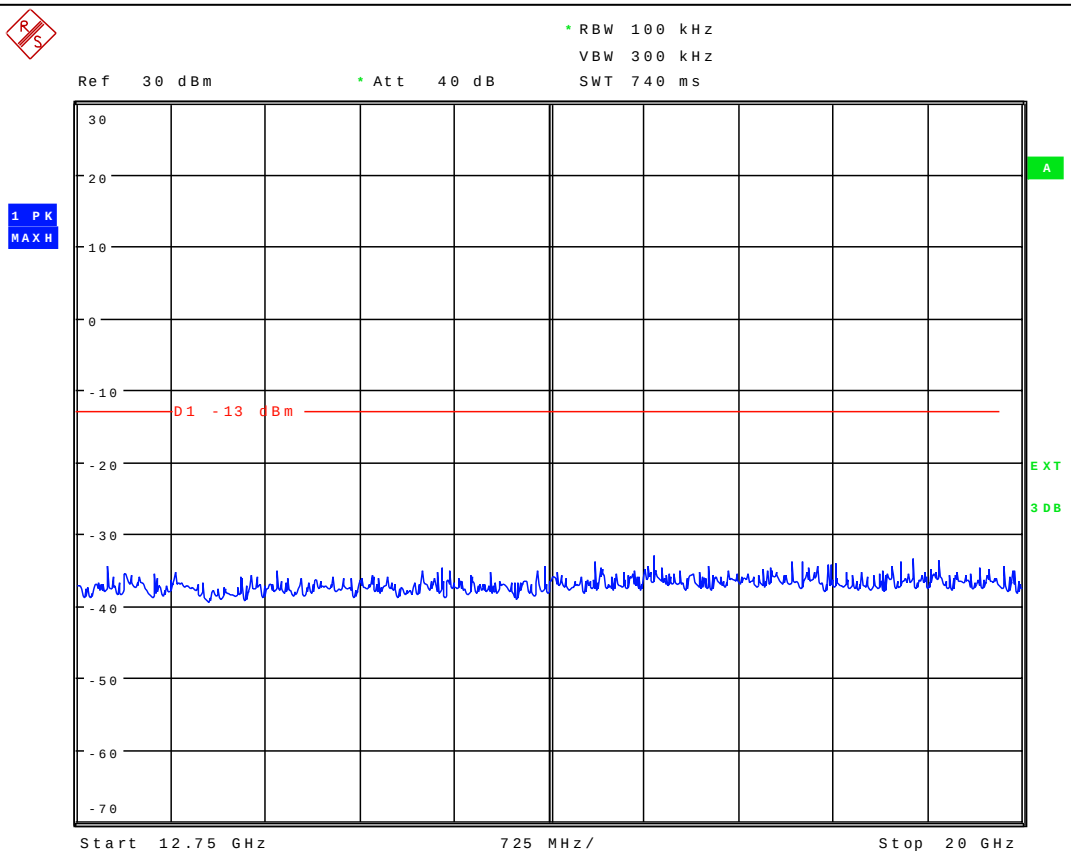
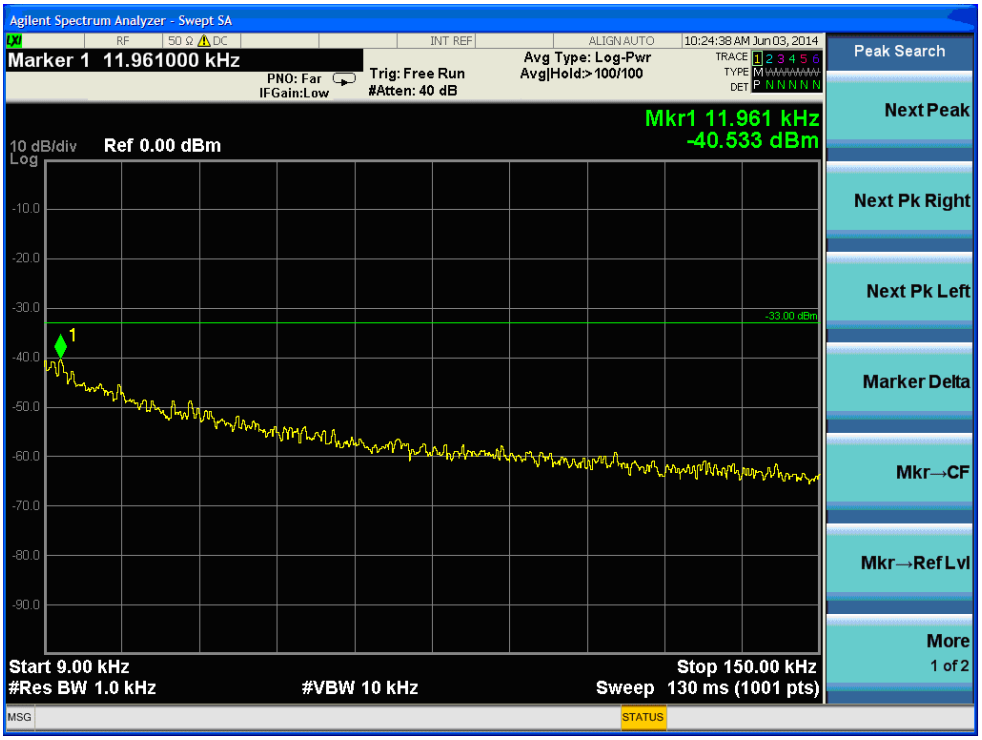
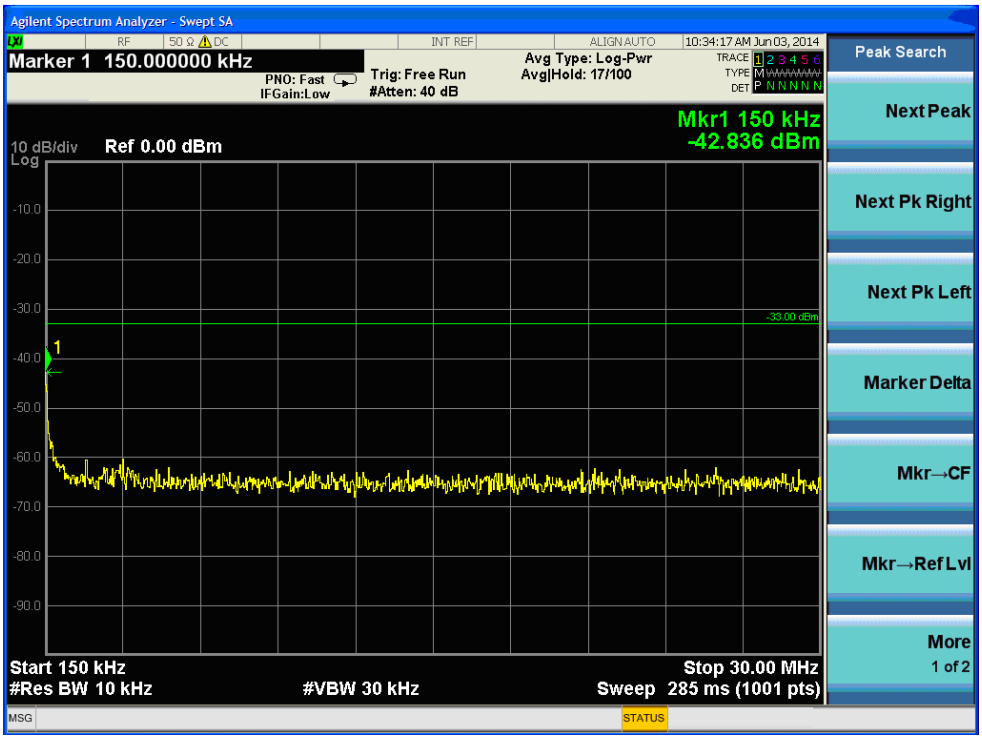
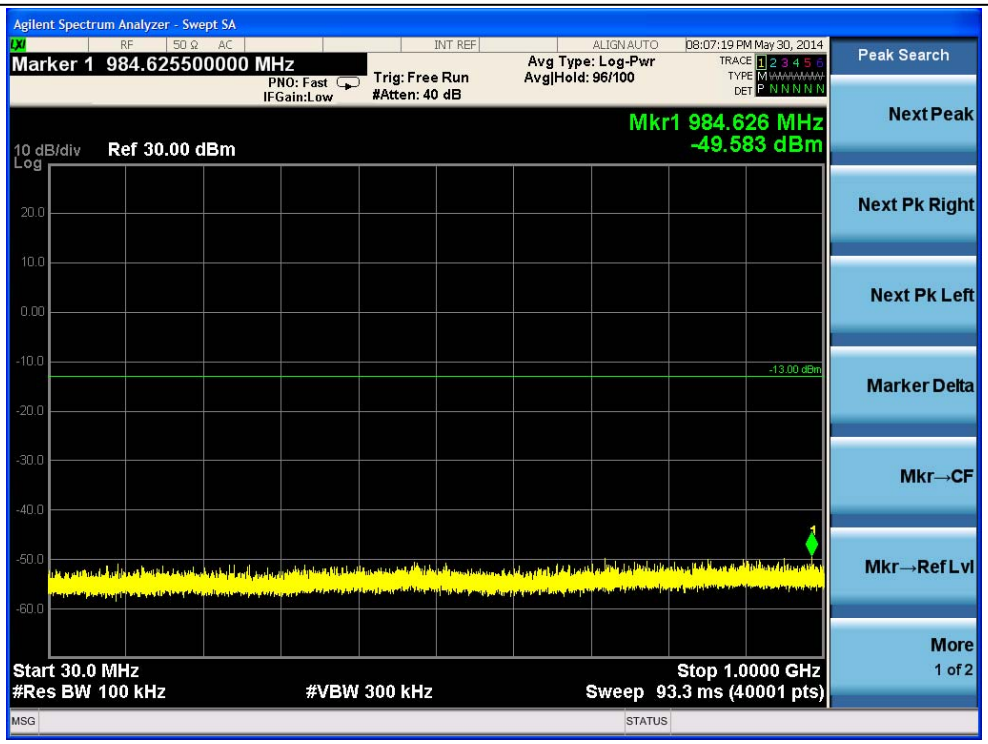
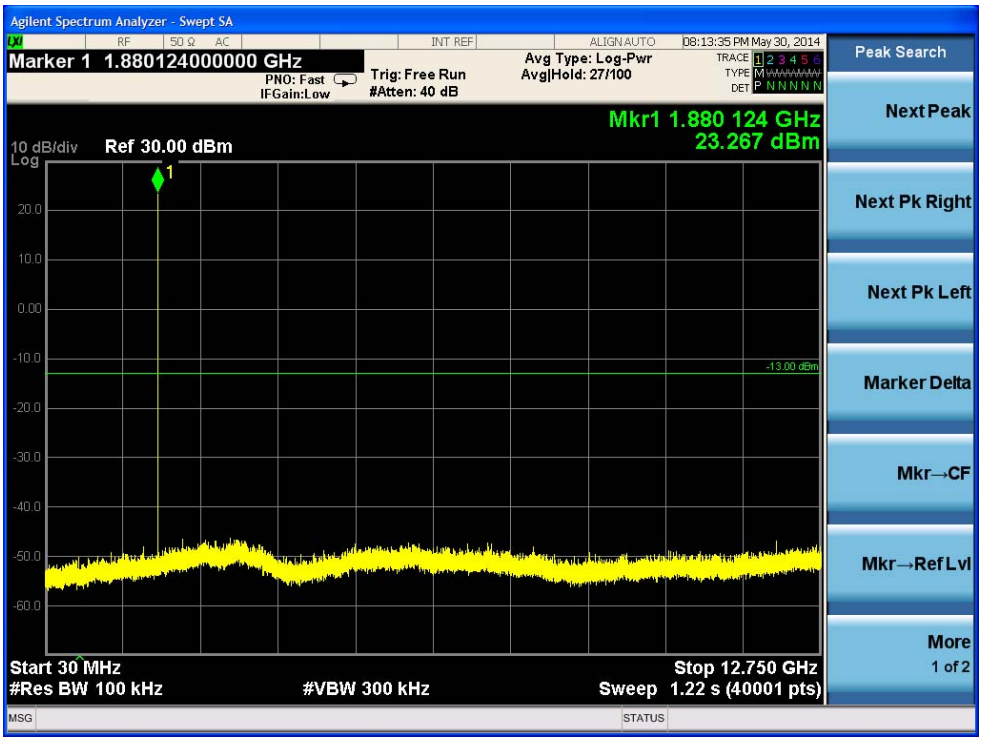

* RBW 100 kHz
VBW 300 kHz
Ref 30 dBm
* Att 40 dB
SWT 740 ms
1 PK
MAXH
A
EXT
3DB
D1 -13 dBm
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 12.75 GHz
725 MHz/
Stop 20 GHz

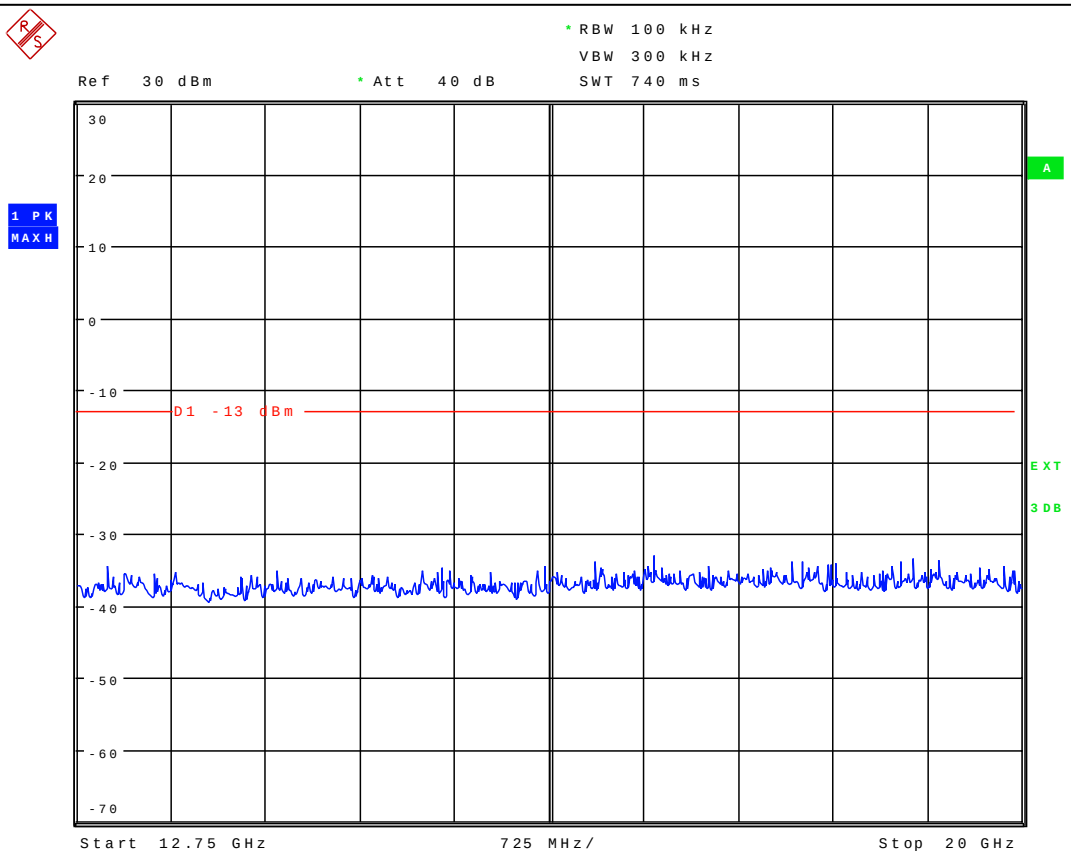
Out of band measurement
Test Band = GSM/GPRS1900
Test Mode = TM1
Test Channel = MCH



