



**Test report no. : 215159-3**

**Item tested : CC1175EM-868-915**

**Type of equipment : Low power Transmitter  
903.5 – 926.5 MHz**

**FCC ID : ZAT1175EM900**

**Client : Texas Instruments Norway AS**

**FCC Part 15.249**

Low Power Transmitter  
902-928 MHz Band

**RSS-210, Issue 8**

Low-Power Licence-exempt Radiocommunications devices  
902 – 928 MHz Band

**6 September 2013**

**Authorized by :** A handwritten signature in blue ink, appearing to read 'Frode Sveinsen', is written over a dotted line.

Frode Sveinsen  
Technical Verificator



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## 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  
Email: [comlab@nemko.no](mailto:comlab@nemko.no)  
FCC test firm : 994405  
IC OATS : 2040D-1  
Total Number of Pages: 31

### 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 Manufacturer

Same as client

## 2 Test Information

### 2.1 Test Item

Name :	Texas Instruments
Model/version :	CC1175EM-868-915
FCC ID:	ZAT1175EM900
IC ID:	451H-1175EM900
Serial number :	0016
Hardware identity and/or version:	1.1.0
Software identity and/or version :	-
Frequency Range :	903.5 – 926.5 MHz
Number of Channels :	3
Operating Modes :	TX only
Type of Modulation :	2-FSK
Data rate:	1.2kbit/s
User Frequency Adjustment :	None, Software controlled
Rated Output Power :	0.15mW (@50 ohms)
Type of Power Supply :	Battery (tested with 3.0 V DC, 2x 1.5 V DC) from the mother board TrxEB
Antenna Connector :	SMA female
Antenna type:	Pulse W5017, rod antenna
Antenna Diversity Supported :	None

#### Description of Test Item

The CC1175EM-868-915 RF-transmitter module placed on a mother board, TrxEB (Evaluation Board).

## **2.2 Test Environment**

### **2.2.1 Normal test condition**

Temperature:	20 – 22 °C
Relative humidity:	21 – 44 %
Normal test voltage:	3.0 V DC

The values are the limit registered during the test period.

## **2.3 Test Period**

Item received date:	2012-10-15
Test period :	from 2012-10-17 -2012-10-31

### 3 TEST REPORT SUMMARY

#### 3.1 General

All measurements are traceable to national standards.

The tests were conducted for the purpose of demonstrating compliance with FCC CFR 47 Part 15.249 and Industry Canada RSS-210, Issue 8 and RSS-GEN, Issue 3.

Radiated tests were conducted in accordance with ANSI C63.4-2003 and ANSI C63.10-2009. The radiated tests were made in a semi-anechoic chamber at measuring distances of 3 and 10 meters.

- |   |   |
|---|---|
| <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>DXT</b> Equipment Code                           | <input type="checkbox"/> Family Listing                 |

**THIS TEST REPORT RELATES ONLY TO THE ITEM (S) TESTED.**

Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".



**TEST REPORT #: 215159-3**



TESTED BY: \_\_\_\_\_

DATE: 2012-10-31

Thomas Dangle, Test engineer

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This test report applies only to the items and configurations tested.

### 3.2 Test Summary

Name of test	FCC Part 15 reference	RSS-210 Issue 8 & RSS-GEN Issue 3	Result
Supply Voltage Variations	15.31(e)	N/A	Complies <sup>1</sup>
Antenna Requirement	15.203	7.1.4 (RSS-GEN)	N/A <sup>2</sup>
Power-line Conducted Emission	15.207(c)	7.2.2 (RSS-GEN)	N/A <sup>1</sup>
Occupied Bandwidth	N/A	4.6.1 (RSS-GEN)	-
Peak Power Output	15.249(a)(c)	A2.9	Complies
Band edge Emissions	15.249(d)	A.2.9	Complies
Spurious Emissions (Radiated)	15.249 (e) 15.209	A2.9 4.9 (RSS-GEN)	Complies

<sup>1</sup> EUT is battery powered.

<sup>2</sup> No antenna included in this test report

RSS Gen issue 3 covers section 7 & 6

RSS 210 issue 8 covers section A2.9

### 3.3 Description of modification for Modification Filing

Not applicable.

### 3.4 Comments

The channels are selected by pressing a button on the mother board, TrxEB. The measurements are performed at channels near top , near middle and near bottom . And the output level is set to maximum in the software. The EUT complies at these channels.

The radiated measurements are tested on three axis.

Fully charged battery is used.

### 3.5 Family List Rationale

Not Applicable.

## 4 TEST RESULTS

### 4.1 Occupied Bandwidth

Para. No.: RSS-Gen 4.6.1

Test Performed By: Thomas Dangle	Date of Test: 24-Oct-2012
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Test Results: Complies

#### Measurement Data:

Data Rate	OBW (kHz)		
	903.500MHz	915.000MHz	926.500MHz
1.2kbps	-	69.30	-

#### Measured Conducted

#### Requirements:

For information only

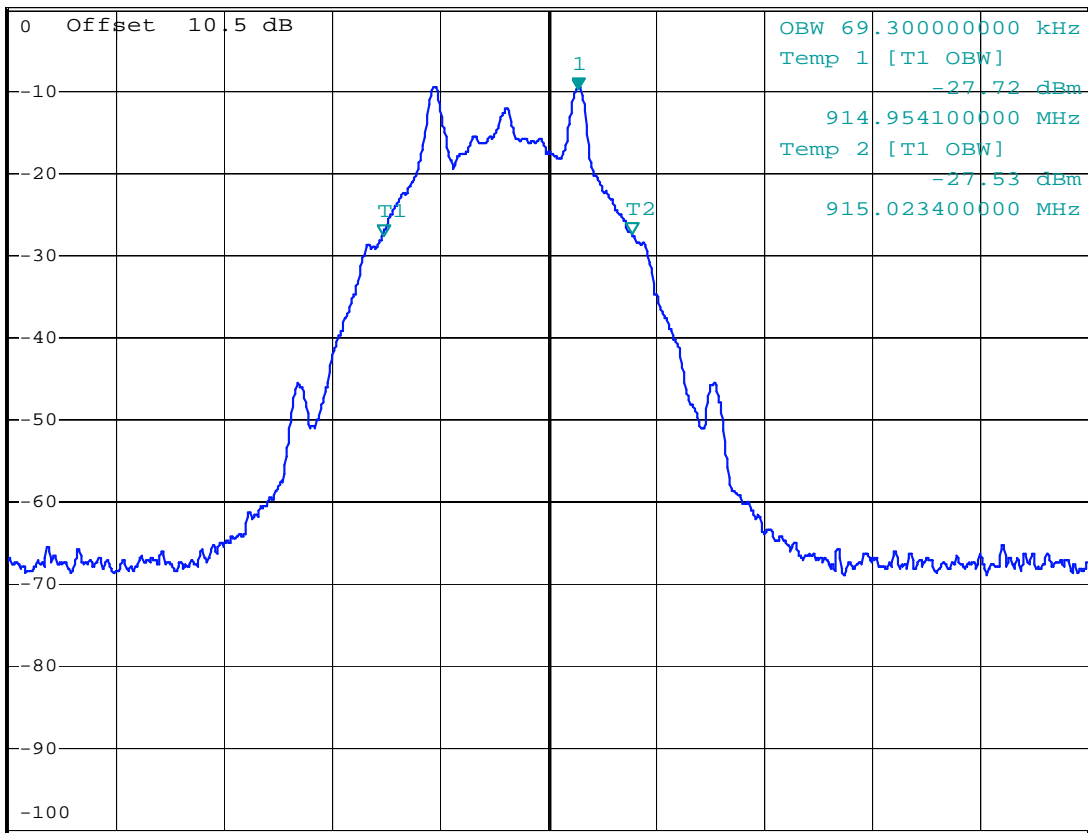




**POWER BW (%)**  
 99 %  
 Ref 0 dBm \* Att 10 dB

\* RBW 3 kHz Marker 1 [T1 ]  
 VBW 10 kHz -9.82 dBm  
 SWT 35 ms 915.008100000 MHz

