

Test Report

Product	Evaluation Board for 2.4 GHz BT Low Energy System-on-Chip	
Name and address of the applicant	Texas Instruments Norway AS Gaustadalléen 21, NO-0349 Oslo, Norway	
Name and address of the manufacturer	Texas Instruments Norway AS Gaustadalléen 21, NO-0349 Oslo, Norway	
Model	xTAG	
Rating	3.0Vdc	
Trademark	Texas Instruments	
Serial number	/	
Additional information	Bluetooth Low Energy (BLE) device	
Tested according to	FCC Part 15.247 Digital Transmission Systems Industry Canada RSS-210, Issue 8 Low Power Licence-Exempt Radiocommunications Devices	
Order number	250972	
Tested in period	2014.01.02 to 2014.01.06	
Issue date	2014.01.17	
Name and address of the testing laboratory	 Instituttveien 6 Kjeller, Norway	FCC No: 994405 IC OATS: 2040D-1 TEL: (+47) 22 96 03 30 FAX: (+47) 22 96 05 50
	 Prepared by [G.Suhanthakumar]	 Approved by [Frode Sveinsen]
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1 INFORMATION

1.1 Test Item

Name :	Texas Instruments
FCC ID :	ZATXTAG
IC :	451H-XTAG
Model/version :	xTAG
Serial number :	-
Hardware identity and/or version:	Rev.0.4
Software identity and/or version :	-
Frequency Range :	2402 – 2480 MHz
Number of Channels :	40
Type of Modulation :	GFSK, 250 kHz deviation (Digital)
Conducted Output Power:	3.07 mW (Peak)
User Frequency Adjustment :	None
Type of Power Supply :	3.0V _{DC} (1x CR2032 Lithium Battery)
Antenna Connector :	N/A
Antenna type:	PCB antenna
Antenna Diversity Supported :	No
Desktop Charger :	None

Description of Test Item

The xTAG RF-transceiver module is an evaluation board for the xTAG System-on-Chip designed to operate in the 2.4 GHz ISM band. The xTAG radio complies with the BLE PHY requirements.

1.2 Test Environment

1.2.1 *Normal test condition*

Temperature:	21 - 22 °C
Relative humidity:	42 - 48 %
Normal test voltage:	3.0 V DC

The values are the limit registered during the test period.

1.3 Test Engineer(s)

G.Suhandhakumar

1.4 Test Equipment

See list of test equipment in clause 4.

2 TEST REPORT SUMMARY

2.1 General

All measurements are traceable to national standards.

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

Radiated tests were conducted in accordance with ANSI C63.4-2003 and KDB 558074 D01 DTS Measurement Guidance v03r01. The 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 type="checkbox"/> Production Unit |
| <input type="checkbox"/> Class II Permissive Change | <input checked="" type="checkbox"/> Pre-production Unit |
| DTS 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".

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2.2 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 ¹
Antenna Requirement	15.203	7.1.4 (RSS-GEN)	N/A ²
Power Line Conducted Emission	15.107(a) 15.207(a)	7.2.2 (RSS-GEN)	N/A ¹
Minimum 6 dB Bandwidth	15.247(a)(2)	A8.2	Complies
Peak Power Output	15.247(b)	A8.4	Complies
Power Spectral Density	15.247(d)	A8.2	Complies
Spurious Emissions (Antenna Conducted)	15.247(c)	A8.5	Complies
Spurious Emissions (Radiated)	15.247(c) 15.109(a) 15.209(a)	A8.5	Complies
Receiver Emissions (Radiated)	N/A	2.3	N/A

¹ EUT is battery operated only.

² PCB antenna

RSS Gen issue 3 covers section 7 & 6

RSS 210 issue 8 covers section A2.9

2.3 Description of modification for Modification Filing

Not applicable.

2.4 Comments

All ports were populated during spurious emission measurements.

2.5 Family List Rational

Not Applicable.

3 TEST RESULTS

3.1 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 μ H/50 ohms LISN.

Test Results: -

Measurement Data: -

3.2 Minimum 6 dB Bandwidth

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

Test Performed By: G.Suwanthakumar	Date of Test: 06 Jan 2014
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Test Results: **Complies**

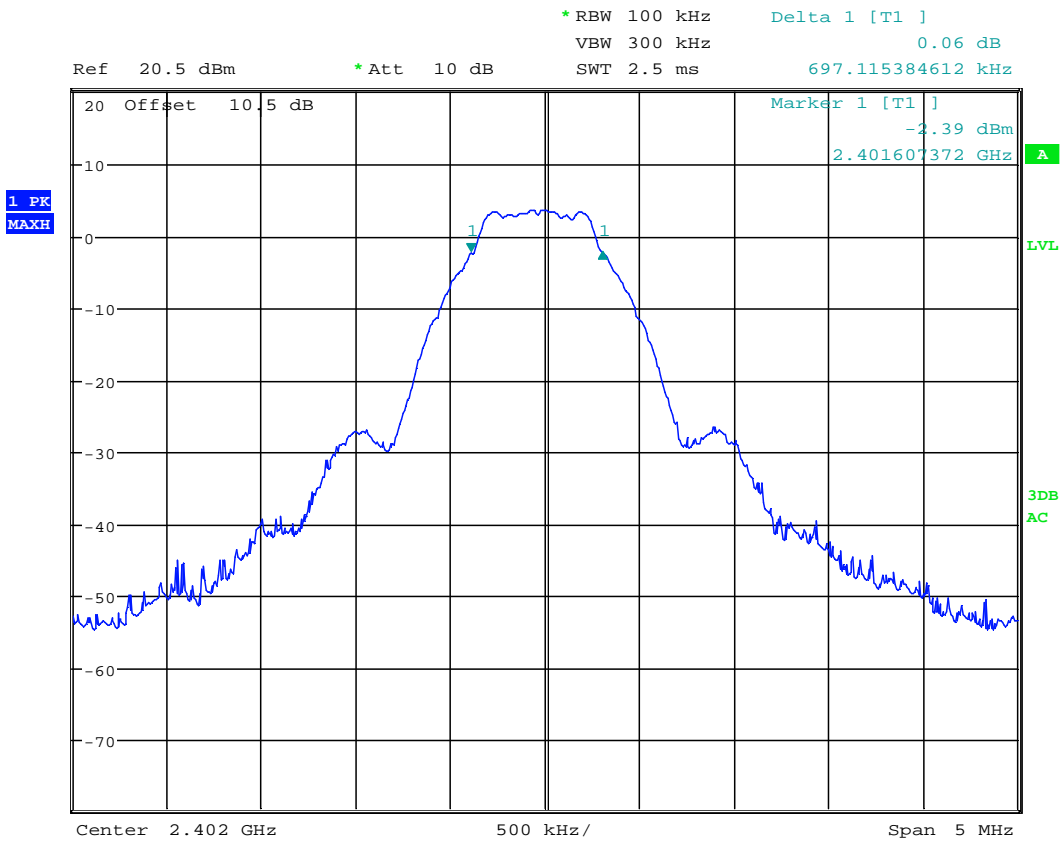
Measurement Data:

Measured 6 dB Bandwidth (kHz)		
2402MHz	2440 MHz	2480MHz
697.1	753.2	785.2

Tested according to KDB 558074 D01 DTS Meas Guidance v03r01, Section 8.1.

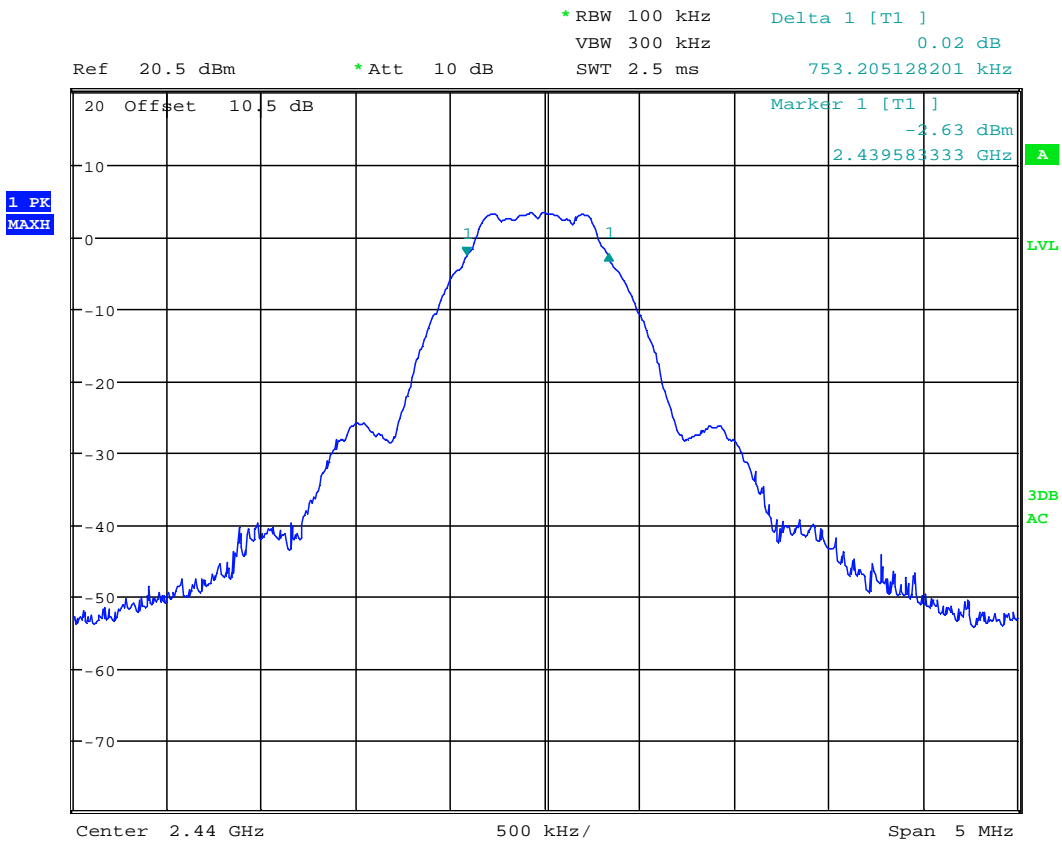
Requirements:

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



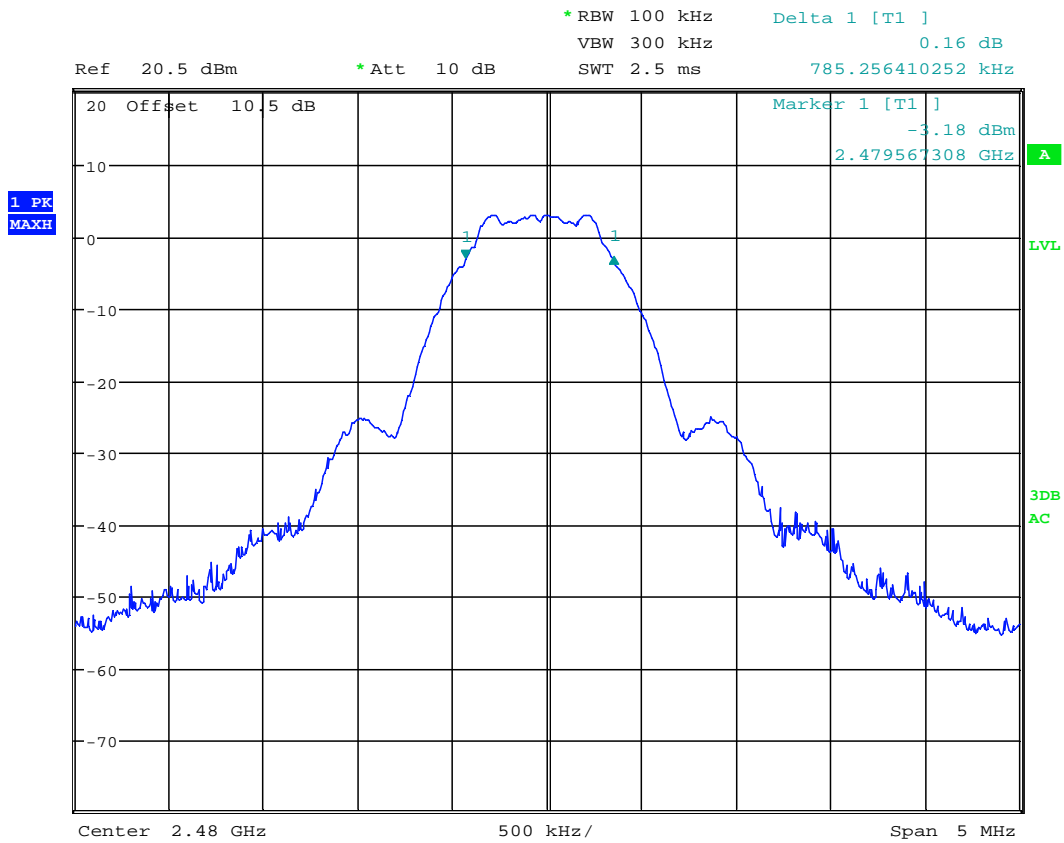
Date: 6.JAN.2014 16:36:59

6 dB Bandwidth at 2402 MHz



Date: 6.JAN.2014 16:48:56

6 dB Bandwidth at 2440 MHz



Date: 6.JAN.2014 16:42:47

6 dB Bandwidth at 2480 MHz

3.3 20 dB Bandwidth

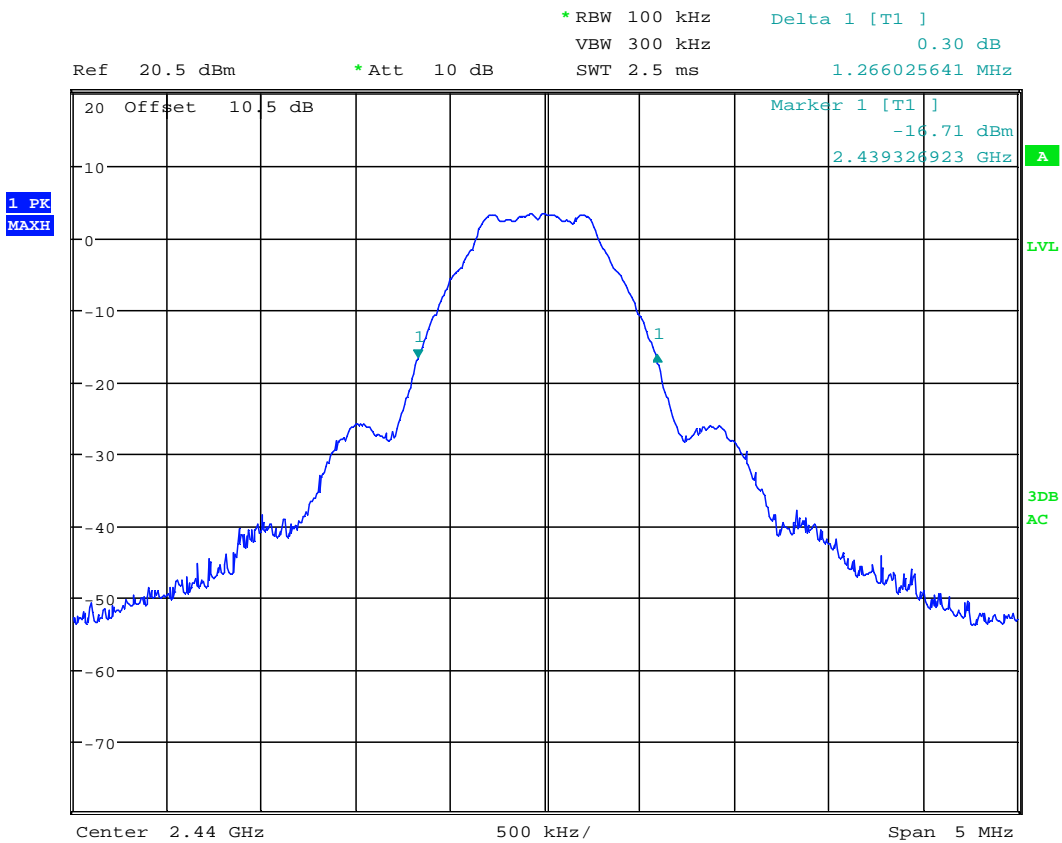
Test Performed By: G.Suhanthakumar	Date of Test: 06 Jan 2014
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Measurement Data:

Measured 20 dB Bandwidth (MHz)
2440 MHz
1.27

Requirements:

No requirements. Reported for information only.



Date: 6.JAN.2014 16:49:56

20 dB Bandwidth at 2440 MHz

3.4 Peak Power Output

Para. No.: 15.247 (b)

Test Performed By: G.Suhanthakumar	Date of Test: 02 Jan 2014
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Test Results: Complies

Measurement Data:

RF channel	2402 MHz	2440 MHz	2480 MHz
Measured Maxium Field strength (dB μ V/m) –VP	100.61	96.85	98.01
Calc. Radiated Power (dBm)	5.35	1.59	2.75
Calc. Radiated Power (mW)	3.42	1.44	1.88
Measured Conducted Power (dBm)	4.87	4.73	4.58
Measured Conducted Power (mW)	3.07	2.97	2.87
Calculated Antenna Gain (dBi)	0.48	-3.13	-1.82

Tested according to KDB 558074 D01 DTS Meas Guidance v03r01, Section 9.1.1.

