

Test Report

Product	ZigBee Gateway
Name and address of the applicant	ASSA ABLOY Hospitality AS Anolitveien 1-3, 1400 Ski Norway
Name and address of the manufacturer	ASSA ABLOY Hospitality AS Anolitveien 1-3, 1400 Ski Norway
Model	Zigbee Gateway 683081066
Rating	5.0 V DC or Power over Ethernet (48 V DC)
Trademark	VingCard Elsafe
Serial number	MAC: 00177A 022FC4 MAC: 00177A 022FD8 MAC: 00177A 020D9E
Additional information	Zigbee
Tested according to	FCC Part 15.247 Frequency Hopping Transmitters / Digital Transmission Systems Industry Canada RSS-210, Issue 8 Low Power Licence-Exempt Radiocommunications Devices
Order number	261518
Tested in period	2014.06.11 – 2014.06.19
Issue date	2014.10.16
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 [Thomas Dangler]  Approved by [Frode Sveinsen]	
This report shall not be reproduced except in full without the written approval of Nemko. Opinions and interpretations expressed within this report are not part of the current accreditation. This report was originally distributed electronically with digital signatures. For more information contact Nemko.	

CONTENTS

1	INFORMATION	3
1.1	Test Item.....	3
1.2	Test Environment	4
1.3	Test Engineer(s)	4
1.4	Test Equipment	4
2	TEST REPORT SUMMARY	5
2.1	General.....	5
2.2	Test Summary	6
2.3	Description of modification for Modification Filing	6
2.4	Comments	6
2.5	Family List Rational	6
3	TEST RESULTS.....	7
3.1	Power Line Conducted Emissions	7
3.2	Occupied Bandwidth.....	11
3.3	Minimum 6 dB Bandwidth.....	13
3.4	Peak Power Output	16
3.5	Spurious Emissions (Radiated)	21
3.6	Power Spectral Density (PSD).....	41
4	LIST OF TEST EQUIPMENT	43
5	BLOCK DIAGRAM	44
5.1	Power Line Conducted Emission.....	44
5.2	Test Site Radiated Emission	44

1 INFORMATION

1.1 Test Item

Name :	Vingcard Elsafe
FCC ID :	Y7V-GW683081066
IC :	9514A-GW683081066
Model/version :	Zigbee Gateway 683081066
Serial number :	MAC: 00177A 022FC4 (Radiated measurements) MAC: 00177A 022FD8 (Conducted measurements) MAC: 00177A 020D9E (Cispr 22 measurements)
Hardware identity and/or version:	/
Software identity and/or version :	/
Frequency Range :	2405 – 2480 MHz
Tunable Bands :	/
Number of Channels :	16
Operating Modes :	CSMA_CA
Type of Modulation :	Q-PSK
User Frequency Adjustment :	No
Output Power :	18.6 dBm (Peak, Conducted)
Type of Power Supply :	5.0 V DC from External PSU or Power over Ethernet (48 V DC)
Antenna Connector :	No (Internal Antenna)
Number of Antennas :	1
Antenna Diversity Supported :	No

Description of Test Item

The EUT is a Zigbee gateway used for communication with the door switches and motion sensors. The gateway is accessed via Ethernet from management software.

Exposure Evaluation

The EUT is designed to be fixed to a wall etc. and the user manual contains text that it shall be mounted with a separation distance of at least 20 cm from any humans. For the purposes of exposure evaluation this EUT is a fixed device. MPE Calculation at 20 cm satisfying FCC requirements is submitted as a separate document.

The EUT is exempted from RF Exposure Evaluation to Industry Canada requirements since the output power complies with the power levels of section 2.5.2 of RSS-102 Issue 4.

1.2 Test Environment

1.2.1 Normal test condition

Temperature:	21.6 – 23.1 °C
Relative humidity:	38.3 – 49.9 %
Normal test voltage:	5.0 V DC or PoE (48 V DC)

All tests were performed with external AC Adaptor except where noted.
The values are the limit registered during the test period.

1.3 Test Engineer(s)

Thomas Dangle

1.4 Test Equipment

See list of test equipment in clause 4.

2 TEST REPORT SUMMARY

2.1 General

All measurements are traceable to national standards.

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

Tests were performed in accordance with ANSI C63.4-2003 and KDB 558074 D01 DTS Measurement Guidance v03r02.

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".

Nemko Group authorizes the above named company to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only. Any reproduction of parts of this report requires approval in writing from Nemko Group.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Nemko Group accepts no responsibility for damages suffered by any third party as a result of decisions made or actions based on this report.

2.2 Test Summary

Name of test	FCC Part 15 reference	RSS-210 Issue 8 reference	Result
Supply Voltage Variations	15.31(e)	8 (RSS-GEN)	Pass
Antenna Requirement	15.203	7.1.4 (RSS-GEN)	Pass
Power Line Conducted Emission	15.107(a) 15.207(a)	7.2.2 (RSS-GEN)	Pass
Occupied Bandwidth	15.247(a)(1)	A8.1	Pass
Minimum 6 dB Bandwidth	15.247(a)(2)	A8.2	Pass
Peak Power Output	15.247(b)	A8.4	Pass
Power Spectral Density	15.247(d)	A8.2	Pass
Spurious Emissions (Antenna Conducted)	15.247(c)	A8.5	Pass
Spurious Emissions (Radiated)	15.247(c) 15.109(a) 15.209(a)	A8.5	Pass

2.3 Description of modification for Modification Filing

Not applicable.

2.4 Comments

All ports were populated during spurious emission measurements.

External AC Adaptor used during testing: Nordic power, Model: SA106B-05

Power over Ethernet switch used for tests with PoE: Dlink, Model: DGS-1008P

2.5 Family List Rational

Not Applicable.

3 TEST RESULTS

3.1 Power Line Conducted Emissions

Para. No.: 15.207 (a)

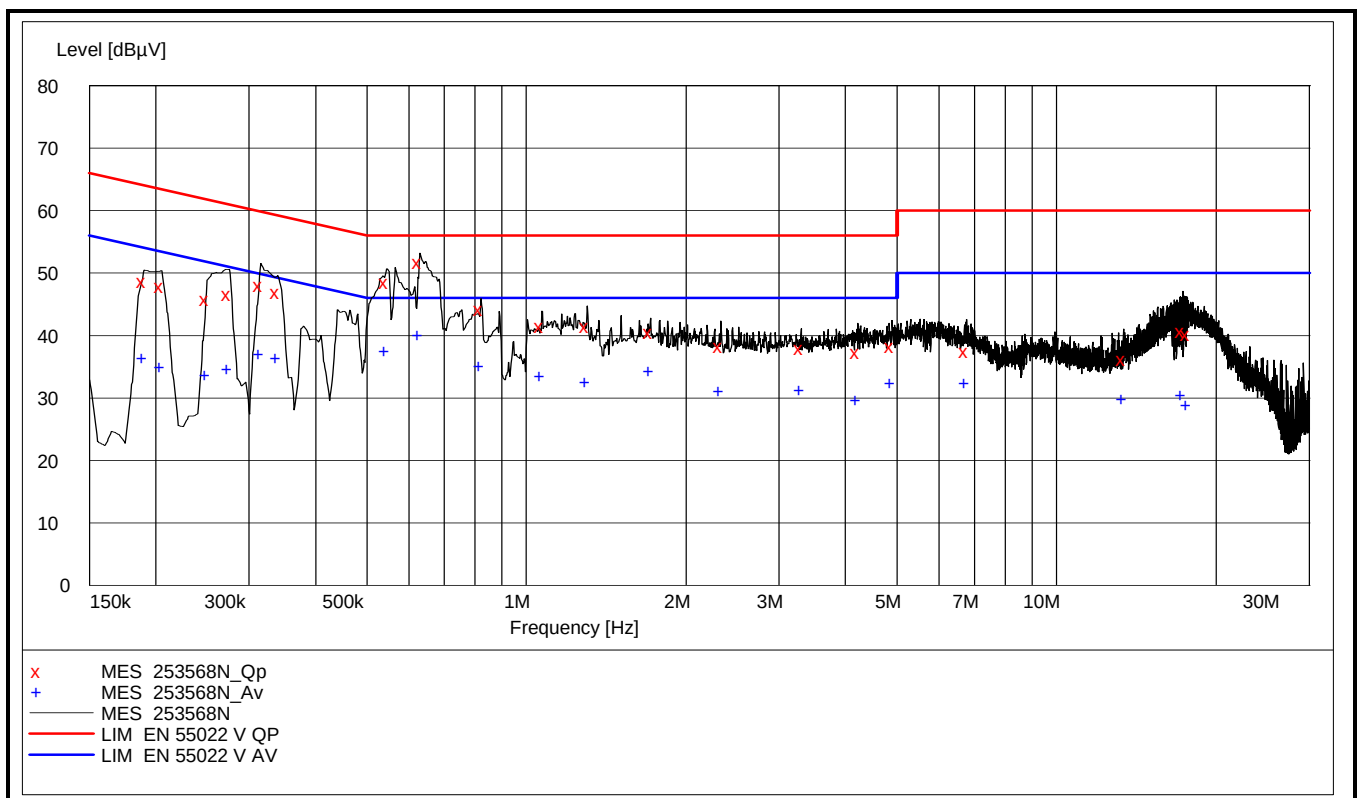
Test Performed By: Thomas Danglé

Date of Test: 2014.06.13

Measurement procedure: ANSI C63.4-2003 using 50 μ H/50 ohms LISN.

Test Results: Complies.

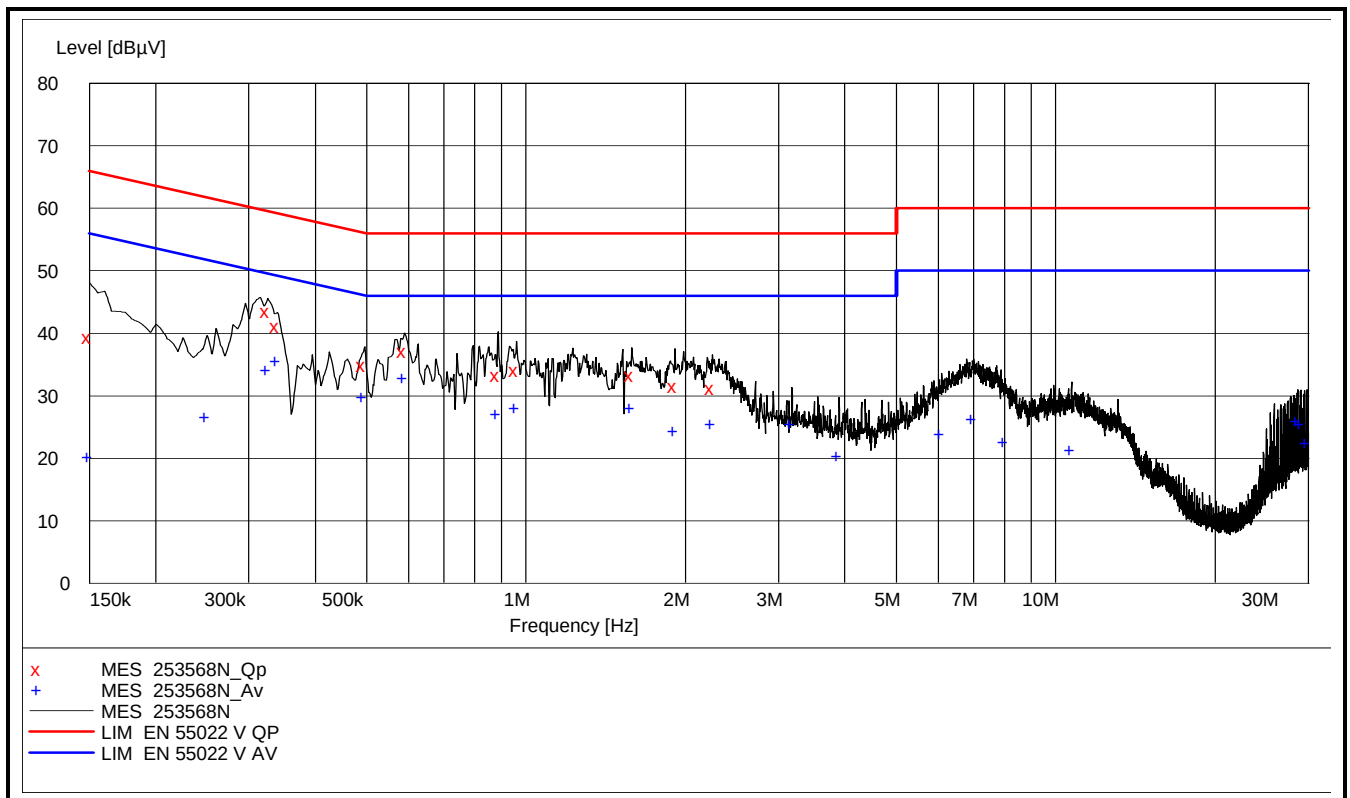
Measurement Data: See attached graph, (Peak detector).



Measured with External AC Adaptor

Measured with External AC Adaptor:

Frequency [MHz]	Level [dBuV]	Af [dB]	Limit [dBuV]	Margin [dB]	Det	Position	Verdict [Pass/Fail]
0.190000	48.70	10.10	64.00	15.30	QP	L1	Pass
0.205000	47.90	10.10	63.40	15.50	QP	L1	Pass
0.250000	45.80	10.10	61.80	16.00	QP	L1	Pass
0.275000	46.70	10.10	61.00	14.30	QP	L1	Pass
0.315000	48.00	10.10	59.80	11.80	QP	L1	Pass
0.340000	47.00	10.20	59.20	12.20	QP	L1	Pass
0.545000	48.60	10.20	56.00	7.40	QP	L1	Pass
0.630000	51.70	10.20	56.00	4.30	QP	N	Pass
0.820000	44.20	10.20	56.00	11.80	QP	N	Pass
1.070000	41.50	10.20	56.00	14.50	QP	L1	Pass
1.300000	41.60	10.20	56.00	14.40	QP	N	Pass
1.715000	40.60	10.20	56.00	15.40	QP	L1	Pass
2.330000	38.30	10.30	56.00	17.70	QP	N	Pass
3.300000	38.00	10.30	56.00	18.00	QP	N	Pass
4.220000	37.30	10.40	56.00	18.70	QP	N	Pass
4.895000	38.30	10.40	56.00	17.70	QP	N	Pass
6.765000	37.50	10.50	60.00	22.50	QP	L1	Pass
13.420000	36.20	10.70	60.00	23.80	QP	L1	Pass
17.325000	40.70	10.90	60.00	19.30	QP	N	Pass
17.730000	40.30	11.00	60.00	19.70	QP	N	Pass
0.190000	36.40	10.10	54.00	17.60	AV	L1	Pass
0.205000	34.90	10.10	53.40	18.50	AV	L1	Pass
0.250000	33.60	10.10	51.80	18.20	AV	L1	Pass
0.275000	34.60	10.10	51.00	16.40	AV	L1	Pass
0.315000	37.00	10.10	49.80	12.80	AV	L1	Pass
0.340000	36.40	10.20	49.20	12.80	AV	L1	Pass
0.545000	37.50	10.20	46.00	8.50	AV	L1	Pass
0.630000	40.10	10.20	46.00	5.90	AV	N	Pass
0.820000	35.20	10.20	46.00	10.80	AV	N	Pass
1.070000	33.50	10.20	46.00	12.50	AV	L1	Pass
1.300000	32.60	10.20	46.00	13.40	AV	N	Pass
1.715000	34.30	10.20	46.00	11.70	AV	L1	Pass
2.330000	31.10	10.30	46.00	14.90	AV	N	Pass
3.300000	31.20	10.30	46.00	14.80	AV	N	Pass
4.220000	29.70	10.40	46.00	16.30	AV	N	Pass
4.895000	32.40	10.40	46.00	13.60	AV	N	Pass
6.765000	32.40	10.50	50.00	17.60	AV	L1	Pass
13.420000	29.80	10.70	50.00	20.20	AV	L1	Pass
17.325000	30.50	10.90	50.00	19.50	AV	N	Pass
17.730000	29.00	11.00	50.00	21.00	AV	N	Pass



Measured with Power over Ethernet

Measured with Power over Ethernet:

Frequency [MHz]	Level [dBuV]	Af [dB]	Limit [dBuV]	Margin [dB]	Det	Position	Verdict [Pass/Fail]
0.150000	39.40	10.10	66.00	26.60	QP	L1	Pass
0.325000	43.50	10.20	59.60	16.10	QP	N	Pass
0.340000	41.10	10.20	59.20	18.10	QP	N	Pass
0.495000	34.90	10.20	56.10	21.20	QP	N	Pass
0.590000	37.20	10.20	56.00	18.80	QP	N	Pass
0.885000	33.40	10.20	56.00	22.60	QP	N	Pass
0.960000	34.20	10.20	56.00	21.80	QP	N	Pass
1.585000	33.40	10.30	56.00	22.60	QP	L1	Pass
1.910000	31.50	10.20	56.00	24.50	QP	N	Pass
2.250000	31.20	10.30	56.00	24.80	QP	N	Pass
0.150000	20.20	10.10	56.00	35.80	AV	L1	Pass
0.250000	26.60	10.10	51.80	25.20	AV	N	Pass
0.325000	34.10	10.20	49.60	15.50	AV	N	Pass
0.340000	35.60	10.20	49.20	13.60	AV	N	Pass
0.495000	29.80	10.20	46.10	16.30	AV	N	Pass
0.590000	32.90	10.20	46.00	13.10	AV	N	Pass
0.885000	27.10	10.20	46.00	18.90	AV	N	Pass
0.960000	28.10	10.20	46.00	17.90	AV	N	Pass
1.585000	28.10	10.30	46.00	17.90	AV	L1	Pass
1.910000	24.40	10.20	46.00	21.60	AV	N	Pass
2.250000	25.40	10.30	46.00	20.60	AV	N	Pass
3.175000	25.50	10.30	46.00	20.50	AV	L1	Pass
3.900000	20.40	10.40	46.00	25.60	AV	N	Pass
6.095000	23.90	10.50	50.00	26.10	AV	N	Pass
7.010000	26.20	10.50	50.00	23.80	AV	L1	Pass
8.030000	22.50	10.60	50.00	27.50	AV	N	Pass
10.720000	21.40	10.60	50.00	28.60	AV	N	Pass
28.665000	25.90	11.40	50.00	24.10	AV	L1	Pass
29.060000	25.40	11.40	50.00	24.60	AV	L1	Pass
29.860000	22.40	11.40	50.00	27.60	AV	L1	Pass

3.2 Occupied Bandwidth

Para. No.: 15.247 (a)(1)(iii)

Test Results: **Complies** (No requirements for DTS)

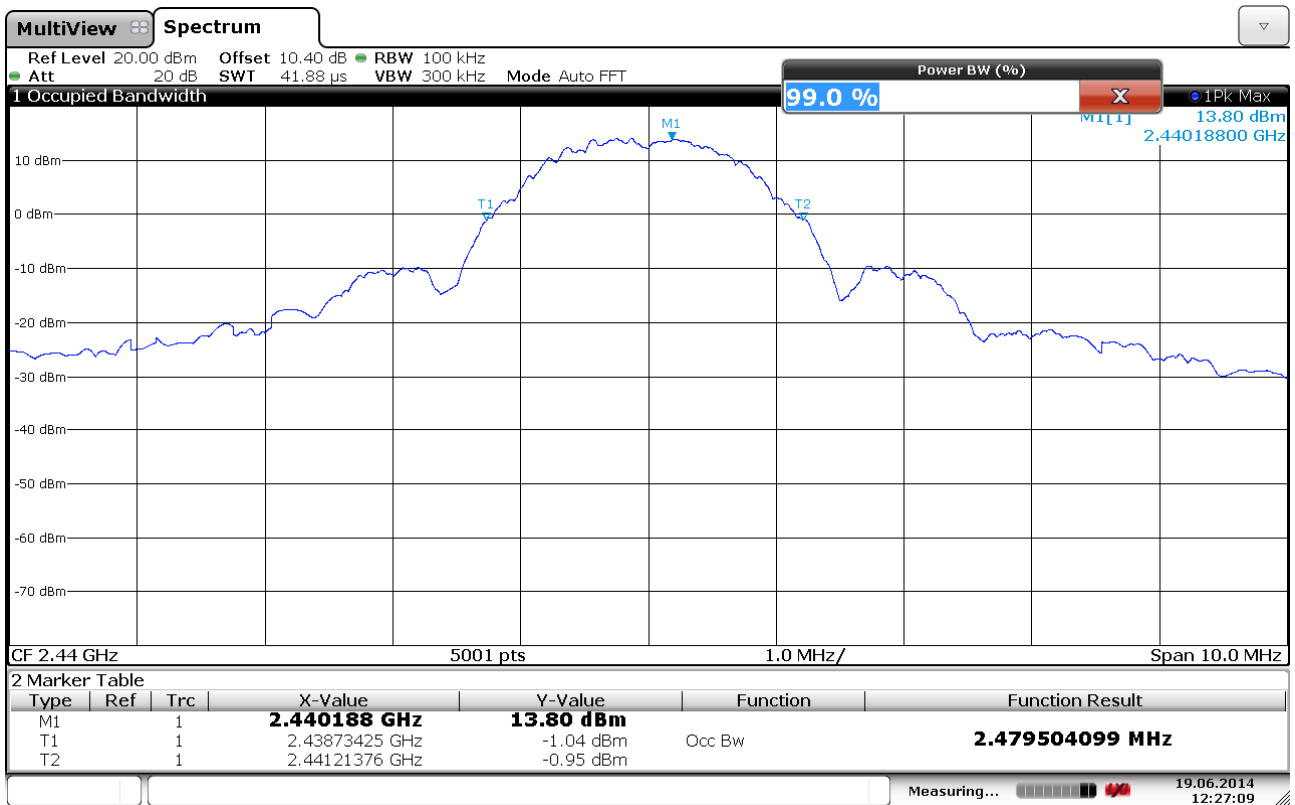
Measurement Data:

99% BW Measured on Mid Channel (2440 MHz)	2.48 MHz
---	----------

See attached plot.

Requirements:

No requirement for 99% BW, reported for information only.



Occupied BW – Ch 2440 MHz

3.3 Minimum 6 dB Bandwidth

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

Test Performed By: Thomas Dangle

Date of Test: 2014.06.19

Test Results: Complies

Measurement Data:

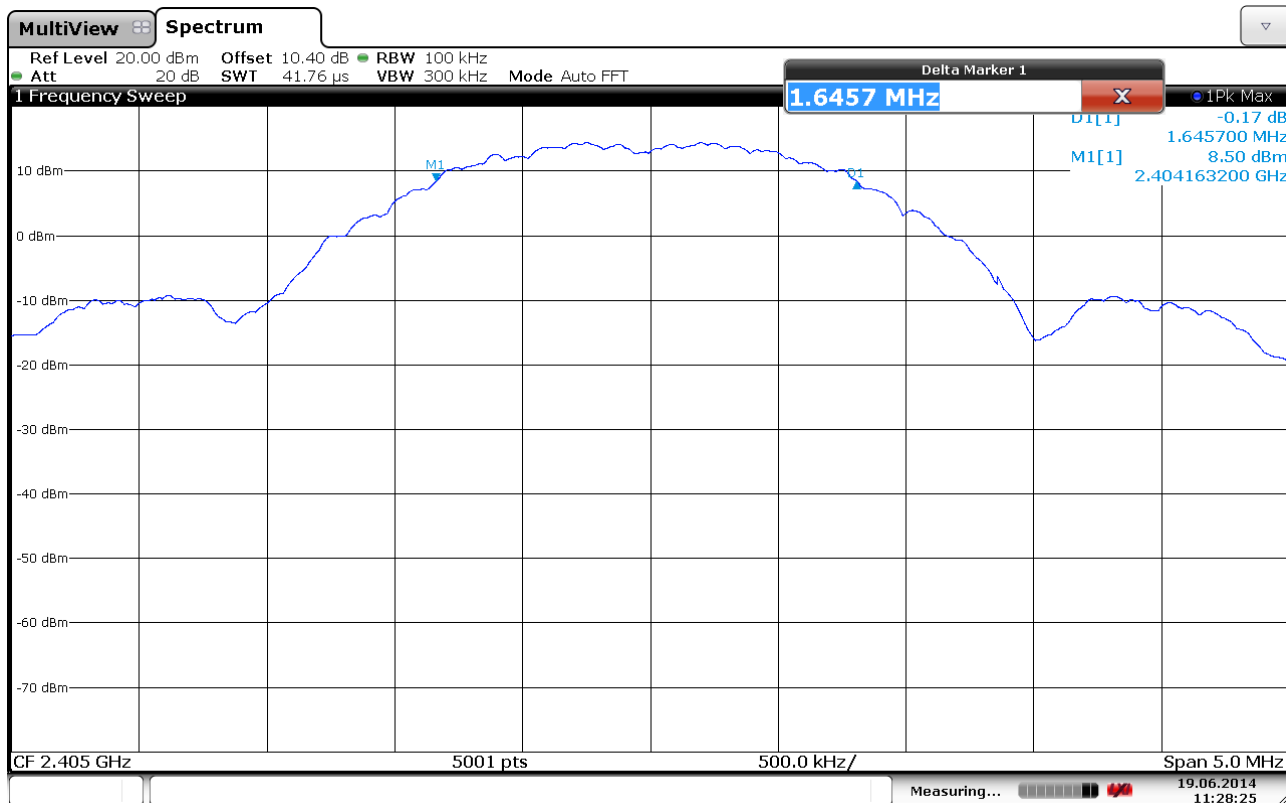
Measured 6 dB Bandwidth (MHz)		
2405 MHz	2440 MHz	2480 MHz
1.65	1.65	1.63

AC Adaptor: Nordic power, Model: SA106B-05

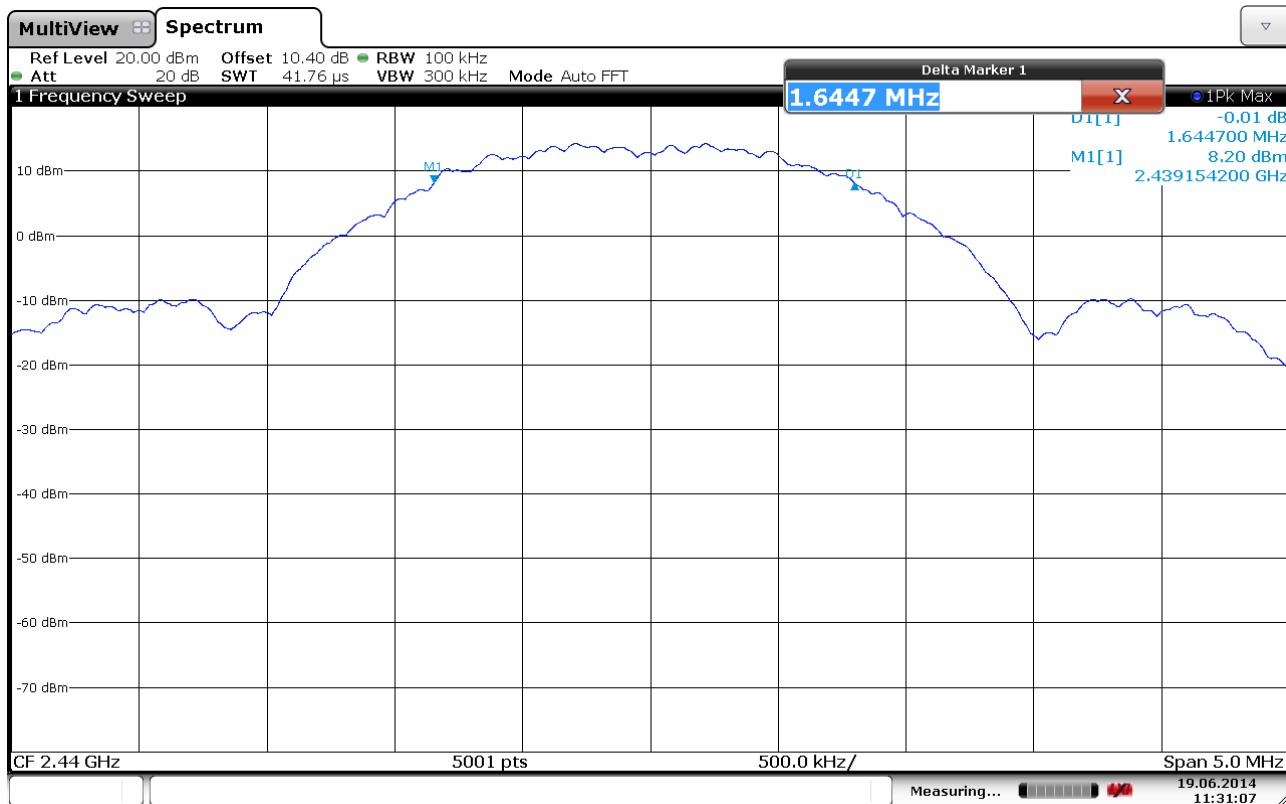
Power supply variation within 85 % to 115% of nominal value has no influence on measured value.

Requirements:

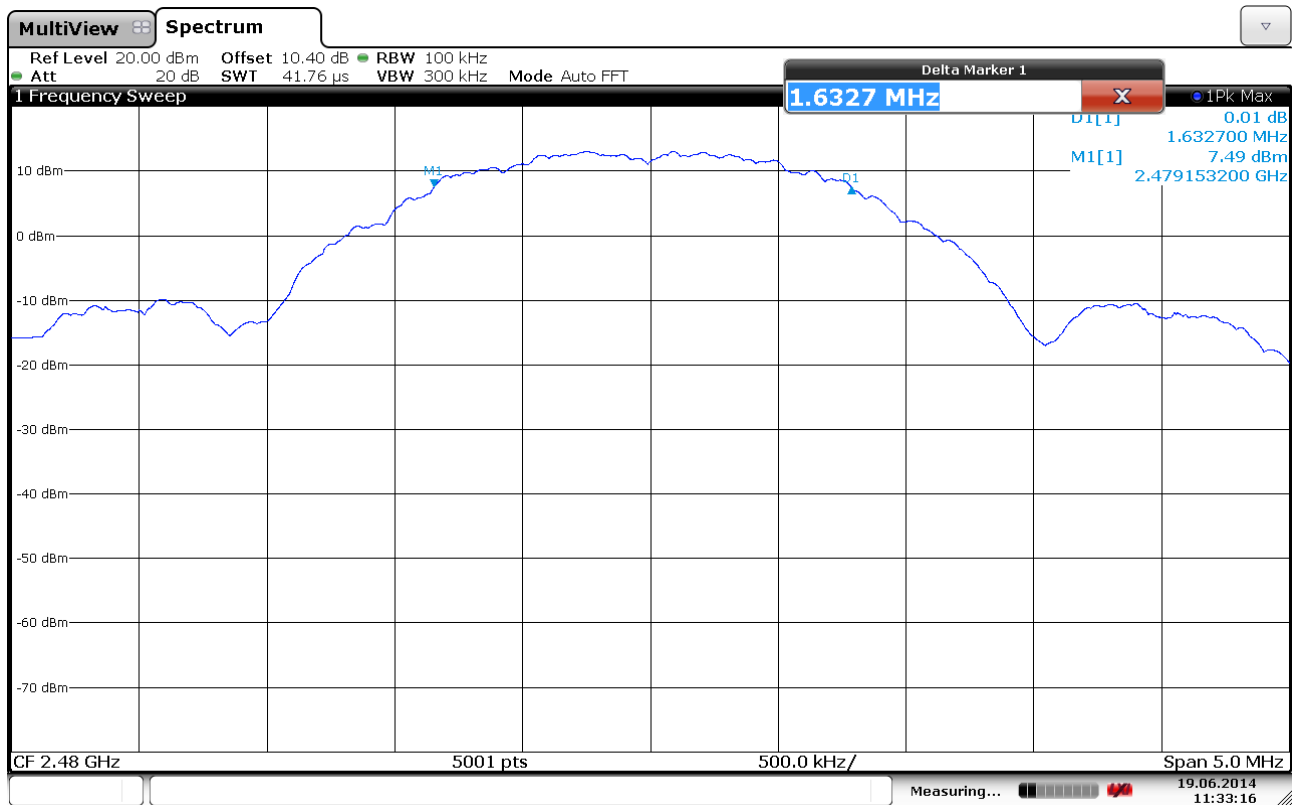
For Digital Transmission Systems in the 2400-2483.5 MHz band the minimum 6 dB bandwidth shall be at least 500 KHz.



Ch 2405 MMz



Ch 2440 MMz



Ch 2480 MMz

3.4 Peak Power Output

Para. No.: 15.247 (b)

Test Results: Complies

Measurement Data:

	2405 MHz	2440 MHz	2480 MHz
Conducted Power (dBm)	18.62	18.43	18.42
Conducted Power (Watts)	0.073	0.070	0.070
Field Strength (dBµV/m)	95.1	95.2	92.5
EIRP, Calculated (Watts)	0.00097	0.00099	0.00053
Antenna gain (dBi)	-18.76	-18.48	-21.18

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

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

See attached graph.

