



Test report no. : 221562-2

Item tested : KX-UDT131

Type of equipment : BT Transceiver in UPCS Handset

FCC ID : ACJ96NKX-UDT131

Client : Panasonic System Networks Co., Ltd.

Parts of FCC Part 15.247

Frequency Hopping Transmitters /
Digital Transmission System

Parts of RSS-210, Issue 8

Low Power Licence-Exempt
Radiocommunication Devices

13 November 2012

Authorized by :



Jan G. Eriksen
Technical Vericator

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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
E-mail: comlab@nemko.com
FCC test firm : 994405
IC OATS : 2040D-1
Total Number of Pages: 36

1.2 Client Information

Name : Panasonic System Networks Co., Ltd.
Address : 1-62, 4-chome Minoshima, Hakata-ku, Fukuoka, 812-8531, Japan
Telephone : +81-92-477-1405

Contact:

Name : Mr. Michihito Miyazaki
Telephone : +81-92-477-1405
E-mail : michihito.miyazaki@jp.panasonic.com

1.3 Responsible Manufacturer (if other than client)

Same as client.

2 Test Information

2.1 Test Item

Name :	Panasonic
Model/version :	KX-UDT131
FCC ID :	ACJ96NKX-UDT131
Industry Canada ID :	216A-KXUDT131
Serial number :	/
Hardware identity and/or version:	PNLB2100ZAxx
Software identity and/or version :	SW1.00
Tested to IC Radio Standard (RSS) :	RSS-210 Issue 8, RSS-GEN Issue 3
Test Site IC Reg. Number :	IC 2040D-1
Frequency Range :	2402 – 2480 MHz
Number of Channels :	79
Operating Modes :	Frequency Hopping
Type of Modulation :	Digital (GFSK)
User Frequency Adjustment :	None
Conducted Output Power :	0.0009 Watts (Peak)
Power Supply :	Secondary Battery (3.7V Li-Ion)
Antenna Connector :	None
Number of Antennas :	1
Antenna Diversity Supported :	No
Desktop Charger :	PNLC1045ZA with AC Adaptor PNLV226UC

Description of Test Item

The EUT is a Bluetooth transceiver integrated into a UPCS Handset. The UPCS part is covered by a separate test report.

Exposure Evaluation

FCC stand alone SAR evaluation for Bluetooth transmitter is not required according to KDB 648474 D01 Table 2 when output power $\leq 12\text{mW}$ and antenna is $< 2.5\text{cm}$ from other antenna each with either Output Power $\leq 12\text{mW}$ or 1-g SAR $< 1.2\text{ W/kg}$.

Output of BT device is 0.0009 Watts and highest 1-g SAR of DECT is 0.030 W/kg.

Industry Canada RSS-102 Issue 4, clause 3.1.3 states that FCC procedures KDB 648474 shall be used for devices with multiple transmitters.

2.2 Test Environment

2.2.1 Normal test condition

Temperature:	19.6 – 21.2 °C
Relative humidity:	29 - 44 %
Normal test voltage:	3.7 V DC (Secondary Battery, Li-Ion)

All tests were performed with a fully charged battery.

The values are the limit registered during the test period.

2.3 Test Period

Item received date:	2012-09-19
Test period :	from 2012-10-25 to 2012-11-02

2.4 Test Engineer(s)

Frode Sveinsen

2.5 Test Equipment

See list of test equipment in clause 5.

3 TEST REPORT SUMMARY

3.1 General

Manufacturer: Panasonic
Model No.: KX-UDT131

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.

Tests were performed in accordance with ANSI C63.4-2003 and DA 00-705 Filing and Guidelines for Frequency Hopping Spread Spectrum Systems.

Radiated tests were made in a semi-anechoic chamber at measuring distances of 3m and 10m.

A description of the test facility is on file with the FCC and Industry Canada.

- | | |
|---|---|
| <input checked="" type="checkbox"/> New Submission | <input checked="" type="checkbox"/> Production Unit |
| <input type="checkbox"/> Class II Permissive Change | <input type="checkbox"/> Pre-production Unit |
| DSS 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 #: 221562-2

TESTED BY: Frode Sveinsen
Frode Sveinsen, Test engineer

DATE: 2 November 2012

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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)	Complies
Power Line Conducted Emission	15.107(a) 15.207(a)	7.2.2 (RSS-GEN)	Complies
Peak Power Output	15.247(b)	A8.4	Complies
Spurious Emissions (Radiated)	15.247(c) 15.109(a) 15.209(a)	A8.5	Complies

¹ The tested equipment has integrated antennas only.

3.3 Description of modification for Modification Filing

Not applicable.

3.4 Comments

The EUT is the same module as in the previously certified UPCS handset KX-UDT121 (FCC ID: ACJ96NKX-UDT121), therefore only Radiated Power and Radiated Emissions are covered by this test report. For all other tests see Nemko test report no. 201776-6.

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)

Test Performed By: Thomas Danglé

Date of Test: 19-Oct-2012

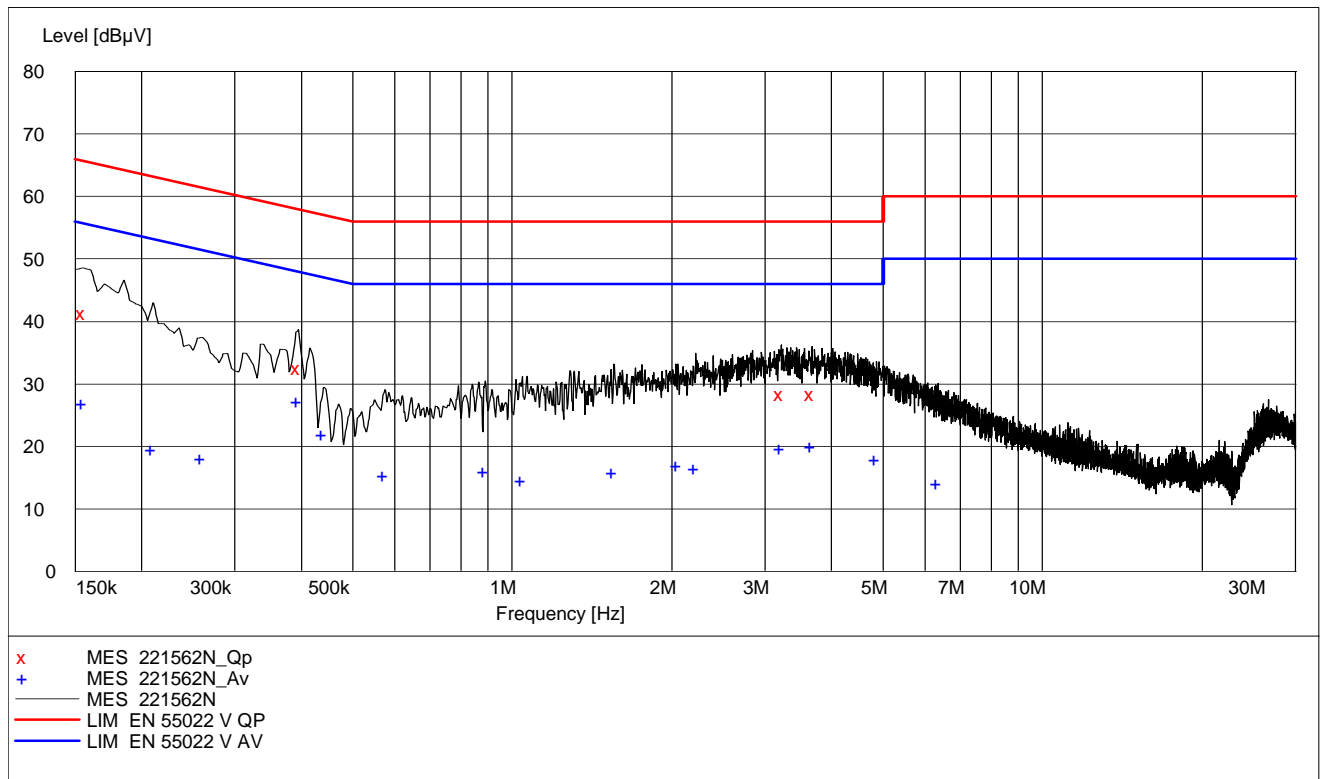
Measurement procedure: ANSI C63.4-2009 using 50 μ H/50 ohms LISN.

Test Results: Complies.

Measurement Data: See attached graph, (Peak detector).

Highest measured value (L1 and N):

Frequency [MHz]	Level [dBuV]	Af [dB]	Limit [dBuV]	Margin [dB]	Det	Position	Verdict [Pass/Fail]
0.155000	41.40	10.10	65.70	24.30	QP	N	Pass
0.395000	32.60	10.20	58.00	25.40	QP	N	Pass
3.215000	28.30	10.30	56.00	27.70	QP	L1	Pass
3.685000	28.30	10.30	56.00	27.70	QP	L1	Pass
0.155000	26.90	10.10	55.70	28.80	AV	N	Pass
0.210000	19.60	10.10	53.20	33.60	AV	N	Pass
0.260000	18.10	10.10	51.40	33.30	AV	N	Pass
0.395000	27.20	10.20	48.00	20.80	AV	N	Pass
0.440000	21.90	10.20	47.10	25.20	AV	N	Pass
0.575000	15.40	10.20	46.00	30.60	AV	N	Pass
0.890000	16.00	10.20	46.00	30.00	AV	L1	Pass
1.045000	14.70	10.20	46.00	31.30	AV	L1	Pass
1.555000	15.90	10.20	46.00	30.10	AV	L1	Pass
2.055000	17.00	10.30	46.00	29.00	AV	L1	Pass
2.220000	16.50	10.30	46.00	29.50	AV	L1	Pass
3.215000	19.80	10.30	46.00	26.20	AV	L1	Pass
3.685000	20.00	10.30	46.00	26.00	AV	L1	Pass
4.865000	17.90	10.40	46.00	28.10	AV	L1	Pass
6.355000	14.10	10.50	50.00	35.90	AV	L1	Pass



Handset Charging, 120V 60Hz, Phase L1 and N (Plot shows maximum of the two phases)

4.2 Peak Power Output

Para. No.: 15.247 (b)

Test Results: **Complies**

Measurement Data:

Carrier Frequency	Maximum Conducted Output Power (W)	Maximum EIRP (W)	Maximum Antenna Gain (dBi)
2402 MHz	0.0008	0.0010	1.0
2441 MHz	0.0009	0.0009	0.0
2480 MHz	0.0009	0.0010	0.5

Output Power values are from Nemko test report no. 201776-6 (FCC ID: ACJ96NKX-UDT121 / IC: 216A-KXUDT121).

Antenna gain = $10 \cdot \log(\text{EIRP} / \text{Conducted power})$ dBi

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

See attached graph.