1 PK  
 MAXH



Center 915 MHz 30 kHz/ Span 300 kHz

Date: 24.OCT.2012 11:08:12

**915 MHz – OBW – 69.30 kHz – Conducted measurement**

## 4.2 Peak Power Output

Para. No.: 15.249 (a) / A2.9

Test Performed By: Thomas Dangle	Date of Test: 24 and 26-Oct-2012
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**Test Results: Complies**

### Measurement Data:

#### Maximum Conducted Peak Output Power

RF channel	903.5MHz	915MHz	926.5MHz
@ 1.2kbps, Measured value (dBm)	-8.22	-8.74	-8.89

#### Maximum Field strength

RF channel	903.5MHz	915MHz	926.5MHz
VP: Measured value (dB $\mu$ V/m)	91.90	91.35	90.79
HP: Measured value (dB $\mu$ V/m)	88.34	87.57	86.73

#### Calculated erp & antenna gain

RF channel	903.5MHz	915MHz	926.5MHz
Radiated power (mW)	0.28	0.25	0.22
Radiated e.r.p. (dBm)	-5.48	-6.03	-6.59
Antenna gain dBd	2.7	2.7	2.3

Radiated measurements are performed at 3 m distance.

Radiated Power is calculated from measured field strength by the formulas in KDB 412172 D01 Determining ERP and EIRP v01.

Detachable antenna?  Yes  No  
 If detachable, is the antenna connector non-standard?  Yes  No  
     SMA connector

A new battery was used.

### Requirements:

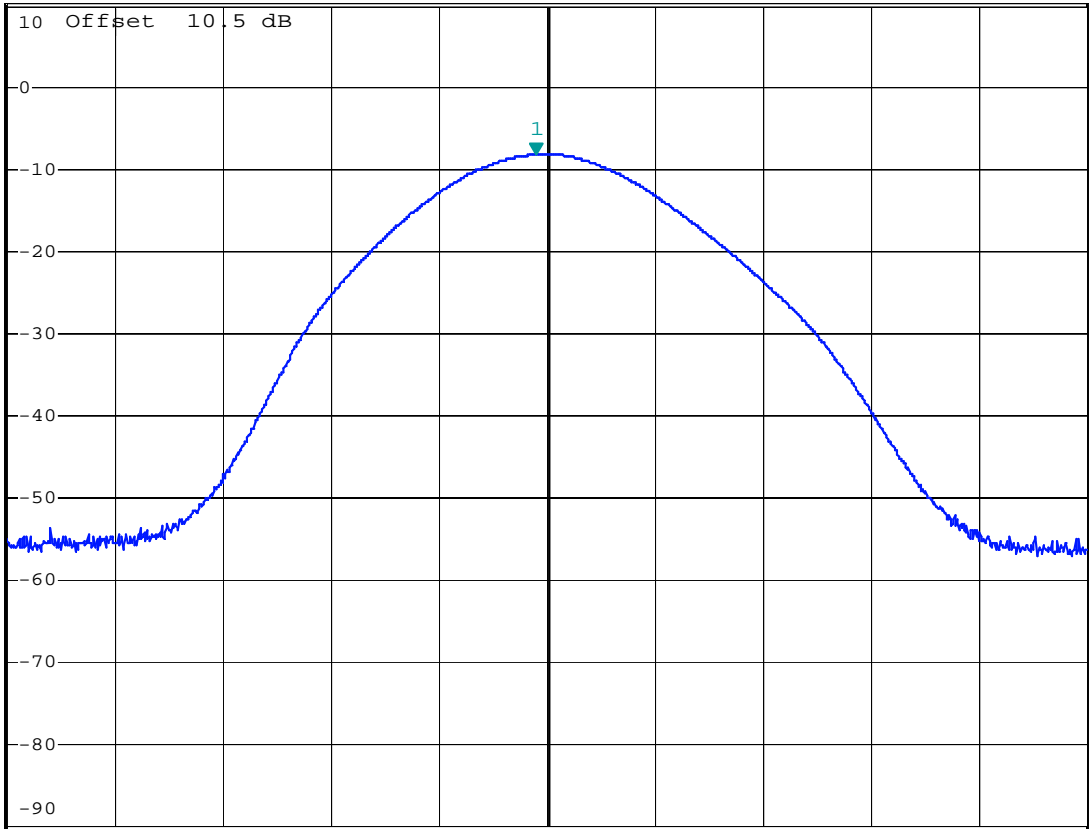
The maximum peak output power shall be  $\leq 94\text{dB}\mu\text{V/m}$



