

# RADIO TEST REPORT

No. 1211824 Ed. 3

## RF performance

### EQUIPMENT UNDER TEST

Equipment : DAS Remote  
Type / model : DDS xxx  
Manufacturer : Deltanode Solutions AB  
Tested by request of : Deltanode Solutions AB

### SUMMARY

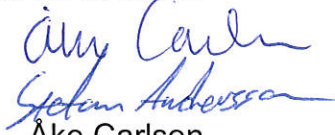
Referring to the emission limits and the operating mode during the tests specified in this report the equipment complies with the requirements according to

47 CFR Part 22, Subpart H

47 CFR Part 24, Subpart E

47 CFR Part 27, Subpart C

Date of issue: 2013-06-28

Tested by:   
Åke Carlson  
Stefan Andersson

Approved by:   
Niklas Boström

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**Revision History**

| <b>Edition</b> | <b>Date</b>       | <b>Description</b>                          |
|----------------|-------------------|---------------------------------------------|
| <b>1</b>       | <b>2012-08-20</b> | <b>First release</b>                        |
| <b>2</b>       | <b>2012-11-30</b> | <b>Reference to product serie in report</b> |
| <b>3</b>       | <b>2013-06-28</b> | <b>Correction of errors</b>                 |

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## 1 CLIENT INFORMATION

The EUT has been tested by request of

Company: Deltanode Solutions AB  
Hammarby fabriksväg 61 6tr  
120 33 Stockholm  
SVERIGE

Name of contact: Daniel Kerek

## 2 EQUIPMENT UNDER TEST (EUT)

### 2.1 Identification of the EUT according to the manufacturer/client declaration

Equipment: DAS Remote  
Type/Model: DDS xxx (DDS 100, 200, 300, 400 series)  
Brand name: Deltanode  
Serial number: DDS 499: 99001  
Manufacturer: Deltanode Solutions AB

Transmitter frequency range: 746 – 757 MHz  
869 – 894 MHz  
1930 – 1990 MHz  
2110 – 2155 MHz

Frequency agile or hopping: ☐ Yes ☒ No  
Antenna connector: ☐ None, internal antenna ☒ Yes, type: N adapter

Rating RF output power: 700 MHz band 41 dBm  
850 MHz band 41 dBm  
1900 MHz band 41 dBm  
AWS band 41 dBm

Type of modulation: 700 MHz band LTE  
GSM  
850 MHz band CDMA  
GSM  
1900 MHz band CDMA  
GSM  
AWS band LTE  
WCDMA

Temperature range: ☐ Category I (General): -20°C to +55°C  
☐ Category II (Portable equipment): -10°C to +55°C  
☐ Category III (Equipment for normal indoor use): +5°C to +35°C  
☒ Other: -30°C to +55°C

## **2.2 Additional hardware information about the EUT**

DDS 100, 200, 300, 400 series are tested for the US frequency bands 700, 850, 1900 and AWS. The product structure allows free configuration of the four bands up to four RF line-up's in one unit.

The part number

DDS 1xx is equipped with 1 RF line up

DDS 2xx is equipped with two RF line up's

DDS 3xx is equipped with three RF line up's

DDS 4xx is equipped with four RF line up's.

The tested unit DDH 499 is a four RF line up's with frequency bands 700, 850, 1900 and AWS.

### 3 TEST SPECIFICATIONS

#### 3.1 Standards

##### **FCC**

47 CFR Part 2 (2012)

47 CFR Part 22 (2012), Subpart H

47 CFR Part 24 (2012), Subpart E

47 CFR Part 27 (2012), Subpart C

Test methods in:

ANSI C63.4-2009: American National Standard for Methods of Measurement of Radio-Noise  
Emissions from Low-Voltage Electrical and Electronic Equipment in the Range  
of 9 kHz to 40 GHz

#### 3.2 Additions, deviations and exclusions from standards and accreditation

No additions, deviations or exclusions have been made from standards and accreditation.

#### 3.3 Test site

Measurements were performed at:

Intertek Semko AB.  
Torshamnsgatan 43,  
P.O. Box 1103  
SE-164 22 Kista

Intertek Semko AB is a FCC listed test site with site registration number 90913  
Intertek Semko AB is a Industry Canada listed test facility with IC assigned code 2042G

Measurement chambers

| Measurement Chamber                | Type of chamber             | IC Site filing # |
|------------------------------------|-----------------------------|------------------|
| STORA HALLEN<br>a.k.a. BIG CHAMBER | Semi-anechoic<br>10m and 3m | 2042G-2          |

### 3.4 Test conditions

If not additionally specified, the tests were performed under the following environmental conditions:

| Parameter            | Normal | Extreme   |
|----------------------|--------|-----------|
| Supplying voltage, V | 120    | 102 – 138 |
| Air temperature, °C  | 20     | -30 - +55 |

## 4 TEST SUMMARY

The results in this report apply only to the tested sample:

### 4.1 Amplifier 700 MHz band

| FCC reference       | Test                                     | Result | Note   |
|---------------------|------------------------------------------|--------|--------|
| 2.1046 and 27.50(b) | RF Output power                          | Pass   |        |
| 2.1049              | Occupied bandwidth                       | Pass   |        |
| -                   | Out of band rejection                    | Pass   |        |
| 2.1051 and 27.53(g) | Intermodulation                          | Pass   | Note 1 |
| 2.1051 and 27.53(g) | Out of band spurious emission, conducted | Pass   |        |
| 2.1053 and 27.53(g) | Out of band spurious emission, radiated  | Pass   |        |
| 2.1055 and 27.54    | Frequency stability                      | Pass   |        |

### 4.2 Amplifier 850 MHz band

| FCC reference        | Test                                     | Result | Note   |
|----------------------|------------------------------------------|--------|--------|
| 2.1046 and 22.913(a) | RF Output power                          | Pass   |        |
| 2.1049               | Occupied bandwidth                       | Pass   |        |
| -                    | Out of band rejection                    | Pass   |        |
| 2.1051 and 22.917(a) | Intermodulation                          | Pass   | Note 1 |
| 2.1051 and 22.917(a) | Out of band spurious emission, conducted | Pass   |        |
| 2.1053 and 22.917(a) | Out of band spurious emission, radiated  | Pass   |        |
| 2.1055               | Frequency stability                      | Pass   |        |

### 4.3 Amplifier 1900 MHz band

| FCC reference     | Test                                     | Result | Note   |
|-------------------|------------------------------------------|--------|--------|
| 2.1046 and 24.232 | RF Output power                          | Pass   |        |
| 2.1049            | Occupied bandwidth                       | Pass   |        |
| -                 | Out of band rejection                    | Pass   |        |
| 2.1051 and 24.238 | Intermodulation                          | Pass   | Note 1 |
| 2.1051 and 24.238 | Out of band spurious emission, conducted | Pass   |        |
| 2.1053 and 24.238 | Out of band spurious emission, radiated  | Pass   |        |
| 2.1055            | Frequency stability                      | Pass   |        |

### 4.4 Amplifier AWS band

| FCC reference       | Test                                     | Result | Note   |
|---------------------|------------------------------------------|--------|--------|
| 2.1046 and 27.50(d) | RF Output power                          | Pass   |        |
| 2.1049              | Occupied bandwidth                       | Pass   |        |
| -                   | Out of band rejection                    | Pass   |        |
| 2.1051 and 27.53(g) | Intermodulation                          | Pass   | Note 1 |
| 2.1051 and 27.53(g) | Out of band spurious emission, conducted | Pass   |        |
| 2.1053 and 27.53(g) | Out of band spurious emission, radiated  | Pass   |        |
| 2.1055 and 27.54    | Frequency stability                      | Pass   |        |

Note 1: The measured result is below the upper limit, but by a margin less than half of the uncertainty interval; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance is more probable than noncompliance.

**5 RF OUTPUT POWER**

|               |             |                   |             |
|---------------|-------------|-------------------|-------------|
| Date of test: | 2012-04-12  | Test location:    | Big Chamber |
| EUT Serial:   | 99001       | Ambient temp.     | 22 °C       |
| Tested by:    | Åke Carlson | Relative humidity | 29 %        |
| Test result:  | Pass        |                   |             |

**5.1 Requirement**

| Amplifier | Rule                 | Limit                |
|-----------|----------------------|----------------------|
| 700       | 2.1046 and 27.50(b)  | 1000 W (60 dBm) ERP  |
| 850       | 2.1046 and 22.913(a) | 500 W (57 dBm) ERP   |
| 1900      | 2.1046 and 24.232    | 1640 W (62 dBm) EIRP |
| AWS       | 2.1046 and 27.50(d)  | 1640 W (62 dBm) EIRP |

**5.2 Test data**

| Amplifier | Input signal | RF Ouput Power (dBm) | Limit value (dBm) |
|-----------|--------------|----------------------|-------------------|
| 700       | LTE          | 40.2                 | 60                |
| 700       | GSM          | 40.3                 | 60                |
| 850       | CDMA         | 40.1                 | 57                |
| 850       | GSM          | 40.1                 | 57                |
| 1900      | CDMA         | 39.2                 | 62                |
| 1900      | GSM          | 39.3                 | 62                |
| AWS       | LTE          | 39.2                 | 62                |
| AWS       | WCDMA        | 39.2                 | 62                |

Measurement results are corrected for attenuation in the set-up configuration.

Example calculation:

Rf output power [dBm] = Power meter reading [dBm] + cable loss [dB] + attenuator loss [dB]

**6 OCCUPIED BANDWIDTH**

|               |             |                   |             |
|---------------|-------------|-------------------|-------------|
| Date of test: | 2012-05-02  | Test location:    | Big Chamber |
| EUT Serial:   | 99001       | Ambient temp.     | 22 °C       |
| Tested by:    | Åke Carlson | Relative humidity | 29 %        |
| Test result:  | Pass        |                   |             |

**6.1 Requirement**

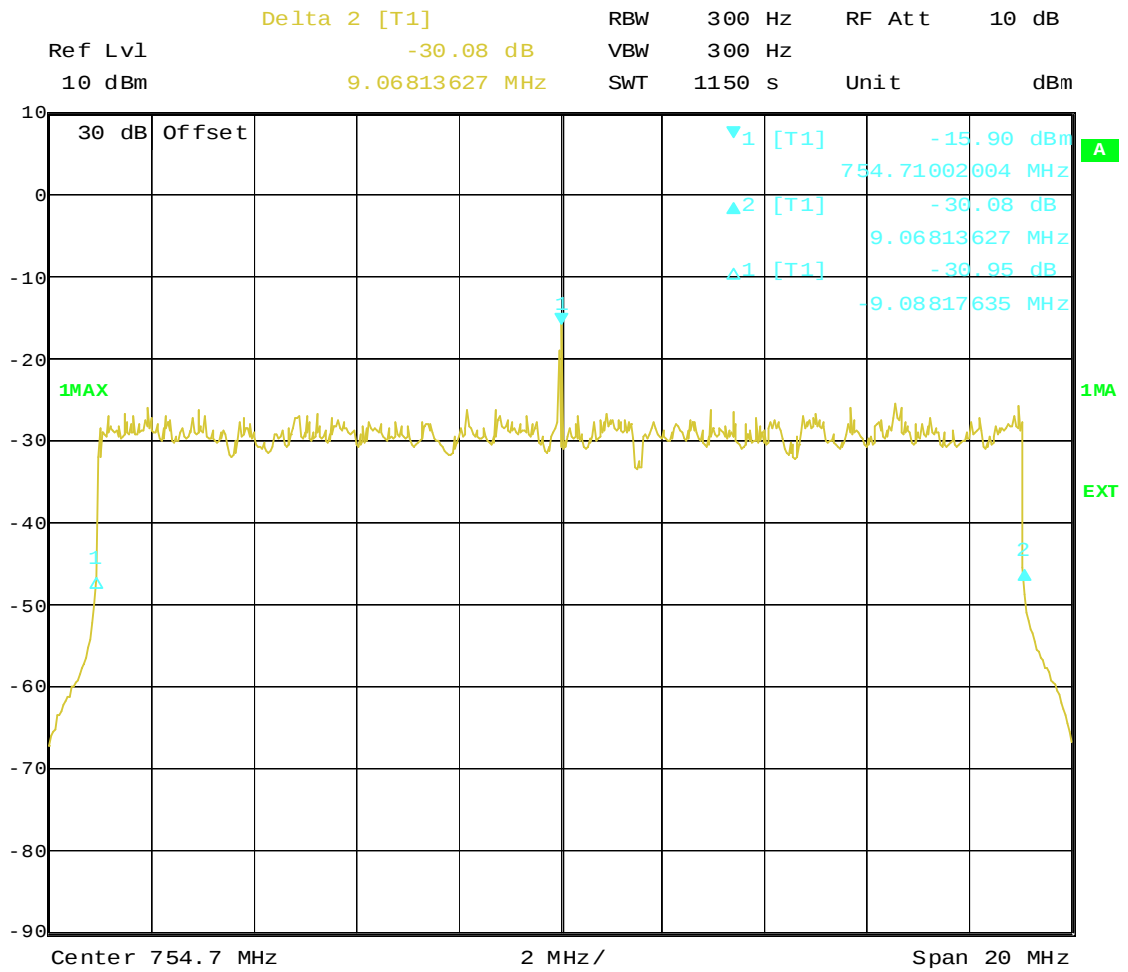
47 CFR 2.1049

The spectral shape of the output should look similar to input for all modulations using 300 Hz RBW (or 1 % of occupied bandwidth)

**6.2 Test data**

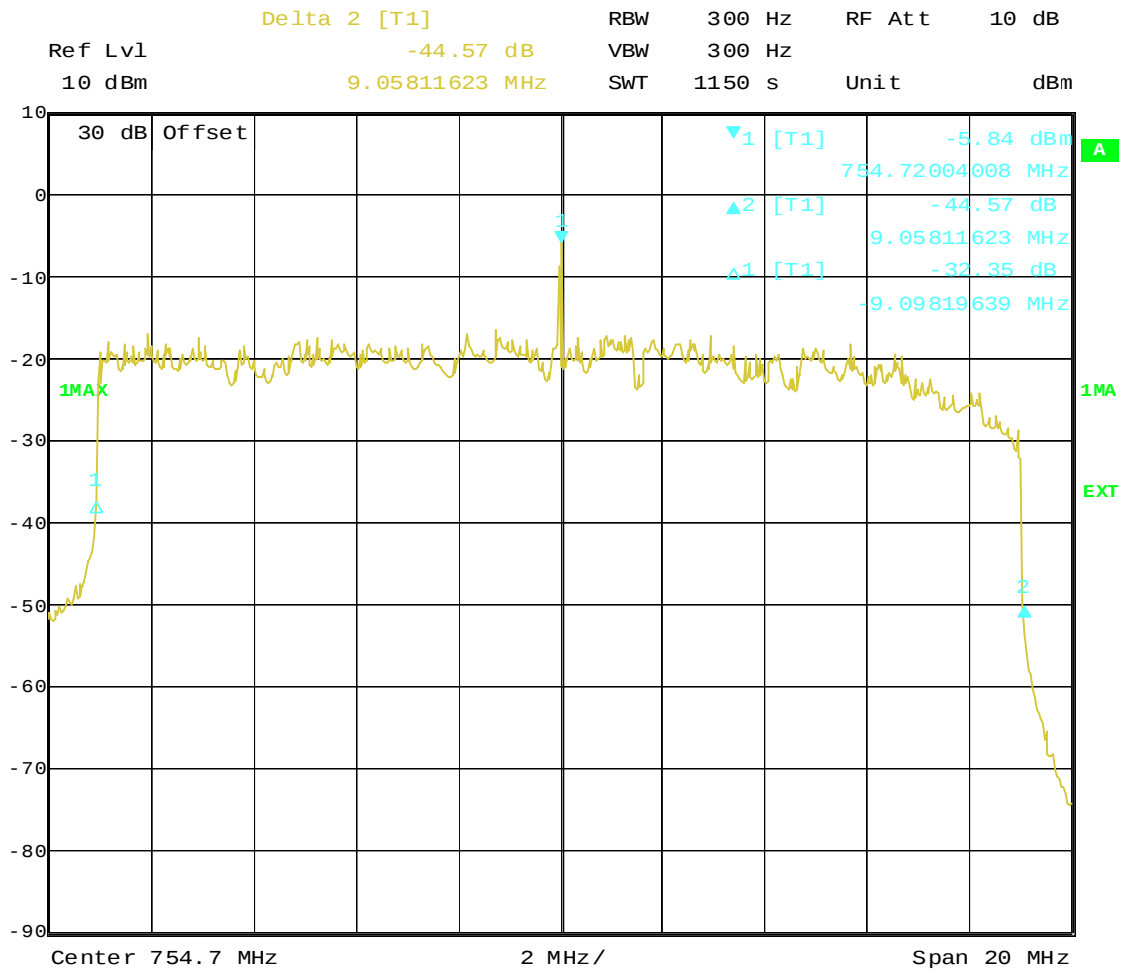
| Amplifier | Input signal | 26 dB bandwidth |              | Plots     |
|-----------|--------------|-----------------|--------------|-----------|
|           |              | Input (kHz)     | Output (kHz) |           |
| 700       | LTE          | 1815.63         |              | Plot 6:1  |
|           |              |                 | 1815.63      | Plot 6:2  |
| 700       | GSM          | 322.346         |              | Plot 6:3  |
|           |              |                 | 322.346      | Plot 6:4  |
| 850       | CDMA         | 1430.86         |              | Plot 6:5  |
|           |              |                 | 1430.86      | Plot 6:6  |
| 850       | GSM          | 320.642         |              | Plot 6:7  |
|           |              |                 | 318.368      | Plot 6:8  |
| 1900      | CDMA         | 1434.87         |              | Plot 6:9  |
|           |              |                 | 1430.862     | Plot 6:10 |
| 1900      | GSM          | 310.622         |              | Plot 6:11 |
|           |              |                 | 312.626      | Plot 6:12 |
| AWS       | WCDMA        | 4599.198        |              | Plot 6:13 |
|           |              |                 | 4599.198     | Plot 6:14 |
| AWS       | LTE          | 1850.00         |              | Plot 6:15 |
|           |              |                 | 1815.63      | Plot 6:16 |

**Plot 6:1**



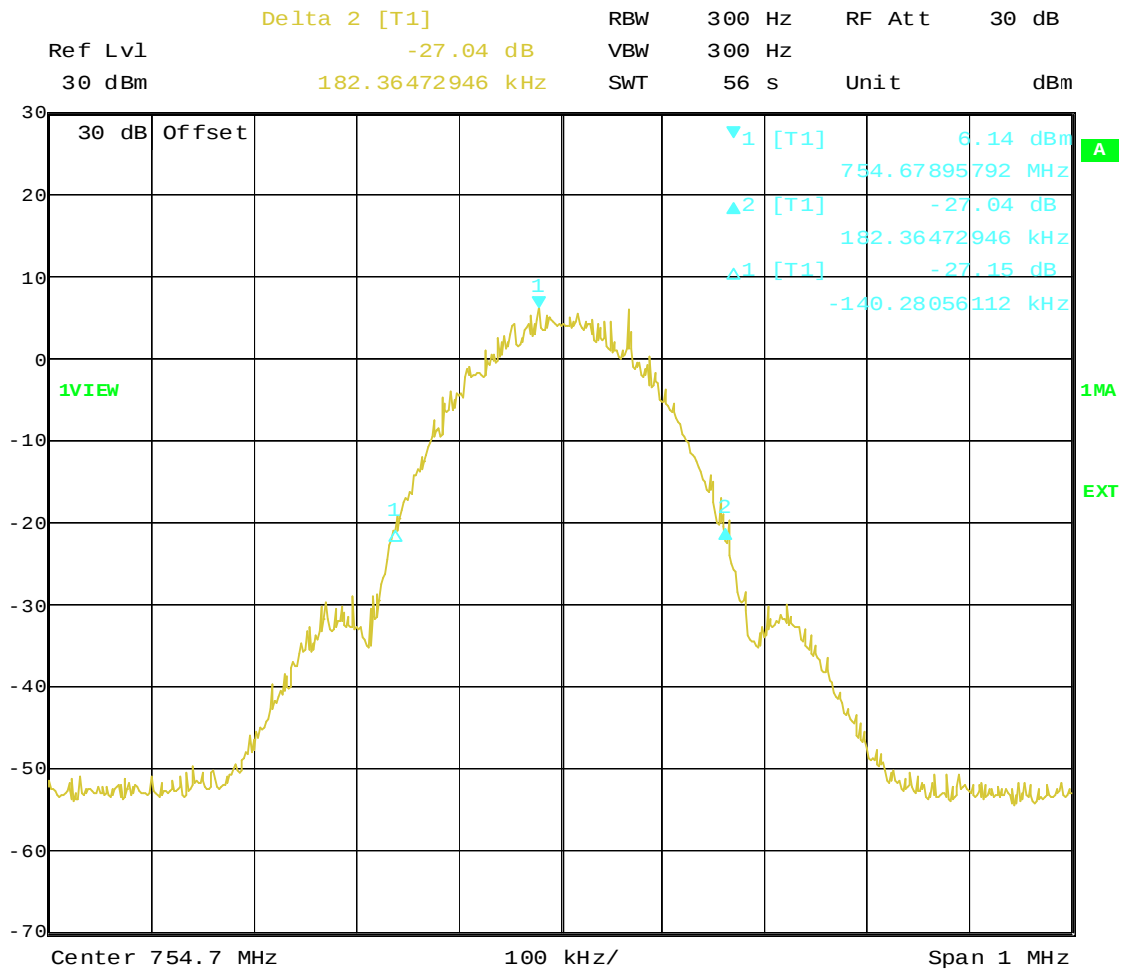
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**Plot 6:2**



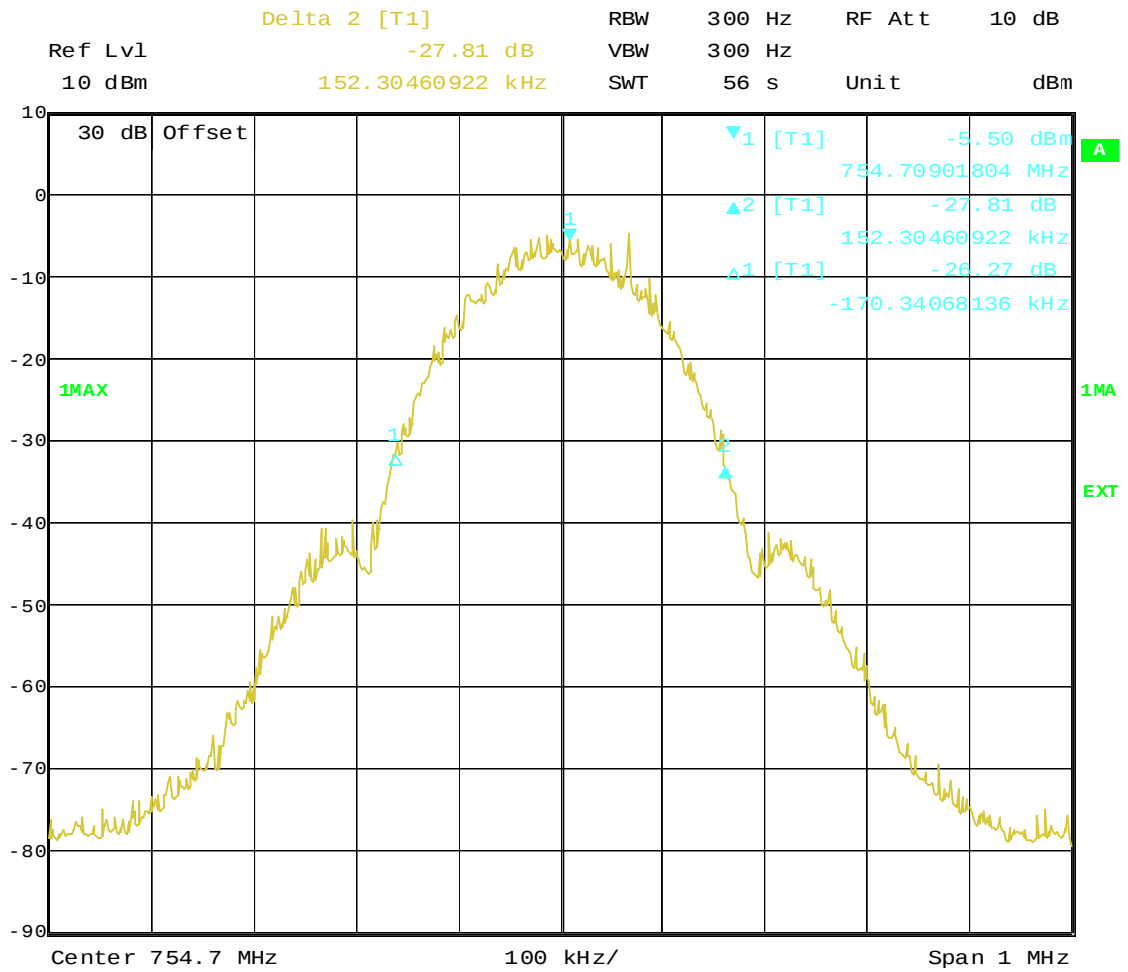
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**Plot 6:3**



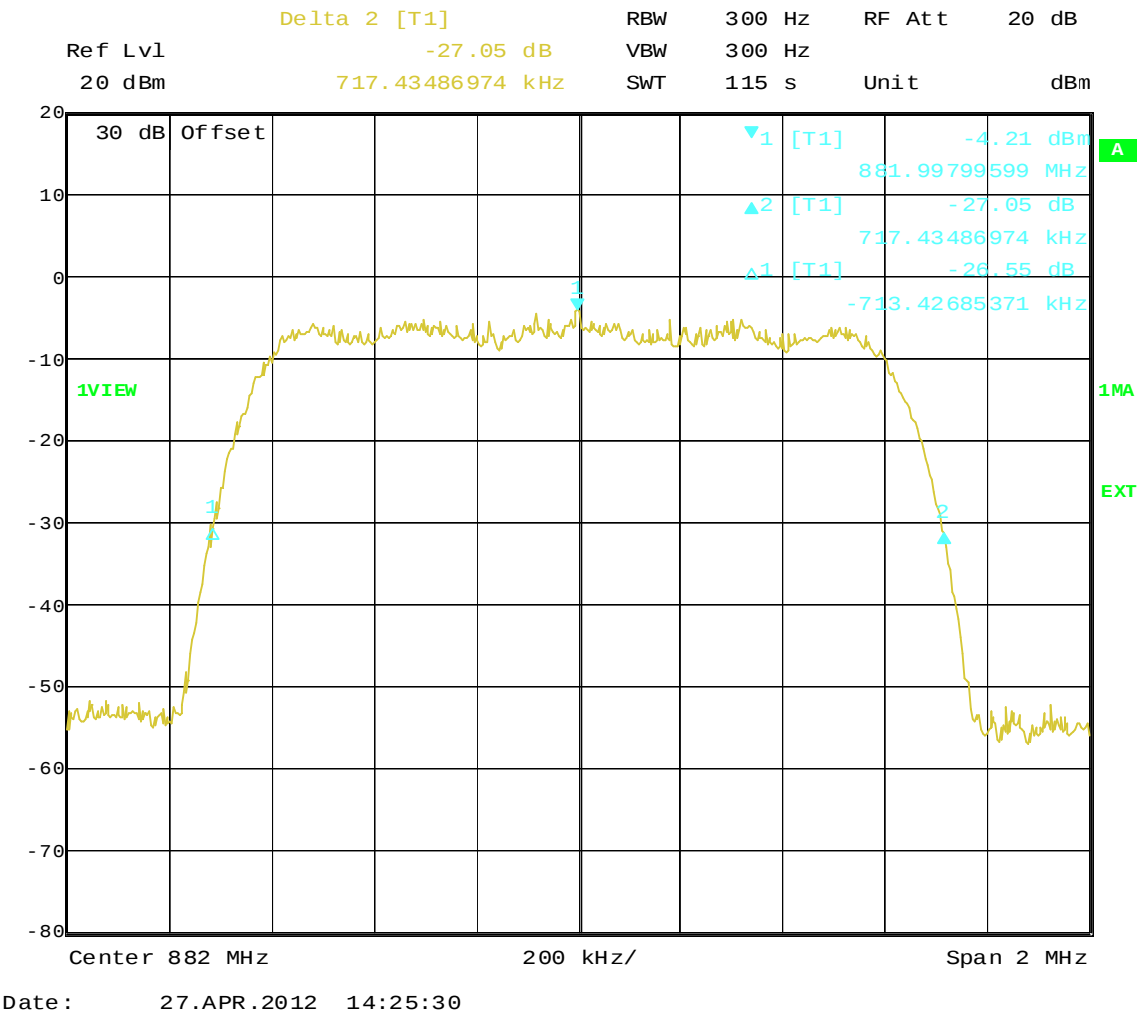
Date: 27.APR.2012 12:30:05

**Plot 6:4**



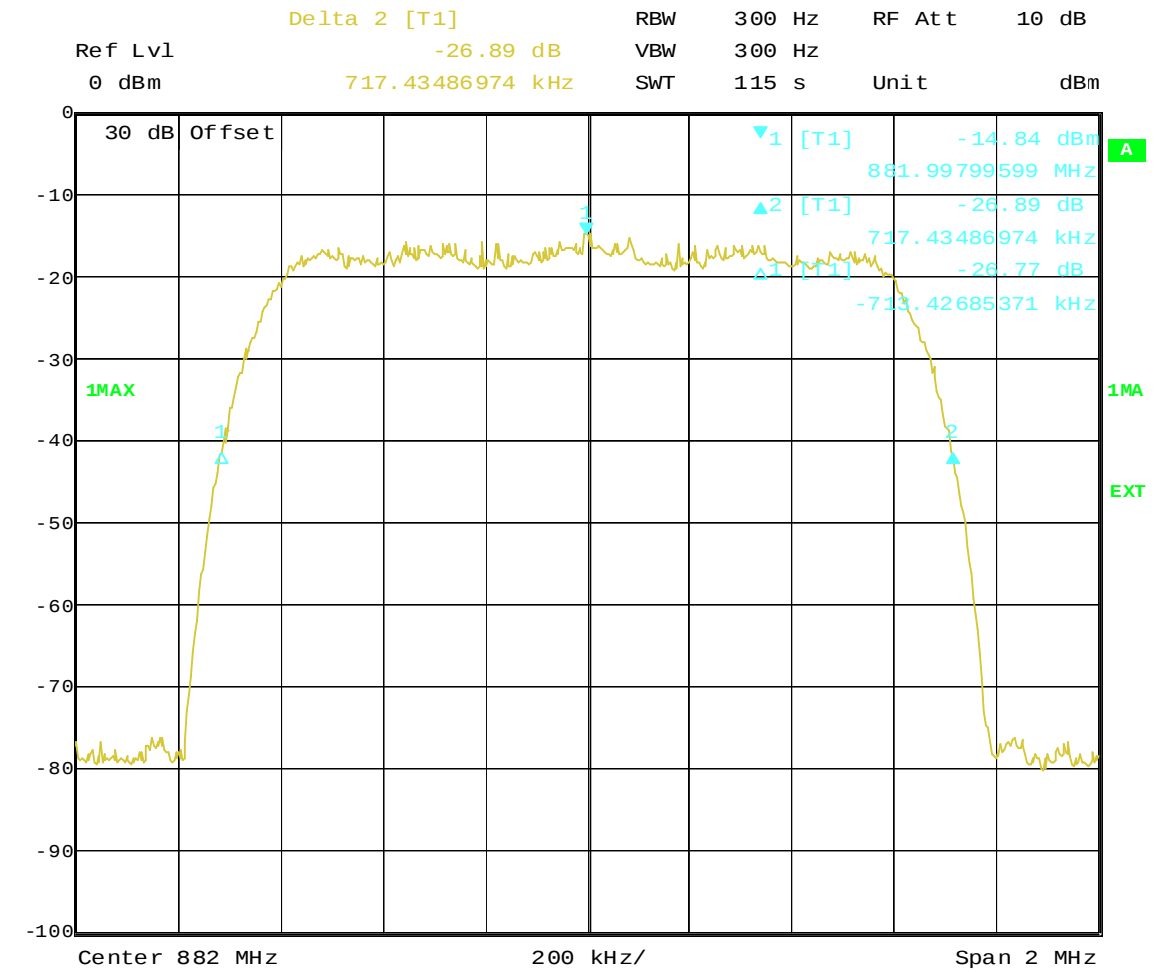
Date: 27.APR.2012 15:45:24

Plot 6:5



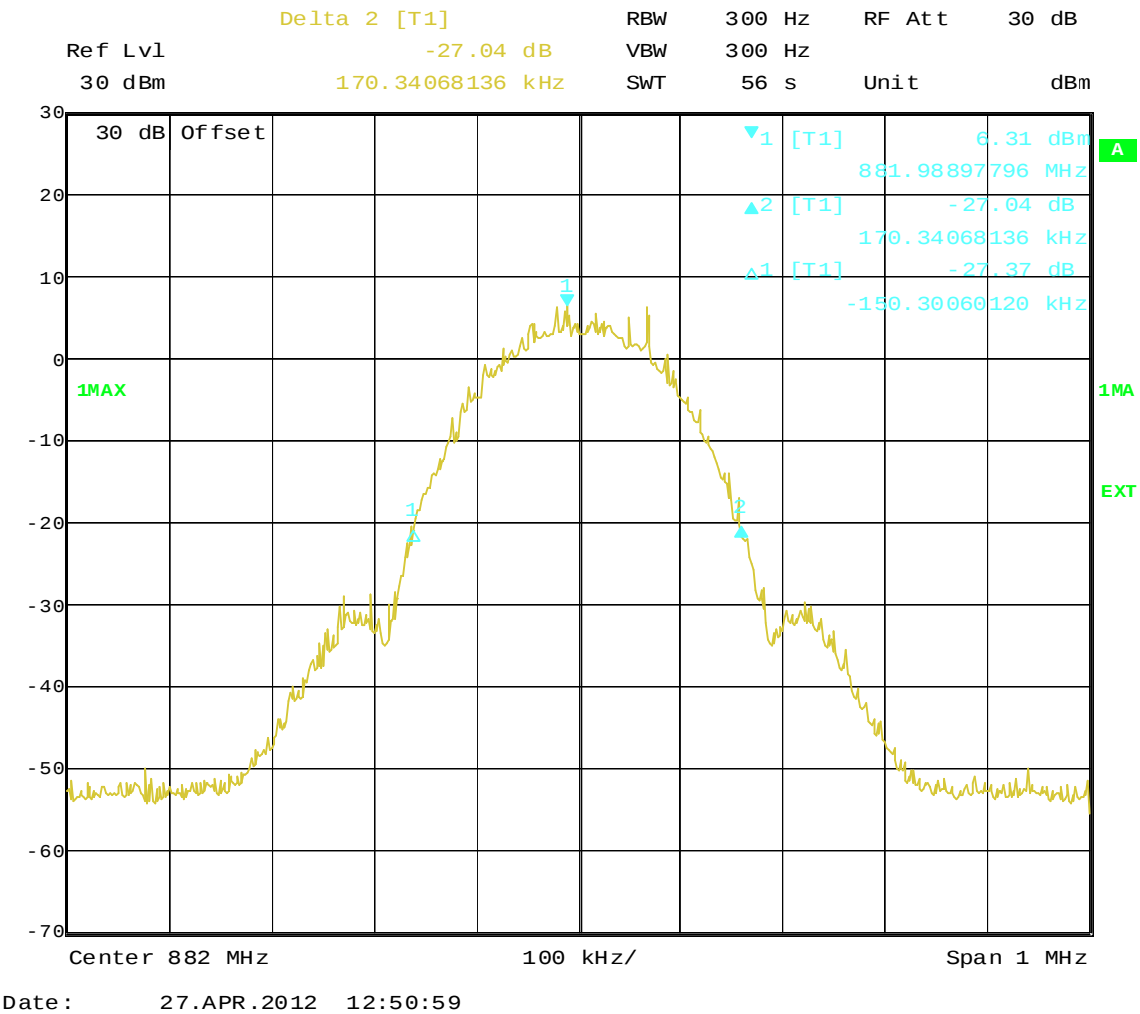
Date: 27.APR.2012 14:25:30

**Plot 6:6**

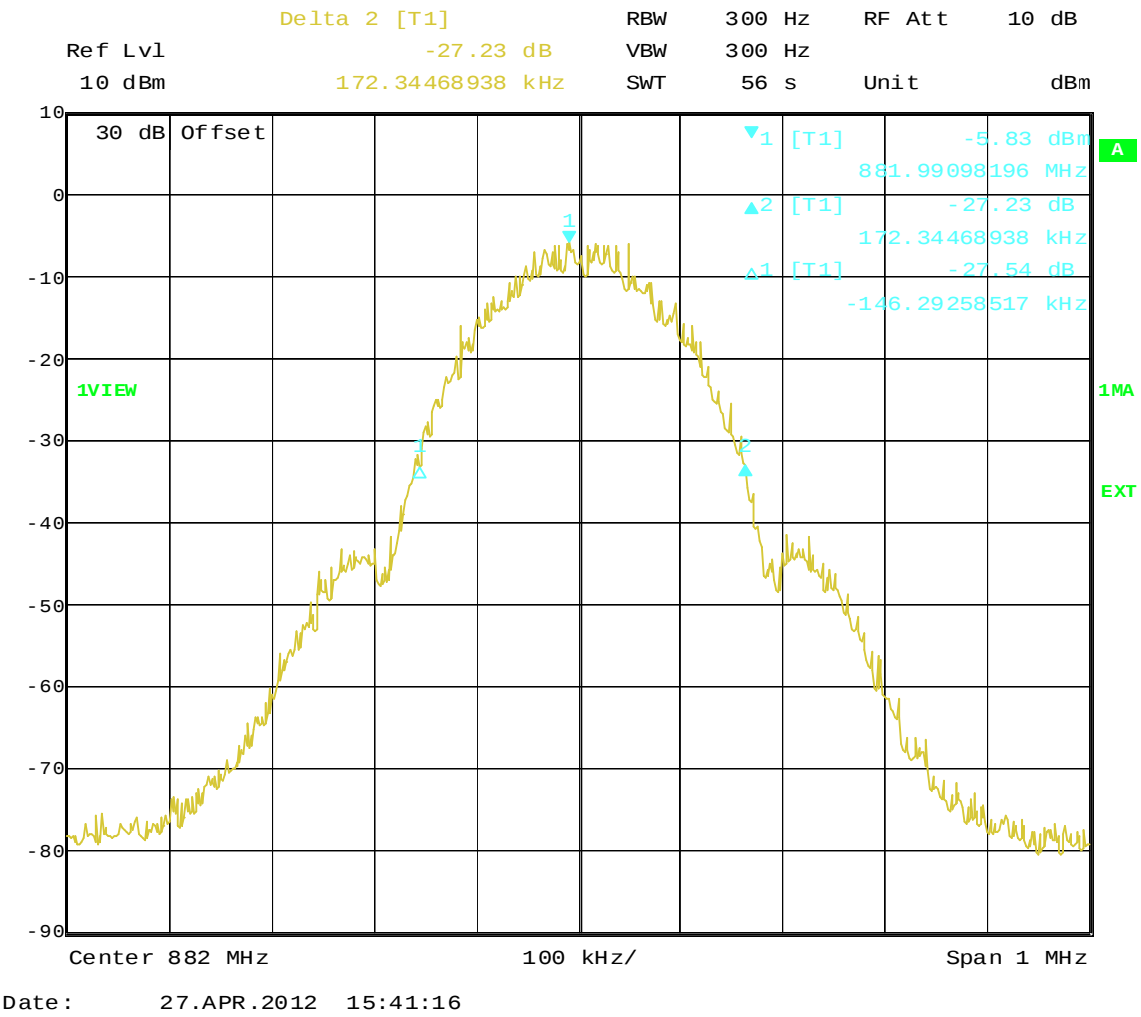


Date: 27.APR.2012 15:33:35

Plot 6:7



Plot 6:8



Ref Lvl 20 dBm Delta 2 [T1] -27.00 dB RBW 300 Hz RF Att 20 dB  
 20 dBm 725.45090180 kHz VBW 300 Hz SWT 115 s Unit dBm

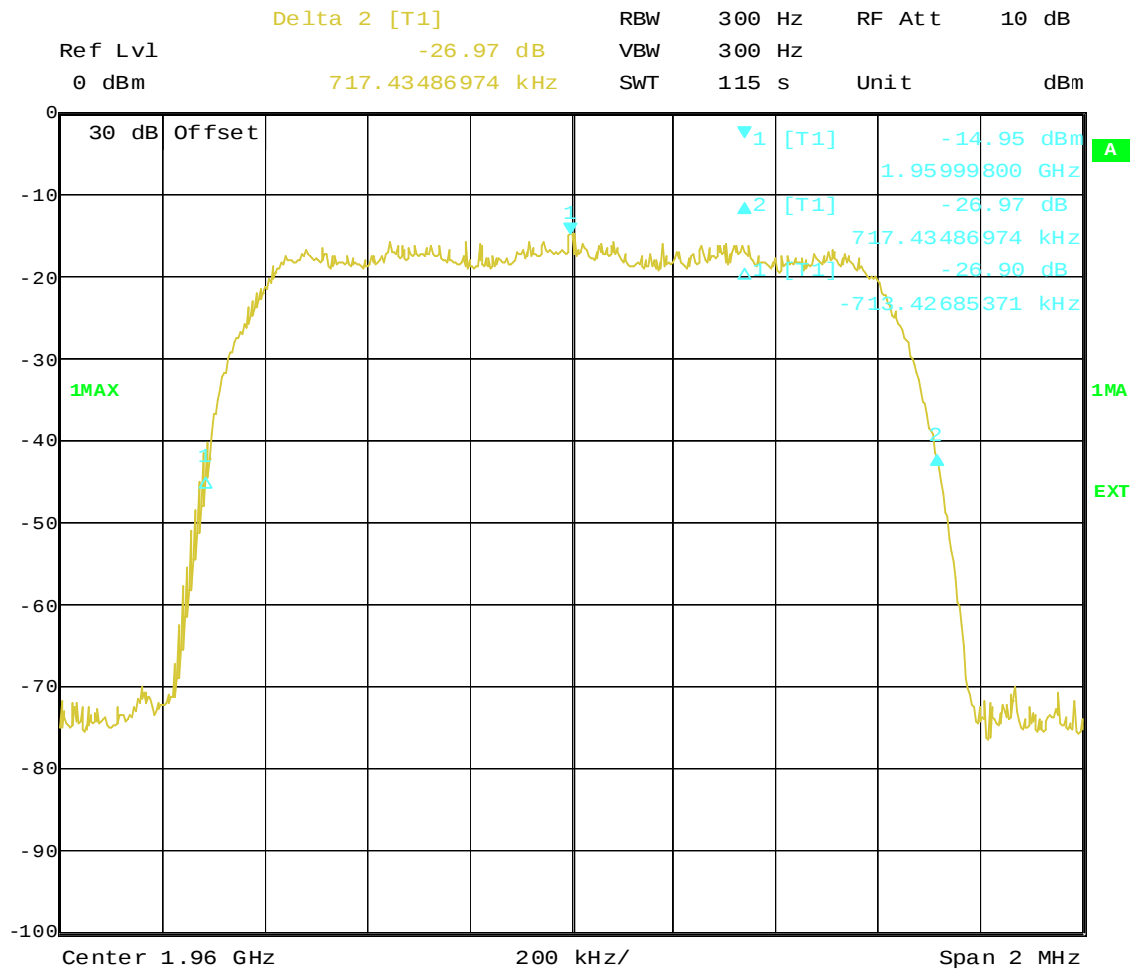
30 dB Offset 1VIEW 1MA EXT

▼1 [T1] 1.42 dBm  
 ▲2 [T1] 1.95999800 GHz  
 ▲1 [T1] -27.00 dB  
 -28.17 dB  
 -749.41883768 kHz