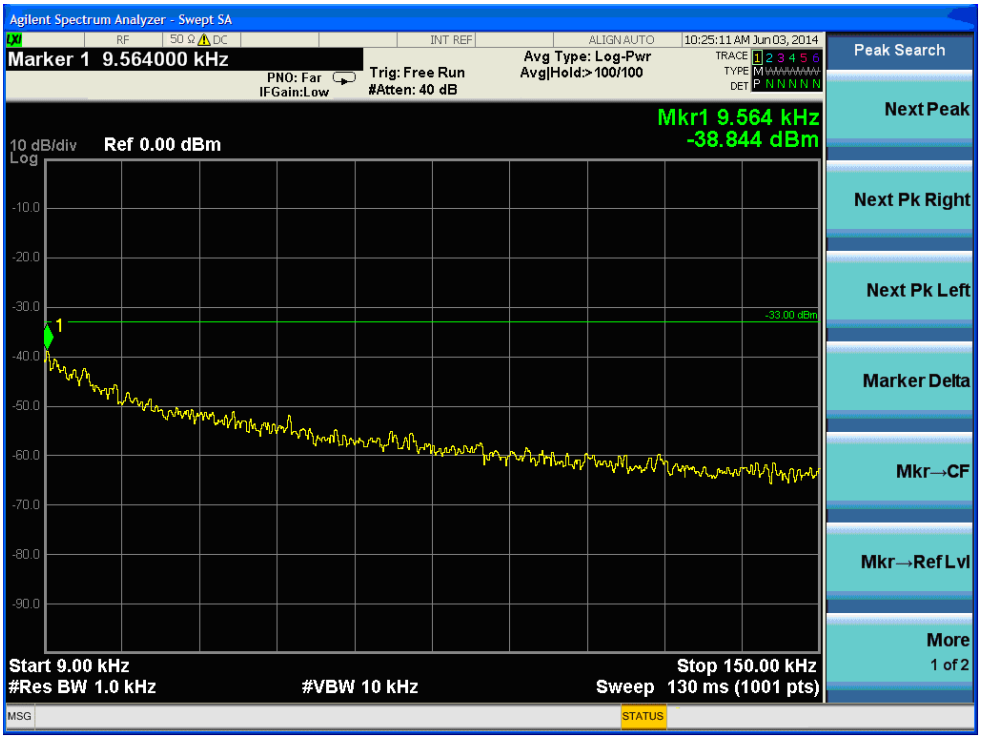


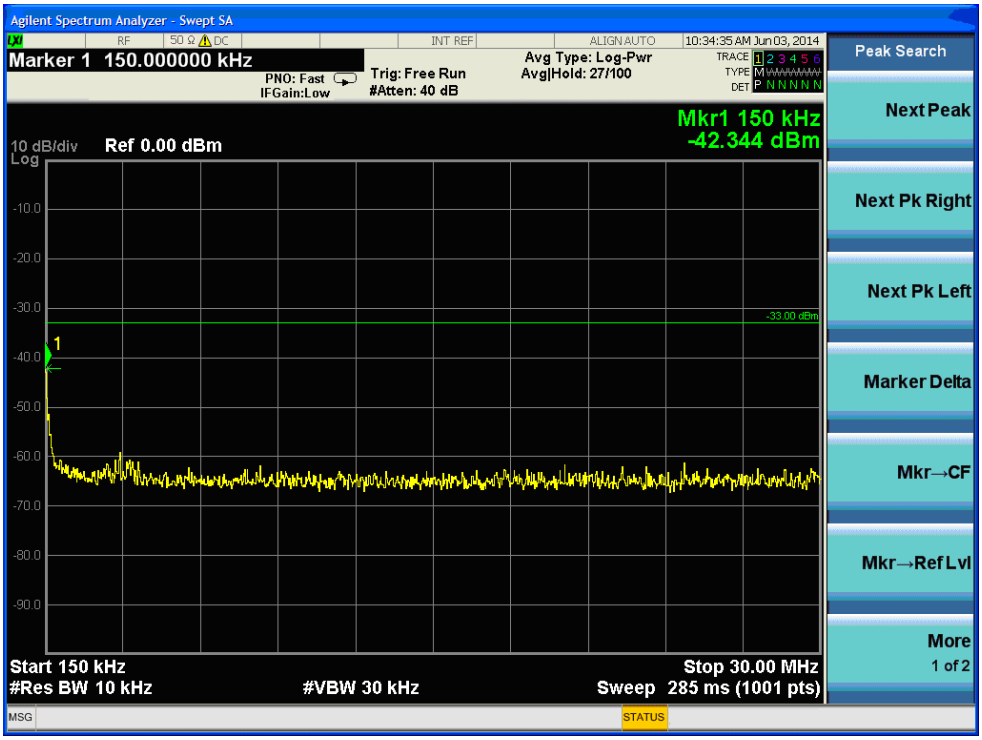

Agilent Spectrum Analyzer - Swept SA
RF 50 Ω AC
INT REF
ALIGN AUTO
08:07:19 PM May 30, 2014
Marker 1 984.625500000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 96/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 984.626 MHz
-49.583 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-13.00 dBm
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 93.3 ms (40001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

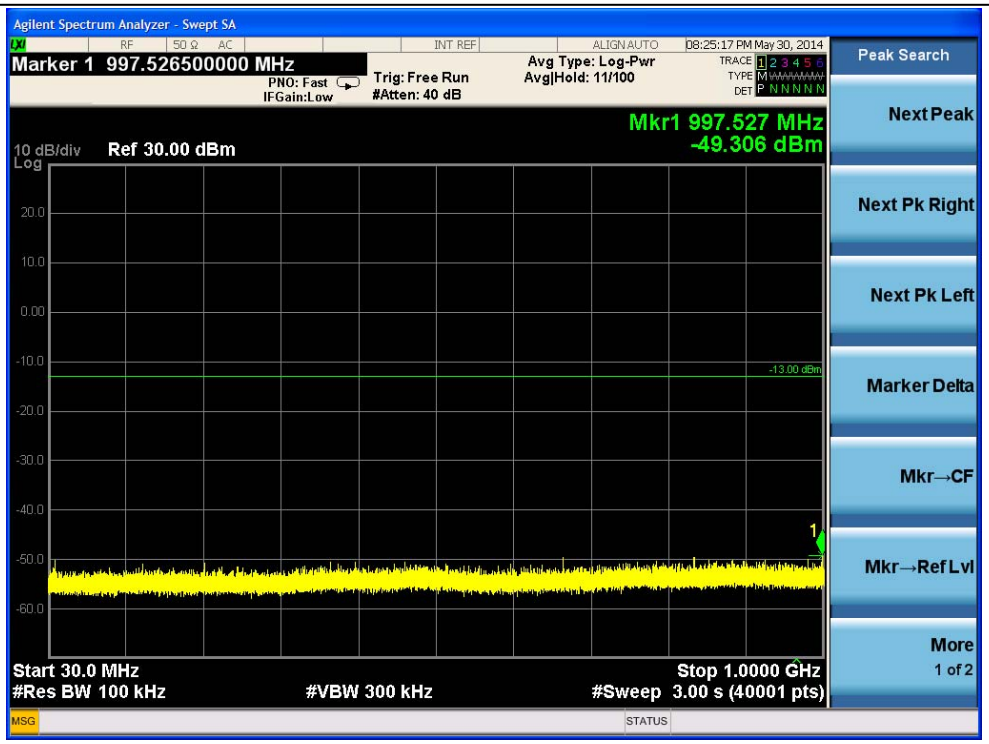

Agilent Spectrum Analyzer - Swept SA
RF 50 Ω AC
INT REF
ALIGN AUTO
08:13:35 PM May 30, 2014
Marker 1 1.880124000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 27/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 1.880 124 GHz
23.267 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-13.00 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 12.750 GHz
Sweep 1.22 s (40001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

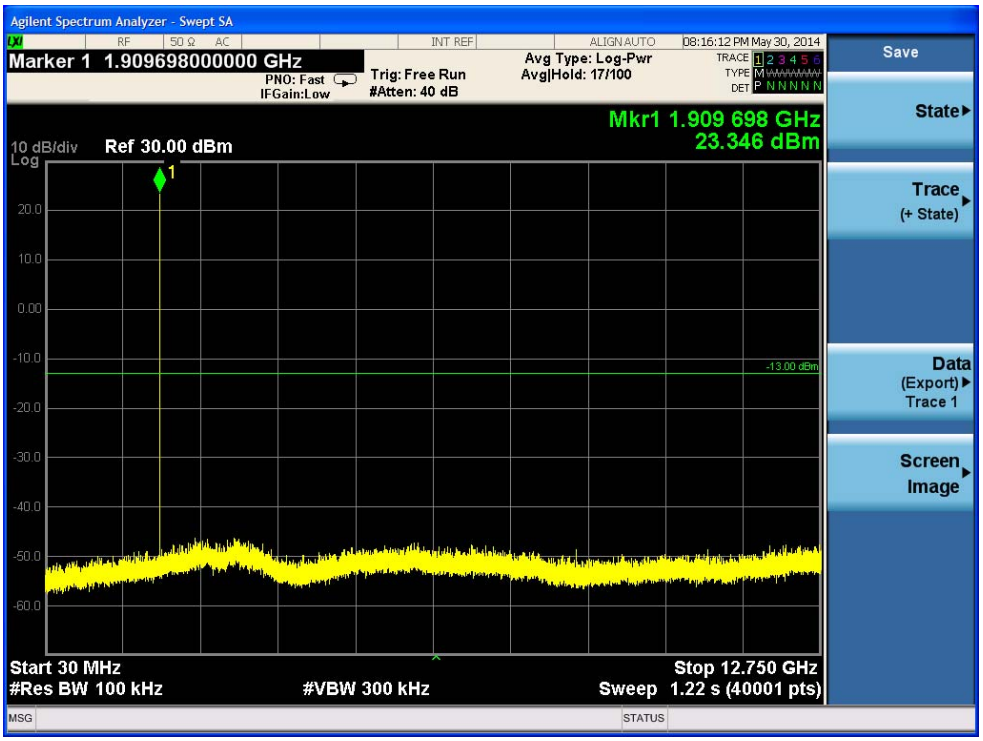

* RBW 100 kHz
VBW 300 kHz
Ref 30 dBm
* Att 40 dB
SWT 740 ms
1 PK
MAXH
A
EXT
3DB
D1 -13 dBm
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 12.75 GHz
725 MHz/
Stop 20 GHz

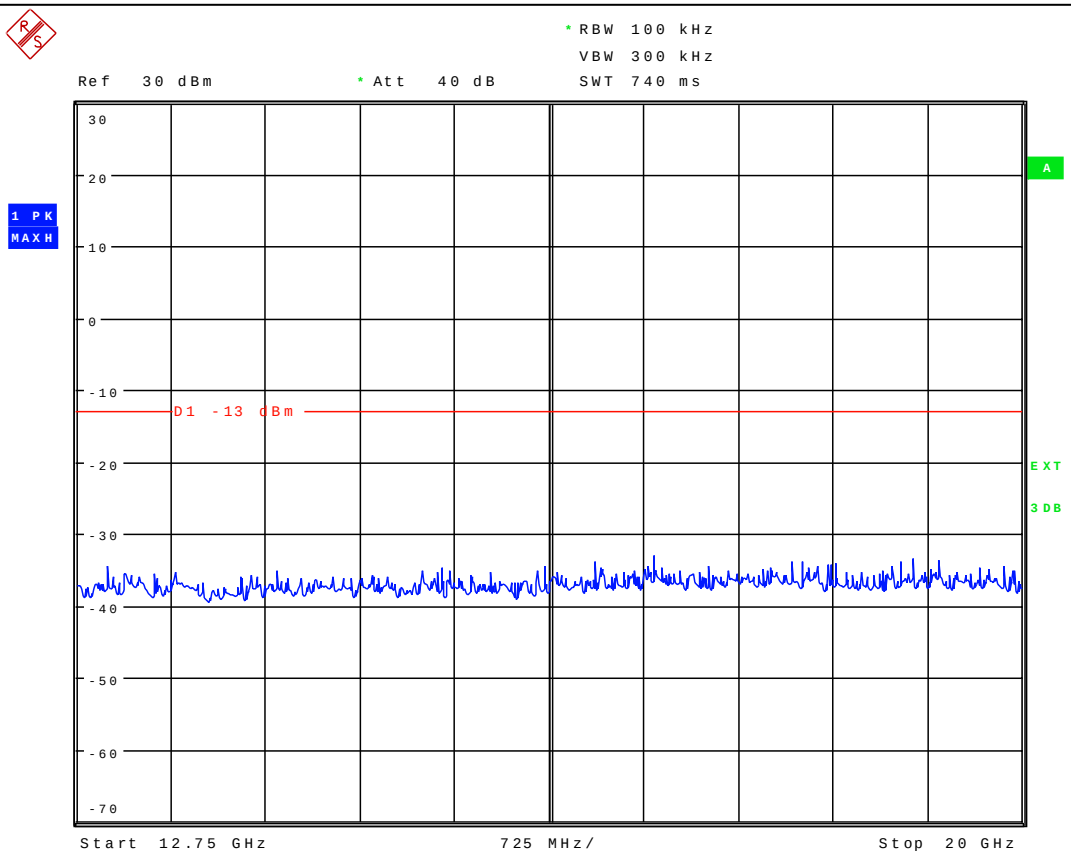
Out of band measurement
Test Band = GSM/GPRS1900
Test Mode = TM1
Test Channel = HCH



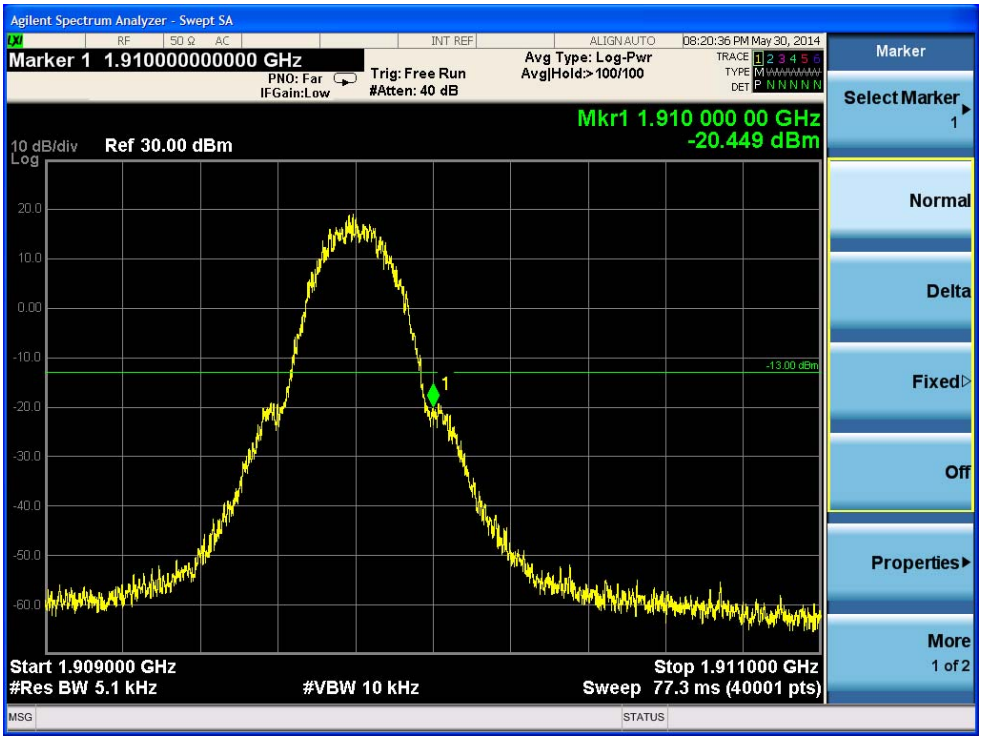


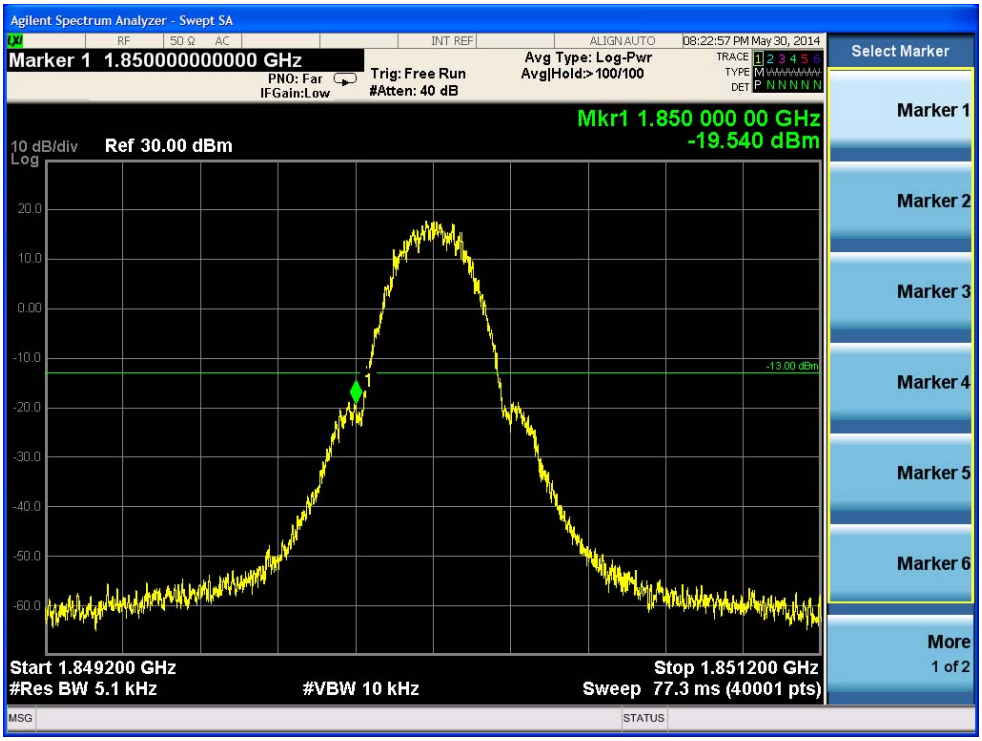

Agilent Spectrum Analyzer - Swept SA
RF 50 Ω AC
INT REF
ALIGN AUTO
08:25:17 PM May 30, 2014
Marker 1 997.526500000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 11/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 997.527 MHz
-49.306 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-13.00 dBm
-20.0
-30.0
-40.0
-50.0
-60.0
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
#Sweep 3.00 s (40001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2


