

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	RX-CAM	
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 2015.03.13	
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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Template version: B

Nemko Norway

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1 INFORMATION

1.1 Test Item

Name :	RØDE Microphones
FCC ID :	2AEAN391002
IC :	20091-391002
Model/version :	RX-CAM
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 :	Digital (GFSK)
Conducted Output Power:	11.86 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 and uses TDMA.

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 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	Result
Supply Voltage Variations	15.31(e)	8 (RSS-GEN)	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)	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.

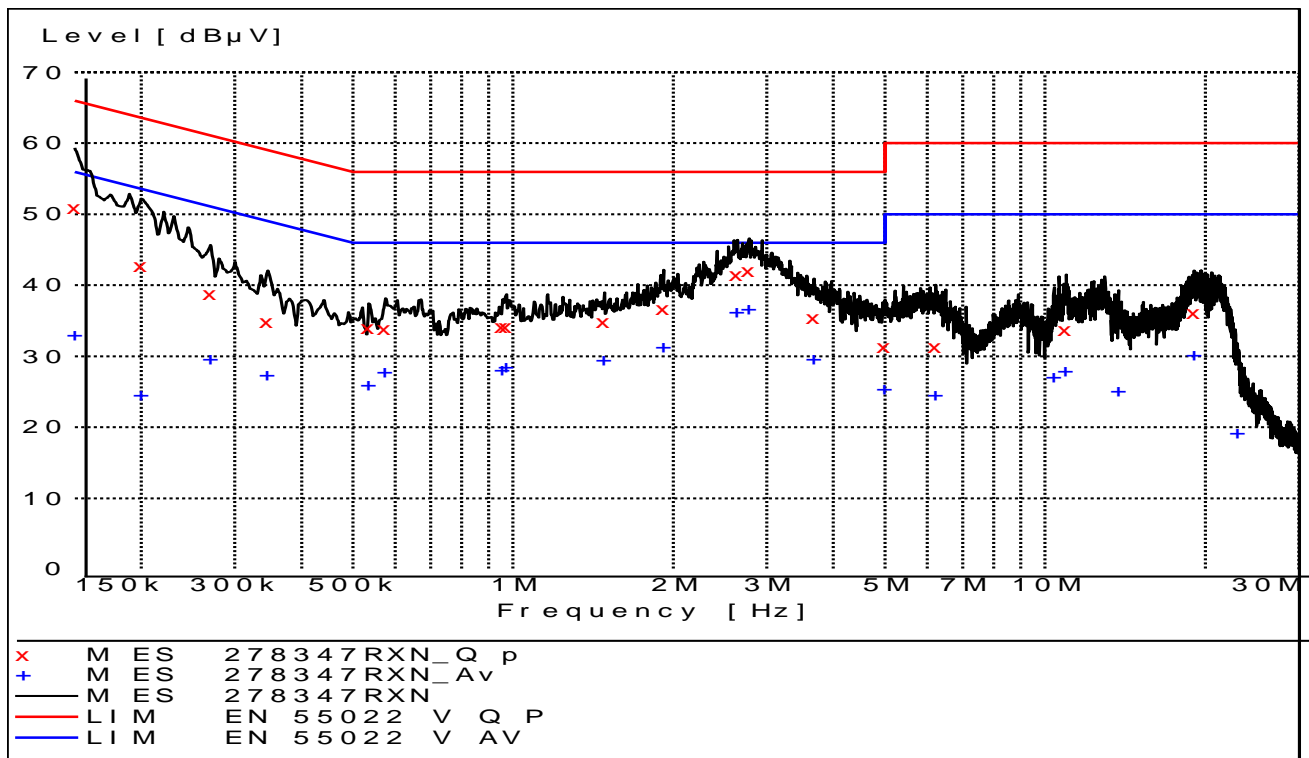
3 TEST RESULTS

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	51.00	10.70	66.00	15.00	QP	L1	Pass
0.200000	42.80	10.70	63.60	20.80	QP	L1	Pass
0.270000	38.70	10.60	61.10	22.40	QP	L1	Pass
0.345000	34.90	10.40	59.10	24.20	QP	N	Pass
0.535000	34.00	10.20	56.00	22.00	QP	L1	Pass
0.575000	33.90	10.20	56.00	22.10	QP	N	Pass
0.955000	34.10	10.30	56.00	21.90	QP	N	Pass
0.970000	34.20	10.30	56.00	21.80	QP	N	Pass
1.485000	34.90	10.40	56.00	21.10	QP	N	Pass
1.915000	36.70	10.40	56.00	19.30	QP	N	Pass
2.640000	41.50	10.40	56.00	14.50	QP	N	Pass
2.775000	42.00	10.40	56.00	14.00	QP	N	Pass
3.675000	35.40	10.40	56.00	20.60	QP	N	Pass
4.995000	31.40	10.50	56.00	24.60	QP	N	Pass
6.230000	31.40	10.60	60.00	28.60	QP	N	Pass
10.955000	33.70	10.70	60.00	26.30	QP	N	Pass
19.100000	36.10	10.80	60.00	23.90	QP	N	Pass
0.150000	33.10	10.70	56.00	22.90	AV	L1	Pass
0.200000	24.50	10.70	53.60	29.10	AV	L1	Pass
0.270000	29.60	10.60	51.10	21.50	AV	L1	Pass
0.345000	27.40	10.40	49.10	21.70	AV	N	Pass
0.535000	26.00	10.20	46.00	20.00	AV	L1	Pass
0.575000	27.80	10.20	46.00	18.20	AV	N	Pass
0.955000	28.10	10.30	46.00	17.90	AV	N	Pass
0.970000	28.50	10.30	46.00	17.50	AV	N	Pass
1.485000	29.50	10.40	46.00	16.50	AV	N	Pass
1.915000	31.30	10.40	46.00	14.70	AV	N	Pass
2.640000	36.30	10.40	46.00	9.70	AV	N	Pass
2.775000	36.60	10.40	46.00	9.40	AV	N	Pass
3.675000	29.60	10.40	46.00	16.40	AV	N	Pass
4.995000	25.40	10.50	46.00	20.60	AV	N	Pass
6.230000	24.60	10.60	50.00	25.40	AV	N	Pass
10.390000	27.10	10.70	50.00	22.90	AV	N	Pass
10.955000	28.00	10.70	50.00	22.00	AV	N	Pass
13.770000	25.20	10.80	50.00	24.80	AV	N	Pass
19.100000	30.30	10.80	50.00	19.70	AV	N	Pass
23.050000	19.30	11.00	50.00	30.70	AV	N	Pass

3.2 Minimum 6 dB Bandwidth

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

Test Performed By: G.Suhanthakumar	Date of Test: 10 Mar 2015
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Test Results: **Complies**

Measurement Data:

Measured 6 dB Bandwidth (kHz)		
2403MHz	2443 MHz	2481MHz
833.3	825.3	833.3

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.

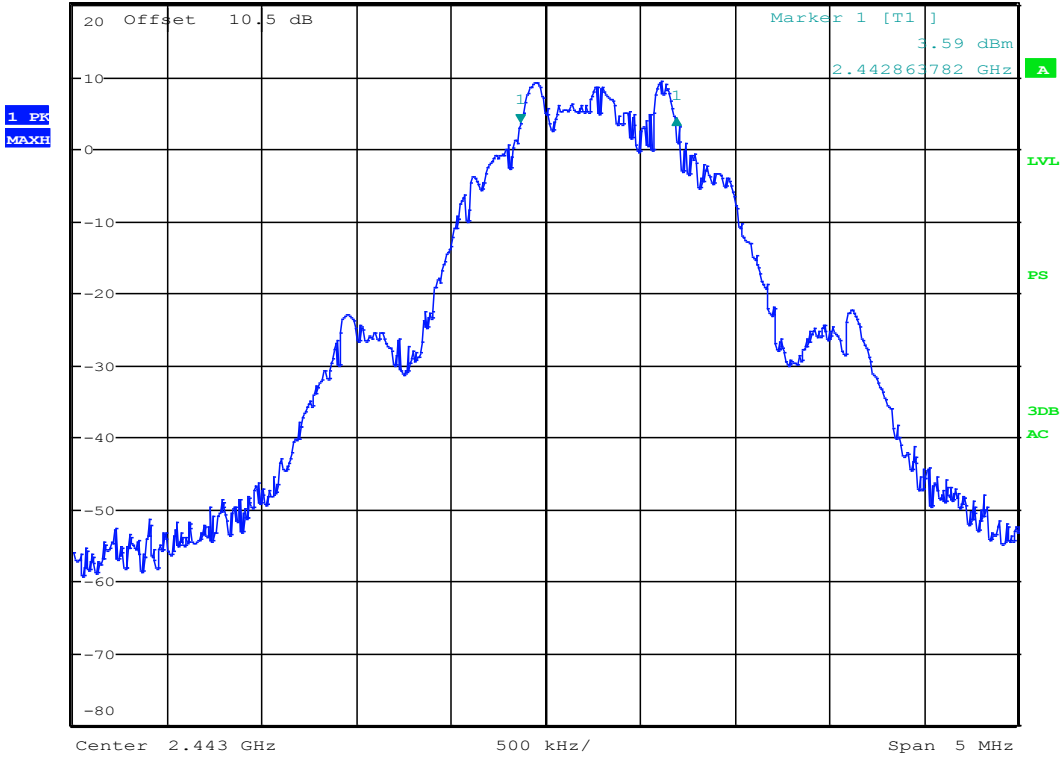


Date: 9.MAR.2015 15:54:20

6 dB Bandwidth at 2403 MHz



*RBW 100 kHz Delta 1 [T1]
 VBW 300 kHz 0.55 dB
 Ref 20 dBm *Att 15 dB SWT 2.5 ms 825.320512816 kHz

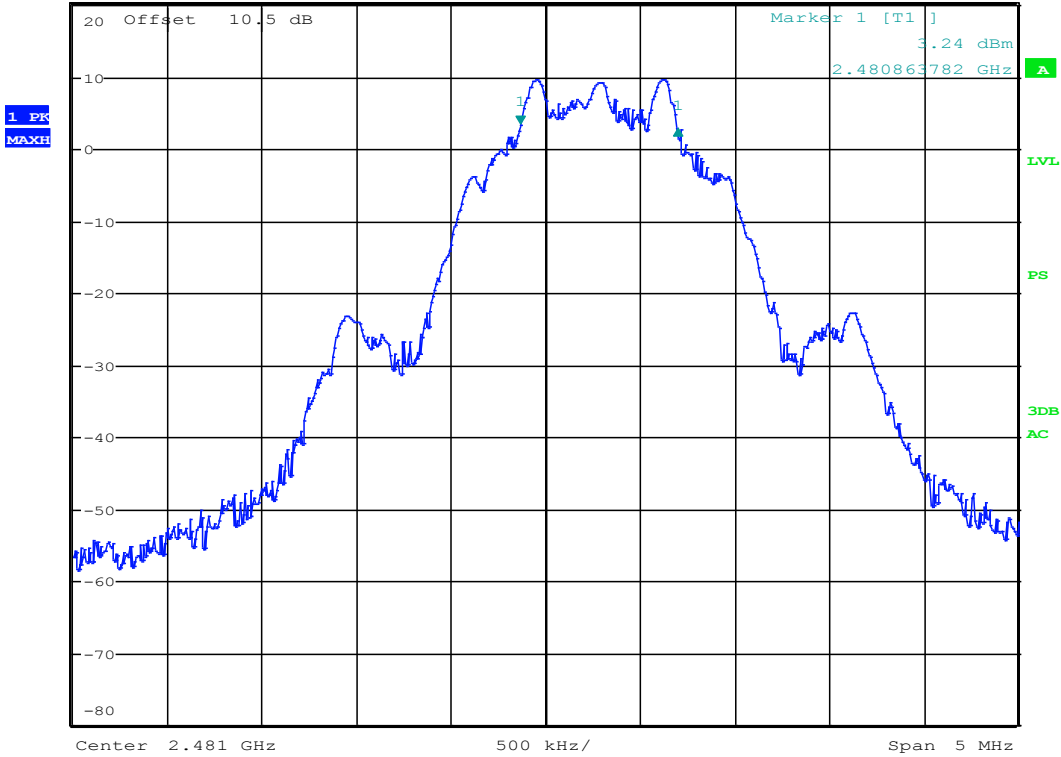


Date: 9.MAR.2015 16:00:23

6 dB Bandwidth at 2443 MHz



*RBW 100 kHz Delta 1 [T1]
 VBW 300 kHz -0.60 dB
 Ref 20 dBm *Att 15 dB SWT 2.5 ms 833.333333330 kHz



Date: 9.MAR.2015 15:43:32

6 dB Bandwidth at 2481 MHz

3.3 20 dB Bandwidth

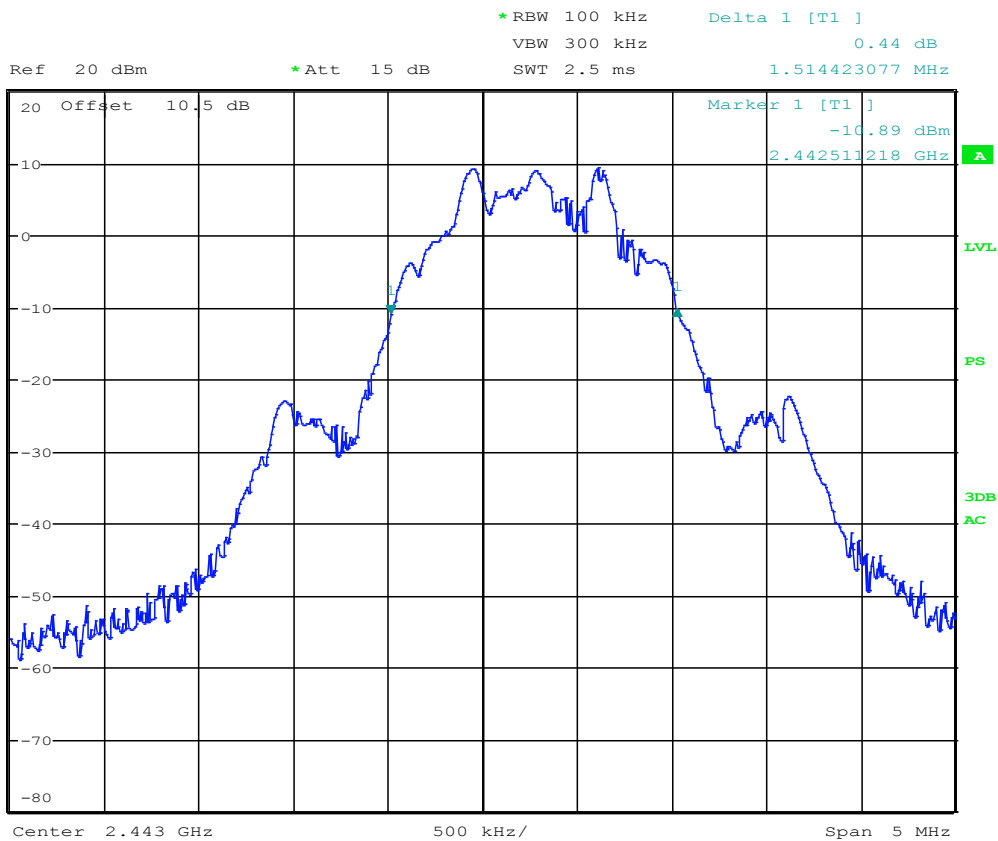
Test Performed By: G.Suhanthakumar	Date of Test: 10 Mar 2015
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Measurement Data:

Measured 20 dB Bandwidth (MHz)
2443 MHz
1.51

Requirements:

No requirements. Reported for information only.



Date: 9.MAR.2015 16:00:52

20 dB Bandwidth at 2443 MHz

3.4 Peak Power Output

Para. No.: 15.247 (b)

Test Performed By: G.Suhanthakumar	Date of Test: 13 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	103.2	103.0	101.7
Calc. Radiated Power (dBm)	7.89	7.78	6.46
Calc. Radiated Power (mW)	6.15	5.99	4.42
Measured Conducted Power (dBm)	10.4	10.4	10.7
Measured Conducted Power (mW)	11.1	10.9	11.9
Calculated Antenna Gain (dBi)	-2.6	-2.6	-4.3

Measurement Data: Antenna 2

RF channel	2403 MHz	2443 MHz	2481 MHz
Measured Maxium Field strength (dB μ V/m) –HP	100.8	102.5	103.0
Calc. Radiated Power (dBm)	5.49	7.20	7.72
Calc. Radiated Power (mW)	3.53	5.25	5.92
Measured Conducted Power (dBm)	10.4	10.4	10.7
Measured Conducted Power (mW)	11.1	10.9	11.9
Calculated Antenna Gain (dBi)	-5.0	-3.2	-3.0

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 XY 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:

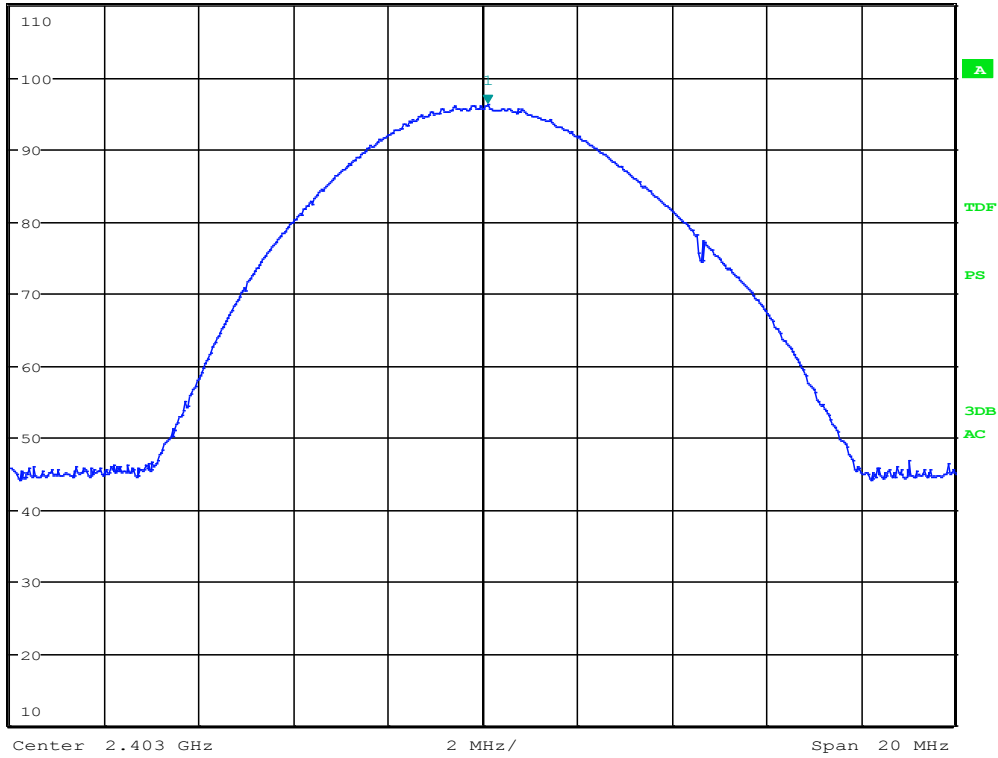
For Digital Transmission Systems in the 2400 - 2483.5 MHz band: 1 Watt

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.



