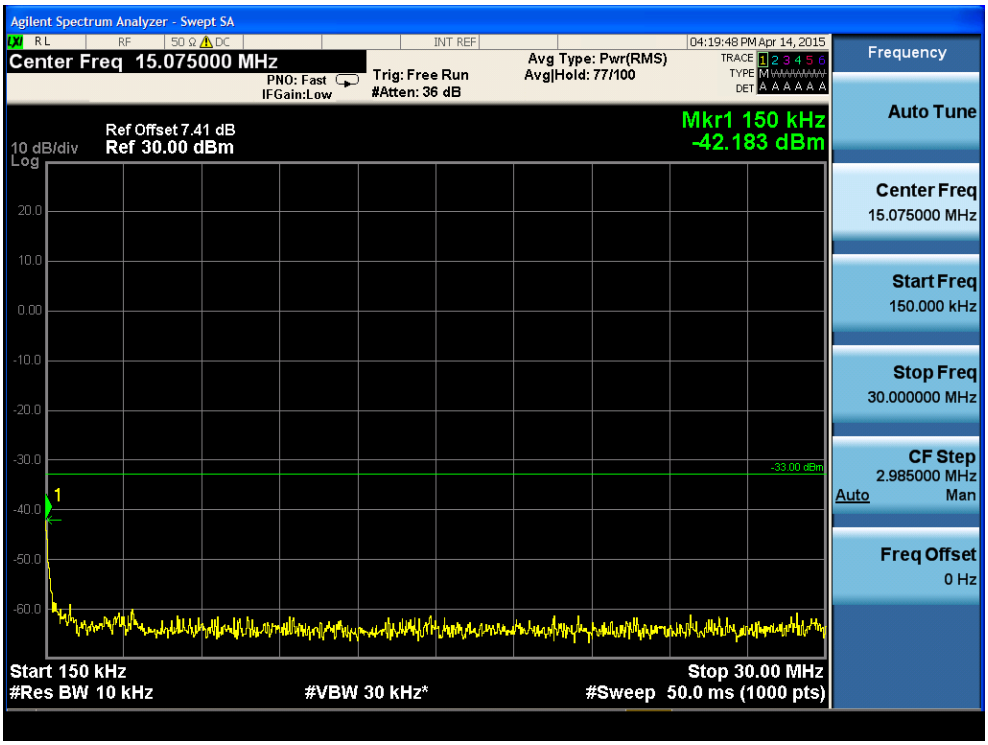
Band edge measurement
Test Band = GSM850
Test Mode = GSM /TM1
Test Channel = LCH/HCH

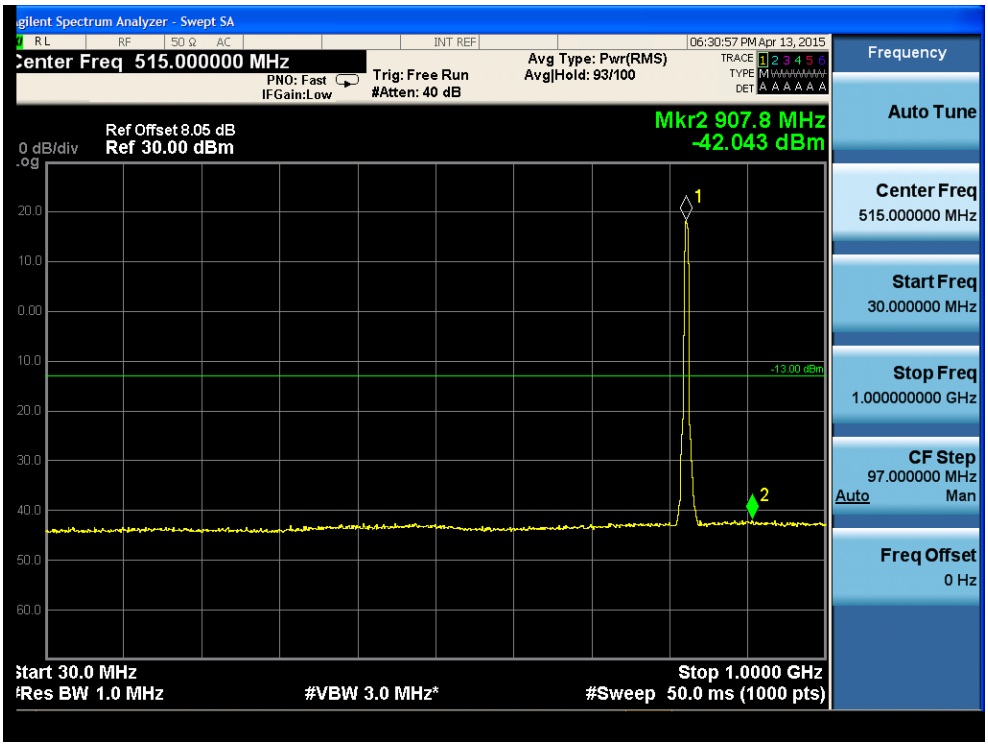


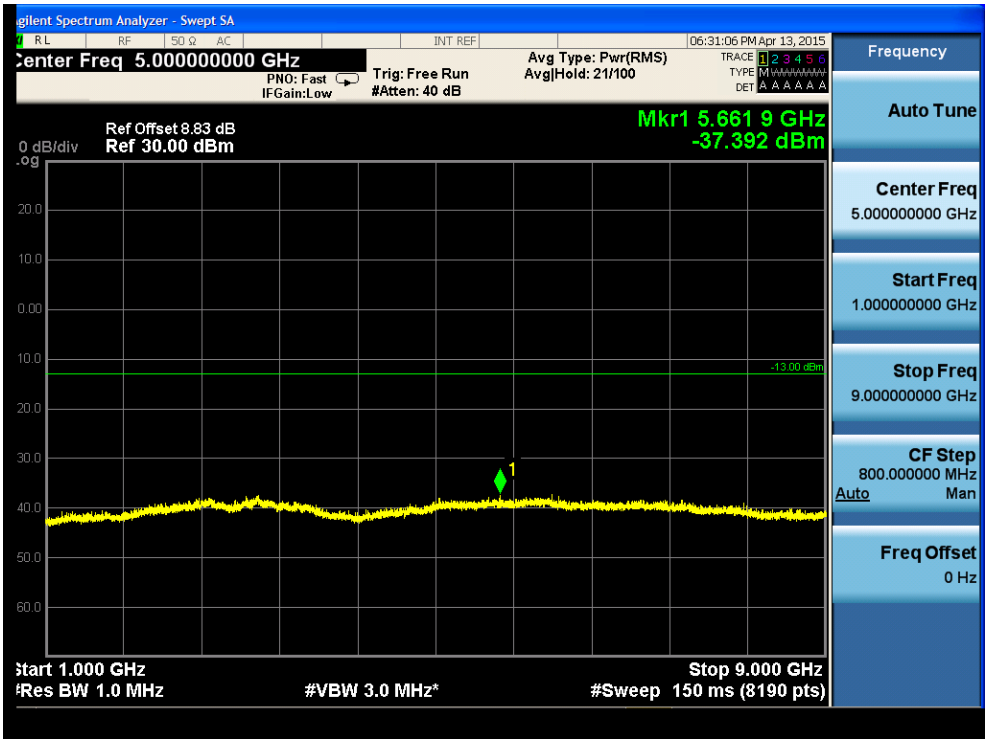


Out of band measurement
Test Band = WCDMA850
Test Mode = WCDMA /TM2
Test Channel = LCH