Agilent Spectrum Analyzer - Swept SA
RF 50 Ω AC
INT REF
ALIGN AUTO
08:16:12 PM May 30, 2014
Marker 1 1.909698000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 17/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 1.909 698 GHz
23.346 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-13.00 dBm
-20.0
-30.0
-40.0
-50.0
-60.0
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 12.750 GHz
Sweep 1.22 s (40001 pts)
MSG
STATUS
Save
State
Trace
(+ State)
Data
(Export)
Trace 1
Screen
Image

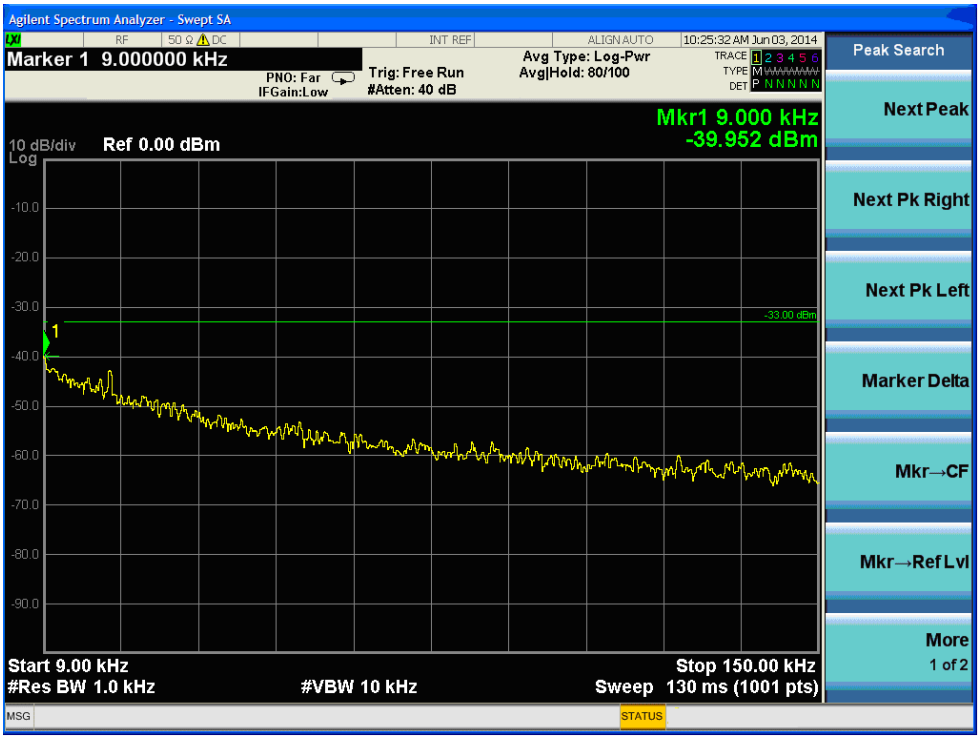

RBW 100 kHz
VBW 300 kHz
SWT 740 ms
Ref 30 dBm
Att 40 dB
1 PK
MAXH
A
EXT
3DB
D1 -13 dBm
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 12.75 GHz
725 MHz/
Stop 20 GHz

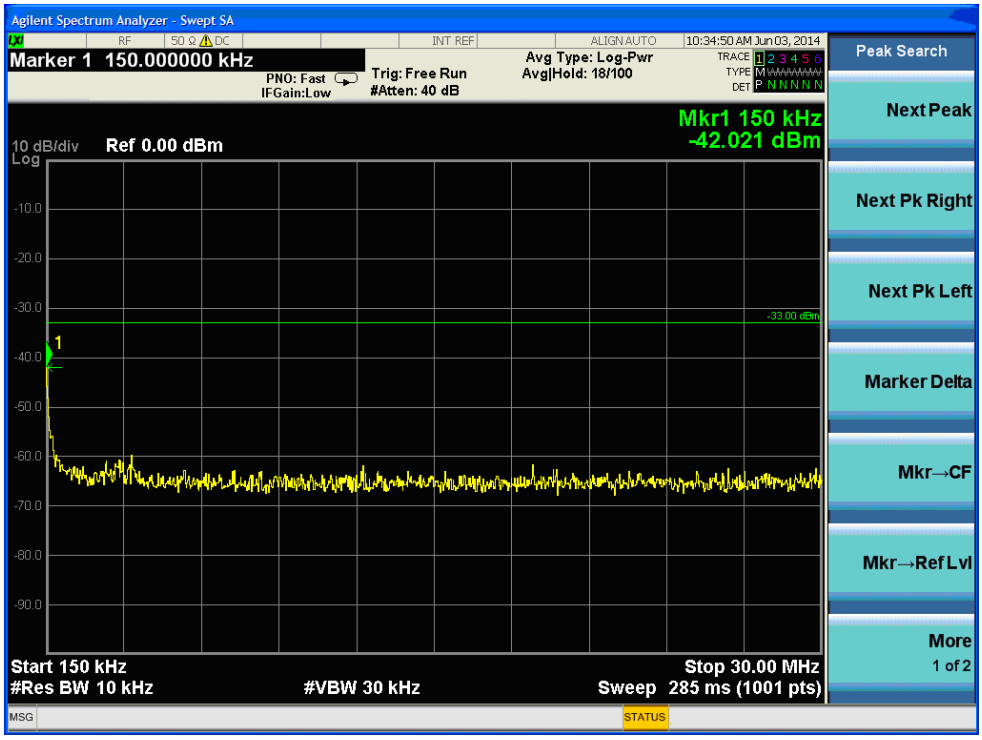
Band edge measurement
Test Band = GSM/GPRS1900
Test Mode = TM1
Test Channel = LCH/HCH

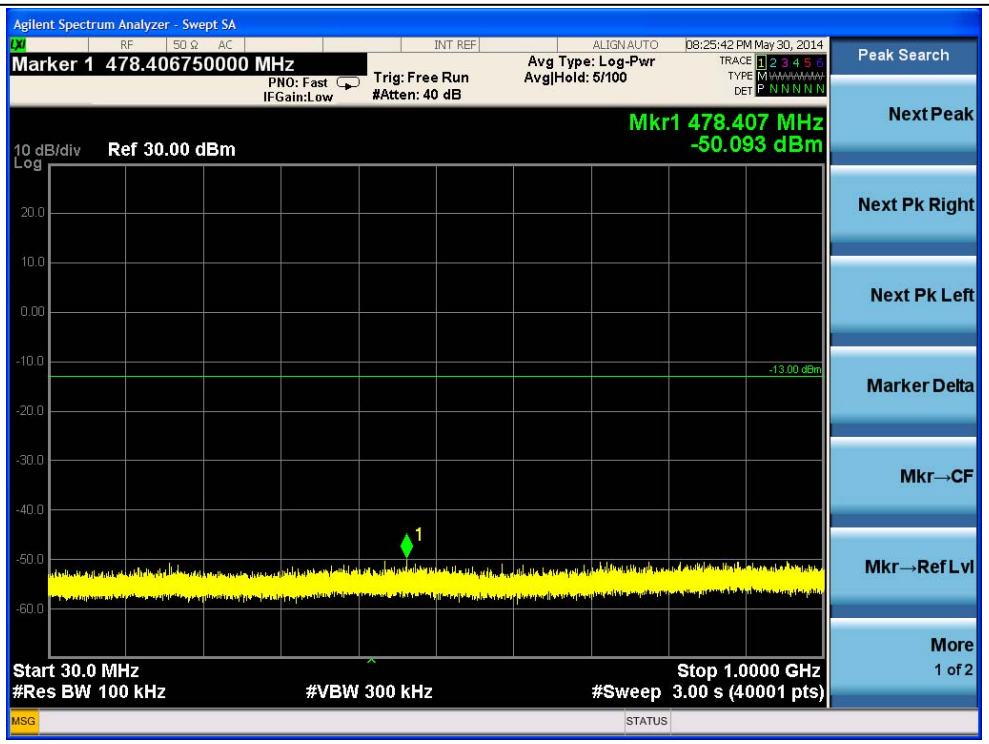


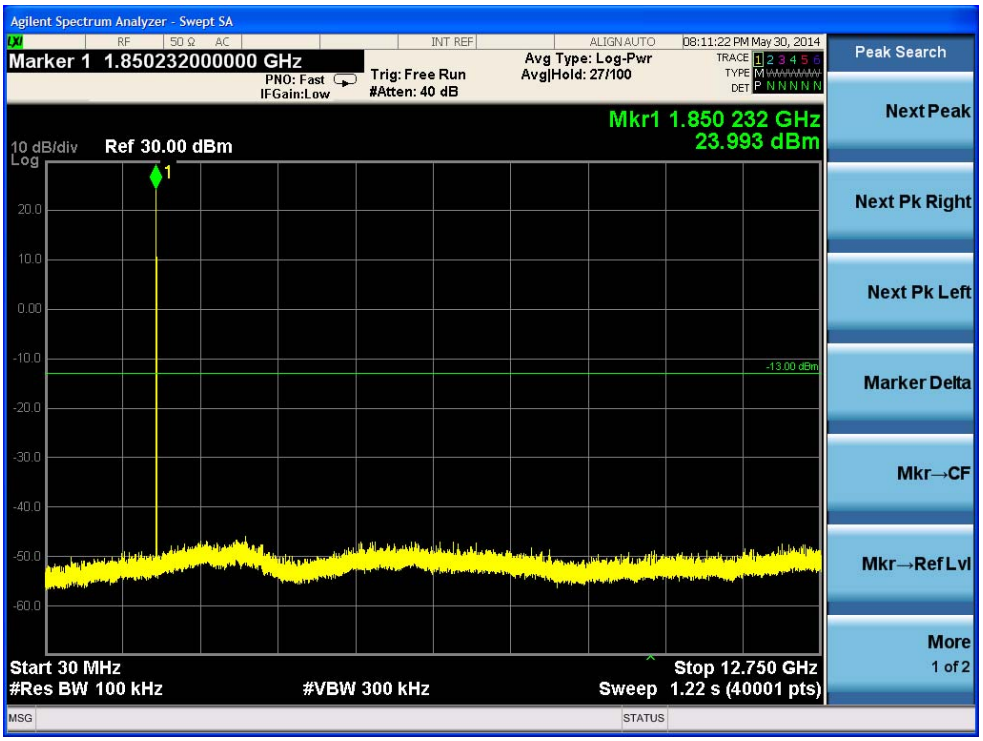


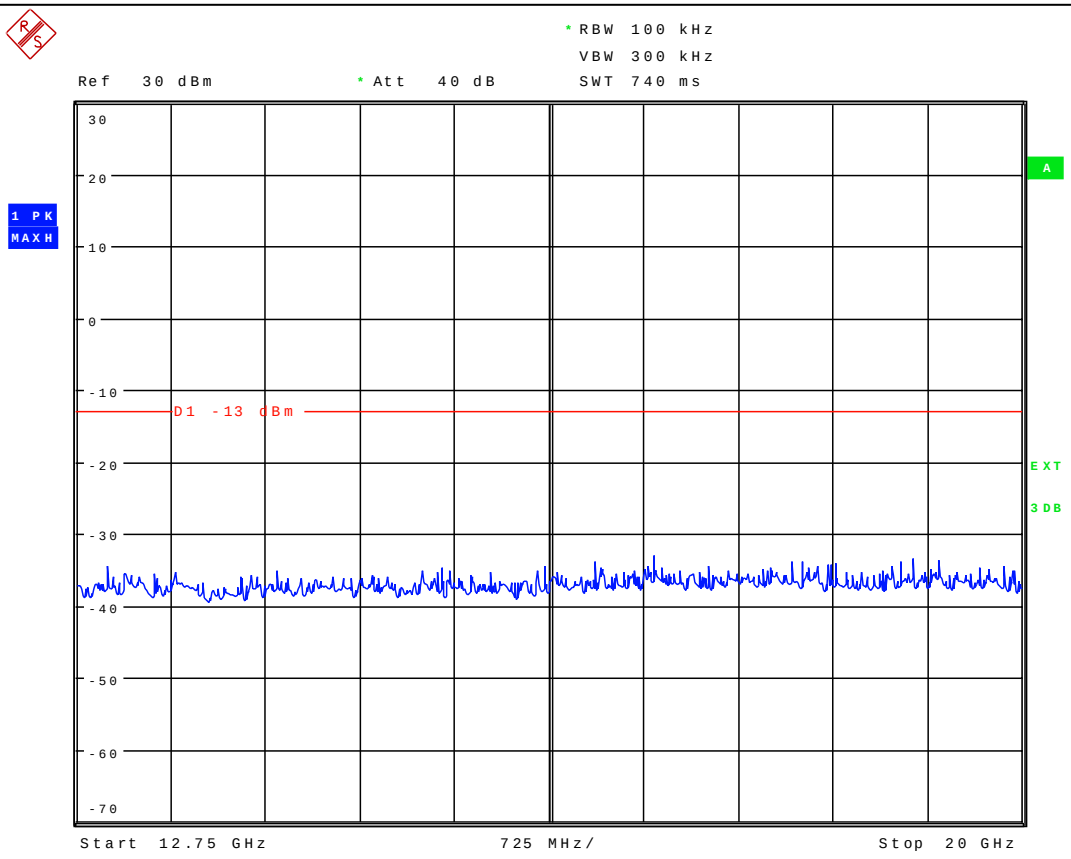
Out of band measurement
Test Band = EGPRS1900
Test Mode = TM2
Test Channel = LCH



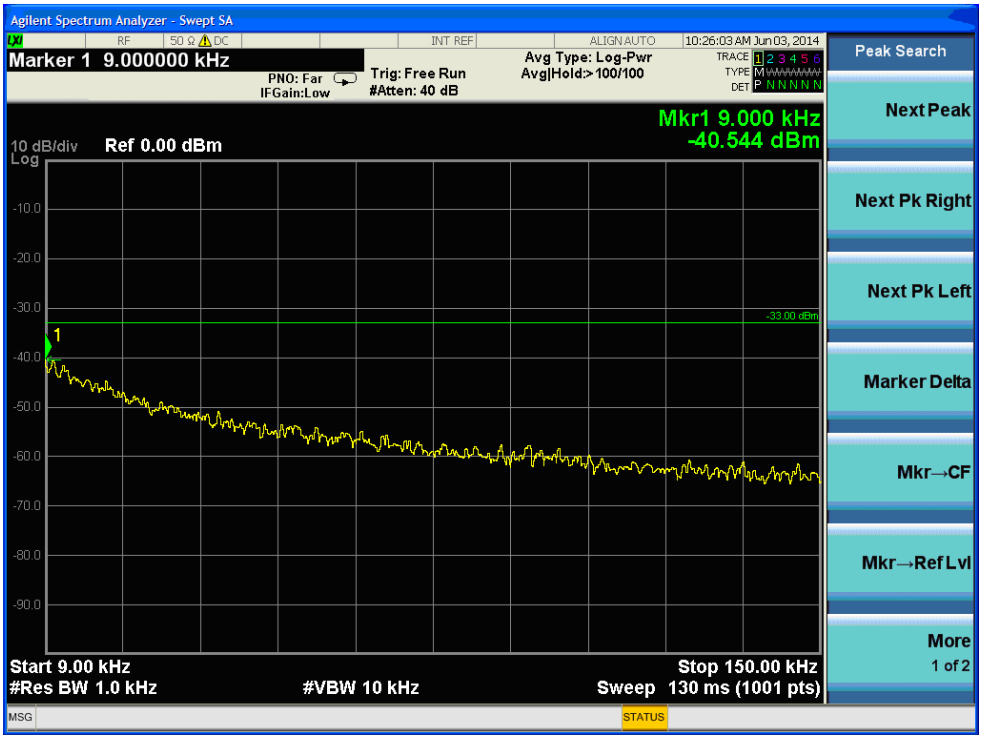


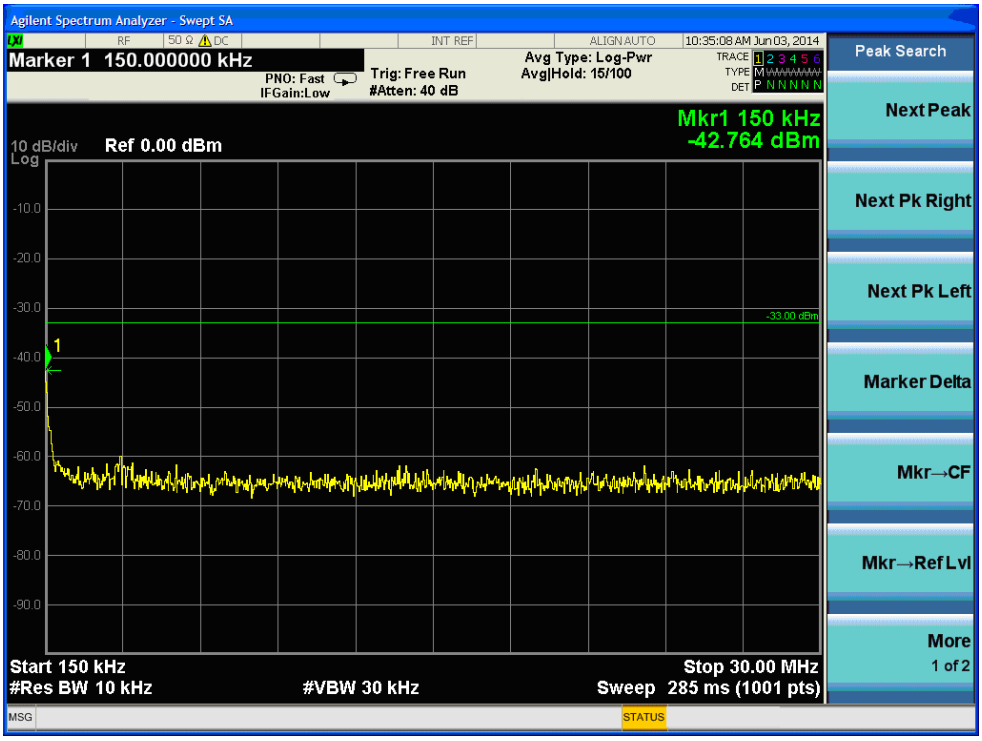

Agilent Spectrum Analyzer - Swept SA
RF 50 Ω AC
INT REF
ALIGN AUTO
08:25:42 PM May 30, 2014
Marker 1 478.406750000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 5/100
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P N N N N N
Mkr1 478.407 MHz
-50.093 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-13.00 dBm
-20.0
-30.0
-40.0
-50.0
-60.0
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
#Sweep 3.00 s (40001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

