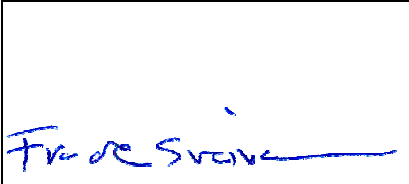
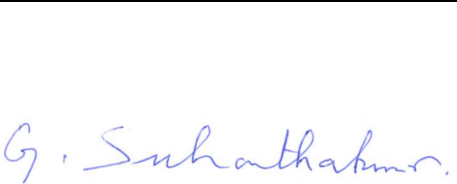


Test Report

Product	Bluetooth Low Energy Wireless Data Keyboard with Mouse
Name and address of the applicant	Trapper Data AB Spjutvägen 6 17561 Järfälla, Sweden
Name and address of the manufacturer	Trapper Data AB Spjutvägen 6 17561 Järfälla, Sweden
Model	MT117
Rating	3.7V _{DC} (Li-Ion battery, 5.0V _{DC} USB charging port)
Trademark	Mousetrapper Alpha
Serial number	/
Additional information	Bluetooth LE
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
Order number	366193
Tested in period	2019-02-13 to 2019-02-18 and 2019-04-10
Issue date	2019-06-05
Name and address of the testing laboratory	 Instituttveien 6 Kjeller, Norway CAB Number: FCC: NO0001 ISED: NO0470   An accredited technical test executed under the Norwegian accreditation scheme
 Prepared by [Frode Sveinsen]  Approved by [G.Suhanthakumar]	
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	Normal test condition	4
1.3	Test Engineer	4
1.4	Antenna Requirement	4
1.5	Comments	4
2	TEST REPORT SUMMARY	5
2.1	General	5
2.2	Test Summary	6
3	TEST RESULTS.....	7
3.1	Power Line Conducted Emissions	7
3.2	Occupied Bandwidth (99% BW)	9
3.3	Minimum 6 dB Bandwidth (DTS BW).....	12
3.4	Peak Power Output	15
3.5	Power Spectral Density (PSD)	19
3.6	Conducted Emissions at Antenna Connector	22
3.7	Restricted Bands of operation	30
3.8	Spurious Emissions (Radiated)	31
3.9	Radiated Emissions, below 1GHz	33
3.10	Radiated Emissions, above 1 GHz	35
4	Measurement Uncertainty.....	44
5	LIST OF TEST EQUIPMENT	45
6	BLOCK DIAGRAM	46
6.1	Power Line Conducted Emission.....	46
6.2	Test Site Radiated Emission.....	46

1 INFORMATION

1.1 Test Item

Name	Mousetrapp Alpha
Model name	MT117
FCC ID	2AP5U-MT117
Industry Canada Registration Number	24021-MT117
Serial number	/
Trademark	Mousetrapp Alpha
Hardware identity and/or version	L137
Software identity and/or version	BT4.2 Cypress 3.54
Tested to ISED Radio Standard (RSS)	RSS-247 Issue 2; RSS-Gen Issue 5
Frequency Range	2402–2480 MHz
Number of Channels	40 Channels
Operating Modes	Bluetooth Low Energy
Type of Modulation	Digital (Gaussian Frequency Shift Keying)
Conducted Output Power	0.51 mW (Peak)
Antenna Connector	None
Number of Antennas	1
Antenna Diversity Supported	No
Power Supply	Secondary Battery (3.7V Li-Ion) and USB Adaptor (5.0V _{DC})
Interface	USB for Charging and SW updates

Description of Test Item

The EUT is a Wireless Keyboard and Pointing Device with Bluetooth Low Energy.

This device has been tested as a DTS system and fulfils all requirements for a DTS systems.

1.2 Normal test condition

Temperature:	20–25 °C
Relative humidity	20–55 %
Air pressure	860–1060 mbar
Normal test voltage	3.7 V _{DC} (Nominal Voltage)

All tests were performed with the EUT powered from a fully charged battery.

Values above are the limit registered during the test period.

1.3 Test Engineer

Frode Sveinsen / Thomas Dangle

1.4 Antenna Requirement

Does the EUT have detachable antenna(s)?	☐ YES	☒ NO
If detachable, is the antenna connector(s) non-standard?	☐ YES	☐ NO
The tested equipment has only integral antennas. Conducted tests with a temporary antenna connector.		

Requirement: FCC 15.203, 15.204

1.5 Comments

The EUT is a Bluetooth Low Energy transceiver.

Radiated measurements were done with the EUT powered by a fully charged battery.

2 TEST REPORT SUMMARY

2.1 General

All measurements are traceable to national standards.

The tests were conducted for demonstrating compliance with FCC CFR 47 Part 15, paragraph 15.247 and Industry Canada RSS-247 Issue 2 and RSS-GEN Issue 5.

Tests were performed in accordance with ANSI C63.4-2014 and ANSI C63.10-2013.

Radiated tests were made in a semi-anechoic chamber at measuring distances of 1m and 3m.

A description of the test facility is on file with FCC and ISSED.

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

Any use that 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 caused by decisions made or actions based on this report.

2.2 Test Summary

Name of test	FCC Part 15 reference	RSS-247 Issue 2, RSS-GEN Issue 5 reference	Result
Supply Voltage Variations	15.31(e)	6.11 (RSS-GEN)	Complies
Antenna Requirement	15.203	6.8 (RSS-GEN)	Complies
Power Line Conducted Emission	15.107(a) 15.207(a)	7.2 / 8.8 (RSS-GEN)	Complies
Occupied Bandwidth	N/A	6.7 (RSS-GEN)	Complies
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
Spurious Emissions (Radiated)	15.247(c) 15.109(a) 15.209(a)	5.5 (RSS-247) 7.3 (RSS-GEN) 8.9 (RSS-GEN)	Complies

Revision history

Version	Date	Comment	Sign
1.0	2019-06-05	First edition	FS

3 TEST RESULTS

3.1 Power Line Conducted Emissions

FCC Part 15.207 (a)

RSS-GEN Issue 5, Clause 7.2 / 8.8

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

Test Results: Complies

Measurement Data: See attached plots.

Highest measured value (L1 and N):

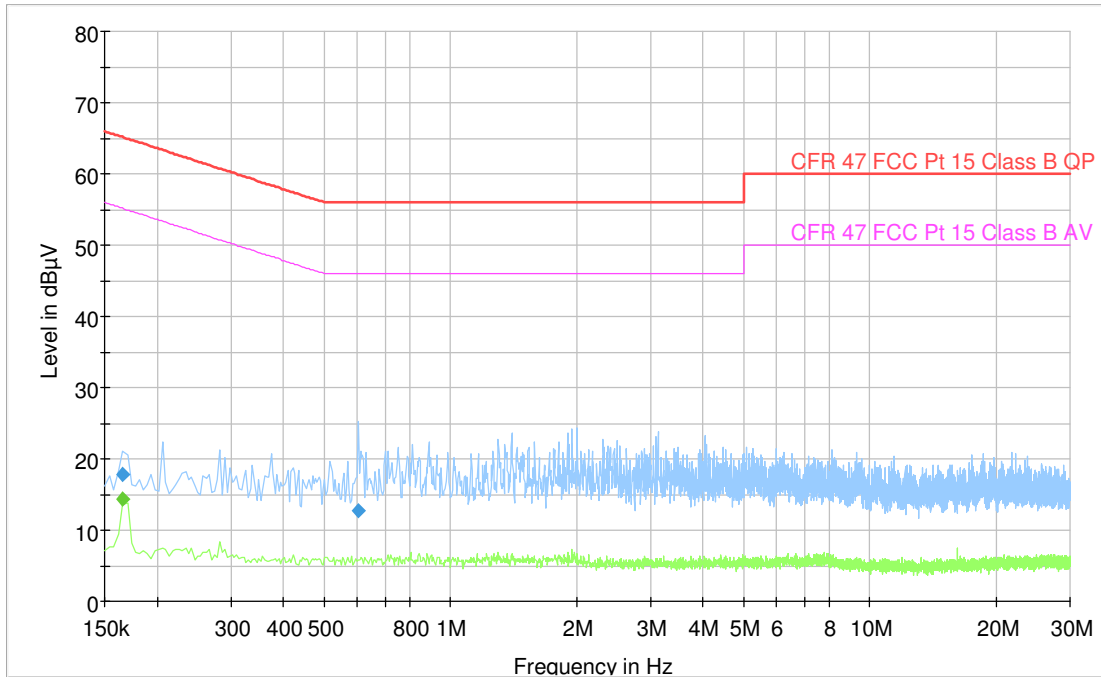
120V 60Hz, Charging:

Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter
0.166	---	14.42	55.16	40.74	1000	9	N	OFF
0.166	17.75	---	65.16	47.41	1000	9	N	OFF
0.604	12.68	---	56.00	43.32	1000	9	N	OFF

120V 60Hz, TX ON:

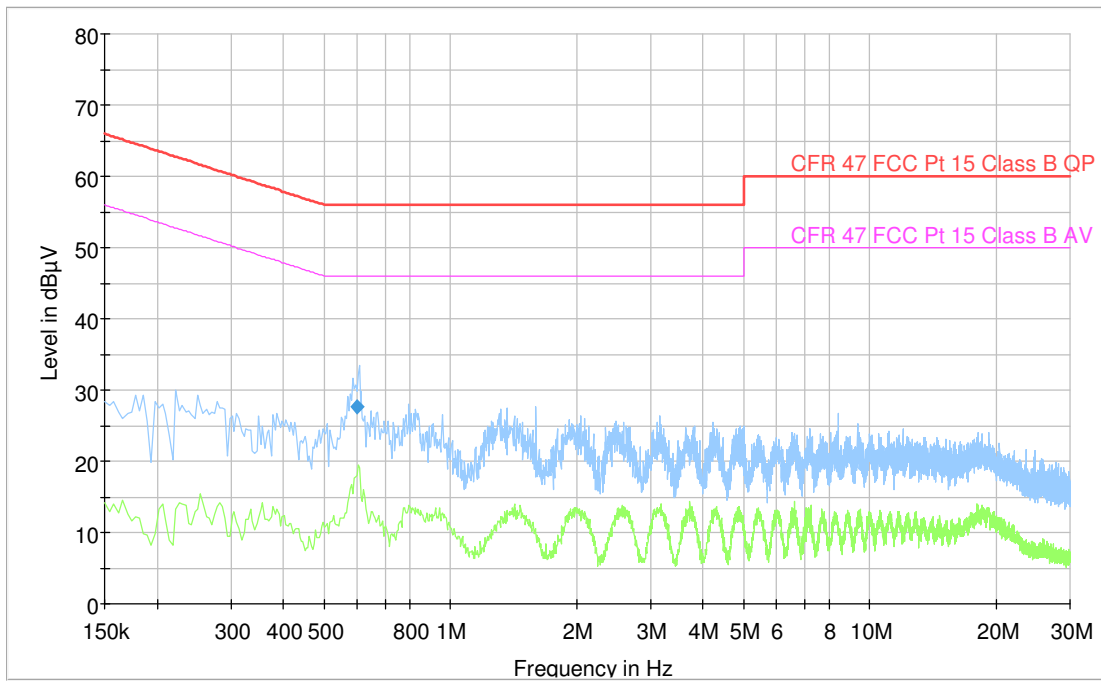
Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter
0.600	27.71	---	56.00	28.29	1000	9	N	OFF

Full Spectrum



120V 60Hz, Charging

Full Spectrum



120V 60Hz, TX ON

3.2 Occupied Bandwidth (99% BW)

ISED Canada RSS-GEN Issue 5, Clause 6.7

Measurement procedure: ANSI C63.10-2013 Clause 6.9.2

Test Results: Complies

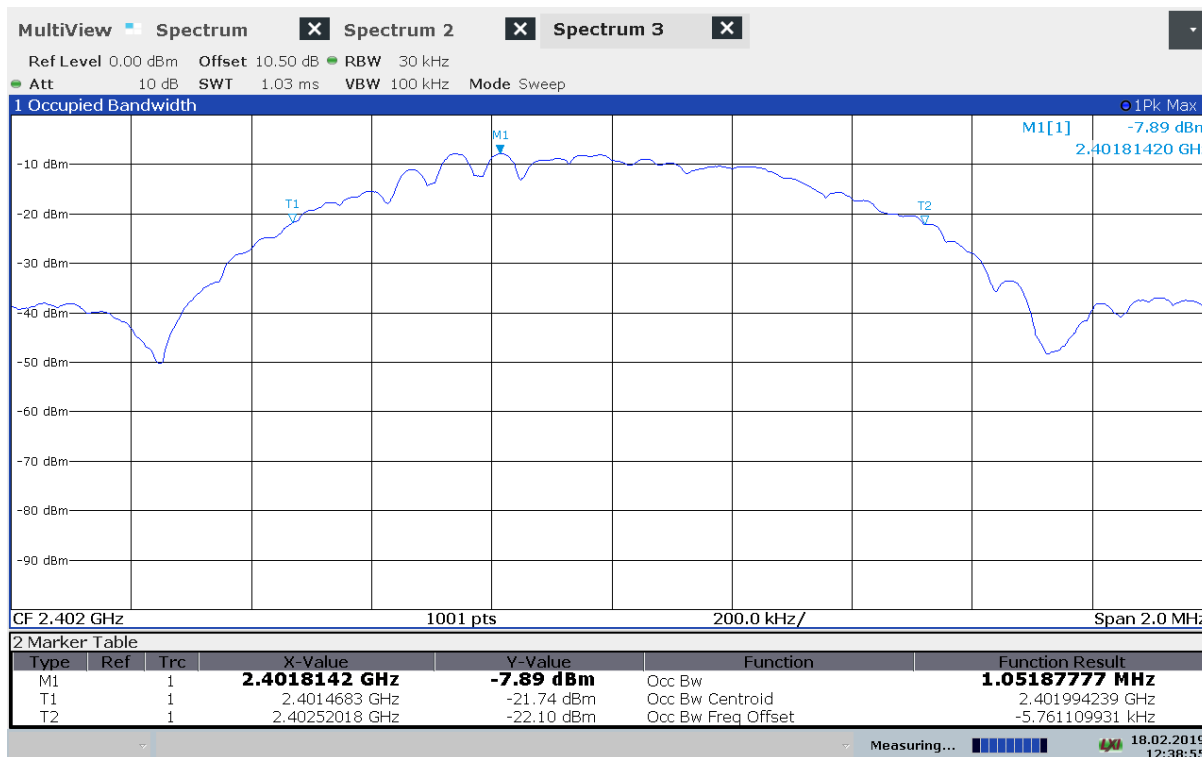
Measurement Data:

Carrier Frequency	Occupied Bandwidth (99% BW)
2402 MHz	1.05 MHz
2440 MHz	1.05 MHz
2480 MHz	1.05 MHz

See attached plots.

Requirements:

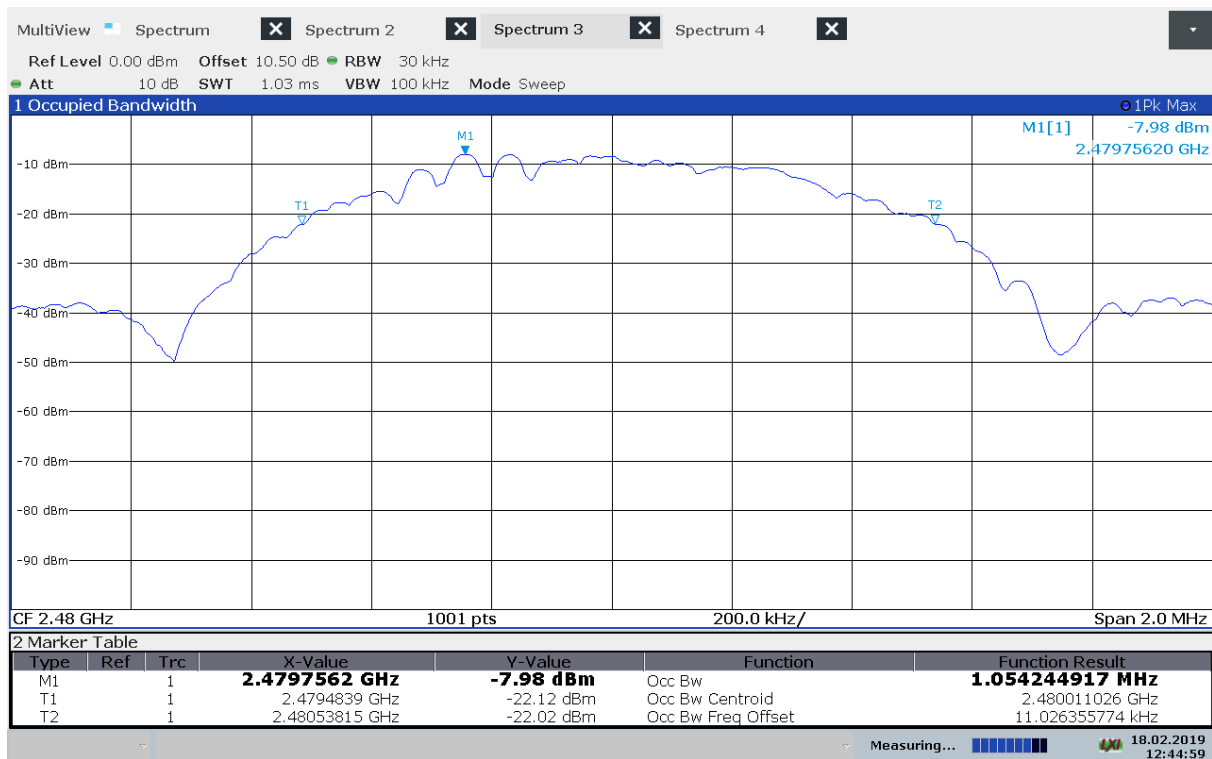
No limit specified.



