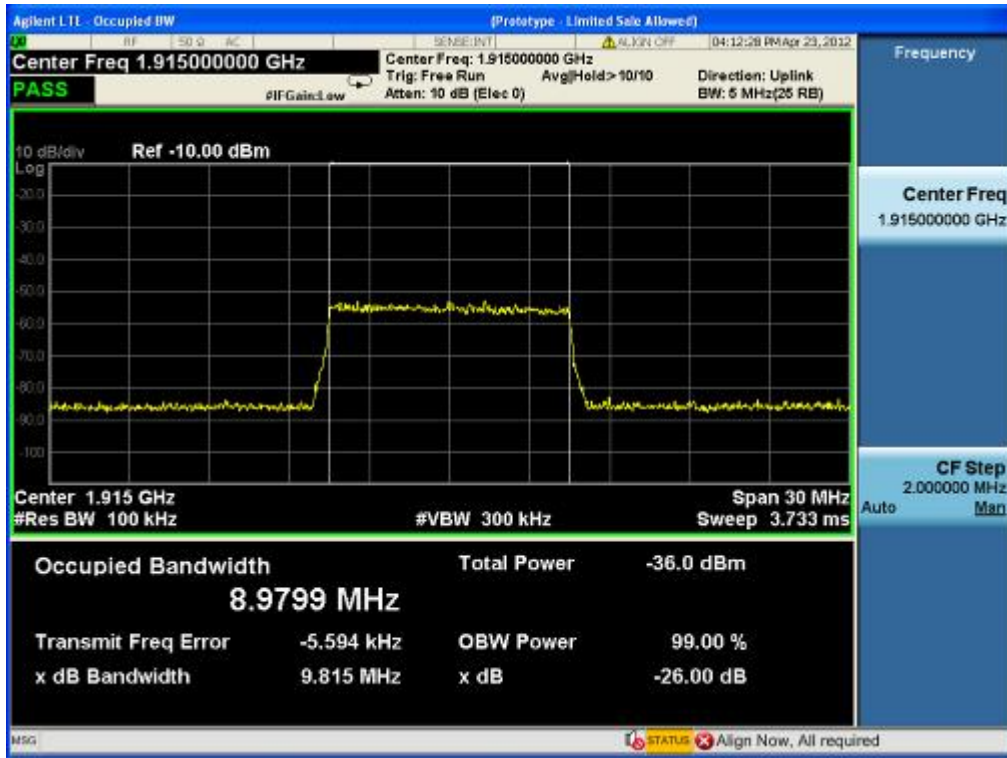
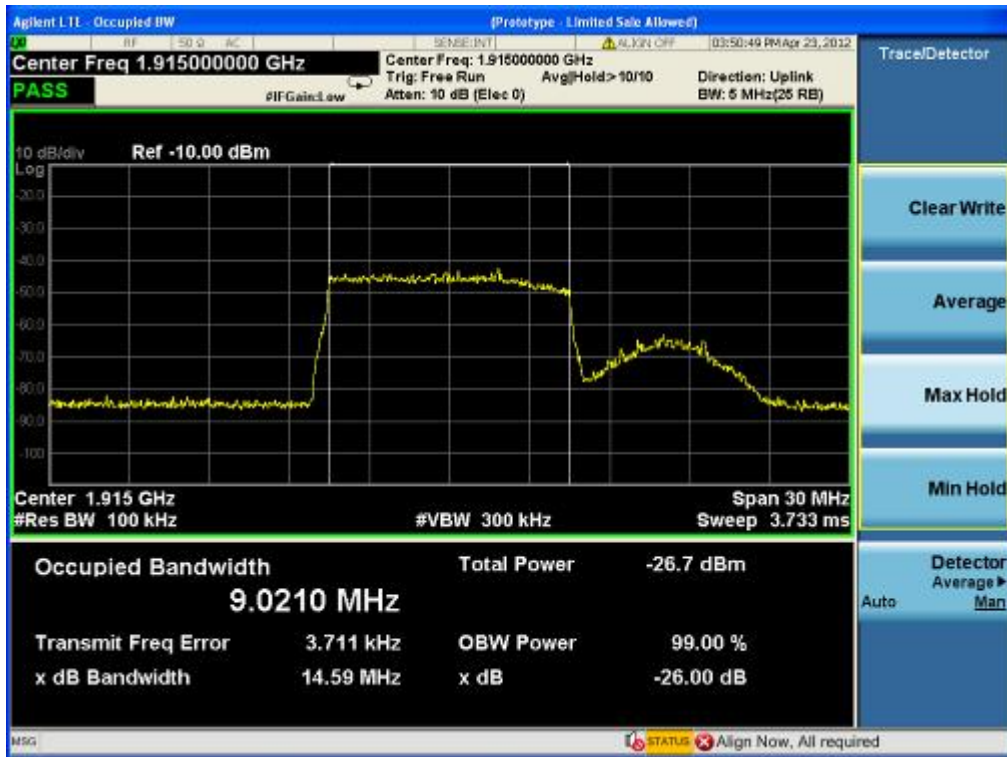


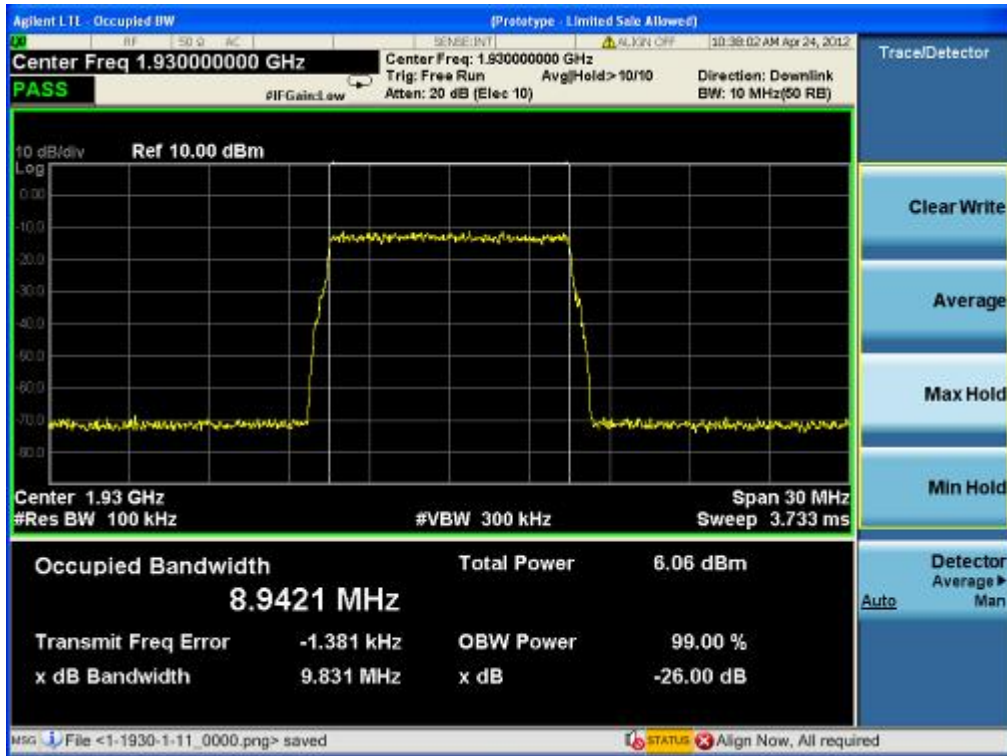
1900MHz-LTE-16QAM uplink (highest frequency) -Input



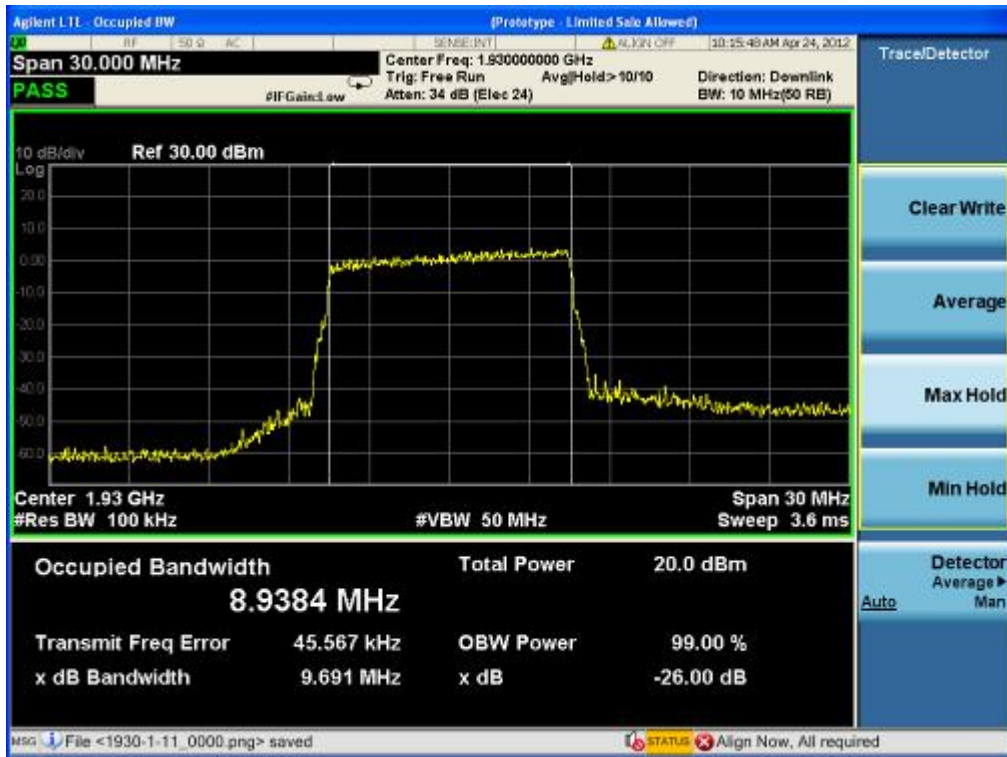
1900MHz-LTE -16QAM uplink (highest frequency)- Output



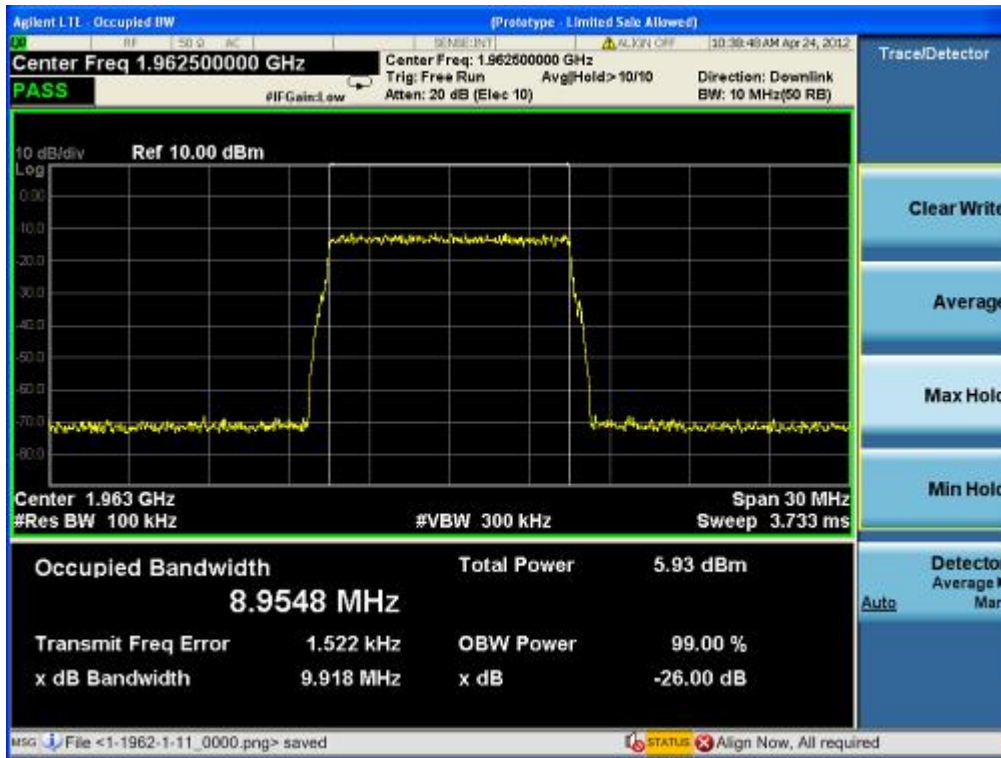
1900MHz-LTE-64QAM downlink (lowest frequency)-Input



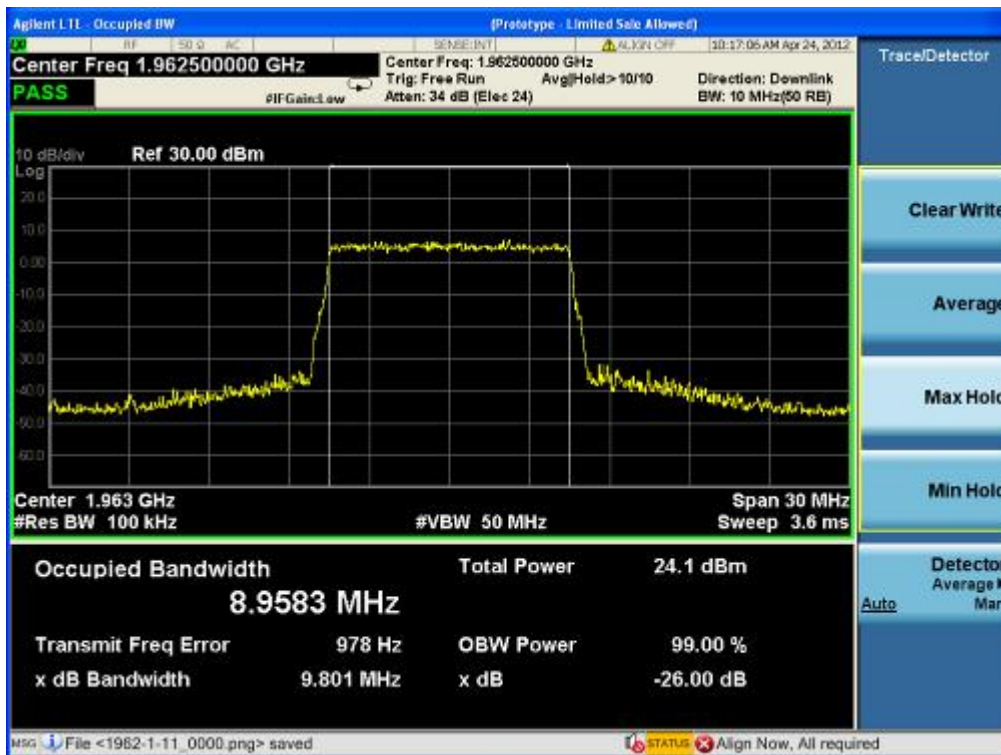
1900MHz-LTE -64QAM downlink (lowest frequency)-Output



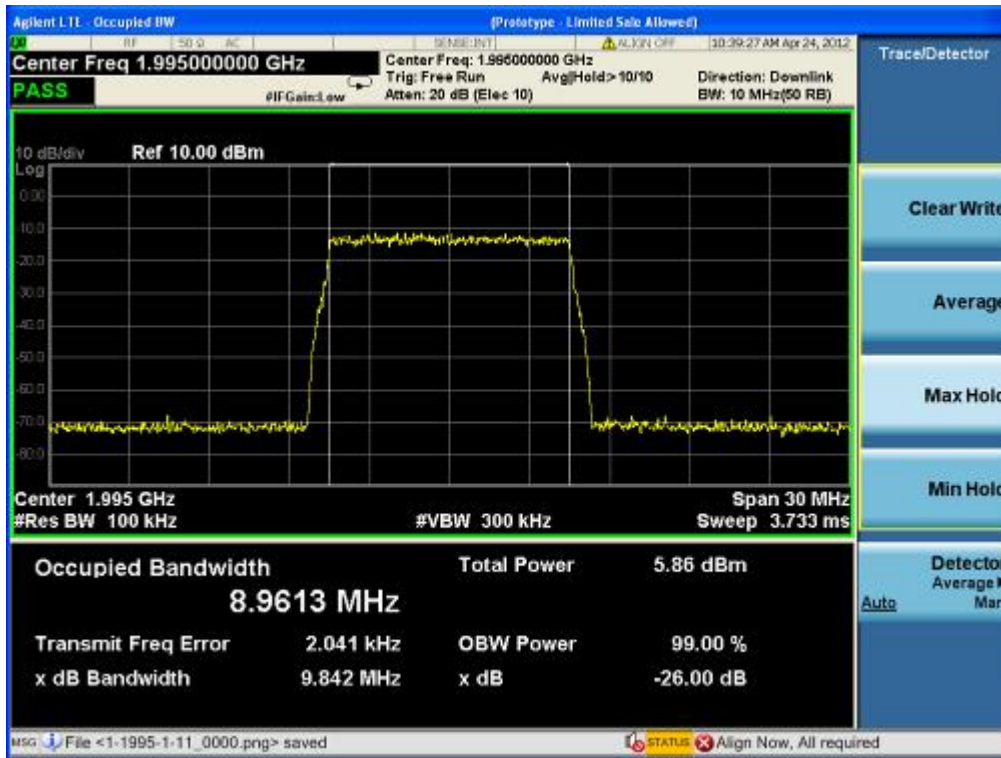
1900MHz-LTE-64QAM downlink (middle frequency)-Input



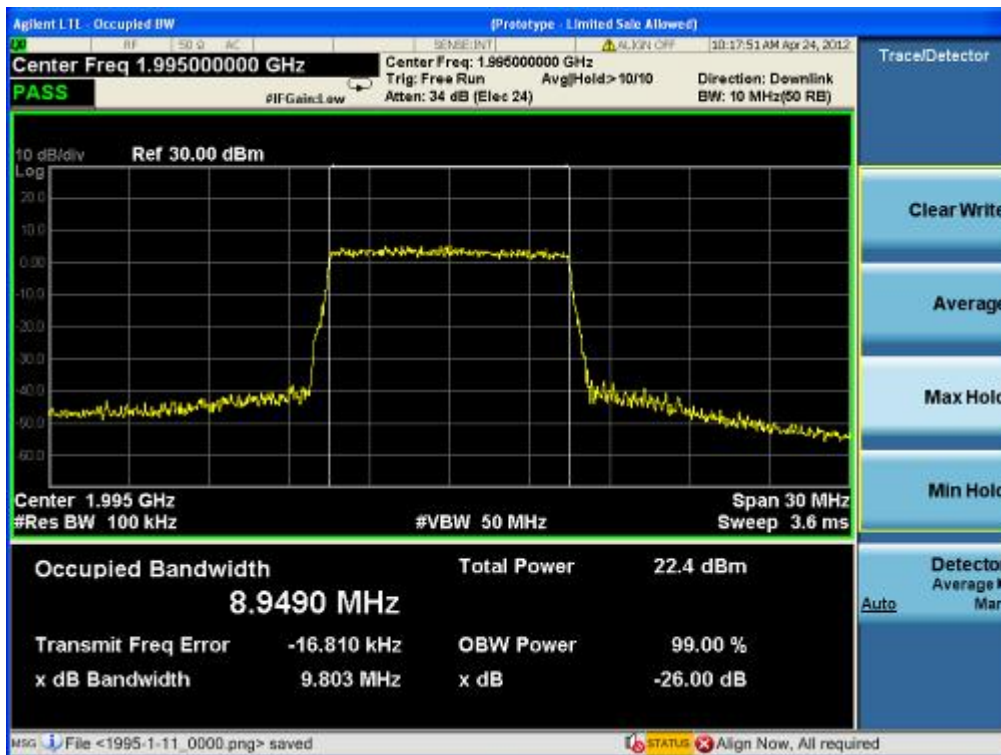
1900MHz-LTE-64QAM downlink (middle frequency)- Output



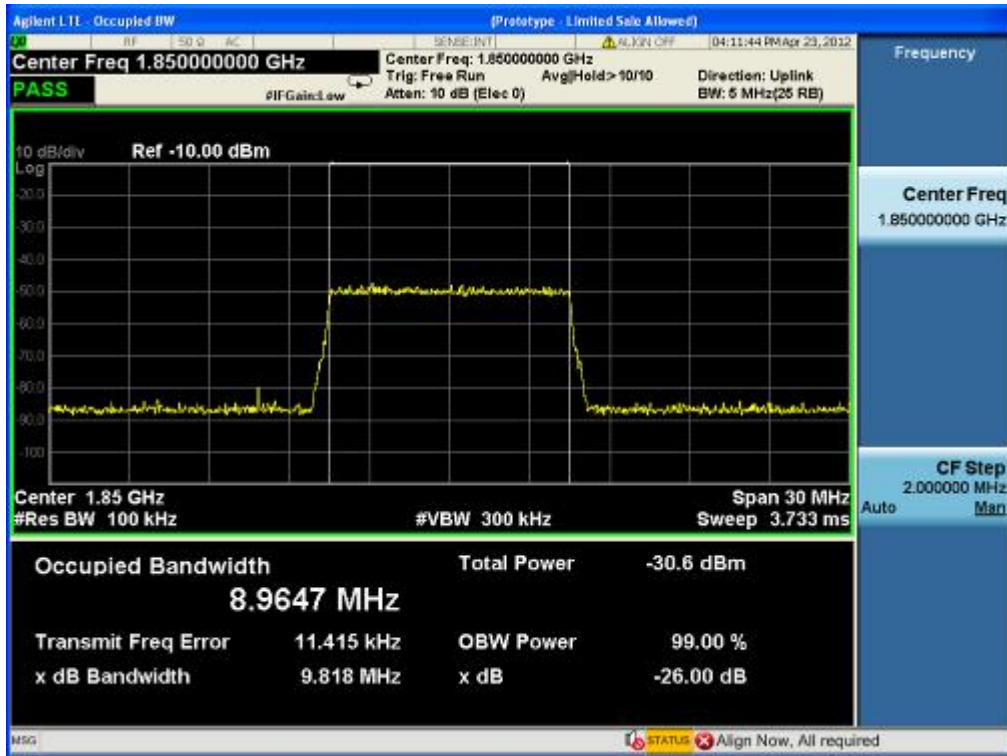
1900MHz-LTE-64QAM downlink (highest frequency )-Input



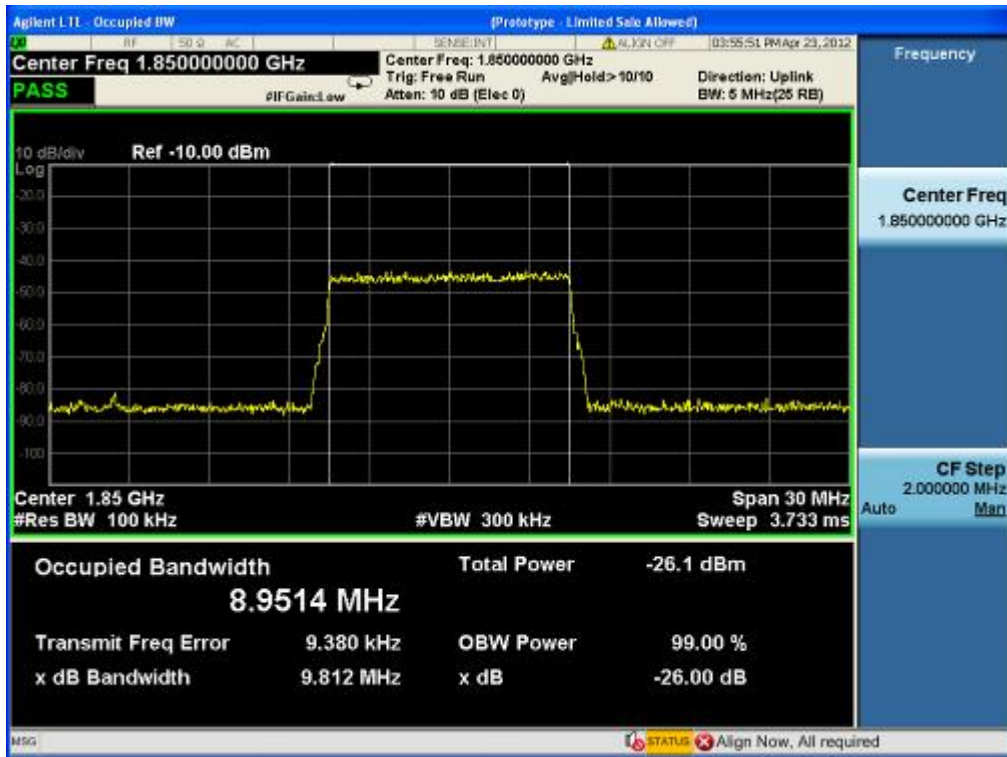
1900MHz-LTE-64QAM downlink (highest frequency)- Output



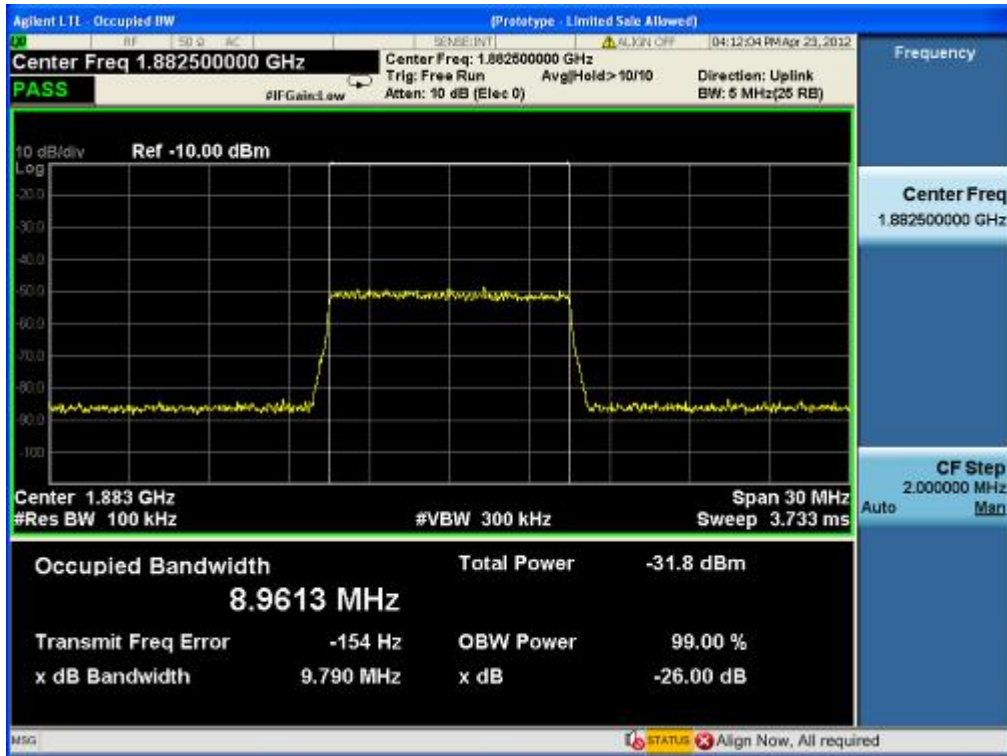
1900MHz-LTE-64QAM uplink (lowest frequency)-Input