- Detachable antenna? Yes No
- If detachable, is the antenna connector non-standard? Yes No
- Type of antenna connector: None

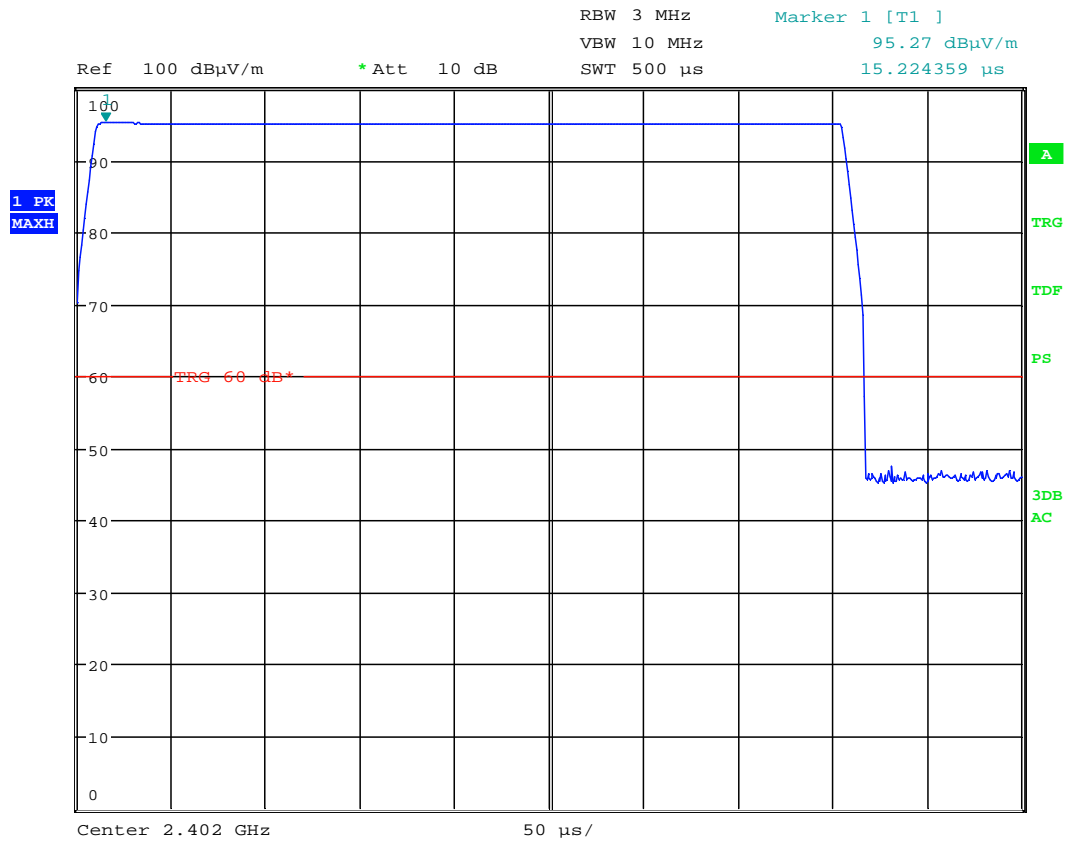
Requirements:

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

For frequency hopping systems employing at least 75 hopping channels: 1 Watt

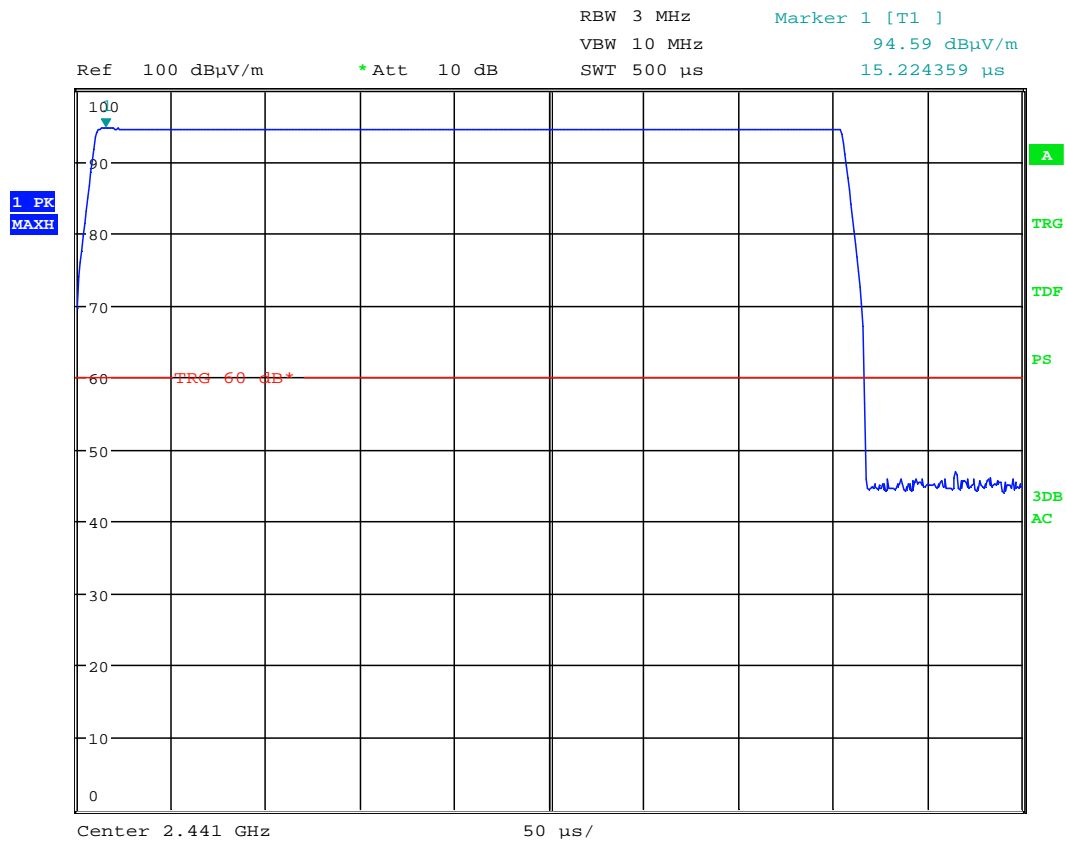
For all other frequency hopping systems in the 2400 - 2483.5 MHz band: 0.125 Watts

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.



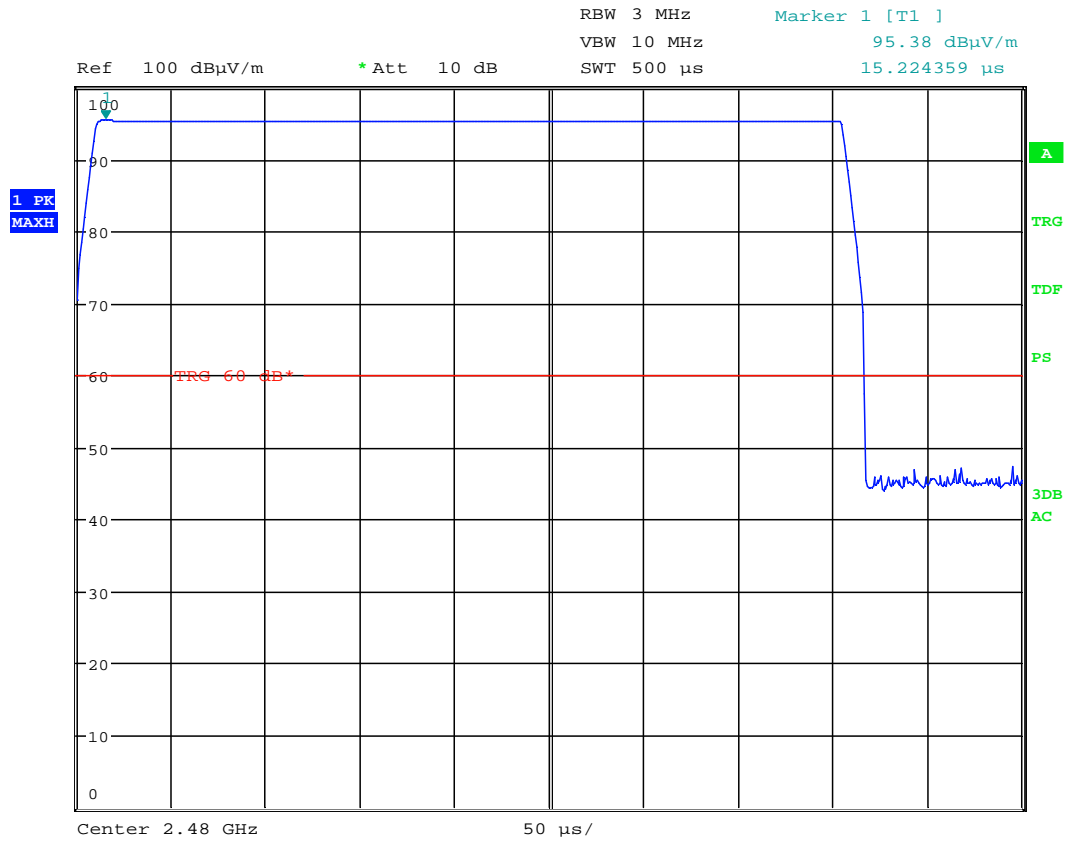
Date: 25.OCT.2012 09:40:13

Radiated Field Strength, 2402 MHz, EUT V, VP



Date: 25.OCT.2012 09:24:30

Radiated Field Strength, 2441 MHz, EUT V, VP



Date: 25.OCT.2012 10:17:08

Radiated Field Strength, 2480 MHz, EUT V, VP

4.3 Spurious Emissions (Radiated)

Para. No.: 15.247 (c)

Test Results: Complies

Measurement Data:

Band-Edge Radiated Power

	Measured field strength @3m (dBµV/m)		Limit dBµV/m	Margin dB	
	2390 MHz	2483.5 MHz			
Peak Detector	43.8	56.9	74	30.2	17.1
Average Detector	23.8	36.9	54	30.2	17.1

Average Detector values are measured with Peak Detector and corrected for Duty Cycle.

