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D-PL-18175-01-02
D-PL-18175-01-03
D-PL-18175-01-04

Report No. 339880-01-001

FCC TEST REPORT / IC TEST REPORT

Product	Lock Controller / Bluetooth Low Energy (BLE) module
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	LCU5351C1
Rating	4.5Vdc
Trademark	ASSA ABLOY
Serial number	/
Additional information	2.4GHz, Bluetooth Low Energy (BLE).
Tested according to	**FCC Part 15.247** Frequency Hopping Transmitters / 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
Report number	339880-01
Tested in period	2017-11-14 - 2018-04-05
Issue date	2018-04-06
Name and address of the testing laboratory	**Nemko GmbH & Co. KG** Reetzstraße 58 D-76327 Pfinztal Tel.: + 49 (0) 7240 – 63 - 0 Fax: + 49 (0) 7240 – 63 – 11 Bundesnetzagentur BNetzA-CAB-17/21-17 FCC No: 973501 IC OATS: 10921A-1

Prepared by [Dipl.-Ing. M. Korny]	Approved by [Dipl.-Ing. P. Lukas]

Template version: B

CONTENTS

1 INFORMATION

1.1 Test Item

Name :	ASSA ABLOY
FCC ID :	Y7V-LCU5351C1
Industry Canada ID :	9514A-LCU5351C1
Model/version :	LCU5351C1
Serial number :	/
Hardware identity and/or version:	P000730805-001-001
Software identity and/or version :	BLE test SW 2.0
Frequency Range :	2402 - 2480MHz
Tunable Bands :	None
Number of Channels :	40
Operating Modes :	Transceiver
Type of Modulation :	GFSK, 250kHz deviation
User Frequency Adjustment :	None
Rated Output Power :	2.61 mW
Type of Power Supply :	4.5Vdc (3x LR6 batteries)
Antenna Connector :	None (PCB antenna)
Antenna Diversity Supported :	No
Desktop Charger :	No

Description of Test Item

The Bluetooth Low Energy module is located on PCB 1105, and is controlled by the main microcontroller located on PCB 1101, both located inside the LCU 5351.

A chip antenna is also located on the PCB 1105. This module will communicate with a BLE enabled Mobile phone held in front of the unit.

Theory of Operation

The module follows the Bluetooth low energy specification 4-0, operating in the 2.4GHz band

The module is designed using the nRF52832 system on chip from Nordic Semiconductor.

The nRF52832 is built around a 32-bit ARM Cortex M0 CPU with integrated memory and an embedded 2.4GHz transceiver.

It depends on, and generates, two different clocks. A high frequency clock and a low frequency clock

The high frequency clock at 32 MHz is controlled by an external 32 MHz crystal, and the low frequency clock at 32768Hz is controlled by an external 32768Hz crystal.

1.2 Normal test conditions

Temperature:	20 - 26 °C
Relative humidity:	45 - 55 %
Normal test voltage:	4.5 V dc(3x1.5Vdc AA batteries)

The values are the limit registered during the test period. All tests were performed with fully charged batteries.

1.3 Test Engineer(s)

Markus Korny

1.4 Description of modification for Modification Filing

Not applicable.

1.5 Family List Rational

Not Applicable.

1.6 Antenna Requirement

Is the antenna detachable?	☐ Yes	☒ No
If detachable, is the antenna connector non-standard?	☐ Yes	☐ No

Type of antenna connector: N/A

Ref. FCC §15.203

1.7 Worst-Case Configuration and Mode

Radiated Emissions was performed with the EUT set to transmit at the channel with the highest output power as worst-case scenario.

1.8 Comments

The output level is set to maximum in the software.
The radiated measurements are tested on three axis.
Three fully charged primary batteries are used.
All ports were populated during spurious emission measurements.

2 TEST REPORT SUMMARY

2.1 General

All measurements are tracable 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 and and ANSI C63.10-2013.

Radiated tests were performed in a semi-anechoic shielded room (f < 1 GHz) and a fully-anechoic shielded room (f > 1 GHz) at a measuring distance of 3m.

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”.

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)	N/A [2]
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)	N/A [2]
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)	N/A
Occupied Bandwidth / 99% OCC-BW	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

[2] EUT is battery powered

- Only for information

3 TEST RESULTS

3.1 99 % Occupied Bandwidth

Para. No.: 6.6 RSS-Gen

Test Performed By: Markus Korny	**Date of Test: 2018-04-05**

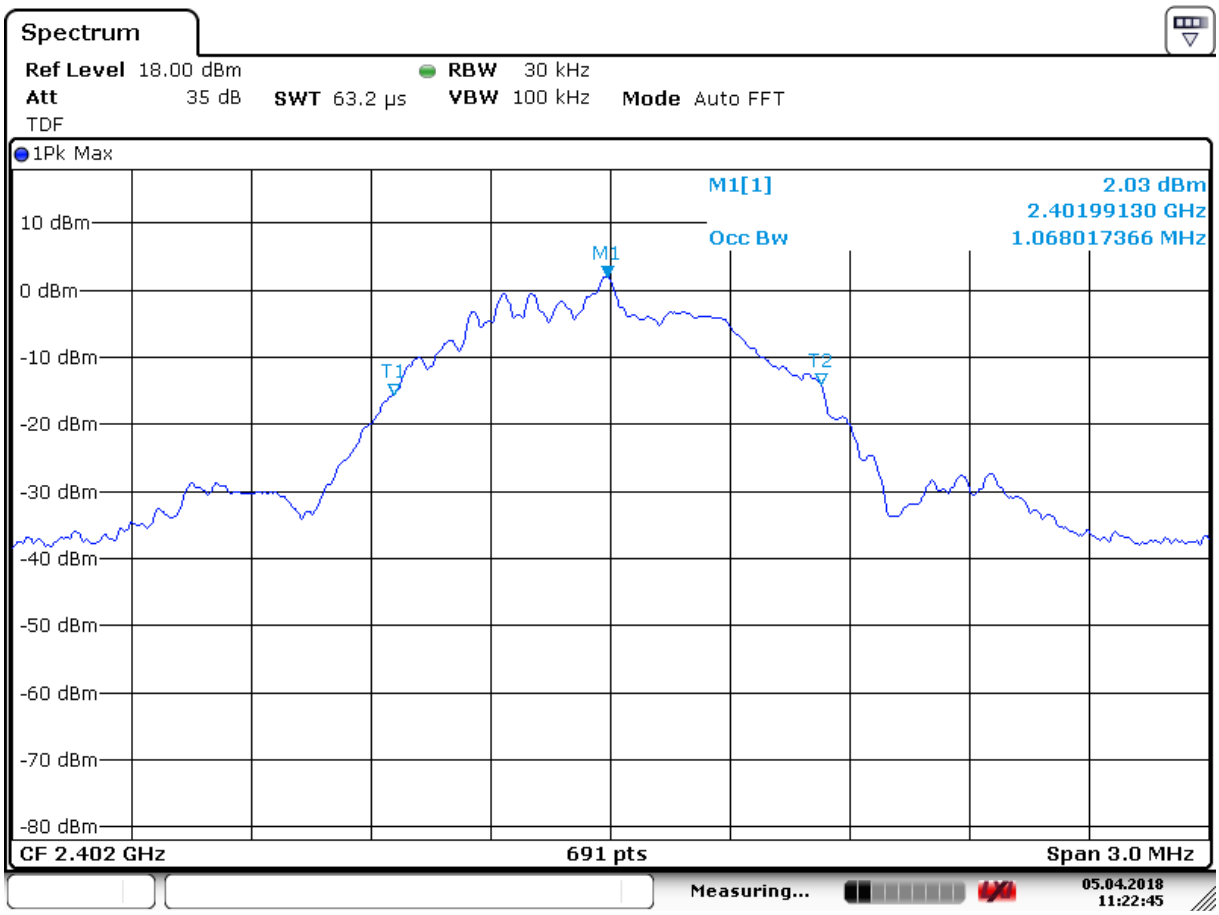
Test Results: Complies

Measurement Data:

99 % (kHz)
2402 MHz
1068

Requirements:

For information only



Date: 5.APR.2018 11:22:45

2402 MHz – 99% OCC BW

3.3 Minimum 6 dB Bandwidth

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

Test Performed By: Markus Korny	**Date of Test: 2017-11-15**

Test Results: Complies

Measurement Data:

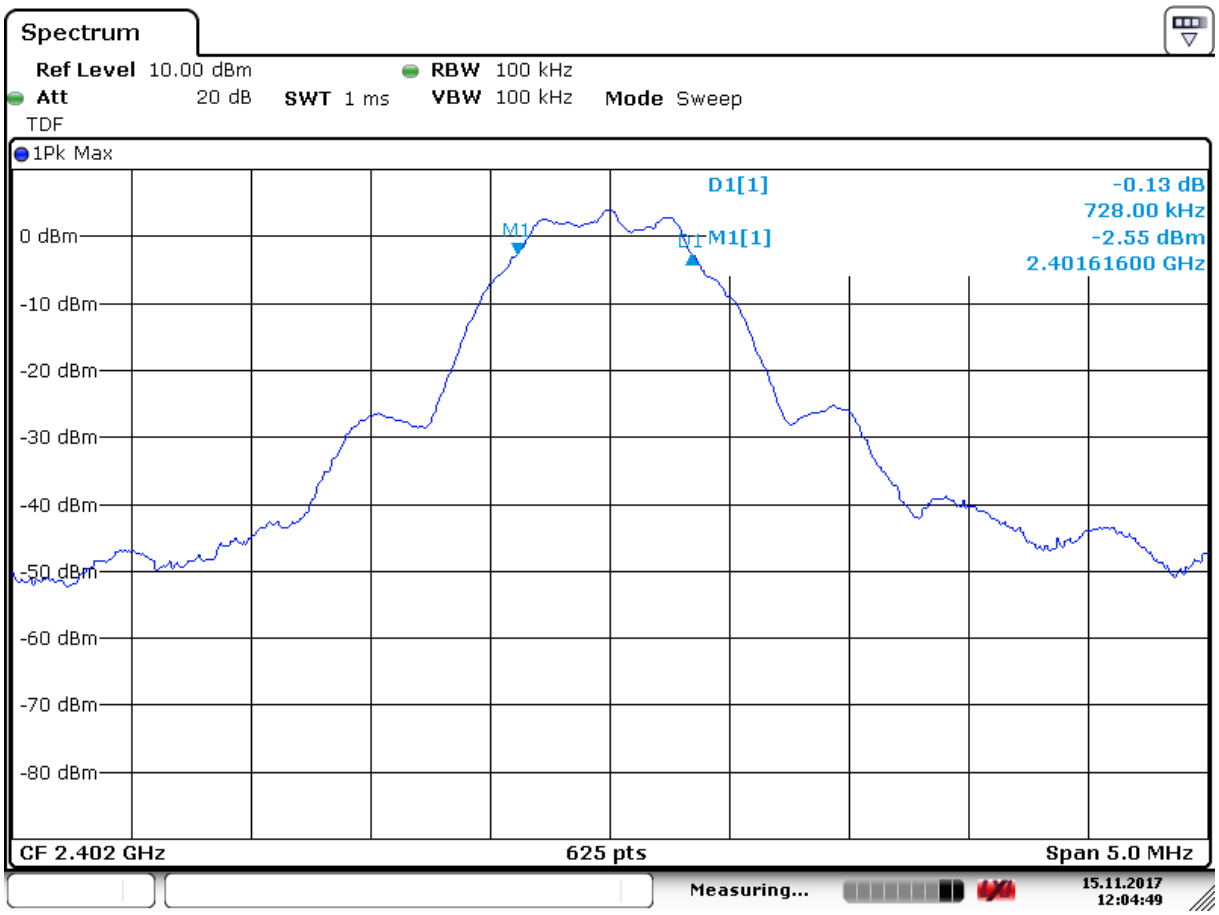
Measured 6 dB Bandwidth (kHz)		
2402 MHz, Ch 0	**2440 MHz, Ch 19**	**2480 MHz, Ch 39**
728.00	712.00	712.00

Fully charged battery is used

Requirements:

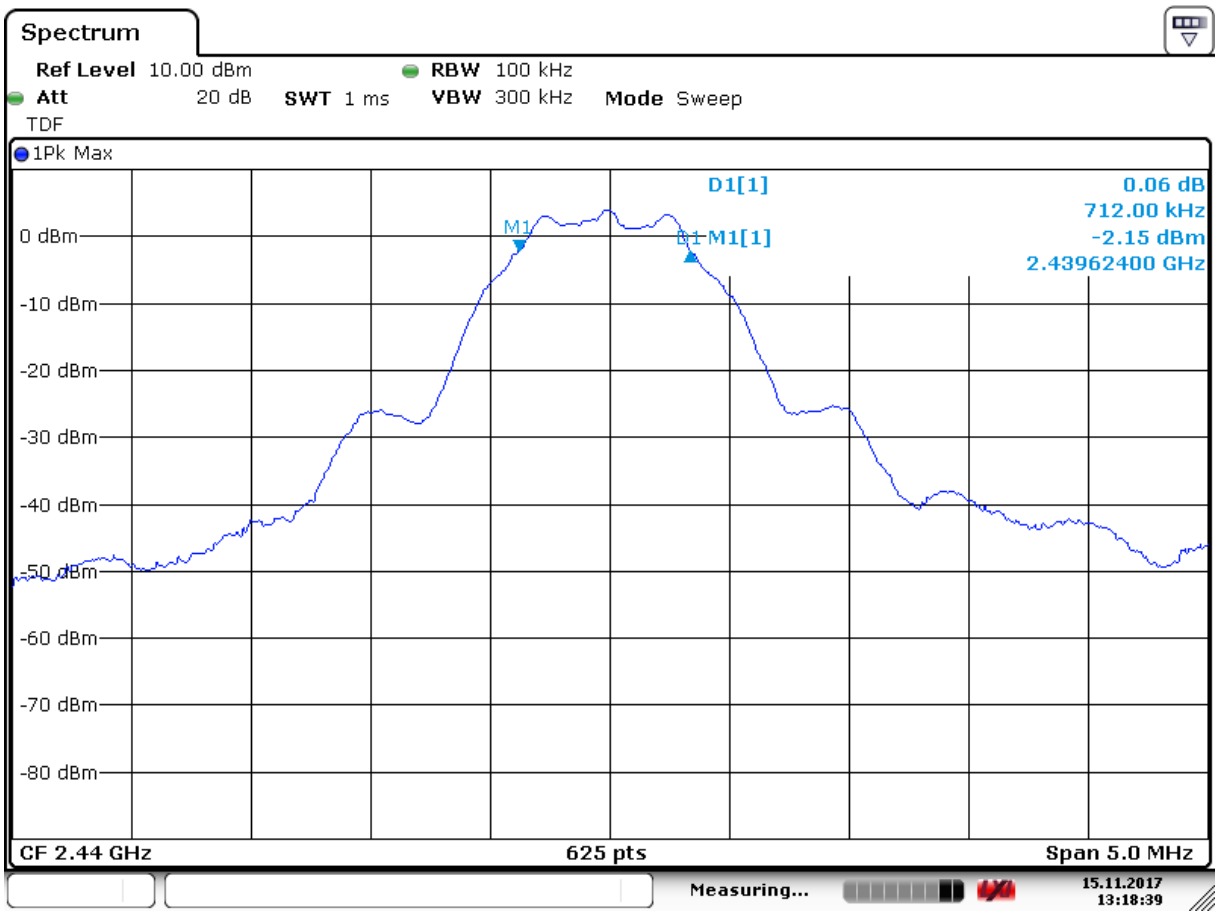
For Digital Transmission Systems in the 2400-2483.5 MHz band the minimum 6 dB bandwidth shall be at least 500 KHz.

No requirements for Frequency Hopping Systems.



Date: 15.NOV.2017 12:04:49

Ch2402MHz, 6 dB BW



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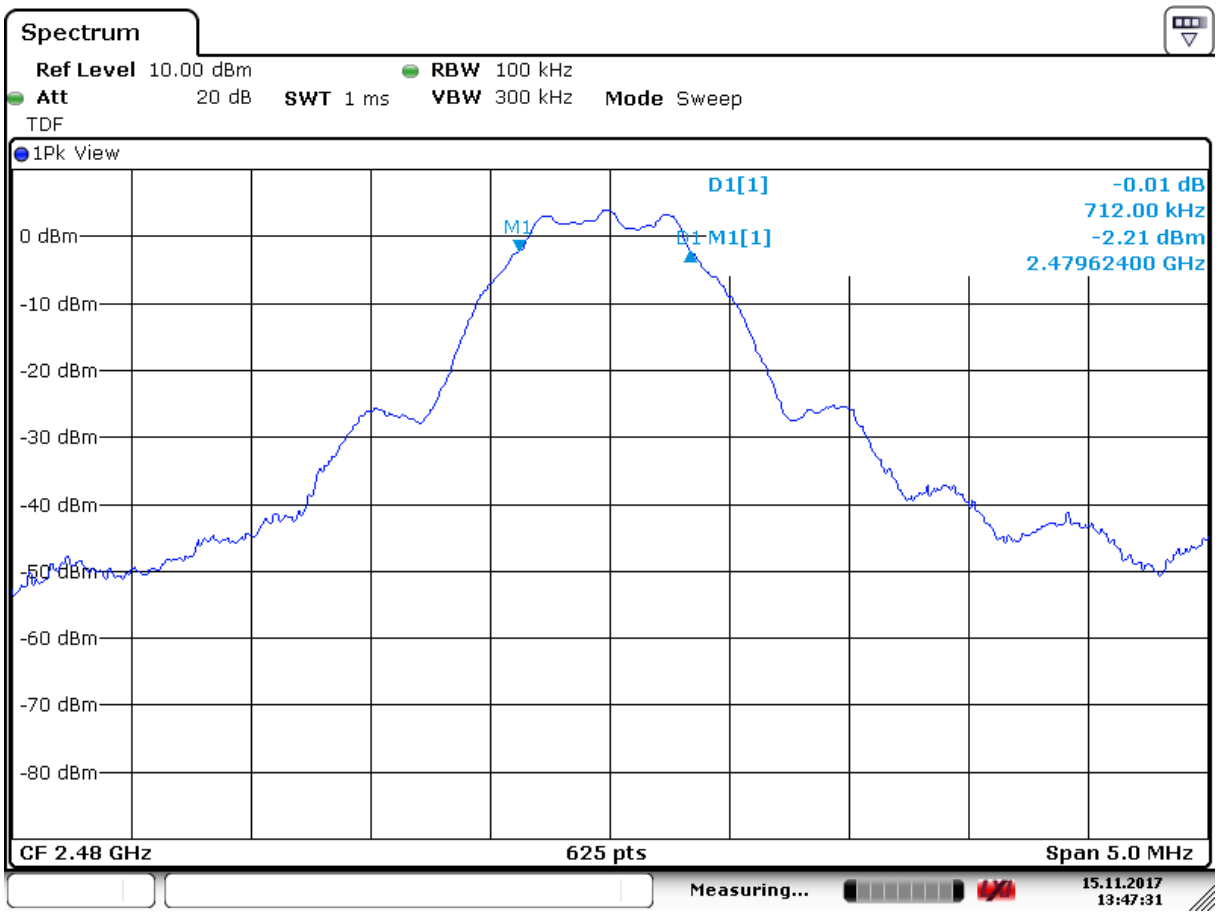
Ch2440MHz, 6 dB BW



Date: 15.NOV.2017 13:47:31

Ch2480MHz, 6 dB BW

3.4 Peak Power Output

Para. No.: 15.247 (b)

Test Performed By:Markus Korny	**Date of Test: 2017-11-15**

Test Results: Complies

Measurement Data:

RF channel	**2402 MHz**	**2440 MHz**	**2480 MHz**
Measured Maxium Field strength (dBµV/m) –HP	92.1	90.8	87.9
Calc. Radiated Power (dBm)	-3.13	-4.48	-7.31
Calc. Radiated Power (mW)	0.49	0.36	0.19
Measured Conducted Power (dBm)	4.2	4.0	4.0
Measured Conducted Power (mW)	2.61	2.48	2.52
Calculated Antenna Gain (dBi)	-7.3	-8.4	-11.3

Antenna gain = 10*log (EIRP/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 XY plane and 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:

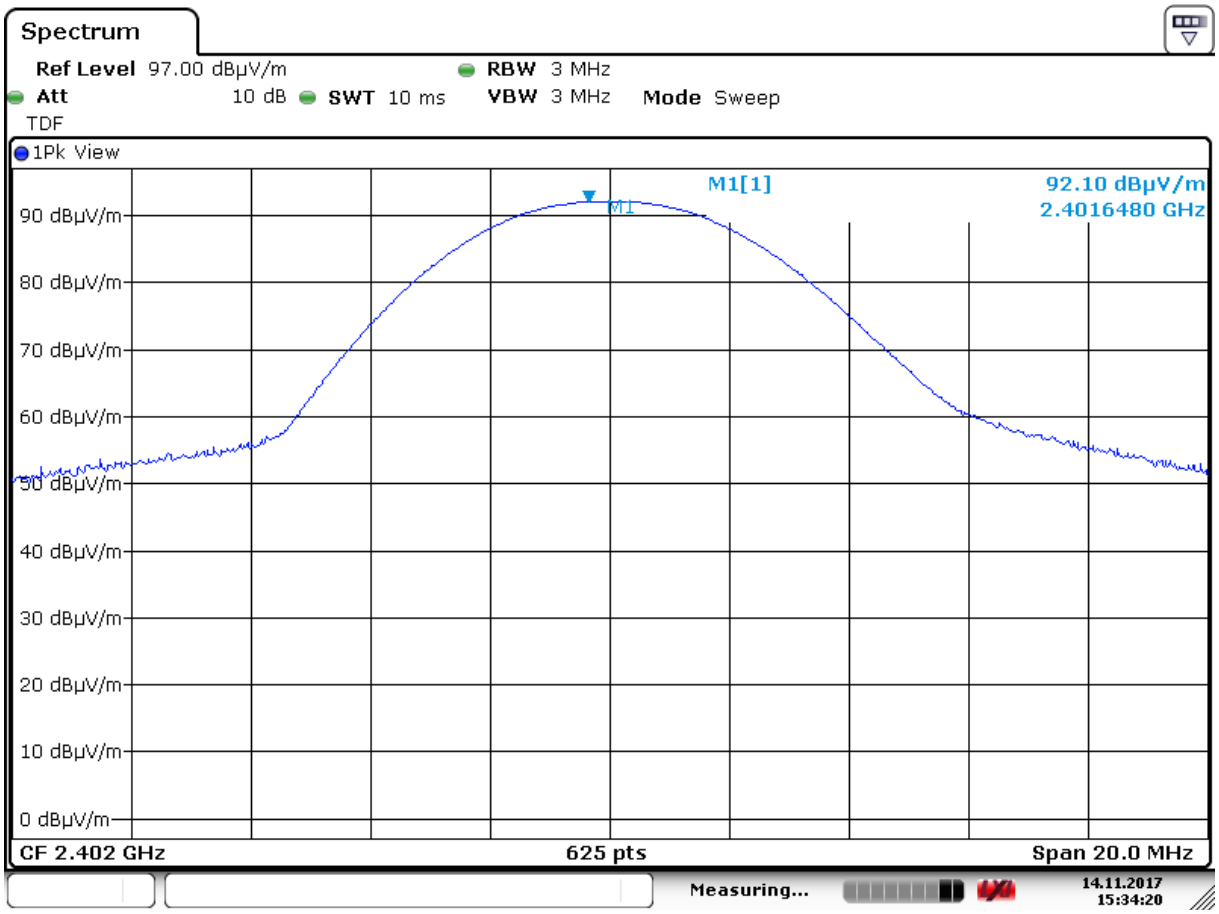
The maximum peak output power shall not exceed the following limits:

For frequency hopping systems employing at least 75 hopping channels: 1 Watt

For all other frequency hopping systems in the 2400 - 2483.5 MHz band: 0.125 Watts

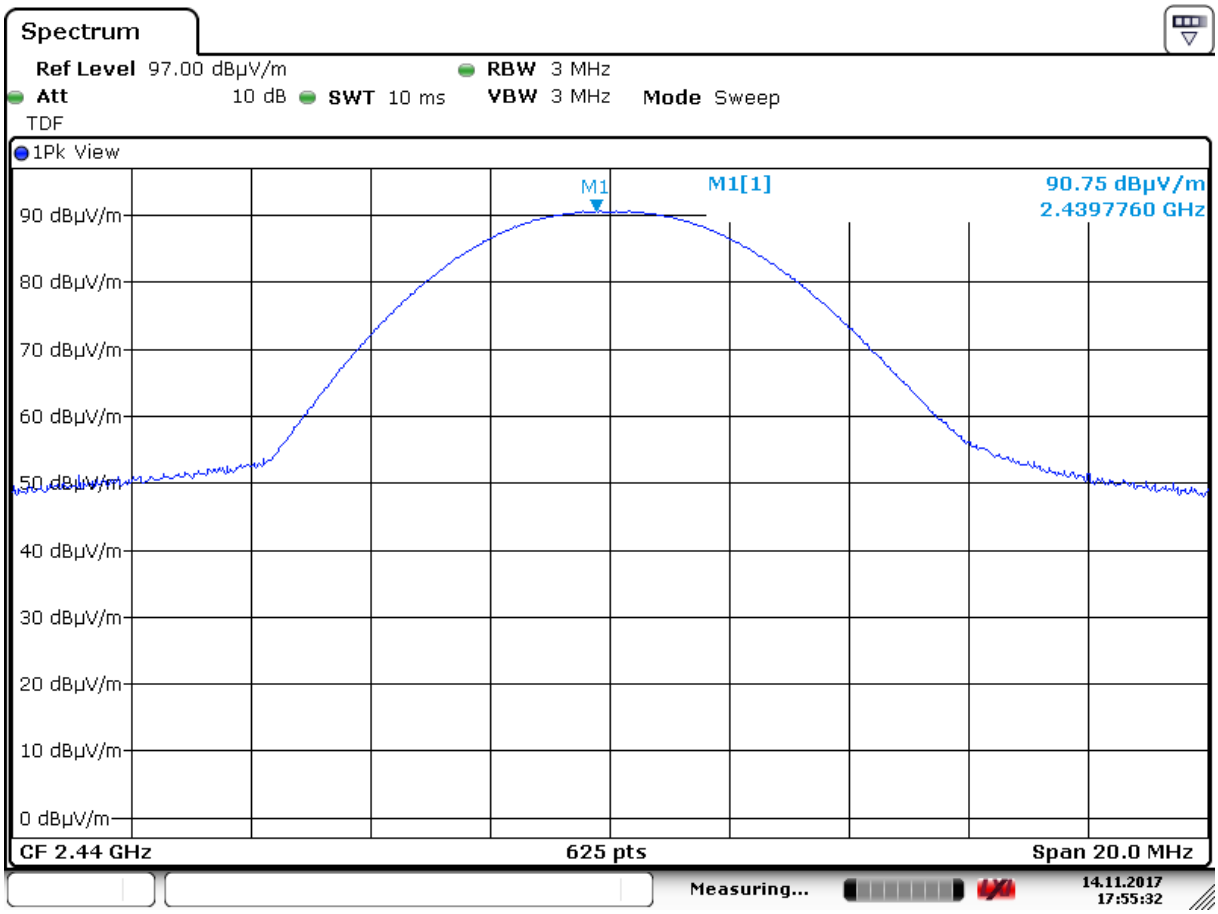
For Digital Transmission Systems in the 2400 - 2483.5 MHz band: 1 Watt

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.