Center 1.96 GHz 200 kHz/ Span 2 MHz

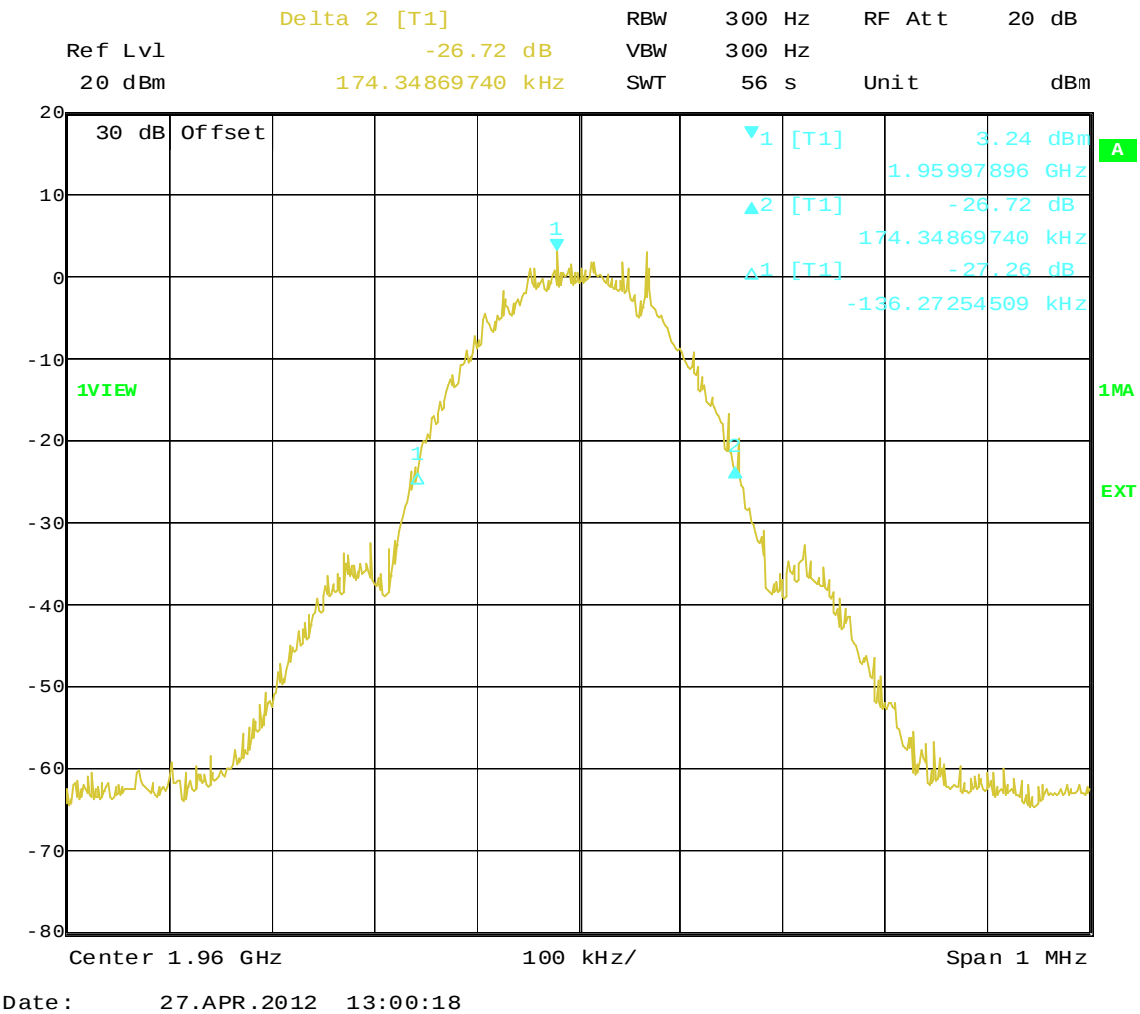
Date: 27.APR.2012 14:18:12

**Plot 6:10**

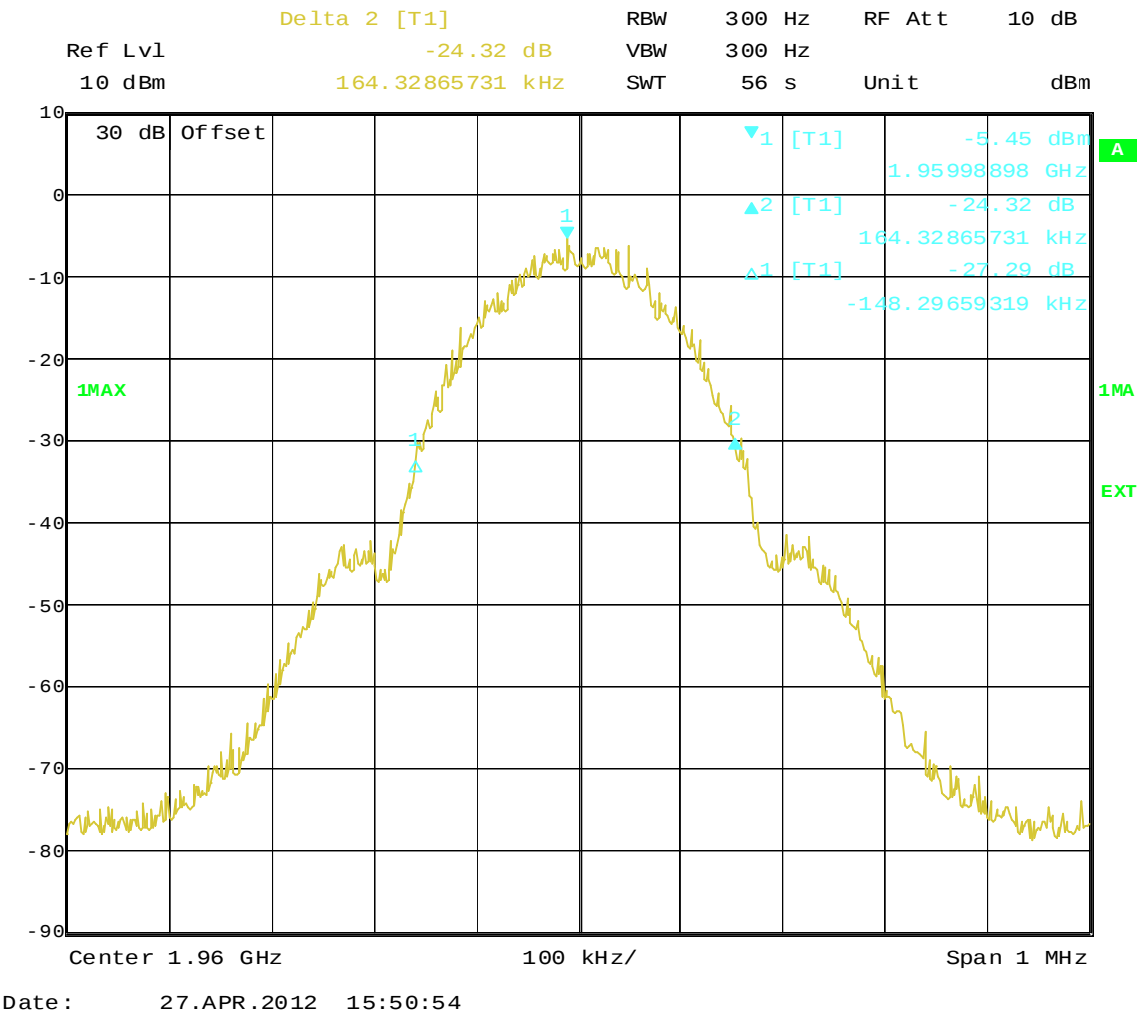


Date: 27.APR.2012 15:21:19

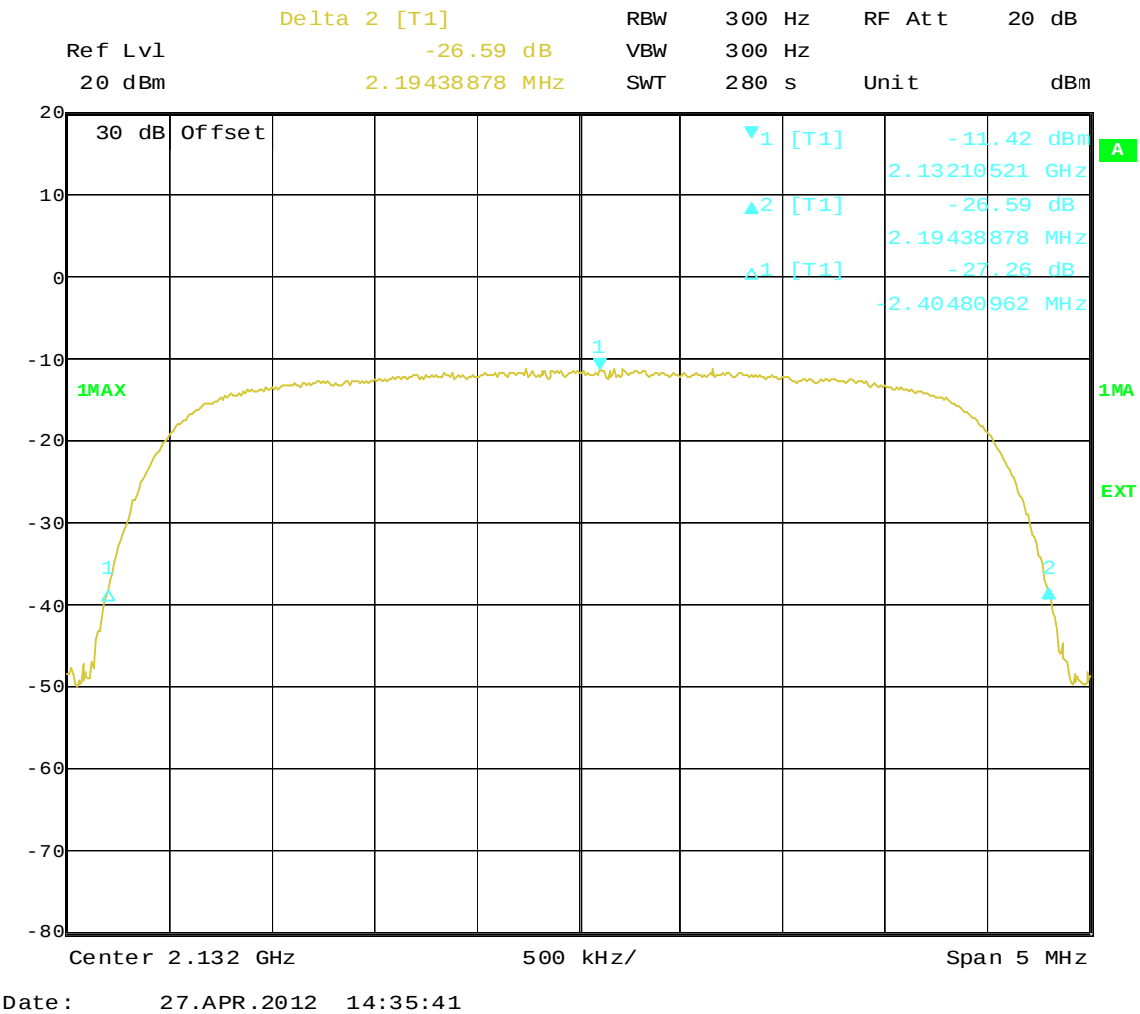
Plot 6:11



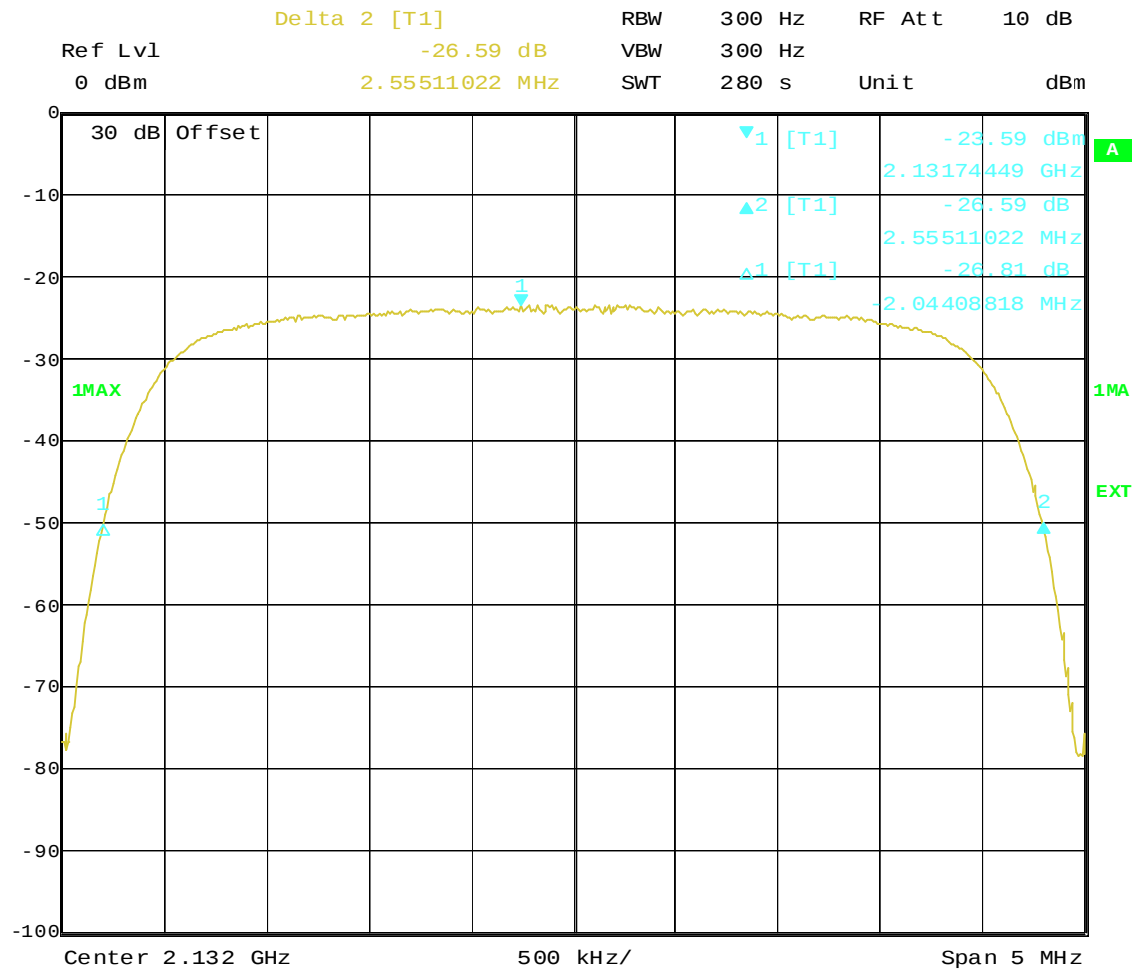
Plot 6:12



Plot 6:13

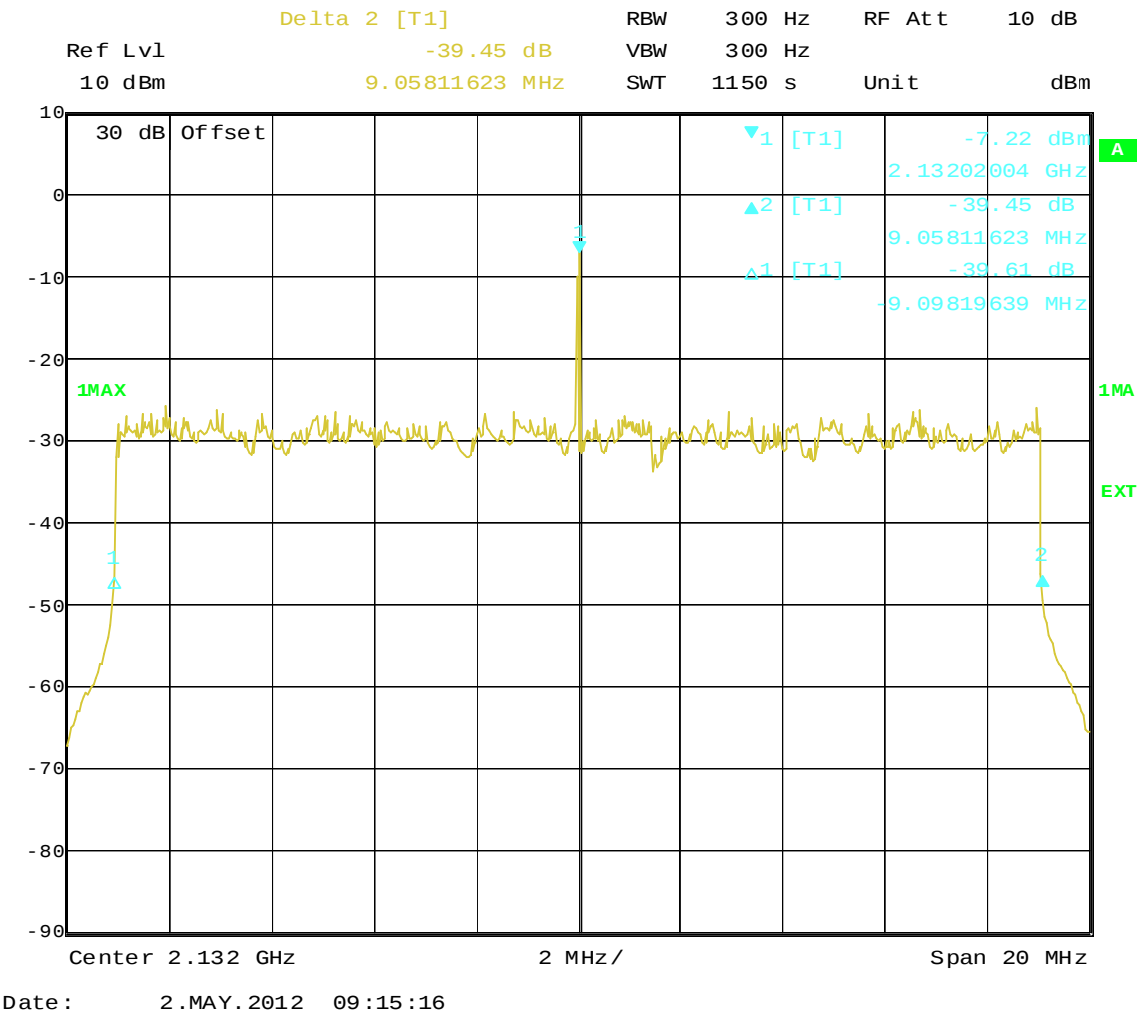


**Plot 6:14**

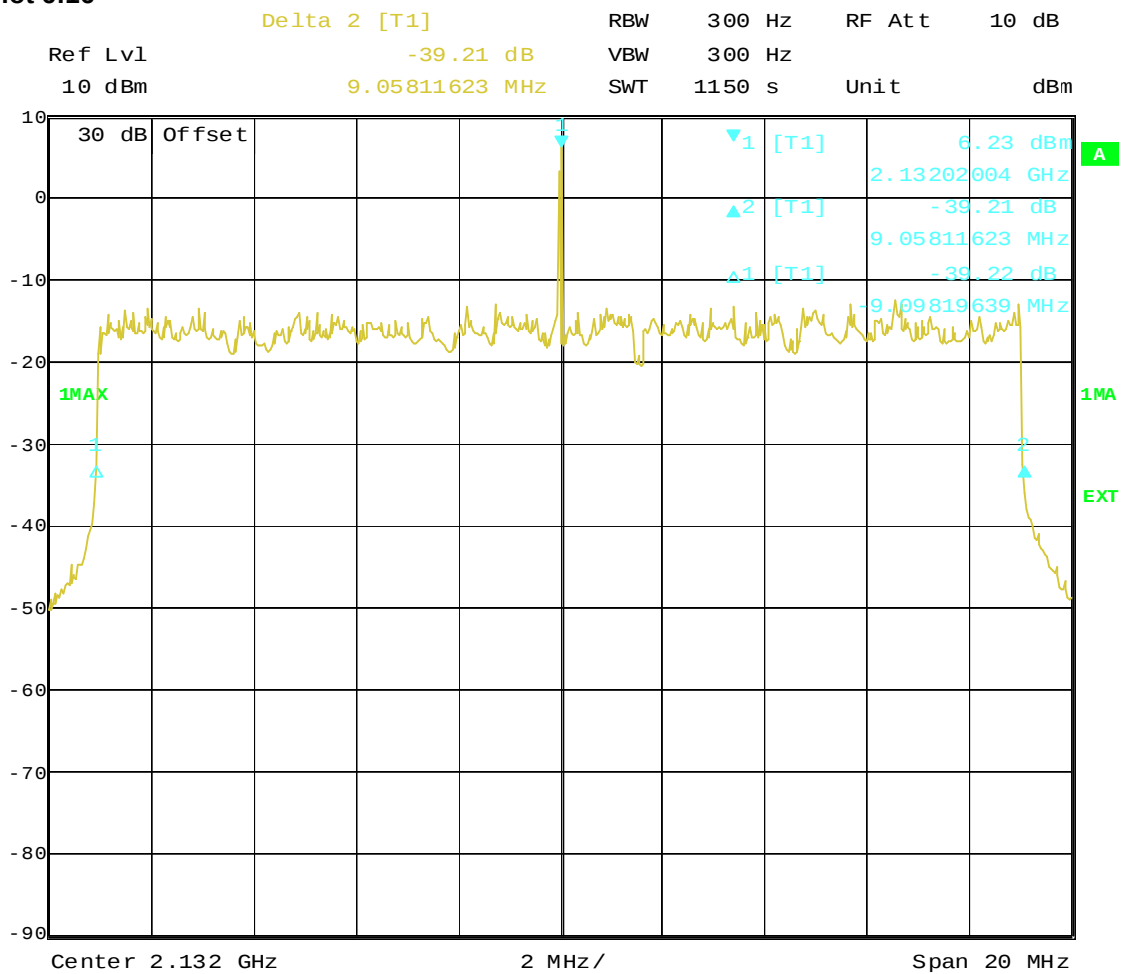


Date: 27.APR.2012 15:16:58

Plot 6:15



Plot 6:16



Date: 2.MAY.2012 09:45:01

## 7 OUT OF BAND REJECTION

|               |             |                   |             |
|---------------|-------------|-------------------|-------------|
| Date of test: | 2012-05-02  | Test location:    | Big Chamber |
| EUT Serial:   | 99001       | Ambient temp.     | 23 °C       |
| Tested by:    | Åke Carlson | Relative humidity | 30 %        |

### 7.1 Test data

The tracking generator in the spectrum analyzer was used to measure the frequency response of the duplex filter in the EUT.

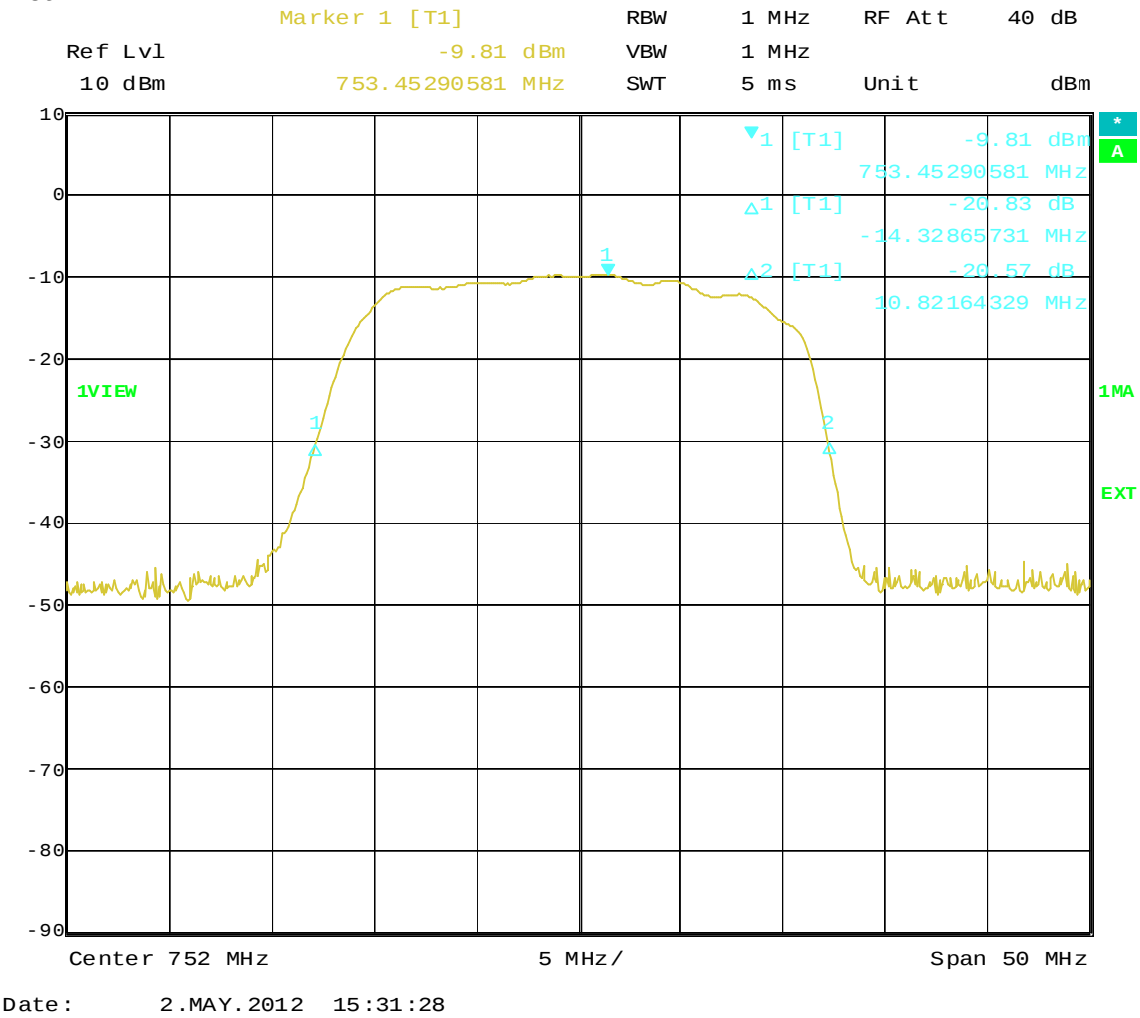
| Amplifier | 20 dB Bandwidth (MHz) | Plots    |
|-----------|-----------------------|----------|
| 700       | 25.150                | Plot 7.1 |
| 850       | 49.786                | Plot 7.2 |
| 1900      | 85.927                | Plot 7.3 |
| AWS       | 62.264                | Plot 7.4 |

Measurement results are corrected for attenuation in the set-up configuration.

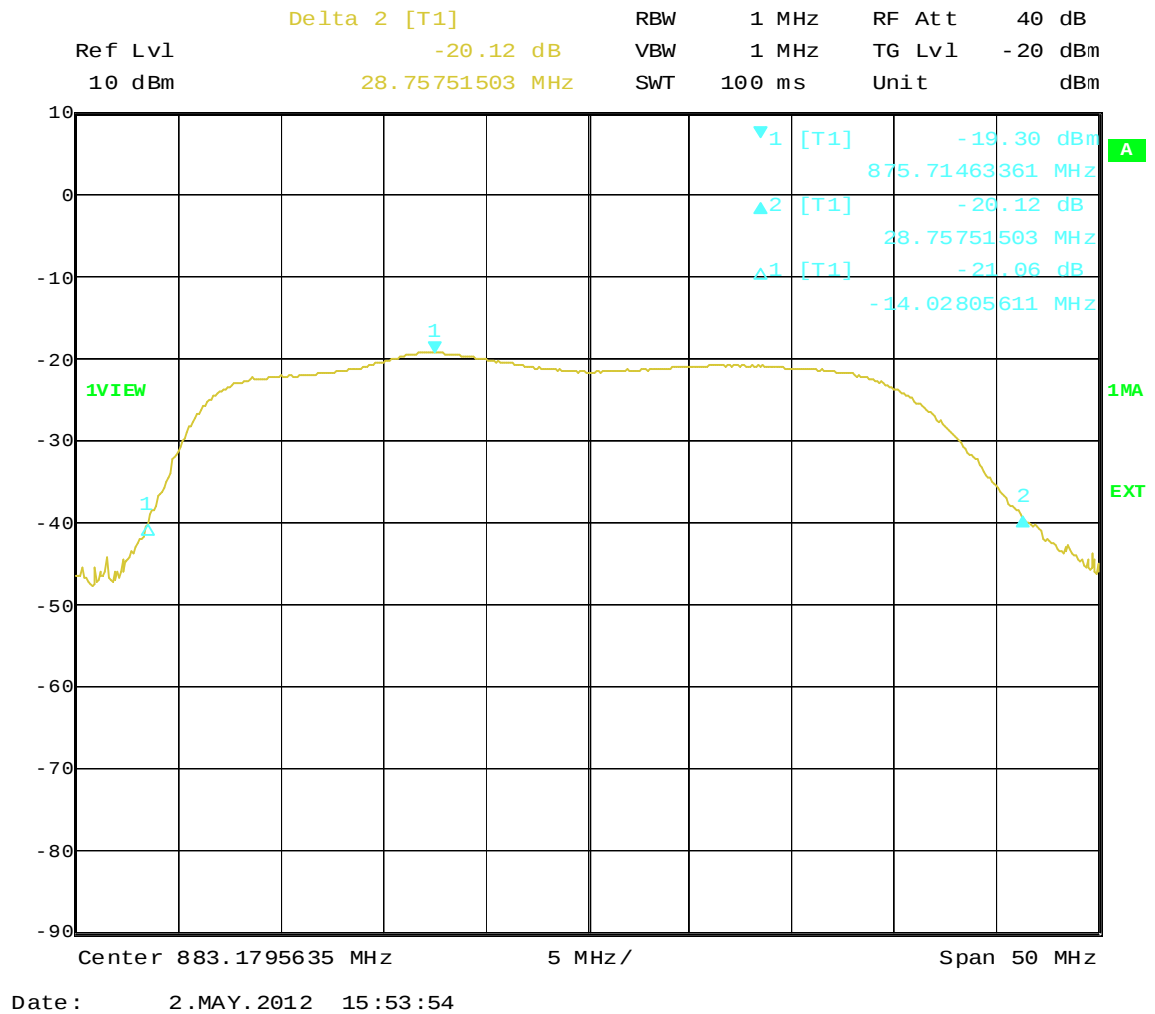
Example calculation:

Measured level [dB] = Analyser reading [dBm] - Tracking Generator signal level [dBm]

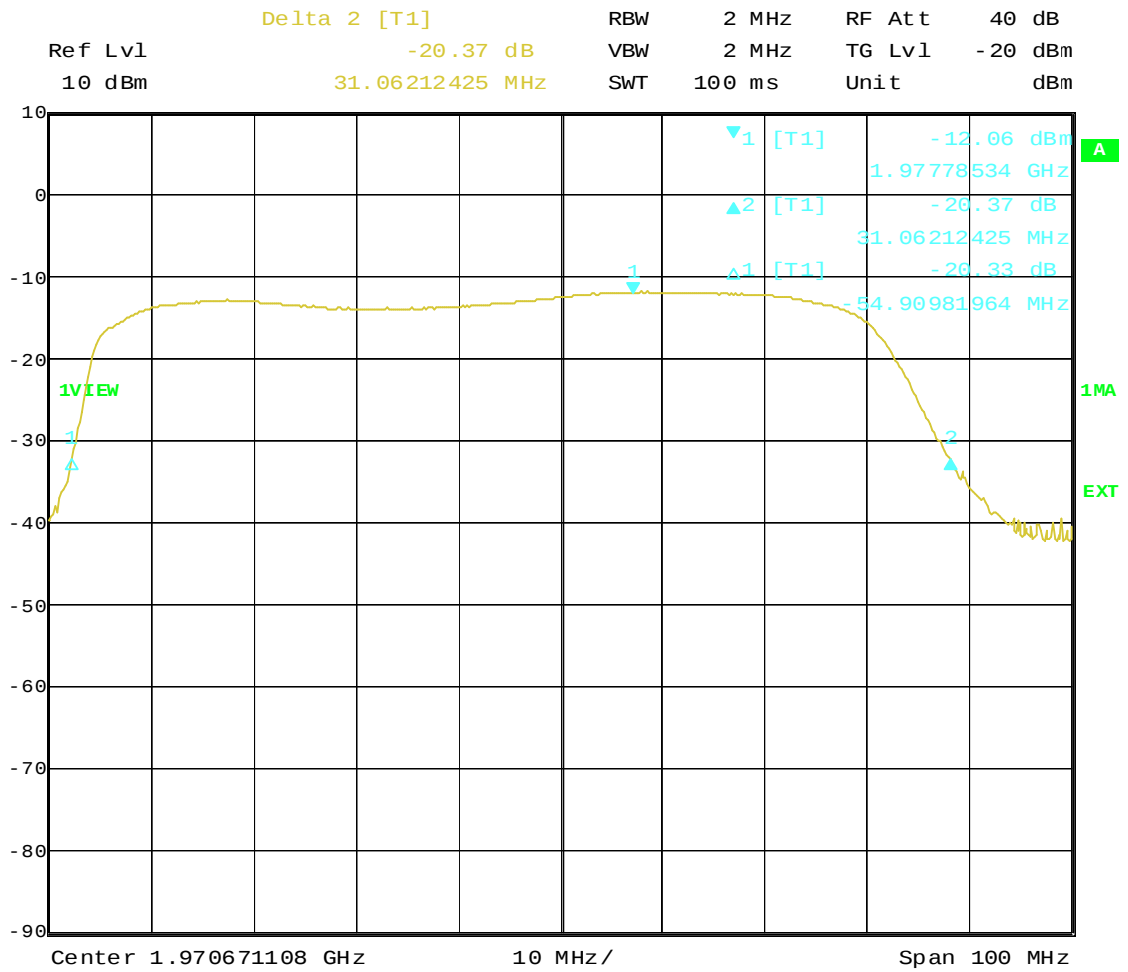
Plot 7:1



**Plot 7:2**

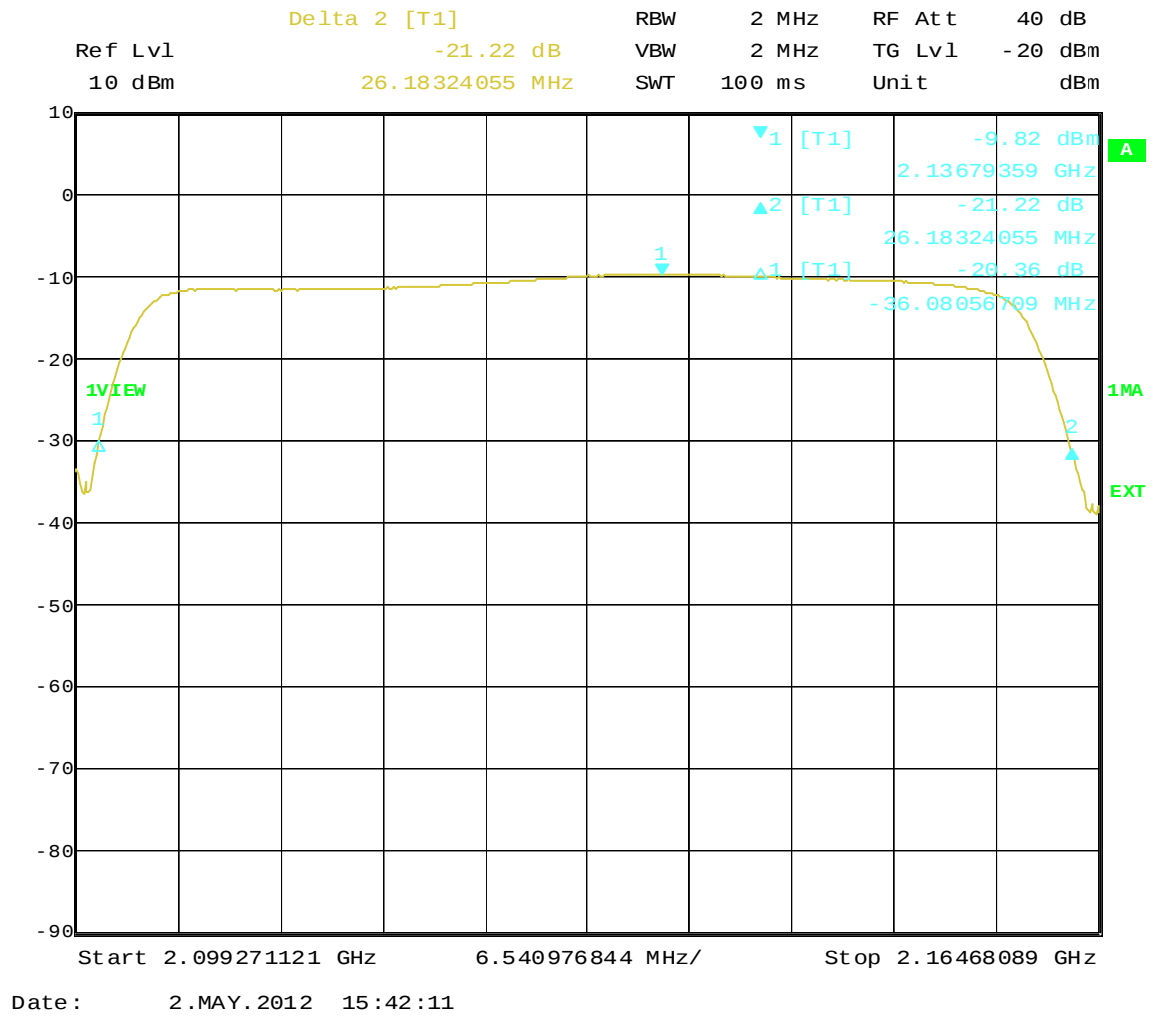


**Plot 7:3**



Date: 2.MAY.2012 15:45:48

**Plot 7:4**



**8 INTERMODULATION**

|               |             |                   |             |
|---------------|-------------|-------------------|-------------|
| Date of test: | 2012-05-04  | Test location:    | Big Chamber |
| EUT Serial:   | 99001       | Ambient temp.     | 23 °C       |
| Tested by:    | Åke Carlson | Relative humidity | 30 %        |
| Test result:  | Pass        | Margin:           | > 1.9 dB    |

**8.1 Test data****700 MHz band.****Intermodulation**

| Test signal(s)                             | Frequency [MHz] | RBW [kHz] | Measured peak level (dBm) | Limit (dBm) | Plots        | Comment |
|--------------------------------------------|-----------------|-----------|---------------------------|-------------|--------------|---------|
| LTE carrier at 750.00 and CW at 746.00 MHz | 746 – 751       | 30        | -16.3                     | -13         | Plot 8.1-8.2 |         |
| LTE carrier at 753.00 and CW at 757.00 MHz | 751 – 753       | 30        | -16.8                     | -13         | Plot 8.3-8.4 |         |
| CW at 746.00 MHz and CW at 748.00 MHz      | 746 – 751       | 30        | -19.1                     | -13         | Plot 8.5-8.6 |         |
| CW at 755.00 MHz and CW at 757.00 MHz      | 751 – 757       | 30        | -17.6                     | -13         | Plot 8.7-8.8 |         |

**850 MHz band.****Intermodulation**

| Test signal(s)                           | Frequency [MHz] | RBW [kHz] | Measured peak level (dBm)  | Limit (dBm) | Plots          | Comment |
|------------------------------------------|-----------------|-----------|----------------------------|-------------|----------------|---------|
| 2 CDMA carriers at 871.00 and 873.00 MHz | 869 – 882       | 30        | No peaks above noise level | -13         | Plot 8.9-8.10  |         |
| 2 CDMA carriers at 892.00 and 894.00 MHz | 884 – 894       | 30        | No peaks above noise level | -13         | Plot 8.11-8.12 |         |
| CW at 871.00 MHz and CW at 873.00 MHz    | 869 – 882       | 30        | -22.4                      | -13         | Plot 8.13-8.14 |         |
| CW at 892.00 MHz and CW at 894.00 MHz    | 884 – 894       | 30        | -20.6                      | -13         | Plot 8.15-8.16 |         |

**1900 MHz band.****Intermodulation**

| Test signal(s)                             | Frequency [MHz] | RBW [kHz] | Measured peak level (dBm) | Limit (dBm) | Plots          | Comment |
|--------------------------------------------|-----------------|-----------|---------------------------|-------------|----------------|---------|
| 2 CDMA carriers at 1932.00 and 1934.00 MHz | 1930 – 1935     | 30        | -24.4                     | -13         | Plot 8.17-8.19 |         |
| 2 CDMA carriers at 1988.00 and 1990.00 MHz | 1975 – 1990     | 30        | -24.5                     | -13         | Plot 8.20-8.22 |         |
| CW at 1932.00 MHz and CW at 1934.00 MHz    | 1930 – 1935     | 30        | -19.0                     | -13         | Plot 8.23-8.25 |         |
| CW at 1988.00 MHz and CW at 1934.00 MHz    | 1975 – 1990     | 30        | -17.4                     | -13         | Plot 8.26-8.28 |         |

**AWS band.****Intermodulation**

| Test signal(s)                               | Frequency [MHz] | RBW [kHz] | Measured peak level (dBm) | Limit (dBm) | Plots          | Comment |
|----------------------------------------------|-----------------|-----------|---------------------------|-------------|----------------|---------|
| LTE carrier at 2114.00 and CW at 2110.00 MHz | 2110 – 2132     | 30        | -18.2                     | -13         | Plot 8.29-8.31 |         |
| LTE carrier at 2115.00 and CW at 2155.00 MHz | 2134 – 2155     | 30        | -14.9                     | -13         | Plot 8.32-8.34 | Note 1  |
| CW at 2110.00 MHz and CW at 2112.00 MHz      | 2110 – 2132     | 30        | -15.2                     | -13         | Plot 8.35-8.37 | Note 1  |
| CW at 2153.00 MHz and CW at 2155.00 MHz      | 2134 – 2155     | 30        | -15.4                     | -13         | Plot 8.38-8.40 | Note 1  |

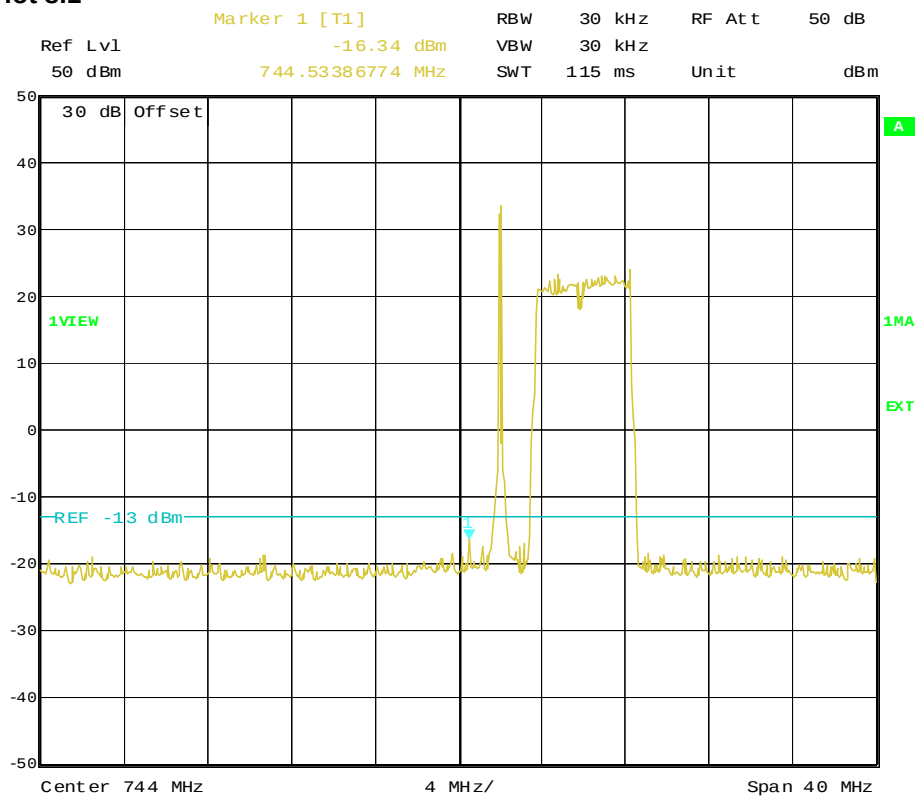
Note 1: The measured result is below the upper limit, but by a margin less than half of the uncertainty interval; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance is more probable than noncompliance.

Measurement results are corrected for attenuation in the set-up configuration.

Example calculation:

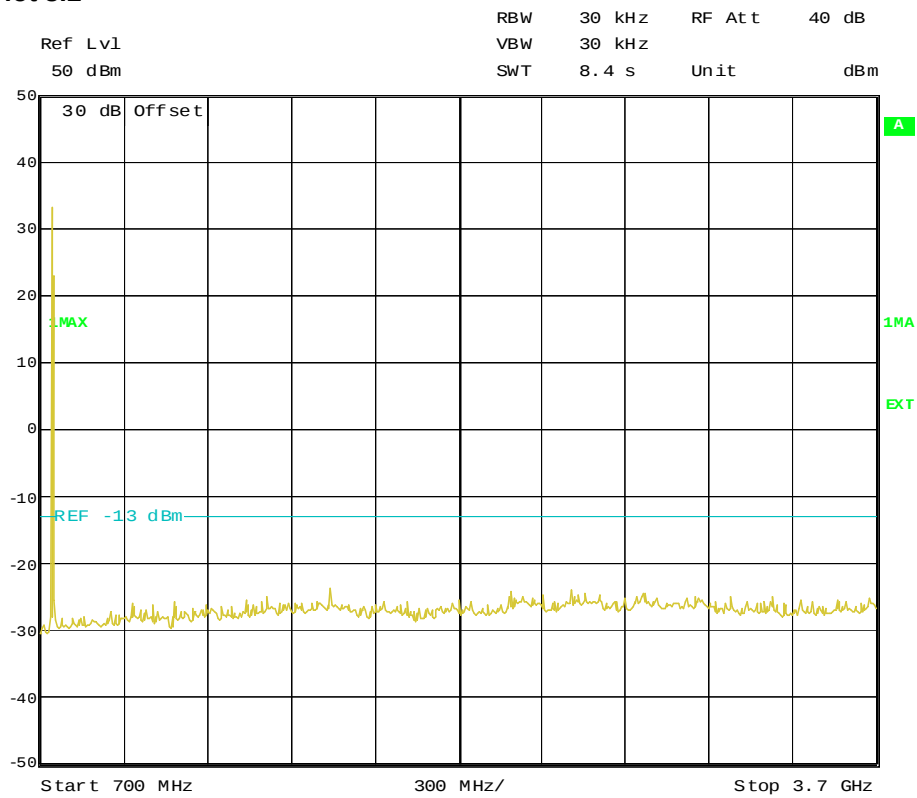
Measured level [dBm] = Analyser reading [dBm] + cable loss [dB] + attenuator loss [dB]