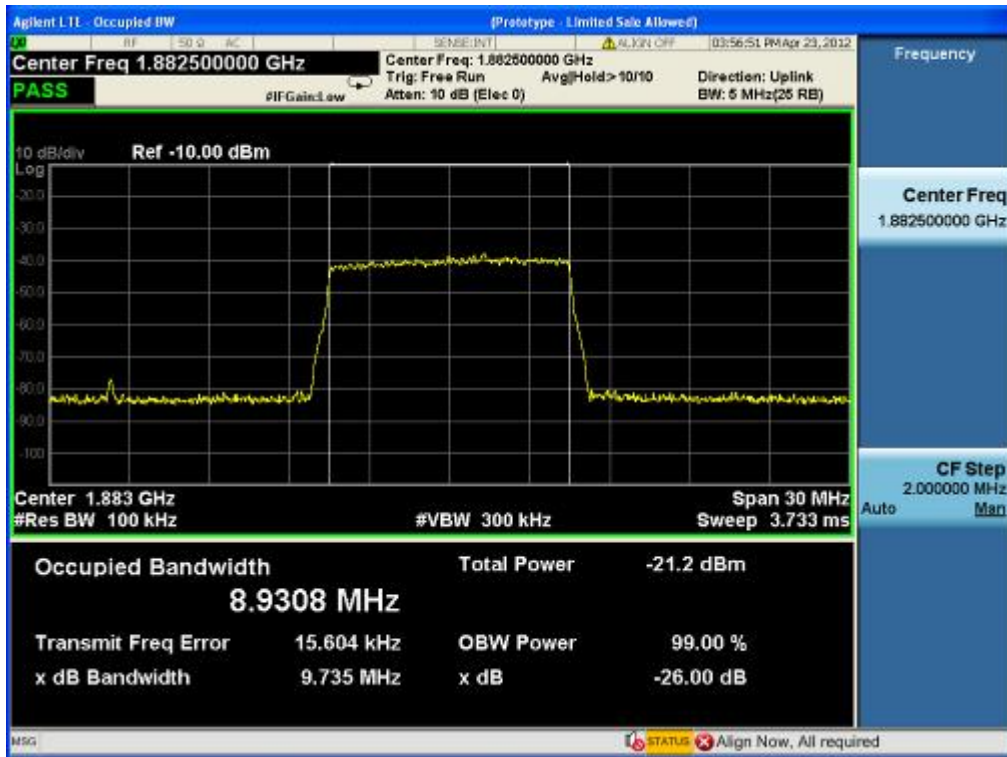
1900MHz-LTE-64QAM uplink (lowest frequency)- Output



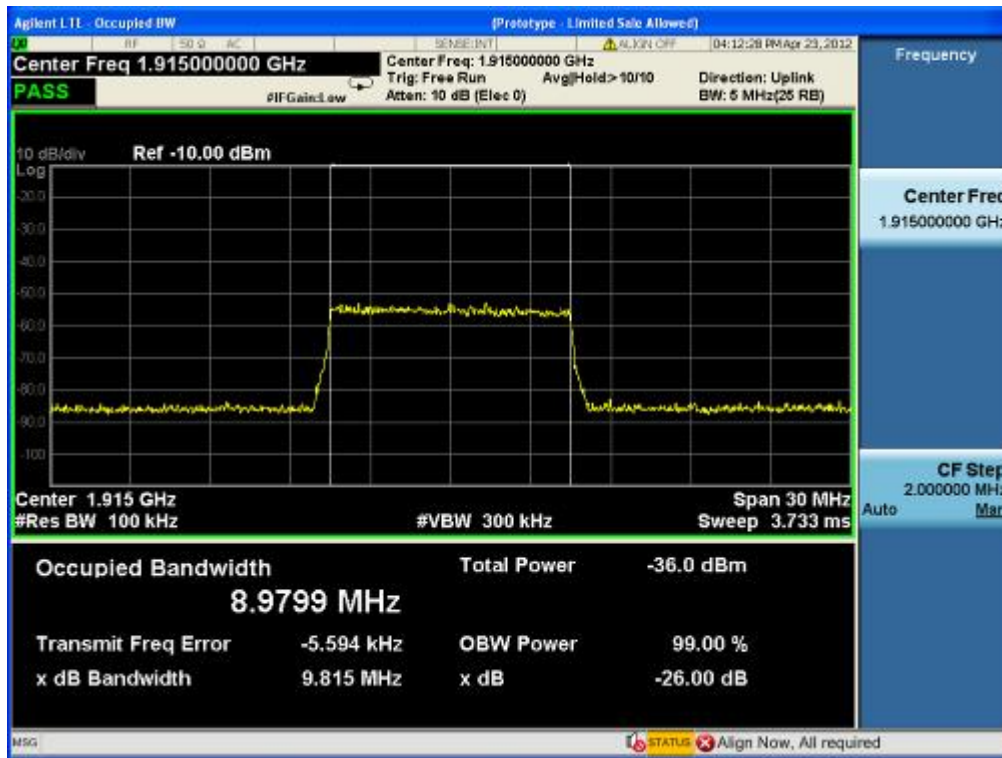
1900MHz-LTE -64QAM uplink (middle frequency)-Input



1900MHz-LTE-64QAM uplink (middle frequency)-Output



1900MHz-LTE-64QAM uplink (highest frequency) -Input



1900MHz-LTE -64QAM uplink (highest frequency)- Output



### 4.2.6 INTERMODULATION

Test Date: 16 April, 2012  
 Test Method: 2-11-04/EAB/RF

Test Requirement: FCC part 22.917(a)& FCC part 24.238(a)&FCC 27.53  
 22.917(a): 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.  
 24.238(a) 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.

EUT Operation: Status  
 The output power of EUT be set to maximum value,the gain of EUT be set to maximum value by software through the manufacture

Conditions Normal

Application 700MHz DL and UL ports,850MHz DL and UL ports, 1900MHz DL and UL ports

Test configuration

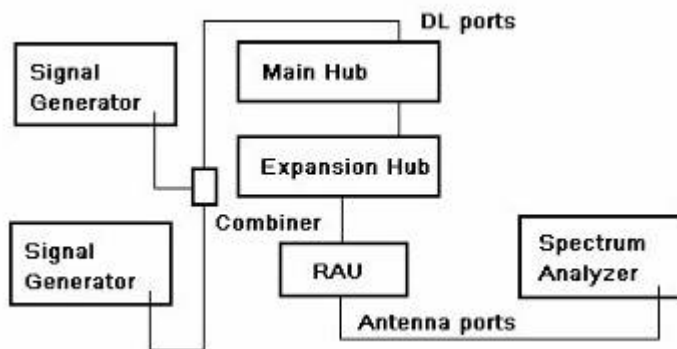


Fig.1 Down Link Intermodulation



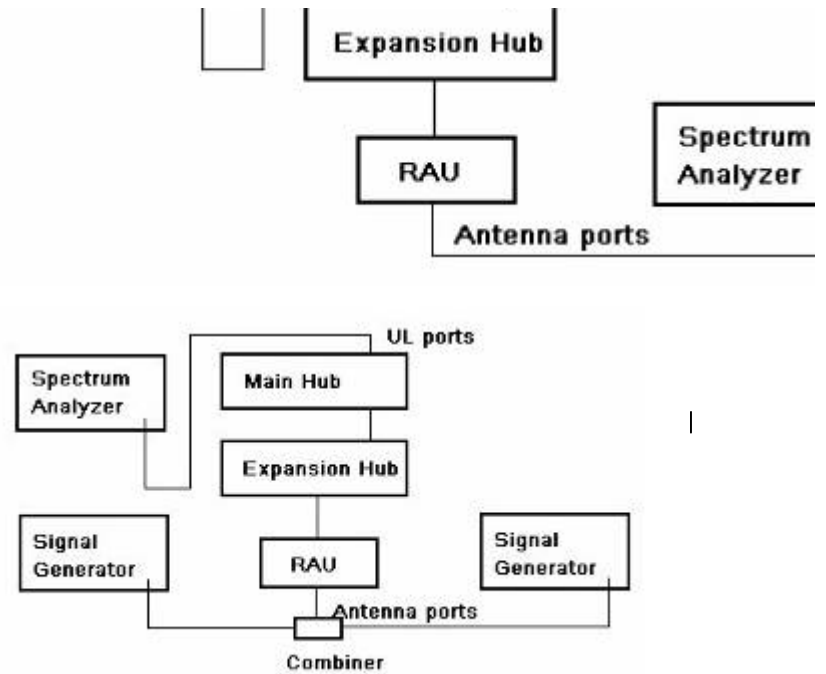


Fig.2 Up Link Intermodulation

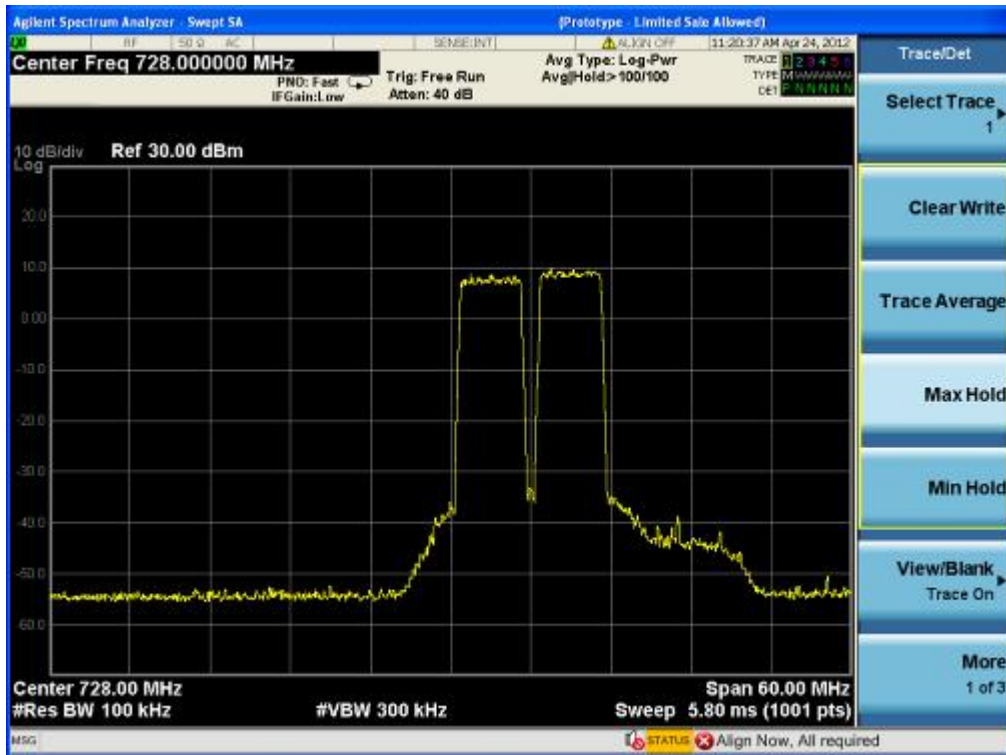
Test Procedure:

1. Connect the equipment as illustrated,
  2. Test the background noise level with all the test facilities
  3. Keep one transmitting path, all other connectors shall be connected by normal power or RF leads
  4. Select the attenuator to avoid the test receiver or spectrum analyzer being destroyed
  5. Keep the EUT continuously transmitting in max power
  6. Keep two signal generator produce two signal are same in modulation type and level
  7. Measurement the 3 order intermodulated produced by the EUT (the sum of the two unwanted signal should be rated power)
  8. Correct for all losses in the RF path
  9. Read the conducted spurious emission of the EUT antenna port.
- CW signal rather than typical signal is acceptable(for FM)  
At maximum drive level, for each modulation:one test with three tones, or two tests(high, low-band edge)with two tones  
Limit usually is -13dBm conducted  
Not need for signal channel systems  
Combination of modulation types not needed

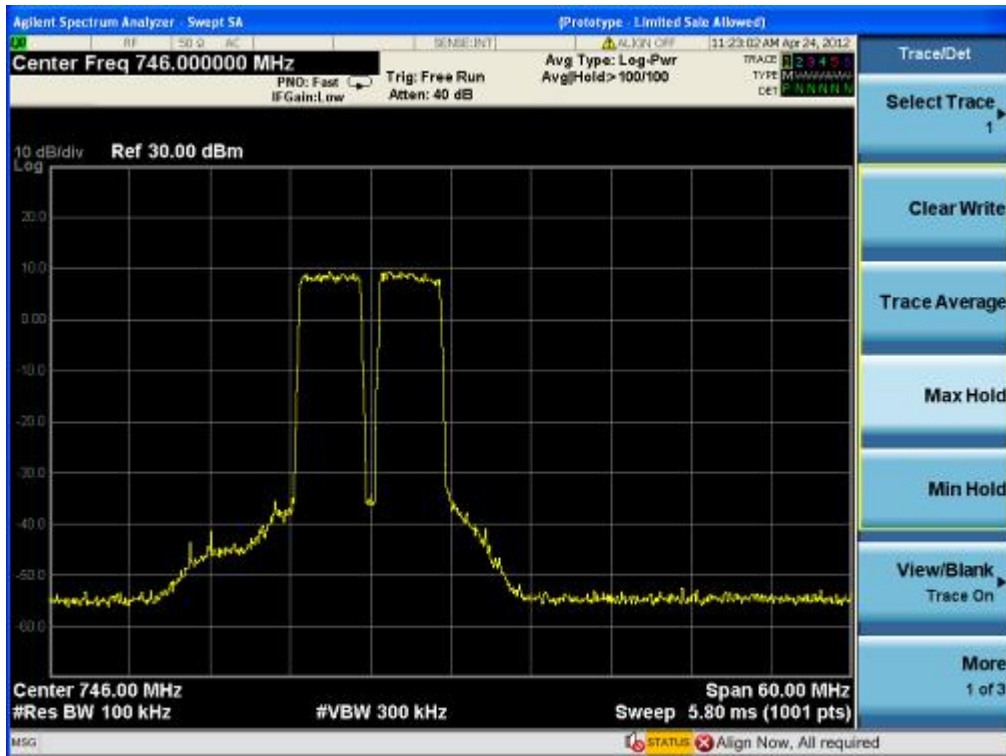
### 4.2.6.1 MEASUREMENT RECORD

#### 700MHz

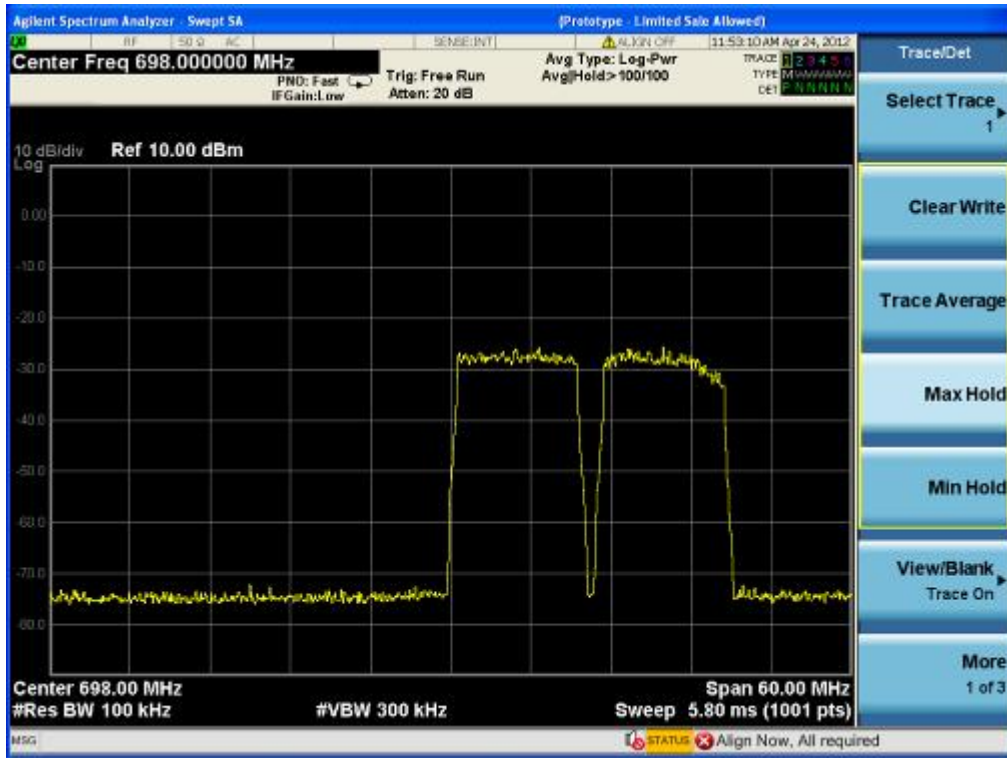
#### 700MHz-LTE-QPSK down link-Lower Edge



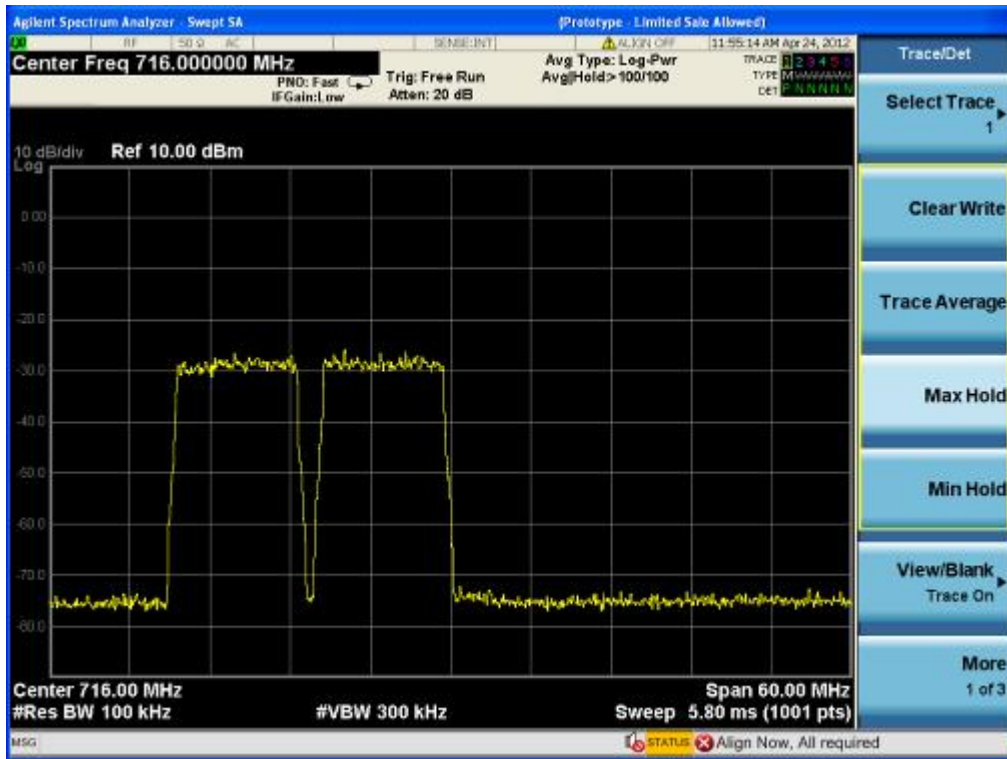
#### 700MHz-LTE-QPSK down link-Upper Edge