Detachable antenna?

☐ Yes

☒ No

If detachable, is the antenna connector non-standard?

☐ Yes

☐ No

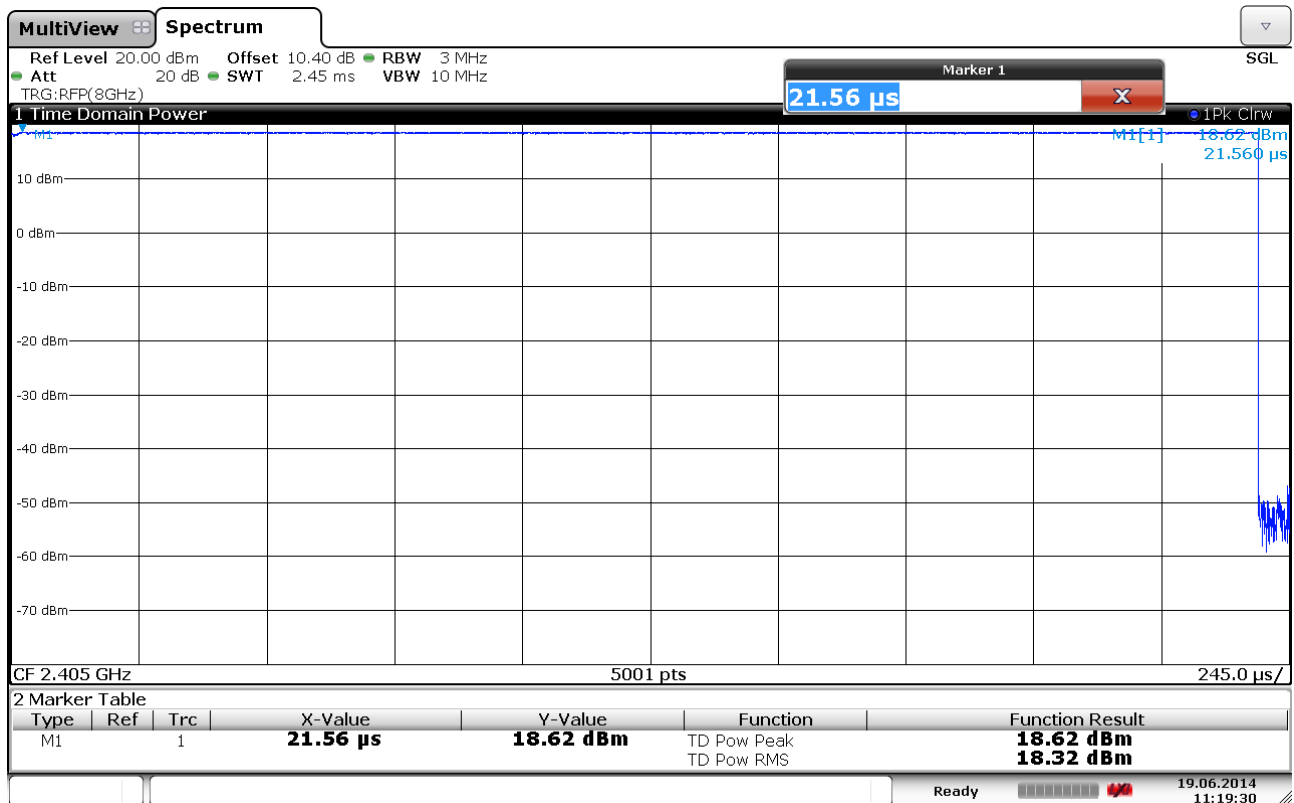
Type of antenna connector: Integrated antenna

Requirements:

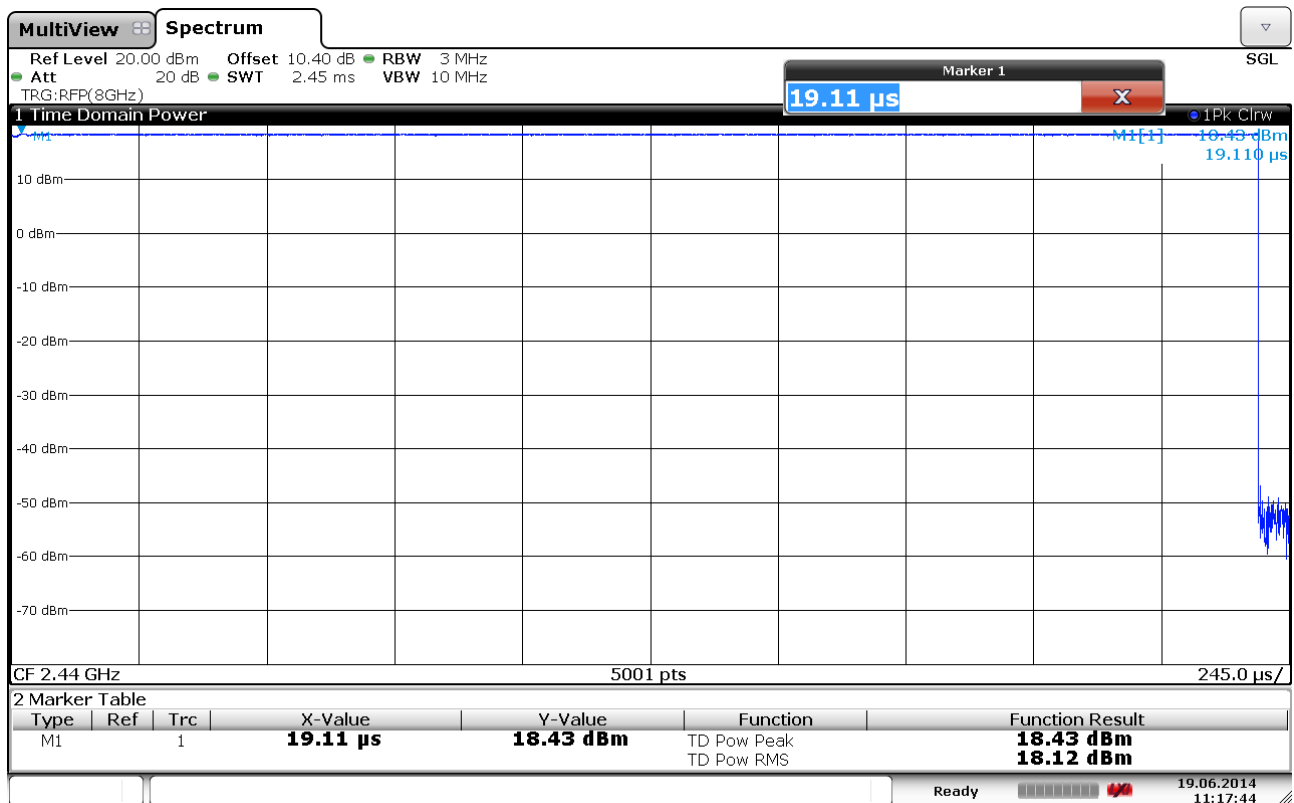
The maximum peak output power shall not exceed the following limits:

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

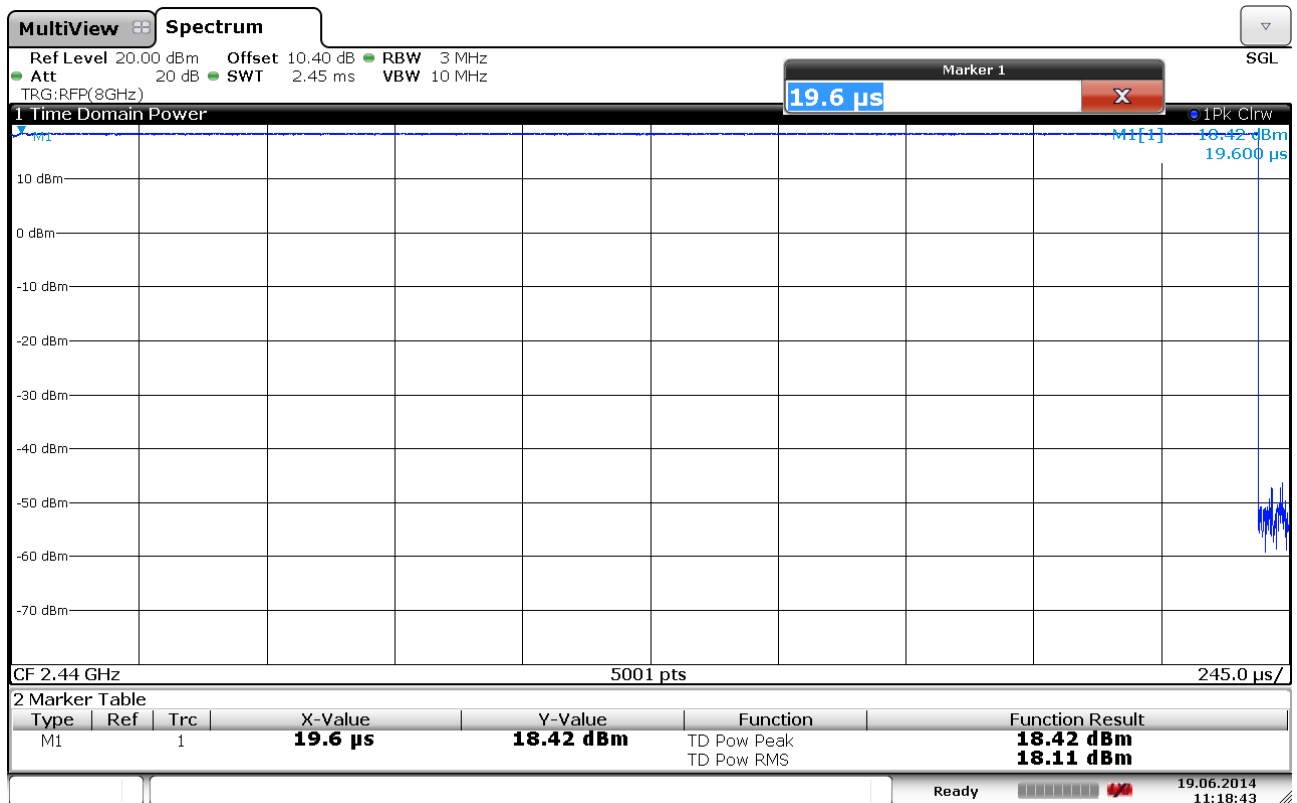
If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced below the stated value above by the amount in dB that the directional gain of the antenna exceeds 6 dBi.



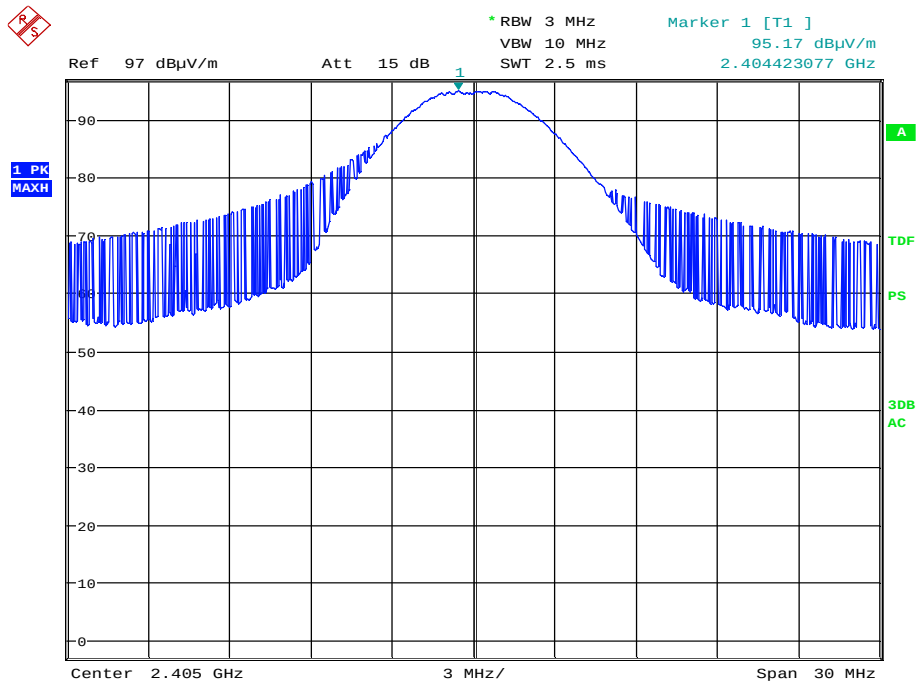
Conducted measurement, Ch 2405 MHz, Max peak



Conducted measurement, Ch 2440 MHz, Max peak

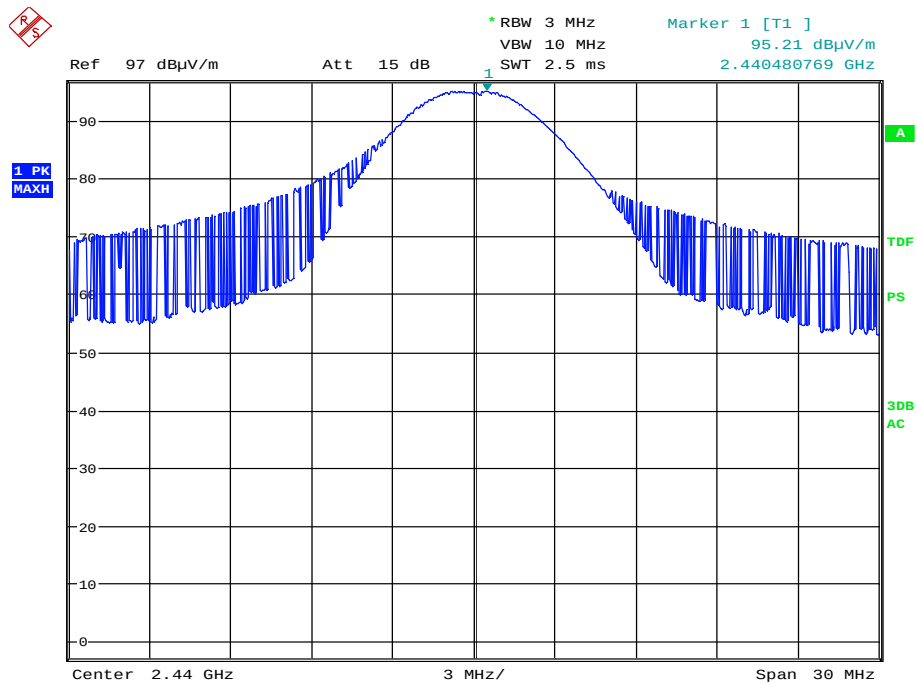


Conducted measurement, Ch 2480 MHz, Max peak



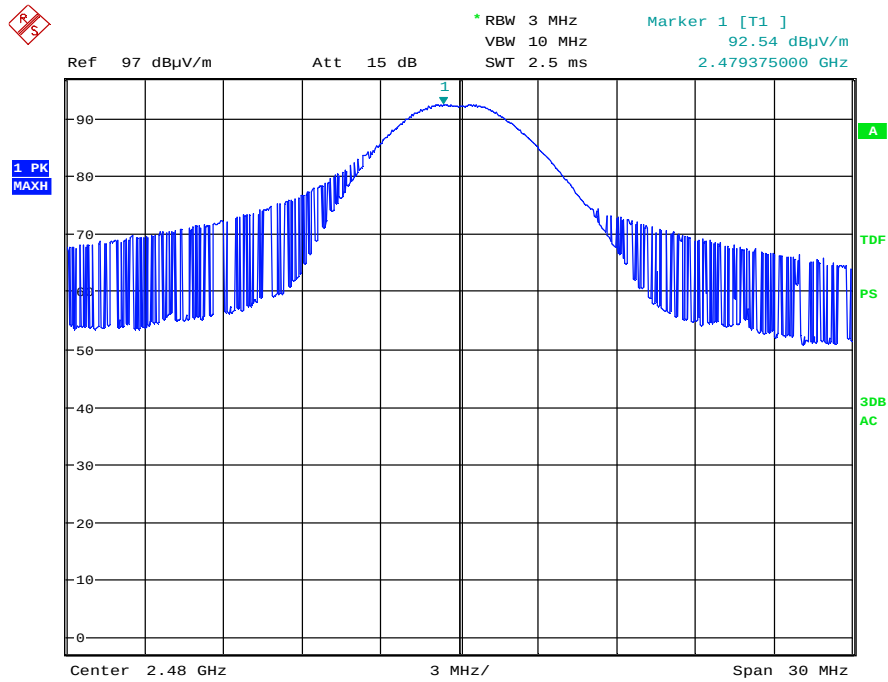
Date: 11.JUN.2014 09:58:47

Radiated measurement, Ch 2405 MHz, EUT V, HP



Date: 11.JUN.2014 09:47:57

Radiated measurement, Ch 2440 MHz, EUT V, HP



Date: 11.JUN.2014 10:08:50

Radiated measurement, Ch 2480 MHz, EUT V, HP

3.5 Spurious Emissions (Radiated)

Para. No.: 15.247 (c)

Test Results: Complies

Measurement Data:

Band-edge conducted power

	Measured field strength (dBμV/m)		Limit	Margin	
	2390 MHz	2483.5 MHz	dBμV/m	dB	
Peak Detector	59.7	68.9	74	14.3	5.1
Average Detector	39.7	48.9	54	14.3	5.1

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

See attached plots.