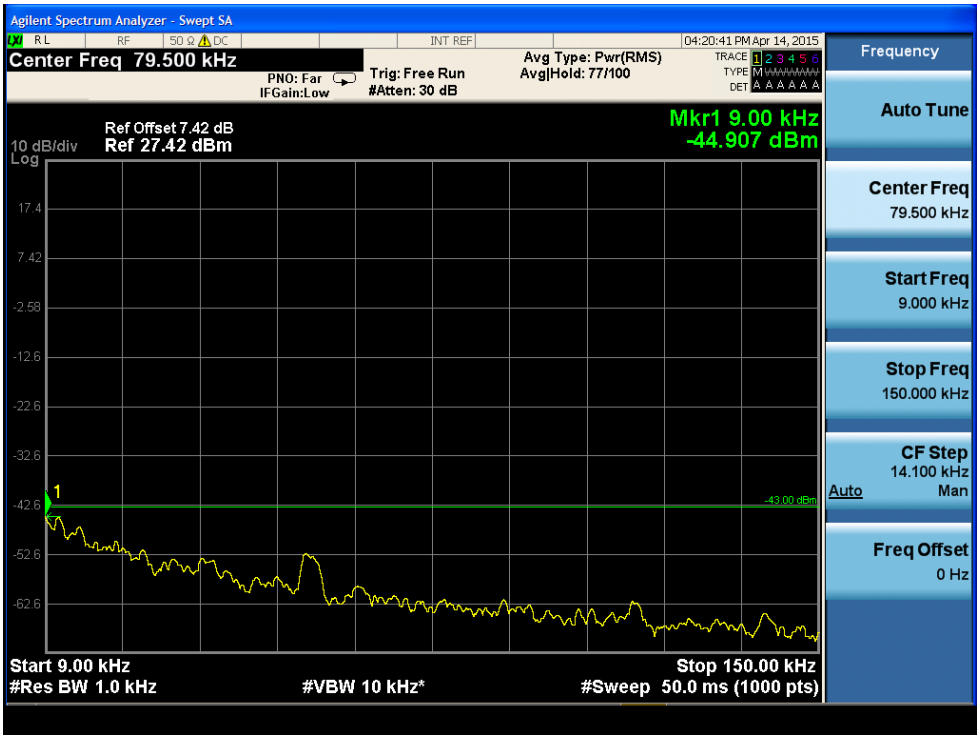


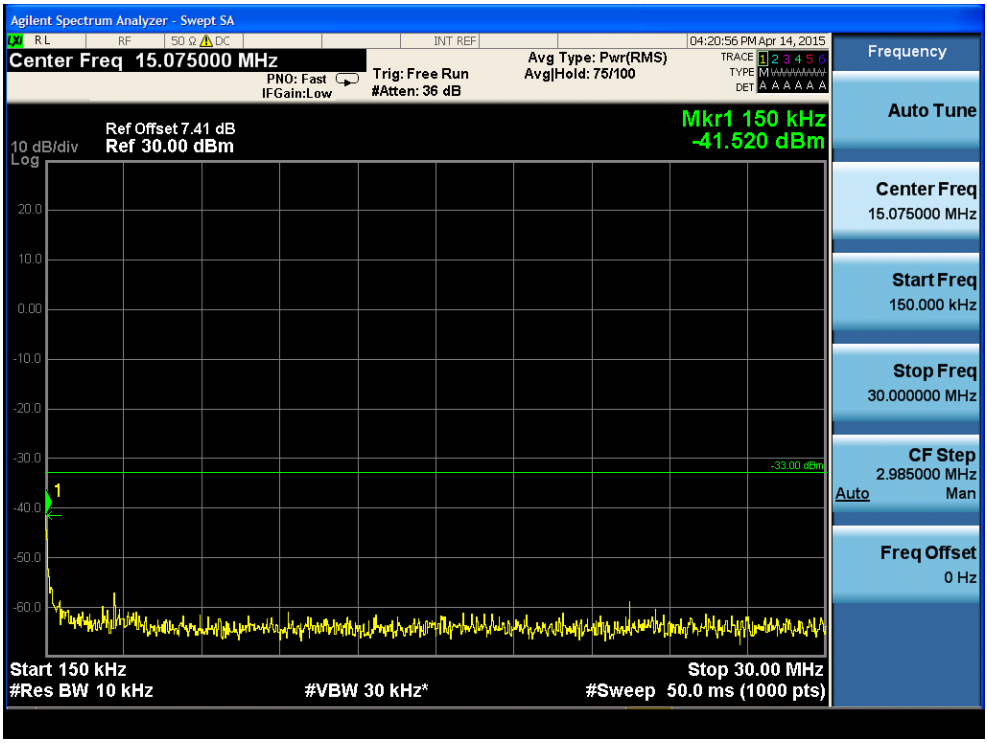


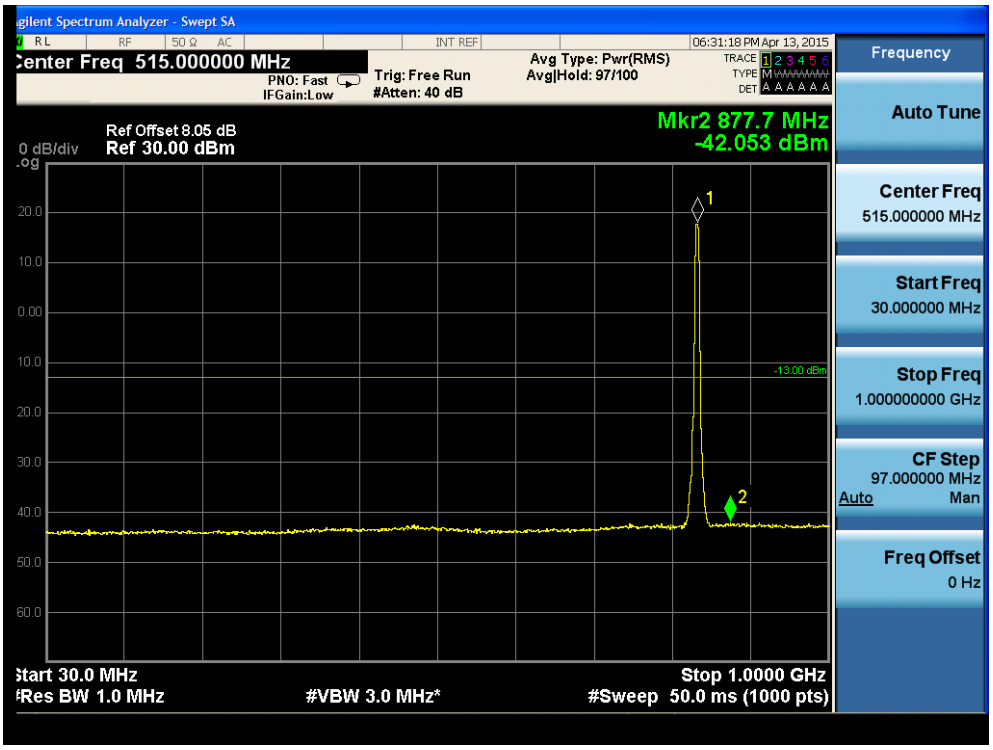

gilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
INT REF
06:30:57 PM Apr 13, 2015
enter Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Pwr(RMS)
Avg|Hold: 93/100
TRACE 1 2 3 4 5 6
TYPE M
DET A A A A A
Mkr2 907.8 MHz
-42.043 dBm
Ref Offset 8.05 dB
0 dB/div
Ref 30.00 dBm
.og
20.0
10.0
0.00
10.0
20.0
30.0
40.0
50.0
60.0
-13.00 dBm
1
2
tart 30.0 MHz
Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 1.0000 GHz
#Sweep 50.0 ms (1000 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz


gilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
INT REF
06:31:06 PM Apr 13, 2015
enter Freq 5.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Pwr(RMS)
Avg|Hold: 21/100
TRACE 1 2 3 4 5 6
TYPE M
DET A A A A A
Mkr1 5.661 9 GHz
-37.392 dBm
Ref Offset 8.83 dB
0 dB/div
Ref 30.00 dBm
.og
20.0
10.0
0.00
10.0
20.0
30.0
40.0
50.0
60.0
-13.00 dBm
1
tart 1.000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 9.000 GHz
#Sweep 150 ms (8190 pts)
Frequency
Auto Tune
Center Freq
5.000000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
9.000000000 GHz
CF Step
800.000000 MHz
Auto
Man
Freq Offset
0 Hz

Out of band measurement
Test Band = WCDMA850
Test Mode = WCDMA /TM2
Test Channel = MCH

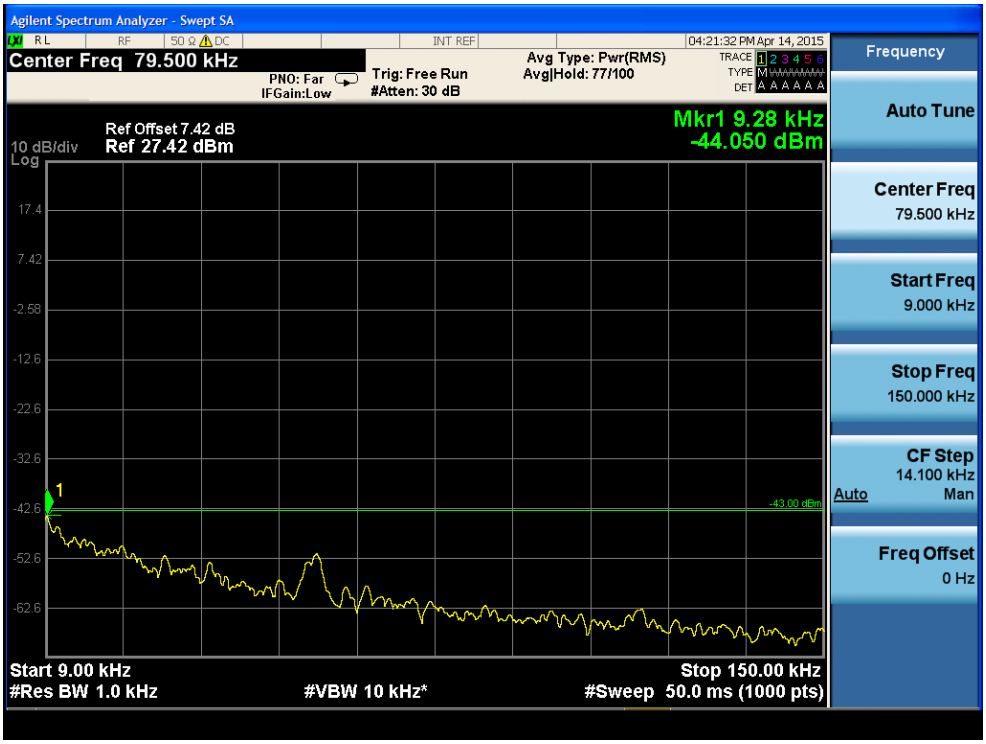


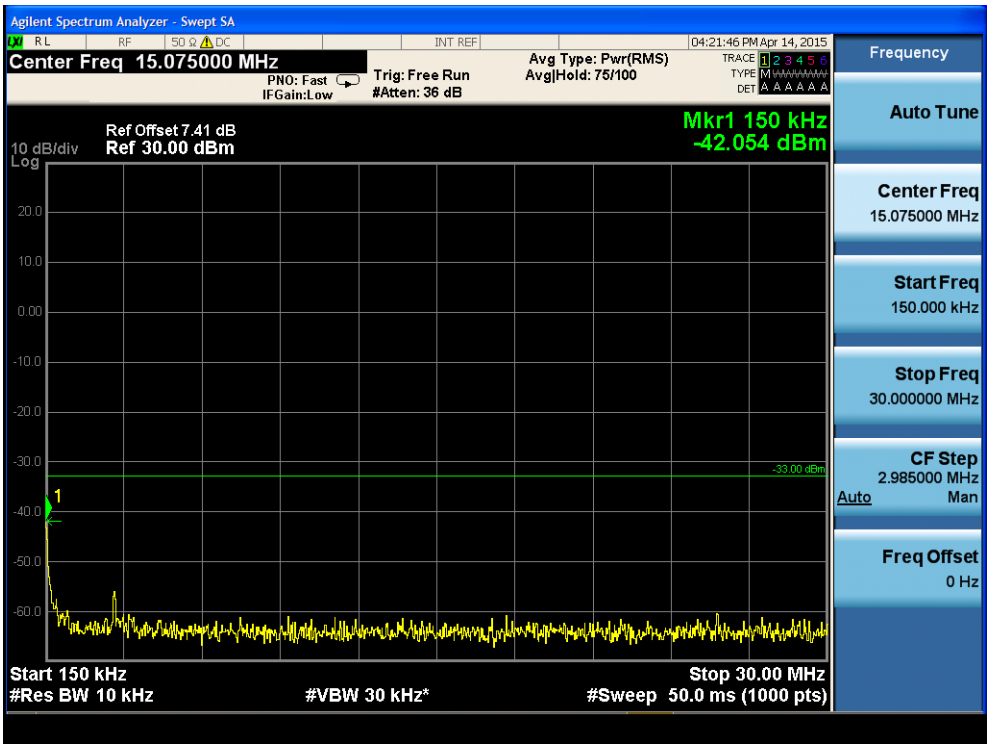


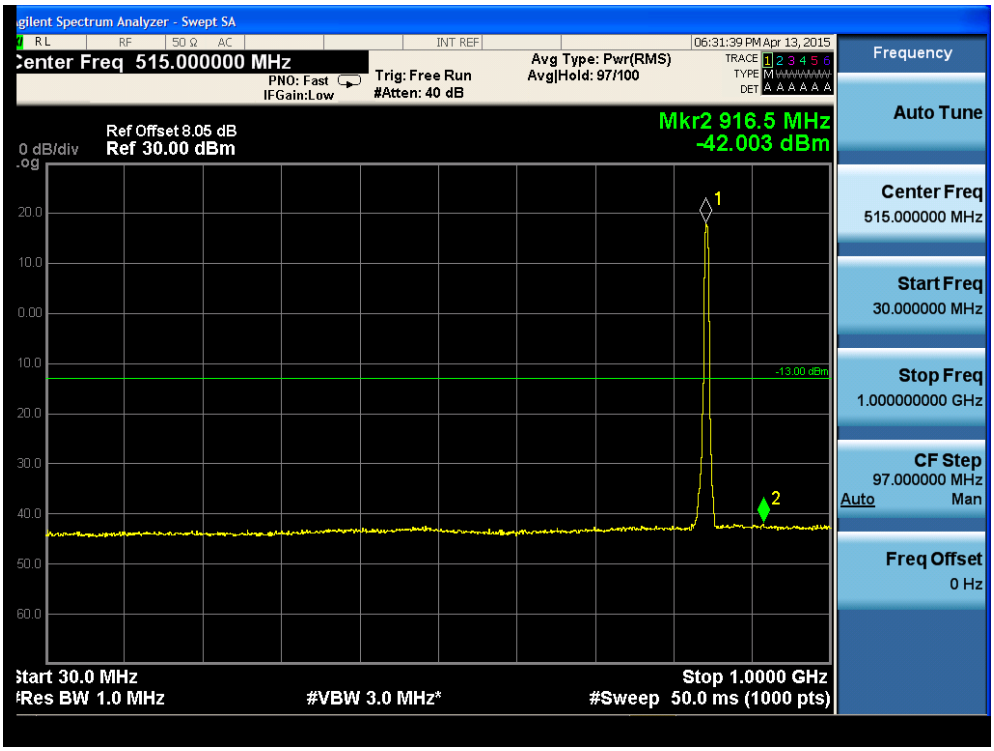

gilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
INT REF
06:31:18 PM Apr 13, 2015
enter Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Pwr(RMS)
Avg|Hold: 97/100
TRACE 1 2 3 4 5 6
TYPE M
DET A A A A A
Mkr2 877.7 MHz
-42.053 dBm
Ref Offset 8.05 dB
0 dB/div
Ref 30.00 dBm
.og
20.0
10.0
0.00
10.0
20.0
30.0
40.0
50.0
60.0
-13.00 dBm
1
2
tart 30.0 MHz
Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 1.0000 GHz
#Sweep 50.0 ms (1000 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz

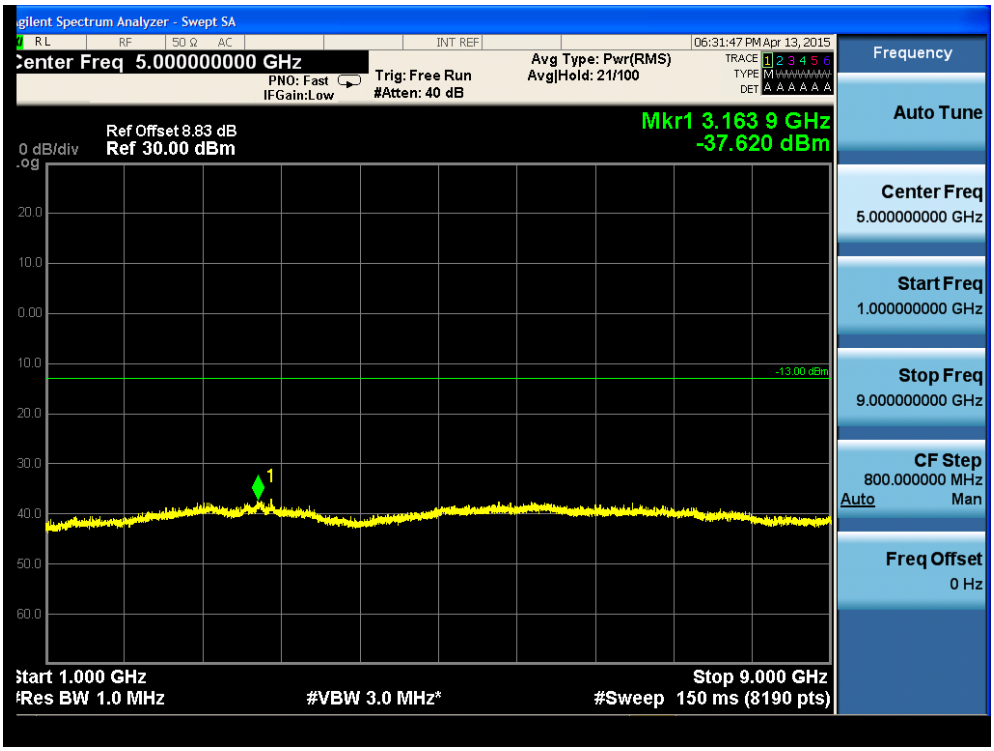

gilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
INT REF
06:31:27 PM Apr 13, 2015
enter Freq 5.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Pwr(RMS)
Avg|Hold: 21/100
TRACE 1 2 3 4 5 6
TYPE M
DET A A A A A
Mkr1 6.144 5 GHz
-37.450 dBm
Ref Offset 8.83 dB
0 dB/div
Ref 30.00 dBm
.og
20.0
10.0
0.00
10.0
20.0
30.0
40.0
50.0
60.0
-13.00 dBm
1
tart 1.000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 9.000 GHz
#Sweep 150 ms (8190 pts)
Frequency
Auto Tune
Center Freq
5.000000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
9.000000000 GHz
CF Step
800.000000 MHz
Auto
Man
Freq Offset
0 Hz

Out of band measurement
Test Band = WCDMA850
Test Mode = WCDMA /TM2
Test Channel = HCH



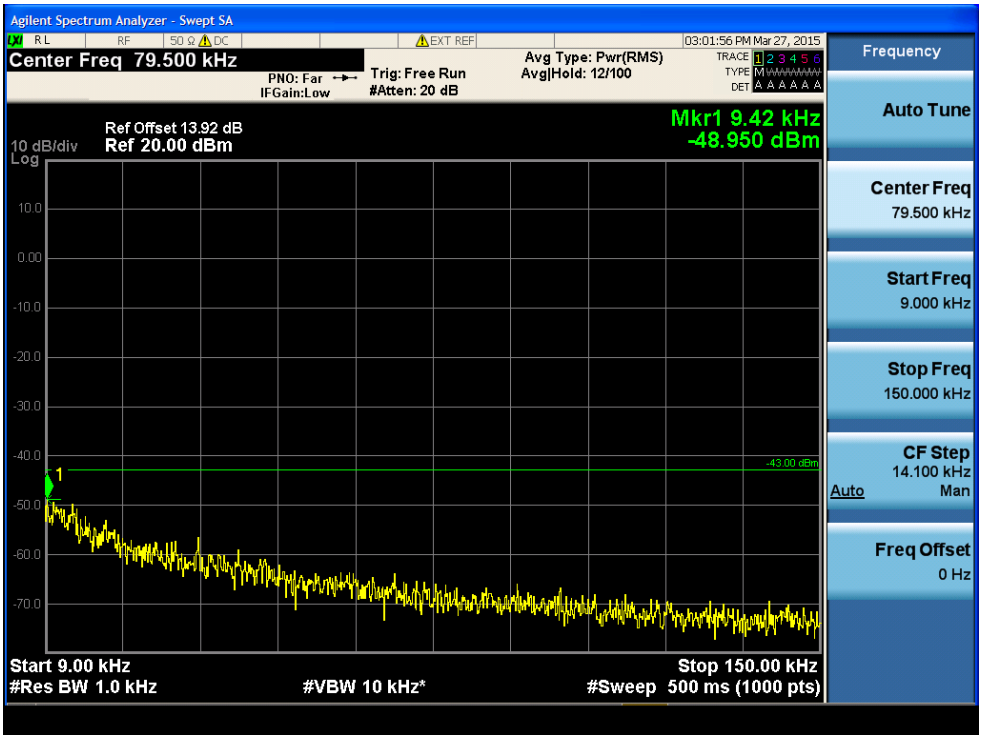


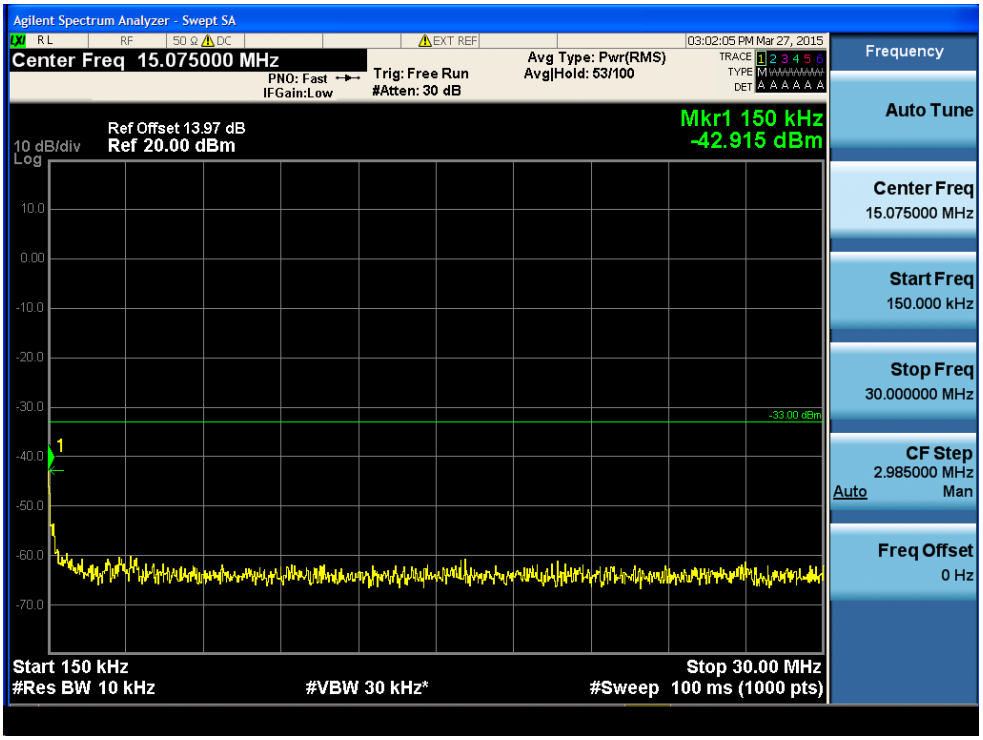

gilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
INT REF
06:31:39 PM Apr 13, 2015
enter Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Pwr(RMS)
Avg|Hold: 97/100
TRACE 1 2 3 4 5 6
TYPE M
DET A A A A A A
Mkr2 916.5 MHz
-42.003 dBm
Ref Offset 8.05 dB
0 dB/div
Ref 30.00 dBm
.og
20.0
10.0
0.00
10.0
20.0
30.0
40.0
50.0
60.0
-13.00 dBm
1
2
tart 30.0 MHz
Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 1.0000 GHz
#Sweep 50.0 ms (1000 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz

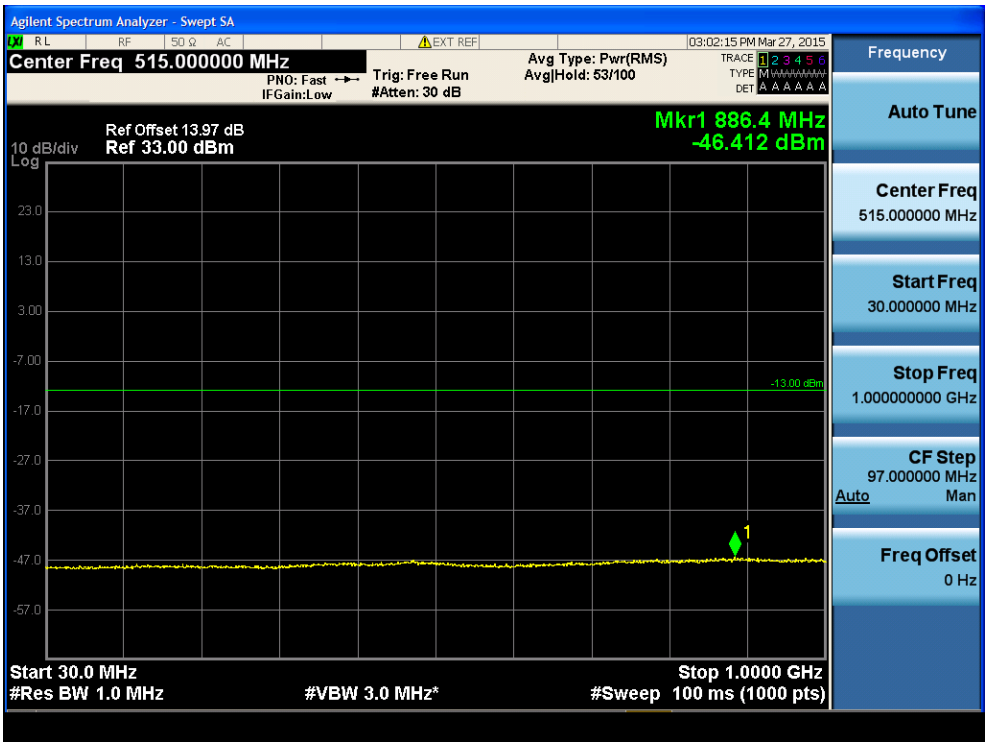

gilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
INT REF
06:31:47 PM Apr 13, 2015
enter Freq 5.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Pwr(RMS)
Avg|Hold: 21/100
TRACE 1 2 3 4 5 6
TYPE M
DET A A A A A A
Mkr1 3.163 9 GHz
-37.620 dBm
Ref Offset 8.83 dB
0 dB/div
Ref 30.00 dBm
.og
20.0
10.0
0.00
10.0
20.0
30.0
40.0
50.0
60.0
-13.00 dBm
1
tart 1.000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 9.000 GHz
#Sweep 150 ms (8190 pts)
Frequency
Auto Tune
Center Freq
5.000000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
9.000000000 GHz
CF Step
800.000000 MHz
Auto
Man
Freq Offset
0 Hz