EIRP is calculated according to KDB 558074 D01 DTS Meas Guidance v03r01, Section 12.2.2. (e)

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:

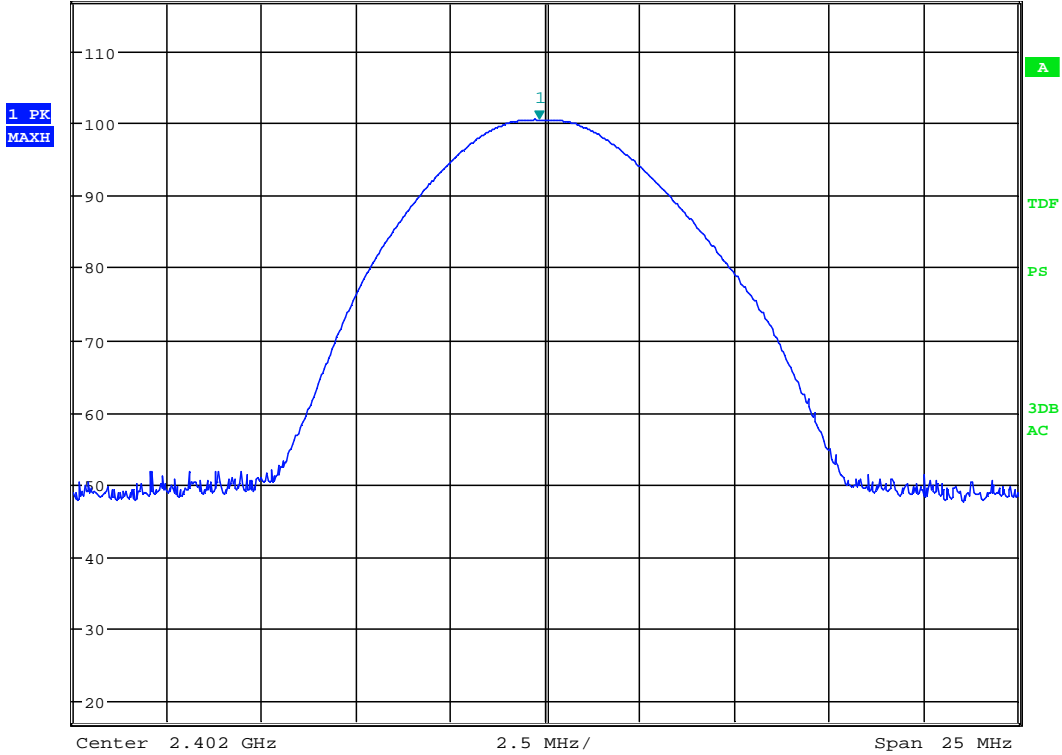
The maximum peak output power shall not exceed the following limits:

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.



*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 100.61 dBμV/m
 Ref 117 dBμV/m *Att 10 dB SWT 2.5 ms 2.401839744 GHz



Date: 2.JAN.2014 13:55:31

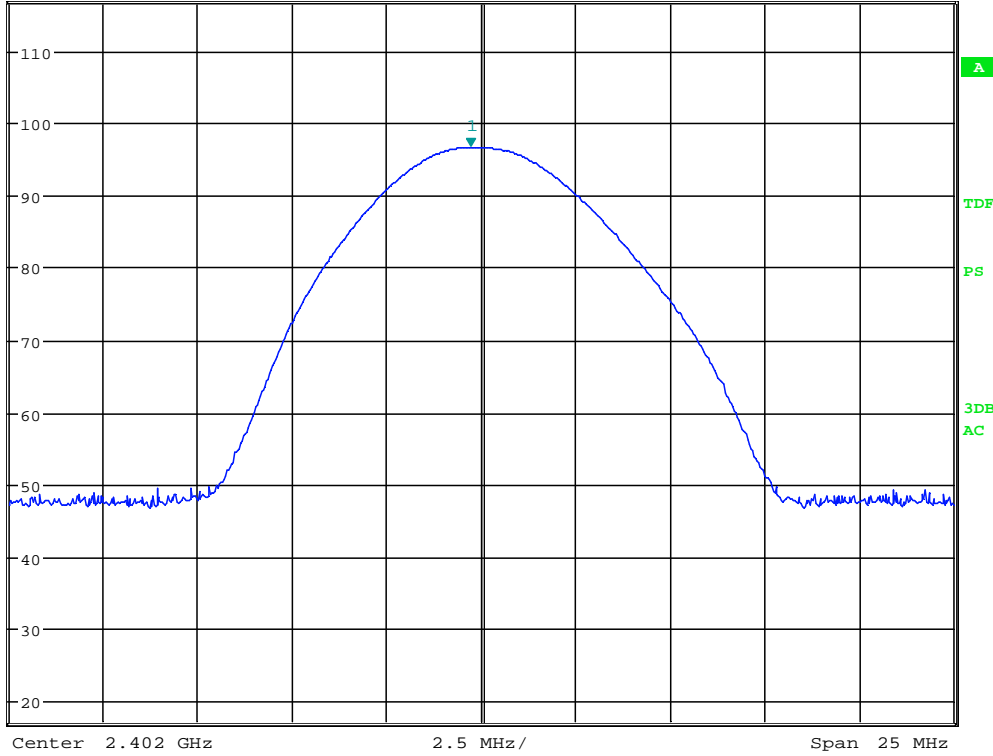
Radiated Field strength, VP , 2402 MHz,PK



*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 96.73 dBµV/m
 SWT 2.5 ms 2.401719551 GHz

Ref 117 dBµV/m *Att 10 dB

1 PK
 MAXH



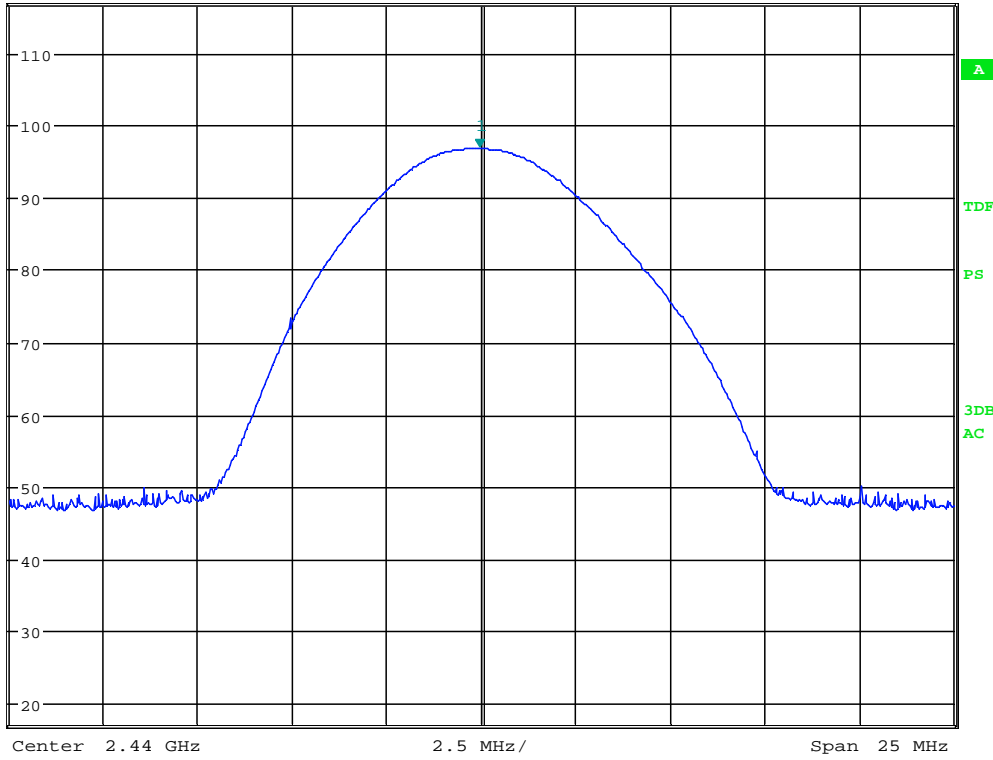
Date: 2.JAN.2014 13:56:41

Radiated field strength, HP, 2402 MHz,PK



Ref 117 dBµV/m *Att 10 dB *RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 96.85 dBµV/m
 SWT 2.5 ms 2.439959936 GHz

1 PK
 MAXH



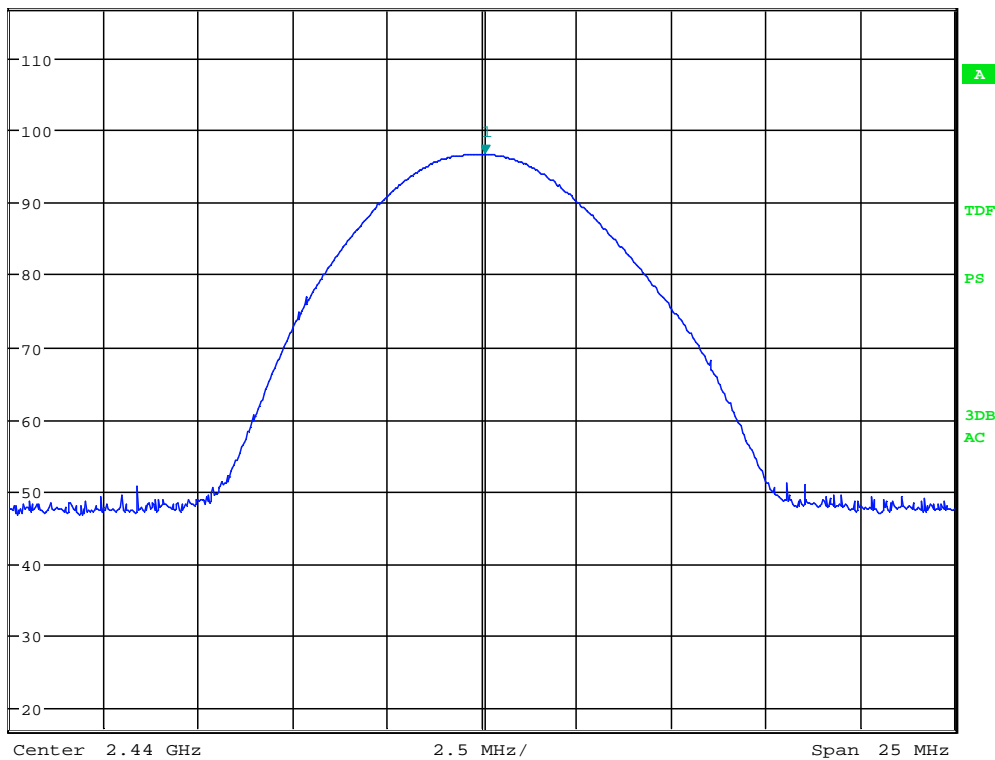
Date: 2.JAN.2014 14:04:41

Radiated field strength, VP, 2440 MHz,PK



Ref 117 dB μ V/m *Att 10 dB *RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 96.67 dB μ V/m
 SWT 2.5 ms 2.440080128 GHz

1 PK
 MAXH



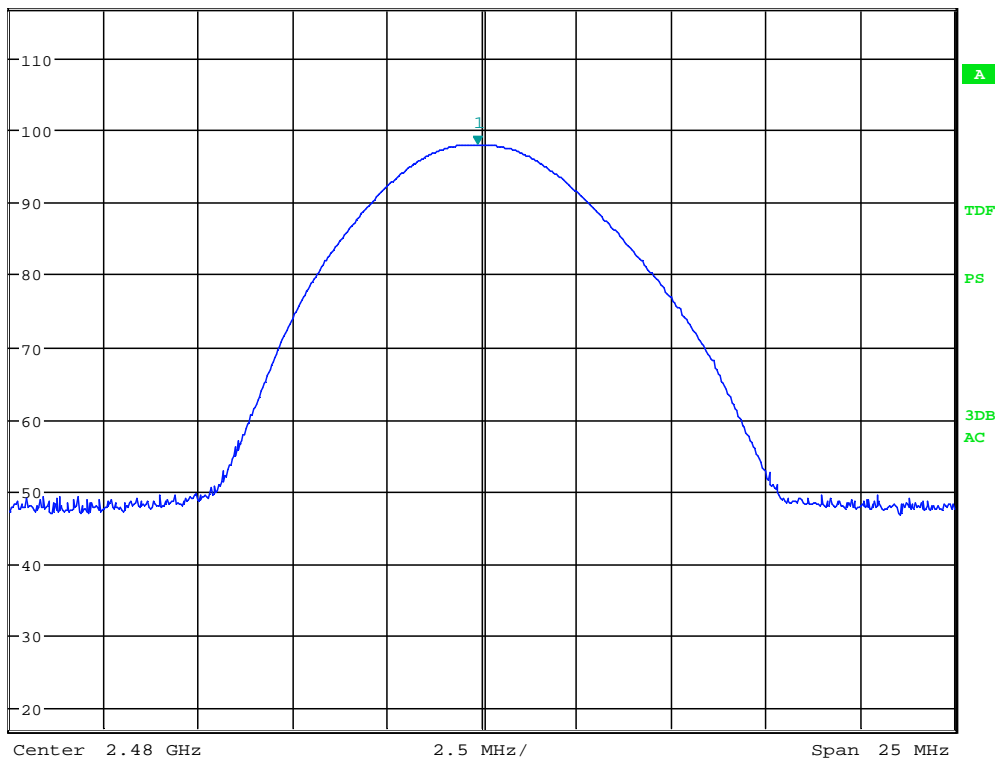
Date: 2.JAN.2014 14:04:01

Radiated field strength, HP, 2440 MHz,PK



Ref 117 dB μ V/m *Att 10 dB *RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 98.01 dB μ V/m
 SWT 2.5 ms 2.479879808 GHz

1 PK
 MAXH



Date: 2.JAN.2014 14:13:34

Radiated field strength, VP, 2480 MHz,PK

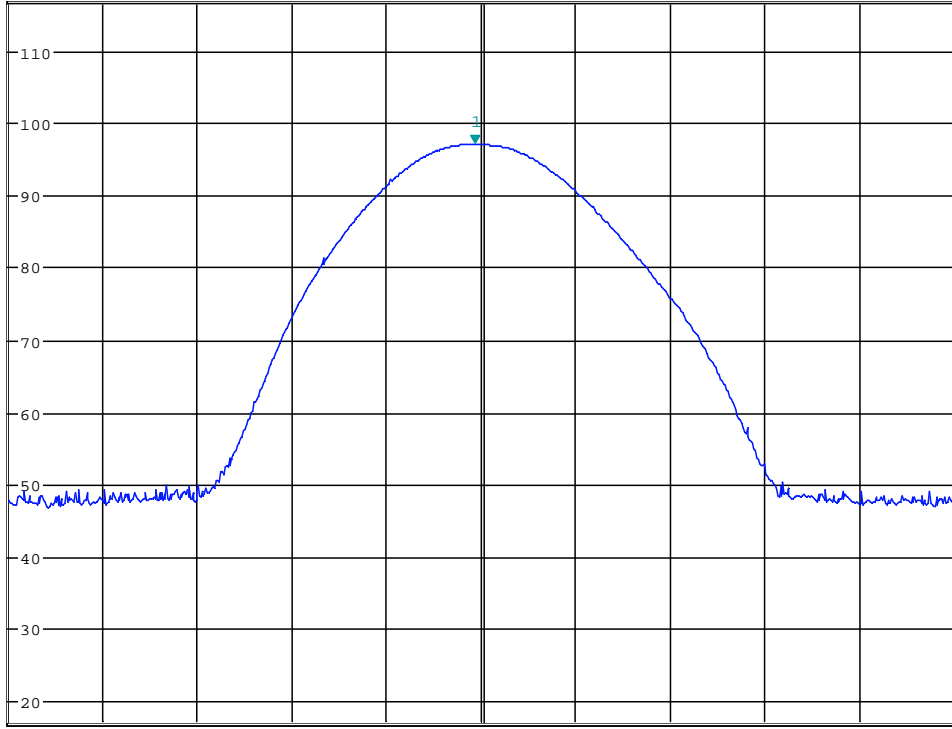


*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 97.09 dBμV/m
 SWT 2.5 ms 2.479839744 GHz