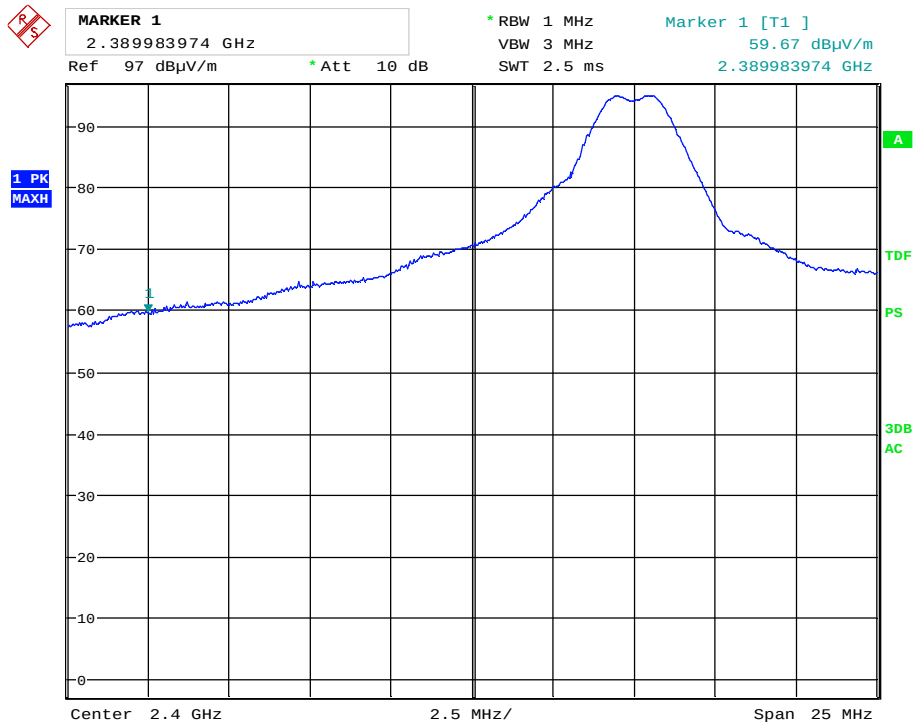
Duty Cycle Correction Factor Calculation:

CSMA/CA (data frame) 2.368 ms (default random back-off exponent of 3)

Data frame transmission 4.256 ms (full frame)

Duty Cycle Correction Factor = $-20 \times \log_{10}(6.624\%)$ dB = 23.6 dB = 20 dB

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



Date: 11.JUN.2014 11:16:44

Band edge at 2390 MHz – Peak detector



MARKER 1

2.4835 GHz

Ref 97 dB μ V/m

* Att 10 dB

* RBW 1 MHz

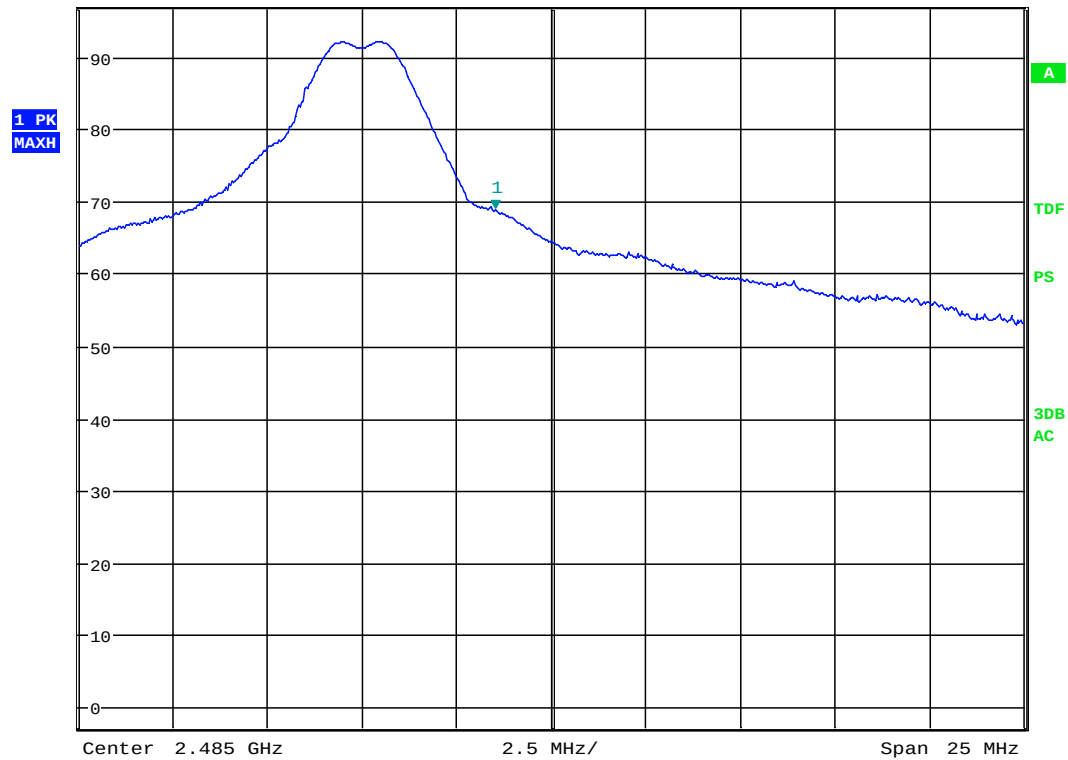
VBW 3 MHz

SWT 2.5 ms

Marker 1 [T1]

68.92 dB μ V/m

2.483500000 GHz

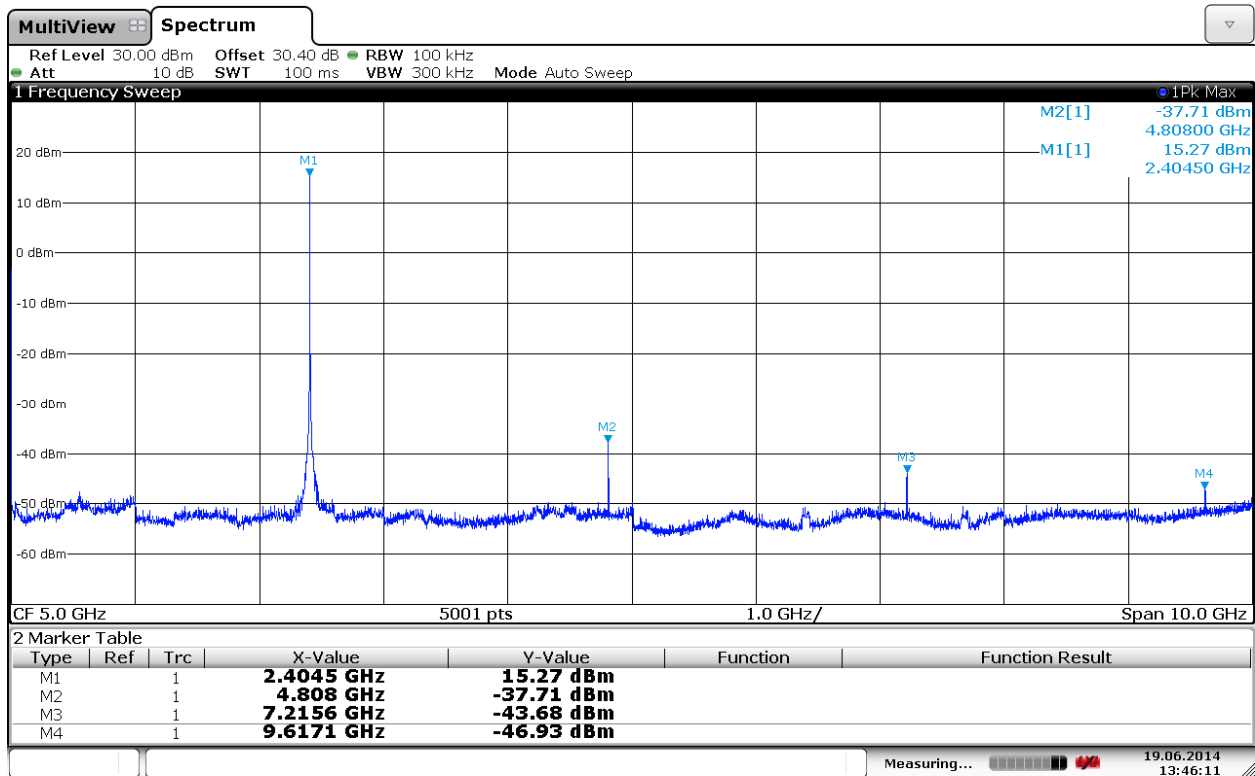


Date: 11.JUN.2014 10:43:29

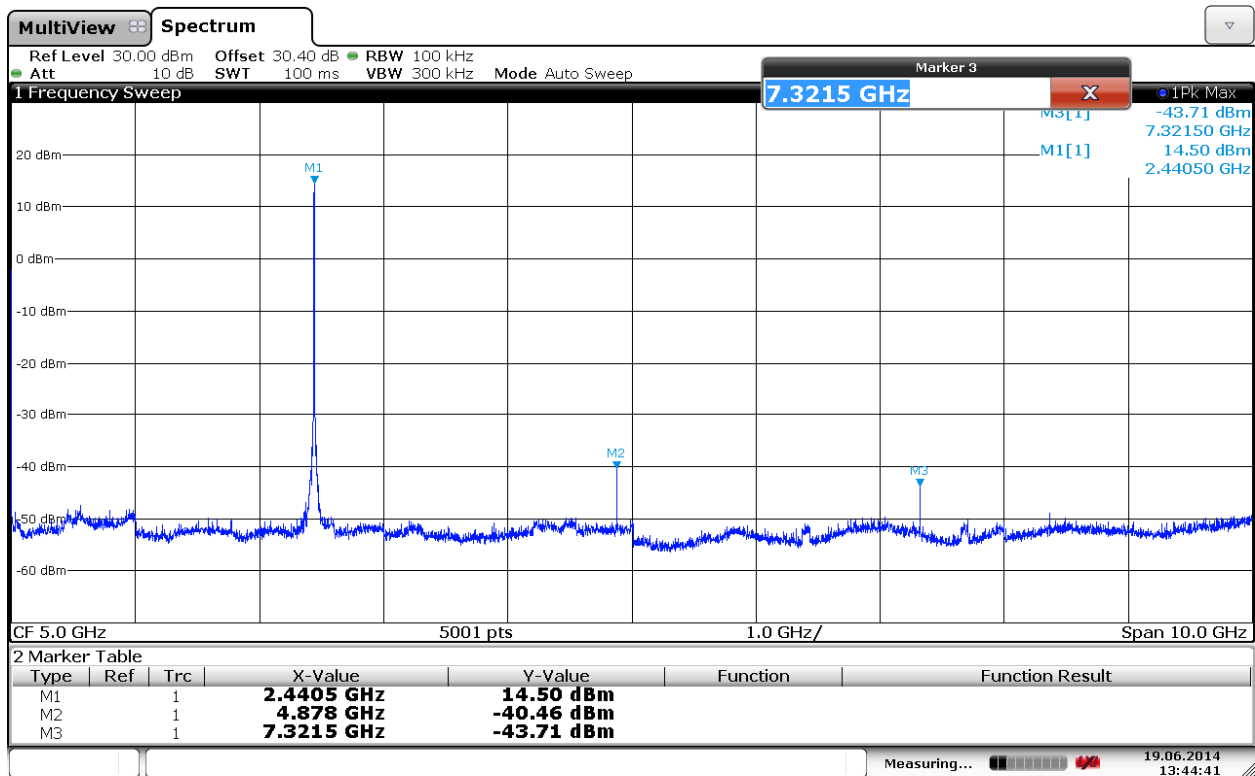
Band edge at 2483.5 MHz – Peak detector

RF conducted power to 25 GHz see attached graph.

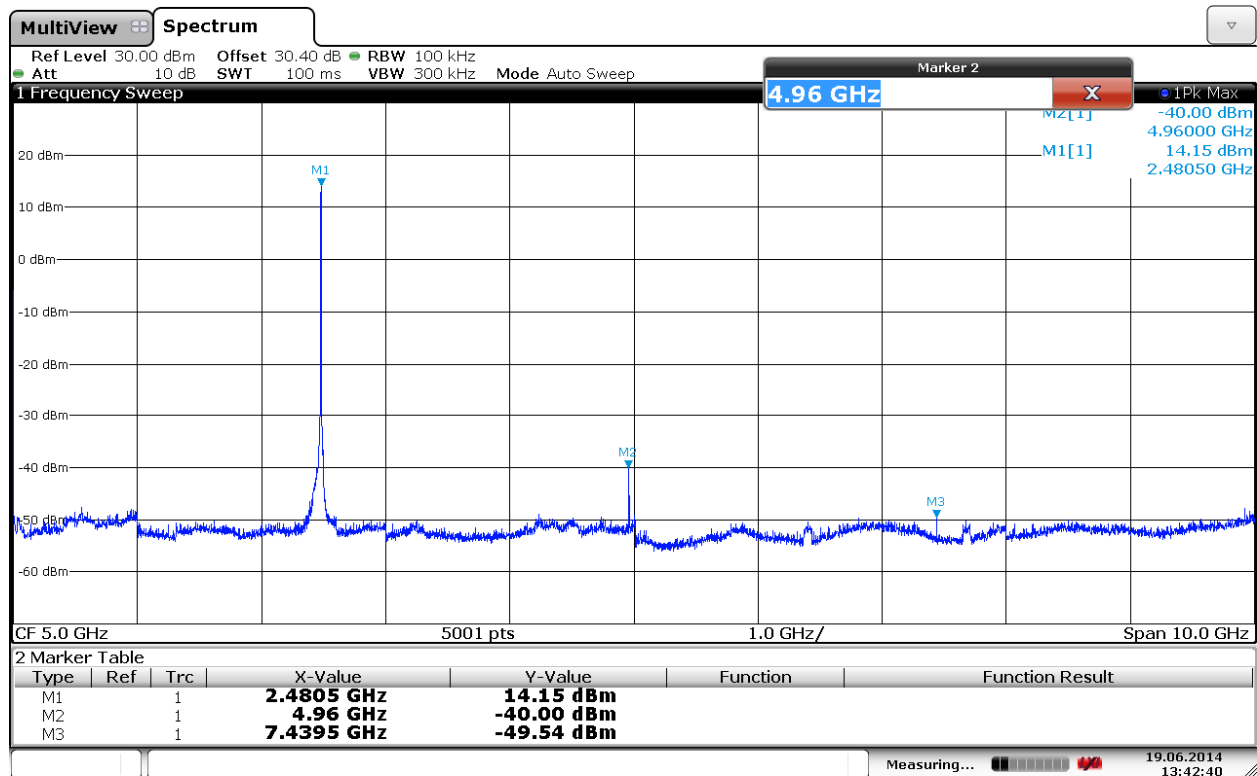
Maximum RF level outside operating band:



RF ch. 2405MHz: > 20 dB/C, margin >20 dB



RF ch. 2440MHz: > 20 dB/C, margin >20 dB



RF ch. 2480MHz: > 20 dB/C, margin >20 dB

Radiated emissions 9 kHz-30 MHz.

Measuring distance 10 m, measured with Peak detector.

See attached graph.

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

Radiated emission 30 – 1000 MHz.

