

Test Report

Product	Wireless Audio Beltpack Transceiver	
Name and address of the applicant	RØDE Microphones 107 Carnarvon Street Silverwater NSW 2128 Australia	
Name and address of the manufacturer	RØDE Microphones 107 Carnarvon Street Silverwater NSW 2128 Australia	
Model	TX-BELT	
Rating	3.0 V DC	
Trademark	RØDE Microphones	
Serial number	Not stated	
Additional information	/	
Tested according to	FCC Part 15.247 Digital Transmission Systems Industry Canada RSS-210, Issue 8 Low Power Licence-Exempt Radiocommunications Devices	
Order number	278347	
Tested in period	2015.02.28 to 2015.03.10	
Issue date	2015.05.06	
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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Nemko Norway

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1 INFORMATION

1.1 Test Item

Name :	RØDE Microphones
FCC ID :	2AEAN391001
IC :	20091-391001
Model/version :	TX-BELT
Serial number :	-
Hardware identity and/or version:	V2/V3
Software identity and/or version :	V0009
Frequency Range :	2403 – 2481 MHz
Number of Channels :	8
Type of Modulation :	TDMA
Conducted Output Power:	11.27 mW (Peak)
User Frequency Adjustment :	None
Type of Power Supply :	Primary Batteries (2xAA Alkaline Batteries)
Antenna Connector :	None (Integral Antennas)
Antenna type:	PCB antennas
Number of Antennas:	2
Antenna Diversity Supported :	Yes
Desktop Charger :	N/A

Description of Test Item

The EUT is a Wireless audio beltpack set using a 2.4 GHz digital transmission. The unit covered by this report is the audio transmitter part. Both the audio transmitter and receiver are capable of transmitting and receiving on 2.4 GHz.

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.Suwanthakumar

1.4 Test Equipment

See list of test equipment in clause 5.

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 C63.4-2009/2014 and KDB 558074 D01 DTS Measurement Guidance v03r02. The radiated tests were performed in a semi-anechoic chamber at measuring distances of 1m, 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 4 reference	Result
Supply Voltage Variations	15.31(e)	6.11 (RSS-GEN)	Complies ¹
Antenna Requirement	15.203	8.3 (RSS-GEN)	N/A ²
Power Line Conducted Emission	15.107(a) 15.207(a)	8.8 (RSS-GEN)	Complies 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

¹ EUT is battery operated only, USB port is only used for firmware updating.

² PCB antenna (Integral)

RSS Gen issue 4 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.

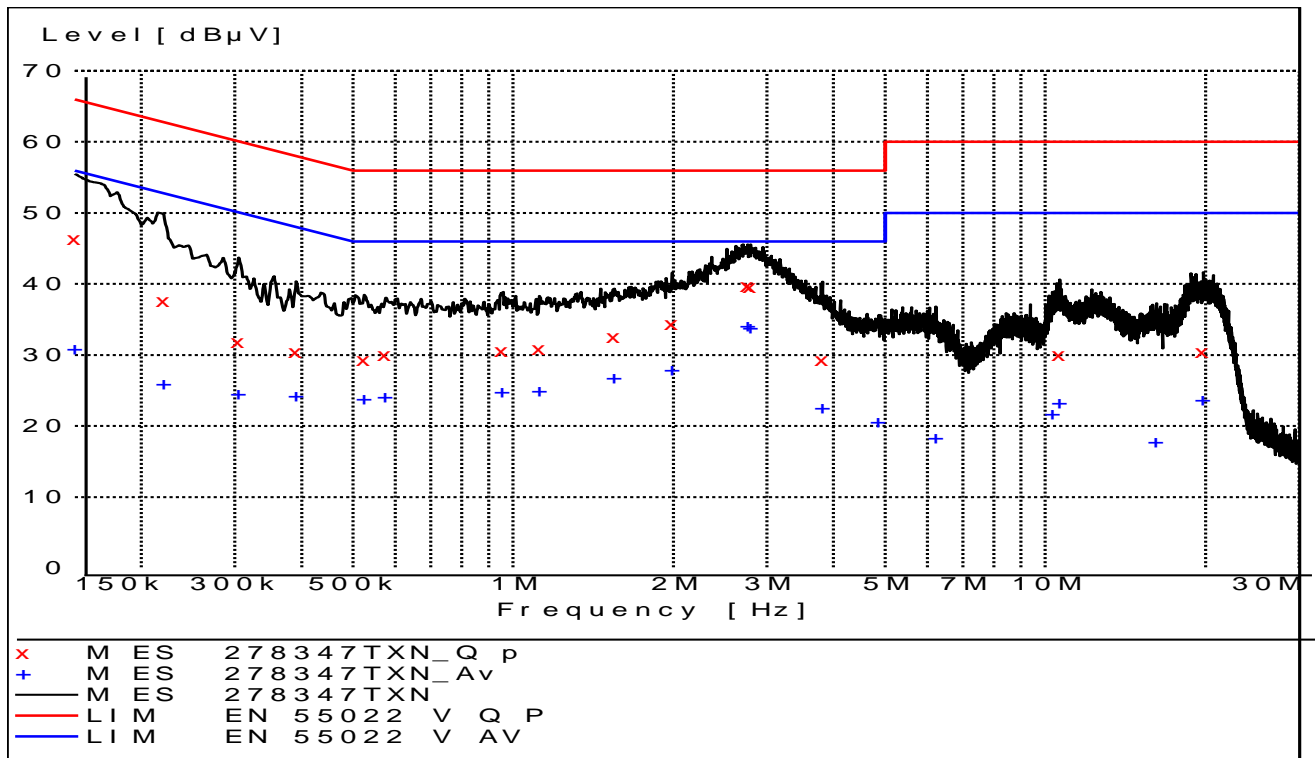
3 TEST RESULTS

3.1 Power Line Conducted Emissions

Para. No.: 15.207 (a)

Test Performed By: G.Suhanthakumar	Date of Test: 2015.03.13
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Measurement procedure: ANSI C63.4-2009/2014 using 50 μ H/50 ohms LISN.
 Test Results: 120V, AC, 60Hz: Used Dell PC E7440,
 The EUT is powered from USB cable during this test
 Measurement Data: Complies



Frequency [MHz]	Level [dBuV]	Af [dB]	Limit [dBuV]	Margin [dB]	Detector	Position	Verdict [Pass/Fail]
0.150000	46.40	10.70	66.00	19.60	QP	N	Pass
0.220000	37.70	10.70	62.80	25.10	QP	N	Pass
0.305000	31.90	10.50	60.10	28.20	QP	N	Pass
0.390000	30.40	10.40	58.10	27.70	QP	L1	Pass
0.525000	29.40	10.20	56.00	26.60	QP	L1	Pass
0.575000	30.10	10.20	56.00	25.90	QP	N	Pass
0.955000	30.70	10.30	56.00	25.30	QP	N	Pass
1.120000	30.80	10.40	56.00	25.20	QP	N	Pass
1.550000	32.60	10.40	56.00	23.40	QP	N	Pass
1.990000	34.40	10.40	56.00	21.60	QP	N	Pass
2.760000	39.80	10.40	56.00	16.20	QP	N	Pass
2.795000	39.60	10.40	56.00	16.40	QP	N	Pass
3.815000	29.40	10.40	56.00	26.60	QP	N	Pass
10.655000	30.10	10.70	60.00	29.90	QP	N	Pass
19.825000	30.50	10.80	60.00	29.50	QP	N	Pass
0.150000	30.80	10.70	56.00	25.20	AV	N	Pass
0.220000	26.00	10.70	52.80	26.80	AV	N	Pass
0.305000	24.60	10.50	50.10	25.50	AV	N	Pass
0.390000	24.30	10.40	48.10	23.80	AV	L1	Pass
0.525000	23.90	10.20	46.00	22.10	AV	L1	Pass
0.575000	24.20	10.20	46.00	21.80	AV	N	Pass
0.955000	24.90	10.30	46.00	21.10	AV	N	Pass
1.120000	25.00	10.40	46.00	21.00	AV	N	Pass
1.550000	26.80	10.40	46.00	19.20	AV	N	Pass
1.990000	27.90	10.40	46.00	18.10	AV	N	Pass
2.760000	34.10	10.40	46.00	11.90	AV	N	Pass
2.795000	33.90	10.40	46.00	12.10	AV	N	Pass
3.815000	22.60	10.40	46.00	23.40	AV	N	Pass
4.870000	20.60	10.50	46.00	25.40	AV	N	Pass
6.230000	18.30	10.60	50.00	31.70	AV	N	Pass
10.325000	21.70	10.70	50.00	28.30	AV	N	Pass
10.655000	23.30	10.70	50.00	26.70	AV	N	Pass
16.190000	17.80	10.80	50.00	32.20	AV	N	Pass
19.825000	23.70	10.80	50.00	26.30	AV	N	Pass

3.2 Minimum 6 dB Bandwidth

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

Test Performed By: G.Suhanthakumar	Date of Test: 08 Mar 2015
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Test Results: Complies

Measurement Data:

Measured 6 dB Bandwidth (kHz)		
2403MHz	2443 MHz	2481MHz
881.4	881.4	849.3

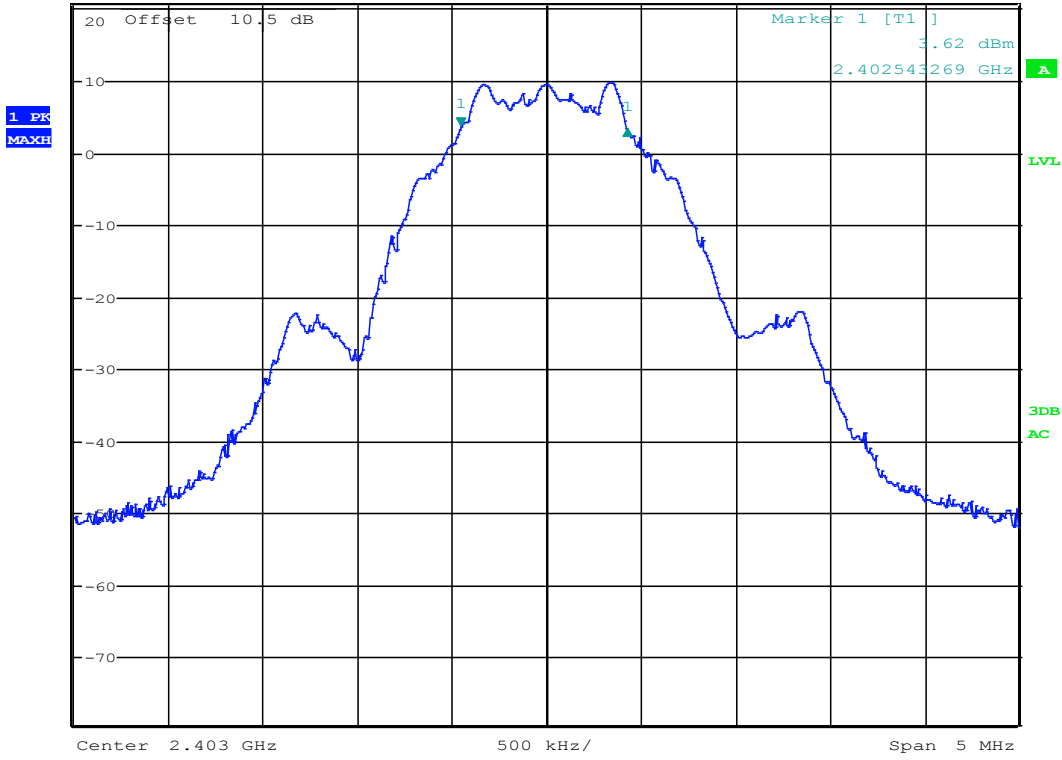
Tested according to KDB 558074 D01 DTS Meas Guidance v03r02, Section 8.1.

Requirements:

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



Step 20.5 dBm *Att 20 dB *RBW 100 kHz Delta 1 [T1]
 VBW 300 kHz -0.38 dB
 SWT 2.5 ms 881.410256407 kHz

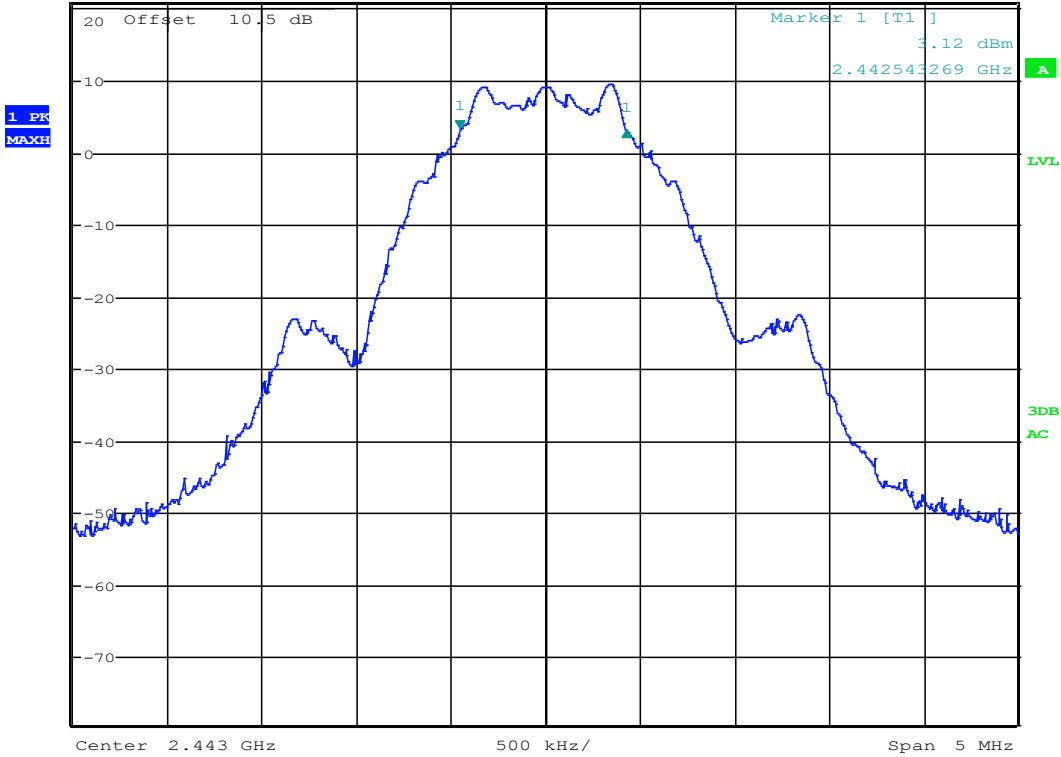


Date: 7.MAR.2015 14:53:21

6 dB Bandwidth at 2403 MHz



Step 20.5 dBm *RBW 100 kHz Delta 1 [T1]
 *Att 15 dB VBW 300 kHz -0.26 dB
 SWT 2.5 ms 881.410256405 kHz

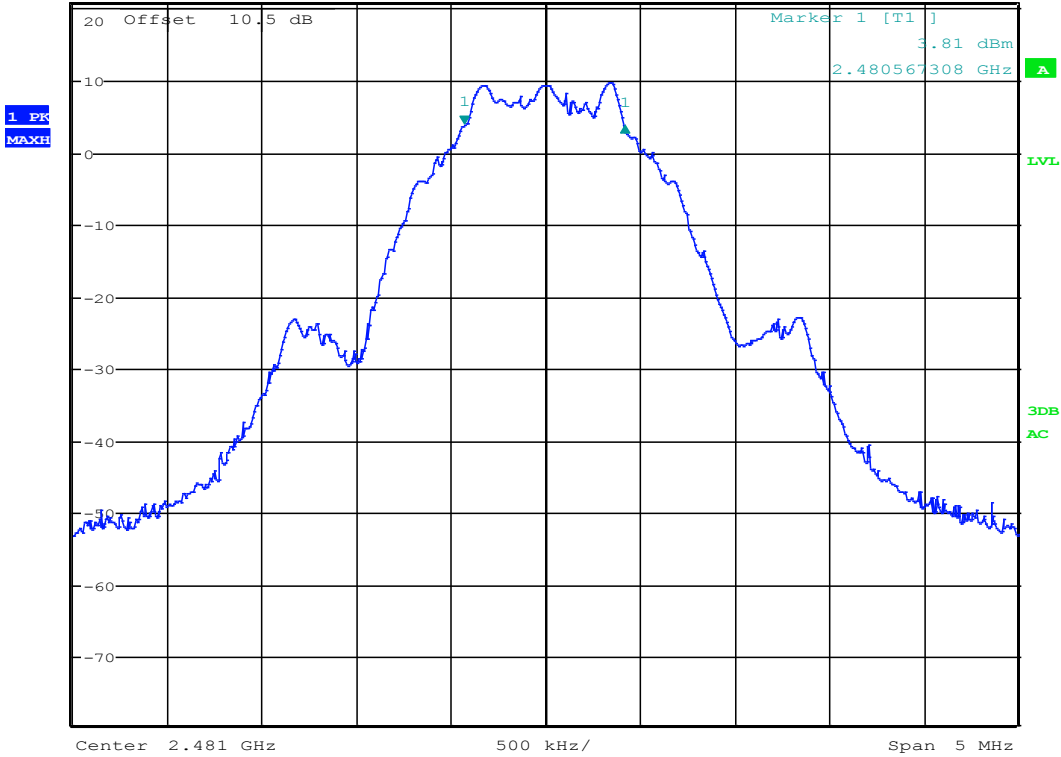


Date: 7.MAR.2015 15:00:20

6 dB Bandwidth at 2443 MHz



Step 20.5 dBm *RBW 100 kHz Delta 1 [T1]
 *Att 15 dB VBW 300 kHz -0.22 dB
 SWT 2.5 ms 849.358974354 kHz



Date: 7.MAR.2015 15:01:54

6 dB Bandwidth at 2481 MHz

3.3 20 dB Bandwidth

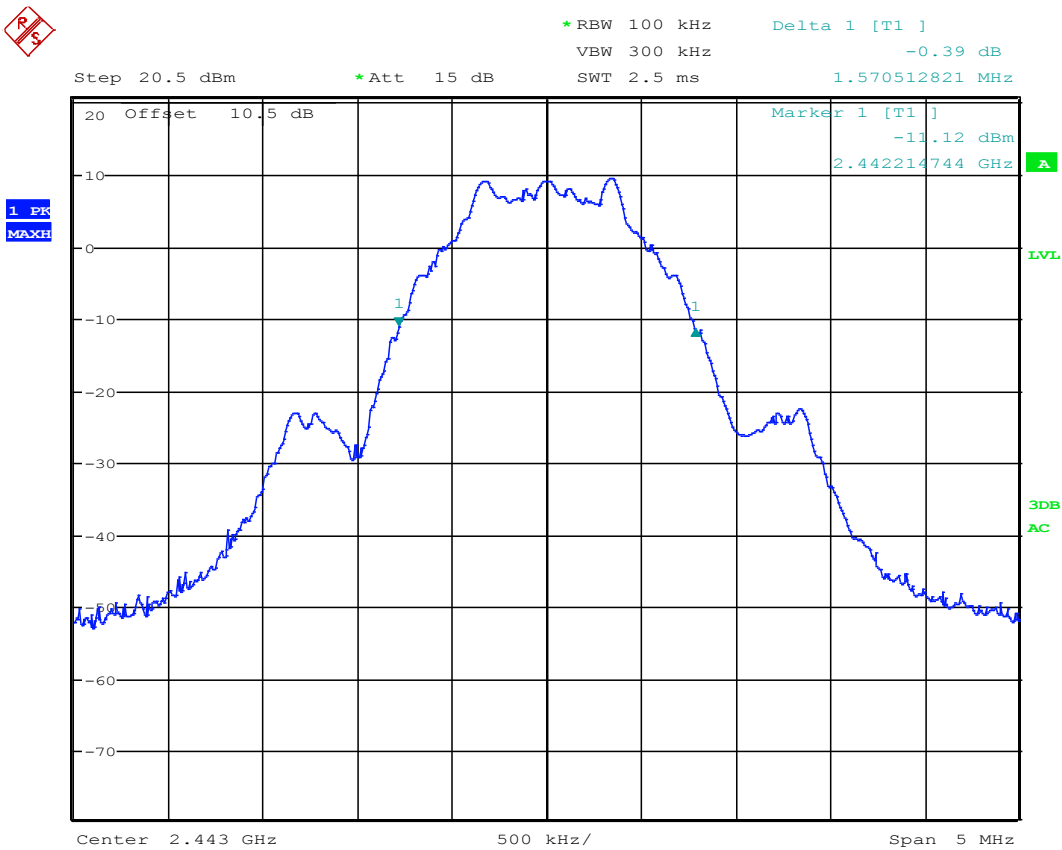
Test Performed By: G.Suhanthakumar	Date of Test: 06 Mar 2015
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Measurement Data:

Measured 20 dB Bandwidth (MHz)
2443 MHz
1.57

Requirements:

No requirements. Reported for information only.



Date: 7.MAR.2015 15:00:55

20 dB Bandwidth at 2443 MHz

3.4 Peak Power Output

Para. No.: 15.247 (b)

Test Performed By: G.Suhanthakumar	Date of Test: 09 Mar 2015
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Test Results: Complies

Measurement Data: Antenna 1

RF channel	2403 MHz	2443 MHz	2481 MHz
Measured Maxium Field strength (dB μ V/m) –HP	105.8	105.0	103.0
Calc. Radiated Power (dBm)	10.5	9.7	7.8
Calc. Radiated Power (mW)	11.3	9.3	6.0
Measured Conducted Power (dBm)	10.5	10.2	10.4
Measured Conducted Power (mW)	11.3	10.4	10.8
Calculated Antenna Gain (dBi)	0.0	-0.5	-2.6

Measurement Data: Antenna 2

RF channel	2403 MHz	2443 MHz	2481 MHz
Measured Maxium Field strength (dB μ V/m) –HP	105.6	105.2	104.5
Calc. Radiated Power (dBm)	10.4	9.9	9.3
Calc. Radiated Power (mW)	10.9	9.8	8.5
Measured Conducted Power (dBm)	10.5	10.2	10.4
Measured Conducted Power (mW)	11.3	10.4	10.8
Calculated Antenna Gain (dBi)	-0.2	-0.2	-1.1

Tested according to KDB 558074 D01 DTS Meas Guidance v03r02, Section 9.1.1.

EIRP is calculated according to KDB 558074 D01 DTS Meas Guidance v03r02, Section 12.2.2. (e)

The maximum field strength is obtained in XZ plane and Horizontal polarization.

See attached graph.

Detachable antenna?

Yes No

If detachable, is the antenna connector non-standard?