Ref 117 dBμV/m

*Att 10 dB

1 PK
 MAXH



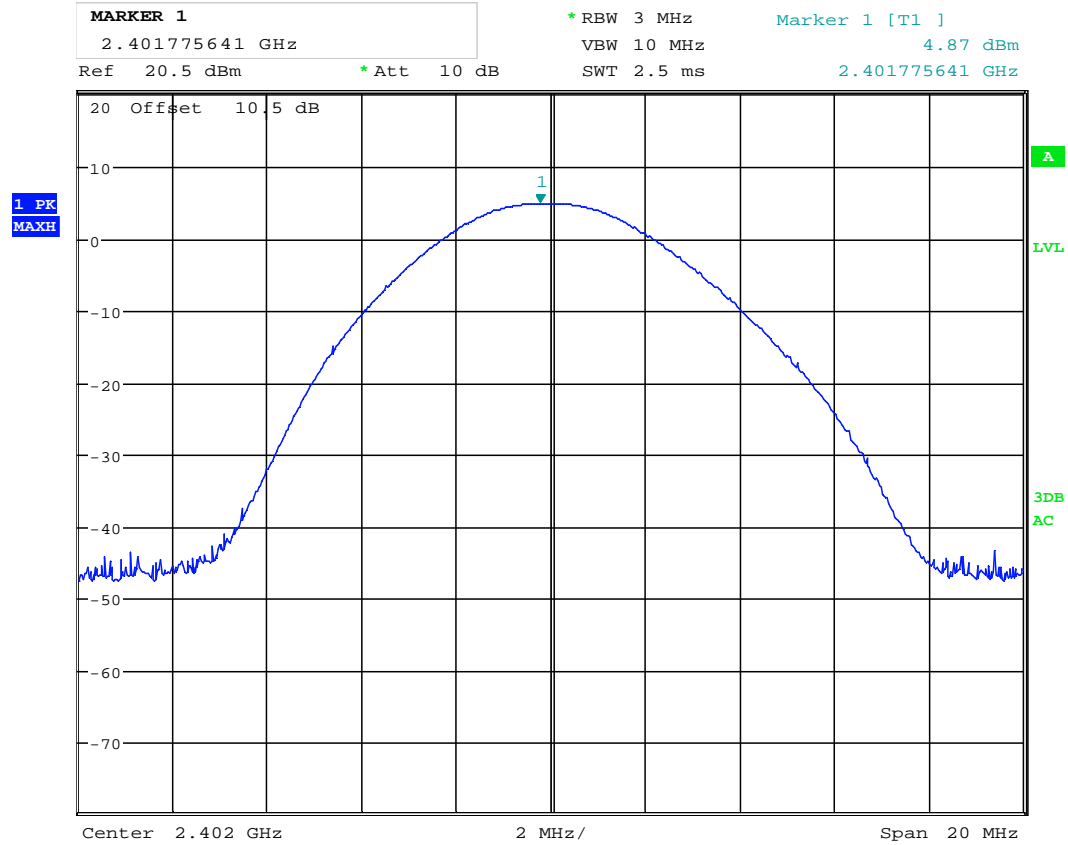
Center 2.48 GHz

2.5 MHz/

Span 25 MHz

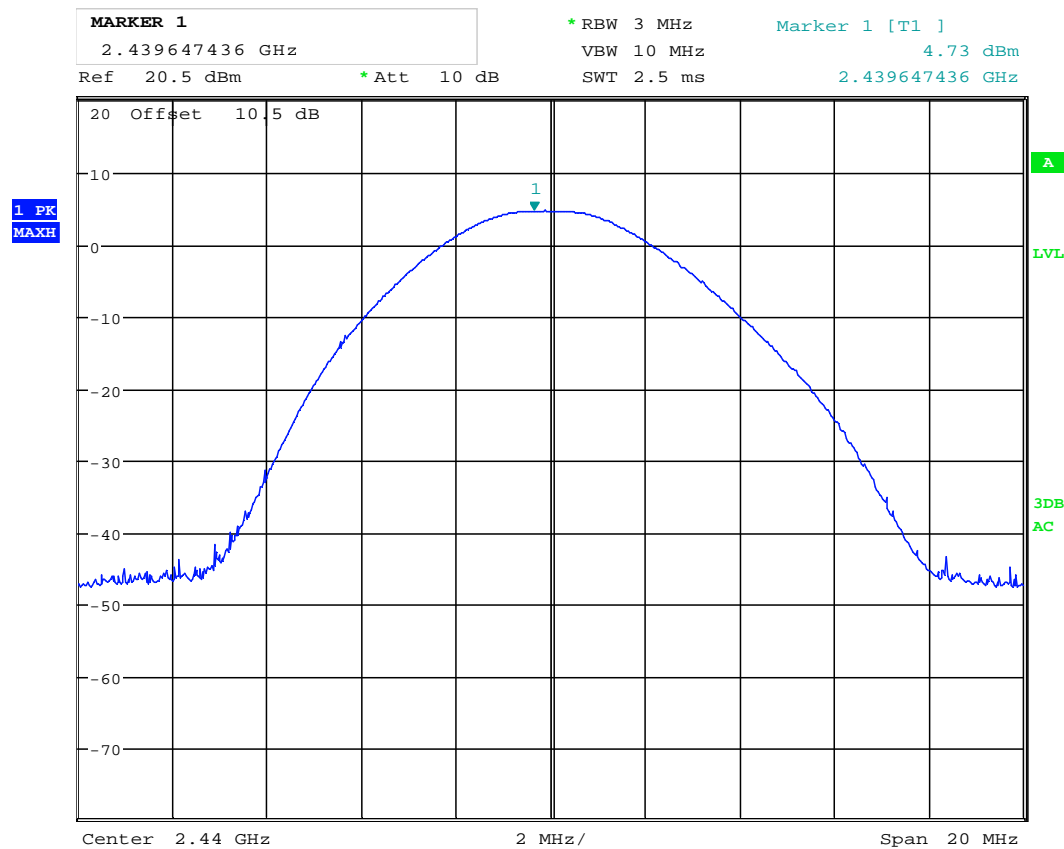
Date: 2.JAN.2014 14:12:55

Radiated field strength, HP, 2480 MHz,PK



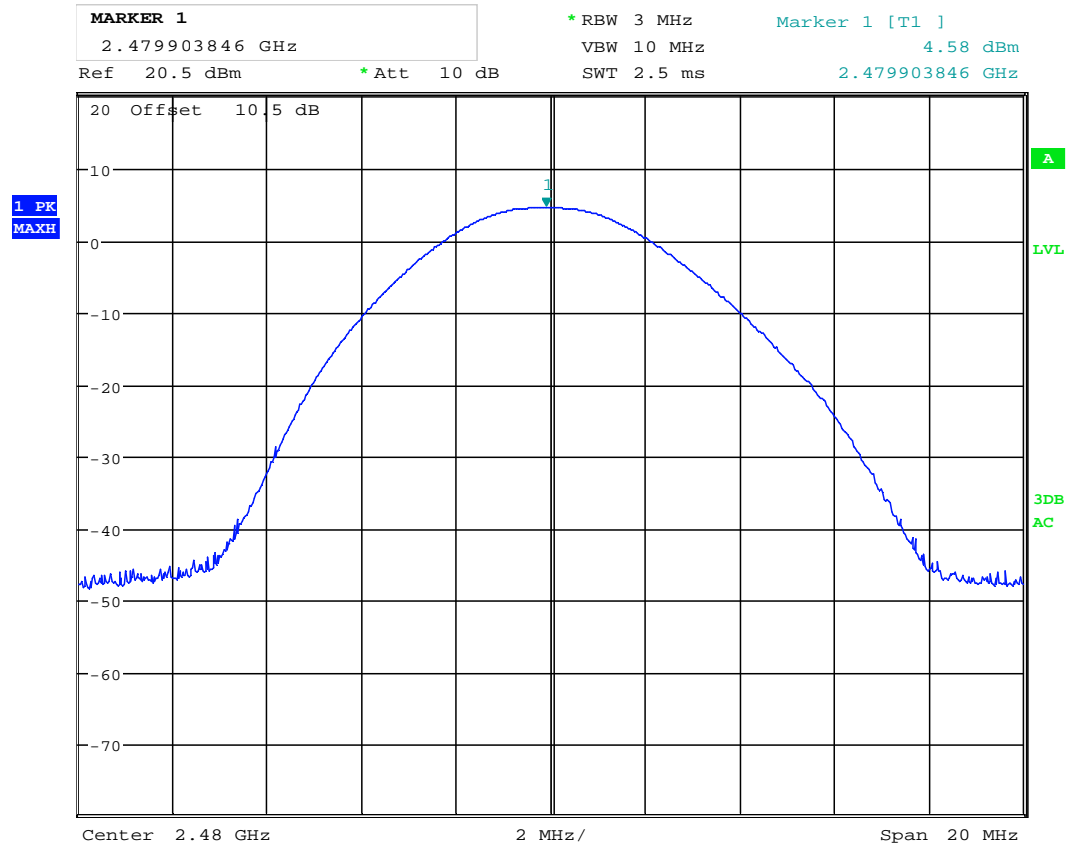
Date: 6.JAN.2014 16:38:13

Conducted power – 2402MHz,PK



Date: 6.JAN.2014 16:47:52

Conducted power – 2440MHz,PK



Date: 6.JAN.2014 16:41:48

Conducted power – 2480MHz, PK

3.5 Spurious Emissions (Radiated)

Para. No.: 15.247 (c)

Test Performed By: G.Suhanthakumar	Date of Test: 02 jan 2014
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Test Results: Complies

Measurement Data:

Band-edge, @3m

Frequency	Measured Field Strength @3m, dB μ V/m	Detector	Limit dB μ V/m	Margin dB
2.39 GHz	46.54	PK	74	27.46
	41.34	AV	54	12.66
2.4835 GHz	57.56	PK	74	16.44
	33.40	AV	54	20.6

Tested according to KDB 558074 D01 DTS Measurement Guidance v03r01, Section 13.1 & 13.3.2.

100% duty cycle

See attached plots.

RF conducted spurious emission

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

All emissions are more than 20dB below carrier.

See attached plots.

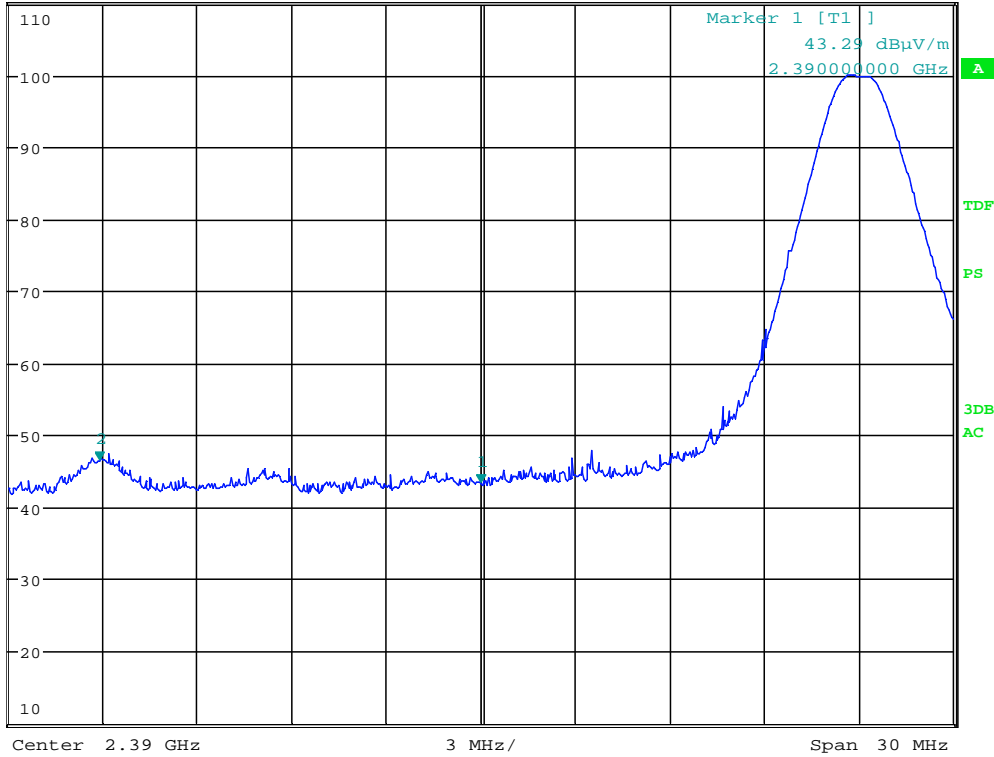


MARKER 2
 2.377884615 GHz
 Ref 110 dBμV/m *Att 10 dB

*RBW 1 MHz
 VBW 3 MHz
 SWT 2.5 ms

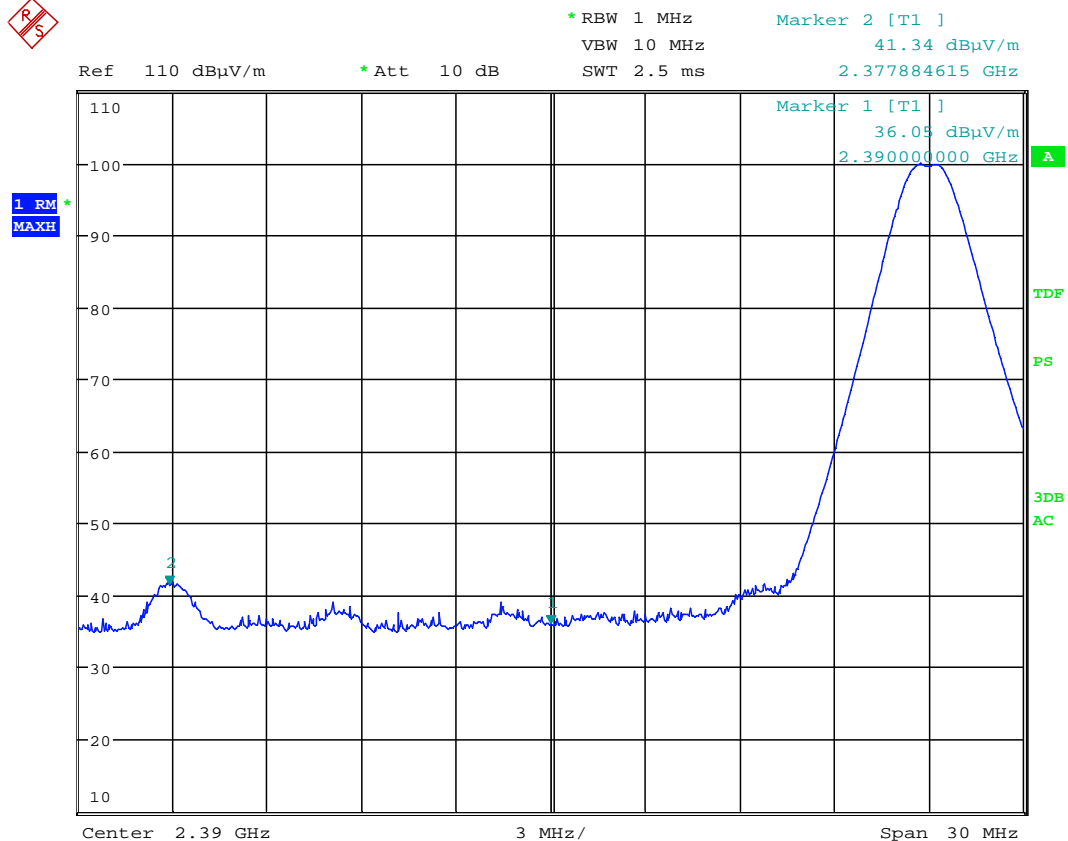
Marker 2 [T1]
 46.54 dBμV/m
 2.377884615 GHz

1 PK
 MAXH



Date: 2.JAN.2014 14:53:38

Band Edge, 2390 MHz, Peak Detector



Date: 2.JAN.2014 14:54:06

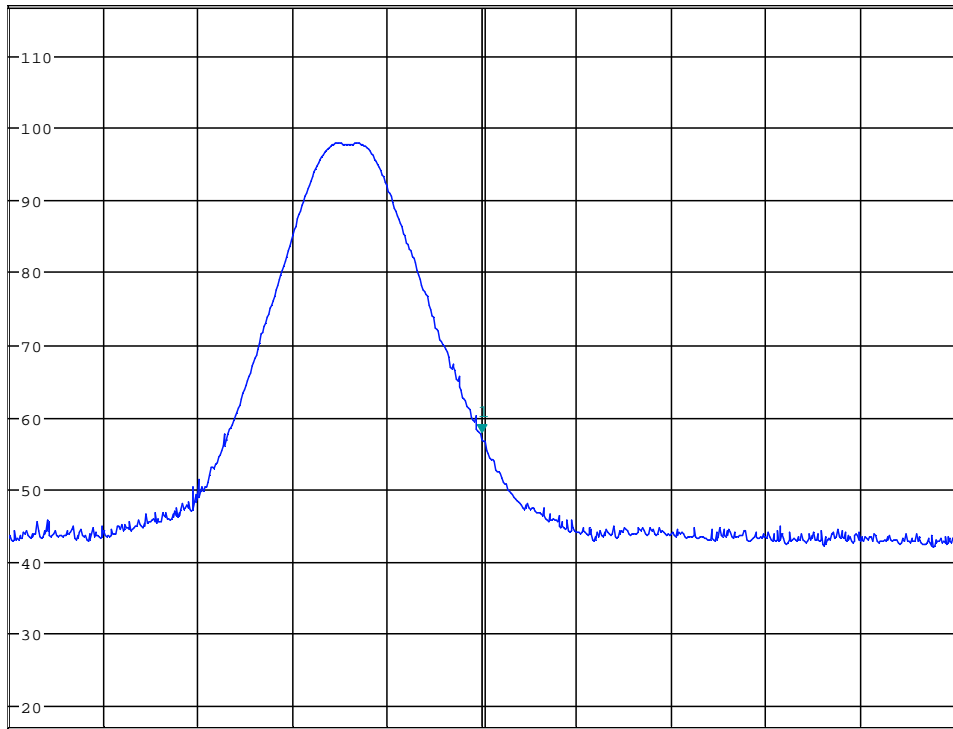
Band Edge, 2390 MHz, Average Detector



*RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 57.56 dBμV/m
 SWT 2.5 ms 2.483485577 GHz