**MARKER 1**  
 903.3 MHz  
 Ref 10 dBm \* Att 10 dB

\* RBW 3 MHz Marker 1 [T1 ]  
 VBW 10 MHz -8.22 dBm  
 SWT 5 ms 903.30000000 MHz

1 PK  
 MAXH



Center 903.5 MHz 2 MHz/ Span 20 MHz

Date: 24.OCT.2012 10:44:23

Conducted power – 903.5MHz

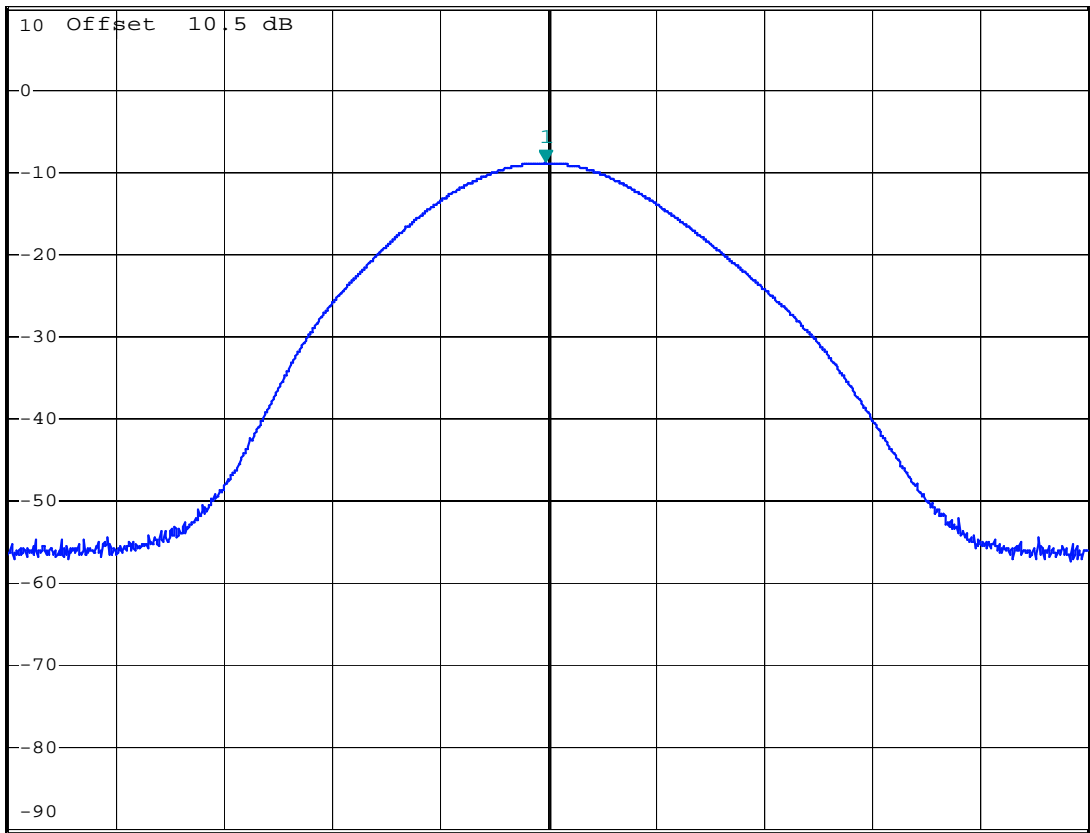




**MARKER 1**  
926.46 MHz  
Ref 10 dBm \*Att 10 dB

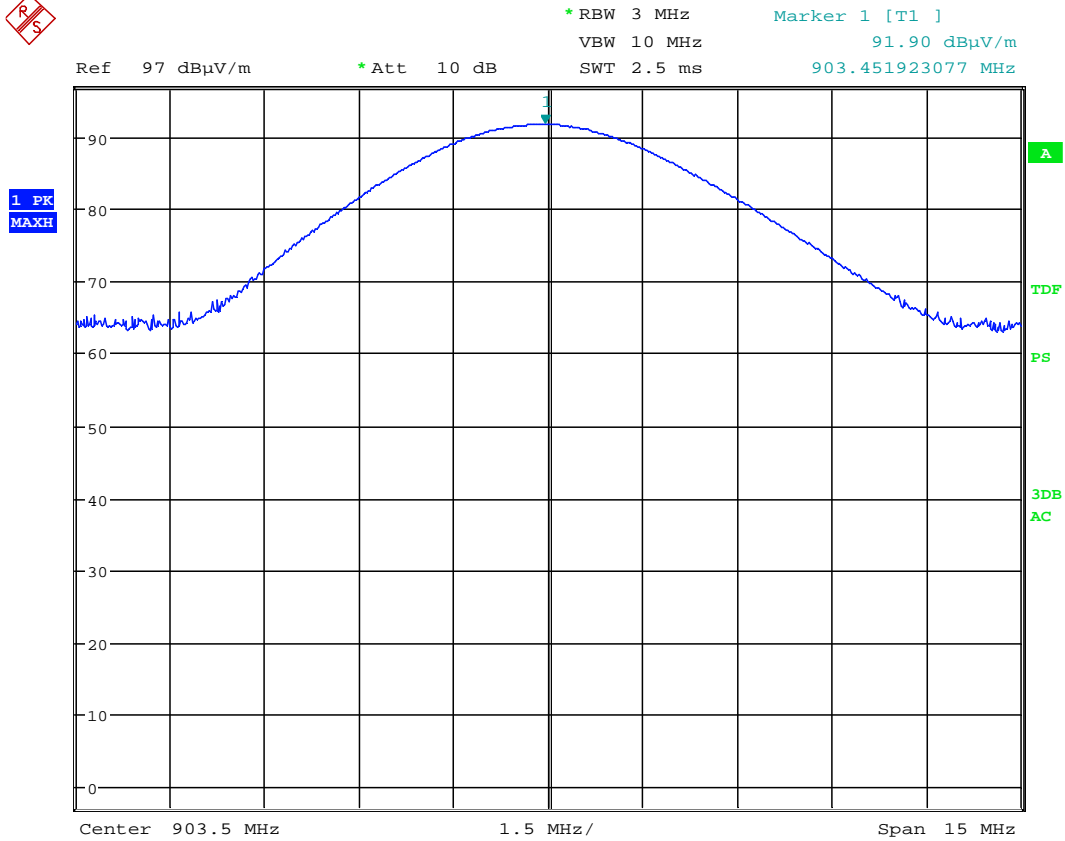
\*RBW 3 MHz Marker 1 [T1 ]  
VBW 10 MHz -8.89 dBm  
SWT 5 ms 926.46000000 MHz