Plot 8.1



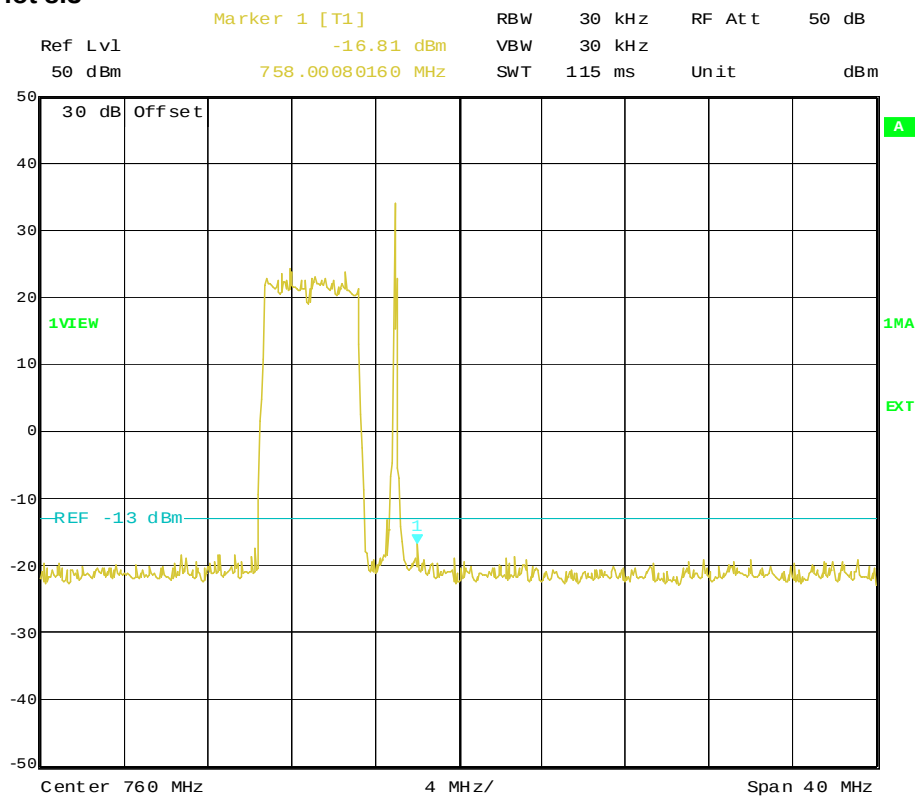
Date: 4.MAY.2012 10:45:26

Plot 8.2



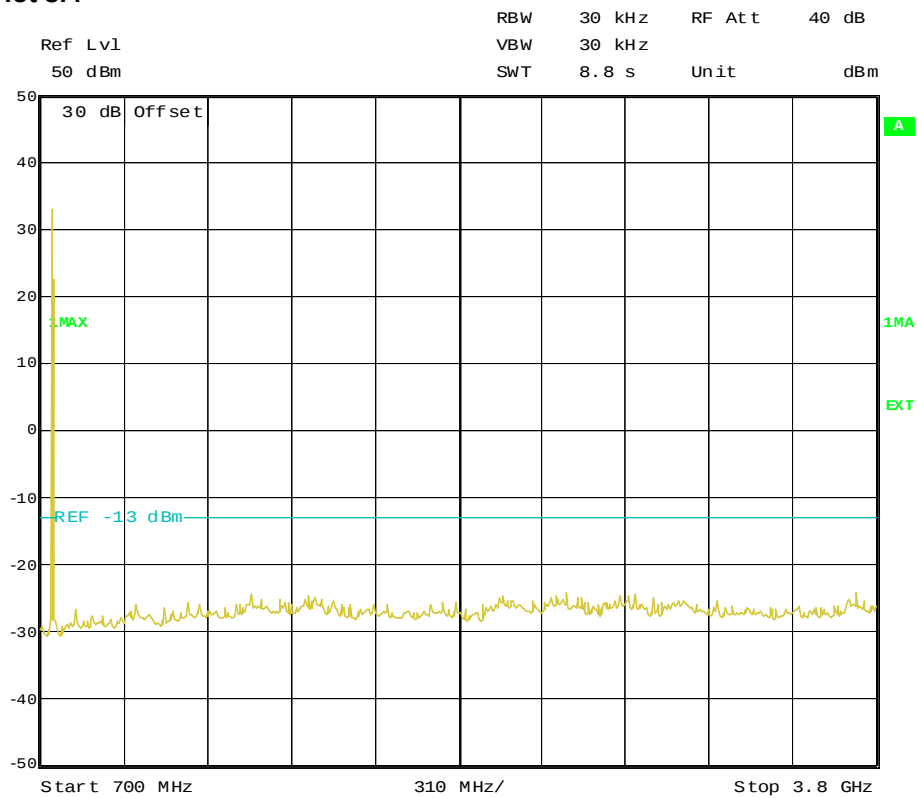
Date: 4.MAY.2012 12:31:31

Plot 8.3



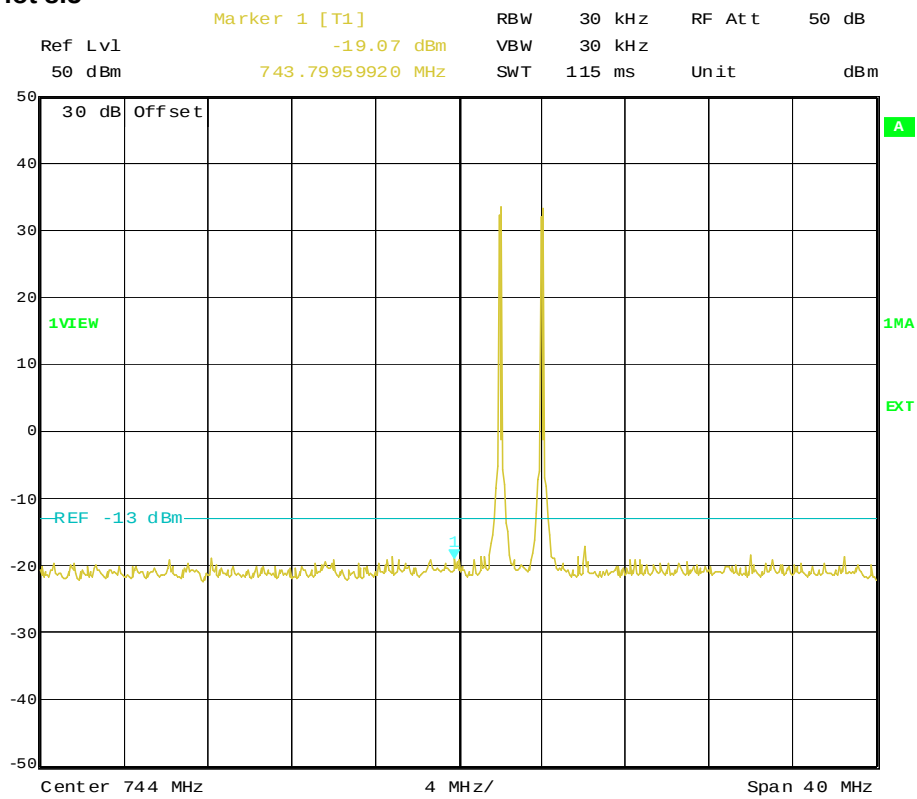
Date : 4.MAY.2012 10:43:50

Plot 8.4



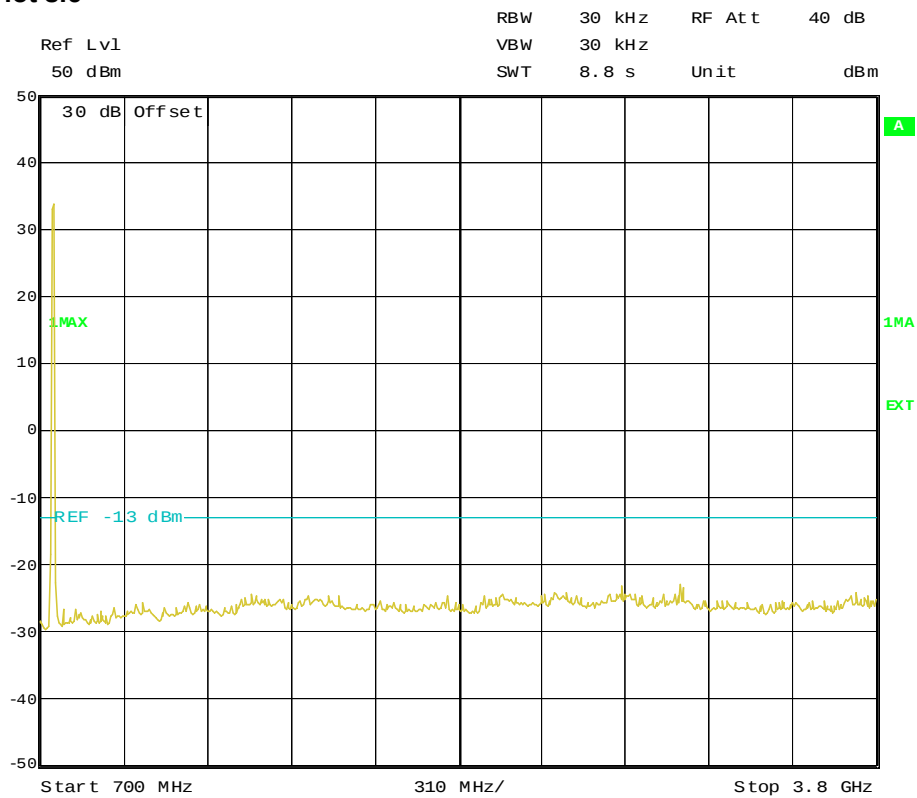
Date : 4.MAY.2012 12:33:55

## Plot 8.5



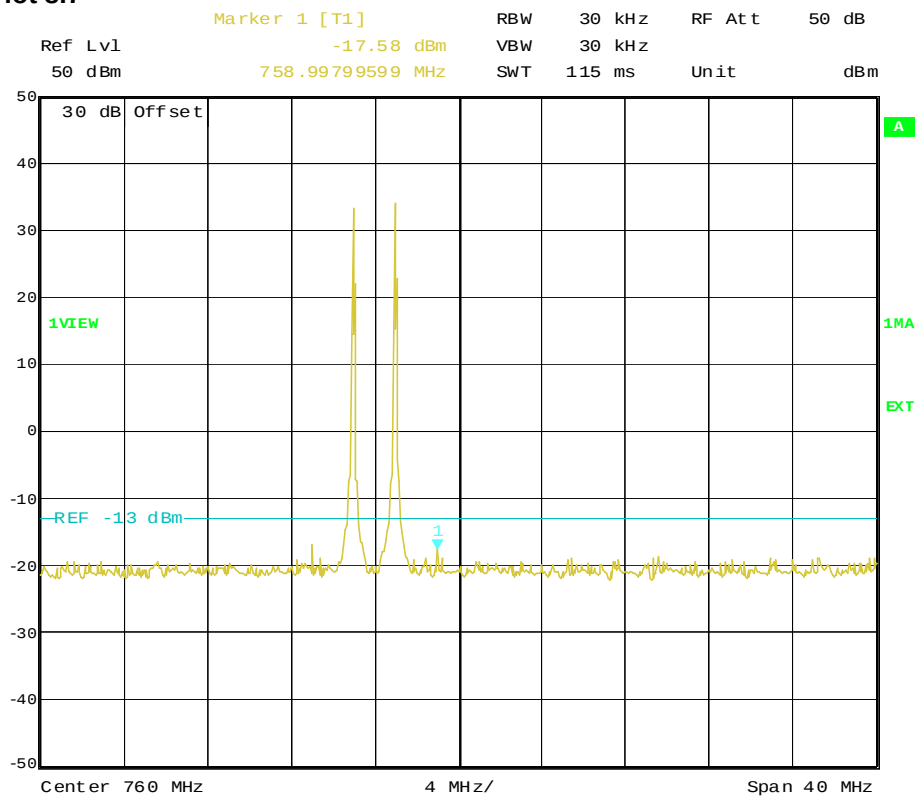
Date : 4.MAY.2012 10:47:52

## Plot 8.6



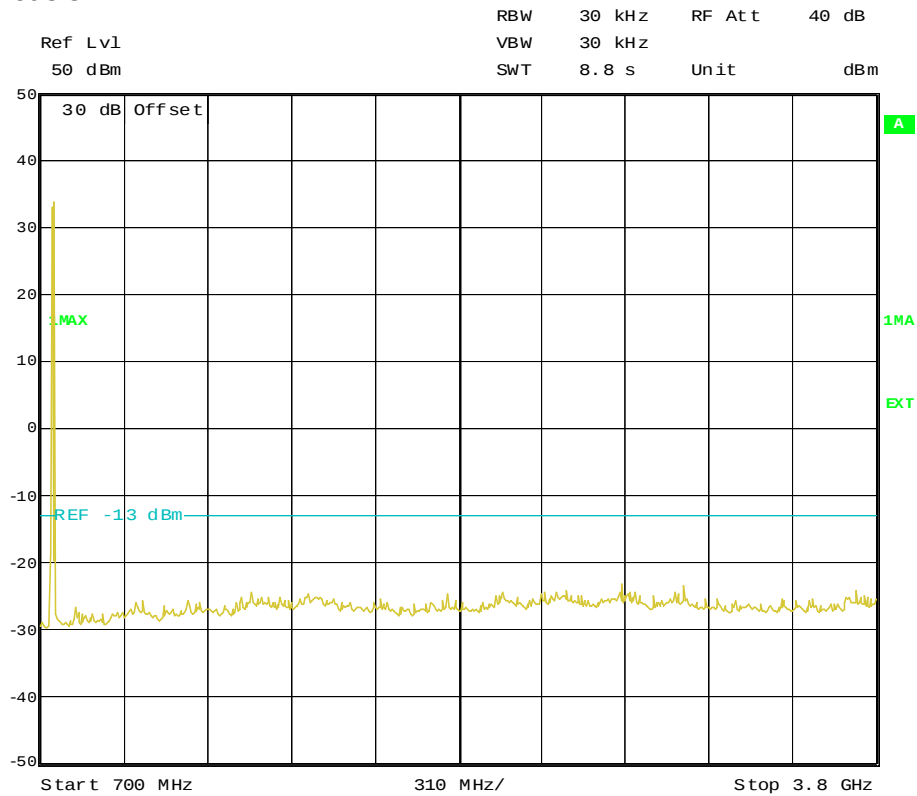
Date : 4.MAY.2012 12:35:39

Plot 8.7



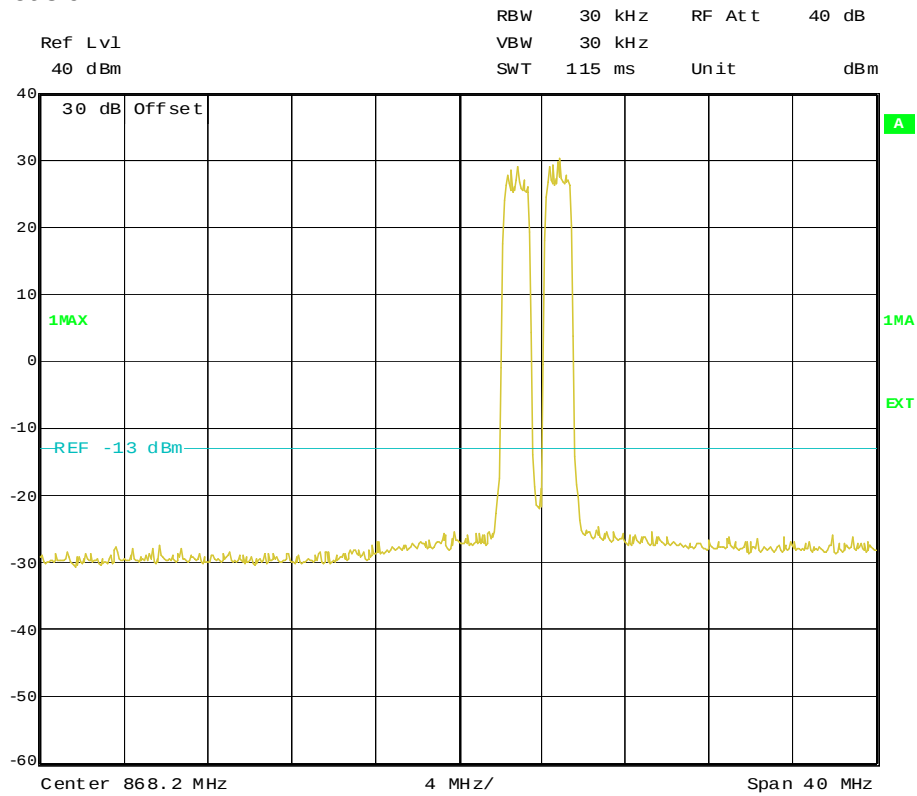
Date : 4.MAY.2012 10:49:39

Plot 8.8



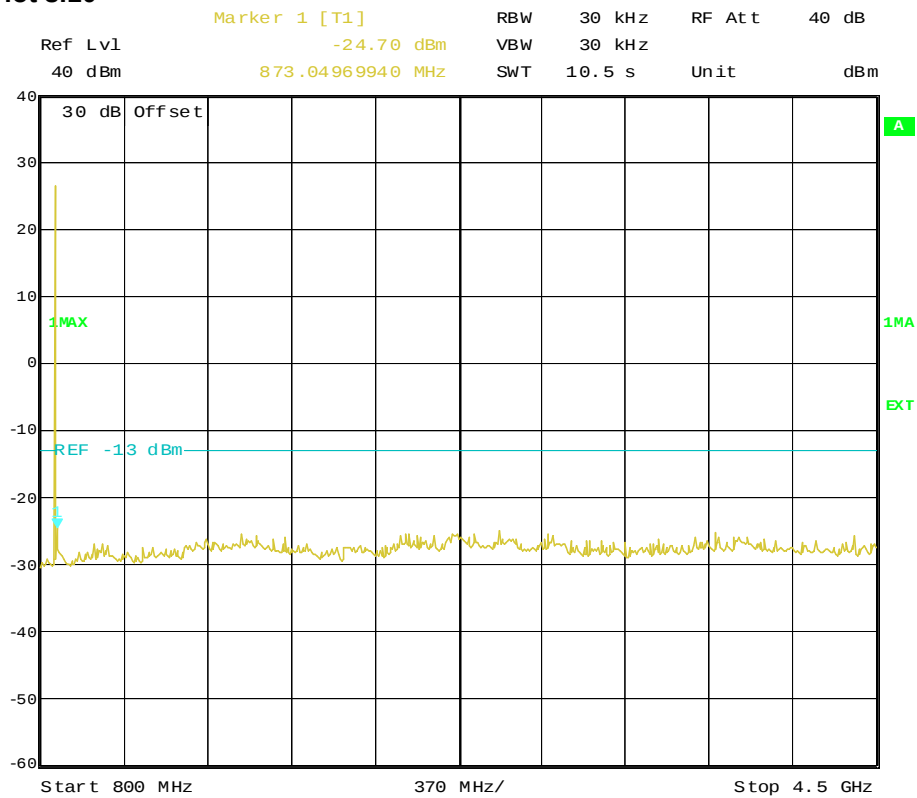
Date : 4.MAY.2012 12:34:40

Plot 8.9



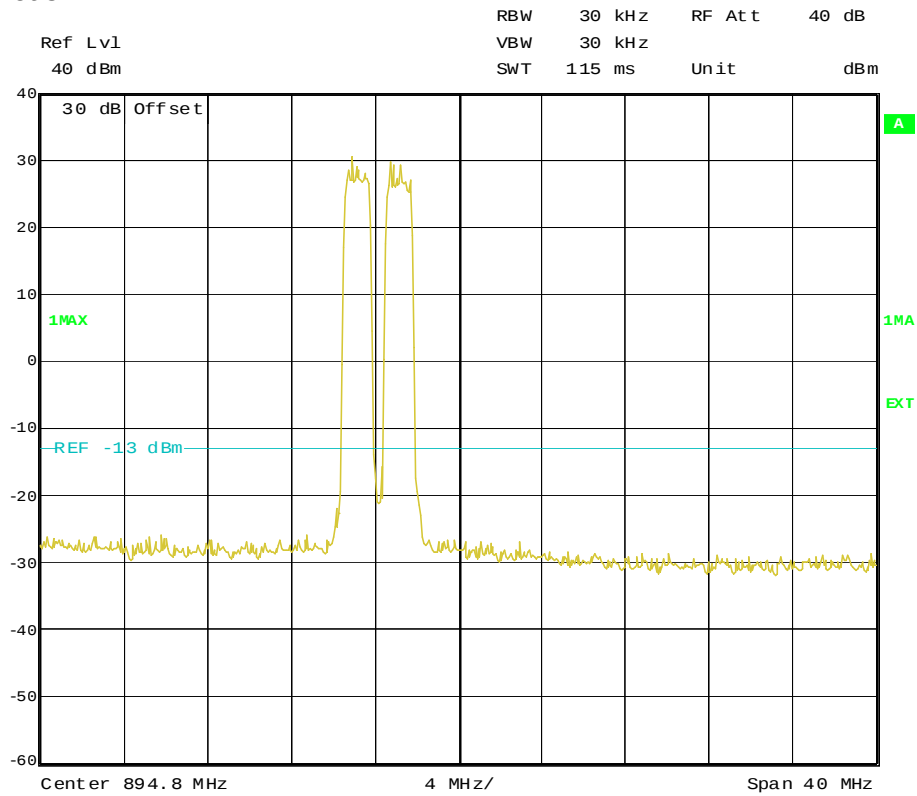
Date: 4.MAY.2012 14:15:07

Plot 8.10



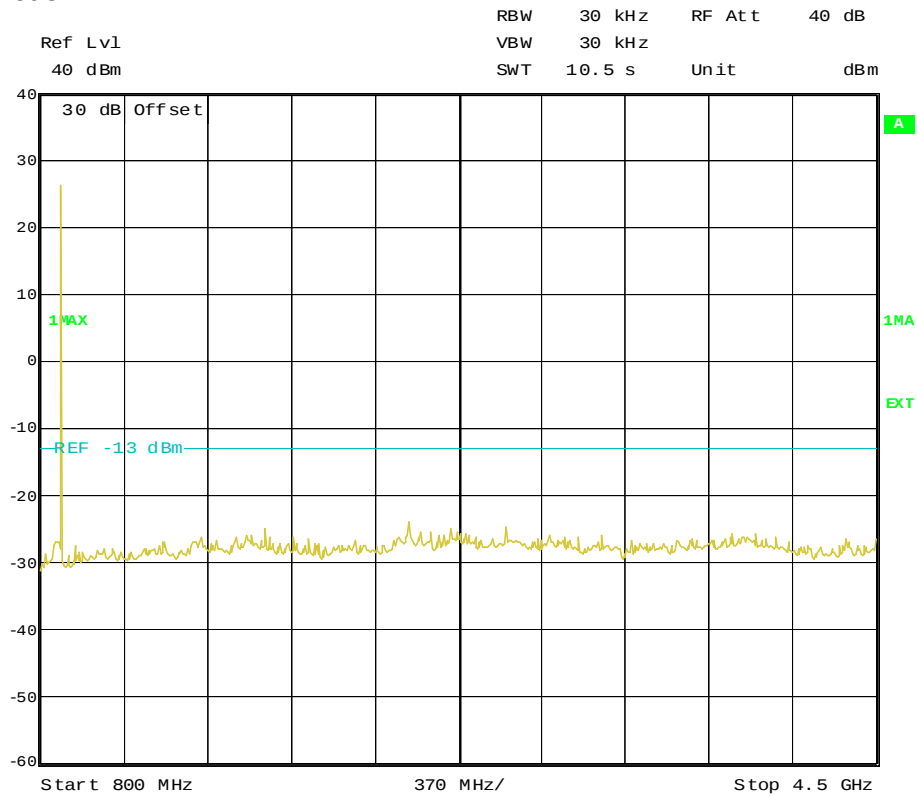
Date: 4.MAY.2012 14:17:23

Plot 8.11



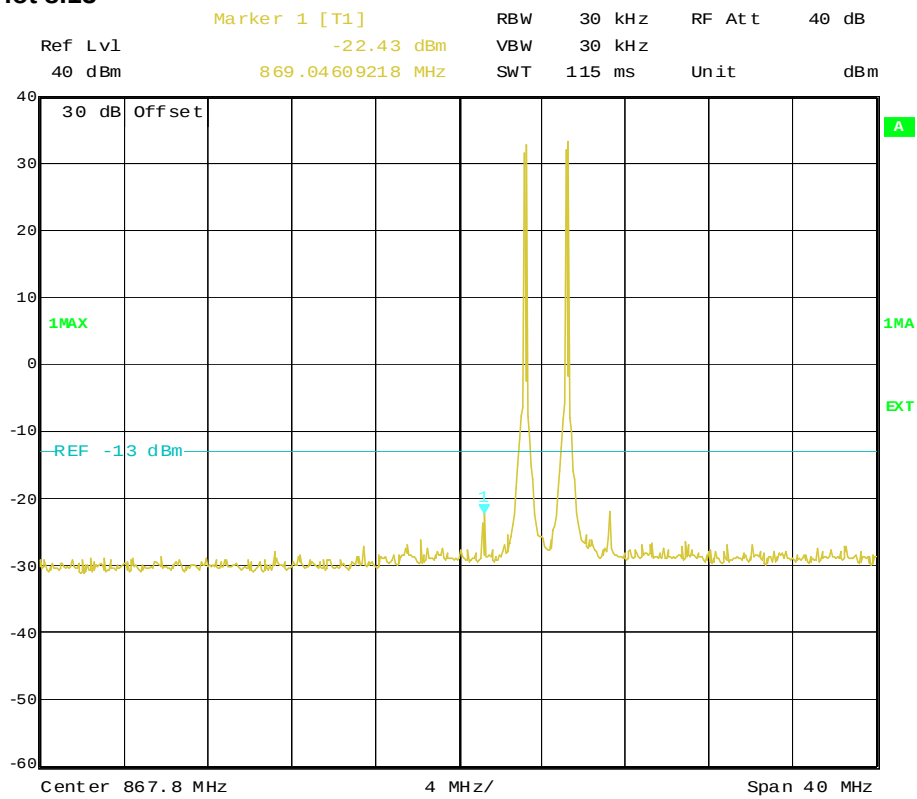
Date : 4.MAY.2012 14:26:53

Plot 8.12



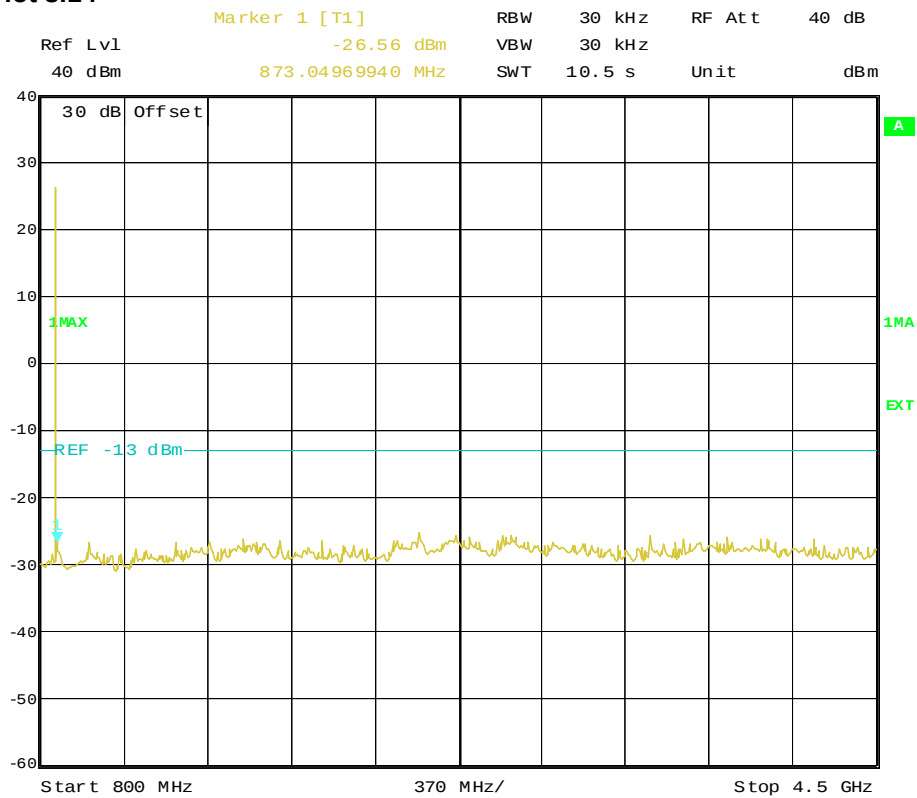
Date : 4.MAY.2012 14:25:09

Plot 8.13



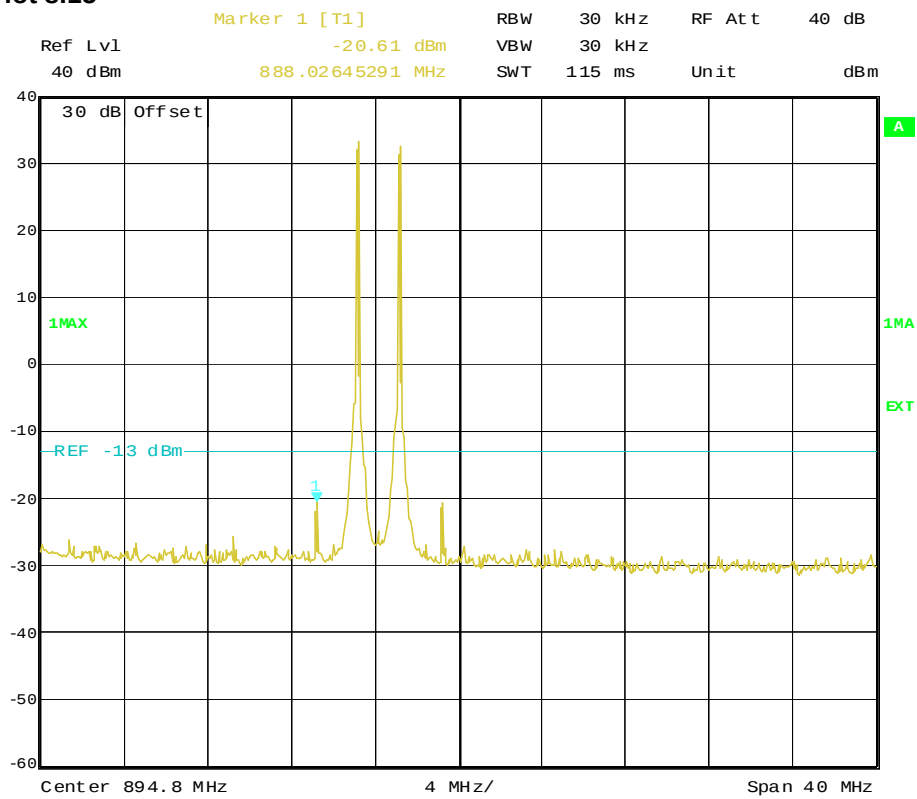
Date: 4.MAY.2012 14:20:05

Plot 8.14



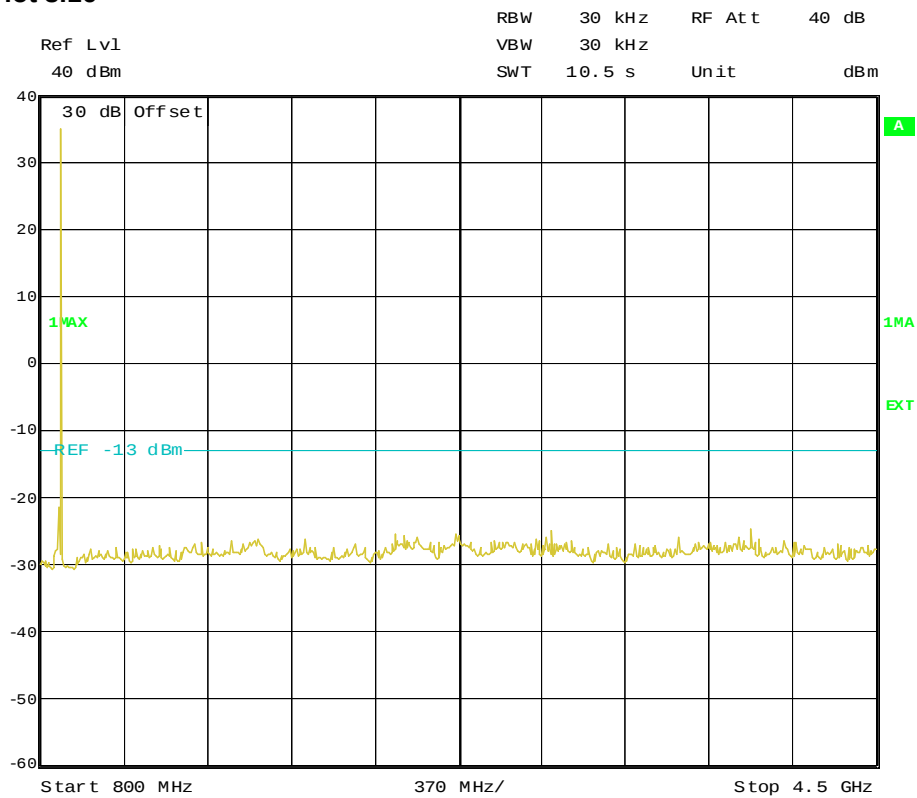
Date: 4.MAY.2012 14:18:26

Plot 8.15



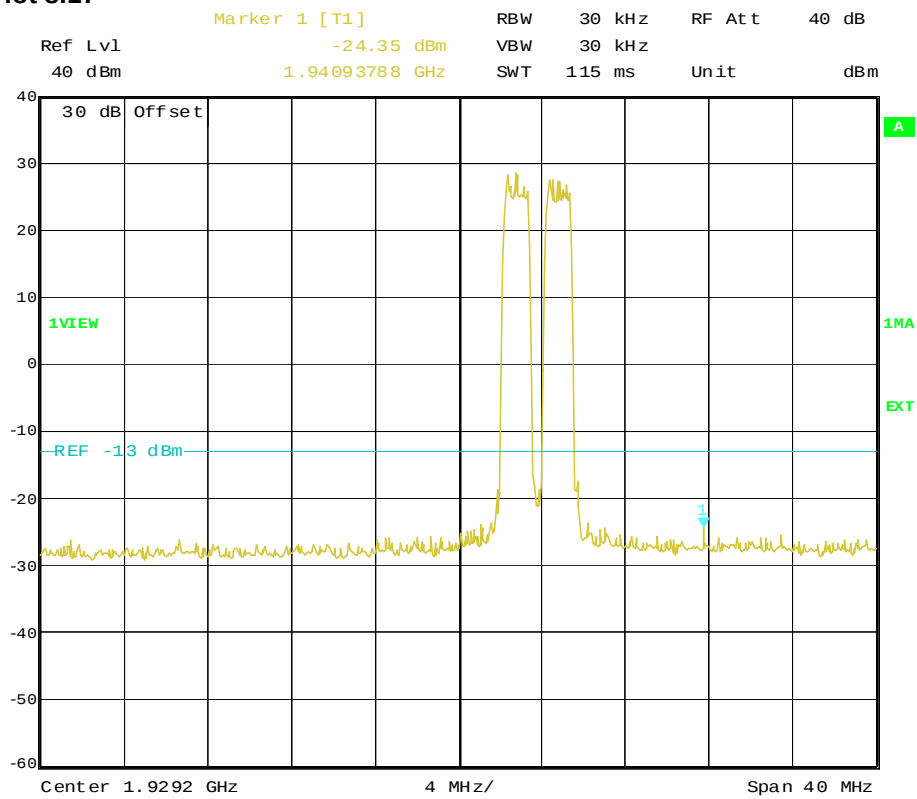
Date : 4.MAY.2012 14:23:39

Plot 8.16



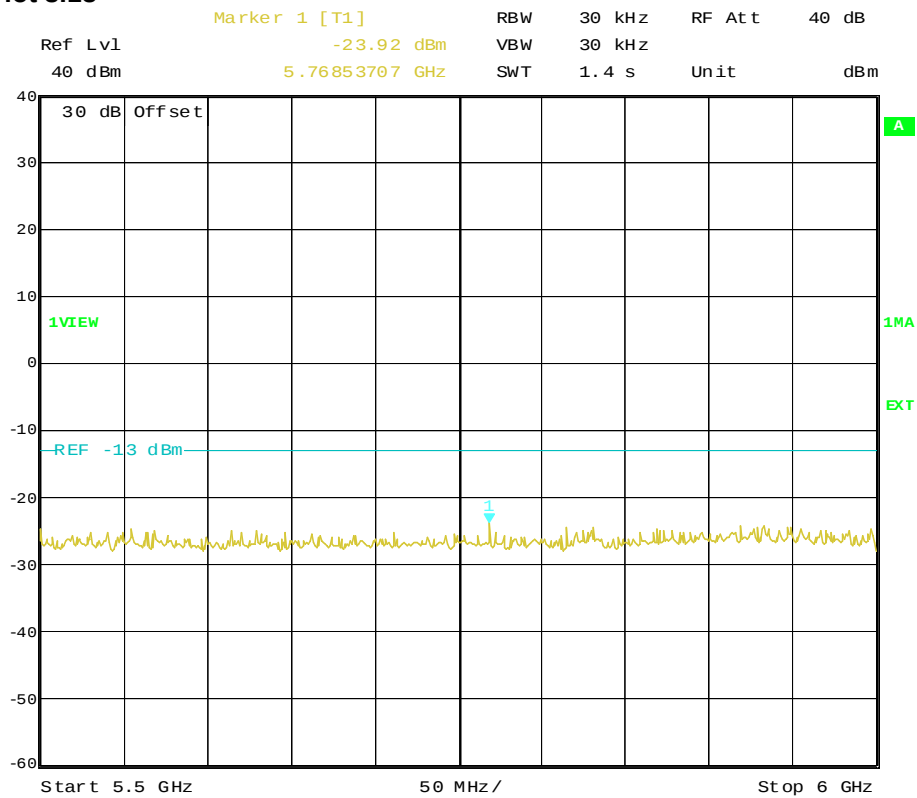
Date : 4.MAY.2012 14:24:20

Plot 8.17



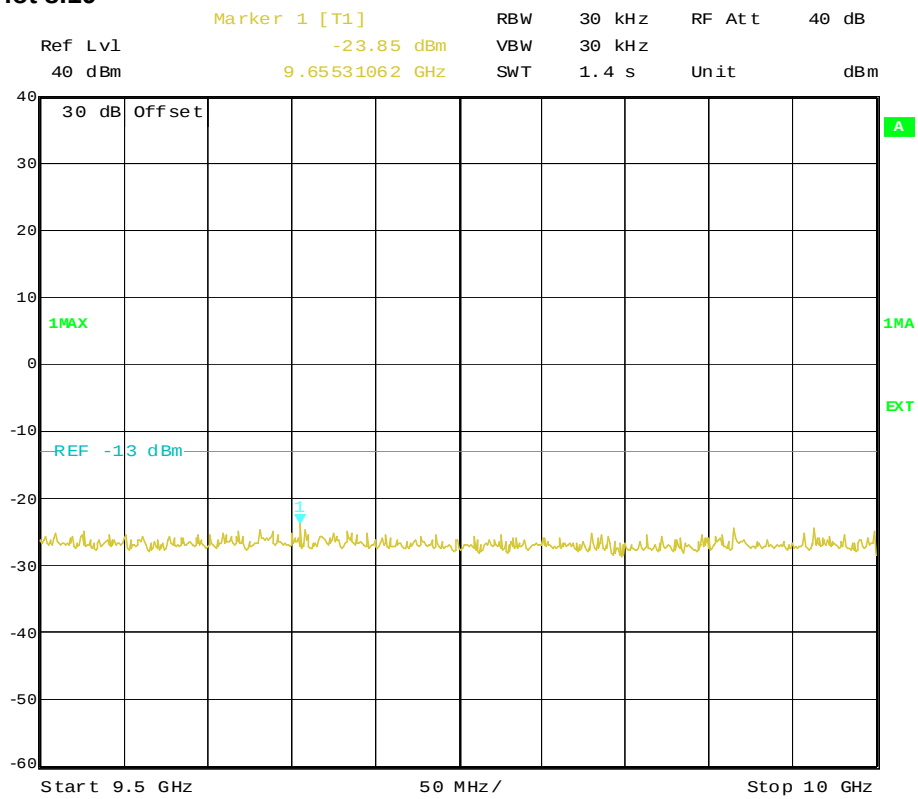
Date: 4.MAY.2012 13:47:31

Plot 8.18



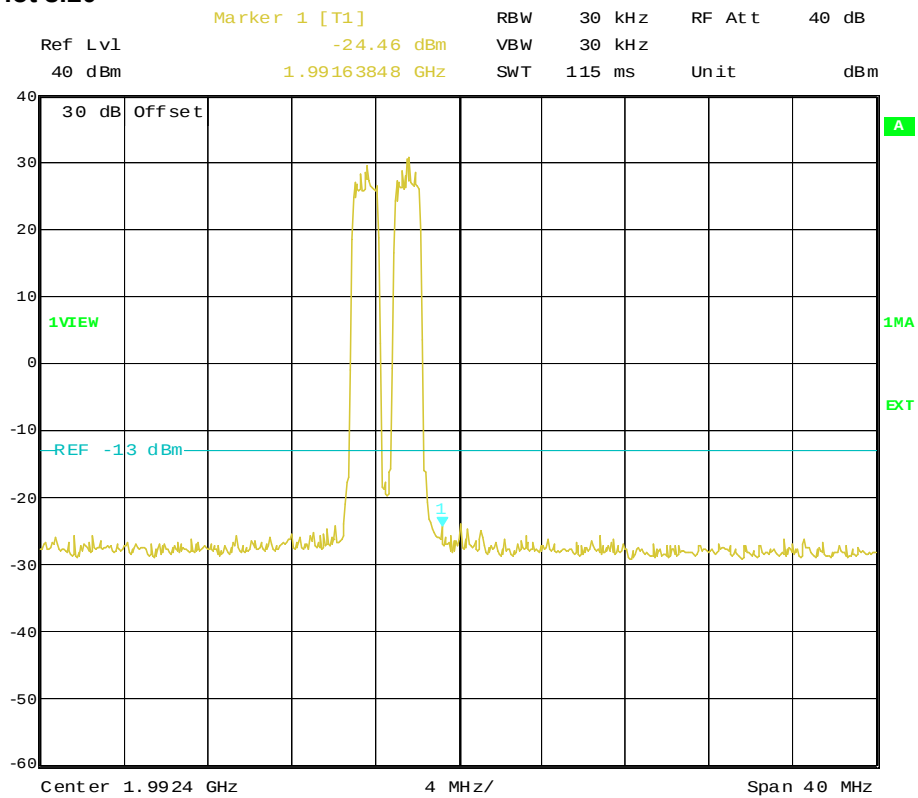
Date: 4.MAY.2012 13:48:36

Plot 8.19



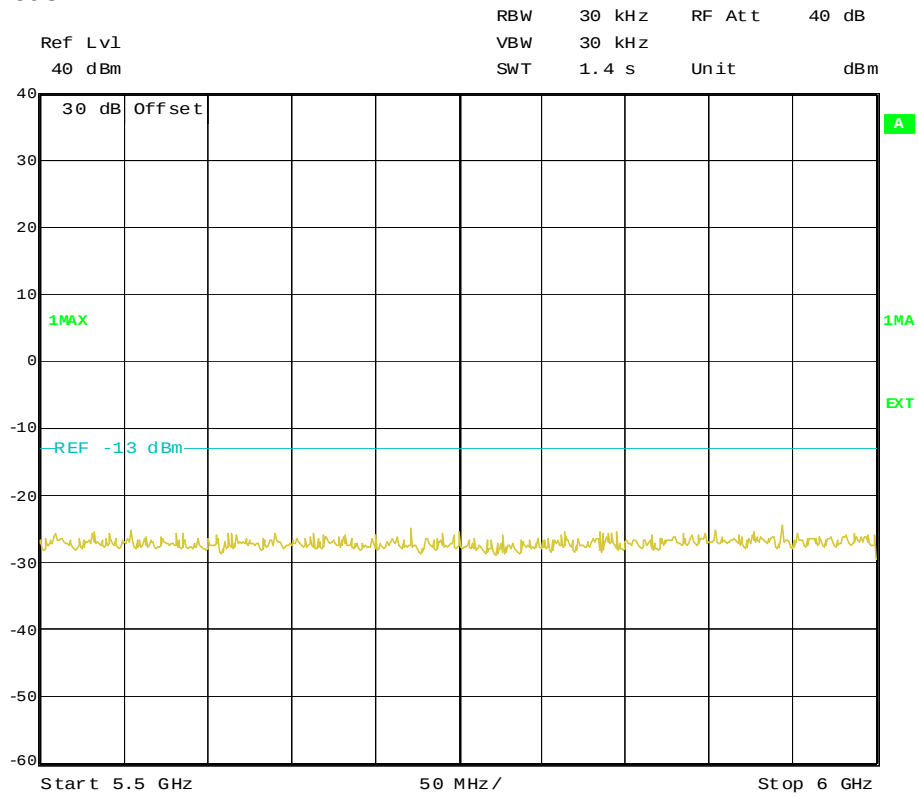
Date : 4.MAY.2012 13:49:17

Plot 8.20



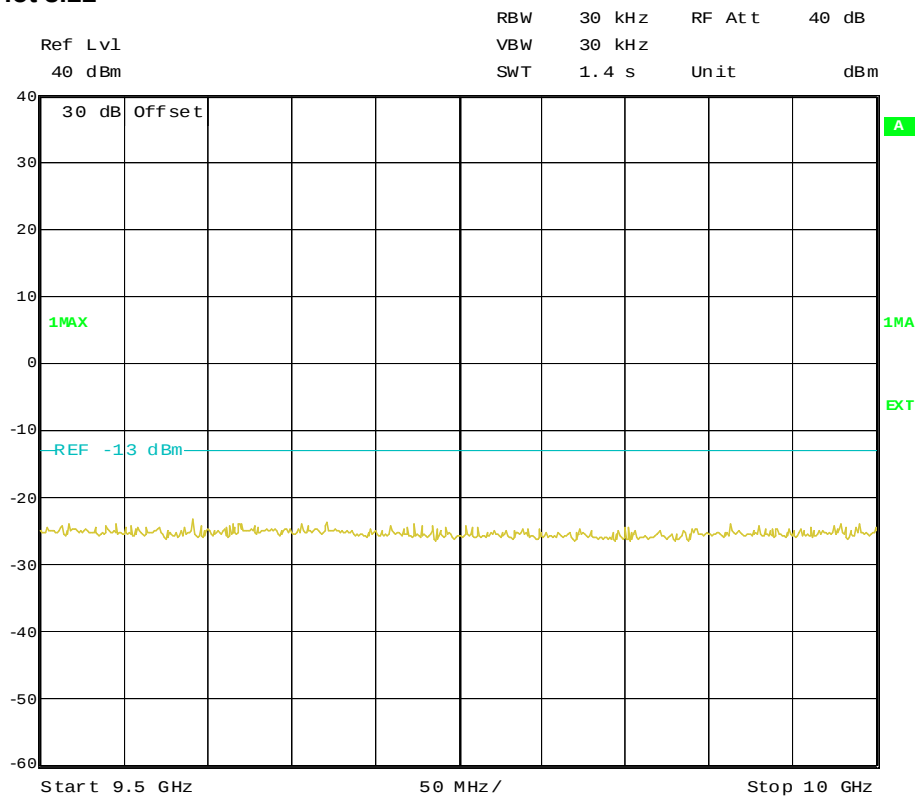
Date : 4.MAY.2012 14:01:59

Plot 8.21



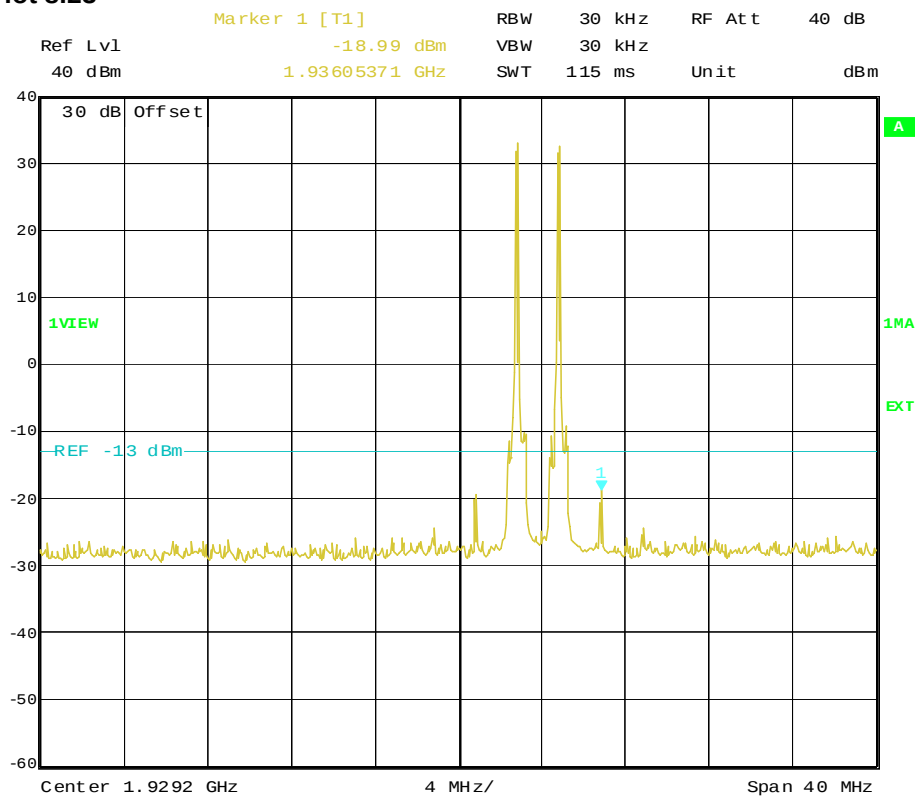
Date : 4.MAY.2012 14:02:45

Plot 8.22



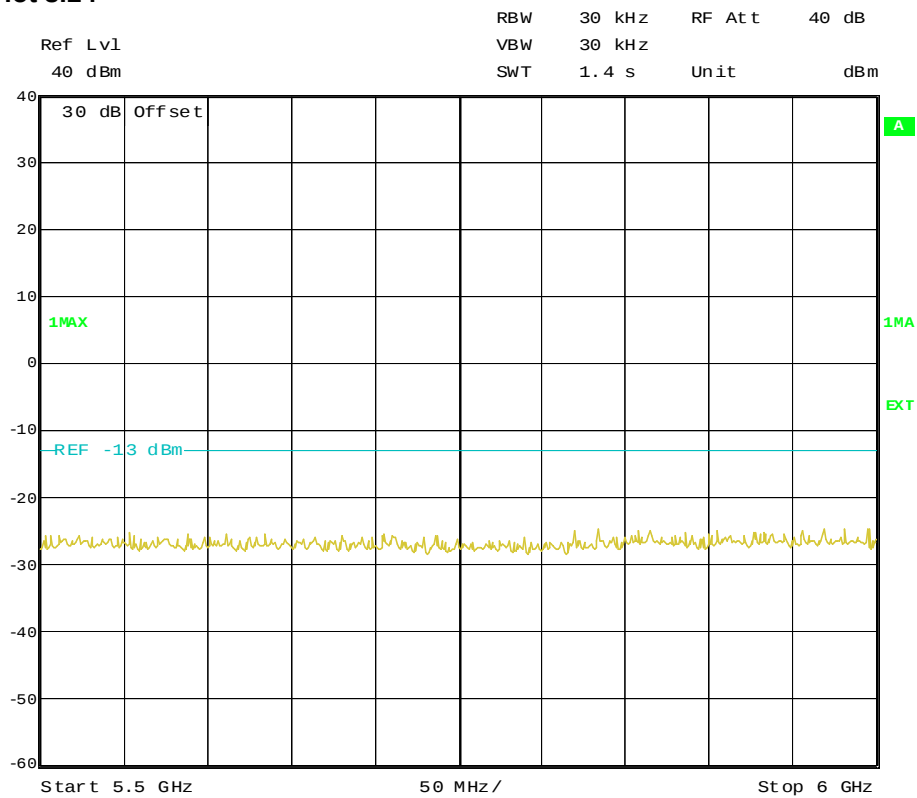
Date : 4.MAY.2012 14:09:29

Plot 8.23



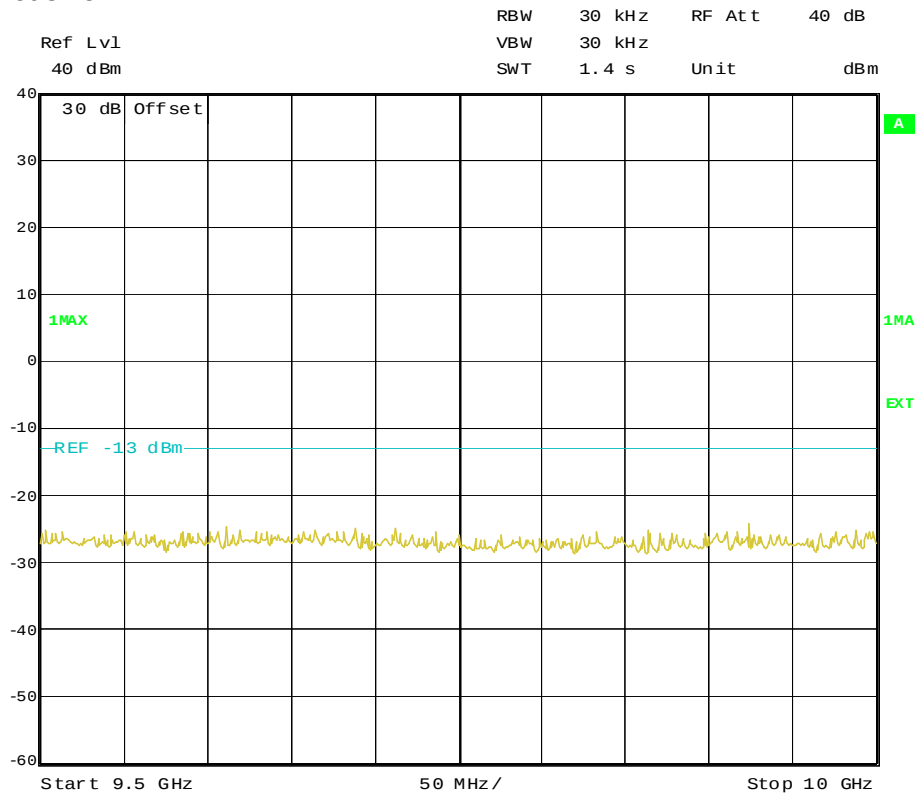
Date : 4.MAY.2012 13:52:11

Plot 8.24



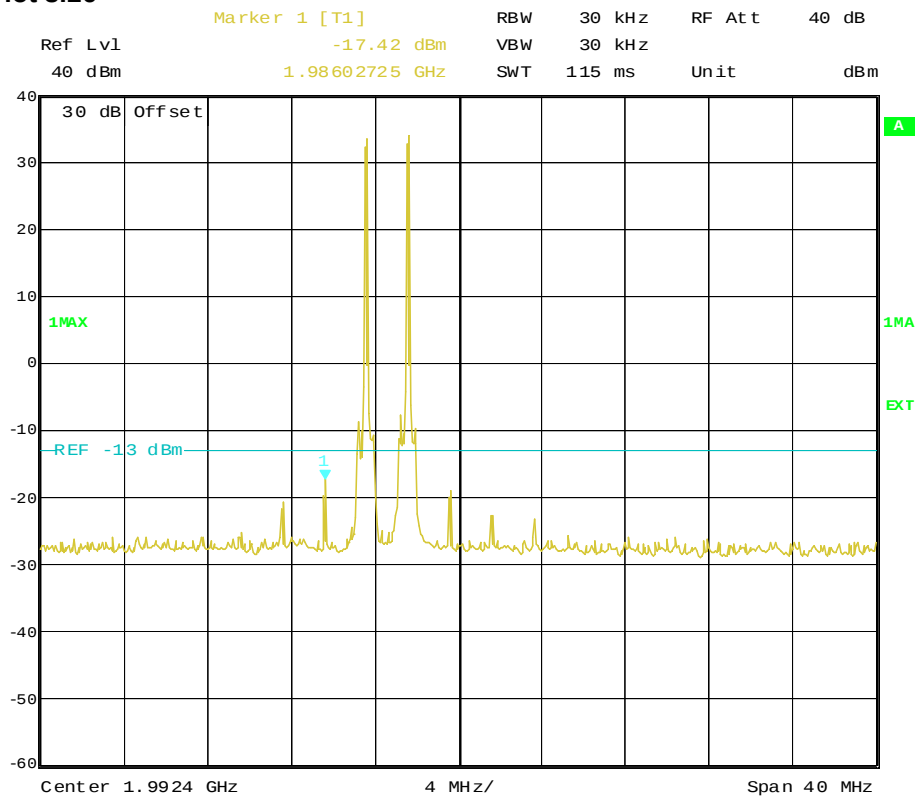
Date : 4.MAY.2012 13:50:43

Plot 8.25



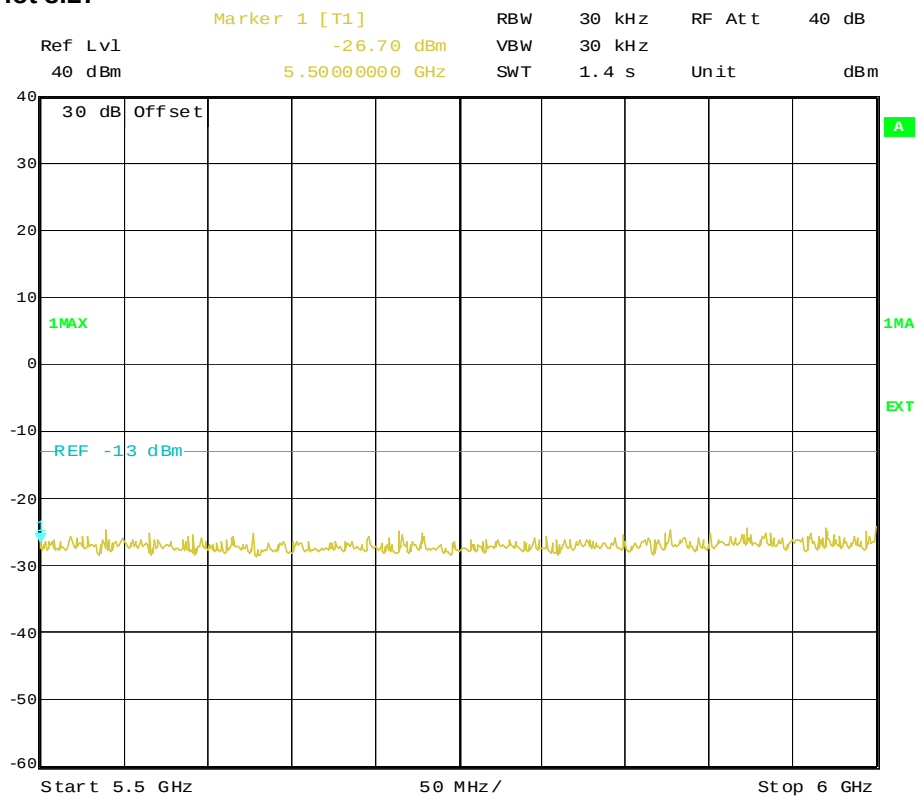
Date: 4.MAY.2012 13:50:05

Plot 8.26



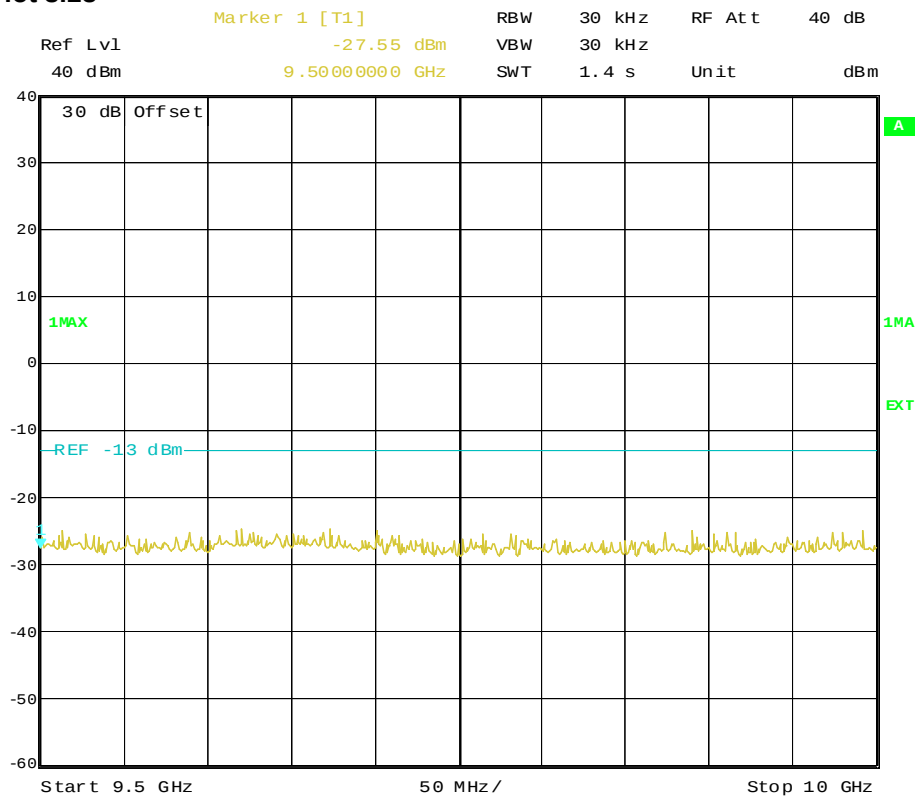
Date: 4.MAY.2012 13:58:34

Plot 8.27



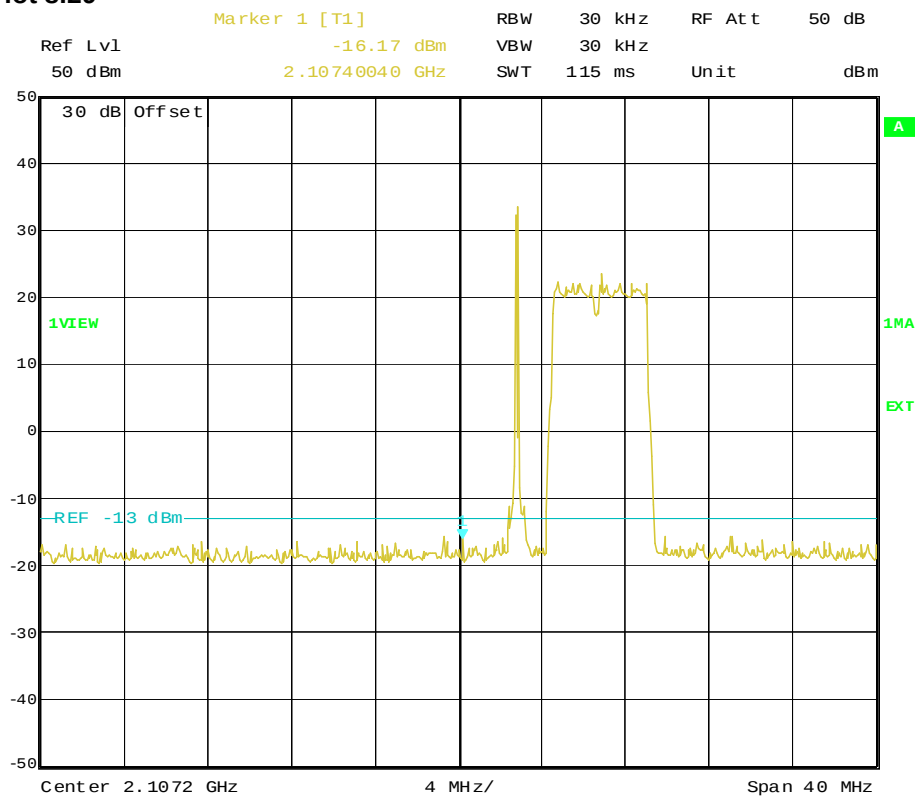
Date: 4.MAY.2012 13:56:13

Plot 8.28



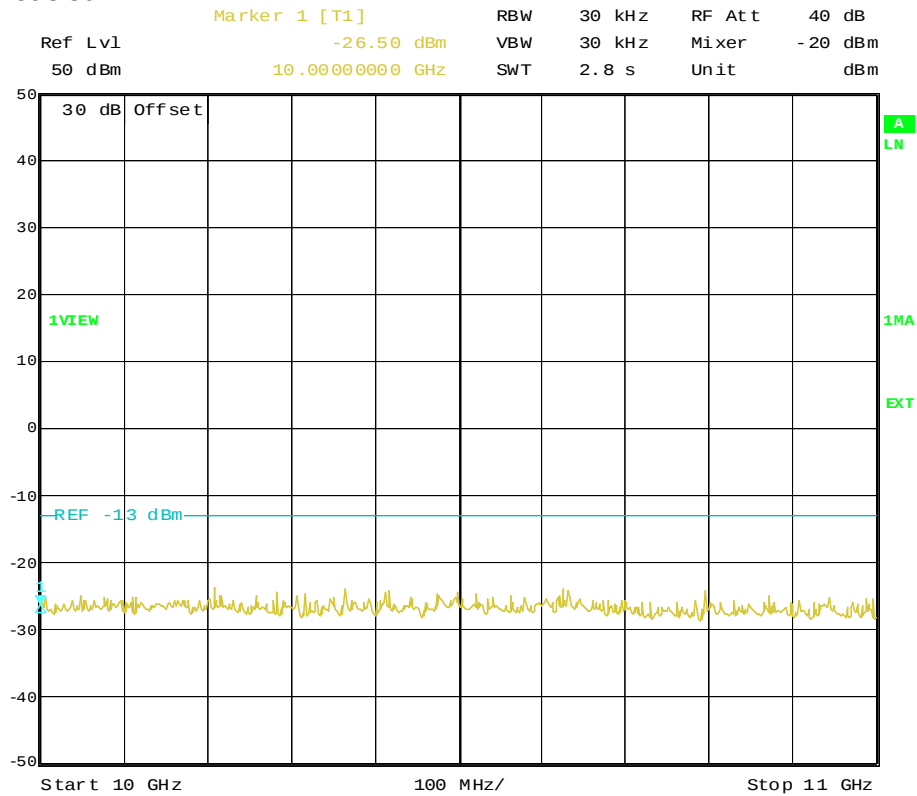
Date: 4.MAY.2012 13:57:08

Plot 8.29



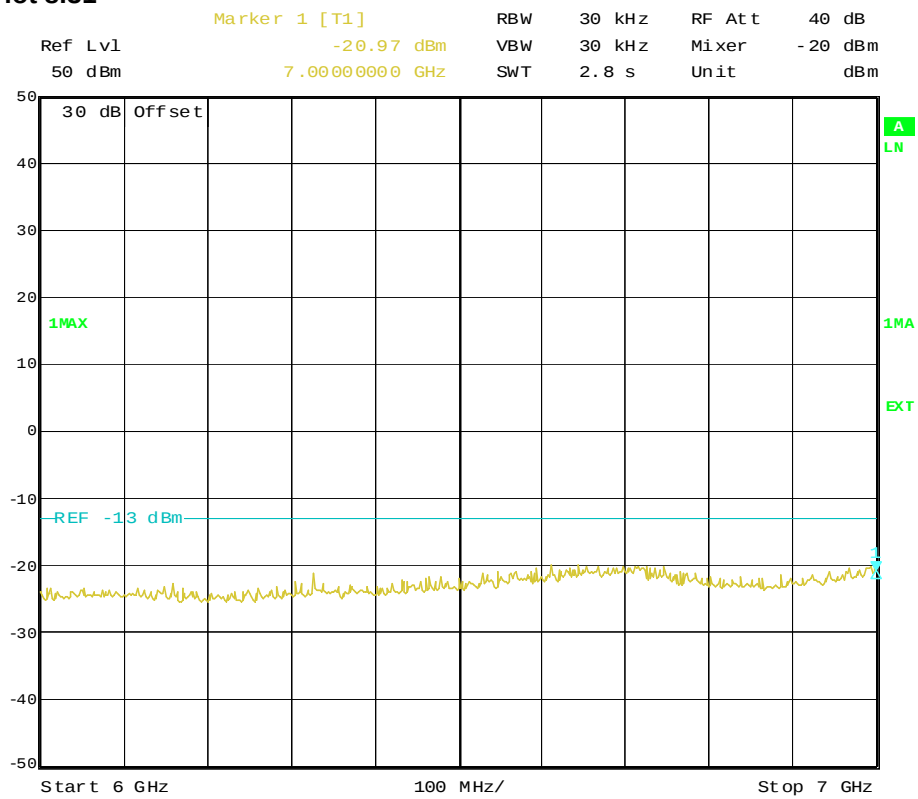
Date: 4.MAY.2012 10:54:26

Plot 8.30



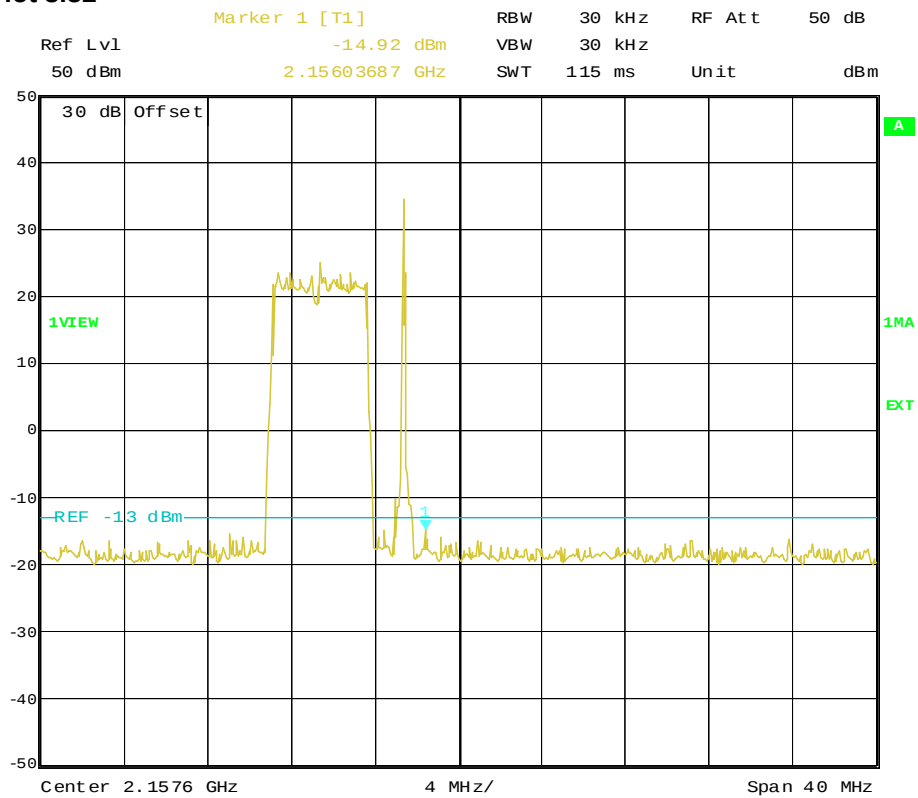
Date: 4.MAY.2012 12:15:05

Plot 8.31



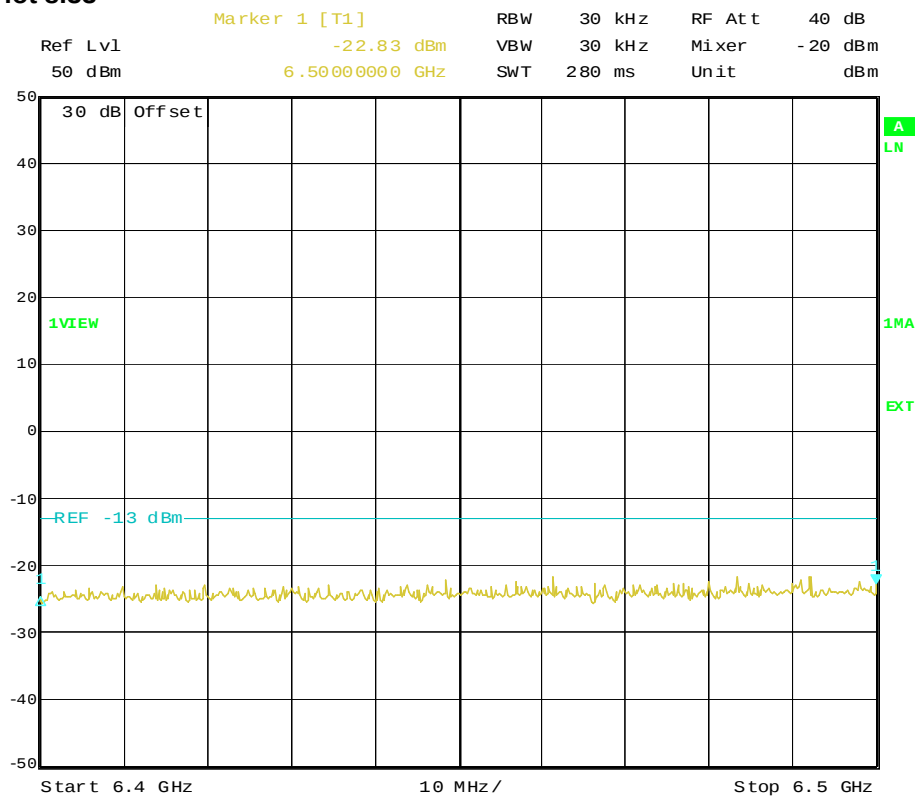
Date: 4.MAY.2012 12:17:04

Plot 8.32



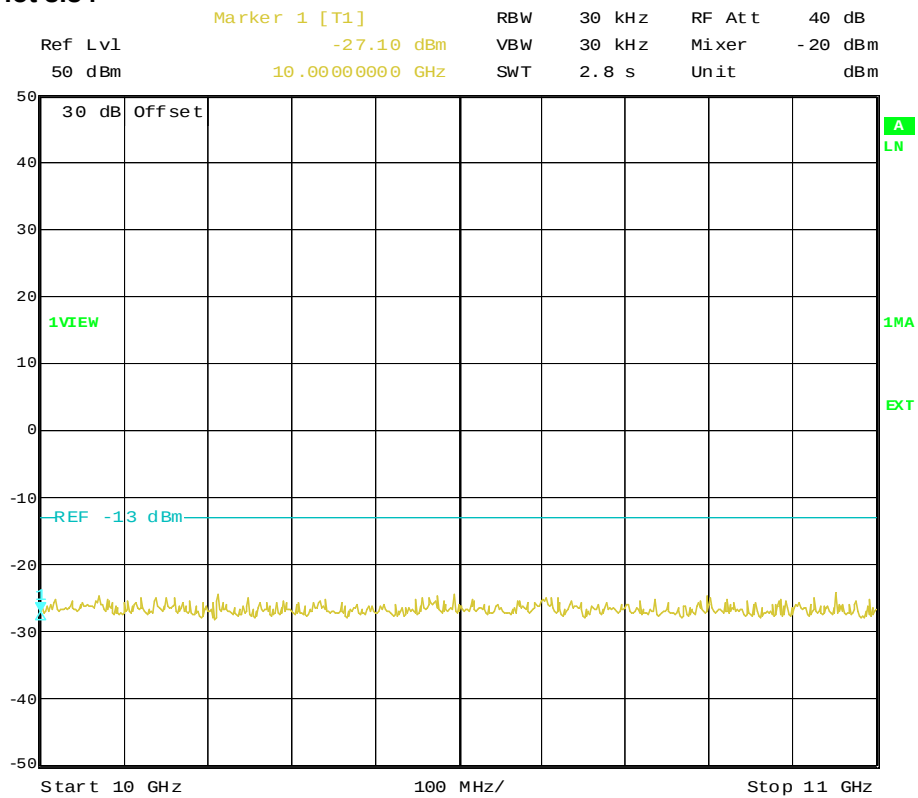
Date: 4.MAY.2012 11:08:38

Plot 8.33



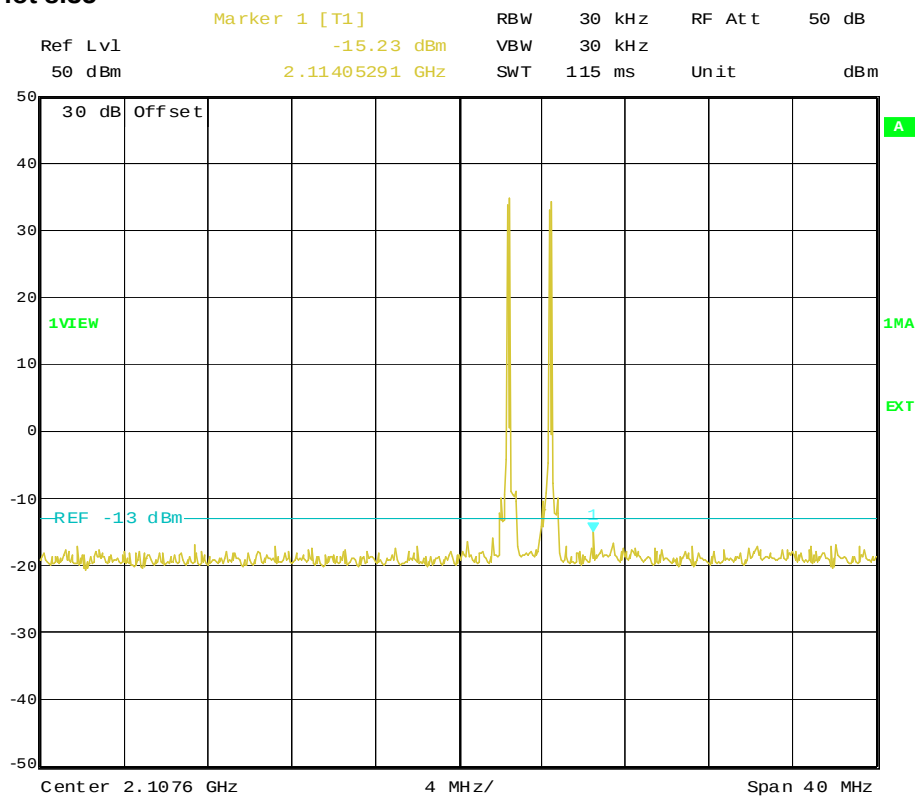
Date : 4.MAY.2012 12:13:07

Plot 8.34



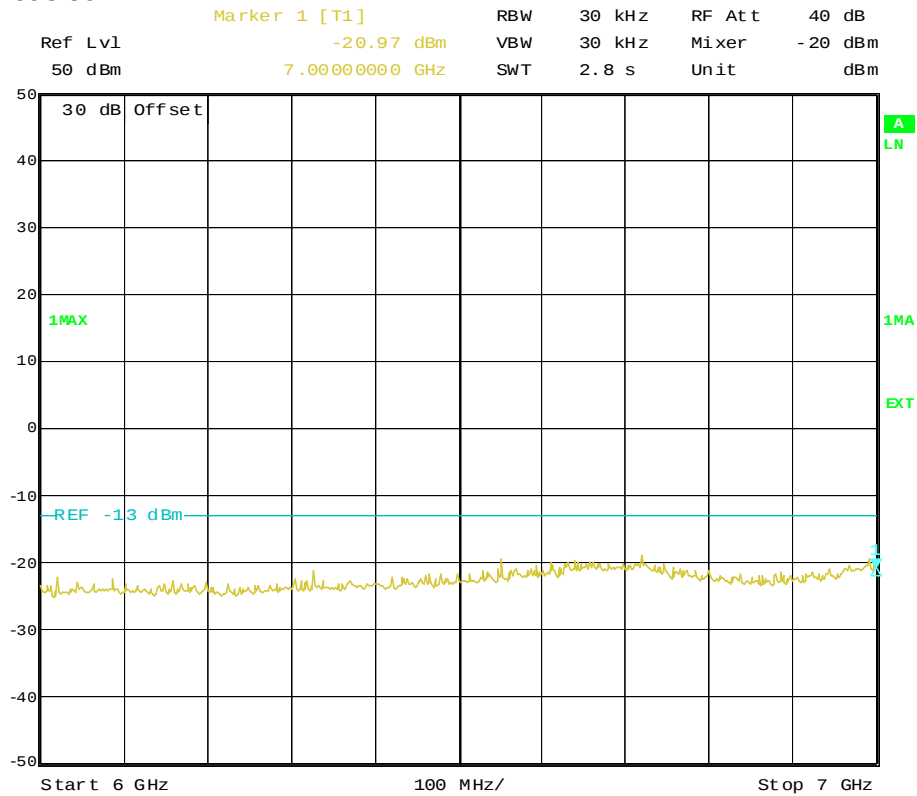
Date : 4.MAY.2012 12:14:03

Plot 8.35



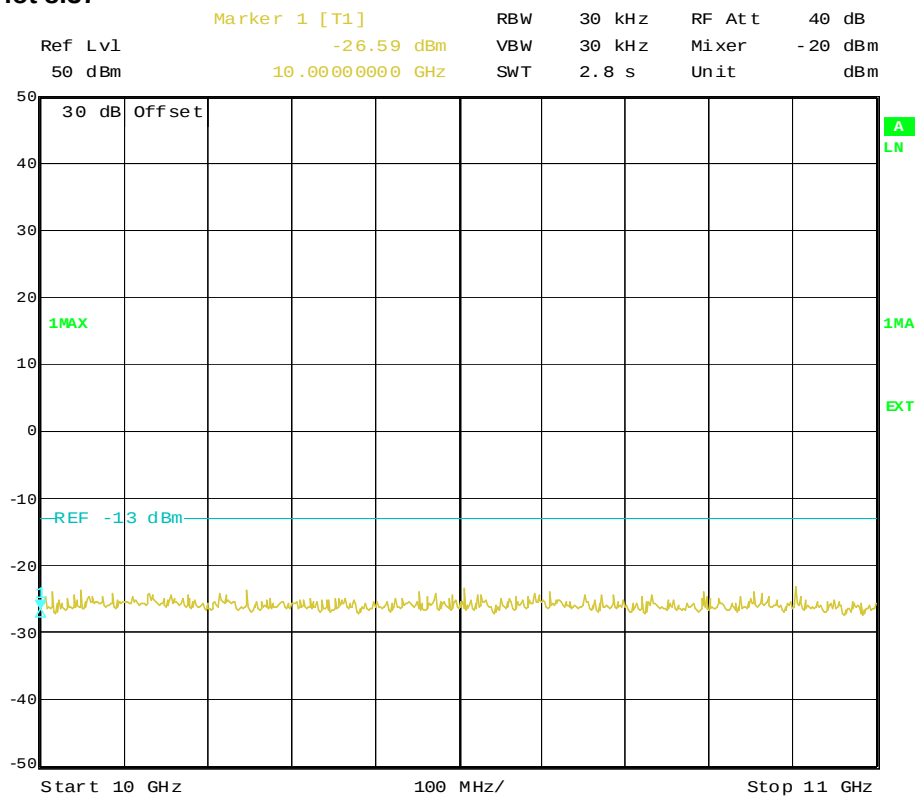
Date : 4.MAY.2012 12:23:24

Plot 8.36



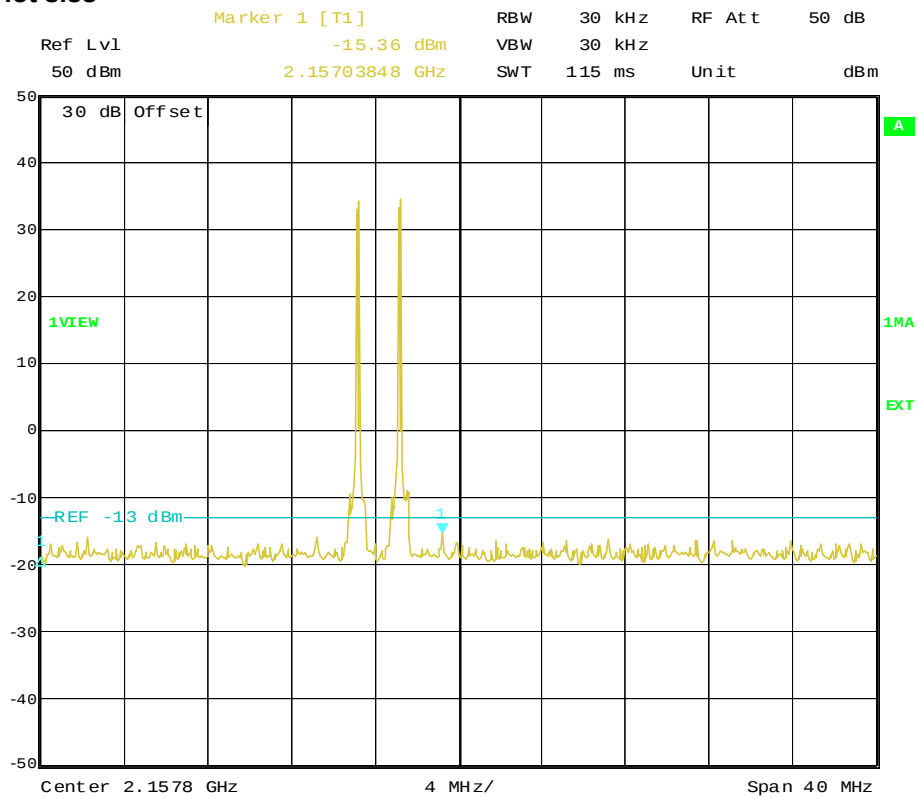
Date : 4.MAY.2012 12:18:24

Plot 8.37



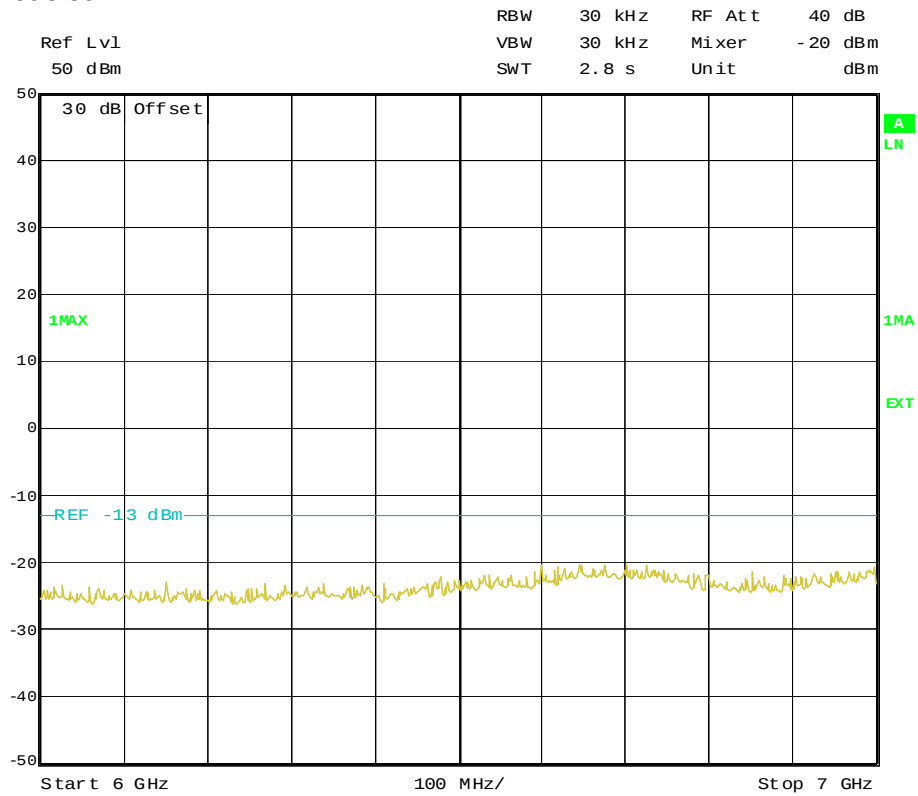
Date : 4.MAY.2012 12:19:15

Plot 8.38



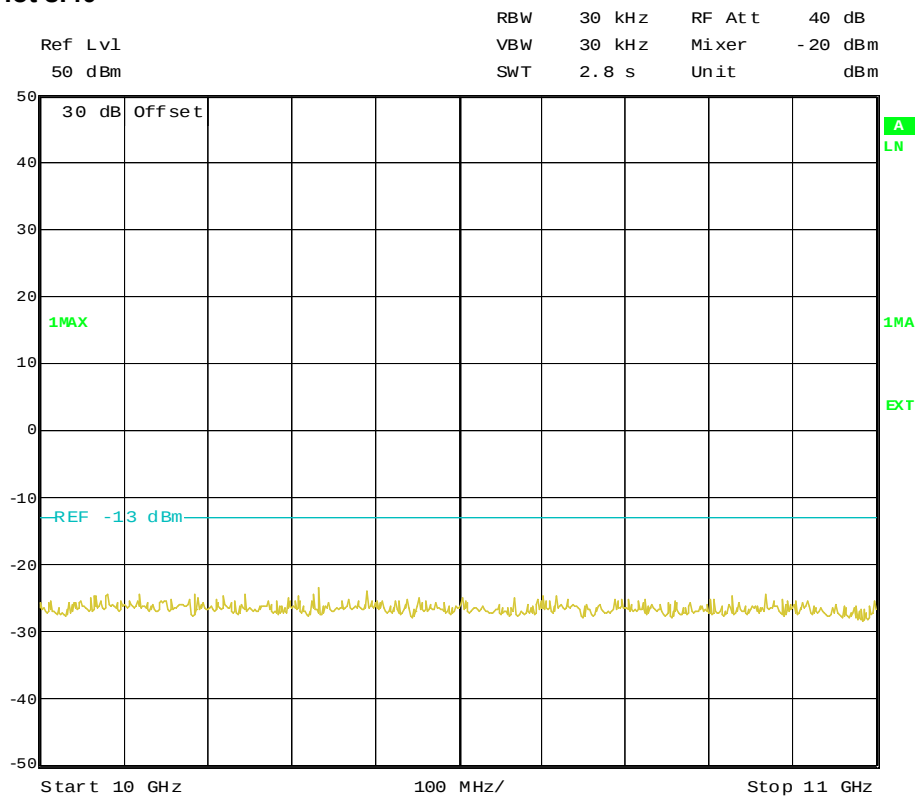
Date : 4.MAY.2012 12:22:07

Plot 8.39



Date : 4.MAY.2012 12:25:30

Plot 8.40



Date : 4.MAY.2012 12:26:03

**9 OUT OF BAND SPURIOS EMISSION, CONDUCTED**

|               |             |                   |             |
|---------------|-------------|-------------------|-------------|
| Date of test: | 2012-04-11  | Test location:    | Big Chamber |
| EUT Serial:   | 99001       | Ambient temp.     | 22 °C       |
| Tested by:    | Åke Carlson | Relative humidity | 29 %        |
| Test result:  | Pass        | Margin:           | >9.2 dB     |

**9.1 Requirement**

Spurious emissions should be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log (P)$

This gives a limit at -13 dBm at the antenna port.

The frequency range to be inspected is from 9 kHz up to the tenth harmonics of the highest fundamental frequency according to 47 CFR 2.1057.

**9.2 Test data****700 MHz band****Modulated carriers**

| Test signal   | Frequency [MHz] | RBW [MHz] | Measured peak level (dBm) | Limit (dBm) | Plots     | Comment |
|---------------|-----------------|-----------|---------------------------|-------------|-----------|---------|
| LTE, low ch.  | 9kHz – 3 000    | 1         | -25.1                     | -13         | Plot 9.1  |         |
| LTE, low ch.  | 3 000 – 10 000  | 1         | -26.1                     | -13         | Plot 9.2  |         |
| LTE, mid. ch. | 9kHz – 3 000    | 1         | -24.7                     | -13         | Plot 9.3  |         |
| LTE, mid. ch. | 3 000 – 10 000  | 1         | -26.2                     | -13         | Plot 9.4  |         |
| LTE, high ch. | 9kHz – 3 000    | 1         | -23.8                     | -13         | Plot 9.5  |         |
| LTE, high ch. | 3 000 – 10 000  | 1         | -26.0                     | -13         | Plot 9.6  |         |
| GSM, low ch.  | 9kHz – 3 000    | 1         | -25.9                     | -13         | Plot 9.7  |         |
| GSM, low ch.  | 3 000 – 10 000  | 1         | -25.9                     | -13         | Plot 9.8  |         |
| GSM, mid. ch. | 9kHz – 3 000    | 1         | -25.3                     | -13         | Plot 9.9  |         |
| GSM, mid. ch. | 3 000 – 10 000  | 1         | -25.2                     | -13         | Plot 9.10 |         |
| GSM, high ch. | 9kHz – 3 000    | 1         | -26.9                     | -13         | Plot 9.11 |         |
| GSM, high ch. | 3 000 – 10 000  | 1         | -26.3                     | -13         | Plot 9.12 |         |

**850 MHz band****Modulated carriers**

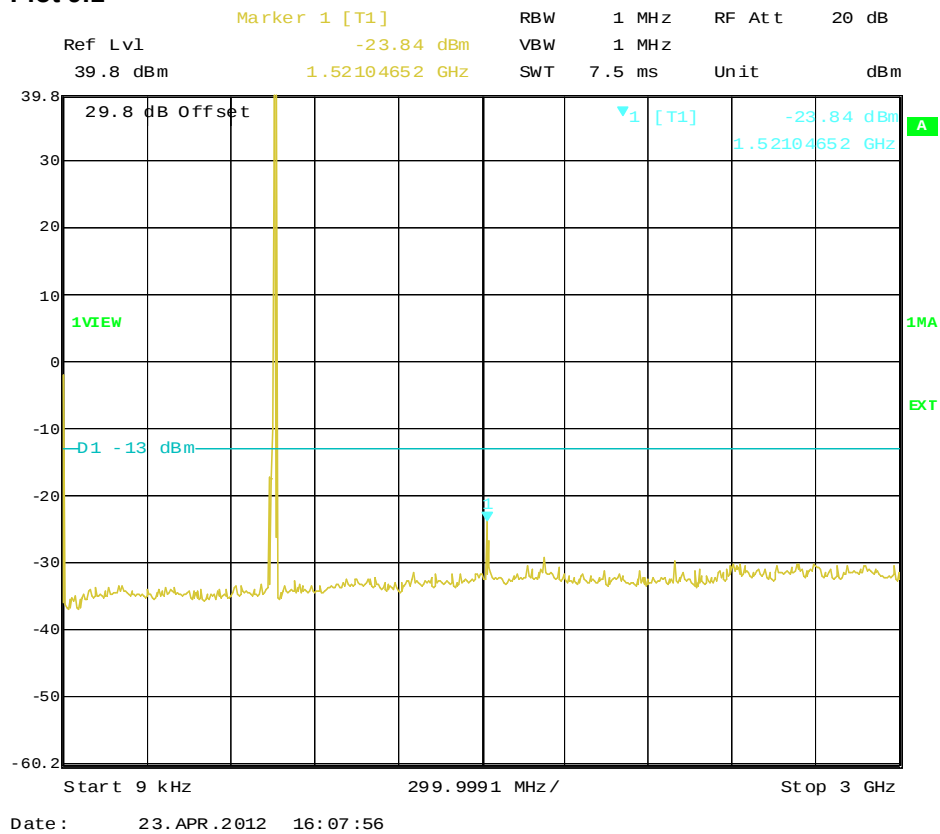