Detector: Quasi-Peak

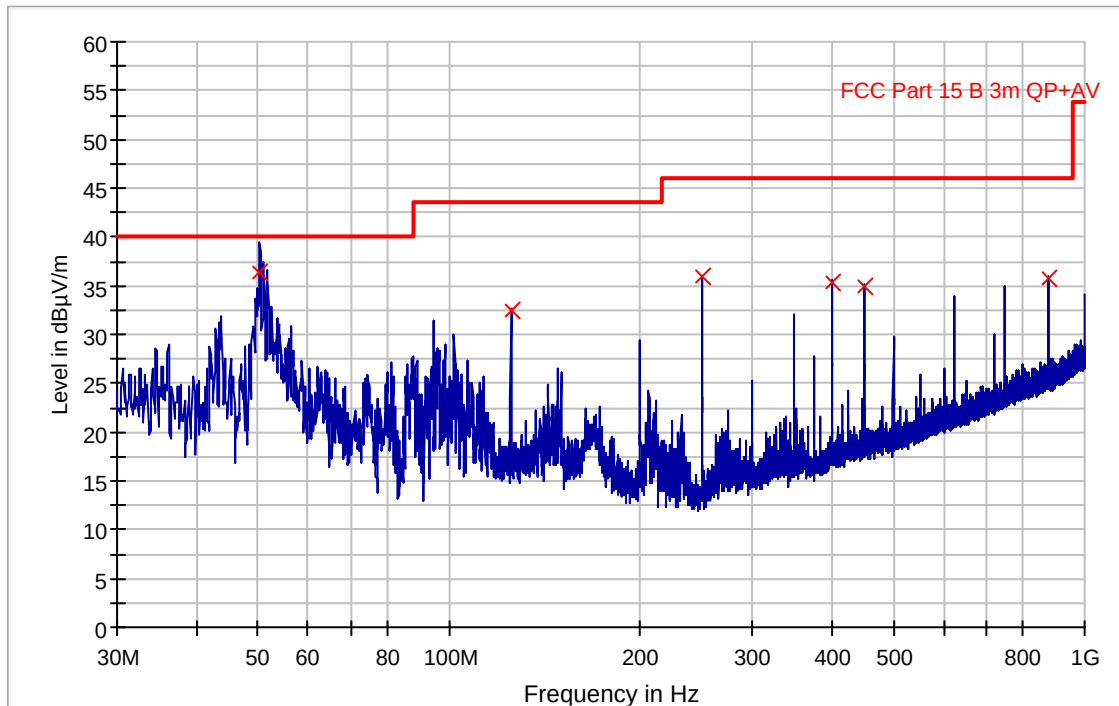
Measuring distance 3 m according to CISPR 22.

Tested in once with Tx-on and once data mode with active connection.

Frequency	Operational condition	Field strength	Measuring distance	Limit FCC15.209	Margin
MHz		dB μ V/m	metres	dB μ V/m	dB
50.395731	TX-on 2440 MHz	36.4	3	40	3.6
125.005084	TX-on 2440 MHz	32.5	3	43.5	11.0
200-1000	TX-on 2440 MHz	<36	3	46	>10
47.795982	PoE & Data mode	33.6	3	40	6.4
51.800637	PoE & Data mode	38.9	3	40	1.1
58.731071	PoE & Data mode	31.1	3	40	8.9
250.017393	PoE & Data mode	39.7	3	46	6.3
300-1000	PoE & Data mode	<34	3	46	>12

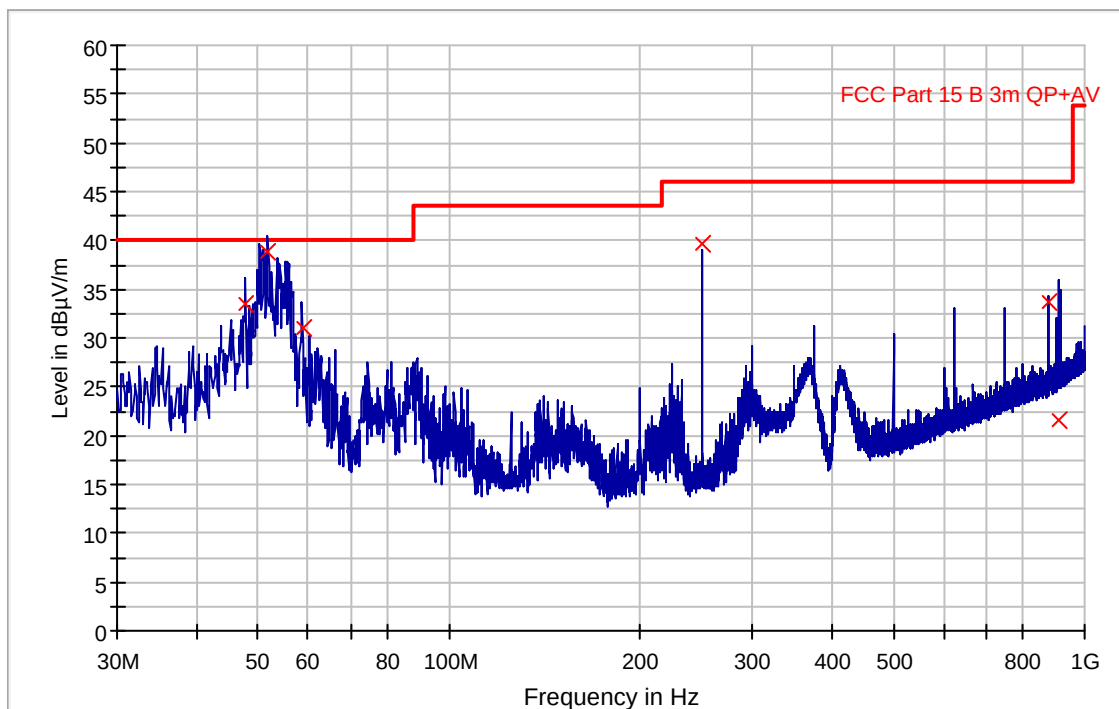
See attached plots.

FCC Pt15 Class B 30-1000M 3m

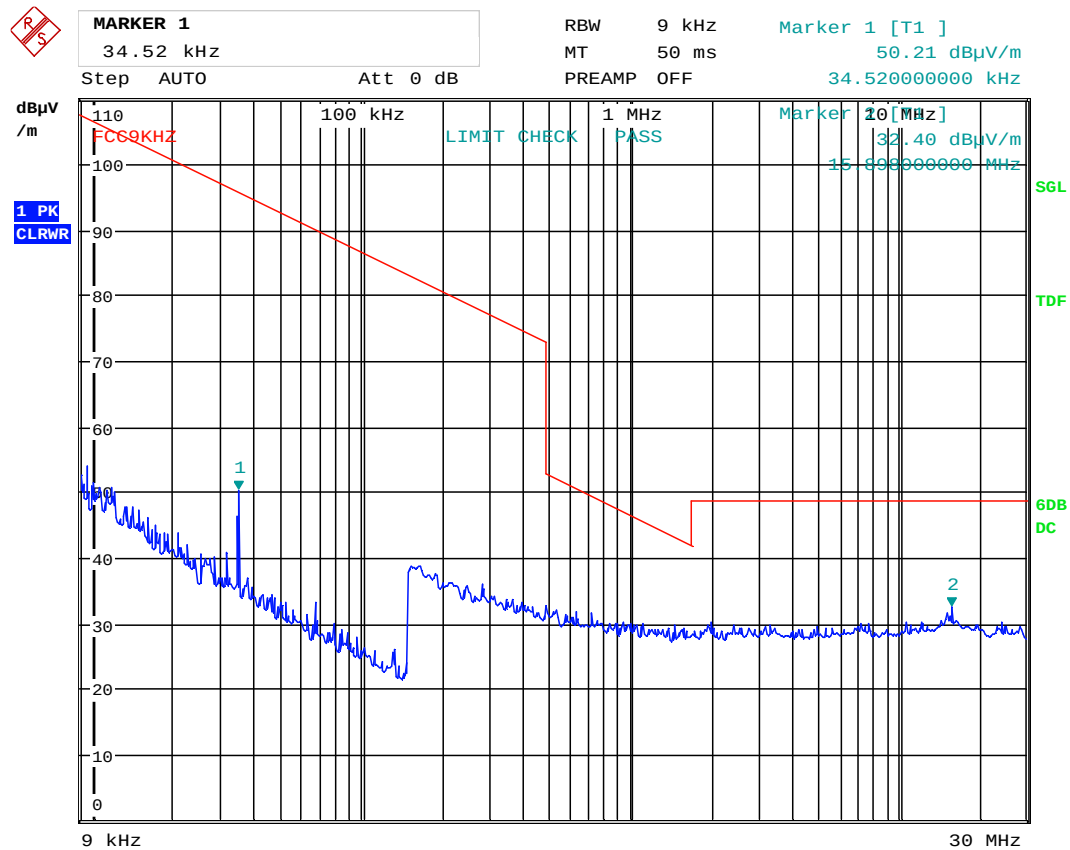


Ch 2440 MHz TX on and Ethernet connection

FCC Pt15 Class B 30-1000M 3m

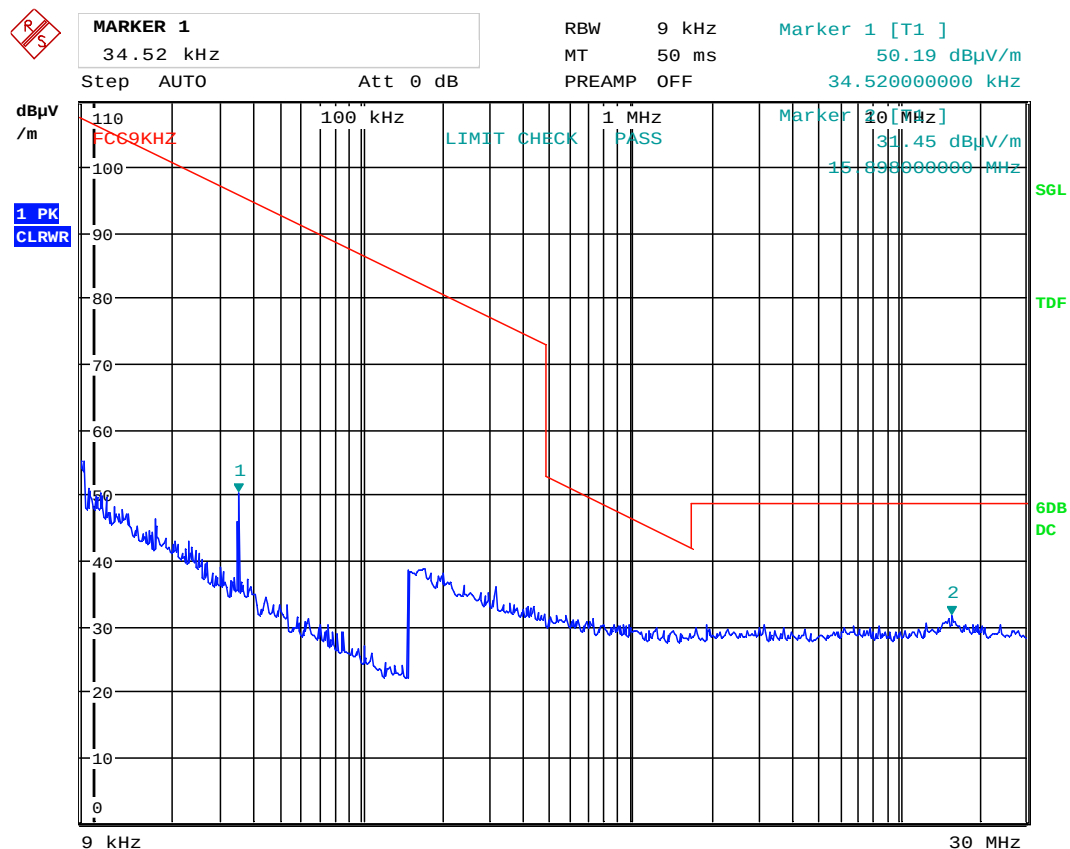


Ethernet connection with PoE and data mode



Date: 12.JUN.2014 09:02:48

With AC/DC 5.0V DC adapter Tx-on ch 2440 MHz



Date: 12.JUN.2014 08:31:22

With PoE Dlink

Radiated Emissions, 1-25 GHz

Measuring distance: 3m (1 – 5.5 GHz)
1m (5.5 – 18 GHz)

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

Peak Detector:

Frequency	RF channel	Dist. corr. factor	Field strength, Peak Detector, 3m	Limit	Margin
MHz	L,M,H	dB	dB μ V/m	dB μ V/m	dB
/	L	/	/	74	/
6125	M	9.5	46.3	74	27.7
/	H	/	/	74	/
Other freqs	L,M,H	/	None detected	74	>20

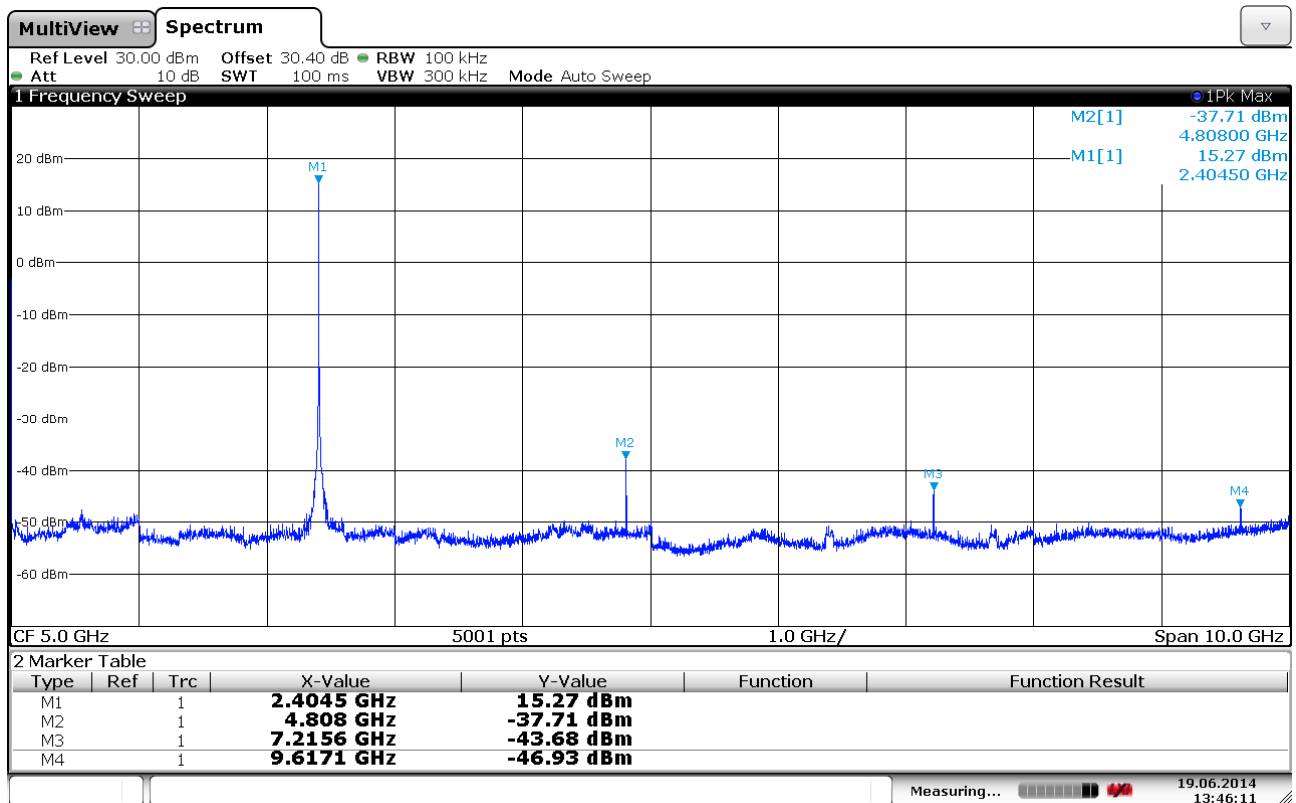
Average Detector:

Frequency	RF channel	Dist. corr. factor	Field strength, Average Detector, 3m	Limit	Margin
GHz	L,M,H	dB	dB μ V/m	dB μ V/m	dB
/	L	/	/	54	/
6125	M	9.5	42.7	54	11.3
/	H	/	/	54	/
Other freqs	L,M,H	/	None detected	54	>20

