

**Test report no. : 182238-3**

**Item tested : CC2533EM**

**Type of equipment : 2.4 GHz Transceiver**

**FCC ID : ZAT2533EM**

**Client : Texas Instruments Norway AS**

www.nemko.com

**FCC Part 15.247**

Digital Transmission System

**RSS-210, Issue 8**

Low Power Licence-Exempt  
Radiocommunication Devices

**16 September 2013**

**Authorized by :** .....



Frode Sveinsen  
Technical Verificator

## CONTENTS

<b>1</b>	<b>GENERAL INFORMATION .....</b>	<b>3</b>
1.1	Testhouse Info .....	3
1.2	Client Information .....	3
1.3	Responsible Manufacturer (If other than client) .....	3
<b>2</b>	<b>TEST INFORMATION .....</b>	<b>4</b>
2.1	Test Item .....	4
2.2	Test Environment .....	5
2.3	Test Period .....	5
<b>3</b>	<b>TEST REPORT SUMMARY .....</b>	<b>6</b>
3.1	General .....	6
3.2	Test Summary .....	7
3.3	Description of modification for Modification Filing .....	7
3.4	Comments .....	7
3.5	Family List Rational .....	7
<b>4</b>	<b>TEST RESULTS .....</b>	<b>8</b>
4.1	Power Line Conducted Emissions .....	8
4.2	Minimum 6 dB Bandwidth .....	9
4.3	20 dB Bandwidth .....	13
4.4	Peak Power Output .....	15
4.5	Spurious Emissions (Radiated) .....	25
4.6	Power Spectral Density (PSD) .....	69
<b>5</b>	<b>LIST OF TEST EQUIPMENT .....</b>	<b>73</b>
<b>6</b>	<b>BLOCK DIAGRAM .....</b>	<b>74</b>
6.1	Power Line Conducted Emission .....	74
6.2	Test Site Radiated Emission .....	74

## 1 GENERAL INFORMATION

### 1.1 Testhouse Info

Name : Nemko AS  
Address : Nemko Kjeller  
Instituttveien 6, Box 96  
NO-2027 Kjeller, NORWAY  
Telephone : +47 64 84 57 00  
Fax : +47 64 84 57 05  
E-mail: [comlab@nemko.com](mailto:comlab@nemko.com)  
FCC test firm : 994405  
IC OATS : 2040D-1  
Total Number of Pages: 74

### 1.2 Client Information

Name : Texas Instruments Norway AS  
Address : Gaustadalléen 21,  
NO-0349 Oslo, Norway  
Telephone : +47 22 95 85 44  
Fax : +47 22 95 85 46

**Contact:**

Name : Dag Grini  
Telephone : +47 22 95 83 01  
E-mail : [d.grini@ti.com](mailto:d.grini@ti.com)

### 1.3 Responsible Manufacturer (If other than client)

Same as the client.

## 2 TEST INFORMATION

### 2.1 Test Item

Name :	Texas Instruments
FCC ID :	ZAT2533EM
IC :	451H-2533EM
Model/version :	CC2533EM
Serial number :	-
Hardware identity and/or version:	Rev 1.7
Software identity and/or version :	-
Frequency Range :	2405 – 2480 MHz
Number of Channels :	16
Type of Modulation :	250 kbps, OQPSK (Digital)
Conducted Output Power:	1.6 mW (Peak)
User Frequency Adjustment :	None
Type of Power Supply :	3.0V <sub>DC</sub> (Two AA 1.5 V <sub>DC</sub> batteries)
Antenna Connector :	PCB antenna
Antenna Diversity Supported :	No
Desktop Charger :	None

#### Description of Test Item

The CC2533EM RF-transceiver module is an evaluation module developed for the 2.4 GHz ISM band. It is based on the CC2533 system on-chip device. The physical layer of the radio complies with the IEEE 802.15.4 standard with Direct Sequence Spread Spectrum (DSSS) and offset-QPSK modulation.

#### Exposure Evaluation

The EUT is exempted from RF Exposure Evaluation.

## **2.2 Test Environment**

### **2.2.1 Normal test condition**

Temperature:	19 – 23 °C
Relative humidity:	20 – 35 %
Normal test voltage:	Nominal 3.0 V DC (2 x AA battery )

New batteries were used for all tests.

The values are the limit registered during the test period.

## **2.3 Test Period**

Item received date: 2013-01-24

Test period : from 2013-03-07 and 2013-03-14

### 3 TEST REPORT SUMMARY

#### 3.1 General

Manufacturer: Texas Instruments

Model No.: CC2533EM

All measurements are traceable to national standards.

The tests were conducted for the purpose of demonstrating compliance with FCC CFR 47 Part 15, paragraph 15.247 and Industry Canada RSS-210 Issue 8.

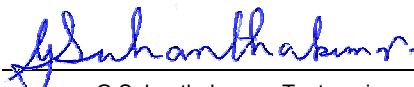
Radiated tests were conducted in accordance with ANSI C63.4-2003. The radiated tests were made in a semi-anechoic chamber at measuring distances of 3m and 10m.

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> New Submission  | <input type="checkbox"/> Production Unit                |
| <input type="checkbox"/> Class II Permissive Change | <input checked="" type="checkbox"/> Pre-production Unit |
| <b>DTS</b> Equipment Code                           | <input type="checkbox"/> Family Listing                 |

**THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.**  
Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".



**TEST REPORT #: 182238-3**

TESTED BY:   
G.Suhanthakumar, Test engineer

DATE: 2013-04-25

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### 3.2 Test Summary

Name of test	FCC Part 15 reference	RSS-210 Issue 8 reference	Result
Antenna Requirement	15.203	7.1.4 (RSS-GEN)	Pass
Power Line Conducted Emission	15.107(a) 15.207(a)	7.2.2 (RSS-GEN)	N/A*
Minimum 6 dB Bandwidth	15.247(a)(2)	A8.2	Pass
Peak Power Output	15.247(b)	A8.4	Pass
Power Spectral Density	15.247(d)	A8.2	Pass
Spurious Emissions (Antenna Conducted)	15.247(c)	A8.5	Pass
Spurious Emissions (Radiated)	15.247(c) 15.109(a) 15.209(a)	A8.5	Pass
Receiver Emissions (Radiated)	N/A	2.3	N/A

\*EUT is battery operated only.

### 3.3 Description of modification for Modification Filing

Not applicable.

### 3.4 Comments

All ports were populated during spurious emission measurements.

### 3.5 Family List Rational

Not Applicable.

## 4 TEST RESULTS

### 4.1 Power Line Conducted Emissions

Para. No.: 15.207 (a)

The test is not applicable since the device is battery powered.

Test Performed By: -	Date of Test: -
----------------------	-----------------

Measurement procedure: ANSI C63.4-2003 using 50  $\mu$ H/50 ohms LISN.

Test Results: -

Measurement Data: -



## 4.2 Minimum 6 dB Bandwidth

Para. No.: 15.247 (a)(2)

Test Performed By: G.Suwanthakumar	Date of Test: 12 March 2013
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Test Results: Complies

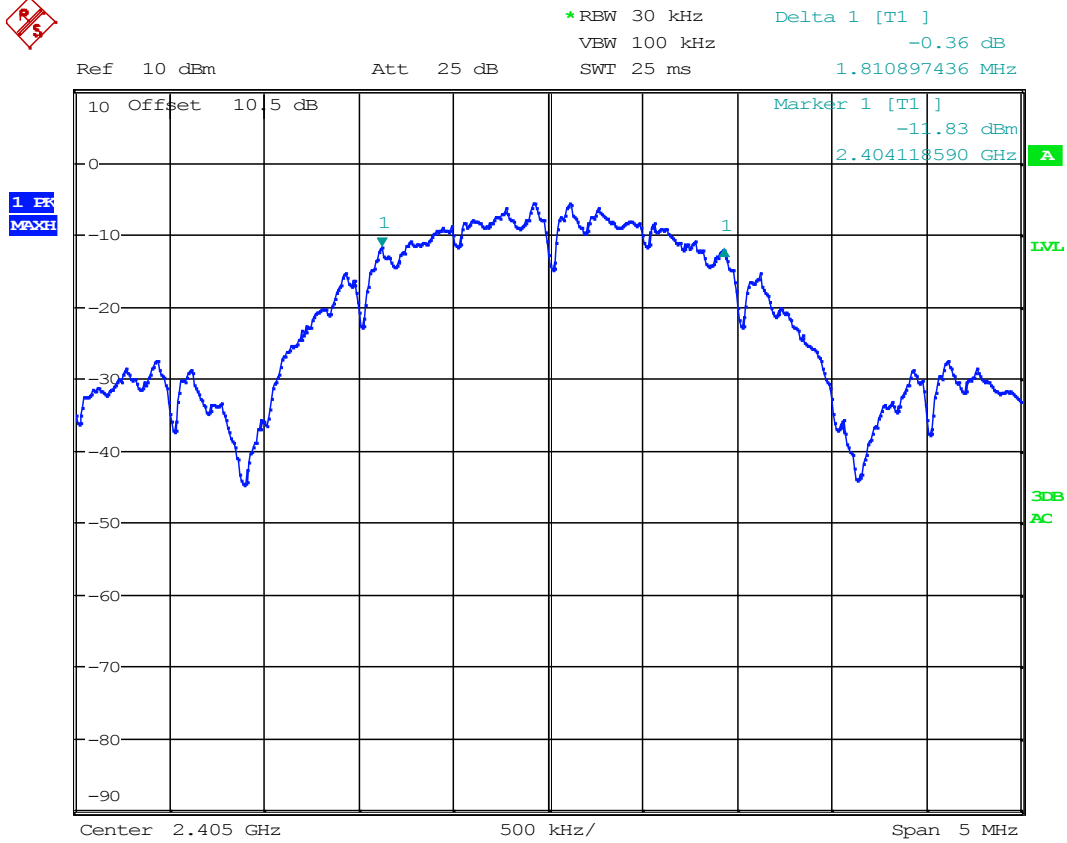
Measurement Data:

Measured 6 dB Bandwidth (MHz)		
2405MHz	2440 MHz	2480MHz
1.81	1.81	1.81

Tested according to KDB 558074 D01 DTS Meas Guidance v02, Section 7.1.

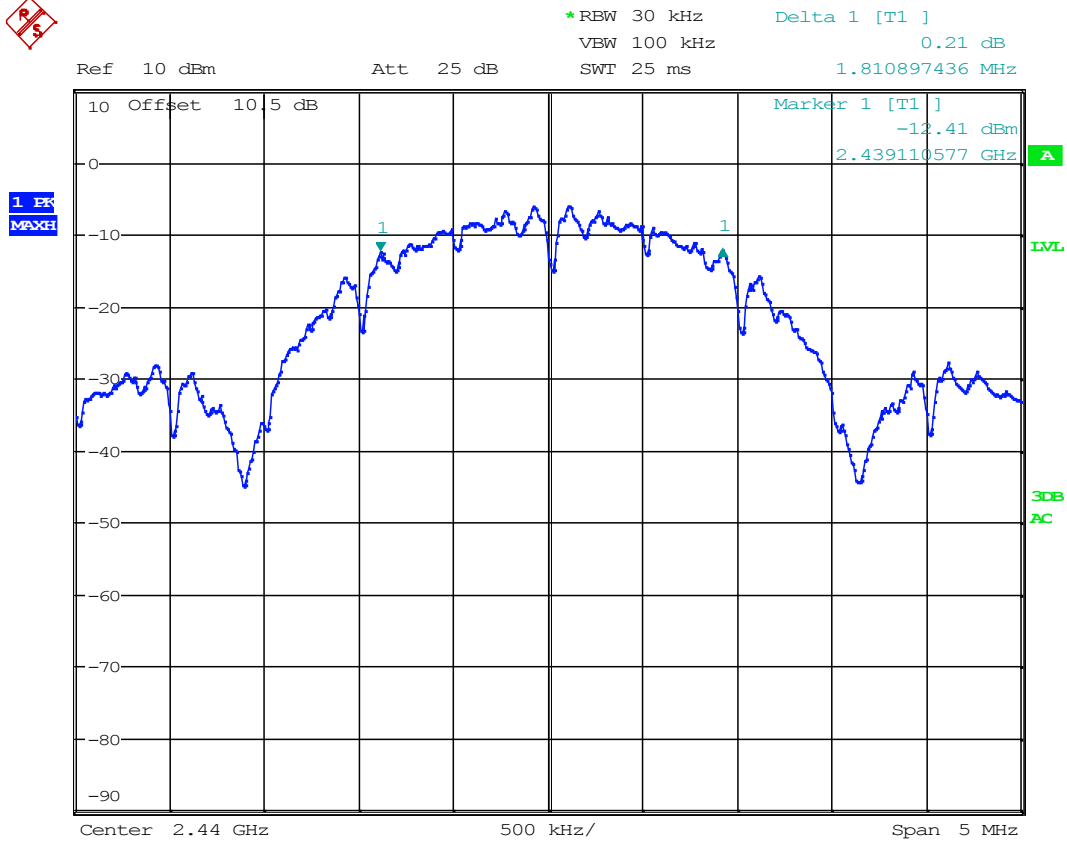
### Requirements:

For Digital Transmission Systems in the 2400-2483.5 MHz band the minimum 6 dB bandwidth shall be at least 500 KHz.



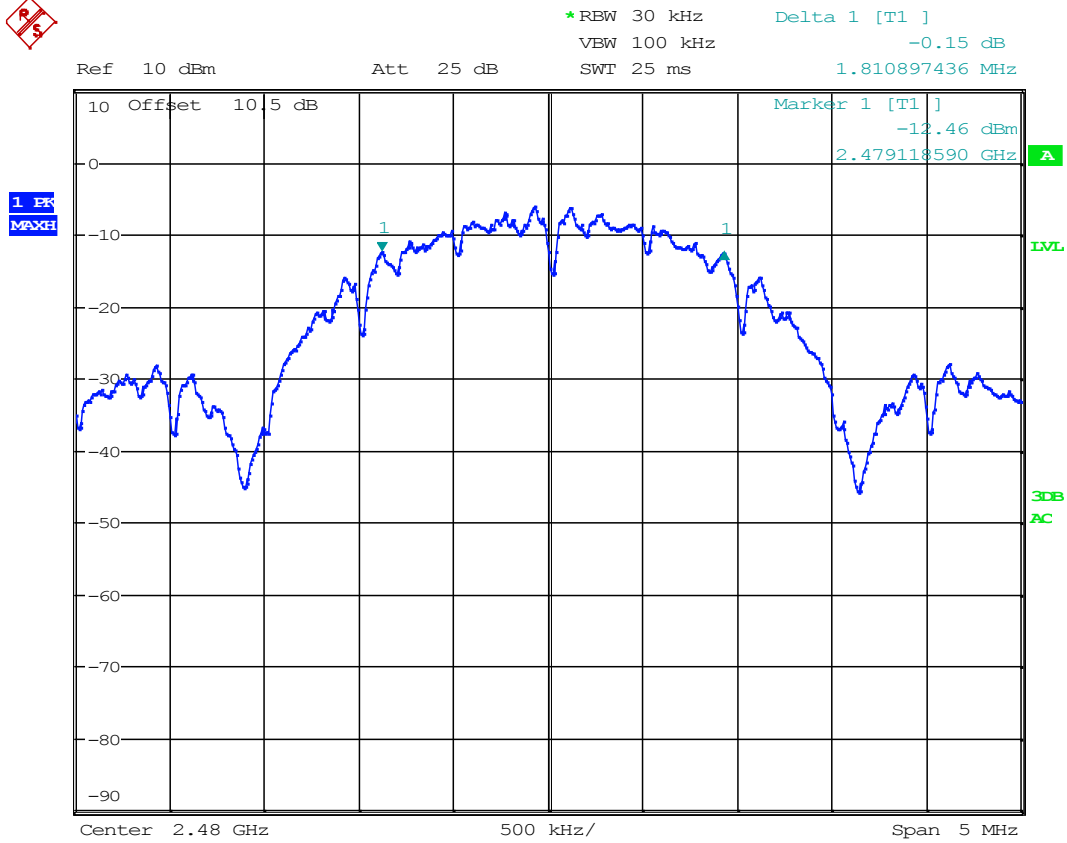
Date: 12.MAR.2013 12:36:00

**6 dB Bandwidth at 2405 MHz**



Date: 12.MAR.2013 12:36:44

**6 dB Bandwidth at 2440 MHz**



Date: 12.MAR.2013 12:33:18

**6 dB Bandwidth at 2480 MHz**

### 4.3 20 dB Bandwidth

Test Performed By: G.Suwanthakumar	Date of Test: 12 Mar. 2013
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**Measurement Data:**

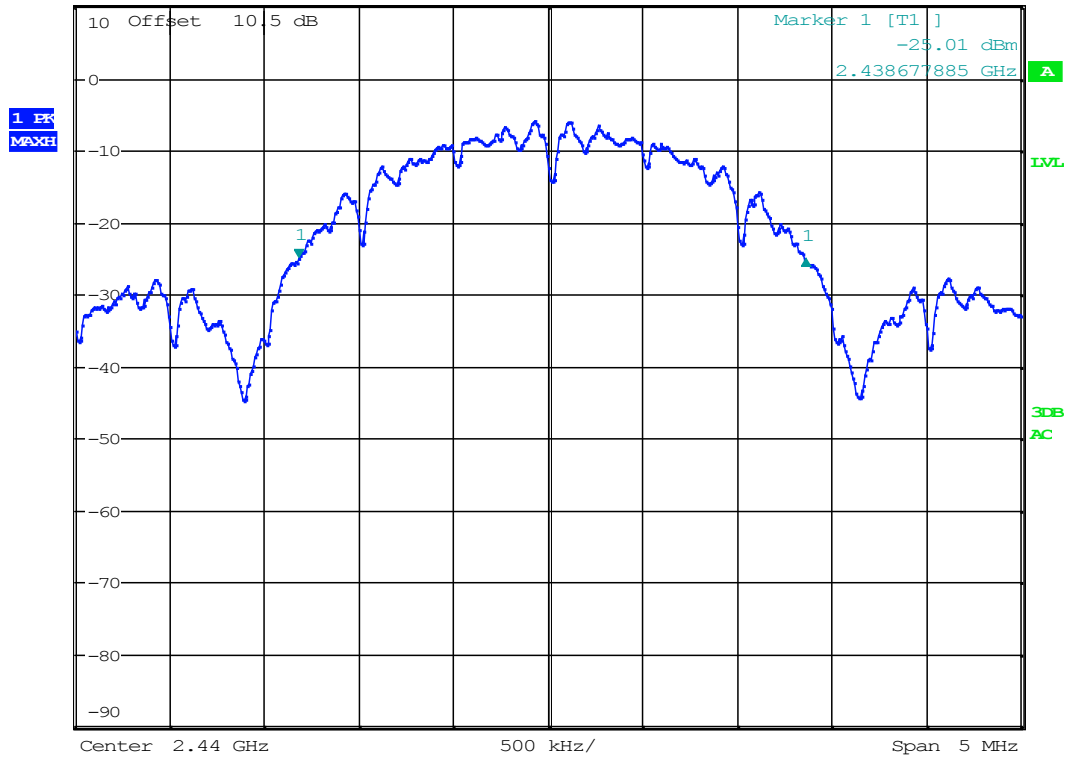
Measured 20 dB Bandwidth (MHz)
2440 MHz
2.68

**Requirements:**

No requirements. Reported for information only.



Ref 10 dBm      Att 25 dB      \*RBW 30 kHz      Delta 1 [T1]      -0.16 dB  
 VBW 100 kHz      SWT 25 ms      2.684294872 MHz



Date: 12.MAR.2013 12:37:31

**20 dB Bandwidth at 2440 MHz**

#### 4.4 Peak Power Output

Para. No.: 15.247 (b)

Test Performed By: G.Suwanthakumar	Date of Test: 12 & 14 Mar 2013
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Test Results: Complies

##### Measurement Data:

RF channel	2405 MHz	2440 MHz	2480 MHz
Measured Maxium Field strength (dBµV/m) –VP	100.92	101.04	100.37
Calc. Radiated Power (dBm)	5.7	5.8	5.1
Calc. Radiated Power (mW)	2.3	3.8	3.3
Measured Conducted Power (dBm)	2.1	1.8	1.6
Measured Conducted Power (mW)	1.6	1.5	1.4
Calculated Antenna Gain (dBi)	3.6	4.0	3.5

Tested according to KDB 558074 D01 DTS Meas Guidance v02, Section 8.1.1.

EIRP is calculated according to KDB 558074 D01 DTS Meas Guidance v02, Section 10.2.2.1

The maximum field strength is obtained in XY plane and Vertical polarization.

##### See attached graph.

Detachable antenna?

Yes  No

If detachable, is the antenna connector non-standard?