| Test signal    | Frequency [MHz] | RBW [MHz] | Measured peak level (dBm) | Limit (dBm) | Plots     | Comment |
|----------------|-----------------|-----------|---------------------------|-------------|-----------|---------|
| CDMA, low ch.  | 9kHz – 3 000    | 1         | -22.8                     | -13         | Plot 9.13 |         |
| CDMA, low ch.  | 3 000 – 10 000  | 1         | -25.7                     | -13         | Plot 9.14 |         |
| CDMA, mid. ch. | 9kHz – 3 000    | 1         | -21.6                     | -13         | Plot 9.15 |         |
| CDMA, mid. ch. | 3 000 – 10 000  | 1         | -25.8                     | -13         | Plot 9.16 |         |
| CDMA, high ch. | 9kHz – 3 000    | 1         | -22.2                     | -13         | Plot 9.17 |         |
| CDMA, high ch. | 3 000 – 10 000  | 1         | -26.1                     | -13         | Plot 9.18 |         |
| GSM, low ch.   | 9kHz – 3 000    | 1         | -22.9                     | -13         | Plot 9.19 |         |
| GSM, low ch.   | 3 000 – 10 000  | 1         | -25.2                     | -13         | Plot 9.20 |         |
| GSM, mid. ch.  | 9kHz – 3 000    | 1         | -22.3                     | -13         | Plot 9.21 |         |
| GSM, mid. ch.  | 3 000 – 10 000  | 1         | -26.0                     | -13         | Plot 9.22 |         |
| GSM, high ch.  | 9kHz – 3 000    | 1         | -22.2                     | -13         | Plot 9.23 |         |
| GSM, high ch.  | 3 000 – 10 000  | 1         | -26.8                     | -13         | Plot 9.24 |         |

**1900 MHz band****Modulated carriers**

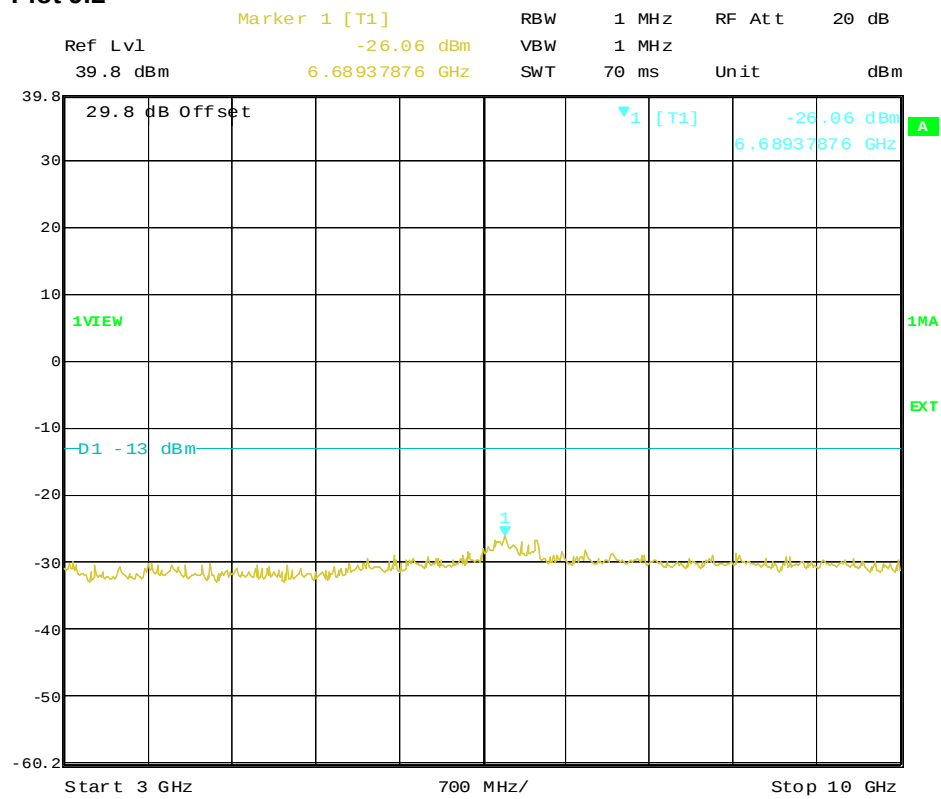
| Test signal    | Frequency [MHz] | RBW [MHz] | Measured peak level (dBm) | Limit (dBm) | Plots     | Comment |
|----------------|-----------------|-----------|---------------------------|-------------|-----------|---------|
| CDMA, low ch.  | 9kHz – 3 000    | 1         | -29.6                     | -13         | Plot 9.25 |         |
| CDMA, low ch.  | 3 000 – 10 000  | 1         | -26.1                     | -13         | Plot 9.26 |         |
| CDMA, low ch.  | 10 000 – 20 000 | 1         | -26.3                     | -13         | Plot 9.27 |         |
| CDMA, mid. ch. | 9kHz – 3 000    | 1         | -29.6                     | -13         | Plot 9.28 |         |
| CDMA, mid. ch. | 3 000 – 10 000  | 1         | -29.3                     | -13         | Plot 9.29 |         |
| CDMA, mid. ch. | 10 000 – 20 000 | 1         | -27.0                     | -13         | Plot 9.30 |         |
| CDMA, high ch. | 9kHz – 3 000    | 1         | -28.8                     | -13         | Plot 9.31 |         |
| CDMA, high ch. | 3 000 – 10 000  | 1         | -25.7                     | -13         | Plot 9.32 |         |
| CDMA, high ch. | 10 000 – 20 000 | 1         | 27.1                      | -13         | Plot 9.33 |         |
| GSM, low ch.   | 9kHz – 3 000    | 1         | -28.8                     | -13         | Plot 9.34 |         |
| GSM, low ch.   | 3 000 – 10 000  | 1         | -25.5                     | -13         | Plot 9.35 |         |
| GSM, low ch.   | 10 000 – 20 000 | 1         | -26.2                     | -13         | Plot 9.36 |         |
| GSM, mid. ch.  | 9kHz – 3 000    | 1         | -29.7                     | -13         | Plot 9.37 |         |
| GSM, mid. ch.  | 3 000 – 10 000  | 1         | -25.7                     | -13         | Plot 9.38 |         |
| GSM, mid. ch.  | 10 000 – 20 000 | 1         | -26.6                     | -13         | Plot 9.39 |         |
| GSM, high ch.  | 9kHz – 3 000    | 1         | -29.2                     | -13         | Plot 9.40 |         |
| GSM, high ch.  | 3 000 – 10 000  | 1         | -26.1                     | -13         | Plot 9.41 |         |
| GSM, high ch.  | 10 000 – 20 000 | 1         | 26.7                      | -13         | Plot 9.42 |         |

**AWS band****Modulated carriers**

| Test signal     | Frequency [MHz] | RBW [MHz] | Measured peak level (dBm) | Limit (dBm) | Plots     | Comment |
|-----------------|-----------------|-----------|---------------------------|-------------|-----------|---------|
| WCDMA, low ch.  | 9kHz – 3 000    | 1         | -29.1                     | -13         | Plot 9.43 |         |
| WCDMA, low ch.  | 3 000 – 10 000  | 1         | -25.7                     | -13         | Plot 9.44 |         |
| WCDMA, low ch.  | 10 000 – 20 000 | 1         | -27.0                     | -13         | Plot 9.45 |         |
| WCDMA, low ch.  | 20 000 – 23 000 | 1         | -25.0                     | -13         | Plot 9.46 |         |
| WCDMA, mid. ch. | 9kHz – 3 000    | 1         | -29.2                     | -13         | Plot 9.47 |         |
| WCDMA, mid. ch. | 3 000 – 10 000  | 1         | -26.4                     | -13         | Plot 9.48 |         |
| WCDMA, mid. ch. | 10 000 – 20 000 | 1         | -26.8                     | -13         | Plot 9.49 |         |
| WCDMA, mid. ch. | 20 000 – 23 000 | 1         | -25.5                     | -13         | Plot 9.50 |         |
| WCDMA, high ch. | 9kHz – 3 000    | 1         | -29.6                     | -13         | Plot 9.51 |         |
| WCDMA, high ch. | 3 000 – 10 000  | 1         | -26.1                     | -13         | Plot 9.52 |         |
| WCDMA, high ch. | 10 000 – 20 000 | 1         | -27.0                     | -13         | Plot 9.53 |         |
| WCDMA, high ch. | 20 000 – 23 000 | 1         | -25.4                     | -13         | Plot 9.54 |         |

