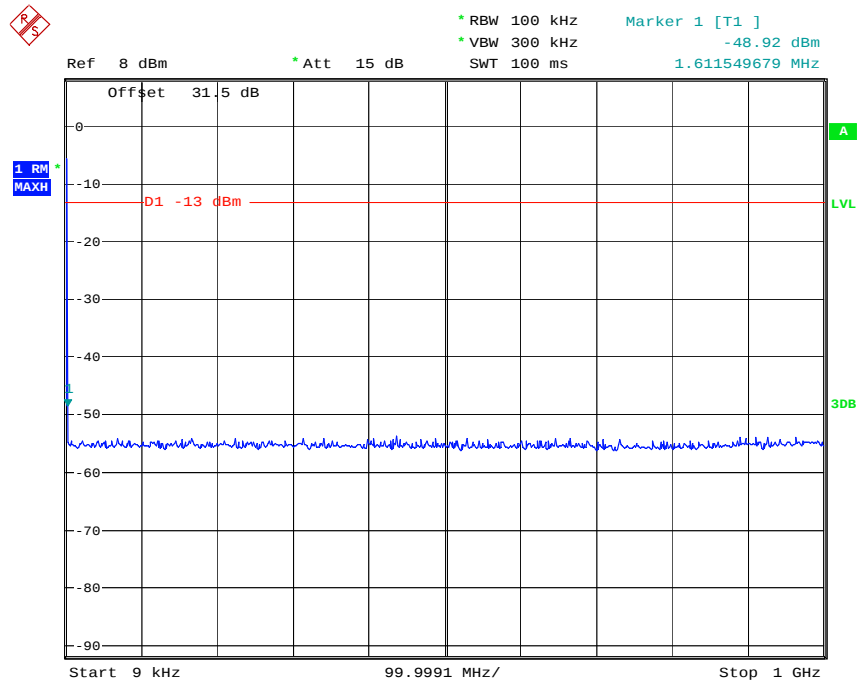


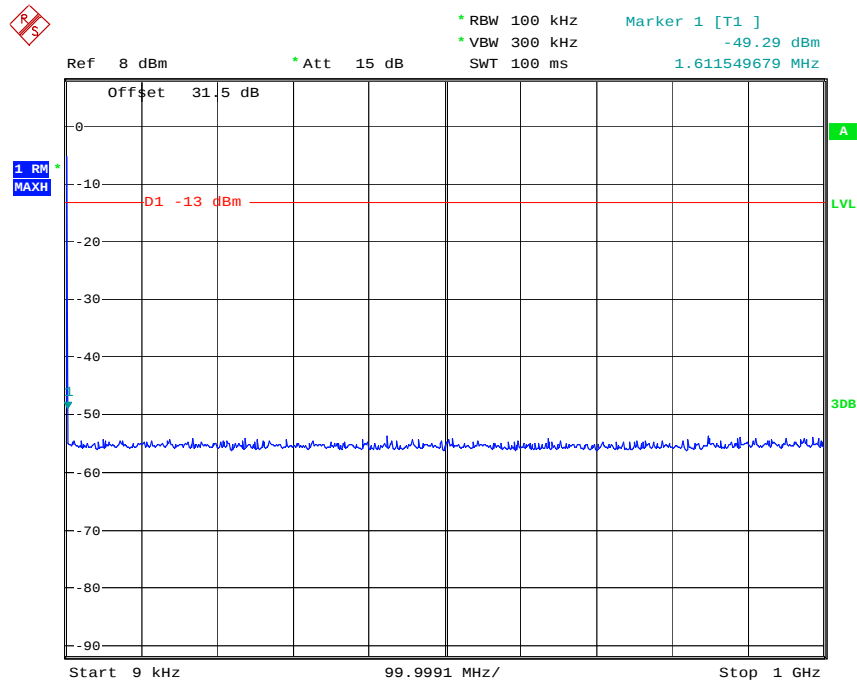
(c) Middle frequency: 9 kHz to 1 GHz



(d) Middle frequency: 1 GHz to 26.5 GHz



(e) Highest frequency: 9 kHz to 1 GHz



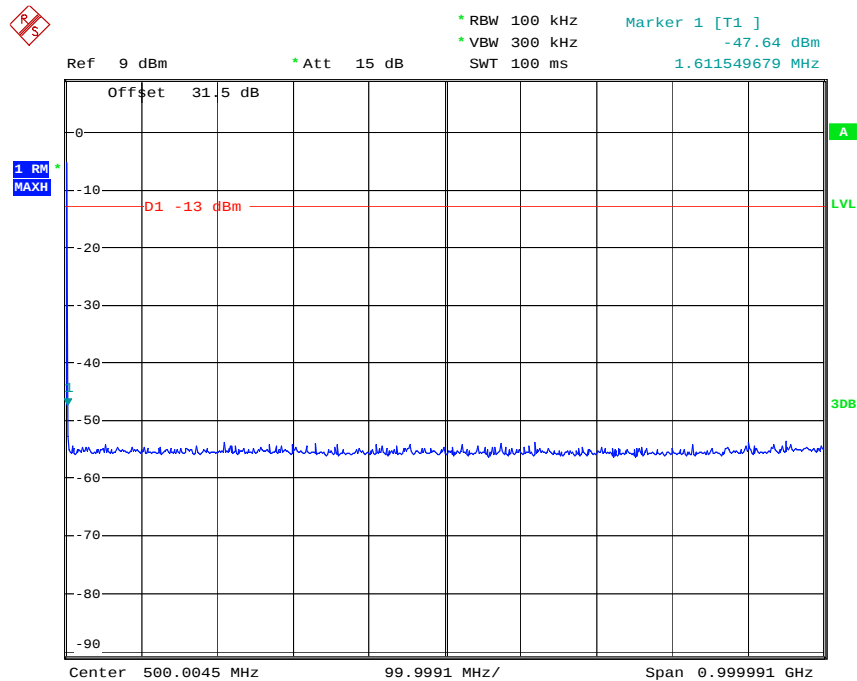
Date: 11.OCT.2013 18:52:54

(f) Highest frequency: 1 GHz to 26.5 GHz



1.3) Test for LTE 5MHz

(a) Lowest frequency: 9 kHz to 1 GHz

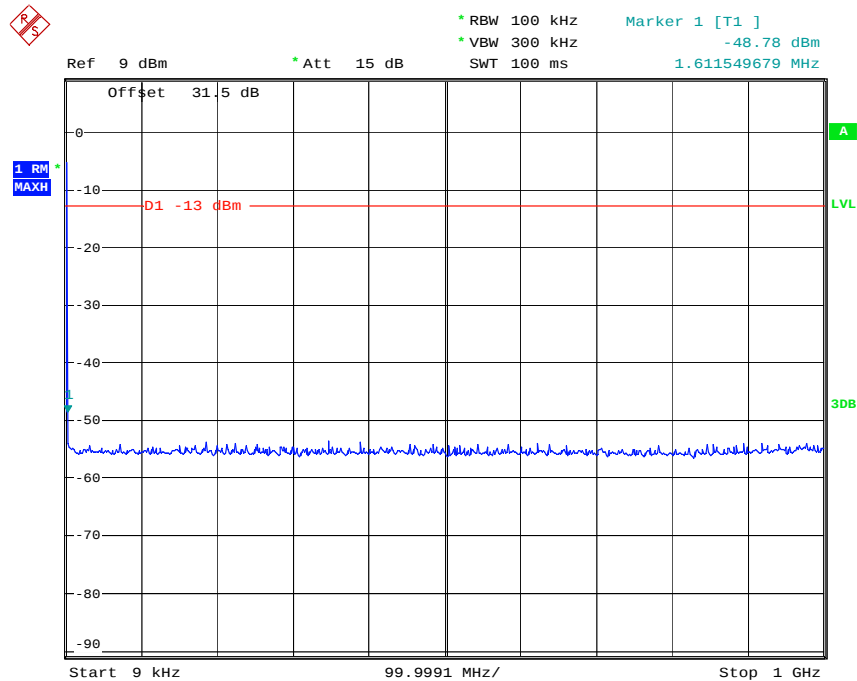


Date: 11.OCT.2013 18:59:35

(b) Lowest frequency: 1 GHz to 26.5 GHz



(c) Middle frequency: 9 kHz to 1 GHz

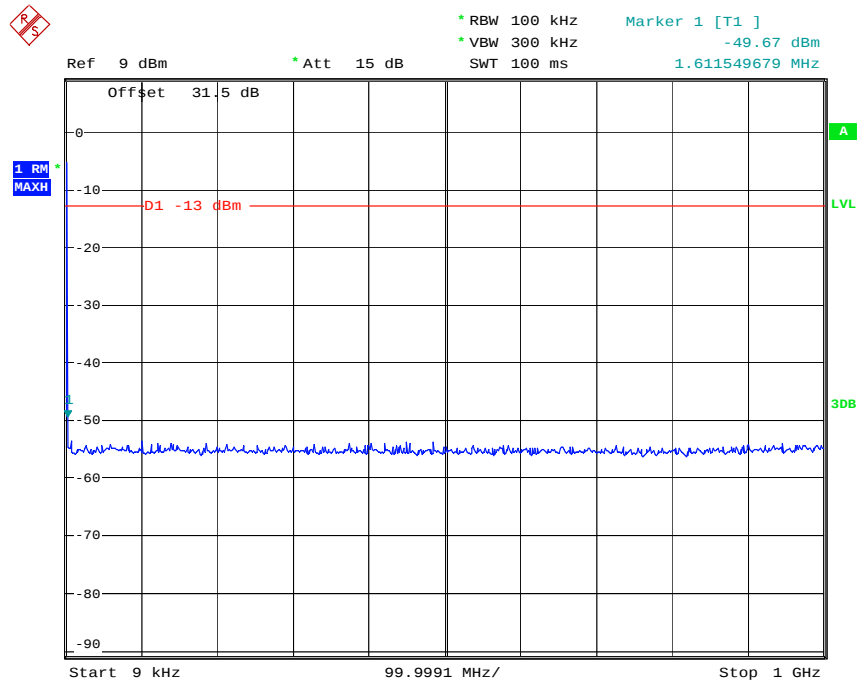


Date: 11.OCT.2013 18:59:12

(d) Middle frequency: 1 GHz to 26.5 GHz

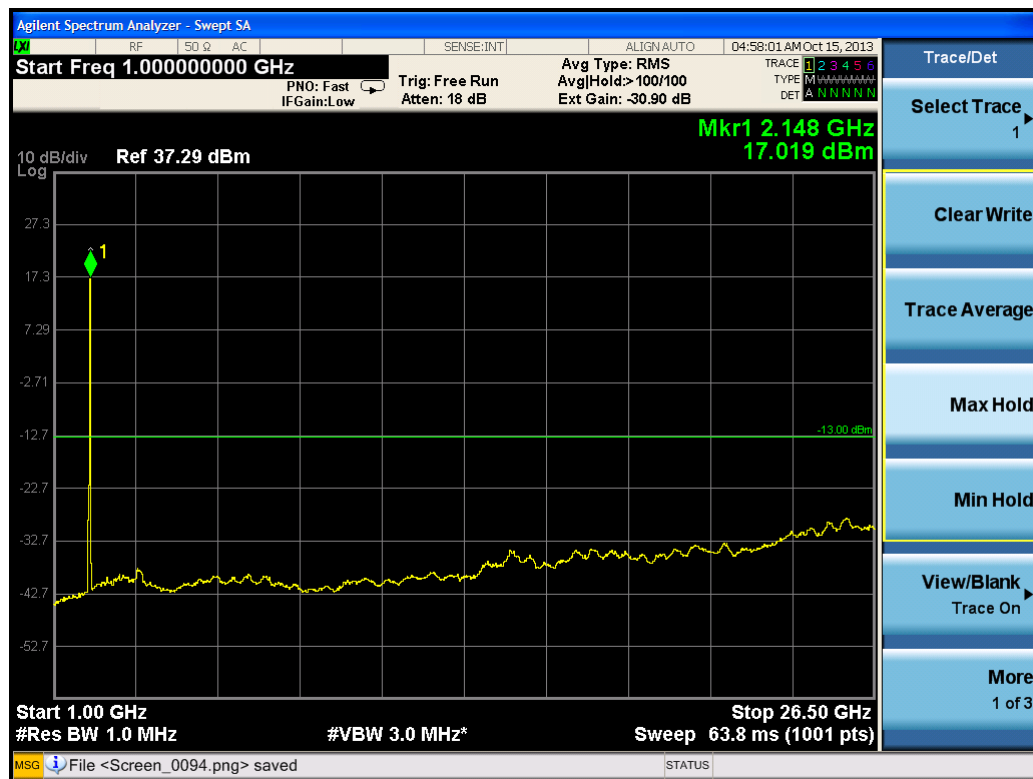


(e) Highest frequency: 9 kHz to 1 GHz



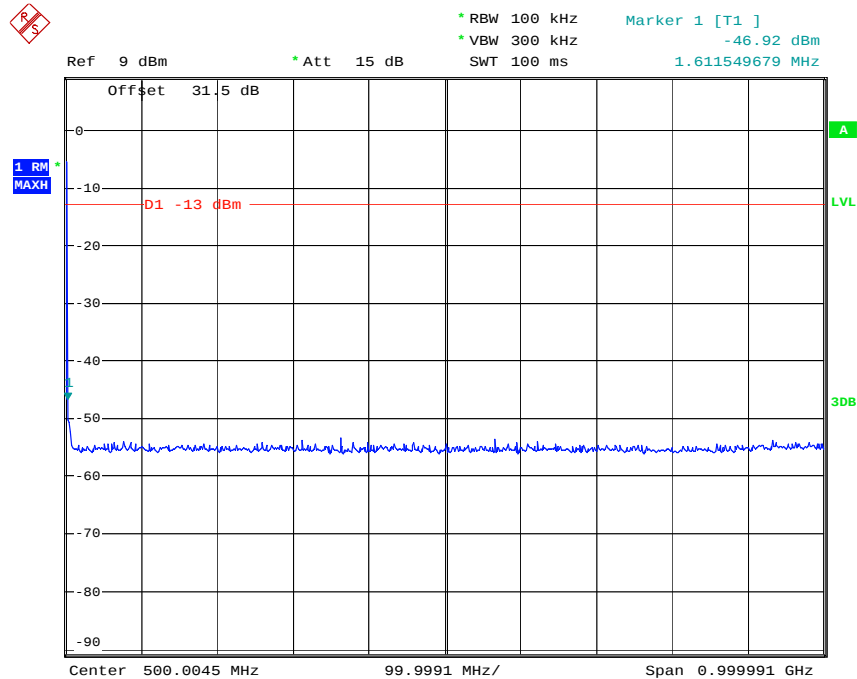
Date: 11.OCT.2013 18:58:48

(f) Highest frequency: 1 GHz to 26.5 GHz



1.4) Test for LTE 10MHz

(a) Lowest frequency: 9 kHz to 1 GHz

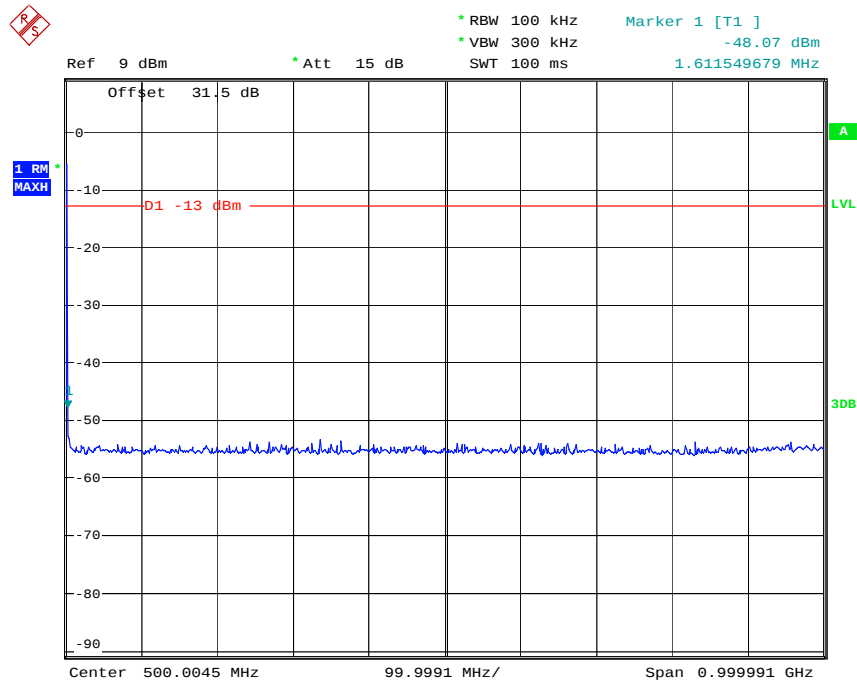


Date: 11.OCT.2013 19:00:26

(b) Lowest frequency: 1 GHz to 26.5 GHz



(c) Middle frequency: 9 kHz to 1 GHz

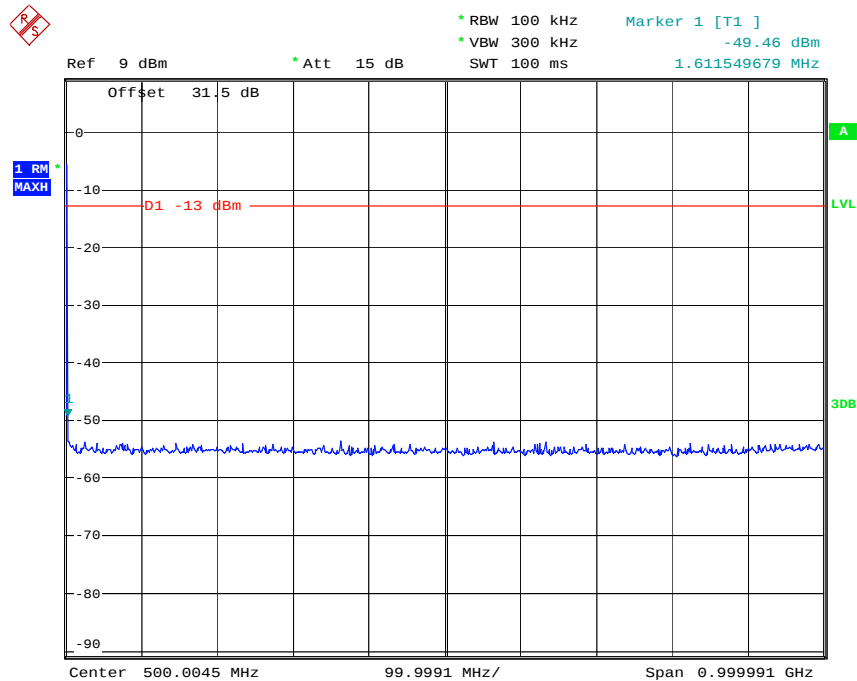


Date: 11.OCT.2013 19:00:58

(d) Middle frequency: 1 GHz to 26.5 GHz



(e) Highest frequency: 9 kHz to 1 GHz



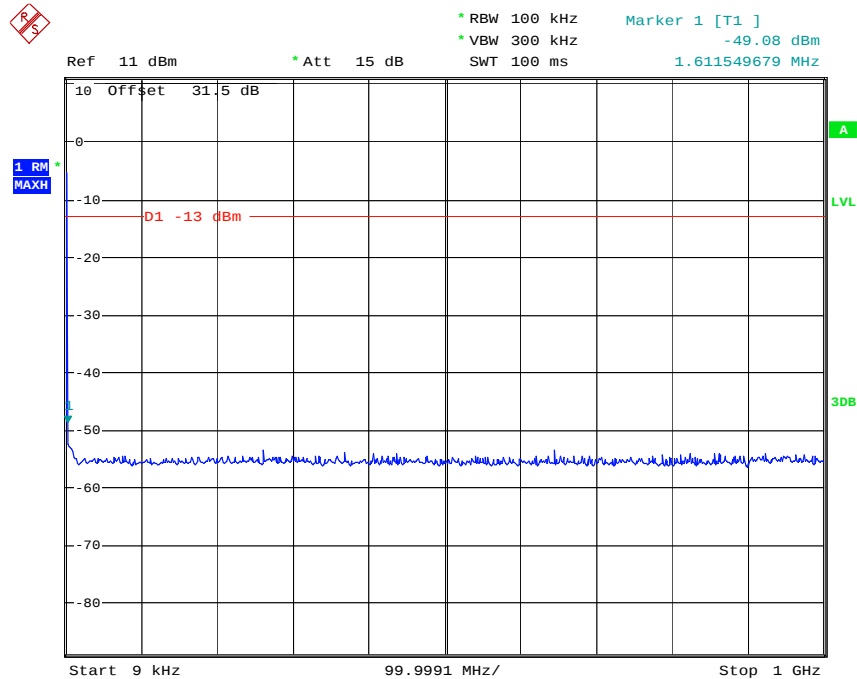
Date: 11.OCT.2013 19:01:21

(f) Highest frequency: 1 GHz to 26.5 GHz



1.5) Test for LTE 15MHz

(a) Lowest frequency: 9 kHz to 1 GHz

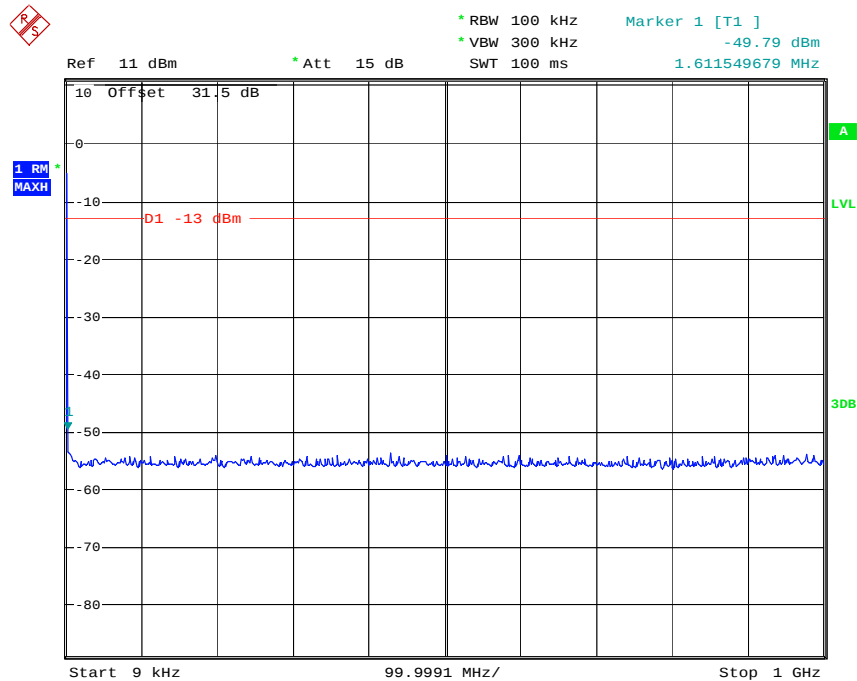


Date: 11.OCT.2013 19:07:01

(b) Lowest frequency: 1 GHz to 26.5 GHz



(c) Middle frequency: 9 kHz to 1 GHz

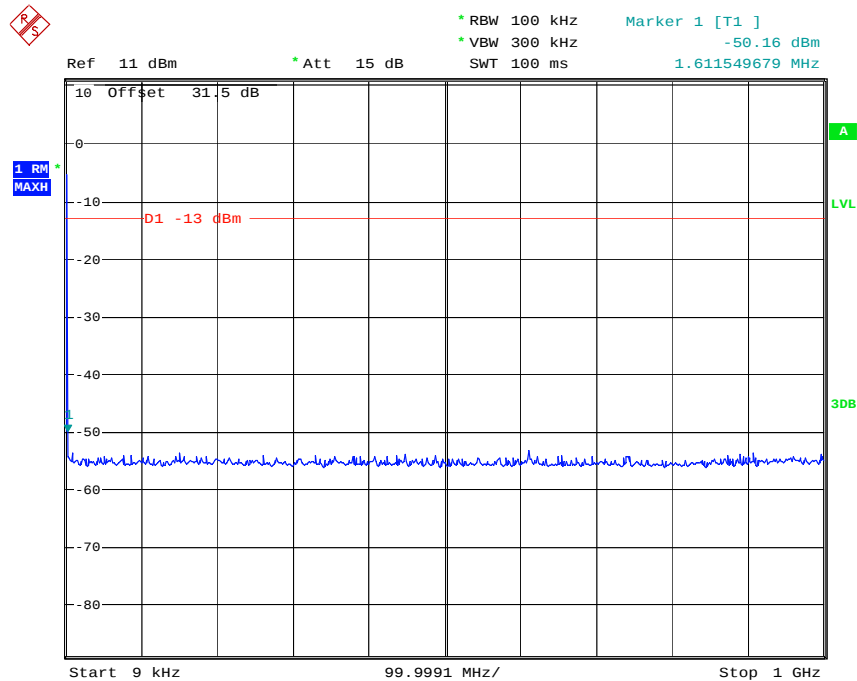


Date: 11.OCT.2013 19:06:39

(d) Middle frequency: 1 GHz to 26.5 GHz



(e) Highest frequency: 9 kHz to 1 GHz



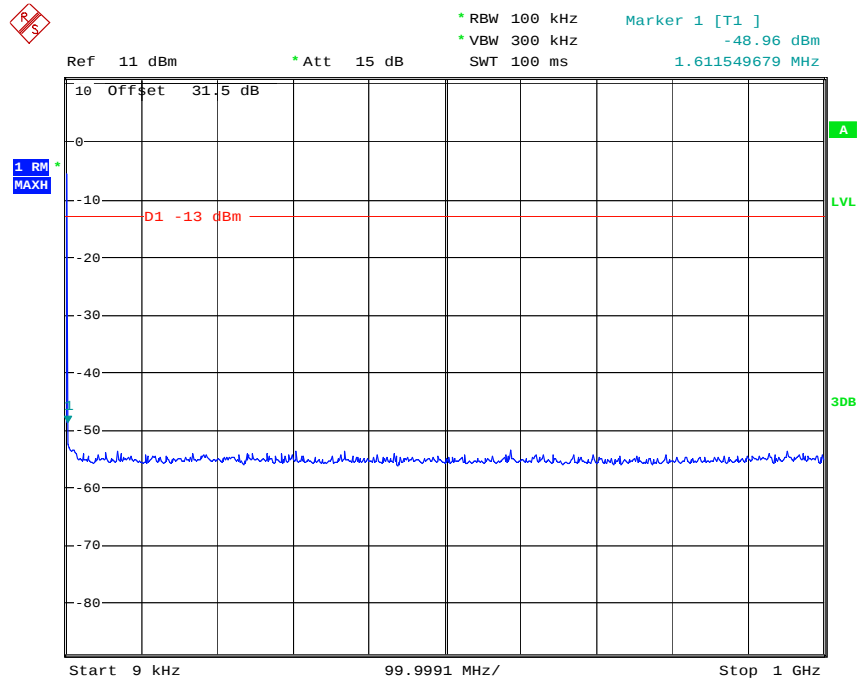
Date: 11.OCT.2013 19:06:17

(f) Highest frequency: 1 GHz to 26.5 GHz



1.6) Test for LTE 20MHz

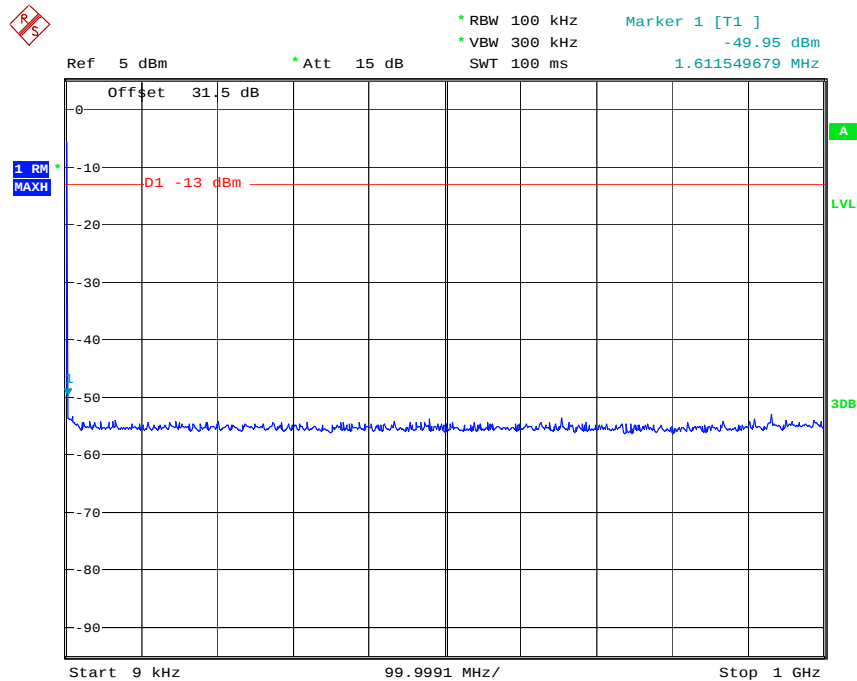
(a) Lowest frequency: 9 kHz to 1 GHz



(b) Lowest frequency: 1 GHz to 26.5 GHz



(c) Middle frequency: 9 kHz to 1 GHz

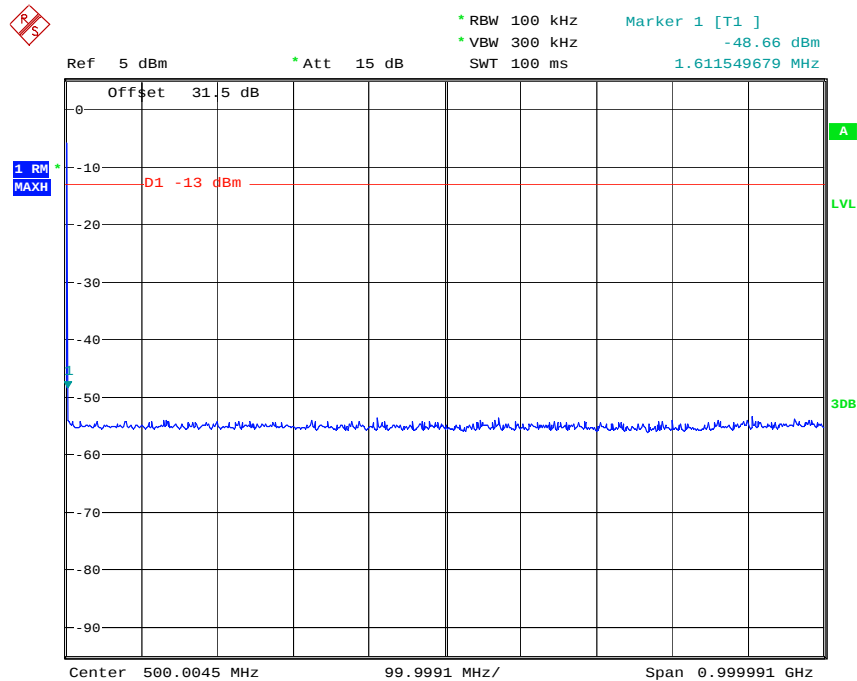


Date: 11.OCT.2013 19:08:21

(d) Middle frequency: 1 GHz to 26.5 GHz



(e) Highest frequency: 9 kHz to 1 GHz



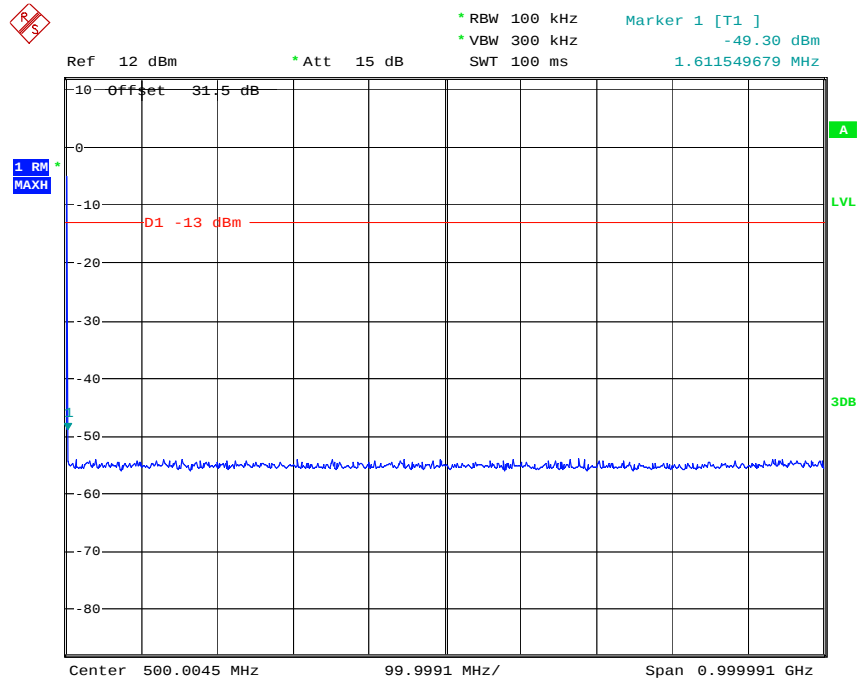
Date: 11.OCT.2013 19:08:51

(f) Highest frequency: 1 GHz to 26.5 GHz



2) CDMA modulation

(a) Lowest frequency: 9 kHz to 1 GHz

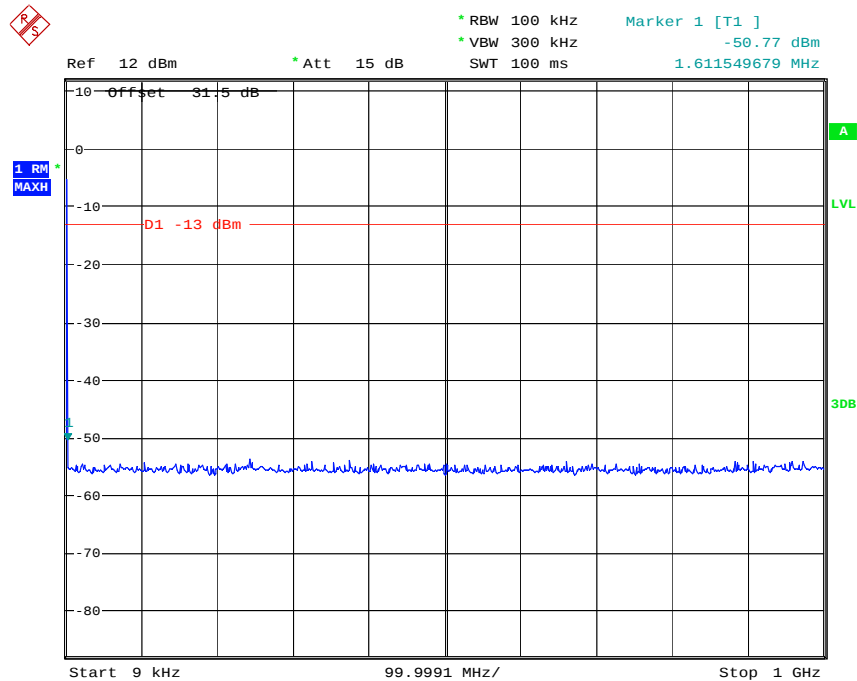


Date: 11.OCT.2013 19:17:23

(b) Lowest frequency: 1 GHz to 26.5 GHz



(c) Middle frequency: 9 kHz to 1 GHz

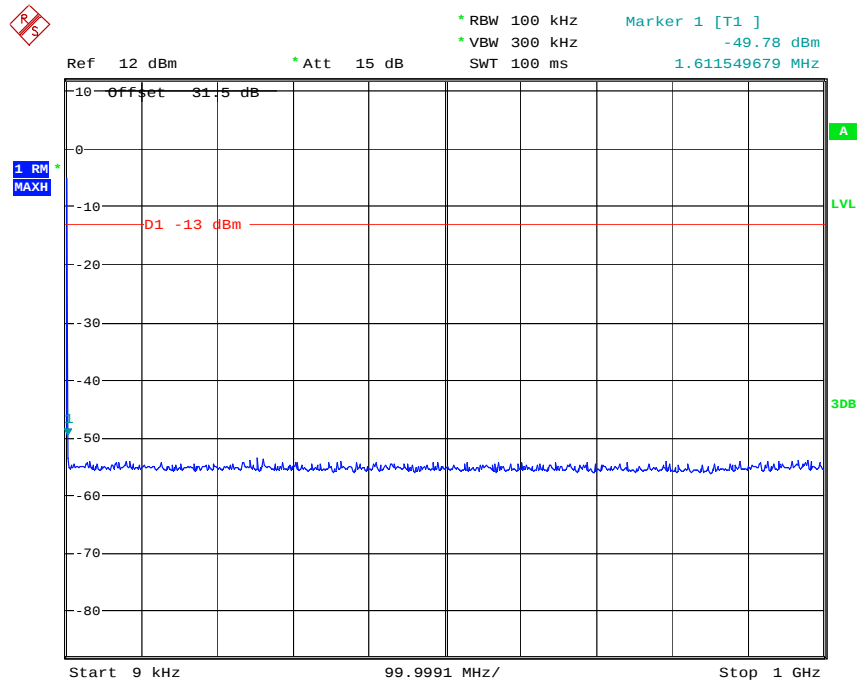


Date: 11.OCT.2013 19:16:56

(d) Middle frequency: 1 GHz to 26.5 GHz

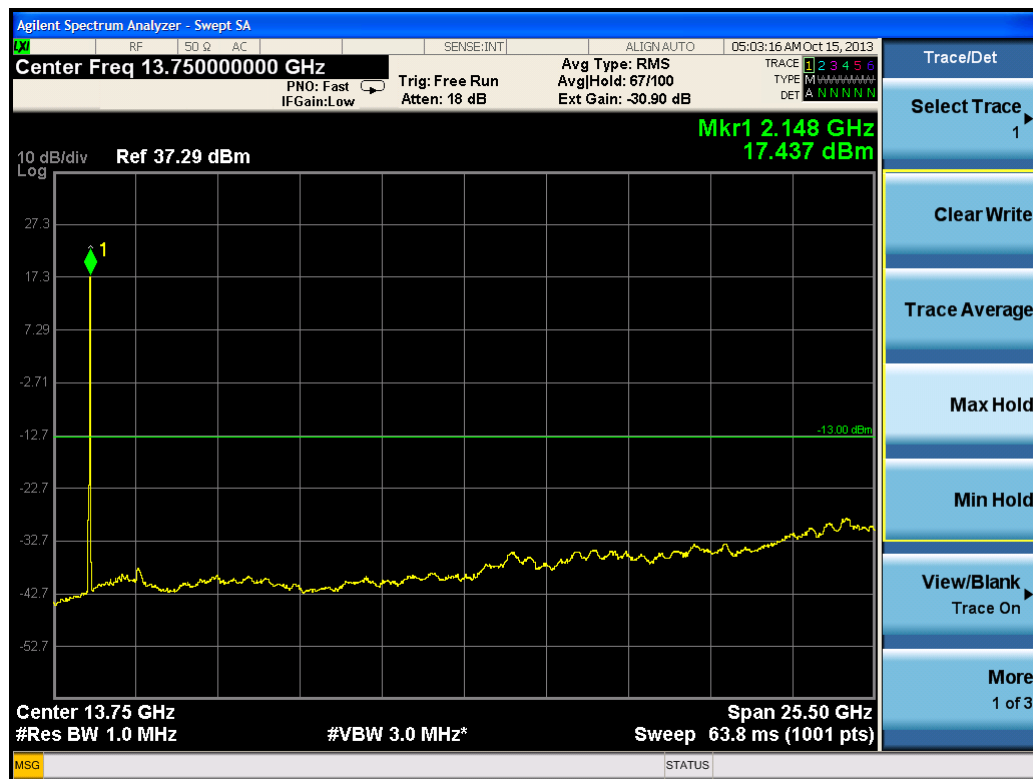


(e) Highest frequency: 9 kHz to 1 GHz



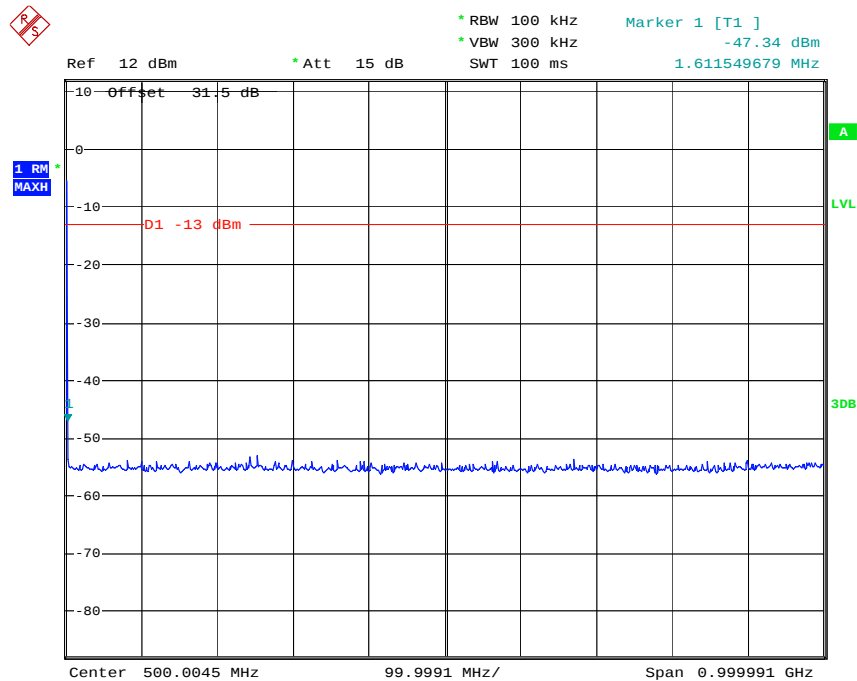
Date: 11.OCT.2013 19:16:30

(f) Highest frequency: 1 GHz to 26.5 GHz



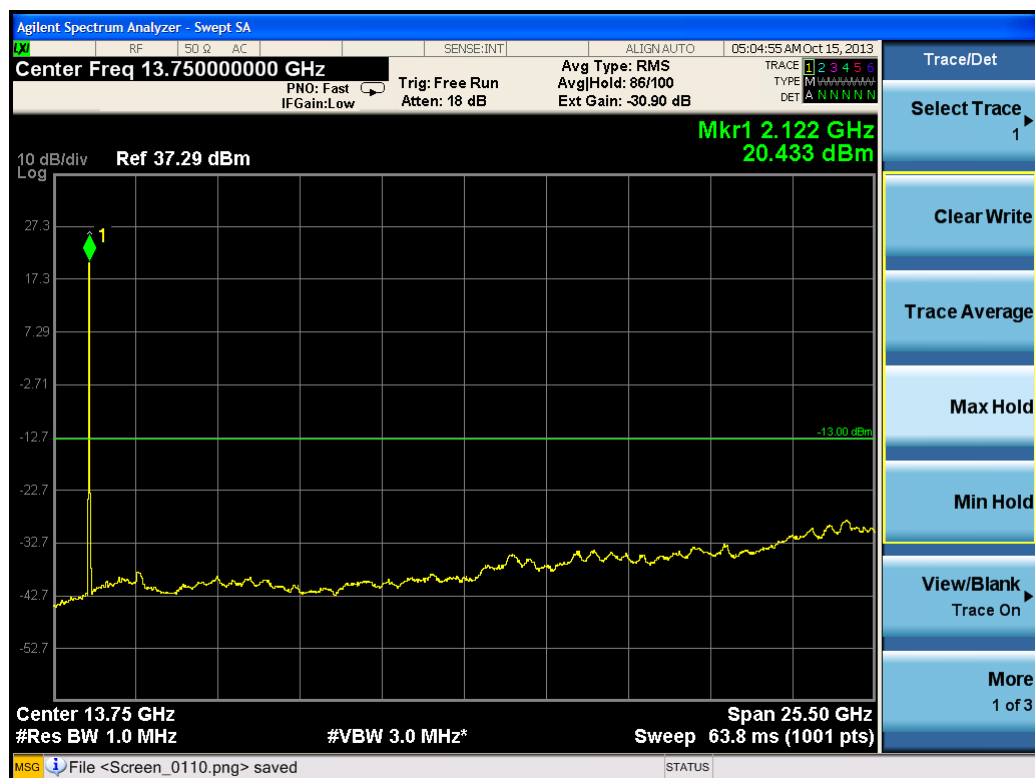
3) WCDMA modulation

(a) Lowest frequency: 9 kHz to 1 GHz

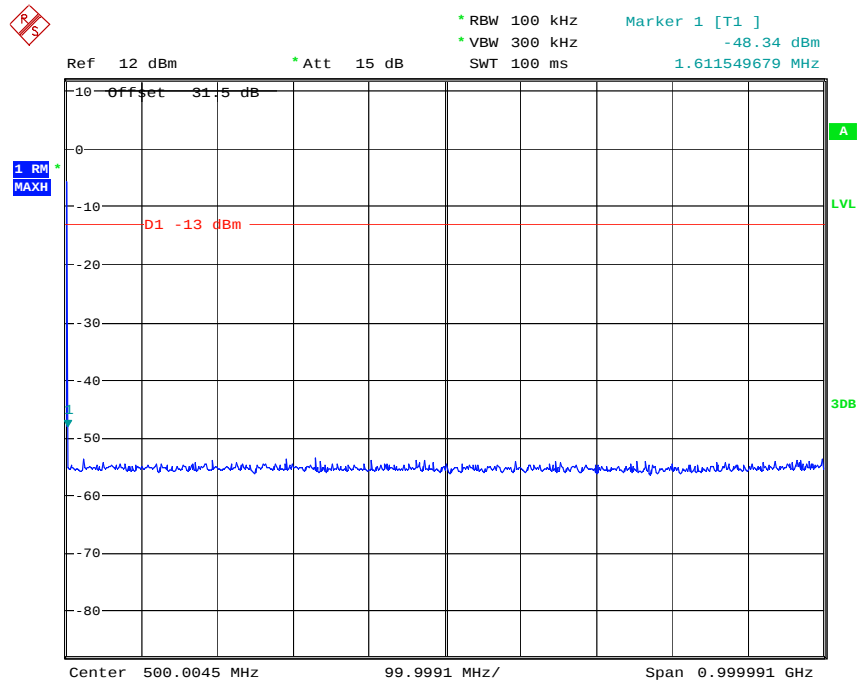


Date: 11.OCT.2013 19:18:27

(b) Lowest frequency: 1 GHz to 26.5 GHz



(c) Middle frequency: 9 kHz to 1 GHz

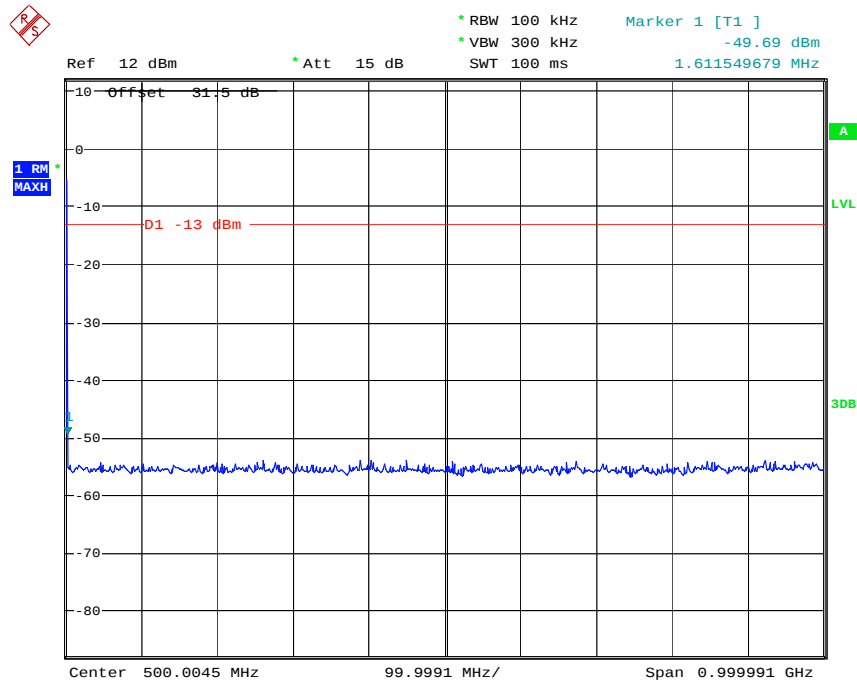


Date: 11.OCT.2013 19:18:47

(d) Middle frequency: 1 GHz to 26.5 GHz



(e) Highest frequency: 9 kHz to 1 GHz



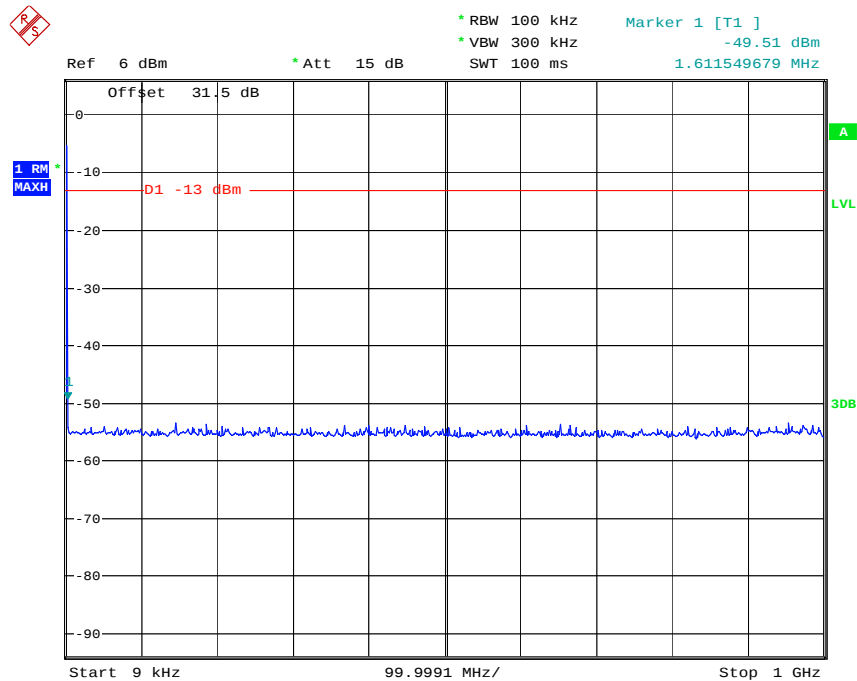
Date: 11.OCT.2013 19:19:05

(f) Highest frequency: 1 GHz to 26.5 GHz



4) 1x EV-DO modulation

(a) Lowest frequency: 9 kHz to 1 GHz

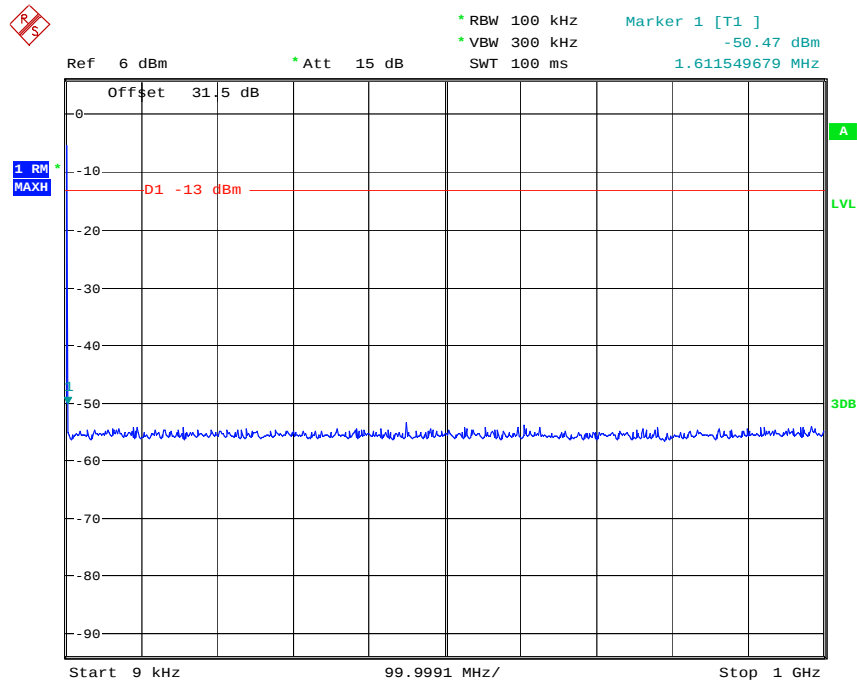


Date: 11.OCT.2013 19:26:11

(b) Lowest frequency: 1 GHz to 26.5 GHz



(c) Middle frequency: 9 kHz to 1 GHz

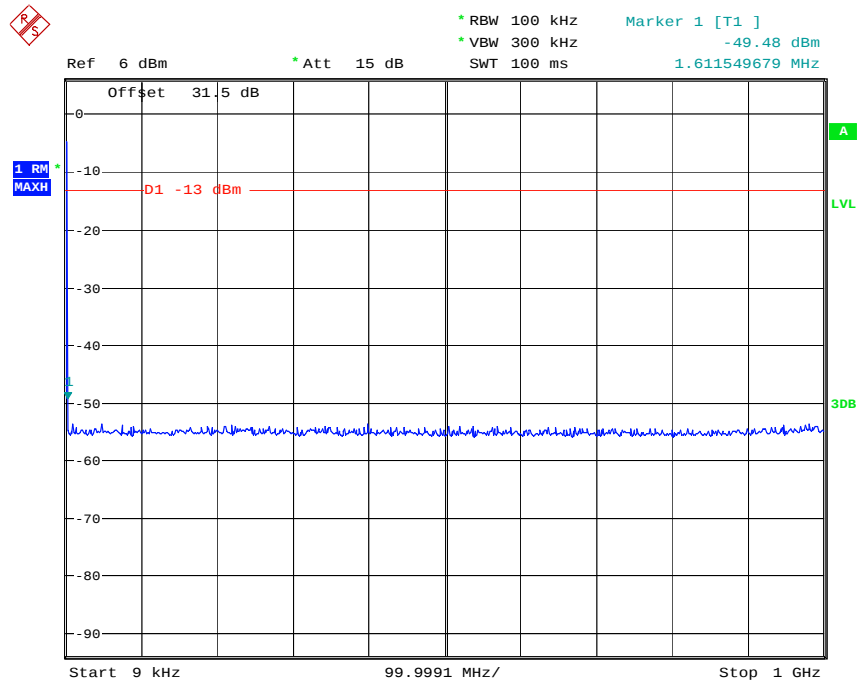


Date: 11.OCT.2013 19:25:47

(d) Middle frequency: 1 GHz to 26.5 GHz



(e) Highest frequency: 9 kHz to 1 GHz



Date: 11.OCT.2013 19:25:28

(f) Highest frequency: 1 GHz to 26.5 GHz



5.3.3 Band Edge

Test Date:	12 Oct, 2013 to 18 Nov, 2013
Ambient Temp:	20.0°C
Humid :	67%
Atmospheric Pressure:	1005mbar
Power supply:	AC 120V 60Hz
Test Method:	FCC part 2. 1051& 935210 D02 Signal Boosters Certification v01r01
Test Requirement:	
700MHz Lower ABC Band	FCC part 27. 53 The power of any emission outside a licensee's frequency block shall be attenuated below the transmitting power (P) by at least $43 + 10 \log (P)$ dB, or -13 dBm.
700MHz Upper C Band	FCC part 27. 53 The power of any emission outside a licensee's frequency block shall be attenuated below the transmitting power (P) by at least $43 + 10 \log (P)$ dB, or -13 dBm.
850MHz Band	FCC part 22. 917 The power of any emission outside a licensee's frequency block shall be attenuated below the transmitting power (P) by at least $43 + 10 \log (P)$ dB, or -13 dBm.
1900MHz Broadband PCS	FCC part 24. 238 The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB, or -13 dBm.
AWS-1 Band	FCC part 27. 53 The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB, or -13 dBm.
EUT Operation:	The output power of EUT be set to maximum value, the gain of EUT be set to maximum value by software through the manufacture
Test conditions:	Normal conditions

