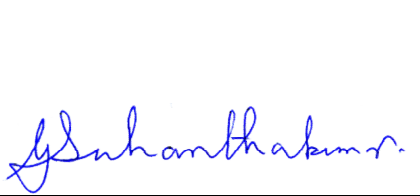


Test Report

Product	Wireless repeater/Gateway for Emergency call systems
Name and address of the applicant	Ascom Sweden AB Grimbodalen 2, Goteborg, SE-40276, Sweden
Name and address of the manufacturer	Ascom Sweden AB Grimbodalen 2, Goteborg, SE-40276, Sweden
Model	NUREP
Rating	5Vdc
Trademark	Ascom
Serial number	G2974888
Additional information	Contains IEEE 802.15.4 based 2.4GHz Zigbee radio.
Tested according to	FCC Part 15.247 Digital Transmission Systems Industry Canada RSS-247, Issue 2 Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
Order number	327231
Tested in period	2017.05.18 - 2017.06.07
Issue date	2017.07.03
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 [Roy Uggerud]	
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1 INFORMATION

1.1 Test Item

Name :	Ascom
FCC ID :	BXZNUREP
Industry Canada ID :	3724B-NUREP
Model/version :	NUREP
Serial number :	G2974888
Hardware identity and/or version:	C
Software identity and/or version :	1.0
Frequency Range :	2405 - 2475MHz
Tunable Bands :	None
Number of Channels :	16
Channel BW:	2 MHz
Type of Modulation :	ZigBee uses Offset quadrature phase-shift keying (OQPSK)
User Frequency Adjustment :	N/A
Rated Output Power :	94.62mW
Type of Power Supply :	5Vdc
Antenna Connector :	PCB antenna
No of antennas:	1
Antenna Diversity Supported :	None
Desktop Charger :	None

Description of Test Item

Wireless devices for emergency calls intended for use in nursing homes and in assisted living facilities. This device contains contains IEEE 802.15.4 based zigbee radio. And it is only powered with DC Voltage

1.2 Normal test conditions

Temperature: 20 - 24 °C

Relative humidity: 20 - 50 %

Normal test voltage: 5Vdc

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.

1.5 Description of modification for Modification Filing

Not applicable.

1.6 Family List Rational

Not Applicable.

1.7 Additional Comments

The measurements were done with the EUT powered by 5VdC. It was checked that power variations between 85% and 115% did not have any influence on the measurements.

All ports were populated during spurious emission measurements.

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-247 Issue 2.

Tests were performed in accordance with ANSI C63.4-2014, KDB 558074 D01 v04 and ANSI C63.10-2013.

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.

☒ New Submission

☐ Production Unit

☐ Class II Permissive Change

☒ Pre-production Unit

DTS Equipment Code

☐ 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-247 Issue 2, RSS-GEN Issue 4 reference	Result
Supply Voltage Variations	15.31(e)	6.11 (RSS-GEN)	Complies
Number of Operating Frequencies	15.31(m)	5.1 (6) (RSS-247)	N/A
Antenna Requirement	15.203	8.3 (RSS-GEN)	Complies ¹
Power Line Conducted Emission	15.107(a) 15.207(a)	8.8 (RSS-GEN)	Complies
Channel Separation	15.247(a)(1)	5.1 (4) (RSS-247)	N/A
Pseudorandom Hopping Algorithm	15.247(a)(1)	5.1 (3) (RSS-247)	N/A
Time of Occupancy	15.247(a)(1)(iii)	5.1 (5) (RSS-247)	N/A
Occupied Bandwidth	15.247(a)(1)	5.1 (7) (RSS-247)	Complies
Occupied Bandwidth	N/A	6.6 (RSS-GEN)	
Minimum 6 dB Bandwidth	15.247(a)(2)	5.2 (1) (RSS-247)	Complies
Peak Power Output	15.247(b)	5.4 (RSS-247)	Complies
Power Spectral Density	15.247(d)	5.2 (2) (RSS-247)	Complies
Spurious Emissions (Antenna Conducted)	15.247(c)	5.5 (RSS-247)	Complies ¹
Spurious Emissions (Radiated)	15.247(c) 15.109(a) 15.209(a)	5.5 (RSS-247) 6.13 (RSS-GEN) 8.9 (RSS-GEN)	Complies

¹ The tested equipment has integrated antennas only.

3 TEST RESULTS

3.1 Power Line Conducted Emissions

Para. No.: 15.207 (a)

Test Performed By: G.Suhanthakumar

Date of Test: 2017.05.21

Measurement procedure: ANSI C63.4-2014 using 50 μ H/50 ohms LISN.

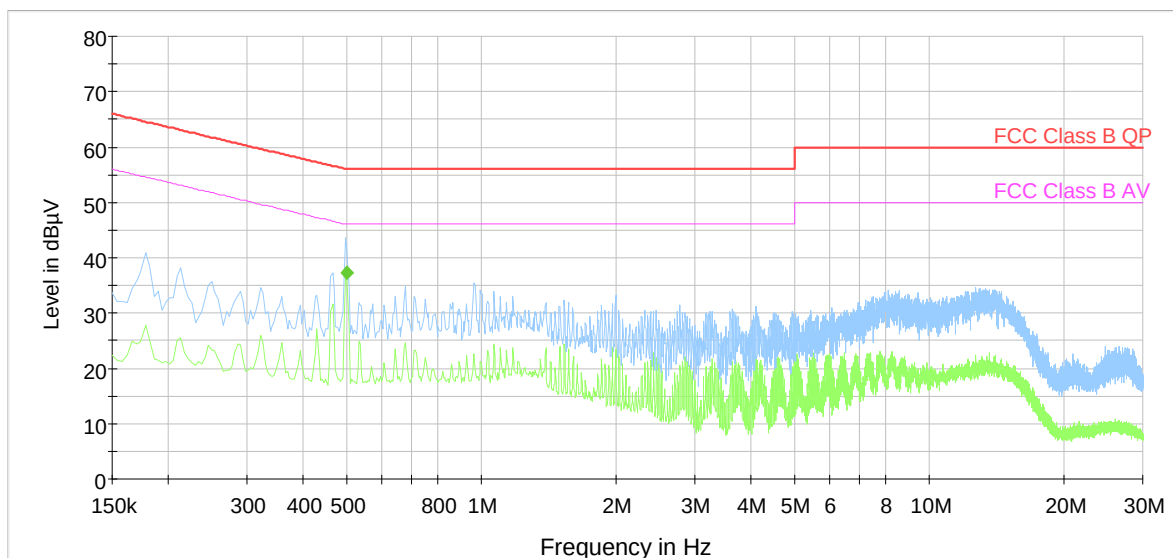
Test Results: Complies.

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

AC/DC adapter type PSAC05R-05L6

Input voltage to AC/DD adapter: 120Vac/60Hz

Highest measured value (L1 and N):



Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.500	---	37.37	46.00	8.63	1000	9	N	GND	10.1

3.2 Minimum 6 dB Bandwidth

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

Test Performed By: G.Suwanthakumar	Date of Test: 2017.05.23
------------------------------------	--------------------------

Test Results: Complies

Measurement Data:

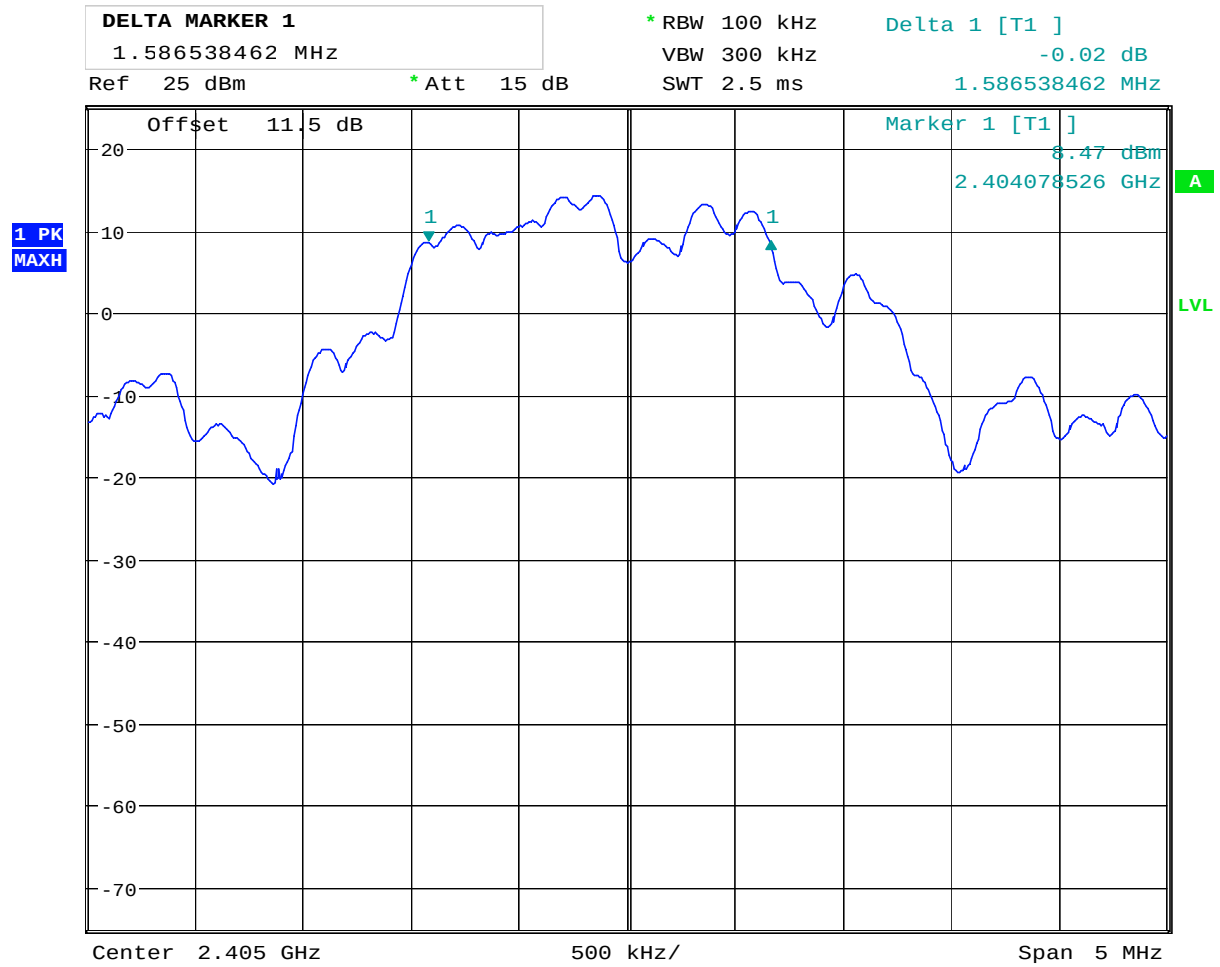
Measured 6 dB Bandwidth (MHz)		
2405MHz	2440 MHz	2475MHz
1.59	1.63	1.62

Power supply variation within 85 % to 115% of nominal value has no influence on measured value.

Requirements:

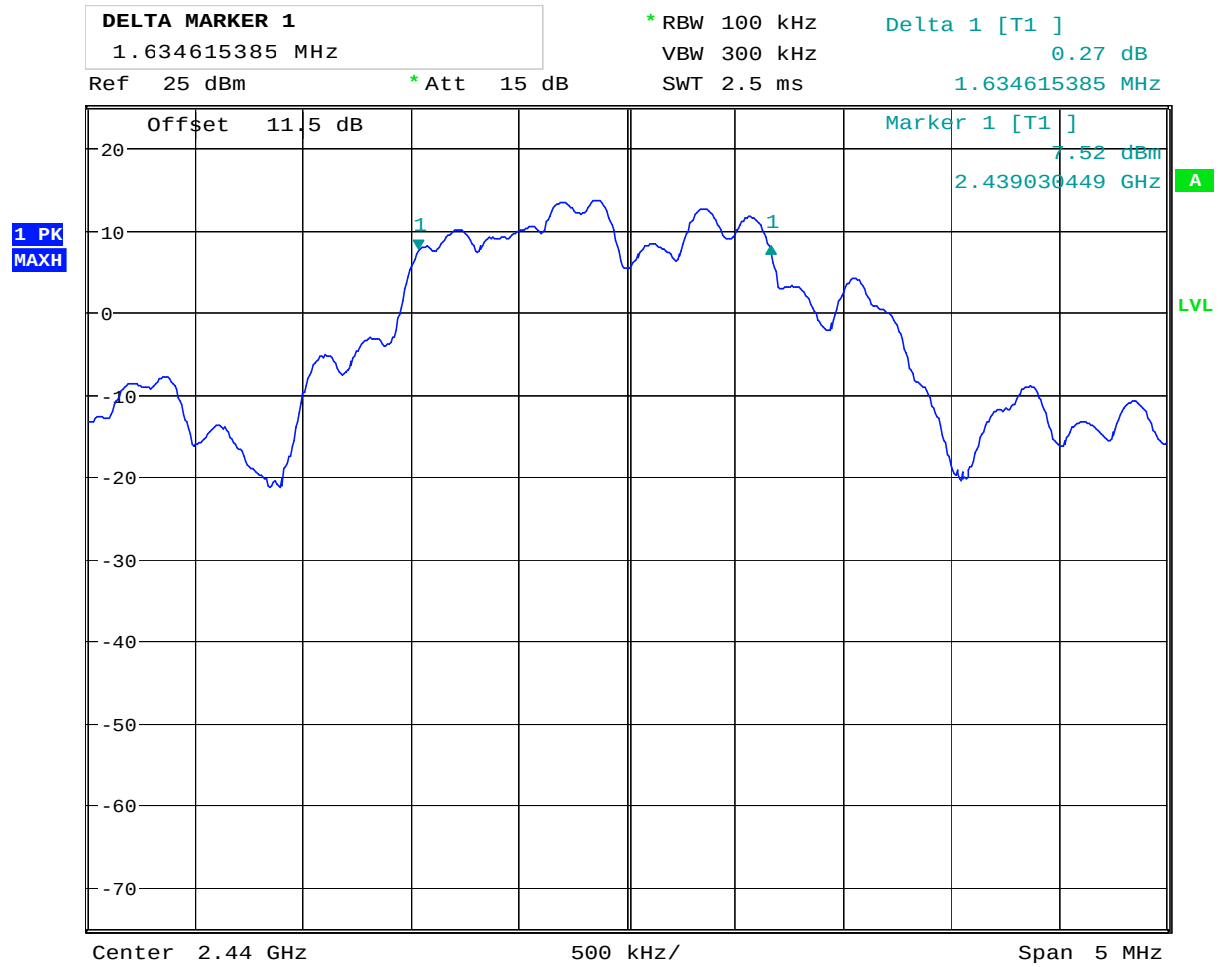
For Digital Transmission Systems in the 2400-2483.5 MHz band the minimum 6 dB bandwidth shall be at least 500 KHz.

No requirements for Frequency Hopping Systems.



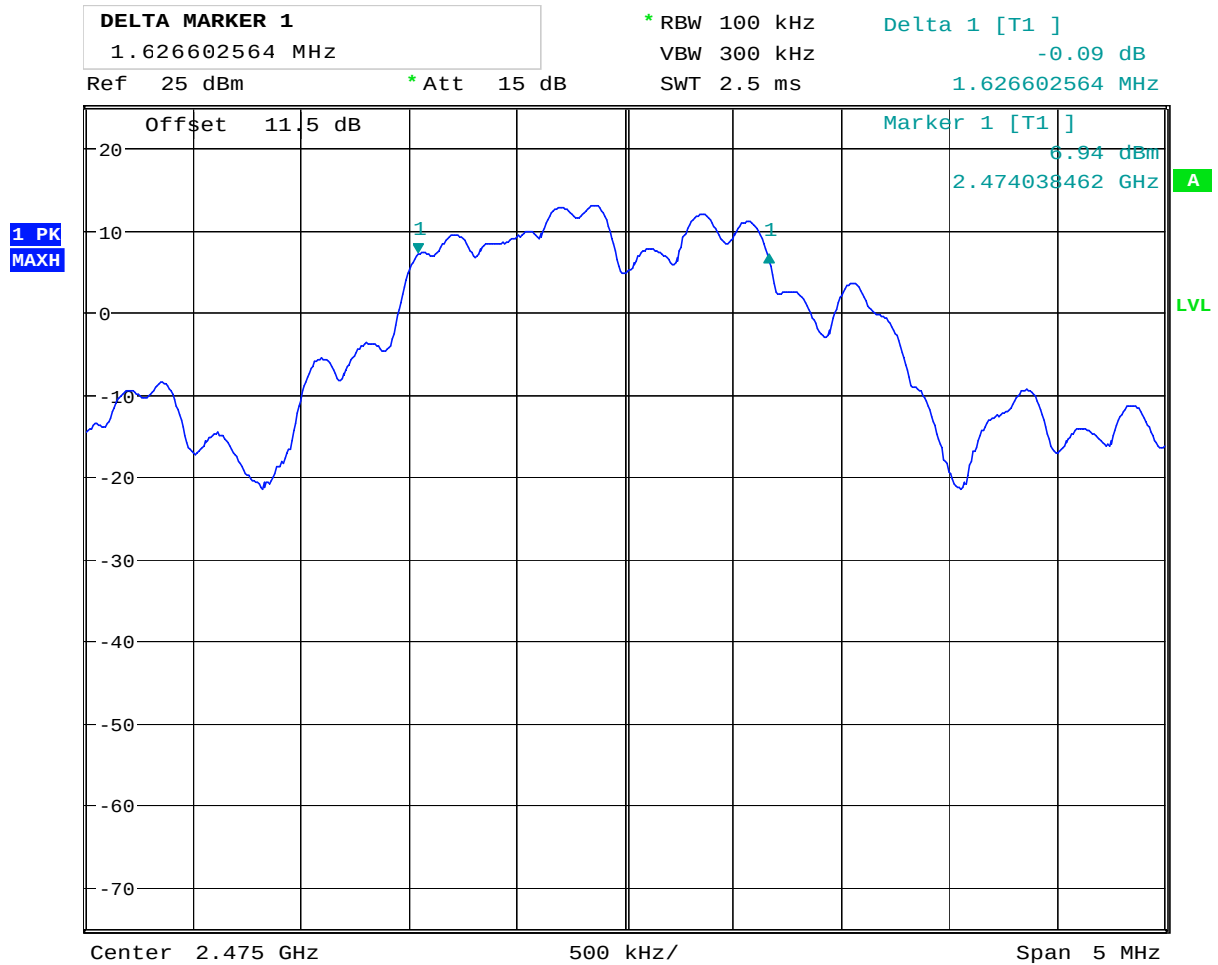
Date: 23.MAY.2017 19:04:39

6 dB Bandwidth at 2405 MHz



Date: 23.MAY.2017 19:01:45

6 dB Bandwidth at 2440 MHz



Date: 23.MAY.2017 18:58:37

6 dB Bandwidth at 2475 MHz

3.3 20 dB Bandwidth

Test Performed By: G.Suwanthakumar

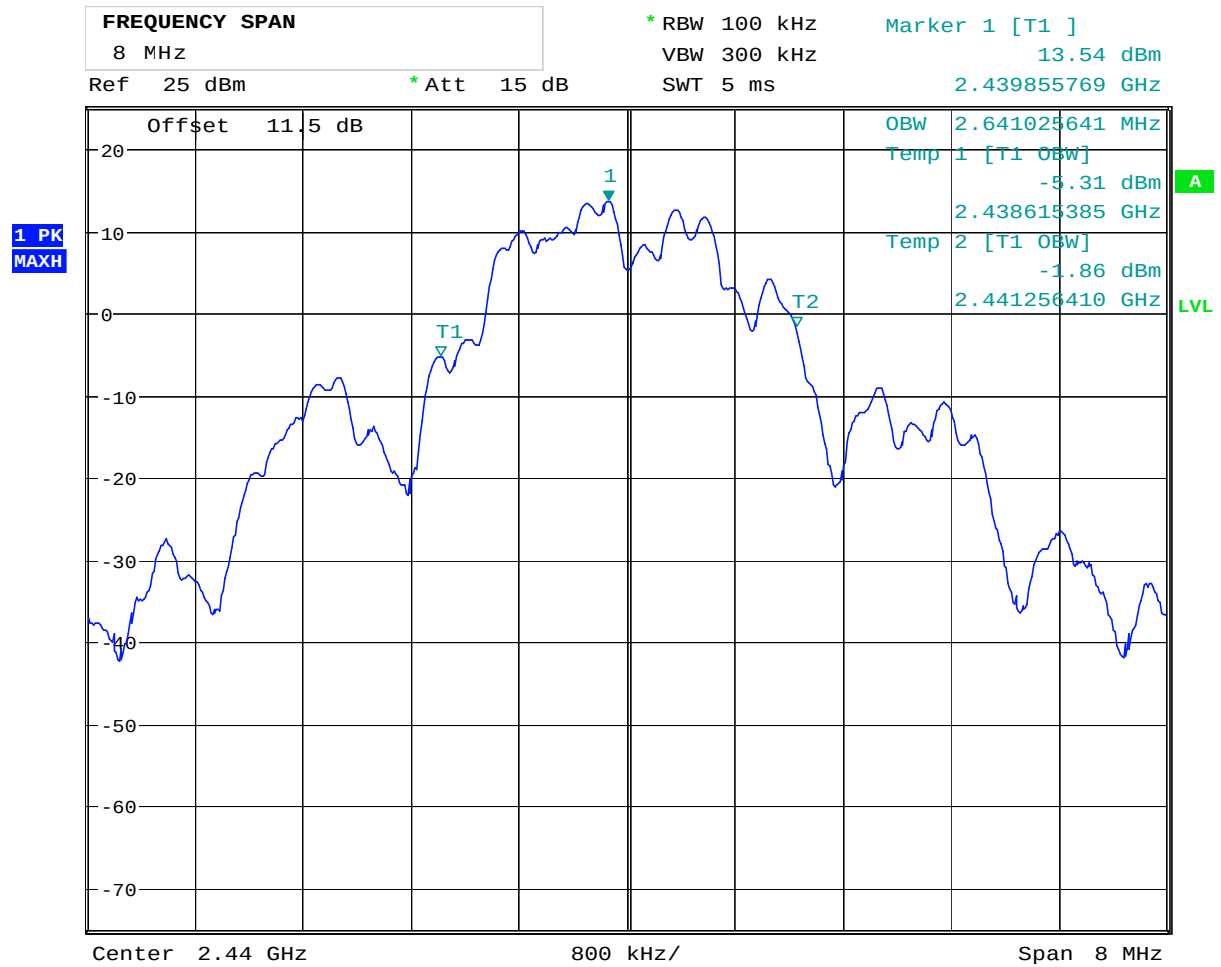
Date of Test: 2017.05.23

Measurement Data:

OBW Bandwidth (MHz)
2440 MHz
2.64

Requirements:

No requirements. Reported for information only.



Date: 23.MAY.2017 19:02:14

OBW Bandwidth at 2440 MHz

3.4 Peak Power Output

Para. No.: 15.247 (b)

Test Performed By: G.Suwanthakumar	Date of Test: 2017.05.18 – 2017.05.23
------------------------------------	---------------------------------------

Test Results: Complies

Measurement Data:

RF channel	2405 MHz	2440 MHz	2475 MHz
Measured Maximum Field strength (dBμV/m) –HP	110.19	112.06	112.32
Calc. Radiated Power (dBm)	14.96	16.83	17.09
Calc. Radiated Power (mW)	31.34	48.21	51.18
Measured Conducted Power (dBm)	19.76	19.09	18.51
Measured Conducted Power (mW)	94.62	81.10	70.96
Calculated Antenna Gain (dBi)	-4.8	-2.3	-1.4

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

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

The maximum field strength is obtained in Horizontal polarization.

See attached graph.

Detachable antenna?

☐ Yes ☒ No

If detachable, is the antenna connector non-standard?

☐ Yes ☐ No

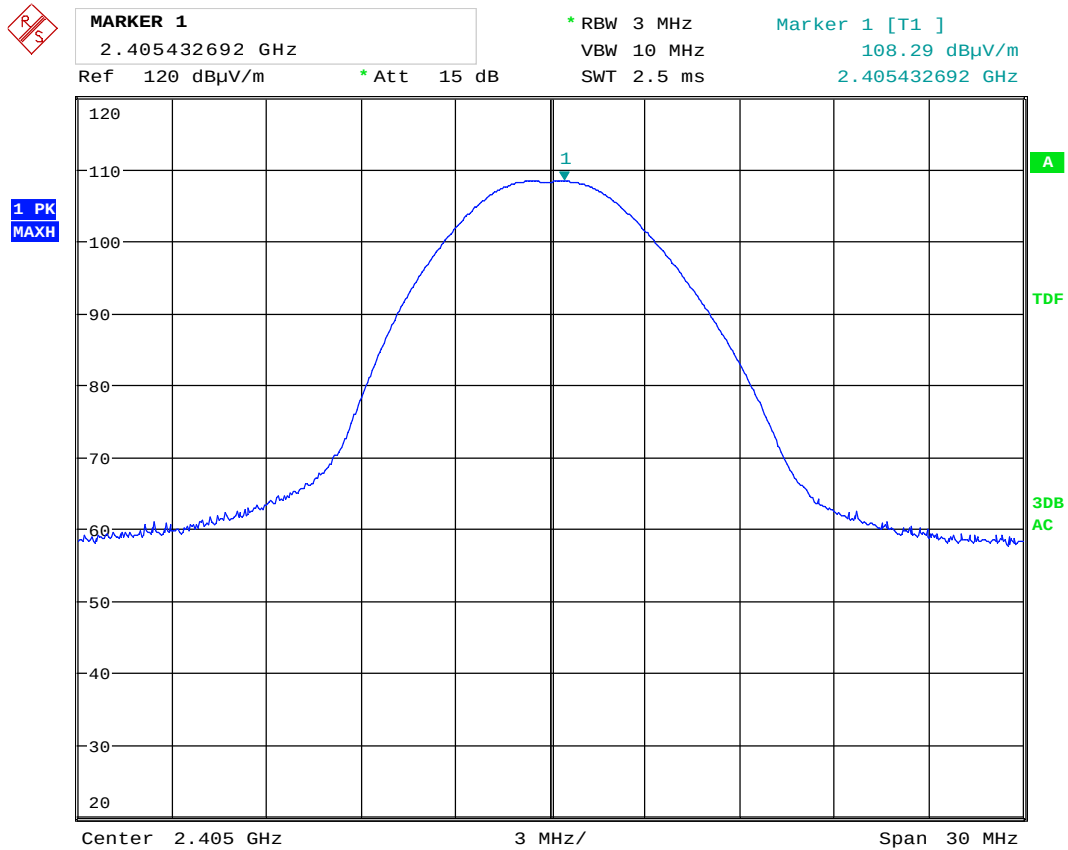
Type of antenna connector: N/A

Requirements:

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

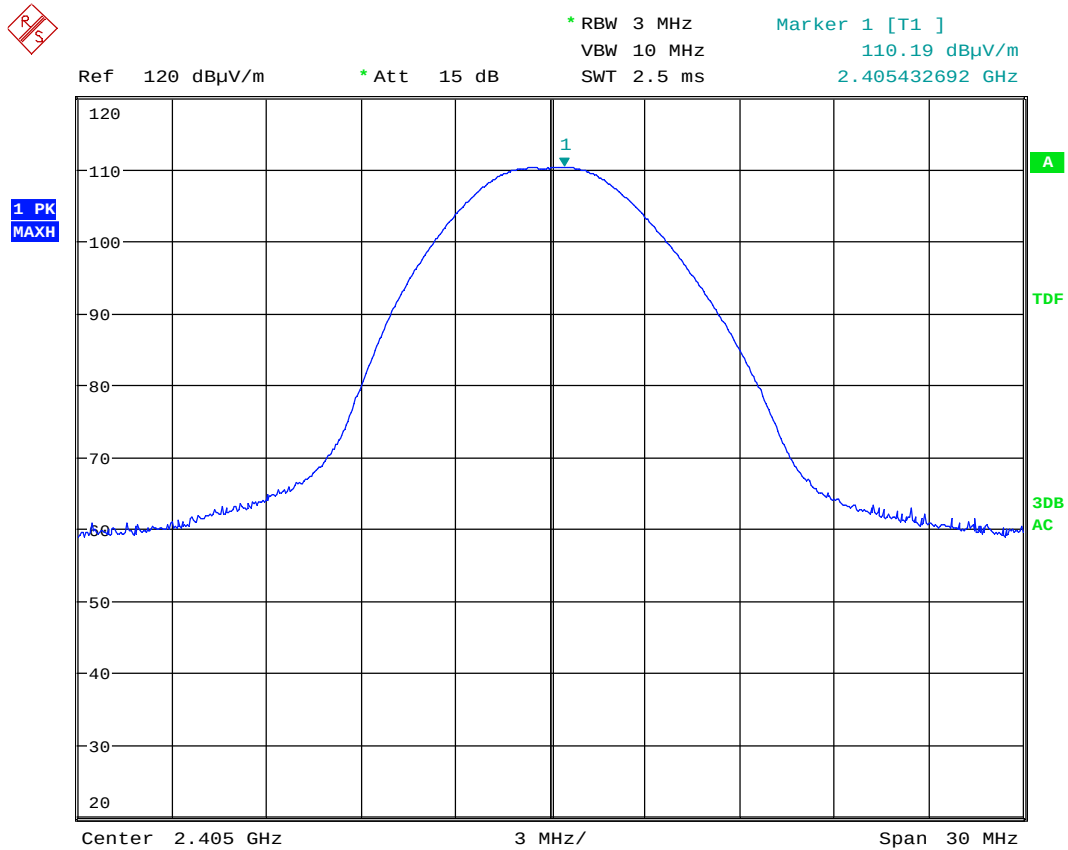
For Digital Transmission Systems in the 2400 - 2483.5 MHz band: 1 Watt

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.



