

3.5 Test Conditions and Results - AC powerline conducted emissions

3.5.1 Information

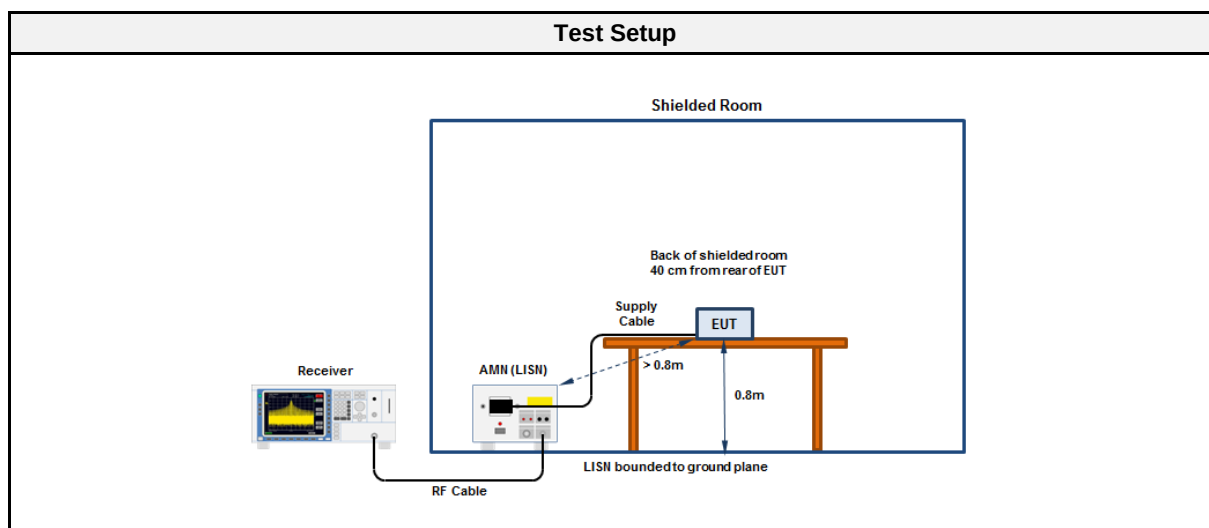
Test Information	
Reference	FCC § 15.207; ISED RSS-247, Issue 2 (section 3.1)
Measurement Method	ANSI C63.10 6.2
Measurement Uncertainty	± 3.82 dB
Operator	Florian Voigt
Date	2022-08-29

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

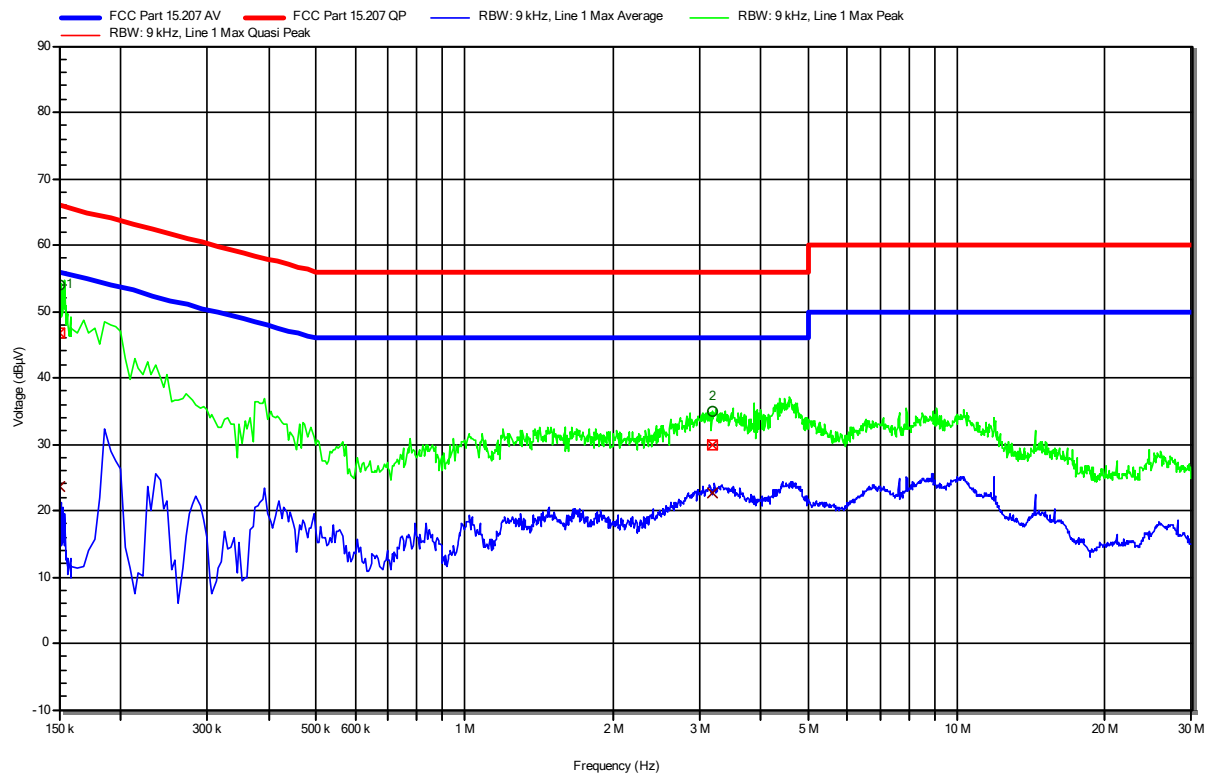
Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESR7	EF00943	2022-08	2023-08
Pulse Limiter	R&S	ESH3-Z2	EF01222	2021-07	2023-07
LISN	Schwarzbeck	NSLK 8127 RC	EF01592	2021-07	2023-07

Conducted emissions at the mains power port according to 47 CFR Part 15.247, RSS-247

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Test Date: 2022-08-29
 Operating Conditions: ambient temperature: 23 °Celsius
 power input: 5.0 V DC
 LISN: Schwarzbeck NSLK 8127 RC L1
 Operational Mode: Tx; LE; 2440 MHz; 2-GFSK, Coding S8, PRBS9, Payload length = 250
 Applied to Port: Mains

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	150 kHz	46.73 dBµV	66 dBµV	-19.27 dB	Pass	Line 1
2	3.179 MHz	29.82 dBµV	56 dBµV	-26.18 dB	Pass	Line 1

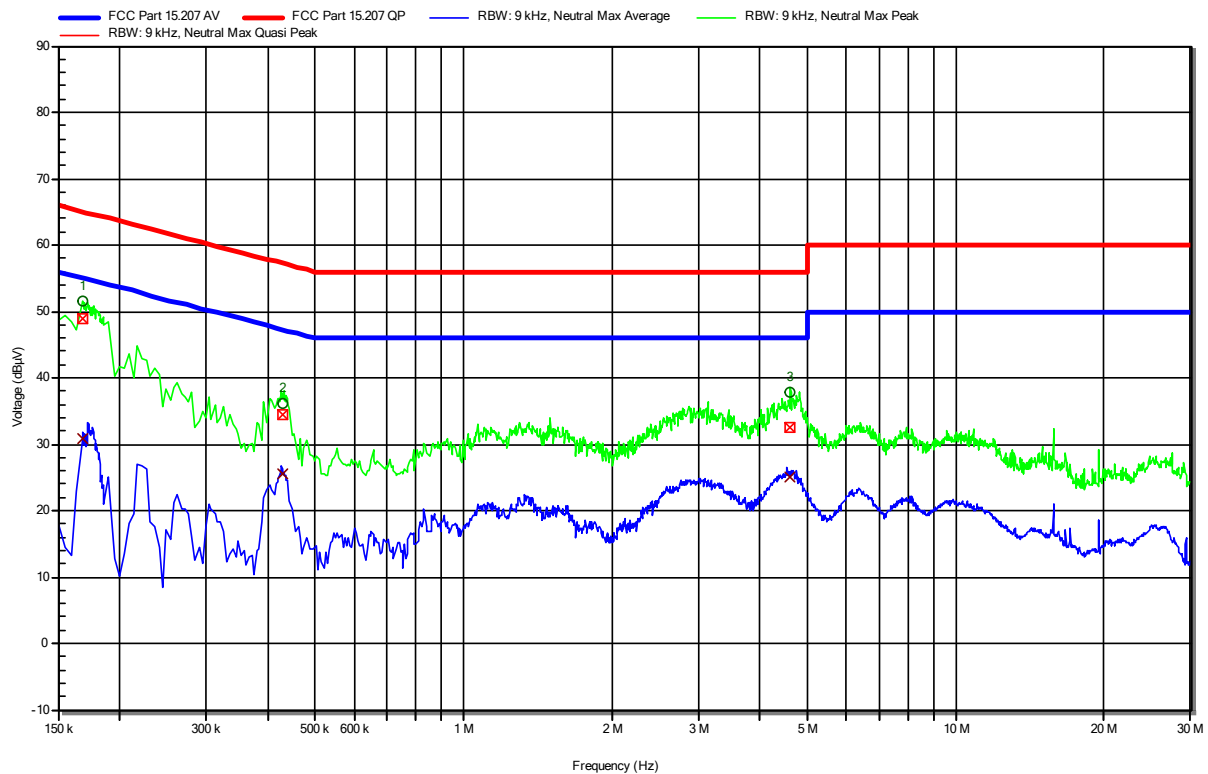
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	150 kHz	23.69 dBµV	56 dBµV	-32.31 dB	Pass	Line 1
2	3.179 MHz	22.71 dBµV	46 dBµV	-23.29 dB	Pass	Line 1

Conducted emissions at the mains power port according to 47 CFR Part 15.247, RSS-247

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Test Date: 2022-08-29
 Operating Conditions: ambient temperature: 23 °Celsius
 power input: 5.0 V DC
 LISN: Schwarzbeck NSLK 8127
 Operational Mode: Tx; LE; 2440 MHz; 2-GFSK, Coding S8, PRBS9, Payload length = 250
 Applied to Port: Mains

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	168 kHz	48.81 dBµV	65.06 dBµV	-16.25 dB	Pass	Neutral
2	429 kHz	34.56 dBµV	57.27 dBµV	-22.72 dB	Pass	Neutral
3	4.614 MHz	32.52 dBµV	56 dBµV	-23.48 dB	Pass	Neutral

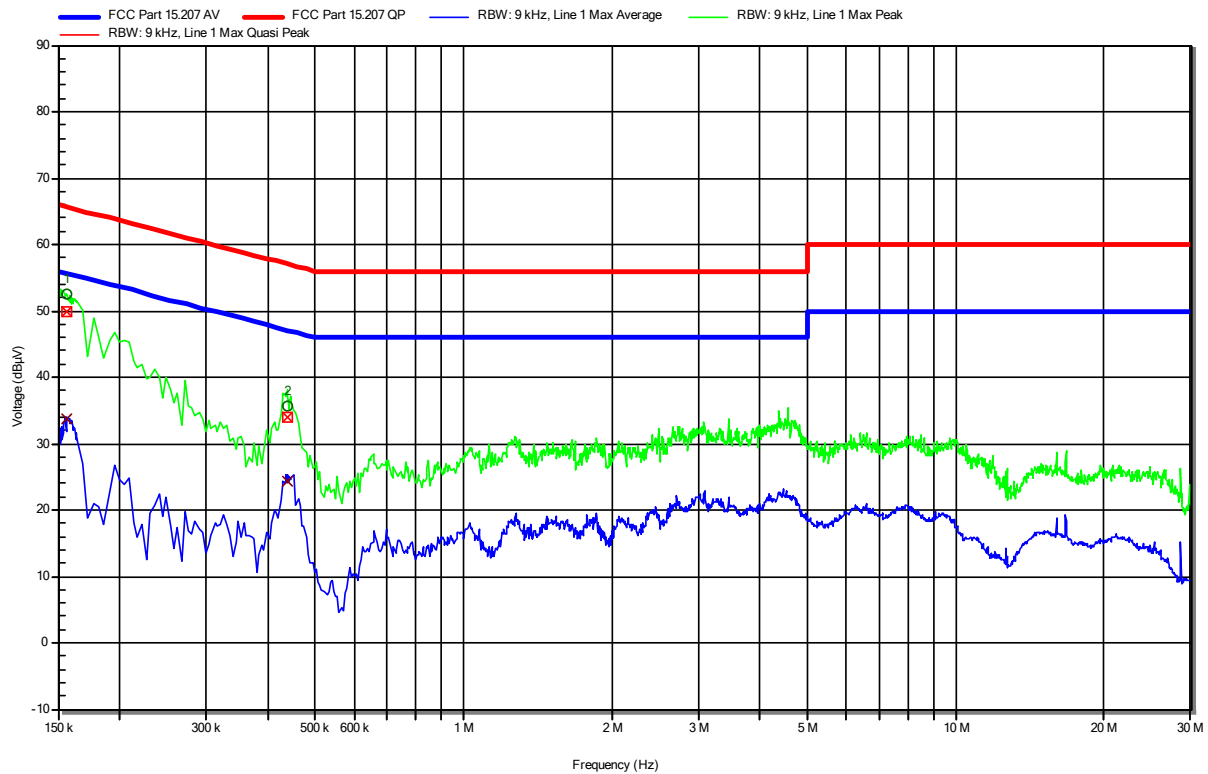
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	168 kHz	30.86 dBµV	55.06 dBµV	-24.2 dB	Pass	Neutral
2	429 kHz	25.52 dBµV	47.27 dBµV	-21.76 dB	Pass	Neutral
3	4.614 MHz	25.06 dBµV	46 dBµV	-20.94 dB	Pass	Neutral

Conducted emissions at the mains power port according to RSS-247

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Test Date: 2022-08-29
 Operating Conditions: ambient temperature: 23 °Celsius
 power input: 5.0 V DC
 LISN: Schwarzbeck NSLK 8127 RC L1
 Operational Mode: RX; LE; 2440 MHz;
 Applied to Port: Mains

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	156.75 kHz	50 dBμV	65.63 dBμV	-15.64 dB	Pass	Line 1
2	438 kHz	33.89 dBμV	57.1 dBμV	-23.21 dB	Pass	Line 1

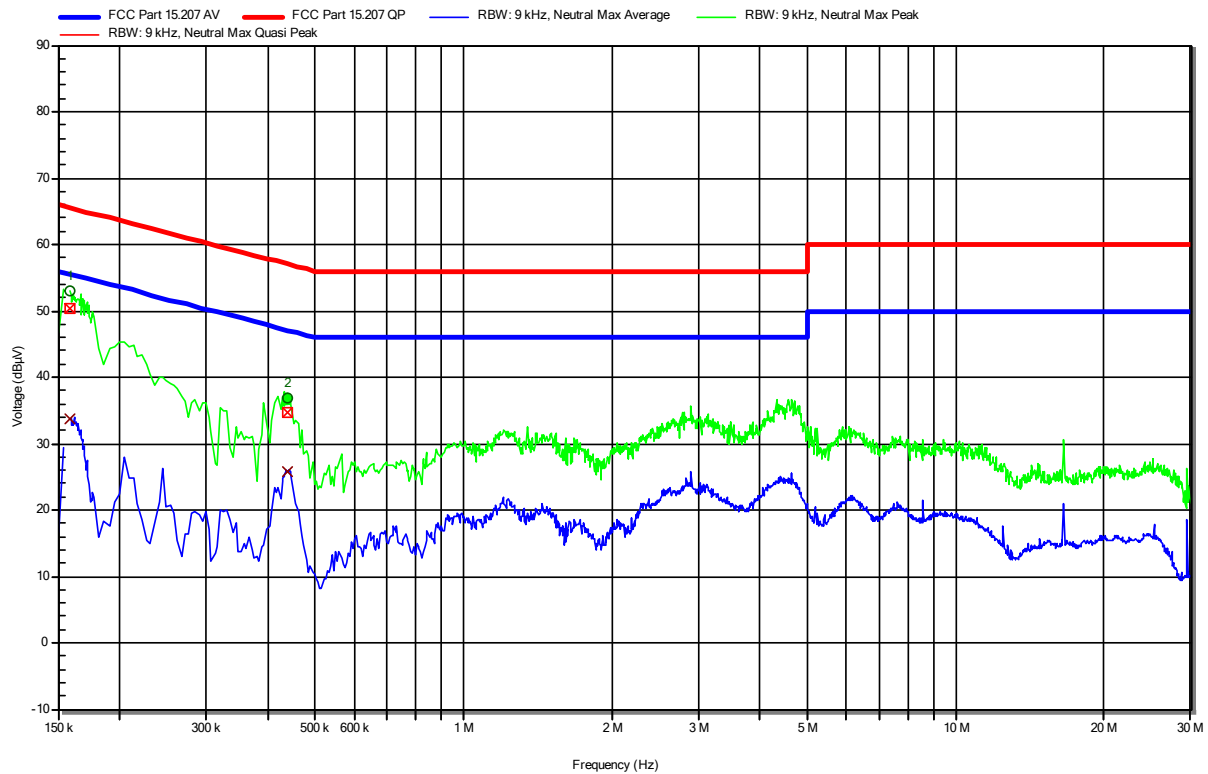
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	156.75 kHz	33.85 dBμV	55.63 dBμV	-21.79 dB	Pass	Line 1
2	438 kHz	24.36 dBμV	47.1 dBμV	-22.74 dB	Pass	Line 1

Conducted emissions at the mains power port according to RSS-247

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Test Date: 2022-08-29
 Operating Conditions: ambient temperature: 23 °Celsius
 power input: 5.0 V DC
 LISN: Schwarzbeck NSLK 8127
 Operational Mode: RX; LE; 2440 MHz;
 Applied to Port: Mains

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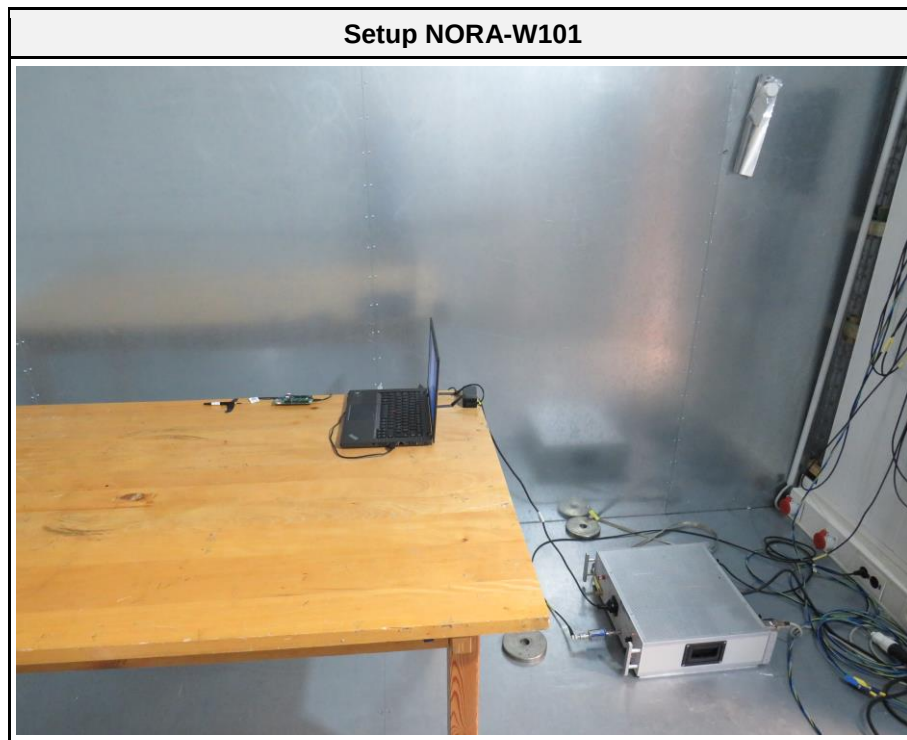
RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	159 kHz	50.43 dBμV	65.52 dBμV	-15.09 dB	Pass	Neutral
2	438 kHz	34.7 dBμV	57.1 dBμV	-22.4 dB	Pass	Neutral

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	159 kHz	33.84 dBμV	55.52 dBμV	-21.68 dB	Pass	Neutral
2	438 kHz	25.76 dBμV	47.1 dBμV	-21.34 dB	Pass	Neutral

3.5.5 Setup Photos



3.6 Test Conditions and Results - Band-edge compliance

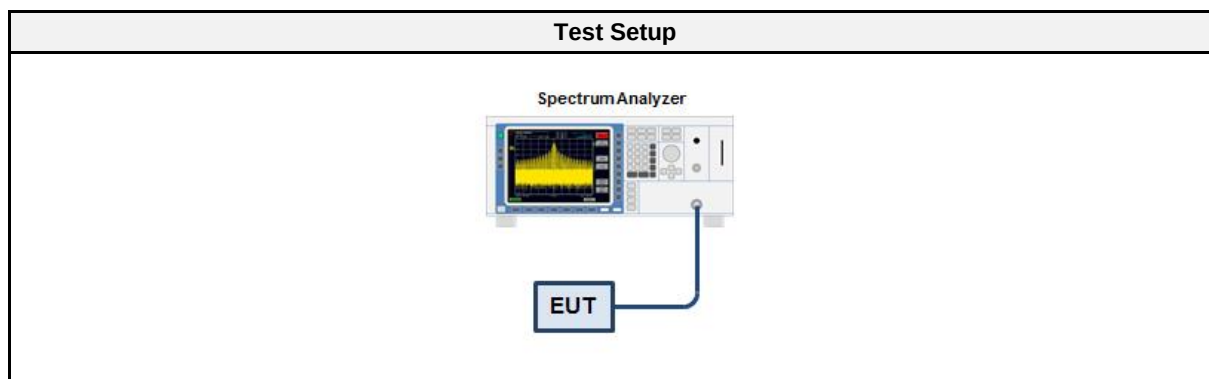
3.6.1 Information

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	Dhamia Almozani
Date	2022-08-16

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 26	EF01003	2022-07	2023-07
Cable (diverse)	– (diverse)	– (diverse)	EF00779 CAABZ	2022-02	2023-02

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 1 Mbps				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
GFSK	2402	-29.538	-20	PASS
GFSK	2480	-28.784	-20	PASS

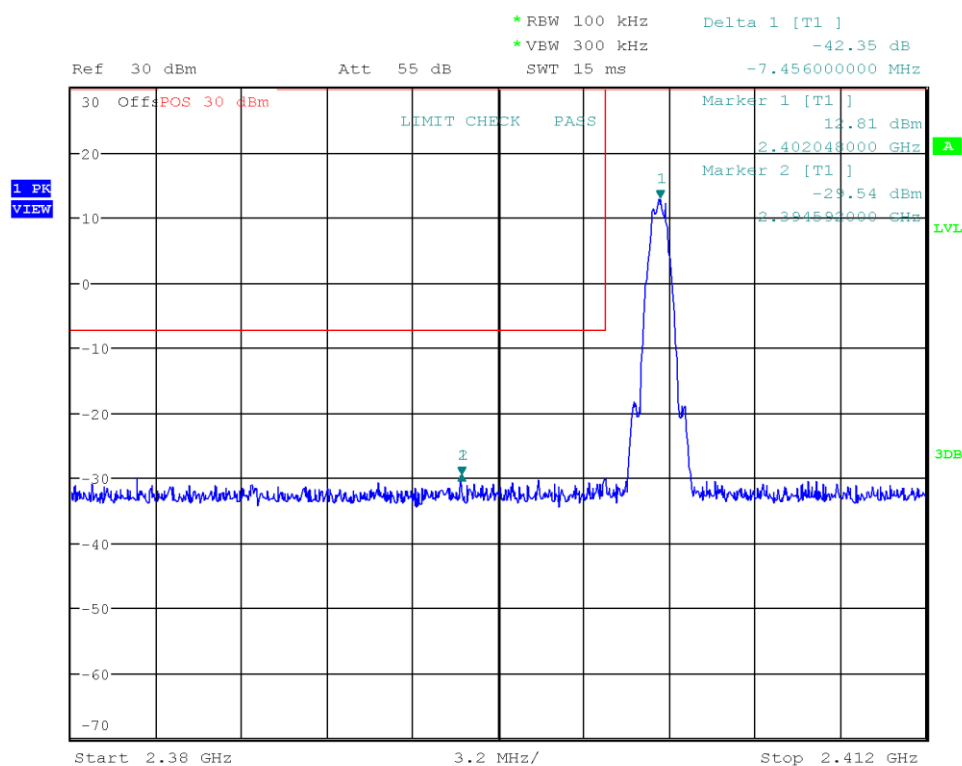
Test Results 2 Mbps				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
GFSK	2402	-28.946	-20	PASS
GFSK	2480	-29.458	-20	PASS

Test Results Coded PHY S2 (500 kb/s)				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
GFSK	2402	-29.226	-20	PASS
GFSK	2480	-29.97	-20	PASS

Test Results Coded PHY S8 (128 kb/s)				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
GFSK	2402	-29.51	-20	PASS
GFSK	2480	-29.547	-20	PASS

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate=1 Mbps, PRBS9, Payload length = 250
 Band-edge: Lower
 In-band Frequency [MHz]: 2402.048
 Max. in-band Level [dBm/100 kHz]: 12.809
 Out-of-band Frequency [MHz]: 2394.592
 Max. out-of-band Level [dBm/100 kHz]: -29.538
 Attenuation [dB]: -42.35



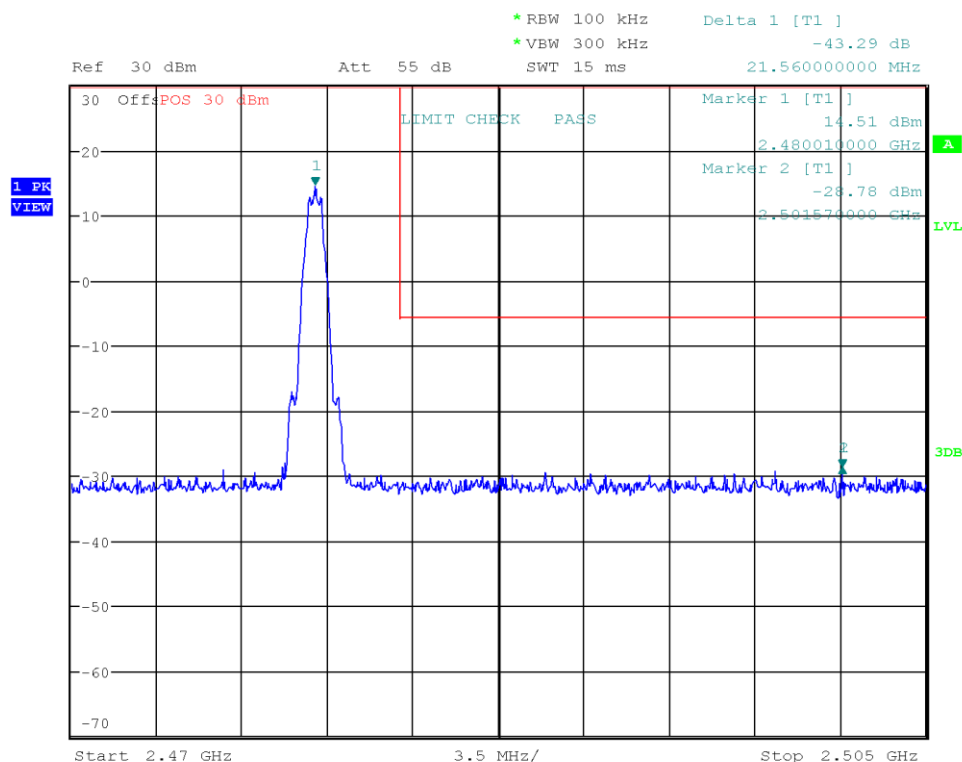
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Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate=1 Mbps, PRBS9, Payload length = 250
 Band-edge: Upper
 In-band Frequency [MHz]: 2480.01
 Max. in-band Level [dBm/100 kHz]: 14.507
 Out-of-band Frequency [MHz]: 2501.57
 Max. out-of-band Level [dBm/100 kHz]: -28.784
 Attenuation [dB]: -43.29



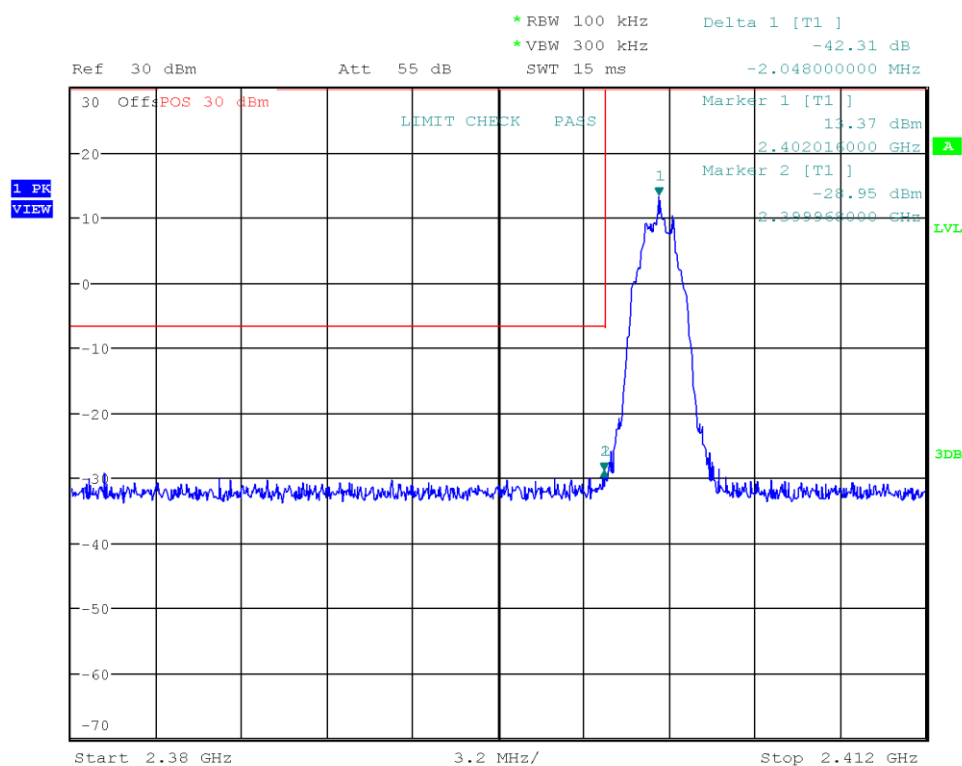
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Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate=2 Mbps, PRBS9, Payload length = 250
 Band-edge: Lower
 In-band Frequency [MHz]: 2402.016
 Max. in-band Level [dBm/100 kHz]: 13.365
 Out-of-band Frequency [MHz]: 2399.968
 Max. out-of-band Level [dBm/100 kHz]: -28.946
 Attenuation [dB]: -42.31



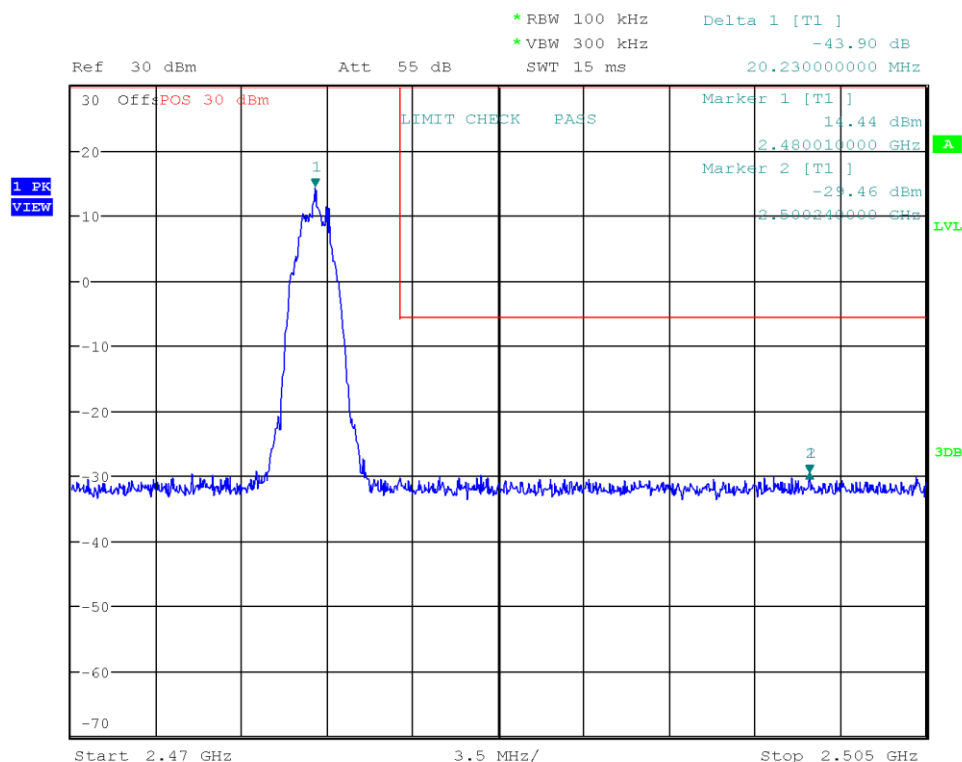
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Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate=2 Mbps, PRBS9, Payload length = 250
 Band-edge: Upper
 In-band Frequency [MHz]: 2480.01
 Max. in-band Level [dBm/100 kHz]: 14.44
 Out-of-band Frequency [MHz]: 2500.24
 Max. out-of-band Level [dBm/100 kHz]: -29.458
 Attenuation [dB]: -43.9



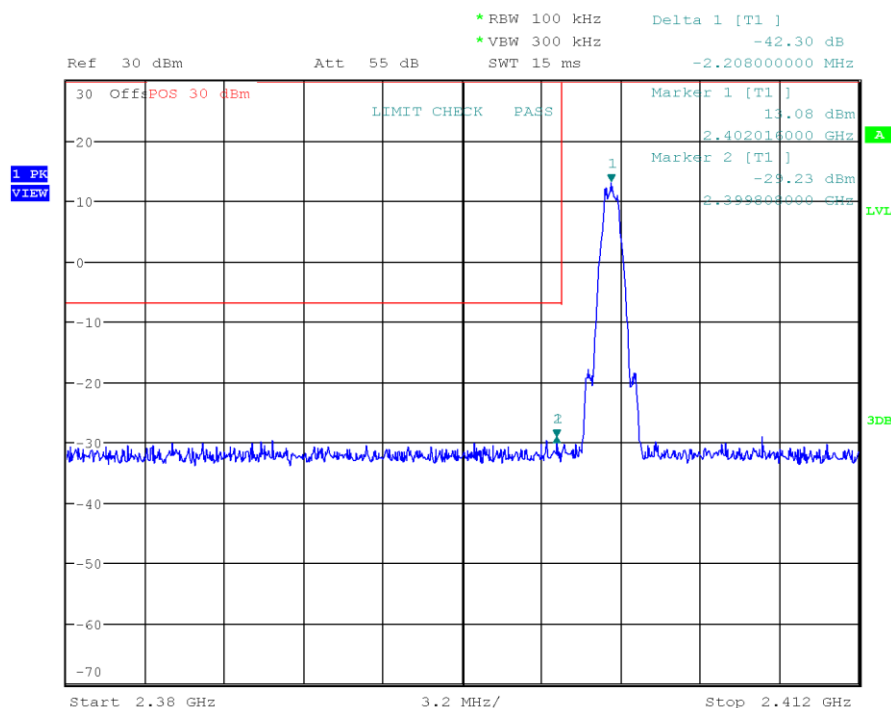
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Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate=Coded PHY S2 (500 kb/s) , PRBS9, Payload length = 250
 Band-edge: Lower
 In-band Frequency [MHz]: 2402.016
 Max. in-band Level [dBm/100 kHz]: 13.078
 Out-of-band Frequency [MHz]: 2399.808
 Max. out-of-band Level [dBm/100 kHz]: -29.226
 Attenuation [dB]: -42.3