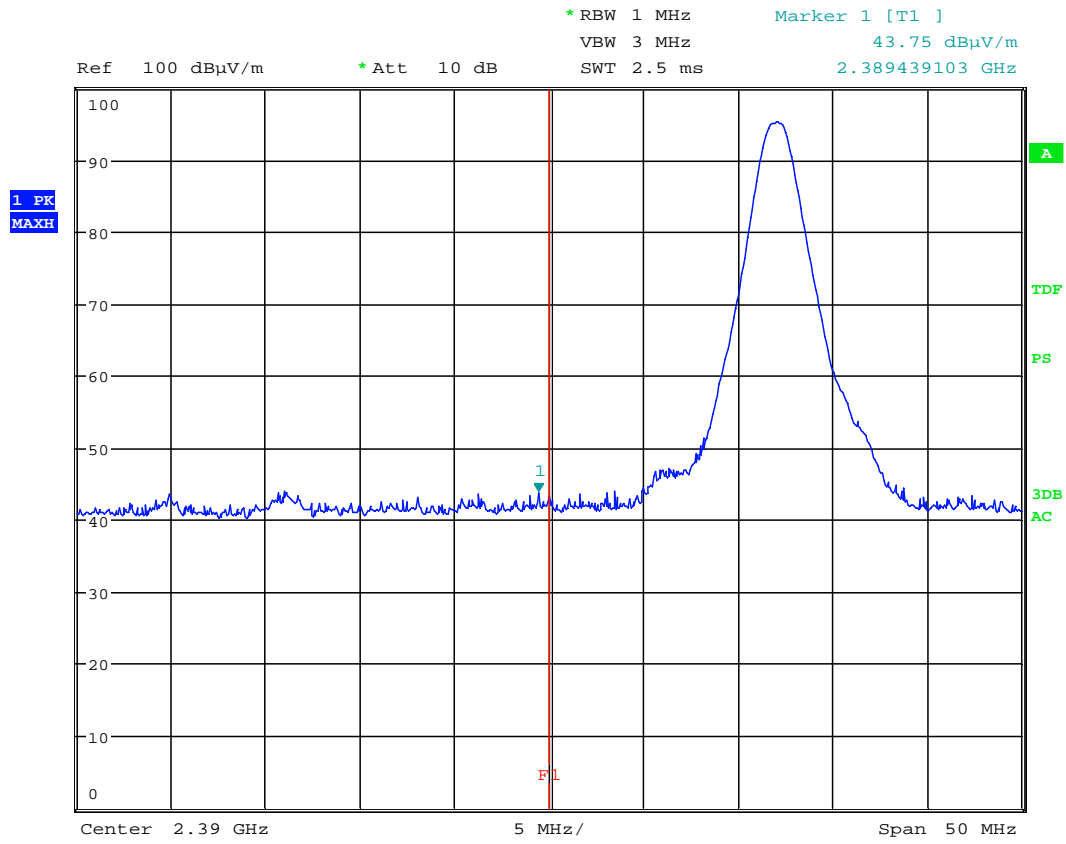
See attached plots.

Duty Cycle Correction Factor Calculation:

Duty Cycle = slot length / frame length

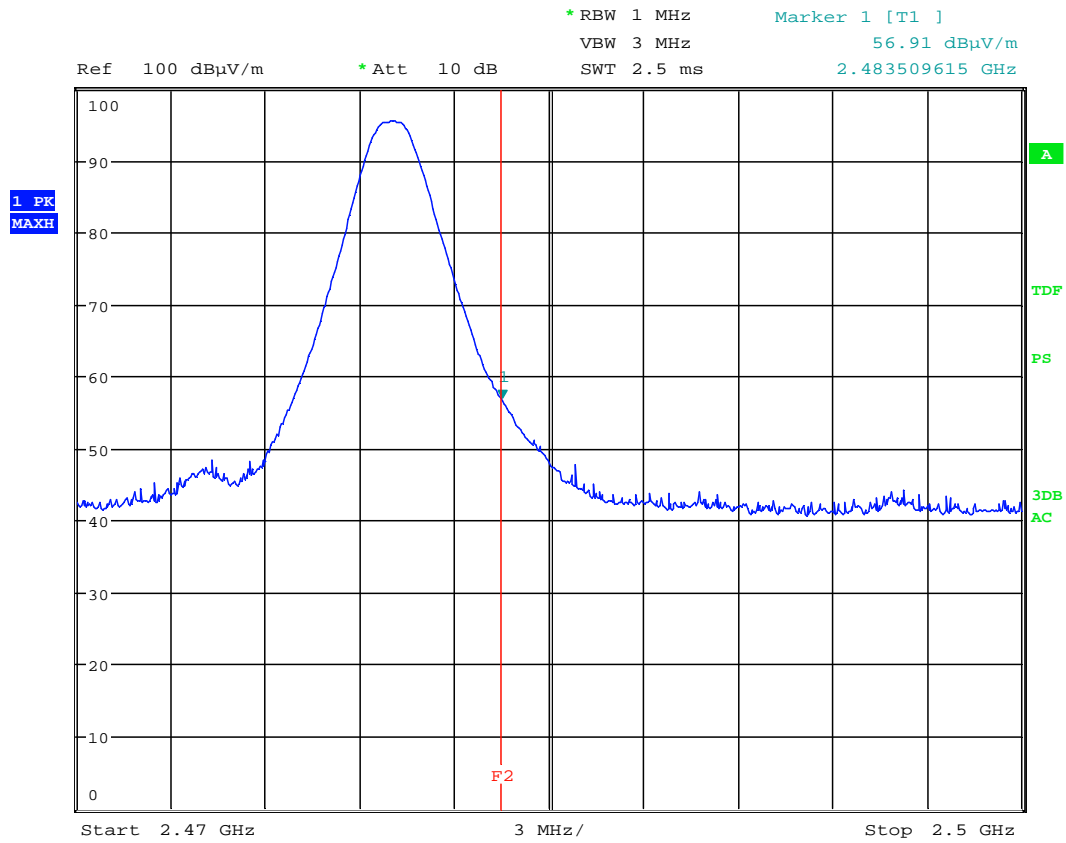
Duty Cycle Correction factor = $-20 \times \log(2.905/100) = 30.7 \text{ dB}$

