

RADIO REPORT FCC 47 CFR Part 15C ISED Canada RSS-247 Digital transmission systems operating within the 2400.0 MHz - 2483.5 MHz band	
Report Reference No	G0M-2302-1881-TFC247ZB-W271-V03
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	    DAkkS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	u-blox AG
Address	Zürcherstrasse 68 8800 Thalwil Switzerland
Test Specification	47 CFR Part 15C RSS-247, Issue 2, 2017-02 RSS-Gen, Issue 5, Amendment 2, 2021-02
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	MAYA-W2 host-based multiradio modules
Model(s)	MAYA-W271-00B
Brand Name(s)	u-blox
Additional Model(s)	None
Hardware Version(s)	02
Software Version(s)	1.0.0.39.1-18.80.1.p154.38
FCC ID	XPYMAYAW2A
IC	8595A-MAYAW2A
Test Result	PASSED

Possible test case verdicts:		
Required by standard but not tested	N/T	
Not required by standard	N/R	
Not applicable to EUT	N/A	
Test object does meet the requirement	P(PASS)	
Test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 °C - 30 °C	
Test Lab Humidity	25 % - 55 %	
Date of receipt of test item	2023-03-02	
Report:		
Compiled by	Radwan Jaafar	
Responsible for test (+ signature) (Responsible for Test)	Radwan Jaafar	
Approved by (+ signature) (Test Lab Engineer)	Wilfried Treffke	
Date of Issue	2024-01-11	
Total number of pages	85	
General Remarks:		
The test results presented in this report relate only to the object tested. The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.		
Additional Comments:		
None		

ADDITIONAL VARIANTS

Additional Variants (not tested and not evaluated variants)		
Not-tested Variant	Description	
1	Product Type Description	Host-based multiradio module
	Model name	MAYA-W261-00B
	Brand name	u-blox
	Hardware Version	02
	Software Version	1.0.0.39.1-18.80.1.p154.38
	FCC ID	XPYMAYAW2A
	IC	8595A-MAYAW2A
	PMN	MAYA-W261-00B
	HVIN	MAYA-W261-00B
	FVIN	N/A
	HMN	N/A
Comment: Those named additional variants above have not been tested. Those additional variants of the series have been declared by the manufacturer. The test report explicitly states that those variants were neither tested nor assessed nor evaluated.		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2023-11-03	Initial Release	
02	2023-11-29	Replaced document: G0M-2302-1881-TFC247ZB-W271-V01 Replaced by: G0M-2302-1881-TFC247ZB-W271-V02 Reason: Correction of the model name and FVIN of the EUT.	R. Jaafar
03	2024-01-11	Replaced document: G0M-2302-1881-TFC247ZB-W271-V02 Replaced by: G0M-2302-1881-TFC247ZB-W271-V03 Reason: - Correction of the module name in the plots. - Editorial correction to AC powerline conducted emissions at section 3.5. - Add EIRP test results for IC at section 3.3.	R. Jaafar

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
DSSS	Direct Sequence Spread Spectrum
EUT	Equipment Under Test
FCC	Federal Communications Commission
IEEE 802.15.4	MAC and PHY Layer for Wireless Personal Area Networks
ISED	Innovation, Science and Economic Development Canada
O-QPSK	Offset-Quadrature Phase Shift Keying
QPSK	Quadrature Phase Shift Keying
RBW	Resolution bandwidth
RMS	Root mean square
VBW	Video bandwidth
V _{NOM}	Nominal supply voltage

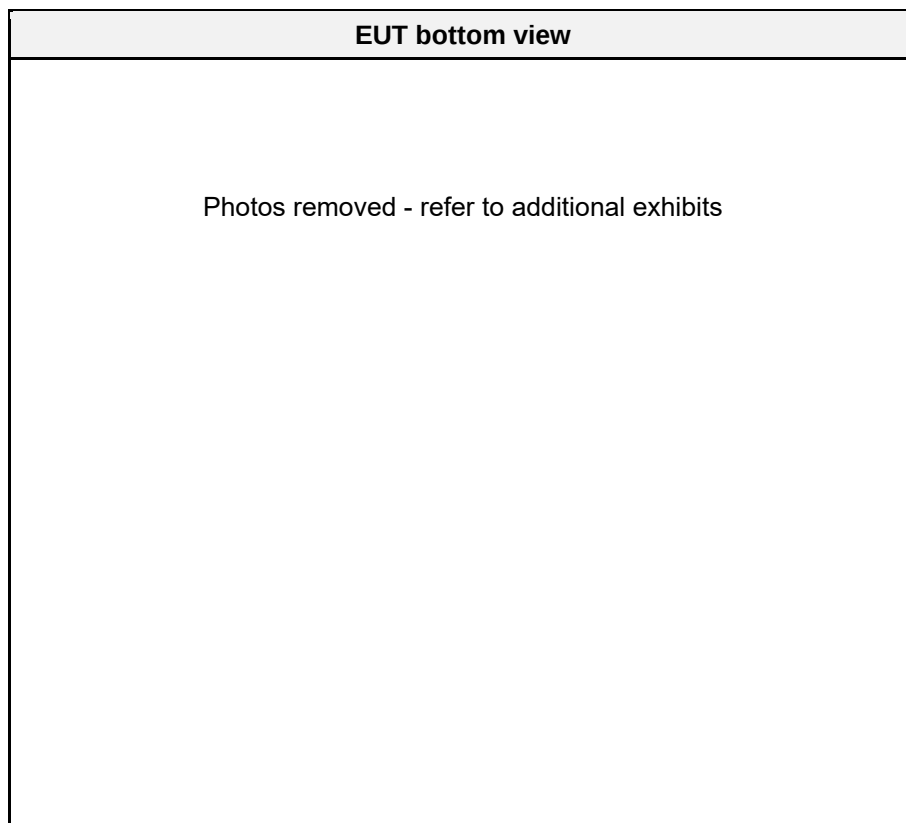
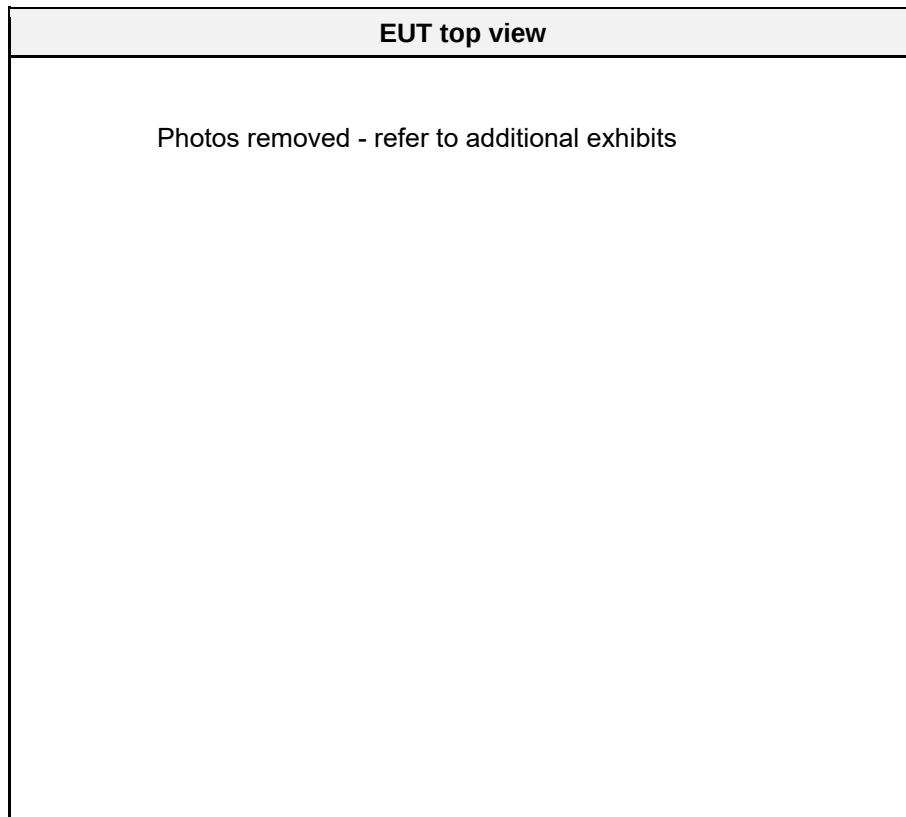
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1 Equipment (Test Item) Under Test

Description	MAYA-W2 host-based multiradio modules		
Model	MAYA-W271-00B		
Additional Model(s)	None		
Brand Name(s)	u-blox		
Sample Identification	EUT	Sample-ID	Serial Number
	conducted, and radiated with external antenna	43093	AM56C1DEB945F940300
Hardware Version(s)	02		
Software Version(s)	1.0.0.39.1-18.80.1.p154.38		
PMN	MAYA-W271-00B		
HVIN	MAYA-W271-00B		
FVIN	N/A		
HMN	N/A		
FCC ID	XPYMAYAW2A		
IC	8595A-MAYAW2A		
Equipment type	Radio Module		
Radio type	Transceiver		
Assigned frequency bands	2400.0 MHz - 2483.5 MHz		
Radio technology	IEEE 802.15.4		
Modulation	O-QPSK		
Number of antenna ports	2		
Antenna	Type	External	
	Model	ANT-DB1-RAF-SMA	
	Manufacturer	Linx Technologies	
	Gain	4.1 dBi (customer declaration)	
Supply Voltage (1 st Port)	V _{NOM}	3.3 VDC	
Supply Voltage (2 nd Port)	V _{NOM}	1.8 VDC	
Operating Temperature	T _{NOM}	20 °C	
AC/DC-Adaptor	Model	None	
Manufacturer	u-blox AG Zürcherstrasse 68 8800 Thalwil Switzerland		

1.1 Photos – Equipment External



EUT overview with external antenna

Photos removed - refer to additional exhibits

External antenna

Photos removed - refer to additional exhibits

Evaluation board top view

Photos removed - refer to additional exhibits

Evaluation board bottom view

Photos removed - refer to additional exhibits

Evaluation board side view

Photos removed - refer to additional exhibits

SPI Cable

Photos removed - refer to additional exhibits

Data cable

Photos removed - refer to additional exhibits

USB C cable

Photos removed - refer to additional exhibits

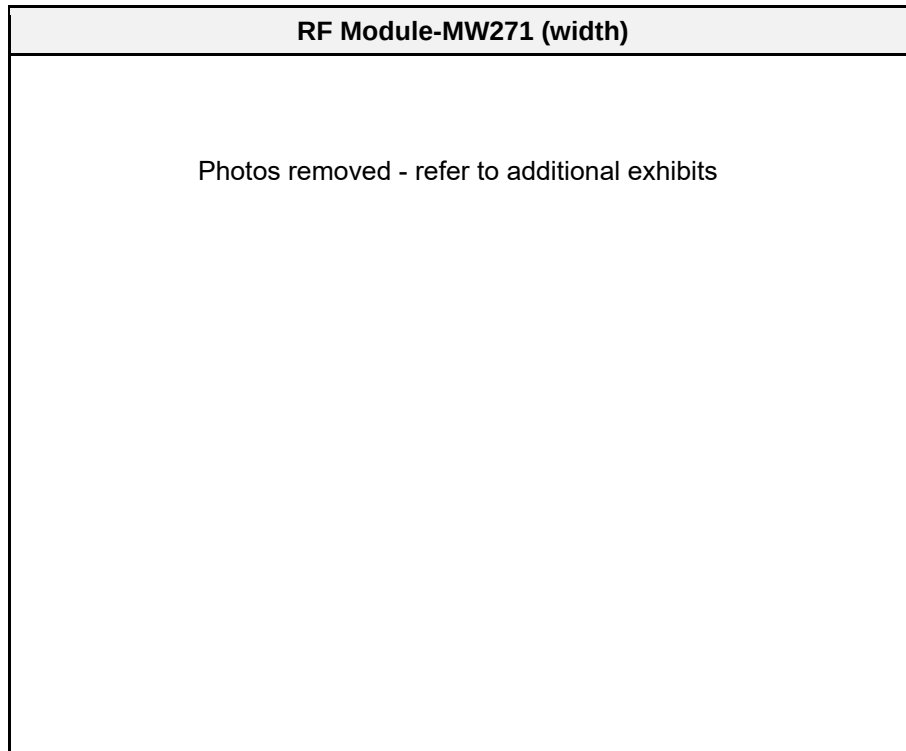
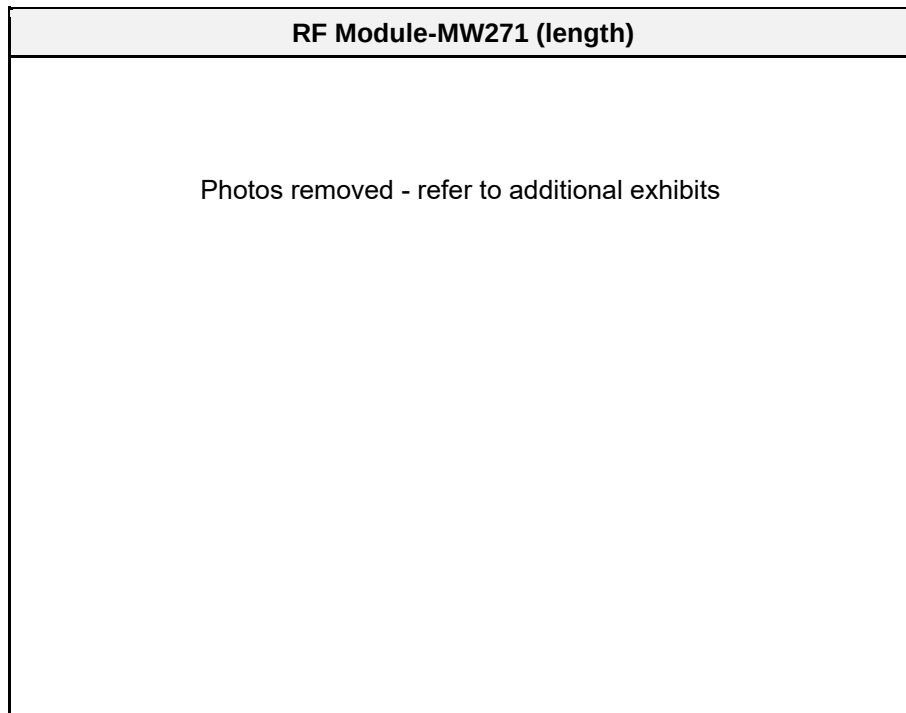
Power adapter

Photos removed - refer to additional exhibits

Cable to connect EUT to external power supply

Photos removed - refer to additional exhibits

1.2 Photos – Equipment Internal



RF Module-MW271 unshielded (length)

Photos removed - refer to additional exhibits

RF Module-MW271 unshielded (width)

Photos removed - refer to additional exhibits

1.3 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	Notebook	Dell	Latitude E7250	For configuring test modes
AE	Evaluation Board	u-blox		
CBL	USB-C	---	---	Connection between evaluation board and EUT
CBL	Data cable	---	---	
CBL	SBI cable			
CBL	Ethernet	---	---	Connection between evaluation board and notebook
AE	AC/DC Adapter	EDACPOWER ELECT.	EA1045CR	To power the evaluation board
SFT	Terminal	Debian / Linux	---	For test mode activation
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.4 Test mode duty cycle

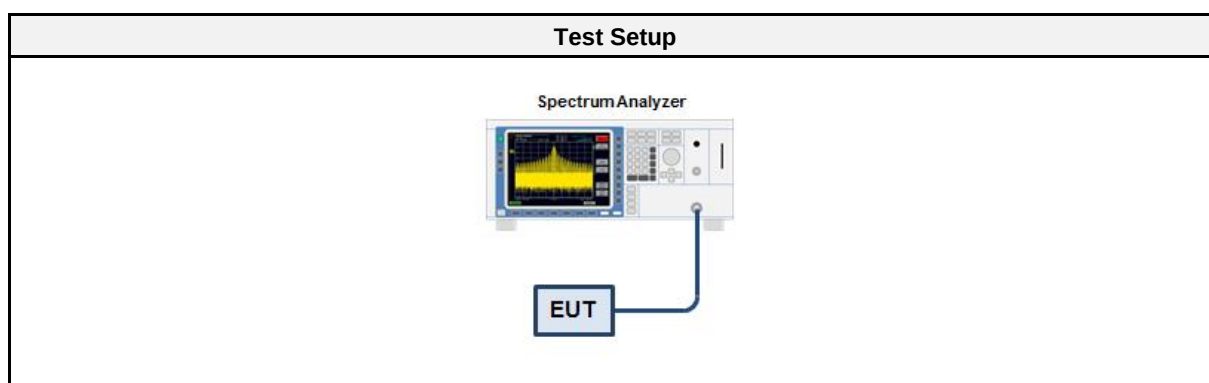
1.4.1 Information

Test Information	
Measurement Method	ANSI C63.10 11.6

1.4.2 Requirements

Requirements	
Duty cycle	Duty cycle correction
≥ 98 %	No correction required
< 98 %	Correction required ($10 \times \log_{10}(1/DC)$)

1.4.3 Setup



1.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 43	EF01631	2022-08	2023-08

1.4.5 Procedure

Test Procedure
- EUT set to test mode - Span is set to zero span - Detector set to peak - Sweep time is set long enough to capture at least 5 bursts - Envelope peak value of emission spectrum is selected - The maximum burst duration T_{ON} is measured using two markers set to the start and the end of the longest burst - The minimum idle duration T_{OFF} is measured using two markers set to the start and the end of the shortest idle period - The duty cycle is calculated by $DC = T_{ON} / (T_{ON} + T_{OFF})$ - The duty cycle correction is calculated by $DC = -10 \times \log_{10}(T_{ON} / (T_{ON} + T_{OFF}))$

1.4.6 Results

Duty Cycle Results		
Mode	Duty Cycle	Correction Factor [dB]
IEEE 802.15.4	0.264	5.78

1.5 Test Modes

Mode	Description
DSSS O-QPSK	Mode = Transmit Modulation = O-QPSK Spreading = DSSS Data rate = 250 kbps Chip rate = 2000 kbps Duty cycle = 26.4% Power level = 20 dBm
Receive	Mode = Receive
Comment:	

1.6 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	11	2405
F2	Tx / Rx	18	2440
F3	Tx / Rx	26	2480

1.7 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyzer in dB μ V. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the spectrum analyzer. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

$$\text{Reading on Analyzer (dB}\mu\text{V)} + \text{A.F. (dB/m)} = \text{Net field strength (dB}\mu\text{V/m)}$$

Net:

This is the net field strength measurement (as shown above).

Margin:

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Field strength limit:

This is the FCC Class B radiated emission limit (in units of dB μ V/m). The FCC limits are given in units of μ V/m. The following formula is used to convert the units of μ V/m to dB μ V/m:

$$\text{Field strength limit (dB}\mu\text{V/m)} = 20 \cdot \log (\mu\text{V/m})$$

Example only for radiated field strength:

Reading + AF	= Net Reading	:	Net reading	- Field strength limit	= Margin
+21.5 dB μ V	+ 26 dB/m	:	47.5 dB μ V/m	- 57.0 dB μ V/m	= -9.5

2 Result Summary

FCC 47 CFR Part 15C, ISED RSS-247				
Product Standard Reference	Requirement	Reference Method	Result	Remarks
ISED RSS-Gen, Issue 5 A2 (section 6.7)	Occupied Bandwidth	ANSI C63.10-2013	N/R	Informational only
FCC § 15.247(a)(2) ISED RSS-247, Issue 2 (section 5.2)	6 dB Bandwidth	ANSI C63.10-2013	PASS	
FCC § 15.247(b) ISED RSS-247, Issue 2 (section 5.4)	Maximum peak conducted power	ANSI C63.10-2013	PASS	
FCC § 15.247(e) ISED RSS-247, Issue 2 (section 5.2)	Power spectral density	ANSI C63.10-2013	PASS	
FCC § 15.207 ISED RSS-247, Issue 2 (section 3.1)	AC power line conducted emissions	ANSI C63.10-2013	PASS	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Band edge compliance	ANSI C63.10-2013	PASS	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Conducted spurious emissions	ANSI C63.10-2013	PASS	
FCC § 15.247(d) FCC § 15.209 ISED RSS-Gen, Issue 5 A2 (section 6.13)	Transmitter radiated spurious emissions	ANSI C63.10-2013	PASS	
ISED RSS-247, Issue 2 (section 3.1)	Receiver radiated spurious emissions	ANSI C63.4-2014	PASS	
Comment: The Decision Rule is applied on the basis of ETSI TR 102 273 and ETSI TR 100 028. These standards provide guidance on how to calculate and apply measurement uncertainty whilst providing maximum uncertainties allowance. In all cases due consideration will be given to ILAC-G8:09/2019. Where a result is considered conditional in respect of its proximity to the limit line, the customer would be made aware of situation so that they can make an informed decision on how to proceed.				

Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

3 Test Conditions and Results

3.1 Test Conditions and Results - Occupied bandwidth

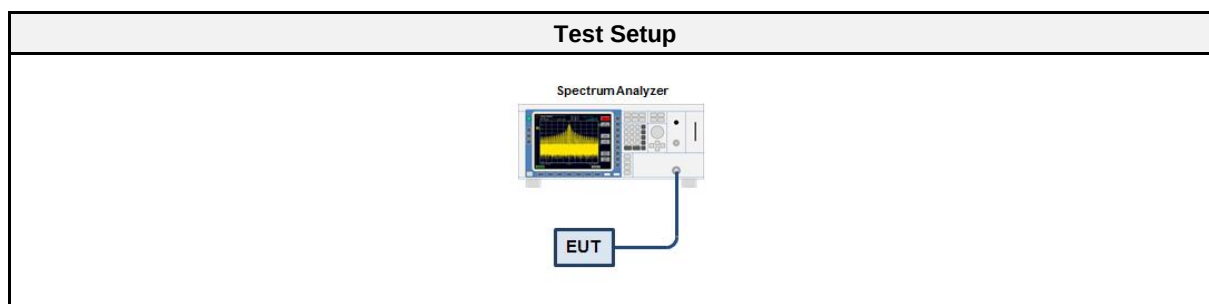
3.1.1 Information

Test Information	
Reference	ISED RSS-Gen, Issue 5 A2 (section 6.7)
Measurement Method	ANSI C63.10 6.9.3
Measurement Uncertainty	$\pm 1.26 \%$
Test Sample ID	43093
Operator	Azamat Ibraimov
Date	2023-07-11

3.1.2 Limits

Limits
None (Informational only)

3.1.3 Setup



3.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 43	EF01631	2022-08	2023-08
Cable (CAABR)	SUCOFLEX	102EA	EF00779	2023-03	2024-03

3.1.5 Procedure

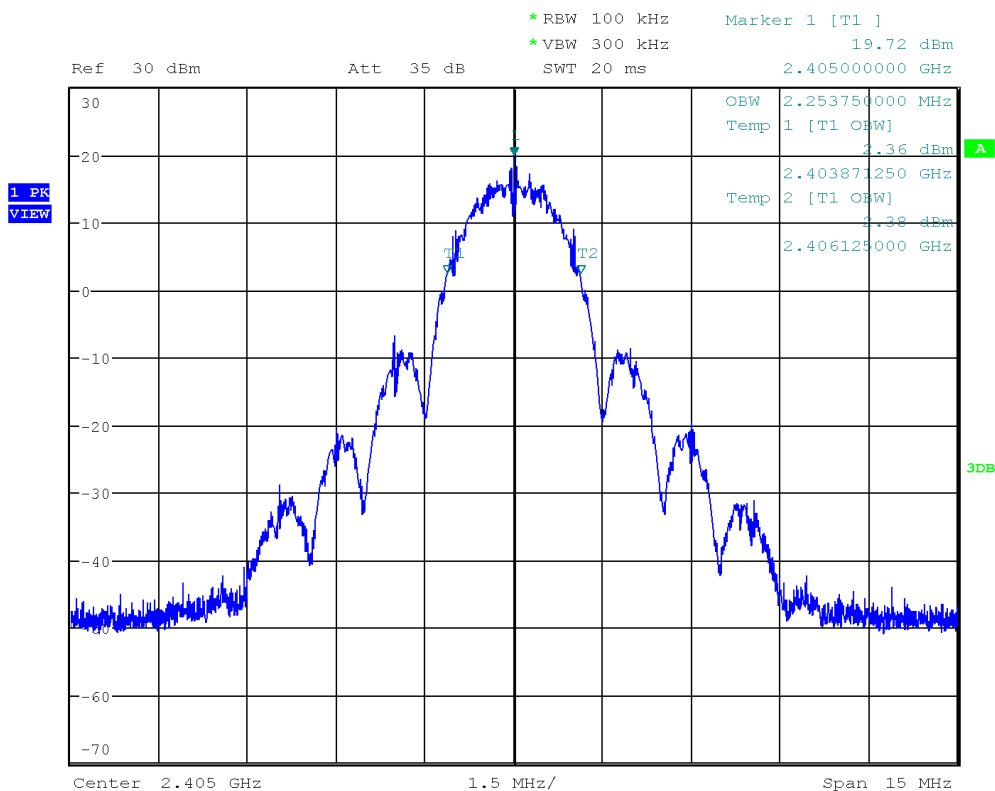
Test Procedure
- EUT transmitter is activated in test mode under normal conditions - The spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum - The resolution bandwidth is set to the range of 1 % to 5 % of the occupied bandwidth - The occupied bandwidth is measured with the build-in analyzer function

3.1.6 Results

Test Results		
Mode	Frequency [MHz]	Bandwidth [MHz]
O-QPSK	2405	2.254
O-QPSK	2440	2.254
O-QPSK	2480	2.269

Occupied Bandwidth

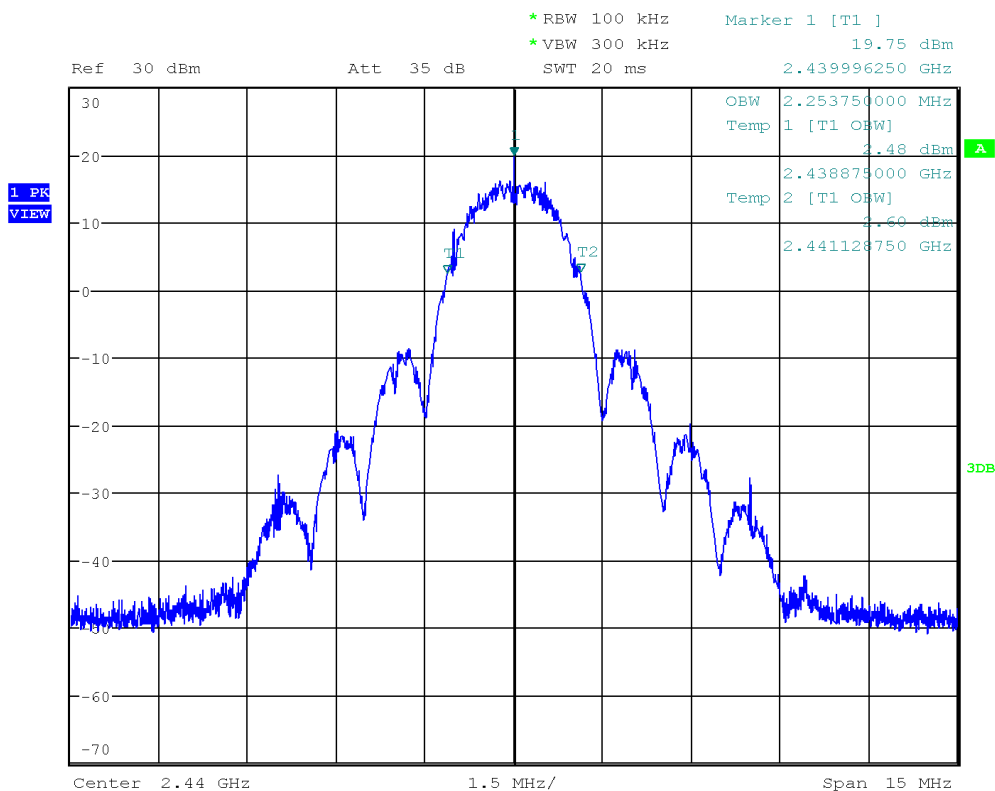
Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-07-11
 Occupied Bandwidth [MHz]: 2.254



Date: 11.JUL.2023 17:27:28

Occupied Bandwidth

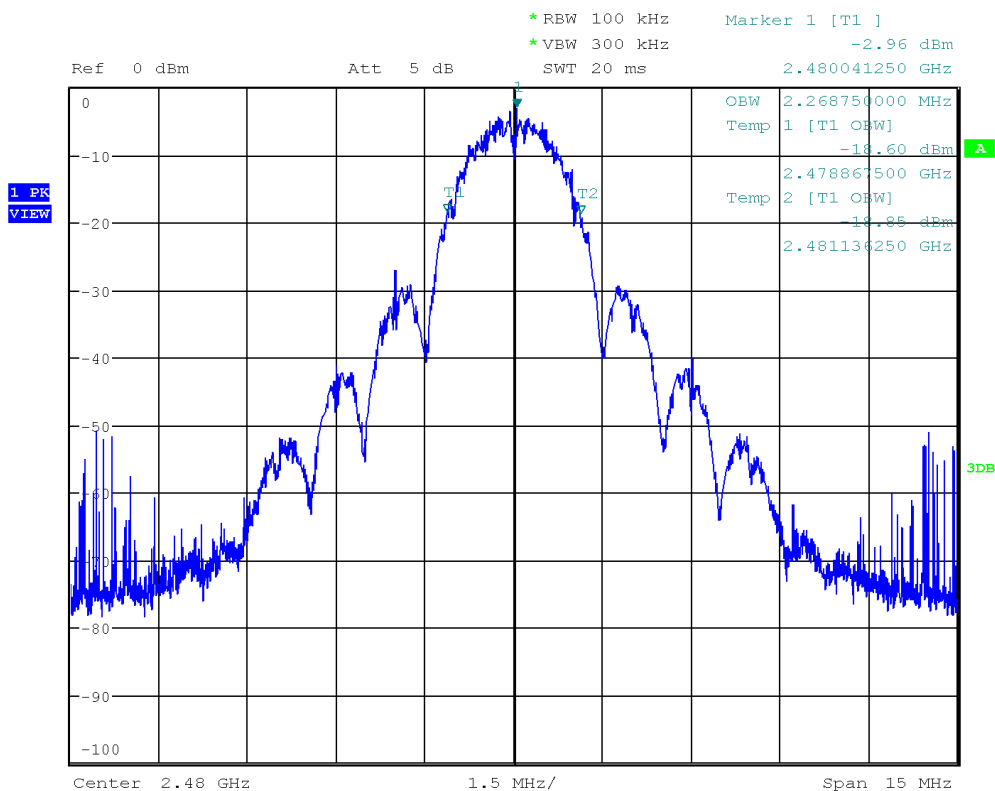
Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 18, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-07-11
 Occupied Bandwidth [MHz]: 2.254



Date: 11.JUL.2023 17:29:08

Occupied Bandwidth

Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-07-11
 Occupied Bandwidth [MHz]: 2.269



Date: 11.JUL.2023 17:30:07

3.2 Test Conditions and Results - 6 dB bandwidth

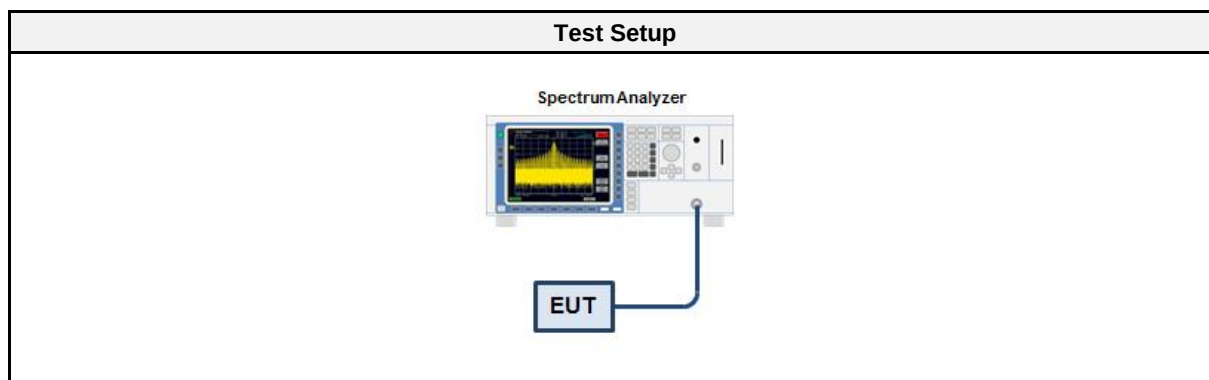
3.2.1 Information

Test Information	
Reference	FCC § 15.247(a)(2); ISED RSS-247, Issue 2 (section 5.2)
Measurement Method	ANSI C63.10 11.8
Measurement Uncertainty	± 1.26 %
Operator	Azamat Ibraimov
Date	2023-07-11

3.2.2 Limits

Limits
≥ 500kHz

3.2.3 Setup



3.2.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 43	EF01631	2022-08	2023-08
Cable (CAABR)	SUCOFLEX	102EA	EF00779	2023-03	2024-03

3.2.5 Procedure

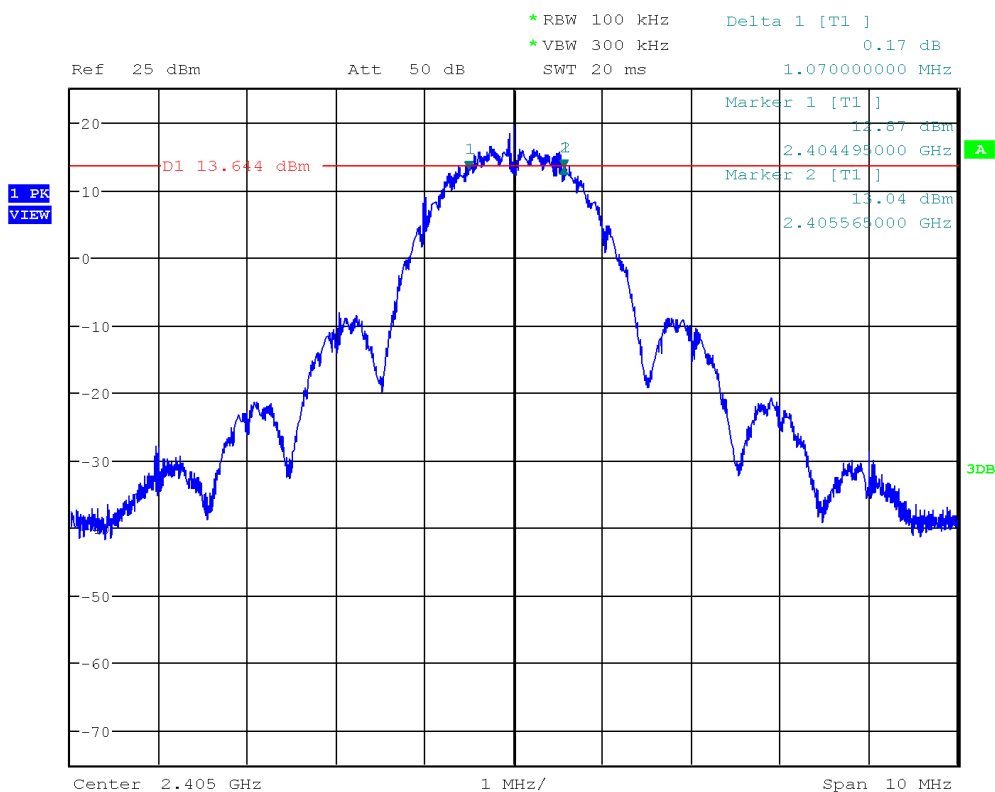
Test Procedure
1. EUT set to test mode 2. Span set to at least twice the emission spectrum 3. Detector set to peak and max hold and RBW is set to 100 kHz 4. Envelope peak value of emission spectrum is selected 5. Marker on envelope of spectrum is set to level of -6 dB to the left of the peak 6. Marker on envelope of spectrum is set to level of -6 dB to the right of the peak 7. 6 dB Bandwidth is determined by marker frequency separation

3.2.6 Results

Test Results				
Mode	Frequency [MHz]	Bandwidth [kHz]	Limit [kHz]	Verdict
O-QPSK	2405	1070.0	500	PASS
O-QPSK	2440	1185.0	500	PASS
O-QPSK	2480	1302.5	500	PASS

DTS (6 dB) Bandwidth

Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-07-11
 Lower Frequency [MHz]: 2404.495
 Upper Frequency [MHz]: 2405.565
 6 dB Bandwidth [kHz]: 1070.0



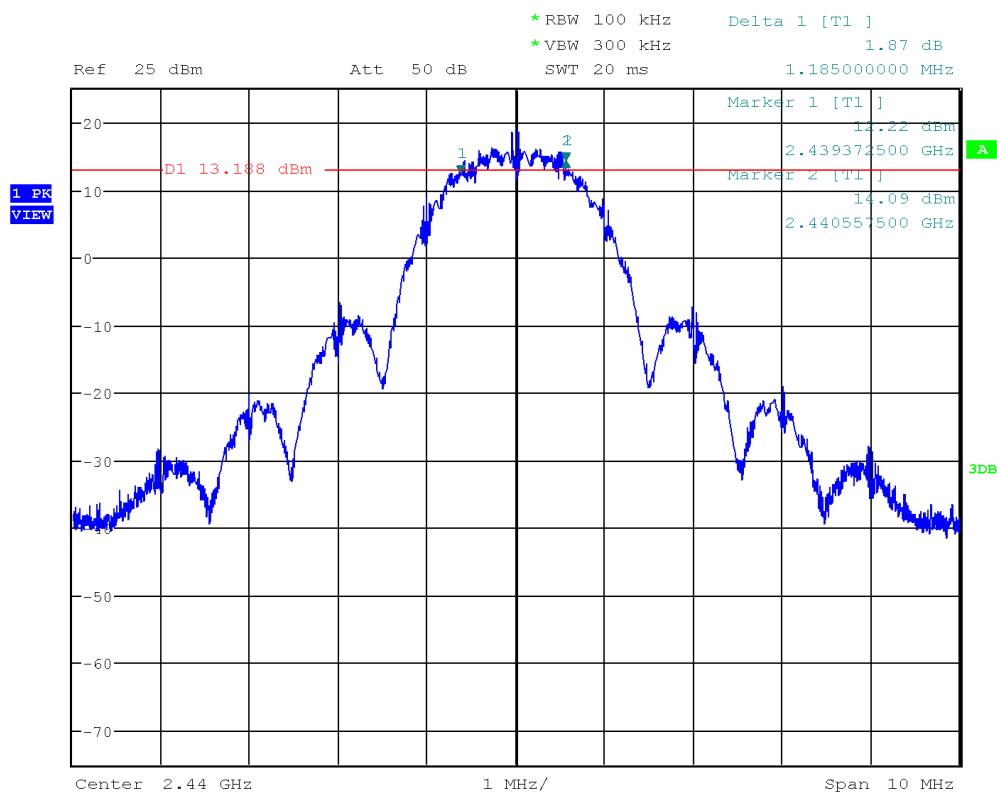
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Test Report No.: G0M-2302-1881-TFC247ZB-W271-V03

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

DTS (6 dB) Bandwidth

Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 18, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-07-11
 Lower Frequency [MHz]: 2439.372
 Upper Frequency [MHz]: 2440.557
 6 dB Bandwidth [kHz]: 1185.0



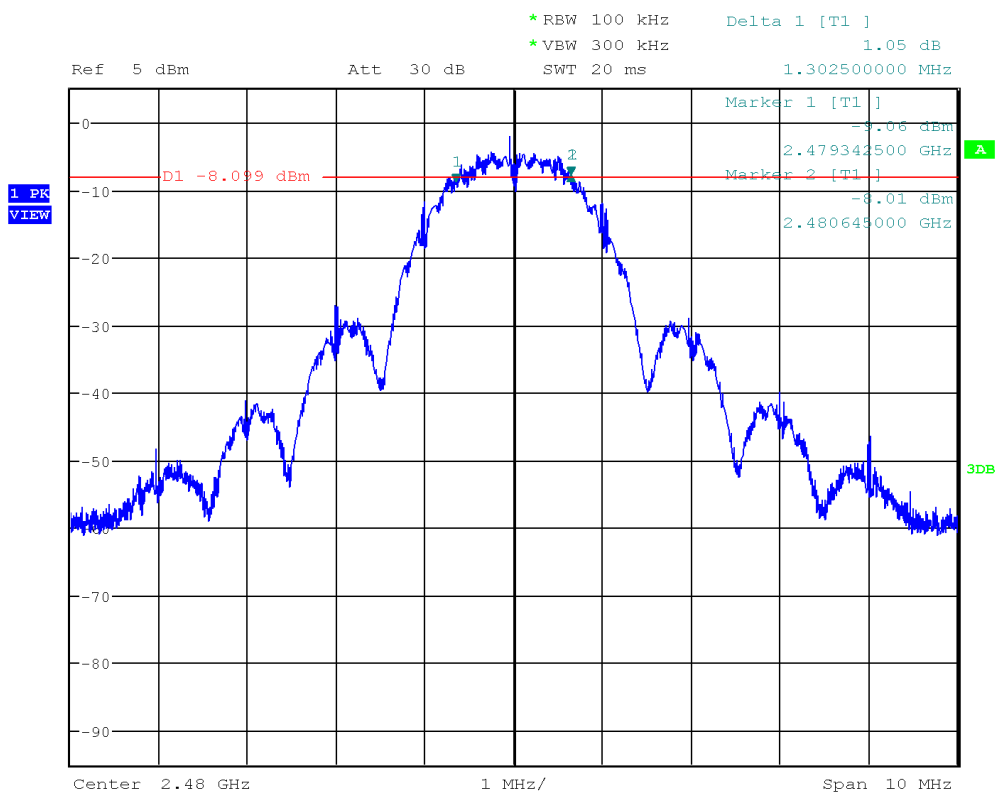
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Test Report No.: G0M-2302-1881-TFC247ZB-W271-V03

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

DTS (6 dB) Bandwidth

Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-07-11
 Lower Frequency [MHz]: 2479.343
 Upper Frequency [MHz]: 2480.645
 6 dB Bandwidth [kHz]: 1302.5



Date: 11.JUL.2023 17:03:34

Test Report No.: G0M-2302-1881-TFC247ZB-W271-V03

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.3 Test Conditions and Results - Maximum peak conducted output power

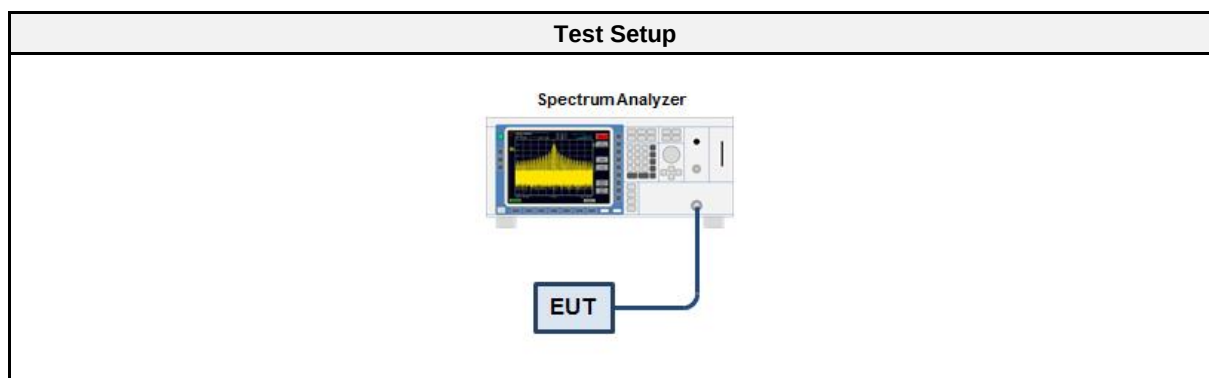
3.3.1 Information

Test Information	
Reference	FCC § 15.247(b); ISED RSS-247, Issue 2 (section 5.4)
Measurement Method	ANSI C63.10 11.9.1
Measurement Uncertainty	± 2.86 dB
Operator	Azamat Ibraimov
Date	2023-07-11

3.3.2 Limits

Limits
1 W (30 dBm)
FCC: The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
ISED: The e.i.r.p. shall not exceed 4 W, except fixed point-to-point systems in the bands 2400-2483.5 MHz and 5725-5850 MHz are permitted to have an e.i.r.p. higher than 4 W provided that the higher e.i.r.p. is achieved by employing higher gain directional antennas and not higher transmitter output powers.