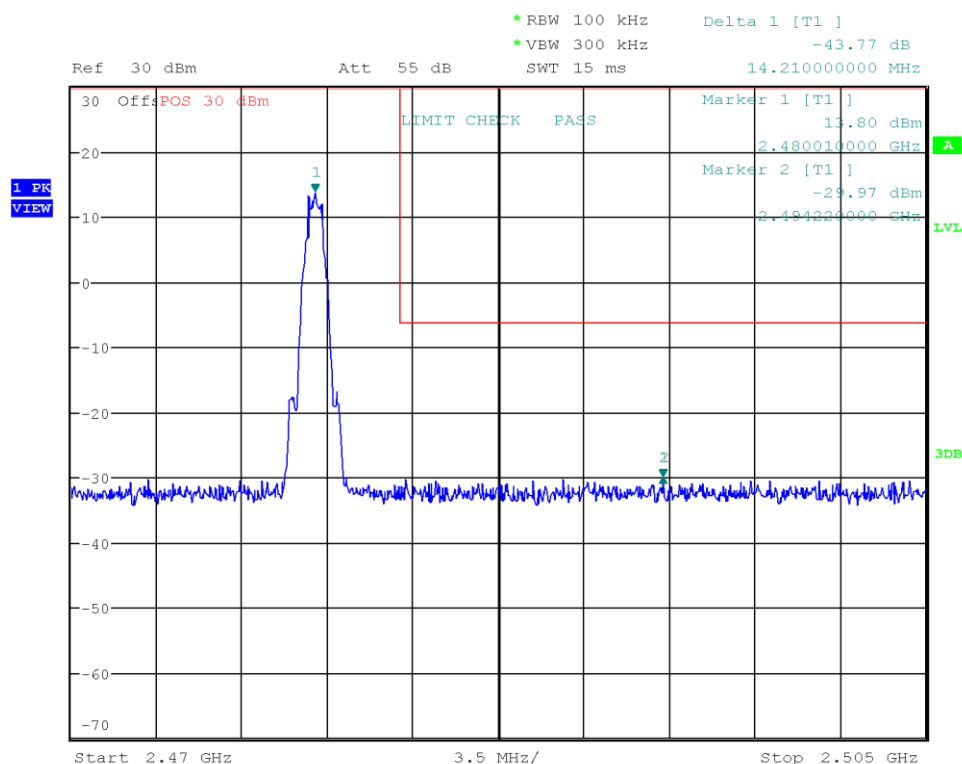
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Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate=Coded PHY S2 (500 kb/s) , PRBS9, Payload length = 250
 Band-edge Upper
 In-band Frequency [MHz]: 2480.01
 Max. in-band Level [dBm/100 kHz]: 13.796
 Out-of-band Frequency [MHz]: 2494.22
 Max. out-of-band Level [dBm/100 kHz]: -29.97
 Attenuation [dB]: -43.77



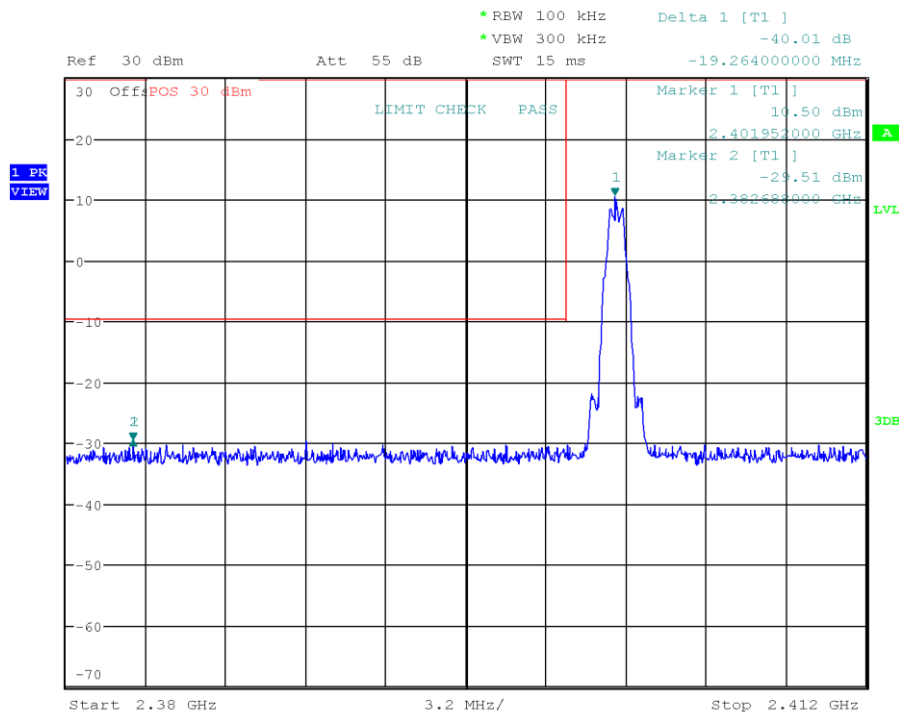
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Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate=Coded PHY S8 (128 kb/s) , PRBS9, Payload length = 250
 Band-edge: Lower
 In-band Frequency [MHz]: 2401.952
 Max. in-band Level [dBm/100 kHz]: 10.498
 Out-of-band Frequency [MHz]: 2382.688
 Max. out-of-band Level [dBm/100 kHz]: -29.51
 Attenuation [dB]: -40.01



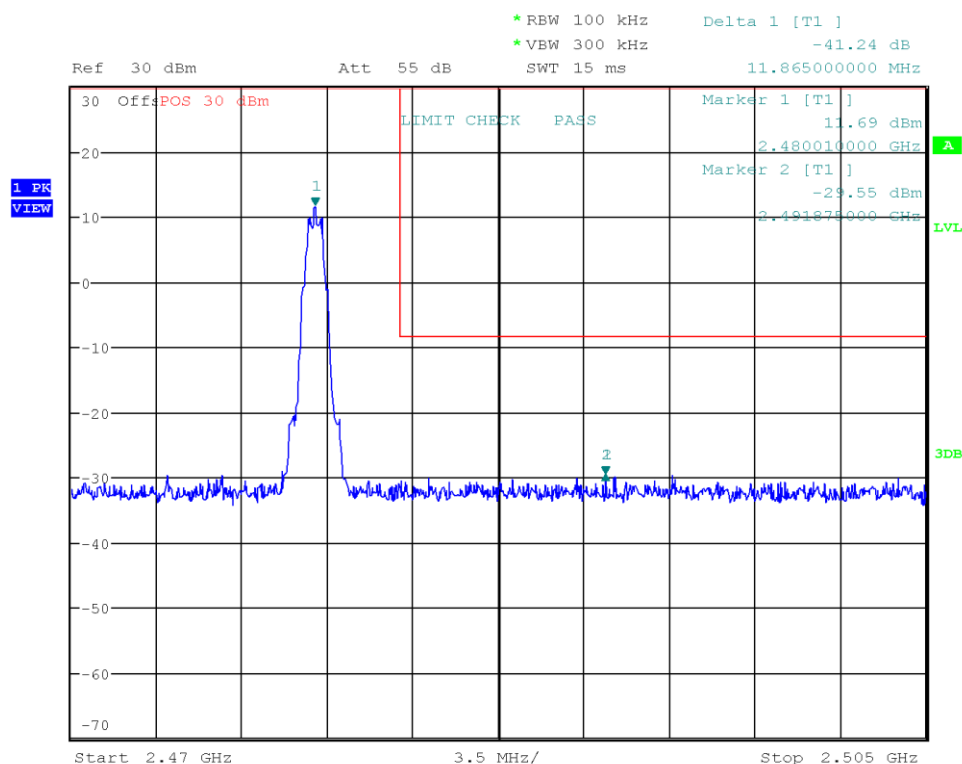
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Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate=Coded PHY S8 (128 kb/s) , PRBS9, Payload length = 250
 Band-edge: Upper
 In-band Frequency [MHz]: 2480.01
 Max. in-band Level [dBm/100 kHz]: 11.691
 Out-of-band Frequency [MHz]: 2491.875
 Max. out-of-band Level [dBm/100 kHz]: -29.547
 Attenuation [dB]: -41.24



Date: 16.AUG.2022 13:48:14

Test Report No.: G0M-2205-1454-TFC247BL-V02

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

3.7 Test Conditions and Results - Conducted spurious emissions

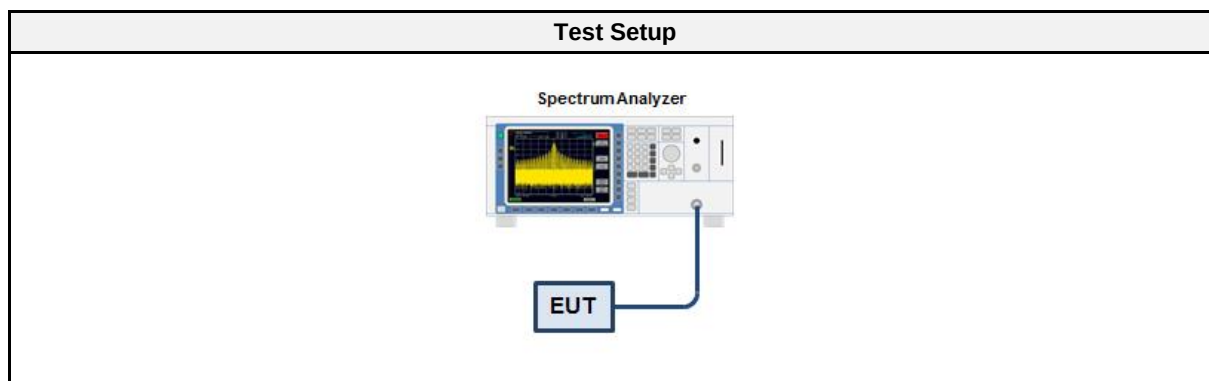
3.7.1 Information

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	Dr.-Ing. Dhamia Almozani
Date	2022-08-16

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 26	EF01003	2022-07	2023-07
Cable (diverse)	– (diverse)	– (diverse)	EF00779 CAABZ	2022-02	2023-02

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 1 Mbps		
Mode	Channel [MHz]	Verdict
GFSK	2402	PASS
GFSK	2440	PASS
GFSK	2480	PASS

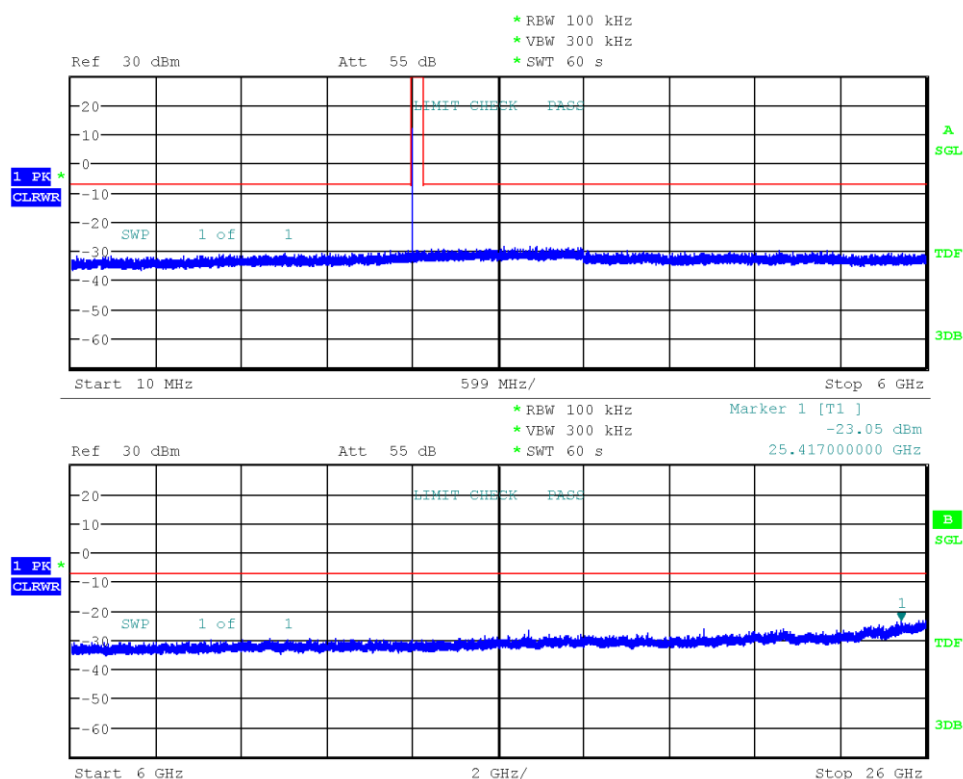
Test Results 2 Mbps		
Mode	Channel [MHz]	Verdict
GFSK	2402	PASS
GFSK	2440	PASS
GFSK	2480	PASS

Test Results Coded PHY S2 (500 kb/s)		
Mode	Channel [MHz]	Verdict
GFSK	2402	PASS
GFSK	2440	PASS
GFSK	2480	PASS

Test Results Coded PHY S8 (128 kb/s)		
Mode	Channel [MHz]	Verdict
GFSK	2402	PASS
GFSK	2440	PASS
GFSK	2480	PASS

Conducted Spurious Emissions

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate= 1 Mbps, PRBS9, Payload length = 250
 Max. in-band Frequency [MHz]: 2402.0
 Max. in-band Level [dBm/100 kHz]: 12.7
 Out-of-band Limit [dBm/100 kHz]: -7.3



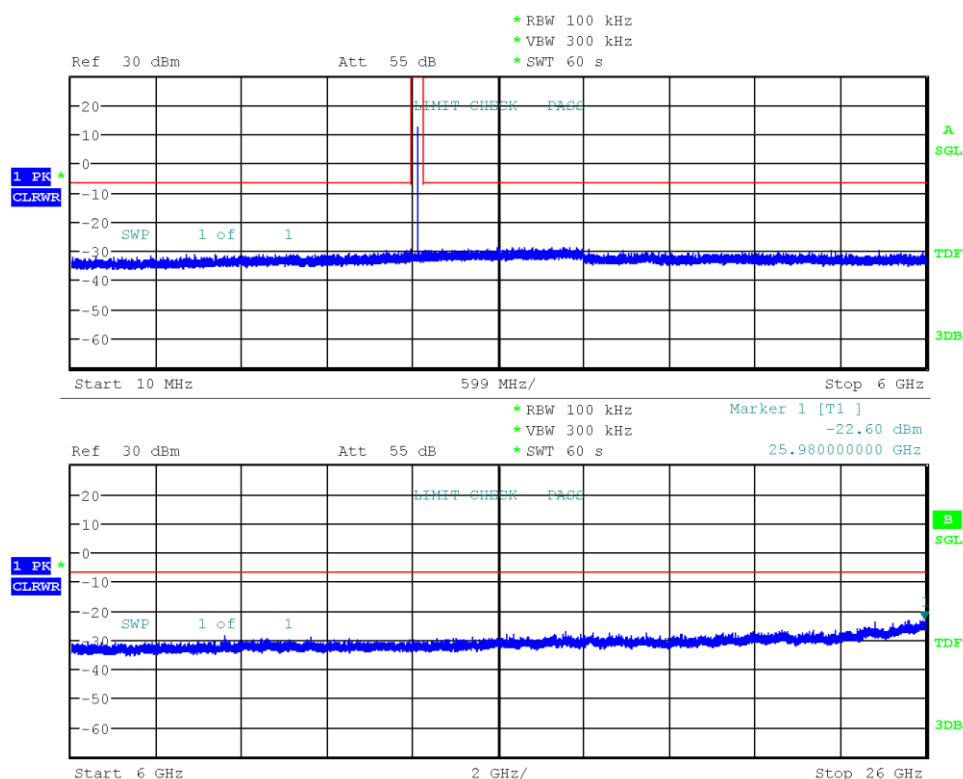
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Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Conducted Spurious Emissions

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate= 1 Mbps, PRBS9, Payload length = 250
 Max. in-band Frequency [MHz]: 2440.0
 Max. in-band Level [dBm/100 kHz]: 13.7
 Out-of-band Limit [dBm/100 kHz]: -6.3



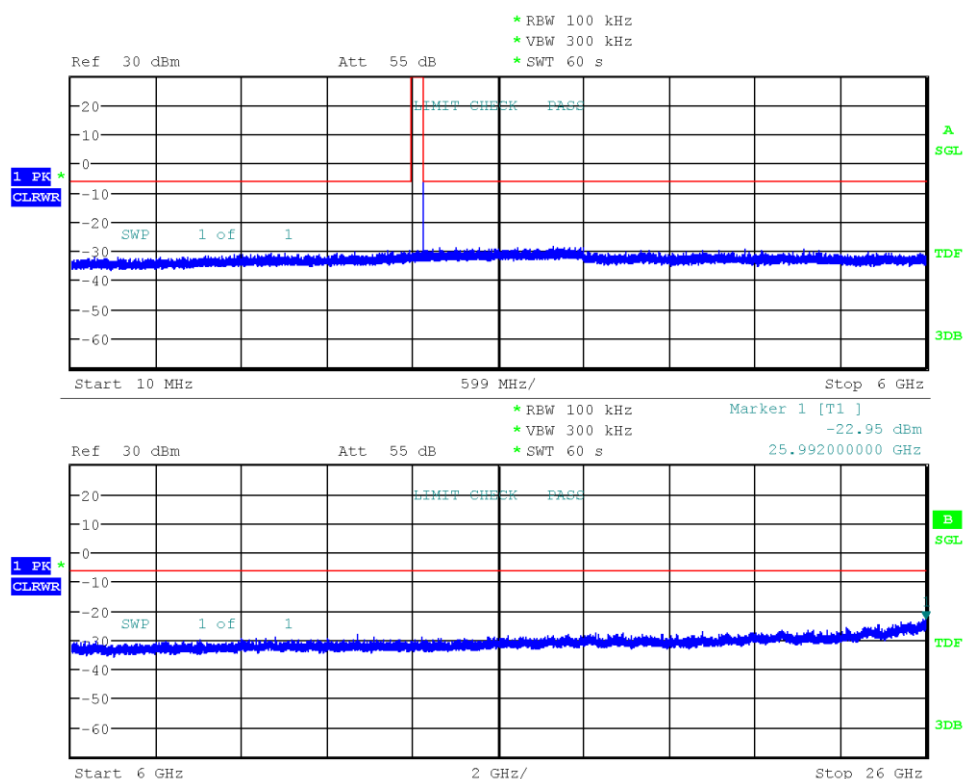
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Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Conducted Spurious Emissions

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate= 1 Mbps, PRBS9, Payload length = 250
 Max. in-band Frequency [MHz]: 2480.0
 Max. in-band Level [dBm/100 kHz]: 14.2
 Out-of-band Limit [dBm/100 kHz]: -5.8



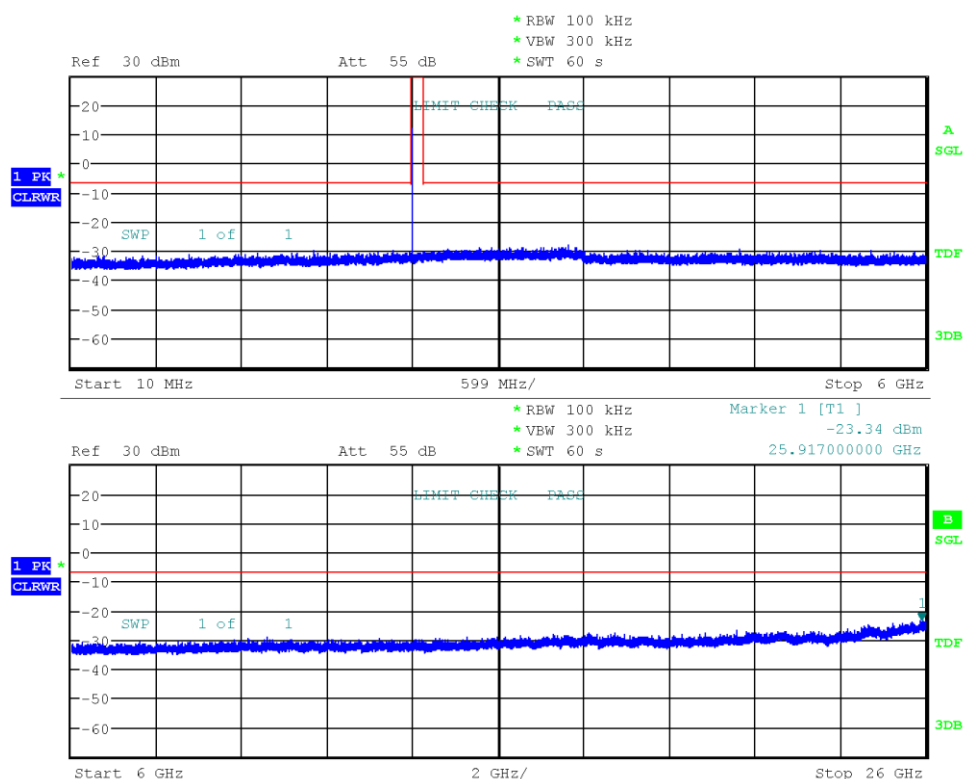
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Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Conducted Spurious Emissions

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate= 2 Mbps, PRBS9, Payload length = 250
 Max. in-band Frequency [MHz]: 2402.0
 Max. in-band Level [dBm/100 kHz]: 13.4
 Out-of-band Limit [dBm/100 kHz]: -6.6



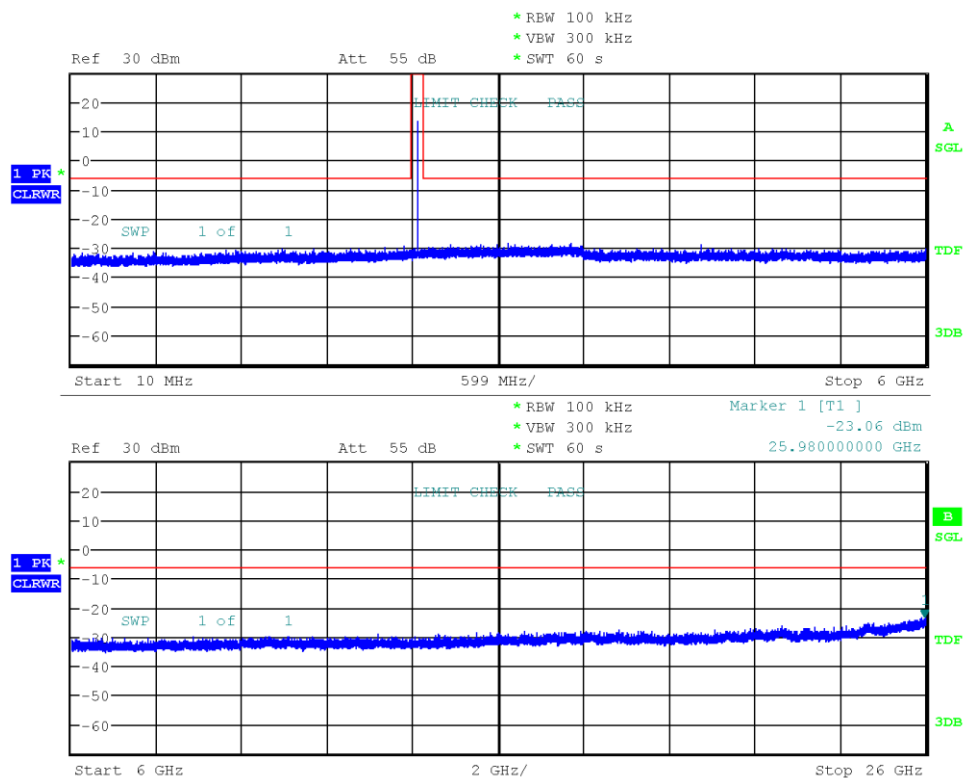
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Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Conducted Spurious Emissions

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate= 2 Mbps, PRBS9, Payload length = 250
 Max. in-band Frequency [MHz]: 2440.0
 Max. in-band Level [dBm/100 kHz]: 14.1
 Out-of-band Limit [dBm/100 kHz]: -5.9



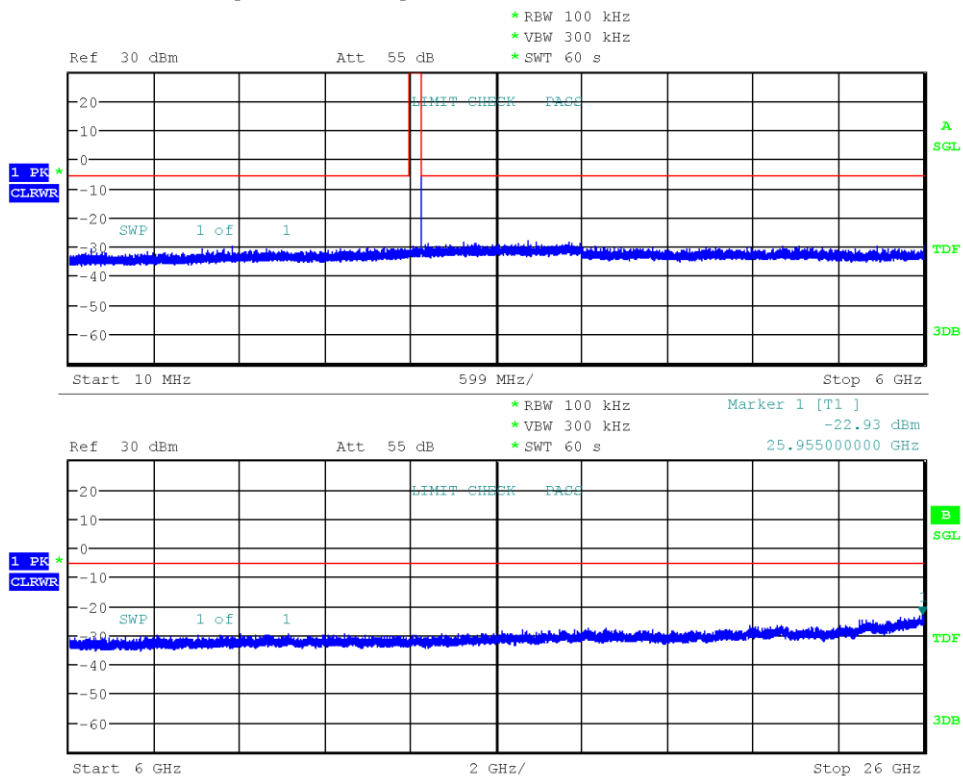
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Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Conducted Spurious Emissions

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate= 2 Mbps, PRBS9, Payload length = 250
 Max. in-band Frequency [MHz]: 2480.0
 Max. in-band Level [dBm/100 kHz]: 14.9
 Out-of-band Limit [dBm/100 kHz]: -5.1

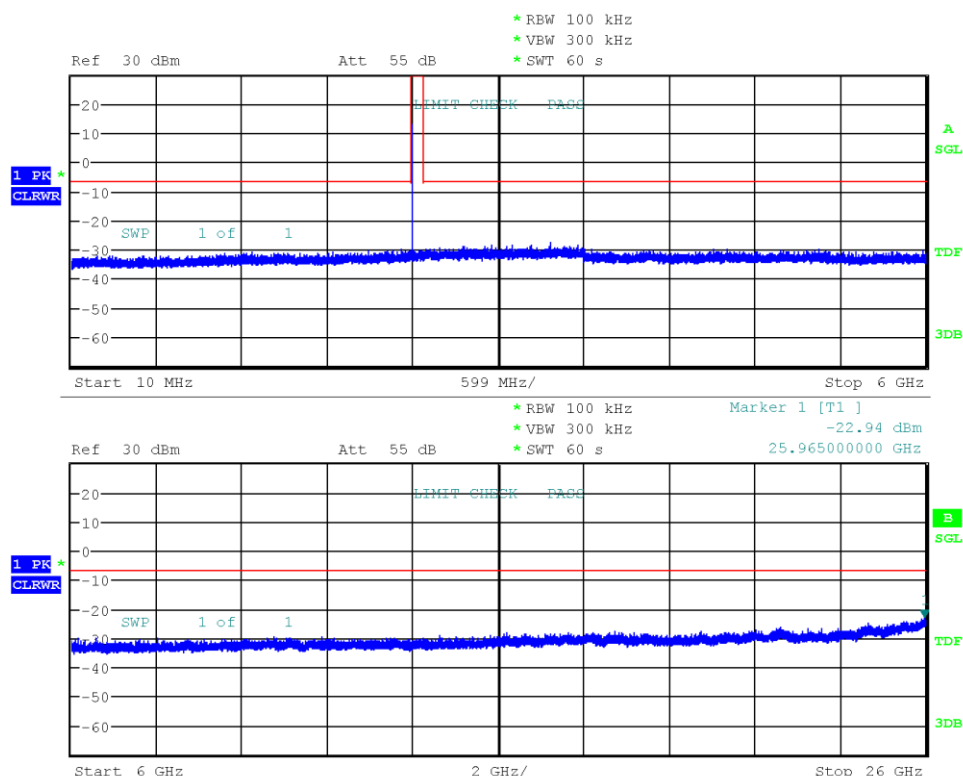


Date: 16.AUG.2022 14:26:06

Conducted Spurious Emissions

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate= Coded PHY S2 (500 kb/s) , PRBS9, Payload length = 250

Max. in-band Frequency [MHz]: 2402.0
 Max. in-band Level [dBm/100 kHz]: 13.4
 Out-of-band Limit [dBm/100 kHz]: -6.6



Date: 16.AUG.2022 14:32:40

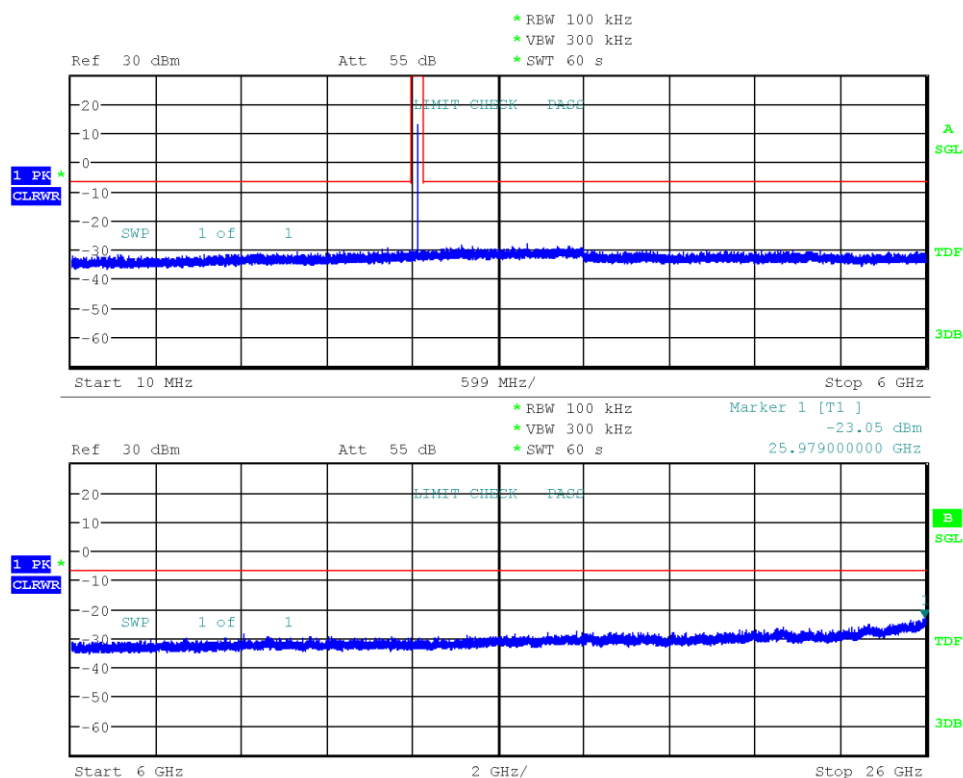
Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Conducted Spurious Emissions

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate= Coded PHY S2 (500 kb/s) , PRBS9, Payload length = 250

Max. in-band Frequency [MHz]: 2440.0
 Max. in-band Level [dBm/100 kHz]: 13.7
 Out-of-band Limit [dBm/100 kHz]: -6.3



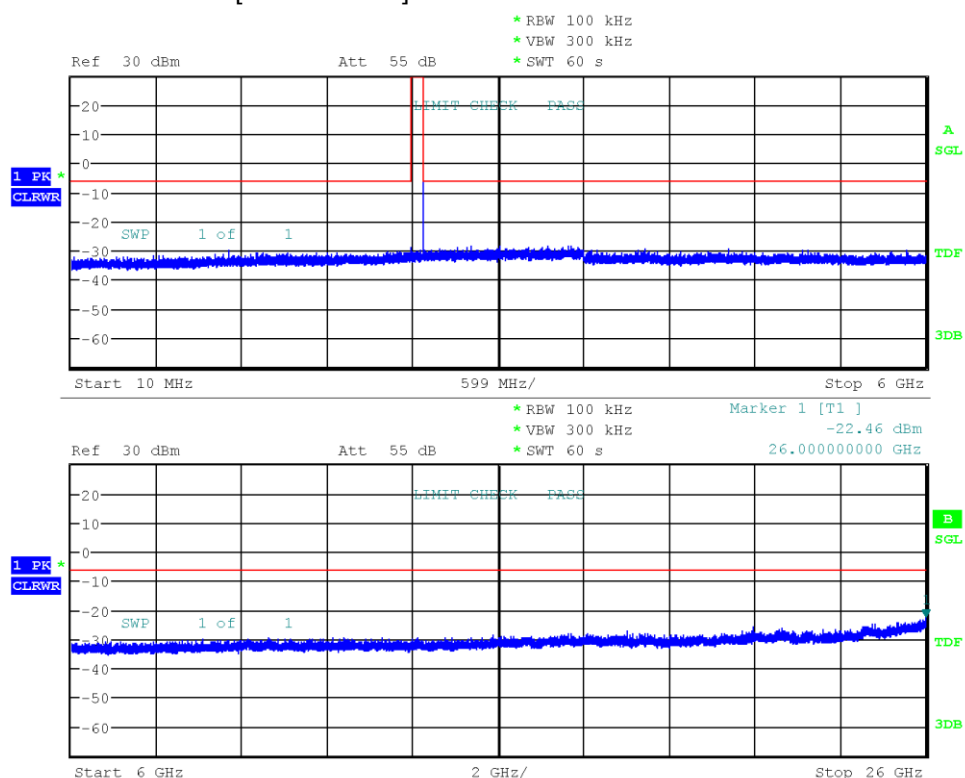
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Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Conducted Spurious Emissions

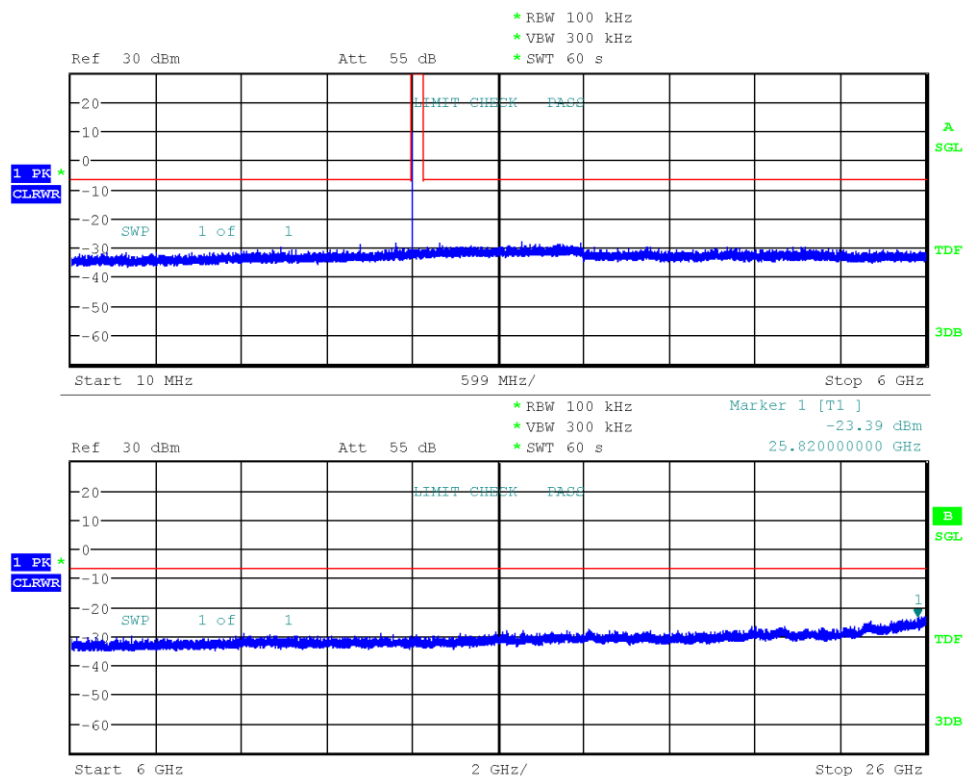
Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate= Coded PHY S2 (500 kb/s) , PRBS9, Payload length = 250
 Max. in-band Frequency [MHz]: 2480.0
 Max. in-band Level [dBm/100 kHz]: 14.2
 Out-of-band Limit [dBm/100 kHz]: -5.8



Date: 16.AUG.2022 14:40:51

Conducted Spurious Emissions

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate= Coded PHY S8 (128 kb/s) , PRBS9, Payload length = 250
 Max. in-band Frequency [MHz]: 2402.0
 Max. in-band Level [dBm/100 kHz]: 13.2
 Out-of-band Limit [dBm/100 kHz]: -6.8