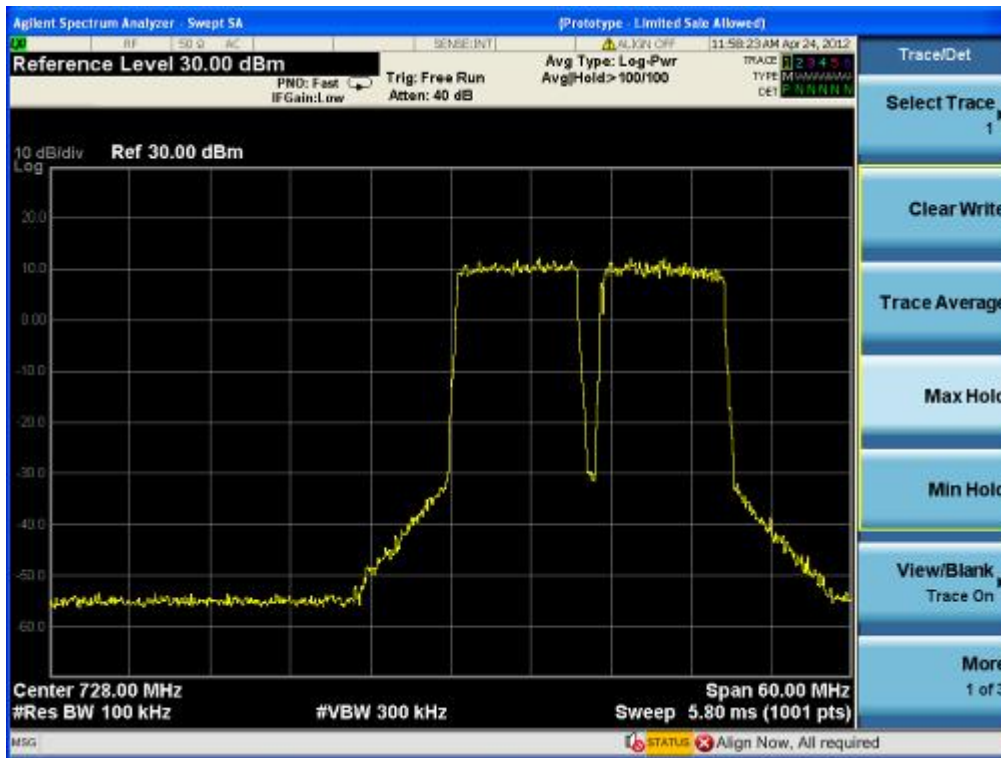
700MHz-LTE-QPSK up link-Lower Edge



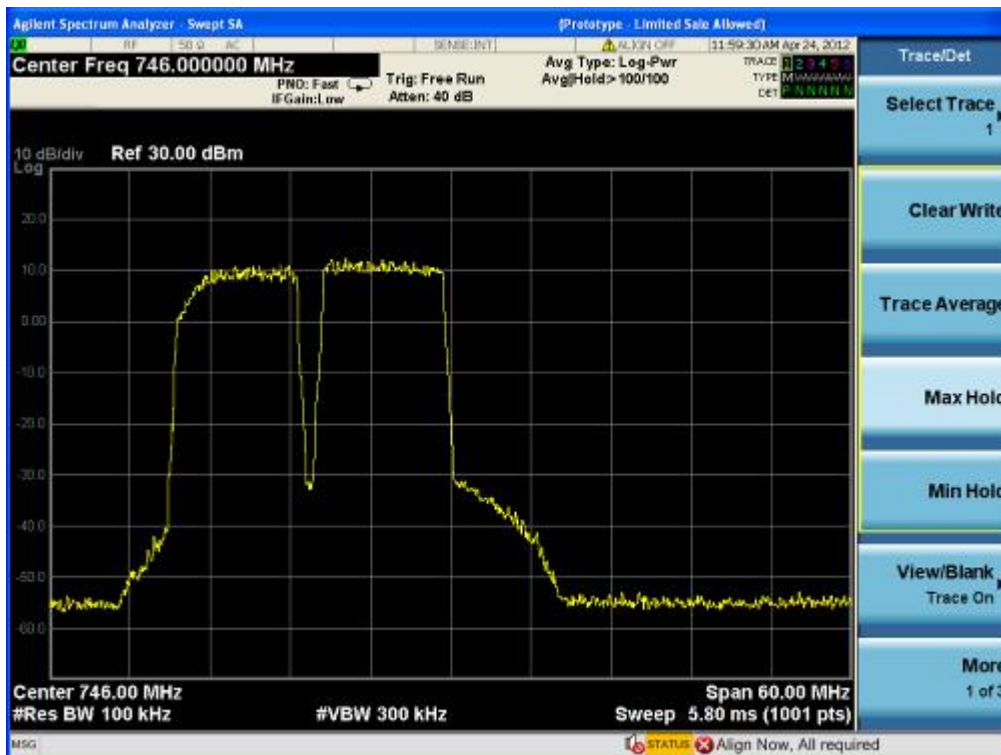
700MHz-LTE-QPSK up link-Upper Edge



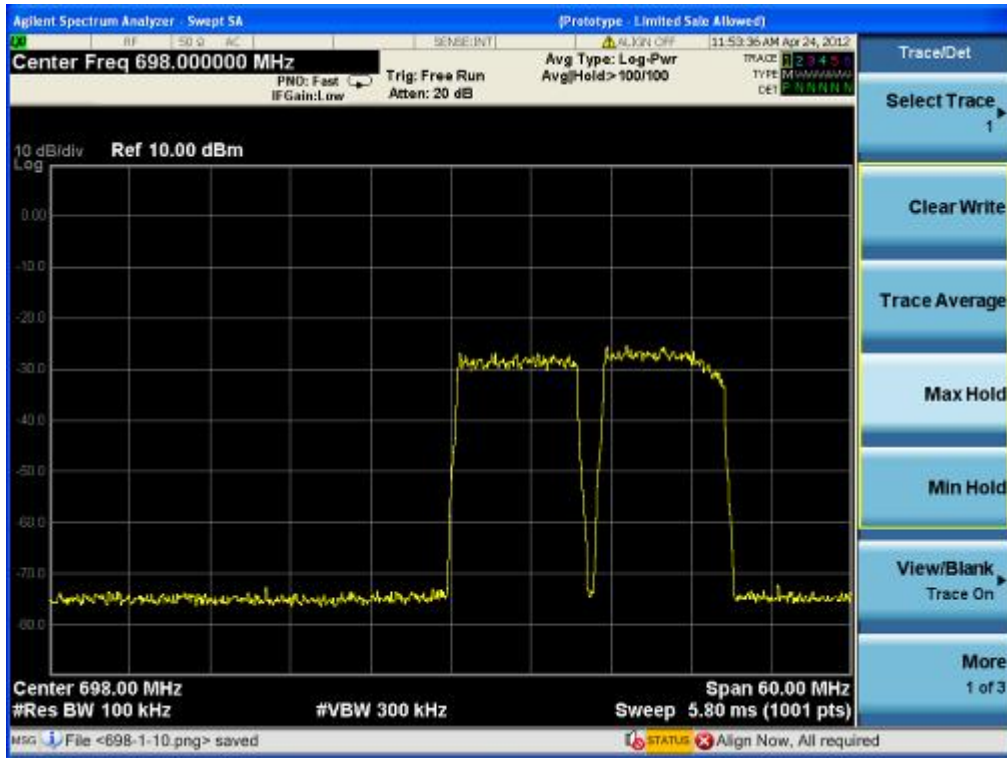
700MHz-LTE-16QAM down link-Lower Edge



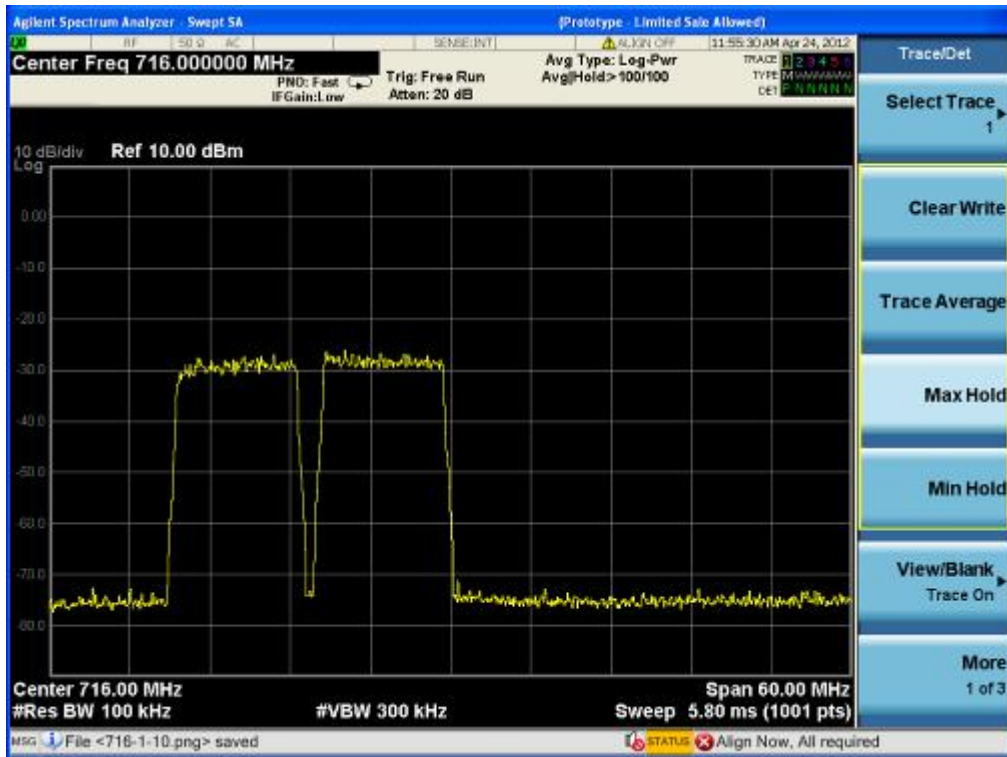
700MHz-LTE-16QAM down link-Upper Edge



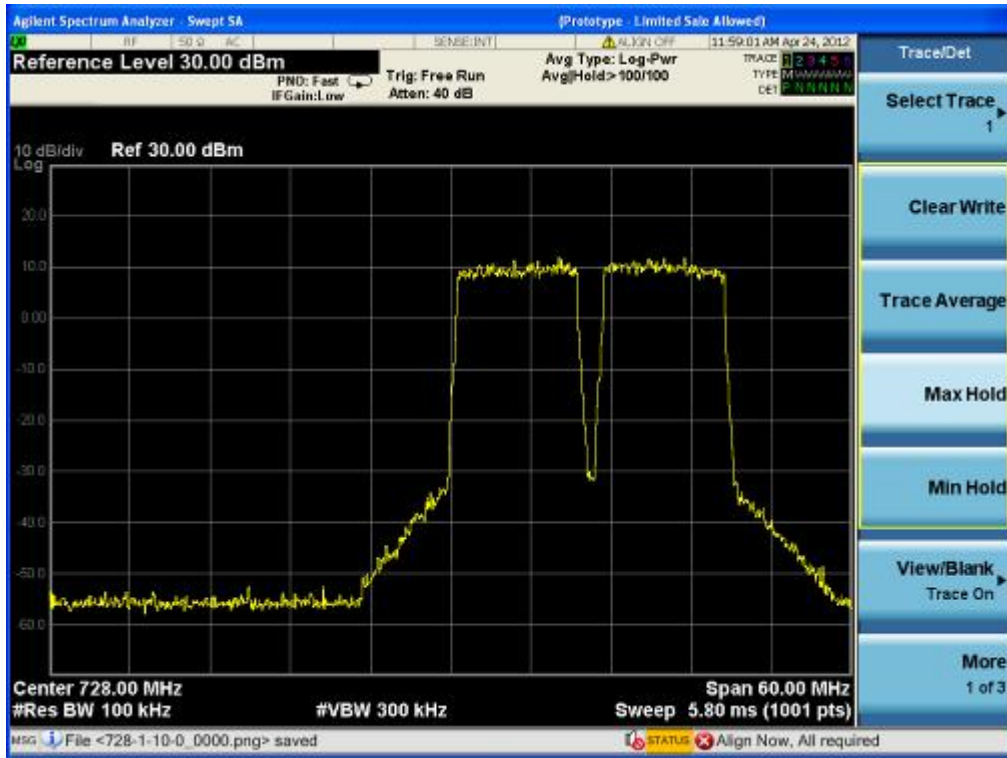
700MHz-LTE-16QAM up link-Lower Edge



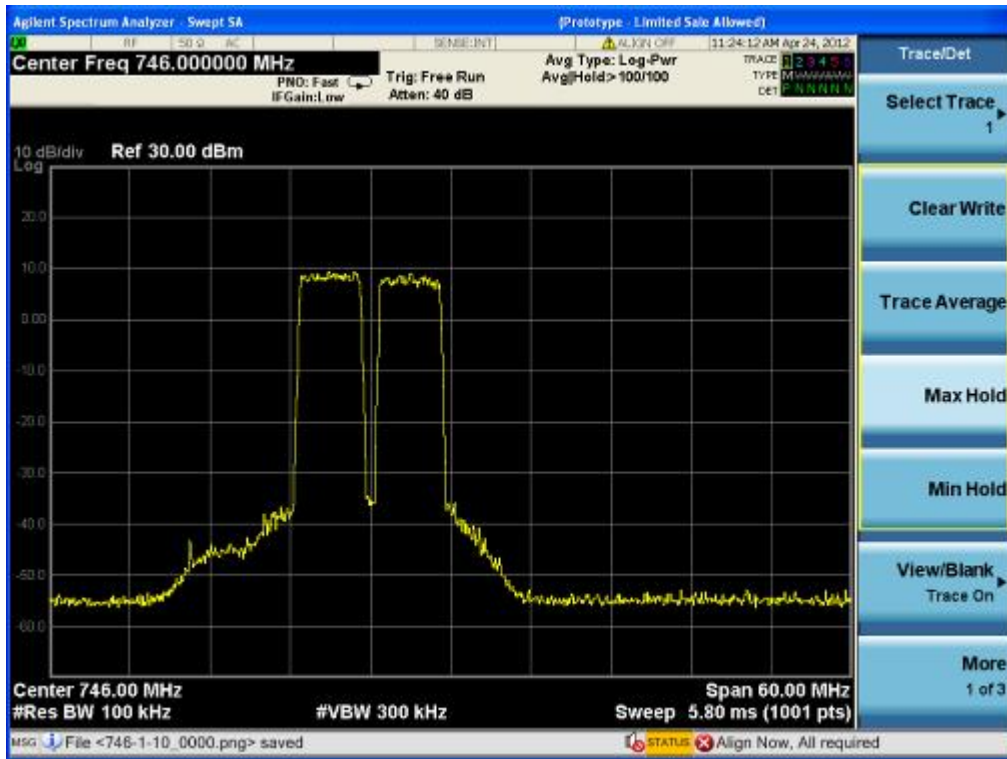
700MHz-LTE-16QAM up link-Upper Edge



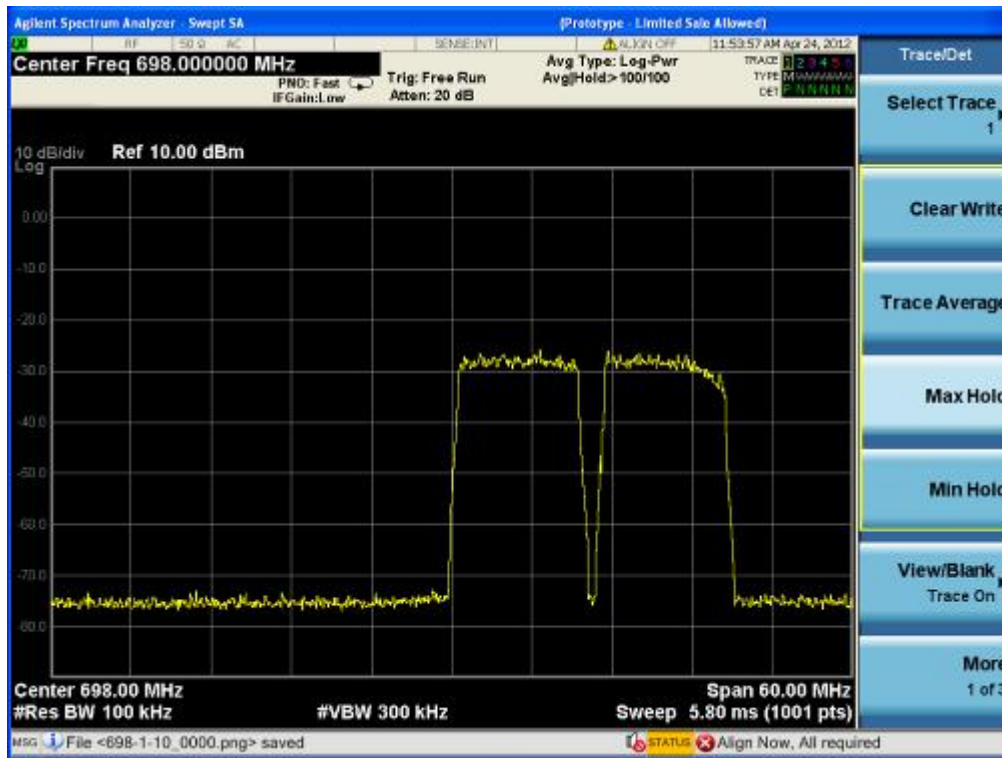
700MHz-LTE-64QAM down link-Lower Edge



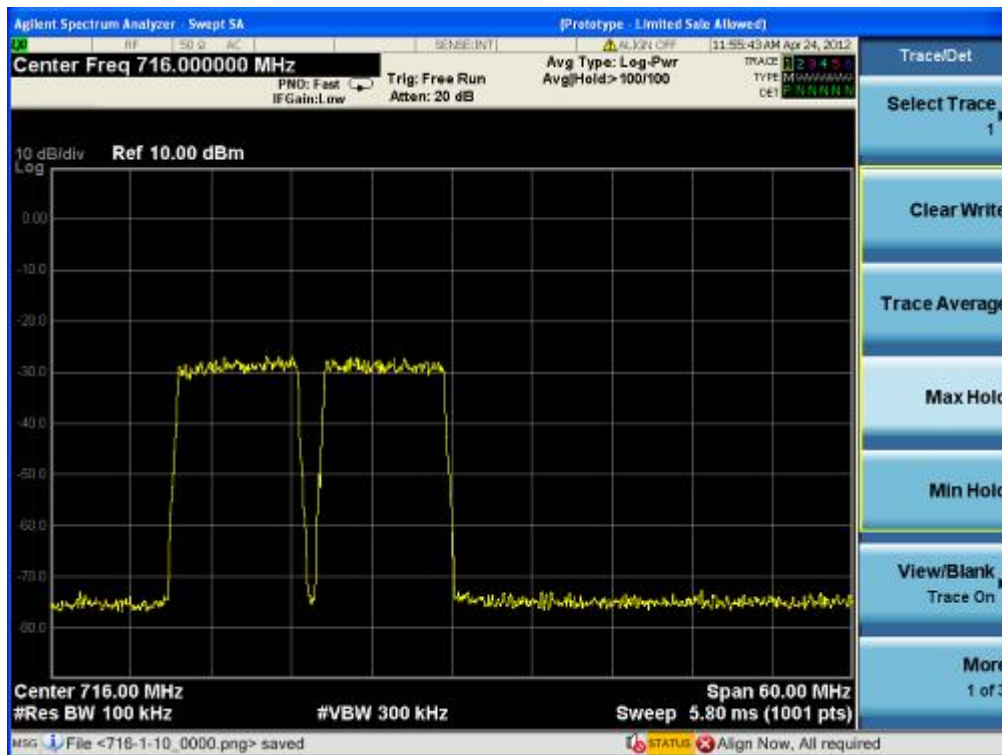
700MHz-LTE-64QAM down link-Upper Edge



700MHz-LTE-64QAM up link-Lower Edge

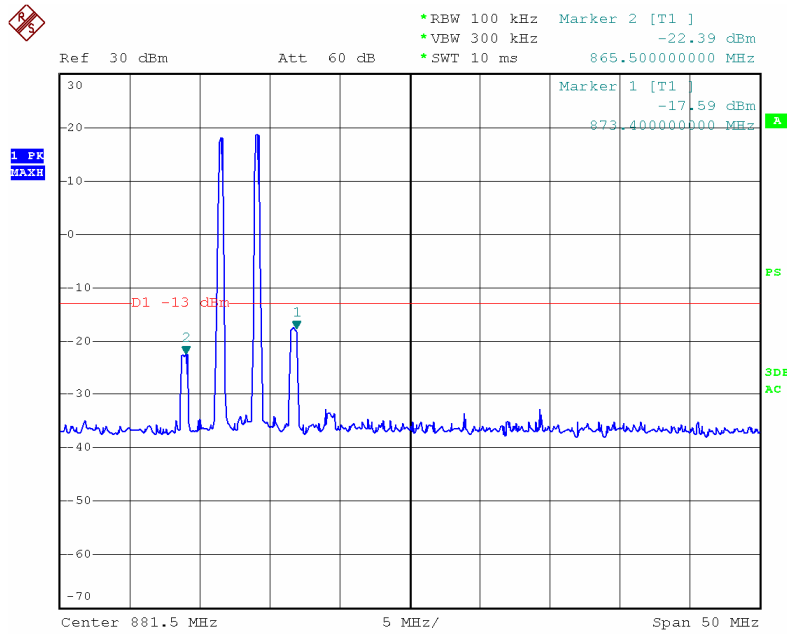


700MHz-LTE-64QAM up link-Upper Edge

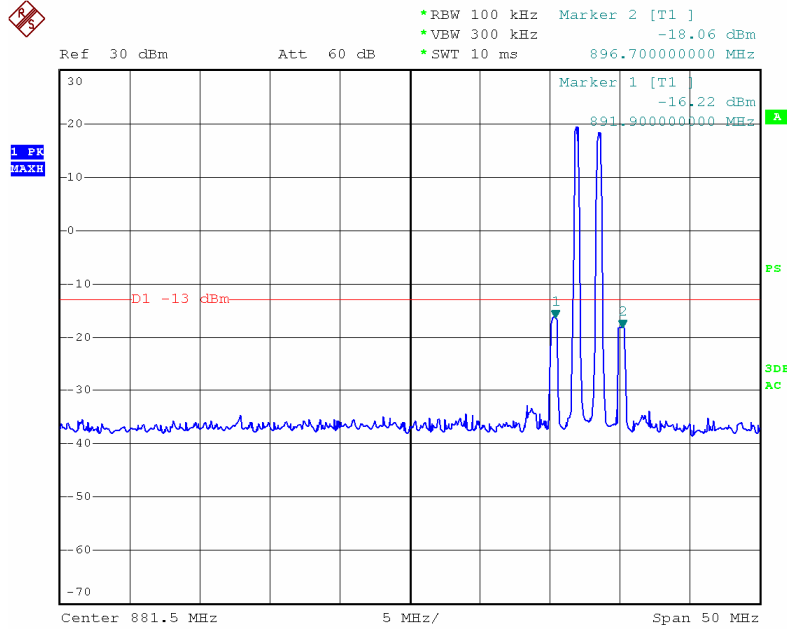


### 850MHz

#### 850MHz-GSM down link-Lower Edge

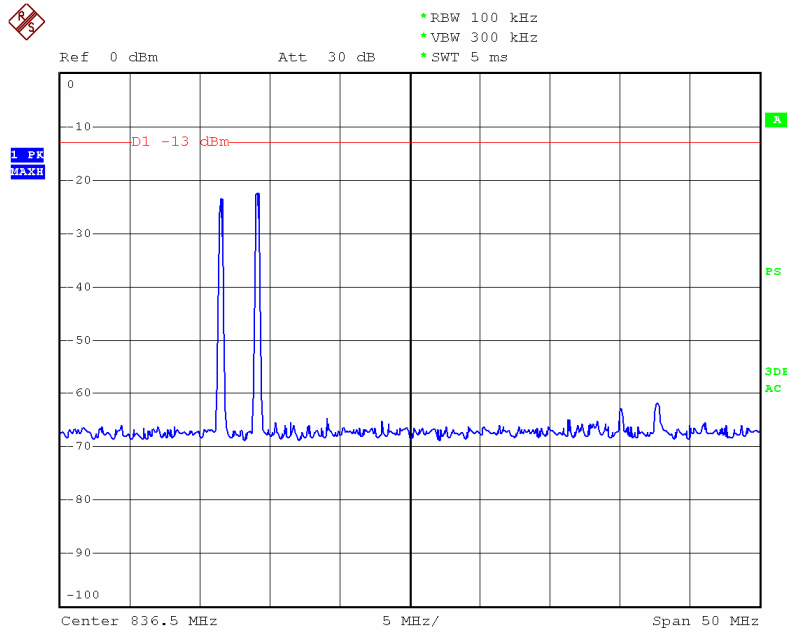


#### 850MHz-GSM down link-Upper Edge

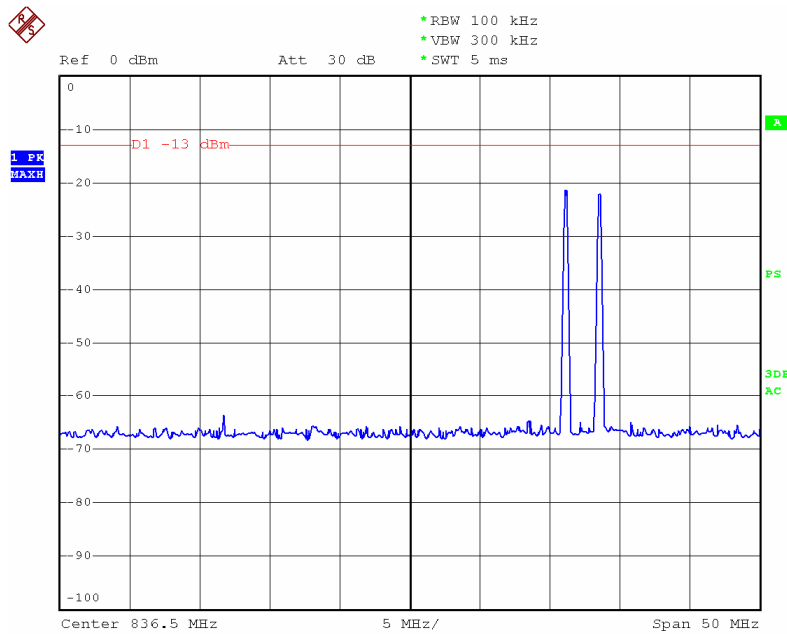




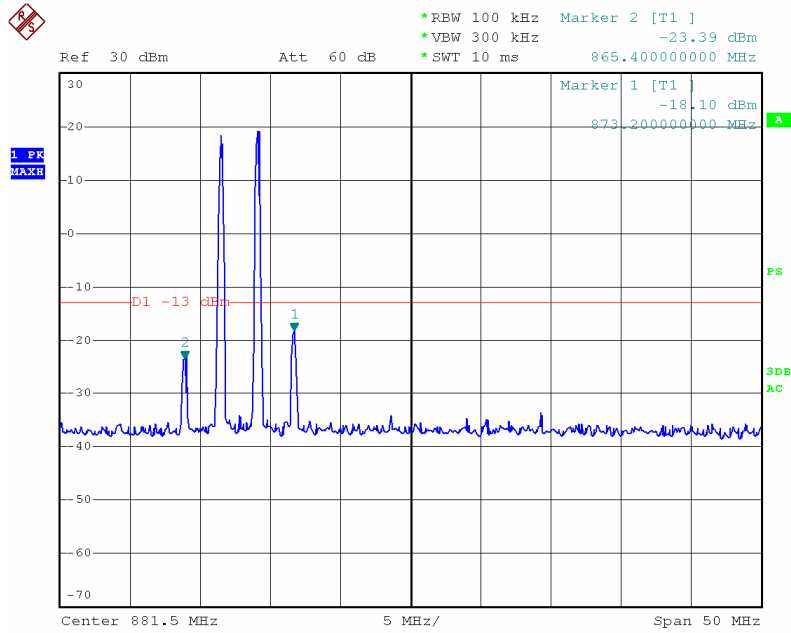
### 850MHz-GSM up link-Lower Edge



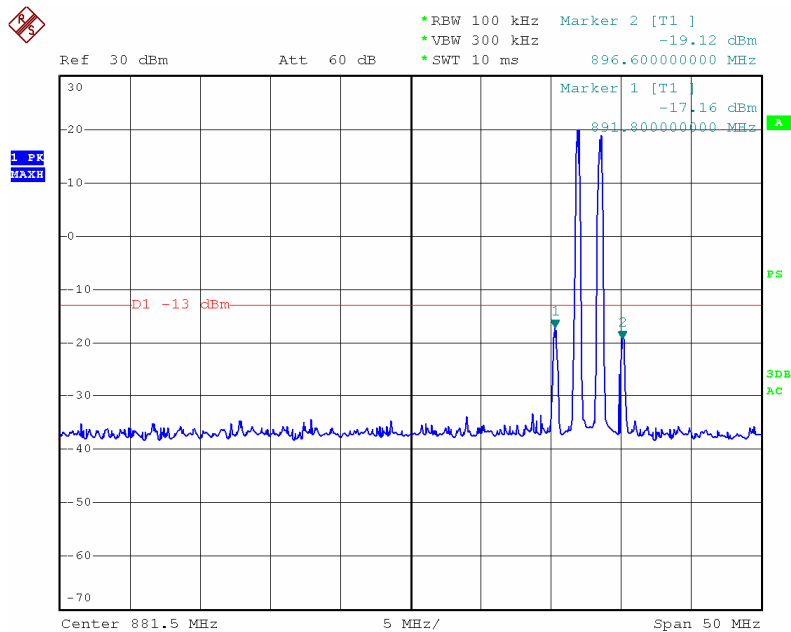
### 850MHz-GSM up link-Upper Edge



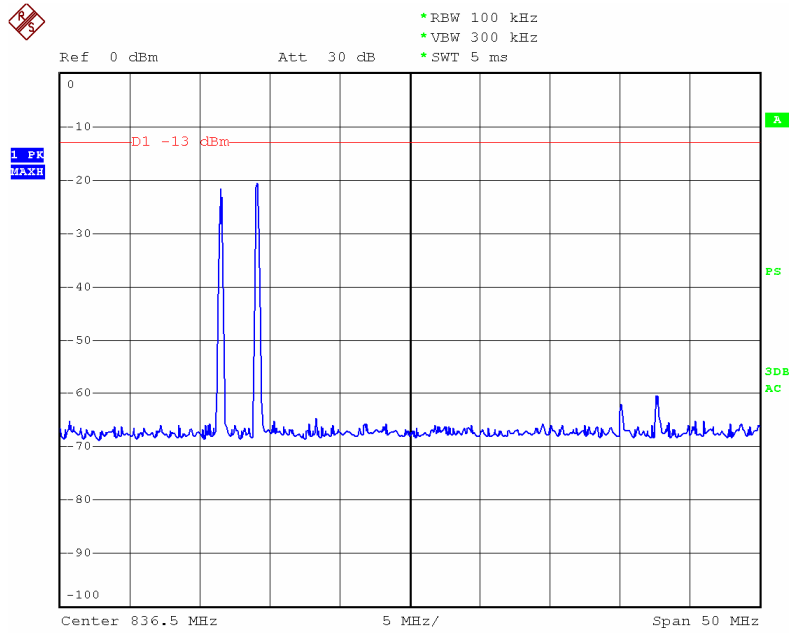
### 850MHz-EDGE down link-Lower Edge



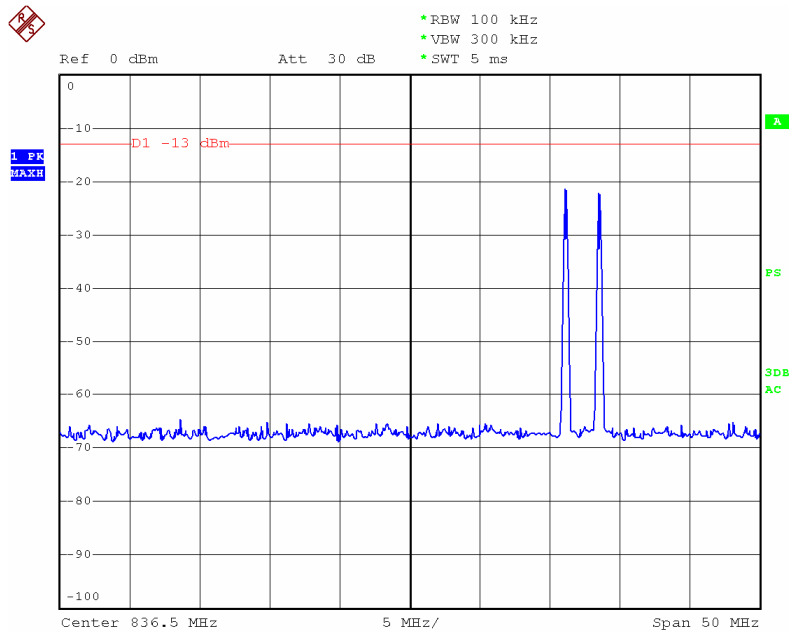
### 850MHz-EDGE down link-Upper Edge



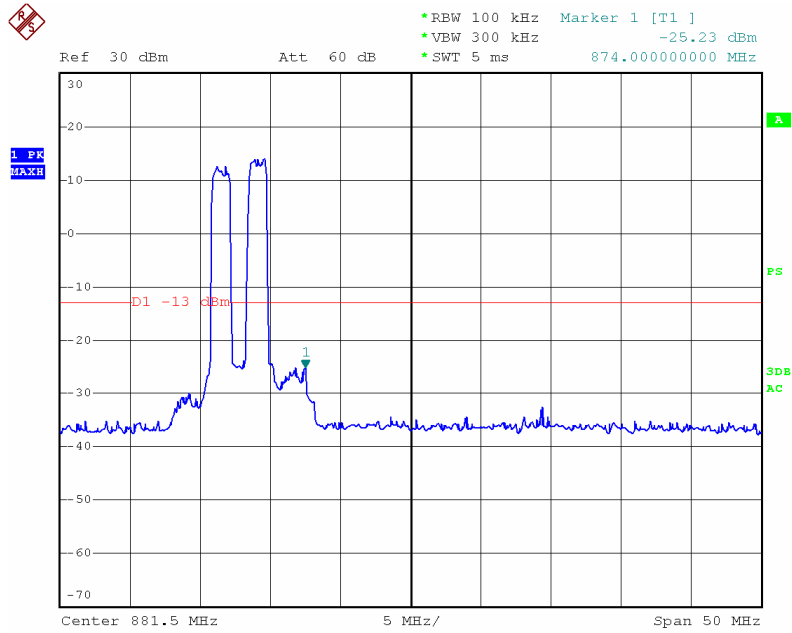
### 850MHz-EDGE up link-Lower Edge



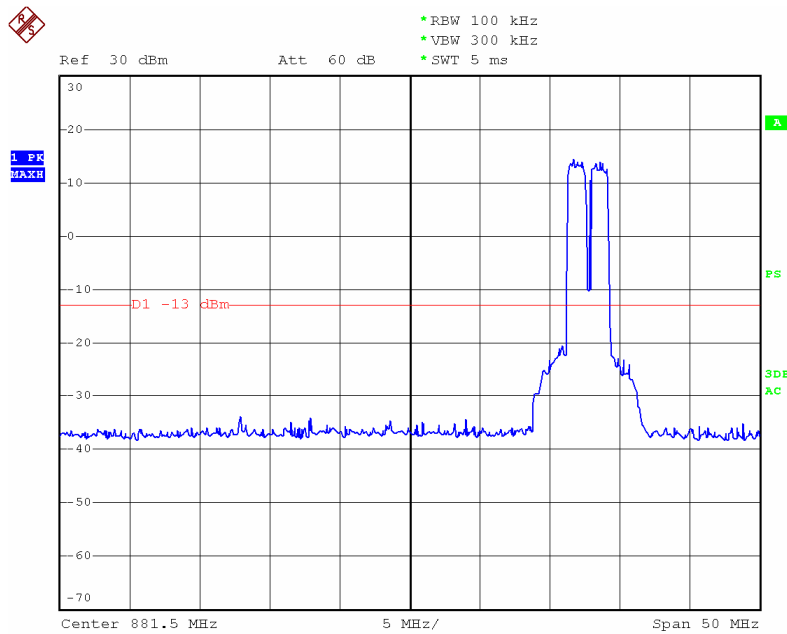
### 850MHz-EDGE up link-Upper Edge



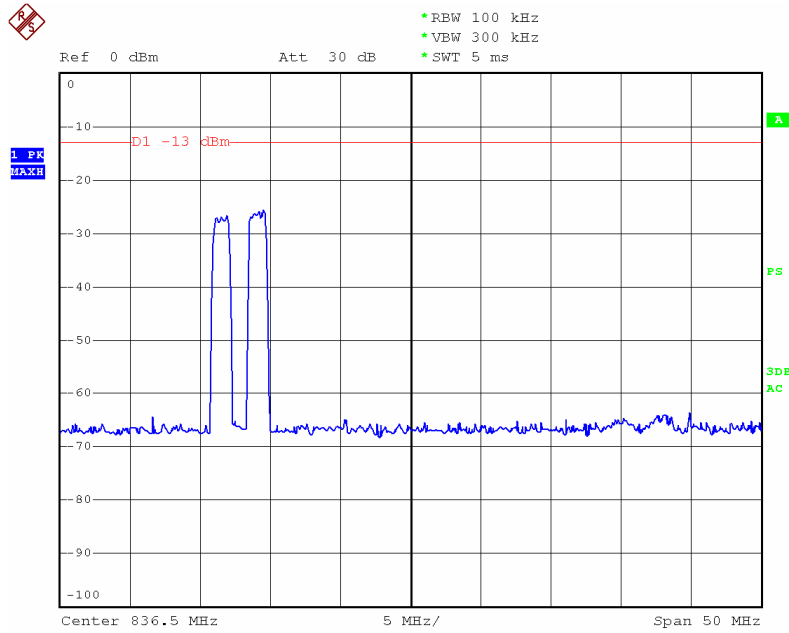
### 850MHz-CDMA2000 down link-Lower Edge



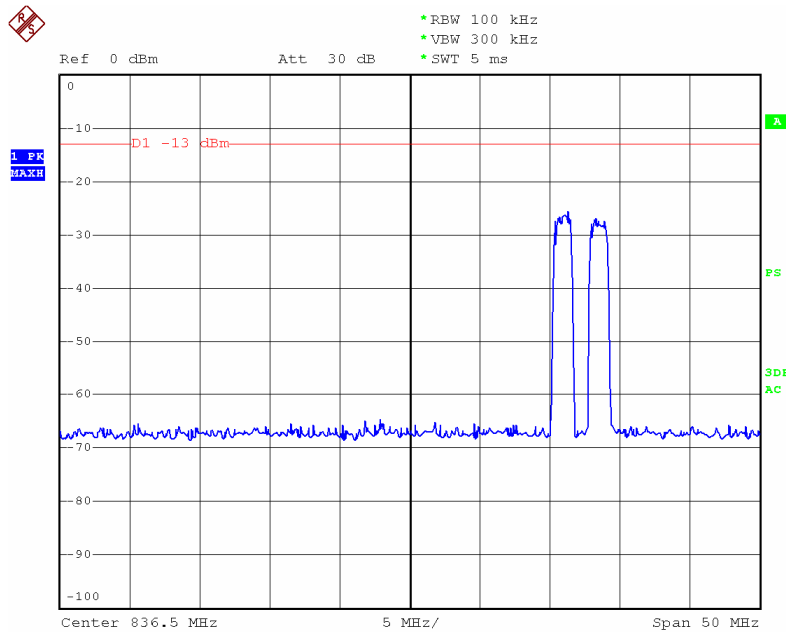
### 850MHz-CDMA2000 down link-Upper Edge