Ref 117 dBμV/m *Att 10 dB

1 PK
 MAXH



Center 2.4835 GHz 2.5 MHz/ Span 25 MHz

Date: 2.JAN.2014 14:33:11

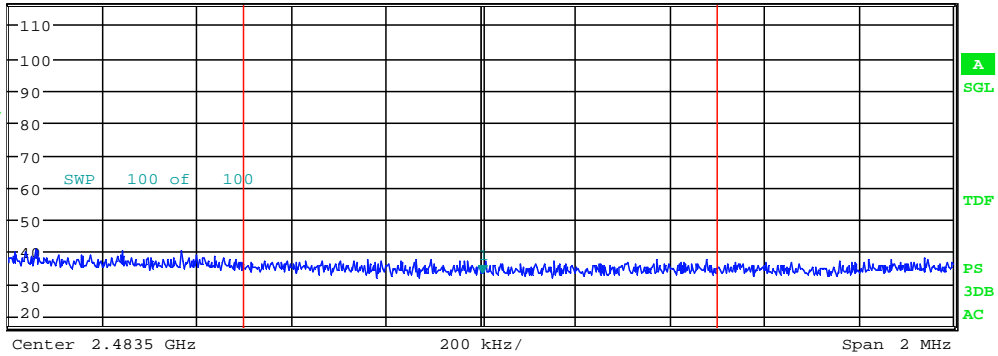
Band Edge, 2483.5 MHz, Peak Detector



MARKER 1
 2.483504713 GHz

* RBW 100 kHz
 VBW 1 MHz
 * SWT 10 ms
 Marker 1 [T1]
 33.40 dBuV/m
 2.483504713 GHz

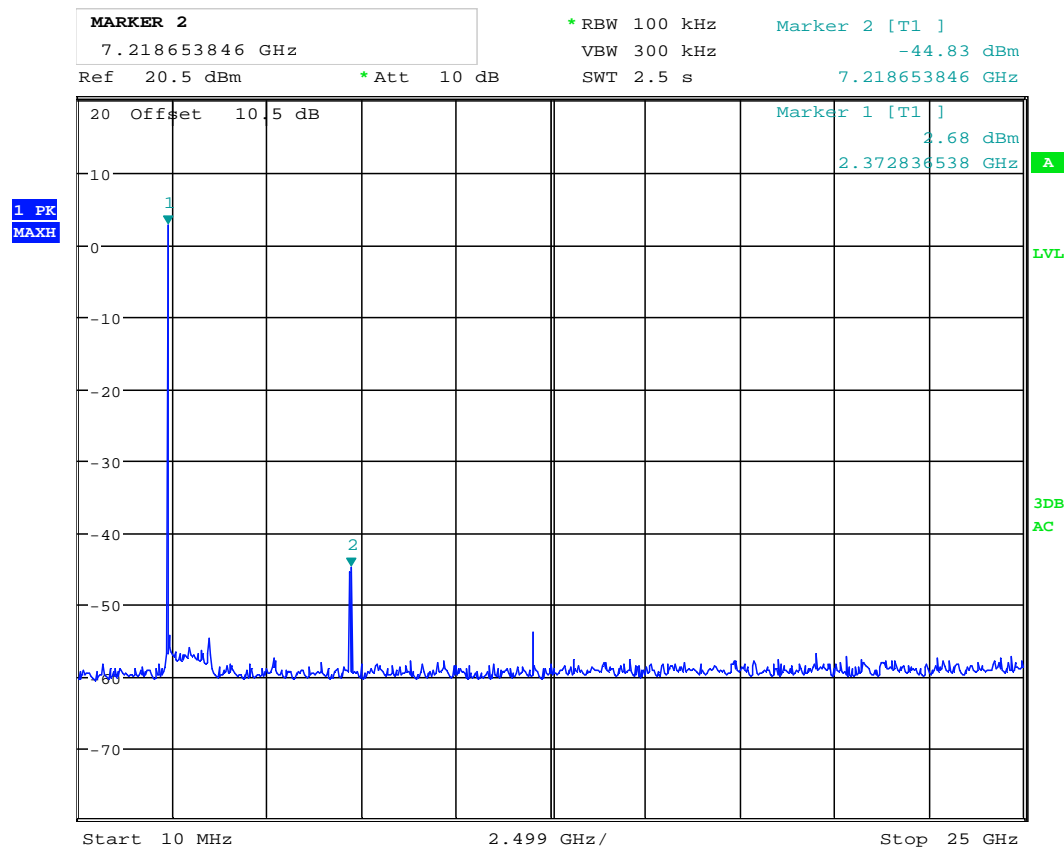
1 RM *
 MAXH



Tx Channel
 Bandwidth 1 MHz Power 44.43 dBuV/m

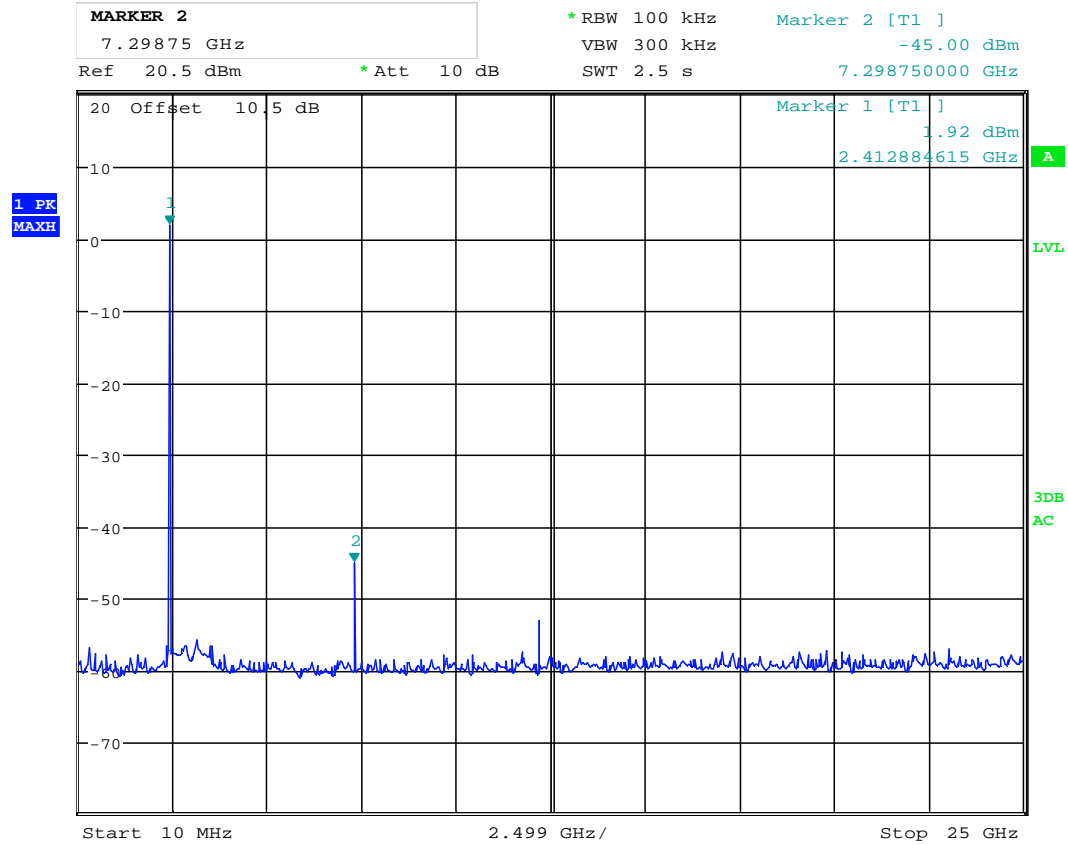
Date: 2.JAN.2014 14:36:44

Band edge power, 2483.5MHz, AV detector



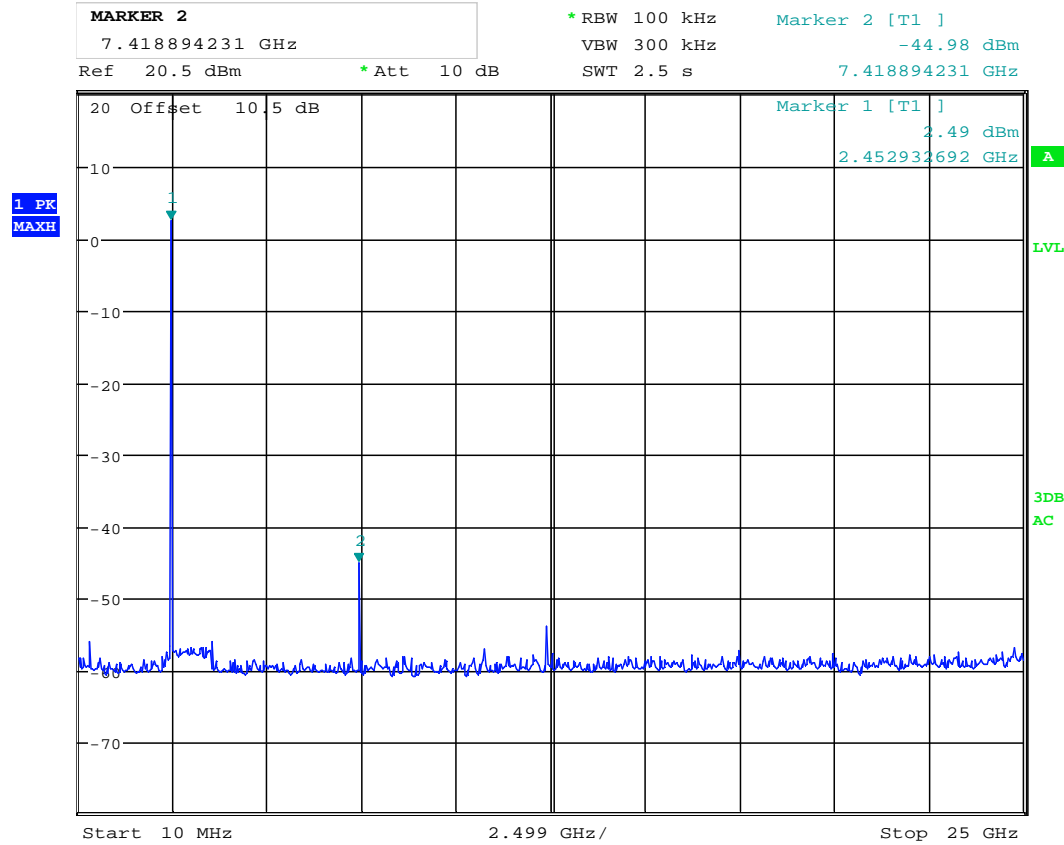
Date: 6.JAN.2014 16:39:26

Conducted spurious emission 10MHz – 25GHz - ch2402MHz



Date: 6.JAN.2014 16:50:29

Conducted spurious emission 10MHz – 25GHz - ch2440MHz



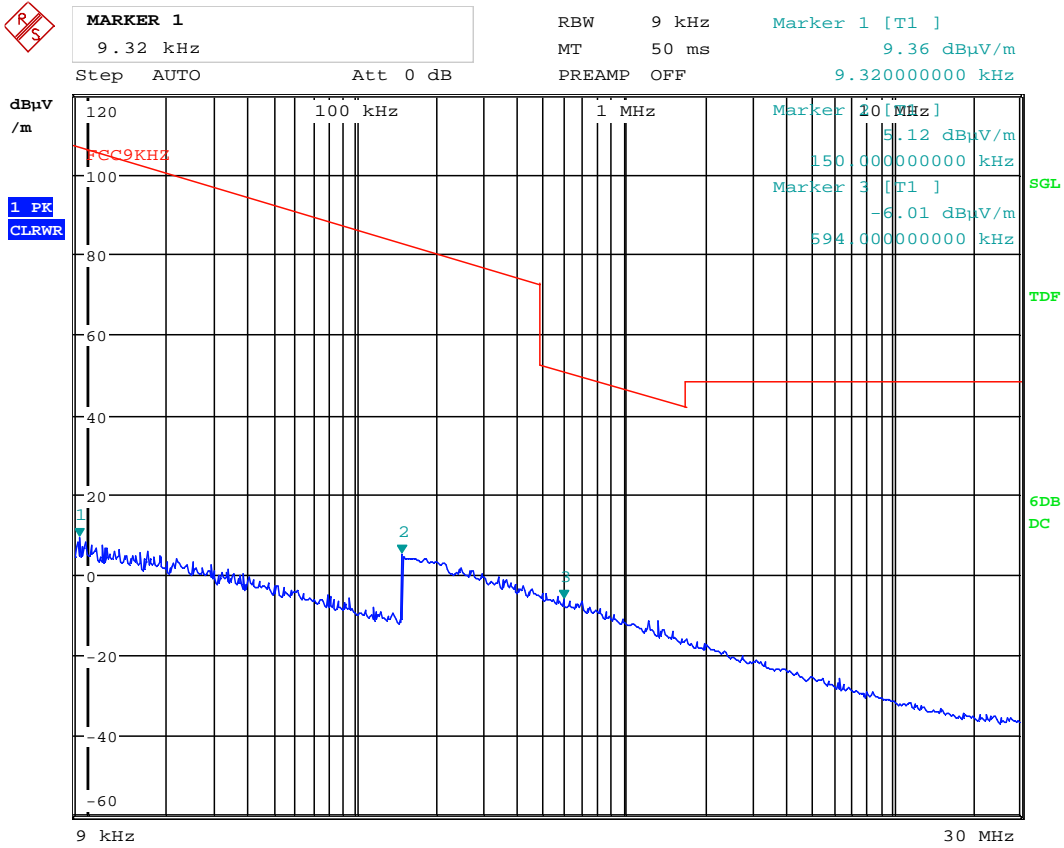
Date: 6.JAN.2014 16:41:14

Conducted spurious emission 10MHz – 25GHz - ch2480MHz

Radiated emissions 9kHz - 30 MHz.

Detector: Quasi-Peak

Measuring distance 10 m.



Date: 3.JAN.2014 12:24:52

Radiated Emissions, 9 kHz – 30 MHz @10m

Radiated emission 30 – 1000 MHz.

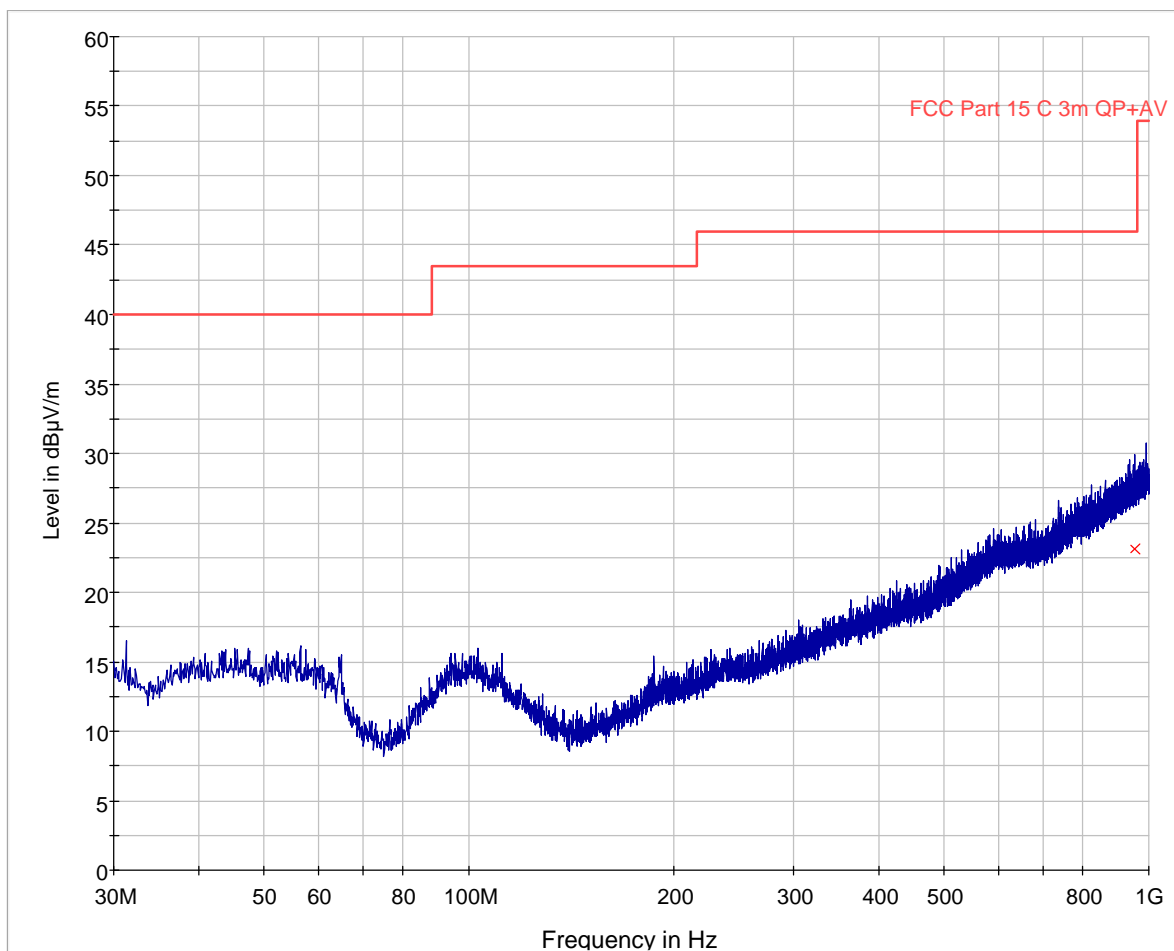
Detector: Peak

Measuring distance at 3m.