3.3.3 Setup



3.3.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 43	EF01631	2022-08	2023-08
Cable (CAABR)	SUCOFLEX	102EA	EF00779	2023-03	2024-03

3.3.5 Procedure

Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Analyzer resolution bandwidth is set ≥ DTS bandwidth 3. Detector set to peak and max hold 4. Sweep time is set to auto 5. After the trace has stabilized a marker is set to peak of envelope

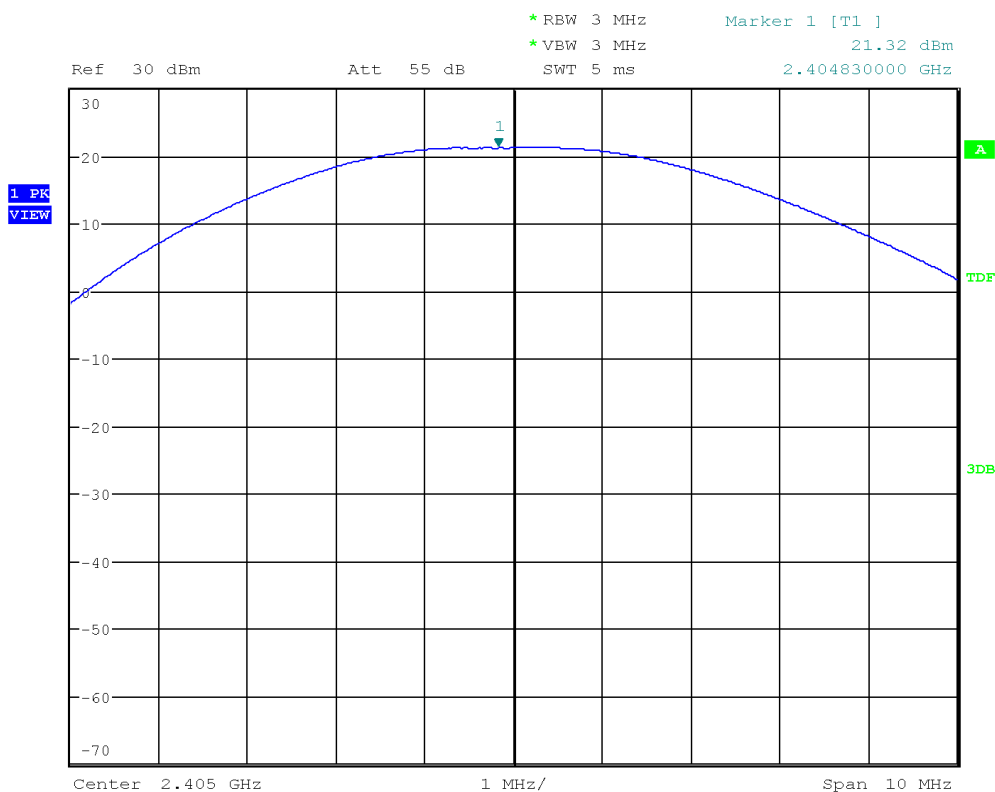
3.3.6 Results

Test Results - FCC				
Channel [MHz]	Conducted Power [dBm]	Conducted Power [W]	Conducted Limit [W]	Verdict
2405	21.317	0.135425	1.0	PASS
2440	21.382	0.137467	1.0	PASS
2480	0.689	0.001172	1.0	PASS

Test Results DSSS - ISSED							
Channel [MHz]	Conducted Power [dBm]	Conducted Power [W]	Conducted Limit [W]	EIRP Power [dBm]	EIRP Power [W]	EIRP Limit [W]	Verdict
2405	21.317	0.135425	1.0	25.417	0.348	4.0	PASS
2440	21.382	0.137467	1.0	25.482	0.353	4.0	PASS
2480	0.689	0.001172	1.0	4.789	0.003	4.0	PASS

Peak Conducted Output Power

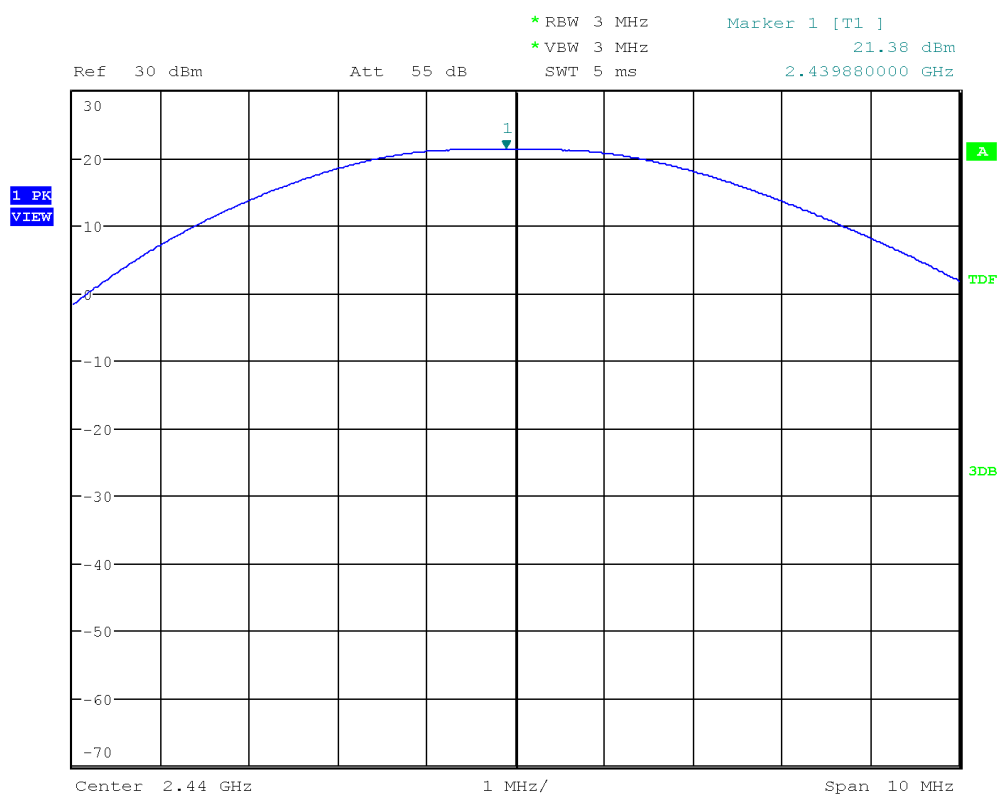
Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-07-11
 Note: Power level = 20
 Peak Power [dBm]: 21.317
 Peak Power [W]: 0.135425



Date: 11.JUL.2023 16:05:38

Peak Conducted Output Power

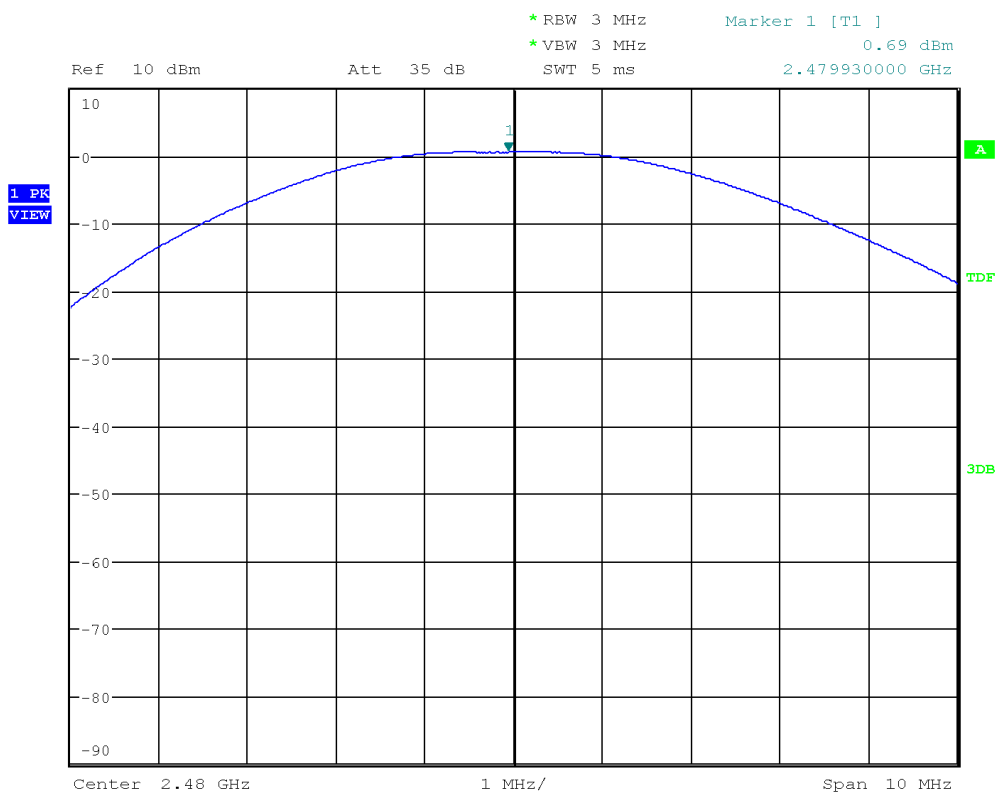
Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 18, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-07-11
 Note: Power level = 20
 Peak Power [dBm]: 21.382
 Peak Power [W]: 0.137467



Date: 11.JUL.2023 16:07:37

Peak Conducted Output Power

Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-07-11
 Note: Power level = 20
 Peak Power [dBm]: 0.689
 Peak Power [W]: 0.001172



Date: 11.JUL.2023 16:08:57

Test Report No.: G0M-2302-1881-TFC247ZB-W271-V03

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.4 Test Conditions and Results - Power spectral density

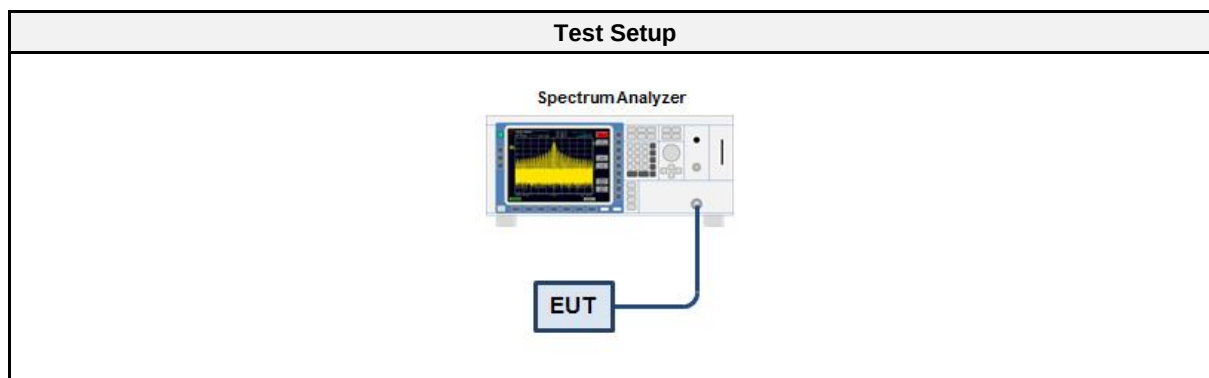
3.4.1 Information

Test Information	
Reference	FCC § 15.247(e); ISED RSS-247, Issue 2 (section 5.2)
Measurement Method	ANSI C63.10 11.10.2, 14.3.2
Measurement Uncertainty	± 2.86 dB
Operator	Azamat Ibraimov
Date	2023-07-11

3.4.2 Limits

Limits
8 dBm / 3 kHz

3.4.3 Setup



3.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 43	EF01631	2022-08	2023-08
Cable (CAABR)	SUCOFLEX	102EA	EF00779	2023-03	2024-03

3.4.5 Procedure

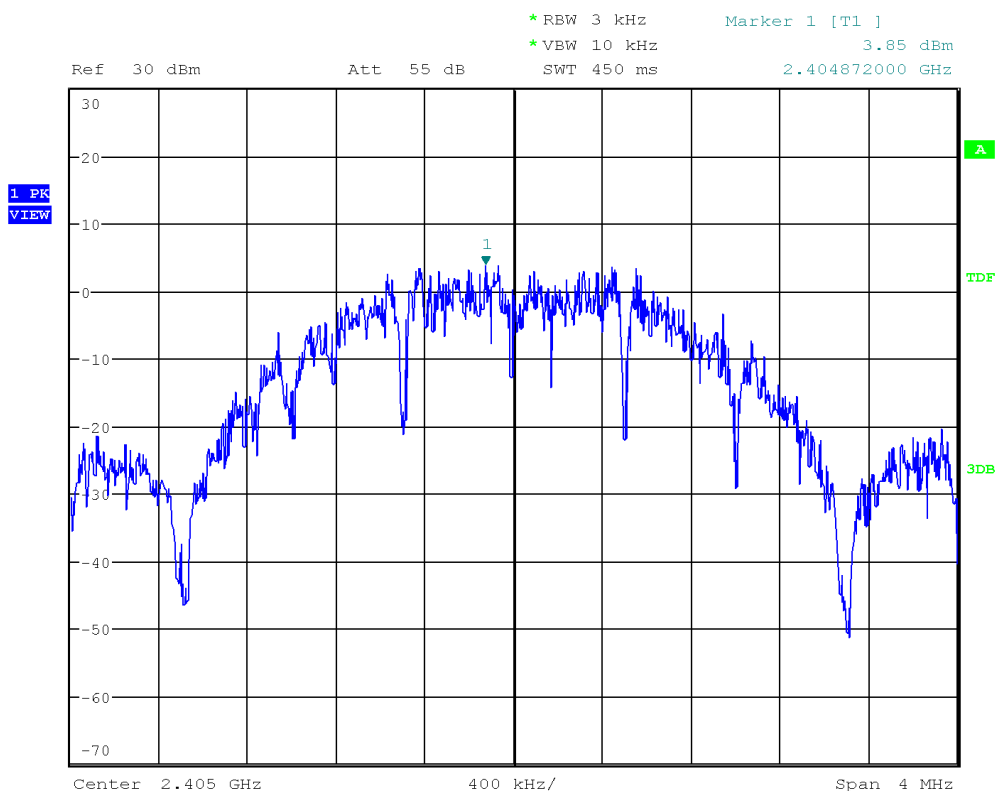
Test Procedure
1. EUT set to test mode 2. The analyzer is set to DTS channel center frequency with a span of 1.5 times the DTS bandwidth 3. The RBW is set to 100 kHz with VBW $\geq$ RBW and the detector is set to peak with max hold 4. After the trace has stabilized a marker is set to the envelope maximum 5. If the power spectral density is above the limit the RBW is reduced (not lower than 3 kHz) and the measurement is repeated 6. If the EUT has more than one transmit chain the procedure is repeated for each transmit chain

3.4.6 Results

Test Results			
Channel [MHz]	PSD [dBm/RBW]	Limit [dBm/3kHz]	Verdict
2405	3.850	8.0	PASS
2440	5.343	8.0	PASS
2480	-3.457	8.0	PASS
RBW = 3 kHz for channel 2405 & 2440 / 100 kHz for channel 2480			

Peak Power Spectral Density

Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-07-11
 Note: Power level = 20
 Peak Frequency [MHz]: 2404.872
 Spectral Density [dBm/RBW]: 3.850
 Resolution Bandwidth [kHz]: 3 kHz



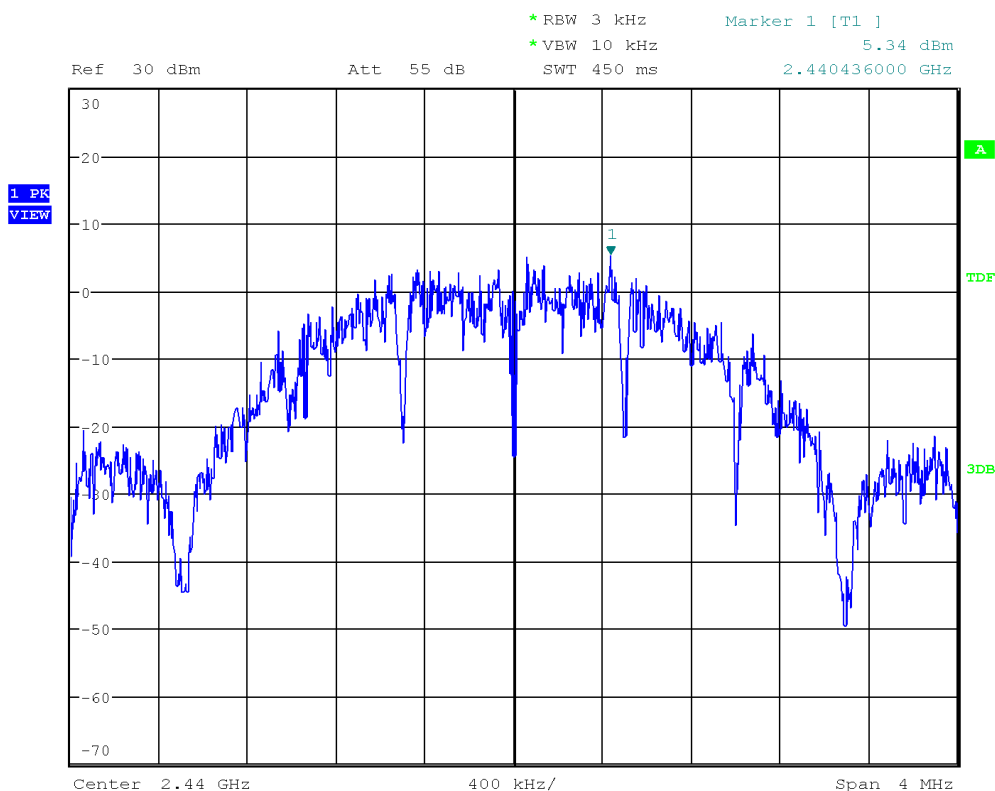
Date: 11.JUL.2023 16:33:17

Test Report No.: G0M-2302-1881-TFC247ZB-W271-V03

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Power Spectral Density

Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 18, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-07-11
 Note: Power level = 20
 Peak Frequency [MHz]: 2440.436
 Spectral Density [dBm/RBW]: 5.343
 Resolution Bandwidth [kHz]: 3 kHz



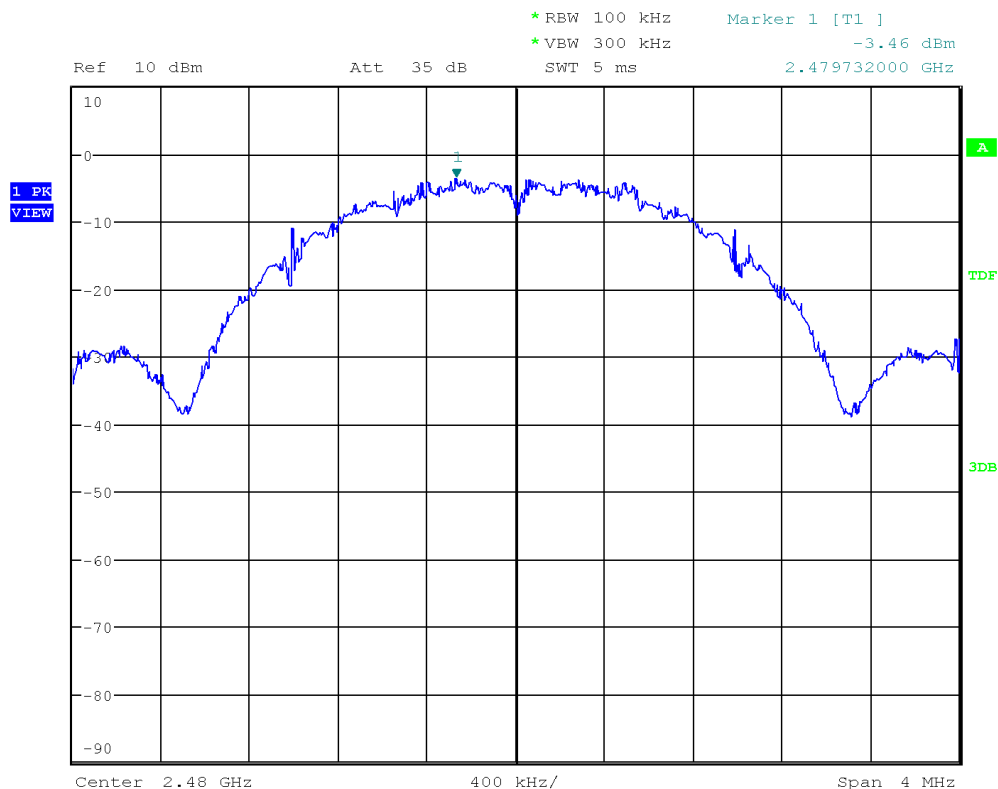
Date: 11.JUL.2023 16:35:02

Test Report No.: G0M-2302-1881-TFC247ZB-W271-V03

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Power Spectral Density

Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-07-11
 Note: Power level = 20
 Peak Frequency [MHz]: 2479.732
 Spectral Density [dBm/RBW]: -3.457
 Resolution Bandwidth [kHz]: 100 kHz



Date: 11.JUL.2023 16:36:37

Test Report No.: G0M-2302-1881-TFC247ZB-W271-V03

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.5 Test Conditions and Results - AC powerline conducted emissions

3.5.1 Information

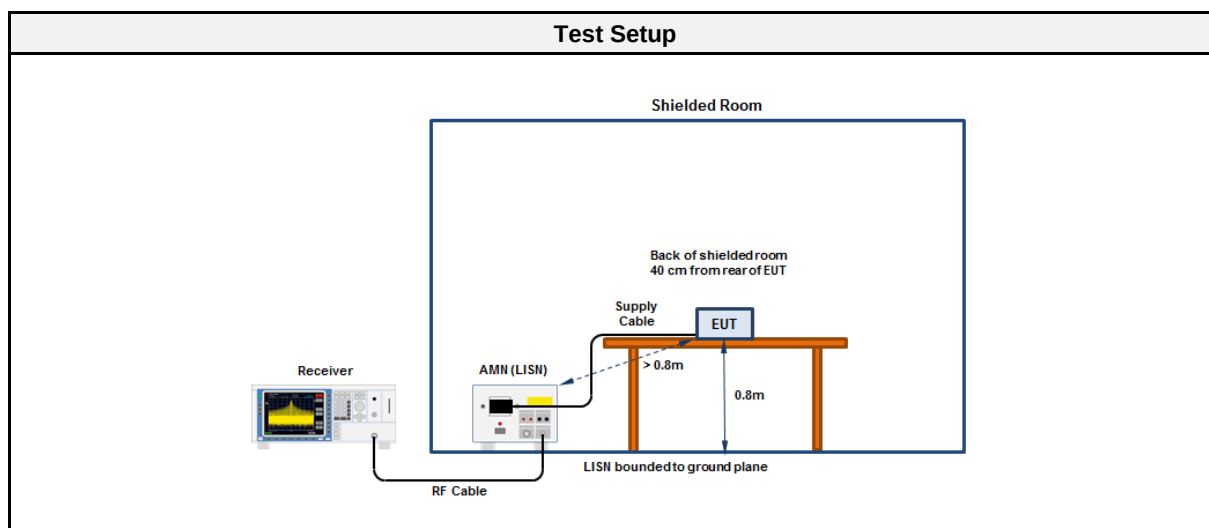
Test Information	
Reference	FCC § 15.207; ISED RSS-247, Issue 2 (section 3.1)
Measurement Method	ANSI C63.10 6.2
Measurement Uncertainty	± 3.82 dB
Operator	Ehsan Sohrabi
Date	2023-07-25

3.5.2 Limits

Limits		
Frequency [MHz]	Quasi-Peak [dBμV]	Average [dBμV]
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5	56	46
5 - 30	60	50

