




RADIO REPORT FCC 47 CFR Part 15C ISED Canada RSS-247 Frequency hopping system operating within the 902.0 MHz - 928.0 MHz band	
Report Reference No	G0M-2004-8955-TFC247FH-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	 <p>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</p>
Applicant	HBC-radiomatic GmbH
Address	Haller Str. 45-53 74564 Crailsheim GERMANY
Test Specification	47 CFR Part 15C RSS-247, Issue 2, 2017-02 RSS-Gen, Issue 5, Amendment 1, 2019-03
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	Radio module for industrial application
Model(s)	TC792.1
Additional Model(s)	None
Brand Name(s)	None
Hardware Version(s)	TC792110
Software Version(s)	SC107001
FCC ID	NO9TC792-1
IC	2977A-TC7921
Test Result	PASSED

Possible test case verdicts:		
Required by standard but not tested	N/T	
Not required by standard	N/R	
Not applicable to EUT	N/A	
Test object does meet the requirement	P(PASS)	
Test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 °C - 30 °C	
Test Lab Humidity	25 % - 55 %	
Date of receipt of test item	2020-09-03	
Report:		
Compiled by	Wilfried Treffke	
Tested by (+ signature) (Responsible for Test)	Wilfried Treffke	
Approved by (+ signature) (Deputy Head of Lab)	Toralf Jahn	
Date of Issue	2020-12-04	
Total number of pages	99	
General Remarks:		
<p>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.</p>		
Additional Comments:		
Customer specific project number : TR-2020-06-03		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2020-12-04	Initial Release	

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
EUT	Equipment Under Test
FCC	Federal Communications Commission
ISED	Innovation, Science and Economic Development Canada
RBW	Resolution bandwidth
RMS	Root mean square
VBW	Video bandwidth
V _{NOM}	Nominal supply voltage

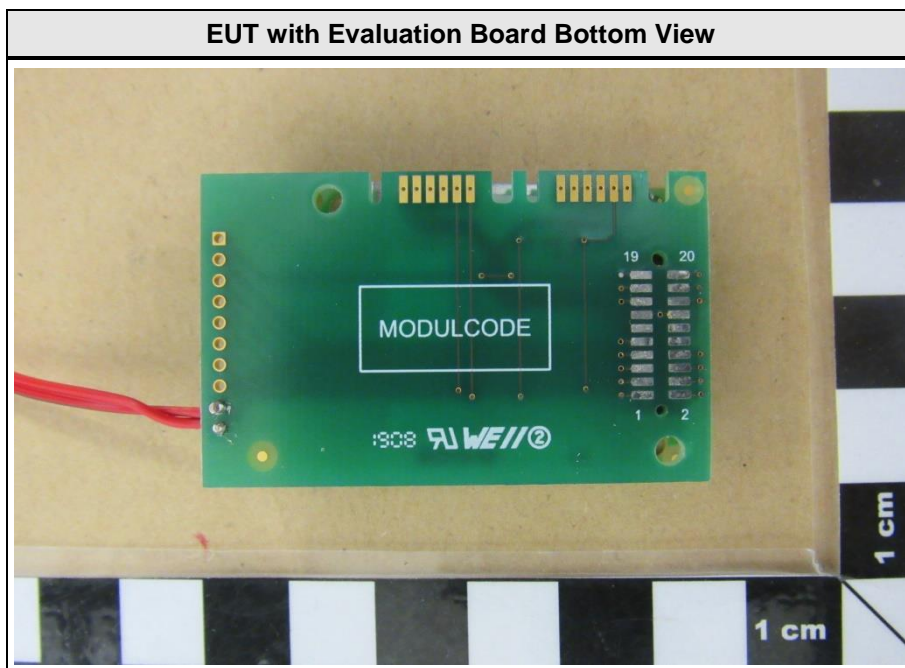
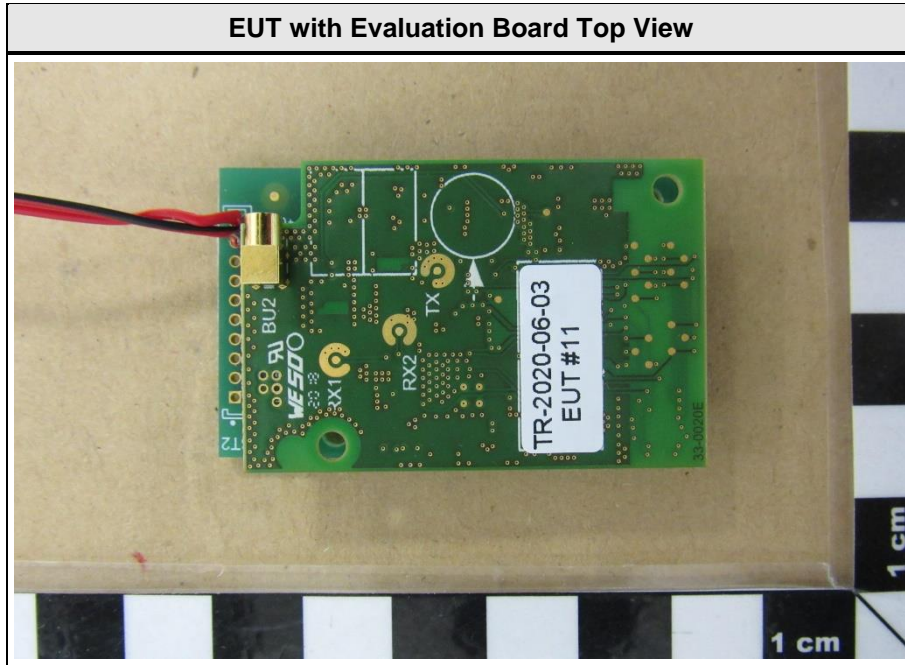
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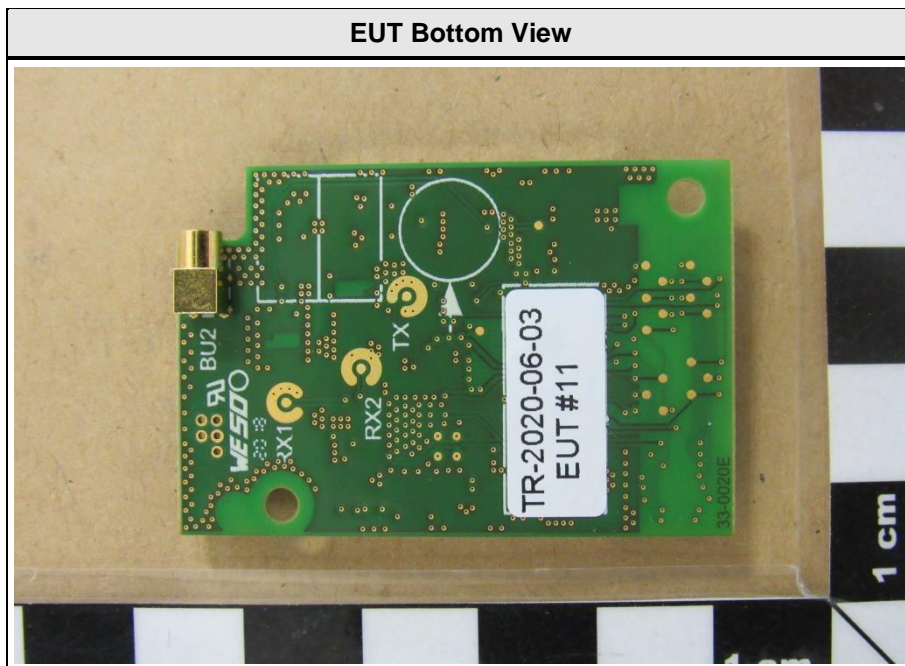
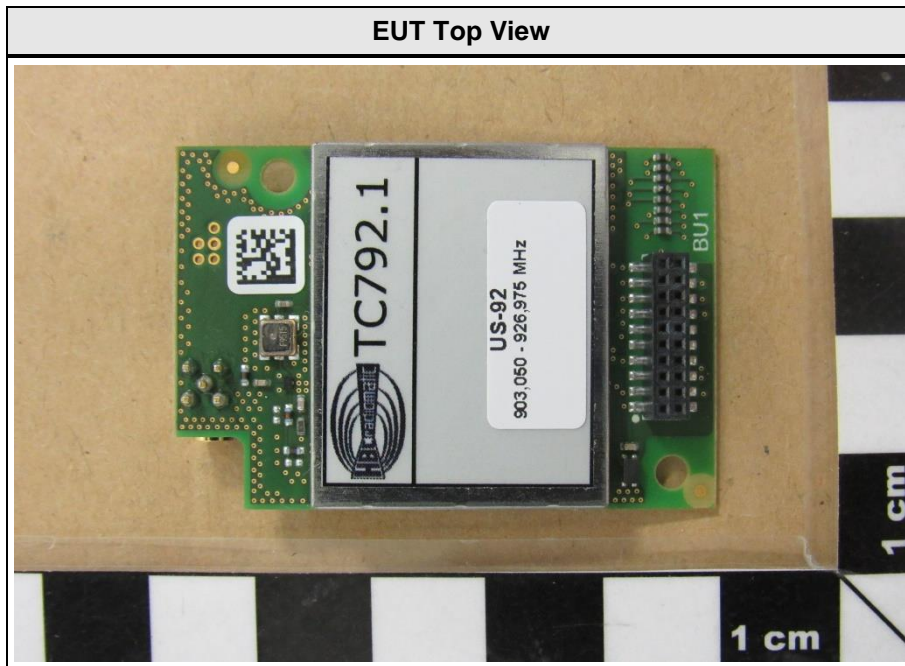
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1 Equipment (Test Item) Under Test

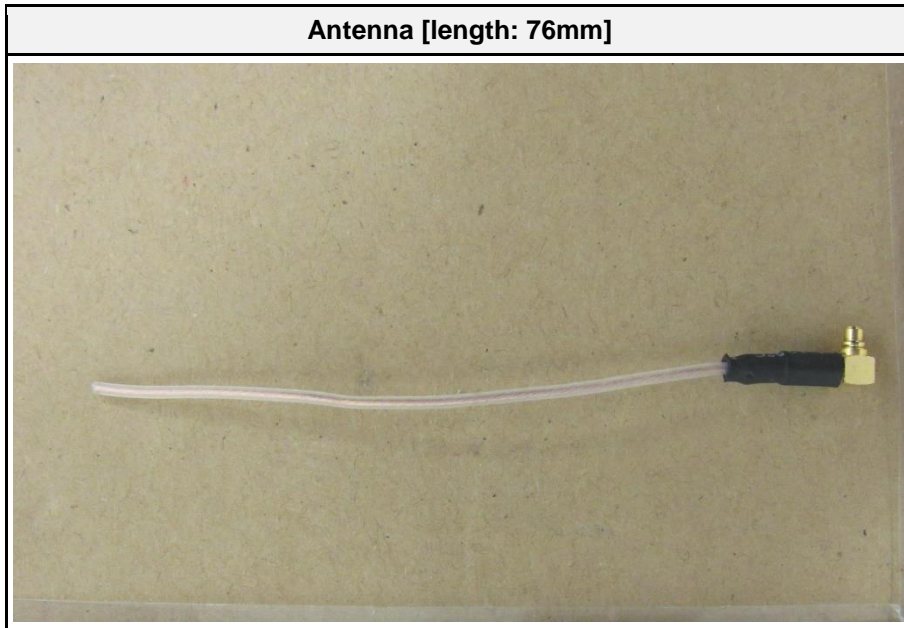
Description	Radio module for industrial application	
Model	TC792.1	
Additional Model(s)	None	
Brand Name(s)	None	
Serial Number(s)	# 11	Test Sample ID 30914
Hardware Version(s)	TC792110	
Software Version(s)	SC107001	
PMN	TC792.1	
HVIN	TC792.1	
FVIN	N/A	
HMN	N/A	
FCC ID	NO9TC792-1	
IC	2977A-TC7921	
Equipment type	Radio Module	
Radio type	Transceiver	
Assigned frequency bands	902.0 MHz - 928.0 MHz	
Radio technology	FHSS	
Modulation	GFSK	
Number of antenna ports	1	
Antenna	Type	Integrated wire antenna
	Model	AA080004
	Manufacturer	HBC-radiomatic
	Gain	0 dBi (declaration by applicant)
Supply Voltage	V _{NOM}	3.6 VDC
Operating Temperature	T _{NOM}	20 °C
AC/DC-Adaptor	Model	None
Manufacturer	HBC-radiomatic GmbH Haller Str. 45-53 74564 Crailsheim GERMANY	

1.1 Photos – Equipment External

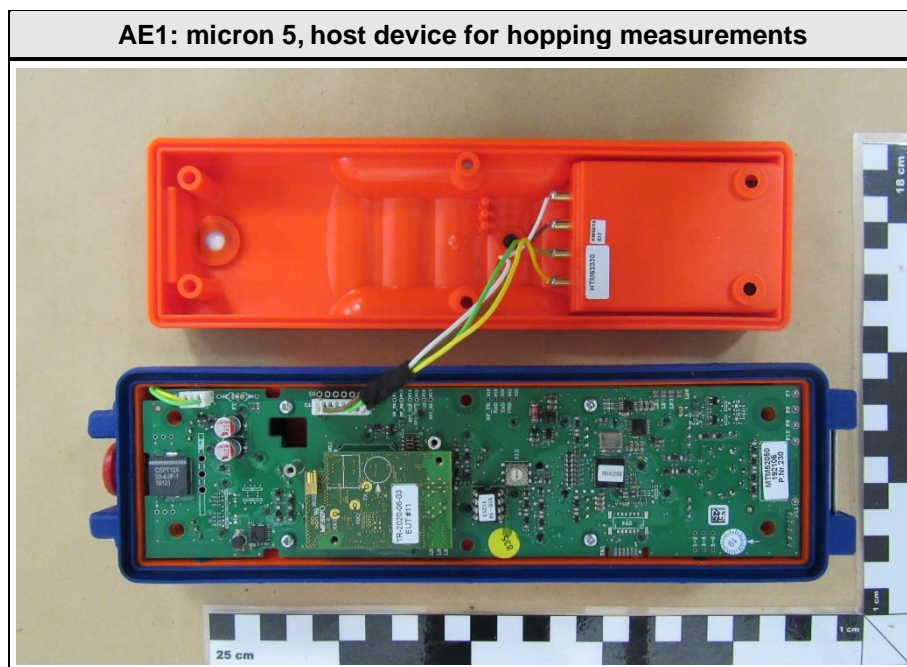
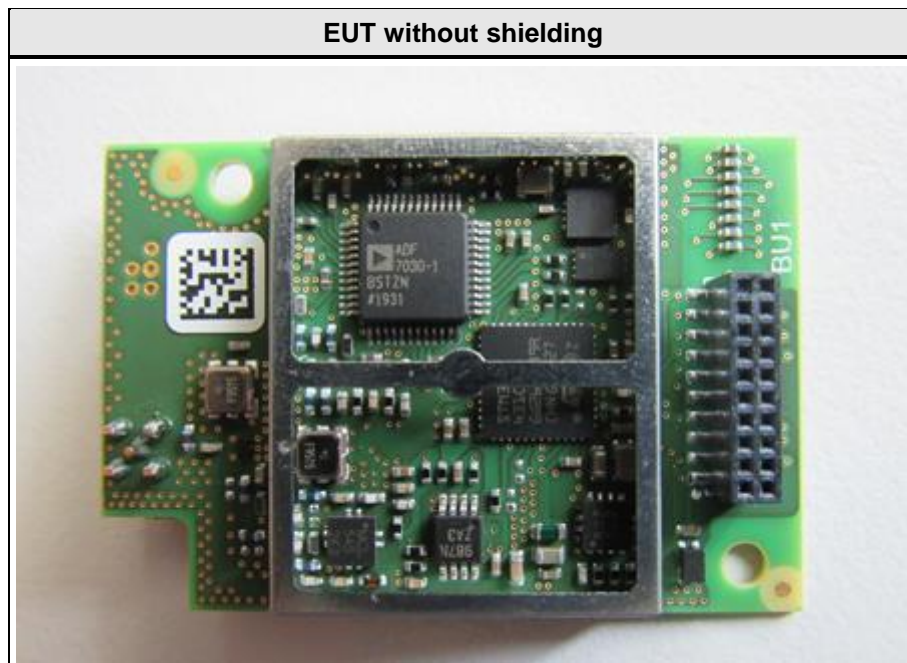