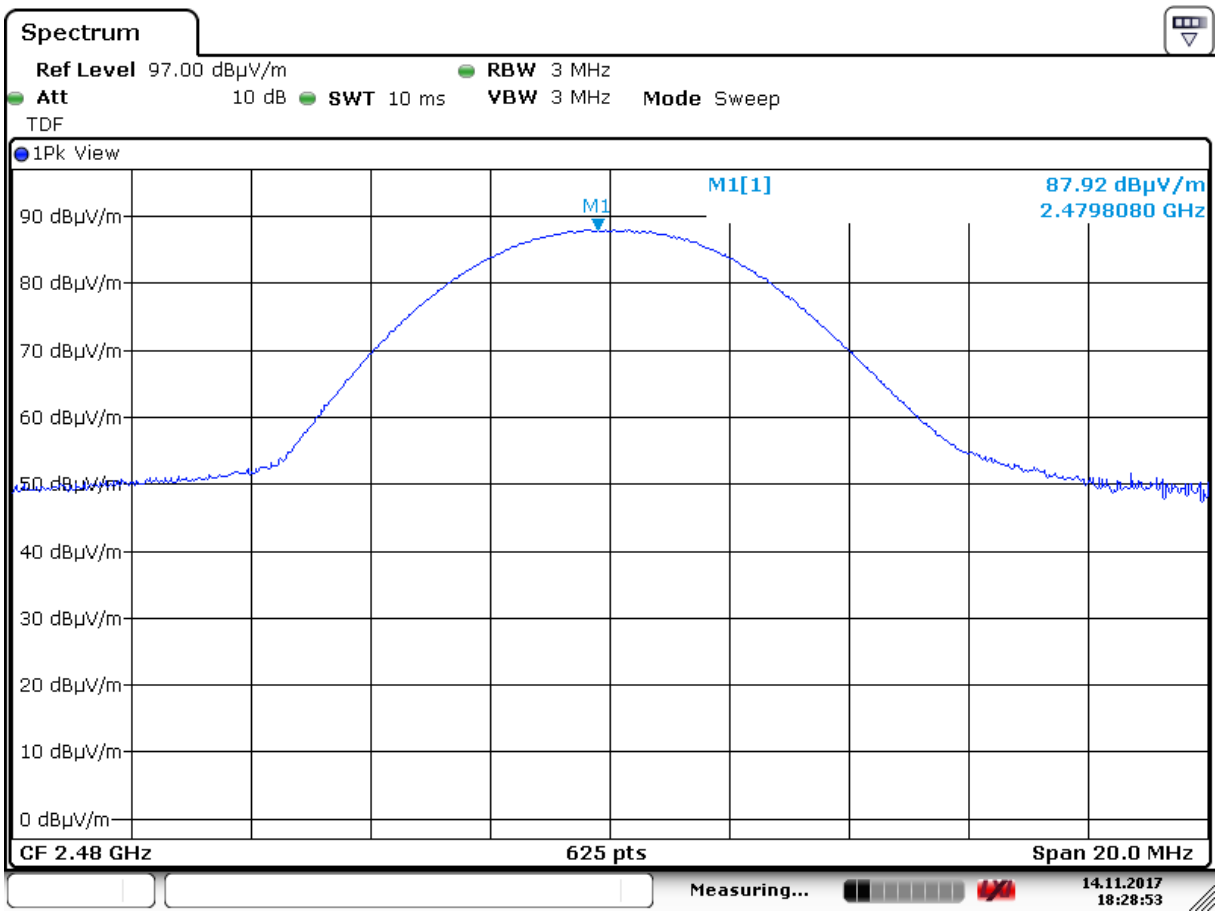
Date: 14.NOV.2017 15:34:19

Radiated field strength, HP, 2402 MHz



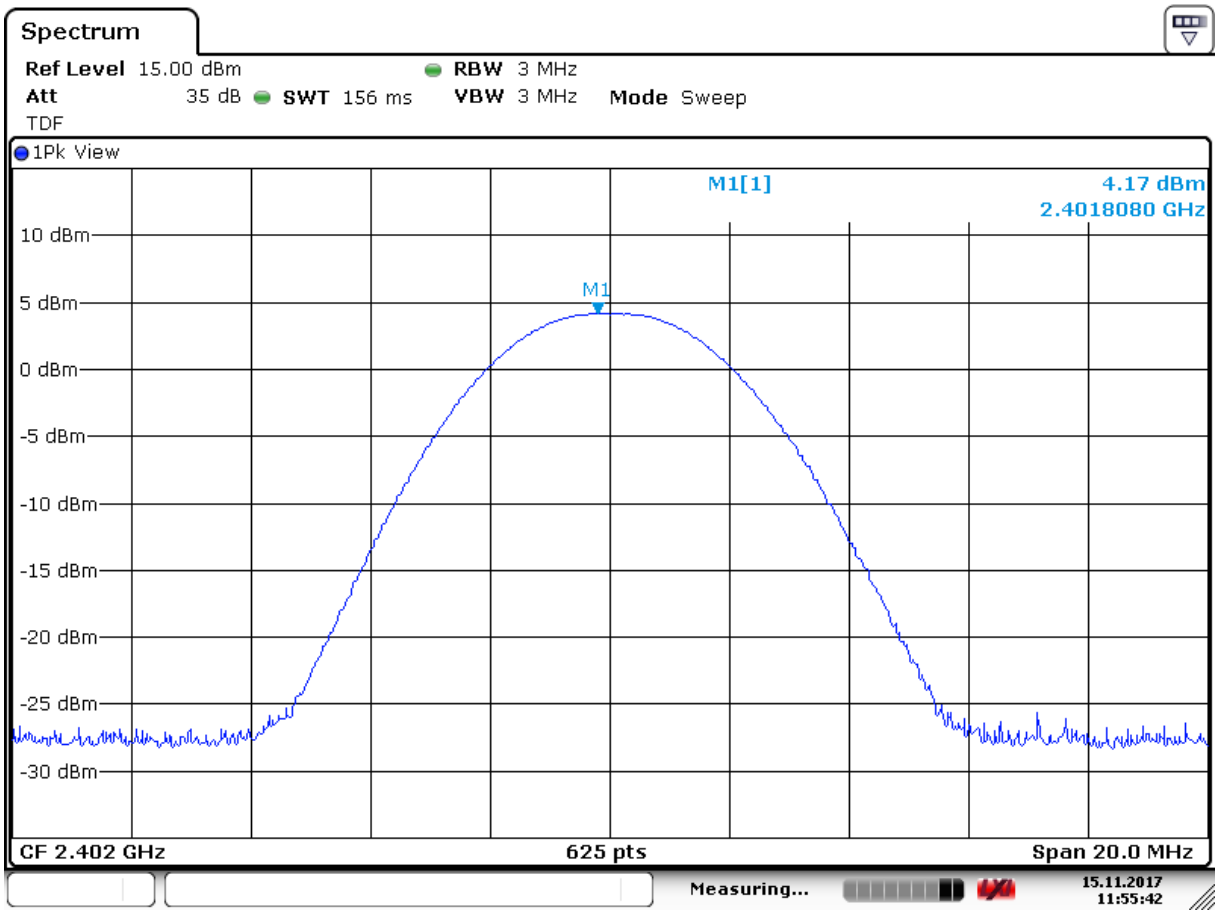
Date: 14.NOV.2017 17:55:32

Radiated field strength, HP, 2440 MHz



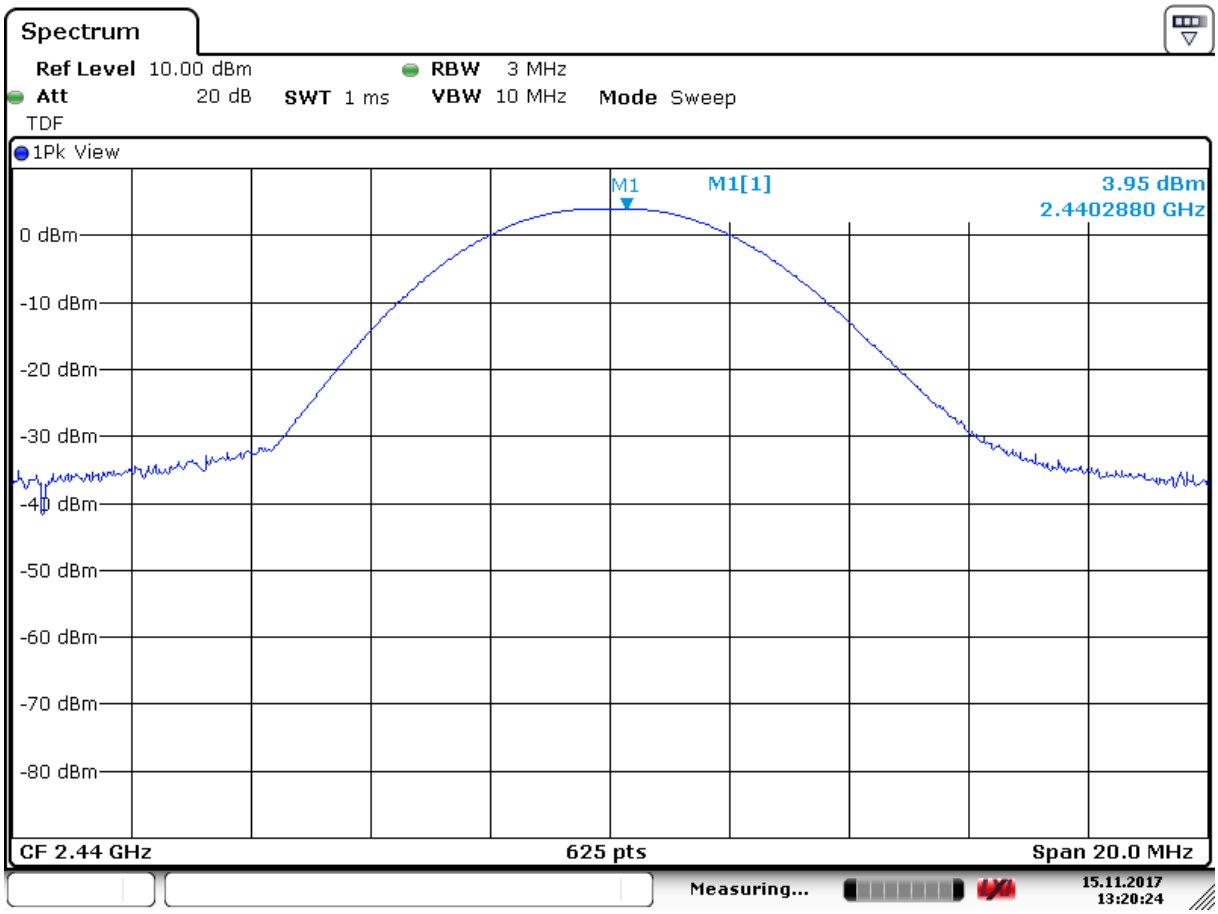
Date: 14.NOV.2017 18:28:53

Radiated field strength, HP, 2480 MHz



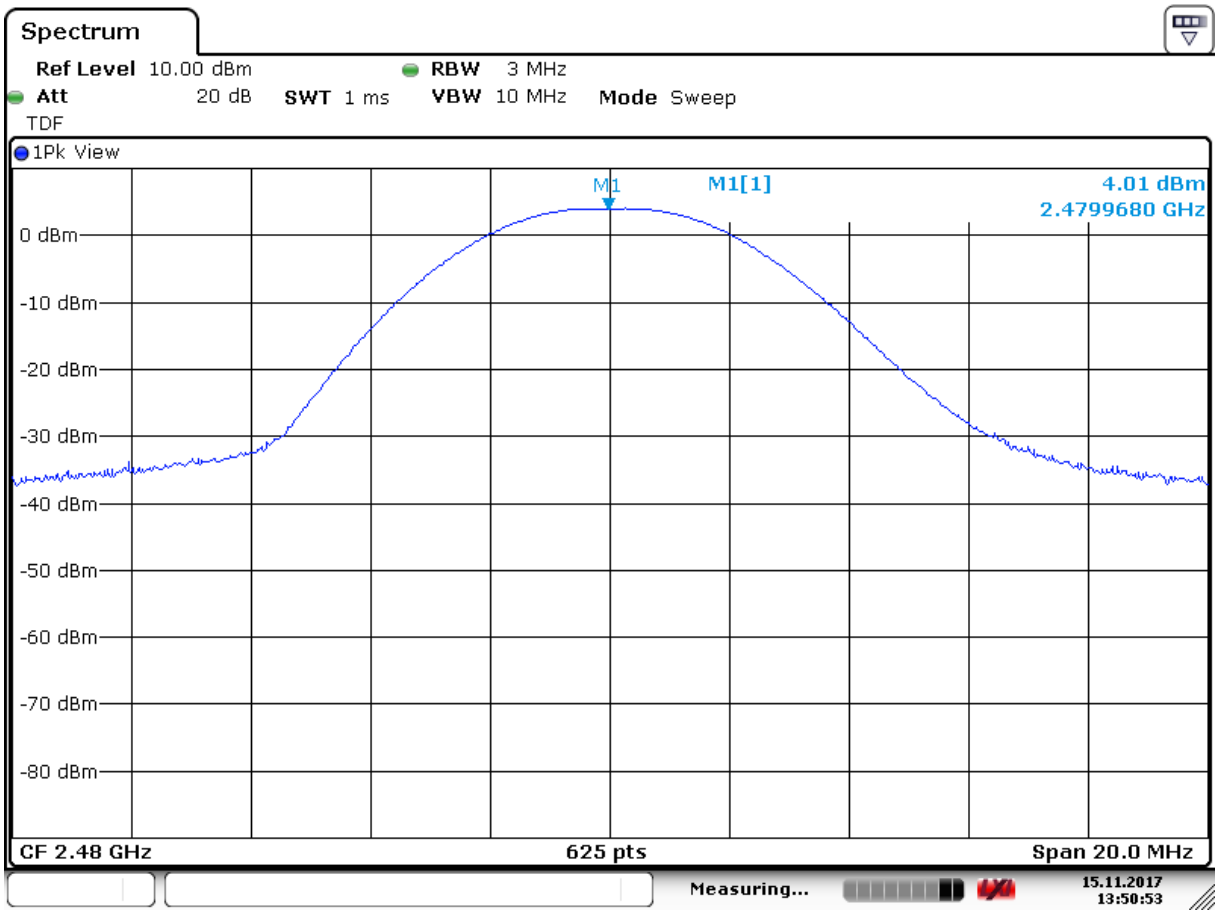
Date: 15.NOV.2017 11:55:43

Conducted power – 2402MHz



Date: 15.NOV.2017 13:20:24

Conducted power – 2440MHz



Date: 15.NOV.2017 13:50:54

Conducted power – 2480MHz

3.5 Conducted Emissions at Antenna Connector

Para. No.: 15.247 (d)

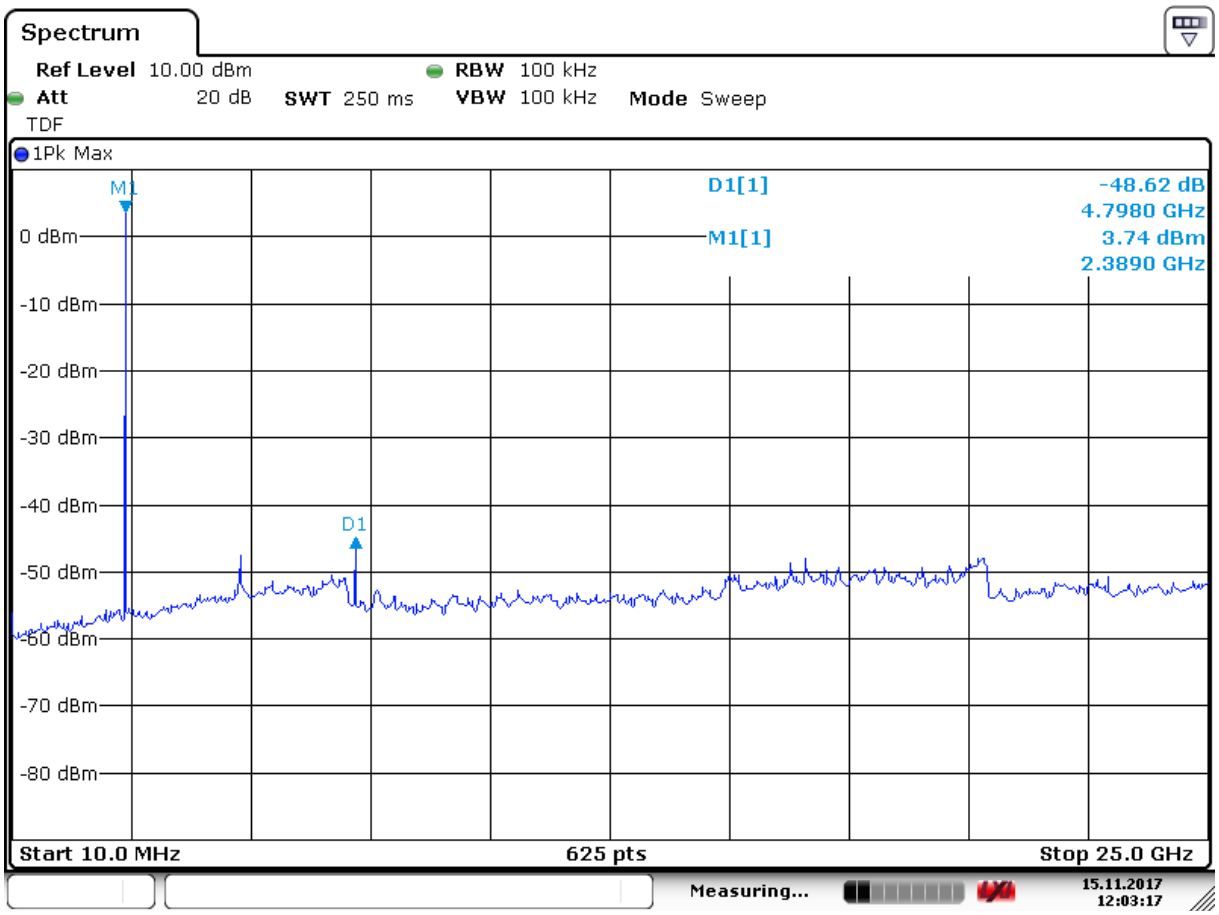
RF conducted power to 25 GHz see attached plots.
Maximum RF level outside operating band:

RF ch 2402MHz: 48 dB/C, margin >20 dB
RF ch 2440MHz: 49 dB/C, margin >20 dB
RF ch 2480MHz: 51 dB/C, margin >20 dB

Limit

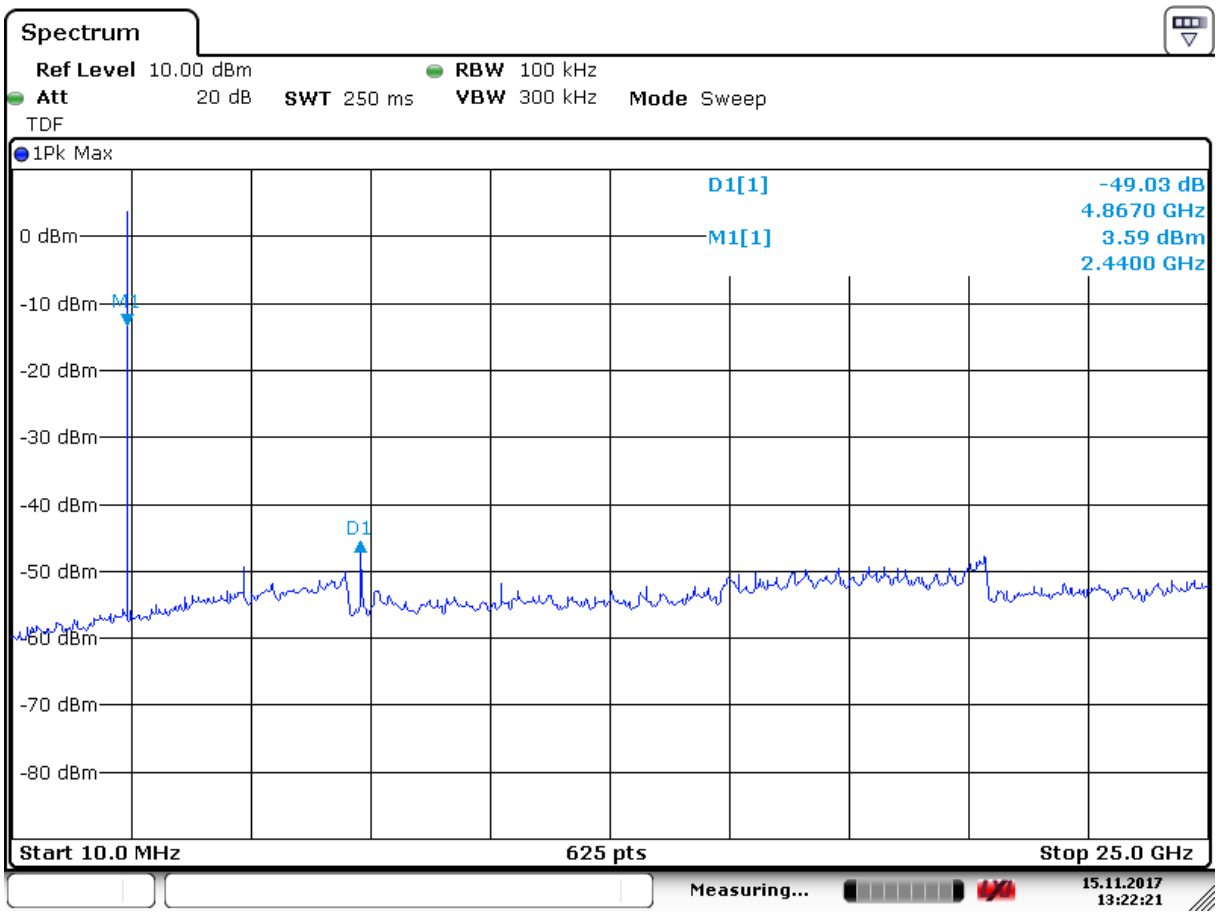
Peak measurement	RMS averaging
20 dBc or more in 100 kHz bandwidth	30 dBc or more in 100 kHz bandwidth

Detector type shall be the same as used for measuring Output Power.
Attenuation below the general limits specified in part 15.209(a) is not required.