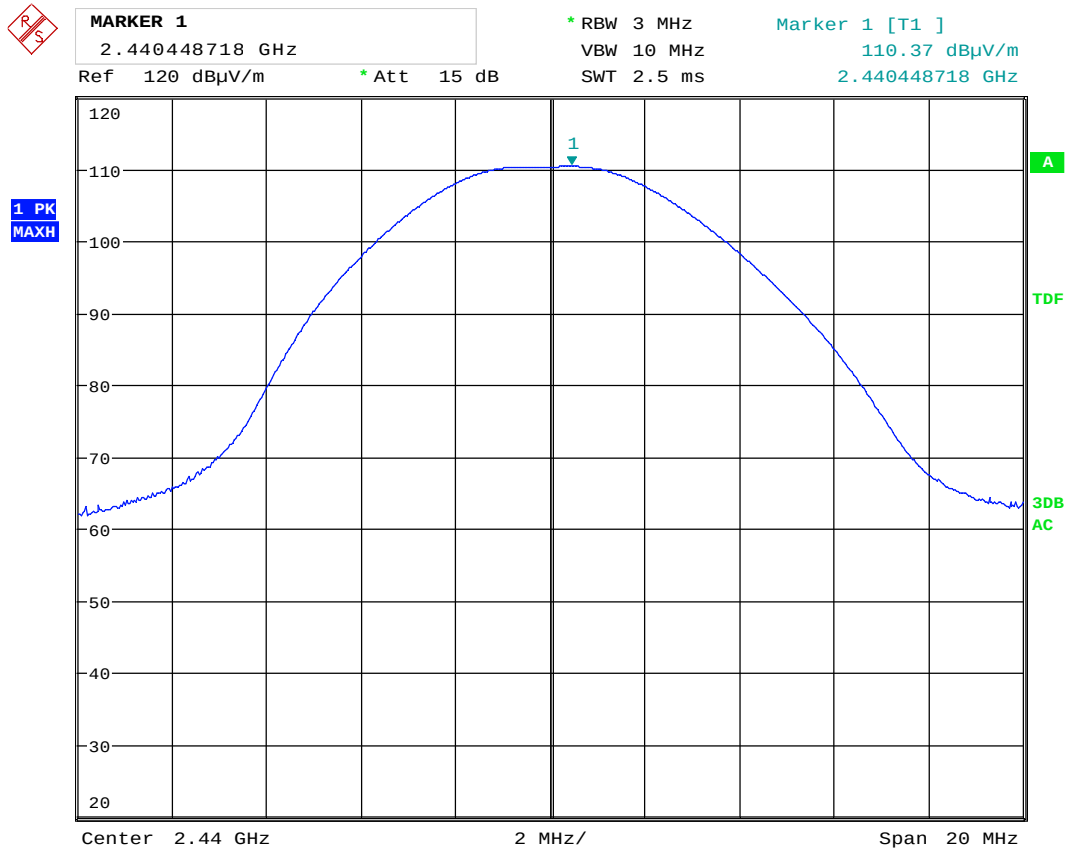
Date: 19.MAY.2017 12:50:23

Radiated Field strength, VP , 2405 MHz



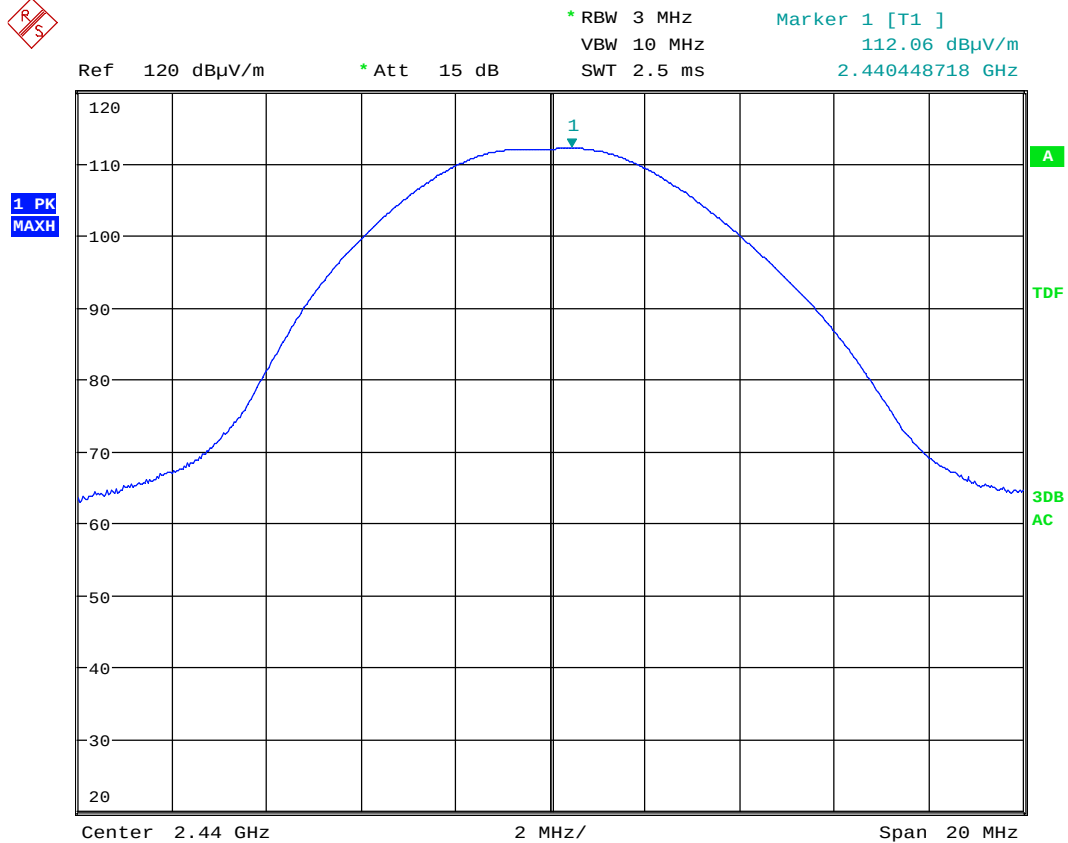
Date: 19.MAY.2017 12:51:19

Radiated field strength, HP, 2405 MHz



Date: 19.MAY.2017 12:56:15

Radiated field strength, VP, 2440 MHz



Date: 19.MAY.2017 12:57:05

Radiated field strength, HP, 2440 MHz

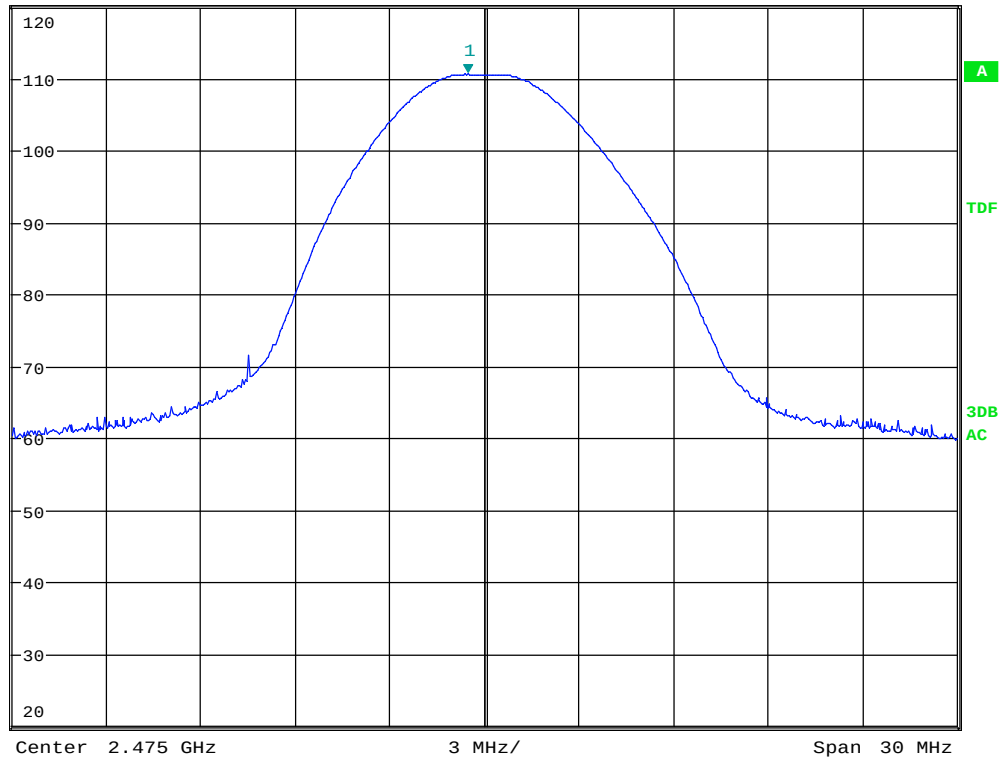


MARKER 1
2.474471154 GHz
Ref 120 dB μ V/m * Att 15 dB

* RBW 3 MHz
VBW 10 MHz
SWT 2.5 ms

Marker 1 [T1]
110.56 dB μ V/m
2.474471154 GHz

1 PK
MAXH



Date: 19.MAY.2017 12:28:23

Radiated field strength, VP, 2475 MHz



MARKER 1

2.474471154 GHz

Ref 120 dB μ V/m

* Att 15 dB

* RBW 3 MHz

VBW 10 MHz

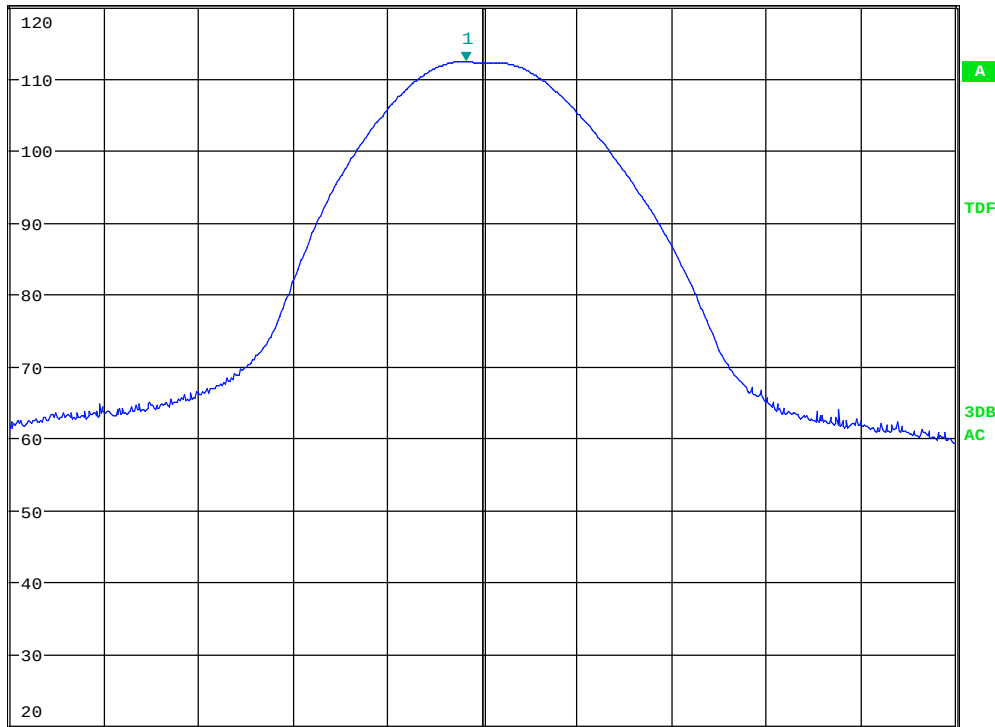
SWT 2.5 ms

Marker 1 [T1]

112.32 dB μ V/m

2.474471154 GHz

1 PK
MAXH



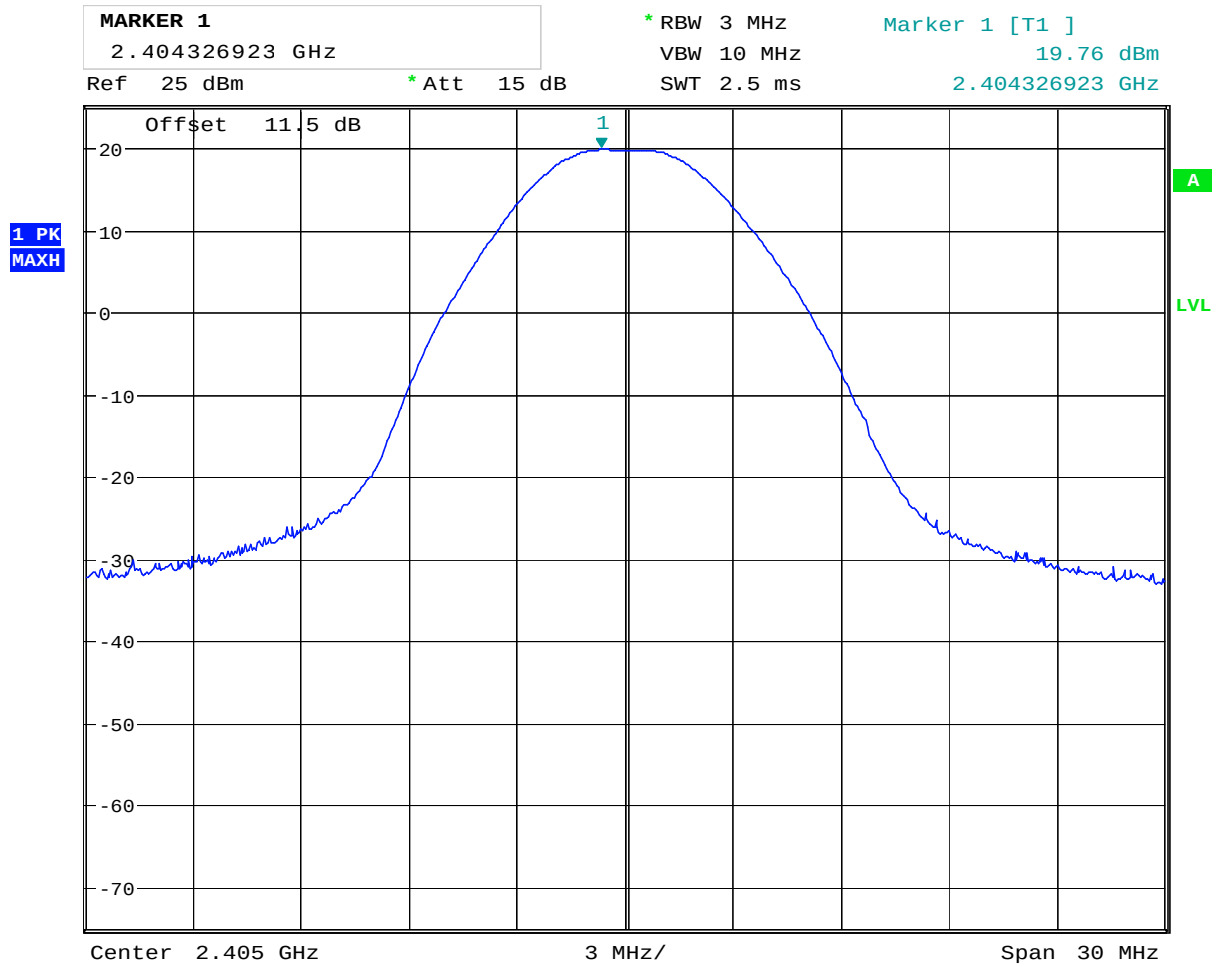
Center 2.475 GHz

3 MHz/

Span 30 MHz

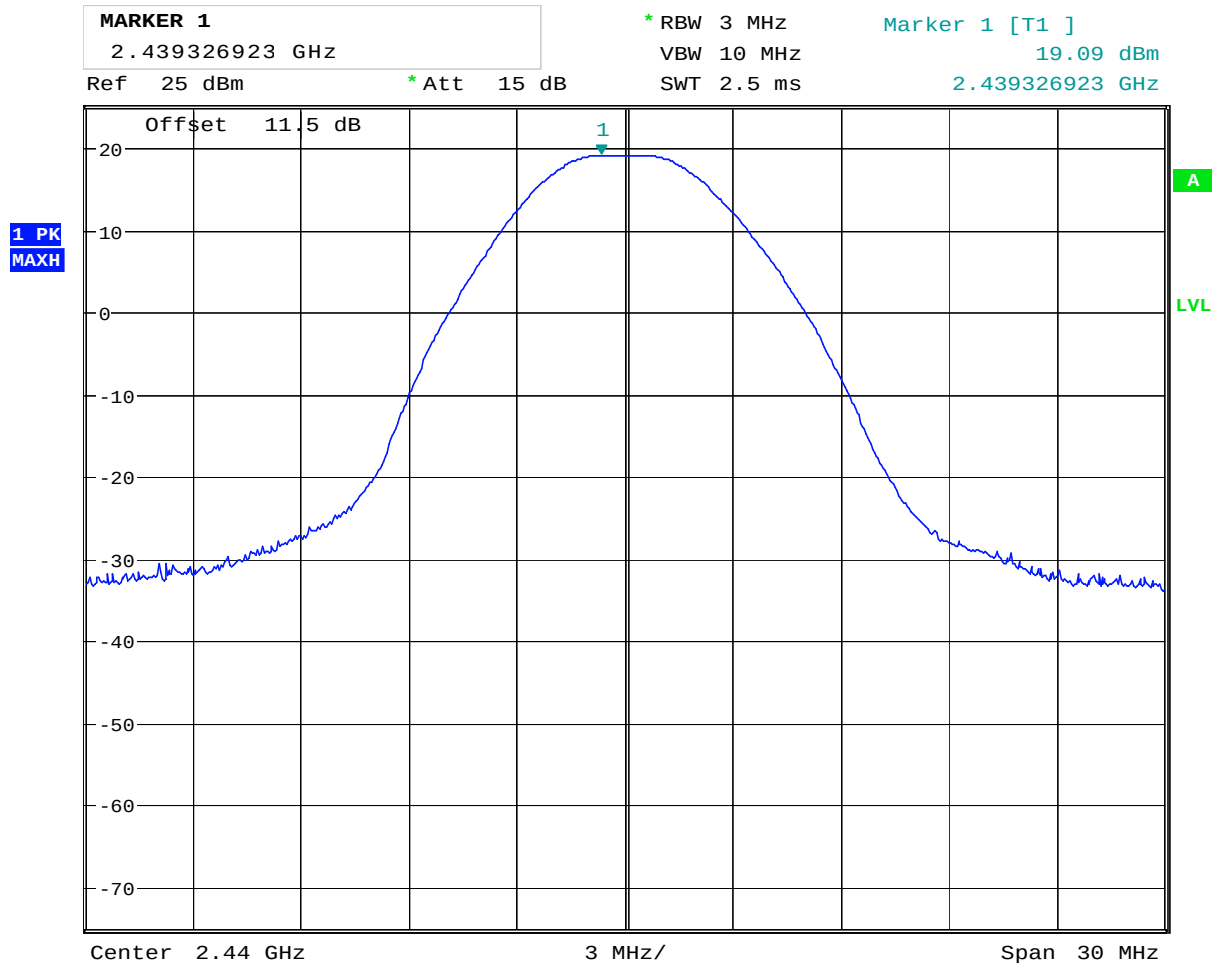
Date: 19.MAY.2017 12:32:55

Radiated field strength, HP, 2475 MHz



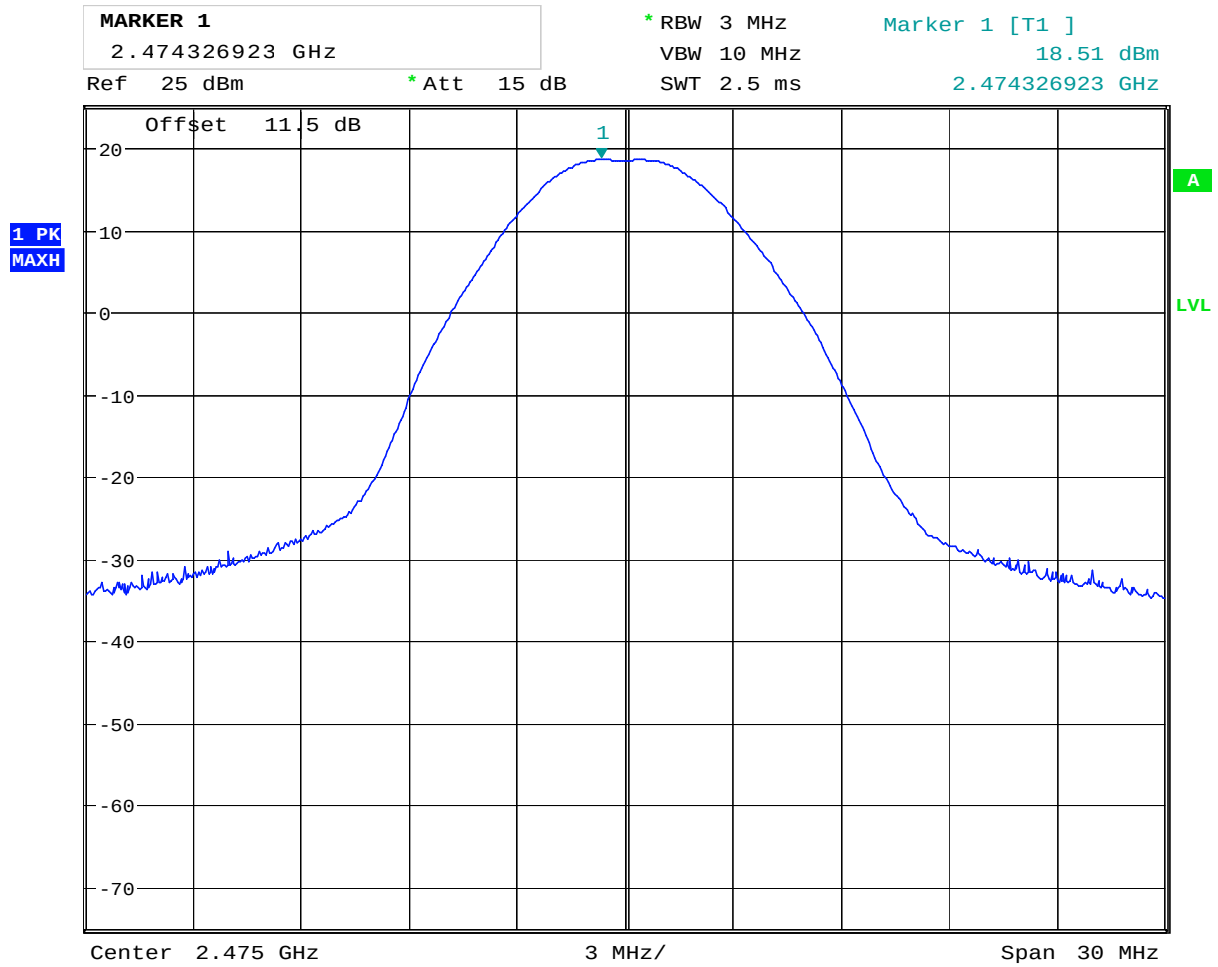
Date: 23.MAY.2017 19:03:57

Conducted power – 2405MHz



Date: 23.MAY.2017 19:02:43

Conducted power – 2440MHz



Date: 23.MAY.2017 18:56:13

Conducted power – 2475MHz

3.5 Spurious Emissions (Radiated)

Para. No.: 15.247 (c)

Test Performed By: G.Suwanthakumar	Date of Test: 2017.06.18
------------------------------------	--------------------------

Test Results: Complies

Measurement Data:

Band-edge, @3m

Frequency	Measured Field Strength @3m, dBμV/m	Detector	Duty Cycle Correction (dB)	Limit dBμV/m	Margin dB
2.39 GHz	53.81	PK	-	74	20.19
	-	AV	-	54	-
2.4835 GHz	58.14	PK	-	74	15.86
	53.71	AV	-	54	0.29

See attached plots.

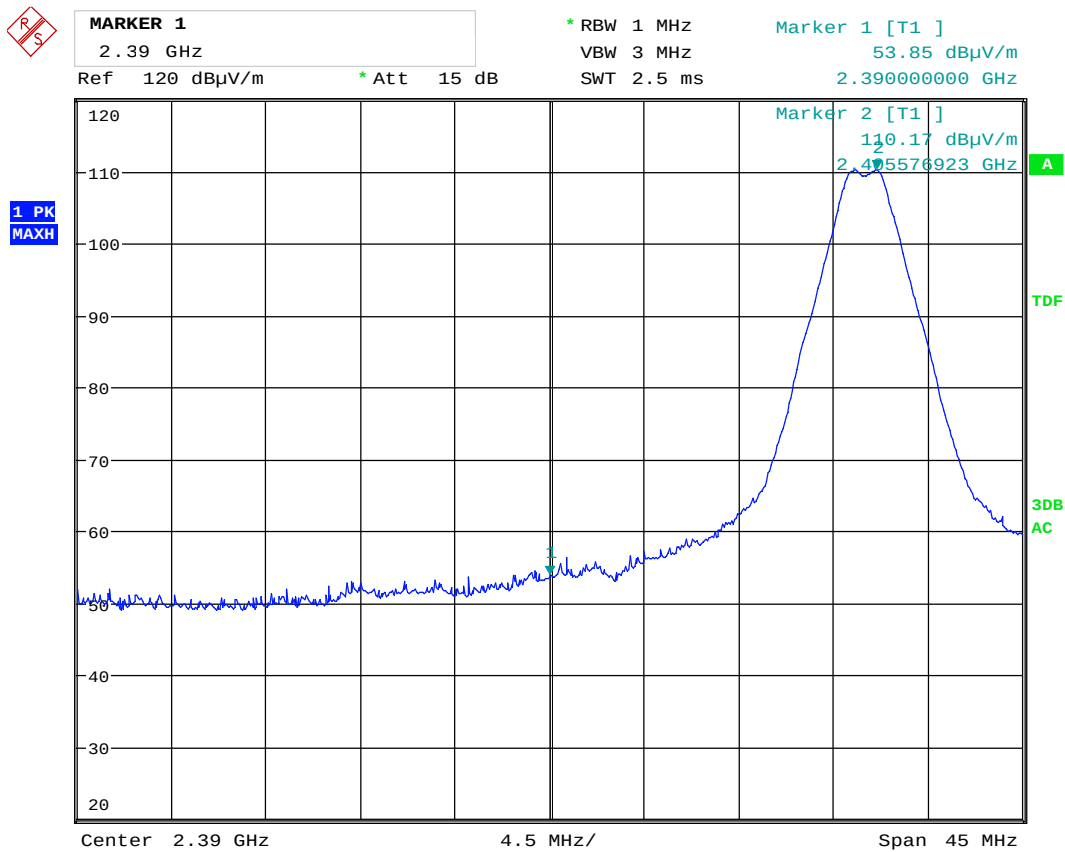
RF conducted power to 25 GHz see attached graph.