Maximum Duty Cycle Correction Factor according to Para 15.35 (b): 20 dB



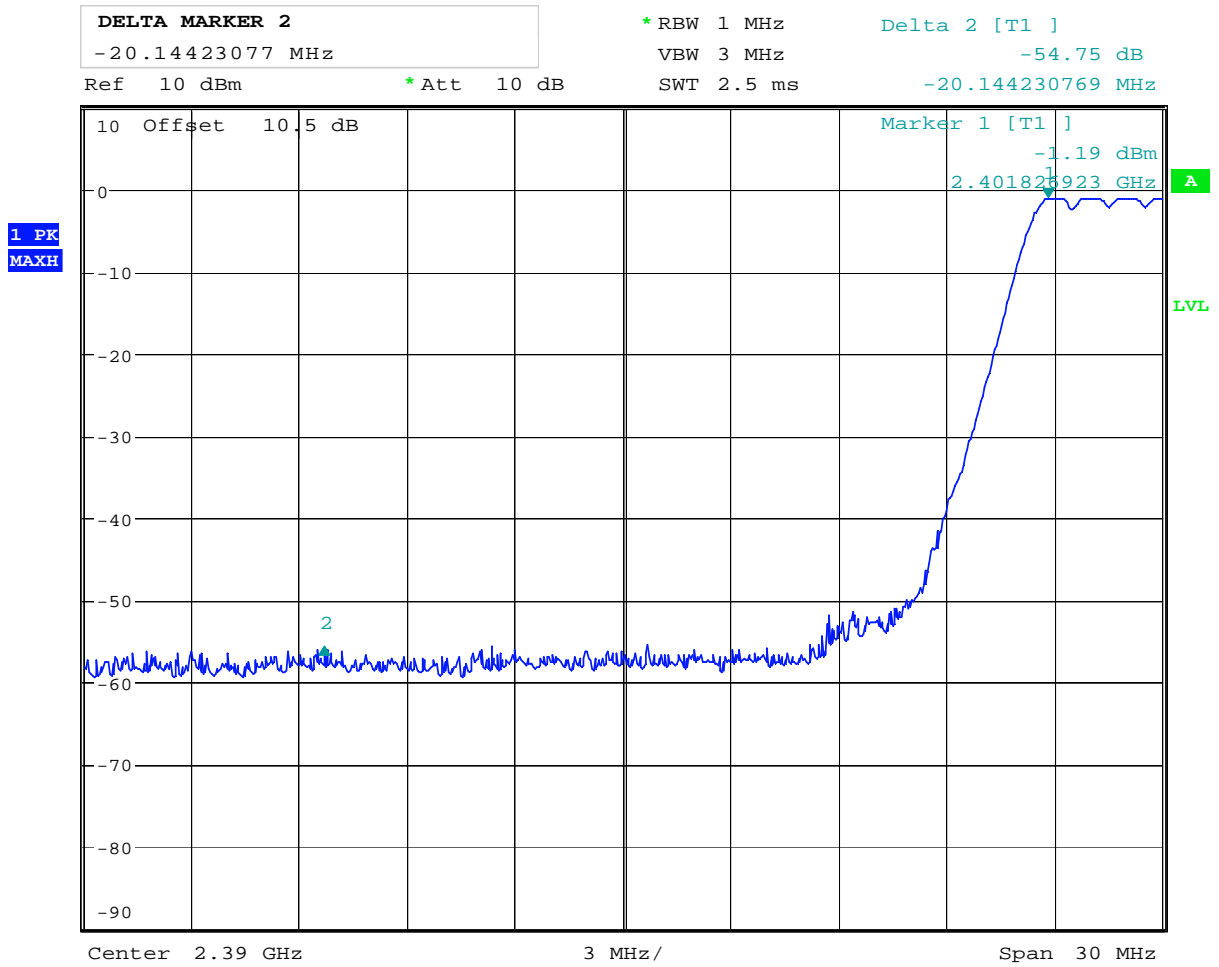
Date: 25.OCT.2012 09:41:18

Band Edge, Lower, 2402 MHz, EUT V, VP, Peak



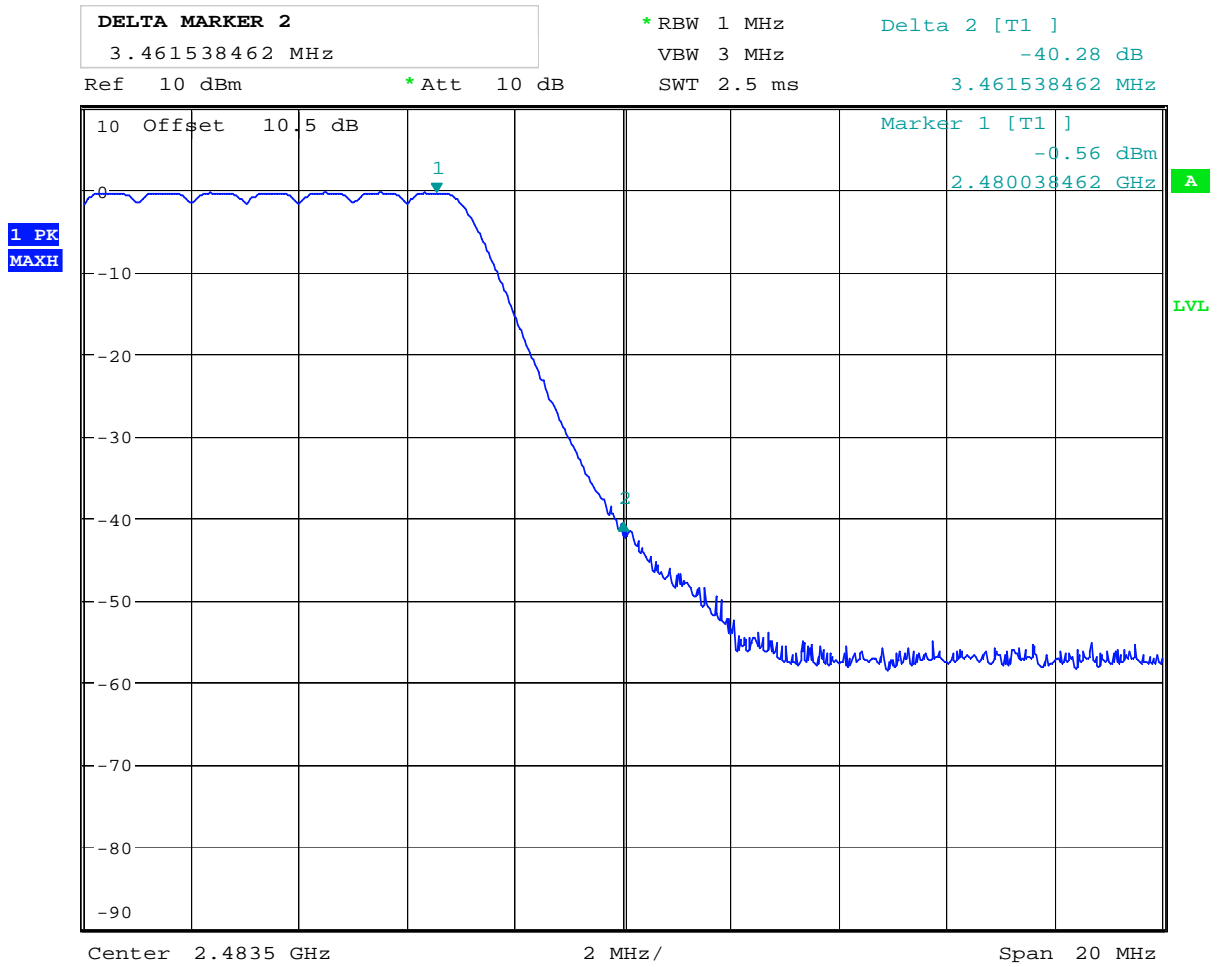
Date: 25.OCT.2012 10:18:50

Band Edge, Upper, 2480 MHz, EUT V, VP, Peak



Date: 19.APR.2012 17:06:09

Band Edge, Lower Channel, Hopping ON



Date: 19.APR.2012 17:04:10

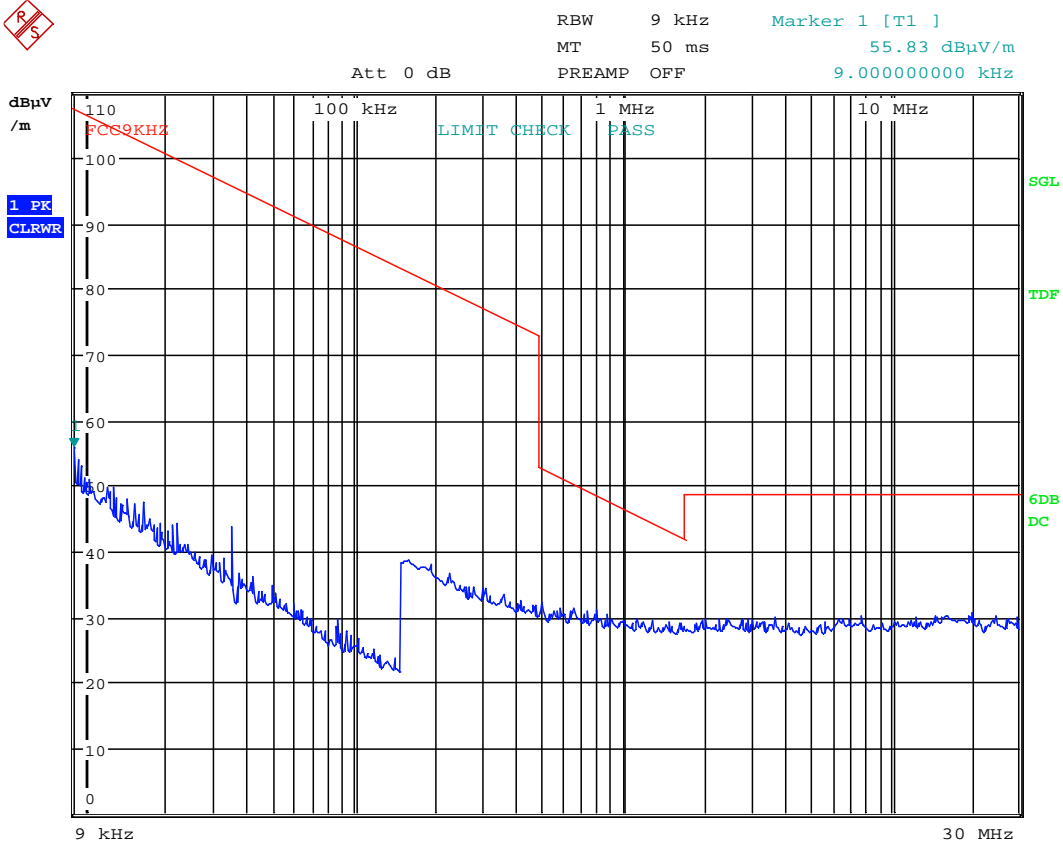
Band Edge, Upper Channel, Hopping ON

Radiated emissions 9 kHz-30 MHz.

Measuring distance 10 m, measured with Peak detector.

No components detected, see attached graph.

Limit is converted to 10 m using 40 dB/decade according to 15.31 (f) (2).



Date: 2.NOV.2012 10:22:26

Radiated emission 30 – 1000 MHz.

Detector: Quasi-Peak

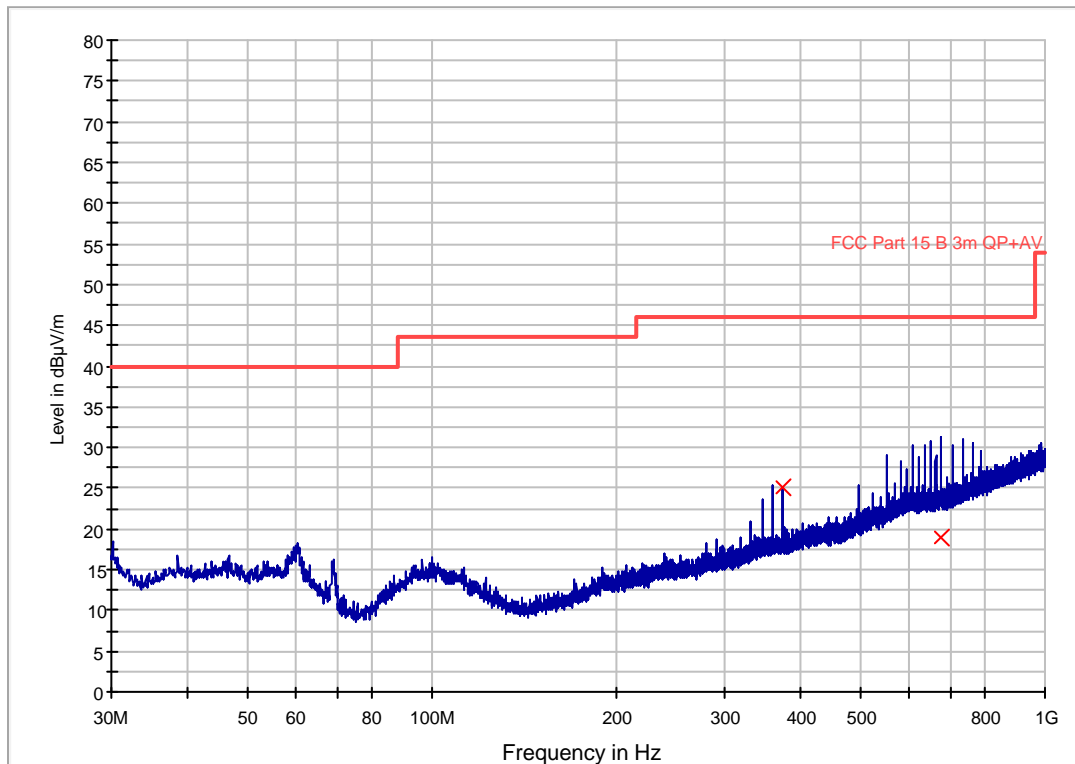
Measuring distance 3m according to FCC 15.209.

Tested in force transmit mode with active connection.

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Polarization	Margin (dB)	Limit (dBµV/m)	Comment
373.247882	25.1	120.000	H	20.9	46.0	
677.475396	19.1	120.000	V	26.9	46.0	

See plot.