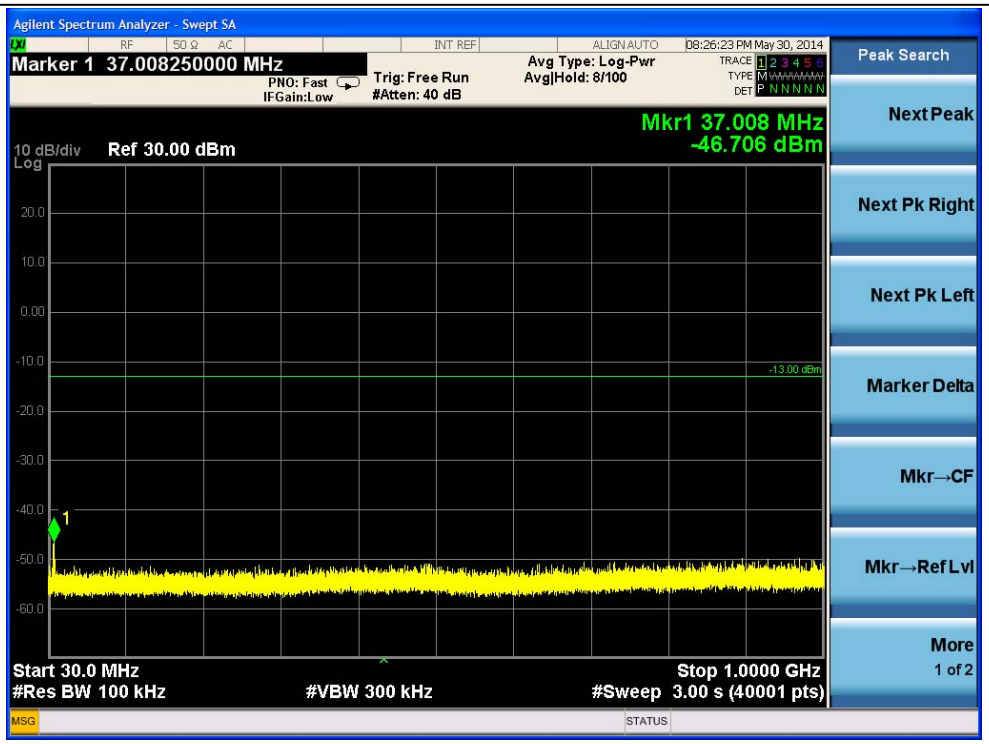

Agilent Spectrum Analyzer - Swept SA
RF 50 Ω AC
INT REF
ALIGN AUTO
08:11:22 PM May 30, 2014
Marker 1 1.850232000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 27/100
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P N N N N N
Mkr1 1.850 232 GHz
23.993 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-13.00 dBm
-20.0
-30.0
-40.0
-50.0
-60.0
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 12.750 GHz
Sweep 1.22 s (40001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

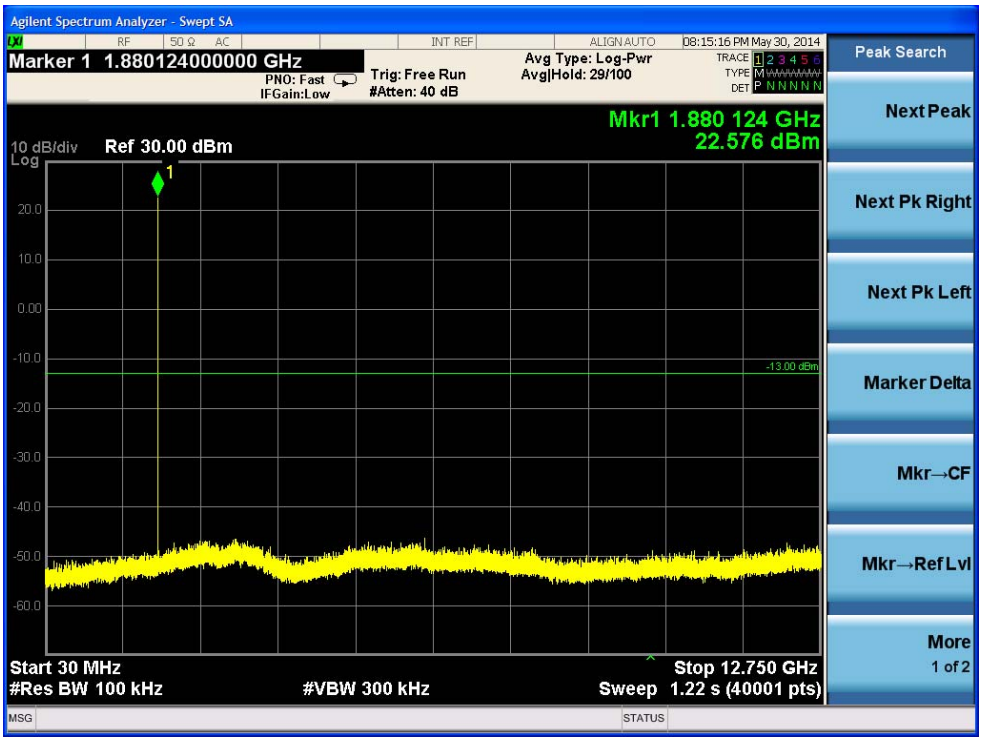

RBW 100 kHz
VBW 300 kHz
SWT 740 ms
Ref 30 dBm
Att 40 dB
1 PK
MAXH
A
EXT
3DB
D1 -13 dBm
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 12.75 GHz
725 MHz/
Stop 20 GHz

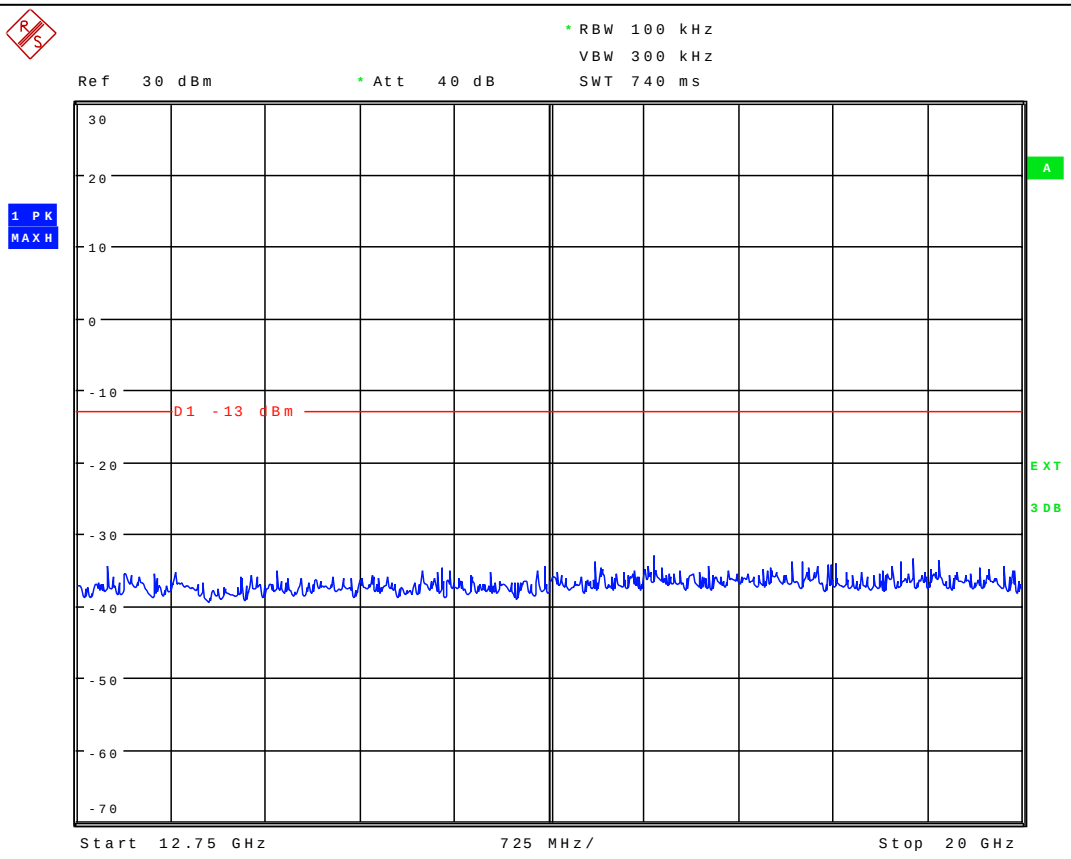
Out of band measurement
Test Band = EGPRS1900
Test Mode = TM2
Test Channel = MCH



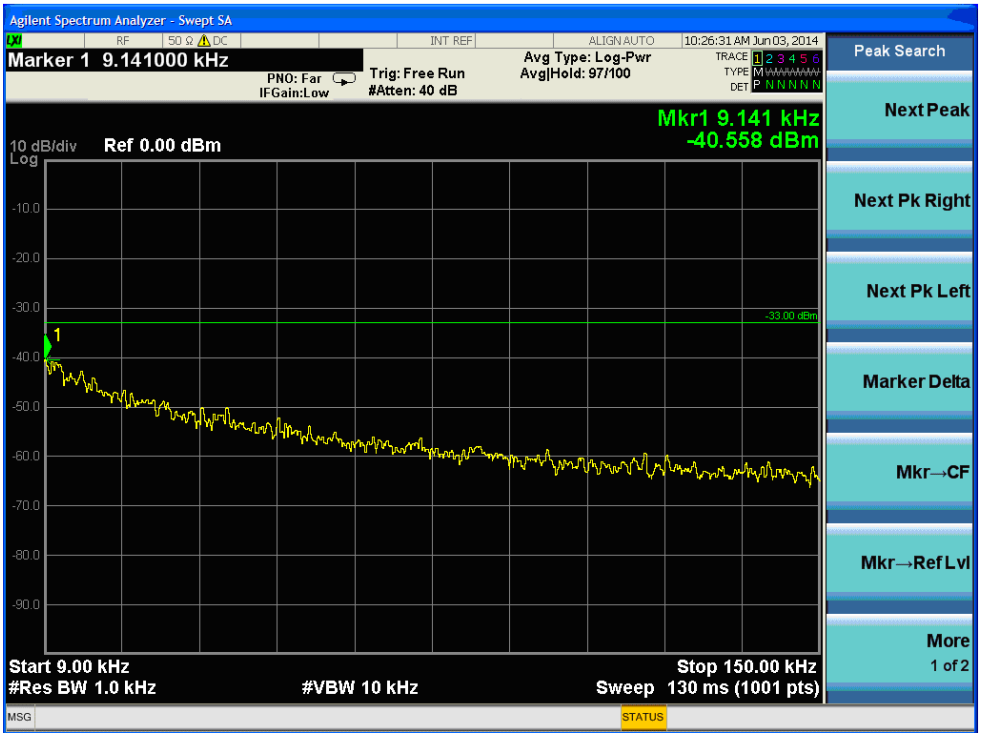


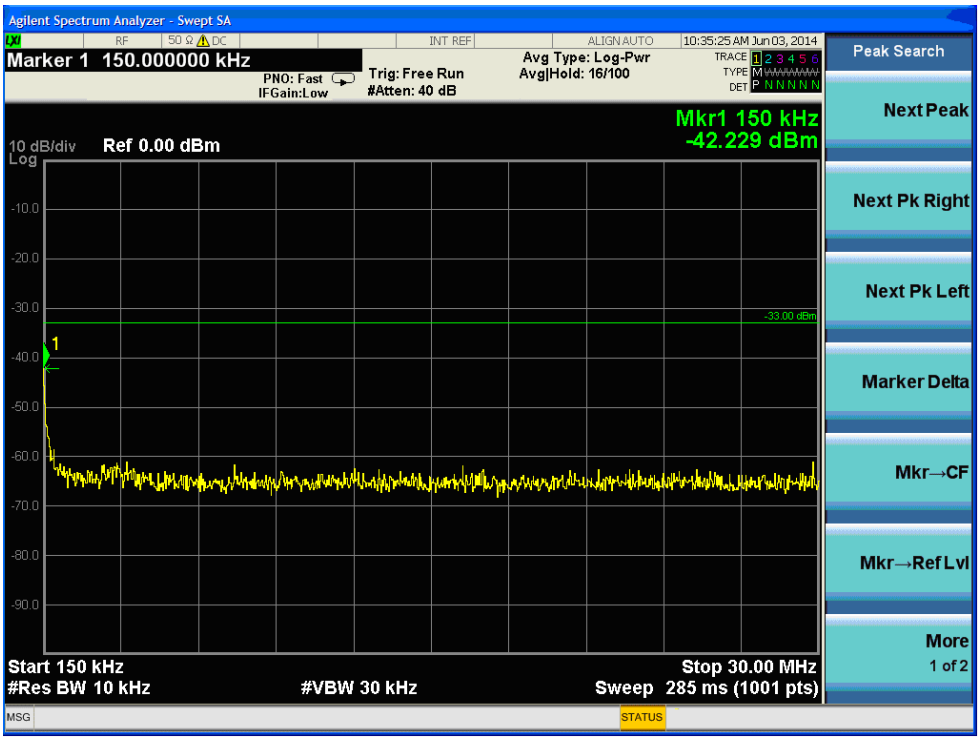

Agilent Spectrum Analyzer - Swept SA
RF 50 Ω AC
INT REF
ALIGN AUTO
08:26:23 PM May 30, 2014
Marker 1 37.008250000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 8/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 37.008 MHz
-46.706 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-13.00 dBm
-20.0
-30.0
-40.0
-50.0
-60.0
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
#Sweep 3.00 s (40001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

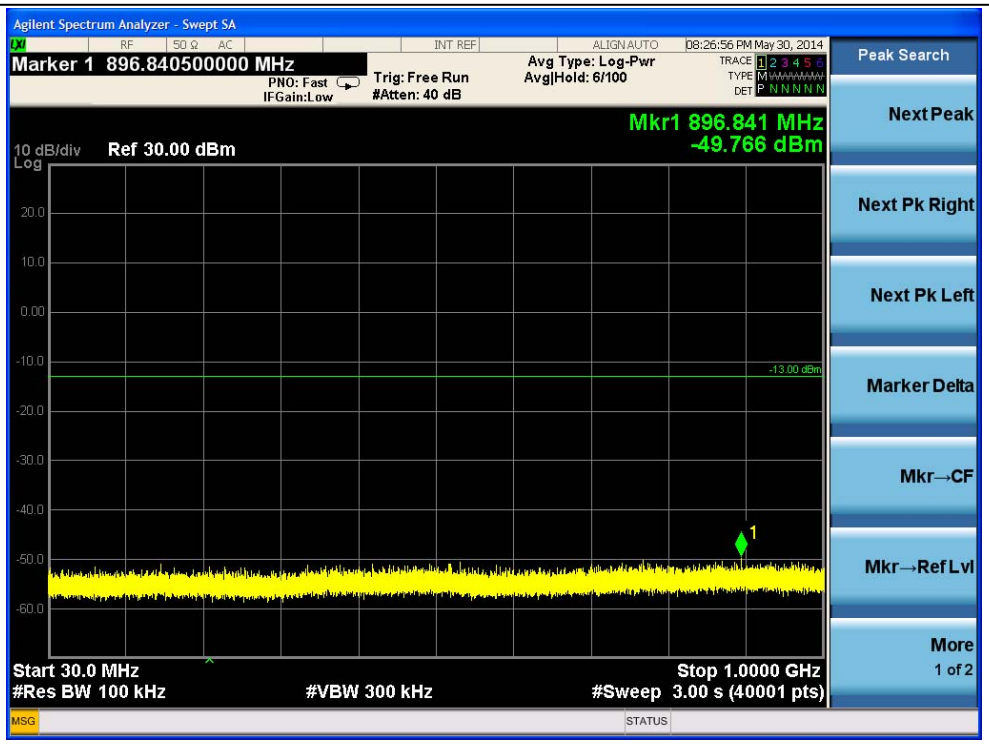

Agilent Spectrum Analyzer - Swept SA
RF 50 Ω AC
INT REF
ALIGN AUTO
08:15:16 PM May 30, 2014
Marker 1 1.880124000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 29/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 1.880 124 GHz
22.576 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-13.00 dBm
-20.0
-30.0
-40.0
-50.0
-60.0
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 12.750 GHz
Sweep 1.22 s (40001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