Maximum RF level outside operating band:

RF ch 1: 46.97 dB/C, margin >30 dB

RF ch 8: 46.26 dB/C, margin >30 dB

RF ch 16: 45.85 dB/C, margin >30 dB



Date: 19.MAY.2017 12:52:57

Band Edge, 2390 MHz, Peak Detector



MARKER 1

2.4835 GHz

Ref 120 dBμV/m

* Att 15 dB

* RBW 1 MHz

VBW 3 MHz

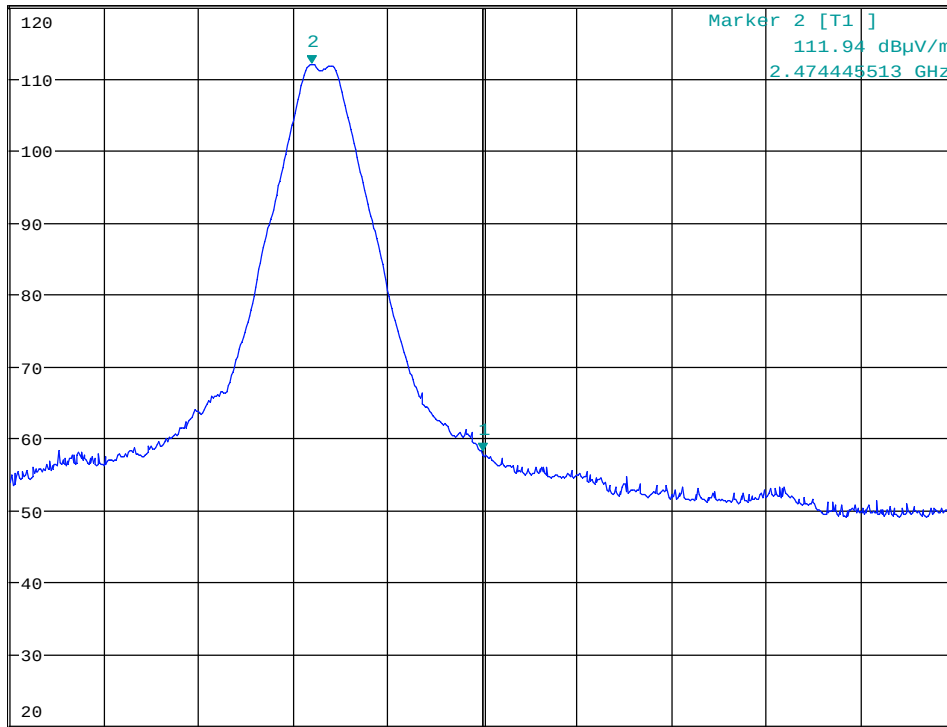
SWT 2.5 ms

Marker 1 [T1]

58.14 dBμV/m

2.483500000 GHz

1 PK
MAXH



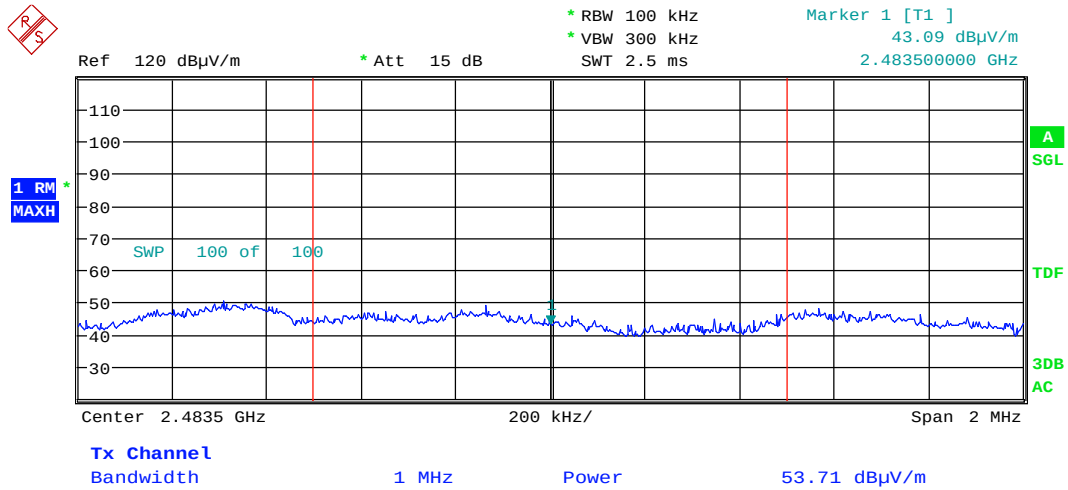
Center 2.4835 GHz

5 MHz/

Span 50 MHz

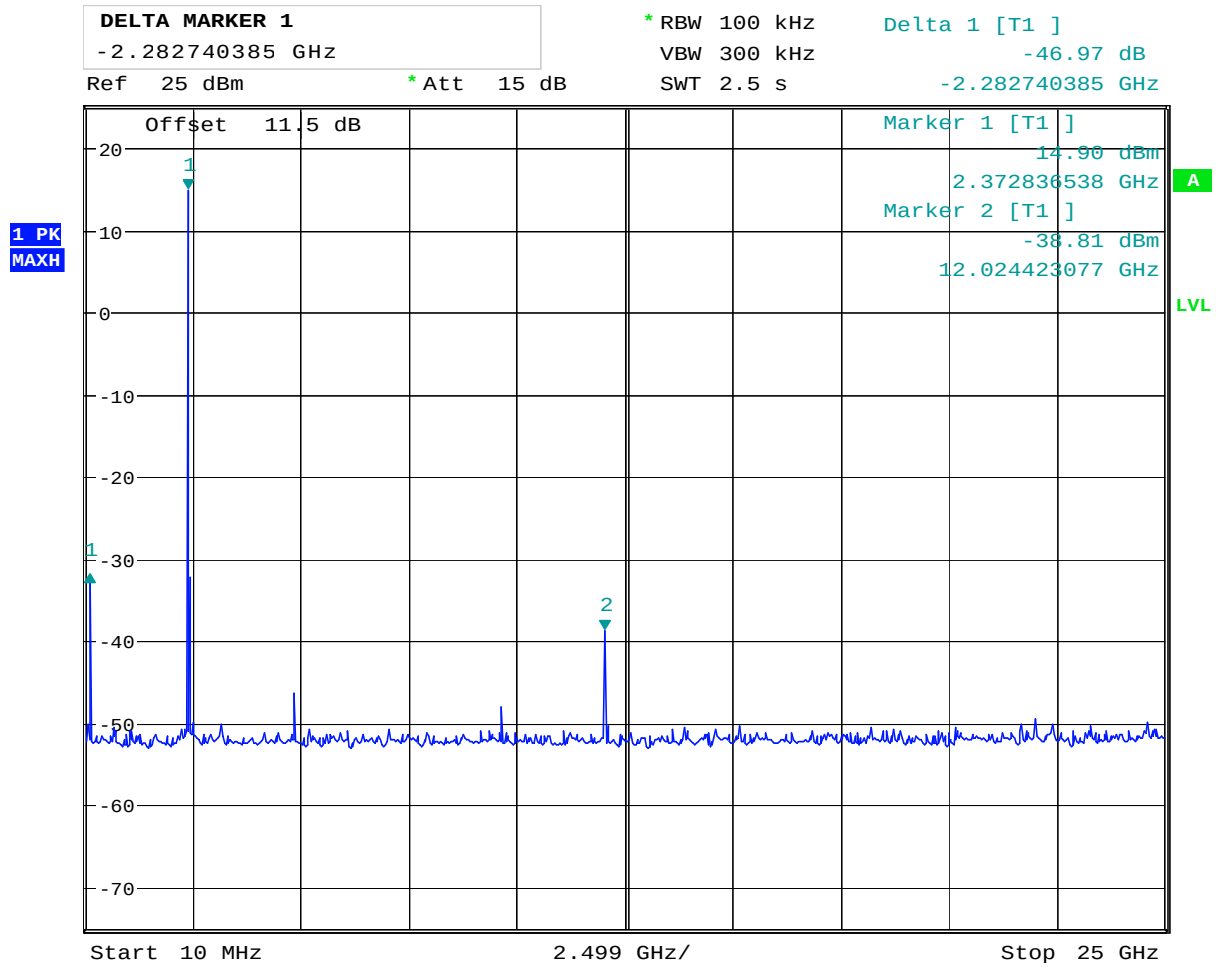
Date: 19.MAY.2017 12:34:17

Band Edge, 2483.5 MHz, Peak Detector



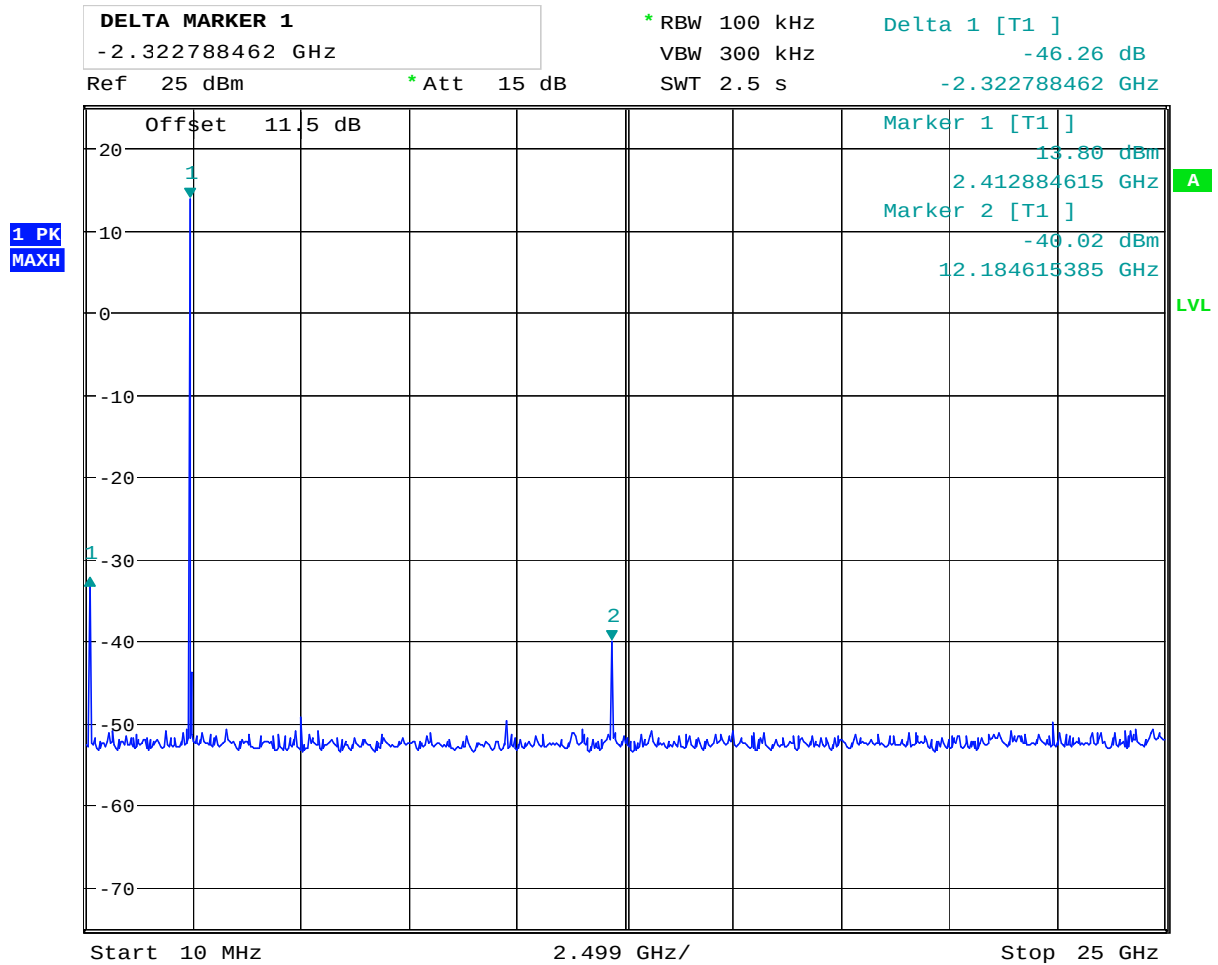
Date: 19.MAY.2017 12:46:18

Band Edge, 2483.5 MHz, rms Detector



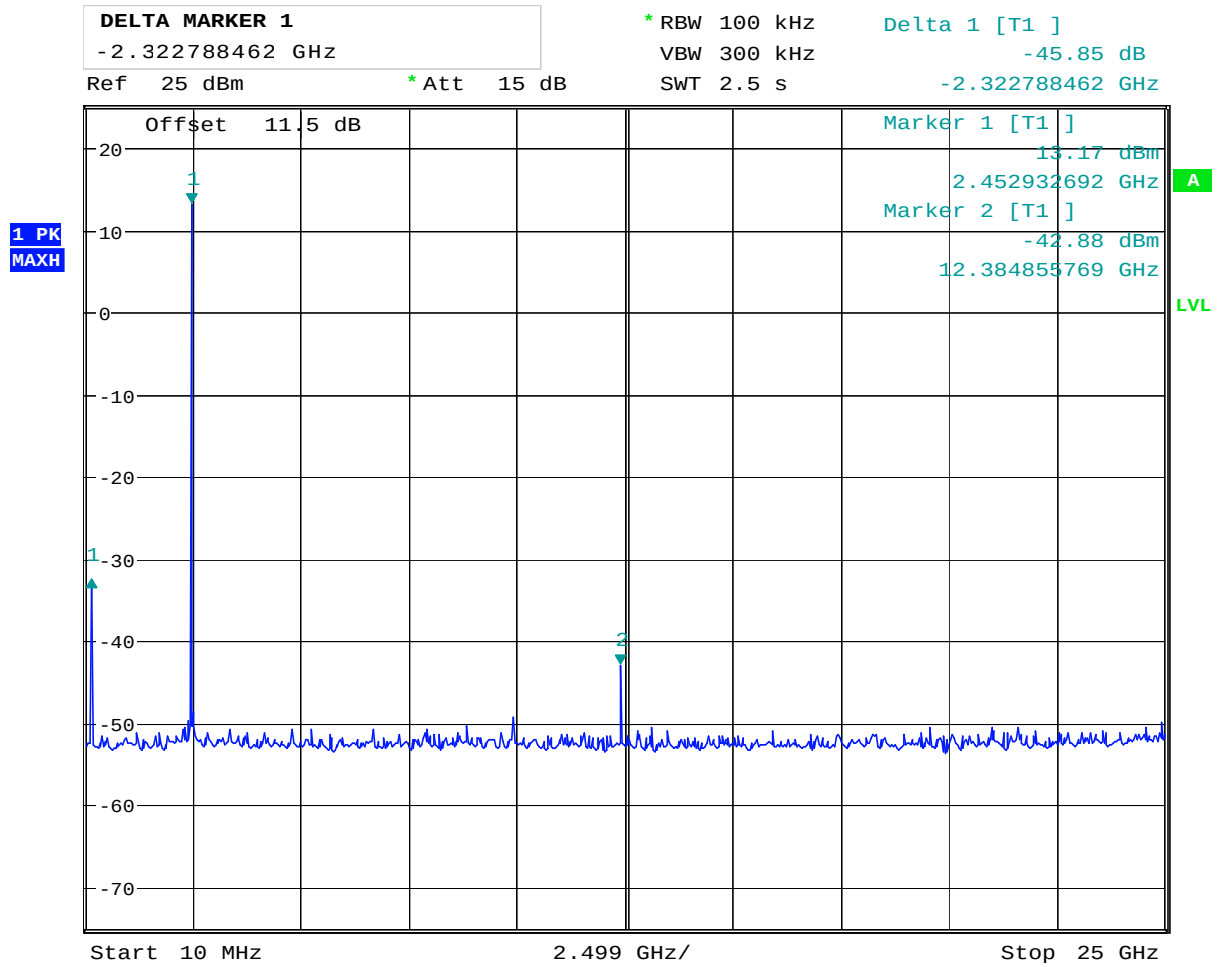
Date: 23.MAY.2017 18:53:15

Conductd spurious emission 10MHz – 25GHz - ch2405MHz



Date: 23.MAY.2017 18:54:12

Conductd spurious emission 10MHz – 25GHz - ch2440MHz



Date: 23.MAY.2017 18:55:28

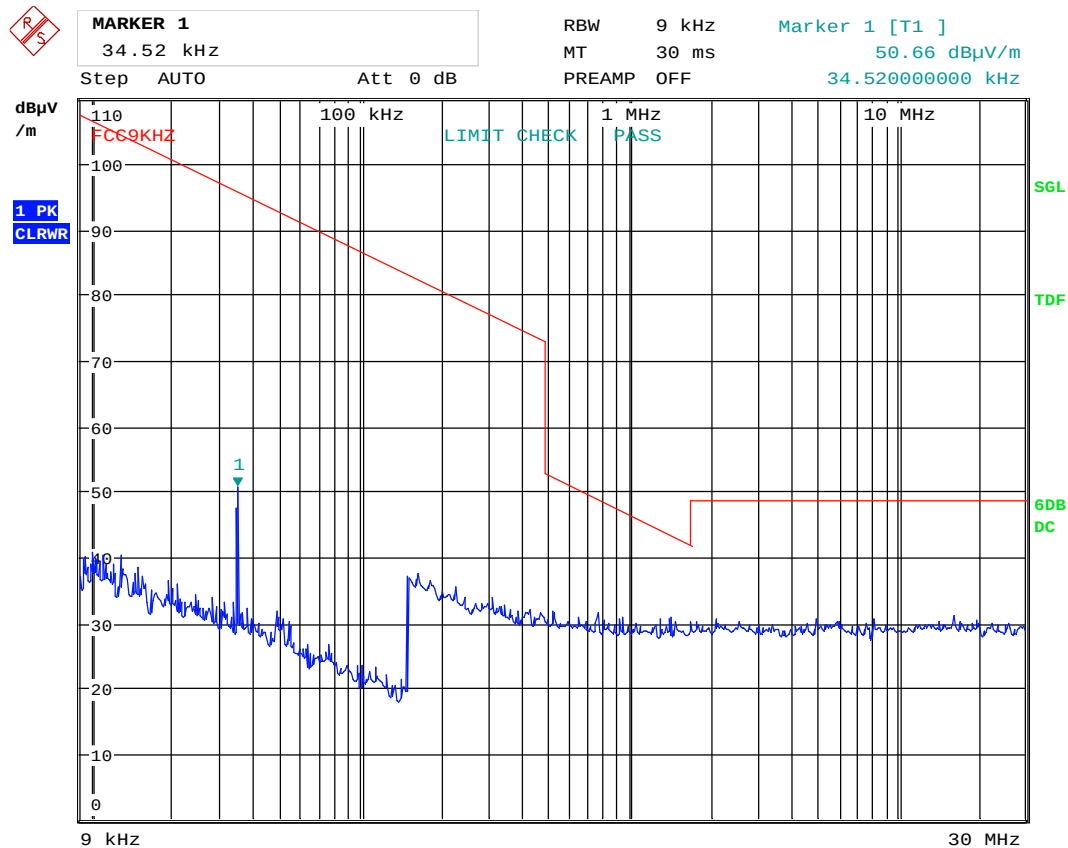
Conducted spurious emission 10MHz – 25GHz - ch2475MHz

Radiated emissions 10 kHz-30 MHz.

Measuring distance 10 m, measured with Peak detector.

No component detected, see attached graph.

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



Date: 18.MAY.2017 19:13:42

Radiated Emissions, 9 kHz – 30 MHz @10m

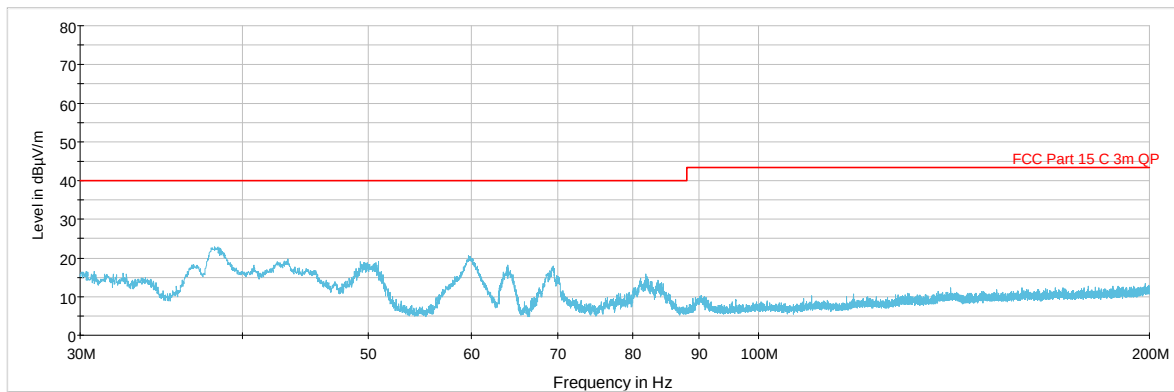
Radiated emission 30 – 1000 MHz.

Detector: Quasi-Peak

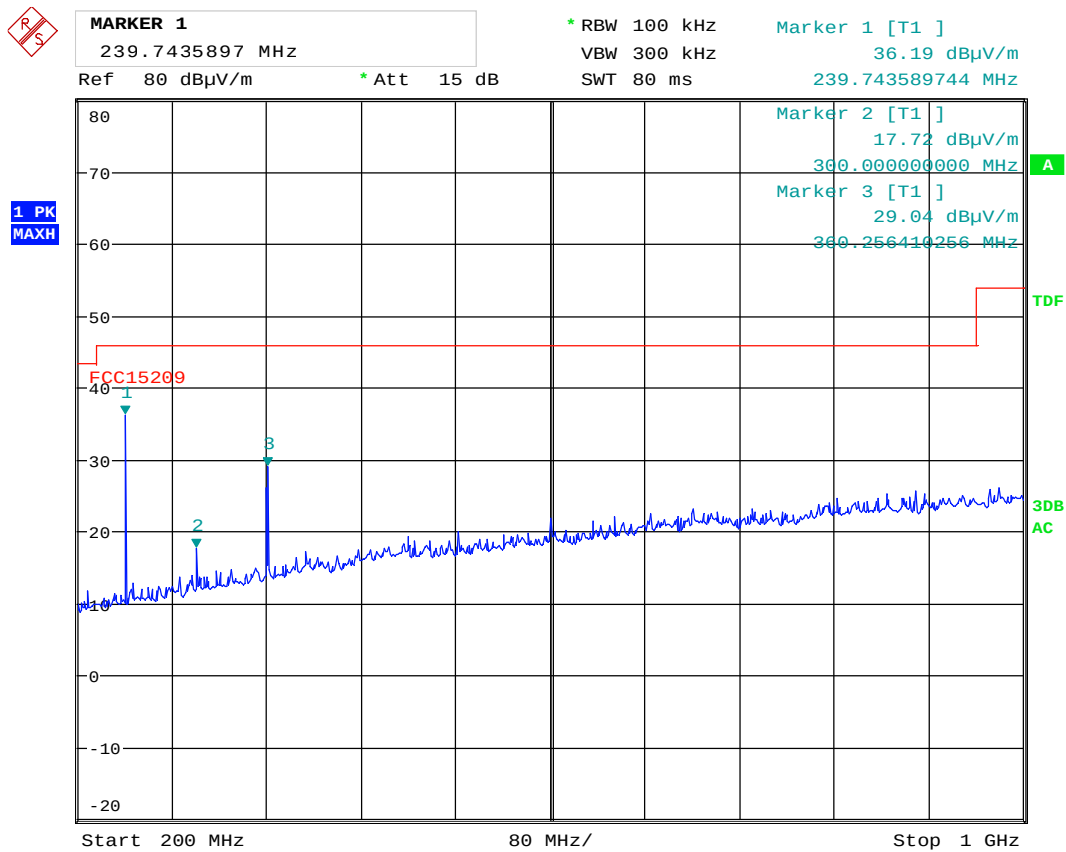
Measuring distance 3 m.

Frequency	Operational condition	Detector	Field strength	Measuring distance	Limit FCC15.209	Margin
MHz			dB μ V/m	metres	dB μ V/m	dB
239.74	TX on	PK	36.16	3	46	10.16
360.25	Tx ON	PK	29.04	3	46	16.96

See attached graphs.



Radiated Emissions, 30 – 200 MHz, @3m, PK scan



Date: 18.MAY.2017 13:23:03

Radiated Emissions, 200 - 1000 MHz, VP , @3m, PK scan



MARKER 1

239.7435897 MHz

Ref 80 dBμV/m

* Att 15 dB

* RBW 100 kHz

VBW 300 kHz

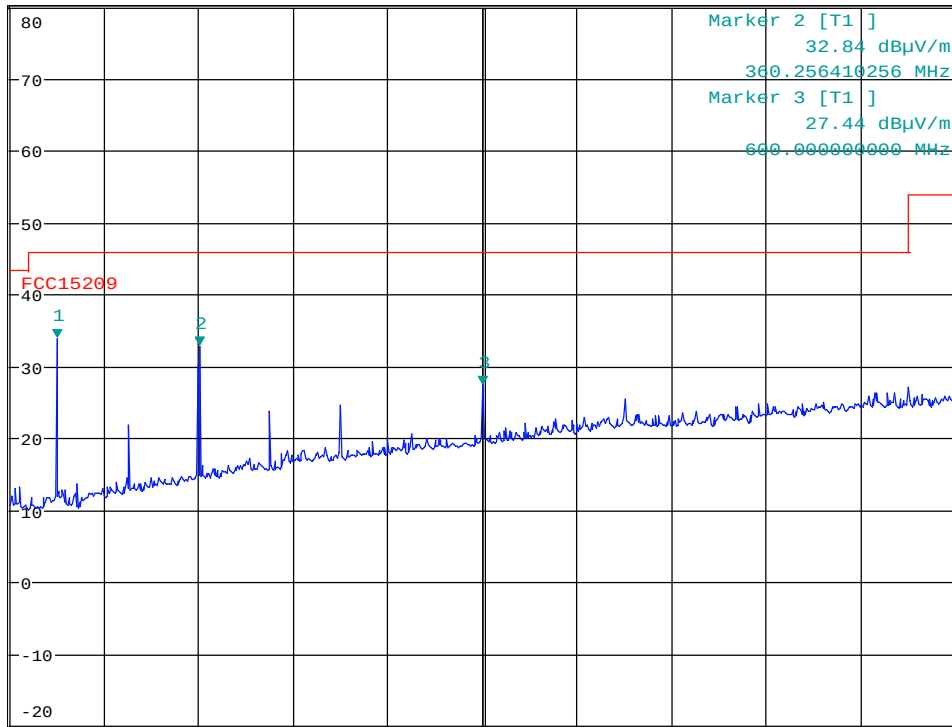
SWT 80 ms

Marker 1 [T1]

33.90 dBμV/m

239.743589744 MHz

1 PK
MAXH



Start 200 MHz

80 MHz/

Stop 1 GHz

Date: 18.MAY.2017 13:26:28

Radiated Emissions, 200 - 1000MHz, HP , @3m, PK scan

Radiated Emissions, 1-25 GHz

Measuring distance: 3m (1 – 12 GHz)
1m (12 – 25 GHz)

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

Peak Detector:

Frequency	RF channel	Polarization	Dist. corr. factor	Field strength, Peak Detector	Duty cycle corr. factor	Limit	Margin
GHz	L,M,H		dB	dB μ V/m	dB	dB μ V/m	dB
4.81	L	VP	0	58.52	0	74	15.48
4.88	M	VP	0	58.11	0	74	15.89
4.95	H	VP	0	55.29	0	74	18.71
7.215	L	HP	0	59.15	0	74	14.85
7.320	M	HP	0	59.94	0	74	14.06
7.425	H	HP	0	60.30	0	74	13.70
9.62	L	VP	0	54.71	0	74	19.29
9.76	M	VP	0	54.60	0	74	19.40
9.90	H	VP	0	55.21	0	74	18.79
12.025	L	HP	*	59.27	0	74	14.73
12.20	M	HP	*	57.62	0	74	16.38
12.375	H	HP	*	57.02	0	74	16.98
Other	L,M,H	VP/HP	-	< 74	0	74	>20

Average Detector:

Frequency	RF channel	Polarization	Dist. corr. factor	Field strength, Average Detector	Duty cycle corr. factor	Limit	Margin
GHz	L,M,H		dB	dB μ V/m	dB	dB μ V/m	dB
4.81	L	VP	0	53.93	-	54	0.07
4.88	M	VP	0	53.82	-	54	0.18
4.95	H	VP	0	50.16	-	54	3.84
7.215	L	HP	0	53.45	-	54	0.55
7.320	M	HP	0	53.85	-	54	0.15
7.425	H	HP	0	53.88	-	54	0.12
9.62	L	VP	0	47.29	-	54	6.71
9.76	M	VP	0	47.95	-	54	6.05
9.0	H	VP	0	48.60	-	54	5.40
12.025	L	HP	*	53.45	-	54	0.55
12.20	M	HP	*	53.17	-	54	0.83
12.375	H	HP	*	52.58	-	54	1.42
Other	L,M,H	VP/HP	-	< 54	-	54	>20

*Distance correction of -9.5 dB for 1m is included in the plot.