FCC Pt15 Class B 30-1000M 3m



Radiated Emissions, 1-25 GHz

Measuring distance: 3m (1 – 8.5 GHz)
1m (8.5 – 18 GHz)

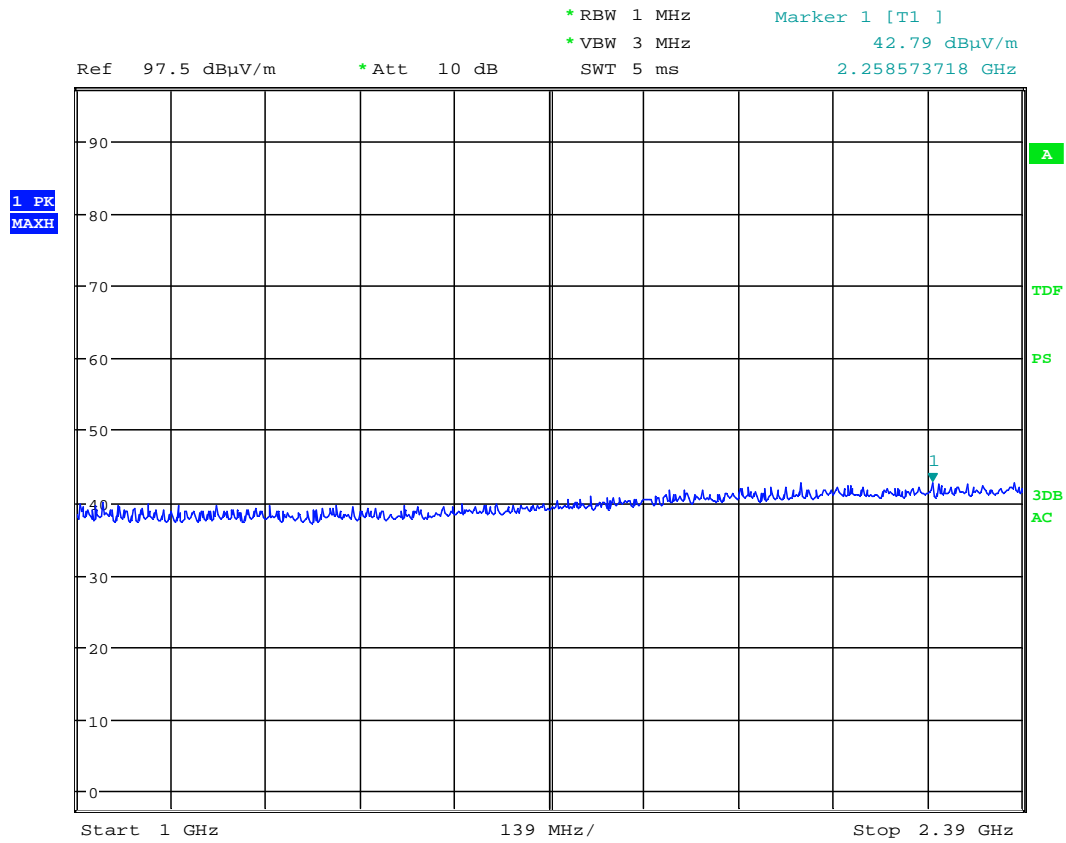
A pre-scan was performed above 18 GHz and no spurious emissions were detected.

No spurious emissions were detected.

The spectrum was investigated from 1 to 25 GHz with the EUT transmitting on 2402, 2441 and 2480 MHz.

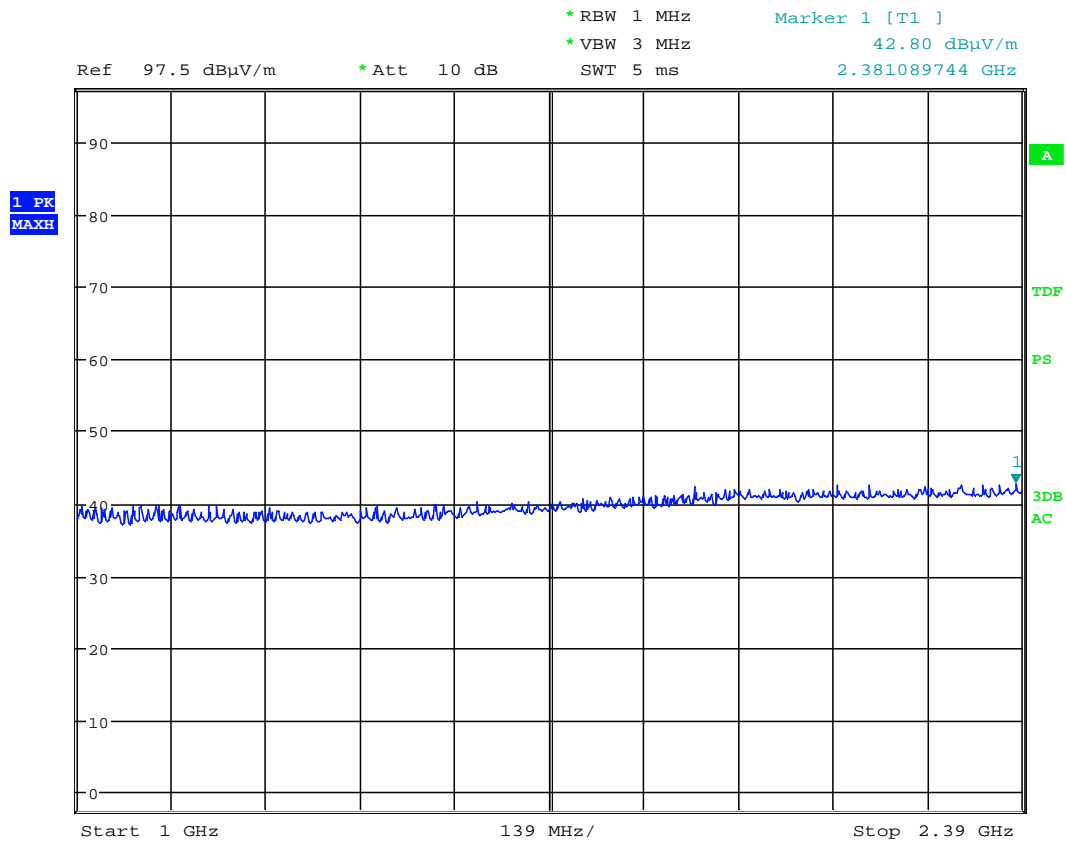
Antenna factor, amplifier gain and cable loss are included in spectrum analyzer “Transducer factor”.

See plots.