MARKER 1	*RBW 3 MHz	Marker 1 [T1]
2.403096154 GHz	VBW 10 MHz	96.14 dBuV/m
Ref 110 dBuV/m	*Att 10 dB	SWT 2.5 ms
		2.403096154 GHz

1 PK
MAXH

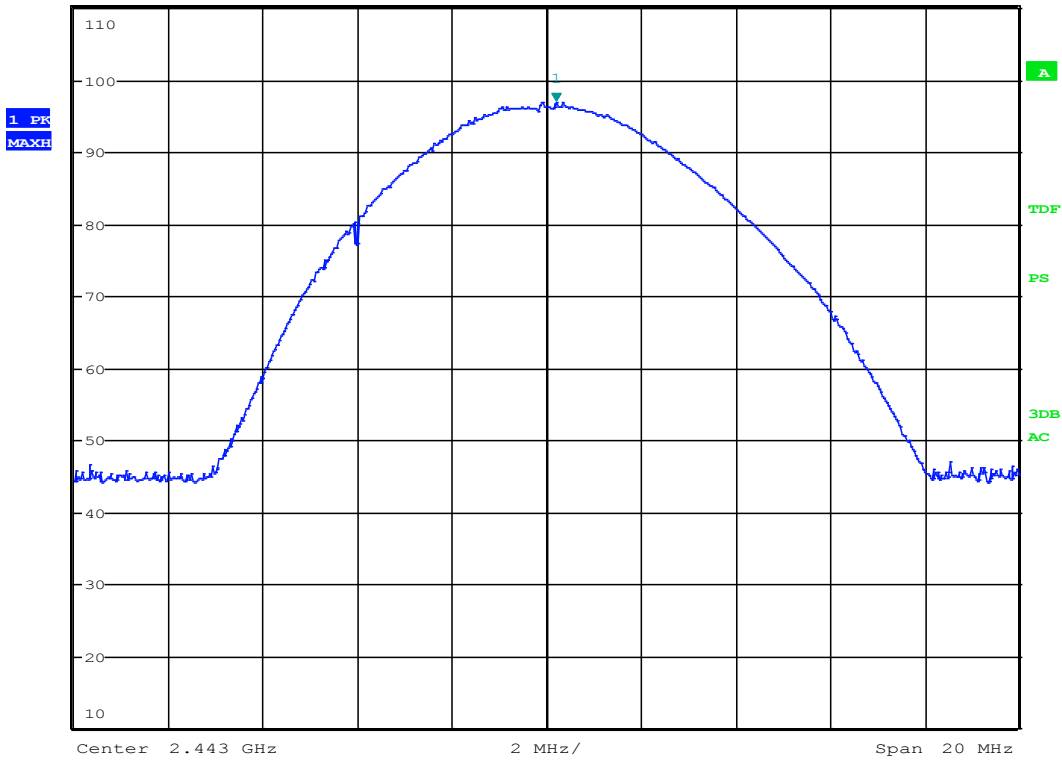


Date: 13.MAR.2015 08:22:04

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



MARKER 1
2.443192308 GHz
Ref 110 dBuV/m *Att 10 dB
*RBW 3 MHz
VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
96.78 dBuV/m
2.443192308 GHz



Date: 13.MAR.2015 08:48:32

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

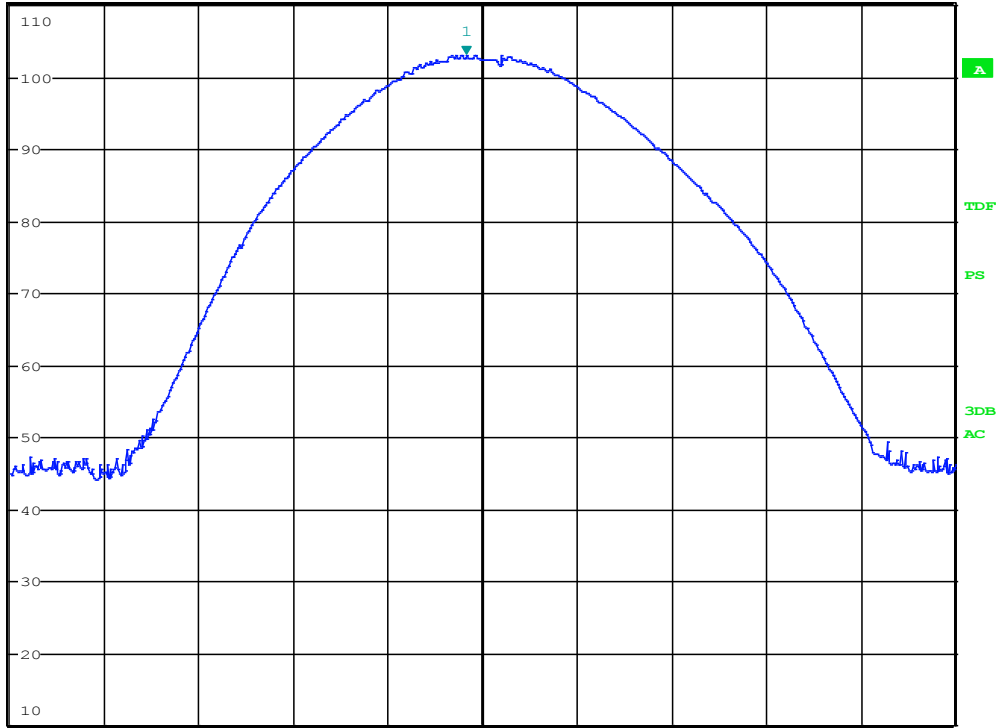


MARKER 1
 2.442647436 GHz

*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 103.04 dB μ V/m
 SWT 2.5 ms 2.442647436 GHz

Ref 110 dB μ V/m *Att 10 dB

1 PK
 MAXH



Center 2.443 GHz 2 MHz/ Span 20 MHz

Date: 13.MAR.2015 08:46:09

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

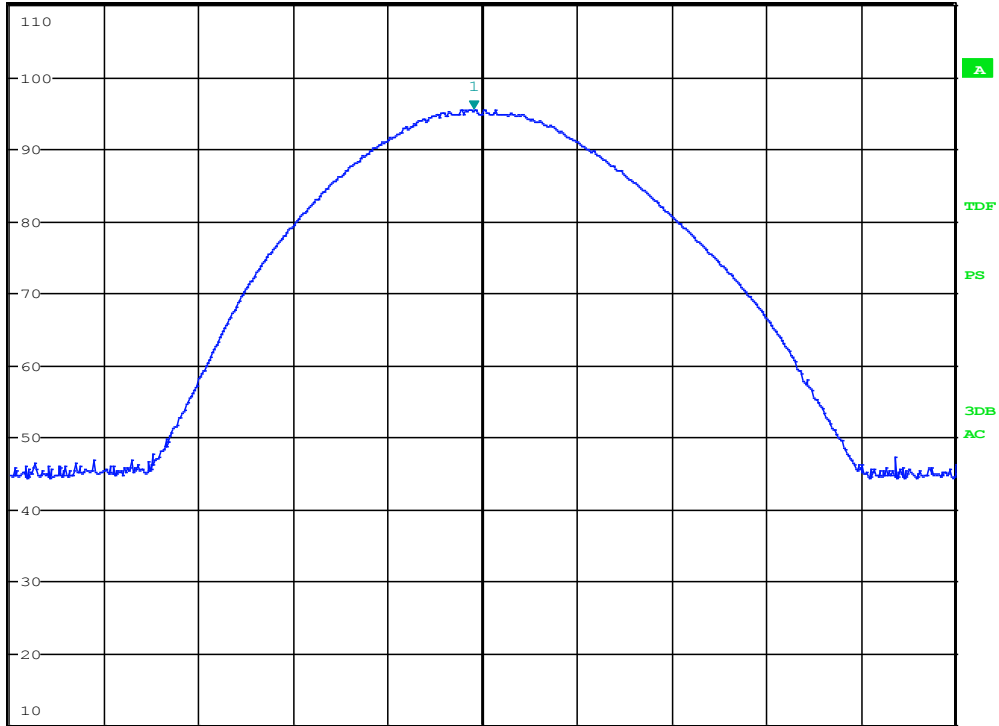


MARKER 1
 2.480807692 GHz

*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 95.43 dBμV/m
 SWT 2.5 ms 2.480807692 GHz

Ref 110 dBμV/m *Att 10 dB

1 PK
 MAXH



Center 2.481 GHz 2 MHz/ Span 20 MHz

Date: 13.MAR.2015 09:06:32

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

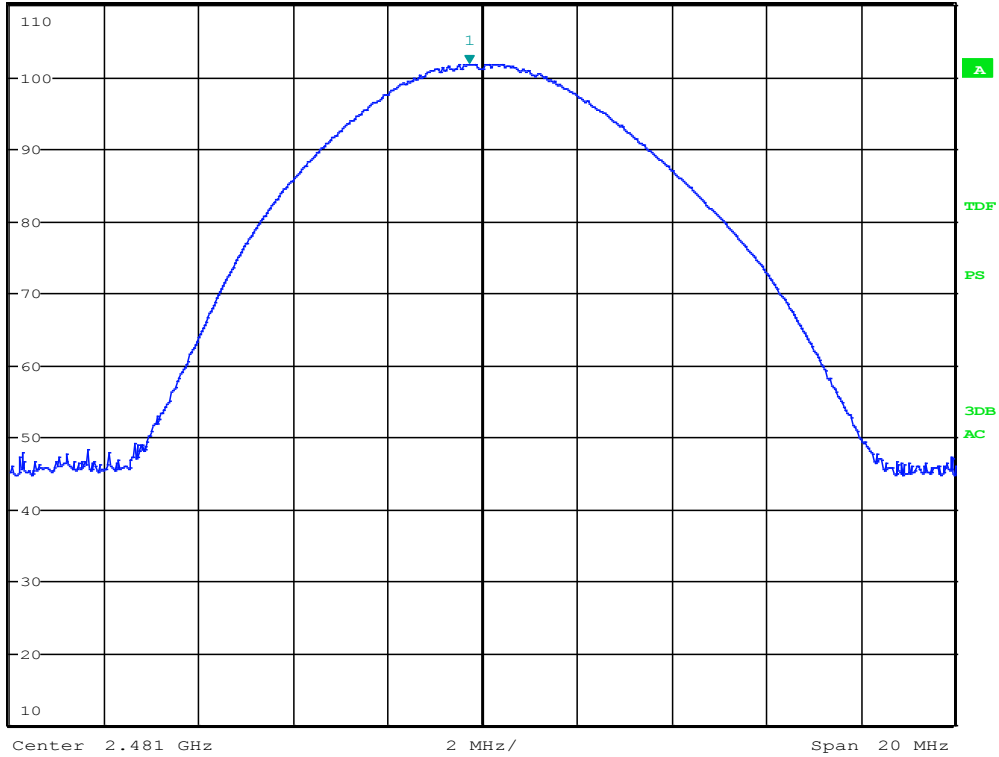


MARKER 1
 2.480711538 GHz

*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 101.72 dBμV/m
 SWT 2.5 ms 2.480711538 GHz

Ref 110 dBμV/m *Att 10 dB

1 PK
 MAXH



Date: 13.MAR.2015 09:01:16

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

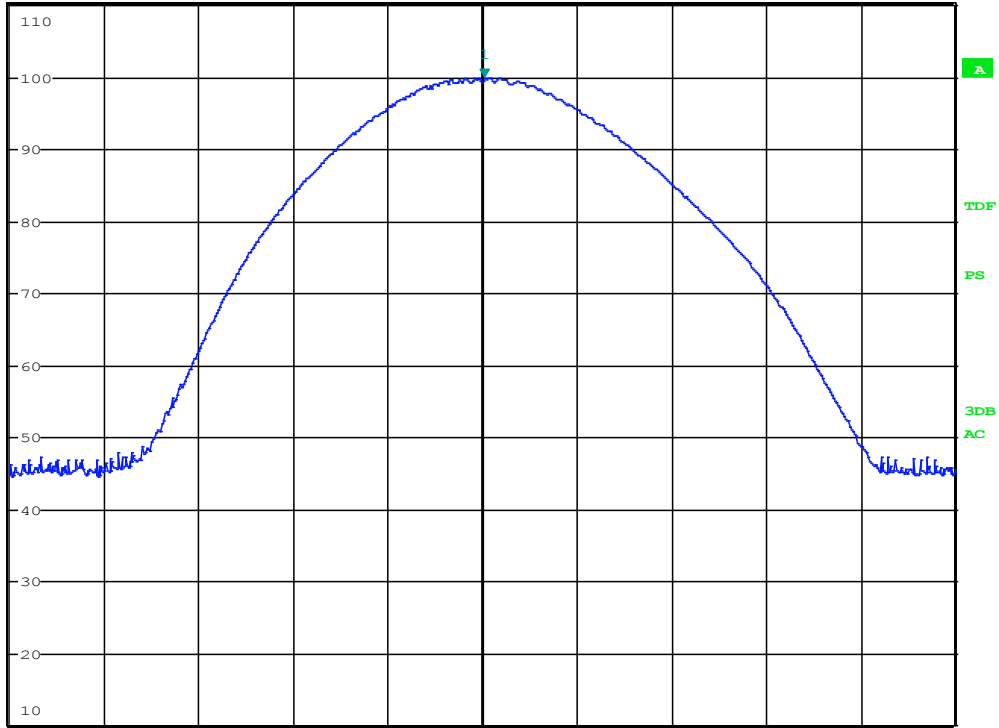


MARKER 1
 2.403032051 GHz

*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 99.77 dBμV/m
 SWT 2.5 ms 2.403032051 GHz

Ref 110 dBμV/m *Att 10 dB

1 PK
 MAXH



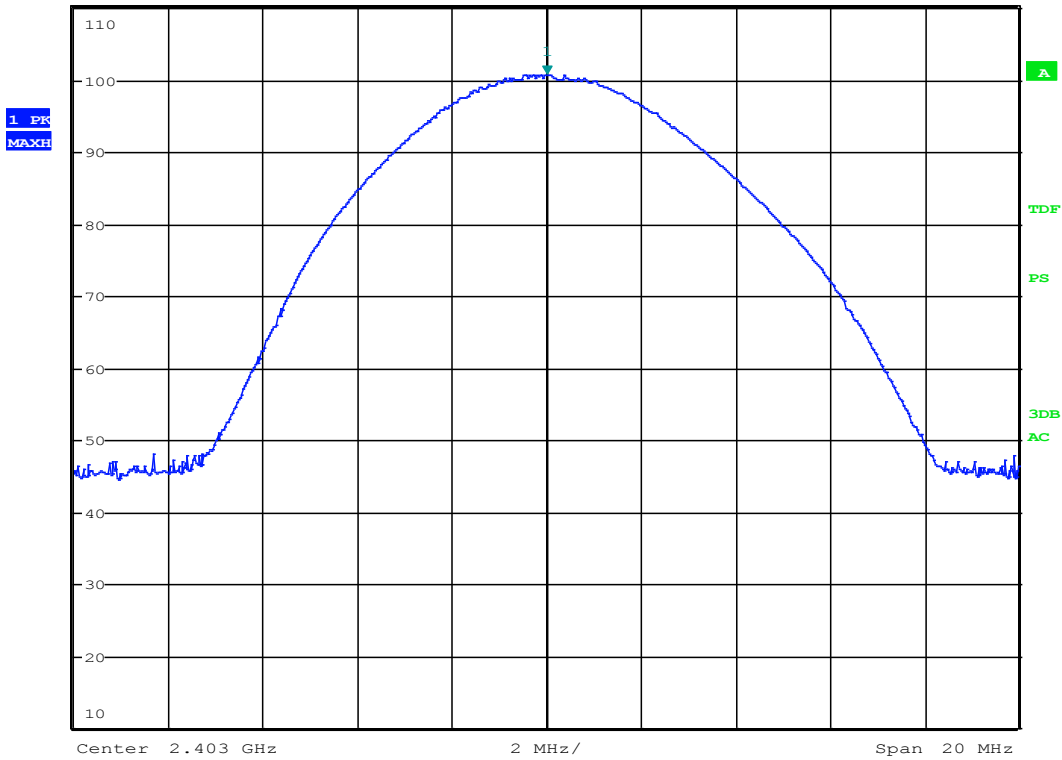
Center 2.403 GHz 2 MHz/ Span 20 MHz

Date: 13.MAR.2015 09:42:34

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



MARKER 1
 2.403 GHz
 Ref 110 dBµV/m *Att 10 dB *RBW 3 MHz VBW 10 MHz SWT 2.5 ms
 Marker 1 [T1]
 100.75 dBµV/m
 2.403000000 GHz

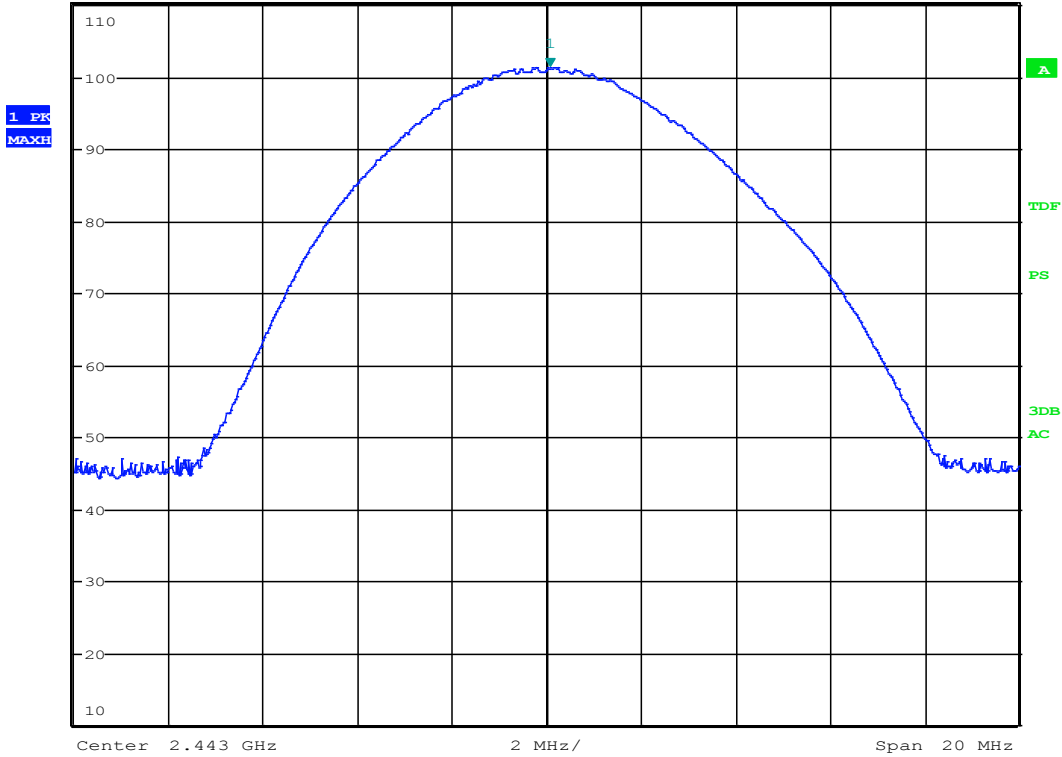


Date: 13.MAR.2015 09:45:23

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



MARKER 1
 2.443064103 GHz
 Ref 110 dBµV/m *Att 10 dB *RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 101.22 dBµV/m
 SWT 2.5 ms 2.443064103 GHz