1 PK  
MAXH



Date: 24.OCT.2012 10:42:57

Conducted power – 926.5MHz

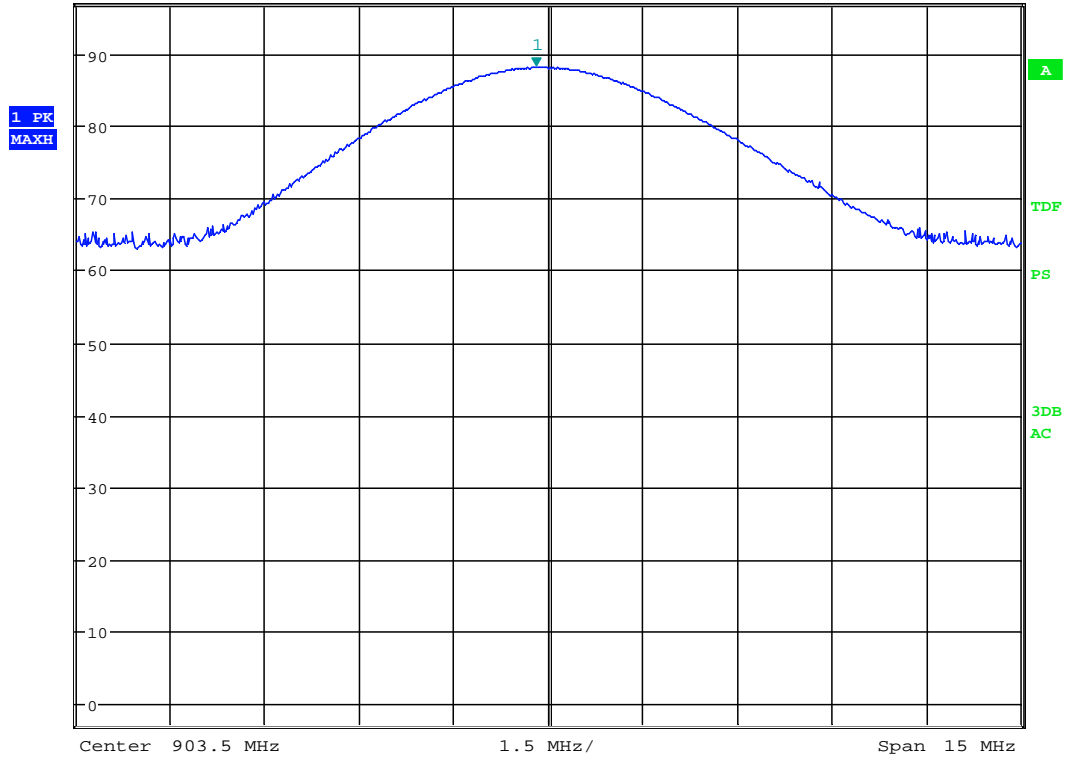


Date: 26.OCT.2012 09:50:34

VP: 903.5MHz – Field strength

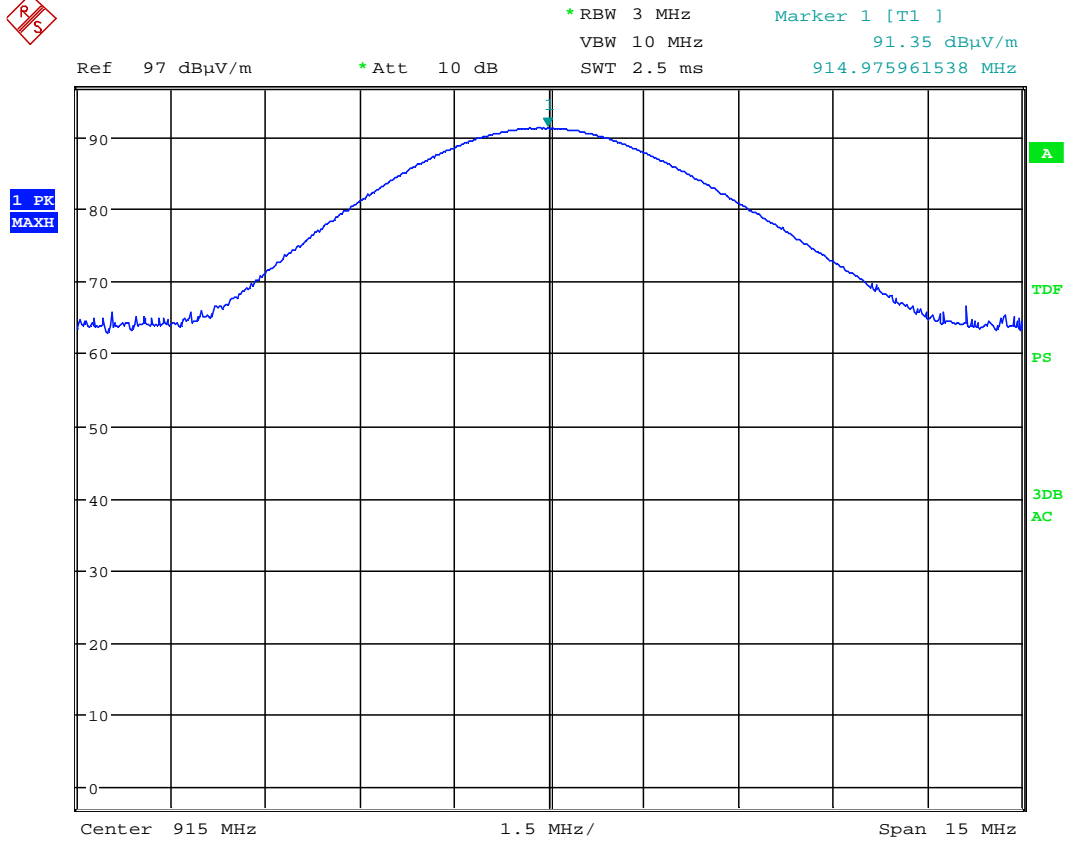


Ref 97 dB $\mu$ V/m      \* Att 10 dB      \* RBW 3 MHz      Marker 1 [T1 ]  
 VBW 10 MHz      88.34 dB $\mu$ V/m  
 SWT 2.5 ms      903.307692308 MHz



Date: 26.OCT.2012 09:49:42

HP: 903.5MHz – Field strength



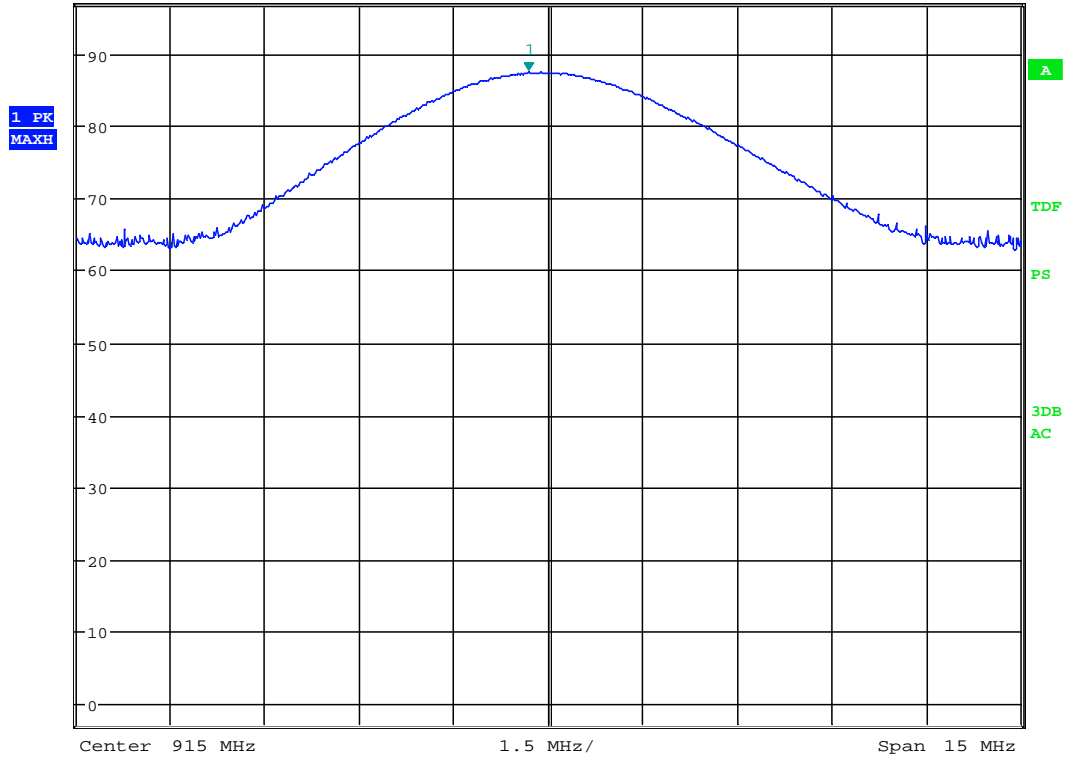
Date: 26.OCT.2012 09:58:05

VP: 915MHz – Field strength



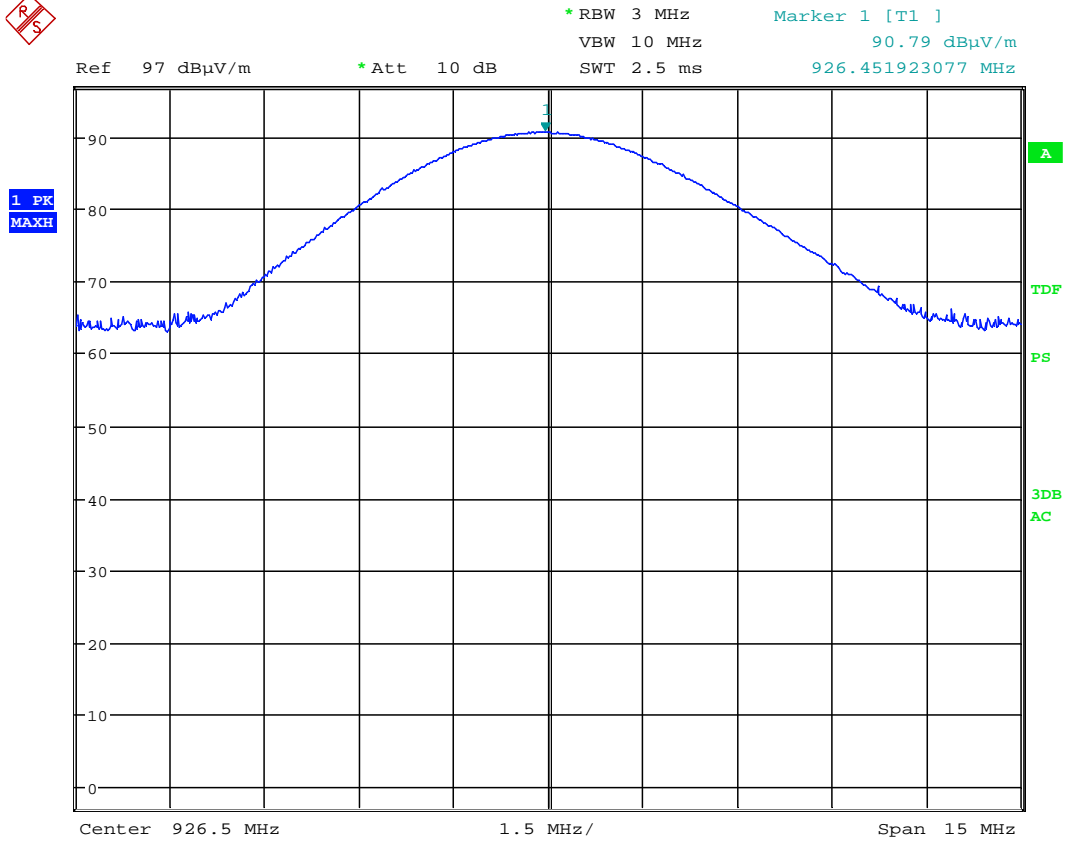


Ref 97 dB $\mu$ V/m      \*Att 10 dB      \*RBW 3 MHz      Marker 1 [T1 ]  
 VBW 10 MHz      87.57 dB $\mu$ V/m  
 SWT 2.5 ms      914.687500000 MHz