Yes No

Requirements:

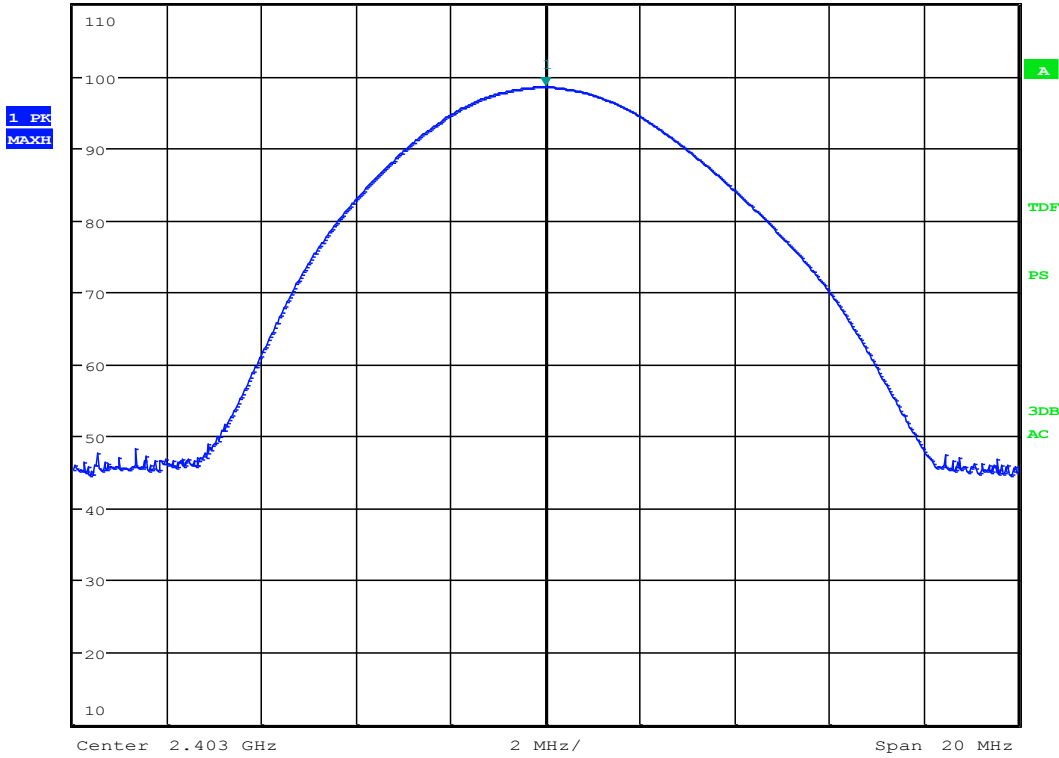
The maximum peak output power shall not exceed the following limits:

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 98.57 dBuV/m
 Ref 110 dBuV/m *Att 10 dB SWT 2.5 ms 2.403000000 GHz

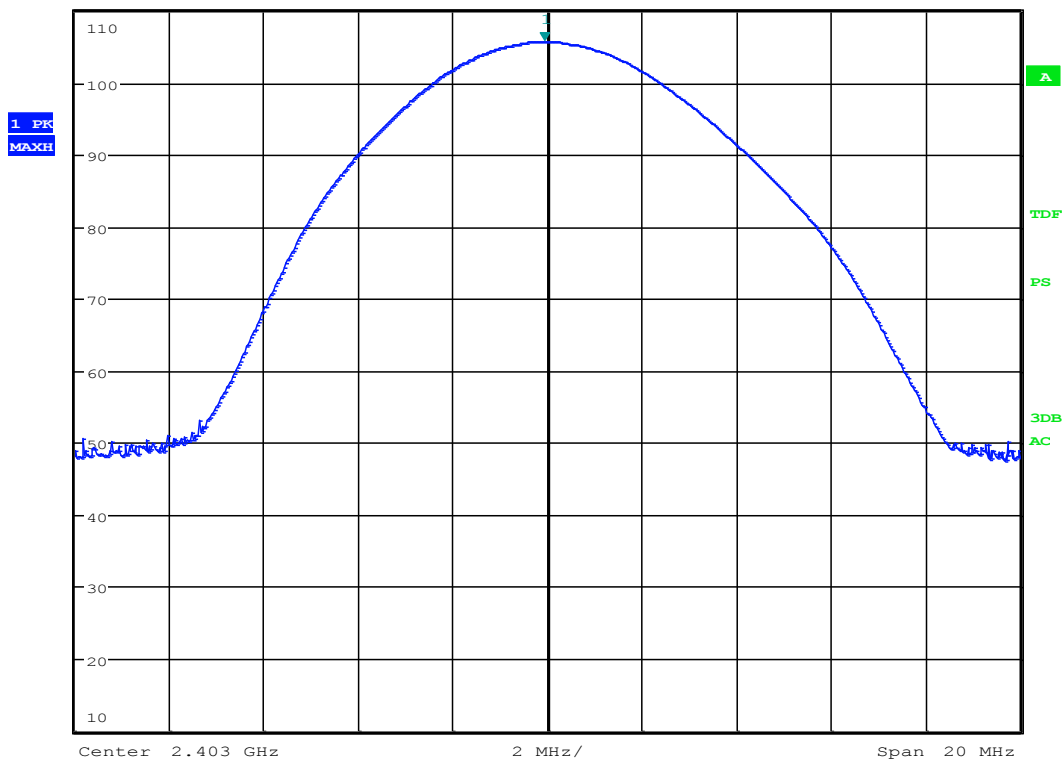


Date: 7.MAR.2015 11:28:18

Radiated Field strength, VP , 2403 MHz,PK – antenna 1



*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 105.78 dBµV/m
 Ref 110 dBµV/m *Att 10 dB SWT 2.5 ms 2.402935897 GHz

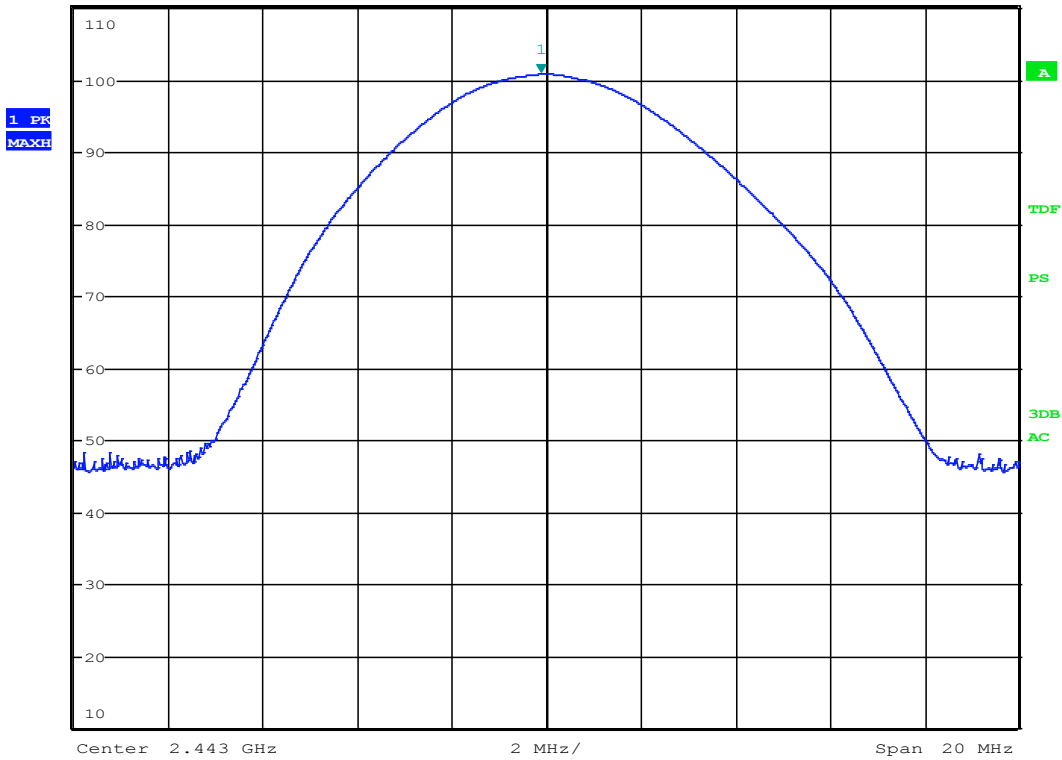


Date: 7.MAR.2015 11:29:07

Radiated field strength, HP, 2403 MHz,PK – antenna 1



MARKER 1
 2.442871795 GHz
 Ref 110 dBµV/m *Att 10 dB *RBW 3 MHz VBW 10 MHz SWT 2.5 ms
 Marker 1 [T1] 100.81 dBµV/m
 2.442871795 GHz



Date: 7.MAR.2015 13:01:31

Radiated field strength, VP, 2443 MHz,PK - Antenna 1

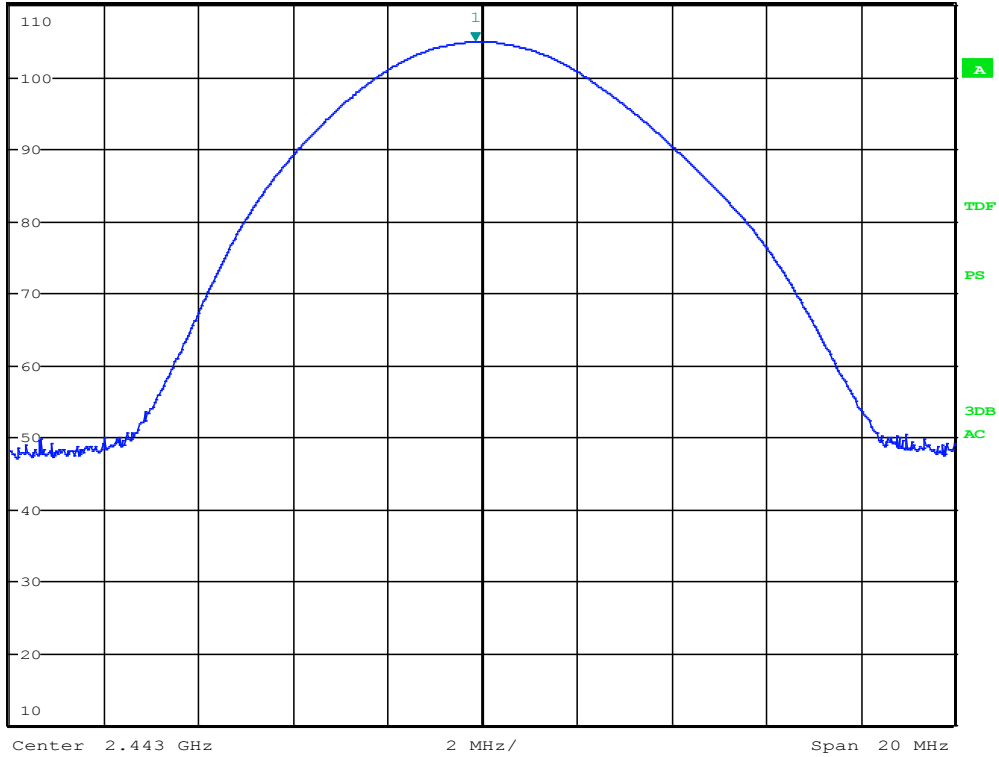


MARKER 1
 2.442839744 GHz

*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 104.95 dBμV/m
 SWT 2.5 ms 2.442839744 GHz

Ref 110 dBμV/m *Att 10 dB

1 PK
 MAXH

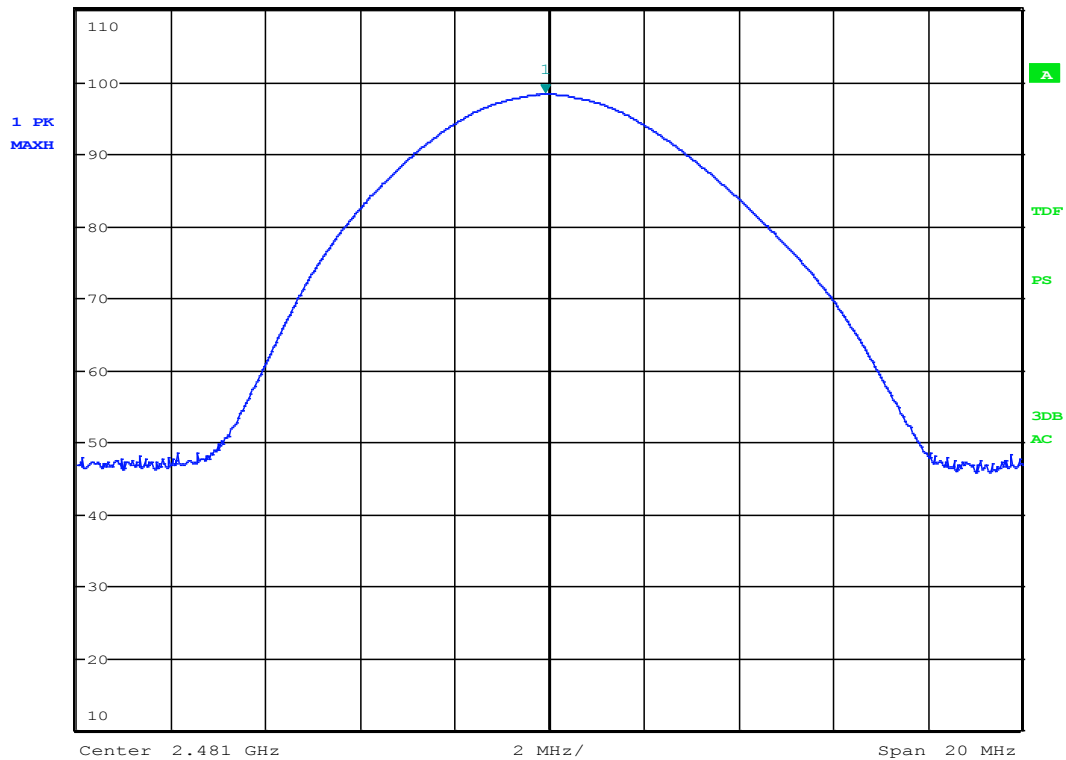


Date: 7.MAR.2015 13:01:51

Radiated field strength, HP, 2443 MHz,PK – Antenna 1

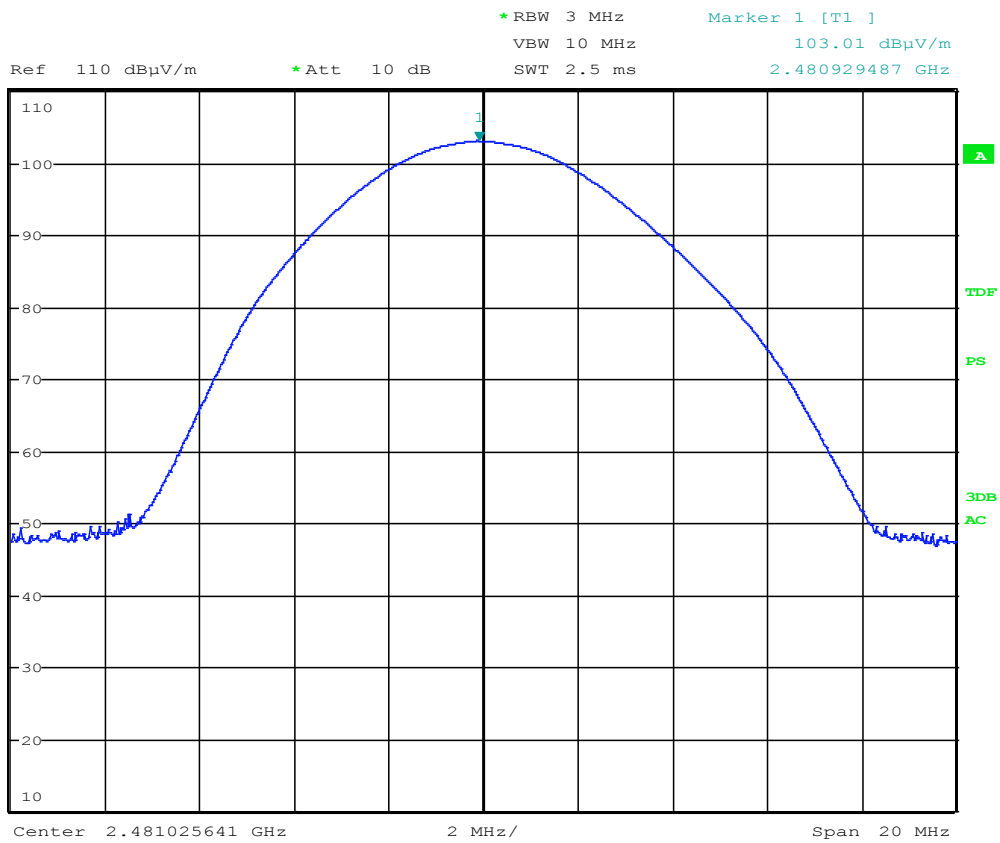


MARKER 1
 2.480903846 GHz
 *RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 98.30 dBμV/m
 Ref 110 dBμV/m *Att 10 dB SWT 2.5 ms 2.480903846 GHz



Date: 13.MAR.2015 10:58:29

Radiated field strength, VP, 2481 MHz,PK – Antenna 1

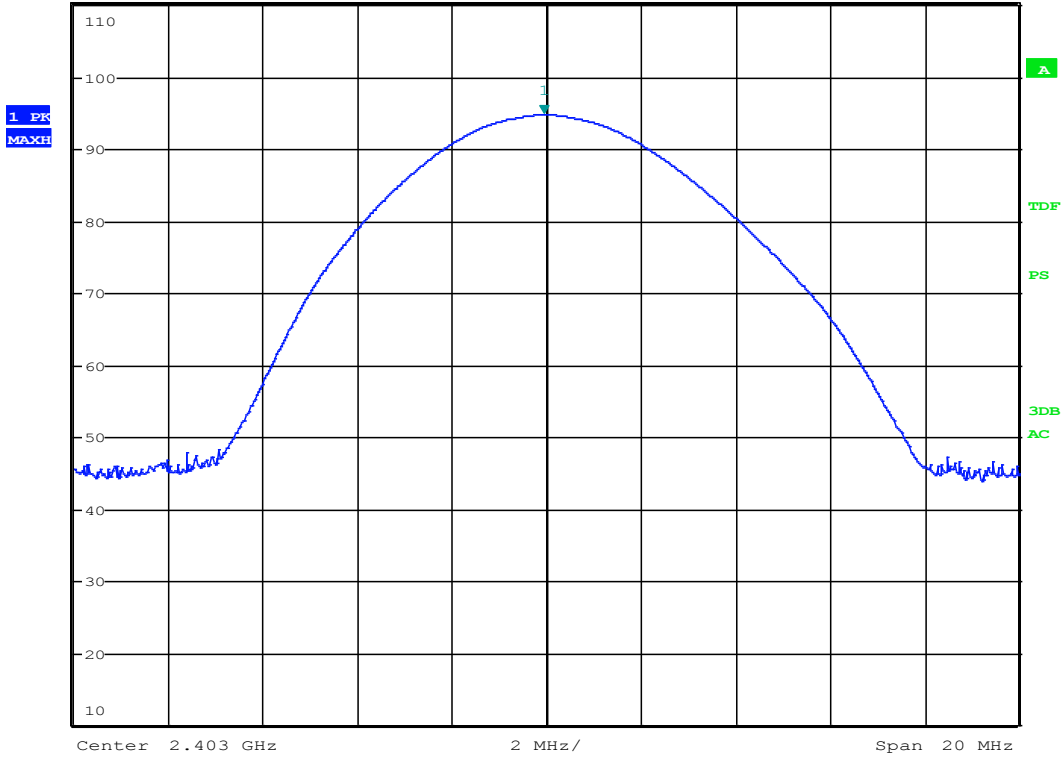


Date: 7.MAR.2015 12:47:36

Radiated field strength, HP, 2481 MHz,PK – Antenna 1



MARKER 1
 2.402935897 GHz
 Ref 110 dBuV/m *Att 10 dB *RBW 3 MHz VBW 10 MHz SWT 2.5 ms
 Marker 1 [T1] 94.78 dBuV/m 2.402935897 GHz

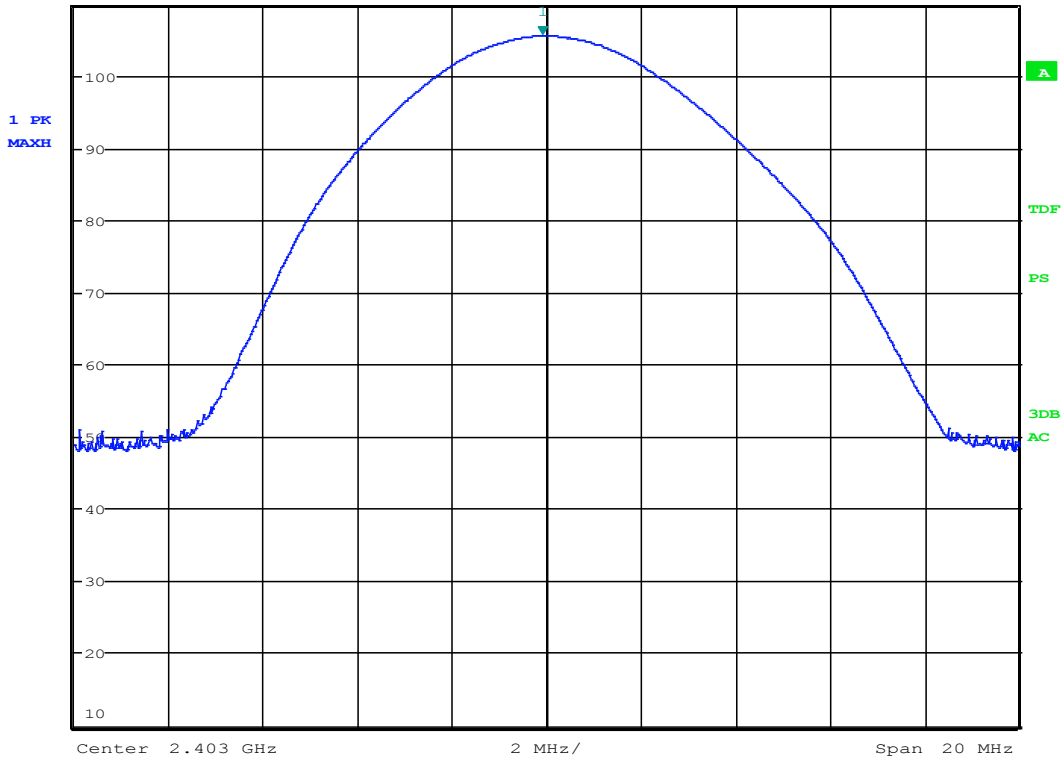


Date: 13.MAR.2015 11:57:32

Radiated Field strength, VP , 2403 MHz,PK – antenna 2



MARKER 1	*RBW 3 MHz	Marker 1 [T1]
2.402903846 GHz	VBW 10 MHz	105.62 dBµV/m
Ref 109.5 dBµV/m	*Att 10 dB	SWT 2.5 ms
		2.402903846 GHz