Test configuration:

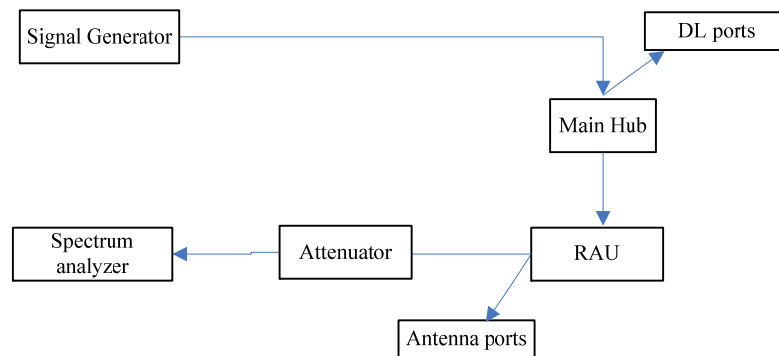
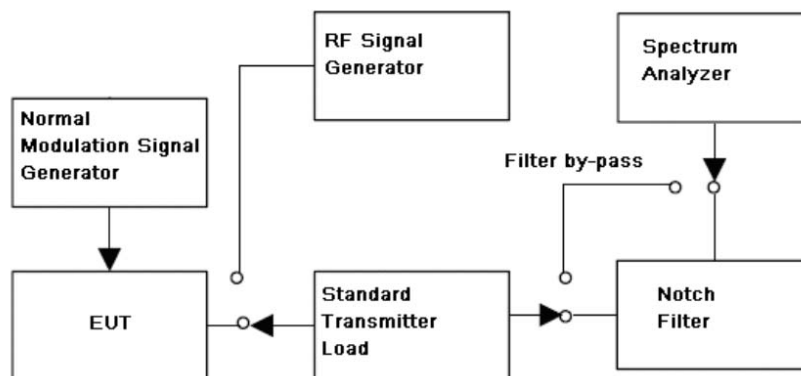


Figure 3: Downlink Configuration



Test Procedure:

Band Edge conducted Emission test procedure:

- a) Connect the equipment as illustrated, when the output power is over the max. value of the Spectrum Analyzer, add the attenuator to avoid destroying the facility.
- b) Set the center frequency of the Spectrum Analyzer to assigned transmitter frequency, and set the level of the carrier to the full scale reference line.
- c) Do not apply any tone to modulate the EUT
- d) Adjust the Spectrum Analyzer for the following setting:
 - 1) Resolution Bandwidth (base the standard, apply the different set), here is 100kHz for frequency band less than 1 GHz, 1 MHz for frequency over 1 GHz
 - 2) Video Bandwidth refer to standard requirement
- e) Adjust the center frequency of the spectrum analyzer for incremental coverage of the range from:
Use spectrum analyzer channel power measurement

- 1) the lowest radio frequency generated in the equipment, it can be 9 kHz base the test method, here select 30 MHz as lowest frequency start point;
 - 2) the highest radio frequency shall higher than 10 times of carrier frequency;
- f) Record the frequencies and levels of spurious emissions;

Remark:

The notch filter is used for avoid the EUT fundamental carrier output power making the spectrum overload and the harmonic spurious brought by it.

When the EUT fundamental carrier is not enough to make the status, the notch filter could be not used.