Date: 13.MAR.2015 10:11:38

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

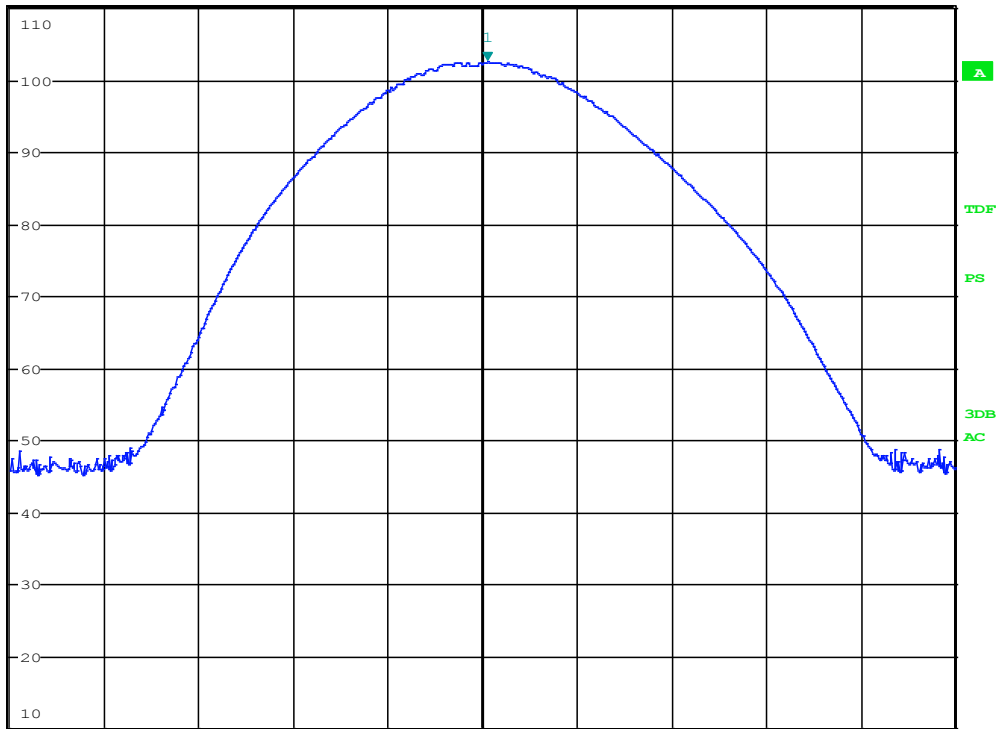


MARKER 1
 2.443096154 GHz

*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 102.46 dBμV/m
 SWT 2.5 ms 2.443096154 GHz

Ref 110 dBμV/m *Att 10 dB

1 PK
 MAXH



Center 2.443 GHz 2 MHz/ Span 20 MHz

Date: 13.MAR.2015 10:12:41

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

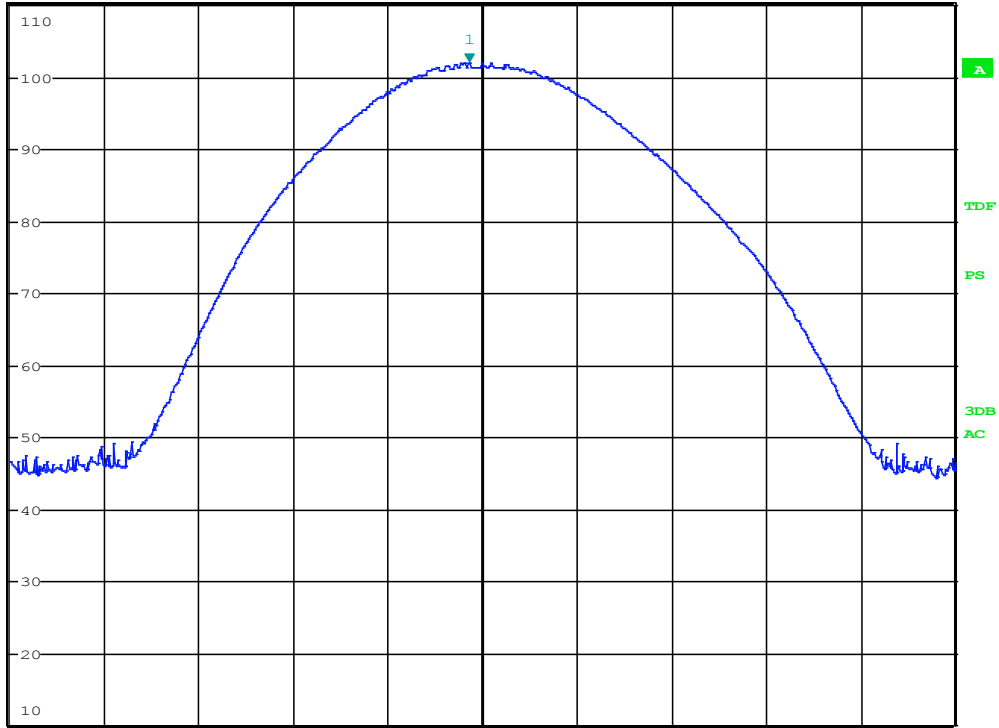


MARKER 1
 2.480711538 GHz

*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 101.92 dBμV/m
 SWT 2.5 ms 2.480711538 GHz

Ref 110 dBμV/m *Att 10 dB

1 PK
 MAXH



Center 2.481 GHz 2 MHz/ Span 20 MHz

Date: 13.MAR.2015 10:19:25

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



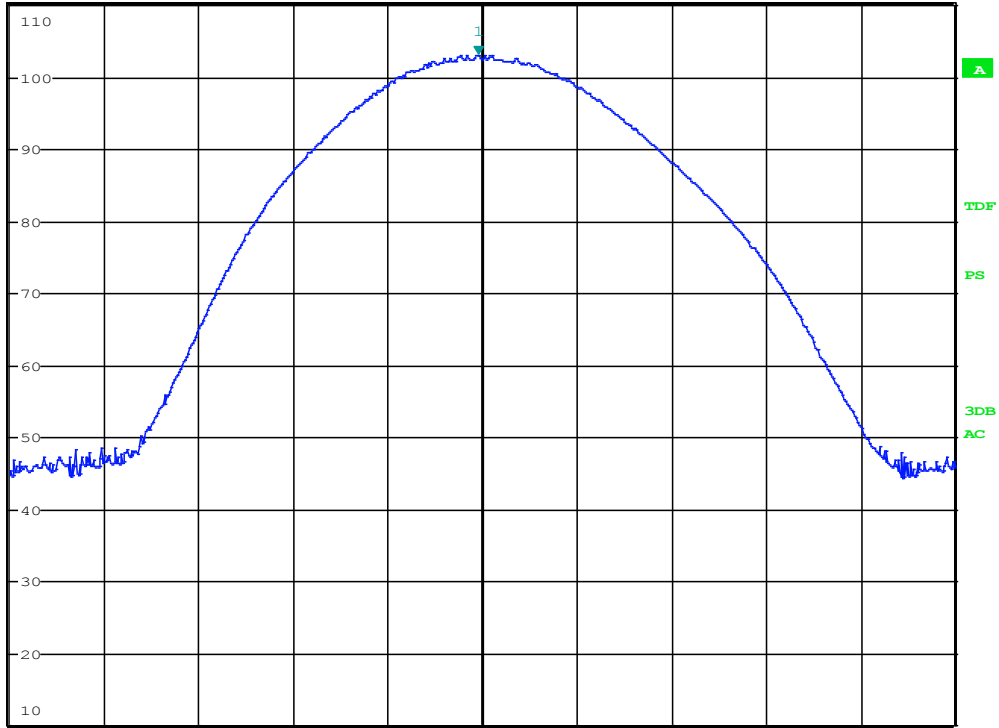
MARKER 1
 2.480903846 GHz

*RBW 3 MHz
 VBW 10 MHz
 SWT 2.5 ms

Marker 1 [T1]
 102.98 dBμV/m
 2.480903846 GHz

Ref 110 dBμV/m *Att 10 dB

1 PK
 MAXH



Center 2.481 GHz 2 MHz/ Span 20 MHz

Date: 13.MAR.2015 09:19:38

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

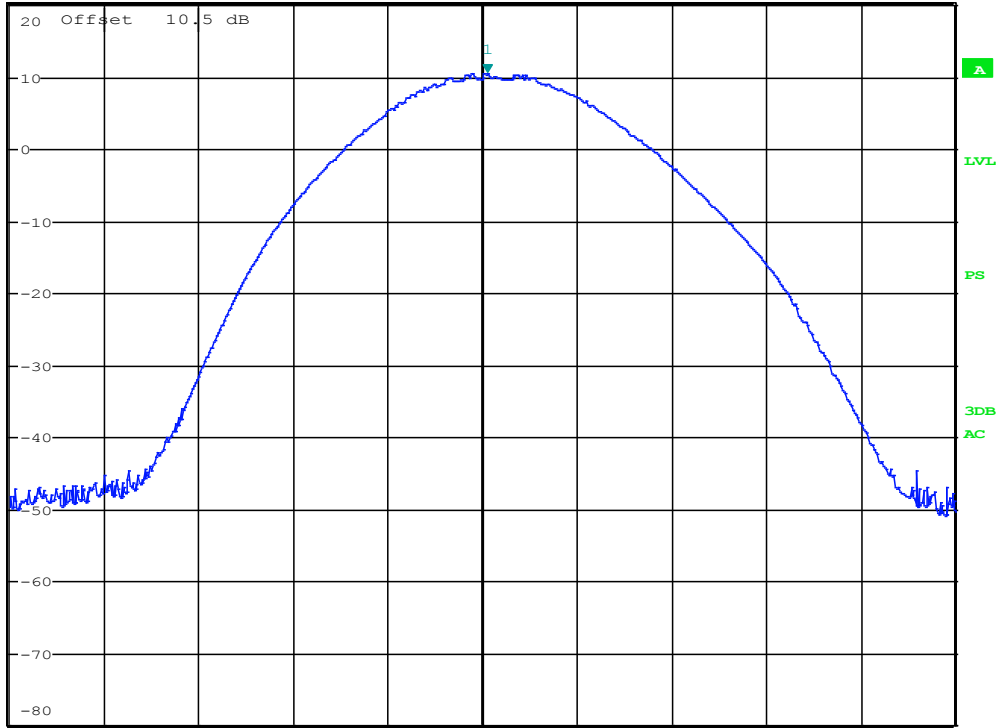


MARKER 1
 2.403096154 GHz

*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 10.44 dBm
 SWT 2.5 ms 2.403096154 GHz

Ref 20 dBm *Att 15 dB

1 PK
 MAXH



Date: 9.MAR.2015 15:52:54

Conducted power – 2403MHz,PK

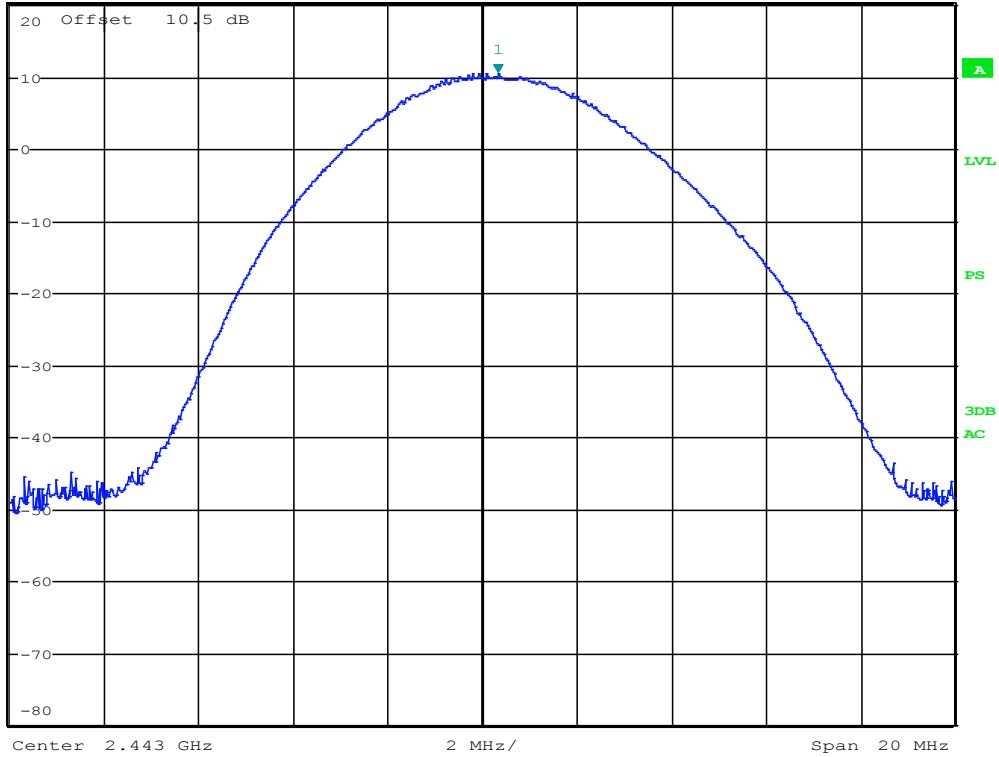


MARKER 1
 2.443320513 GHz

*RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 10.36 dBm
 SWT 2.5 ms 2.443320513 GHz

Ref 20 dBm *Att 15 dB

1 PK
 MAXH



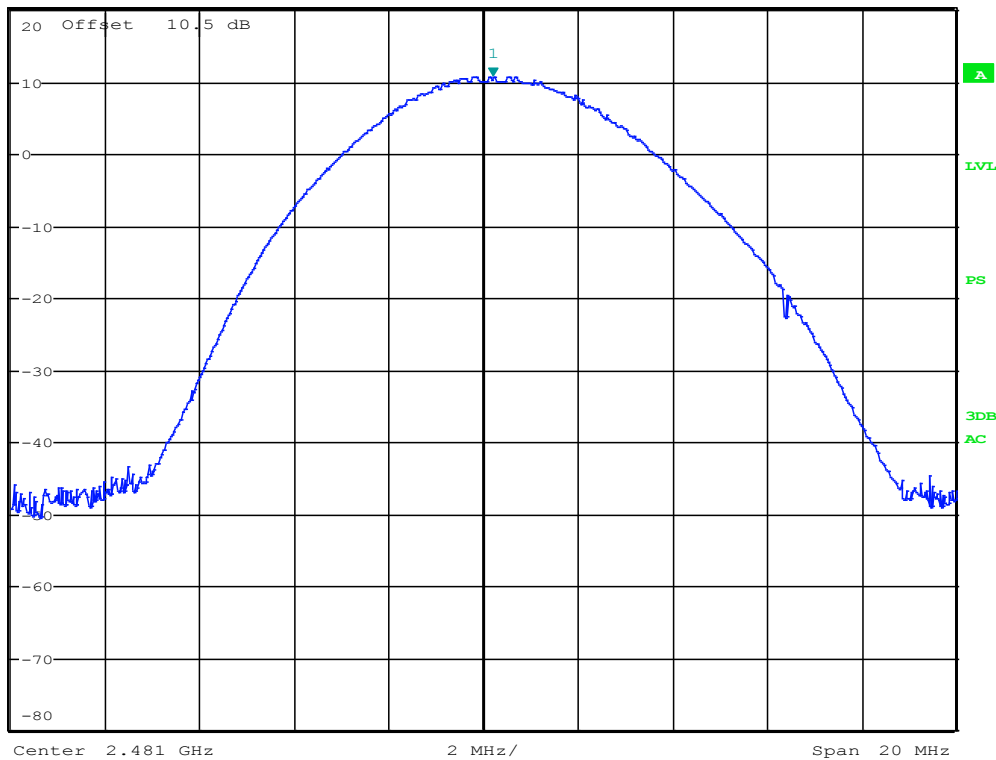
Date: 9.MAR.2015 16:02:23

Conducted power – 2443MHz,PK



MARKER 1
 2.481192308 GHz
 *RBW 3 MHz Marker 1 [T1]
 VBW 10 MHz 10.74 dBm
 Ref 20 dBm *Att 15 dB SWT 2.5 ms 2.481192308 GHz

1 PK
 MAXH



Date: 9.MAR.2015 15:39:27

Conducted power – 2481MHz, PK

3.5 Spurious Emissions (Radiated)

Para. No.: 15.247 (c)

Test Performed By: G.Suhanthakumar	Date of Test: 13 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	41.1	PK	74	32.9
	34.6	AV	54	19.4
2.4835 GHz	73.9	PK	74	0.1
	44.5	AV	54	9.5

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
	33.1	AV	54	20.9
2.4835 GHz	73.5	PK	74	0.5
	46.0	AV	54	9.0

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.