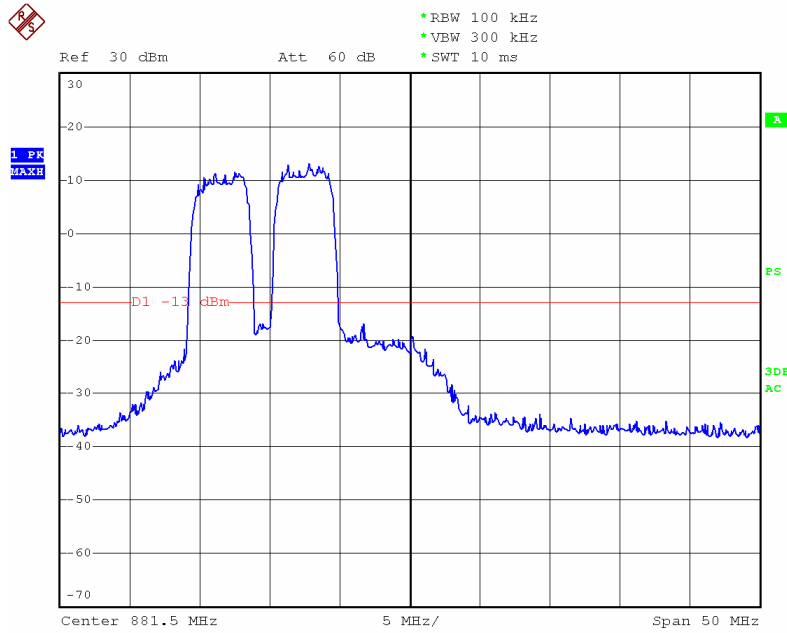
### 850MHz-CDMA2000 up link-Lower Edge



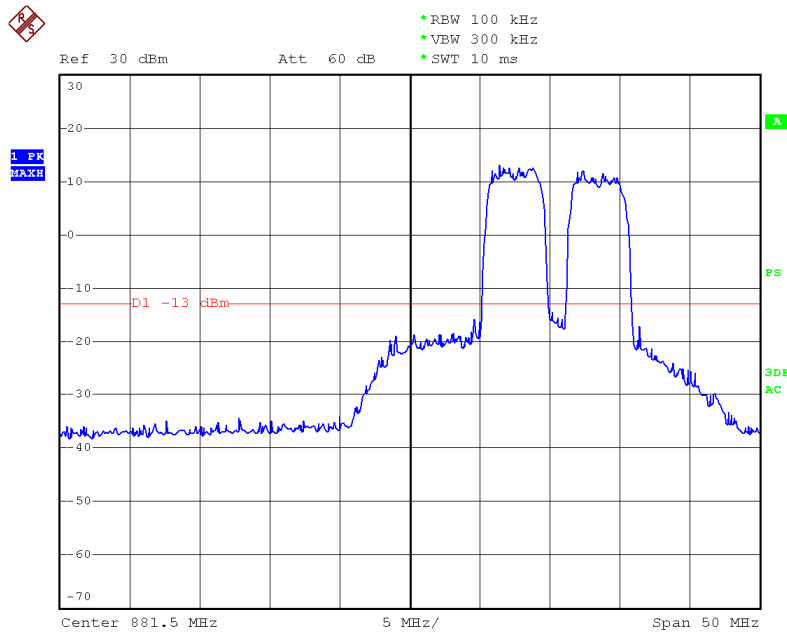
### 850MHz-CDMA2000 up link-Upper Edge



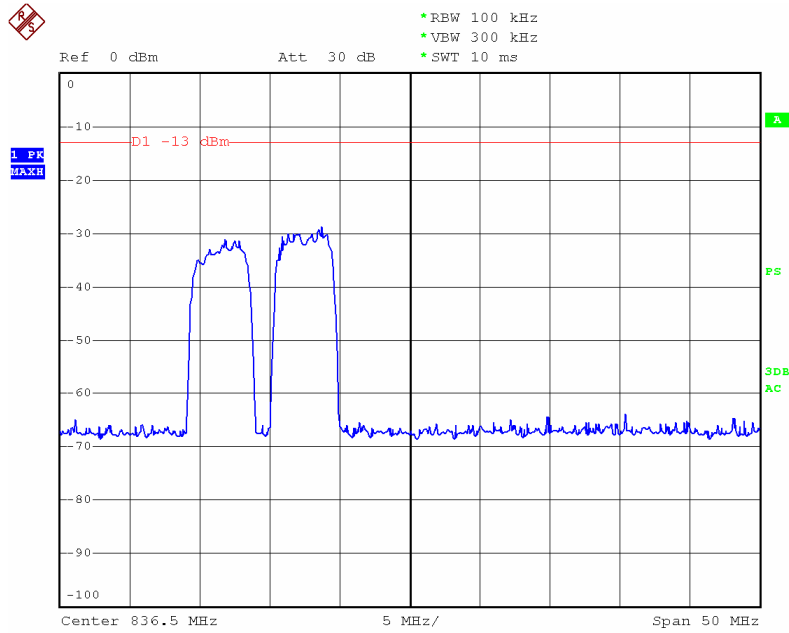
### 850MHz-WCDMA down link-Lower Edge



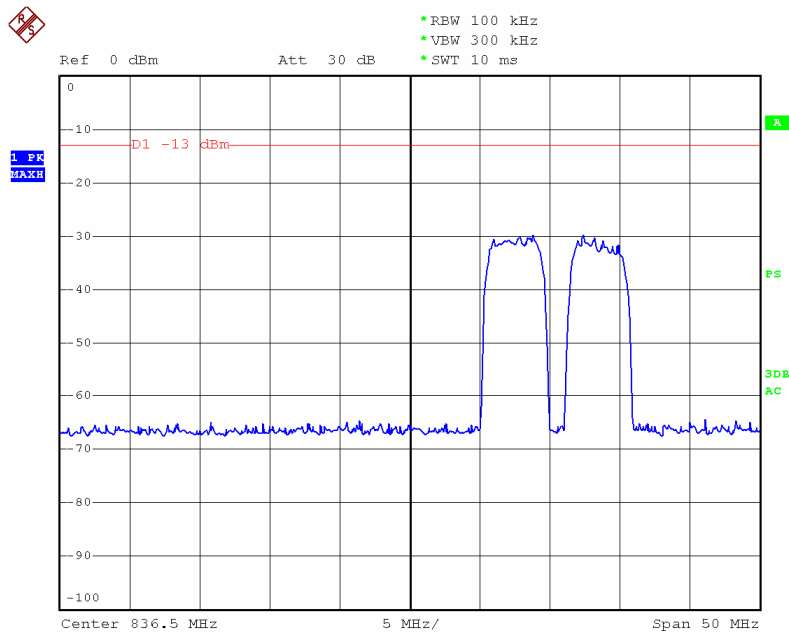
### 850MHz-WCDMA down link-Upper Edge



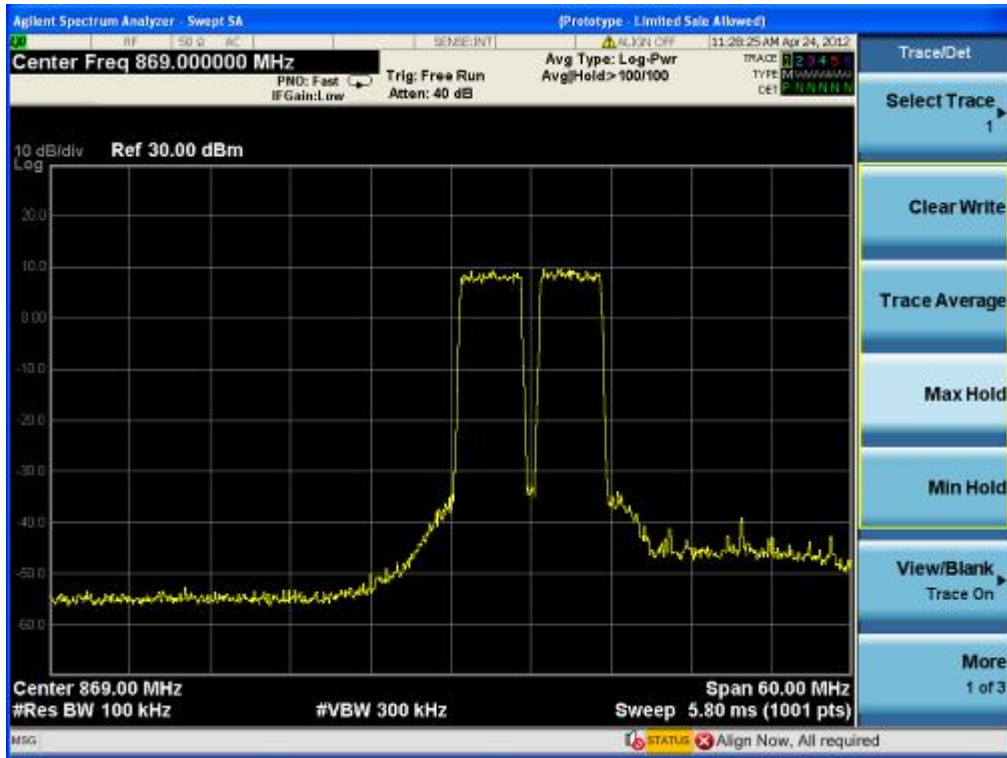
### 850MHz-WCDMA up link-Lower Edge



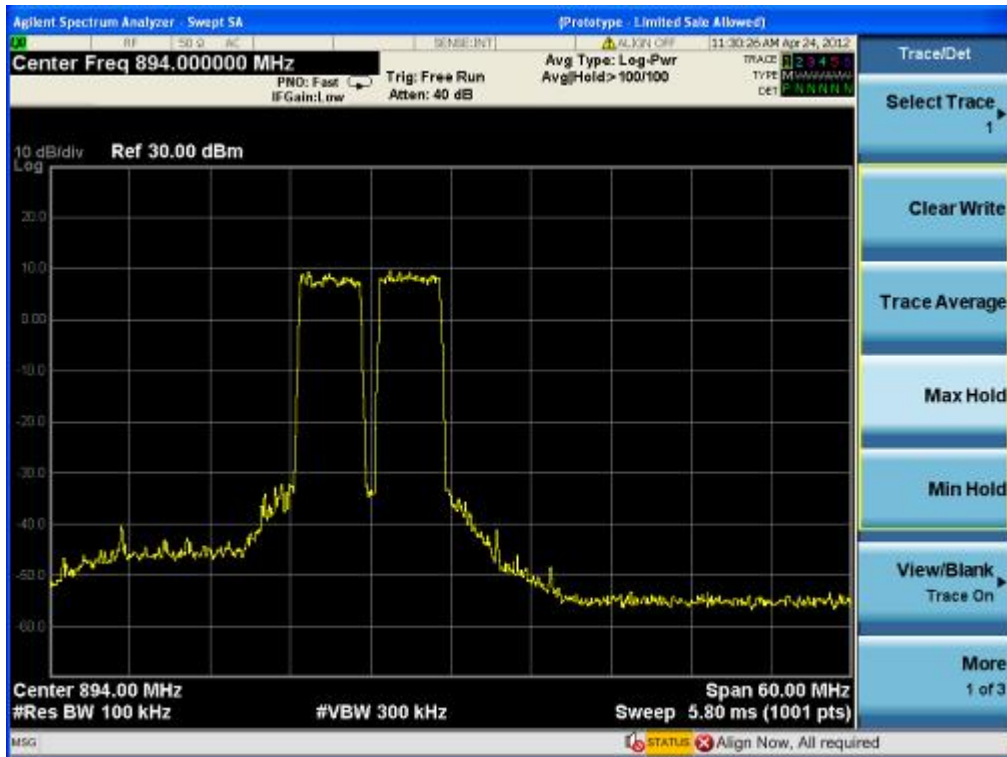
### 850MHz-WCDMA up link-Upper Edge



850MHz-LTE-QPSK down link-Lower Edge



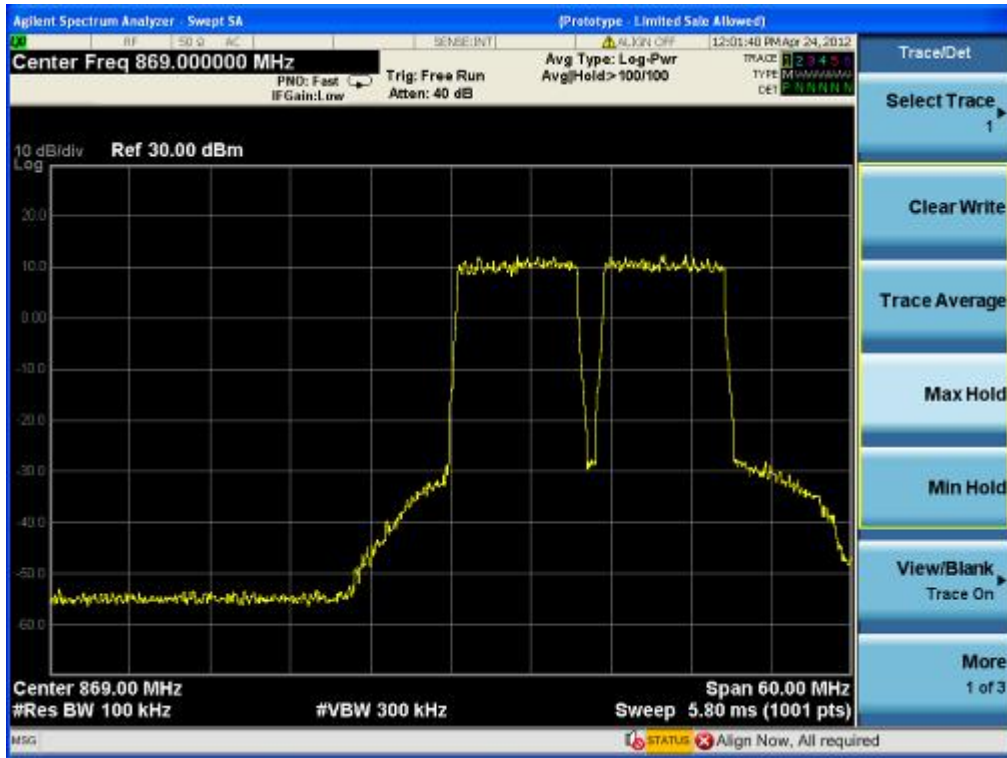
850MHz-LTE-QPSK down link-Upper Edge



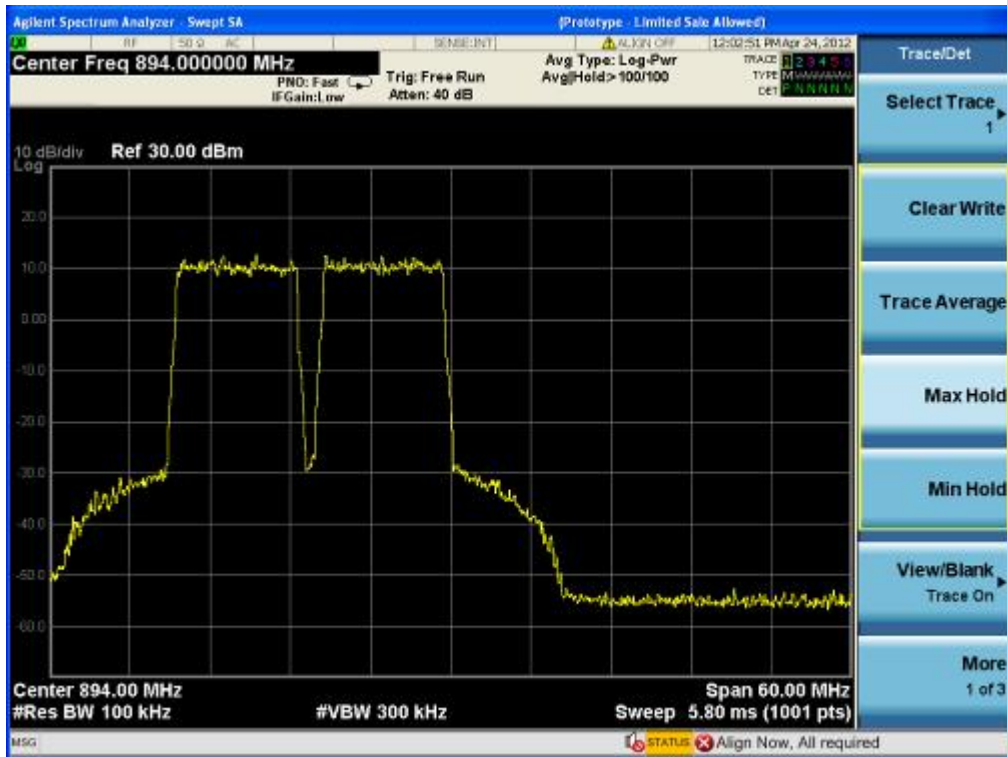




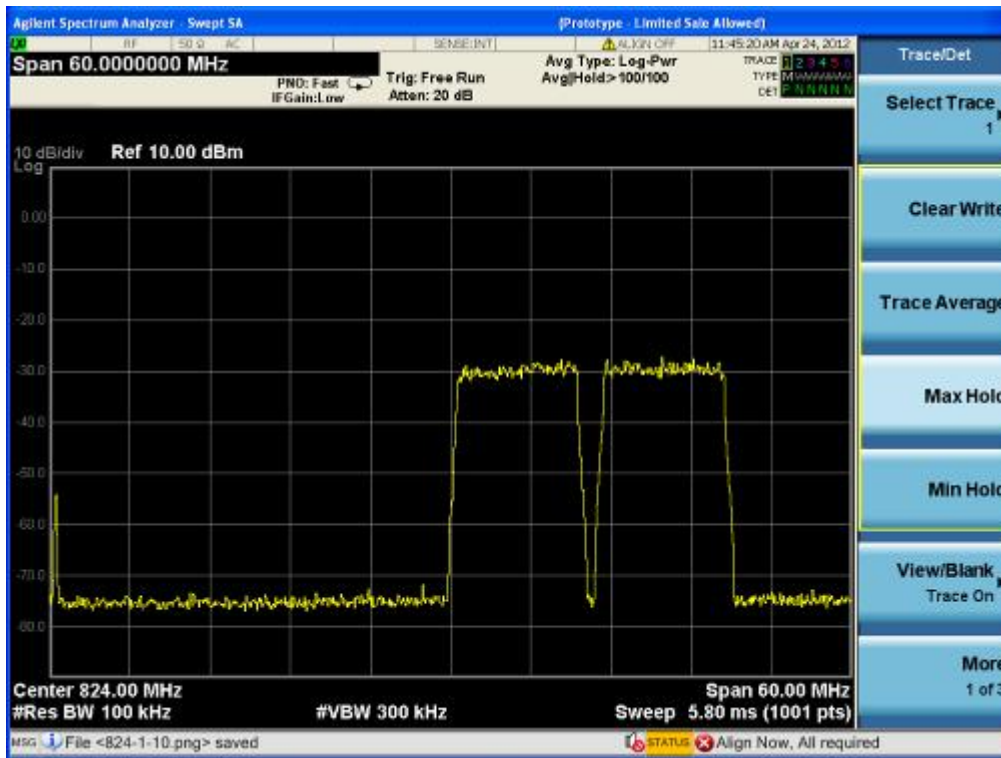
850MHz-LTE-16QAM down link-Lower Edge



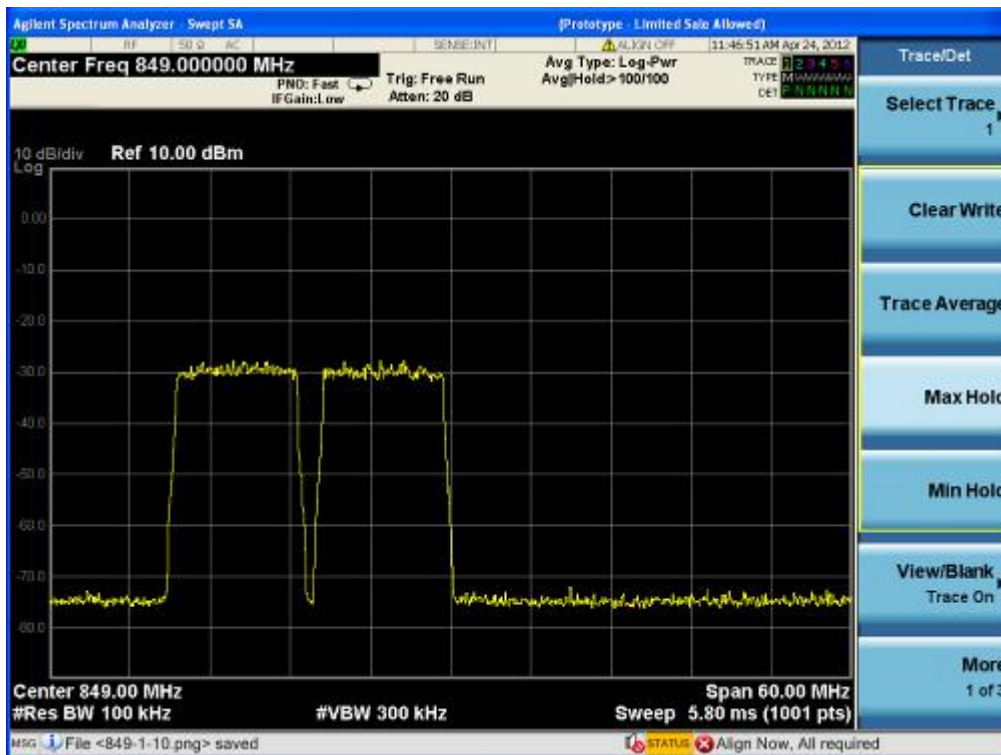
850MHz-LTE-16QAM down link-Upper Edge



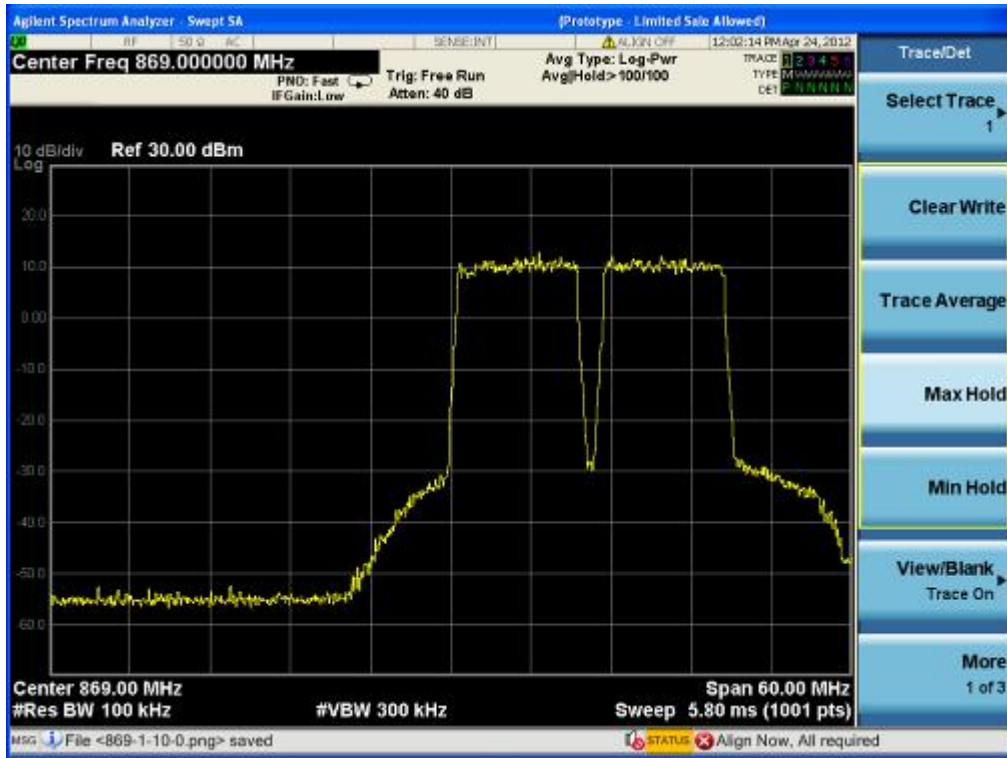
850MHz-LTE-16QAM up link-Lower Edge



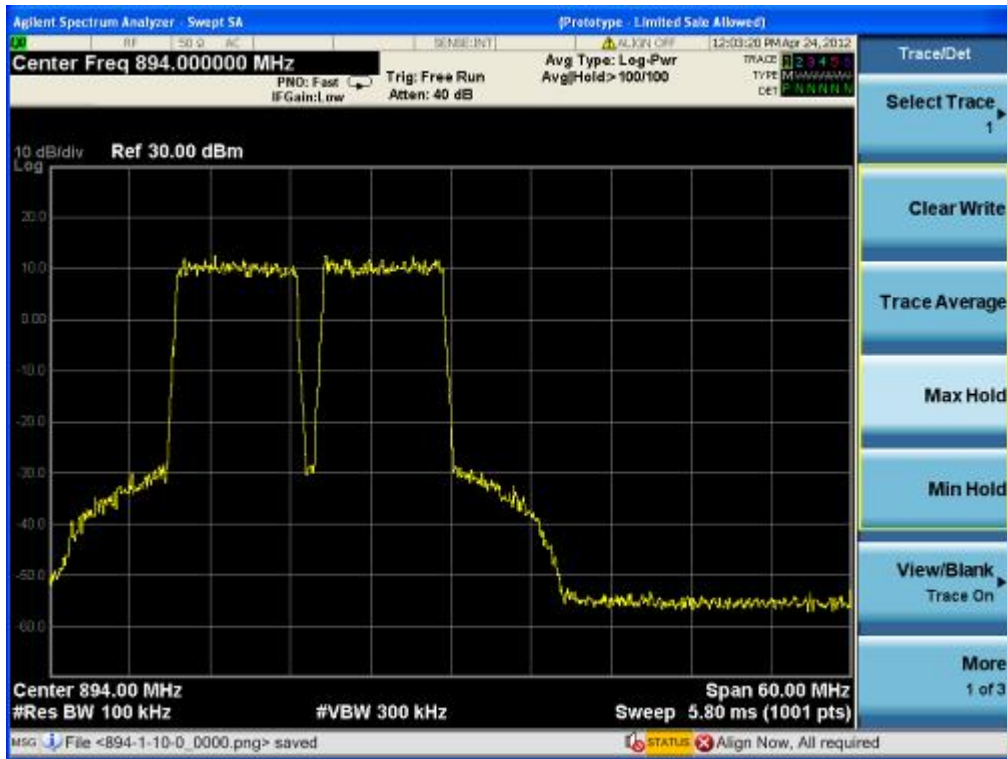
850MHz-LTE-16QAM up link-Upper Edge



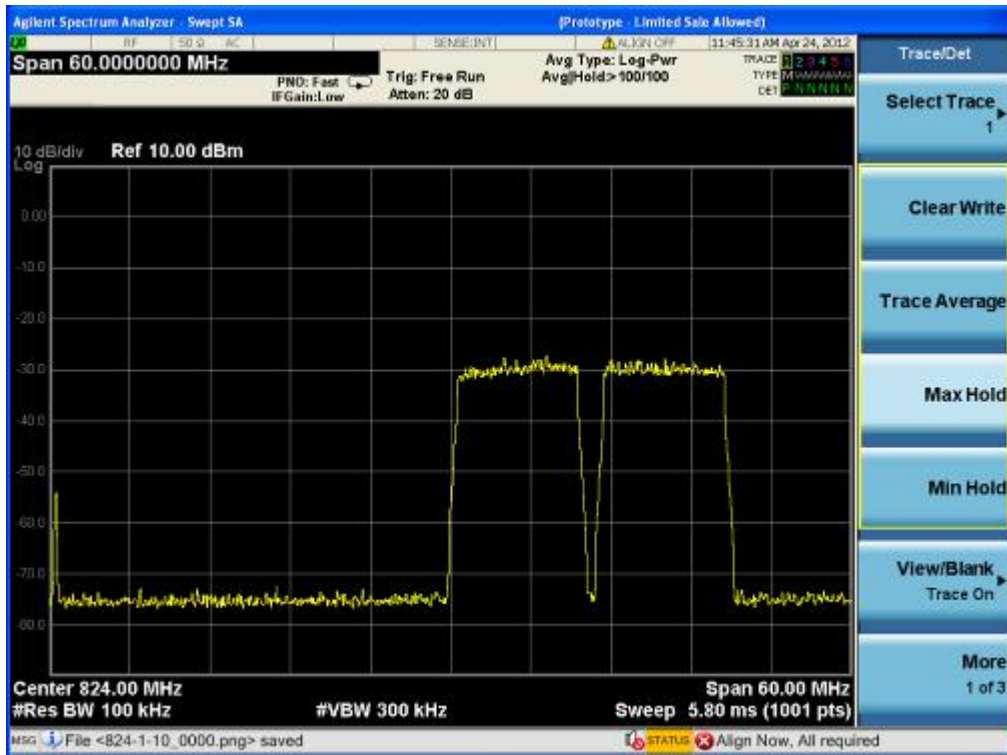
850MHz-LTE-64QAM down link-Lower Edge