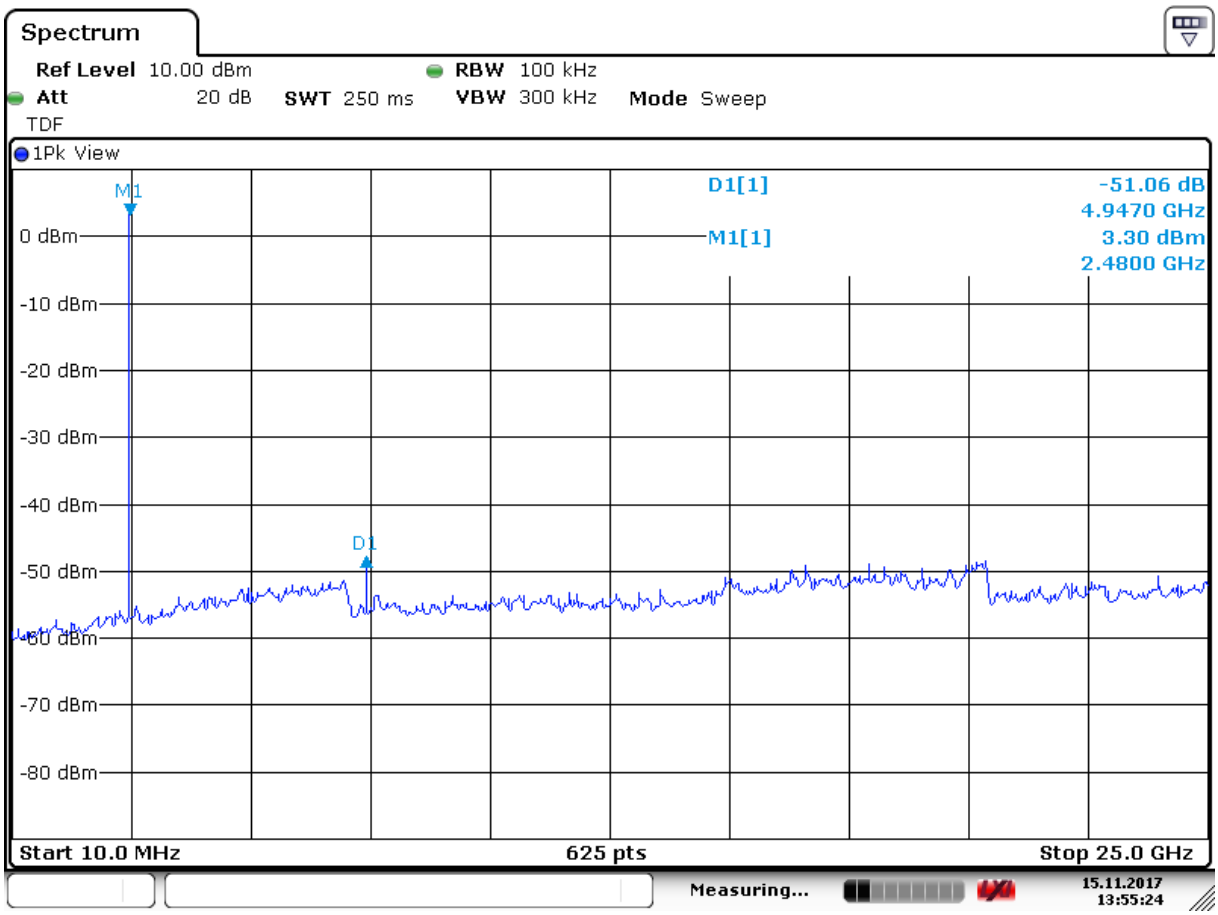
Date: 15.NOV.2017 12:03:18

Conductd spurious emission 10MHz – 25GHz - ch2402MHz



Date: 15.NOV.2017 13:22:22

Conductd spurious emission 10MHz – 25GHz - ch2440MHz



Date: 15.NOV.2017 13:55:24

Conducted spurious emission 10MHz – 25GHz - ch2480MHz

3.6 Restricted Bands of operation

Restricted Bands of operation for FCC and ISED are defined in FCC Part 15.205 and ISED RSS-GEN, Issue 4 clause 8.10.

Generally, no fundamentals are allowed in the restricted bands and all emissions must comply with the limits in FCC 15.209 or RSS-GEN, Issue 4, clause 8.9.

FCC (MHz)	ISED (MHz)	FCC (GHz)	ISED (GHz)
0.090-0.110		**0.96-1.24** **1.3-1.427**	**0.96-1.427**
0.495-0.505		1.435-1.6265	
2.1735-2.1905		1.6455-1.6465	
	3.020-3.026	1.660-1.710	
4.125-4.128		1.7188-1.7222	
4.17725-4.17775		2.2-2.3	
4.20725-4.20775		2.31-2.39	
	5.677-5.683	**2.4835-2.5**	
6.215-6.218		**2.69-2.9**	**2.655-2.9**
6.26775-6.26825		3.26-3.267	
6.31175-6.31225		3.332-3.339	
8.291-8.294		3.3458-3.358	
8.362-8.366		**3.6-4.4**	**3.5-4.4**
8.37625-8.38675		4.5-5.15	
8.41425-8.41475		5.35-5.46	
12.29-12.293		7.25-7.75	
12.51975-12.52025		8.025-8.5	
12.57675-12.57725		9.0-9.2	
13.36-13.41		9.3-9.5	
16.42-16.423		10.6-12.7	
16.69475-16.69525		13.25-13.4	
16.80425-16.80475		14.47-14.5	
25.5-25.67		15.35-16.2	
37.5-38.25		17.7-21.4	
73-74.6		22.01-23.12	
74.8-75.2		23.6-24.0	
108-121.94 **123-138**	**108-138**	31.2-31.8	
149.9-150.05		36.43-36.5	
156.52475-156.52525		Above 38.6	
156.7-156.9			
162.0125-167.17			
167.72-173.2			
240-285			
322-335.4			
399.9-410			
608-614			

Frequencies in **Bold** text are specific for FCC or ISED, all other frequencies are common.

3.7 Spurious Emissions (Radiated)

Para. No.: 15.247 (c)

Test Performed By: Markus Korny	Date of Test: 2017-11-14 – 2017-11-15

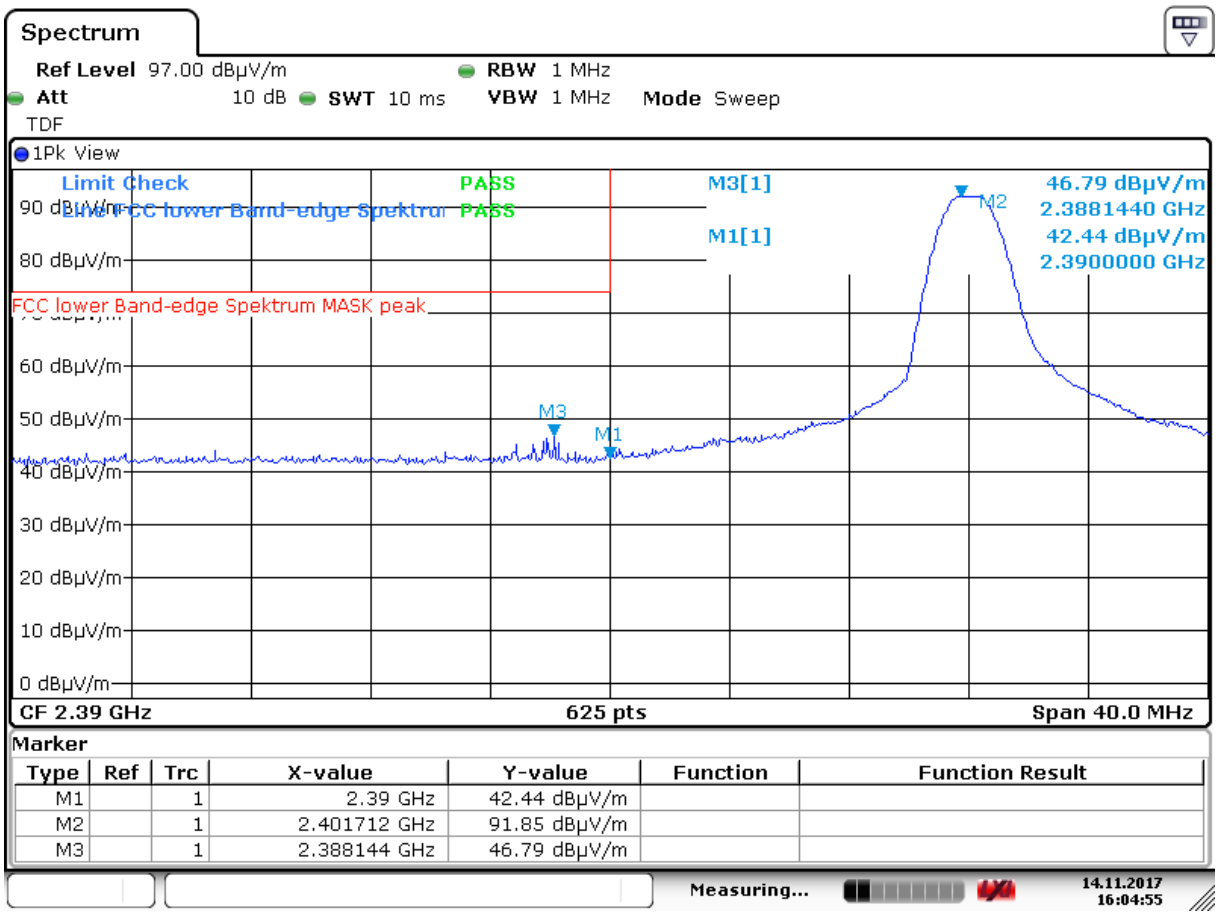
Test Results: Complies

Band-edge, @3m

Frequency	Measured Field Strength @3m, dBµV/m	Detector	Limit dBµV/m	Margin dB
2.388 GHz	46.79	PK	74	27.21
	/	AV	54	/
2.39 GHz	42.44	PK	74	31.56
	/	AV	54	/
2.4835 GHz	50.83	PK	74	23.17
	/	AV	54	/

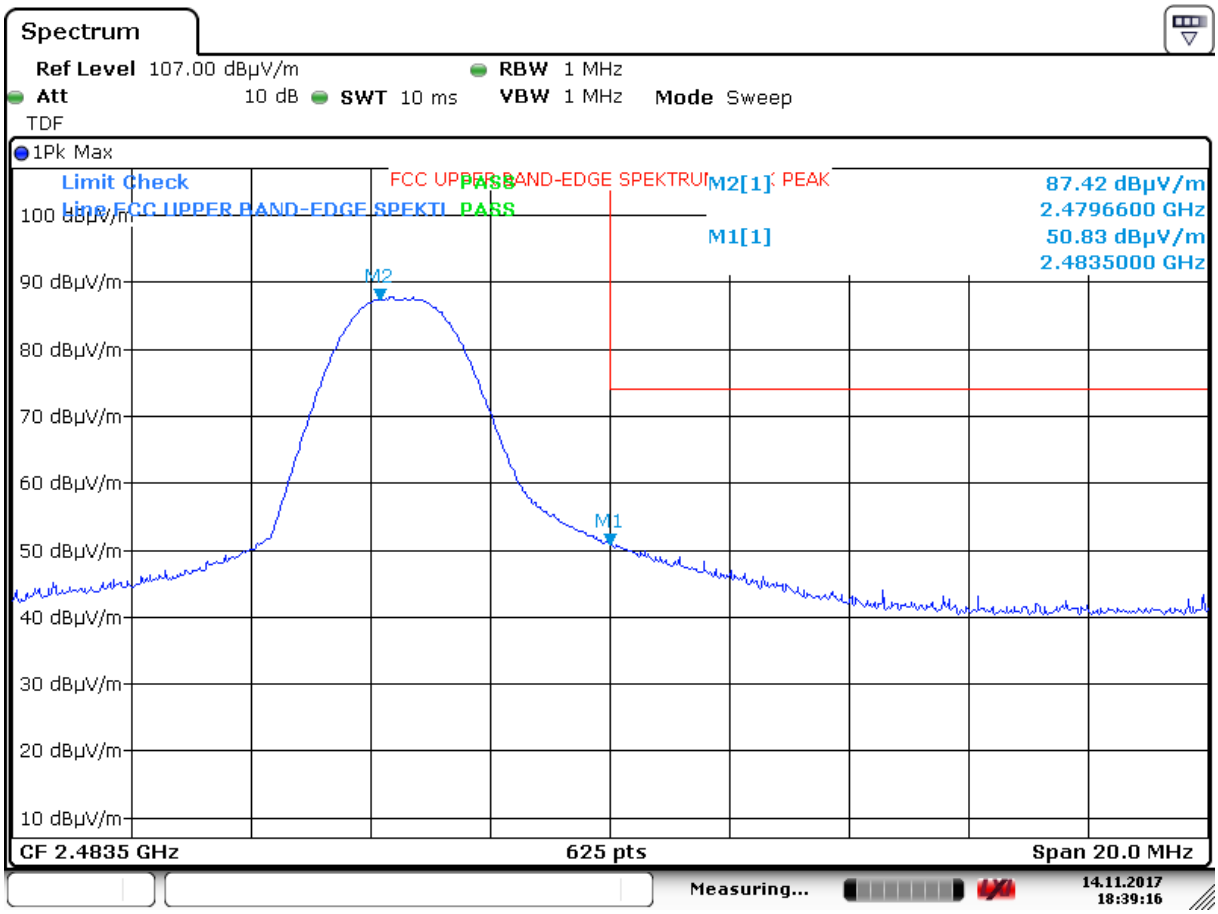
Average values are measured with Peak Detector and corrected for Duty Cycle.
See attached plots.

Duty Cycle Correction Factor Calculation:
Duty Cycle = On Time / (Period * Number of Channels) = 213 µs / (628 µs * 40) = 0.0085
Duty Cycle Correction factor = -20 x log (Duty Cycle) = 41.4 dB
Maximum allowed Duty Cycle Correction: 20 dB



Date: 14.NOV.2017 16:04:55

Band Edge, 2390 MHz, Peak Detector



Date: 14.NOV.2017 18:39:16

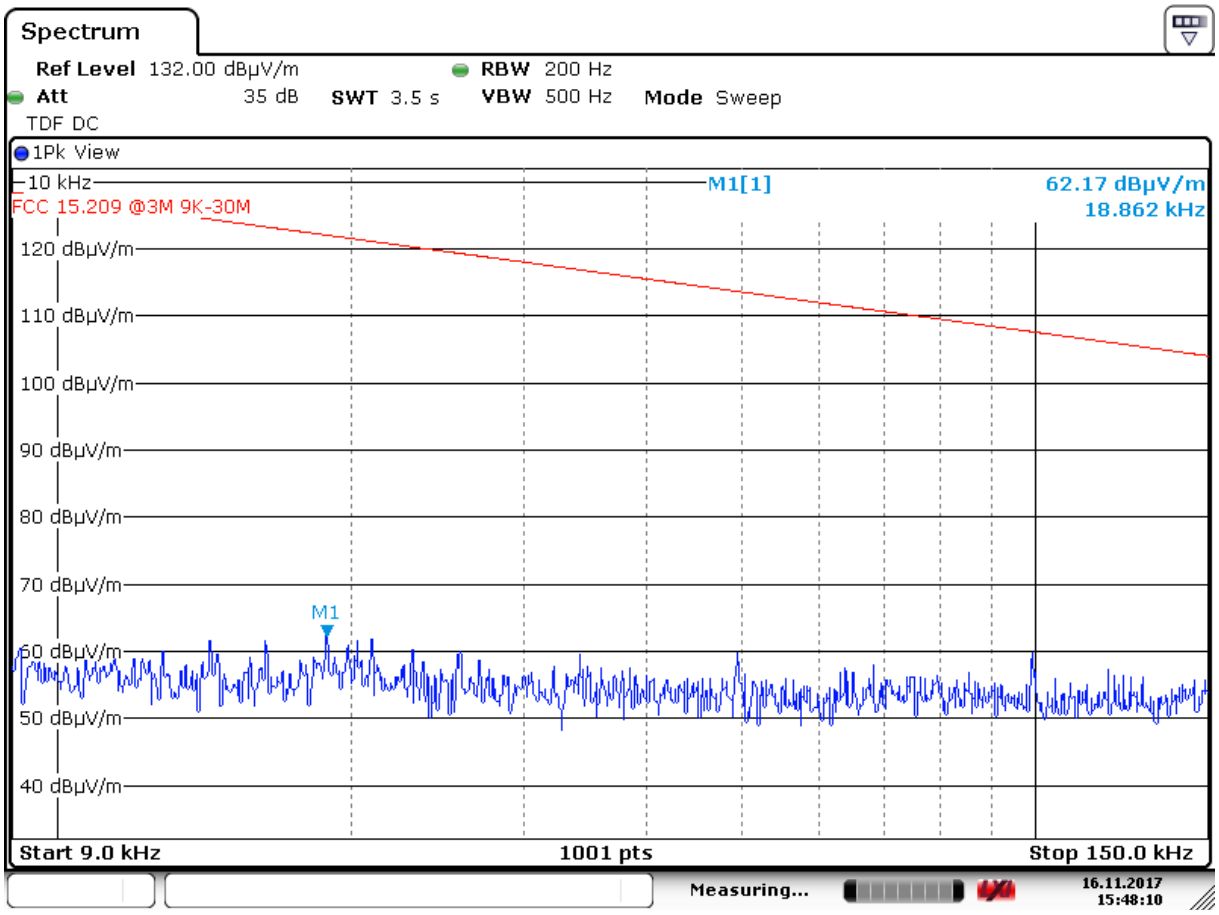
Band Edge, 2483.5 MHz, Peak Detector

Radiated emissions 10 kHz-30 MHz.

Measuring distance 3 m, measured with Peak detector.

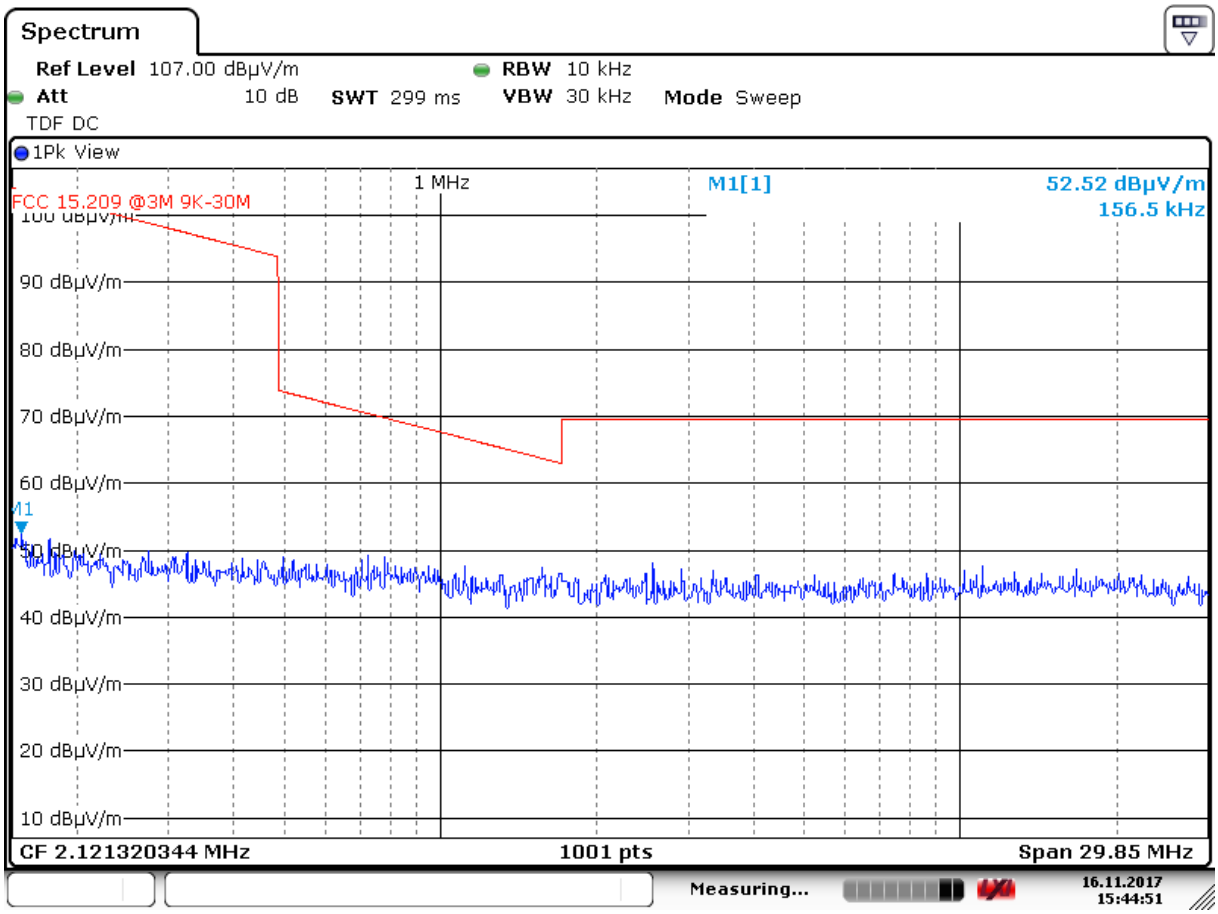
No spurious detected, see attached graph.

Limit is converted to 3 m using 40 dB/decade according to 15.31 (f) (2).



Date: 16.NOV.2017 15:48:10

Radiated Emissions, 9 kHz – 150 kHz @3m



Date: 16.NOV.2017 15:44:51

Radiated Emissions, 150 kHz - 30MHz @3m

Radiated emission 30 – 1000 MHz.