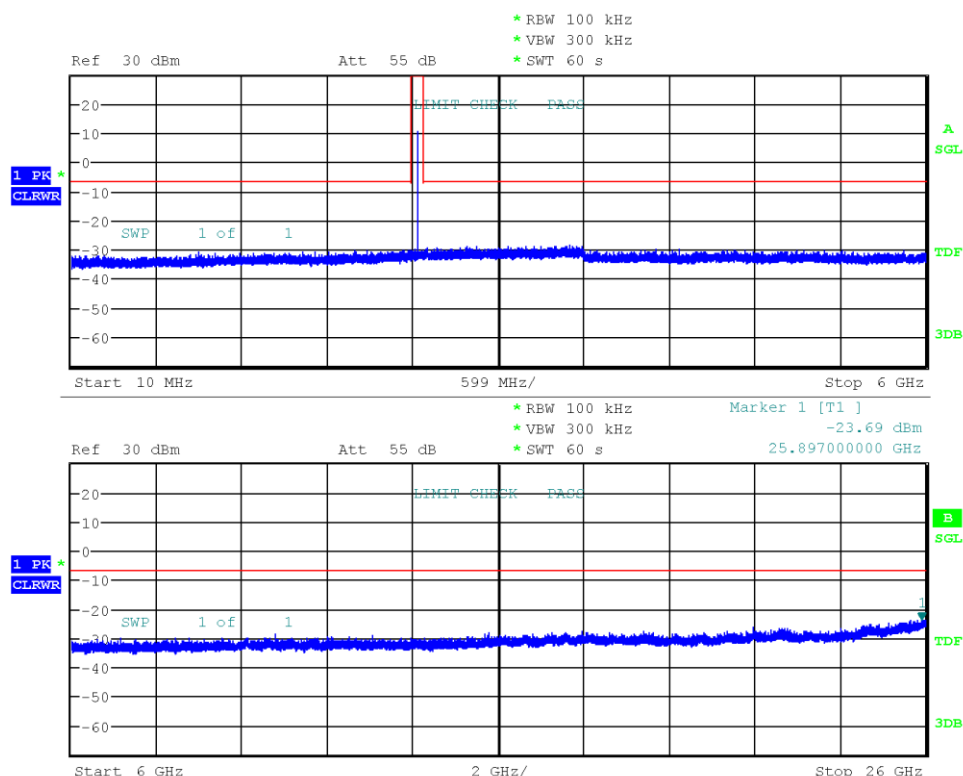
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Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Conducted Spurious Emissions

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate= Coded PHY S8 (128 kb/s) , PRBS9, Payload length = 250
 Max. in-band Frequency [MHz]: 2440.0
 Max. in-band Level [dBm/100 kHz]: 13.4
 Out-of-band Limit [dBm/100 kHz]: -6.6



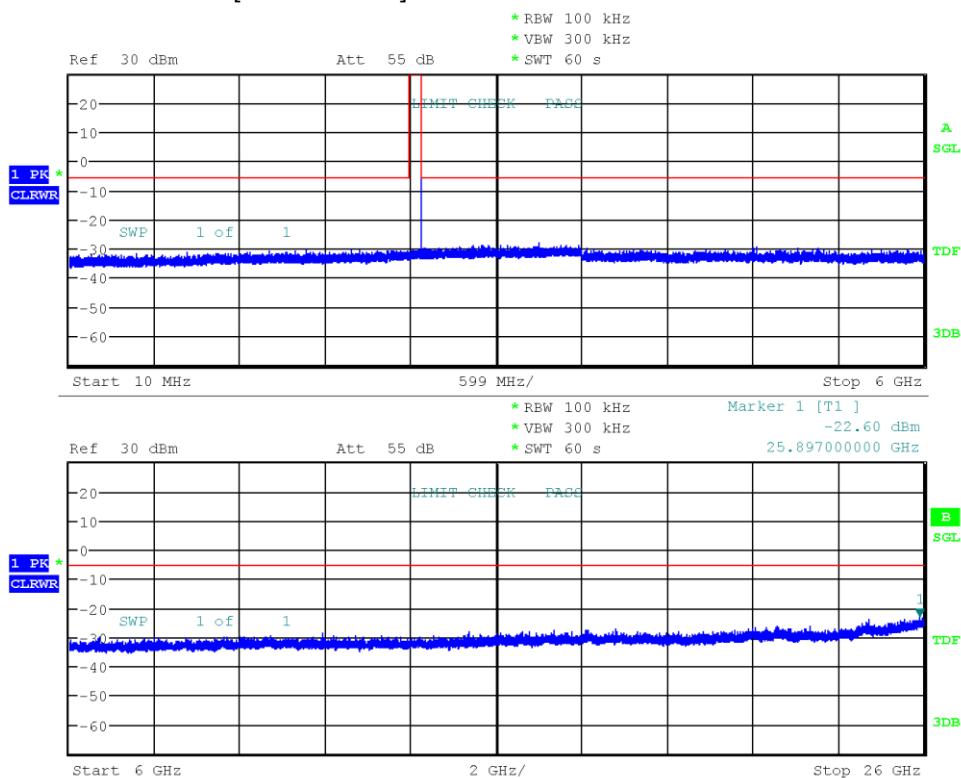
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Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Conducted Spurious Emissions

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40677
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Dhamia Almozani
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-08-16
 Note: Data rate= Coded PHY S8 (128 kb/s) , PRBS9, Payload length = 250
 Max. in-band Frequency [MHz]: 2480.0
 Max. in-band Level [dBm/100 kHz]: 14.4
 Out-of-band Limit [dBm/100 kHz]: -5.6



Date: 16.AUG.2022 14:58:56

Test Report No.: G0M-2205-1454-TFC247BL-V02

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

3.8 Test Conditions and Results - Transmitter radiated emissions

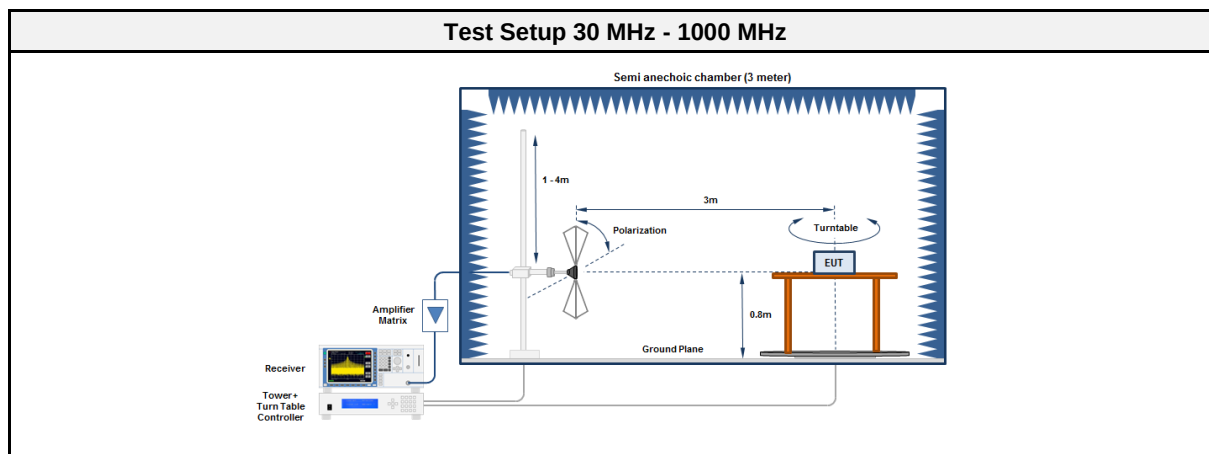
3.8.1 Information

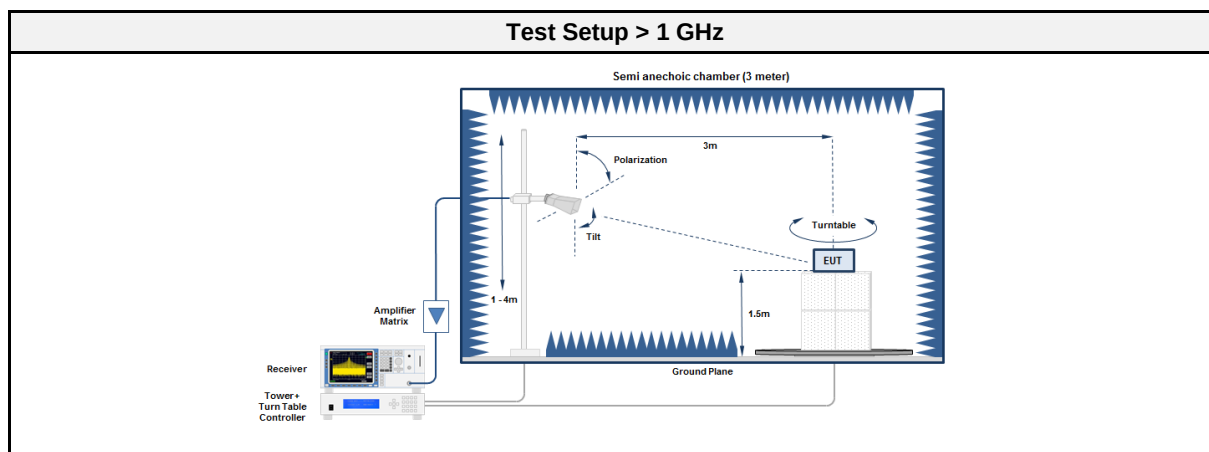
Test Information	
Reference	FCC § 15.247(d); FCC § 15.209; ISSED RSS-Gen, Issue 5 A2 (section 6.13)
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6, 11.12
Operator	Florian Voigt; Radwan Jaafar; Odai Qawasmeh
Date	2022-08-03 - 2022-08-25

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	2021-02	2024-02
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2021-07	2023-01
Antenna	R&S	HK 116	EF00030	2021-05	2024-05
Antenna	R&S	HL 223	EF00187	2022-06	2025-06

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC2	EF01616	2021-09 2022-10	2022-09 2023-10
Spectrum analyzer	R&S	FSW43	EF00896	2022-08	2023-08
Horn 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	2023-06

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

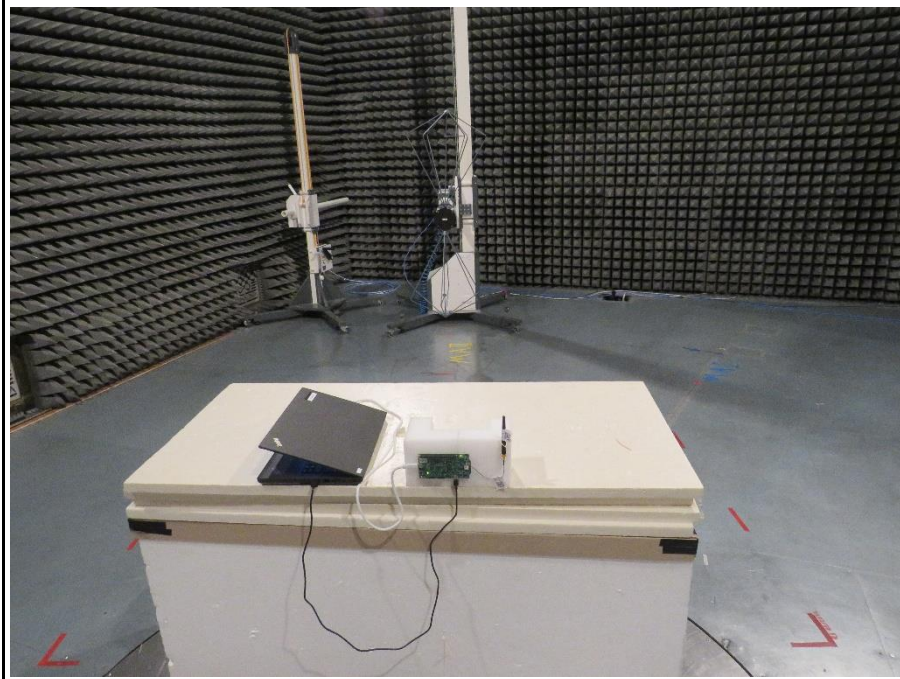
Test Results - NORA-W101							
Mode	Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
Coded PHY S8	2402	2389.8	52.20	pk	ver	74.00	-21.80
Coded PHY S8	2402	2389.8	41.71	avg	ver	54.00	-12.29
Coded PHY S8	2402	4803.9	43.50	pk	ver	74.00	-30.50
Coded PHY S8	2402	4803.9	38.24	avg	ver	54.00	-15.76
1 Mbps	2402	2389.6	51.87	pk	hor	74.00	-22.13
1 Mbps	2402	2389.6	43.94	avg	hor	54.00	-10.06
1 Mbps	2402	4803.9	45.85	pk	ver	74.00	-28.15
1 Mbps	2402	4803.9	41.71	avg	ver	54.00	-12.29
2 Mbps	2402	4804	44.31	pk	ver	74.00	-29.69
2 Mbps	2402	4804	37.60	avg	ver	54.00	-16.40
Coded PHY S8	2440	131.932	24.10	qpk	ver	43.50	-19.47
1 Mbps	2440	4879.9	43.55	pk	hor	74.00	-30.45
1 Mbps	2440	4879.9	39.48	avg	hor	54.00	-14.52
1 Mbps	2440	4880	48.68	pk	ver	74.00	-25.32
1 Mbps	2440	4880	44.96	avg	ver	54.00	-09.04
Coded PHY S2	2440	4880.1	47.64	pk	ver	74.00	-26.36
Coded PHY S2	2440	4880.1	42.19	avg	ver	54.00	-11.81
Coded PHY S8	2480	131.9306	25.40	qpk	ver	43.50	-18.10
Coded PHY S8	2480	2483.5	57.29	pk	hor	74.00	-16.71
Coded PHY S8	2480	2483.5	48.66	avg	hor	54.00	-05.34
Coded PHY S8	2480	2483.7	59.61	pk	ver	74.00	-14.39
Coded PHY S8	2480	2483.7	50.35	avg	ver	54.00	-03.65
Coded PHY S8	2480	4960	47.43	pk	hor	74.00	-26.57
Coded PHY S8	2480	4960	49.26	pk	ver	74.00	-24.74
Coded PHY S8	2480	4960	41.03	avg	hor	54.00	-12.97
Coded PHY S8	2480	4960	44.92	avg	ver	54.00	-09.08
1 Mbps	2480	2483.7	60.72	pk	ver	74.00	-13.28
1 Mbps	2480	2483.7	50.33	avg	ver	54.00	-03.67
1 Mbps	2480	4960	48.85	pk	hor	74.00	-25.15
1 Mbps	2480	4960	50.65	pk	ver	74.00	-23.35
1 Mbps	2480	4960	45.57	avg	hor	54.00	-08.43
1 Mbps	2480	4960	47.57	avg	ver	54.00	-06.43
2 Mbps	2480	2483.5	57.06	pk	hor	74.00	-16.94
2 Mbps	2480	2483.5	63.33	pk	ver	74.00	-10.67
2 Mbps	2480	2483.5	48.38	avg	hor	54.00	-05.62
2 Mbps	2480	2483.5	50.44	avg	ver	54.00	-03.56
2 Mbps	2480	4960	47.47	pk	ver	74.00	-26.53
2 Mbps	2480	4960	42.90	avg	ver	54.00	-11.10
Note: For full results see ANNEX A							

Test Results - Variant 1 (NORA-W106 with PCB antenna AT1608-A2R4NAA)							
Mode	Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
1 Mbps	2402	2390	53.12	pk	ver	74.00	-20.88
1 Mbps	2402	2390	43.11	avg	ver	54.00	-10.89
1 Mbps	2402	4804.1	40.40	pk	ver	74.00	-33.60
1 Mbps	2402	4804.1	32.84	avg	ver	54.00	-21.16
Coded PHY S8	2440	4879.9	44.82	pk	ver	74.00	-29.18
Coded PHY S8	2440	4879.9	38.36	avg	ver	54.00	-15.64
1 Mbps	2480	270.12	30.50	pk	hor	46.00	-15.52
Coded PHY S8	2480	2483.6	57.54	pk	hor	74.00	-16.46
Coded PHY S8	2480	2483.6	46.90	avg	hor	54.00	-07.10
Coded PHY S8	2480	4960	49.90	pk	ver	74.00	-24.10
Coded PHY S8	2480	4960	44.28	avg	ver	54.00	-09.72
Note: For full results see ANNEX B							

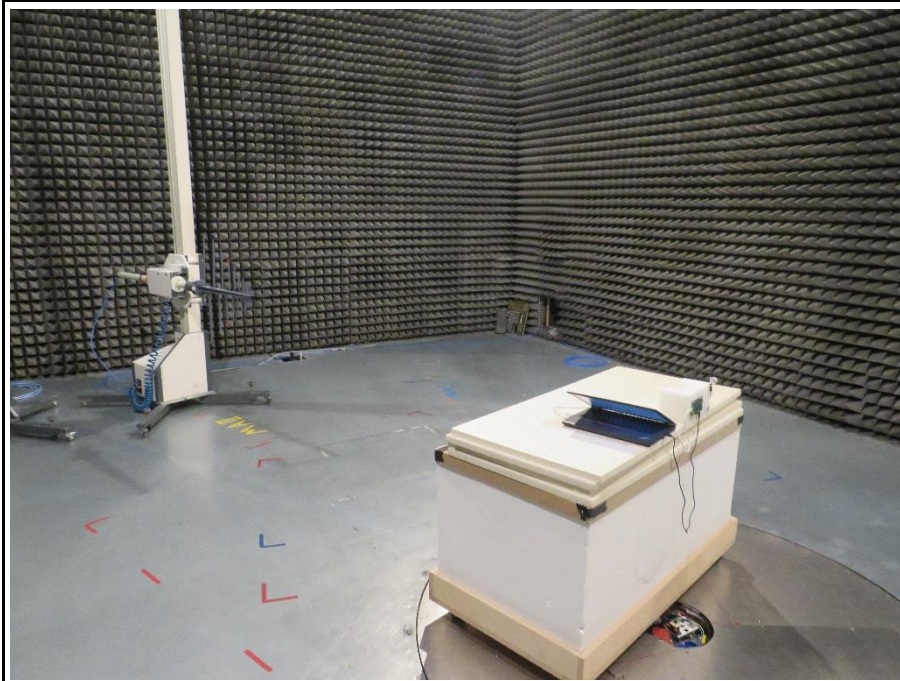
Test Results - Variant 2 (NORA-W101 with external antenna PN PRO-IS-237)							
Mode	Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
1 Mbps	2402	2388.2	53.87	pk	ver	74.00	-20.13
1 Mbps	2402	2388.2	42.02	avg	ver	54.00	-11.98
1 Mbps	2402	4003.2	42.08	pk	ver	74.00	-31.92
1 Mbps	2402	4003.2	37.74	avg	ver	54.00	-16.26
1 Mbps	2402	4804.4	45.52	pk	hor	74.00	-28.48
1 Mbps	2402	4804.4	39.03	avg	hor	54.00	-14.97
1 Mbps	2440	4879.5	51.89	pk	hor	74.00	-22.11
1 Mbps	2440	4879.5	48.73	avg	hor	54.00	-05.27
1 Mbps	2480	1604	49.38	pk	hor	74.00	-24.62
1 Mbps	2480	1604	29.32	avg	hor	54.00	-24.68
1 Mbps	2480	2483.6	58.57	pk	ver	74.00	-15.43
1 Mbps	2480	2483.6	47.71	avg	ver	54.00	-06.29
1 Mbps	2480	4960	54.60	pk	hor	74.00	-19.40
1 Mbps	2480	4960	52.05	avg	hor	54.00	-01.95
Coded PHY S8	2402	150.0073	24.30	pk	ver	43.50	-19.20
Coded PHY S8	2402	611.3	27.60	pk	ver	46.00	-18.43
Coded PHY S8	2402	17740	43.44	pk	hor	74.00	-30.56
Coded PHY S8	2402	17740	31.33	avg	hor	54.00	-22.67
Coded PHY S8	2440	149.986	24.00	pk	ver	43.50	-19.50
Coded PHY S8	2440	612.54	27.50	pk	ver	46.00	-18.54
Coded PHY S8	2440	18012	48.98	pk	hor	74.00	-25.02
Coded PHY S8	2440	18012	35.75	avg	hor	54.00	-18.25
Coded PHY S8	2440	4880	51.61	pk	hor	74.00	-22.39
Coded PHY S8	2440	4880	48.34	avg	hor	54.00	-05.66
Coded PHY S8	2480	149.9945	24.70	pk	ver	43.50	-18.86
Coded PHY S8	2480	613.12	27.50	pk	ver	46.00	-18.52
Coded PHY S8	2480	18502	48.43	pk	hor	74.00	-25.57
Coded PHY S8	2480	18502	36.65	avg	hor	54.00	-17.35
Note: For full results see ANNEX C							

3.8.7 Setup Photos

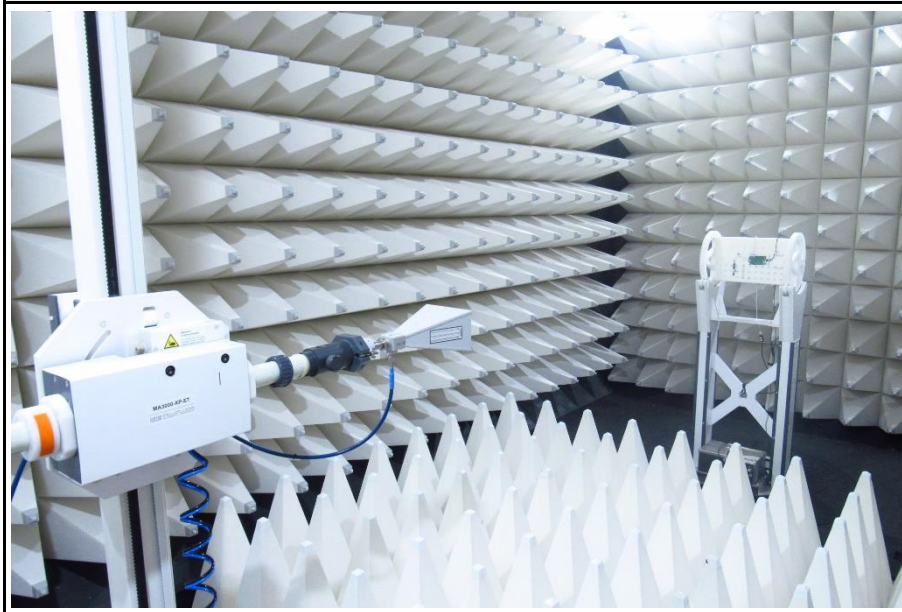
Setup below 1 GHz (NORA-W101) -A



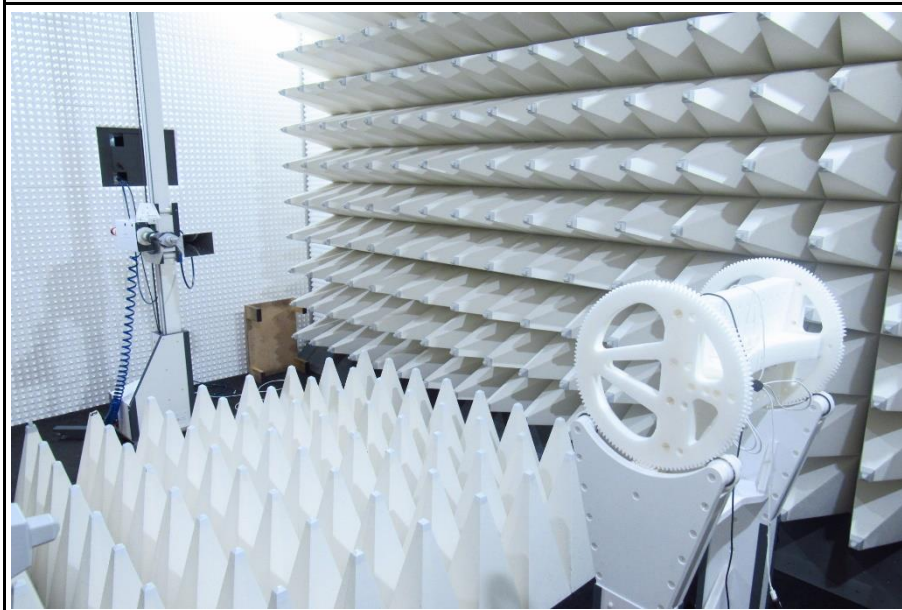
Setup below 1 GHz (NORA-W101) -B



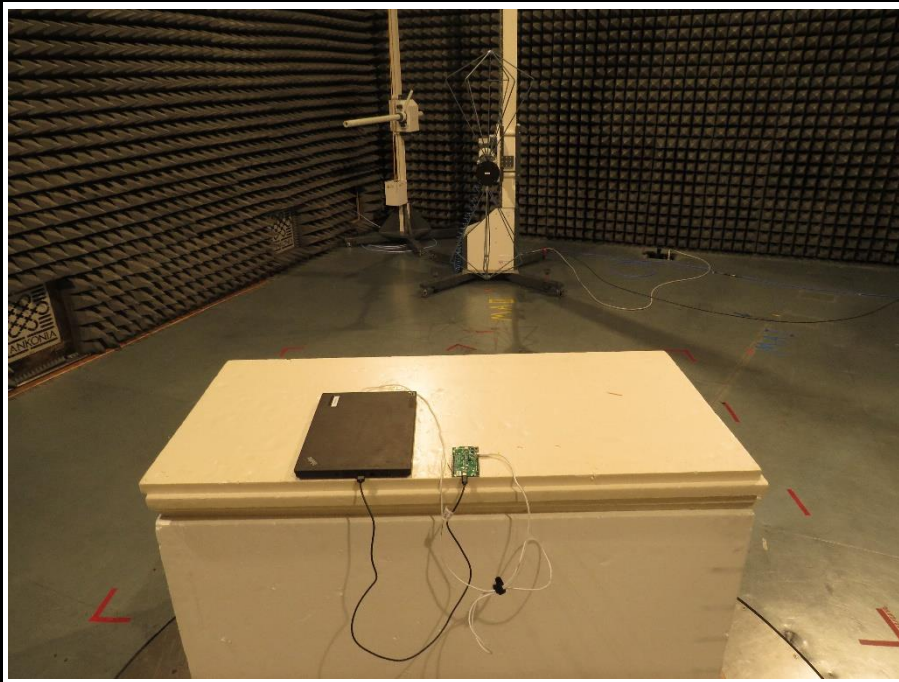
Setup above 1 GHz (NORA-W101) -A



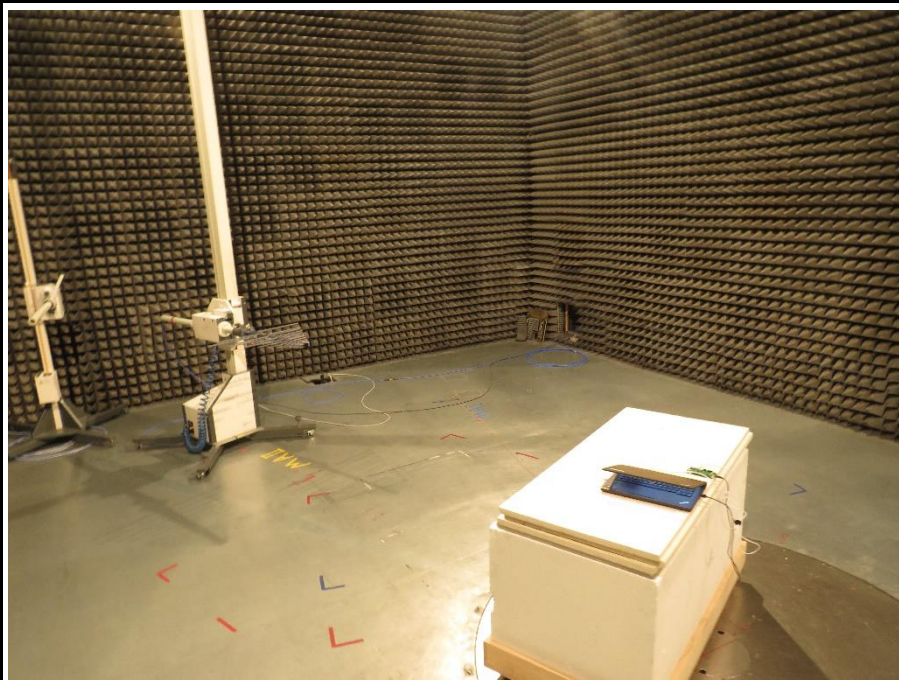
Setup above 1 GHz (NORA-W101) -B



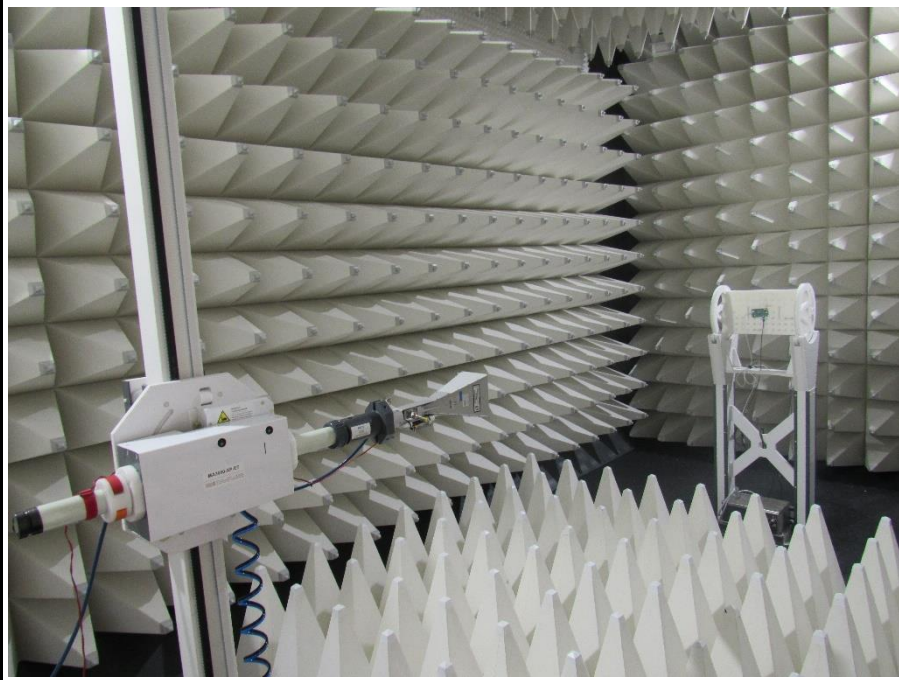
Setup below 1 GHz for Variant 1 (NORA-W106 with PCB antenna) -A



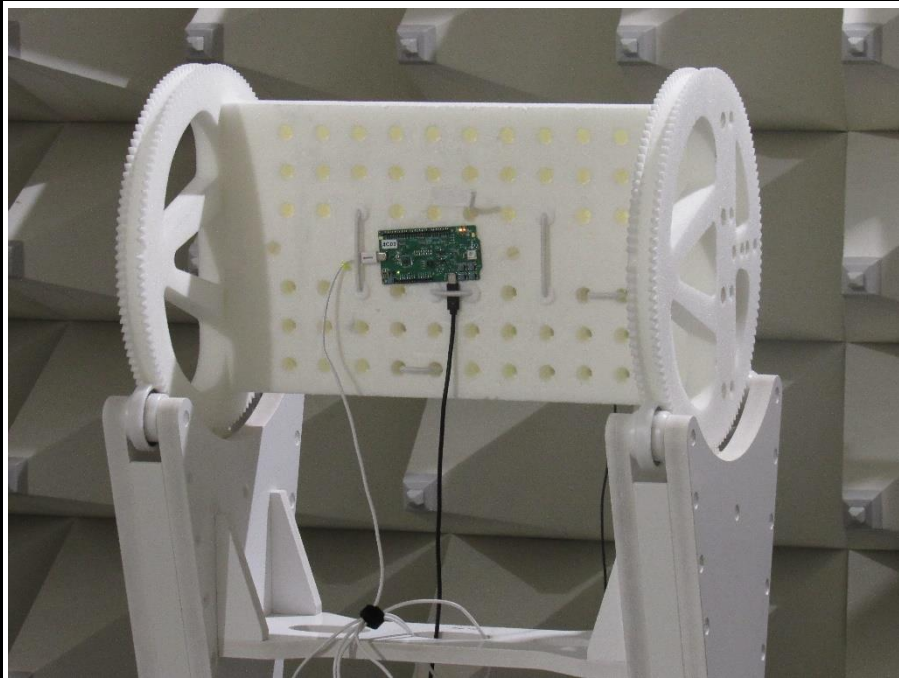
Setup below 1 GHz for Variant 1 (NORA-W106 with PCB antenna) -B



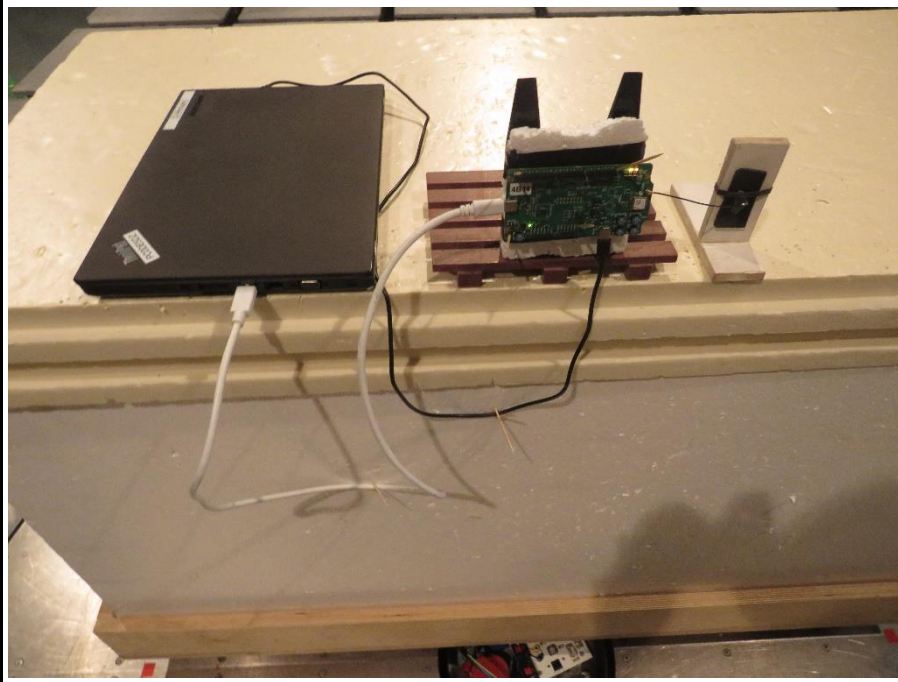
Setup above 1 GHz for Variant 1 (NORA-W106 with PCB antenna) -A



Setup above 1 GHz for Variant 1 (NORA-W106 with PCB antenna) -B



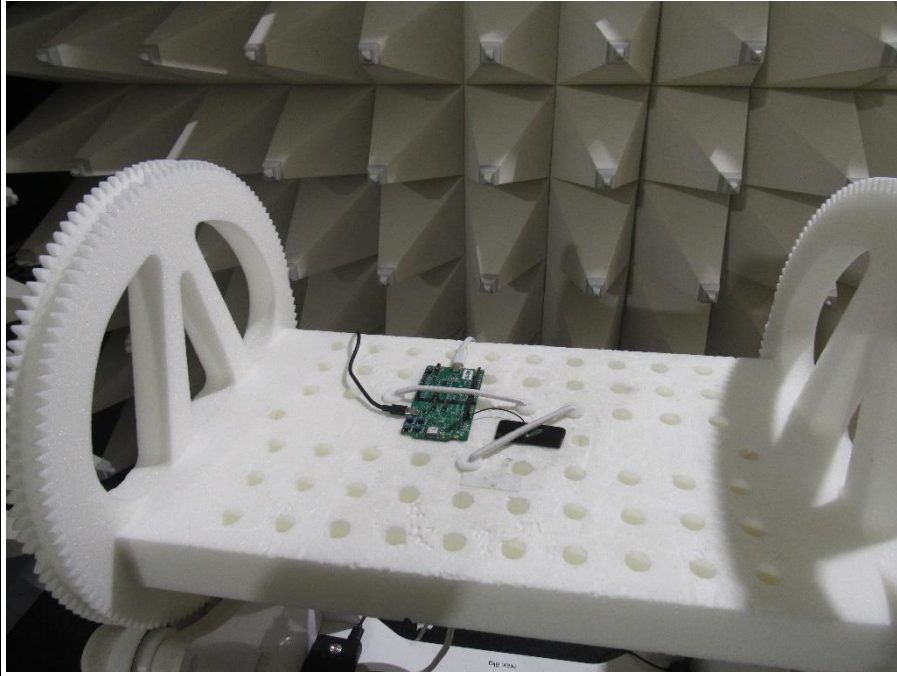
**Setup below 1 GHz for Variant 2 (NORA-W101 with external antenna
PN PRO-IS-237) -A**