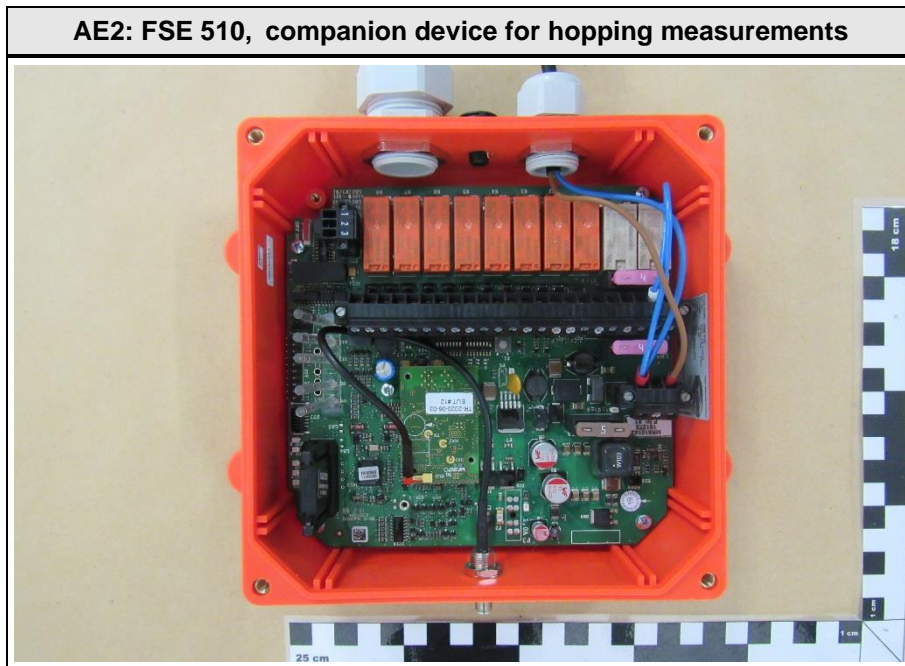


Antenna [length: 76mm]

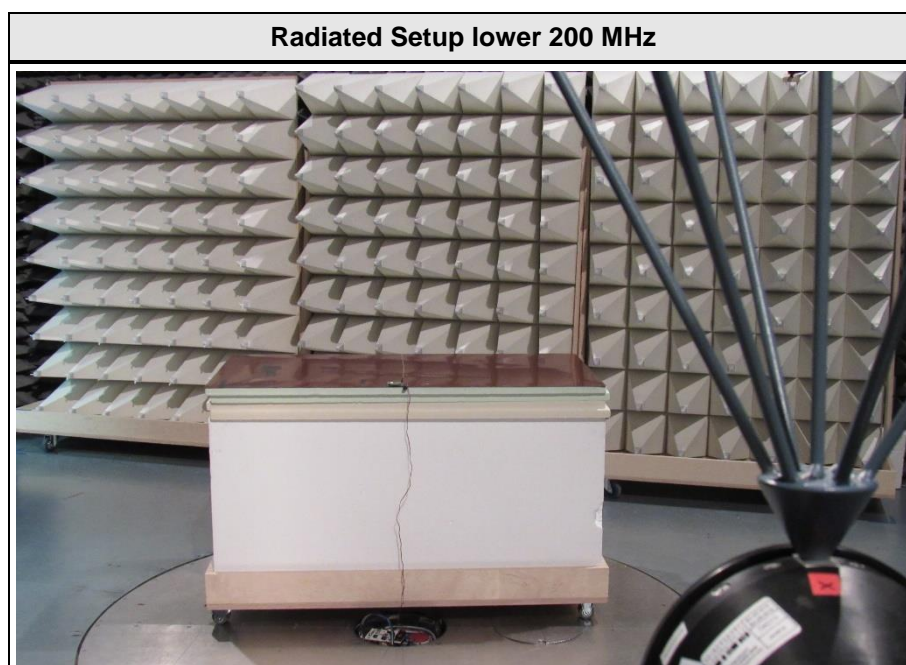
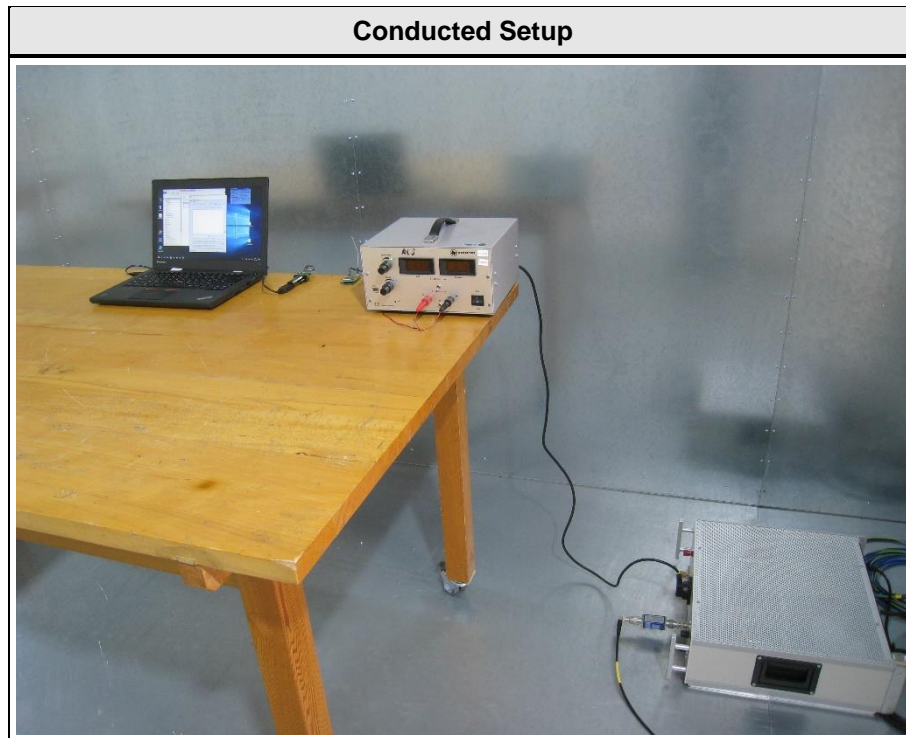


1.2 Photos – Equipment Internal

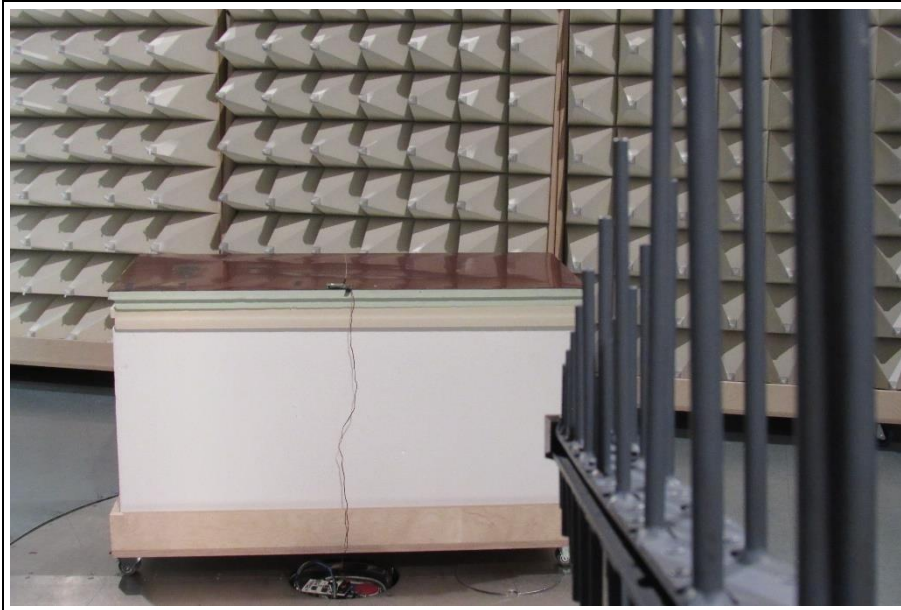




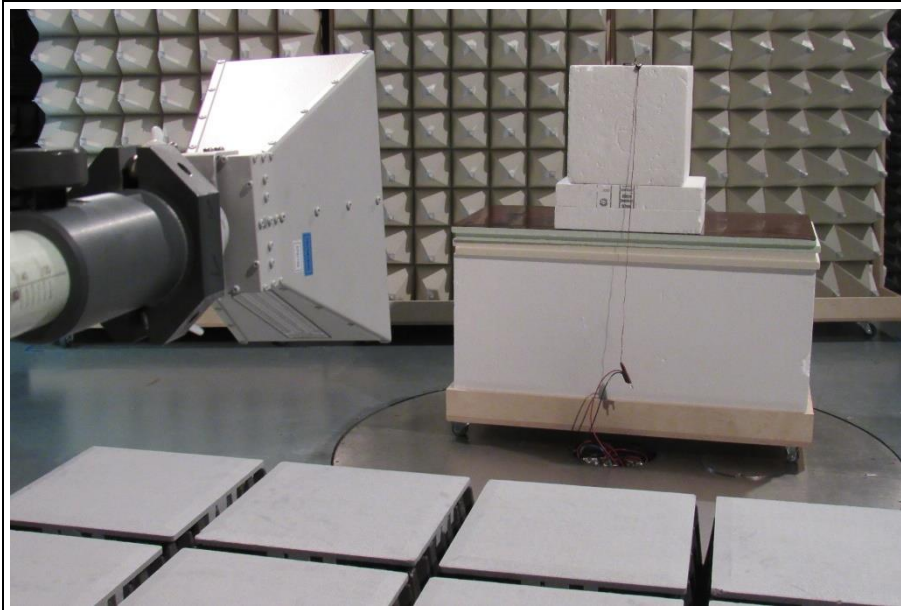
1.3 Photos – Test Setup



Radiated Setup 200 MHz to 1 GHz



Radiated Setup upper 1 GHz



1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE1	Transmitter	HBC-radiomatic GmbH	micron 5	Host device for hopping measurements
AE2	Receiver	HBC-radiomatic GmbH	FSE 510	Companion device for hopping measurements
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.5 Test mode duty cycle

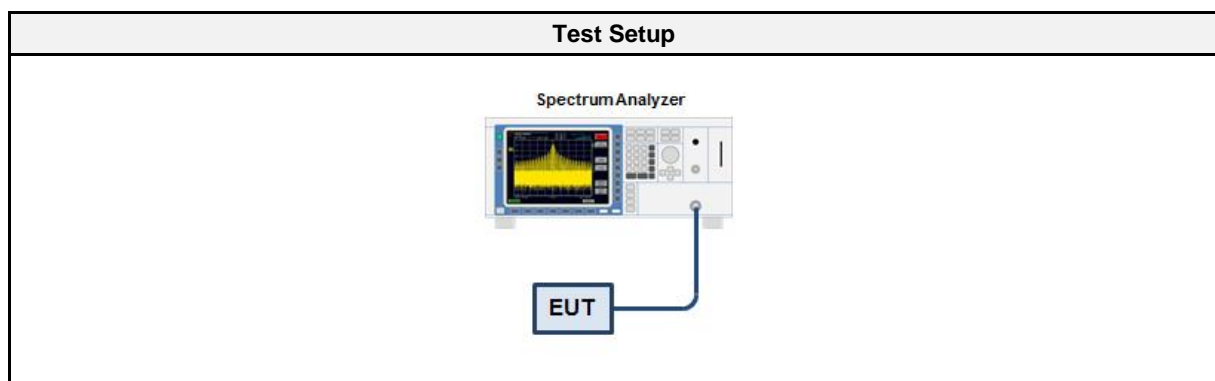
1.5.1 Information

Test Information	
Measurement Method	ANSI C63.10 11.6

1.5.2 Requirements

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

1.5.3 Setup



1.5.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2020-07	2021-07

1.5.5 Procedure

Test Procedure
<ol style="list-style-type: none"> 1. EUT set to test mode 2. Span is set to zero span 3. Detector set to peak 4. Sweep time is set long enough to capture at least 5 bursts 5. Envelope peak value of emission spectrum is selected 6. The maximum burst duration T_{ON} is measured using two markers set to the start and the end of the longest burst 7. The minimum idle duration T_{OFF} is measured using two markers set to the start and the end of the shortest idle period 8. The duty cycle is calculated by $DC = T_{ON} / (T_{ON} + T_{OFF})$ 9. The duty cycle correction is calculated by $DC = 10 \times \log_{10}(T_{ON} / (T_{ON} + T_{OFF}))$

1.5.6 Results

Duty Cycle Results		
Mode	Duty Cycle	Correction Factor [dB]
Transmit Single	100%	0

1.6 Test Modes

Mode	Description
Transmit Single	Mode = Transmit, single frequency Modulation = GFSK Duty cycle = 100 %
Transmit Hopping 1	Mode = Transmit, hopping on connection channels only Modulation = GFSK
Transmit Hopping 2	Mode = Transmit, hopping on all channels (connection + data channels) Modulation = GFSK
Receive	Mode = Receive Modulation = GFSK
Comment:	

1.7 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	1	903.050
F2	Tx / Rx	160	914.975
F3	Tx / Rx	320	926.975

1.8 Sample emission level calculation

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

Reading:

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

A.F.:

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

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

Net:

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

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 15C, ISED RSS-247				
Product Standard Reference	Requirement	Reference Method	Result	Remarks
ISED RSS-Gen, Issue 5 (section 6.6)	Occupied Bandwidth	ANSI C63.10-2013	N/R	Informational only
FCC § 15.247(a)(1) ISED RSS-247 § 5.1 Issue 2	20 dB Bandwidth	ANSI C63.10-2013	PASS	
FCC § 15.247(a)(1)(iii) ISED RSS-247, Issue 2 (section 5.1)	Number of hopping frequencies	ANSI C63.10-2013	PASS	
FCC § 15.247(a)(1) ISED RSS-247, Issue 2 (section 5.1)	Frequency hopping channel separation	ANSI C63.10-2013	PASS	
FCC § 15.247(a)(1)(iii) ISED RSS-247, Issue 2 (section 5.1)	Time of occupancy (Dwell time)	ANSI C63.10-2013	PASS	
FCC § 15.247(b)(1) ISED RSS-247, Issue 2 (section 5.4)	Maximum peak conducted power	ANSI C63.10-2013	PASS	
FCC § 15.207 ISED RSS-247, Issue 2 (section 3.1)	AC power line conducted emissions	ANSI C63.10-2013	PASS	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Band edge compliance	ANSI C63.10-2013	PASS	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Conducted spurious emissions	ANSI C63.10-2013	PASS	
FCC § 15.247(d) FCC § 15.209 ISED RSS-Gen, Issue 5 (section 6.13)	Transmitter radiated spurious emissions	ANSI C63.10-2013	PASS	
ISED RSS-247, Issue 2 (section 3.1)	Receiver radiated spurious emissions	ANSI C63.10-2013	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

3 Test Conditions and Results

3.1 Test Conditions and Results - Occupied bandwidth

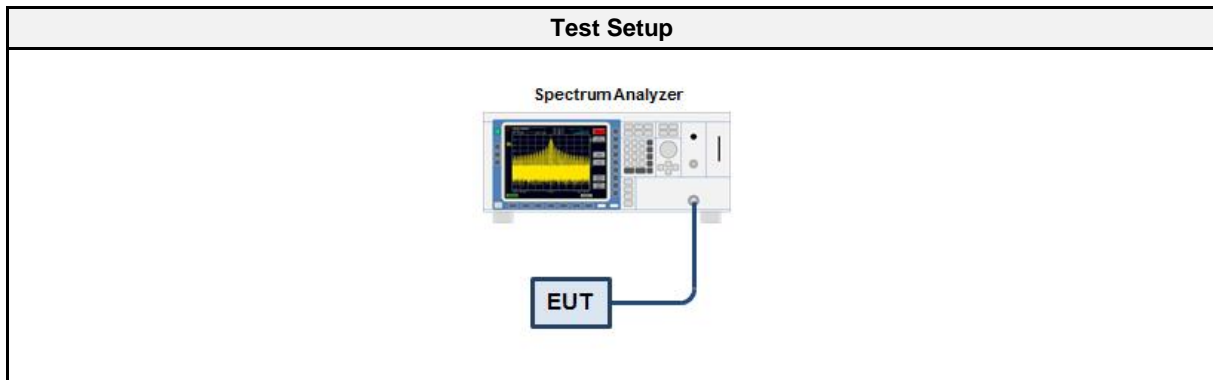
3.1.1 Information

Test Information	
Reference	ISED RSS-Gen, Issue 5 (section 6.6)
Measurement Method	ANSI C63.10 6.9.3
Measurement Uncertainty:	$\pm 1.26 \%$
Operator	Wilfried Treffke
Date	2020-09-09

3.1.2 Limits

Limits
None (Informational only)

3.1.3 Setup



3.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2020-07	2021-07
Cable	Gigalane	SMS111B	EF00779 CAAZ	2018-10	2020-10

3.1.5 Procedure

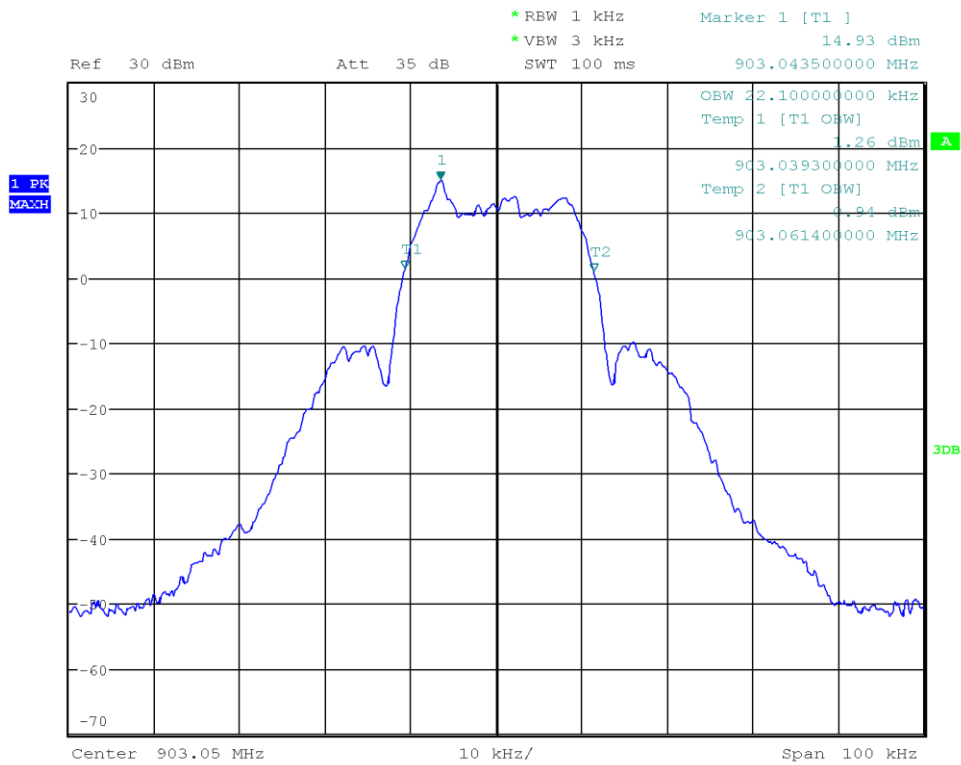
Test Procedure
<ol style="list-style-type: none"> 1. EUT transmitter is activated in test mode under normal conditions 2. The spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum 3. The resolution bandwidth is set to the range of 1 % to 5 % of the occupied bandwidth 4. The occupied bandwidth is measured with the build-in analyzer function

3.1.6 Results

Test Results		
Mode	Frequency [MHz]	Bandwidth [MHz]
Transmit	903.050	0.0221
Transmit	914.975	0.0222
Transmit	926.975	0.0221

Occupied Bandwidth

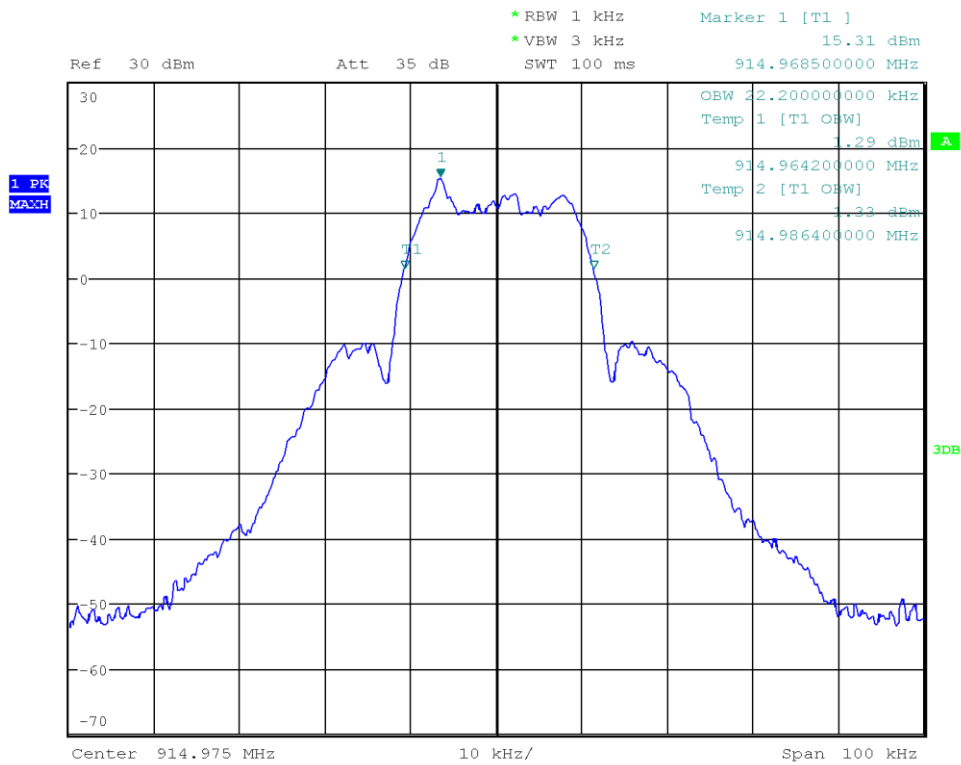
Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 903.050 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-09
 Occupied Bandwidth [MHz]: 0.022



Date: 9.SEP.2020 13:33:29

Occupied Bandwidth

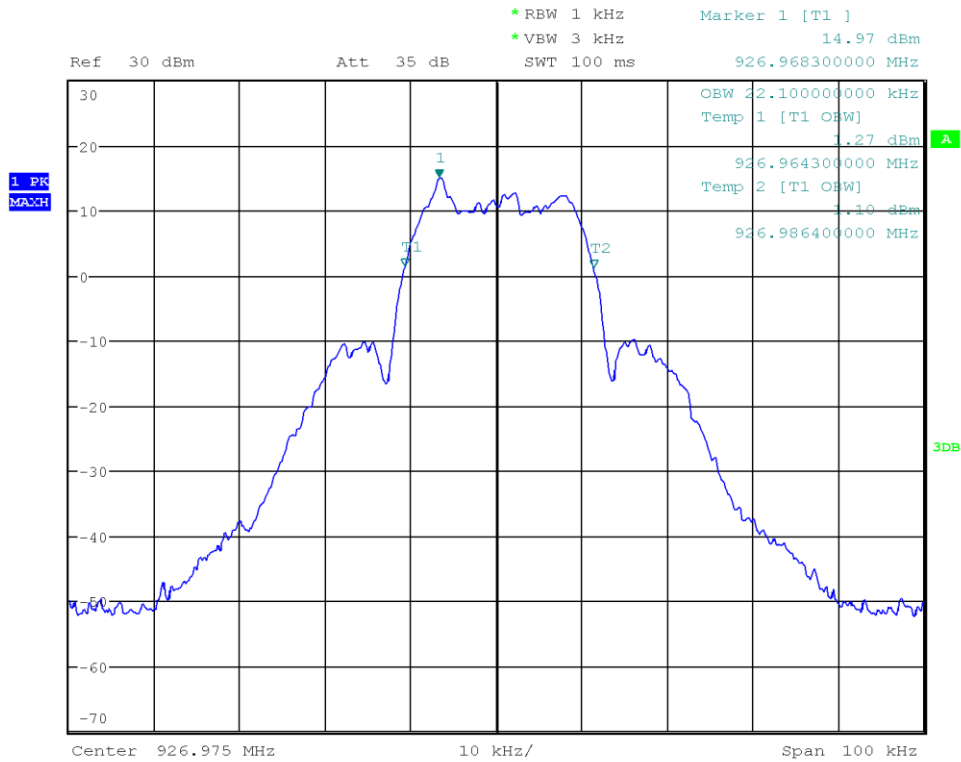
Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 914.975 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-09
 Occupied Bandwidth [MHz]: 0.022



Date: 9.SEP.2020 13:43:04

Occupied Bandwidth

Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 926.975 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-09
 Occupied Bandwidth [MHz]: 0.022



Date: 9.SEP.2020 13:48:40

3.2 Test Conditions and Results - 20 dB bandwidth

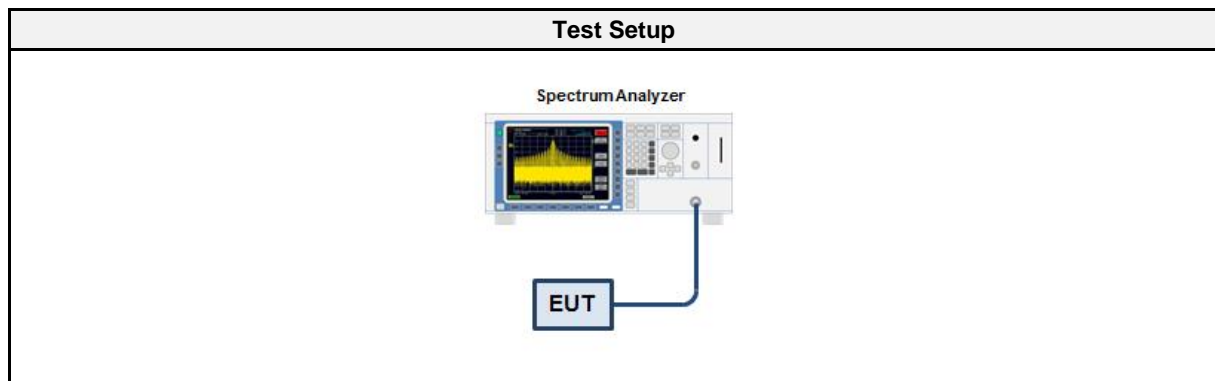
3.2.1 Information

Test Information	
Reference	FCC 15.247(a)(1) / ISED RSS-247 5.1
Measurement Method	ANSI C63.10 6.9.2
Measurement Uncertainty:	$\pm 1.26 \%$
Operator	Wilfried Treffke
Date	2020-09-09

3.2.2 Limits

Limits	
Condition	Limit
Number of hopping channels ≥ 50 Time of occupancy ≤ 0.4 s within 20 s	20 dB BW < 250 kHz
Number of hopping channels ≥ 25 Time of occupancy ≤ 0.4 s within 10 s	250 kHz \leq 20 dB BW < 500 kHz

3.2.3 Setup



3.2.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2020-07	2021-07
Cable	Gigalane	SMS111B	EF00779 CAAZ	2018-10	2020-10