Detector: Quasi-Peak

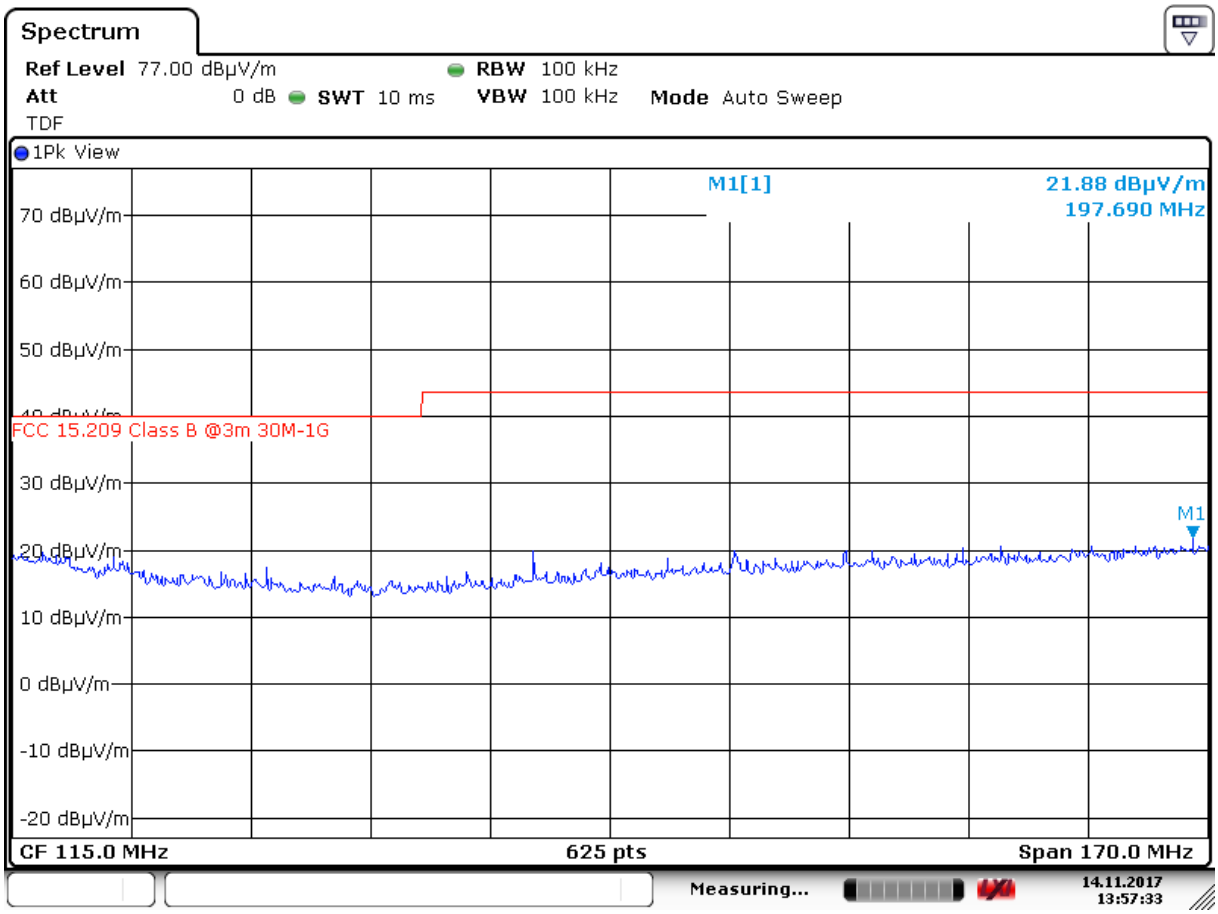
Measuring distance 3 .

Frequency	Operational condition	Detector	Field strength	Measuring distance	Limit FCC15.209	Margin
MHz			dBµV/m	metres	dBµV/m	dB
/	TX on	PK	/	3	40.0	/

See attached graphs.

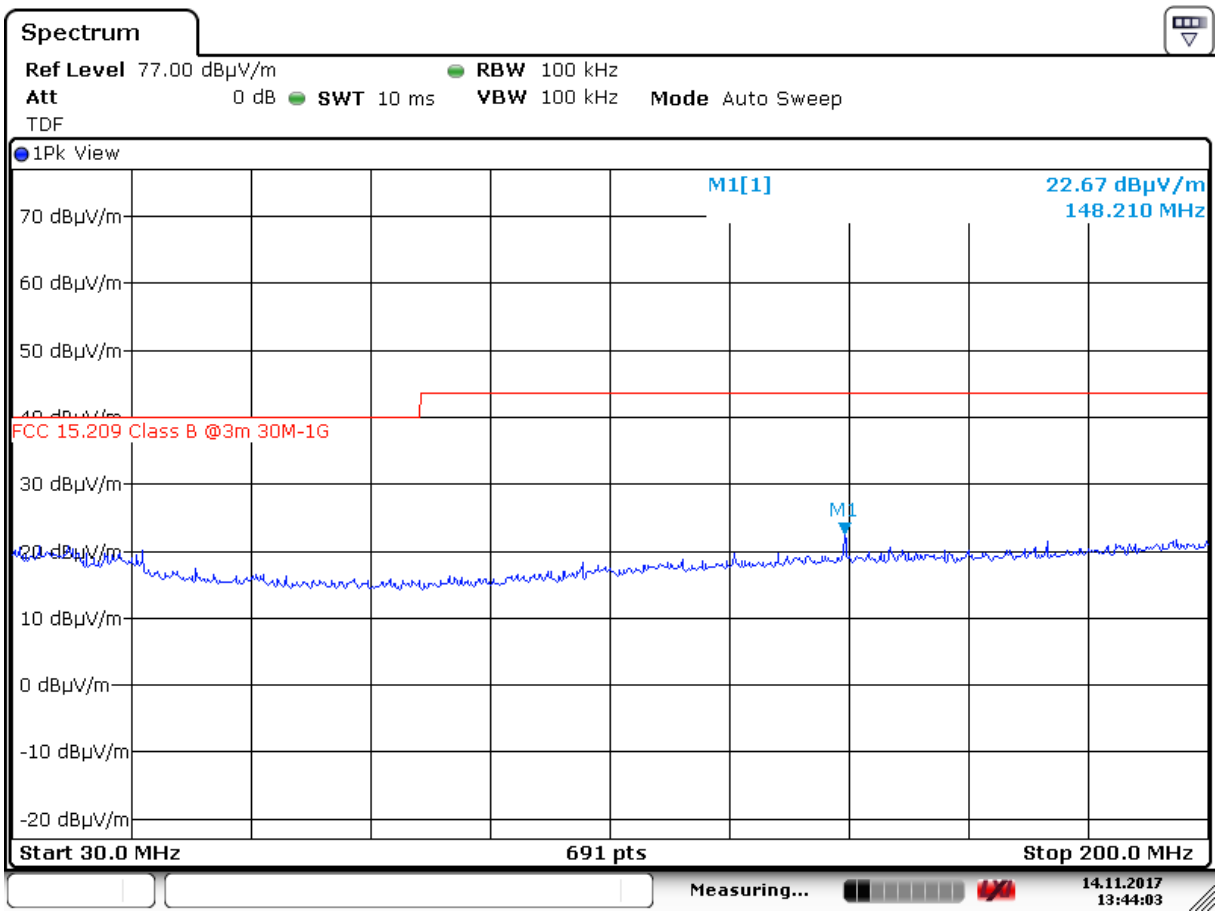
Requirements/Limit

FCC	Part 15.209 @ frequencies defined in §15.205	
ISED	RSS-GEN Issue 4, Clause 8.9 @ frequencies defined in clause 8.10	
	Radiated emission limit @3 meters	
Frequency (MHz)	**Quasi Peak (µV/m)**	**Quasi Peak (dBµV/m)**
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0



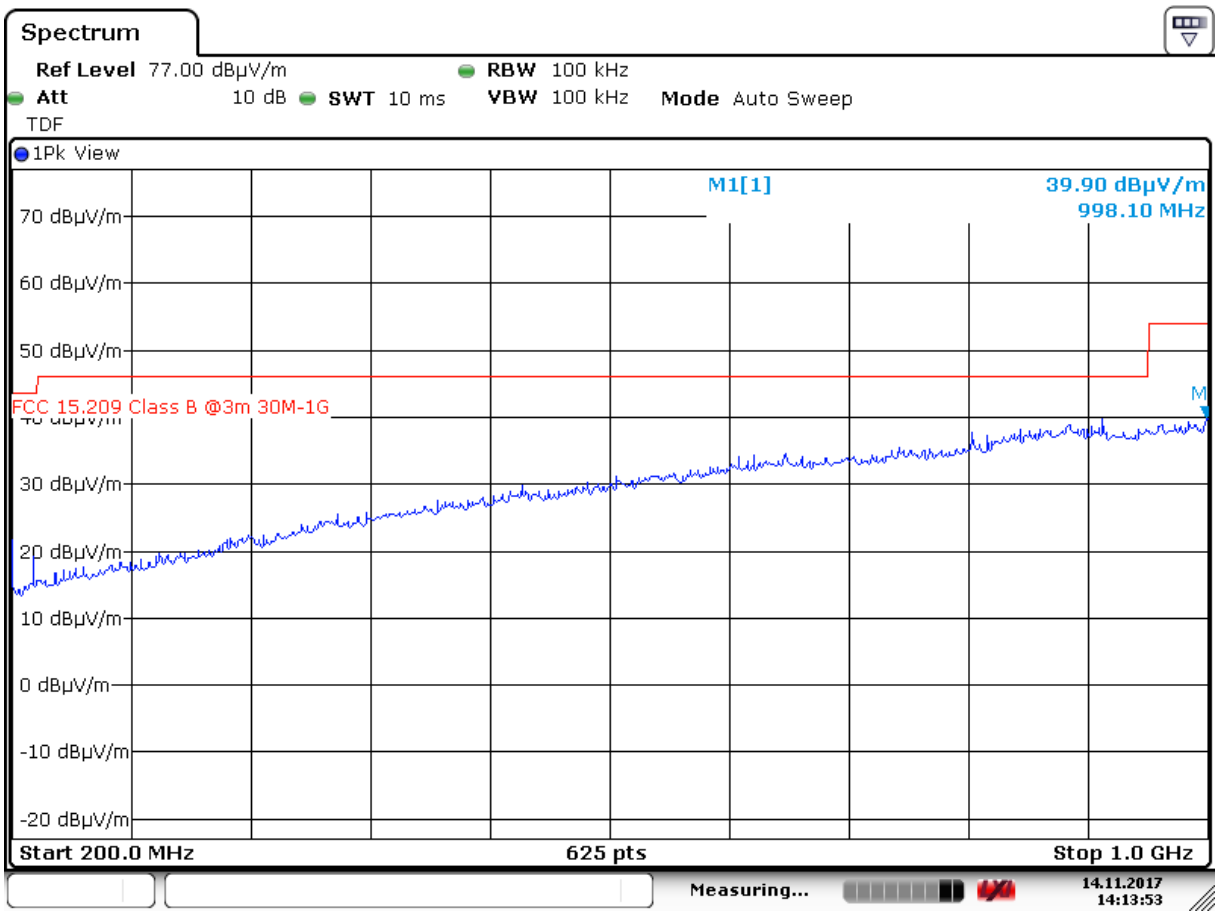
Date: 14.NOV.2017 13:57:33

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



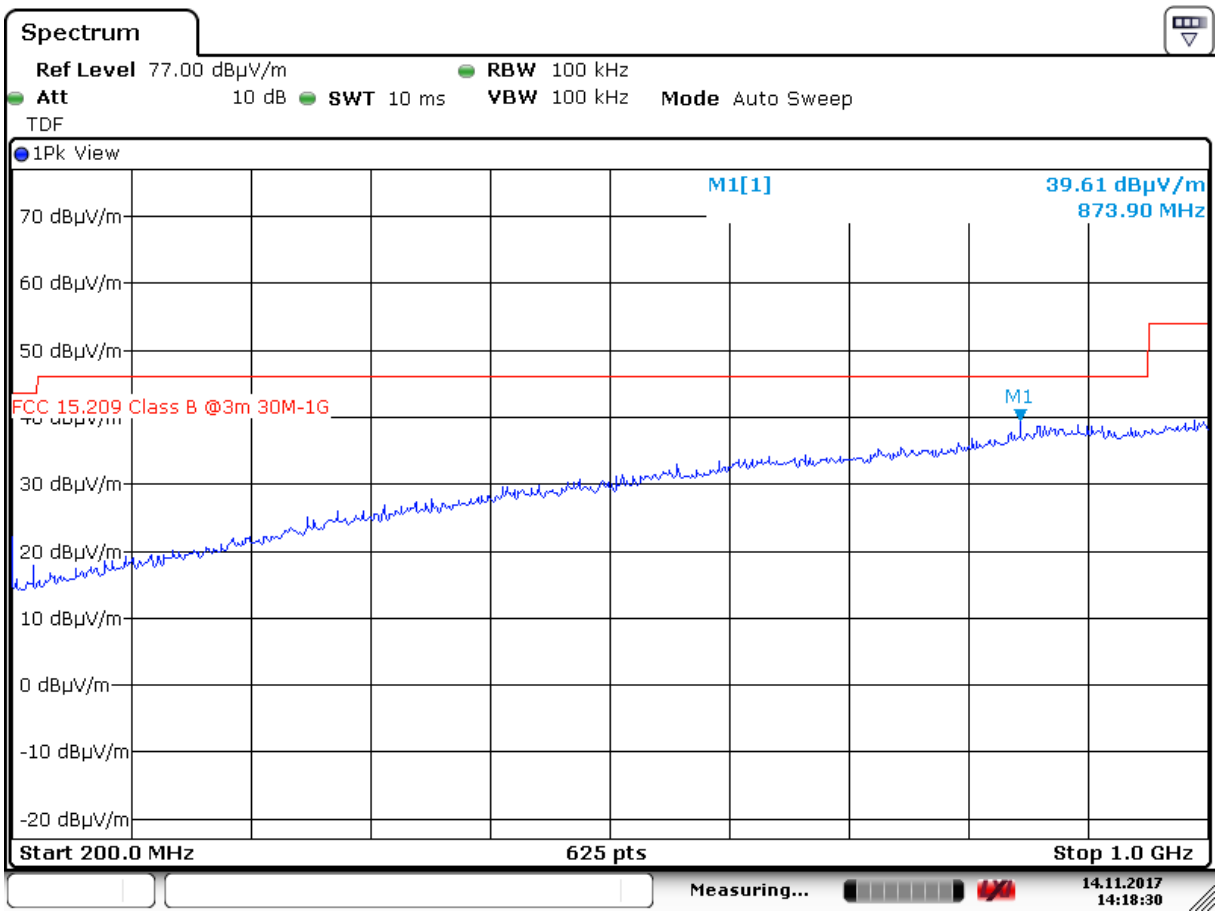
Date: 14.NOV.2017 13:44:03

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



Date: 14.NOV.2017 14:13:53

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



Date: 14.NOV.2017 14:18:30

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

Radiated Emissions, 1-25 GHz

Measuring distance: 3m (1 – 25 GHz)

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

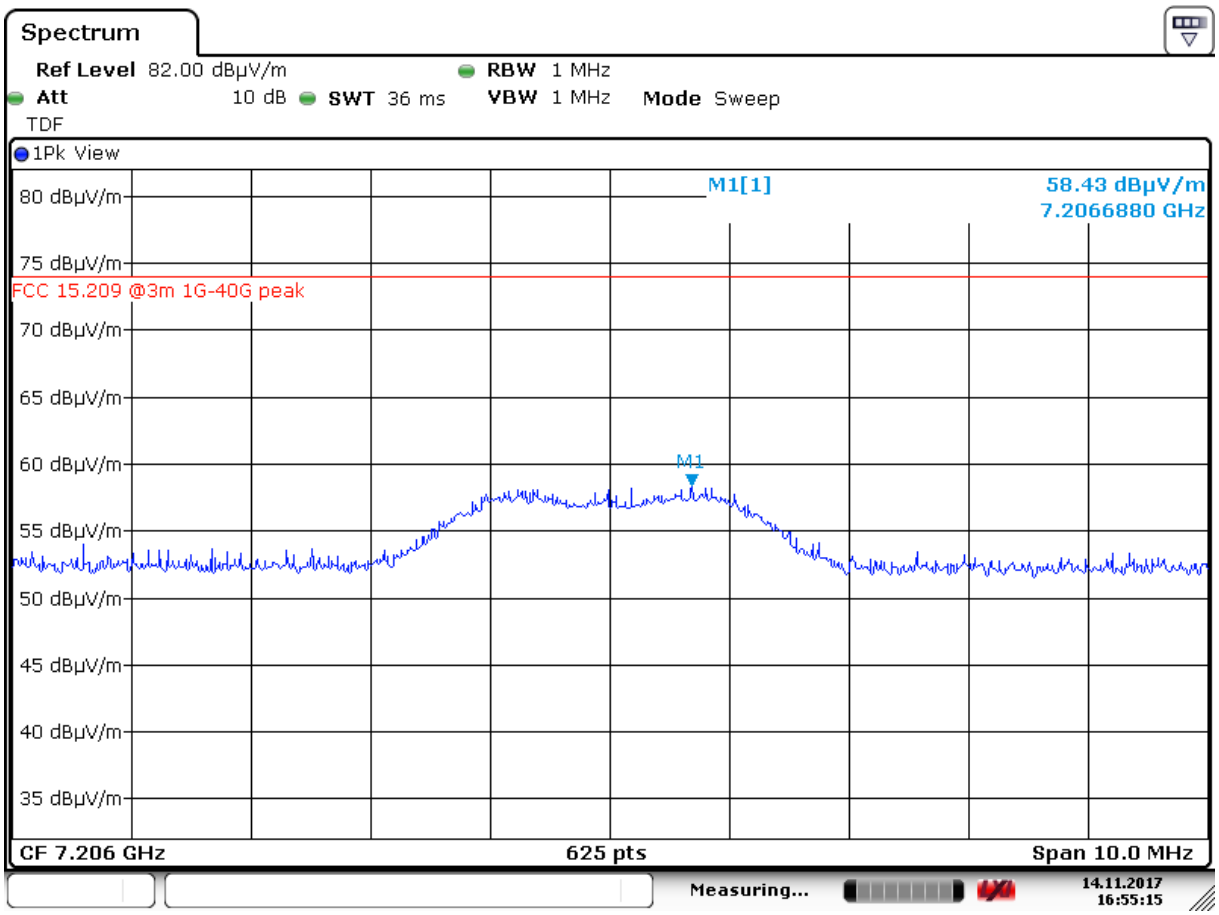
Peak Detector:

Frequency	RF channel	Dist. corr. factor	Field strength, Peak Detector	Duty cycle corr. factor	Limit	Margin
GHz	L,M,H	dB	dBµV/m	dB	dBµV/m	dB
4.81	L	0	< 54	0	74	>20
4.88	M	0	< 54	0	74	>20
4.96	H	0	< 54	0	74	>20
7.206	L	0	58.43	0	74	15.47
7.320	M	0	60.97	0	74	13.03
7.440	H	0	60.20	0	74	13.80
Other freqs	L,M,H	/	< 54	0	74	>20

Average Detector:

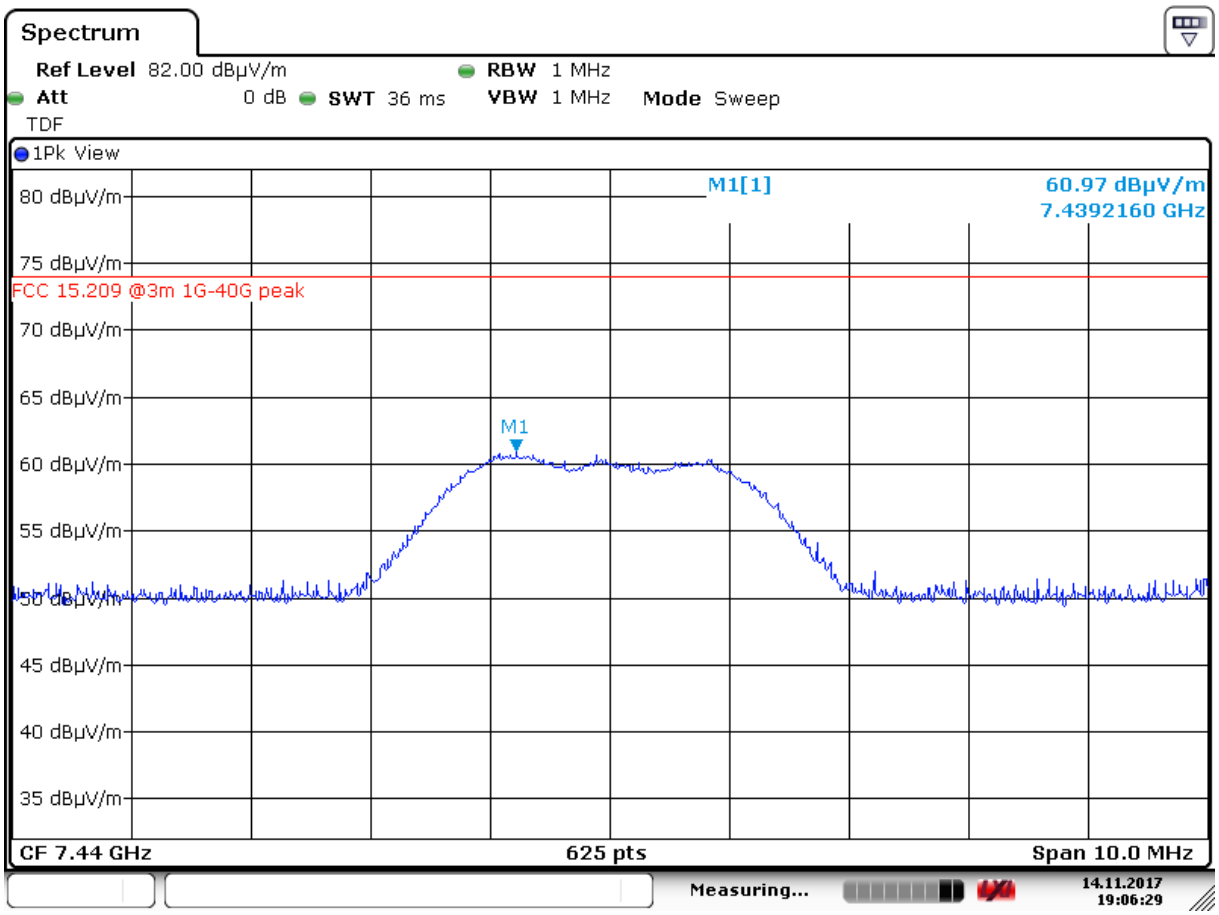
Frequency	RF channel	Dist. corr. factor	Field strength, Average Detector	Duty cycle corr. factor	Limit	Margin
GHz	L,M,H	dB	dBµV/m	dB	dBµV/m	dB
4.81	L	0	/	0	54	/
4.88	M	0	/	0	54	/
4.96	H	0	/	0	54	/
7.206	L	0	38.43	20	54	15.47
7.320	M	0	40.97	20	54	13.03
7.440	H	0	40.20	20	54	13.80
Other freqs	L,M,H	/	/	0	54	/

Tested according to KDB 558074 D01 DTS Meas Guidance v03r05, Section 12.2.5.2
Antenna factor, amplifier gain and cable loss are included in spectrum analyzer “Transducer factor”.
See plots.