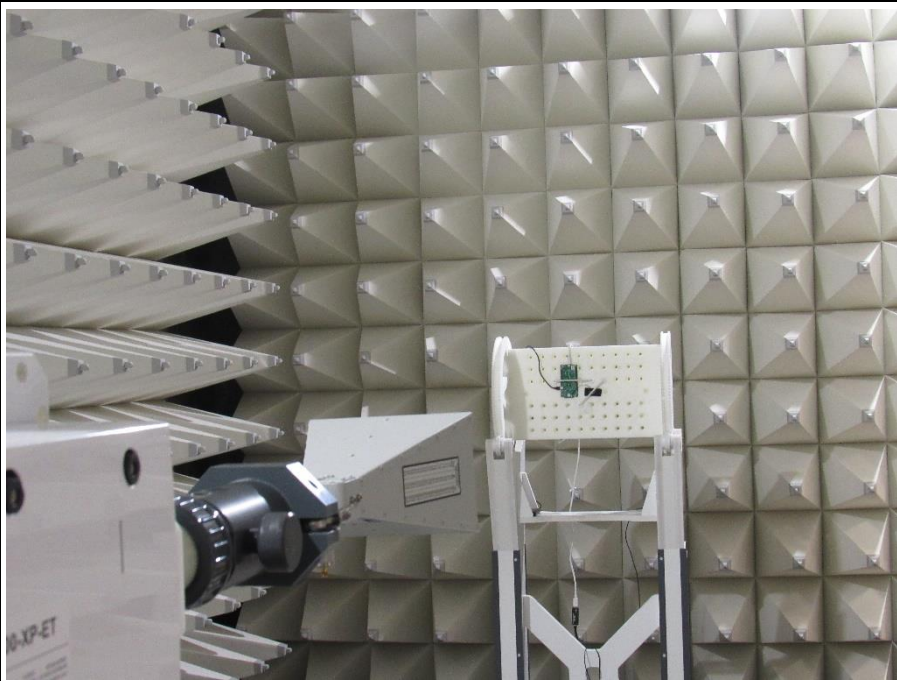
**Setup below 1 GHz for Variant 2 (NORA-W101 with external antenna
PN PRO-IS-237) -B**



**Setup above 1 GHz for Variant 2 (NORA-W101 with external antenna
PN PRO-IS-237) -A**



**Setup above 1 GHz for Variant 2 (NORA-W101 with external antenna
PN PRO-IS-237) -B**



3.9 Test Conditions and Results - Receiver radiated emissions

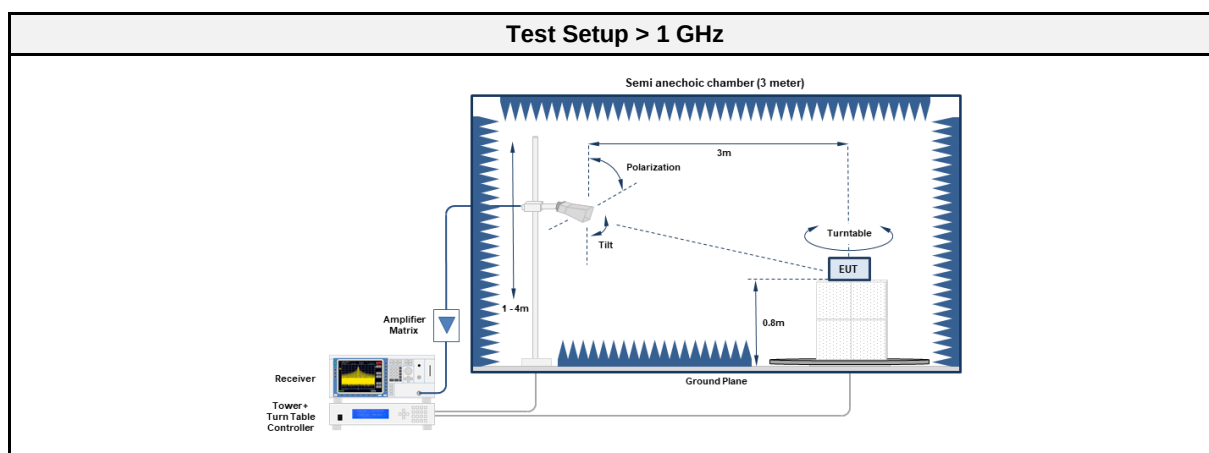
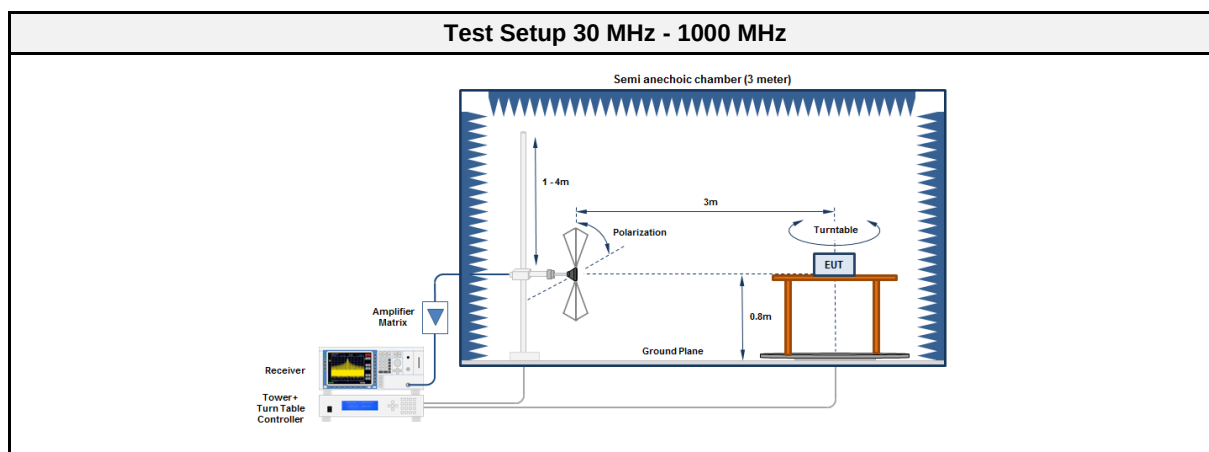
3.9.1 Information

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	Florian Voigt; Odai Qawasmeh
Date	2022-08-03 - 2022-08-23

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	2021-02	2024-02
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2021-07	2023-01
Antenna	R&S	HK 116	EF00030	2021-05	2024-05
Antenna	R&S	HL 223	EF00187	2022-06	2025-06

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF01011	2022-06	2025-06
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2021-07	2023-01
Antenna	Schwarzbeck	BBHA 9120D	EF01561	2021-11	2024-11
Antenna	Schwarzbeck	HWRD 650	EF01679	2021-03	2024-03

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

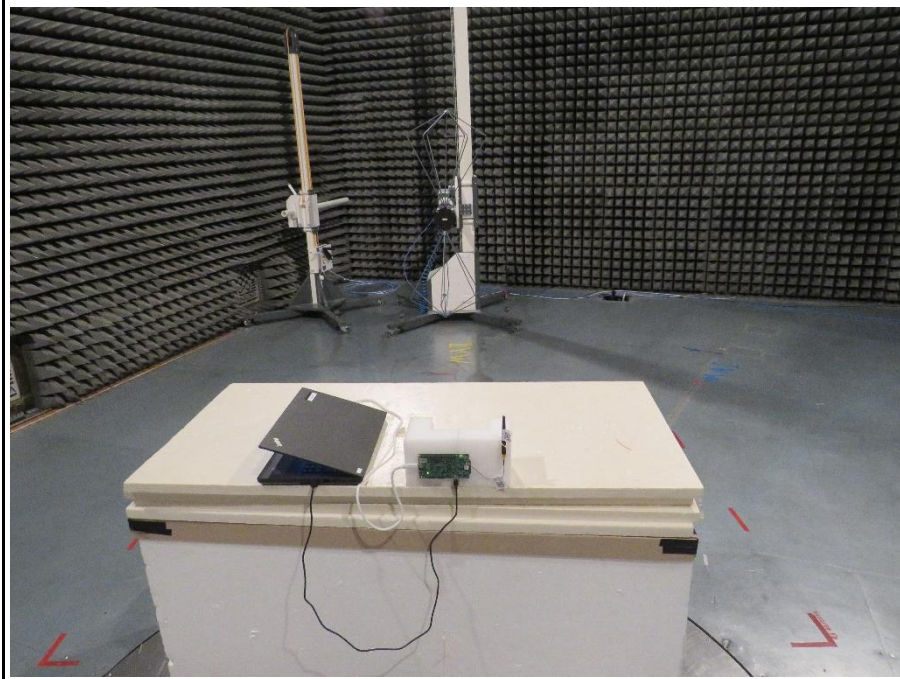
Test Results - NORA-W101						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
2440	79.8822	21.70	qpk	ver	40.00	-18.32
2440	480	26.60	qpk	ver	46.00	-19.40
2440	1675	36.58	pk	ver	74.00	-37.42
2440	1675	31.08	avg	ver	53.98	-22.90
Note: For full results see ANNEX D						

Test Results – Variant 1 (NORA-W106 with PCB antenna AT1608-A2R4NAA)						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
2440	6172	45.51	pk	ver	74.00	-28.49
2440	6172	39.07	avg	ver	53.98	-14.91
Note: For full results see ANNEX E						

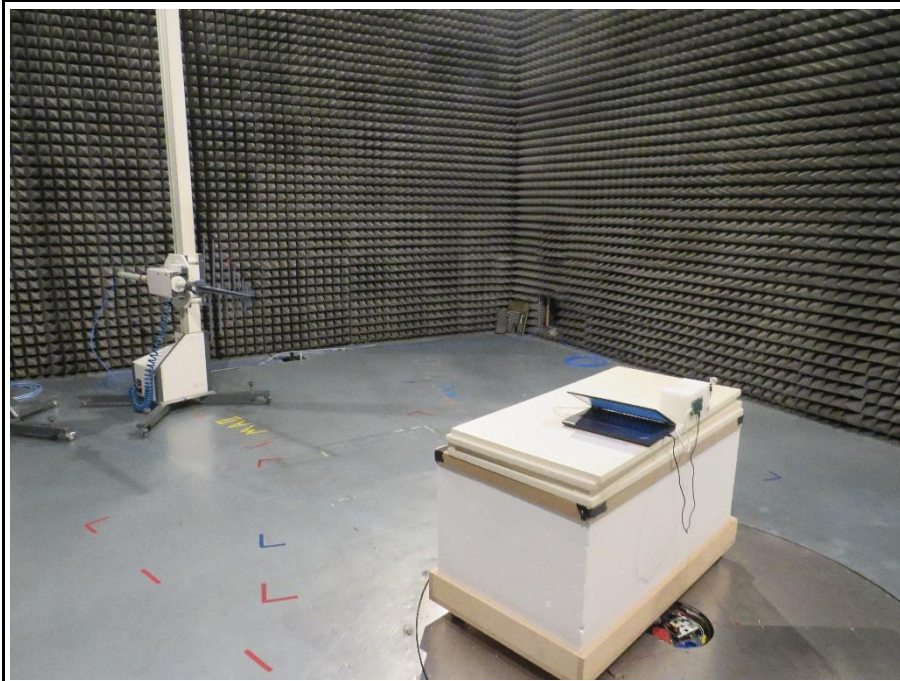
Test Results – Variant 2 (NORA-W101 with external antenna PN PRO-IS-237)						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
2440	150.0243	24.30	pk	ver	43.50	-19.19
2440	684.88	35.70	pk	ver	46.00	-10.28
2440	6442	50.38	pk	ver	74.00	-23.62
2440	6442	37.89	avg	ver	53.98	-16.09
2440	17860	49.08	pk	ver	74.00	-24.92
2440	17860	36.51	avg	ver	53.98	-17.47
Note: For full results see ANNEX F						

3.9.7 Setup Photos

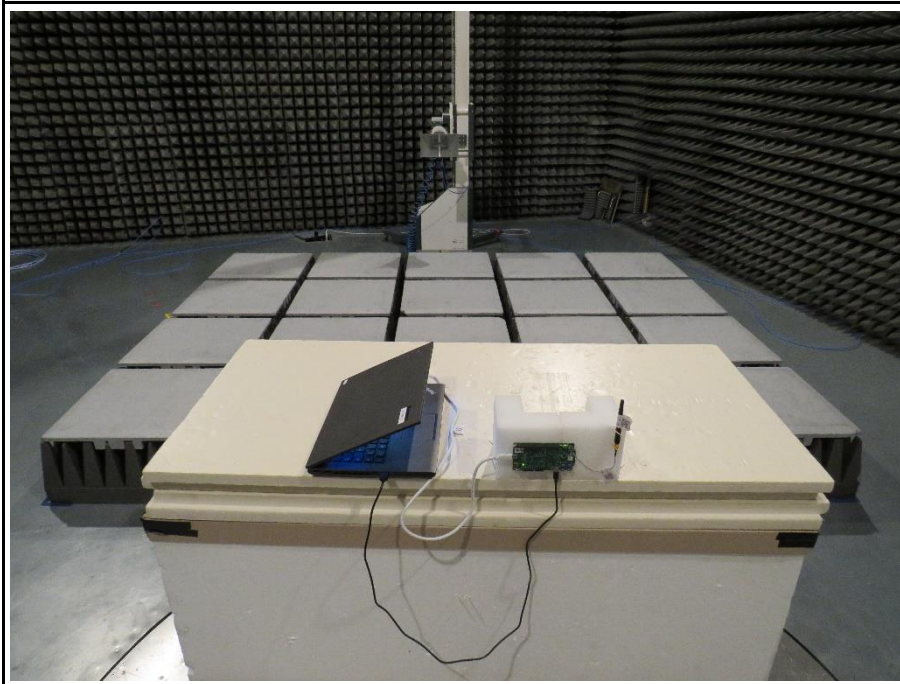
Setup below 1 GHz (NORA-W101) -A



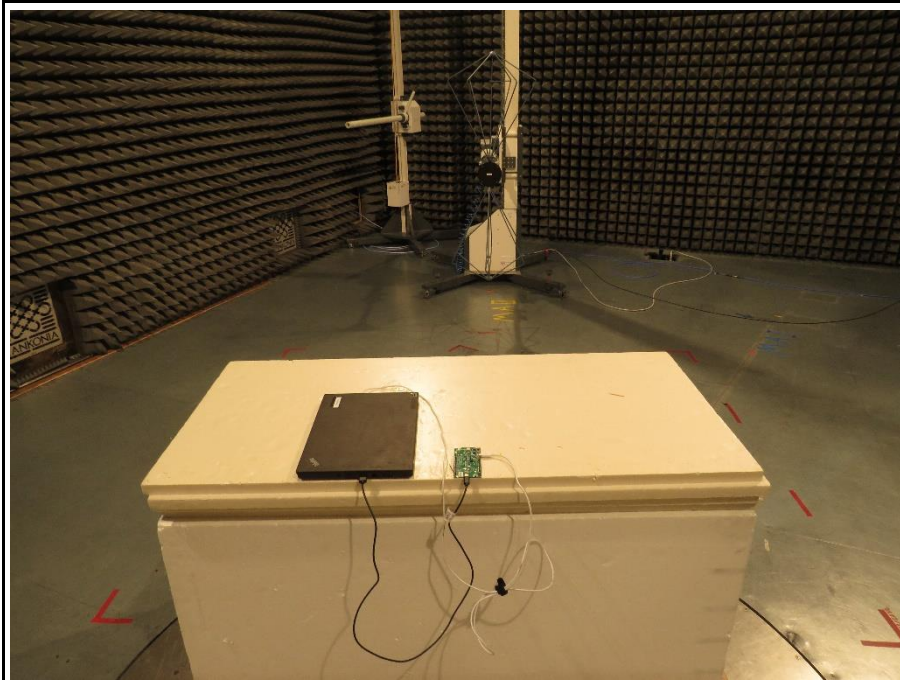
Setup below 1 GHz (NORA-W101) -B



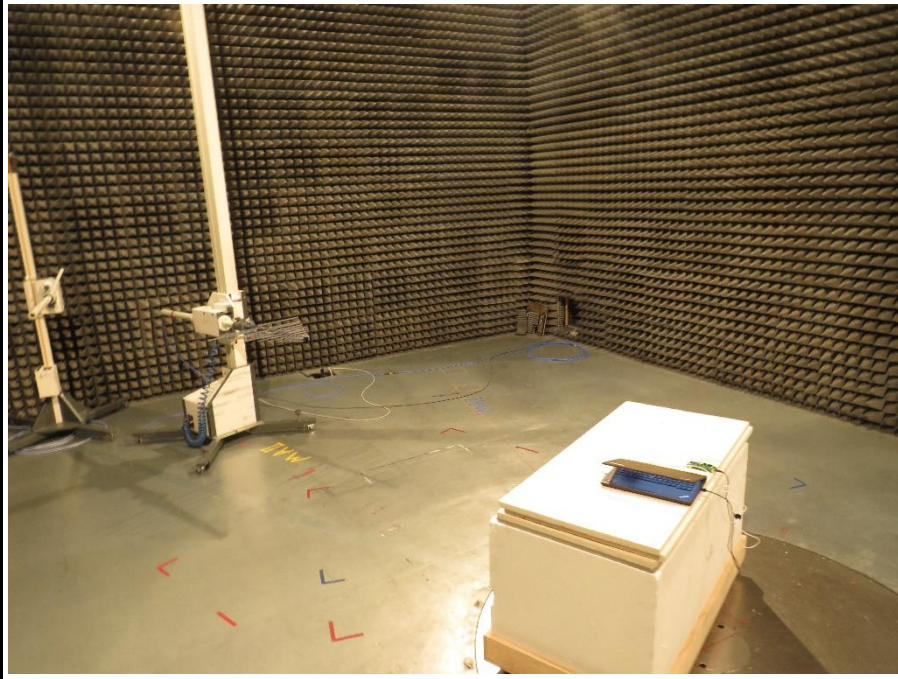
Setup above 1 GHz (NORA-W101)



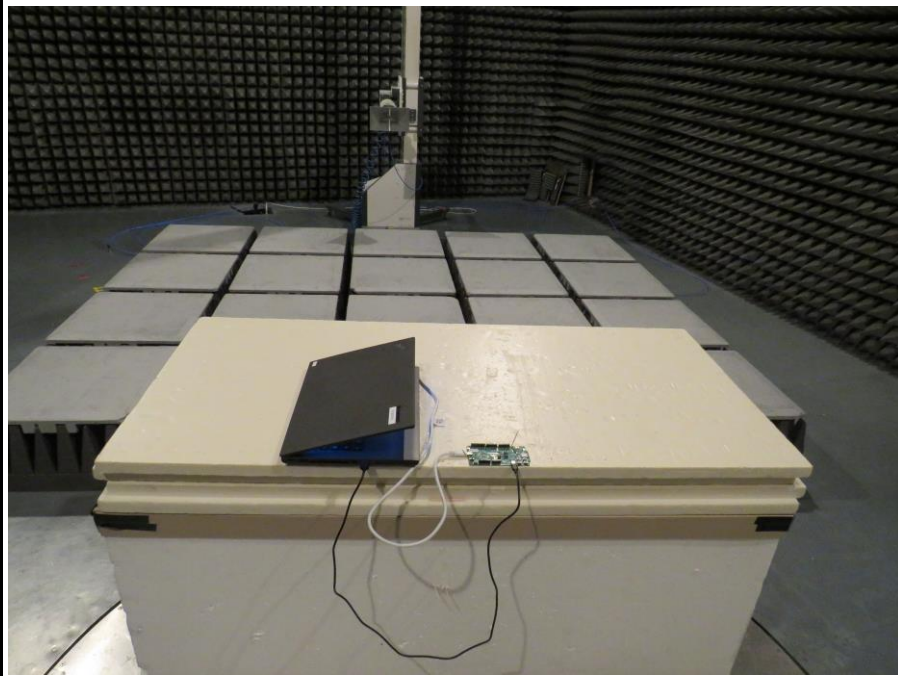
Setup below 1 GHz for Variant 1 (NORA-W106 with PCB antenna) -A



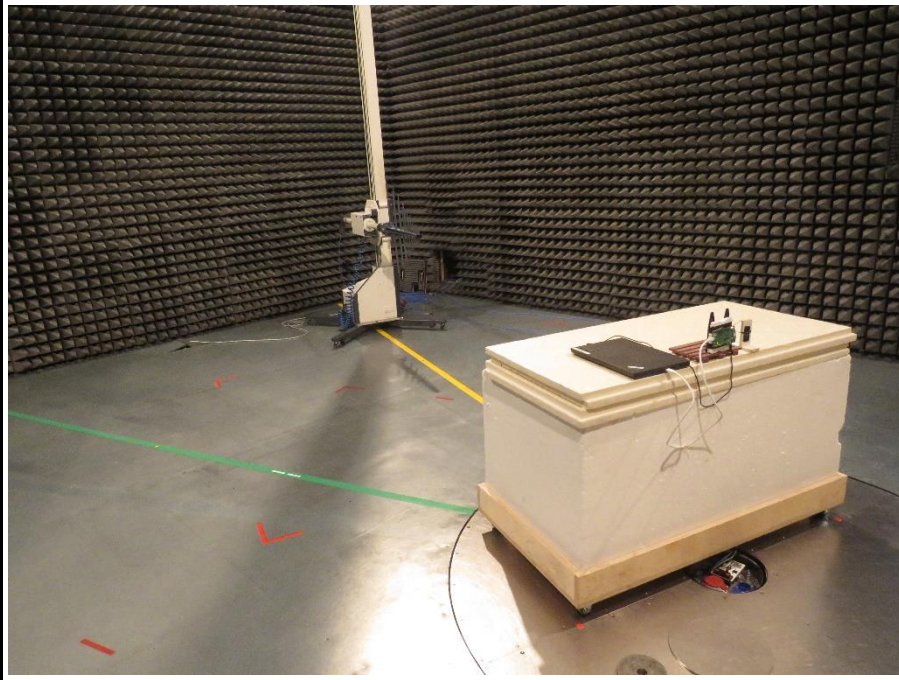
Setup below 1 GHz for Variant 1 (NORA-W106 with PCB antenna) -B



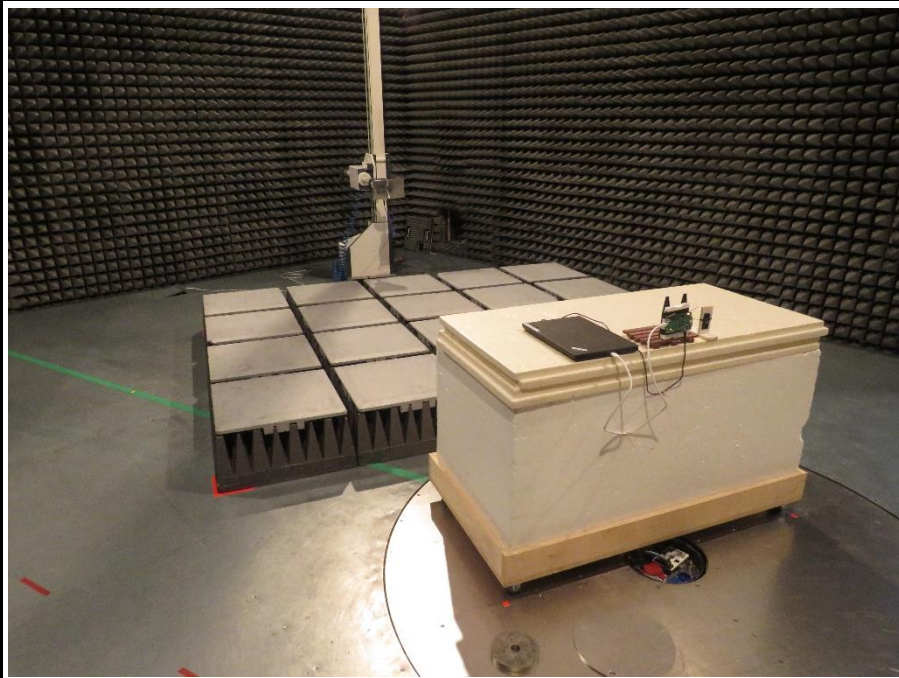
Setup above 1 GHz for Variant 1 (NORA-W106 with PCB antenna)



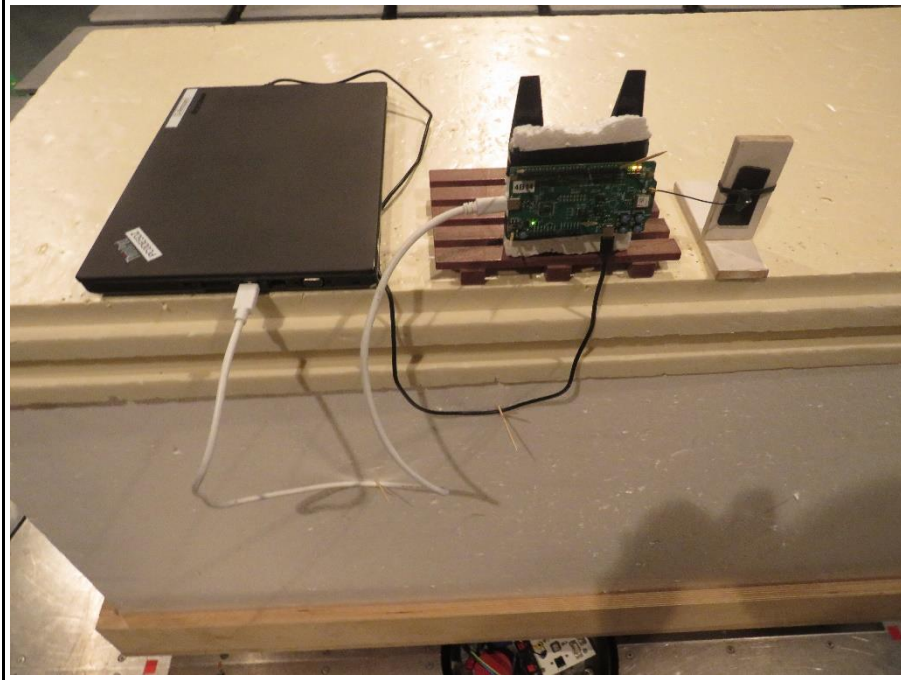
**Setup below 1 GHz for Variant 2 (NORA-W101 with external antenna
PN PRO-IS-237)**



**Setup above 1 GHz for Variant 2 (NORA-W101 with external antenna
PN PRO-IS-237)**



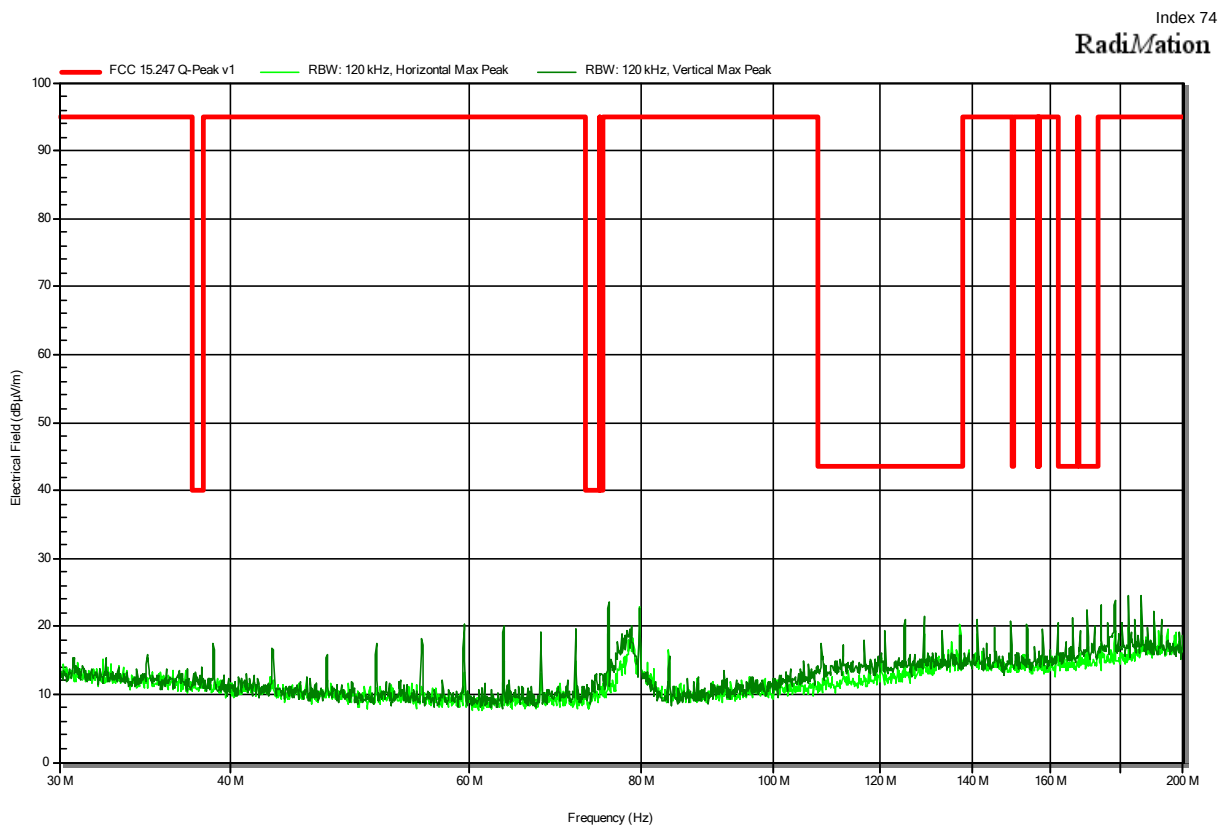
EUT Test Setup for Variant 2 (NORA-W101 with external antenna PN PRO-IS-237)



ANNEX A Transmitter spurious emissions for NORA-W101

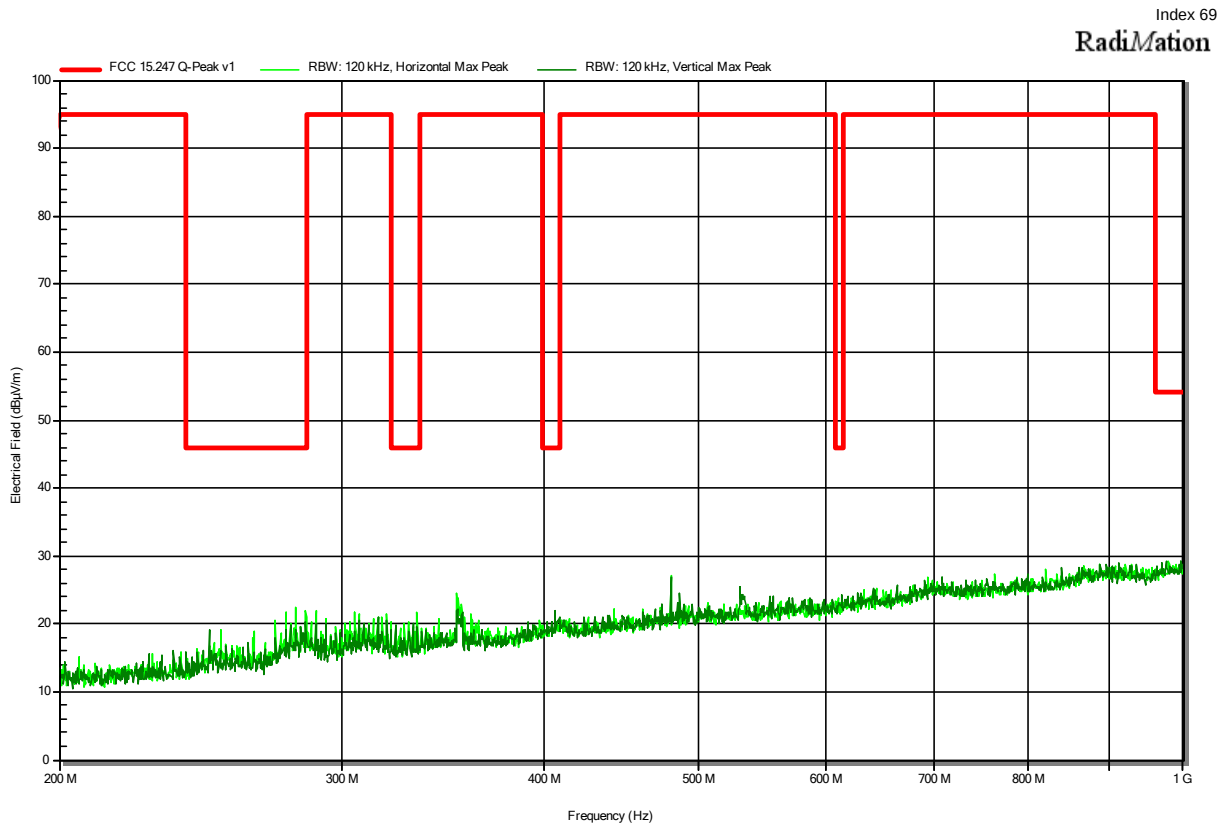
Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116
 Measurement distance: 3 m
 Mode: Tx; LE, 2402 MHz, Power Level 13, Coding S8, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-22
 Note:



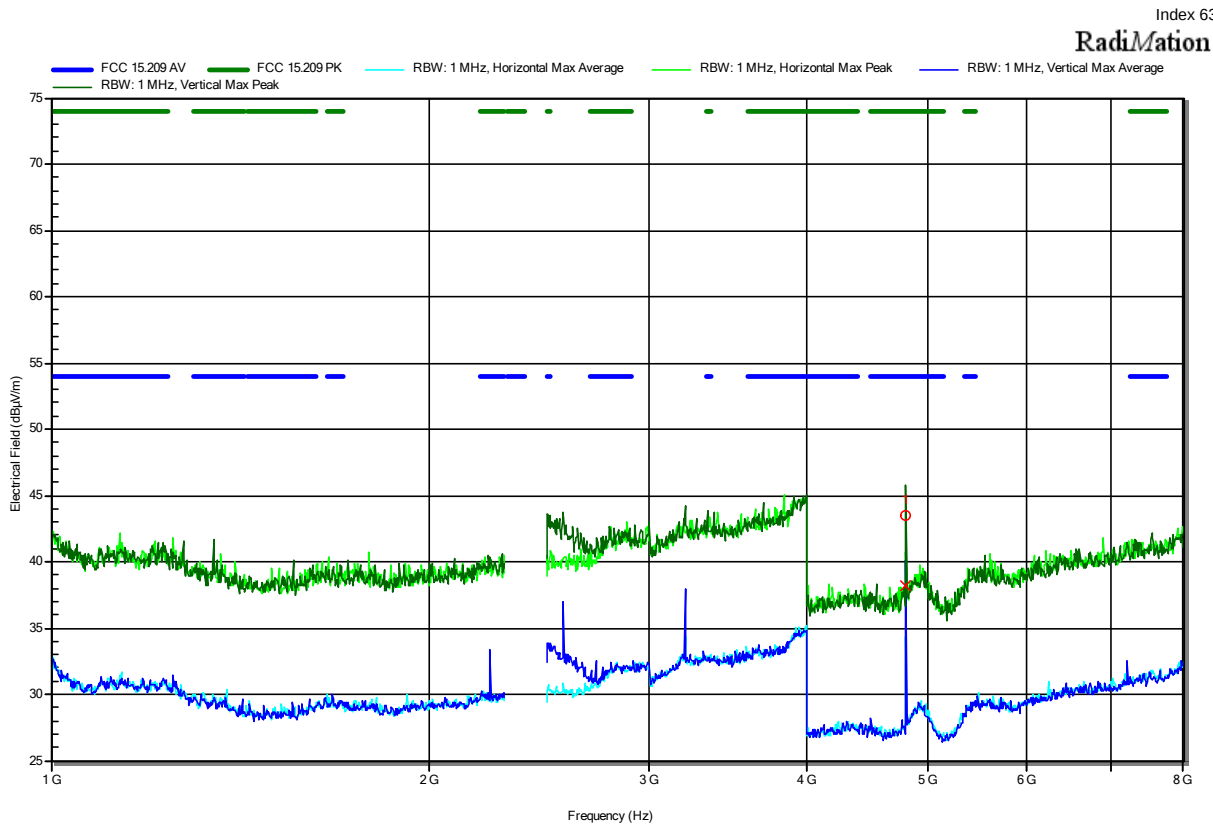
Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223
 Measurement distance: 3 m
 Mode: Tx; LE, 2402 MHz, Power Level 13, Coding S8, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-22
 Note:



Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2402 MHz, Power Level 13, Coding S8, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note:



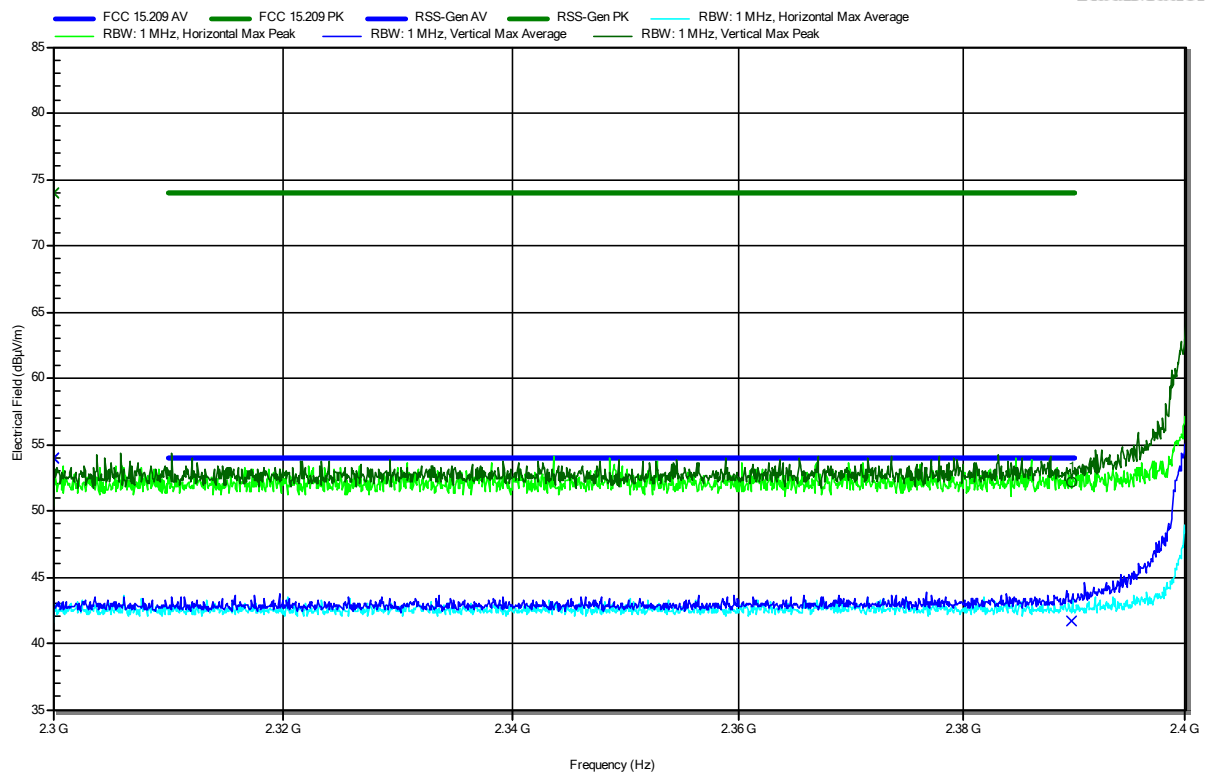
Frequency 4.8039 GHz	Peak 43.5 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -30.5 dB	Peak Status Pass	Polarization Vertical
Frequency 4.8039 GHz	Average 38.24 dBμV/m	Average Limit 54 dBμV/m	Average Difference -15.76 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2402 MHz, Power Level 13, Coding S8, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note: lower bandedge

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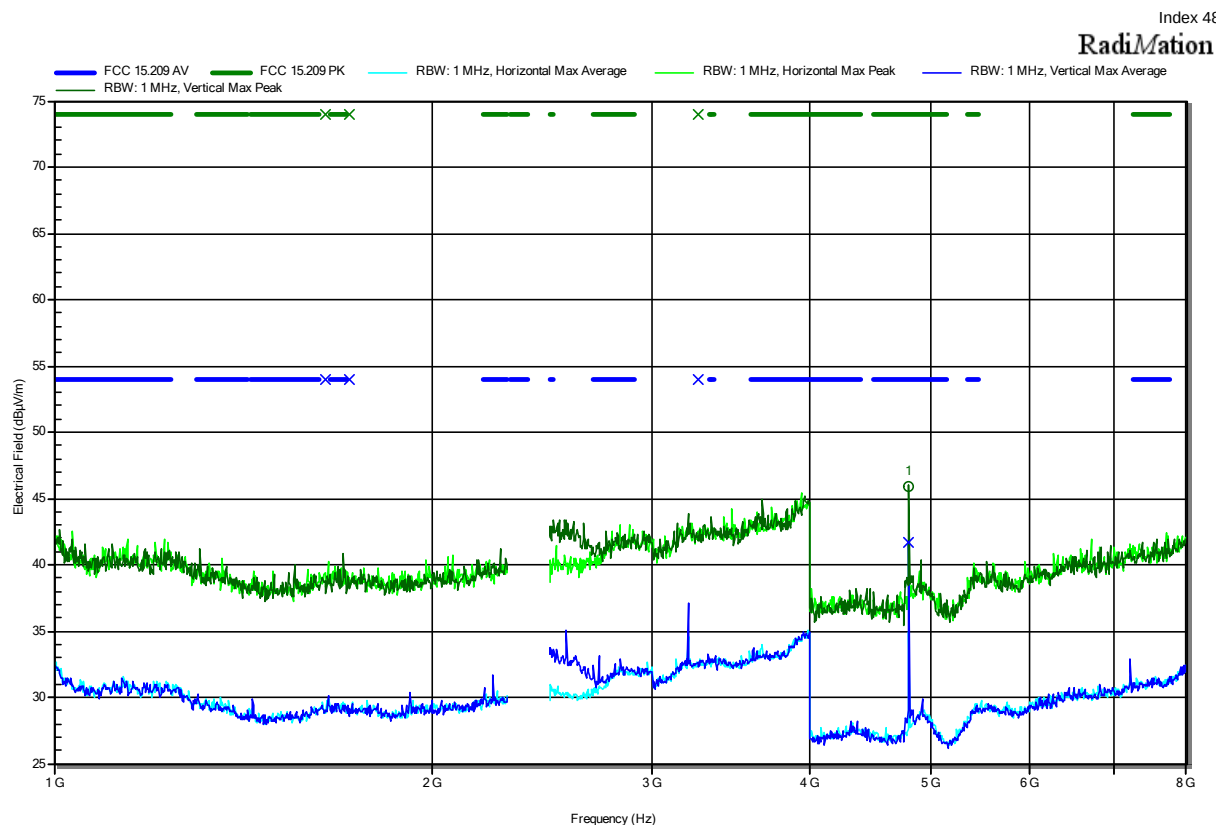
Frequency 2.3898 GHz	Peak 52.2 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -21.8 dB	Peak Status Pass	Polarization Vertical
Frequency 2.3898 GHz	Average 41.71 dBμV/m	Average Limit 54 dBμV/m	Average Difference -12.29 dB	Average Status Pass	Polarization Vertical

Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2402 MHz, Power Level 13, 1 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-04
 Note:



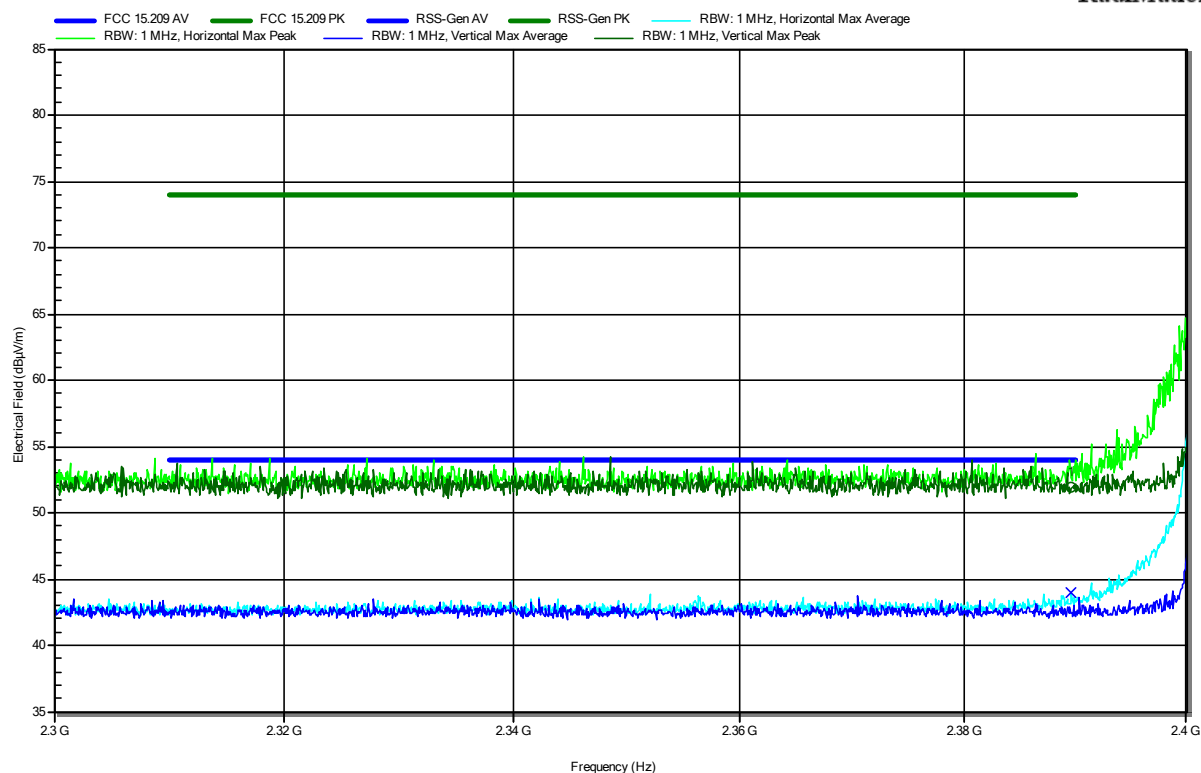
Frequency 4.8039 GHz	Peak 45.85 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -28.15 dB	Peak Status Pass	Polarization Vertical
Frequency 4.8039 GHz	Average 41.71 dBμV/m	Average Limit 54 dBμV/m	Average Difference -12.29 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2402 MHz, Power Level 13, 1 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-04
 Note: lower bandedge

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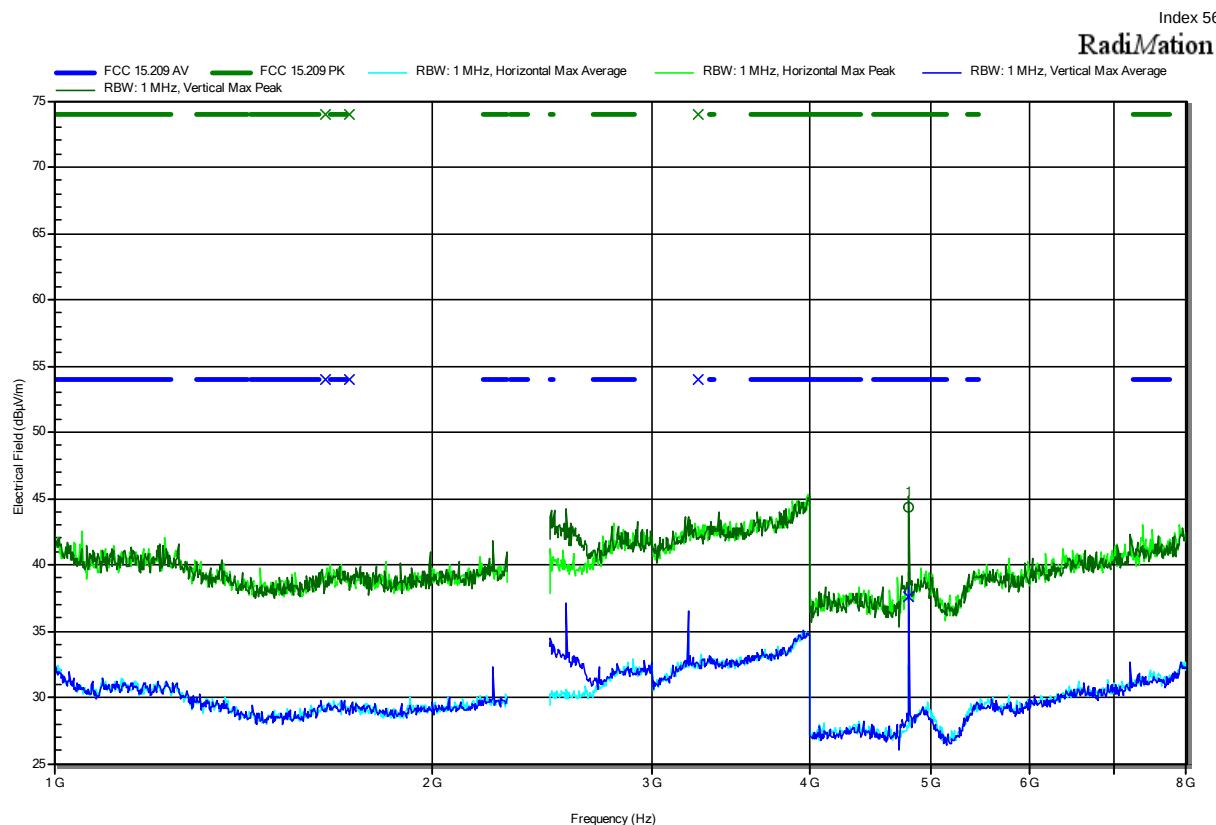
Frequency 2.3896 GHz	Peak 51.87 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -22.13 dB	Peak Status Pass	Polarization Horizontal
Frequency 2.3896 GHz	Average 43.94 dBμV/m	Average Limit 54 dBμV/m	Average Difference -10.06 dB	Average Status Pass	Polarization Horizontal

Test Report No.: G0M-2205-1454-TFC247BL-V02

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

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2402 MHz, Power Level 13, 2 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note:



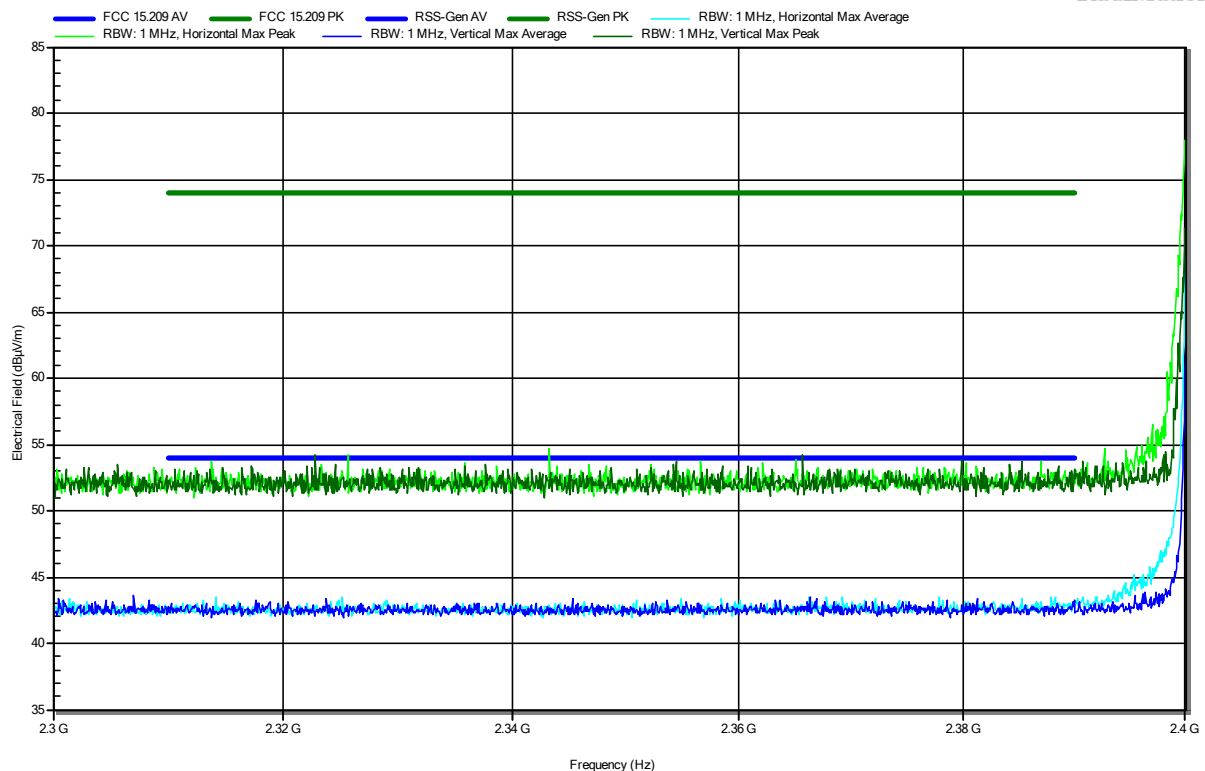
Frequency 4.804 GHz	Peak 44.31 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -29.69 dB	Peak Status Pass	Polarization Vertical
Frequency 4.804 GHz	Average 37.6 dBμV/m	Average Limit 54 dBμV/m	Average Difference -16.4 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2402 MHz, Power Level 13, 2 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note: lower bandedge

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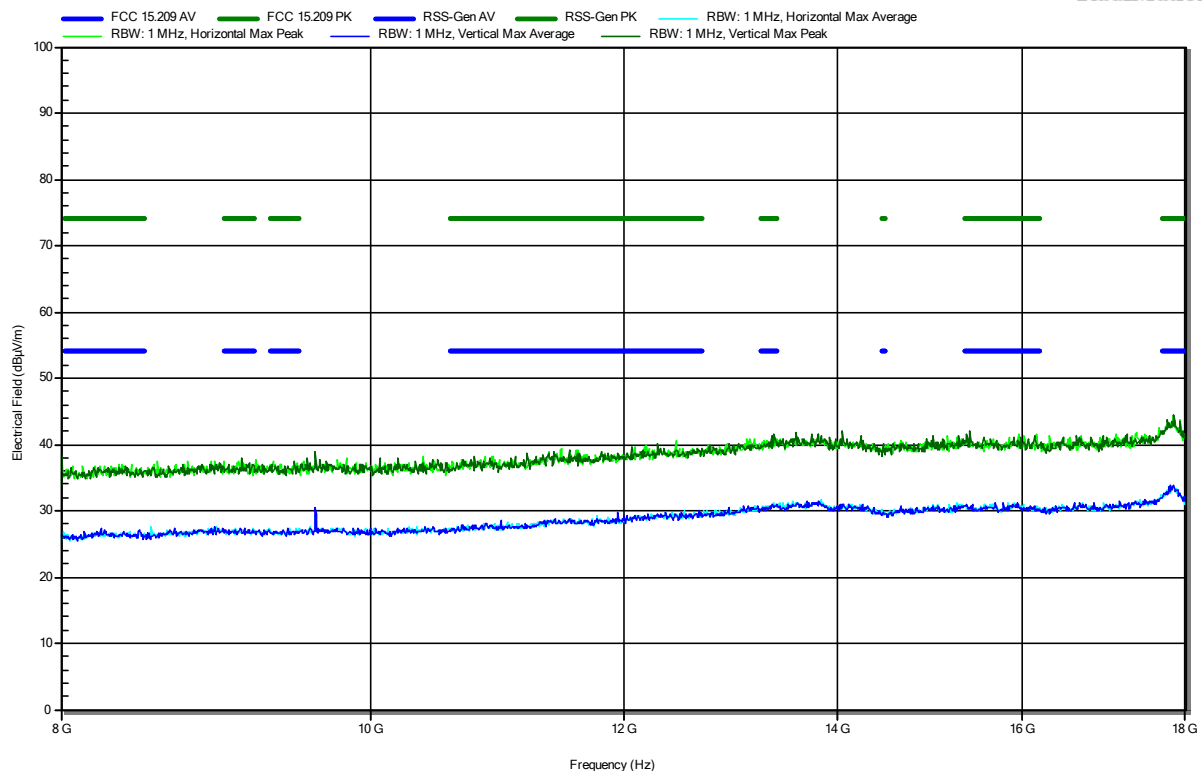


Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; LE, 2402 MHz, Power Level 13, 1 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note:

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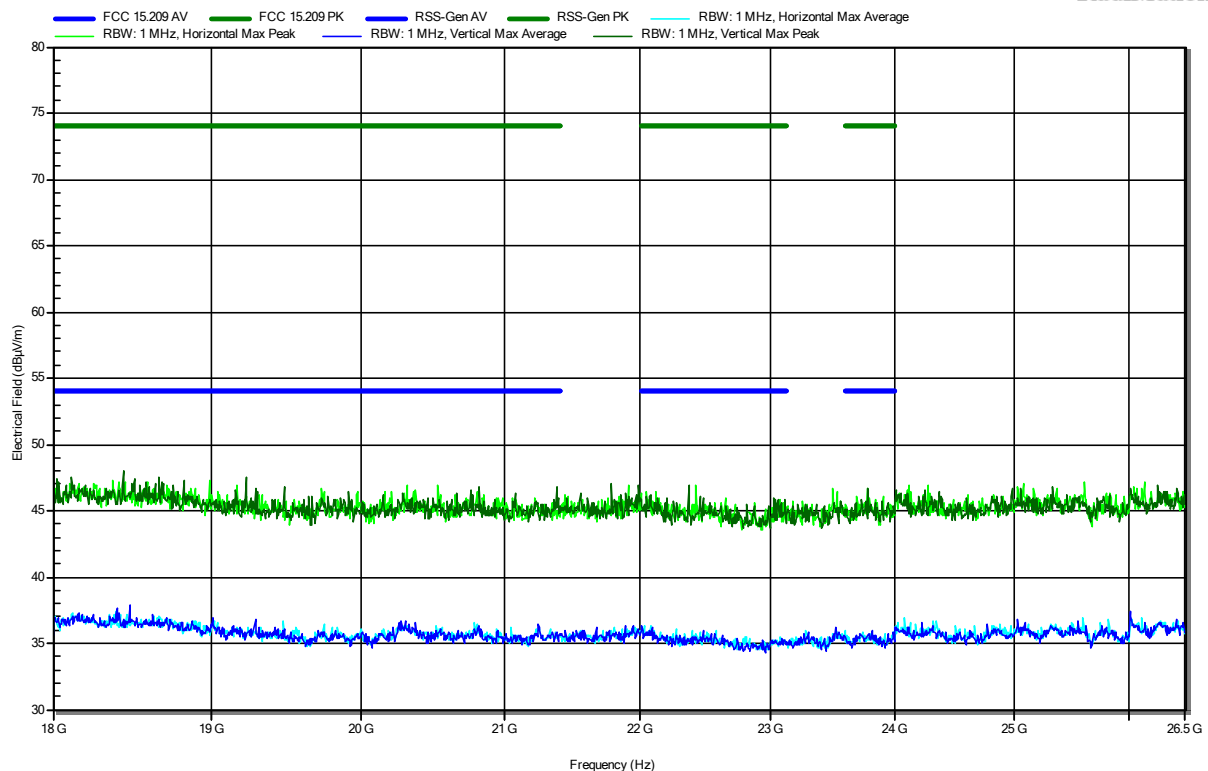


Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; LE, 2402 MHz, Power Level 13, 1 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note:

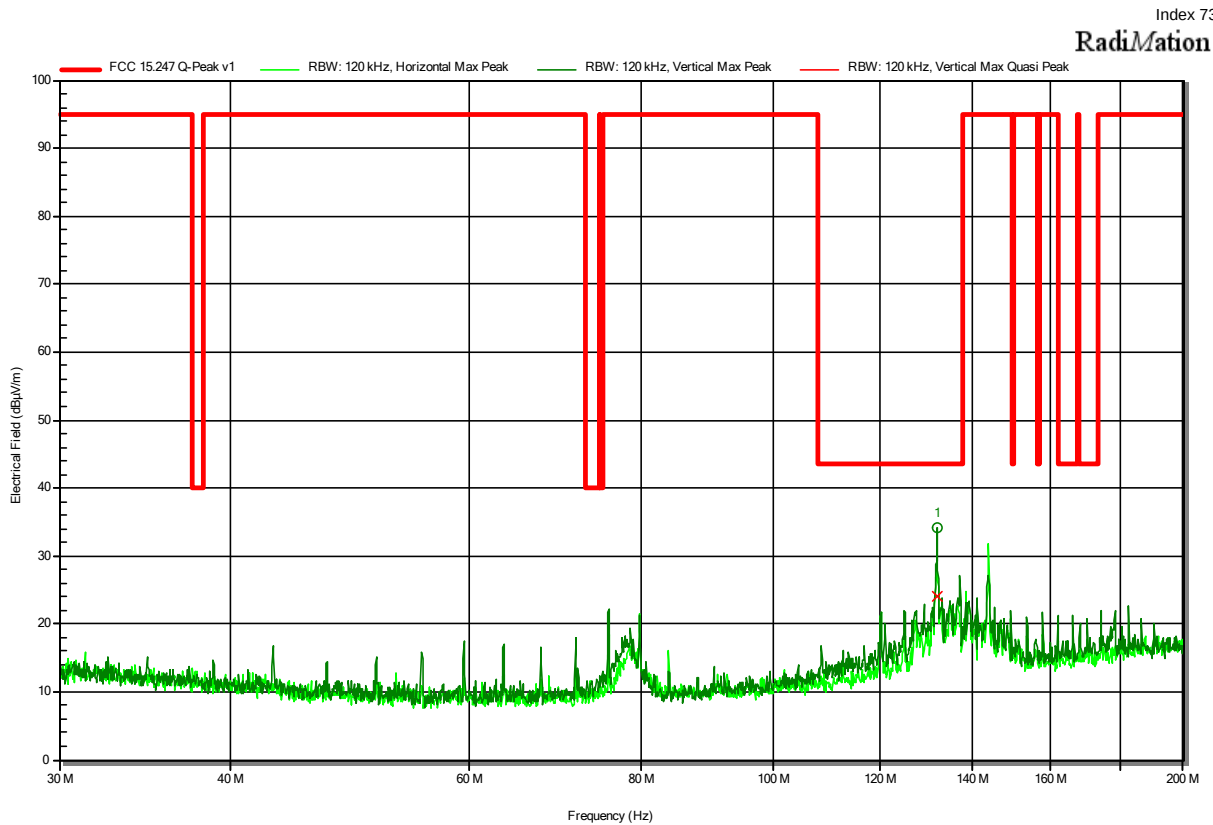
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RadiMation



Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

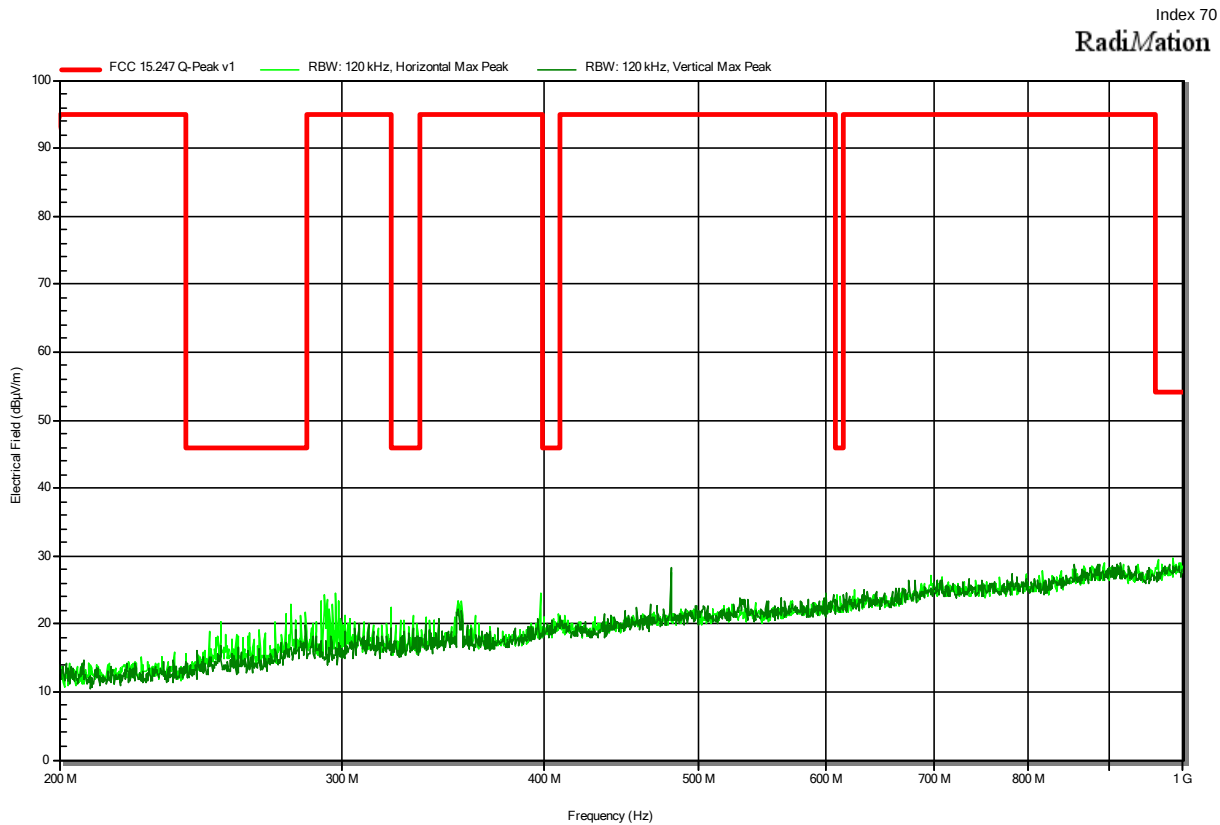
Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116
 Measurement distance: 3 m
 Mode: Tx; LE, 2440 MHz, Power Level 13, Coding S8, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-22
 Note:



Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Polarization
131.932 MHz	24.1 dBµV/m	43.5 dBµV/m	-19.47 dB	Pass	Vertical

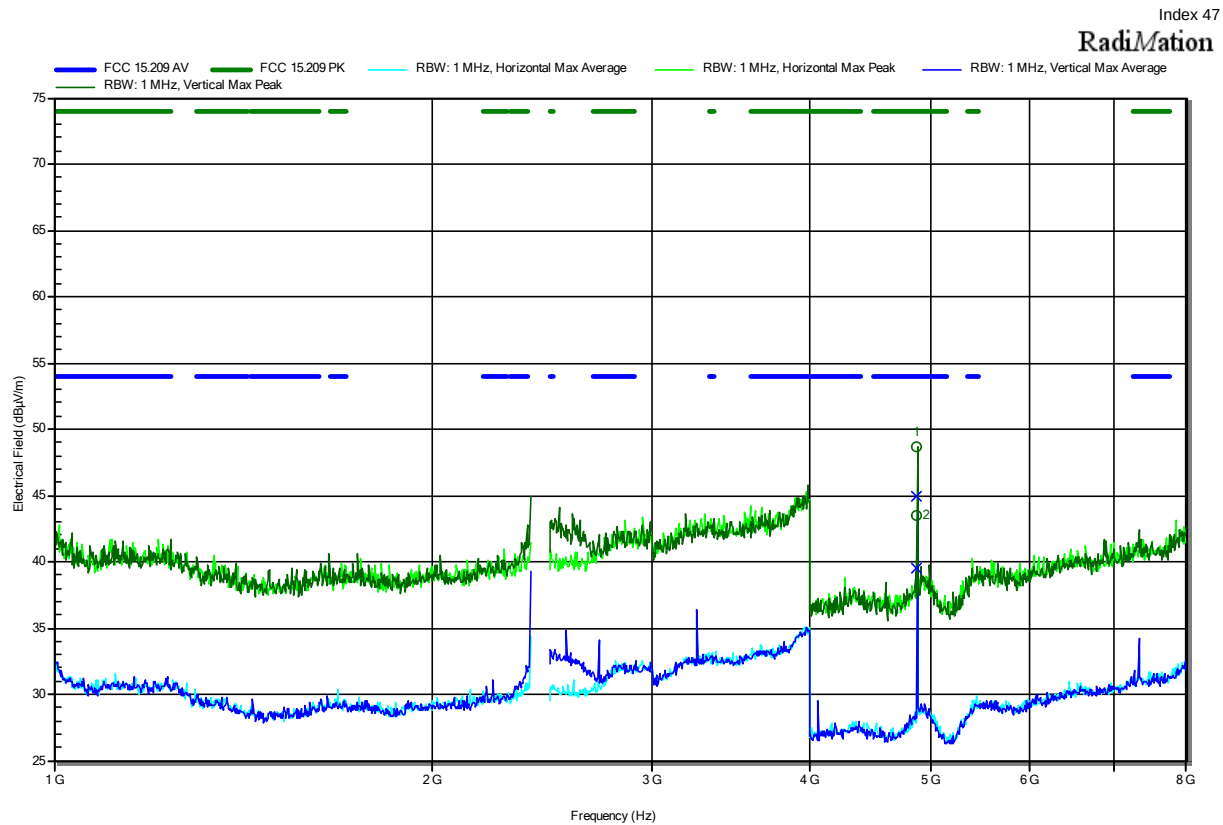
Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223
 Measurement distance: 3 m
 Mode: Tx; LE, 2440 MHz, Power Level 13, Coding S8, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-22
 Note:



Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2440 MHz, Power Level 13, 1 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-04
 Note:

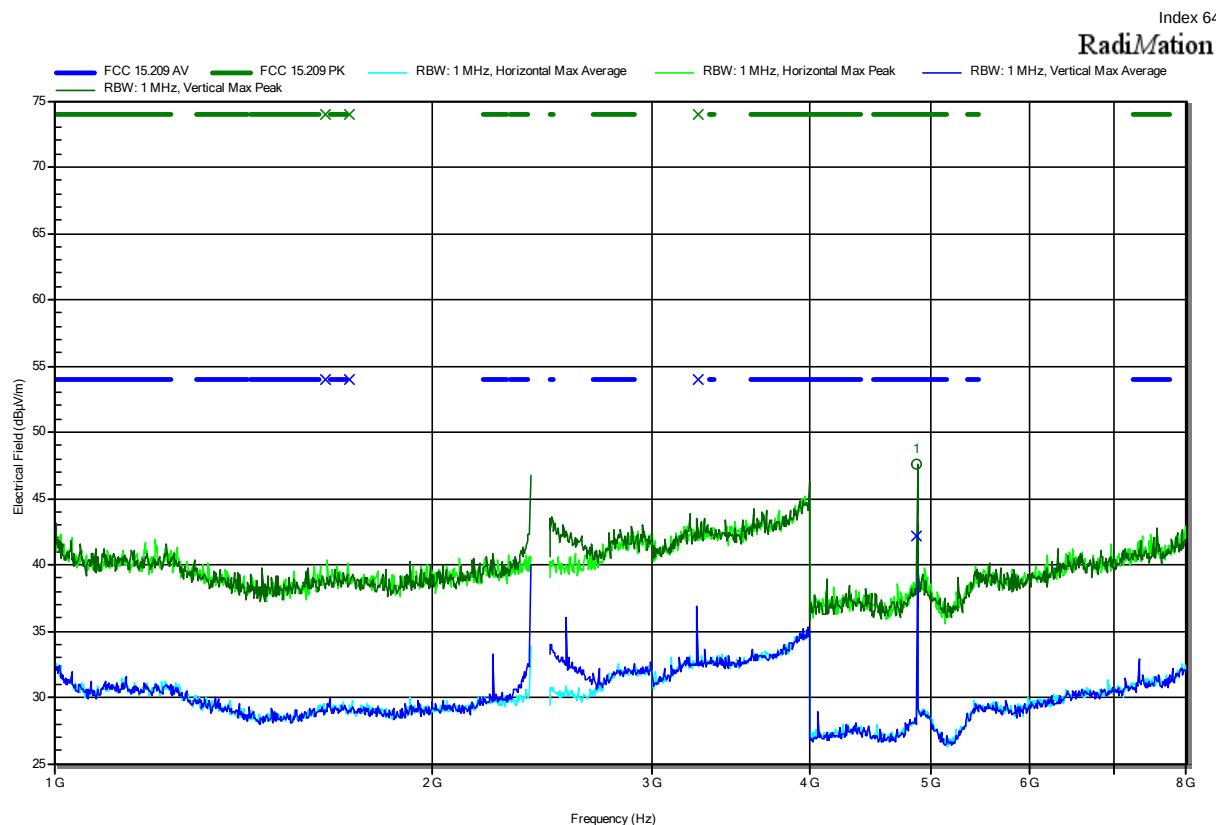


Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
4.8799 GHz	43.55 dBμV/m	74 dBμV/m	-30.45 dB	Pass	Horizontal
4.88 GHz	48.68 dBμV/m	74 dBμV/m	-25.32 dB	Pass	Vertical

Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
4.8799 GHz	39.48 dBμV/m	54 dBμV/m	-14.52 dB	Pass	Horizontal
4.88 GHz	44.96 dBμV/m	54 dBμV/m	-9.04 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2440 MHz, Power Level 13, Coding S2, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note:



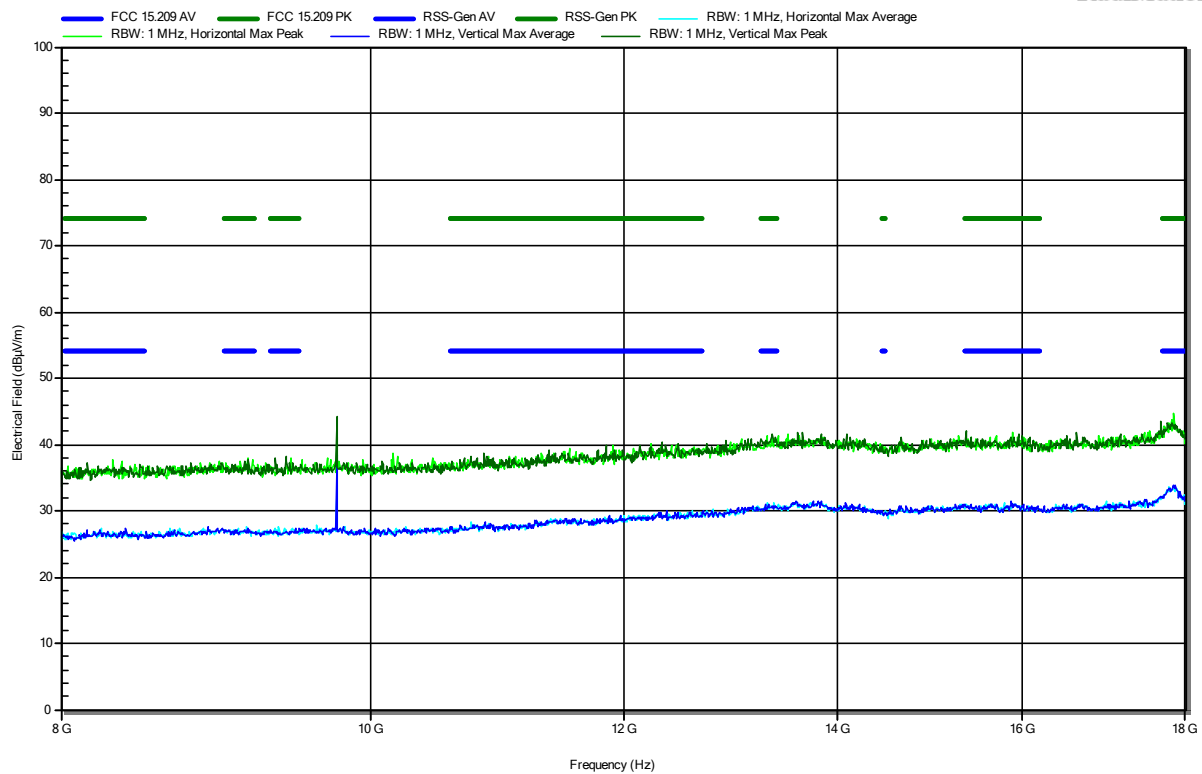
Frequency 4.8801 GHz	Peak 47.64 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -26.36 dB	Peak Status Pass	Polarization Vertical
Frequency 4.8801 GHz	Average 42.19 dBμV/m	Average Limit 54 dBμV/m	Average Difference -11.81 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; LE, 2440 MHz, Power Level 13, 1 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note:

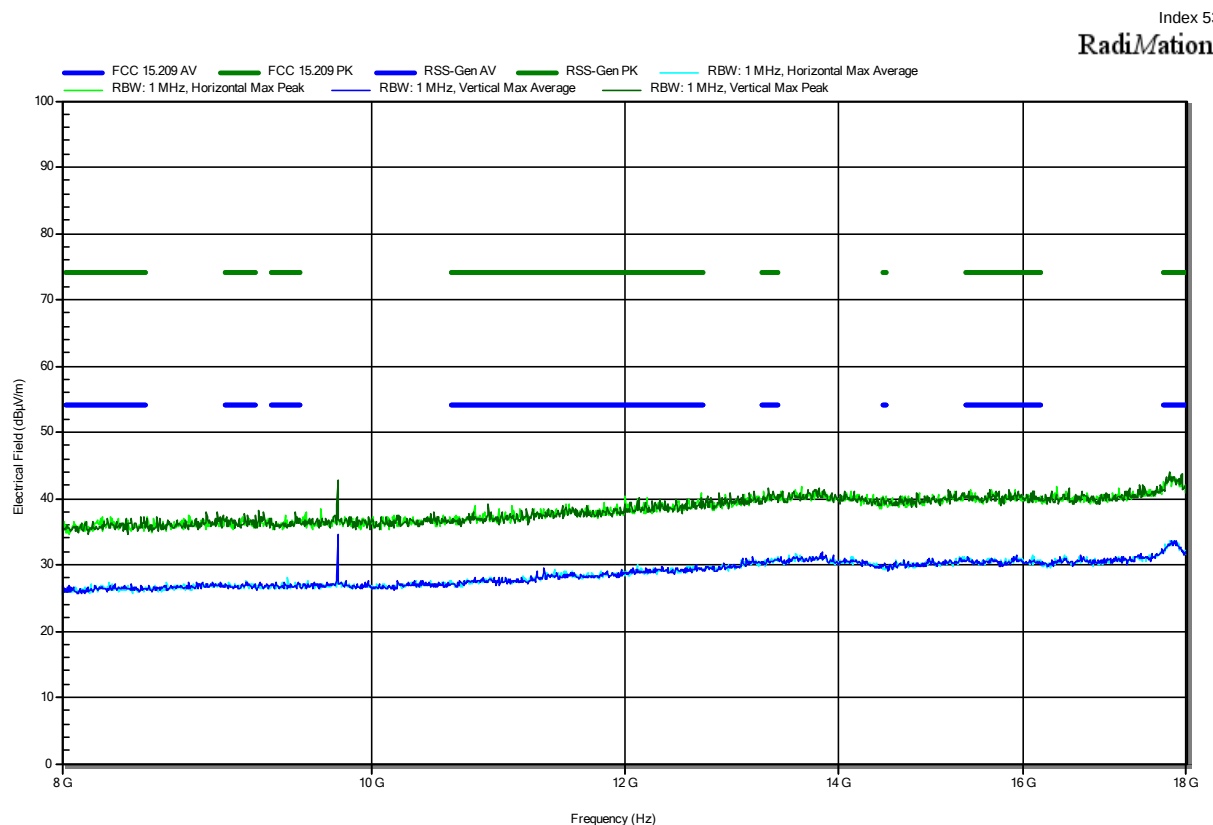
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RadiMation



Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; LE, 2440 MHz, Power Level 13, 2 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note:

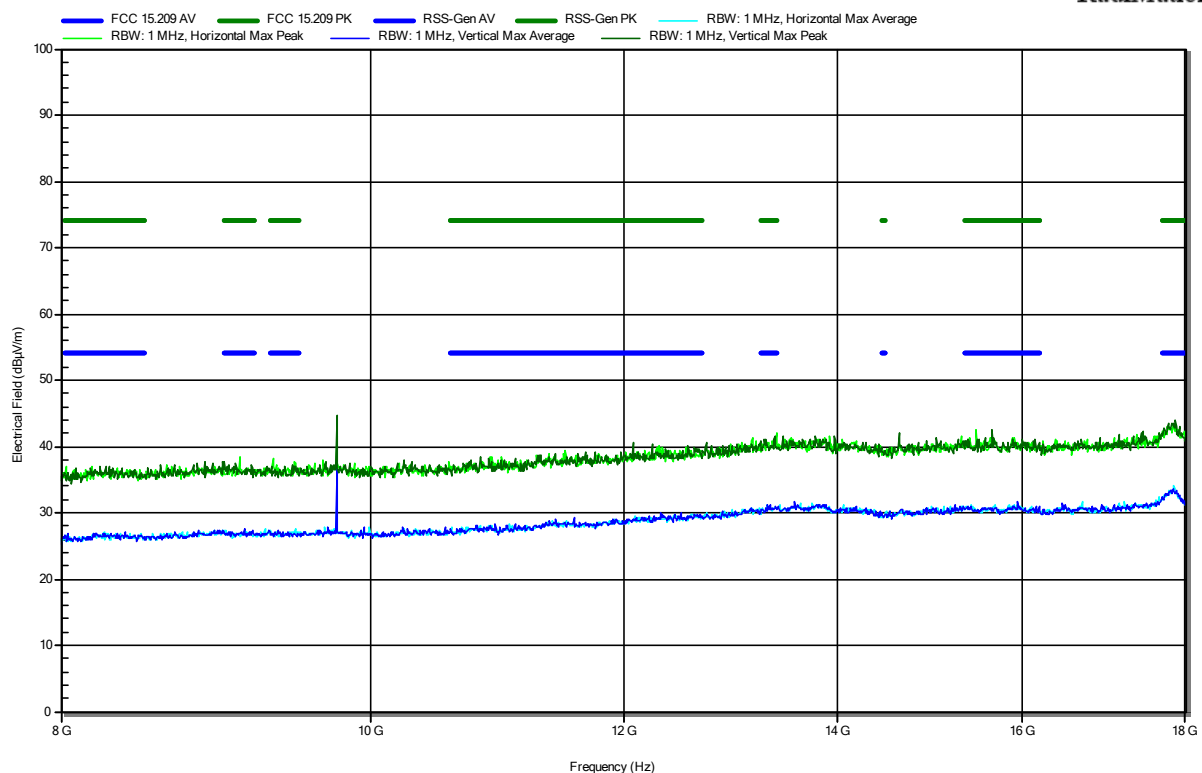


Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; LE, 2440 MHz, Power Level 13, Coding S2, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note:

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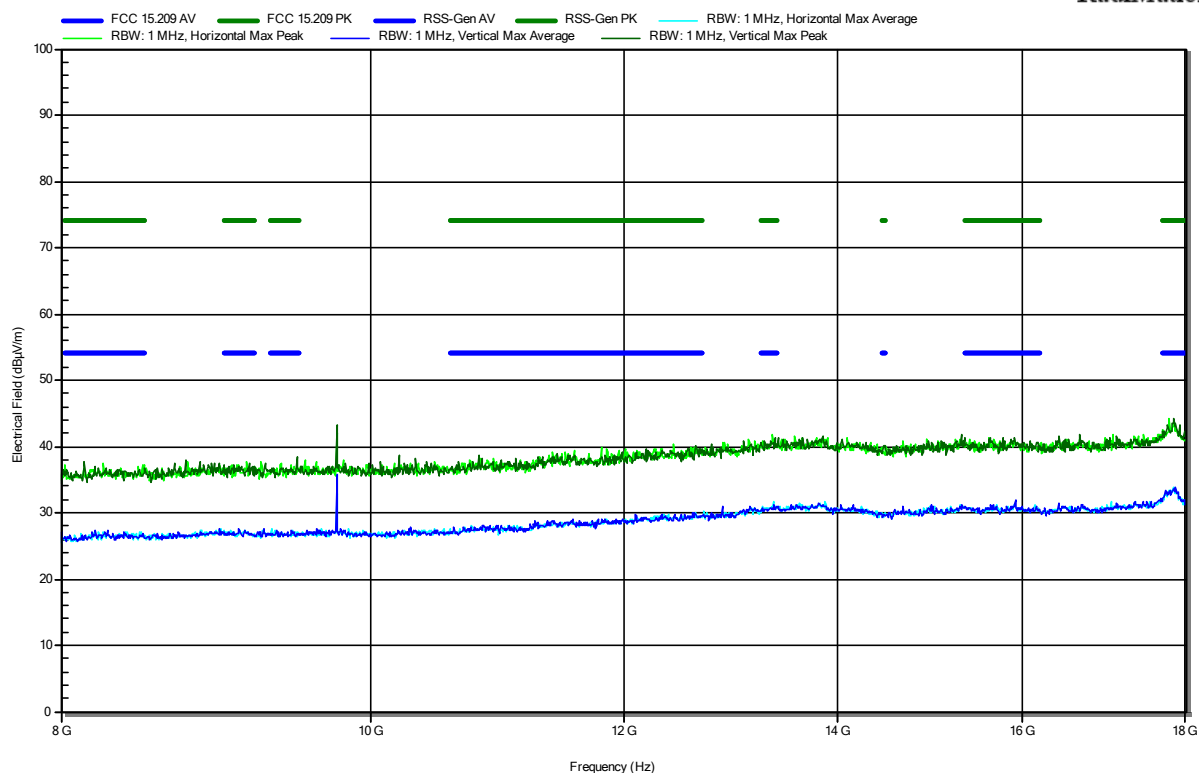


Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; LE, 2440 MHz, Power Level 13, Coding S8, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note:

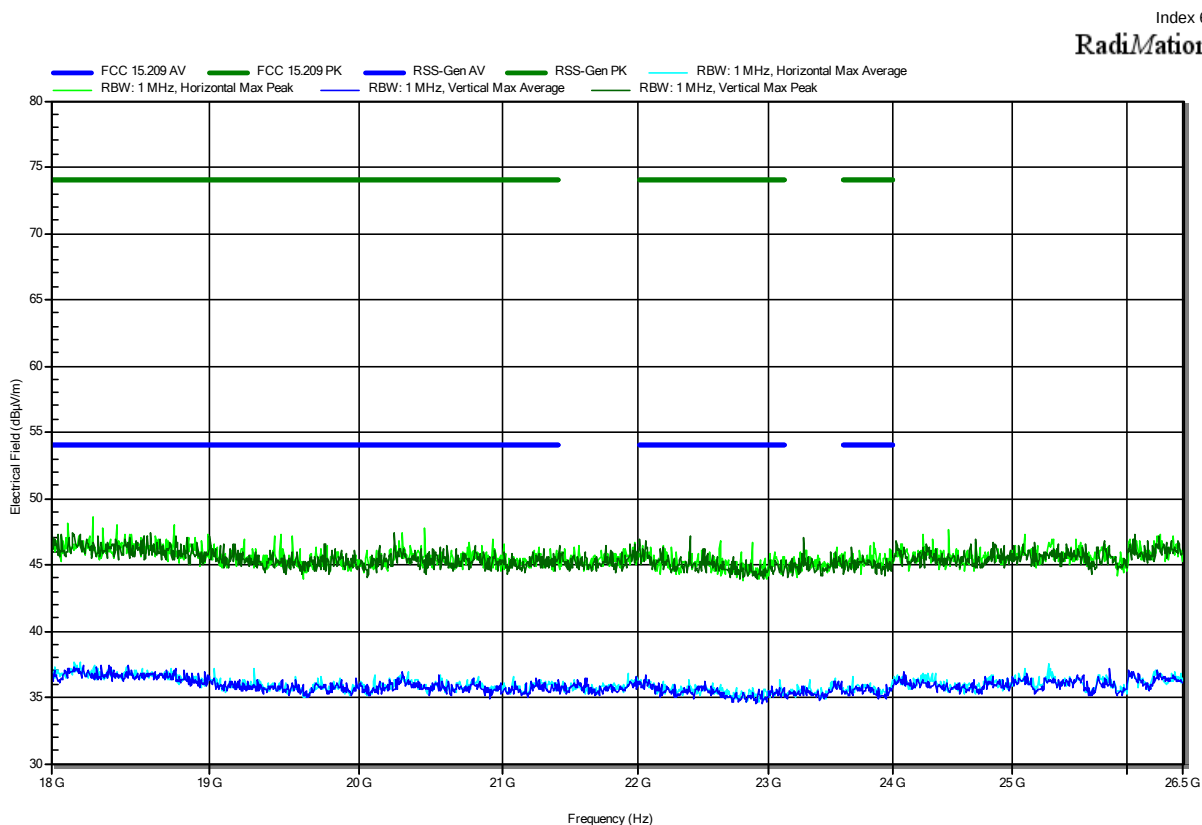
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RadiMation



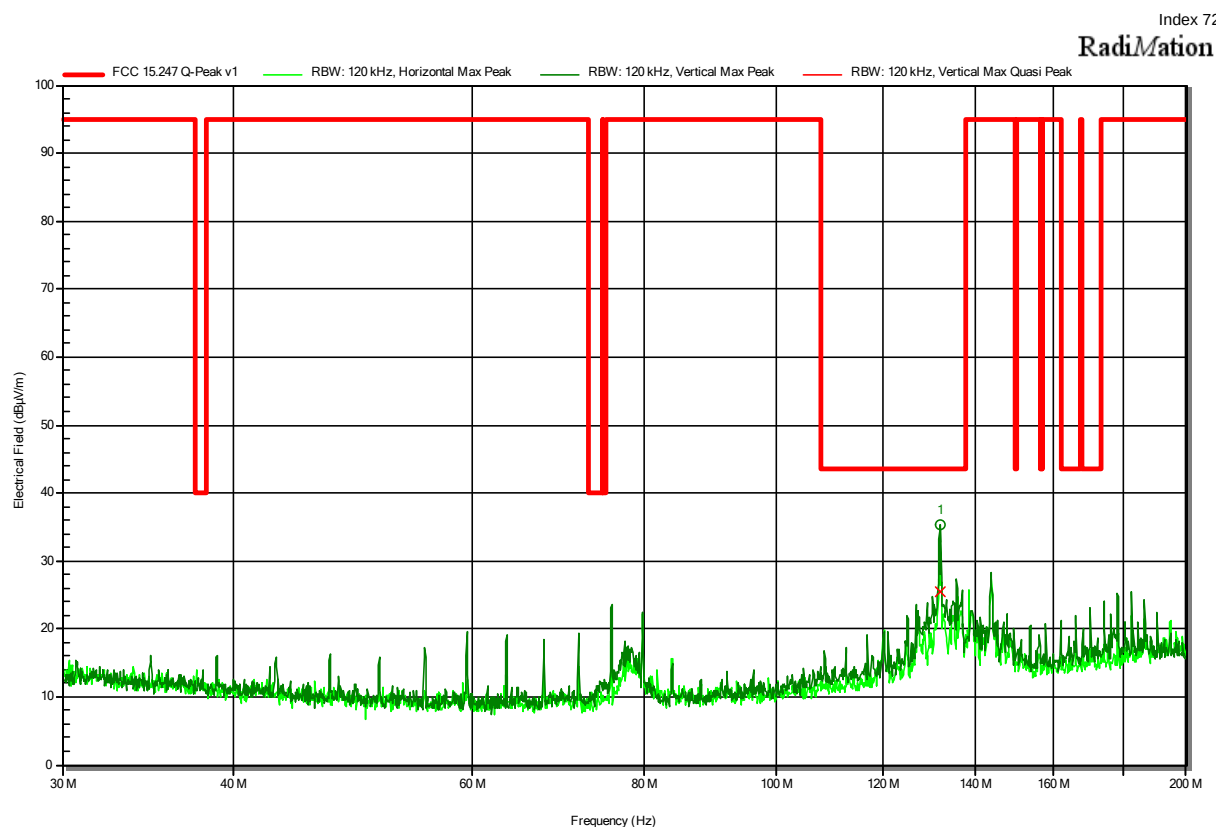
Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; LE, 2440 MHz, Power Level 13, 1 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note:



Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

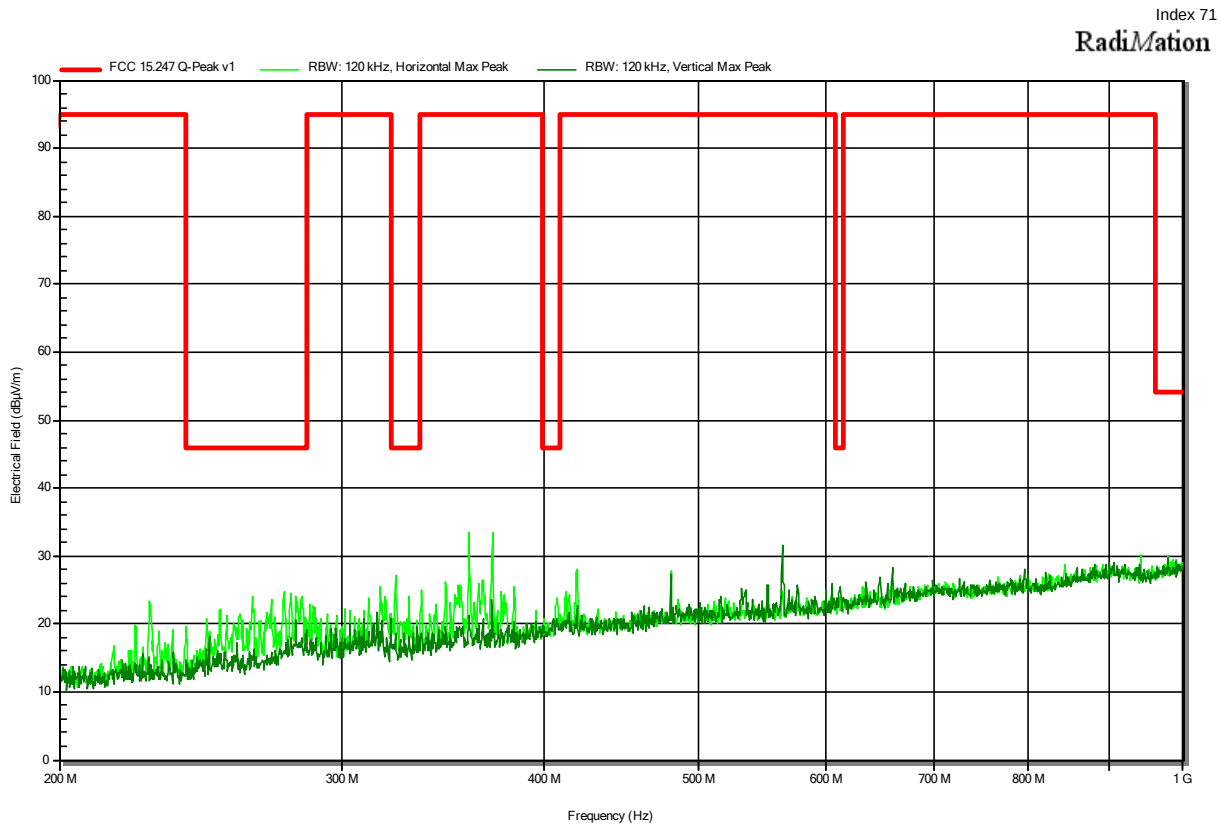
Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116
 Measurement distance: 3 m
 Mode: Tx; LE, 2480 MHz, Power Level 13, Coding S8, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-22
 Note:



Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Polarization
131.9306 MHz	25.4 dBµV/m	43.5 dBµV/m	-18.1 dB	Pass	Vertical

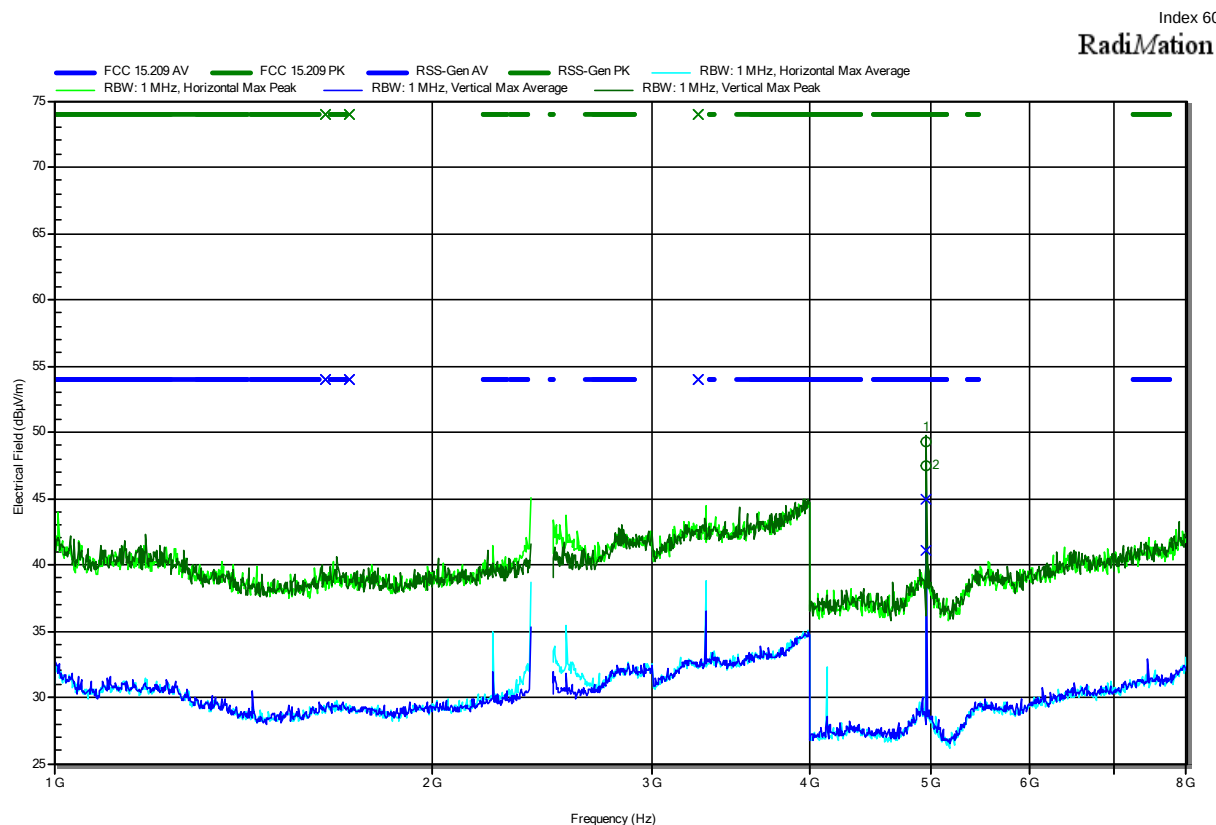
Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223
 Measurement distance: 3 m
 Mode: Tx; LE, 2480 MHz, Power Level 13, Coding S8, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-22
 Note:



Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2480 MHz, Power Level 13, Coding S8, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note:



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
4.96 GHz	47.43 dBμV/m	74 dBμV/m	-26.57 dB	Pass	Horizontal
4.96 GHz	49.26 dBμV/m	74 dBμV/m	-24.74 dB	Pass	Vertical

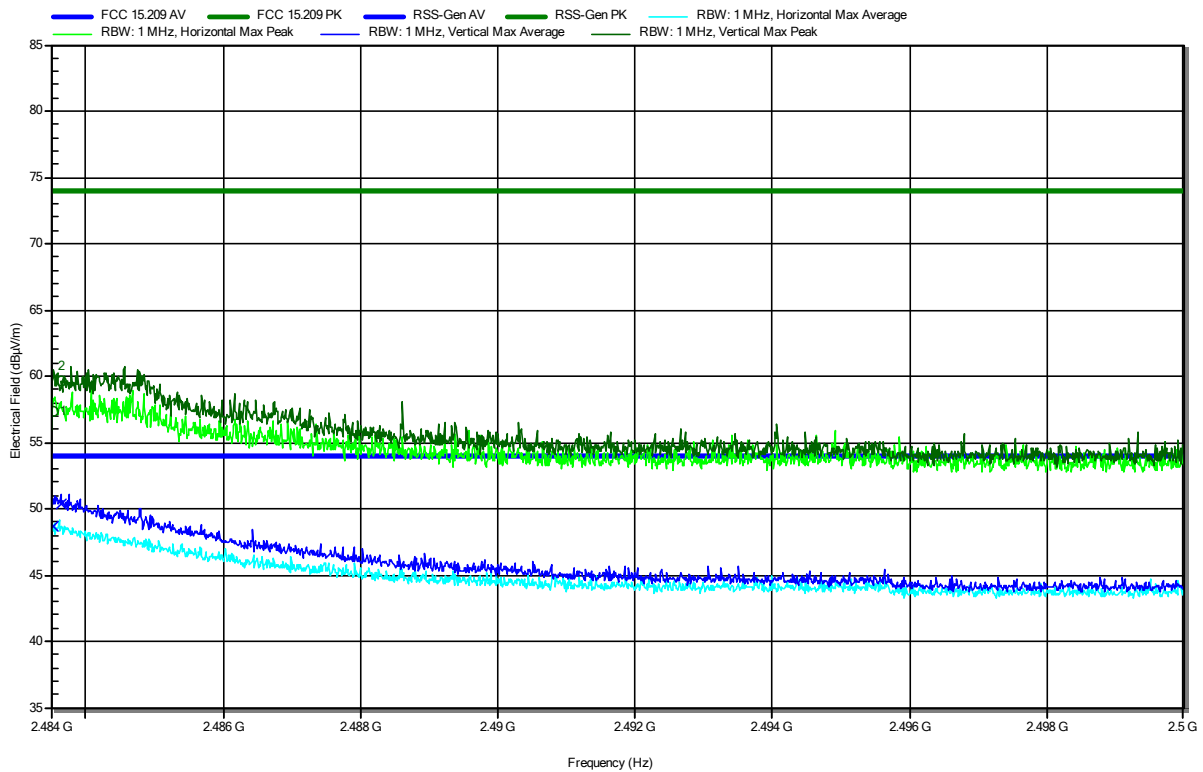
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
4.96 GHz	41.03 dBμV/m	54 dBμV/m	-12.97 dB	Pass	Horizontal
4.96 GHz	44.92 dBμV/m	54 dBμV/m	-9.08 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2480 MHz, Power Level 13, Coding S8, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note: upper bandedge

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.4835 GHz	57.29 dBμV/m	74 dBμV/m	-16.71 dB	Pass	Horizontal
2.4837 GHz	59.61 dBμV/m	74 dBμV/m	-14.39 dB	Pass	Vertical

Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.4835 GHz	48.66 dBμV/m	54 dBμV/m	-5.34 dB	Pass	Horizontal
2.4837 GHz	50.35 dBμV/m	54 dBμV/m	-3.65 dB	Pass	Vertical

Test Report No.: G0M-2205-1454-TFC247BL-V02

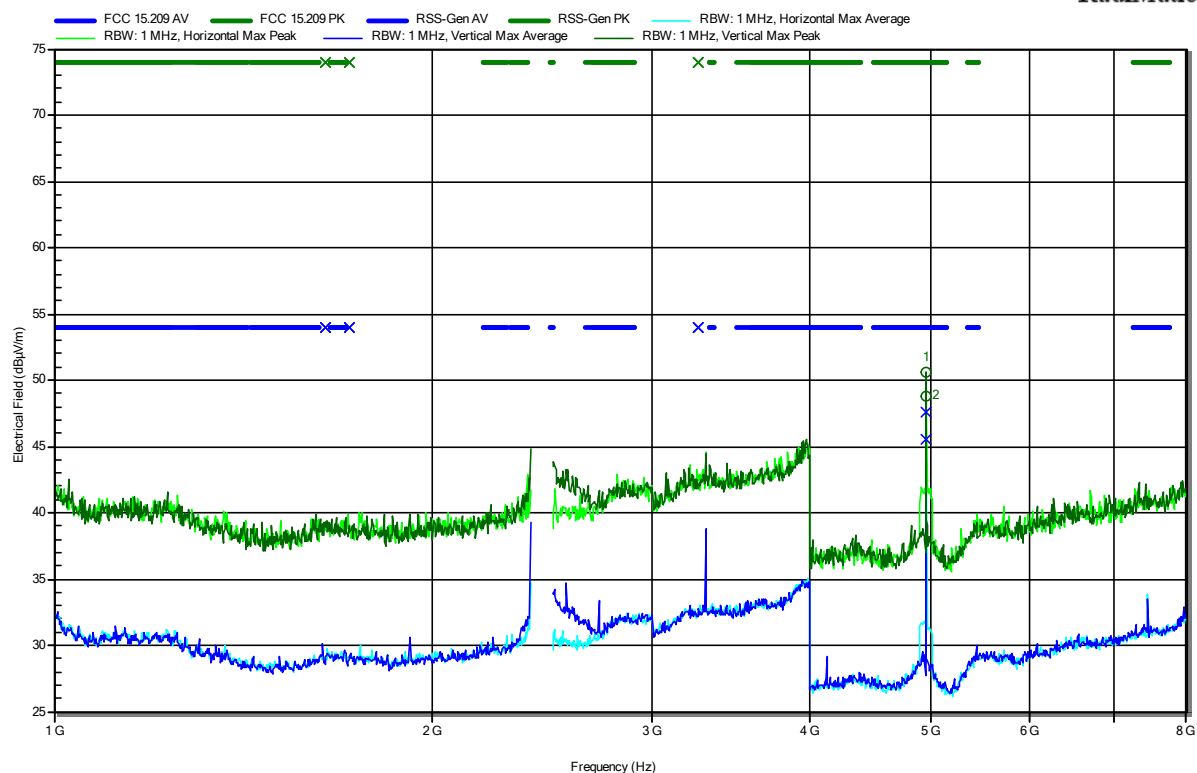
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2480 MHz, Power Level 13, 1 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-04
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
4.96 GHz	48.85 dBμV/m	74 dBμV/m	-25.15 dB	Pass	Horizontal
4.96 GHz	50.65 dBμV/m	74 dBμV/m	-23.35 dB	Pass	Vertical

Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
4.96 GHz	45.57 dBμV/m	54 dBμV/m	-8.43 dB	Pass	Horizontal
4.96 GHz	47.57 dBμV/m	54 dBμV/m	-6.43 dB	Pass	Vertical

Test Report No.: G0M-2205-1454-TFC247BL-V02

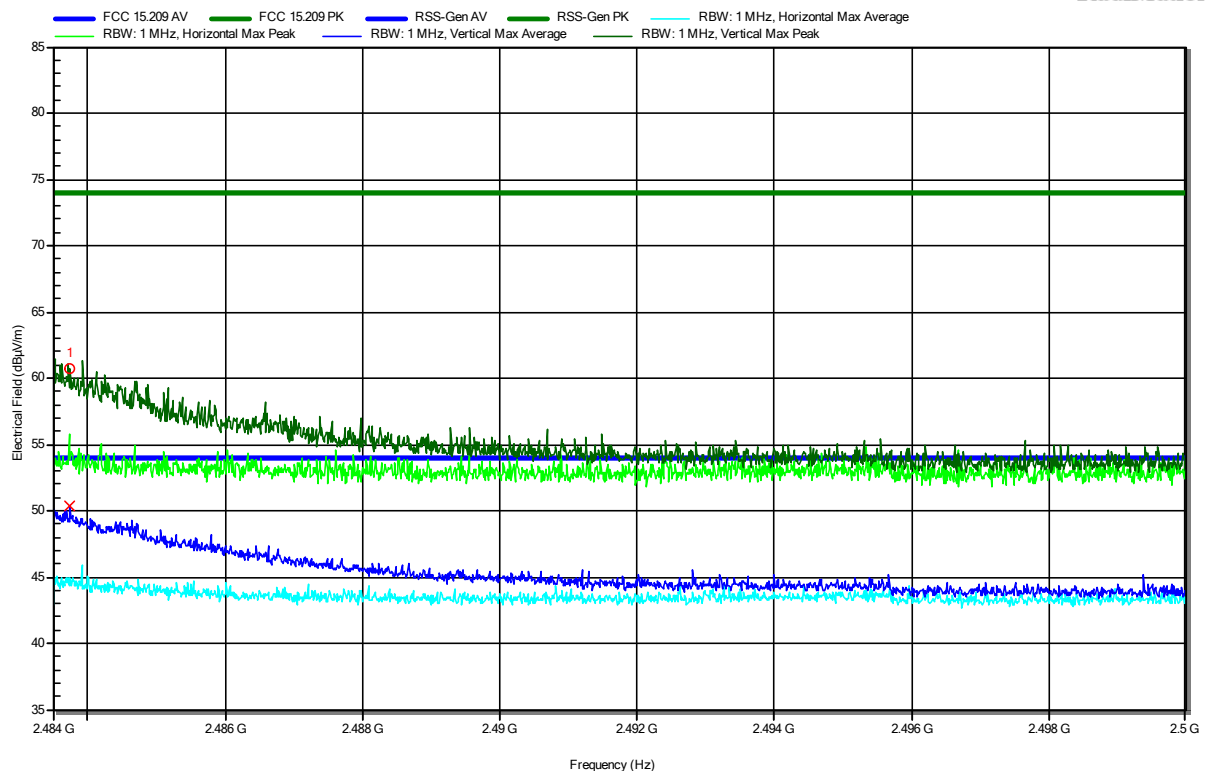
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2480 MHz, Power Level 13, 1 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-04
 Note: upper bandedge

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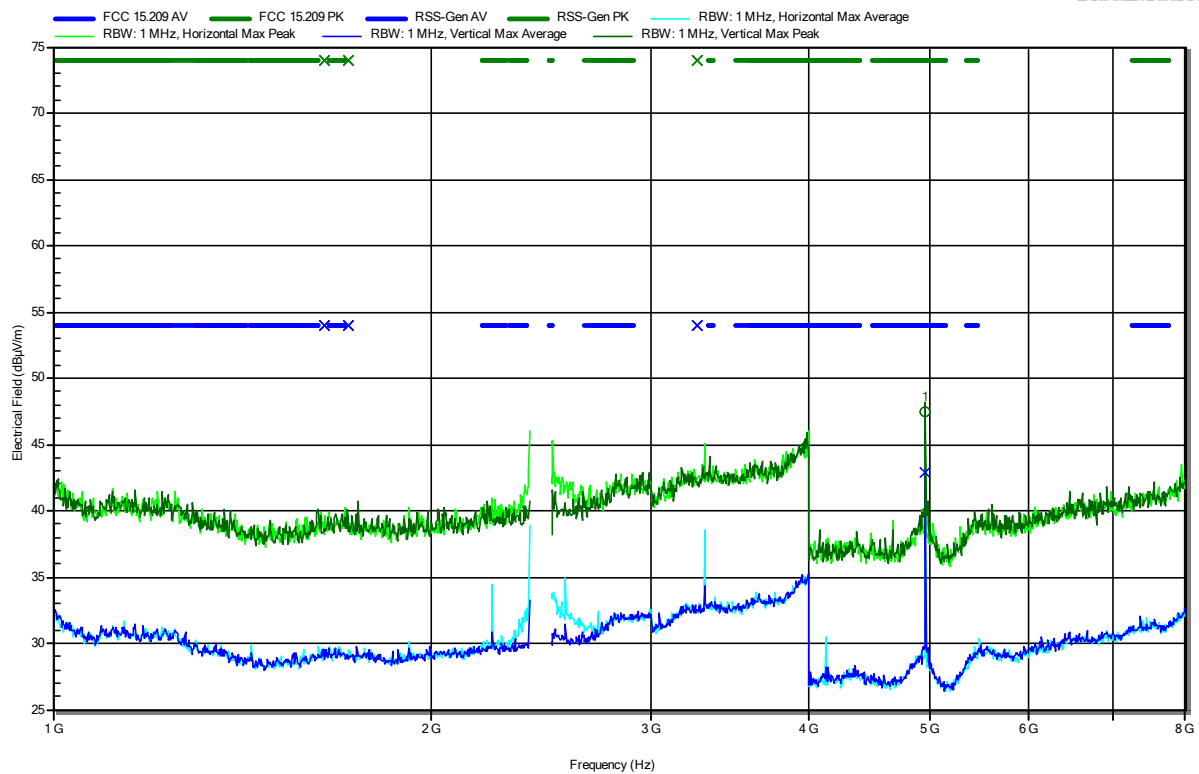
Frequency 2.4837 GHz	Peak 60.72 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -13.28 dB	Peak Status Pass	Polarization Vertical
Frequency 2.4837 GHz	Average 50.33 dBμV/m	Average Limit 54 dBμV/m	Average Difference -3.67 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2480 MHz, Power Level 13, 2 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note:

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Frequency 4.96 GHz	Peak 47.47 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -26.53 dB	Peak Status Pass	Polarization Vertical
Frequency 4.96 GHz	Average 42.9 dBμV/m	Average Limit 54 dBμV/m	Average Difference -11.1 dB	Average Status Pass	Polarization Vertical

Test Report No.: G0M-2205-1454-TFC247BL-V02

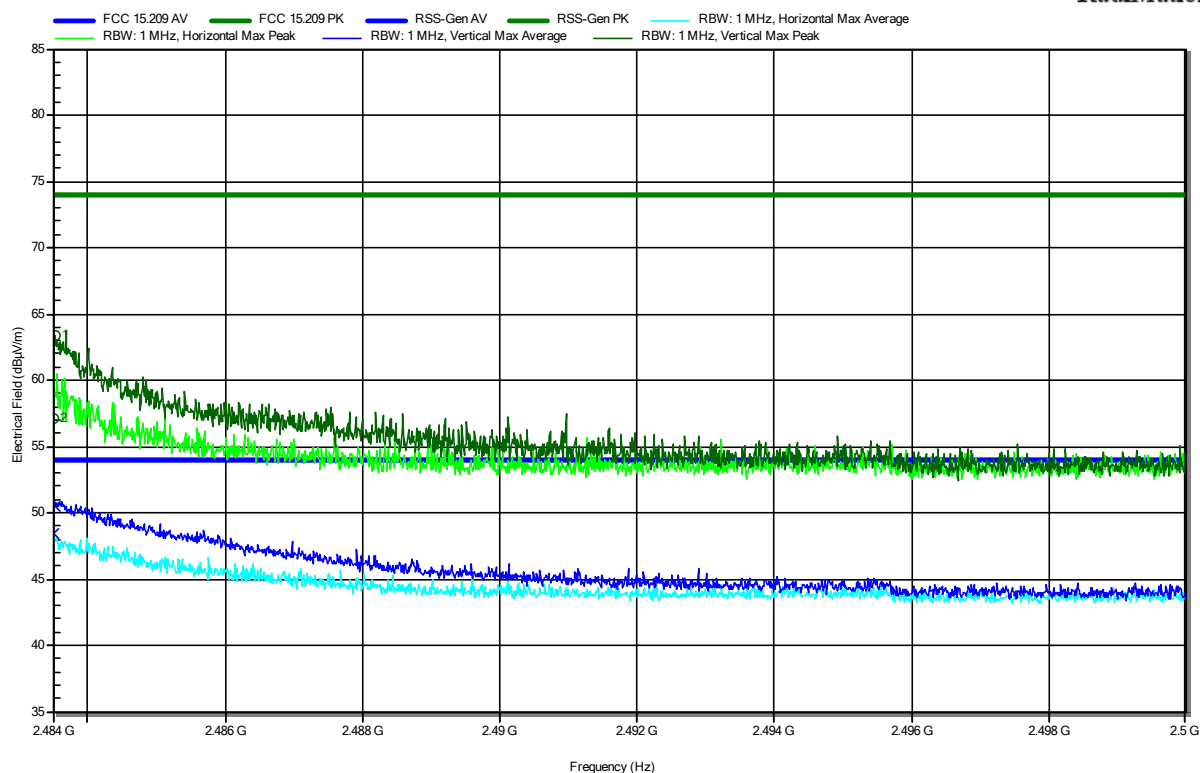
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2480 MHz, Power Level 13, 2 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note: upper bandedge

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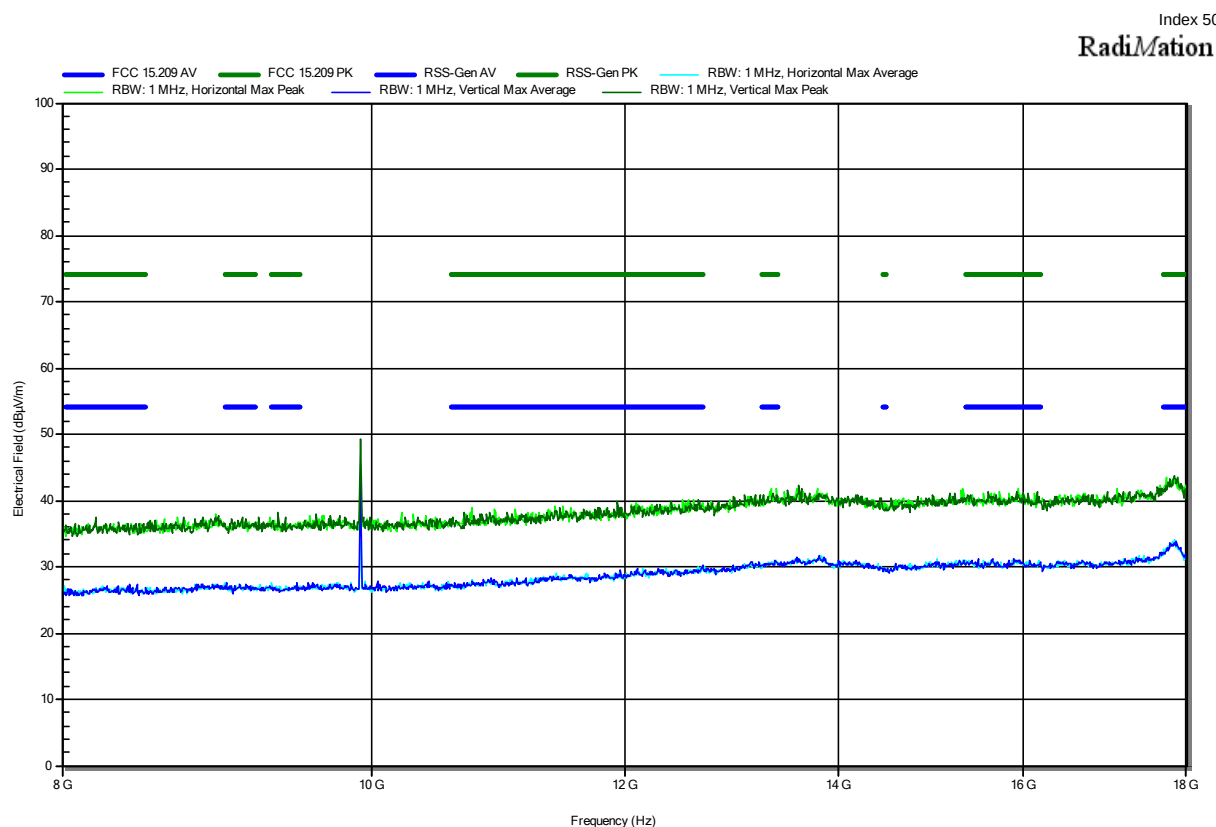


Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.4835 GHz	57.06 dBμV/m	74 dBμV/m	-16.94 dB	Pass	Horizontal
2.4835 GHz	63.33 dBμV/m	74 dBμV/m	-10.67 dB	Pass	Vertical

Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.4835 GHz	48.38 dBμV/m	54 dBμV/m	-5.62 dB	Pass	Horizontal
2.4835 GHz	50.44 dBμV/m	54 dBμV/m	-3.56 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; LE, 2480 MHz, Power Level 13, 1 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note:

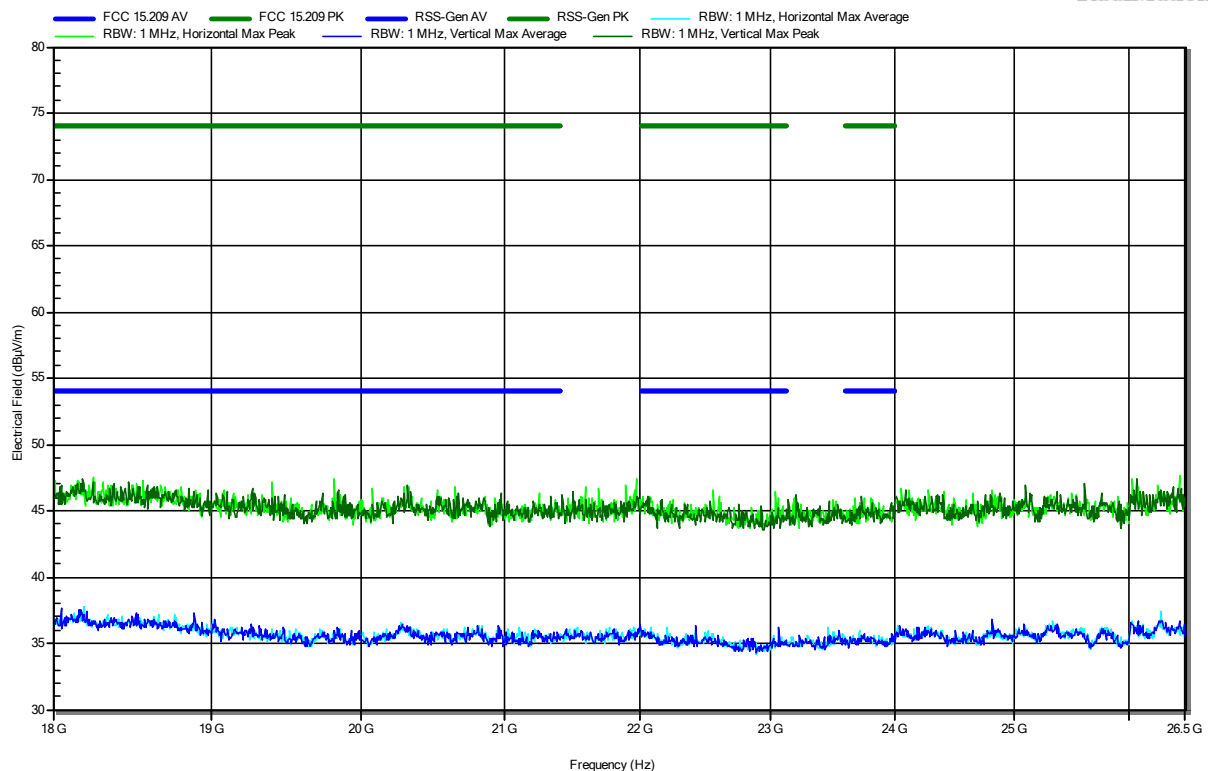


Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; LE, 2480 MHz, Power Level 13, 1 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note:

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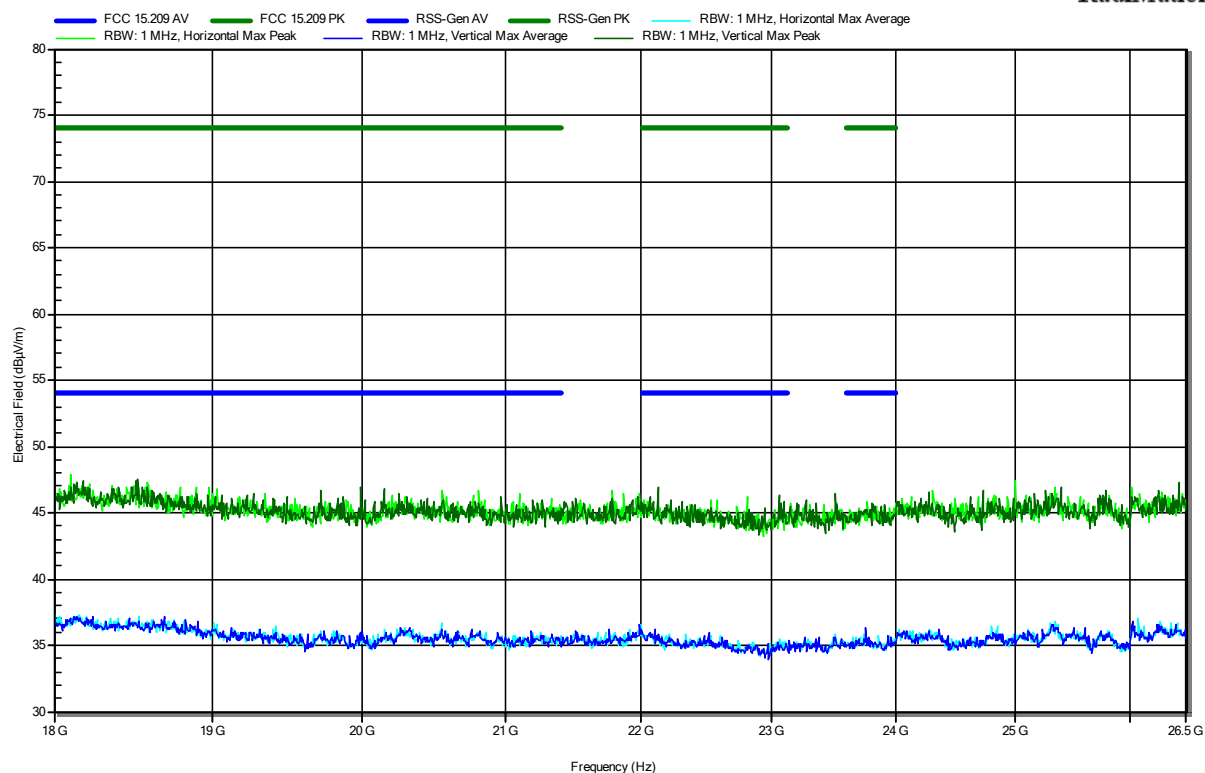


Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 40679
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; LE, 2480 MHz, Power Level 13, 2 Mbps, 2-GFSK, PRBS9, EUT vertical
 Test Date: 2022-08-05
 Note:

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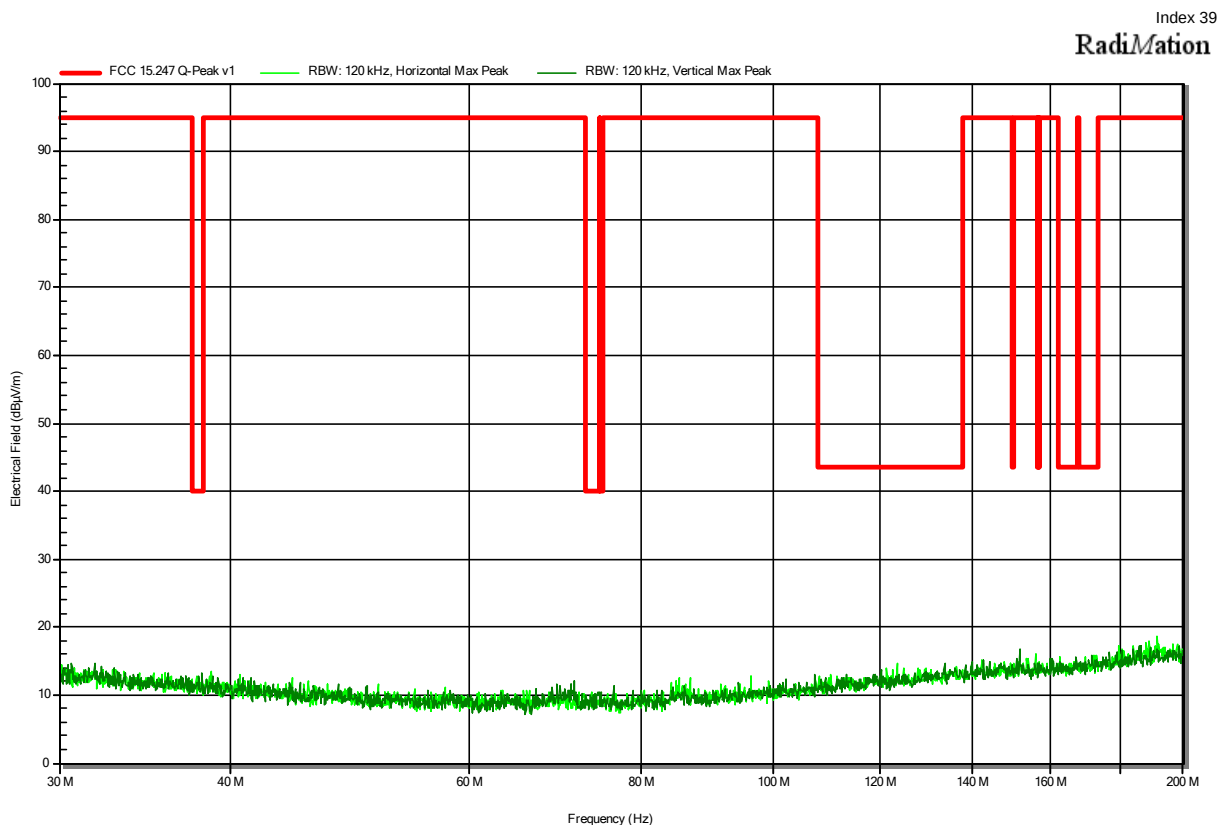
RadiMation



ANNEX B Transmitter spurious emissions (Tested variant 1)

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116
 Measurement distance: 3 m
 Mode: Tx; LE, 2402 MHz, 1 Mbps, PBRs9, EUT horizontal
 Test Date: 2022-08-03
 Note:

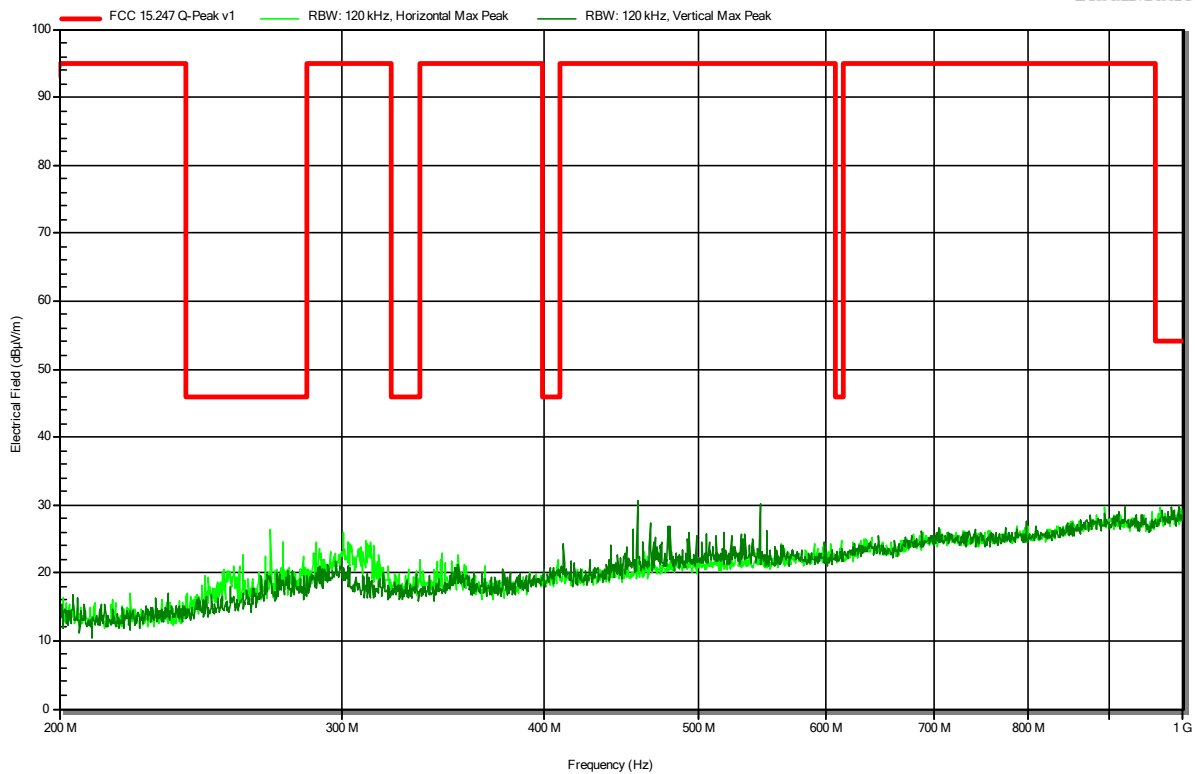


Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223
 Measurement distance: 3 m
 Mode: Tx; LE, 2402 MHz, 1 Mbps, PBR9, EUT horizontal
 Test Date: 2022-08-03
 Note:

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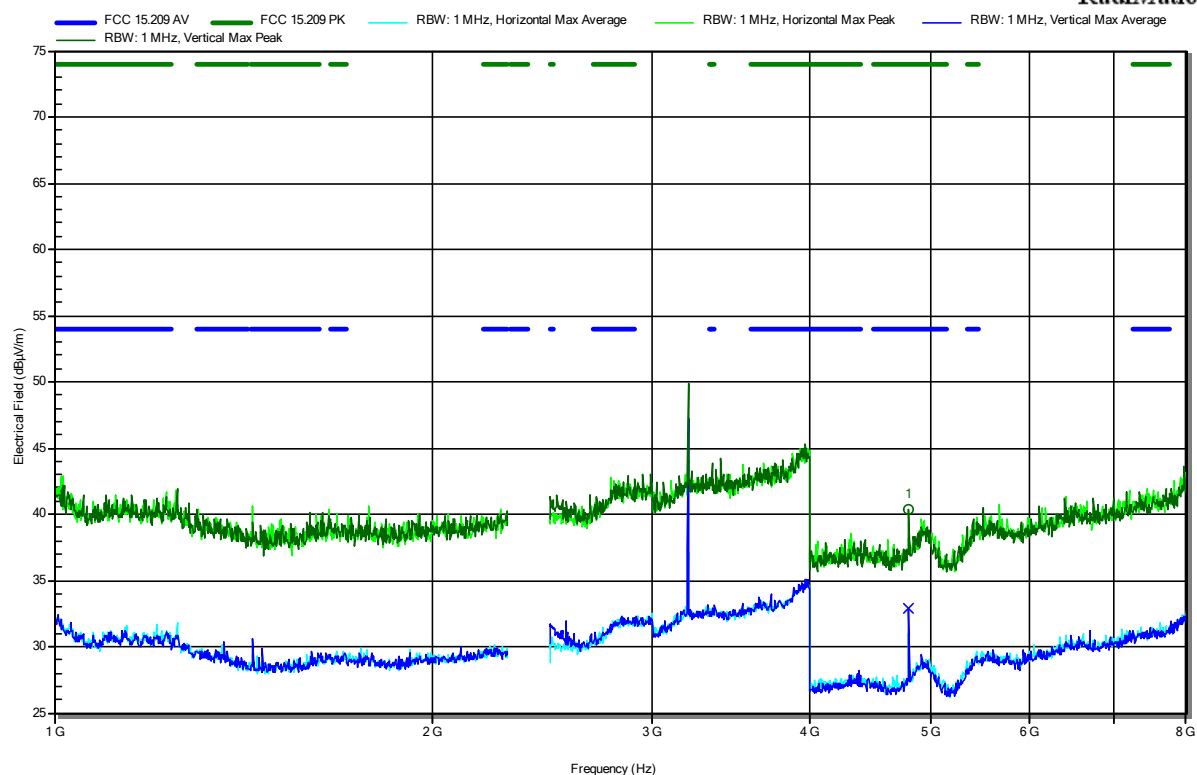


Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2402 MHz, 1 Mbps, PBR9, EUT vertical
 Test Date: 2022-08-10
 Note:

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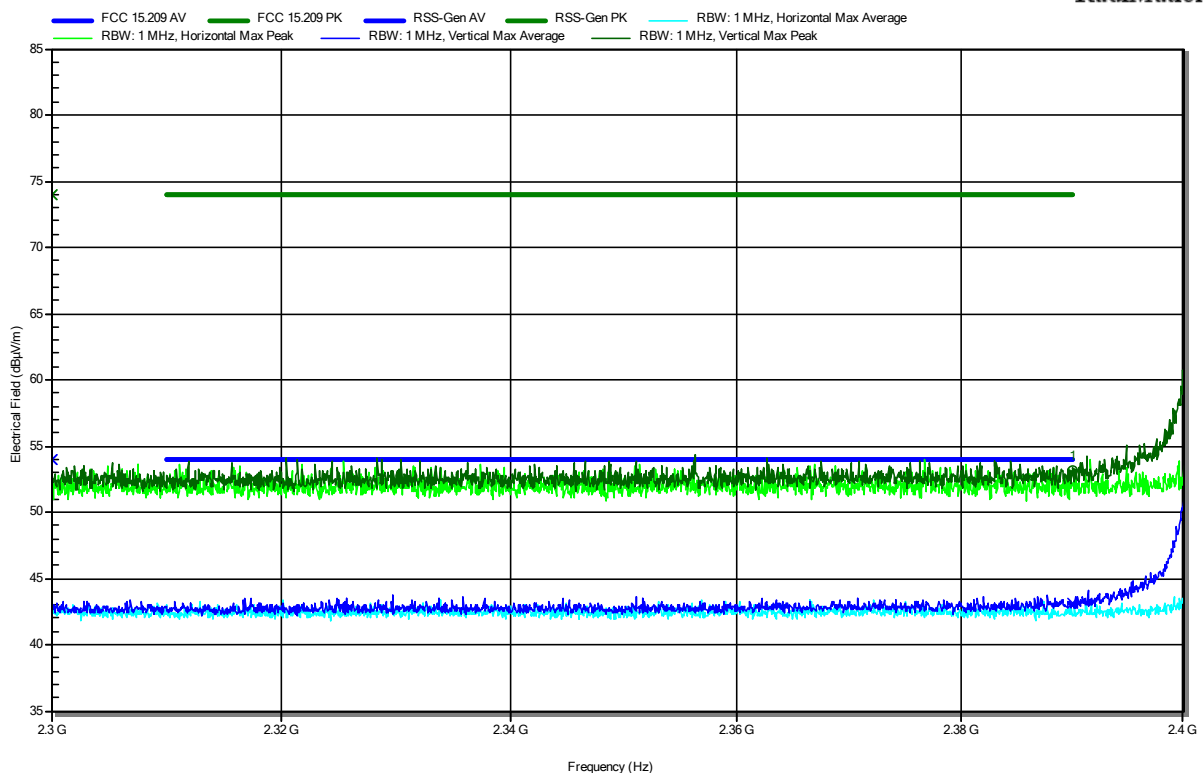
Frequency 4.8041 GHz	Peak 40.4 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -33.6 dB	Peak Status Pass	Polarization Vertical
Frequency 4.8041 GHz	Average 32.84 dBμV/m	Average Limit 54 dBμV/m	Average Difference -21.16 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2402 MHz, 1 Mbps, PBRs9, EUT vertical
 Test Date: 2022-08-10
 Note: lower bandedge

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.39 GHz	53.12 dBµV/m	74 dBµV/m	-20.88 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.39 GHz	43.11 dBµV/m	54 dBµV/m	-10.89 dB	Pass	Vertical

Test Report No.: G0M-2205-1454-TFC247BL-V02

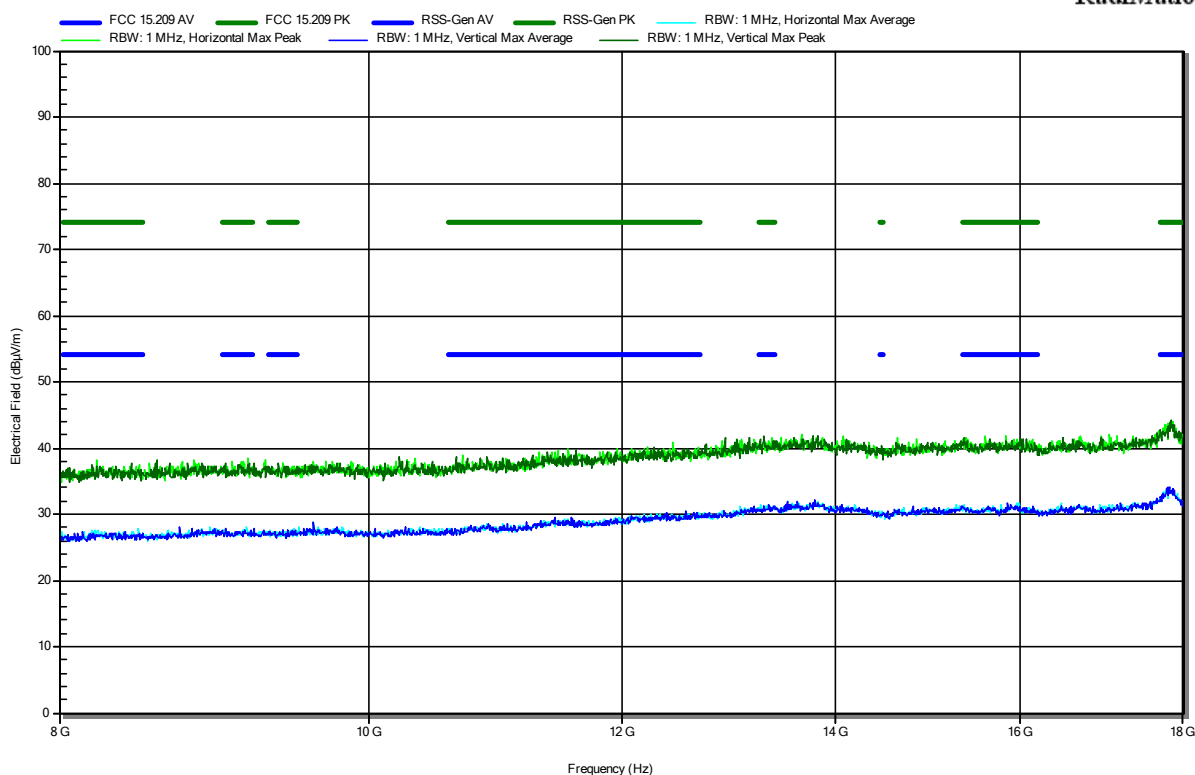
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 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: Tx; LE, 2402 MHz, Coding S8, PBR9, EUT vertical
 Test Date: 2022-08-10
 Note:

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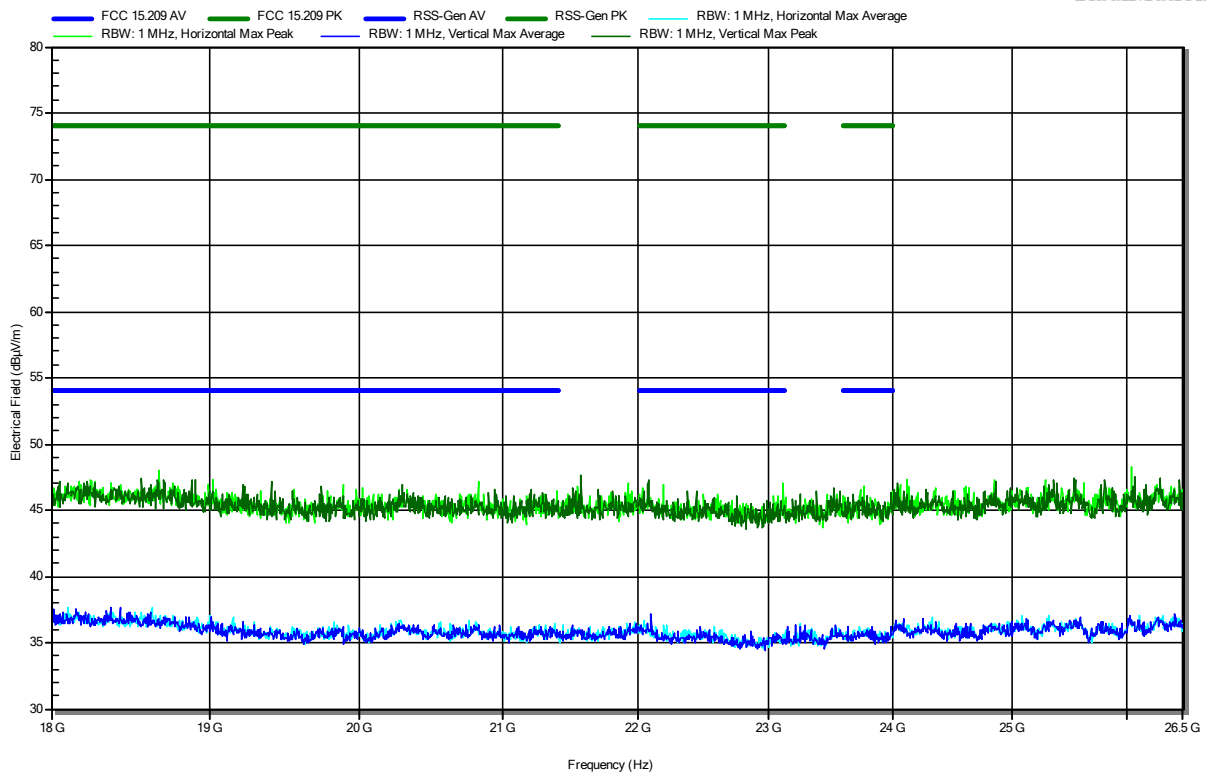


Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; LE, 2402 MHz, Coding S8, PBRs9, EUT vertical
 Test Date: 2022-08-10
 Note:

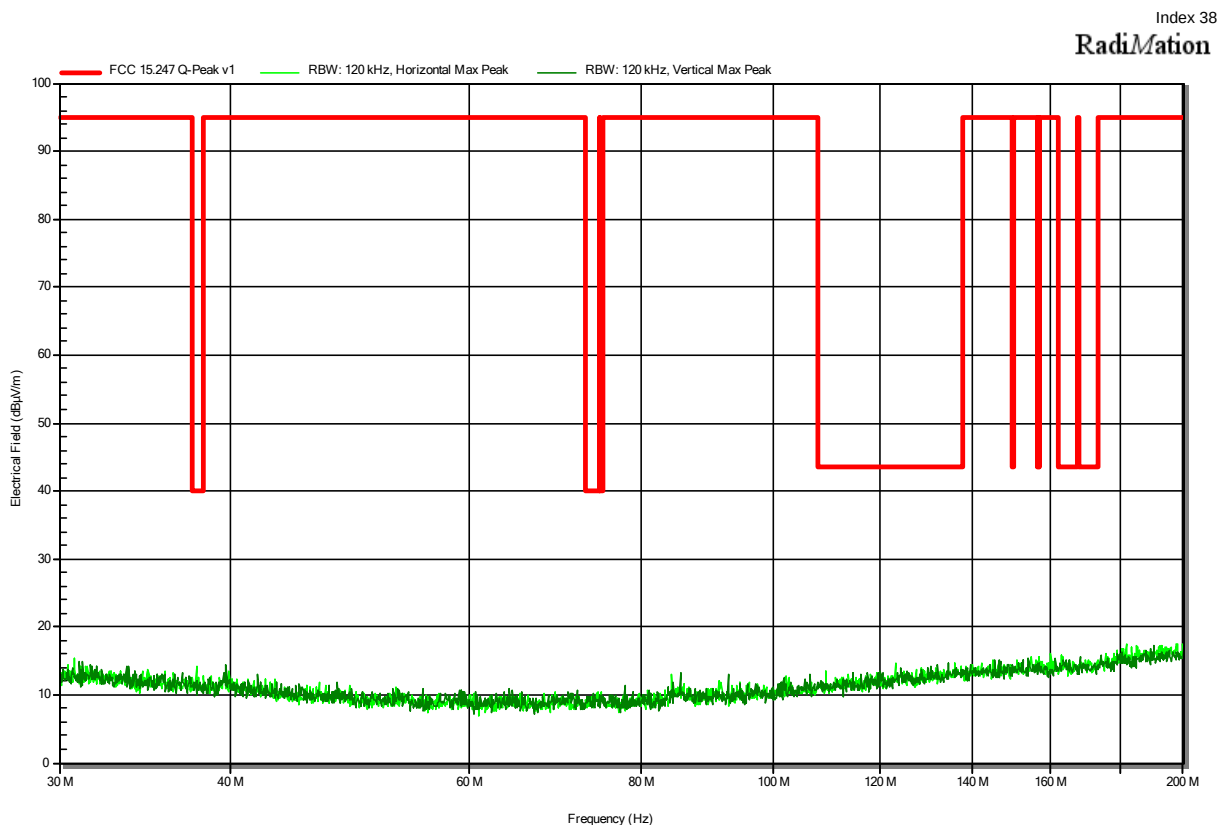
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RadiMation