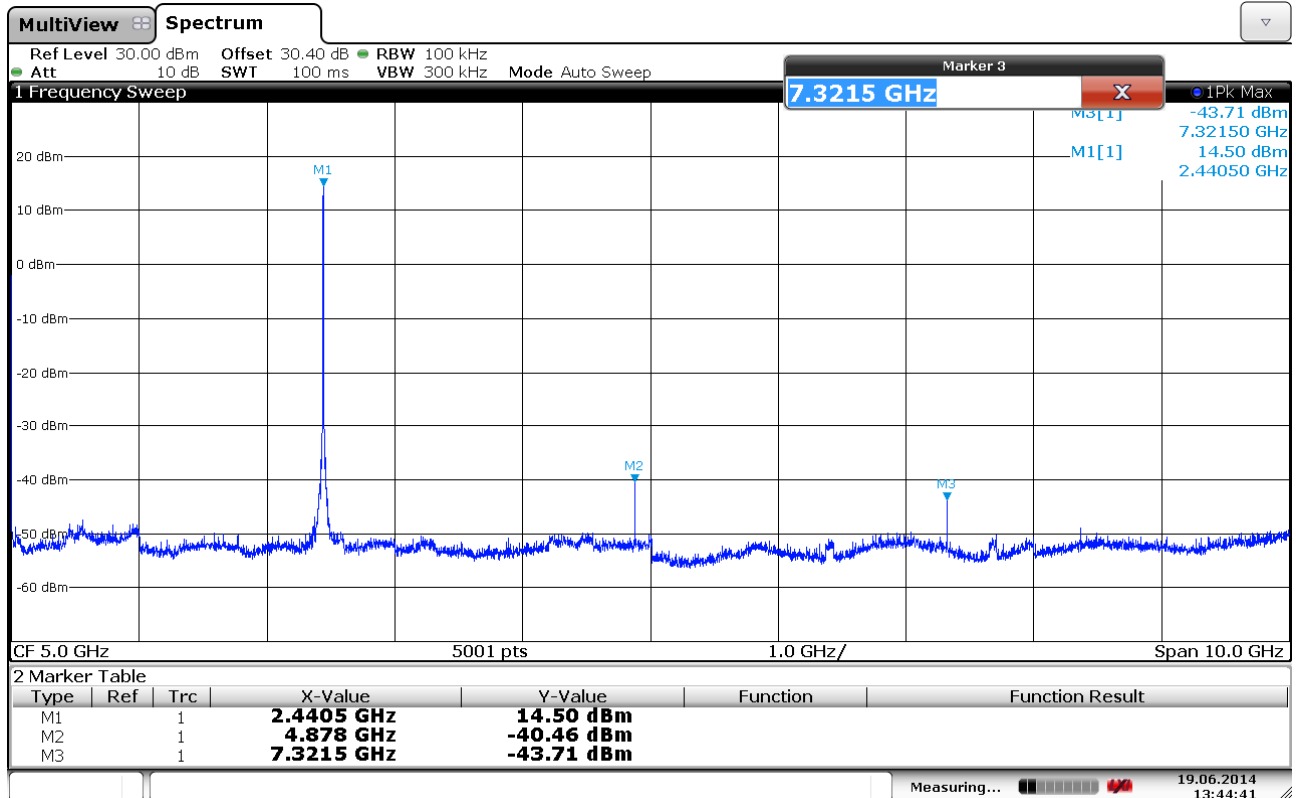
Average Detector values were measured with RMS detector.

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

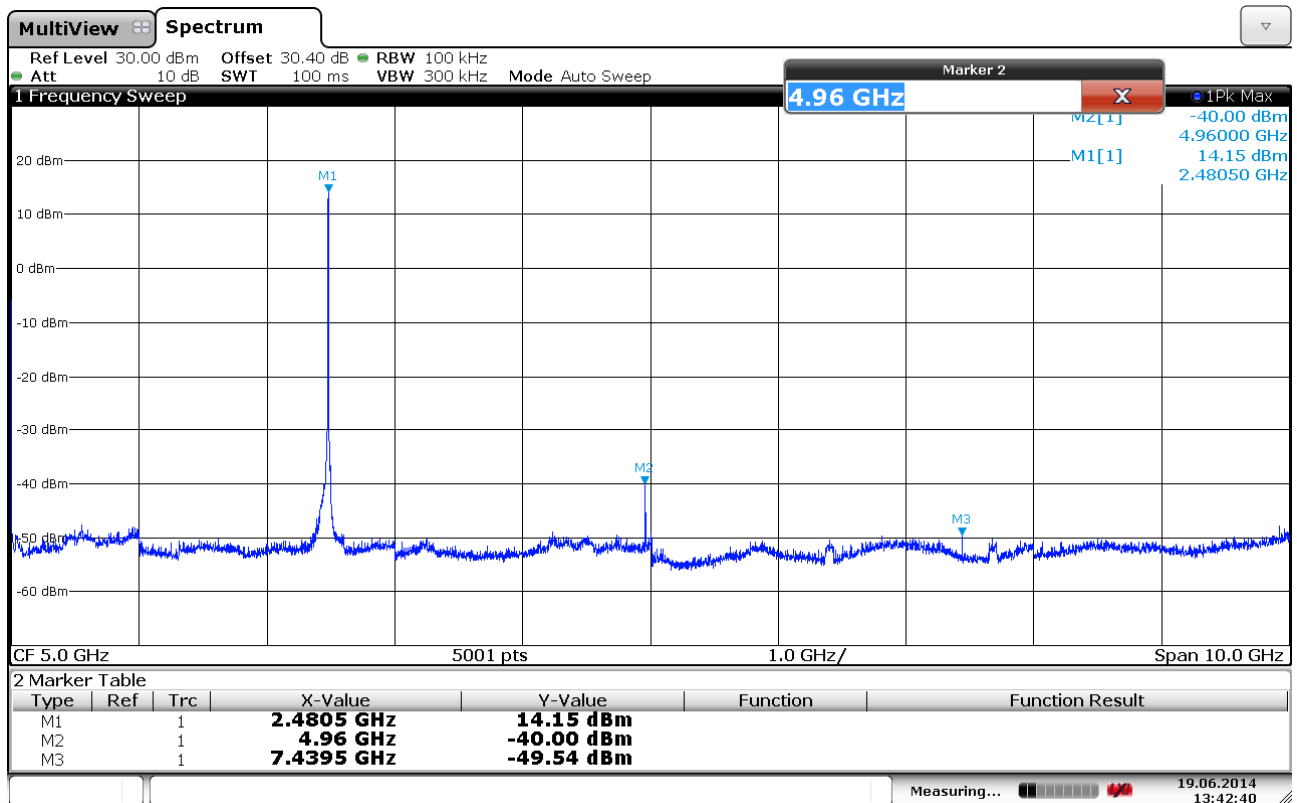
See plots.



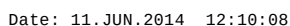
Conducted measurement, 9kHz -25GHz, ch 2405 MHz



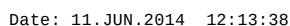
Conducted measurement, 9kHz -25GHz, ch 2440 MHz



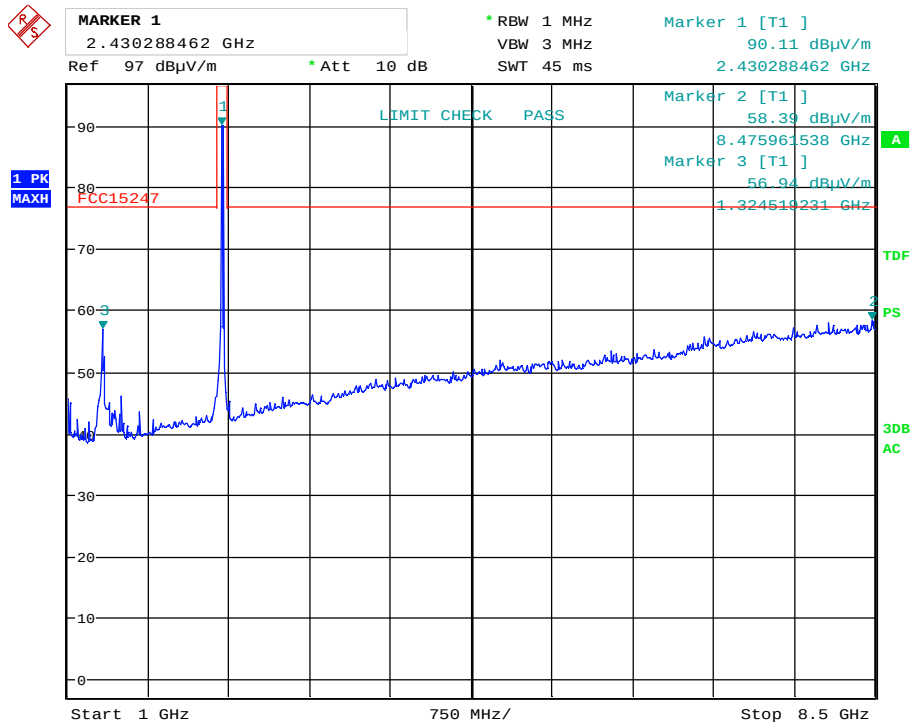
Conducted measurement, 9kHz -25GHz, ch 2480 MHz