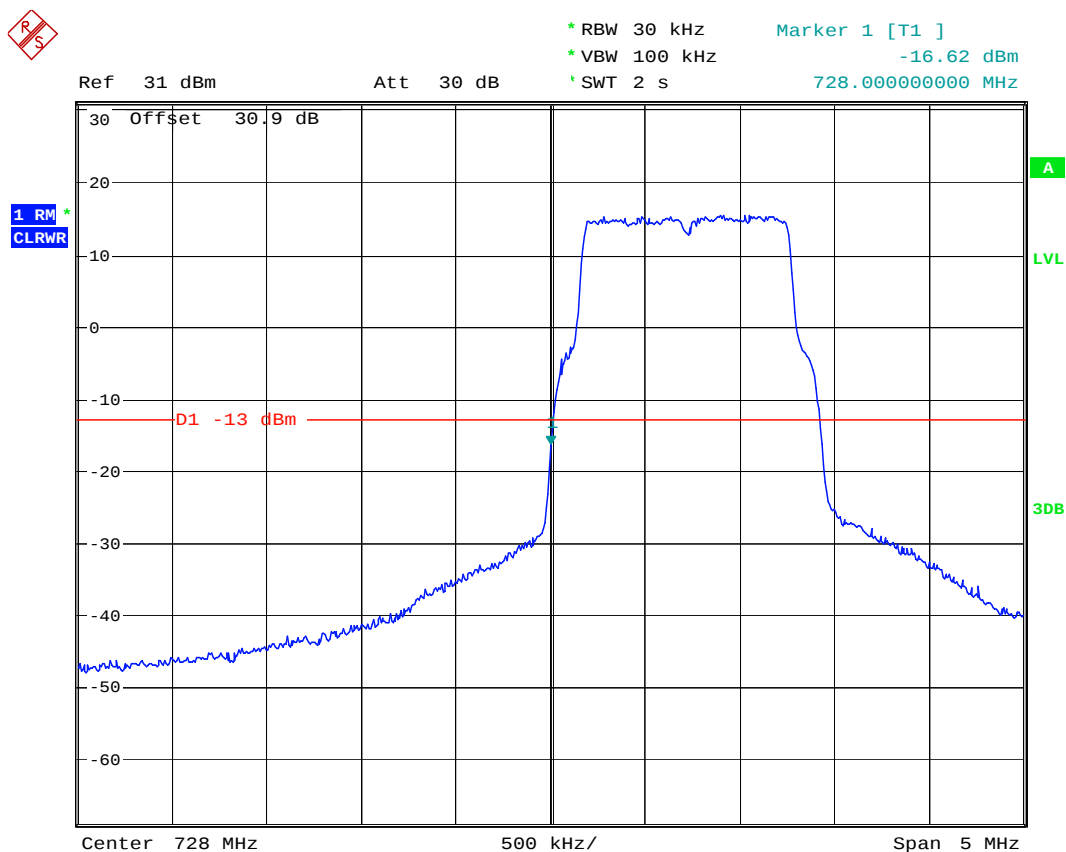
5.3.3.1 Measurement Record

5.3.3.1.1 700MHz Lower ABC Band for Downlink

1) 700MHz Lower A LTE modulation

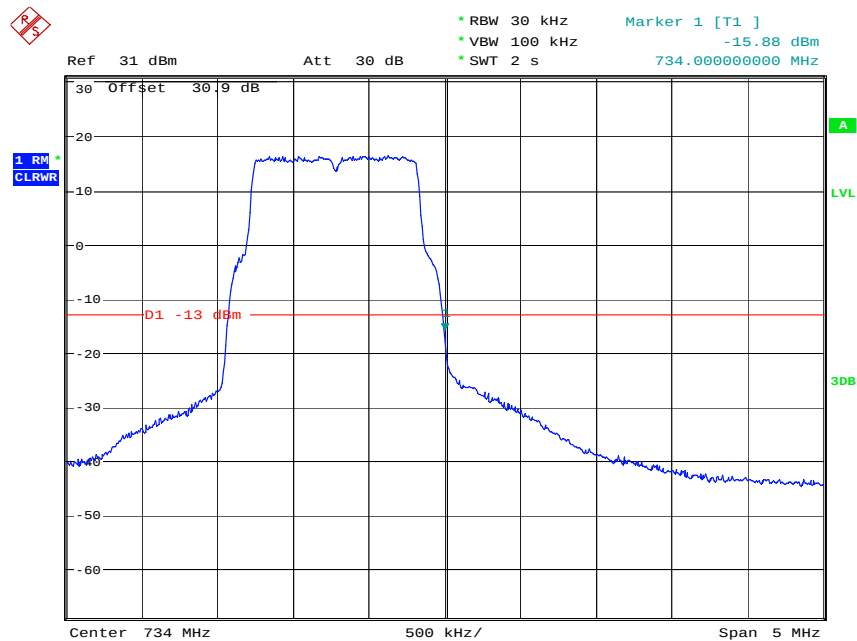
1.1) Test for LTE 1.4MHz

a) Lower Edge



Date: 12.OCT.2013 17:32:13

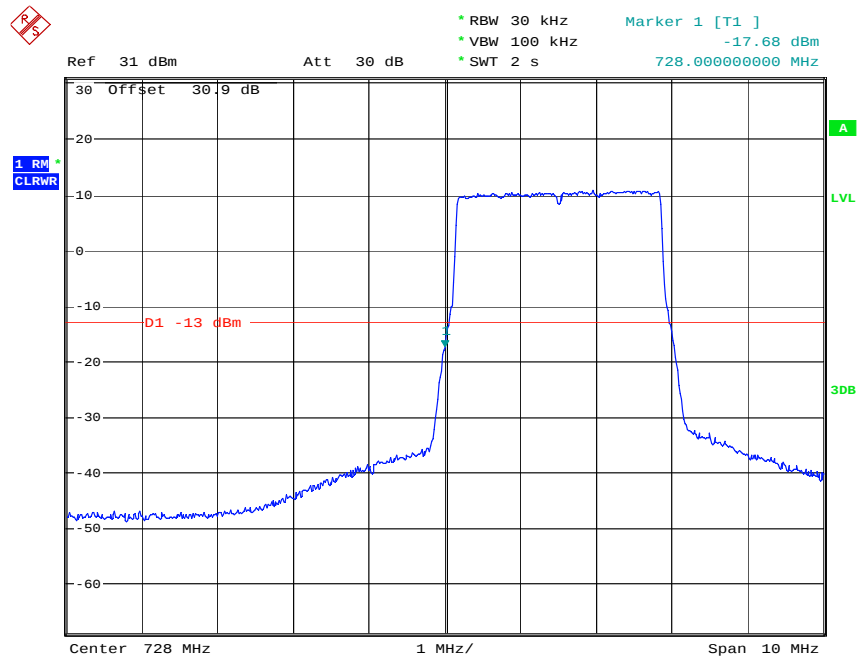
b) Upper Edge



Date: 12.OCT.2013 17:33:13

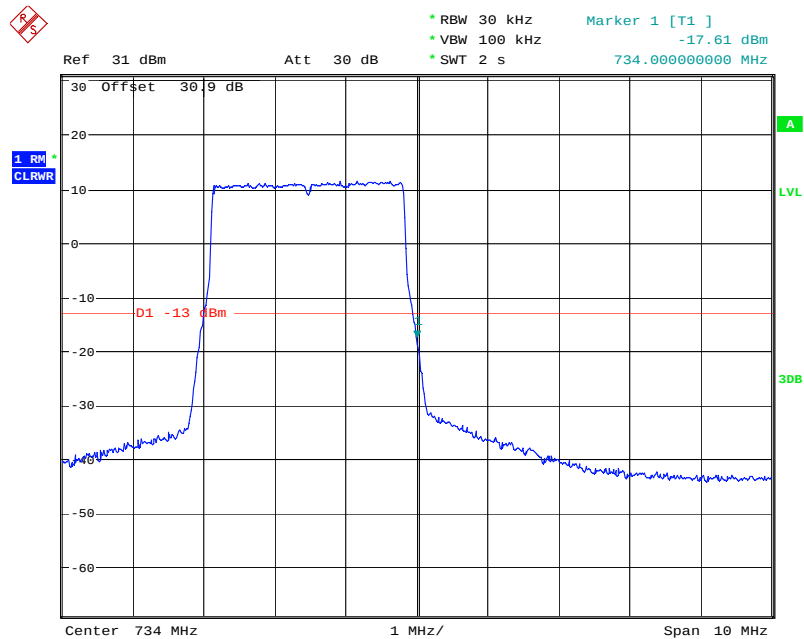
1.2) Test for LTE 3MHz

a) Lower Edge



Date: 12.OCT.2013 17:37:10

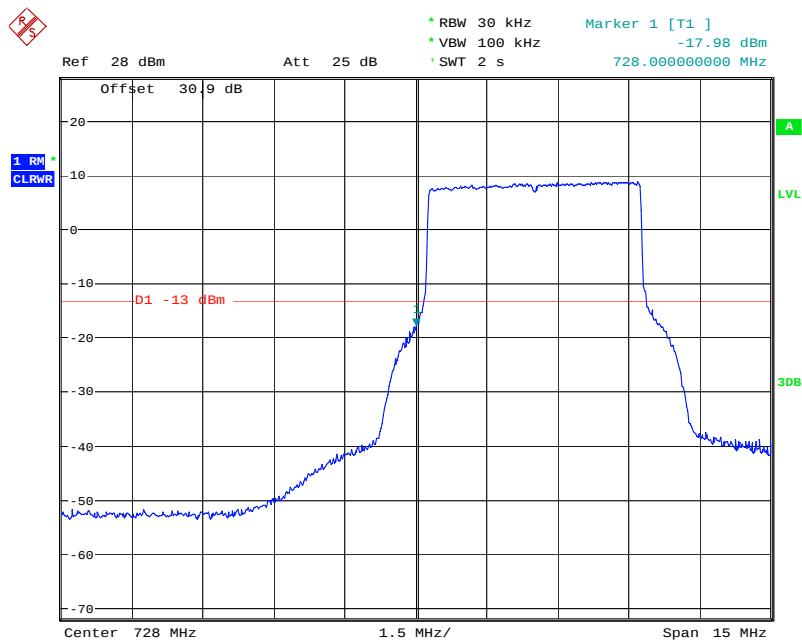
b) Upper Edge



Date: 12.OCT.2013 17:36:29

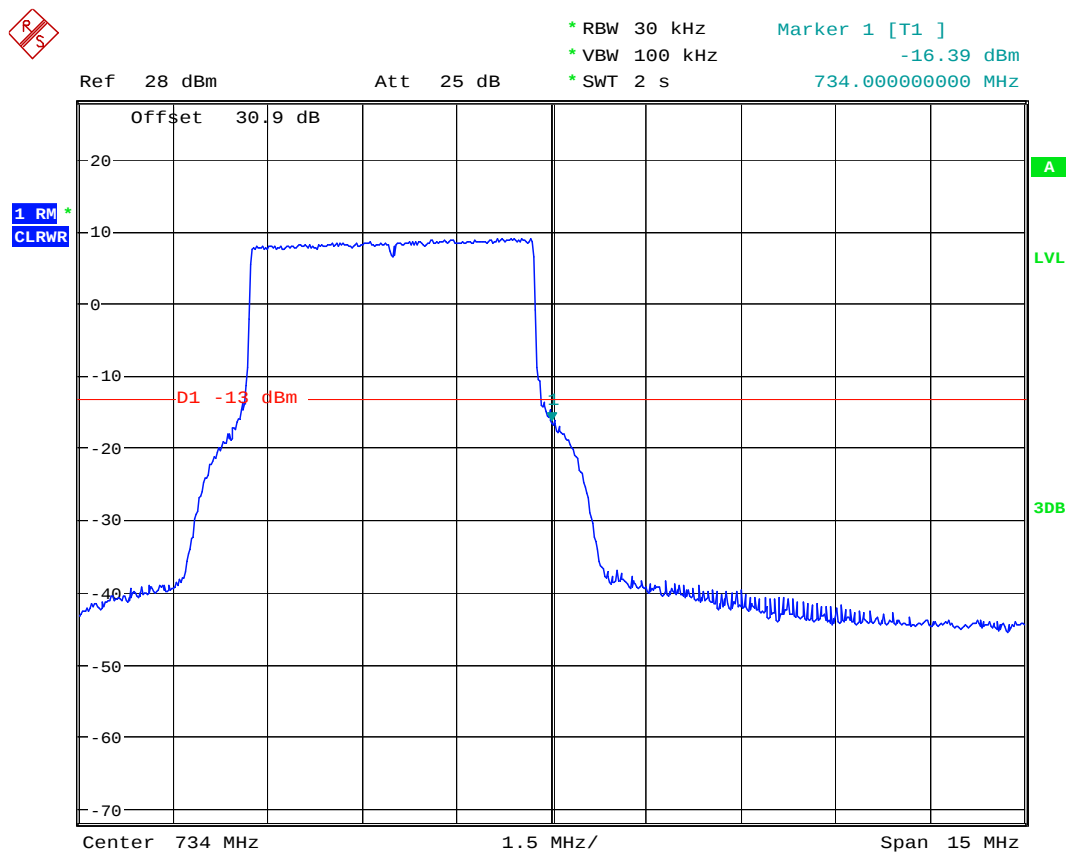
1.3) Test for LTE 5MHz

a) Lower Edge



Date: 12.OCT.2013 17:38:17

b) Upper Edge

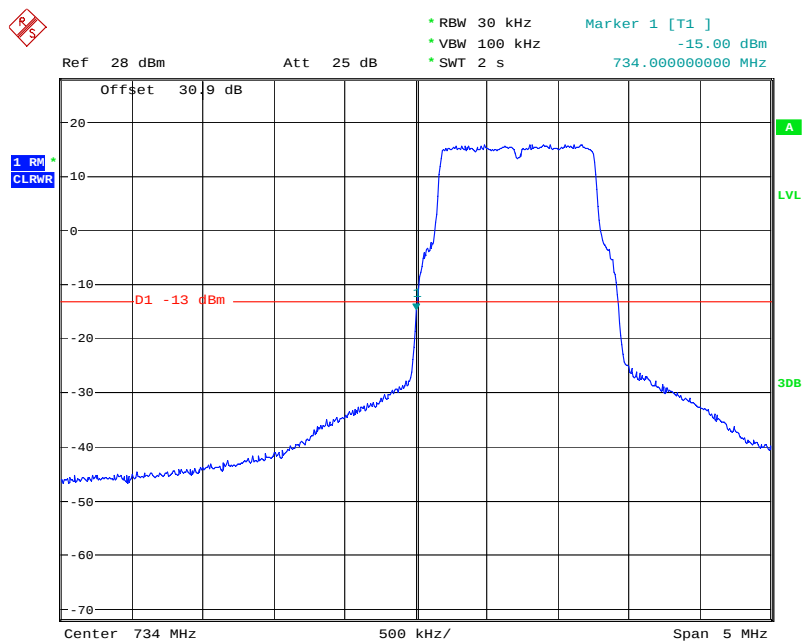


Date: 12.OCT.2013 17:38:57

2) 700MHz Lower B LTE modulation

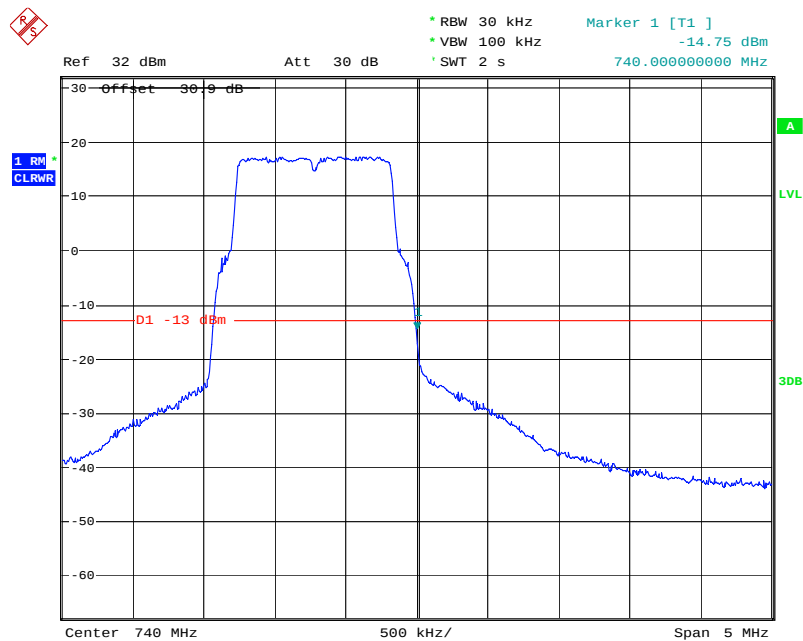
2.1) Test for LTE 1.4MHz

a) Lower Edge



Date: 12.OCT.2013 17:41:27

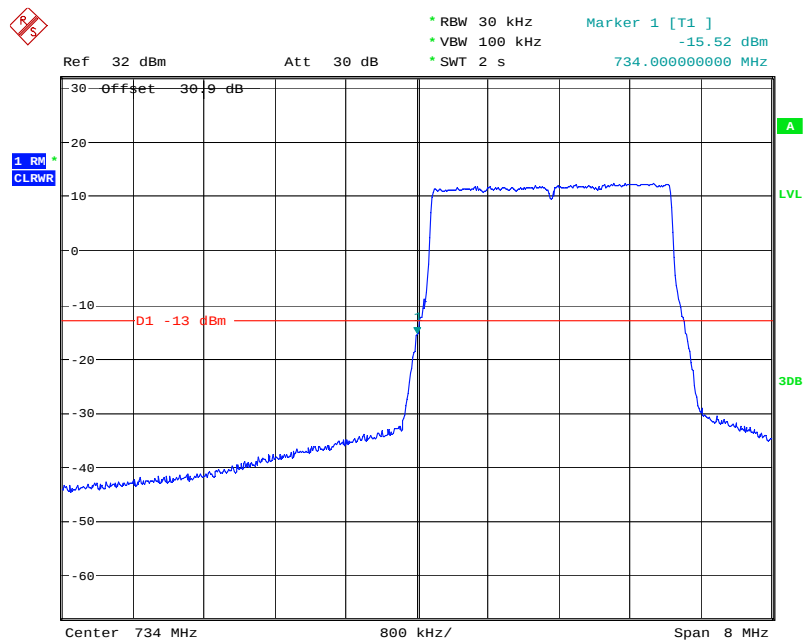
b) Upper Edge



Date: 12.OCT.2013 17:42:22

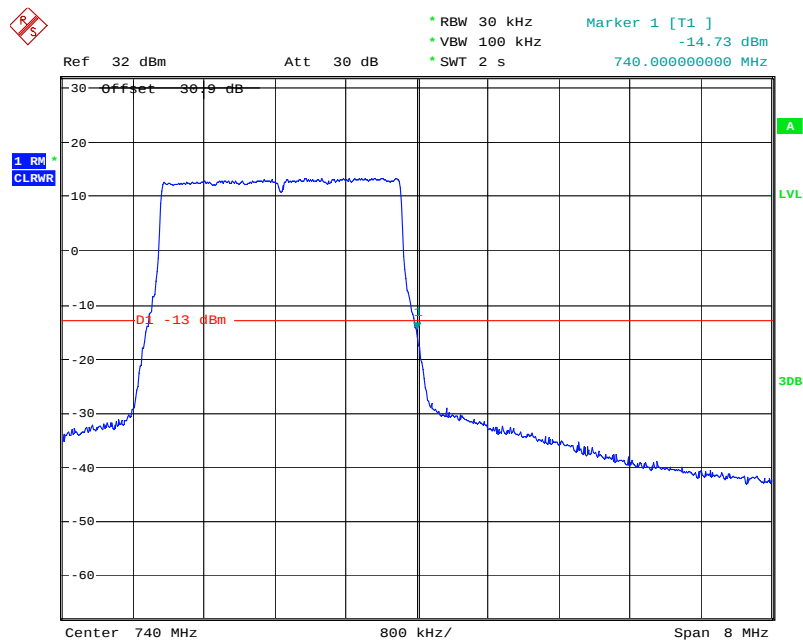
2.2) Test for LTE 3 MHz

a) Lower Edge



Date: 12.OCT.2013 17:44:55

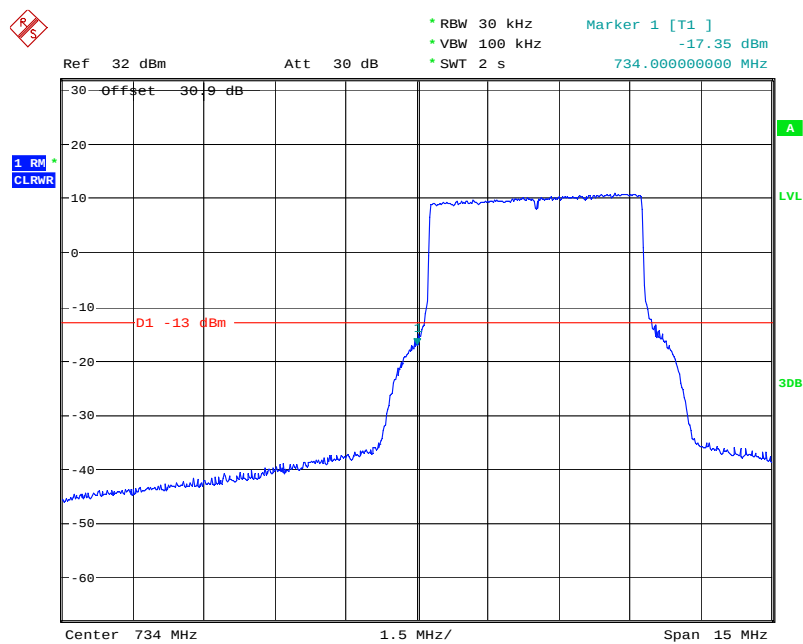
b) Upper Edge



Date: 12.OCT.2013 17:44:03

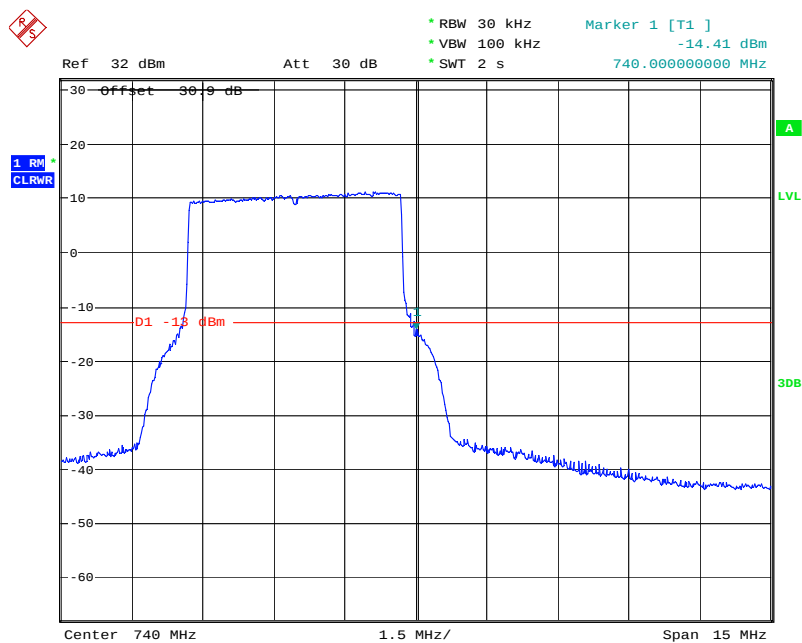
2.3) Test for LTE 5 MHz

a) Lower Edge



Date: 12.OCT.2013 17:45:42

b) Upper Edge

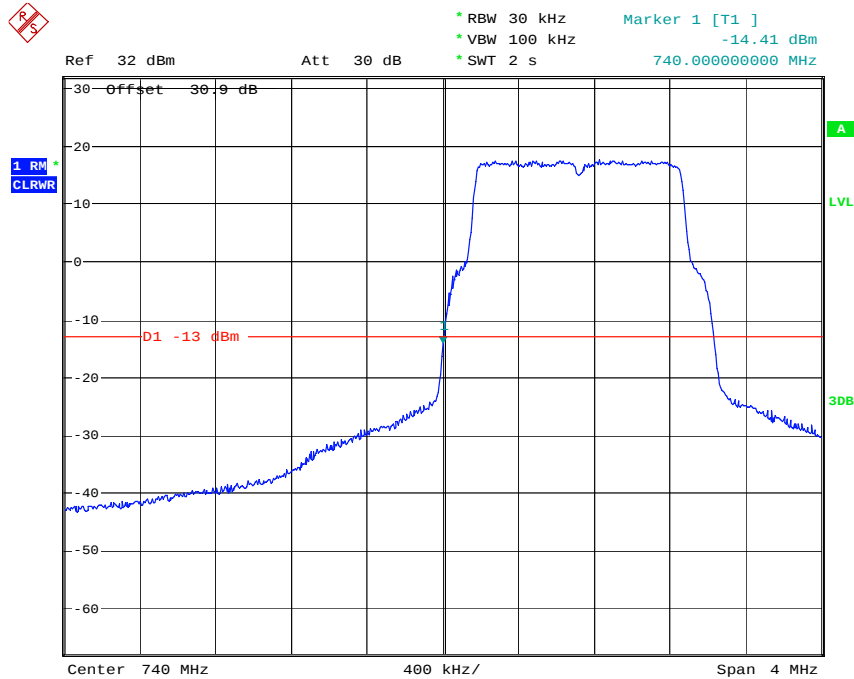


Date: 12.OCT.2013 17:46:38

3) 700MHz Lower C LTE modulation

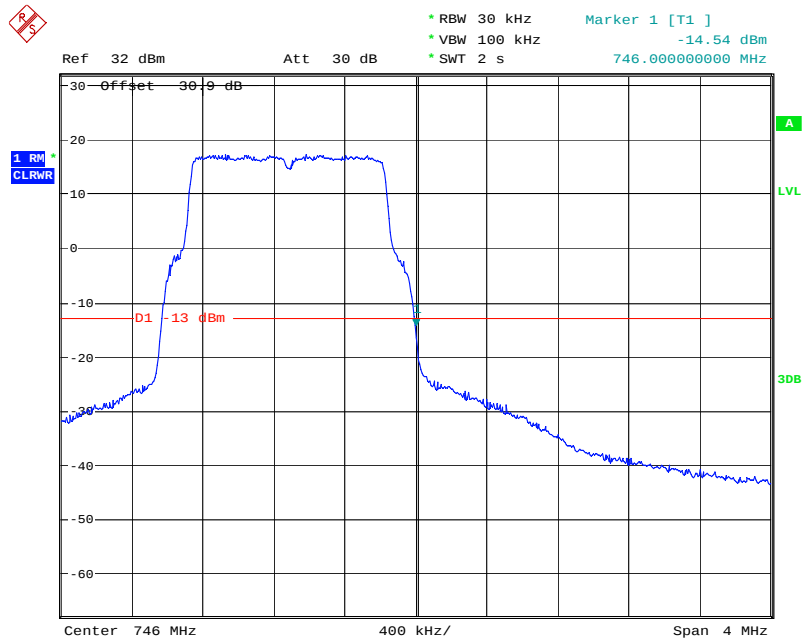
3.1) Test for LTE 1.4MHz

a) Lower Edge



Date: 12.OCT.2013 17:48:38

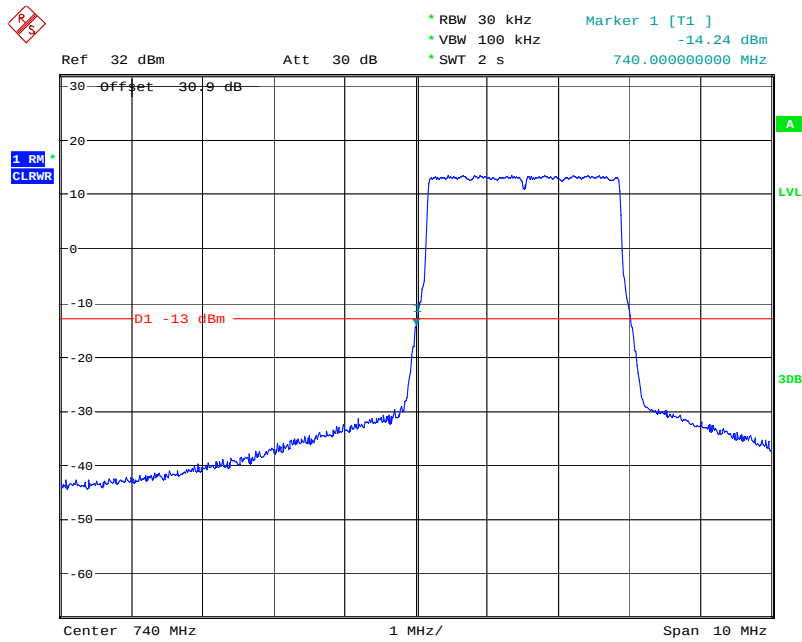
b) Upper Edge



Date: 12.OCT.2013 17:49:39

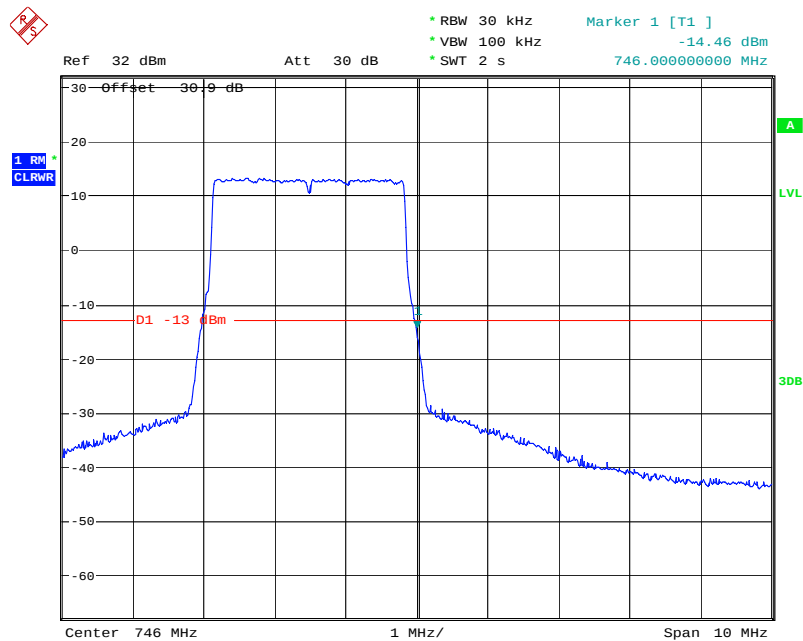
3.2) Test for LTE 3 MHz

a) Lower Edge



Date: 12.OCT.2013 17:50:49

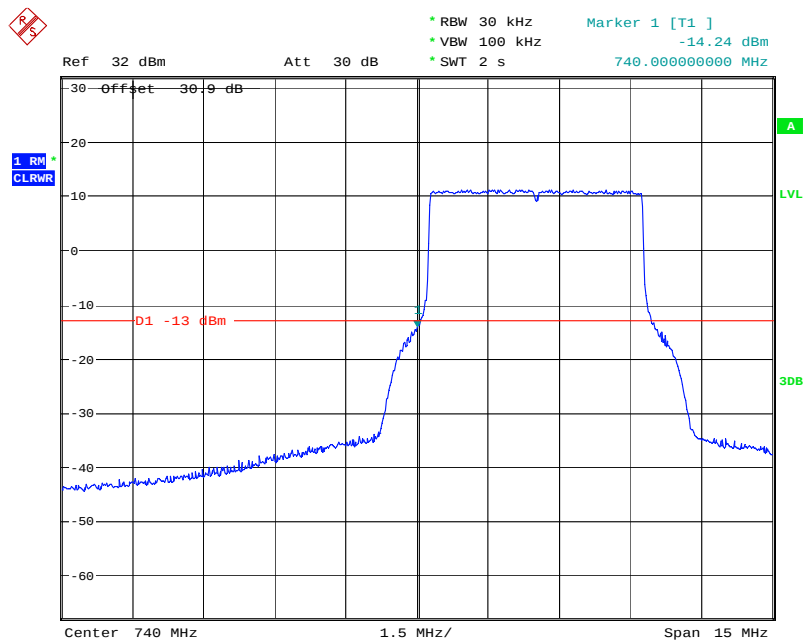
b) Upper Edge



Date: 12.OCT.2013 17:51:27

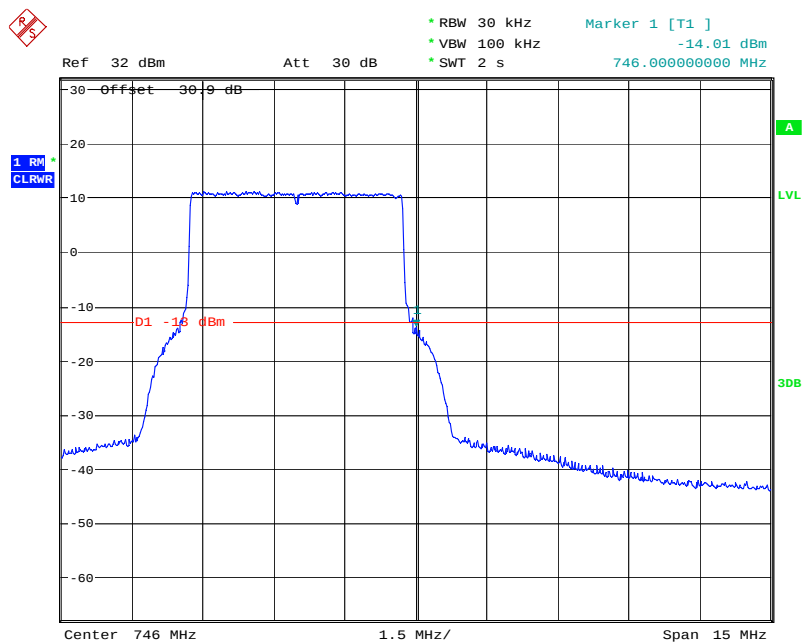
3.3) Test for LTE 5 MHz

a) Lower Edge



Date: 12.OCT.2013 17:52:56

b) Upper Edge

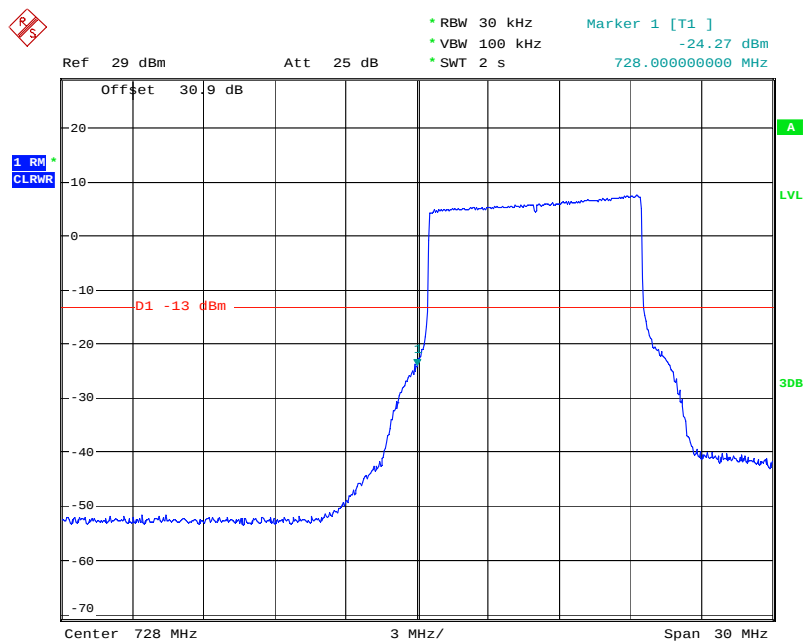


Date: 12.OCT.2013 17:54:16

4) 700MHz Lower ABC LTE modulation

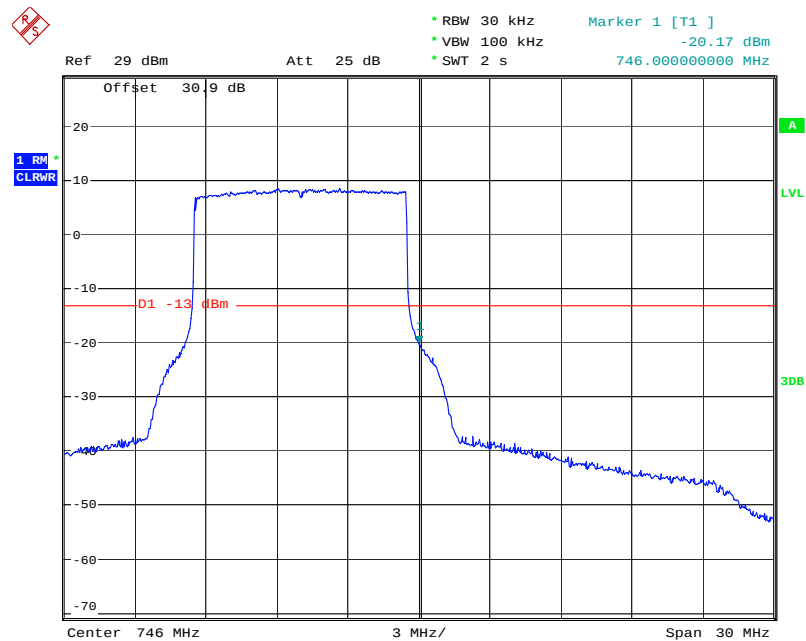
4.1) Test for LTE 10MHz

a) Lower Edge



Date: 12.OCT.2013 17:56:12

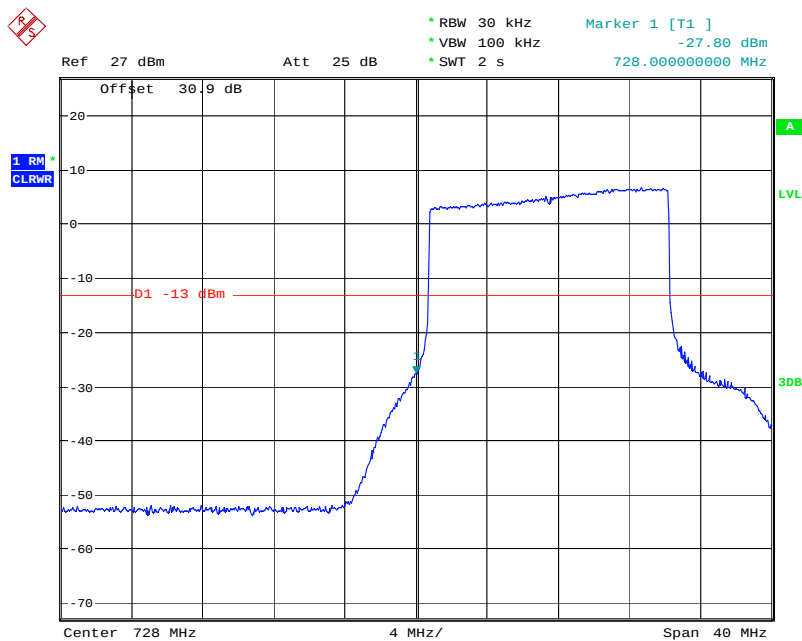
b) Upper Edge



Date: 12.OCT.2013 17:57:35

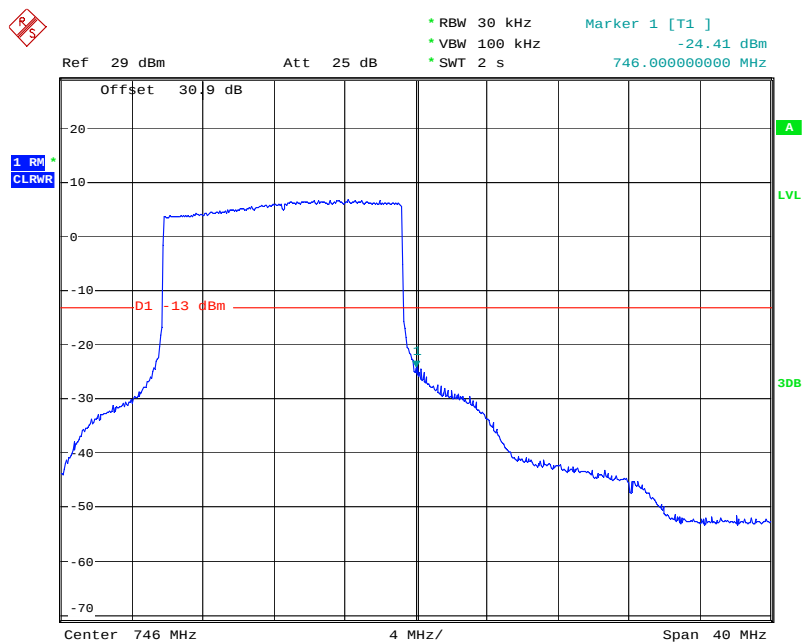
4.2) Test for LTE 15MHz

a) Lower Edge



Date: 12.OCT.2013 17:59:26

b) Upper Edge

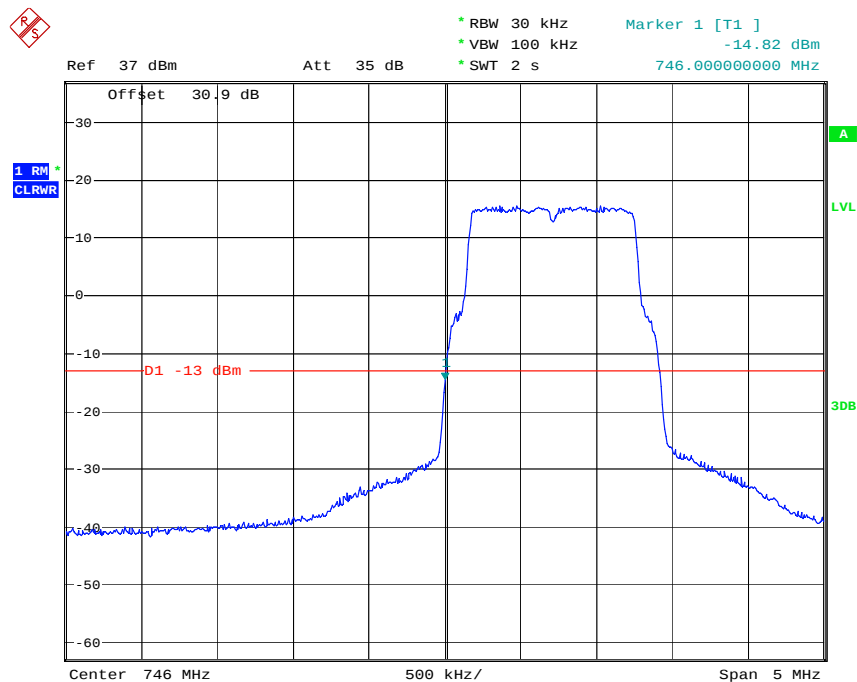


Date: 12.OCT.2013 17:58:33

5.3.3.1.2 700MHz Upper C Band

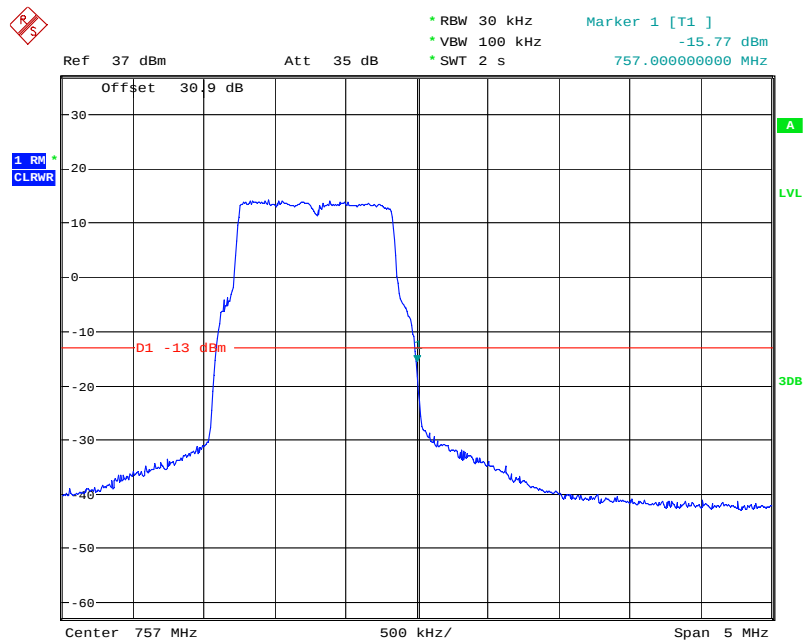
1.1) Test for LTE 1.4MHz

a) Lower Edge



Date: 12.OCT.2013 18:08:19

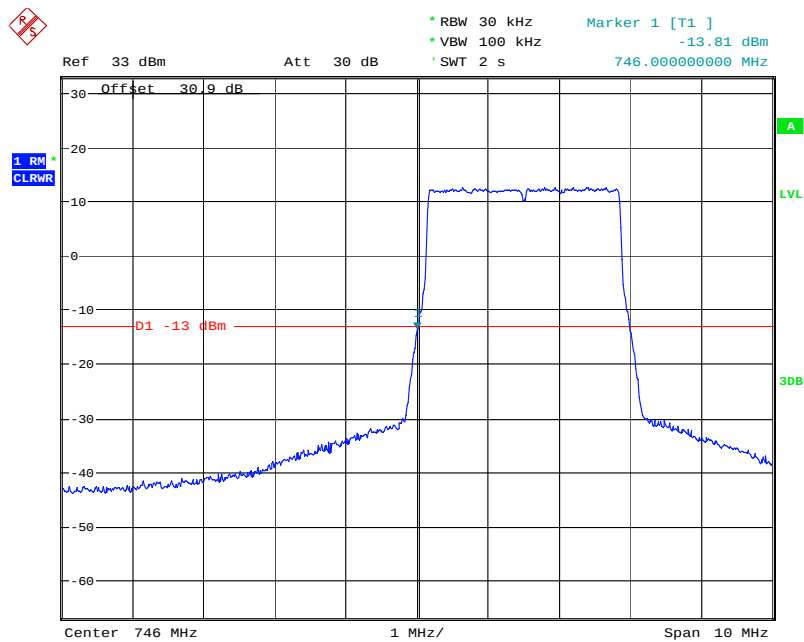
b) Upper Edge



Date: 12.OCT.2013 18:09:18

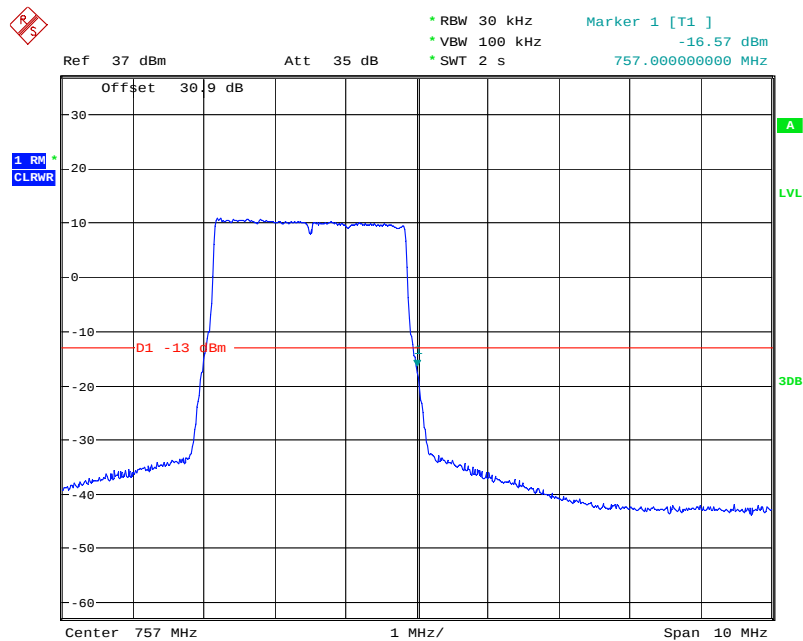
1.2) Test for LTE 3 MHz

a) Lower Edge



Date: 12.OCT.2013 18:10:56

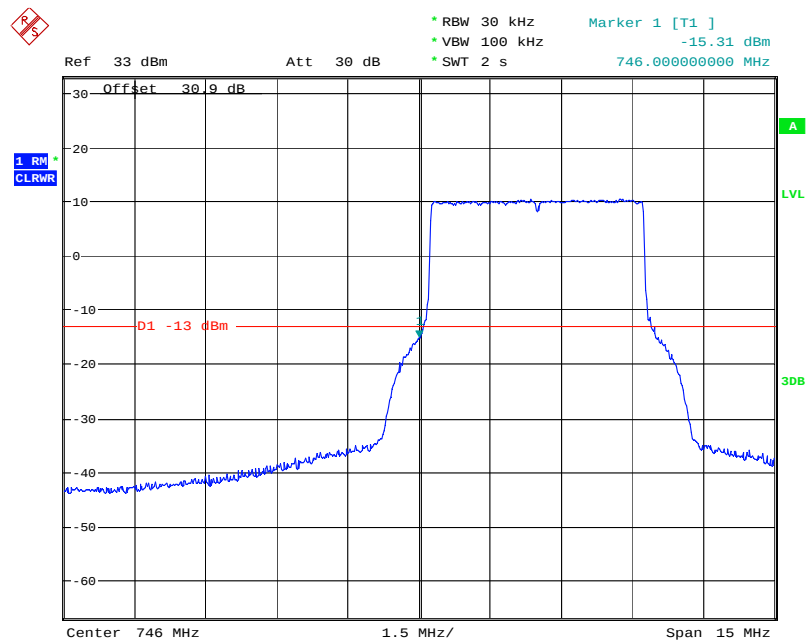
b) Upper Edge



Date: 12.OCT.2013 18:09:57

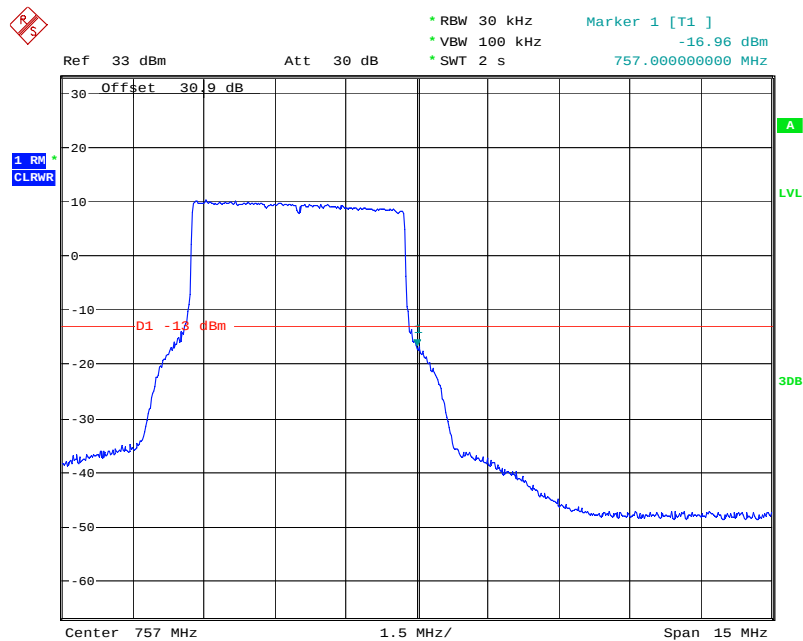
1.3) Test for LTE 5 MHz

a) Lower Edge



Date: 12.OCT.2013 18:11:40

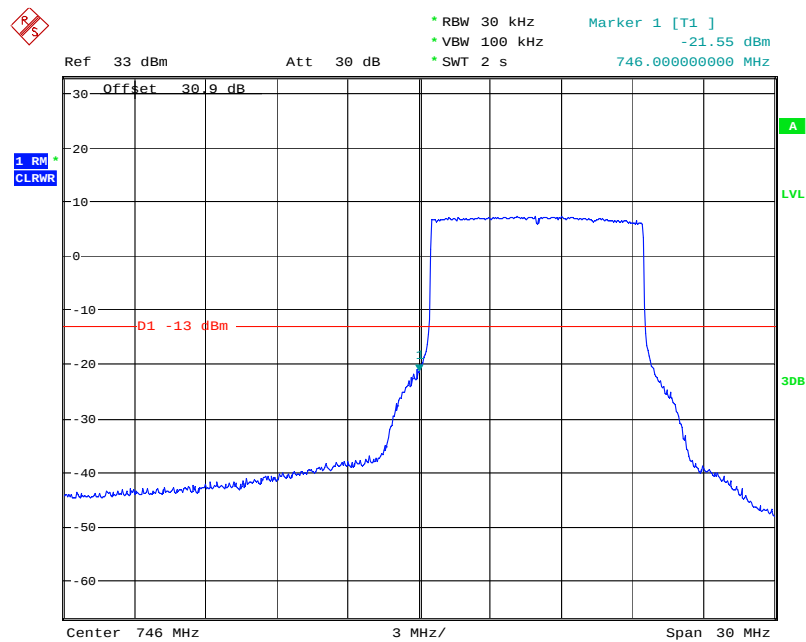
b) Upper Edge



Date: 12.OCT.2013 18:12:22

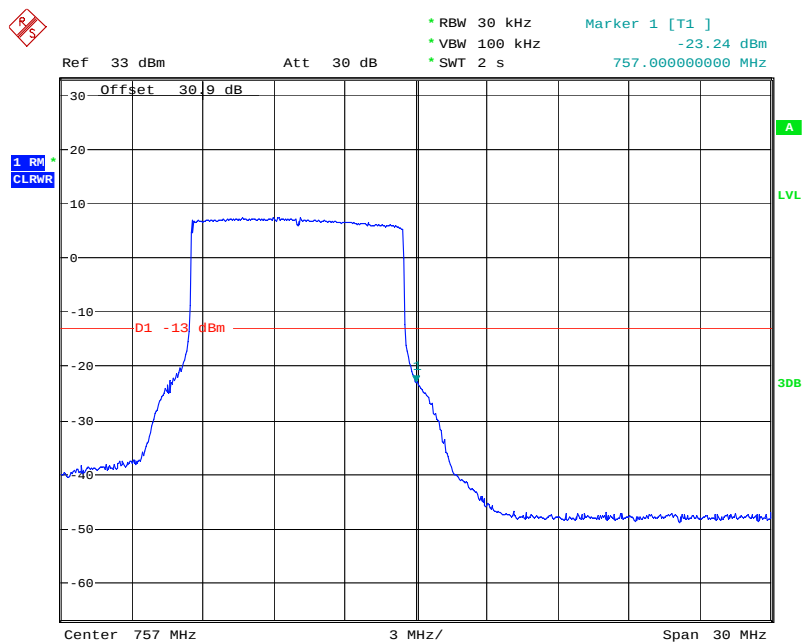
1.4) Test for LTE 10 MHz

a) Lower Edge



Date: 12.OCT.2013 18:14:14

b) Upper Edge



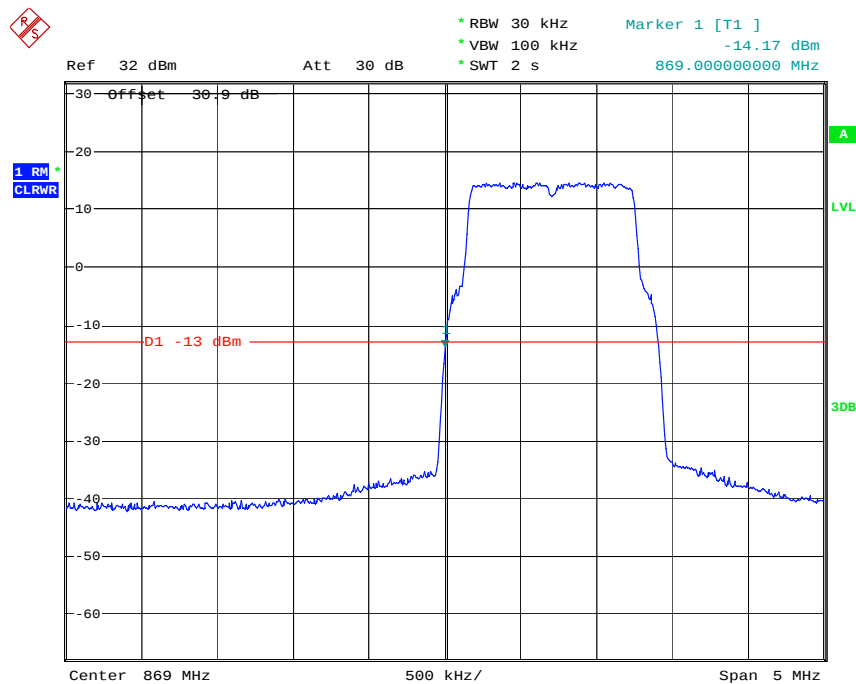
Date: 12.OCT.2013 18:13:27

5.3.3.1.3 850MHz Band for Downlink

1) LTE modulation for Downlink

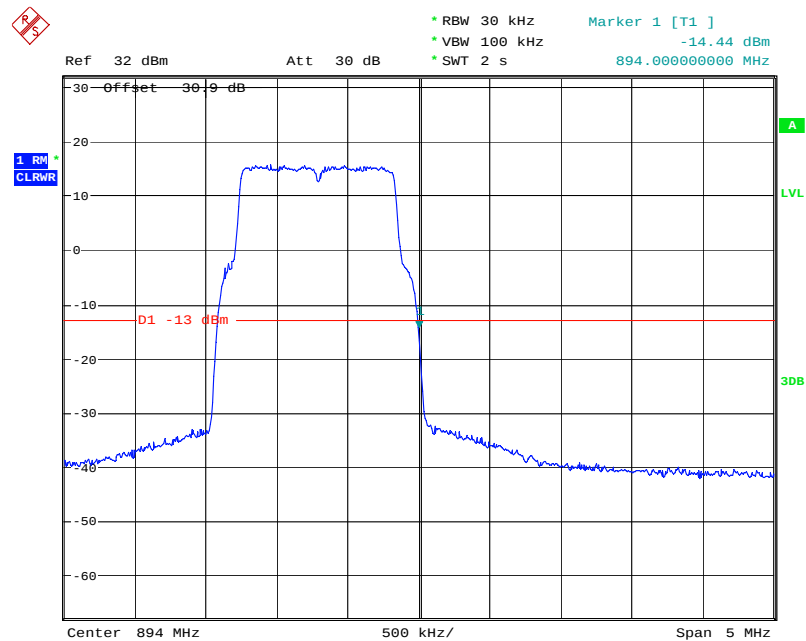
1.1) Test for LTE 1.4MHz

a) Lower Edge



Date: 12.OCT.2013 18:40:20

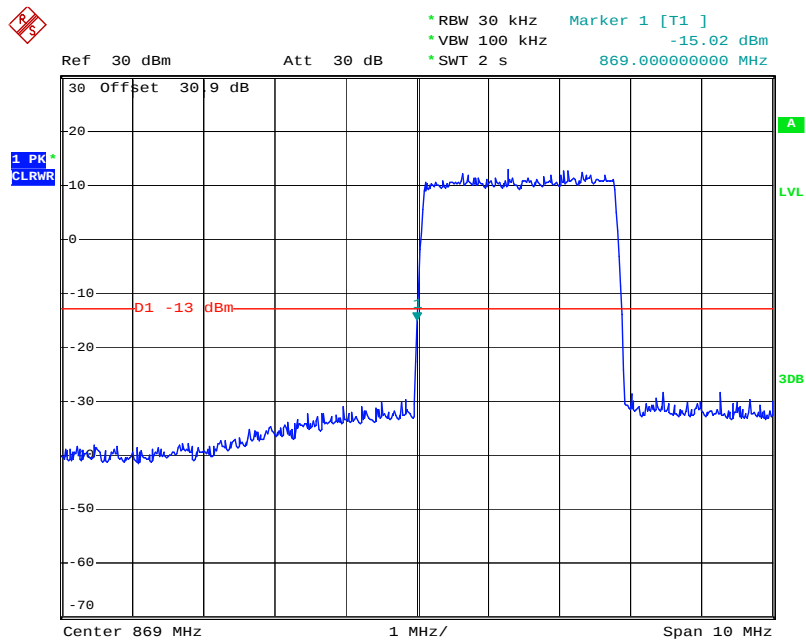
b) Upper Edge



Date: 12.OCT.2013 18:40:54

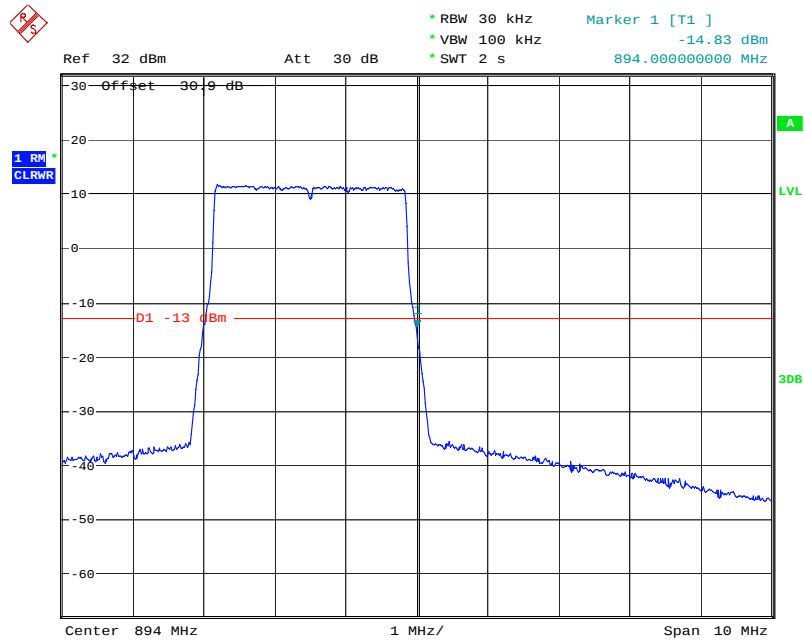
1.2) Test for LTE 3MHz

a) Lower Edge



Date: 18.NOV.2013 05:41:55

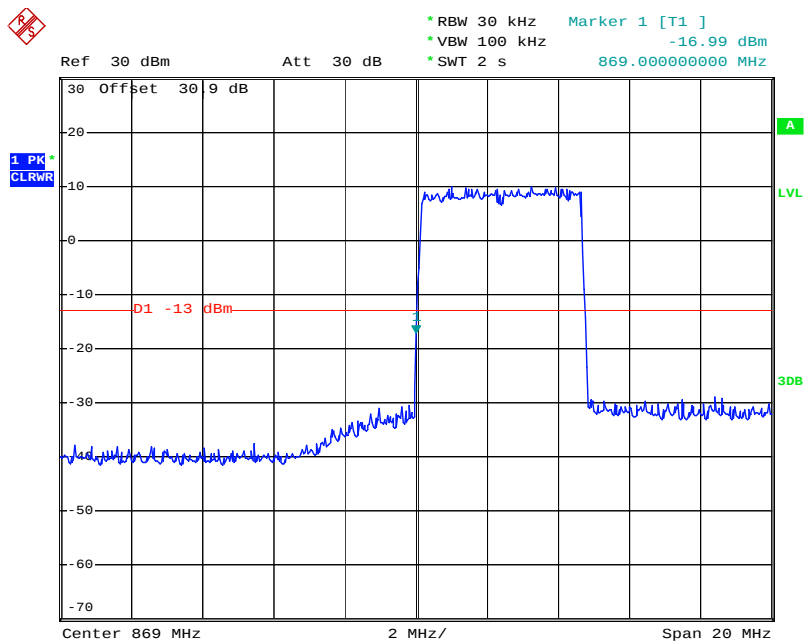
b) Upper Edge



Date: 12.OCT.2013 18:42:00

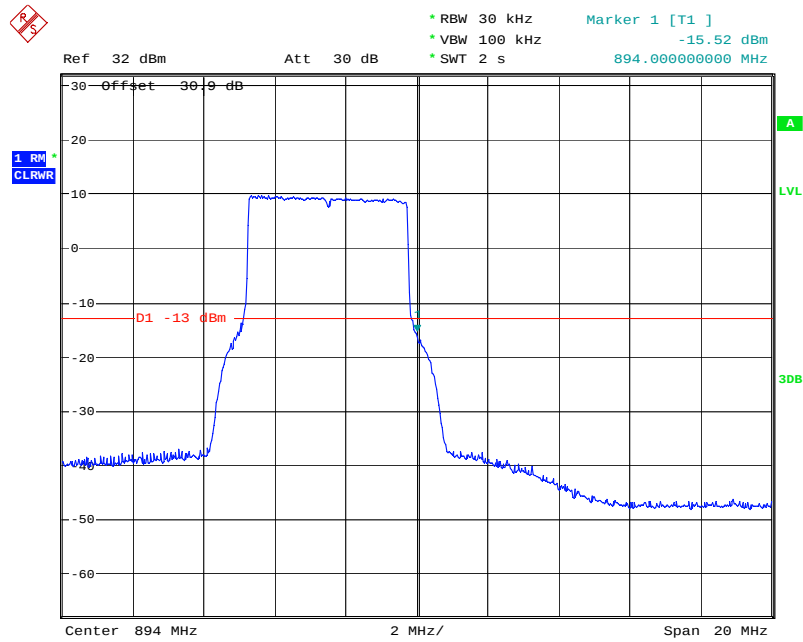
1.3) Test for LTE 5MHz

a) Lower Edge



Date: 18.NOV.2013 05:45:30

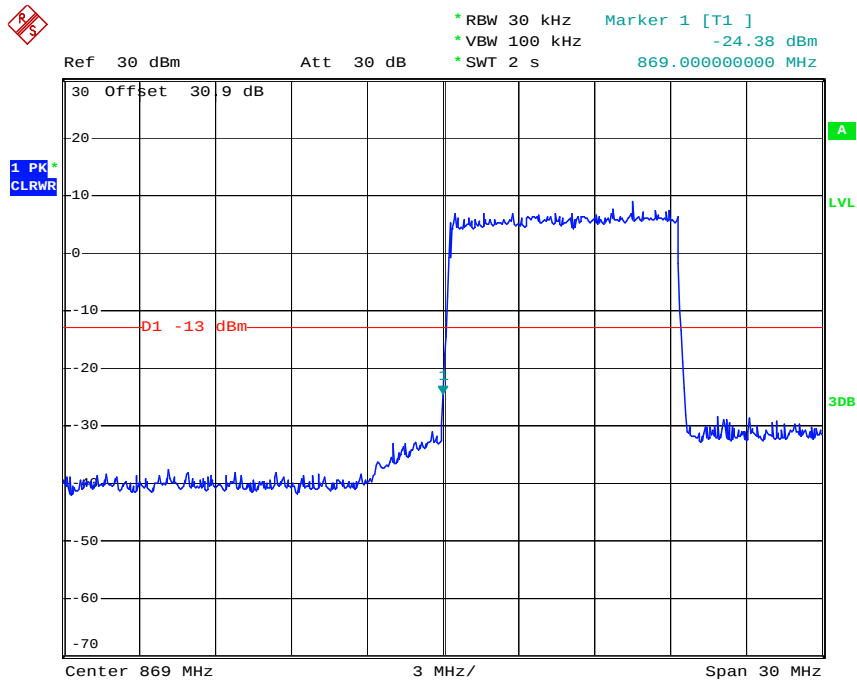
b) Upper Edge



Date: 12.OCT.2013 18:42:40

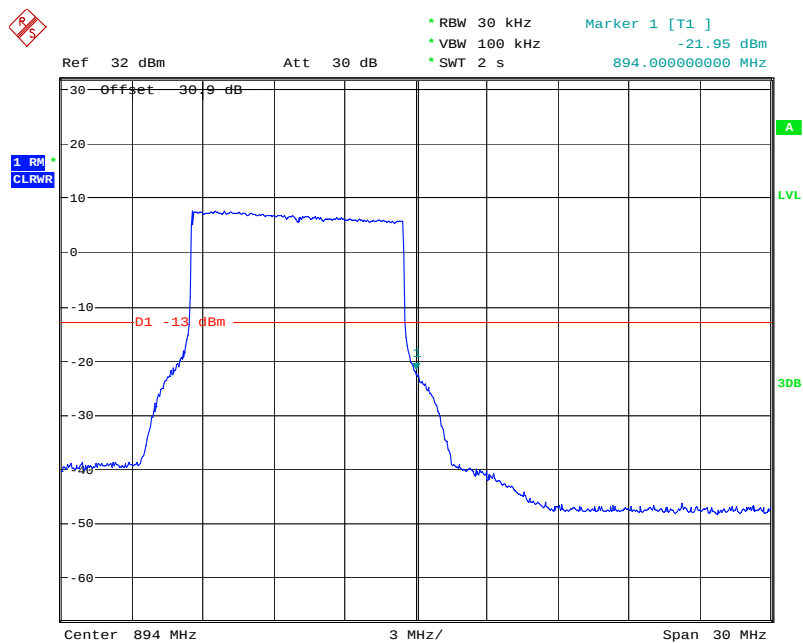
1.4) Test for LTE 10MHz

a) Lower Edge



Date: 18.NOV.2013 05:47:20

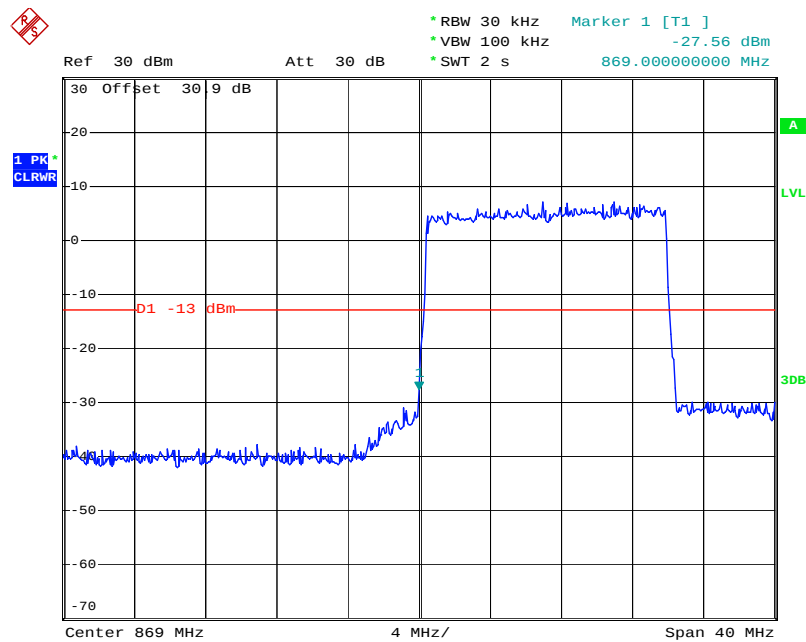
