

EMC TEST REPORT FCC 47 CFR Part 15B, ISED ICES-003 Issue 6	
Report Reference No	G0M-1907-8361-EF0115B-V01
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-2 DAkks - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	R3 - Reliable Realtime Radio Communications GmbH
Address	Bismarckstr. 10-12 10625 Berlin GERMANY
Test Specification Standard(s)	47 CFR Part 15 Subpart B ISED ICES-003 Issue 6 ANSI C63.4:2014+A1:2017
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	EchoRing Ethernet Bridge
Model(s)	ER-EB 1001M
Additional Model(s)	None
Brand Name(s)	ECHORING
Hardware Version(s)	V2.2
Software Version(s)	V2
FCC-ID	2AWGE3CH0
IC	26133-3CH0
Test Result	PASSED

Possible test case verdicts:		
required by standard but not tested	N/T	
not required by standard	N/R	
required by standard but not appl. to test object	N/A	
test object does meet the requirement	P(PASS)	
test object does not meet the requirement	F(FAIL)	
Testing:		
Date of receipt of test item	2020-04-28	
Report:		
Compiled by	Matthias Handrik	
Tested by (+ signature) (Responsible for Test)	Matthias Handrik	
Approved by (+ signature) (Deputy Head of Lab)	Jens Marquardt	
Date of Issue	2020-09-25	
Total number of pages	90	
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:		

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
EUT	Equipment Under Test
FCC	Federal Communications Commission
ISED	Innovation, Science and Economic Development Canada
T _{NOM}	Nominal operating temperature
V _{NOM}	Nominal supply voltage

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2020-09-25	Initial Release	-

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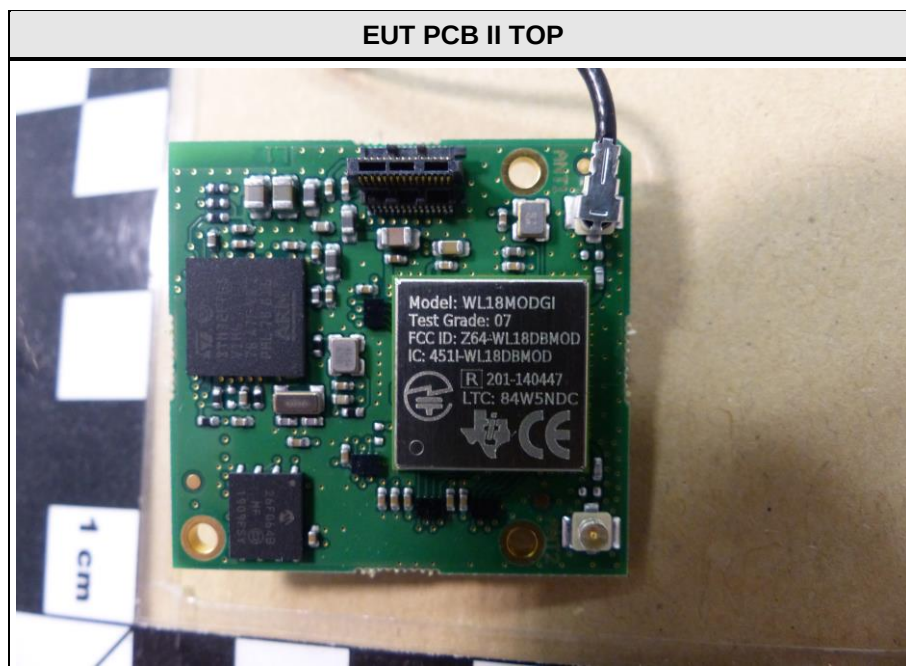
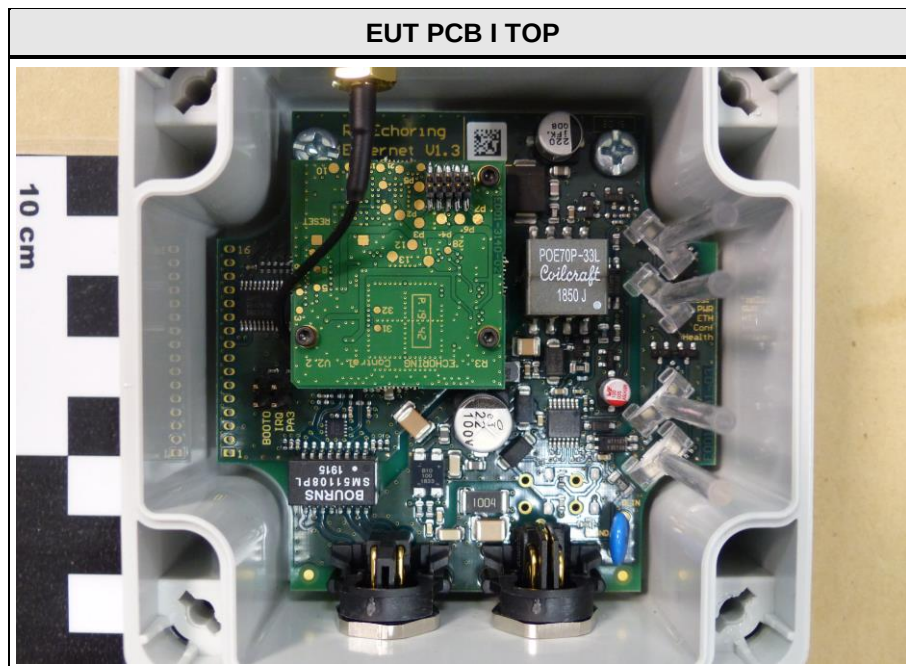
1 Equipment (Test Item) Under Test

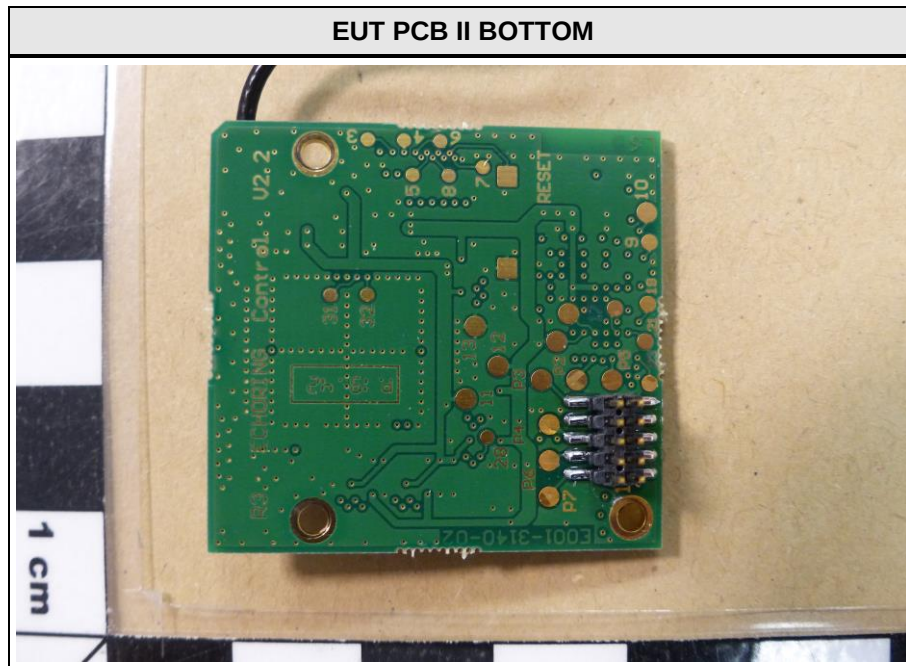
Description	EchoRing Ethernet Bridge	
Model	ER-EB 1001M	
Additional Model(s)	None	
Brand Name(s)	ECHORING	
Serial Number(s)	00 00 00 03	
Hardware Version(s)	V2.2	
Software Version(s)	V2	
FCC-ID	2AWGE3CH0	
IC	26133-3CH0	
Class	Class B	
Equipment type	Table top	
Highest internal frequency [MHz]	5850	
Radio Module	Type	WLAN-module
	Model	WL1807MODGI
	Manufacturer	Texas Instruments
	FCC-ID	Z64-WL18DBMOD
	IC	N/A
Supply Voltage	V _{NOM}	24 VDC / 48V DC via PoE
AC/DC-Adaptor	None	
Manufacturer	WEPTech elektronik GmbH Ostring 10 76829 Landau Germany	

1.1 Equipment Ports

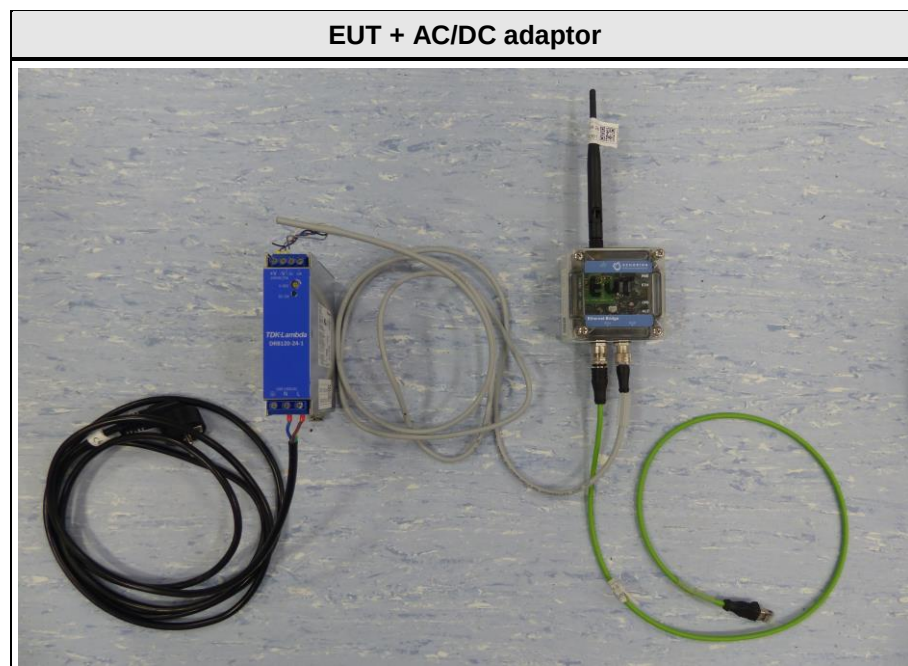
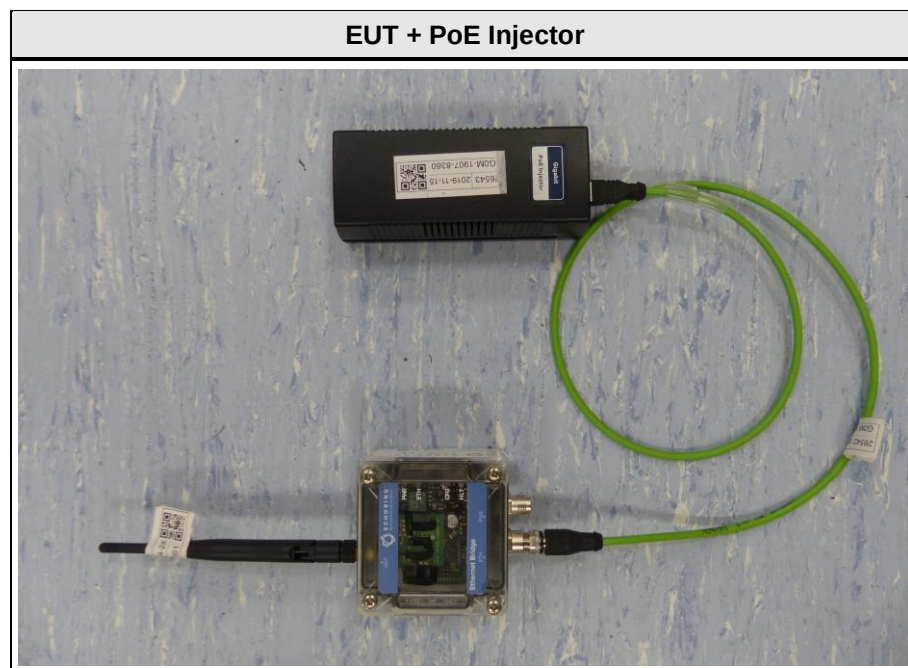
Name	Type	Attributes	Comment
Power	DC	Count: 1 Direction: In Service only: No	-
Ethernet	IO	Count: 1 Direction: IO Service only: No	4-pole M12 Cable: 142M4D15010, 35/19, 1.0m, 9352/2913502
Antenna	IO	Count: 1 Direction: IO Service only: No	-
Description:			
AC	AC mains power input/output port		
DC	DC power input/output port		
BAT	DC power input port connected to external battery		
IO	Input/Output port		
TP	Telecommunication port		
NE	Non-electrical port		

1.2 Equipment Photos - Internal

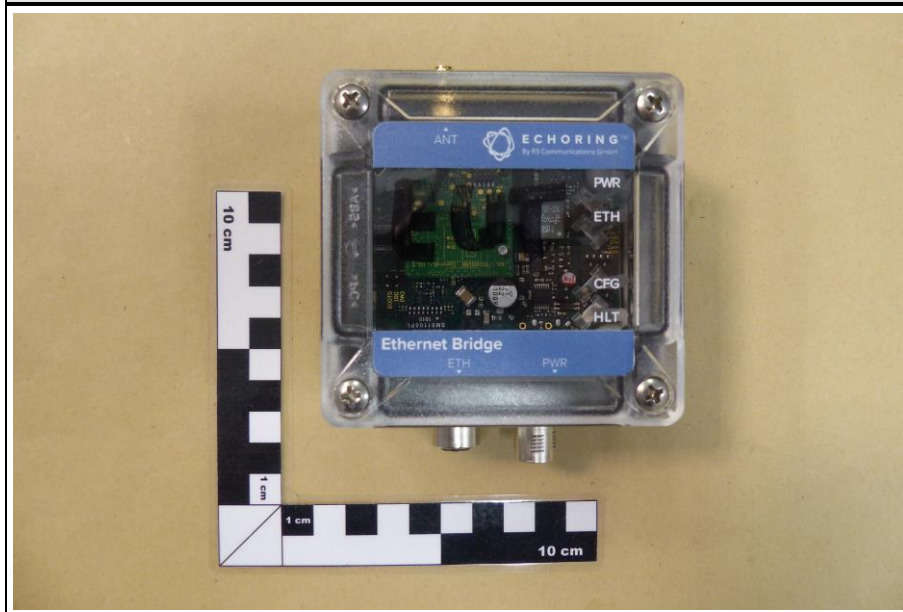




1.3 Equipment Photos - External



EUT TOP



EUT BOTTOM



EUT RIGHT



EUT LEFT



EUT BACK



EUT FRONT



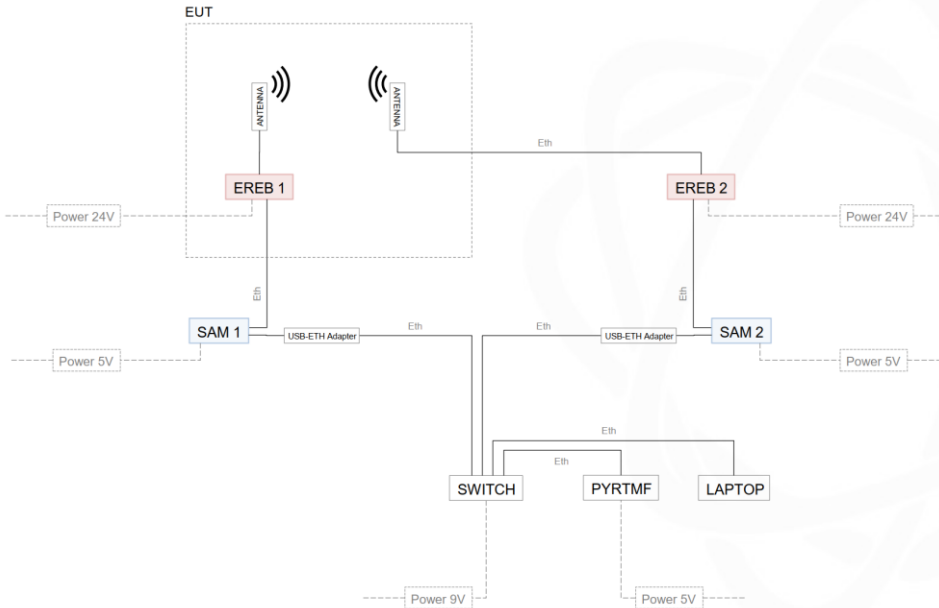
1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	Power supply	TDK Lambda	RB120241	24V DC Customer support equipment
AE	PoE Injector	BV-Tech	POE-I100GL	48V DC Customer support equipment
AE	Raspberry Pi	Raspberry Pi Foundation	3.0B	3x Customer support equipment
AE	Laptop	Lenovo	E590	Customer support equipment
AE	Second EUT	R3 Coms	ER-EB 1001M	Customer support equipment Support EUT
AE	switch	TP Link	TL-SG08	Customer support equipment
AE	USB to Ethernet adaptor	CSL	302471/20170829S Z008	2xCustomer support equipment
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
MON	Monitoring Equipment			
CBL	Connecting Cable			
Comment:				

1.5 Operational Modes

Mode #	Description
1	WLAN connection on 5747MHz. Powered via 24 V DC
2	WLAN connection on 5747MHz. Powered via 48V DC PoE
3	WLAN connection on 5180MHz. Powered via 24 V DC DC
4	WLAN connection on 5180MHz. Powered via 48V DC PoE
Comment:	

1.6 EUT Configuration

Configuration #	Description
1	 EUT powered via 24VDC from external power supply. EUT (EREB 1) connected via ethernet cable to Raspberry Pi (SAM 1). Support EUT (EREB 2) connected via ethernet cable to second Raspberry Pi (SAM 2). Laptop controlled EUT via third Raspberry Pi (PYRTMF) with web browser.
2	EUT powered via 48V DC from PoE injector. Cable assambly is the same as for Configuration #1.
Comment:	

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 analyser in dBµV. Any external preamplifiers used are taken into account through internal analyser 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 analyser. 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:

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

Net:

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

Limit:

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

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

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.

Example only:

Reading + AF	= Net Reading	:	Net reading - FCC limit	= Margin
+21.5 dBµV + 26 dB/m	= 47.5 dBµV/m	:	47.5 dBµV/m - 57.0 dBµV/m	= -9.5 dB

2 Result Summary

FCC 47 CFR Part 15B, ISED ICES-003 Issue 6				
Reference	Requirement	Reference Method	Result	Remarks
Emission				
FCC 15.109 ICES-003, 6.2	Radiated emissions	ANSI C63.4:2014 +A1:2017	PASS	-
FCC 15.107 ICES-003, 6.1	AC power line conducted emissions	ANSI C63.4:2014 +A1:2017	PASS	-
Comment:				

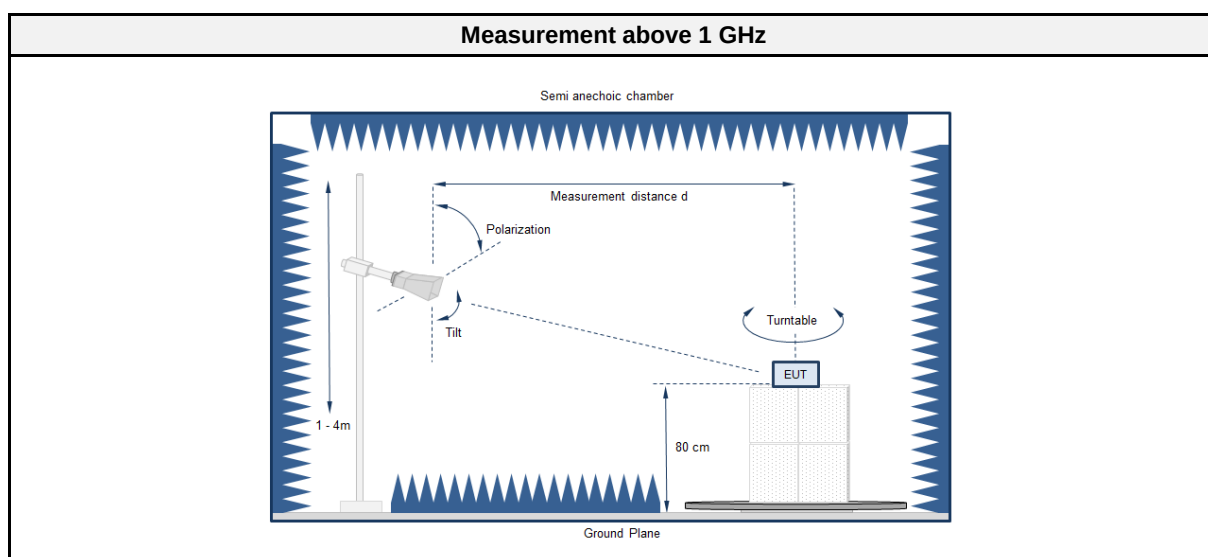
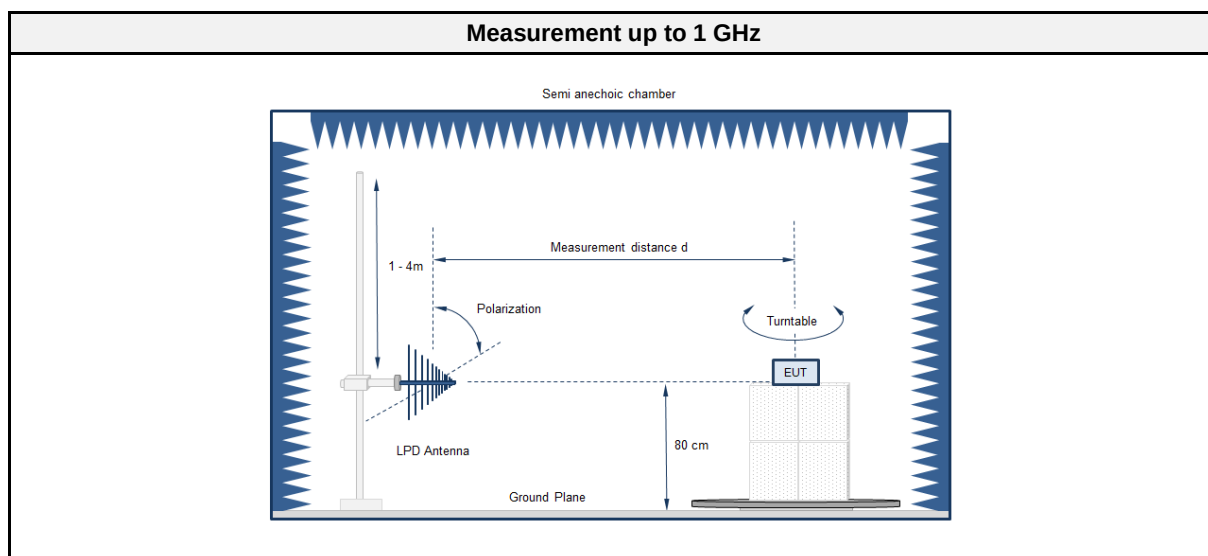
Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

2.1 Test Conditions and Results - Radiated emissions acc. to ANSI C63.4

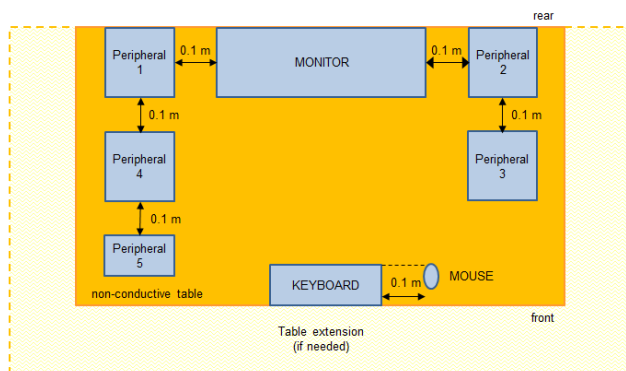
2.1.1 Information

Test Information	
Reference	FCC 15.109, ICES-003, 6.2
Reference method	ANSI C63.4:2014+A1:2017 Section 8
Equipment class	Class A
Equipment type	Table top
Highest internal frequency [MHz]	5850
Measurement range	30 MHz to 29250 MHz
Temperature [°C]	21-22
Humidity [%]	36-39
Operator	Matthias Handrik
Date	2020-05-29

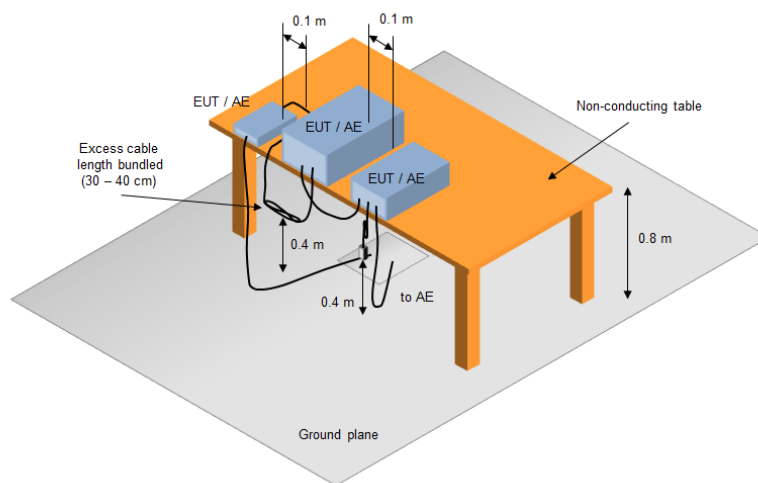
2.1.2 Setup



Equipment placement - Table top



Test Setup



2.1.3 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	Radimation	2016.1.10

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic chamber	Frankonia	AC1	EF00062	2018-07	2021-07
EMI Test Receiver	Rohde & Schwarz Vertriebs GmbH	ESR7	EF00943	2019-10	2020-10
Spectrum analyzer	Rohde & Schwarz Vertriebs GmbH	FSW43	EF00896	2019-07	2020-07
EMI Test Receiver	Rohde & Schwarz Vertriebs GmbH	ESU8	EF00379	2019-07	2020-07
Biconical Antenna	R&S	HK 116	EF00030	2019-04	2022-04
LPD Antenna	R&S	HL 223	EF00187	2019-05	2022-05
Horn Antenna	Schwarzbeck	BBHA9120D	EF00018	2019-10	2022-10
Horn antenna	Amplifier Research	ATH18G40 (18-40GHz)	EF01152	2018-10	2020-10
40GHz Standard Gain Horn with Amplifier	Flann Microwave Ltd	22240-25 Amp. CBL26402075	EF00301	2019-12	2022-12
Climatic Sensor	Embedded Data Systems, LLC.	2800100000254 17E	EF01054	2020-03	2021-03

2.1.4 Procedure

Exploratory measurement	
1.	The EUT was placed on a non-conductive table at a height of 0.8m.
2.	The EUT and support equipment, if needed, were set up to simulate typical usage.
3.	Cables, of type and length specified by the manufacturer, were connected to at least one port of each type and were terminated by a device or simulating load of actual usage.
4.	The antenna was placed at a distance of 3 or 10 m.
5.	The received signal was monitored at the measurement receiver.
6.	This procedure has to be performed in both antenna polarizations, horizontal and vertical.
7.	The arrangement of the equipment with the maximum emission level is shown on the setup picture at item 1.3

Final measurement	
1.	The EUT was placed on a 0.8 m non-conductive table at a 3 m distance from the receive antenna. The antenna output was connected to the measurement receiver.
2.	A biconical antenna was used for the frequency range 30 – 200 MHz, a logarithmic periodical antenna was used for the frequency range from 200 – 1000 MHz. Above one 1 GHz a Double Ridged Broadband Horn antenna was used. The antenna was placed on an adjustable height antenna mast.
3.	The EUT and cable arrangement were based on the exploratory measurement results.
4.	Emissions were maximized at each frequency by rotating the EUT and adjusting the receive antenna height and polarization. The maximum values were recorded.
5.	The test data of the worst-case conditions were recorded and shown on the next pages.