3.2.5 Procedure

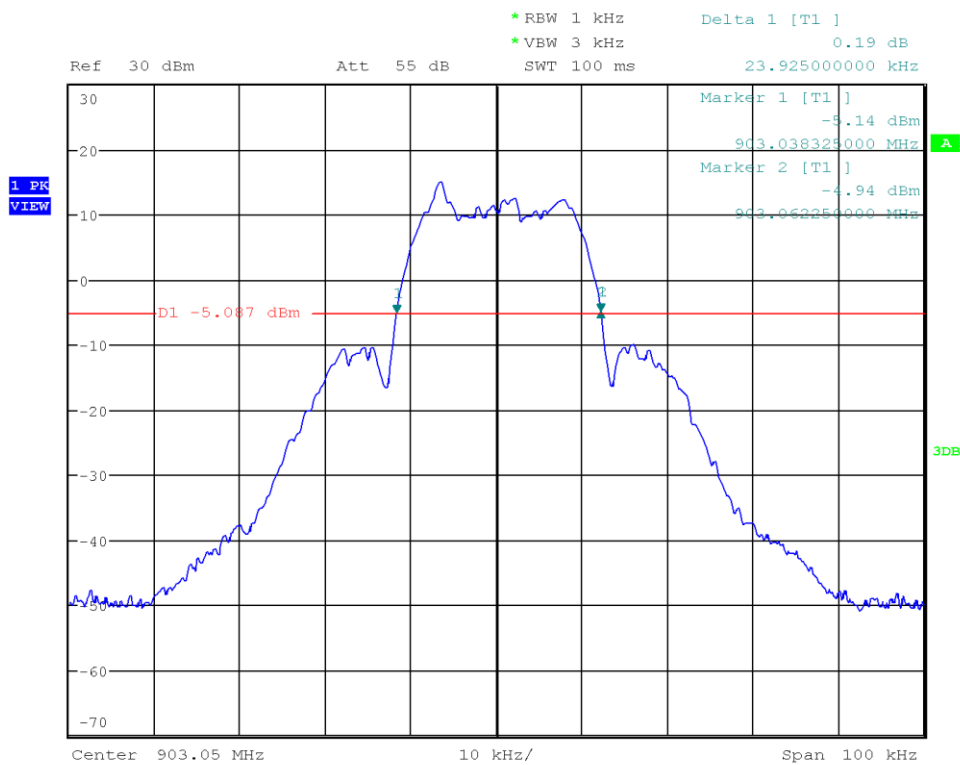
Test Procedure
<ol style="list-style-type: none"> 1. EUT set to test mode (Communication tester is used if needed) 2. Span set to at least twice the emission spectrum 3. Detector set to peak and max hold 4. Envelope peak value of emission spectrum is selected 5. Marker on envelope of spectrum is set to level of -20 dB to the left of the peak 6. Marker on envelope of spectrum is set to level of -20 dB to the right of the peak 7. 20dB Bandwidth is determined by marker frequency separation

3.2.6 Results

Test Results		
Mode	Frequency [MHz]	Bandwidth [kHz]
Transmit	903.050	23.9
Transmit	914.975	23.9
Transmit	926.975	23.9

20 dB Bandwidth

Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.2
 Operational Mode: GFSK, single, Channel: 903.05 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-09
 Lower Frequency [MHz]: 903.038
 Upper Frequency [MHz]: 903.062
 20 dB Bandwidth [kHz]: 23.9



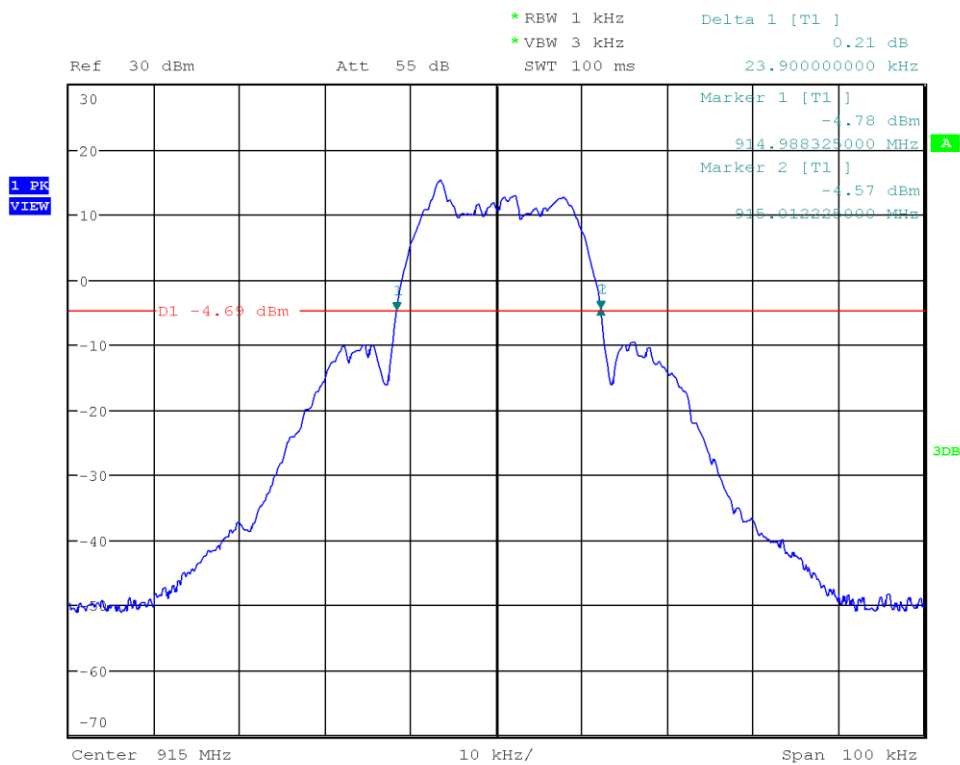
Date: 9.SEP.2020 13:00:38

Test Report No.: G0M-2004-8955-TFC247FH-V01

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

20 dB Bandwidth

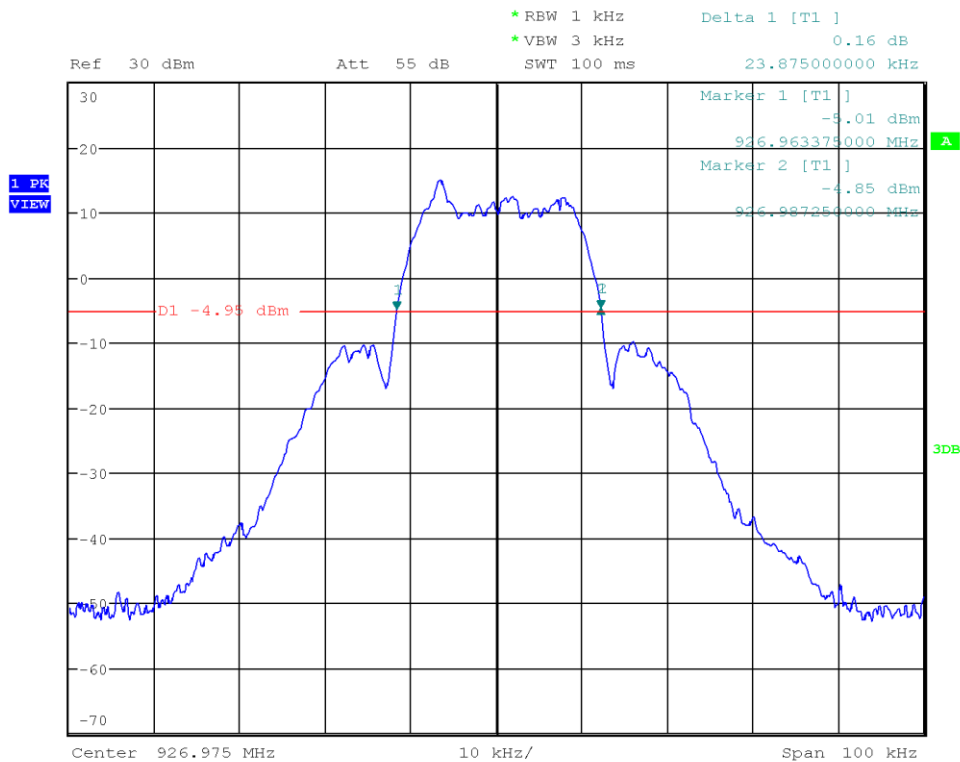
Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.2
 Operational Mode: GFSK, single, Channel: 914.975 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-09
 Lower Frequency [MHz]: 914.988
 Upper Frequency [MHz]: 915.012
 20 dB Bandwidth [kHz]: 23.9



Date: 9.SEP.2020 13:09:24

20 dB Bandwidth

Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.2
 Operational Mode: GFSK, single, Channel: 926.975 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-09
 Lower Frequency [MHz]: 926.963
 Upper Frequency [MHz]: 926.987
 20 dB Bandwidth [kHz]: 23.9



Date: 9.SEP.2020 13:12:57

3.3 Test Conditions and Results - Number of hopping frequencies

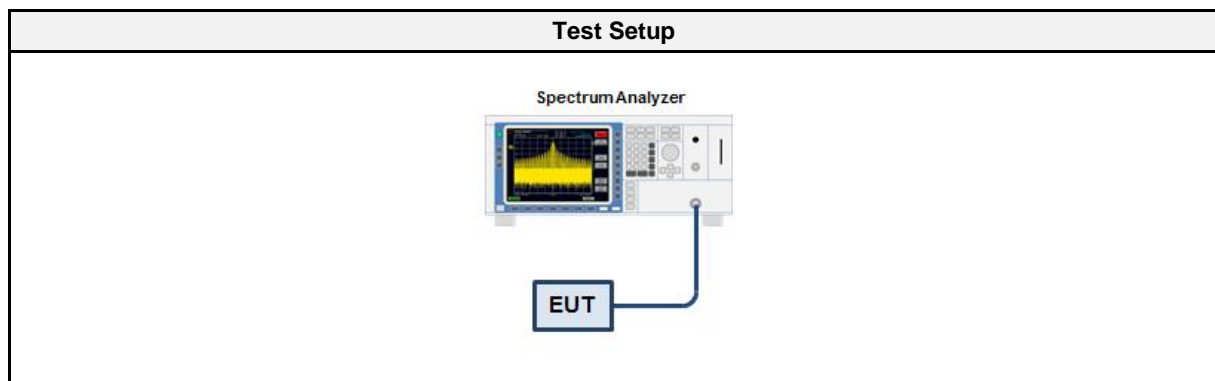
3.3.1 Information

Test Information	
Reference	FCC § 15.247(a)(1)(iii); ISED RSS-247, Issue 2 (section 5.1)
Measurement Method	ANSI C63.10 7.8.3
Measurement Uncertainty:	N/A
Operator	Wilfried Treffke
Date	2020-09-10

3.3.2 Limits

Limits	
Condition	Number of hopping channels
20 dB BW < 250 kHz Time of occupancy ≤ 0.4 s within 20 s	Number of hopping channels ≥ 50
250 kHz ≤ 20 dB BW < 500 kHz Time of occupancy ≤ 0.4 s within 10 s	Number of hopping channels ≥ 25

3.3.3 Setup



3.3.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2020-07	2021-07
Cable	Gigalane	SMS111B	EF00779 CAAZ	2018-10	2020-10

3.3.5 Procedure

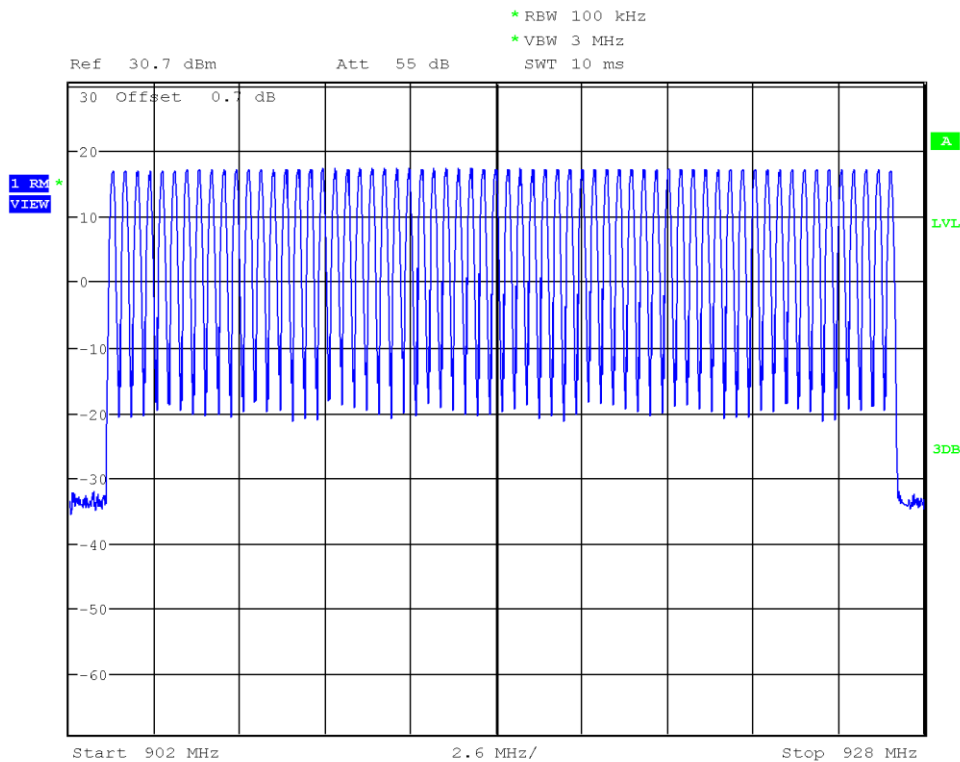
Test Procedure
<ol style="list-style-type: none"> 1. EUT set to test mode (Communication tester is used if needed) 2. Span set to measurement frequency range 3. Detector set to peak and max hold 4. Resolution bandwidth is set small enough to resolve hopping channel emission spectra 5. The number of peaks is counted to determine number of hopping frequencies

3.3.6 Results

Test Results			
Hopping Mode	Number of hopping frequencies	Limit	Verdict
Transmit Hopping 1	64	>50	PASS
Transmit Hopping 2	320	>50	PASS

Number of hopping frequencies

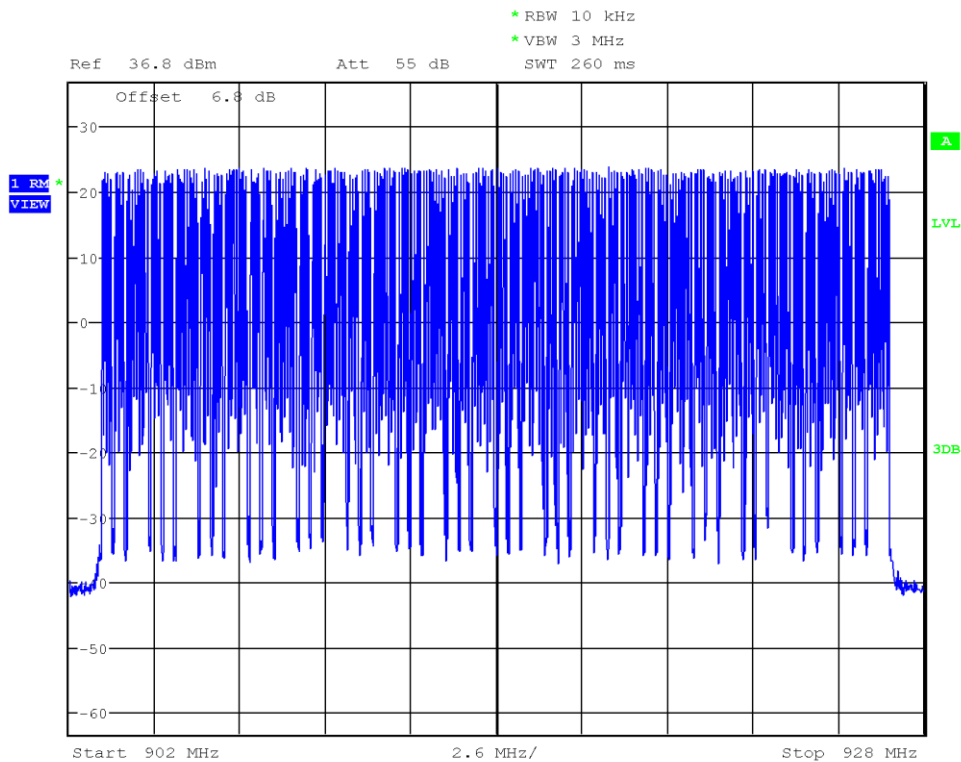
Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Reference Standards: FCC 15.247 (a)(1)(i)
 Reference Method: ANSI C63.10:2013 7.8.3
 Operational Mode: GFSK, Hopping Mode 1 (communication channels)
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-10
 Number of Hopping Channels: 64
 Limit: at least 50
 Verdict: Pass