* Limit decreases linearly with the logarithm of the frequency

3.5.3 Setup

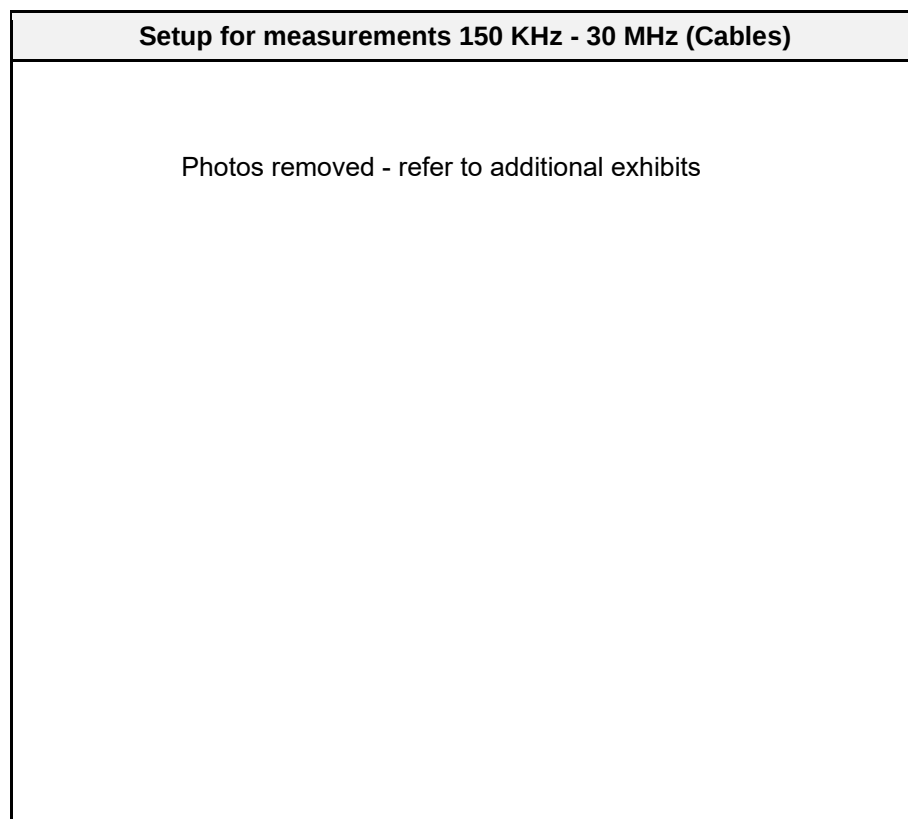
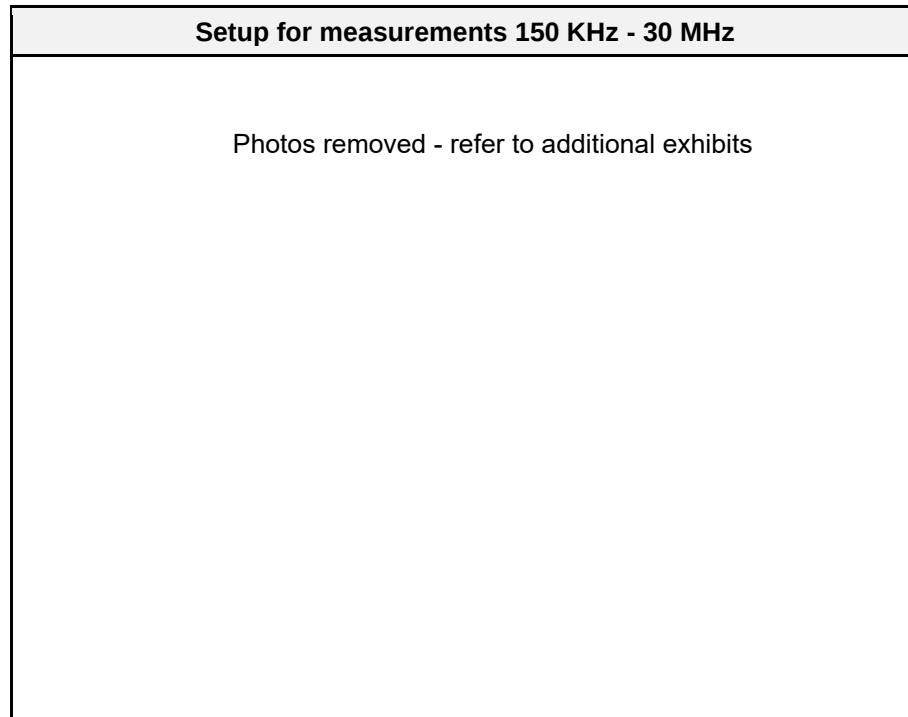


3.5.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2020.1.8

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESR7	EF00943	2022-07	2023-07
Pulse Limiter	R&S	ESH3-Z2	EF01222	2021-07	2023-07
LISN	Schwarzbeck	NSLK 8127 RC	EF01592	2023-06	2024-06

3.5.5 Setup Photos



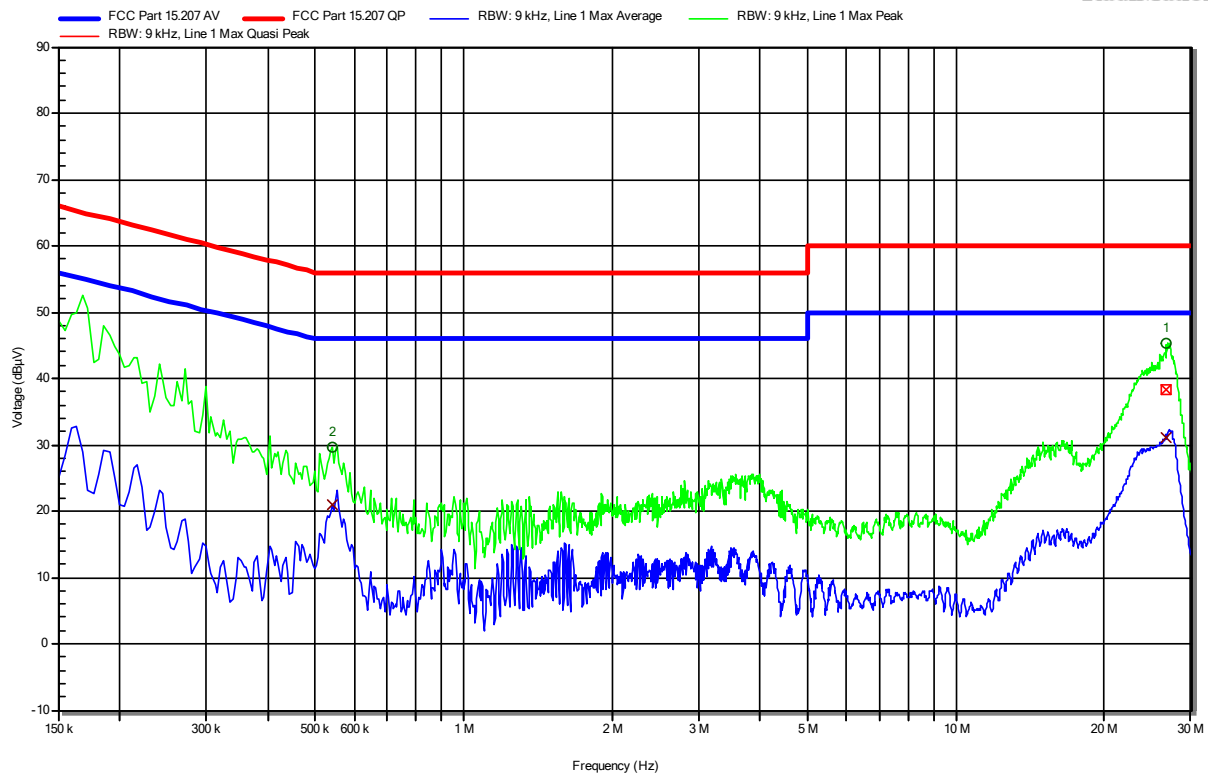
EUT Setup
Photos removed - refer to additional exhibits

Photos removed - refer to additional exhibits

**Conducted emissions at the mains power port
according to 47 CFR Part 15.247**

Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Ehsan Sohrabi
 Test Date: 2023-07-25
 Operating Conditions: ambient temperature: 23 °Celsius
 power input: 3.3 V
 LISN: Schwarzbeck NSLK 8127 RC (L)
 Operational Mode: Tx, IEEE 802.15.4, CH 18, 2440 MHz, O-QPSK, 250 Kbps, P = max
 EUT Configuration:
 Applied to Port: 120 VAC / 60 Hz

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	26.781 MHz	38.27 dBµV	60 dBµV	-21.73 dB	Pass	Line 1
2	541.5 kHz					Line 1
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	26.781 MHz	31.19 dBµV	50 dBµV	-18.81 dB	Pass	Line 1
2	541.5 kHz	21.06 dBµV	46 dBµV	-24.94 dB	Pass	Line 1

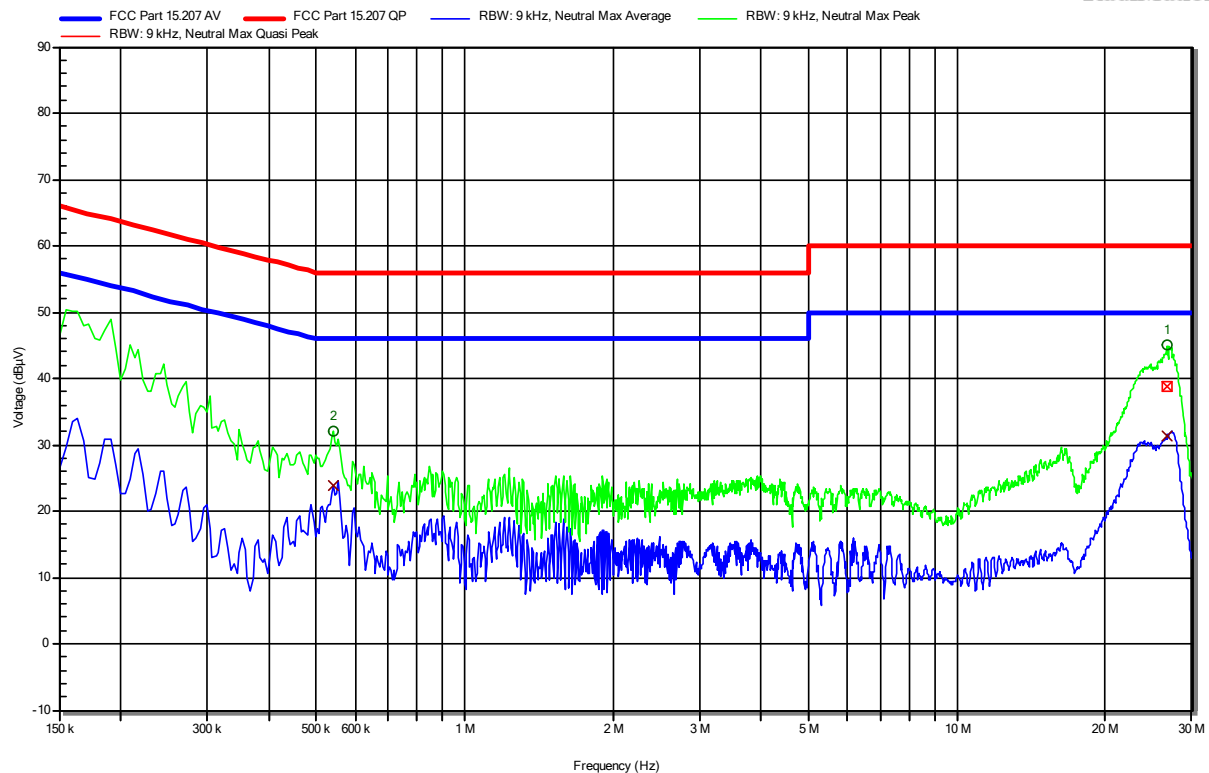
Test Report No.: G0M-2302-1881-TFC247ZB-W271-V03

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

**Conducted emissions at the mains power port
according to 47 CFR Part 15.247**

Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Ehsan Sohrabi
 Test Date: 2023-07-25
 Operating Conditions: ambient temperature: 23 °Celsius
 power input: 3.3 V
 LISN: Schwarzbeck NSLK 8127 (N)
 Operational Mode: Tx, IEEE 802.15.4, CH 18, 2440 MHz, O-QPSK, 250 Kbps, P = max
 EUT Configuration:
 Applied to Port: 120 VAC / 60 Hz

Index 103
RadiMation



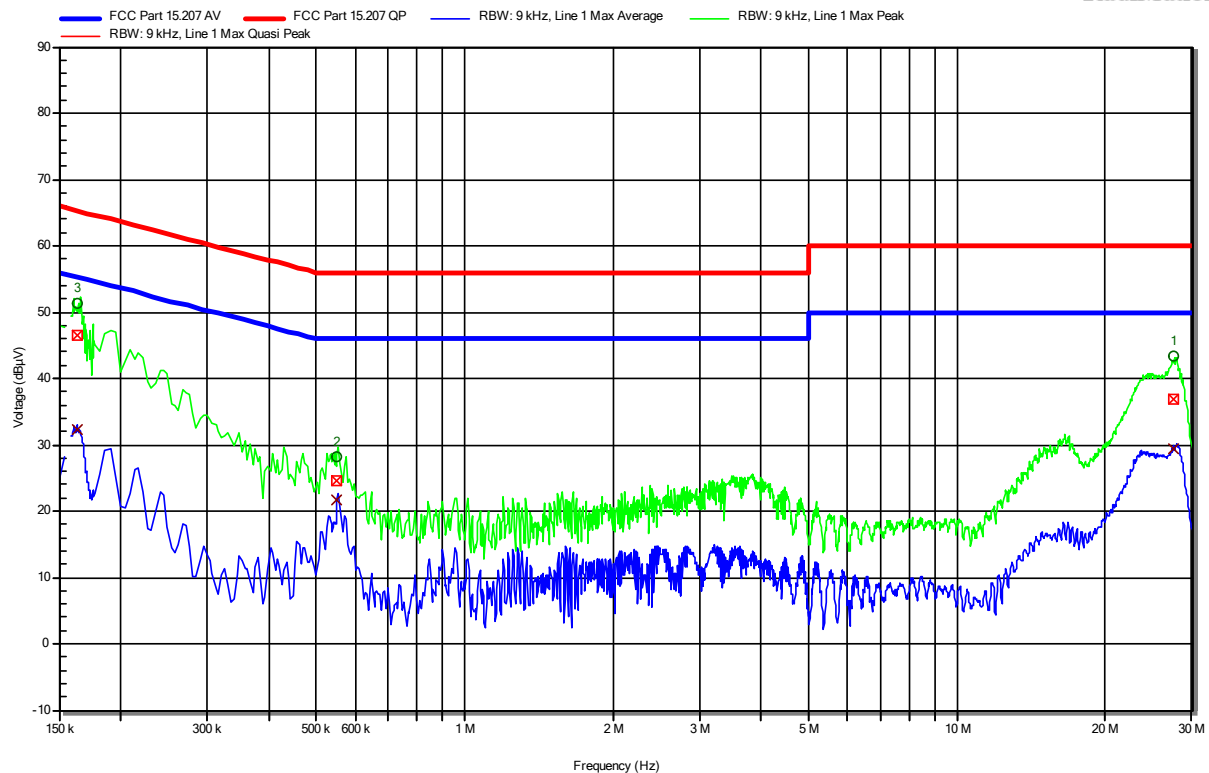
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	26.804 MHz	38.74 dBµV	60 dBµV	-21.26 dB	Pass	Neutral
2	541.5 kHz					Neutral

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	26.804 MHz	31.22 dBµV	50 dBµV	-18.78 dB	Pass	Neutral
2	541.5 kHz	23.83 dBµV	46 dBµV	-22.17 dB	Pass	Neutral

**Conducted emissions at the mains power port
according to 47 CFR Part 15.247**

Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Ehsan Sohrabi
 Test Date: 2023-07-25
 Operating Conditions: ambient temperature: 23 °Celsius
 power input: 3.3 V
 LISN: Schwarzbeck NSLK 8127 RC (L)
 Operational Mode: Rx, IEEE 802.15.4, CH 18, 2440 MHz
 EUT Configuration:
 Applied to Port: 120 VAC / 60 Hz

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	27.623 MHz	36.81 dBµV	60 dBµV	-23.19 dB	Pass	Line 1
2	550.5 kHz	24.63 dBµV	56 dBµV	-31.37 dB	Pass	Line 1
3	163.95 kHz	46.41 dBµV	65.26 dBµV	-18.85 dB	Pass	Line 1

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	27.623 MHz	29.33 dBµV	50 dBµV	-20.67 dB	Pass	Line 1
2	550.5 kHz	21.58 dBµV	46 dBµV	-24.42 dB	Pass	Line 1
3	163.95 kHz	32.2 dBµV	55.26 dBµV	-23.06 dB	Pass	Line 1

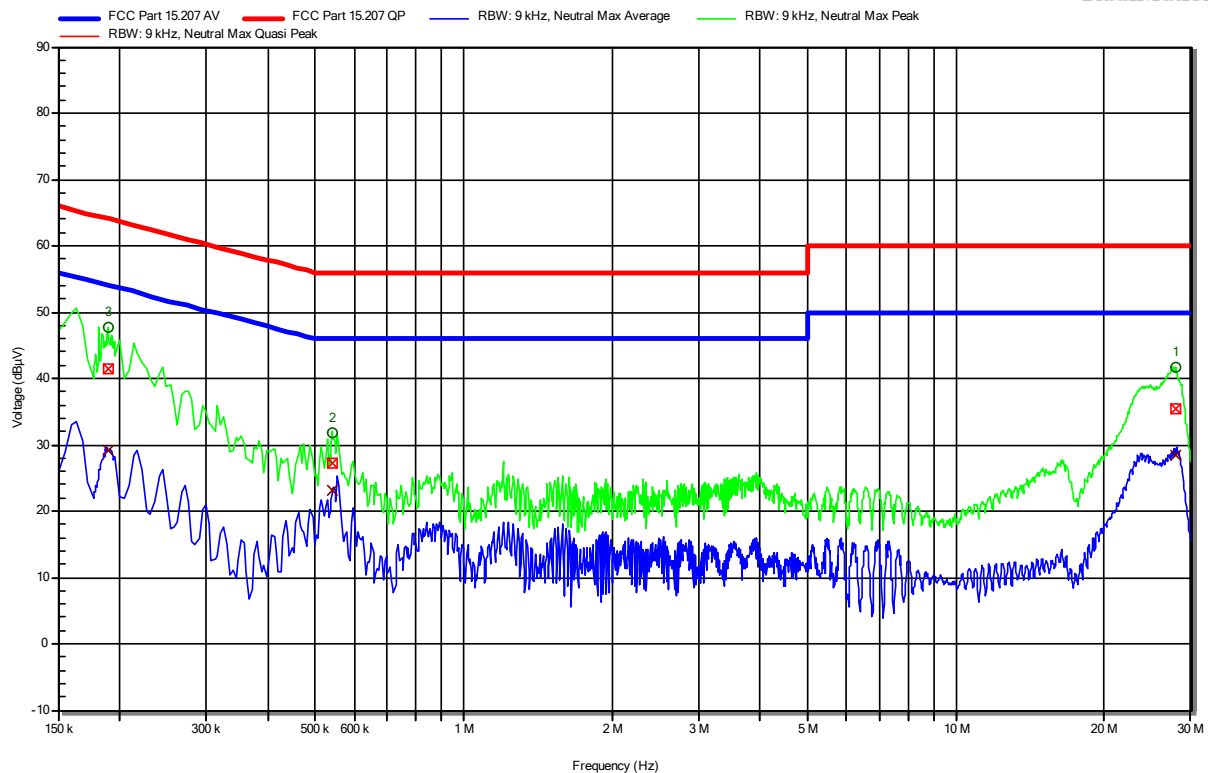
Test Report No.: G0M-2302-1881-TFC247ZB-W271-V03

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

**Conducted emissions at the mains power port
according to 47 CFR Part 15.247**

Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Ehsan Sohrabi
 Test Date: 2023-07-25
 Operating Conditions: ambient temperature: 23 °Celsius
 power input: 3.3 V
 LISN: Schwarzbeck NSLK 8127 (N)
 Operational Mode: Rx, IEEE 802.15.4, CH 18, 2440 MHz
 EUT Configuration:
 Applied to Port: 120 VAC / 60 Hz

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	27.839 MHz	35.46 dBµV	60 dBµV	-24.54 dB	Pass	Neutral
2	541.5 kHz	27.21 dBµV	56 dBµV	-28.79 dB	Pass	Neutral
3	189.6 kHz	41.54 dBµV	64.05 dBµV	-22.52 dB	Pass	Neutral

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	27.839 MHz	28.39 dBµV	50 dBµV	-21.61 dB	Pass	Neutral
2	541.5 kHz	23.17 dBµV	46 dBµV	-22.83 dB	Pass	Neutral
3	189.6 kHz	29.17 dBµV	54.05 dBµV	-24.89 dB	Pass	Neutral

Test Report No.: G0M-2302-1881-TFC247ZB-W271-V03

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.6 Test Conditions and Results - Band edge compliance

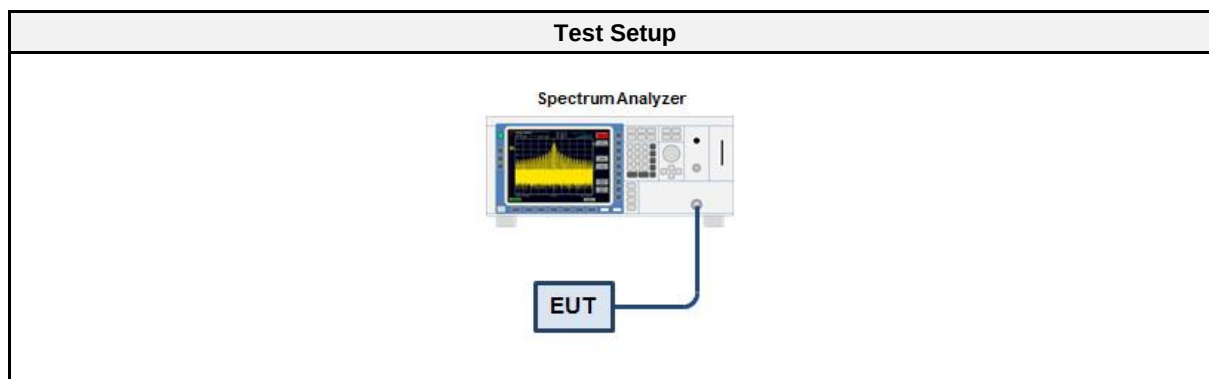
3.6.1 Information

Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Uncertainty	± 3.64 dB
Measurement Method	ANSI C63.10 11.13
Operator	Azamat Ibraimov
Date	2023-07-11

3.6.2 Limits

Limits	
Power Measurement	Out-of-band attenuation [dB]
Peak	20
RMS	30

3.6.3 Setup



3.6.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 43	EF01631	2022-08	2023-08
Cable (CAABR)	SUCOFLEX	102EA	EF00779	2023-03	2024-03