Occupied Bandwidth, 99%, 2402 MHz



Occupied Bandwidth, 99%, 2440 MHz



Occupied Bandwidth, 99%, 2480 MHz

3.3 DTS Bandwidth

FCC Part 15.247 (a)(2)

ISED Canada RSS-247 Issue 2, Clause 5.2 (1)

Measurement procedure: ANSI C63.10-2013 Clause 11.8

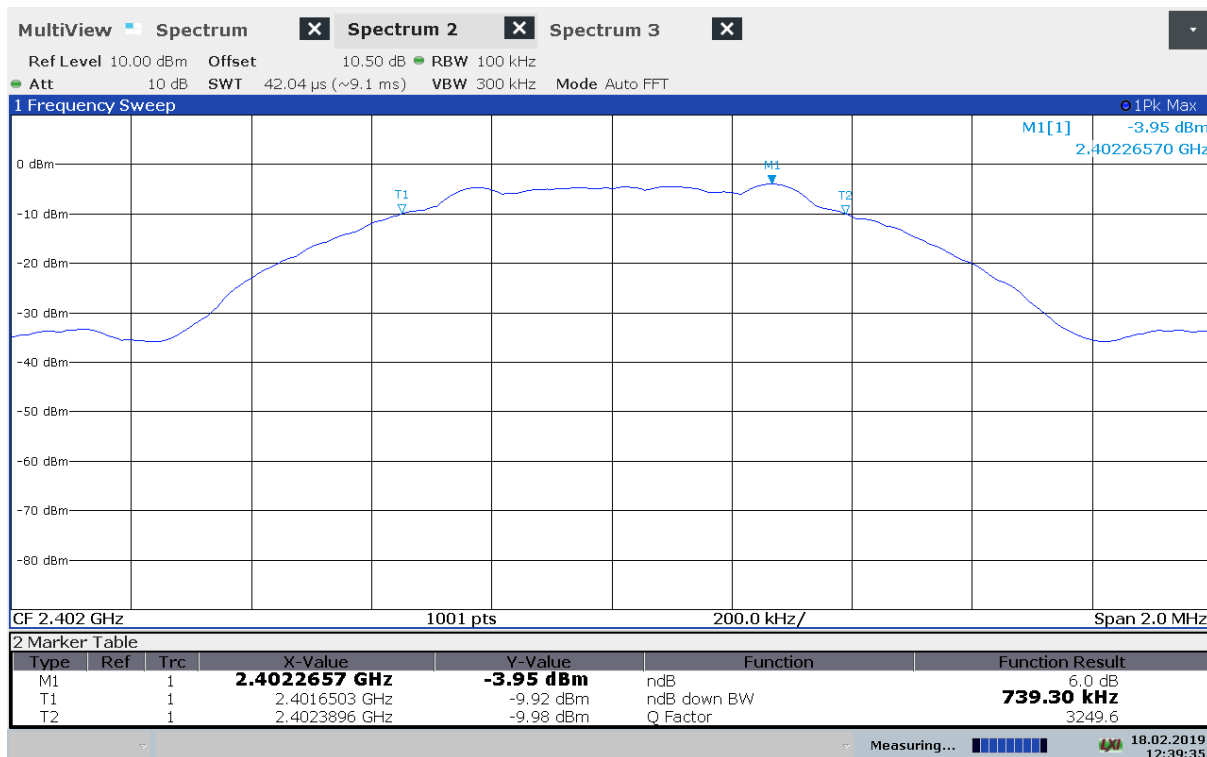
Test Results: Complies

Measurement Data:

Modulation type and bitrate	Measured DTS Bandwidth (kHz)
2402 MHz	739
2440 MHz	749
2480 MHz	763

Requirements:

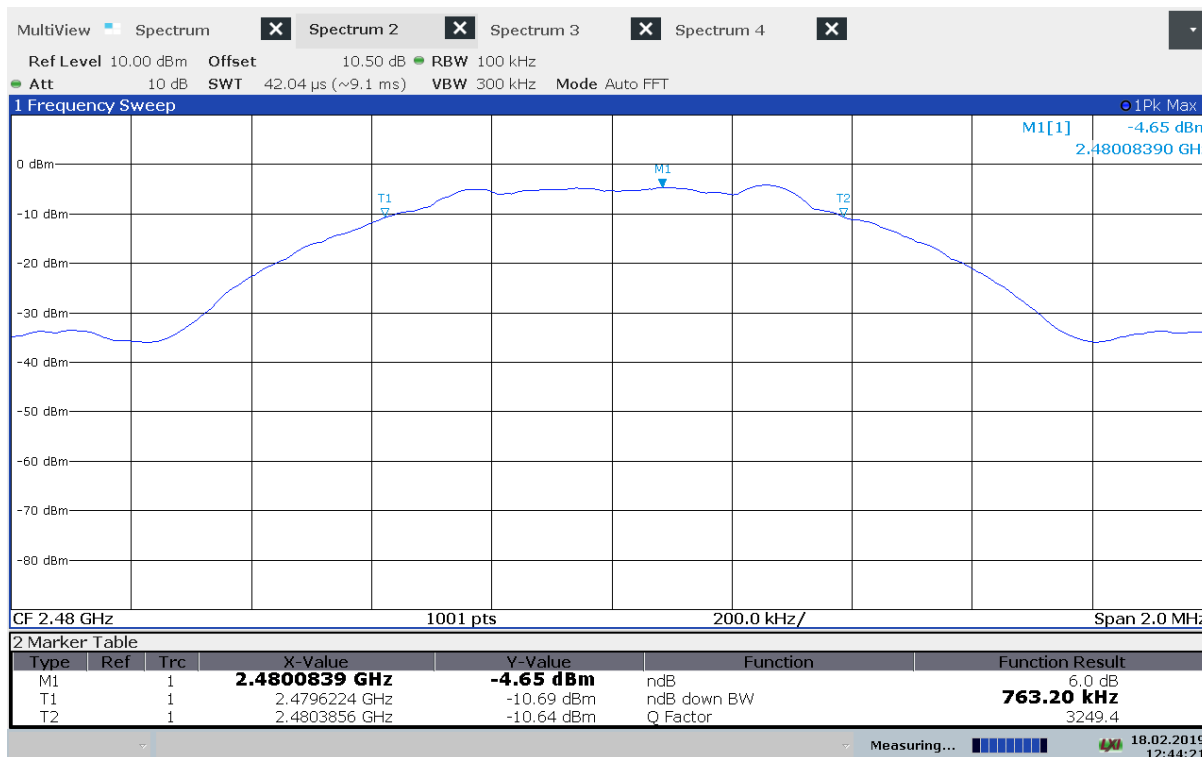
For Digital Transmission Systems in the 2400–2483.5 MHz band the minimum 6 dB bandwidth shall be at least 500 kHz.



DTS Bandwidth, 2402 MHz



DTS Bandwidth, 2440 MHz



DTS Bandwidth, 2480 MHz

3.4 Peak Power Output

FCC Part 15.247 (b)

ISED Canada RSS-247 Issue 2, Clause 5.4

Measurement procedure: ANSI C63.10-2013 Clause 11.9.1.2

Test Results: Complies

Measurement Data:

Maximum Peak Power, Max Power			
	2402 MHz	2440 MHz	2480 MHz
Peak Power (dBm)	-2.93	-3.11	-3.06
Peak Power (mW)	0.51	0.49	0.49
Peak Field Strength (dBμV/m @3m)	98.9	98.6	98.1
Peak Radiated power (calculated e.i.r.p.) (dBm)	3.64	3.37	2.91
Calculated Antenna Gain (dBi)	6.6	6.5	6.0

The Integrated Band Power Method was used to measure Output Power

Output Power reported is Maximum Peak Power.

Radiated Power was calculated from measured Field Strength using the method described in FCC KDB 412172 D01.

Antenna Gain exceeds 6 dBi, output power limit is reduced by 0.6 dB. New limit is 0.87 Watt.

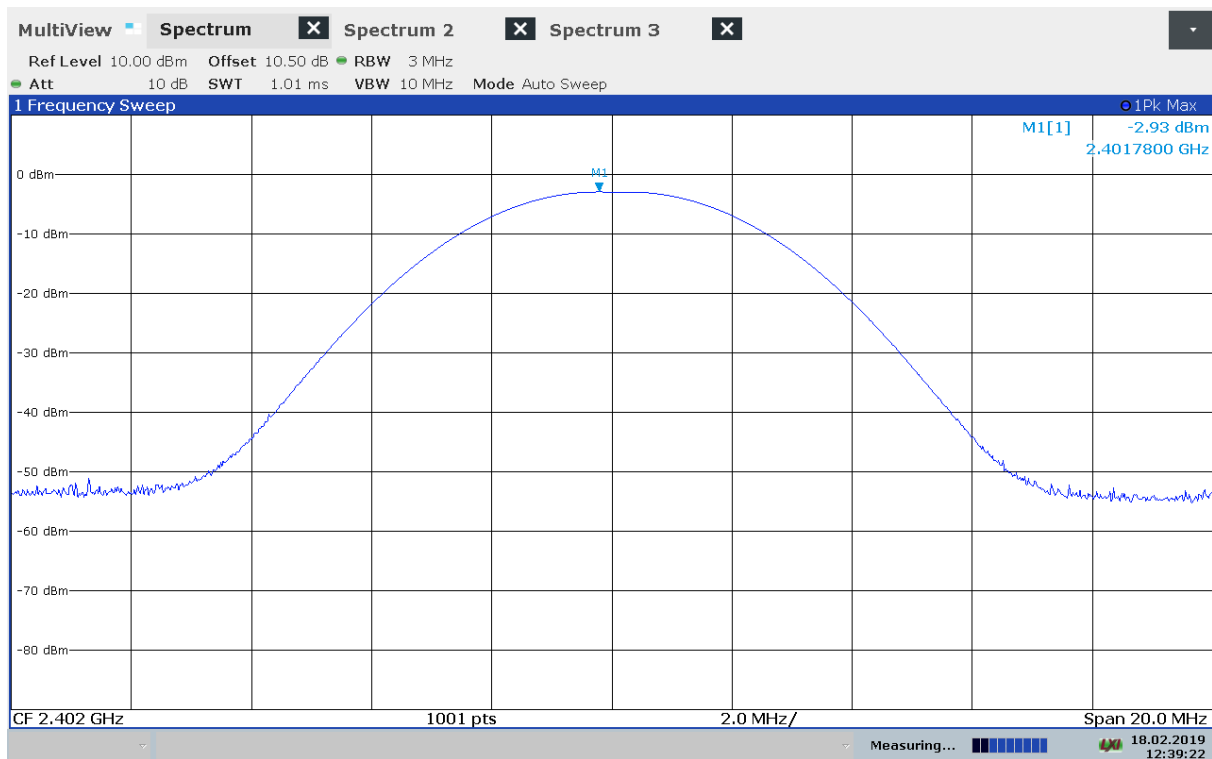
See attached plots.

Requirements:

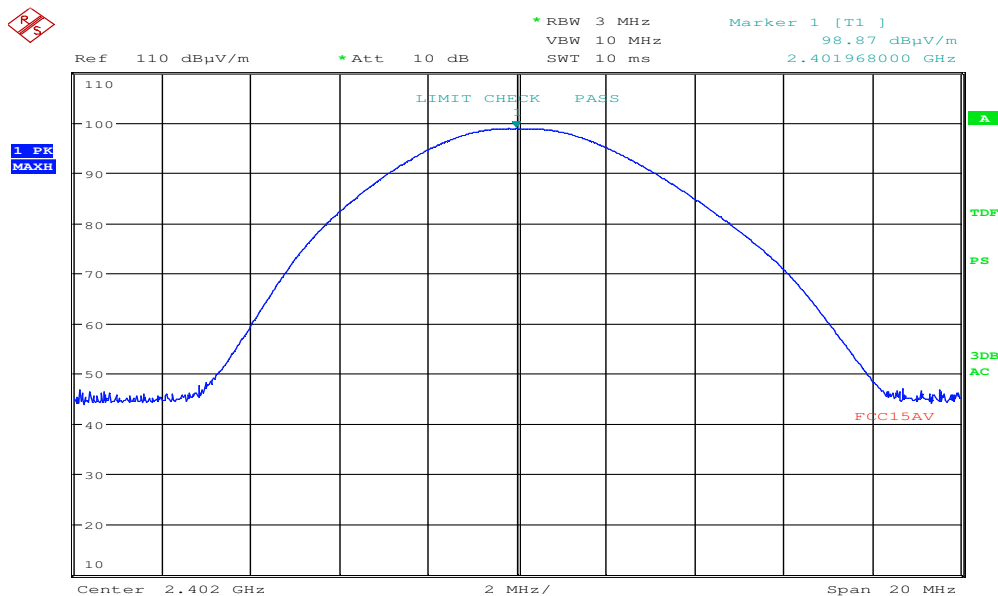
The maximum peak output power shall not exceed the following limits:

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 limit shall be reduced below the stated value above by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