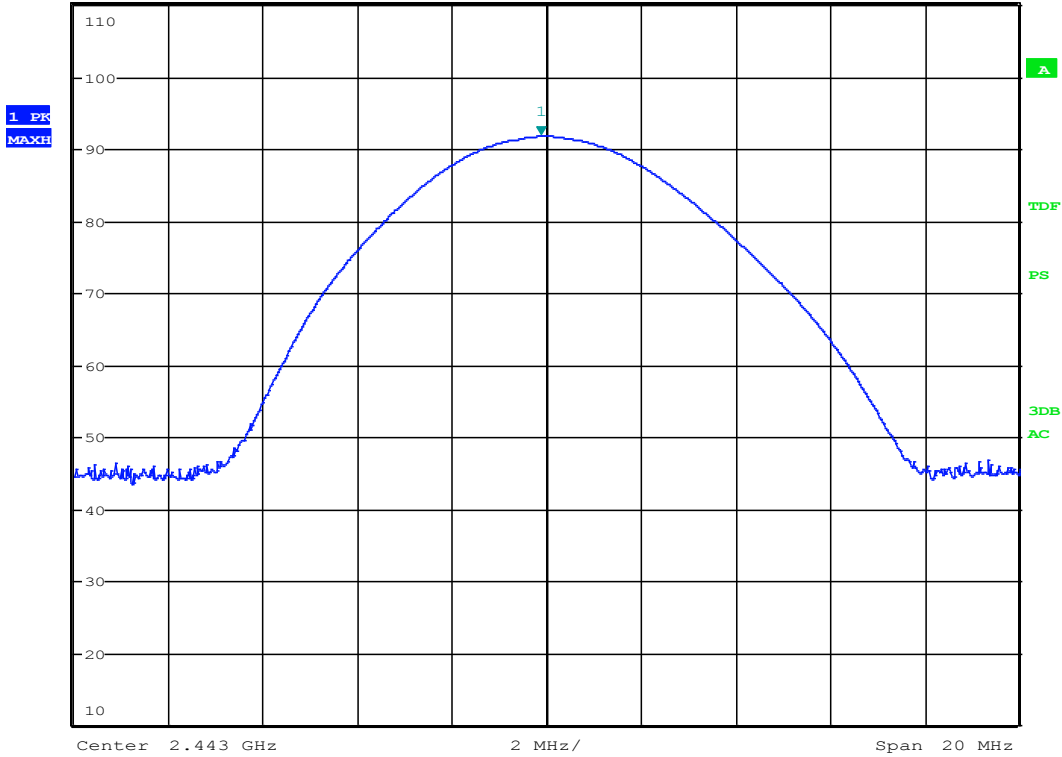


Date: 13.MAR.2015 13:29:39

Radiated field strength, HP, 2403 MHz,PK – antenna 2



MARKER 1
 2.442871795 GHz
 Ref 110 dBuV/m *Att 10 dB *RBW 3 MHz VBW 10 MHz SWT 2.5 ms
 Marker 1 [T1] 91.79 dBuV/m 2.442871795 GHz



Date: 13.MAR.2015 11:59:38

Radiated field strength, VP, 2443 MHz,PK - Antenna 2

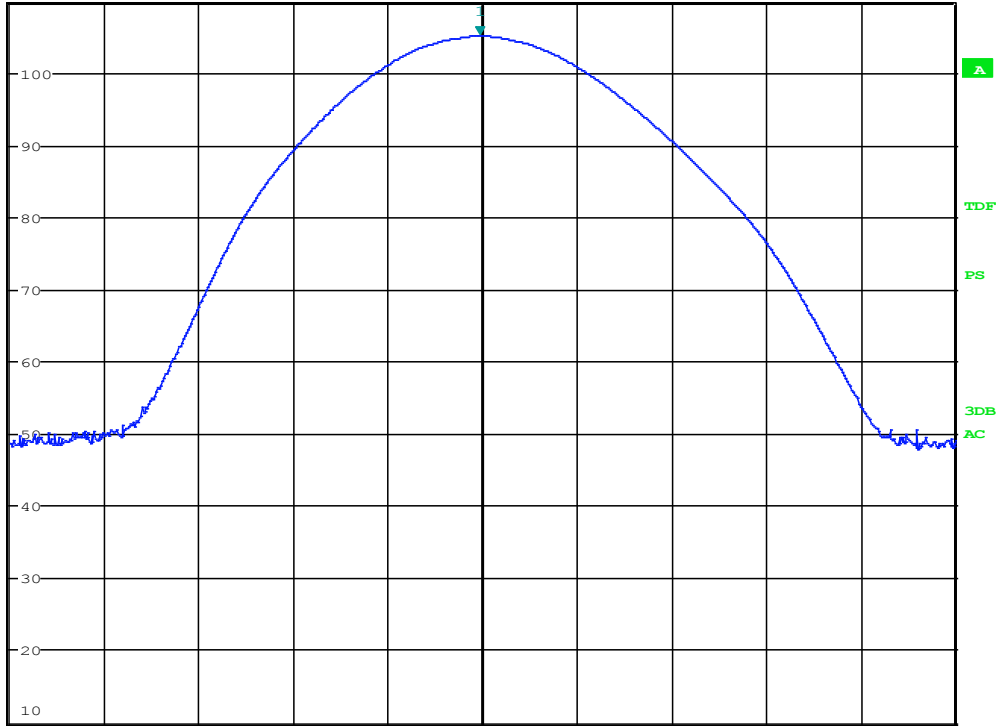


MARKER 1
 2.442935897 GHz

*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 105.18 dBμV/m
 SWT 2.5 ms 2.442935897 GHz

Ref 109.5 dBμV/m *Att 10 dB

1 PK
 MAXH



Center 2.443 GHz 2 MHz/ Span 20 MHz

Date: 13.MAR.2015 13:27:00

Radiated field strength, HP, 2443 MHz,PK – Antenna 2



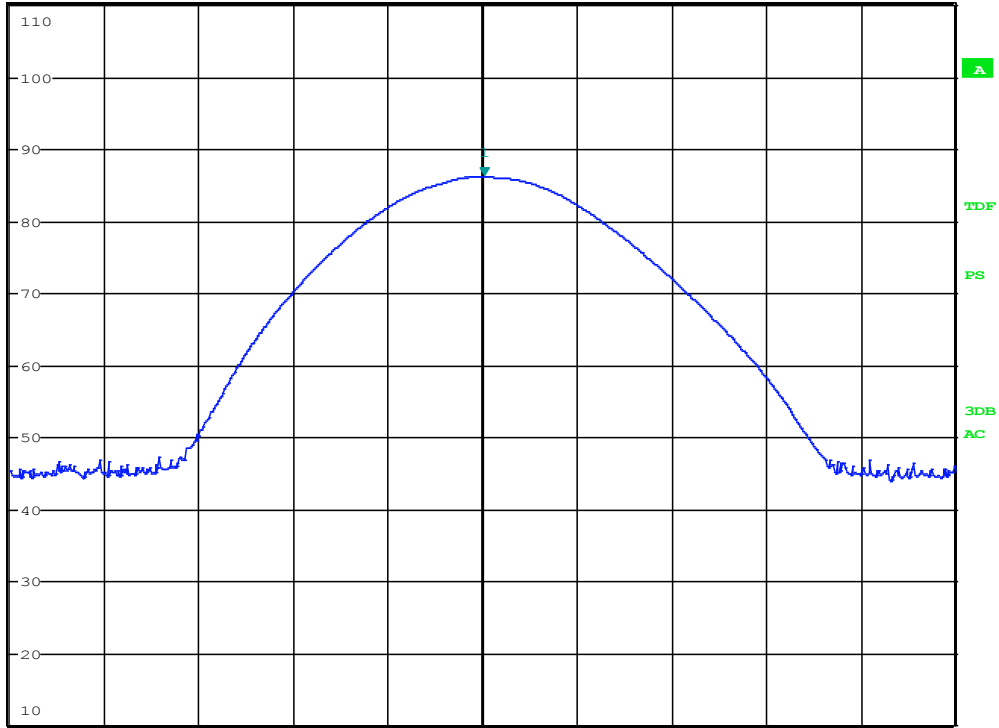
MARKER 1
 2.481032051 GHz

*RBW 3 MHz
 VBW 10 MHz
 SWT 2.5 ms

Marker 1 [T1]
 86.11 dBμV/m
 2.481032051 GHz

Ref 110 dBμV/m *Att 10 dB

1 PK
 MAXH



Center 2.481 GHz 2 MHz/ Span 20 MHz

Date: 13.MAR.2015 11:18:51

Radiated field strength, VP, 2481 MHz,PK – Antenna 2

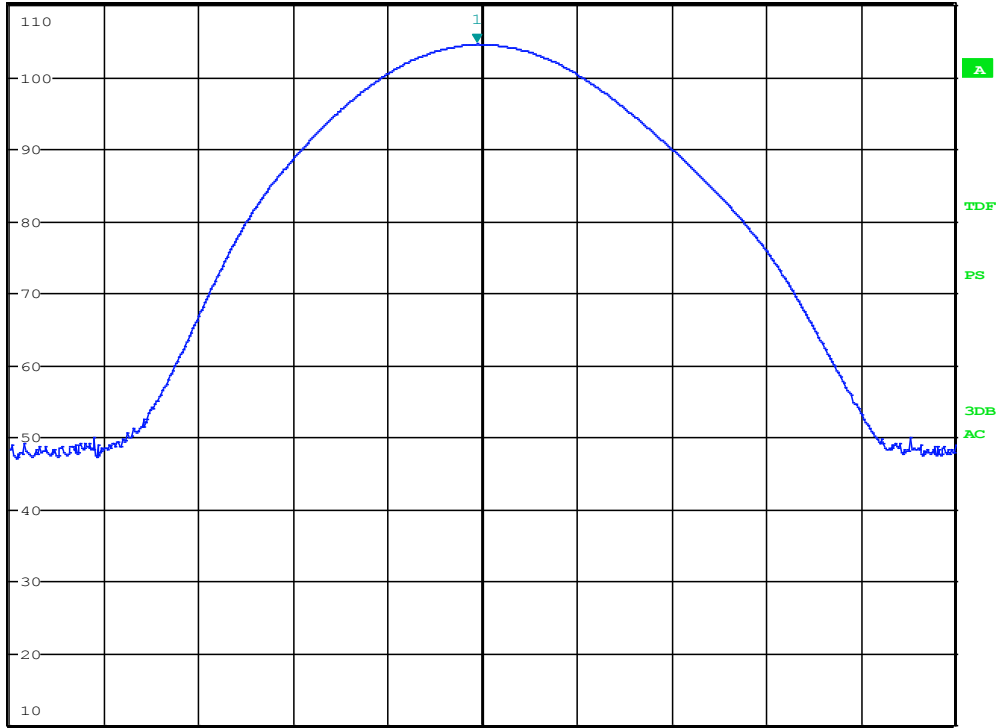


MARKER 1
 2.480871795 GHz

*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 104.54 dBμV/m
 SWT 2.5 ms 2.480871795 GHz

Ref 110 dBμV/m *Att 10 dB

1 PK
 MAXH



Center 2.481 GHz 2 MHz/ Span 20 MHz

Date: 13.MAR.2015 11:18:09

Radiated field strength, HP, 2481 MHz,PK – Antenna 2

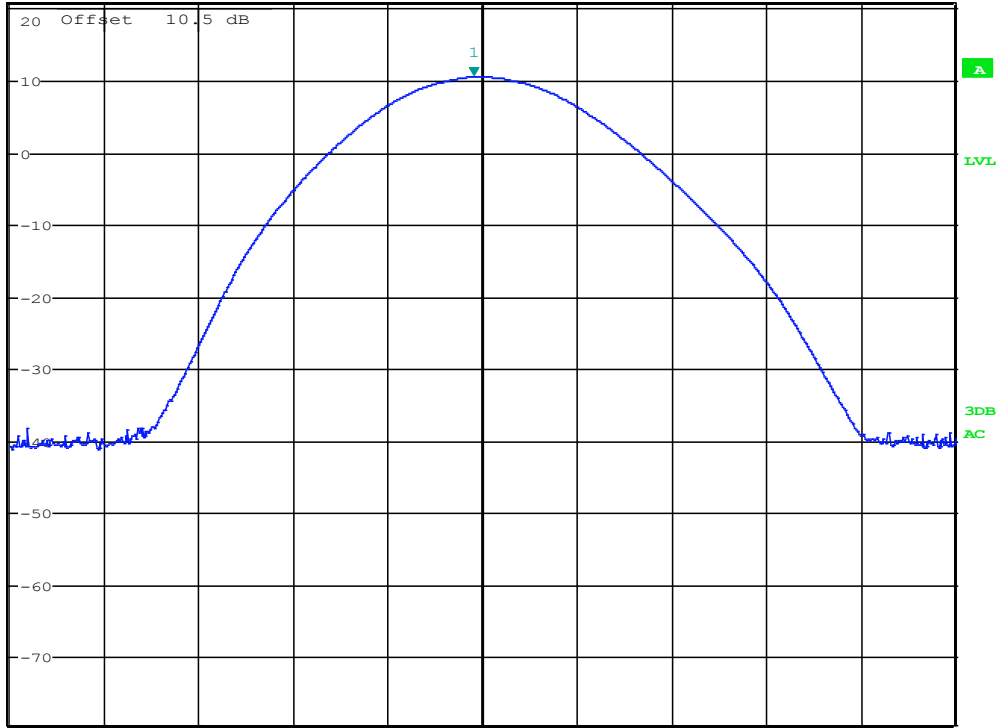


MARKER 1
 2.402807692 GHz

*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 10.52 dBm
 SWT 2.5 ms 2.402807692 GHz

Step 20.5 dBm *Att 20 dB

1 PK
 MAXH



Center 2.403 GHz 2 MHz/ Span 20 MHz

Date: 7.MAR.2015 14:52:13

Conducted power – 2403MHz,PK

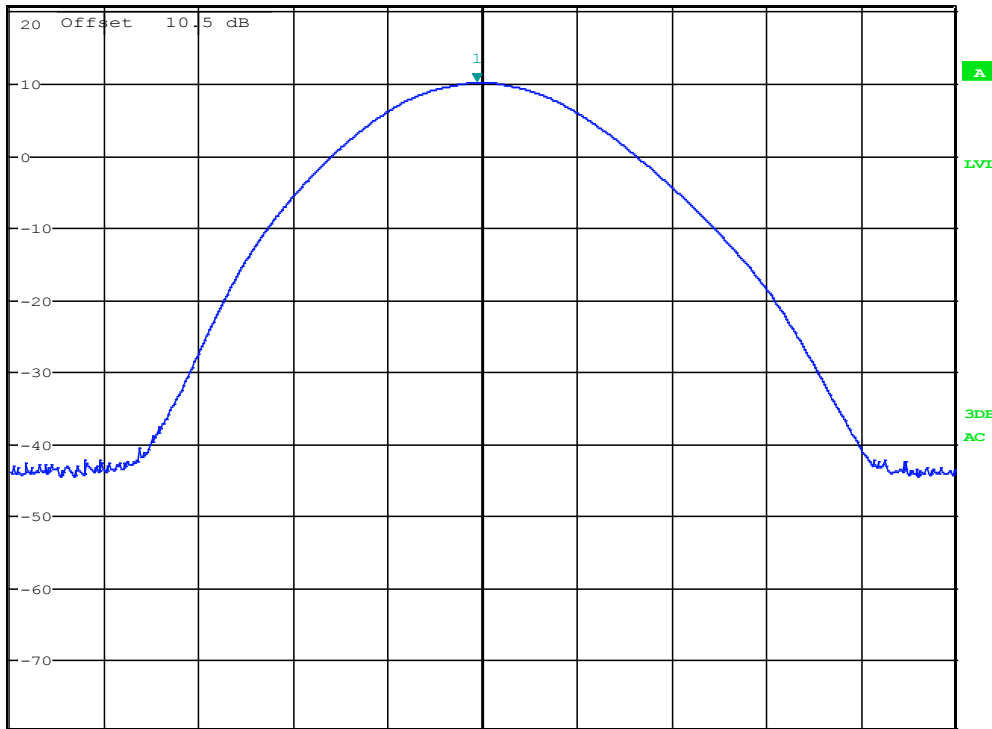


MARKER 1
2.442871795 GHz

*RBW 3 MHz Marker 1 [T1]
VBW 10 MHz 10.16 dBm
SWT 2.5 ms 2.442871795 GHz

Step 20.5 dBm *Att 15 dB

1 PK
MAXH



Center 2.443 GHz 2 MHz/ Span 20 MHz

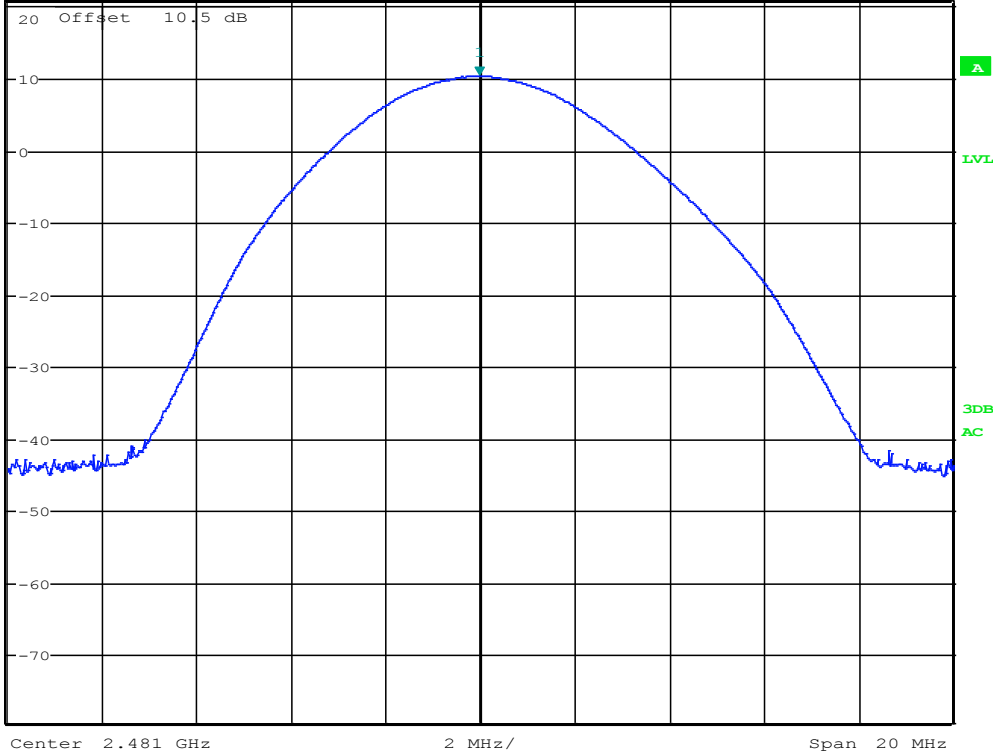
Date: 7.MAR.2015 14:58:50

Conducted power – 2443MHz,PK



MARKER 1
 2.480967949 GHz

*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 10.35 dBm
 *Att 15 dB SWT 2.5 ms 2.480967949 GHz



Date: 7.MAR.2015 15:03:44

Conducted power – 2481MHz, PK

3.5 Spurious Emissions (Radiated)

Para. No.: 15.247 (c)

Test Performed By: G.Suhanthakumar	Date of Test: 08 Mar 2015
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Test Results: Complies

Measurement Data: Antenna 1

Band-edge, @3m

Frequency	Measured Field Strength @3m, dB μ V/m	Detector	Limit dB μ V/m	Margin dB
2.39 GHz	43.8	PK	74	38.2
	37.1	AV	54	16.9
2.4835 GHz	72.9	PK	74	1.10
	45.8	AV	54	8.20

Measurement Data: Antenna 2

Band-edge, @3m

Frequency	Measured Field Strength @3m, dB μ V/m	Detector	Limit dB μ V/m	Margin dB
2.39 GHz	41.0	PK	74	33.0
	34.2	AV	54	19.8
2.4835 GHz	74.0	PK	74	0.0
	51.8	AV	54	2.2

Tested according to KDB 558074 D01 DTS Measurement Guidance v03r02, Section 13.1 & 13.3.2.

All tests were performed with the EUT transmitting at 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 plots.