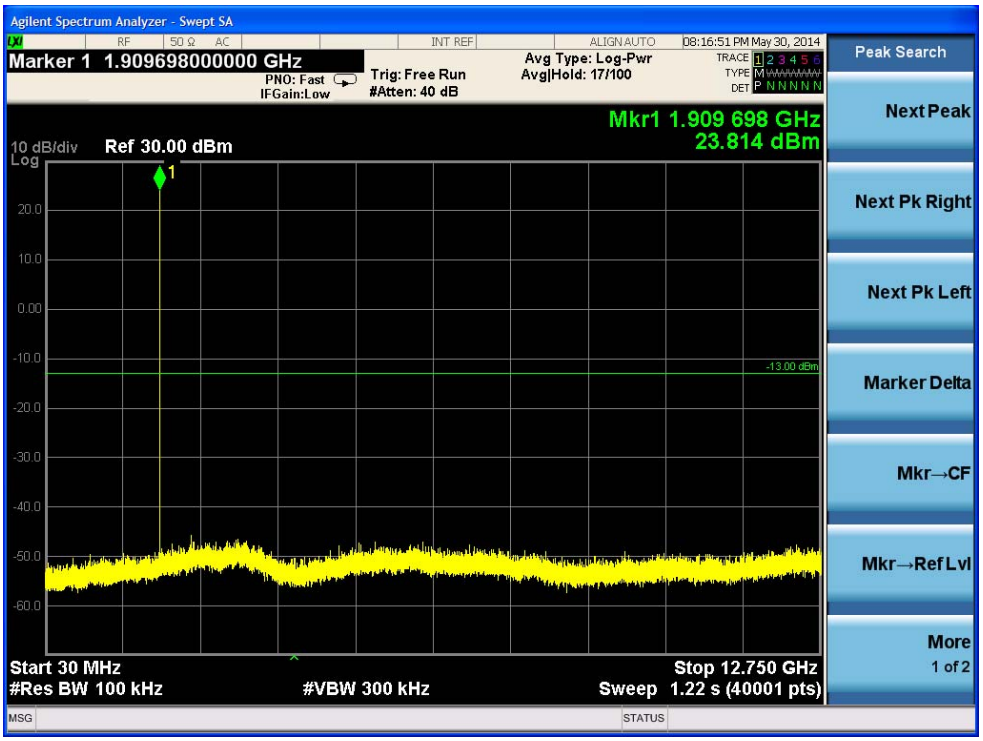

* RBW 100 kHz
VBW 300 kHz
Ref 30 dBm
* Att 40 dB
SWT 740 ms
1 PK
MAXH
A
EXT
3DB
D1 -13 dBm
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 12.75 GHz
725 MHz/
Stop 20 GHz

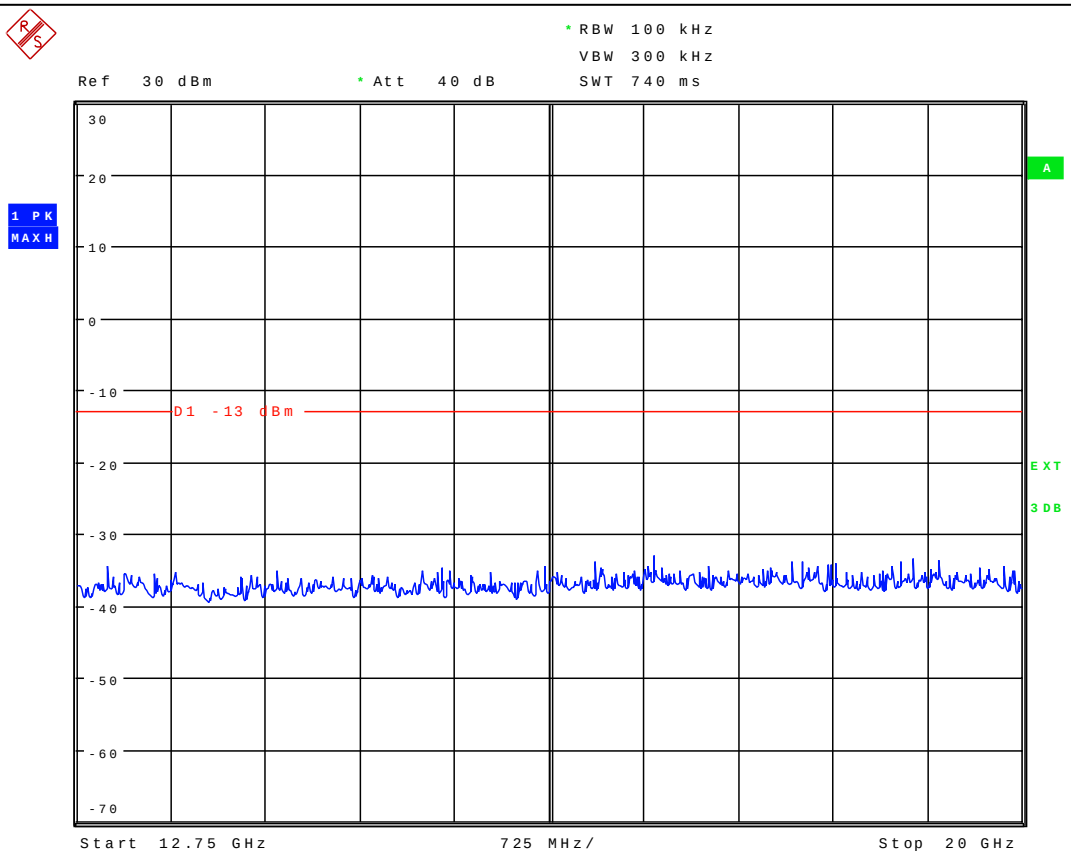
Out of band measurement
Test Band = EGPRS1900
Test Mode = TM2
Test Channel = HCH



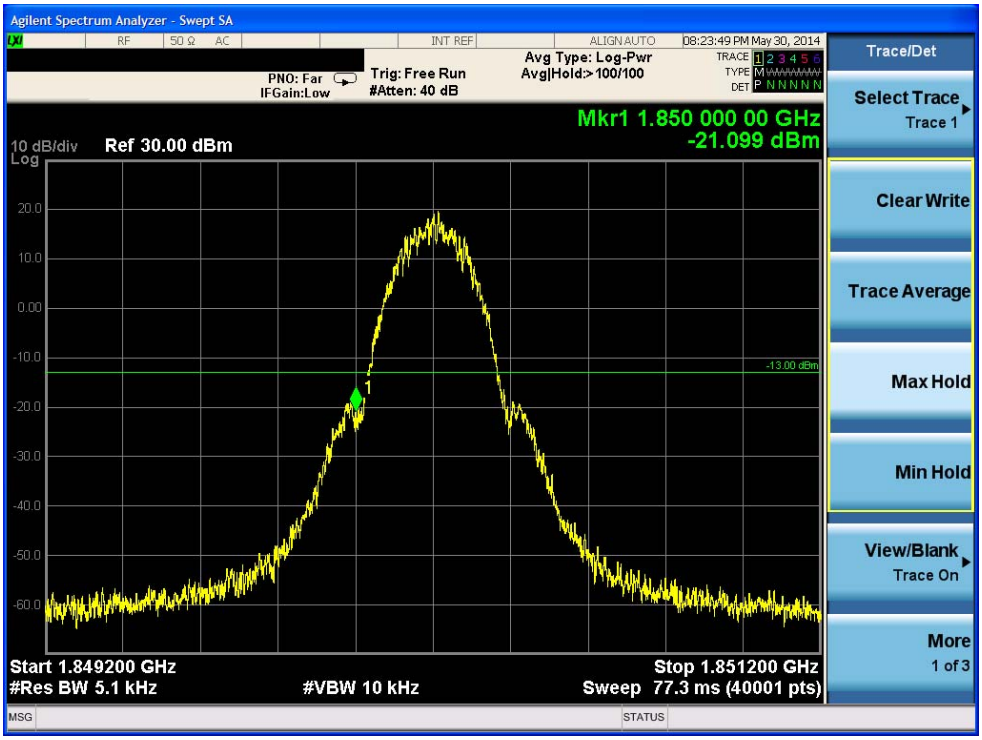


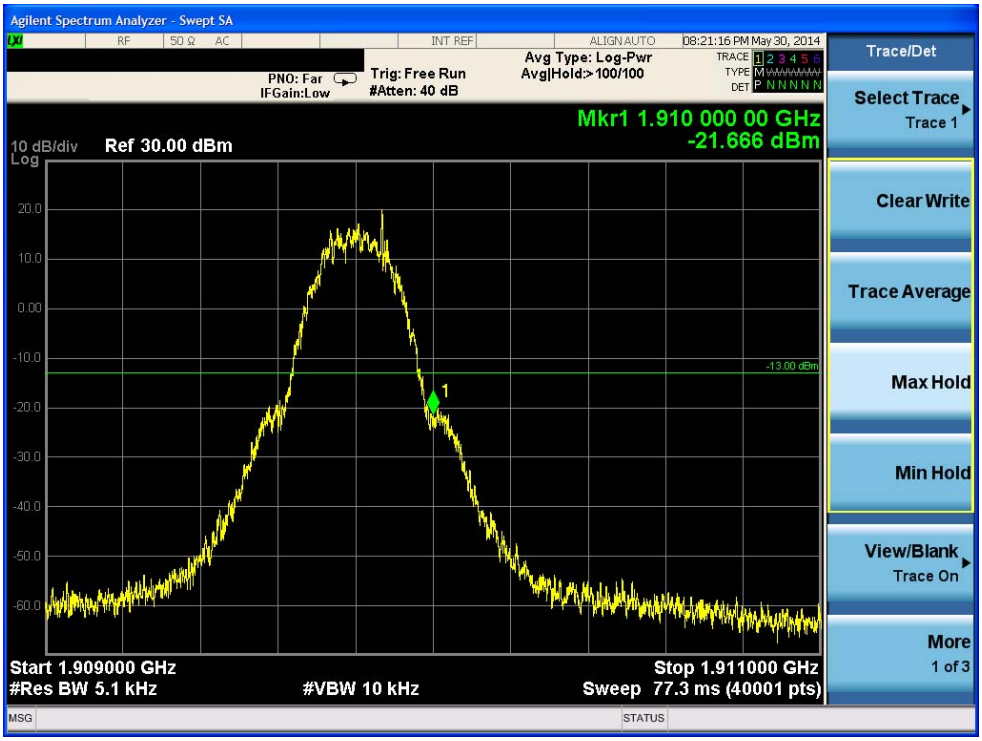

Agilent Spectrum Analyzer - Swept SA
RF 50 Ω AC
INT REF
ALIGN AUTO
08:26:56 PM May 30, 2014
Marker 1 896.840500000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 6/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 896.841 MHz
-49.766 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-13.00 dBm
-20.0
-30.0
-40.0
-50.0
-60.0
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
#Sweep 3.00 s (40001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2


Agilent Spectrum Analyzer - Swept SA
RF 50 Ω AC
INT REF
ALIGN AUTO
08:16:51 PM May 30, 2014
Marker 1 1.909698000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 17/100
TRACE 1 2 3 4 5
TYPE M
DET P N N N N N
Mkr1 1.909 698 GHz
23.814 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-13.00 dBm
-20.0
-30.0
-40.0
-50.0
-60.0
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 12.750 GHz
Sweep 1.22 s (40001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

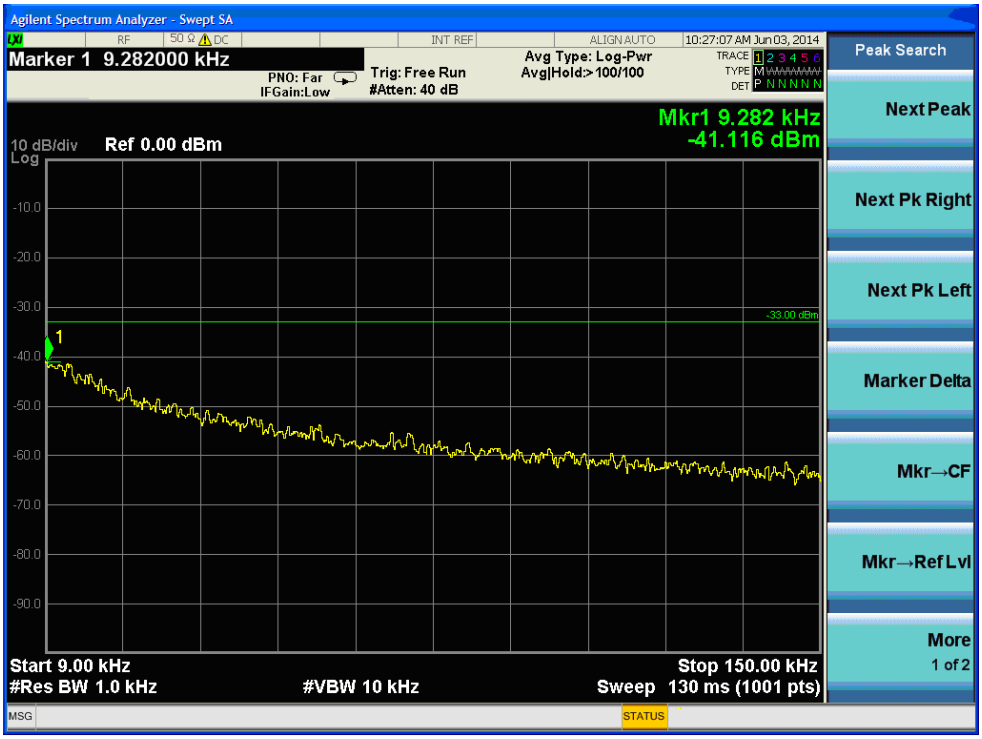

* RBW 100 kHz
VBW 300 kHz
Ref 30 dBm
* Att 40 dB
SWT 740 ms
1 PK
MAXH
A
EXT
3DB
D1 -13 dBm
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 12.75 GHz
725 MHz/
Stop 20 GHz

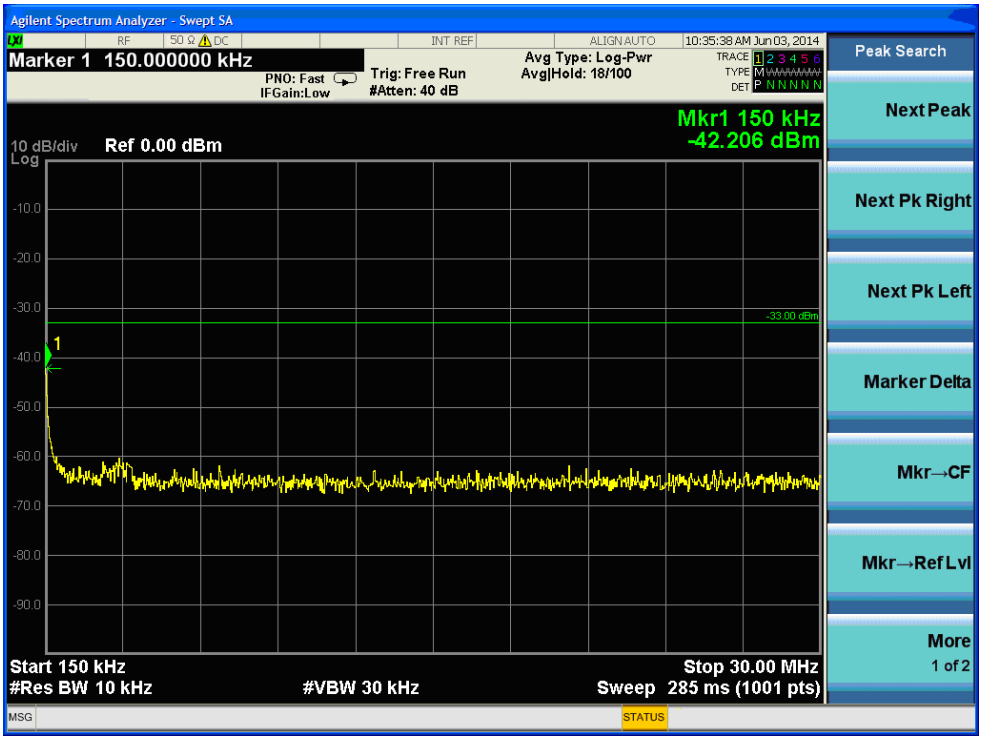
Band edge measurement
Test Band = EGPRS1900
Test Mode = TM2
Test Channel = LCH/HCH