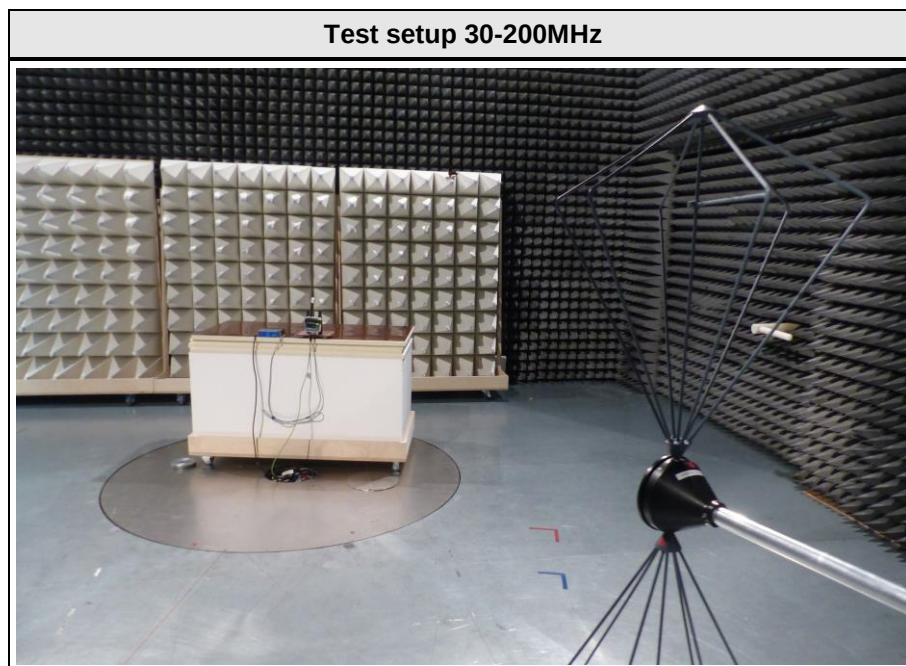
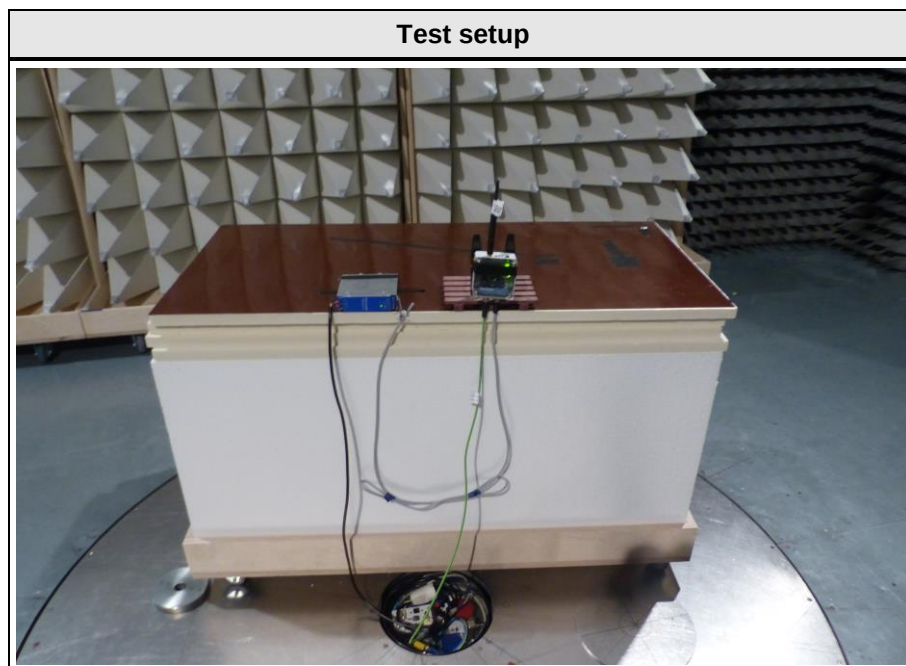
2.1.5 Limits

Class A @ 10 m		
Frequency [MHz]	Detector	Limit [dBμV/m]
30 - 88	Quasi-peak	39
88 - 216	Quasi-peak	43.5
216 - 960	Quasi-peak	46.5
960 - 1000	Quasi-peak	49.5
> 1000	Peak	69.5
	Average	49.5

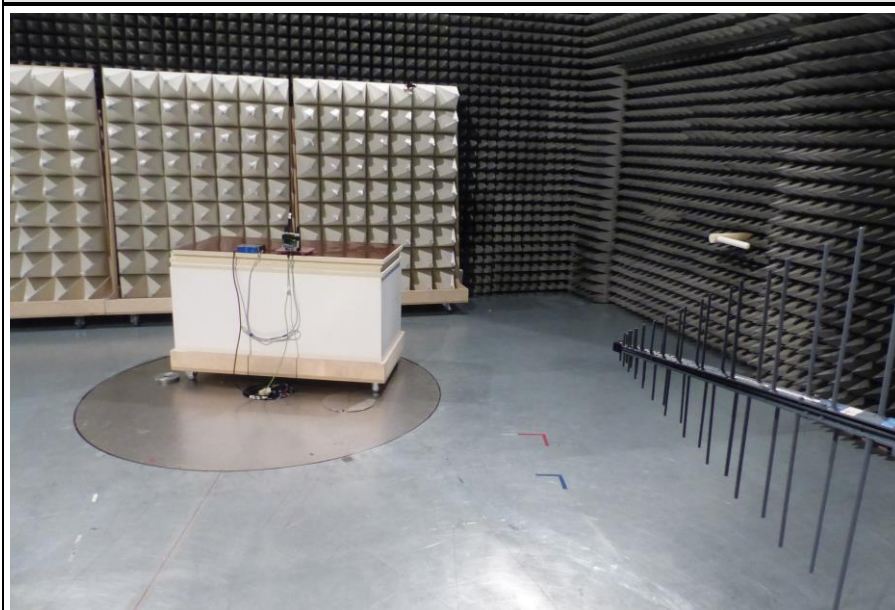
2.1.6 Results

Test Results			
Operational mode	EUT Configuration	Verdict	Remark
1	1	PASS	-
2	2	PASS	-
3	1	PASS	-
4	2	PASS	-

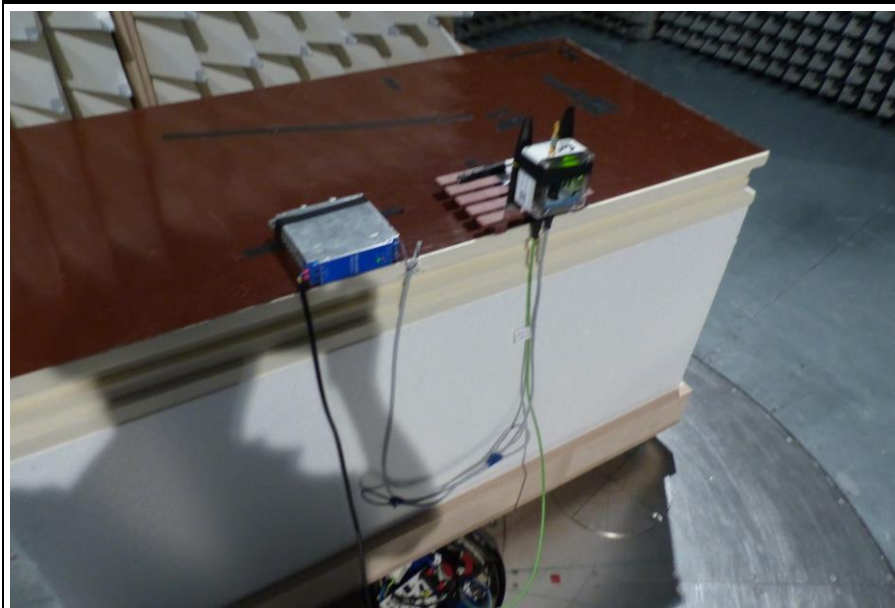
2.1.7 Setup Photos



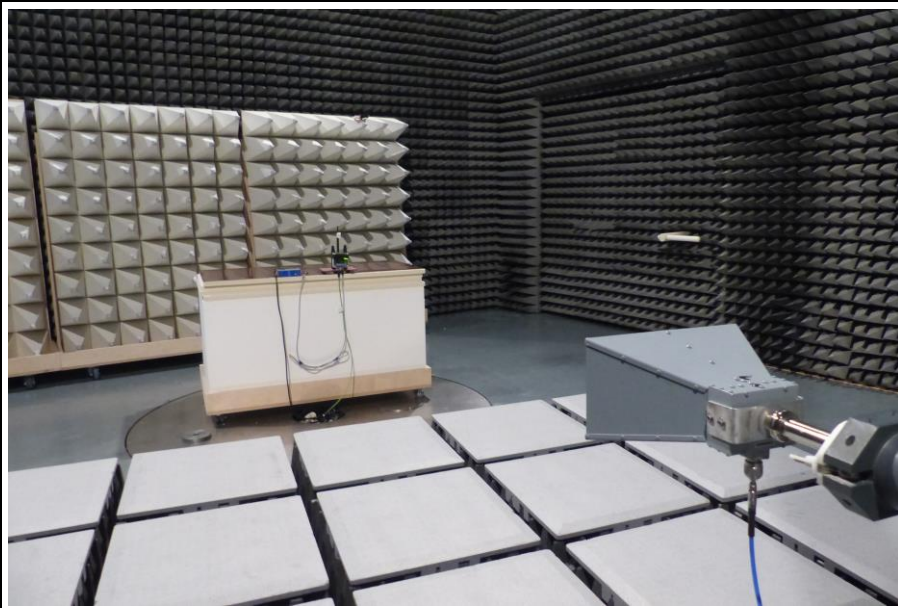
Test setup 200-1000MHz



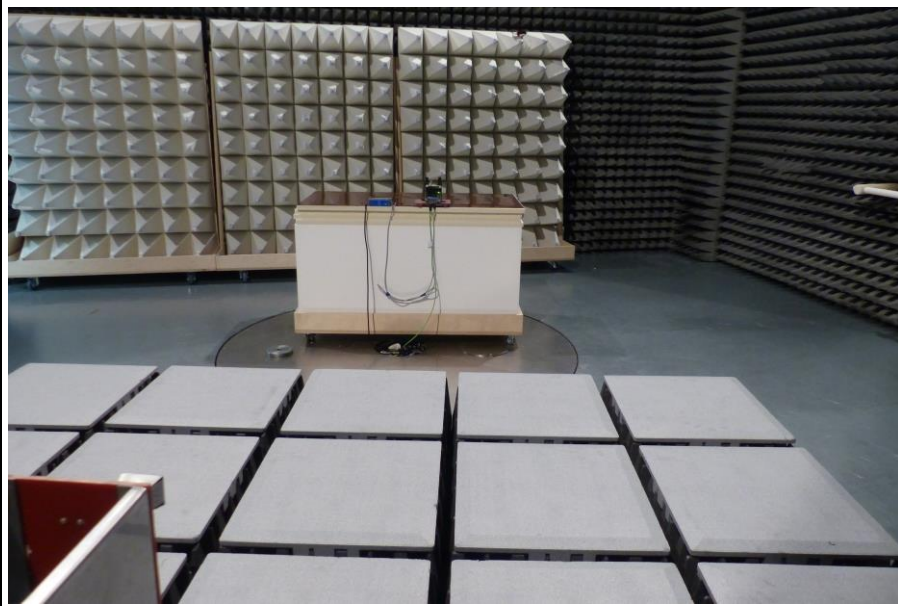
Test setup at 1GHz



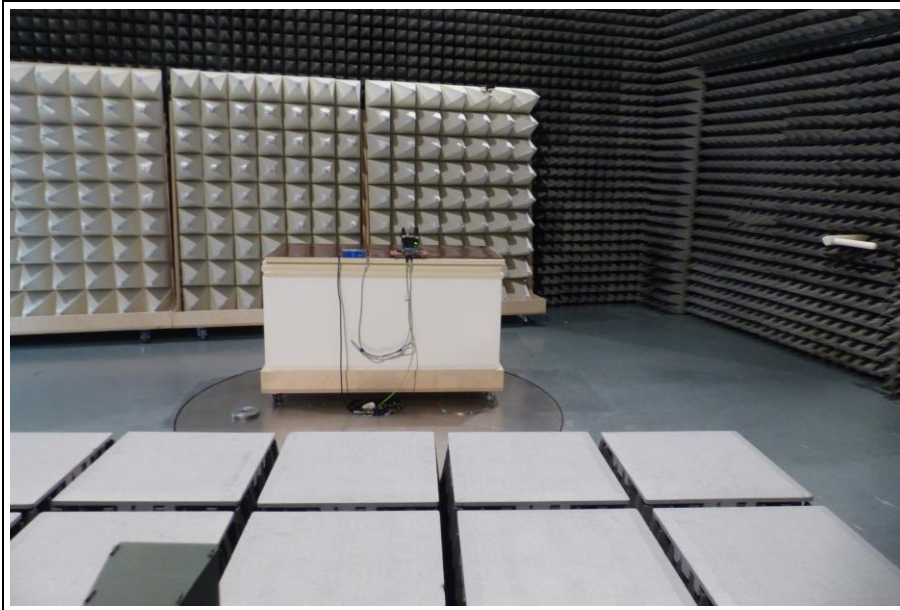
Test setup 1-17GHz



Test setup 17-26.5GHz



Test setup 26.5-30GHz

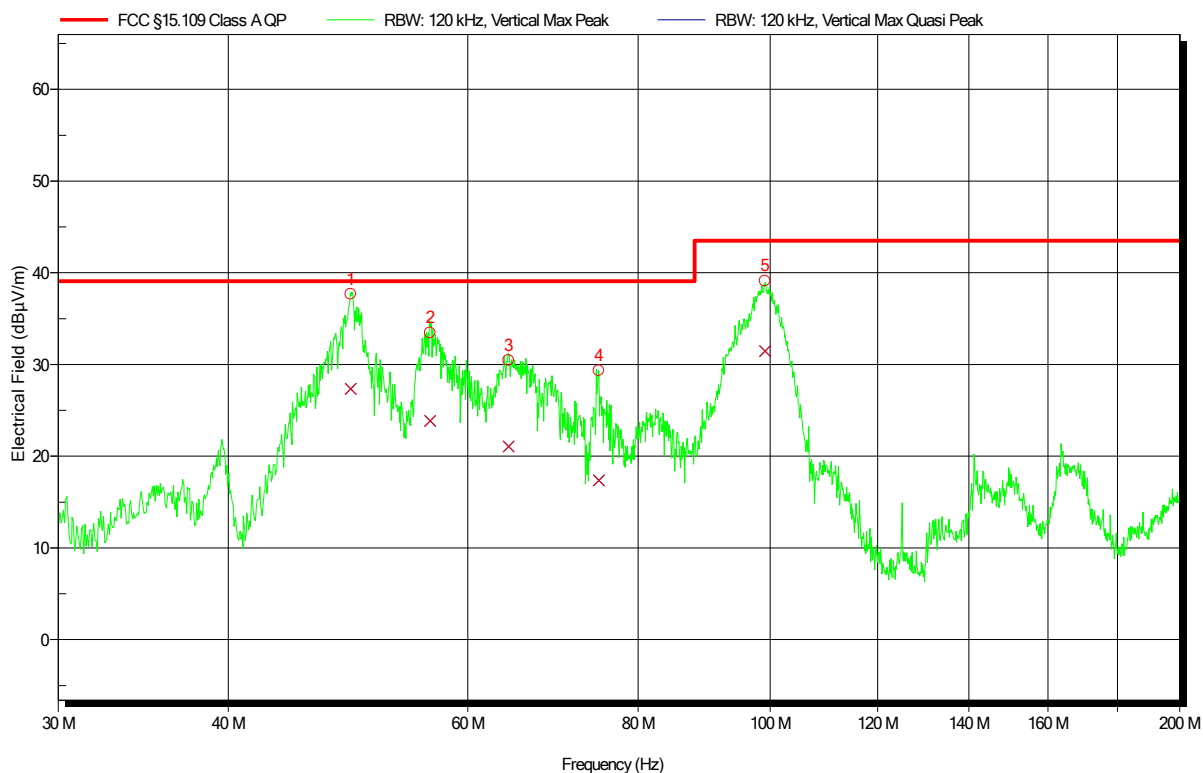


2.1.8 Records

Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-05-29
 Operating Conditions: ambient temperature: 21°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 1
 Note 1:

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Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	49.2 MHz	27.35 dBµV/m	39.08 dBµV/m	-11.74 dB	Pass	140 Degree	1 m
2	56.28 MHz	23.86 dBµV/m	39.08 dBµV/m	-15.23 dB	Pass	140 Degree	1 m
3	64.26 MHz	21.08 dBµV/m	39.08 dBµV/m	-18.01 dB	Pass	140 Degree	1 m
4	74.88 MHz	17.36 dBµV/m	39.08 dBµV/m	-21.72 dB	Pass	140 Degree	1 m
5	99.18 MHz	31.46 dBµV/m	43.52 dBµV/m	-12.06 dB	Pass	140 Degree	1 m

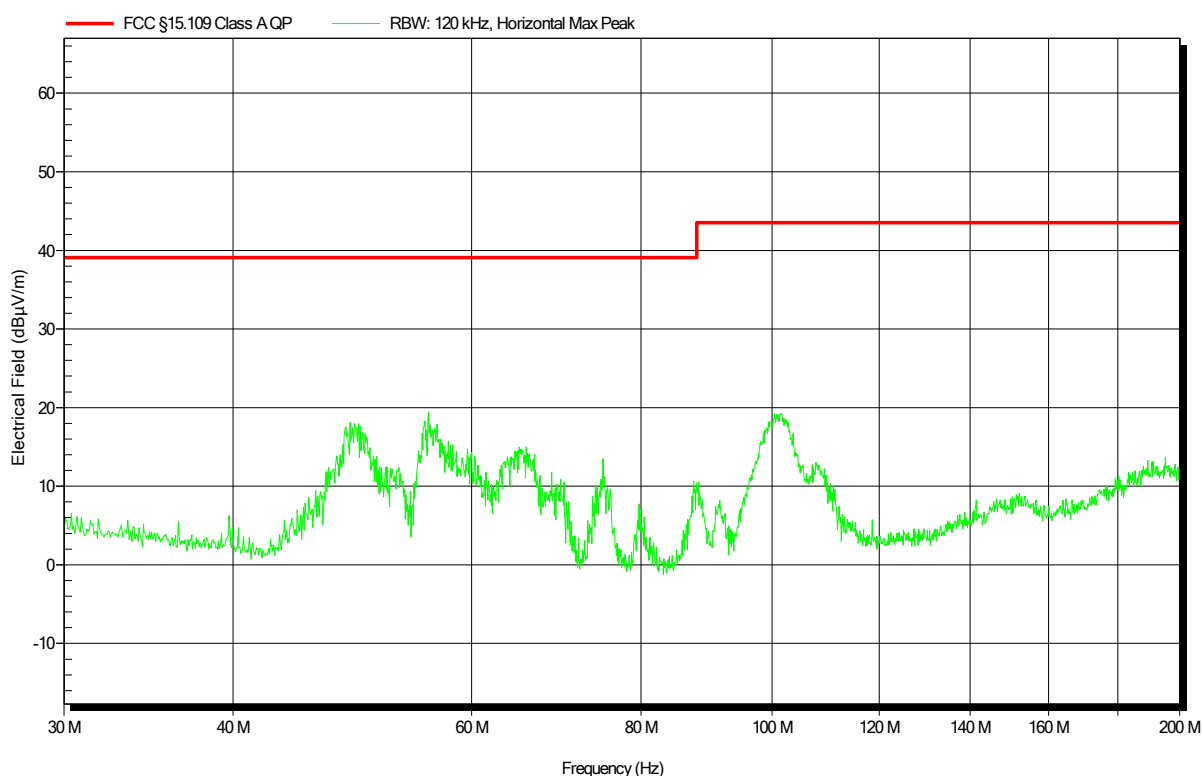
Test Report No.: G0M-1907-8361-EF0115B-V01

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

Radiated emissions according to FCC part 15B

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 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-05-29
 Operating Conditions: ambient temperature: 21°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 1
 Note 1:

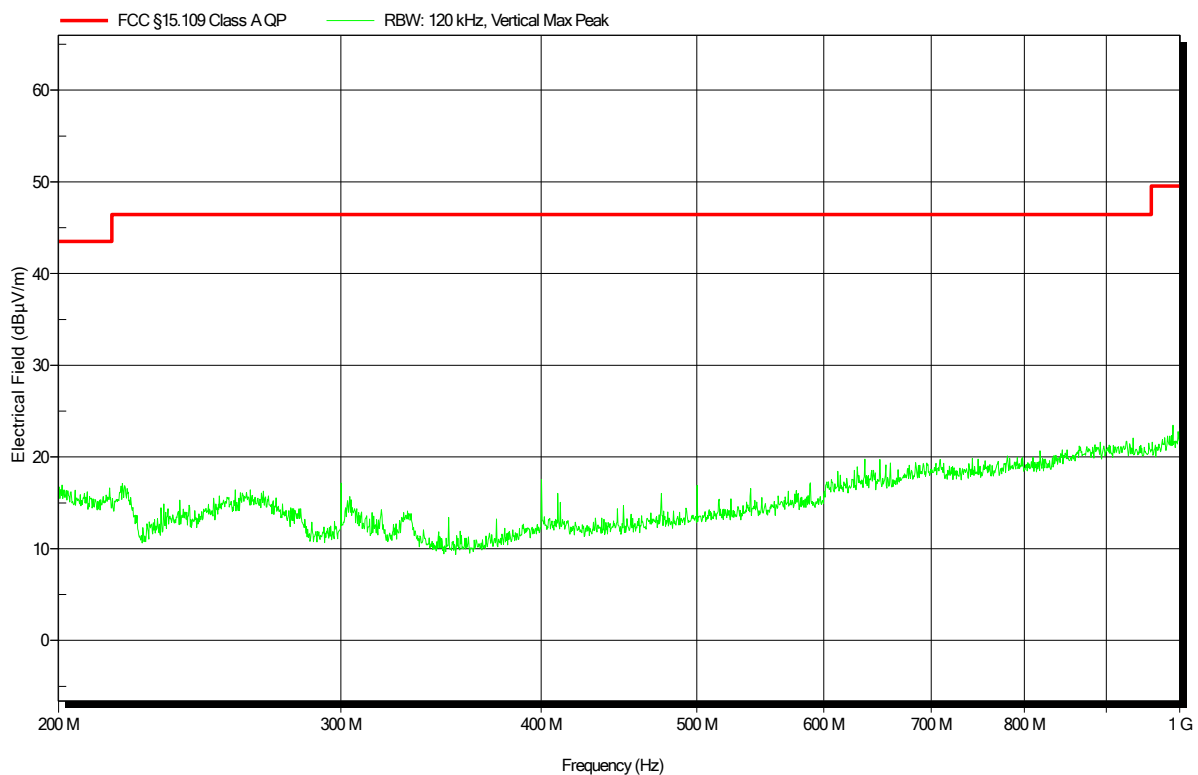
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Radiated emissions according to FCC part 15B

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 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-05-29
 Operating Conditions: ambient temperature: 21°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 1
 Note 1:

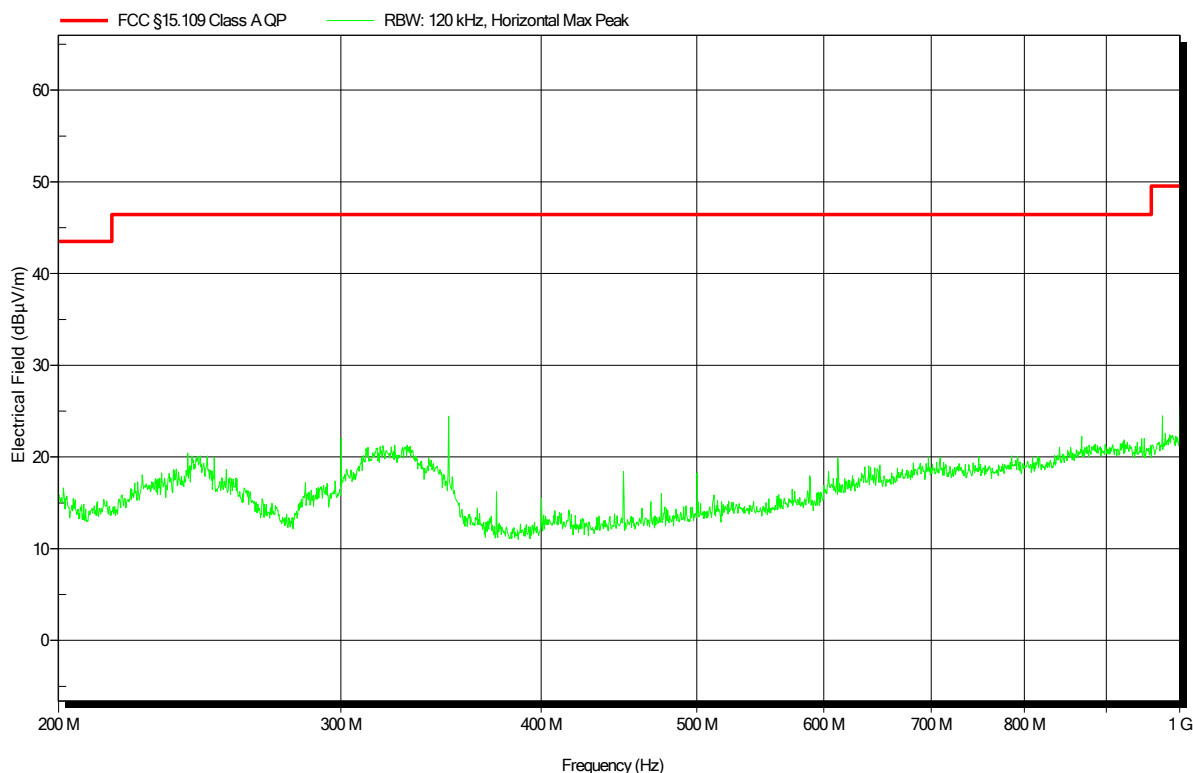
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-05-29
 Operating Conditions: ambient temperature: 21°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 1
 Note 1:

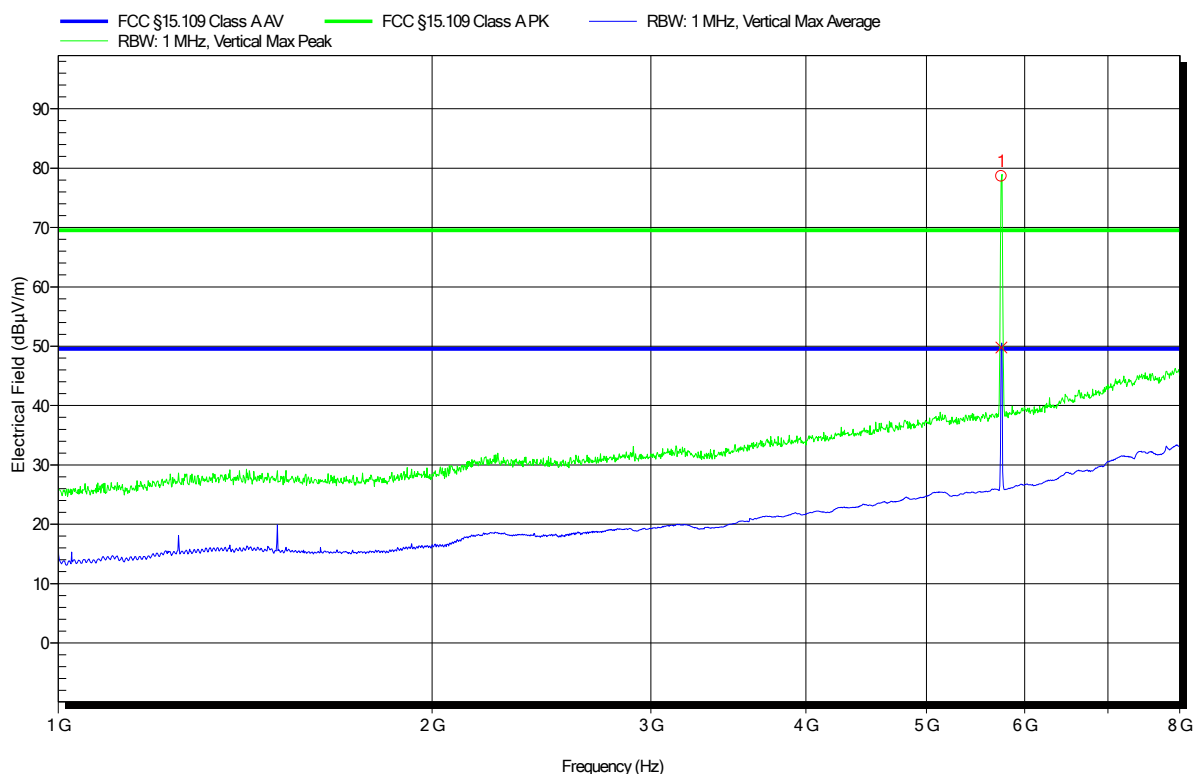
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 21°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 1
 Note 1: 50 Ohm at antenna port