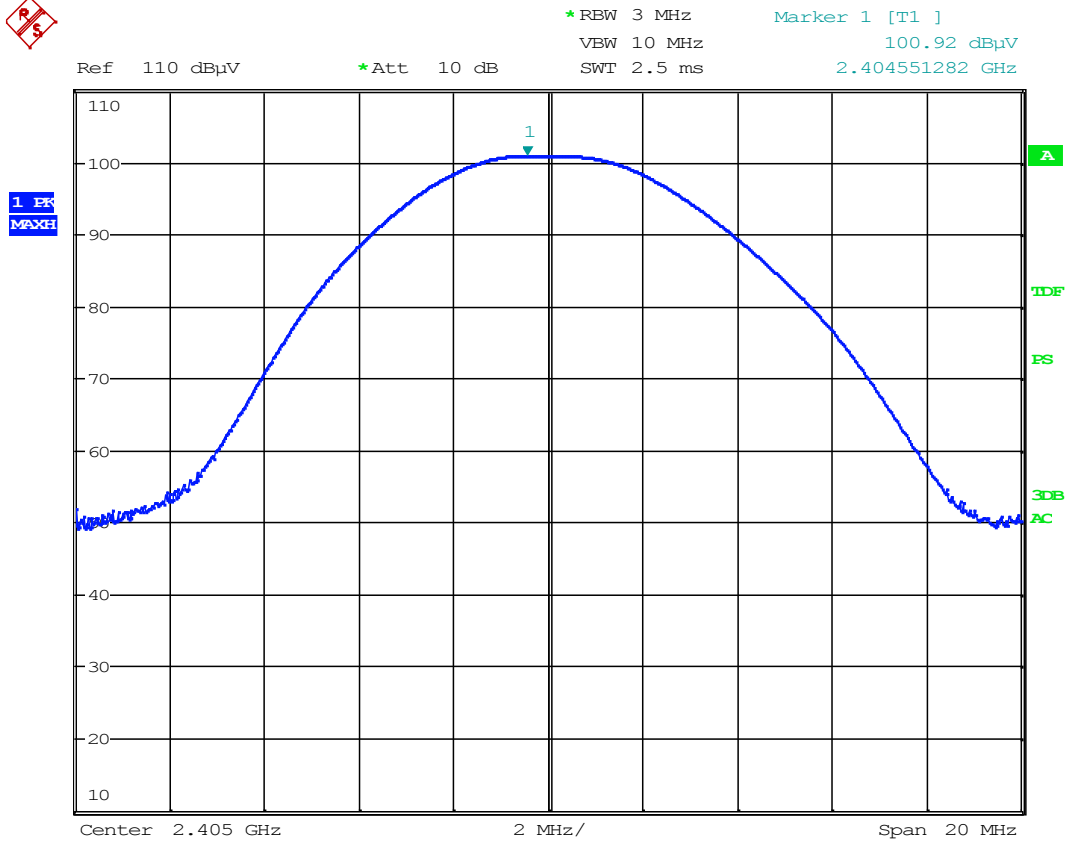
Yes  No

##### Requirements:

The maximum peak output power shall not exceed the following limits:

For Digital Transmission Systems in the 2400 - 2483.5 MHz band: 1 Watt

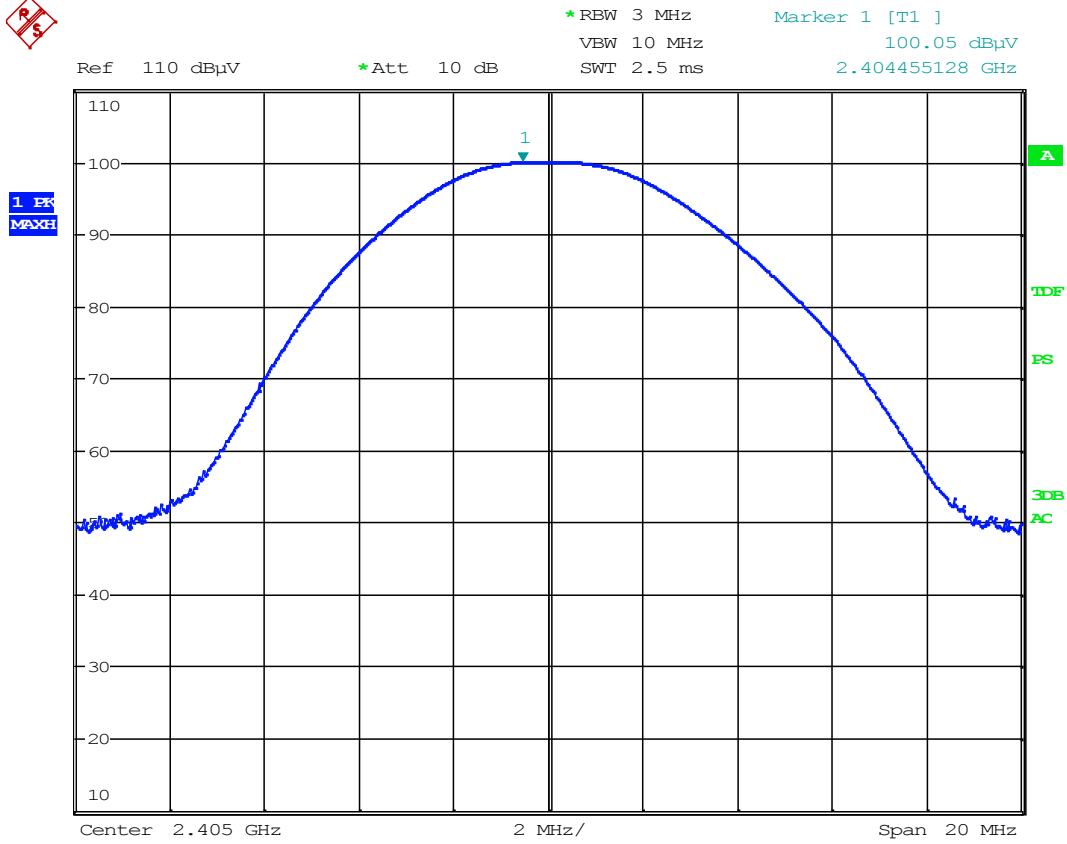
If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced below the stated value above by the amount in dB that the directional gain of the antenna exceeds 6 dBi.



Date: 12.MAR.2013 09:18:42

**Radiated Field strength, VP , 2405 MHz**





Date: 12.MAR.2013 09:20:14

**Radiated field strength, HP, 2405 MHz**



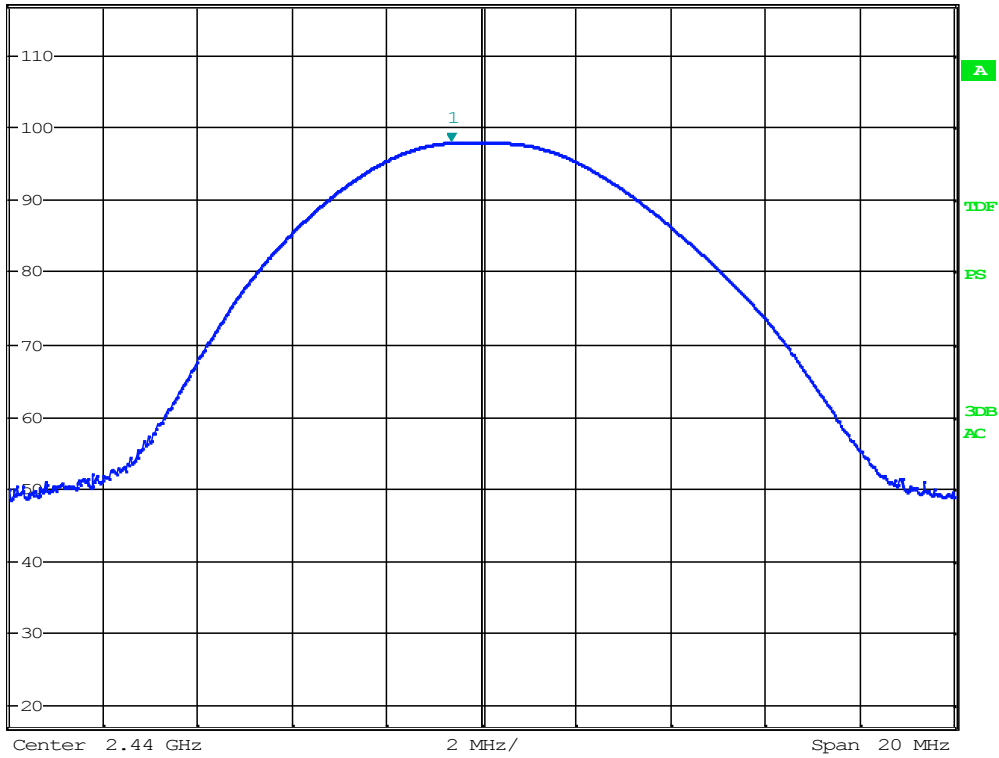


\*RBW 3 MHz      Marker 1 [T1 ]  
 VBW 10 MHz      98.00 dBμV  
 SWT 2.5 ms      2.439358974 GHz

Ref 117 dBμV

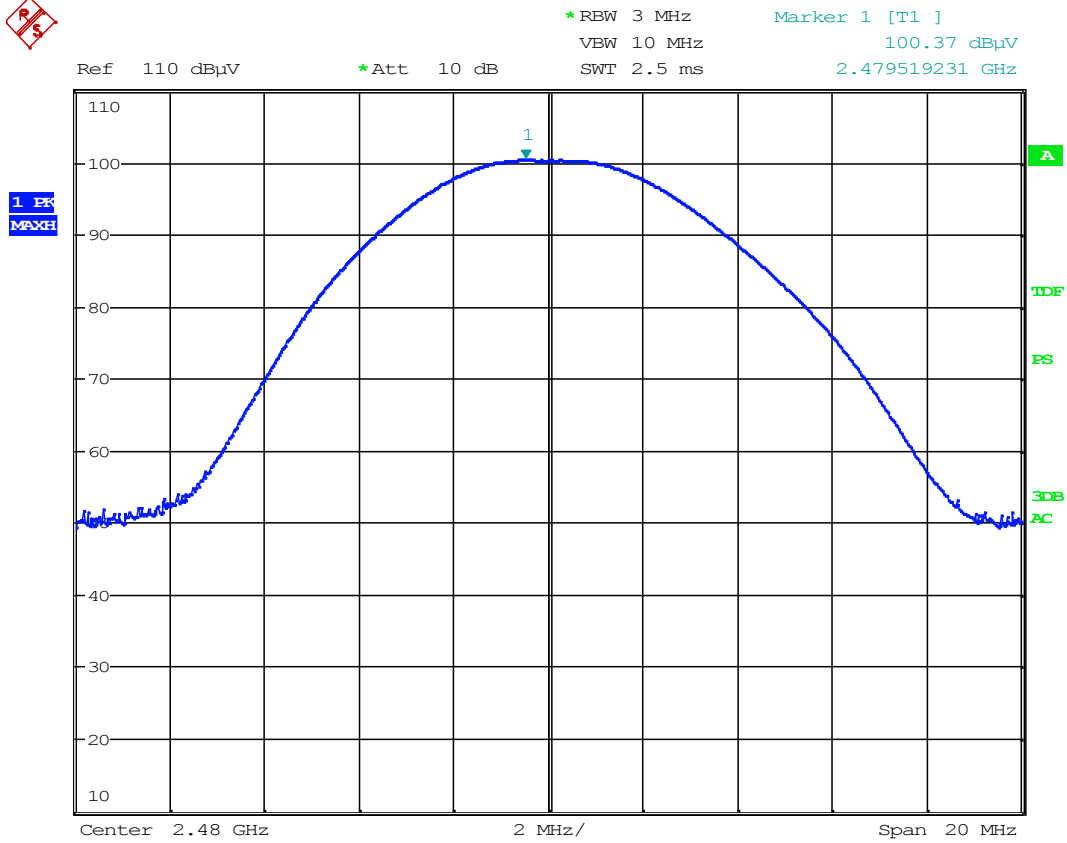
\*Att 10 dB

1 PK  
 MAXH



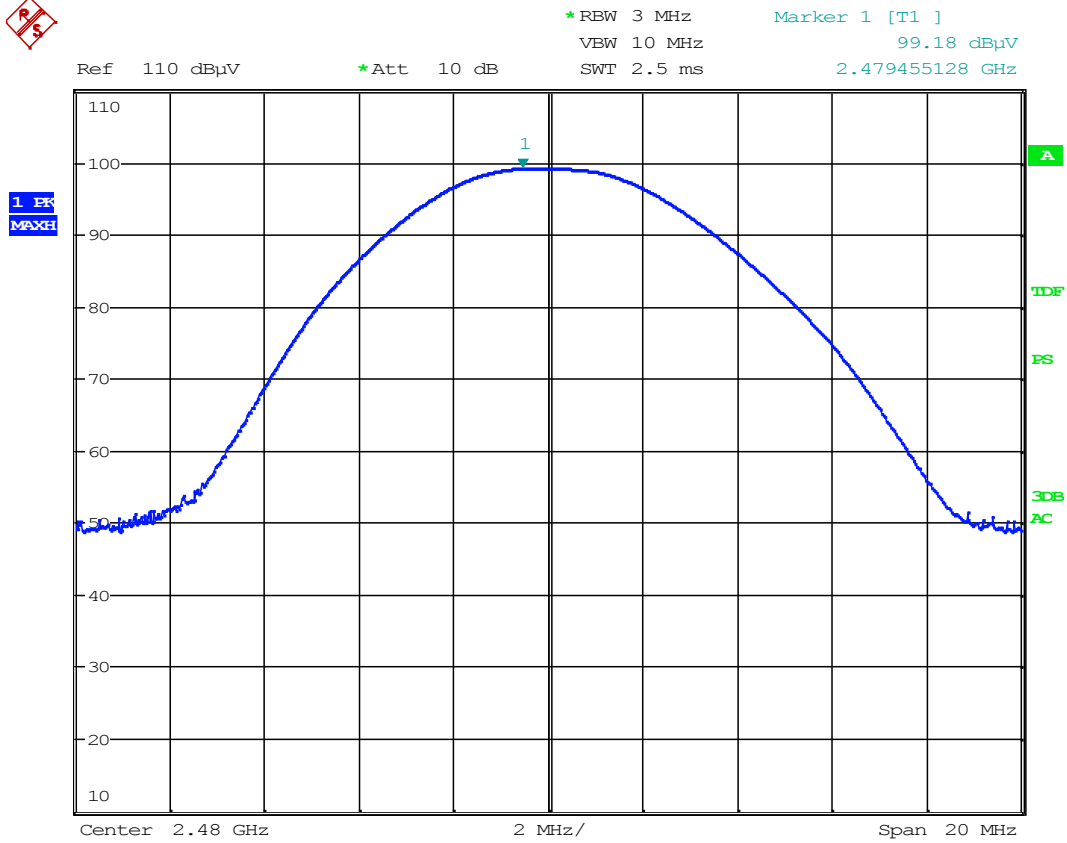
Date: 12.MAR.2013 08:39:37

**Radiated field strength, HP, 2440 MHz**



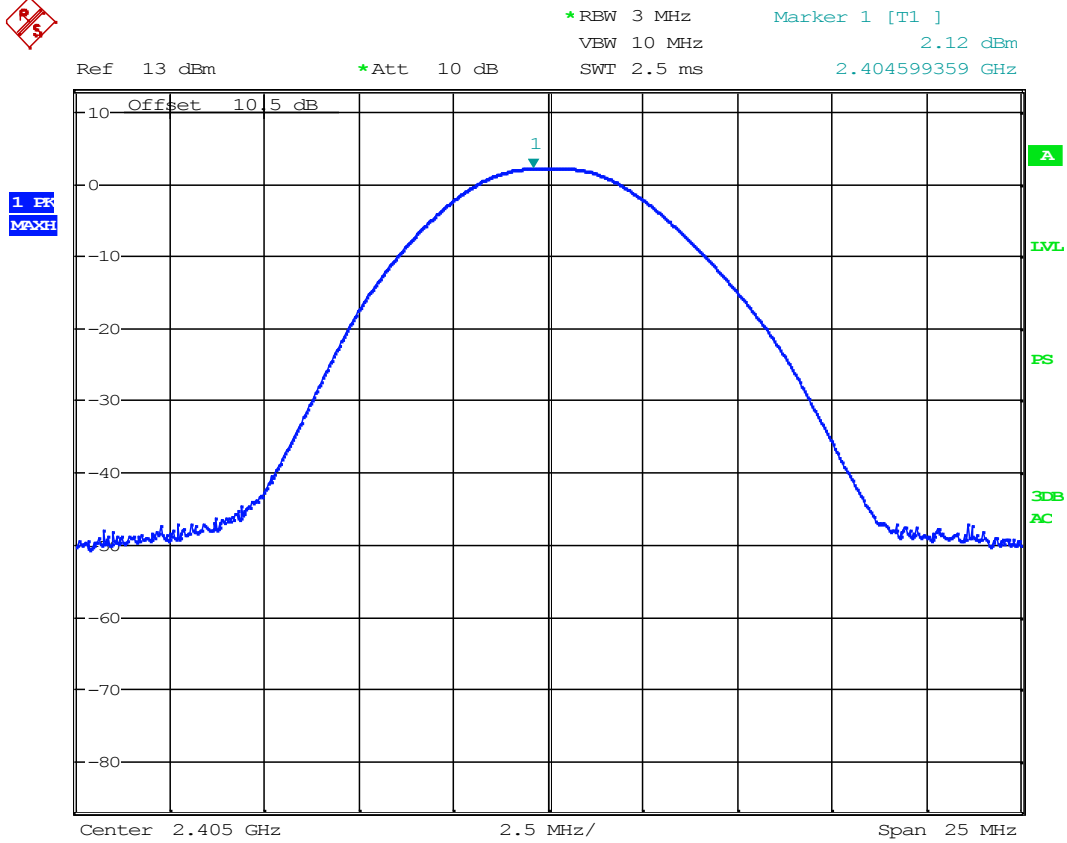
Date: 12.MAR.2013 10:23:55

**Radiated field strength, VP, 2480 MHz**



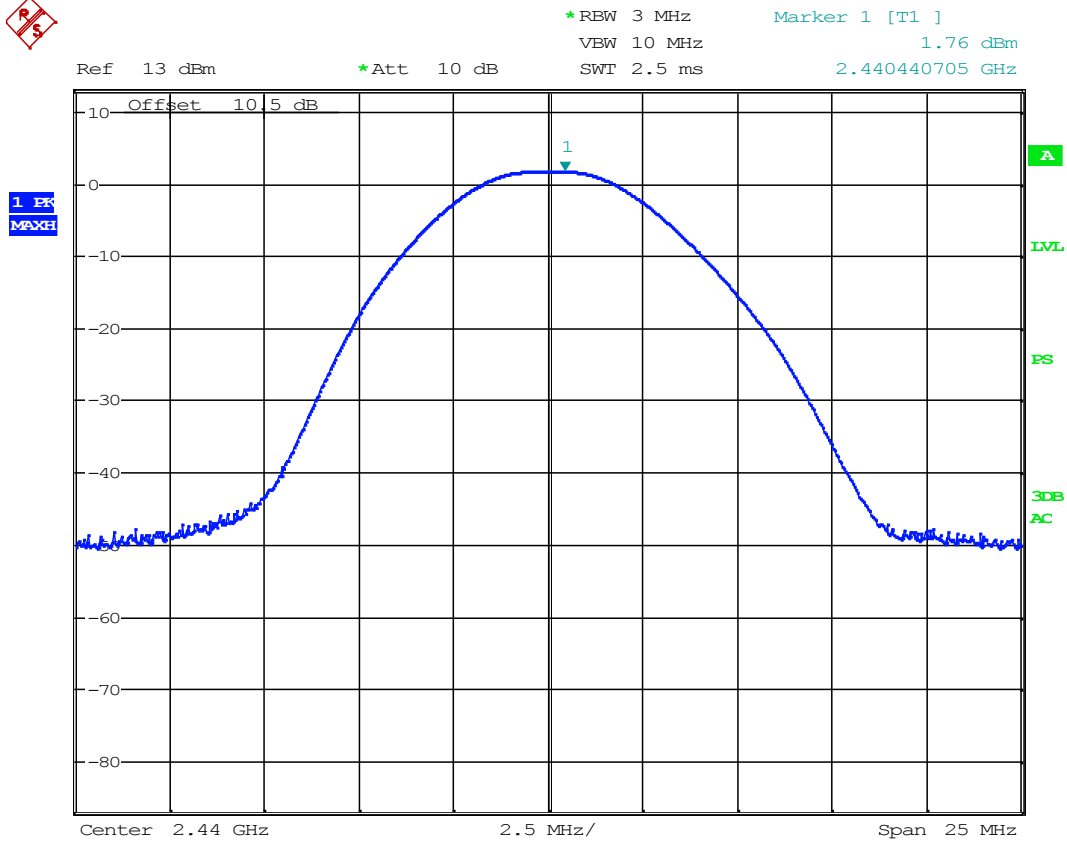
Date: 12.MAR.2013 10:25:24

**Radiated field strength, HP, 2480 MHz**



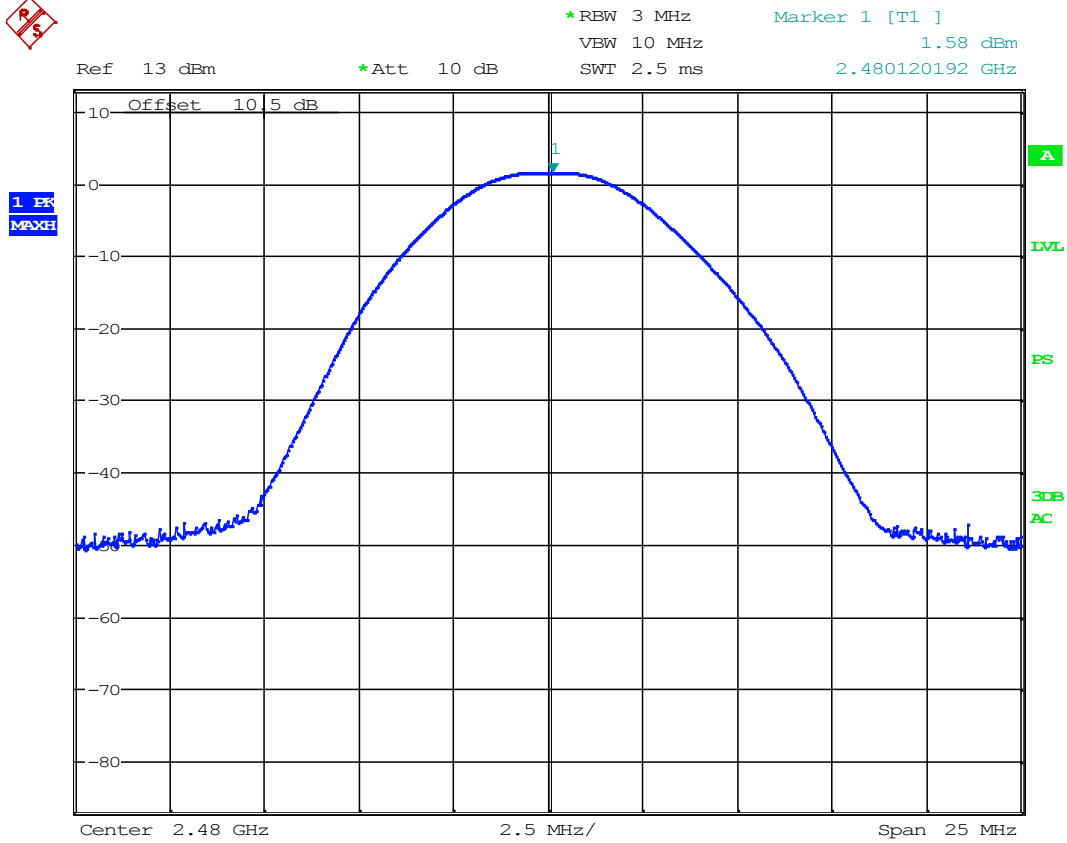
Date: 14.MAR.2013 07:40:36

**Conducted power – 2405MHz**



Date: 14.MAR.2013 07:41:08

**Conducted power – 2440MHz**



Date: 14.MAR.2013 07:41:37

**Conducted power – 2480MHz**



## 4.5 Spurious Emissions (Radiated)

Para. No.: 15.247 (c)

Test Performed By: G.Suhanthakumar	Date of Test: 12 Mar 2013
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Test Results: Complies

### Measurement Data:

Band-edge, @3m

Frequency	Measured Field Strength @3m, dB $\mu$ V/m	Detector	Limit dB $\mu$ V/m	Margin dB
2.39 GHz	44.1	PK	74	29.9
	35.8	AV	54	18.2
2.4835 GHz	70.5	PK	74	3.5
	53.3	AV	54	0.7

Tested according to KDB 913591.