Date: 10.SEP.2020 13:00:38

Number of hopping frequencies

Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Reference Standards: FCC 15.247 (a)(1)(i)
 Reference Method: ANSI C63.10:2013 7.8.3
 Operational Mode: GFSK, Hopping Mode 2 (all channels)
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-10
 Number of Hopping Channels: 320
 Limit: at least 50
 Verdict: Pass



Date: 10.SEP.2020 12:38:56

3.4 Test Conditions and Results - Frequency hopping channel separation

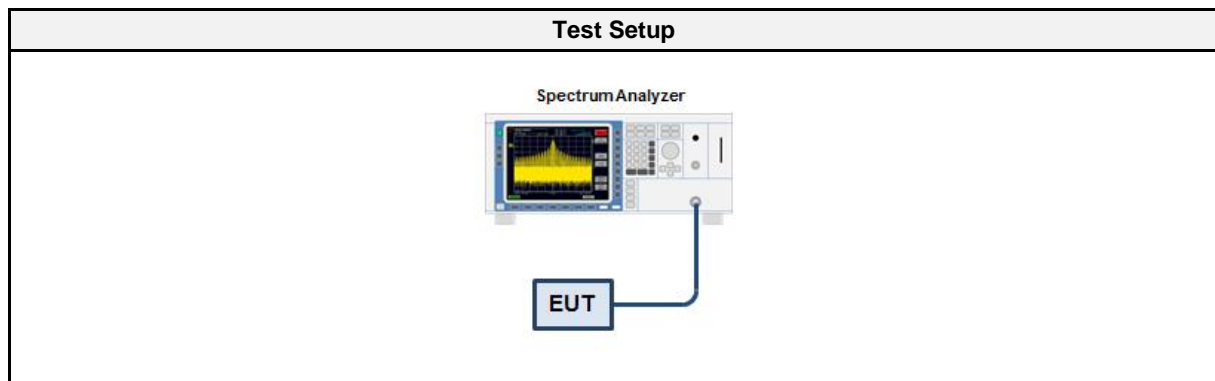
3.4.1 Information

Test Information	
Reference	FCC § 15.247(a)(1); ISED RSS-247, Issue 2 (section 5.1)
Measurement Method	ANSI C63.10 7.8.4
Measurement Uncertainty:	3.14 %
Operator	Wilfried Treffke
Date	2020-09-10

3.4.2 Limits

Limit
≥ 25 kHz or 20 dB bandwidth, whichever is greater

3.4.3 Setup



3.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2020-07	2021-07
Cable	Gigalane	SMS111B	EF00779 CAAZ	2018-10	2020-10

3.4.5 Procedure

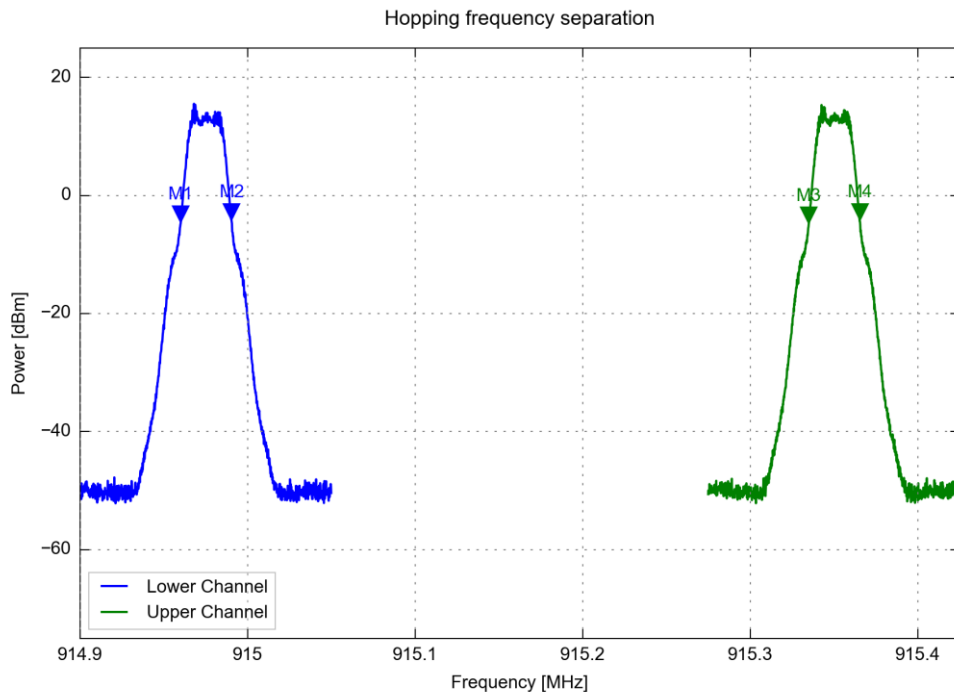
Test Procedure
<ol style="list-style-type: none"> 1. EUT set to test mode (Communication tester is used if needed) 2. Span set to measurement frequency range 3. Detector set to peak and max hold 4. Resolution bandwidth is set small enough to resolve hopping channel emission spectra 5. The two adjacent channel peaks are marked 6. Channel separation is determined from frequency separation of markers

3.4.6 Results

Test Results			
Hopping Mode	Channel separation [kHz]	Limit [kHz]	Verdict
Transmit Hopping 1	375	≥25	PASS
Transmit Hopping 2	75	≥25	PASS

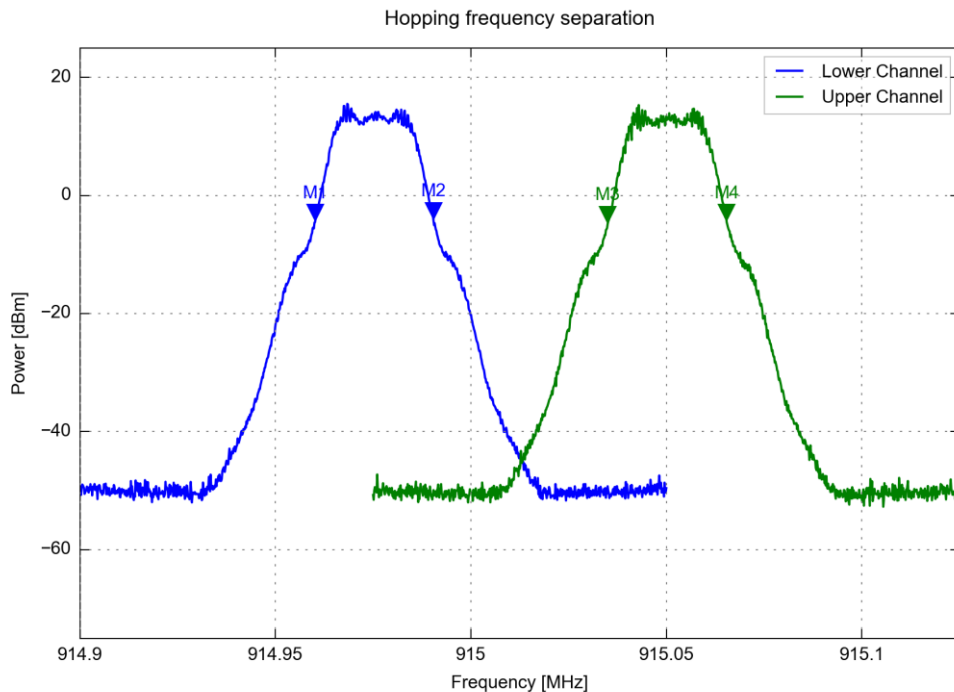
Hopping frequency separation

Project Number:	G0M-2004-8955
Applicant:	HBC-radiomatic GmbH
Model Description:	Radio module for industrial application
Model:	TC792.1
Test Sample ID:	30914
Reference Standards:	FCC 15.247(a)(1)
Reference Method:	ANSI C63.10:2013 7.8.2
Operational Mode:	Hopping Mode 1, GFSK, Channels: 160 + 165 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2020-09-10
Lower Frequency (M1) [MHz]:	914.960
Upper Frequency (M2) [MHz]:	914.991
Lower Frequency (M3) [MHz]:	915.335
Upper Frequency (M4) [MHz]:	915.366
Lower center Frequency [MHz]:	914.975
Upper center Frequency [MHz]:	915.350
Hopping Frequency Separation [MHz]:	0.375



Hopping frequency separation

Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Reference Standards: FCC 15.247(a)(1)
 Reference Method: ANSI C63.10:2013 7.8.2
 Operational Mode: Hopping Mode 2, GFSK, Channels: 160 + 161 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-10
 Lower Frequency (M1) [MHz]: 914.960
 Upper Frequency (M2) [MHz]: 914.990
 Lower Frequency (M3) [MHz]: 915.035
 Upper Frequency (M4) [MHz]: 915.065
 Lower center Frequency [MHz]: 914.975
 Upper center Frequency [MHz]: 915.050
 Hopping Frequency Separation [MHz]: 0.075



3.5 Test Conditions and Results - Time of occupancy (Dwell time)

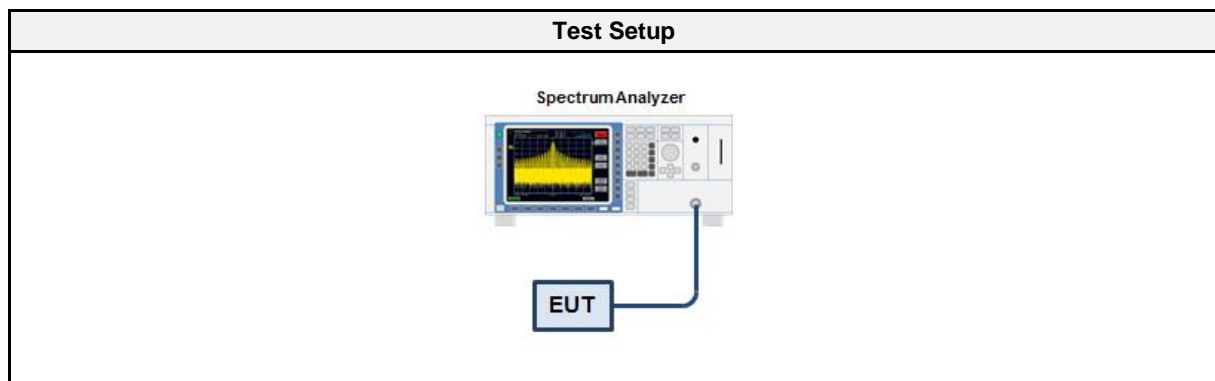
3.5.1 Information

Test Information	
Reference	FCC § 15.247(a)(1); ISED RSS-247, Issue 2 (section 5.1)
Measurement Method	ANSI C63.10 7.8.2
Measurement Uncertainty:	± 78.5 %
Operator	Wilfried Treffke
Date	2020-09-10

3.5.2 Limits

Limits	
Condition	Limit
20 dB BW < 250 kHz Number of hopping channels ≥ 50	Time of occupancy ≤ 0.4 s within 20 s
250 kHz ≤ 20 dB BW < 500 kHz Number of hopping channels ≥ 25	Time of occupancy ≤ 0.4 s within 10 s

3.5.3 Setup



3.5.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2020-07	2021-07
Cable	Gigalane	SMS111B	EF00779 CAAZ	2018-10	2020-10

3.5.5 Procedure

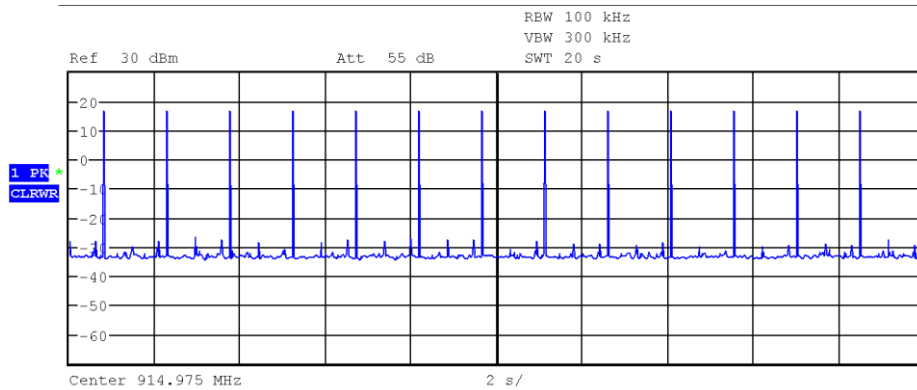
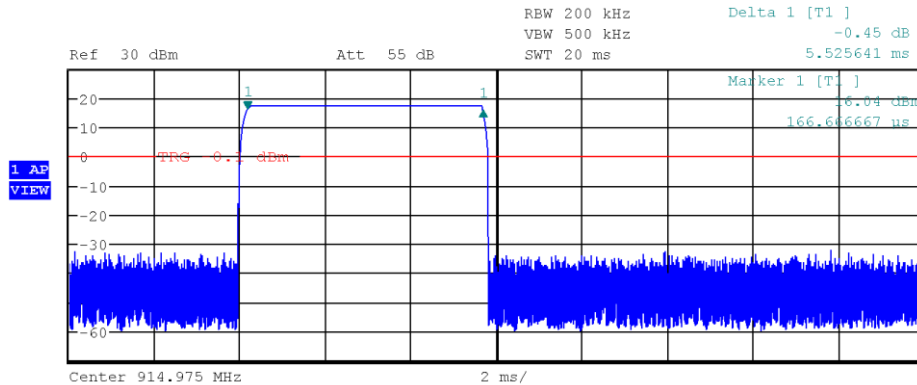
Test Procedure	
1.	EUT set to test hopping mode (Communication tester is used if needed)
2.	Analyzer span is set to zero span
3.	Detector set to peak and max hold
4.	RBW is set to 100 kHz and VBW to 300 kHz
5.	The sweep time is set to capture one single dwell time
6.	Trigger is set to video trigger
7.	A marker is set to the start and end positions of the burst
8.	The dwell time is determined from the marker difference
9.	Another sweep is initiated without trigger and sweep time set to the observation time
10.	The number of hops is counted
11.	The total time of occupancy is calculated from the dwell time per hop multiplied by the number of hops

3.5.6 Results

Test Results						
Hopping Mode	Observation Period [s]	Number of Hops	Dwell time per Hop [s]	Time of occupancy [s]	Limit [s]	Verdict
Transmit Hopping 1	20	14	0.00552	0.077	≤ 0.4 s	PASS
Transmit Hopping 2	20	2	0.01202	0.024	≤ 0.4 s	PASS