Tested according to KDB 558074 D01 DTS Meas Guidance v03r04, Section 12.2.5.2

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

See plots.



MARKER 1

4.810897436 GHz

Ref 80 dBμV/m

* Att 10 dB

* RBW 1 MHz

* VBW 3 MHz

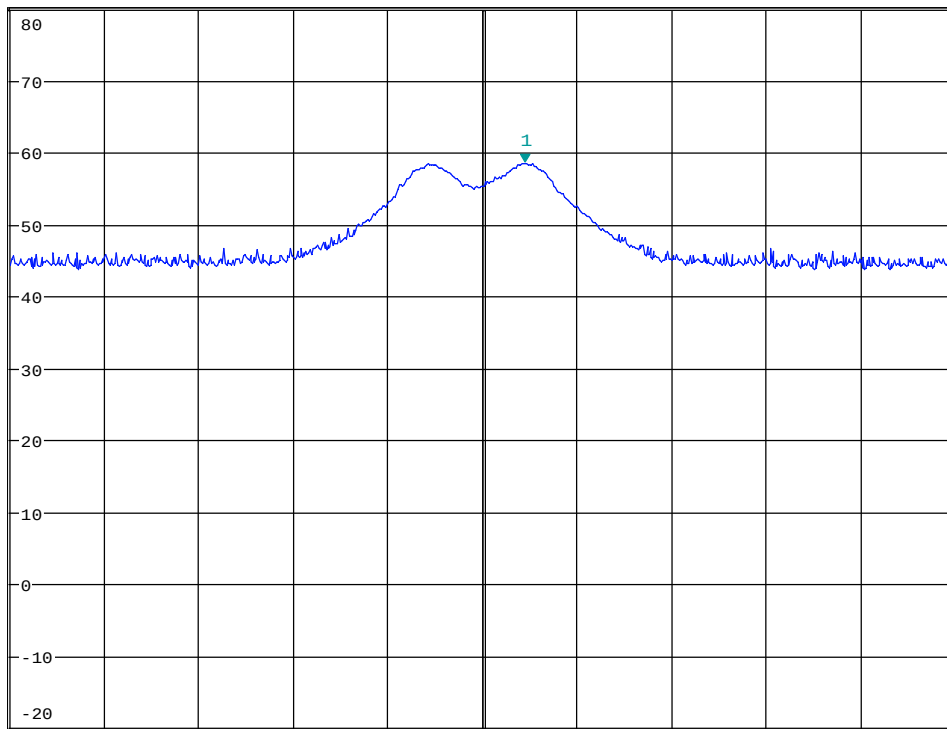
SWT 20 ms

Marker 1 [T1]

58.52 dBμV/m

4.810897436 GHz

1 PK
MAXH



Center 4.81 GHz

2 MHz/

Span 20 MHz

A

TDF

LNA

PS

3DB

AC

Date: 19.MAY.2017 15:54:32

2nd Harm, 2405MHz , VP @3m , PK detector



MARKER 1

4.808878205 GHz

Ref 80 dBμV/m

* Att 10 dB

* RBW 1 MHz

* VBW 3 MHz

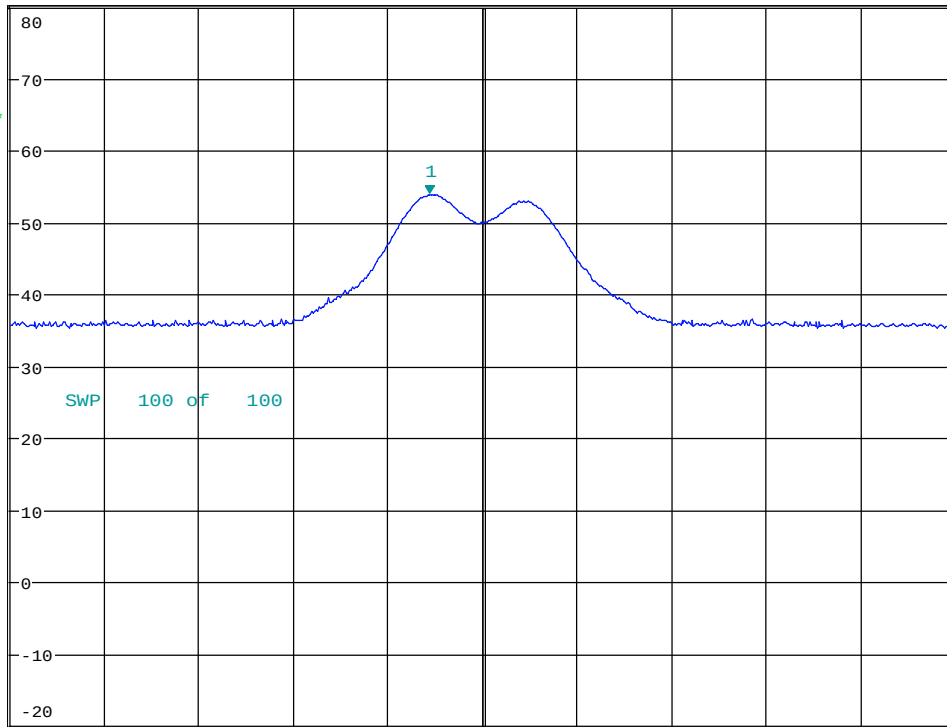
SWT 20 ms

Marker 1 [T1]

53.93 dBμV/m

4.808878205 GHz

1 RM
MAXH



Center 4.81 GHz

2 MHz/

Span 20 MHz

Date: 19.MAY.2017 15:53:52

2nd Harm, 2405MHz , VP @3m , rms detector



MARKER 1

4.878910256 GHz

Ref 80 dBμV/m

* Att 10 dB

* RBW 1 MHz

* VBW 3 MHz

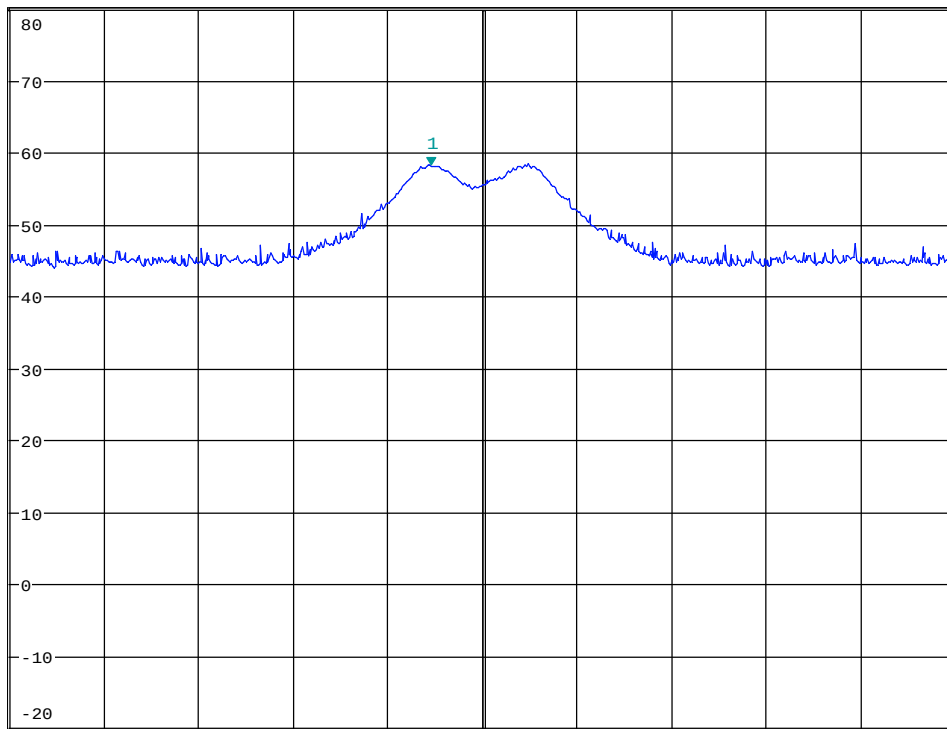
SWT 20 ms

Marker 1 [T1]

58.11 dBμV/m

4.878910256 GHz

1 PK
MAXH



Center 4.88 GHz

2 MHz/

Span 20 MHz

A

TDF

LNA

PS

3DB

AC

Date: 19.MAY.2017 15:30:37

2nd Harm, 2440MHz , VP @3m , PK detector

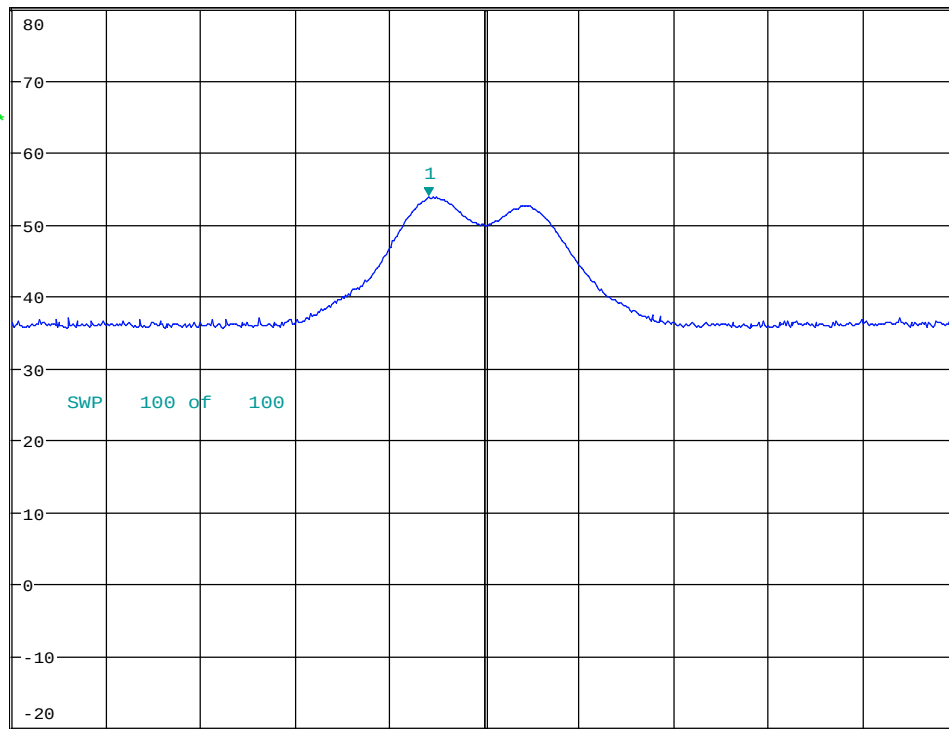


MARKER 1
4.878814103 GHz
Ref 80 dBμV/m * Att 10 dB

* RBW 1 MHz
* VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
53.82 dBμV/m
4.878814103 GHz

1 RM
MAXH



Center 4.88 GHz 2 MHz/ Span 20 MHz

A
SGL
TDF
LNA
PS
3DB
AC

Date: 19.MAY.2017 15:31:23

2nd Harm, 2440MHz , VP @3m , rms detector



MARKER 1

4.948814103 GHz

Ref 80 dBμV/m

* Att 10 dB

* RBW 1 MHz

* VBW 3 MHz

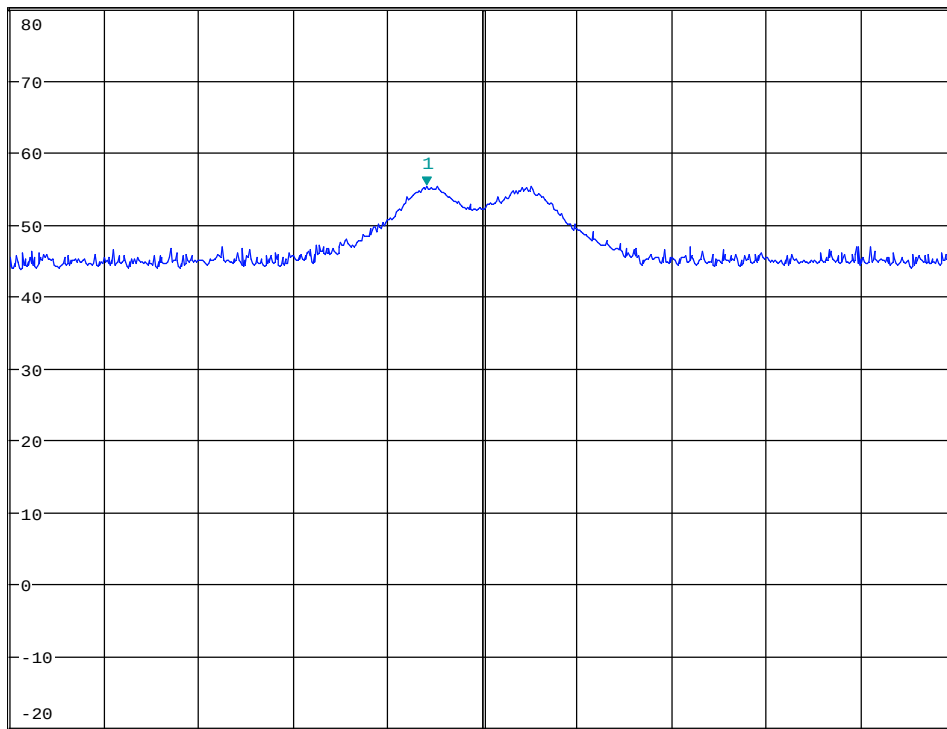
SWT 20 ms

Marker 1 [T1]

55.29 dBμV/m

4.948814103 GHz

1 PK
MAXH



Center 4.95 GHz

2 MHz/

Span 20 MHz

A

TDF

LNA

PS

3DB

AC

Date: 19.MAY.2017 16:05:26

2nd Harm, 2475MHz , VP @3m , PK detector



MARKER 1

4.948942308 GHz

Ref 80 dBμV/m

* Att 10 dB

* RBW 1 MHz

* VBW 3 MHz

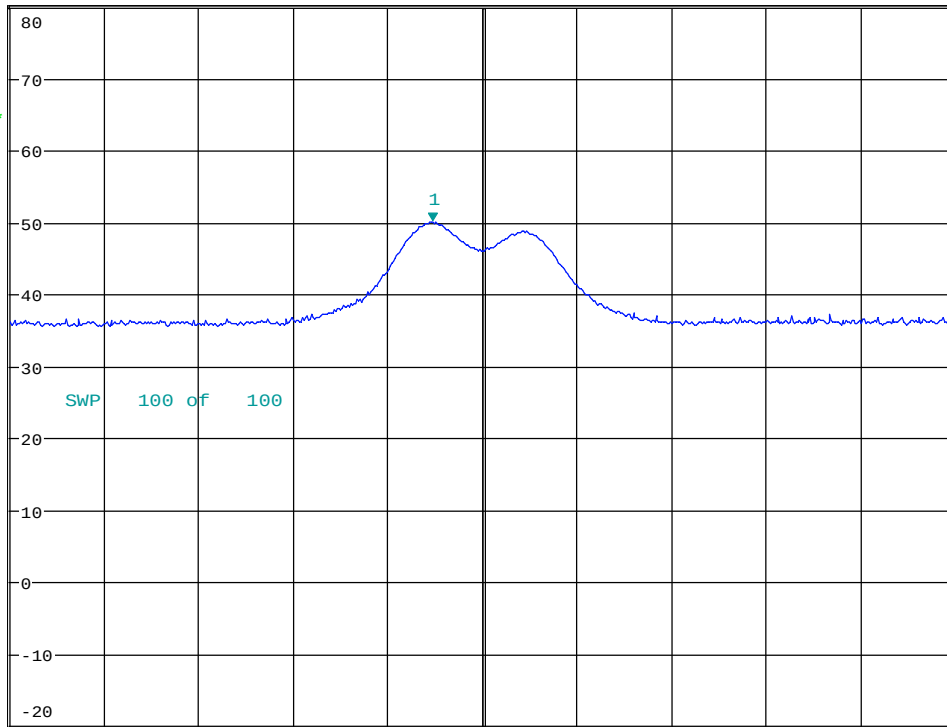
SWT 20 ms

Marker 1 [T1]

50.16 dBμV/m

4.948942308 GHz

1 RM
MAXH



Center 4.95 GHz

2 MHz/

Span 20 MHz

Date: 19.MAY.2017 16:05:02

2nd Harm, 2475MHz , VP @3m , rms detector



MARKER 1

7.213141026 GHz

Ref 80 dBμV/m

* Att 10 dB

* RBW 1 MHz

* VBW 3 MHz

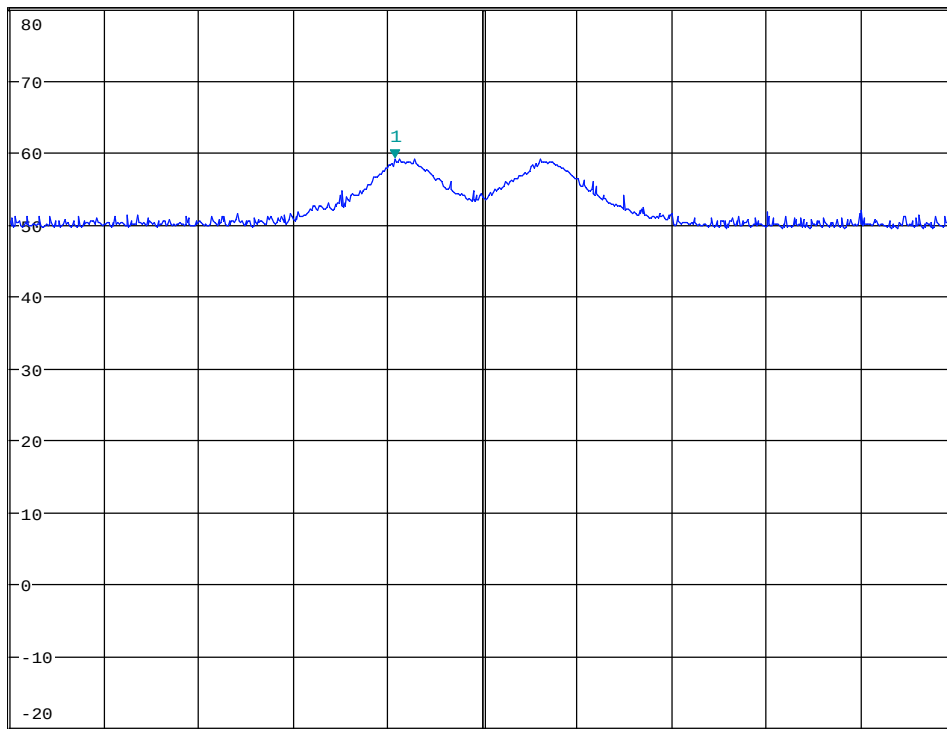
SWT 20 ms

Marker 1 [T1]

59.15 dBμV/m

7.213141026 GHz

1 PK
MAXH



Center 7.215 GHz

2 MHz/

Span 20 MHz

A

TDF

LNA

PS

3DB

AC

Date: 19.MAY.2017 15:57:48

3rd Harm, 2405MHz , HP @3m , PK detector



MARKER 1

7.213333333 GHz

Ref 80 dBμV/m

* Att 10 dB

* RBW 1 MHz

* VBW 3 MHz

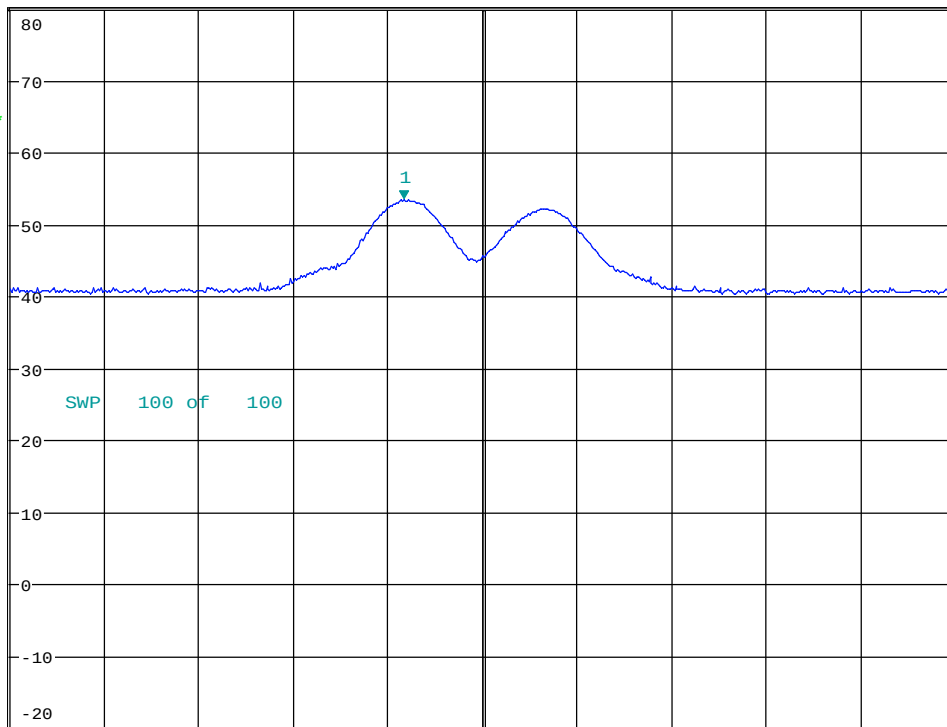
SWT 20 ms

Marker 1 [T1]

53.45 dBμV/m

7.213333333 GHz

1 RM
MAXH



Center 7.215 GHz

2 MHz/

Span 20 MHz

Date: 19.MAY.2017 15:56:50

3rd Harm, 2405MHz , HP @3m , rms detector



MARKER 1

7.32150641 GHz

Ref 80 dBμV/m

* Att 10 dB

* RBW 1 MHz

VBW 3 MHz

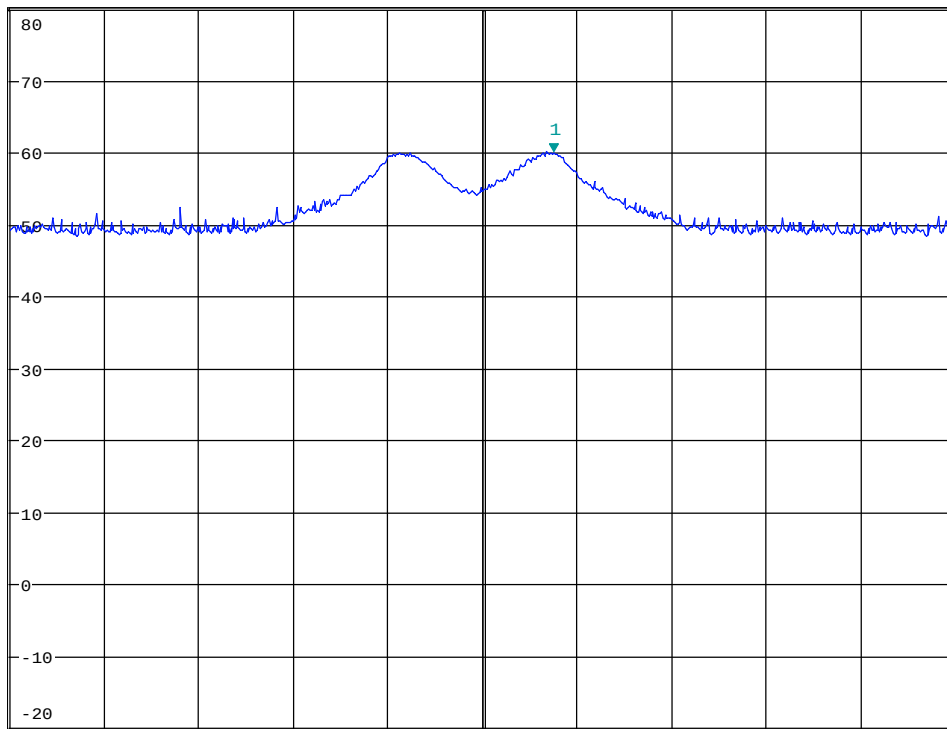
SWT 20 ms

Marker 1 [T1]

59.94 dBμV/m

7.321506410 GHz

1 PK
MAXH



Center 7.32 GHz

2 MHz/

Span 20 MHz

A

TDF

LNA

PS

3DB

AC

Date: 19.MAY.2017 15:16:13

3rd Harm, 2440MHz , HP @3m , PK detector



MARKER 1

7.318365385 GHz

Ref 80 dBμV/m

* Att 10 dB

* RBW 1 MHz

* VBW 3 MHz

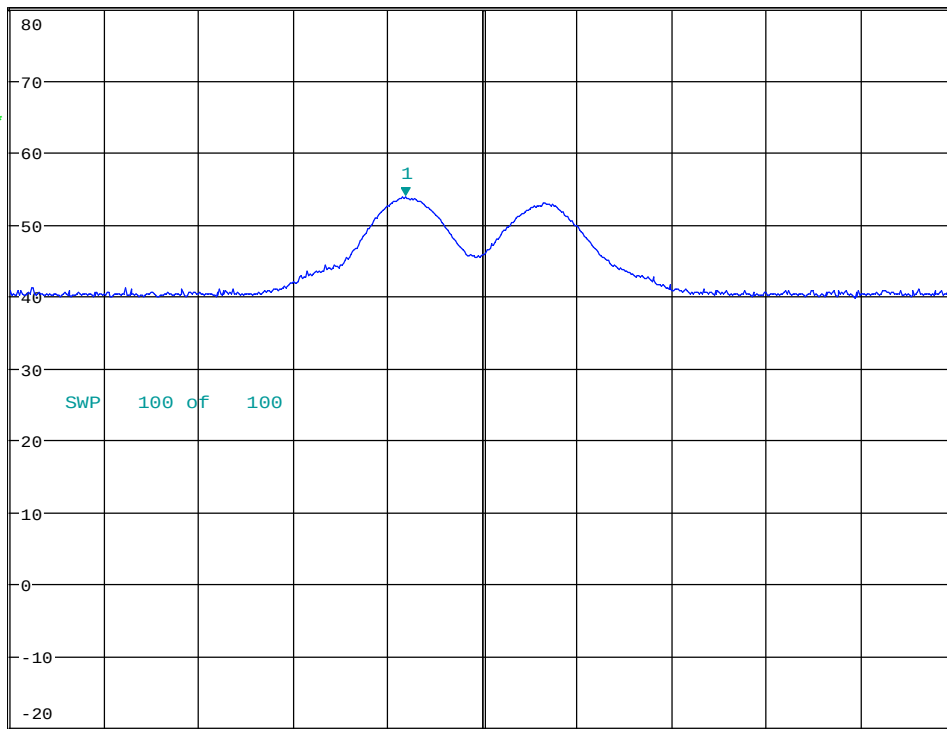
SWT 20 ms

Marker 1 [T1]