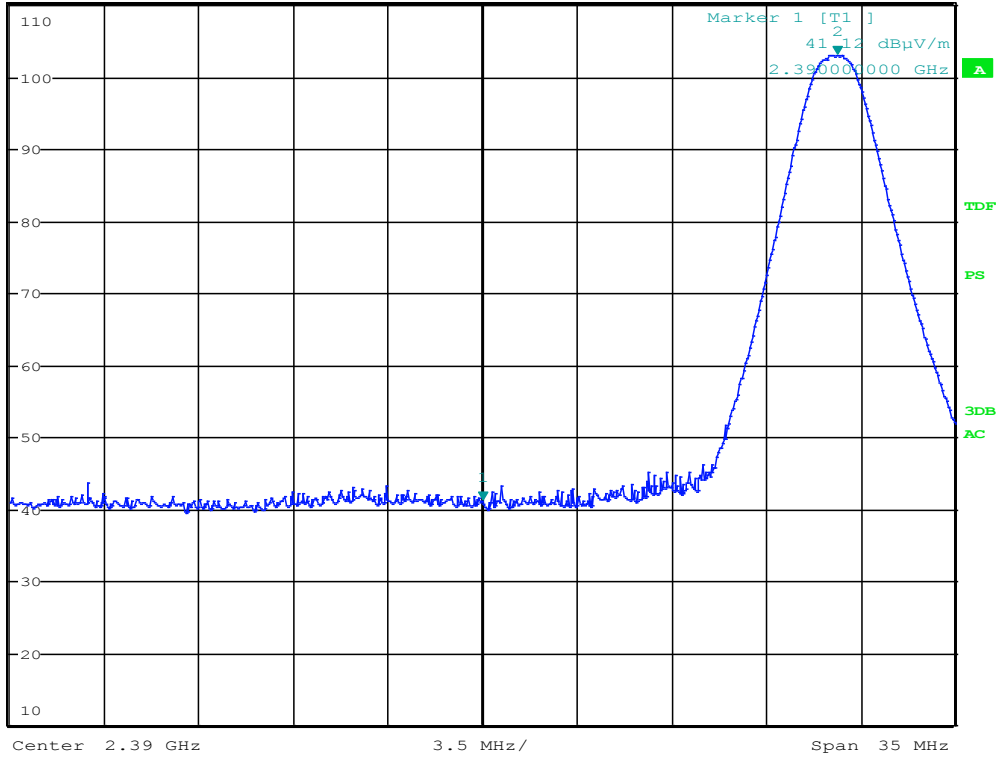
MARKER 2
 2.403125 GHz

*RBW 1 MHz
 VBW 3 MHz
 SWT 2.5 ms

Marker 2 [T1]
 103.03 dBμV/m
 2.403125000 GHz

Ref 110 dBμV/m *Att 10 dB

1 PK
 MAXH



Date: 13.MAR.2015 08:43:28

Lower Band Edge, Peak Detector- Antenna 1



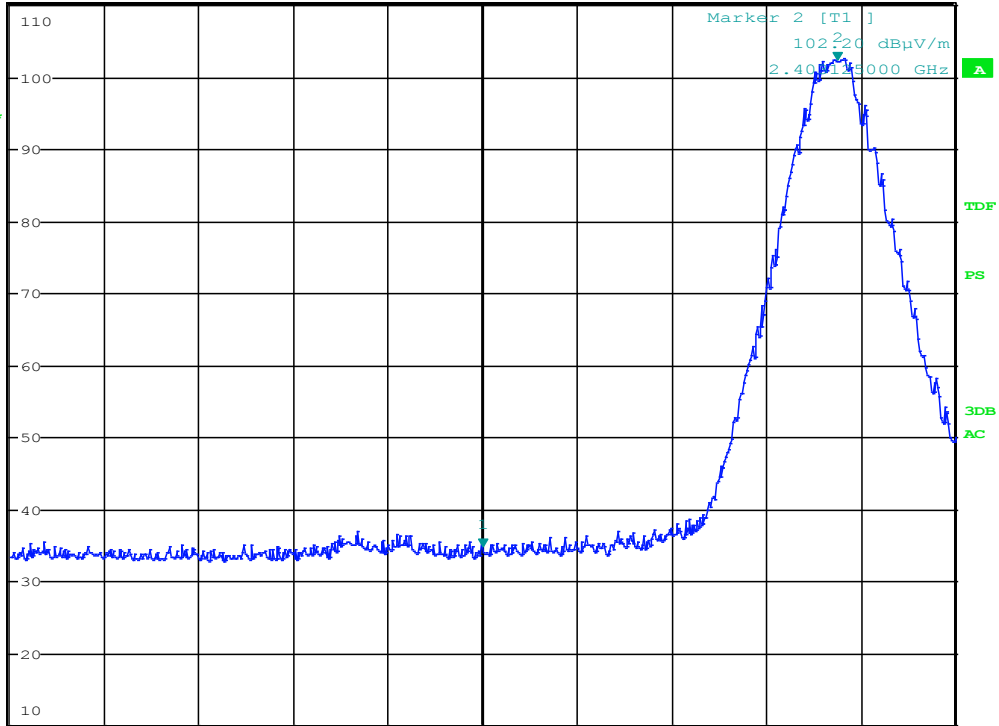
MARKER 1
 2.39 GHz

*RBW 1 MHz
 VBW 10 MHz
 SWT 2.5 ms

Marker 1 [T1]
 34.64 dBμV/m
 2.390000000 GHz

Ref 110 dBμV/m *Att 10 dB

1 RM *
 MAXH



Date: 13.MAR.2015 08:44:25

Lower Band Edge, Average Detector – Antenna 1



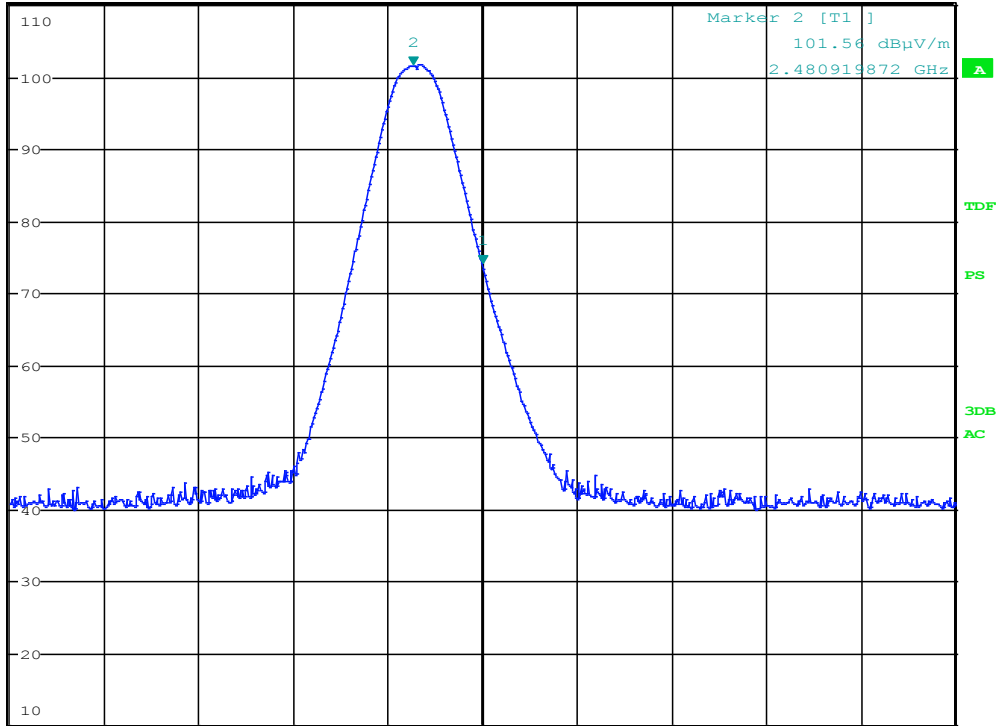
MARKER 1
 2.4835 GHz

*RBW 1 MHz
 VBW 3 MHz
 SWT 2.5 ms

Marker 1 [T1]
 73.92 dB μ V/m
 2.483500000 GHz

Ref 110 dB μ V/m *Att 10 dB

1 PK
 MAXH



Center 2.4835 GHz 3.5 MHz/ Span 35 MHz

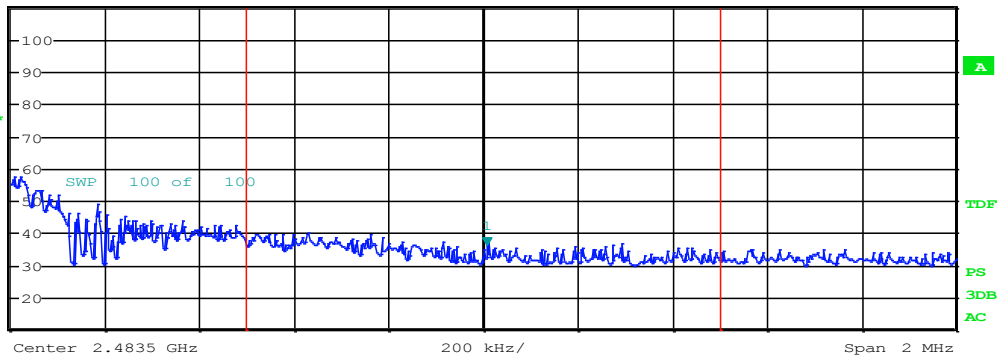
Date: 13.MAR.2015 09:02:14

Band Edge, 2483.5 MHz, Peak Detector – Antenna 1



Ref 110 dBµV/m *Att 10 dB *REW 100 kHz Marker 1 [T1] 35.88 dBµV/m
 VEW 1 MHz 2.483506410 GHz
 SWT 2.5 ms

1 RM *
 MAXH



Tx Channel Bandwidth 1 MHz Power 44.45 dBµV/m

Date: 13.MAR.2015 09:04:30

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



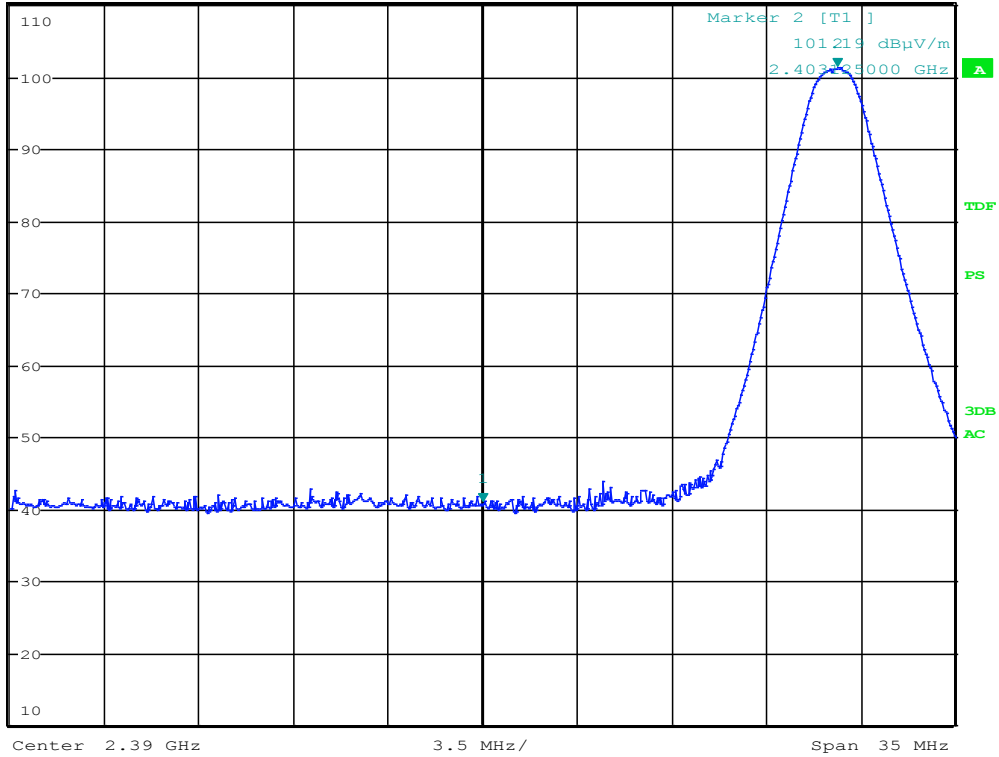
MARKER 1
 2.39 GHz

*RBW 1 MHz
 VBW 3 MHz
 SWT 2.5 ms

Marker 1 [T1]
 41.04 dB μ V/m
 2.390000000 GHz

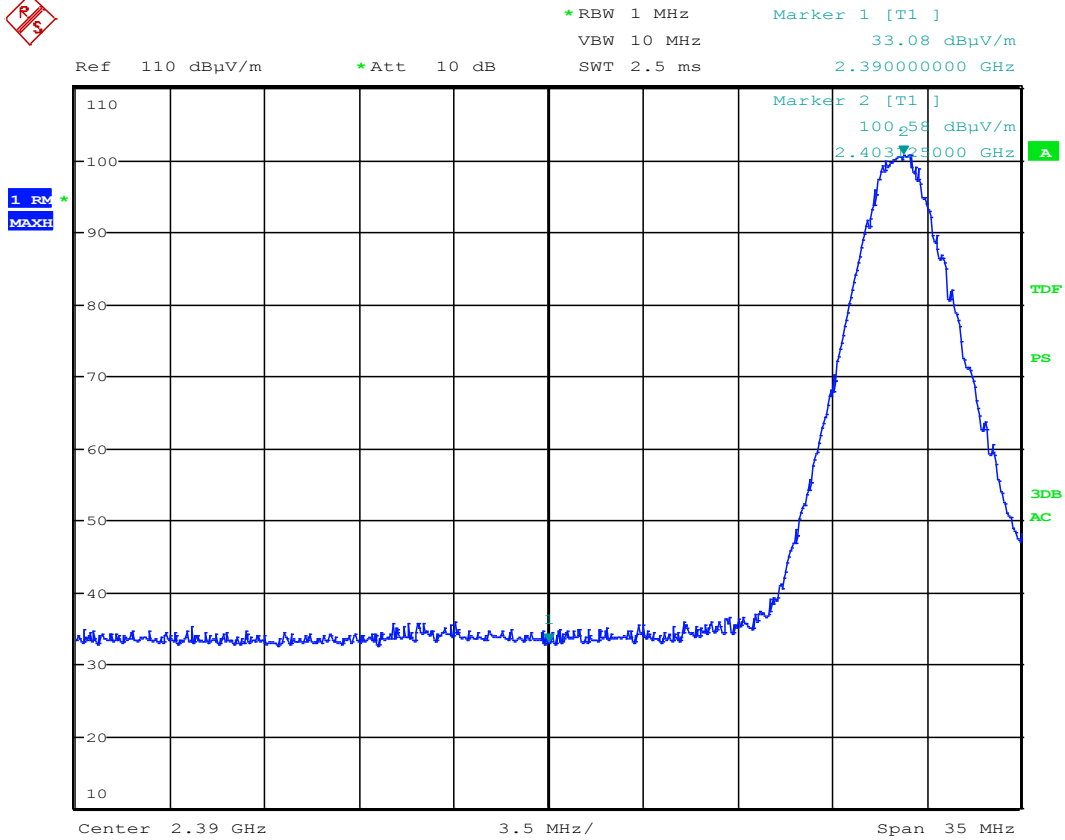
Ref 110 dB μ V/m *Att 10 dB

1 PK
 MAXH



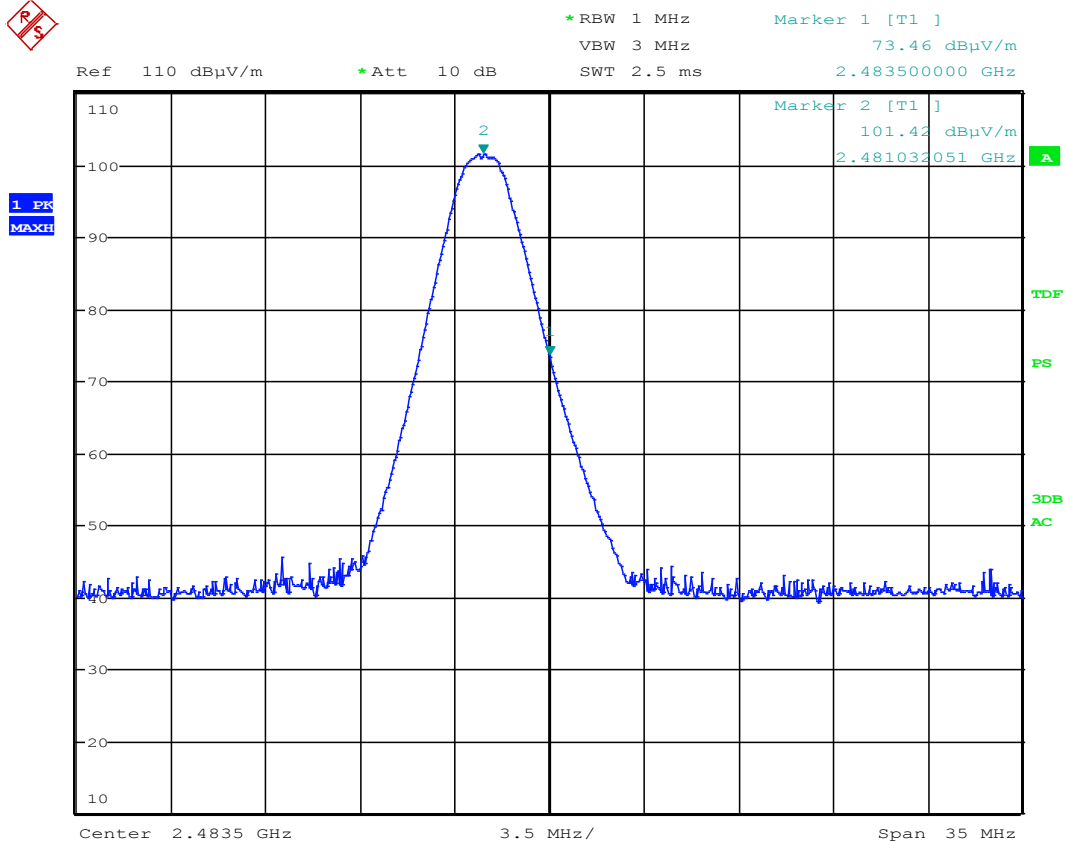
Date: 13.MAR.2015 10:08:13

Lower Band Edge, Peak Detector- Antenna 2



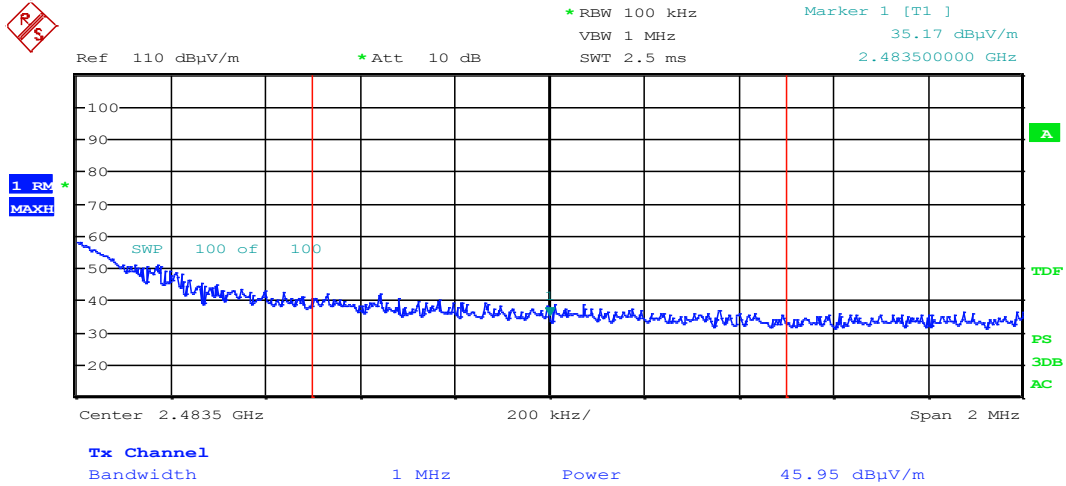
Date: 13.MAR.2015 10:08:53

Lower Band Edge, Average Detector – Antenna 2



Date: 13.MAR.2015 10:15:53

Band Edge, 2483.5 MHz, Peak Detector – Antenna 2



Date: 13.MAR.2015 10:17:53

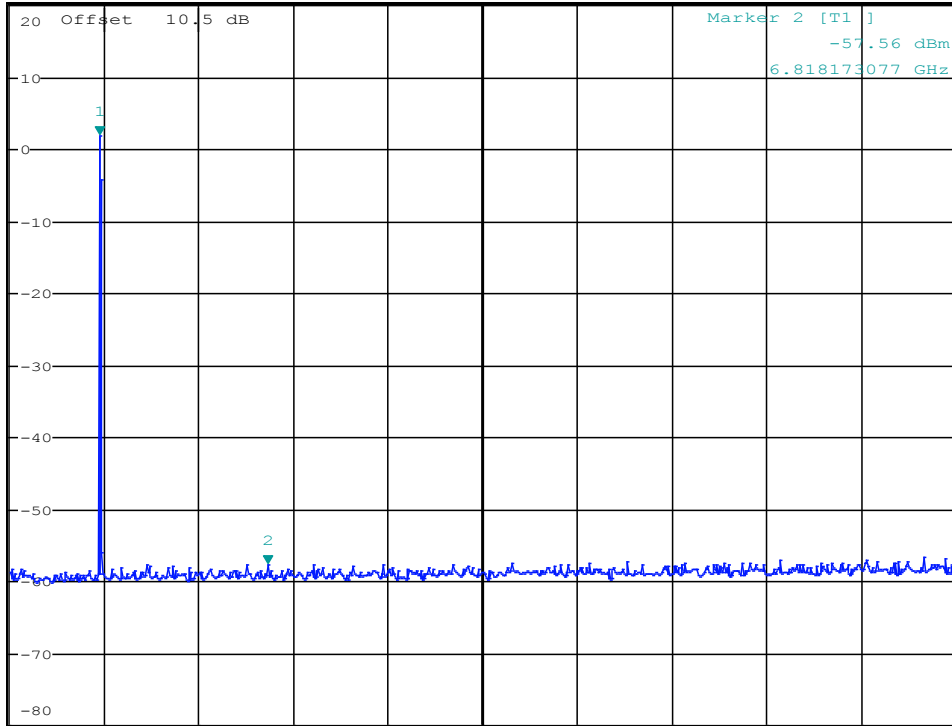
Band edge power, 2483.5MHz, AV detector - Antenna 2