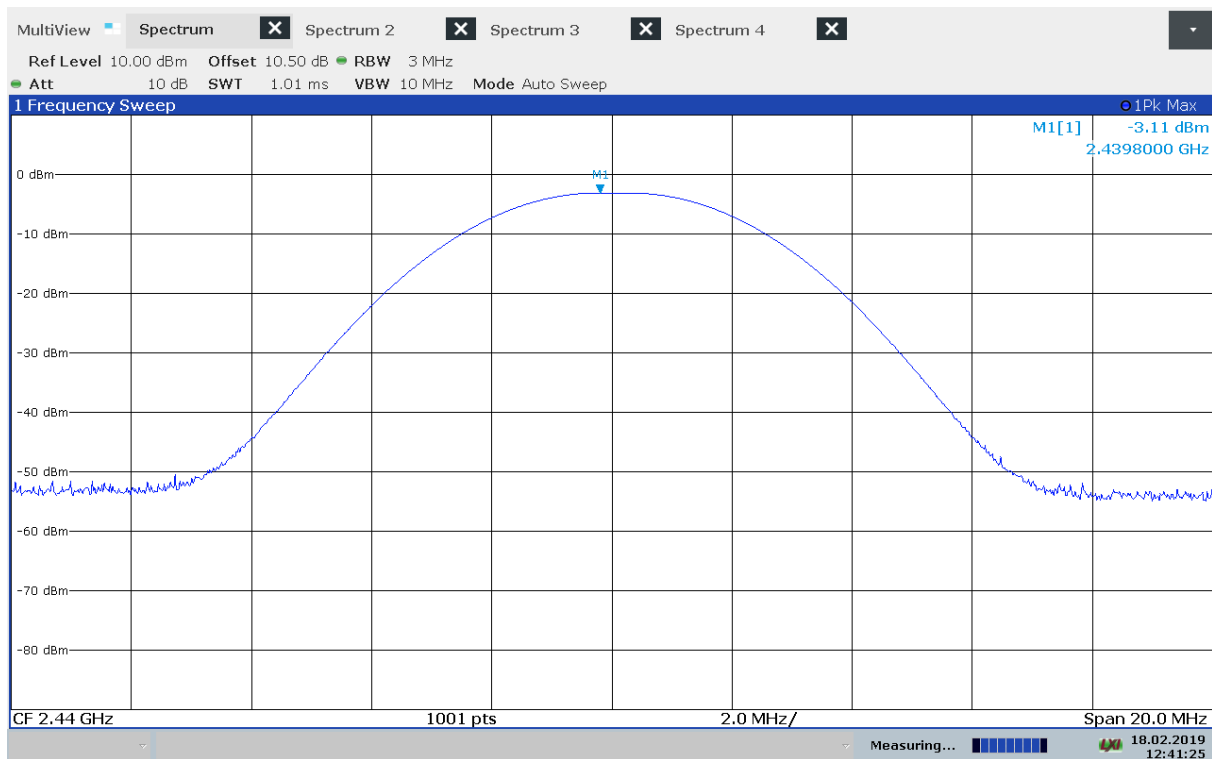


Conducted Power, 2402 MHz

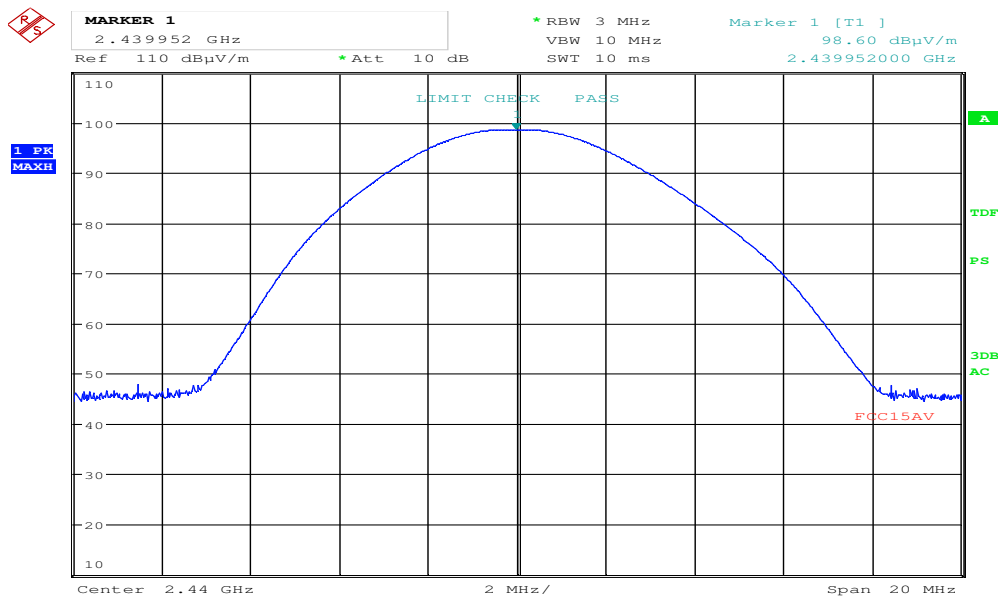


Date: 13.FEB.2019 09:12:05

Maximum Field Strength, 2402 MHz

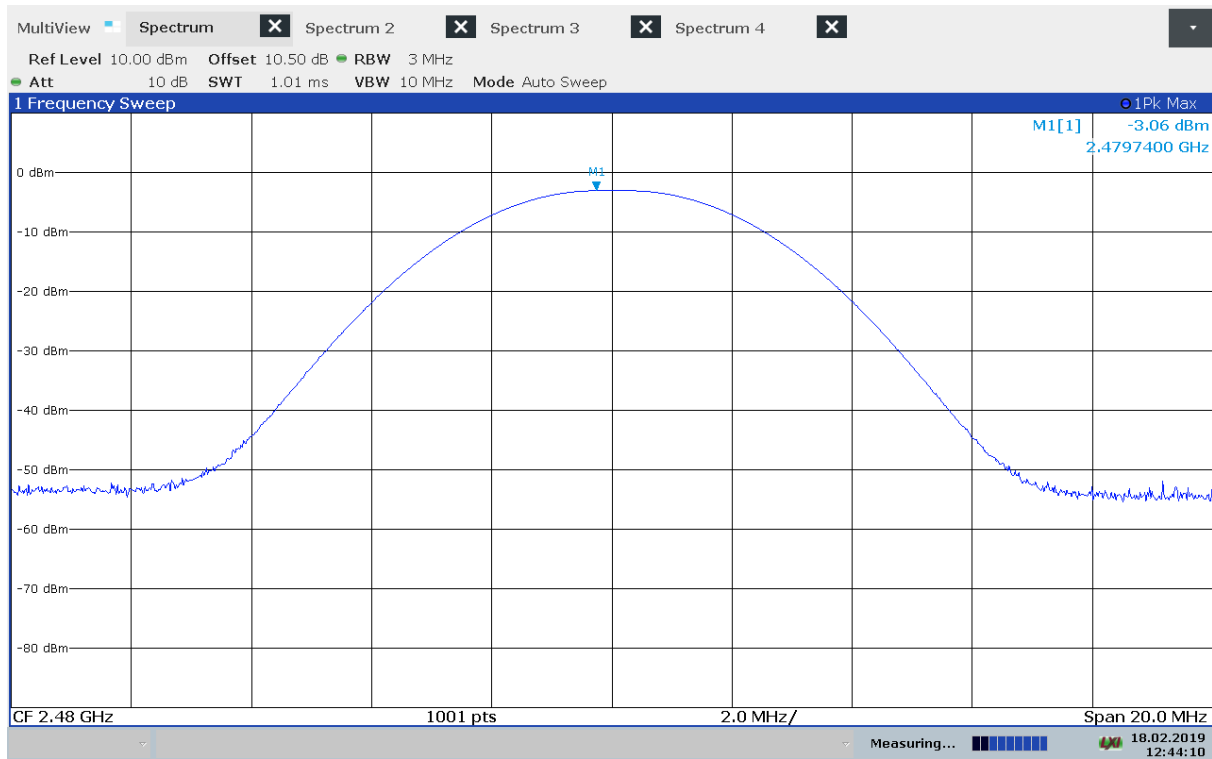


Conducted Power, 2440 MHz

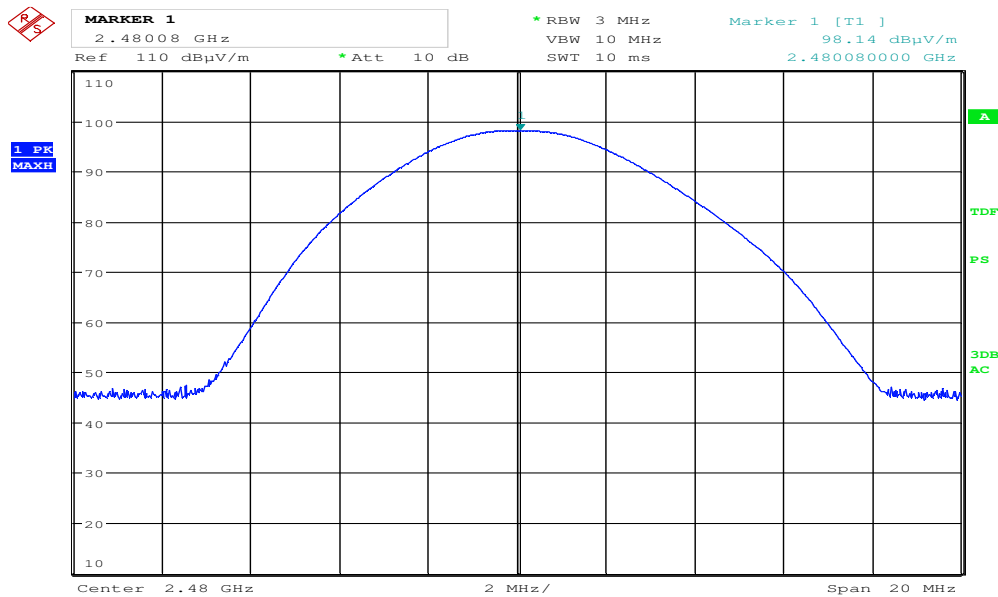


Date: 13.FEB.2019 09:16:27

Maximum Field Strength, 2440 MHz



Conducted Power, 2480 MHz



Date: 13.FEB.2019 09:17:30

Maximum Field Strength, 2480 MHz

3.5 Power Spectral Density (PSD)

FCC part 15.247(d)

ISED Canada RSS-247 Issue 2, Clause 5.2 (2)

Measurement procedure: ANSI C63.10-2013 Clause 11.10

Test Results: Complies

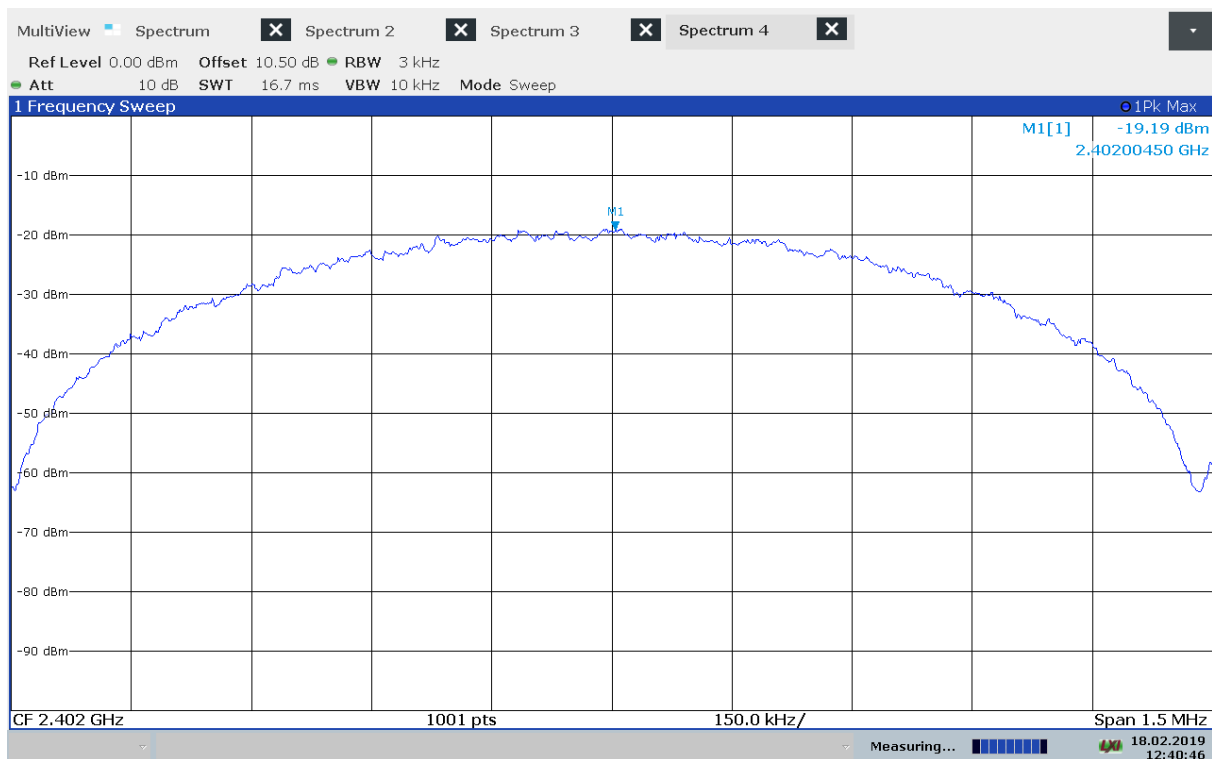
Measurement Data:

The measurement procedures PKPSD described in ANSI C63.10-2013 was used.

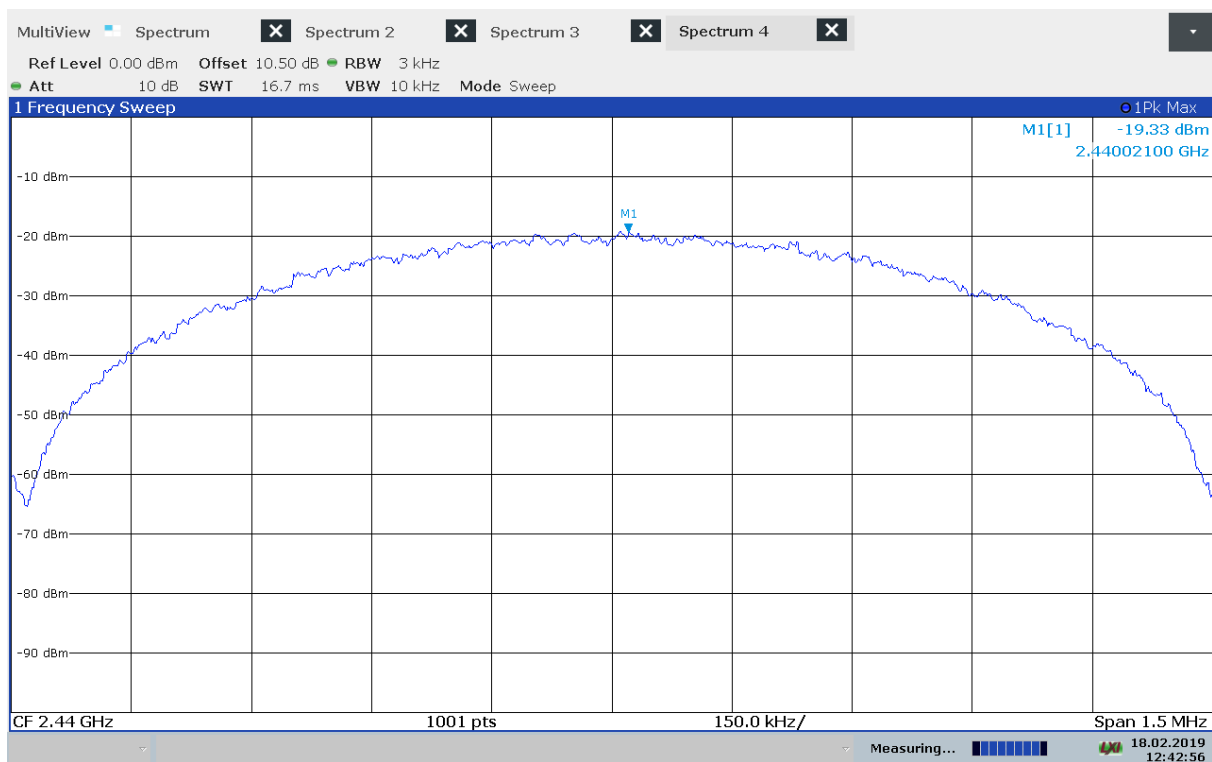
Carrier Frequency (MHz)	Power Spectral Density (dBm/3 kHz)
2402	-19.2
2440	-19.3
2480	-19.2

Requirements:

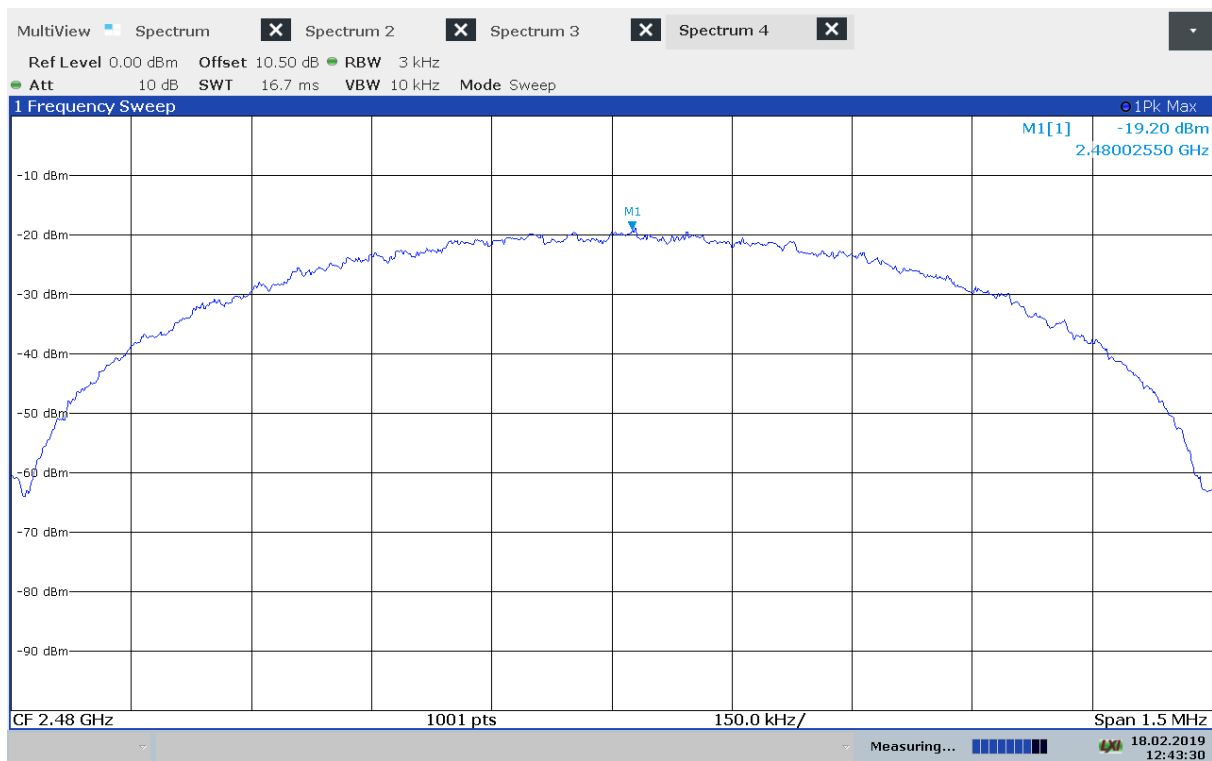
The Power Spectral Density of a Digital Transmission System shall be no greater than +8 dBm in any 3 kHz band.



Power Spectral Density, 2402 MHz, Max Power



Power Spectral Density, 2440 MHz, Max Power



Power Spectral Density, 2480 MHz, Max Power

3.6 Conducted Emissions at Antenna Connector

FCC Part 15.247 (d)

ISED Canada RSS-247 Issue 2, Clause 5.5

Measurement procedure: ANSI C63.10-2013 Clause 11.11

Test Results: Complies

Measurement Data:

Carrier Frequency	Highest Value (dBc)	Margin (dB)	Verdict
2402 MHz	>40	>20	Pass
2440 MHz	>40	>20	Pass
2480 MHz	>40	>20	Pass

Measured with Peak Detector

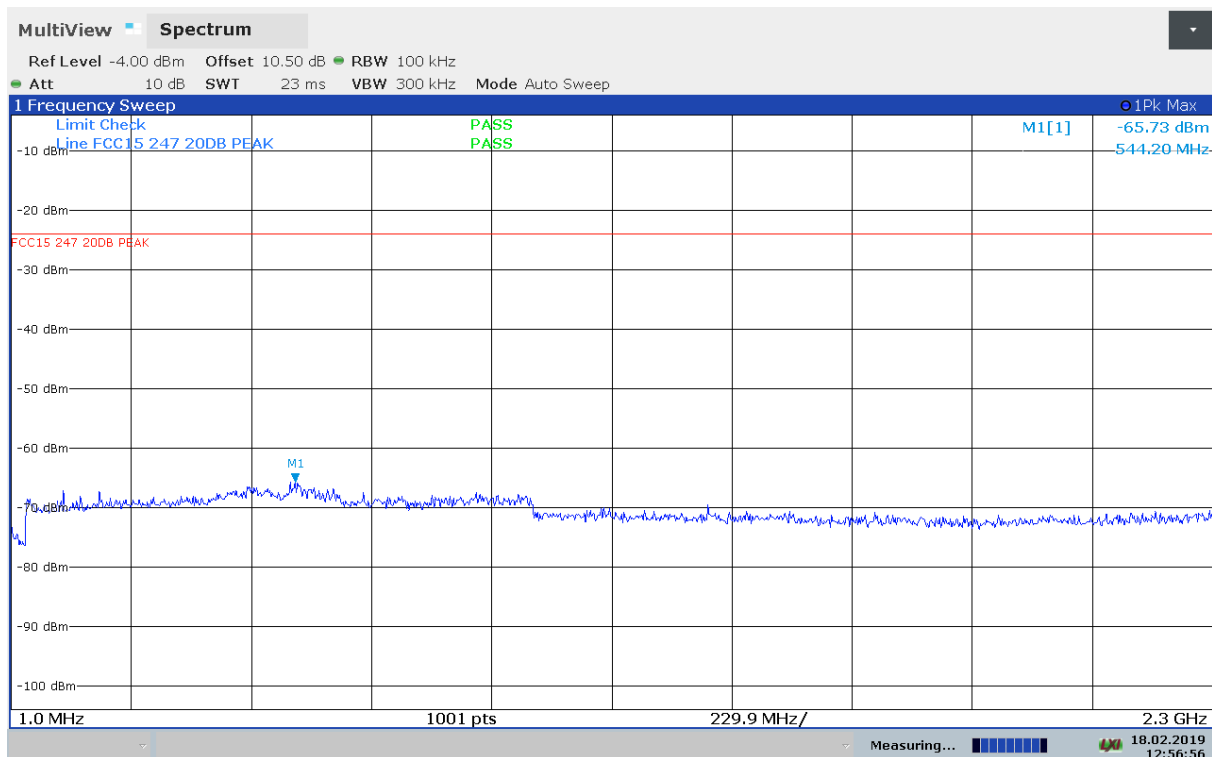
RF conducted power to 25 GHz: see attached plots.