Radiated measurement, 1 – 8.5 GHz, ch 2405 MHz, VP, 3m

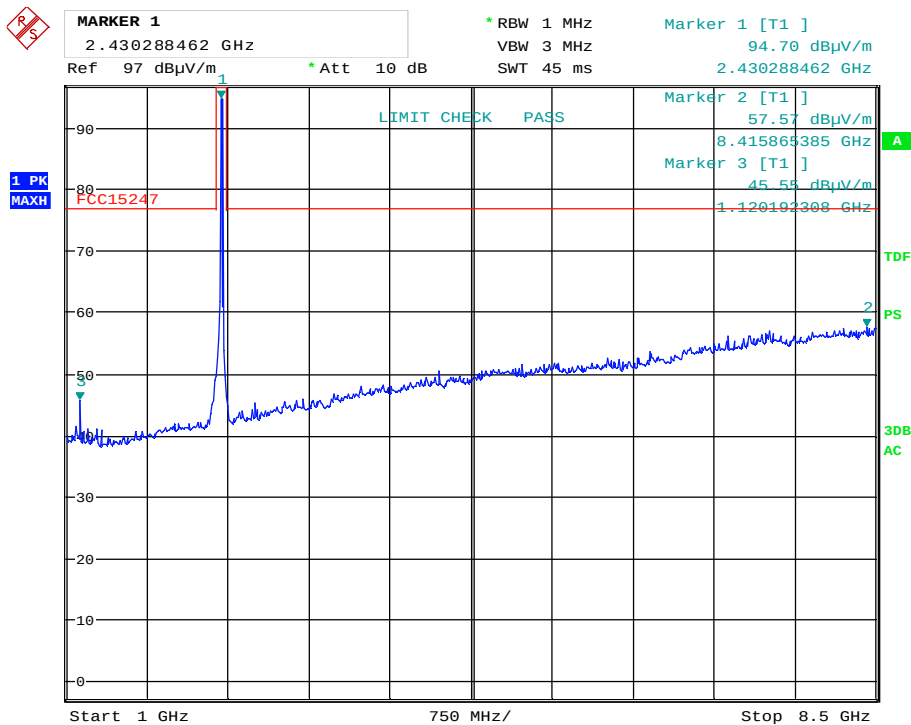


Radiated measurement, 1 – 8.5 GHz, ch 2405 MHz, HP, 3m



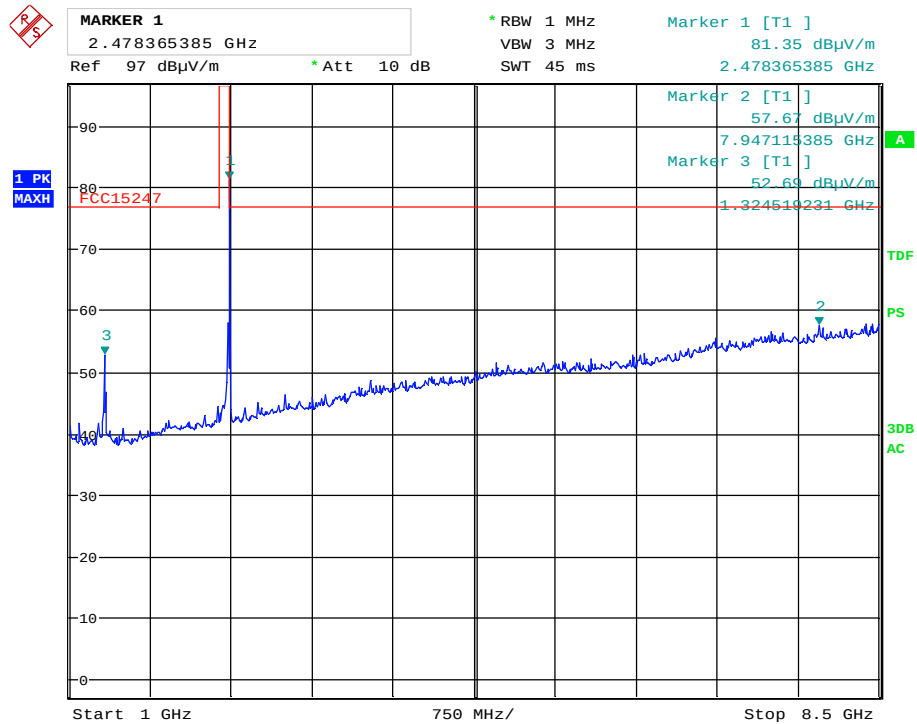
Date: 11.JUN.2014 12:05:21

Radiated measurement, 1 – 8.5 GHz, ch 2440 MHz, VP, 3m



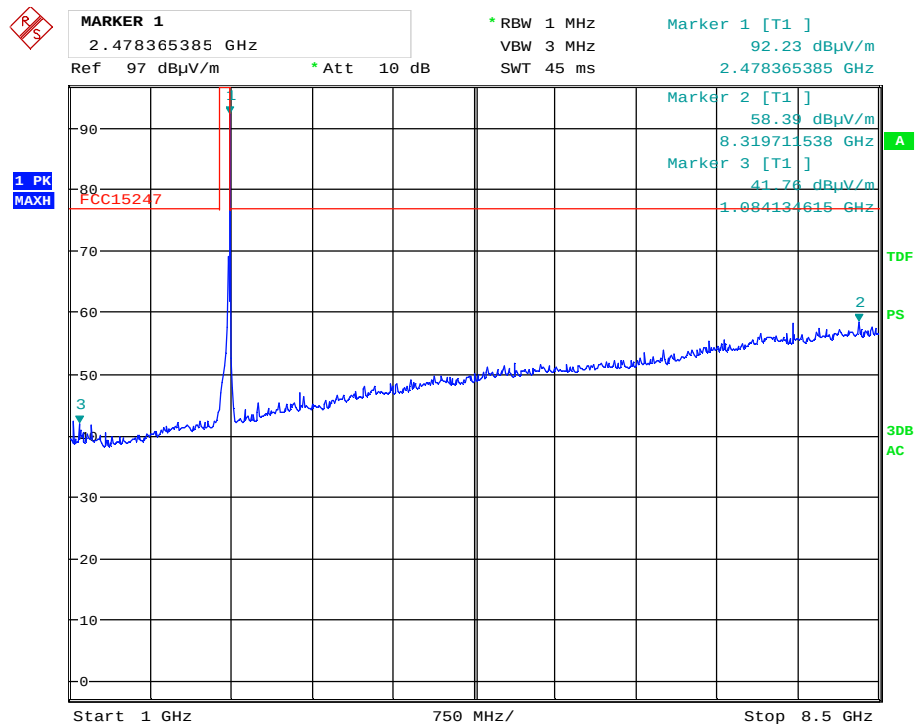
Date: 11.JUN.2014 11:57:19

Radiated measurement, 1 – 8.5 GHz, ch 2440 MHz, HP, 3m



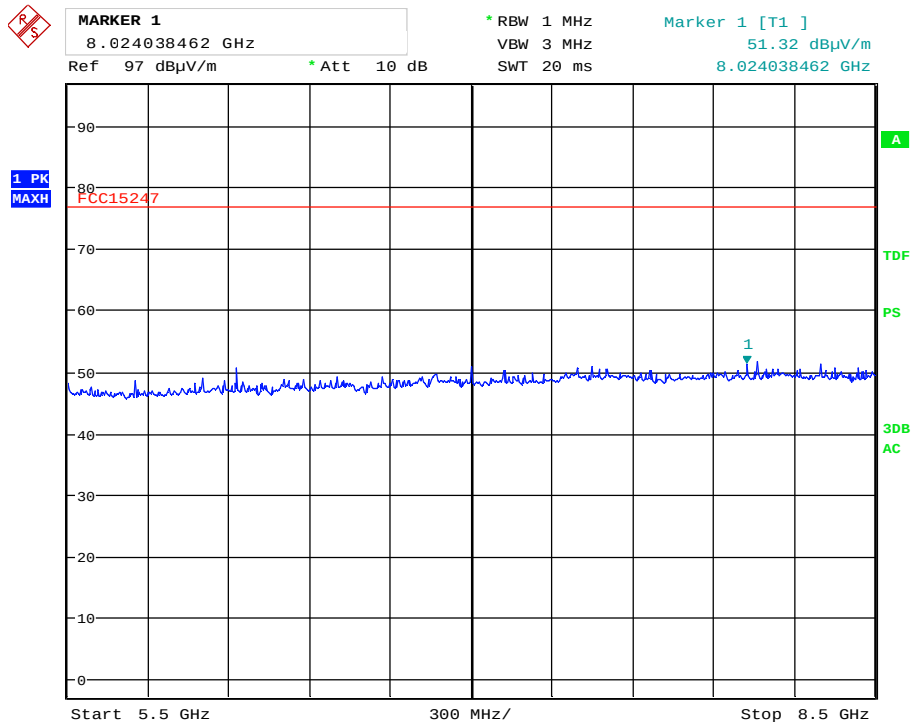
Date: 11.JUN.2014 12:23:11

Radiated measurement, 1 – 8.5 GHz, ch 2480 MHz, VP, 3m



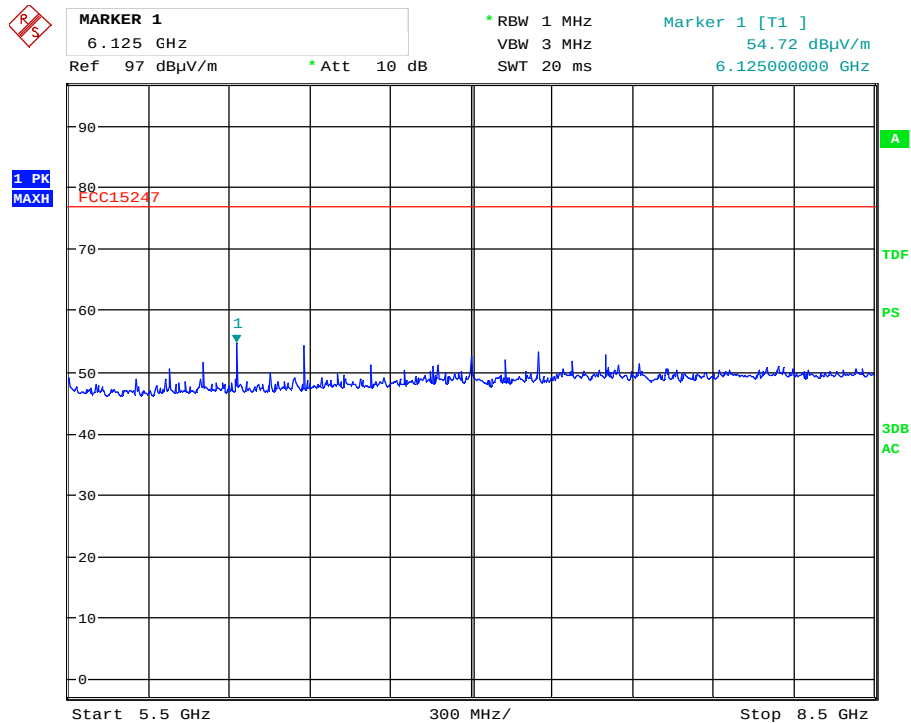
Date: 11.JUN.2014 12:18:20

Radiated measurement, 1 – 8.5 GHz, ch 2480 MHz, HP, 3m



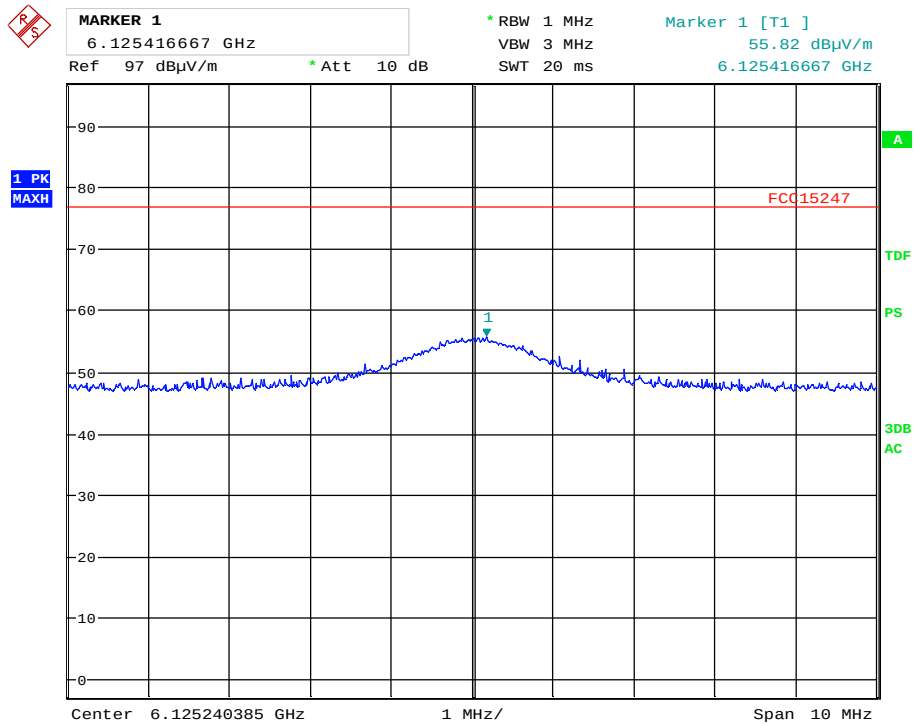
Date: 11.JUN.2014 12:46:32

Radiated measurement, 5.5 – 8.5 GHz, ch 2440 MHz, VP, 1m



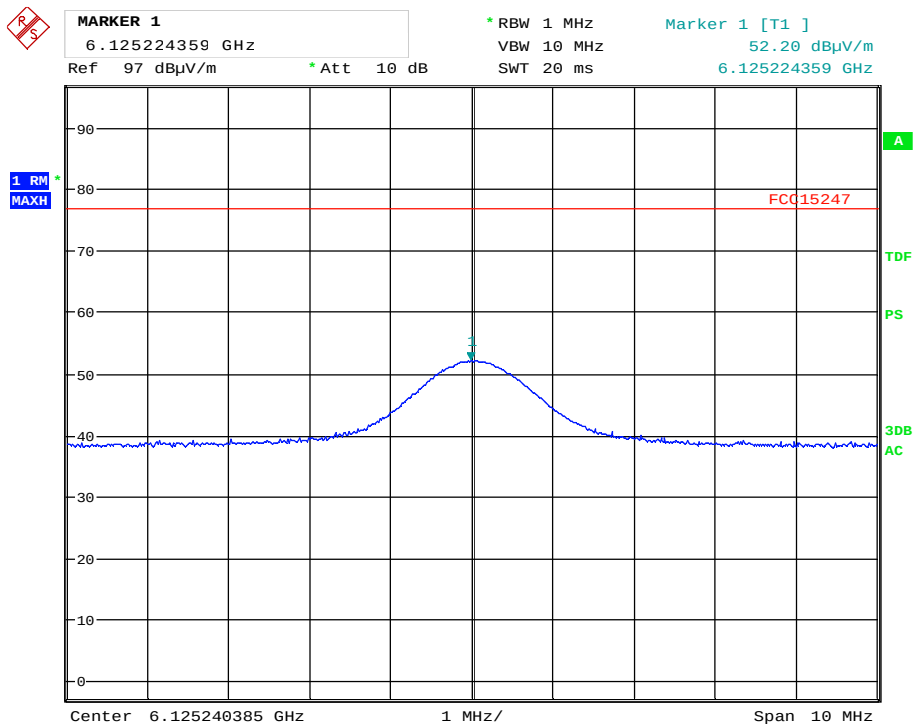
Date: 11.JUN.2014 12:48:00

Radiated measurement, 5.5 – 8.5 GHz, ch 2440 MHz, HP, 1m



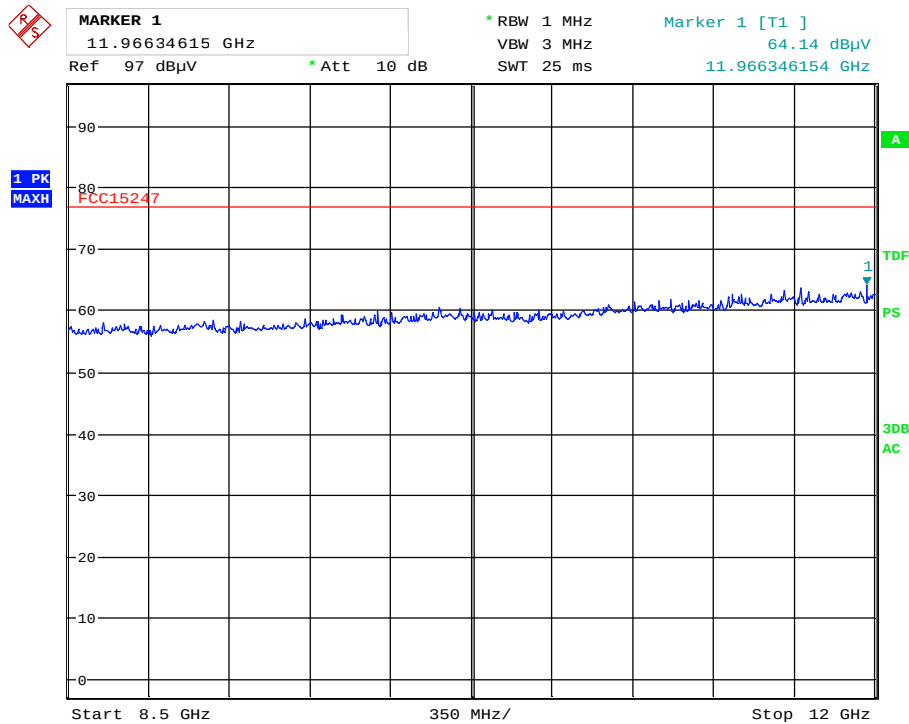
Date: 11.JUN.2014 12:54:52

6125MHz Peak detector



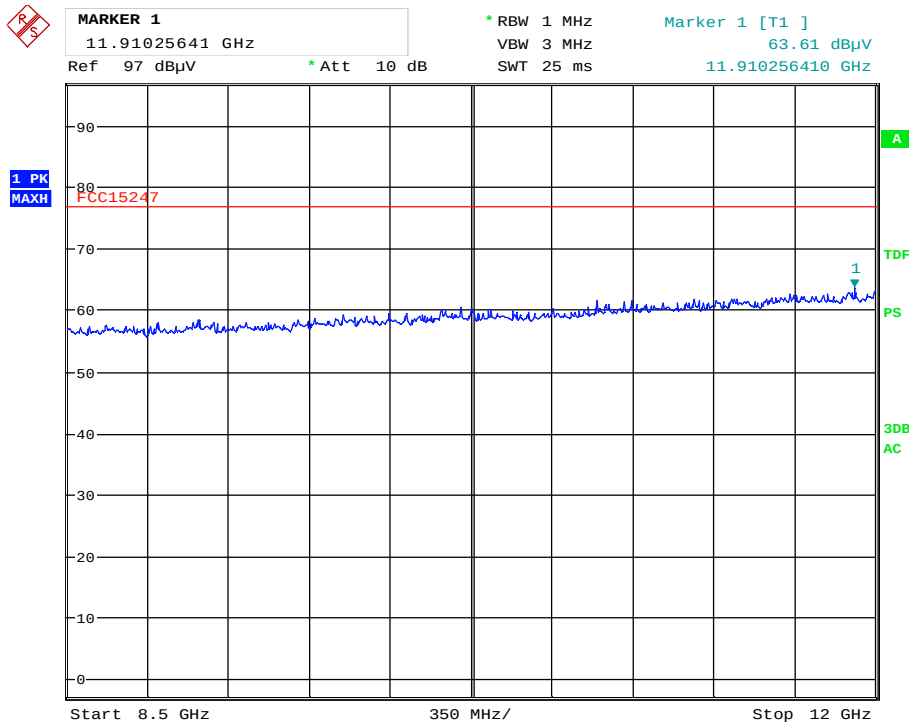
Date: 11.JUN.2014 12:53:22

6125MHz RMS detector



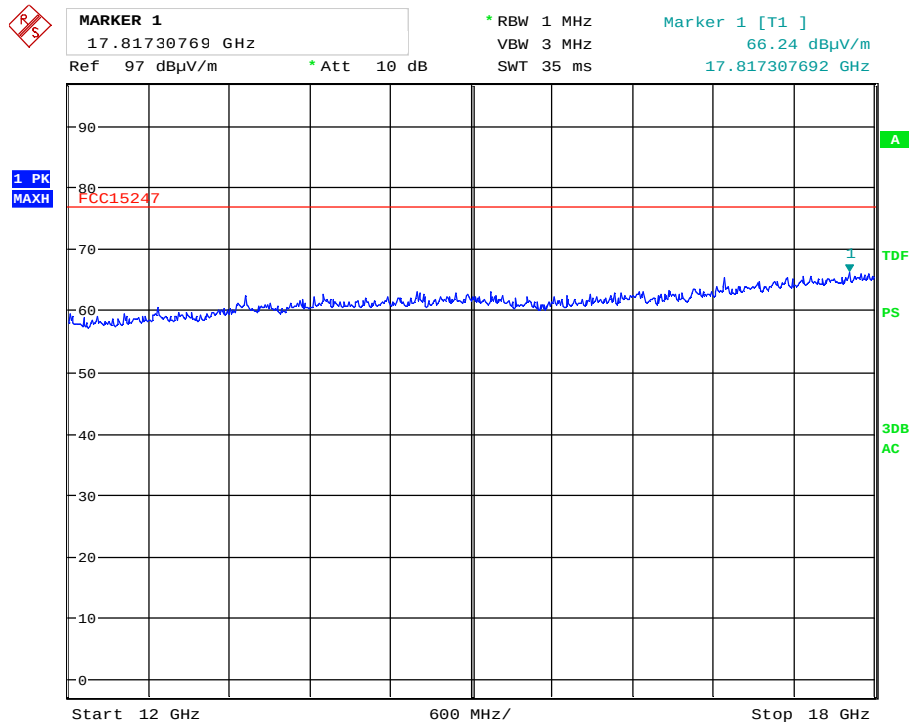
Date: 11.JUN.2014 13:14:19

Radiated measurement, 8.5 – 12 GHz, ch 2440 MHz, VP, 1m



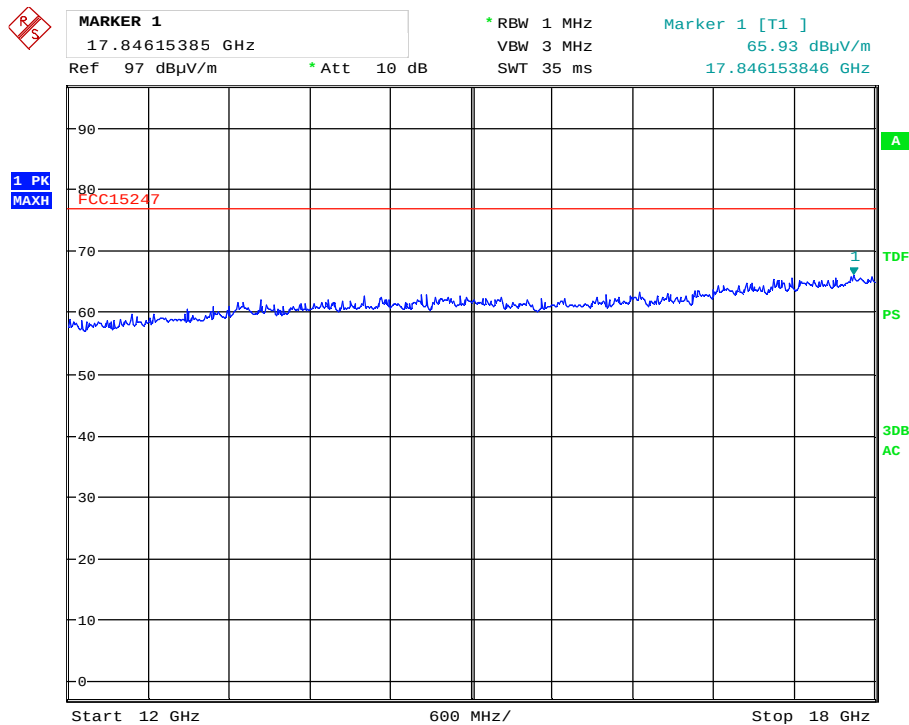
Date: 11.JUN.2014 13:11:58

Radiated measurement, 8.5 – 12 GHz, ch 2440 MHz, HP, 1m



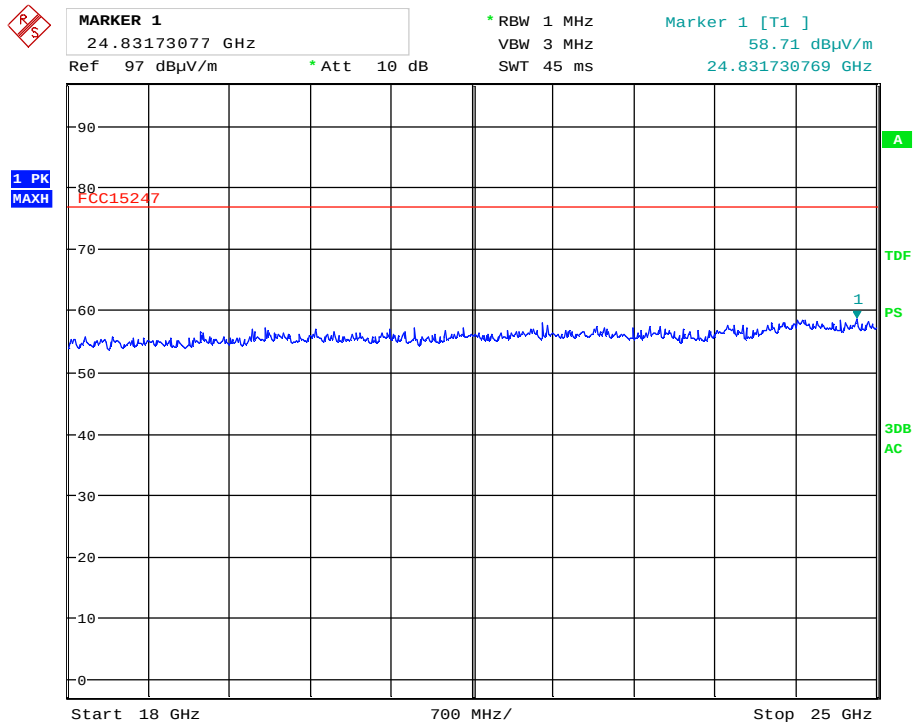
Date: 11.JUN.2014 13:21:03

Radiated measurement, 12 – 18 GHz, ch 2440 MHz, VP, 1m



Date: 11.JUN.2014 13:22:56

Radiated measurement, 12 – 18 GHz, ch 2440 MHz, HP, 1m



Date: 12.JUN.2014 12:35:33

Radiated measurement, 18 – 25 GHz, ch 2440 MHz, VP+HP, <0.1m

3.6 Power Spectral Density (PSD)

Para. No.: 15.247 (d)

Test Performed By: Thomas Dangle	Date of Test: 2014.06.19
----------------------------------	--------------------------

Test Results: Passed