Time of occupancy

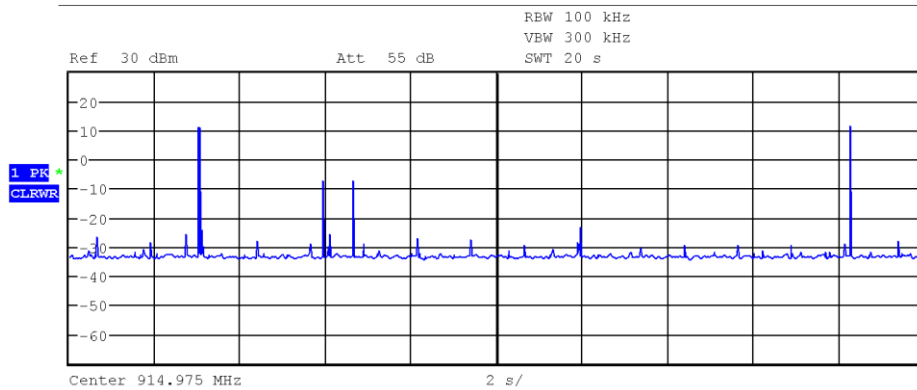
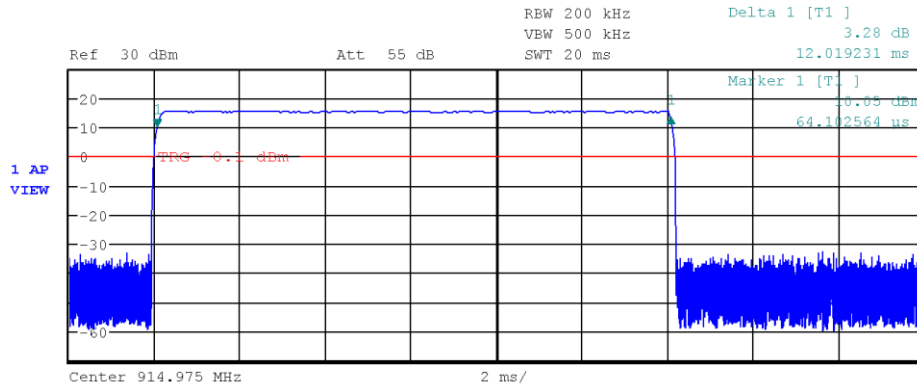
Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-10
 Operating Conditions: Tnom/Vnom
 Mode: Transmit Hopping 1 (connection channels)
 Note 1: Dwell Time per Hop [ms]: 5.52
 Note 2: Number of Hops: 14
 Note 3: Time of occupancy [s]: 0.077



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Time of occupancy

Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-10
 Operating Conditions: Tnom/Vnom
 Mode: Transmit Hopping 2 (all channels)
 Note 1: Dwell Time per Hop [ms]: 12.02
 Note 2: Number of Hops: 2
 Note 3: Time of occupancy [s]: 0.02404



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3.6 Test Conditions and Results - Maximum peak conducted output power

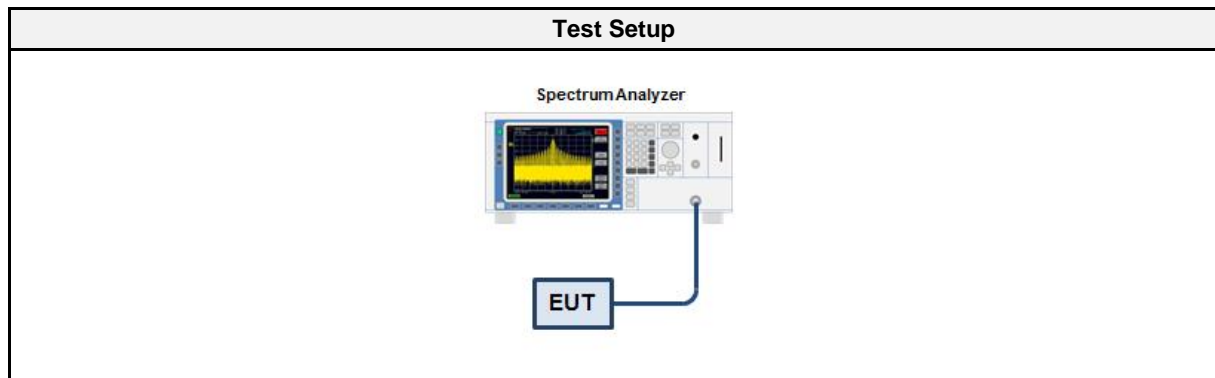
3.6.1 Information

Test Information	
Reference	FCC § 15.247(b); ISED RSS-247, Issue 2 (section 5.4)
Measurement Method	ANSI C63.10 11.9.1
Measurement Uncertainty:	± 1.77 dB
Operator	Wilfried Treffke
Date	2020-09-09

3.6.2 Limits

Limits	
Condition	Limit
Number of hopping channels ≥ 50	1 W (30 dBm)
$50 >$ Number of hopping channels ≥ 25	0.25 W (24 dBm)

3.6.3 Setup



3.6.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2020-07	2021-07
Cable	Gigalane	SMS111B	EF00779 CAAZ	2018-10	2020-10

3.6.5 Procedure

Test Procedure
<ol style="list-style-type: none"> 1. EUT set to test mode (Communication tester is used if needed) 2. The spectrum analyzer is set to peak detection and maximum hold 3. The peak power is measured with a spectrum analyzer 4. If the EUT has more than one transmit chain the procedure is repeated for each transmit chain and the power is summed up

3.6.6 Results

Test Results				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
903.050	17.2	0.0526	1.0	PASS
914.975	17.6	0.0580	1.0	PASS
926.975	17.4	0.0549	1.0	PASS

3.7 Test Conditions and Results - AC powerline conducted emissions

3.7.1 Information

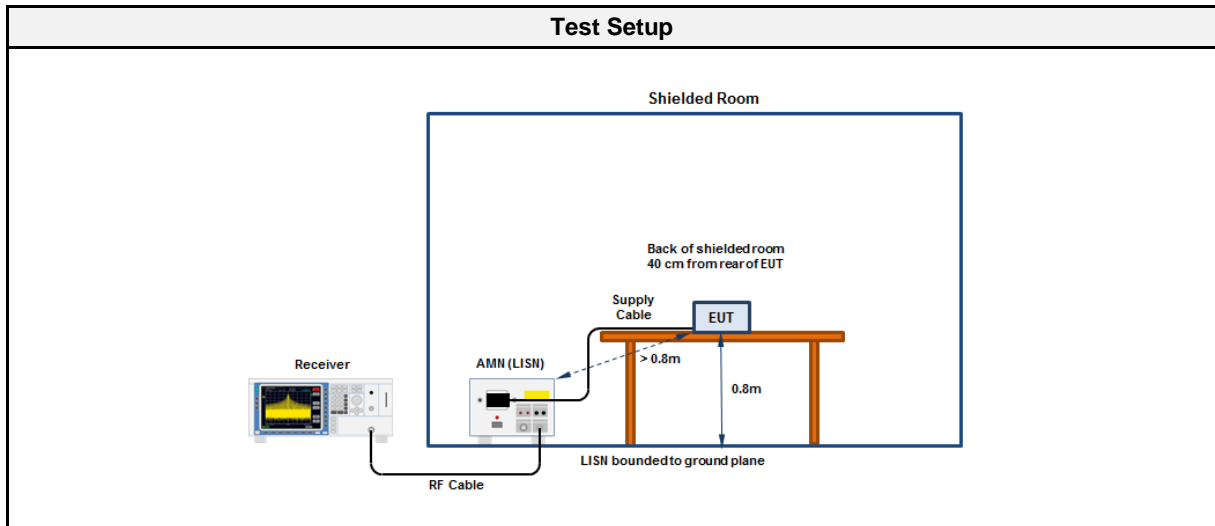
Test Information	
Reference	FCC § 15.207; ISED RSS-247, Issue 2 (section 3.1)
Measurement Method	ANSI C63.10 6.2
Operator	Wilfried Treffke
Date	2020-09-15

3.7.2 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

3.7.3 Setup



3.7.4 Equipment

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

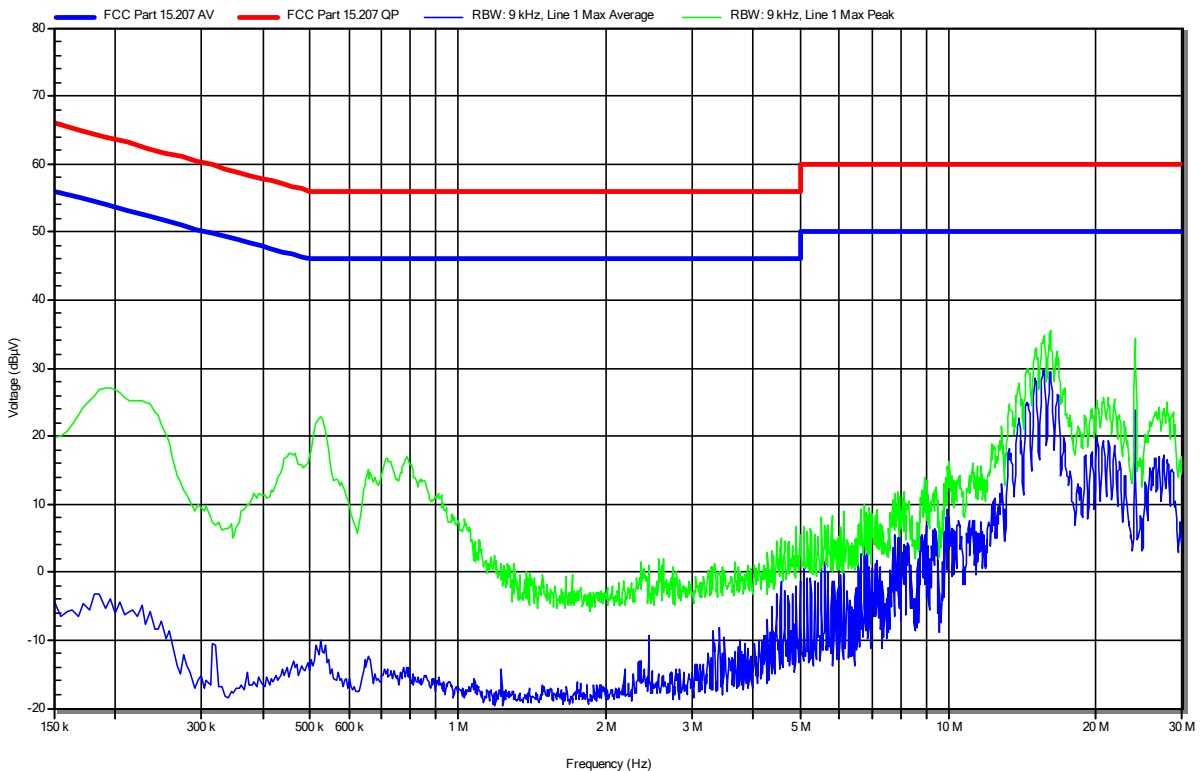
Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESR7	EF00943	2020-07	2021-07
Pulse Limiter	R&S	ESH3-Z2	EF01222	2020-07	2021-07
LISN	Schwarzbeck	NSLK 8127 RC	EF01592	2020-07	2021-07

Conducted emissions at the mains power port according to FCC 47 CFR 15.207

Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Date: 2020-09-15
 Operating Conditions: ambient temperature: 22 °Celsius
 power input: 120 VAC
 LISN: Schwarzbeck NSLK 8127 RC L
 Mode: GFSK; 914.975 MHz
 Applied to Port: AC Mains
 Note 1: Power supply type 2224.7

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RadiMation

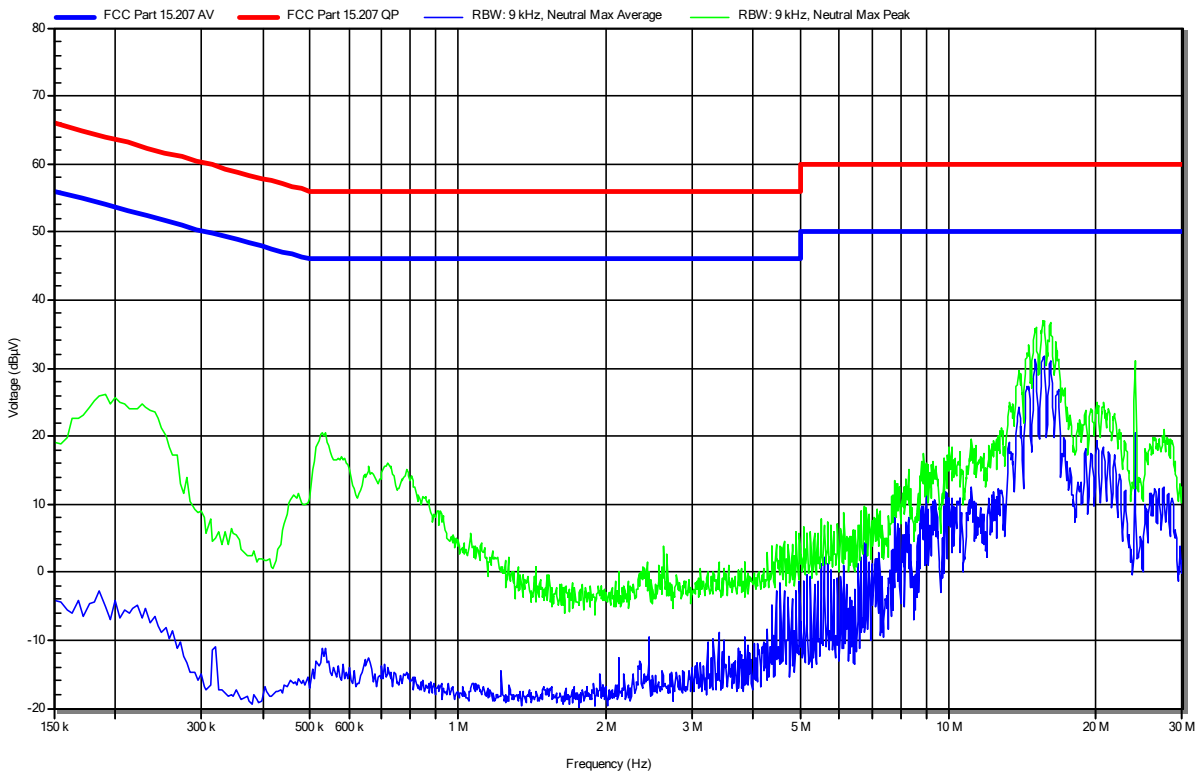


Conducted emissions at the mains power port according to FCC 47 CFR 15.207

Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Date: 2020-09-15
 Operating Conditions: ambient temperature: 22 °Celsius
 power input: 120 VAC
 LISN: Schwarzbeck NSLK 8127 RC N
 Mode: GFSK; 914.975 MHz
 Applied to Port: AC Mains
 Note 1: Power supply type 2224.7