Limit

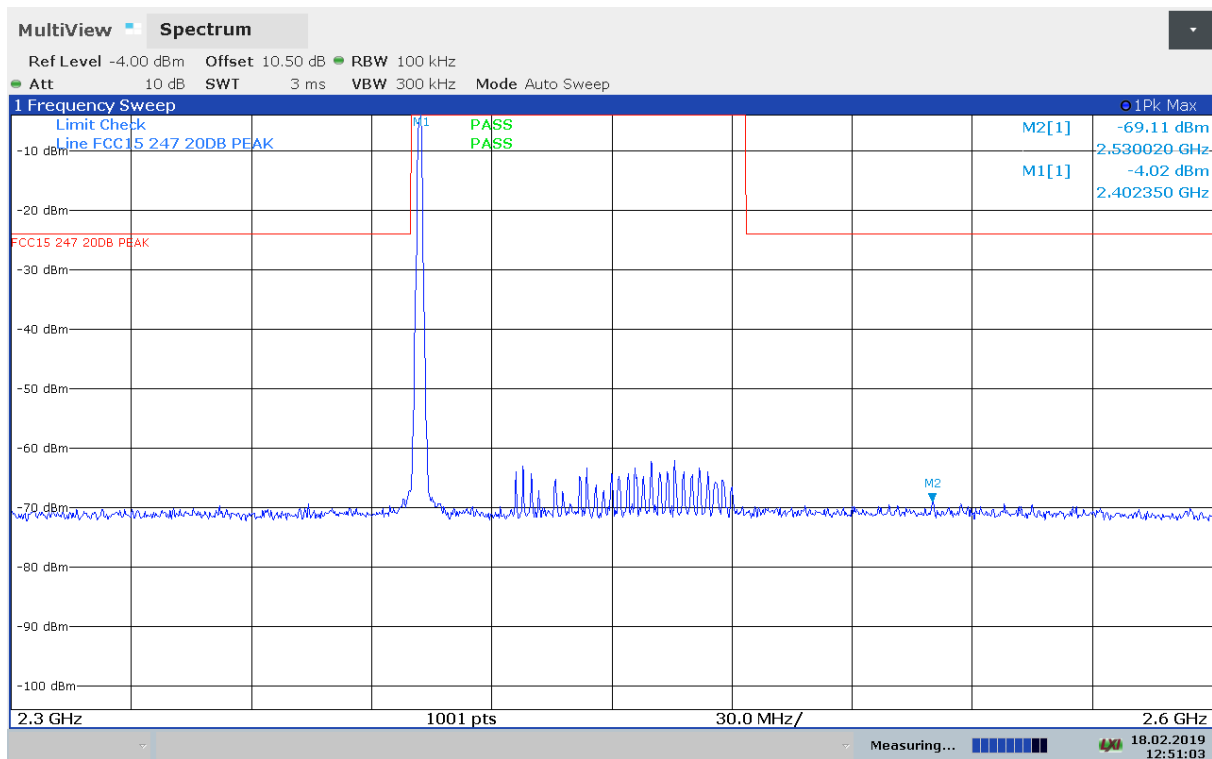
Peak measurement	RMS averaging
20 dBc or more in 100 kHz bandwidth	30 dBc or more in 100 kHz bandwidth

Detector type shall be the same as used for measuring Output Power.

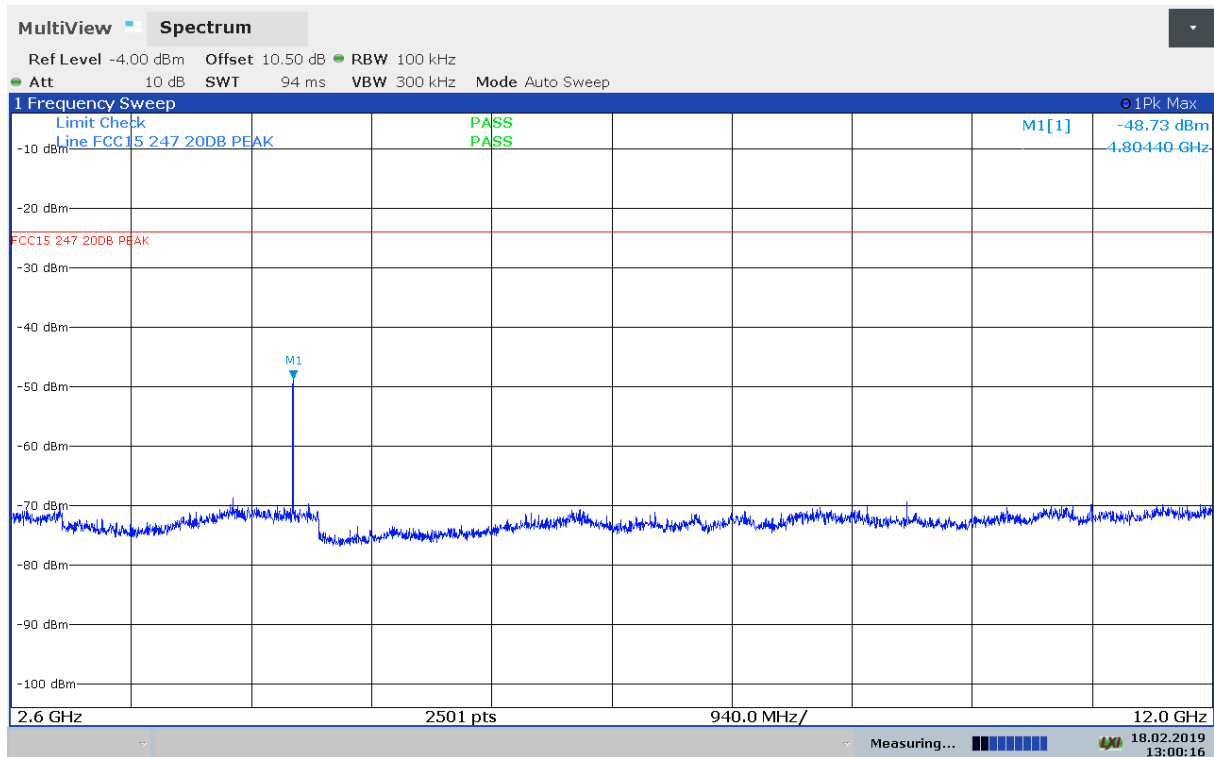
Attenuation below the general limits specified in part 15.209(a) is not required.



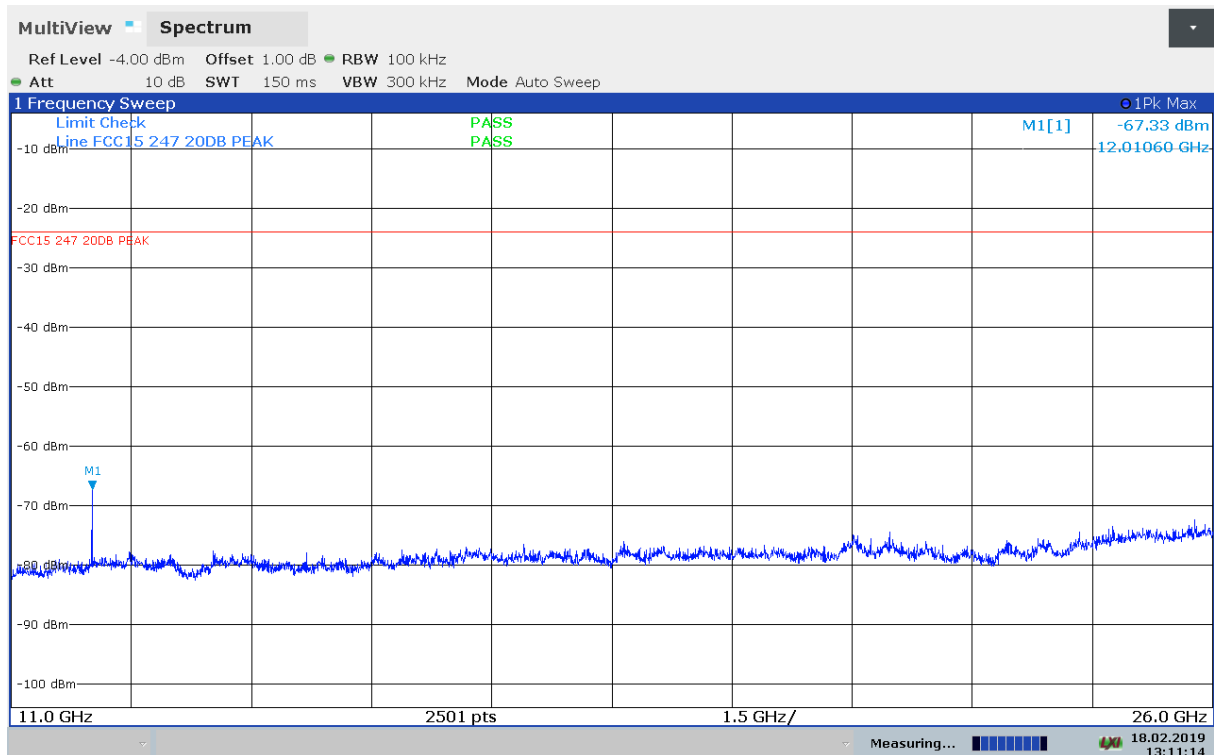
Conducted Emissions, 1–2300 MHz, 2402MHz



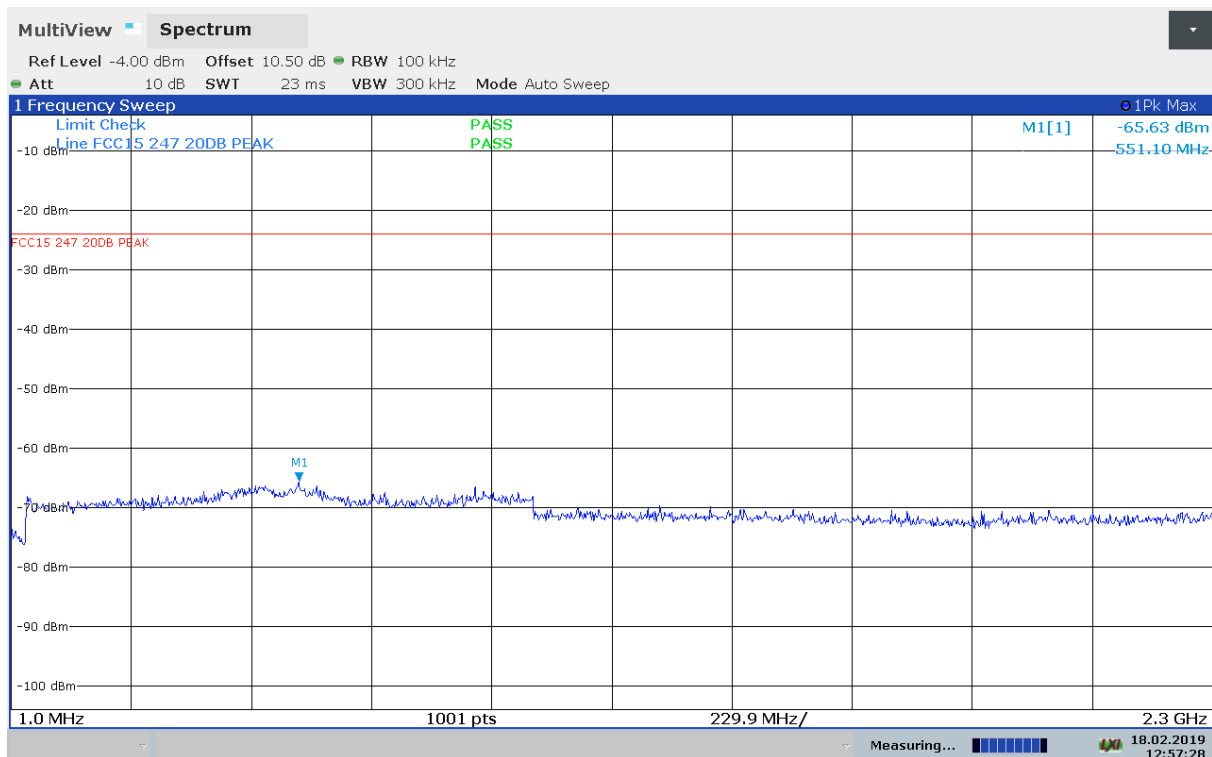
Conducted Emissions, 2300–2600 MHz, 2402MHz



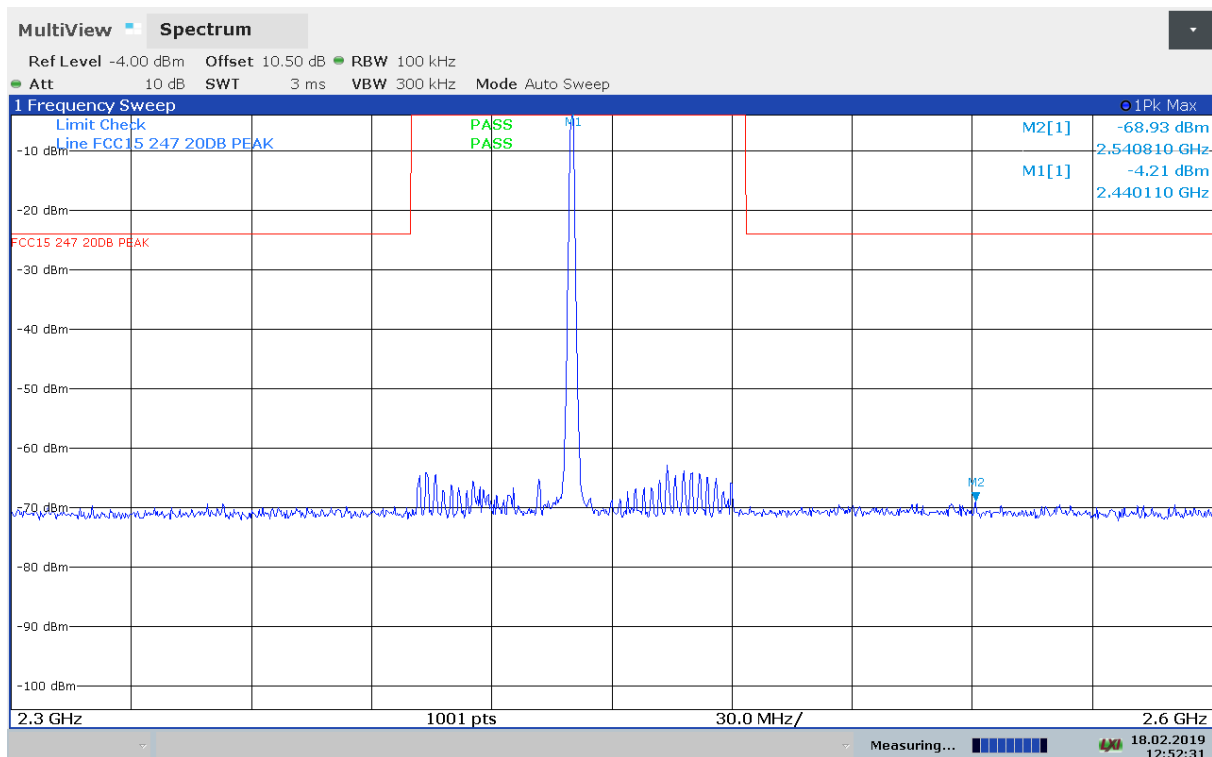
Conducted Emissions, 2600–12000 MHz, 2402MHz