### Band-edge field strength 2.4835 GHz:

Marker Delta 100kHz RBW: 46.12 dB

Average Field Strength: 99.39– 46.12 = 53.27 dB $\mu$ V/m

### 100% duty cycle

See attached plots.

### RF conducted power

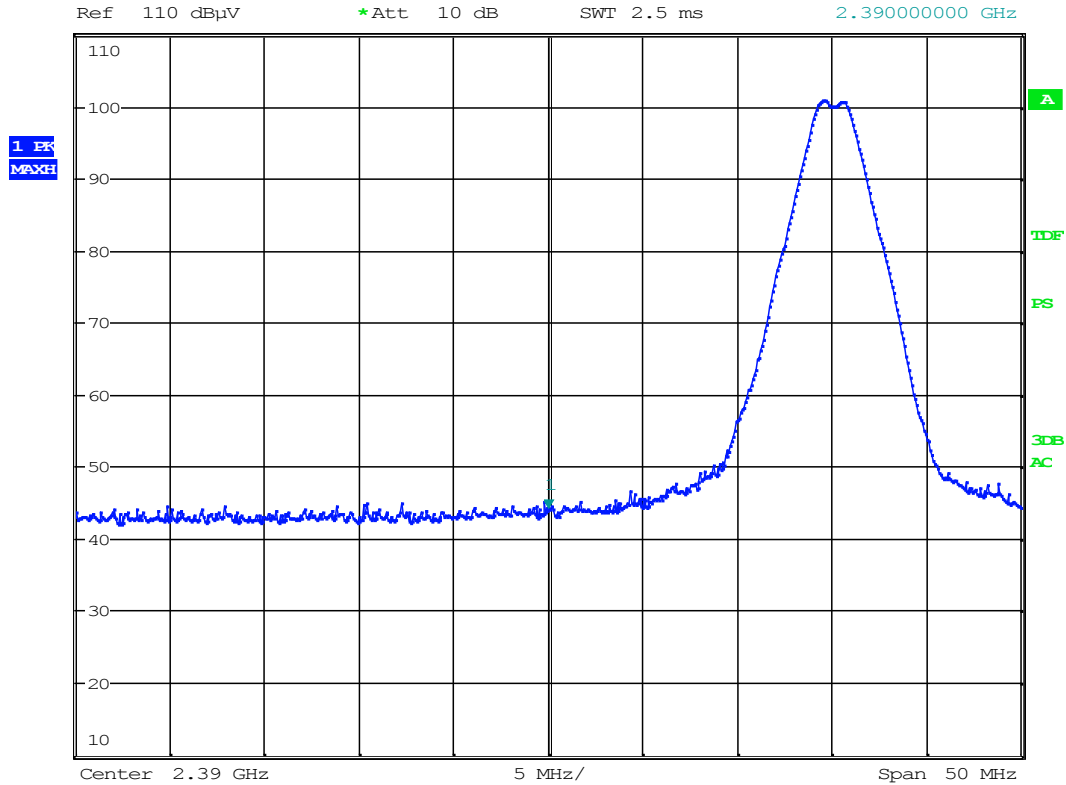
Scan performed radiated with 100 kHz Bandwidth from 0.01 to 25 GHz.

All emissions are more than 20dB below carrier.

See plots.



\*RBW 1 MHz      Marker 1 [T1 ]  
VBW 3 MHz      44.07 dBμV  
SWT 2.5 ms      2.390000000 GHz

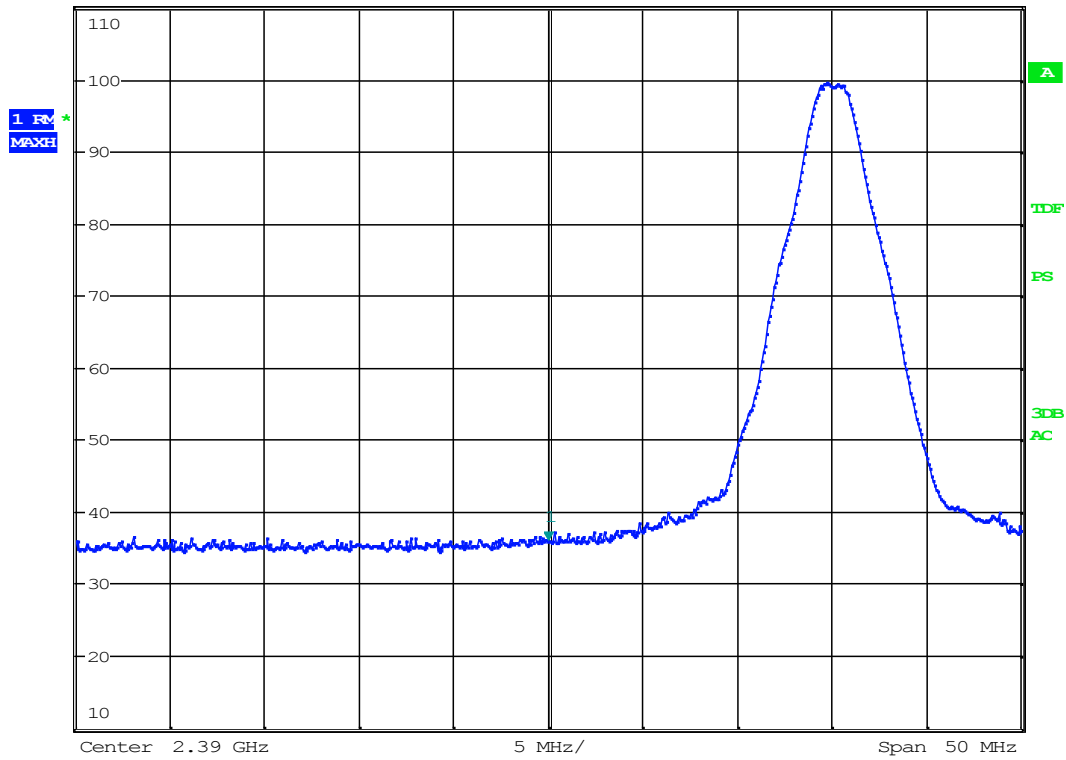


Date: 12.MAR.2013 09:24:50

**Band Edge, 2390 MHz, Peak Detector**

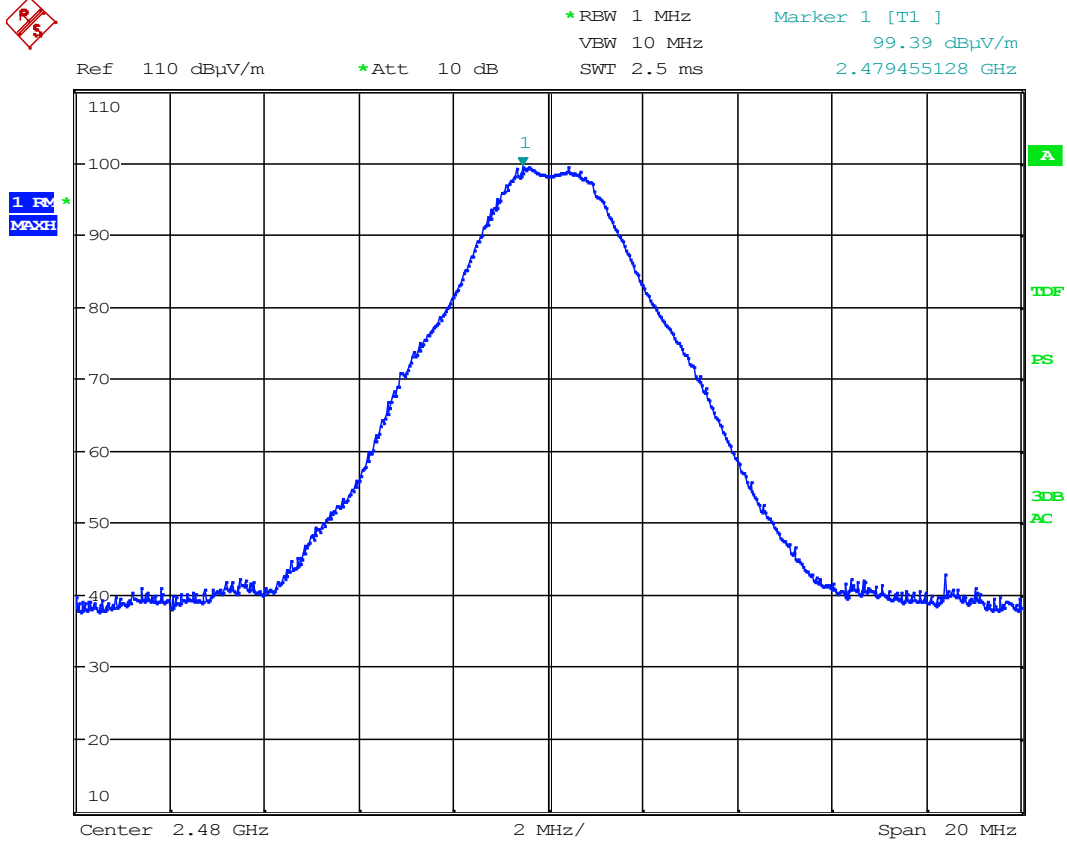


Ref 110 dB $\mu$ V      \*Att 10 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 10 MHz      35.84 dB $\mu$ V  
 SWT 2.5 ms      2.390000000 GHz



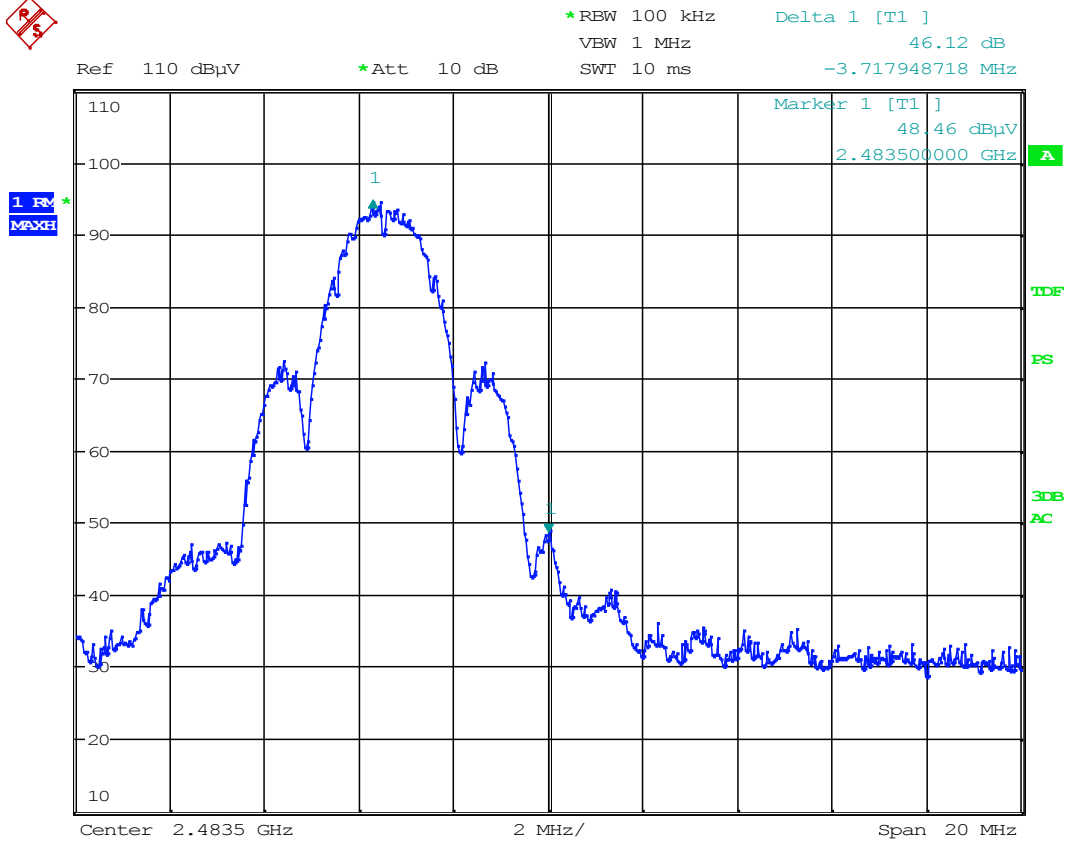
Date: 12.MAR.2013 09:25:13

**Band Edge, 2390 MHz, Average Detector**



Date: 14.MAR.2013 16:52:42

**Field strength at 2480MHz for delta marker**

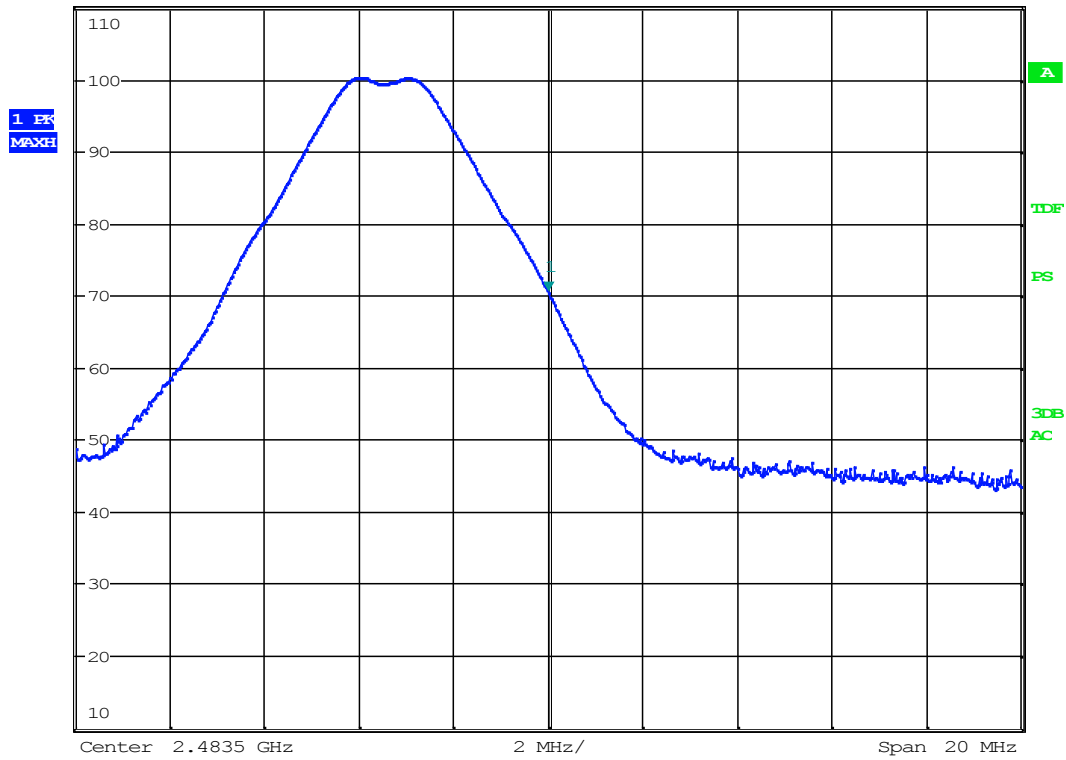


Date: 12.MAR.2013 10:33:51

**Delta marker, 2483.5MHz, AV detector**

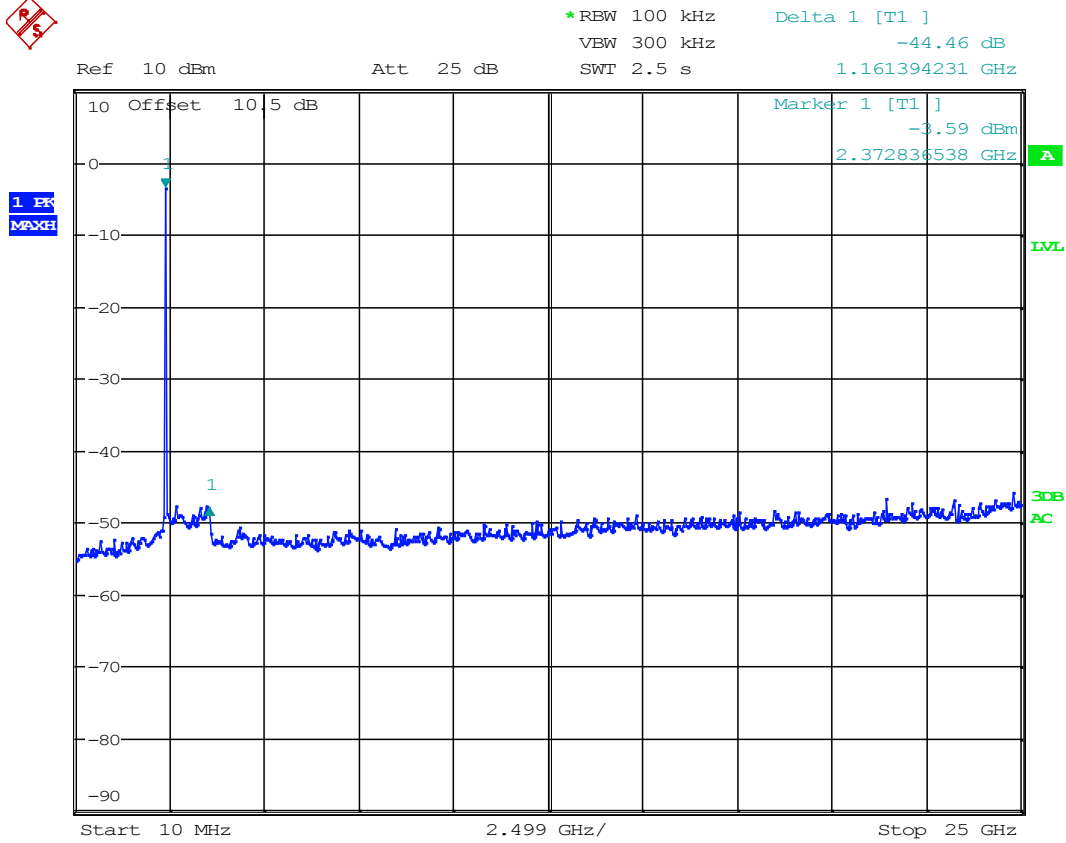


Ref 110 dB $\mu$ V      \*Att 10 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      70.52 dB $\mu$ V  
 SWI 2.5 ms      2.483500000 GHz



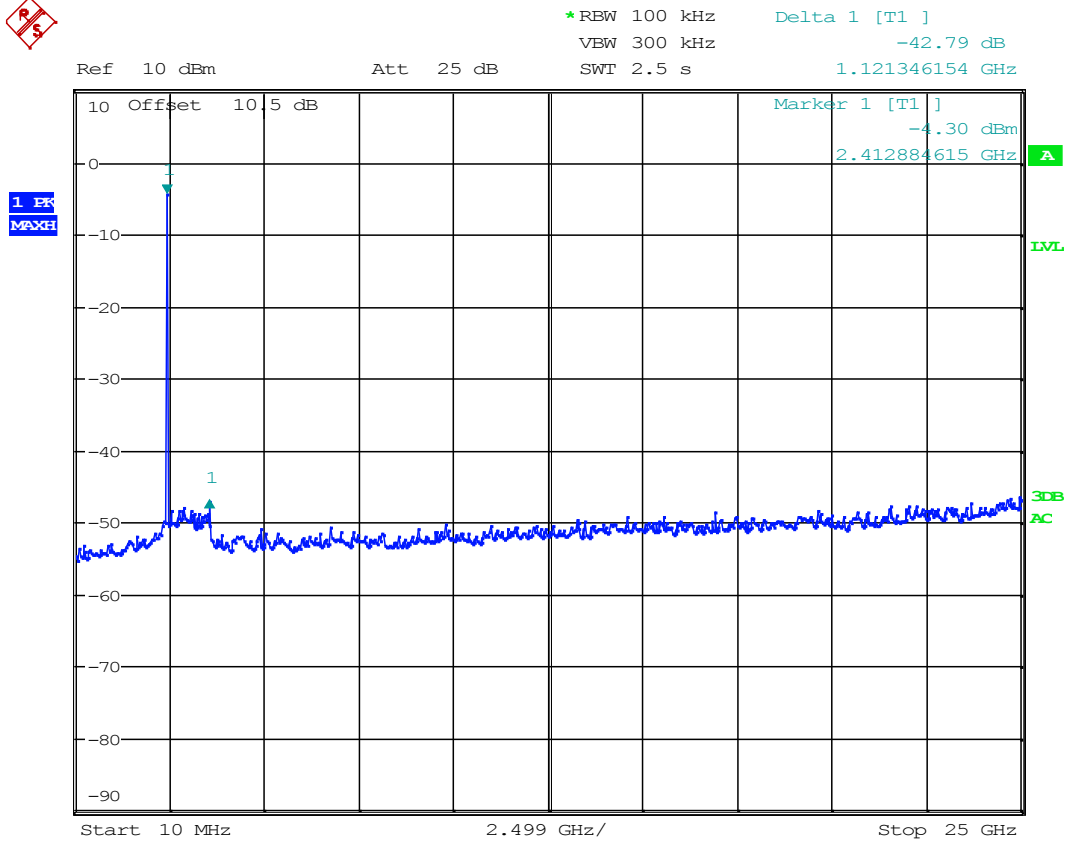
Date: 12.MAR.2013 10:32:07

**Band Edge, 2483.5 MHz, Peak Detector**



Date: 12.MAR.2013 12:29:15

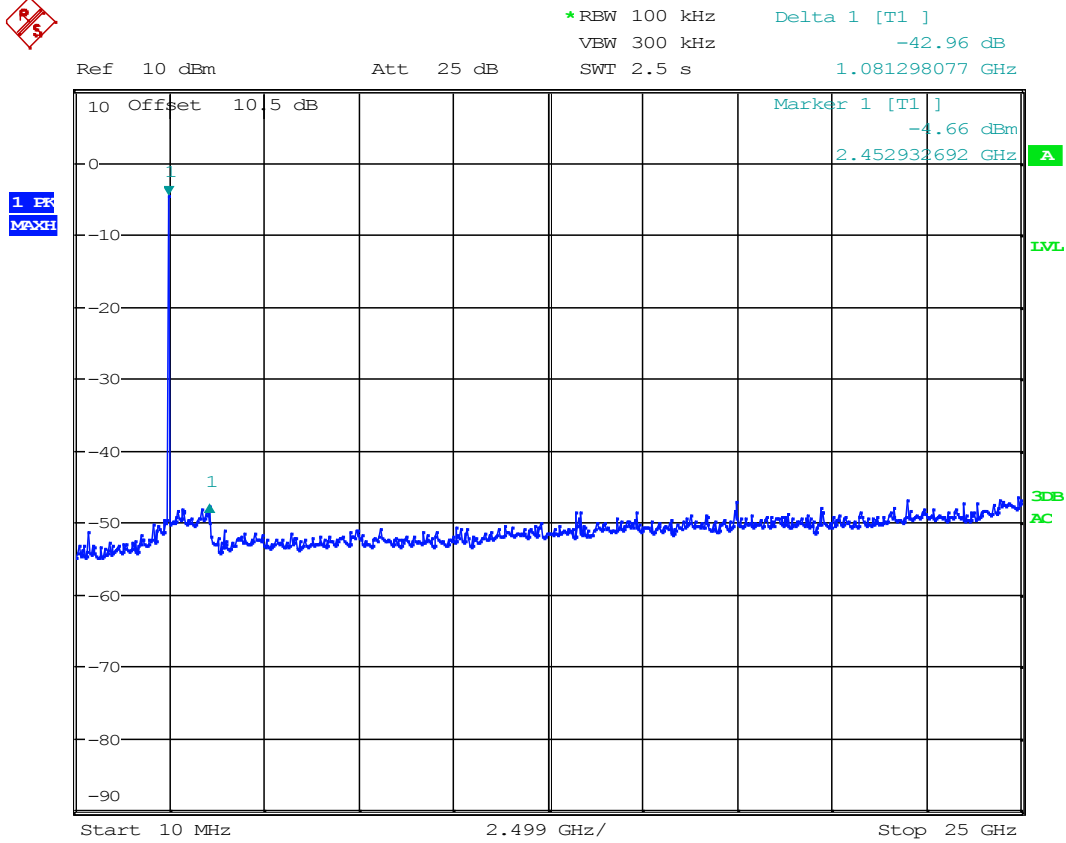
**Conducted spurious emission 10MHz – 25GHz - ch2405MHz**