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RadiMation



3.8 Test Conditions and Results - Band-edge compliance

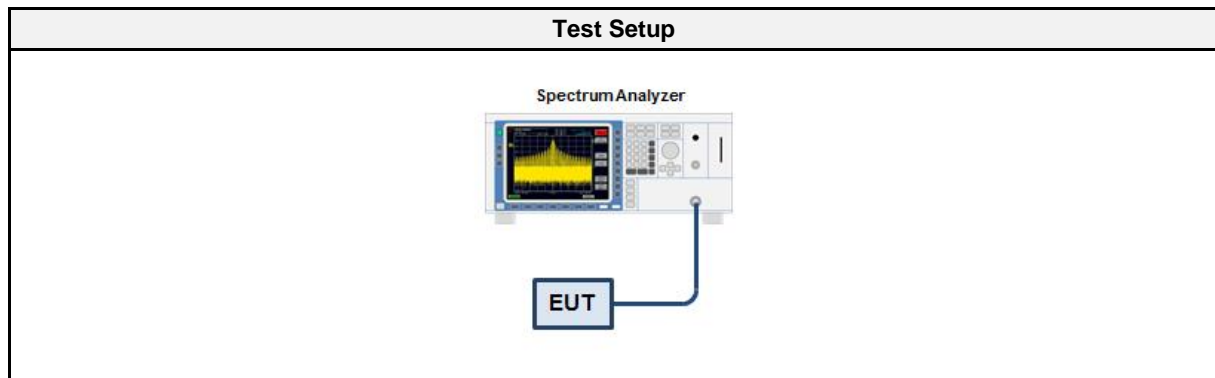
3.8.1 Information

Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Method	ANSI C63.10 11.13
Measurement Uncertainty:	± 1.80 dB
Operator	Wilfried Treffke
Date	2020-09-10

3.8.2 Limits

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

3.8.3 Setup



3.8.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2020-07	2021-07
Cable	Gigalane	SMS111B	EF00779 CAAZ	2018-10	2020-10

3.8.5 Procedure

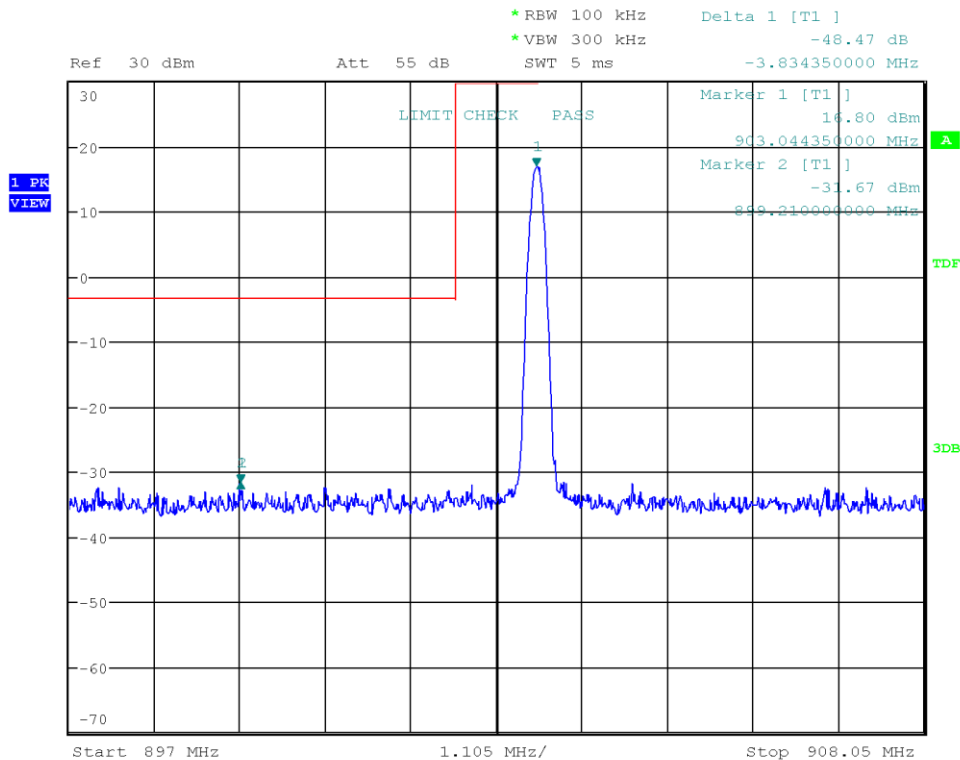
Test Procedure
<ol style="list-style-type: none"> 1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels within frequency band and outside frequency band 5. Band edge attenuation is determined from level difference

3.8.6 Results

Test Results				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
Transmit Single	903.050	-48.47	-20	PASS
Transmit Single	926.975	-58.56	-20	PASS
Transmit Hopping 2	903.050	-48.11	-20	PASS
Transmit Hopping 2	926.975	-57.90	-20	PASS

Emissions in nonrestricted frequency bands at the Band-edge

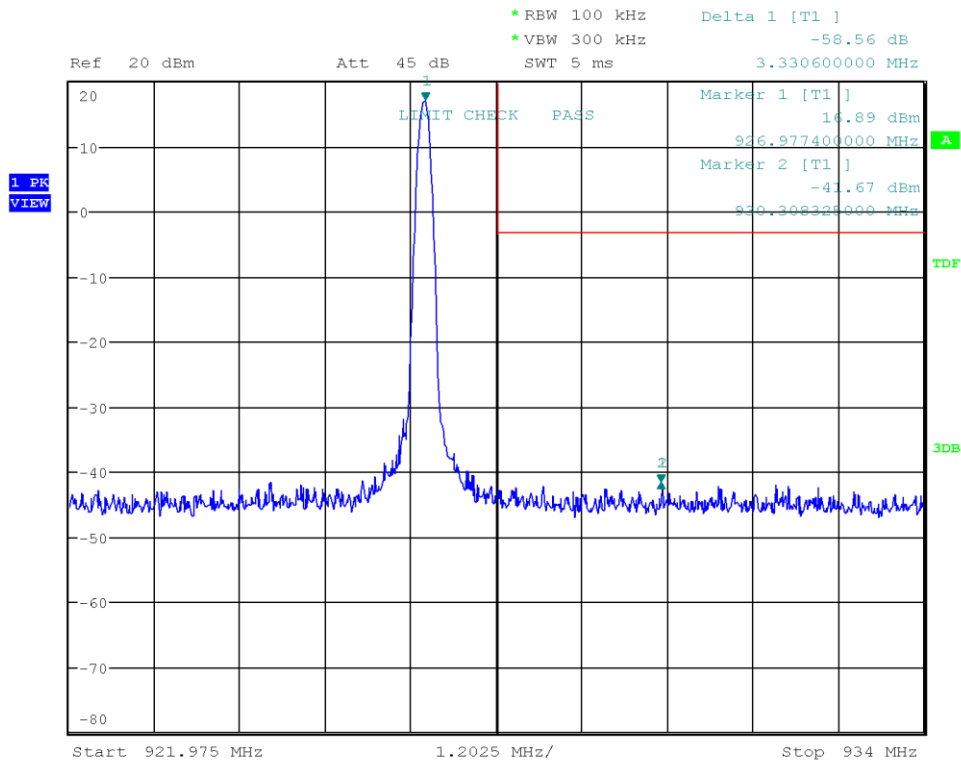
Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.10
 Operational Mode: single frequency, Channel: 903.05 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-10
 Band-edge: Lower
 In-band Frequency [MHz]: 903.044
 Max. in-band Level [dBm/100 kHz]: 16.805
 Out-of-band Frequency [MHz]: 899.21
 Max. out-of-band Level [dBm/100 kHz]: -31.667
 Attenuation [dB]: -48.47



Date: 10.SEP.2020 08:45:58

Emissions in nonrestricted frequency bands at the Band-edge

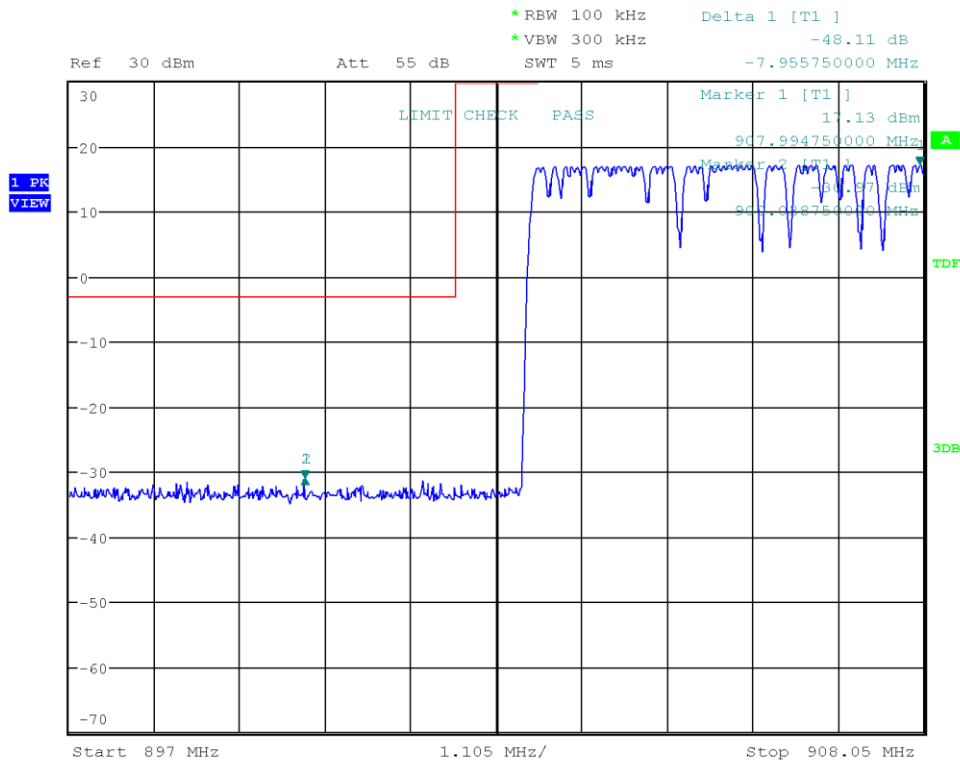
Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.10
 Operational Mode: single frequency, Channel: 926.975 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-10
 Band-edge: Upper
 In-band Frequency [MHz]: 926.977
 Max. in-band Level [dBm/100 kHz]: 16.888
 Out-of-band Frequency [MHz]: 930.308
 Max. out-of-band Level [dBm/100 kHz]: -41.668
 Attenuation [dB]: -58.56



Date: 10.SEP.2020 08:43:31

Emissions in nonrestricted frequency bands at the Band-edge

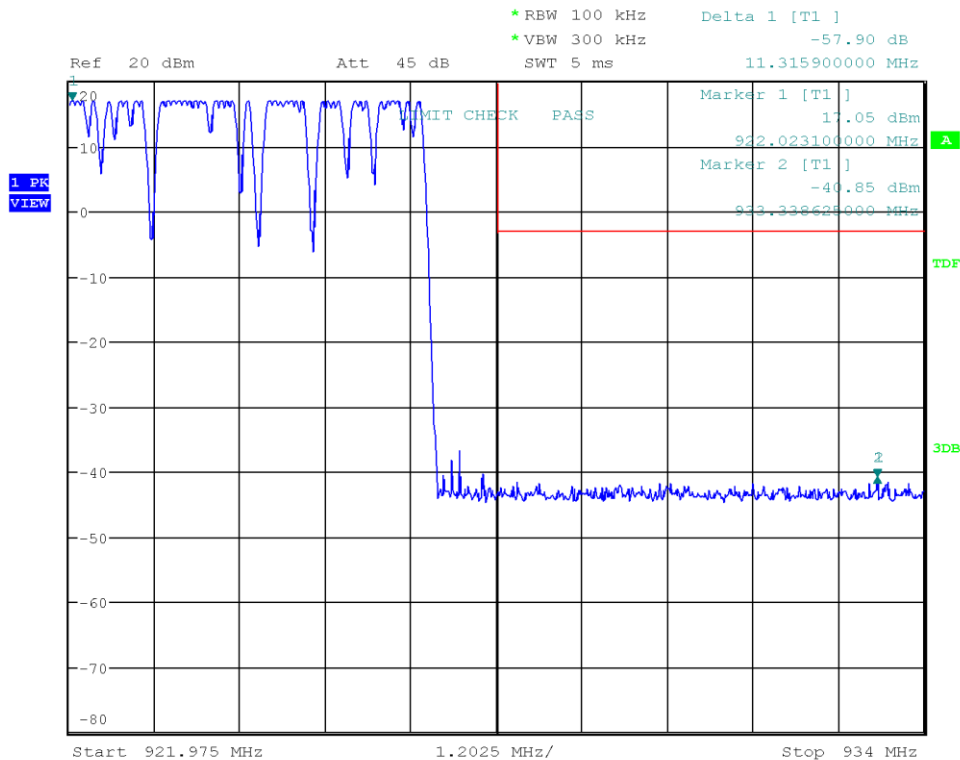
Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.10
 Operational Mode: hopping mode, Channel: 903.05 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-10
 Band-edge: Lower
 In-band Frequency [MHz]: 907.995
 Max. in-band Level [dBm/100 kHz]: 17.134
 Out-of-band Frequency [MHz]: 900.039
 Max. out-of-band Level [dBm/100 kHz]: -30.974
 Attenuation [dB]: -48.11



Date: 10.SEP.2020 09:18:12

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.10
 Operational Mode: hopping mode, Channel: 926.975 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-10
 Band-edge: Upper
 In-band Frequency [MHz]: 922.023
 Max. in-band Level [dBm/100 kHz]: 17.055
 Out-of-band Frequency [MHz]: 933.339
 Max. out-of-band Level [dBm/100 kHz]: -40.847
 Attenuation [dB]: -57.9



Date: 10.SEP.2020 09:21:55

3.9 Test Conditions and Results - Conducted spurious emissions

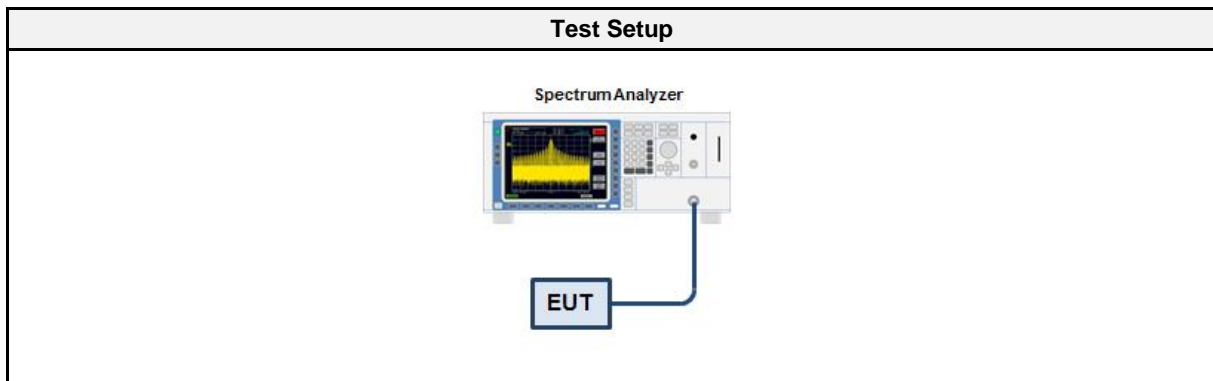
3.9.1 Information

Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Method	ANSI C63.10 11.11
Measurement Uncertainty:	± 4.25 dB
Operator	Wilfried Treffke
Date	2020-09-09