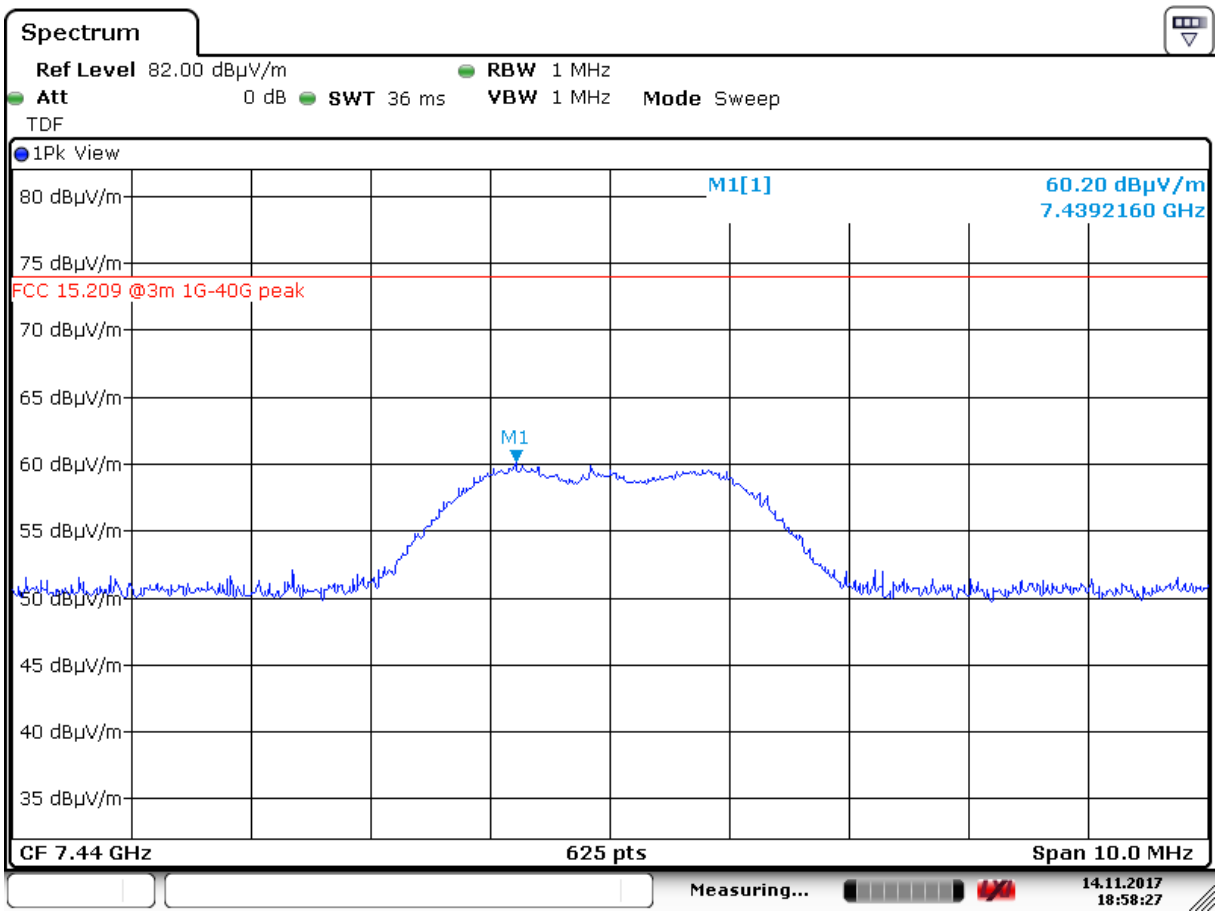
Date: 14.NOV.2017 16:55:15

3rd harmonic – ch 2402MHz, VP – PK



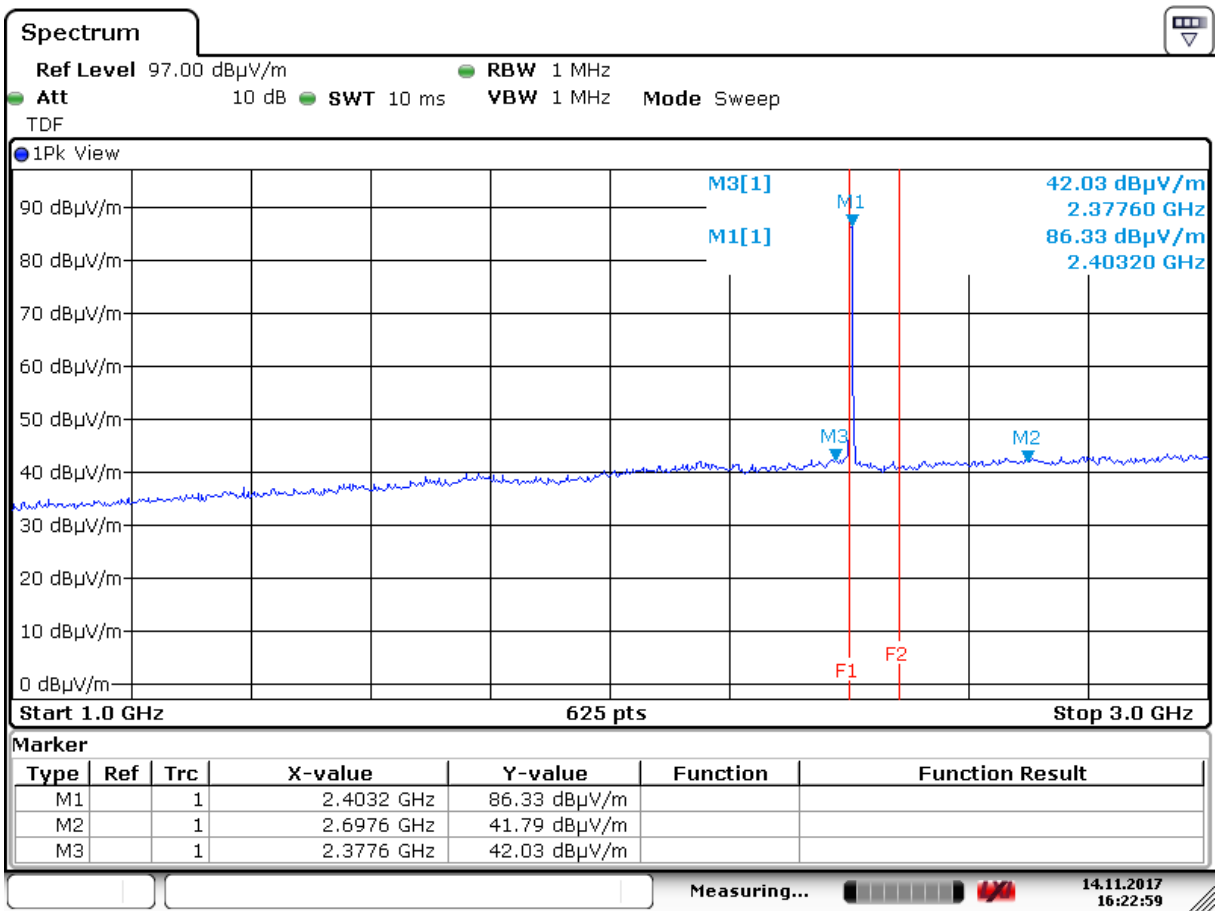
Date: 14.NOV.2017 19:06:29

3rd harmonic – ch 2440MHz, VP – PK



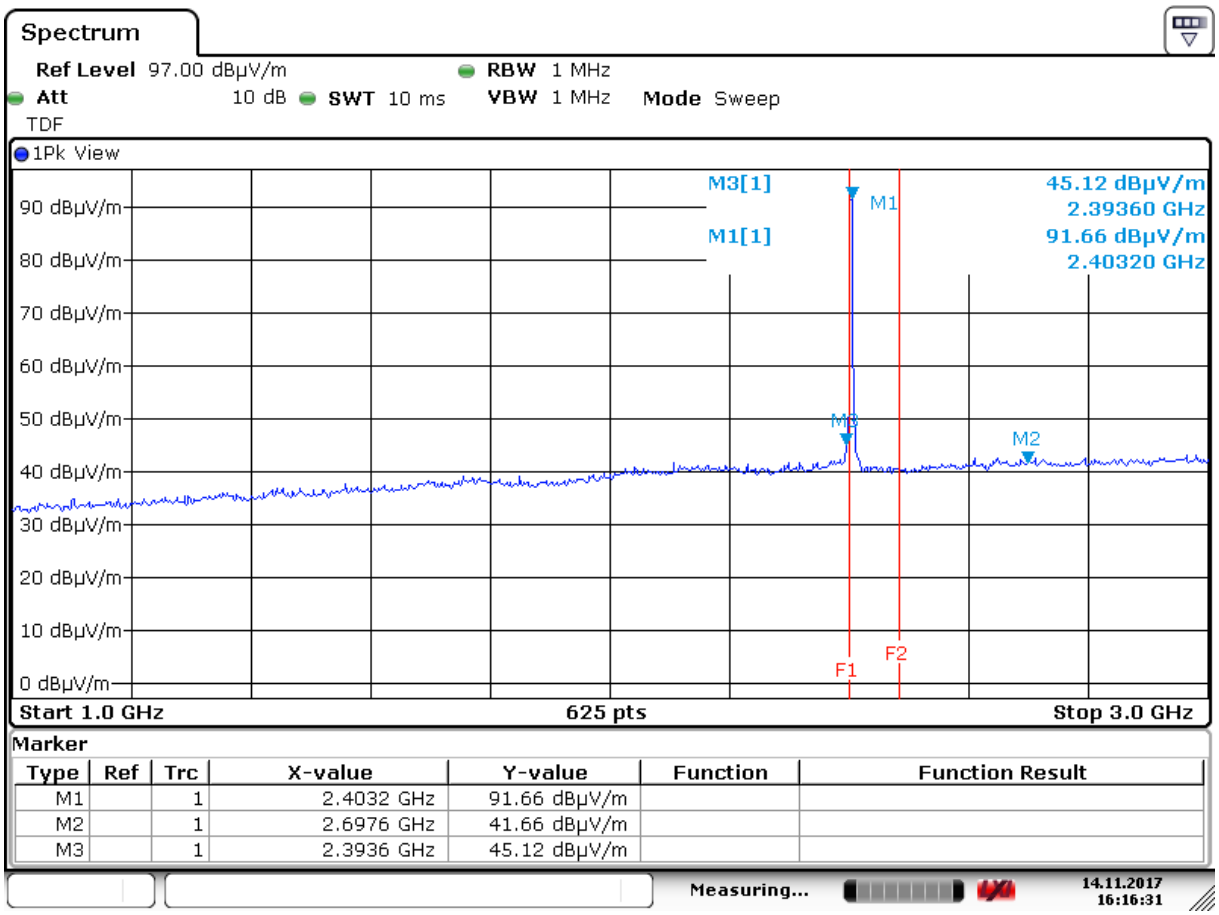
Date: 14.NOV.2017 18:58:27

3rd harmonic – ch 2480MHz, HP – PK



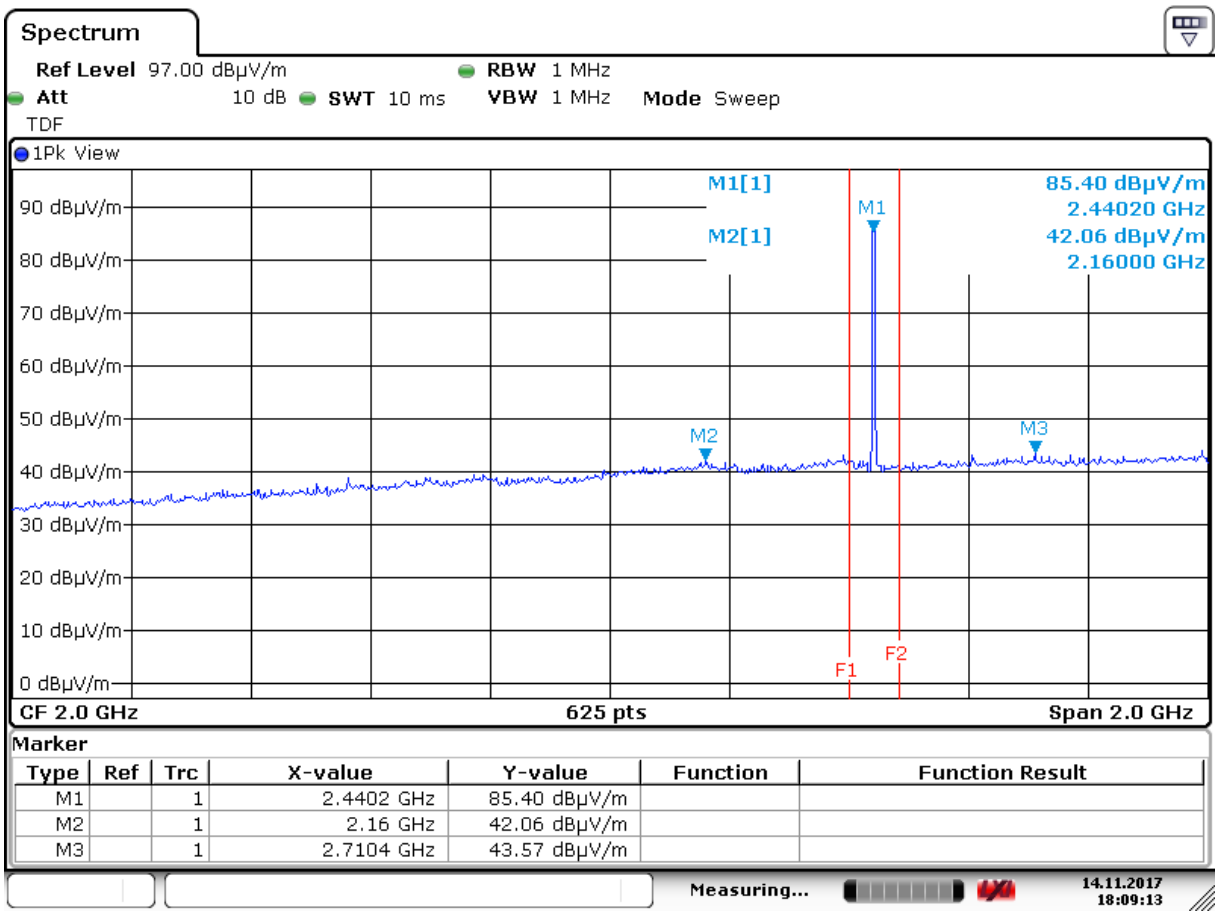
Date: 14.NOV.2017 16:22:59

Radiated Emissions, 2402 MHz, 1 – 3 GHz, VP, @3m – Pre-scan



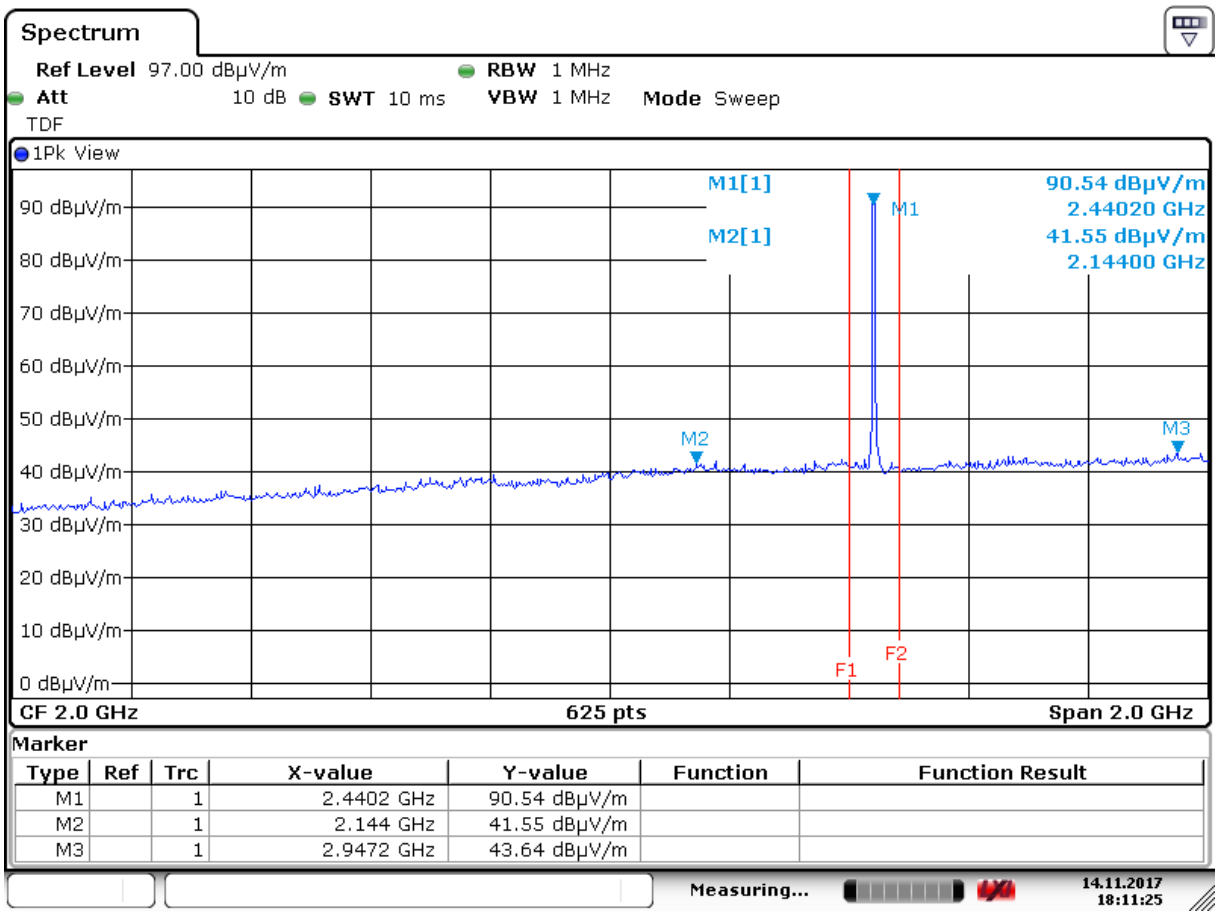
Date: 14.NOV.2017 16:16:31

Radiated Emissions, 2402 MHz, 1 – 3 GHz, HP, @3m – Pre-scan



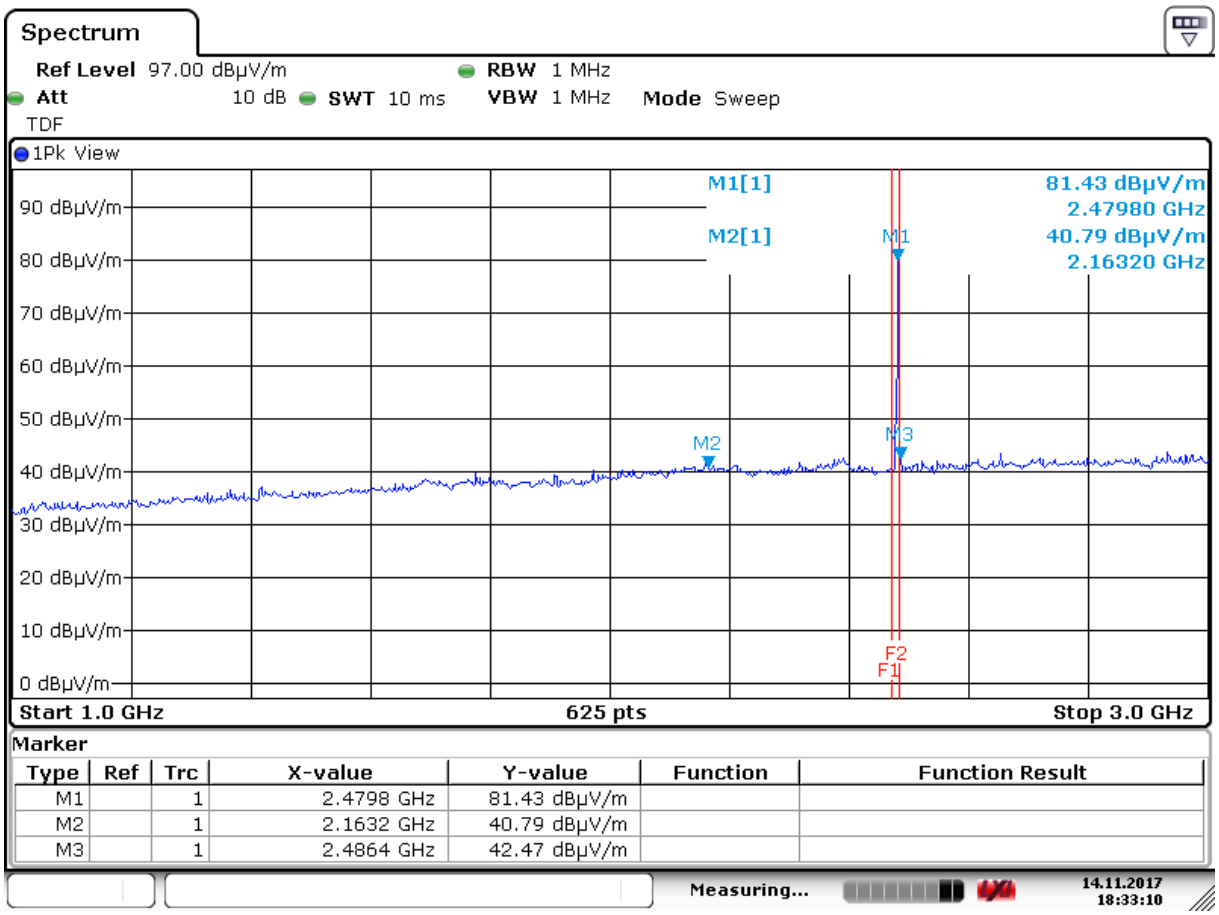
Date: 14.NOV.2017 18:09:13

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



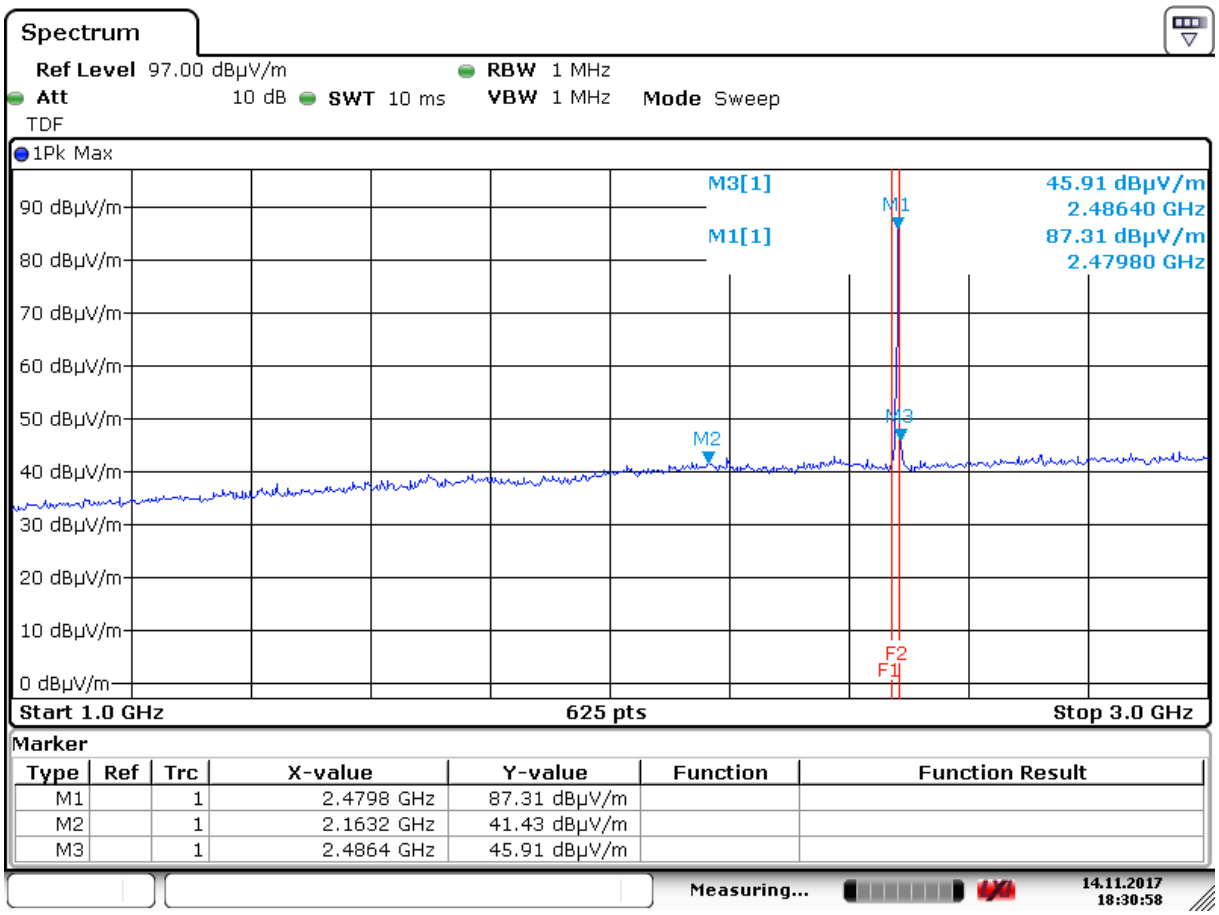
Date: 14.NOV.2017 18:11:25

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



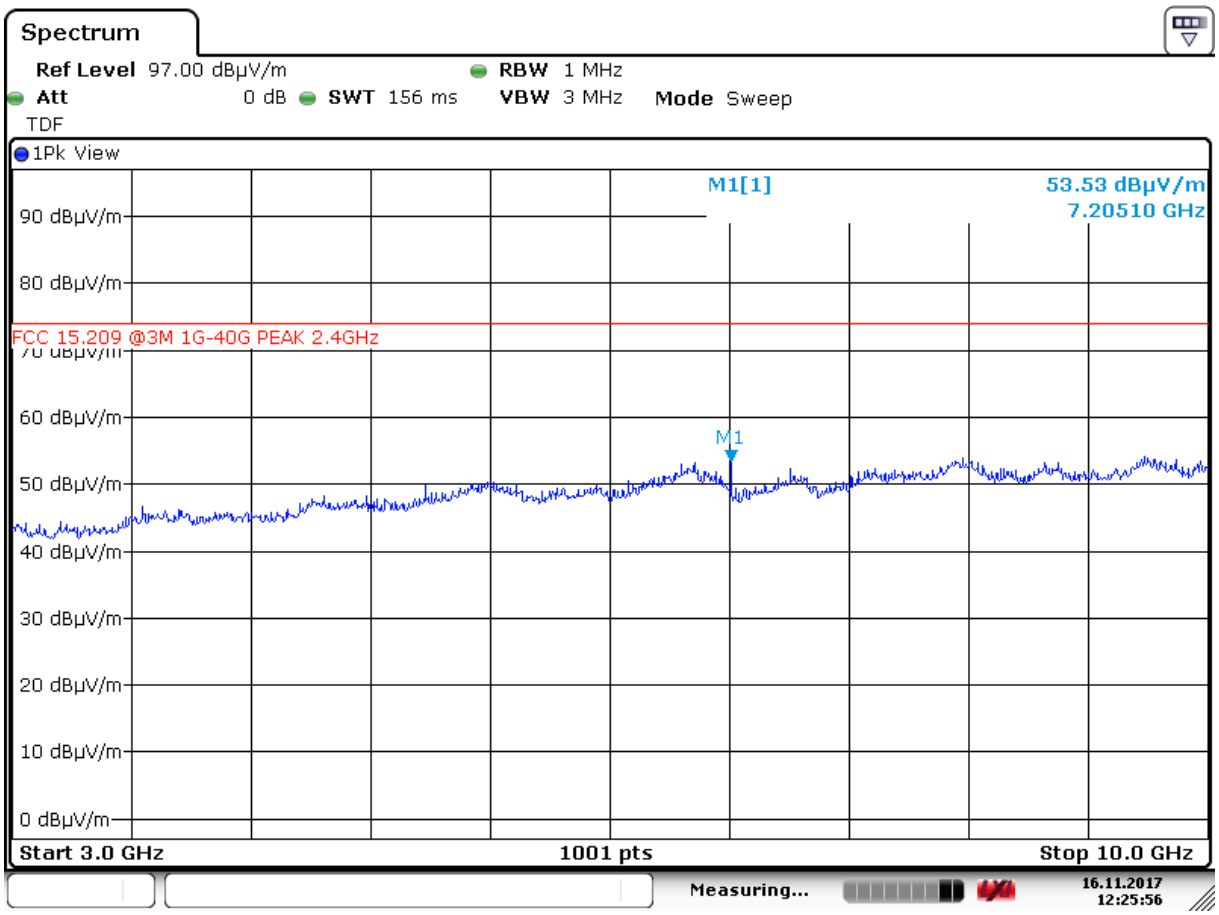
Date: 14.NOV.2017 18:33:10

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



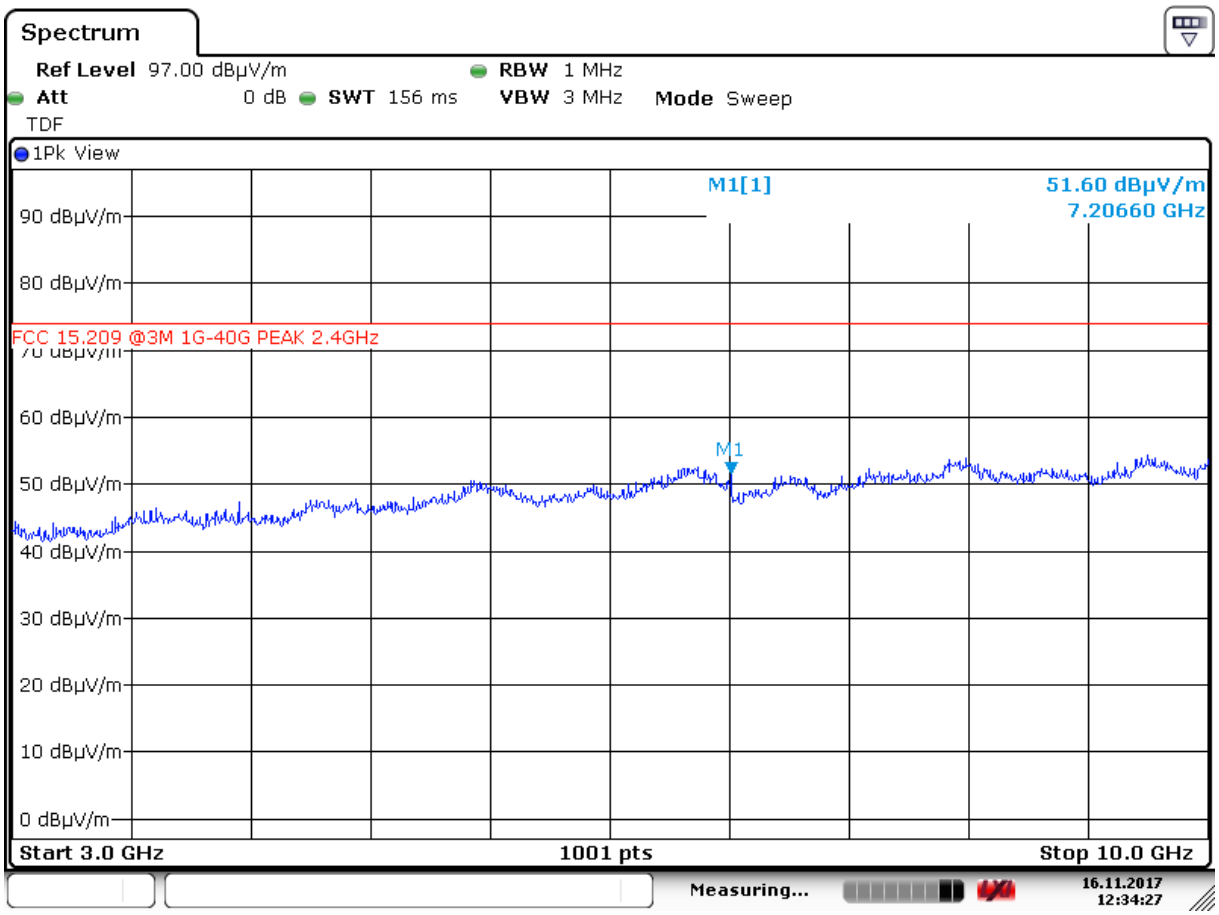
Date: 14.NOV.2017 18:30:58

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



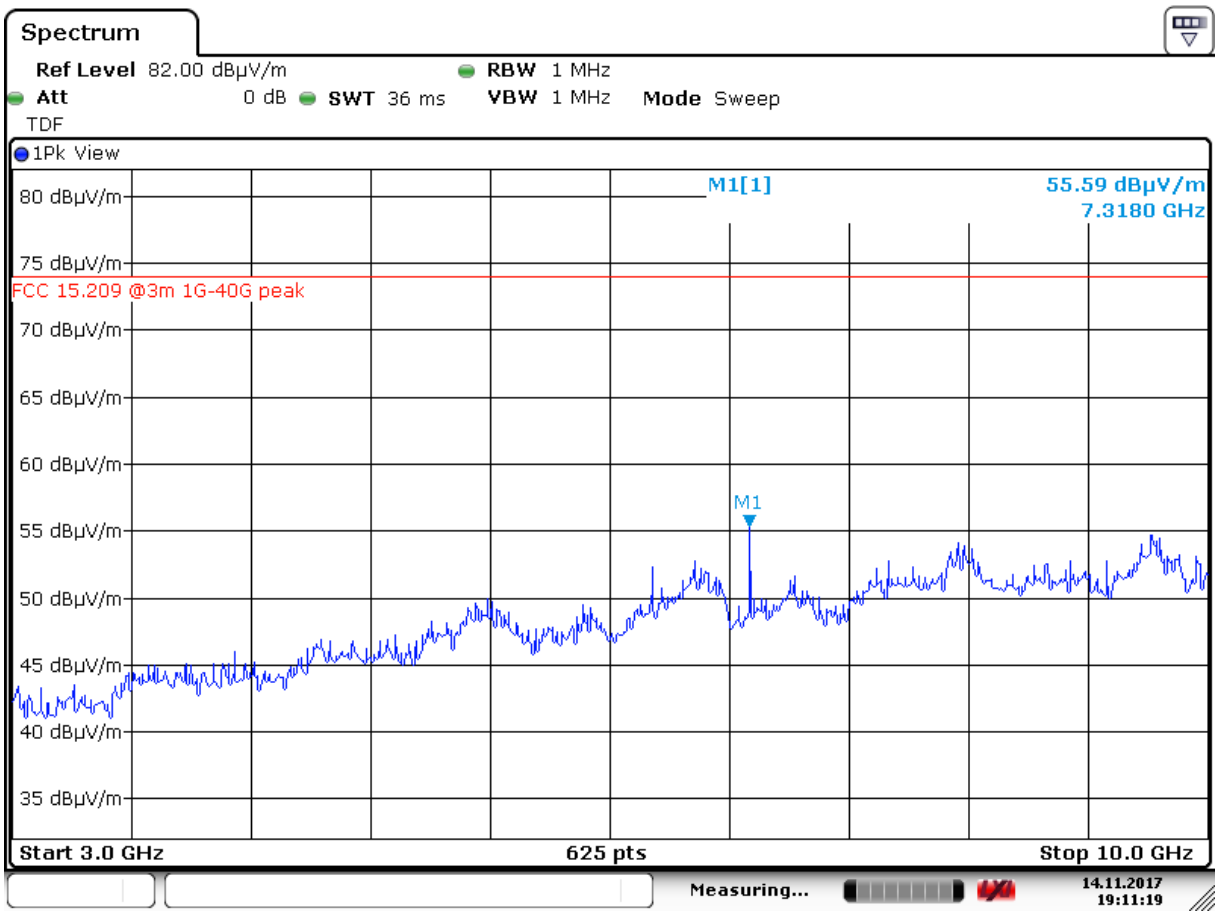
Date: 16.NOV.2017 12:25:57

Radiated Emissions ch. 2402 MHz, 3 – 10 GHz, VP, @3m – Pre-scan



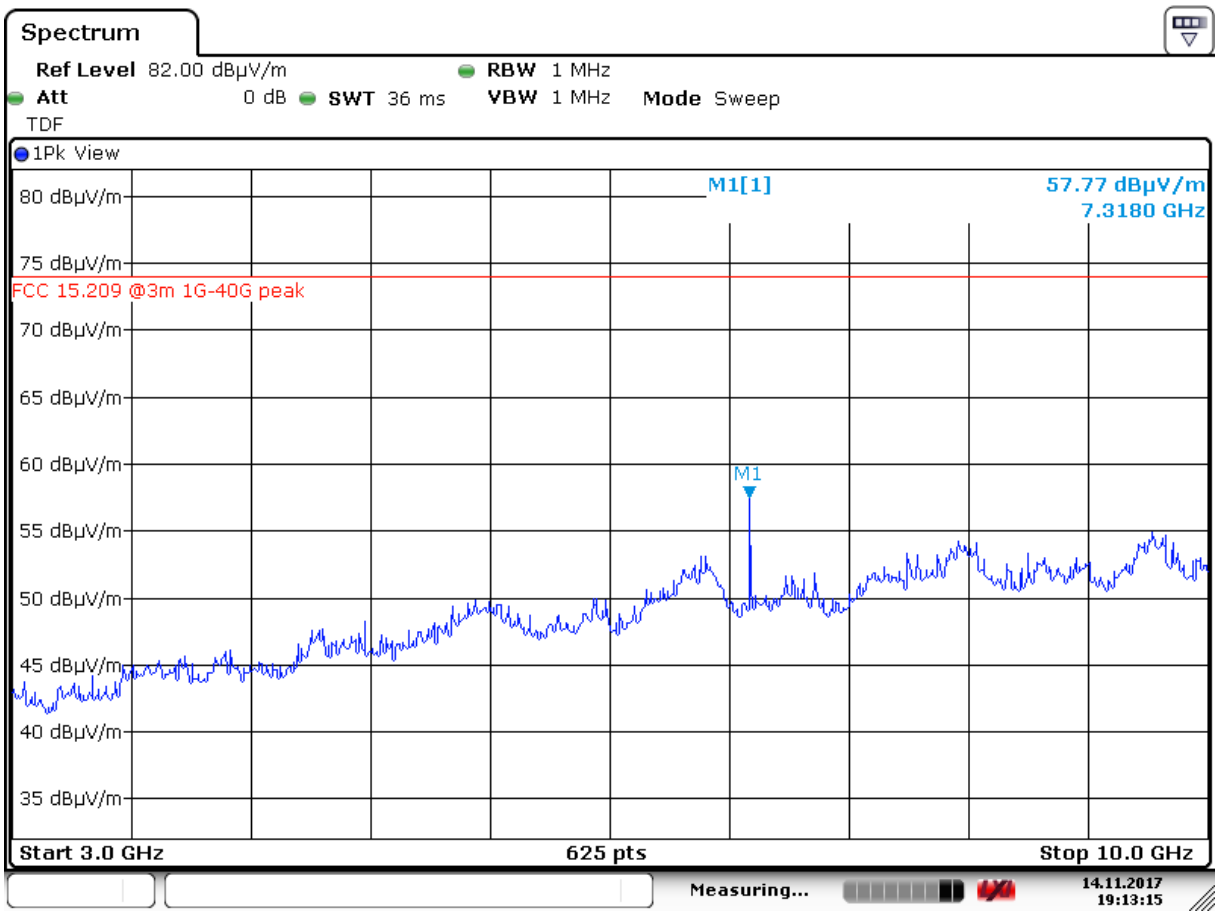
Date: 16.NOV.2017 12:34:27

Radiated Emissions ch. 2402 MHz, 3 – 10 GHz, HP, @3m – Pre-scan



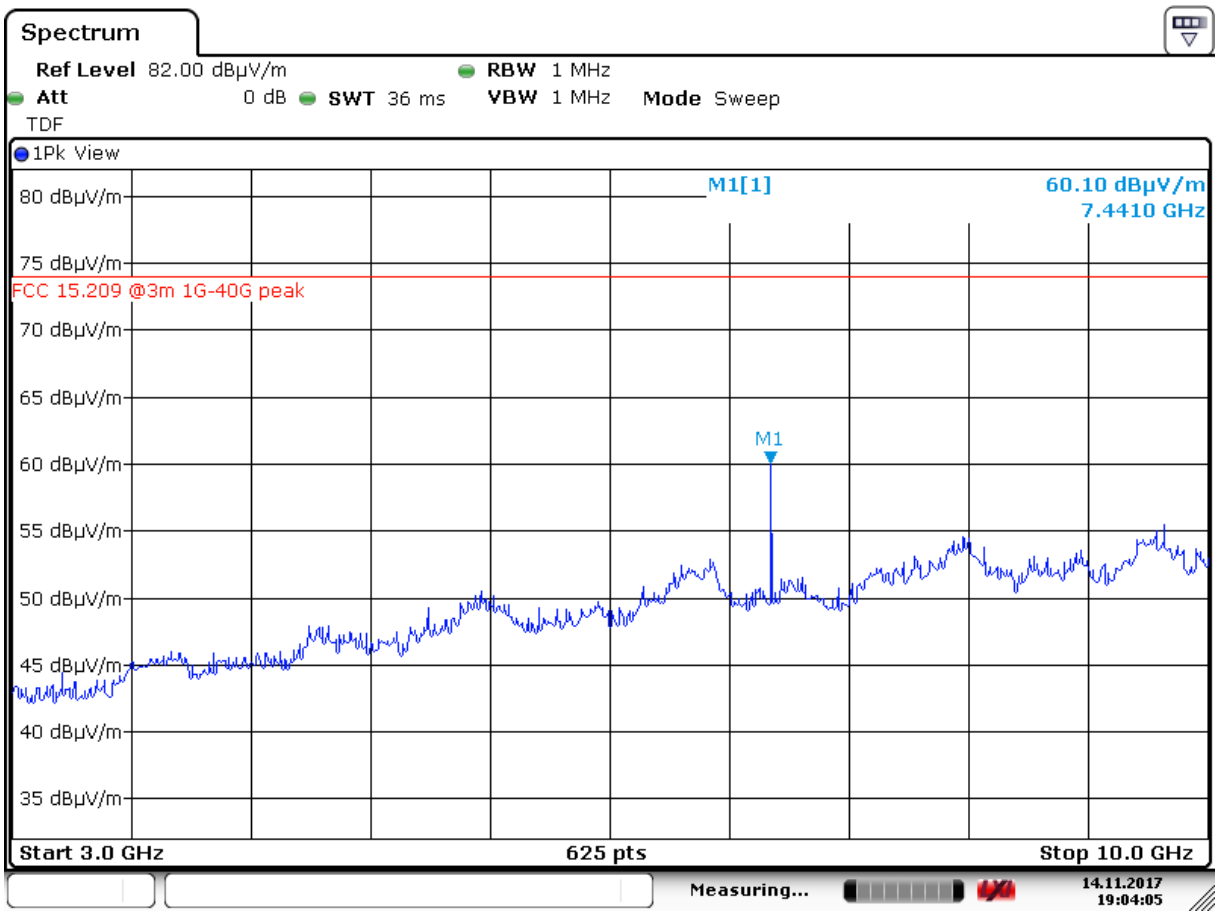
Date: 14.NOV.2017 19:11:19

Radiated Emissions ch. 2440 MHz, 3 – 10 GHz, VP, @3m – Pre-scan



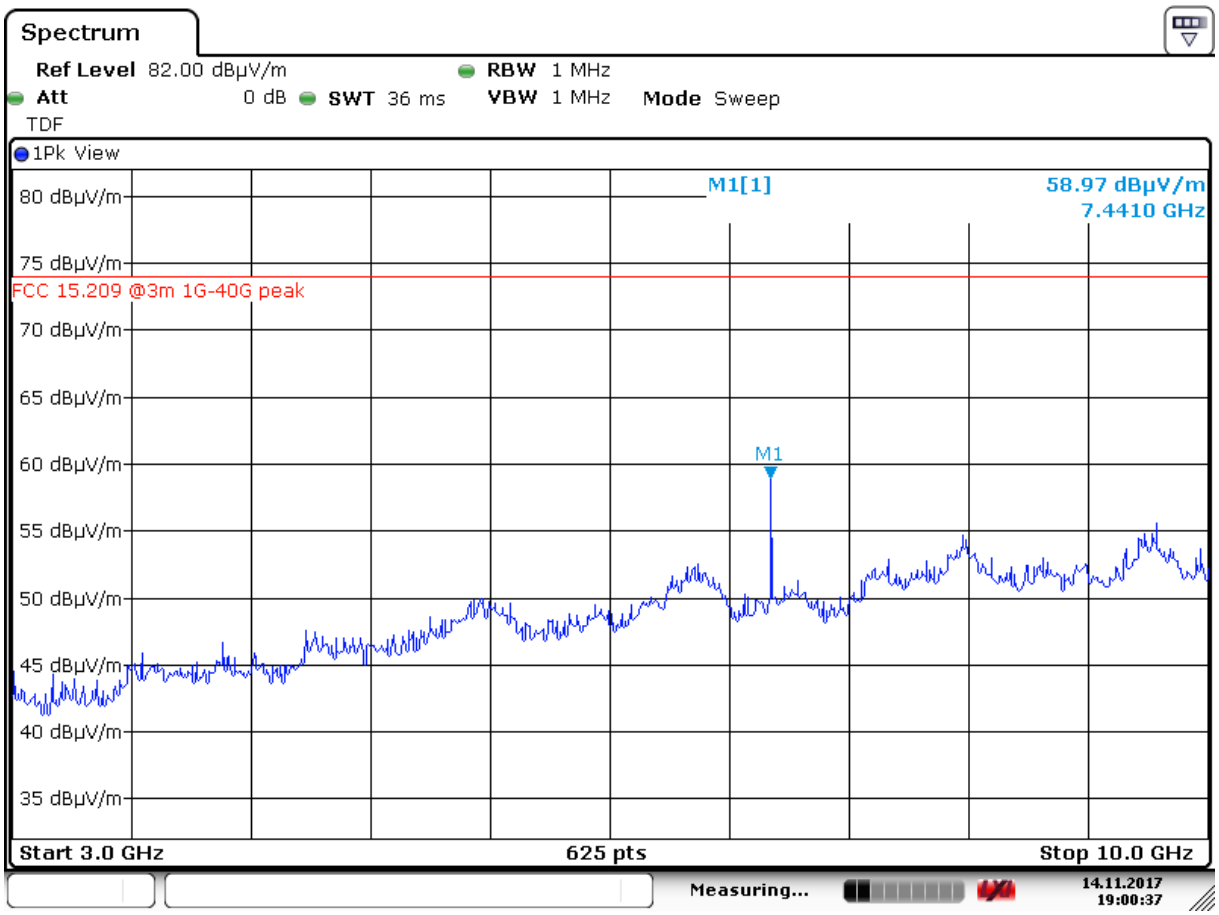
Date: 14.NOV.2017 19:13:15