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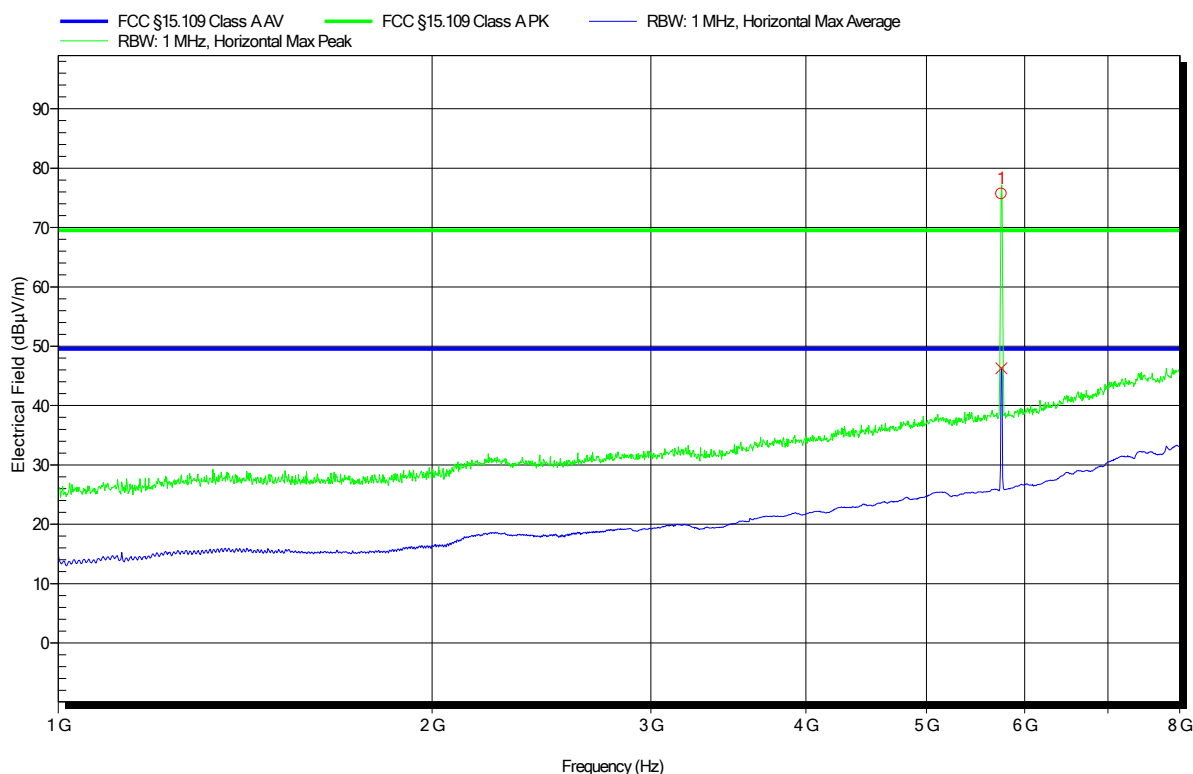


Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	5.747 GHz	WLAN carrier					

Radiated emissions according to FCC part 15B

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 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 21°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 1
 Note 1: 50 Ohm at antenna port

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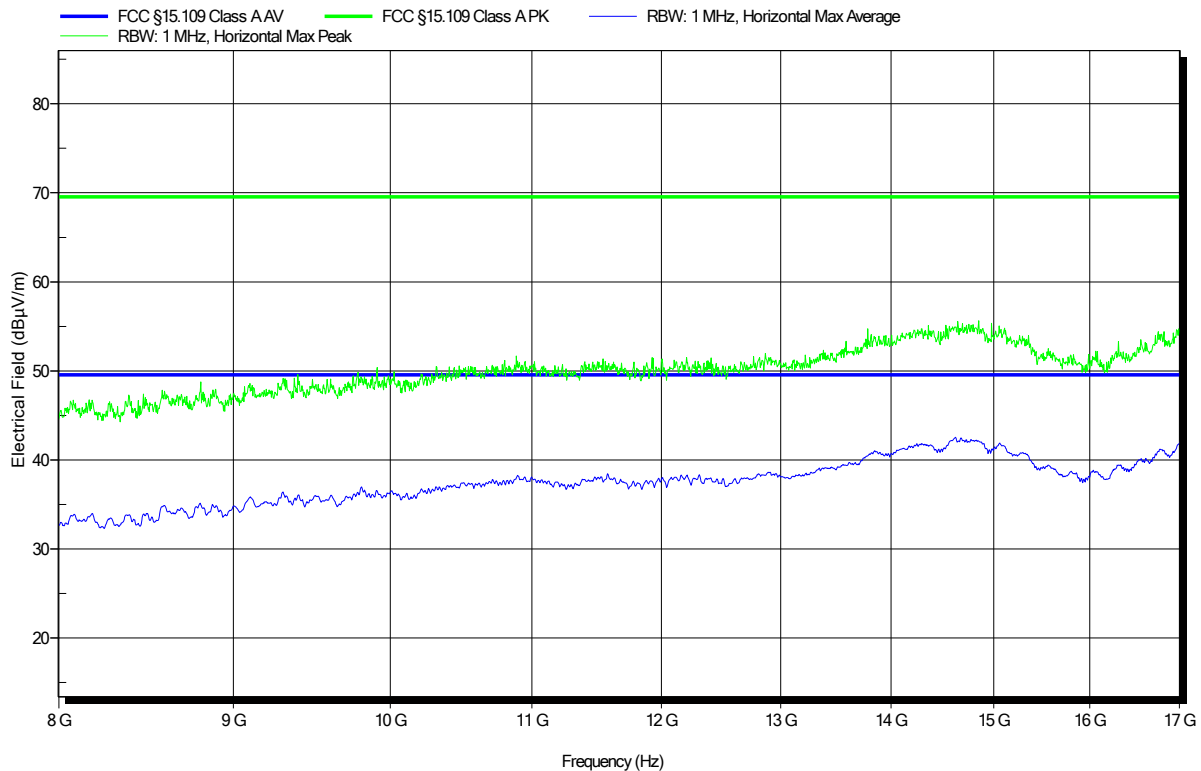


Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	5.746 GHz	WLAN carrier					

Radiated emissions according to FCC part 15B

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 Test Date: 2020-06-02
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 power input: 24V DC (AC/DC adaptor)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 1
 Note 1: 50 Ohm at antenna port

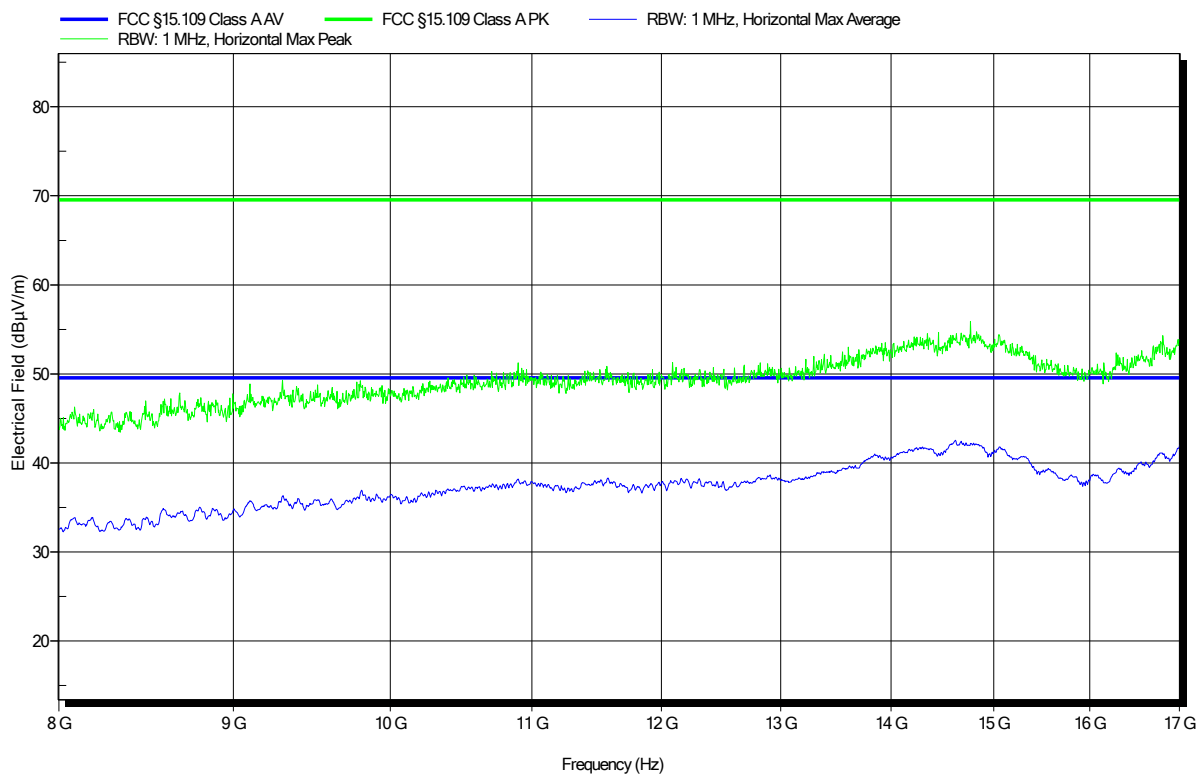
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Radiated emissions according to FCC part 15B

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 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 21°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 1
 Note 1: 50 Ohm at antenna port

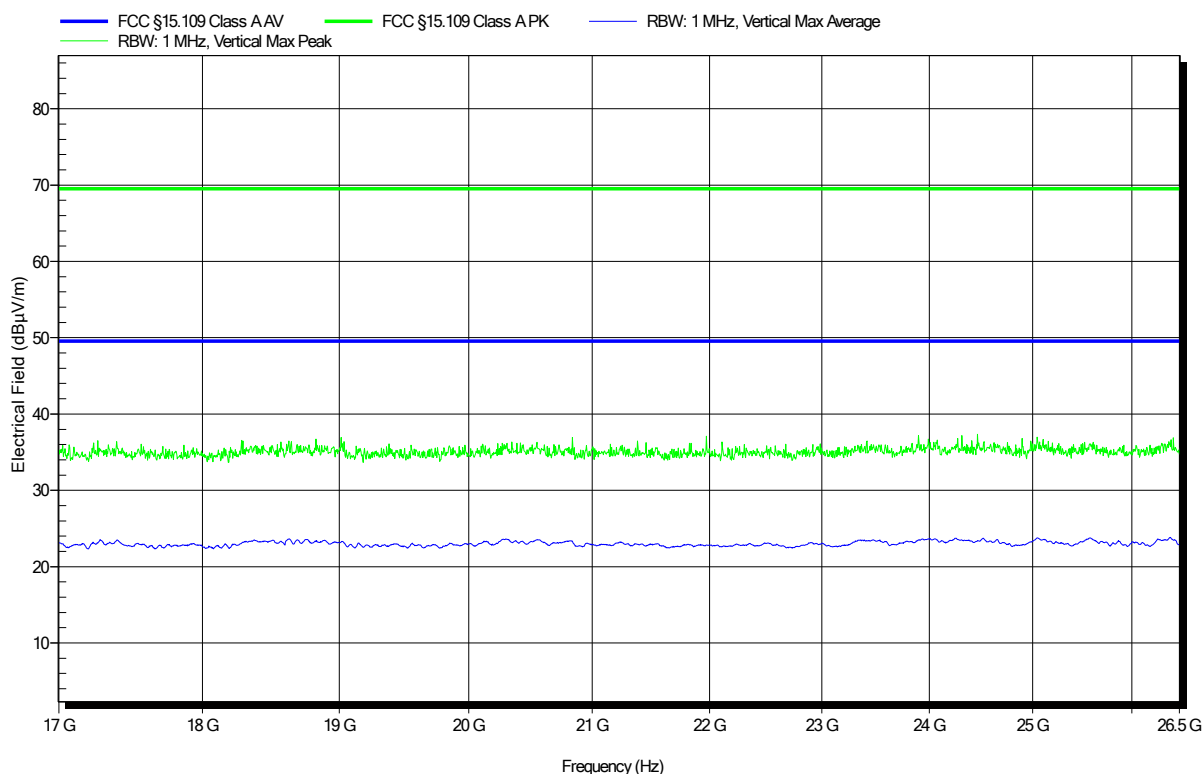
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 21°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: ATH18G40, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 1
 Note 1: 50 Ohm at antenna port

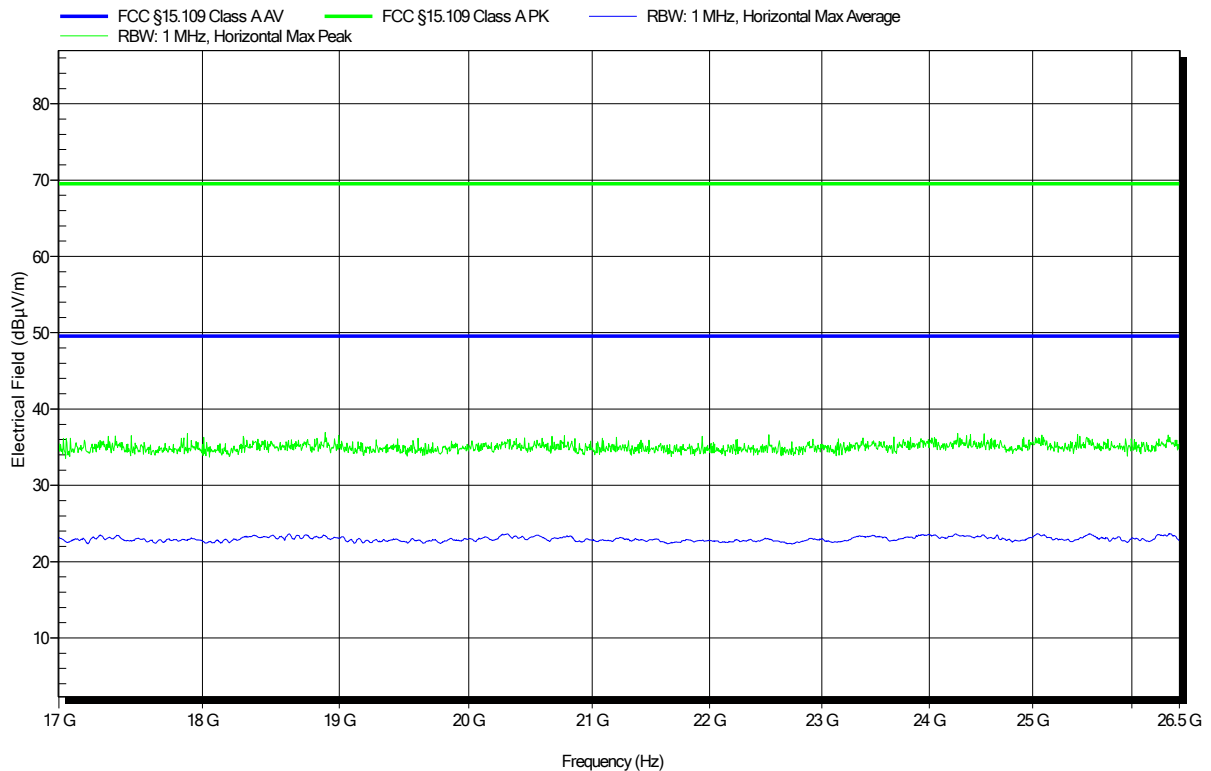
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 21°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: ATH18G40, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 1
 Note 1: 50 Ohm at antenna port

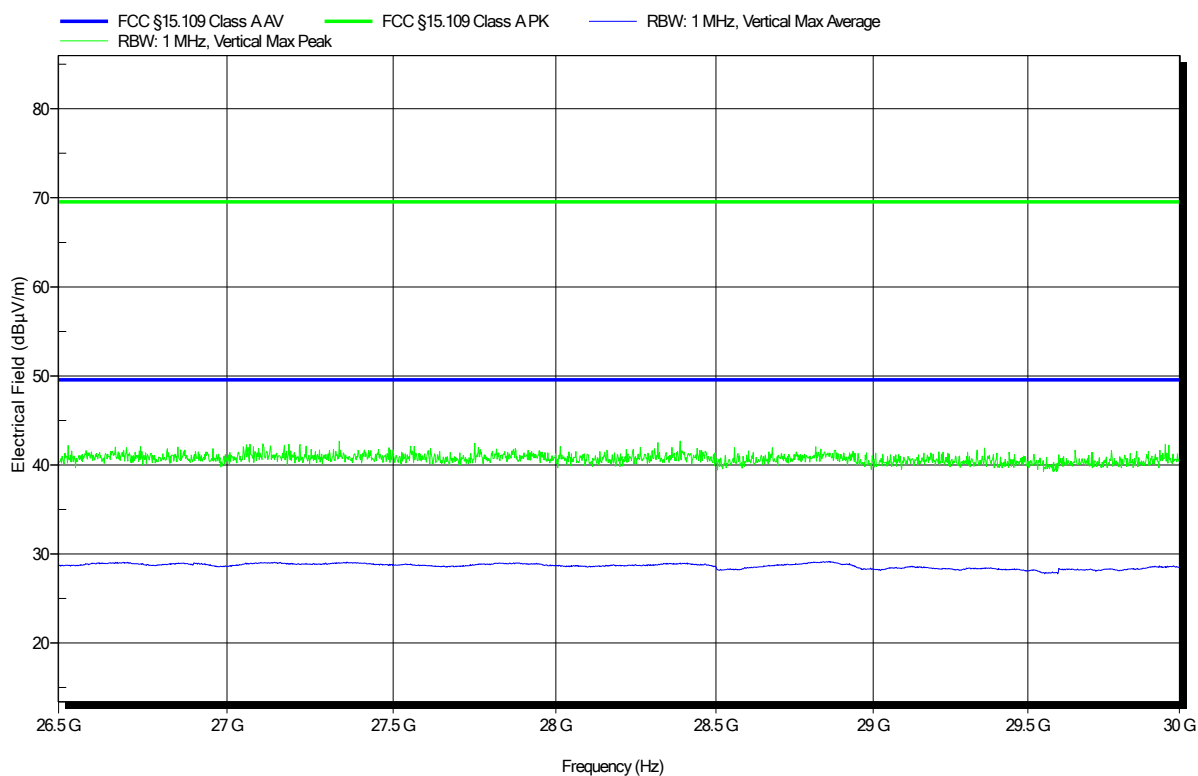
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: CBL26402075, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 1
 Note 1: 50 Ohm at antenna port

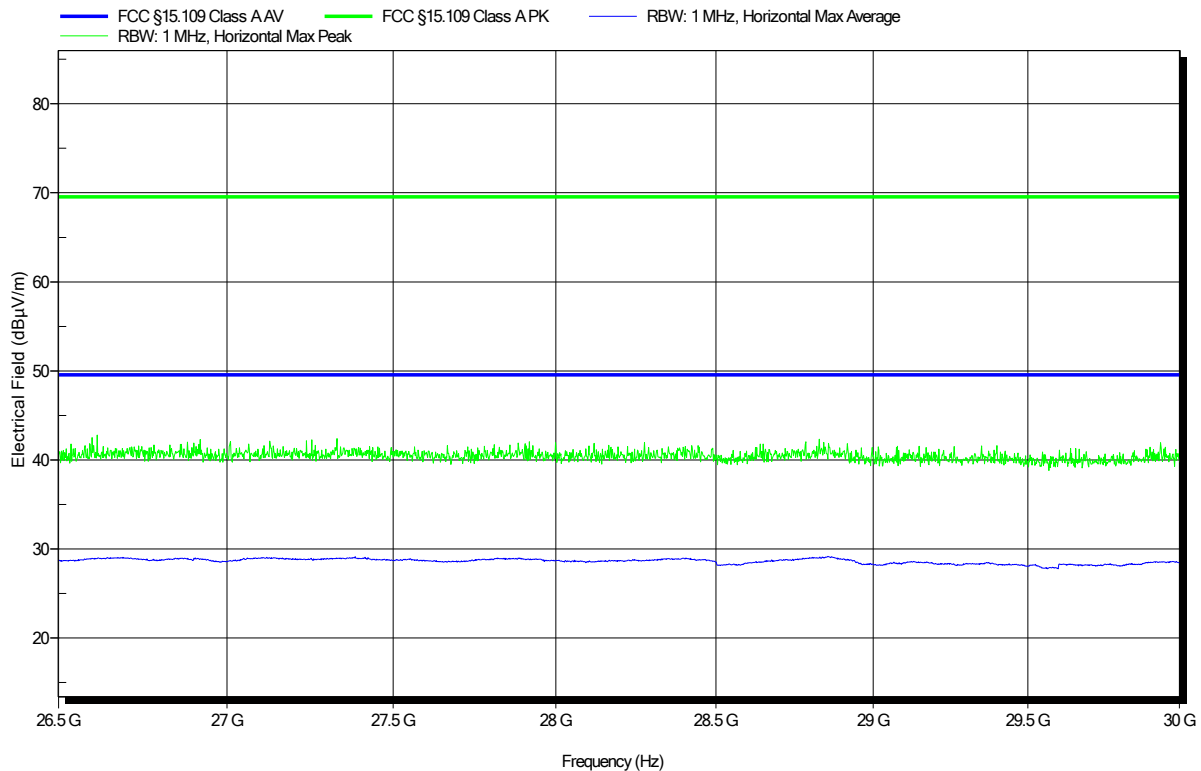
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: CBL26402075, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 1
 Note 1: 50 Ohm at antenna port

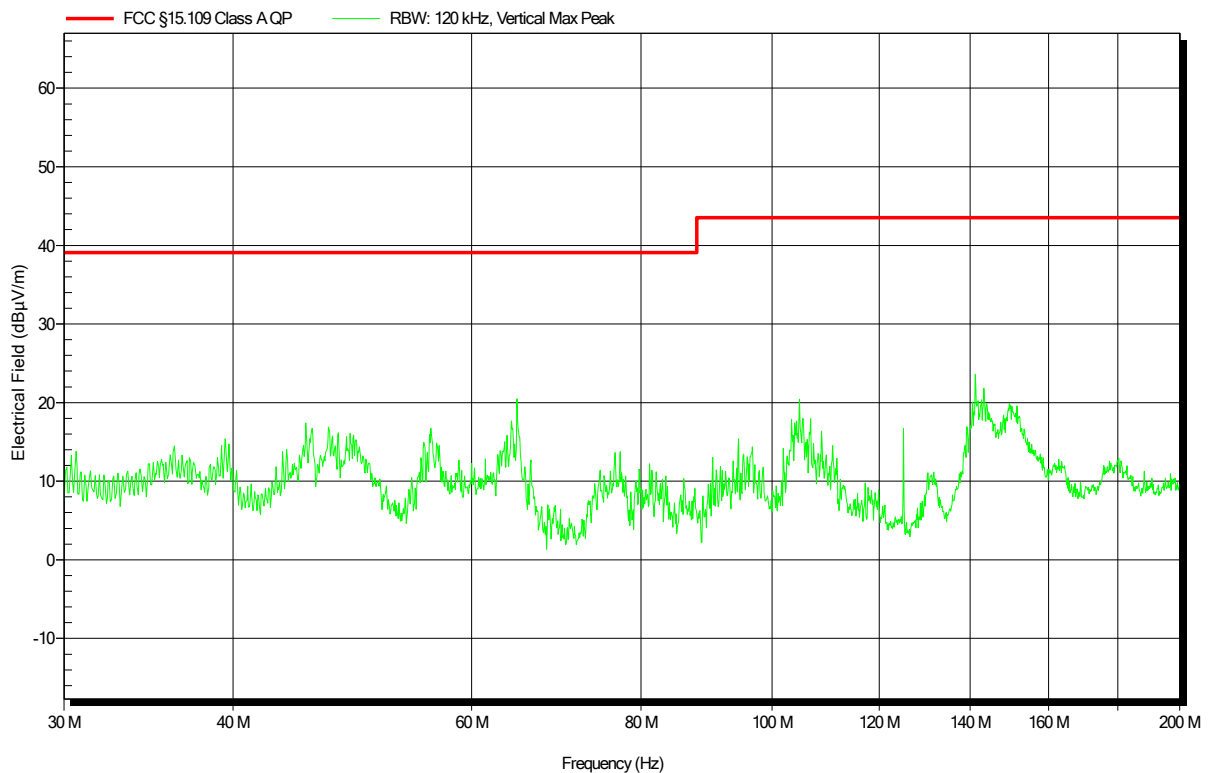
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-05-29
 Operating Conditions: ambient temperature: 21°C
 power input: 48V DC PoE
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 2
 Note 1:

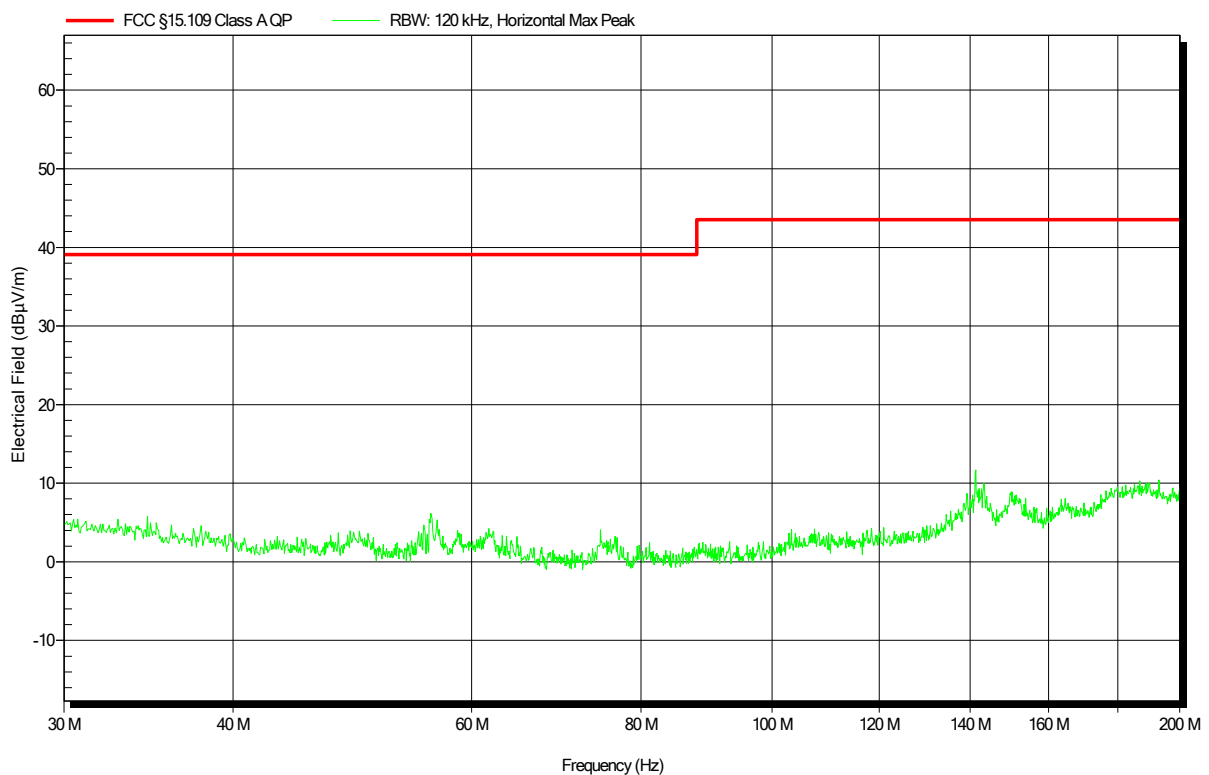
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-05-29
 Operating Conditions: ambient temperature: 21°C
 power input: 48V DC PoE
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 2
 Note 1:

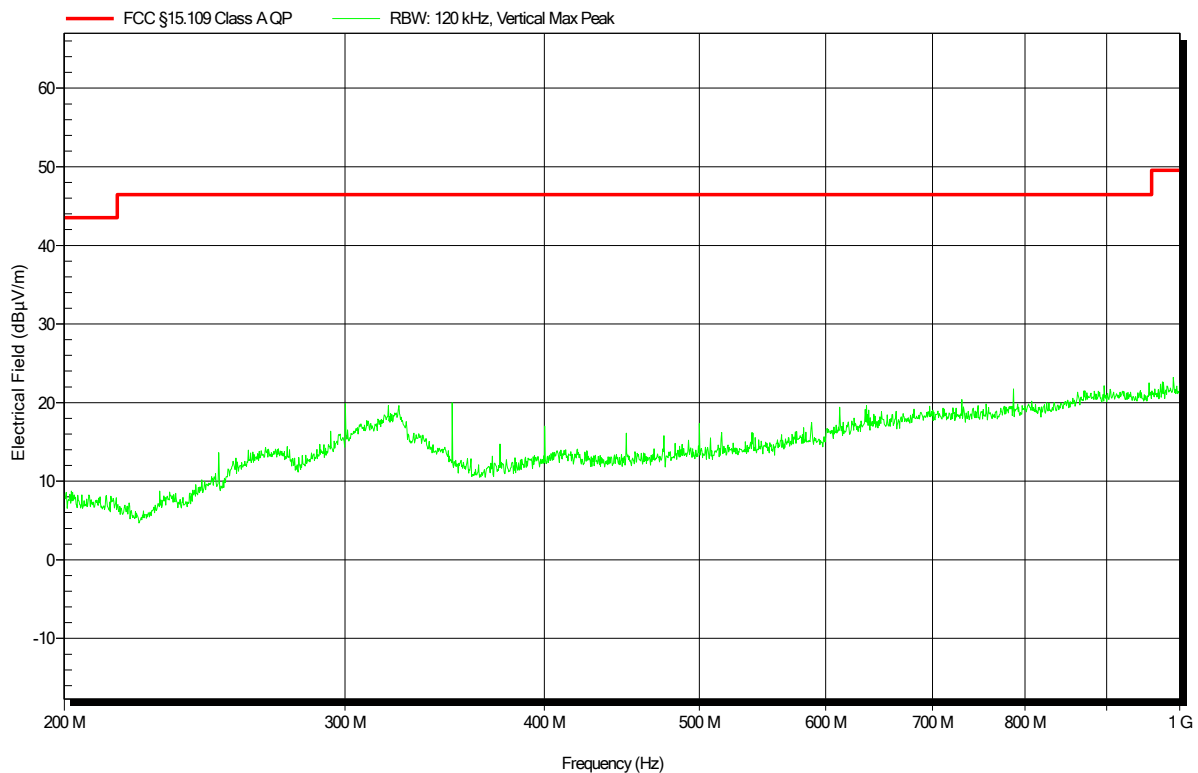
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-05-29
 Operating Conditions: ambient temperature: 21°C
 power input: 48V DC PoE
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 2
 Note 1:

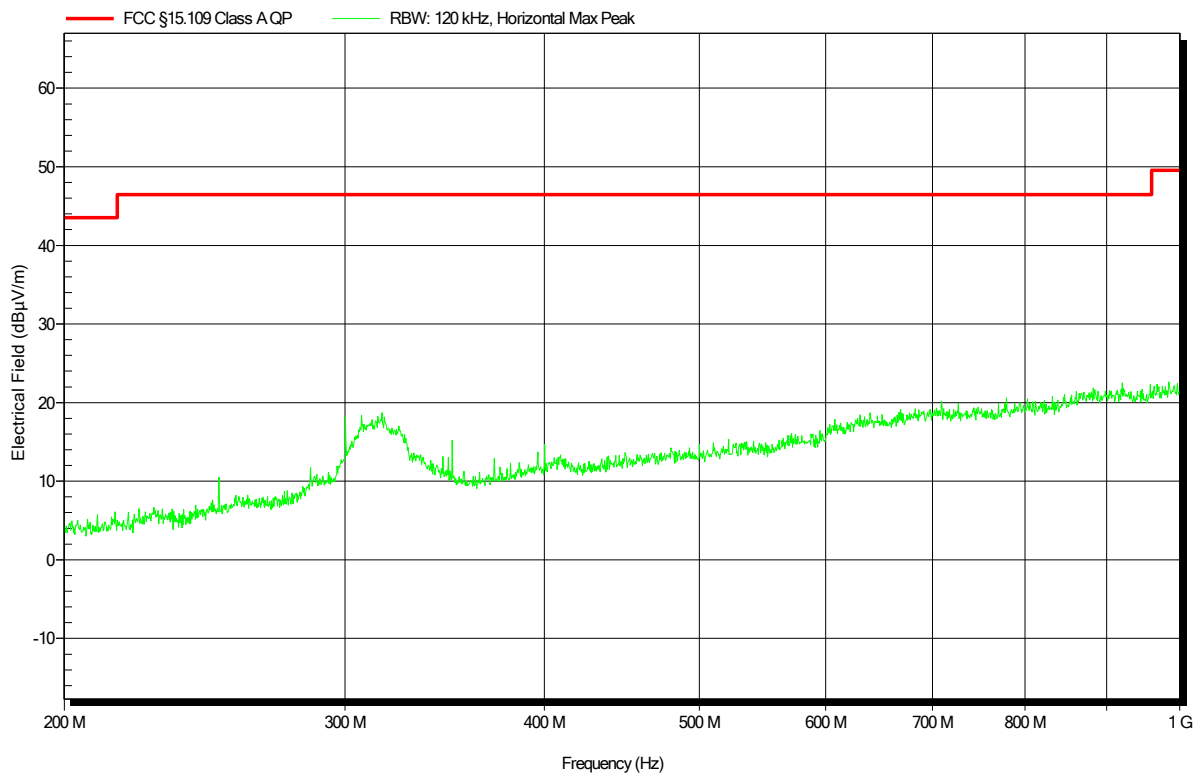
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-05-29
 Operating Conditions: ambient temperature: 21°C
 power input: 48V DC PoE
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 2
 Note 1:

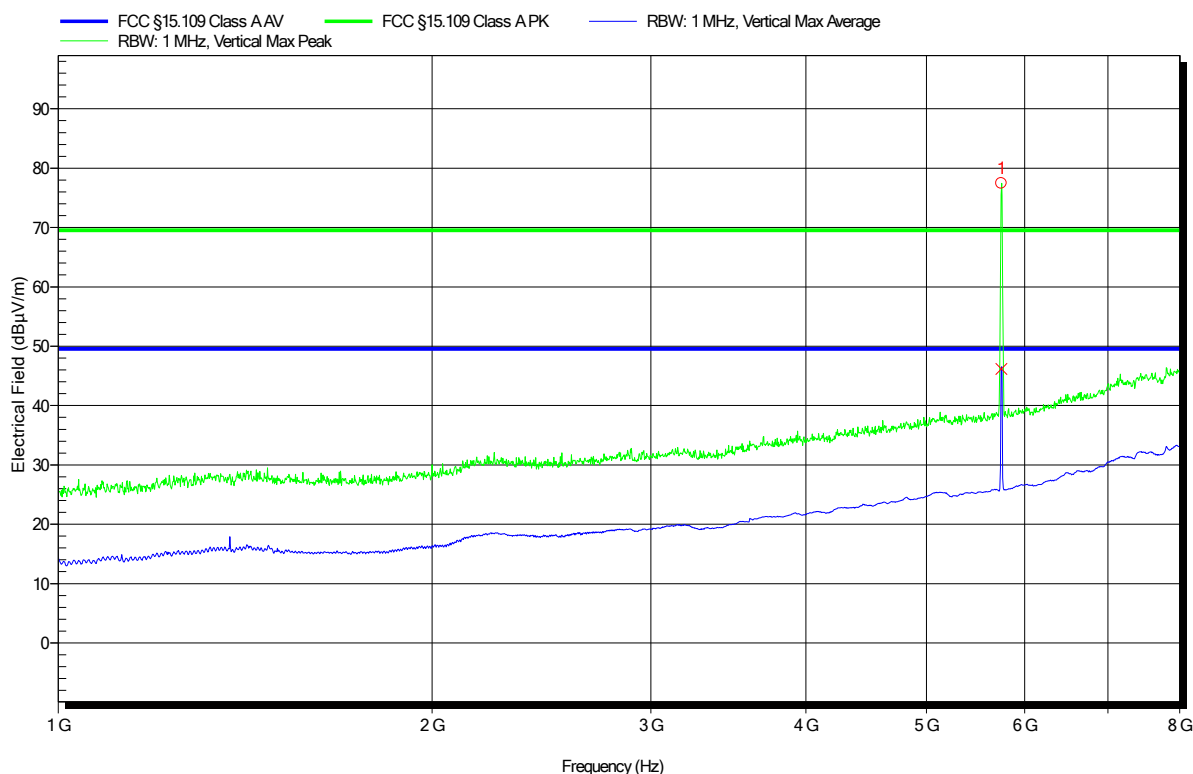
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 21°C
 power input: 48V DC PoE
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 2
 Note 1: 50 Ohm at antenna port

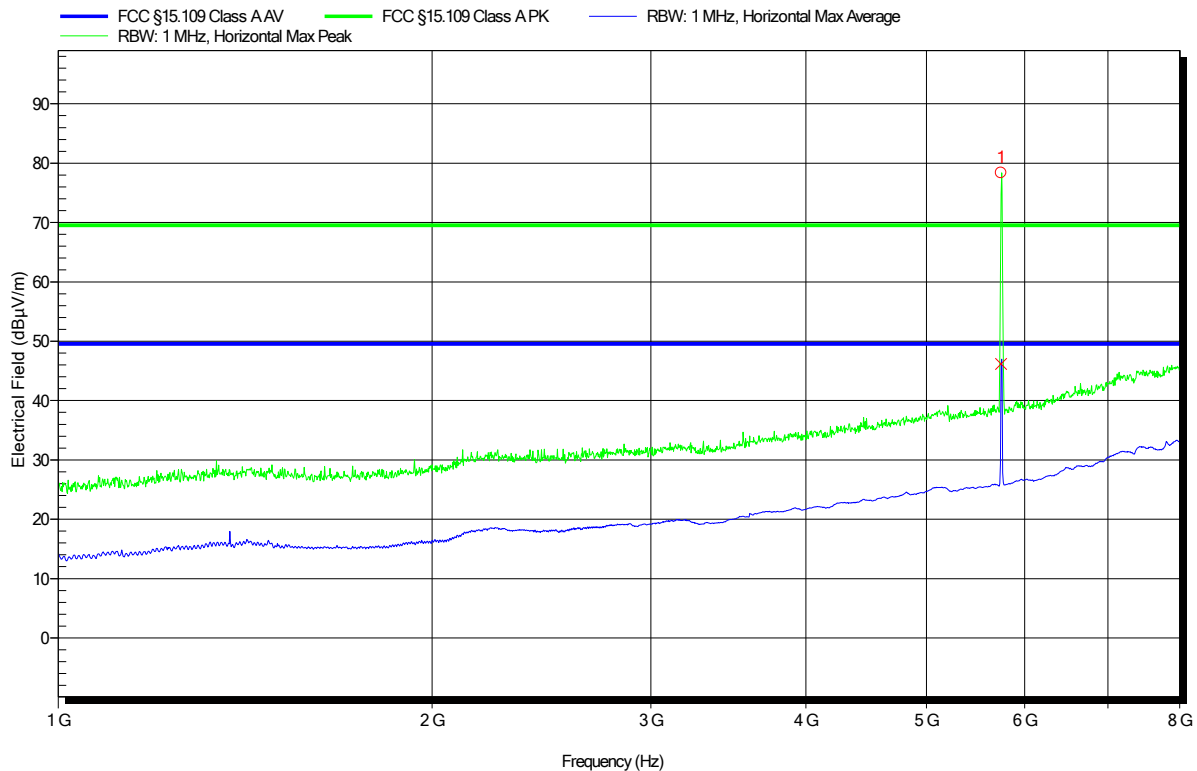
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 21°C
 power input: 48V DC PoE
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 2
 Note 1: 50 Ohm at antenna port

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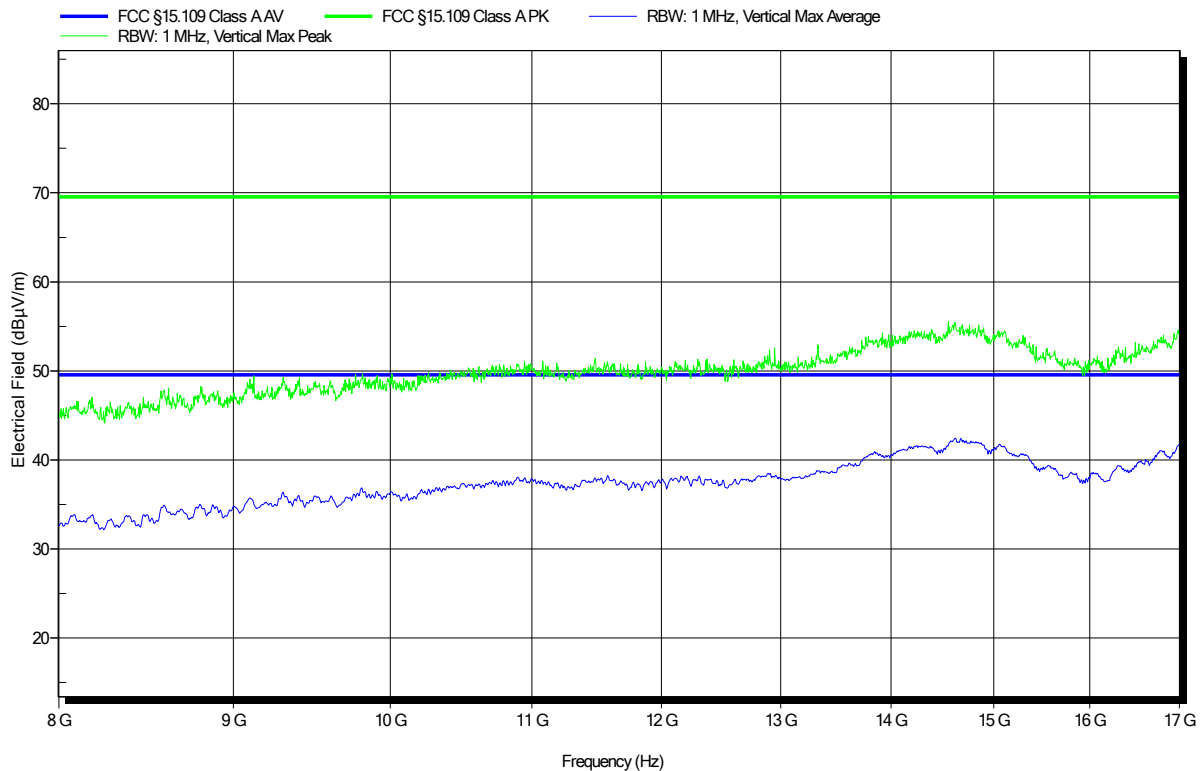


Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	5.744 GHz	WLAN carrier					

Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 21°C
 power input: 48V DC PoE
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 2
 Note 1: 50 Ohm at antenna port

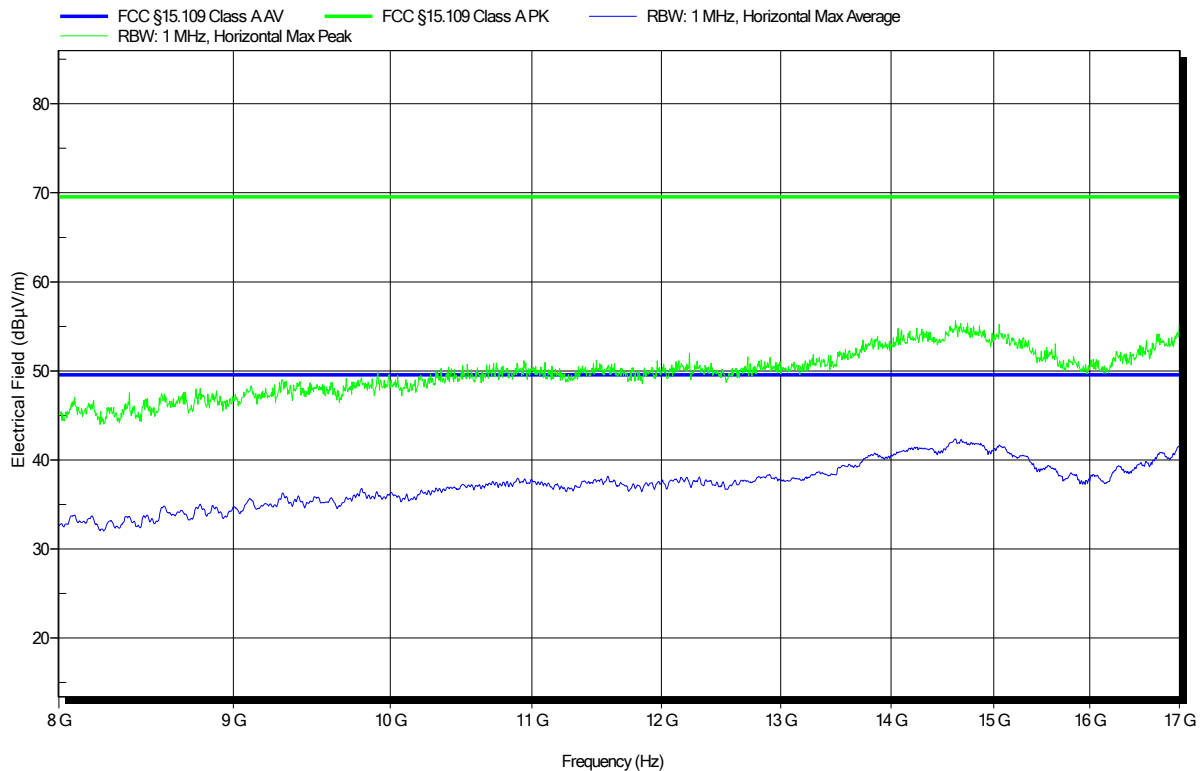
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 21°C
 power input: 48V DC PoE
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 2
 Note 1: 50 Ohm at antenna port

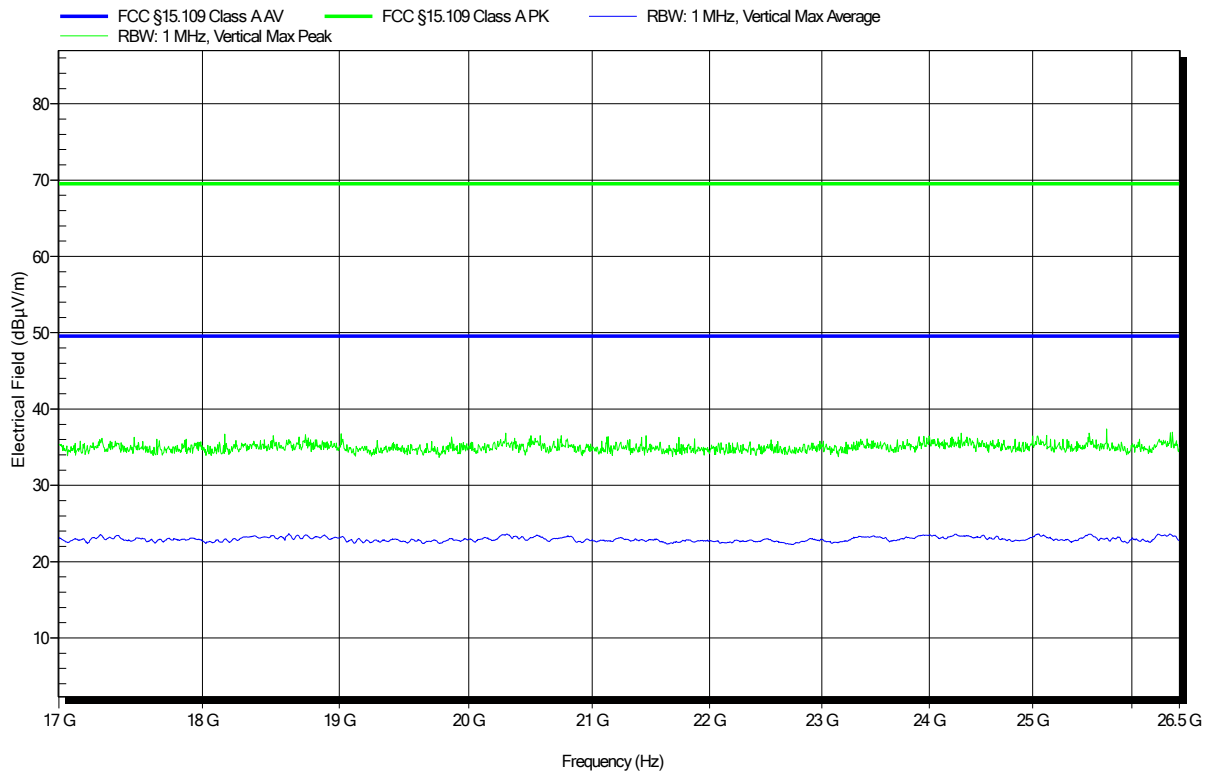
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 48V DC PoE
 Antenna: ATH18G40, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 2
 Note 1: 50 Ohm at antenna port

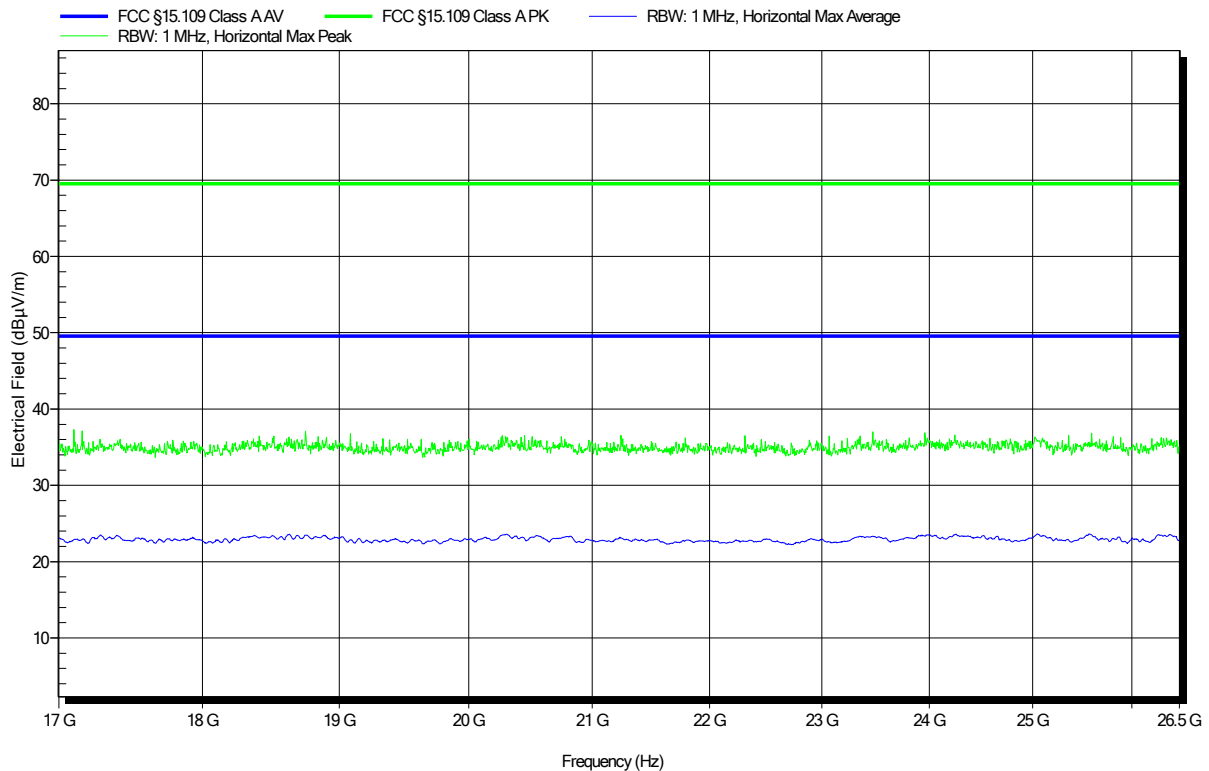
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 48V DC PoE
 Antenna: ATH18G40, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 2
 Note 1: 50 Ohm at antenna port

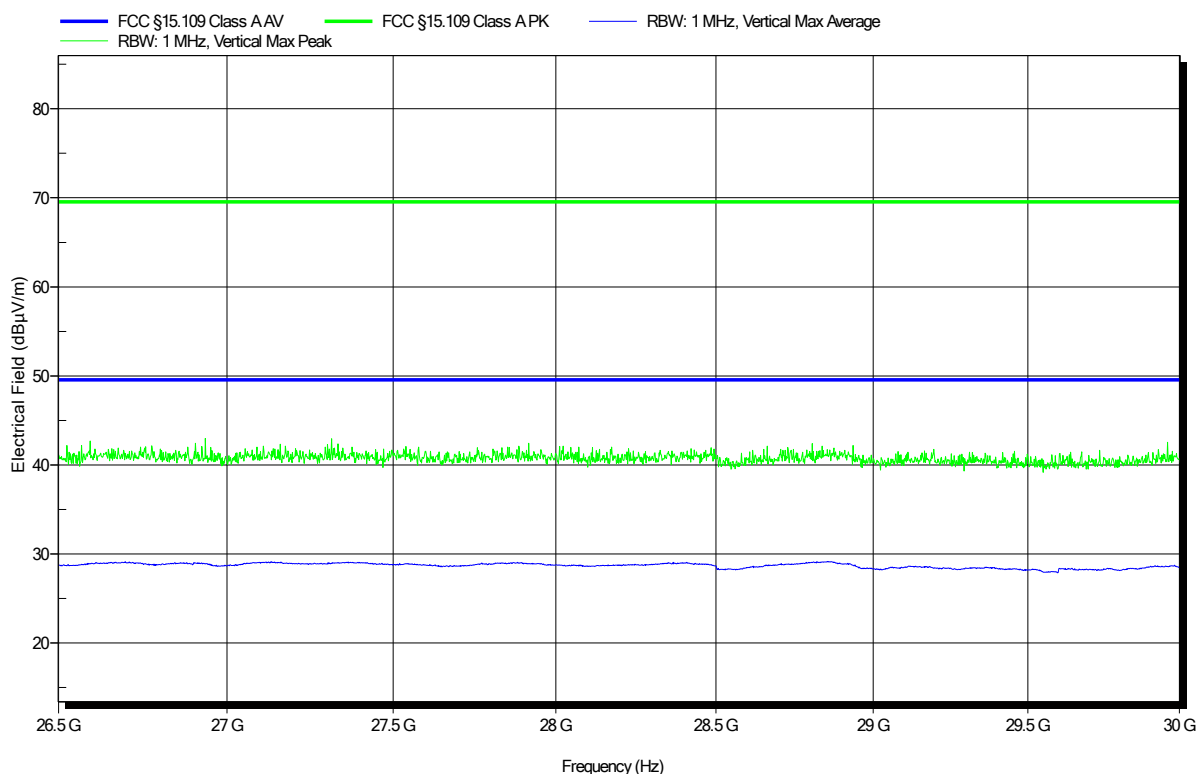
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 48V DC PoE
 Antenna: CBL26402075, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 2
 Note 1: 50 Ohm at antenna port

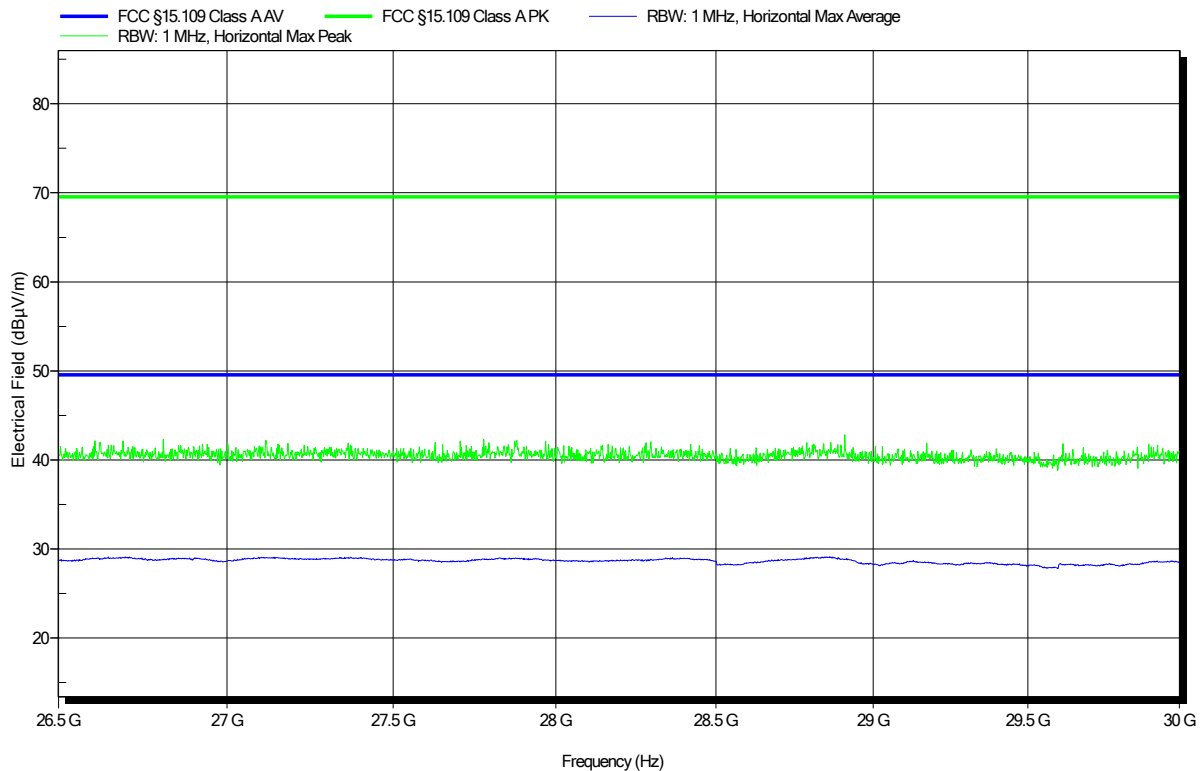
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 48V DC PoE
 Antenna: CBL26402075, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 2
 Note 1: 50 Ohm at antenna port