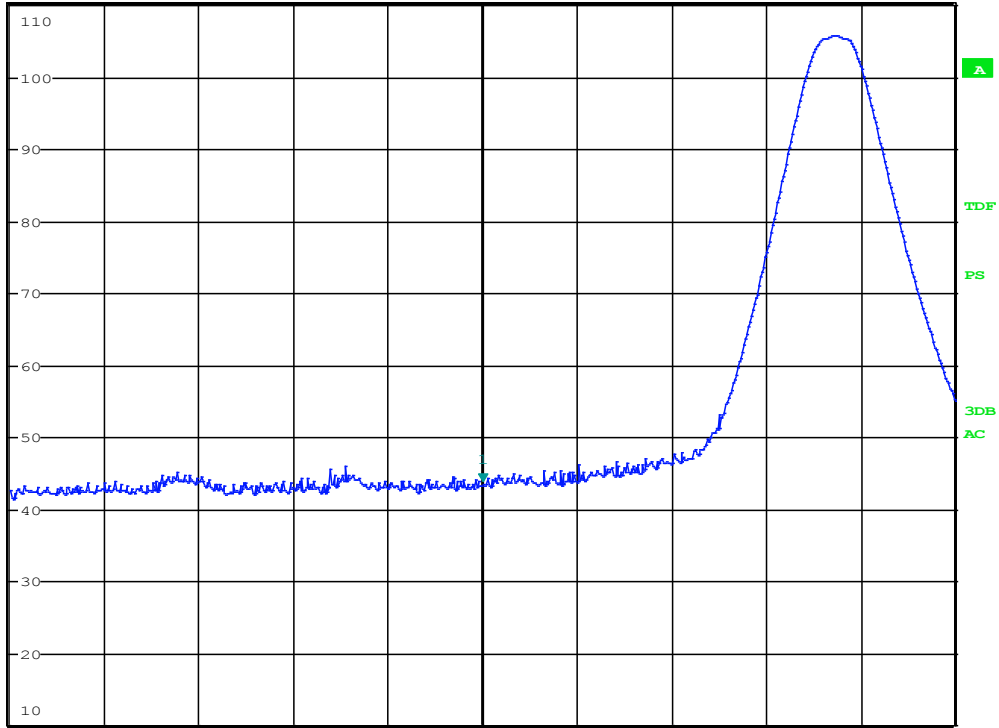


MARKER 1
 2.39 GHz

*RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 43.81 dBμV/m
 SWT 2.5 ms 2.390000000 GHz

Ref 110 dBμV/m *Att 10 dB

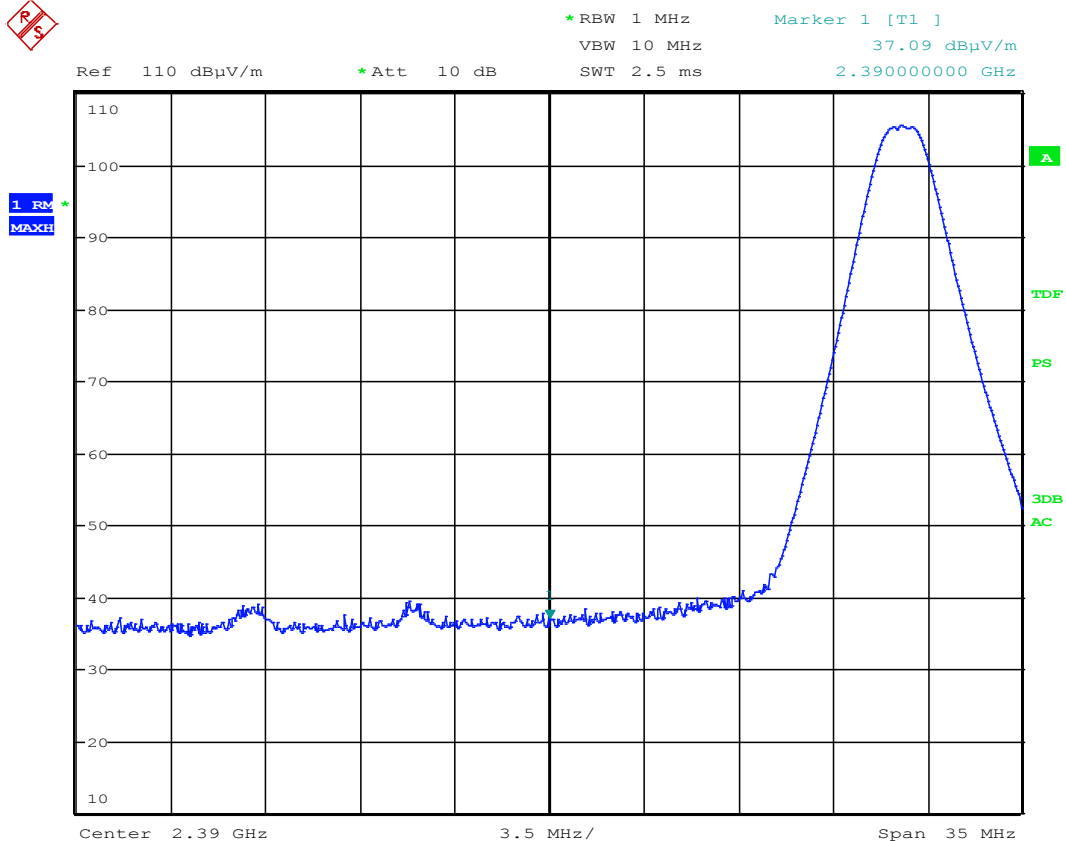
1 PK
 MAXH



Center 2.39 GHz 3.5 MHz/ Span 35 MHz

Date: 7.MAR.2015 11:35:37

Lower Band Edge, Peak Detector – Antenna 1



Date: 7.MAR.2015 11:36:28

Lower Band Edge, Average Detector – Antenna 1

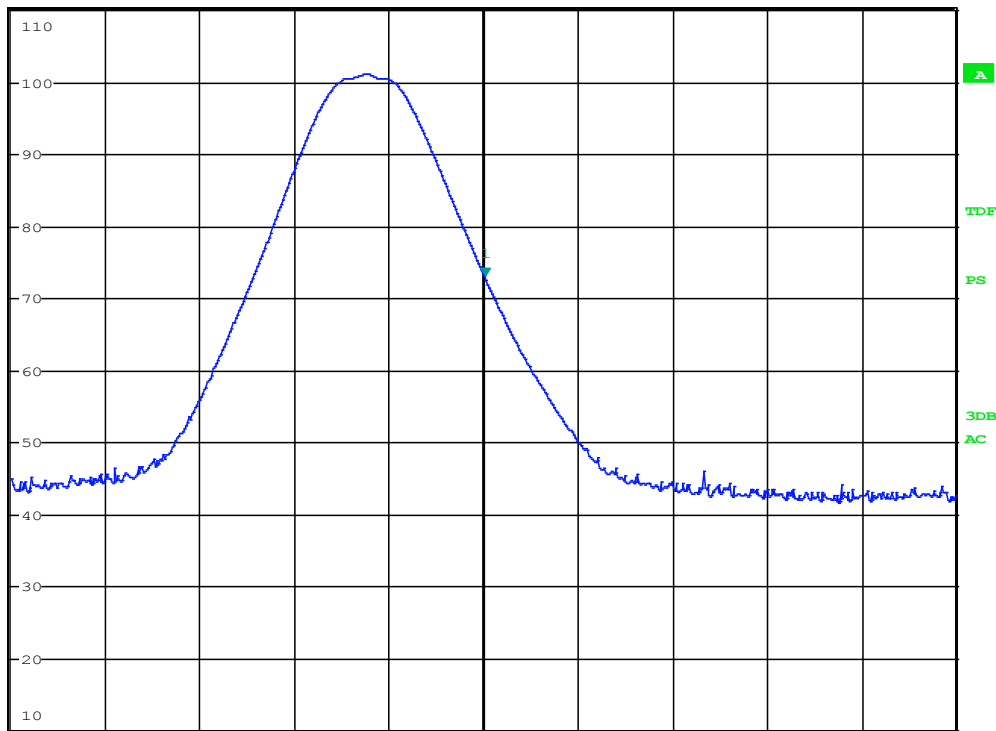


MARKER 1
 2.483525641 GHz

*RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 72.88 dBμV/m
 SWT 2.5 ms 2.483525641 GHz

Ref 110 dBμV/m *Att 10 dB

1 PK
 MAXH



Center 2.4835 GHz 2 MHz/ Span 20 MHz

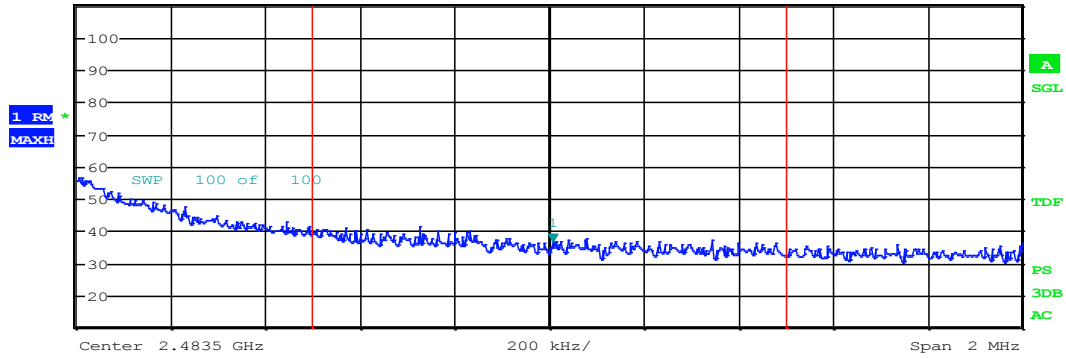
Date: 7.MAR.2015 12:55:11

Band Edge, 2483.5 MHz, Peak Detector – Antenna 1



MARKER 1
 2.48350641 GHz

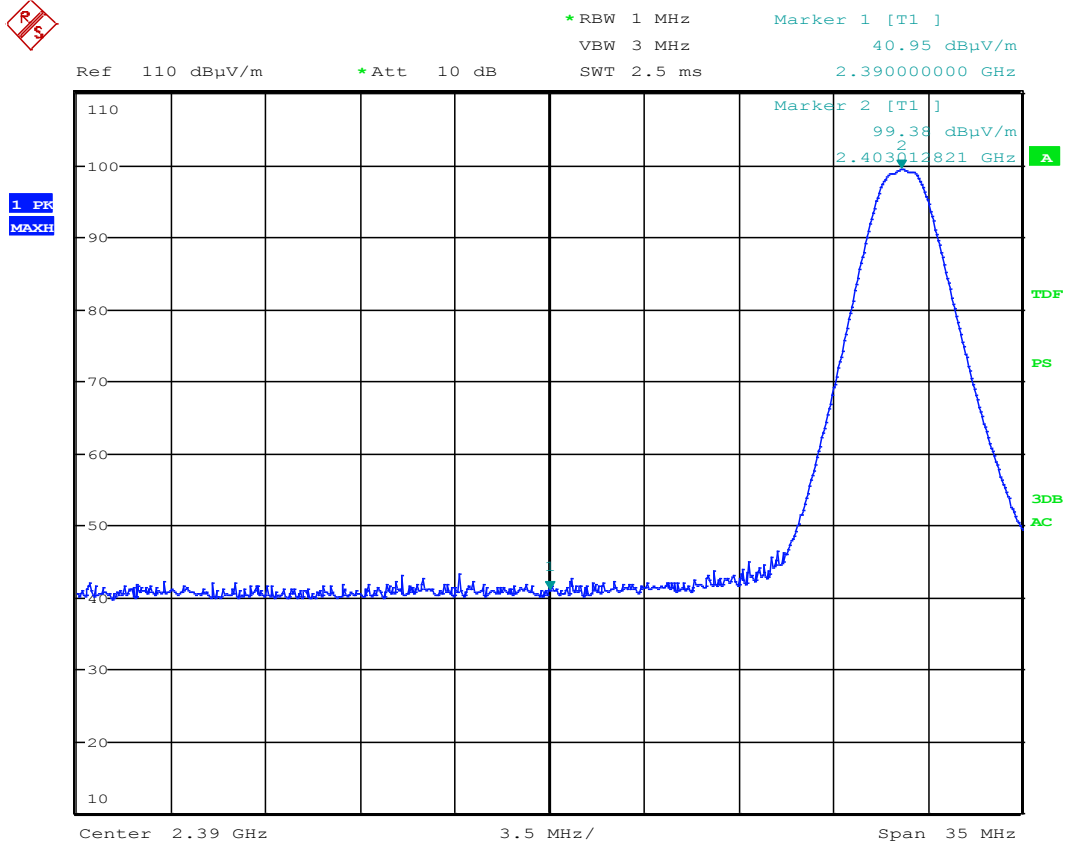
* REW 100 kHz
 VEW 1 MHz
 SWT 2.5 ms
 Marker 1 [T1]
 36.56 dBuV/m
 2.483506410 GHz