Radiated Emissions ch. 2440 MHz, 3 – 10 GHz, HP, @3m – Pre-scan



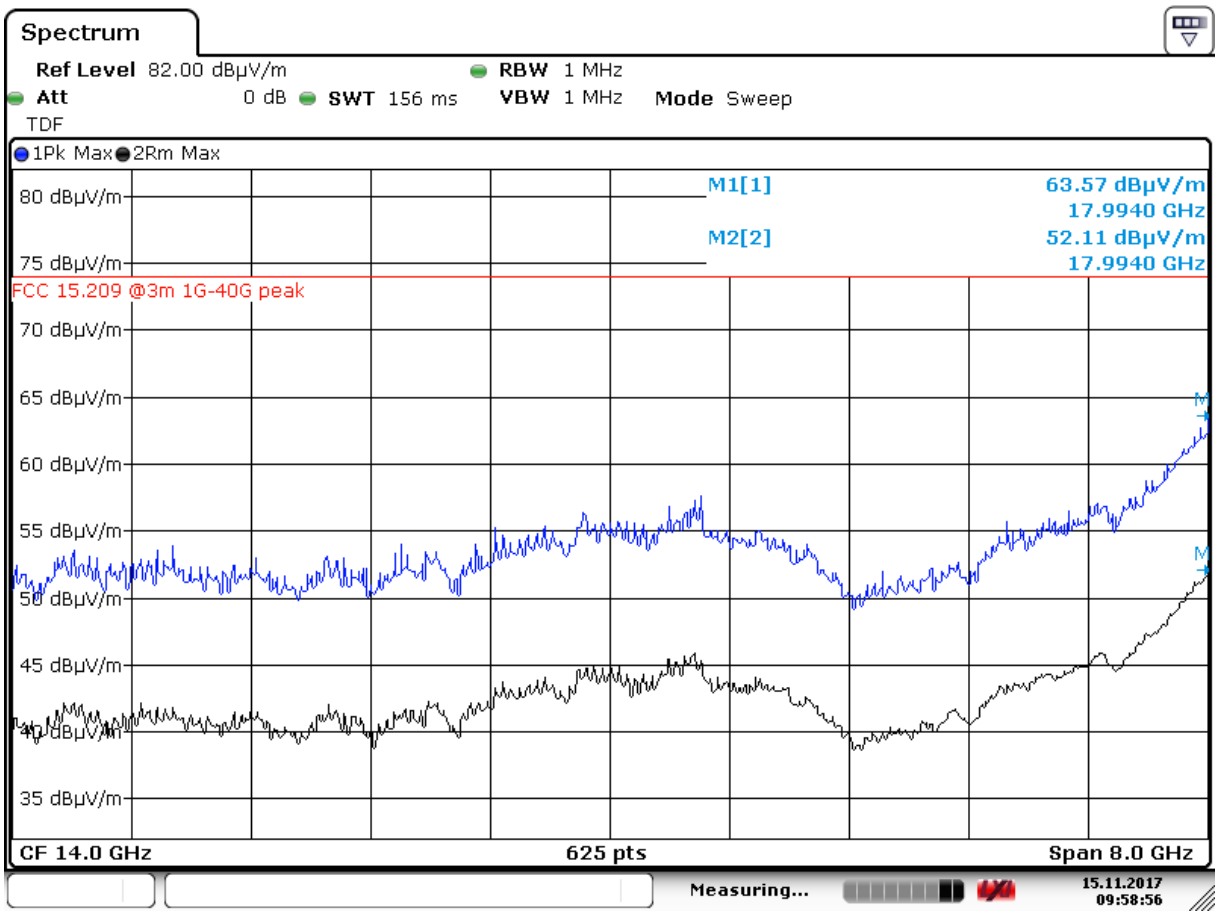
Date: 14.NOV.2017 19:04:05

Radiated Emissions ch. 2480 MHz, 3 – 10 GHz, VP, @3m – Pre-scan



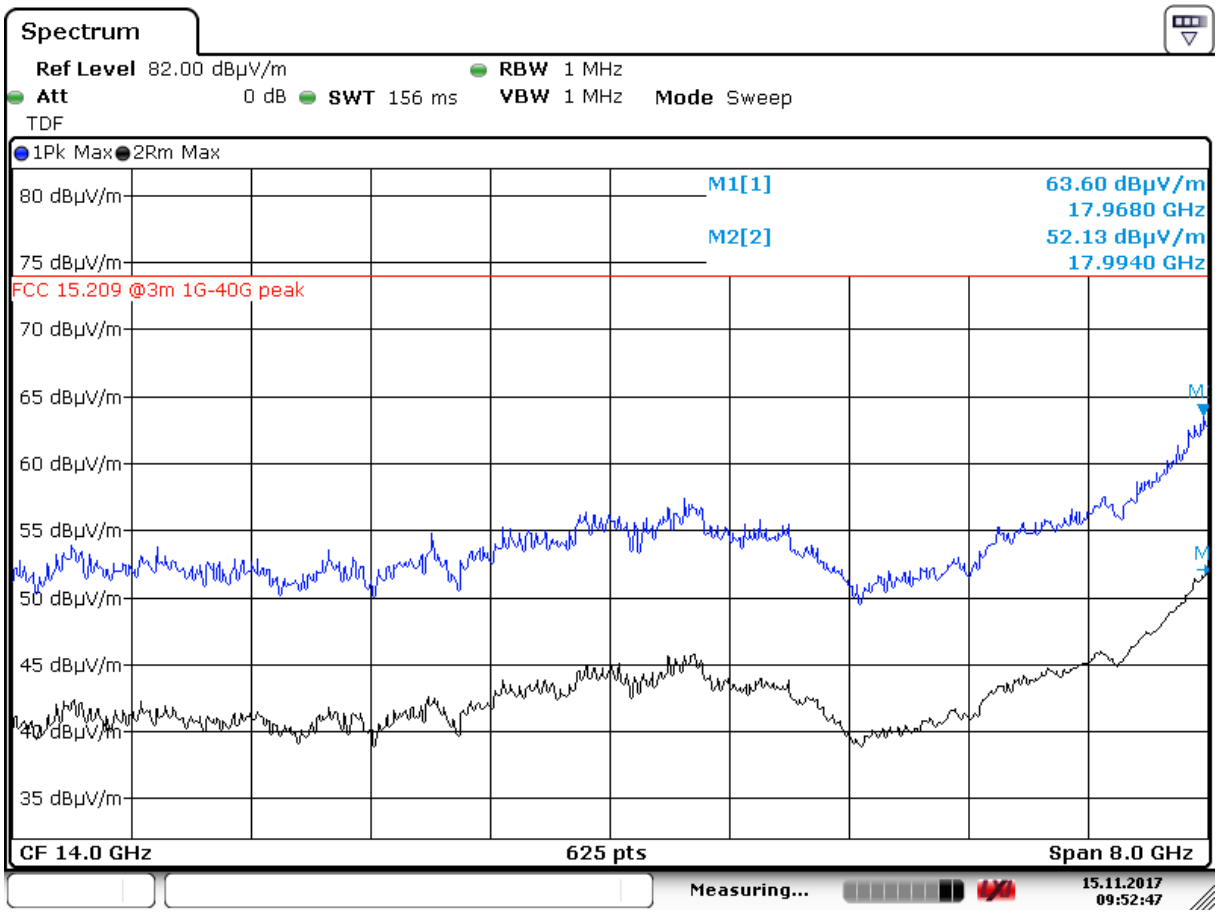
Date: 14.NOV.2017 19:00:37

Radiated Emissions ch. 2480 MHz, 3 – 10 GHz, HP, @3m – Pre-scan



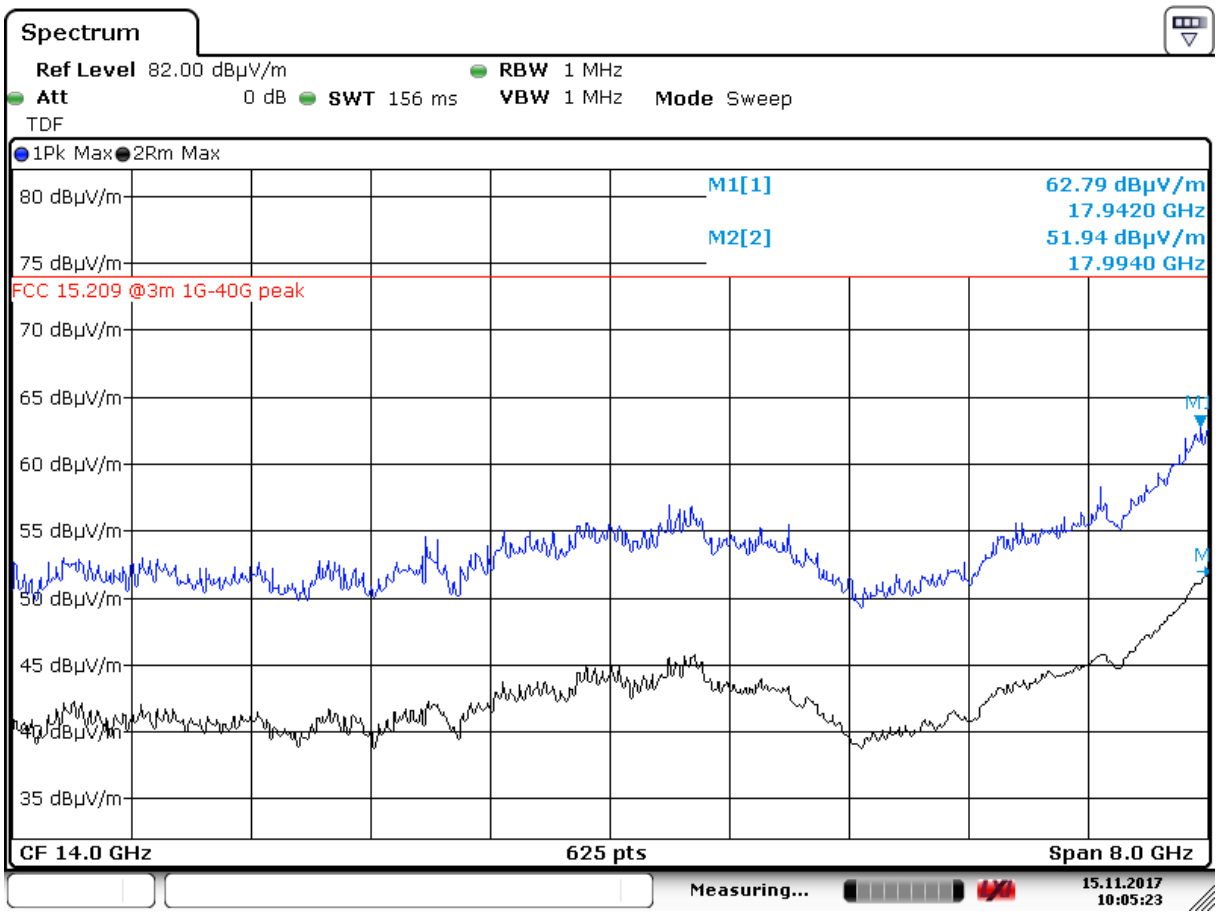
Date: 15.NOV.2017 09:58:56

Radiated Emissions ch. 2402 MHz, 10 – 18 GHz, VP – Pre-scan



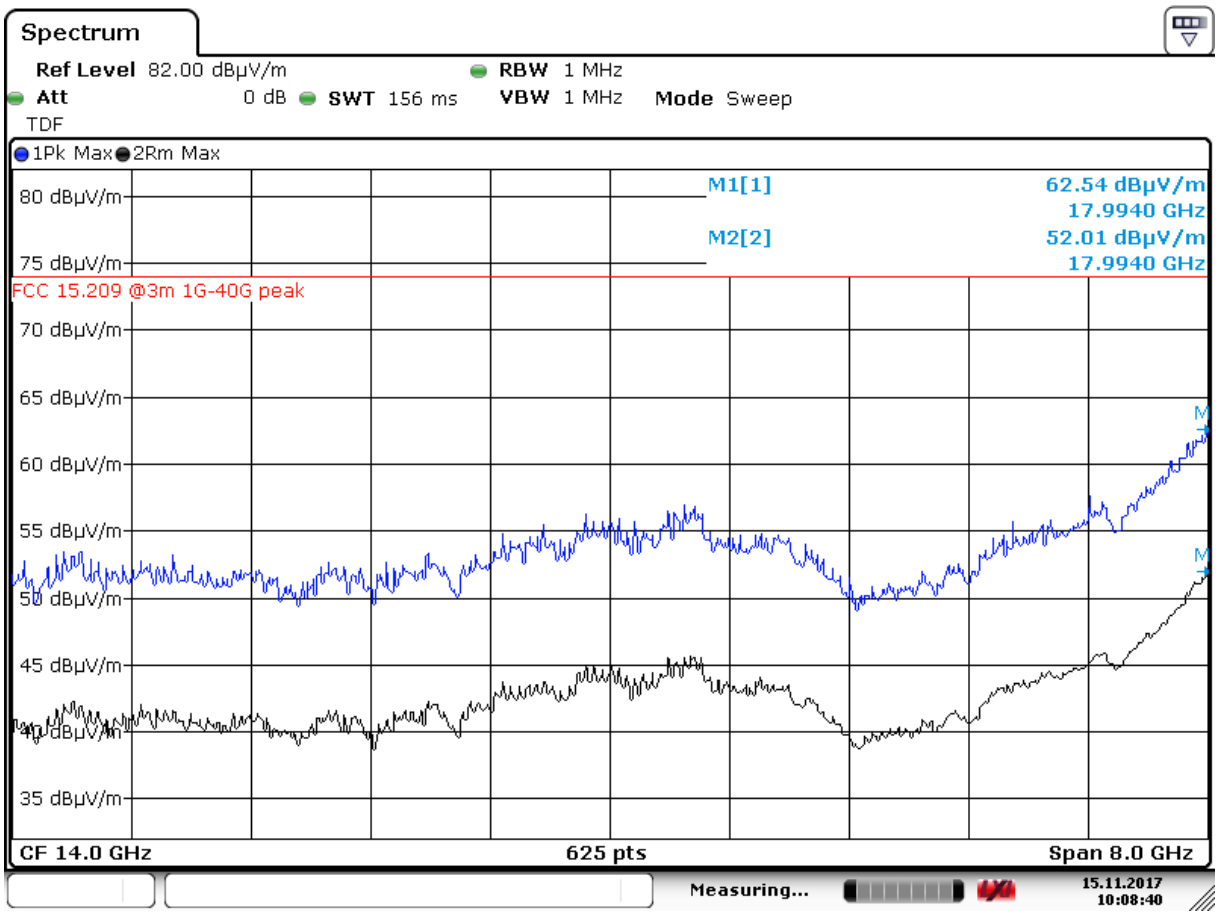
Date: 15.NOV.2017 09:52:47

Radiated Emissions ch. 2402 MHz, 10 – 18GHz, HP, @3m – Pre-scan



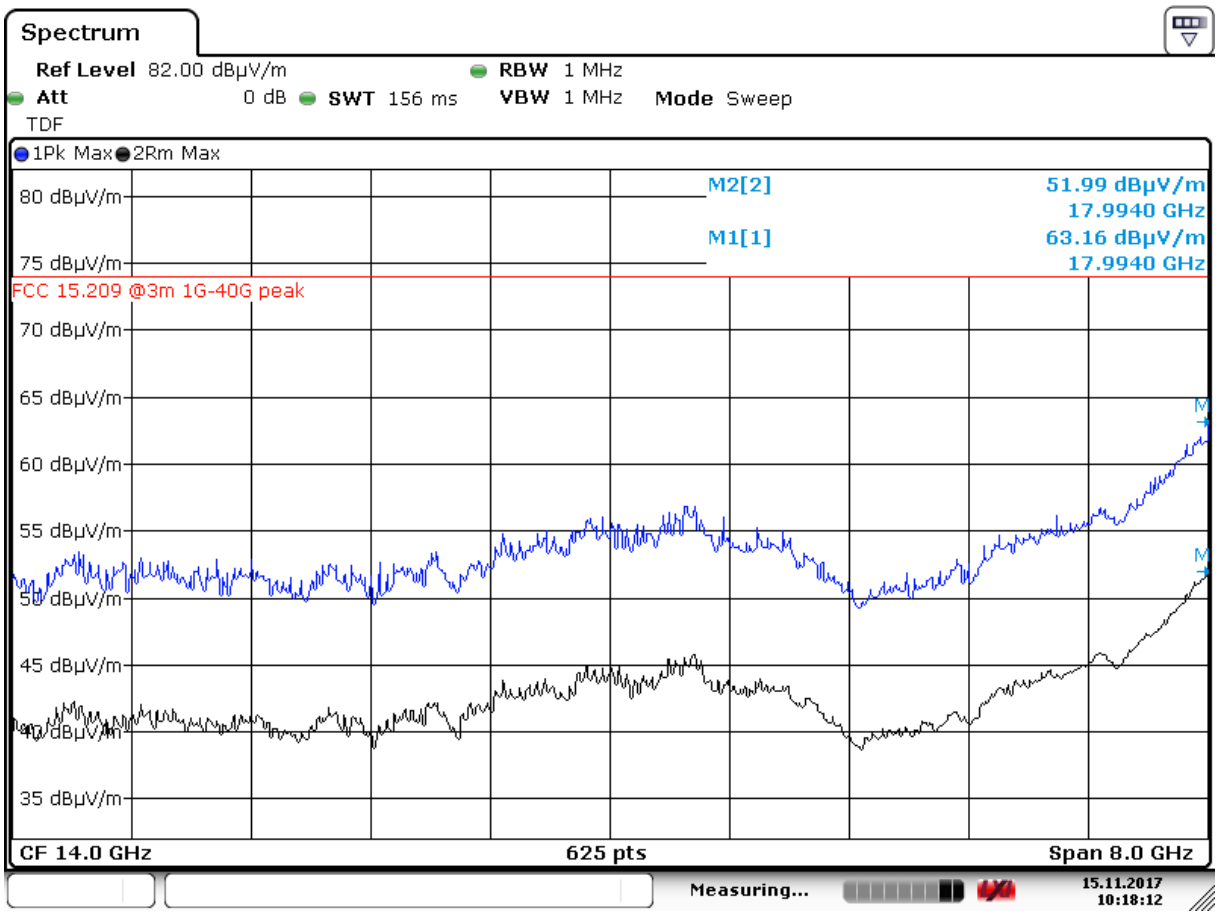
Date: 15.NOV.2017 10:05:24

Radiated Emissions ch. 2440 MHz, 10 – 18 GHz, VP, @3m – Pre-scan



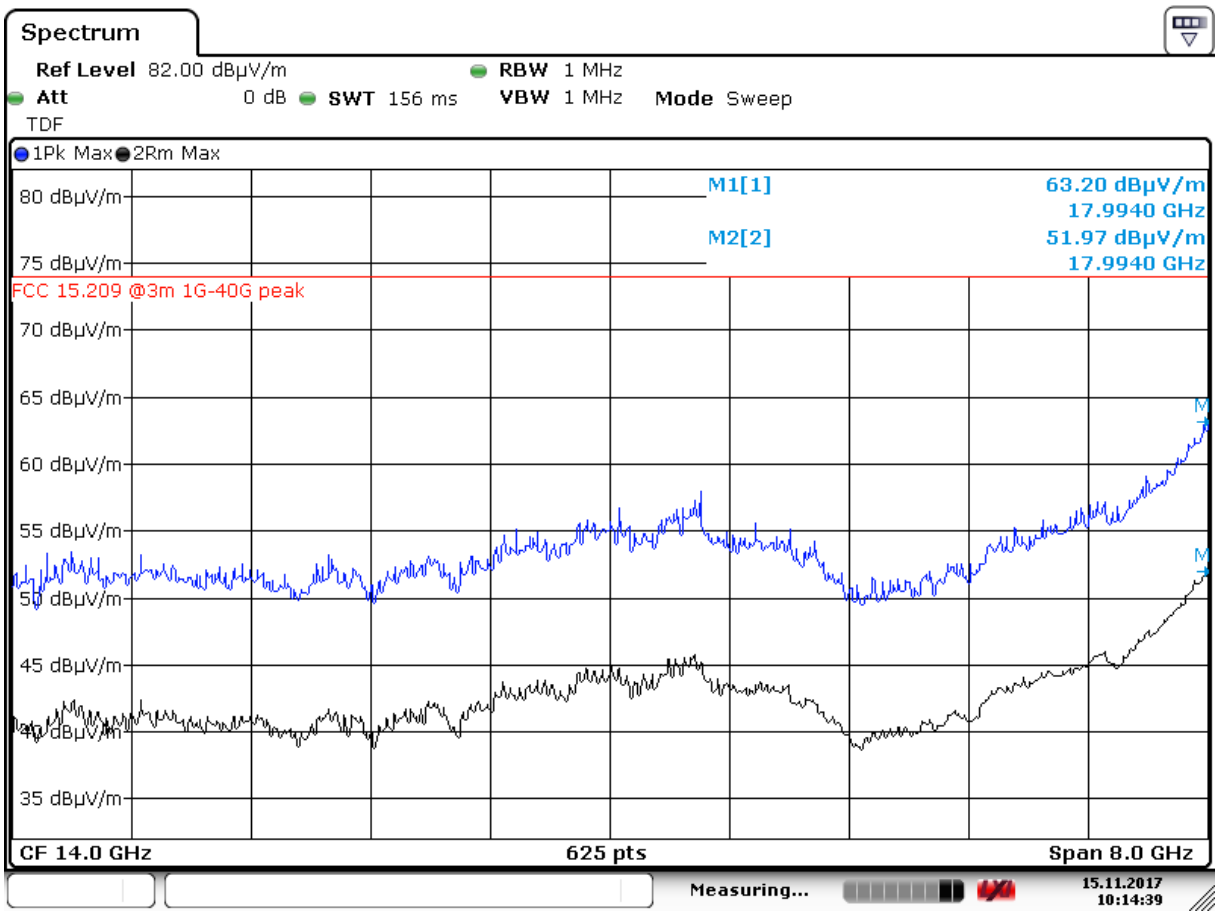
Date: 15.NOV.2017 10:08:40

Radiated Emissions ch. 2440 MHz, 10 – 18 GHz, HP, @3m – Pre-scan



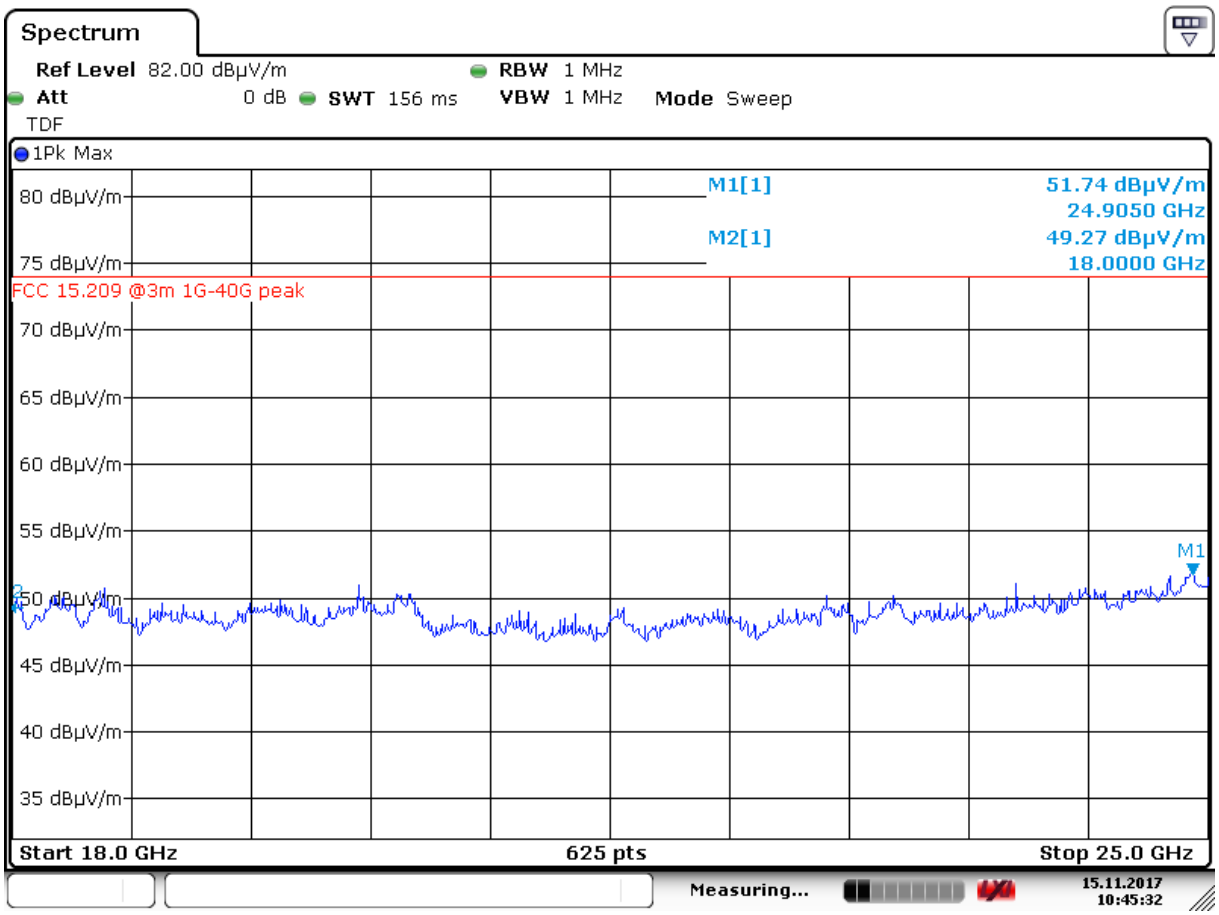
Date: 15.NOV.2017 10:18:13

Radiated Emissions ch. 2480 MHz, 10 – 18 GHz, VP, @3m – Pre-scan



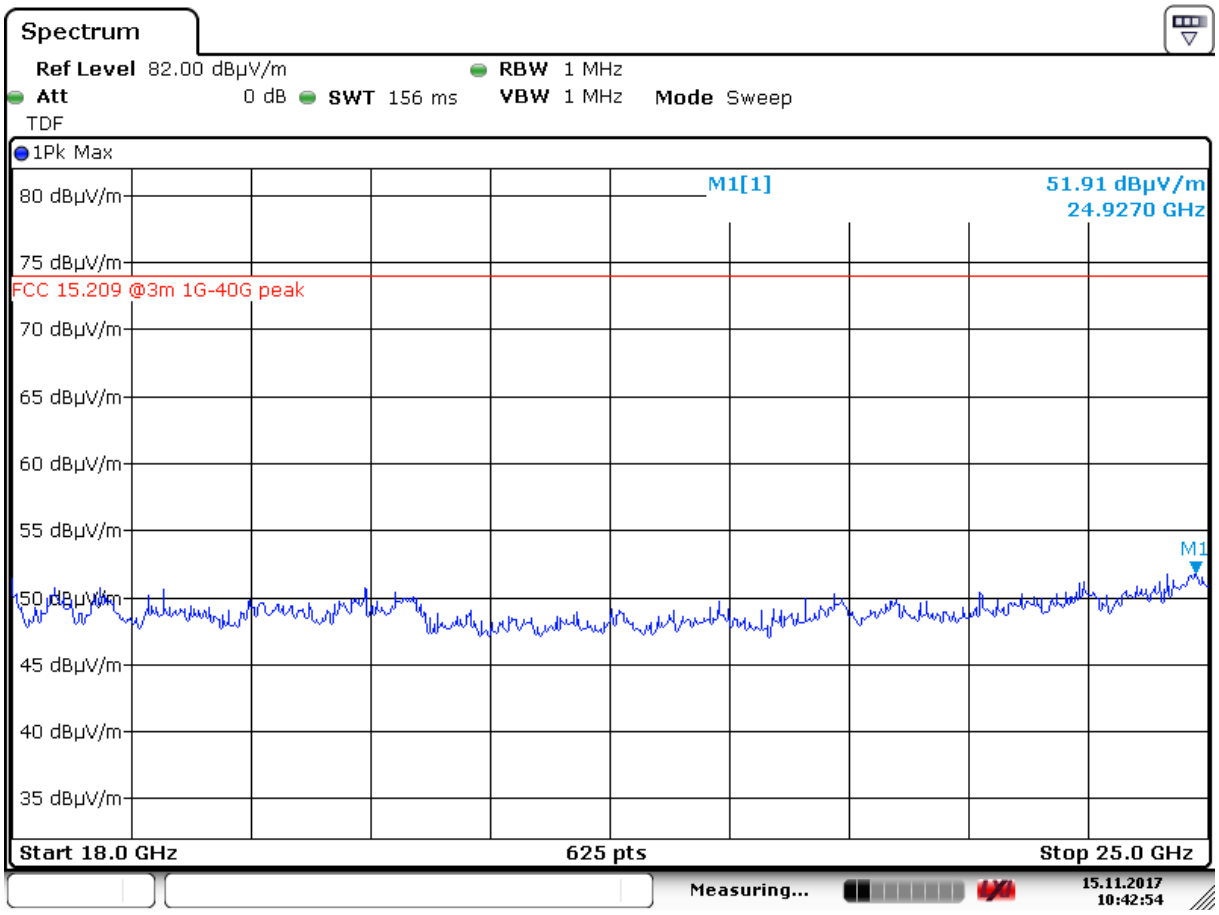
Date: 15.NOV.2017 10:14:40

Radiated Emissions, ch. 2480 MHz, 10 – 18 GHz, HP, @3m – Pre-scan



Date: 15.NOV.2017 10:45:32

Radiated Emissions, 18 – 25 GHz, VP, @3m – Pre-scan



Date: 15.NOV.2017 10:42:55

Radiated Emissions, 18 – 25 GHz, HP, @3m – Pre-scan

3.8 Power Spectral Density (PSD)

Para. No.: 15.247 (d)

Test Performed By: Markus Korny	**Date of Test: 2017-11-15**

Test Results: Passed

Measured and Calculated Data:

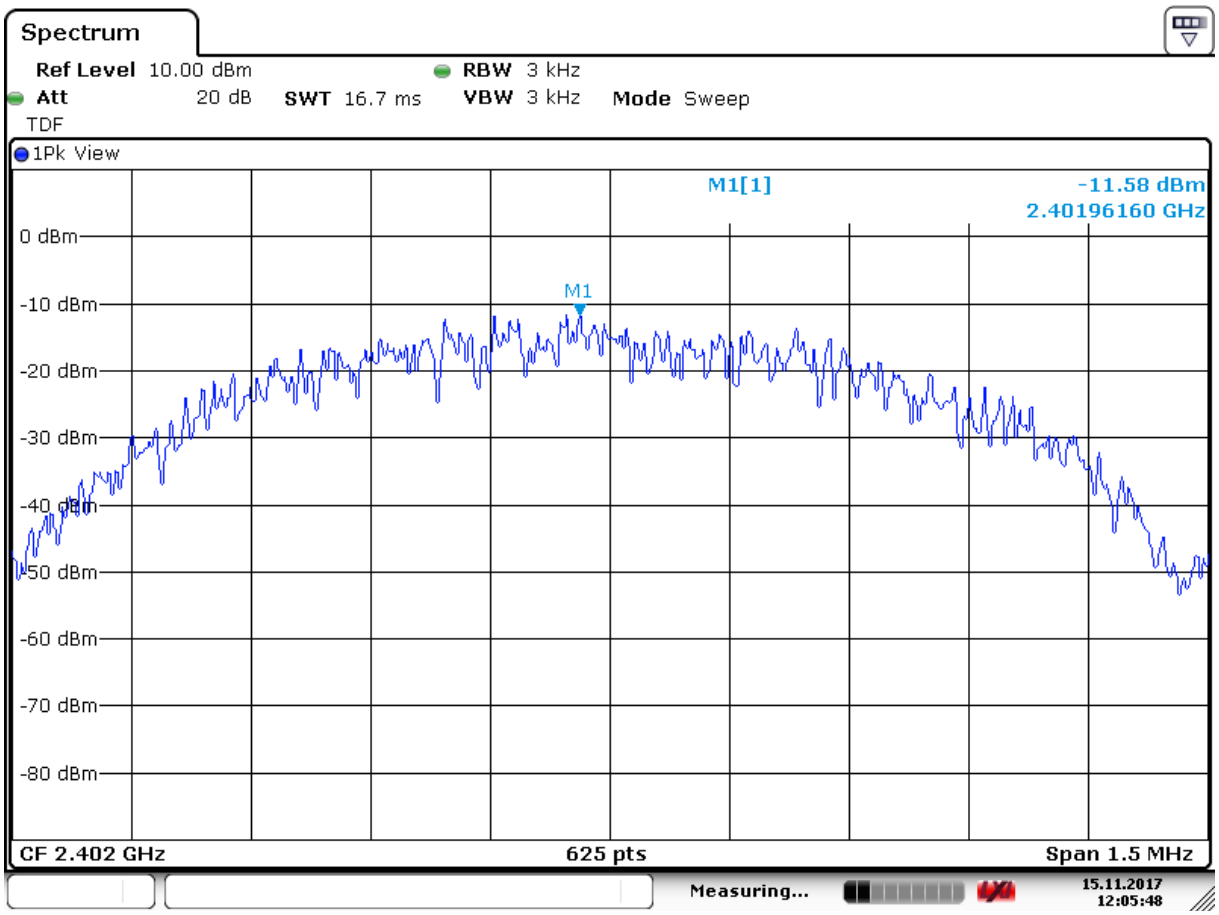
The measurement procedures PKPSD described in KDB 558074 D01 v03r05 was used.