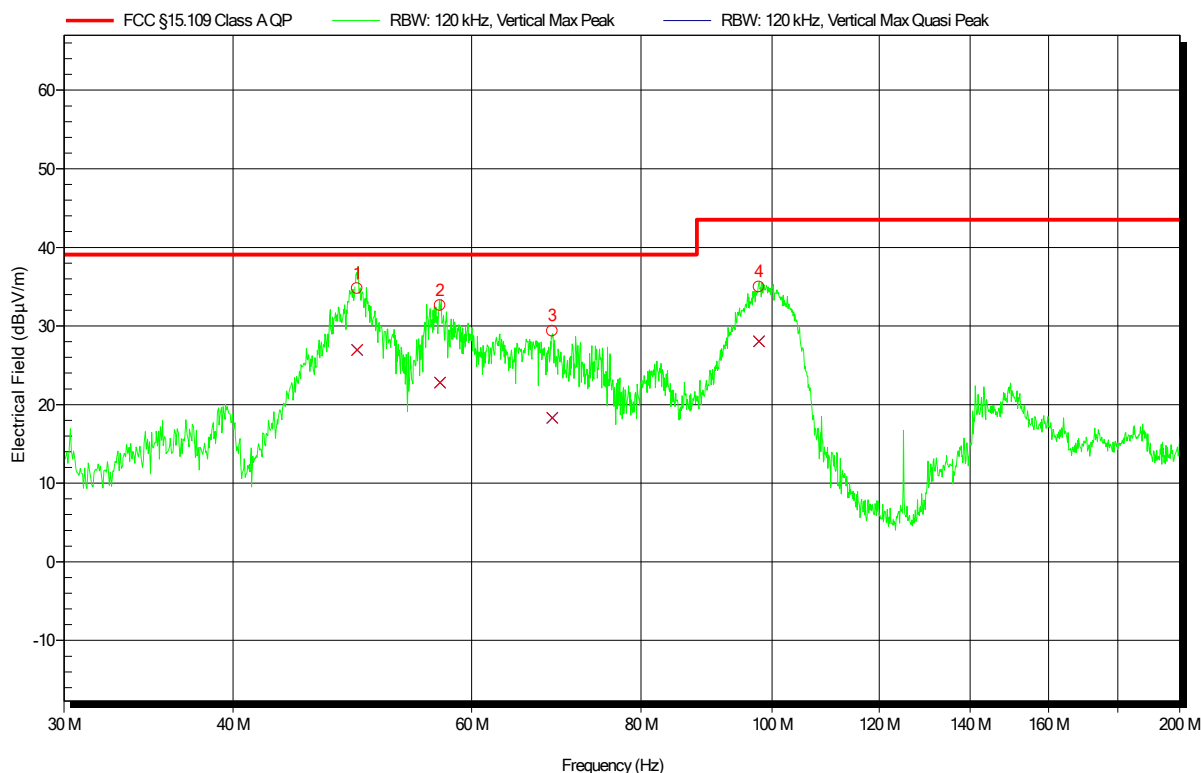
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-05-29
 Operating Conditions: ambient temperature: 21°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 3
 Note 1:

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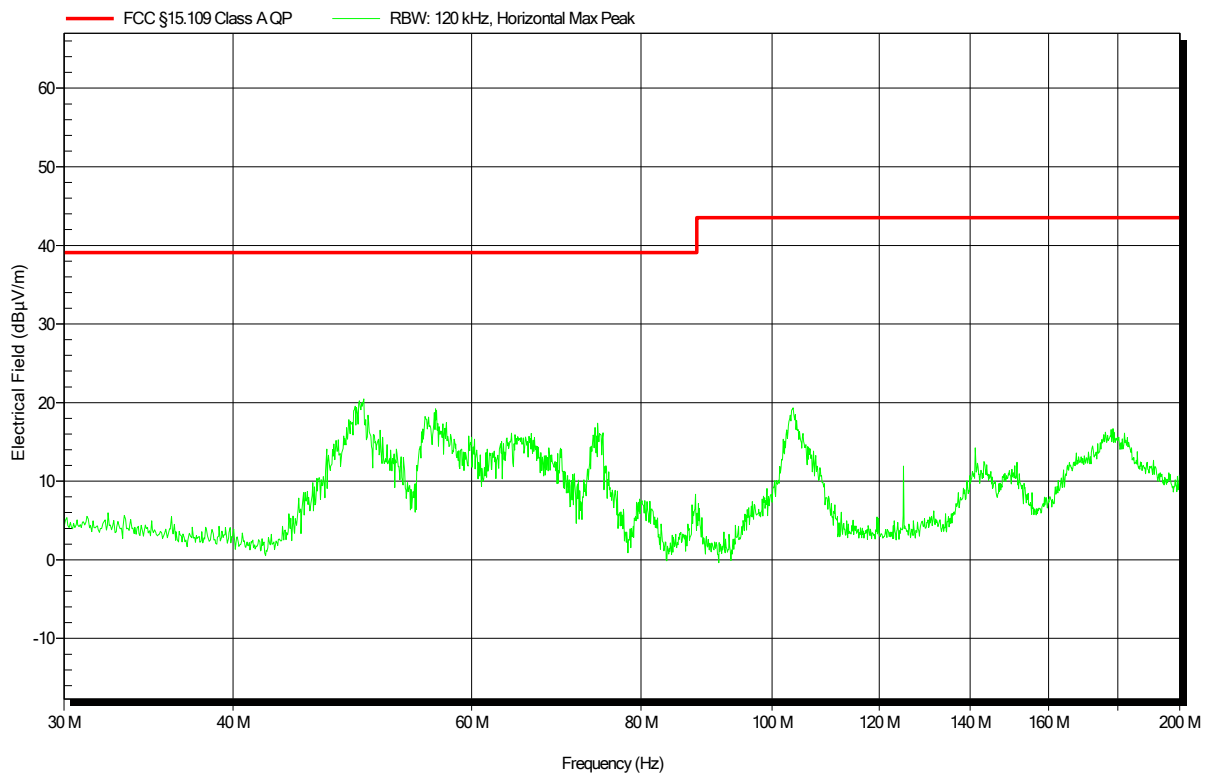


Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	49.38 MHz	26.97 dBμV/m	39.08 dBμV/m	-12.12 dB	Pass	68 Degree	1 m
2	56.88 MHz	22.78 dBμV/m	39.08 dBμV/m	-16.3 dB	Pass	68 Degree	1 m
3	68.82 MHz	18.33 dBμV/m	39.08 dBμV/m	-20.75 dB	Pass	68 Degree	1 m
4	97.8 MHz	28.07 dBμV/m	43.52 dBμV/m	-15.46 dB	Pass	68 Degree	1 m

Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-05-29
 Operating Conditions: ambient temperature: 21°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 3
 Note 1:

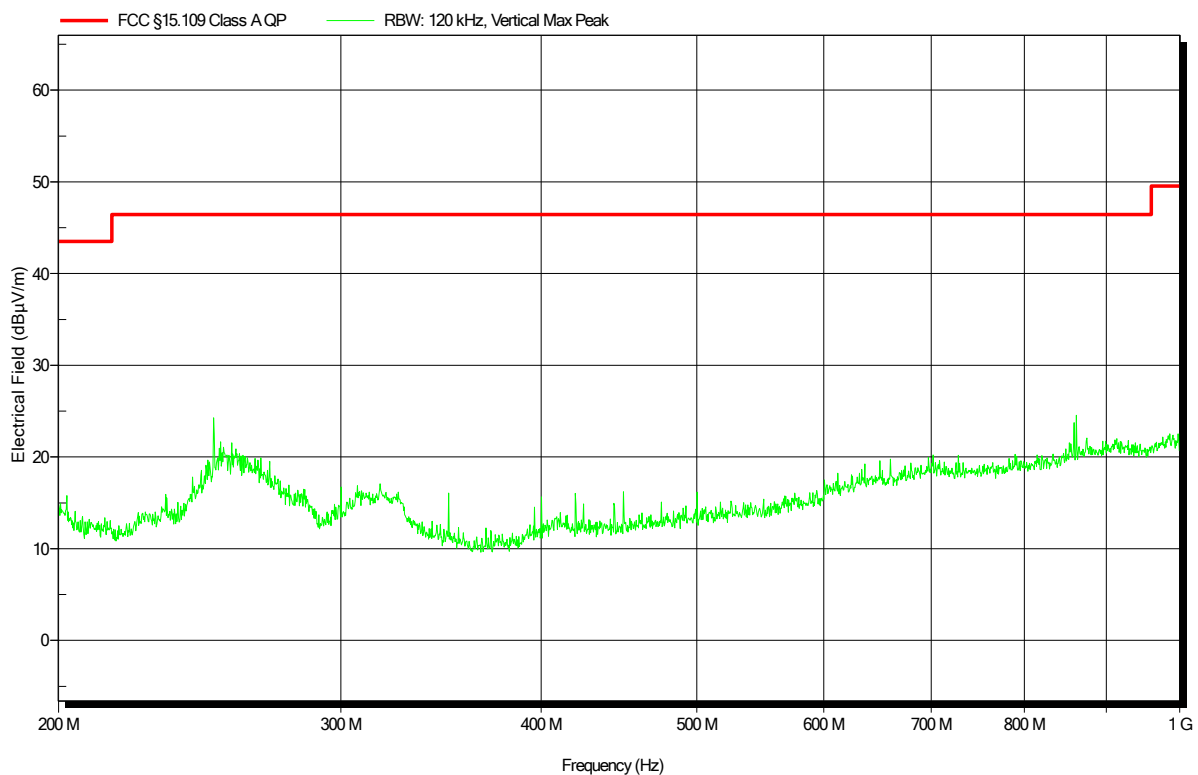
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-05-29
 Operating Conditions: ambient temperature: 21°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 3
 Note 1:

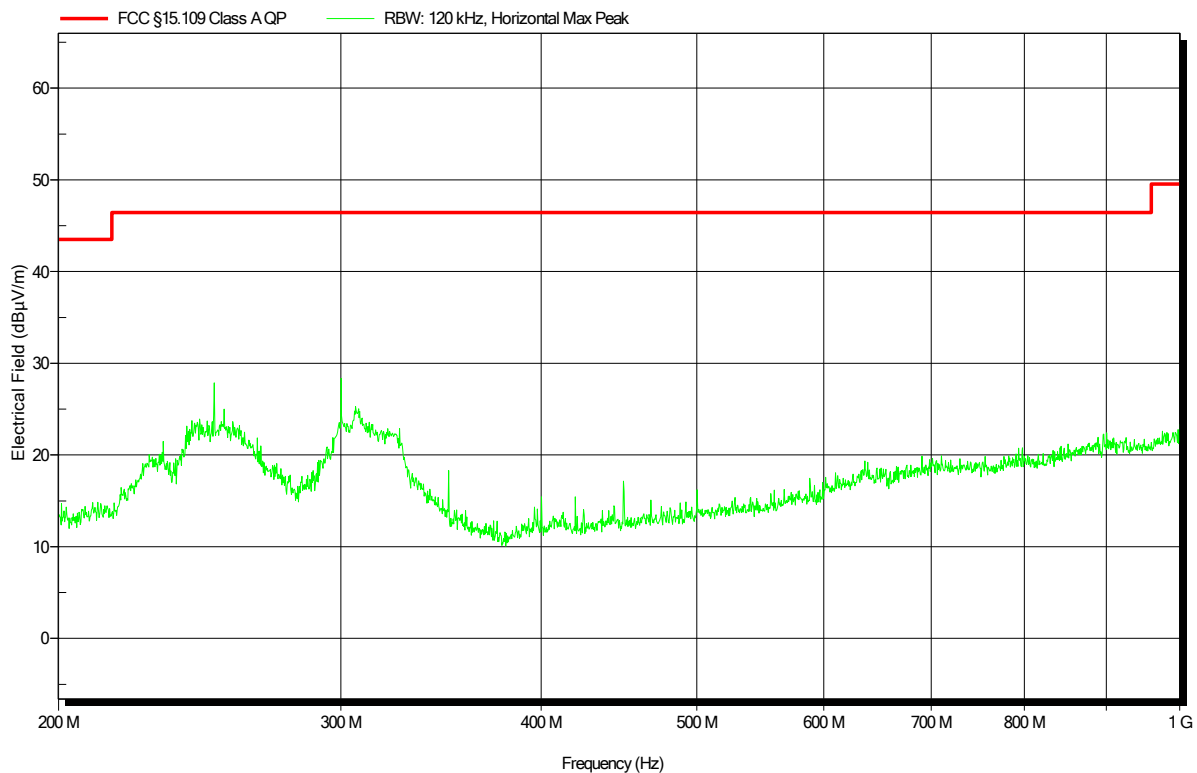
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-05-29
 Operating Conditions: ambient temperature: 21°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 3
 Note 1:

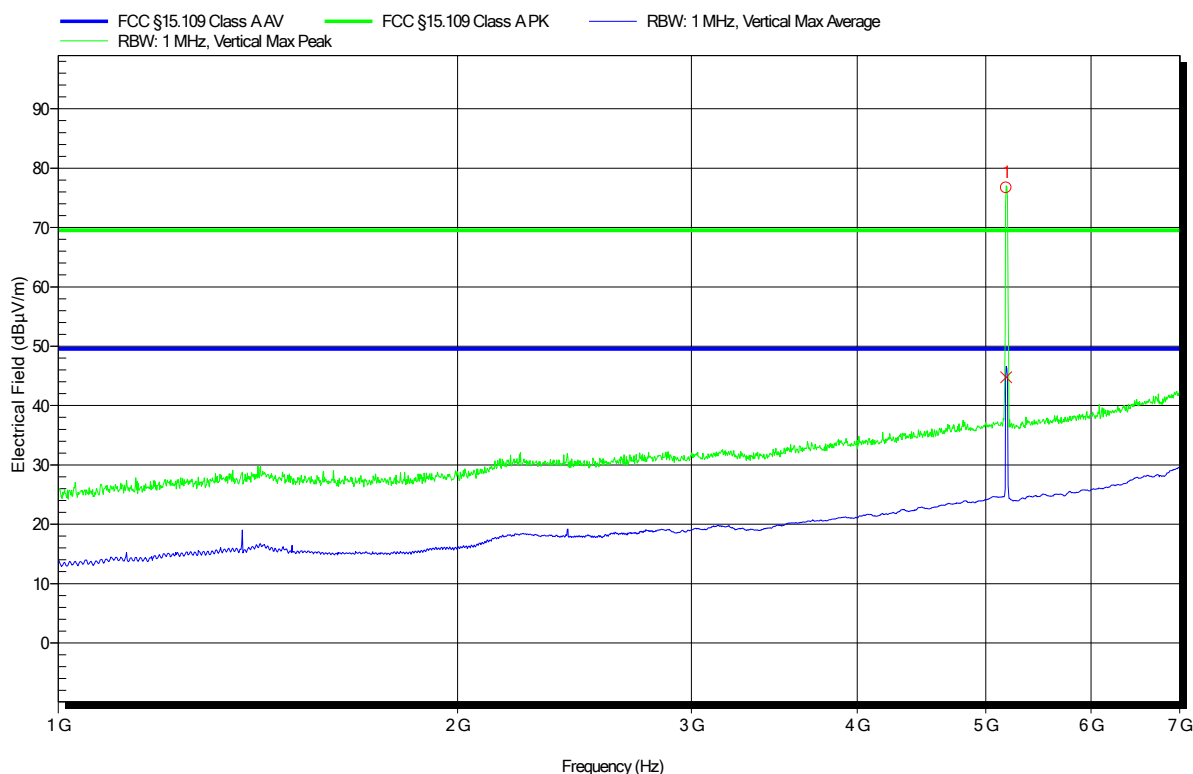
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 3
 Note 1: 50 Ohm at antenna port

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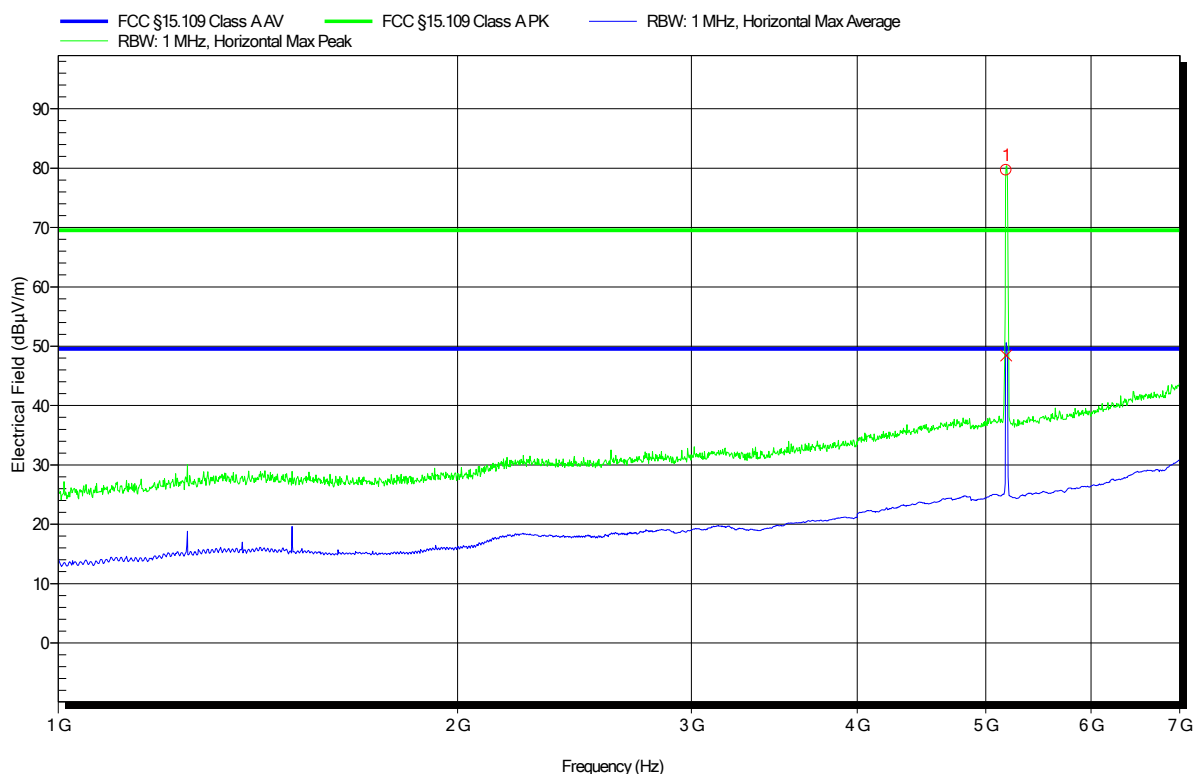


Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	5.18 GHz	WLAN carrier					

Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 3
 Note 1: 50 Ohm at antenna port

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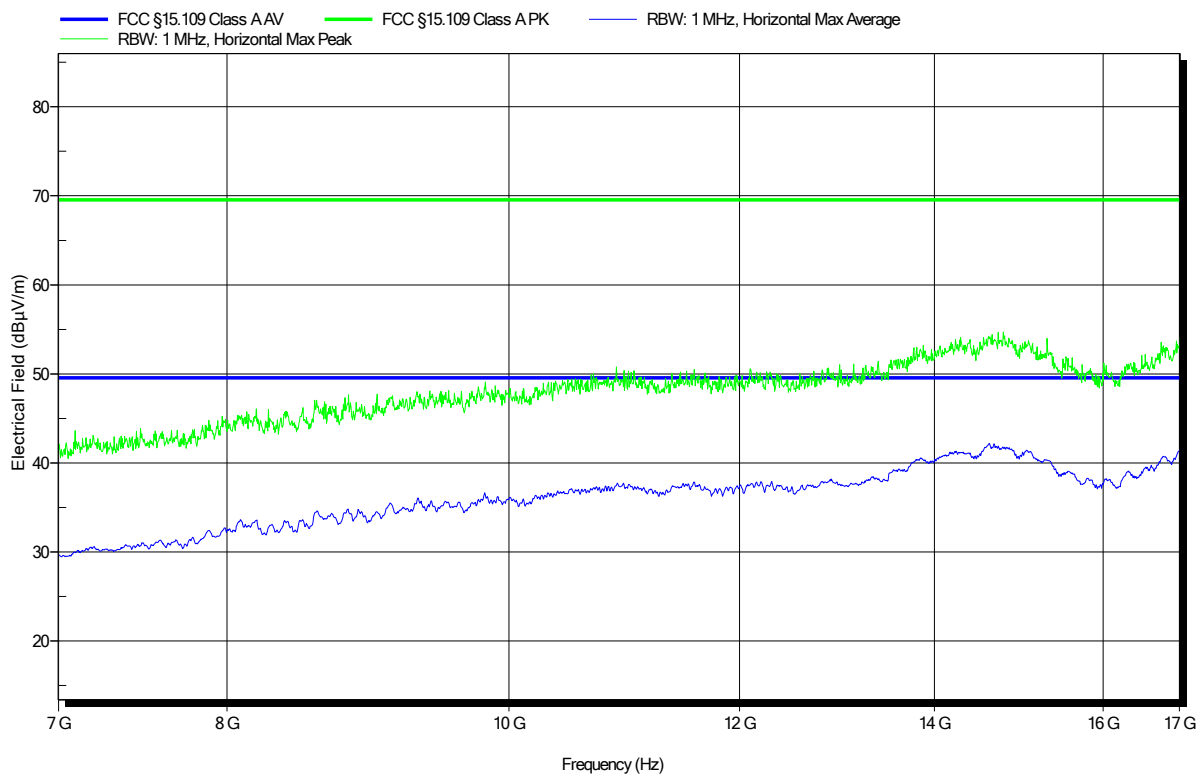


Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	5.181 GHz	WLAN carrier					

Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 3
 Note 1: 50 Ohm at antenna port

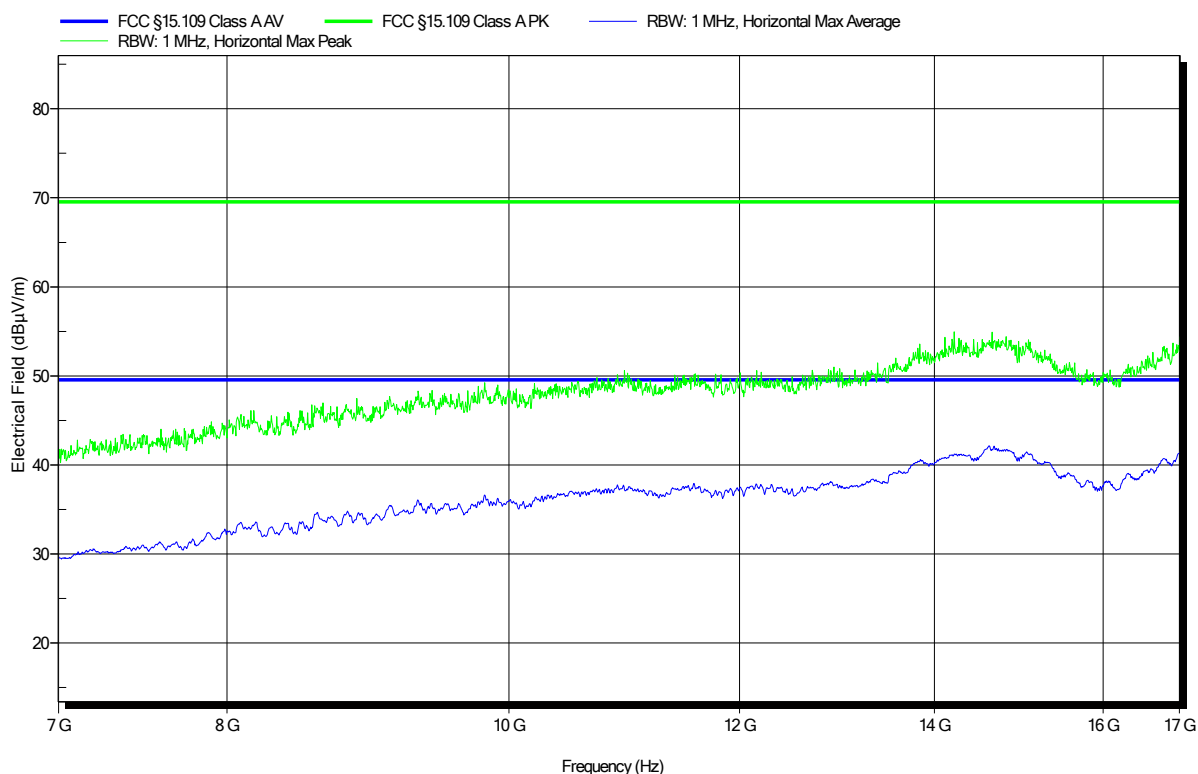
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 3
 Note 1: 50 Ohm at antenna port

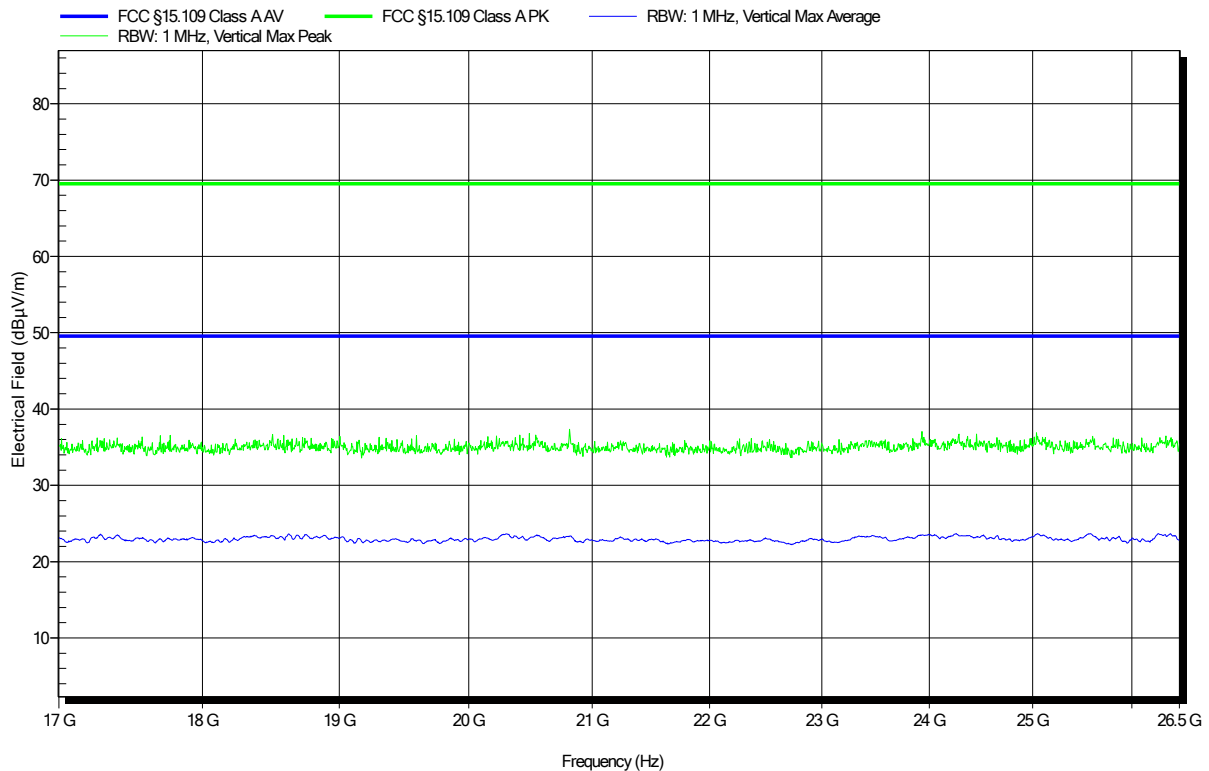
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: ATH18G40, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 3
 Note 1: 50 Ohm at antenna port