Date: 26.OCT.2012 09:57:06

HP: 915MHz – Field strength

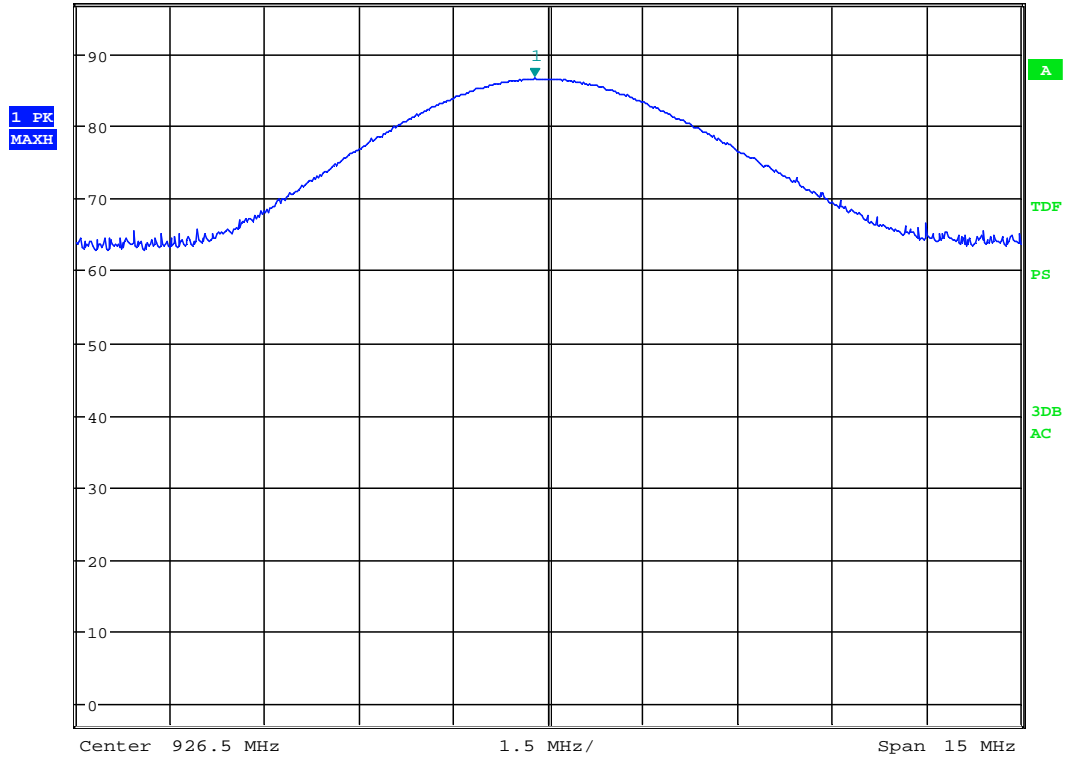


Date: 26.OCT.2012 10:07:05

VP: 926.5MHz – Field strength



Ref 97 dB $\mu$ V/m      \*Att 10 dB      \*RBW 3 MHz      Marker 1 [T1 ]  
 VBW 10 MHz      86.73 dB $\mu$ V/m  
 SWT 2.5 ms      926.283653846 MHz



Date: 26.OCT.2012 10:06:05

HP: 926.5MHz – Field strength

### 4.3 Spurious Emissions (Radiated)

Para. No.: 15.209 / 15.249 (e) / A2.9 / 4.9

Test Performed By: Thomas Danglé	Date of Test: 23-Oct-2012
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**Test Results: Complies**

**Measurement Data:**

**Radiated Emissions with antenna, 1-10 GHz**

1-10 GHz measured at a distance of 3m.

**Measured with Peak Detector:**

Frequency	Dist. corr. factor	Field strength, Peak	Duty cycle corr. factor	Limit	Margin
GHz	dB	dB $\mu$ V/m	dB	dB $\mu$ V/m	dB
1 - 3	0	<46	-	74	28
3 – 8.5	0	<52	-	74	22
8.5 - 10	0	<53	-	74	21

**Average Detector:**

Frequency	Dist. corr. factor	Field strength, AV	Duty cycle corr. factor	Limit	Margin
GHz	dB	dB $\mu$ V/m	dB	dB $\mu$ V/m	dB
1 - 10	0	None detected	-	54	-

The maximum is observed in Vertical polarization

The test sample was transmitting with 100% duty cycle for all tests.

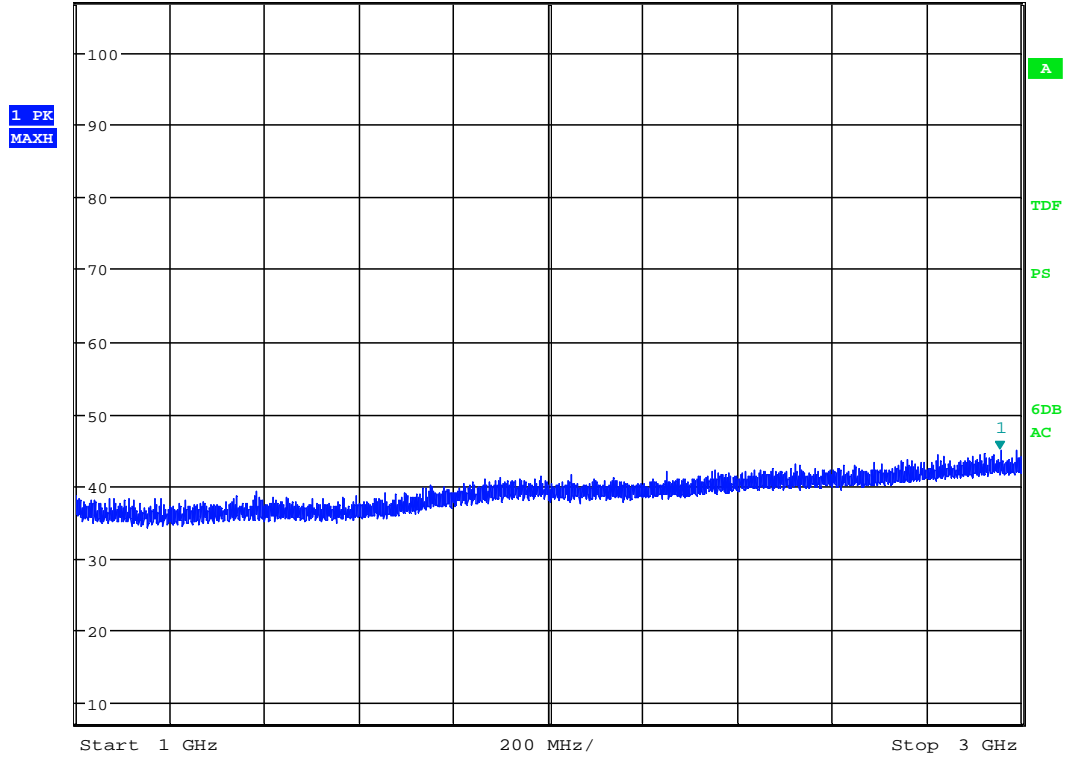
Antenna factor, amplifier gain and cable loss are included in spectrum analyzer “Transducer factor”.

**Requirement:**

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.