b) Upper Edge



Date: 12.OCT.2013 18:44:22

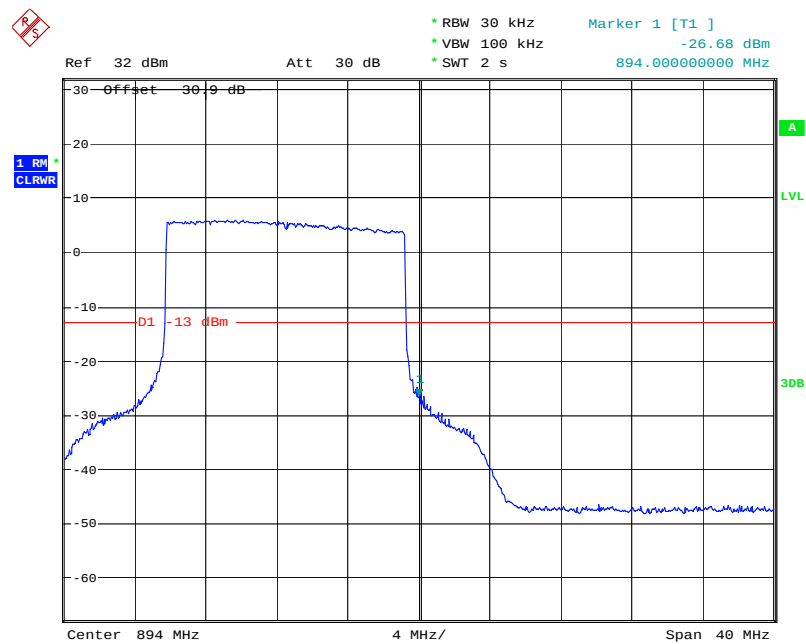
1.5) Test for LTE 15MHz

a) Lower Edge



Date: 18.NOV.2013 05:49:52

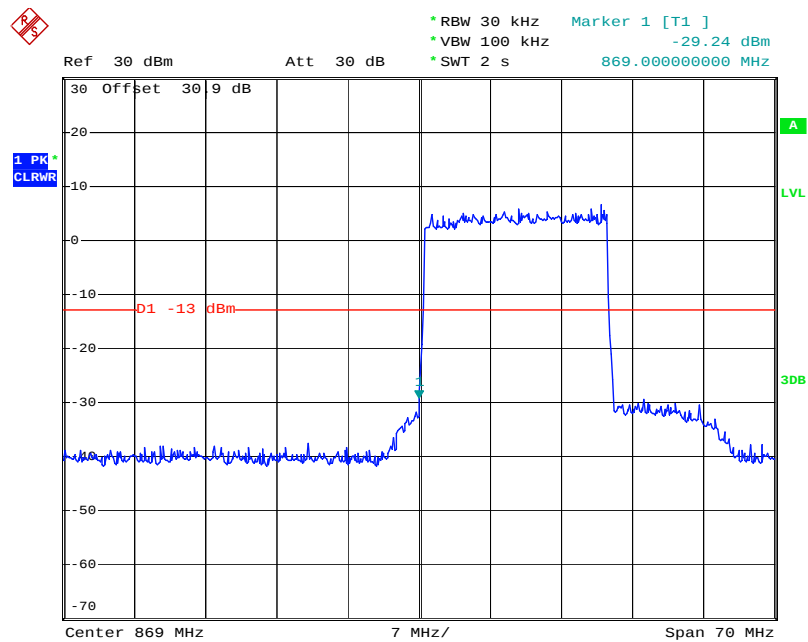
b) Upper Edge



Date: 12.OCT.2013 18:45:01

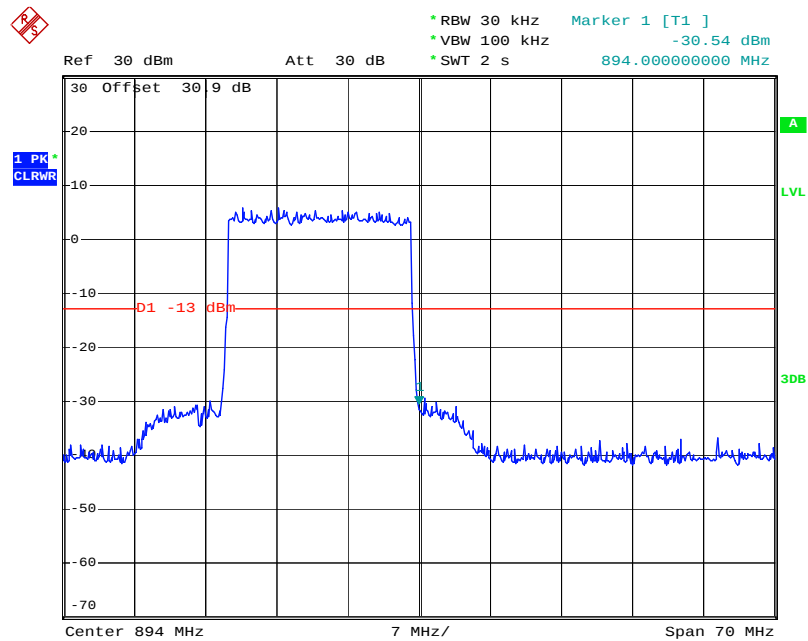
1.6) Test for LTE 20MHz

a) Lower Edge



Date: 18.NOV.2013 05:51:29

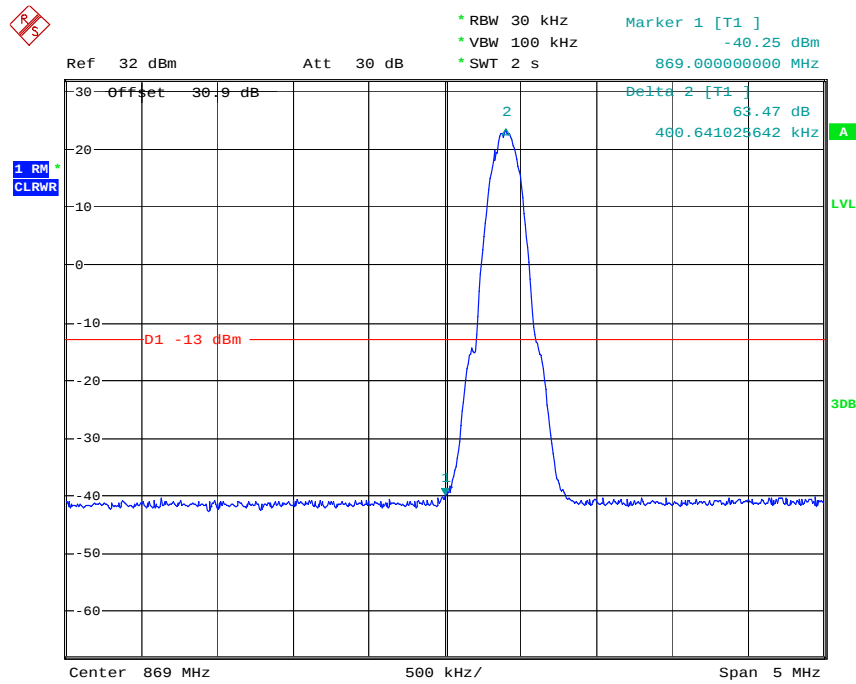
b) Upper Edge



Date: 18.NOV.2013 05:53:17

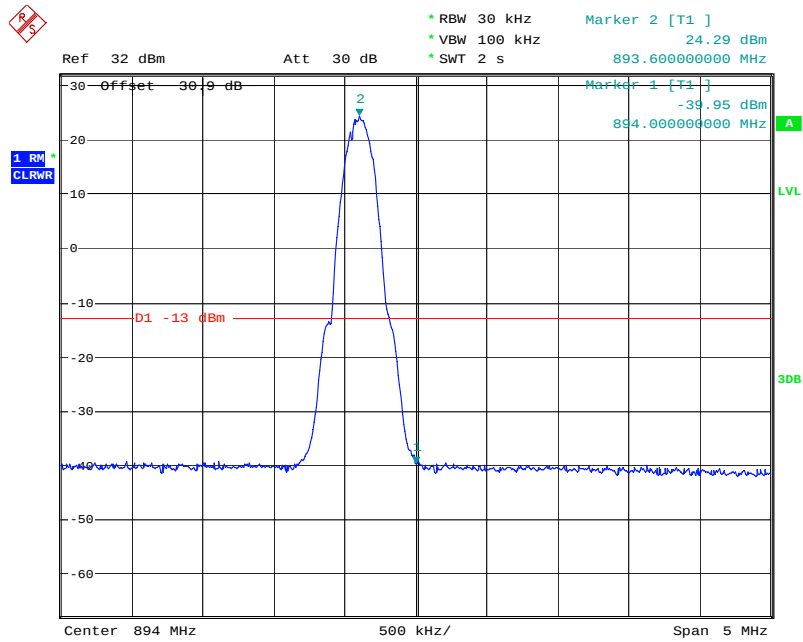
2) GSM modulation

a) Lower Edge



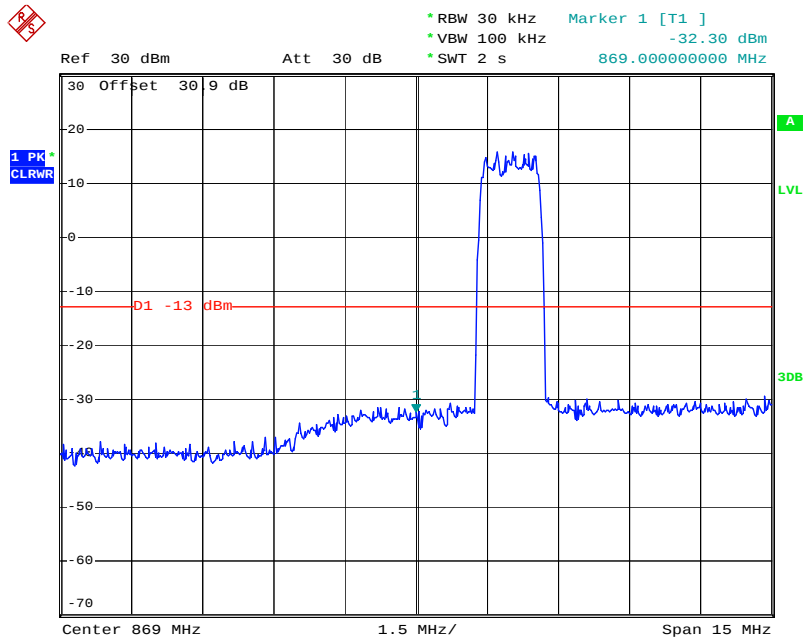
Date: 12.OCT.2013 19:00:17

b) Upper Edge

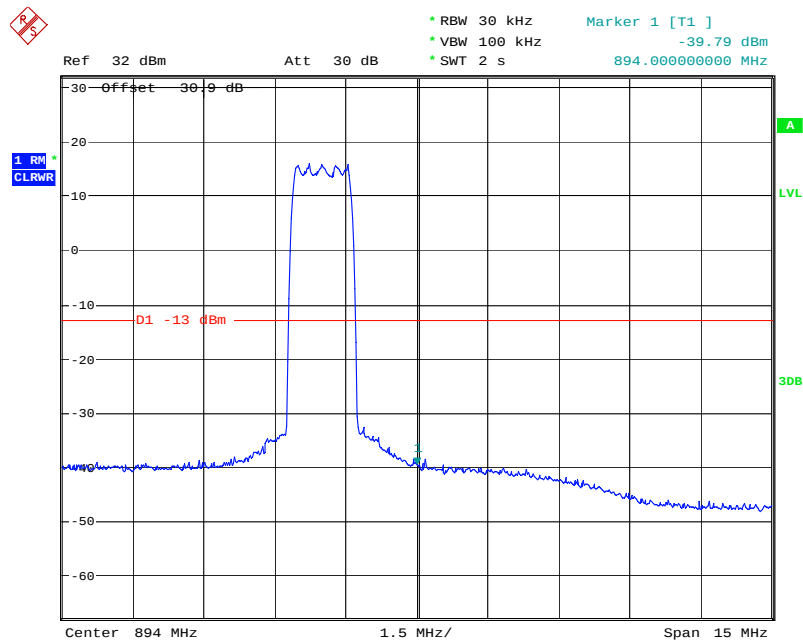


3) CDMA modulation

a) Lower Edge



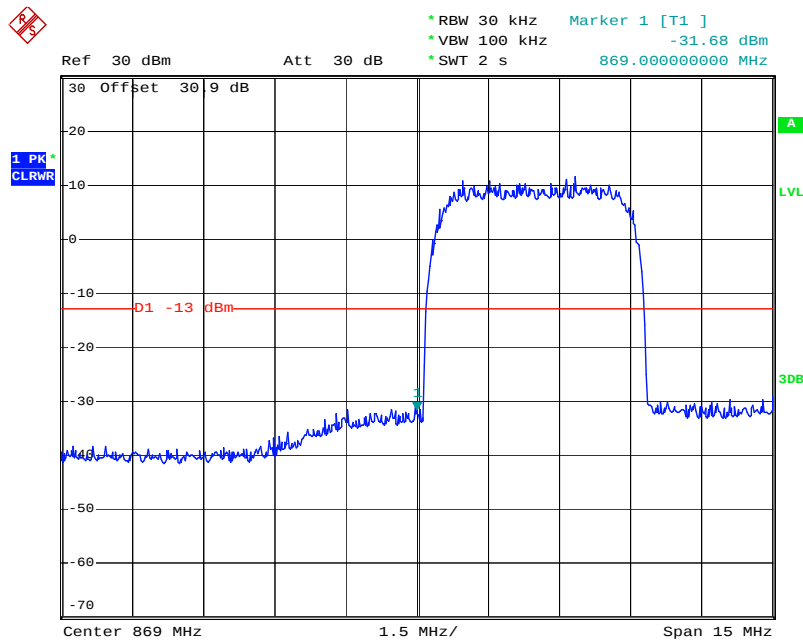
b) Upper Edge



Date: 12.OCT.2013 19:05:22

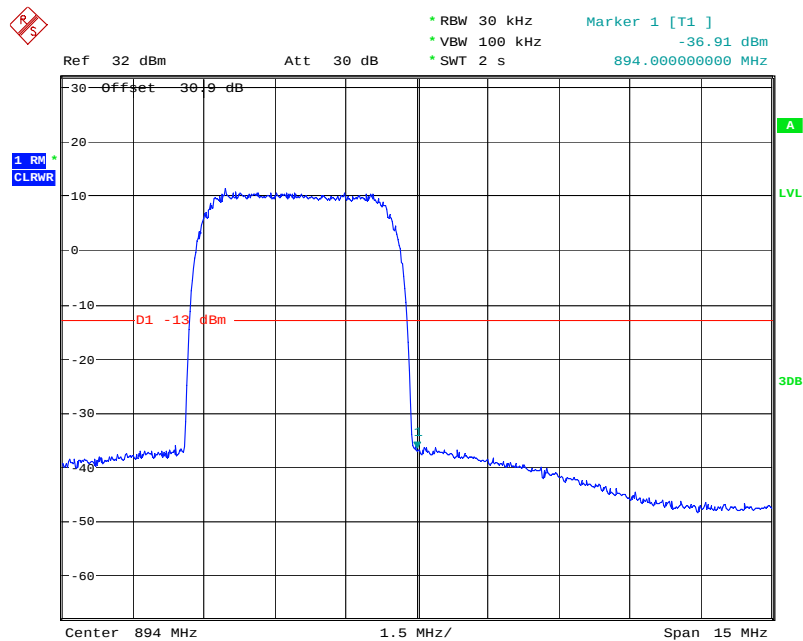
4) WCDMA modulation

a) Lower Edge



Date: 18.NOV.2013 06:06:23

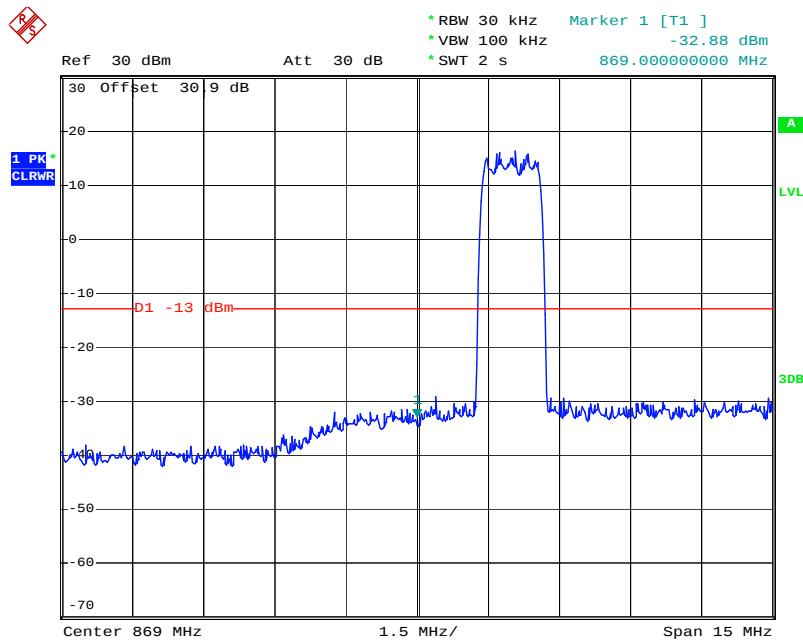
b) Upper Edge



Date: 12.OCT.2013 19:12:40

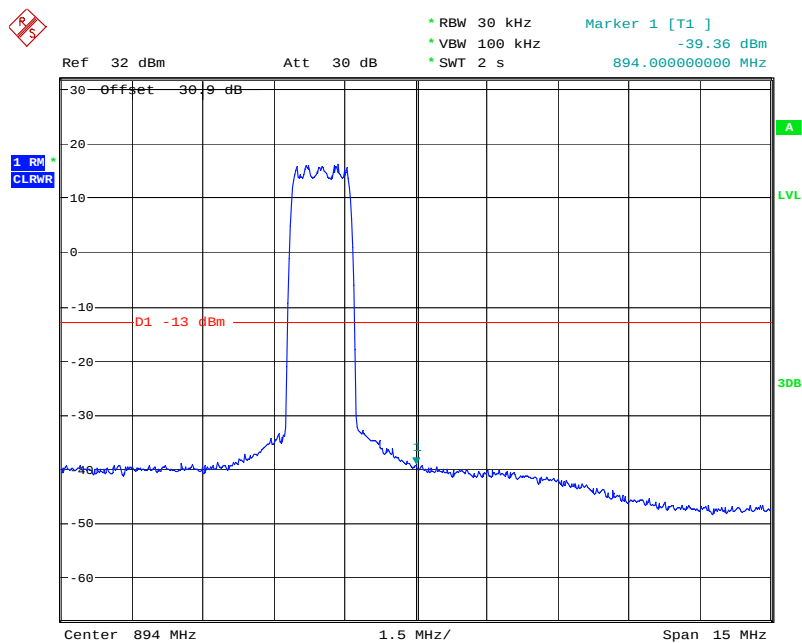
5) 1x EV-DO modulation

a) Lower Edge



Date: 18.NOV.2013 06:04:59

b) Upper Edge



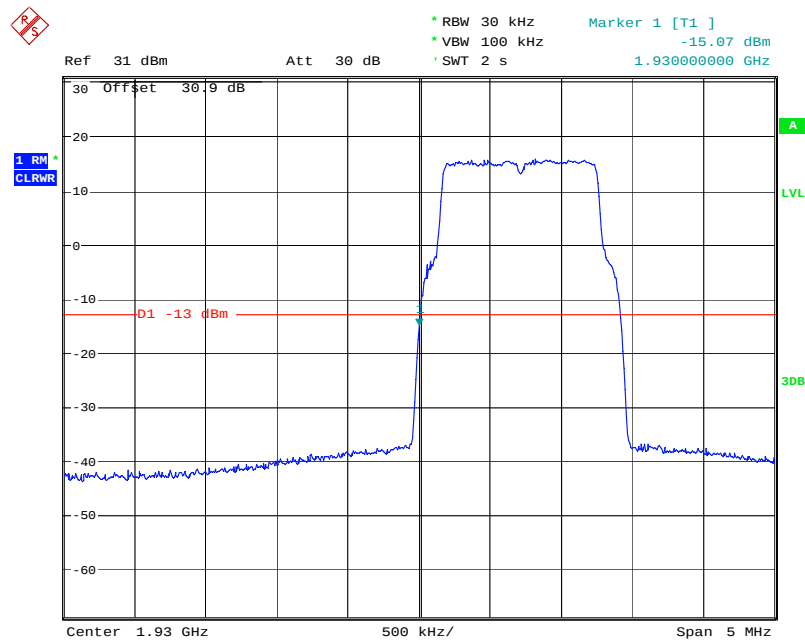
Date: 12.OCT.2013 19:14:32

5.3.3.1.5 1900MHz Broadband PCS for Downlink

1) LTE modulation

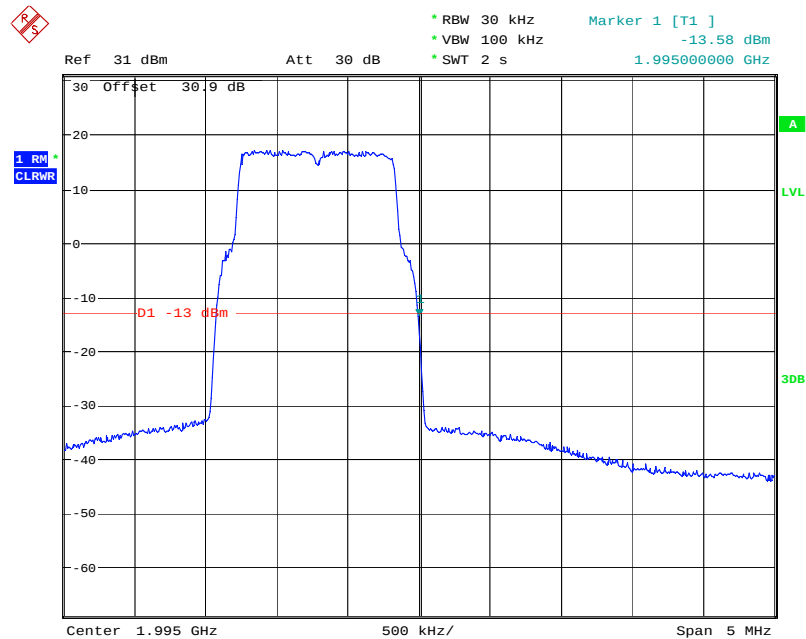
1.1) Test for LTE 1.4MHz

a) Lower Edge



Date: 12.OCT.2013 19:25:08

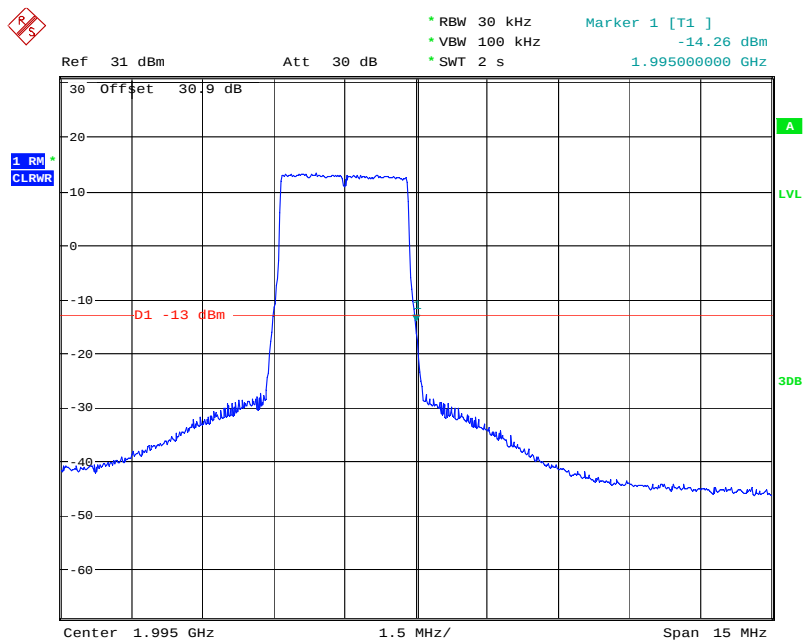
b) Upper Edge



Date: 12.OCT.2013 19:26:05

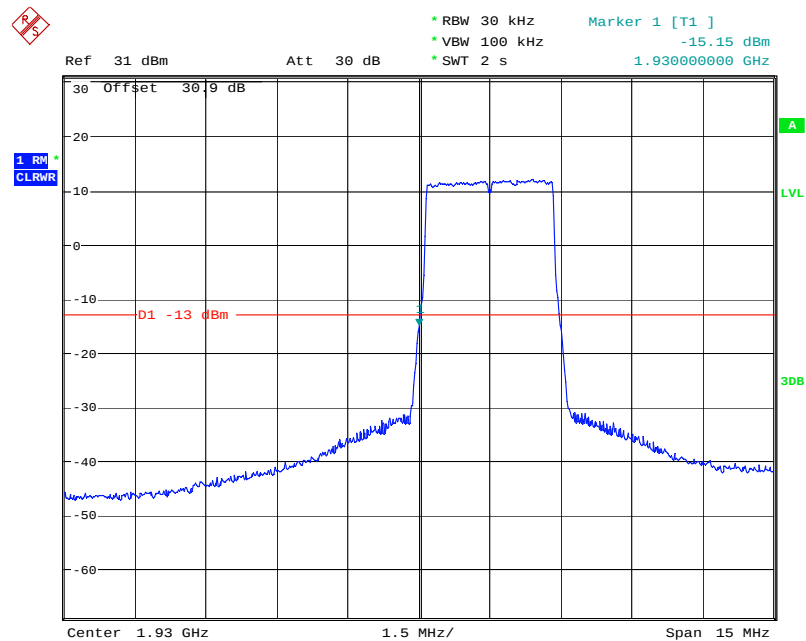
1.2) Test for LTE 3MHz

a) Lower Edge



Date: 12.OCT.2013 19:28:08

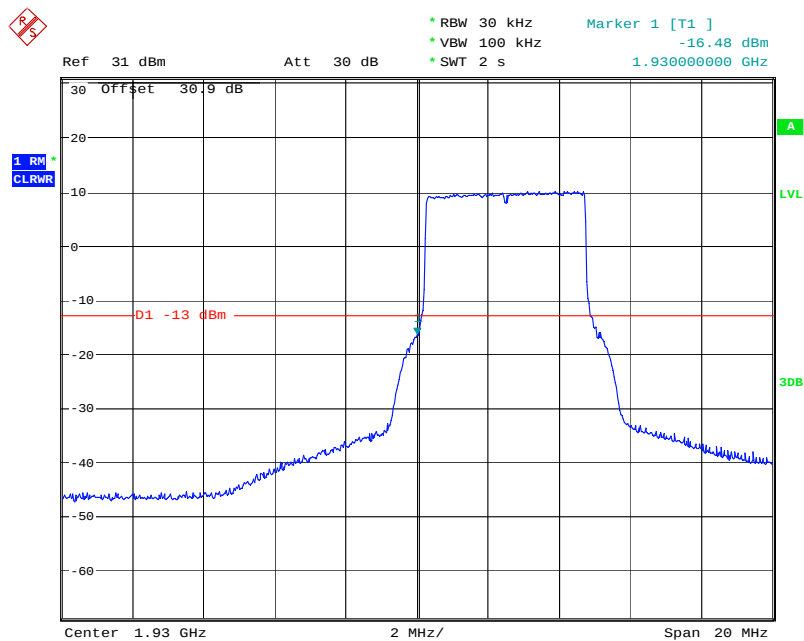
b) Upper Edge



Date: 12.OCT.2013 19:28:36

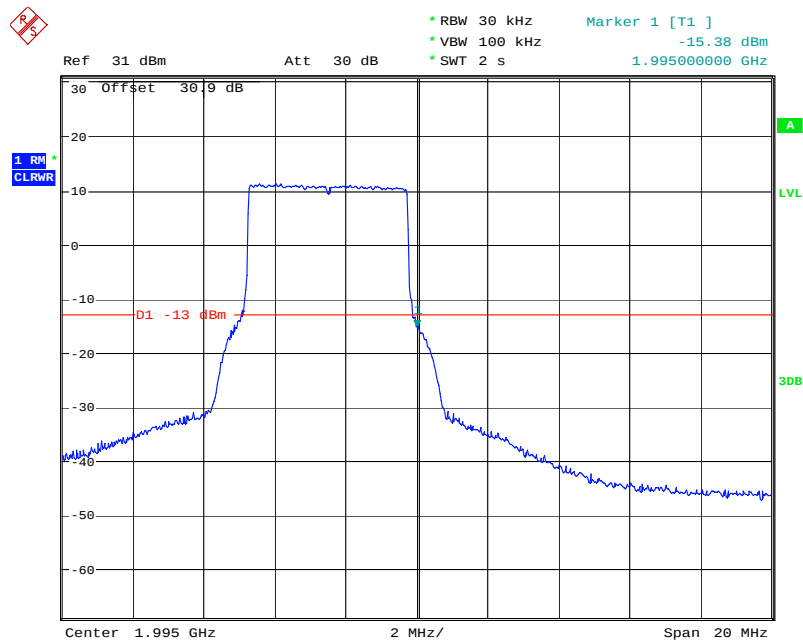
1.3) Test for LTE 5MHz

a) Lower Edge



Date: 12.OCT.2013 19:29:05

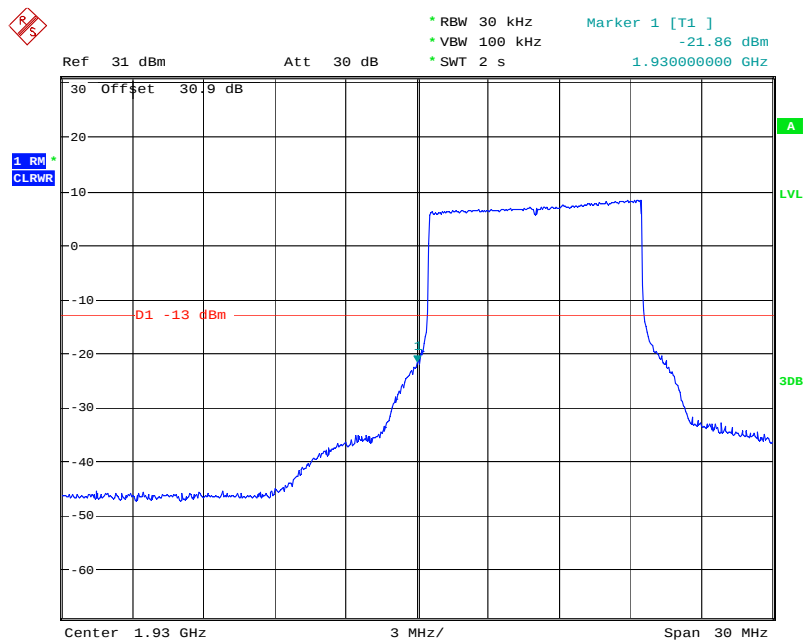
b) Upper Edge



Date: 12.OCT.2013 19:29:46

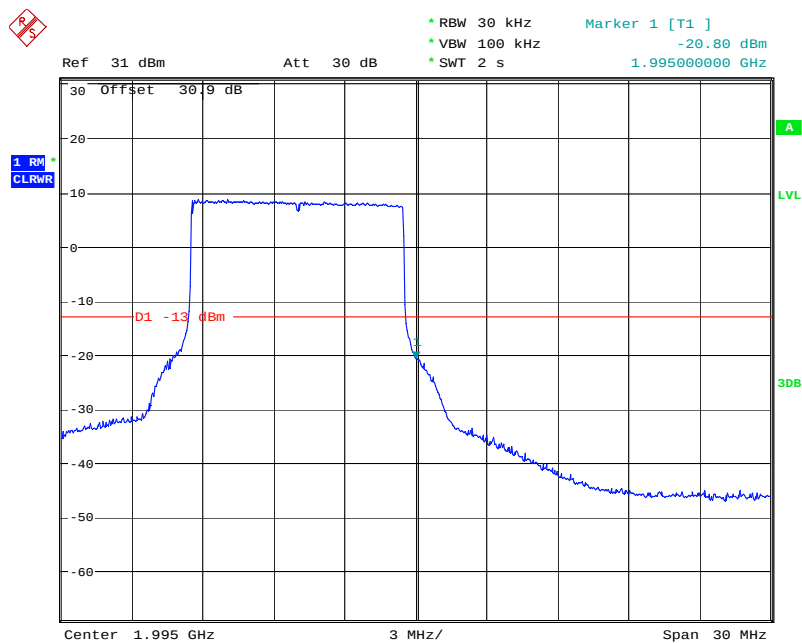
1.4) Test for LTE 10MHz

a) Lower Edge



Date: 12.OCT.2013 19:30:49

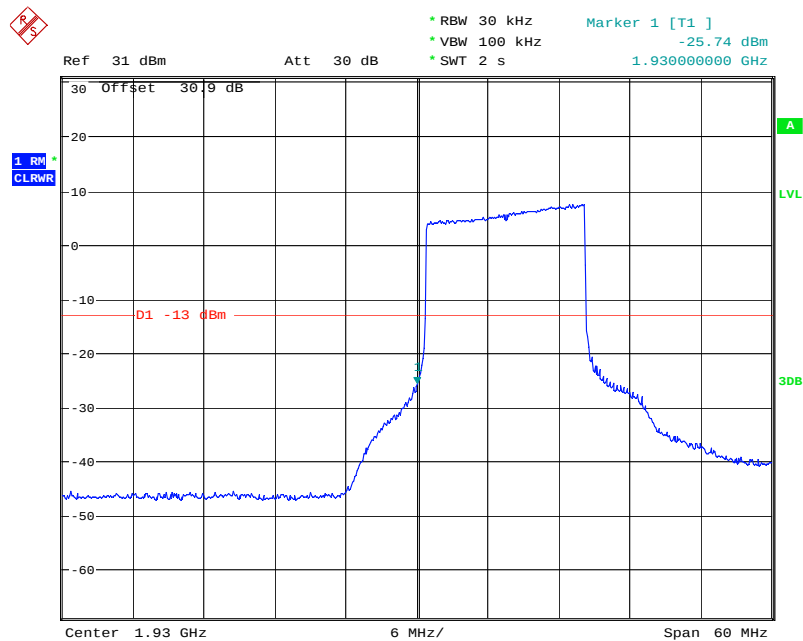
b) Upper Edge



Date: 12.OCT.2013 19:30:21

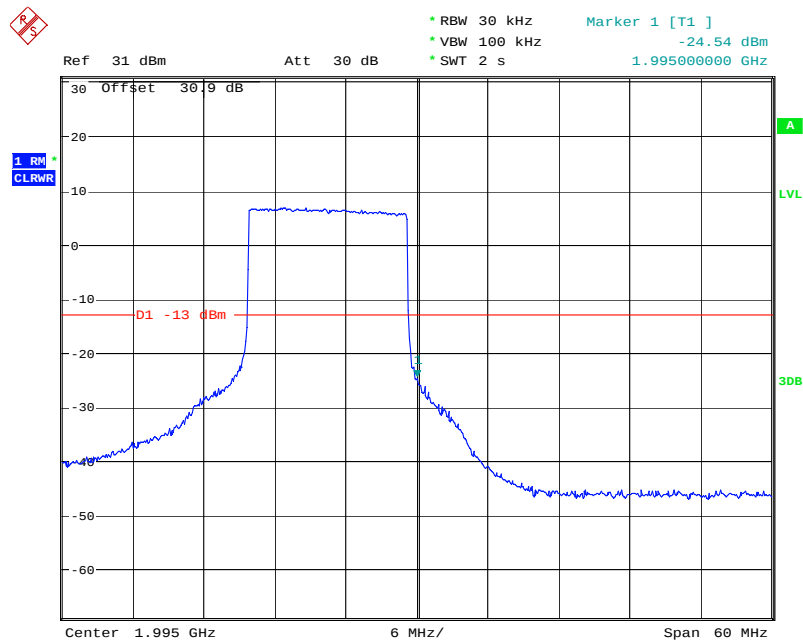
1.5) Test for LTE 15MHz

a) Lower Edge



Date: 12.OCT.2013 19:32:38

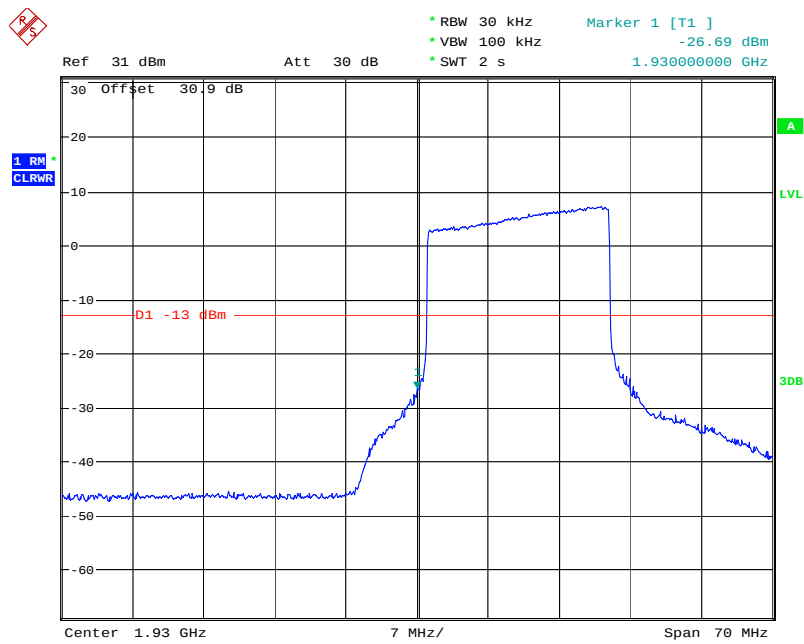
b) Upper Edge



Date: 12.OCT.2013 19:33:18

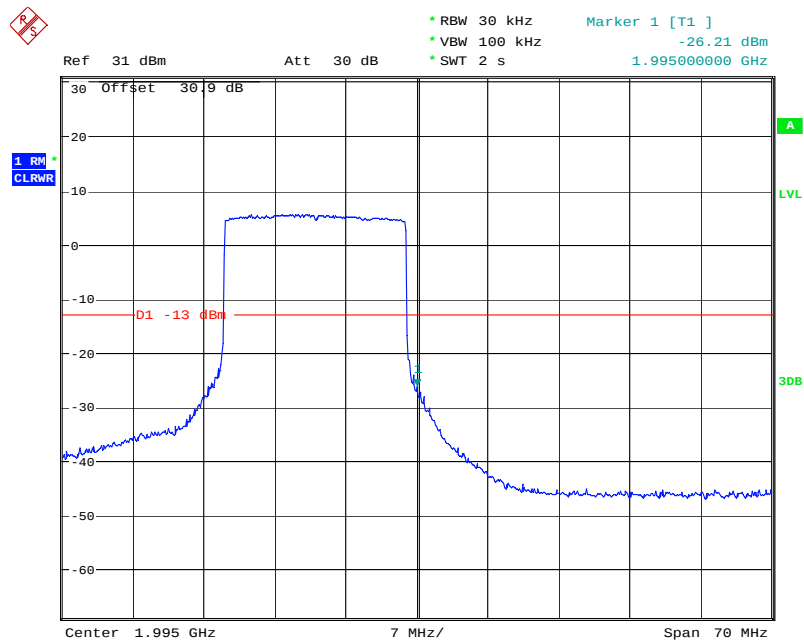
1.6) Test for LTE 20MHz

a) Lower Edge



Date: 12.OCT.2013 19:34:34

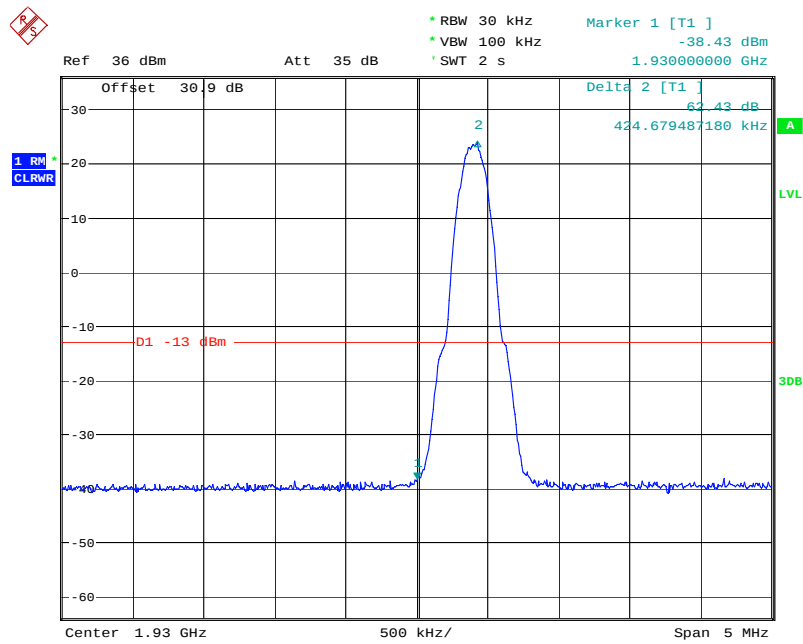
b) Upper Edge



Date: 12.OCT.2013 19:33:50

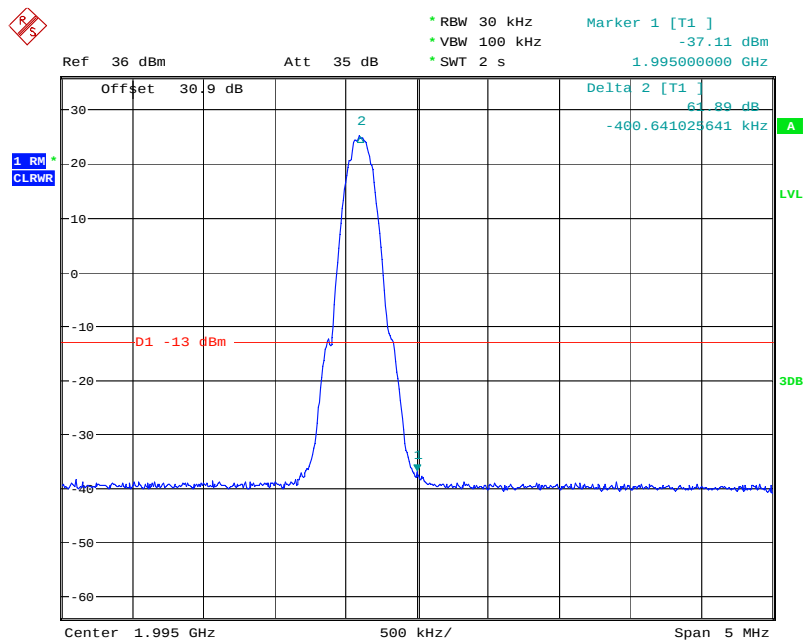
2) GSM modulation

a) Lower Edge



Date: 12.OCT.2013 19:36:06

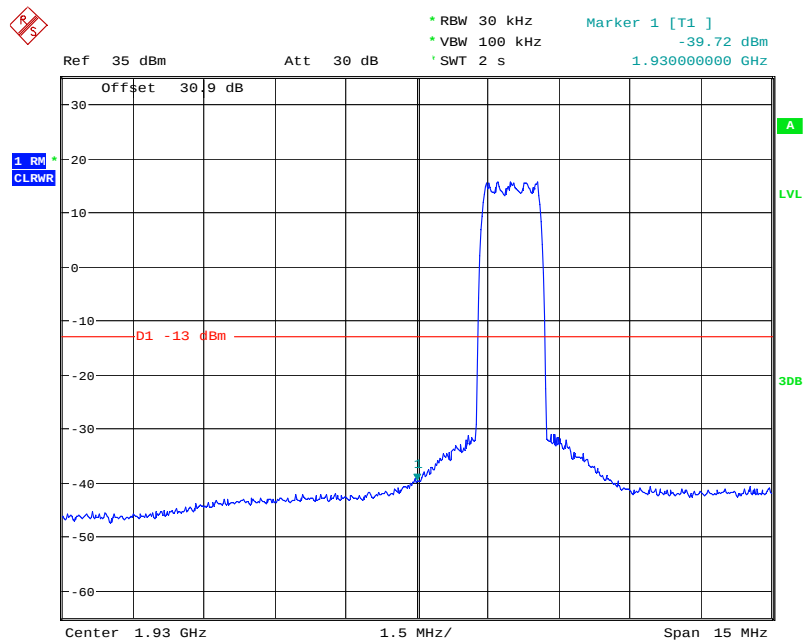
b) Upper Edge



Date: 12.OCT.2013 19:36:38

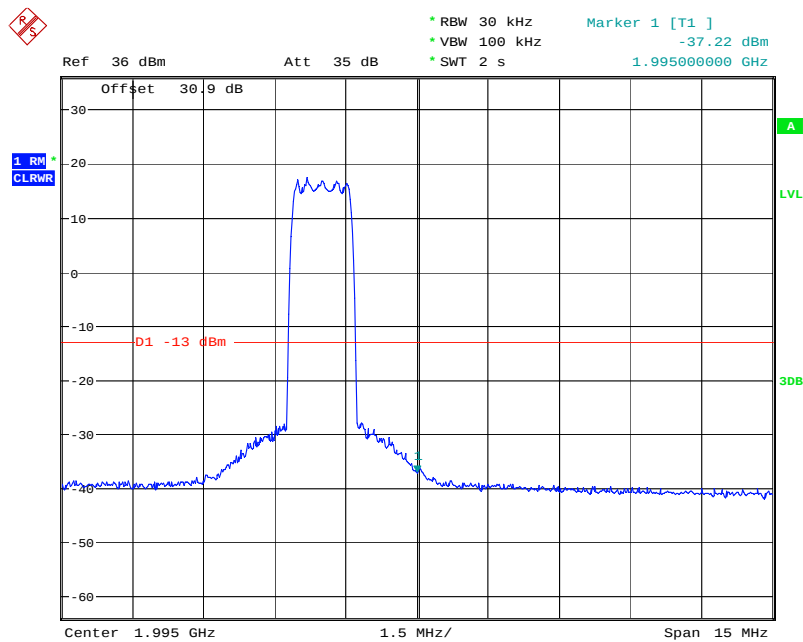
3) CDMA modulation

a) Lower Edge



Date: 12.OCT.2013 19:38:27

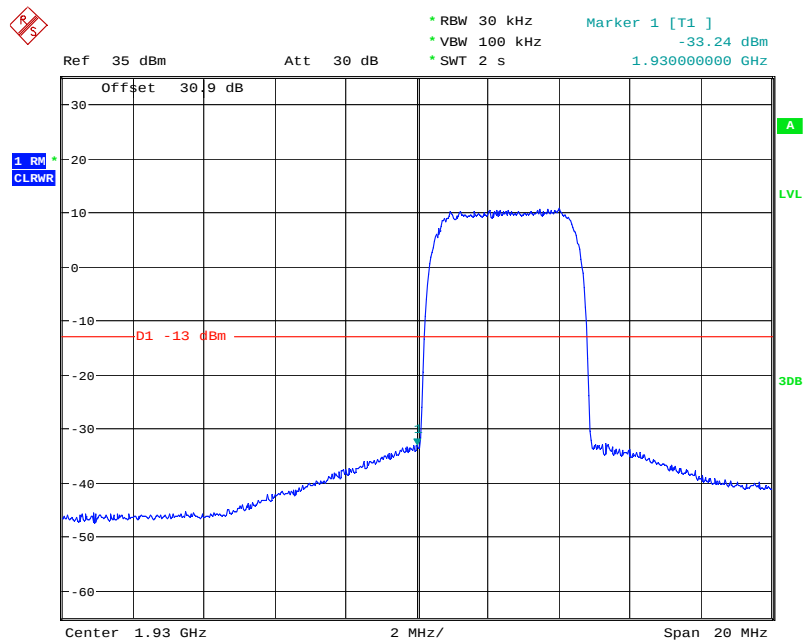
b) Upper Edge



Date: 12.OCT.2013 19:37:48

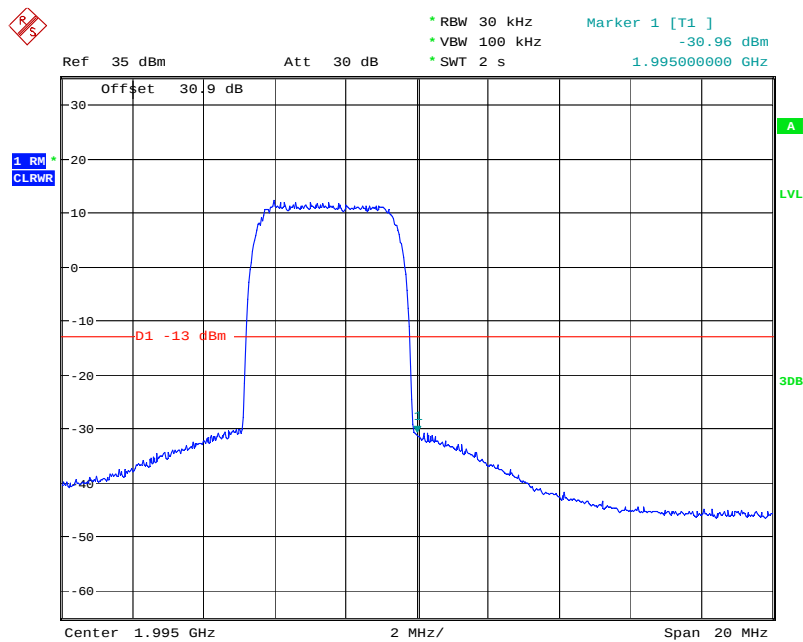
4) WCDMA modulation

a) Lower Edge



Date: 12.OCT.2013 19:39:49

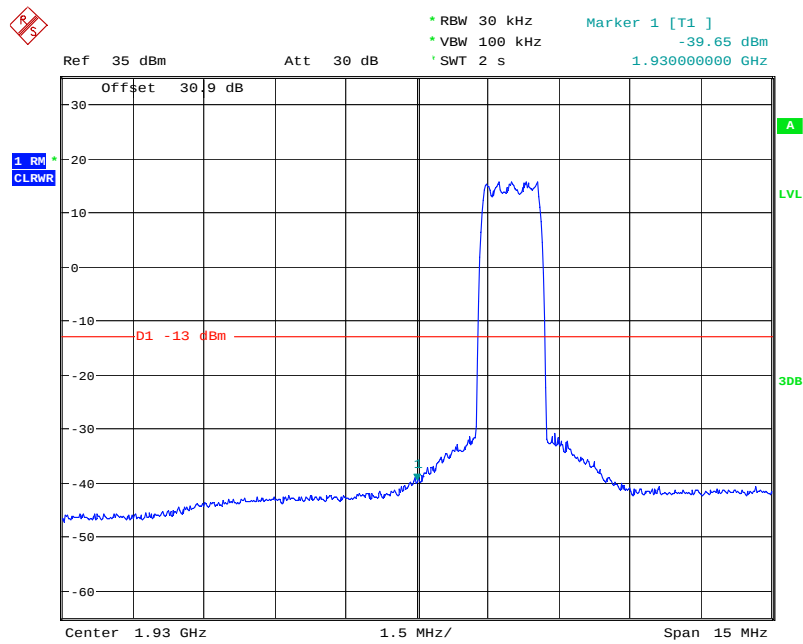
b) Upper Edge



Date: 12.OCT.2013 19:40:10

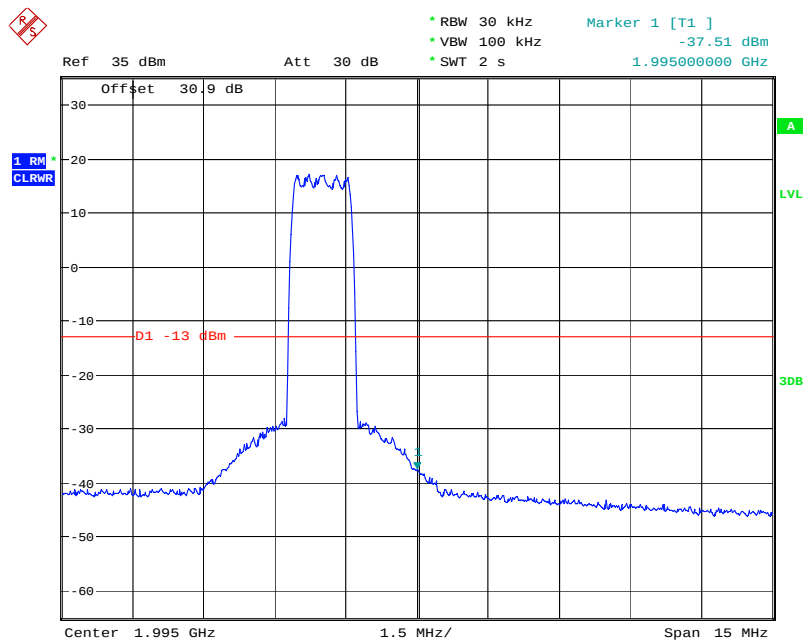
5) 1x EV-DO modulation

a) Lower Edge



Date: 12.OCT.2013 19:38:41

b) Upper Edge



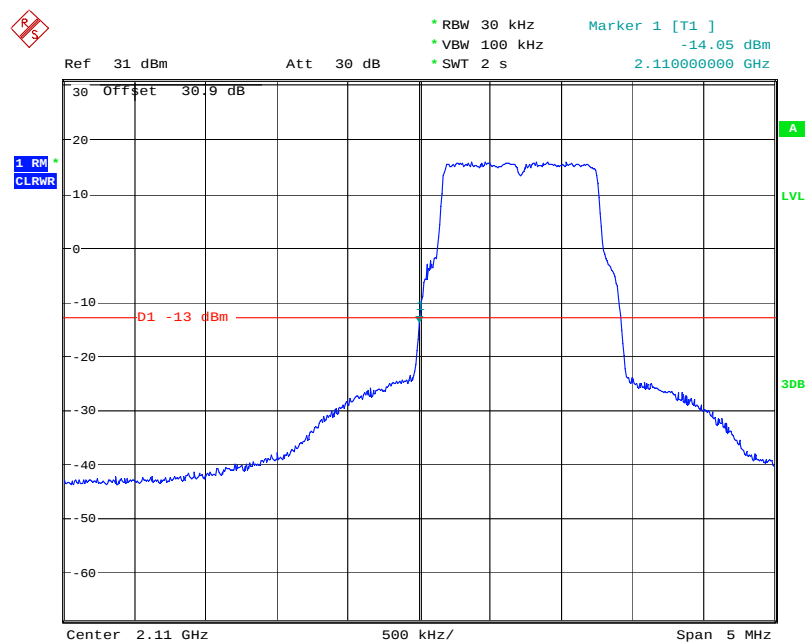
Date: 12.OCT.2013 19:39:06

5.3.3.1.6 AWS-1 Band for Downlink

1) LTE modulation

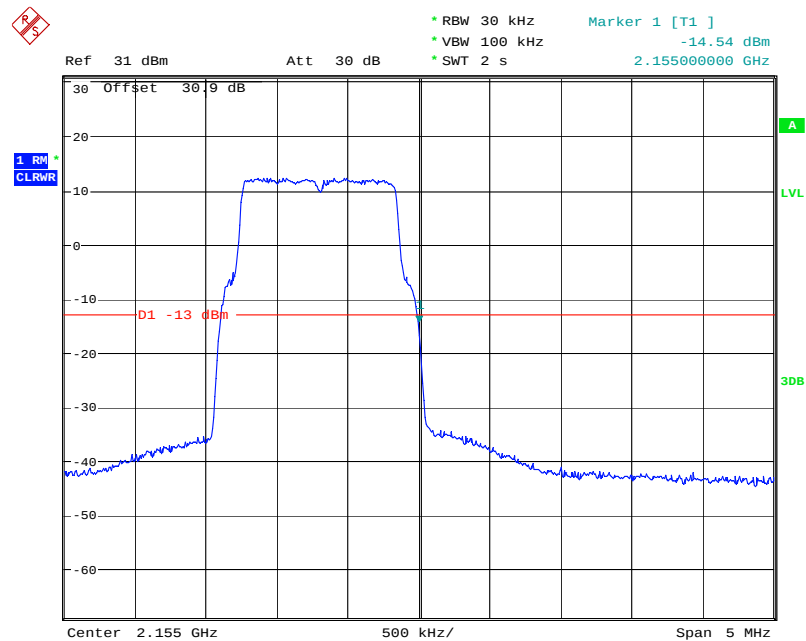
1.1) Test for LTE 1.4MHz

a) Lower Edge



Date: 12.OCT.2013 19:44:56

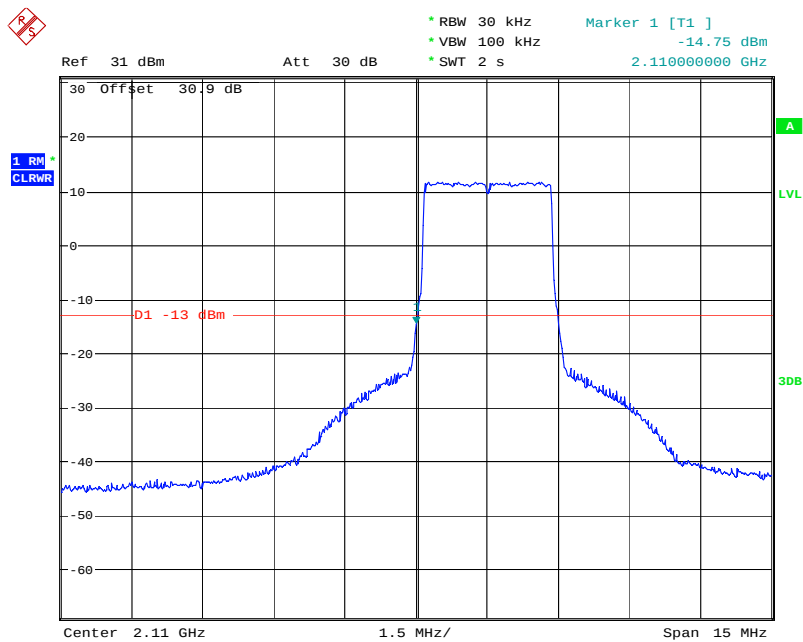
b) Upper Edge



Date: 12.OCT.2013 19:45:24

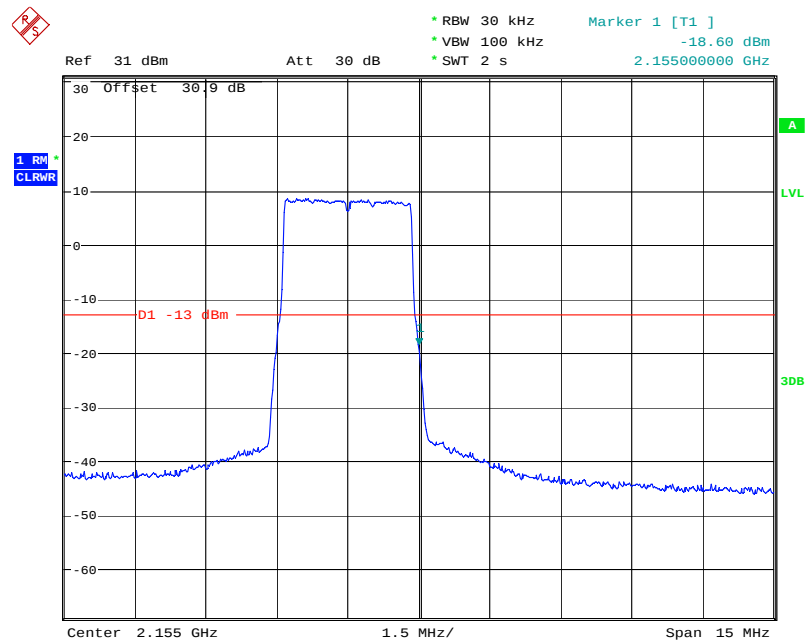
1.2) Test for LTE 3MHz

a) Lower Edge



Date: 12.OCT.2013 19:46:50

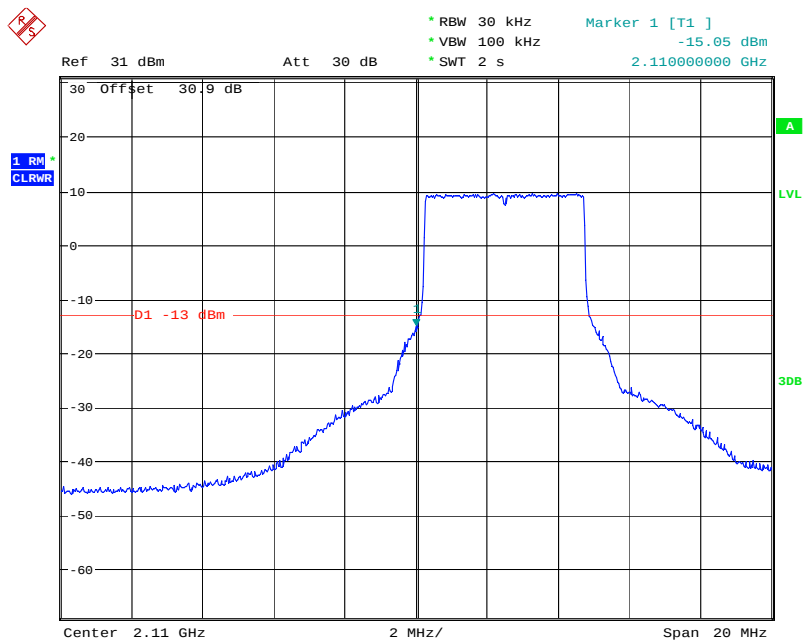
b) Upper Edge



Date: 12.OCT.2013 19:46:03

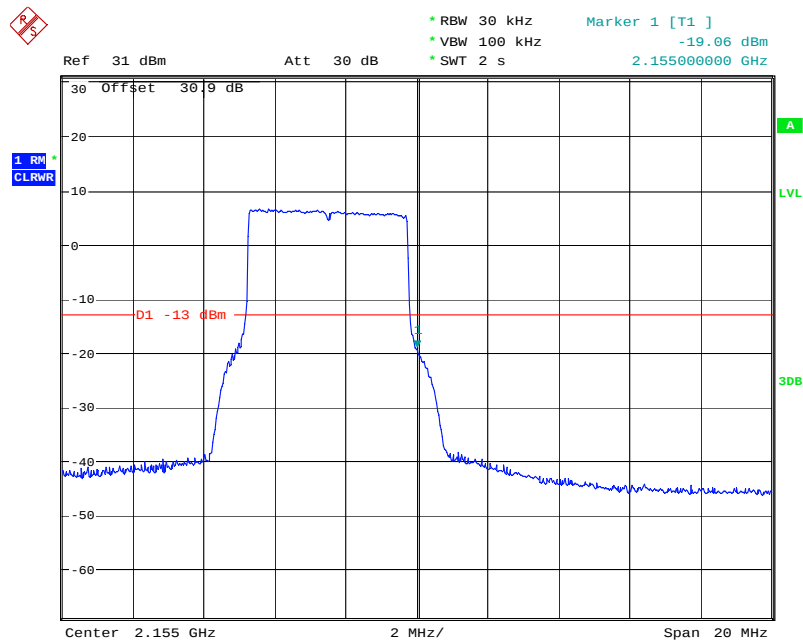
1.3) Test for LTE 5MHz

a) Lower Edge



Date: 12.OCT.2013 19:47:24

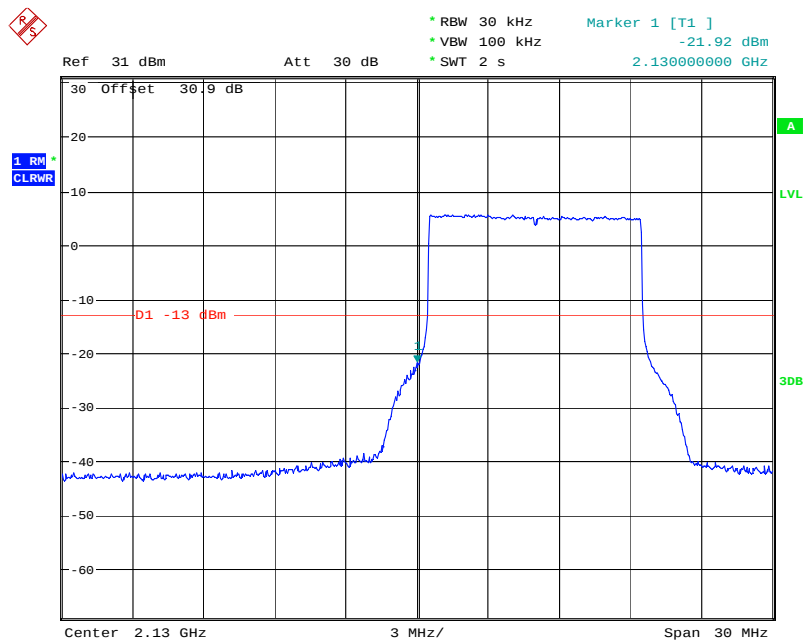
b) Upper Edge



Date: 12.OCT.2013 19:47:50

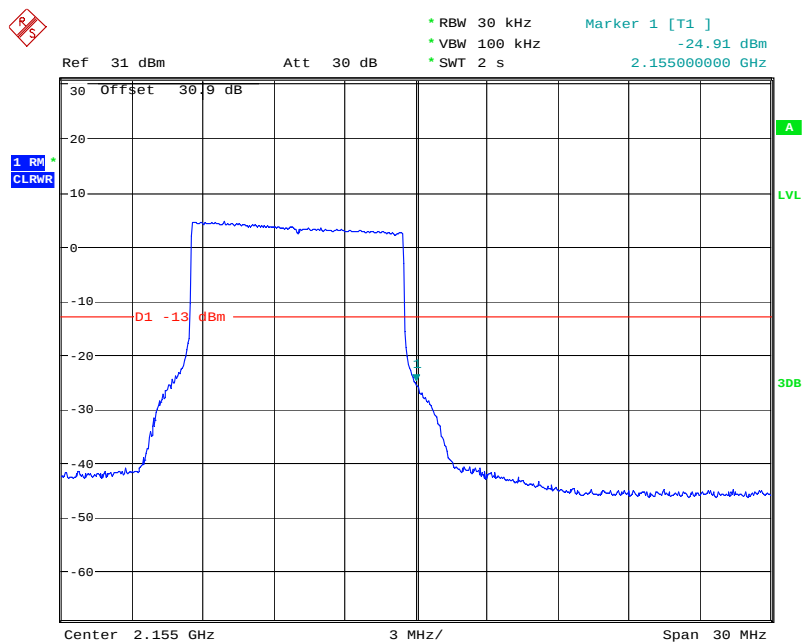
1.4) Test for LTE 10MHz

a) Lower Edge



Date: 12.OCT.2013 19:48:46

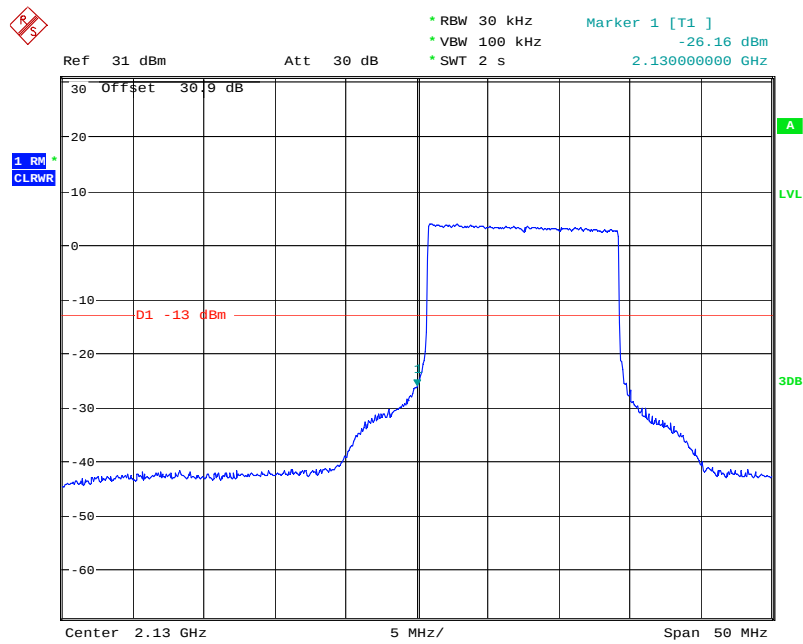
b) Upper Edge



Date: 12.OCT.2013 19:48:17