Date: 12.MAR.2013 12:30:16

**Conducted spurious emission 10MHz – 25GHz - ch2440MHz**





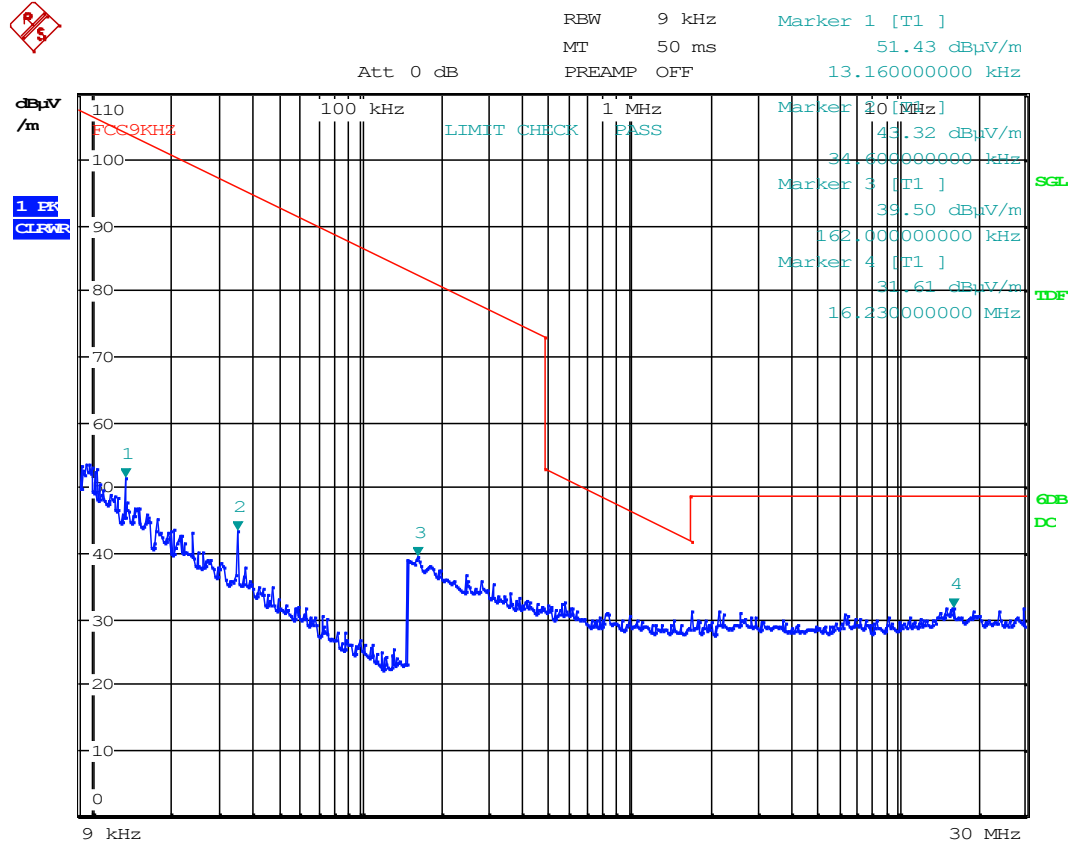
Date: 12.MAR.2013 12:30:46

**Conducted spurious emission 10MHz – 25GHz - ch2480MHz**

**Radiated emissions 9kHz - 30 MHz.**

Detector: Quasi-Peak

Measuring distance 10 m.



Date: 12.MAR.2013 12:24:32

**Radiated Emissions, 9 kHz – 30 MHz @10m**

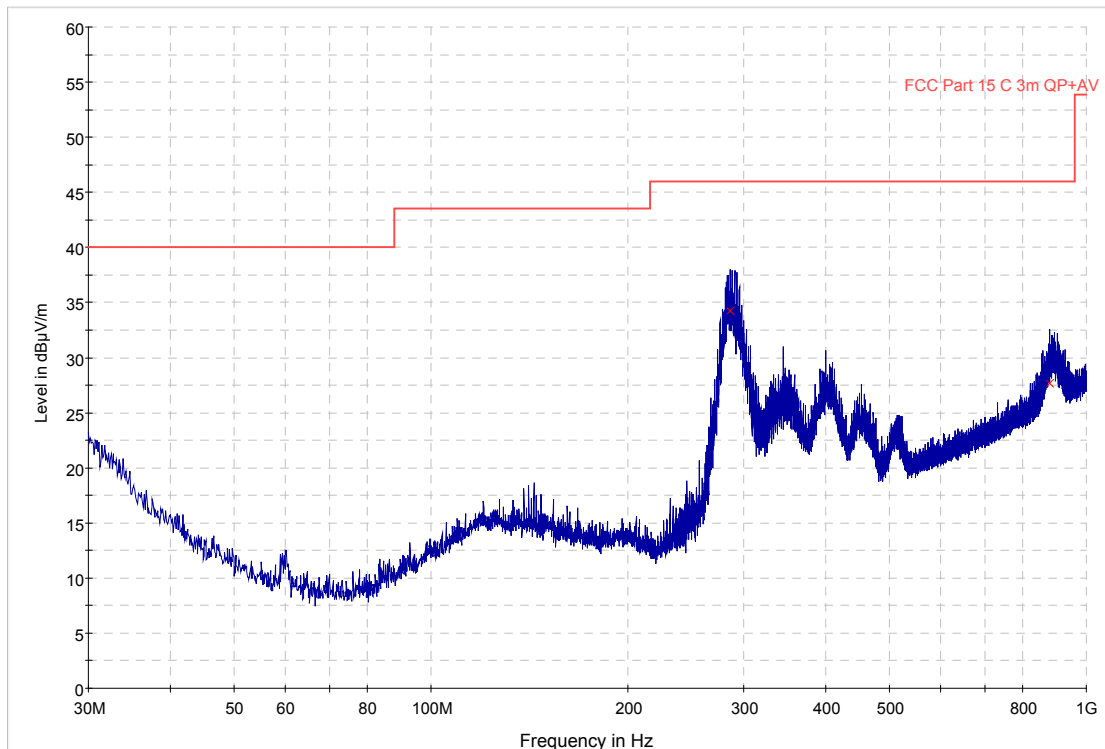
**Radiated emission 30 – 1000 MHz.**

Detector: Peak

Measuring distance at 3m.

All values are below the limit even when measured with Peak Detector.

See attached plot.



**Radiated Emissions, 30 – 1000 MHz, VP and HP, @3m**

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
285.748383	34.3	1000.0	120.000	116.0	H	77.0	-9.1	11.8	46.0	
877.789666	27.7	1000.0	120.000	100.0	H	265.0	1.2	18.3	46.0	

**Radiated Emissions, 1-25 GHz**

1-8 GHz measured at a distance of 3 m

8 - 25 GHz measured at 1m

**Peak detector**

Frequency MHz	Field Strength @3m dB $\mu$ V/m	Detector	Limit dB $\mu$ V/m	Margin dB
4810	57.1	Pk	74	16.9
4880	57.5	Pk	74	16.5
4960	58.0	Pk	74	16.0
7215	57.7	Pk	74	16.3
7320	58.4	Pk	74	15.6
7440	56.2	Pk	74	17.8
8000 - 25000	None detected	Pk	74	-

**Average detector**

Frequency MHz	Field Strength @3m dB $\mu$ V/m	Detector	Limit dB $\mu$ V/m	Margin dB
4810	48.5	Av	54	5.5
4880	48.2	Av	54	5.8
4960	49.7	Av	54	4.3
7215	48.6	Av	54	5.4
7320	49.0	Av	54	5.0
7440	48.3	Av	54	5.7
8000 - 25000	None detected	Av	54	-

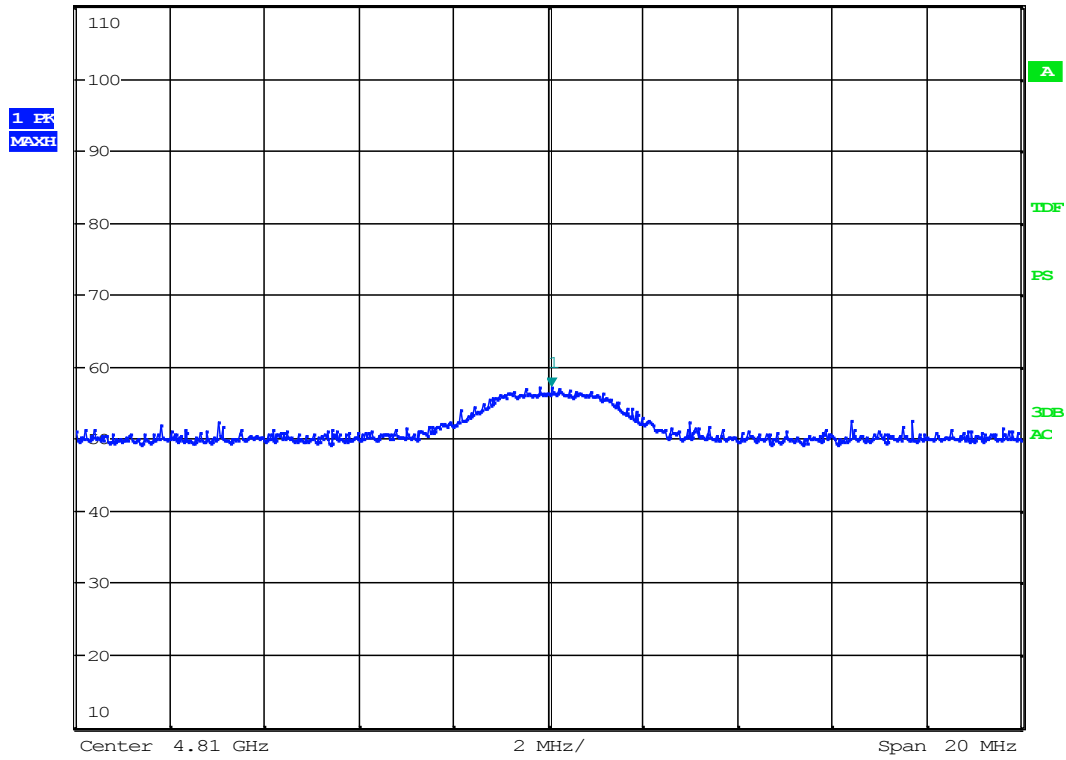
Maximum is obtained at horizontal polarization

Antenna factor, amplifier gain and cable loss are included in Spectrum Analyzer "Transducer factor".

See attached graphs.

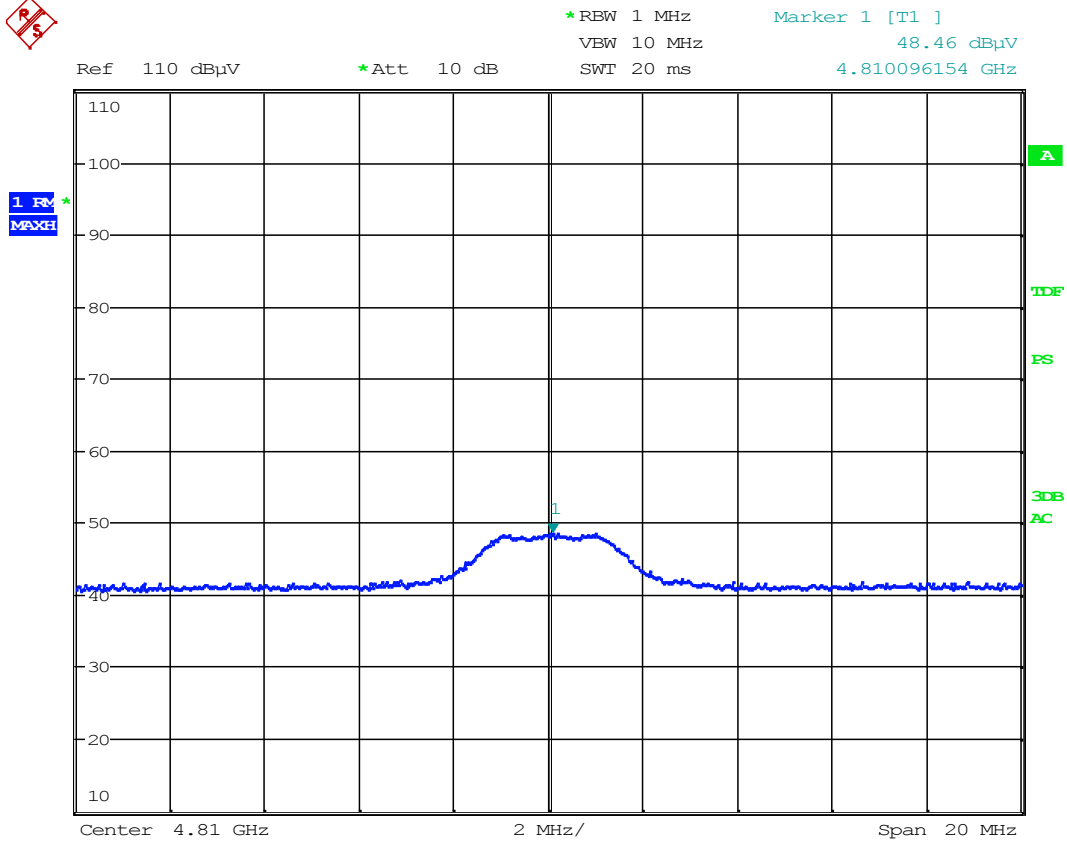


Ref 110 dB $\mu$ V      \*Att 10 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      57.07 dB $\mu$ V  
 SWI 20 ms      4.810064103 GHz



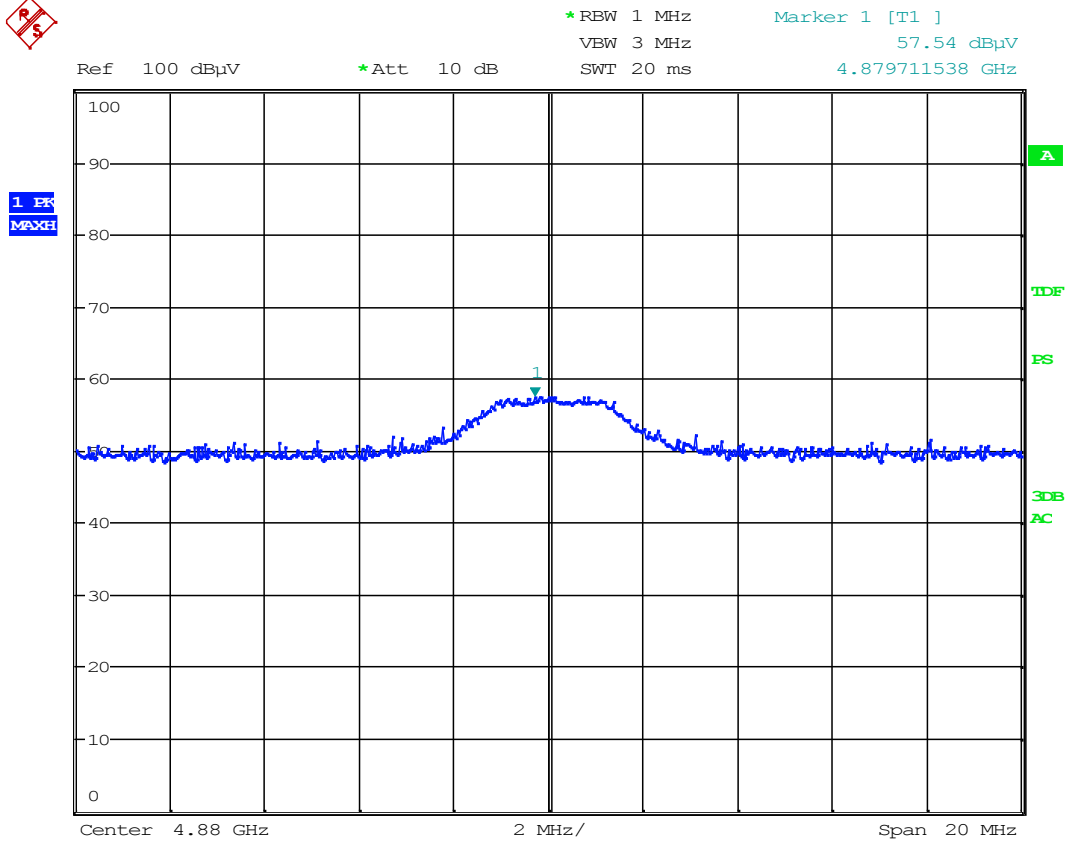
Date: 12.MAR.2013 10:16:08

HP: 2<sup>nd</sup> Har – ch2405MHz – PK



Date: 12.MAR.2013 10:16:36

HP: 2<sup>nd</sup> Har – ch2405MHz – AV

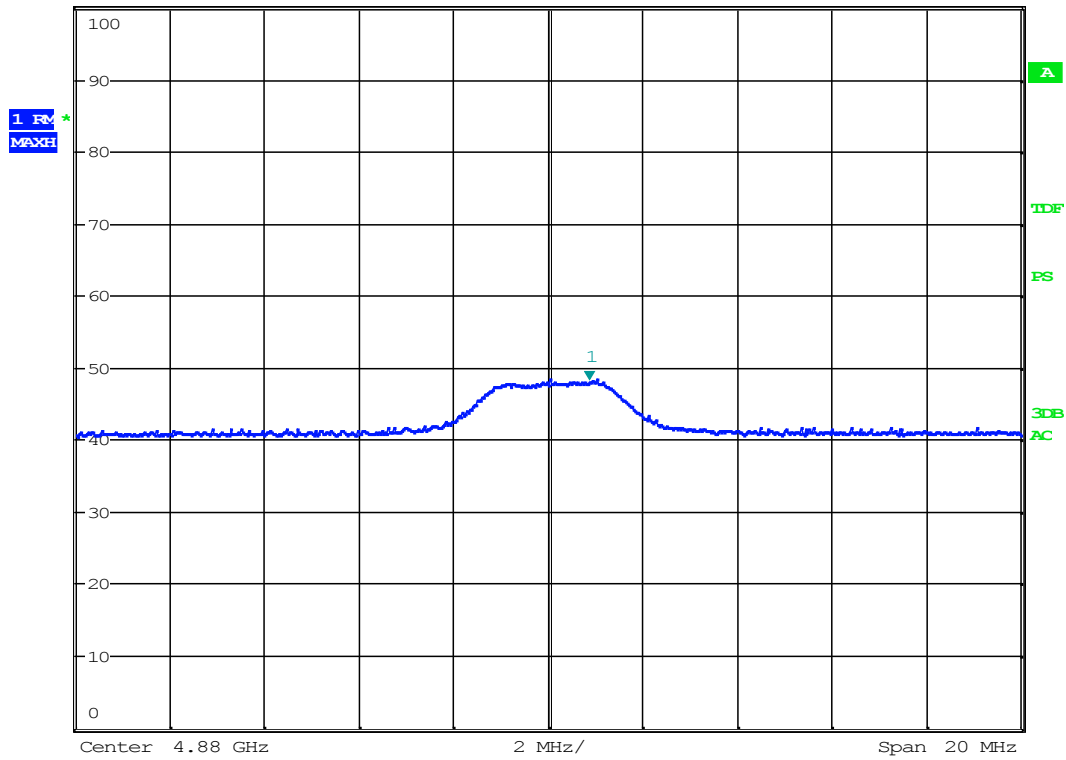


Date: 12.MAR.2013 09:05:50

HP: 2<sup>nd</sup> Har – ch2440MHz – PK



Ref 100 dB $\mu$ V/m      \*Att 10 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 10 MHz      48.23 dB $\mu$ V/m  
 SWT 20 ms      4.880865385 GHz