53.85 dBμV/m

7.318365385 GHz

1 RM
MAXH



Center 7.32 GHz

2 MHz/

Span 20 MHz

Date: 19.MAY.2017 15:24:36

3rd Harm, 2440MHz , HP @3m , rms detector



MARKER 1

7.423333333 GHz

Ref 80 dBμV/m

* Att 10 dB

* RBW 1 MHz

* VBW 3 MHz

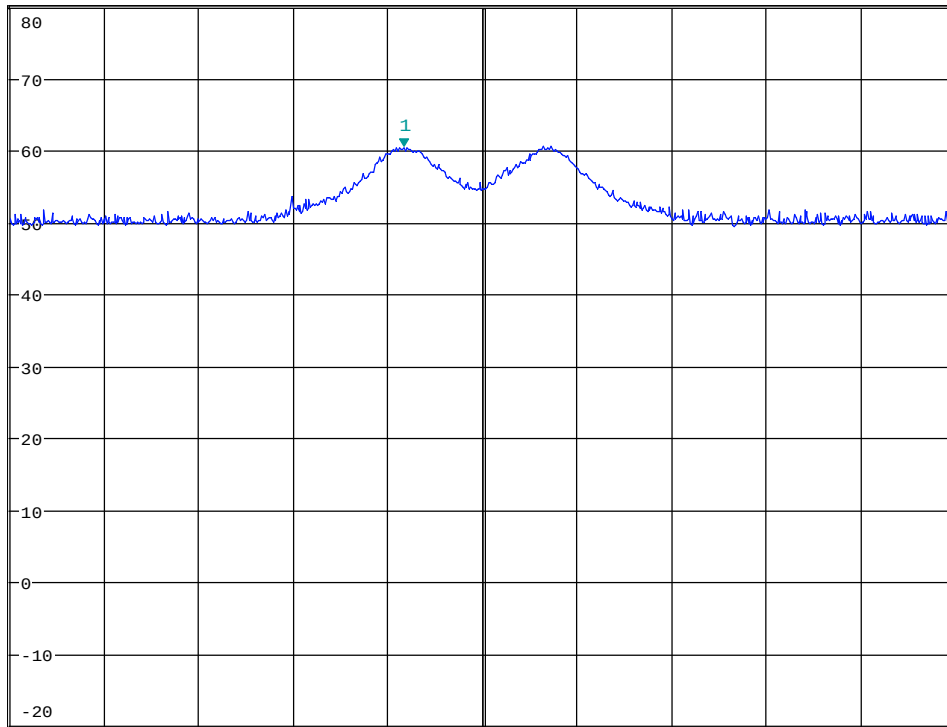
SWT 20 ms

Marker 1 [T1]

60.30 dBμV/m

7.423333333 GHz

1 PK
MAXH



Center 7.425 GHz

2 MHz/

Span 20 MHz

Date: 19.MAY.2017 16:00:02

3rd Harm, 2475MHz , HP @3m , PK detector

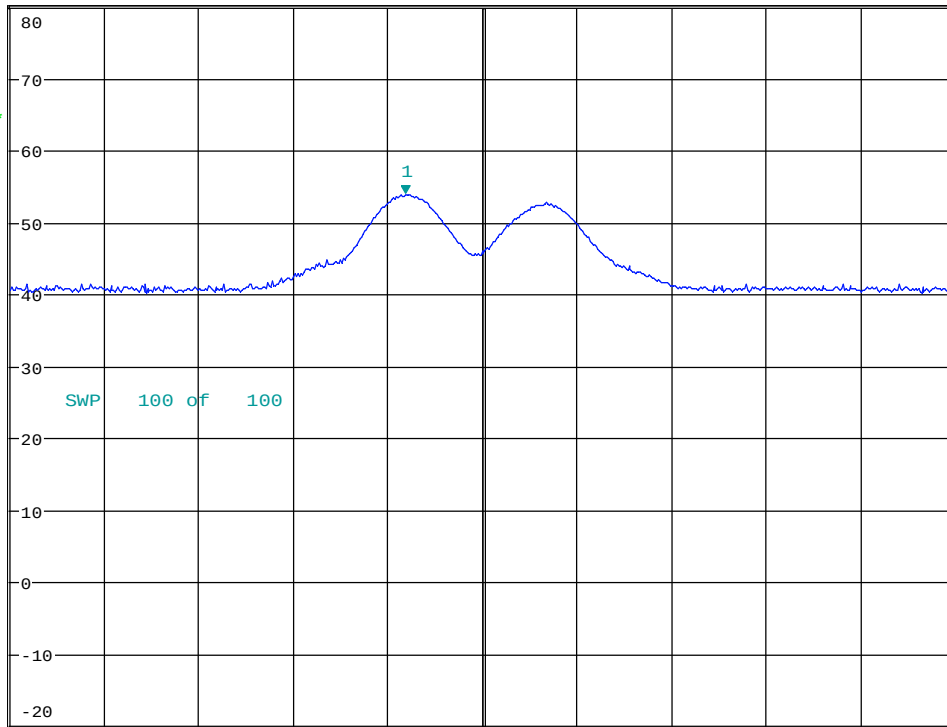


MARKER 1
7.423365385 GHz
Ref 80 dBμV/m * Att 10 dB

* RBW 1 MHz
* VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
53.88 dBμV/m
7.423365385 GHz

1 RM
MAXH



Center 7.425 GHz 2 MHz/ Span 20 MHz

Date: 19.MAY.2017 16:00:55

3rd Harm, 2475MHz , HP @3m , rms detector



MARKER 1

9.621987179 GHz

Ref 80 dBμV/m

* Att 10 dB

* RBW 1 MHz

* VBW 3 MHz

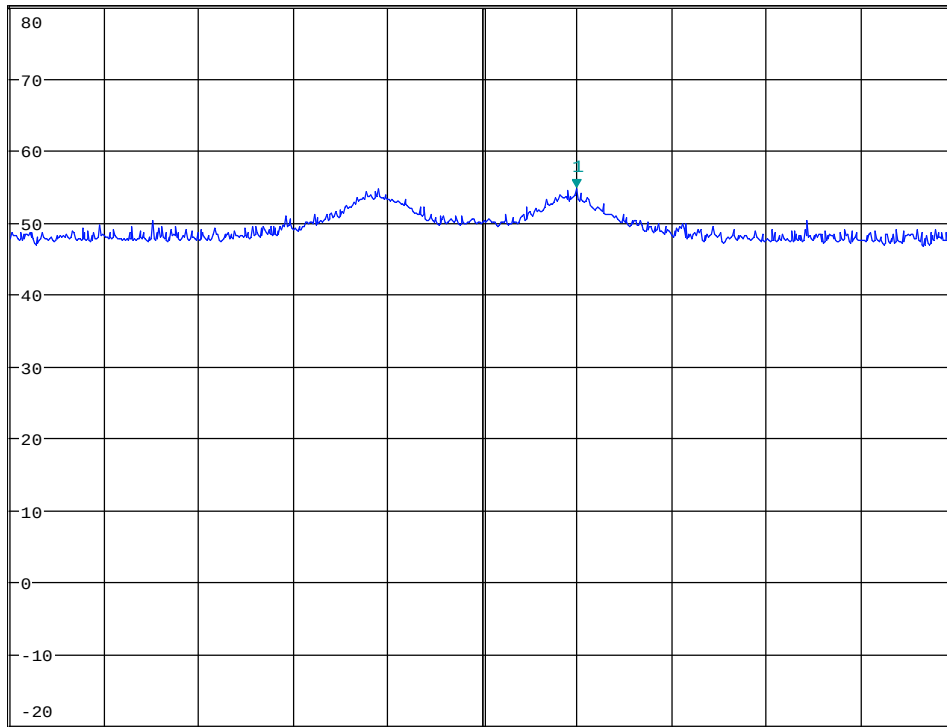
SWT 20 ms

Marker 1 [T1]

54.71 dBμV/m

9.621987179 GHz

1 PK
MAXH



Center 9.62 GHz

2 MHz/

Span 20 MHz

Date: 19.MAY.2017 16:22:53

4th Harm, 2405MHz , VP @3m , PK detector



MARKER 1

9.617788462 GHz

Ref 80 dBμV/m

* Att 10 dB

* RBW 1 MHz

* VBW 3 MHz

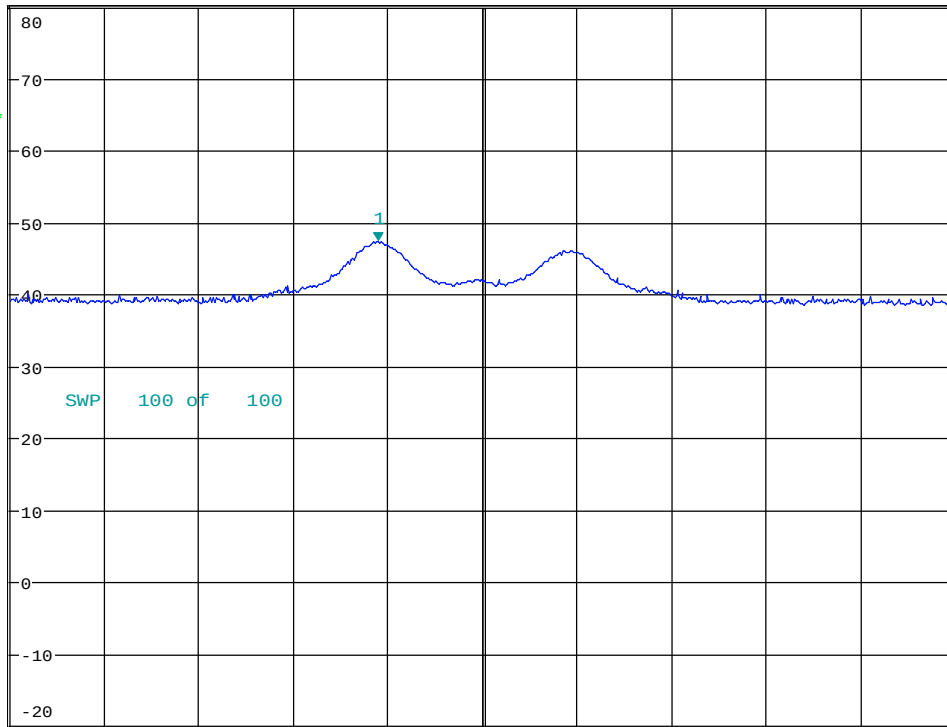
SWT 20 ms

Marker 1 [T1]

47.29 dBμV/m

9.617788462 GHz

1 RM
MAXH



Date: 19.MAY.2017 16:22:30

4th Harm, 2405MHz , VP @3m , rms detector



MARKER 1

9.761955128 GHz

Ref 80 dBμV/m

* Att 10 dB

* RBW 1 MHz

* VBW 3 MHz

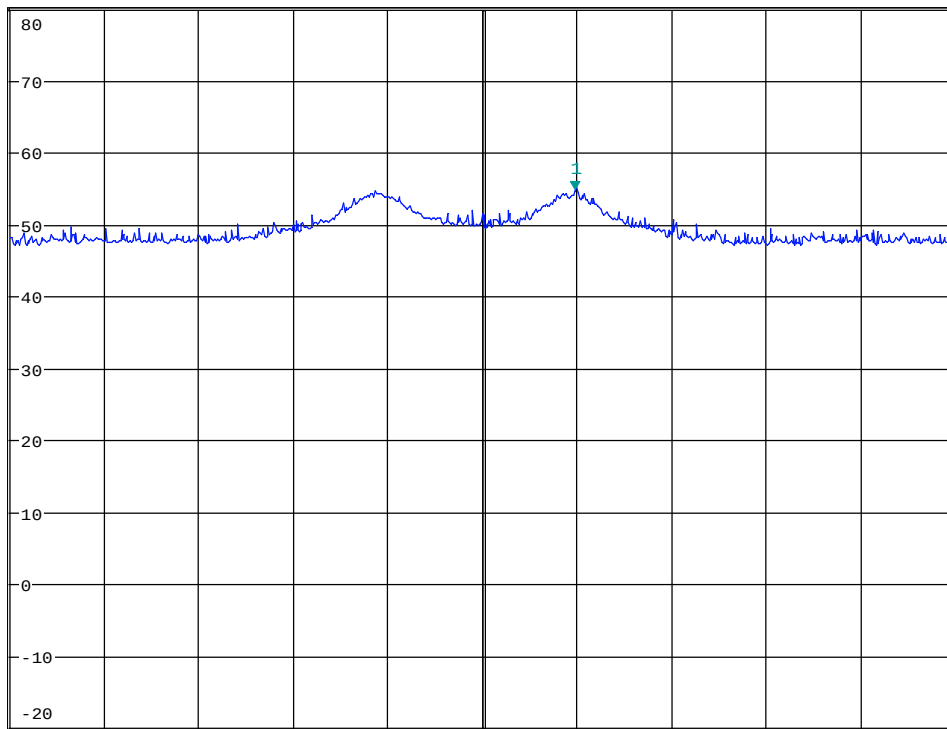
SWT 20 ms

Marker 1 [T1]

54.60 dBμV/m

9.761955128 GHz

1 PK
MAXH



Center 9.76 GHz

2 MHz/

Span 20 MHz

A

TDF

LNA

PS

3DB

AC

Date: 19.MAY.2017 16:20:23

4th Harm, 2440MHz , VP @3m , PK detector

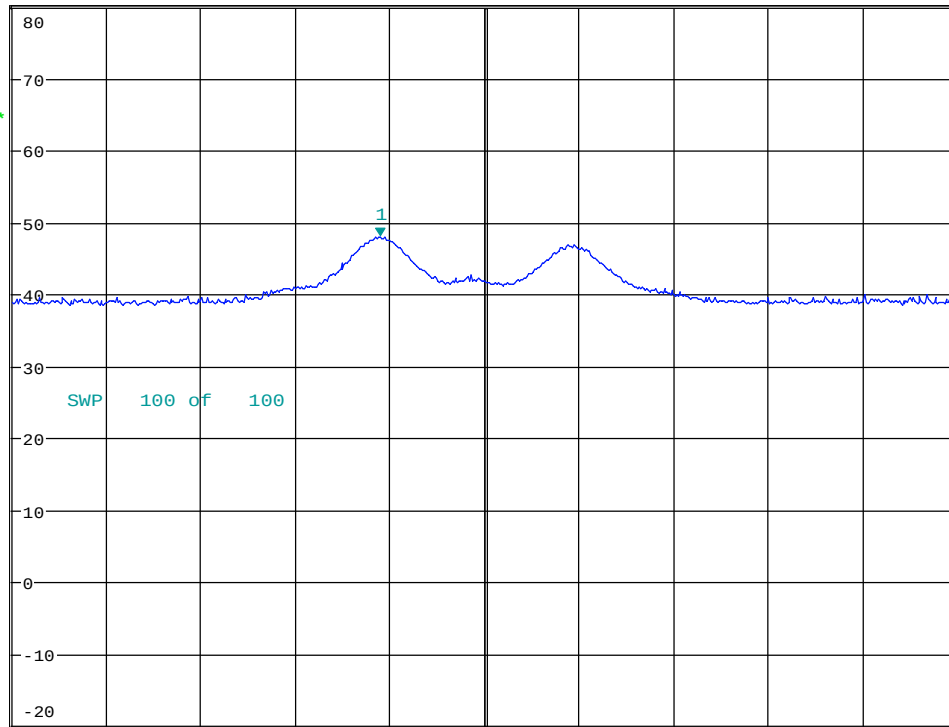


MARKER 1
9.757788462 GHz
Ref 80 dBμV/m * Att 10 dB

* RBW 1 MHz
* VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
47.95 dBμV/m
9.757788462 GHz

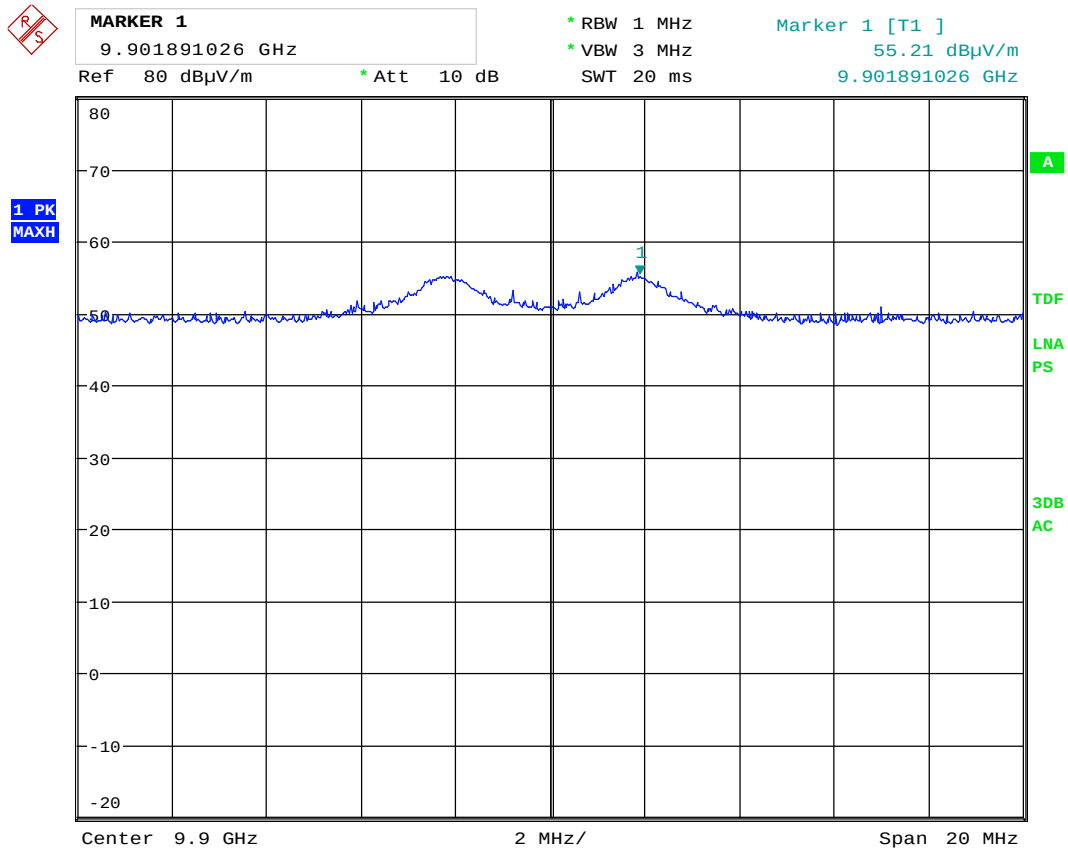
1 RM
MAXH



Center 9.76 GHz 2 MHz/ Span 20 MHz

Date: 19.MAY.2017 16:20:59

4th Harm, 2440MHz , VP @3m , rms detector



Date: 19.MAY.2017 16:15:24

4th Harm, 2475MHz , VP @3m , PK detector



MARKER 1

9.897820513 GHz

Ref 80 dBμV/m

* Att 10 dB

* RBW 1 MHz

* VBW 3 MHz

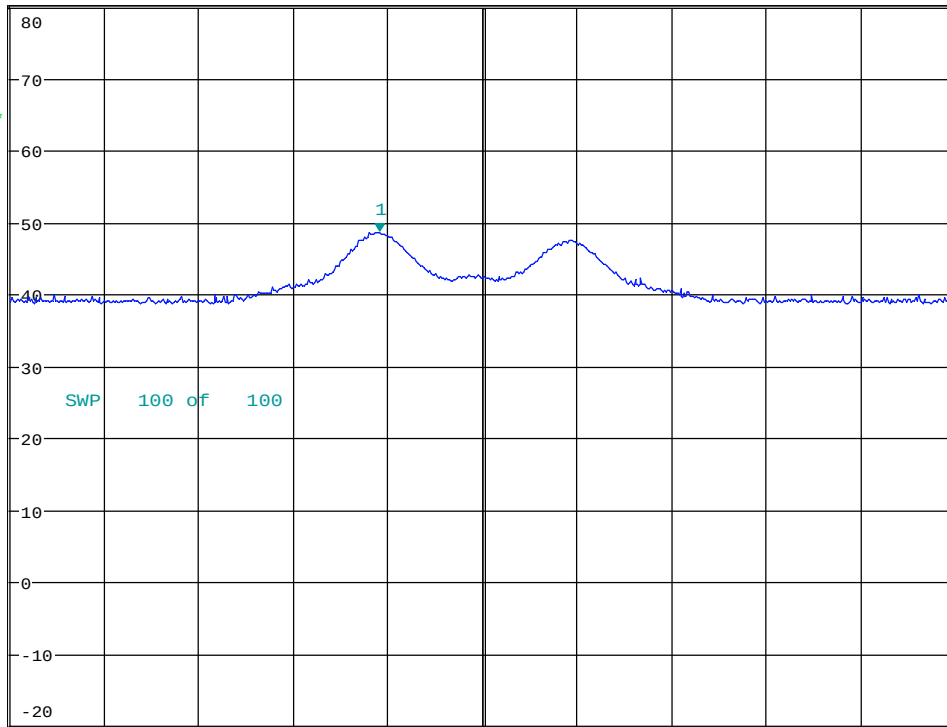
SWT 20 ms

Marker 1 [T1]

48.60 dBμV/m

9.897820513 GHz

1 RM
MAXH



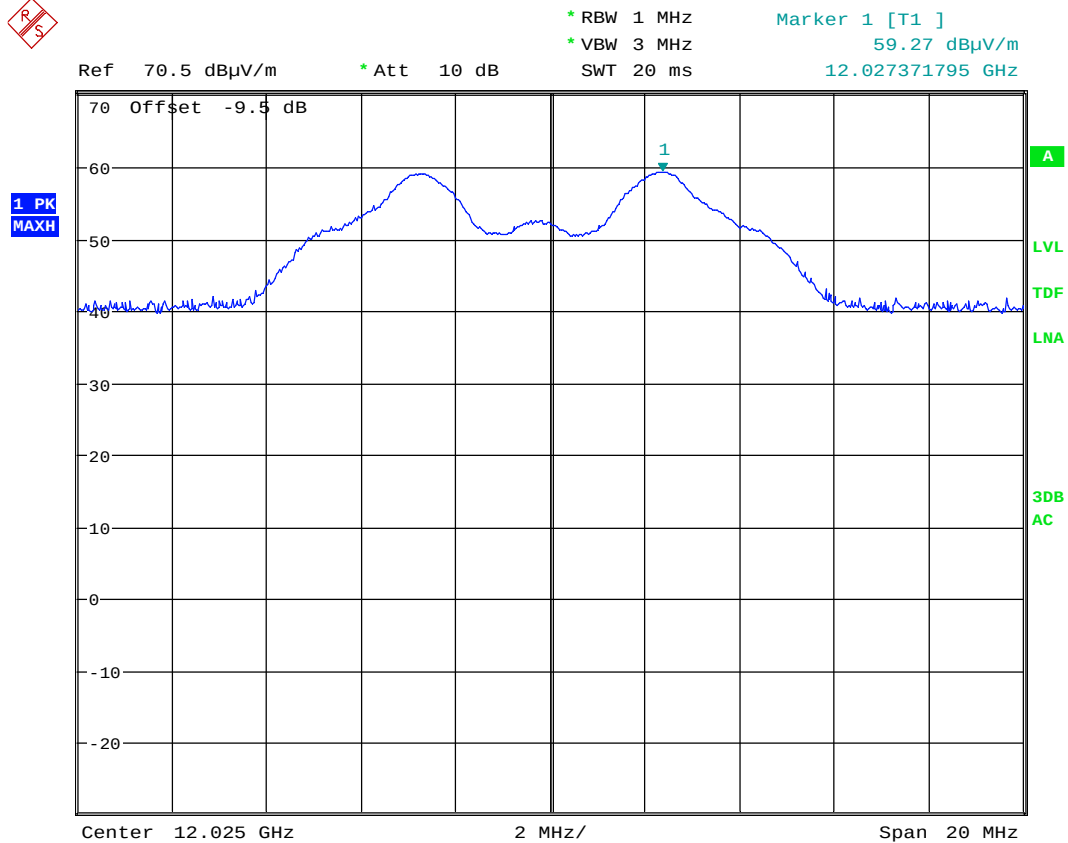
Center 9.9 GHz

2 MHz/

Span 20 MHz

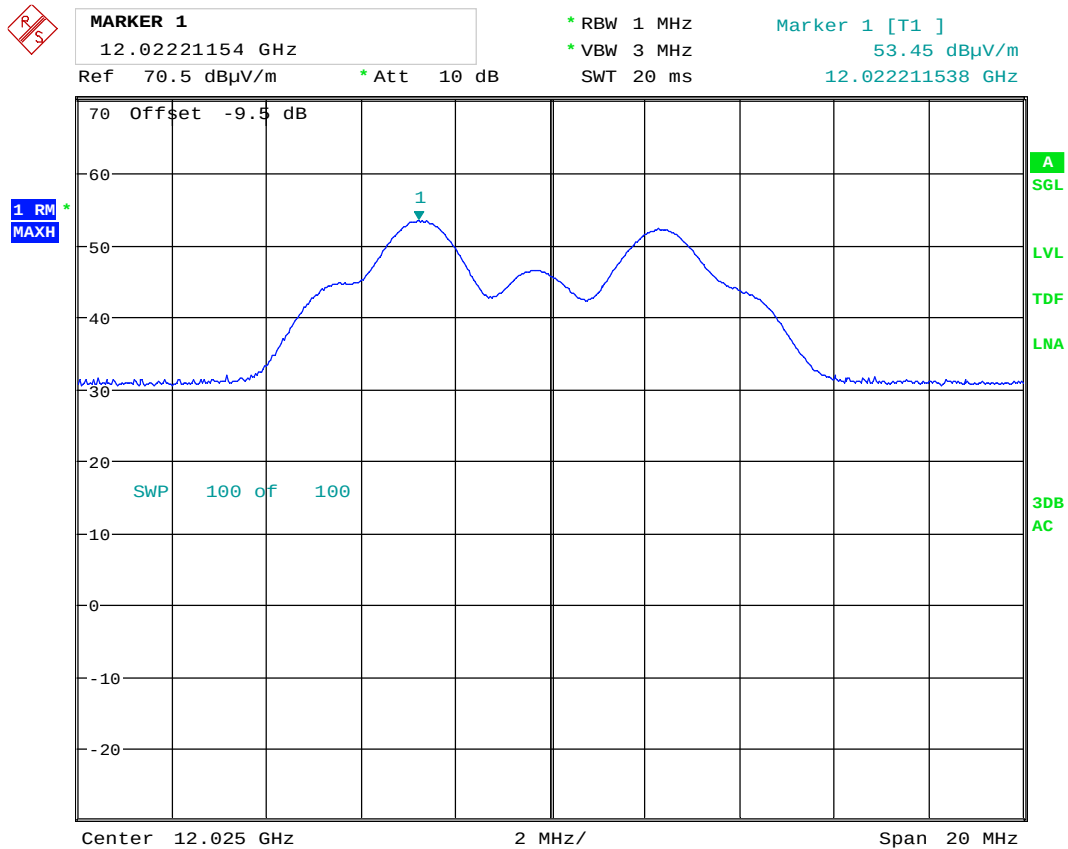
Date: 19.MAY.2017 16:16:05

4th Harm, 2475MHz , VP @3m , rms detector



Date: 19.MAY.2017 16:32:49

5th Harm, 2405MHz , HP @3m , PK detector, Distance Correction factor of -9.5 dB is included in the plot



Date: 19.MAY.2017 16:34:24

5th Harm, 2405MHz , HP @3m , RMS detector, Distance Correction factor of -9.5 dB is included in the plot



MARKER 1

12.19717949 GHz

Ref 70.5 dBμV/m

* Att 10 dB

* RBW 1 MHz

* VBW 3 MHz

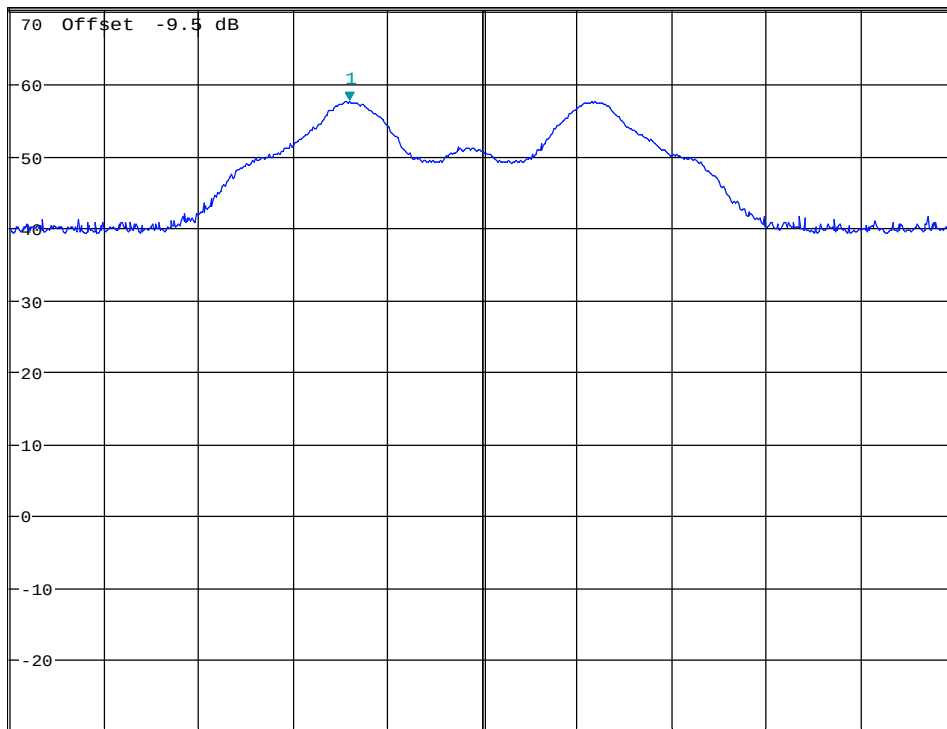
SWT 20 ms

Marker 1 [T1]