All values are below the limit even when measured with Peak Detector, RBW=100kHz, VBW=300kHz.

See attached plot.

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
953.612769	23.2	1000.0	120.000	228.0	V	4.0	3.0	22.8	46.0	



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

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 μ V/m	Detector	Limit dB μ V/m	Margin dB
4803	47.83	Pk	74	26.17
4880	46.79	Pk	74	27.21
4960	45.85	Pk	74	28.15

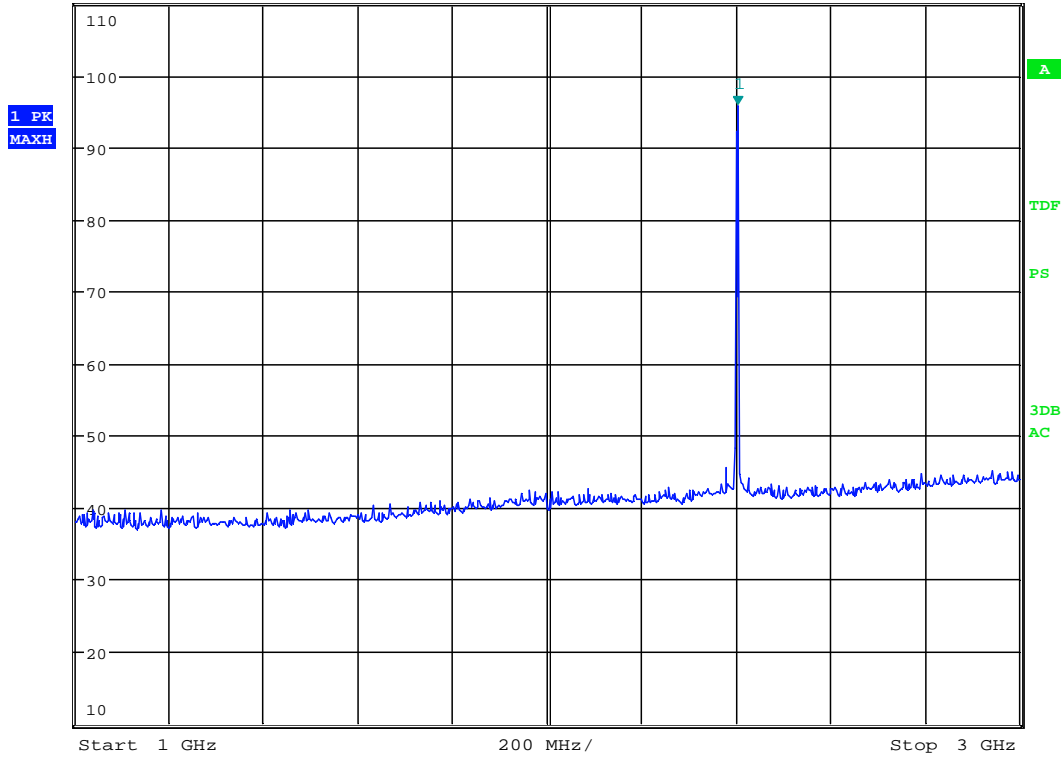
Average detector

Frequency MHz	Field Strength @3m dB μ V/m	Detector	Limit dB μ V/m	Margin dB
4804	39.11	AV	54	14.89
4880	38.52	AV	54	15.48
4960	38.13	AV	54	15.87

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



Ref 110 dBµV/m * Att 10 dB * RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 95.84 dBµV/m
 SWT 5 ms 2.403846154 GHz

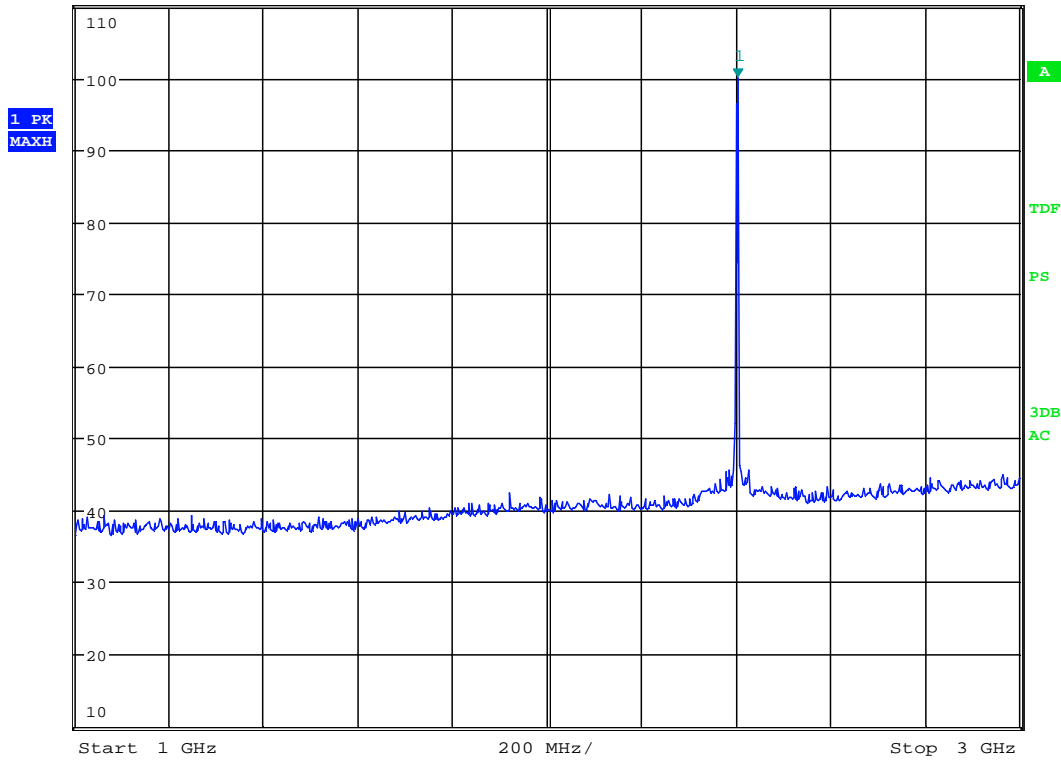


Date: 2.JAN.2014 14:56:23

Radiated Emissions ch. 2402 MHz, 1 – 3 GHz, VP, @3m – Pre-scan with Peak detector



MARKER 1	* RBW 1 MHz	Marker 1 [T1]
2.403846154 GHz	VBW 3 MHz	100.09 dBµV/m
Ref 110 dBµV/m	SWT 5 ms	2.403846154 GHz
* Att 10 dB		

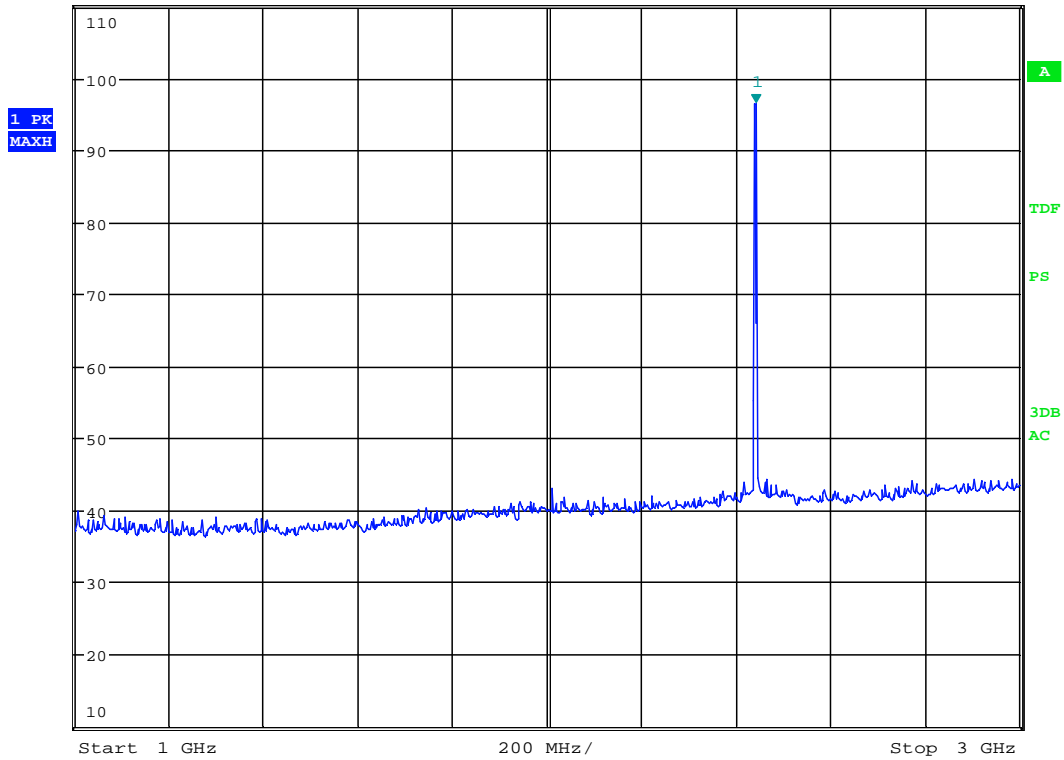


Date: 2.JAN.2014 14:54:45

Radiated Emissions ch. 2402 MHz, 1 – 3 GHz, HP, @3m – Pre-scan with Peak detector



MARKER 1
 2.442307692 GHz
 Ref 110 dBµV/m * Att 10 dB
 * RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 96.51 dBµV/m
 SWT 5 ms 2.442307692 GHz



Date: 2.JAN.2014 15:03:28

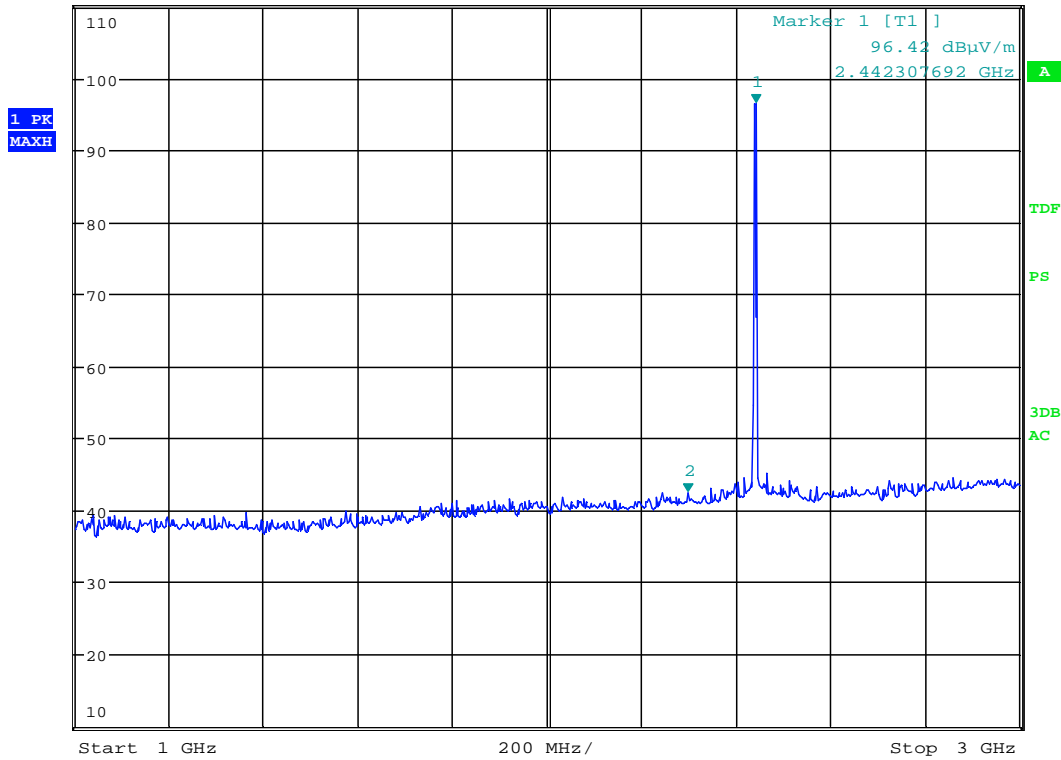
Radiated Emissions ch. 2440 MHz, 1 – 3 GHz, VP, @3m – Pre-scan with Peak detector



MARKER 2
 2.298076923 GHz
 Ref 110 dBuV/m * Att 10 dB

* RBW 1 MHz
 VBW 3 MHz
 SWT 5 ms

Marker 2 [T1]
 42.43 dBuV/m
 2.298076923 GHz



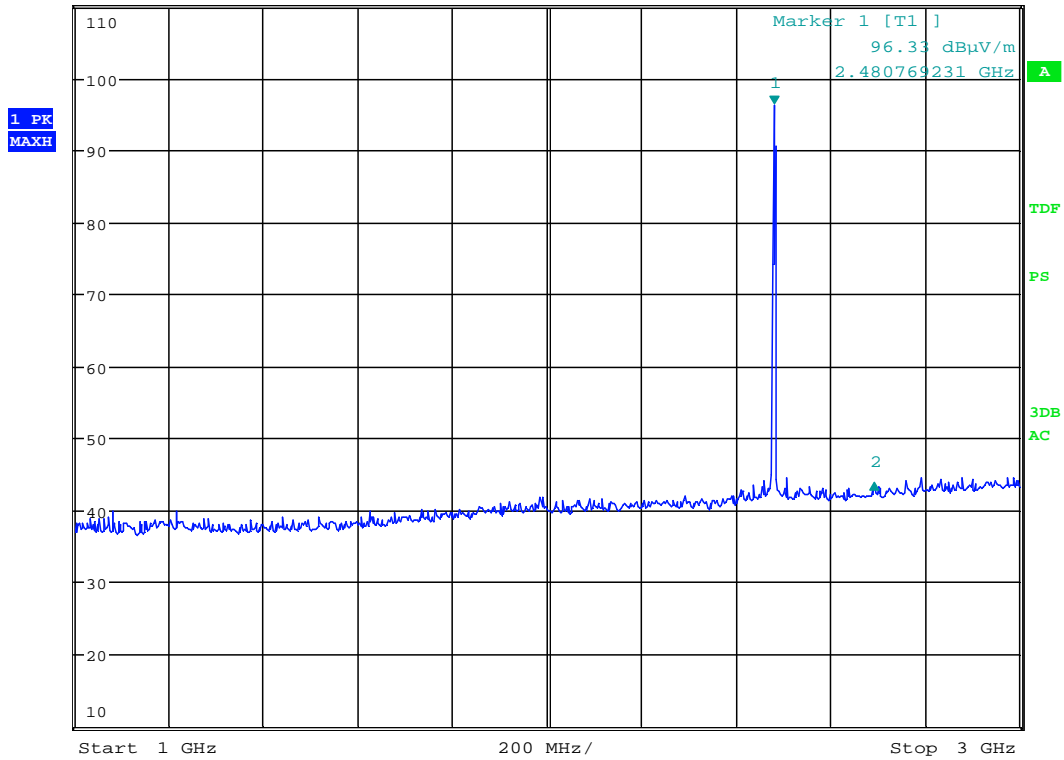
Date: 2.JAN.2014 15:04:20

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



DELTA MARKER 2
 211.5384615 MHz
 Ref 110 dBuV/m * Att 10 dB

* RBW 1 MHz Delta 2 [T1]
 VBW 3 MHz -52.60 dB
 SWT 5 ms 211.538461538 MHz

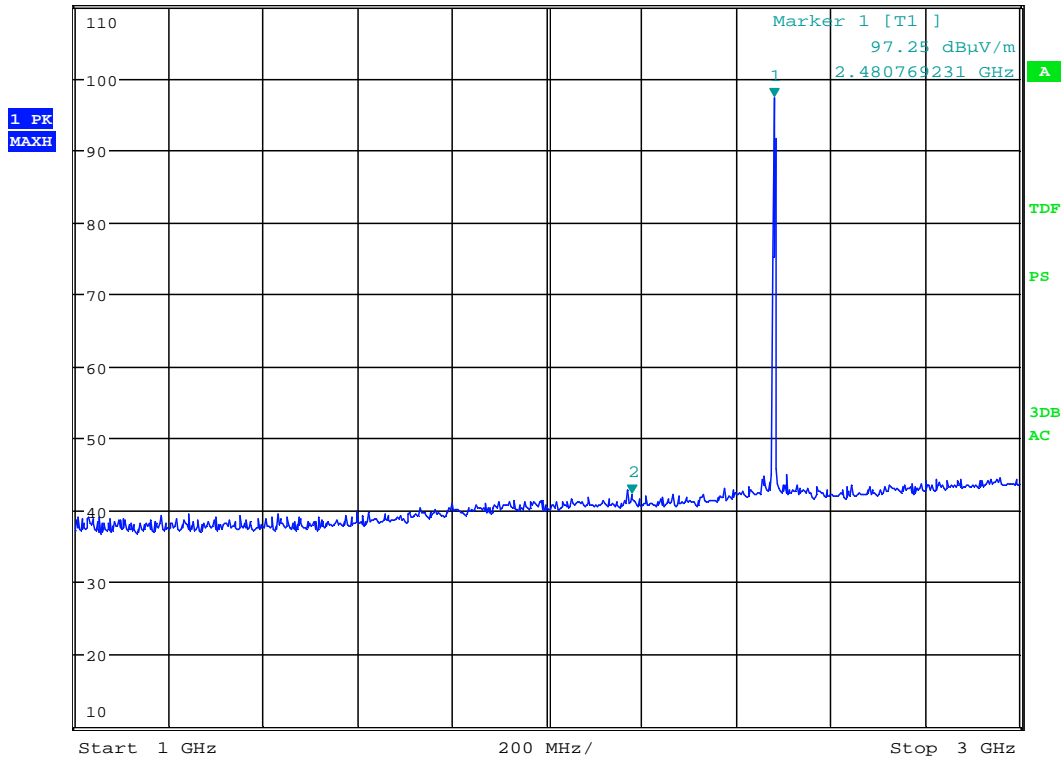


Date: 2.JAN.2014 15:07:56

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



MARKER 2
 2.179487179 GHz
 Ref 110 dBuV/m * Att 10 dB
 * RBW 1 MHz Marker 2 [T1]
 VBW 3 MHz 42.31 dBuV/m
 SWT 5 ms 2.179487179 GHz