Ref 107 dB $\mu$ V/m      \*Att 10 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      44.94 dB $\mu$ V/m  
 SWT 45 ms      2.956400000 GHz

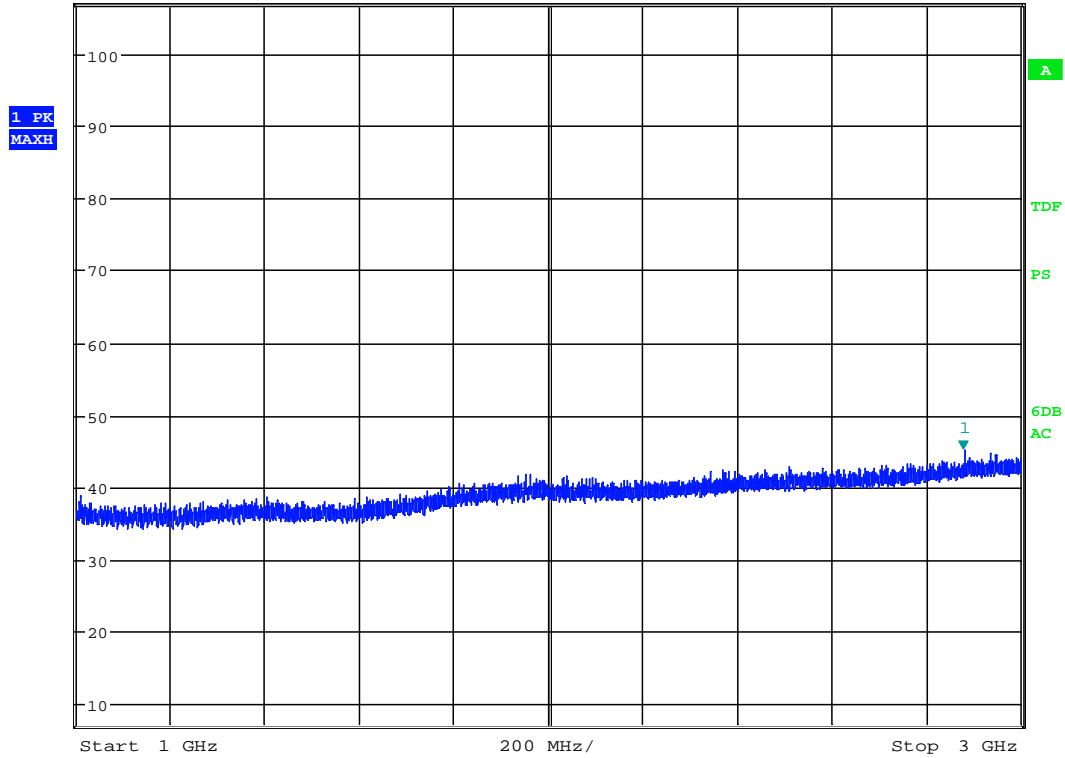


Date: 23.OCT.2012 14:23:44

**VP: pre-view scan 1 - 3 GHz -Pk with HP-filter**



Ref 107 dB $\mu$ V/m      \* Att 10 dB      \* RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      45.15 dB $\mu$ V/m  
 SWT 45 ms      2.879000000 GHz

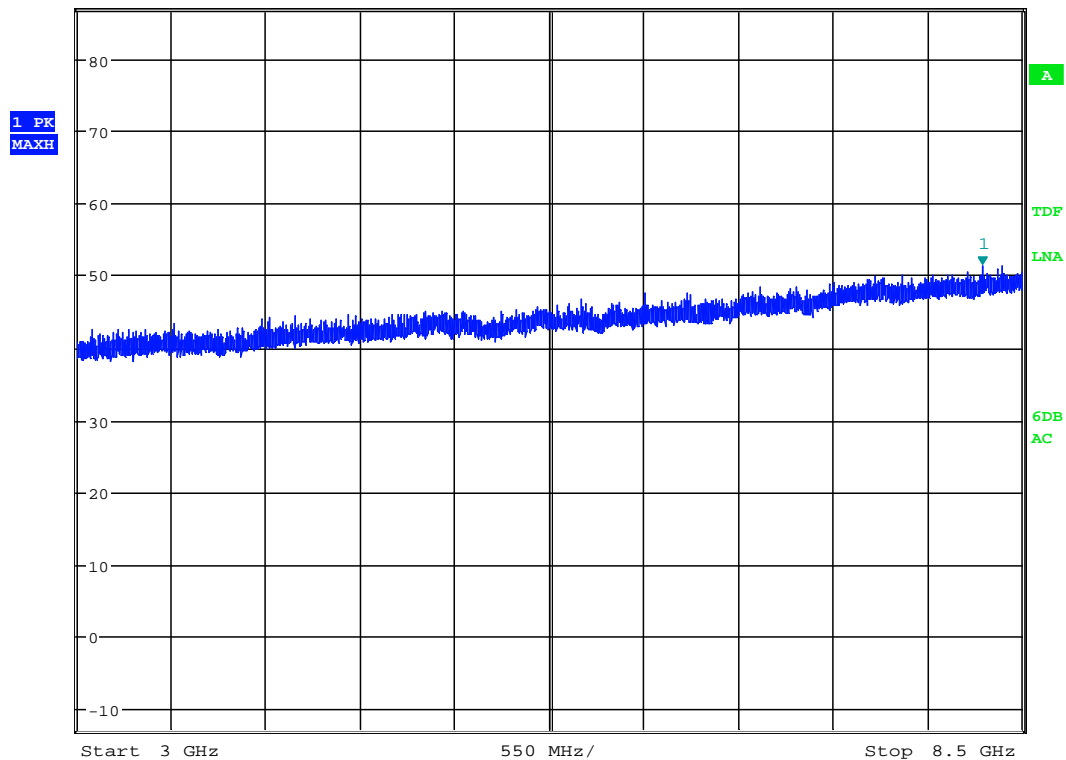


Date: 23.OCT.2012 14:21:44

**HP: pre-view scan 1 - 3 GHz -Pk with HP-filter**



Ref 87 dB $\mu$ V/m      \*Att 10 dB      \*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      51.45 dB $\mu$ V/m  
 SWT 45 ms      8.271200000 GHz