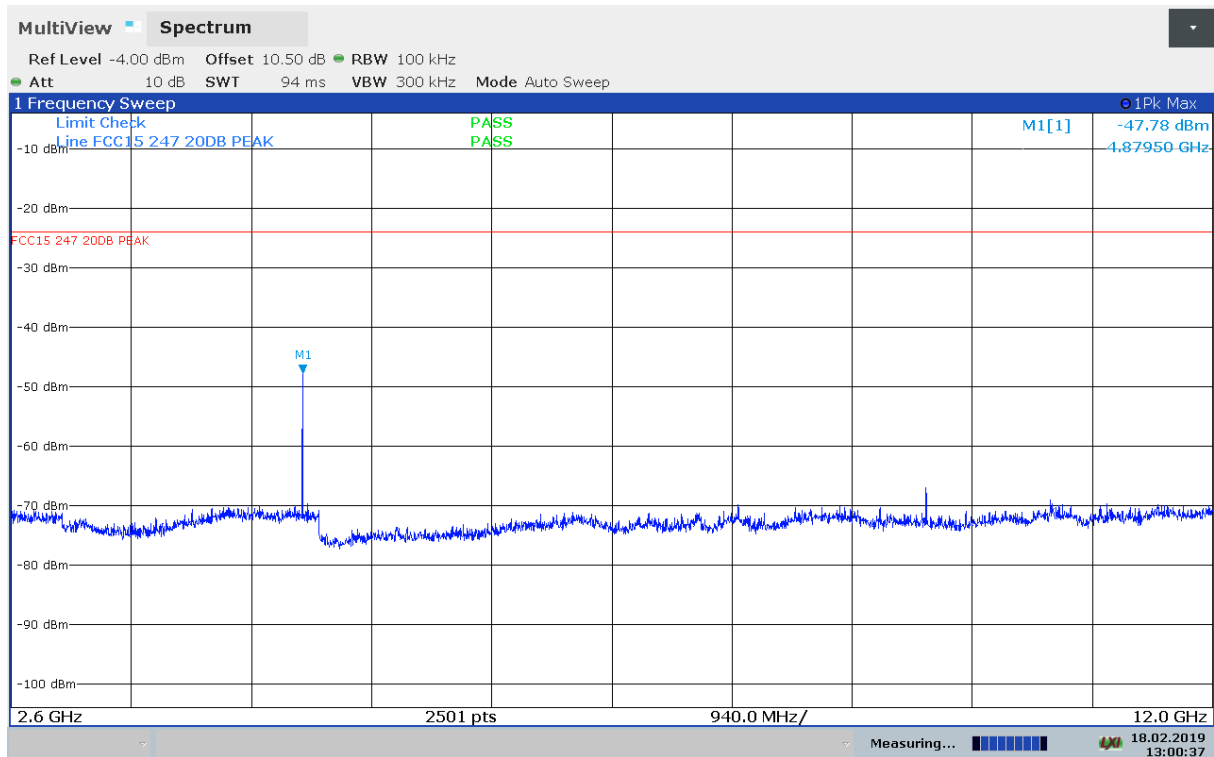
Conducted Emissions, 11000–26000 MHz, 2402MHz



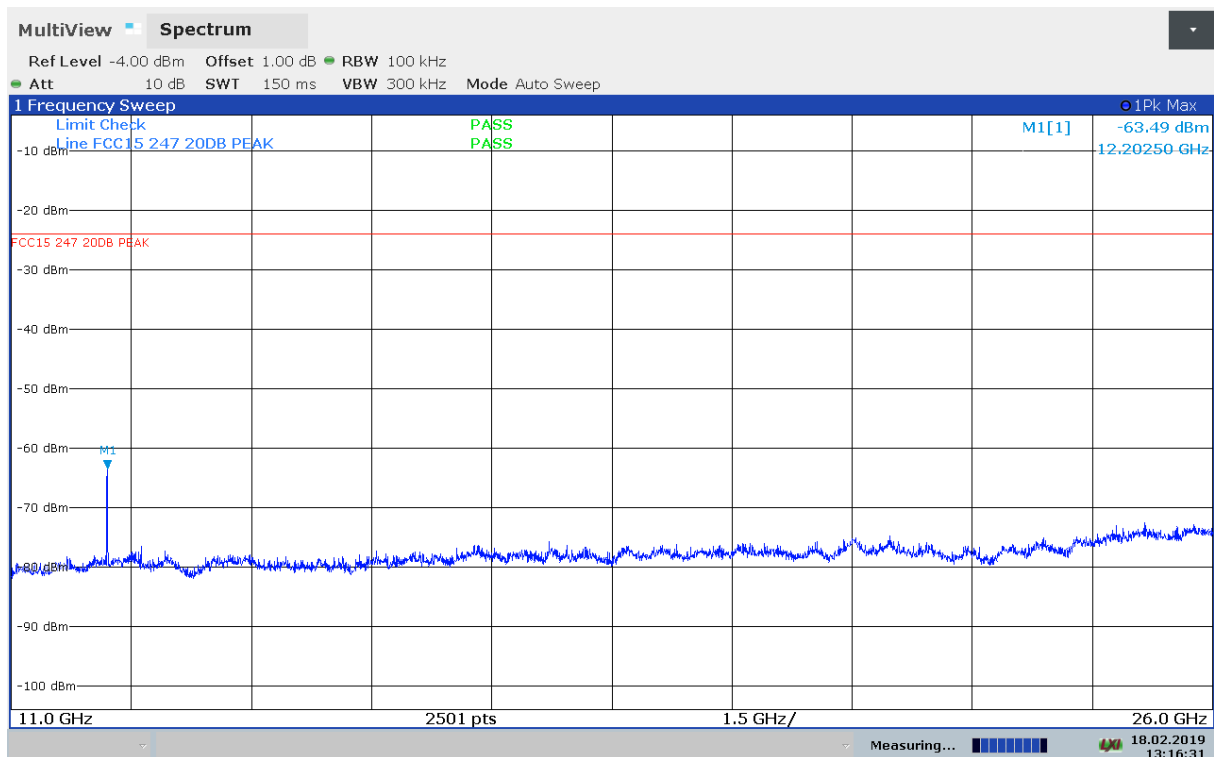
Conducted Emissions, 1–2300 MHz, 2440MHz



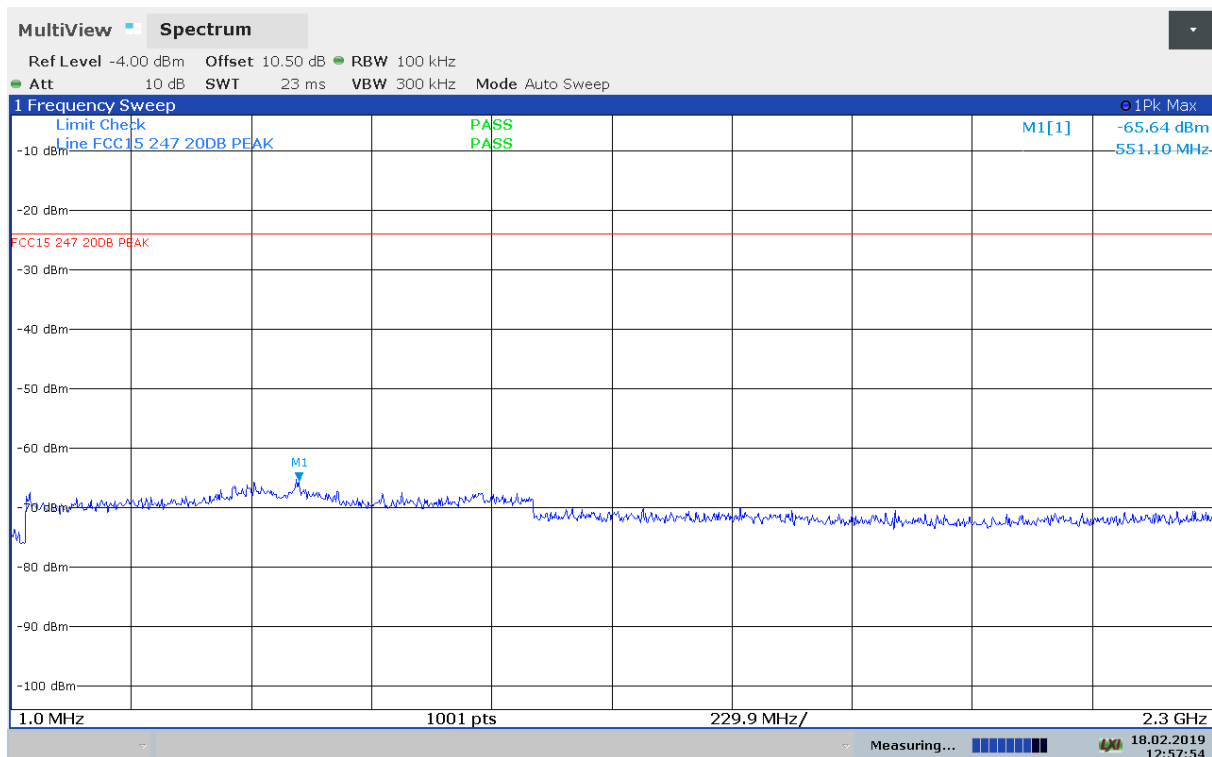
Conducted Emissions, 2300–2600 MHz, 2440MHz



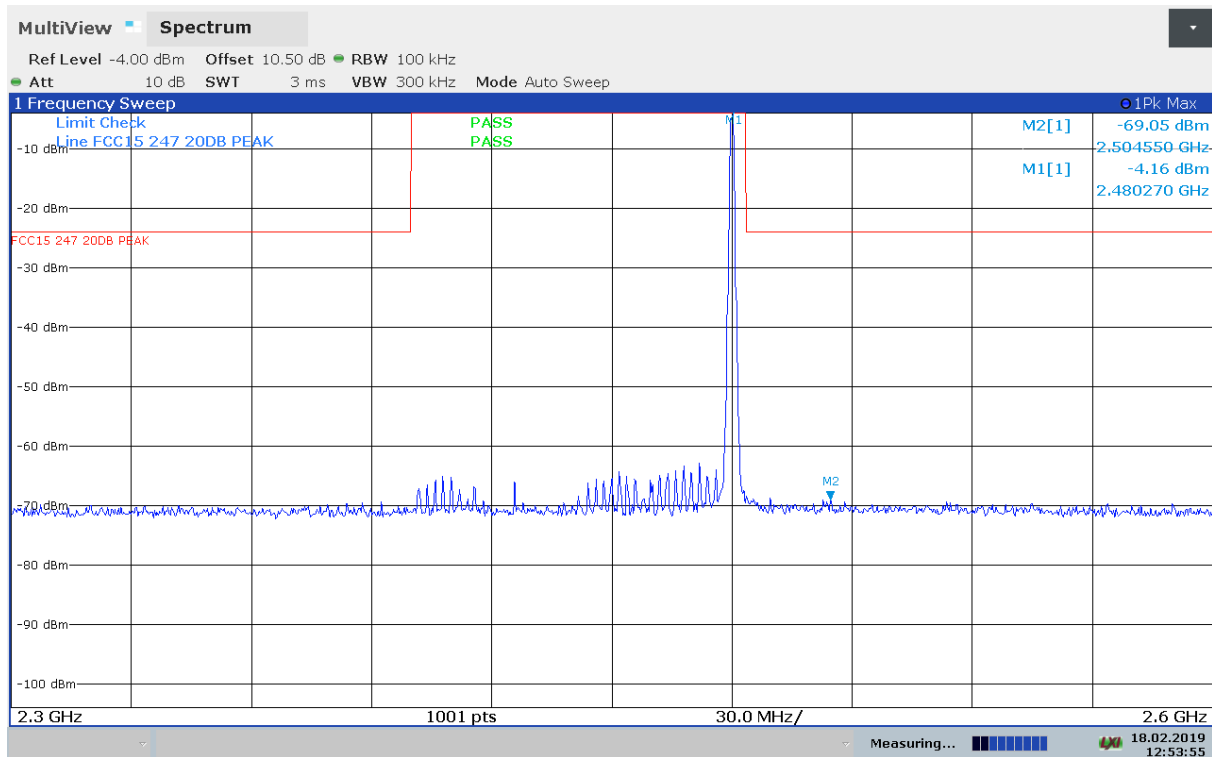
Conducted Emissions, 2600–12000 MHz, 2440MHz



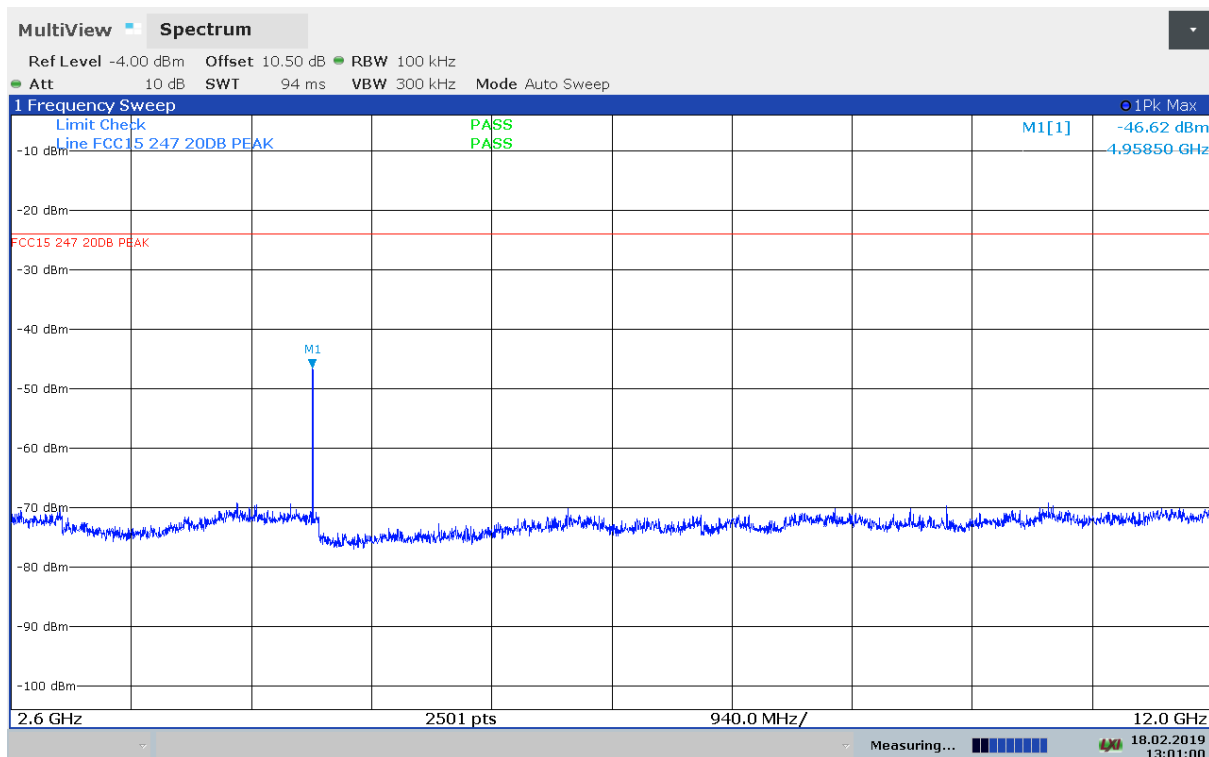
Conducted Emissions, 11000–26000 MHz, 2440MHz



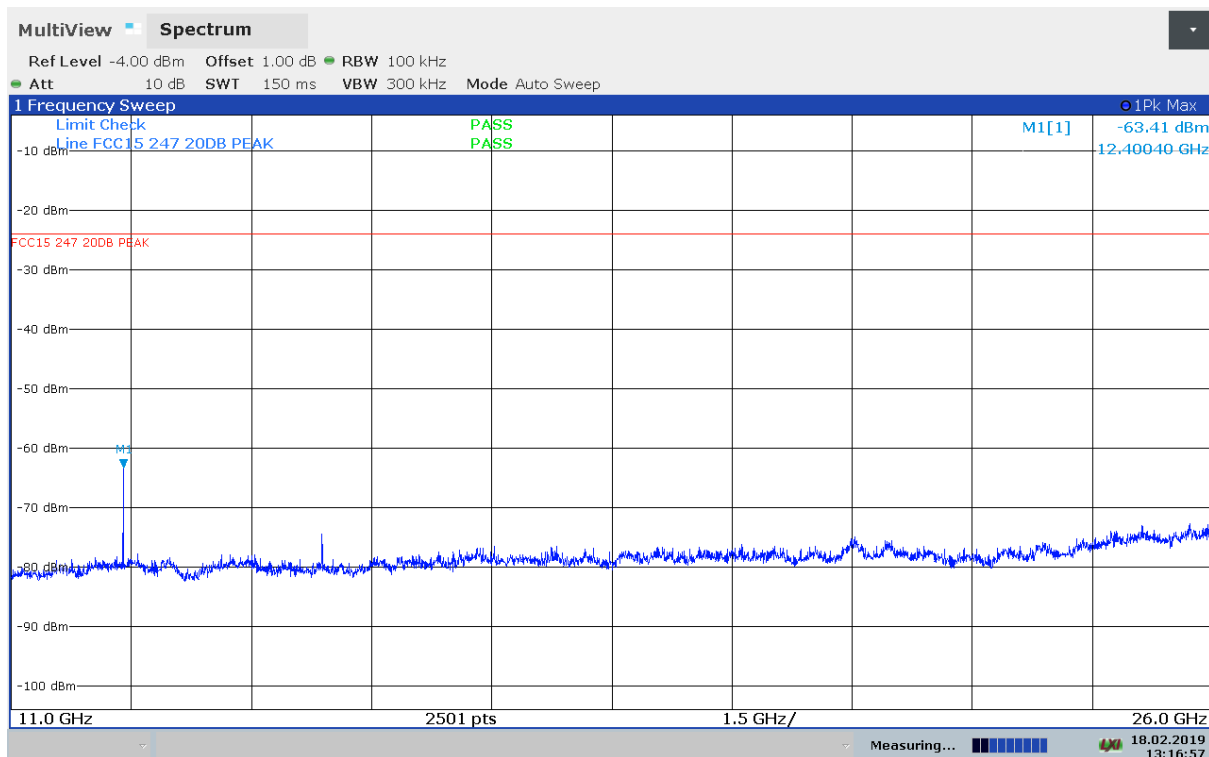
Conducted Emissions, 1–2300 MHz, 2480MHz