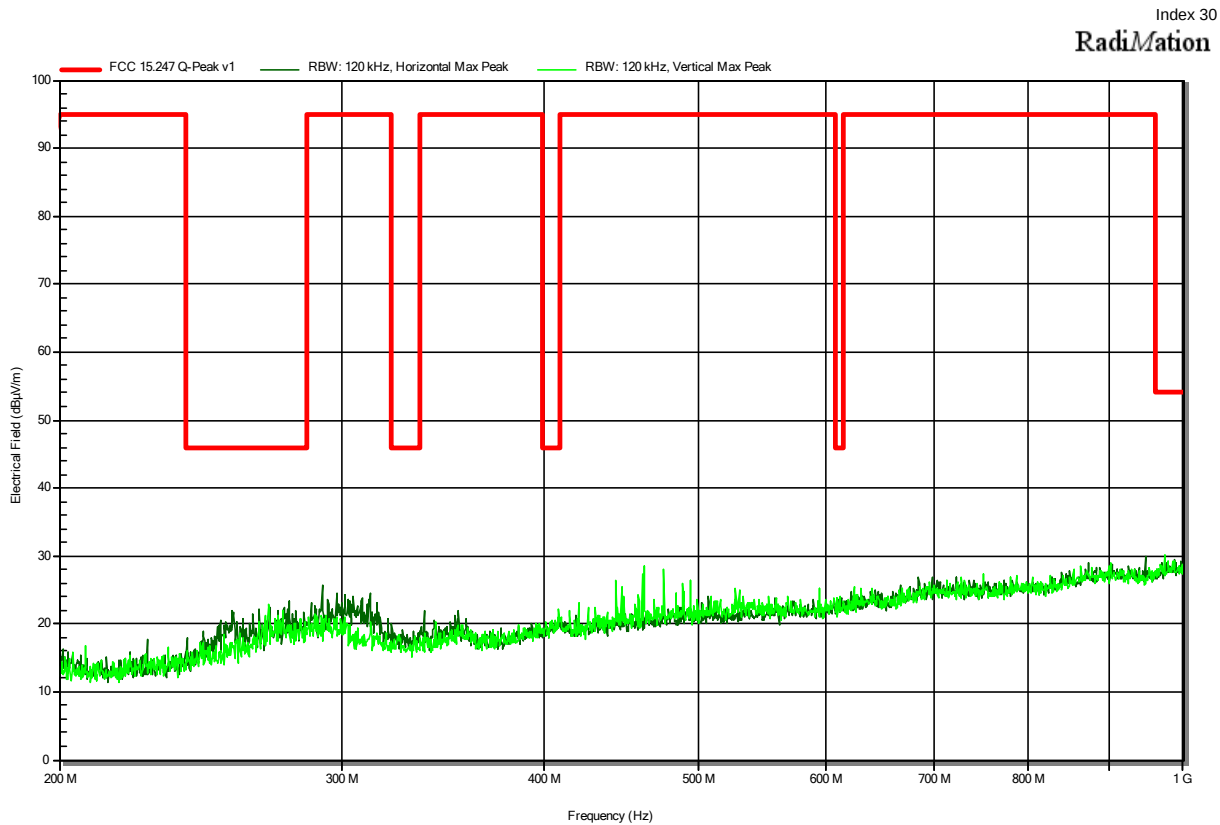
Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116
 Measurement distance: 3 m
 Mode: Tx; LE, 2440 MHz, 1 Mbps, PBR9, EUT horizontal
 Test Date: 2022-08-03
 Note:



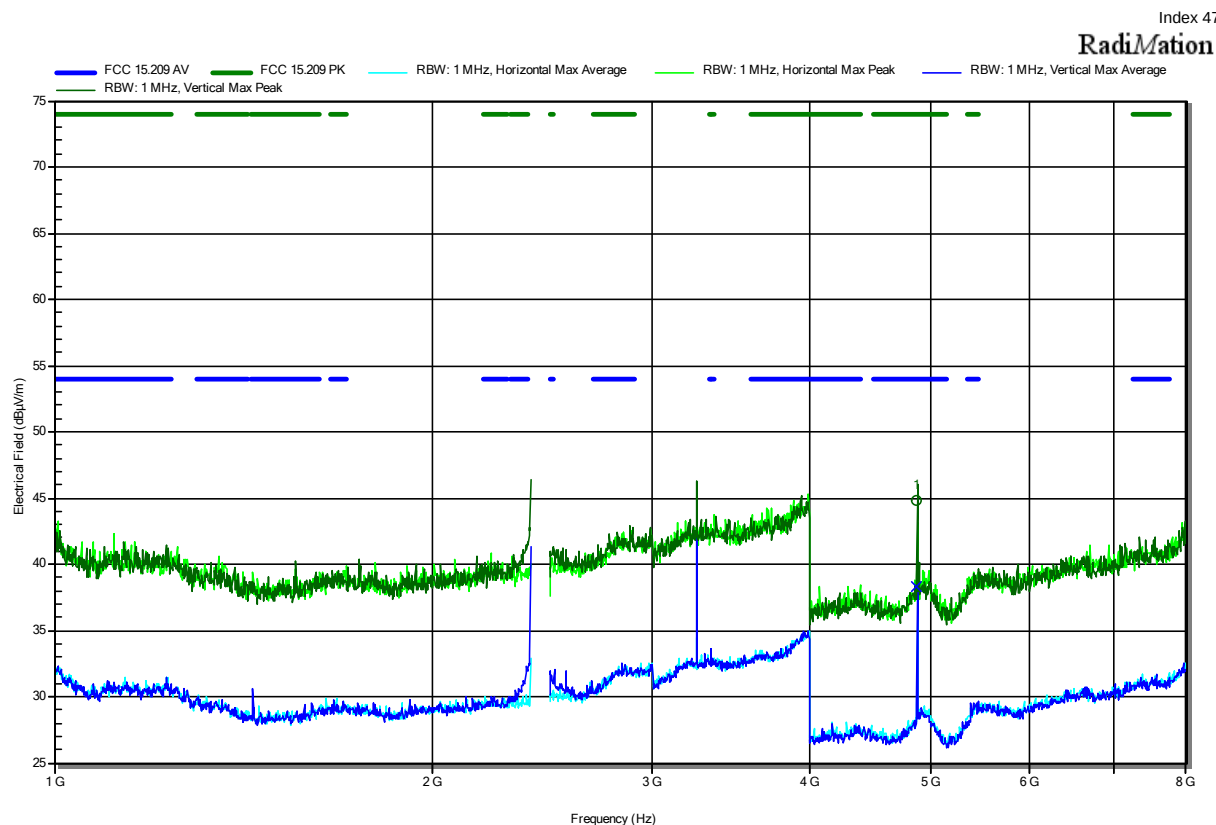
Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223
 Measurement distance: 3 m
 Mode: Tx; LE, 2440 MHz, 1 Mbps, PBR9, EUT horizontal
 Test Date: 2022-08-03
 Note:



Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2440 MHz, Coding S8, PBRs9, EUT vertical
 Test Date: 2022-08-10
 Note:



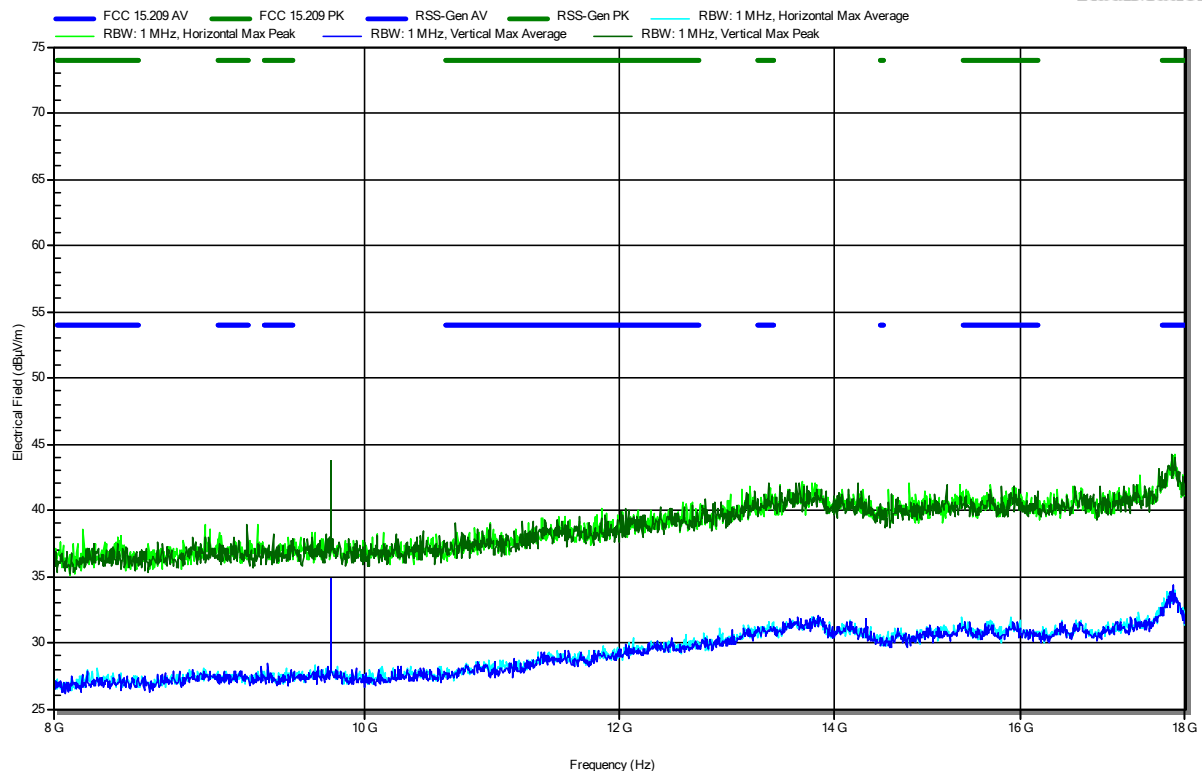
Frequency 4.8799 GHz	Peak 44.82 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -29.18 dB	Peak Status Pass	Polarization Vertical
Frequency 4.8799 GHz	Average 38.36 dBµV/m	Average Limit 54 dBµV/m	Average Difference -15.64 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 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: Tx; LE, 2440 MHz, Coding S8, PBRs9, EUT vertical
 Test Date: 2022-08-10
 Note:

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RadiMation

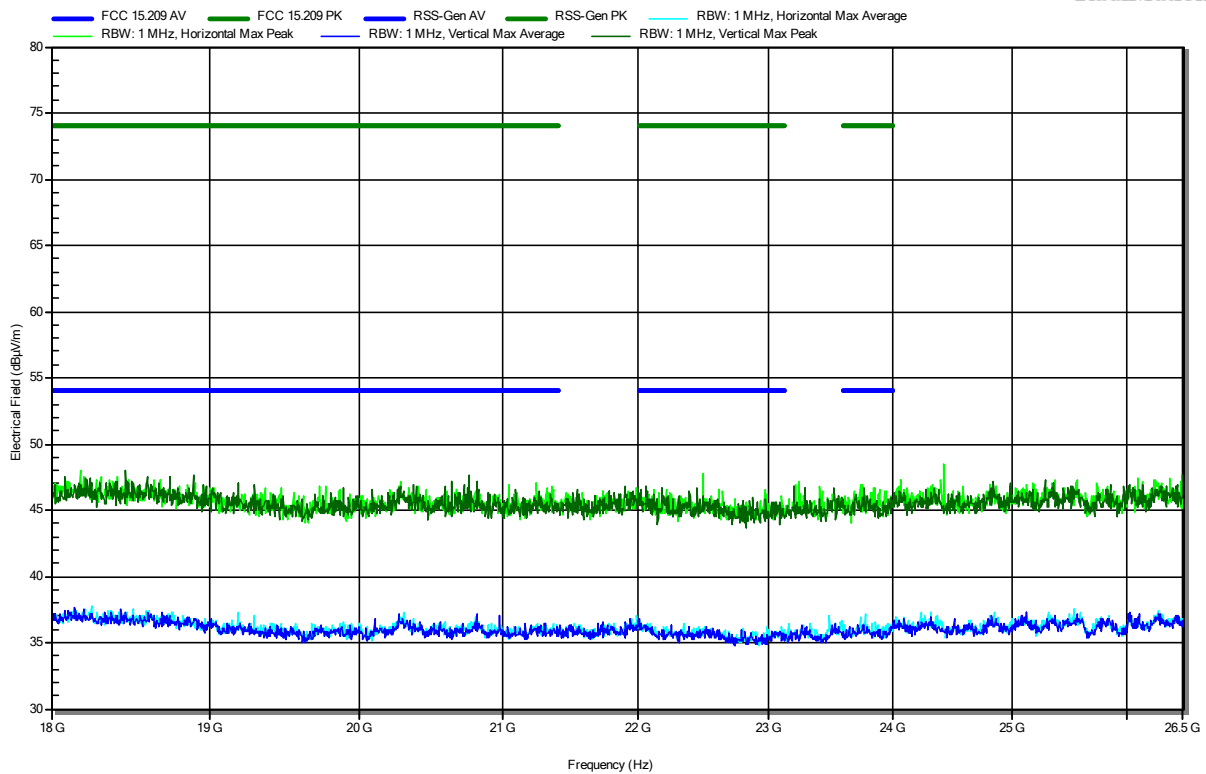


Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; LE, 2440 MHz, Coding S8, PBR9, EUT vertical
 Test Date: 2022-08-10
 Note:

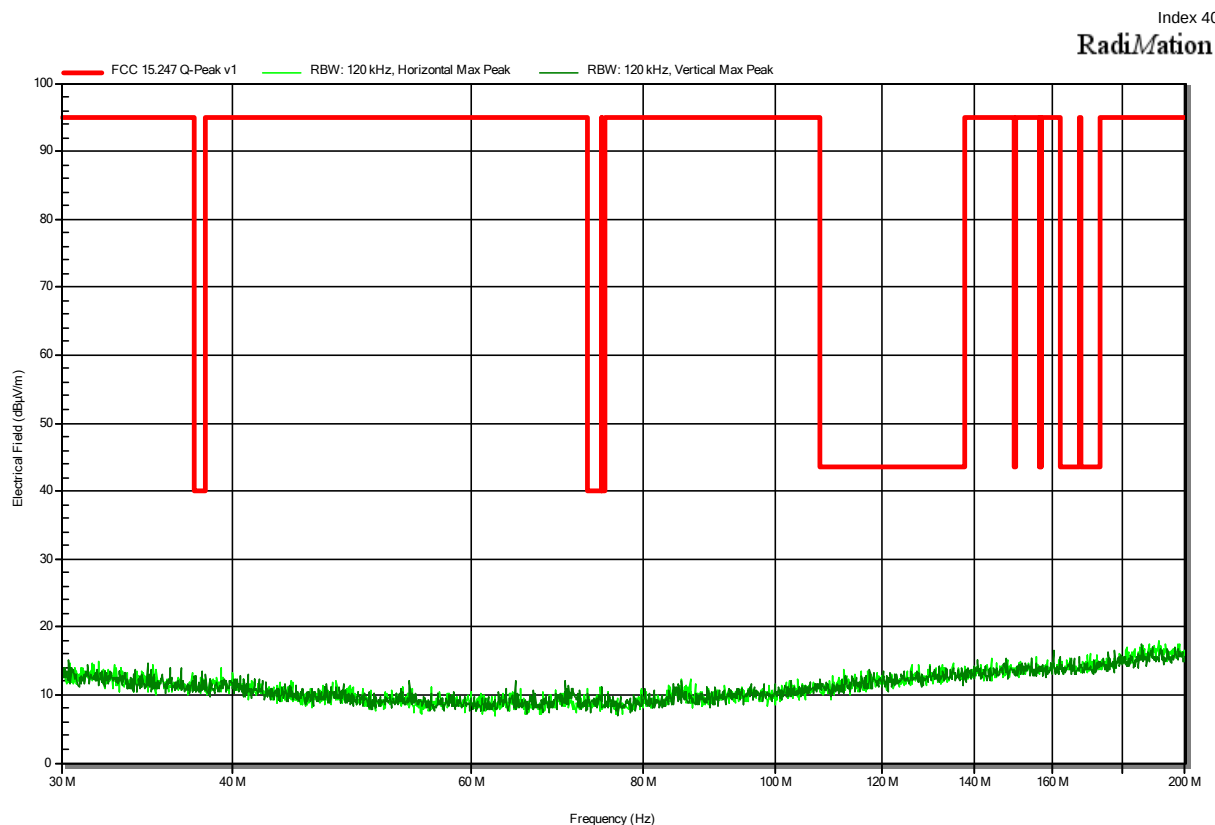
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RadiMation



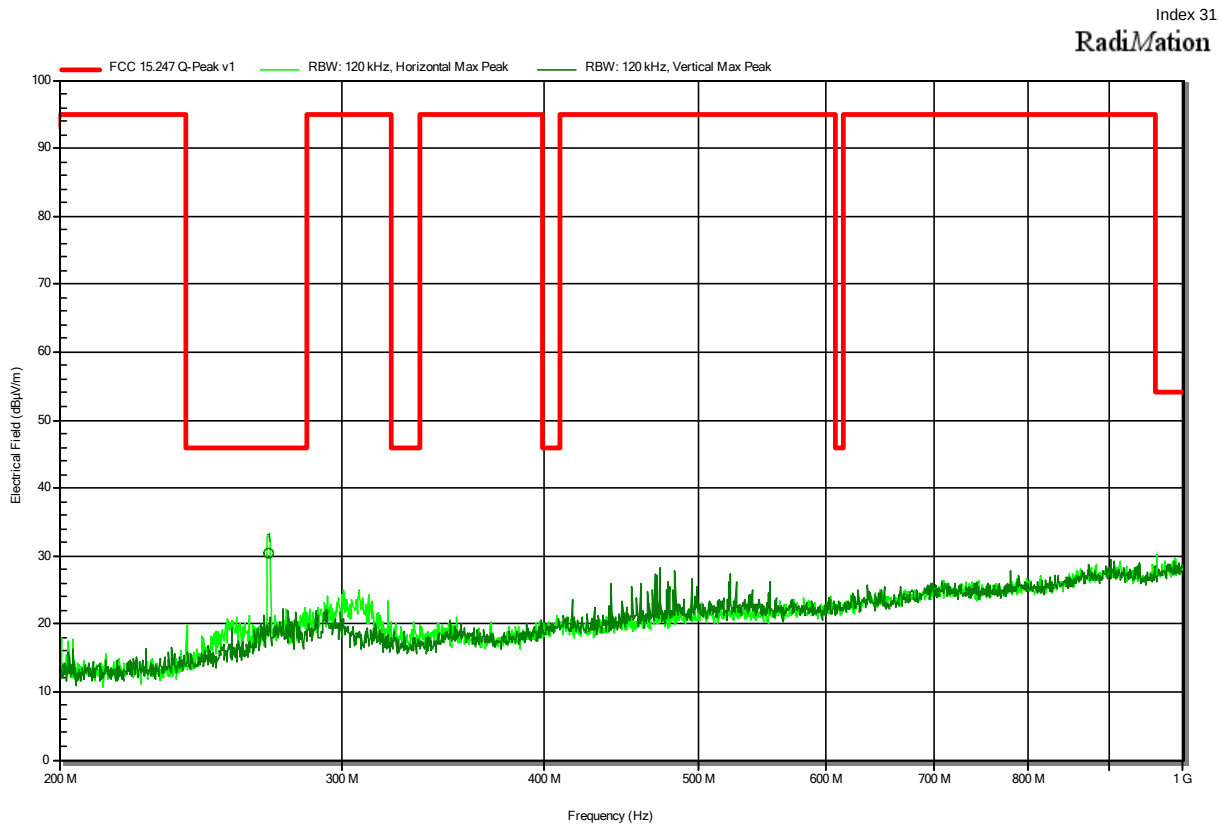
Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116
 Measurement distance: 3 m
 Mode: Tx; LE, 2480 MHz, 1 Mbps, PBR9, EUT horizontal
 Test Date: 2022-08-03
 Note:



Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223
 Measurement distance: 3 m
 Mode: Tx; LE, 2480 MHz, 1 Mbps, PBR9, EUT horizontal
 Test Date: 2022-08-03
 Note:



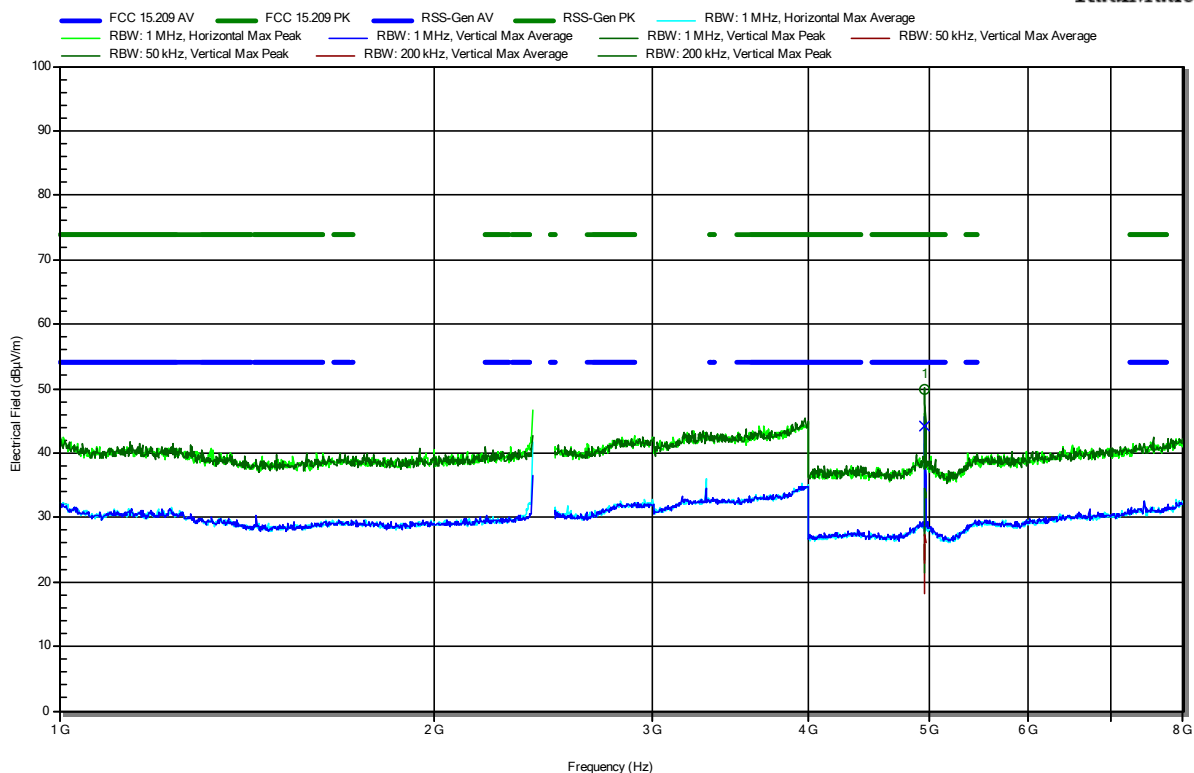
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
270.12 MHz	30.5 dBμV/m	46 dBμV/m	-15.52 dB	Pass	Horizontal

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2480 MHz, Coding S8, PBRs9, EUT vertical
 Test Date: 2022-08-10
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
4.96 GHz	49.9 dBµV/m	74 dBµV/m	-24.1 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
4.96 GHz	44.28 dBµV/m	54 dBµV/m	-9.72 dB	Pass	Vertical

Test Report No.: G0M-2205-1454-TFC247BL-V02

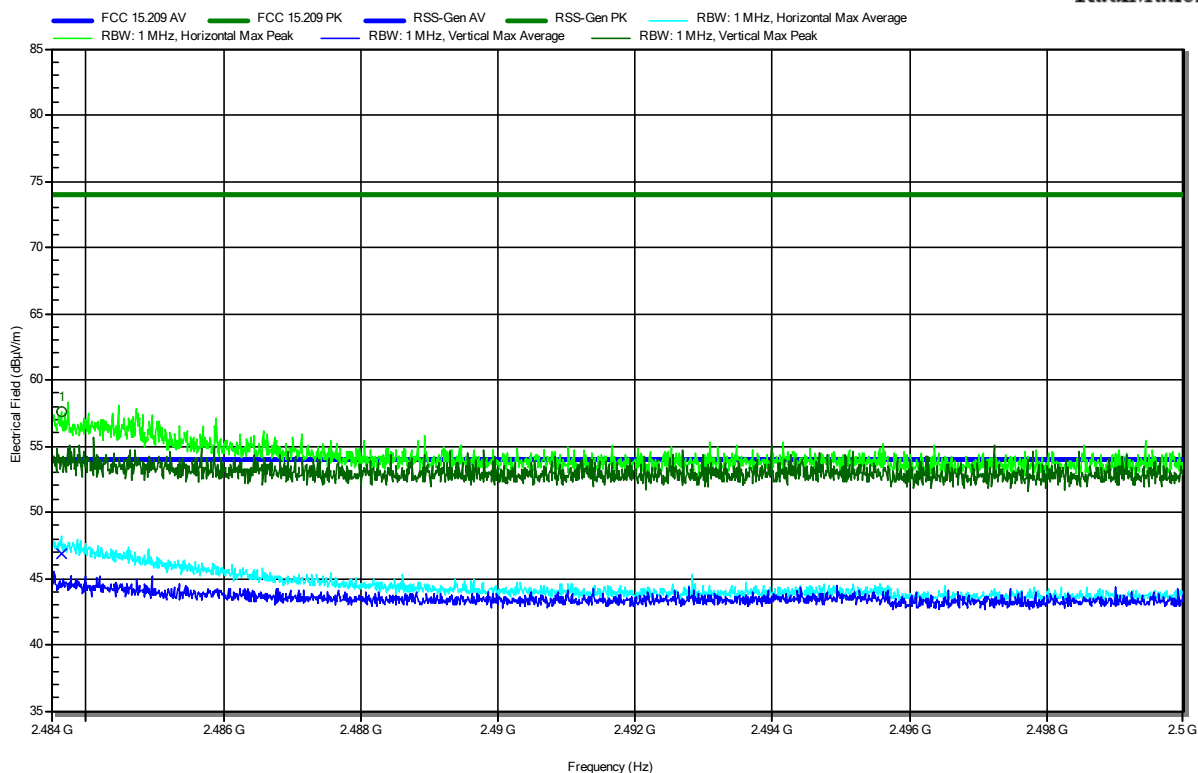
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; LE, 2480 MHz, Coding S8, PBRs9, EUT vertical
 Test Date: 2022-08-10
 Note: upper bandedge

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Frequency 2.4836 GHz	Peak 57.54 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -16.46 dB	Peak Status Pass	Polarization Horizontal
Frequency 2.4836 GHz	Average 46.9 dBμV/m	Average Limit 54 dBμV/m	Average Difference -7.1 dB	Average Status Pass	Polarization Horizontal

Test Report No.: G0M-2205-1454-TFC247BL-V02

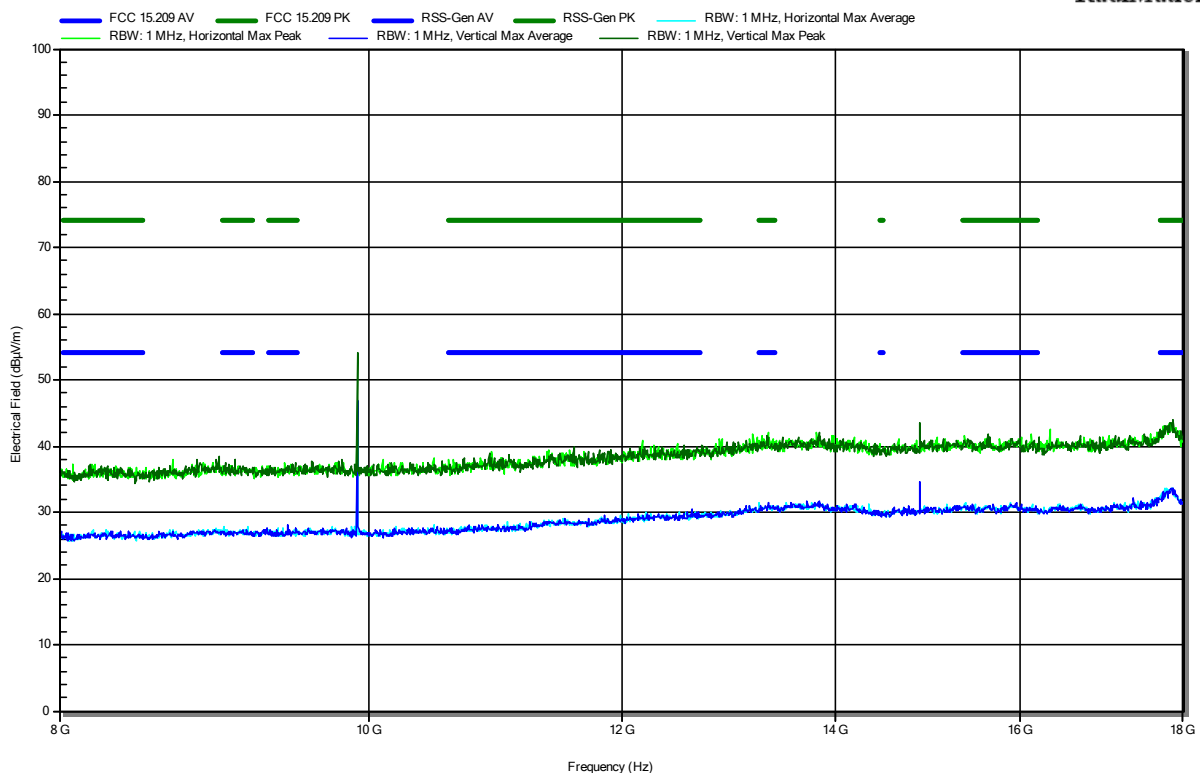
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 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: Tx; LE, 2480 MHz, Coding S8, PBR9, EUT vertical
 Test Date: 2022-08-10
 Note:

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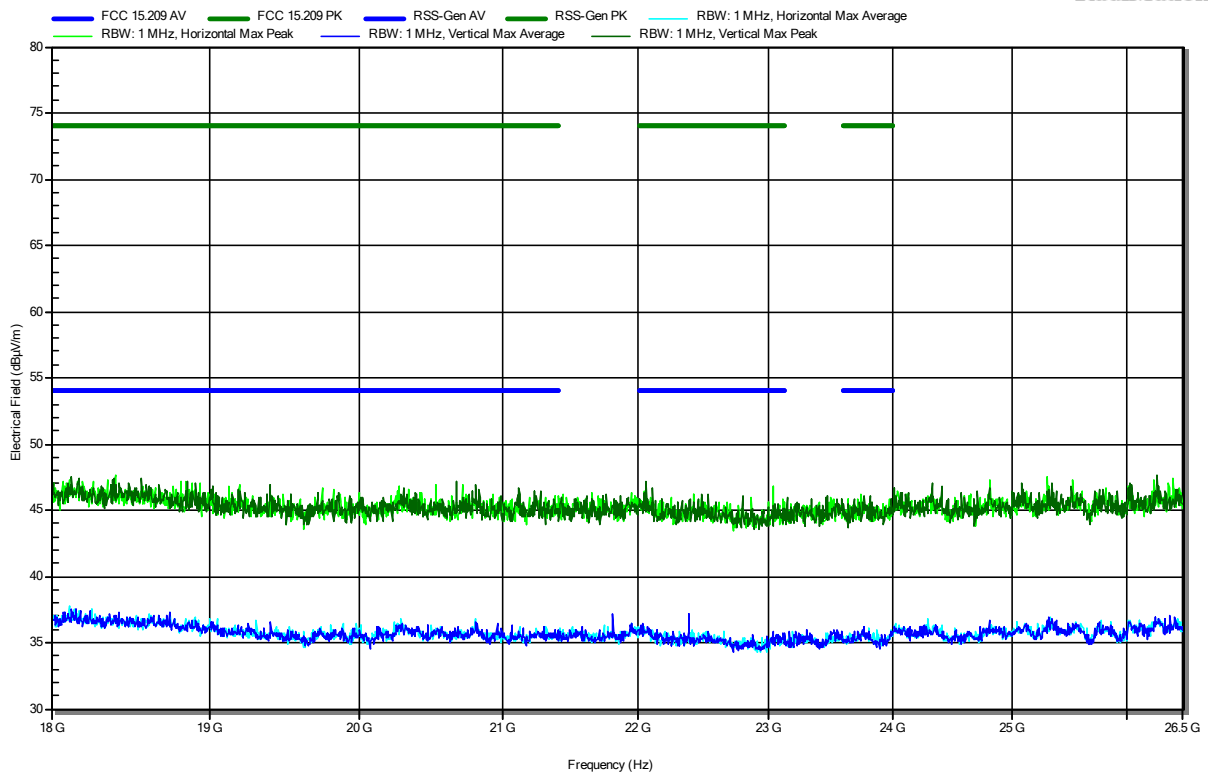


Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W106
 Test Sample ID: 40680
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; LE, 2480 MHz, Coding S8, PBR9, EUT vertical
 Test Date: 2022-08-10
 Note:

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RadiMation



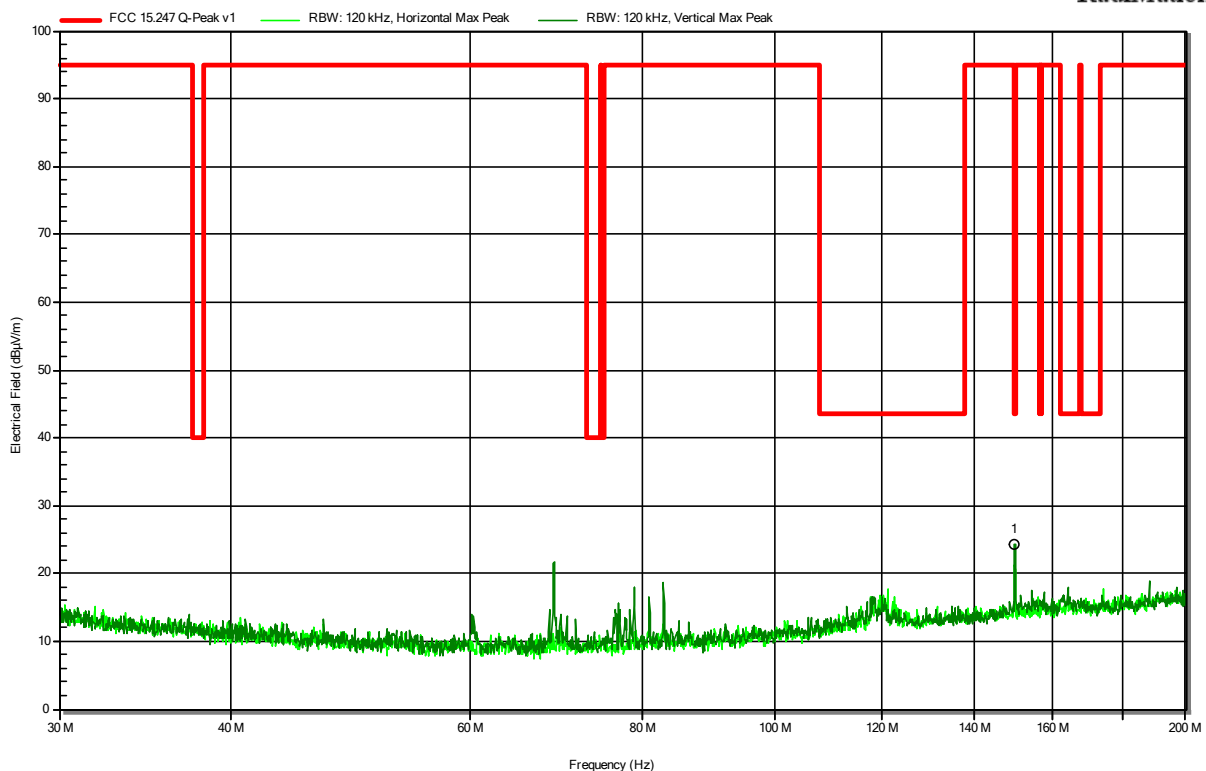
ANNEX C Transmitter spurious emissions (Tested variant 2)

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247

Project Number: G0M-2205-1454
 Applicant: u-blox AG
 Model Description: Stand-alone multiradio module
 Model: NORA-W101
 Test Sample ID: 41947
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 20 °Celsius, Vnom: 3.3 V DC
 Antenna: Rohde & Schwarz HK 116
 Measurement distance: 3 m
 Mode: Tx; BLE; 2402 MHz; coding S8; PBR9, Power level 13; EUT vertical
 Test Date: 2022-11-11
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
150.0073 MHz	24.3 dBμV/m	43.5 dBμV/m	-19.2 dB	Pass	Vertical

Test Report No.: G0M-2205-1454-TFC247BL-V02

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