3.6.5 Procedure

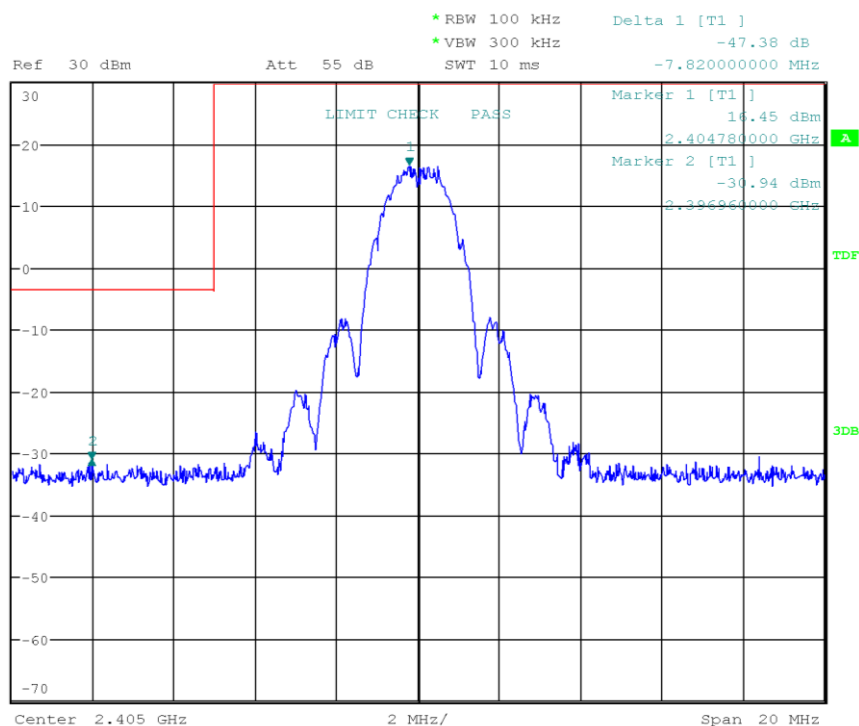
Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels within frequency band and outside frequency band 5. Band edge attenuation is determined from level difference

3.6.6 Results

Test Results				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
O-QPSK	2405	-30.937	-20	PASS
O-QPSK	2480	-51.654	-20	PASS

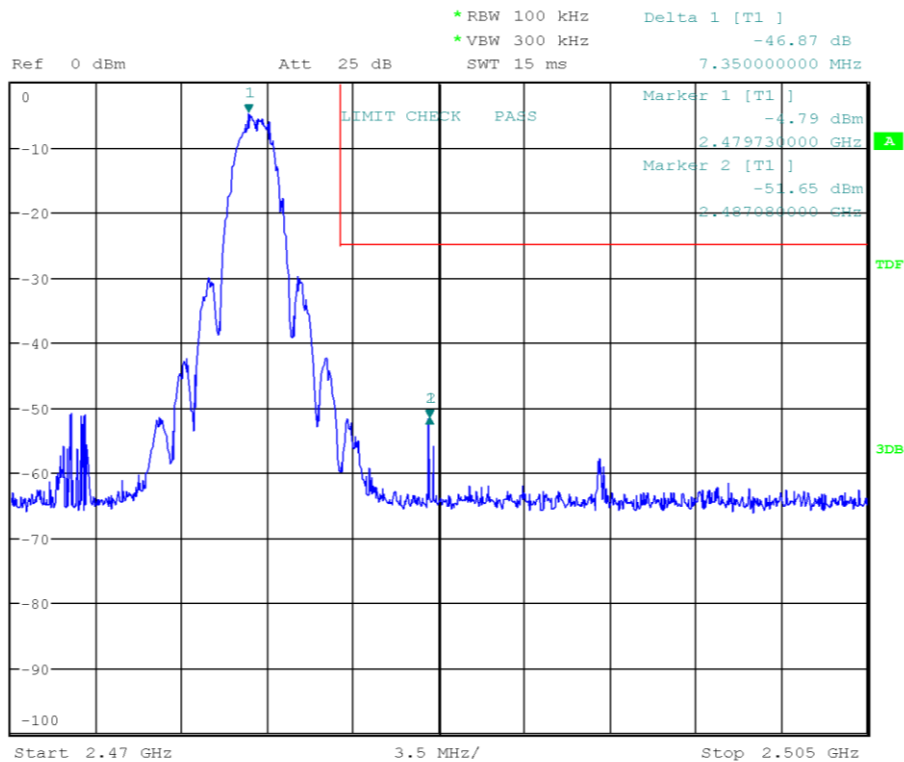
Emissions in nonrestricted frequency bands at the Band-edge

Project Number:	G0M-2302-1881
Applicant:	u-blox AG
Model Description:	Host-based multiradio module
Model:	MAYA-W271-00B
Test Sample ID:	43093
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Radwan Jaafar
Test Site:	Eurofins Product Service GmbH
Test Date:	2023-07-11
Band-edge	Lower
In-band Frequency [MHz]:	2404.78
Max. in-band Level [dBm/100 kHz]:	16.446
Out-of-band Frequency [MHz]:	2396.96
Max. out-of-band Level [dBm/100 kHz]:	-30.937
Attenuation [dB]:	-47.38



Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Radwan Jaafar
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-07-27
 Band-edge: Upper
 In-band Frequency [MHz]: 2479.73
 Max. in-band Level [dBm/100 kHz]: -4.788
 Out-of-band Frequency [MHz]: 2487.08
 Max. out-of-band Level [dBm/100 kHz]: -51.654
 Attenuation [dB]: -46.87



27.JUL.2023 10:48:48

Test Report No.: G0M-2302-1881-TFC247ZB-W271-V03

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.7 Test Conditions and Results - Conducted spurious emissions

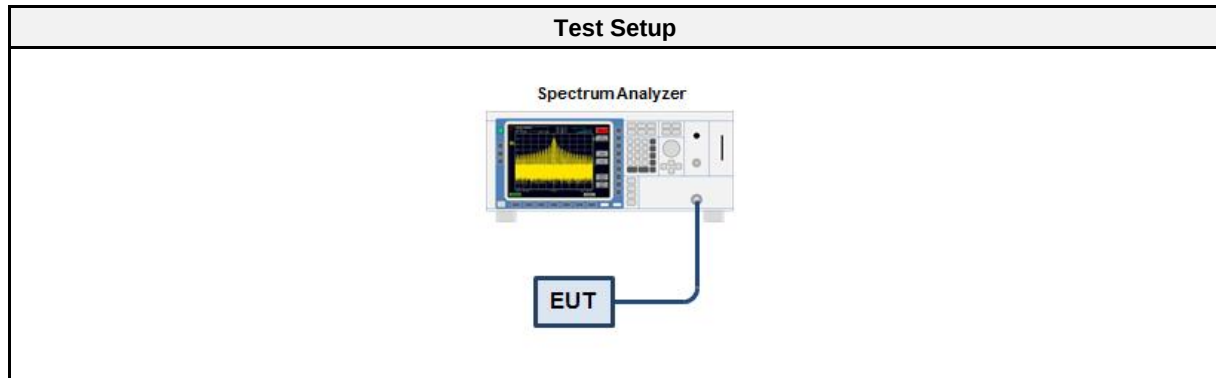
3.7.1 Information

Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Uncertainty	± 4.25 dB
Measurement Method	ANSI C63.10 11.11
Operator	Azamat Ibraimov
Date	2023-07-11

3.7.2 Limits

Limits	
Power Measurement	Out-of-band attenuation [dB]
Peak	20
RMS	30

3.7.3 Setup



3.7.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 43	EF01631	2022-08	2023-08
Cable (CAABR)	SUCOFLEX	102EA	EF00779	2023-03	2024-03

3.7.5 Procedure

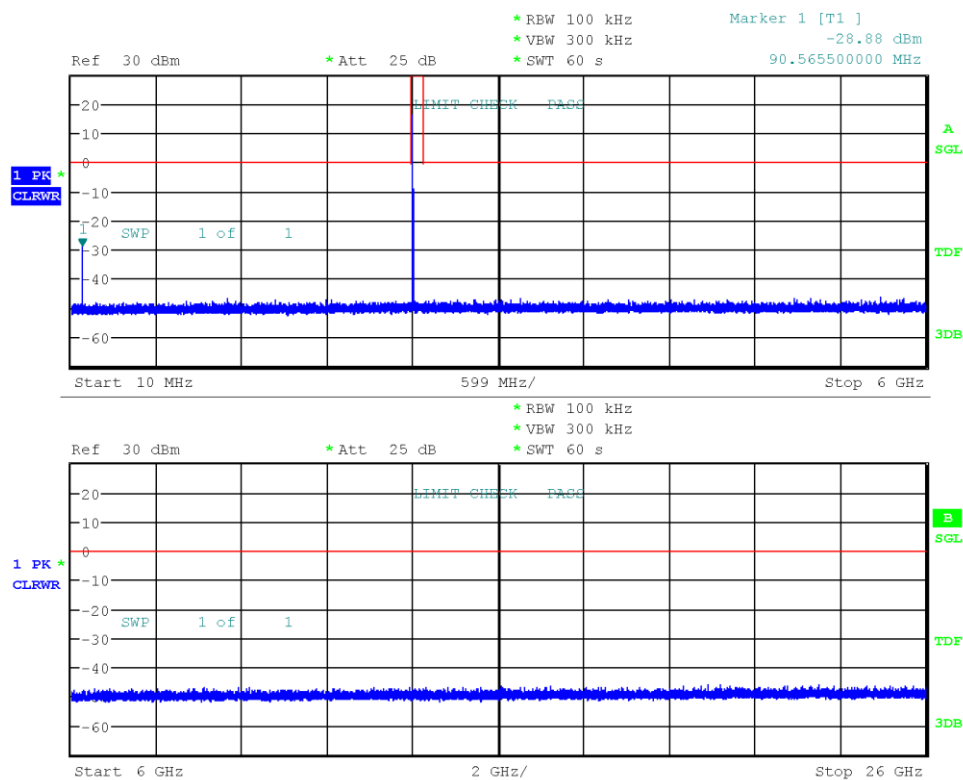
Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels outside frequency band

3.7.6 Results

Test Results		
Mode	Channel [MHz]	Verdict
O-QPSK	2405	PASS
O-QPSK	2440	PASS
O-QPSK	2480	PASS

Conducted Spurious Emissions

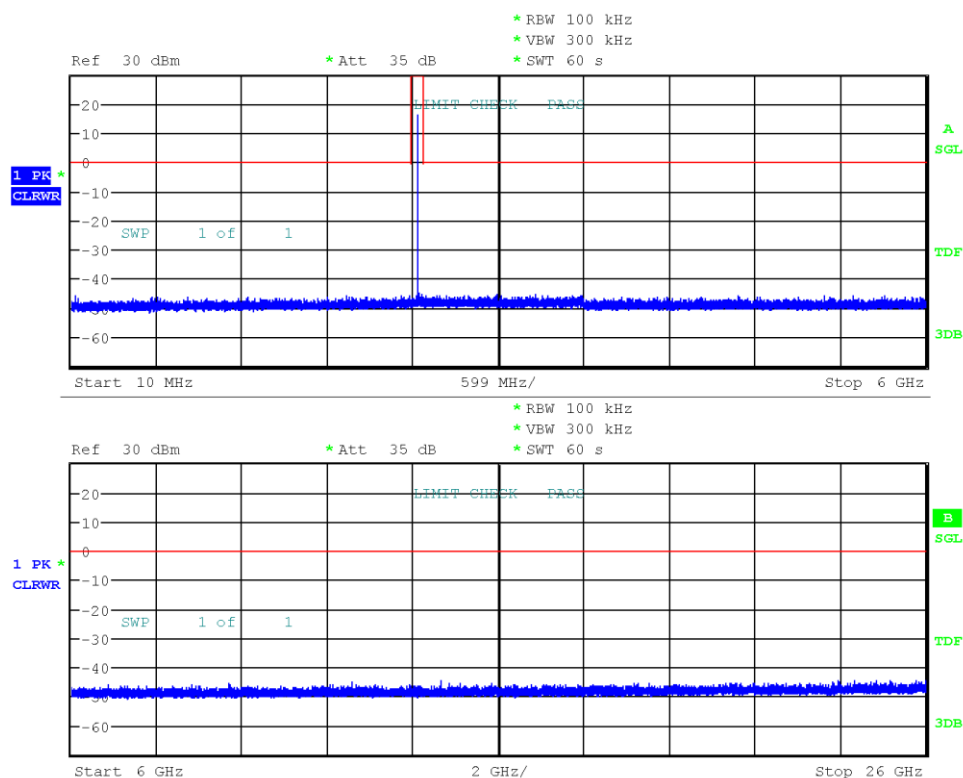
Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Radwan Jaafar
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-07-28
 Max. in-band Frequency [MHz]: 2405.0
 Max. in-band Level [dBm/100 kHz]: 19.8
 Out-of-band Limit [dBm/100 kHz]: -0.2



Date: 28.JUL.2023 13:19:20

Conducted Spurious Emissions

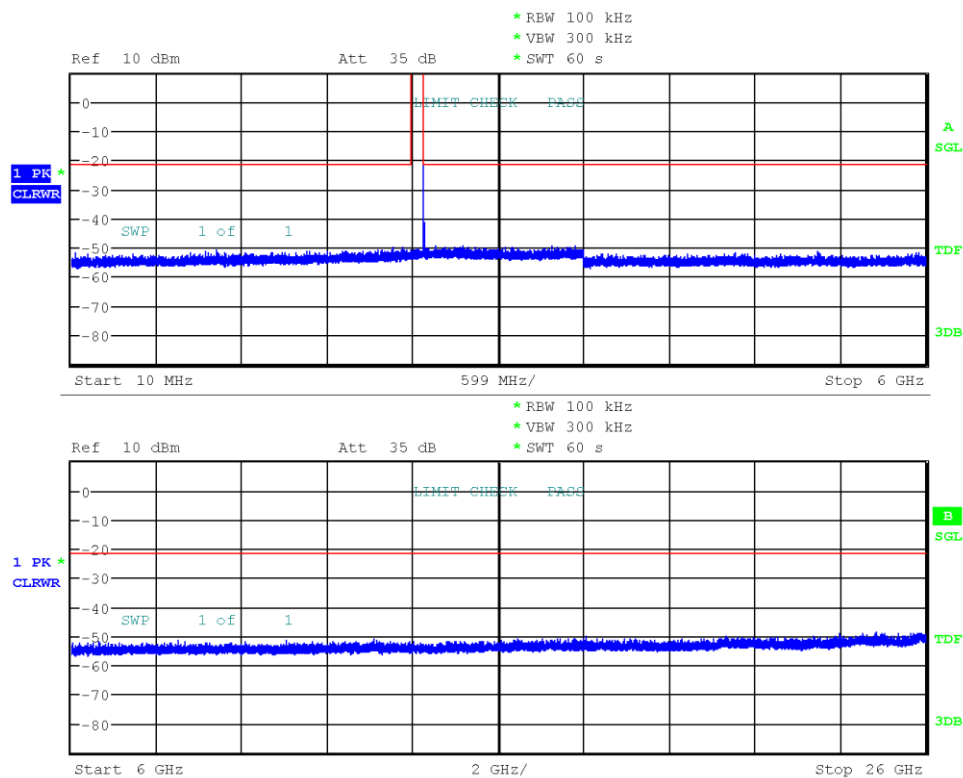
Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 18, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Radwan Jaafar
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-07-28
 Max. in-band Frequency [MHz]: 2440.0
 Max. in-band Level [dBm/100 kHz]: 19.8
 Out-of-band Limit [dBm/100 kHz]: -0.2



Date: 28.JUL.2023 13:24:10

Conducted Spurious Emissions

Project Number: G0M-2302-1881
 Applicant: u-blox AG
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Radwan Jaafar
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-07-28
 Max. in-band Frequency [MHz]: 2480.0
 Max. in-band Level [dBm/100 kHz]: -1.3
 Out-of-band Limit [dBm/100 kHz]: -21.3



Date: 28.JUL.2023 13:28:51

3.8 Test Conditions and Results - Transmitter radiated emissions

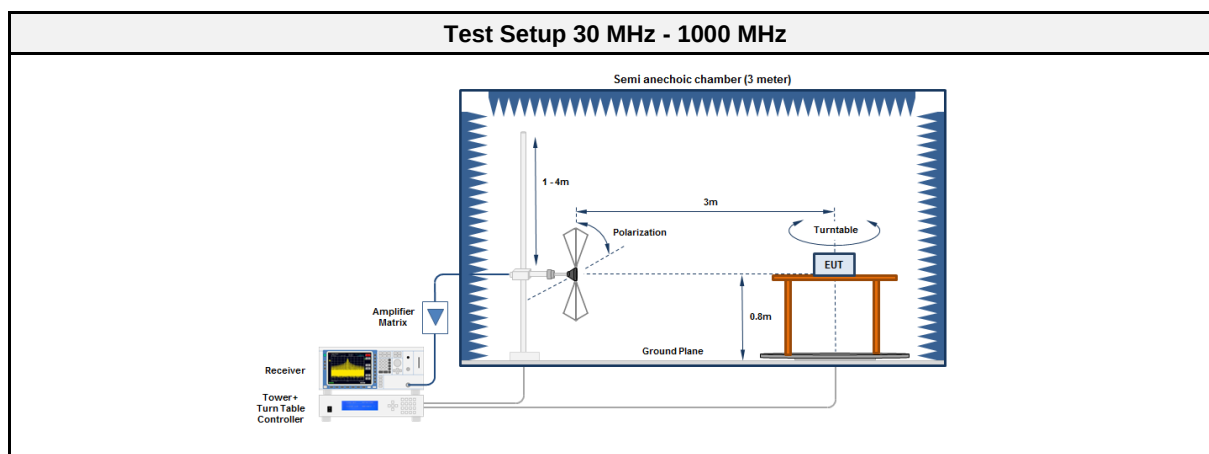
3.8.1 Information

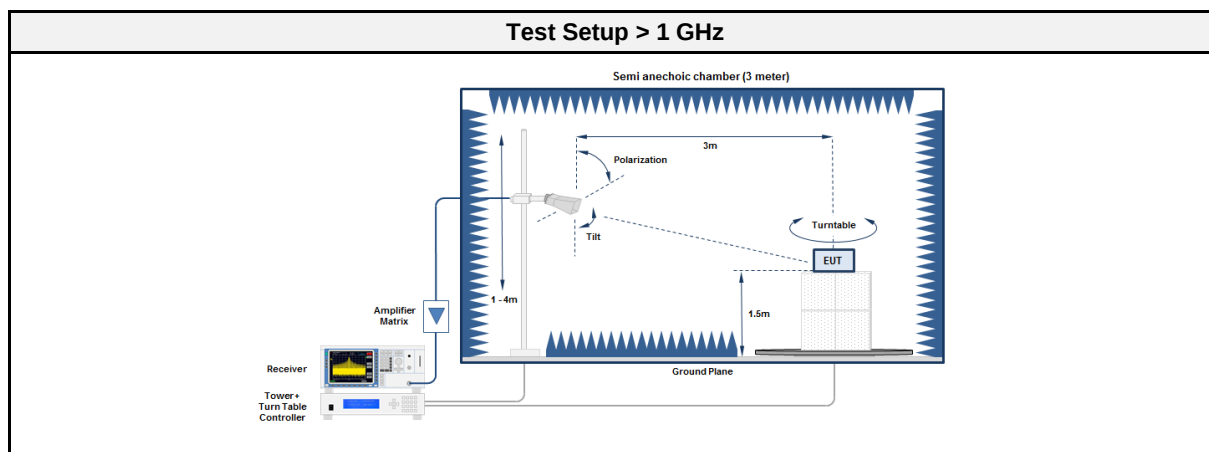
Test Information	
Reference	FCC § 15.247(d); FCC § 15.209; ISSED RSS-Gen, Issue 5 A2 (section 6.13)
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6, 11.12
Operator	Azamat Ibraimov, Ehsan Sohrabi
Date	2023-07-25 – 2023-07-27

3.8.2 Limits

Limits			
Frequency range [MHz]	Detector	Field strength [µV/m]	Measurement distance [m]
0.009 - 0.09	Average	2400/F[kHz]	300
0.09 - 0.110	Quasi-Peak	2400/F[kHz]	300
0.110 - 0.490	Average	2400/F[kHz]	300
0.490 - 1.705	Quasi-Peak	24000/F[kHz]	30
1.705 - 30.0	Quasi-Peak	30	30
30 - 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3
960 - 1000	Quasi-Peak	500	3
>1000	Average	500	3

3.8.3 Setup





3.8.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2020.1.8

Test Equipment 30 MHz - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2022-11	2025-11
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2023-02	2024-02
Antenna	Schwarzbeck	VULB 9168	EF01824	2022-10	2023-10

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC2	EF01616	2022-10	2023-10
Spectrum analyzer	R&S	FSW43	EF00896	2022-08	2023-08
Antenna	Schwarzbeck	BBHA 9120B	EF01678	2021-03	2024-03
Antenna	Schwarzbeck	HWRD 650	EF01679	2021-03	2024-03
Antenna	Amplifier Research	AT4560	EF00302	2021-06	2023-09

3.8.5 Procedure

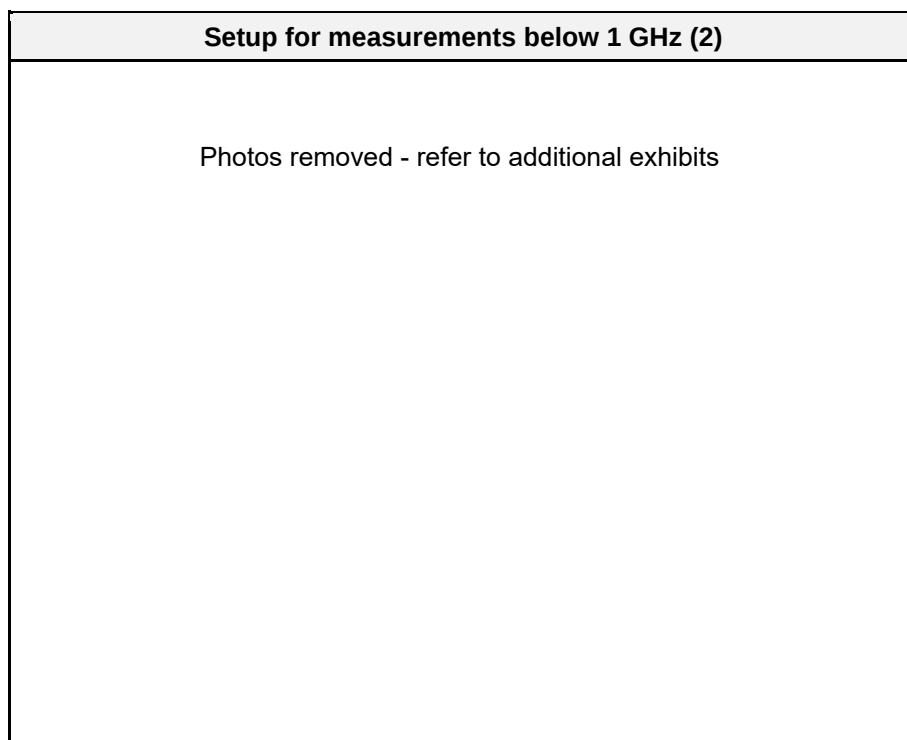
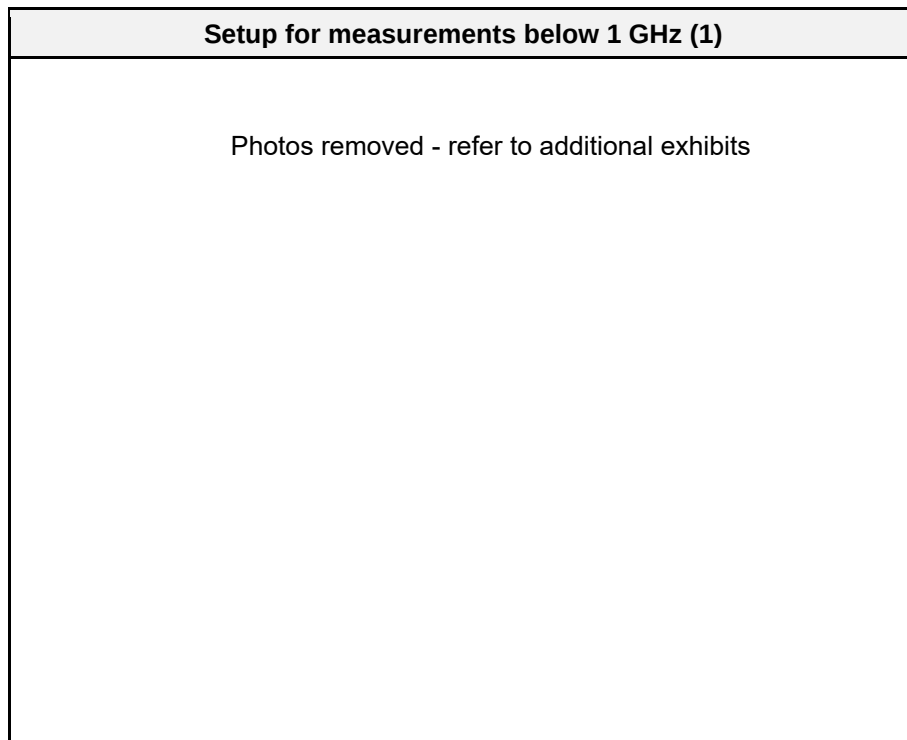
Test Procedure 30 MHz - 1000 MHz	
1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector	