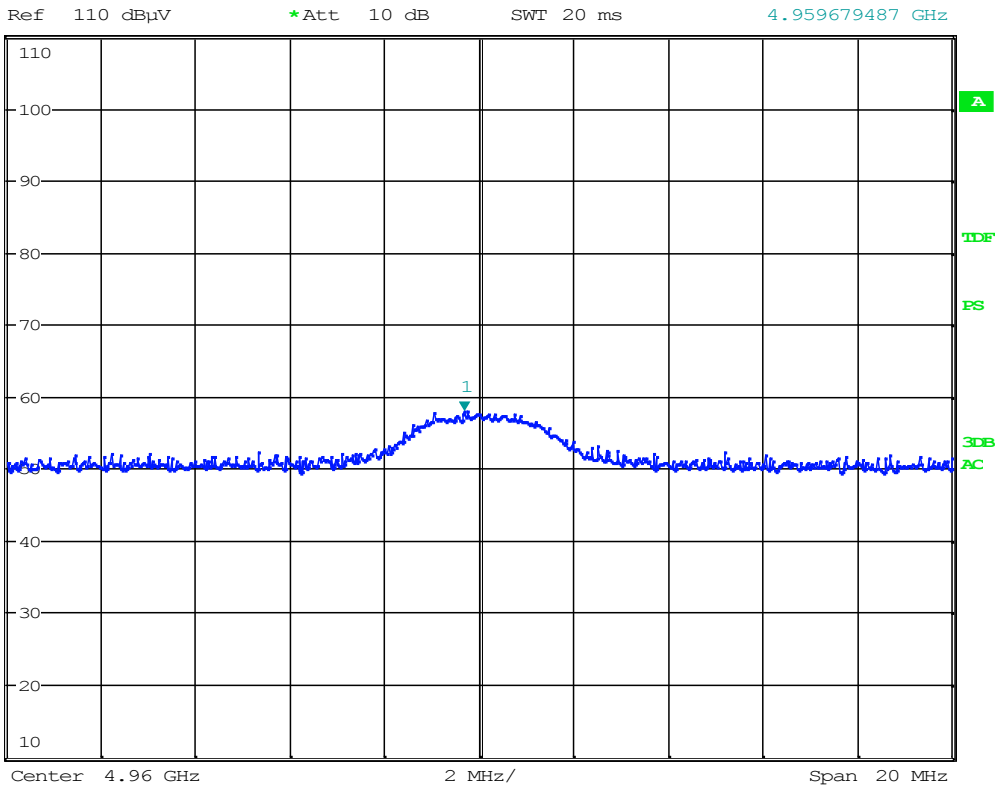
Date: 14.MAR.2013 07:58:21

HP: 2<sup>nd</sup> Har – ch2440MHz – AV



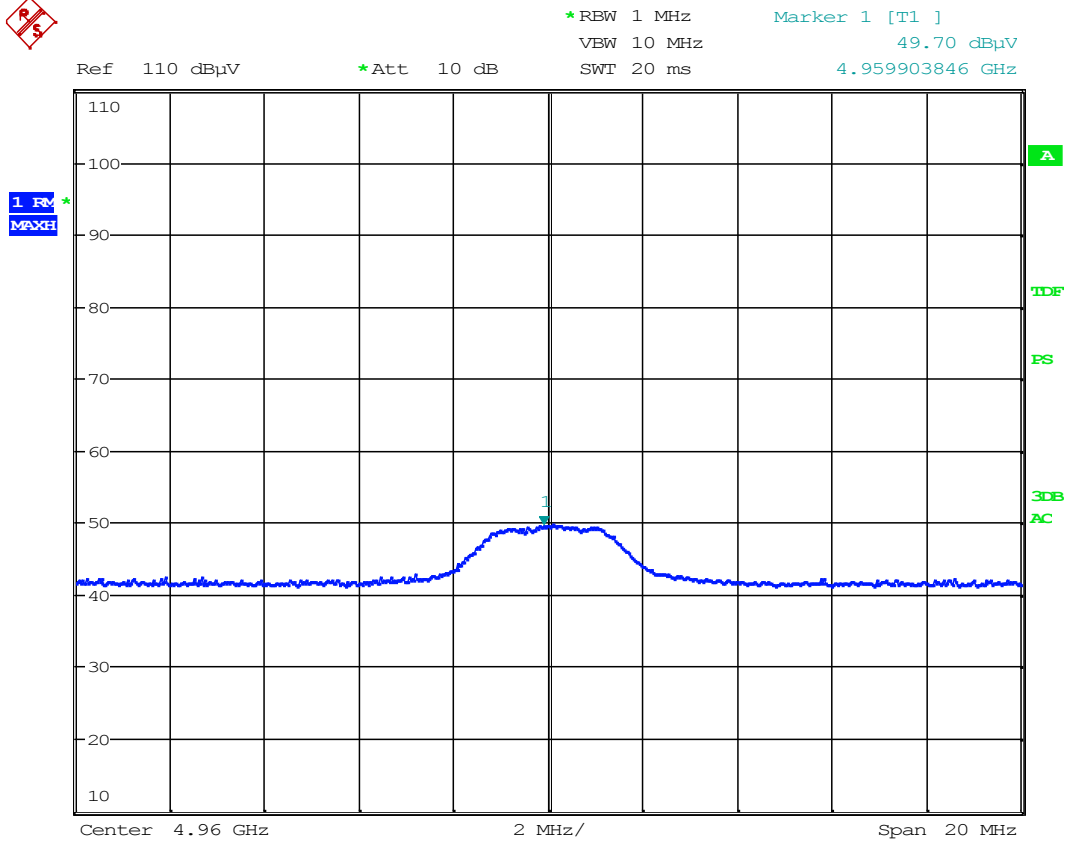


\*RBW 1 MHz      Marker 1 [T1 ]  
VBW 3 MHz      57.96 dBμV  
SWT 20 ms      4.959679487 GHz



Date: 12.MAR.2013 10:37:08

HP: 2<sup>nd</sup> Har – ch2480MHz – PK

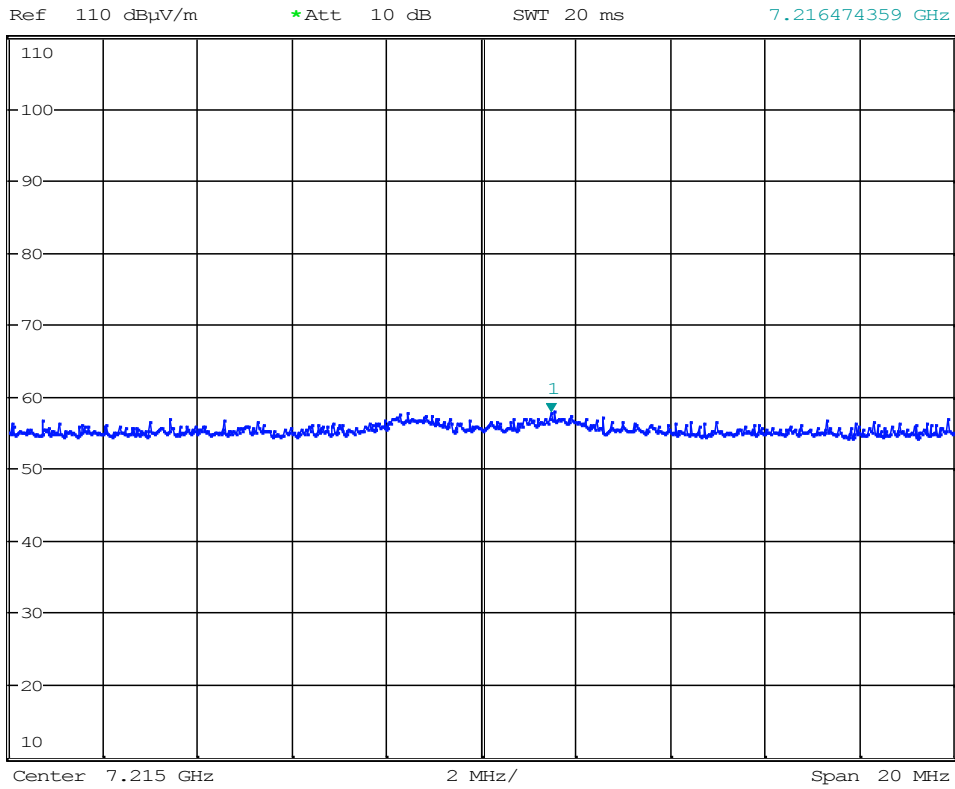


Date: 12.MAR.2013 10:37:35

HP: 2<sup>nd</sup> Har – ch2480MHz – AV



\*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      57.71 dB $\mu$ V/m  
 SWI 20 ms      7.216474359 GHz

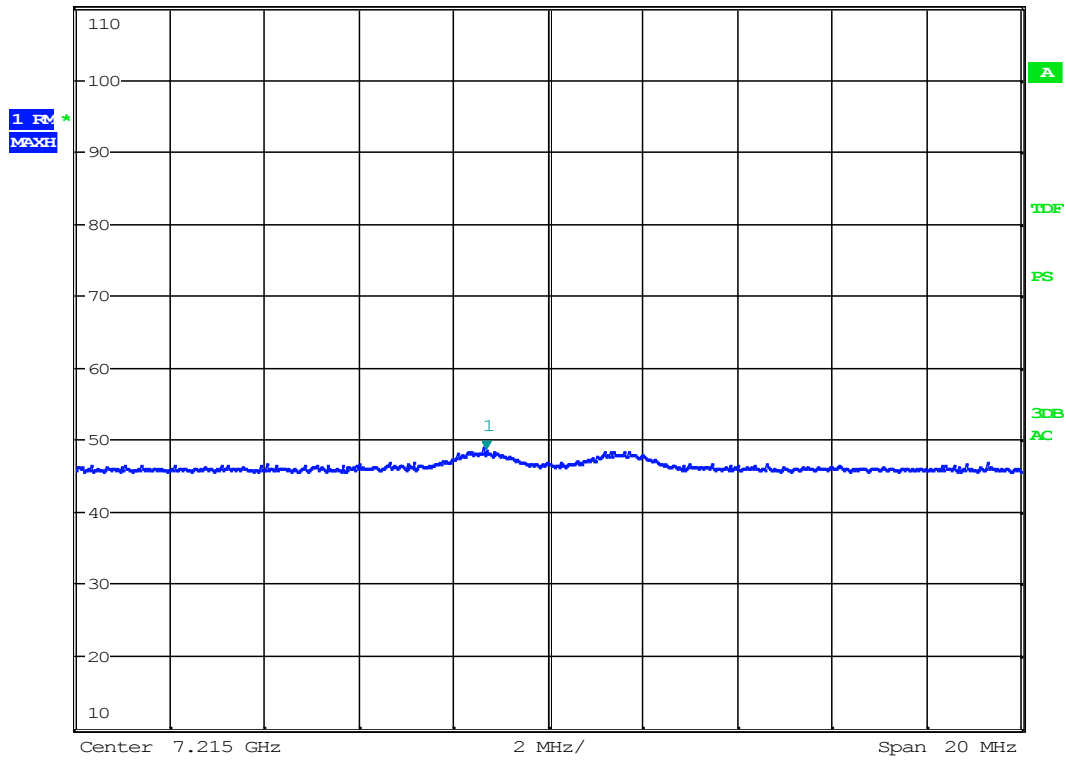


Date: 14.MAR.2013 07:37:46

HP: 3rd Har – ch2405MHz – PK

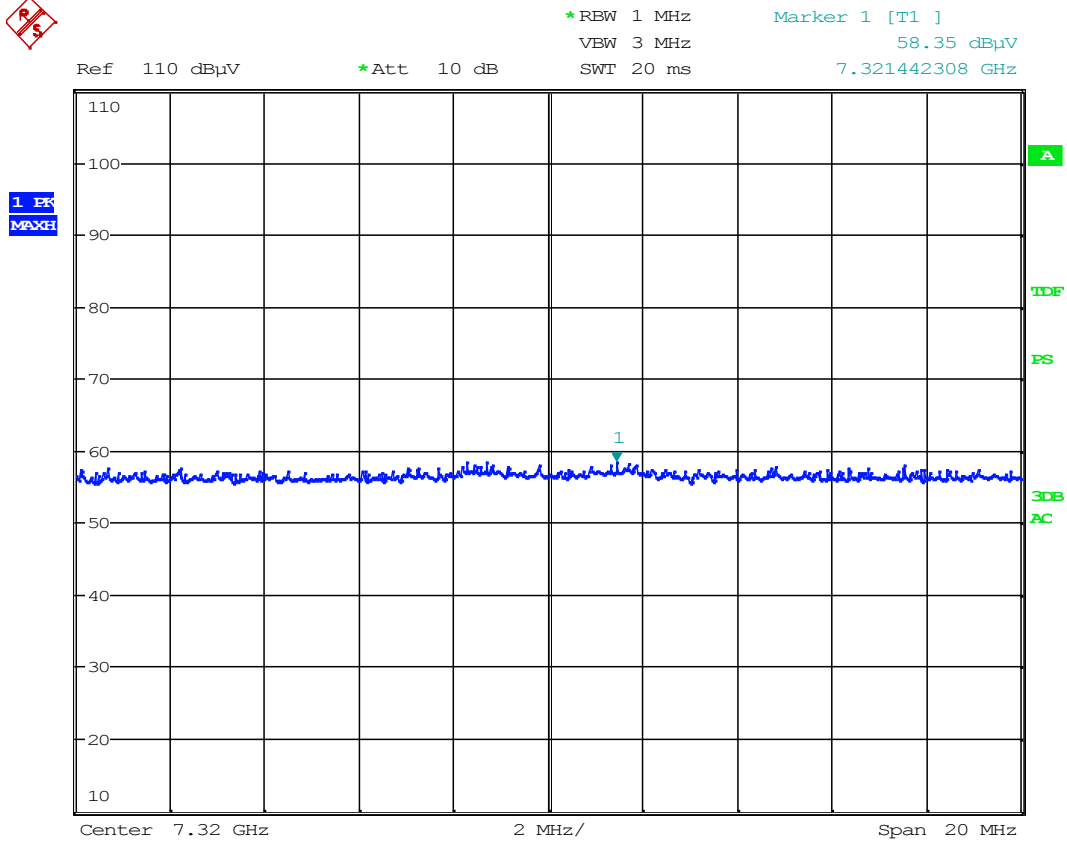


Ref 110 dB $\mu$ V/m      \*Att 10 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 10 MHz      48.61 dB $\mu$ V/m  
 SWT 20 ms      7.213685897 GHz



Date: 14.MAR.2013 07:37:23

HP: 3rd Har – ch2405MHz – AV

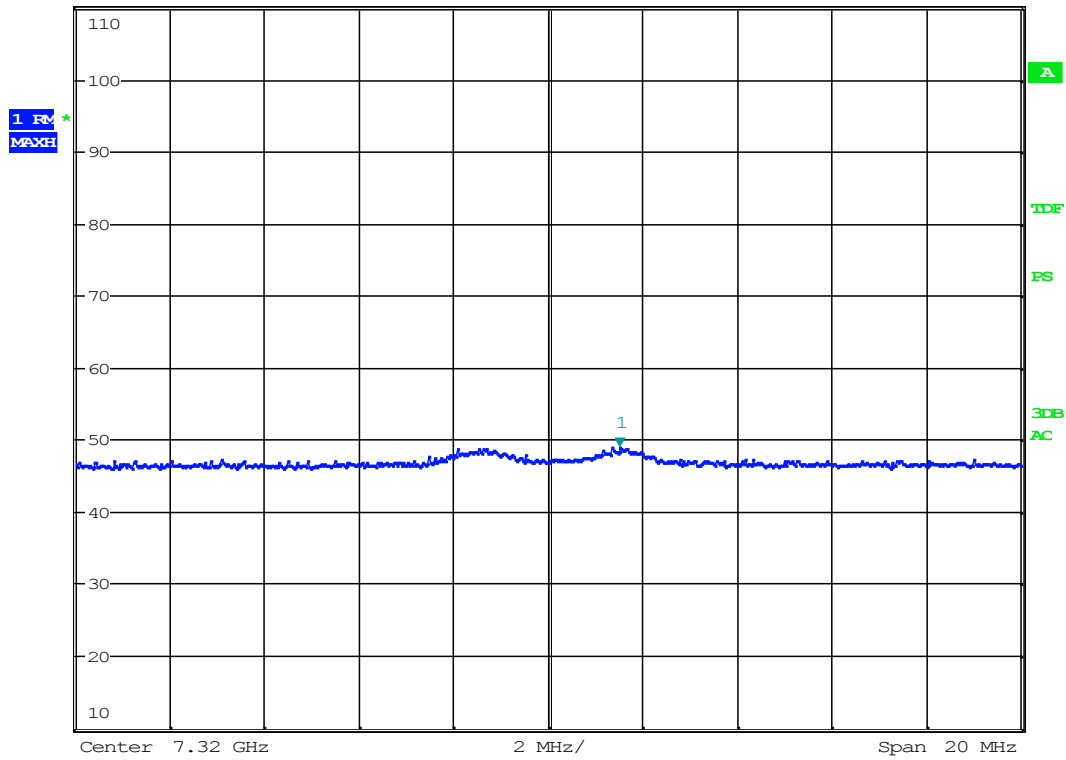


Date: 12.MAR.2013 10:50:48

HP: 3rd Har – ch2440MHz – PK

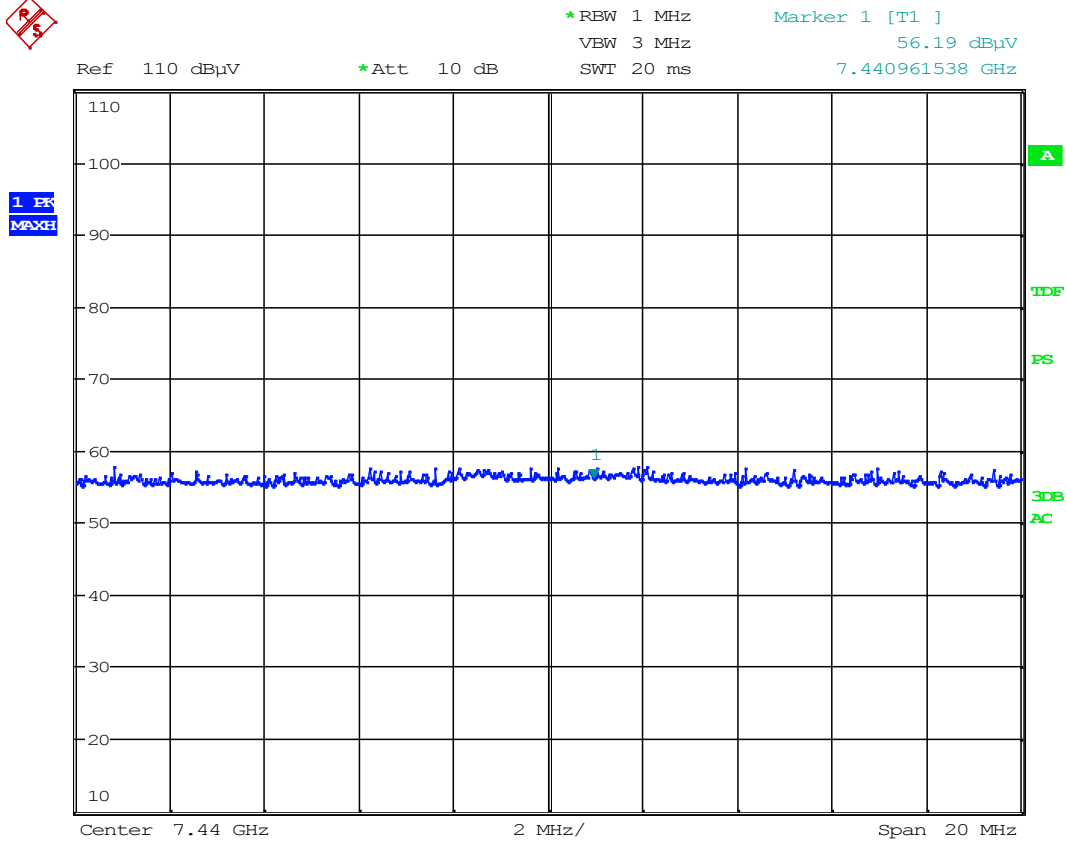


Ref 110 dB $\mu$ V      \*Att 10 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
VBW 10 MHz      49.02 dB $\mu$ V  
SWT 20 ms      7.321506410 GHz