Conducted Emissions, 2300–2600 MHz, 2480MHz



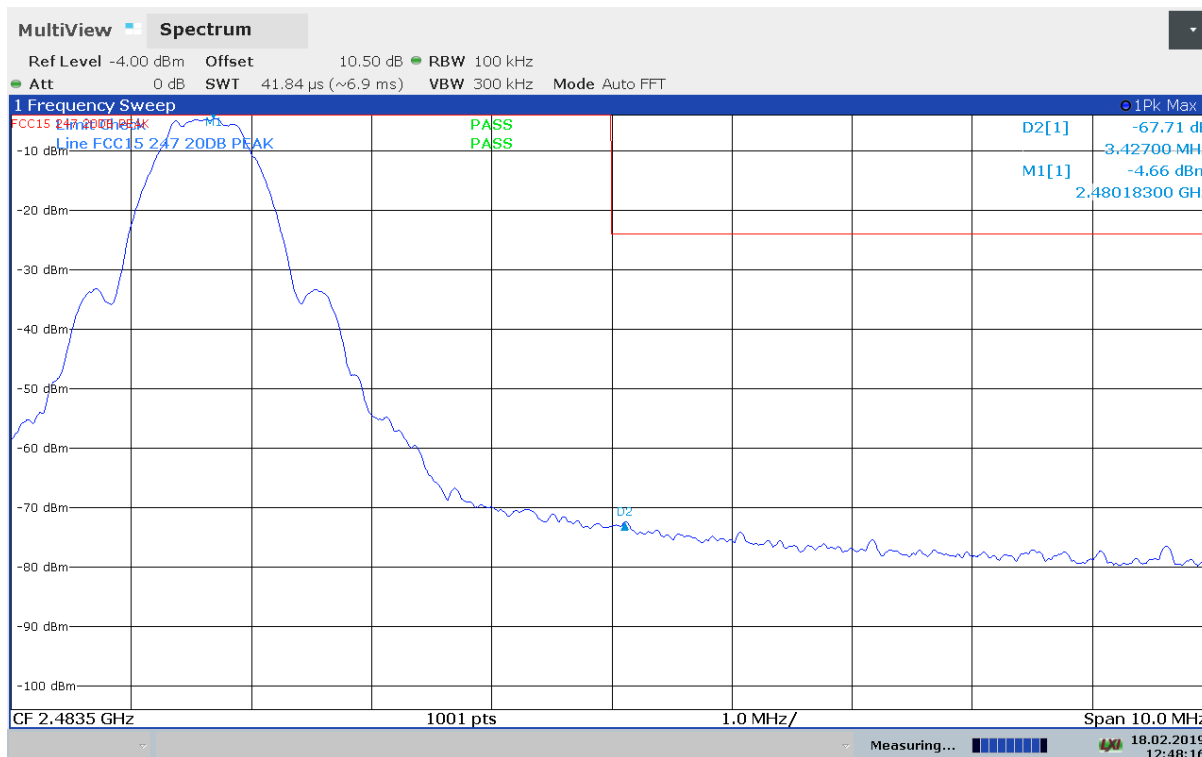
Conducted Emissions, 2600–12000 MHz, 2480MHz



Conducted Emissions, 11000–26000 MHz, 2480MHz



Conducted Emissions, 2400 MHz, Lower Band Edge



Conducted Emissions, 2483.5 MHz, Upper Band Edge

3.7 Restricted Bands of operation

Restricted Bands of operation for FCC and ISSED are defined in FCC Part 15.205 and ISSED RSS-GEN, Issue 5 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 5, clause 8.9.

FCC (MHz)	ISSED (MHz)	FCC (GHz)	ISSED (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 ISSED, all other frequencies are common.

3.8 Radiated Emissions, Band Edge

FCC Part 15.209 (a)

ISED Canada RSS-GEN Issue 5, Clause 7.3 / 8.9

Measurement procedure: ANSI C63.10-2013 Clause 11.12

Test Results: Complies

Measurement Data:

	Measured field strength (dBμV/m)		Limit	Margin	
	2390 MHz	2483.5 MHz	(dBμV/m)	(dB)	
Peak Detector	42.0	64.7	74	32.0	9.3
Average Detector	22.0	44.7	54	32.0	9.3

Band Edge is measured with the EUT transmitting on 2402 and 2480 MHz

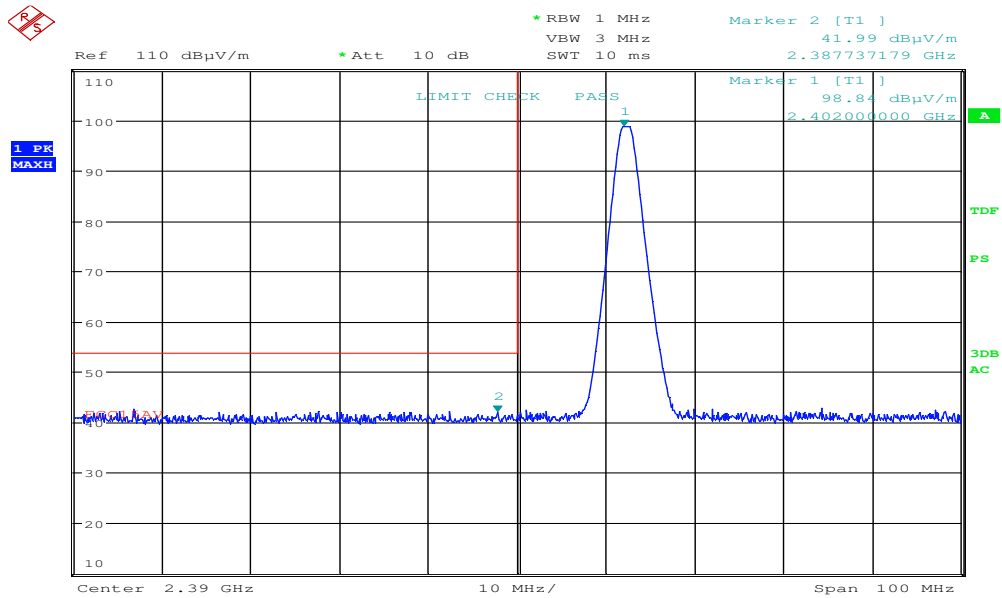
Average values are calculated from Peak Values using the Duty Cycle correction factor.

See attached plots.

Duty Cycle Correction Factors

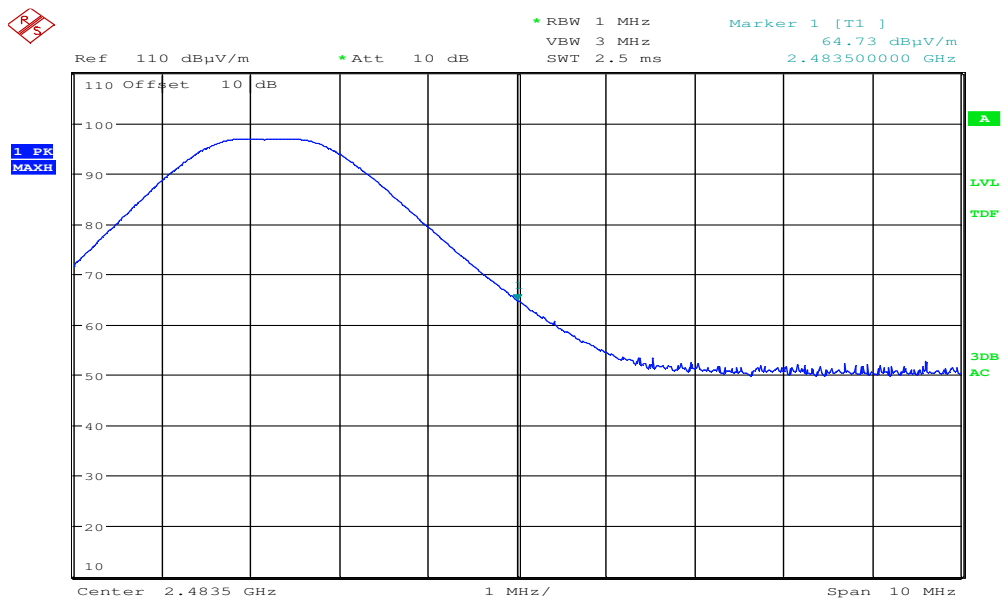
Correction Factor = $-20 \times \log(\text{Duty Cycle}) = -20 \times \log(0.10) = 20.0 \text{ dB}$

Maximum Allowed Correction Factor = 20 dB



Date: 13.FEB.2019 09:13:34

Band Edge, Lower, Peak, 2402 MHz, Max Power



Date: 13.FEB.2019 11:51:18

Band Edge, Upper, Peak, 2480 MHz, Max Power

3.9 Radiated Emissions, 30 – 1000 MHz

FCC Part 15.209 (a)

ISED Canada RSS-GEN Issue 5, Clause 7.3/8.9

Measurement procedure: ANSI C63.10-2013 Clause 11.12

Test Results: Complies

Measurement Data:

Measuring distance 3 m.

Tested in test mode with EUT transmitting.

Measured values:

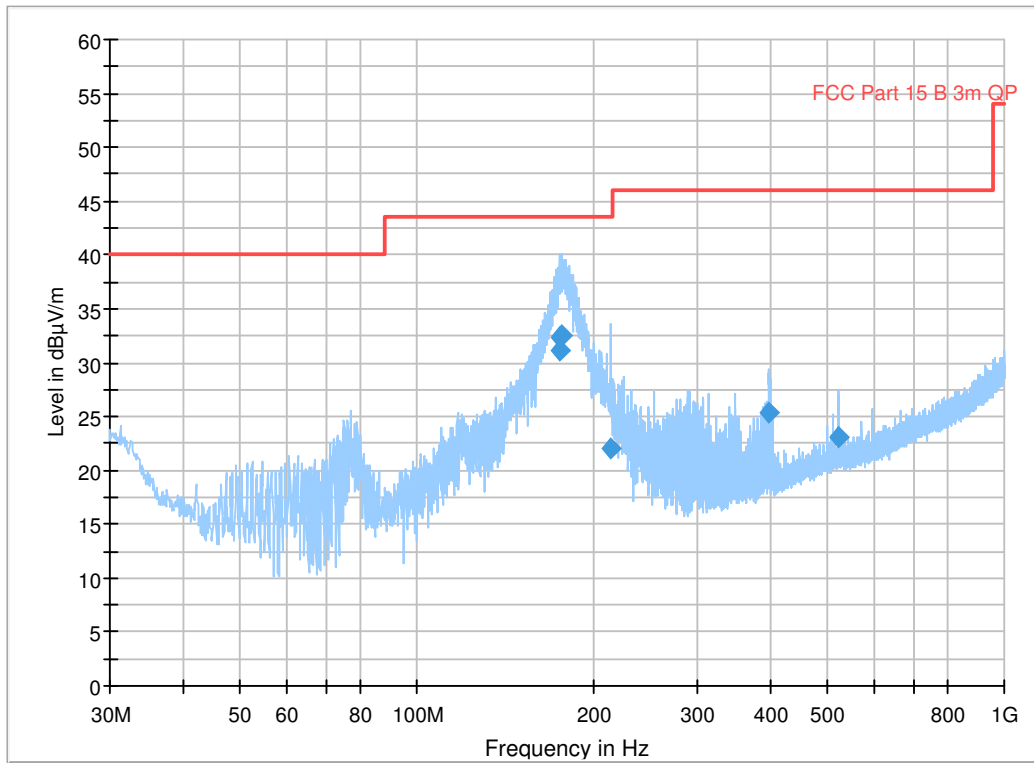
Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
174.945700	31.19	43.50	12.31	1000.0	120.000	236.0	H	282.0
175.617400	32.44	43.50	11.06	1000.0	120.000	190.0	H	81.0
176.616900	32.56	43.50	10.94	1000.0	120.000	189.0	H	238.0
213.468700	22.04	43.50	21.46	1000.0	120.000	152.0	H	240.0
398.444000	25.43	46.00	20.57	1000.0	120.000	116.0	H	2.0
522.855250	23.05	46.00	22.95	1000.0	120.000	248.0	H	172.0

See attached plots.

Requirements/Limit

FCC	Part 15.209 @ frequencies defined in §15.205	
ISED	RSS-GEN Issue 5, clause 8.9 @ frequencies defined in clause 8.10	
Frequency	Radiated emission limit @3 meters Quasi Peak Detector	
30 – 88 MHz	100 μV/m	40.0 dBμV/m
88 – 216 MHz	150 μV/m	43.5 dBμV/m
216 – 960 MHz	200 μV/m	46.0 dBμV/m
960 – 1000 MHz	500 μV/m	54.0 dBμV/m

Full Spectrum



3.10 Radiated Emissions, 1 - 25 GHz

FCC Part 15.209 (a)

ISED Canada RSS-GEN Issue 5, Clause 7.3/8.9

Measurement procedure: ANSI C63.10-2013 Clause 11.12

Test Results: Complies

Measurement Data:

Measuring distance: 3 m (1–18 GHz)
1 m (18-25 GHz)

Measured values:

Frequency (MHz)	Channel	Polarization	Peak (dBµV/m)	Average (dBµV/m)	Peak Margin (dB)	Av Margin (dB)
all	Mid	V/H	< 55	< 44	>19	>10

All measurements were performed with the EUT transmitting on a fixed channel.

Average Values are calculated from Peak Values by Duty Cycle Correction Factor.

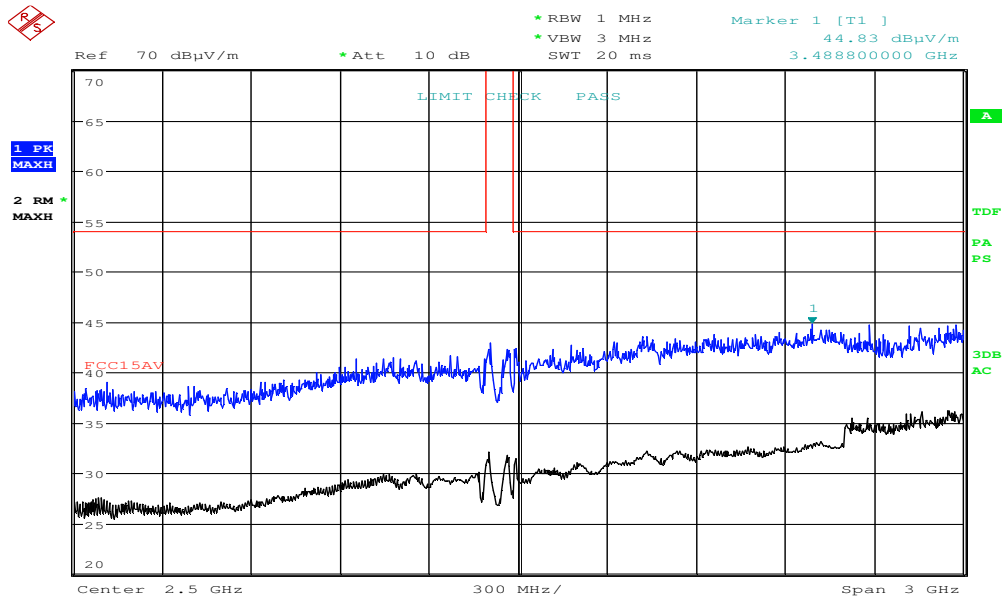
A Band Reject Filter was used for measurements from 1 GHz to 4 GHz and a High Pass Filter was used from 3 GHz to 18 GHz.

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

See plots.

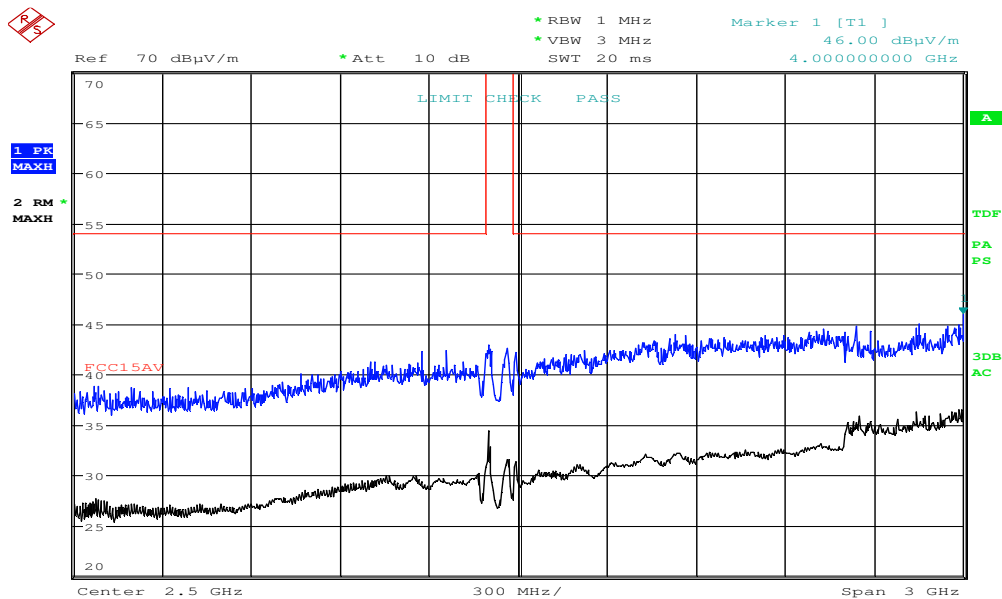
Requirements/Limit

FCC	Part 15.209 @ frequencies defined in §15.205	
ISED	RSS-GEN Issue 5, clause 8.9 @ frequencies defined in clause 8.10	
	Radiated emission limit @3 meters	
Frequency	Average Detector	Peak Detector
1 – 26 GHz	54.0 dBµV/m	74.0 dBµV/m