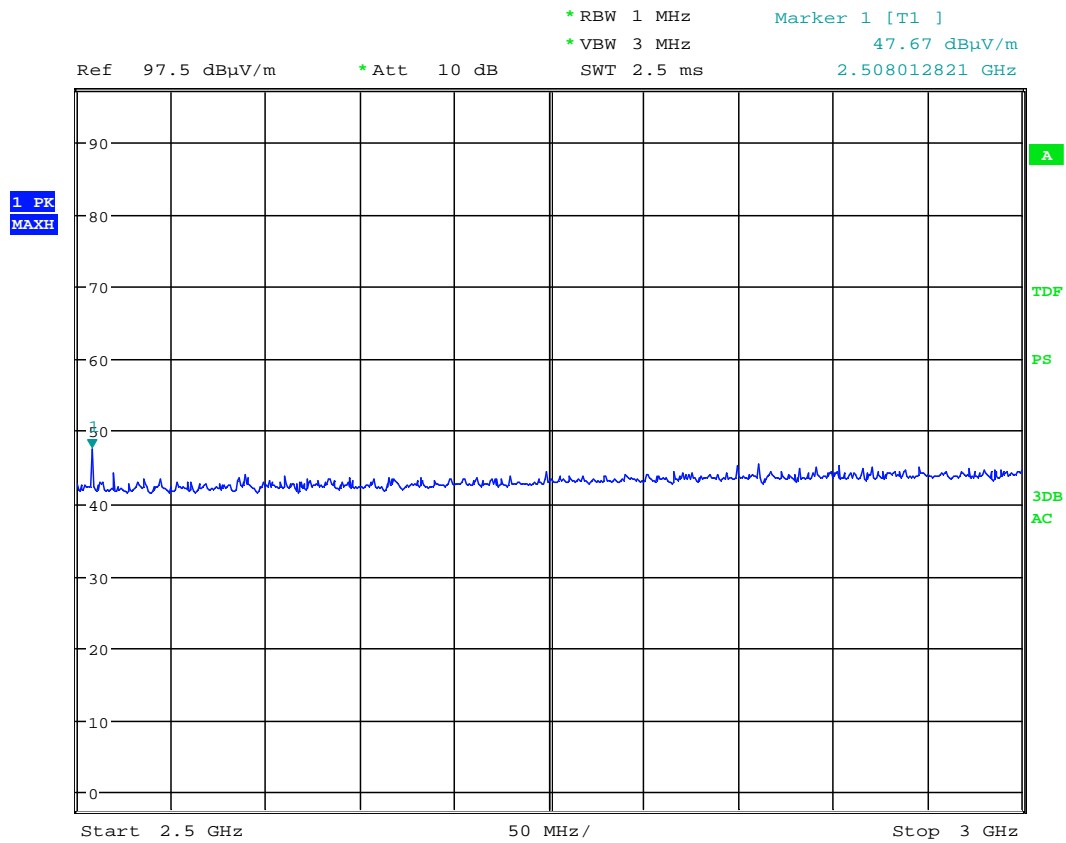
Date: 25.OCT.2012 10:02:54

Spurious Emissions, 1000 – 2390 MHz, 2402 MHz, EUT V, HP



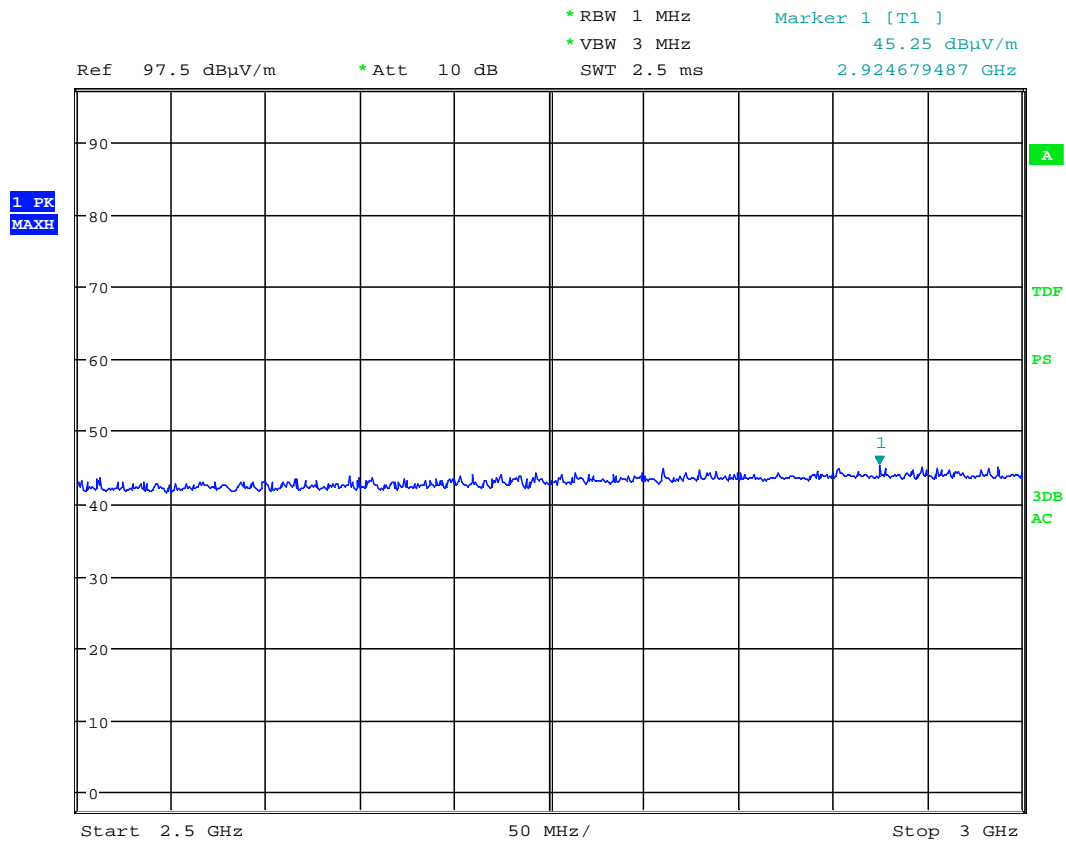
Date: 25.OCT.2012 10:01:03

Spurious Emissions, 1000 – 2390 MHz, 2402 MHz, EUT V, VP



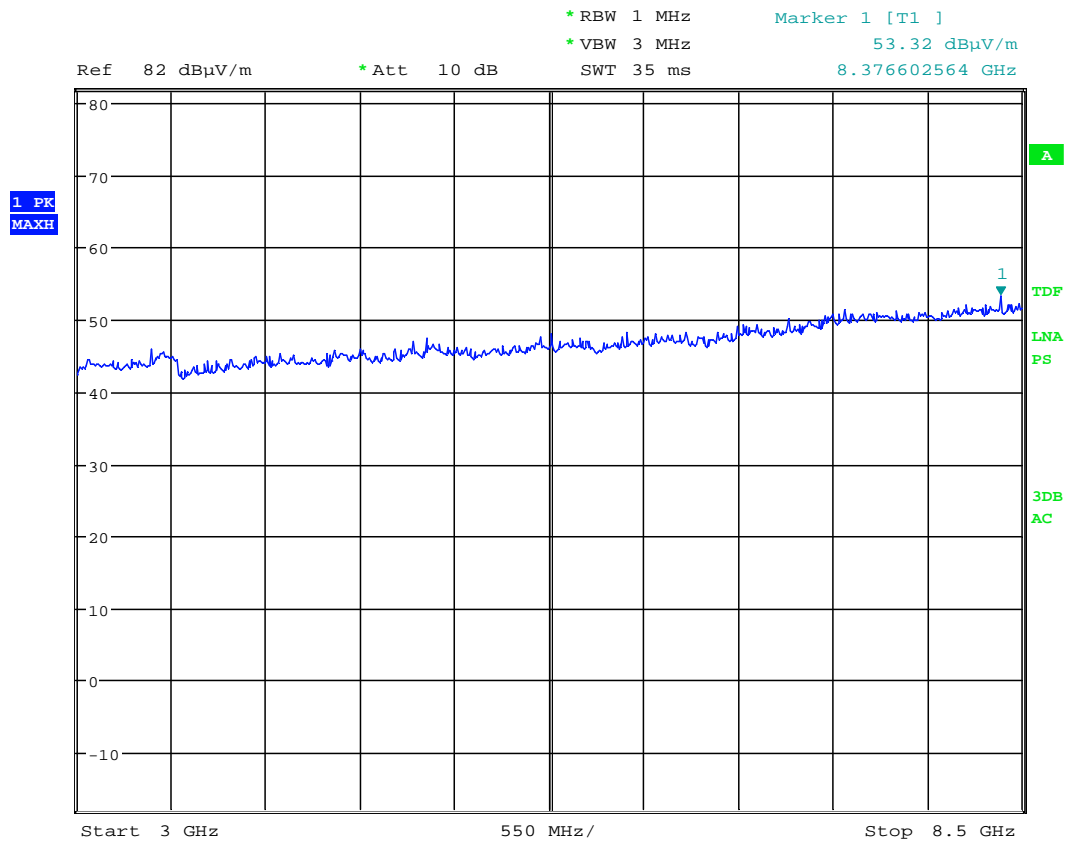
Date: 25.OCT.2012 10:11:43

Spurious Emissions, 2500 – 3000 MHz, 2480 MHz, EUT V, HP



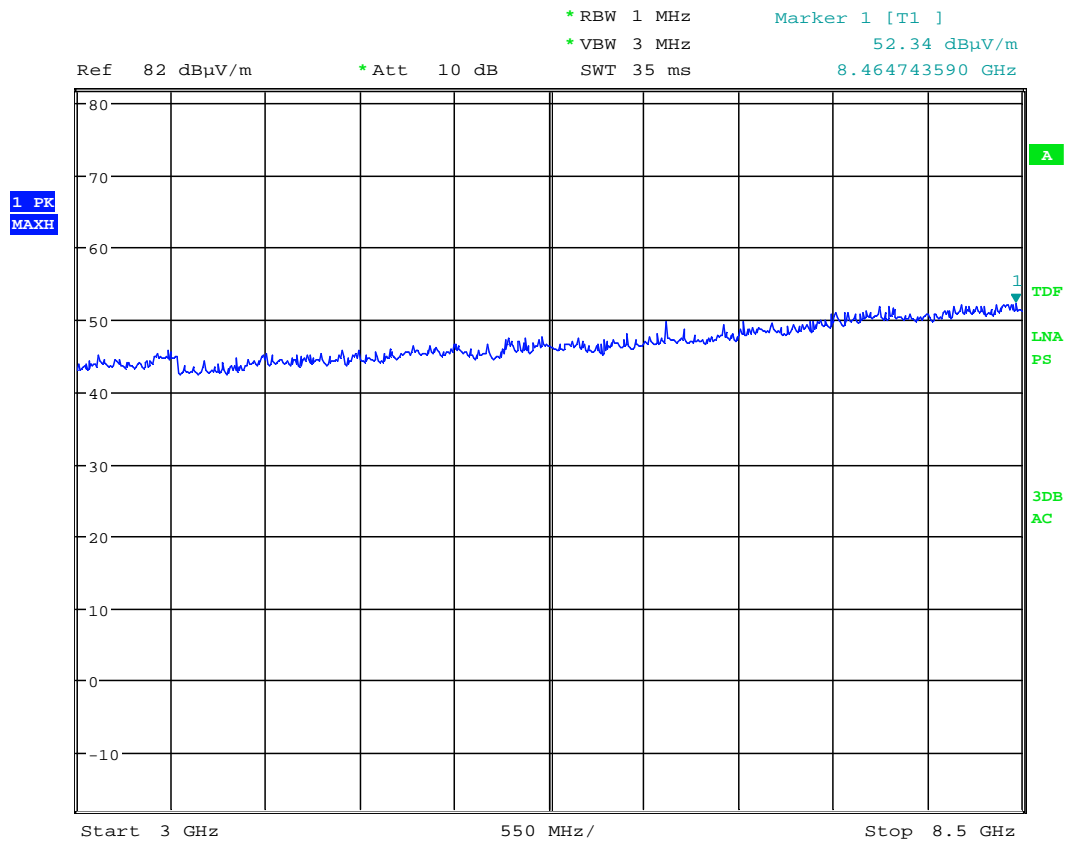
Date: 25.OCT.2012 10:09:52

Spurious Emissions, 2500 – 3000 MHz, 2480 MHz, EUT V, VP



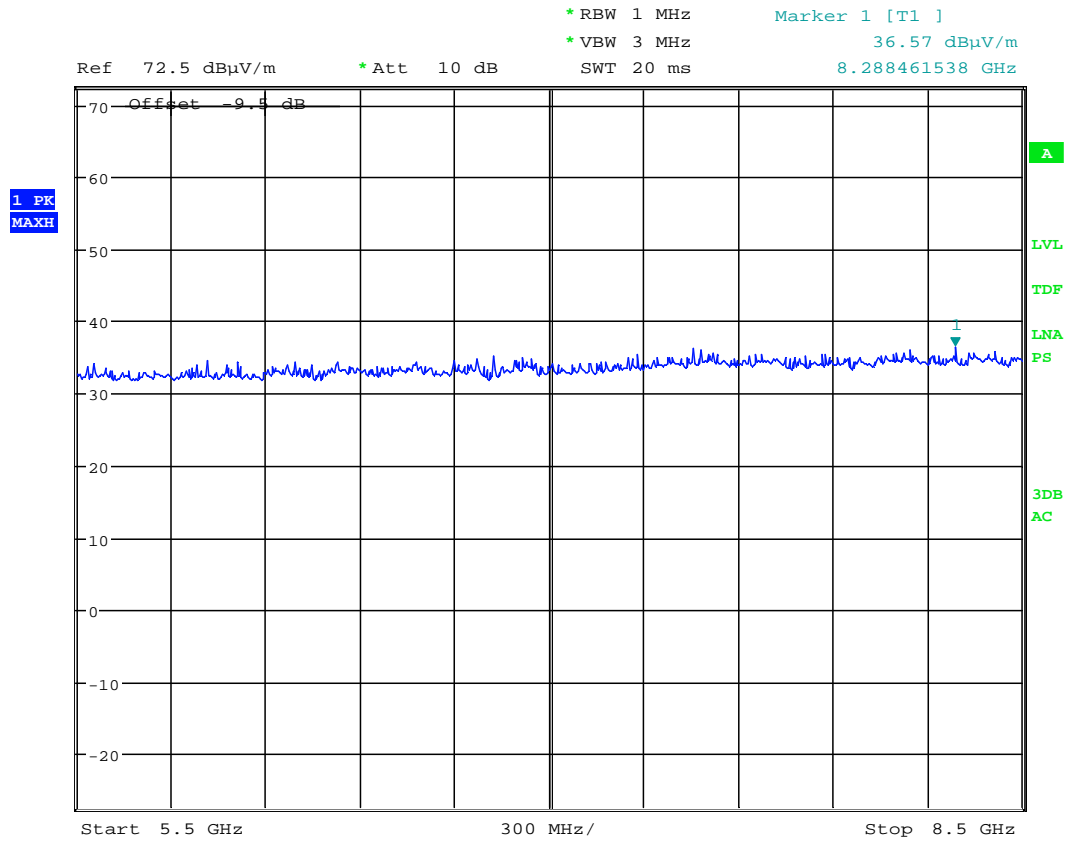
Date: 25.OCT.2012 10:27:09

Spurious Emissions, 3000 – 8500 MHz, 2441 MHz, EUT V, HP



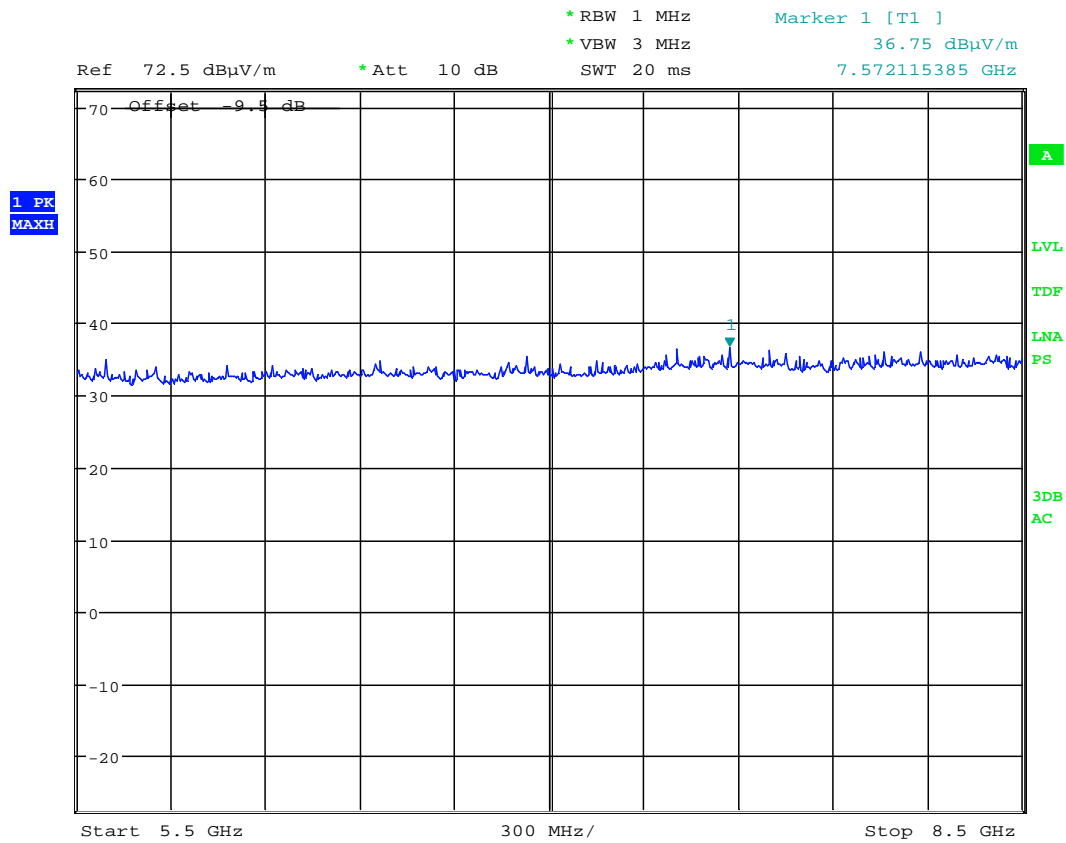
Date: 25.OCT.2012 10:25:26

Spurious Emissions, 3000 – 8500 MHz, 2441 MHz, EUT V, VP



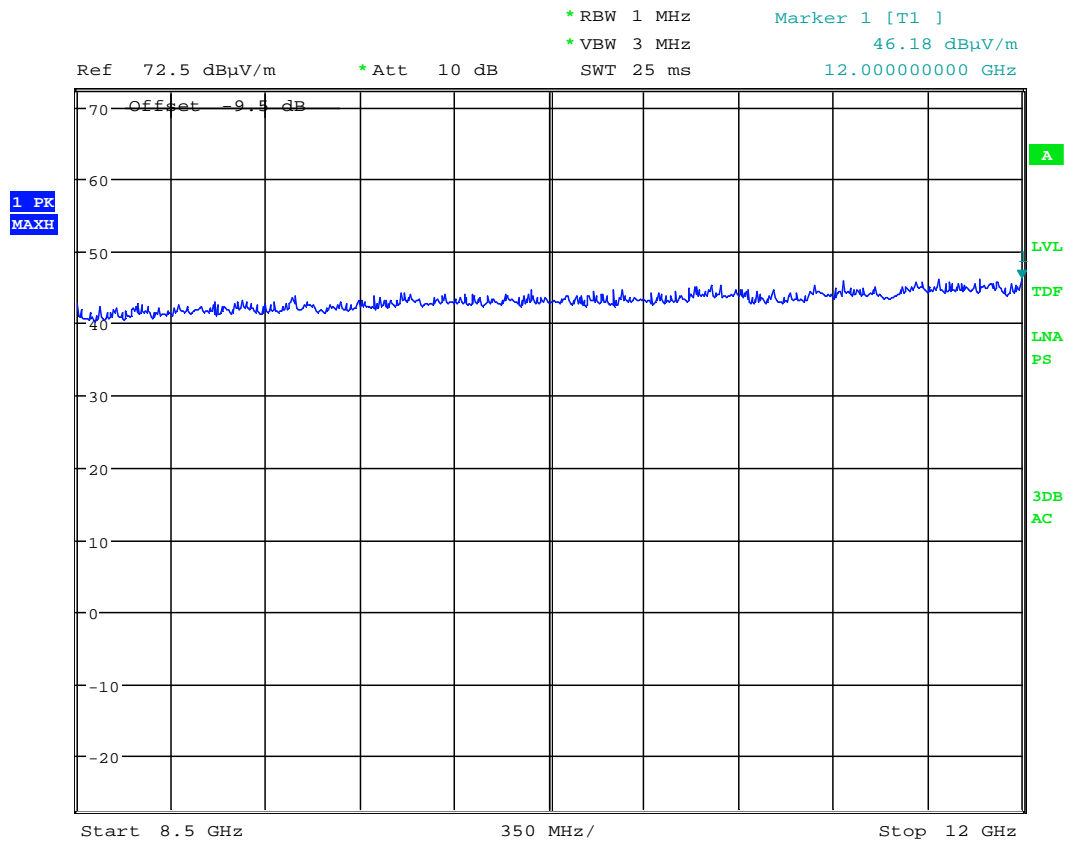
Date: 25.OCT.2012 11:09:28

Spurious Emissions, 5500 – 8500 MHz, 2441 MHz, EUT V, HP, @1m



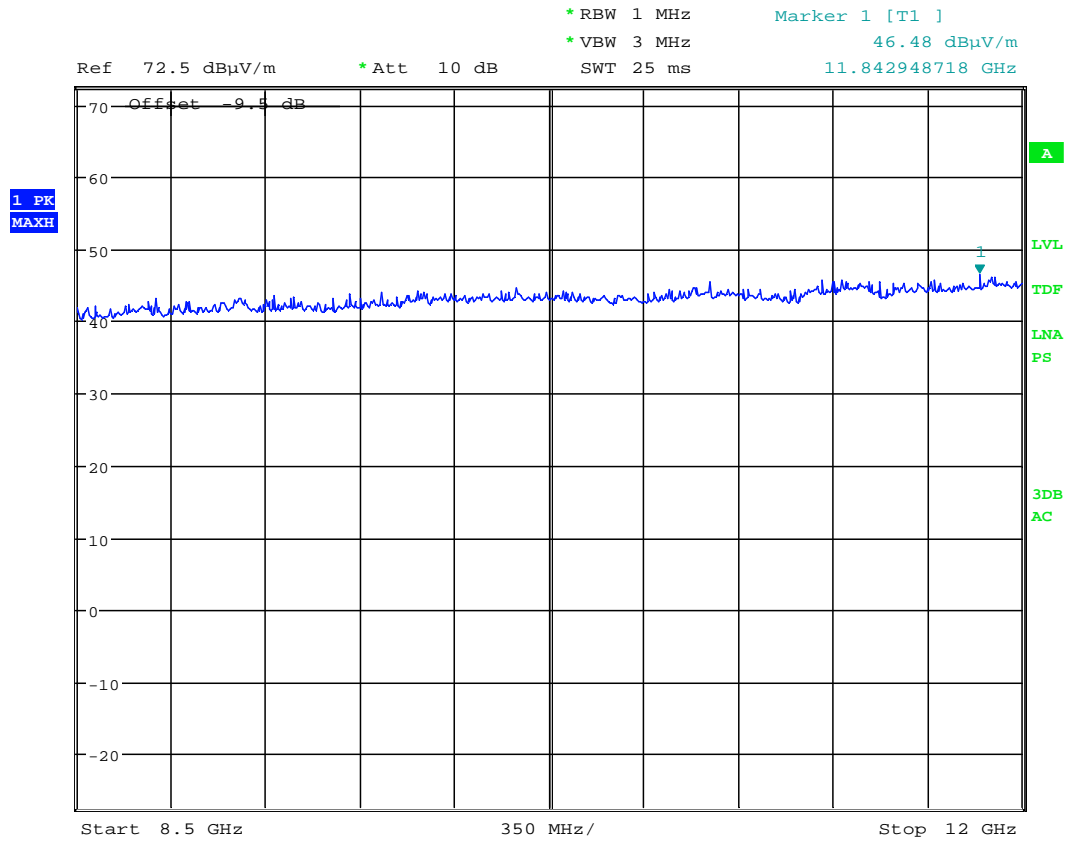