MARKER 1
 2.372836538 GHz

*RBW 100 kHz Marker 1 [T1]
 VBW 300 kHz 1.91 dBm
 Ref 20 dBm *Att 10 dB SWT 2.5 s 2.372836538 GHz

1 PK
 MAXH



Date: 9.MAR.2015 16:08:52

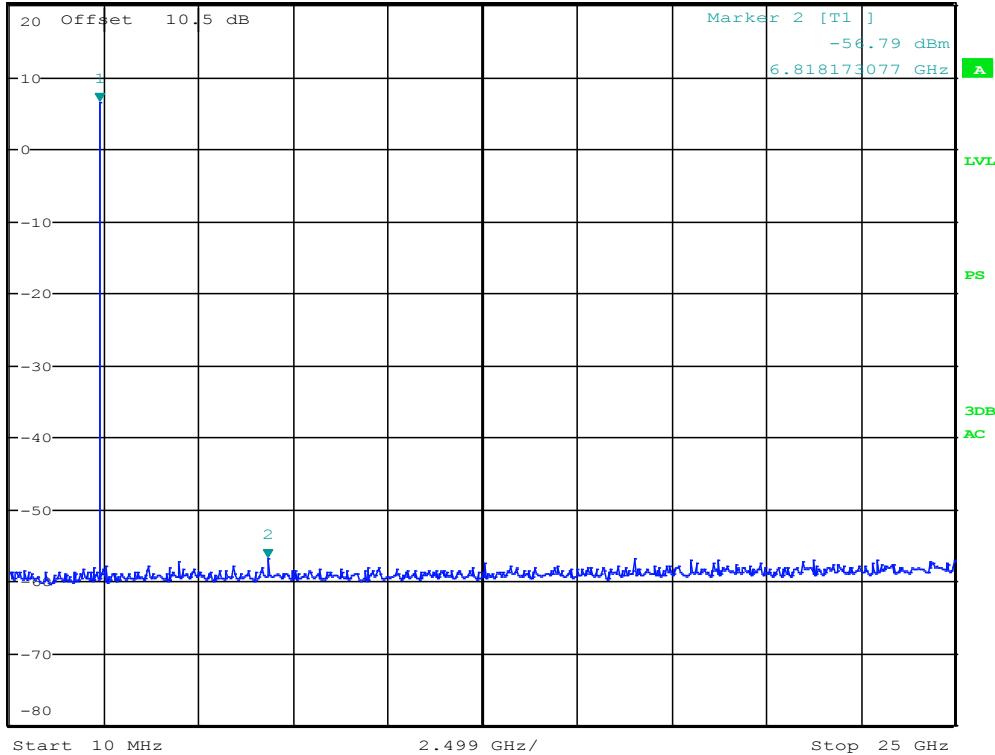
Conducted spurious emission 10MHz – 25GHz - ch2403MHz



MARKER 1
 2.372836538 GHz

*RBW 100 kHz Marker 1 [T1]
 VBW 300 kHz 6.40 dBm
 Ref 20 dBm *Att 10 dB SWT 2.5 s 2.372836538 GHz

1 PK
 MAXH



Date: 9.MAR.2015 16:06:22

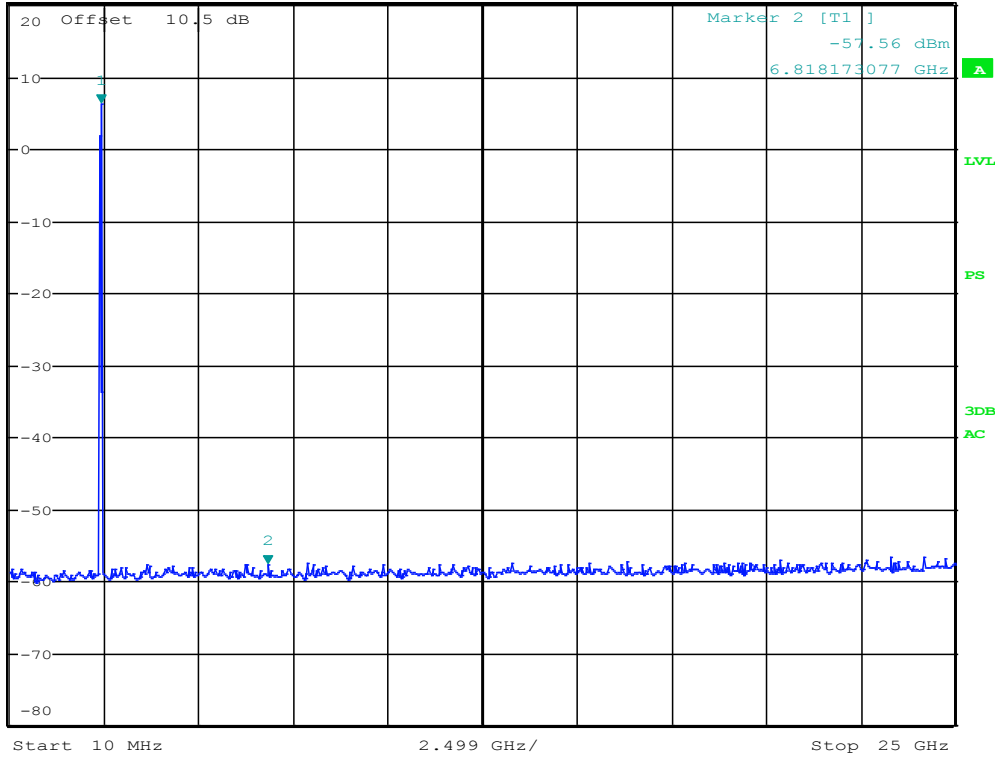
Conducted spurious emission 10MHz – 25GHz - ch2443MHz



MARKER 1
 2.412884615 GHz

*RBW 100 kHz Marker 1 [T1]
 VBW 300 kHz 6.32 dBm
 Ref 20 dBm *Att 10 dB SWT 2.5 s 2.412884615 GHz

1 PK
 MAXH



Date: 9.MAR.2015 16:09:45

Conducted spurious emission 10MHz – 25GHz - ch2481MHz

Radiated emissions 9kHz - 30 MHz.

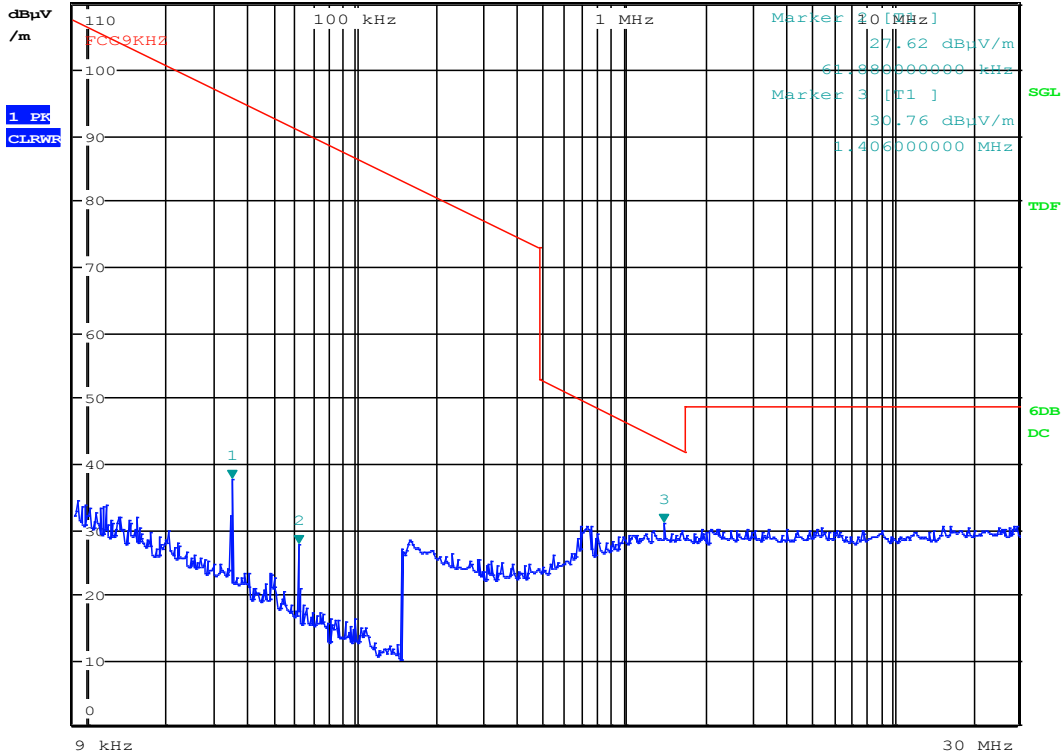
Detector: Quasi-Peak

Measuring distance 10 m.



MARKER 1
 34.52 kHz

RBW 9 kHz Marker 1 [T1]
 MT 50 ms 37.60 dBµV/m
 Step AUTO Att 0 dB PREAMP OFF 34.52000000 kHz



Date: 7.MAR.2015 13:50:20

Radiated Emissions, 9 kHz – 30 MHz @10m

Radiated emission 30 – 1000 MHz.

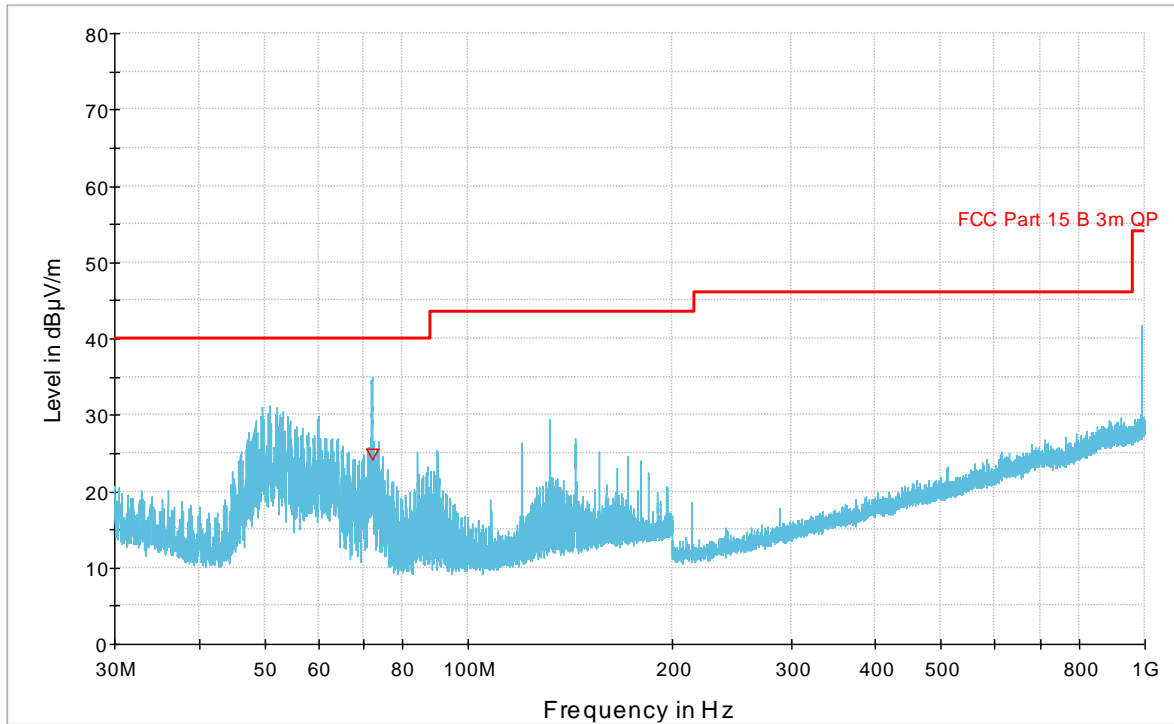
Detector: Peak

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
72.013300	24.78	1000.0	120.000	100.0	V	115.0	-15.3	15.22	40.0	



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

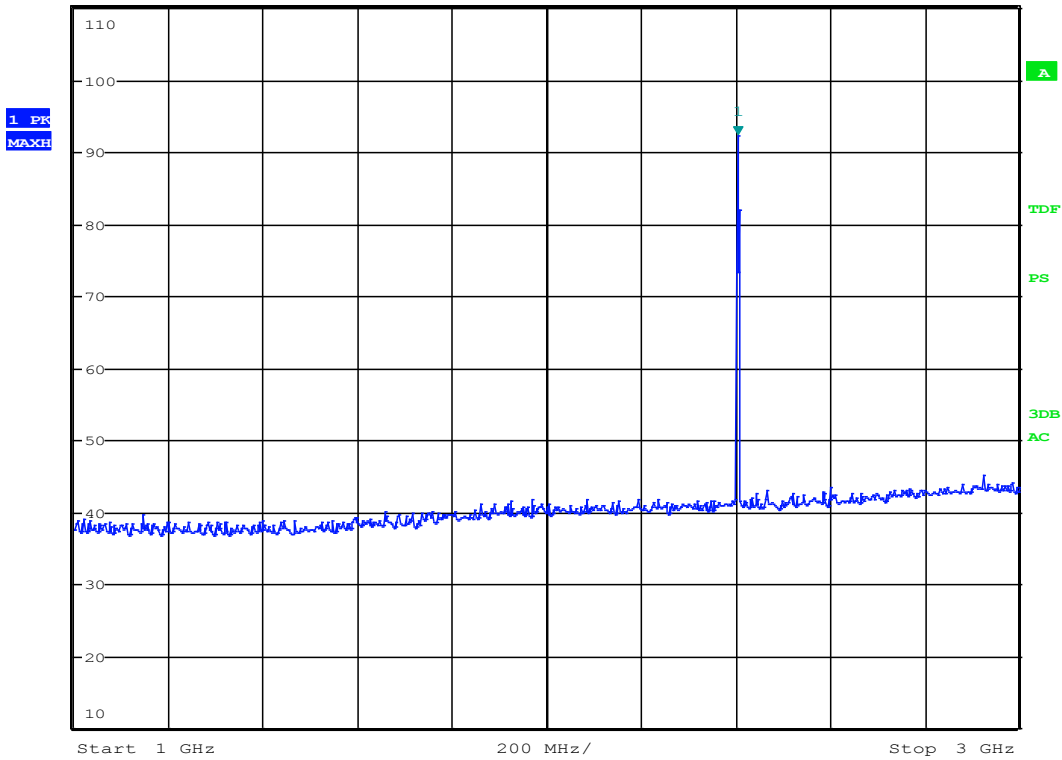
Frequency MHz	Field Strength @3m dB μ V/m	Detector	Limit dB μ V/m	Margin dB
-	-	AV	54	-

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



MARKER 1
 2.403846154 GHz
 Ref 110 dBuV/m *Att 10 dB

*RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 92.31 dBuV/m
 SWT 5 ms 2.403846154 GHz

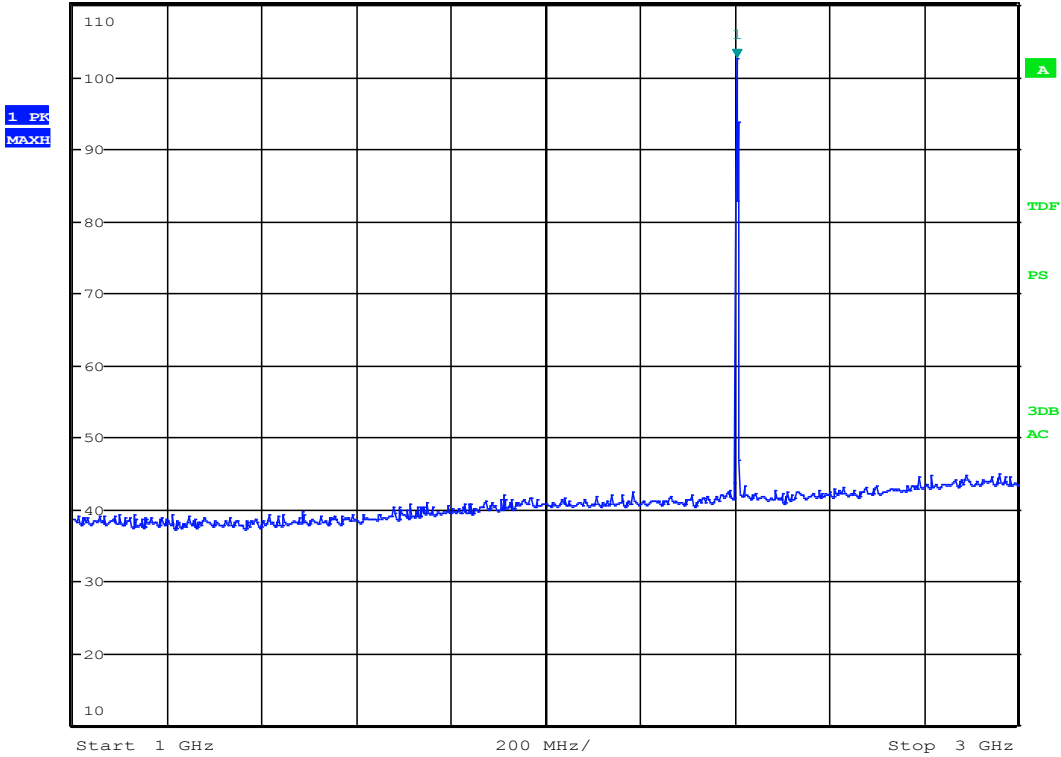


Date: 13.MAR.2015 08:58:08

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



*RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 102.55 dBμV/m
 Ref 110 dBμV/m *Att 10 dB SWT 5 ms 2.403846154 GHz

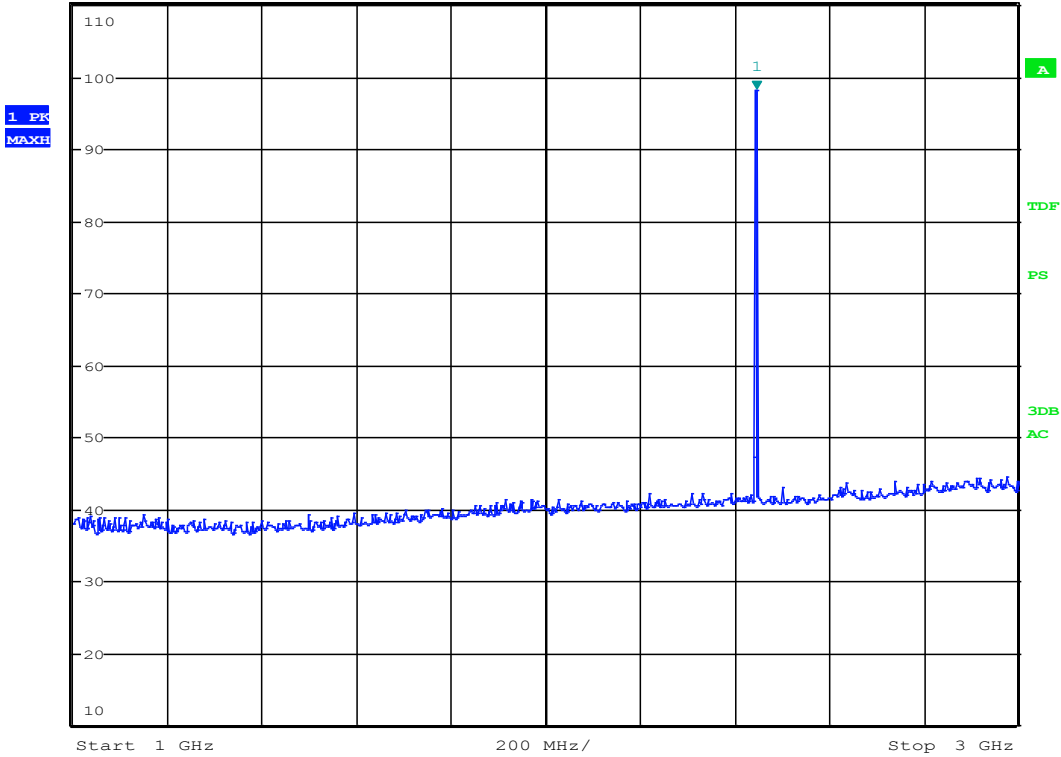


Date: 13.MAR.2015 08:59:57

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



*RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 98.12 dBµV/m
 Ref 110 dBµV/m *Att 10 dB SWT 5 ms 2.445512821 GHz