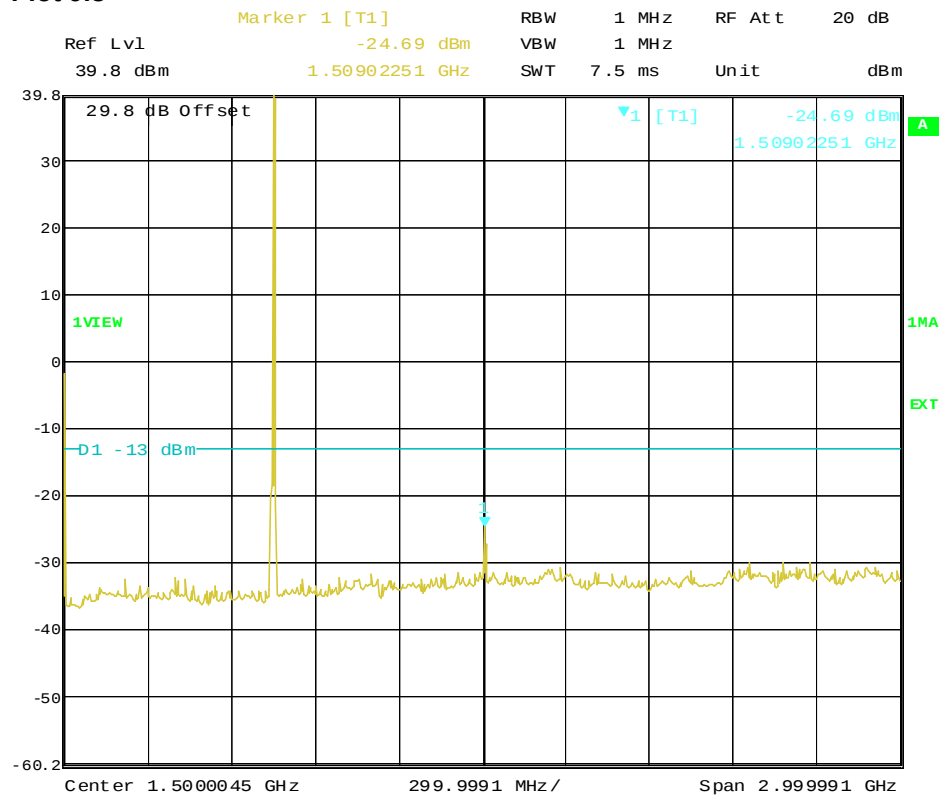
**Plot 9.1**

## Plot 9.2



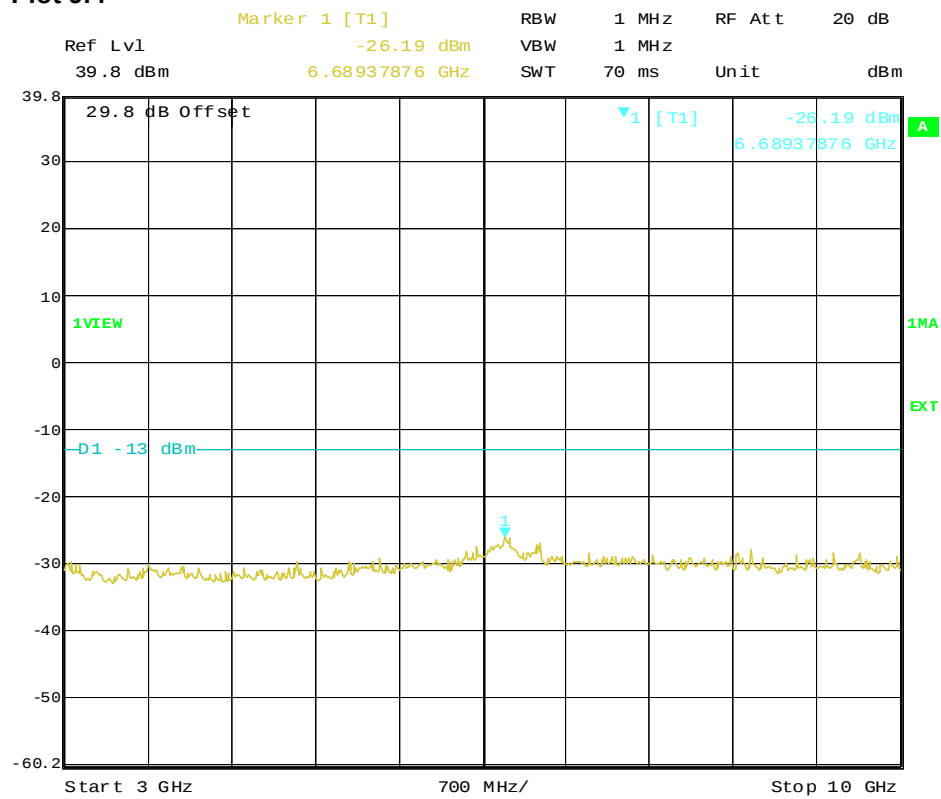
Date: 24. APR. 2012 08:42:15

## Plot 9.3



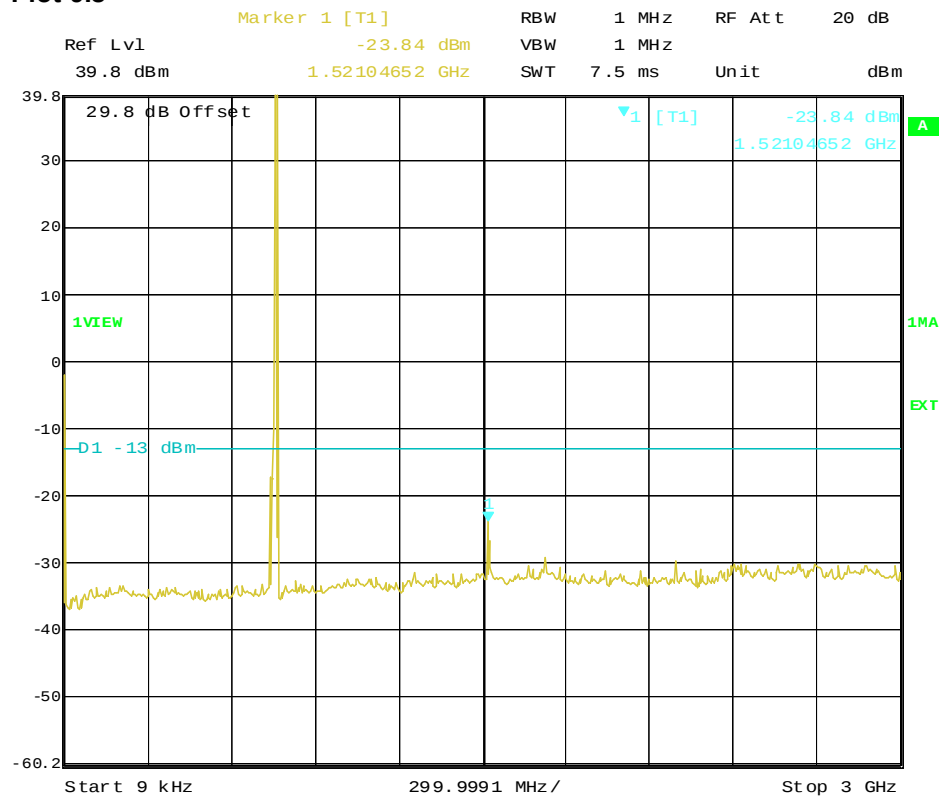
Date: 23. APR. 2012 16:05:39

## Plot 9.4



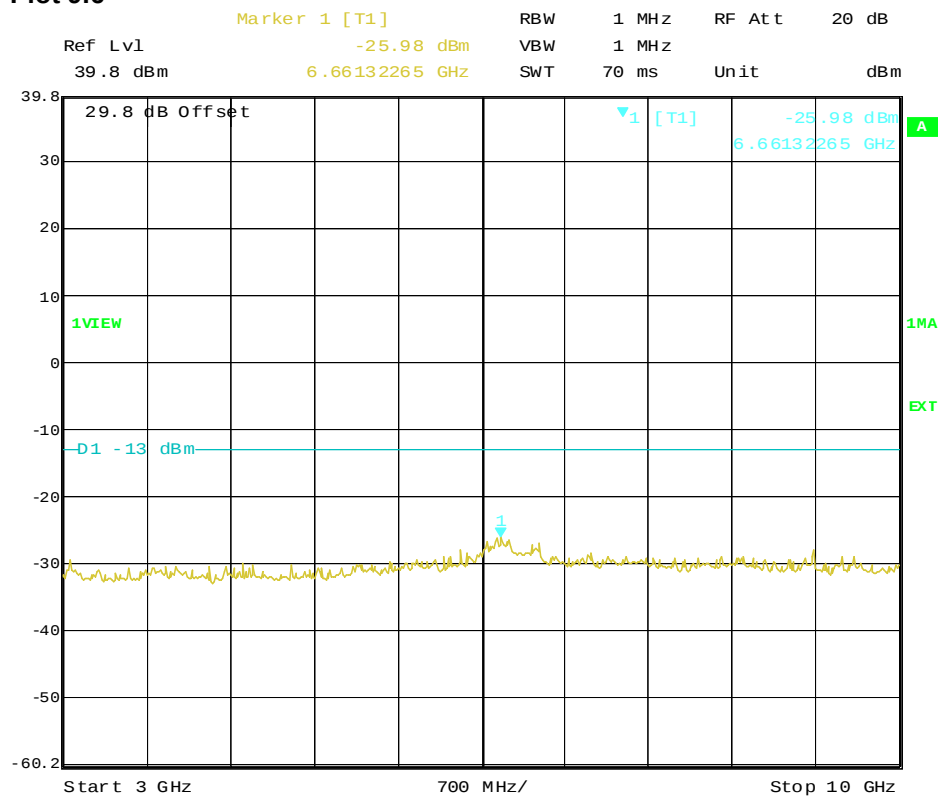
Date : 24. APR. 2012 08:41:00

## Plot 9.5



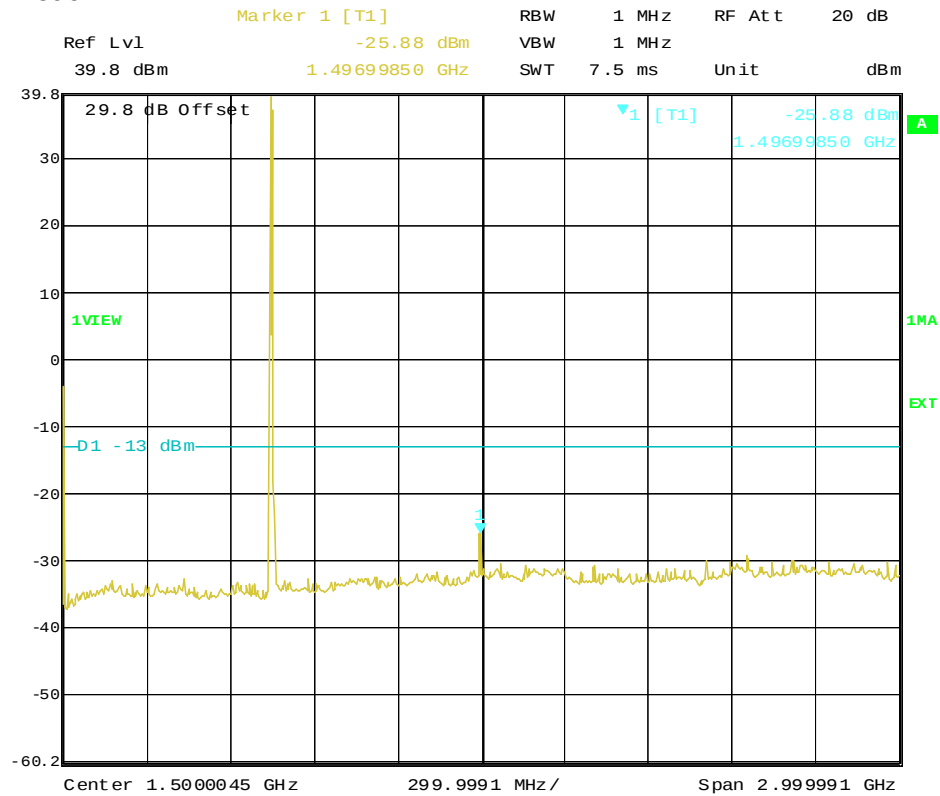
Date : 23. APR. 2012 16:07:56

## Plot 9.6



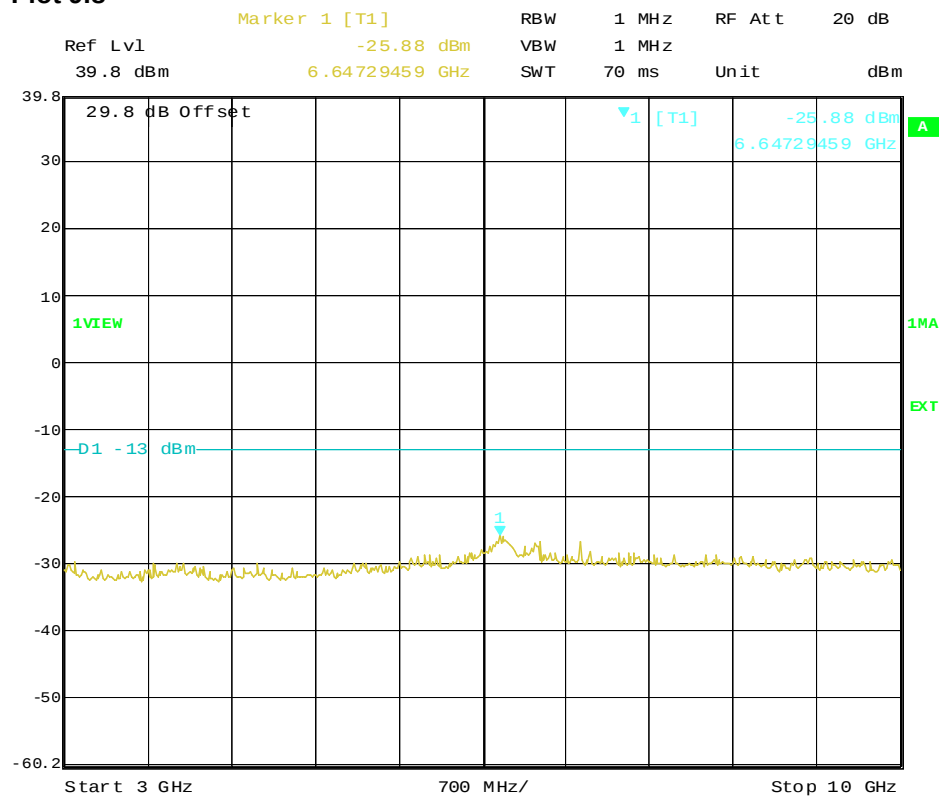
Date : 24. APR. 2012 08:38:04

## Plot 9.7



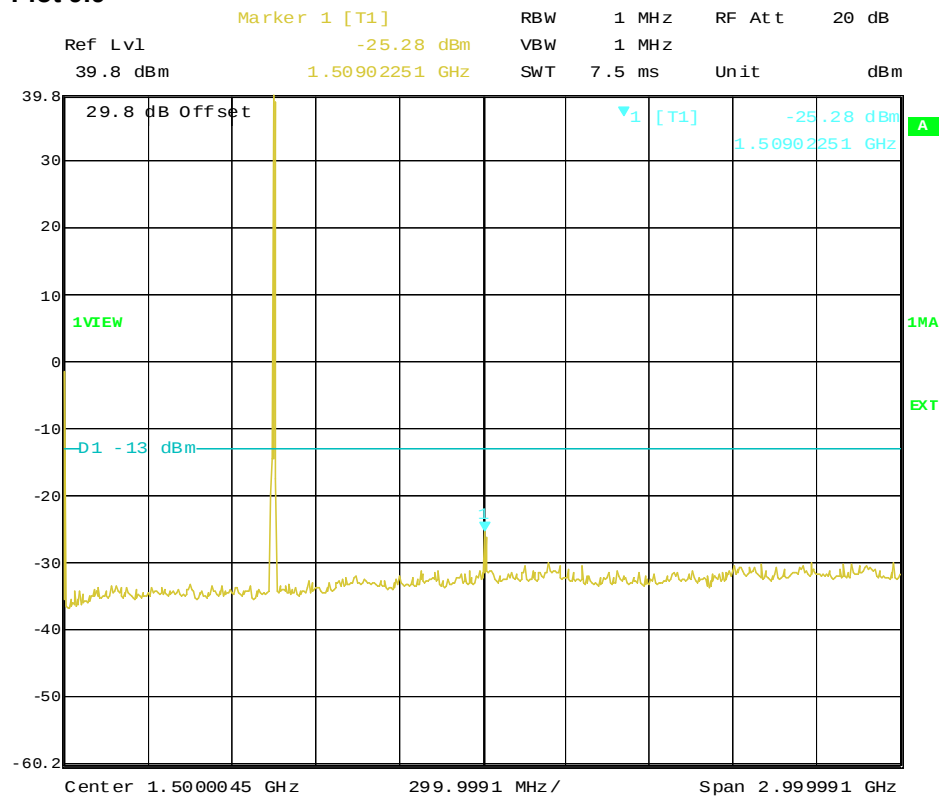
Date : 24. APR. 2012 08:32:11

## Plot 9.8



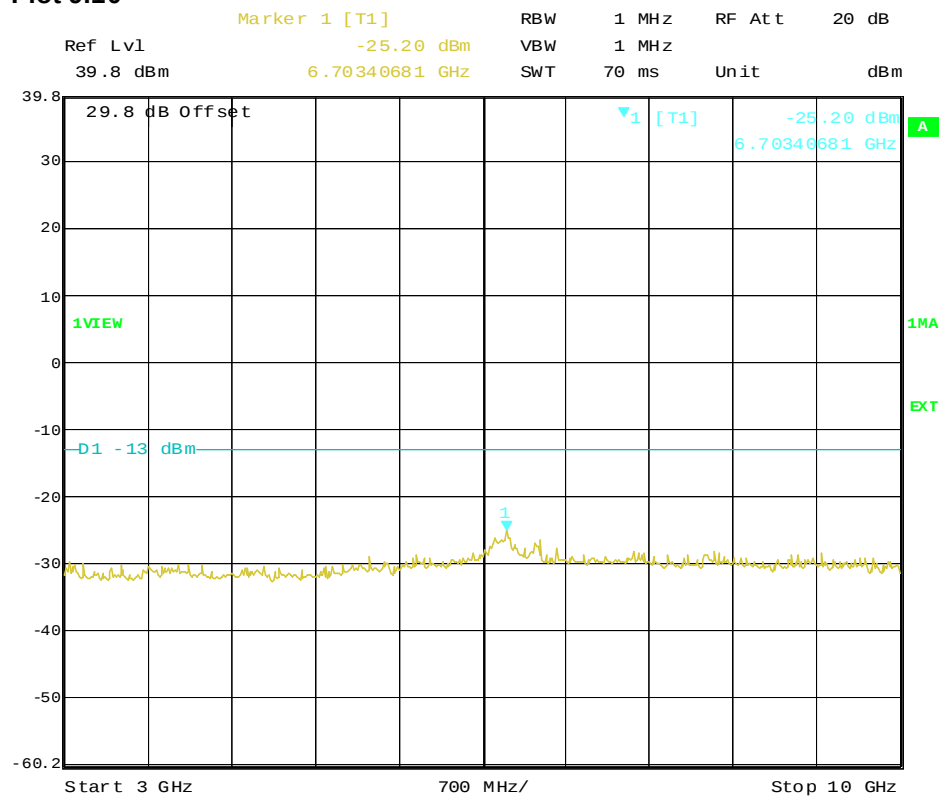
Date : 24. APR. 2012 08:33:38

## Plot 9.9



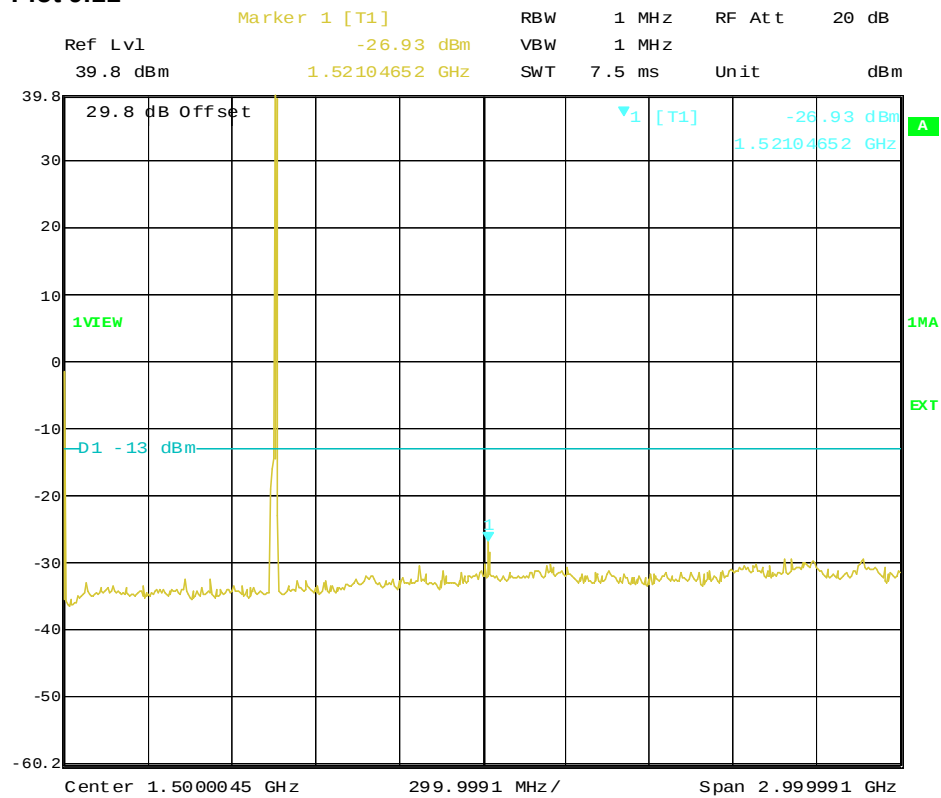
Date : 24. APR. 2012 08:25:02

Plot 9.10



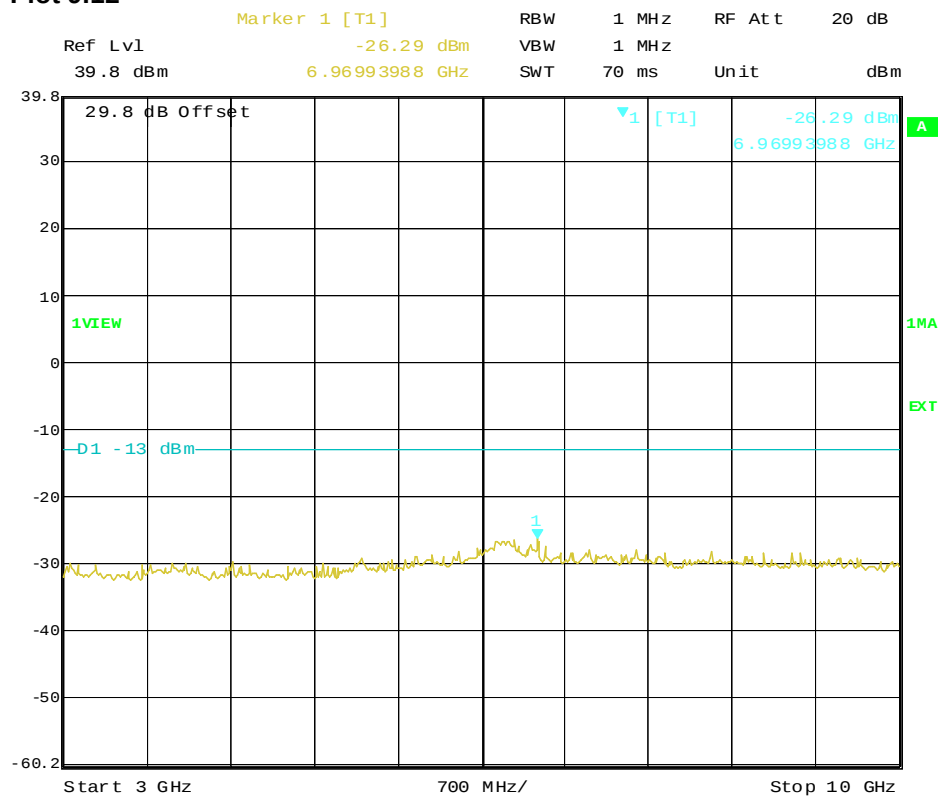
Date : 24. APR. 2012 08:34:44

Plot 9.11



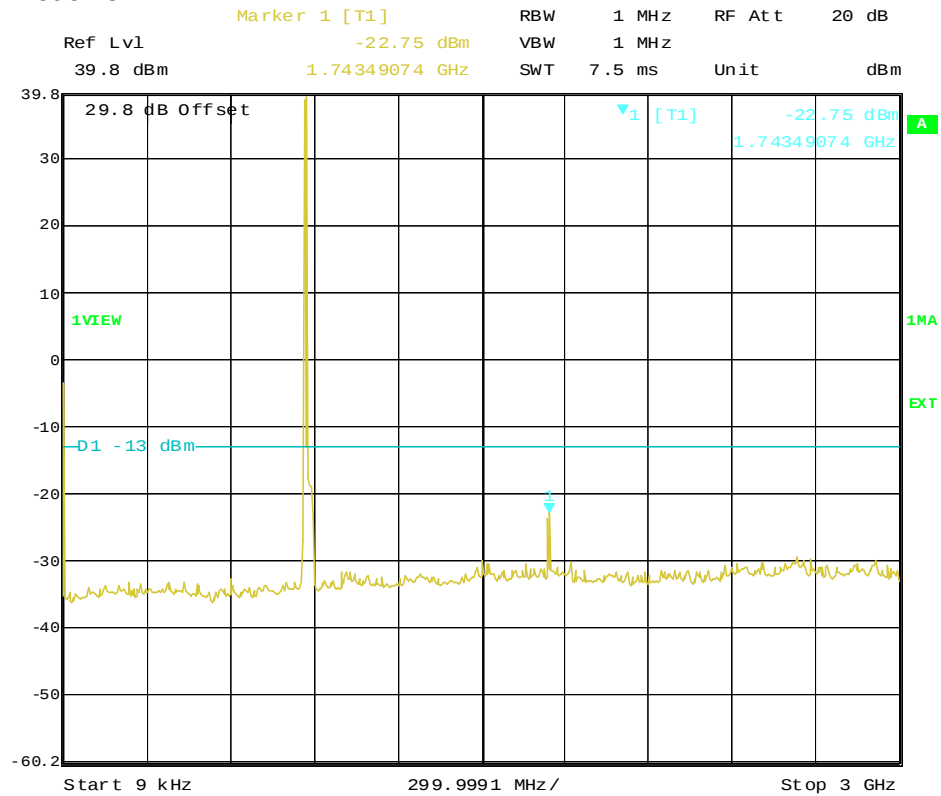
Date : 24. APR. 2012 08:21:43

Plot 9.12



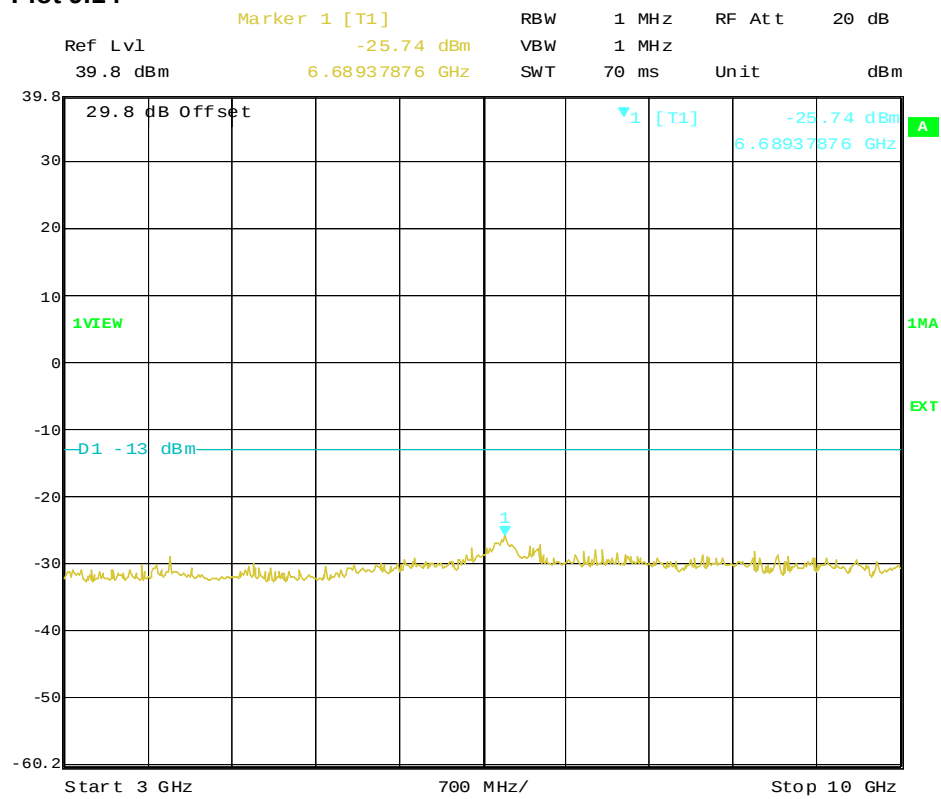
Date : 24. APR. 2012 08:36:42

Plot 9.13



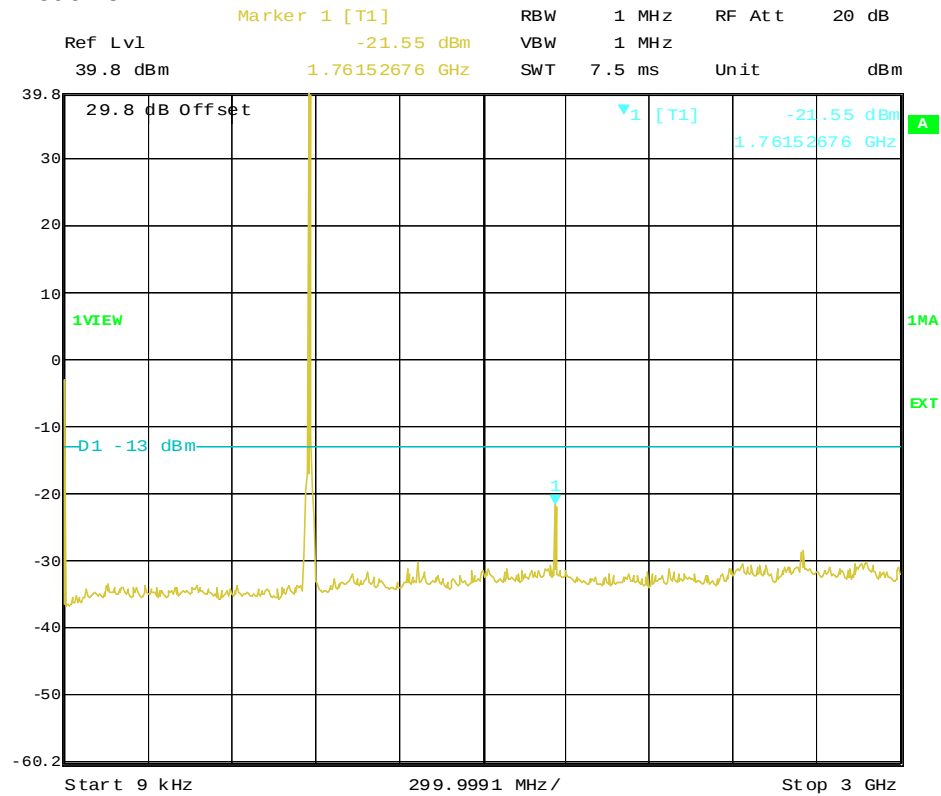
Date : 24. APR. 2012 09:37:57

Plot 9.14



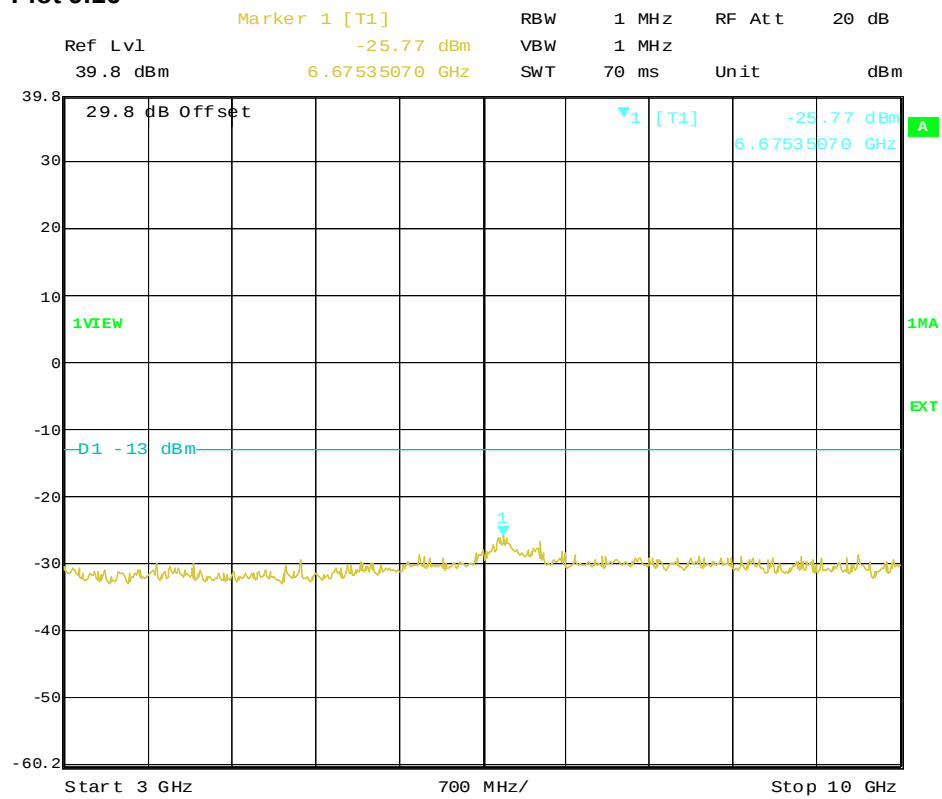
Date : 24. APR. 2012 09:36:36

Plot 9.15



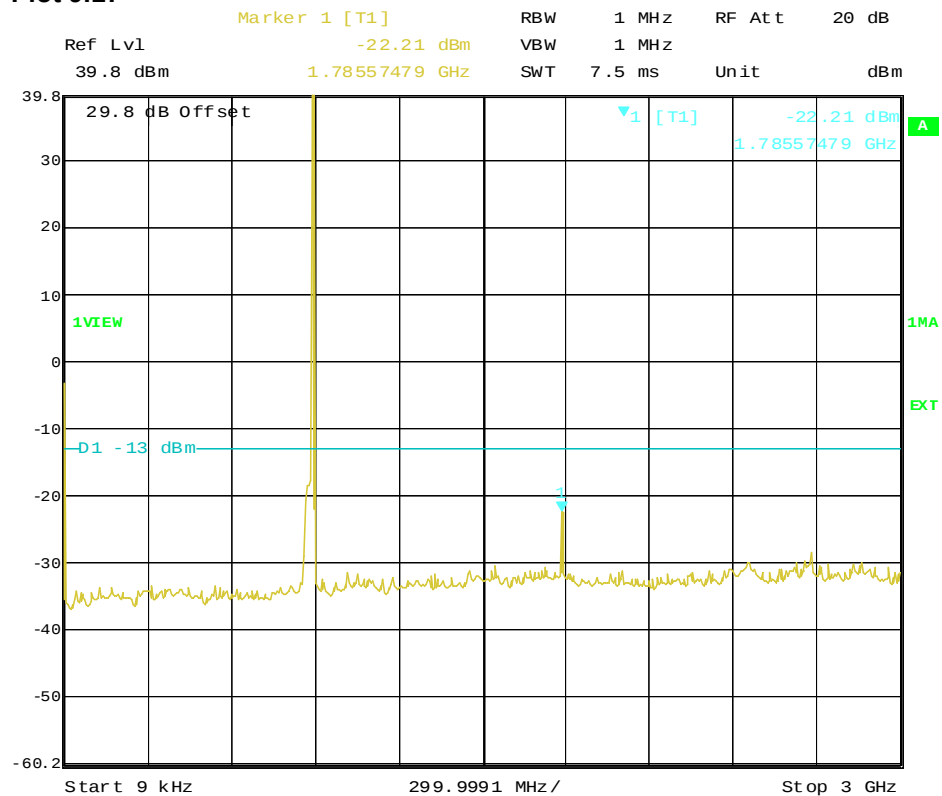
Date : 24. APR. 2012 09:41:15

Plot 9.16



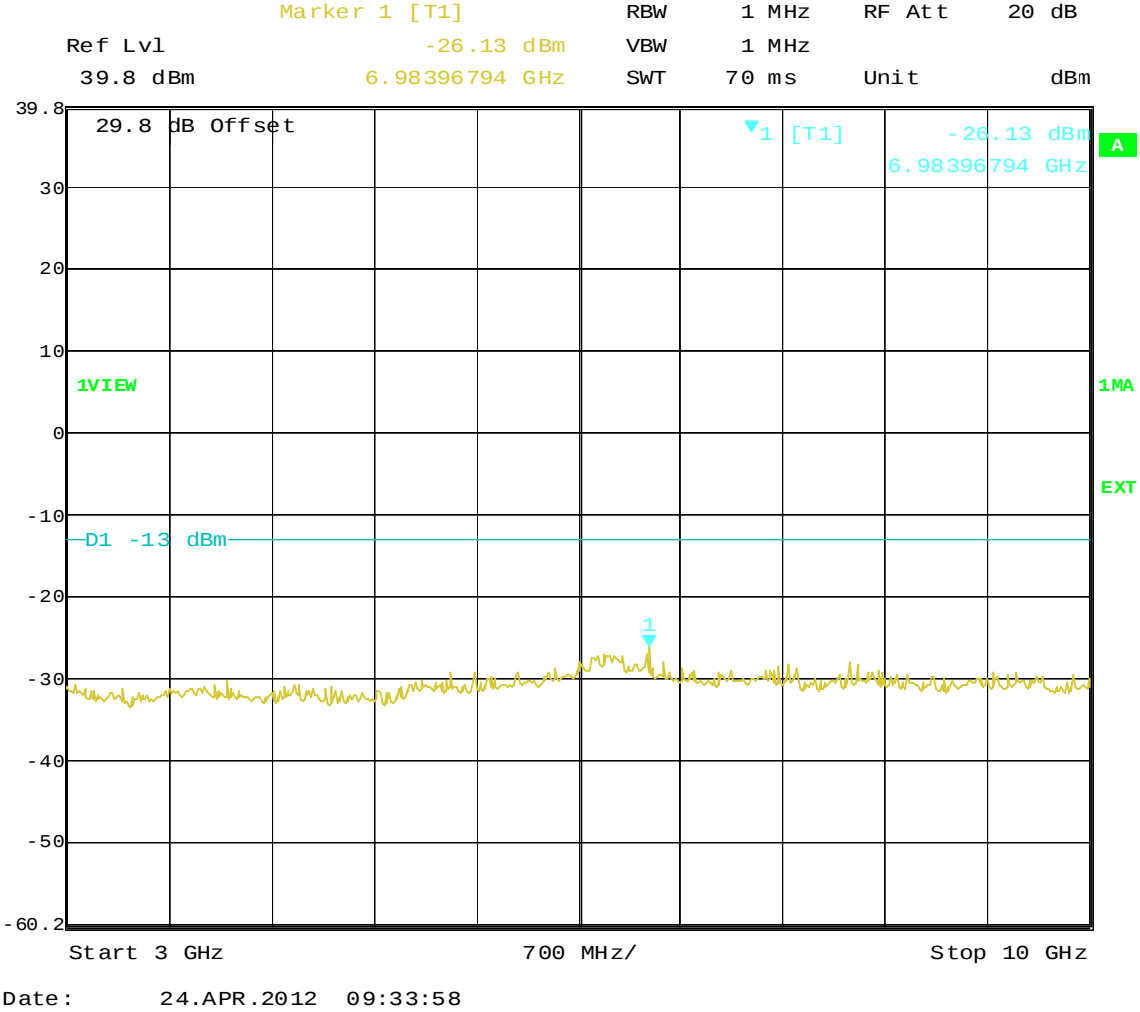
Date : 24. APR. 2012 09:35:30

Plot 9.17

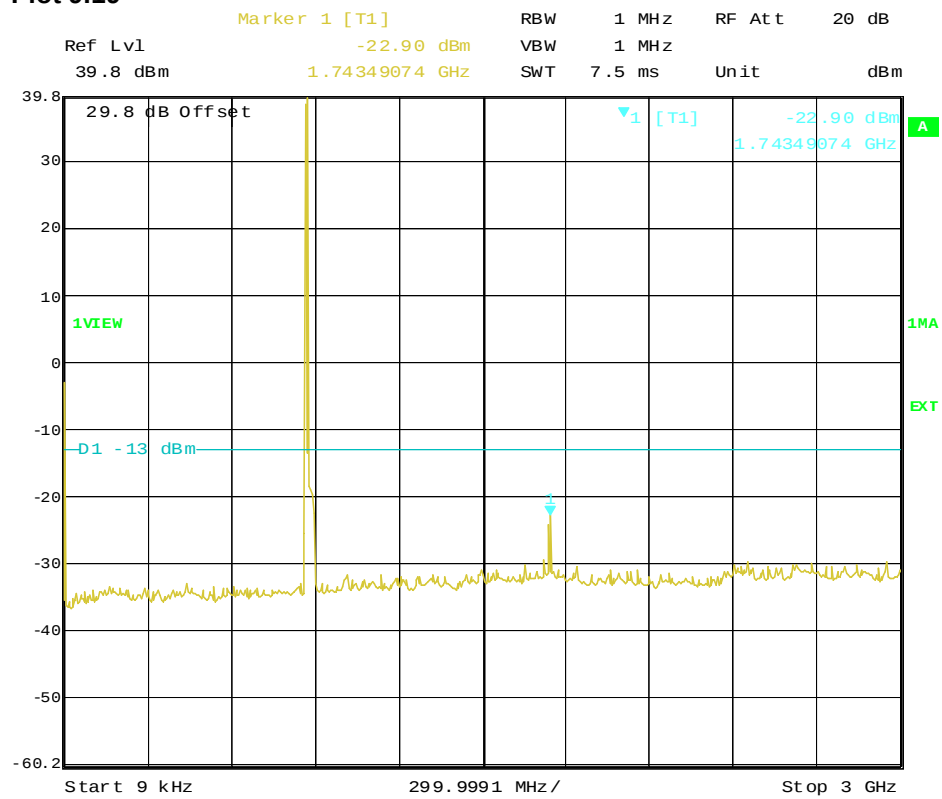


Date : 24. APR. 2012 09:39:19

Plot 9.18

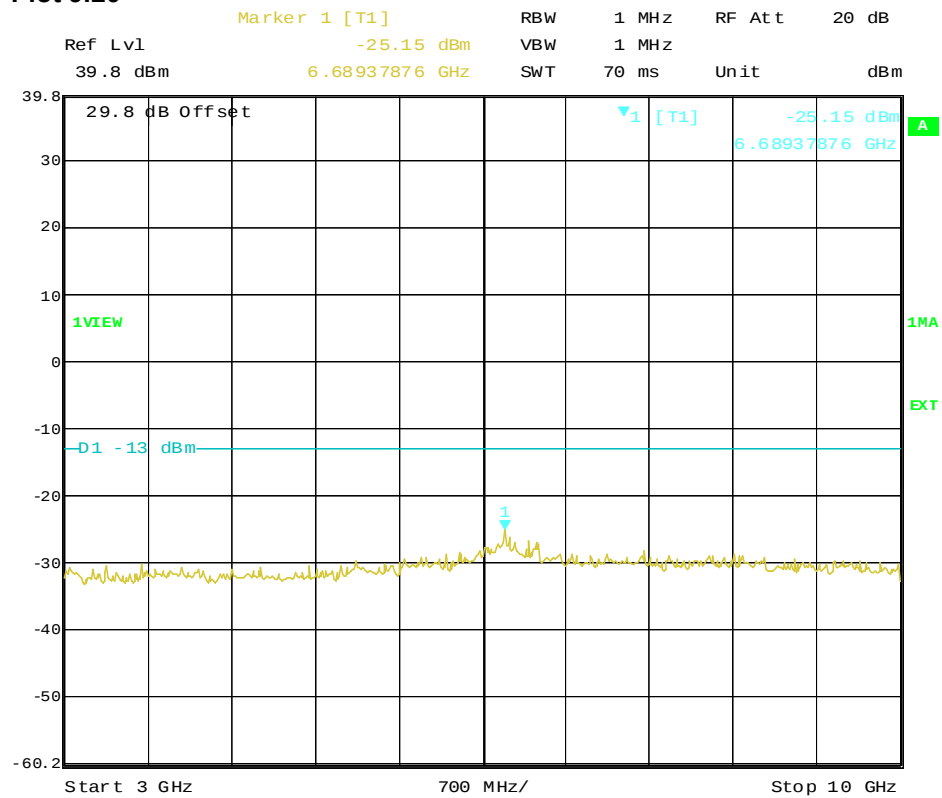


Plot 9.19



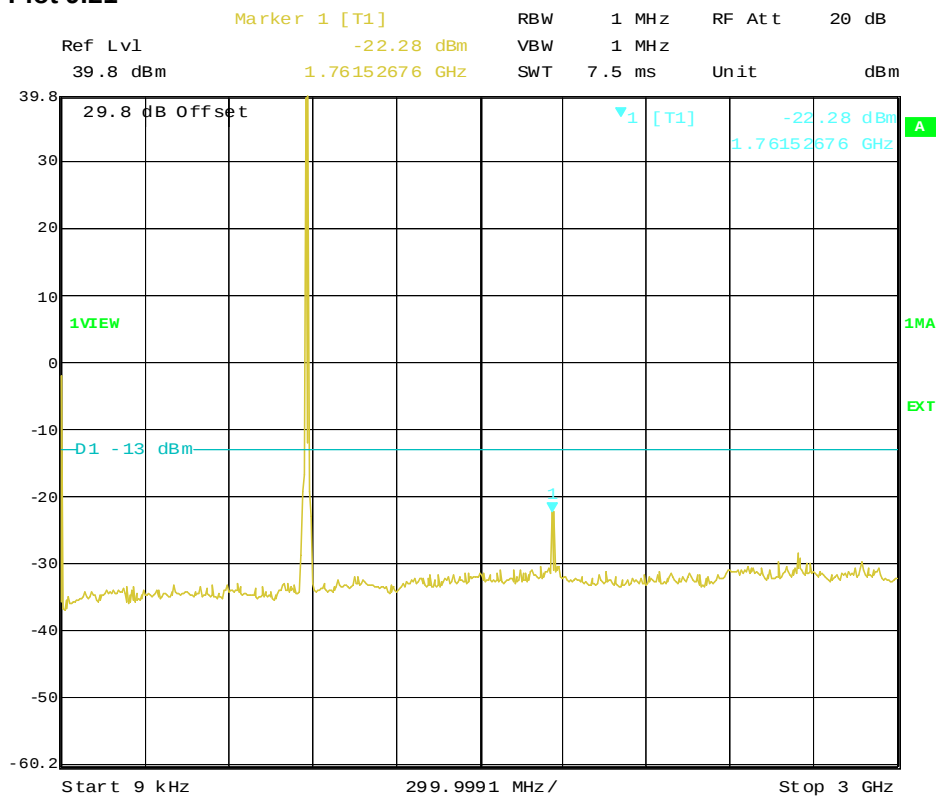
Date: 24.APR.2012 09:44:05

Plot 9.20



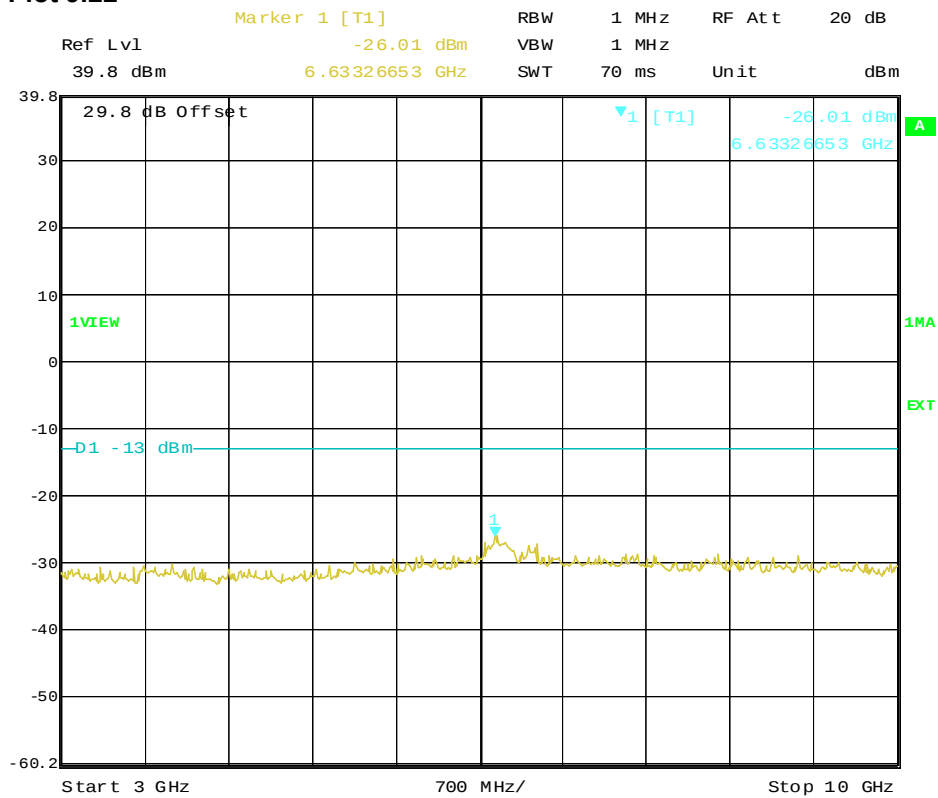
Date: 24.APR.2012 09:23:43

Plot 9.21



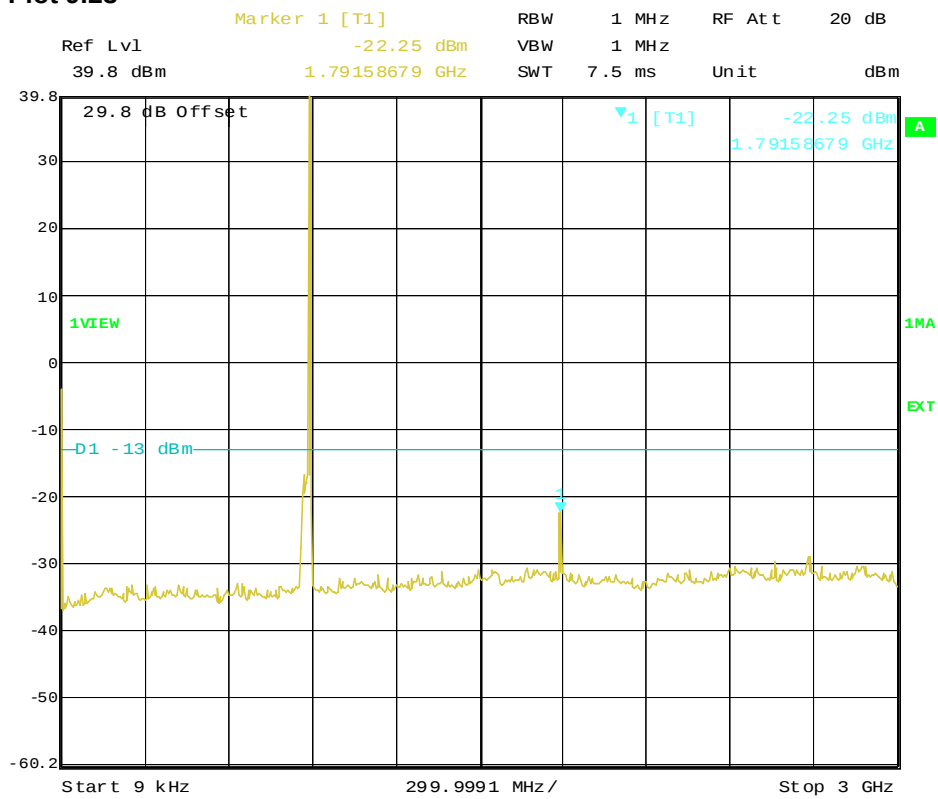
Date : 24. APR. 2012 09:42:28

Plot 9.22



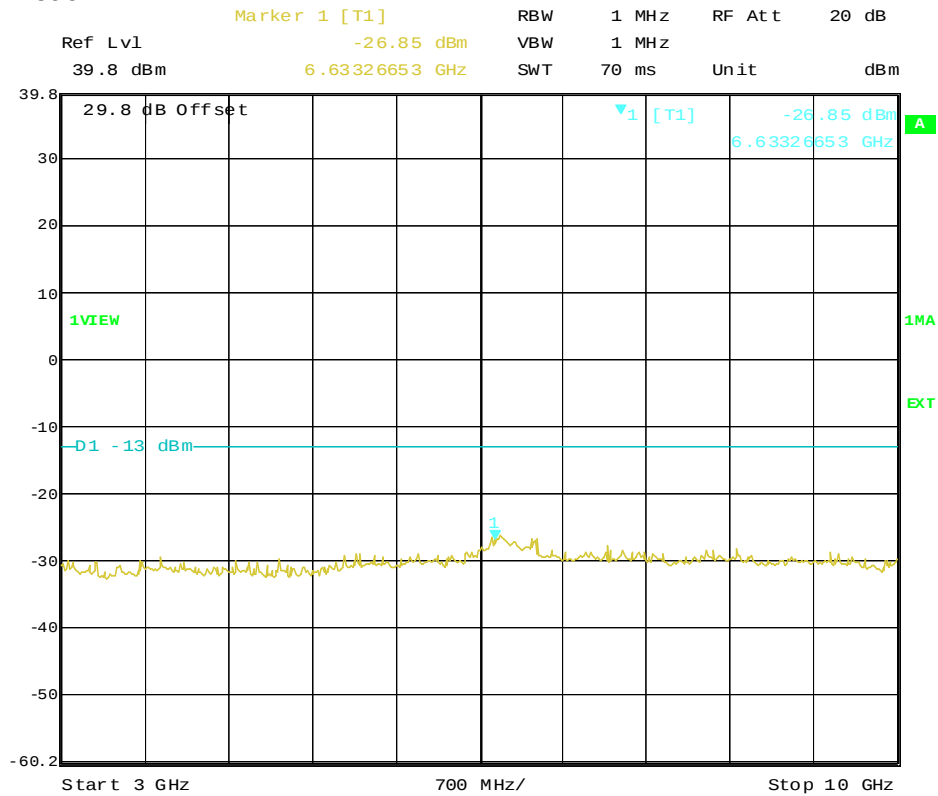
Date : 24. APR. 2012 09:25:23

Plot 9.23



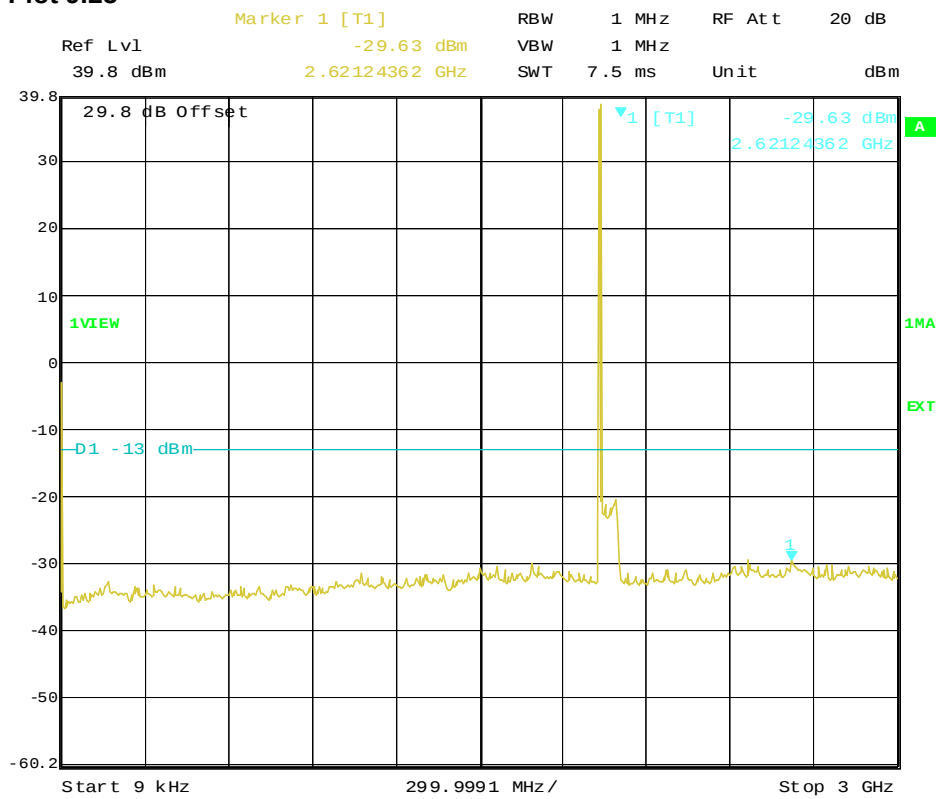
Date : 24. APR. 2012 09:45:13

Plot 9.24



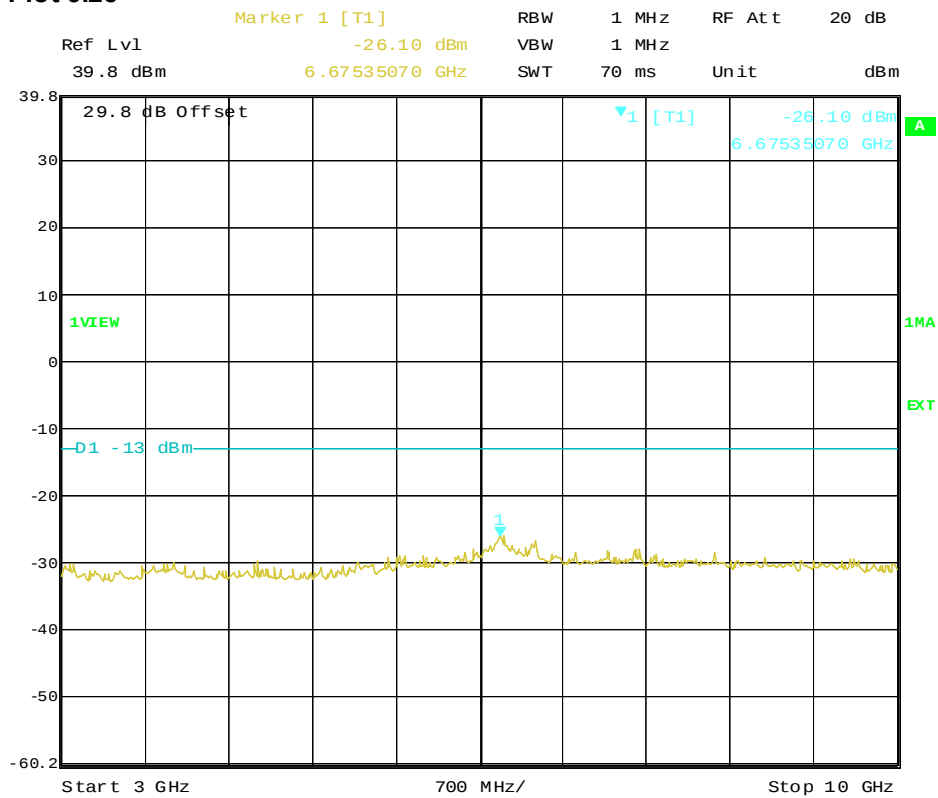
Date : 24. APR. 2012 09:32:46

Plot 9.25



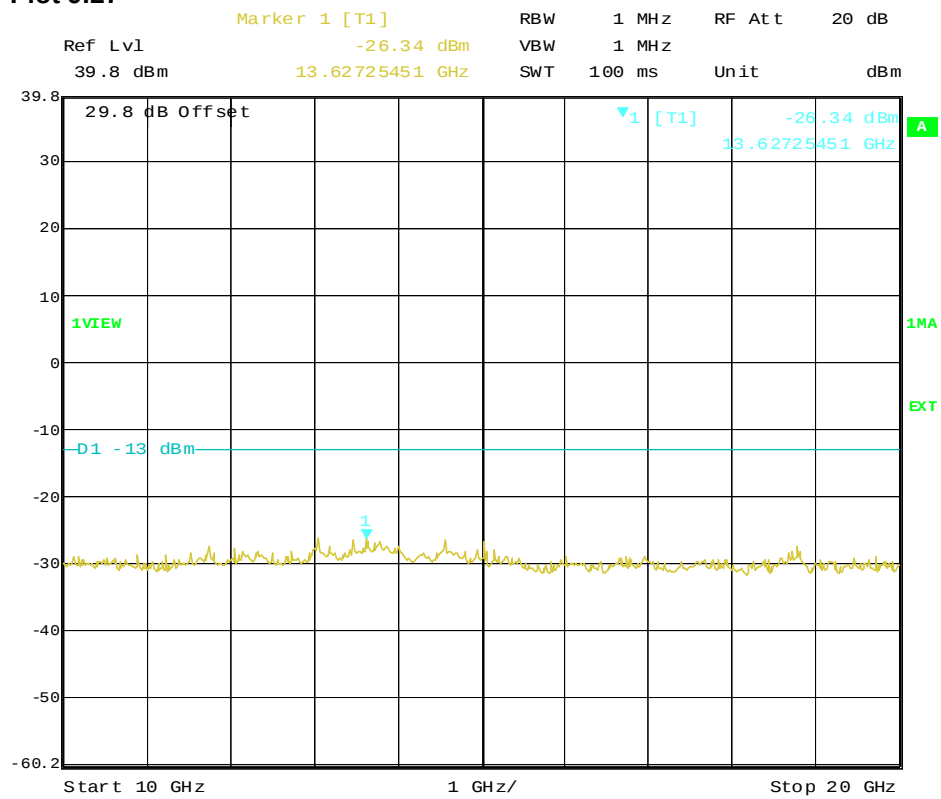
Date: 24.APR.2012 13:14:05

Plot 9.26



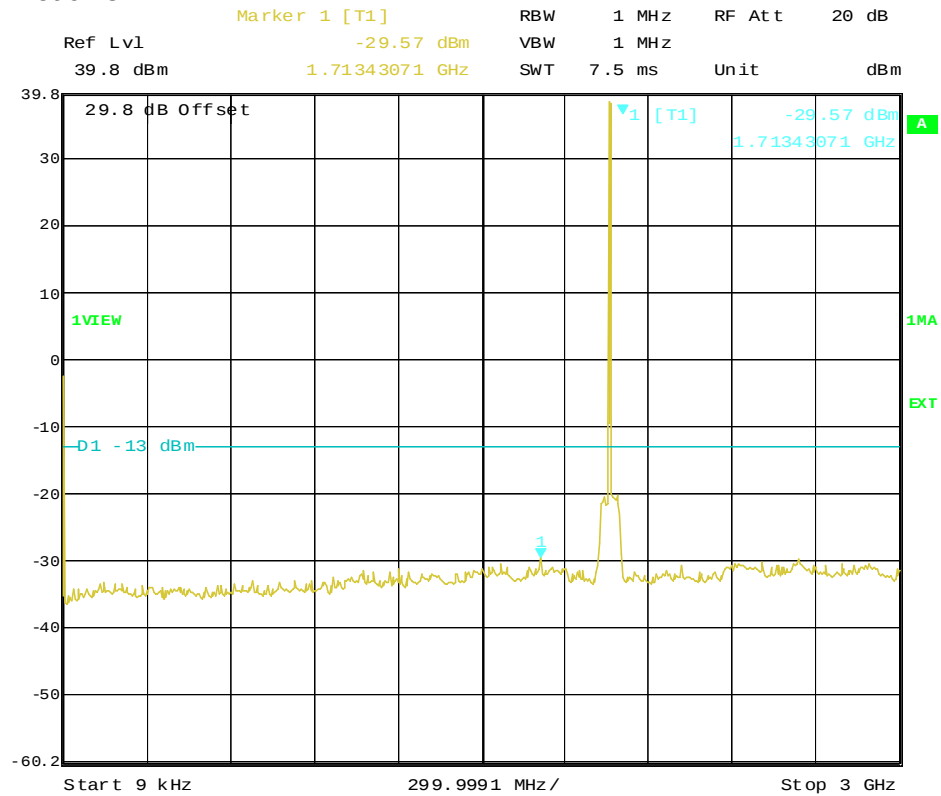
Date: 24.APR.2012 13:18:19

Plot 9.27



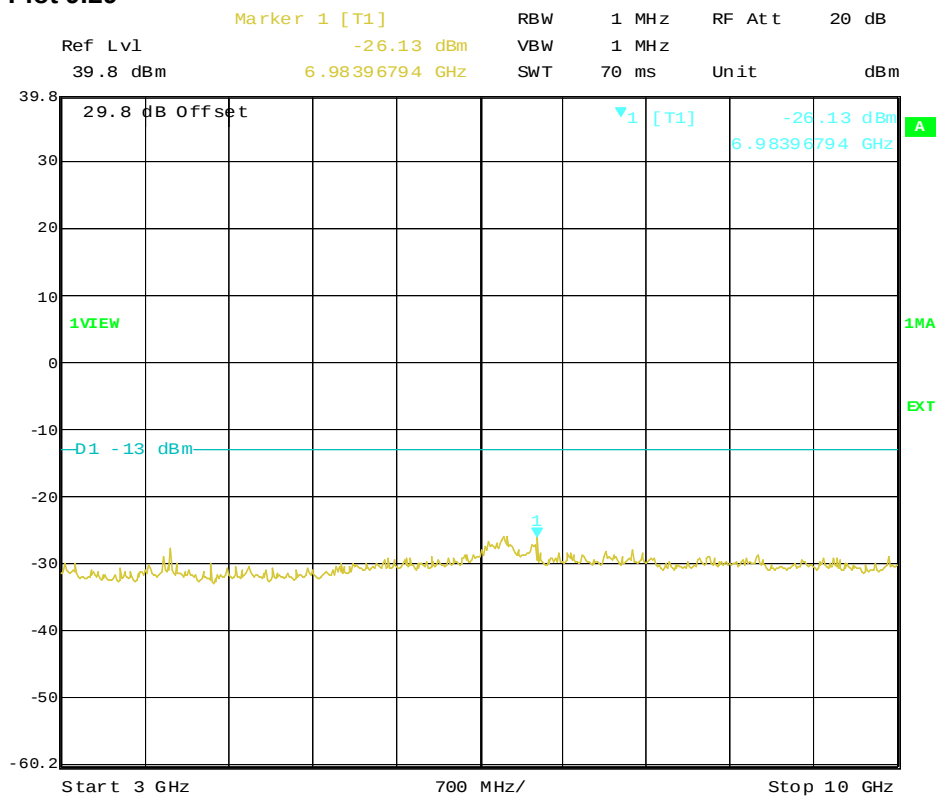
Date : 24.APR.2012 13:37:45

Plot 9.28



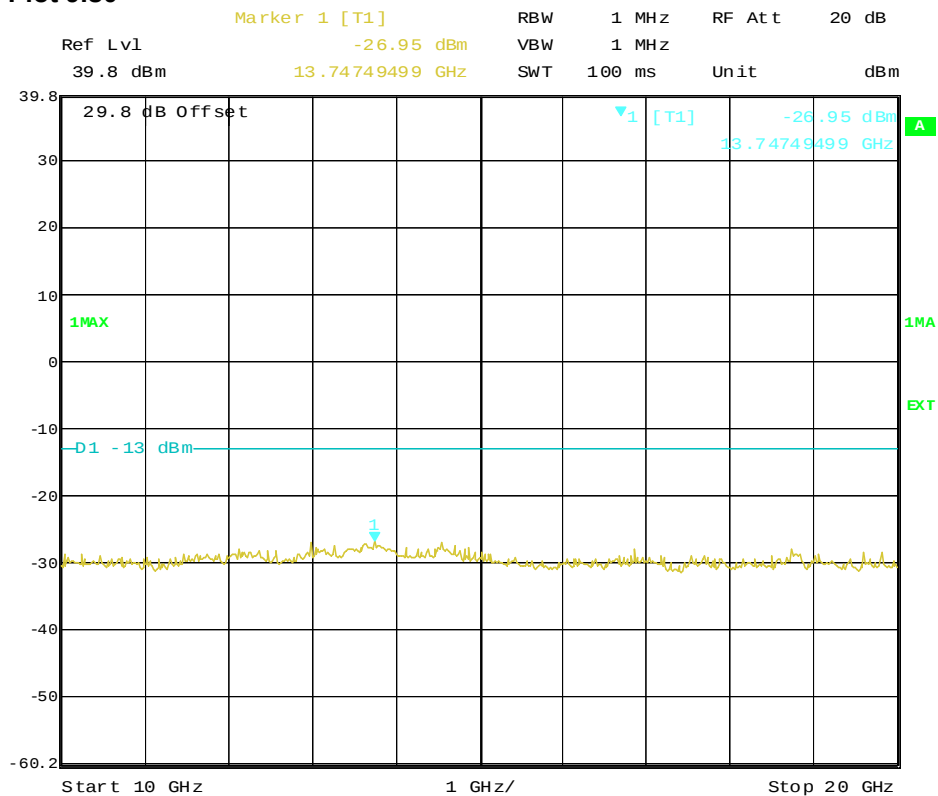
Date : 24.APR.2012 13:15:30

Plot 9.29



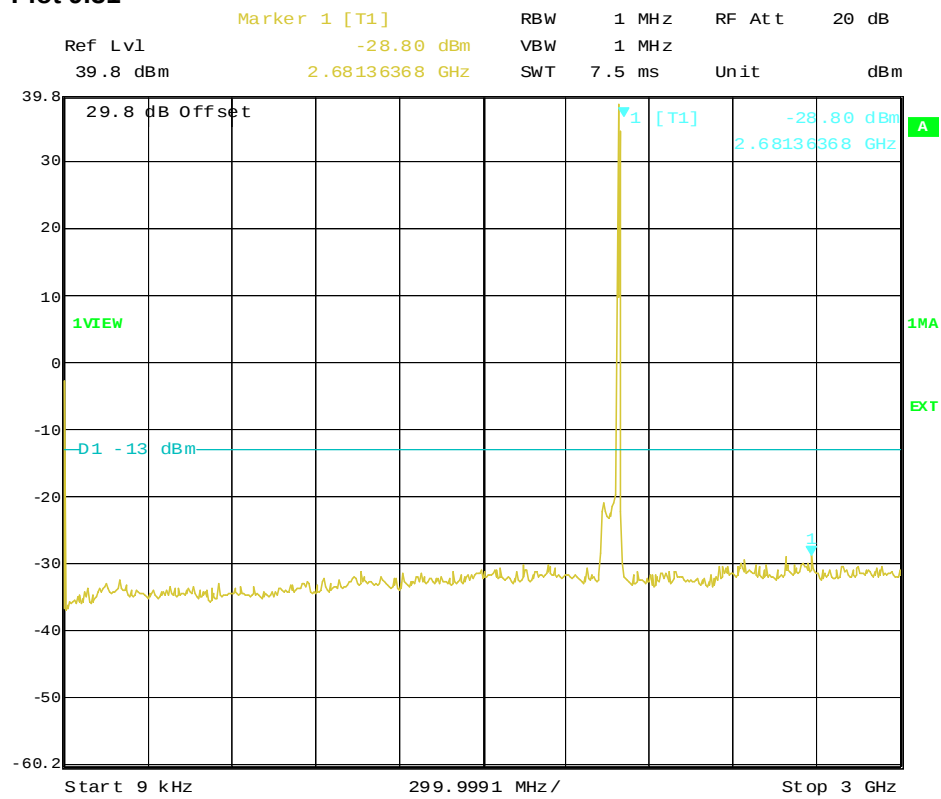
Date: 24. APR. 2012 13:16:41

Plot 9.30



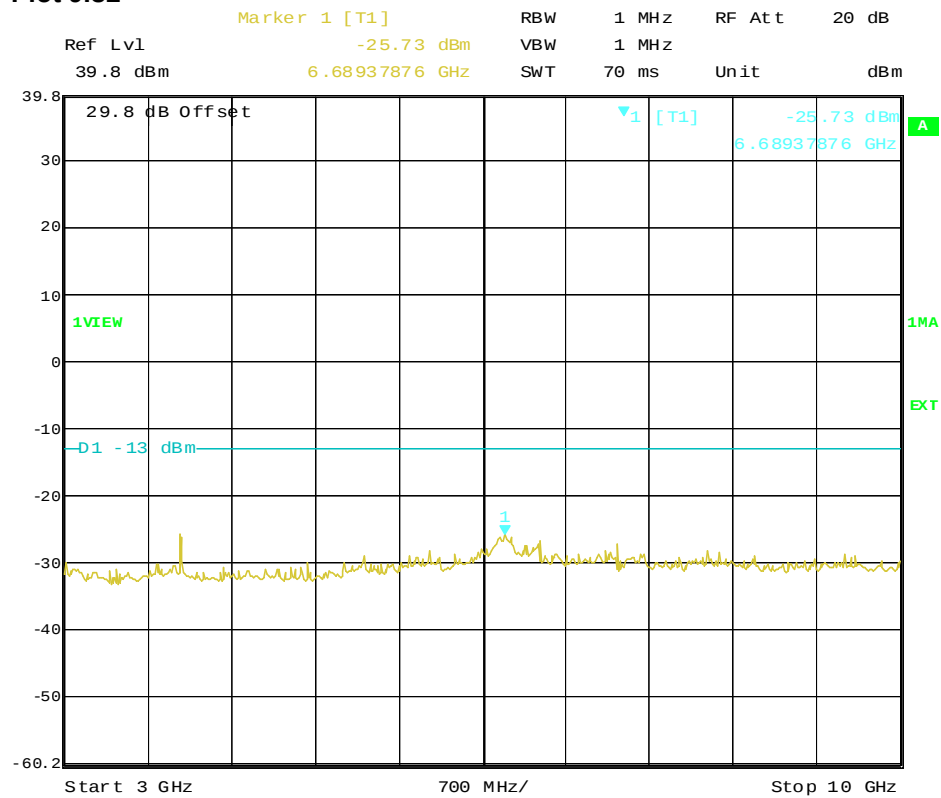
Date: 24. APR. 2012 13:38:49

Plot 9.31



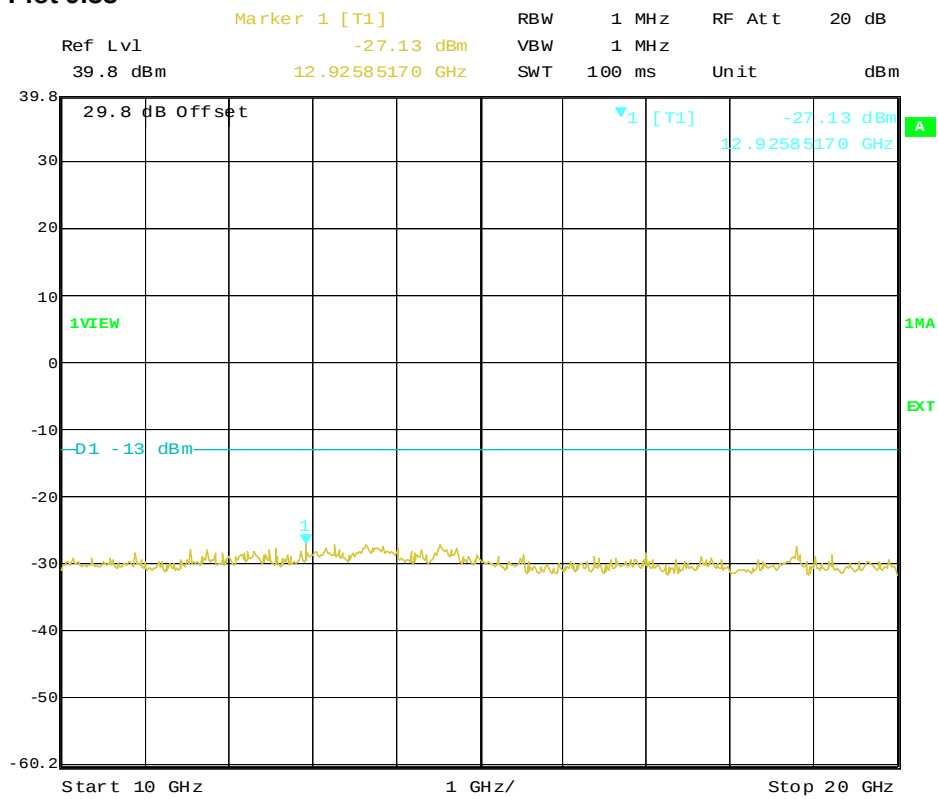