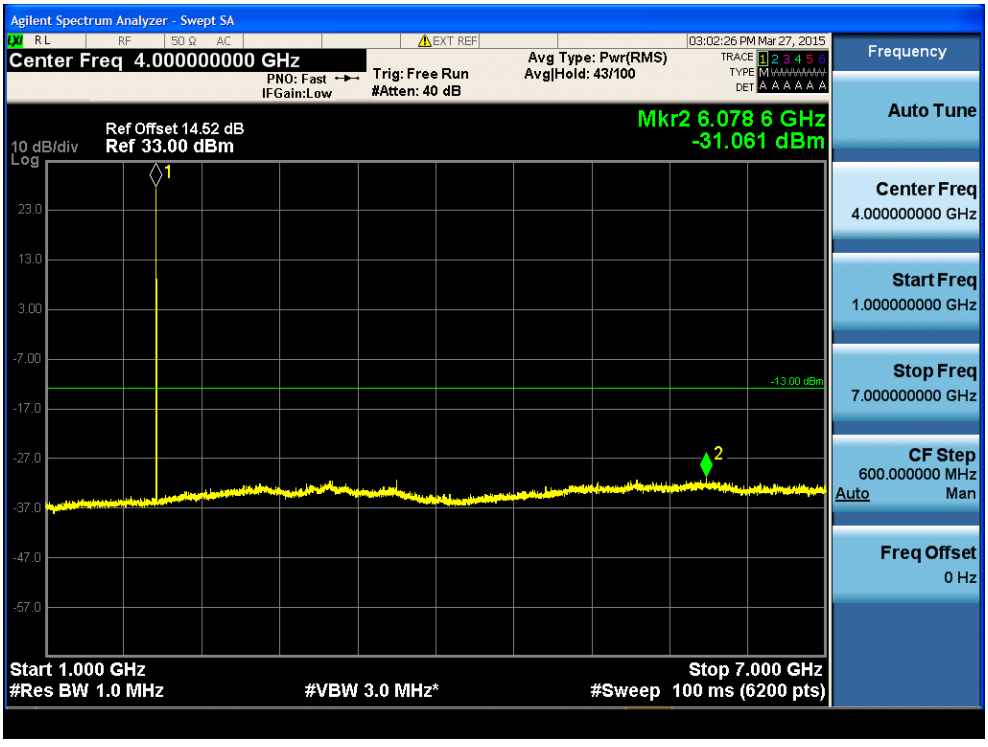
Band edge measurement
Test Band = WCDMA850
Test Mode = WCDMA /TM2
Test Channel = LCH/HCH

Out of band measurement
Test Band = GSM1900
Test Mode = GSM /TM1
Test Channel = LCH

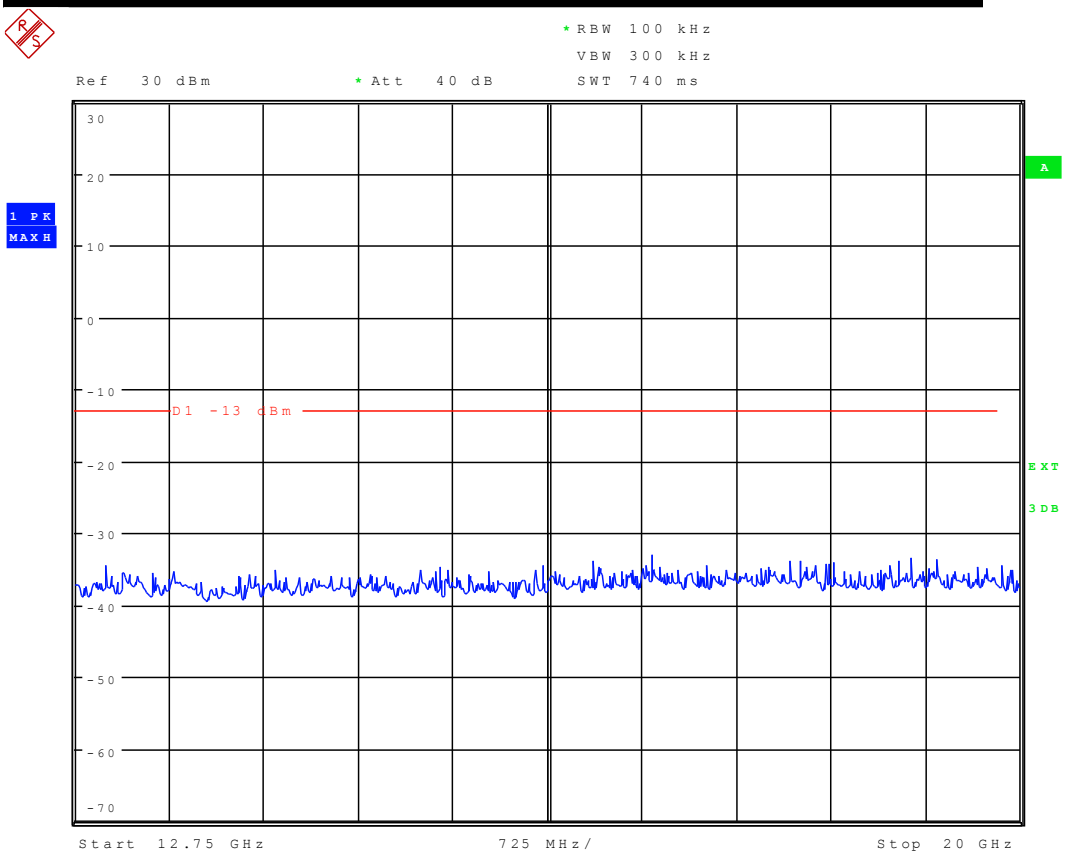




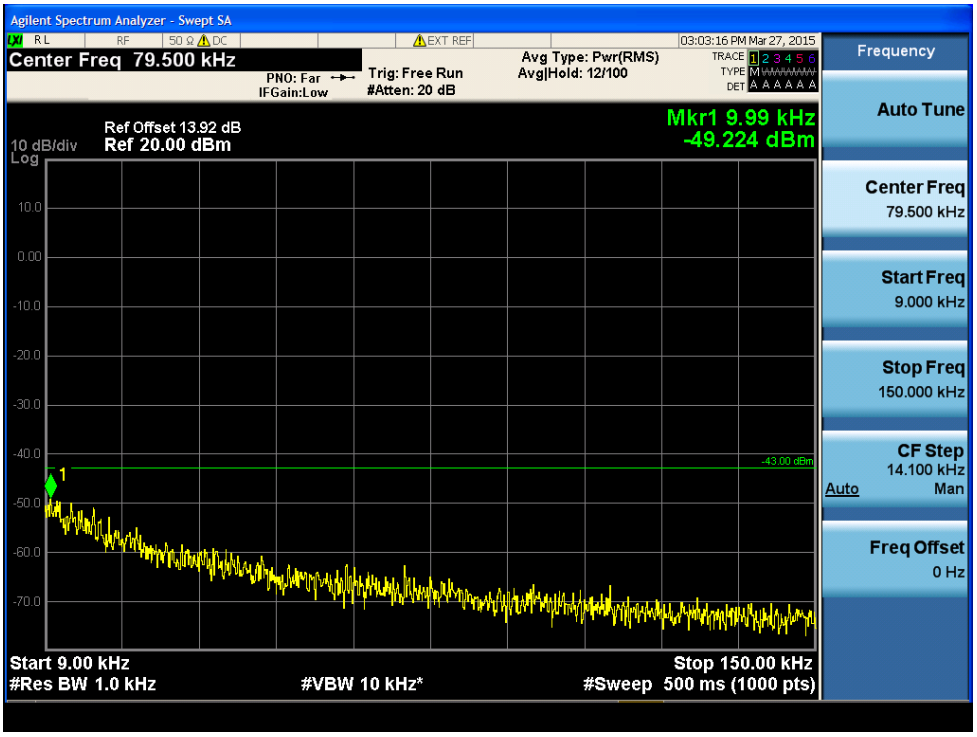

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
EXT REF
03:02:15 PM Mar 27, 2015
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Pwr(RMS)
Avg|Hold: 53/100
TRACE 1 2 3 4 5 6
TYPE M
DET A A A A A
Ref Offset 13.97 dB
10 dB/div
Log
Ref 33.00 dBm
Mkr1 886.4 MHz
-46.412 dBm
23.0
13.0
3.00
-7.00
-17.0
-27.0
-37.0
-47.0
-57.0
-13.00 dBm
1
Start 30.0 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 1.0000 GHz
#Sweep 100 ms (1000 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz

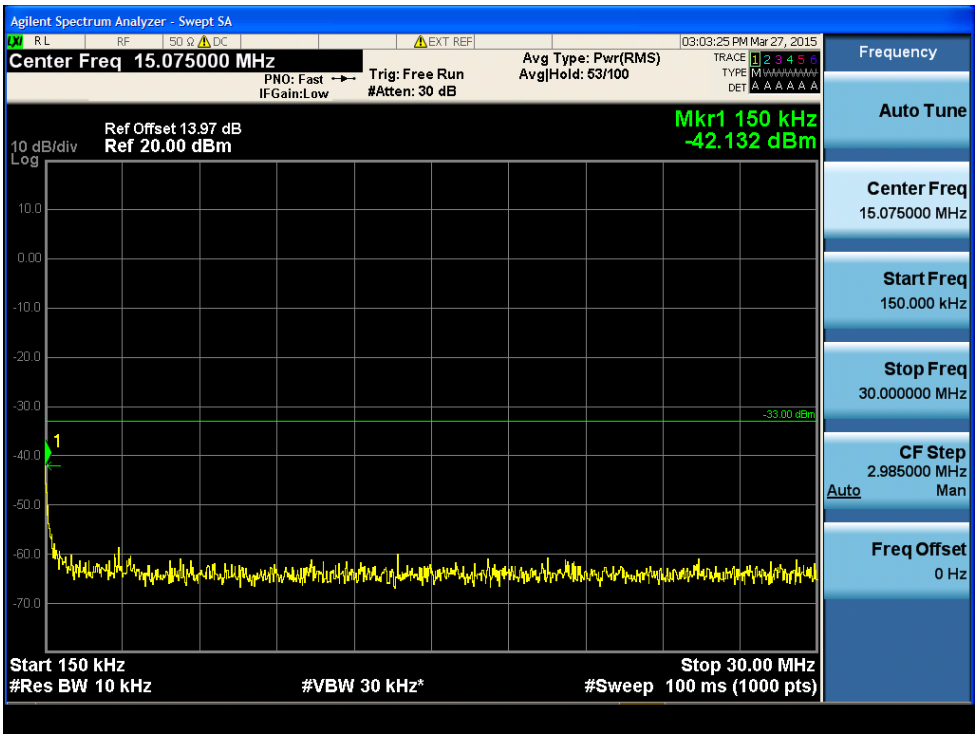

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
EXT REF
03:02:26 PM Mar 27, 2015
Center Freq 4.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Pwr(RMS)
Avg|Hold: 43/100
TRACE 1 2 3 4 5 6
TYPE M
DET A A A A A
Ref Offset 14.52 dB
10 dB/div
Log
Ref 33.00 dBm
Mkr2 6.078 6 GHz
-31.061 dBm
23.0
13.0
3.00
-7.00
-17.0
-27.0
-37.0
-47.0
-57.0
-13.00 dBm
1
2
Start 1.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 7.000 GHz
#Sweep 100 ms (6200 pts)
Frequency
Auto Tune
Center Freq
4.000000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
7.000000000 GHz
CF Step
600.000000 MHz
Auto
Man
Freq Offset
0 Hz