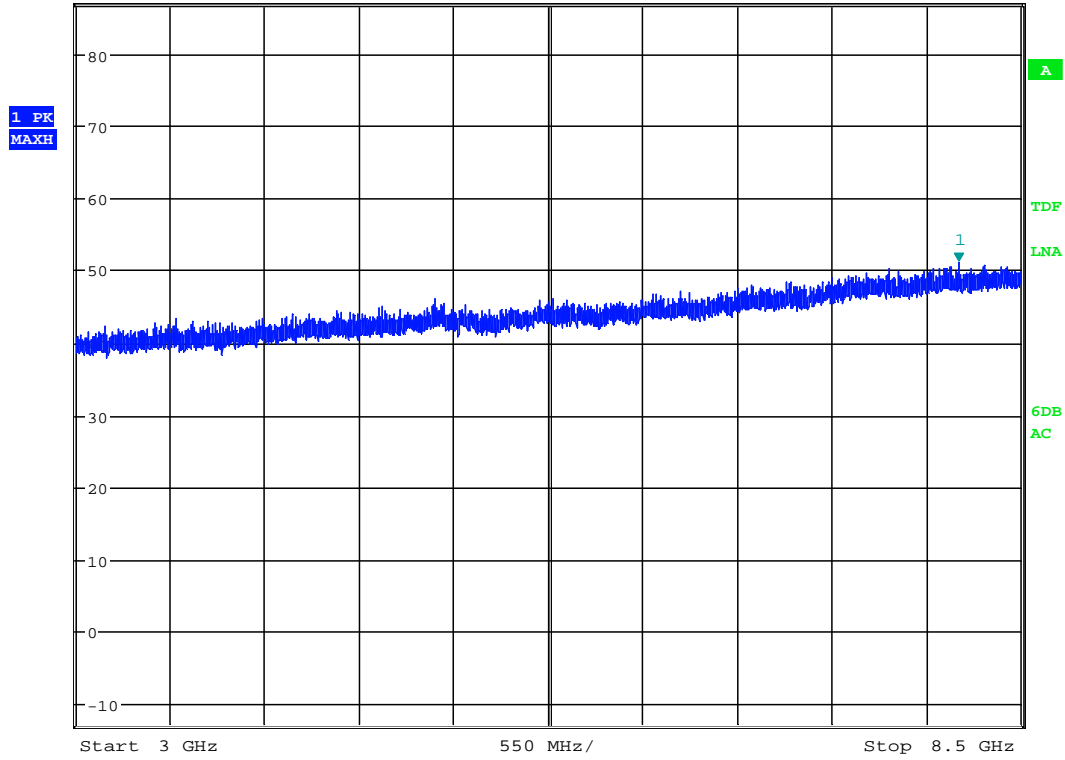


Date: 23.OCT.2012 14:30:54

**VP: pre-view scan 3 - 8.5 GHz -Pk with HP-filter**



Ref 87 dB $\mu$ V/m      \* Att 10 dB      \* RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      51.23 dB $\mu$ V/m  
 SWT 45 ms      8.137550000 GHz



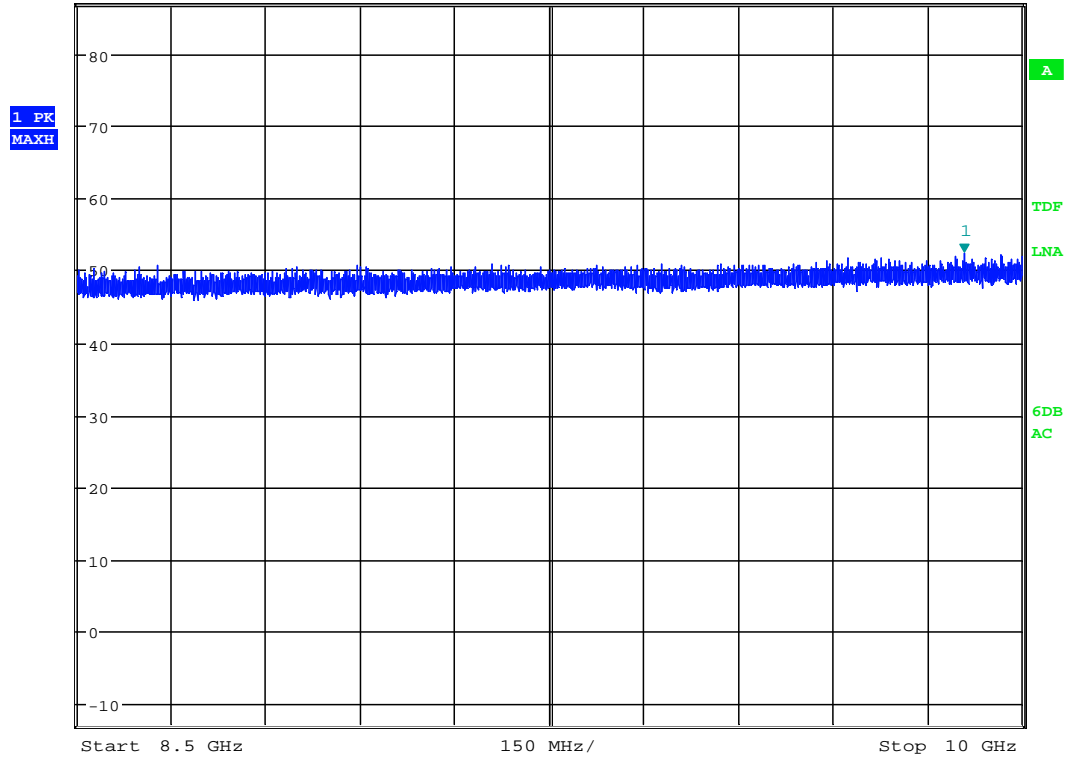
Date: 23.OCT.2012 14:28:37

**HP: pre-view scan 3 - 8.5 GHz -Pk with HP-filter**





\*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      52.48 dBμV/m  
 Ref 87 dBμV/m    \*Att 10 dB      SWT 45 ms      9.908200000 GHz

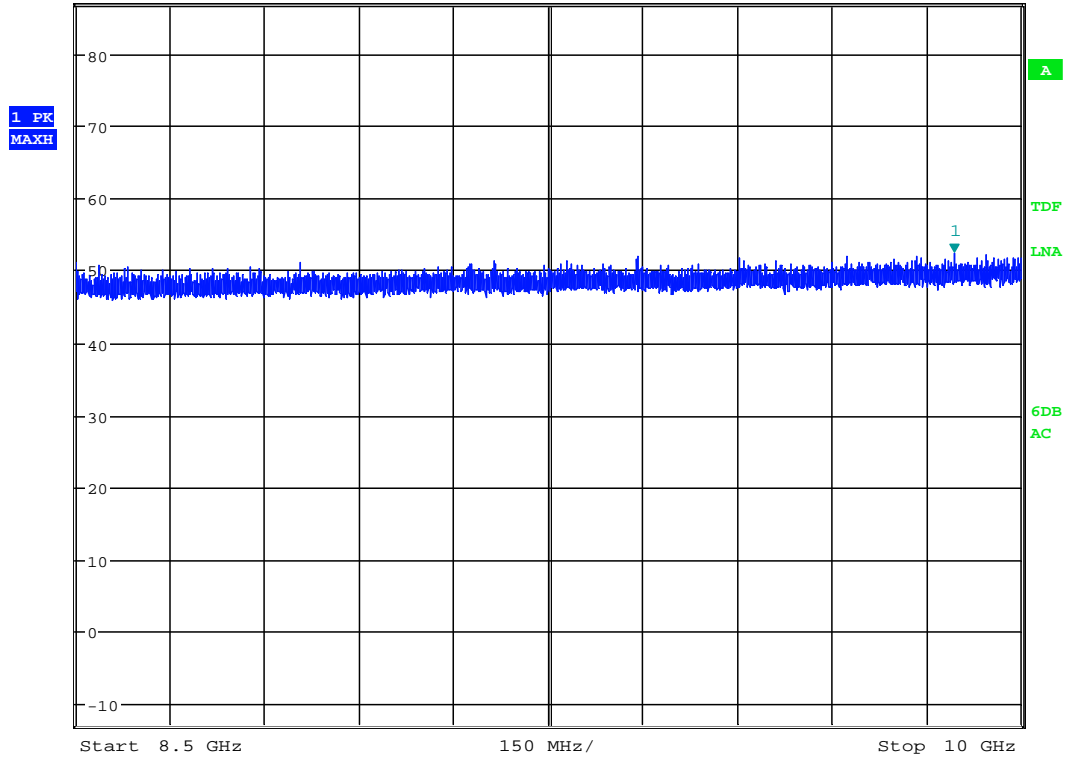


Date: 23.OCT.2012 14:50:20

**VP: pre-view scan 8.5 - 10 GHz -Pk with HP-filter**



\*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      52.38 dBμV/m  
 Ref 87 dBμV/m    \*Att 10 dB      SWT 45 ms      9.894100000 GHz