Test Procedure > 1 GHz	
1. EUT is placed on a non conducting support at the center of a turn table 1.5 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector	

3.8.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
2405	2294.6	47.79	pk	ver	74.00	-26.21
2405	2294.6	37.20	avg	ver	54.00	-16.80
2405	4811.1	37.21	avg	hor	54.00	-16.79
2405	12027	32.56	avg	ver	54.00	-21.44
2440	4879.1	48.43	pk	ver	74.00	-25.57
2440	4879.1	42.71	avg	ver	54.00	-11.29
2440	7321.5	48.59	pk	ver	74.00	-25.41
2440	7321.5	42.48	avg	ver	54.00	-11.52
2440	12202	35.77	avg	ver	54.00	-18.23
2480	1280	37.23	avg	ver	54.00	-16.77

3.8.7 Setup Photos



EUT Test Setup below 1 GHz

Photos removed - refer to additional exhibits

Setup for measurements above 1 GHz

Photos removed - refer to additional exhibits

EUT Test Setup above 1 GHz

Photos removed - refer to additional exhibits

3.9 Test Conditions and Results - Receiver radiated emissions

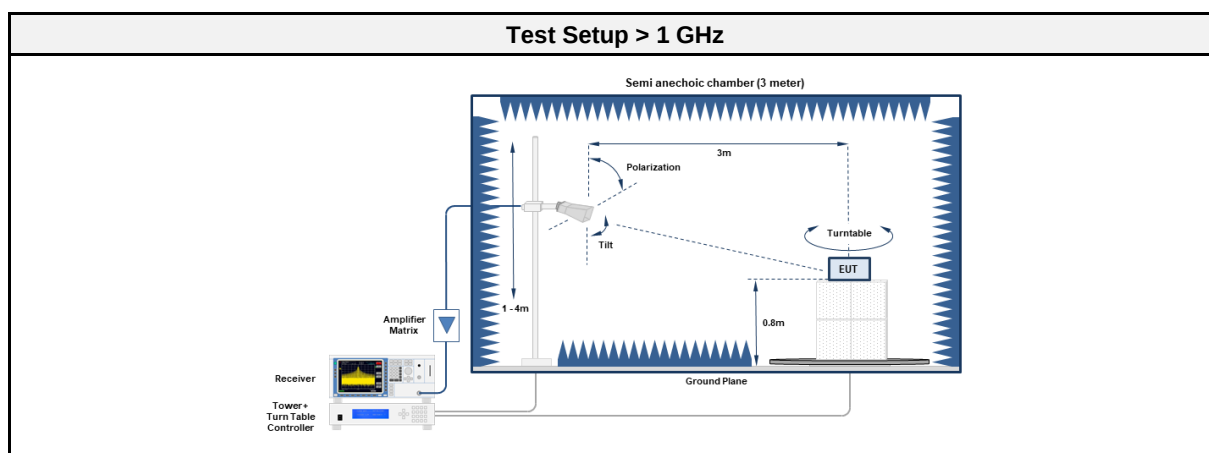
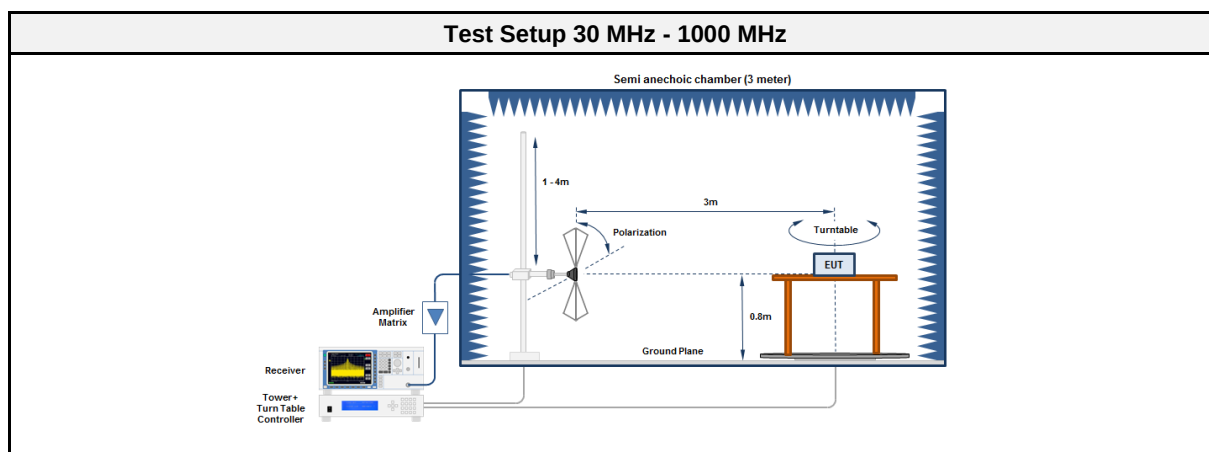
3.9.1 Information

Test Information	
Reference	ISED RSS-247, Issue 2 (section 3.1)
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.4-2014 8.1-8.3
Operator	Ehsan Sohrabi
Date	2023-07-27

3.9.2 Limits

Limits			
Frequency range [MHz]	Detector	Field strength [$\mu\text{V/m}$]	Measurement distance [m]
30 - 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3
960 - 1000	Quasi-Peak	500	3
>1000	Average	500	3

3.9.3 Setup



3.9.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2020.1.8

Test Equipment 30 MHz - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2022-11	2025-11
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2023-02	2024-02
Antenna	Schwarzbeck	VULB 9168	EF01824	2022-10	2023-10

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC2	EF01616	2022-10	2023-10
Spectrum analyzer	R&S	FSW43	EF00896	2022-08	2023-08
Antenna	Schwarzbeck	BBHA 9120B	EF01678	2021-03	2024-03
Antenna	Schwarzbeck	HWRD 650	EF01679	2021-03	2024-03
Antenna	Amplifier Research	AT4560	EF00302	2021-06	2023-09

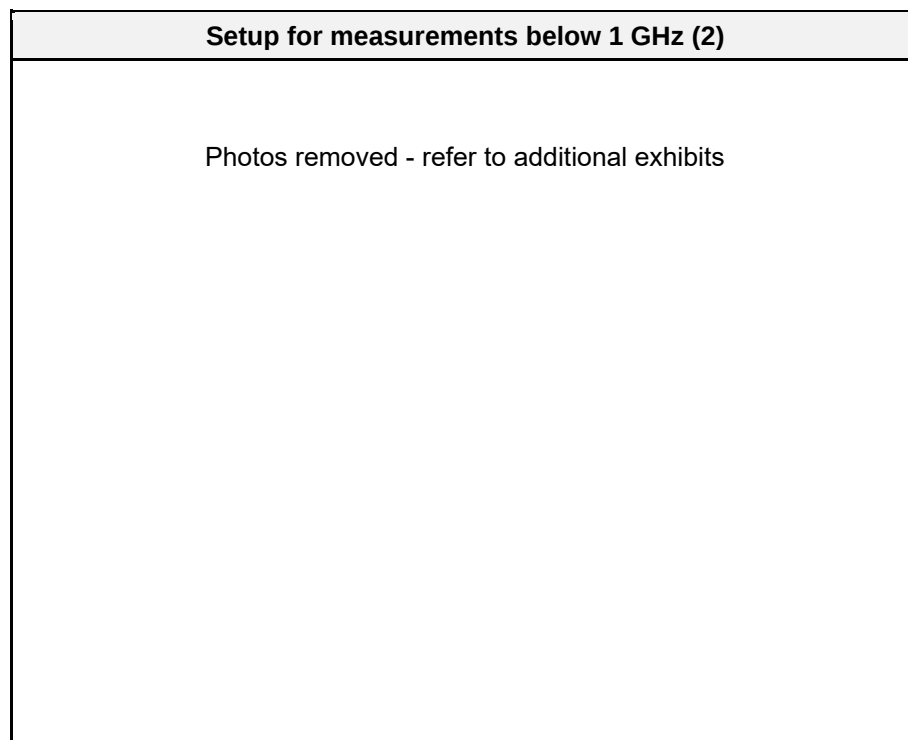
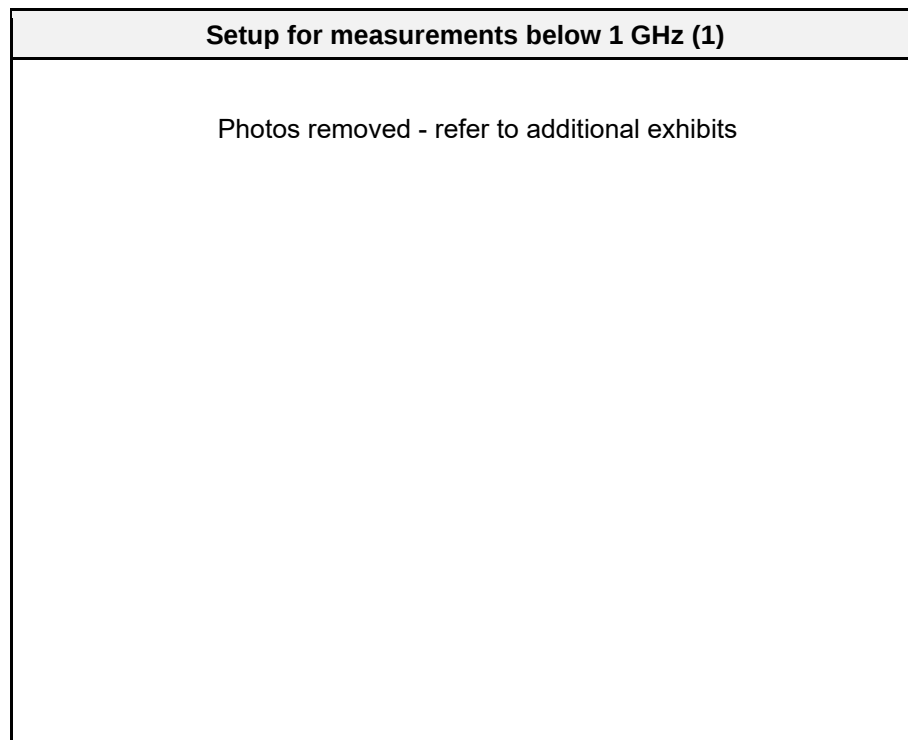
3.9.5 Procedure

Test Procedure
1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground 2. EUT is set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector

3.9.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
2440	924.534	35.10	pk	ver	46.00	-10.94
2440	1280	37.27	pk	ver	74.00	-36.73
2440	1280	33.43	avg	ver	53.98	-20.55

3.9.7 Setup Photos



Setup for measurements above 1 GHz (1)

Photos removed - refer to additional exhibits

Setup for measurements above 1 GHz (2)

Photos removed - refer to additional exhibits

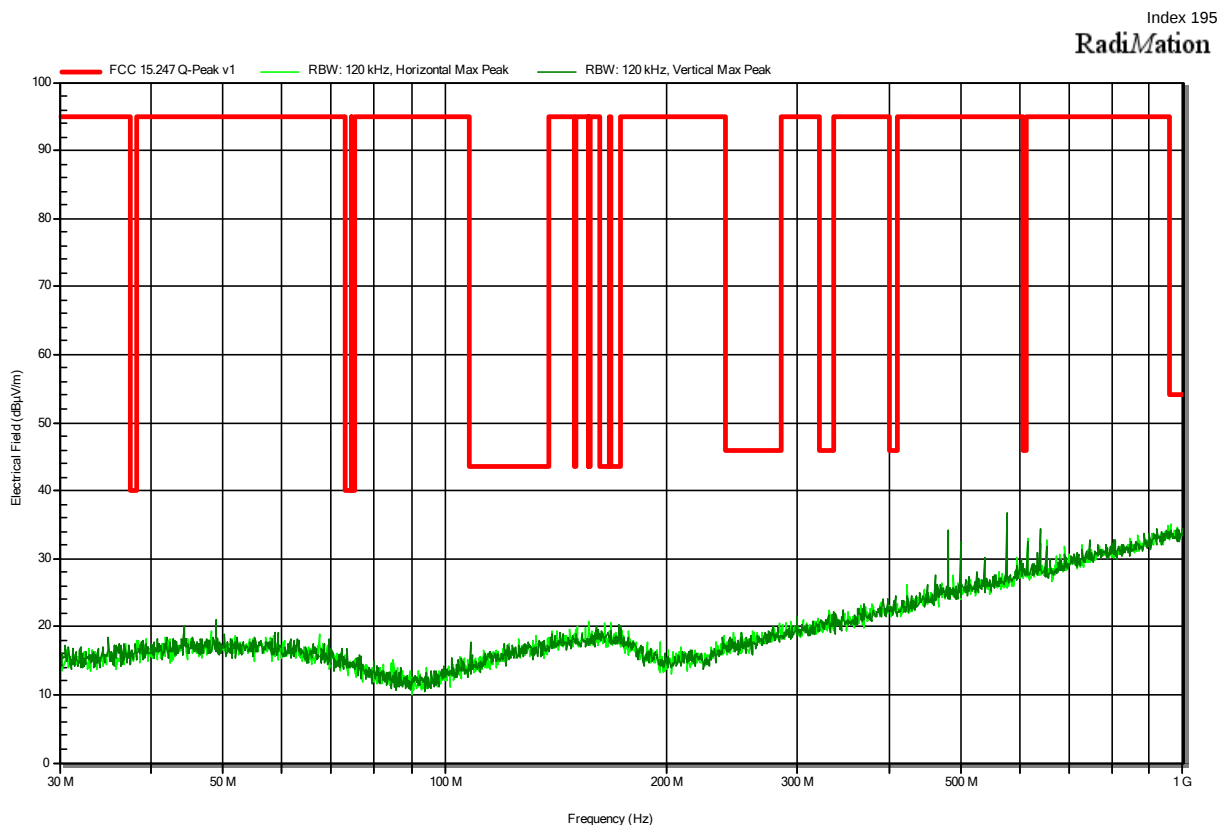
EUT Test Setup

Photos removed - refer to additional exhibits

ANNEX A Transmitter spurious emissions

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Tx; IEEE 802.15.4, CH 11, 2405 MHz, O-QPSK, 250 Kbps, P = max
 Test Date: 2023-07-27

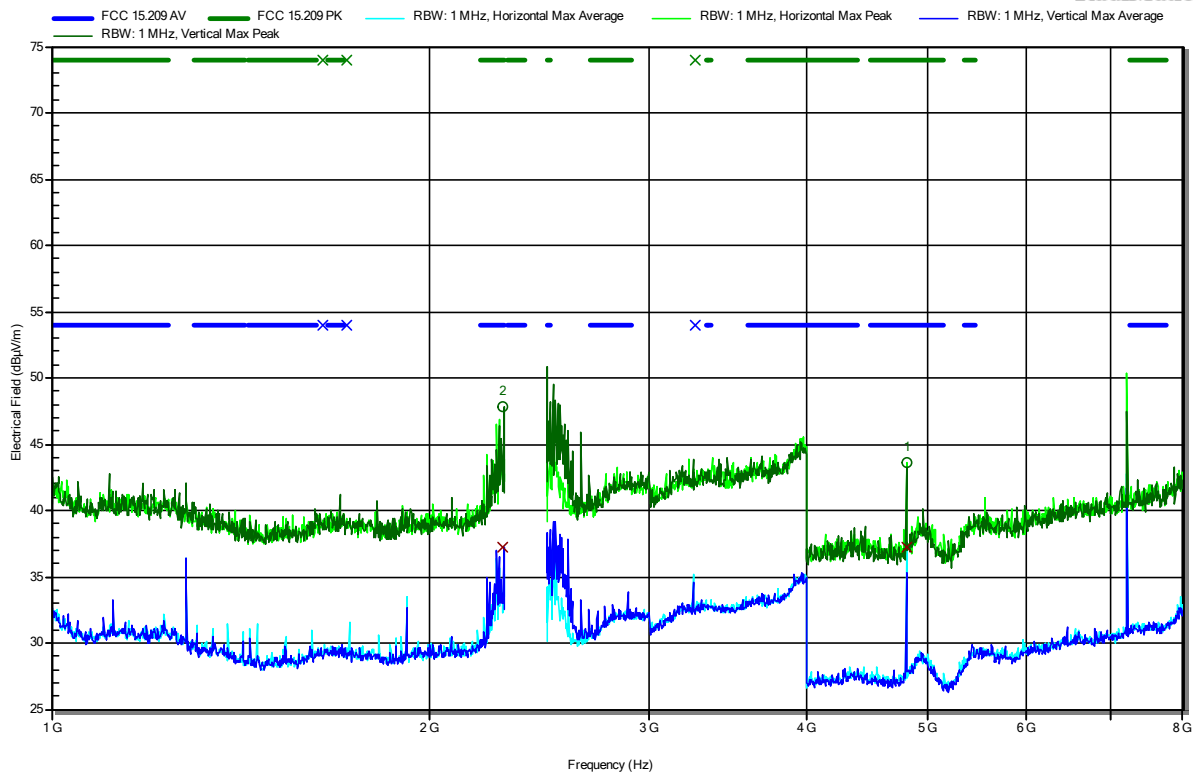


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Ibraimov Azamat
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE 802.15.4, CH 11, 2405 MHz, O-QPSK, 250 Kbps, P = max
 Test Date: 2023-07-25

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.2946 GHz	47.79 dBμV/m	74 dBμV/m	-26.21 dB	Pass	Vertical
4.8111 GHz	43.67 dBμV/m	74 dBμV/m	-30.33 dB	Pass	Horizontal

Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.2946 GHz	37.2 dBμV/m	54 dBμV/m	-16.8 dB	Pass	Vertical
4.8111 GHz	37.21 dBμV/m	54 dBμV/m	-16.79 dB	Pass	Horizontal

Test Report No.: G0M-2302-1881-TFC247ZB-W271-V03

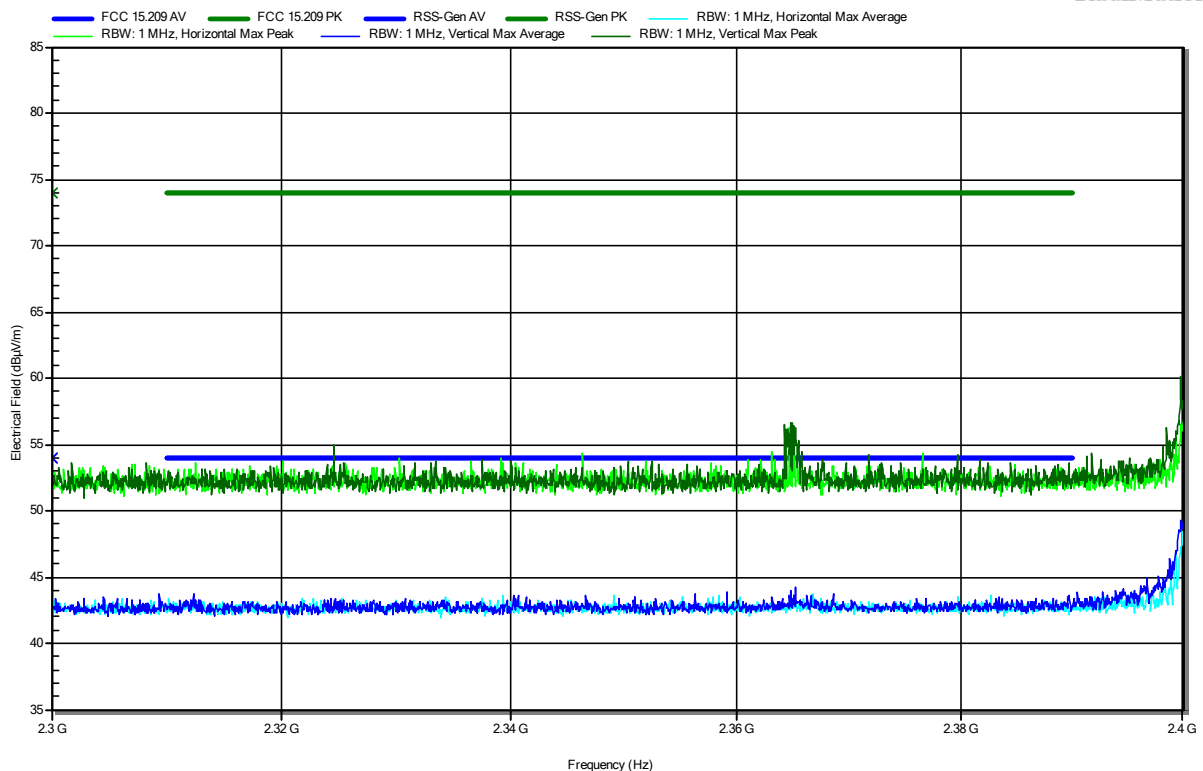
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Ibraimov Azamat
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE 802.15.4, CH 11, 2405 MHz, O-QPSK, 250 Kbps, P = max
 Test Date: 2023-07-25
 Note: lower bandedge