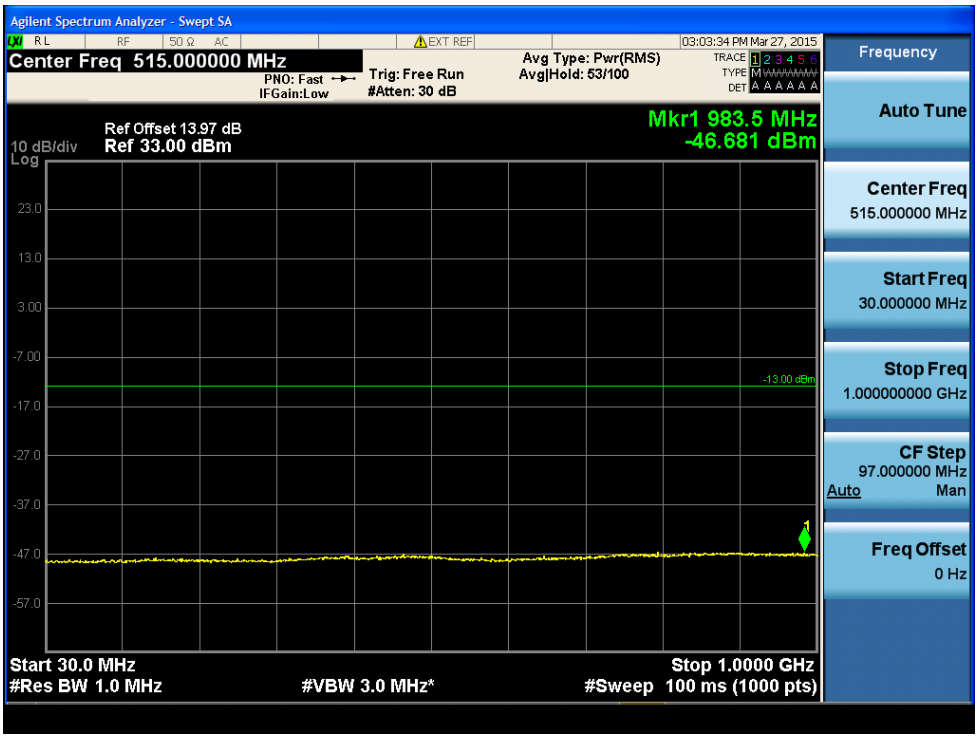

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
EXT REF
03:02:36 PM Mar 27, 2015
Center Freq 10.300000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Pwr(RMS)
Avg|Hold: 40/100
TRACE 1 2 3 4 5 6
TYPE M
DET A A A A A
Ref Offset 15.36 dB
10 dB/div
Log
Ref 33.00 dBm
Mkr1 13.164 1 GHz
-40.361 dBm
23.0
13.0
3.00
-7.00
-17.0
-27.0
-37.0
-47.0
-57.0
-13.00 dBm
1
Start 7.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 13.600 GHz
#Sweep 100 ms (6800 pts)
Frequency
Auto Tune
Center Freq
10.300000000 GHz
Start Freq
7.000000000 GHz
Stop Freq
13.600000000 GHz
CF Step
660.000000 MHz
Auto
Man
Freq Offset
0 Hz

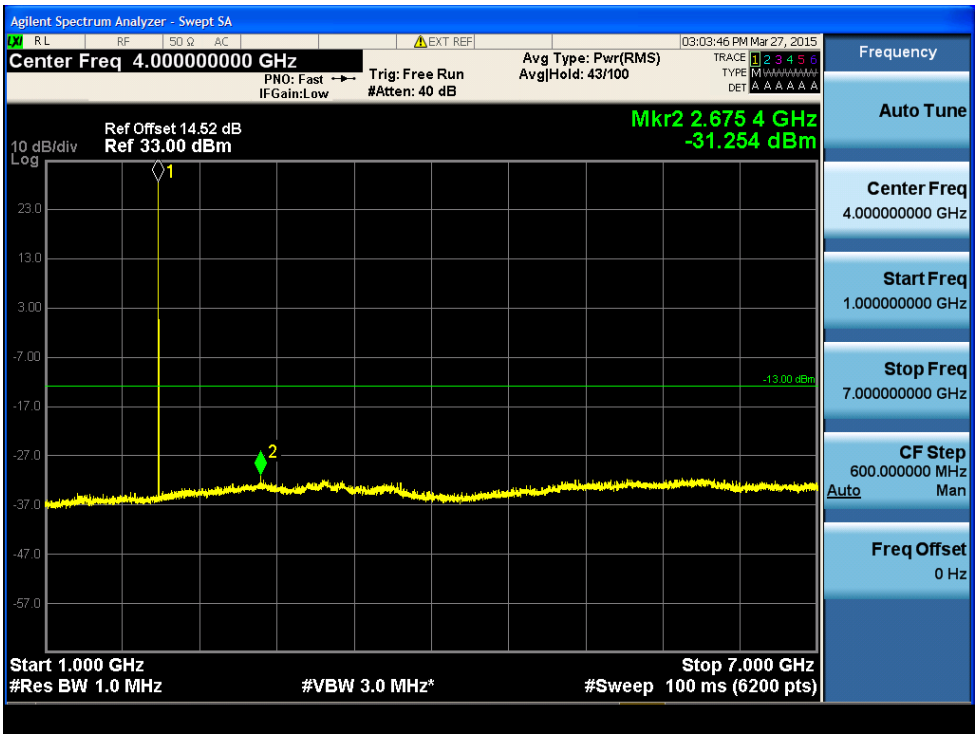

* RBW 100 kHz
VBW 300 kHz
Ref 30 dBm
* Att 40 dB
SWT 740 ms
1 PK
MAXH
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
D1 -13 dBm
A
EXT
3DB
Start 12.75 GHz
725 MHz/
Stop 20 GHz

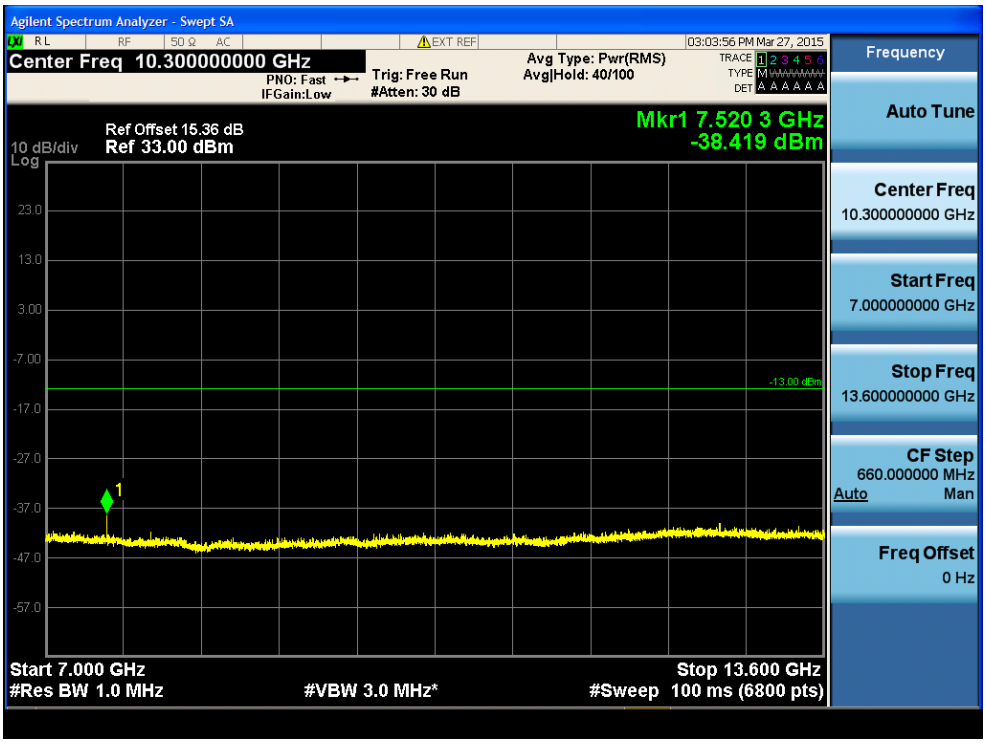
Out of band measurement
Test Band = GSM1900
Test Mode = GSM /TM1
Test Channel = MCH