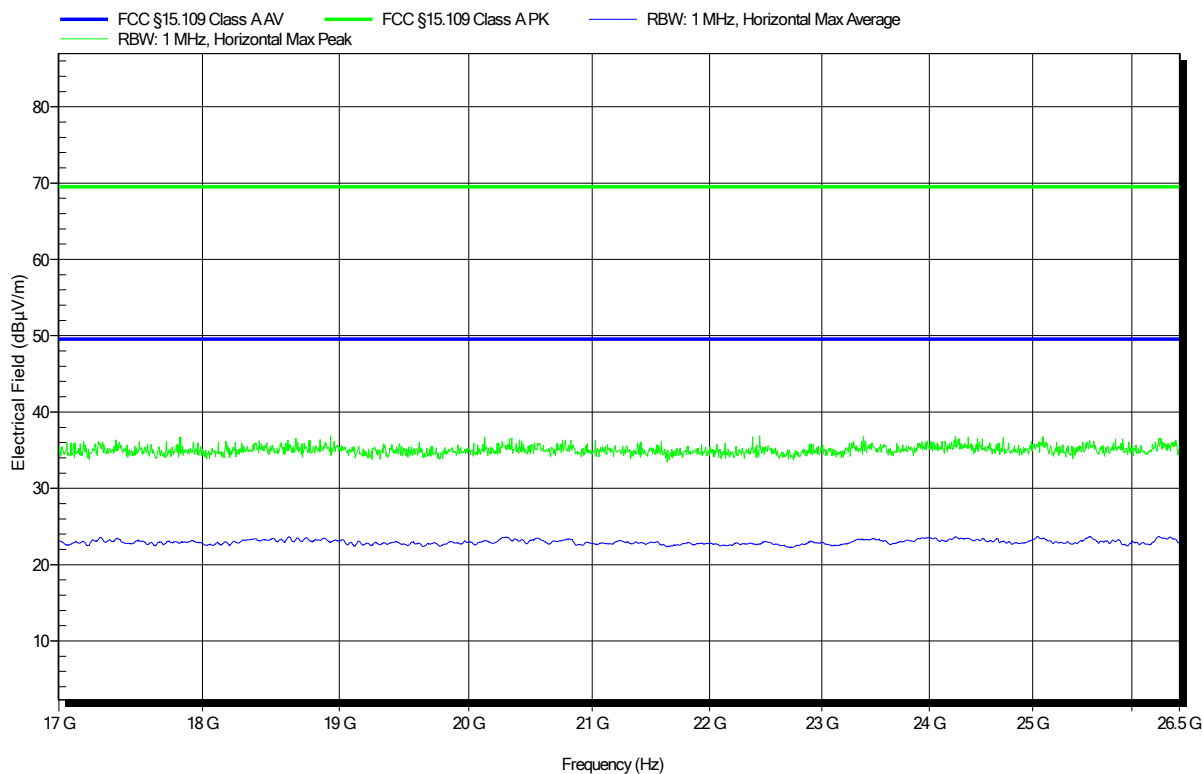
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: ATH18G40, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 3
 Note 1: 50 Ohm at antenna port

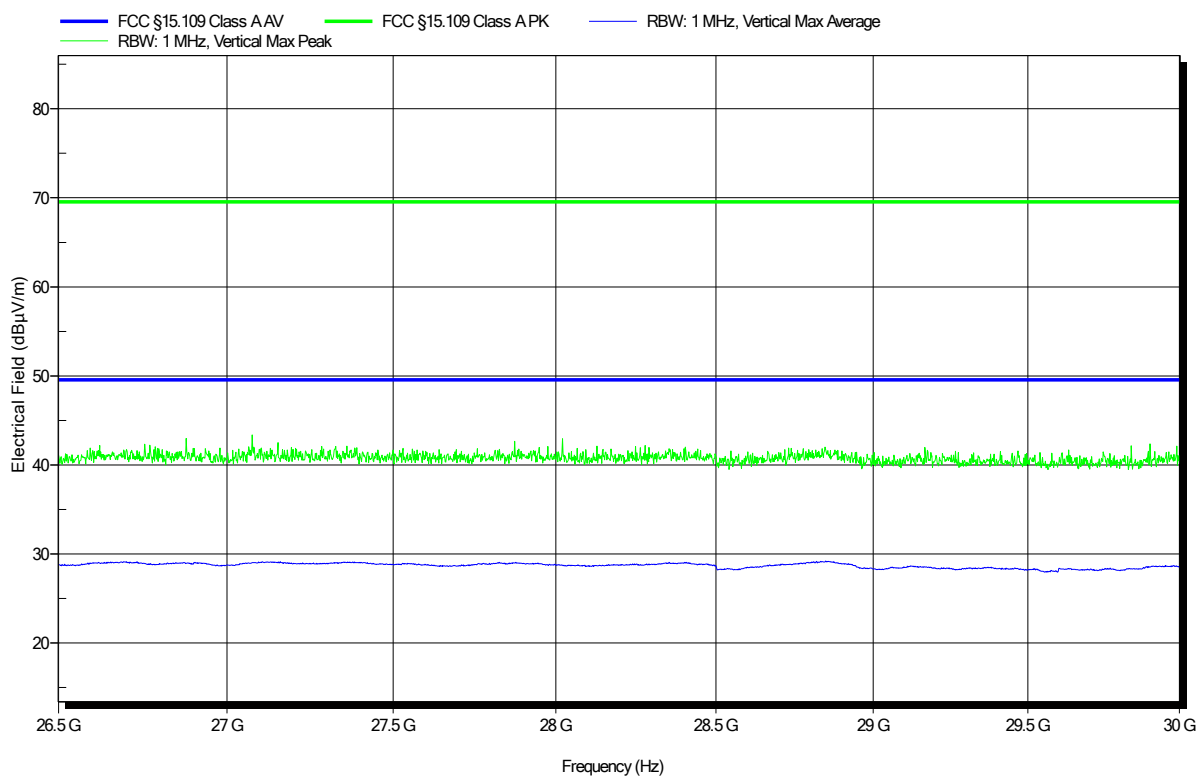
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: CBL26402075, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 3
 Note 1: 50 Ohm at antenna port

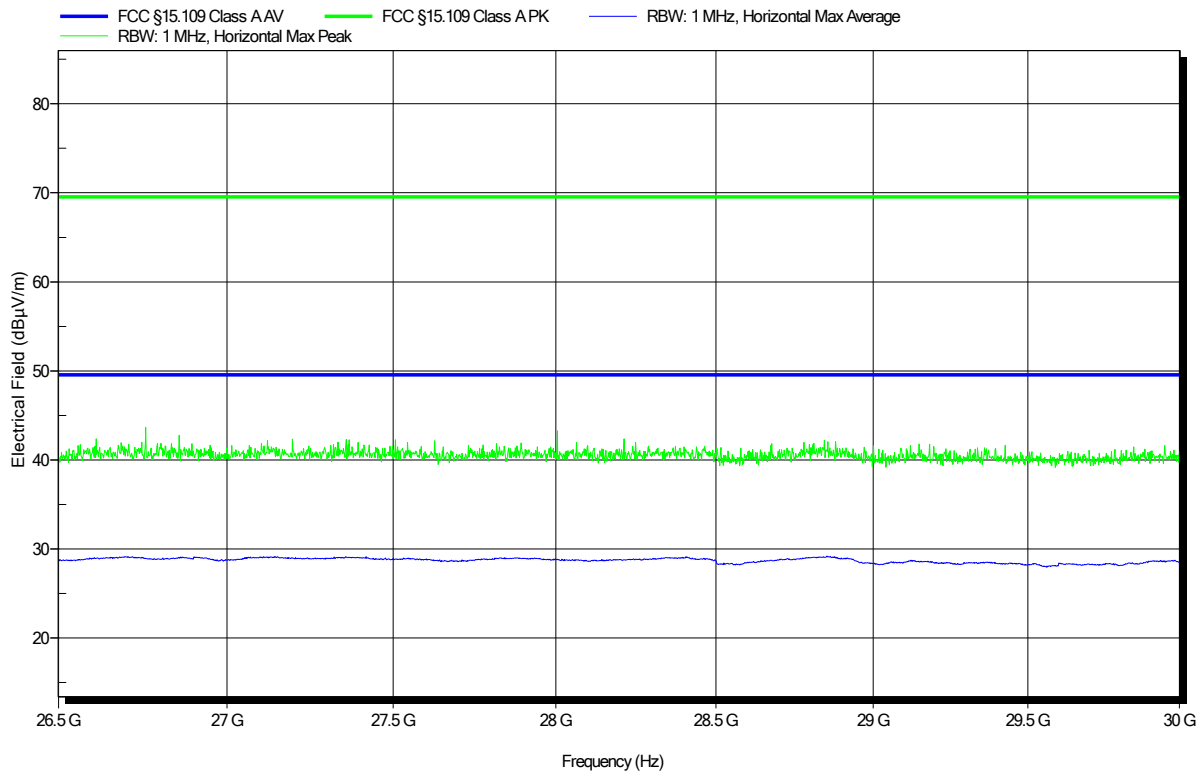
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 24V DC (AC/DC adaptor)
 Antenna: CBL26402075, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 3
 Note 1: 50 Ohm at antenna port

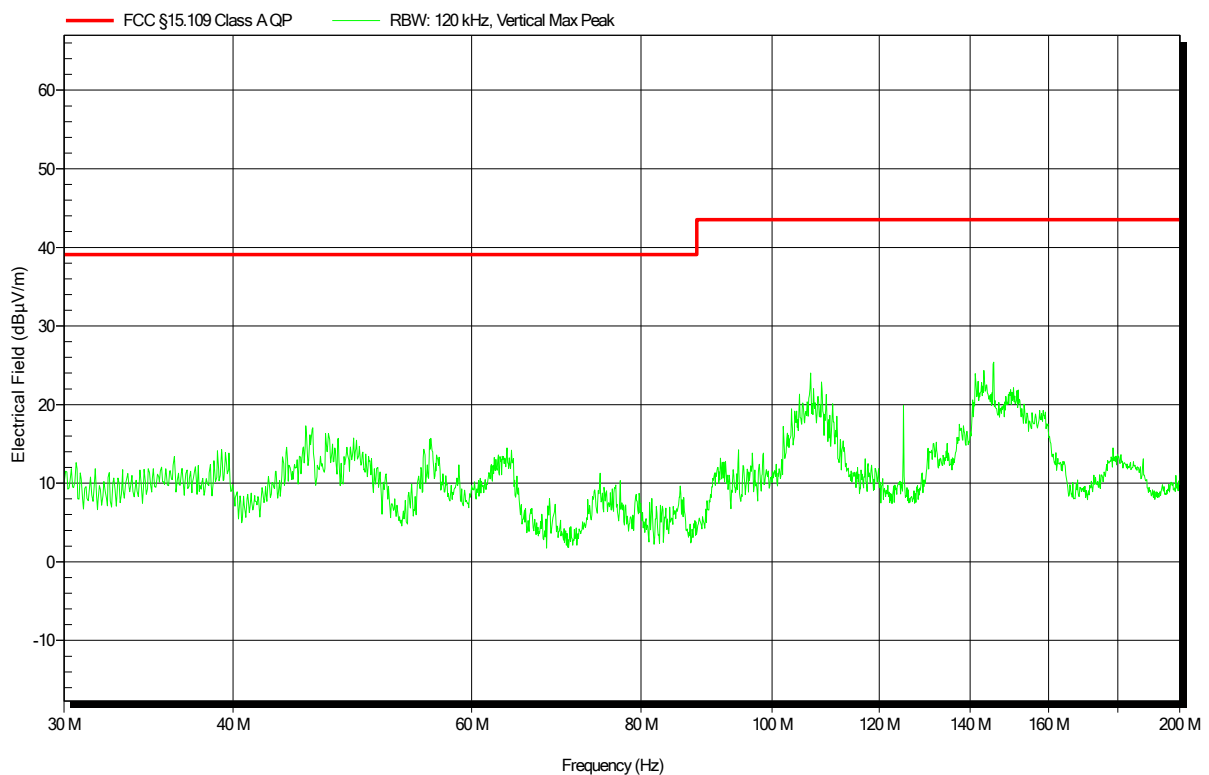
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-05-29
 Operating Conditions: ambient temperature: 21°C
 power input: 48V DC PoE
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 4
 Note 1:

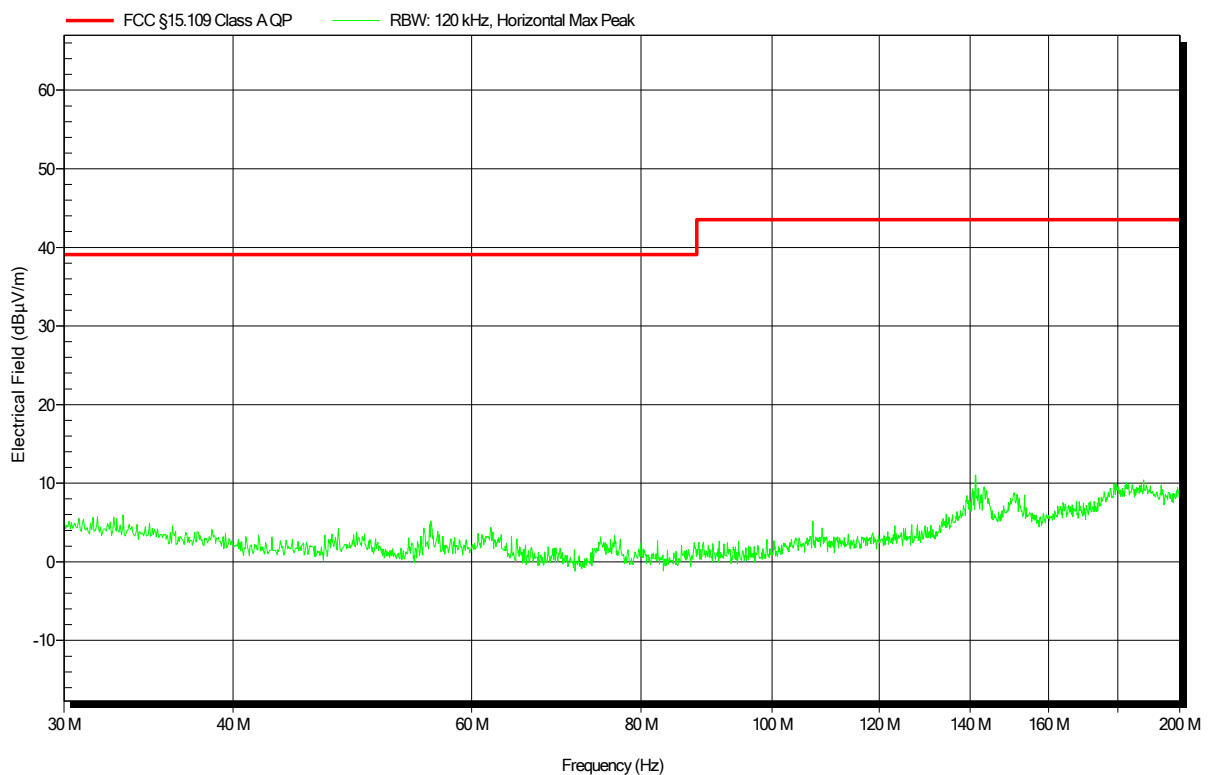
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-05-29
 Operating Conditions: ambient temperature: 21°C
 power input: 48V DC PoE
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 4
 Note 1: 169

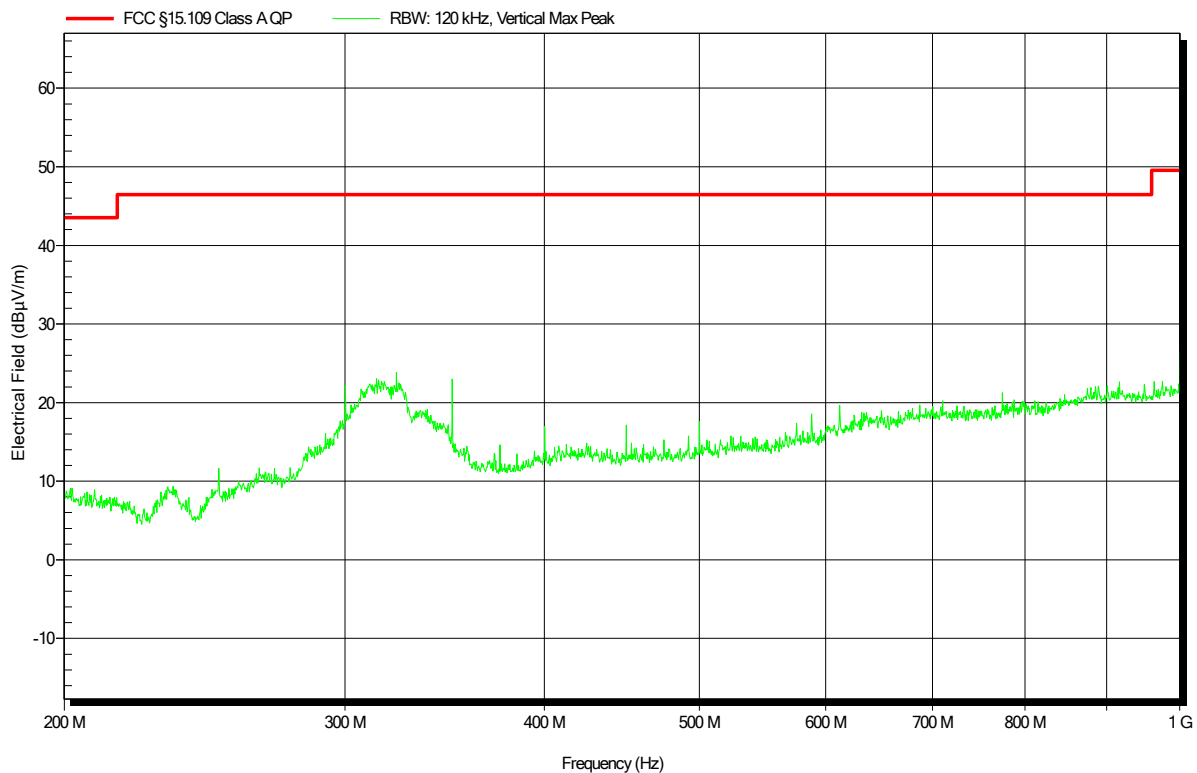
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-05-29
 Operating Conditions: ambient temperature: 21°C
 power input: 48V DC PoE
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 4
 Note 1:

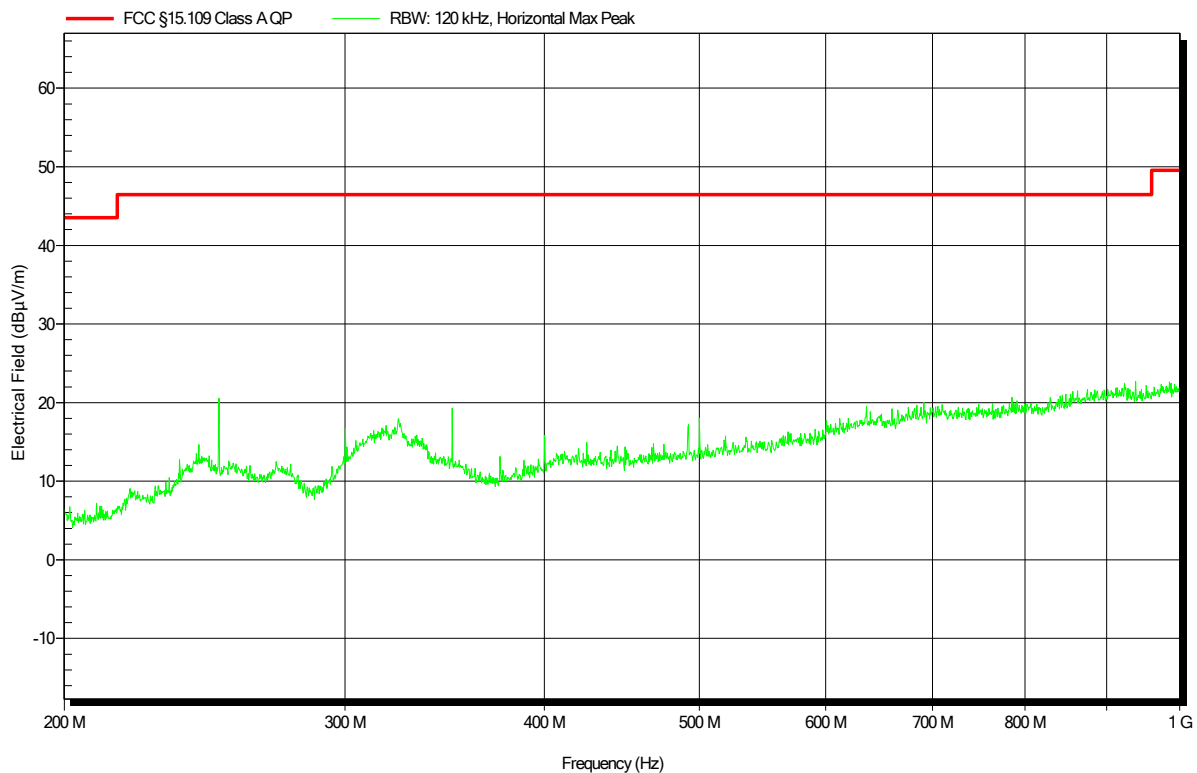
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-05-29
 Operating Conditions: ambient temperature: 21°C
 power input: 48V DC PoE
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 4
 Note 1:

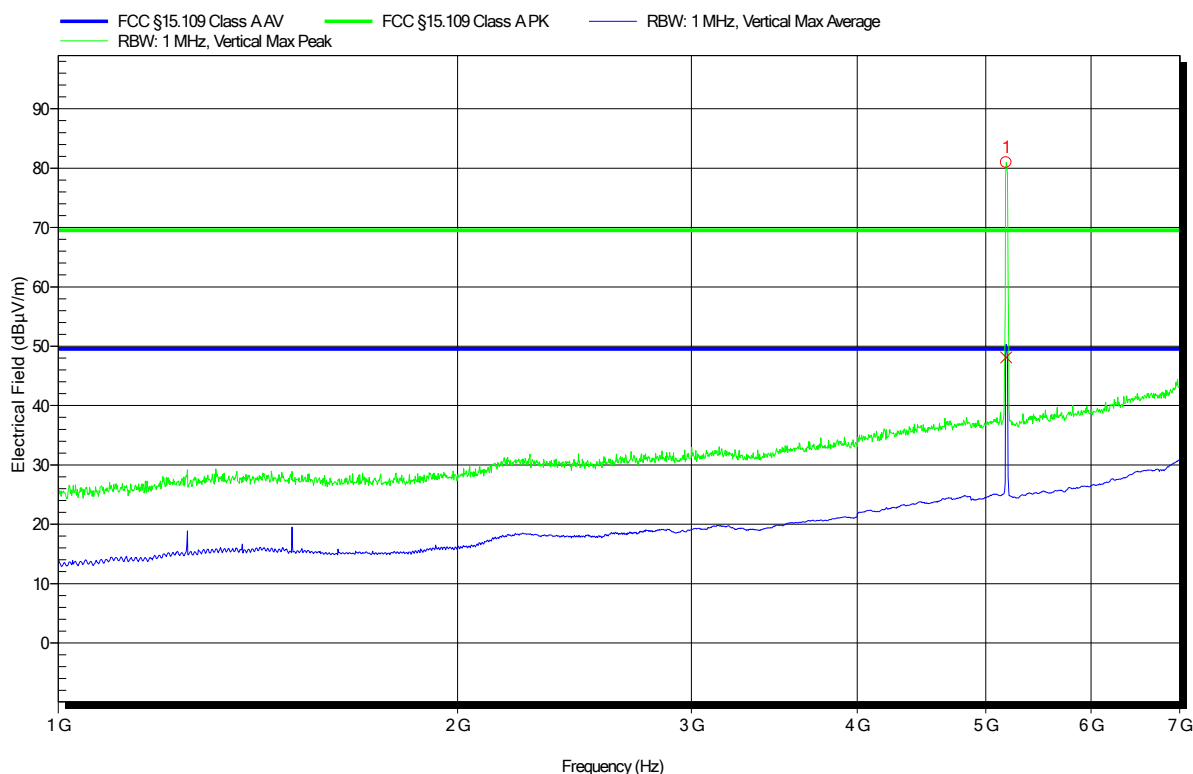
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 48V DC PoE
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 4
 Note 1: 50 Ohm at antenna port

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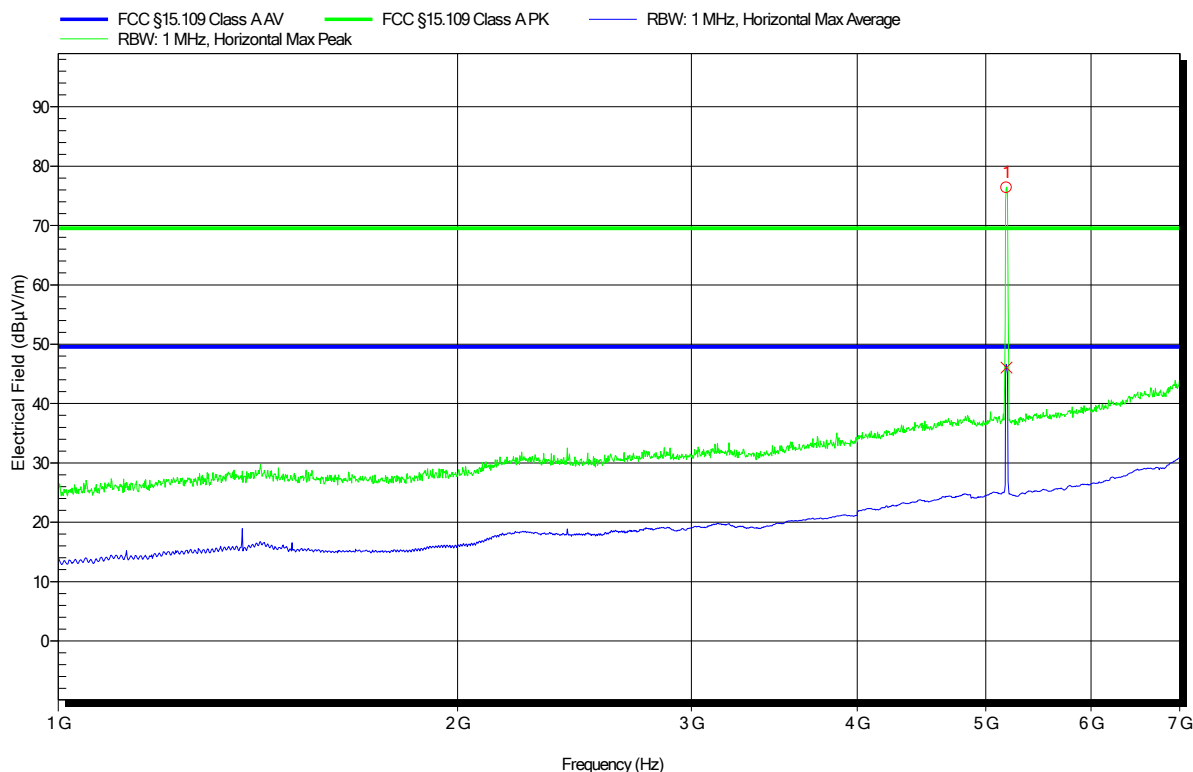


Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	5.18 GHz	WLAN carrier					

Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 48V DC PoE
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 4
 Note 1: 50 Ohm at antenna port

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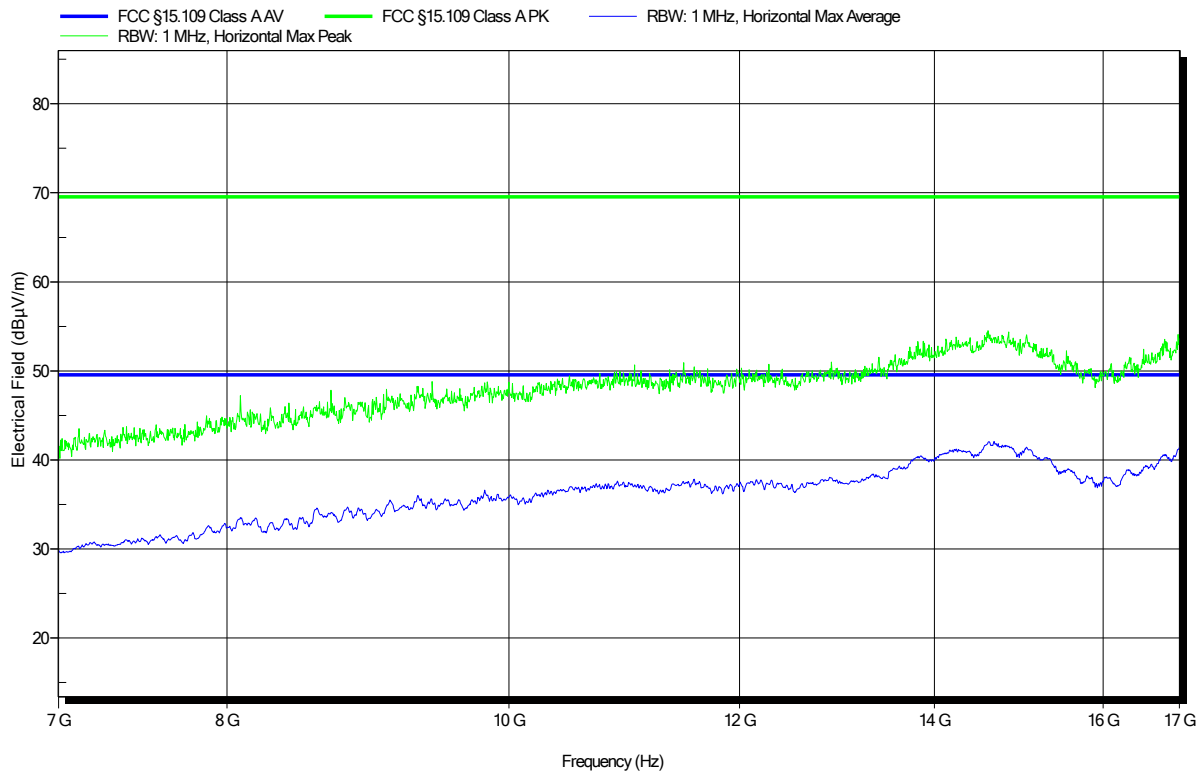


Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	5.182 GHz	WLAN carrier					

Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 48V DC PoE
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 4
 Note 1: 50 Ohm at antenna port

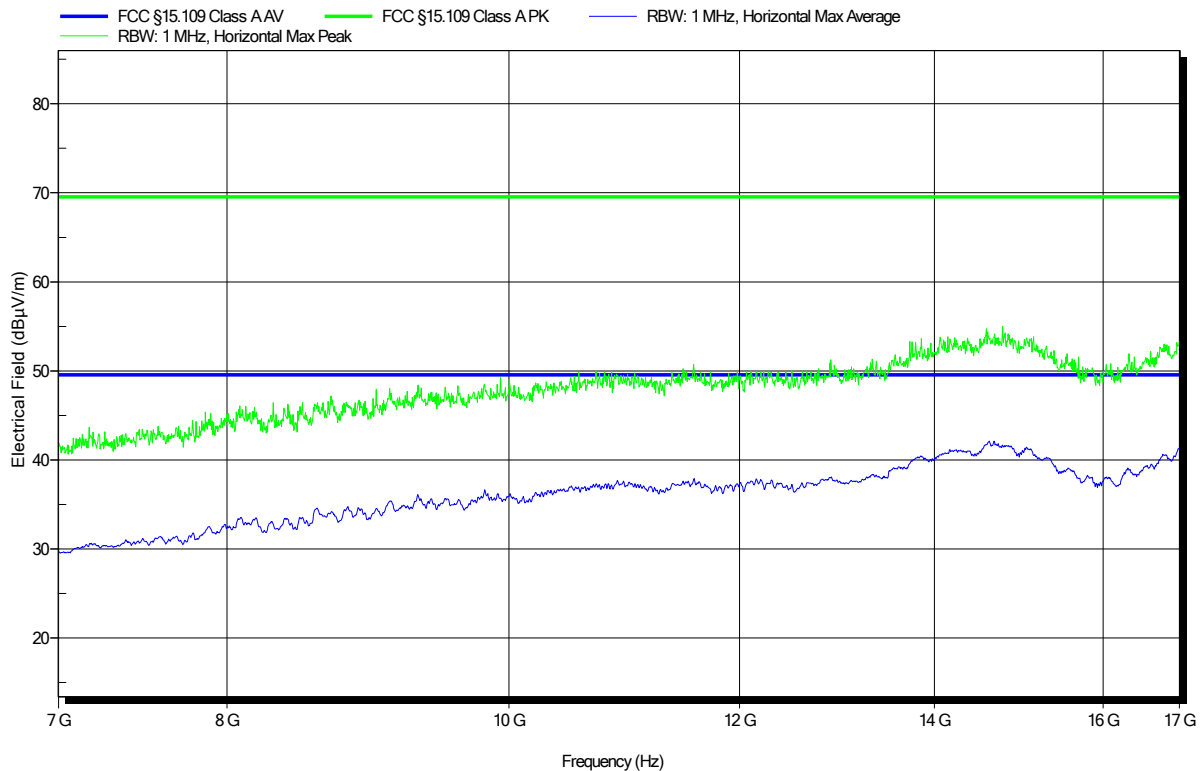
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 48V DC PoE
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 4
 Note 1: 50 Ohm at antenna port

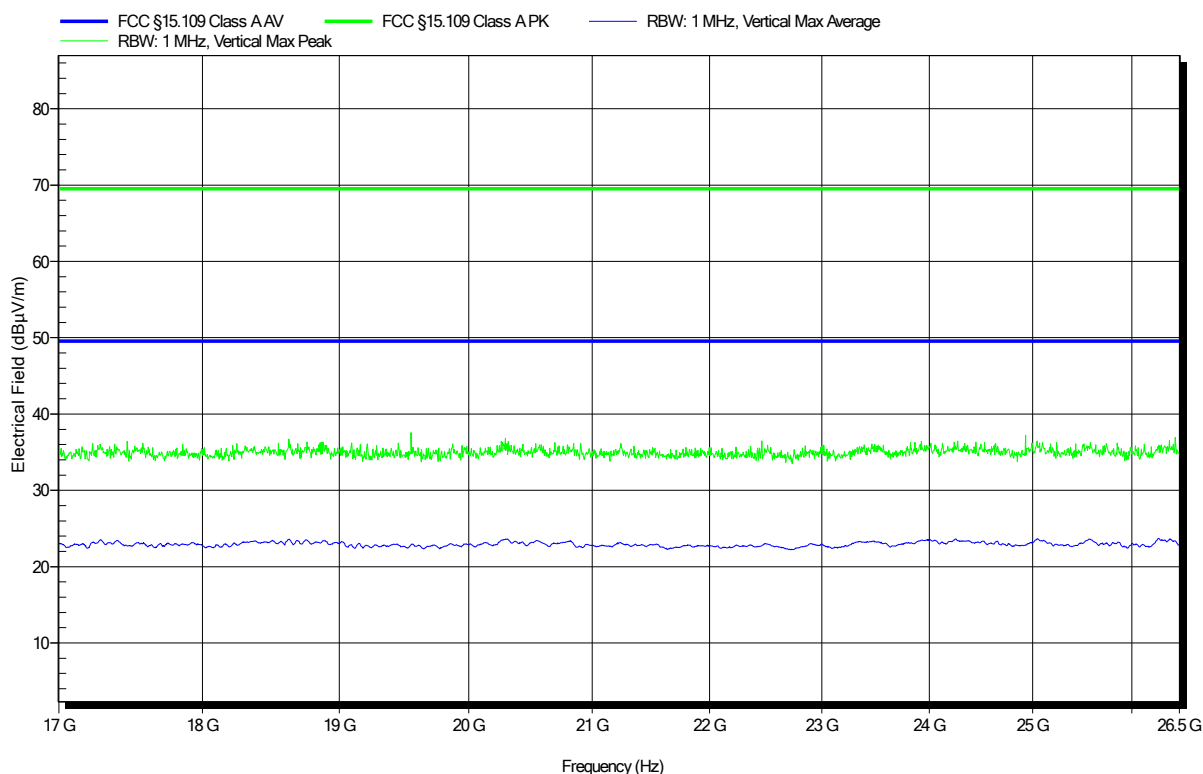
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 48V DC PoE
 Antenna: ATH18G40, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 4
 Note 1: 50 Ohm at antenna port

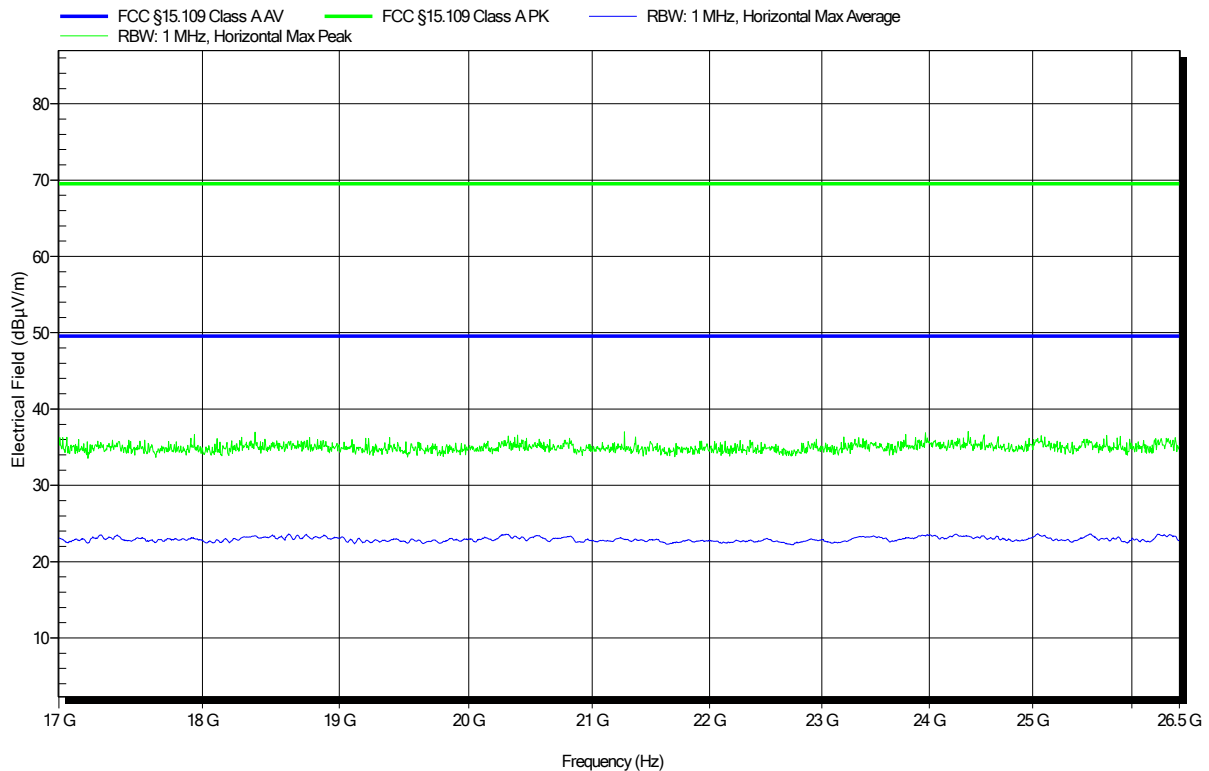
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 48V DC PoE
 Antenna: ATH18G40, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 4
 Note 1: 50 Ohm at antenna port

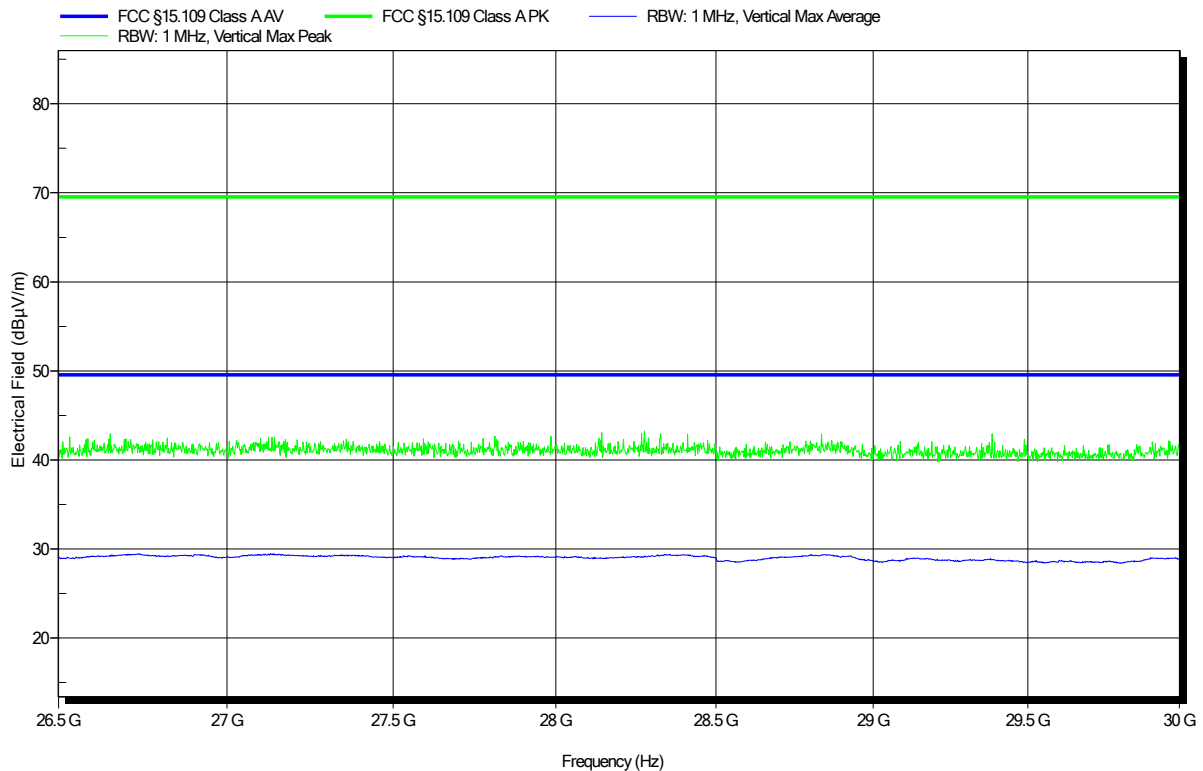
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 48V DC PoE
 Antenna: CBL26402075, Vertical
 Measurement Distance: 3m, converted to 10m
 Mode: 4
 Note 1: 50 Ohm at antenna port

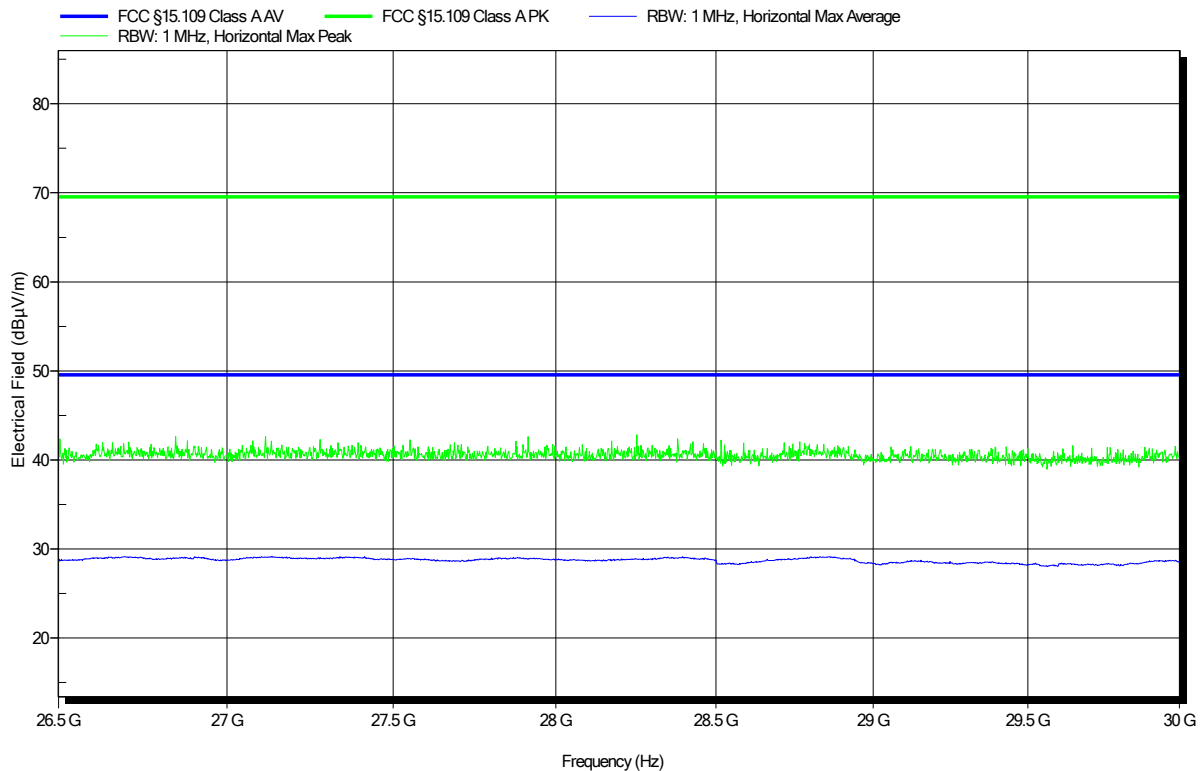
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Radiated emissions according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-02
 Operating Conditions: ambient temperature: 22°C
 power input: 48V DC PoE
 Antenna: CBL26402075, Horizontal
 Measurement Distance: 3m, converted to 10m
 Mode: 4
 Note 1: 50 Ohm at antenna port

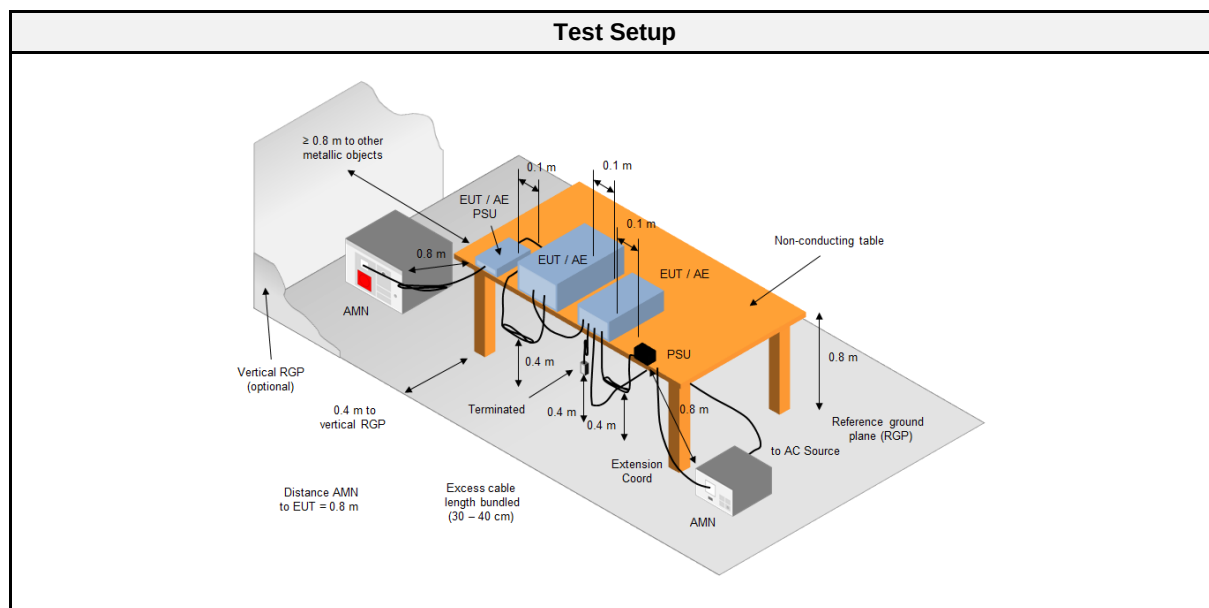
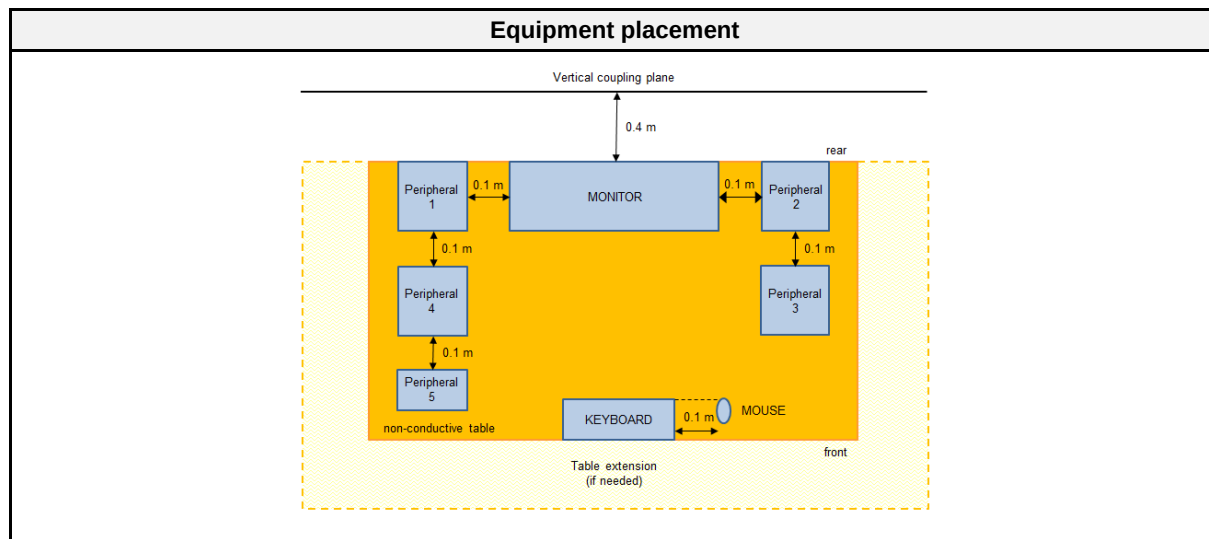
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2.2.1 Information

Test Information	
Reference	FCC 15.107, ICES-003, 6.1
Reference method	ANSI C63.4:2014+A1:2017 Section 12
Measurement range	150 kHz to 30 MHz
Equipment class	Class A
Equipment type	Table top
Temperature [°C]	21
Humidity [%]	39
Operator	Matthias Handrik
Date	2020-06-03

2.2.2 Setup



2.2.3 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	Radimation	2016.1.10

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
AMN	Schwarzbeck	NSLK 8127	EF01592	2019-10	2020-10
AMN	R&S	ESH3-Z5	EF00036	2019-07	2021-07
Pulse Limiter	R&S	ESH3-Z2	EF01063	2019-07	2020-07
EMI Test Receiver	R&S	ESR 7	EF00943	2019-10	2020-10
Climatic Sensor	Embedded Data Systems, LLC.	2800100000254 17E	EF01054	2020-03	2021-03

2.2.4 Procedure

Exploratory measurement
- The EUT was placed on a non conductive table 0.8 m above the reference ground plane and 0.4 m away from the vertical conducting plane (ANSI C63.4: 2014 item 7.3.1) - The power cord that is normally supplied or recommended by the manufacturer was connected to the LISN. - The distance between the outer edge of the EUT and the LISN shall be set to 0.8 m. A longer power cord shall be bundled to this length (bundling shall not exceed 40 cm in length). - The LISN measurement port was connected to a measurement receiver - I/O cables were bundled not longer than 0.4 m - Measurement was performed in the frequency range 0.15 – 30MHz on each current-carrying conductor - To maximize the emissions the cable positions were manipulated - The worst configuration of EUT and cables is shown on a test setup picture at item 1.3

Final measurement
- The EUT was placed on a non conductive table 0.8 m above the reference ground plane and 0.4 m away from the vertical conducting plane (ANSI C63.4: 2014 item 7.3.1) - The power cord that is normally supplied or recommended by the manufacturer was connected to the LISN. - The distance between the outer edge of the EUT and the LISN shall be set to 0.8 m. A longer power cord shall be bundled to this length (bundling shall not exceed 40 cm in length). - The LISN measurement port was connected to a measurement receiver - The EUT and cable arrangement were based on the exploratory measurement results - The test data of the worst-case conditions were recorded and shown on the next pages

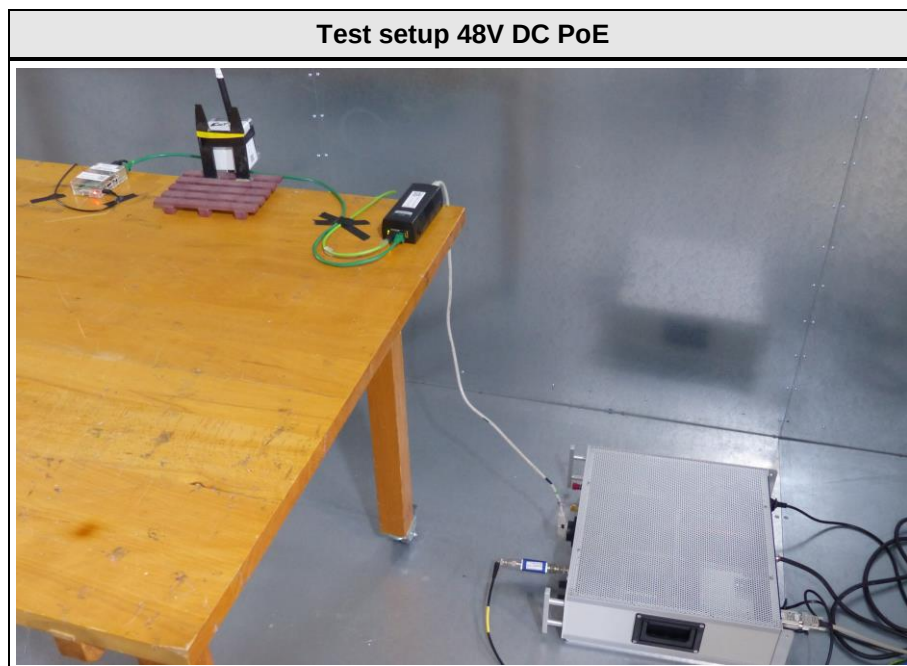
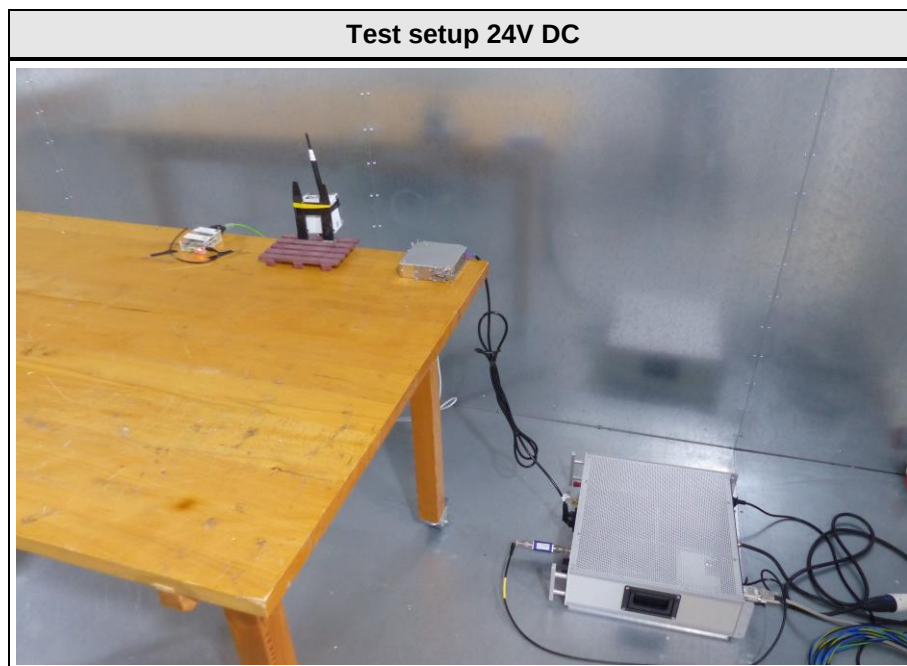
2.2.5 Limits

Class B		
Frequency [MHz]	Quasi-peak Limit [dBμV]	Average Limit [dBμV]
0.15 - 0.5	66 - 56 *	56 - 46 *
0.5 - 5	56	46
5 - 30	60	50
* Decreases with the logarithm of the frequency		

2.2.6 Results

AC power line conducted emissions					
Port	Coupling	Operational mode	EUT Configuration	Verdict	Remark
Power	AMN	1	1	PASS	-
Power	AMN	2	2	PASS	-
Power	AMN	3	1	PASS	-
Power	AMN	4	2	PASS	-