Date: 25.OCT.2012 11:07:46

Spurious Emissions, 5500 – 8500 MHz, 2441 MHz, EUT V, VP, @1m



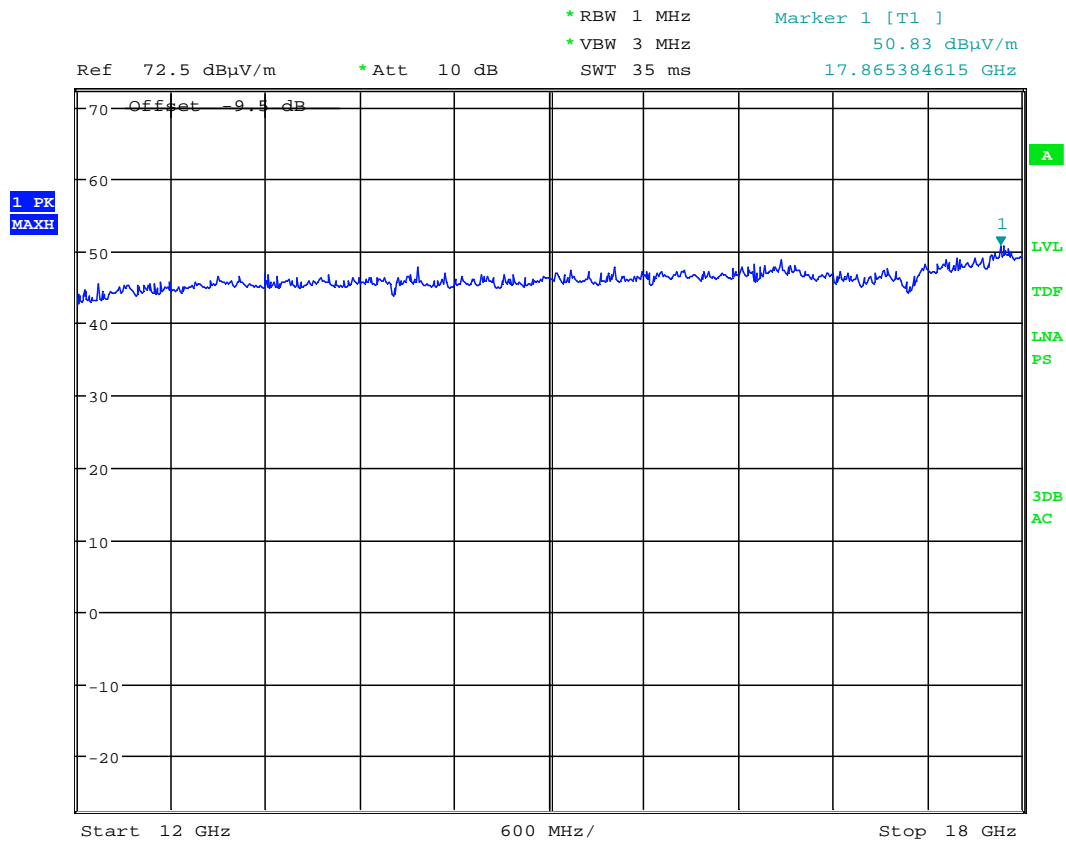
Date: 25.OCT.2012 11:16:18

Spurious Emissions, 8500 – 12000 MHz, 2441 MHz, EUT V, HP, @1m



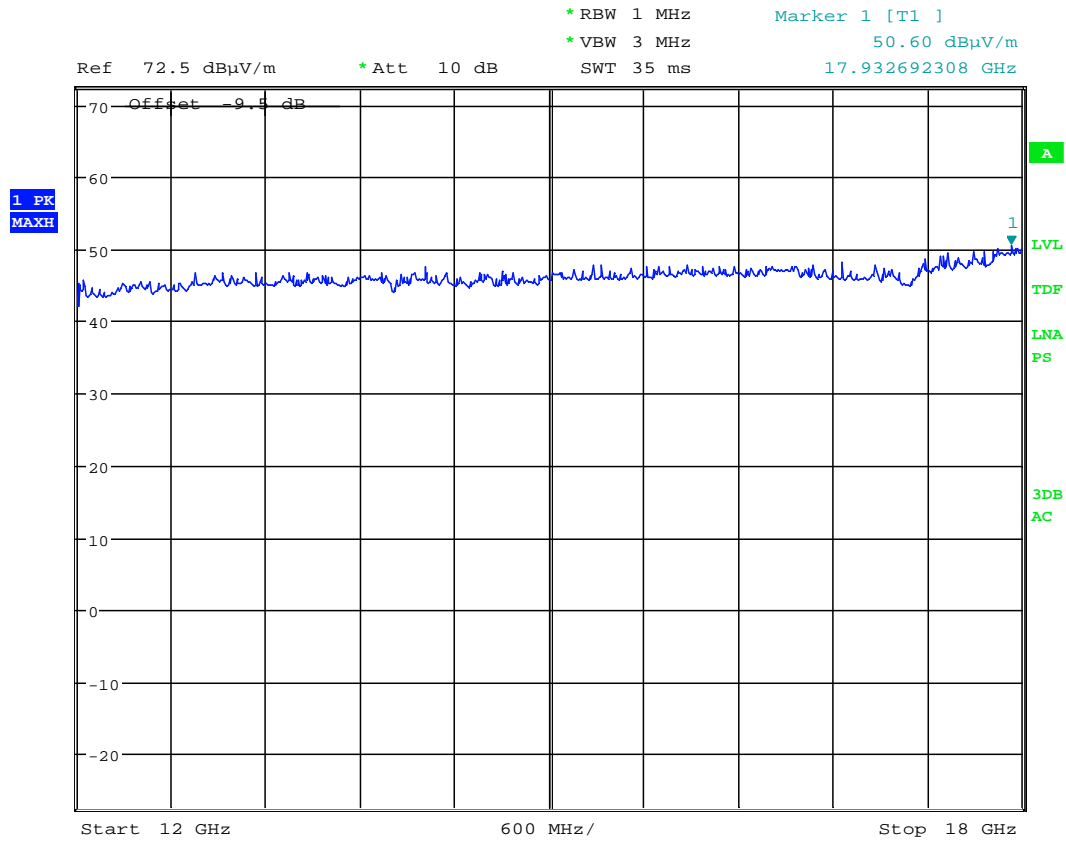
Date: 25.OCT.2012 11:14:36

Spurious Emissions, 8500 – 12000 MHz, 2441 MHz, EUT V, VP, @1m



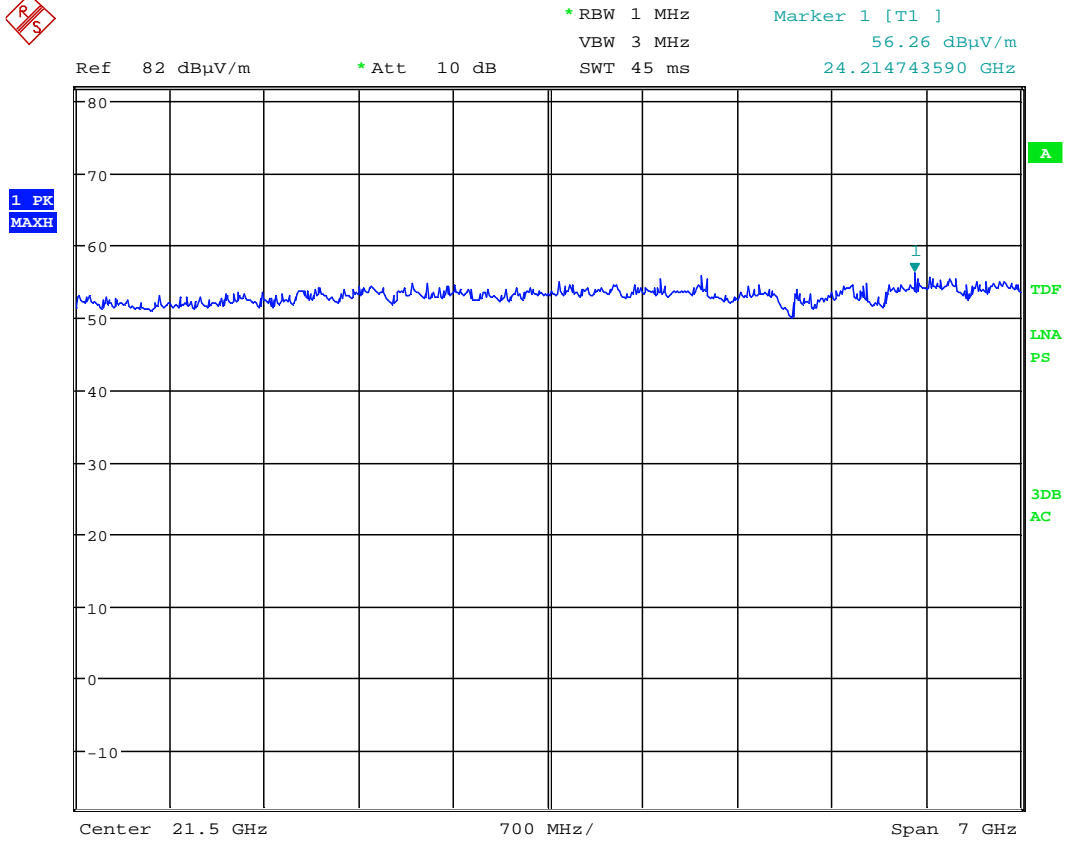
Date: 25.OCT.2012 11:22:59

Spurious Emissions, 12000 – 18000 MHz, 2441 MHz, EUT V, HP, @1m



Date: 25.OCT.2012 11:21:16

Spurious Emissions, 12000 – 18000 MHz, 2441 MHz, EUT V, VP, @1m



Date: 2.NOV.2012 11:27:39

Pre-scan, 18000 – 25000 MHz, 2441 MHz, @ ~10cm

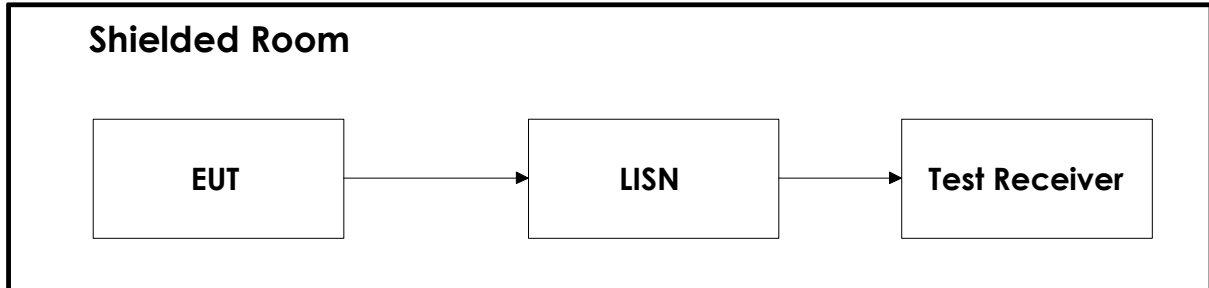
5 LIST OF TEST EQUIPMENT

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	Measuring Receiver	Rohde & Schwarz	LR 1639	2012-06	2013-06
2	ESHS10	Measuring Receiver	Rohde & Schwarz	N- 3528	2012.06	2013.06