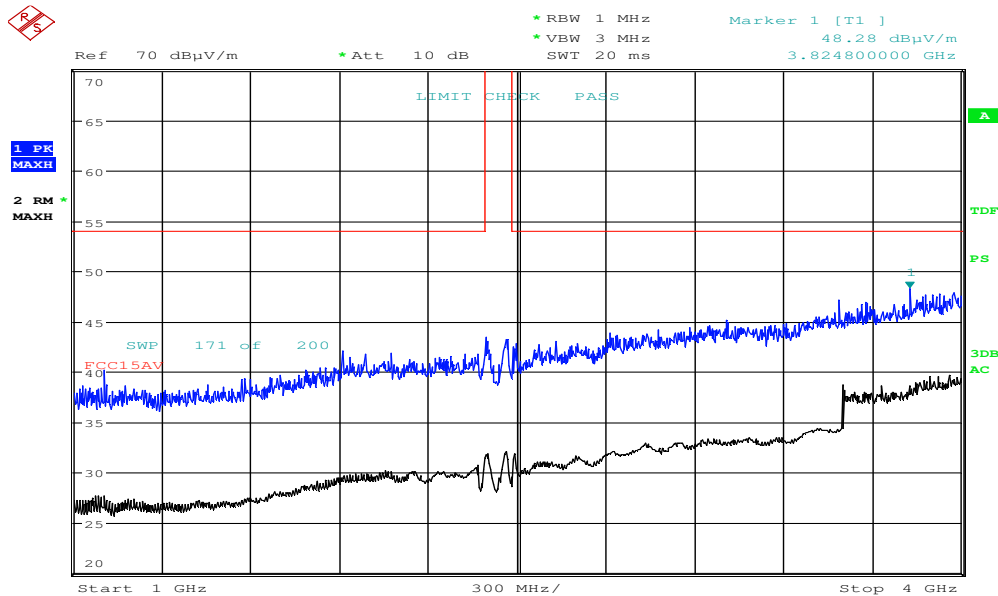
Date: 13.FEB.2019 09:48:08

Radiated Emissions, 1000 – 4000 MHz, 2402 MHz, EUT H, VP



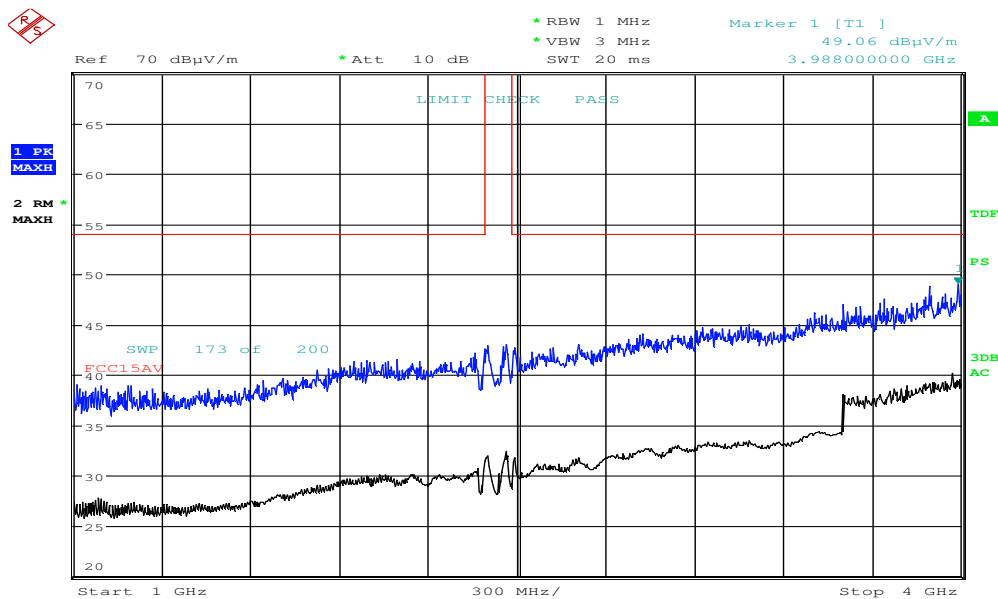
Date: 13.FEB.2019 09:50:03

Radiated Emissions, 1000 – 4000 MHz, 2402 MHz, EUT H, HP



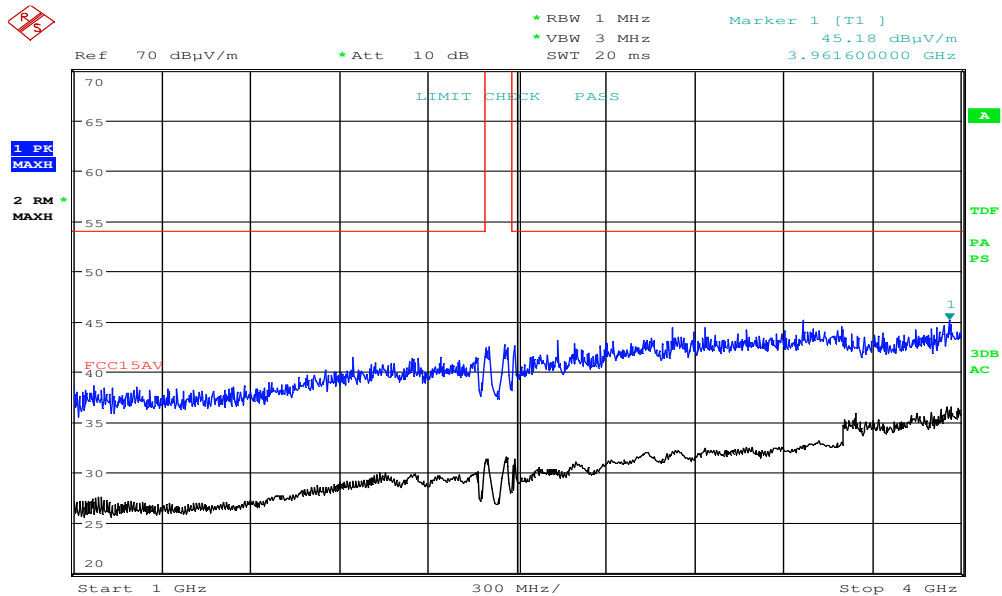
Date: 13.FEB.2019 09:40:35

Radiated Emissions, 1000 – 4000 MHz, 2440 MHz, EUT H, VP



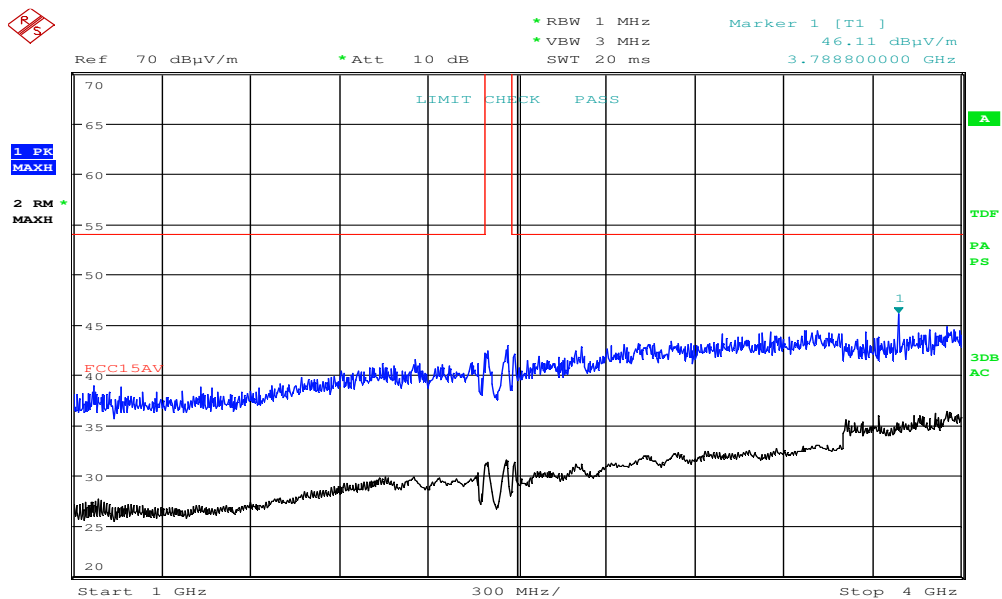
Date: 13.FEB.2019 09:42:30

Radiated Emissions, 1000 – 4000 MHz, 2440 MHz, EUT H, HP



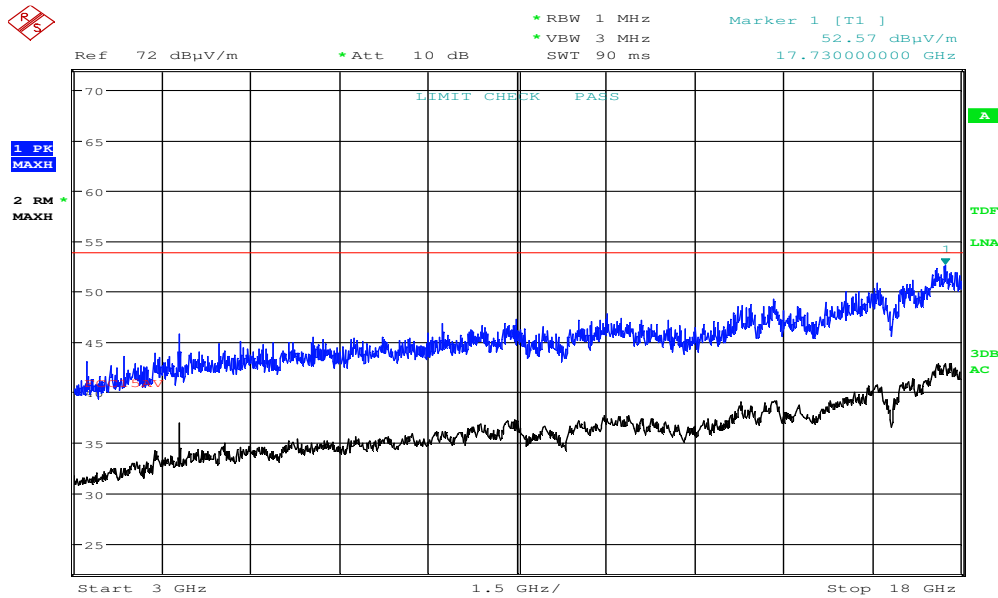
Date: 13.FEB.2019 09:53:14

Radiated Emissions, 1000 – 4000 MHz, 2480 MHz, EUT H, VP



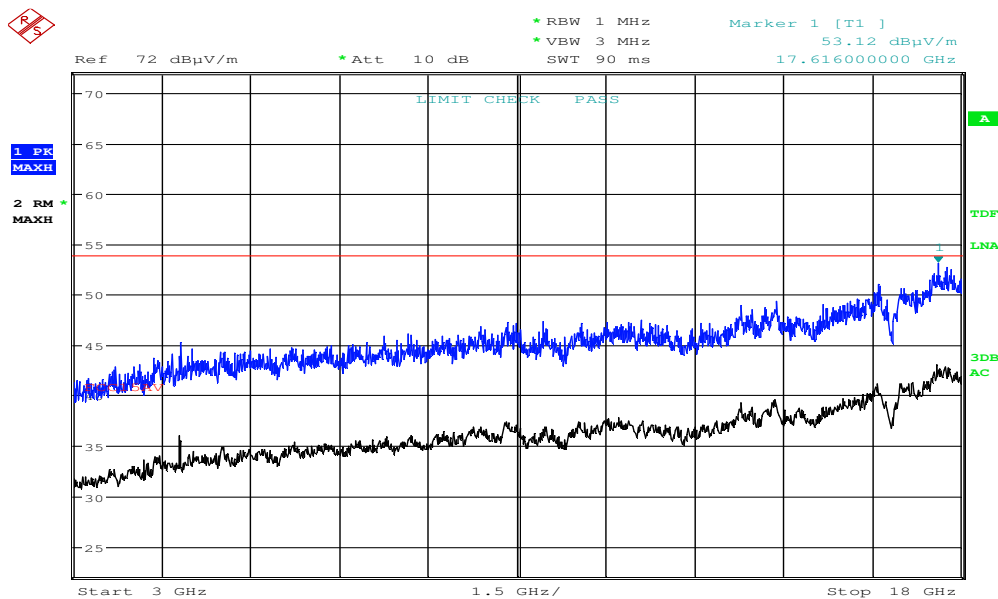
Date: 13.FEB.2019 09:55:09

Radiated Emissions, 1000 – 4000 MHz, 2480 MHz, EUT H, HP



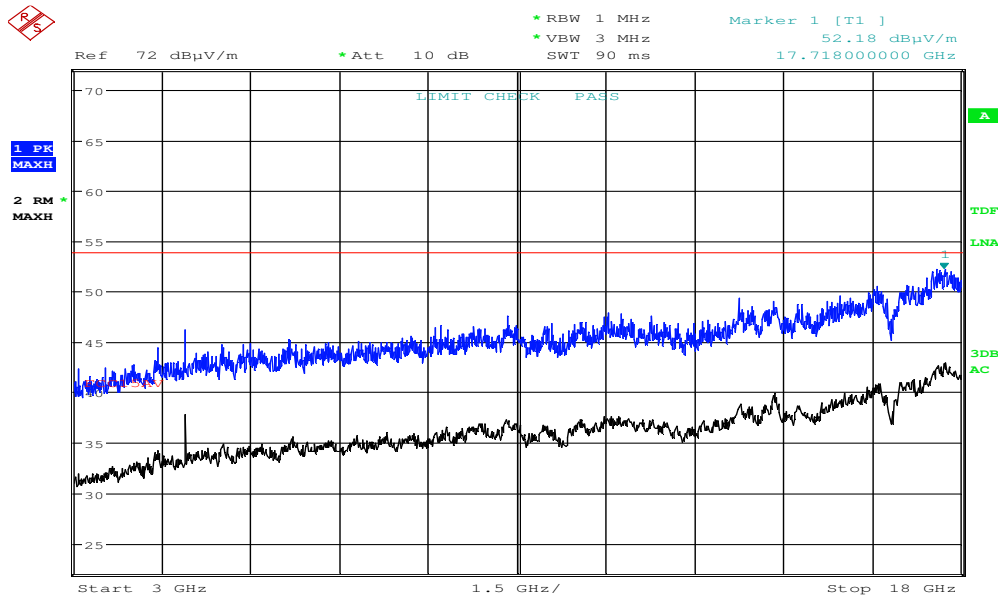
Date: 13.FEB.2019 10:34:28

Radiated Emissions, 3000 – 18000 MHz, 2402 MHz, EUT H, VP



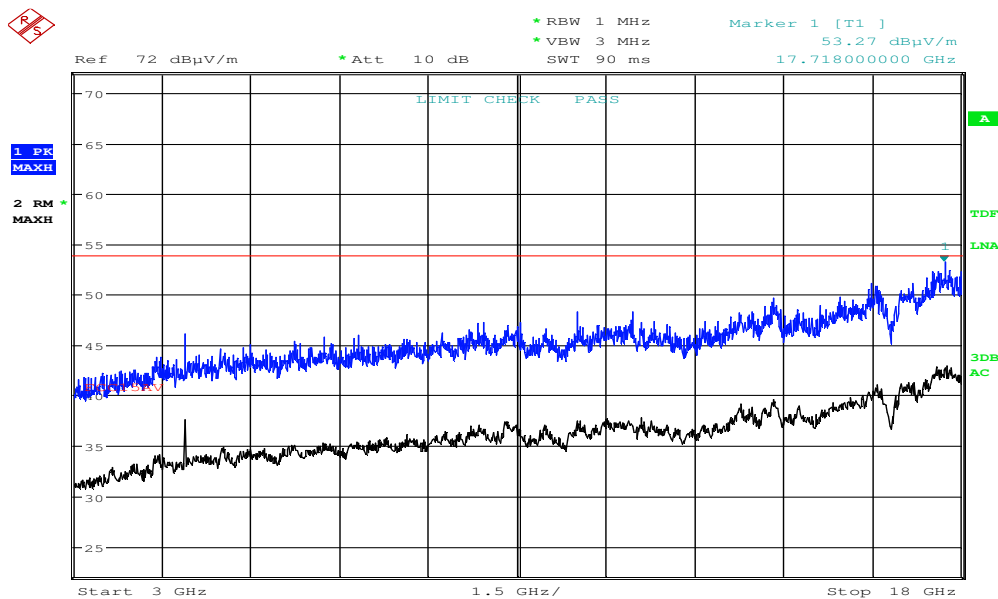
Date: 13.FEB.2019 10:36:22

Radiated Emissions, 3000 – 18000 MHz, 2402 MHz, EUT H, HP



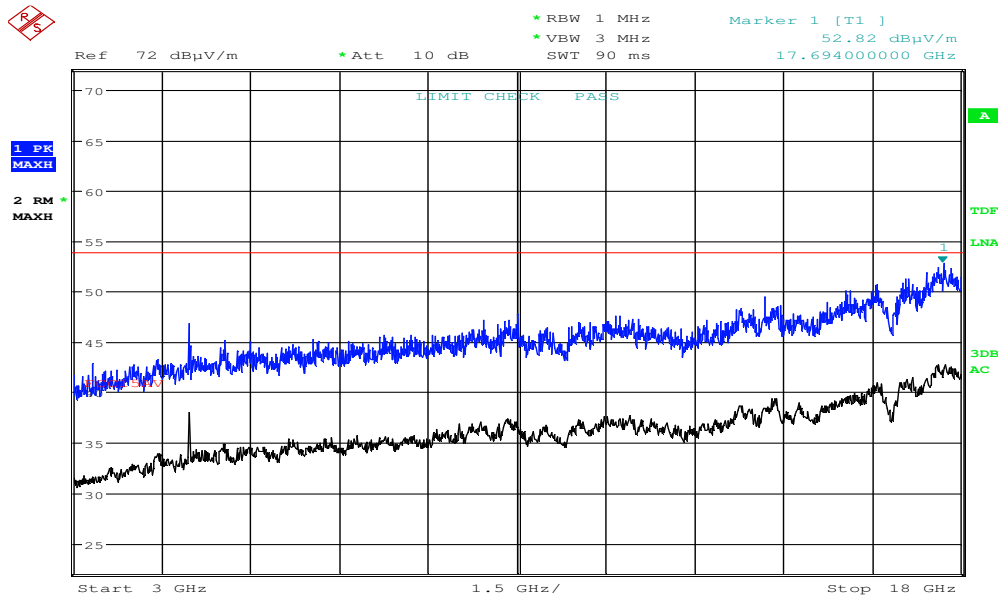
Date: 13.FEB.2019 10:29:28

Radiated Emissions, 3000 – 18000 MHz, 2440 MHz, EUT H, VP



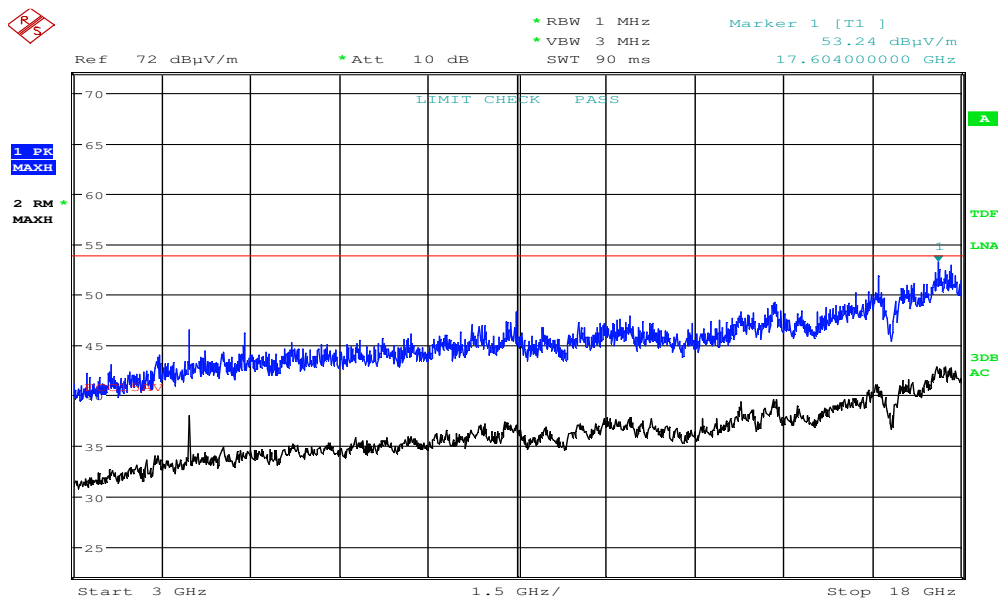
Date: 13.FEB.2019 10:31:22

Radiated Emissions, 3000 – 18000 MHz, 2440 MHz, EUT H, HP



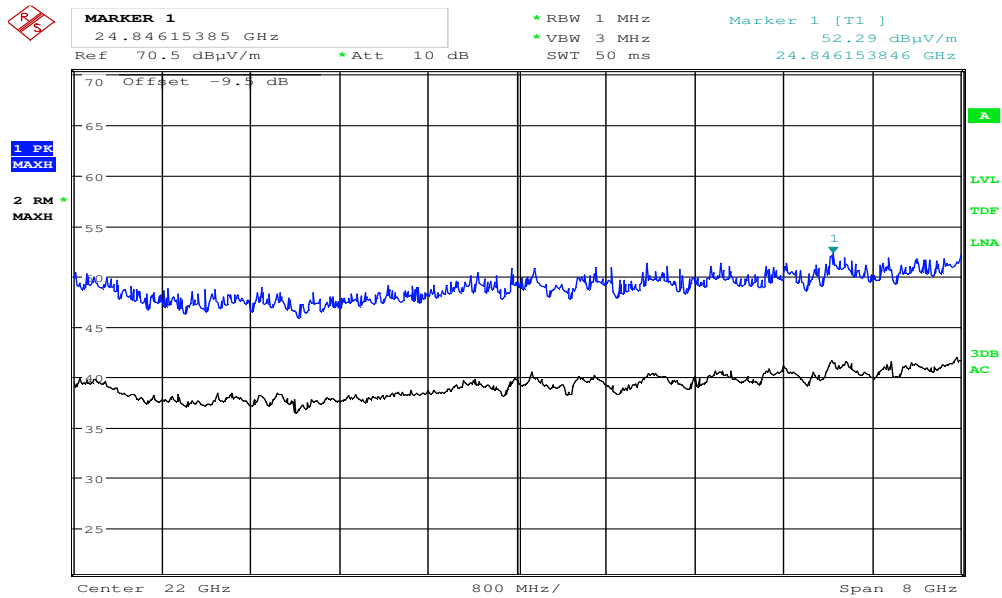
Date: 13.FEB.2019 10:22:29

Radiated Emissions, 3000 – 18000 MHz, 2480 MHz, EUT H, VP



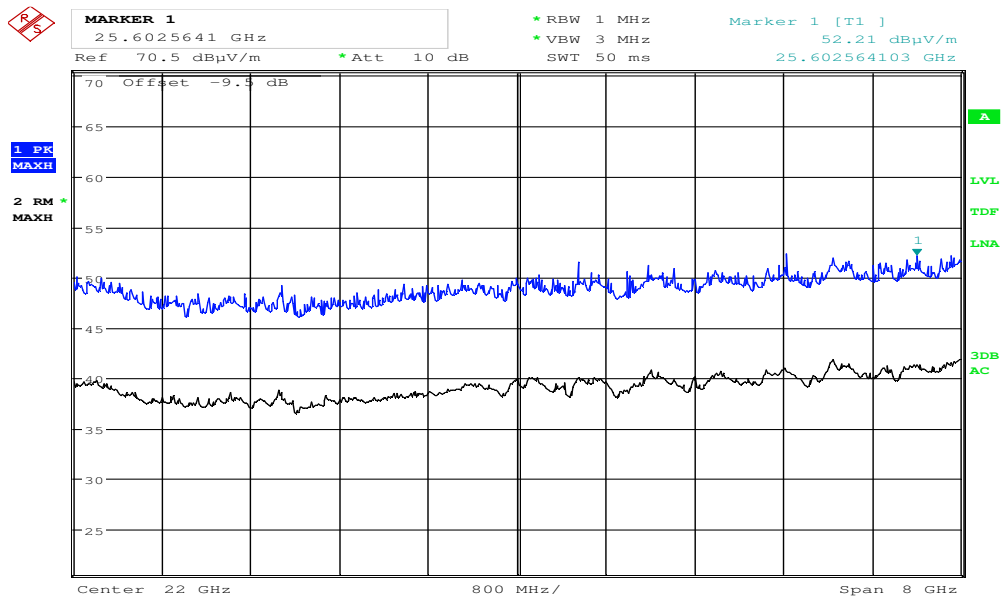
Date: 13.FEB.2019 10:24:23

Radiated Emissions, 3000 – 18000 MHz, 2480 MHz, EUT H, HP



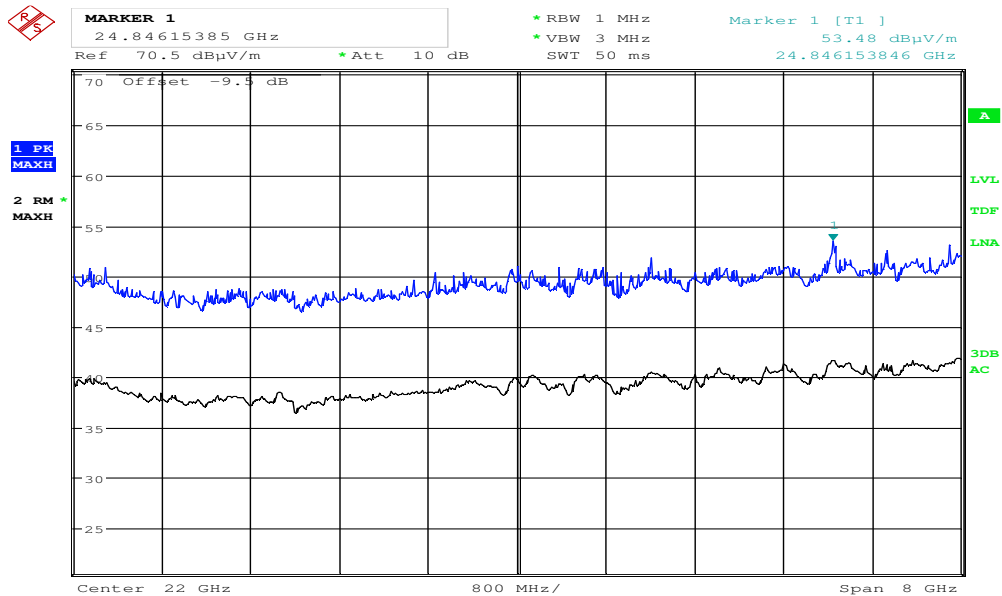
Date: 13.FEB.2019 15:49:01

Radiated Emissions, 18 – 26 GHz, 2440 MHz, EUT H, VP, @1m



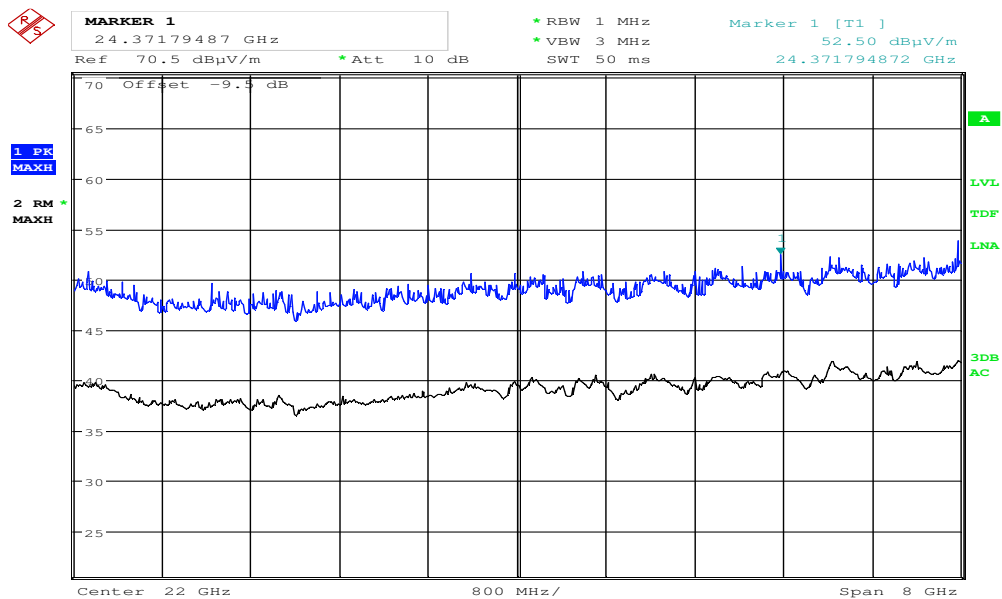
Date: 13.FEB.2019 15:47:52

Radiated Emissions, 18 – 26 MHz, 2440 MHz, EUT H, HP, @1m



Date: 13.FEB.2019 15:51:57

Radiated Emissions, 18 – 26 GHz, 2440 MHz, EUT V, VP, @1m



Date: 13.FEB.2019 15:53:17

Radiated Emissions, 18 – 26 MHz, 2440 MHz, EUT V, HP, @1m

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.	Model number	Description	Manufacturer	Ref. no.	Cal. date	Cal. Due