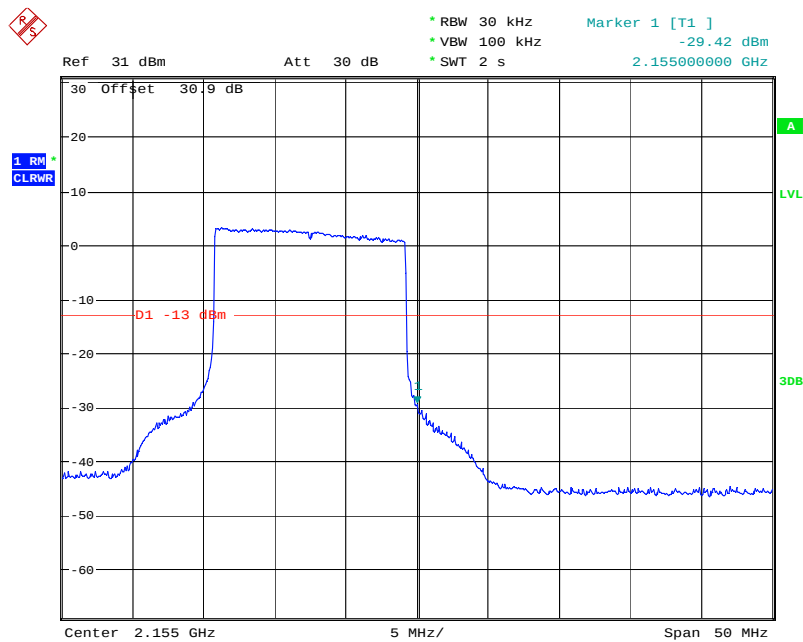
1.5) Test for LTE 15MHz

a) Lower Edge



Date: 12.OCT.2013 19:49:11

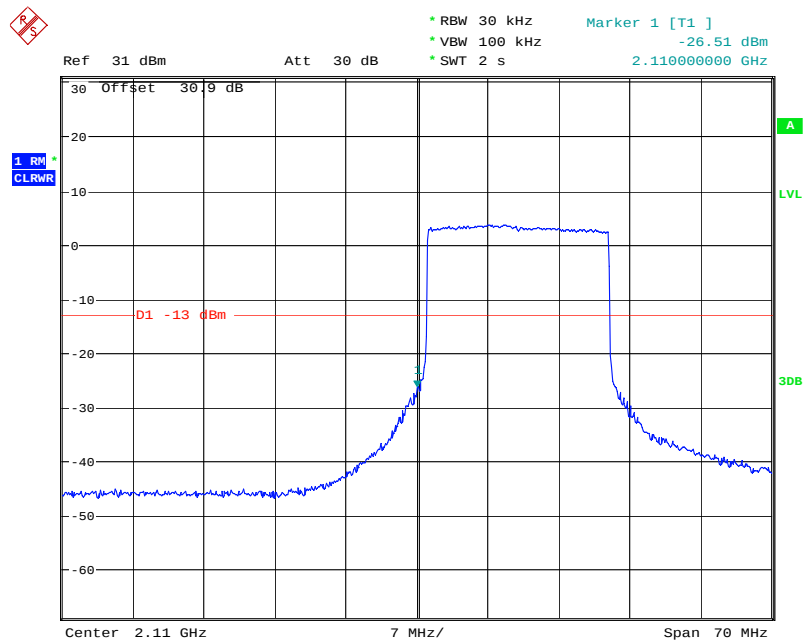
b) Upper Edge



Date: 12.OCT.2013 19:49:36

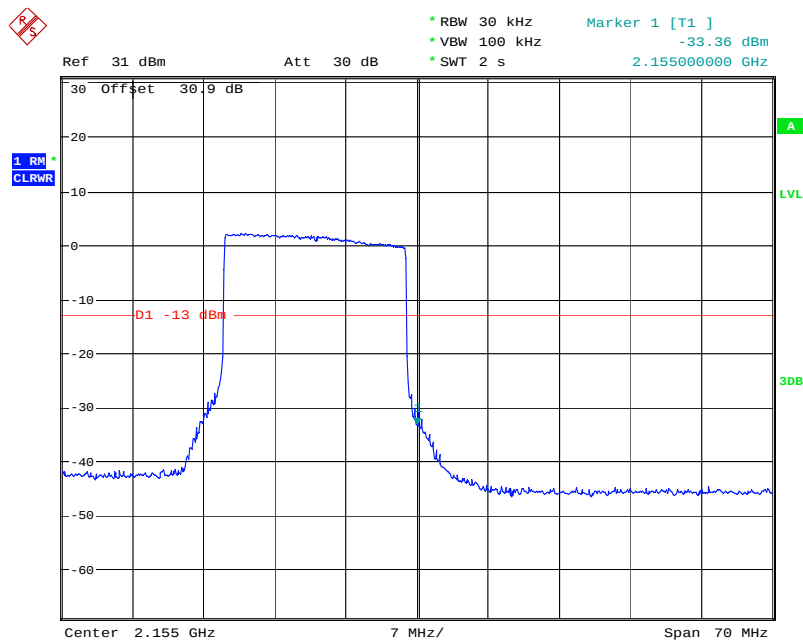
1.6) Test for LTE 20MHz

a) Lower Edge



Date: 12.OCT.2013 19:50:49

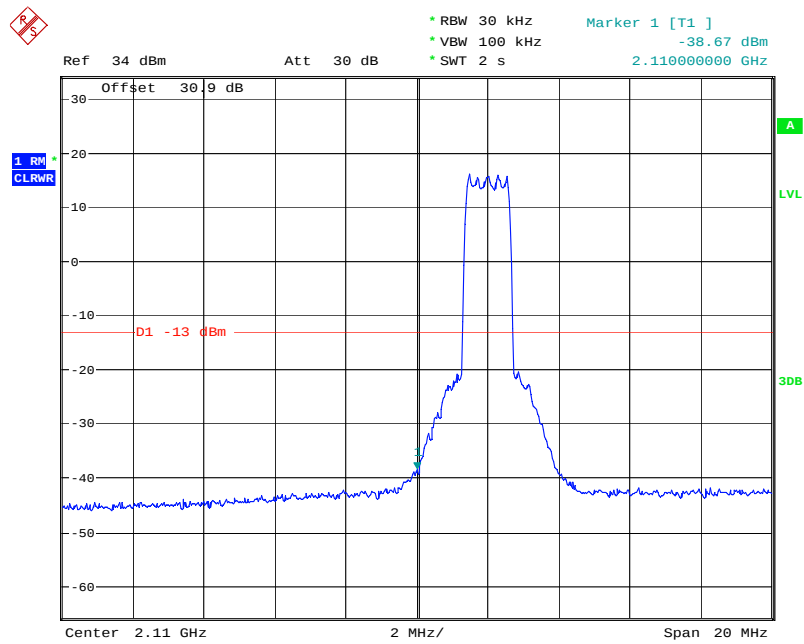
b) Upper Edge



Date: 12.OCT.2013 19:50:06

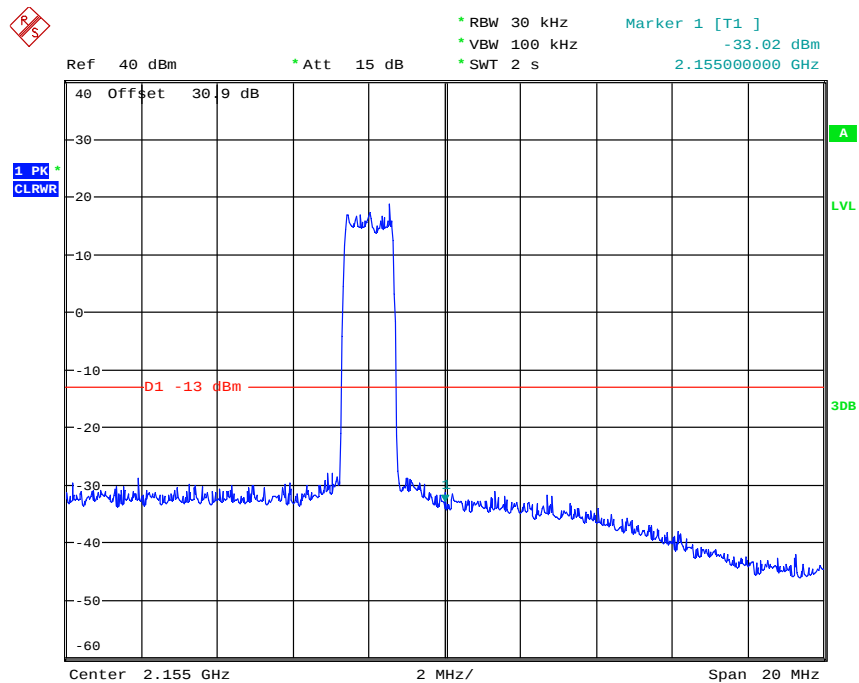
2) CDMA modulation

a) Lower Edge



Date: 12.OCT.2013 19:42:37

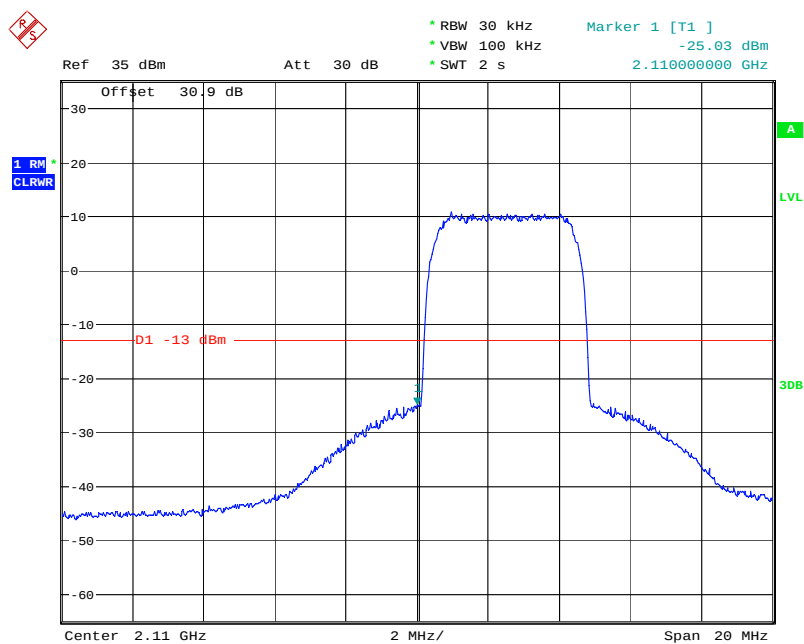
b) Upper Edge



Date: 16.NOV.2013 10:15:30

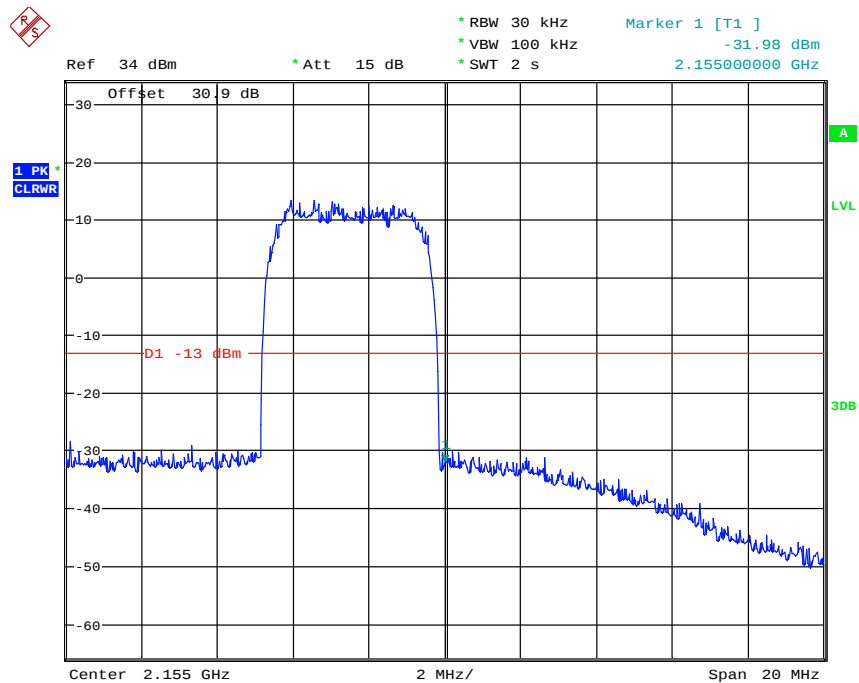
3) WCDMA modulation

a) Lower Edge



Date: 12.OCT.2013 19:41:38

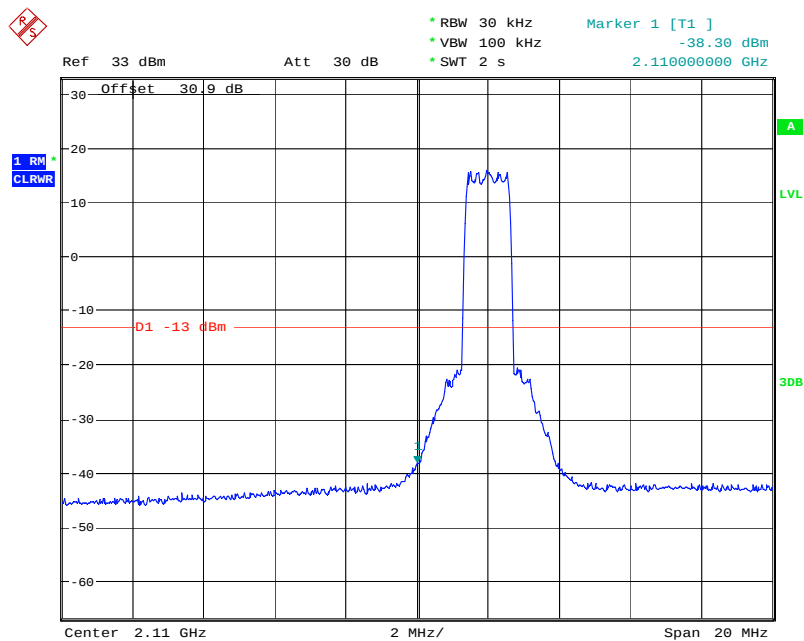
b) Upper Edge



Date: 16.NOV.2013 10:17:59

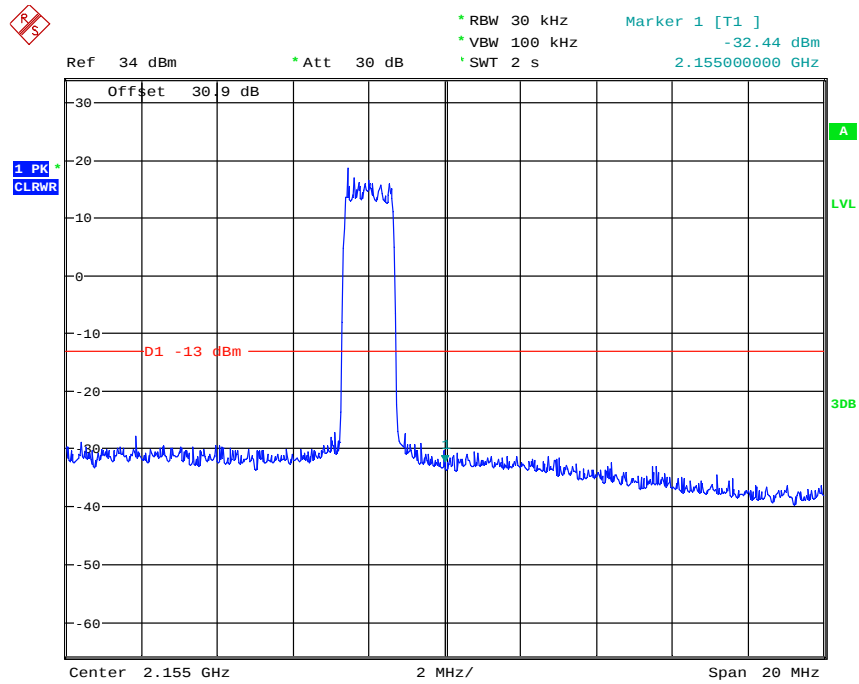
4) 1x EV-DO modulation

a) Lower Edge



Date: 12.OCT.2013 19:43:07

b) Upper Edge



Date: 16.NOV.2013 10:19:44

5.3.4 Intermodulation

Test Date:	14 Oct, 2013 to 18 Nov, 2013
Ambient Temp:	20.0°C
Humid :	67%
Atmospheric Pressure:	1005mbar
Power supply:	AC 120V 60Hz
Test Method:	935210 D02 Signal Boosters Certification v01r01
Test Requirement:	
700MHz Lower ABC Band	FCC part 27. 53 The power of any emission outside a licensee's frequency block shall be attenuated below the transmitting power (P) by at least $43 + 10 \log (P)$ dB, or -13 dBm.
700MHz Upper C Band	FCC part 27. 53 The power of any emission outside a licensee's frequency block shall be attenuated below the transmitting power (P) by at least $43 + 10 \log (P)$ dB, or -13 dBm.
850MHz Band	FCC part 22. 917 The power of any emission outside a licensee's frequency block shall be attenuated below the transmitting power (P) by at least $43 + 10 \log (P)$ dB, or -13 dBm.
1900MHz Broadband PCS	FCC part 24. 238 The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB, or -13 dBm.
AWS-1 Band	FCC part 27. 53 The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB, or -13 dBm.
EUT Operation:	The output power of EUT be set to maximum value, the gain of EUT be set to maximum value by software through the manufacture
Test conditions:	Normal conditions

Test configuration:

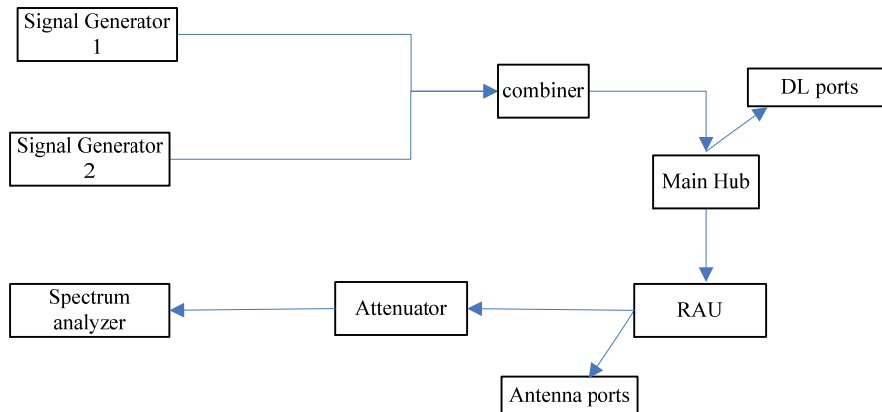
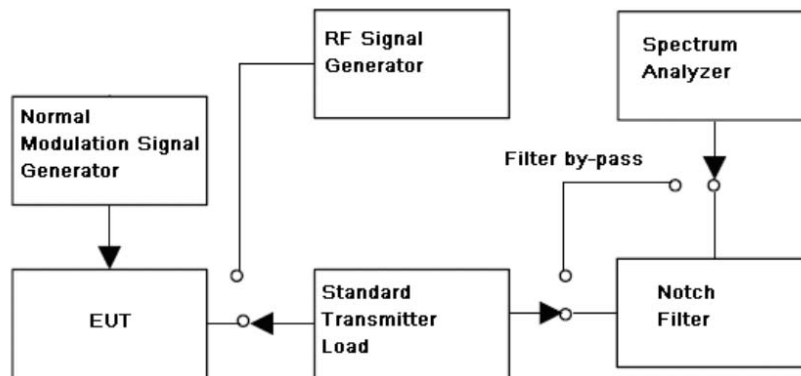


Figure 4: Downlink Intermodulation



Test Procedure:

Intermodulation test procedure:c

- Connect the equipment as illustrated;
- Test the background noise level with all the test facilities;
- Keep one transmitting path, all other connectors shall be connected by normal power or RF leads;
- Select the attenuator to avoid the test receiver or spectrum analyzer being destroyed;
- Keep the EUT continuously transmitting in max power;
- Keep two signal generator produce two signal are same in modulation type and level;
- Measurement the 3 order intermodulated produced by the EUT(the sum of the two unwanted signal should be rated power);
- Correct for all losses in the RF path;
- 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 test (high, low-band edge) with two tones;

Limit usually is -13 dBm conducted;

Not need for single channel systems;

Combination of modulation types not needed;

Remark:

For the test in two signal input or intermodulation, test input signal f1 and f2 will consider as follows conditions:

- 1) EUT frequency band span and the amount of channels;
- 2) f1 is the center frequency of lower channel, f2 is the center frequency of higher channel, Δf is the channel spacing;
- 3) in lower edge test, f1 is the center frequency of lower channel, and f2 is f1 + 1 channel frequency;
- 4) in higher edge test, f2 is the center frequency of higher channel, and f1 is f2 - 1 channel frequency;
- 5) according to the amplifier characteristic, the 3rd product will be appeared when two signals input;
- 6) base the 3rd product frequency $F1=2f1-f2$ and $F2=2f2-f1$, when the f1 and f2 frequency select above:
 - a) in lower edge test, $F1=2f1-f2=2f1-(f1+\Delta f)=f1-\Delta f$ =lower edge frequency;
 - b) in higher edge test, $F2=2f2-f1=f2+\Delta f$ =higher edge frequency;