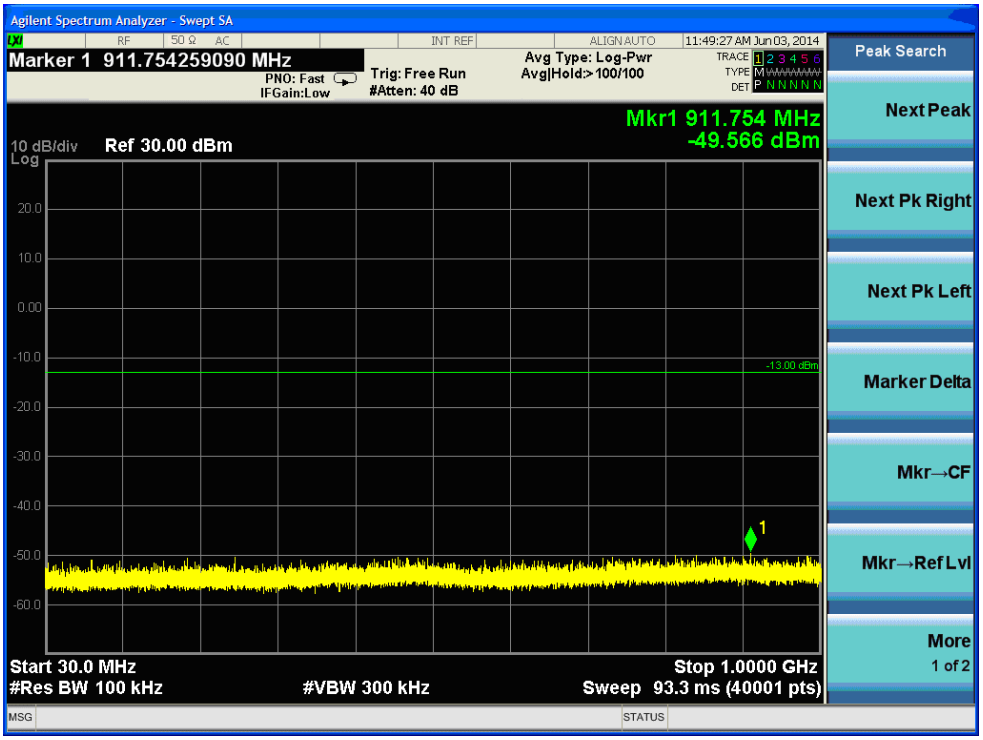


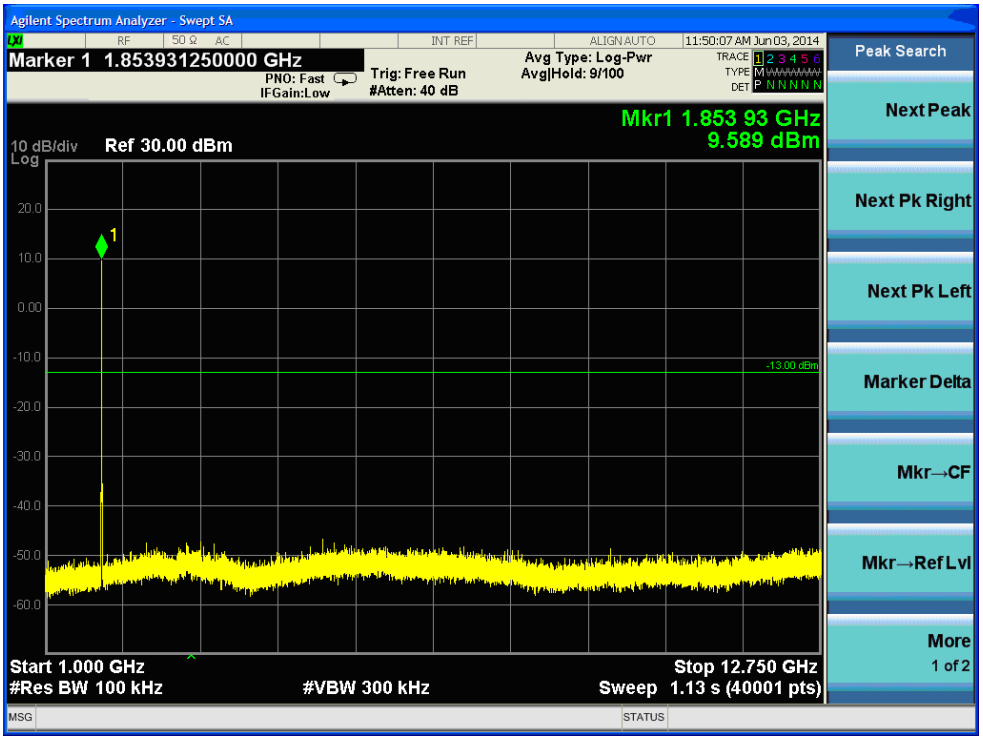


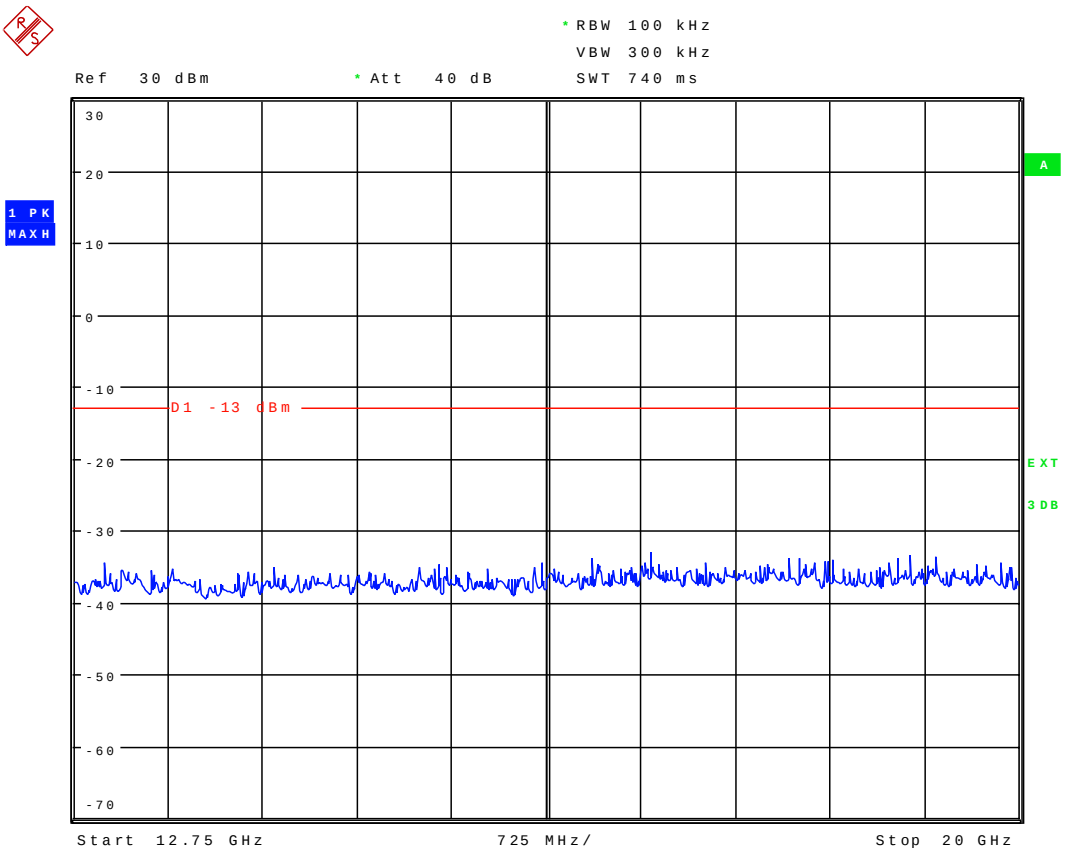
Out of band measurement
Test Band = WCDMA1900
Test Mode = TM3
Test Channel = LCH



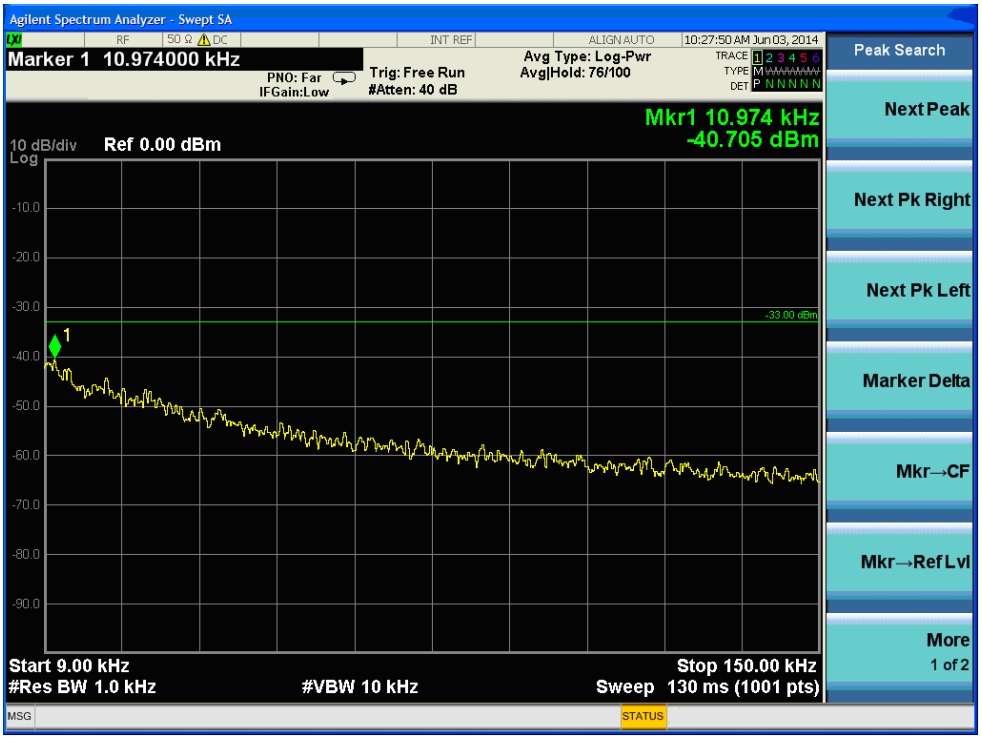


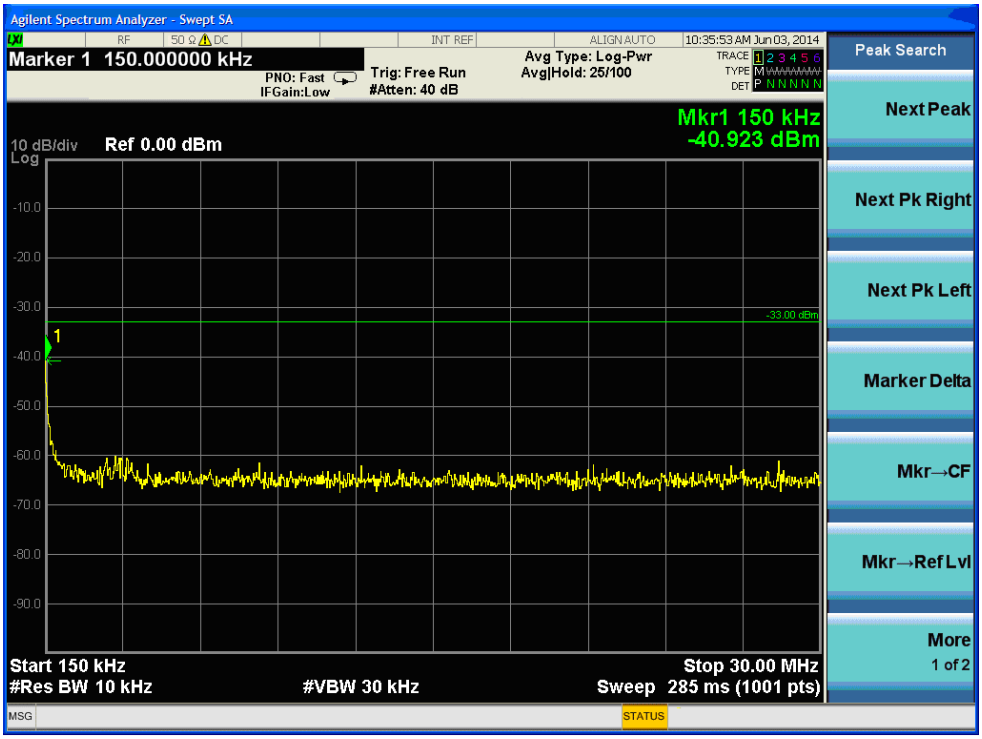

Agilent Spectrum Analyzer - Swept SA
RF
50 Ω AC
INT REF
ALIGN AUTO
11:49:27 AM Jun 03, 2014
Marker 1 911.754259090 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 911.754 MHz
-49.566 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-13.00 dBm
1
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 93.3 ms (40001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

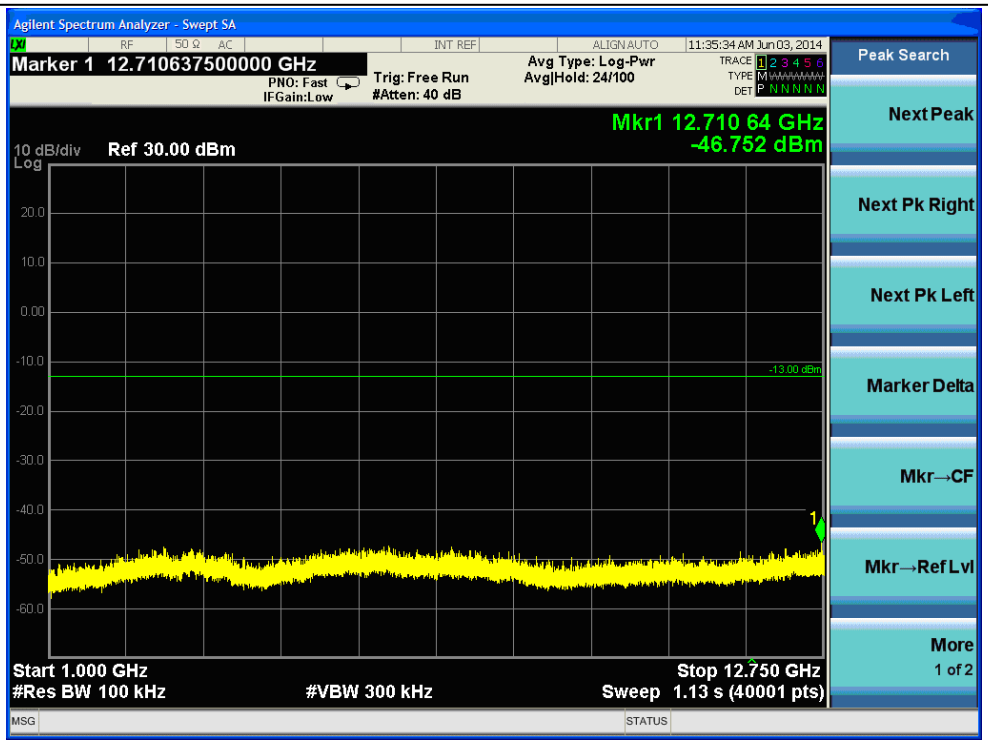

Agilent Spectrum Analyzer - Swept SA
RF
50 Ω AC
INT REF
ALIGN AUTO
11:50:07 AM Jun 03, 2014
Marker 1 1.853931250000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 9/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 1.853 93 GHz
9.589 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-13.00 dBm
1
Start 1.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 12.750 GHz
Sweep 1.13 s (40001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

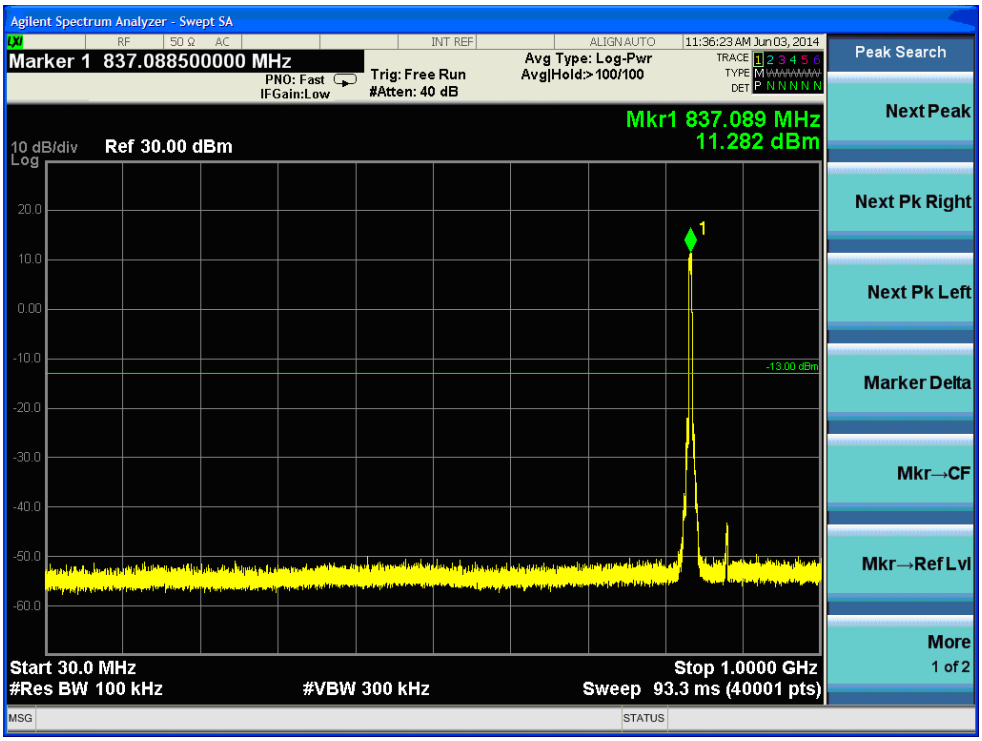

RBW 100 kHz
VBW 300 kHz
Ref 30 dBm
Att 40 dB
SWT 740 ms
1 PK
MAXH
A
D1 -13 dBm
EXT
3DB
Start 12.75 GHz
725 MHz/
Stop 20 GHz