	calculated peak PSD dBm
Power Spectral Density @2402 MHz	-11.58
Power Spectral Density @2440 MHz	-11.60
Power Spectral Density @2480 MHz	-11.34

Requirements:

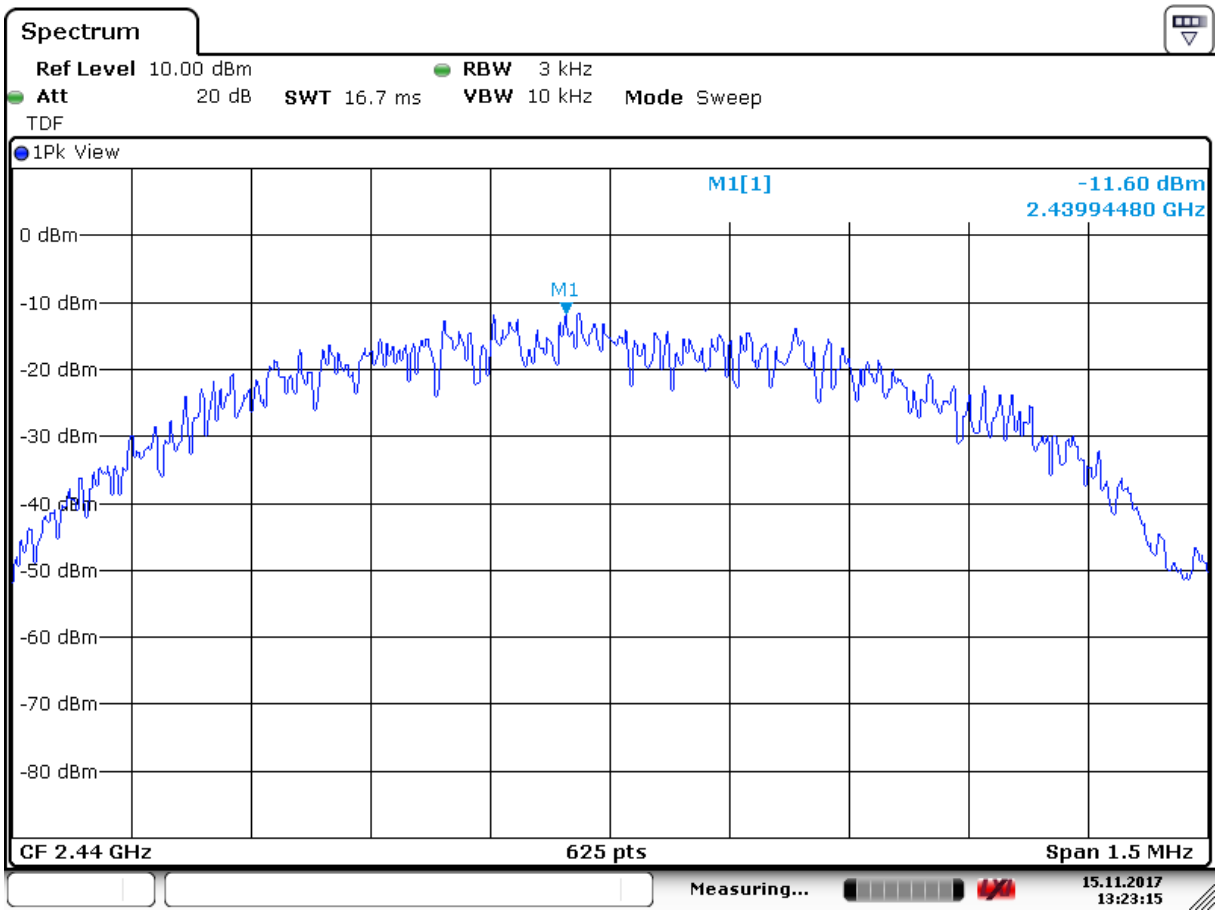
The Power Spectral Density of a Digital Transmission System shall be no greater than +8 dBm in any 3 kHz band

No requirements for Frequency Hopping Systems.



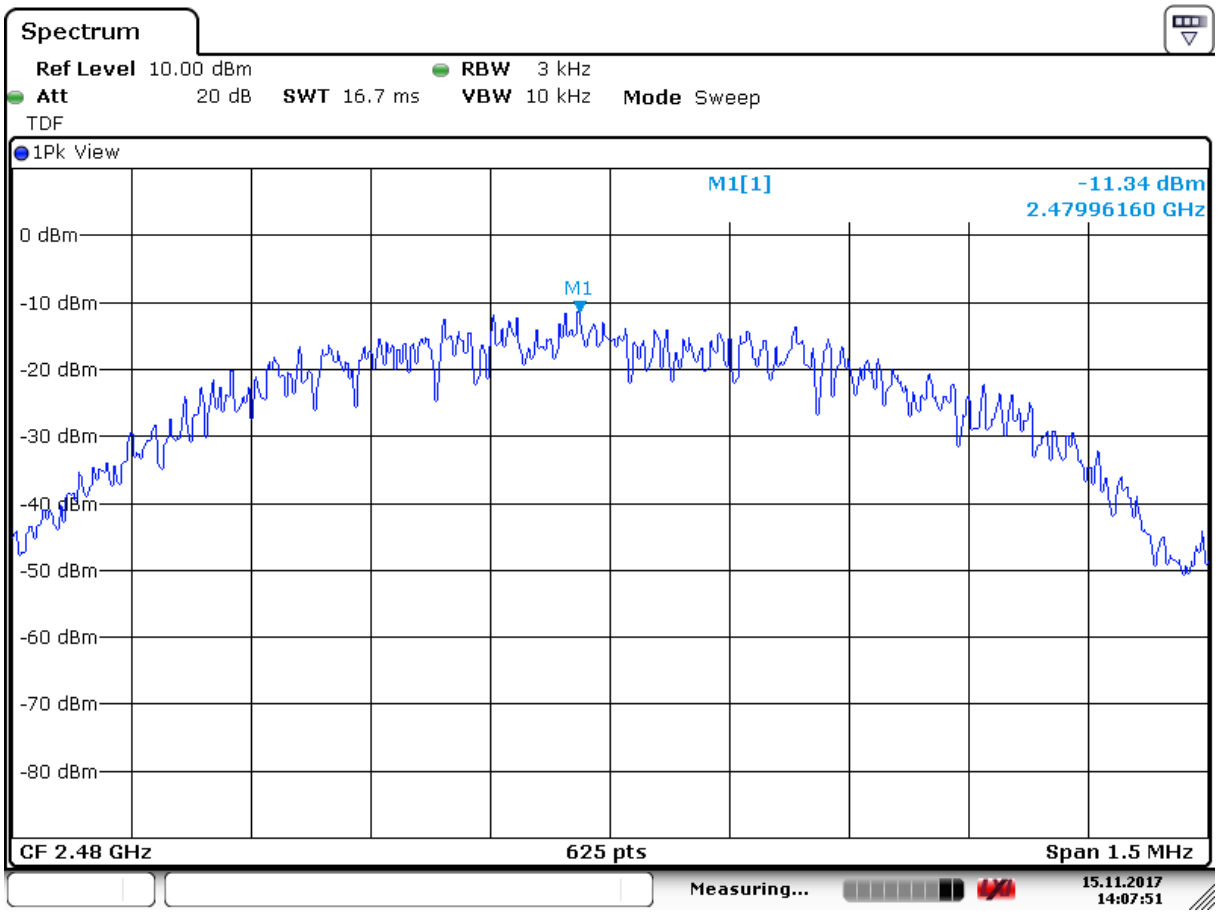
Date: 15.NOV.2017 12:05:48

PSD Measurement - 2402MHz



Date: 15.NOV.2017 13:23:16

PSD Measurement – 2440MHz



Date: 15.NOV.2017 14:07:52

PSD Measurement - 2480MHz

4 Measurement Uncertainty

Measurement Uncertainty Values		
Test Item		**Uncertainty**
Output Power		±0.8 dB
Power Spectral Density		±0.8 dB
Out of Band Emissions, Conducted	**< 3.6 GHz**	±0.8 dB
	> 3.6 GHz	±1.2 dB
Spurious Emissions, Radiated	**< 200 MHz**	±4.77 dB
	200 MHz - 1 GHz	±5.02 dB
	1 GHz – 18 GHz	±4.94 dB
	> 18 GHz	±5.91 dB
Emission Bandwidth		±4 %
Power Line Conducted Emissions		±3.58 %
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

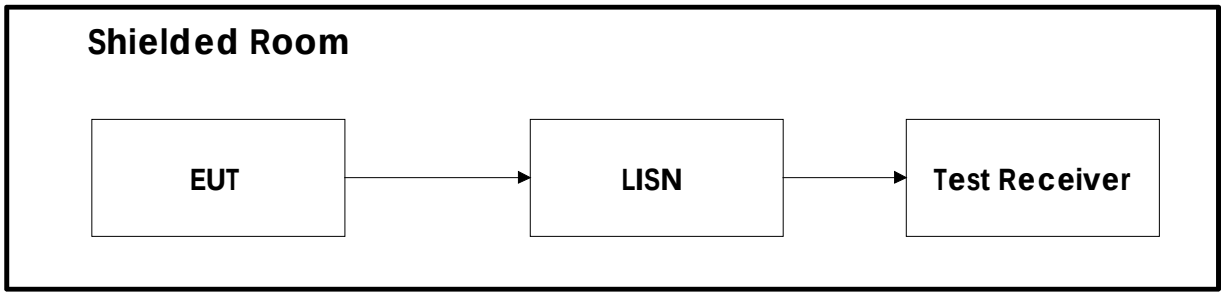
5 LIST OF TEST EQUIPMENT

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.

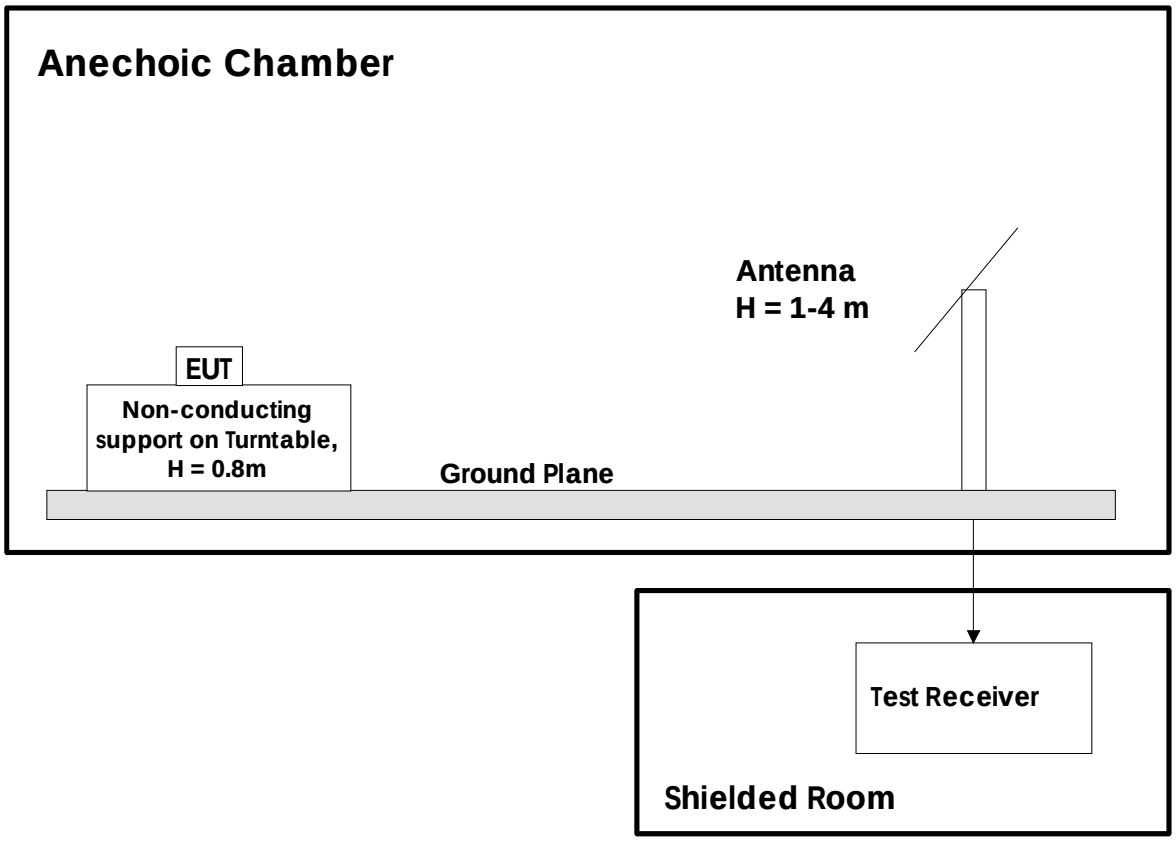
Ref No	*Instrument/ ancillary*	*Manufacturer*	*Type of instrument/ ancillary*	*Cal. Date*	*Cal. Due*
1-0039	Loop antenna	Rohde & Schwarz	HFH2-Z2	2017-09	2018-09
1-0040	Biconical antenna	Rohde & Schwarz	HK116	2015-08	2018-08
1-0055	LopPer antenna	Rohde & Schwarz	HL223	2015-08	2018-08
1-0080	Turntable	H. Deisel	DS 420	--	--
1-0256	Horn antenna	Schwarzbeck Mess-Elektronik	BBHA 9120	--	--