Measured and Calculated Data:

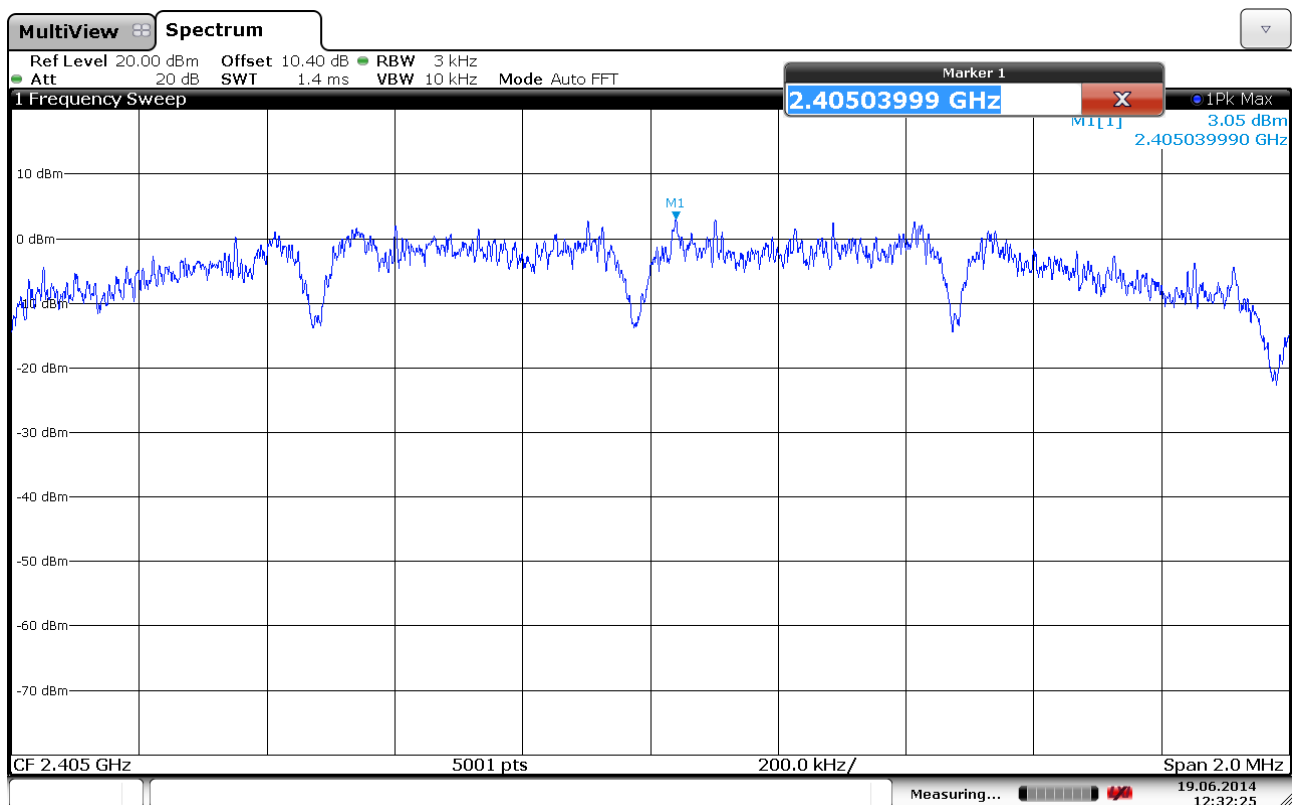
The measurement procedures PKPSD described in KDB 558074 D01 DTS Meas Guidance v03r02 was used.

	2405 MHz	2440 MHz	2480 Mhz
Measured value (dBm)	3.05	2.35	1.22

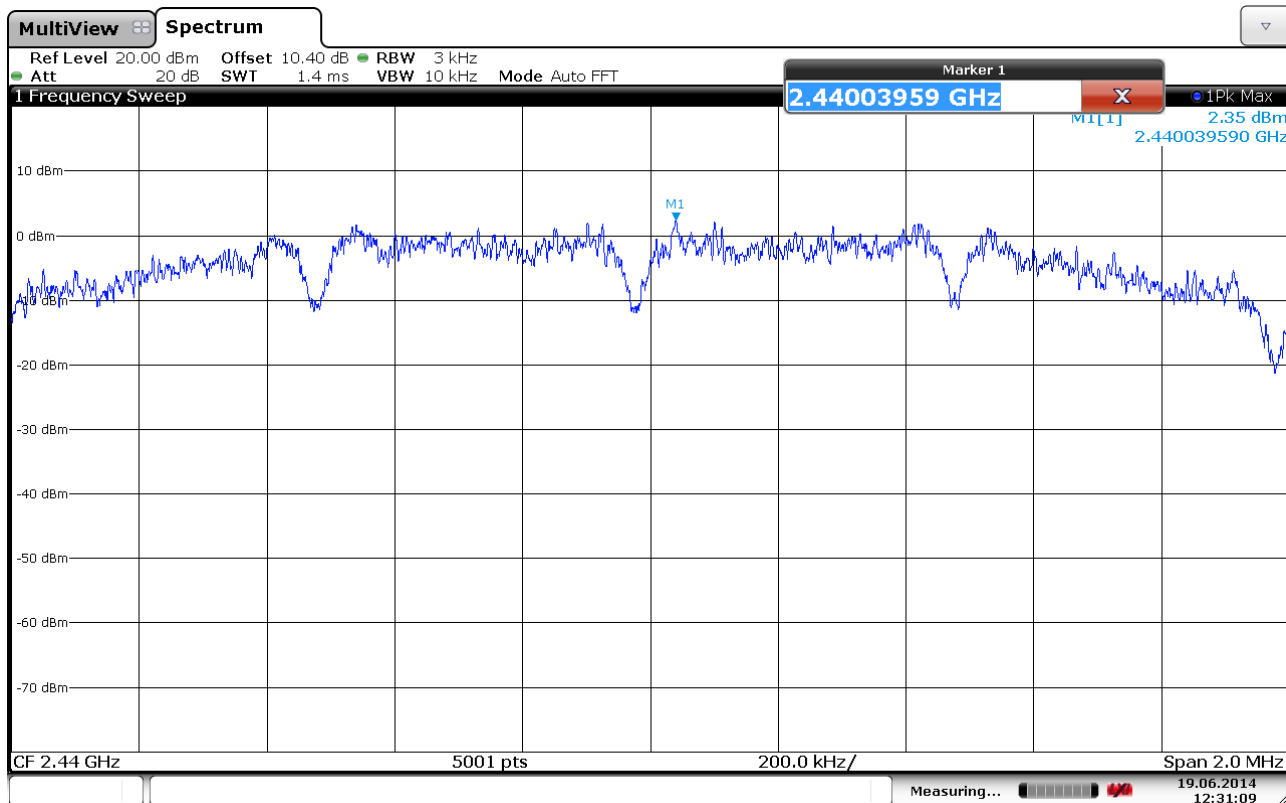
Requirements:

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

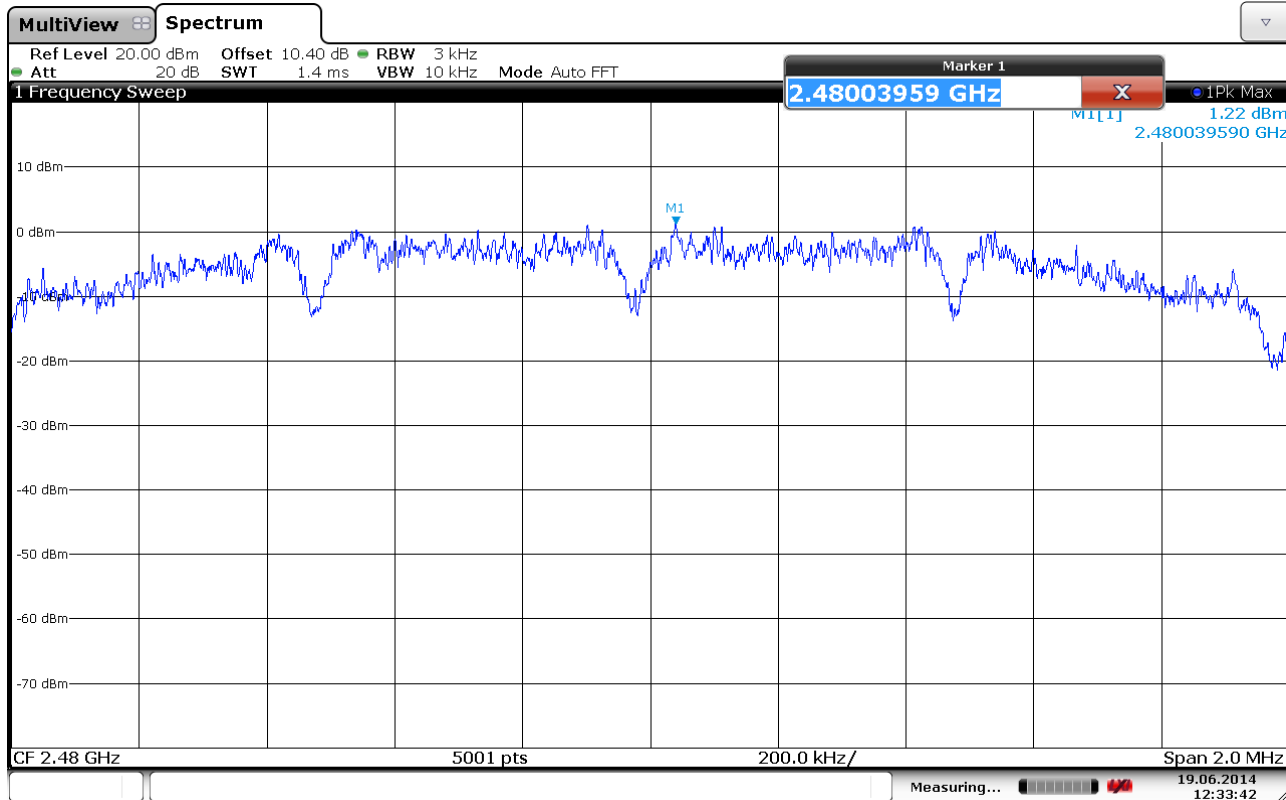
No requirements for Frequency Hopping Systems.



Conducted measurement, Ch 2405 MHz



Conducted measurement, Ch 2440 MHz



Conducted measurement, Ch 2480 MHz

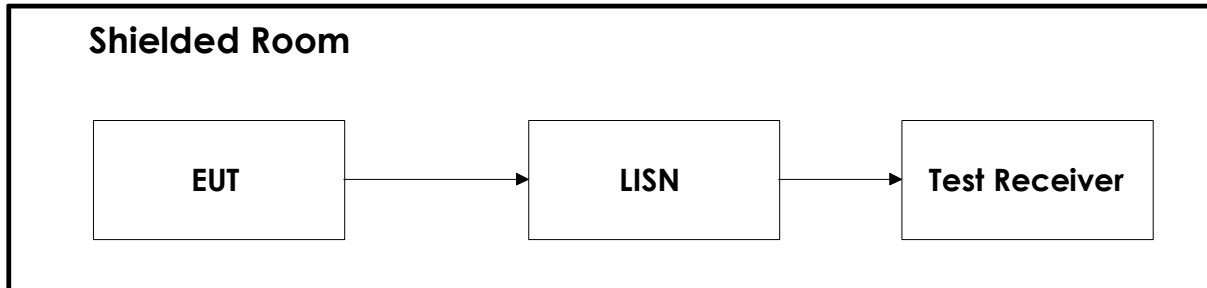
4 LIST OF TEST EQUIPMENT

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the Test Laboratory.

No.	Model number	Description	Manufacturer	Ref. no.	Cal. date	Cal. Due
1	FSW26	Spectrum Analyzer	Rohde & Schwarz	LR 1640	2013.09	2014.09
2	ESU40	Measuring Receiver	Rohde & Schwarz	LR 1639	2013.09	2014.09
3	4768-10	Attenuator	Narda	LR 1356	Cal b4 use	
4	6HC3000/18000	Highpass Filter	Trilithic	LR 1614	Cal b4 use	
5	JB3	BiLog Antenna	Sunol Sciences	N-4525	2012.10	2015.10
6	LNA6900	Preamplifier	Teseq	LR 1593	Cal b4 use	
7	3115	Horn Antenna	EMCO	LR 1330	2010.08.05	2015.08.05
8	8449A	Pre-amplifier	Hewlett Packard	LR 1322	2013-09	2014-09
9	643	Antenna Horn	Narda	LR 093	2009.01.26	2019.01.26
10	PM7320X	Antenna Horn	Sivers Lab	LR 102	2009.01.26	2019.01.26
11	DBF-520-20	Antenna Horn	Systron Donner	LR 100	2009.01.26	2019.01.26
12	638	Antenna Horn	Narda	LR 1480	2010.06.17	2019.06.17
14	HFH2-Z2	Loop Antenna	Rohde & Schwarz	LR 285	2013.12	2016.12
15	Model 87V	Multimeter	Fluke	LR 1599	2012.10.29	2014.10.29
16	HP6032A	Power Supply	Hewlett Packard	LR1062	N/A	
17	B300D	Power Supply	Oltronics	LR 1000	N/A	
18	Agilent 6812B	AC power source/analyzer	Agilent	LR1515	2013.10	2014.10

5 BLOCK DIAGRAM

5.1 Power Line Conducted Emission



5.2 Test Site Radiated Emission