Tx Channel
 Bandwidth 1 MHz Power 45.84 dBuV/m

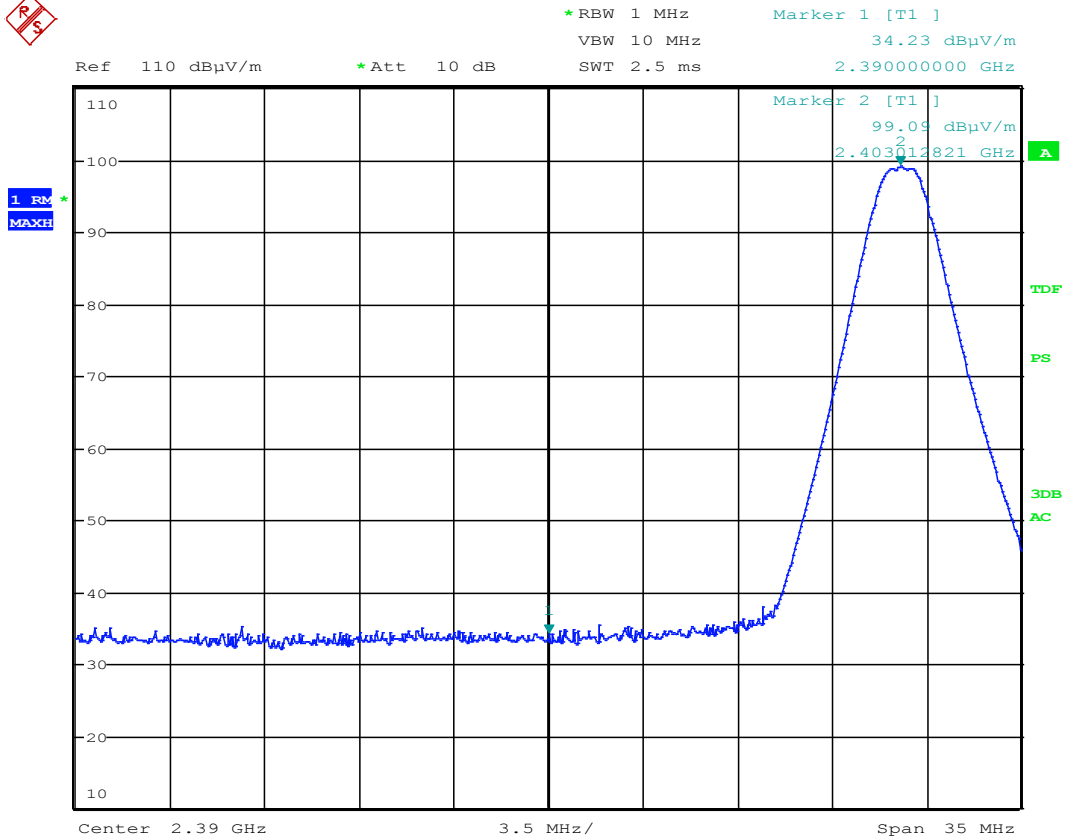
Date: 7.MAR.2015 12:57:12

Band edge power, 2483.5MHz, AV detector – Antenna 1



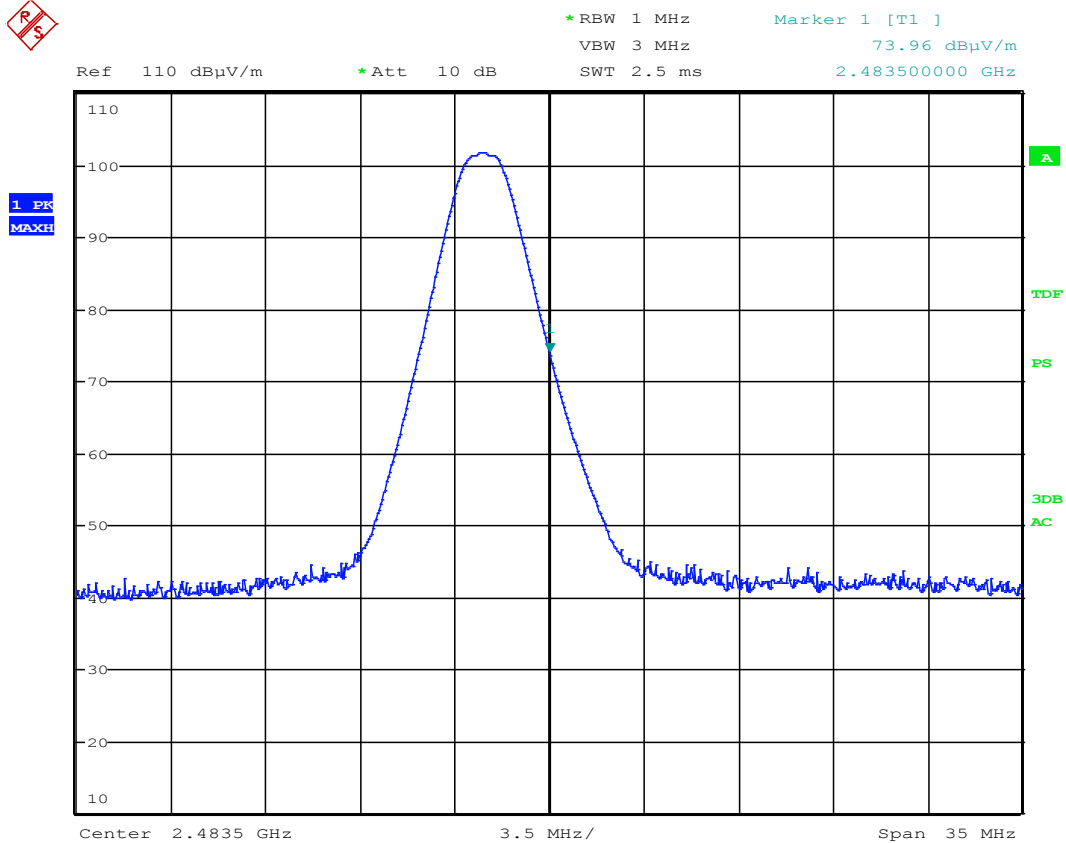
Date: 13.MAR.2015 11:54:35

Lower Band Edge, Peak Detector – Antenna 2



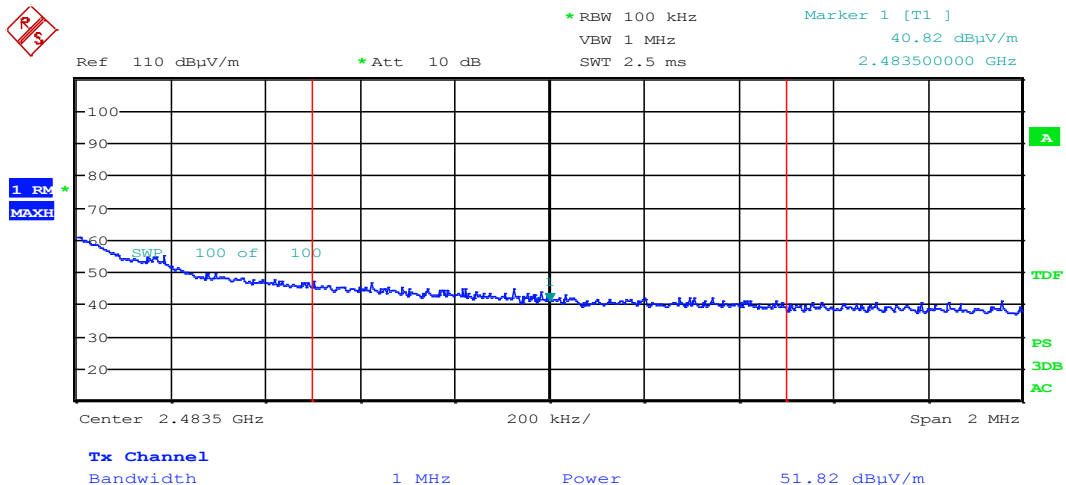
Date: 13.MAR.2015 11:55:02

Lower Band Edge, Average Detector – Antenna 2



Date: 13.MAR.2015 11:23:24

Band Edge, 2483.5 MHz, Peak Detector – Antenna 2



Date: 13.MAR.2015 11:21:57

Band edge power, 2483.5MHz, AV detector – Antenna 2

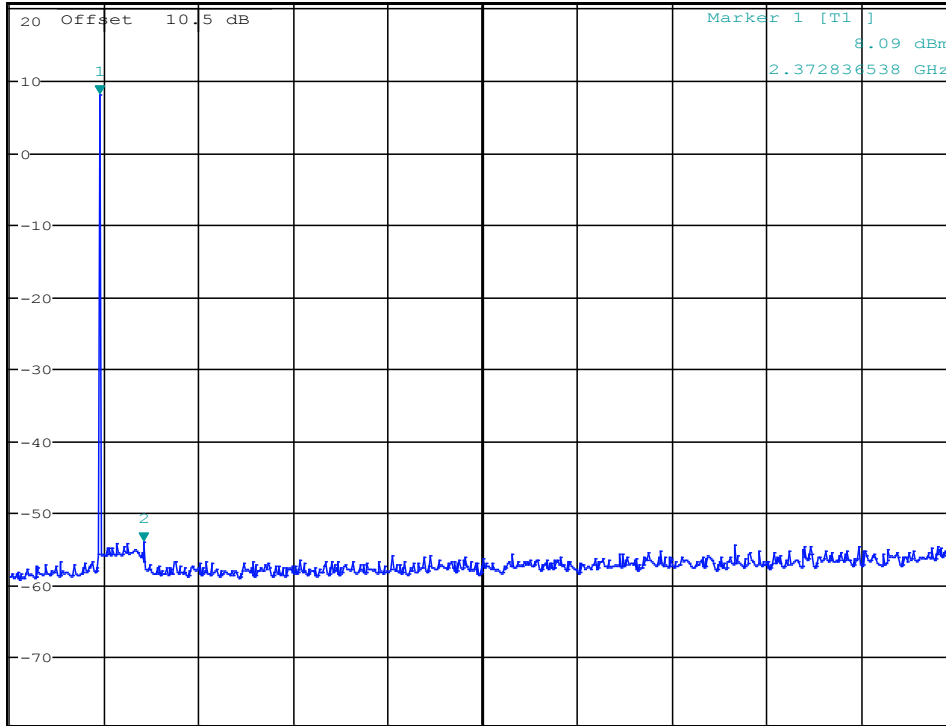


MARKER 2
 3.534230769 GHz

*RBW 100 kHz Marker 2 [T1]
 VBW 300 kHz -53.98 dBm
 SWT 2.5 s 3.534230769 GHz

Step 20.5 dBm *Att 15 dB

1 PK
 MAXH



Start 10 MHz 2.499 GHz/ Stop 25 GHz

Date: 7.MAR.2015 14:57:09

Conducted spurious emission 10MHz – 25GHz - ch2403MHz

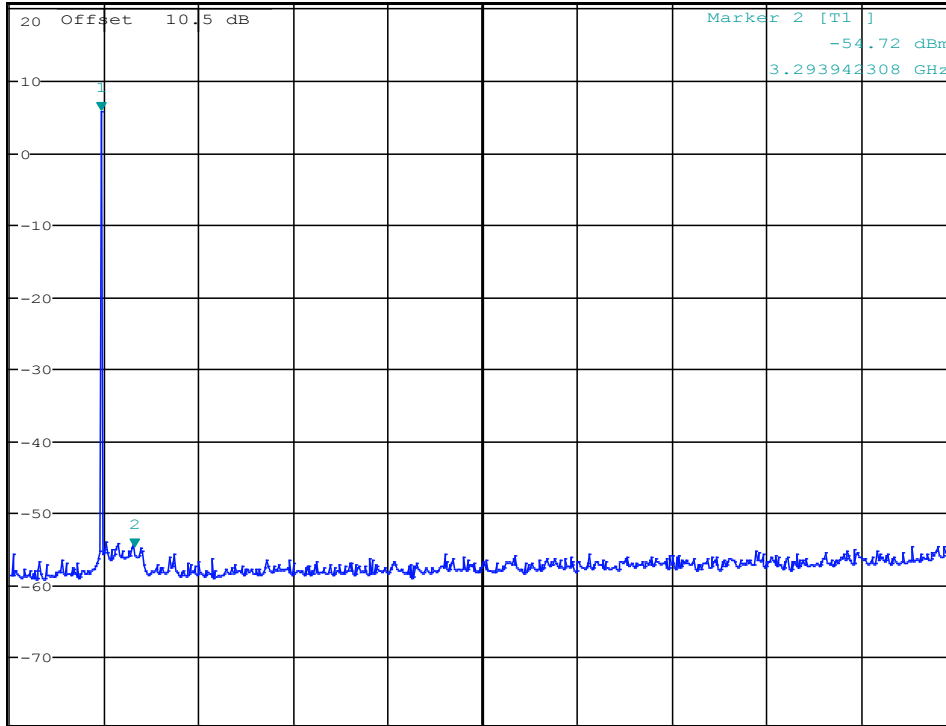


MARKER 1
 2.412884615 GHz

*RBW 100 kHz Marker 1 [T1]
 VBW 300 kHz 5.76 dBm
 SWT 2.5 s 2.412884615 GHz

Step 20.5 dBm *Att 15 dB

1 PK
 MAXH



Start 10 MHz 2.499 GHz/ Stop 25 GHz

Date: 7.MAR.2015 14:58:17

Conducted spurious emission 10MHz – 25GHz - ch2443MHz

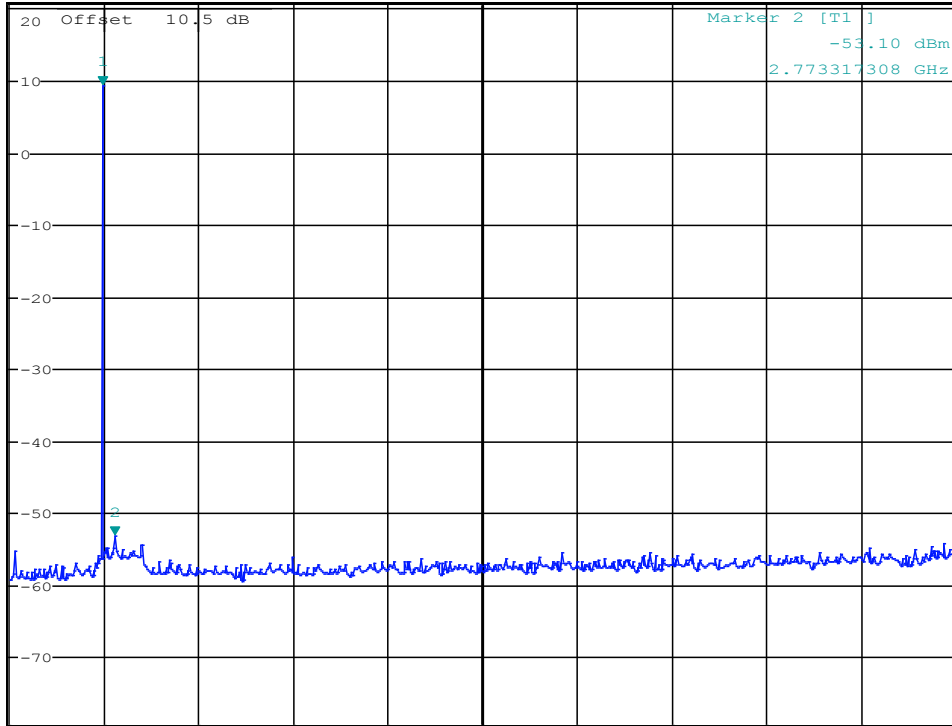


MARKER 1
 2.452932692 GHz

*RBW 100 kHz Marker 1 [T1]
 VBW 300 kHz 9.34 dBm
 SWT 2.5 s 2.452932692 GHz

Step 20.5 dBm *Att 15 dB

1 PK
 MAXH



Start 10 MHz 2.499 GHz/ Stop 25 GHz

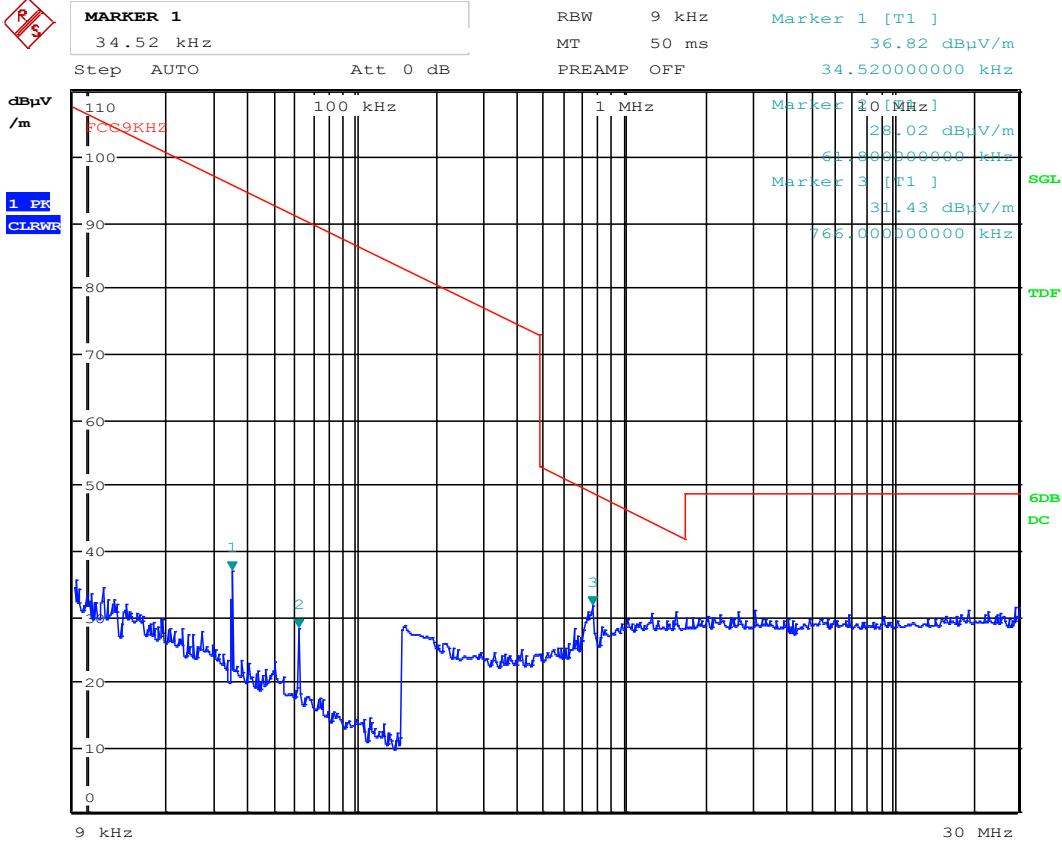
Date: 7.MAR.2015 15:03:11

Conducted spurious emission 10MHz – 25GHz - ch2481MHz

Radiated emissions 9kHz - 30 MHz.

Detector: Quasi-Peak

Measuring distance 10 m.



Date: 7.MAR.2015 14:01:24

Radiated Emissions, 9 kHz – 30 MHz @10m

Radiated emission 30 – 1000 MHz.

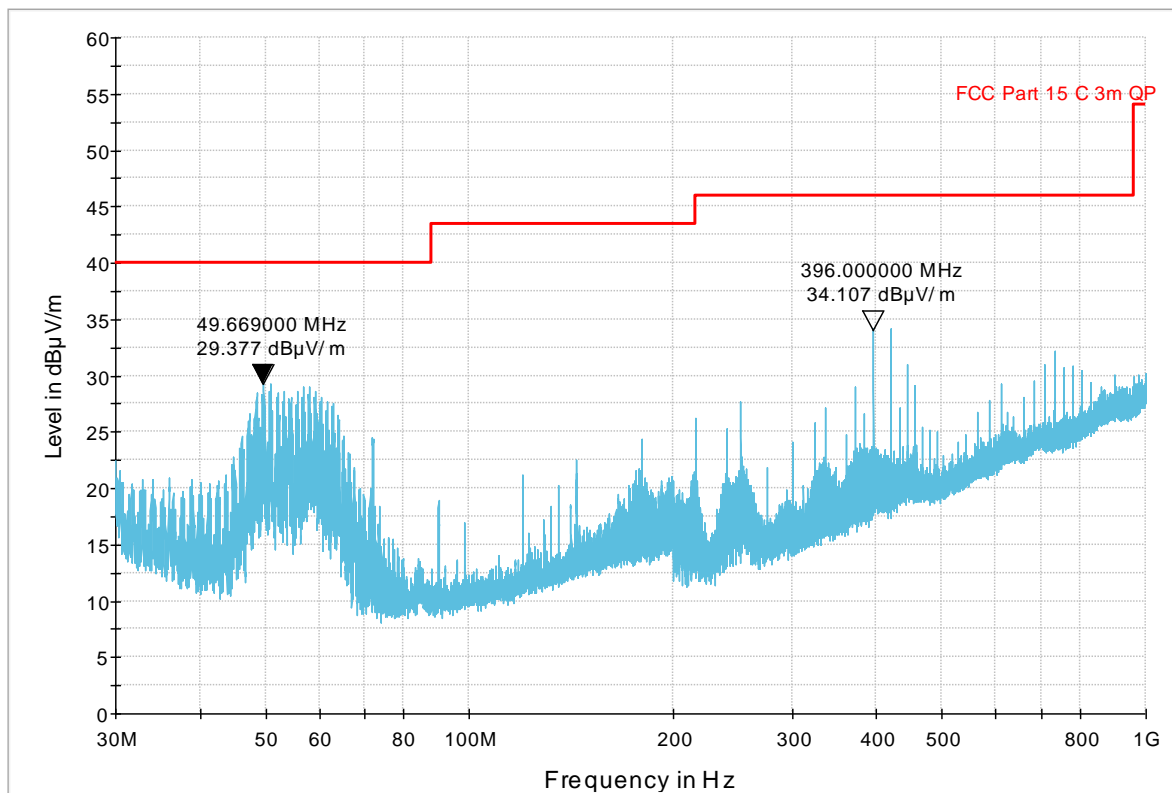
Detector: Peak

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
396.000	34.1	1000.0	120.000	245.0	H	287.0	2.9	11.9	46.0	



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

Radiated Emissions, 1-25 GHz

1-12 GHz measured at a distance of 3 m

12 - 25 GHz measured at 1m

Peak detector

Frequency MHz	Field Strength @3m dB μ V/m	Detector	Limit dB μ V/m	Margin dB
-	-	Pk	74	-

Average detector

Frequency MHz	Field Strength @3m dB μ V/m	Detector	Limit dB μ V/m	Margin dB
-	-	AV	54	-

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

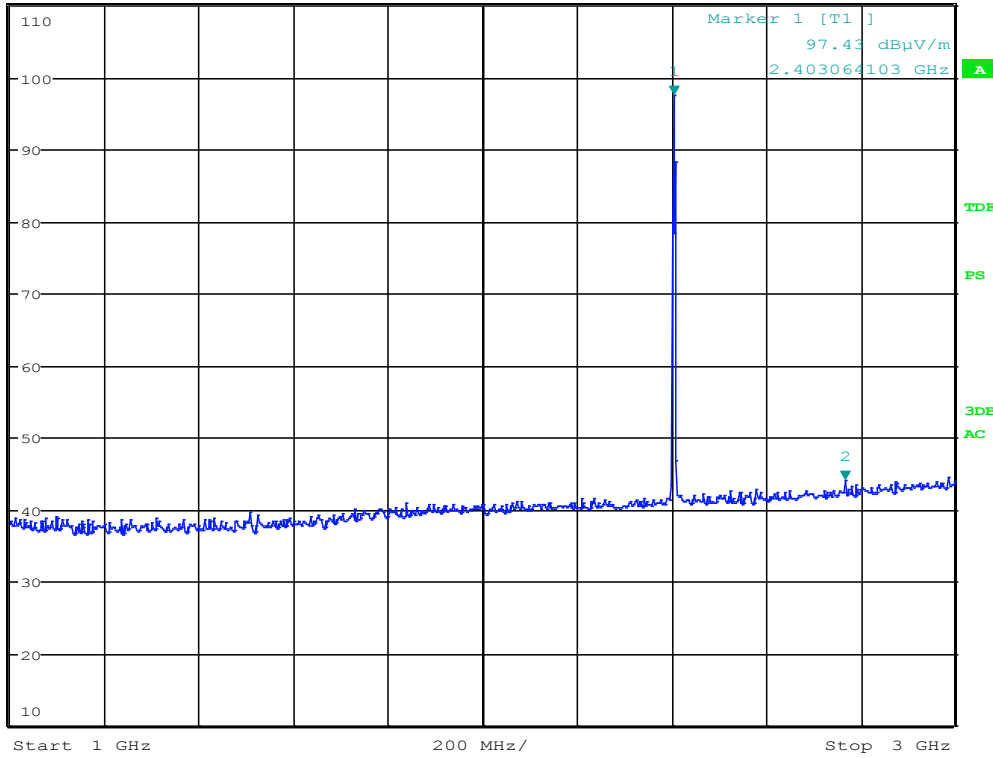


MARKER 2
 2.766025641 GHz
 Ref 110 dBuV/m *Att 10 dB

*RBW 1 MHz
 VBW 3 MHz
 SWT 5 ms

Marker 2 [T1]
 44.06 dBuV/m
 2.766025641 GHz

1 PR
 MAXH

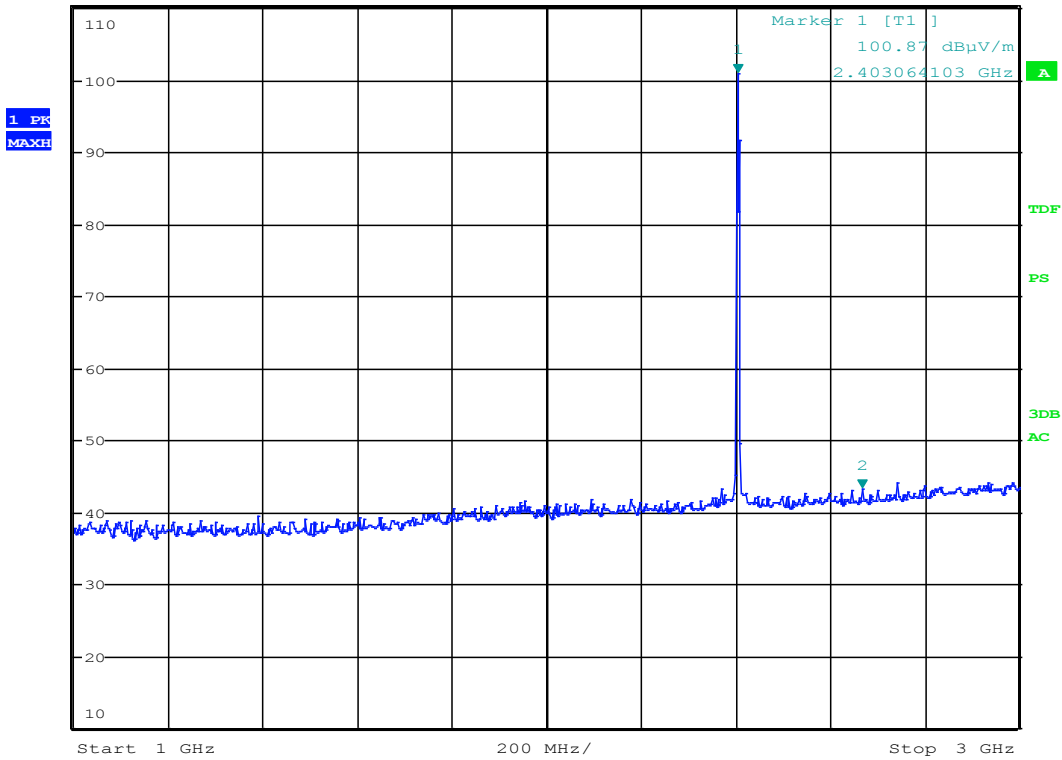


Date: 7.MAR.2015 12:18:21

Radiated Emissions ch. 2403 MHz, 1 – 3 GHz, VP, @3m – Pre-scan with Peak detector – antenna 1



MARKER 2
 2.666666667 GHz
 Ref 110 dBuV/m *Att 10 dB *RBW 1 MHz Marker 2 [T1]
 VBW 3 MHz 43.21 dBuV/m
 SWT 5 ms 2.666666667 GHz



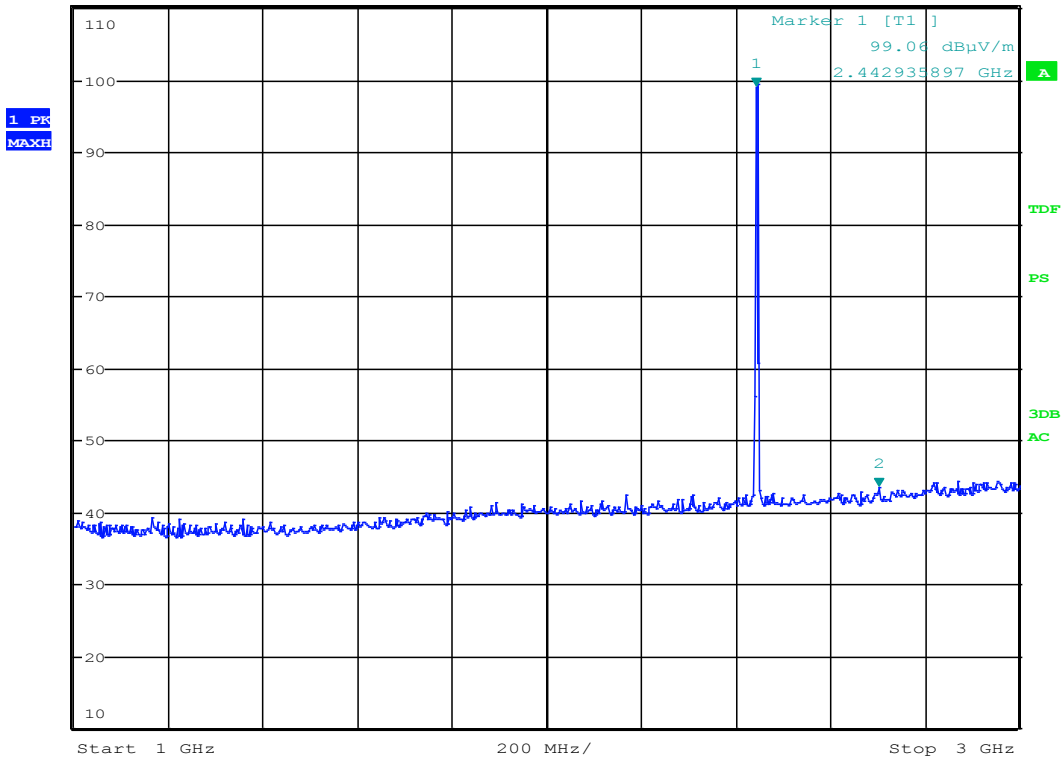
Date: 7.MAR.2015 12:16:42

Radiated Emissions ch. 2403 MHz, 1 – 3 GHz, HP, @3m – Pre-scan with Peak detector – antenna 1



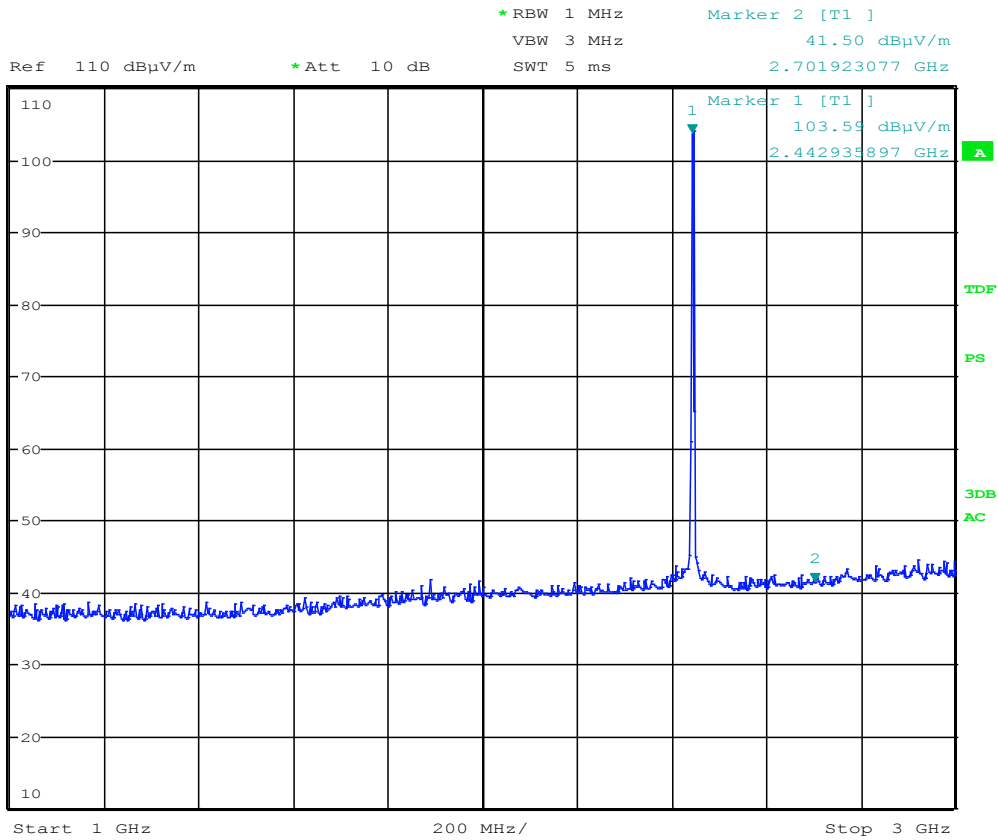
MARKER 2
 2.701923077 GHz
 Ref 110 dBuV/m *Att 10 dB

*RBW 1 MHz Marker 2 [T1]
 VBW 3 MHz 43.56 dBuV/m
 SWT 5 ms 2.701923077 GHz



Date: 7.MAR.2015 12:39:10

Radiated Emissions ch. 2443 MHz, 1 – 3 GHz, VP, @3m – Pre-scan with Peak detector - antenna 1



Date: 7.MAR.2015 12:39:41

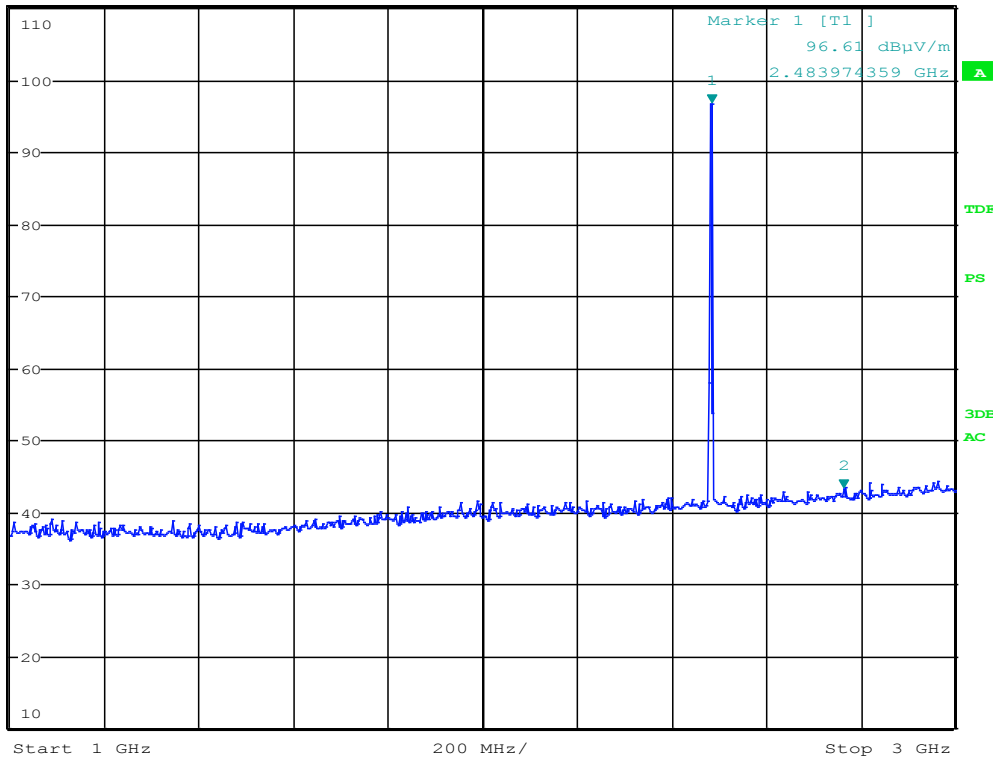
Radiated Emissions ch. 2443 MHz, 1 – 3 GHz, HP, @3m – Pre-scan with Peak detector – antenna 1