Date : 24.APR.2012 13:10:59

Plot 9.32



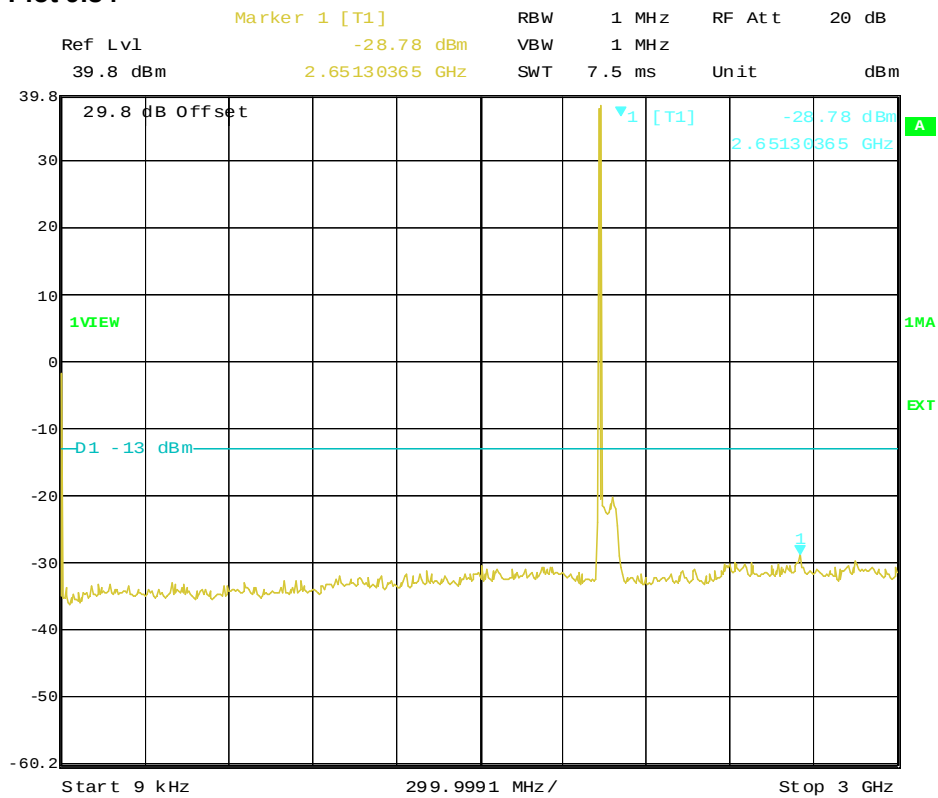
Date : 24.APR.2012 13:19:31

Plot 9.33



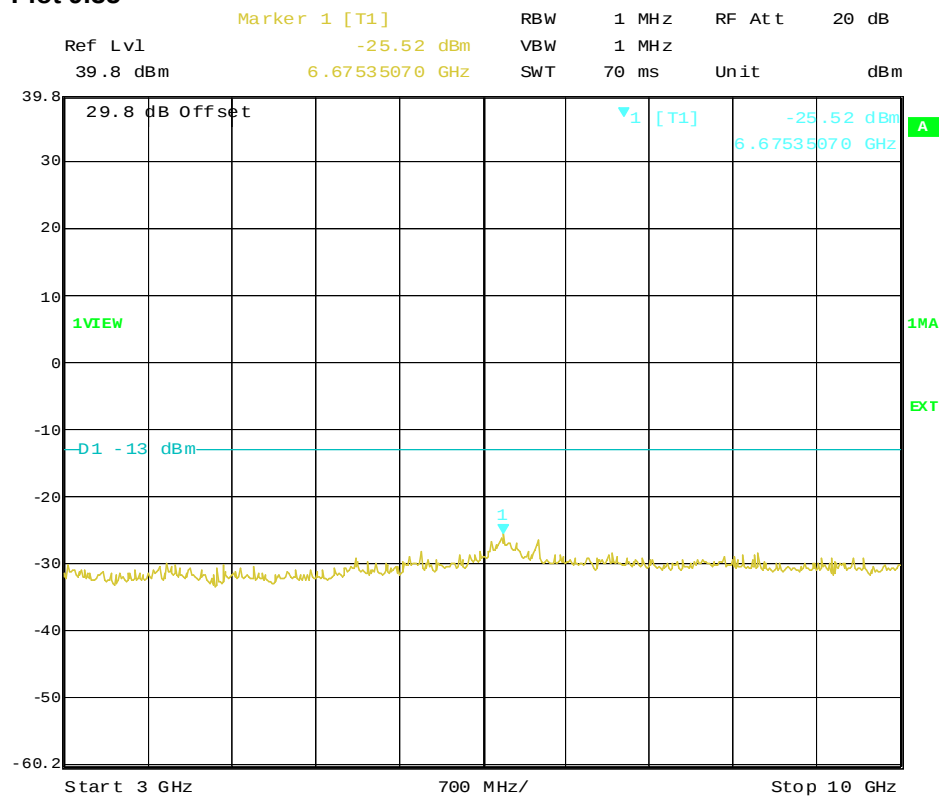
Date : 24.APR.2012 13:39:54

Plot 9.34



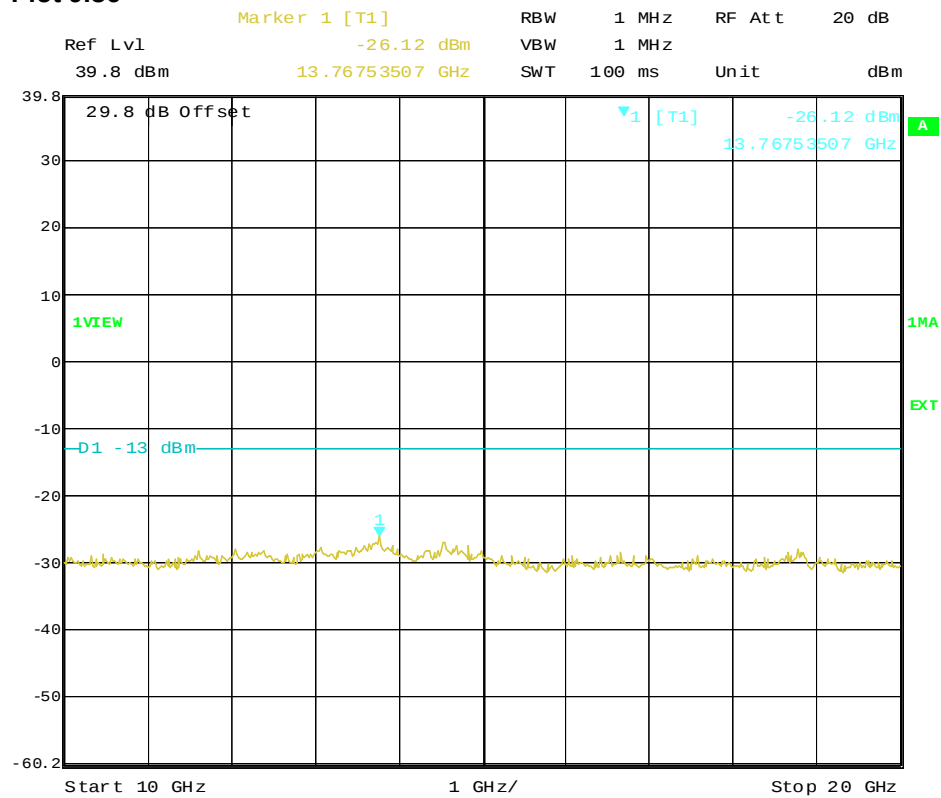
Date : 24.APR.2012 13:07:04

Plot 9.35



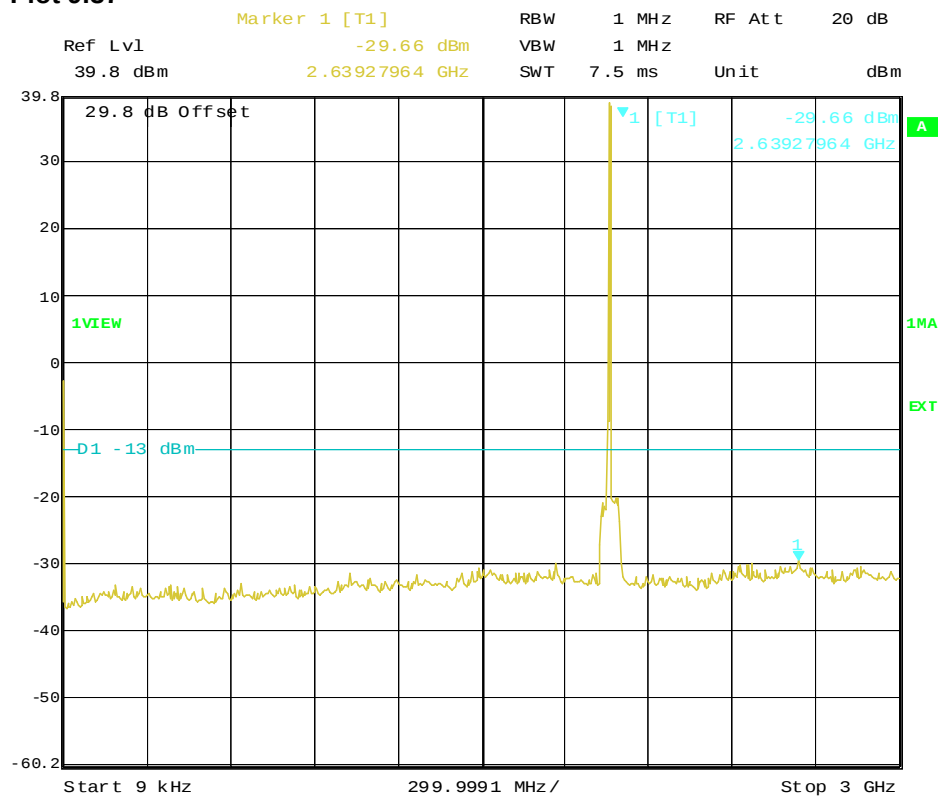
Date : 24. APR. 2012 13:21:55

Plot 9.36



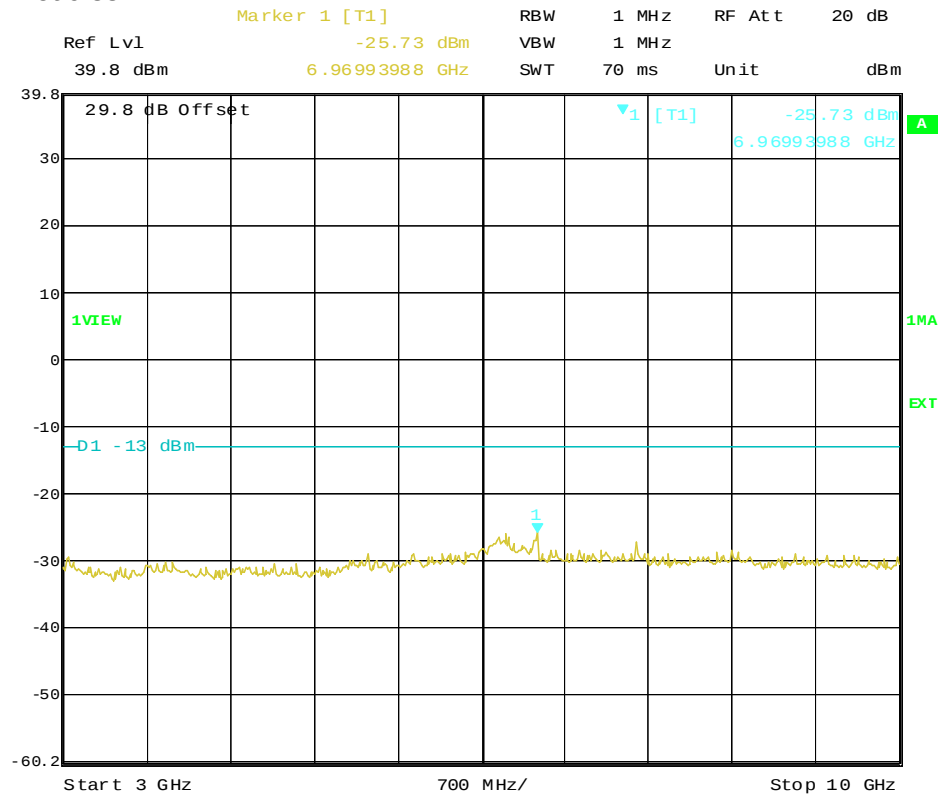
Date : 24. APR. 2012 13:24:10

Plot 9.37



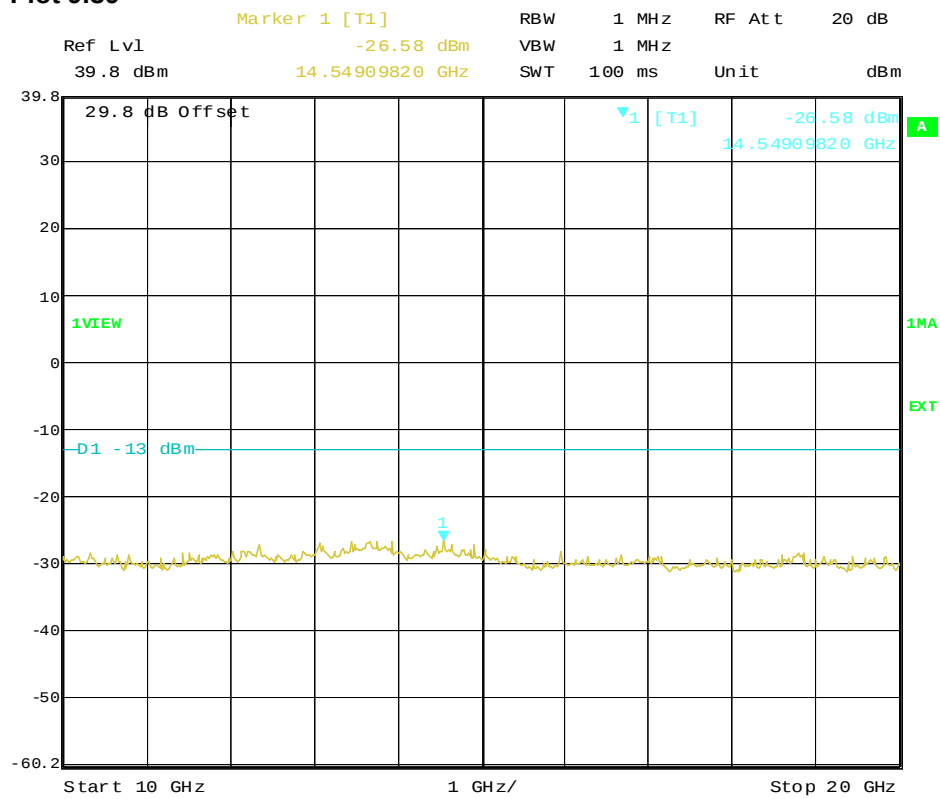
Date: 24.APR.2012 13:08:08

Plot 9.38



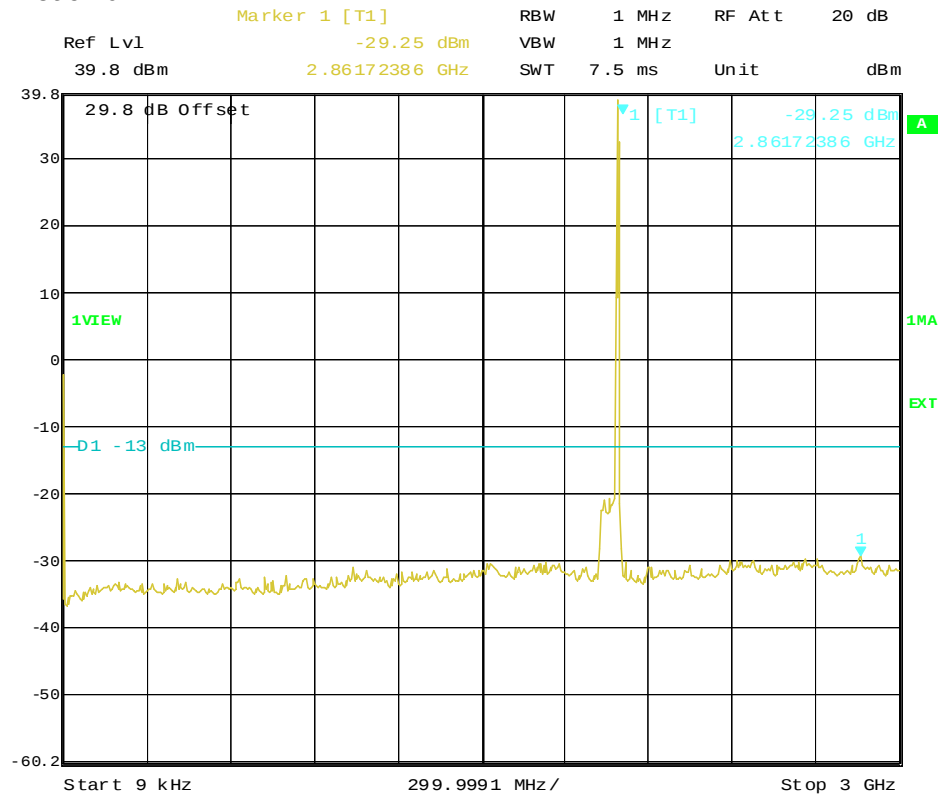
Date: 24.APR.2012 13:23:01

Plot 9.39



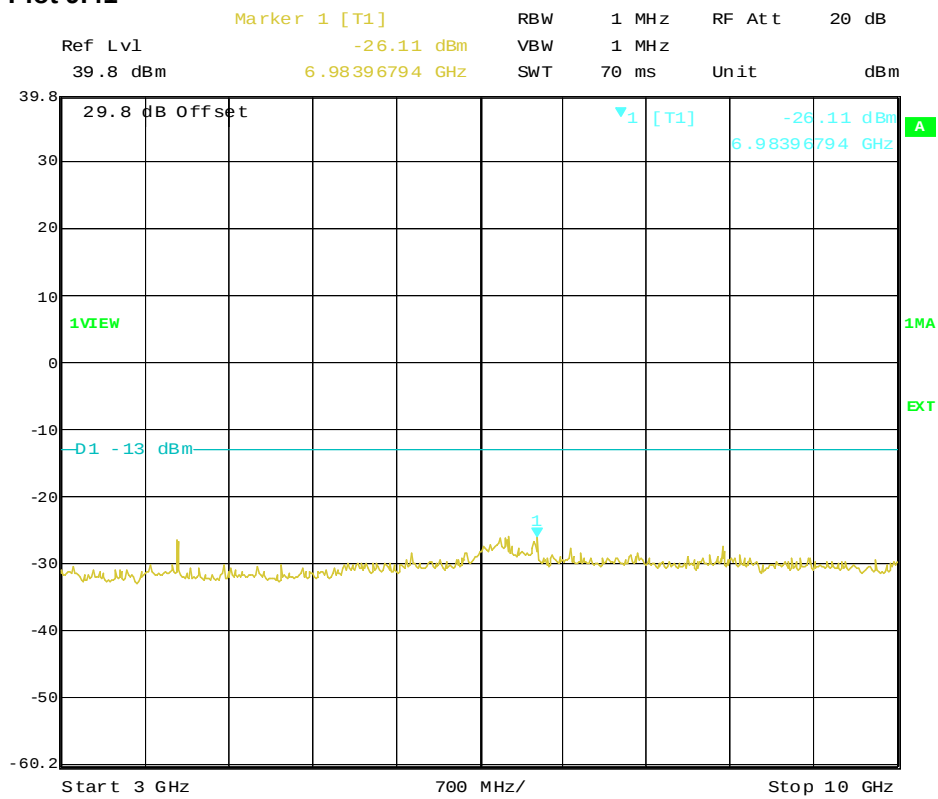
Date : 24. APR. 2012 13:26:06

Plot 9.40



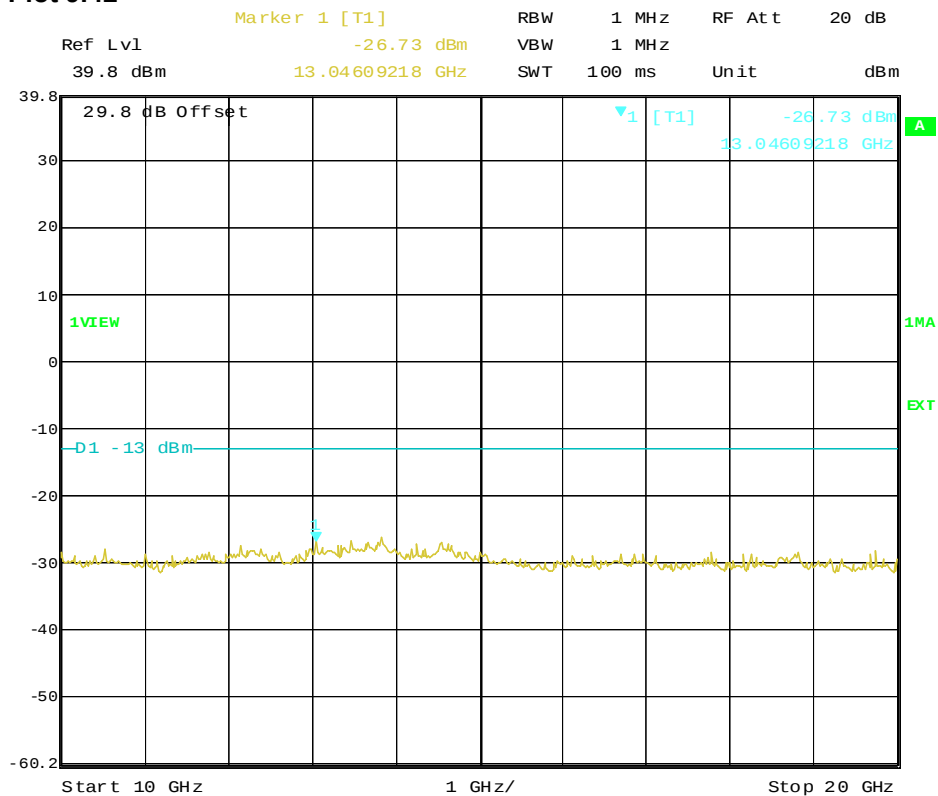
Date : 24. APR. 2012 13:09:43

## Plot 9.41



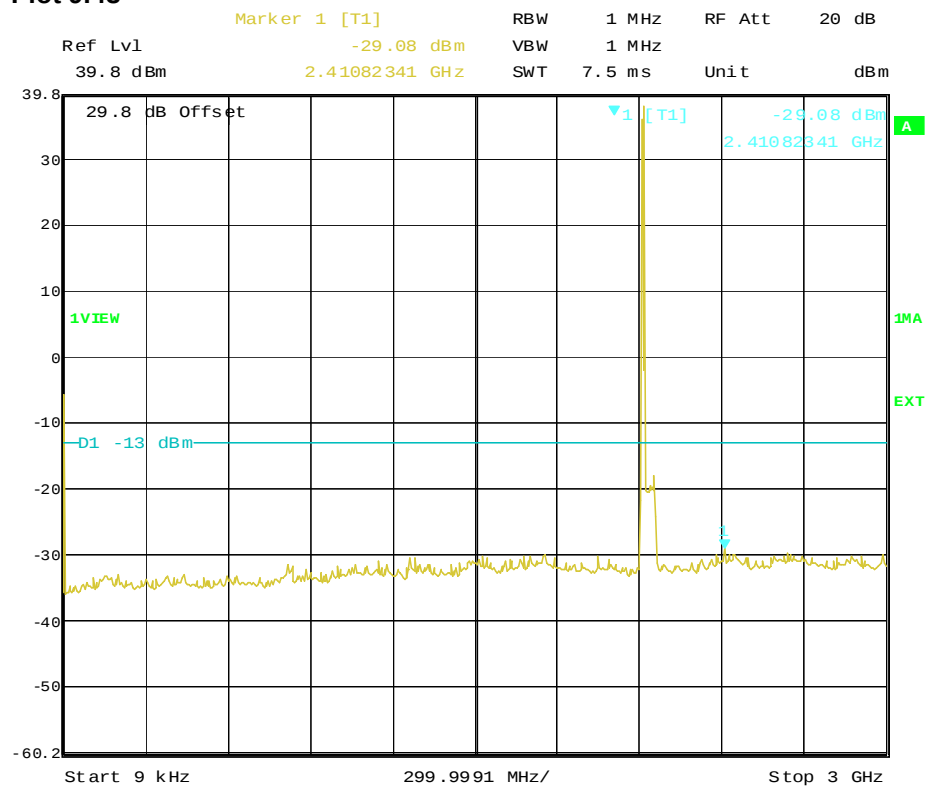
Date : 24. APR. 2012 13:20:39

## Plot 9.42



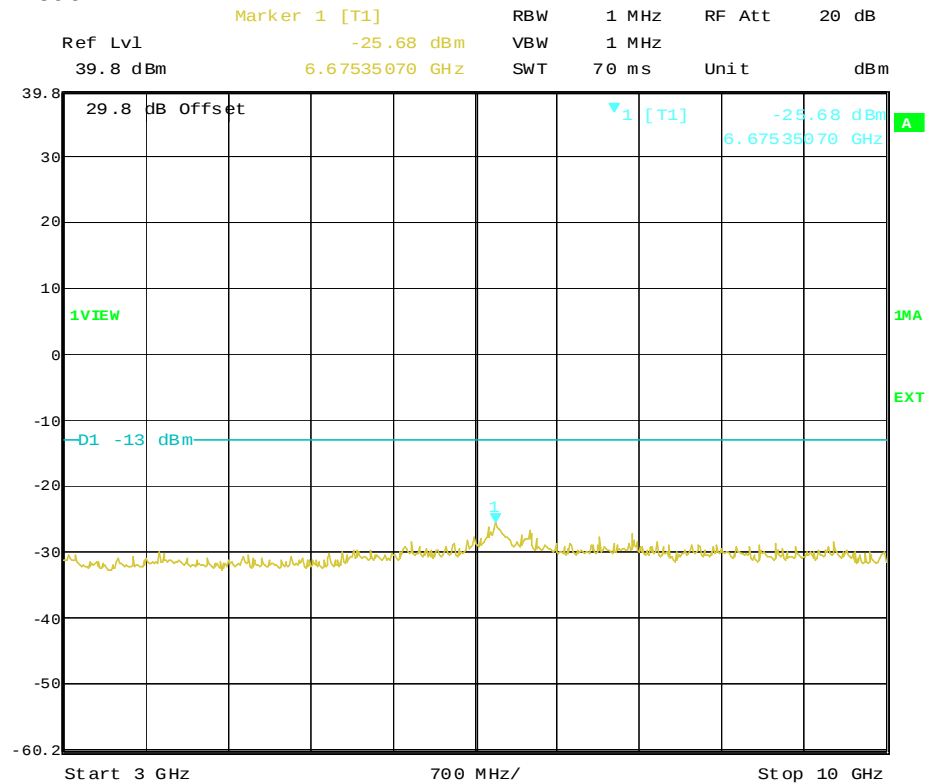
Date : 24. APR. 2012 13:36:10

Plot 9.43



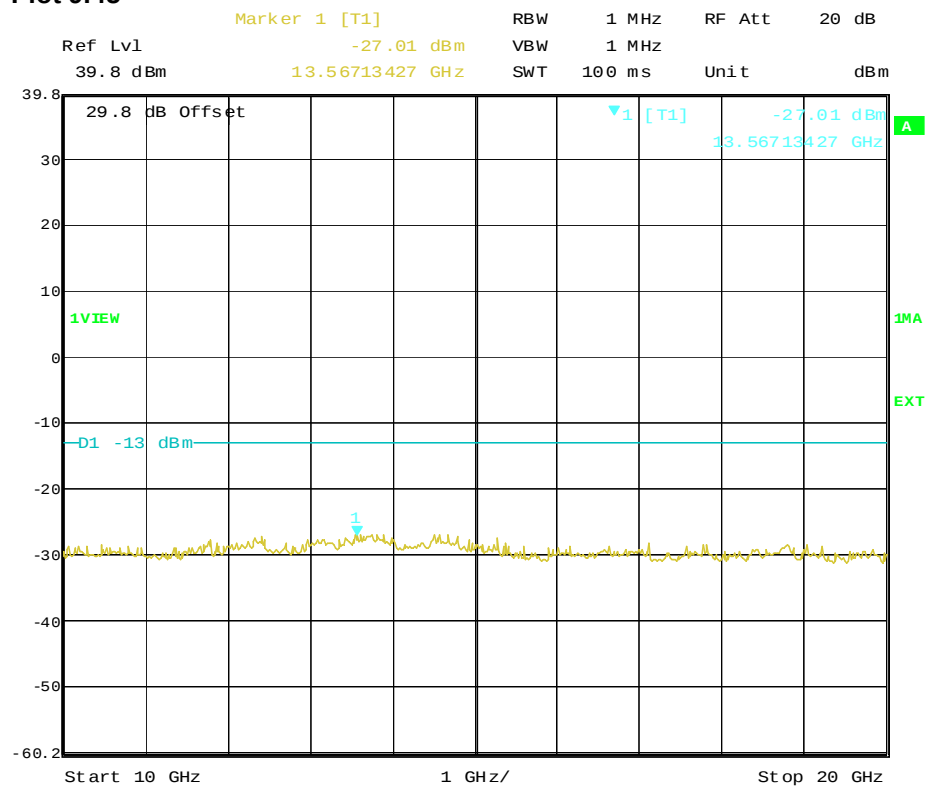
Date: 24. APR. 2012 10:29:22

Plot 9.44



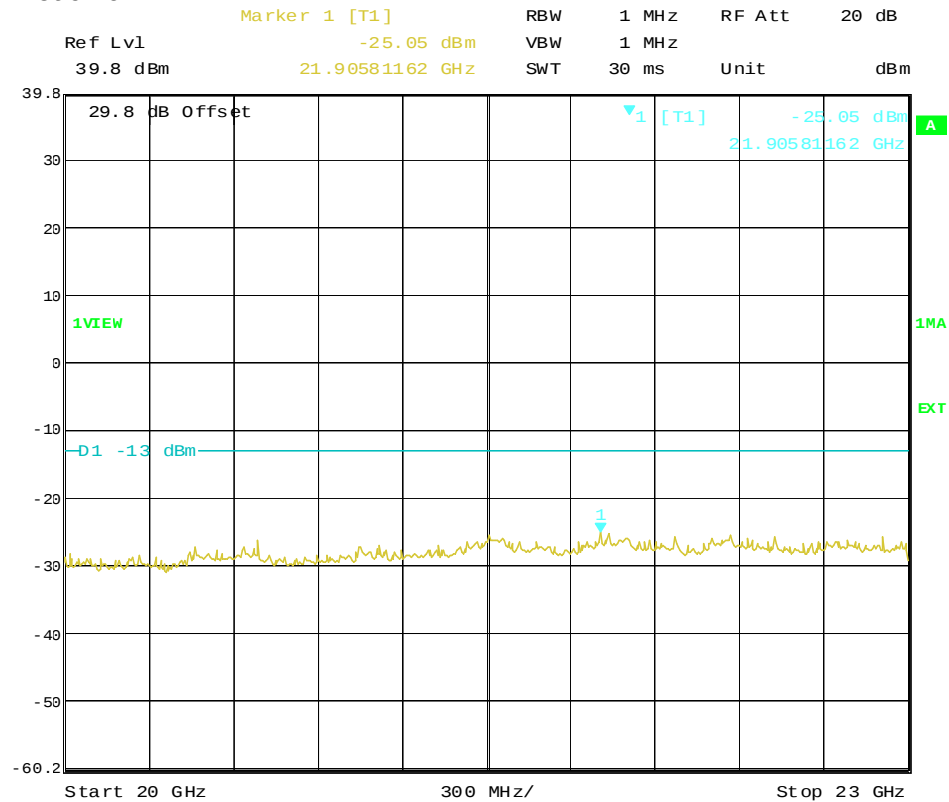
Date: 24. APR. 2012 10:34:27

## Plot 9.45



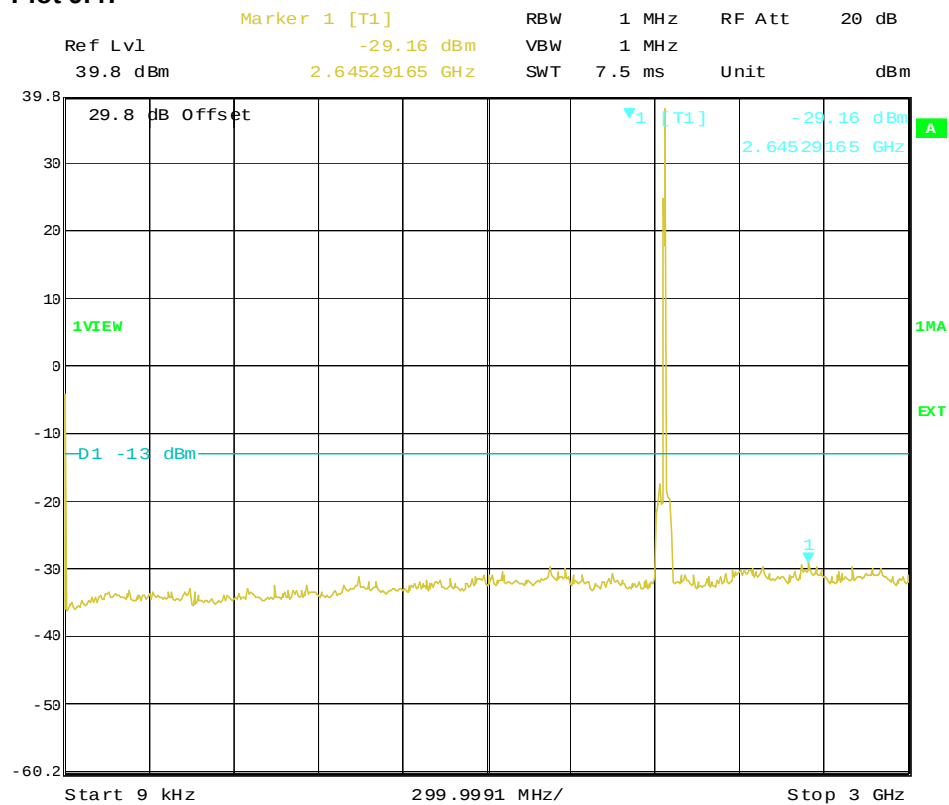
Date: 24. APR. 2012 11:01:41

## Plot 9.46



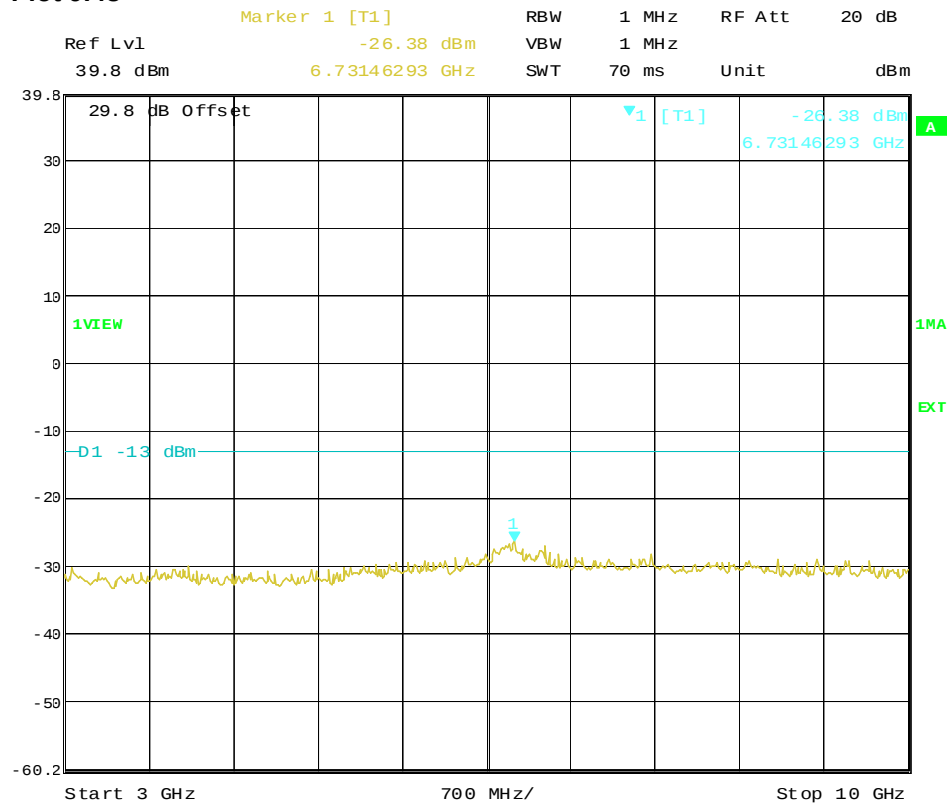
Date: 24. APR. 2012 11:05:40

Plot 9.47



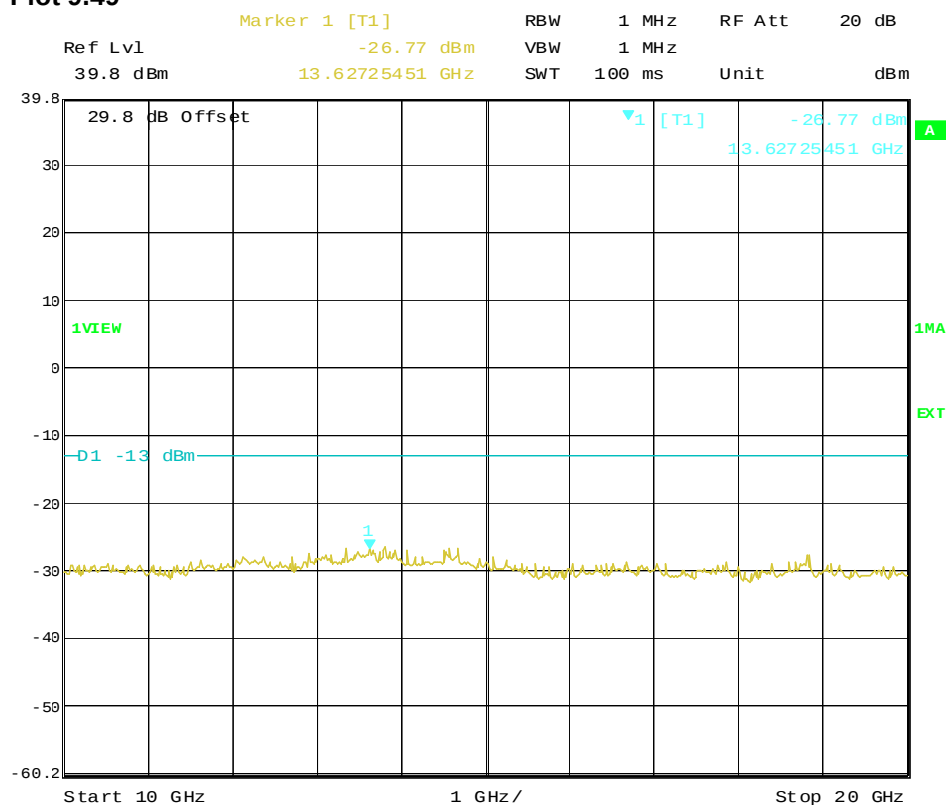
Date: 24.APR.2012 10:30:48

Plot 9.48



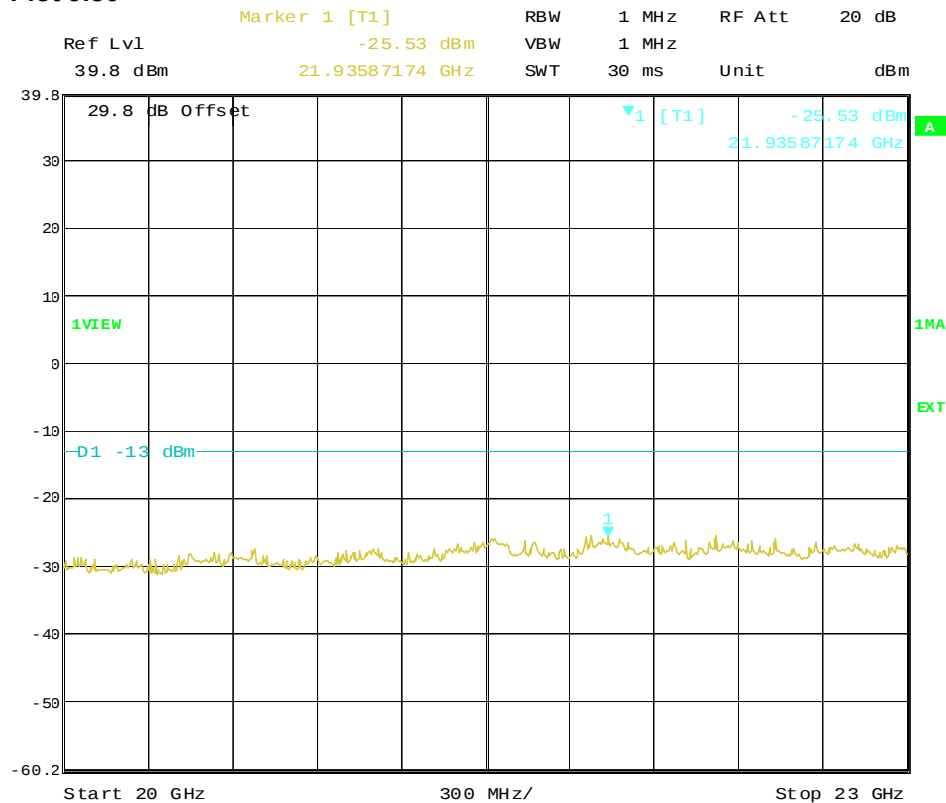
Date: 24.APR.2012 10:36:29

Plot 9.49



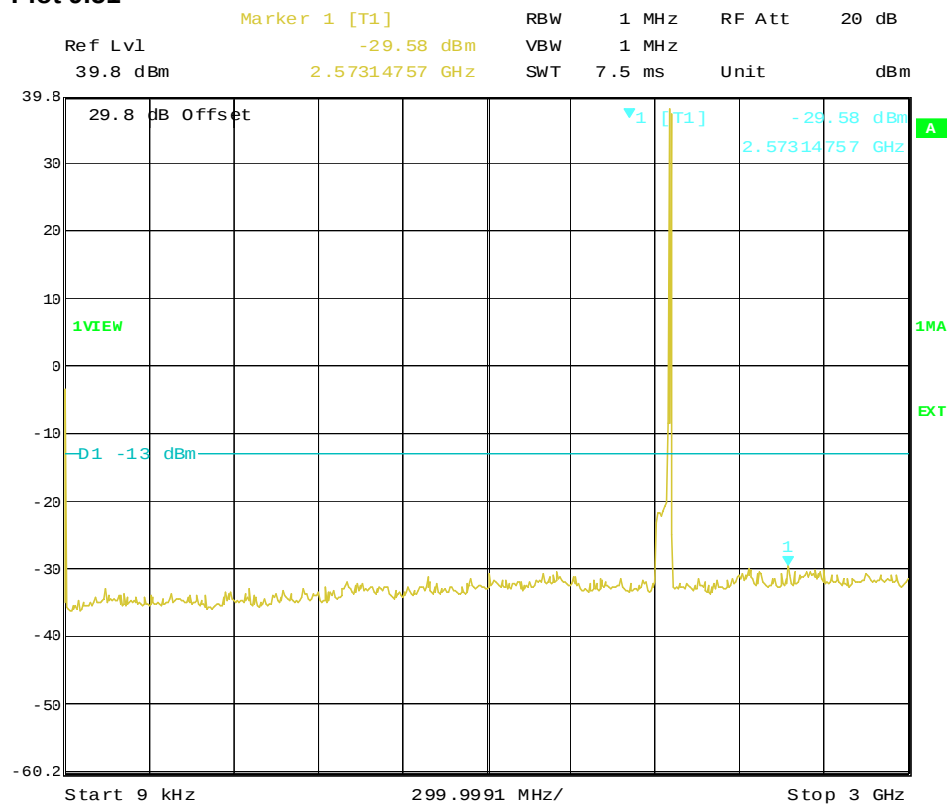
Date: 24.APR.2012 11:00:30

Plot 9.50



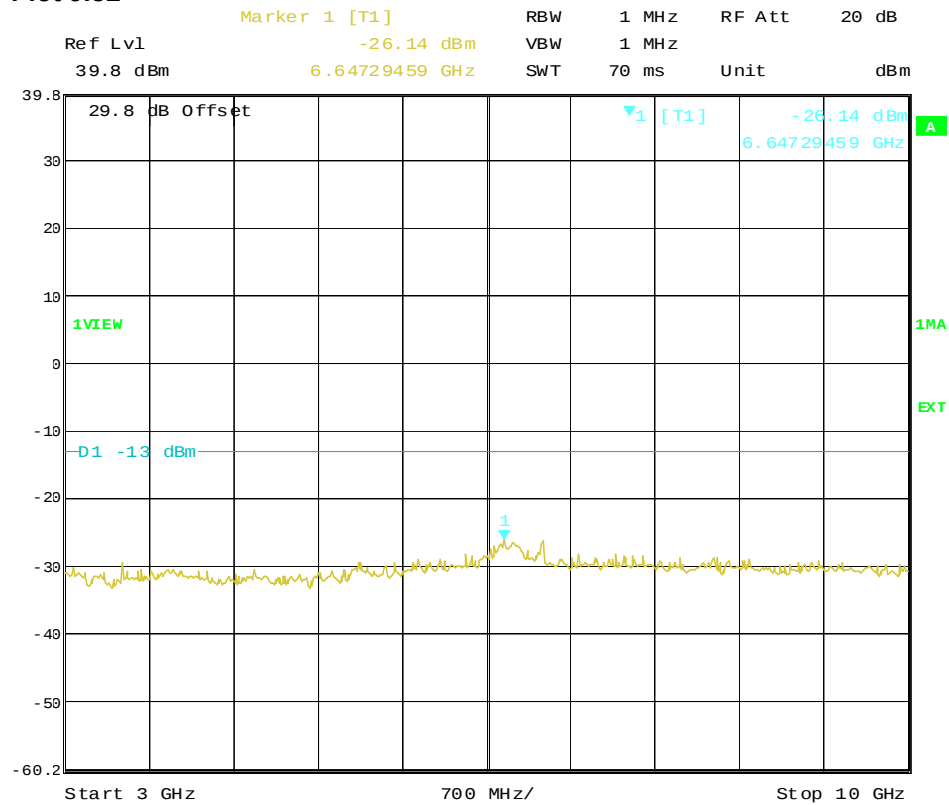
Date: 24.APR.2012 11:06:55

Plot 9.51



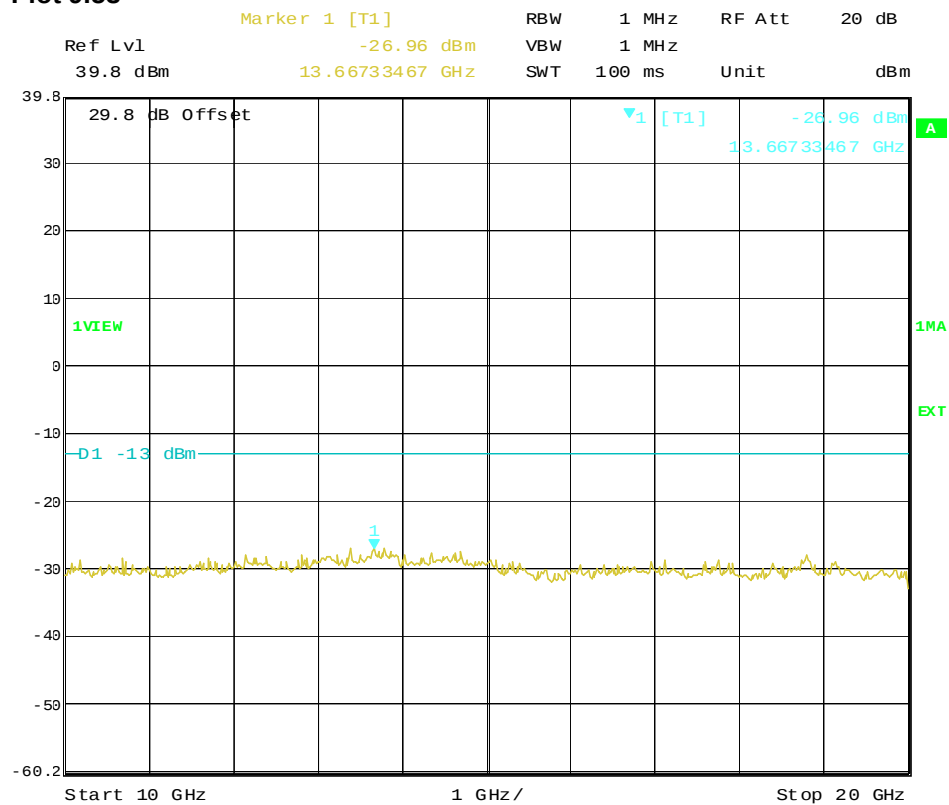
Date: 24.APR.2012 10:31:55

Plot 9.52



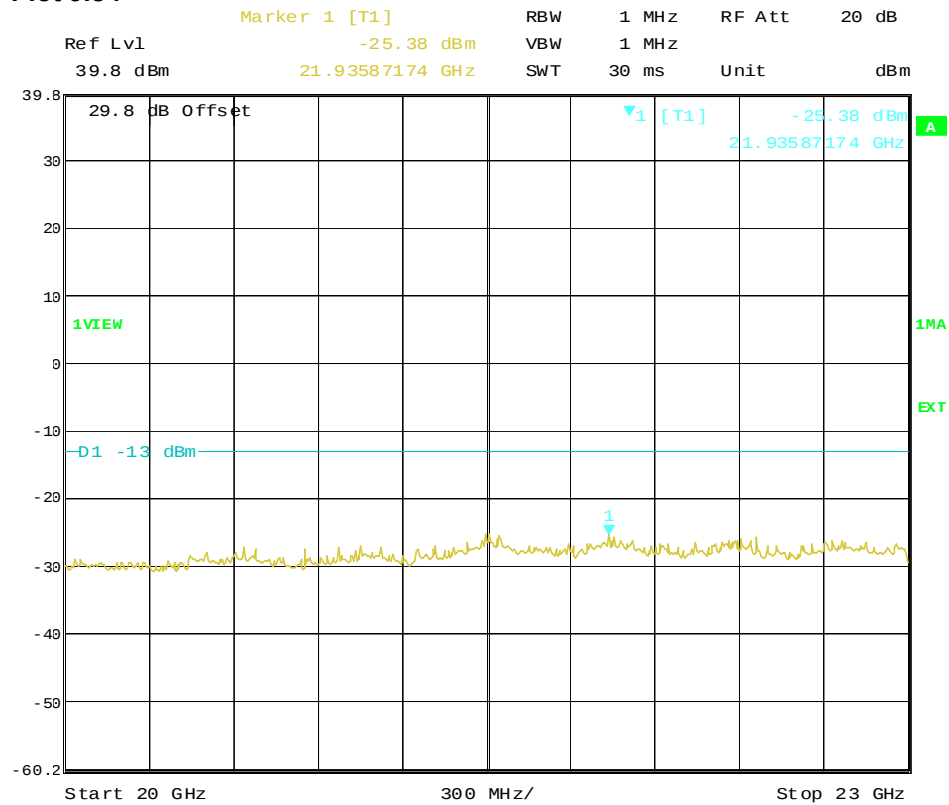
Date: 24.APR.2012 10:33:02

Plot 9.53



Date: 24.APR.2012 11:02:57

Plot 9.54



Date: 24.APR.2012 11:03:57

**10 OUT OF BAND SPURIOS EMISSION, RADIATED**

|               |             |                   |             |
|---------------|-------------|-------------------|-------------|
| Date of test: | 2012-04-19  | Test location:    | Big Chamber |
| EUT Serial:   | 99001       | Ambient temp.     | 23 °C       |
| Tested by:    | Åke Carlson | Relative humidity | 48 %        |
| Test result:  | Pass        | Margin:           | >14 dB      |

**10.1 Test specifications**

47 CFR 2.1051 and 22.917(a)

47 CFR 2.1051 and 24.238

47 CFR 2.1051 and 27.53(g)

Spurious emissions should be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log (P)$

This gives a limit at -13 dBm.