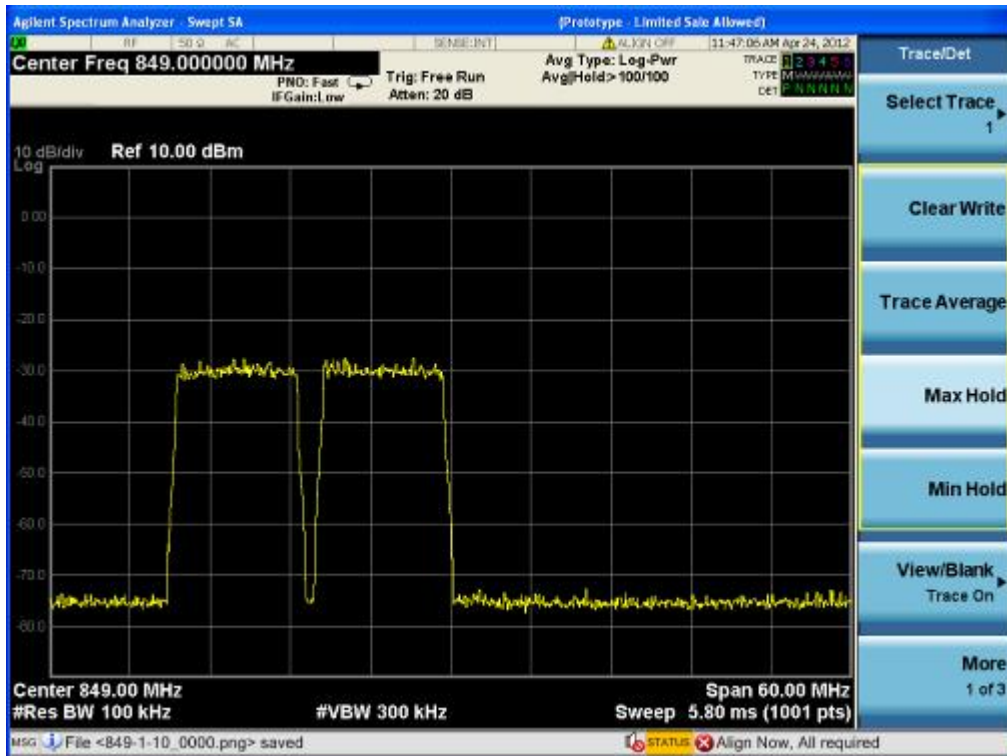
850MHz-LTE-64QAM down link-Upper Edge



850MHz-LTE-64QAM up link-Lower Edge

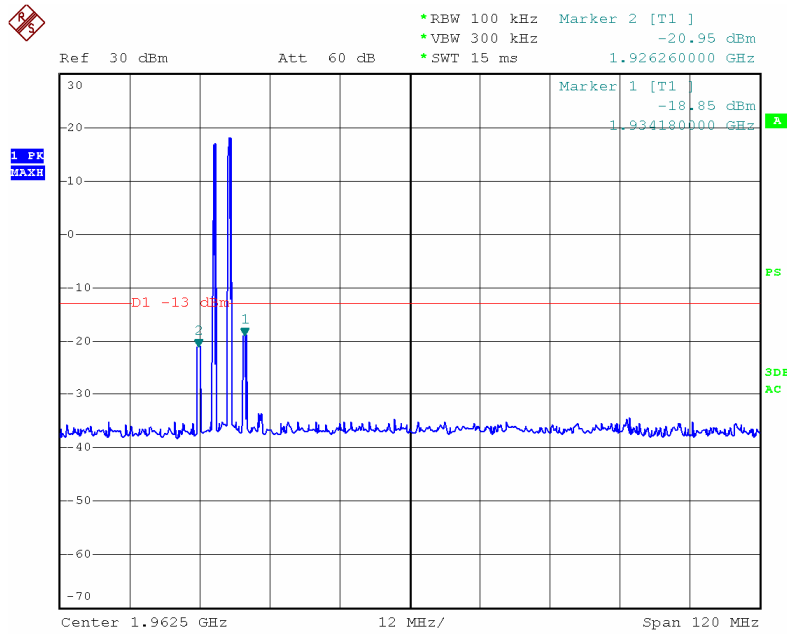


850MHz-LTE-64QAM up link-Upper Edge

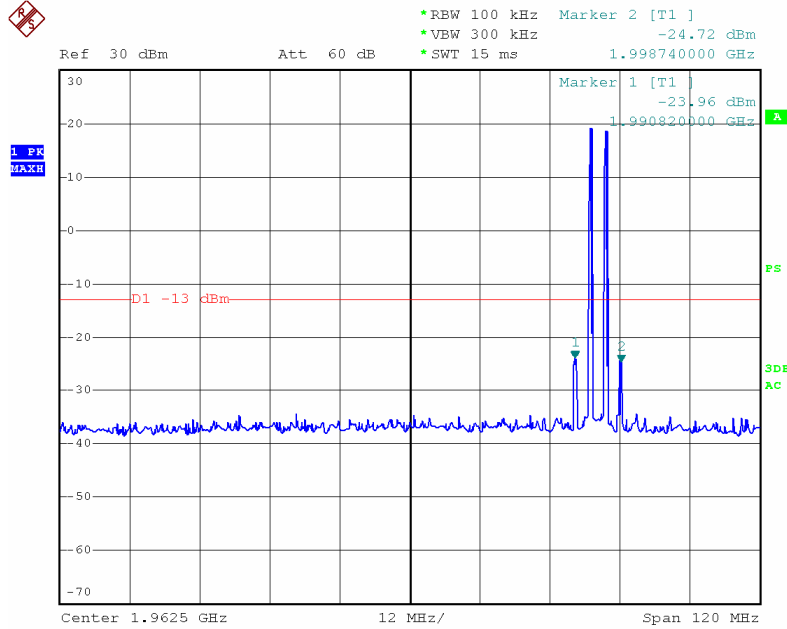


### 1900MHz

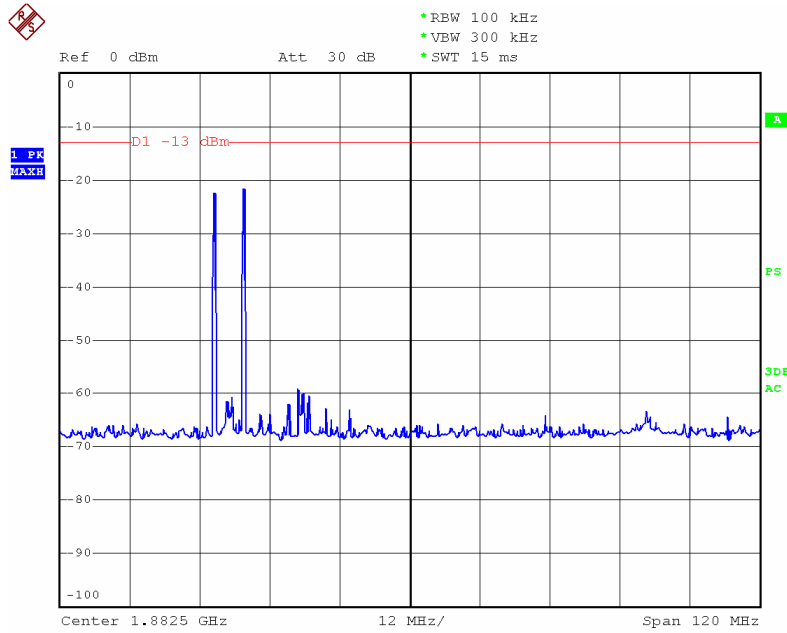
#### 1900MHz-GSM down link-Lower Edge



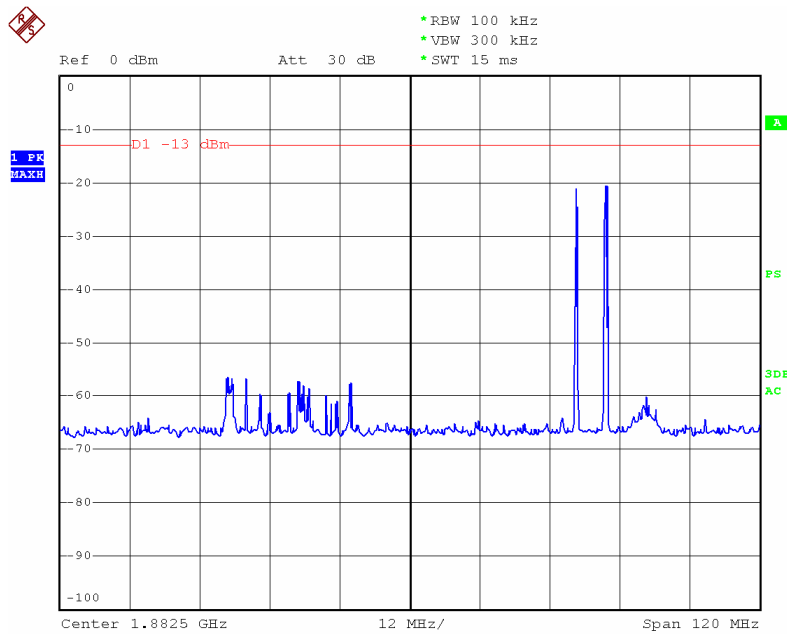
#### 1900MHz-GSM down link-Upper Edge



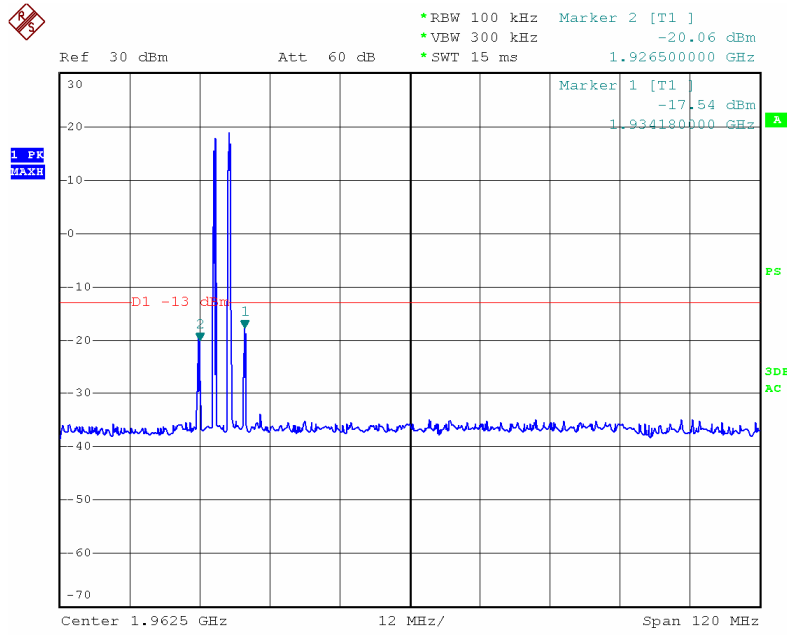
### 1900MHz-GSM up link-Lower Edge



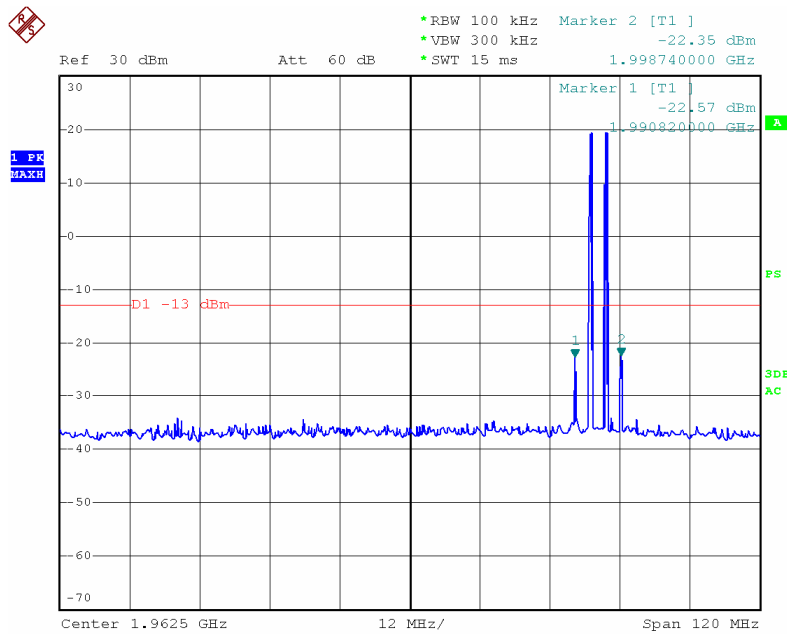
### 1900MHz-GSM up link-Upper Edge



### 1900MHz-EDGE down link-Lower Edge

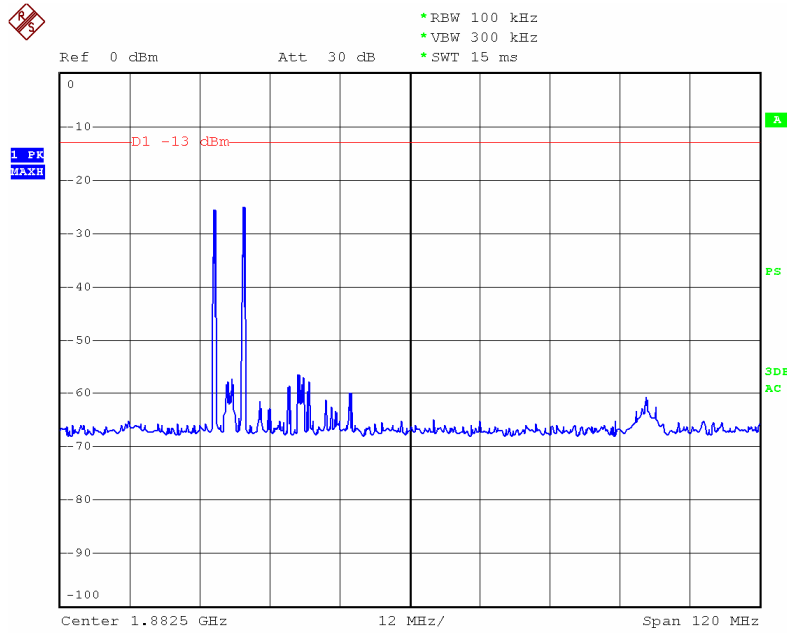


### 1900MHz-EDGE down link-Upper Edge

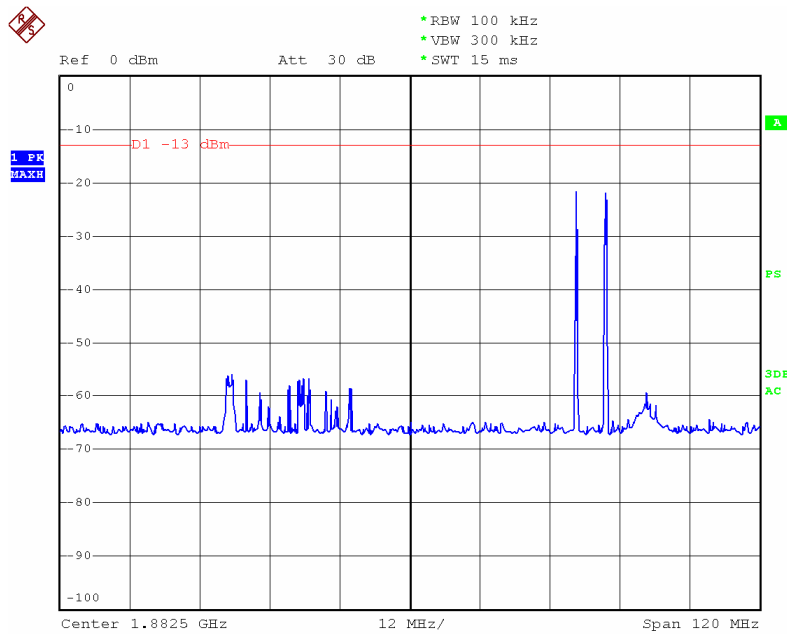




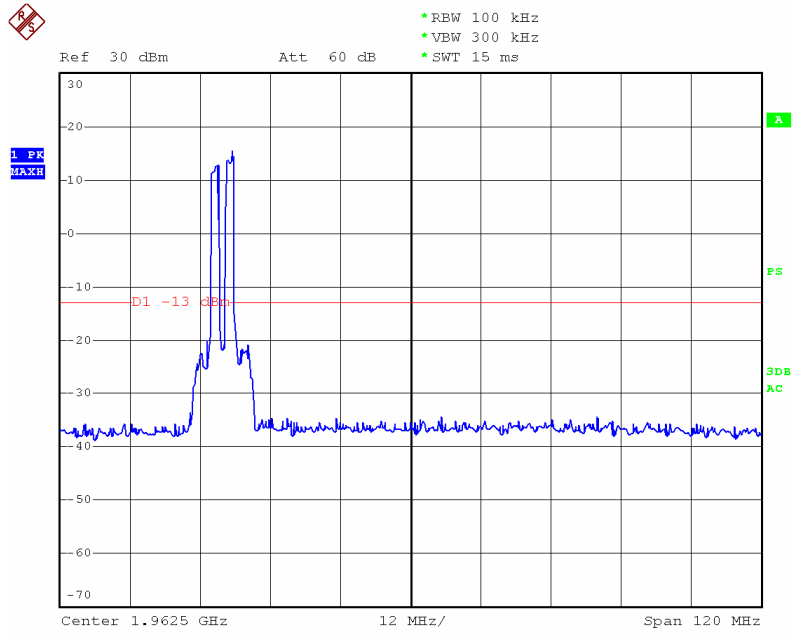
### 1900MHz-EDGE up link-Lower Edge



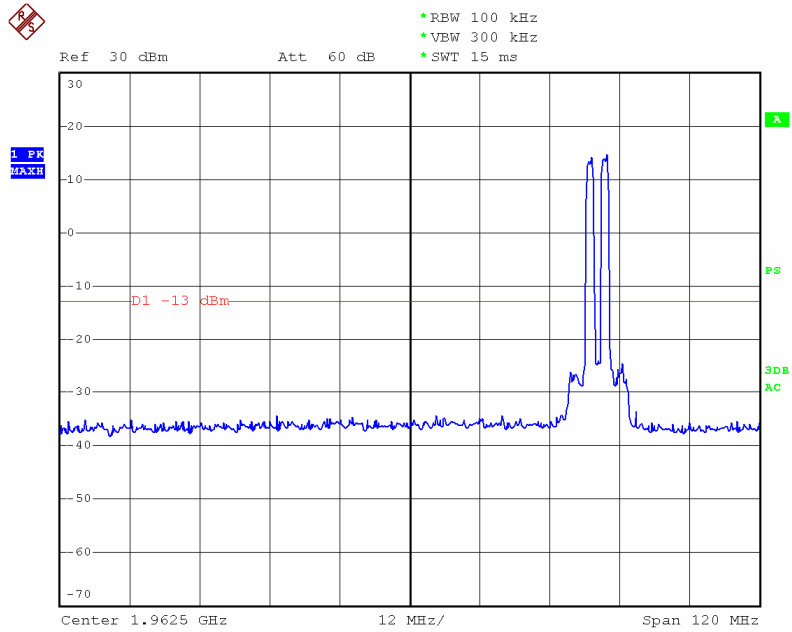
### 1900MHz-EDGE up link-Upper Edge



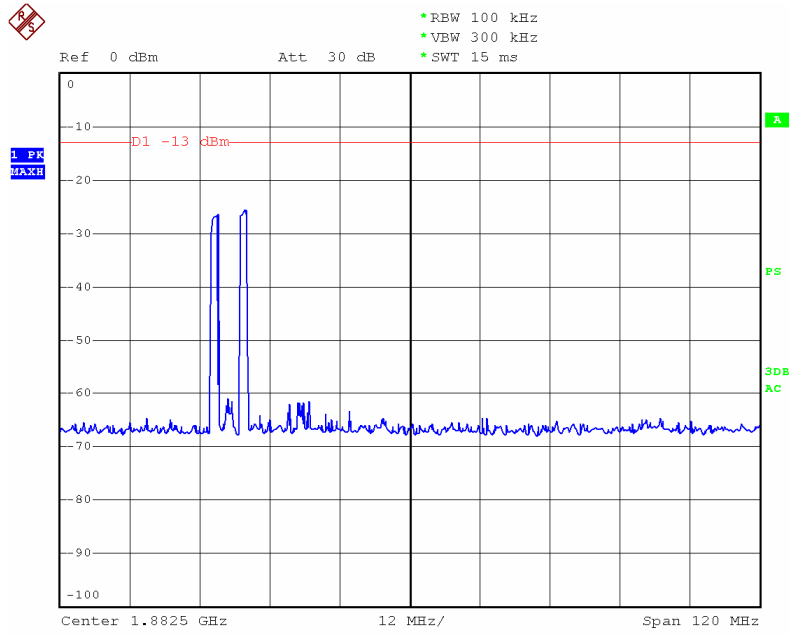
### 1900MHz-CDMA2000 down link-Lower Edge



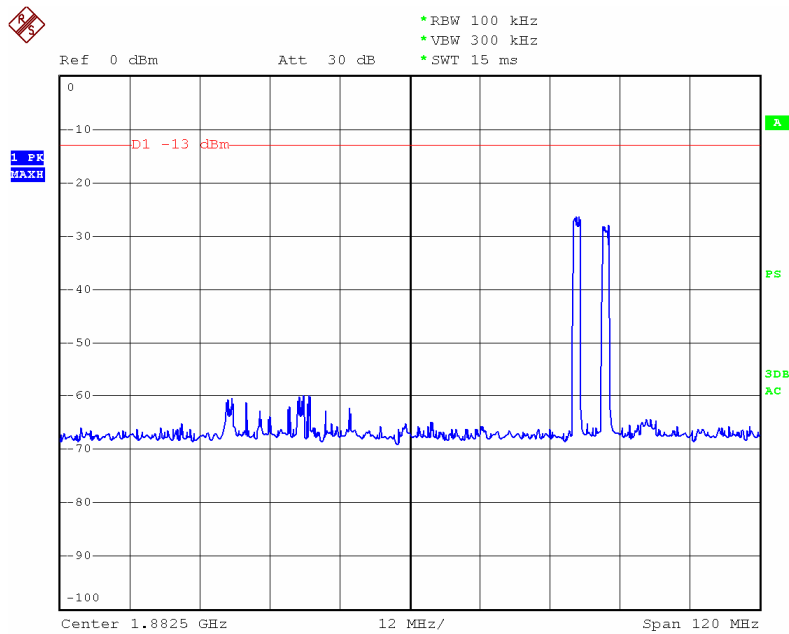
### 1900MHz-CDMA2000 down link-Upper Edge