MARKER 2
 2.762820513 GHz
 Ref 110 dBuV/m *Att 10 dB

*RBW 1 MHz Marker 2 [T1]
 VBW 3 MHz 43.19 dBuV/m
 SWT 5 ms 2.762820513 GHz

1 PR
 MAXH

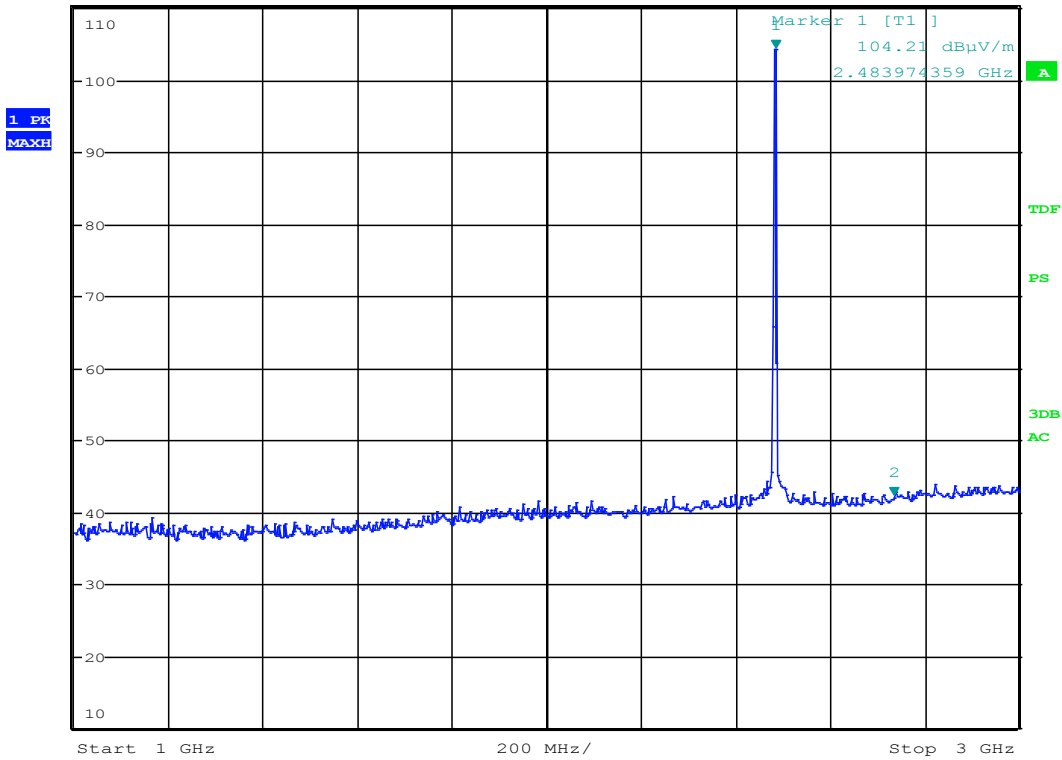


Date: 7.MAR.2015 12:41:51

Radiated Emissions ch. 2481 MHz, 1 – 3 GHz, VP, @3m – Pre-scan with Peak detector - antenna 1



MARKER 2
 2.733974359 GHz
 Ref 110 dBuV/m *Att 10 dB
 *RBW 1 MHz Marker 2 [T1]
 VBW 3 MHz 42.23 dBuV/m
 SWT 5 ms 2.733974359 GHz

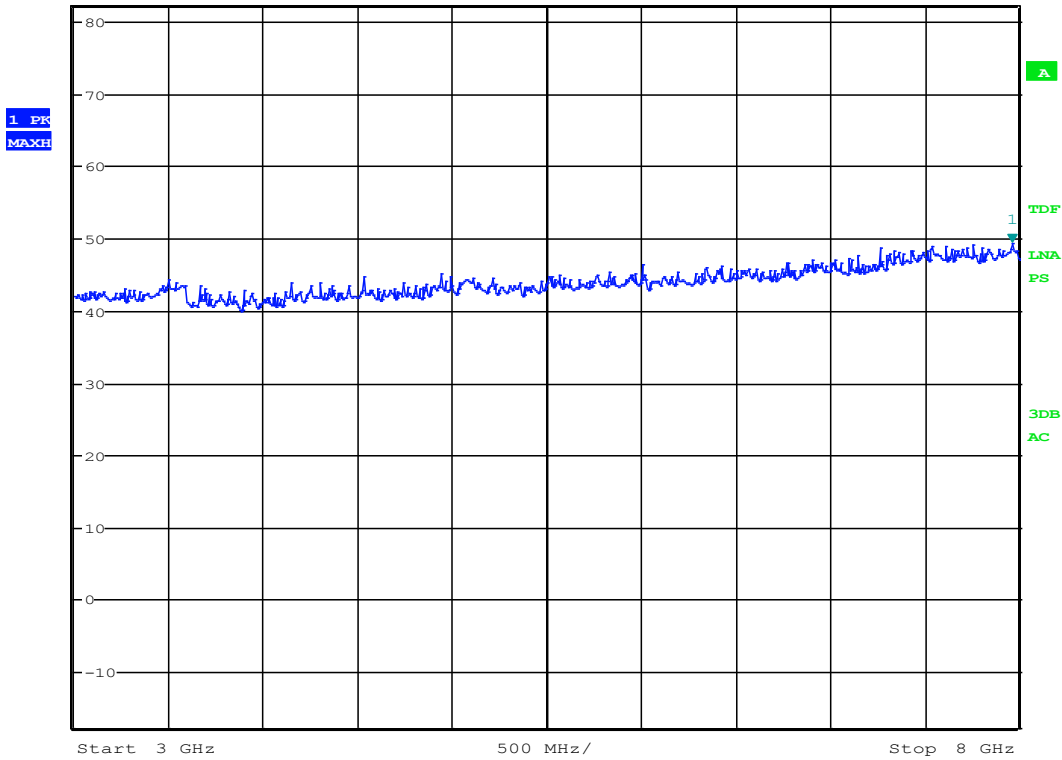


Date: 7.MAR.2015 12:41:14

Radiated Emissions ch. 2481 MHz, 1 – 3 GHz, HP, @3m – Pre-scan with Peak detector – antenna 1



MARKER 1	*RBW 1 MHz	Marker 1 [T1]
7.959935897 GHz	VBW 3 MHz	49.43 dBµV/m
Ref 82 dBµV/m	*Att 10 dB	SWT 30 ms
		7.959935897 GHz

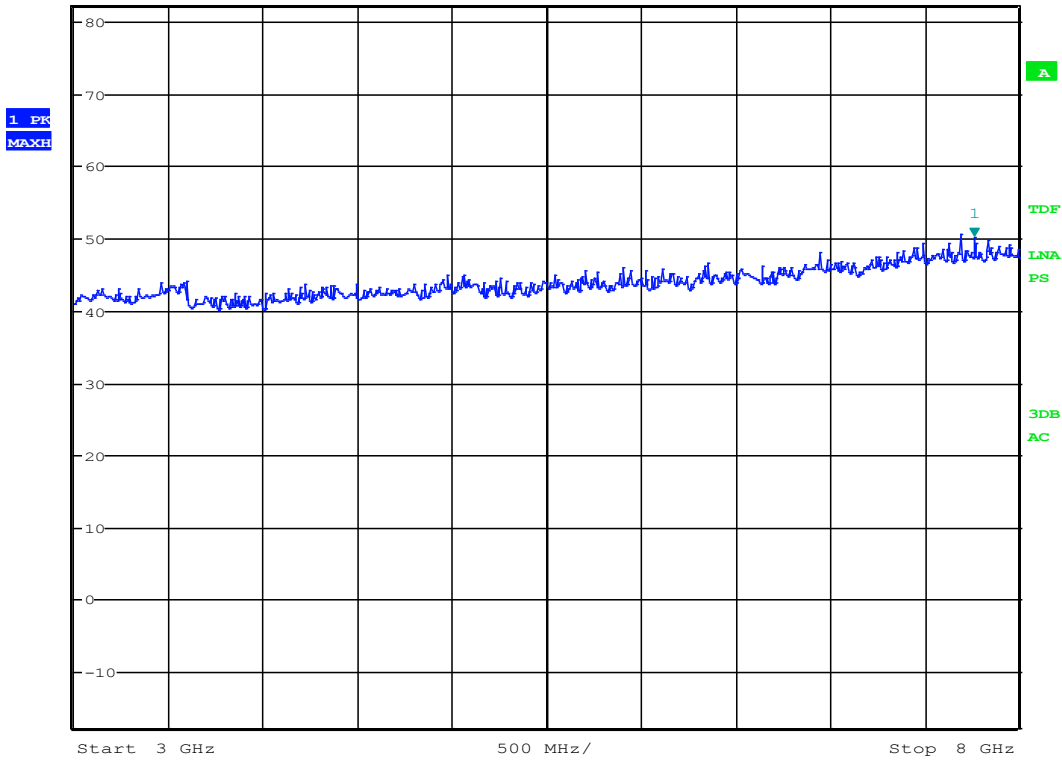


Date: 7.MAR.2015 13:11:19

Radiated Emissions ch. 2403 MHz, 3 – 8 GHz, VP, @3m – Pre-scan with Peak detector – antenna 1



MARKER 1
 7.759615385 GHz
 Ref 82 dB μ V/m *Att 10 dB *RBW 1 MHz VBW 3 MHz SWT 30 ms
 Marker 1 [T1] 50.21 dB μ V/m 7.759615385 GHz

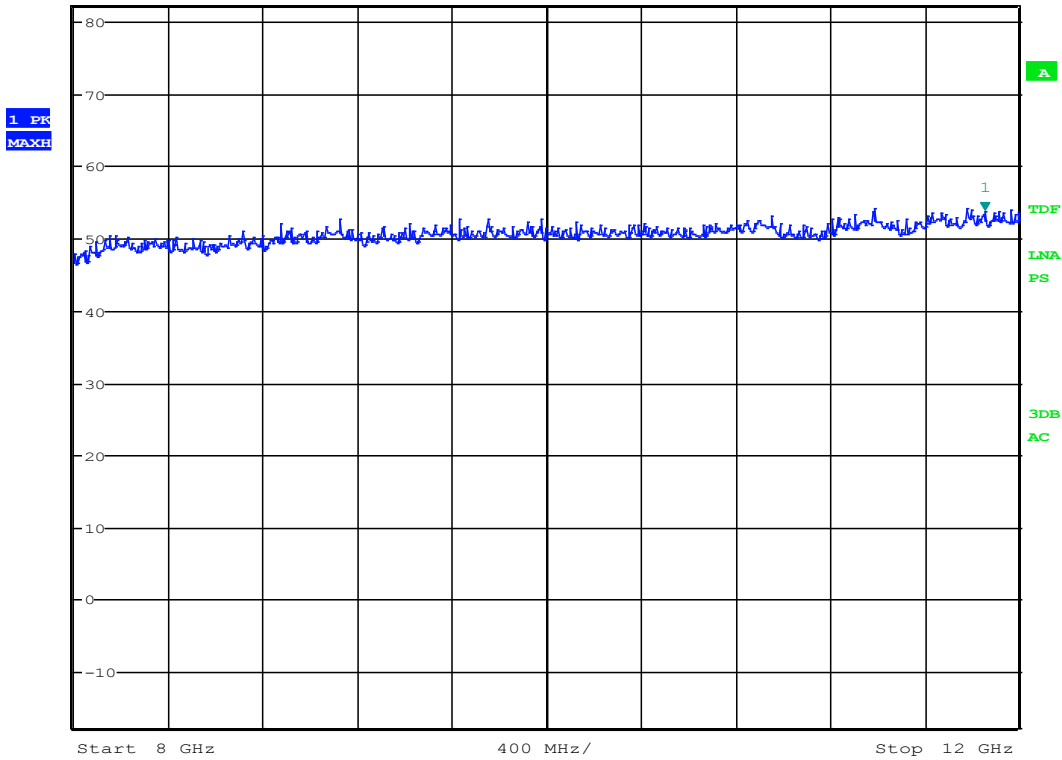


Date: 7.MAR.2015 13:12:17

Radiated Emissions ch. 2403 MHz, 3 – 8 GHz, HP, @3m – Pre-scan with Peak detector – antenna 1



MARKER 1
 11.8525641 GHz
 Ref 82 dB μ V/m *Att 10 dB *RBW 1 MHz VBW 3 MHz SWT 25 ms
 Marker 1 [T1] 53.69 dB μ V/m 11.852564103 GHz

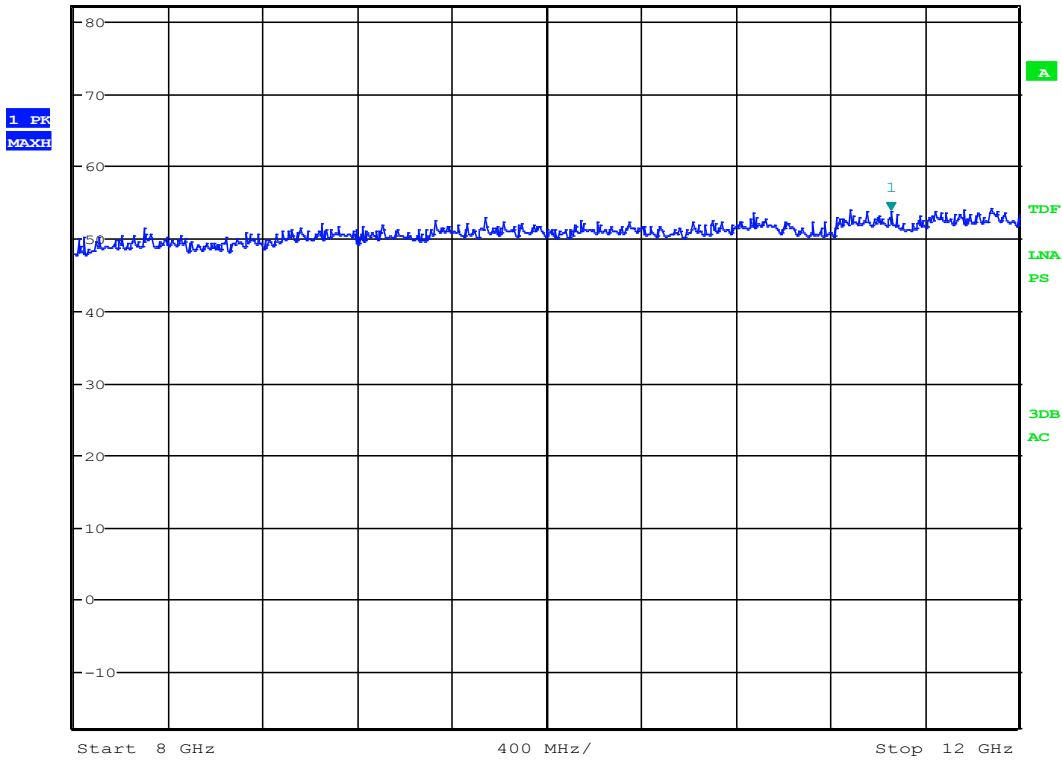


Date: 7.MAR.2015 13:20:07

Radiated Emissions ch. 2403 MHz, 8 – 12 GHz, VP, @3m – Pre-scan with Peak detector – antenna 1



MARKER 1
 11.45512821 GHz
 Ref 82 dB μ V/m *Att 10 dB *RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 53.73 dB μ V/m
 SWT 25 ms 11.455128205 GHz

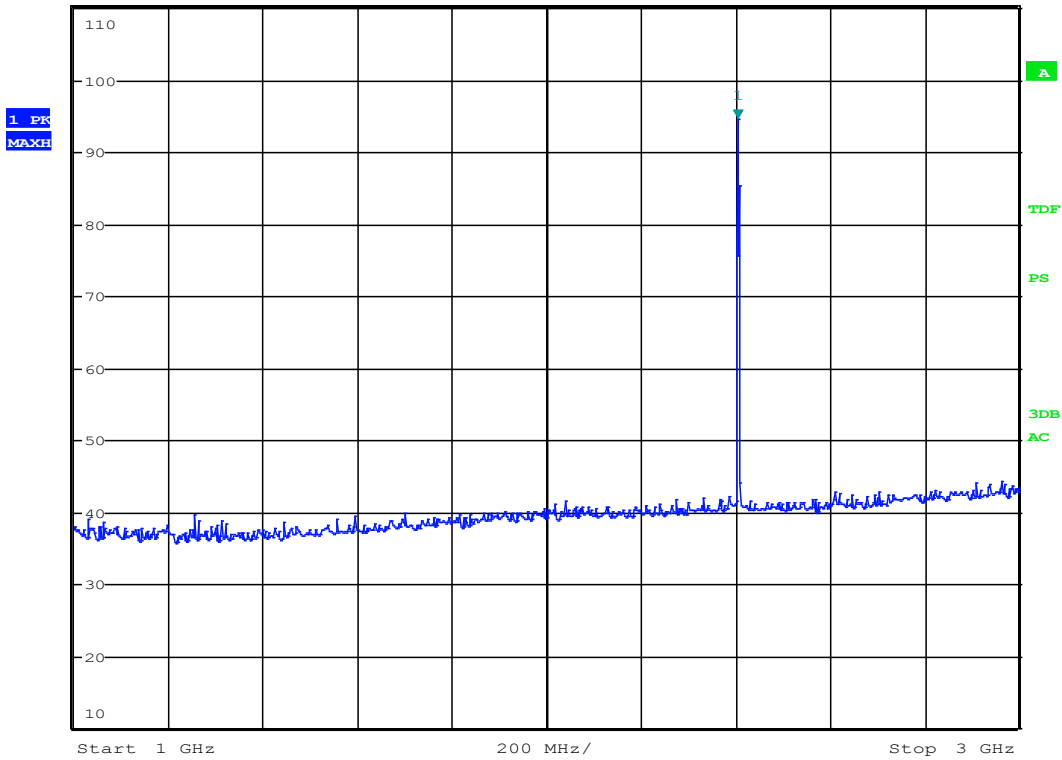


Date: 7.MAR.2015 13:19:39

Radiated Emissions ch. 2403 MHz, 8 – 12 GHz, HP, @3m – Pre-scan with Peak detector – antenna 1



MARKER 1
 2.403846154 GHz
 Ref 110 dBuV/m *Att 10 dB *RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 94.58 dBuV/m
 SWT 5 ms 2.403846154 GHz

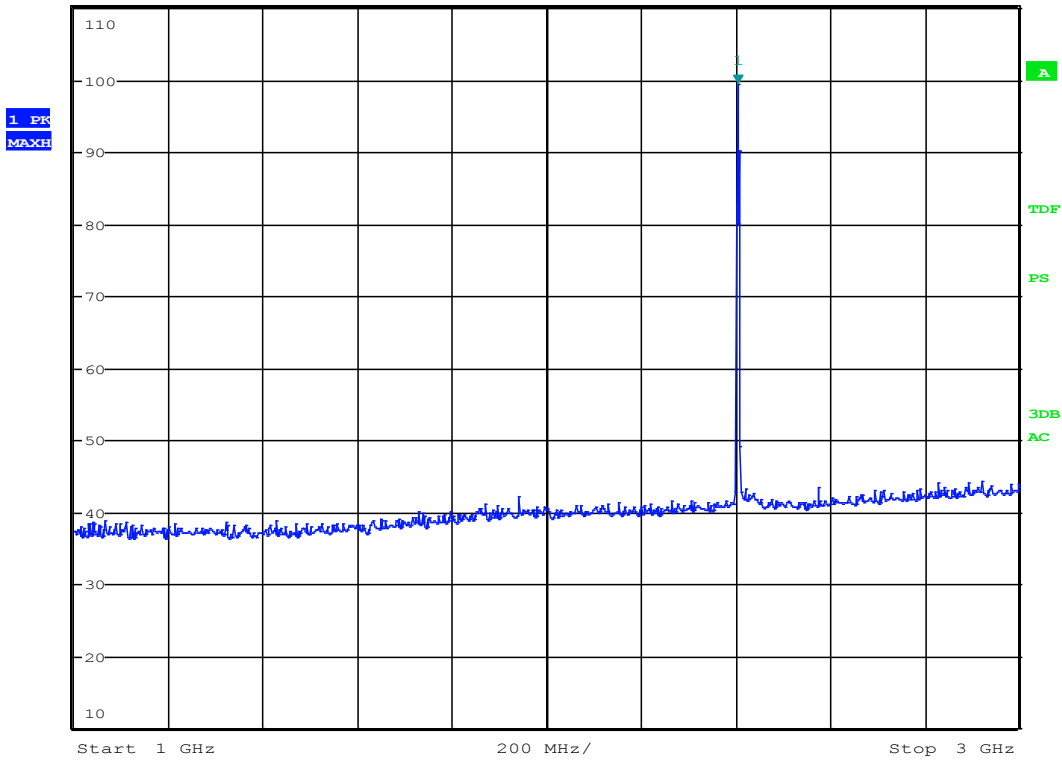


Date: 13.MAR.2015 11:57:59

Radiated Emissions ch. 2403 MHz, 1 – 3 GHz, VP, @3m – Pre-scan with Peak detector – antenna 2



MARKER 1
 2.403846154 GHz
 Ref 110 dBuV/m *Att 10 dB *RBW 1 MHz VBW 3 MHz SWT 5 ms
 Marker 1 [T1] 99.36 dBuV/m
 2.403846154 GHz