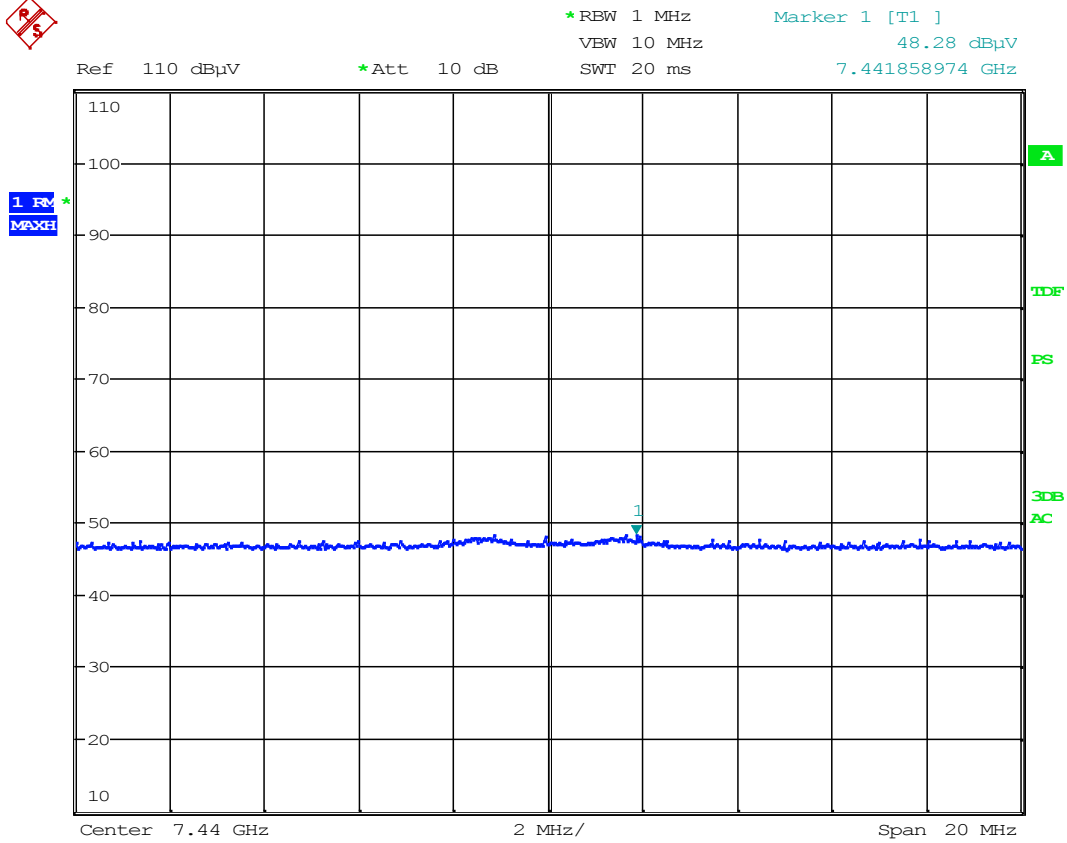
Date: 12.MAR.2013 10:51:10

HP: 3rd Har – ch2440MHz – AV



Date: 12.MAR.2013 10:52:37

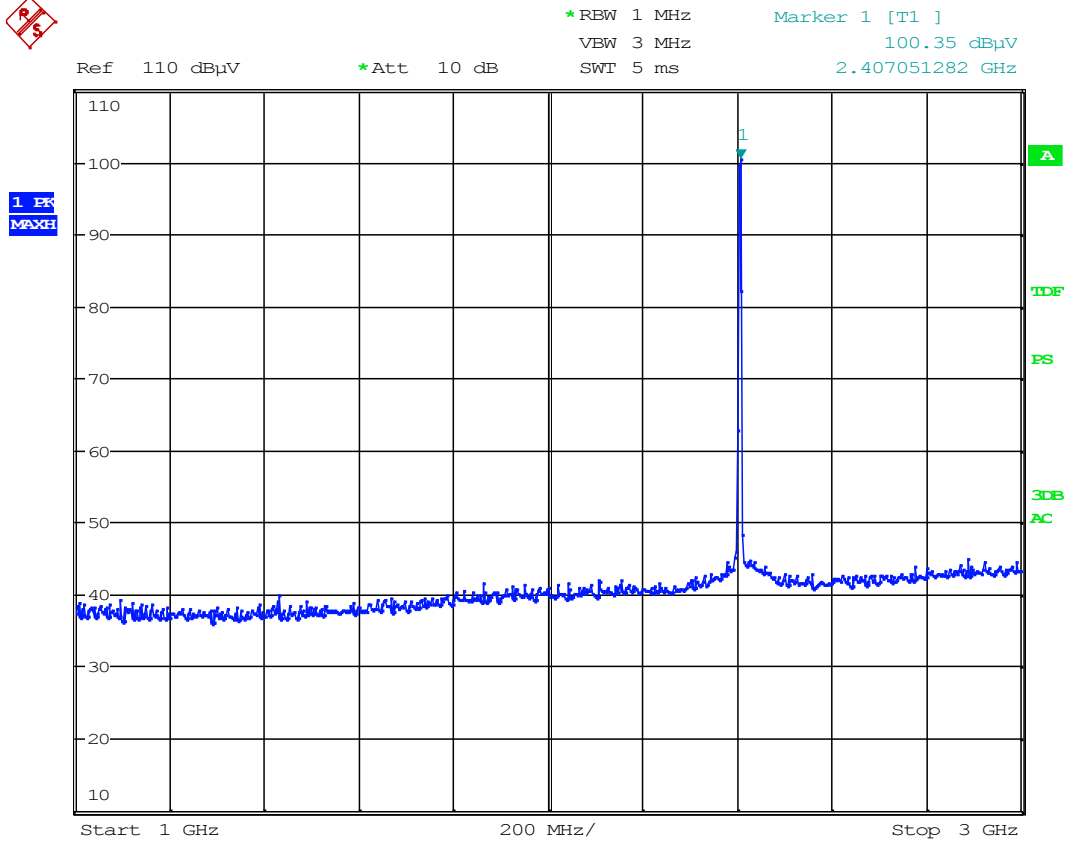
HP: 3rd Har – ch2480MHz – PK



Date: 12.MAR.2013 10:52:14

HP: 3rd Har – ch2480MHz – AV



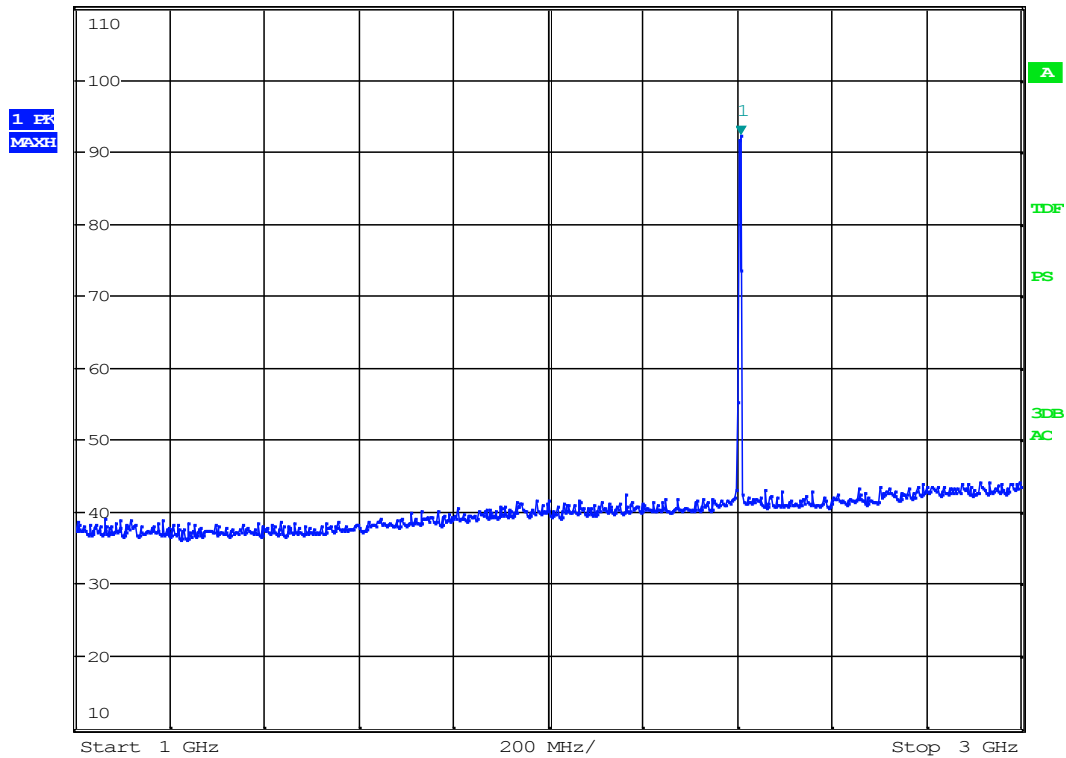


Date: 12.MAR.2013 10:58:52

**Radiated Emissions ch. 2405 MHz, 1 – 3 GHz, VP, @3m – Pre-scan with Peak detector**

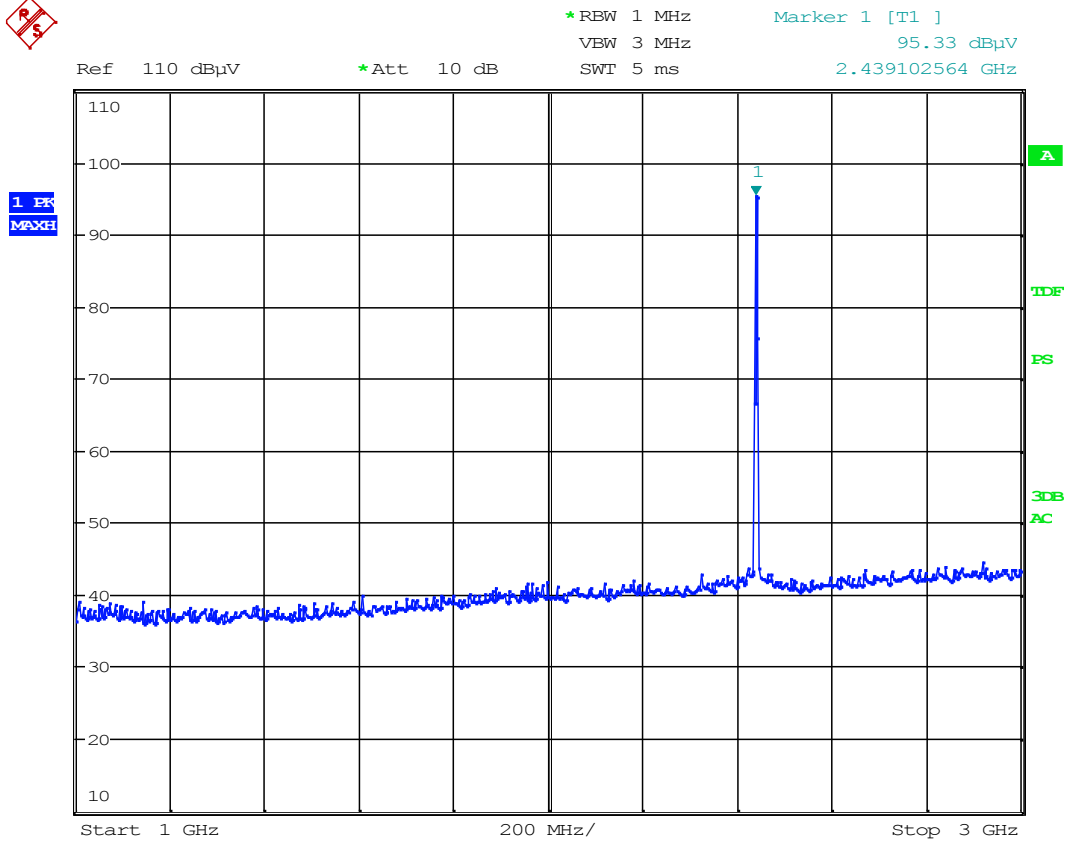


Ref 110 dB $\mu$ V      \*Att 10 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
VBW 3 MHz      92.24 dB $\mu$ V  
SWT 5 ms      2.407051282 GHz



Date: 12.MAR.2013 11:01:42

**Radiated Emissions ch. 2405 MHz, 1 – 3 GHz, HP, @3m – Pre-scan with Peak detector**

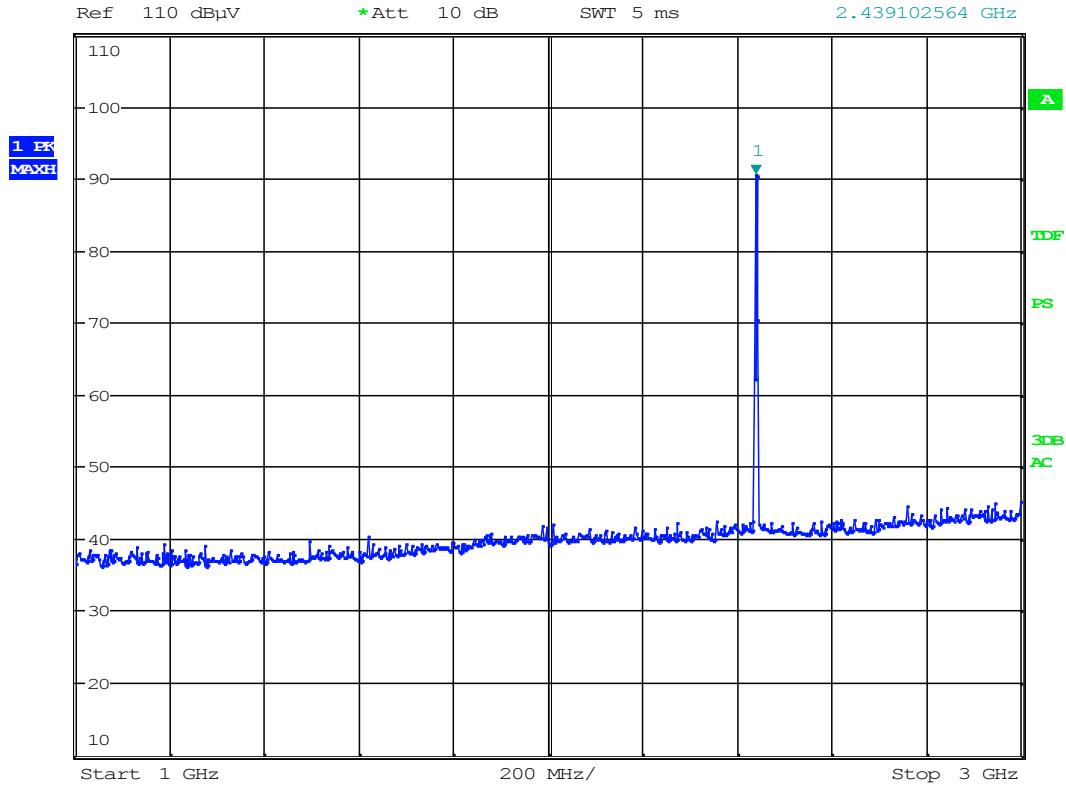


Date: 12.MAR.2013 10:41:18

**Radiated Emissions ch. 2440 MHz, 1 – 3 GHz, VP, @3m – Pre-scan with Peak detector**



\*RBW 1 MHz      Marker 1 [T1 ]  
VBW 3 MHz      90.59 dBμV  
SWT 5 ms      2.439102564 GHz

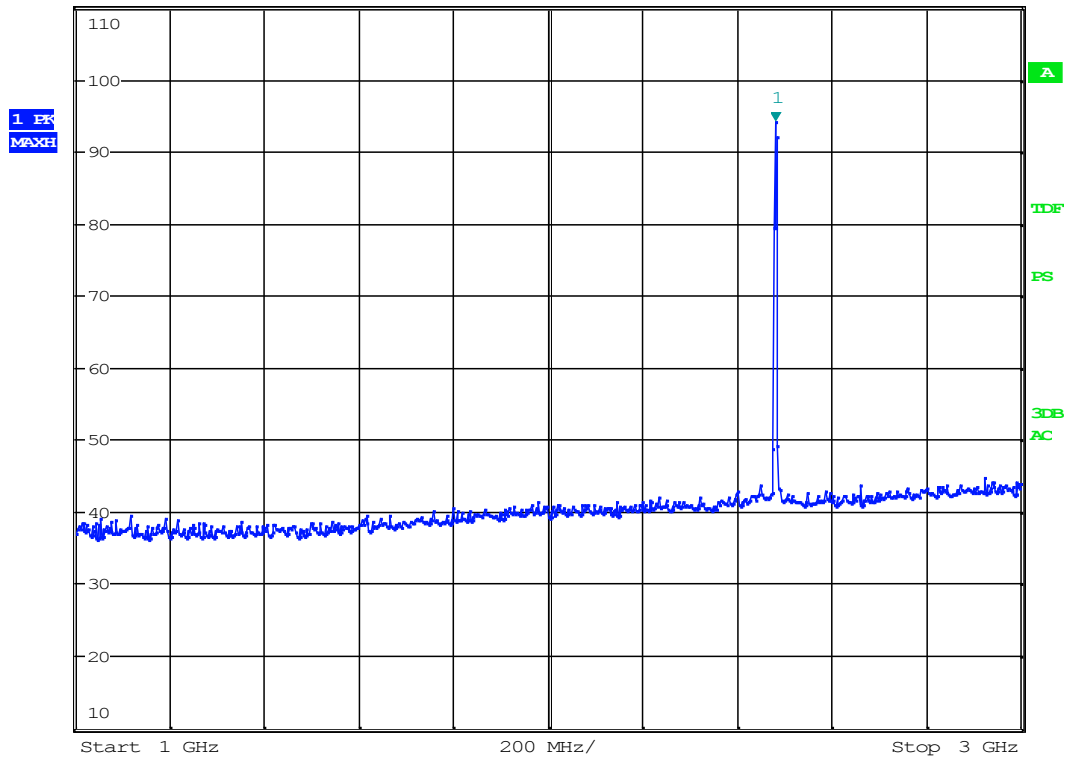


Date: 12.MAR.2013 10:40:59

**Radiated Emissions ch. 2440 MHz, 1 – 3 GHz, HP, @3m – Pre-scan with Peak detector**



Ref 110 dB $\mu$ V      \*Att 10 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      94.21 dB $\mu$ V  
 SWT 5 ms      2.480769231 GHz

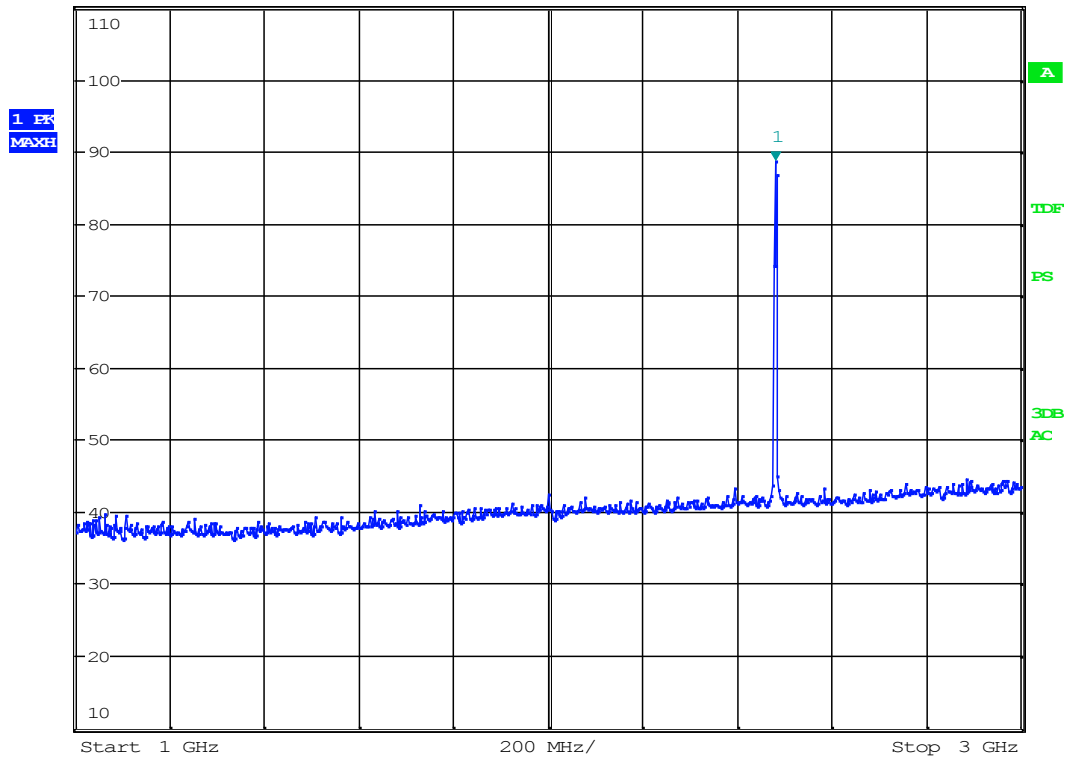


Date: 12.MAR.2013 10:38:34

**Radiated Emissions ch. 2480 MHz, 1 – 3 GHz, VP, @3m – Pre-scan with Peak detector**



Ref 110 dB $\mu$ V      \*Att 10 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      88.76 dB $\mu$ V  
 SWI 5 ms      2.480769231 GHz



Date: 12.MAR.2013 10:38:05

**Radiated Emissions ch. 2480 MHz, 1 – 3 GHz, HP, @3m – Pre-scan with Peak detector**

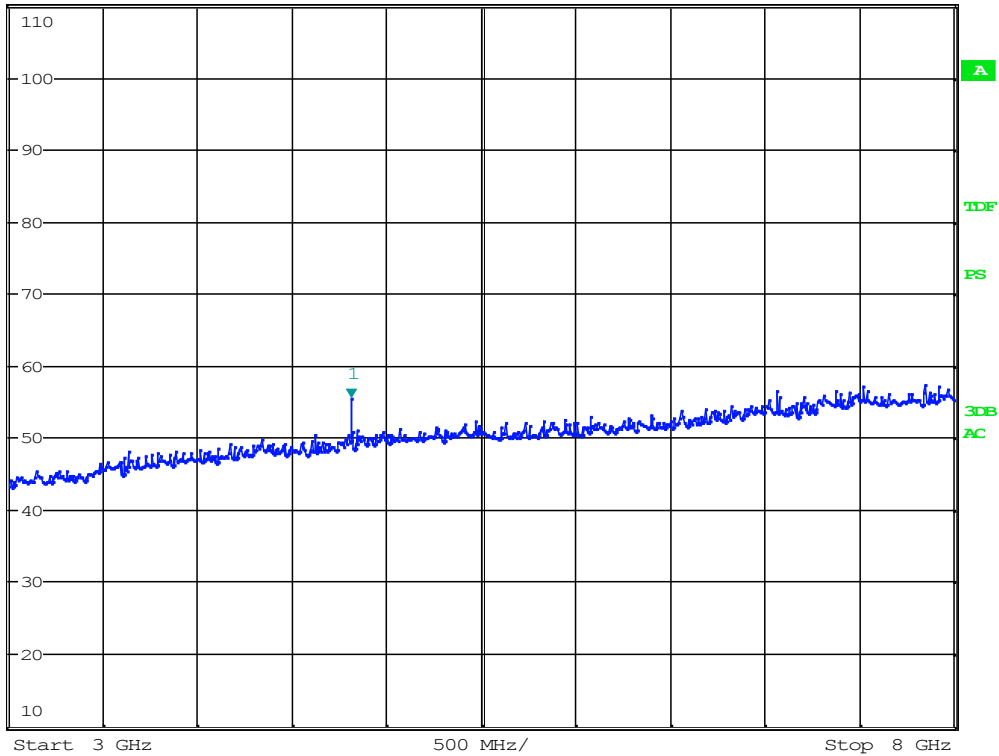


\*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      55.53 dBμV  
 SWT 30 ms      4.810897436 GHz

Ref 110 dBμV

\*Att 10 dB

1 PK  
 MAXH

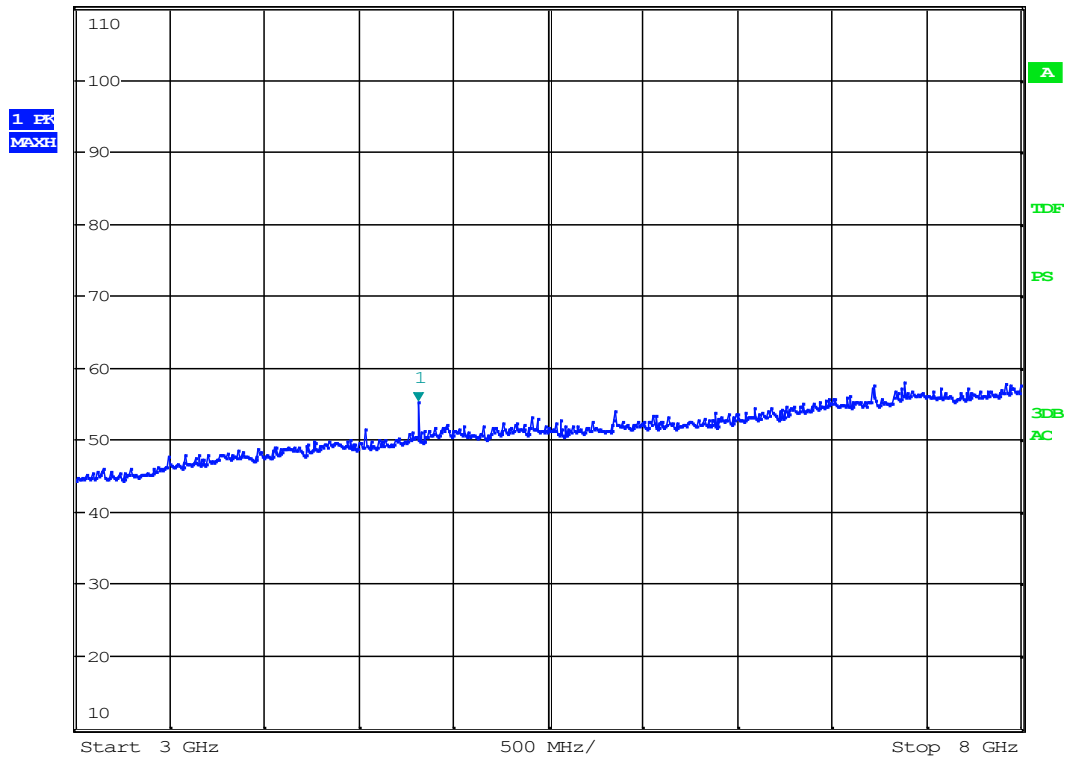


Date: 12.MAR.2013 10:59:25

**Radiated Emissions ch. 2405 MHz, 3 – 8 GHz, VP, @3m – Pre-scan with Peak detector**



Ref 110 dB $\mu$ V      \*Att 10 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      55.30 dB $\mu$ V  
 SWT 30 ms      4.810897436 GHz