57.62 dBμV/m

12.197179487 GHz

1 PK
MAXH



Center 12.2 GHz

2 MHz/

Span 20 MHz

Date: 19.MAY.2017 16:37:09

5th Harm, 2440MHz , HP @3m , PK detector, Distance Correction factor of -9.5 dB is included in the plot

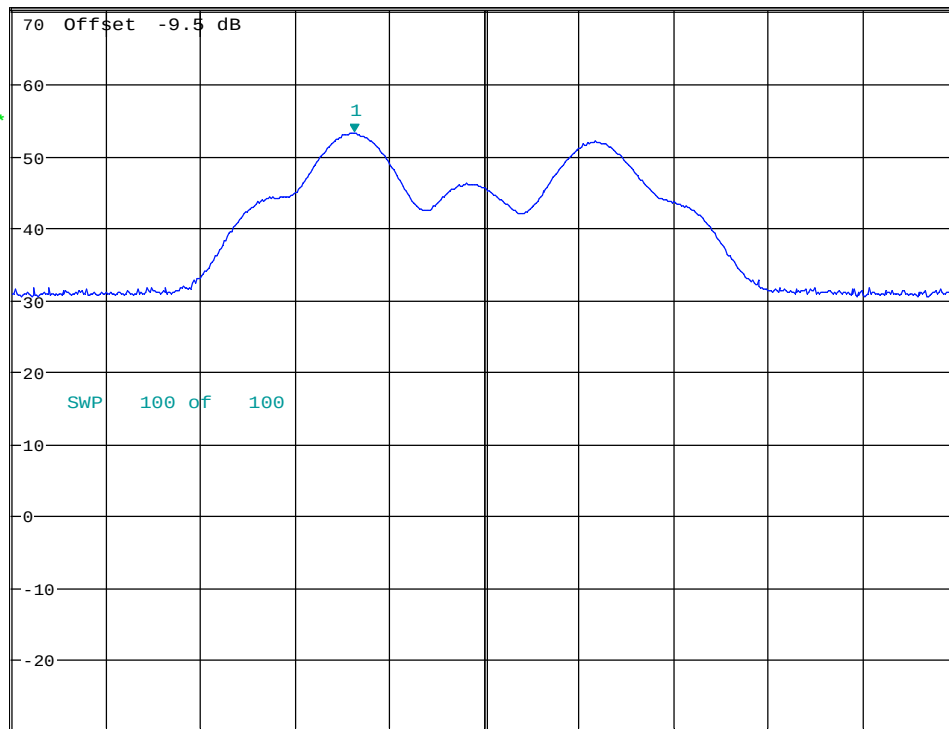


MARKER 1
12.19724359 GHz
Ref 70.5 dBμV/m * Att 10 dB

* RBW 1 MHz
* VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
53.17 dBμV/m
12.197243590 GHz

1 RM
MAXH



Center 12.2 GHz 2 MHz/ Span 20 MHz

Date: 19.MAY.2017 16:36:44

5th Harm, 2440MHz , HP @3m , RMS detector, Distance Correction factor of -9.5 dB is included in the plot



MARKER 1

12.37227564 GHz

Ref 70.5 dBμV/m

* Att 10 dB

* RBW 1 MHz

* VBW 3 MHz

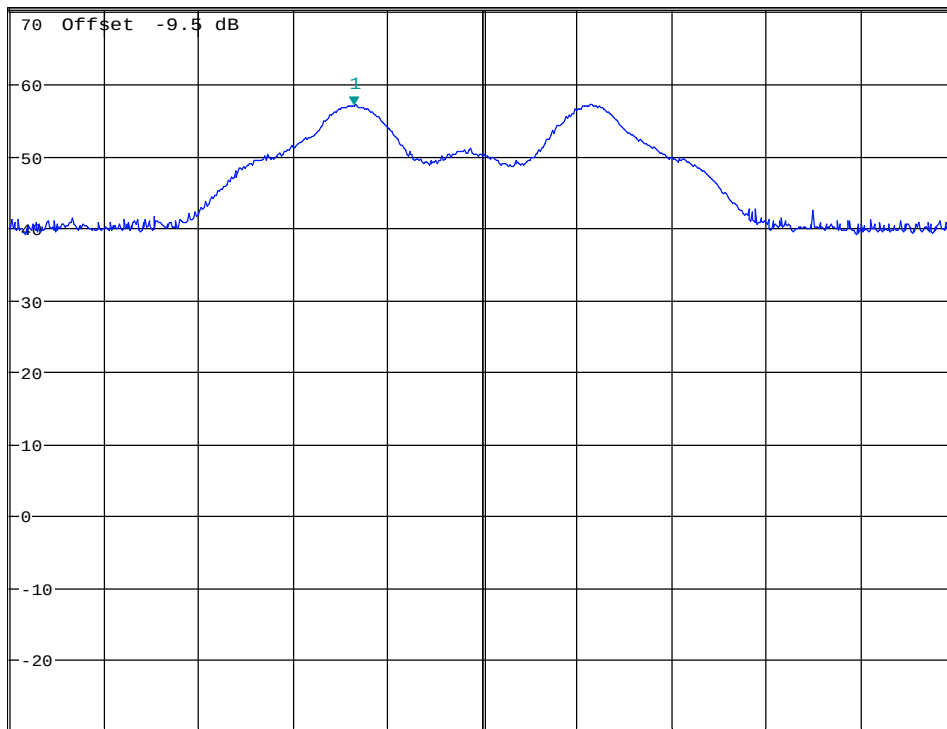
SWT 20 ms

Marker 1 [T1]

57.02 dBμV/m

12.372275641 GHz

1 PK
MAXH



Center 12.375 GHz

2 MHz/

Span 20 MHz

Date: 19.MAY.2017 16:40:27

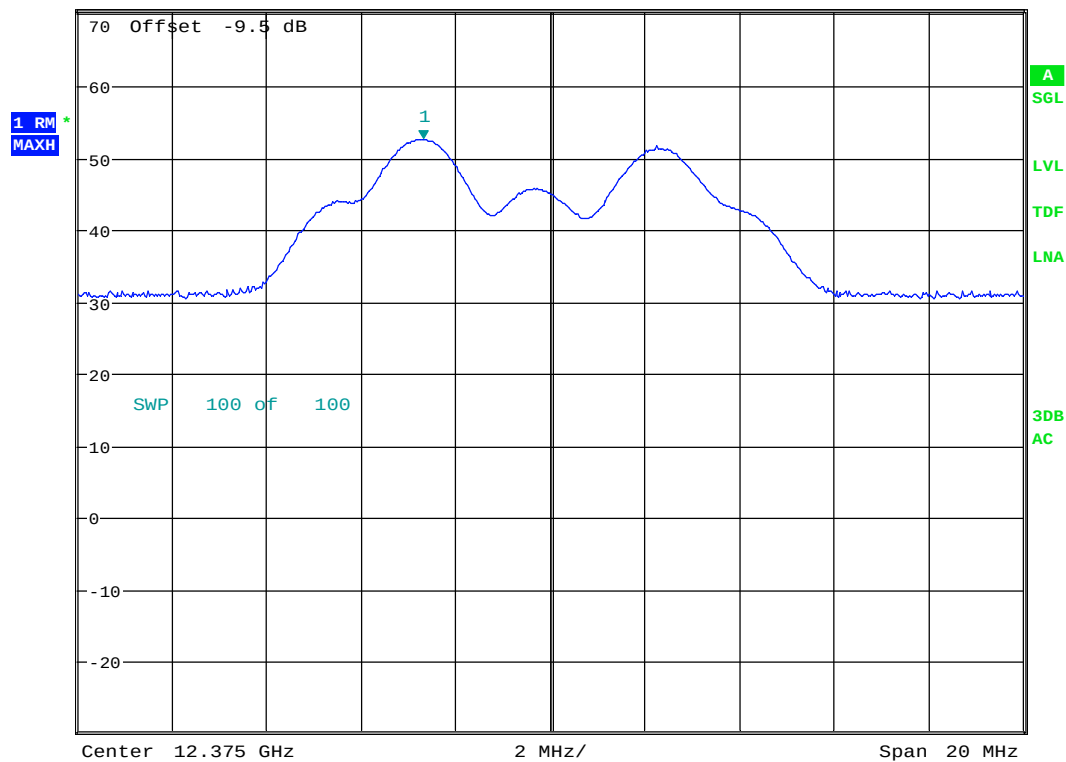
5th Harm, 2475MHz , HP @3m , PK detector, Distance Correction factor of -9.5 dB is included in the plot



MARKER 1
12.37230769 GHz
Ref 70.5 dBμV/m * Att 10 dB

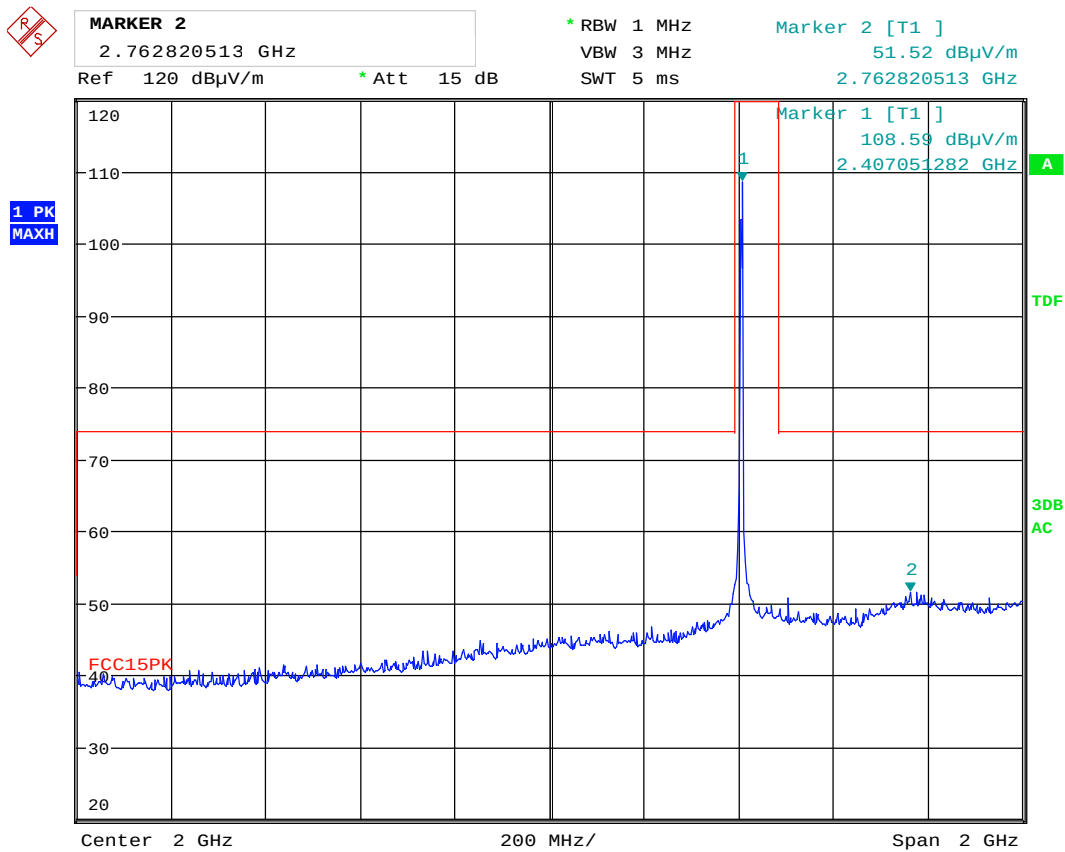
* RBW 1 MHz
* VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
52.58 dBμV/m
12.372307692 GHz



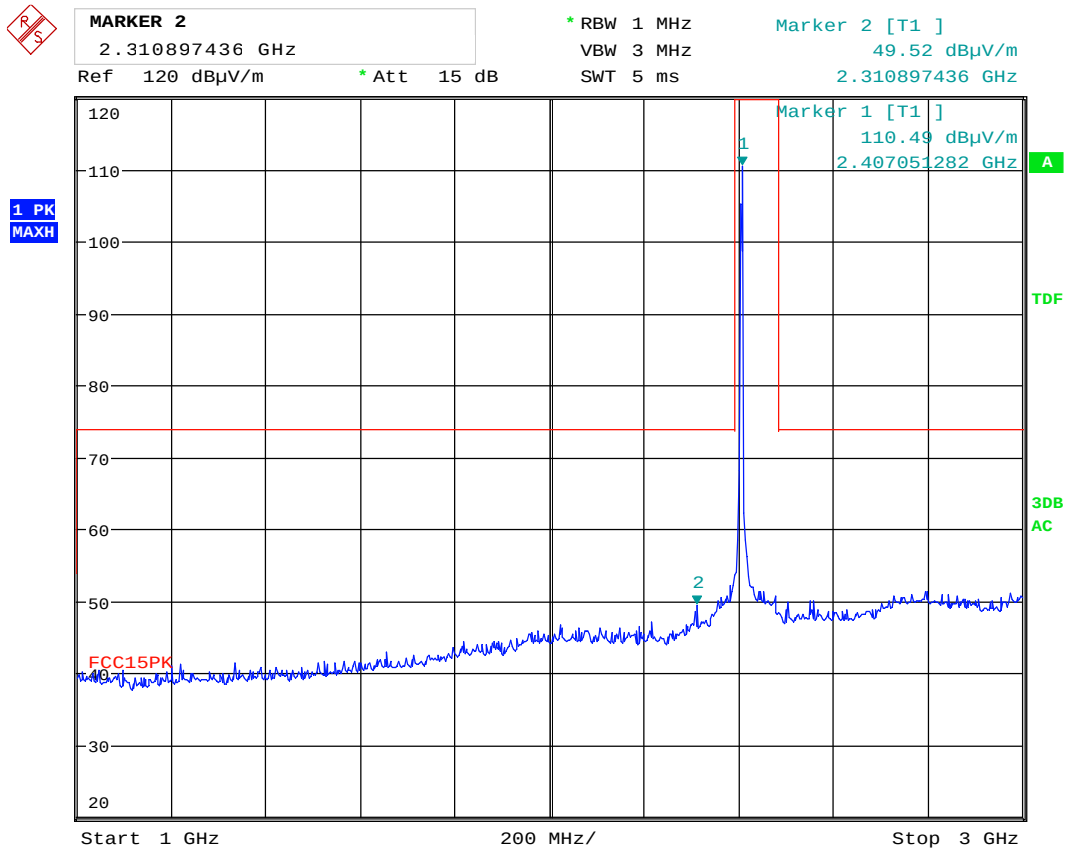
Date: 19.MAY.2017 16:41:00

5th Harm, 2475MHz , HP @3m , RMS detector, Distance Correction factor of -9.5 dB is included in the plot



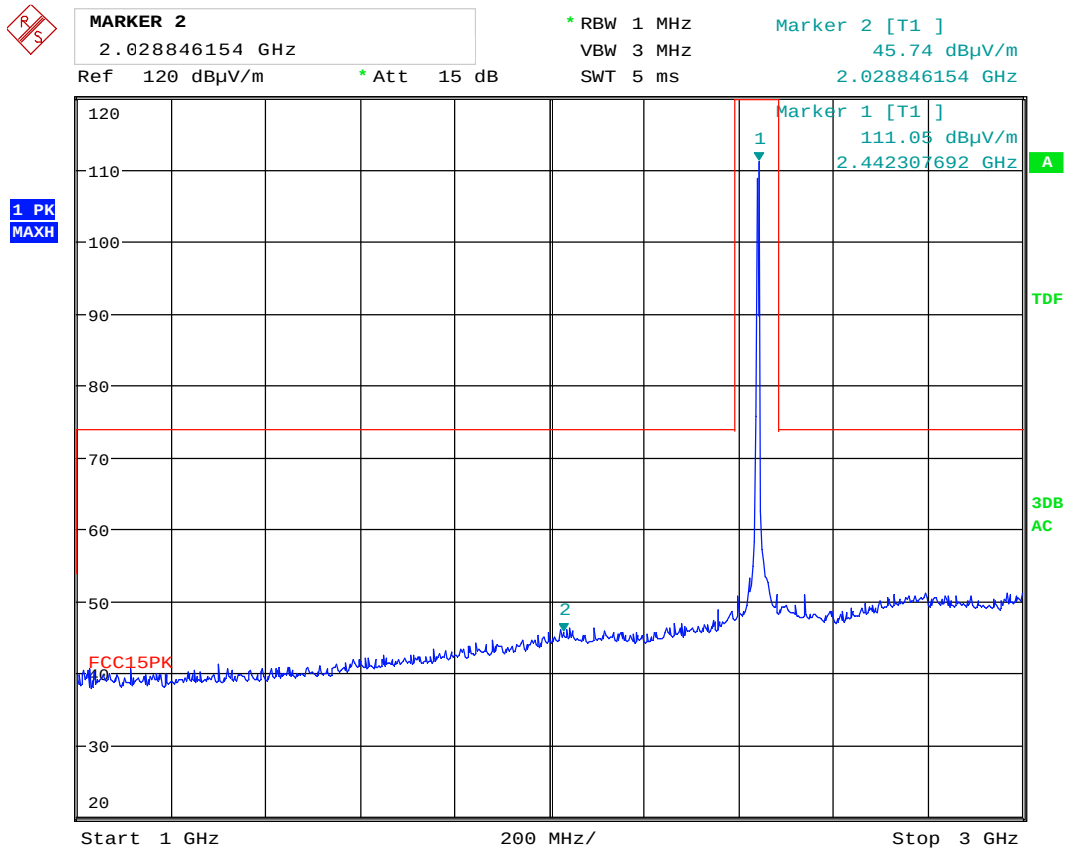
Date: 19.MAY.2017 12:49:52

Radiated Emissions, 2405MHz, 1 – 3 GHz, VP, @3m – Pre-scan with Peak detector



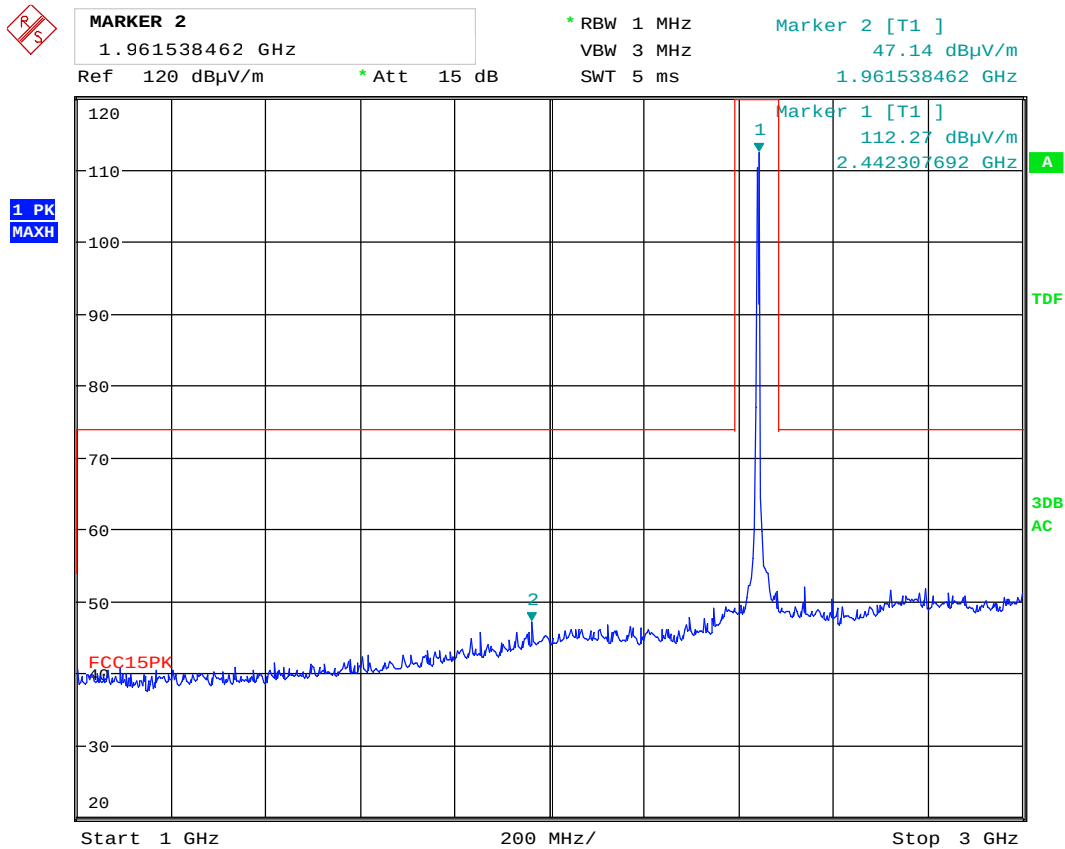
Date: 19.MAY.2017 12:53:36

Radiated Emissions, 2405 MHz, 1 – 3 GHz, HP, @3m – Pre-scan with Peak detector



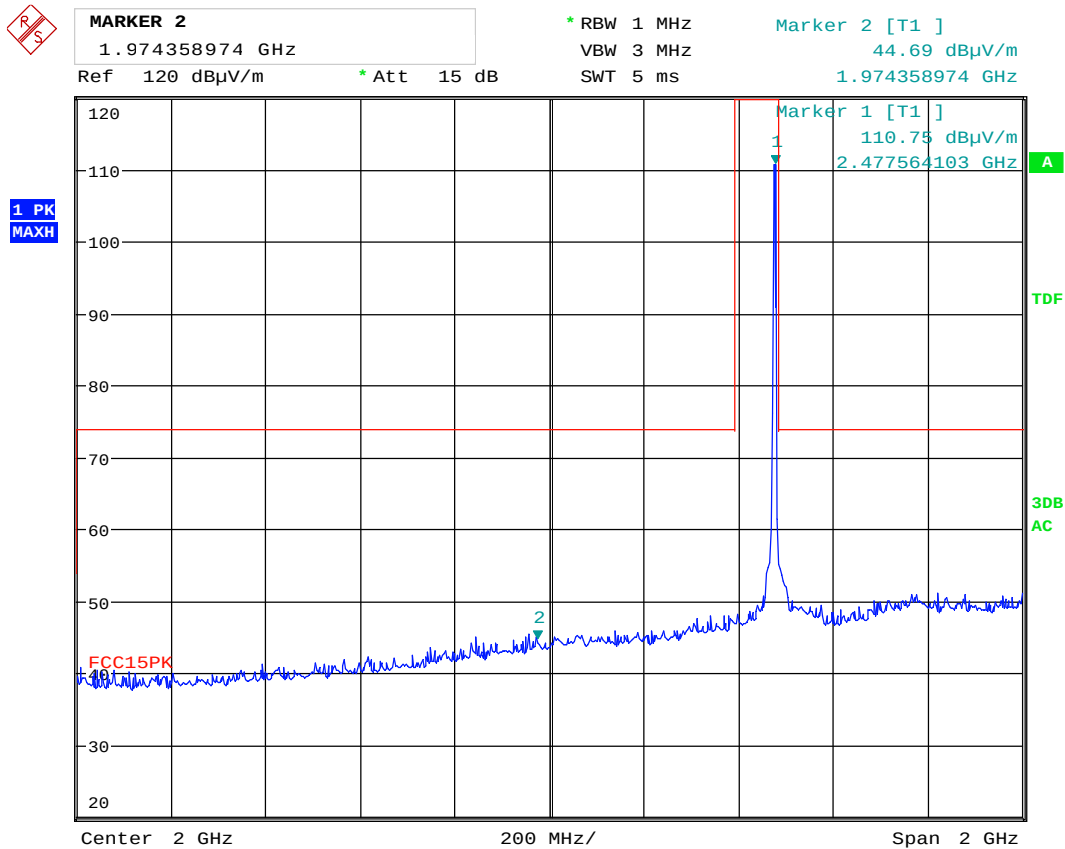
Date: 19.MAY.2017 12:55:36

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



Date: 19.MAY.2017 12:54:51

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



Date: 19.MAY.2017 12:47:53

Radiated Emissions ch. 2475 MHz, 1 – 3 GHz, VP, @3m – Pre-scan with Peak detector



Radiated Emissions ch. 2475 MHz, 1 – 3 GHz, HP, @3m – Pre-scan with Peak detector

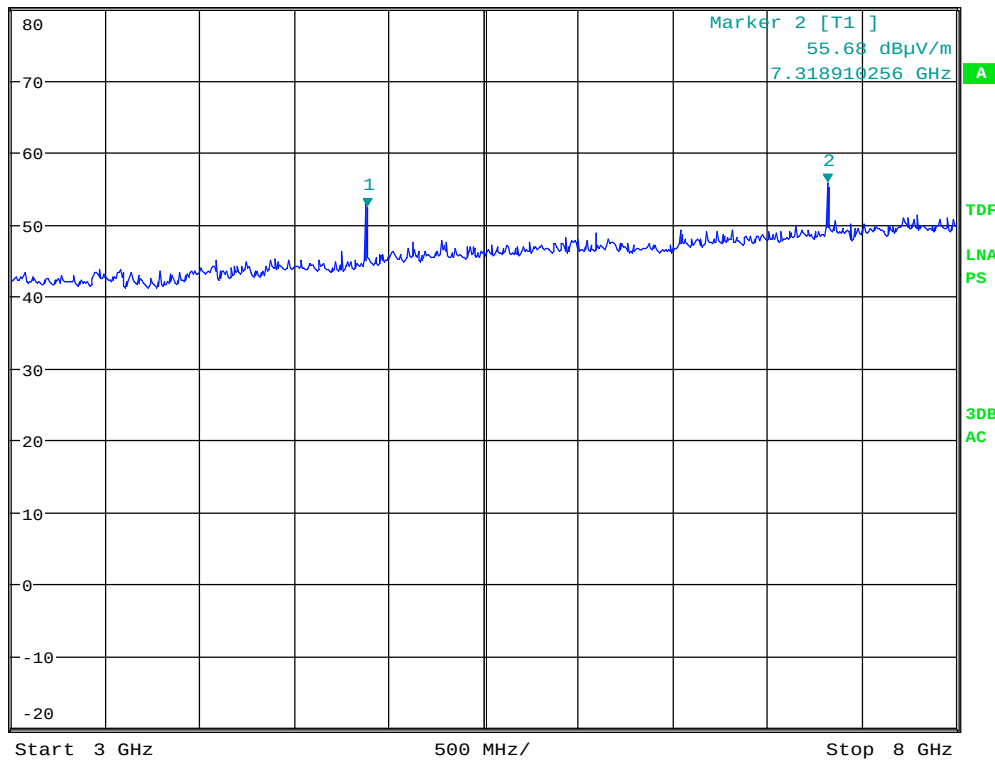


MARKER 1
4.883012821 GHz
Ref 80 dB μ V/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 30 ms

Marker 1 [T1]
52.38 dB μ V/m
4.883012821 GHz

1 PK
MAXH



Date: 19.MAY.2017 15:10:56

Radiated Emissions ch. 2440 MHz, 3 – 8 GHz, HP, @3m – Pre-scan with Peak detector