3	6HC3000/18000	Highpass Filter	Trilithic	LR 1614	Cal b4 use	
4	ESH3-Z5	Two Line V-Network	Rohde & Schwarz	LR 1076	2011.11.03	2013.11.03
5	80S	Signal Generator	Powertron	LT 502	Cal b4 use	
6	6812B	AC Power Source	Agilent	LR 1515	2012.05.08	2013.05.08
7	ESH3-Z2	Pulse Limiter	Rohde & Schwarz	LR 285	2011.10.08	2013.10.08
8	3115	Horn Antenna	EMCO	LR 1330	2010.08.05	2013.08.05
9	8449A	Pre-amplifier	Hewlett Packard	LR 1322	2012.09.11	2013.09.11
10	643	Antenna Horn	Narda	LR 093	2009.01.26	2014.01.26
11	PM7320X	Antenna Horn	Sivers Lab	LR 102	2009.01.26	2014.01.26
12	DBF-520-20	Antenna Horn	Systron Donner	LR 100	2009.01.26	2014.01.26
13	638	Antenna Horn	Narda	LR 1480	2010.06.17	2013.06.17
14	HFH2-Z2	Loop Antenna	Rohde & Schwarz	LR 285	2010-10-08	2013-10-08
15	LNA6900	Preamplifier	Teseq	LR 1593	2010.11.16	2012.11.16
16	VULB9163	BiLog Antenna	Schwarzbeck	LR 1616	2011.08.22	2014.08.22

6 BLOCK DIAGRAM

6.1 Power Line Conducted Emission



6.2 Test Site Radiated Emission