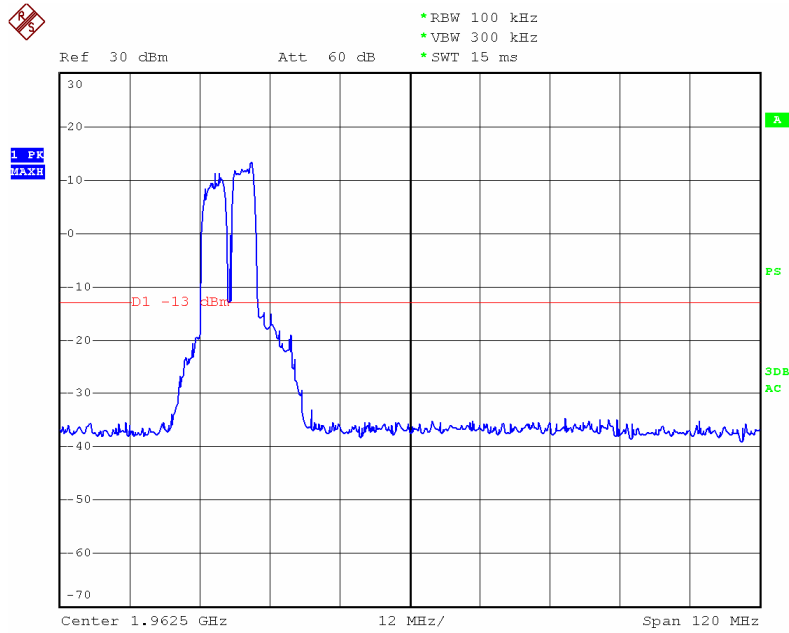
### 1900MHz-CDMA2000 up link-Lower Edge



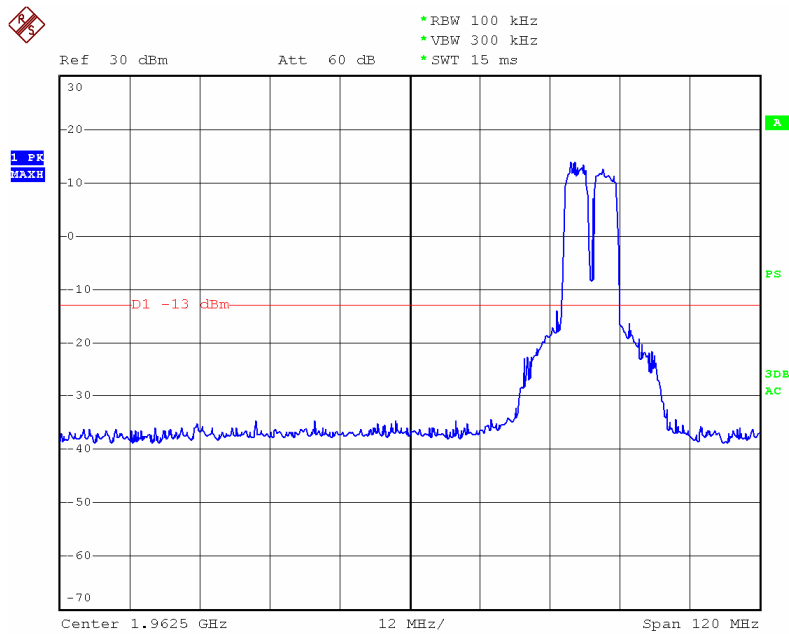
### 1900MHz-CDMA2000 up link-Upper Edge



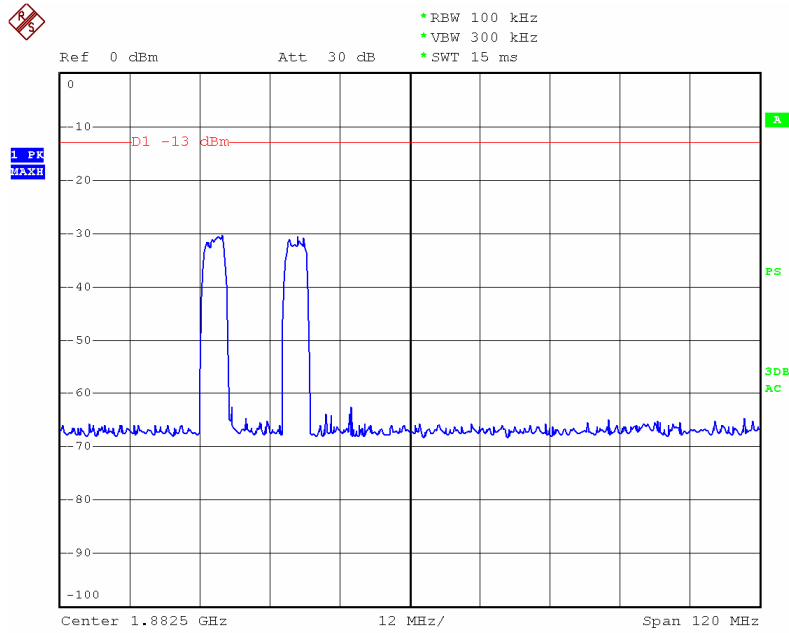
### 1900MHz-WCDMA down link-Lower Edge



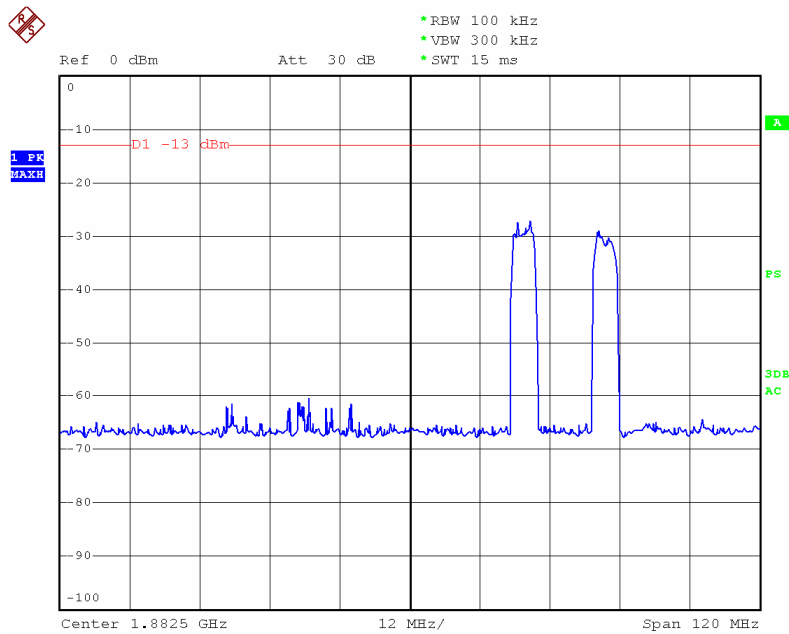
### 1900MHz-WCDMA down link-Upper Edge



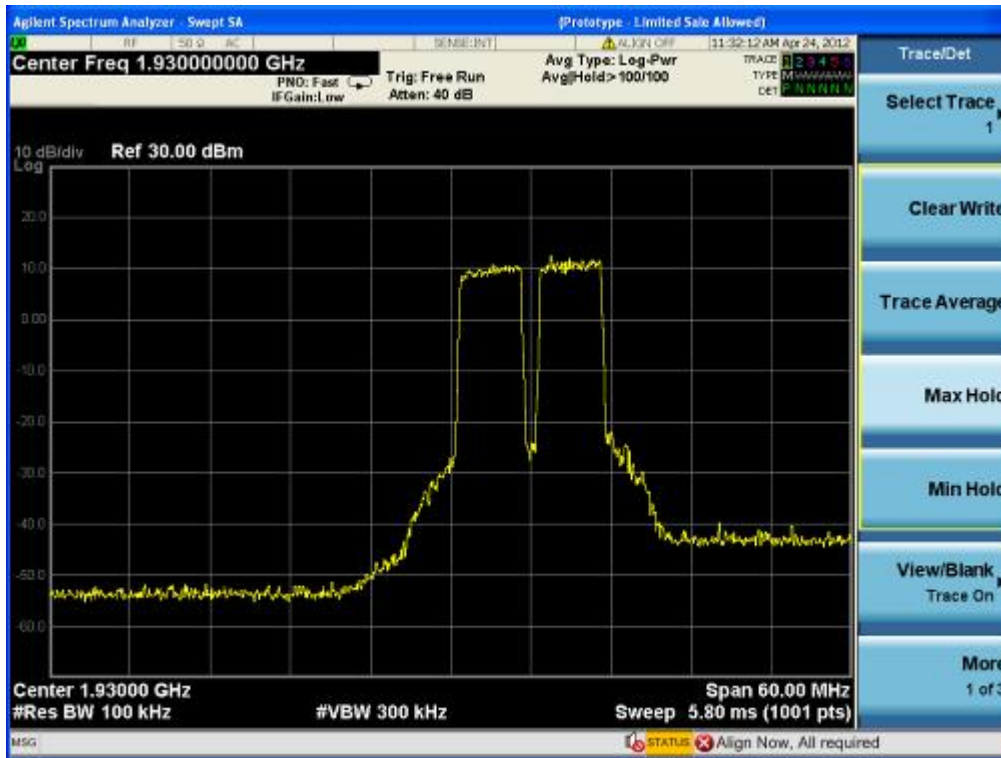
### 1900MHz-WCDMA up link-Lower Edge



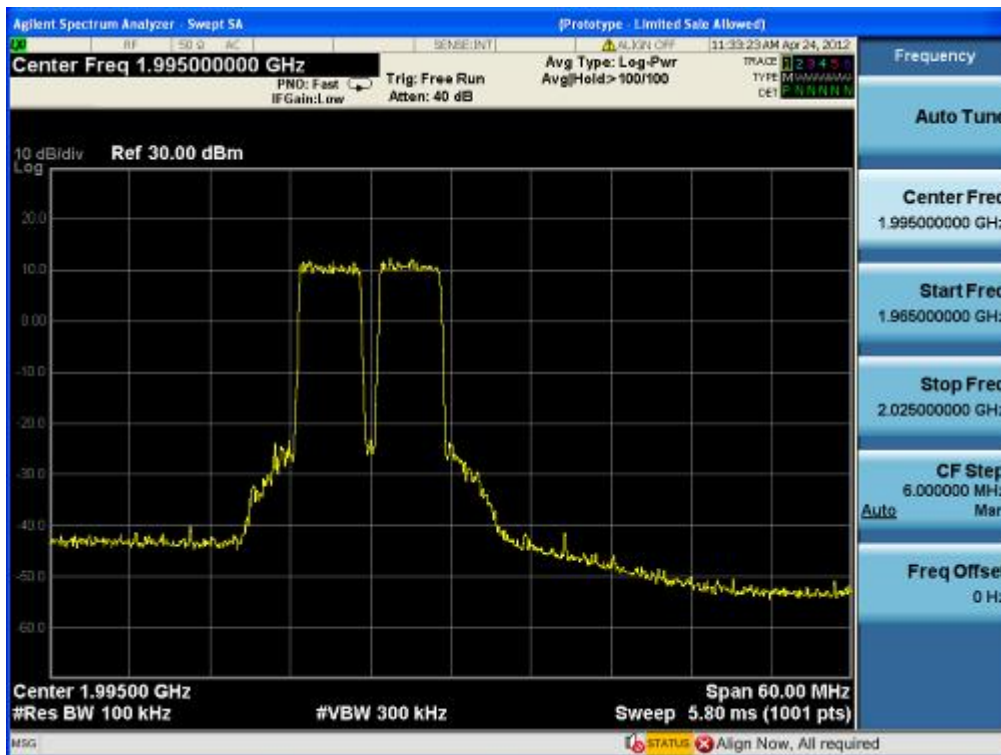
### 1900MHz-WCDMA up link-Upper Edge



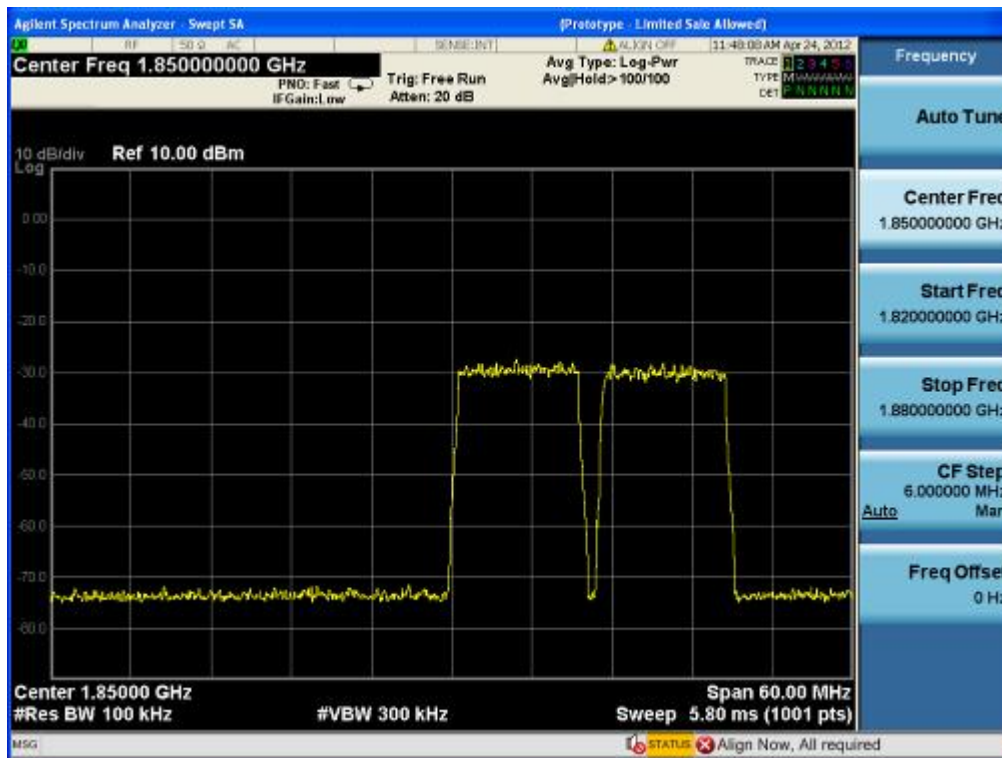
190MHz-LTE-QPSK down link-Lower Edge



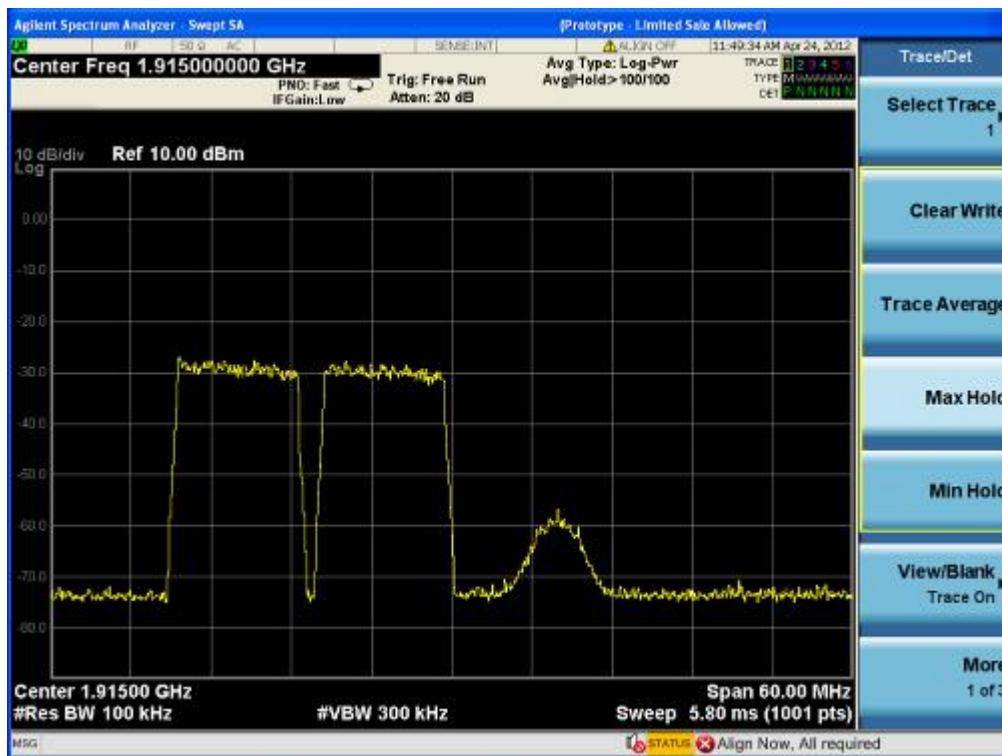
1900MHz-LTE-QPSK down link-Upper Edge



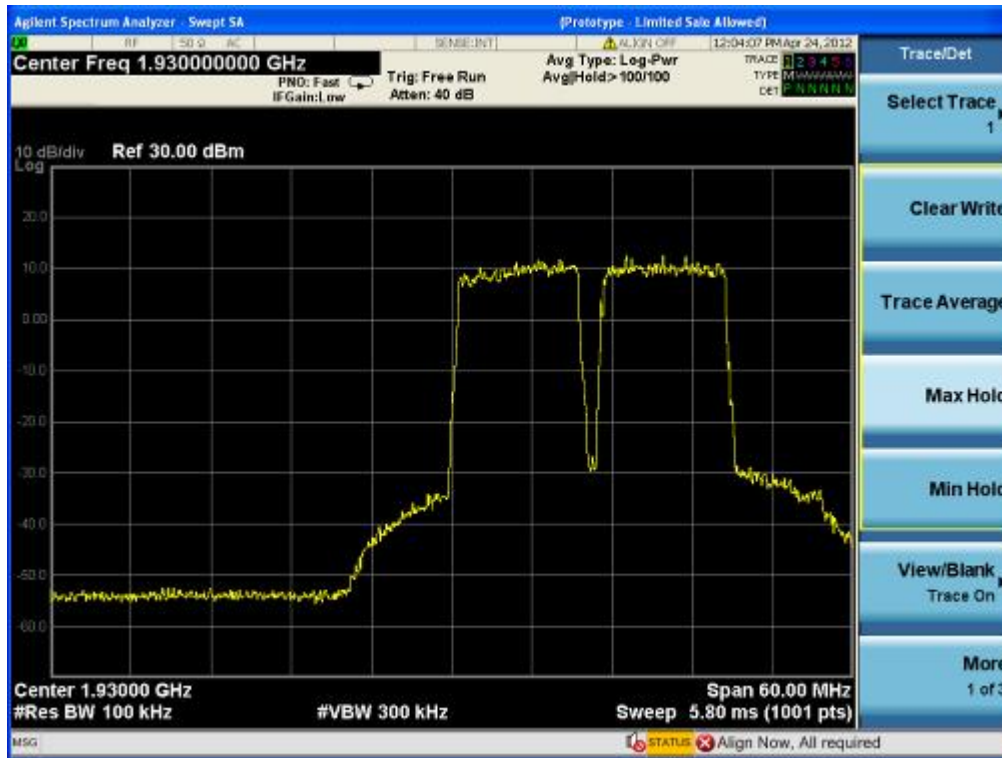
1900MHz-LTE-QPSK up link-Lower Edge



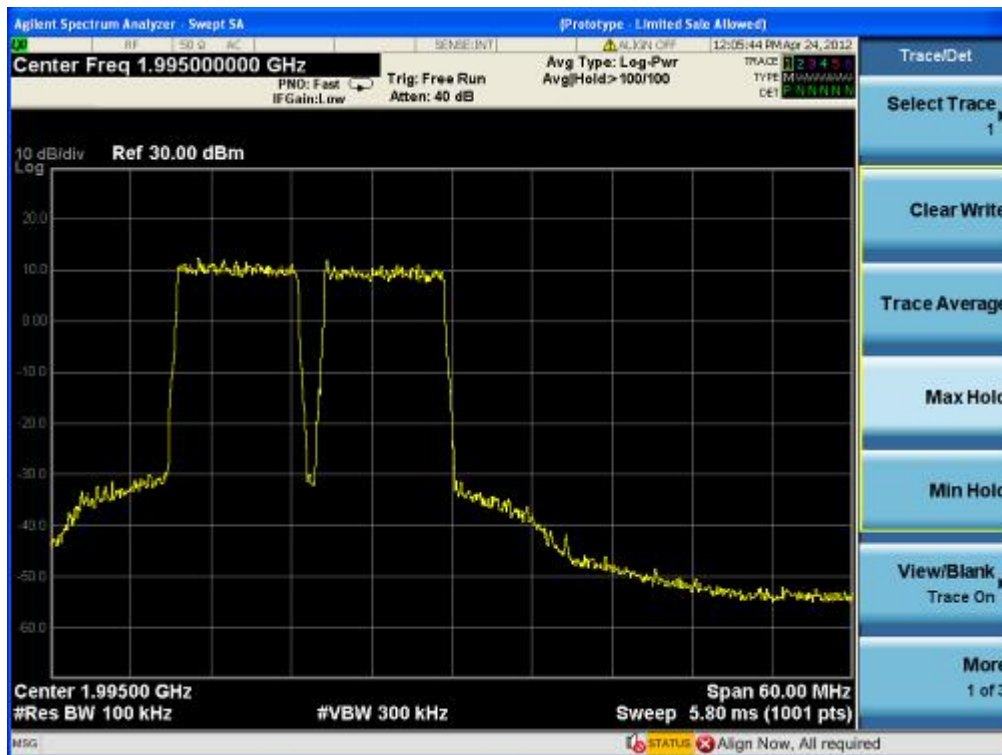
1900MHz-LTE-QPSK up link-Upper Edge



1900MHz-LTE-16QAM down link-Lower Edge

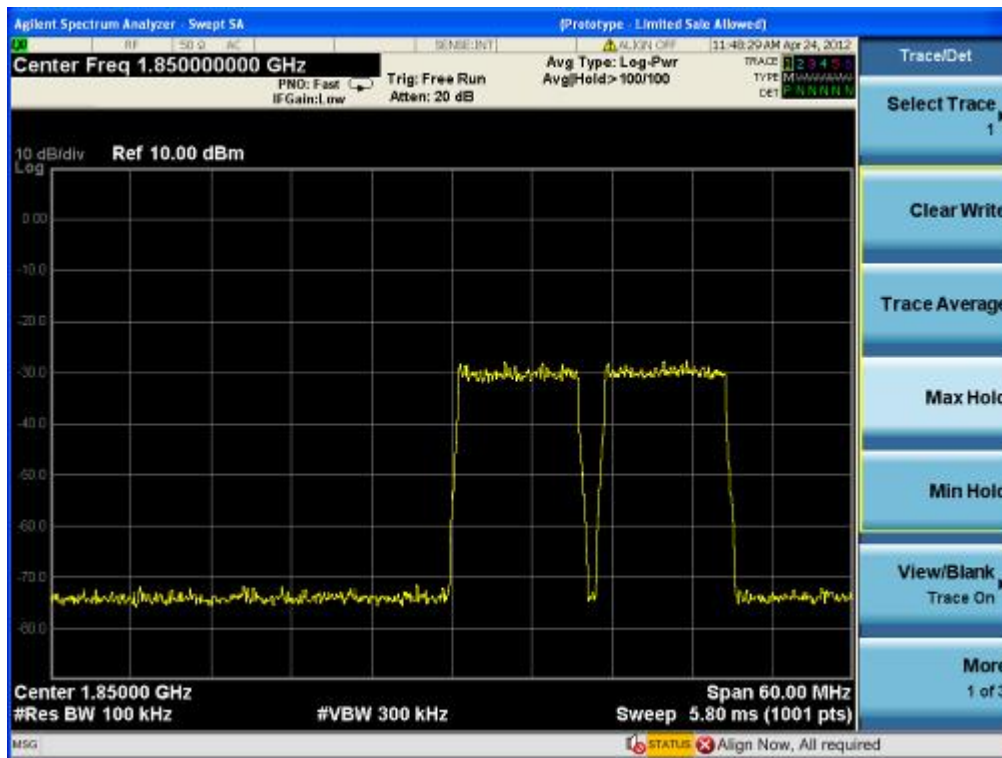


1900MHz-LTE-16QAM down link-Upper Edge

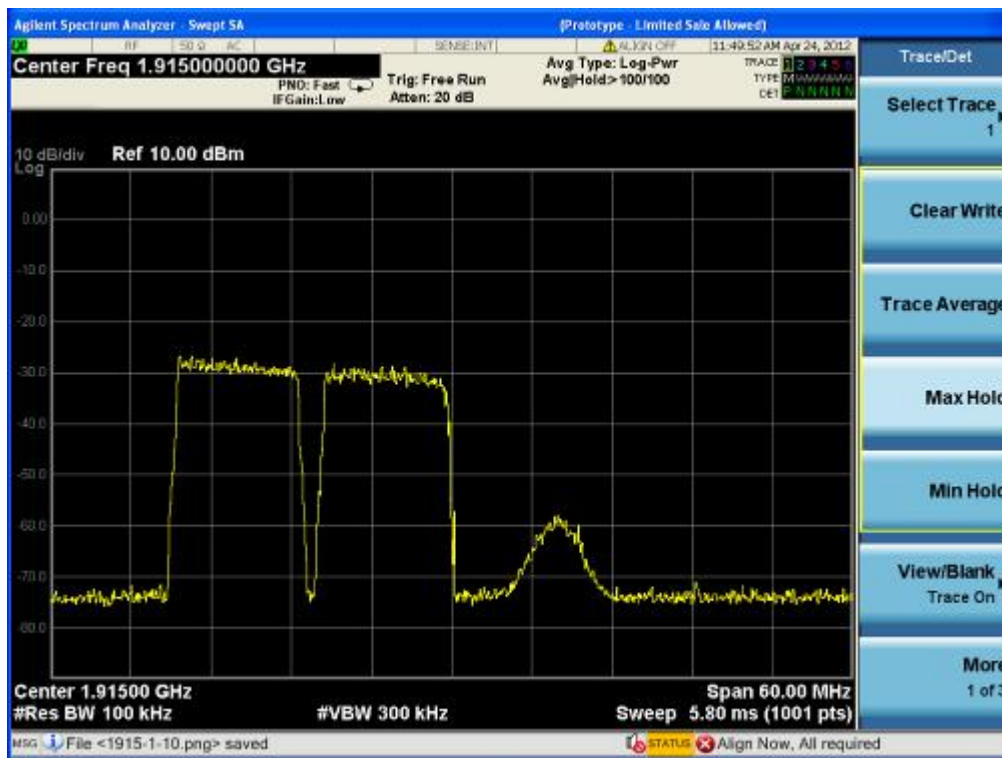




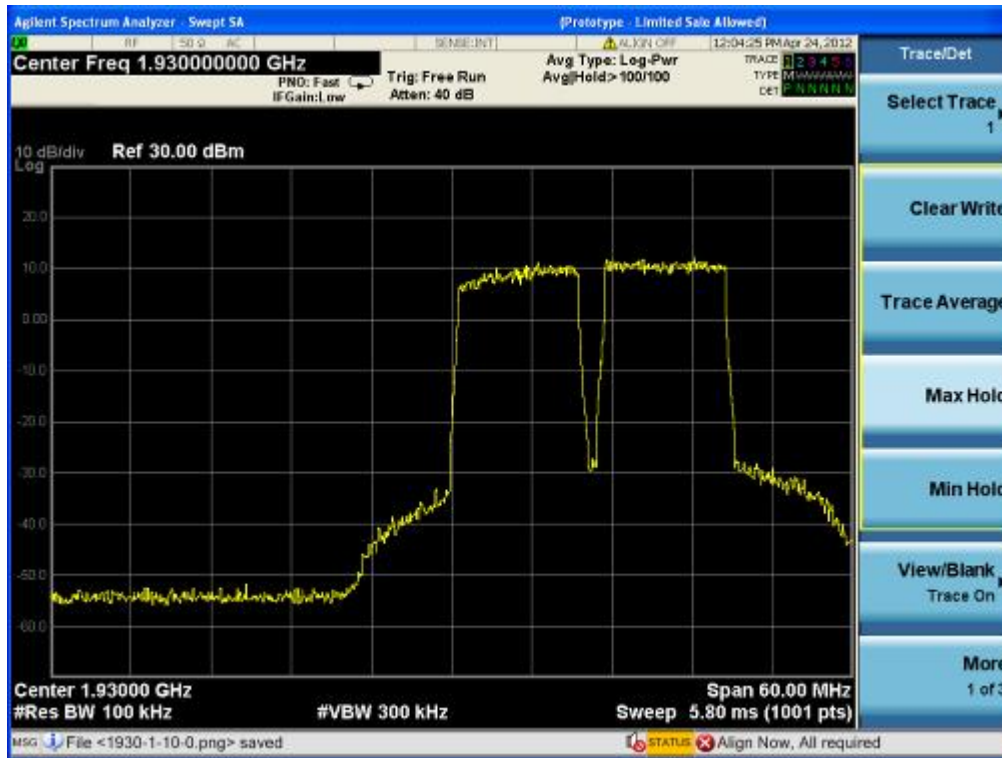
1900MHz-LTE-16QAM up link-Lower Edge



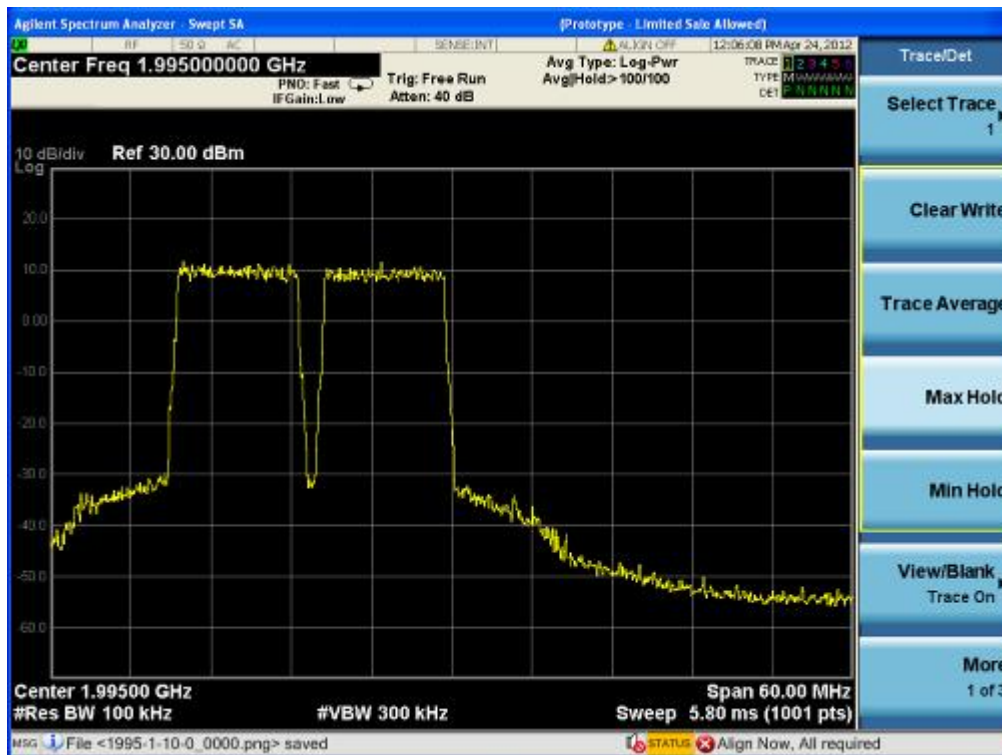
1900MHz-LTE-16QAM up link-Upper Edge



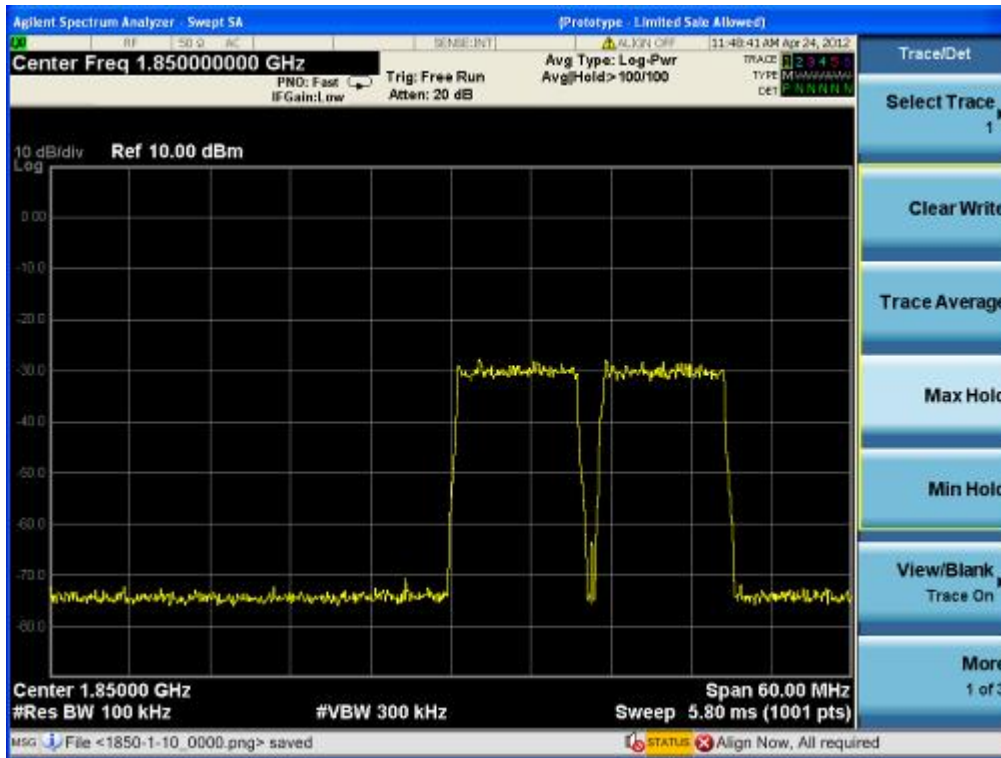
1900MHz-LTE-64QAM down link-Lower Edge



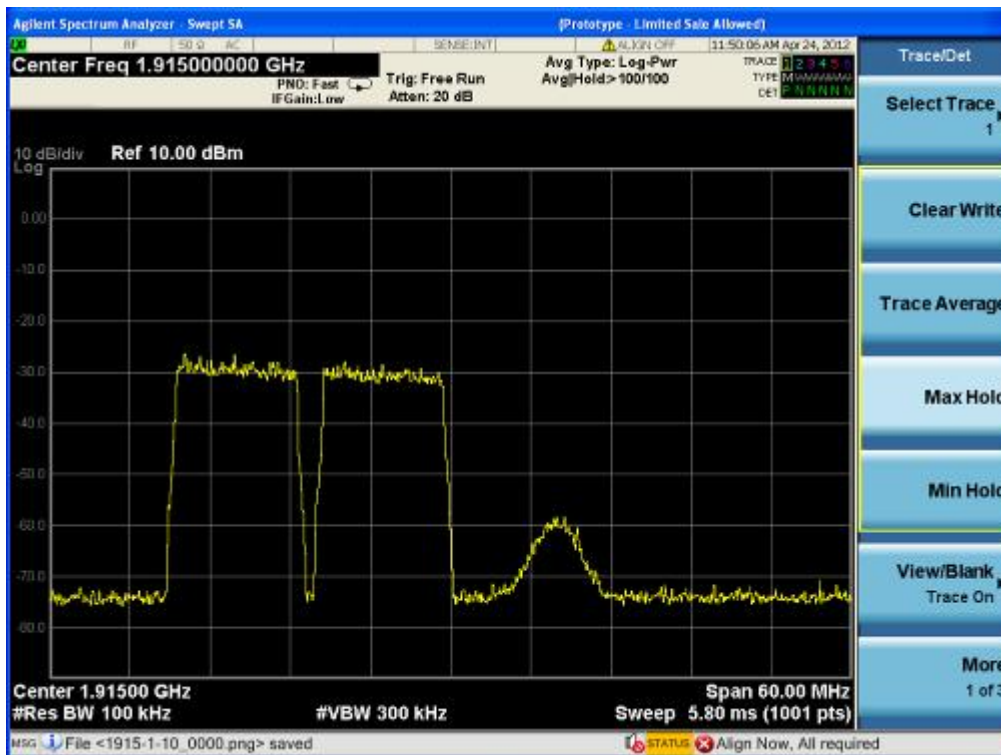
1900MHz-LTE-64QAM down link-Upper Edge



1900MHz-LTE-64QAM up link-Lower Edge



1900MHz-LTE-64QAM up link-Upper Edge



**Remark:**

For the test in two signal input or intermodulation, test input signal  $f_1$  and  $f_2$  will consider as follows conditions:

7) EUT frequency band span and the amount of channels;

8)  $f_1$  is the frequency lower,  $f_2$  is the frequency higher,  $\Delta f$  is the channel spacing;

9) in lower edge test,  $f_1$  is the lower frequency + 1 channel frequency, and  $f_2$  is + 2 channel frequency;

10) in higher edge test,  $f_1$  is the higher frequency - 2 channel frequency, and  $f_2$  is - 1 channel frequency;