2.2.7 Setup Photos

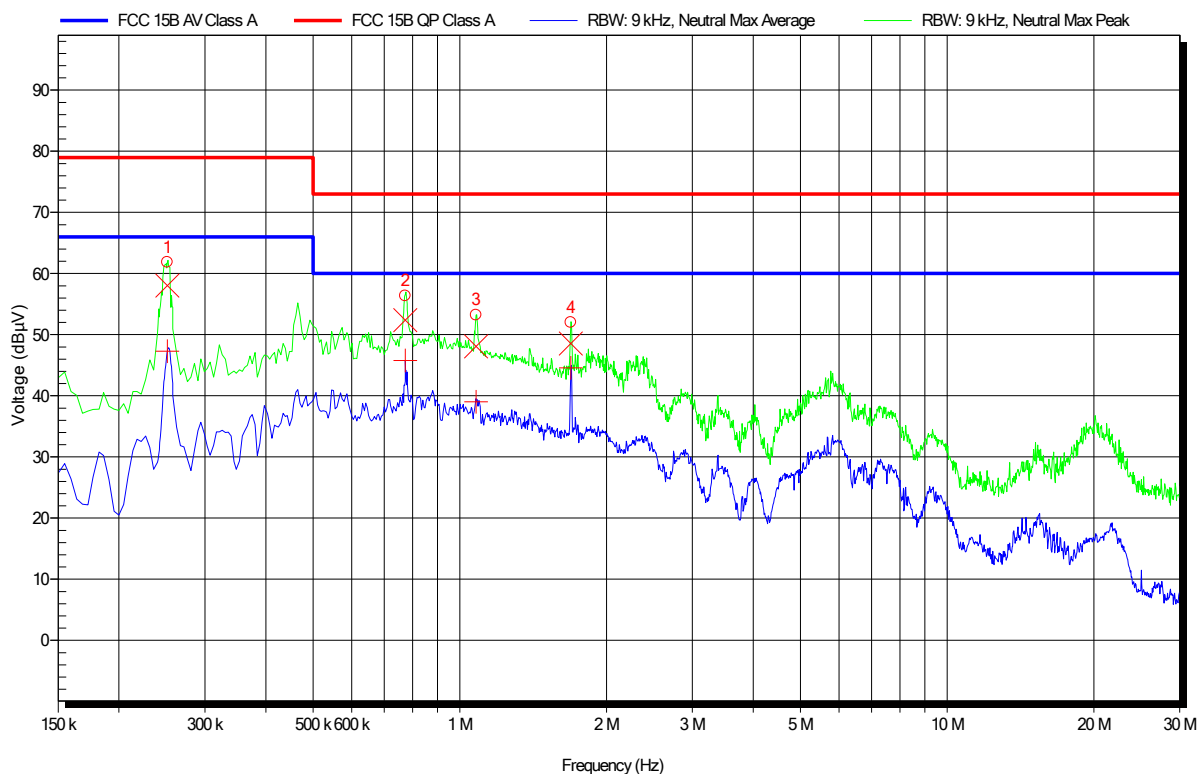


2.2.8 Records

Conducted emissions at the mains power port according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-03
 Operating Conditions: ambient temperature: 21°C
 power input: 120 VAC (24V DC via AC/DC adaptor)
 LISN: Schwarzbeck NSLK 8127 RC N
 Mode: 1
 Applied to Port: AC-mains
 Note 1:

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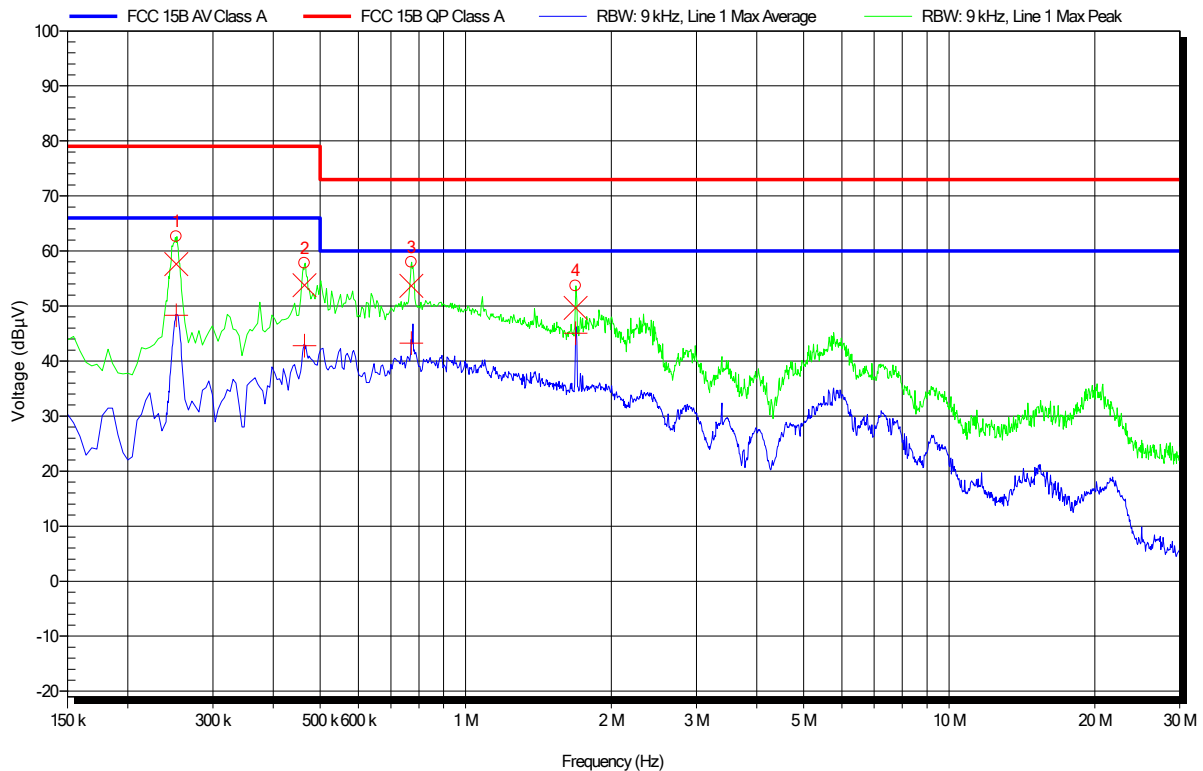
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	251.25 kHz	58.03 dBμV	79 dBμV	-20.97 dB	Pass	Neutral
2	773.7 kHz	52.36 dBμV	73 dBμV	-20.64 dB	Pass	Neutral
3	1.08 MHz	48.1 dBμV	73 dBμV	-24.9 dB	Pass	Neutral
4	1.689 MHz	48.57 dBμV	73 dBμV	-24.43 dB	Pass	Neutral

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	251.25 kHz	47.32 dBμV	66 dBμV	-18.68 dB	Pass	Neutral
2	773.7 kHz	45.81 dBμV	60 dBμV	-14.19 dB	Pass	Neutral
3	1.08 MHz	39.03 dBμV	60 dBμV	-20.97 dB	Pass	Neutral
4	1.689 MHz	44.57 dBμV	60 dBμV	-15.43 dB	Pass	Neutral

Conducted emissions at the mains power port according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-03
 Operating Conditions: ambient temperature: 21°C
 power input: 120 VAC (24V DC via AC/DC adaptor)
 LISN: Schwarzbeck NSLK 8127 RC L
 Mode: 1
 Applied to Port: AC-mains
 Note 1:

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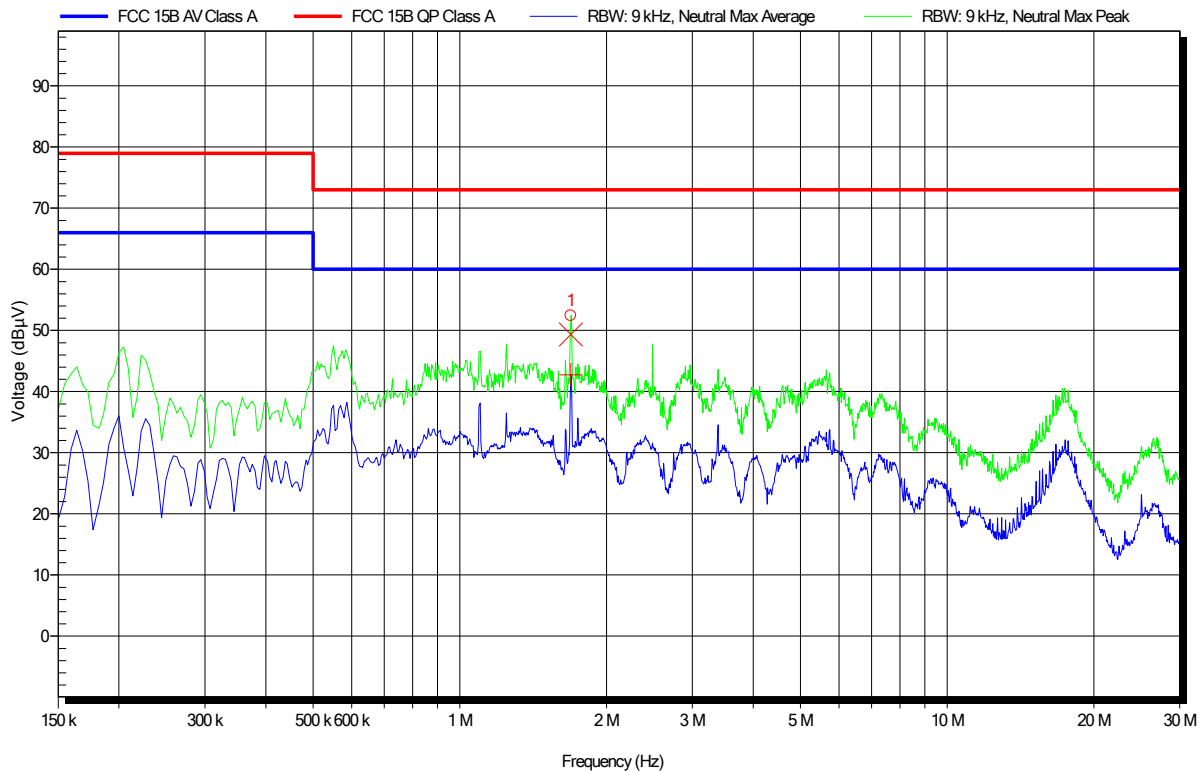
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	252.15 kHz	57.61 dBµV	79 dBµV	-21.39 dB	Pass	Line 1
2	464.1 kHz	53.79 dBµV	79 dBµV	-25.21 dB	Pass	Line 1
3	771.9 kHz	53.69 dBµV	73 dBµV	-19.31 dB	Pass	Line 1
4	1.688 MHz	49.62 dBµV	73 dBµV	-23.38 dB	Pass	Line 1

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	252.15 kHz	48.32 dBµV	66 dBµV	-17.68 dB	Pass	Line 1
2	464.1 kHz	42.77 dBµV	66 dBµV	-23.23 dB	Pass	Line 1
3	771.9 kHz	43.26 dBµV	60 dBµV	-16.74 dB	Pass	Line 1
4	1.688 MHz	45.07 dBµV	60 dBµV	-14.93 dB	Pass	Line 1

Conducted emissions at the mains power port according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-03
 Operating Conditions: ambient temperature: 21°C
 power input: 120 VAC (48V DC via PoE injector)
 LISN: Schwarzbeck NSLK 8127 RC N
 Mode: 2
 Applied to Port: AC-mains
 Note 1:

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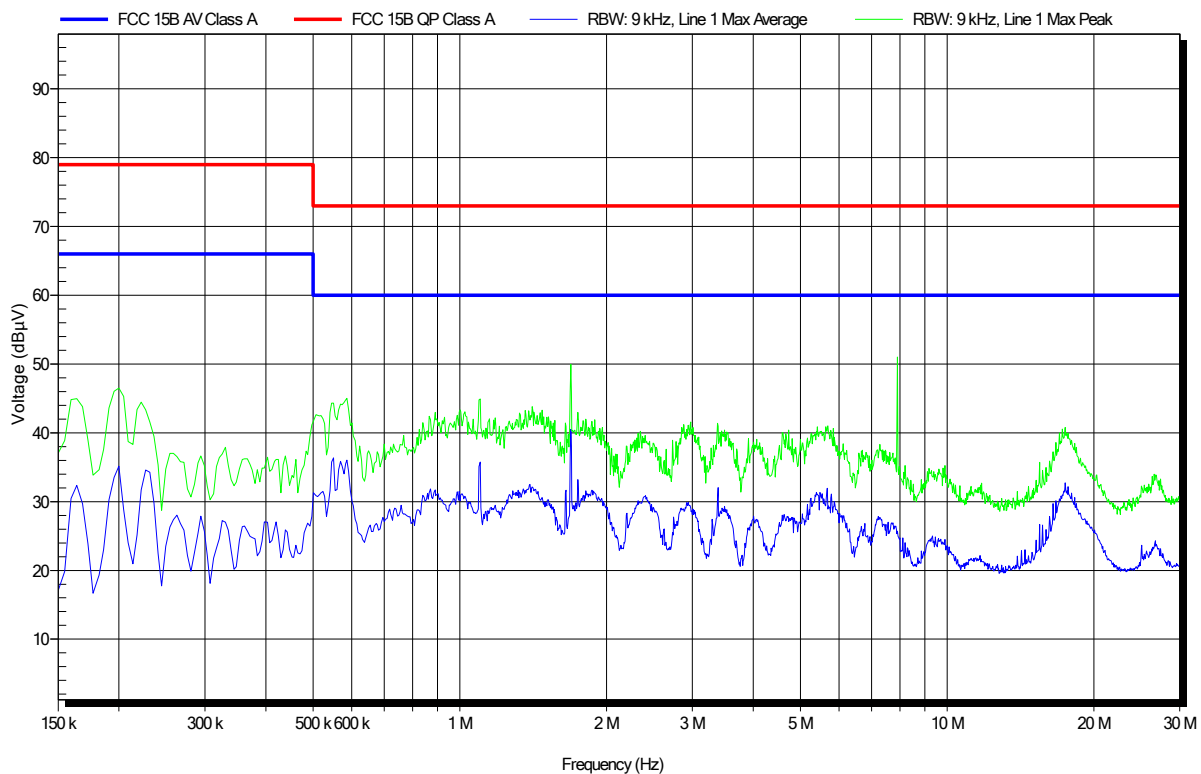


Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	1.689 MHz	49.32 dBμV	73 dBμV	-23.68 dB	Pass	Neutral
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	1.689 MHz	42.74 dBμV	60 dBμV	-17.26 dB	Pass	Neutral

Conducted emissions at the mains power port according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-03
 Operating Conditions: ambient temperature: 21°C
 power input: 120 VAC (48V DC via PoE injector)
 LISN: Schwarzbeck NSLK 8127 RC L
 Mode: 2
 Applied to Port: AC-mains
 Note 1:

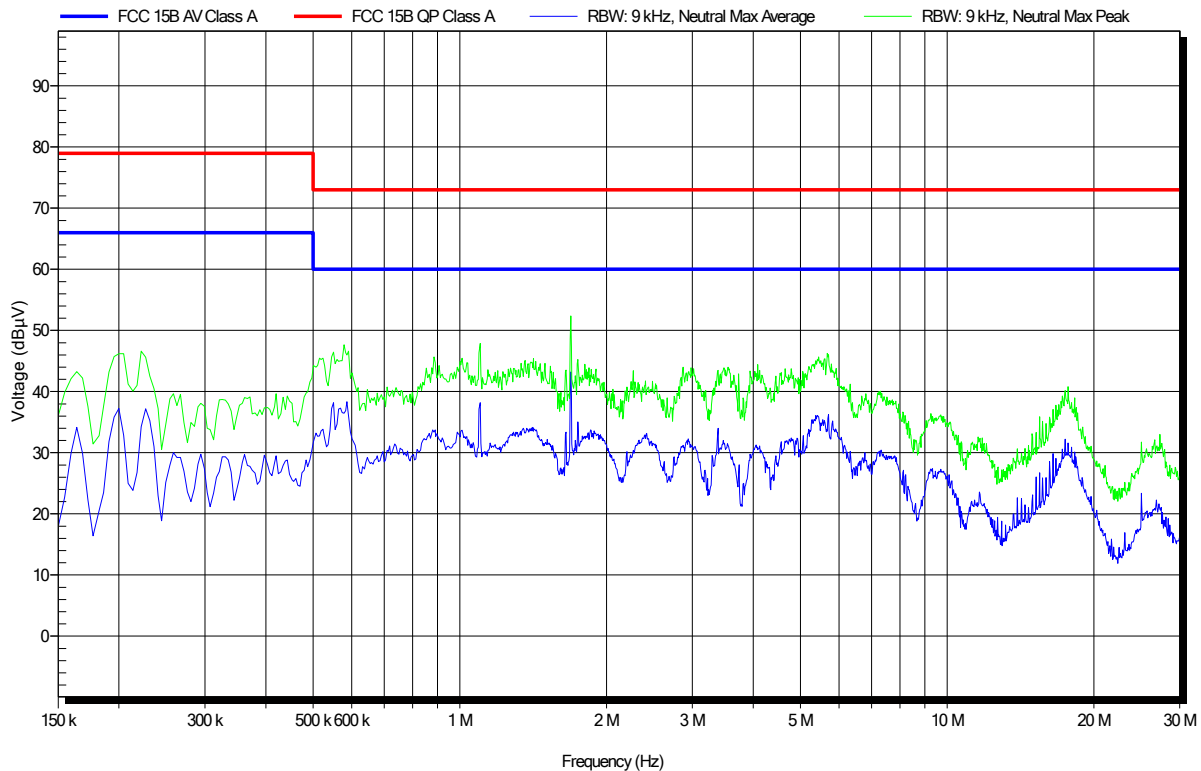
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Conducted emissions at the mains power port according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-03
 Operating Conditions: ambient temperature: 21°C
 power input: 120 VAC (48V DC via PoE injector)
 LISN: Schwarzbeck NSLK 8127 RC N
 Mode: 4
 Applied to Port: AC-mains
 Note 1:

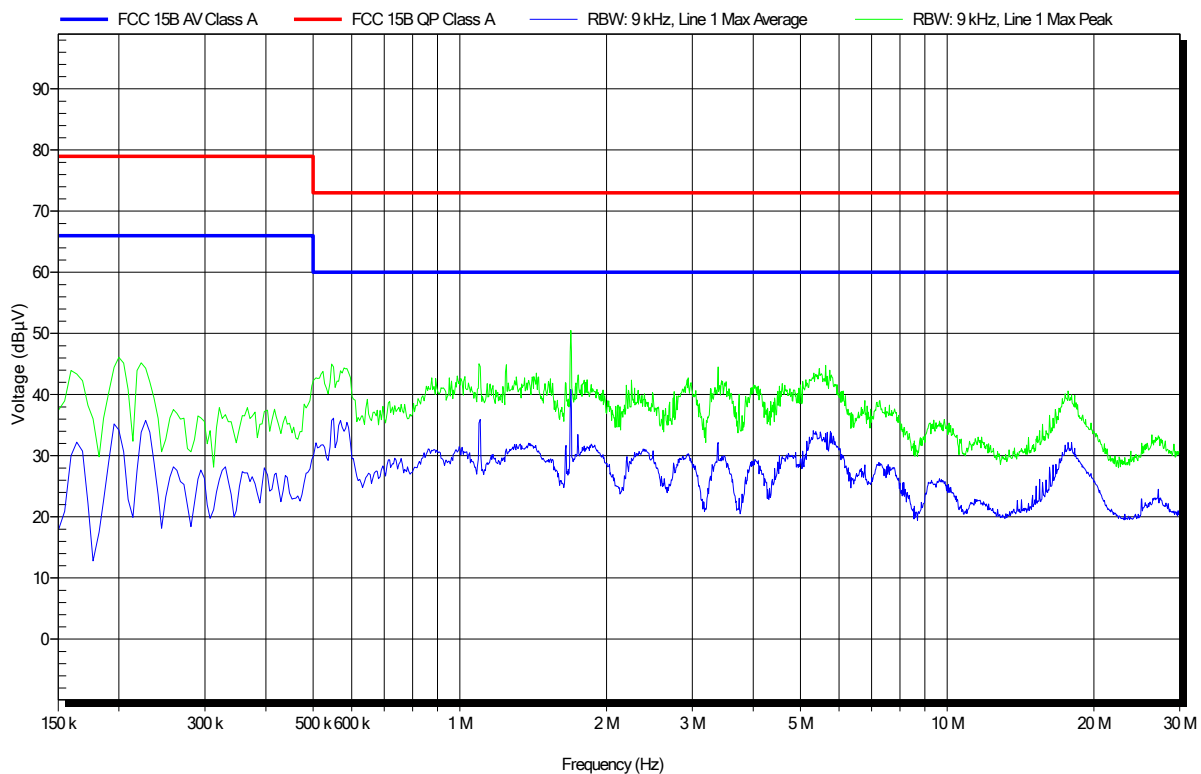
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Conducted emissions at the mains power port according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-03
 Operating Conditions: ambient temperature: 21°C
 power input: 120 VAC (48V DC via PoE injector)
 LISN: Schwarzbeck NSLK 8127 RC L
 Mode: 4
 Applied to Port: AC-mains
 Note 1:

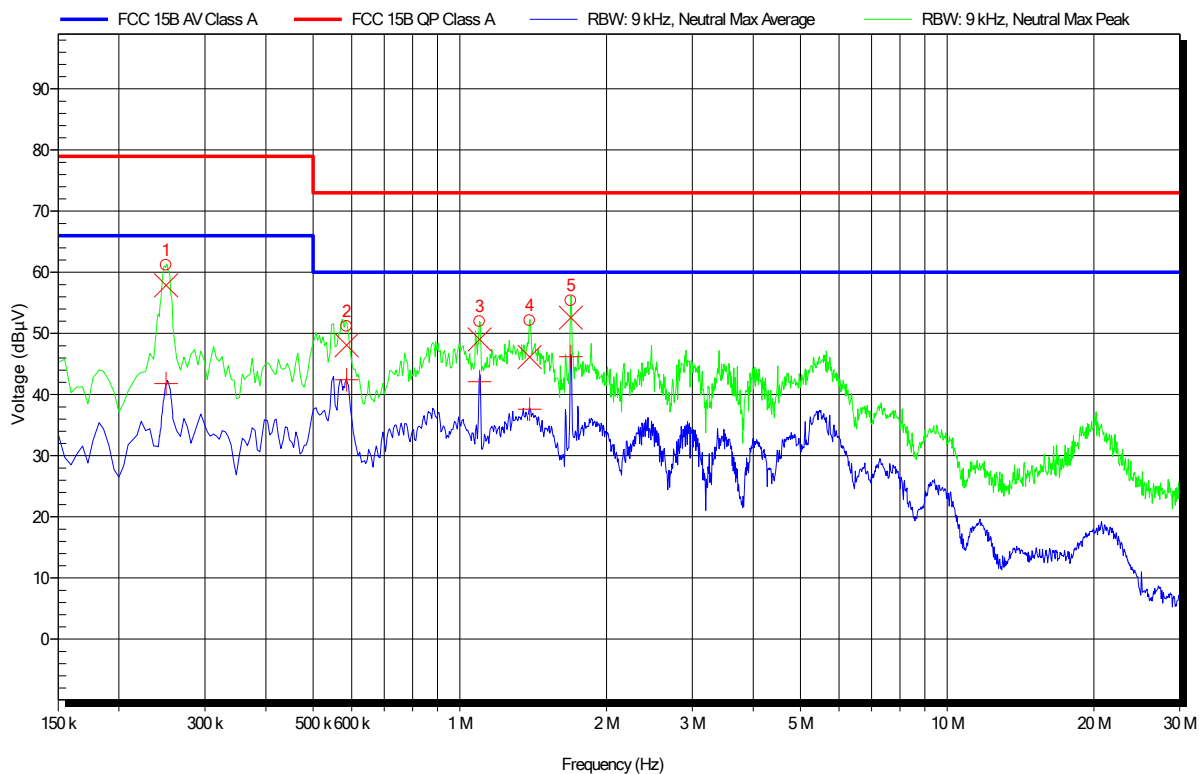
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Conducted emissions at the mains power port according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-03
 Operating Conditions: ambient temperature: 21°C
 power input: 120 VAC (24V DC via AC/DC adaptor)
 LISN: Schwarzbeck NSLK 8127 RC N
 Mode: 3
 Applied to Port: AC-mains
 Note 1:

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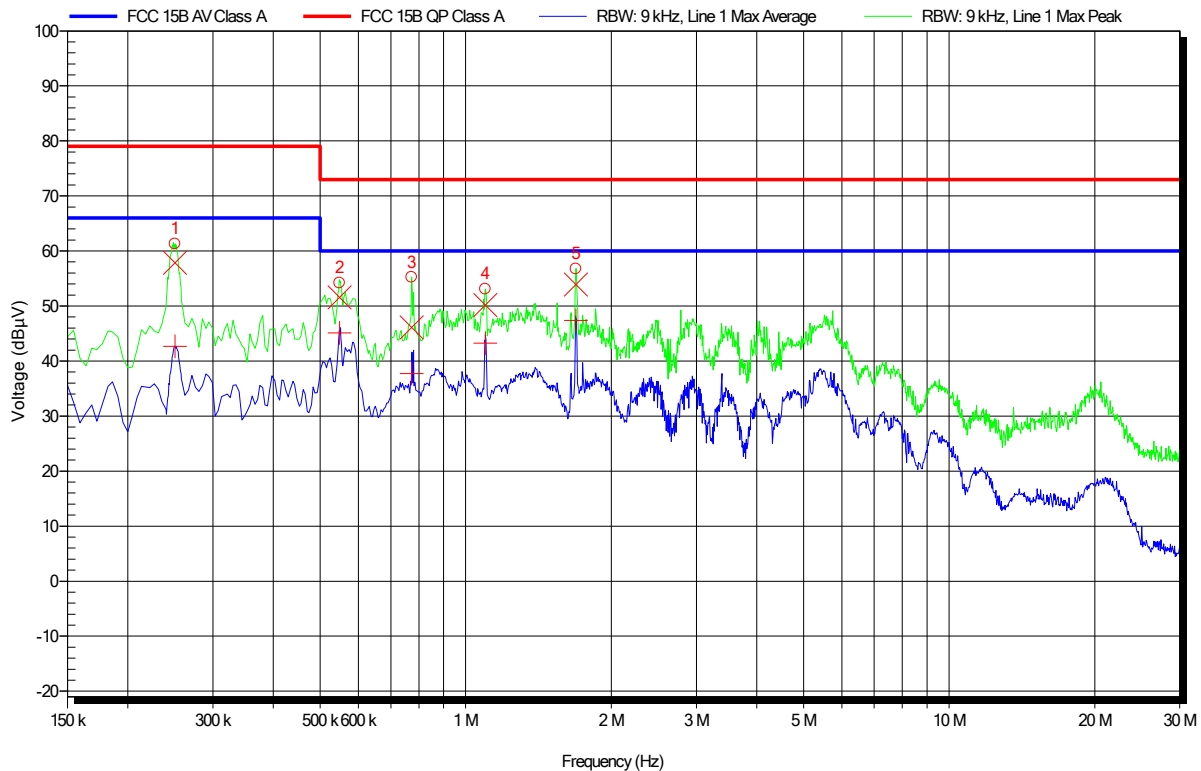


Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	249.9 kHz	57.89 dBµV	79 dBµV	-21.11 dB	Pass	Neutral
2	586.05 kHz	48.11 dBµV	73 dBµV	-24.89 dB	Pass	Neutral
3	1.098 MHz	49.03 dBµV	73 dBµV	-23.97 dB	Pass	Neutral
4	1.391 MHz	46.16 dBµV	73 dBµV	-26.84 dB	Pass	Neutral
5	1.69 MHz	52.59 dBµV	73 dBµV	-20.41 dB	Pass	Neutral
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	249.9 kHz	41.79 dBµV	66 dBµV	-24.21 dB	Pass	Neutral
2	586.05 kHz	42.42 dBµV	60 dBµV	-17.58 dB	Pass	Neutral
3	1.098 MHz	42.13 dBµV	60 dBµV	-17.87 dB	Pass	Neutral
4	1.391 MHz	37.63 dBµV	60 dBµV	-22.37 dB	Pass	Neutral
5	1.69 MHz	46.22 dBµV	60 dBµV	-13.78 dB	Pass	Neutral

Conducted emissions at the mains power port according to FCC part 15B

Project Number: G0M-1907-8361
 Applicant: R3 - Reliable Realtime Radio Communications GmbH
 Model Description: EchoRing Ethernet Bridge
 Model: ER-EB 1001M
 Test Sample ID: 29089
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Handrik
 Test Date: 2020-06-03
 Operating Conditions: ambient temperature: 21°C
 power input: 120 VAC (24V DC via AC/DC adaptor)
 LISN: Schwarzbeck NSLK 8127 RC L
 Mode: 3
 Applied to Port: AC-mains
 Note 1:

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Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	250.35 kHz	57.86 dBμV	79 dBμV	-21.14 dB	Pass	Line 1
2	548.25 kHz	51.57 dBμV	73 dBμV	-21.43 dB	Pass	Line 1
3	773.25 kHz	46.08 dBμV	73 dBμV	-26.92 dB	Pass	Line 1
4	1.097 MHz	50.16 dBμV	73 dBμV	-22.84 dB	Pass	Line 1
5	1.689 MHz	53.9 dBμV	73 dBμV	-19.1 dB	Pass	Line 1

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	250.35 kHz	42.66 dBμV	66 dBμV	-23.34 dB	Pass	Line 1
2	548.25 kHz	45.14 dBμV	60 dBμV	-14.86 dB	Pass	Line 1
3	773.25 kHz	37.71 dBμV	60 dBμV	-22.29 dB	Pass	Line 1
4	1.097 MHz	43.28 dBμV	60 dBμV	-16.72 dB	Pass	Line 1
5	1.689 MHz	47.36 dBμV	60 dBμV	-12.64 dB	Pass	Line 1