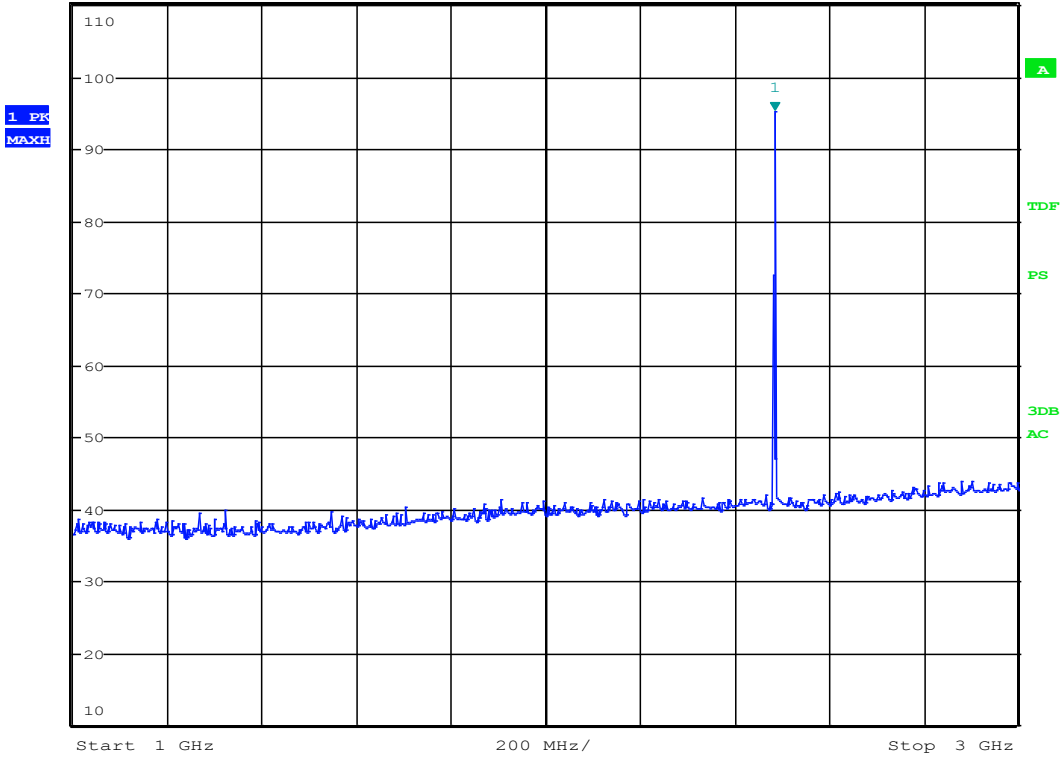


Date: 13.MAR.2015 08:56:53

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



*RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 95.24 dBµV/m
 Ref 110 dBµV/m *Att 10 dB SWT 5 ms 2.483506410 GHz

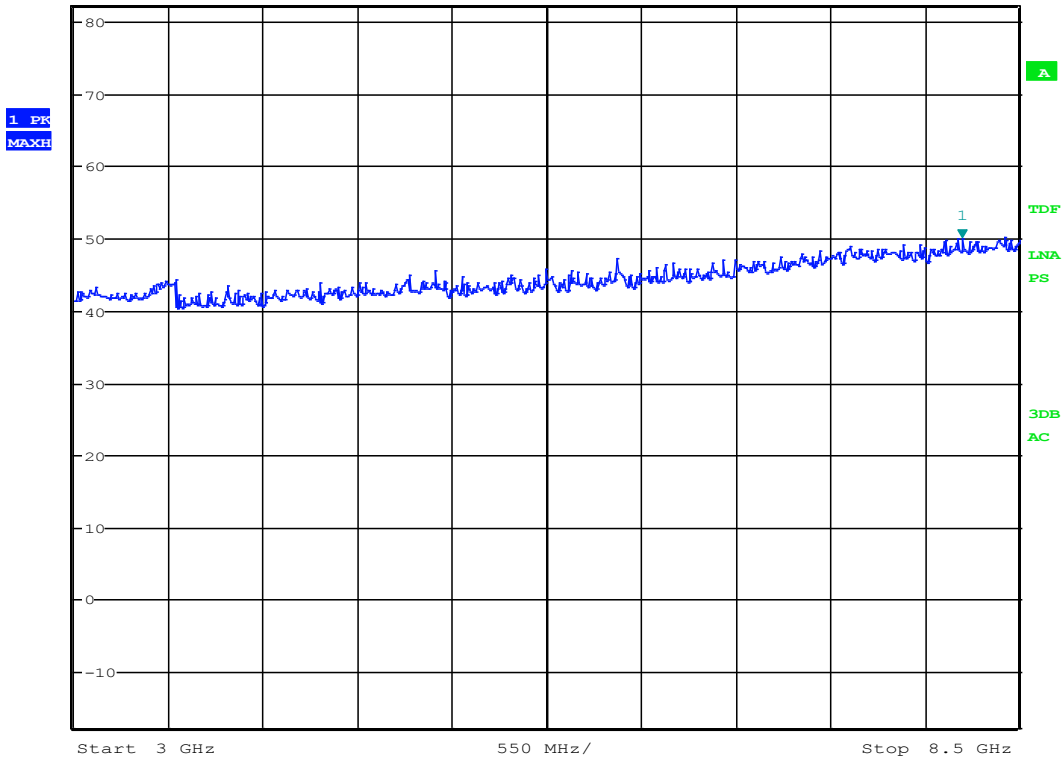


Date: 13.MAR.2015 09:05:48

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



MARKER 1
 8.165064103 GHz
 Ref 82 dB μ V/m *Att 10 dB *RBW 1 MHz VBW 3 MHz SWT 35 ms
 Marker 1 [T1] 49.87 dB μ V/m 8.165064103 GHz

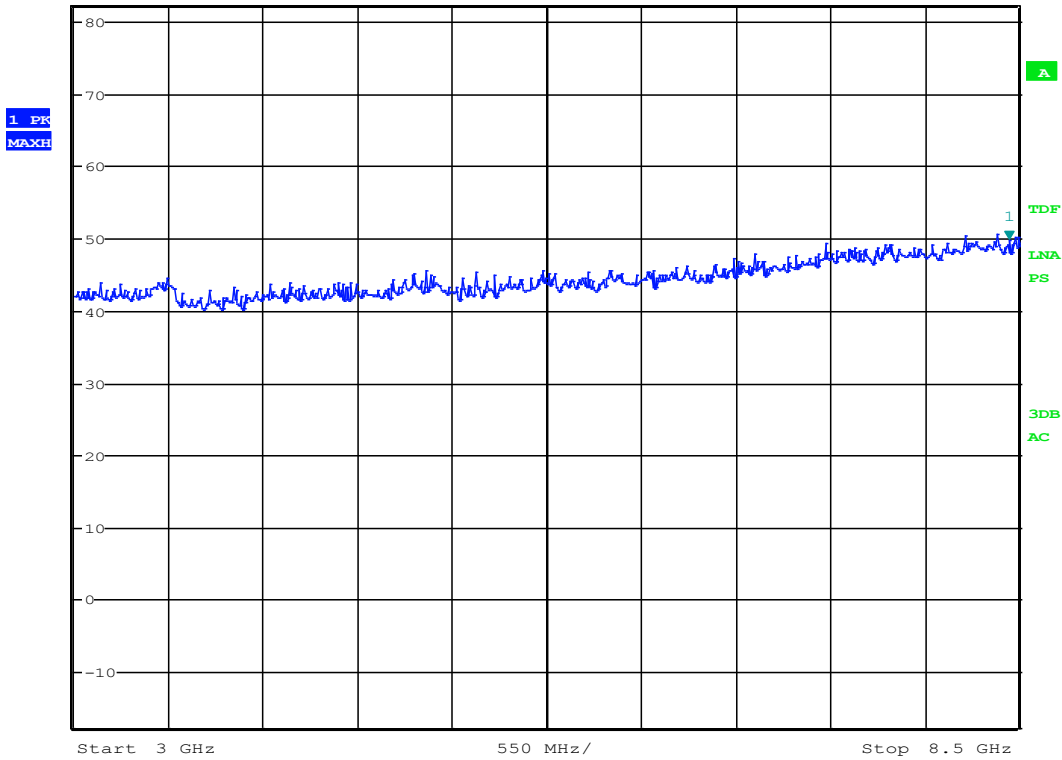


Date: 13.MAR.2015 10:28:59

Radiated Emissions ch. 2403 MHz, 3 – 8.5 GHz, VP, @3m – Pre-scan with Peak detector – antenna 1



MARKER 1
 8.438301282 GHz
 Ref 82 dB μ V/m *Att 10 dB
 *RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 49.69 dB μ V/m
 SWT 35 ms 8.438301282 GHz

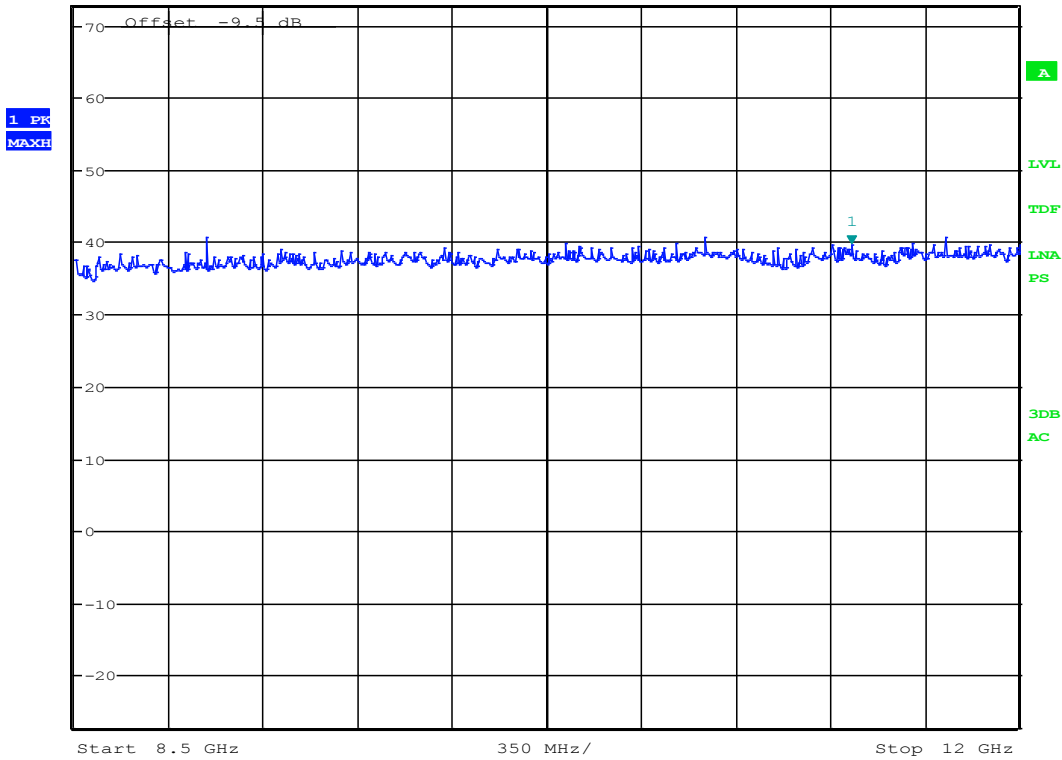


Date: 13.MAR.2015 10:29:26

Radiated Emissions ch. 2403 MHz, 3 – 8.5 GHz, HP, @3m – Pre-scan with Peak detector – antenna 1



MARKER 1
 11.37740385 GHz
 Ref 87 dB μ V/m *Att 10 dB
 *RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 39.72 dB μ V/m
 SWT 25 ms 11.377403846 GHz

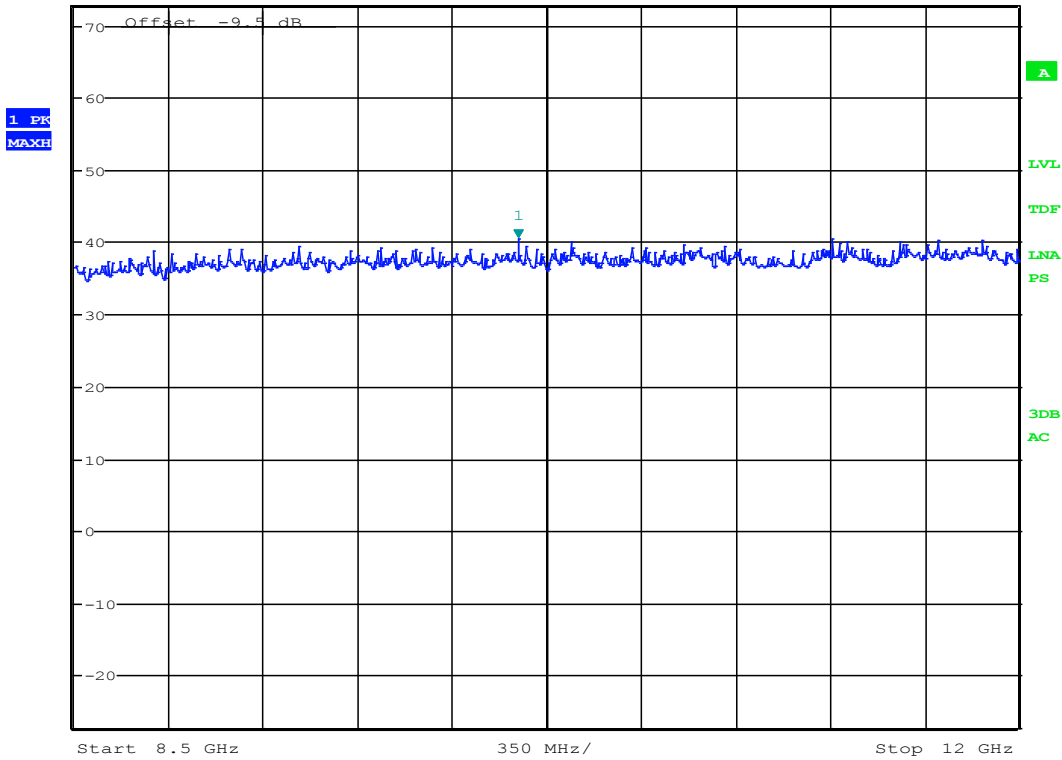


Date: 13.MAR.2015 12:48:37

**Radiated Emissions ch. 2403 MHz, 8.5 – 12 GHz, VP, @3m – Pre-scan with Peak detector – antenna 1
 Distance Correction factor of -9.5 dB is included in the graph.**



MARKER 1
 10.14342949 GHz
 Ref 87 dB μ V/m *Att 10 dB *RBW 1 MHz VBW 3 MHz SWT 25 ms
 Marker 1 [T1] 40.44 dB μ V/m
 10.143429487 GHz

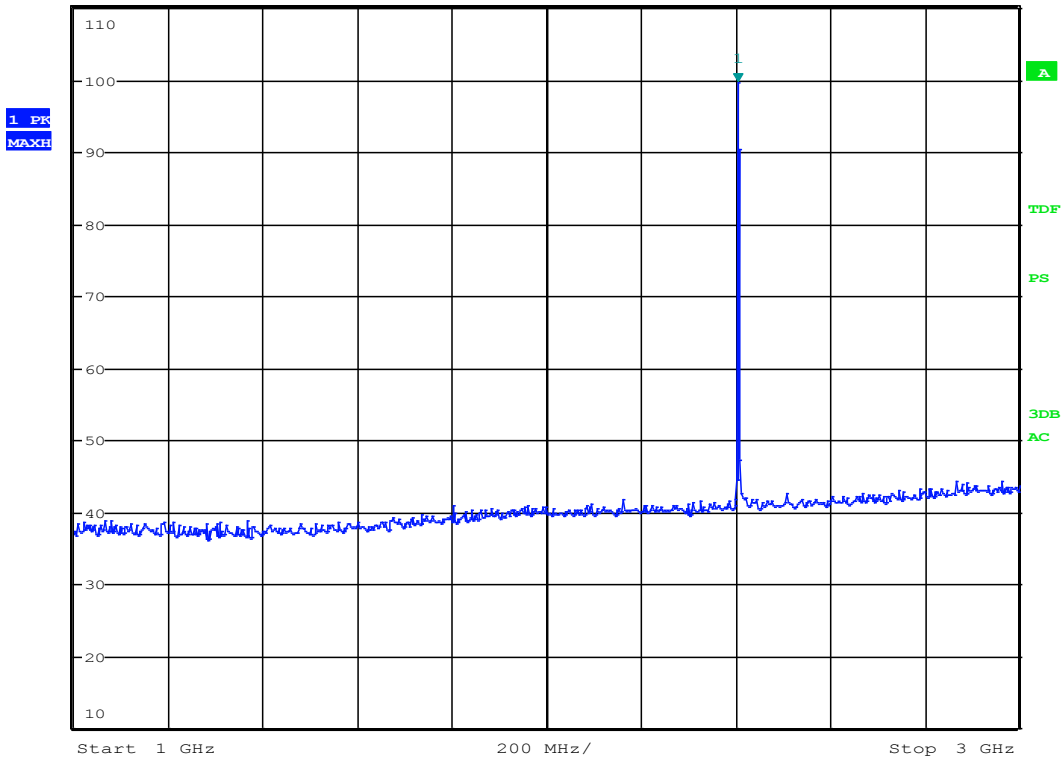


Date: 13.MAR.2015 12:49:03

**Radiated Emissions ch. 2403 MHz, 8.5 – 12 GHz, HP, @3m – Pre-scan with Peak detector – antenna 1
 Distance Correction factor of -9.5 dB is included in the graph.**



MARKER 1
 2.403846154 GHz
 Ref 110 dBuV/m *Att 10 dB *RBW 1 MHz VBW 3 MHz SWT 5 ms
 Marker 1 [T1] 99.67 dBuV/m 2.403846154 GHz