MARKER 1

4.874455128 GHz

Ref 80 dBμV/m

* Att 10 dB

* RBW 1 MHz

* VBW 3 MHz

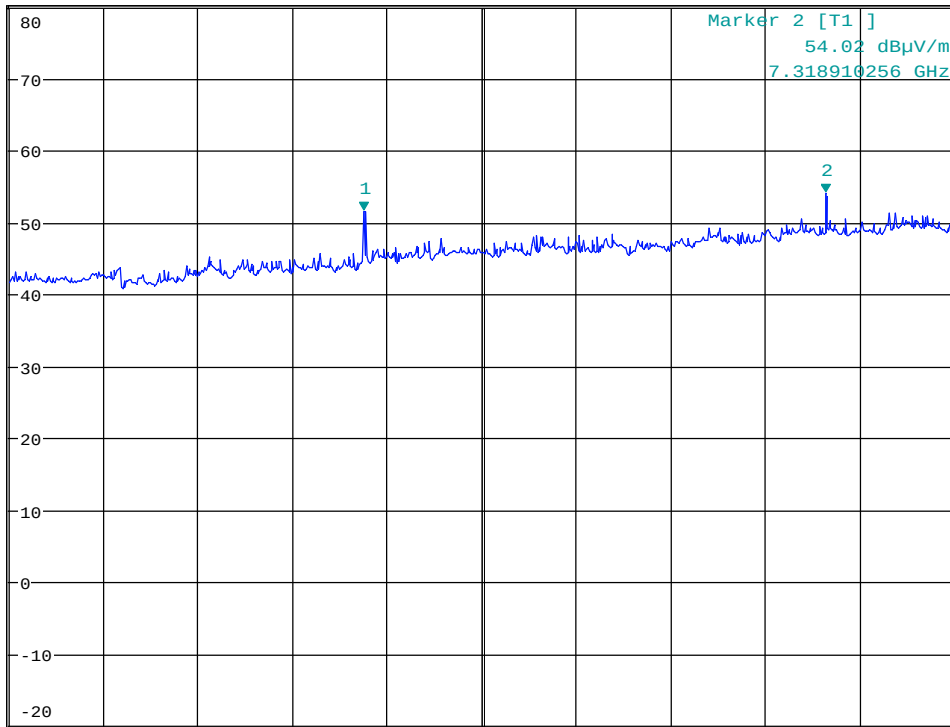
SWT 30 ms

Marker 1 [T1]

51.55 dBμV/m

4.874455128 GHz

1 PK
MAXH



Start 3 GHz

500 MHz/

Stop 8 GHz

Date: 19.MAY.2017 15:26:22

Radiated Emissions ch. 2440 MHz, 3 – 8 GHz, VP, @3m – Pre-scan with Peak detector

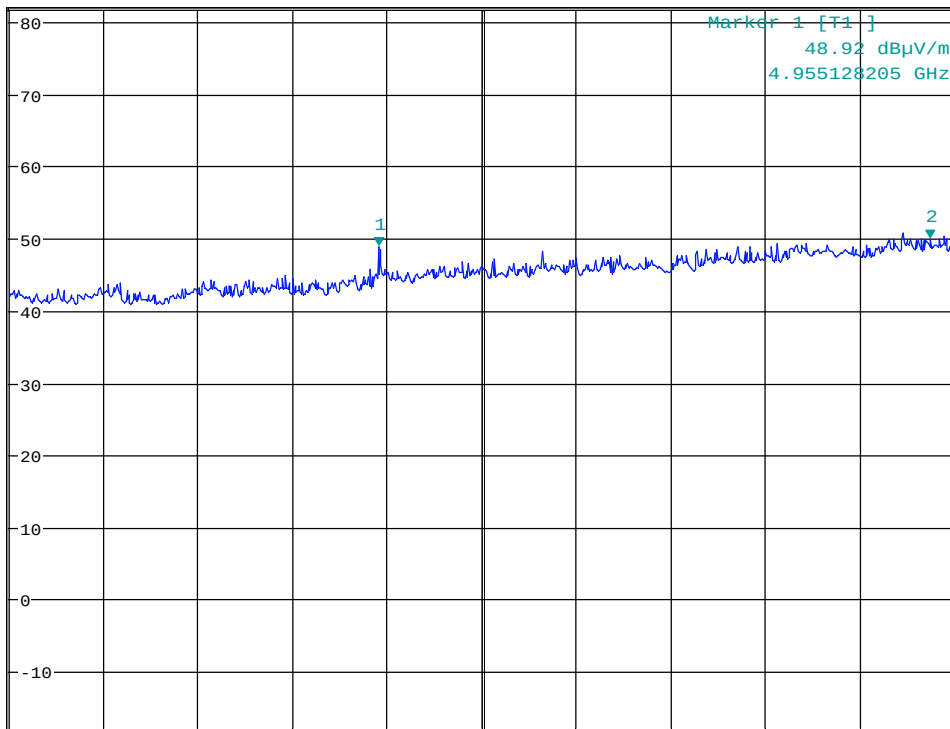


MARKER 2
7.871794872 GHz
Ref 82 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 30 ms

Marker 2 [T1]
50.00 dBμV/m
7.871794872 GHz

1 PK
MAXH



Start 3 GHz 500 MHz/ Stop 8 GHz

Date: 18.MAY.2017 15:55:50

Radiated Emissions ch. 2475 MHz, 3 – 8 GHz, VP, @3m – Pre-scan with Peak detector

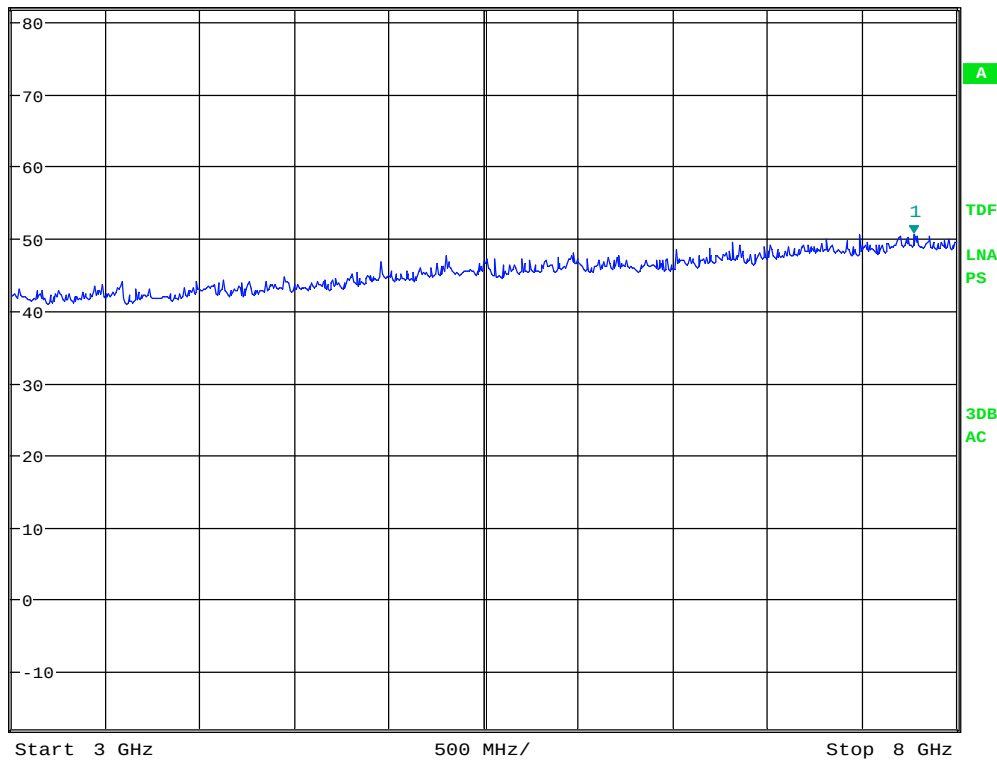


MARKER 1
7.775641026 GHz
Ref 82 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 30 ms

Marker 1 [T1]
50.49 dBμV/m
7.775641026 GHz

1 PK
MAXH



Date: 18.MAY.2017 15:52:44

Radiated Emissions ch. 2475 MHz, 3 – 8 GHz, HP, @3m – Pre-scan with Peak detector

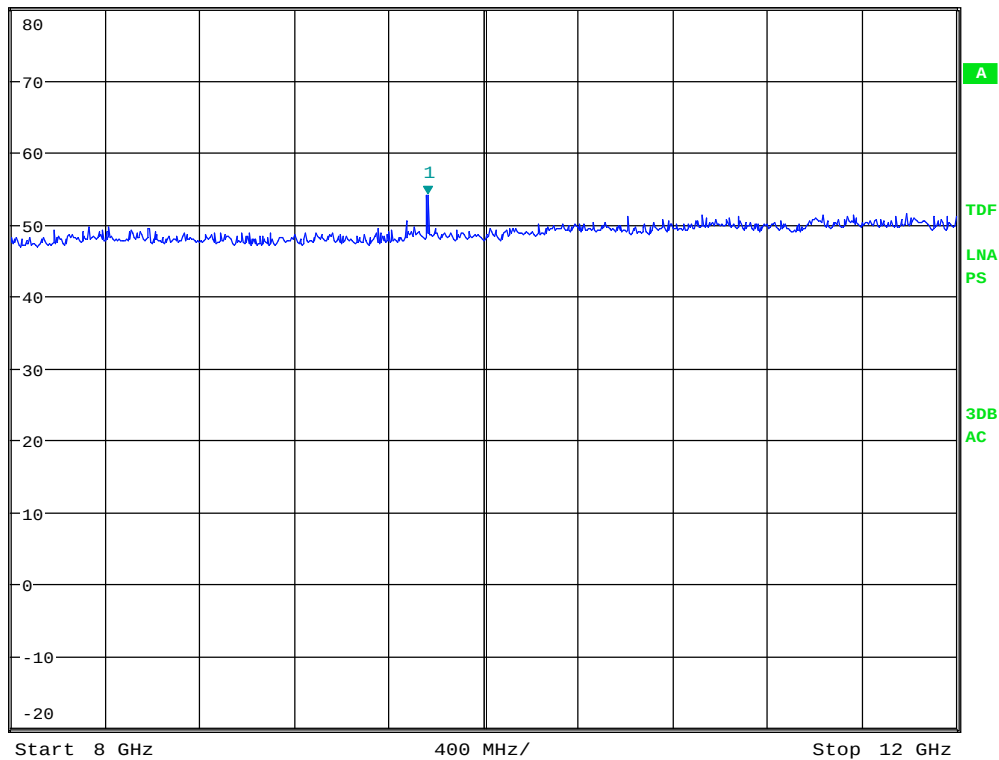


MARKER 1
9.762820513 GHz
Ref 80 dBμV/m * Att 10 dB

* RBW 1 MHz
* VBW 3 MHz
SWT 25 ms

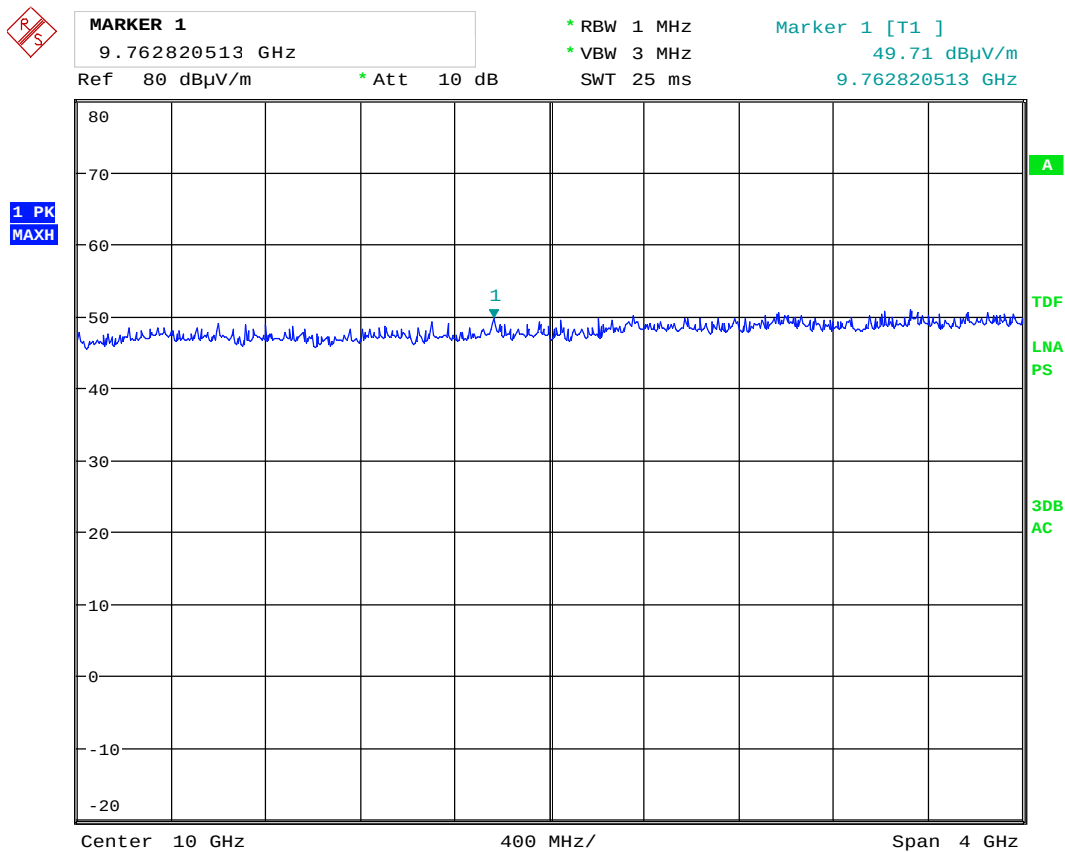
Marker 1 [T1]
54.03 dBμV/m
9.762820513 GHz

1 PK
MAXH



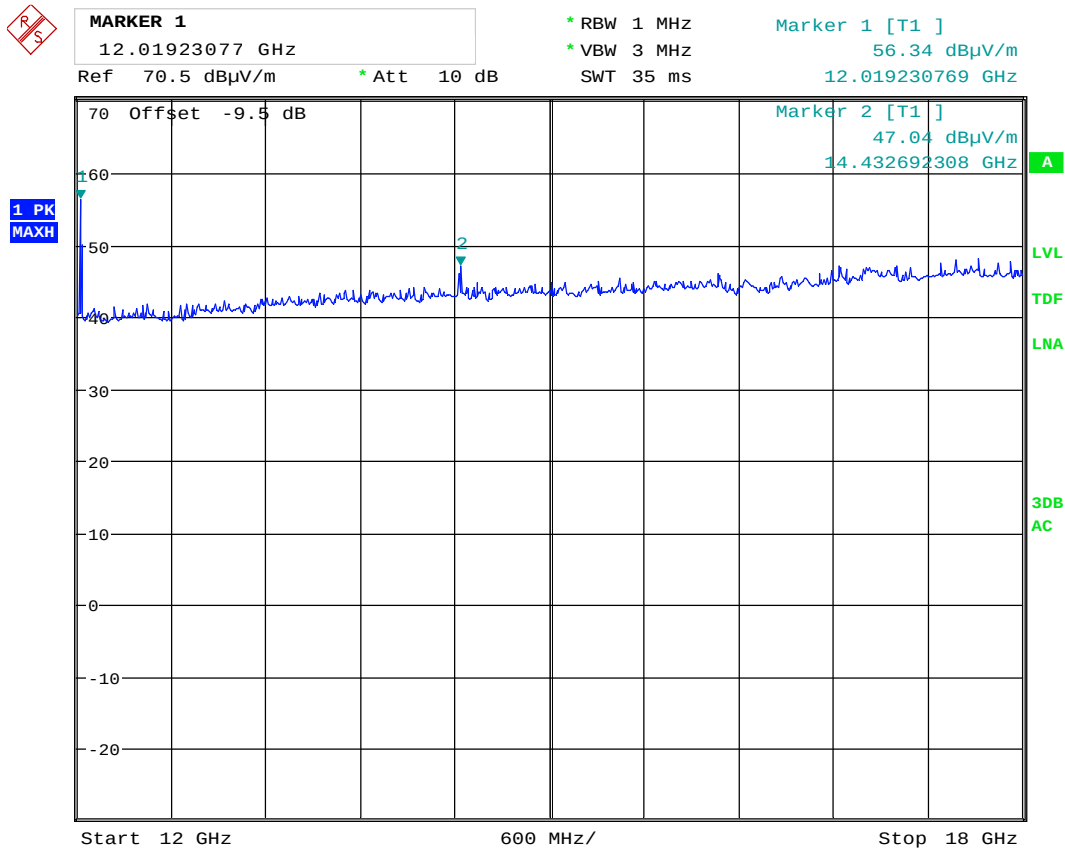
Date: 19.MAY.2017 16:19:36

Radiated Emissions ch. 2440 MHz, 8 – 12 GHz, VP, @3m – Pre-scan with Peak detector,



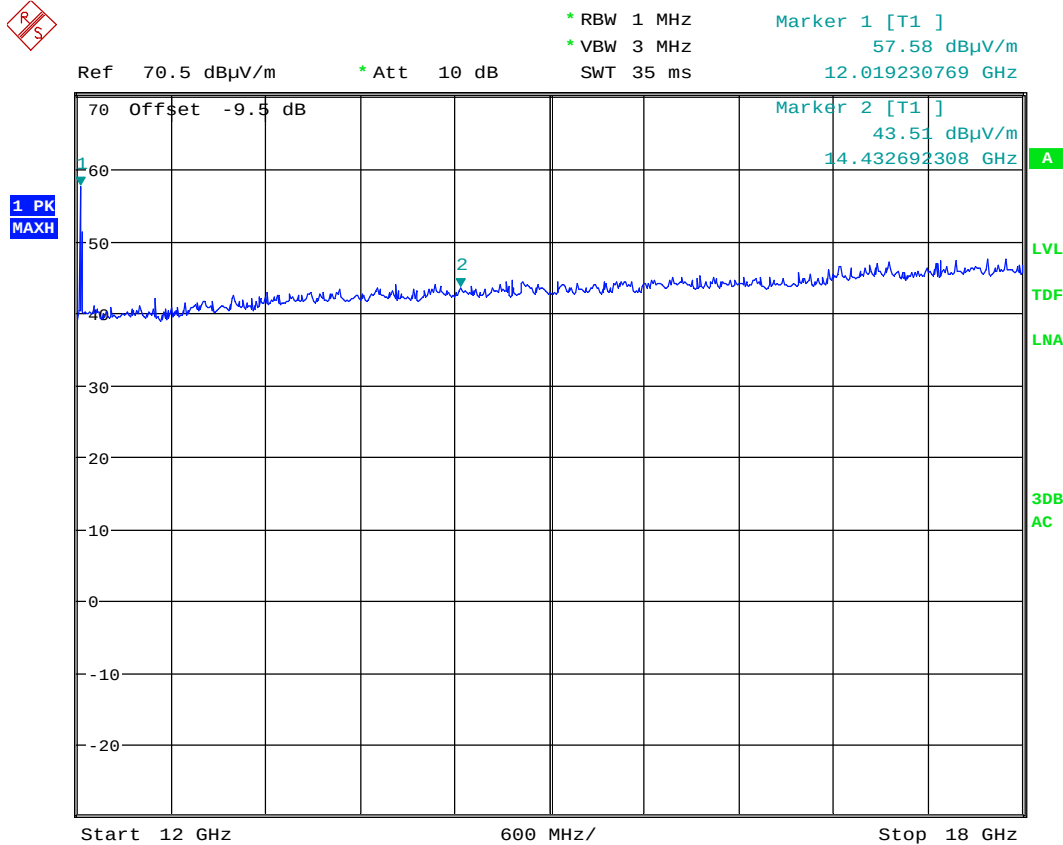
Date: 19.MAY.2017 16:19:56

Radiated Emissions ch. 2440 MHz, 8 – 12 GHz, HP, @3m – Pre-scan with Peak detector,



Date: 19.MAY.2017 16:30:51

**Radiated Emissions ch. 2405 MHz, 12 – 18 GHz, VP, @1m – Pre-scan with Peak detector,
Distance Correction factor of -9.5 dB is included in the plot**



Date: 19.MAY.2017 16:31:39

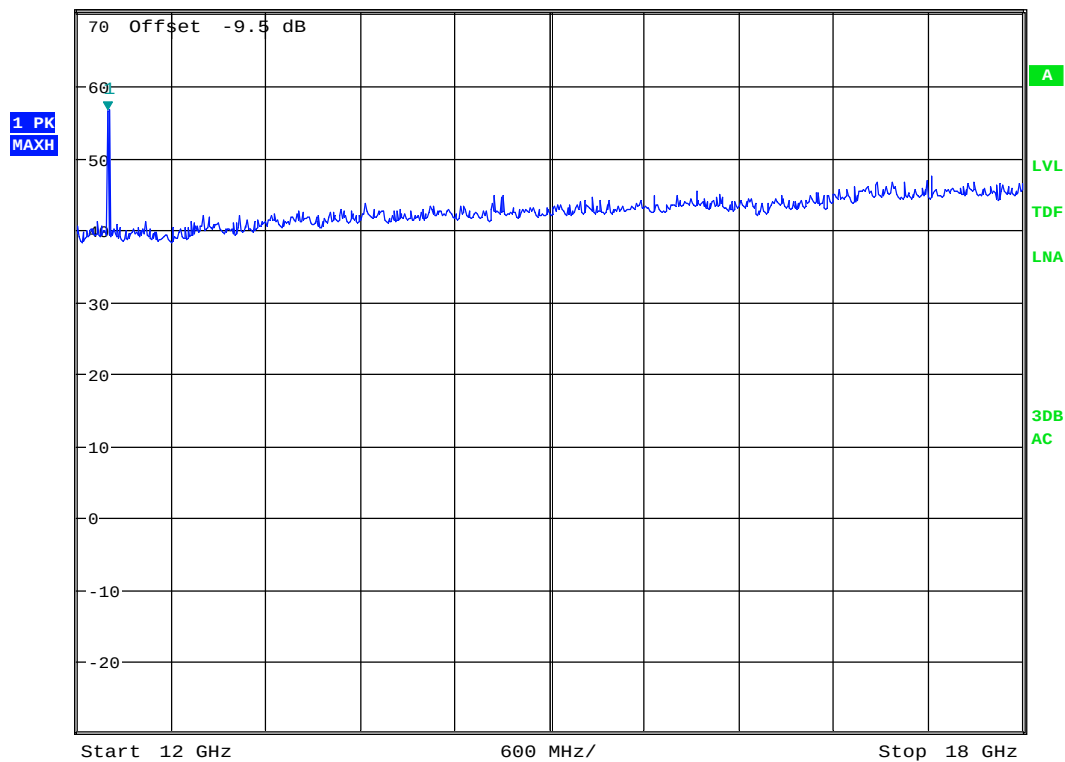
**Radiated Emissions ch. 2405 MHz, 12 – 18 GHz, HP, @1m – Pre-scan with Peak detector,
Distance Correction factor of -9.5dB is included in the plot**



MARKER 1
12.19230769 GHz
Ref 70.5 dBμV/m * Att 10 dB

* RBW 1 MHz
* VBW 3 MHz
SWT 35 ms

Marker 1 [T1]
56.51 dBμV/m
12.192307692 GHz



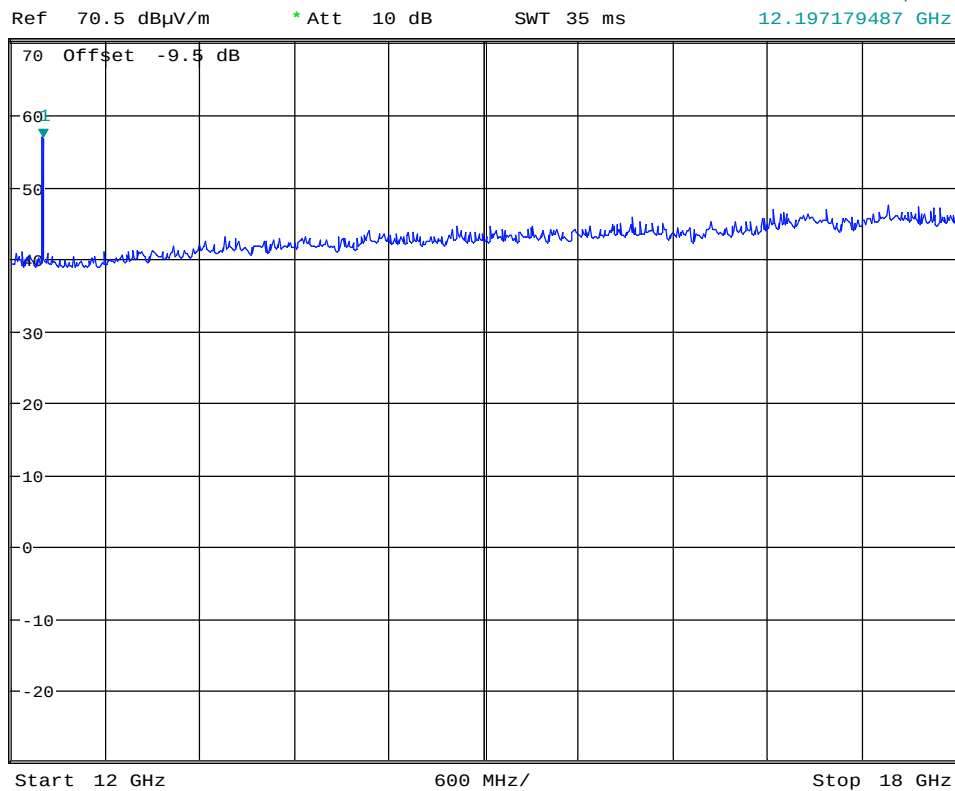
Date: 19.MAY.2017 16:37:58

**Radiated Emissions ch. 2440 MHz, 12 – 18 GHz, VP, @1m – Pre-scan with Peak detector,
Distance Correction factor of -9.5 dB is included in the plot**



* RBW 1 MHz
* VBW 3 MHz
SWT 35 ms

Marker 1 [T1]
56.81 dBμV/m
12.197179487 GHz



Date: 19.MAY.2017 16:37:32

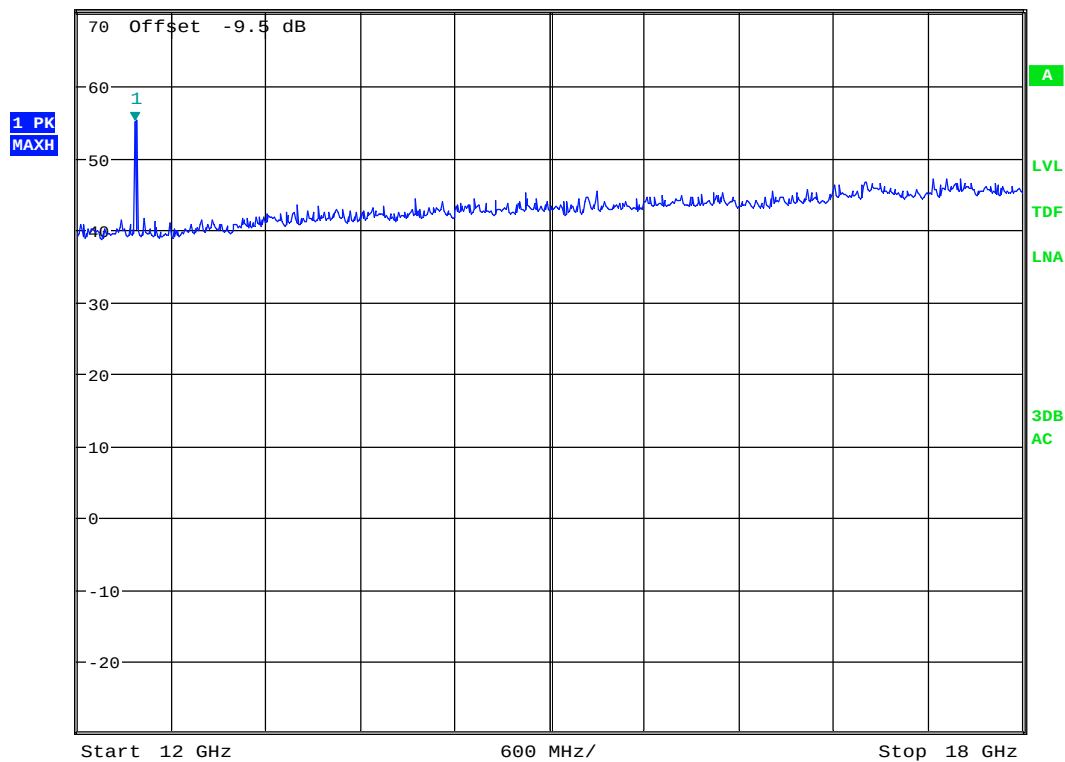
**Radiated Emissions ch. 2440 MHz, 12 – 18 GHz, HP, @1m – Pre-scan with Peak detector,
Distance Correction factor of -9.5dB is not included in the plot**