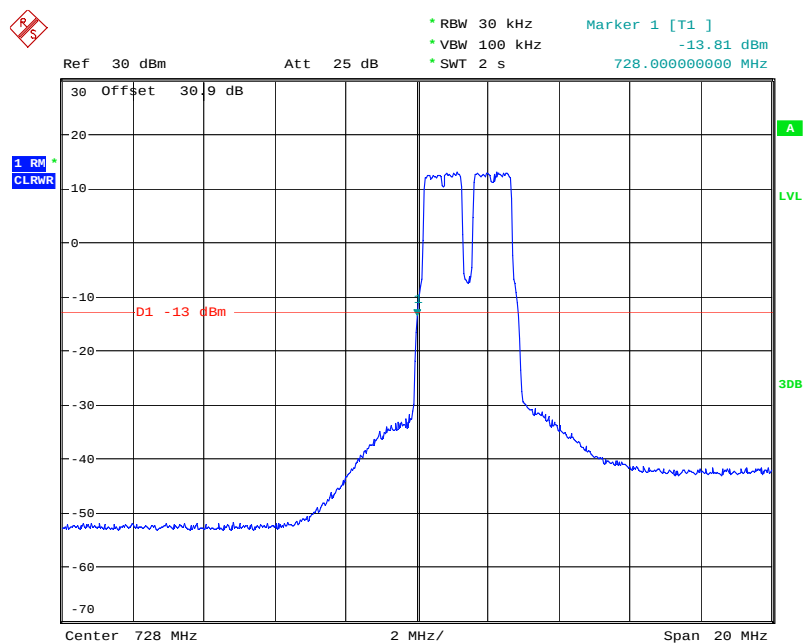
5.3.4.1 Measurement Record

5.3.4.1.1 700MHz Lower ABC Band for Downlink

1) 700MHz Lower A LTE modulation

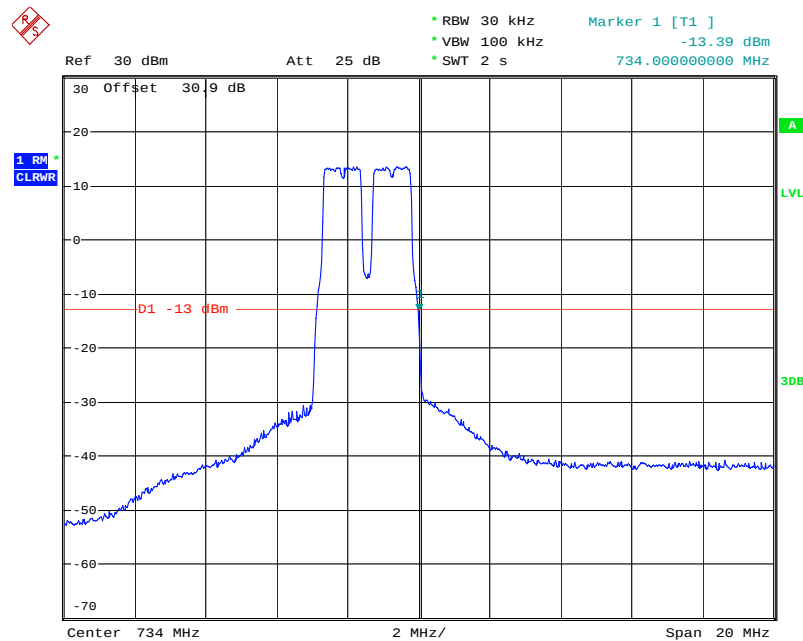
1.1) Test for LTE 1.4MHz

a) Lower Edge



Date: 14.OCT.2013 16:35:57

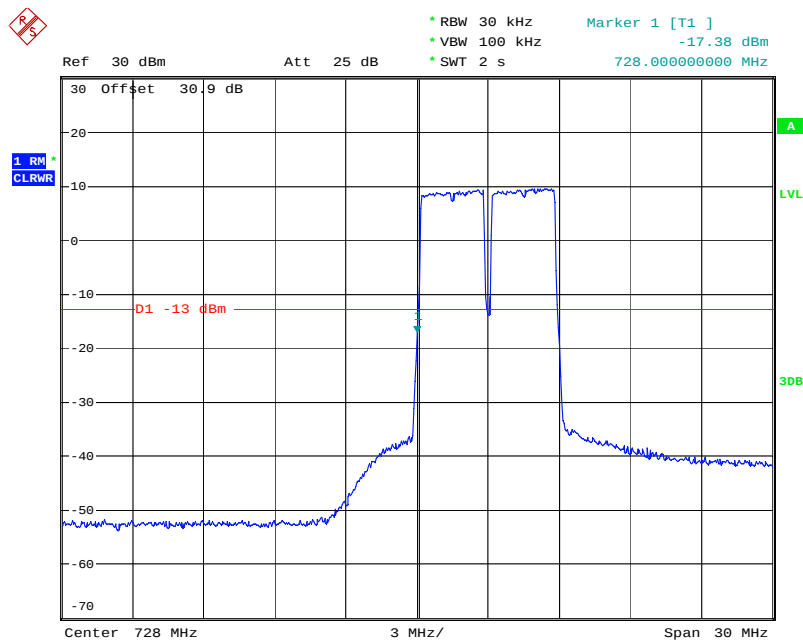
b) Upper Edge



Date: 14.OCT.2013 16:38:34

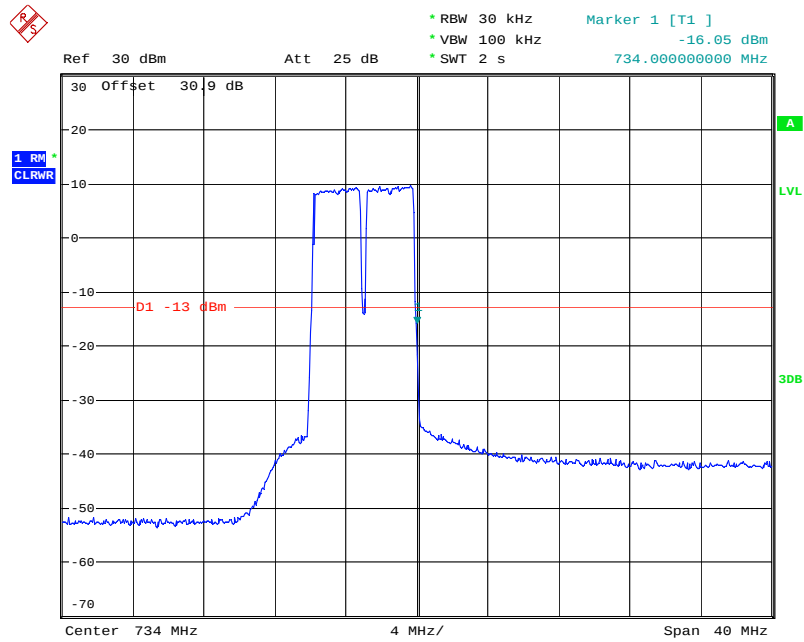
1.2) Test for LTE 3MHz

a) Lower Edge



Date: 14.OCT.2013 16:40:12

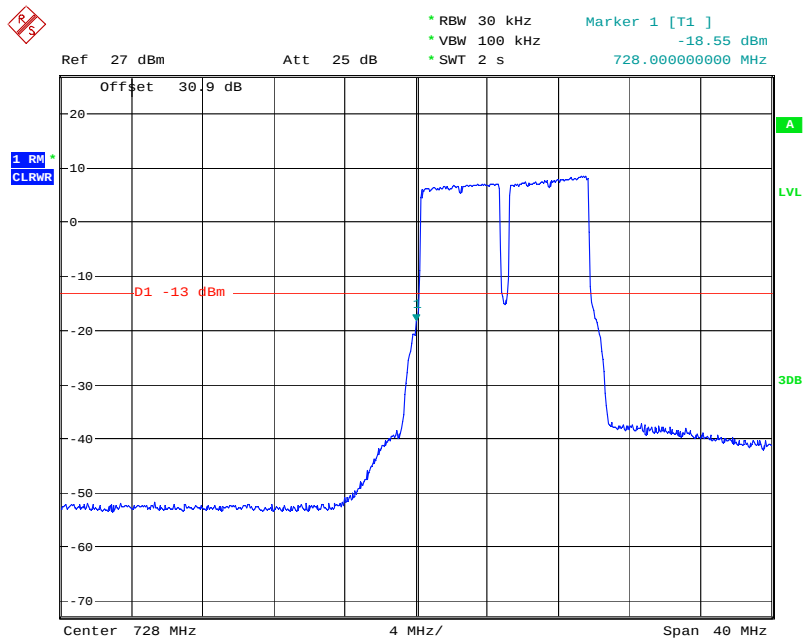
b) Upper Edge



Date: 14.OCT.2013 16:39:25

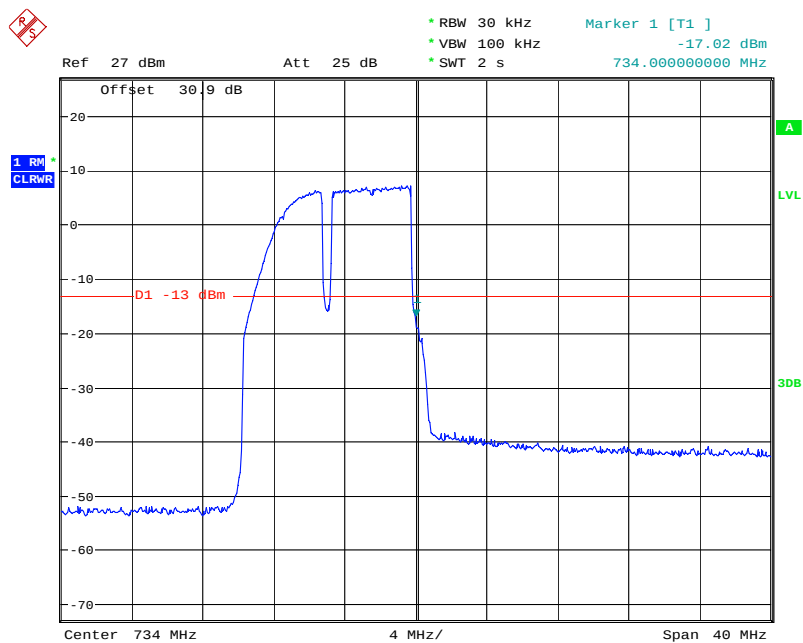
1.3) Test for LTE 5MHz

a) Lower Edge



Date: 14.OCT.2013 16:41:26

b) Upper Edge

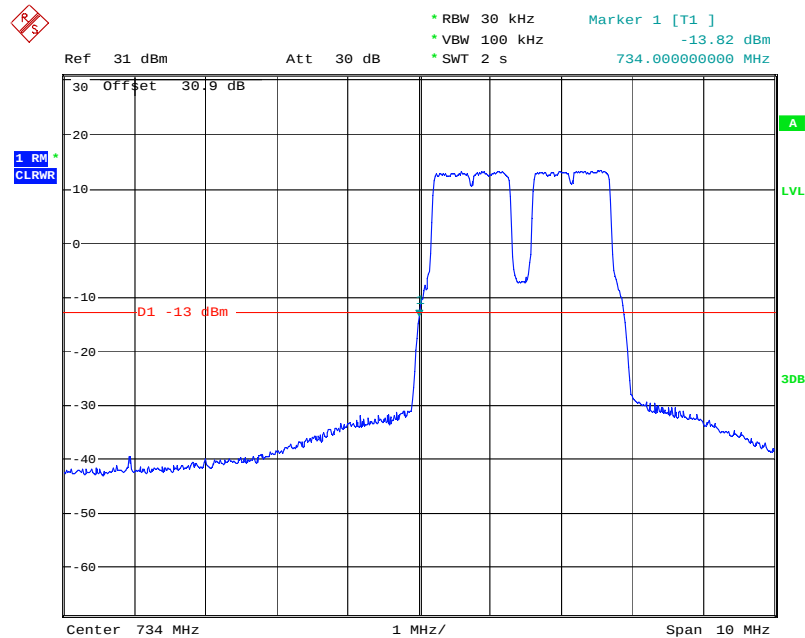


Date: 14.OCT.2013 16:42:09

2) 700MHz Lower B LTE modulation for Downlink

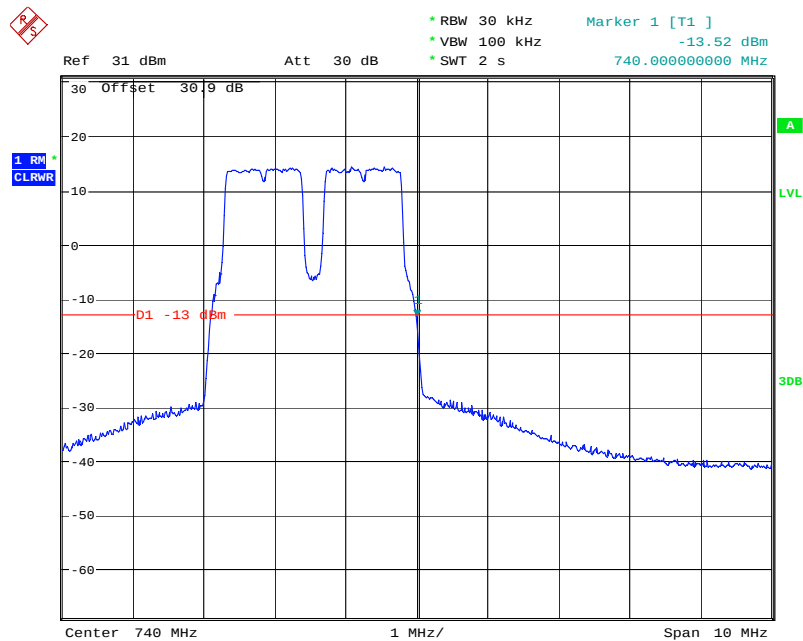
2.1) Test for LTE 1.4MHz

a) Lower Edge



Date: 14.OCT.2013 16:53:18

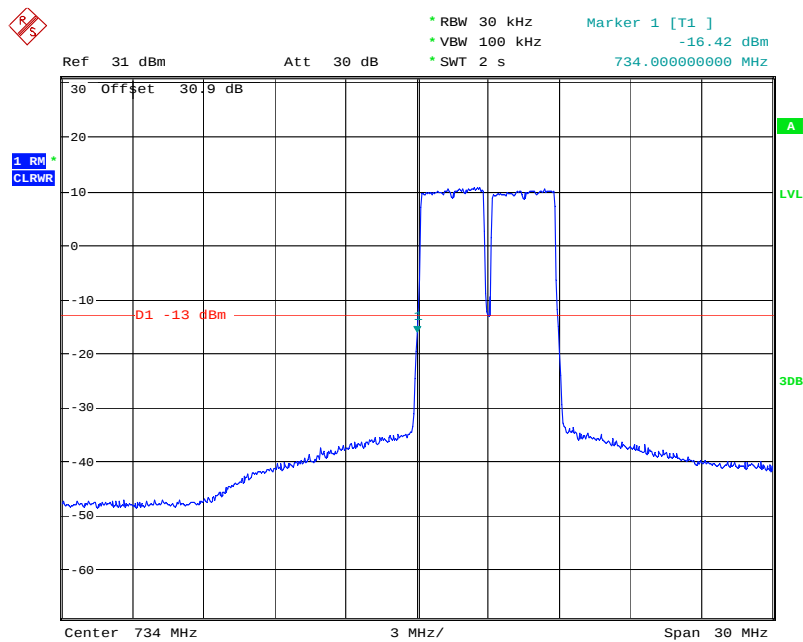
b) Upper Edge



Date: 14.OCT.2013 16:48:44

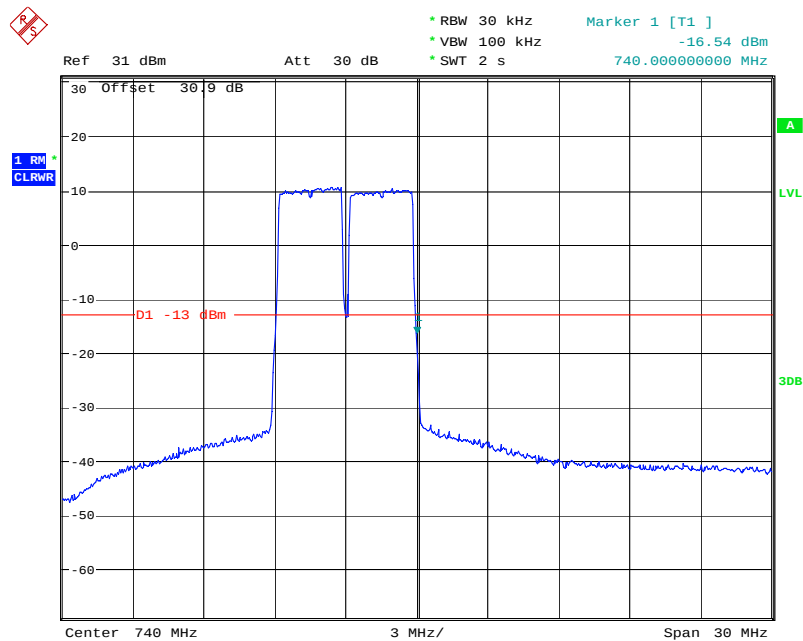
2.2) Test for LTE 3 MHz

a) Lower Edge



Date: 14.OCT.2013 16:46:11

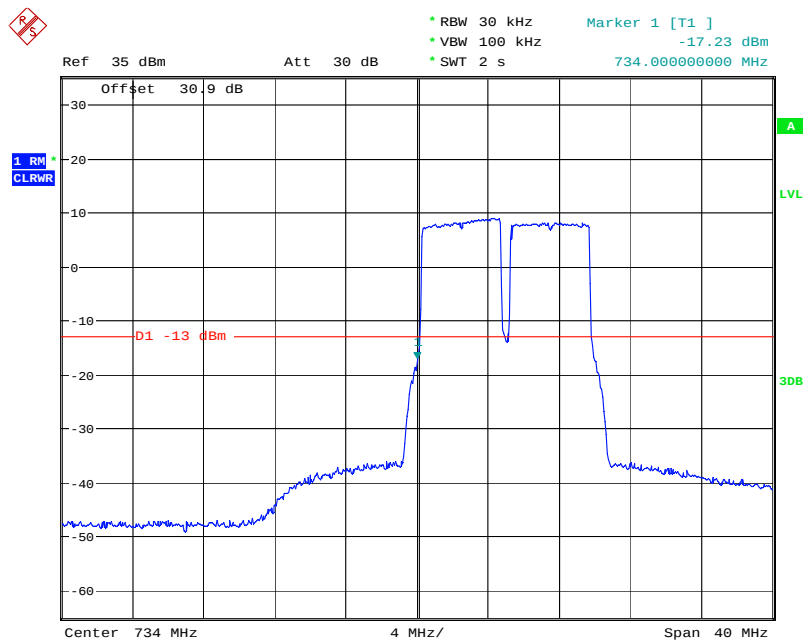
b) Upper Edge



Date: 14.OCT.2013 16:46:47

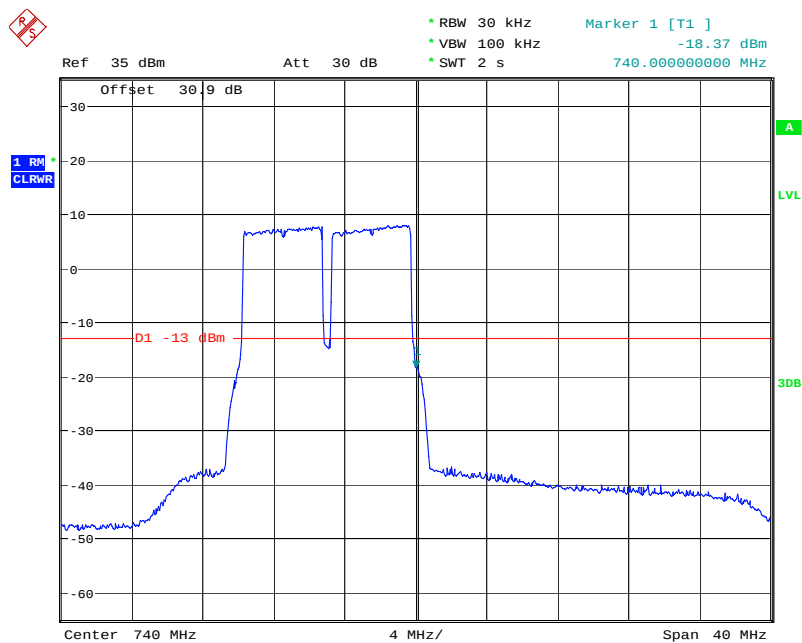
2.3) Test for LTE 5 MHz

a) Lower Edge



Date: 14.OCT.2013 16:45:09

b) Upper Edge

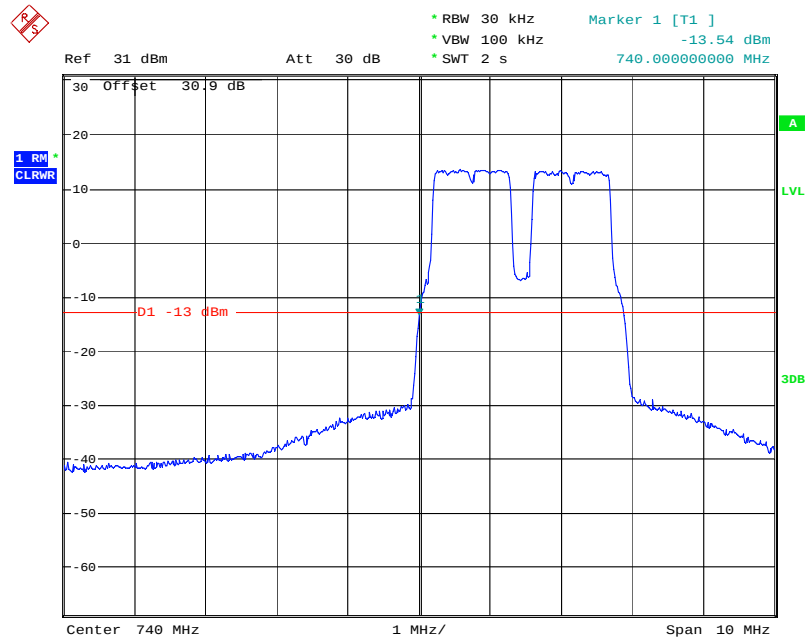


Date: 14.OCT.2013 16:44:15

3) 700MHz Lower C LTE modulation for Downlink

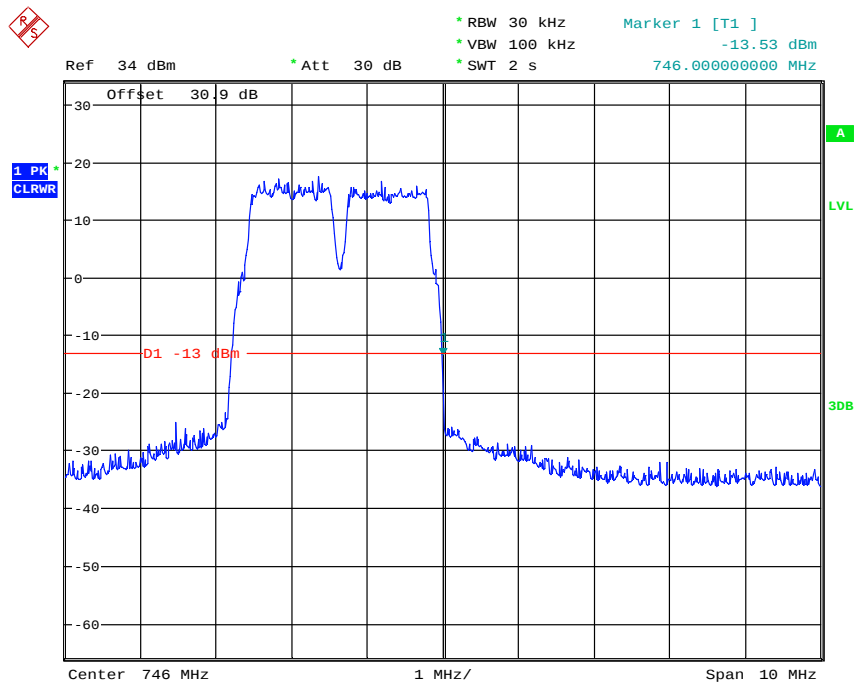
3.1) Test for LTE 1.4MHz

a) Lower Edge



Date: 14.OCT.2013 16:55:28

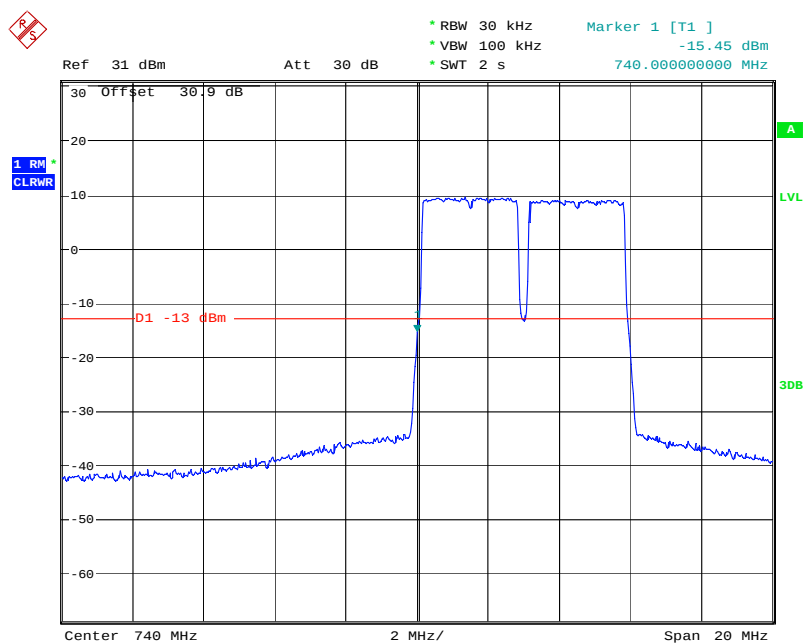
b) Upper Edge



Date: 16.NOV.2013 10:33:57

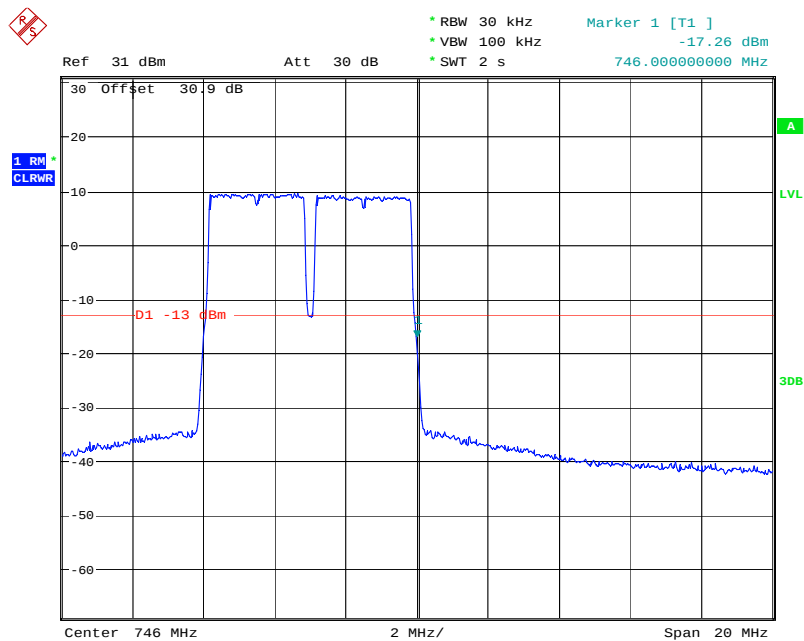
3.2) Test for LTE 3 MHz

a) Lower Edge



Date: 14.OCT.2013 16:57:33

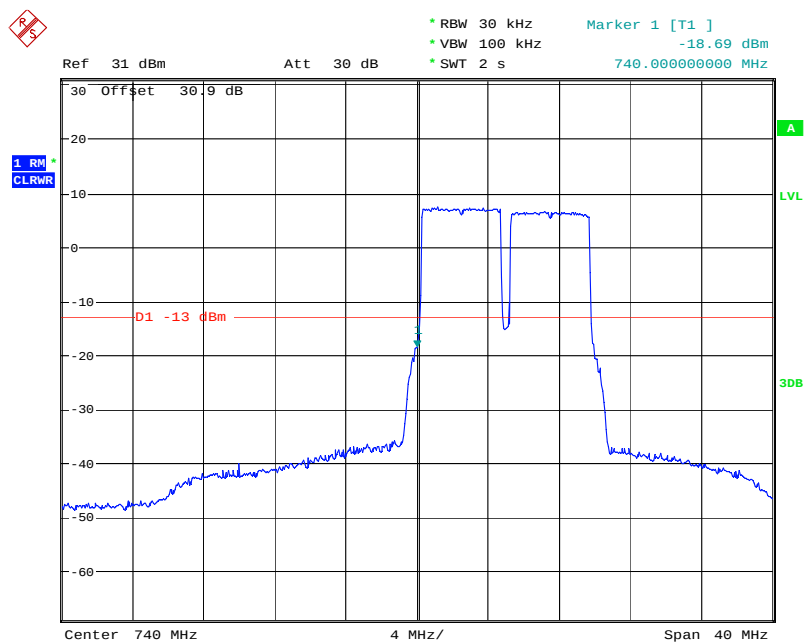
b) Upper Edge



Date: 14.OCT.2013 16:57:00

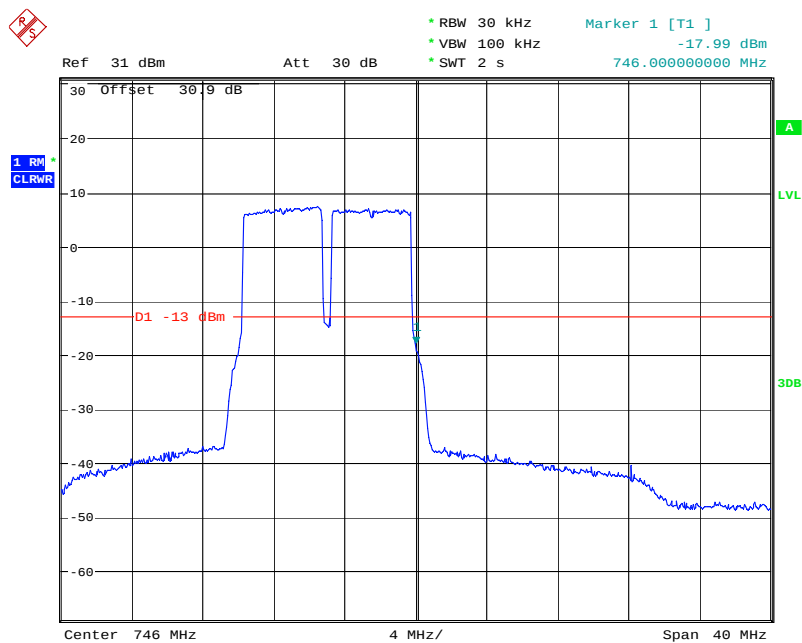
3.3) Test for LTE 5 MHz

a) Lower Edge



Date: 14.OCT.2013 16:58:06

b) Upper Edge

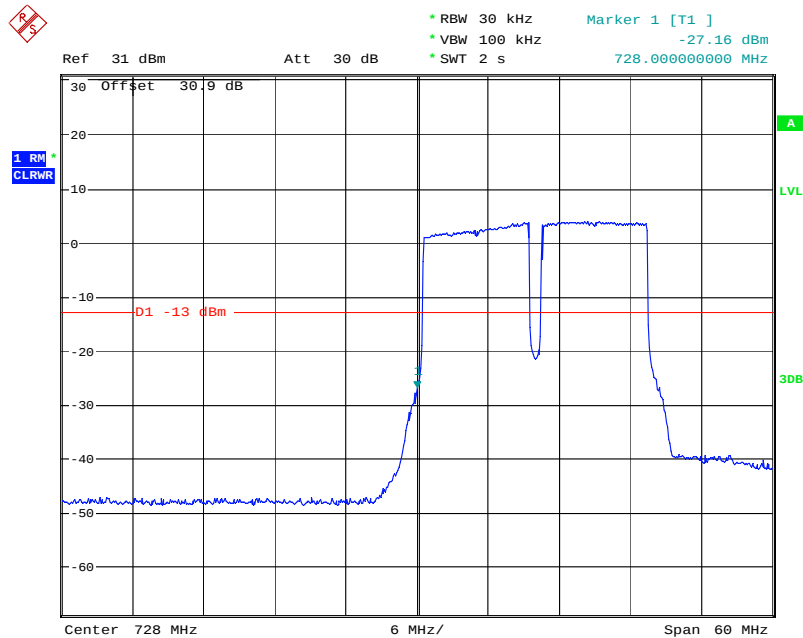


Date: 14.OCT.2013 16:59:09

4) 700MHz Lower ABC LTE modulation for Downlink

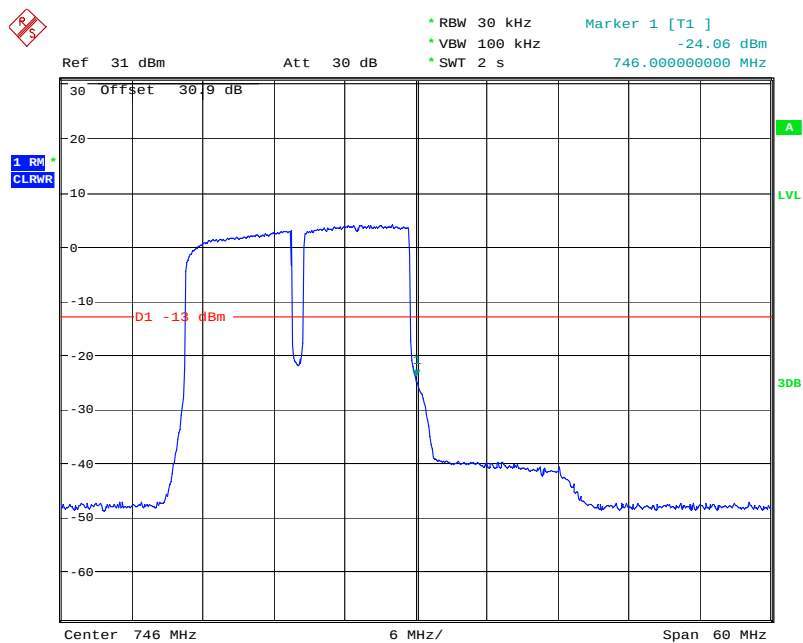
4.1) Test for LTE 10MHz

a) Lower Edge



Date: 14.OCT.2013 17:00:50

b) Upper Edge



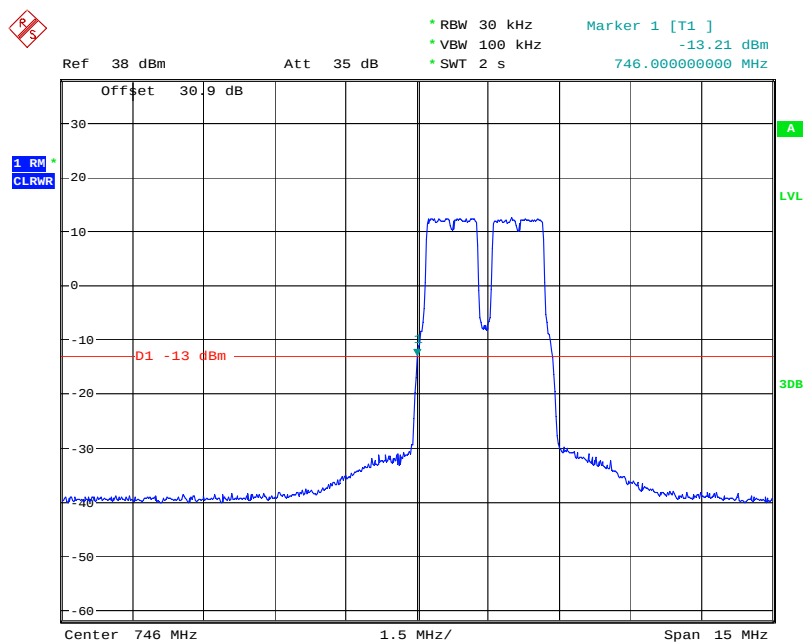
Date: 14.OCT.2013 17:00:14

5.3.4.1.2 700MHz Upper C Band for Downlink

1) LTE modulation

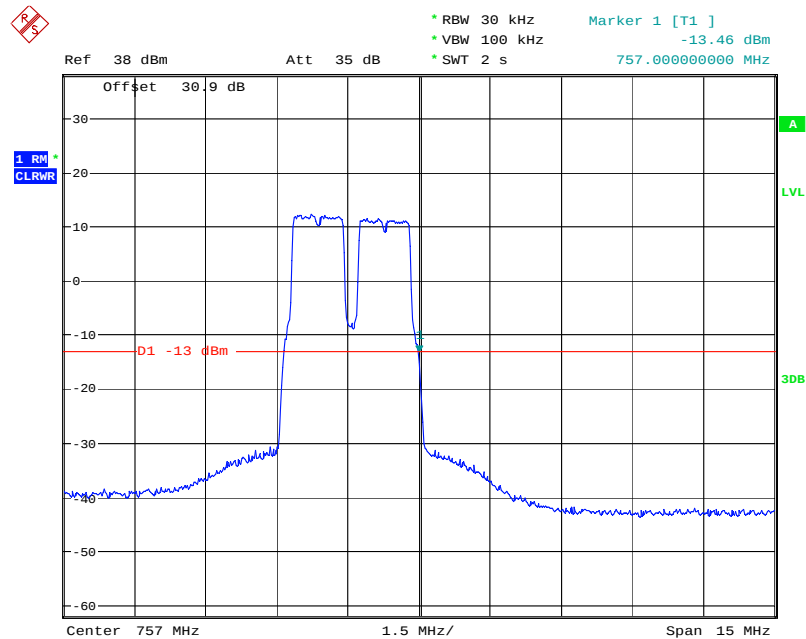
1.1) Test for LTE 1.4MHz

a) Lower Edge



Date: 14.OCT.2013 16:21:04

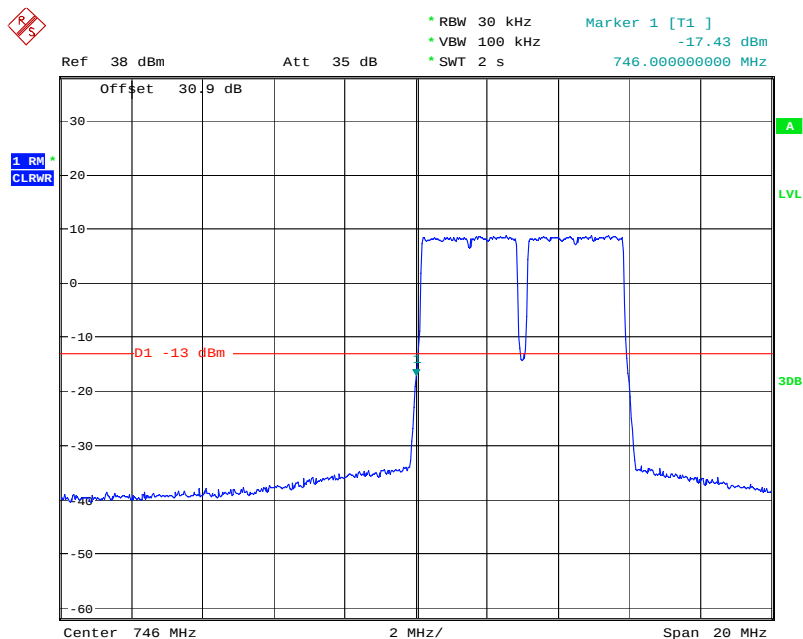
b) Upper Edge



Date: 14.OCT.2013 16:22:08

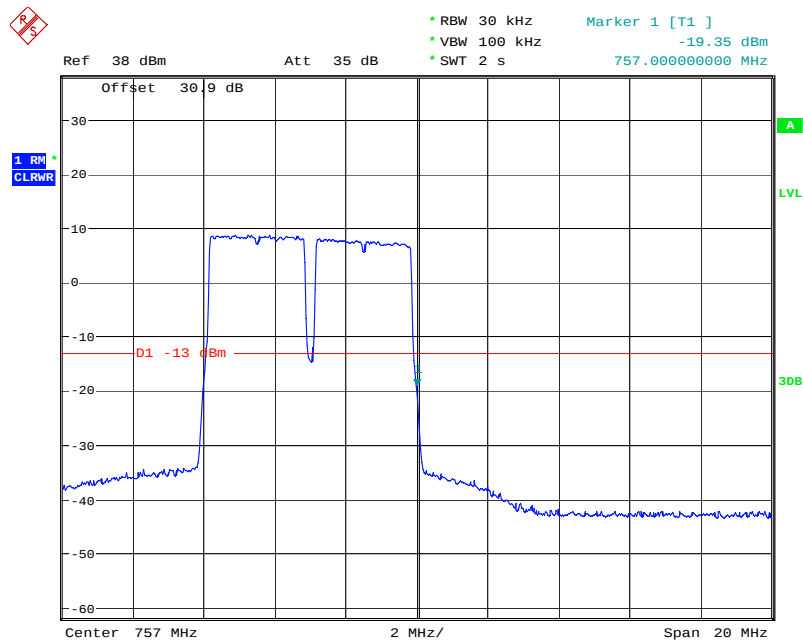
1.2) Test for LTE 3MHz

a) Lower Edge



Date: 14.OCT.2013 16:27:53

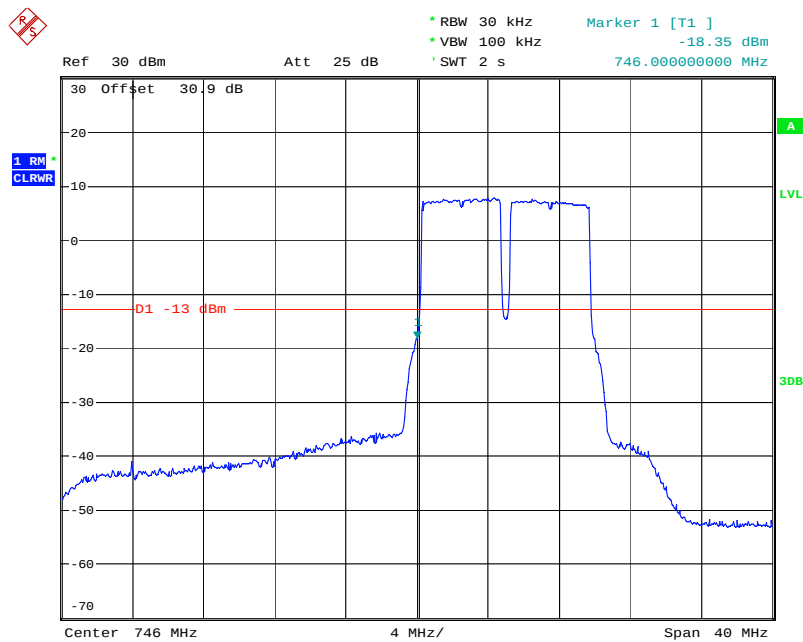
b) Upper Edge



Date: 14.OCT.2013 16:22:54

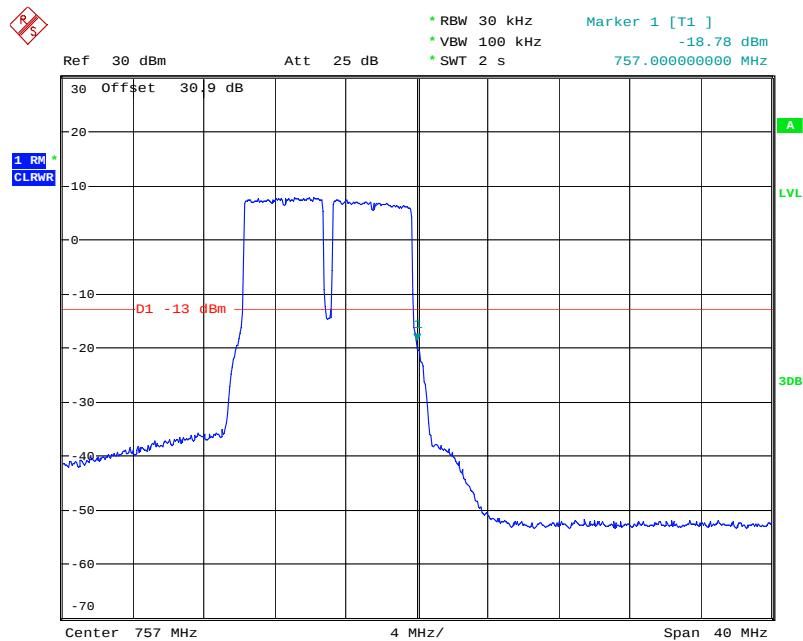
1.3) Test for LTE 5MHz

a) Lower Edge



Date: 14.OCT.2013 16:29:12

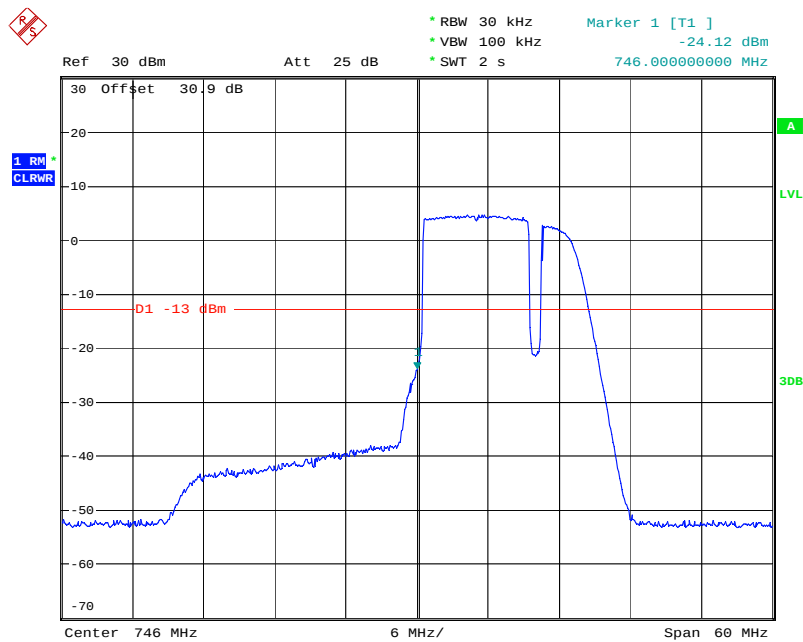
b) Upper Edge



Date: 14.OCT.2013 16:29:49

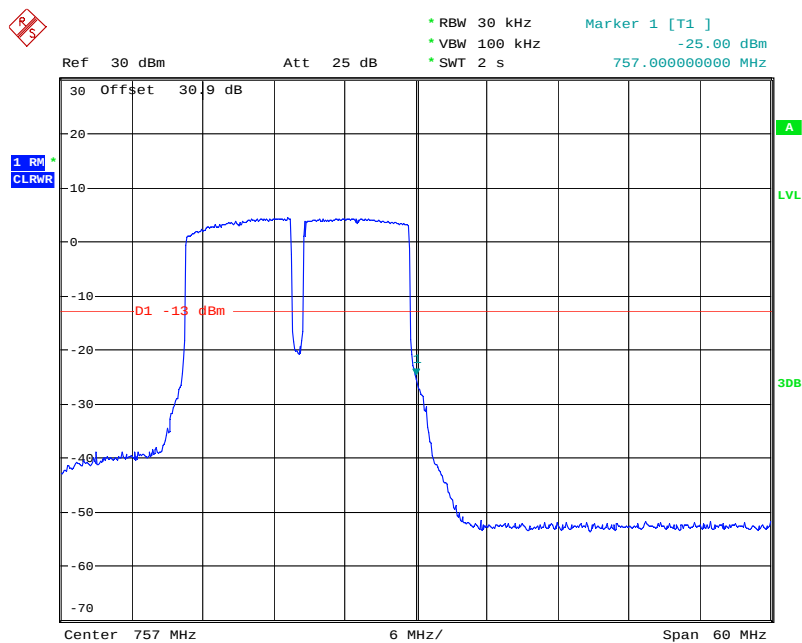
1.4) Test for LTE 10MHz

a) Lower Edge



Date: 14.OCT.2013 16:31:33

b) Upper Edge



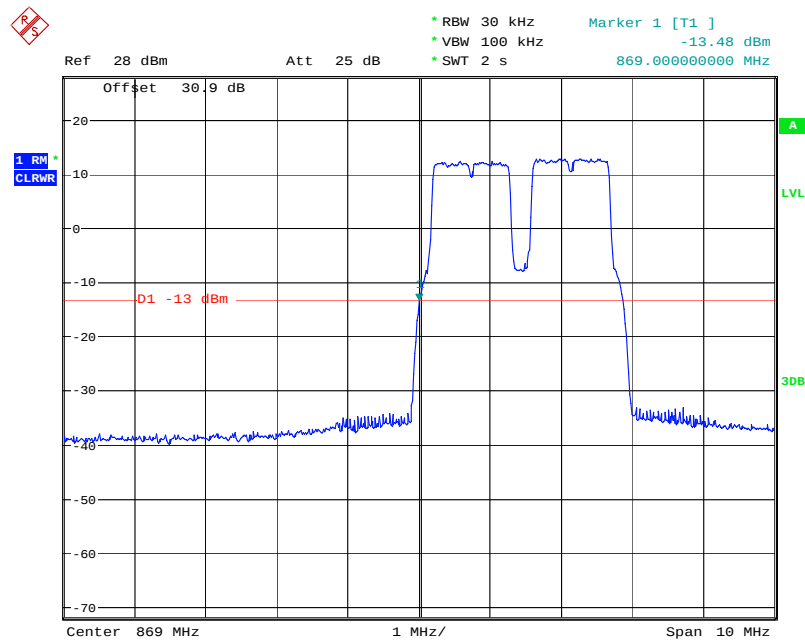
Date: 14.OCT.2013 16:30:46

5.3.4.1.3 850MHz Band for Downlink

1) LTE modulation

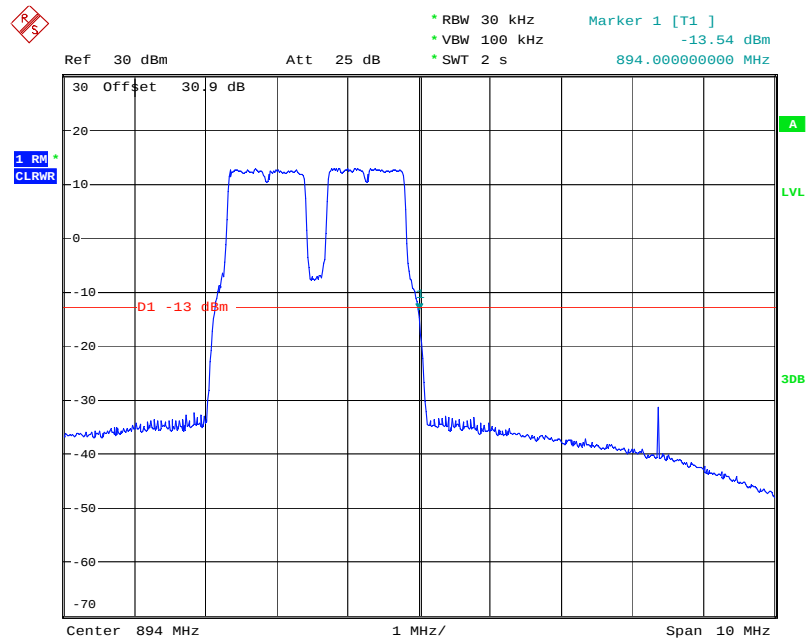
1.1) Test for LTE 1.4MHz

a) Lower Edge



Date: 14.OCT.2013 14:46:14

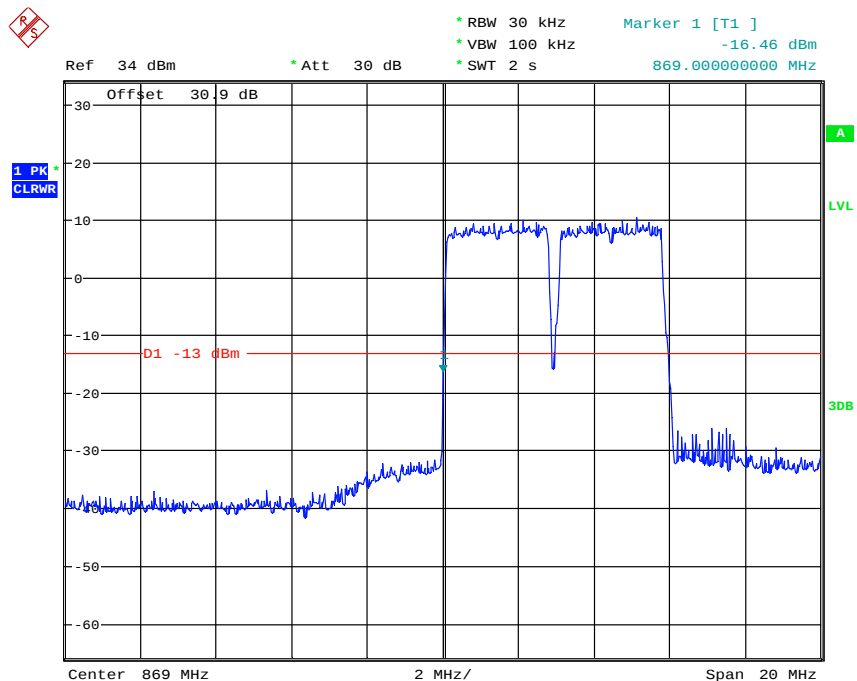
b) Upper Edge



Date: 14.OCT.2013 14:44:43

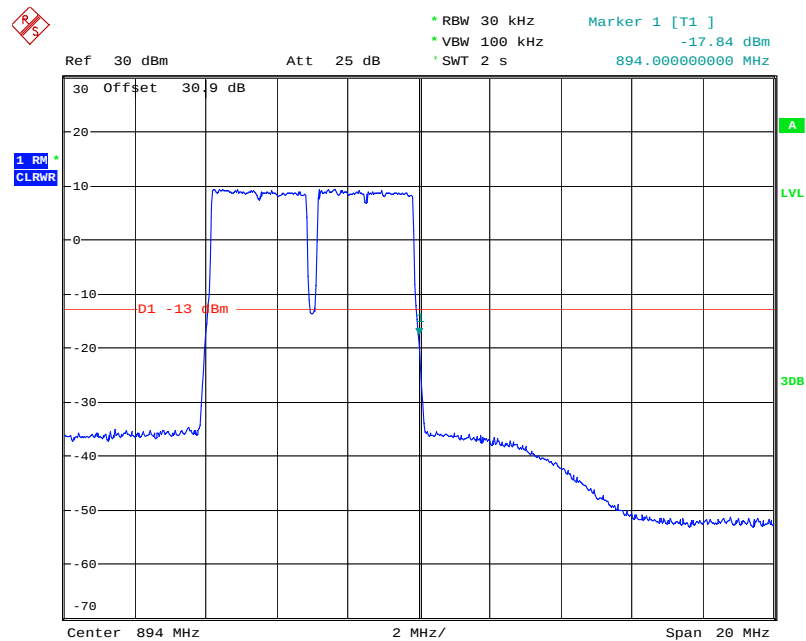
1.2) Test for LTE 3MHz

a) Lower Edge



Date: 16.NOV.2013 10:41:33

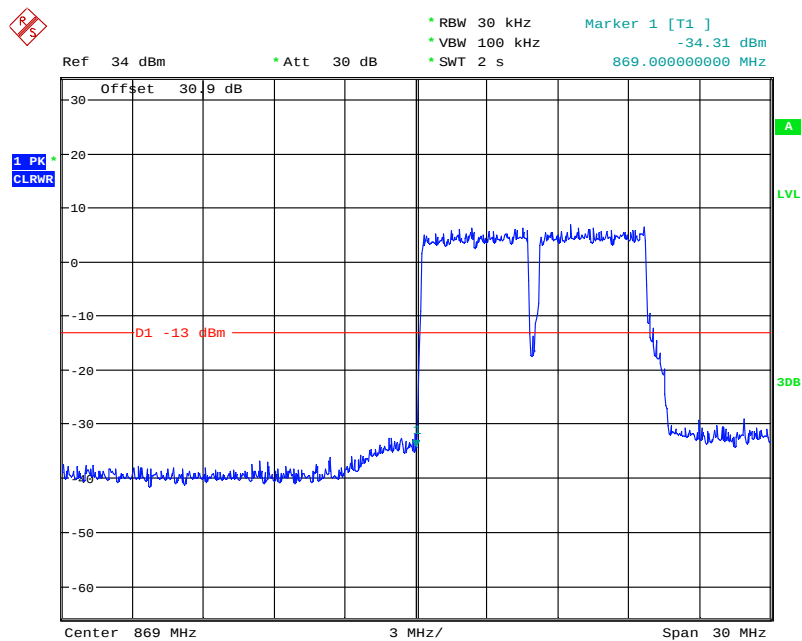
b) Upper Edge



Date: 14.OCT.2013 14:42:40

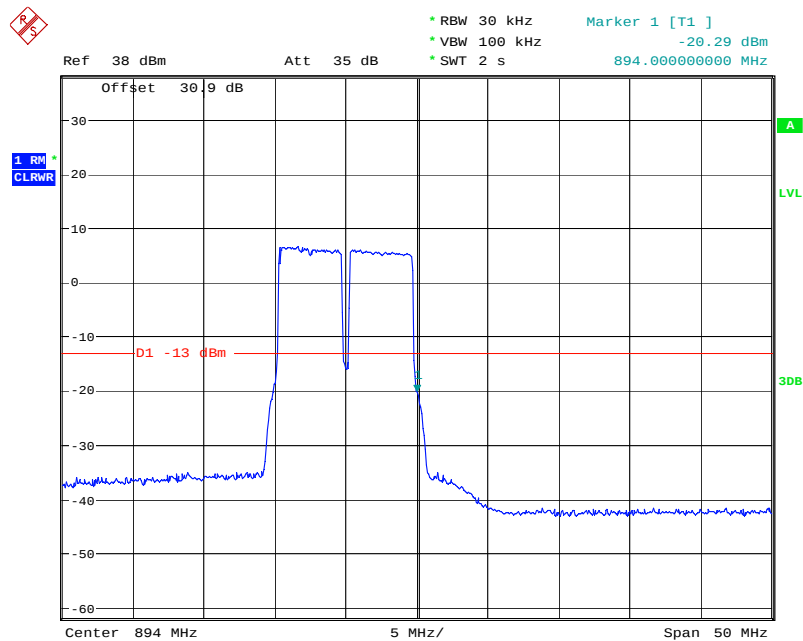
1.3) Test for LTE 5MHz

a) Lower Edge



Date: 16.NOV.2013 10:43:48

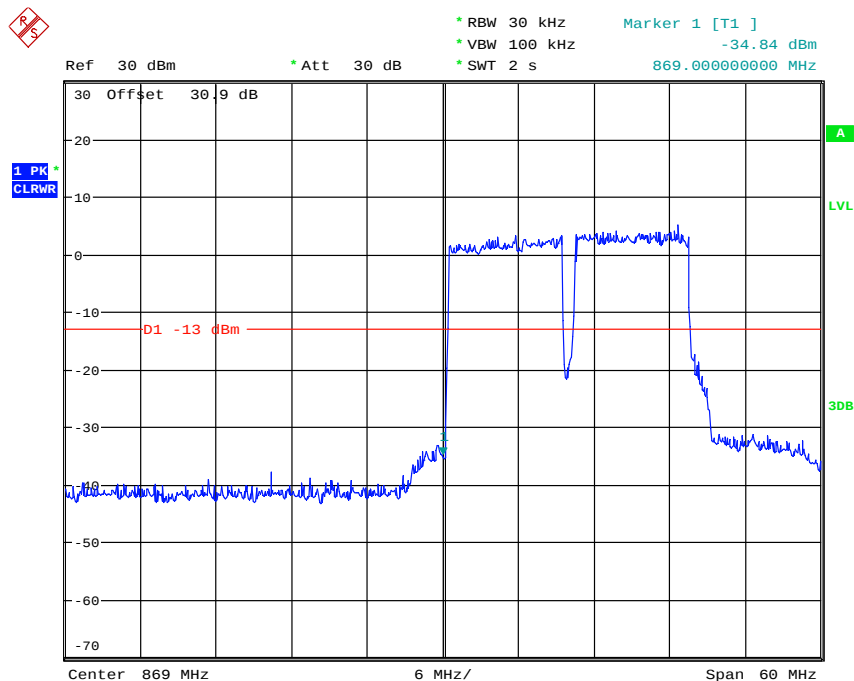
b) Upper Edge



Date: 14.OCT.2013 14:36:52

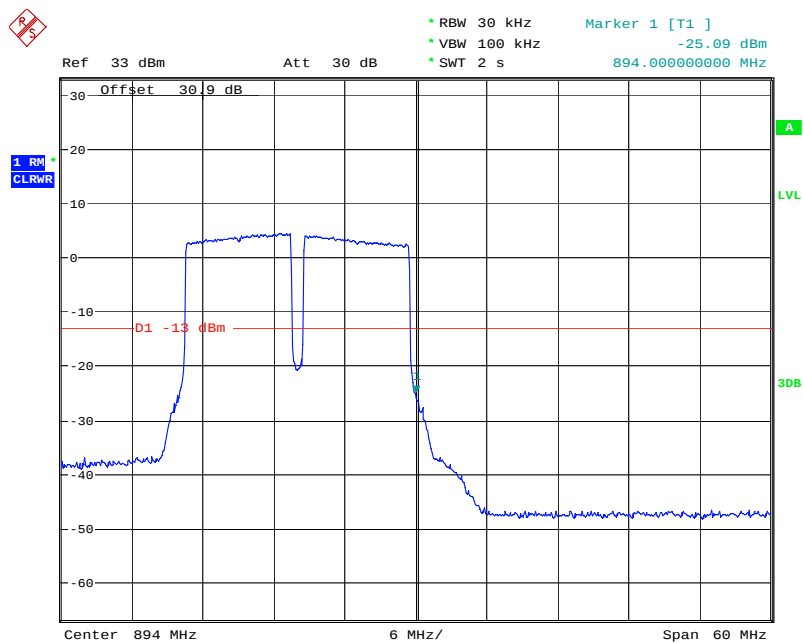
1.4) Test for LTE 10MHz

a) Lower Edge



Date: 16.NOV.2013 10:45:49

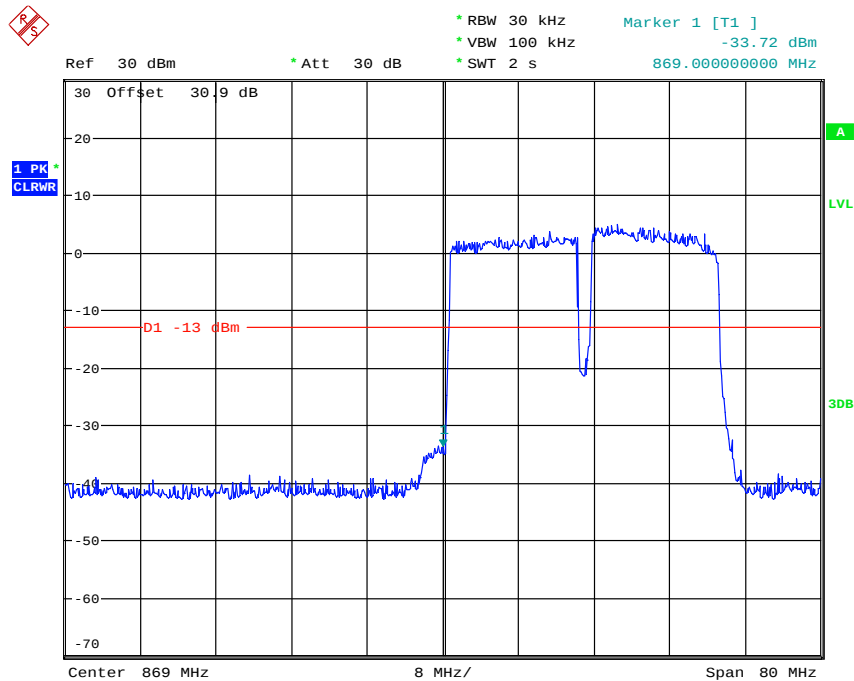
b) Upper Edge



Date: 14.OCT.2013 14:35:10

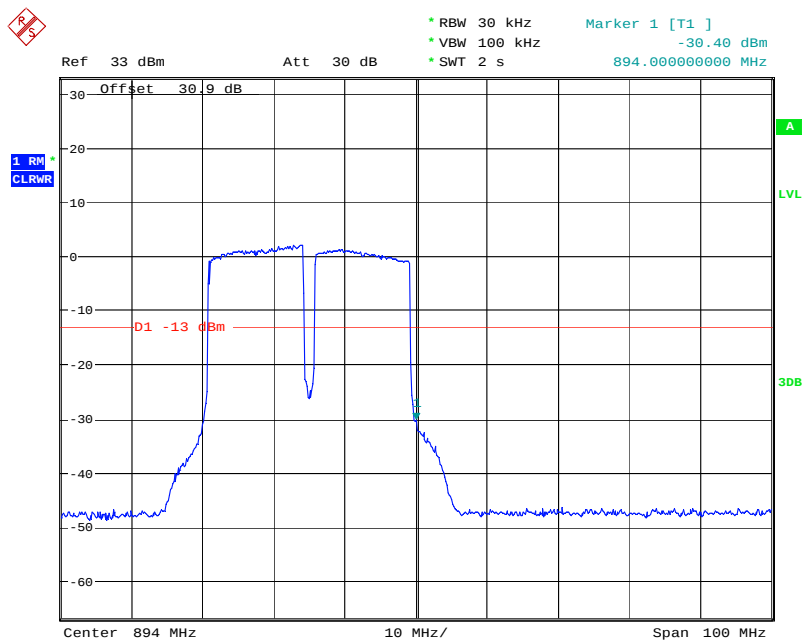
1.5) Test for LTE 15MHz

a) Lower Edge



Date: 16.NOV.2013 10:48:47

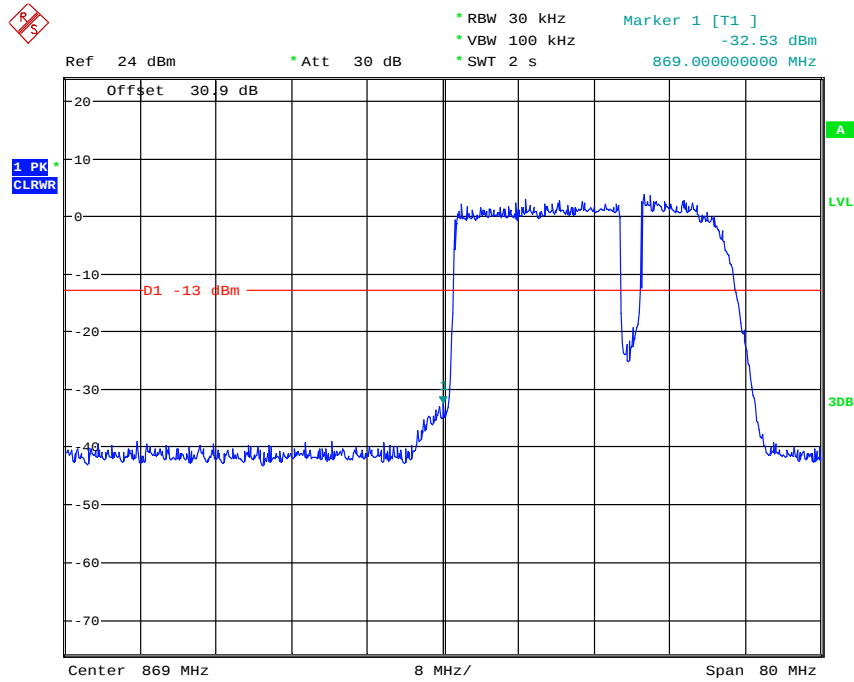
b) Upper Edge



Date: 14.OCT.2013 14:30:29

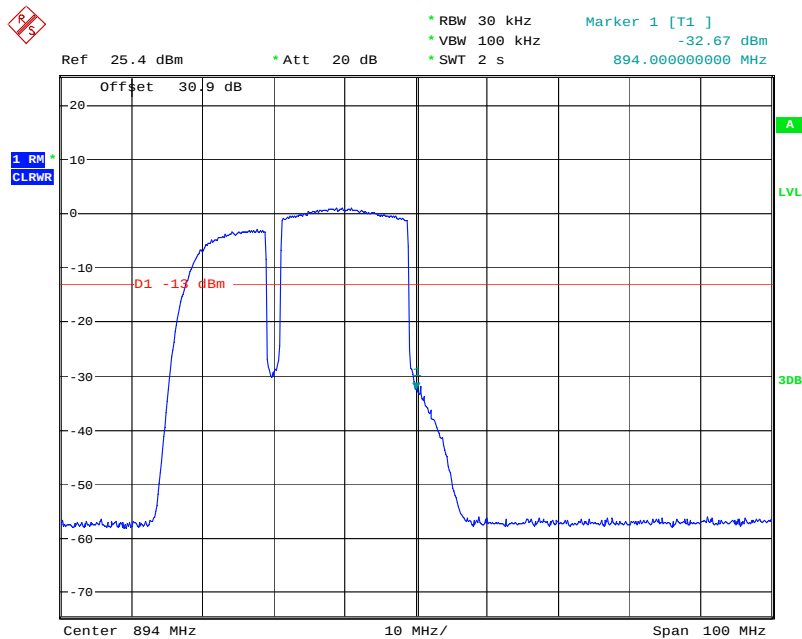
1.6) Test for LTE 20MHz

a) Lower Edge



Date: 16.NOV.2013 10:50:44

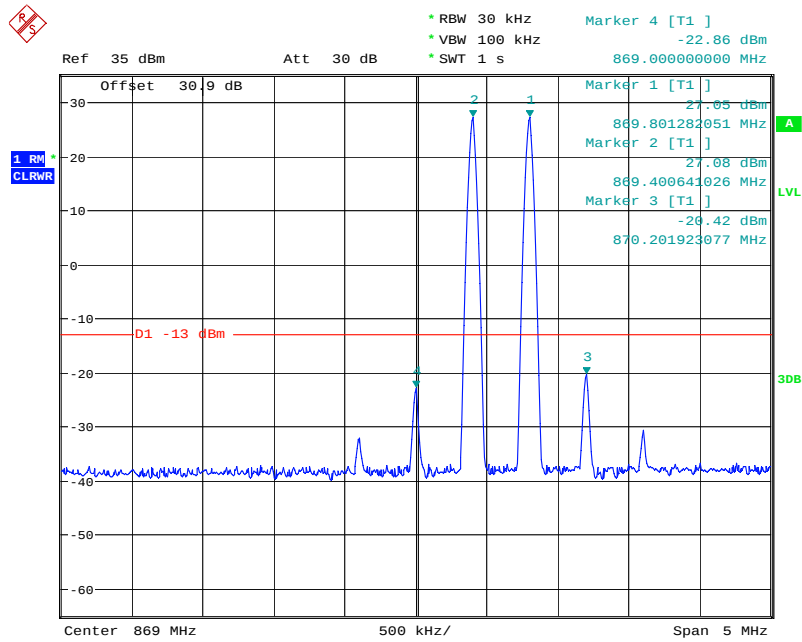
b) Upper Edge



Date: 14.OCT.2013 14:26:54

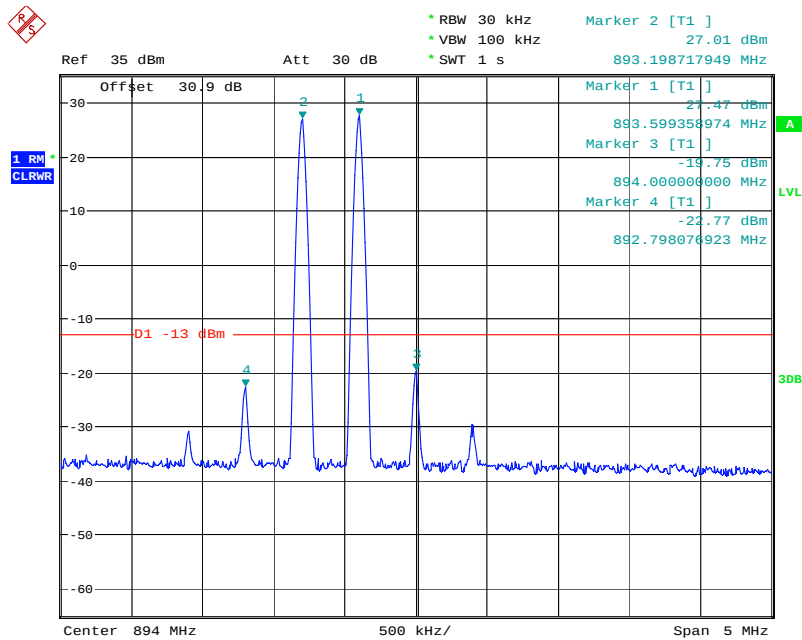
2) GSM modulation for Downlink

a) Lower Edge



Date: 14.OCT.2013 14:49:46

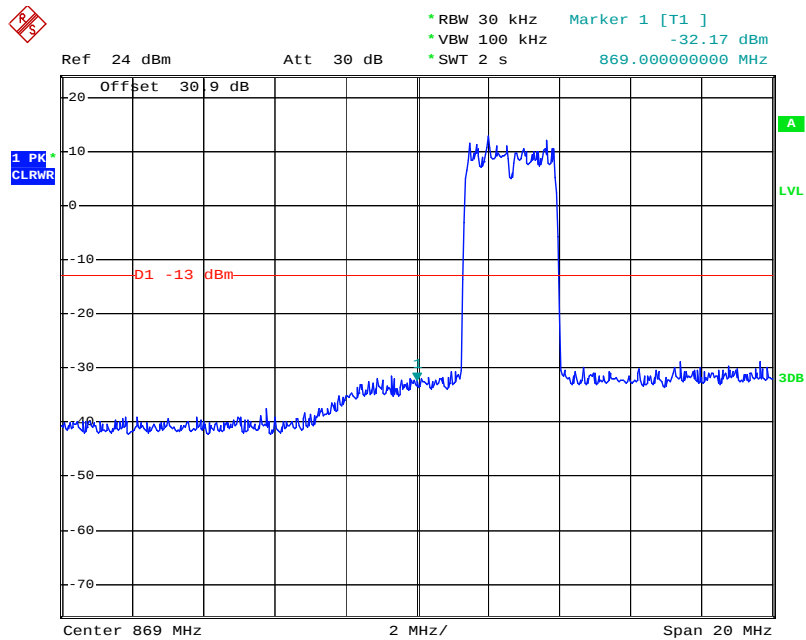
b) Upper Edge



Date: 14.OCT.2013 14:48:49

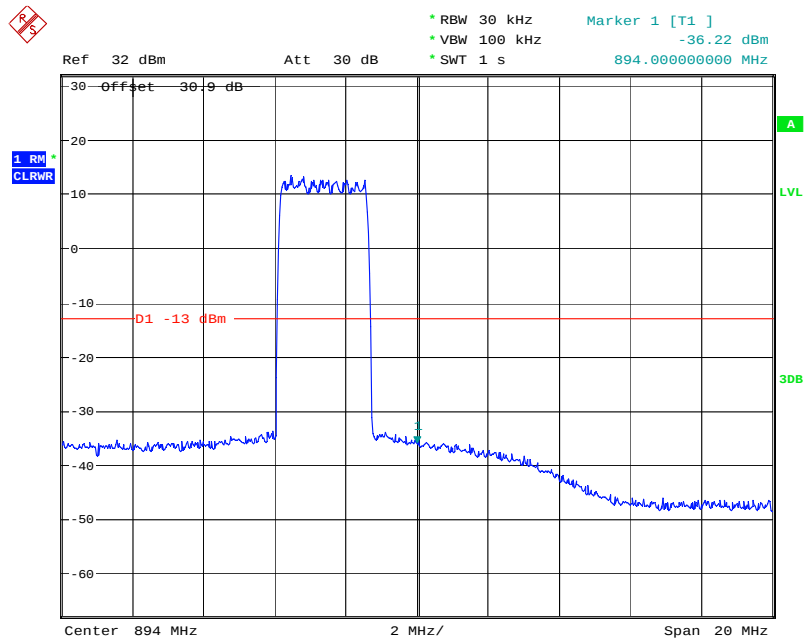
3) CDMA modulation for Downlink

a) Lower Edge



Date: 18.NOV.2013 06:19:21

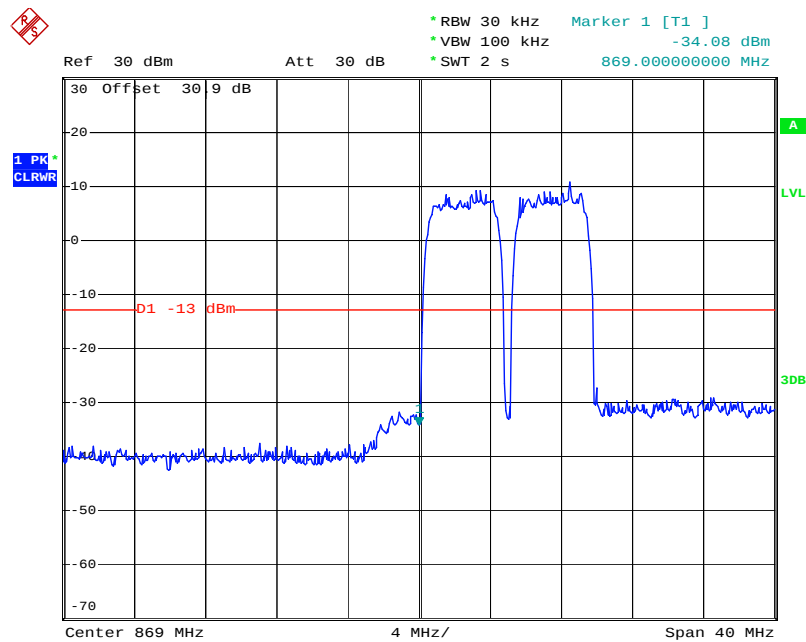
b) Upper Edge



Date: 14.OCT.2013 14:55:53

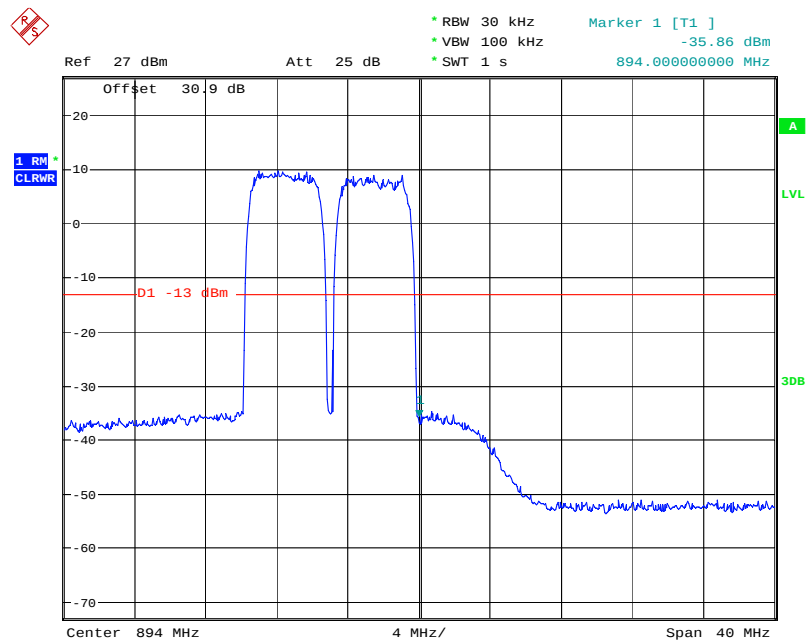
4) WCDMA modulation for Downlink

a) Lower Edge



Date: 18.NOV.2013 06:34:37

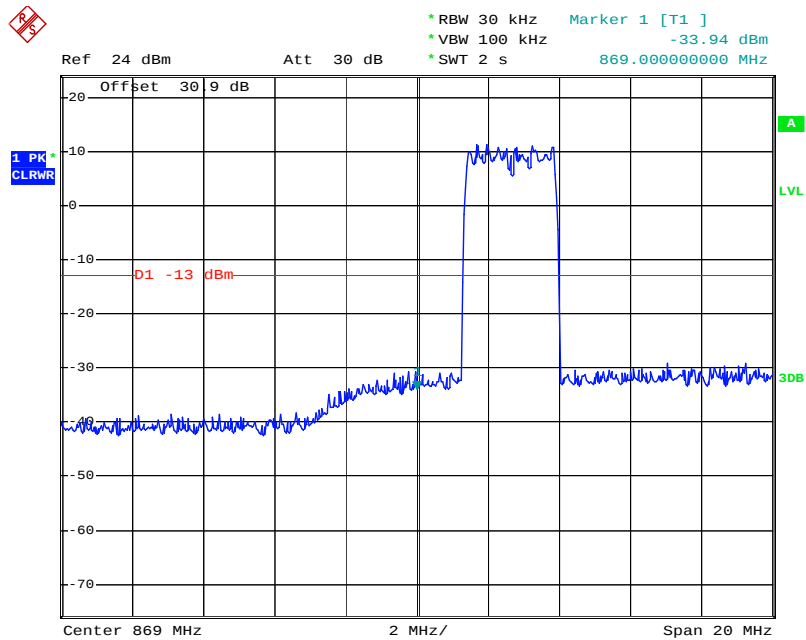
b) Upper Edge



Date: 14.OCT.2013 14:59:19

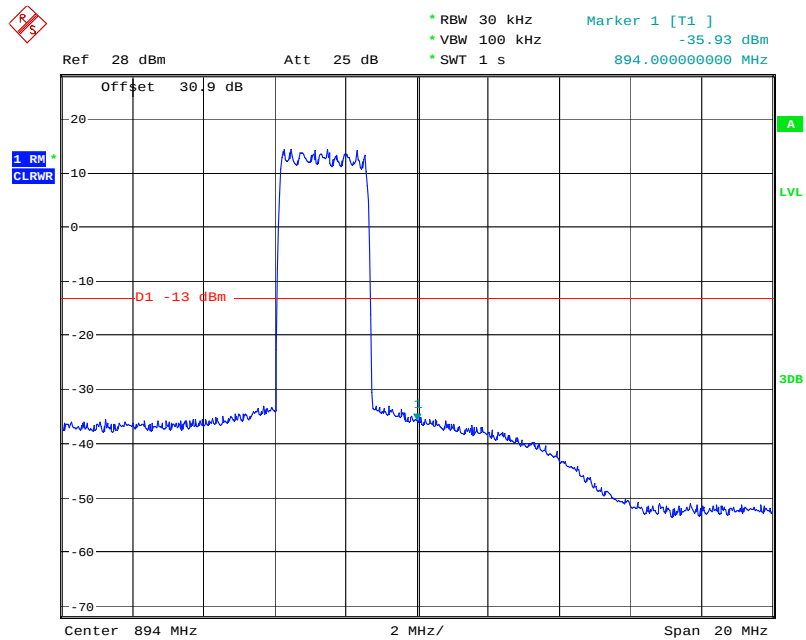
5) 1x EV-DO modulation for Downlink

a) Lower Edge



Date: 18.NOV.2013 06:20:14

b) Upper Edge



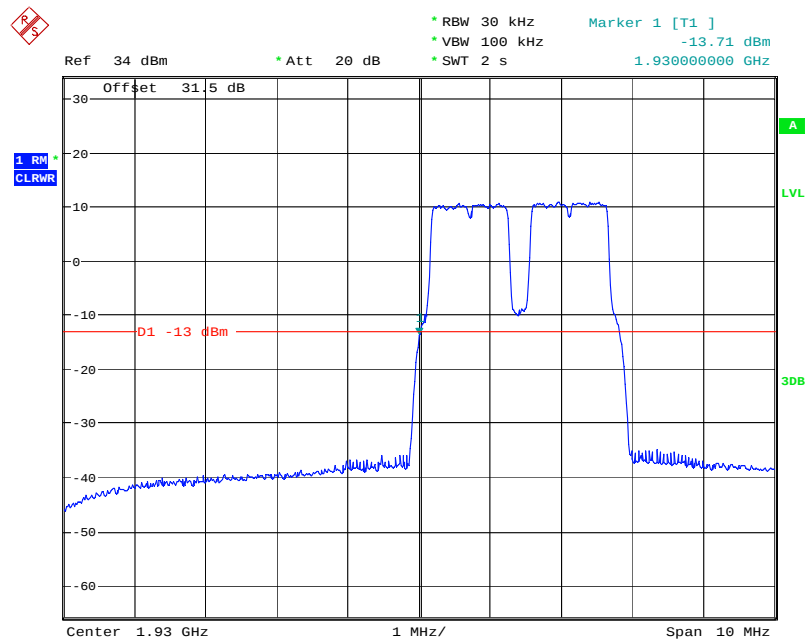
Date: 14.OCT.2013 14:58:04

5.3.4.1.4 1900MHz Broadband PCS for Downlink

1) LTE modulation

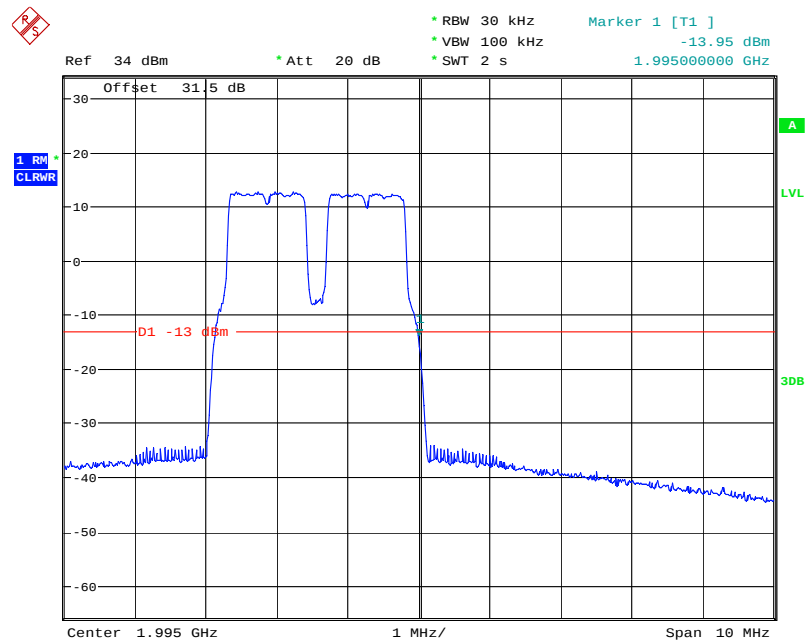
1.1) Test for LTE 1.4MHz

a) Lower Edge



Date: 14.OCT.2013 12:05:04

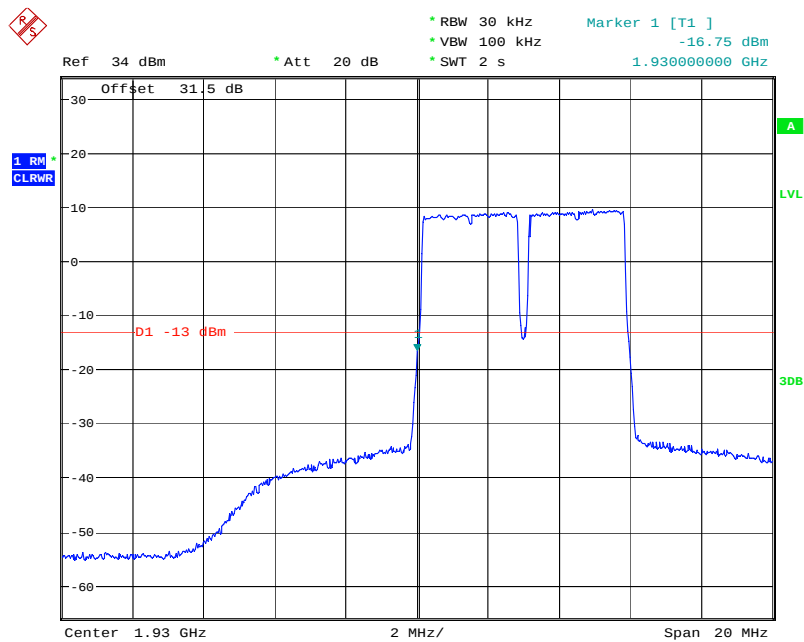
b) Upper Edge



Date: 14.OCT.2013 12:04:08

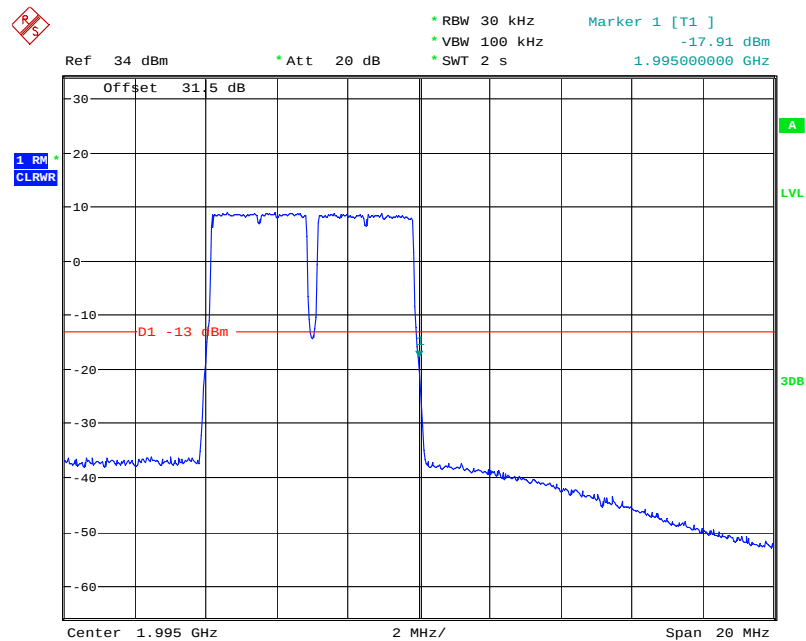
1.2) Test for LTE 3MHz

a) Lower Edge



Date: 14.OCT.2013 12:00:55

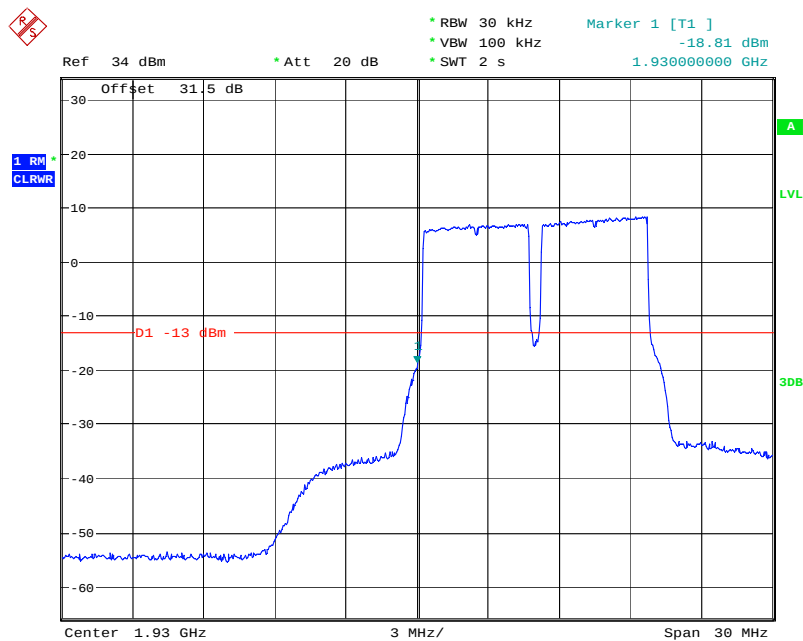