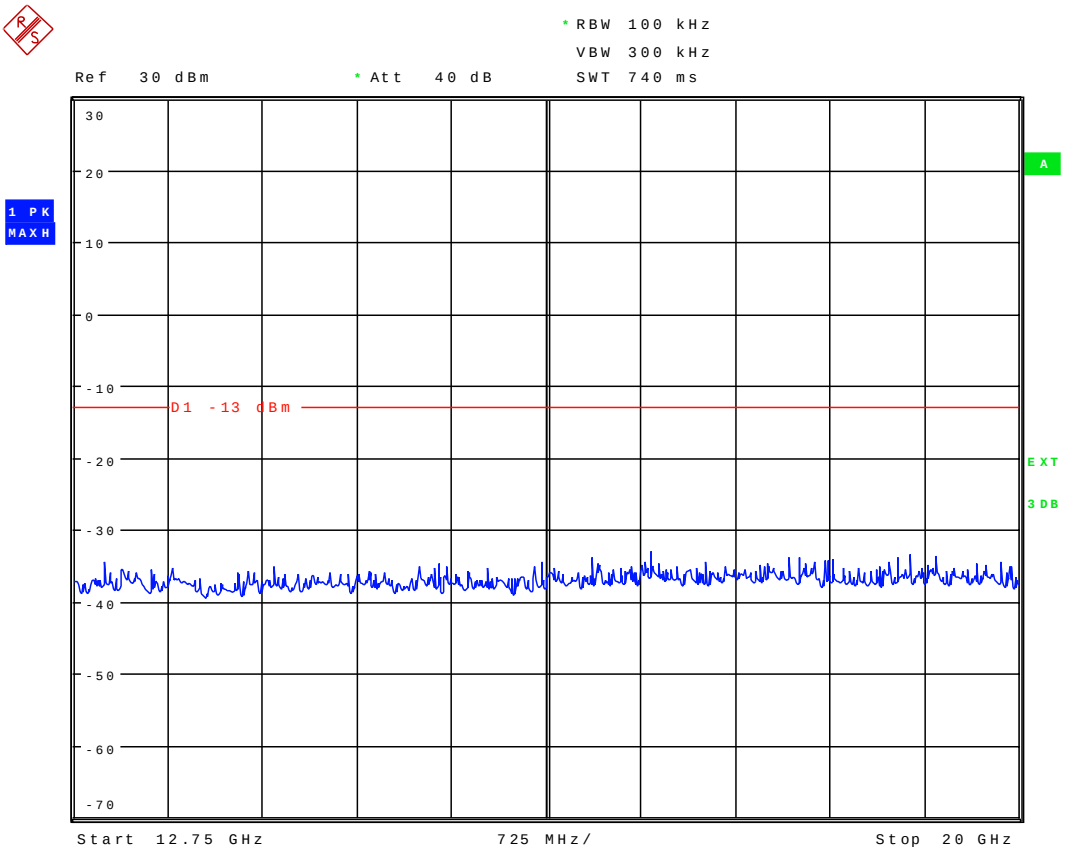
Out of band measurement
Test Band = WCDMA1900
Test Mode = TM3
Test Channel = MCH



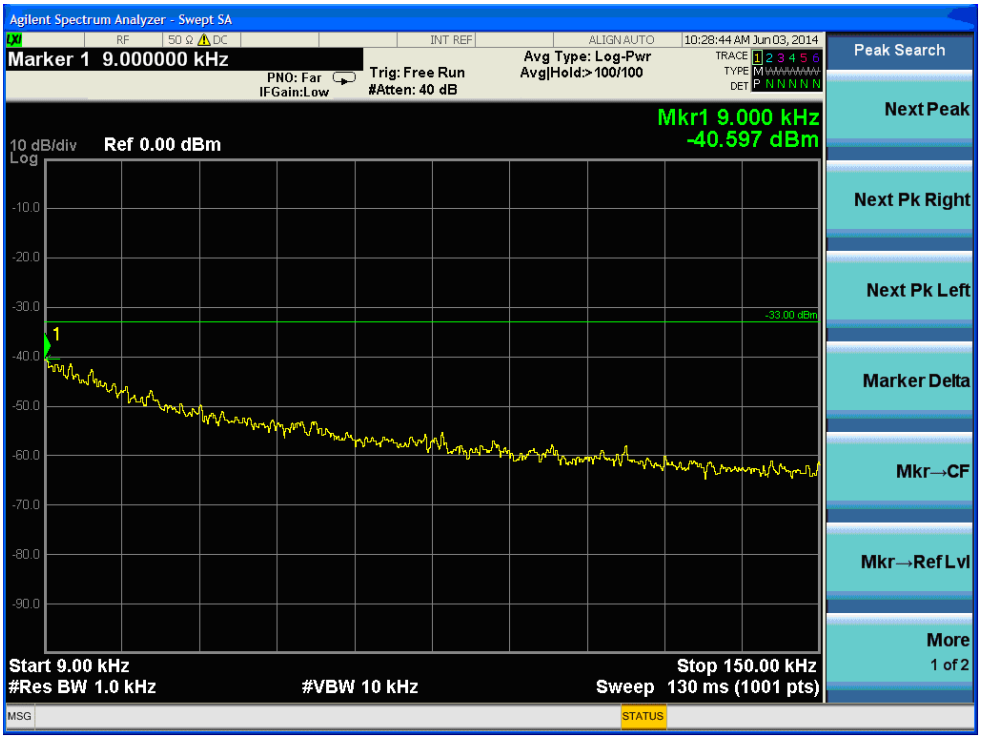


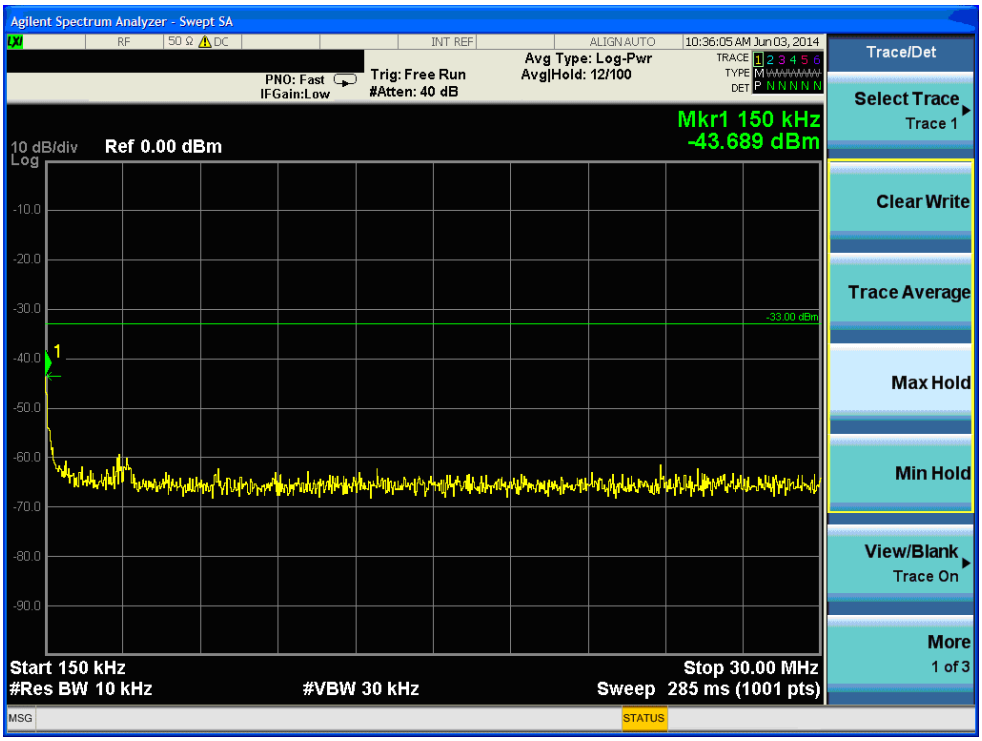

Agilent Spectrum Analyzer - Swept SA
RF 50 Ω AC
INT REF
ALIGN AUTO
11:35:34 AM Jun 03, 2014
Marker 1 12.710637500000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 24/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 12.710 64 GHz
-46.752 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-13.00 dBm
1
Start 1.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 12.750 GHz
Sweep 1.13 s (40001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

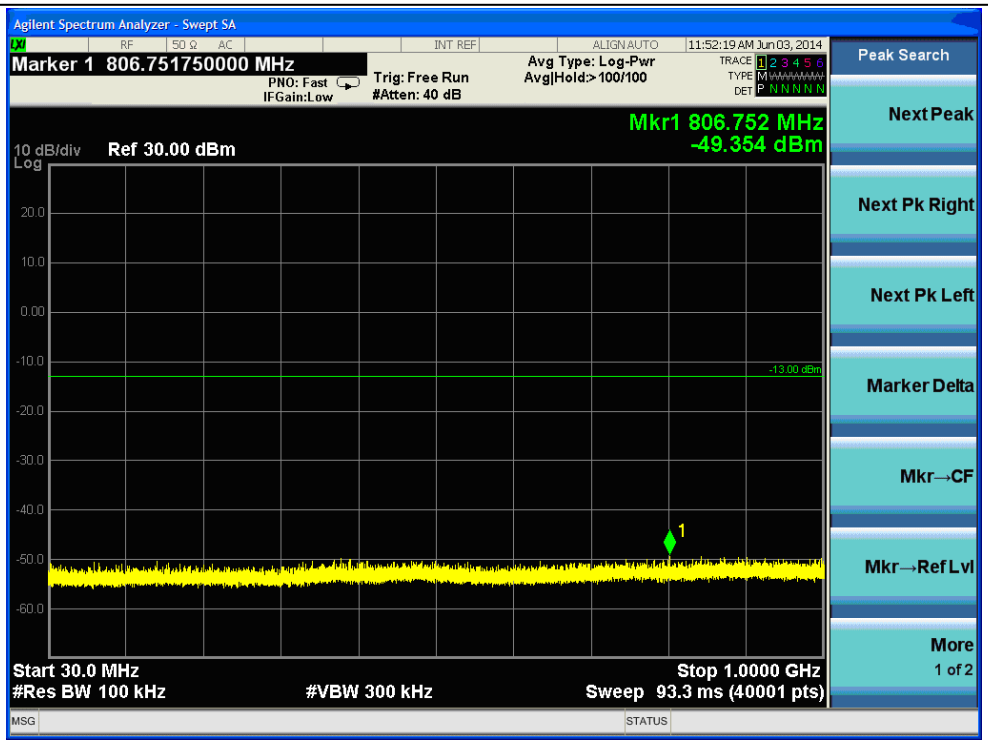

Agilent Spectrum Analyzer - Swept SA
RF 50 Ω AC
INT REF
ALIGN AUTO
11:36:23 AM Jun 03, 2014
Marker 1 837.088500000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 837.089 MHz
11.282 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-13.00 dBm
1
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 93.3 ms (40001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

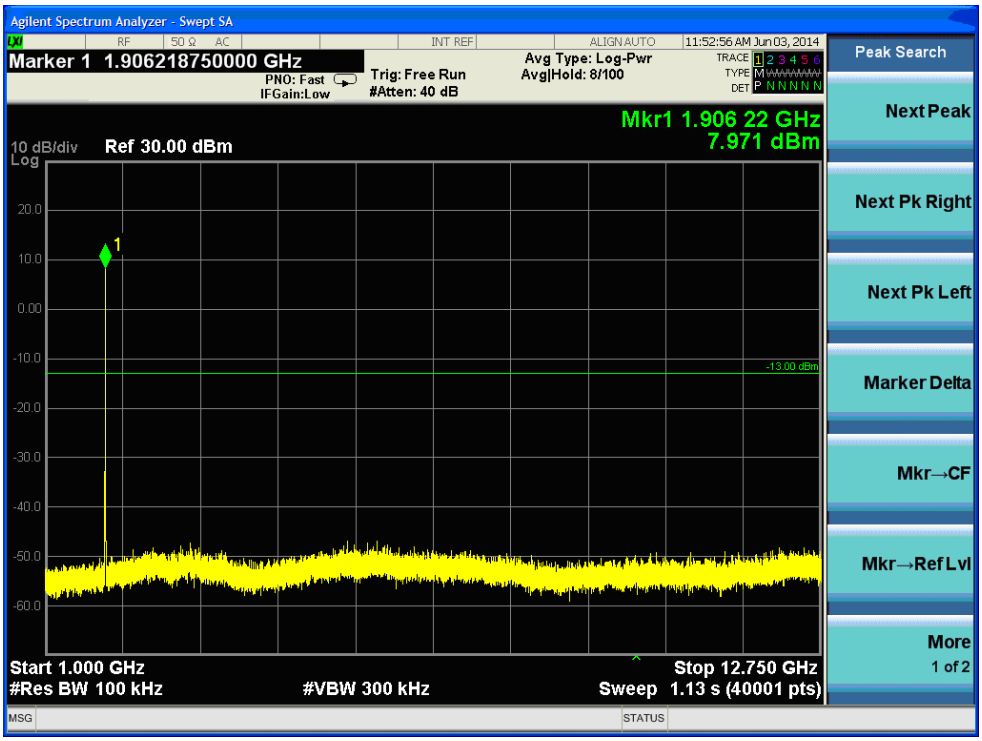

* RBW 100 kHz
VBW 300 kHz
Ref 30 dBm
* Att 40 dB
SWT 740 ms
1 PK
MAXH
A
EXT
3DB
D1 -13 dBm
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 12.75 GHz
725 MHz/
Stop 20 GHz

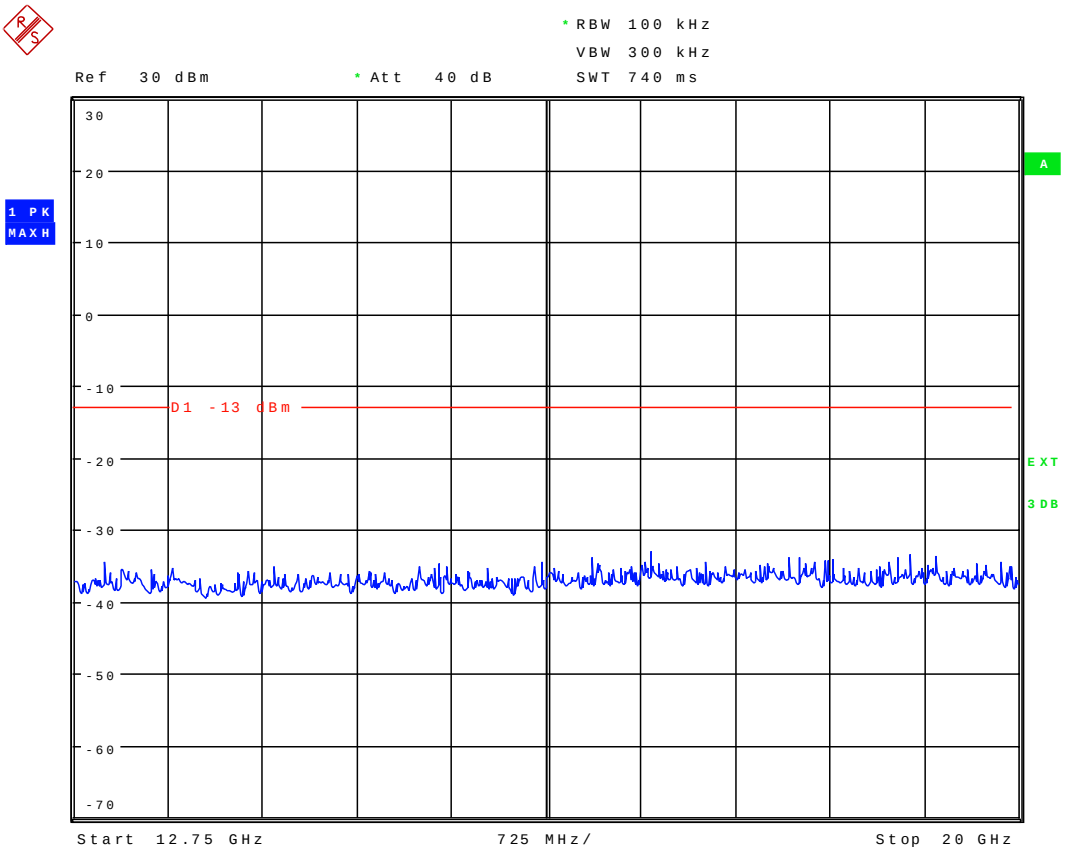
Out of band measurement
Test Band = WCDMA1900
Test Mode = TM3
Test Channel = HCH