The frequency range to be inspected up to the tenth harmonics of the highest fundamental frequency according to 47 CFR 2.1057.

The field strength limit is calculated using the plane wave relation.

$$GP/4\pi R^2 = E^2 / 120\pi$$

G: antenna gain

P: power (W)

R: measurement distance (m)

-13 dBm EIRP gives a field strength limit of 77.8 dB $\mu$ V/m at a 10m measurement distance in an semi anechoic chamber, assuming 6dB addition from the reflection in the ground floor.

-13 dBm EIRP gives a field strength limit of 82.2 dB $\mu$ V/m at a 3m measurement distance in an anechoic chamber.

**10.2 Test equipment**

| Equipment | Manufacturer | Type | SEMKO No. |
|-----------|--------------|------|-----------|
|-----------|--------------|------|-----------|

*Test site: "Big Chamber"*

*Semi-anechoic shielded chamber, 10 x 20 x 8,5 m (W x L x H)*

|                       |                 |          |       |
|-----------------------|-----------------|----------|-------|
| Software:             | Rohde & Schwarz | EMC 32   |       |
| Measurement receiver: | Rohde & Schwarz | ESU 8    | 12866 |
| Antenna:              | Chase           | CBL 6111 | 8578  |
| Preamplifier:         | Chase           | CBL 6111 | 8578  |

### **10.3 Measurement set-up**

Test site: "Big Chamber" Semi-anechoic shielded chamber (30 – 1000 MHz)

The radiated disturbance electric field intensity was measured in a semi-anechoic chamber at a distance of 10 m and the EUT was placed on a non-metallic table, 0.8 m above the reference ground plane. The specified test mode was enabled. Test set-up photos are given below.

An overview sweep with peak detection of the electric field intensity was performed with the measurement receiver in max-hold and with the antenna placed 1.5 m, 2.5 m and 3.5 m above the floor. The polarisation was horizontal and vertical. The measurements were repeated with the EUT rotated in 90-degree steps.

At the frequencies where high disturbance levels were found a search for max disturbance level was performed. With the EUT and antenna in the worst-case configuration new measurements with quasi-peak detector were carried out.

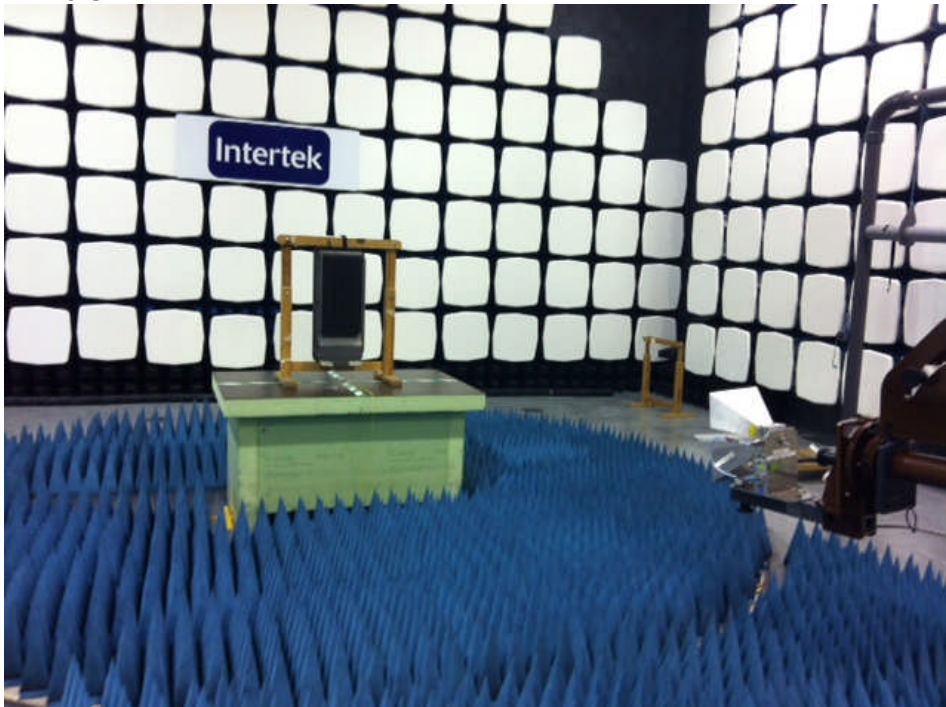
The EUT was supplied with 120 V AC (60 Hz) during the test.

Test set-up photo:

30 – 1000 MHz



1 – 26 GHz



**10.4 Test data**Data summary

| <b>700 MHz, Field strength of spurious emissions low channel</b> |       |                |            |             |
|------------------------------------------------------------------|-------|----------------|------------|-------------|
| Frequency                                                        | RBW   | Measured level | Limit      | Note        |
| [MHz]                                                            | [kHz] | [dB(μV/m)]     | [dB(μV/m)] |             |
| 30 - 1000                                                        | 120   | -              | 77.8       | Noise floor |
| 1491.90                                                          | 1000  | 41.9           | 82.2       |             |

| <b>700 MHz, Field strength of spurious emissions middle channel</b> |       |                |            |             |
|---------------------------------------------------------------------|-------|----------------|------------|-------------|
| Frequency                                                           | RBW   | Measured level | Limit      | Note        |
| [MHz]                                                               | [kHz] | [dB(μV/m)]     | [dB(μV/m)] |             |
| 30 - 1000                                                           | 120   | -              | 77.8       | Noise floor |
| 1501.85                                                             | 1000  | 47.2           | 82.2       |             |

| <b>700 MHz, Field strength of spurious emissions high channel</b> |       |                |            |             |
|-------------------------------------------------------------------|-------|----------------|------------|-------------|
| Frequency                                                         | RBW   | Measured level | Limit      | Note        |
| [MHz]                                                             | [kHz] | [dB(μV/m)]     | [dB(μV/m)] |             |
| 30 - 1000                                                         | 120   | -              | 77.8       | Noise floor |
| 1514.10                                                           | 1000  | 46.7           | 82.2       |             |

| <b>850 MHz, Field strength of spurious emissions low channel</b> |       |                |            |             |
|------------------------------------------------------------------|-------|----------------|------------|-------------|
| Frequency                                                        | RBW   | Measured level | Limit      | Note        |
| [MHz]                                                            | [kHz] | [dB(μV/m)]     | [dB(μV/m)] |             |
| 30 - 1000                                                        | 120   | -              | 77.8       | Noise floor |
| 1783.00                                                          | 1000  | 48.4           | 82.2       |             |

| <b>850 MHz, Field strength of spurious emissions middle channel</b> |       |                |            |             |
|---------------------------------------------------------------------|-------|----------------|------------|-------------|
| Frequency                                                           | RBW   | Measured level | Limit      | Note        |
| [MHz]                                                               | [kHz] | [dB(μV/m)]     | [dB(μV/m)] |             |
| 30 - 1000                                                           | 120   | -              | 77.8       | Noise floor |
| 1762.00                                                             | 1000  | 42.8           | 82.2       |             |
| 2643.05                                                             | 1000  | 42.5           | 82.2       |             |

| <b>850 MHz, Field strength of spurious emissions high channel</b> |       |                |            |             |
|-------------------------------------------------------------------|-------|----------------|------------|-------------|
| Frequency                                                         | RBW   | Measured level | Limit      | Note        |
| [MHz]                                                             | [kHz] | [dB(μV/m)]     | [dB(μV/m)] |             |
| 30 - 1000                                                         | 120   | -              | 77.8       | Noise floor |
| 1000 - 13000                                                      | 1000  | -              | 82.2       | Noise floor |

| <b>1900 MHz, Field strength of spurious emissions low channel</b> |       |                |            |             |
|-------------------------------------------------------------------|-------|----------------|------------|-------------|
| Frequency                                                         | RBW   | Measured level | Limit      | Note        |
| [MHz]                                                             | [kHz] | [dB(μV/m)]     | [dB(μV/m)] |             |
| 30 - 1000                                                         | 120   | -              | 77.8       | Noise floor |
| 3859.95                                                           | 1000  | 51.8           | 82.2       |             |
| 5789.85                                                           | 1000  | 49.8           | 82.2       |             |
| 7720.00                                                           | 1000  | 55.6           | 82.2       |             |
| 18000 - 26000                                                     | 1000  | -              | 82.2       | Noise floor |

| <b>1900 MHz, Field strength of spurious emissions middle channel</b> |       |                |            |             |
|----------------------------------------------------------------------|-------|----------------|------------|-------------|
| Frequency                                                            | RBW   | Measured level | Limit      | Note        |
| [MHz]                                                                | [kHz] | [dB(μV/m)]     | [dB(μV/m)] |             |
| 30 - 1000                                                            | 120   | -              | 77.8       | Noise floor |
| 3919.95                                                              | 1000  | 52.3           | 82.2       |             |
| 5880.00                                                              | 1000  | 47.1           | 82.2       |             |
| 18000 - 26000                                                        | 1000  | -              | 82.2       | Noise floor |

| <b>1900 MHz, Field strength of spurious emissions high channel</b> |       |                |            |             |
|--------------------------------------------------------------------|-------|----------------|------------|-------------|
| Frequency                                                          | RBW   | Measured level | Limit      | Note        |
| [MHz]                                                              | [kHz] | [dB(μV/m)]     | [dB(μV/m)] |             |
| 30 - 1000                                                          | 120   | -              | 77.8       | Noise floor |
| 3979.95                                                            | 1000  | 48.6           | 82.2       |             |
| 5970.10                                                            | 1000  | 50.0           | 82.2       |             |
| 18000 - 26000                                                      | 1000  | -              | 82.2       | Noise floor |

| <b>AWS, Field strength of spurious emissions low channel</b> |       |                |            |             |
|--------------------------------------------------------------|-------|----------------|------------|-------------|
| Frequency                                                    | RBW   | Measured level | Limit      | Note        |
| [MHz]                                                        | [kHz] | [dB(μV/m)]     | [dB(μV/m)] |             |
| 30 - 1000                                                    | 120   | -              | 77.8       | Noise floor |
| 4220.00                                                      | 1000  | 68.6           | 82.2       |             |
| 6330.15                                                      | 1000  | 54.6           | 82.2       |             |
| 8440.00                                                      | 1000  | 62.3           | 82.2       |             |
| 18000 - 26000                                                | 1000  | -              | 82.2       | Noise floor |

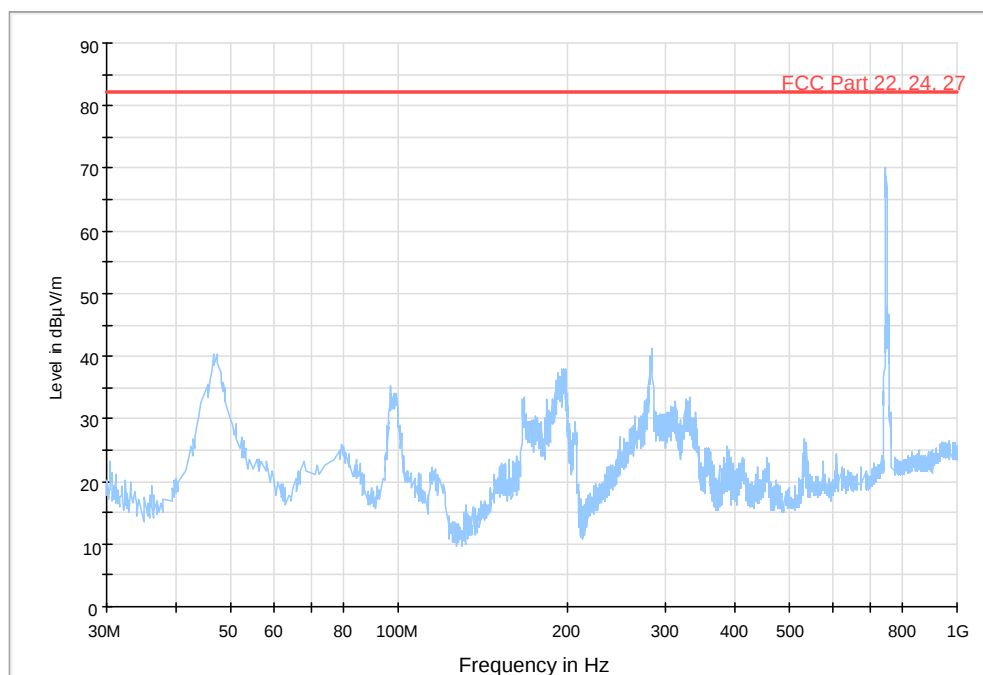
| <b>AWS, Field strength of spurious emissions middle channel</b> |       |                |            |             |
|-----------------------------------------------------------------|-------|----------------|------------|-------------|
| Frequency                                                       | RBW   | Measured level | Limit      | Note        |
| [MHz]                                                           | [kHz] | [dB(μV/m)]     | [dB(μV/m)] |             |
| 30 - 1000                                                       | 120   | -              | 77.8       | Noise floor |
| 4264.00                                                         | 1000  | 68.2           | 82.2       |             |
| 6396.00                                                         | 1000  | 56.0           | 82.2       |             |
| 8527.95                                                         | 1000  | 55.6           | 82.2       |             |
| 18000 - 26000                                                   | 1000  | -              | 82.2       | Noise floor |

| <b>AWS, Field strength of spurious emissions high channel</b> |       |                |            |             |
|---------------------------------------------------------------|-------|----------------|------------|-------------|
| Frequency                                                     | RBW   | Measured level | Limit      | Note        |
| [MHz]                                                         | [kHz] | [dB(μV/m)]     | [dB(μV/m)] |             |
| 30 - 1000                                                     | 120   | -              | 77.8       | Noise floor |
| 4310.10                                                       | 1000  | 63.7           | 82.2       |             |
| 6465.05                                                       | 1000  | 55.3           | 82.2       |             |
| 8620.00                                                       | 1000  | 52.1           | 82.2       |             |
| 18000 - 26000                                                 | 1000  | -              | 82.2       | Noise floor |

Semi-anechoic shielded chamber

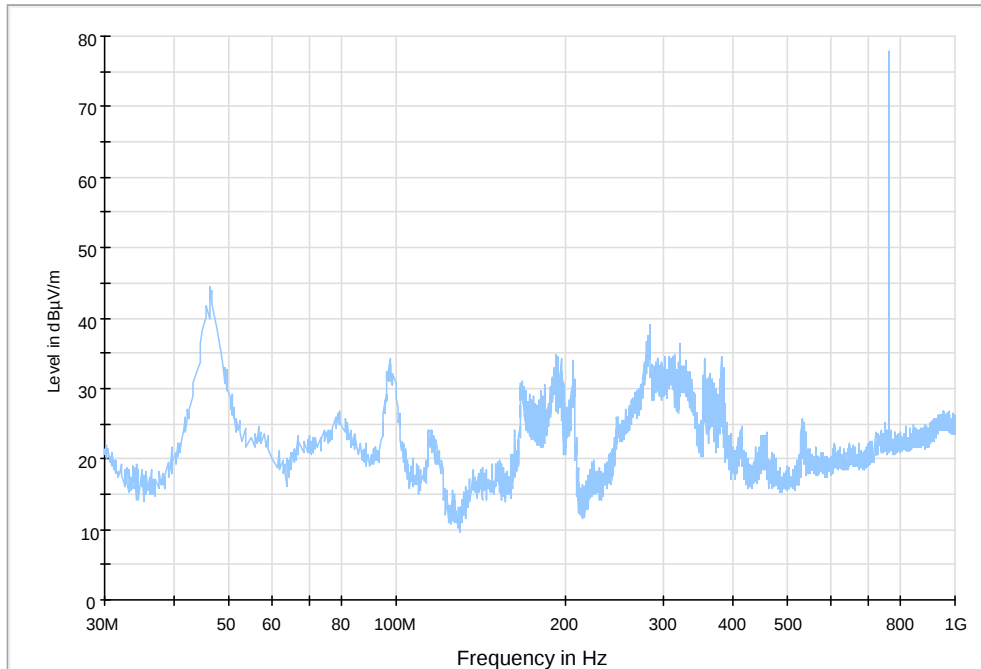
30 – 1000 MHz, max peak at a distance of 3 m. CW carrier in lower part of the 700 MHz pass band.

FCC 30 - 1000 MHz FCC Part 22, 24, 27 3m



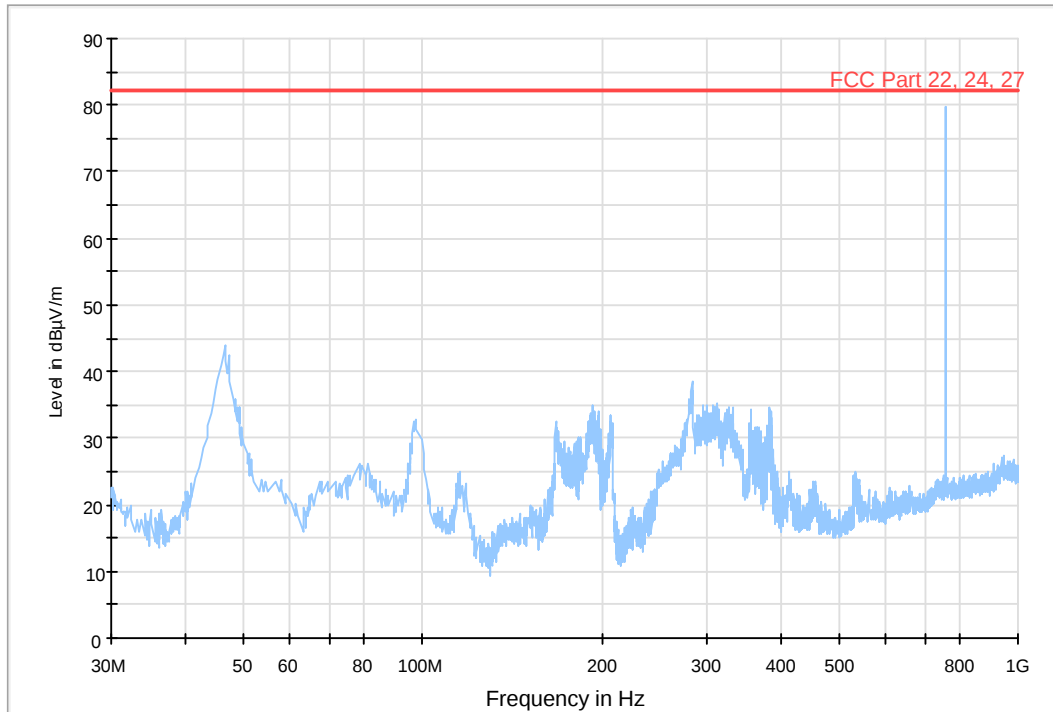
30 – 1000 MHz, max peak at a distance of 3 m. CW carrier in middle part of the 700 MHz pass band.

FCC 30 - 1000 MHz FCC Part 22, 24, 27 3m



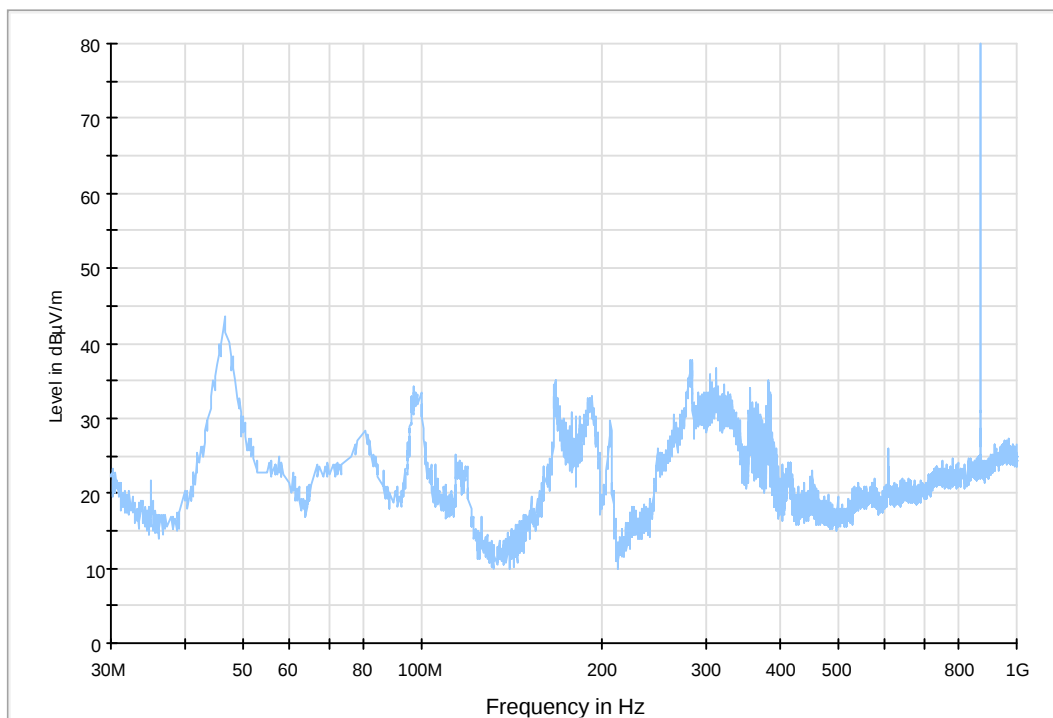
30 – 1000 MHz, max peak at a distance of 3 m. CW carrier in higher part of the 700 MHz pass band.

FCC 30 - 1000 MHz FCC Part 22, 24, 27 3m



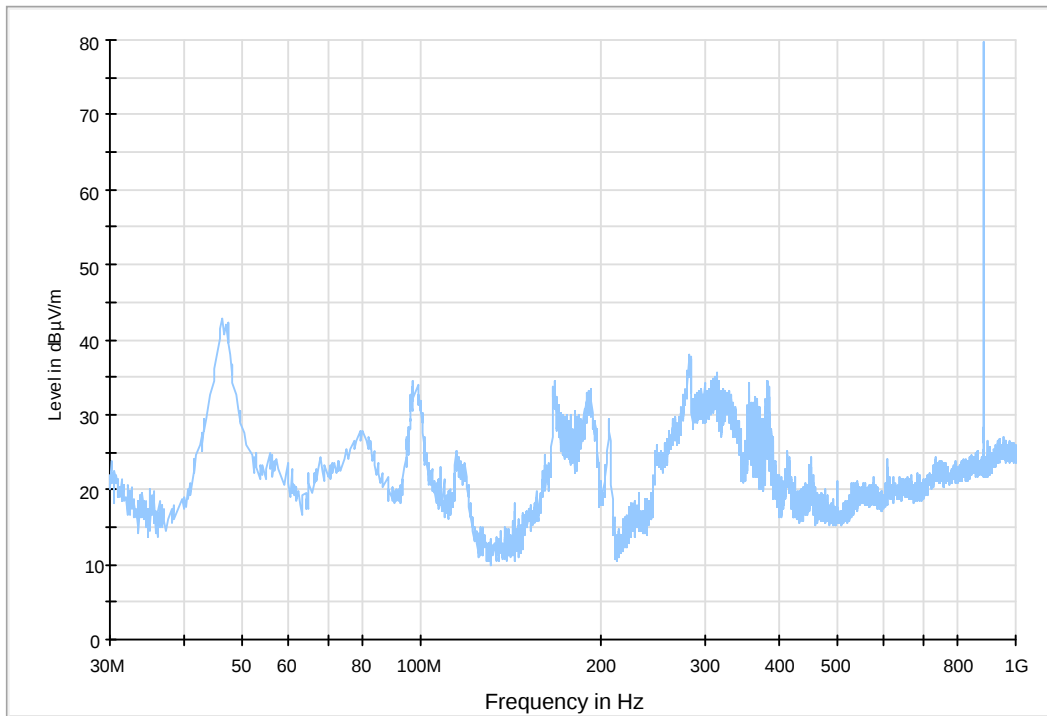
30 – 1000 MHz, max peak at a distance of 3 m. CW carrier in lower part of the 850 MHz pass band.

FCC 30 - 1000 MHz FCC Part 22, 24, 27 3m



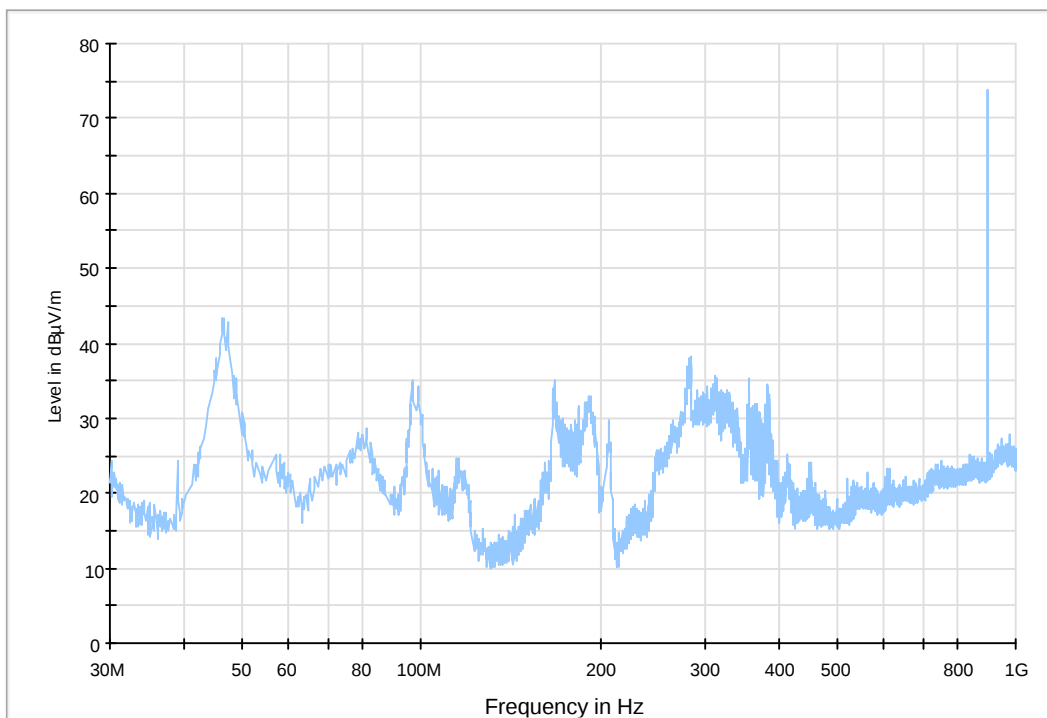
30 – 1000 MHz, max peak at a distance of 3 m. CW carrier in middle part of the 850 MHz pass band.

FCC 30 - 1000 MHz FCC Part 22, 24, 27 3m



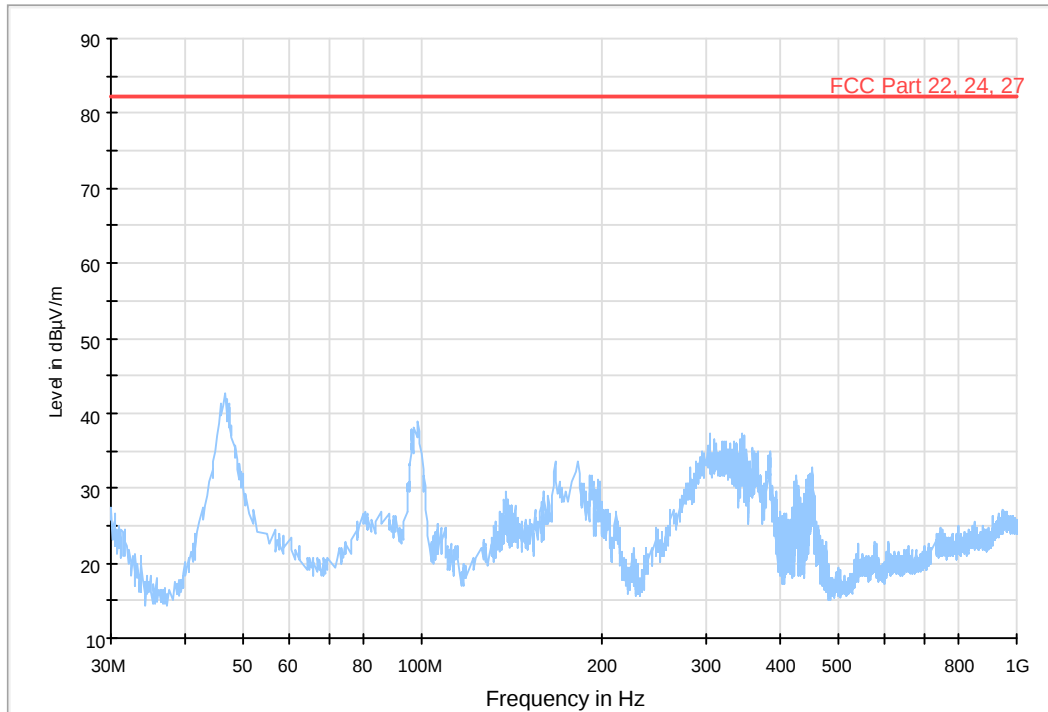
30 – 1000 MHz, max peak at a distance of 3 m. CW carrier in higher part of the 850 MHz pass band.

FCC 30 - 1000 MHz FCC Part 22, 24, 27 3m



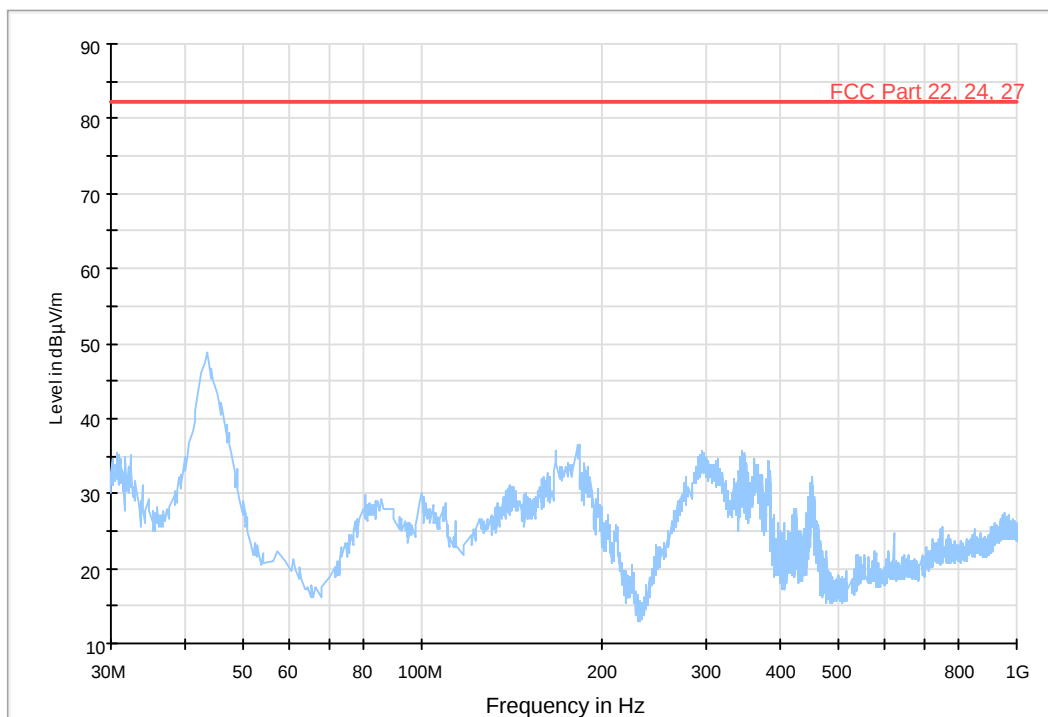
30 – 1000 MHz, max peak at a distance of 3 m. CW carrier in lower part of the 1900 MHz pass band.

FCC 30 - 1000 MHz FCC Part 22, 24, 27 3m



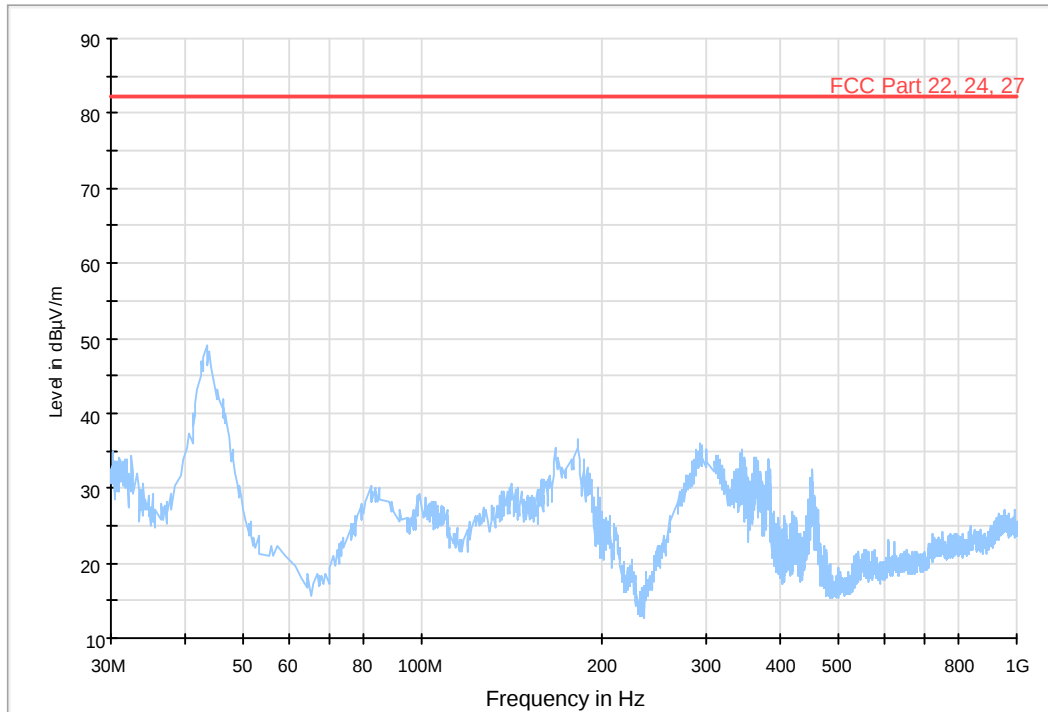
30 – 1000 MHz, max peak at a distance of 3 m. CW carrier in middle part of the 1900 MHz pass band.

FCC 30 - 1000 MHz FCC Part 22, 24, 27 3m



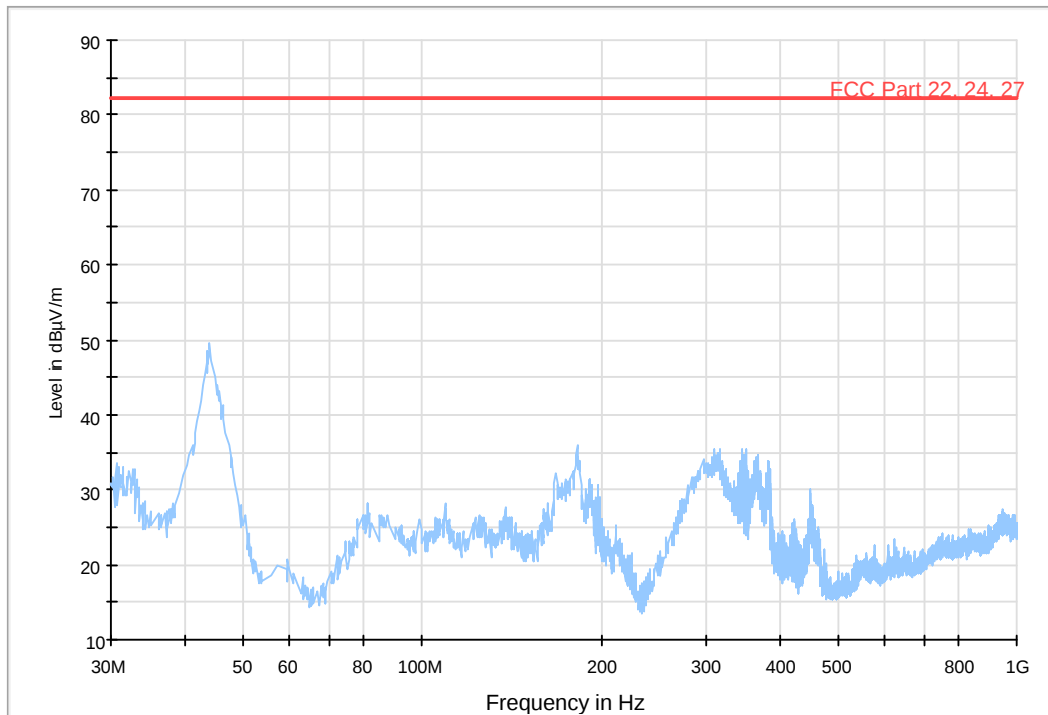
30 – 1000 MHz, max peak at a distance of 3 m. CW carrier in higher part of the 1900 MHz pass band.

FCC 30 - 1000 MHz FCC Part 22, 24, 27 3m



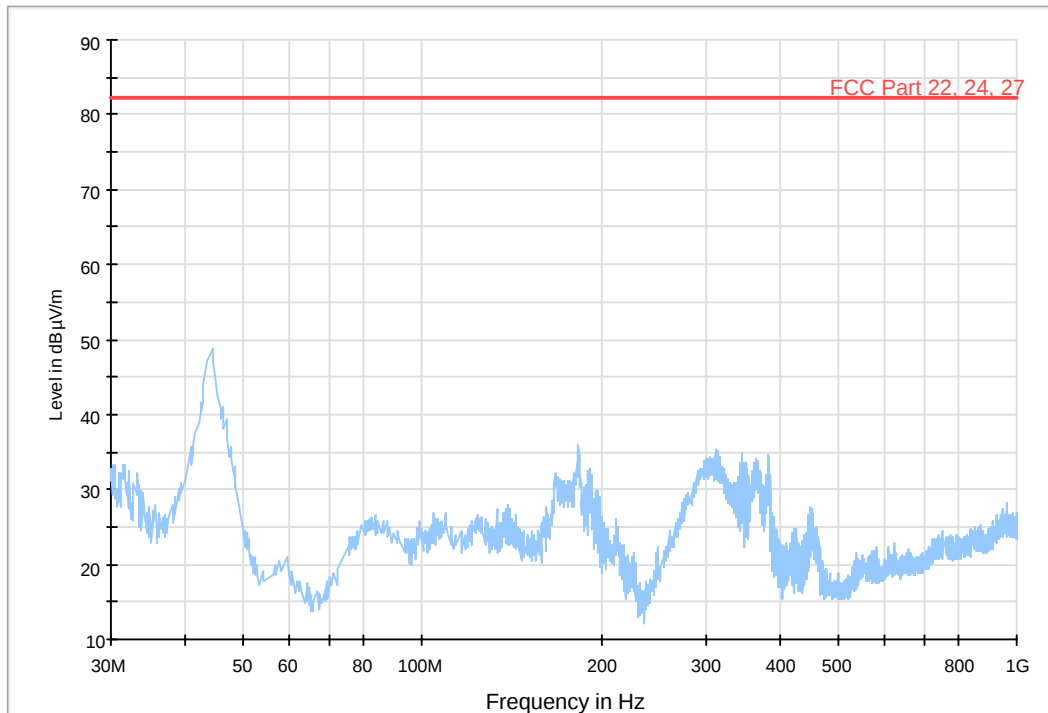
30 – 1000 MHz, max peak at a distance of 3 m. CW carrier in lower part of the AWS pass band.

FCC 30 - 1000 MHz FCC Part 22, 24, 27 3m



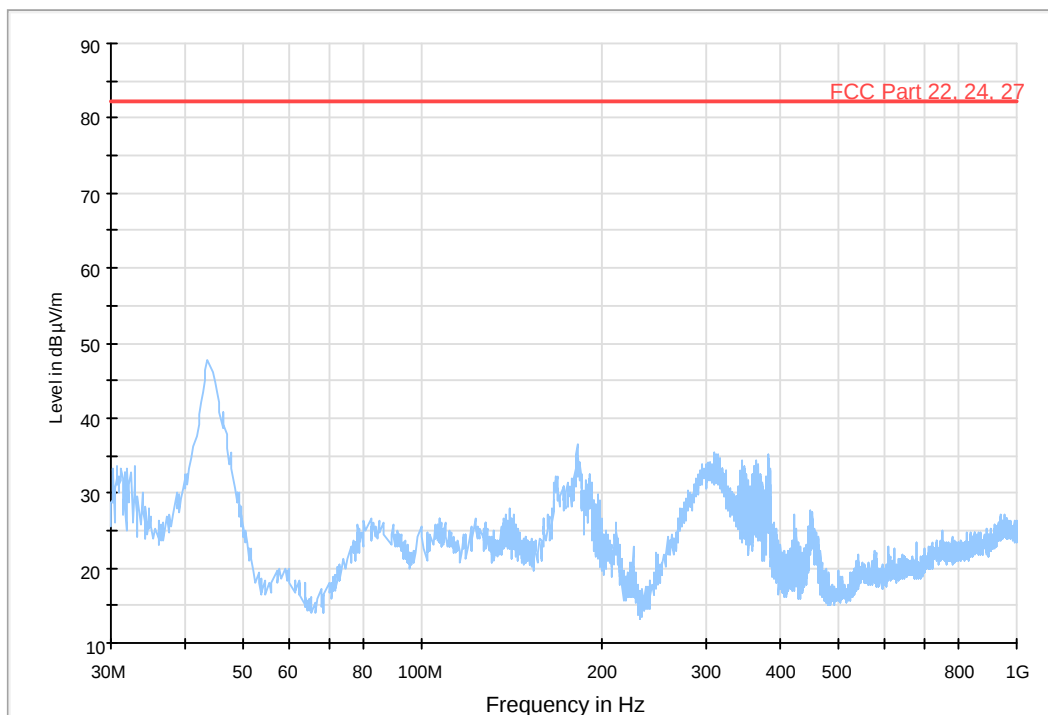
30 – 1000 MHz, max peak at a distance of 3 m. CW carrier in middle part of the AWS pass band.

FCC 30 - 1000 MHz FCC Part 22, 24, 27 3m



30 – 1000 MHz, max peak at a distance of 3 m. CW carrier in higher part of the AWS pass band.

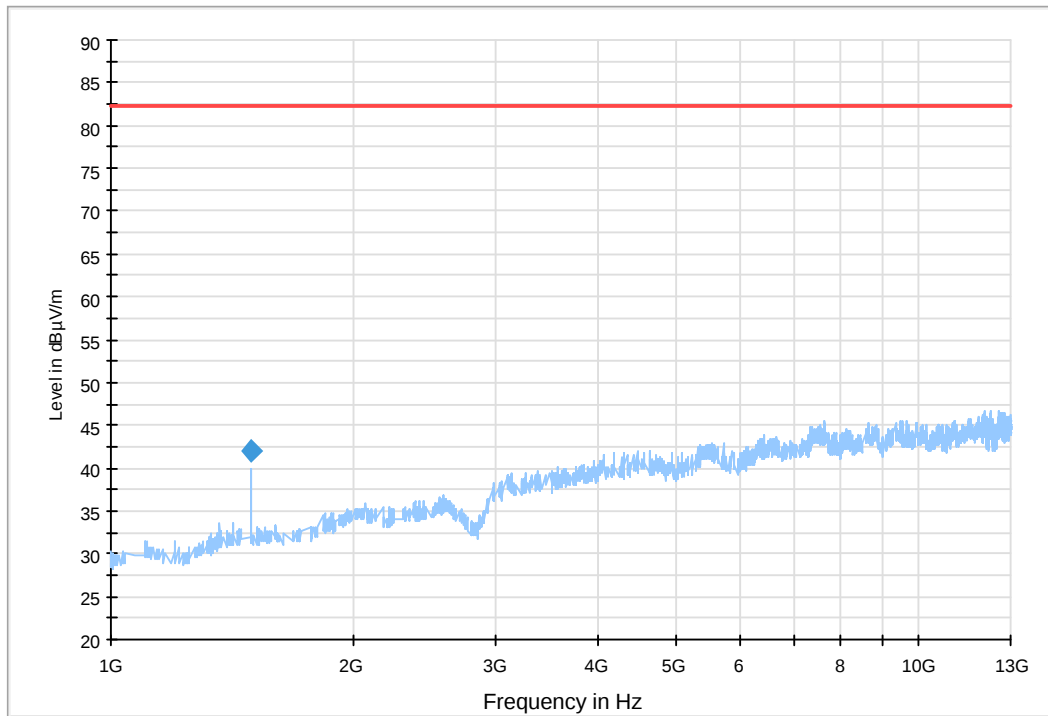
FCC 30 - 1000 MHz FCC Part 22, 24, 27 3m



700 MHz band

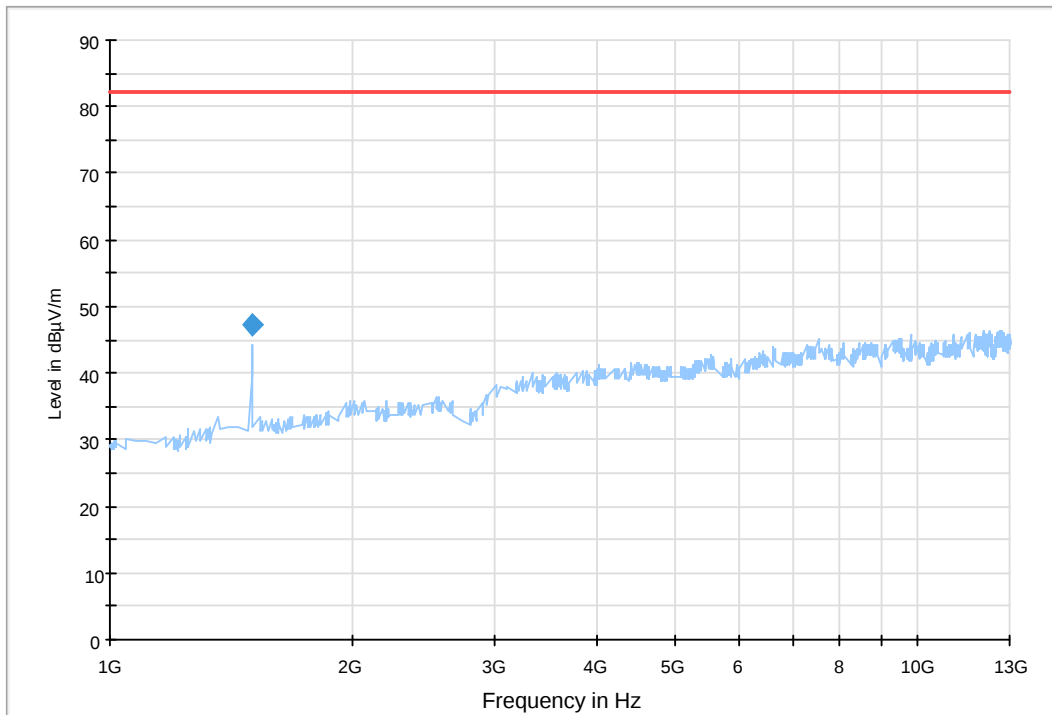
1000 – 13000 MHz, max peak at a distance of 3 m. CW carrier in lower part of the 700 MHz pass band.