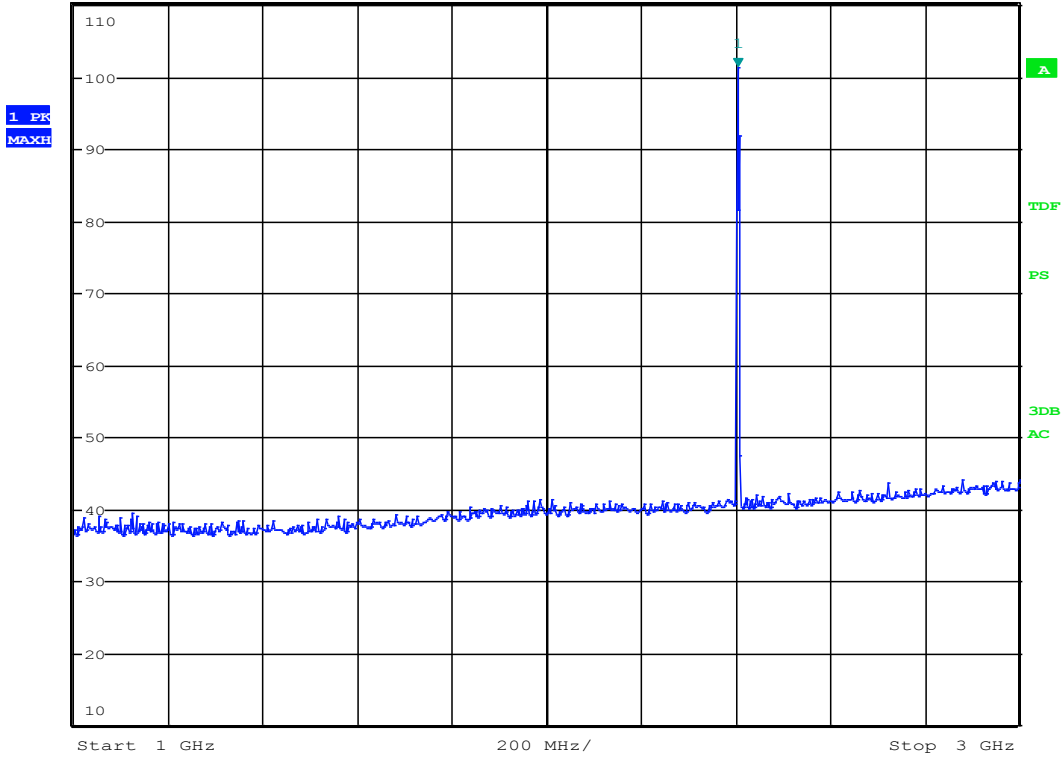


Date: 13.MAR.2015 10:09:37

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]
 101.19 dBuV/m
 2.403846154 GHz

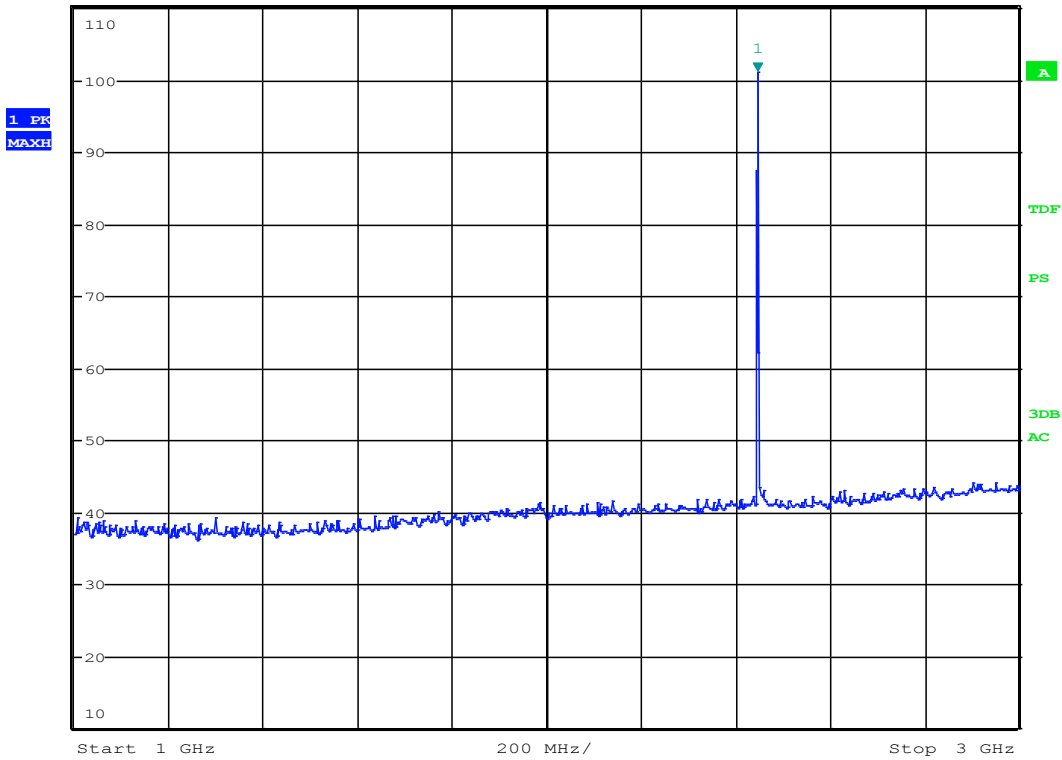


Date: 13.MAR.2015 10:07:06

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



MARKER 1
 2.445512821 GHz
 Ref 110 dBµV/m *Att 10 dB
 *RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 101.06 dBµV/m
 SWT 5 ms 2.445512821 GHz

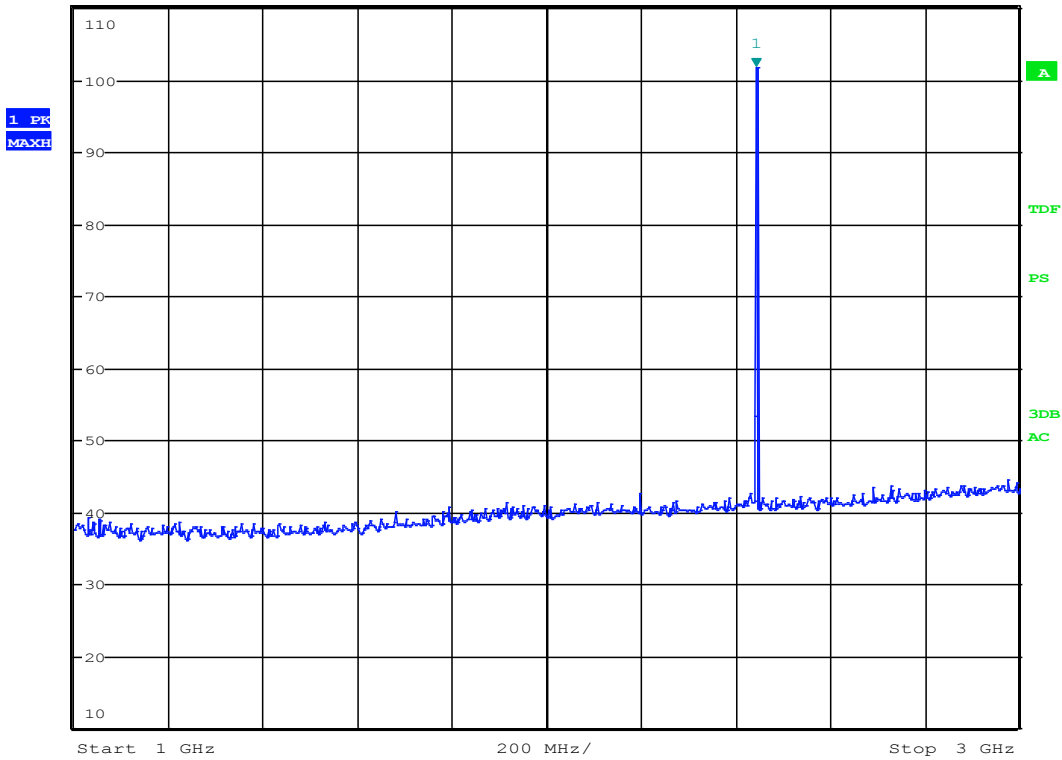


Date: 13.MAR.2015 10:11:01

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



MARKER 1
 2.442307692 GHz
 Ref 110 dBuV/m *Att 10 dB
 *RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 101.72 dBuV/m
 SWT 5 ms 2.442307692 GHz



Date: 13.MAR.2015 10:13:07

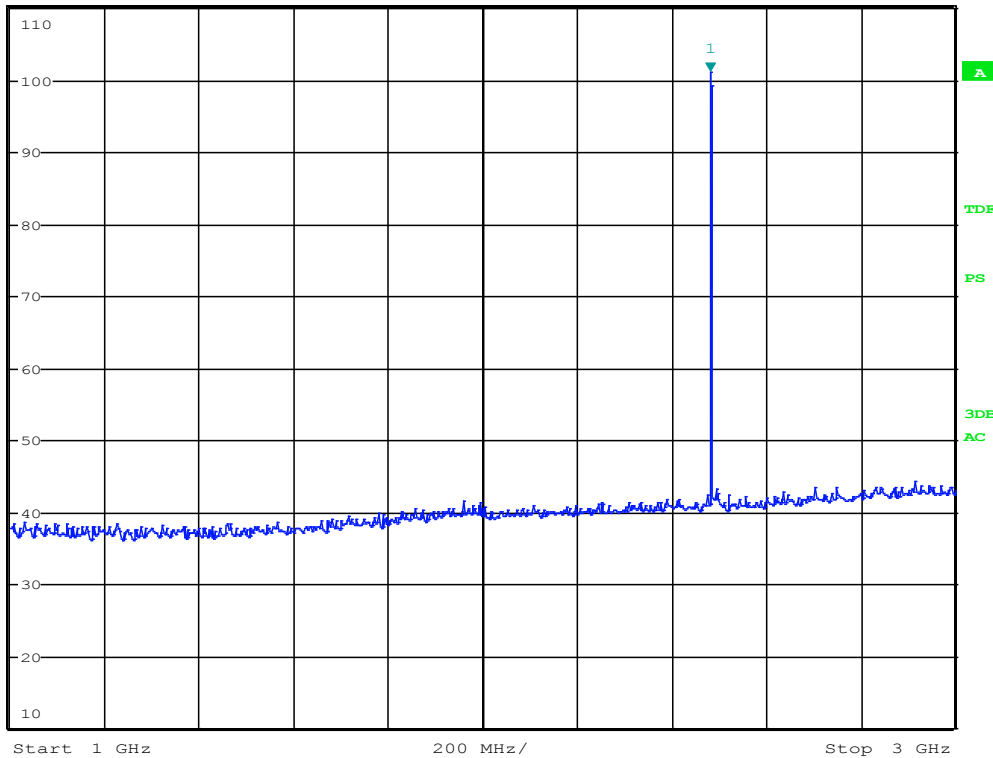
Radiated Emissions ch. 2443 MHz, 1 – 3 GHz, HP, @3m – Pre-scan with Peak detector - antenna 2



MARKER 1
 2.480769231 GHz

*RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 101.08 dBµV/m
 Ref 110 dBµV/m *Att 10 dB SWT 5 ms 2.480769231 GHz

1 PK
 MAXH

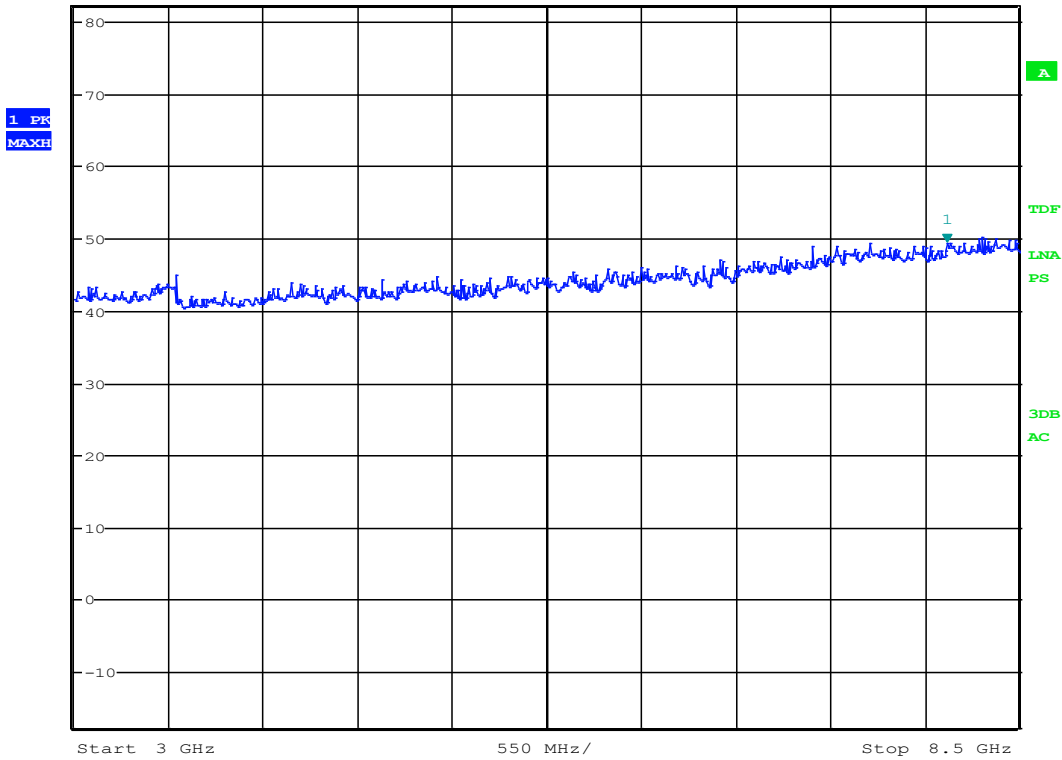


Date: 13.MAR.2015 10:18:42

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



MARKER 1
 8.076923077 GHz
 Ref 82 dBµV/m *Att 10 dB *RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 49.30 dBµV/m
 SWT 35 ms 8.076923077 GHz

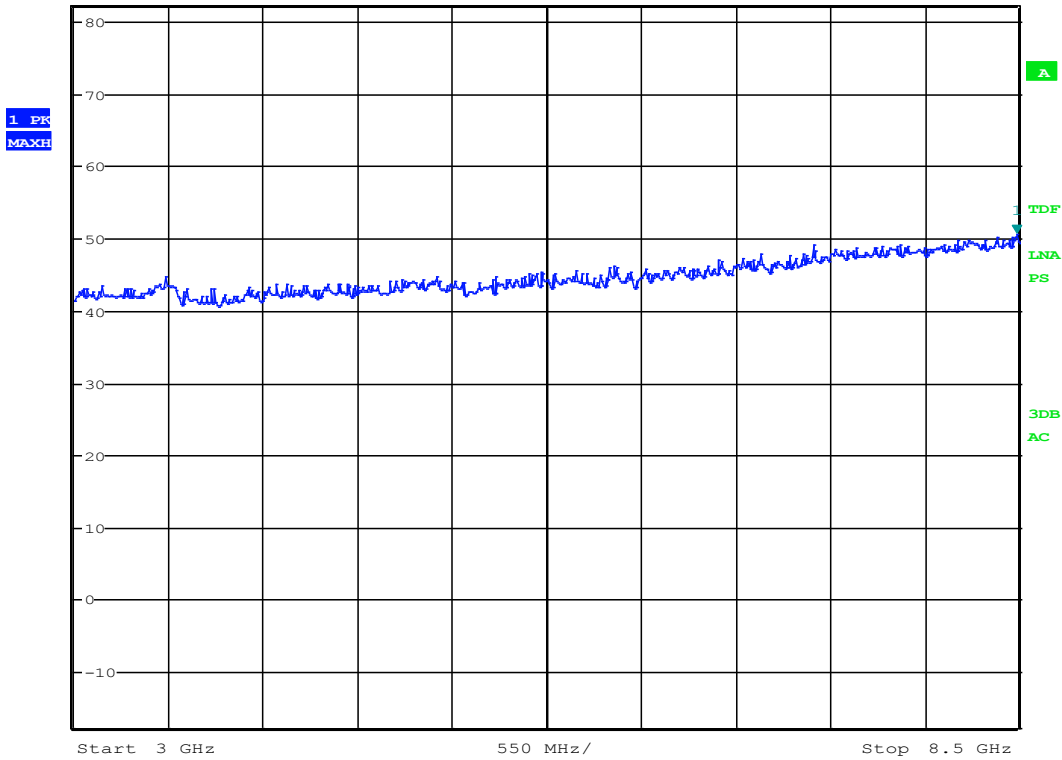


Date: 13.MAR.2015 10:24:28

Radiated Emissions ch. 2403 MHz, 3 – 8.5 GHz, VP, @3m – Pre-scan with Peak detector – antenna 2



MARKER 1
 8.482371795 GHz
 Ref 82 dB μ V/m *Att 10 dB
 *RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 50.53 dB μ V/m
 SWT 35 ms 8.482371795 GHz

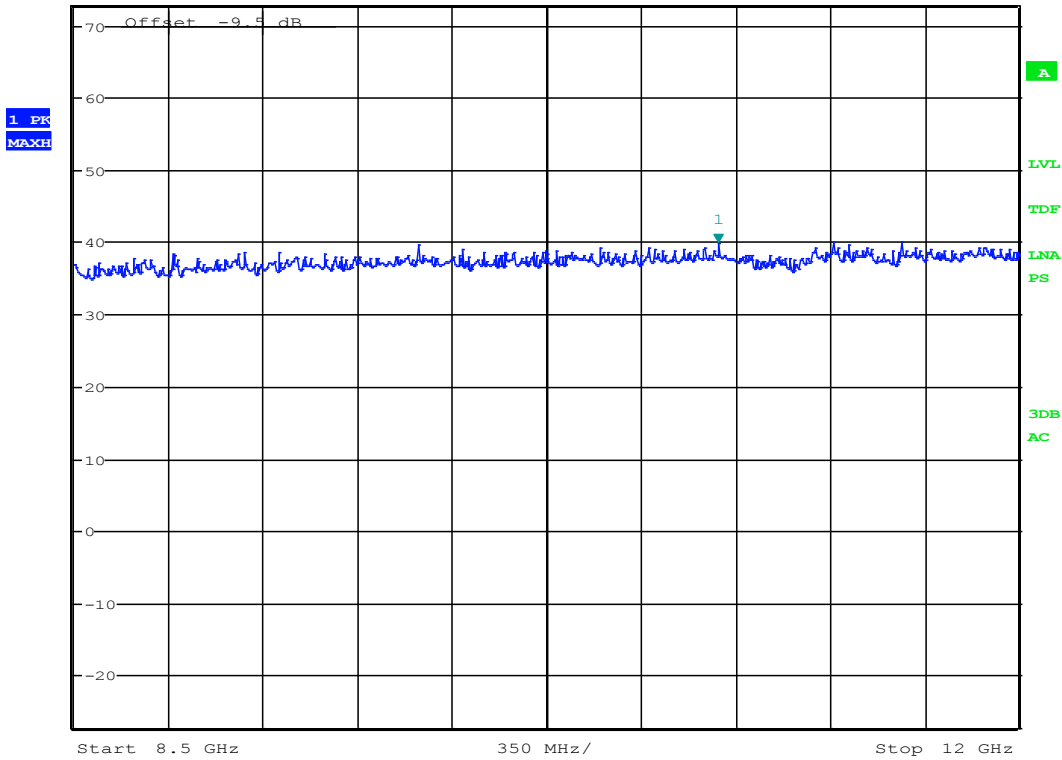


Date: 13.MAR.2015 10:23:56

Radiated Emissions ch. 2403 MHz, 3 – 8.5 GHz, HP, @3m – Pre-scan with Peak detector – antenna 2