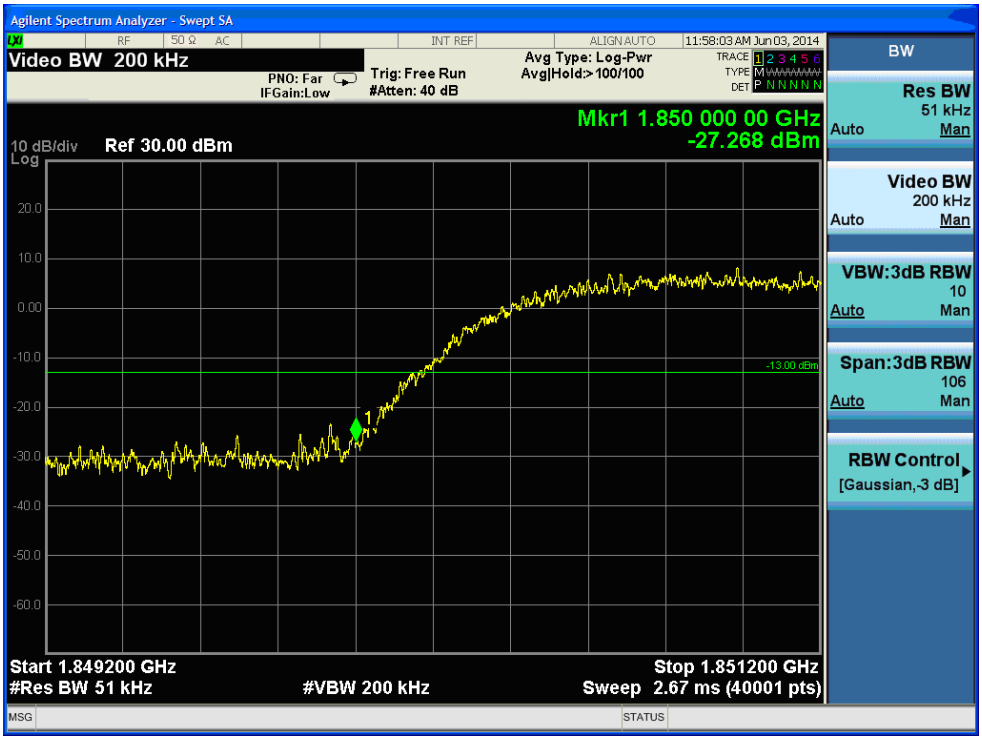


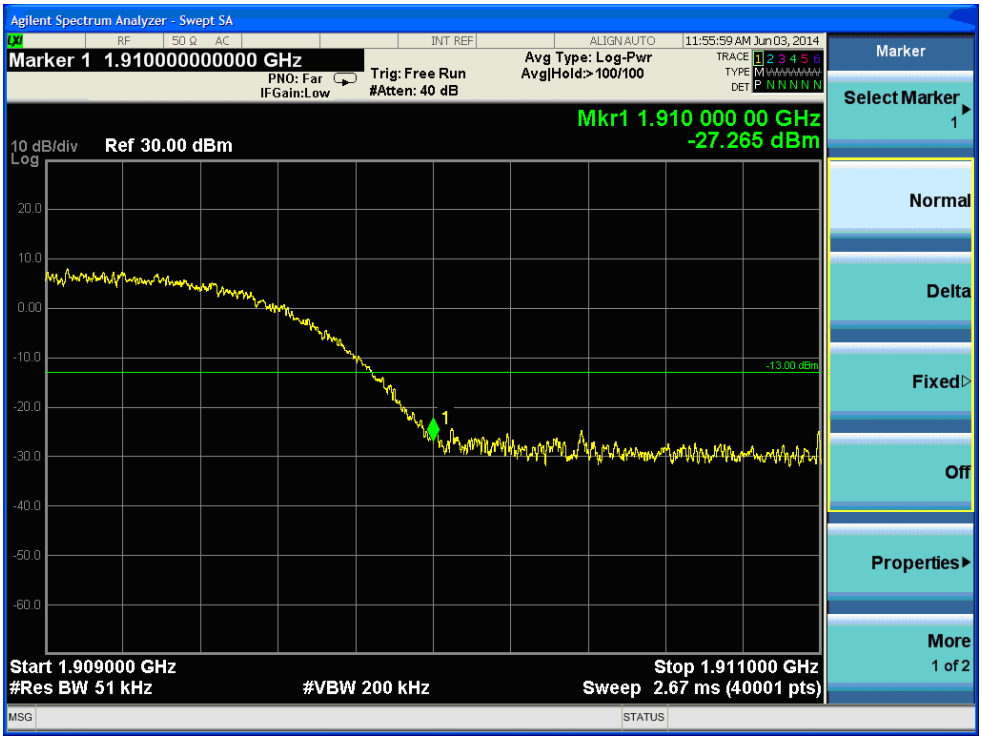

Agilent Spectrum Analyzer - Swept SA
RF
50 Ω
AC
INT REF
ALIGN AUTO
11:52:19 AM Jun 03, 2014
Marker 1 806.751750000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 806.752 MHz
-49.354 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-13.00 dBm
1
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 93.3 ms (40001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2


Agilent Spectrum Analyzer - Swept SA
RF
50 Ω
AC
INT REF
ALIGN AUTO
11:52:56 AM Jun 03, 2014
Marker 1 1.906218750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 8/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 1.906 22 GHz
7.971 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-13.00 dBm
1
Start 1.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 12.750 GHz
Sweep 1.13 s (40001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2


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

Band edge measurement
Test Band = WCDMA1900
Test Mode = TM3
Test Channel = LCH/HCH





5.5. Spurious Emissions Radiated

5.5.1. Test Standard

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

5.5.2. 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.

5.5.3.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:

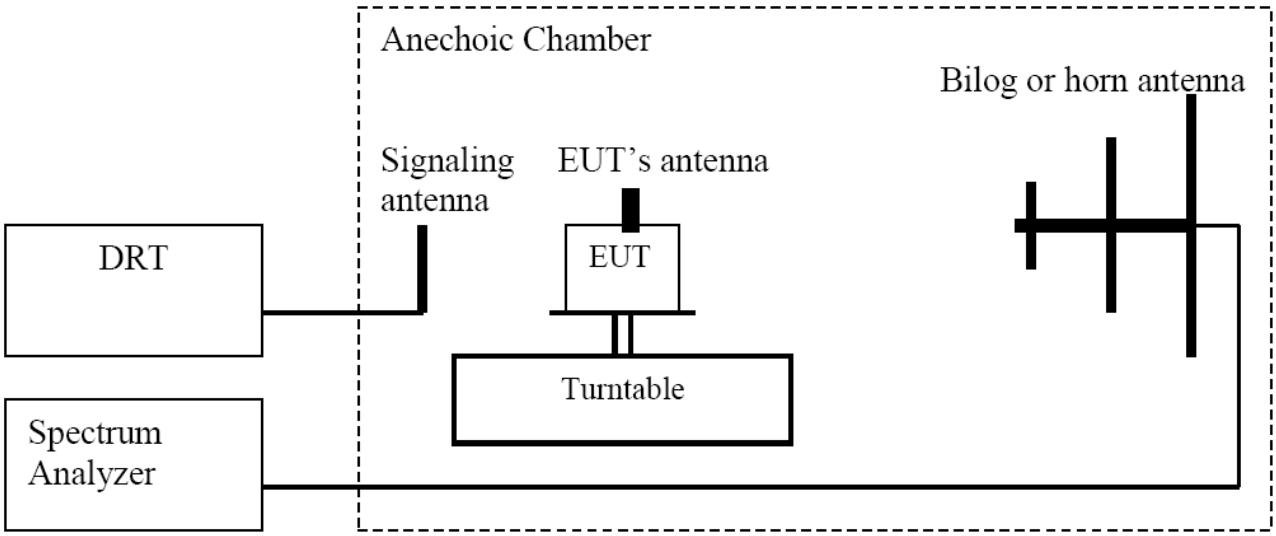
Spurious (dBm) = LVL (dBm) + LOSS (dB):

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

5.5.4.Test Setup



5.5.5.Test Data

Test Band = GSM/GPRS850
Test Mode = TM1
Test Channel = LCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBd]	dB	Level (ERP)	Vertical	[dBm]
					[dBm]		
1648.4	-6.05	0.9	6.77	40.6	-40.78		-13

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 = GSM/GPRS850
Test Mode = TM1
Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBd]	dB	Level (ERP)	Vertical	[dBm]
					[dBm]		
1673.2	-5.9	0.9	6.77	40.6	-40.63		-13

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 = GSM/GPRS850
Test Mode = TM1
Test Channel = HCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBd]	dB	Level (ERP)	Vertical	[dBm]
					[dBm]		
1697.6	-4.91	0.9	6.77	40.6	-39.64		-13

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 = EGPRS850
Test Mode = TM2
Test Channel = LCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBd]	dB	Level (ERP)	Vertical	[dBm]
					[dBm]		
1648.4	-7.19	0.9	6.77	40.6	-41.92		-13

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 = EGPRS850
Test Mode = TM2
Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBd]	dB	Level (ERP)	Vertical	[dBm]
					[dBm]		
1673.2	-7.01	0.9	6.77	40.6	-41.74		-13

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 = EGPRS850
Test Mode = TM2
Test Channel = HCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBd]	dB	Level (ERP)	Vertical	[dBm]
					[dBm]		
1697.6	-5.54	0.9	6.77	40.6	-40.27		-13

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 = TM3
Test Channel = LCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBd]	dB	Level (ERP)	Vertical	[dBm]
					[dBm]		
1652.8	-10.65	0.9	6.77	40.6	-45.38		-13

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 = TM3
Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBd]	dB	Level (ERP)	Vertical	[dBm]
					[dBm]		
1672.8	-10.04	0.9	6.77	40.6	-44.77		-13

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 = TM3
Test Channel = HCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBd]	dB	Level (ERP)	Vertical	[dBm]
					[dBm]		
1693.2	-9.59	0.9	6.77	40.6	-44.32		-13

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 = GSM/GPRS1900
Test Mode = TM1
Test Channel = LCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP)	Vertical	[dBm]
					[dBm]		
3700.4	-9.19	4.6	9.53	39	-43.26		-13

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 = GSM/GPRS1900
Test Mode = TM1
Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP)	Vertical	[dBm]
					[dBm]		
3760	-8.87	4.6	9.53	39	-42.94		-13

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 = GSM/GPRS1900
Test Mode = TM1
Test Channel = HCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP)	Vertical	[dBm]
					[dBm]		
3819.6	-8.31	4.6	9.53	39	-42.38		-13

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 = EGPRS1900
Test Mode = TM2
Test Channel = LCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP)	Vertical	[dBm]
					[dBm]		
3700.4	-10.01	4.6	9.53	39	-44.08		-13

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 = EGPRS1900
Test Mode = TM2
Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP)	Vertical	[dBm]
					[dBm]		
3760	-10.19	4.6	9.53	39	-44.26		-13

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 = EGPRS1900
Test Mode = TM2
Test Channel = HCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP)	Vertical	[dBm]
					[dBm]		
3819.6	-9.65	4.6	9.53	39	-43.72		-13

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 = WCDMA1900
Test Mode = TM3
Test Channel = LCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP)	Vertical	[dBm]
					[dBm]		
3704.8	-11.89	4.6	9.53	39	-45.96		-13

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 = WCDMA1900
Test Mode = TM3
Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP)	Vertical	[dBm]
					[dBm]		
3760	-11.94	4.6	9.53	39	-46.01		-13

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 = WCDMA1900
Test Mode = TM3
Test Channel = HCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP)	Vertical	[dBm]
					[dBm]		
3815.2	-11.65	4.6	9.53	39	-45.72		-13

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

5.6. Frequency Stability

5.6.1. Test Standard

CFR 47 (FCC) part 2.1055, 22.355 and 24.235

5.6.2. 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.

5.6.3. 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.

5.6.4. 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.

5.6.5.Test Data

Measurement Results vs. Variation of Temperature－GSM/GPRS850:TM1

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 ℃	836.6	10	Pass
-20 ℃	836.6	-22	Pass
-10 ℃	836.6	16	Pass
0 ℃	836.6	1	Pass
+10 ℃	836.6	24	Pass
+20 ℃	836.6	-5	Pass
+30 ℃	836.6	-12	Pass
+40 ℃	836.6	-15	Pass
+50 ℃	836.6	-17	Pass
+60 ℃	836.6	-22	Pass
+70 ℃	836.6	-14	Pass
+75 ℃	836.6	-26	Pass

Measurement Results vs. Variation of Temperature－GSM/GPRS850:TM1

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.135V	836.6	21	Pass
3.3 V	836.6	-19	Pass
4.4V	836.6	8	Pass

Measurement Results vs. Variation of Temperature—EGPRS850:TM2

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 ℃	836.6	6	Pass
-20 ℃	836.6	19	Pass
-10 ℃	836.6	11	Pass
0 ℃	836.6	22	Pass
+10 ℃	836.6	-8	Pass
+20 ℃	836.6	10	Pass
+30 ℃	836.6	-12	Pass
+40 ℃	836.6	-25	Pass
+50 ℃	836.6	-23	Pass
+60 ℃	836.6	12	Pass
+70 ℃	836.6	-3	Pass
+75 ℃	836.6	-17	Pass

Measurement Results vs. Variation of Voltage—EGPRS850:TM2

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.135V	836.6	21	Pass
3.3 V	836.6	-23	Pass
4.4V	836.6	16	Pass

Measurement Results vs. Variation of Temperature—GSM/GPRS1900:TM1

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 ℃	1880.0	4	Pass
-20 ℃	1880.0	18	Pass
-10 ℃	1880.0	-12	Pass
0 ℃	1880.0	15	Pass
+10 ℃	1880.0	-13	Pass
+20 ℃	1880.0	9	Pass
+30 ℃	1880.0	22	Pass
+40 ℃	1880.0	-15	Pass
+50 ℃	1880.0	-19	Pass
+60 ℃	1880.0	21	Pass
+70 ℃	1880.0	-8	Pass
+75 ℃	1880.0	-13	Pass

Measurement Results vs. Variation of Voltage—GSM/GPRS1900:TM1

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.135V	1880.0	25	Pass
3.3 V	1880.0	22	Pass
4.4V	1880.0	-6	Pass

Measurement Results vs. Variation of Temperature—EGPRS1900:TM2

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 ℃	1880.0	2	Pass
-20 ℃	1880.0	11	Pass
-10 ℃	1880.0	10	Pass
0 ℃	1880.0	20	Pass
+10 ℃	1880.0	-22	Pass
+20 ℃	1880.0	6	Pass
+30 ℃	1880.0	24	Pass
+40 ℃	1880.0	-25	Pass
+50 ℃	1880.0	-18	Pass
+60 ℃	1880.0	7	Pass
+70 ℃	1880.0	13	Pass
+75 ℃	1880.0	-14	Pass

Measurement Results vs. Variation of Voltage—EGPRS1900:TM2

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.135V	1880.0	25	Pass
3.3 V	1880.0	22	Pass
4.4V	1880.0	-6	Pass

Measurement Results vs. Variation of Temperature—WCDMA850:TM3

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 ℃	836.6	-3	Pass
-20 ℃	836.6	5	Pass
-10 ℃	836.6	0	Pass
0 ℃	836.6	-24	Pass
+10 ℃	836.6	3	Pass
+20 ℃	836.6	-15	Pass
+30 ℃	836.6	9	Pass
+40 ℃	836.6	15	Pass
+50 ℃	836.6	1	Pass
+60 ℃	836.6	-12	Pass
+70 ℃	836.6	9	Pass
+75 ℃	836.6	18	Pass

Measurement Results vs. Variation of Voltage—WCDMA850:TM3

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.135V	836.6	-6	Pass
3.3 V	836.6	-15	Pass
4.4V	836.6	11	Pass

Measurement Results vs. Variation of Temperature—WCDMA1900:TM3

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 ℃	1880.0	18	Pass
-20 ℃	1880.0	-12	Pass
-10 ℃	1880.0	-11	Pass
0 ℃	1880.0	20	Pass
+10 ℃	1880.0	6	Pass
+20 ℃	1880.0	0	Pass
+30 ℃	1880.0	24	Pass
+40 ℃	1880.0	-6	Pass
+50 ℃	1880.0	-12	Pass
+60 ℃	1880.0	-14	Pass
+70 ℃	1880.0	-16	Pass
+75 ℃	1880.0	-21	Pass

Measurement Results vs. Variation of Voltage—WCDMA1900:TM3

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.135V	1880.0	14	Pass
3.3 V	1880.0	-16	Pass
4.4V	1880.0	8	Pass