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RadiMation

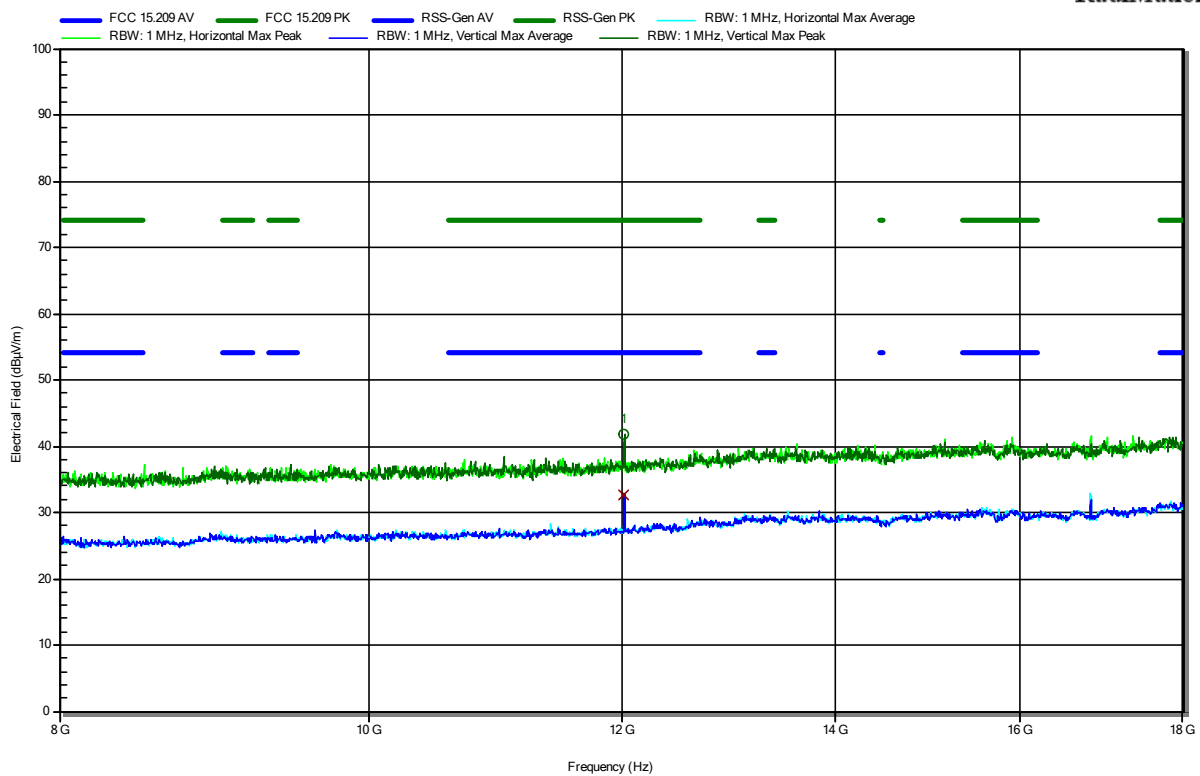


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Ibraimov Azamat
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; IEEE 802.15.4, CH 11, 2405 MHz, O-QPSK, 250 Kbps, P = max
 Test Date: 2023-07-25

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RadiMation



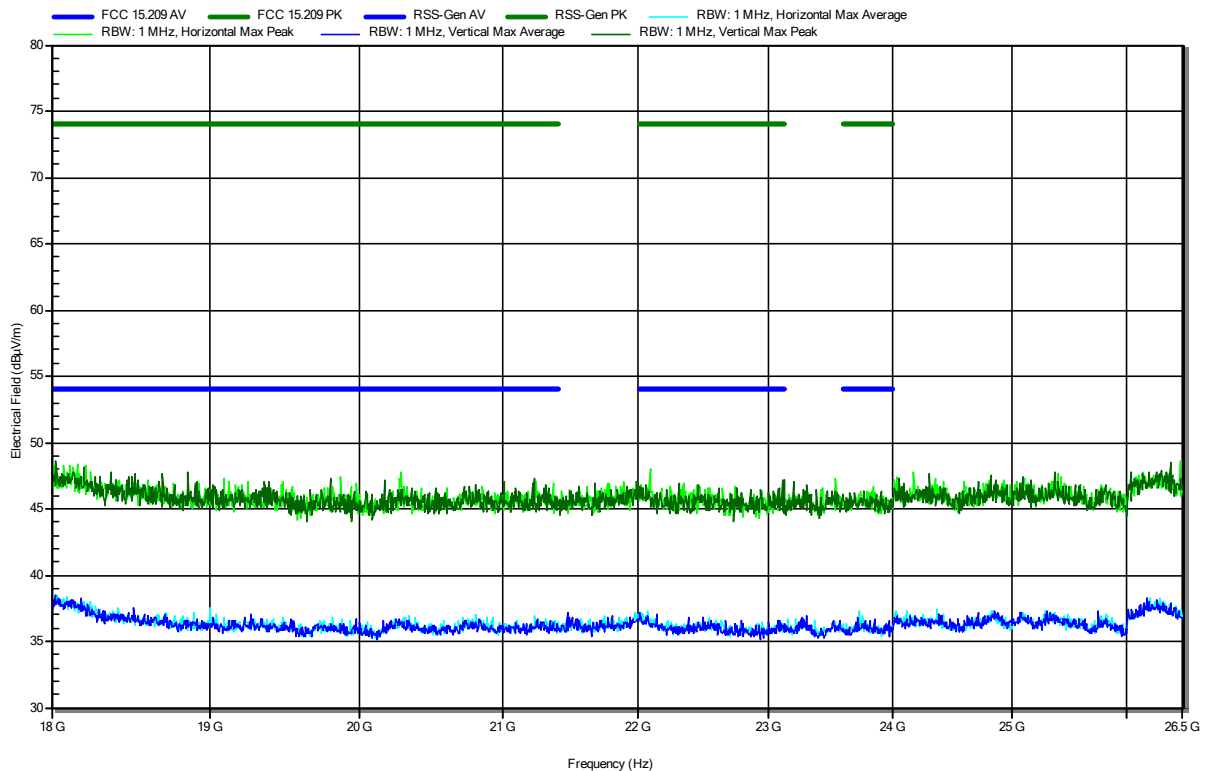
Frequency 12.027 GHz	Peak 41.75 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -32.25 dB	Peak Status Pass	Polarization Vertical
Frequency 12.027 GHz	Average 32.56 dBμV/m	Average Limit 54 dBμV/m	Average Difference -21.44 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Ibraimov Azamat
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; IEEE 802.15.4, CH 11, 2405 MHz, O-QPSK, 250 Kbps, P = max
 Test Date: 2023-07-25

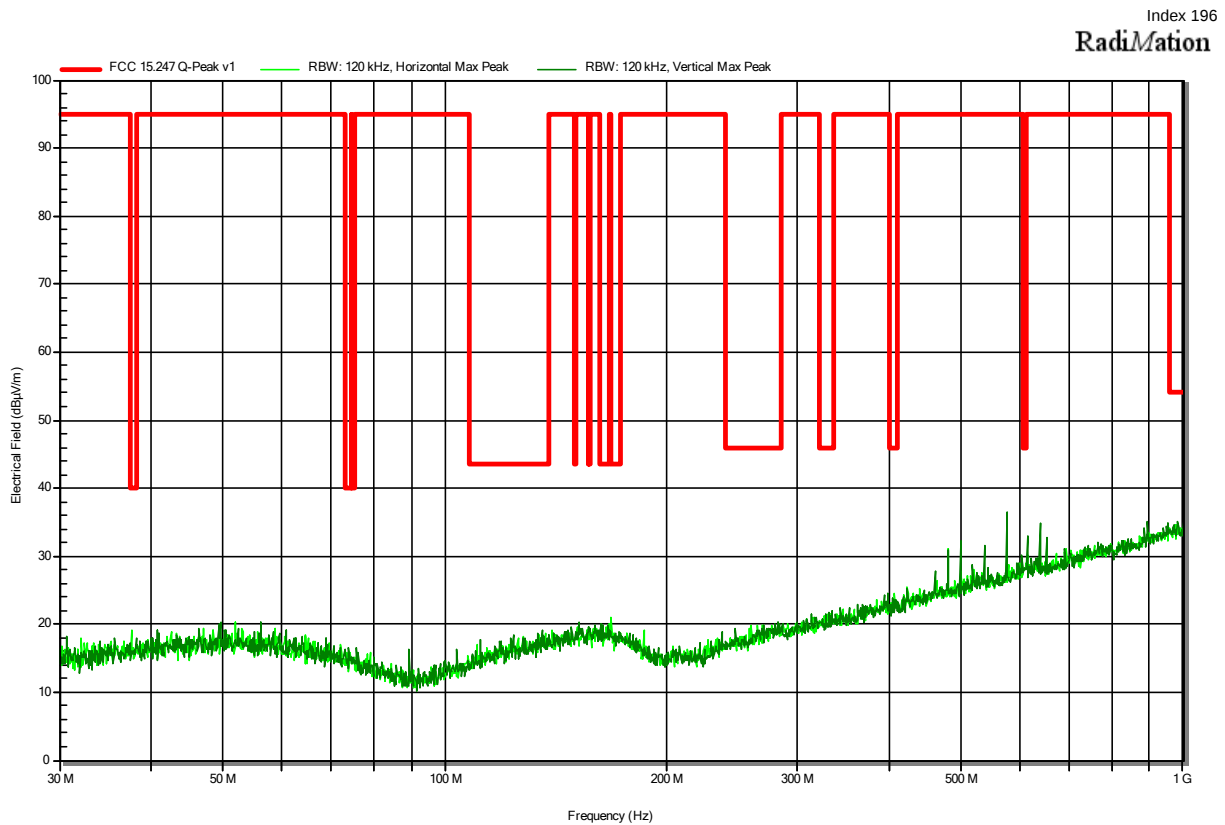
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RadiMation



Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Tx; IEEE 802.15.4, CH 18, 2440 MHz, O-QPSK, 250 Kbps, P = max
 Test Date: 2023-07-27

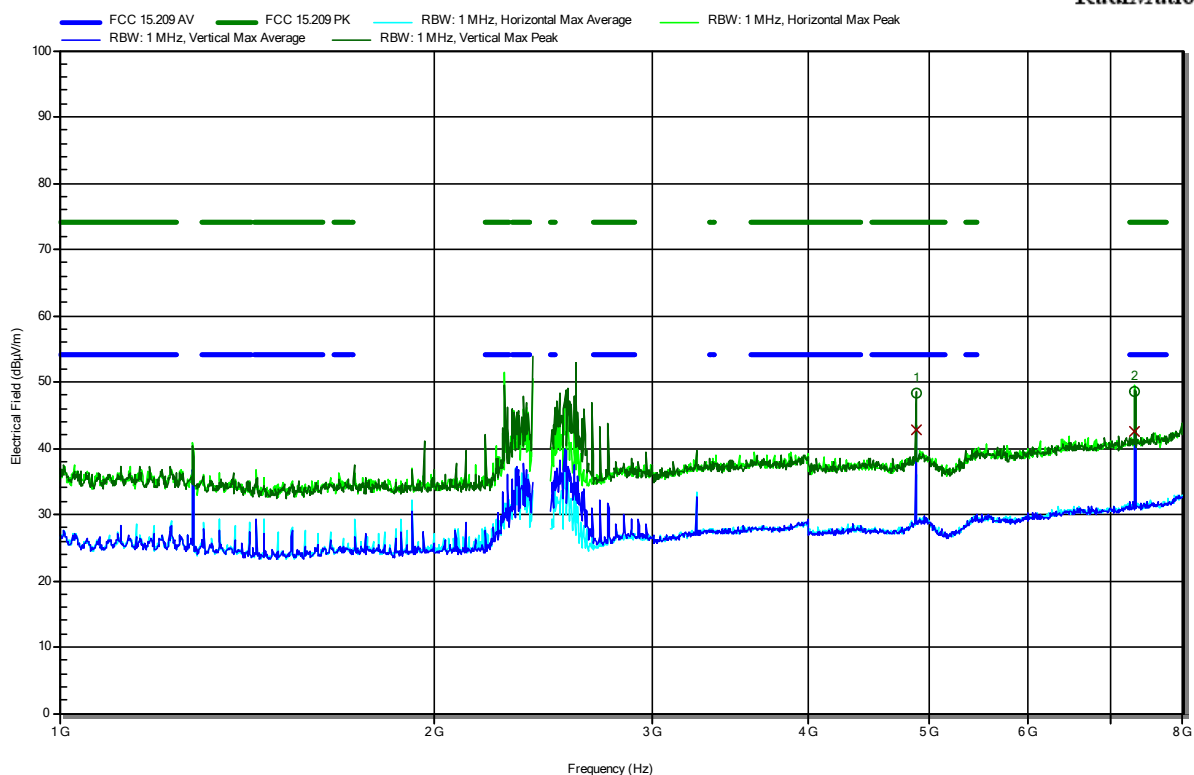


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Ibraimov Azamat
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE 802.15.4, CH 18, 2440 MHz, O-QPSK, 250 Kbps, P = max
 Test Date: 2023-07-25

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
4.8791 GHz	48.43 dBµV/m	74 dBµV/m	-25.57 dB	Pass	Vertical
7.3215 GHz	48.59 dBµV/m	74 dBµV/m	-25.41 dB	Pass	Vertical

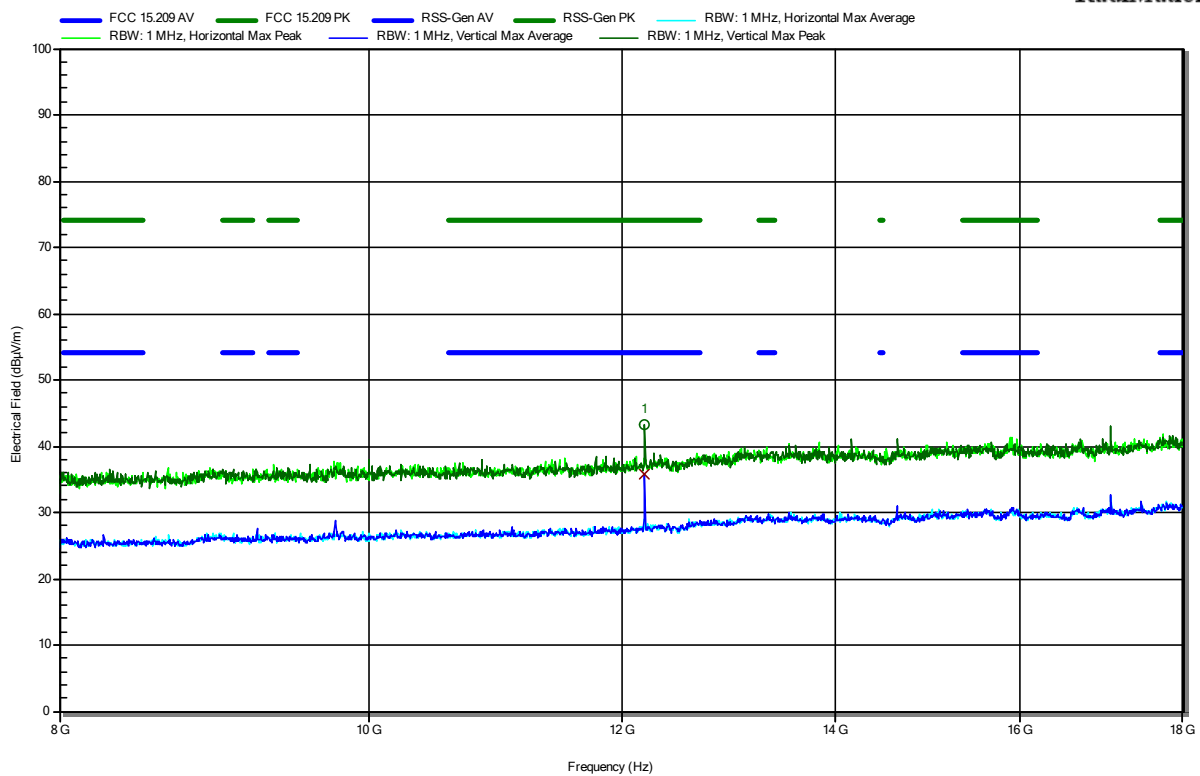
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
4.8791 GHz	42.71 dBµV/m	54 dBµV/m	-11.29 dB	Pass	Vertical
7.3215 GHz	42.48 dBµV/m	54 dBµV/m	-11.52 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Ibraimov Azamat
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; IEEE 802.15.4, CH 18, 2440 MHz, O-QPSK, 250 Kbps, P = max
 Test Date: 2023-07-25

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RadiMation



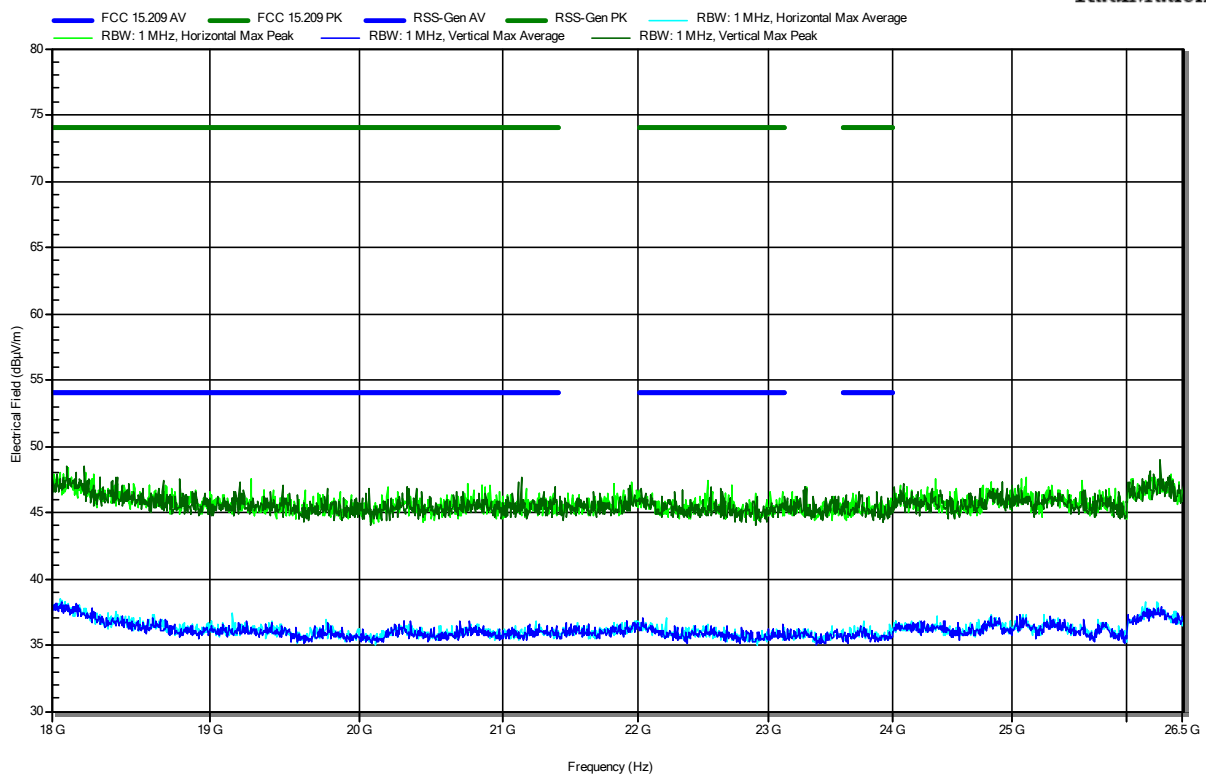
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
12.202 GHz	43.28 dBμV/m	74 dBμV/m	-30.72 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
12.202 GHz	35.77 dBμV/m	54 dBμV/m	-18.23 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Ibraimov Azamat
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; IEEE 802.15.4, CH 18, 2440 MHz, O-QPSK, 250 Kbps, P = max
 Test Date: 2023-07-25

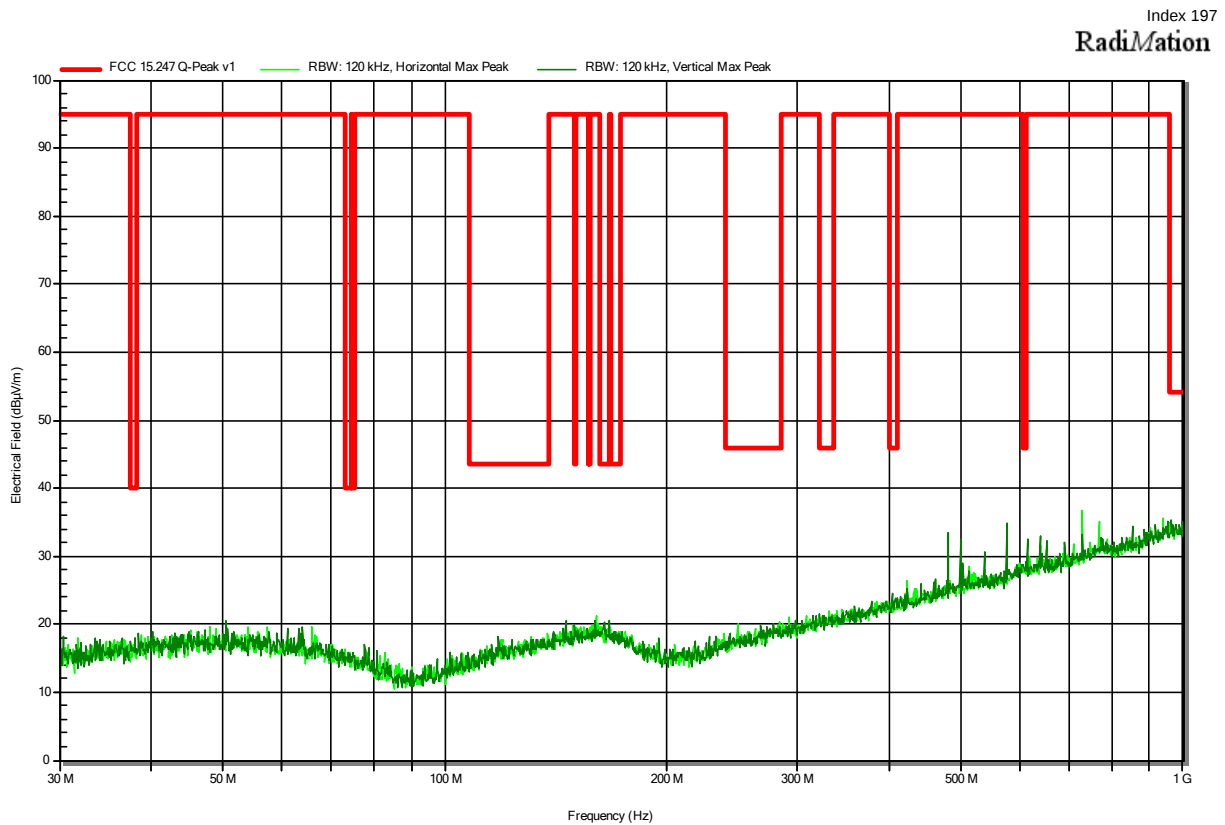
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Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Tx; IEEE 802.15.4, CH 26, 2480 MHz, O-QPSK, 250 Kbps, P = max
 Test Date: 2023-07-27