11) according to the amplifier characteristic, the 3rd product will appear when two signals input;

12) base the 3rd product frequency  $F_1 = 2f_1 - f_2$ , and  $F_2 = 2f_2 - f_1$ , when the  $f_1$  and  $f_2$  frequency select above,

a) in lower edge test,  $F_1 = 2f_1 - (f_1 + \Delta f) = f_1 - \Delta f =$  lower dege frequency;

b) in higher edge test,  $F_2 = 2f_2 - (f_1 - \Delta f) = f_1 + \Delta f =$  higher dege frequency

### 4.2.7 OUT OF BAND REJECTION

Test Date:	16 April, 2012
Test Method:	2-11-04/EAB/RF
Test Requirement:	2-11-04/EAB/RF Test for rejection of out of band signals, Filter freq, response plots are acceptable
Specification	The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block ,The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ( $\pm 2.5\text{ppm}$ ) of the center frequency
Status	The output power of EUT be set to maximum value, the gain of EUT be set to maximum value by software through the manufacture
Conditions	Normal conditions
Application	700MHz DL and UL ports, 850MHz DL and UL ports, 1900MHz DL and UL ports

Test configuration

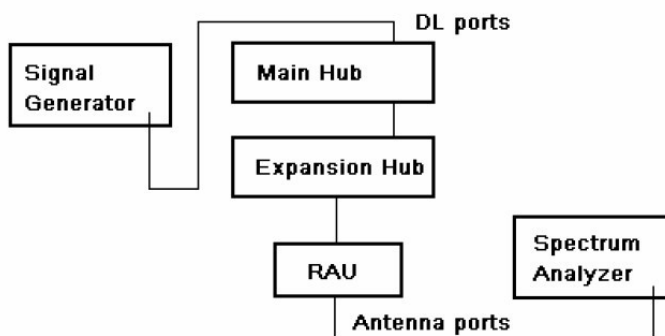


Fig.1 Down Link Configuration

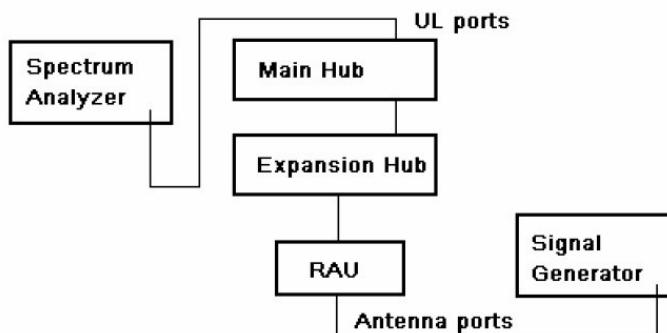


Fig.2 Up Link Configuration

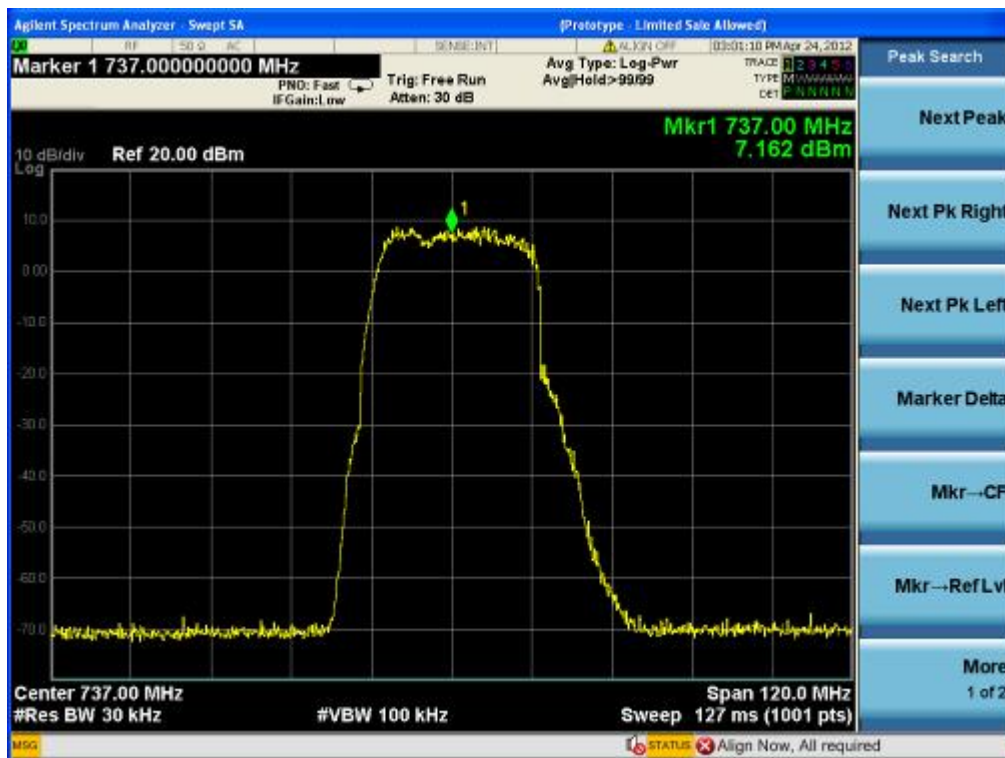
## Test procedure

1. Connect the equipment as illustrated;
  2. Test the background noise level with all the test facilities;
  3. Keep one transmitting path, all other connectors shall be connected by normal power or RF leads;
  4. Select the attenuator to avoid the test receiver or spectrum analyzer being destroyed ;
  5. Keep the EUT continuously transmitting in max power;
  6. Signal generator sweep from the frequency more lower than the product frequency to the frequency more higher than it, find the product band filter characteristic.
- CW signal rather than typical signal is acceptable (for FM)  
Multiple band filter will need test each other