b) Upper Edge



Date: 14.OCT.2013 12:02:20

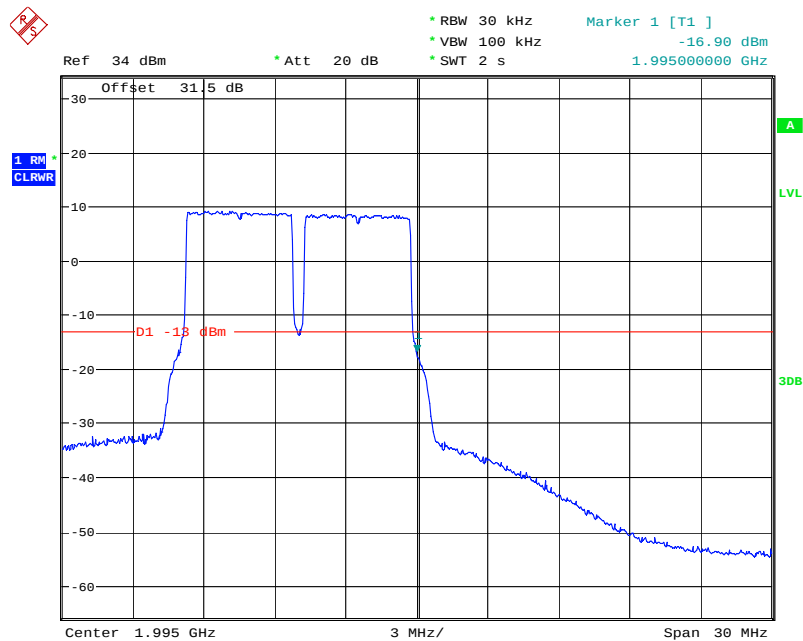
1.3) Test for LTE 5MHz

a) Lower Edge



Date: 14.OCT.2013 11:59:50

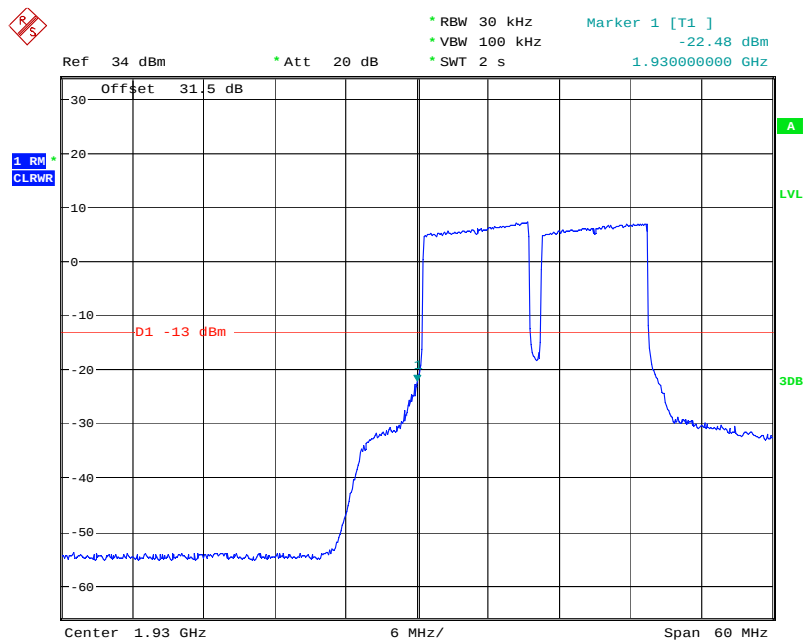
b) Upper Edge



Date: 14.OCT.2013 11:58:22

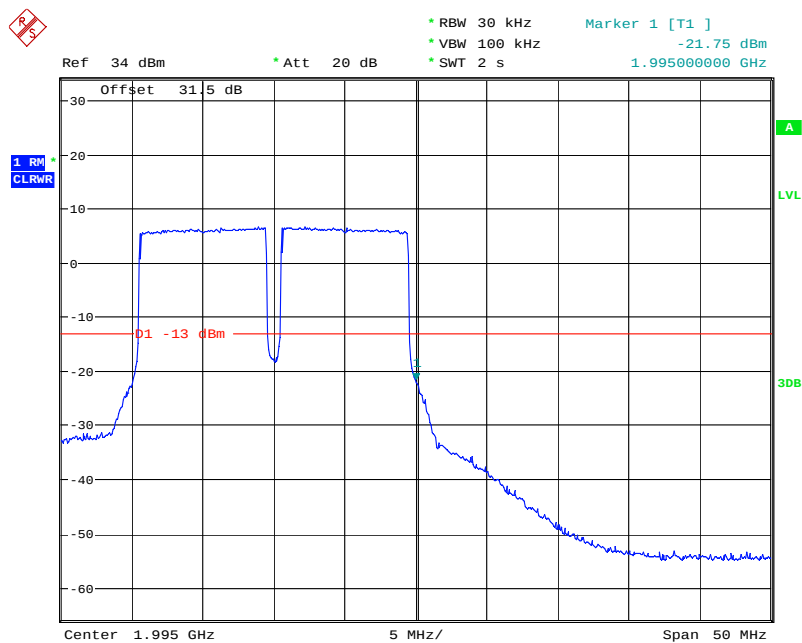
1.4) Test for LTE 10MHz

a) Lower Edge



Date: 14.OCT.2013 11:56:10

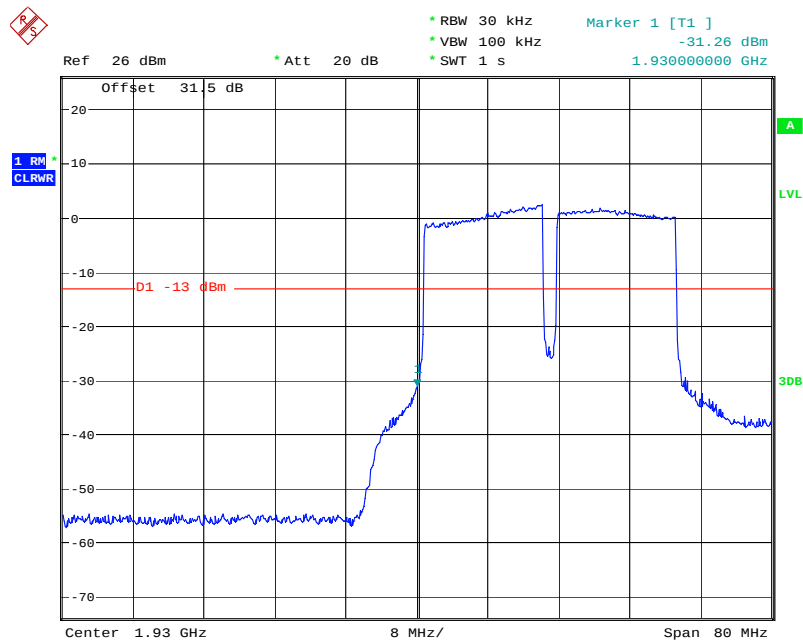
b) Upper Edge



Date: 14.OCT.2013 11:53:58

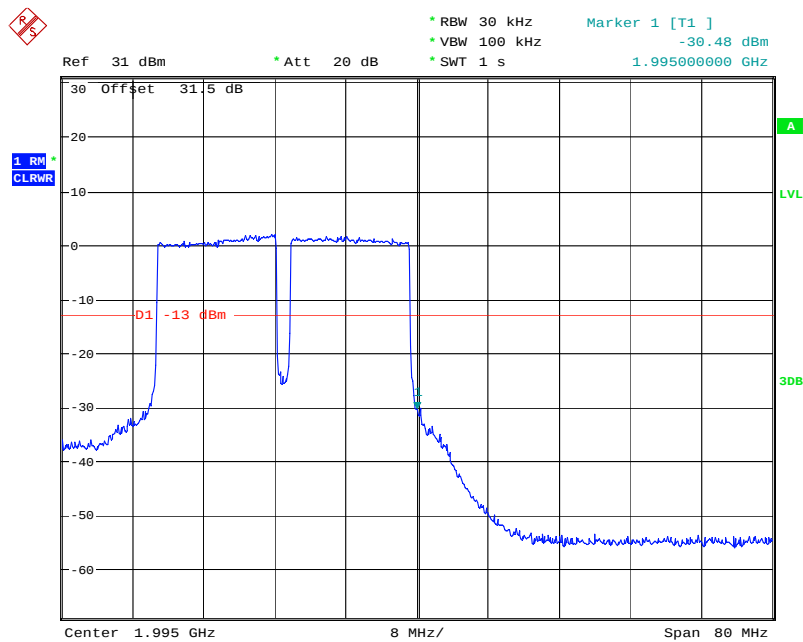
1.5) Test for LTE 15MHz

a) Lower Edge



Date: 14.OCT.2013 12:08:34

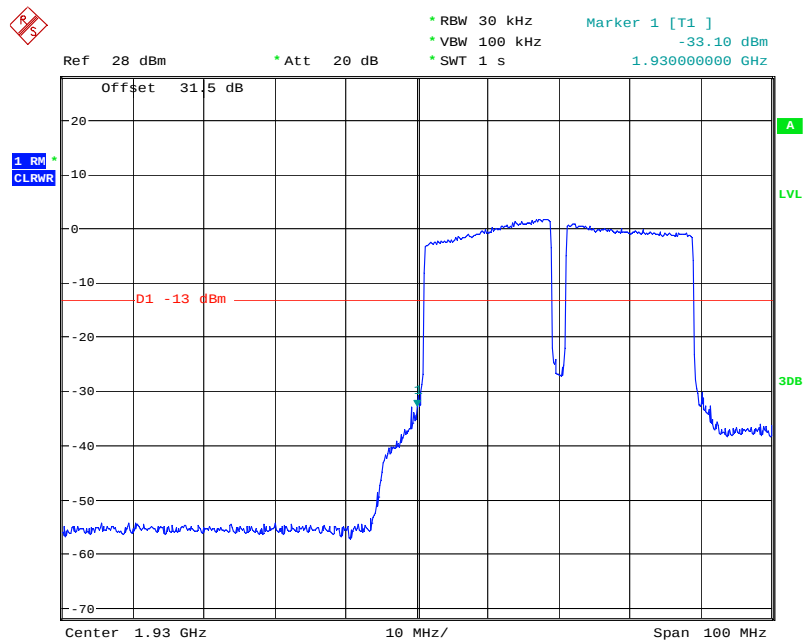
b) Upper Edge



Date: 14.OCT.2013 12:10:13

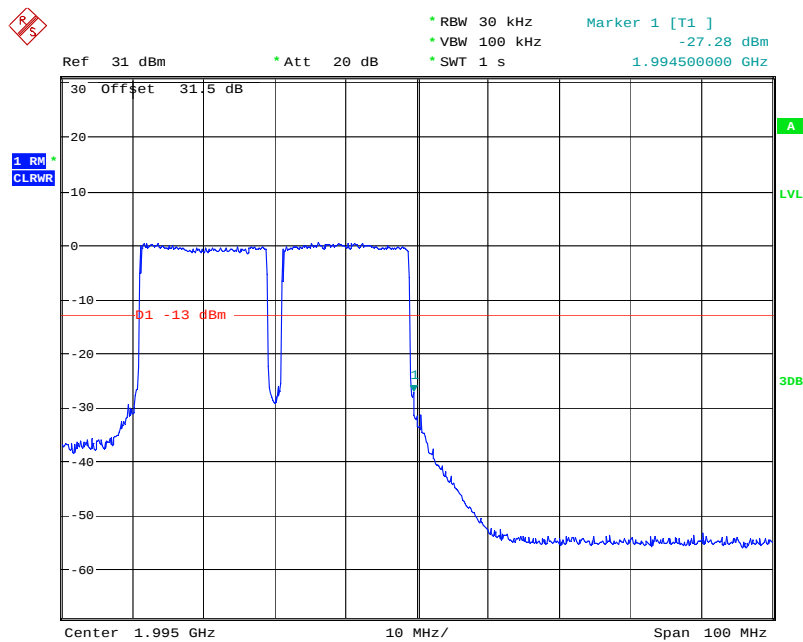
1.6) Test for LTE 20MHz

a) Lower Edge



Date: 14.OCT.2013 12:12:41

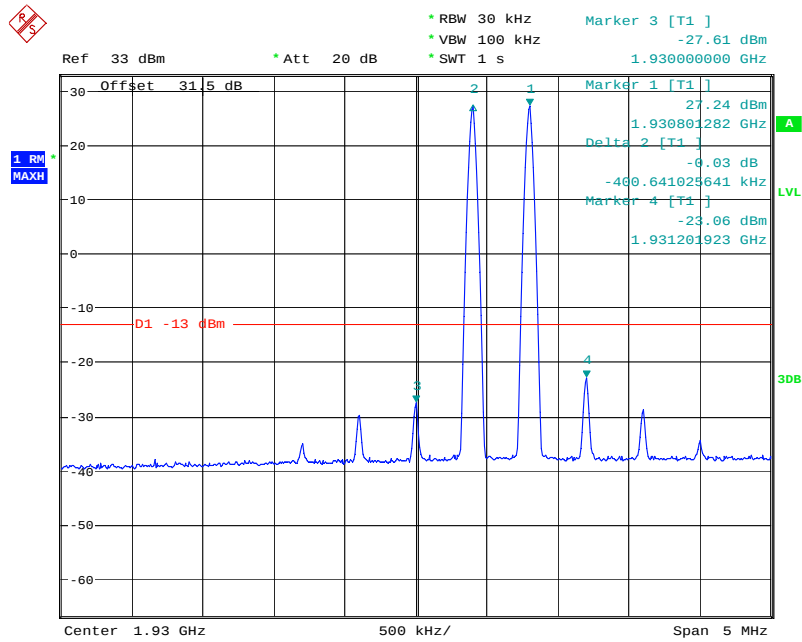
b) Upper Edge



Date: 14.OCT.2013 12:11:54

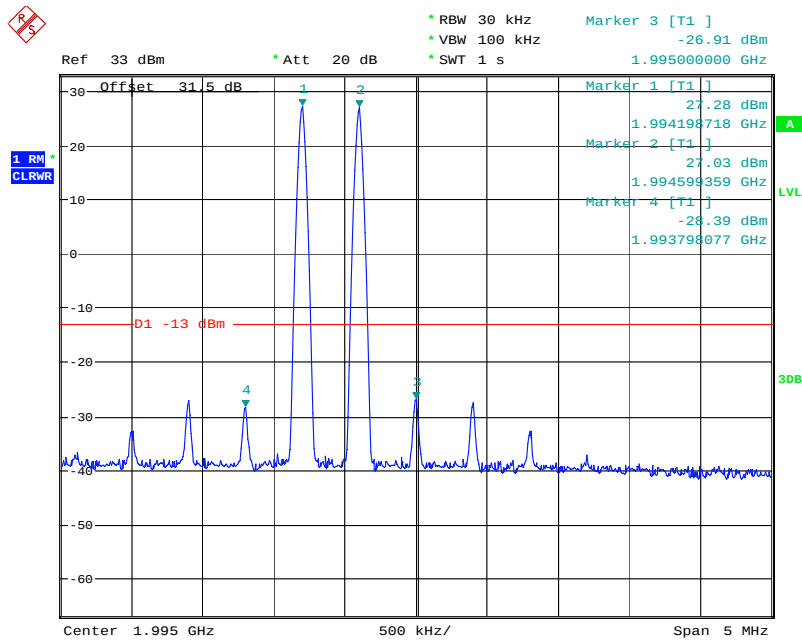
2) GSM modulation

a) Lower Edge



Date: 14.OCT.2013 12:15:43

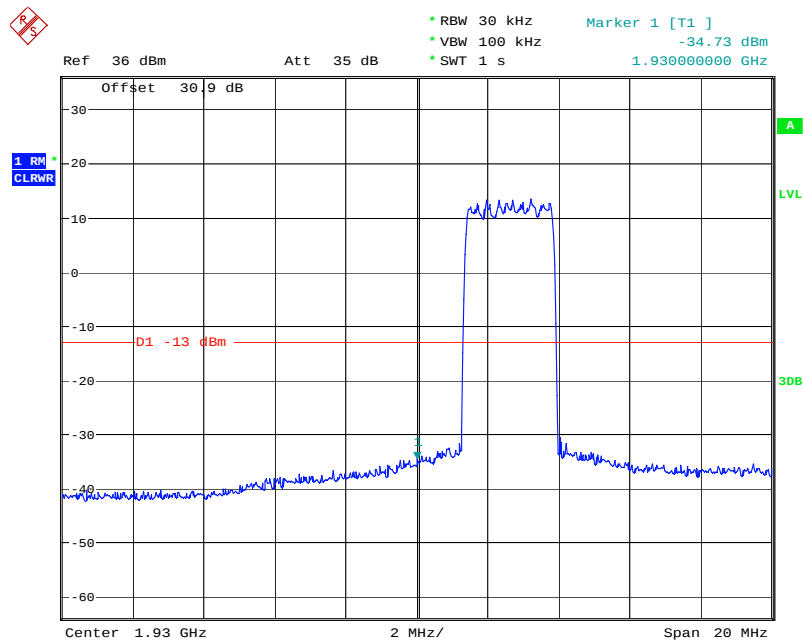
b) Upper Edge



Date: 14.OCT.2013 12:17:06

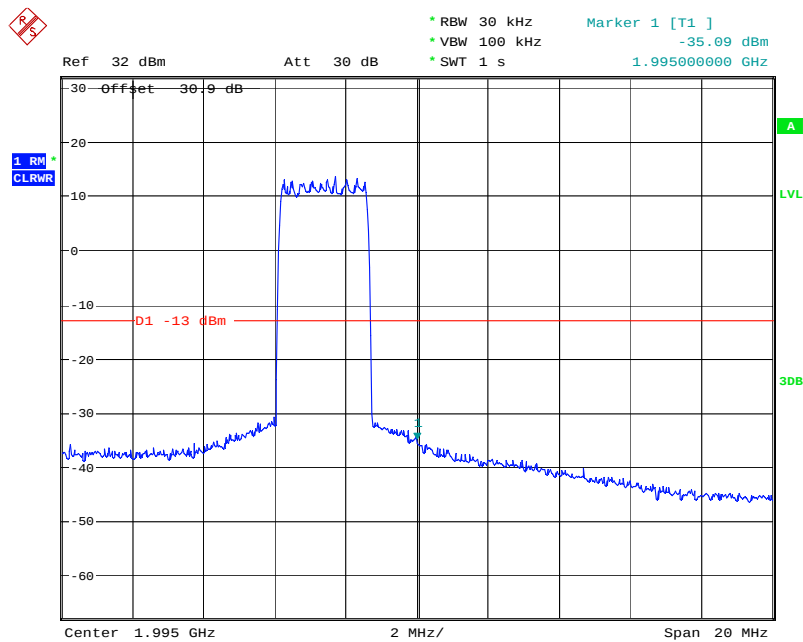
3) CDMA modulation

a) Lower Edge



Date: 14.OCT.2013 15:06:31

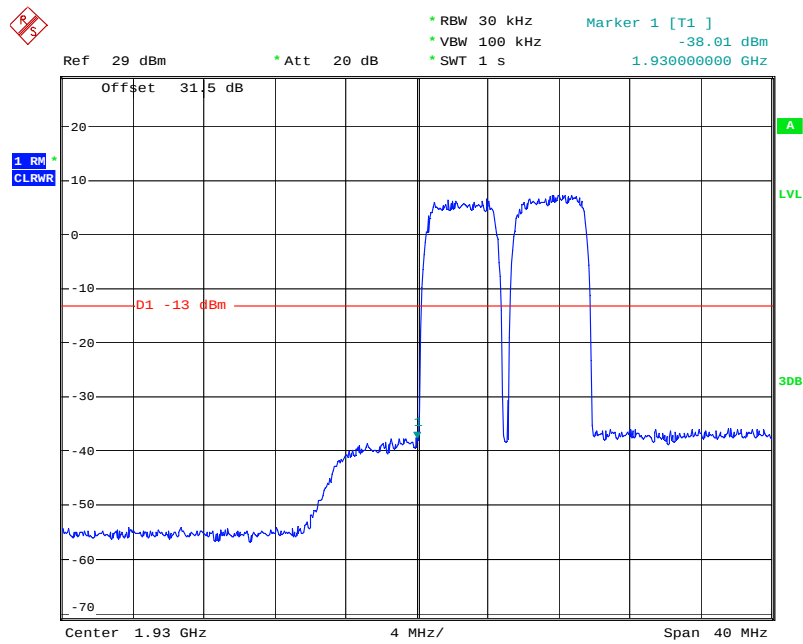
b) Upper Edge



Date: 14.OCT.2013 15:09:44

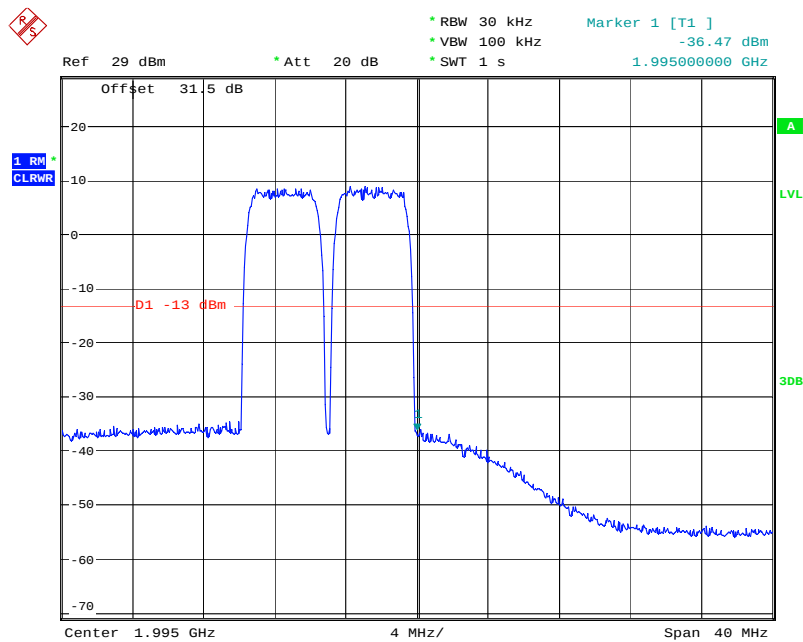
4) WCDMA modulation

a) Lower Edge



Date: 14.OCT.2013 12:21:46

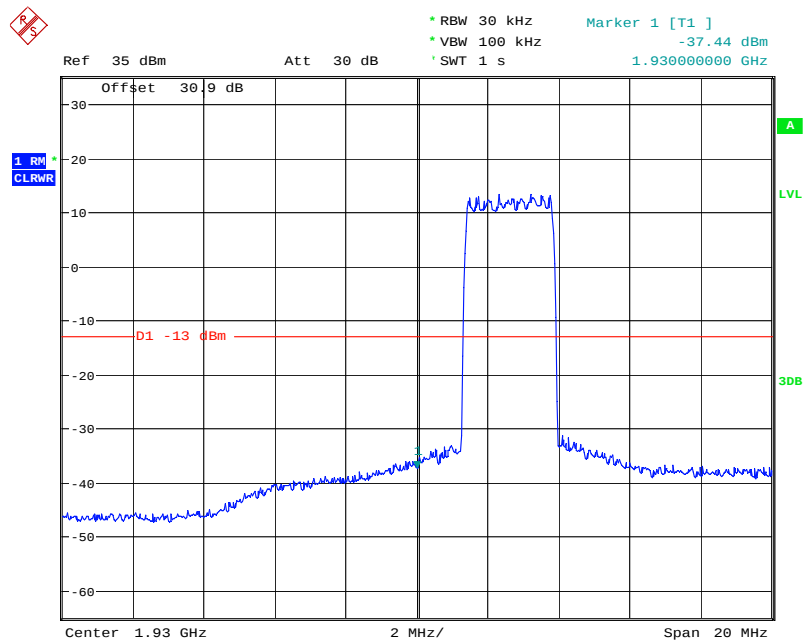
b) Upper Edge



Date: 14.OCT.2013 12:22:43

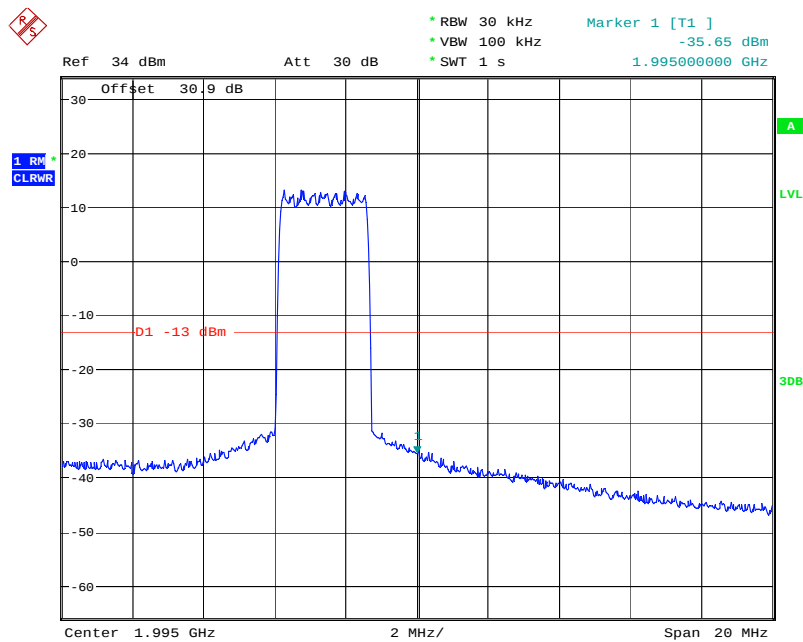
5) 1x EV-DO modulation for Downlink

a) Lower Edge



Date: 14.OCT.2013 15:07:56

b) Upper Edge



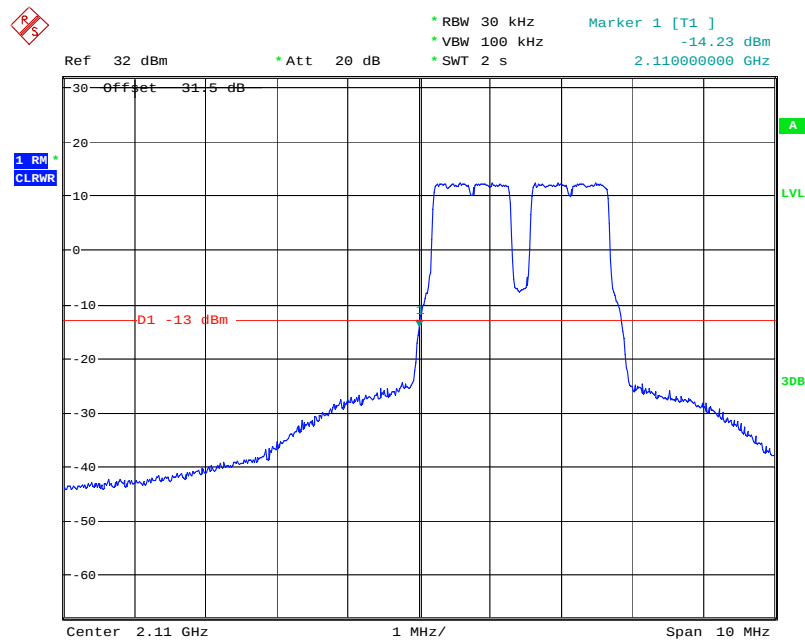
Date: 14.OCT.2013 15:10:13

5.3.4.1.5 AWS-1 Band for Downlink

1) LTE modulation

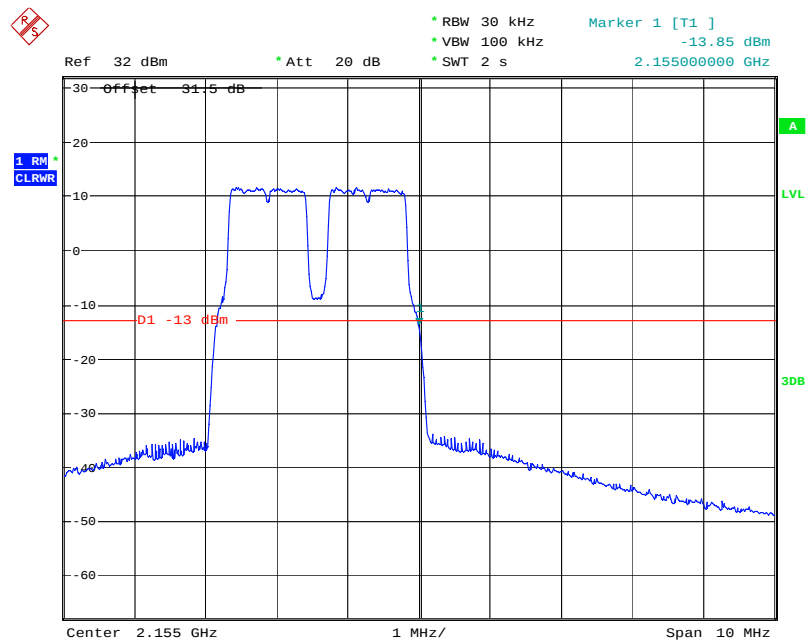
1.1) Test for LTE 1.4MHz

a) Lower Edge



Date: 14.OCT.2013 12:41:19

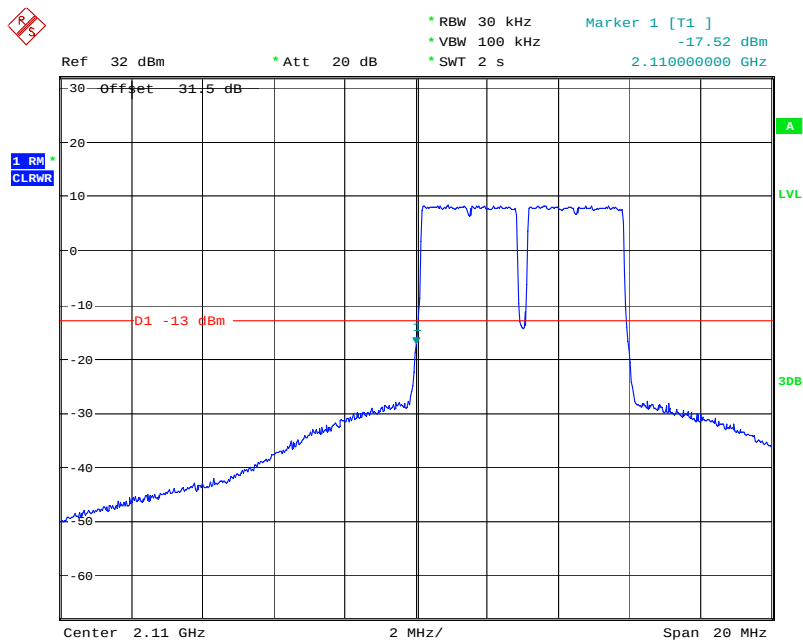
b) Upper Edge



Date: 14.OCT.2013 12:43:34

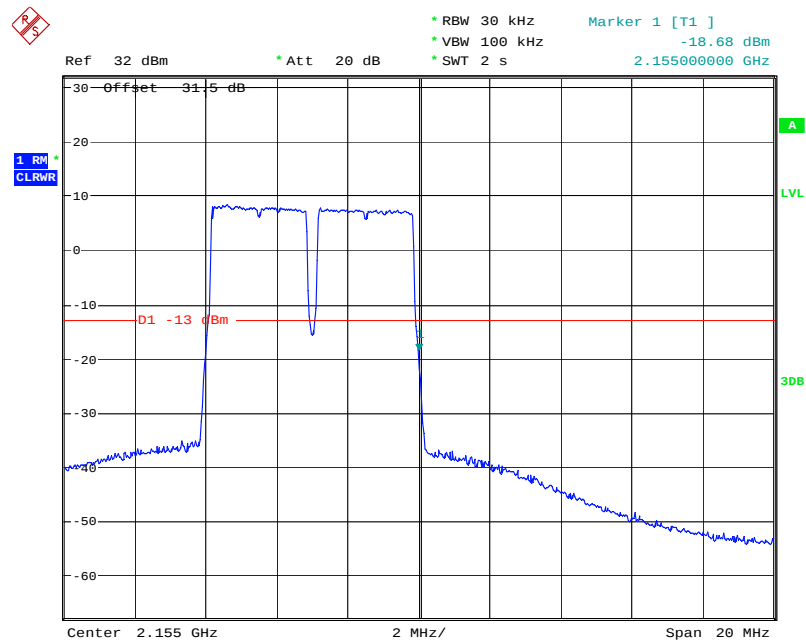
1.2) Test for LTE 3MHz

a) Lower Edge



Date: 14.OCT.2013 12:46:39

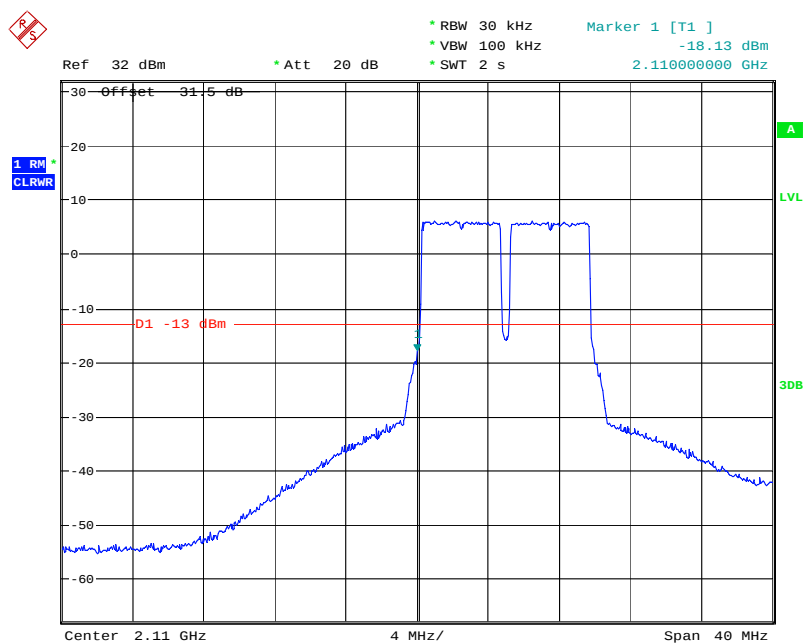
b) Upper Edge



Date: 14.OCT.2013 12:44:52

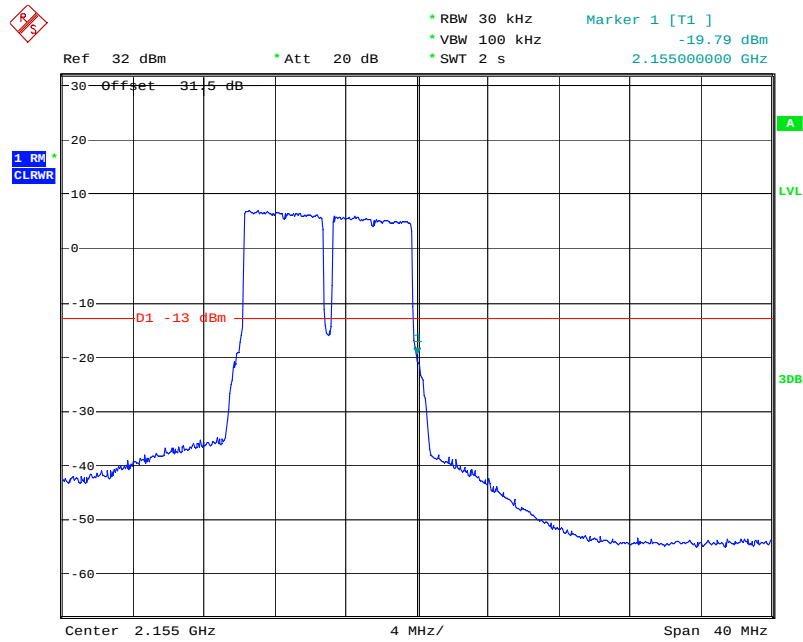
1.3) Test for LTE 5MHz

a) Lower Edge



Date: 14.OCT.2013 12:47:45

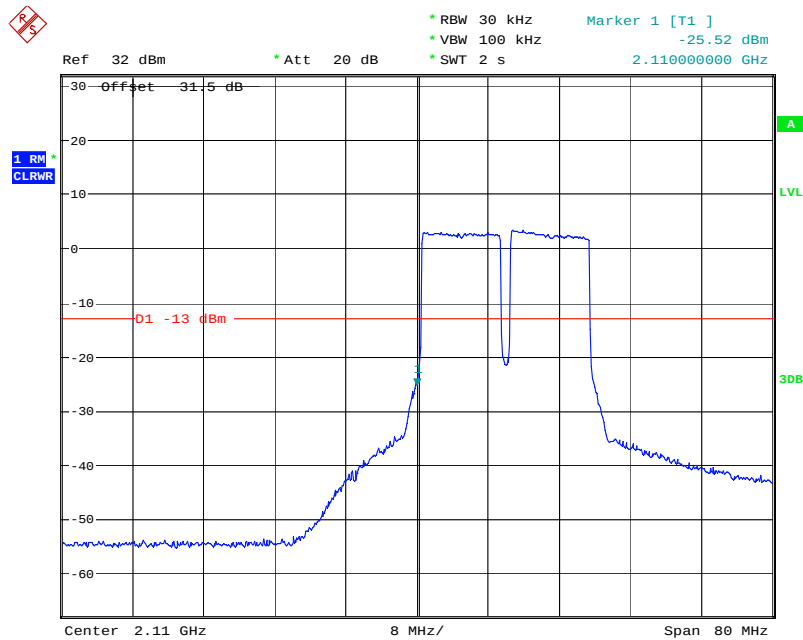
b) Upper Edge



Date: 14.OCT.2013 12:48:47

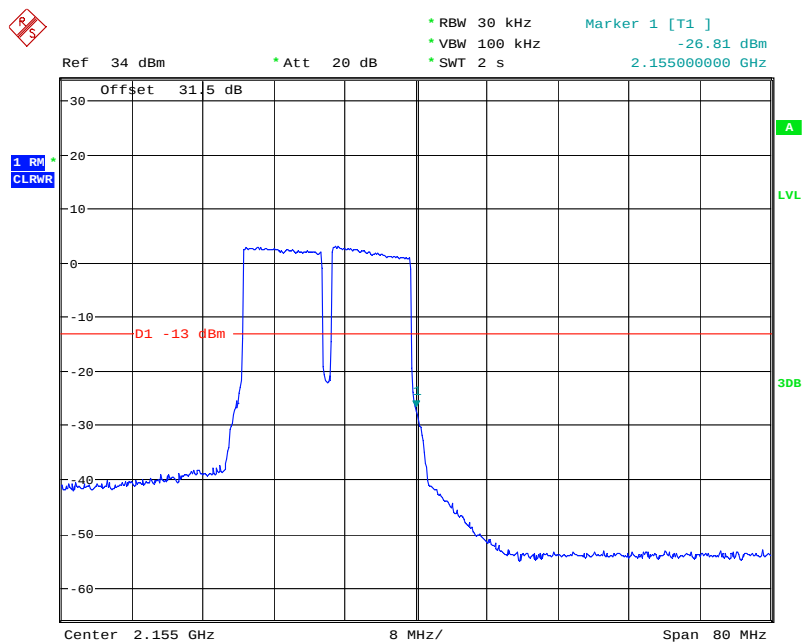
1.4) Test for LTE 10MHz

a) Lower Edge



Date: 14.OCT.2013 12:52:19

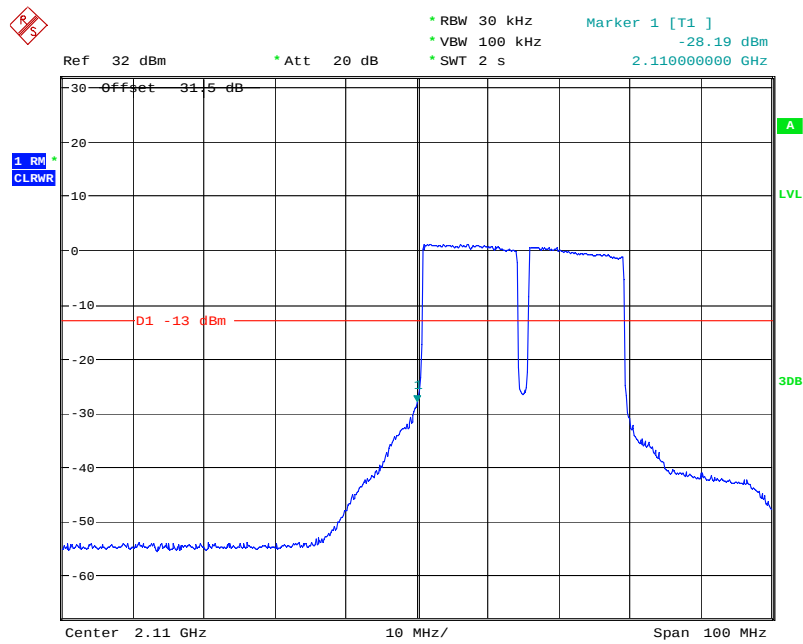
b) Upper Edge



Date: 14.OCT.2013 12:51:00

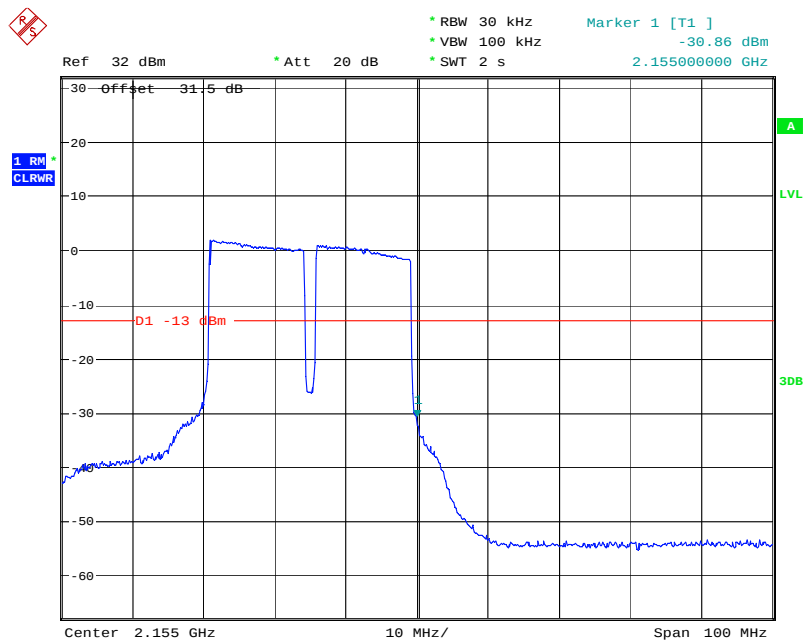
1.5) Test for LTE 15MHz

a) Lower Edge



Date: 14.OCT.2013 12:54:00

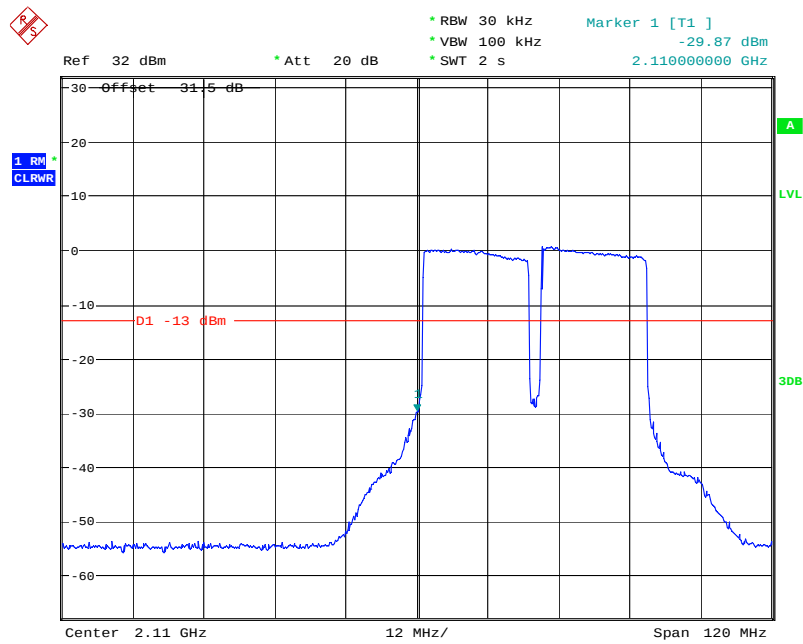
b) Upper Edge



Date: 14.OCT.2013 12:55:38

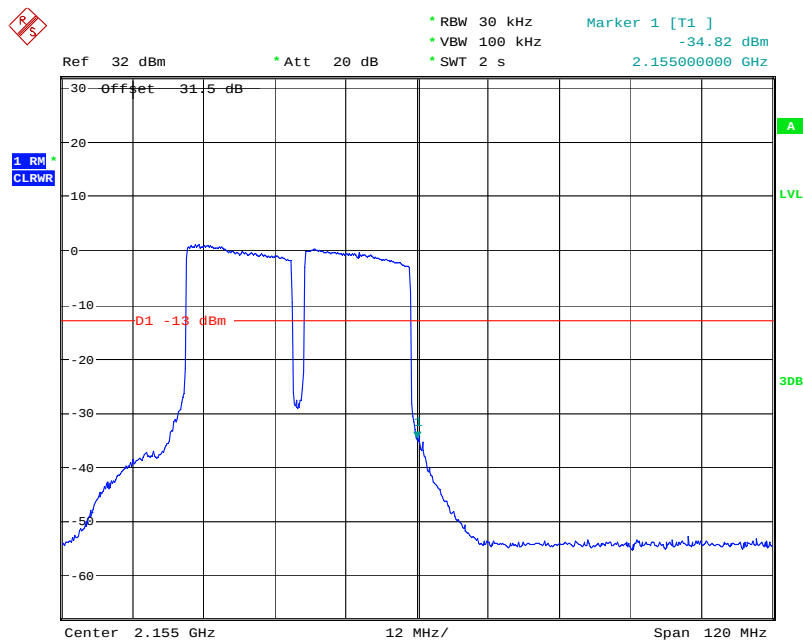
1.6) Test for LTE 20MHz

a) Lower Edge



Date: 14.OCT.2013 12:58:32

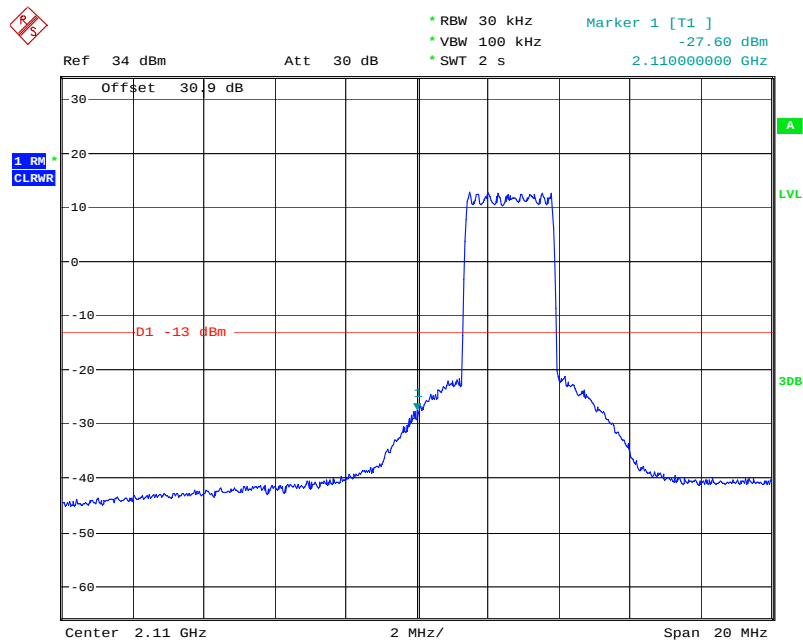
b) Upper Edge



Date: 14.OCT.2013 12:57:01

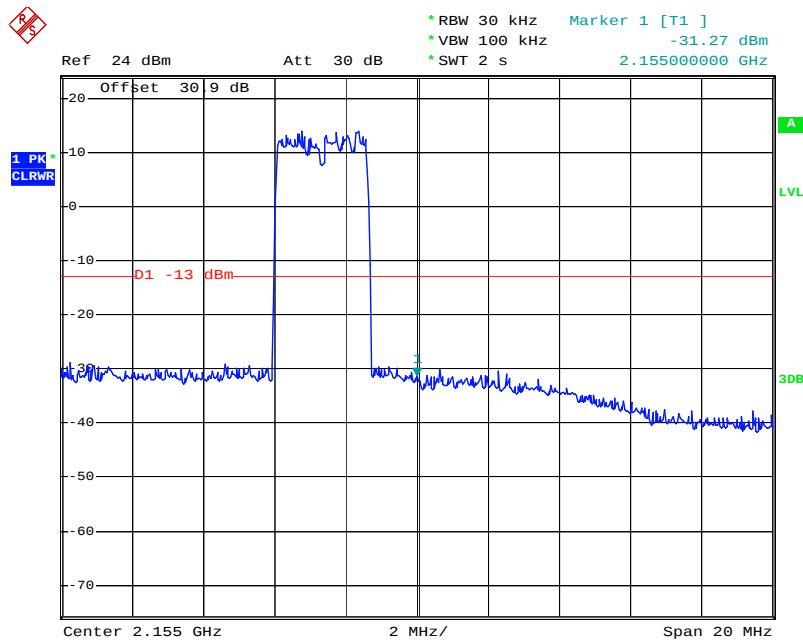
2) CDMA modulation

a) Lower Edge



Date: 14.OCT.2013 15:13:30

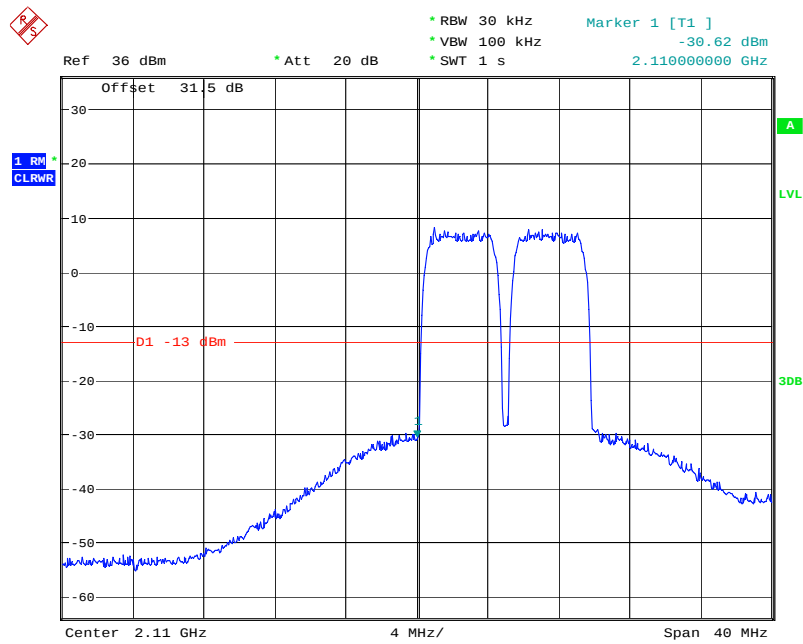
b) Upper Edge



Date: 18.NOV.2013 06:23:58

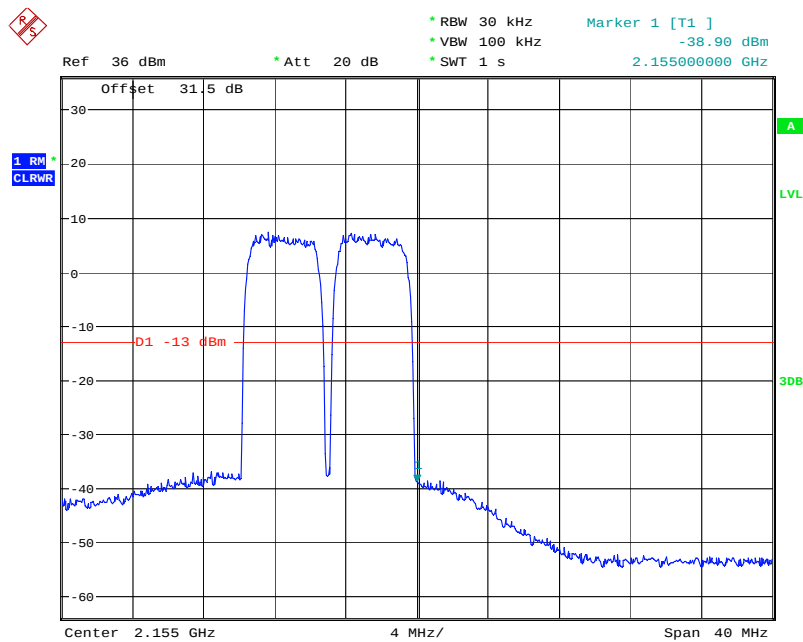
3) WCDMA modulation

a) Lower Edge



Date: 14.OCT.2013 12:35:49

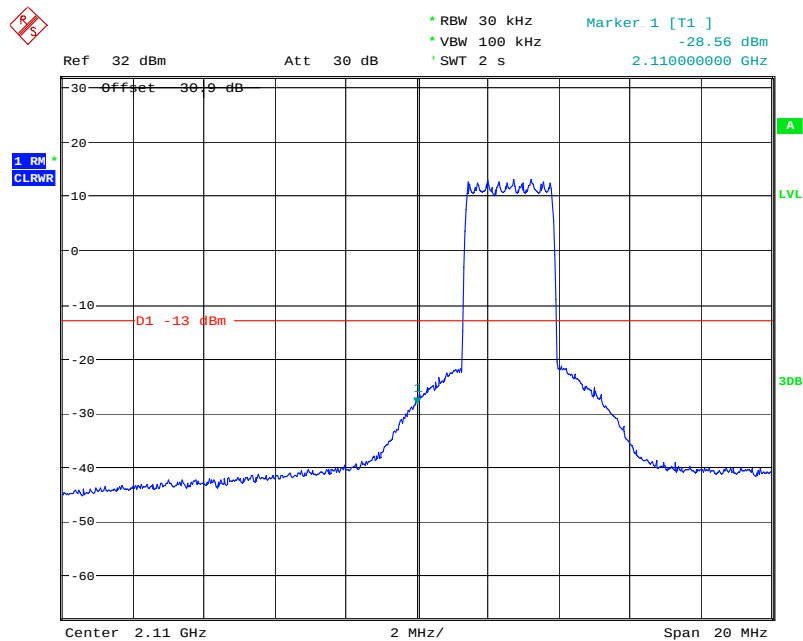
b) Upper Edge



Date: 14.OCT.2013 12:37:55

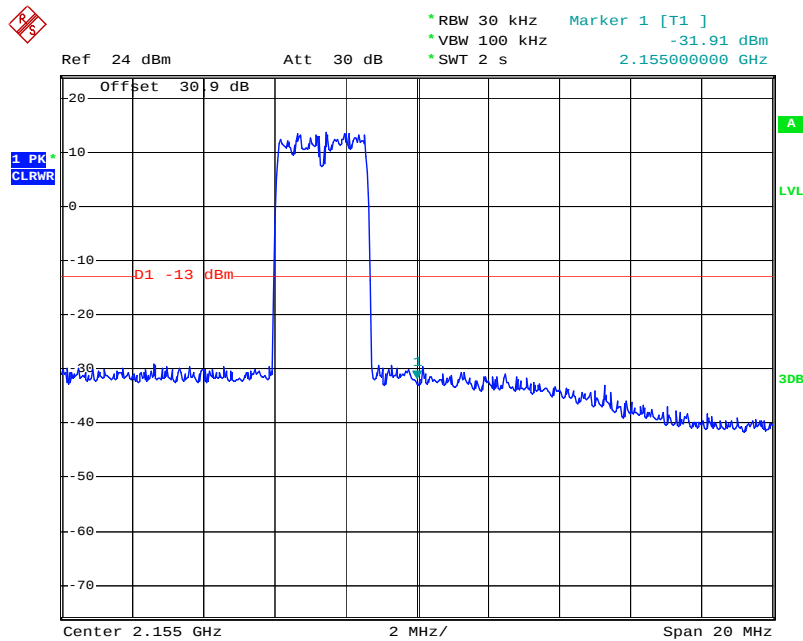
4) 1x EV-DO modulation

a) Lower Edge



Date: 14.OCT.2013 15:14:07

b) Upper Edge



Date: 18.NOV.2013 06:25:28

5.3.5 Frequency Stability

Test Date: 14 Oct, 2013 to 15 Oct, 2013

Ambient Temp: 20.0°C

Humid : 67%

Atmospheric Pressure: 1005mbar

Test Method: FCC part 2.1055

Test Requirement:

700MHz Lower ABC Band FCC part 27. 54

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation, The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency.

700MHz Upper C Band FCC part 27. 54

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation, The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency

850MHz Band FCC part 22. 355

The frequency stability of the transmitter shall be maintained within ± 0.00025 percent (± 2.5 ppm) of the center frequency over a temperature variation of -30° Celsius to $+50^{\circ}$ Celsius at normal supply voltage, and over a variation in the primary supply voltage of 85 percent to 115 percent of the rated supply voltage at a temperature of 20° Celsius.

1900MHz Broadband PCS FCC part 24. 135

The frequency stability of the transmitter shall be maintained within ± 0.0001 percent (± 1 ppm) of the center frequency over a temperature variation of -30° Celsius to $+50^{\circ}$ Celsius at normal supply voltage, and over a variation in the primary supply voltage of 85 percent to 115 percent of the rated supply voltage at a temperature of 20° Celsius.

AWS-1 Band FCC part 27. 54

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation, The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency

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

Test conditions:

Temperature conditions, Voltage condition

Test configuration:

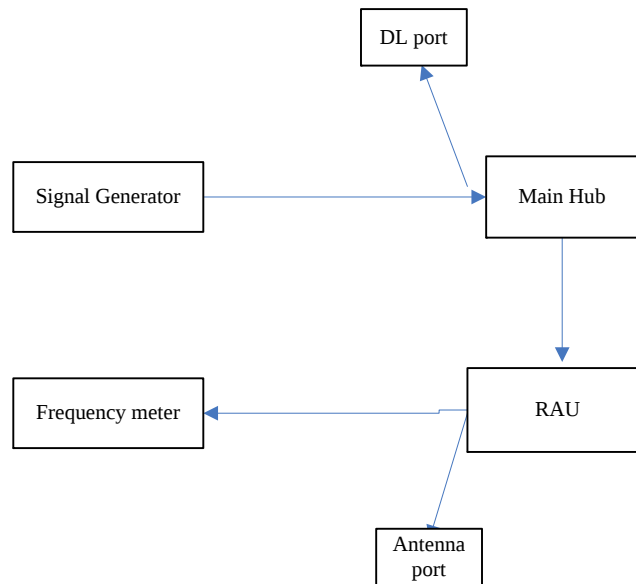


Figure 5: Downlink Frequency Stability

Test Procedure:

Frequency Stability test procedure:

- 1) Temperature condition:
 - a) Connect the equipment as illustrated
 - b) The RF output port of the EUT was connected to frequency meter;
 - c) Set the working frequency in the middle channel;
 - d) Record the 20°C and nominal voltage frequency value as reference point;
 - e) Vary the temperature from -30°C to 50°C with step 10°C;
 - f) When reach a temperature point, keep the temperature banlance at least 1 hour to make the product working in this status;