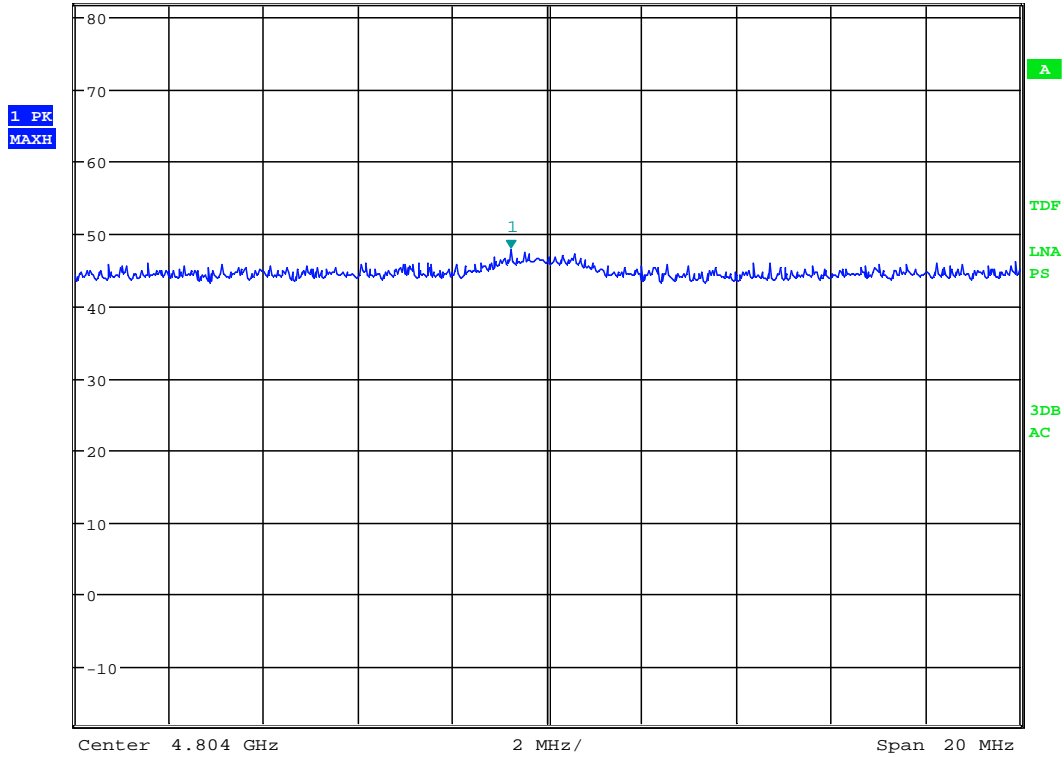


Date: 2.JAN.2014 15:07:26

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



* RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 47.83 dBµV/m
 Ref 82 dBµV/m * Att 10 dB SWT 20 ms 4.803230769 GHz

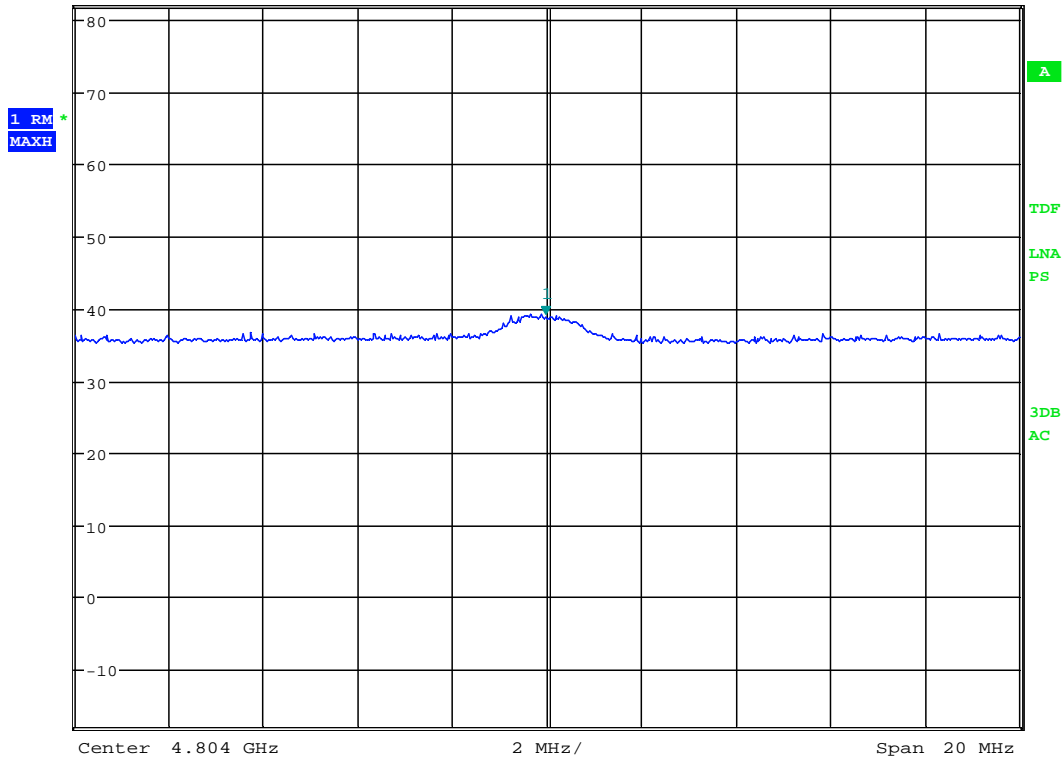


Date: 2.JAN.2014 15:46:01

2nd harmonic , ch2402MHz – HP, PK detector



MARKER 1
 4.803967949 GHz
 Ref 82 dBµV/m * Att 10 dB * RBW 1 MHz Marker 1 [T1]
 VBW 10 MHz 39.11 dBµV/m
 SWT 20 ms 4.803967949 GHz



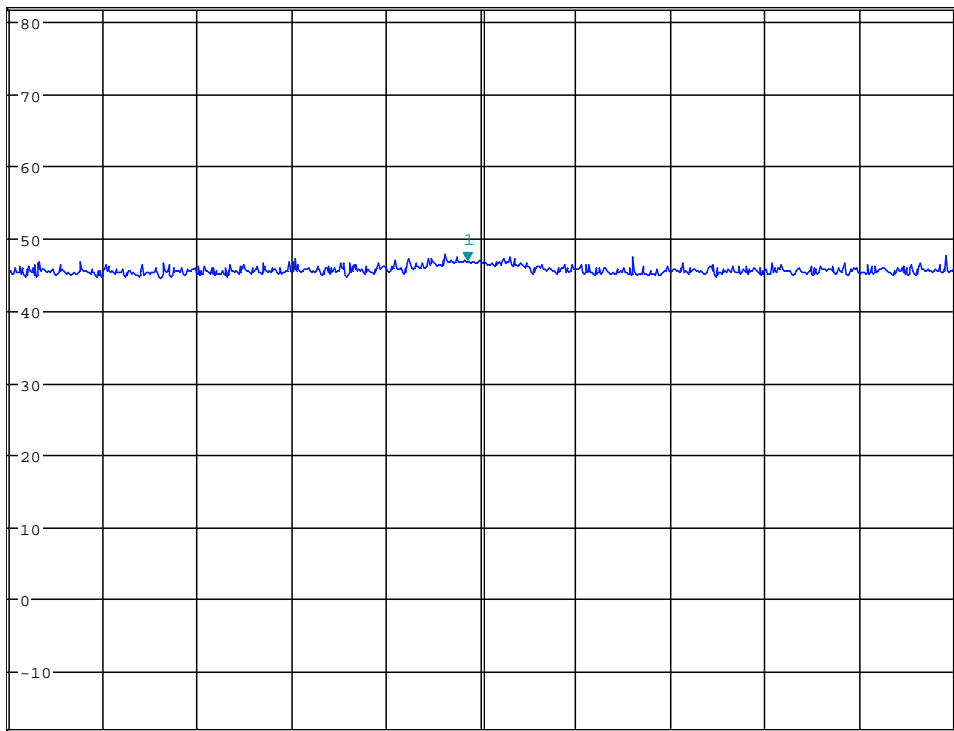
Date: 2.JAN.2014 15:47:18

2nd harmonic , ch2402MHz – HP, AV detector



MARKER 1	* RBW 1 MHz	Marker 1 [T1]
4.879711538 GHz	VBW 3 MHz	46.79 dBµV/m
Ref 82 dBµV/m	SWT 20 ms	4.879711538 GHz
* Att 10 dB		

1 PK
MAXH



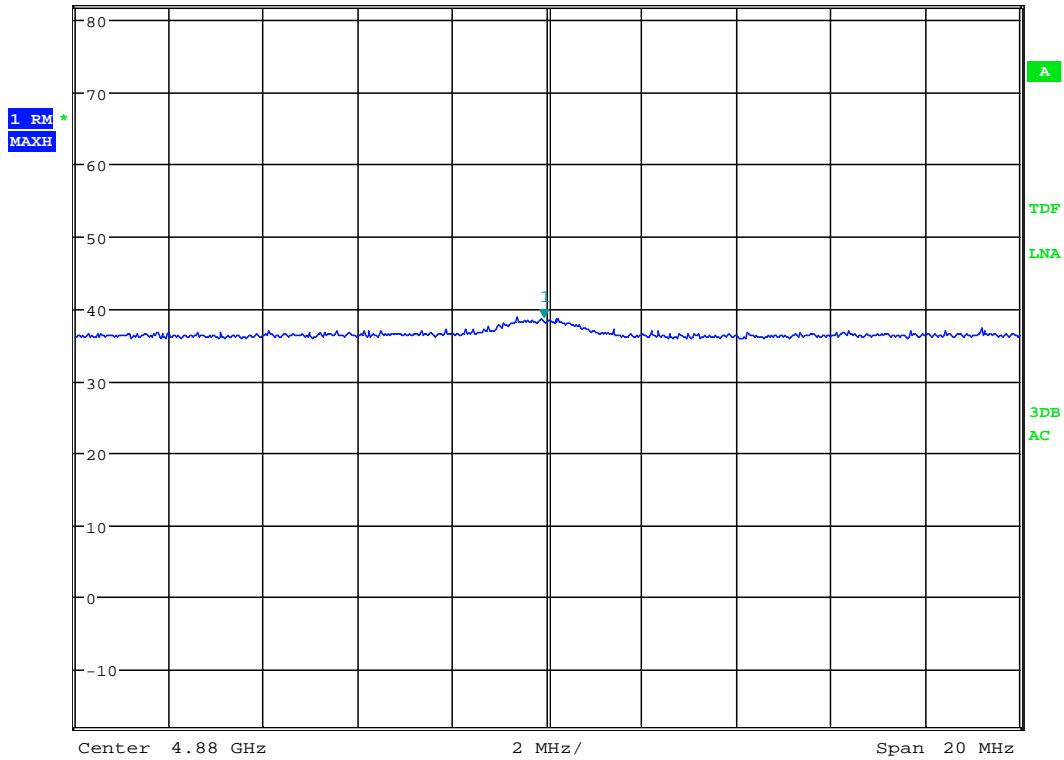
Center 4.88 GHz 2 MHz/ Span 20 MHz

Date: 2.JAN.2014 15:54:47

2nd harmonic , ch2440MHz – HP, PK detector



MARKER 1
 4.879935897 GHz
 Ref 82 dBµV/m * Att 10 dB * RBW 1 MHz Marker 1 [T1]
 VBW 10 MHz 38.52 dBµV/m
 SWT 20 ms 4.879935897 GHz



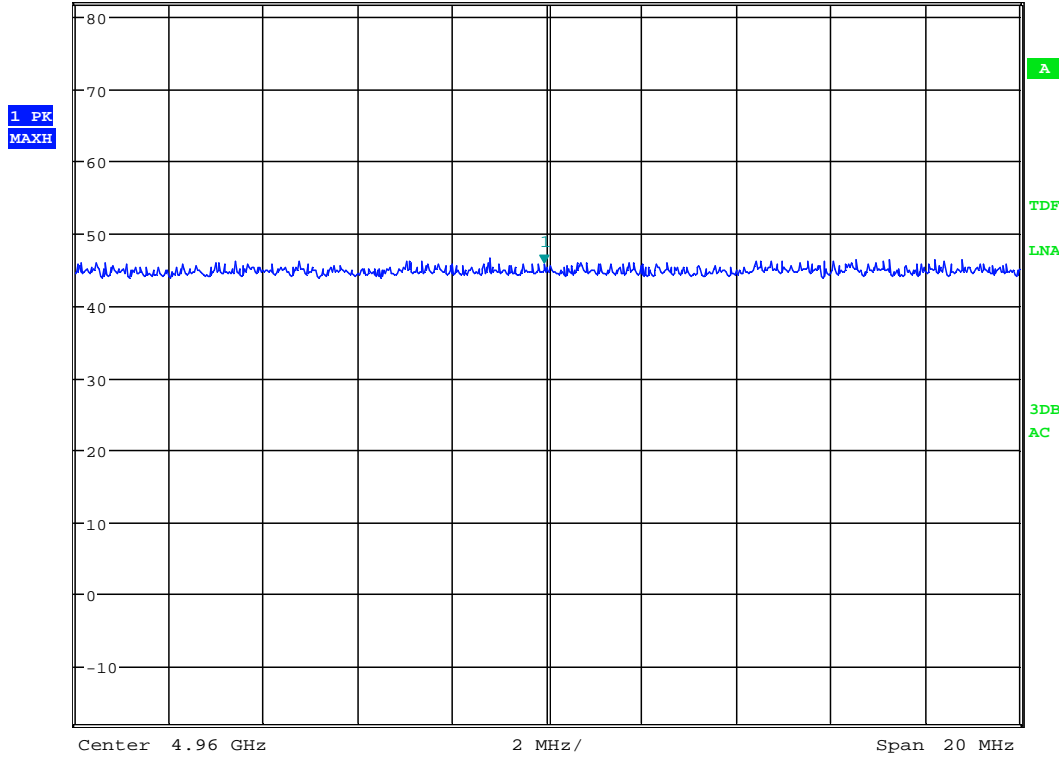
Date: 2.JAN.2014 15:55:30

2nd harmonic , ch2440MHz – HP, AV detector



* RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 45.85 dBμV/m
 SWT 20 ms 4.959935897 GHz