1	FSW43	Spectrum Analyzer	Rohde & Schwarz	LR 1690	2019-01	2020-01
2	ESU40	Measuring Receiver	Rohde & Schwarz	LR 1639	2019-01	2020-01
3	6810.17B	Attenuator	Suhner	LR 1669	COU	
4	6HC3000/18000	Highpass Filter	Trilithic	LR 1614	COU	
5	JB3	BiLog Antenna	Sunol Sciences	N-4525	2016-05	2019-05
6	317	Preamplifier	Sonoma Inst.	LR 1687	2018-07	2019-07
7	3115	Horn Antenna	EMCO	LR 1330	2016-10	2019-10
8	3117-PA	Horn Antenna with Preamp	EMCO	LR 1717	2017-12	2019-12
9	8449A	Pre-amplifier	Hewlett Packard	LR 1322	2018-07	2019-07
10	638	Horn Antenna	Narda	LR 1480	2010-06	2020-06
11	WRCG2400/2483.5	Band Reject Filter	Wainwright Inst.	LR 1530	COU	
12	Model 87 V	Multimeter	Fluke	LR 1597	2018.02	2020.02
13	6812B	AC Power Source	Agilent	LR 1515	COU	
14	ENV216	Two Line V-Network	Rohde & Schwarz	LR 1665	2017.11	2019.11
15	ESC13	Measuring Receiver	Rohde & Schwarz	N-4259	2017.10	2019.10
16	ST18/SMA/N/36	RF Cable	Suhner	LR 1627	COU	
17	SF102/1000MM	RF Cable	Suhner	SN 50113/2	COU	
18	SF102/2000MM	RF Cable	Suhner	SN 500100/2	COU	

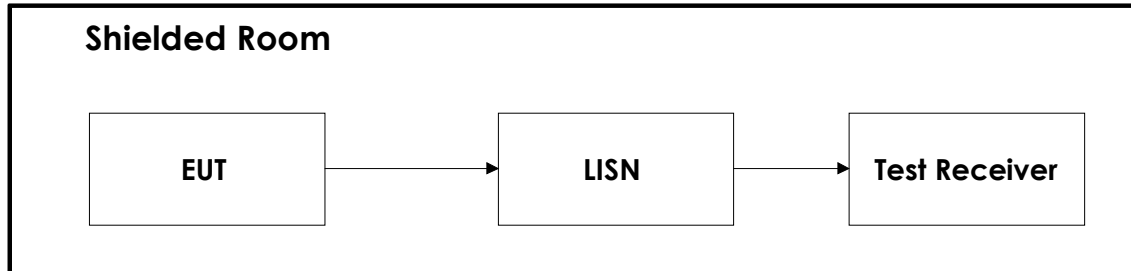
COU - Calibrate ON Use; N/A – Not Applicable

The software listed below has been used for one or more tests.

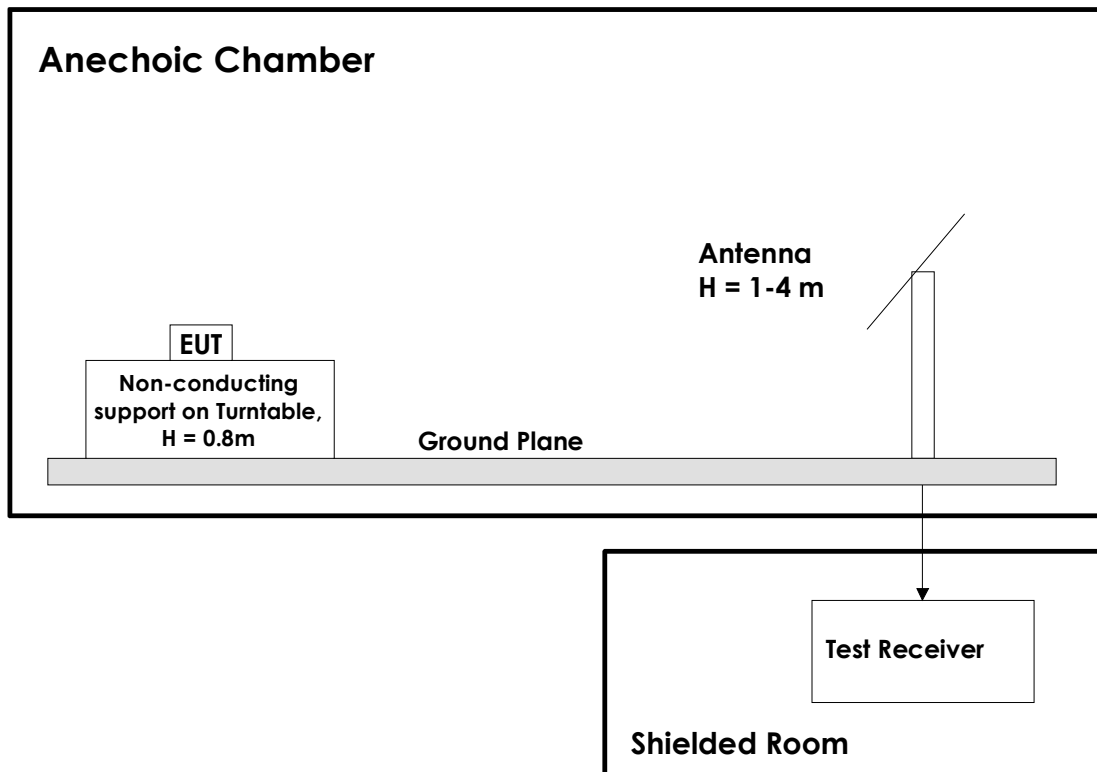
No.	Manufacturer	Name	Version	Comment
1	Rohde & Schwarz	EMC32	10.20.10	Power Line Conducted test software
2	Rohde & Schwarz	EMC32	10.20.10	Radiated Emission test software
3	Rohde & Schwarz	GPBShot	2.7	Screenshots from R&S Spectrum Analyzers

6 BLOCK DIAGRAM

6.1 Power Line Conducted Emission



6.2 Test Site Radiated Emission



This test setup is used for all radiated emissions tests. The measuring distance is 3m or 1m. Emissions above 1 GHz are measured with a Spectrum Analyzer and Horn Antenna.

For measurements above 18 GHz the test receiver is moved inside the anechoic chamber and located next to the antenna to minimize the cable loss. All measurements at 1GHz and above were performed with turntable height 1.5m and with the ground plane covered by absorbers. A pre-amplifier is used for all measurements, and High-Pass filter is used for all harmonics.