1-0361	Semi anechoic chamber	Reinhold & Mahla	3m	2017-06	2020-06
1-0364	Antenna cable 2	Kabelwerk Eupen	RF/Cord CMS / RG 214-N/7	2016-09	2019-09
1-0604	EMI test receiver	Rohde & Schwarz	ESU8	2017-09	2018-09
1-0611	Signal analyzer	Rohde & Schwarz	FSV 40	2017-09	2018-09
1-0614	Log.-per. antenna	Schwarzbeck Mess-Elektronik	STLP 9148 Stacked Log.-Per. Antenne	2016-11	2019-11
1-0615	Pre amplifier	Schwarzbeck Mess-Elektronik	BBV-9718 Broadband Preamplifier	2017-09	2018-09
1-0619	Coaxial cable (to SAC)	Huber+Suhner	SF106/2x11N-651/2m	2016-09	2019-09
1-0620	Antenna cable 3	Huber+Suhner	SF106/2x11N-651/3m	2016-09	2019-09
1-0770	Broadband Horn antenna	Schwarzbeck Mess-Elektronik	SHF-EHF Horn, 15-40GHz	2015-02	2018-02
1-0771	Broadband Horn antenna	Schwarzbeck Mess-Elektronik	SHF-EHF Horn, 15-40GHz	2015-02	2018-02
1-0781	Pre amplifier	Schwarzbeck Mess-Elektronik	BBV 9721	2017-09	2018-09
1-0782	Antenna cable	Huber & Suhner	FB142A	2015-07	2018-07
1-0789	High Pass Filter	Mini Circuits	VHF-1320+ 1700-3800 MHz	2016-09	2019-09
1-0790	High Pass Filter	Mini Circuits	VHF-3100+ 3400-9900MHz	2016-09	2019-09
1-0791	High Pass Filter	Mini Circuits	VHF-740+ 900-2200MHz	2016-09	2019-09
1-0870	10 dB Attenuator	Mini Circuits	BW-N10W5+	2016-09	2019-09
1-0924	Cable 1m	---	SMA	2016-09	2019-09
1-0925	Cable 1m	---	SMA	2016-09	2019-09
1-0926	Cable 1m	Harbour Industries	SMA	2016-09	2019-09
1-0927	Cable 1m	Harbour Industries	SMA	2016-09	2019-09
1-0966	RF power meter	DARE	RPR3006W	2017-07	2018-07

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
001	2018-04-06	99% OCC-BW included	mk
00	2017-11-23	First version	mk