Date: 13.MAR.2015 11:55:46

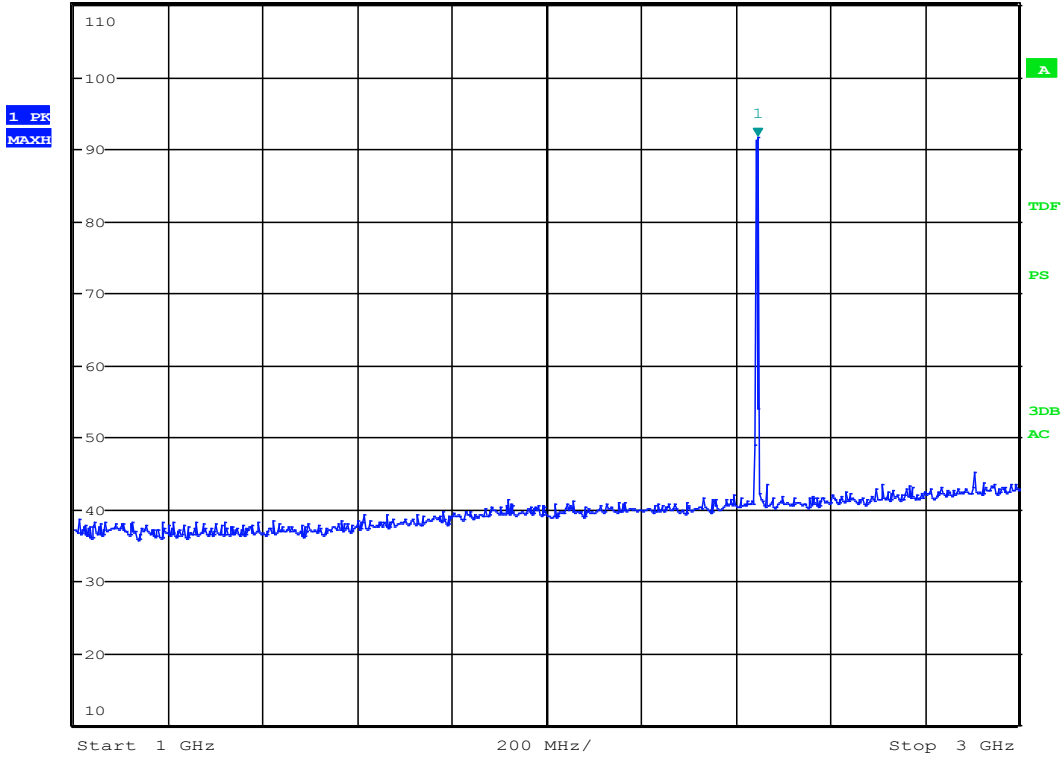
Radiated Emissions ch. 2403 MHz, 1 – 3 GHz, HP, @3m – Pre-scan with Peak detector – antenna 2



MARKER 1
 2.445512821 GHz
 Ref 110 dBuV/m *Att 10 dB

*RBW 1 MHz
 VBW 3 MHz
 SWT 5 ms

Marker 1 [T1]
 91.70 dBuV/m
 2.445512821 GHz



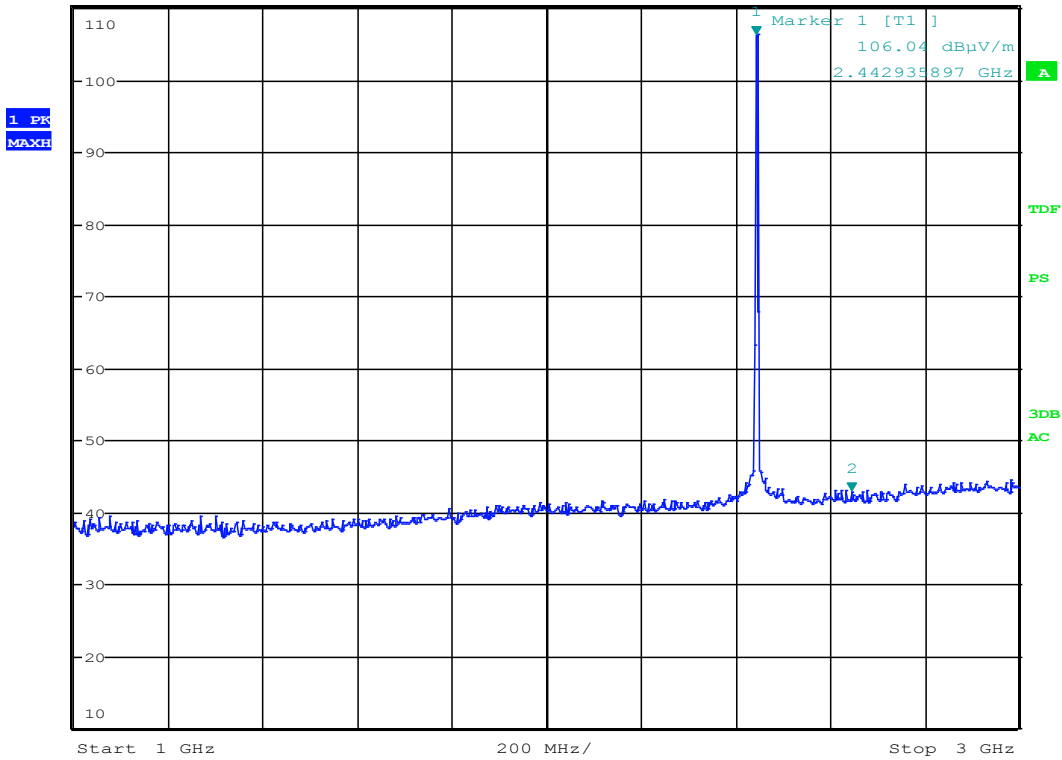
Date: 13.MAR.2015 11:58:57

Radiated Emissions ch. 2443 MHz, 1 – 3 GHz, VP, @3m – Pre-scan with Peak detector - antenna 2



MARKER 2
 2.644230769 GHz
 Ref 110 dBuV/m *Att 10 dB

*RBW 1 MHz Marker 2 [T1]
 VBW 3 MHz 42.79 dBuV/m
 SWT 5 ms 2.644230769 GHz

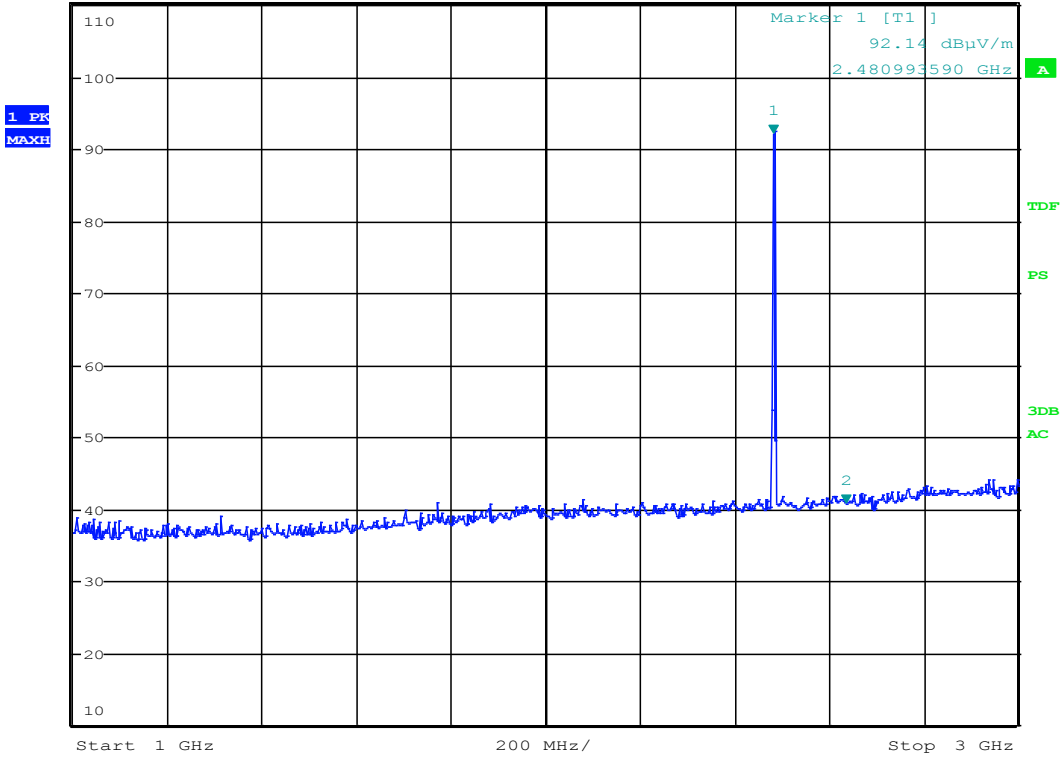


Date: 7.MAR.2015 12:36:51

Radiated Emissions ch. 2443 MHz, 1 – 3 GHz, HP, @3m – Pre-scan with Peak detector – antenna 2



*RBW 1 MHz Marker 2 [T1]
 VBW 3 MHz 40.82 dBuV/m
 Ref 110 dBuV/m *Att 10 dB SWT 5 ms 2.634615385 GHz



Date: 7.MAR.2015 12:50:57

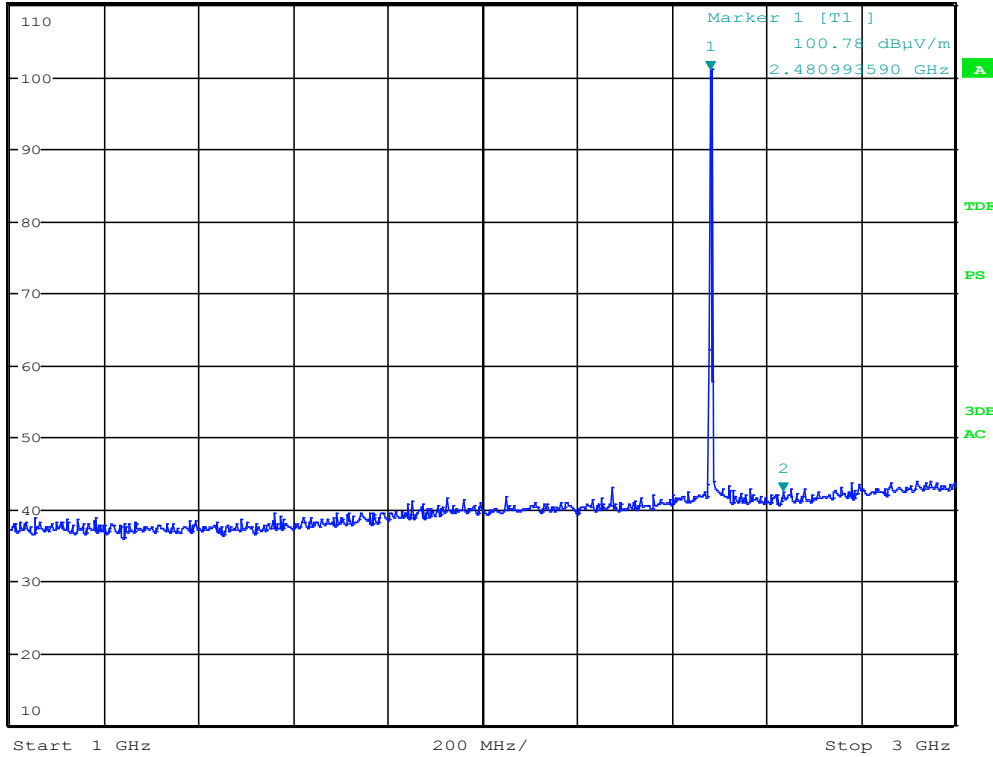
Radiated Emissions ch. 2481 MHz, 1 – 3 GHz, VP, @3m – Pre-scan with Peak detector - antenna 2



MARKER 2
 2.634615385 GHz
 Ref 110 dBuV/m *Att 10 dB

*RBW 1 MHz Marker 2 [T1]
 VBW 3 MHz 42.47 dBuV/m
 SWT 5 ms 2.634615385 GHz

1 PR
 MAXH

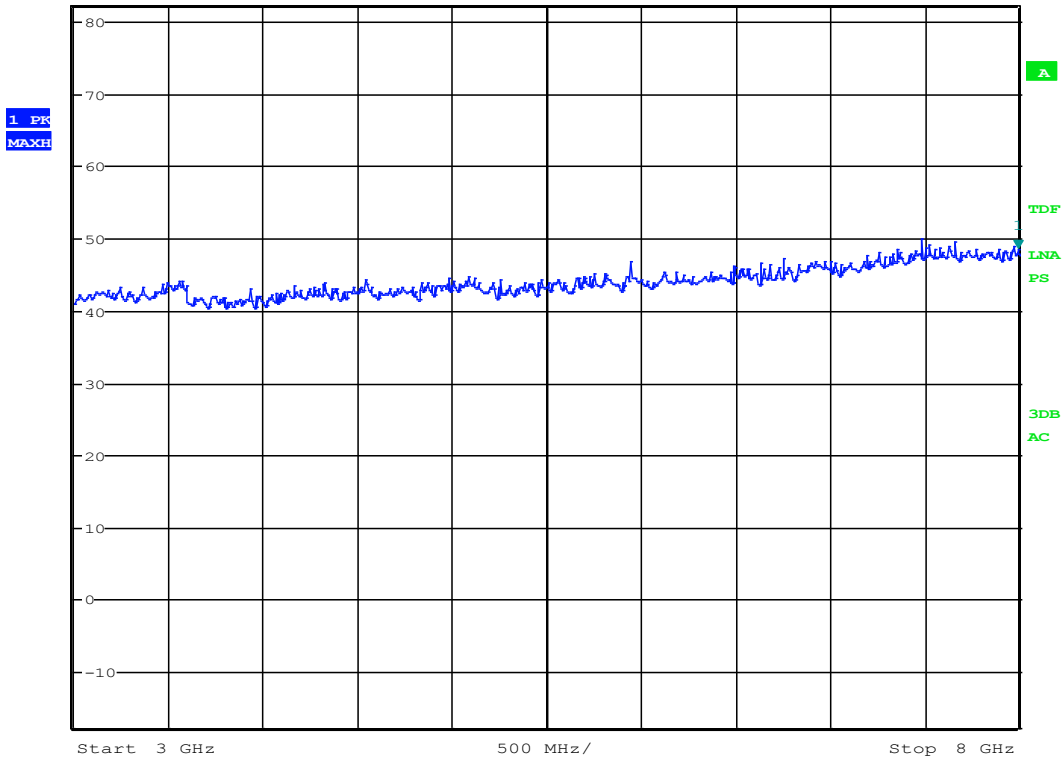


Date: 7.MAR.2015 12:49:57

Radiated Emissions ch. 2481 MHz, 1 – 3 GHz, HP, @3m – Pre-scan with Peak detector – antenna 2



MARKER 1
 7.991987179 GHz
 Ref 82 dB μ V/m *Att 10 dB *RBW 1 MHz VBW 3 MHz SWT 30 ms
 Marker 1 [T1] 48.48 dB μ V/m 7.991987179 GHz

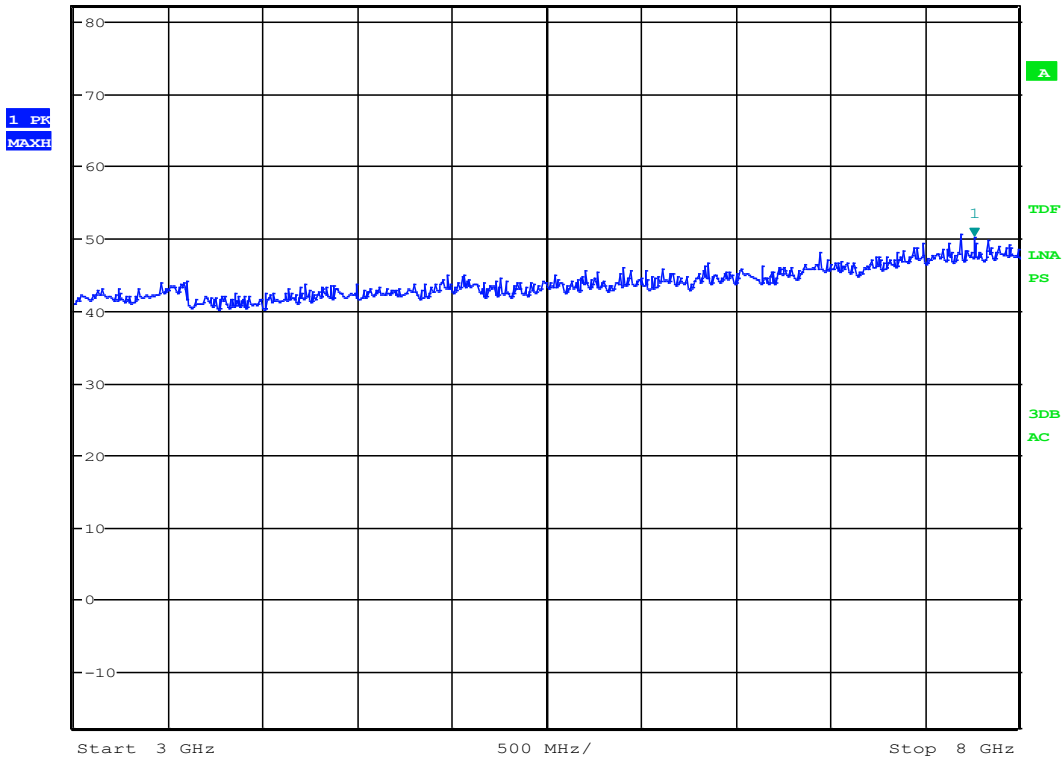


Date: 7.MAR.2015 13:11:53

Radiated Emissions ch. 2403 MHz, 3 – 8 GHz, VP, @3m – Pre-scan with Peak detector – antenna 2



MARKER 1
 7.759615385 GHz
 Ref 82 dB μ V/m *Att 10 dB *RBW 1 MHz VBW 3 MHz SWT 30 ms
 Marker 1 [T1] 50.21 dB μ V/m 7.759615385 GHz

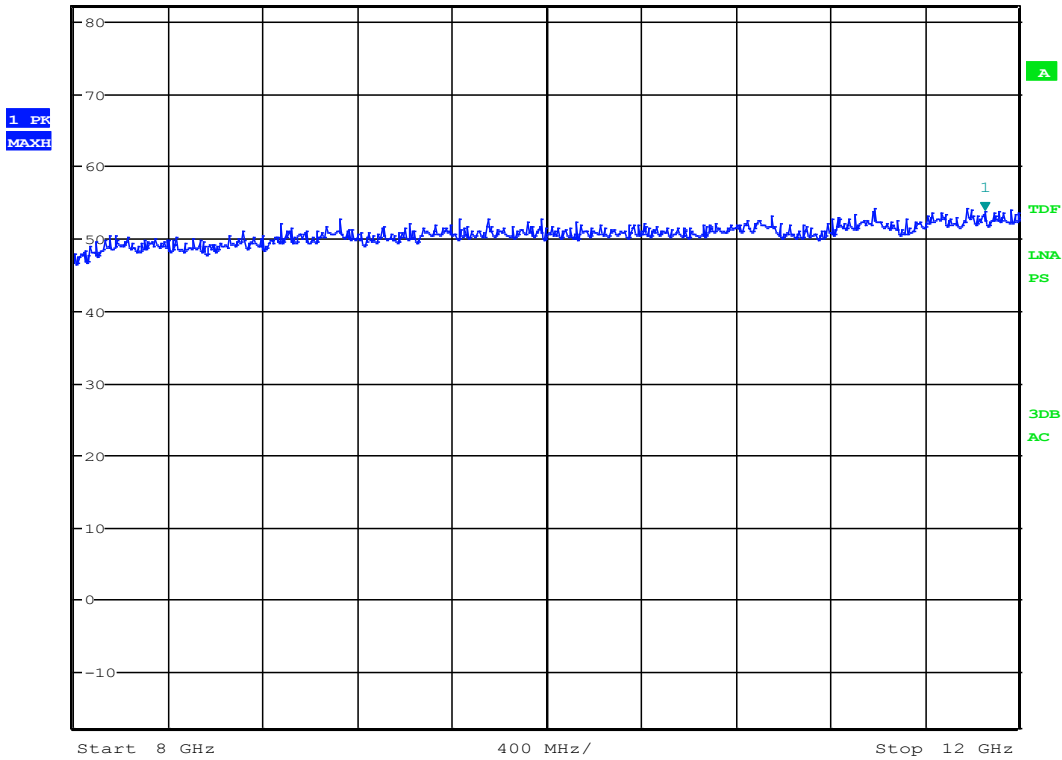


Date: 7.MAR.2015 13:12:17

Radiated Emissions ch. 2403 MHz, 3 – 8 GHz, HP, @3m – Pre-scan with Peak detector – antenna 2



MARKER 1
 11.8525641 GHz
 Ref 82 dB μ V/m *Att 10 dB *RBW 1 MHz VBW 3 MHz SWT 25 ms
 Marker 1 [T1] 53.69 dB μ V/m 11.852564103 GHz

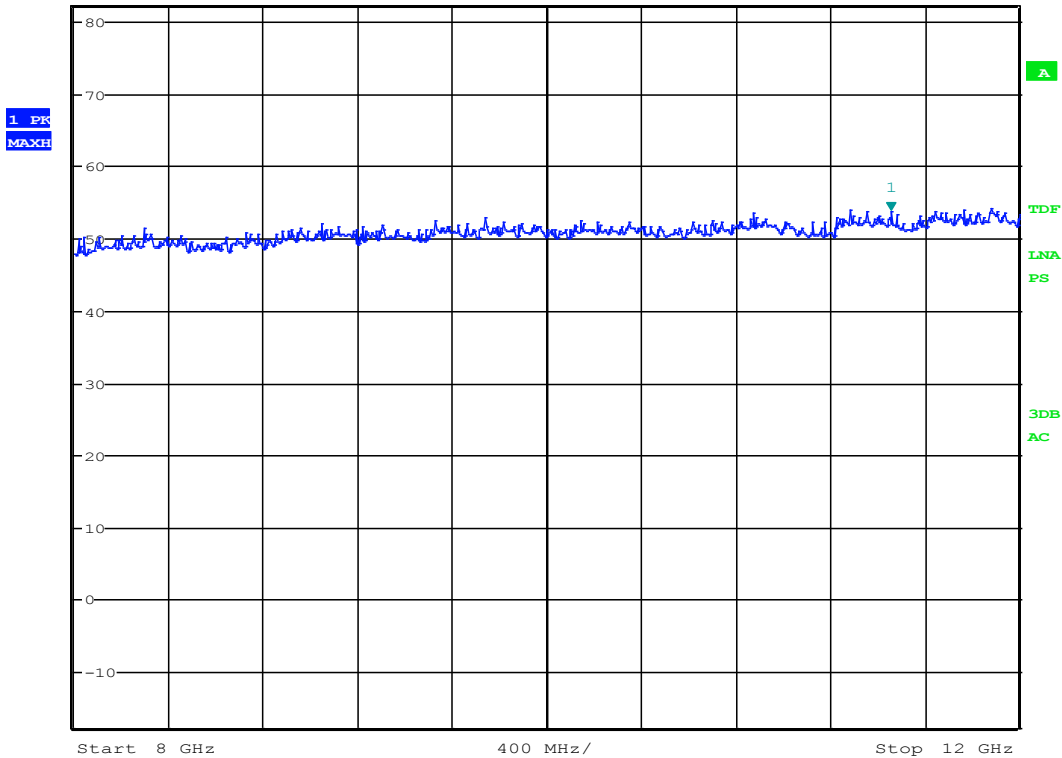


Date: 7.MAR.2015 13:20:07

Radiated Emissions ch. 2403 MHz, 8 – 12 GHz, VP, @3m – Pre-scan with Peak detector – antenna 2