MARKER 1
12.36538462 GHz
Ref 70.5 dBμV/m * Att 10 dB

* RBW 1 MHz
* VBW 3 MHz
SWT 35 ms

Marker 1 [T1]
55.08 dBμV/m
12.365384615 GHz



Date: 19.MAY.2017 16:39:31

**Radiated Emissions ch. 2475 MHz, 12 – 18 GHz, VP, @1m – Pre-scan with Peak detector,
Distance Correction factor of -9.5 dB is not included in the plot**



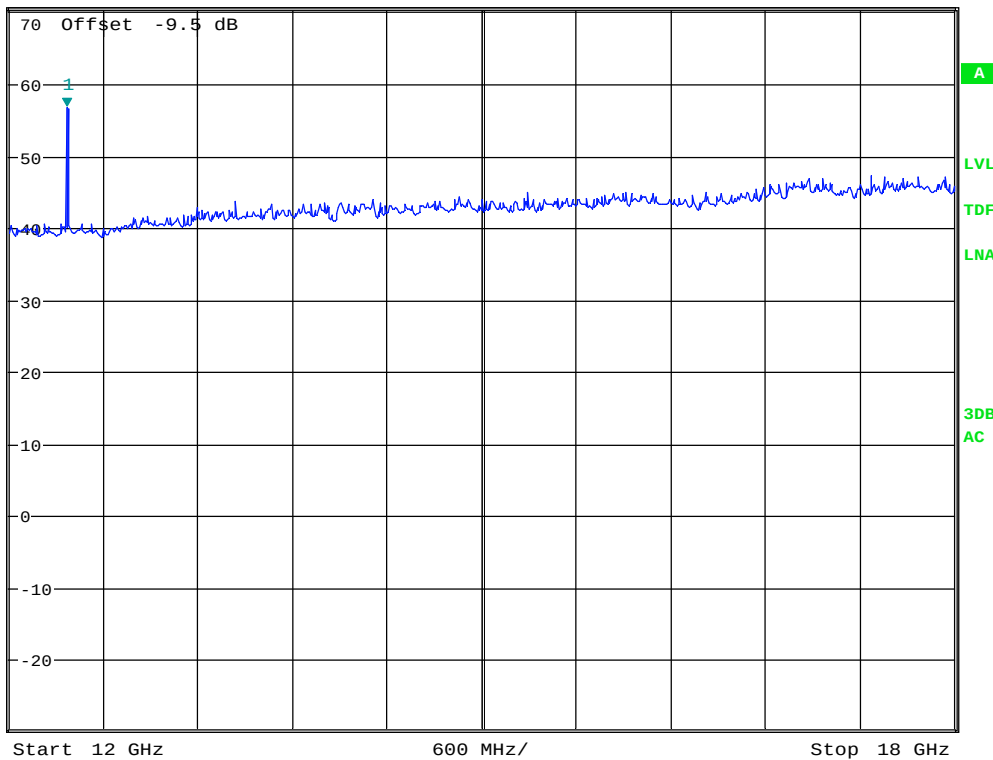
MARKER 1
12.36538462 GHz

* RBW 1 MHz
* VBW 3 MHz
SWT 35 ms

Marker 1 [T1]
56.70 dBμV/m
12.365384615 GHz

Ref 70.5 dBμV/m * Att 10 dB

1 PK
MAXH



Date: 19.MAY.2017 16:39:56

**Radiated Emissions ch. 2475 MHz, 12 – 18 GHz, HP, @1m – Pre-scan with Peak detector,
Distance Correction factor of -9.5dB is not included in the plot**



MARKER 1

23.74358974 GHz

Ref 82 dBμV/m

* Att 10 dB

* RBW 1 MHz

VBW 3 MHz

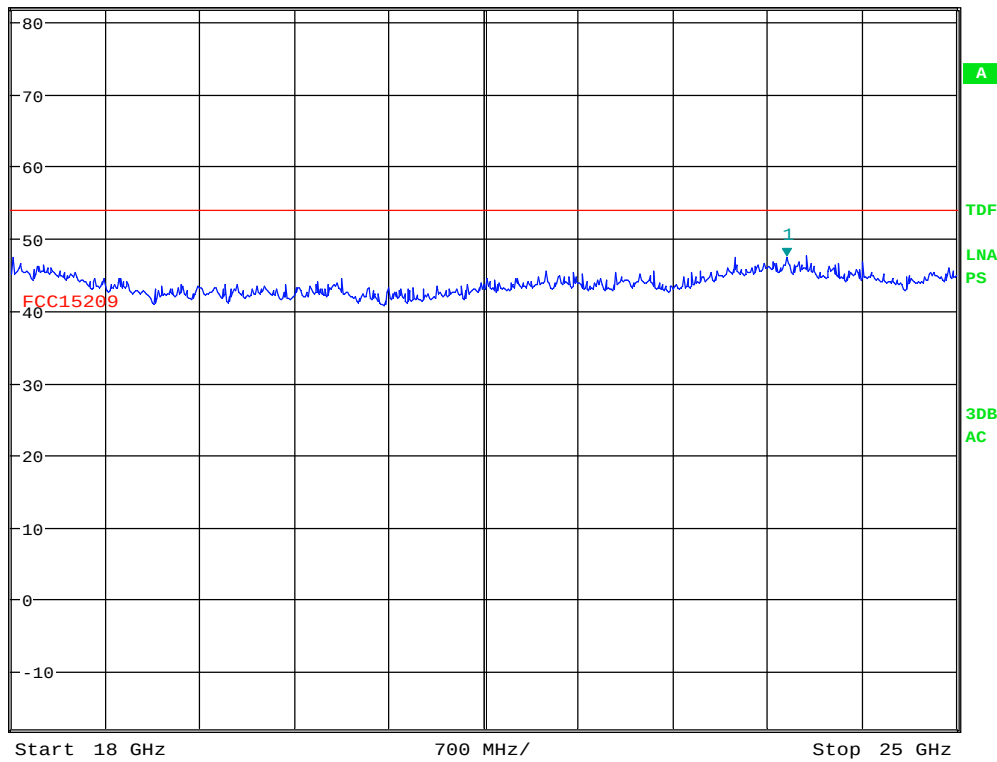
SWT 45 ms

Marker 1 [T1]

47.45 dBμV/m

23.743589744 GHz

1 PK
MAXH



Date: 30.MAY.2017 08:32:42

Radiated Emissions , 18 – 25 GHz, VP, Pre-scan with Peak detector,



MARKER 1

23.57532051 GHz

Ref 82 dB μ V/m

* Att 10 dB

* RBW 1 MHz

VBW 3 MHz

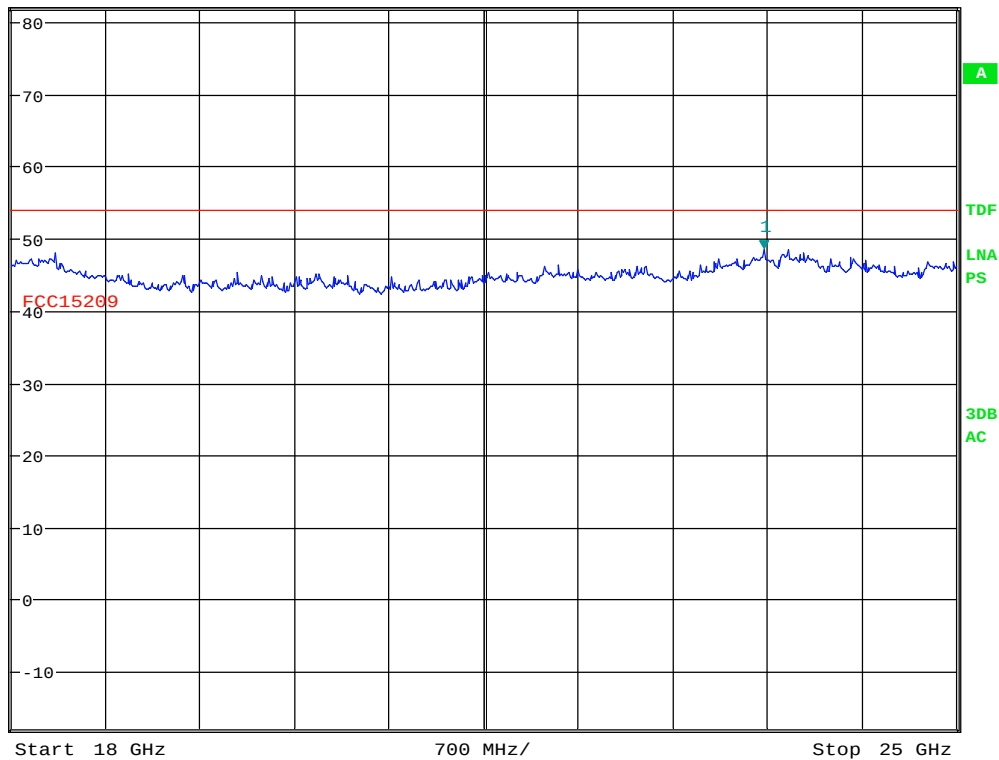
SWT 45 ms

Marker 1 [T1]

48.53 dB μ V/m

23.575320513 GHz

1 PK
MAXH



Date: 30.MAY.2017 08:32:21

Radiated Emissions , 18 – 25 GHz, HP, Pre-scan with Peak detector,

3.6 Power Spectral Density (PSD)

Para. No.: 15.247 (d)

Test Performed By: G.Suwanthakumar

Date of Test: 2017.05.23

Test Results: Passed

Measured and Calculated Data:

The measurement procedures PKPSD described in KDB 558074 D01 v04 was used.

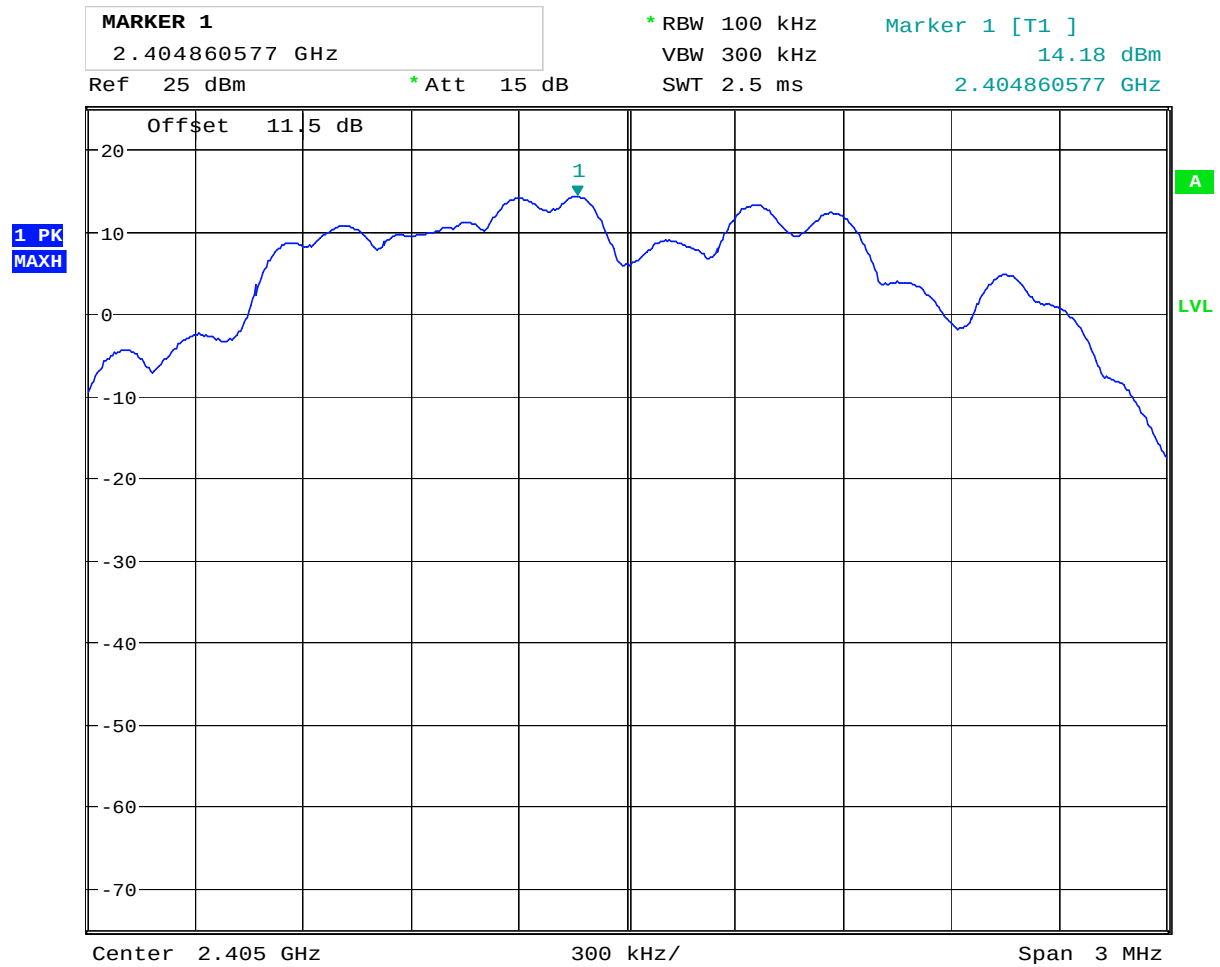
	calculated peak PSD dBm
Power Spectral Density @2405 MHz	-1.02
Power Spectral Density @2440 MHz	-1.66
Power Spectral Density @2475 MHz	-2.23

The measured values with 100 kHz RBW are corrected by a Bandwidth Correction Factor of -15.2 dB.

Requirements:

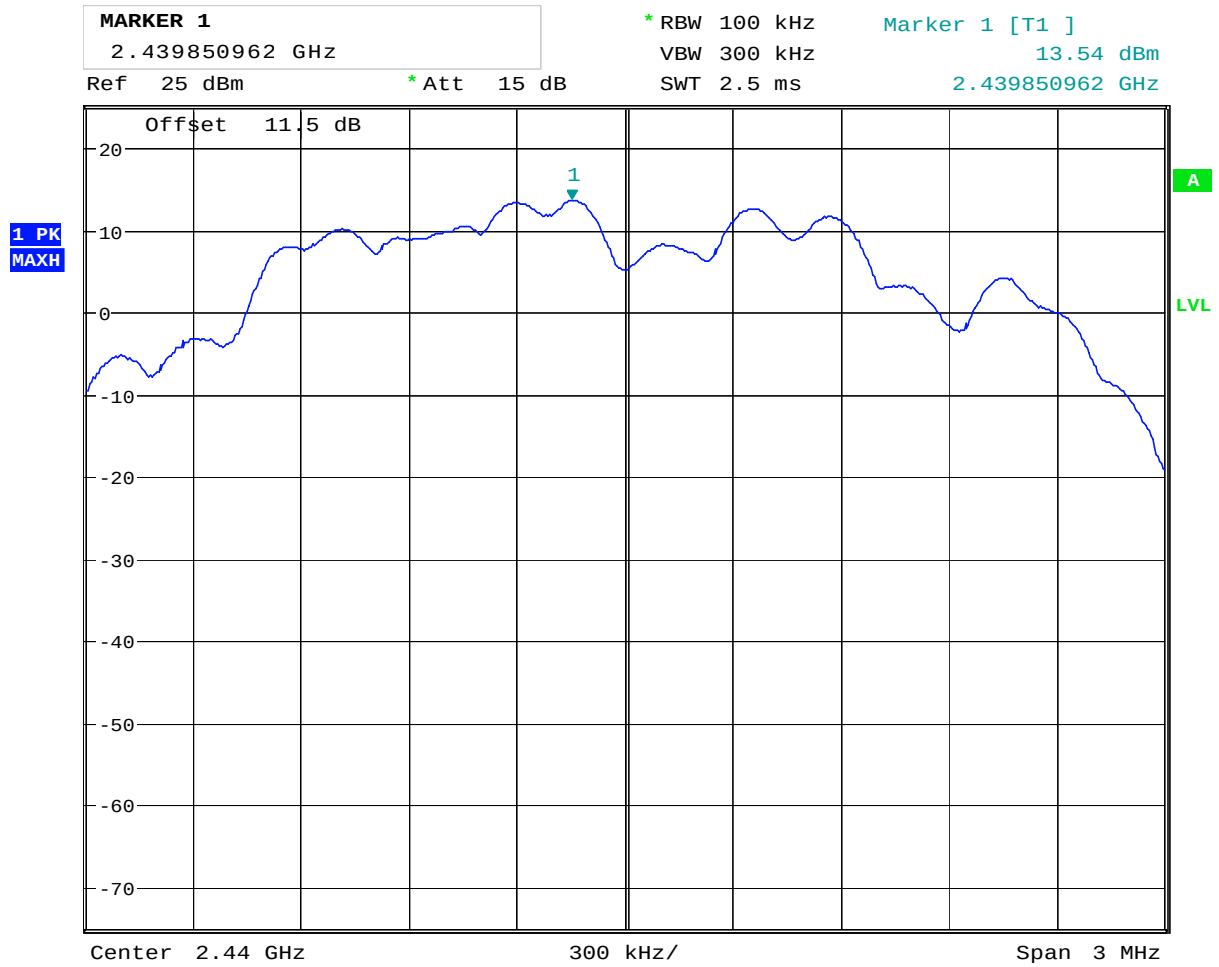
The Power Spectral Density of a Digital Transmission System shall be no greater than +8 dBm in any 3 kHz band

No requirements for Frequency Hopping Systems.



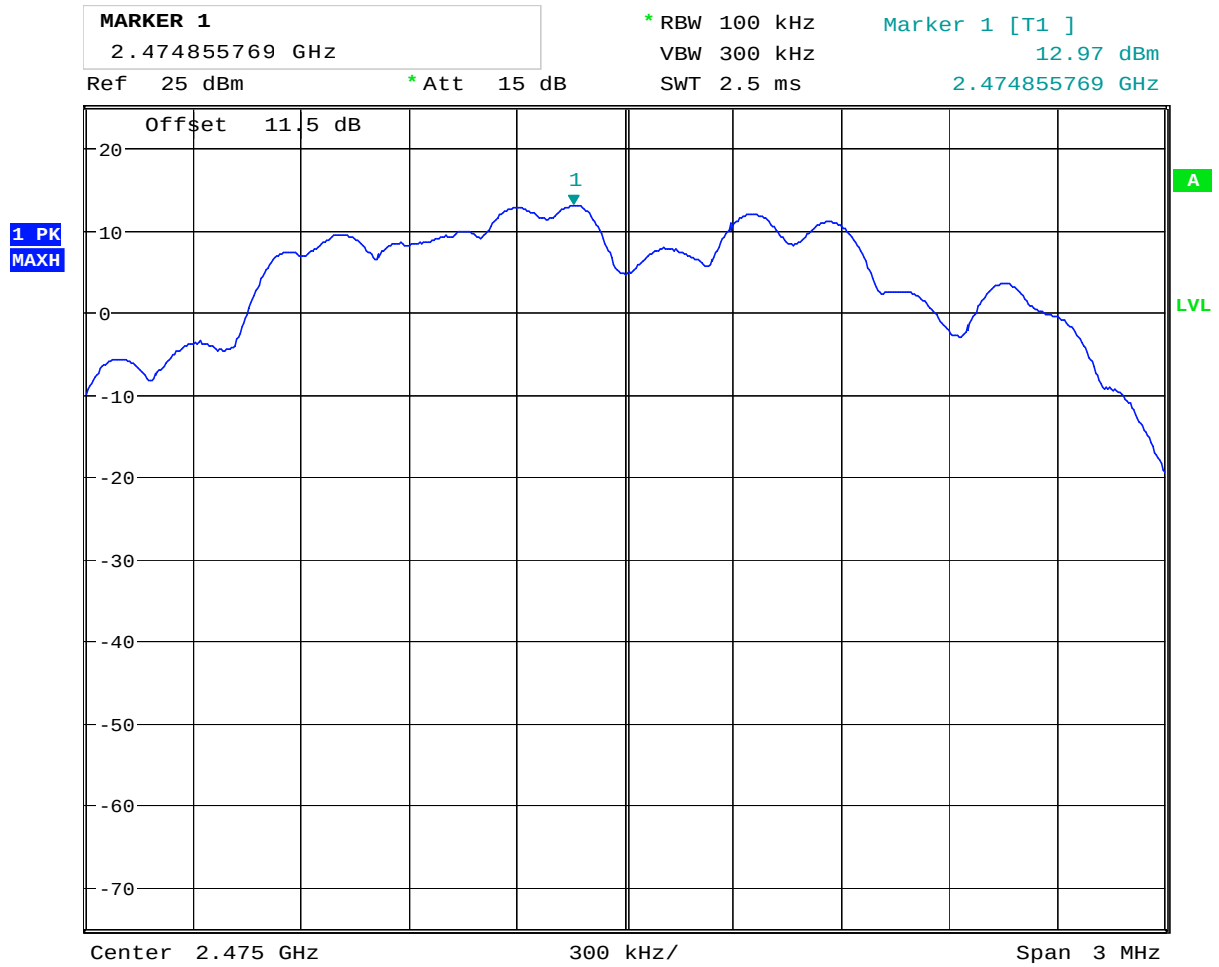
Date: 23.MAY.2017 19:05:33

PSD Measurement - 2405MHz



Date: 23.MAY.2017 19:00:58

PSD Measurement – 2440MHz



Date: 23.MAY.2017 19:00:14

PSD Measurement - 2475MHz

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

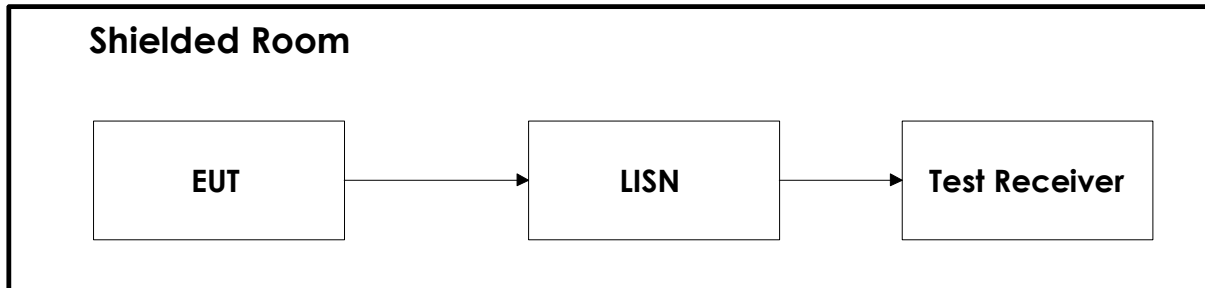
5 LIST OF TEST EQUIPMENT

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.

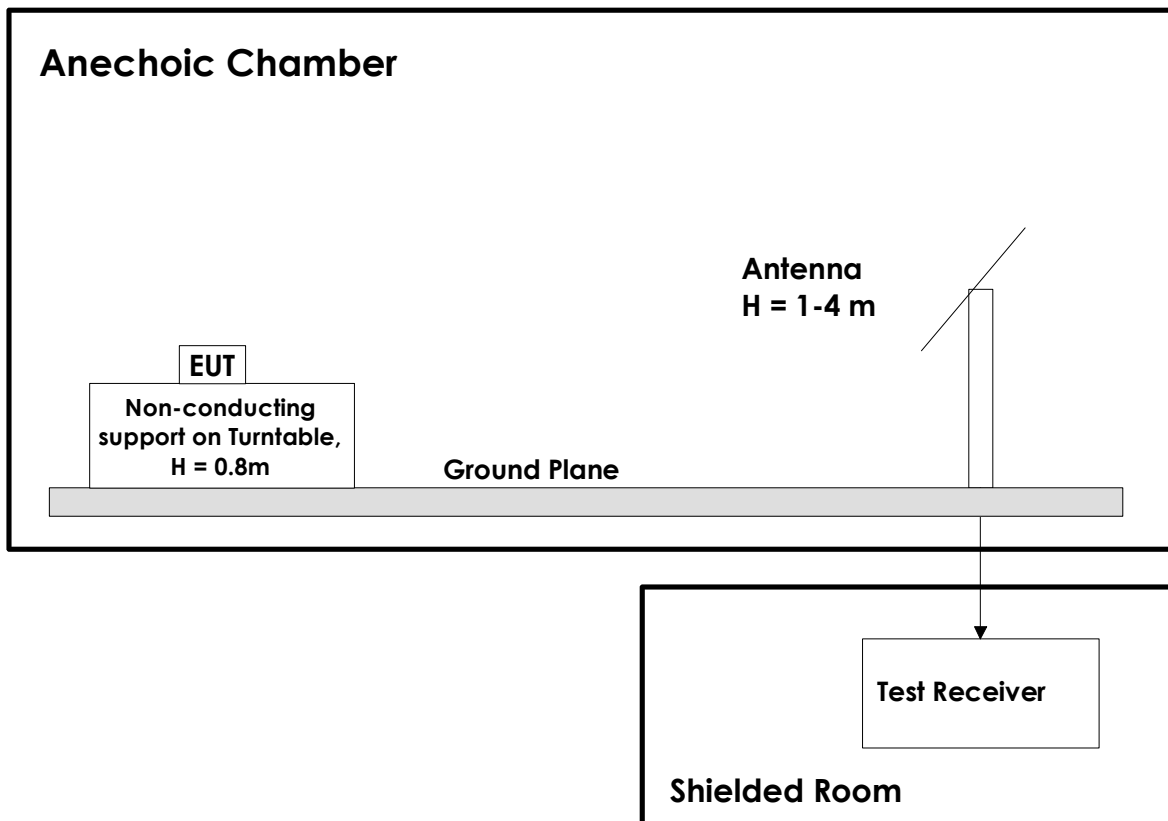
No.	Instrument/ ancillary	Type of instrument/ ancillary	Manufacturer	Ref. no.	Cal. Date	Cal. Due
1.	ESU40	EMI Receiver	Rohde & Schwarz	LR1639	2016.11	2017.11
2.	FSW26	Spectrum Analyzer	Rohde & Schwarz	LR 1640	2015.11	2017.11
3.	HFH2-Z2	Active Loop antenna	Rohde & Schwarz	LR1660	2014.10	2017.10
4.	3115	Antenna horn	EMCO	LR 1330	2010.08	2017.08
5.	HK116	Biconical Antenna	Rohde & Schwarz	LR 1260	2016.12	2018.12
6.	HL223	Log Periodic antenna	Rohde & Schwarz	LR 1261	2016.12	2018.12
7.	643	Antenna Horn	Narda	LR 093	2009.10	2019.10
8.	PM7320X	Antenna Horn	Sivers Lab	LR 102	2009.10	2019.10
9.	DBF-520-20	Antenna Horn	Systron Donner	LR 100	2009.10	2019.10
10.	638	Antenna Horn	Narda	LR 1480	2009.10	2019.10
11.	4768-10	Attenuator	Narda	LR 1356	Cal b4 use	
12.	6HC3000/18000	Highpass Filter	Trilithic	LR 1614	Cal b4 use	
13.	8449B	Pre-amplifier	Hewlett Packard	LR 1322	2016.10	2017.10
14.	317	Pre-amplifier	Sonoma	LR 1687	2016.9	2017.9
15.	Model 87 V	Multimeter	Fluke	LR 1597	2016.10	2018.10
16.	6812B	Power source	Agilent	LR 1515	2015.12	2017.12
17.	CPX400S	DC power supply	AIM TTI	LR 1710	Cal b4 use	

6 BLOCK DIAGRAM

6.1 Power Line Conducted Emission



6.2 Test Site Radiated Emission



Measurements at 1GHz and above were performed with turntable height 1.5m and with the ground plane covered by absorbers.

Revision history

Version	Date	Comment	Sign
00	2017.07.03	First test report	gns