Ref 82 dBμV/m * Att 10 dB

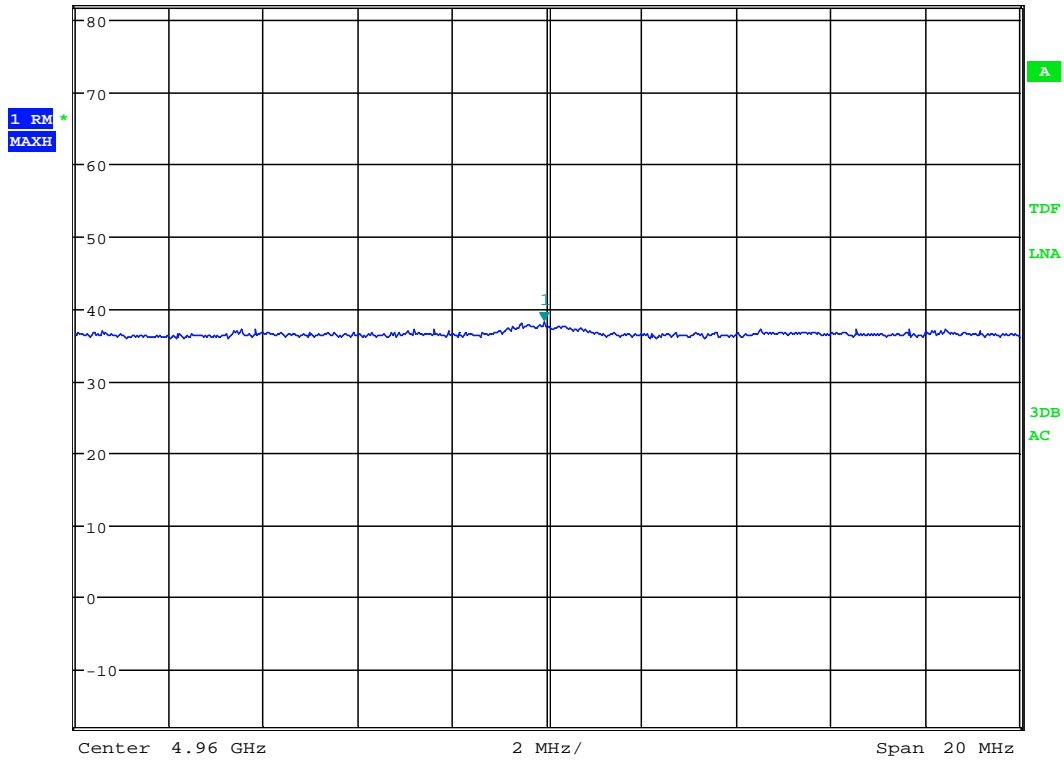


Date: 2.JAN.2014 15:58:47

2nd harmonic , ch2480MHz – HP, PK detector



MARKER 1	* RBW 1 MHz	Marker 1 [T1]
4.959935897 GHz	VBW 10 MHz	38.13 dBµV/m
Ref 82 dBµV/m	* Att 10 dB	SWT 20 ms
		4.959935897 GHz

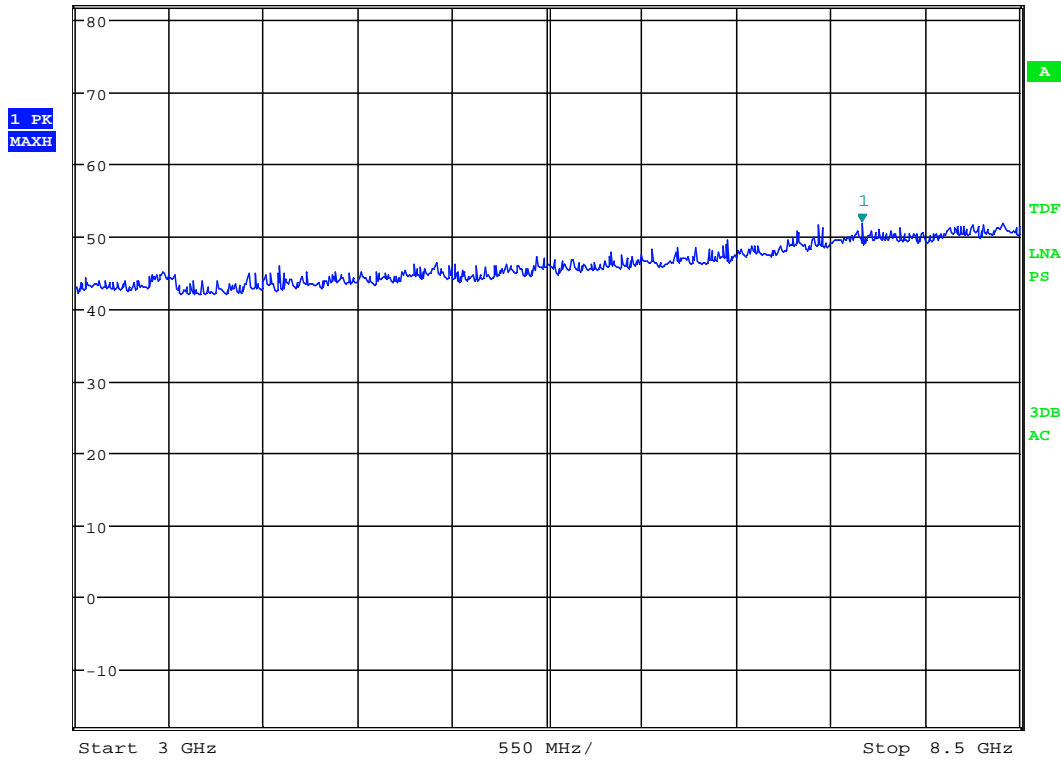


Date: 2.JAN.2014 15:58:27

2nd harmonic , ch2480MHz – HP, AV detector



MARKER 1	* RBW 1 MHz	Marker 1 [T1]
7.583333333 GHz	VBW 3 MHz	51.90 dBµV/m
Ref 82 dBµV/m	SWT 35 ms	7.583333333 GHz
* Att 10 dB		

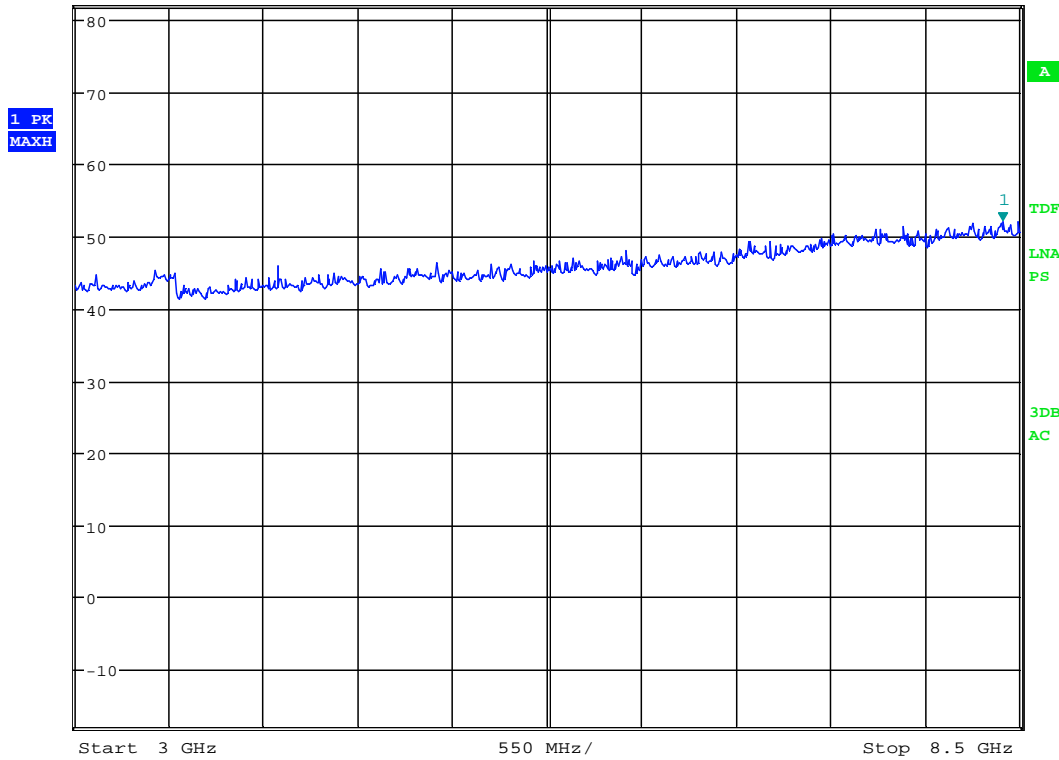


Date: 2.JAN.2014 15:49:27

Radiated Emissions ch. 2402 MHz, 3 – 8.5 GHz, VP, @3m – Pre-scan with Peak detector



MARKER 1
8.403044872 GHz
Ref 82 dB μ V/m * Att 10 dB * RBW 1 MHz VBW 3 MHz SWT 35 ms
Marker 1 [T1]
52.02 dB μ V/m
8.403044872 GHz

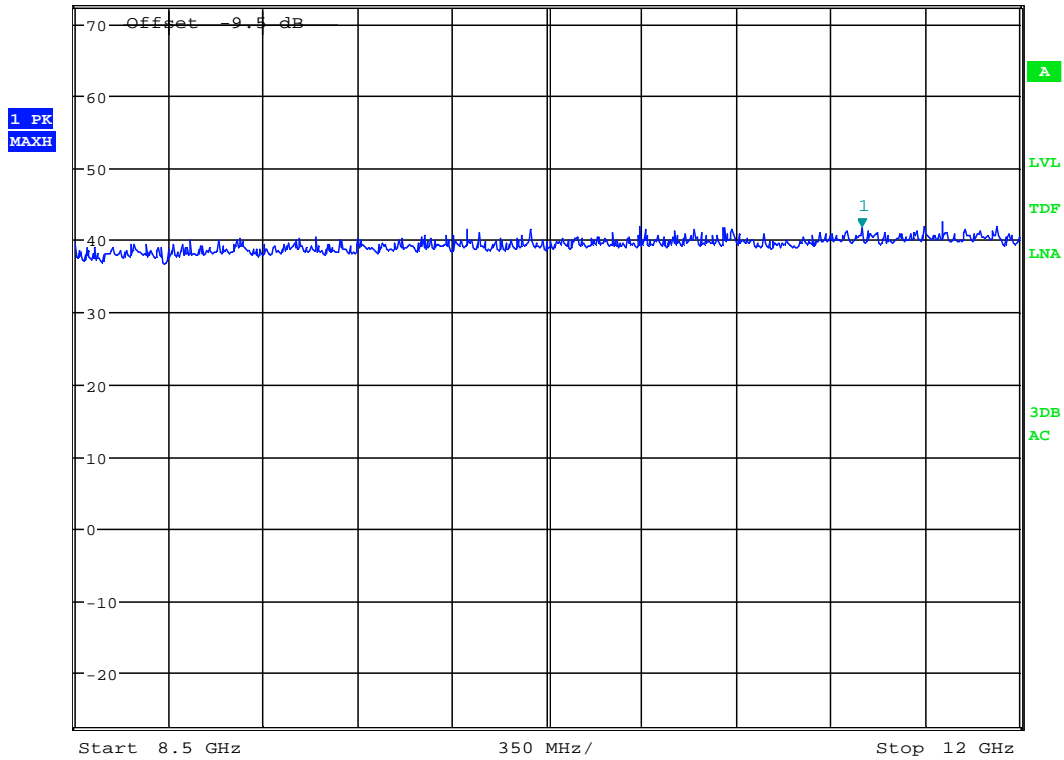


Date: 2.JAN.2014 15:48:26

Radiated Emissions ch. 2402 MHz, 3 – 8.5 GHz, HP, @3m – Pre-scan with Peak detector



MARKER 1
 11.41666667 GHz
 Ref 72.5 dBµV *Att 10 dB
 *RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 41.71 dBµV
 SWT 25 ms 11.41666667 GHz

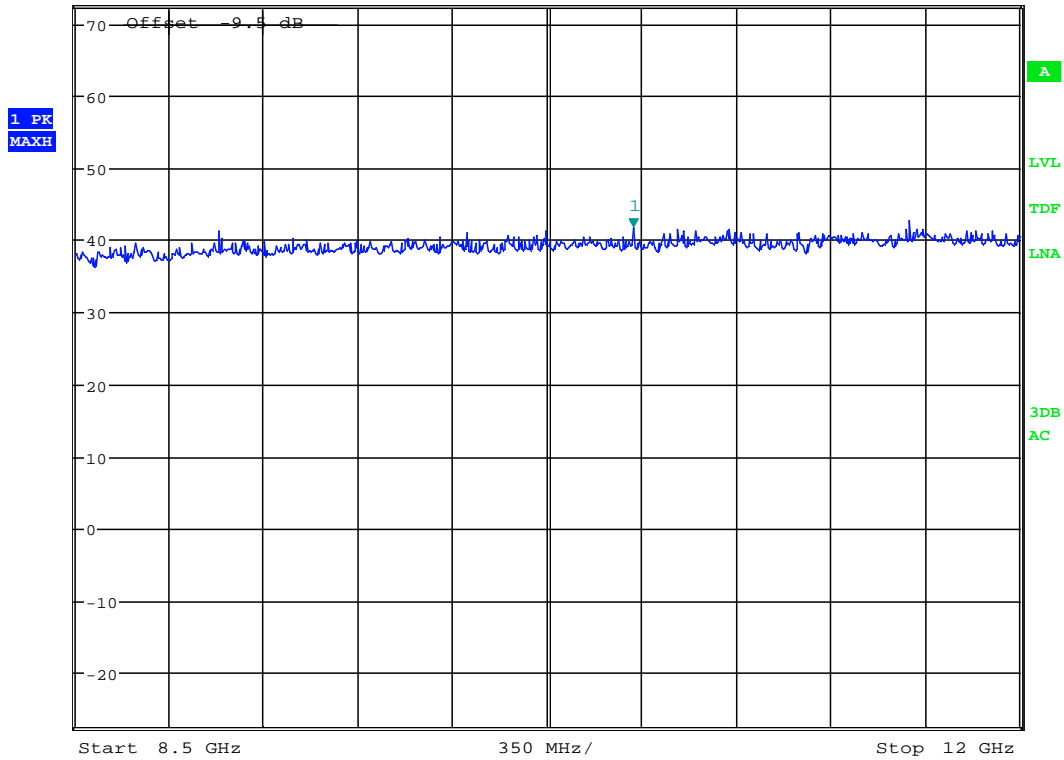


Date: 2.JAN.2014 16:07:27

Radiated Emissions ch. 2402 MHz, 8.5 – 12 GHz, VP, @1m – Pre-scan with Peak detector , Distance Correction factor of -9.5 dB is included in the graph



MARKER 1
 10.56971154 GHz
 Ref 72.5 dBµV *Att 10 dB
 *RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 41.70 dBµV
 SWT 25 ms 10.569711538 GHz

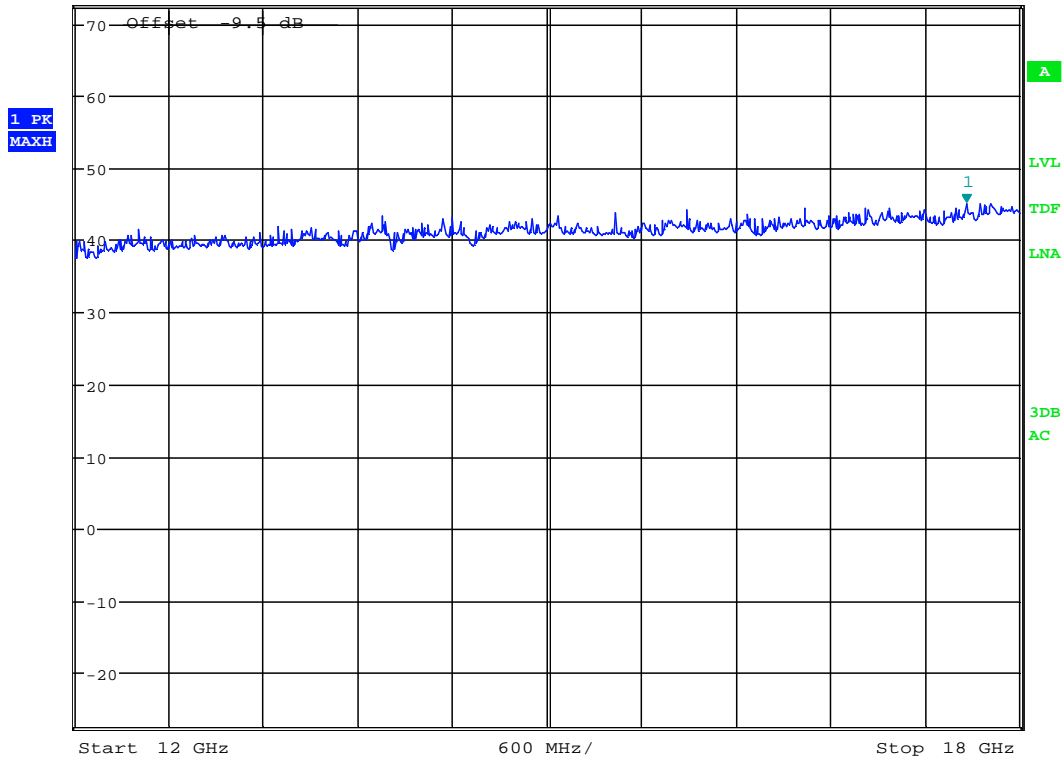


Date: 2.JAN.2014 16:08:03

Radiated Emissions ch. 2402 MHz, 8.5 – 12 GHz, HP, @1m – Pre-scan with Peak detector , Distance Correction factor of -9.5 dB is included in the graph.