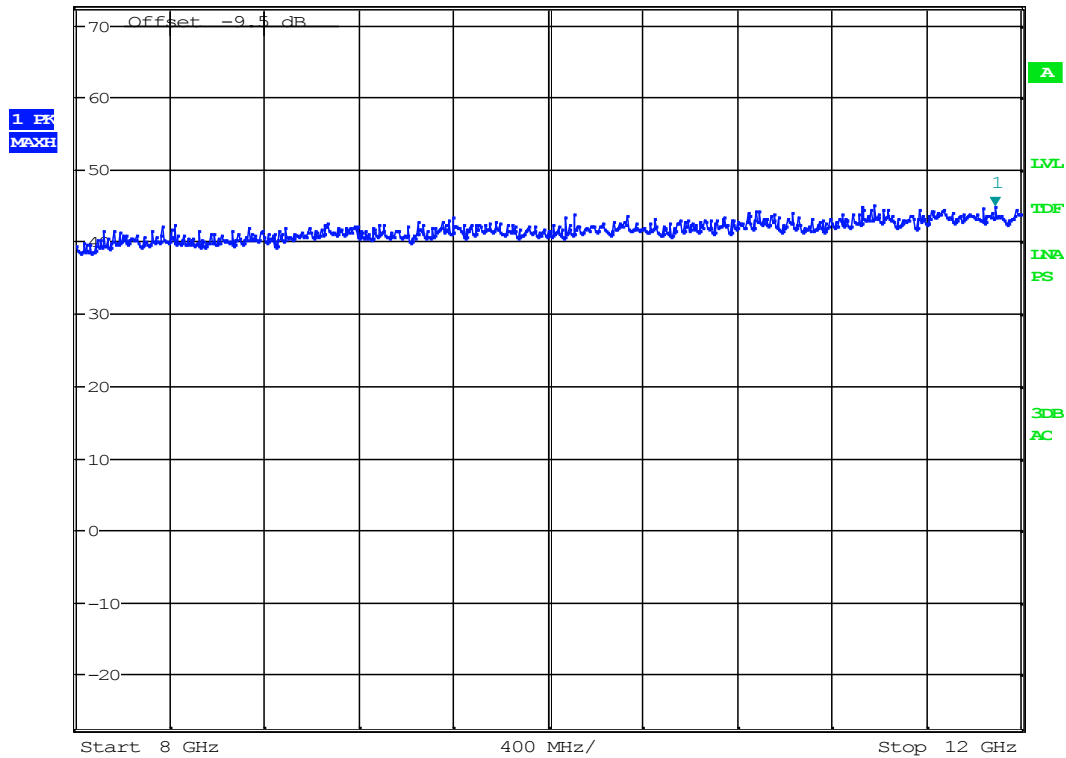
Date: 12.MAR.2013 11:01:22

**Radiated Emissions ch. 2405 MHz, 3 – 8 GHz, HP, @3m – Pre-scan with Peak detector**





Ref 72.5 dBμV      \*Att 15 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
 Offset -9.5 dB      VBW 3 MHz      44.85 dBμV  
 SWT 25 ms      11.891025641 GHz

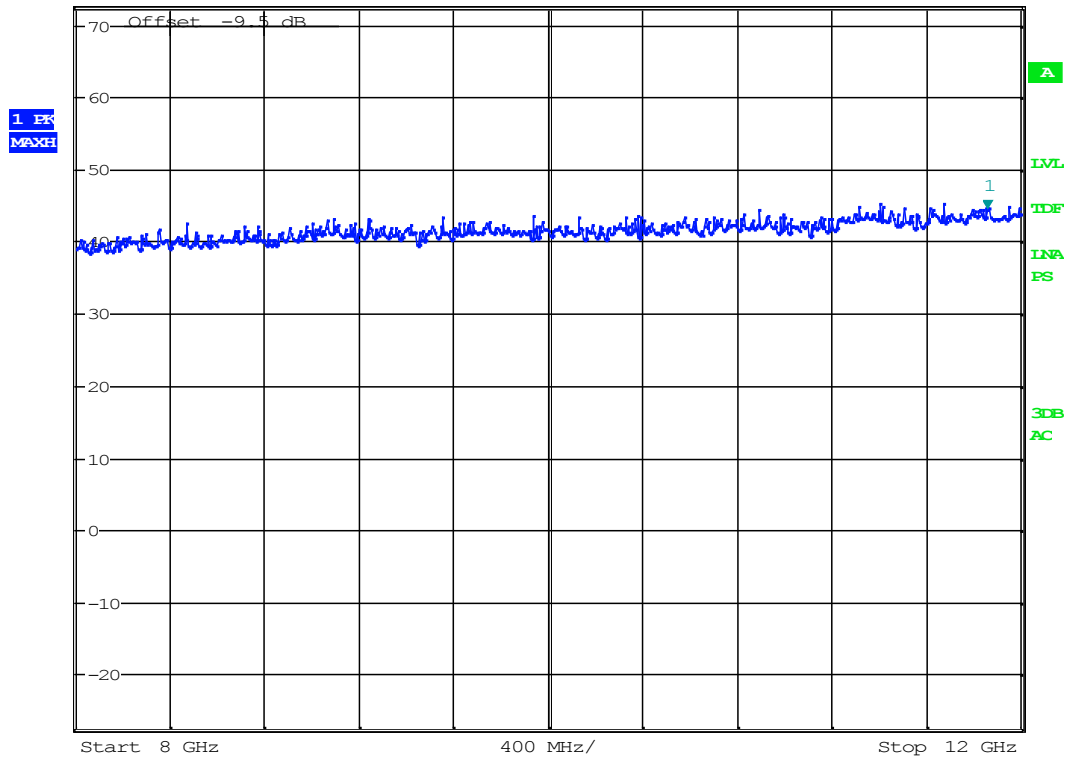


Date: 12.MAR.2013 11:10:02

**Radiated Emissions ch. 2405 MHz, 8 – 12 GHz, VP, @1m – Pre-scan with Peak detector , Distance Correction factor of -9.5 dB is included in the graph**

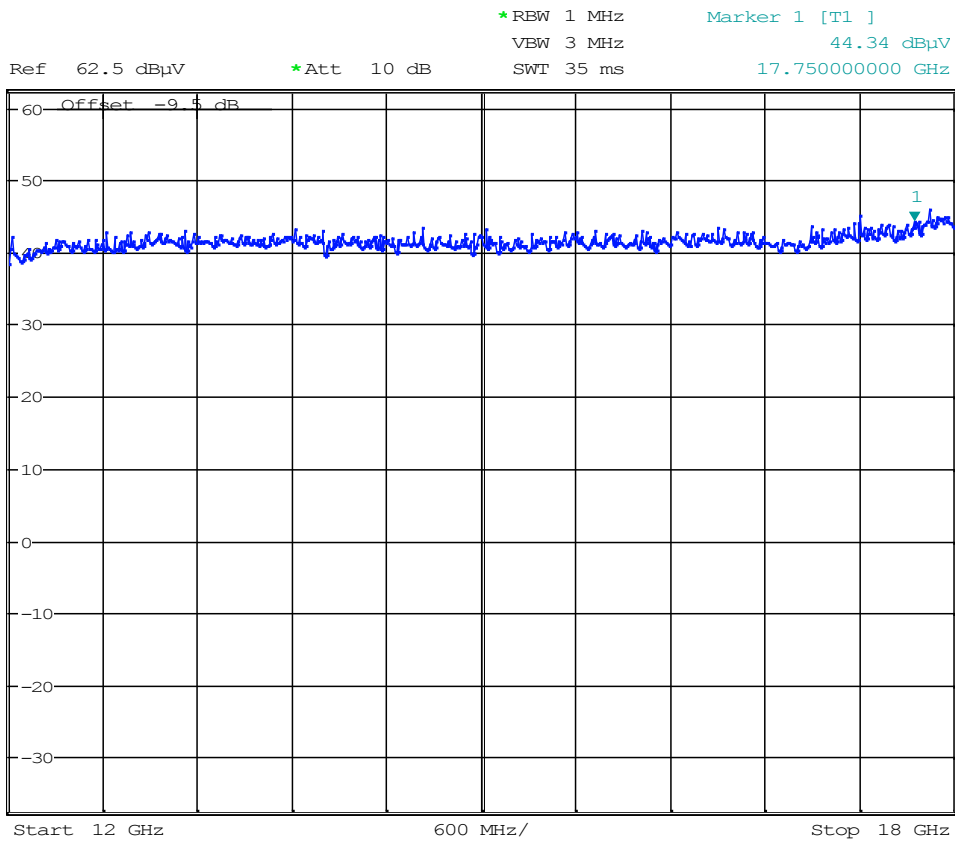


Ref 72.5 dBμV      \*Att 15 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
 Offset -9.5 dB      VBW 3 MHz      44.44 dBμV  
 SWT 25 ms      11.858974359 GHz



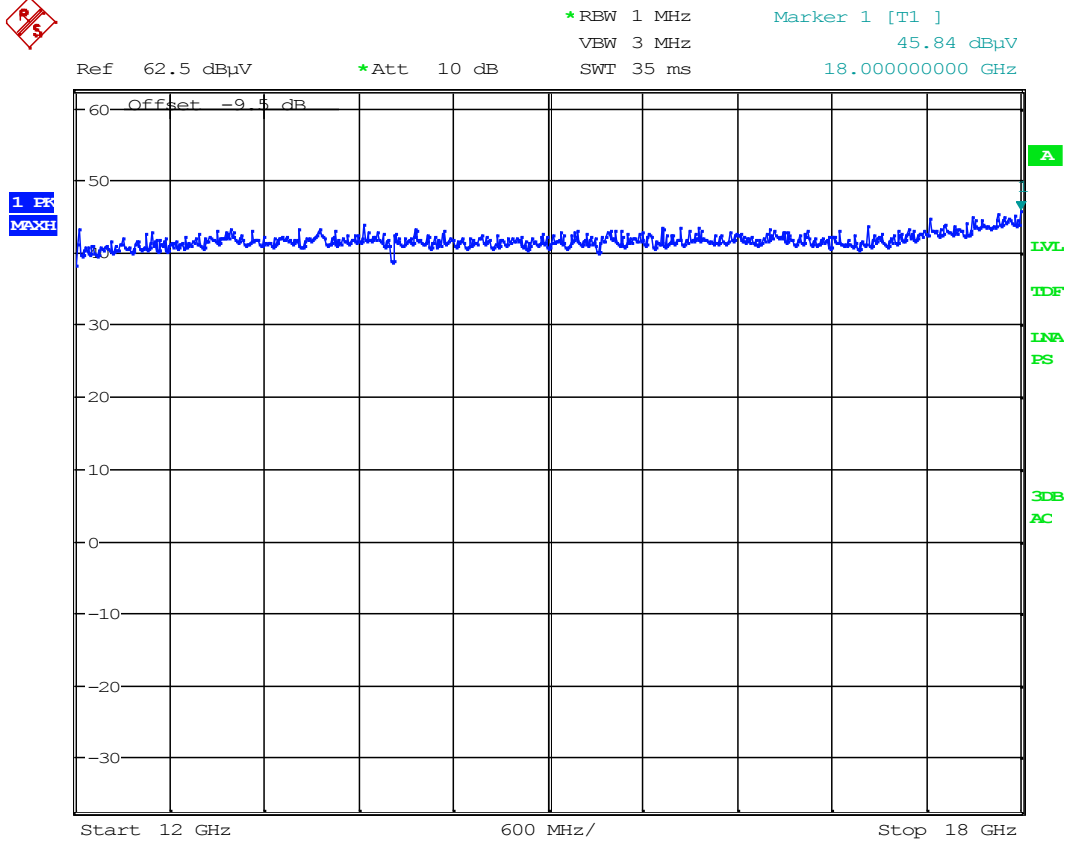
Date: 12.MAR.2013 11:10:30

**Radiated Emissions ch. 2405 MHz, 8 – 12 GHz, HP, @1m – Pre-scan with Peak detector , Distance Correction factor of -9.5 dB is included in the graph.**



Date: 12.MAR.2013 11:24:01

**Radiated Emissions ch. 2405 MHz, 12 – 18 GHz, VP, @1m – Pre-scan with Peak detector, Distance Correction factor of -9.5 dB is included in the graph.**

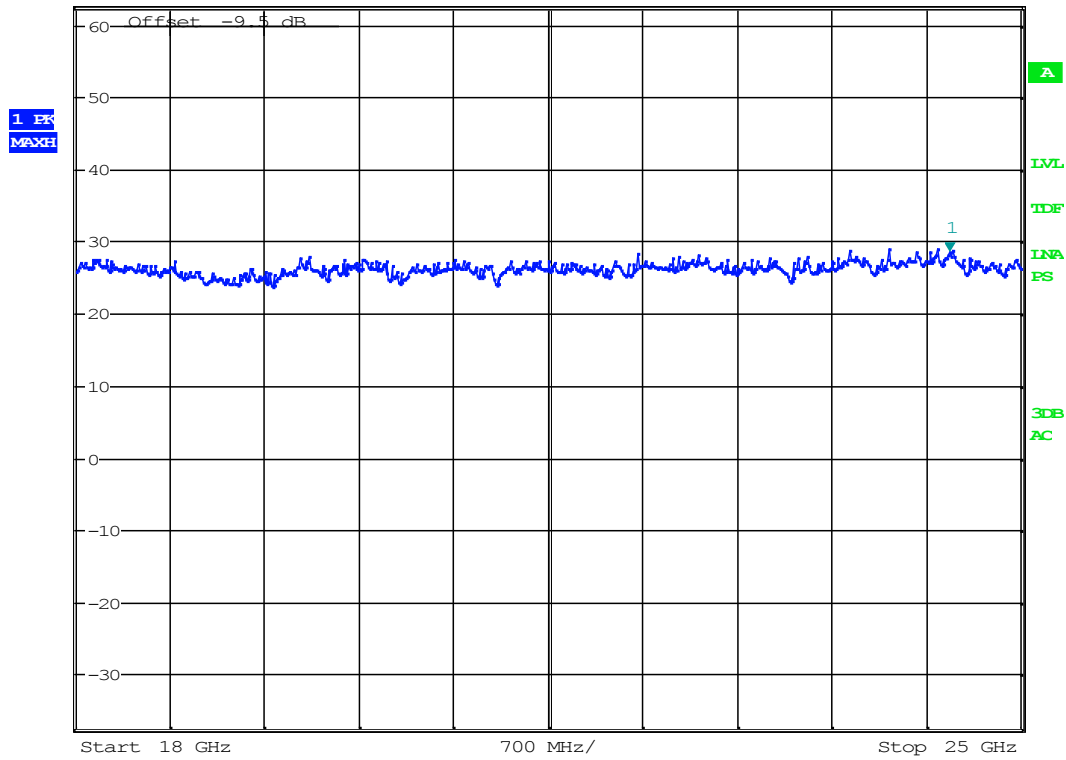


Date: 12.MAR.2013 11:23:43

**Radiated Emissions ch. 2405 MHz, 12 – 18 GHz, HP, @1m – Pre-scan with Peak detector, Distance Correction factor of -9.5dB is included in the graph.**



Ref 62.5 dB $\mu$ V/m    \*Att 10 dB    \*RBW 1 MHz    Marker 1 [T1 ]  
 Offset -9.5 dB    VBW 3 MHz    28.62 dB $\mu$ V/m  
 SWT 45 ms    24.472756410 GHz



Date: 12.MAR.2013 11:27:39

**Radiated Emissions ch. 2405 MHz, 18 – 25 GHz, VP/HP, Pre-scan with Peak detector, Distance Correction factor -9.5dB is not included in the graph.**

Detected LO leakage emissions in receive mode:

**Peak detector**

Frequency MHz	Channel MHz	Field Strength @3m dB $\mu$ V/m	Detector	Limit dB $\mu$ V/m	Margin dB
4809	2405	39.8	Pk	74	34.2
4879	2440	40.4	Pk	74	33.6
4959	2480	40.6	Pk	74	33.4

**Average detector**

Frequency MHz	Channel MHz	Field Strength @3m dB $\mu$ V/m	Detector	Limit dB $\mu$ V/m	Margin dB
4809	2405	34.9	Av	54	19.1
4879	2440	34.6	Av	54	19.4
4959	2480	35.6	Av	54	18.4

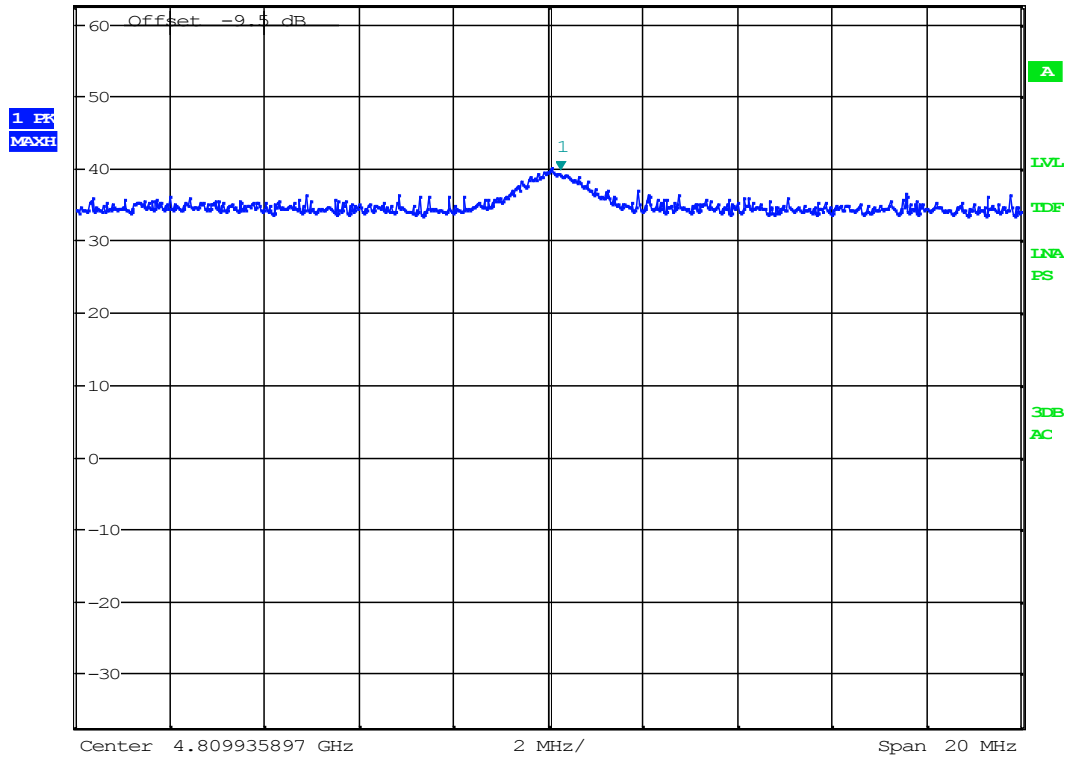
The detected spurious emissions are within the restricted band (4.5 - 5.15 GHz ).

The maximum is detected in Horizontal polarization.

See attached graphs.