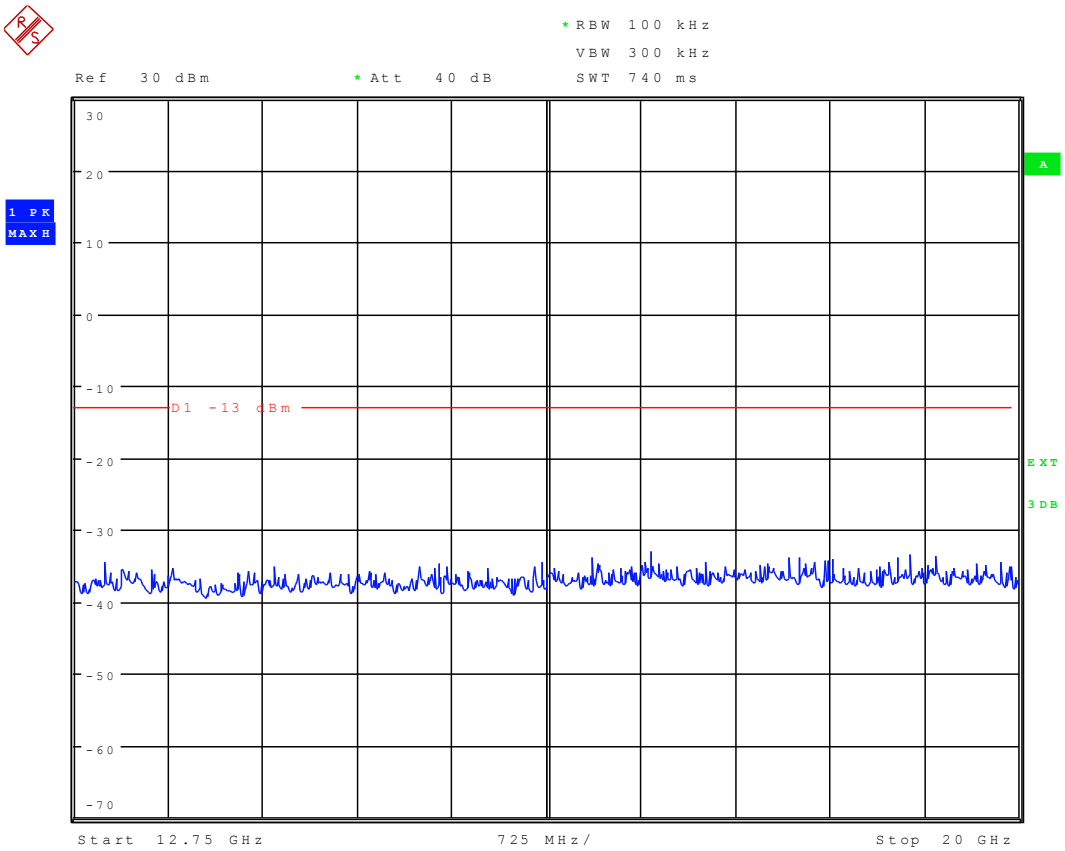




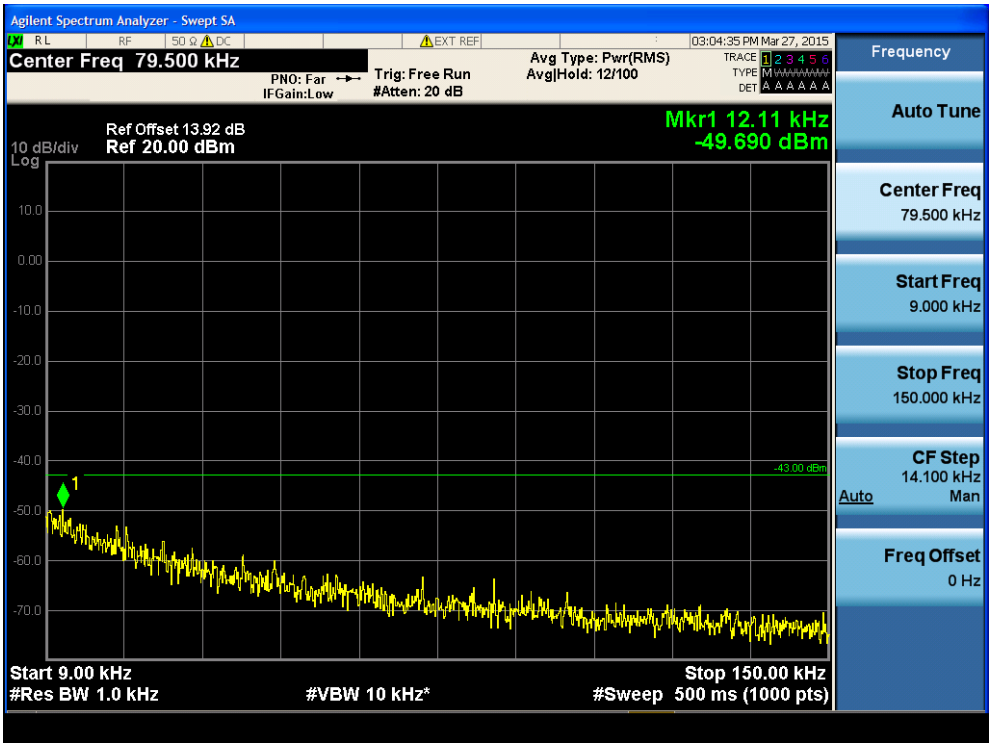

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
EXT REF
03:03:34 PM Mar 27, 2015
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Pwr(RMS)
Avg|Hold: 53/100
TRACE 1 2 3 4 5 6
TYPE M
DET A A A A A
Mkr1 983.5 MHz
-46.681 dBm
Ref Offset 13.97 dB
10 dB/div
Log
Ref 33.00 dBm
23.0
13.0
3.00
-7.00
-17.0
-27.0
-37.0
-47.0
-57.0
-13.00 dBm
Start 30.0 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 1.0000 GHz
#Sweep 100 ms (1000 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz

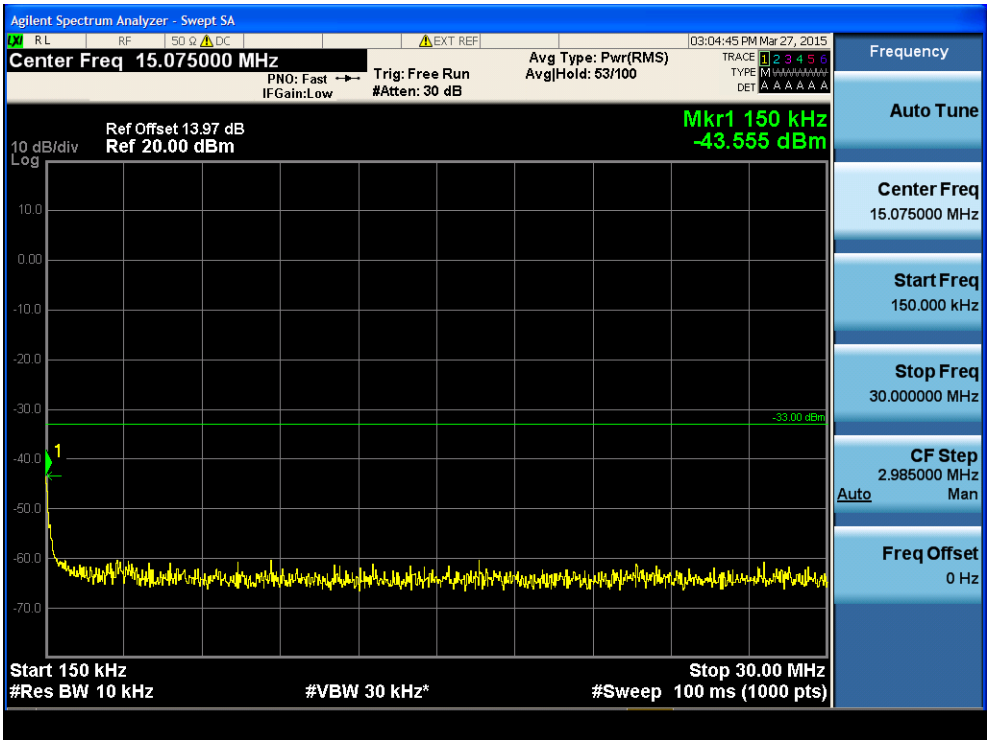

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
EXT REF
03:03:46 PM Mar 27, 2015
Center Freq 4.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Pwr(RMS)
Avg|Hold: 43/100
TRACE 1 2 3 4 5 6
TYPE M
DET A A A A A
Mkr2 2.675 4 GHz
-31.254 dBm
Ref Offset 14.52 dB
10 dB/div
Log
Ref 33.00 dBm
23.0
13.0
3.00
-7.00
-17.0
-27.0
-37.0
-47.0
-57.0
-13.00 dBm
Start 1.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 7.000 GHz
#Sweep 100 ms (6200 pts)
Frequency
Auto Tune
Center Freq
4.000000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
7.000000000 GHz
CF Step
600.000000 MHz
Auto
Man
Freq Offset
0 Hz

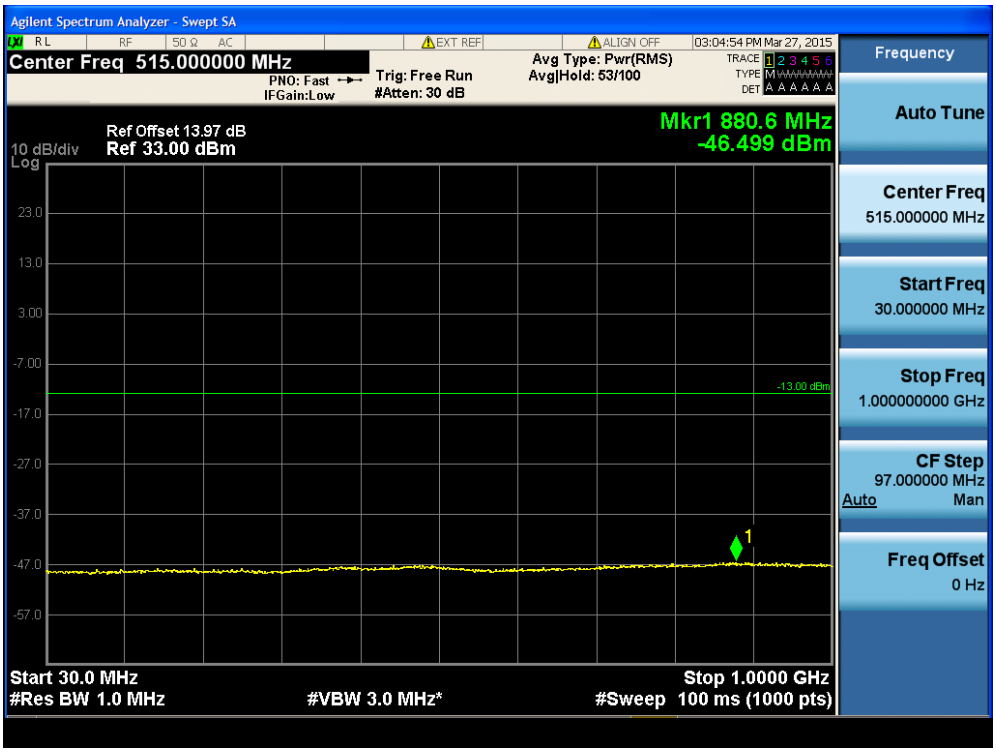

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
EXT REF
03:03:56 PM Mar 27, 2015
Center Freq 10.300000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Pwr(RMS)
Avg|Hold: 40/100
TRACE 1 2 3 4 5 6
TYPE M
DET A A A A A
Ref Offset 15.36 dB
10 dB/div
Log
Ref 33.00 dBm
Mkr1 7.520 3 GHz
-38.419 dBm
23.0
13.0
3.00
-7.00
-17.0
-27.0
-37.0
-47.0
-57.0
-13.00 dBm
1
Start 7.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 13.600 GHz
#Sweep 100 ms (6800 pts)
Frequency
Auto Tune
Center Freq
10.300000000 GHz
Start Freq
7.000000000 GHz
Stop Freq
13.600000000 GHz
CF Step
660.000000 MHz
Auto
Man
Freq Offset
0 Hz

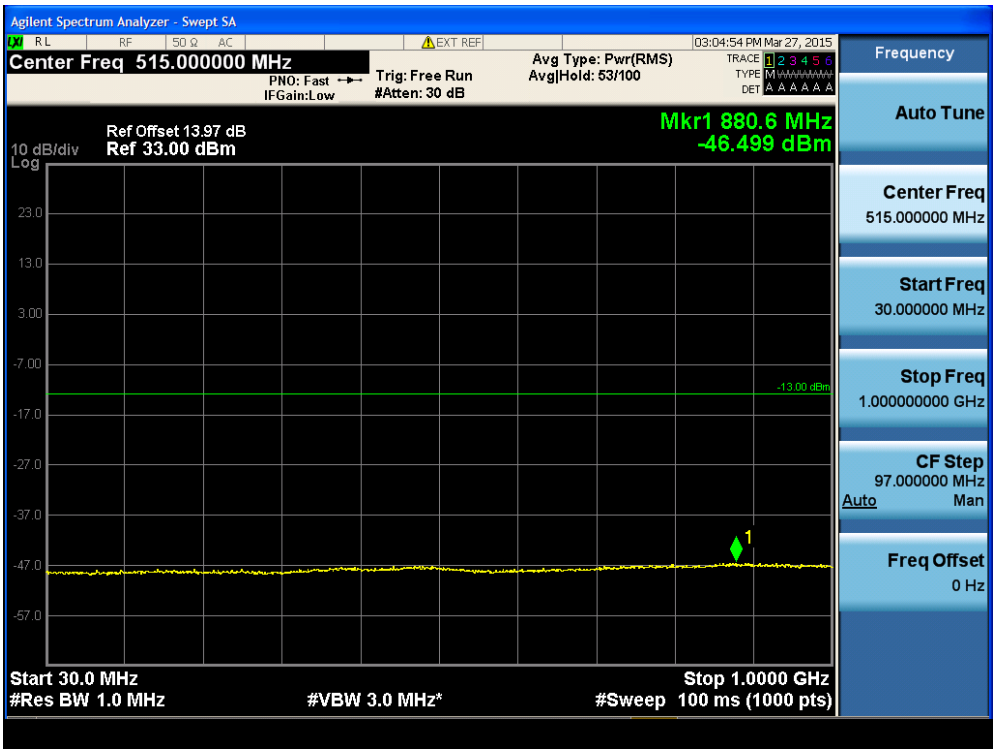

* RBW 100 kHz
VBW 300 kHz
Ref 30 dBm
* Att 40 dB
SWT 740 ms
1 PK
MAXH
A
30
20
10
0
-10
D1 -13 dBm
-20
-30
-40
-50
-60
-70
EXT
3DB
Start 12.75 GHz
725 MHz/
Stop 20 GHz