MARKER 1
 17.66346154 GHz
 Ref 72.5 dBµV/m * Att 10 dB
 * RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 45.14 dBµV/m
 SWT 35 ms 17.663461538 GHz

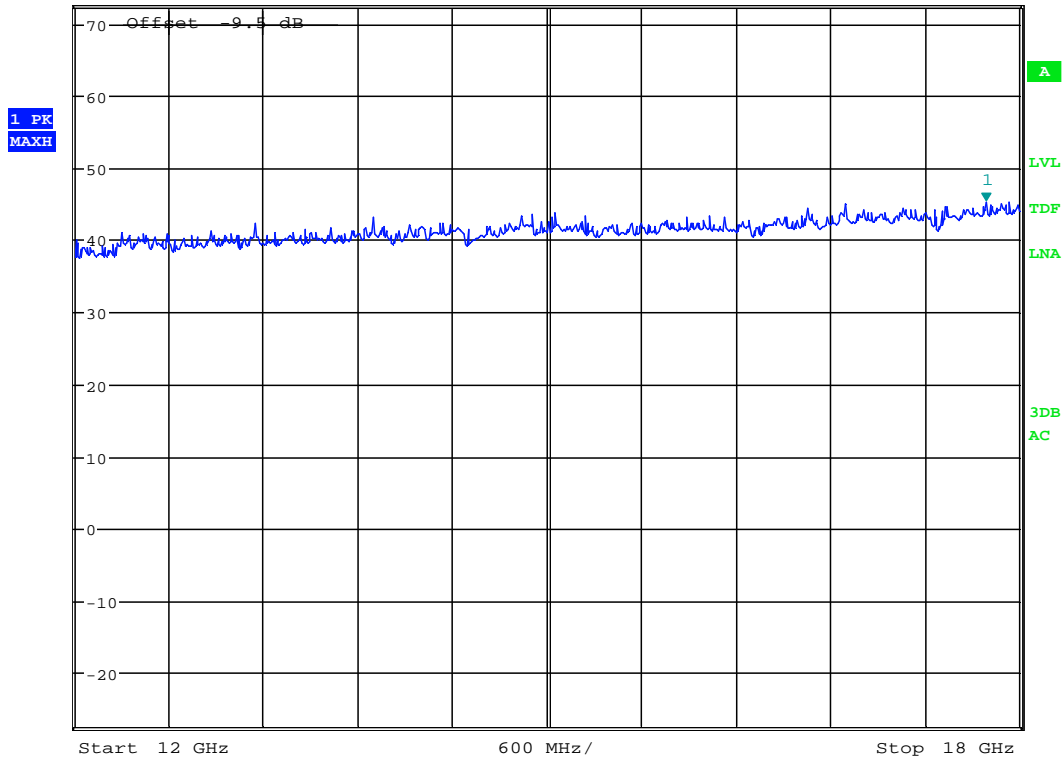


Date: 2.JAN.2014 16:10:05

Radiated Emissions ch. 2402 MHz, 12 – 18 GHz, VP, @1m – Pre-scan with Peak detector, Distance Correction factor of -9.5 dB is included in the graph.



MARKER 1	* RBW 1 MHz	Marker 1 [T1]
17.78846154 GHz	VBW 3 MHz	45.29 dBµV/m
Ref 72.5 dBµV/m	* Att 10 dB	SWT 35 ms
		17.788461538 GHz

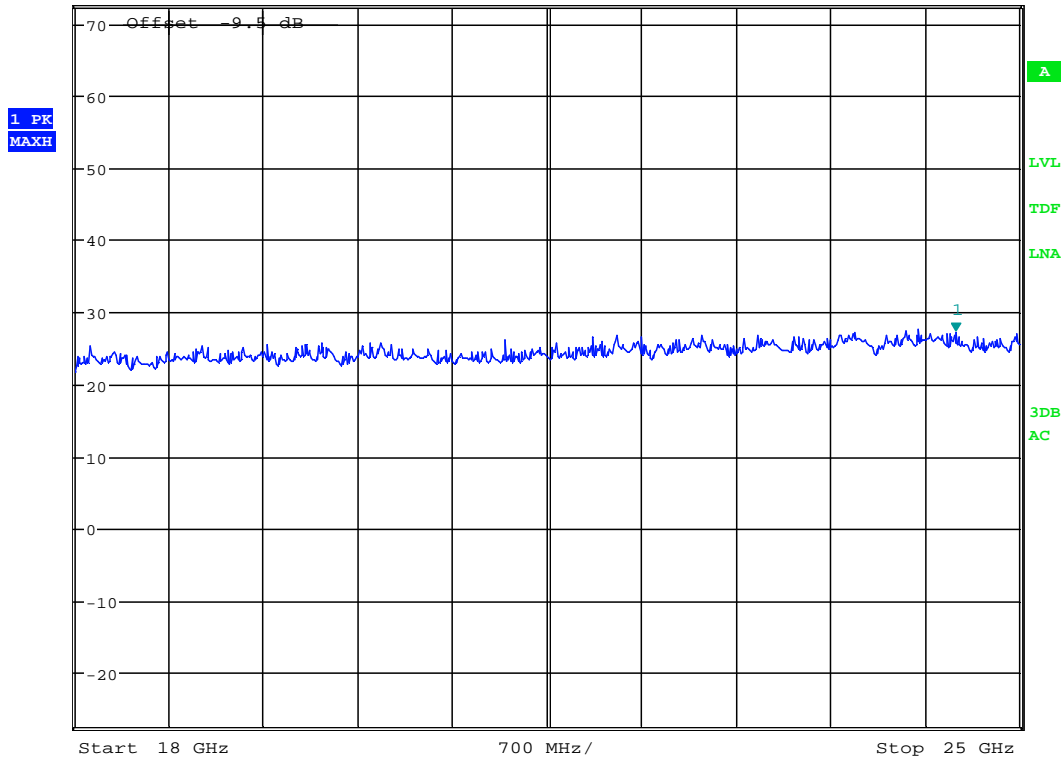


Date: 2.JAN.2014 16:10:32

Radiated Emissions ch. 2402 MHz, 12 – 18 GHz, HP, @1m – Pre-scan with Peak detector, Distance Correction factor of -9.5dB is included in the graph.



MARKER 1
 24.52884615 GHz
 Ref 72.5 dB μ V/m * Att 10 dB
 * RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 27.26 dB μ V/m
 SWT 45 ms 24.528846154 GHz



Date: 2.JAN.2014 16:18:44

Radiated Emissions ch. 2402 MHz, 18 – 25 GHz, VP/HP, Pre-scan with Peak detector, Distance Correction factor -9.5dB is included in the graph.

3.6 Power Spectral Density (PSD)

Para. No.: 15.247 (e)

Test Performed By: G.Suhanthakumar	Date of Test: 06 Jan 2014
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Test Results: Complies

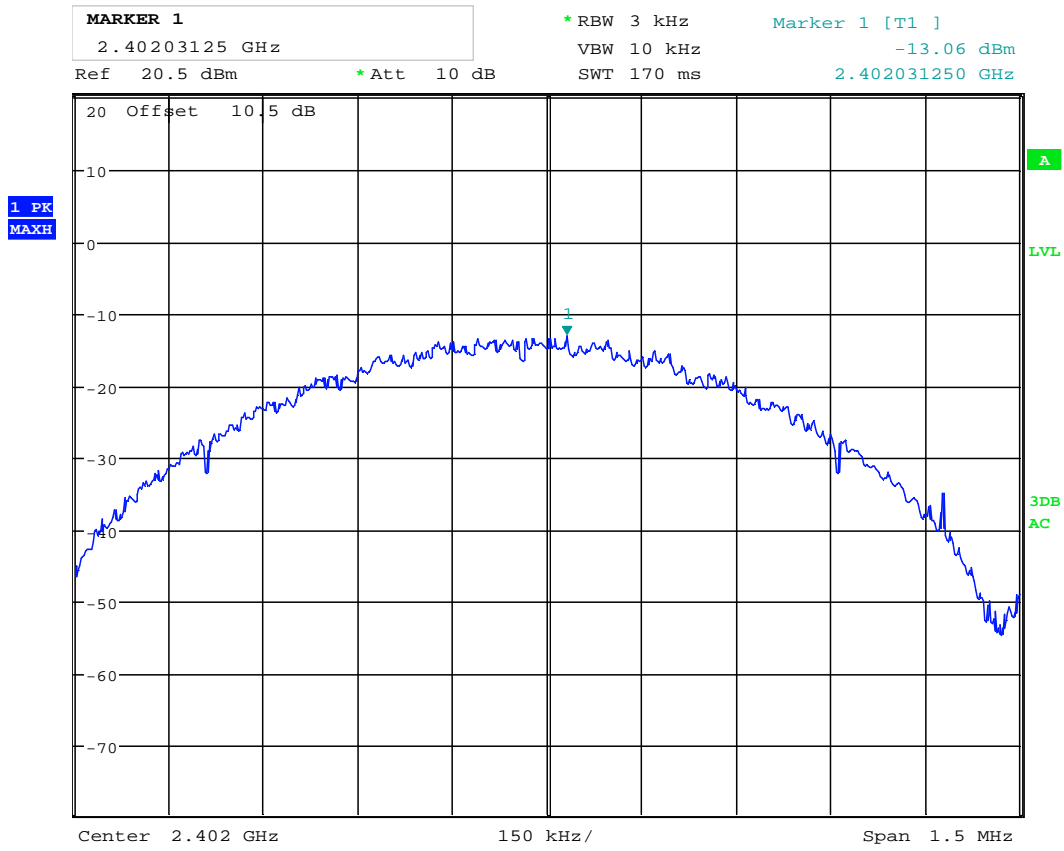
Measured and Calculated Data:

	calculated peak PSD dBm
Power Spectral Density @2402 MHz	-13.06
Power Spectral Density @2440 MHz	-13.91
Power Spectral Density @2480 MHz	-13.71

Tested according to KDB 558074 D01 DTS Meas Guidance v03r01, Section 10.2.

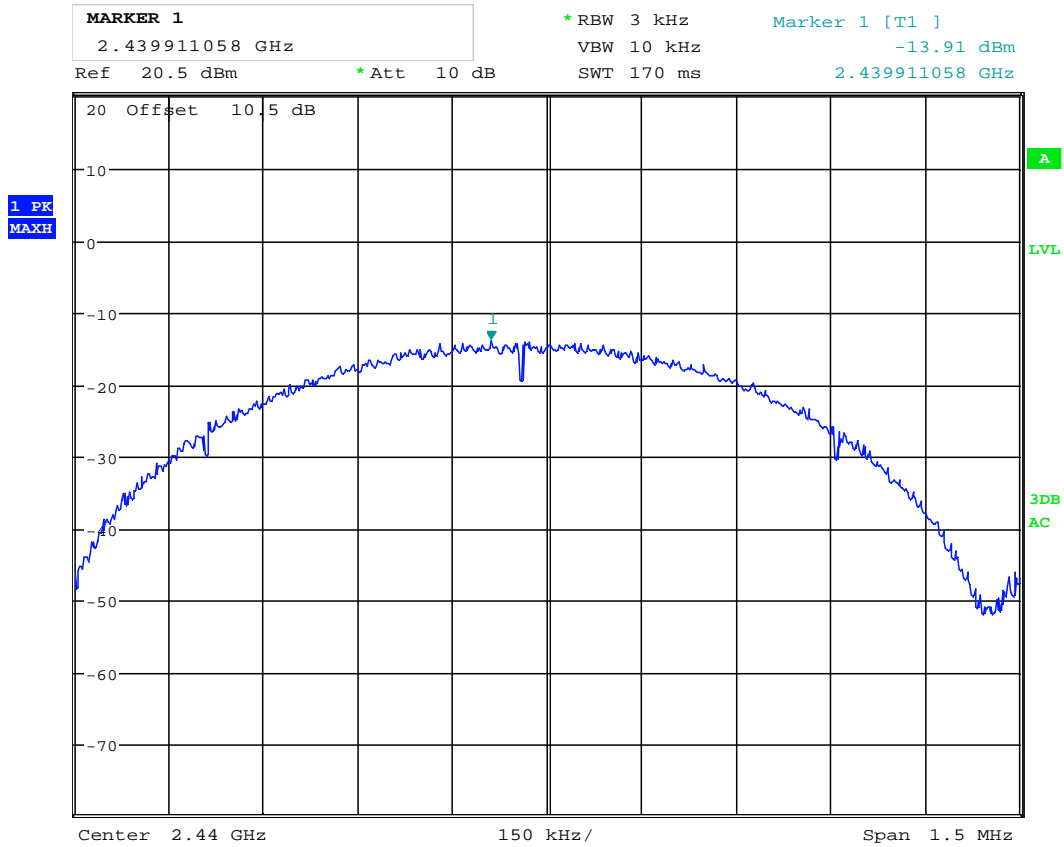
Requirements:

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



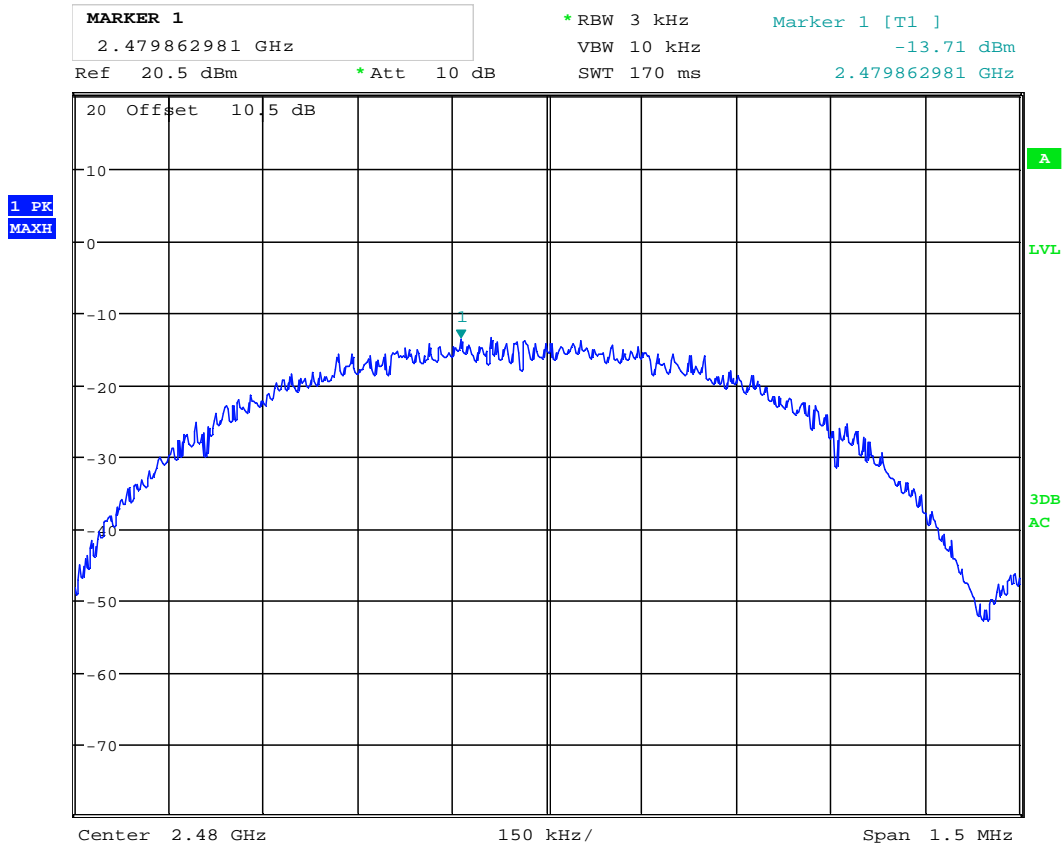
Date: 6.JAN.2014 16:38:49

PSD Measurement - 2402MHz



Date: 6.JAN.2014 16:47:16

PSD Measurement – 2440MHz



Date: 6.JAN.2014 16:43:27

PSD Measurement - 2480MHz

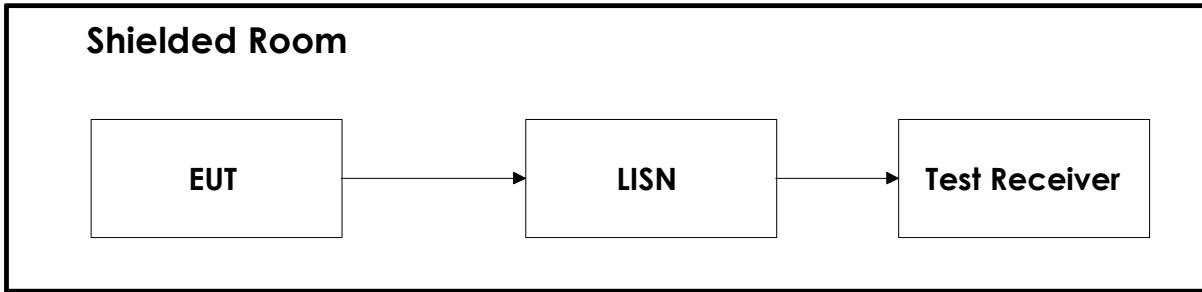
4 LIST OF TEST EQUIPMENT

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	FSU26	Spectrum Analyzer	Rohde & Schwarz	LR 1504	2013.11	2015.11
2	ESU40	EMI Receiver	Rohde & Schwarz	LR1639	2013.09.24	2014.09.24
3	3115	Antenna horn	EMCO	LR 1330	2010.08.05	2015.08.05
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	JB3	BiLog Antenna	Sunol Sciences	N-4525	2011.09.07	2014.09.07
10	8449B	Pre-amplifier	Hewlett Packard	LR 1322	2013.09.27	2014.09.27
11	LNA6900	Pre-amplifier	Teseq	LR 1593	2013.11	2014.11
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
22	6502	Antenna, Loop	EMCO	N3488	2010.10.08	2014.10.08

5 BLOCK DIAGRAM

5.1 Power Line Conducted Emission



5.2 Test Site Radiated Emission