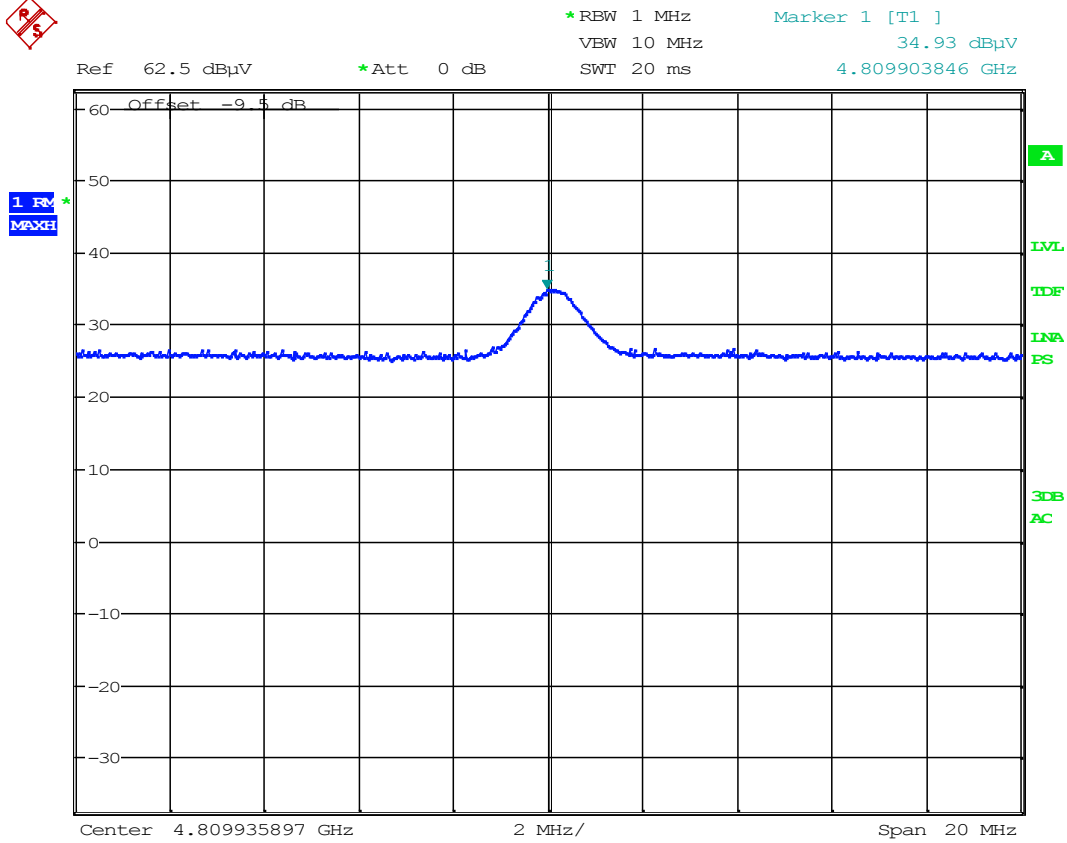


Ref 62.5 dBµV      \*Att 0 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      39.81 dBµV  
 SWT 20 ms      4.810192308 GHz



Date: 12.MAR.2013 11:15:31

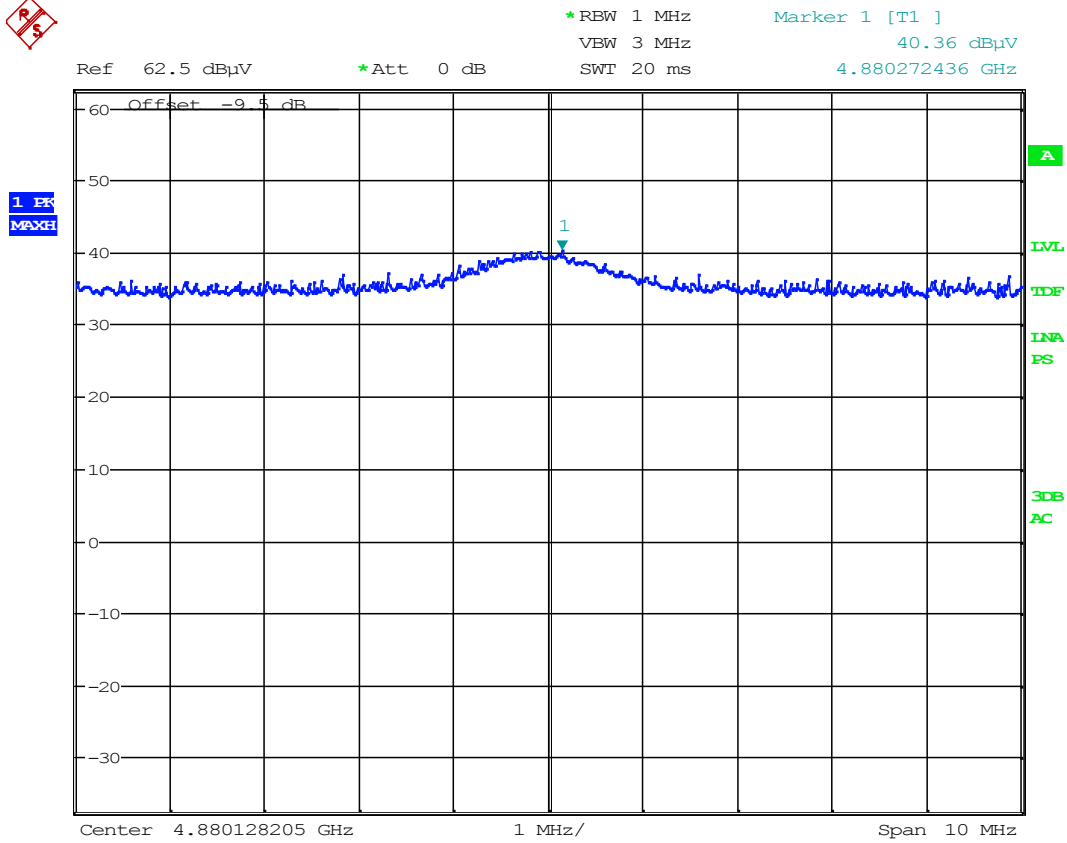
LO leakage at ch 2405MHz – HP : PK detector



Date: 12.MAR.2013 11:16:01

LO leakage at ch 2405MHz – HP : AV detector



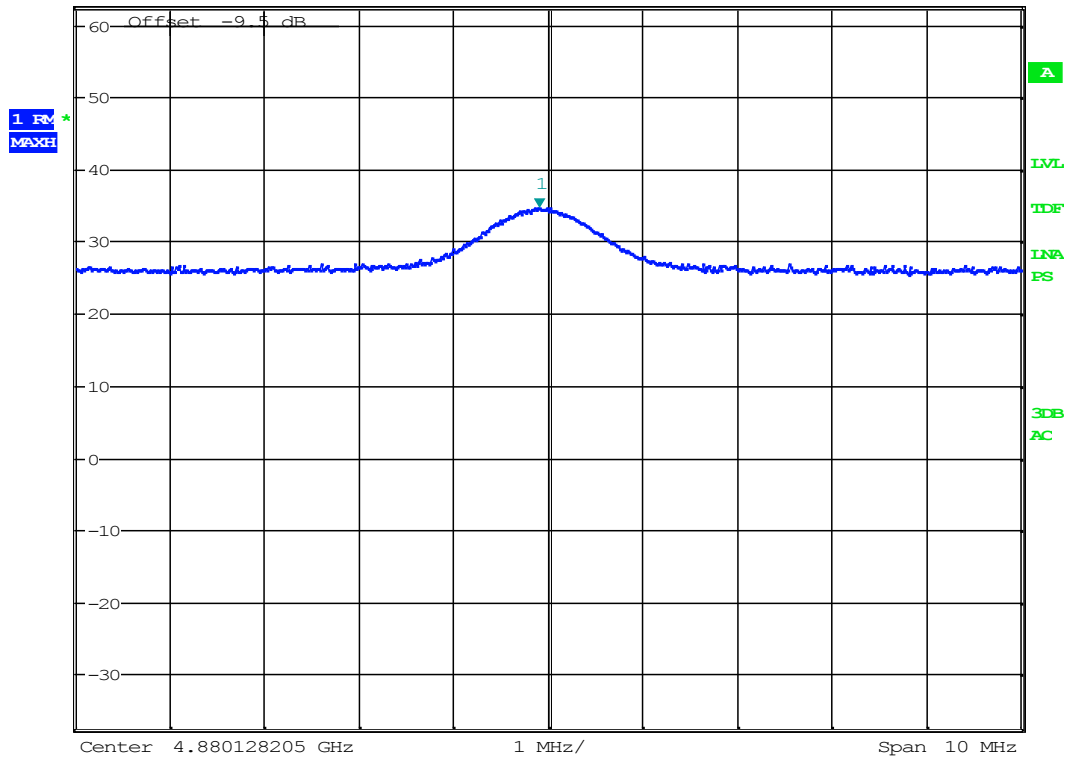


Date: 12.MAR.2013 11:17:28

LO leakage at ch 2440MHz – HP : PK detector



Ref 62.5 dBμV      \*Att 0 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
 Offset -9.5 dB      VBW 10 MHz      34.59 dBμV  
 SWT 20 ms      4.880032051 GHz

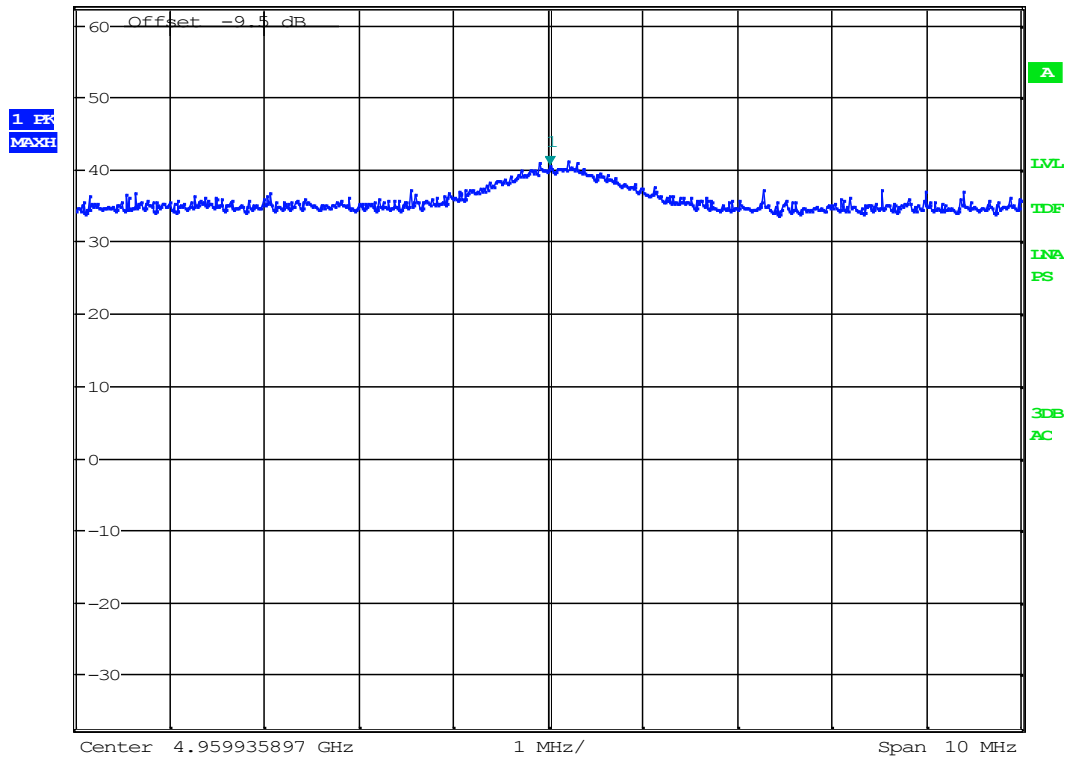


Date: 12.MAR.2013 11:17:09

LO leakage at ch 2440MHz – HP : AV detector



Ref 62.5 dBμV      \*Att 0 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      40.61 dBμV  
 SWT 20 ms      4.959951923 GHz

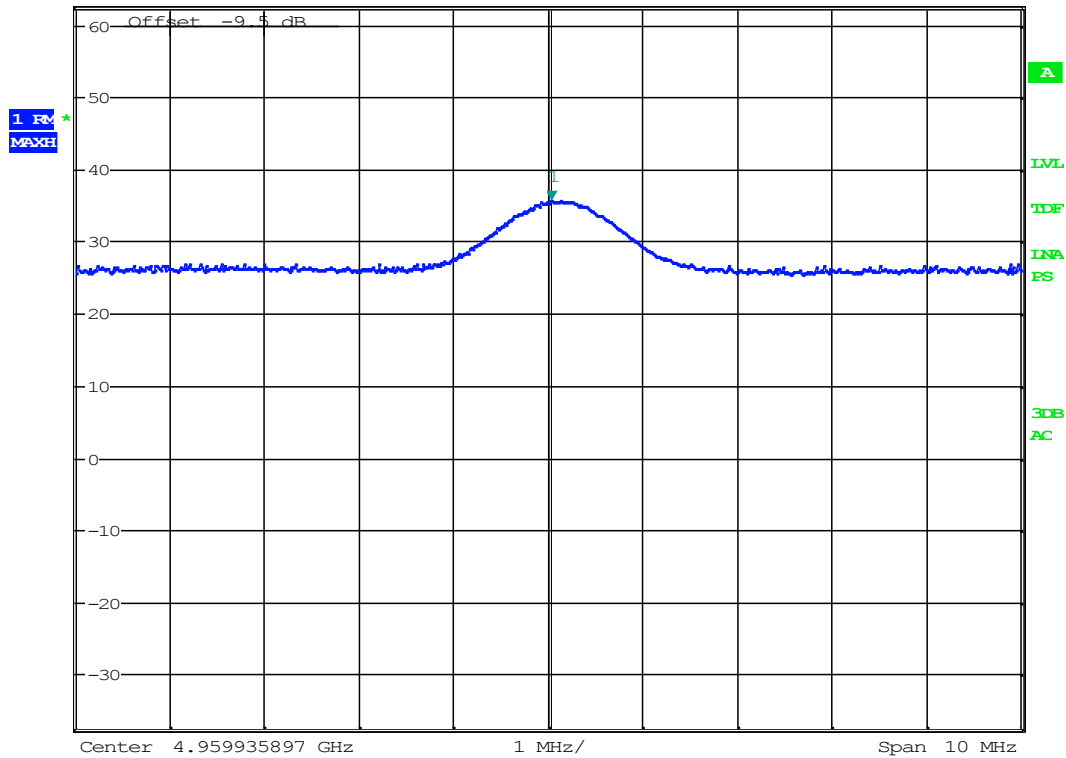


Date: 12.MAR.2013 11:18:22

LO leakage at ch 2480MHz – HP : PK detector



Ref 62.5 dBμV      \*Att 0 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
 Offset -9.5 dB      VBW 10 MHz      35.62 dBμV  
 SWI 20 ms      4.959967949 GHz



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

LO leakage at ch 2480MHz – HP : AV detector

#### 4.6 Power Spectral Density (PSD)

Para. No.: 15.247 (e)

Test Performed By: G.Suwanthakumar	Date of Test: 12 Mar. 2013
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Test Results: Complies

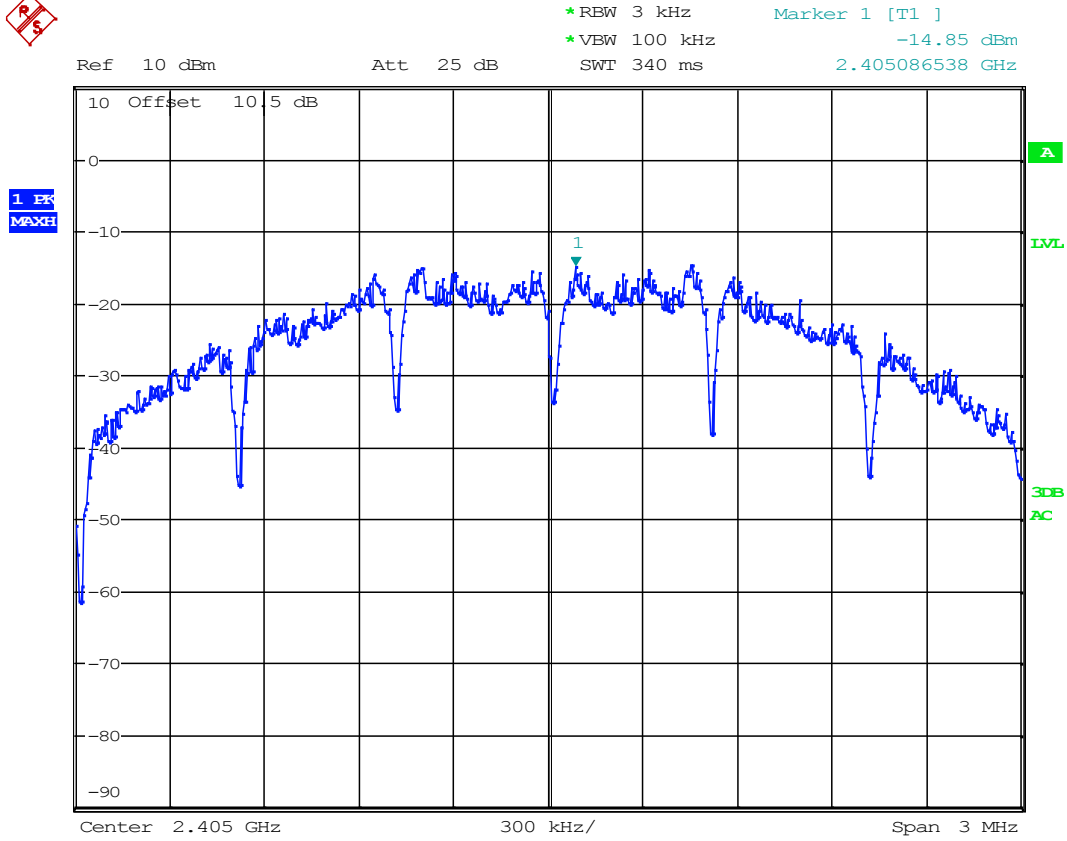
#### Measured and Calculated Data:

	calculated peak PSD dBm
Power Spectral Density @2405 MHz	-14.85
Power Spectral Density @2440 MHz	-14.98
Power Spectral Density @2480 MHz	-14.47

Tested according to KDB 558074 D01 DTS Meas Guidance v02, Section 9.1.

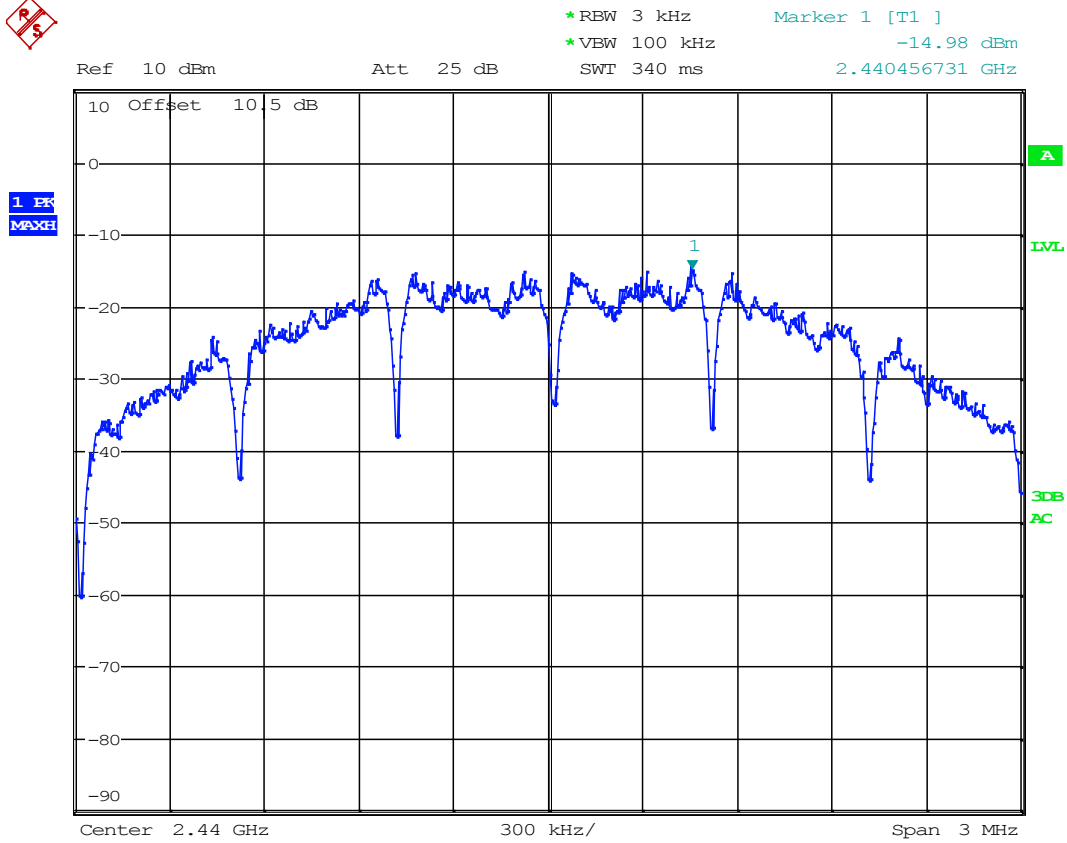
#### Requirements:

The Power Spectral Density of a Digital Transmission System shall be no greater than +8 dBm in any 3 kHz band.



Date: 12.MAR.2013 12:35:16

**PSD Measurement - 2405MHz**



Date: 12.MAR.2013 12:38:05

**PSD Measurement – 2440MHz**





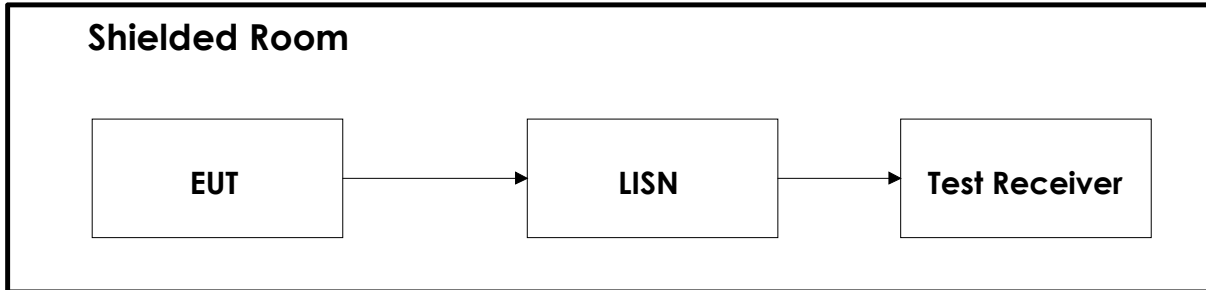
## 5 LIST OF TEST EQUIPMENT

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the test laboratory.

No.	Instrument/ ancillary	Type of instrument/ ancillary	Manufacturer	Ref. no.	Cal. Date	Cal. Due
1	FSP30	Spectrum Analyzer	Rohde & Schwarz	LR 1551	2012.04.05	2013.04.05
2	ESU40	EMI Receiver	Rohde & Schwarz	LR1639	2010.06	2013.06
3	3115	Antenna horn	EMCO	LR 1330	2010.08.05	2013.08.05
4	643	Antenna horn	Narda	LR 093	2009.01.26	2014.01.26
5	642	Antenna horn	Narda	LR 220	2009.01.26	2014.01.26
6	PM7320X	Antenna horn	Siverts lab	LR 103	2009.01.26	2014.01.26
7	DBF-520-20	Antenna horn	Systron Donner	LR 101	2009.01.26	2014.01.26
8	638	Antenna horn	Narda	LR 098	2010.06.17	2015.06.17
9	VULB 9163	Antenna TriLog	Schwarzbeck	LR1616	2012-08	2013-08
10	8449B	Pre-amplifier	Hewlett Packard	LR 1322	2012-09-27	2013-09-27
11	LNA6900	Pre-amplifier	Teseq	LR 1593	2012-11	2013-11
14	80S	Signal Generator	Powertron	LT 502	Cal b4 use	
15	Model 87 V	Multimeter	Fluke	LR 1598	2012-12-14	2014-12-14
17	6810.17A	10 attenuator	Suhner	LR 1143	2012.09.15	2014.09.15
18	FA210A1010003030	Microwave cable	Rosenberger	LR1566	Cal b4 use	
19	6HC 3000-18000	HP Filter	Trithlic	LR1614	Cal b4 use	
20	6HC 2500-18000	HP Filter	Trithlic	LR1615	Cal b4 use	
21	FSW	Spectrum Analyzer	Rohde & Schwarz	LR1640	2012.06	2014.06

## 6 BLOCK DIAGRAM

### 6.1 Power Line Conducted Emission



### 6.2 Test Site Radiated Emission