MARKER 1
 11.45512821 GHz
 Ref 82 dB μ V/m *Att 10 dB
 *RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 53.73 dB μ V/m
 SWT 25 ms 11.455128205 GHz

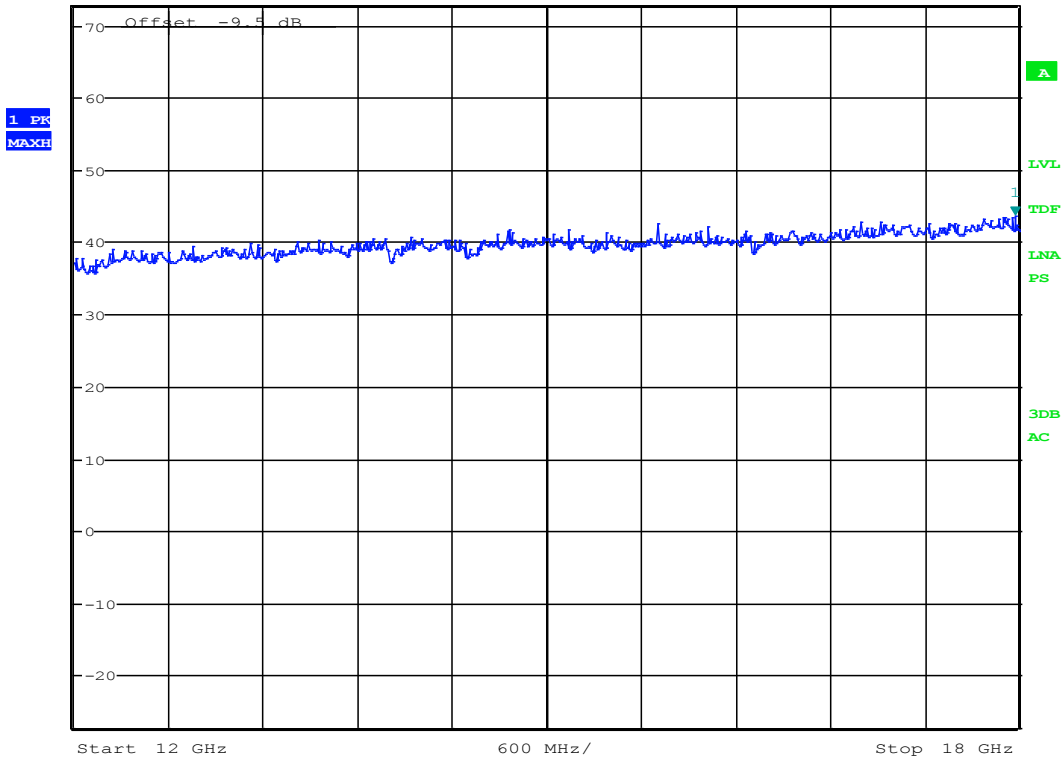


Date: 7.MAR.2015 13:19:39

Radiated Emissions ch. 2403 MHz, 8 – 12 GHz, HP, @3m – Pre-scan with Peak detector – antenna 2



MARKER 1
 17.97115385 GHz
 Ref 72.5 dBµV/m *Att 10 dB
 *RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 43.56 dBµV/m
 SWT 35 ms 17.971153846 GHz

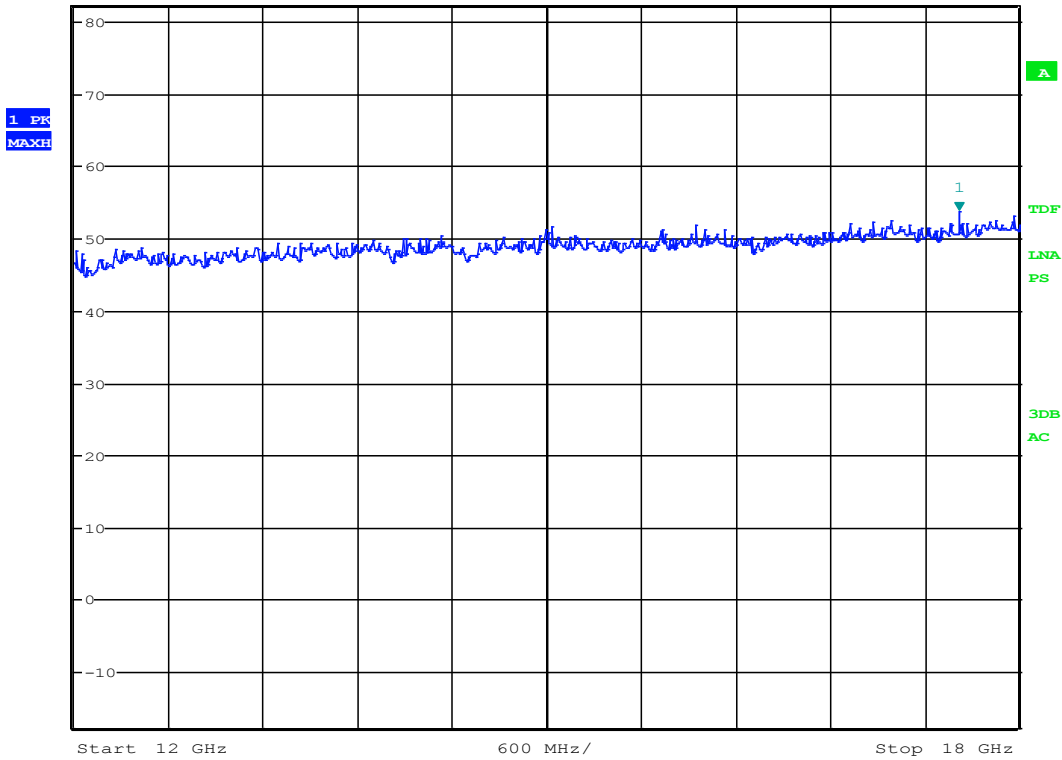


Date: 7.MAR.2015 13:21:39

Radiated Emissions ch. 2403 MHz, 12 – 18 GHz, VP, @1m – Pre-scan with Peak detector, Distance Correction factor of -9.5 dB is included in the graph. Antenna 1, 2



MARKER 1
 17.61538462 GHz
 Ref 82 dB μ V/m *Att 10 dB *RBW 1 MHz VBW 3 MHz SWT 35 ms
 Marker 1 [T1] 53.73 dB μ V/m 17.615384615 GHz

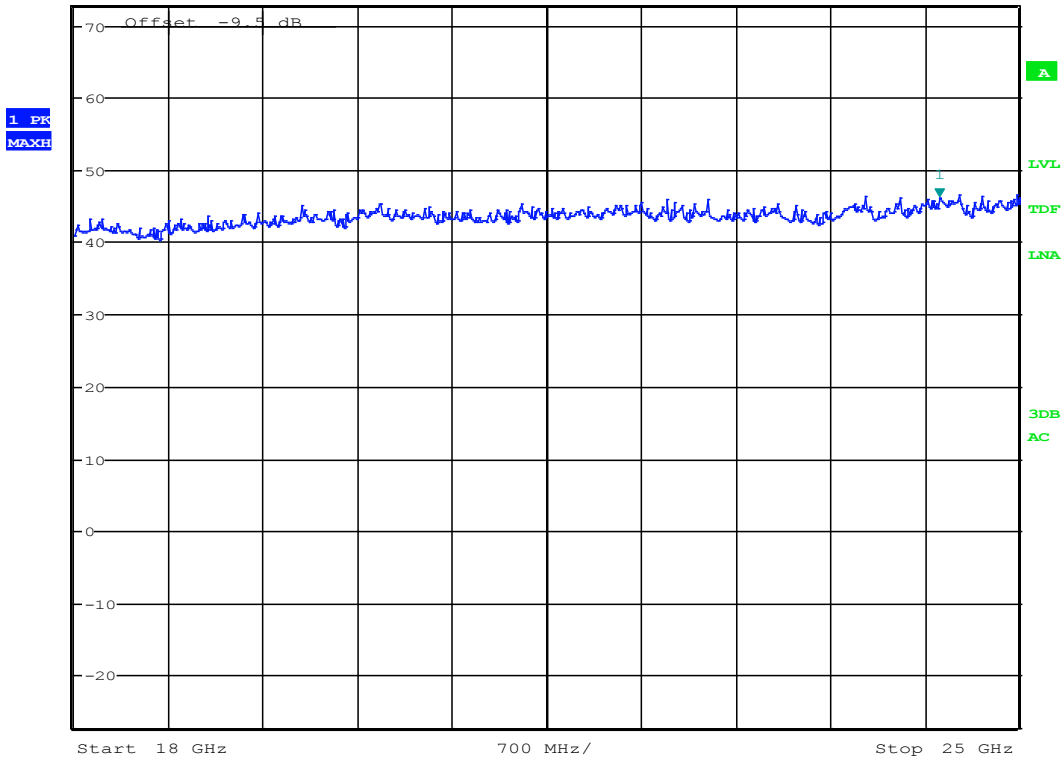


Date: 7.MAR.2015 13:24:05

Radiated Emissions ch. 2403 MHz, 12 – 18 GHz, HP, @1m – Pre-scan with Peak detector, Distance Correction factor of -9.5dB is included in the graph. – antenna 1, 2



MARKER 1
 24.40544872 GHz
 Ref 72.5 dBµV/m *Att 5 dB *RBW 1 MHz VBW 3 MHz SWT 45 ms
 Marker 1 [T1] 46.03 dBµV/m 24.405448718 GHz



Date: 9.MAR.2015 16:42:02

Radiated Emissions ch. 2403 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: 08 Mar 2015
------------------------------------	---------------------------

Test Results: Complies

Measured and Calculated Data:

	calculated peak PSD dBm
Power Spectral Density @2403 MHz	-4.93
Power Spectral Density @2443 MHz	-5.53
Power Spectral Density @2481 MHz	-5.43

Tested according to KDB 558074 D01 DTS Meas Guidance v03r02, Section 10.2.

Requirements:

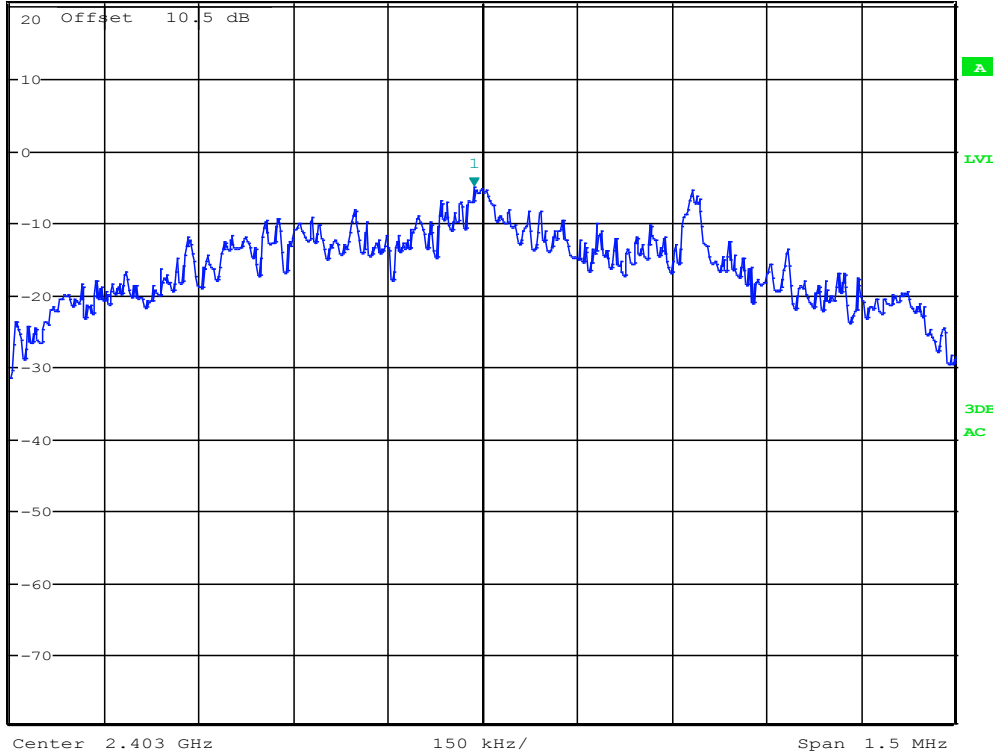
The Power Spectral Density of a Digital Transmission System shall be no greater than +8 dBm in any 3 kHz band.



MARKER 1
 2.402985577 GHz
 Step 20.5 dBm

*RBW 3 kHz Marker 1 [T1]
 VBW 10 kHz -4.93 dBm
 *Att 20 dB SWT 170 ms 2.402985577 GHz

1 PK
 MAXH

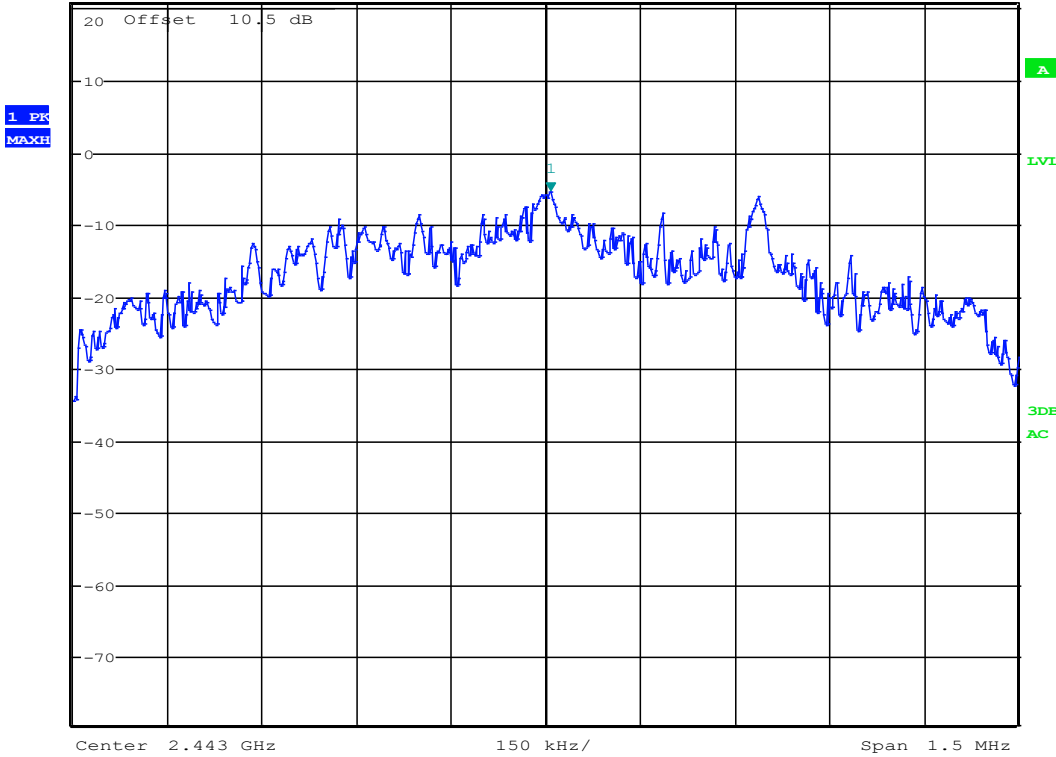


Date: 7.MAR.2015 14:56:01

PSD Measurement - 2403MHz



MARKER 1
2.443007212 GHz
Step 20.5 dBm *Att 15 dB *RBW 3 kHz VBW 10 kHz SWT 170 ms
Marker 1 [T1] -5.53 dBm 2.443007212 GHz

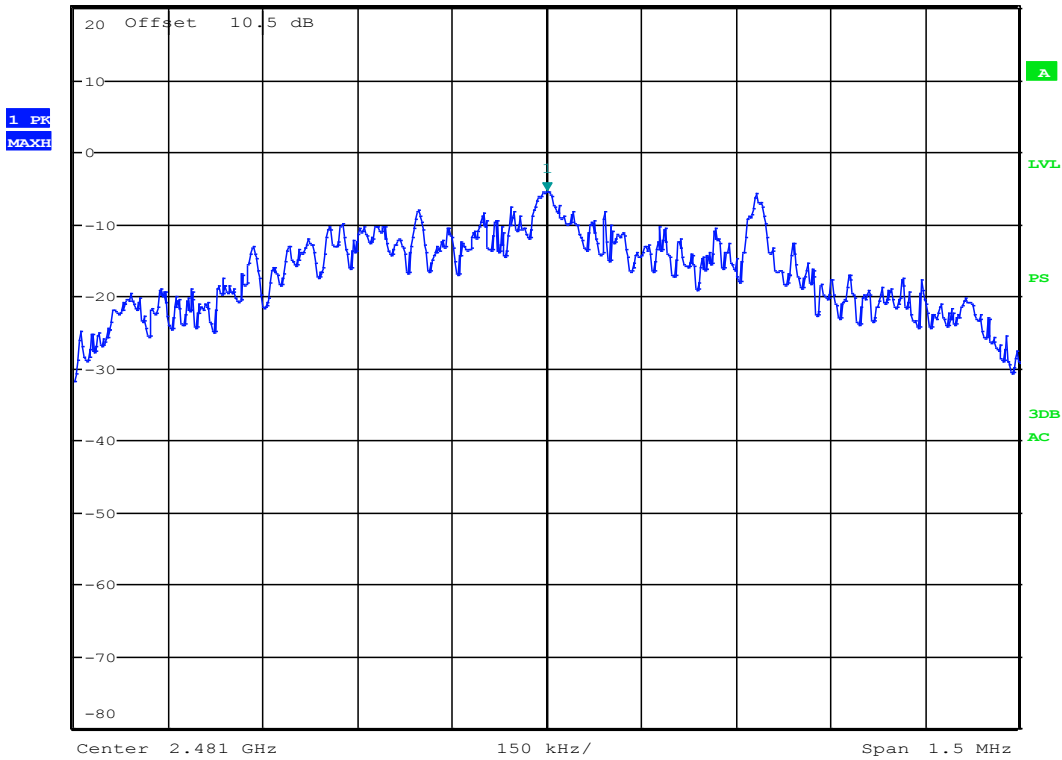


Date: 7.MAR.2015 14:59:25

PSD Measurement – 2443MHz



MARKER 1
 2.481 GHz
 Ref 20 dBm *Att 15 dB RBW 3 kHz VBW 10 kHz SWT 170 ms
 Marker 1 [T1] -5.43 dBm
 2.481000000 GHz



Date: 9.MAR.2015 15:34:47

PSD Measurement - 2481MHz

4 Measurement Uncertainty

Measurement Uncertainty Values		
Test Item		Uncertainty
Output Power		±0.5 dB
Power Spectral Density		±0.5 dB
Out of Band Emissions, Conducted	< 3.6 GHz	±0.6 dB
	> 3.6 GHz	±0.9 dB
Spurious Emissions, Radiated	< 1 GHz	±2.5 dB
	> 1 GHz	±2.2 dB
Emission Bandwidth		±4 %
Power Line Conducted Emissions		+2.9 / -4.1 dB
Spectrum Mask Measurements	Frequency	±5 %
	Amplitude	±1.0 dB
Frequency Error		±0.6 ppm
Temperature Uncertainty		±1 °C

All uncertainty values are expanded standard uncertainty to give a confidence level of 95%, based on coverage factor k=2

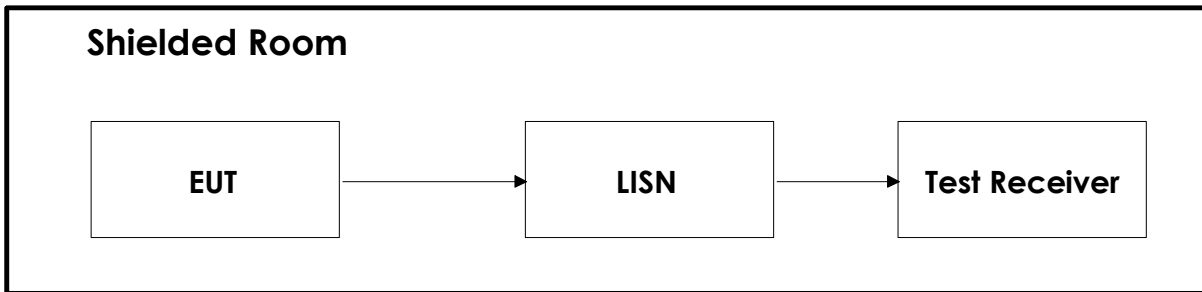
5 LIST OF TEST EQUIPMENT

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	FSU26	Spectrum Analyzer	Rohde & Schwarz	LR 1504	2013.12	2015.12
2	ESU40	EMI Receiver	Rohde & Schwarz	LR1639	2014.11.20	2015.11.20
3	3115	Antenna horn	EMCO	LR 1330	2010.08.05	2015.08.05
4	643	Antenna horn	Narda	LR 093	2009.01.26	2017.01.26
5	642	Antenna horn	Narda	LR 220	2009.01.26	2017.01.26
6	PM7320X	Antenna horn	Siverts lab	LR 103	2009.01.26	2017.01.26
7	DBF-520-20	Antenna horn	Systron Donner	LR 101	2009.01.26	2017.01.26
8	638	Antenna horn	Narda	LR 098	2010.06.17	2017.06.17
9	HK116	Biconical Antenna	Rohde & Schwarz	LR 1260	2013.12	2017.12
10	HL223	LPDA antenna	Rohde & Schwarz	LR 1261	2013.12	2017.12
11	8449B	Pre-amplifier	Hewlett Packard	LR 1322	2014.11	2015.11
12	LNA6900	Pre-amplifier	Teseq	LR 1593	2014.07	2015.07
13	80S	Signal Generator	Powertron	LT 502	Cal b4 use	
14	Model 87 V	Multimeter	Fluke	LR 1598	2014-10-27	2015-10-27
15	74-10-12	10 attenuator	Aeroflex	LR 1579	Cal b4 use	
16	FA210A1010003030	Microwave cable	Rosenberger	LR1566	Cal b4 use	
17	6HC 3000-18000	HP Filter	Trithlic	LR1614	Cal b4 use	
18	6HC 2500-18000	HP Filter	Trithlic	LR1615	Cal b4 use	
19	FSW	Spectrum Analyzer	Rohde & Schwarz	LR1640	2014.09	2015.09
20	HFH2-Z2	Antenna, Loop	Rohde & Schwarz	LR 1660	2014.10	2016.10
21	ESHS10	EMI	Rohde & Schwarz	N 3528	2014.09.12	2015.09.12
22	ESH3-Z5	Two-line V-Network	Rohde & Schwarz	LR 1076	2014.04.23	2016.04.23
23	ESH3-Z2	Pulse limiter	Rohde & Schwarz	LR 1074	2015.03.05	2017.03.05
24	6812B	AC power Source	Agilent	LR 1515	2013.10.28	2015.10.28

6 BLOCK DIAGRAM

6.1 Power Line Conducted Emission



6.2 Test Site Radiated Emission