MARKER 1
 10.8838141 GHz
 Ref 72.5 dBµV *Att 10 dB *RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 39.79 dBµV
 SWT 25 ms 10.883814103 GHz

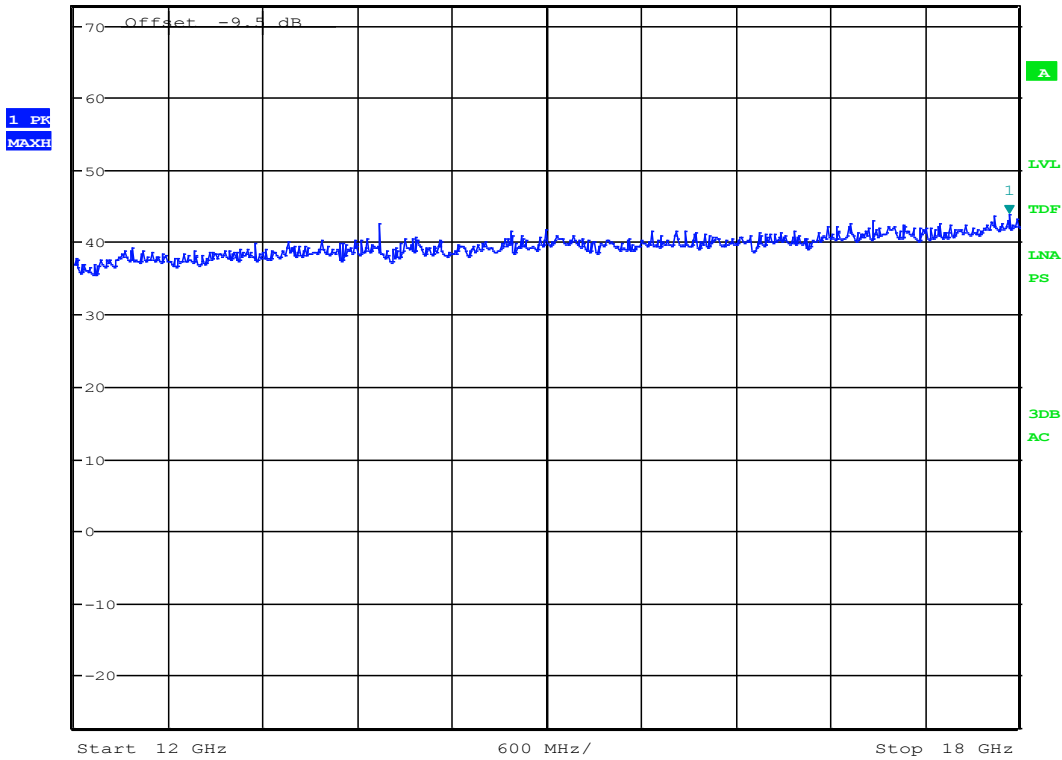


Date: 13.MAR.2015 12:39:04

**Radiated Emissions ch. 2403 MHz, 8.5 – 12 GHz, HP, @1m – Pre-scan with Peak detector – antenna 2
 Distance Correction factor of -9.5 dB is included in the graph.**



MARKER 1
 17.93269231 GHz
 Ref 72.5 dBµV/m *Att 10 dB *RBW 1 MHz VBW 3 MHz SWT 35 ms
 Marker 1 [T1] 43.82 dBµV/m
 17.932692308 GHz

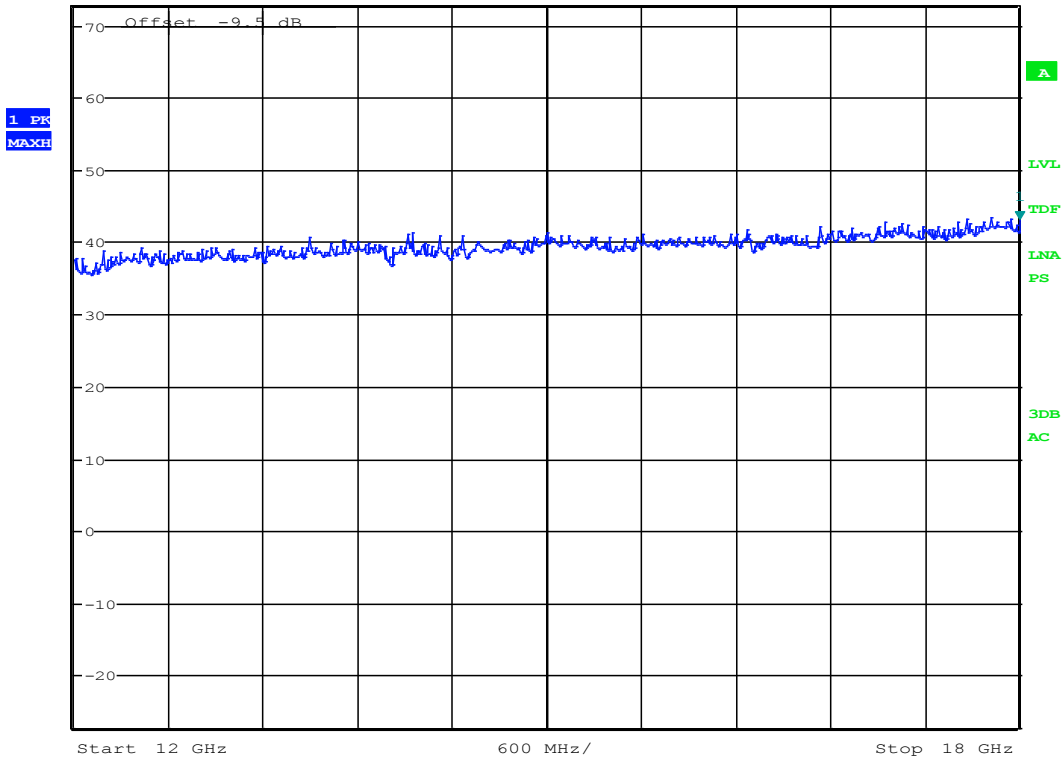


Date: 13.MAR.2015 12:44:19

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.



MARKER 1
 18 GHz
 Ref 72.5 dBµV/m *Att 10 dB RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 43.03 dBµV/m
 SWT 35 ms 18.00000000 GHz

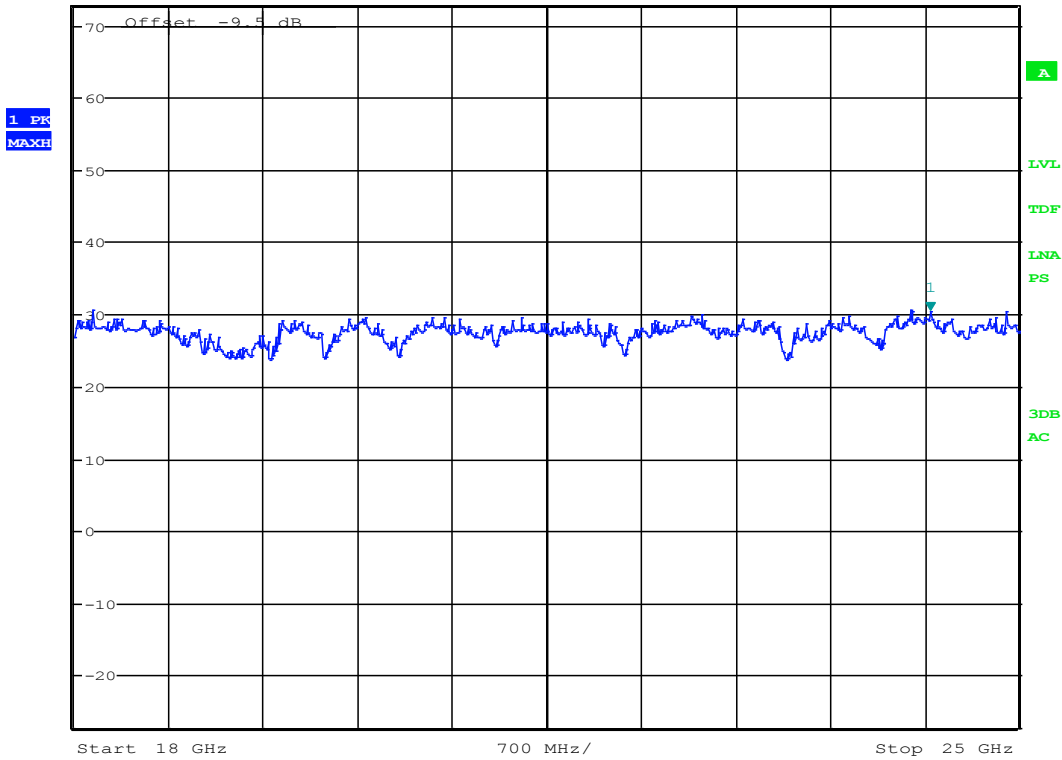


Date: 13.MAR.2015 12:44:53

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.



MARKER 1
 24.33814103 GHz
 Ref 72.5 dBµV/m *Att 10 dB RBW 1 MHz VBW 3 MHz SWT 45 ms
 Marker 1 [T1] 30.41 dBµV/m
 24.338141026 GHz



Date: 13.MAR.2015 13:19:24

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: 10 Mar 2015
------------------------------------	---------------------------

Test Results: Complies

Measured and Calculated Data:

	calculated peak PSD dBm
Power Spectral Density @2403 MHz	-8.98
Power Spectral Density @2443 MHz	-7.82
Power Spectral Density @2481 MHz	-7.37

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

Requirements:

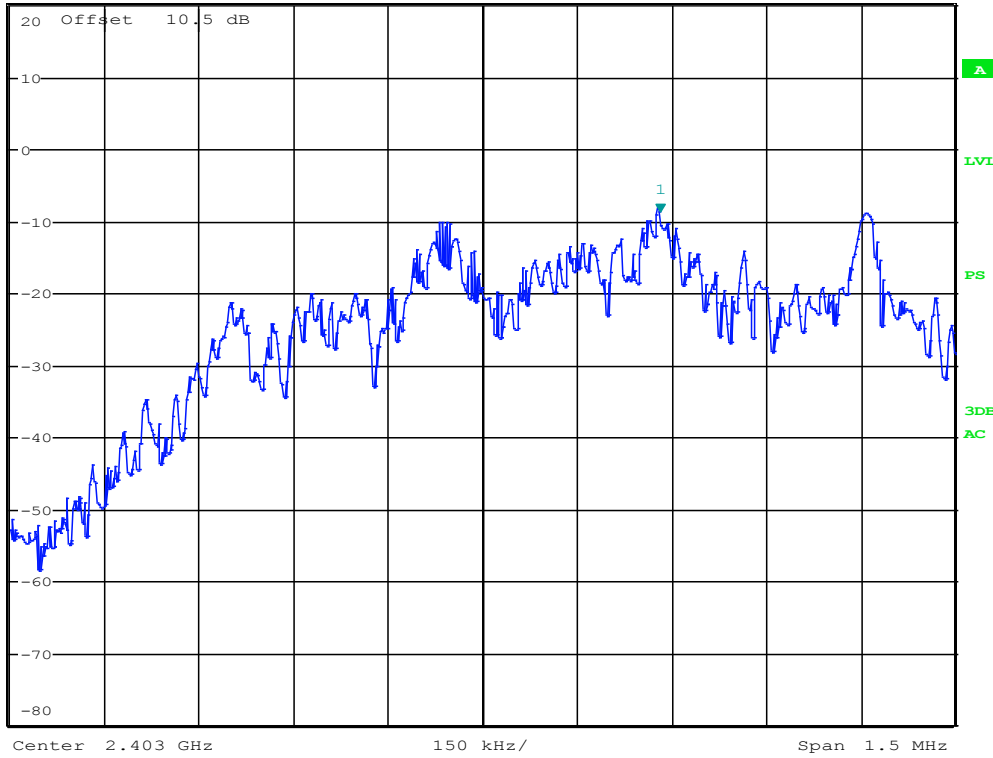
The Power Spectral Density of a Digital Transmission System shall be no greater than +8 dBm in any 3 kHz band.



MARKER 1
 2.40328125 GHz
 Ref 20 dBm

*RBW 3 kHz Marker 1 [T1]
 VBW 10 kHz -8.98 dBm
 *Att 15 dB SWT 170 ms 2.403281250 GHz

1 PK
 MAXH

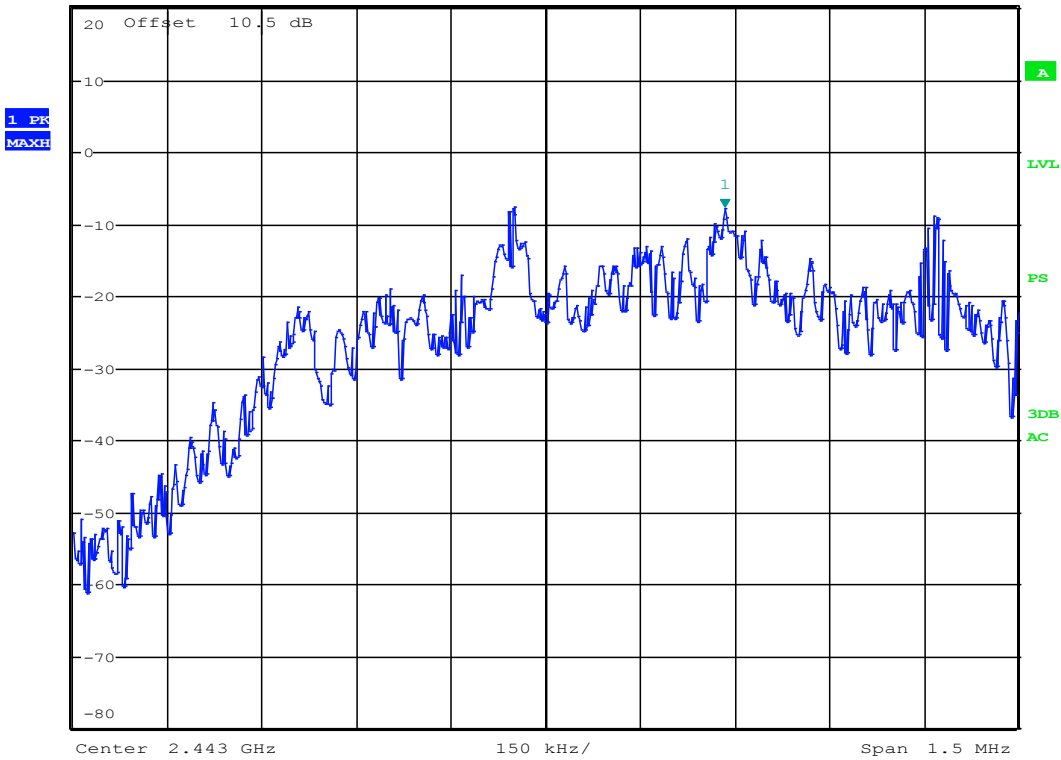


Date: 9.MAR.2015 15:55:55

PSD Measurement - 2403MHz



MARKER 1
2.443283654 GHz
Ref 20 dBm *Att 15 dB *RBW 3 kHz VBW 10 kHz SWT 170 ms
Marker 1 [T1] -7.82 dBm 2.443283654 GHz

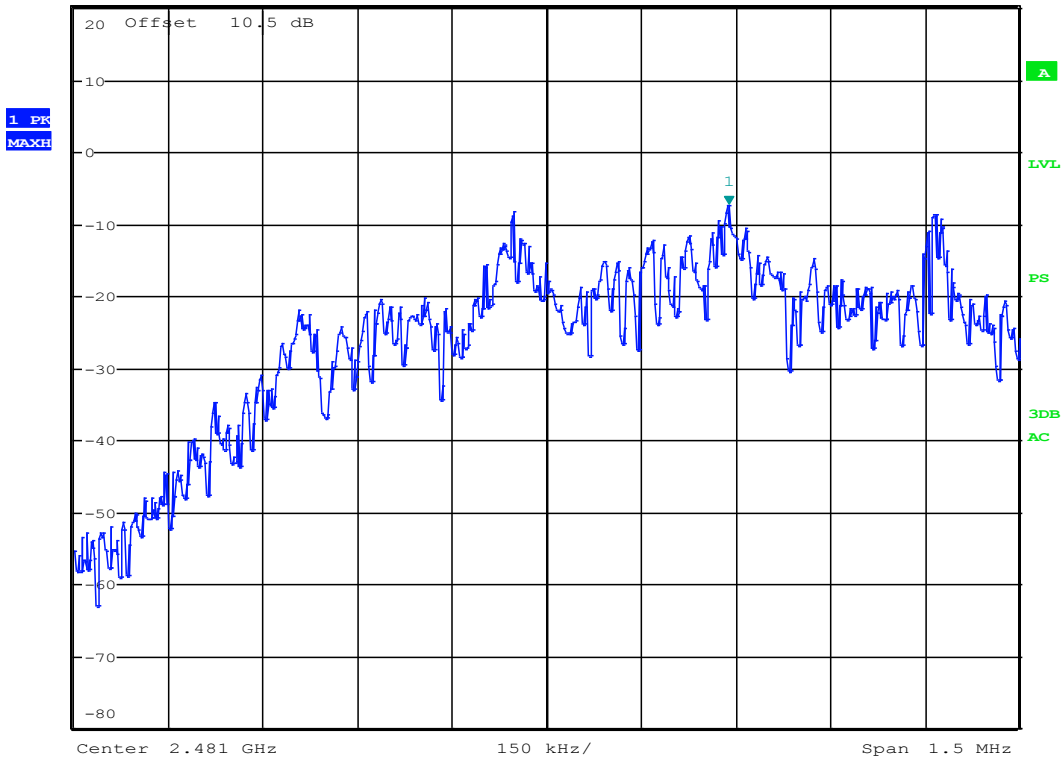


Date: 9.MAR.2015 16:01:48

PSD Measurement – 2443MHz



MARKER 1
 2.481288462 GHz
 Ref 20 dBm *Att 15 dB *RBW 3 kHz VBW 10 kHz Marker 1 [T1] -7.37 dBm
 SWT 170 ms 2.481288462 GHz



Date: 9.MAR.2015 15:45:11

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

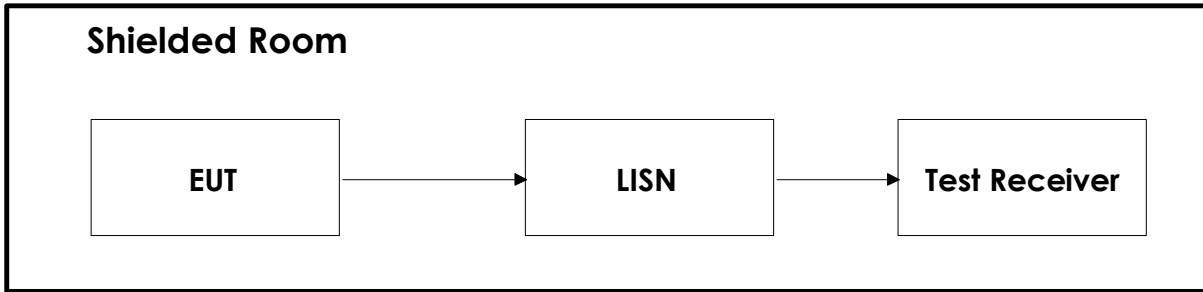
5 LIST OF TEST EQUIPMENT

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