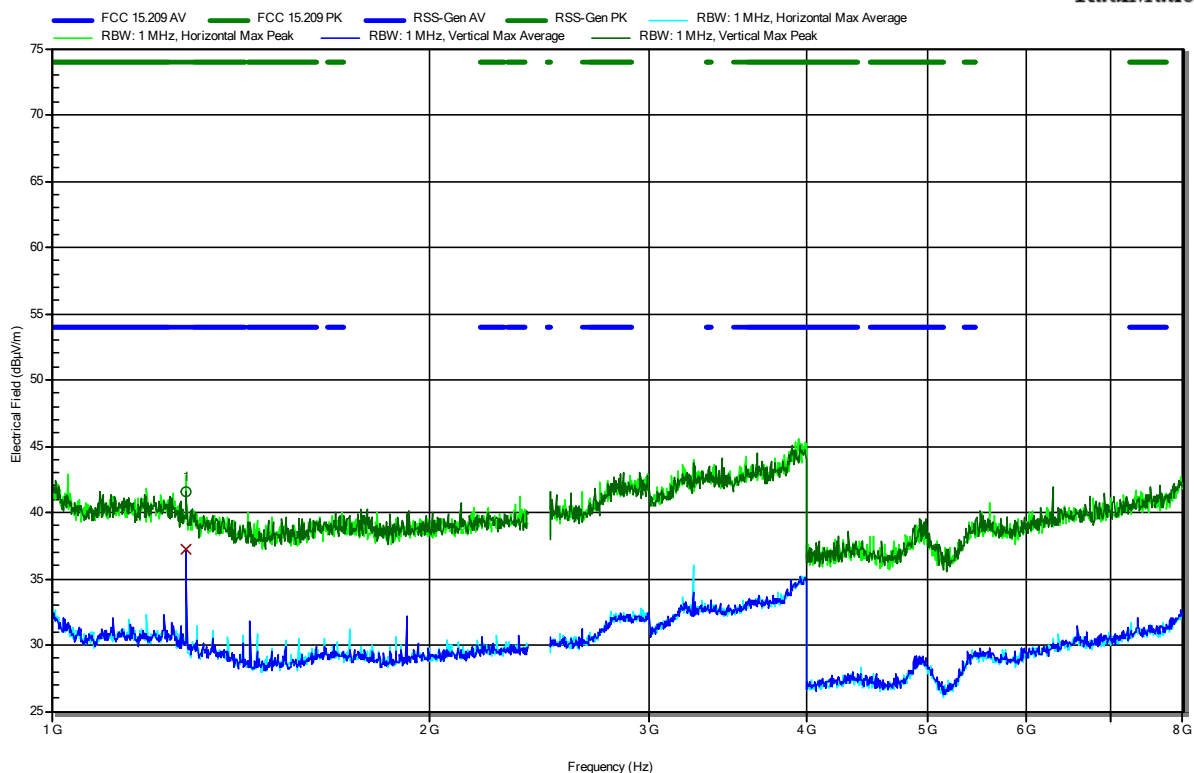


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Ibraimov Azamat
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE 802.15.4, CH 26, 2480 MHz, O-QPSK, 250 Kbps, P = max
 Test Date: 2023-07-25

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RadiMation



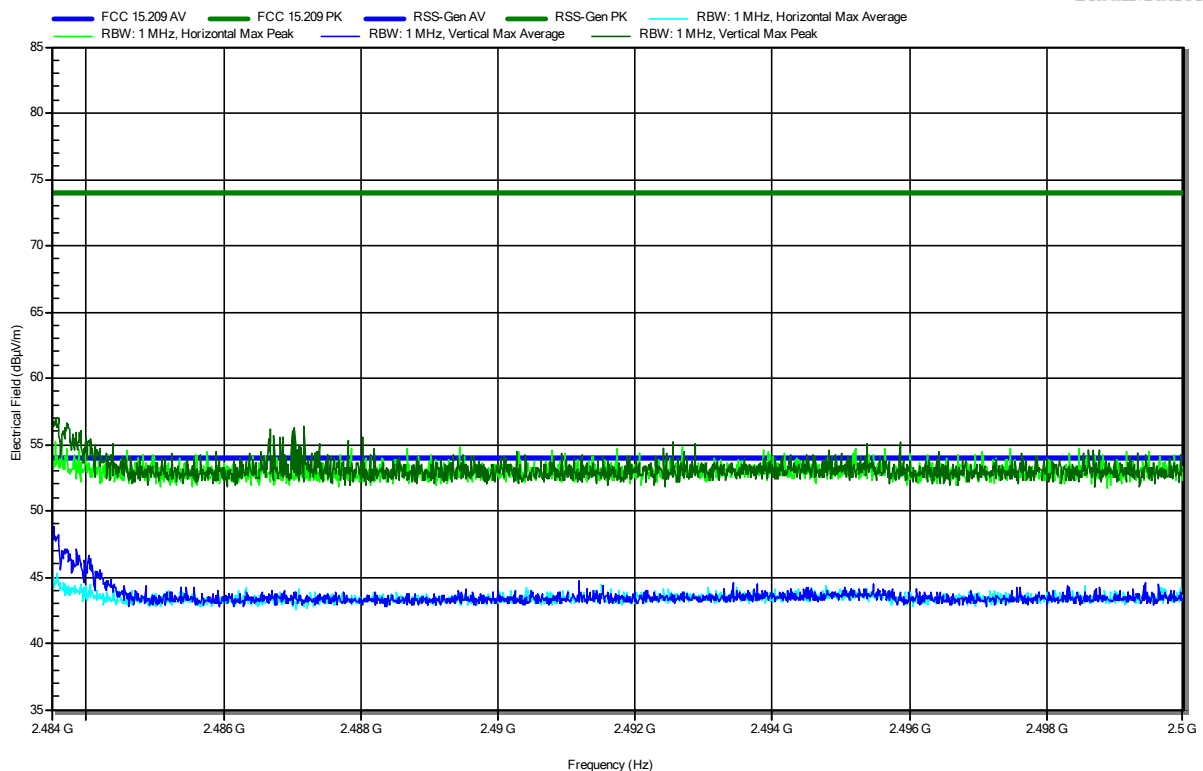
Frequency 1.28 GHz	Peak 41.62 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -32.38 dB	Peak Status Pass	Polarization Vertical
Frequency 1.28 GHz	Average 37.23 dBμV/m	Average Limit 54 dBμV/m	Average Difference -16.77 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Ibraimov Azamat
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE 802.15.4, CH 26, 2480 MHz, O-QPSK, 250 Kbps, P = max
 Test Date: 2023-07-25
 Note: upper bandedge

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RadiMation

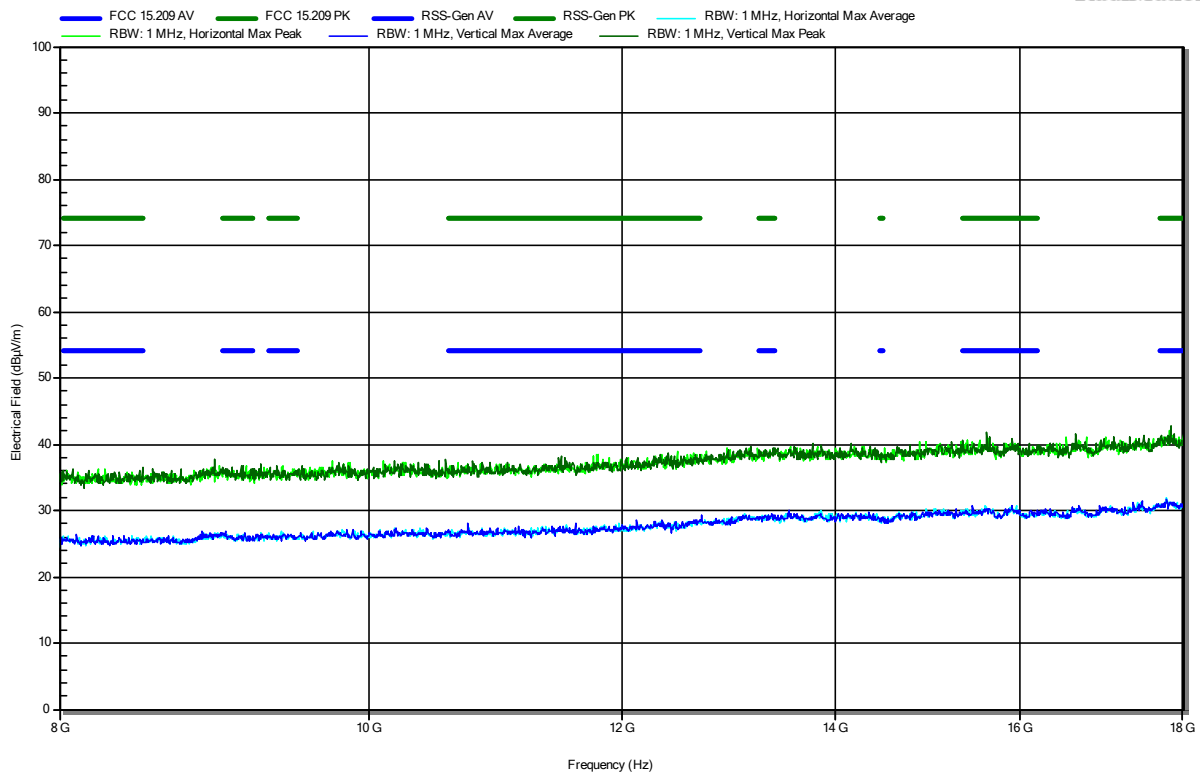


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Ibraimov Azamat
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; IEEE 802.15.4, CH 26, 2480 MHz, O-QPSK, 250 Kbps, P = max
 Test Date: 2023-07-25

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RadiMation

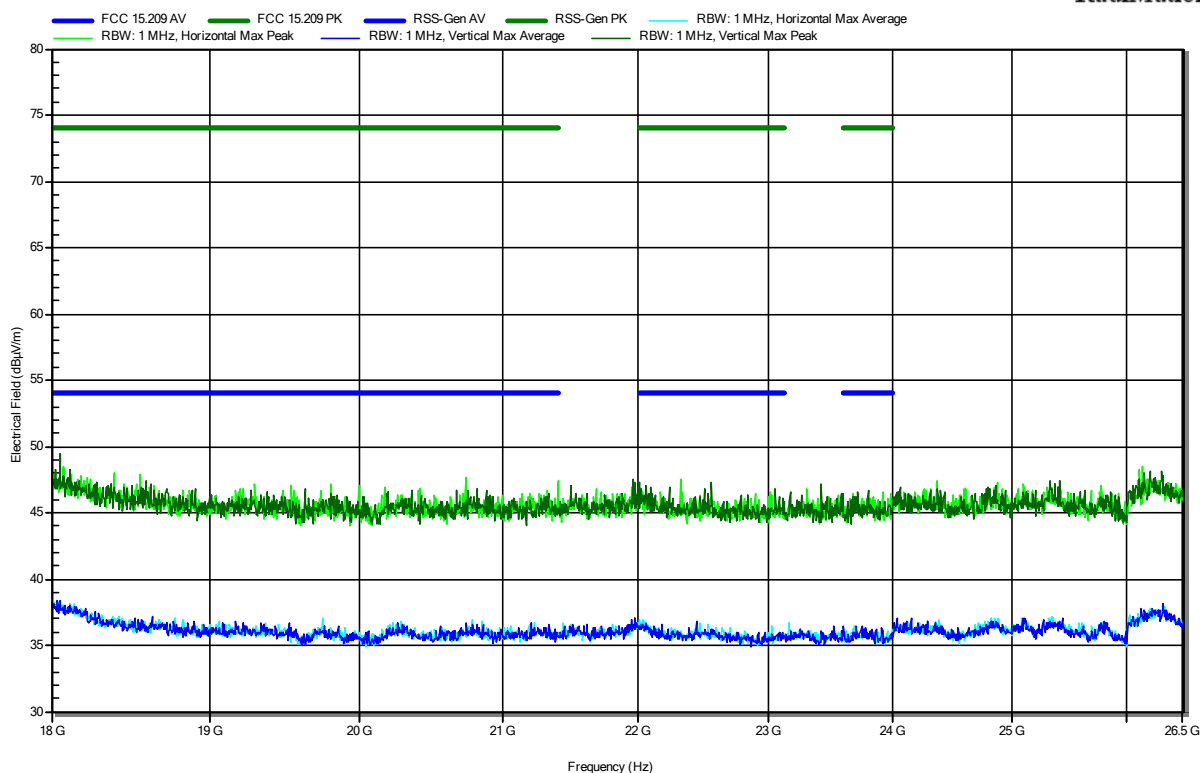


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Ibraimov Azamat
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; IEEE 802.15.4, CH 26, 2480 MHz, O-QPSK, 250 Kbps, P = max
 Test Date: 2023-07-25
 Note:

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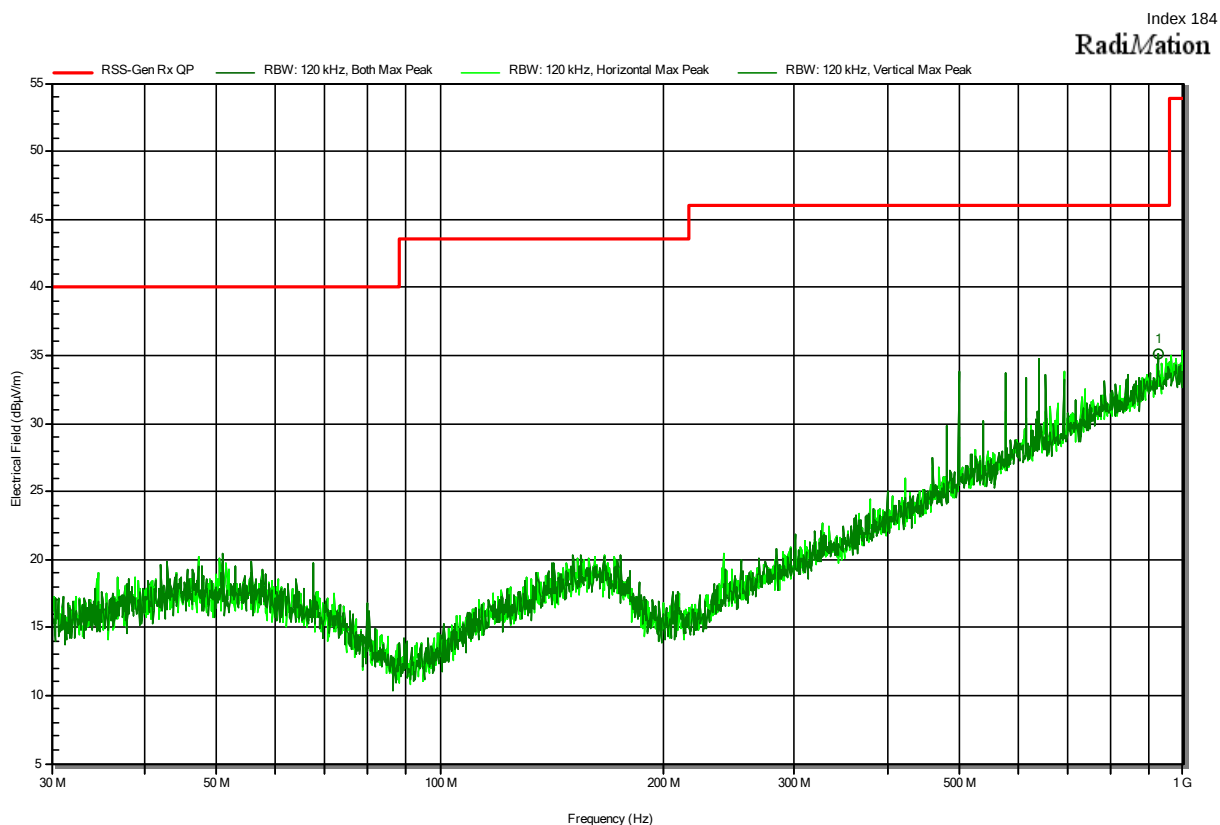
RadiMation



ANNEX B Receiver spurious emissions

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Rx; IEEE 802.15.4, CH 18, 2440
 Test Date: 2023-07-27



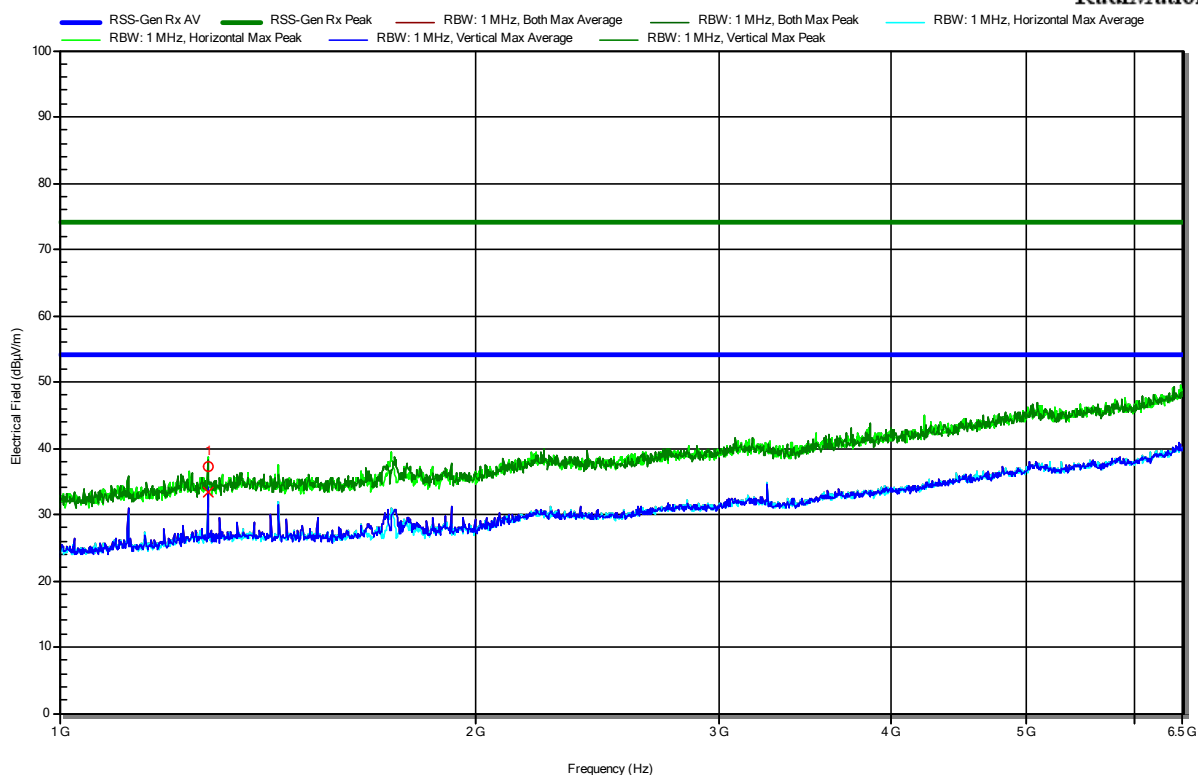
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
924.534 MHz	35.1 dBµV/m	46 dBµV/m	-10.94 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D
 Measurement distance: 3 m
 Mode: Rx; IEEE 802.15.4, CH 18, 2440
 Test Date: 2023-07-27

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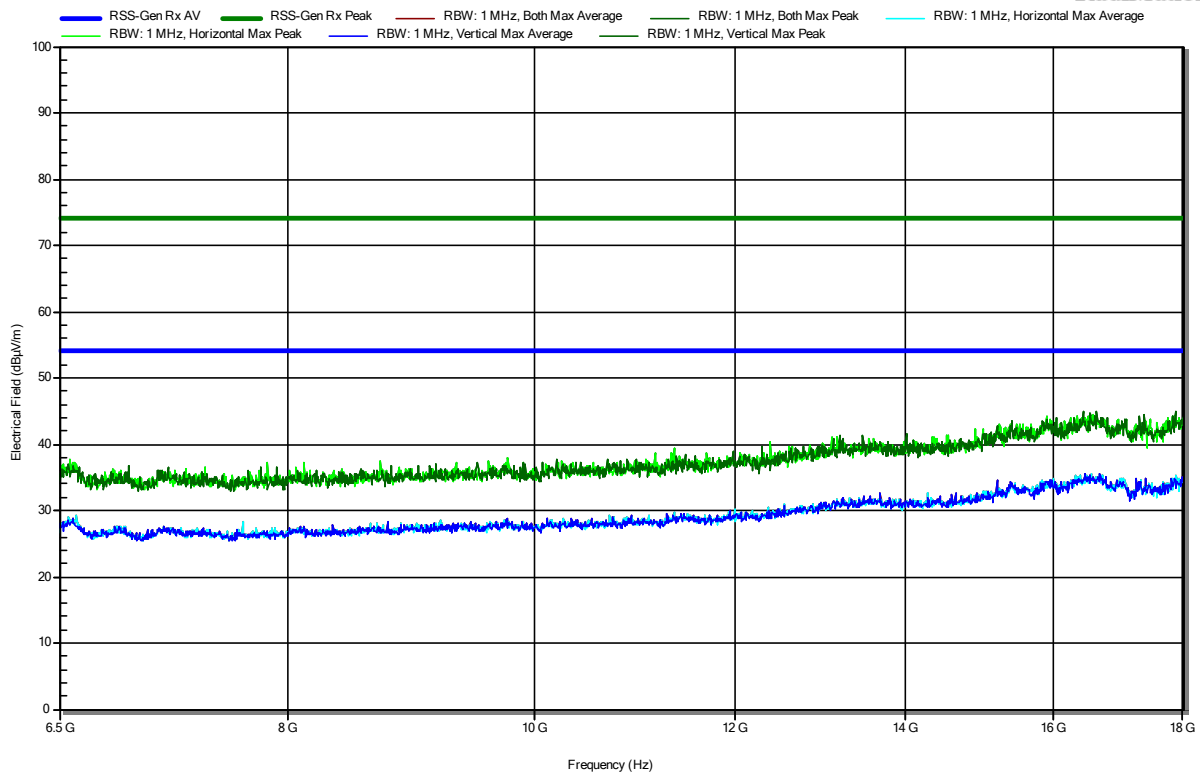
Frequency 1.28 GHz	Peak 37.27 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -36.73 dB	Peak Status Pass	Polarization Vertical
Frequency 1.28 GHz	Average 33.43 dBμV/m	Average Limit 53.98 dBμV/m	Average Difference -20.55 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1881
 Applicant: u-blox Malmö AB
 Model Description: Host-based multiradio module
 Model: MAYA-W271-00B
 Test Sample ID: 43093
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Rx; IEEE 802.15.4, CH 18, 2440
 Test Date: 2023-07-27

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== END OF TEST REPORT ==