 - g) Read the frequency at the relative temperature;
- 2) Correct for all losses in the RF path
 - a) Record the 20°C and nominal voltage frequency value as reference point;
 - b) Vary the voltage from -15% nominal voltage to +15% voltage;Read the frequency at the relative voltage;

5.3.5.1 Measurement Record

5.3.5.1.1 Frequency Stability vs temperature for Downlink

1) 700MHz Lower ABC Band

a) Test Lower A, The center frequency is 731MHz

Temperature(°C)	Frequency(MHz)	Tolerance(ppm)
60	731.0000102	0.014
50	731.0000107	0.015
40	731.0000103	0.014
30	731.0000095	0.013
20	731.0000095	0.013
10	731.0000097	0.013
0	731.0000093	0.013
-10	731.0000086	0.012
-20	731.0000075	0.010
-30	731.0000076	0.010

b) Test Lower B, The center frequency is 737MHz

Temperature(°C)	Frequency(MHz)	Tolerance(ppm)
60	737.0000103	0.014
50	737.0000098	0.013
40	737.0000099	0.013
30	737.0000096	0.013
20	737.0000095	0.013
10	737.0000095	0.013
0	737.0000093	0.012
-10	737.0000098	0.013
-20	737.0000089	0.012
-30	737.0000090	0.012

c) Test Lower C, The center frequency is 743MHz

Temperature(°C)	Frequency(MHz)	Tolerance(ppm)
60	743.0000103	0.014
50	743.0000099	0.013
40	743.0000095	0.013
30	743.0000097	0.013
20	743.0000097	0.013
10	743.0000095	0.013
0	743.0000094	0.013
-10	743.0000090	0.012
-20	743.0000088	0.012
-30	743.0000086	0.011

2) 700MHz Upper C Band, The center frequency is 751.5MHz

Temperature(°C)	Frequency(MHz)	Tolerance(ppm)
60	751.5000099	0.013
50	751.5000100	0.013
40	751.5000098	0.013
30	751.5000099	0.013
20	751.5000097	0.013
10	751.5000096	0.013
0	751.5000094	0.012
-10	751.5000095	0.013
-20	751.5000089	0.012
-30	751.5000087	0.012

3) 850MHz Band, The center frequency is 881.5MHz

Temperature(°C)	Frequency(MHz)	Tolerance(ppm)
60	881.5000119	0.013
50	881.5000116	0.013
40	881.5000115	0.013
30	881.5000115	0.013
20	881.5000114	0.013
10	881.5000113	0.013
0	881.5000111	0.012
-10	881.5000107	0.012
-20	881.5000107	0.012
-30	881.5000100	0.011

4) 1900MHz Broadband PCS, The center frequency is 1962.5MHz

Temperature(°C)	Frequency(MHz)	Tolerance(ppm)
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60	1962.500031	0.016
50	1962.500029	0.015
40	1962.500027	0.014
30	1962.500024	0.012
20	1962.500025	0.012
10	1962.500025	0.012
0	1962.500026	0.012
-10	1962.500024	0.012
-20	1962.500020	0.010
-30	1962.500018	0.010

5) AWS-1 Band, The center frequency is 2132.5MHz

Temperature(°C)	Frequency(MHz)	Tolerance(ppm)
60	2132.500030	0.014
50	2132.500029	0.014
40	2132.500026	0.012
30	2132.500026	0.012
20	2132.500027	0.012
10	2132.500027	0.012
0	2132.500026	0.012
-10	2132.500024	0.011
-20	2132.500024	0.011
-30	2132.500020	0.010

5.3.5.1.2 Frequency Stability vs voltage for Downlink**1) 700MHz Lower ABC Band**

a) Test Lower A, The center frequency is 731MHz

Voltage(V)	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	731.0000095	0.013
120	731.0000095	0.013
138 (120*1.15)	731.0000095	0.013

b) Test Lower B, The center frequency is 737MHz

Voltage(V)	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	737.0000095	0.013
120	737.0000095	0.013
138 (120*1.15)	737.0000095	0.013

c) Test Lower C, The center frequency is 743MHz

Voltage(V)	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	743.0000097	0.013
120	743.0000097	0.013
138 (120*1.15)	743.0000097	0.013

2) 700MHz (Upper C) Band, The center frequency is 751.5MHz

Voltage(V)	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	751.5000097	0.013
120	751.5000097	0.013
138 (120*1.15)	751.5000097	0.013

3) 850MHz Band, The center frequency is 881.5MHz

Voltage(V)	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	881.5000114	0.013
120	881.5000114	0.013
138 (120*1.15)	881.5000114	0.013

4) 1900MHz Broadband PCS, The center frequency is 1962.5MHz

Voltage(V)	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	1962.500025	0.012
120	1962.500025	0.012
138 (120*1.15)	1962.500025	0.012

5) AWS-1 Band, The center frequency is 2132.5MHz

Voltage(V)	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	2132.500027	0.012
120	2132.500027	0.012
138 (120*1.15)	2132.500027	0.012

5.3.6 Occupied Bandwidth

Test Date: 15 Oct, 2013 to 16 Oct, 2013
Ambient Temp: 20.0°C
Humid : 67%
Atmospheric Pressure: 1005mbar
Power supply: AC 120V 60Hz
Test Method: FCC part 2.1049& 935210 D02 Signal Boosters Certification v01r01

Test Requirement:

700MHz Lower ABC Band	935210 D02 Signal Boosters Certification v01r01
700MHz Upper C Band	935210 D02 Signal Boosters Certification v01r01
850MHz Band	935210 D02 Signal Boosters Certification v01r01
1900MHz Broadband PCS	935210 D02 Signal Boosters Certification v01r01
AWS-1 Band	935210 D02 Signal Boosters Certification v01r01

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

Test conditions: Normal conditions

Test configuration:

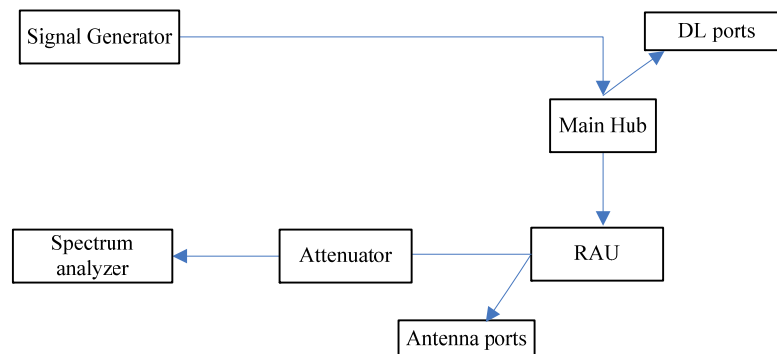


Figure 6: Downlink Occupied Bandwidth

Test Procedure:

Occupied bandwidth test procedure:

- Set the spectrum analyzer RBW 300Hz >1%&<2% bandwidth of carrier;
- Capture the trace of input signal;
- Connect the equipment as illustrated;
- Capture the trace of output signal

5.3.6.1 Measurement Record

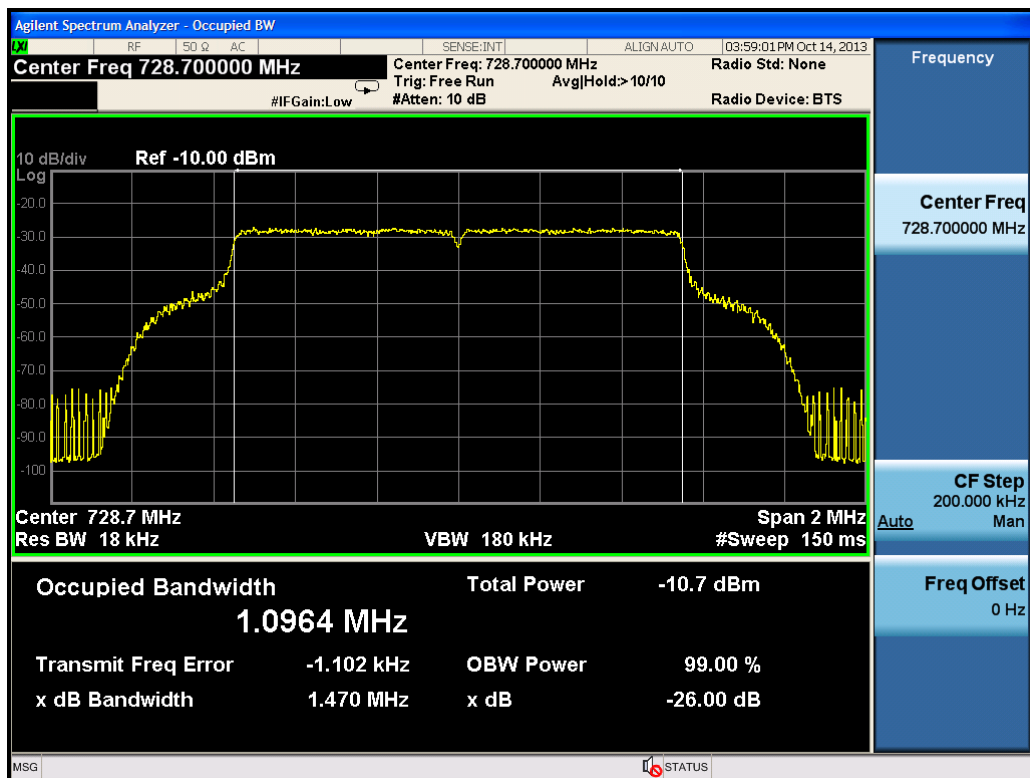
5.3.6.1.1 700MHz Lower ABC Band

1) Test Lower A(728MHz~734MHz)

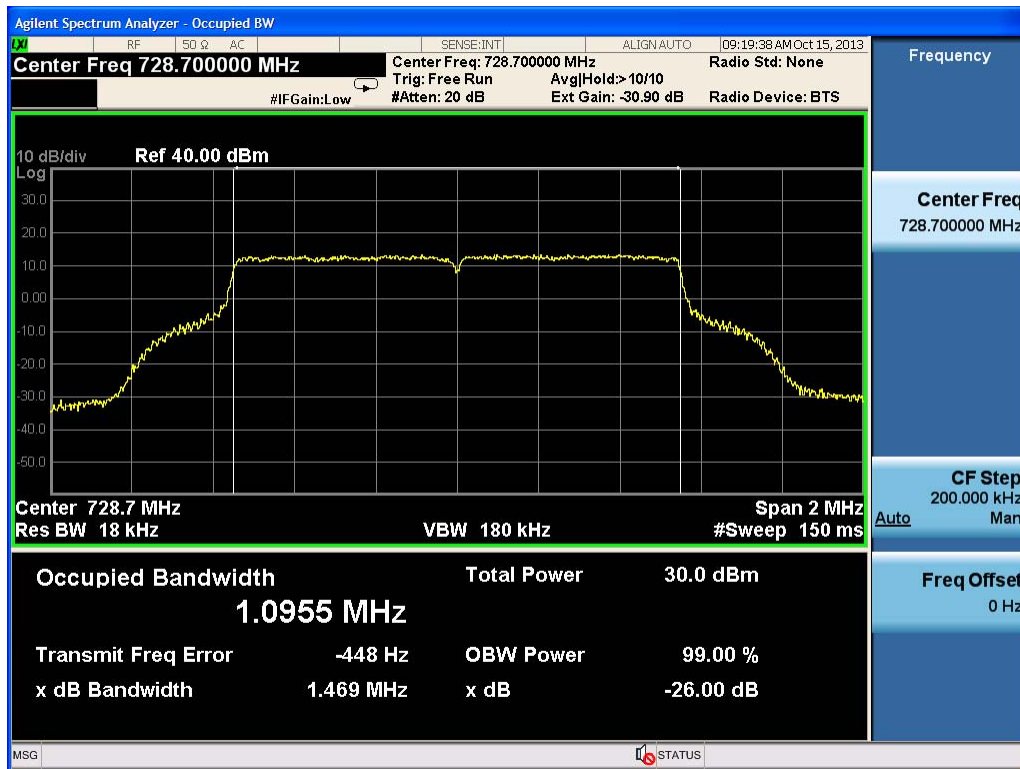
1.1) Test for LTE 1.4MHz

1.1.1) Lowest frequency

a) Input signal

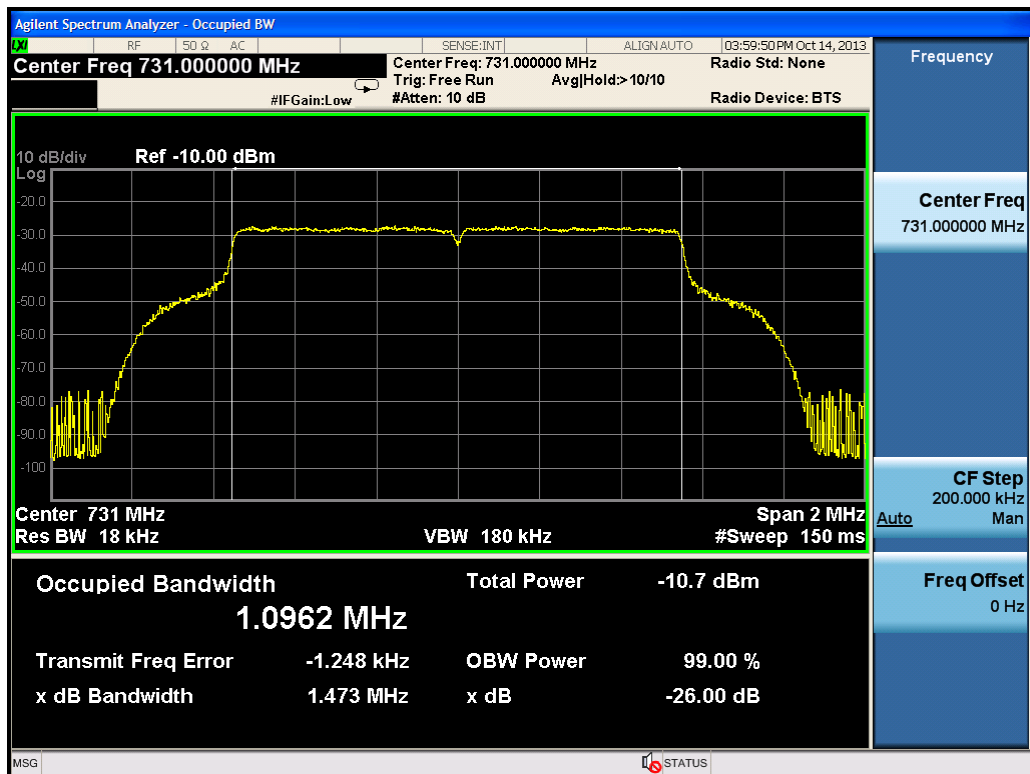


b) Output signal

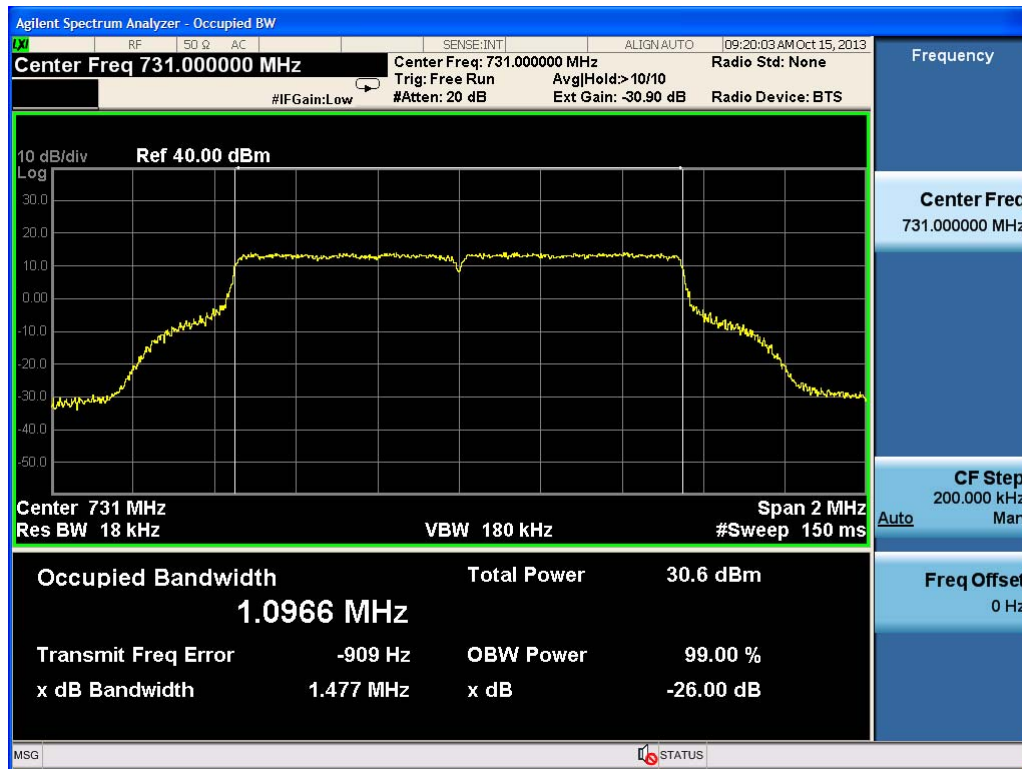


1.1.2) Middle frequency

a) Input signal

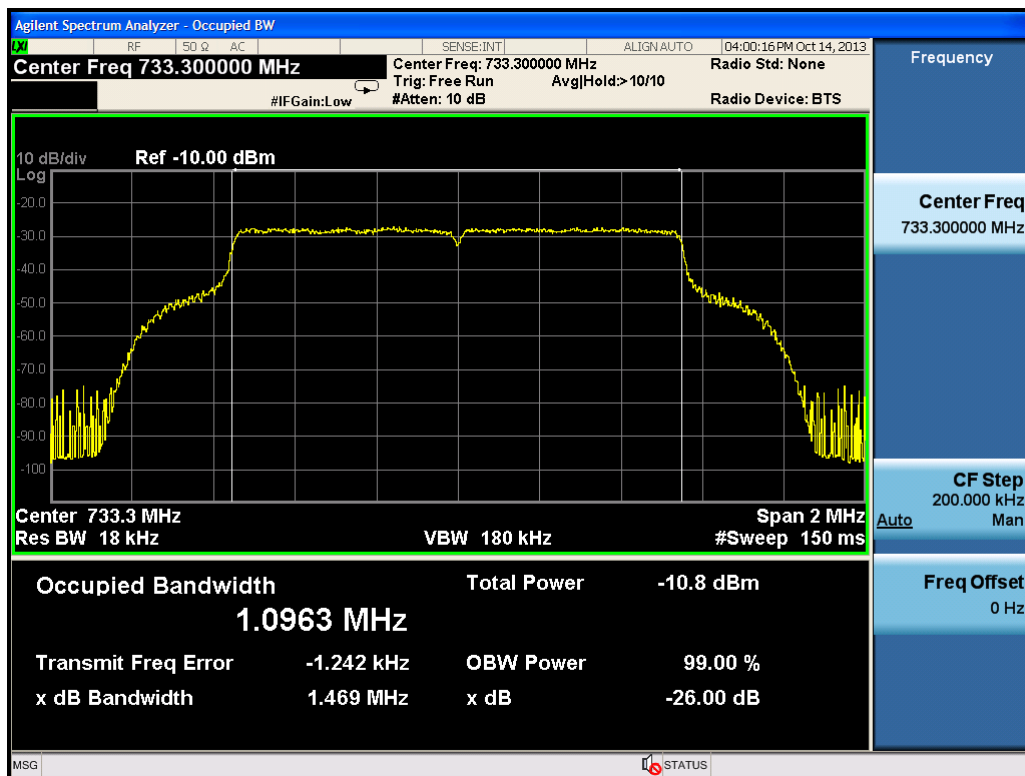


b) Output signal



1.1.3) Highest frequency

a) Input signal



b) Output signal