FCC Part 22-24-27 1G - 18 G 3m ESU40



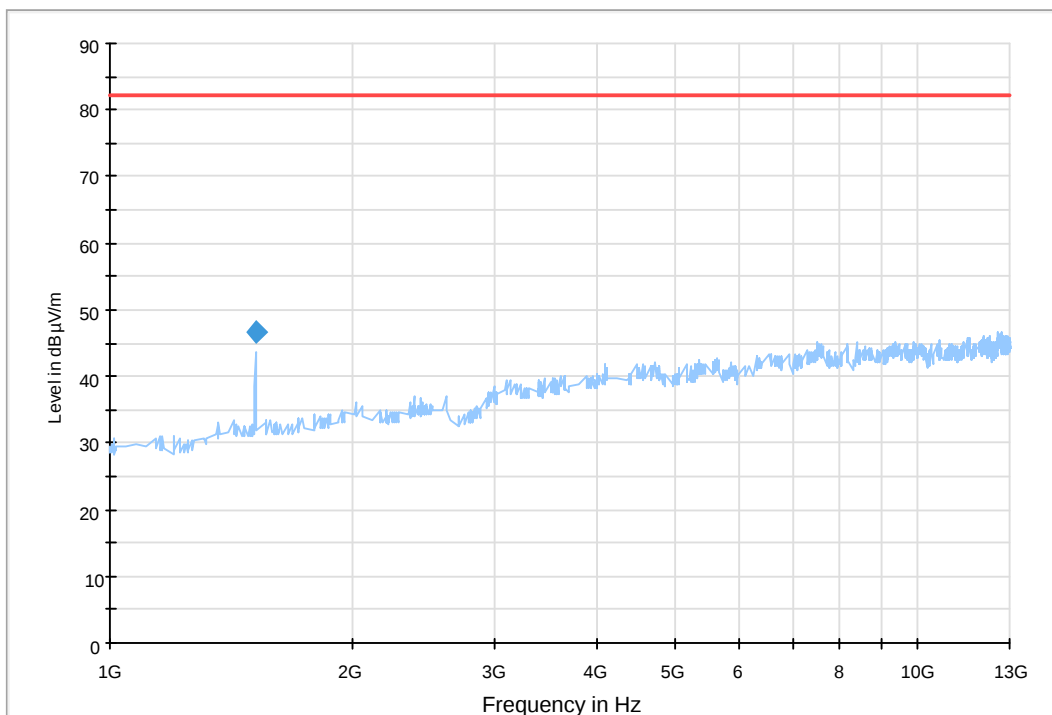
1000 – 13000 MHz, max peak at a distance of 3 m. CW carrier in middle part of the 700 MHz pass band.

FCC Part 22-24-27 1G - 18 G 3m ESU40



1000 – 13000 MHz, max peak at a distance of 3 m. CW carrier in higher part of the 700 MHz pass band.

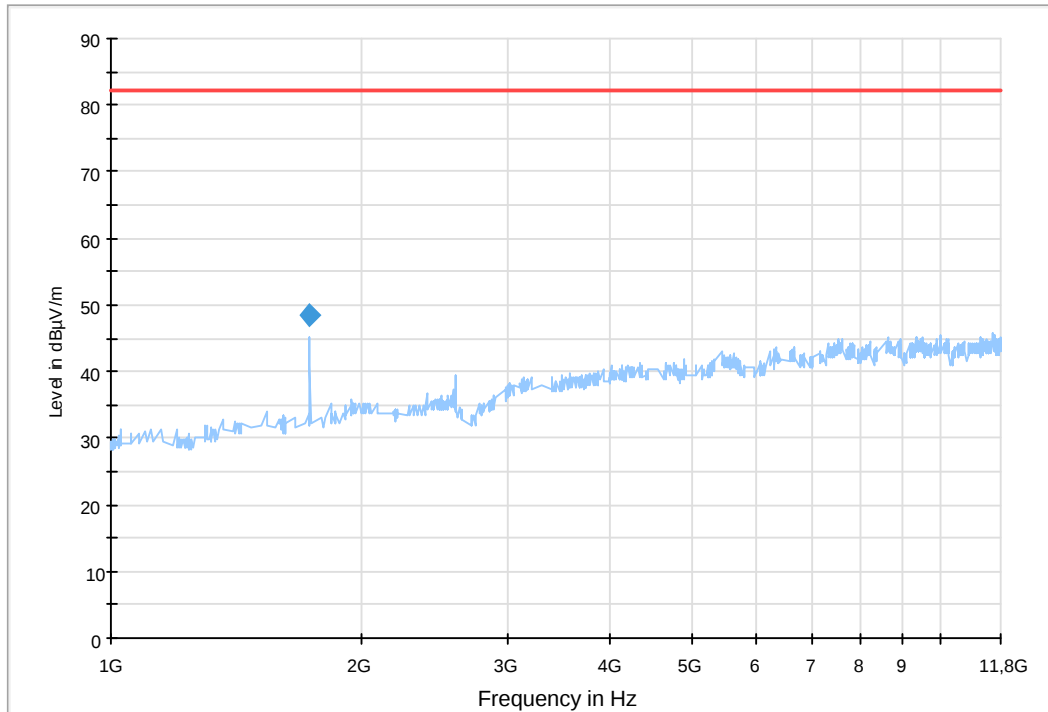
FCC Part 22-24-27 1G - 18 G 3m ESU40



850 MHz band

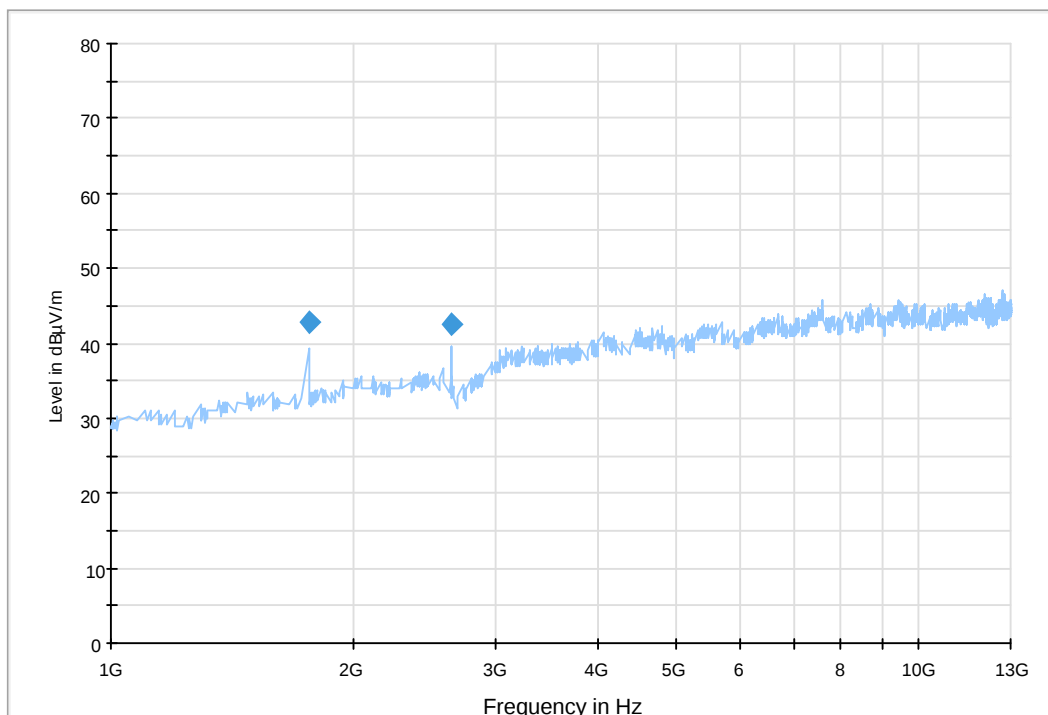
1000 – 13000 MHz, max peak at a distance of 3 m. CW carrier in lower part of the 850 MHz pass band.

FCC Part 22-24-27 1G - 18 G 3m ESU40



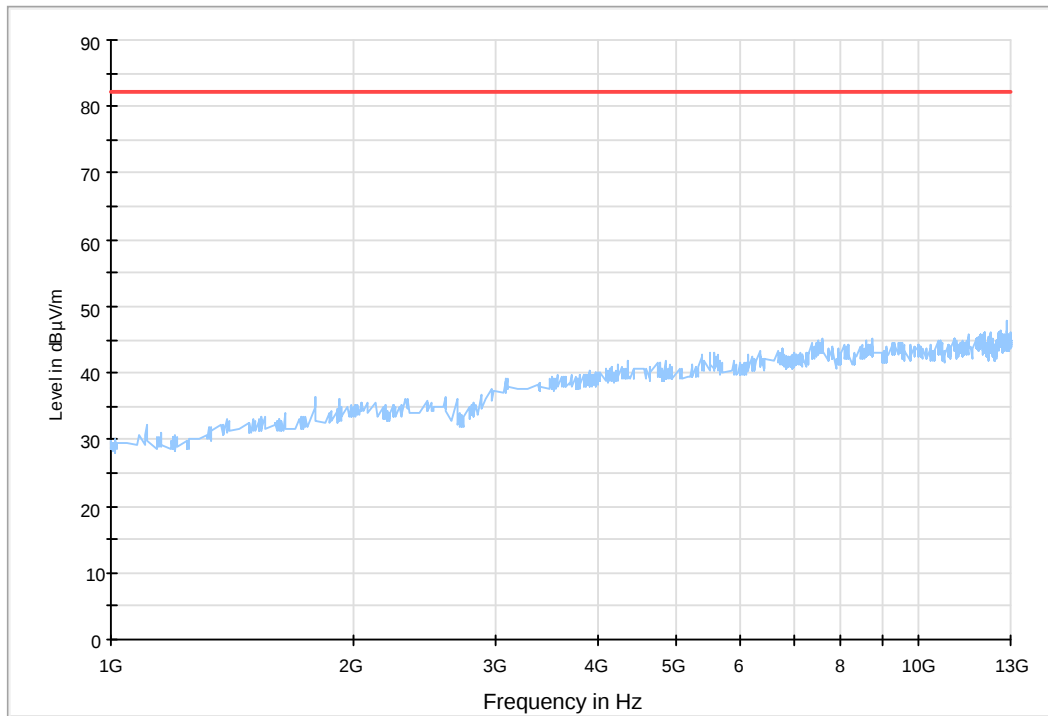
1000 – 13000 MHz, max peak at a distance of 3 m. CW carrier in middle part of the 850 MHz pass band.

FCC Part 22-24-27 1G - 18 G 3m ESU40



1000 – 13000 MHz, max peak at a distance of 3 m. CW carrier in higher part of the 850 MHz pass band.

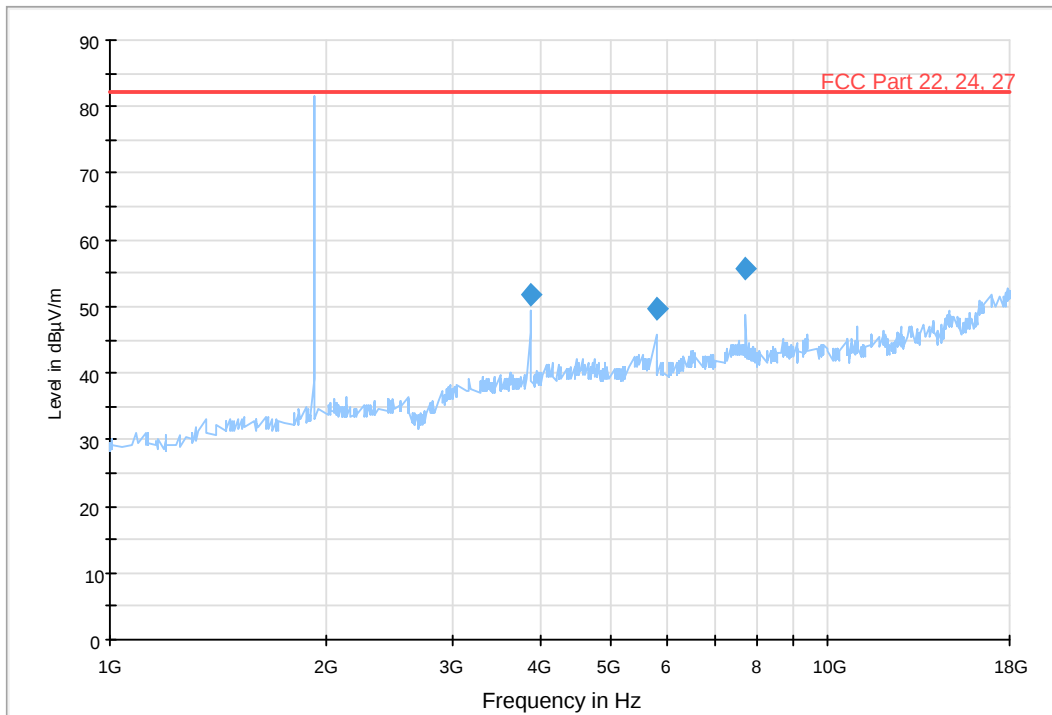
FCC Part 22-24-27 1G - 18 G 3m ESU40



1900 MHz band

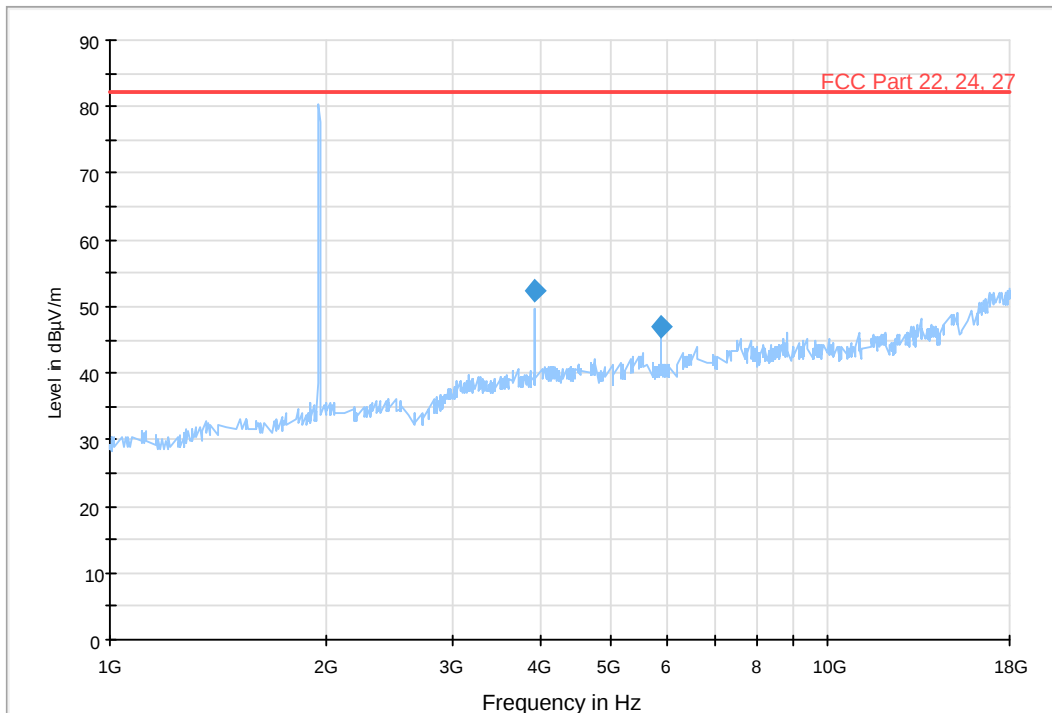
1000 – 18000 MHz, max peak at a distance of 3 m. CW carrier in lower part of the 1900 MHz pass band.

FCC Part 22-24-27 1G - 18 G 3m ESU40



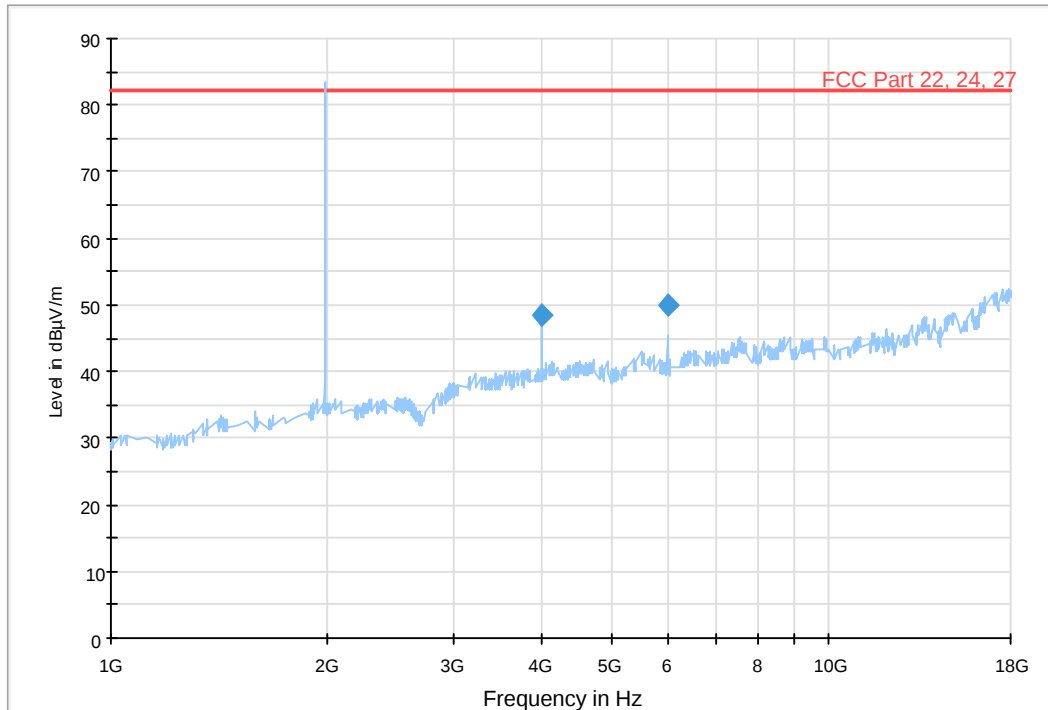
1000 – 18000 MHz, max peak at a distance of 3 m. CW carrier in middle part of the 1900 MHz pass band.

FCC Part 22-24-27 1G - 18 G 3m ESU40



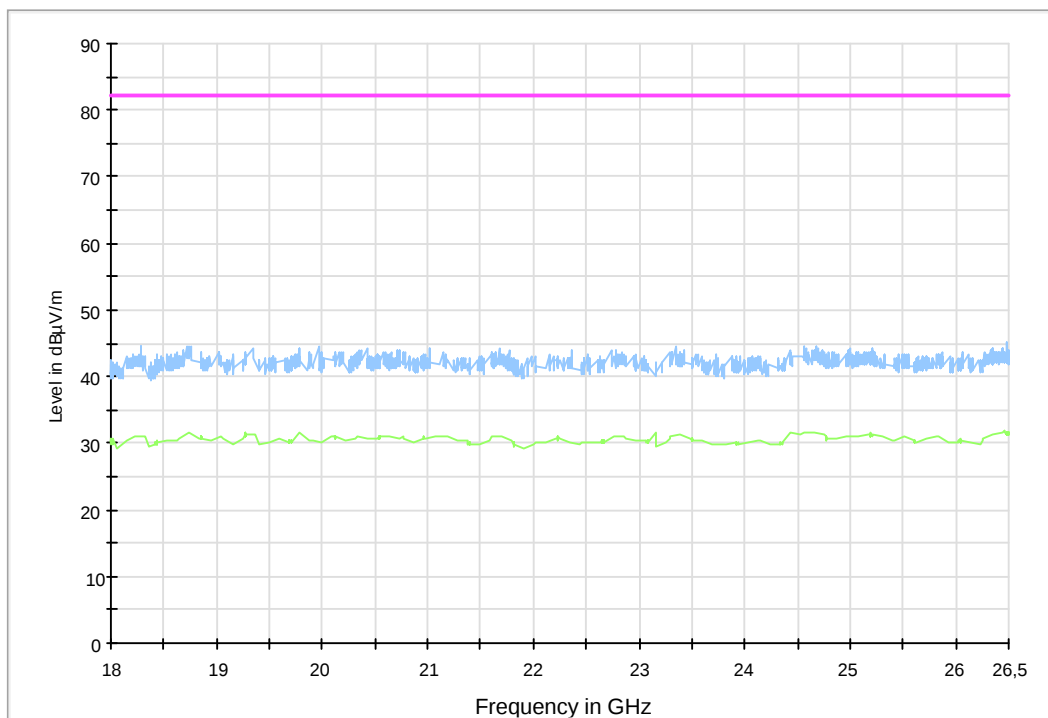
1000 – 18000 MHz, max peak at a distance of 3 m. CW carrier in higher part of the 1900 MHz pass band.

FCC Part 22-24-27 1G - 18 G 3m ESU40



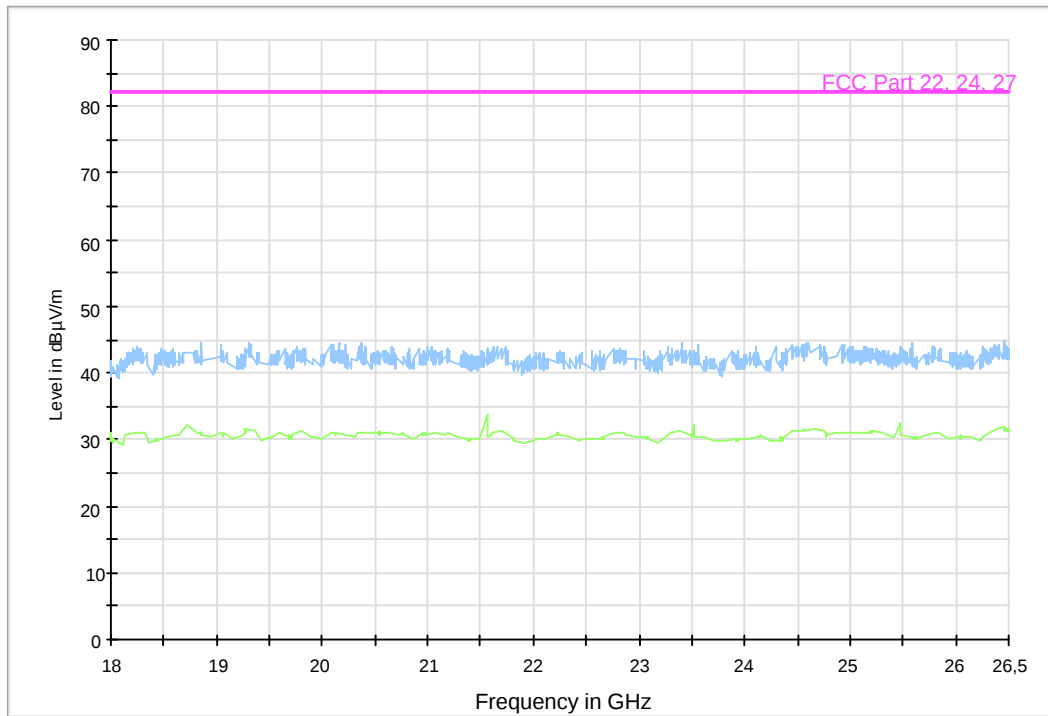
18000 – 26000 MHz, max peak at a distance of 3 m. CW carrier in lower part of the 1900 pass band.

Copy (3) of FCC 18 G - 26,5 G class B 3m ESU40



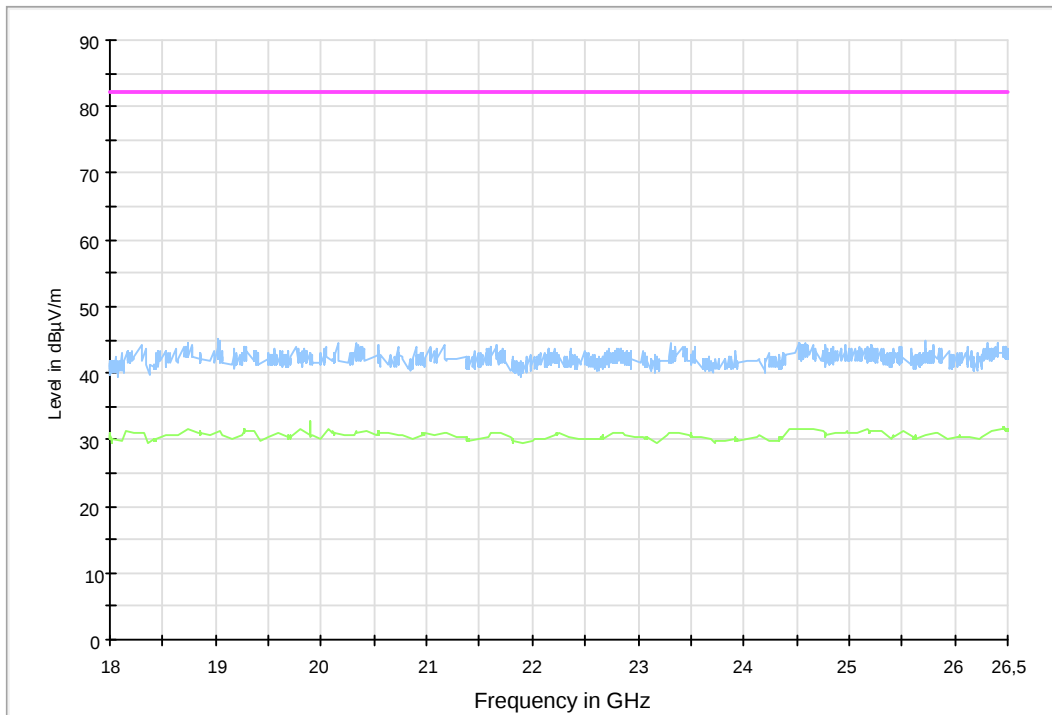
18000 – 26000 MHz, max peak at a distance of 3 m. CW carrier in middle part of the 1900 pass band.

Copy (3) of FCC 18 G - 26,5 G class B 3m ESU40



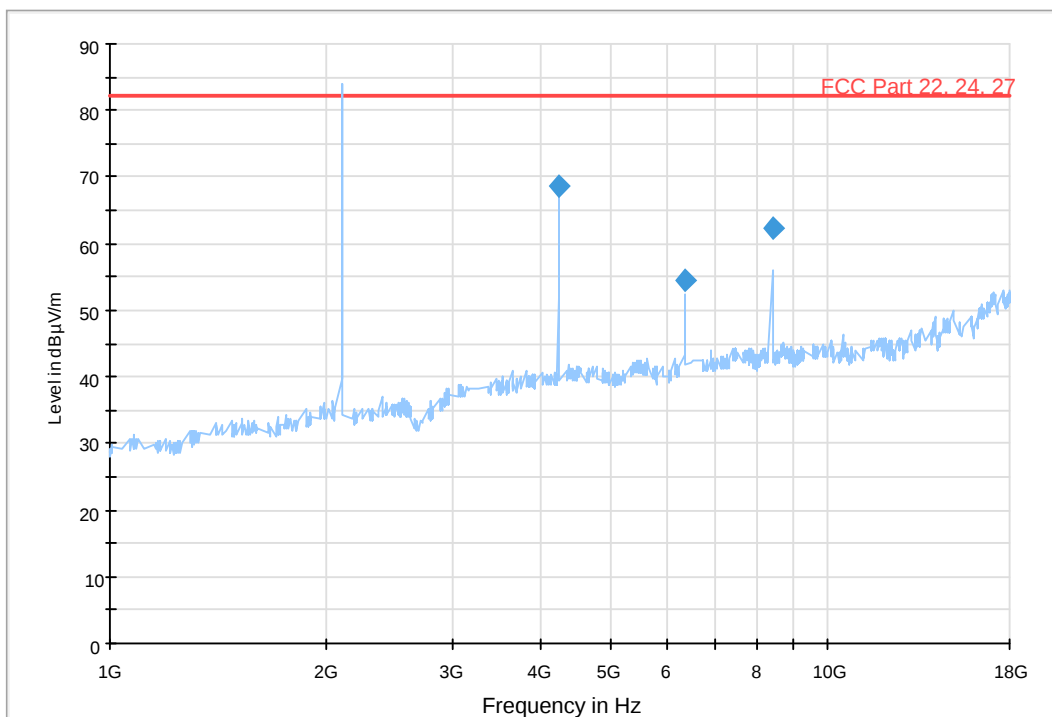
18000 – 26000 MHz, max peak at a distance of 3 m. CW carrier in higher part of the 1900 pass band.

Copy (3) of FCC 18 G - 26,5 G class B 3m ESU40



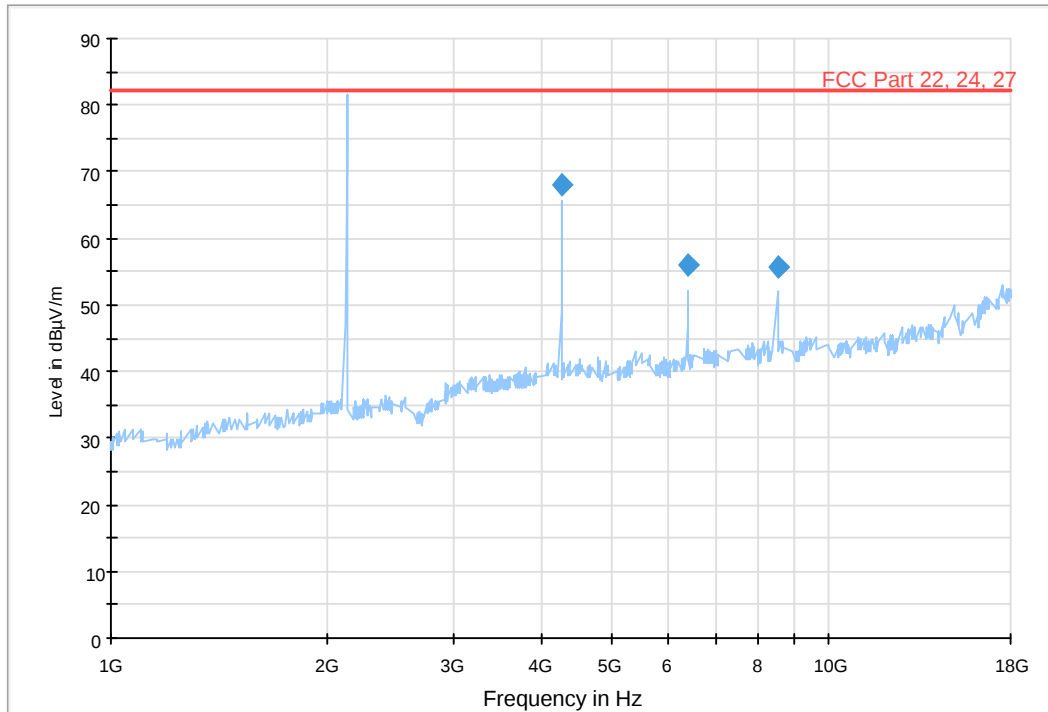
AWS  
1000 – 18000 MHz, max peak at a distance of 3 m. CW carrier in lower part of the AWS pass band.

FCC Part 22-24-27 1G - 18 G 3m ESU40



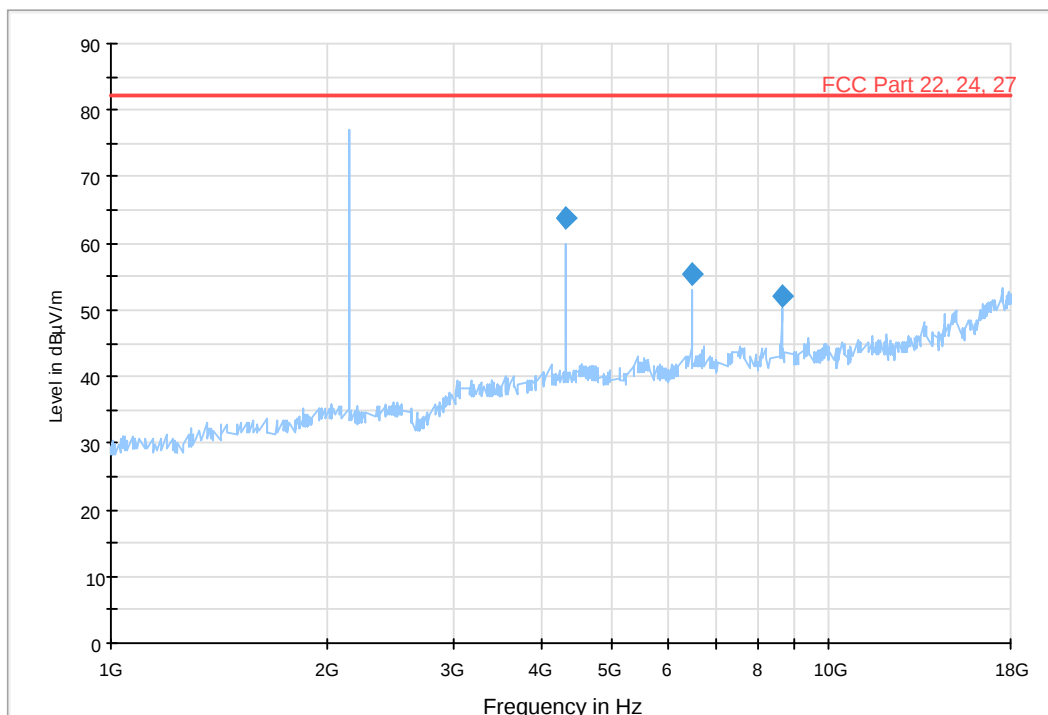
1000 – 18000 MHz, max peak at a distance of 3 m. CW carrier in middle part of the AWS pass band.

FCC Part 22-24-27 1G - 18 G 3m ESU40



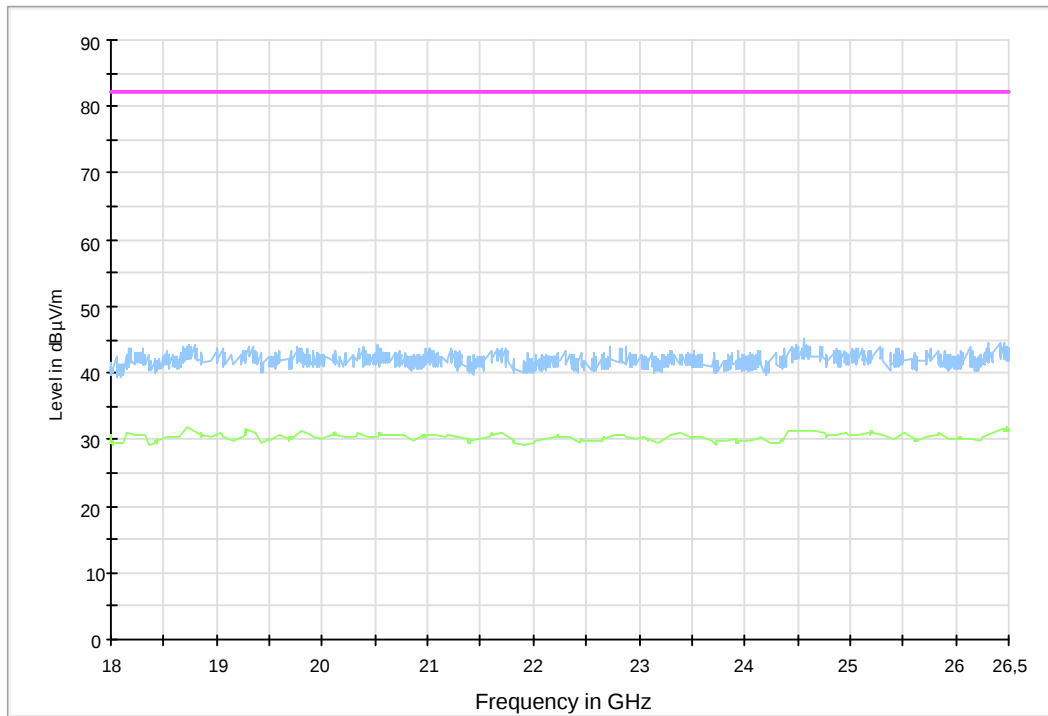
1000 – 18000 MHz, max peak at a distance of 3 m. CW carrier in higher part of the AWS pass band.

FCC Part 22-24-27 1G - 18 G 3m ESU40



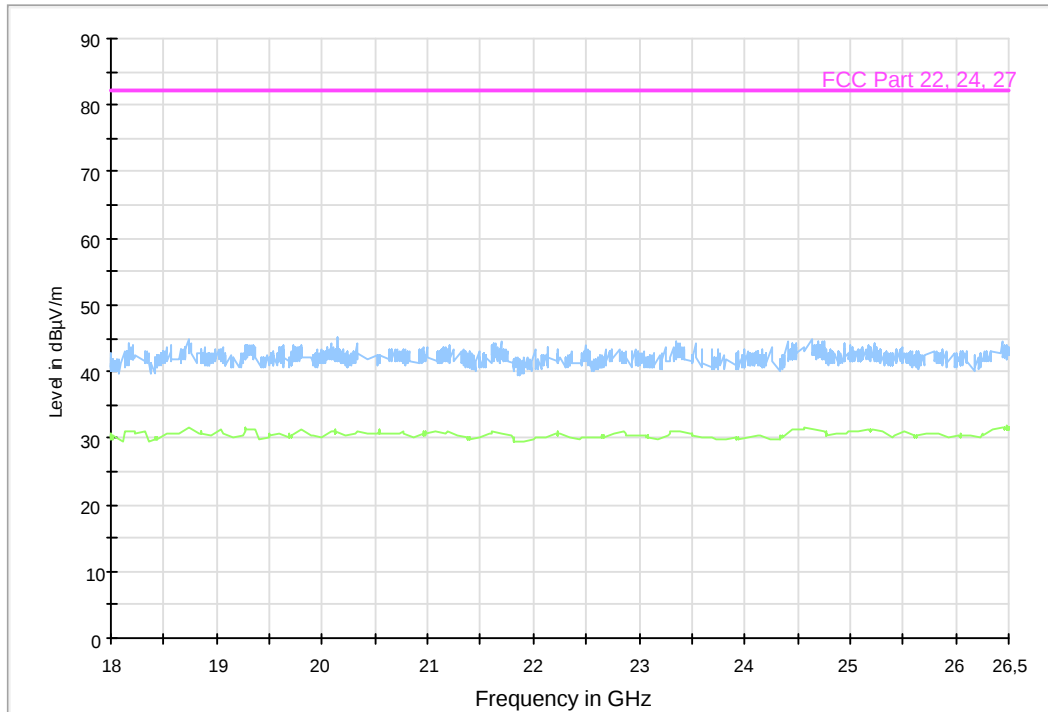
18000 – 26000 MHz, max peak at a distance of 3 m. CW carrier in lower part of the AWS pass band.

Copy (3) of FCC 18 G - 26,5 G class B 3m ESU40



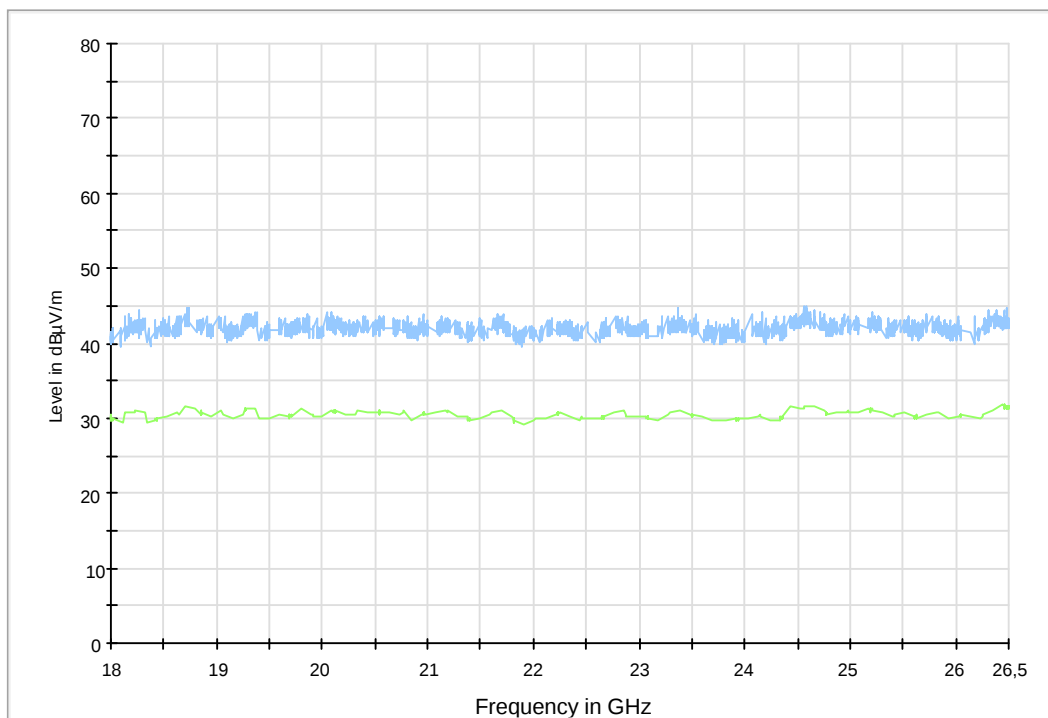
18000 – 26000 MHz, max peak at a distance of 3 m. CW carrier in middle part of the AWS pass band.

Copy (3) of FCC 18 G - 26,5 G class B 3m ESU40



18000 – 26000 MHz, max peak at a distance of 3 m. CW carrier in higher part of the AWS pass band.

Copy (3) of FCC 18 G - 26,5 G class B 3m ESU40



**11 FREQUENCY STABILITY**

|               |             |                   |       |
|---------------|-------------|-------------------|-------|
| Date of test: | 2012-04-26  | Ambient temp.     | 22 °C |
| EUT Serial:   | 99001       | Relative humidity | 29 %  |
| Tested by:    | Åke Carlson | Test result:      | Pass  |

**11.1 Requirement****11.2 Test protocol**

The test was done with two different input signals:

- First test was with a modulated carrier and the frequency error was measured with a signal analyzer.
- Second test was with a CW signal and the frequency error was measured with a frequency counter.

**11.3 Limits**

The frequency tolerance for a fixed Base transmitter in 47 CFR §22.255 is 1.5 ppm, at 894MHz that equals 1.34 kHz.

**11.4 Test data****Amplifier 700 MHz band**

Input signal: modulated carrier at 754.7 MHz  
CW at 754.7 MHz

| Frequency error          |                           |                          |                         |
|--------------------------|---------------------------|--------------------------|-------------------------|
| Ambient temperature (°C) | CDMA frequency error (Hz) | GSM frequency error (Hz) | CW frequency error (Hz) |
| -30                      | < 20                      | < 20                     | +2                      |
| -20                      | < 10                      | < 10                     | +3                      |
| -10                      | < 10                      | < 10                     | +3                      |
| 0                        | < 10                      | < 10                     | +3                      |
| 10                       | < 10                      | < 10                     | +3                      |
| 20                       | < 10                      | < 10                     | +3                      |
| 30                       | < 10                      | < 10                     | +3                      |
| 40                       | < 10                      | < 10                     | +3                      |
| 50                       | < 10                      | < 10                     | +3                      |
| 55                       | < 10                      | < 10                     | +3                      |

| Frequency error<br>Nominal voltage: 120 VAC |                          |                         |
|---------------------------------------------|--------------------------|-------------------------|
| Voltage (V AC)                              | GSM frequency error (Hz) | CW frequency error (Hz) |
| 85% of nominal = 102                        | < 10                     | +3                      |
| 90% of nominal = 108                        | < 10                     | +3                      |
| 95% of nominal = 114                        | < 10                     | +3                      |
| 100% of nominal = 120                       | < 10                     | +3                      |
| 105% of nominal = 126                       | < 10                     | +3                      |
| 110% of nominal = 132                       | < 10                     | +3                      |
| 115% of nominal = 138                       | < 10                     | +3                      |

**Amplifier 850 MHz band**

Input signal: GSM carrier at 882.0 MHz  
CW at 882.0 MHz

| Frequency error          |                          |                         |
|--------------------------|--------------------------|-------------------------|
| Ambient temperature (°C) | GSM frequency error (Hz) | CW frequency error (Hz) |
| -30                      | < 10                     | +2                      |
| -20                      | < 10                     | +3                      |
| -10                      | < 10                     | +3                      |
| 0                        | < 10                     | +3                      |
| 10                       | < 10                     | +3                      |
| 20                       | < 10                     | +3                      |
| 30                       | < 10                     | +3                      |
| 40                       | < 10                     | +3                      |
| 50                       | < 10                     | +3                      |
| 55                       | < 10                     | +3                      |

| Frequency error<br>Nominal voltage: 120 VAC |                          |                         |
|---------------------------------------------|--------------------------|-------------------------|
| Voltage (V AC)                              | GSM frequency error (Hz) | CW frequency error (Hz) |
| 85% of nominal = 102                        | < 10                     | +3                      |
| 90% of nominal = 108                        | < 10                     | +3                      |
| 95% of nominal = 114                        | < 10                     | +3                      |
| 100% of nominal = 120                       | < 10                     | +3                      |
| 105% of nominal = 126                       | < 10                     | +3                      |
| 110% of nominal = 132                       | < 10                     | +3                      |
| 115% of nominal = 138                       | < 10                     | +3                      |

**Amplifier 1900 MHz band**

Input signal: GSM carrier at 1960.0 MHz  
CW at 1960.0 MHz

| Frequency error          |                          |                         |
|--------------------------|--------------------------|-------------------------|
| Ambient temperature (°C) | GSM frequency error (Hz) | CW frequency error (Hz) |
| -30                      | < 10                     | +3                      |
| -20                      | < 10                     | +3                      |
| -10                      | < 10                     | +3                      |
| 0                        | < 10                     | +3                      |
| 10                       | < 10                     | +3                      |
| 20                       | < 10                     | +3                      |
| 30                       | < 10                     | +3                      |
| 40                       | < 10                     | +3                      |
| 50                       | < 10                     | +3                      |
| 55                       | < 10                     | +3                      |

| Frequency error<br>Nominal voltage: 120 VAC |                          |                         |
|---------------------------------------------|--------------------------|-------------------------|
| Voltage (V AC)                              | GSM frequency error (Hz) | CW frequency error (Hz) |
| 85% of nominal = 102                        | < 10                     | +3                      |
| 90% of nominal = 108                        | < 10                     | +3                      |
| 95% of nominal = 114                        | < 10                     | +3                      |
| 100% of nominal = 120                       | < 10                     | +3                      |
| 105% of nominal = 126                       | < 10                     | +3                      |
| 110% of nominal = 132                       | < 10                     | +3                      |
| 115% of nominal = 138                       | < 10                     | +3                      |

**Amplifier AWS band**

Input signal: WCDMA carrier at 2132.0 MHz  
CW at 2132.0 MHz

| Frequency error          |                            |                         |
|--------------------------|----------------------------|-------------------------|
| Ambient temperature (°C) | WCDMA frequency error (Hz) | CW frequency error (Hz) |
| -30                      | < 10                       | +2                      |
| -20                      | < 10                       | +3                      |
| -10                      | < 10                       | +3                      |
| 0                        | < 10                       | +3                      |
| 10                       | < 10                       | +3                      |
| 20                       | < 10                       | +3                      |
| 30                       | < 10                       | +3                      |
| 40                       | < 10                       | +3                      |
| 50                       | < 10                       | +3                      |
| 55                       | < 10                       | +3                      |

| Frequency error<br>Nominal voltage: 120 VAC |                          |                         |
|---------------------------------------------|--------------------------|-------------------------|
| Voltage (V AC)                              | GSM frequency error (Hz) | CW frequency error (Hz) |
| 85% of nominal = 102                        | < 10                     | +3                      |
| 90% of nominal = 108                        | < 10                     | +3                      |
| 95% of nominal = 114                        | < 10                     | +3                      |
| 100% of nominal = 120                       | < 10                     | +3                      |
| 105% of nominal = 126                       | < 10                     | +3                      |
| 110% of nominal = 132                       | < 10                     | +3                      |
| 115% of nominal = 138                       | < 10                     | +3                      |

## 12 UNCERTAINTIES SUMMARY

The measurement uncertainty describes the overall uncertainty of the given measured value during operation of the EUT.

Measurement uncertainty is calculated in accordance with EA-4/02-1997.

The measurement uncertainty is given with a confidence of 95% (k=2).

### **Radiated disturbance, field strength, 30 MHz - 1000 MHz**

|                                                         |              |
|---------------------------------------------------------|--------------|
| 30 to 300 MHz at 1 m and at a fixed height $\leq 1,5$ m | $\pm 5,3$ dB |
| 200 to 1000 MHz at 1 m                                  | $\pm 6,2$ dB |
| 30 to 300 MHz at 3 m                                    | $\pm 4,7$ dB |
| 200 to 1000 MHz at 3 m                                  | $\pm 4,8$ dB |
| 30 to 300 MHz at 10 m                                   | $\pm 4,6$ dB |
| 200 to 1000 MHz at 10 m                                 | $\pm 4,6$ dB |

### **Radiated disturbance, field strength, 1 to 40 GHz in Semi Anechoic Chambers "Stora Hallen" and "Björkhallen"**

|                                           |              |
|-------------------------------------------|--------------|
| 1 to 18 GHz with filter or attenuator     | $\pm 5,4$ dB |
| 1 to 18 GHz without filter or attenuator  | $\pm 5,2$ dB |
| 18 to 26 GHz without filter or attenuator | $\pm 5,5$ dB |
| 26 to 40 GHz without filter or attenuator | $\pm 5,6$ dB |

### **Conducted disturbances at the antenna port on radio equipment**

|                                   |              |
|-----------------------------------|--------------|
| Frequency range 9 kHz – 1 GHz     | $\pm 0,9$ dB |
| Frequency range 1 GHz – 7 GHz     | $\pm 1,4$ dB |
| Frequency range 7 GHz -18GHz      | $\pm 2,4$ dB |
| Frequency range 18 GHz -26,5GHz   | $\pm 3,0$ dB |
| Frequency range 26,5 GHz - 40 GHz | $\pm 3,6$ dB |

### **Radiated power**

|                   |              |
|-------------------|--------------|
| 25 MHz - 1000 MHz | $\pm 3,7$ dB |
| 1 – 18 GHz at 3 m | $\pm 3,4$ dB |

|                                                                            |              |
|----------------------------------------------------------------------------|--------------|
| <b>Radiated emission with loop antenna, magnetic field, 9 kHz - 30 MHz</b> | $\pm 3,2$ dB |
|----------------------------------------------------------------------------|--------------|

|                                    |              |
|------------------------------------|--------------|
| <b>Intermodulation attenuation</b> | $\pm 4,1$ dB |
|------------------------------------|--------------|

|                         |              |
|-------------------------|--------------|
| <b>Out of band gain</b> | $\pm 2,6$ dB |
|-------------------------|--------------|

### **Adjacent channel power**

|                            |               |
|----------------------------|---------------|
| Amplitude                  | $\pm 2,0$ dB  |
| Frequency, 9 kHz - 30 MHz: | $\pm 0,8$ %   |
| Frequency, 20 MHz - 1 GHz: | $\pm 0,002$ % |

### **Frequency error**

|                        |              |
|------------------------|--------------|
| With frequency counter | $\pm 150$ Hz |
|------------------------|--------------|

### **Frequency range**

|          |             |
|----------|-------------|
| HP 8593E | $\pm 0,2$ % |
| HP 8566B | $\pm 2,3$ % |
| R&S FSIQ | $\pm 0,2$ % |

### **Output power**

Analog signals, conducted:

|                   |              |
|-------------------|--------------|
| RF-power meter    | $\pm 0,6$ dB |
| Spectrum analyser | $\pm 3,5$ dB |

|                                    |          |
|------------------------------------|----------|
| Analogue signals, radiated:        |          |
| 25 MHz - 1000 MHz                  | ± 3,7 dB |
| 1 GHz - 18 GHz                     | ± 3,4 dB |
| Digital signals, conducted         | ± 0,6 dB |
| Digital signals, radiated:         |          |
| 25 MHz - 1000 MHz                  | ± 3,7 dB |
| 1 GHz - 18 GHz                     | ± 3,4 dB |
| <b>Peak power density</b>          |          |
| Conducted:                         |          |
| 8593E                              | ± 2,5 dB |
| 8566B                              | ± 2,7 dB |
| Radiated:                          |          |
| 8593E & 8566B, 25 - 1000 MHz       | ± 4,5 dB |
| 8593E & 8566B, 1 - 18 GHz          | ± 4,7 dB |
| <b>Spurious response rejection</b> | ± 3,6 dB |
| <b>Modulation accuracy</b>         |          |
| Phase error (RMS) for GSM GMSK     | ± 1,4 °  |
| Phase error (Peak) for GSM GMSK    | ± 3,7 °  |
| EVM for GSM EDGE                   | ± 2,2 %  |

**13 PHOTO OF THE EUT**