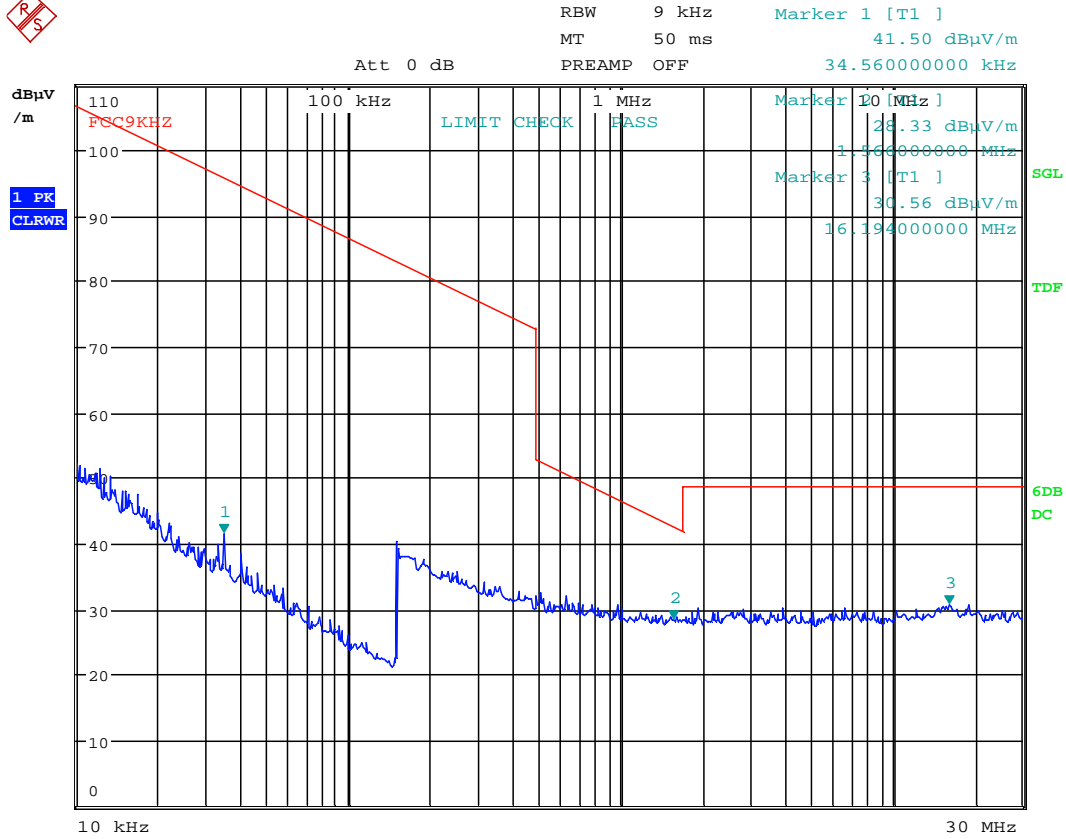
Date: 23.OCT.2012 14:47:42

**HP: pre-view scan 8.5 - 10 GHz -Pk with HP-filter**

**Radiated emissions 9kHz – 30 MHz.**

Detector: Peak

Measuring distance 10 m.



Date: 23.OCT.2012 13:23:55

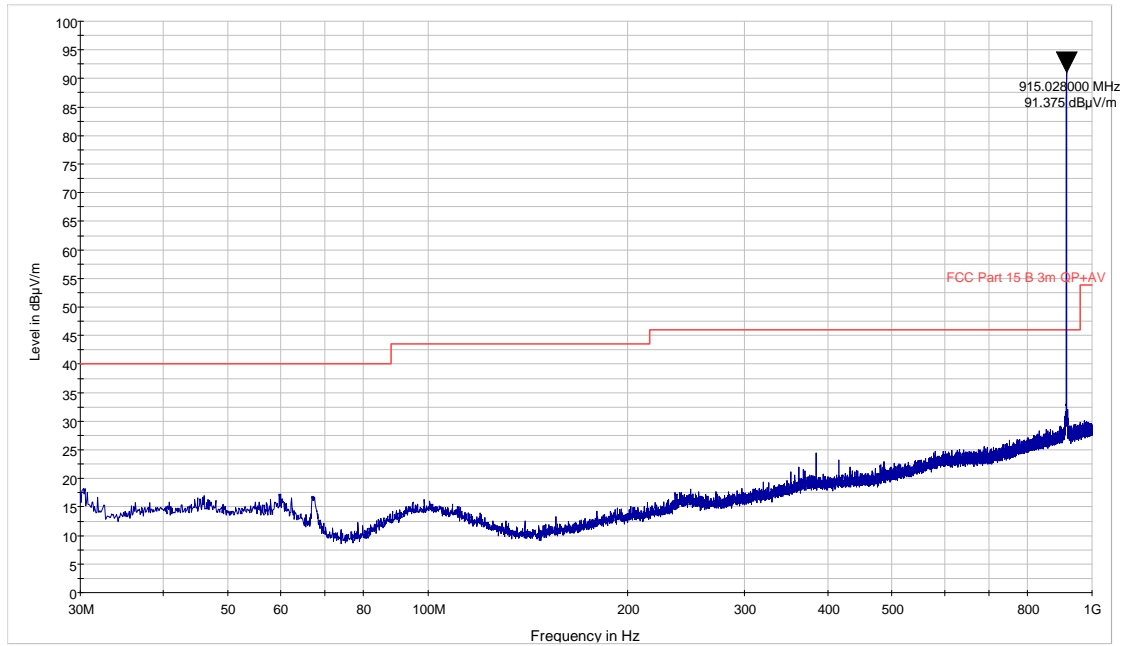
**Radiated emissions 30 – 1000 MHz.**

Detector: Peak

Measuring distance 3 m.

The graph shows peak scan and highest values. The QP values are given in the table below.

**FCC Pt15 Class B 30-1000 MHz 3m**



The marker shows the transmitter carrier at channel 915 MHz

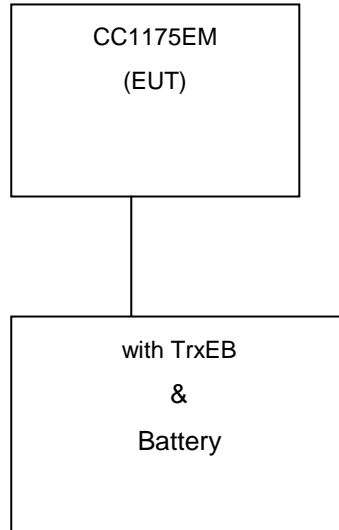
## 5 LIST OF TEST EQUIPMENT

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.	Model number	Description	Manufacturer	Ref. no.	Cal. date	Cal. Due
1.	ESU40	EMI Receiver	Rohde & Schwarz	LR1639	2010.06	2013.06
2.	3115	Antenna horn	EMCO	LR 1330	2010.08.05	2013.08.05
3.	6810.17A	Attenuator	Suhner	LR 1185	2011.10.18	2013.10.18
4.	87V	Multimeter, Digital	Fluke	LR1599	2010.12.15	2012.12.15
5.	8449B	Amplifier	Hewlett Packard	LR 1322	2011.09.26	2012.09.26
6.	HFH2-Z2	Antenna loop	Rohde and Schwarz	LR 285	2010.10.08	2013.10.08
7.	10855A	Amplifier	Hewlett Packard	LR 1445	2011.10.12	2012.10.12
8.	HL223	Antenna log.per	Rohde & Schwarz	LR 1261	2010.05.09	2013.05.09
9.	HK116	Antenna biconic	Rohde & Schwarz	LR 1260	2010.05.09	2013.05.09
10.	LNA6900	Amplifier, low noise	Teseq	LR1593	2011.11.24	2013.11.24
11.	VULB9163	Antenna Trilog	Schwarzbeck	LR1616	2010.08	2012.08
12.	6HC 1000-10000	HP filter	Trithlic		Cal b4 use	
13.	FA210A1010003030	Microwave cable	Rosenberger	LR1566	Cal b4 use	
14.	FSEK30	Spectrum analyzer	Rohde & Schwarz	LR1337	2010.12.15	2012.12.15

## 6 BLOCK DIAGRAM

### 6.1 System set up for radiated measurements



Test equipment: 1- 12

## 6.2 Test Site Radiated Emission