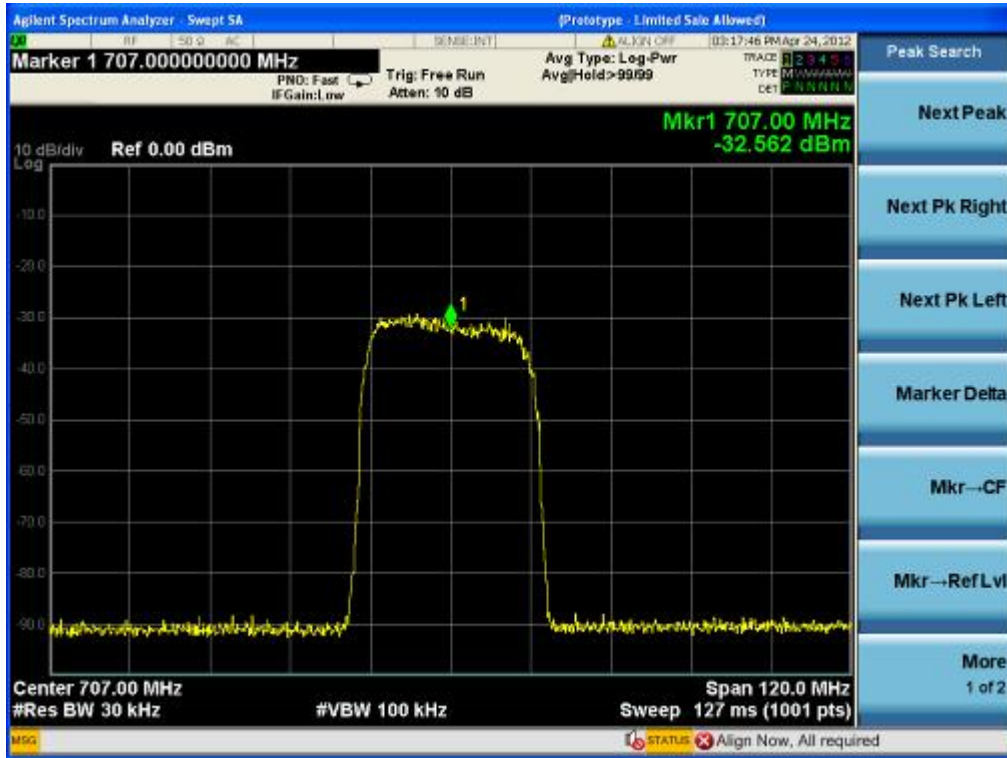
#### 4.2.7.1 MEASUREMENT RECORD

##### 700MHz Band

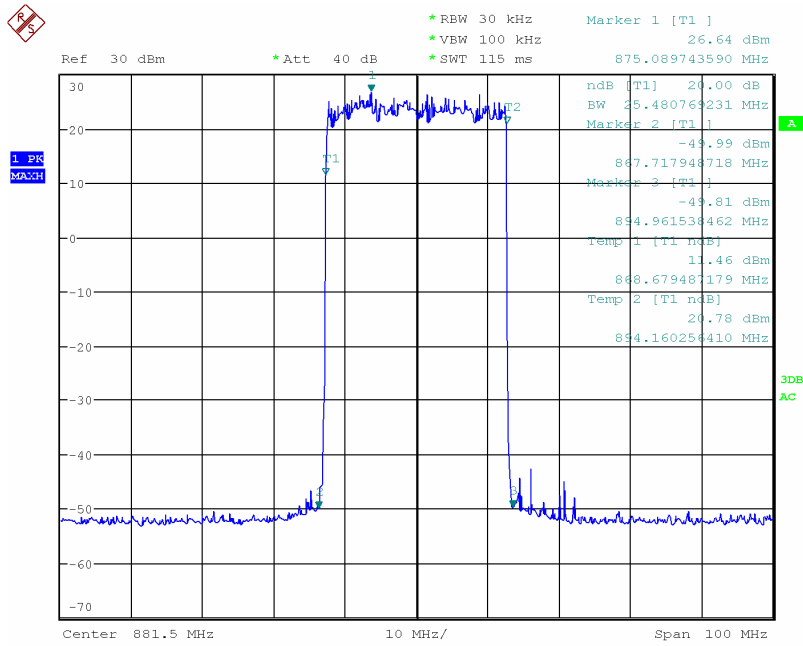
700MHz-down link



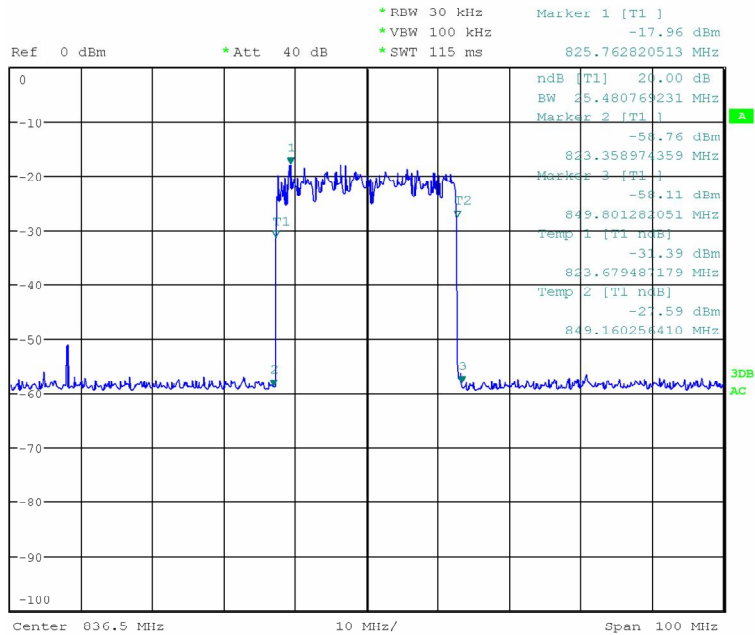
700MHz-up link



### 850MHz Band 850MHz-down link



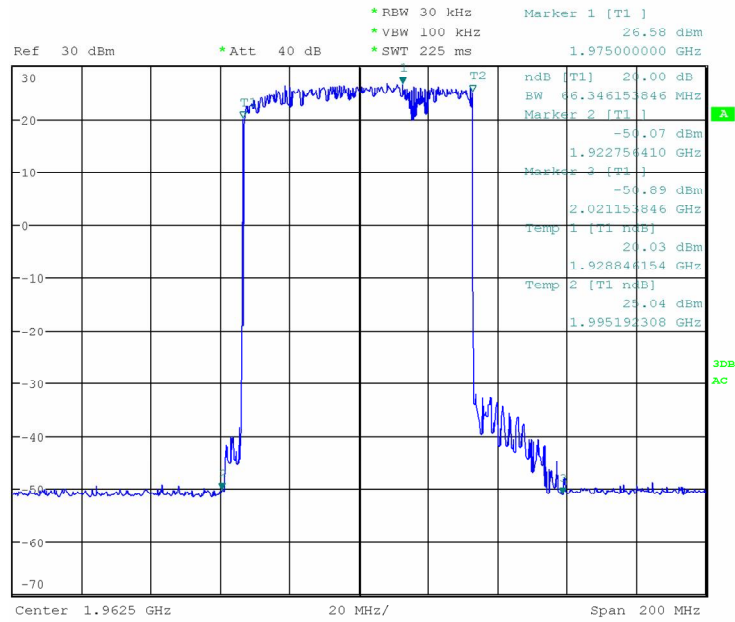
### 850MHz-up link



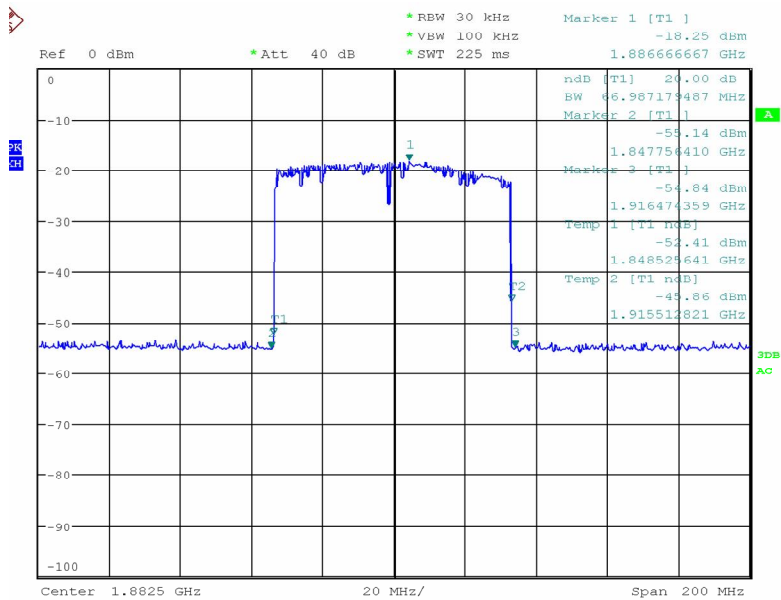


### 1900MHz Band

#### 1900MHz-down link



#### 1900MHz-up link



## 4.2.8 FREQUENCY STABILITY

Test Date:	16 April, 2012
Test Method:	FCC part 2.1055
Test Requirement:	FCC part 22.355& FCC part 24.235&FCC 27.54
Specification	The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block ,The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ( $\pm 2.5\text{ppm}$ )of the center frequency
Status	The output power of EUT be set to maximum value,the gain of EUT be set to maximum value by software through the manufacture
Conditions	Temperature condition, Voltage condition
Application	700MHz DL and UL ports,850MHz DL and UL ports, 1900MHz DL and UL ports
Test procedure	<ol style="list-style-type: none"><li>1. Temperature conditions:<ol style="list-style-type: none"><li>a)record the 20°C and normal voltage frequency value as reference point;</li><li>b)vary the temperature from -30°C to 60°C with step 10°C</li><li>c)when reach a temperature point ,keep the temperature banlance at least 1 hour to make the product working in this status;</li><li>d)record the frequency at the relative temperature.</li></ol></li><li>2. Voltage condition :<ol style="list-style-type: none"><li>a)record the 20°C and normal voltage frequency value as reference point;</li><li>b)vary the voltage from -15% norminal voltage to +15% voltage</li><li>c)read the frequency at the relative voltage.</li></ol></li></ol>

### 4.2.8.1 MEASUREMENT RECORD

#### 1. Frequency Stability vs temperature

##### 700MHz

Temperature(°C)	Frequency(MHz)	Tolerance(ppm)
60	737.000490	0.011
50	737.000478	-0.054
40	737.000465	0.023
30	737.000446	-0.022
20	737.000482	Reference
10	737.000467	-0.020
0	737.000449	-0.045
-10	737.000487	0.068
-20	737.000456	-0.065
-30	737.000468	-0.065

##### 850MHz

Temperature(°C)	Frequency(MHz)	Tolerance(ppm)
60	881.500489	0.009
50	881.500476	-0.006
40	881.500503	0.025
30	881.500492	0.012
20	881.500481	Reference
10	881.500468	-0.015
0	881.500429	-0.059
-10	881.500431	-0.057
-20	881.500410	-0.081
-30	881.500417	-0.073

##### 1900MHz

Temperature(°C)	Frequency(MHz)	Tolerance(ppm)
60	1962.500483	0.015
50	1962.500465	0.006
40	1962.500472	0.009
30	1962.500462	0.004
20	1962.500454	Reference
10	1962.500501	0.024
0	1962.500489	0.018
-10	1962.500287	-0.085
-20	1962.500398	-0.029
-30	1962.500380	-0.038

2.Frequency Stability vs voltage

700MHz

Voltage(V )	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	737.000468	0.018
120	737.000455	Reference
138(120*1.15)	737.000433	-0.029

850MHz

Voltage(V )	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	881.500466	-0.017
120	881.500481	Reference
138(120*1.15)	881.500456	-0.027

1900MHz

Voltage(V )	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	1962.500477	0.012
120	1962.500454	Reference
138(120*1.15)	1962.500469	0.008

## APPENDIX A: PHOTOGRAPH OF THE TEST CONFIGURATION

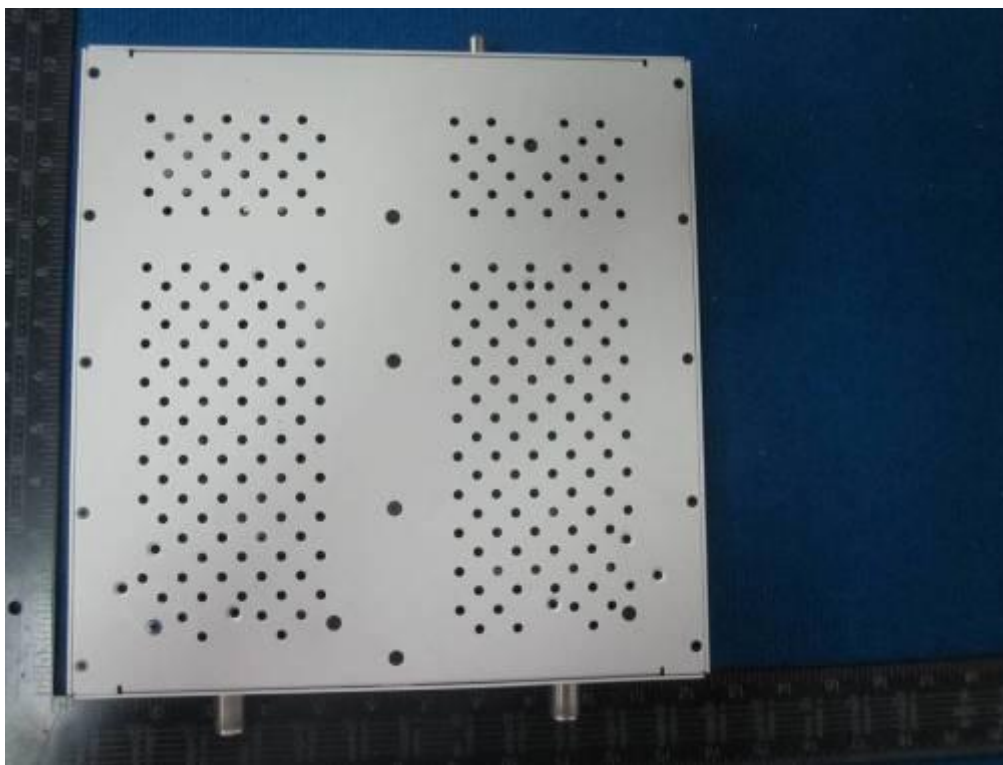
RE (Blowe 1GHz)

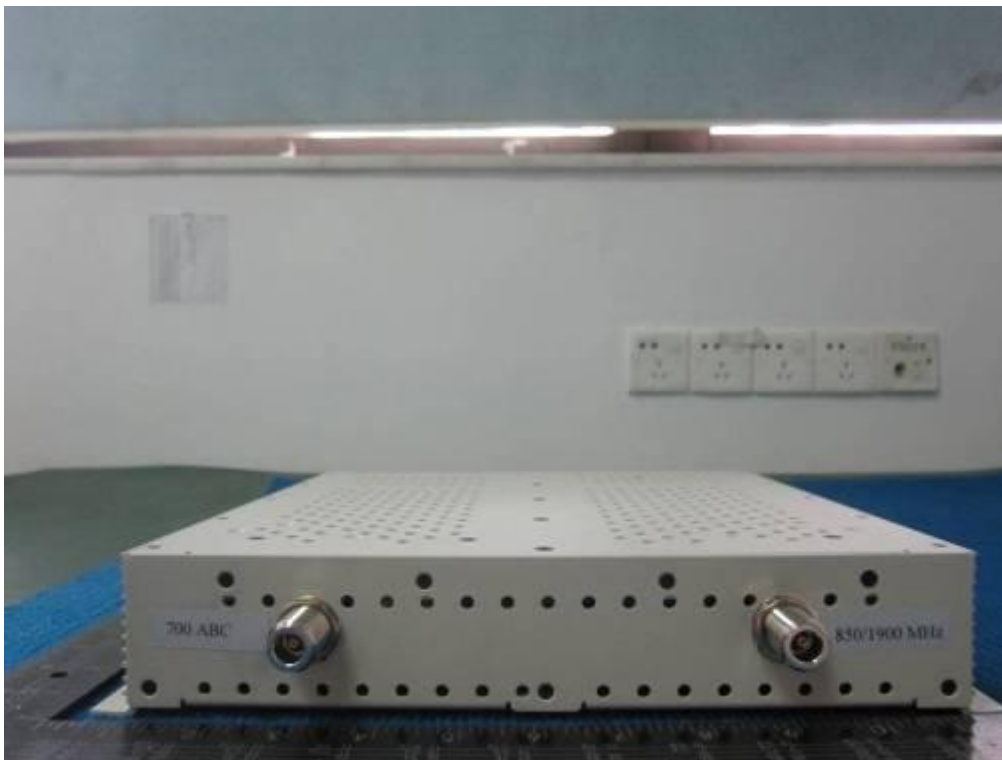


RE (Above 1GHz)

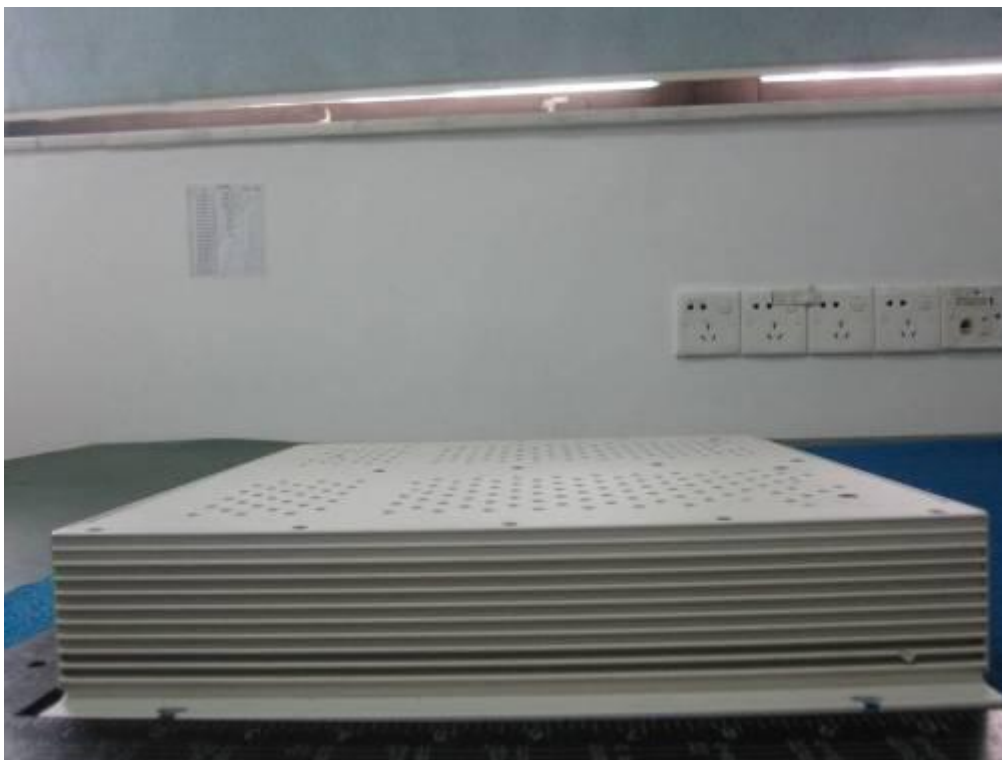


**APPENDIX B: PHOTOGRAPHS OF EUT**

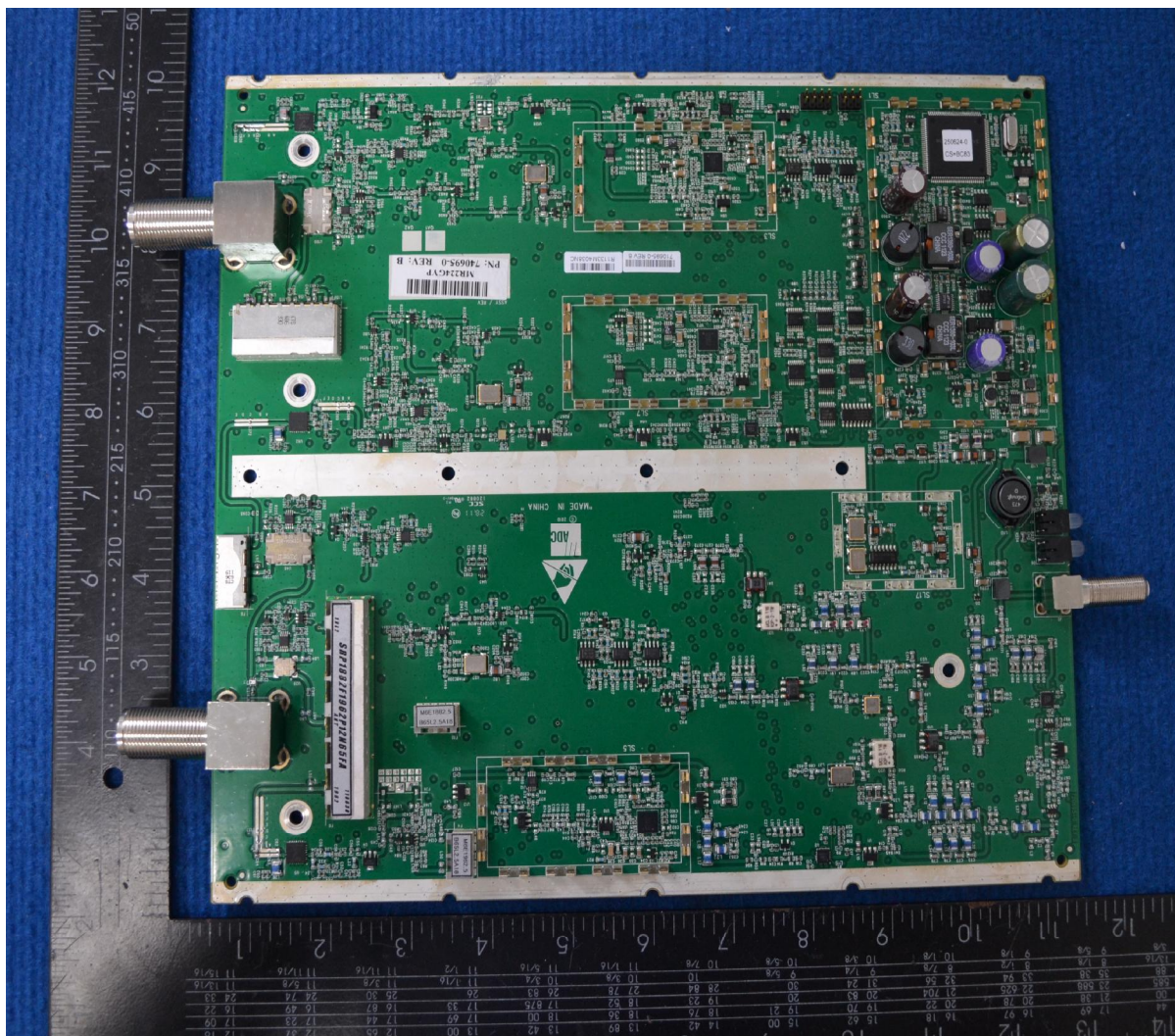




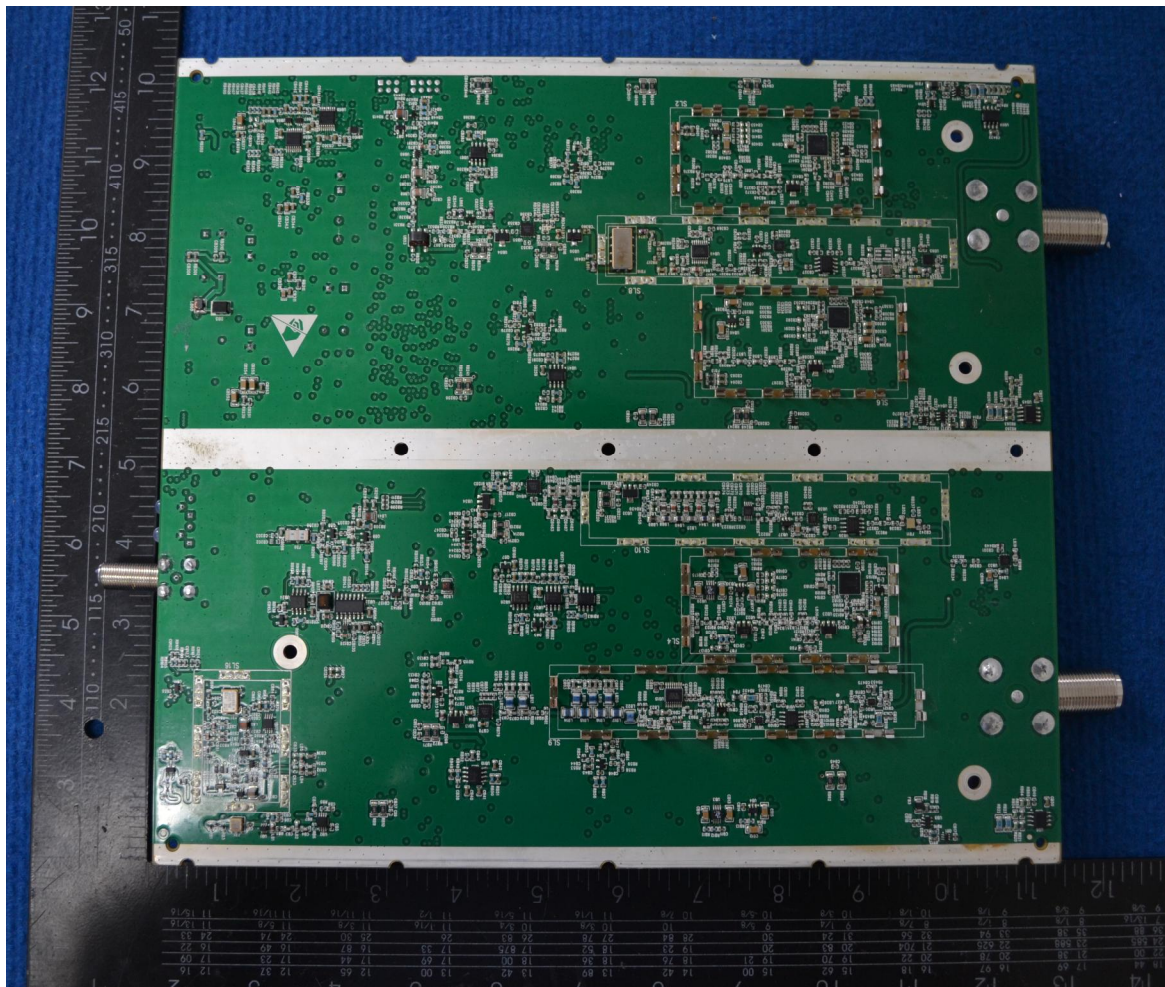




Front side



Rear side



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