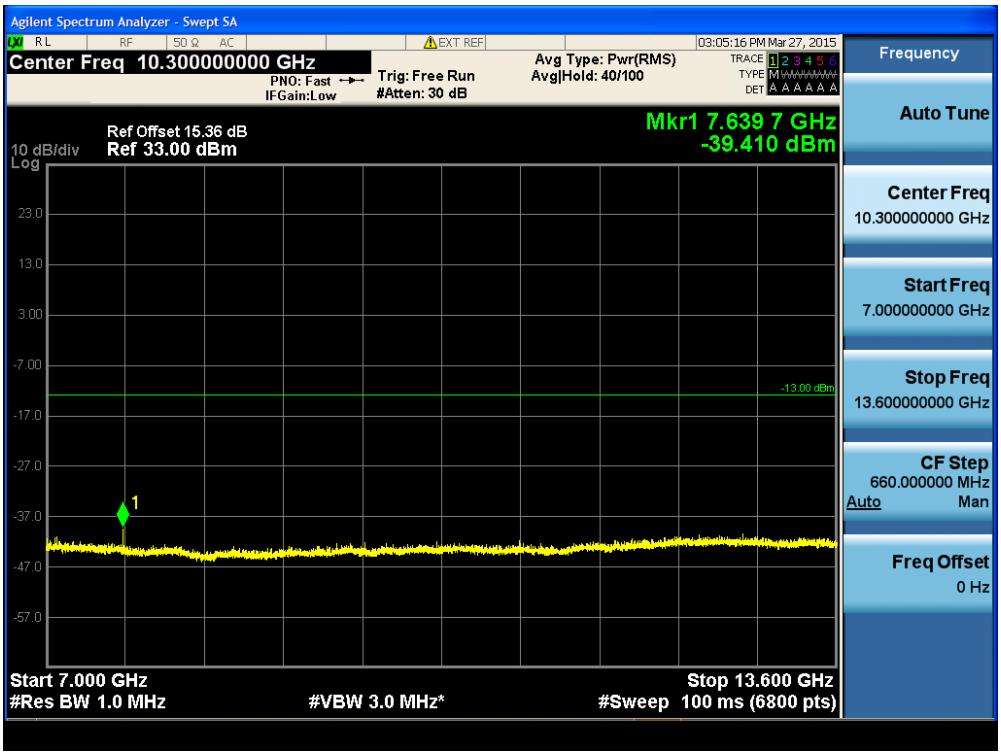
Out of band measurement
Test Band = GSM1900
Test Mode = GSM /TM1
Test Channel = HCH

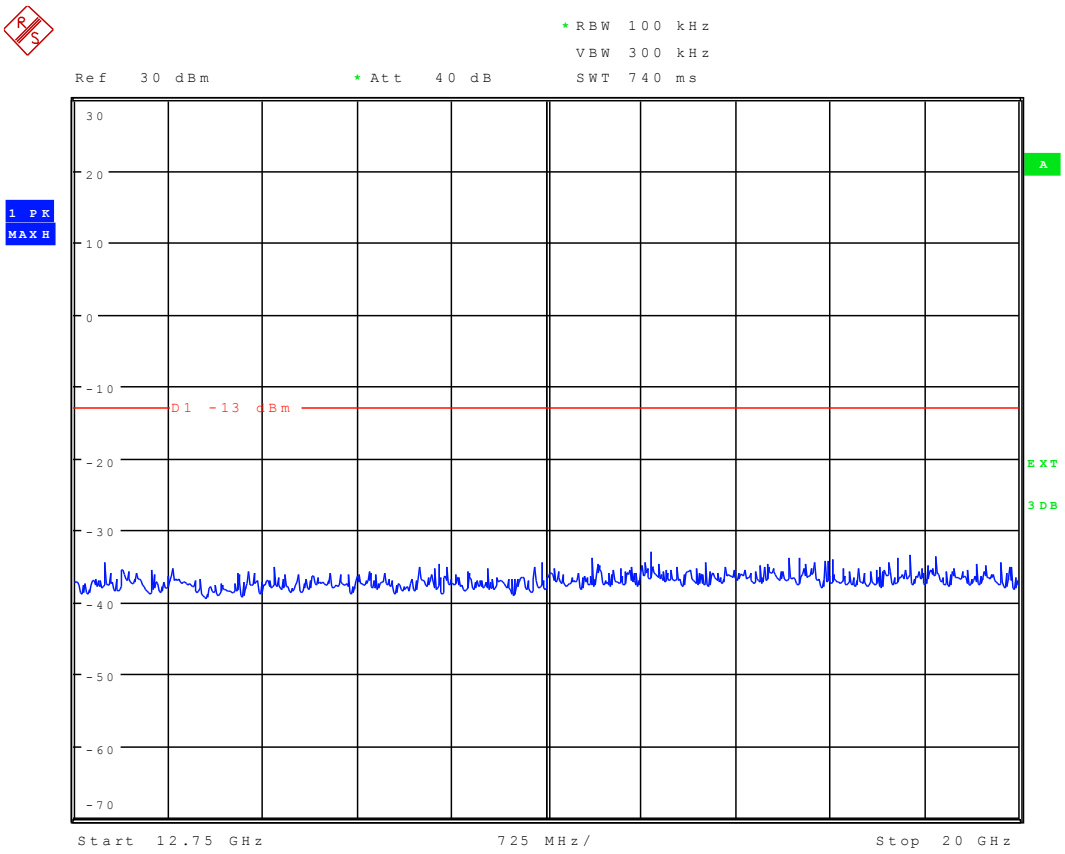




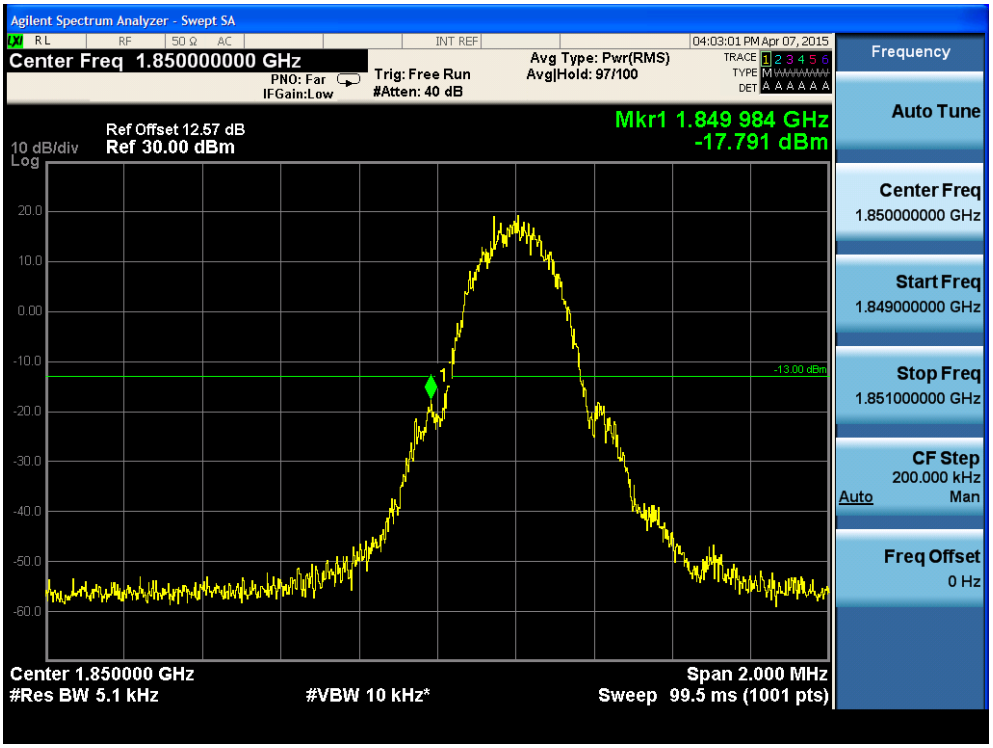

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
EXT REF
ALIGN OFF
03:04:54 PM Mar 27, 2015
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Pwr(RMS)
Avg|Hold: 53/100
TRACE 1 2 3 4 5 6
TYPE M
DET A A A A A
Ref Offset 13.97 dB
10 dB/div
Ref 33.00 dBm
Log
Mkr1 880.6 MHz
-46.499 dBm
23.0
13.0
3.00
-7.00
-17.0
-27.0
-37.0
-47.0
-57.0
-13.00 dBm
1
Start 30.0 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 1.0000 GHz
#Sweep 100 ms (1000 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz

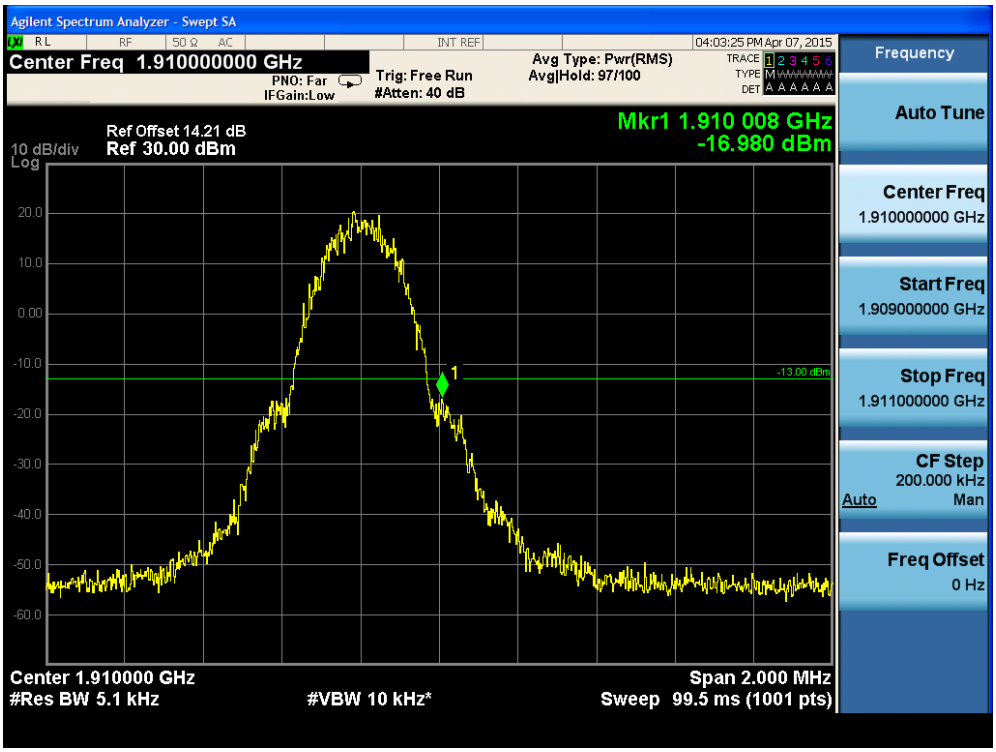

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
EXT REF
03:04:54 PM Mar 27, 2015
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Pwr(RMS)
Avg|Hold: 53/100
TRACE 1 2 3 4 5 6
TYPE M
DET A A A A A
Ref Offset 13.97 dB
10 dB/div
Ref 33.00 dBm
Log
Mkr1 880.6 MHz
-46.499 dBm
23.0
13.0
3.00
-7.00
-17.0
-27.0
-37.0
-47.0
-57.0
-13.00 dBm
1
Start 30.0 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 1.0000 GHz
#Sweep 100 ms (1000 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz


Agilent Spectrum Analyzer - Swept SA
Center Freq 10.300000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Pwr(RMS)
Avg|Hold: 40/100
03:05:16 PM Mar 27, 2015
Ref Offset 15.36 dB
10 dB/div
Log
Ref 33.00 dBm
Mkr1 7.639 7 GHz
-39.410 dBm
-13.00 dBm
Start 7.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 13.600 GHz
#Sweep 100 ms (6800 pts)
Frequency
Auto Tune
Center Freq
10.300000000 GHz
Start Freq
7.000000000 GHz
Stop Freq
13.600000000 GHz
CF Step
660.000000 MHz
Auto
Man
Freq Offset
0 Hz


RBW 100 kHz
VBW 300 kHz
Ref 30 dBm
Att 40 dB
SWT 740 ms
D1 -13 dBm
1 PK
MAXH
A
EXT
3DB
Start 12.75 GHz
725 MHz/
Stop 20 GHz

Band edge measurement
Test Band = GSM1900
Test Mode = GSM /TM1
Test Channel = LCH/HCH





4.6. Spurious Emissions Radiated

4.6.1. Test Standard

FCC: CFR Part 2.1053, CFR Part 22.917, CFR Part 24.238

4.6.2. Test Limit

Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission.

5.5.3 Limits:
(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
For all power levels +30dBm to 0dBm, this becomes a constant specification of -13dBm.

5.5.3.1 FCC 22.917 Emission limitations for cellular equipment.
The rules in this section govern the spectral characteristics of emissions in the Cellular
Radiotelephone Service.
(b) Measurement procedure. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

5.5.3.2 FCC 24.238 Emission limitations for Broadband PCS equipment.
The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.
(b) Measurement procedure. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

4.6.3.Test Procedure

1. Connect the equipment as shown in the above diagram with the EUT's antenna in a horizontal orientation.
2. Adjust the settings of the Universal Radio Communication Tester (CMU) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure peak hold with the required settings.
4. Place the measurement antenna in a horizontal orientation. Rotate the EUT 360 .

Raise the measurement antenna up to 4 meters in 0.5 meters increments and rotate the EUT 360 at each height to maximize all emissions. Measure and record all spurious emissions (LVL) up to the tenth harmonic of the carrier frequency.

5. Replace the EUT with a horizontally polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (LOSS). LOSS = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the level of spurious emissions using the following equation:

Spurious (dBm) = LVL (dBm) + LOSS (dB):

8. Repeat steps 4, 5 and 6 with all antennas vertically polarized.
9. Determine the level of spurious emissions using the following equation:

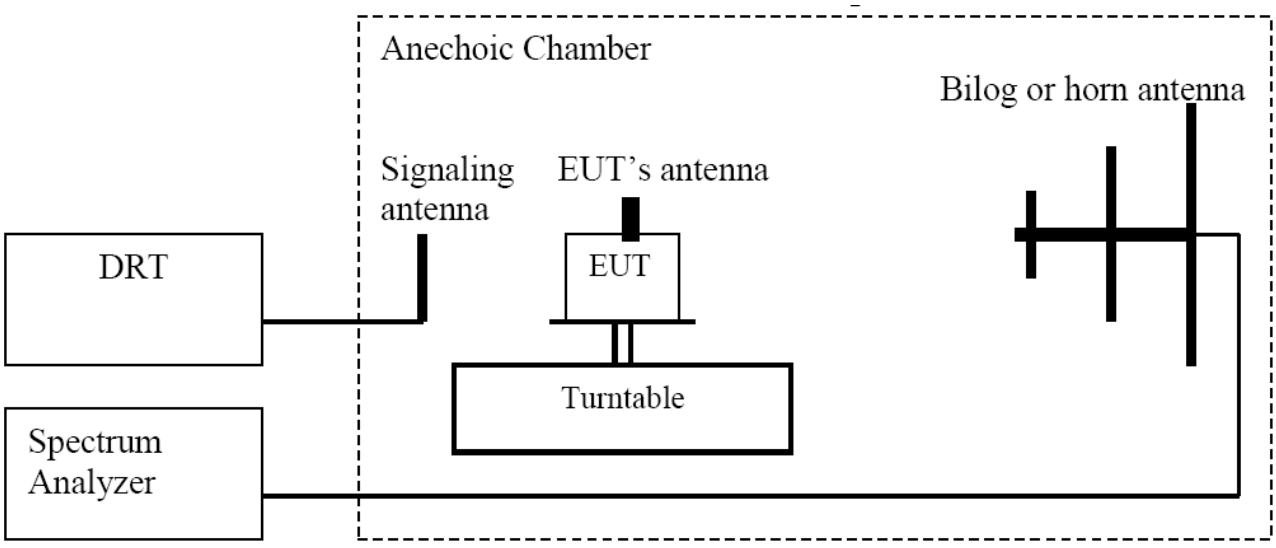
Spurious (dBm) = LVL (dBm) + LOSS (dB):

10. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

(Note: Steps 5 and 6 above are performed prior to testing and LOSS is recorded by test software. Steps 3, 4 and 7 above are performed with test software.)

Spectrum analyzer settings: RBW=VBW=1MHz

4.6.4.Test Setup



4.6.5.Test Data

Test Band = GSM850
Test Mode = GSM /TM1
Test Channel = LCH

Freq.	SG. Level	Cable Loss	Antenn a Gain	Preamp	Substitutio n	Limit
[MHz]	[dBm]	[dB]	[dBd]	dB	Level (ERP)	[dBm]
					[dBm]	
--	--	--	--	--	--	--

The emissions don't show in above result tables are more than 20dB below the limits
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = GSM850
Test Mode = GSM /TM1
Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenn a Gain	Preamp	Substitutio n	Limit
[MHz]	[dBm]	[dB]	[dBd]	dB	Level (ERP)	[dBm]
					[dBm]	
--	--	--	--	--	--	--

The emissions don' t show in above result tables are more than 20dB below the limits
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = GSM850
Test Mode = GSM /TM1
Test Channel = HCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Limit
[MHz]	[dBm]	[dB]	[dBd]	dB	Level (ERP)	[dBm]
					[dBm]	
--	--	--	--	--	--	--

The emissions don’ t show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = WCDMA850
Test Mode = WCDMA /TM2
Test Channel = LCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Limit
[MHz]	[dBm]	[dB]	[dBd]	dB	Level (ERP)	[dBm]
					[dBm]	
--	--	--	--	--	--	--

The emissions don’ t show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = WCDMA850
Test Mode = WCDMA /TM2
Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Limit
[MHz]	[dBm]	[dB]	[dBd]	dB	Level (ERP)	[dBm]
					[dBm]	
--	--	--	--	--	--	--

The emissions don’ t show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = WCDMA850
Test Mode = WCDMA /TM2
Test Channel = HCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Limit
[MHz]	[dBm]	[dB]	[dBd]	dB	Level (ERP)	[dBm]
					[dBm]	
--	--	--	--	--	--	--

The emissions don’ t show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = GSM1900
Test Mode = GSM /TM1
Test Channel = LCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP)	[dBm]
					[dBm]	
--	--	--	--	--	--	--

The emissions don’ t show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = GSM1900
Test Mode = GSM /TM1
Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP)	[dBm]
					[dBm]	
--	--	--	--	--	--	--

The emissions don’ t show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = GSM1900
Test Mode = GSM /TM1
Test Channel = HCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP)	[dBm]
					[dBm]	
--	--	--	--	--	--	--

The emissions don’ t show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

4.7. Frequency Stability

4.7.1. Test Standard

CFR 47 (FCC) part 2.1055, 22.355 and 24.235

4.7.2. Test Limit

According to part 22.355, from 821MHz to 896MHz, for mobile device, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances 2.5ppm.

4.7.3. Test Procedure

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMU 200 Universal Radio Communication Tester.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30 C.
3. With the EUT, powered via nominal voltage, connected to the CMU 200 and in a simulated call on mid channel (190 for GSM 850 & 4183 for FDD5 & 661 for PCS1900 & 9400 for FDD2), measure the carrier frequency. These measurements should be made within 2 minutes of powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10 C increments from -30 C to +50 C. Allow at least 1 1/2 hours at each temperature, un-powered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Re-measure carrier frequency at low and high voltage. Pause at nominal voltage for 1 1/2 hours un-powered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50 C.
7. With the EUT, powered via nominal voltage, connected to the CMU 200 and in a simulated call on mid channel (190 for GSM 850 & 4183 for FDD5 & 661 for PCS1900 & 9400 for FDD2), measure the carrier frequency. These measurements should be made within 2 minutes of powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 C increments from +50 C to -30 C. Allow at least 1 1/2 hours at each temperature, un-powered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5 C during the measurement procedure.

4.7.4. Test Setup

Connect the EUT to the Wireless Communication test set CMU200 via the connector. Then measure the frequency error by the Wireless Communication test set CMU200. The EUT’s output is matched with a 50 Ω load.

4.7.5.Test Data

Measurement Results vs. Variation of Temperature－GSM850

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 ℃	836.6	11.27	Pass
-20 ℃	836.6	19.63	Pass
-10 ℃	836.6	10.20	Pass
0 ℃	836.6	15.04	Pass
+10 ℃	836.6	12.60	Pass
+20 ℃	836.6	12.62	Pass
+30 ℃	836.6	10.26	Pass
+40 ℃	836.6	12.88	Pass
+50 ℃	836.6	17.50	Pass

Measurement Results vs. Variation of Voltage－GSM850

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.5 V	836.6	9.28	Pass
3.8 V	836.6	7.10	Pass
4.2V	836.6	9.48	Pass

Measurement Results vs. Variation of Temperature—GSM1900

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 ℃	1880.0	14.39	Pass
-20 ℃	1880.0	25.29	Pass
-10 ℃	1880.0	15.06	Pass
0 ℃	1880.0	27.33	Pass
+10 ℃	1880.0	17.09	Pass
+20 ℃	1880.0	27.58	Pass
+30 ℃	1880.0	33.22	Pass
+40 ℃	1880.0	31.79	Pass
+50 ℃	1880.0	38.23	Pass

Measurement Results vs. Variation of Voltage—GSM1900

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.5 V	1880.0	22.78	Pass
3.8 V	1880.0	30.51	Pass
4.2V	1880.0	23.18	Pass

Measurement Results vs. Variation of Temperature—WCDMA850

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 ℃	836.6	-2.18	Pass
-20 ℃	836.6	-0.41	Pass
-10 ℃	836.6	-2.36	Pass
0 ℃	836.6	-0.96	Pass
+10 ℃	836.6	-0.90	Pass
+20 ℃	836.6	0.76	Pass
+30 ℃	836.6	-1.39	Pass
+40 ℃	836.6	-8.74	Pass
+50 ℃	836.6	-1.44	Pass

Measurement Results vs. Variation of Voltage—WCDMA850

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.5 V	836.6	0.68	Pass
3.8 V	836.6	-6.89	Pass
4.2V	836.6	-0.98	Pass