3.9.2 Limits

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

3.9.3 Setup



3.9.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2020-07	2021-07
Cable	Gigalane	SMS111B	EF00779 CAA AZ	2018-10	2020-10

3.9.5 Procedure

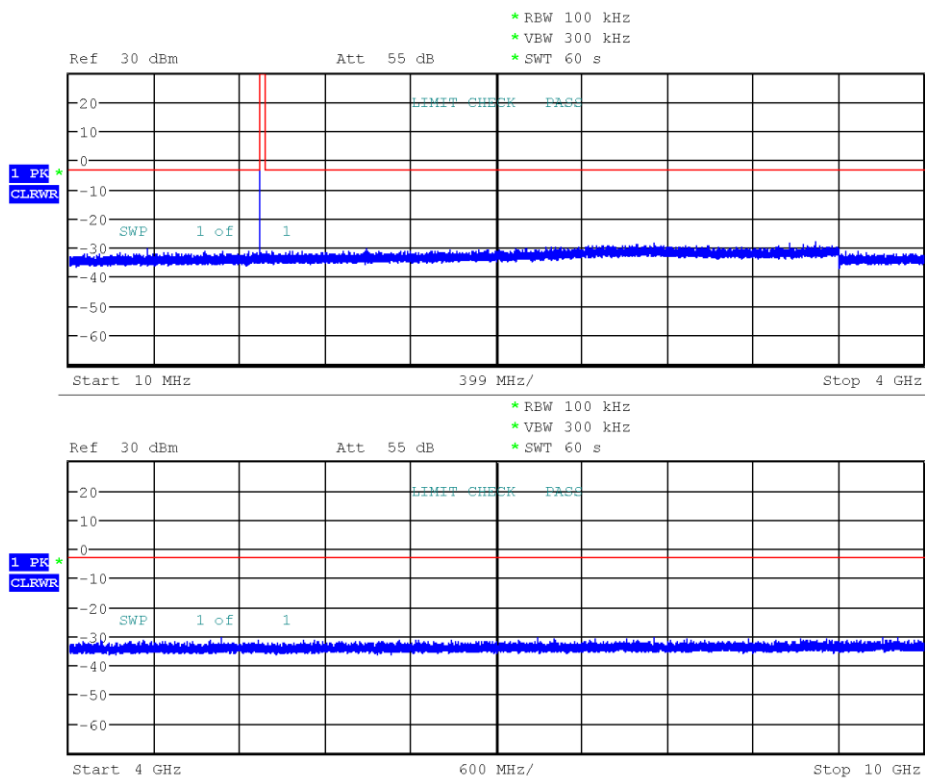
Test Procedure
<ol style="list-style-type: none"> 1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels outside frequency band

3.9.6 Results

Test Results		
Mode	Channel [MHz]	Verdict
Transmit Single	903.050	PASS
Transmit Single	914.975	PASS
Transmit Single	926.975	PASS

Conducted Spurious Emissions

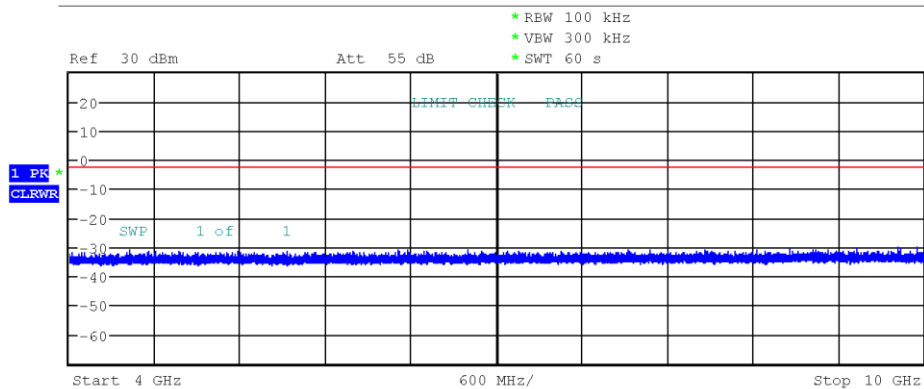
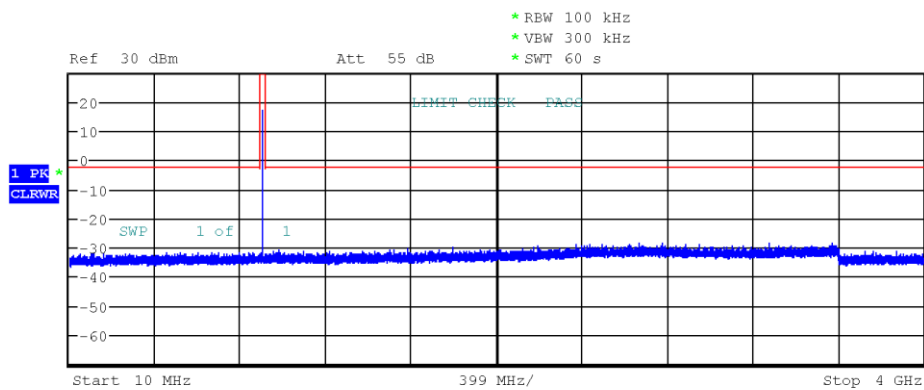
Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 903.050 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-09
 Max. in-band Frequency [MHz]: 903.1
 Max. in-band Level [dBm/100 kHz]: 16.9
 Out-of-band Limit [dBm/100 kHz]: -3.1



Date: 9.SEP.2020 14:55:26

Conducted Spurious Emissions

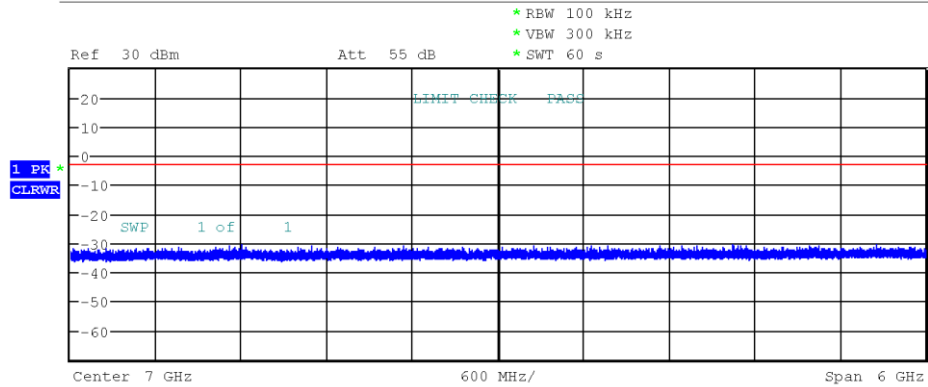
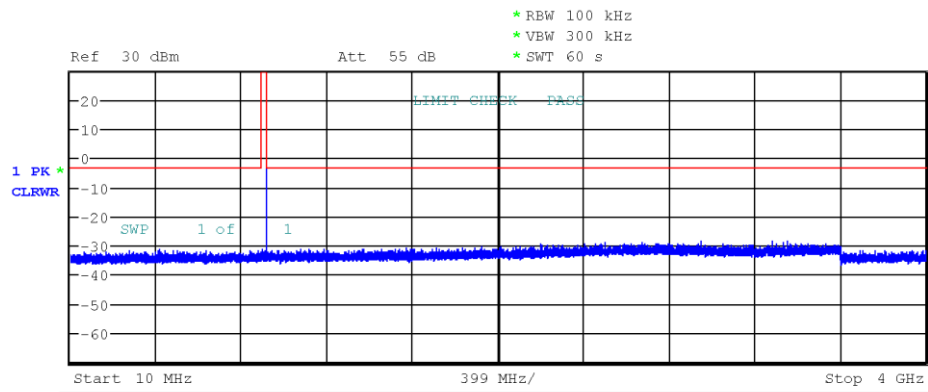
Project Number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 Model Description: Radio module for industrial application
 Model: TC792.1
 Test Sample ID: 30914
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 914.975 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2020-09-09
 Max. in-band Frequency [MHz]: 915.0
 Max. in-band Level [dBm/100 kHz]: 17.4
 Out-of-band Limit [dBm/100 kHz]: -2.6



Date: 9.SEP.2020 15:36:59

Conducted Spurious Emissions

Project Number: G0M-2004-8955
Applicant: HBC-radiomatic GmbH
Model Description: Radio module for industrial application
Model: TC792.1
Test Sample ID: 30914
Reference Standards: FCC 15.247, RSS-247
Reference Method: ANSI C63.10:2013, Section 11.11
Operational Mode: GFSK, Channel: 926.975 MHz
Operating Conditions: Tnom/Vnom
Operator: Wilfried Treffke
Test Site: Eurofins Product Service GmbH
Test Date: 2020-09-09
Max. in-band Frequency [MHz]: 927.0
Max. in-band Level [dBm/100 kHz]: 17.0
Out-of-band Limit [dBm/100 kHz]: -3.0



Date: 9.SEP.2020 15:42:10

3.10 Test Conditions and Results - Transmitter radiated emissions

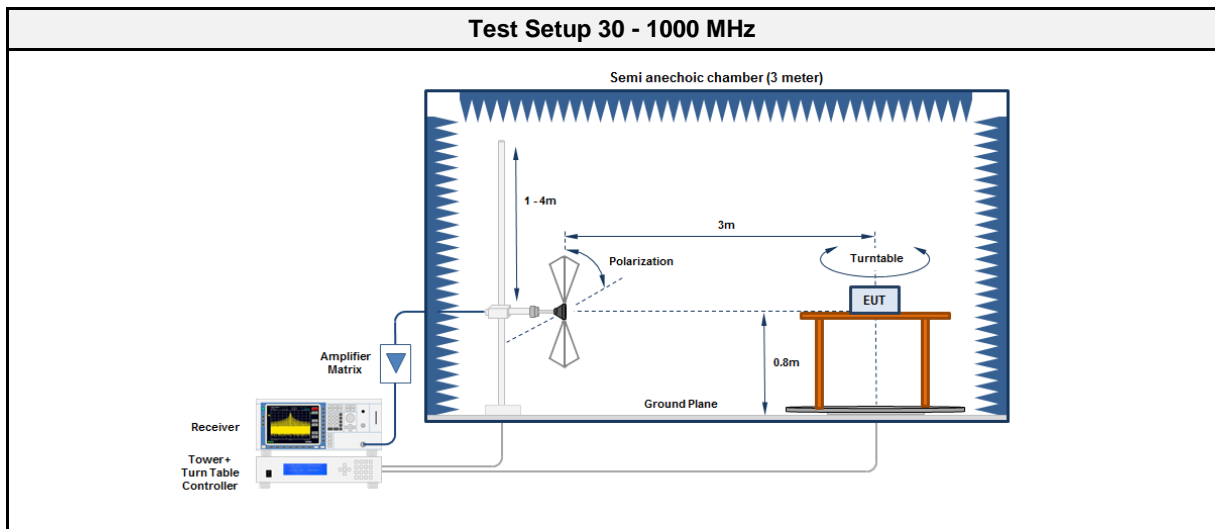
3.10.1 Information

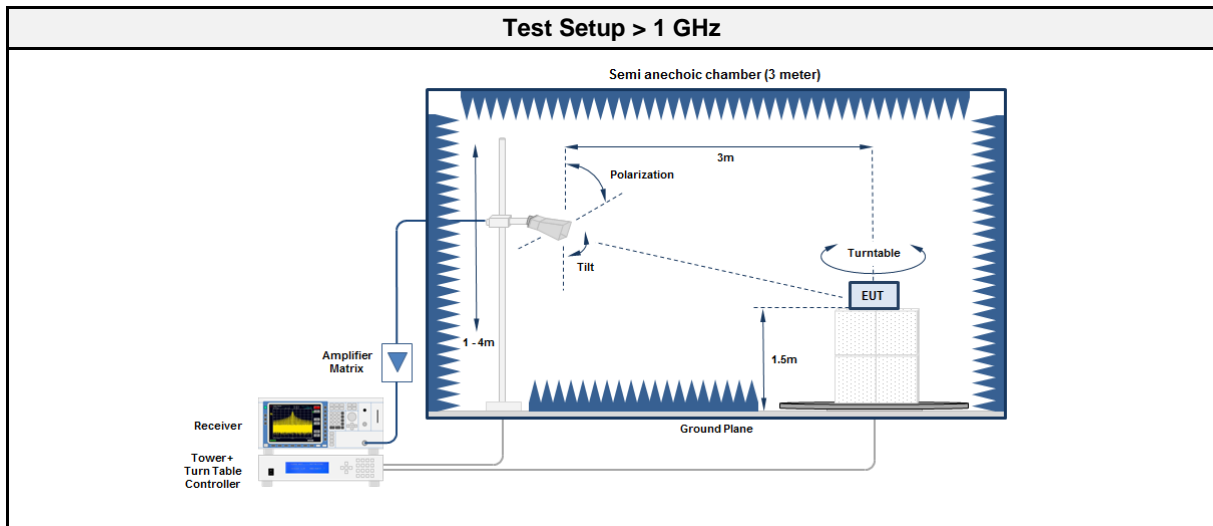
Test Information	
Reference	FCC § 15.247(d); FCC § 15.209; ISED RSS-Gen, Issue 5 (section 6.13)
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6, 11.12
Measurement Uncertainty:	± 5.95 dB
Operator	Wilfried Treffke
Date	2020-09-15

3.10.2 Limits

Limits			
Frequency [MHz]	Detector	Field strength [$\mu\text{V}/\text{m}$]	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

3.10.3 Setup





3.10.4 Equipment

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

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2020-06	2021-06
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00187	2019-05	2022-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2020-06	2021-06
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2019-10	2022-10

3.10.5 Procedure

Test Procedure 30 - 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

3.10.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
903.050	2709	46.19	pk	hor	74.00	-27.81
903.050	2709	43.30	avg	hor	54.00	-10.70
914.975	2745	46.84	pk	hor	74.00	-27.16
914.975	2745	44.06	avg	hor	54.00	-09.94
914.975	2745	46.96	pk	ver	74.00	-27.04
914.975	2745	44.11	avg	ver	54.00	-09.89
914.975	7320	53.47	pk	hor	74.00	-20.53
914.975	7320	47.96	avg	hor	54.00	-06.04
914.975	7320	51.65	pk	ver	74.00	-22.35
914.975	7320	46.00	avg	ver	54.00	-08.00
926.975	2781	48.54	pk	hor	74.00	-25.46
926.975	2781	45.95	avg	hor	54.00	-08.05
926.975	2781	45.73	pk	ver	74.00	-28.27
926.975	2781	42.77	avg	ver	54.00	-11.23

3.11 Test Conditions and Results - Receiver radiated emissions

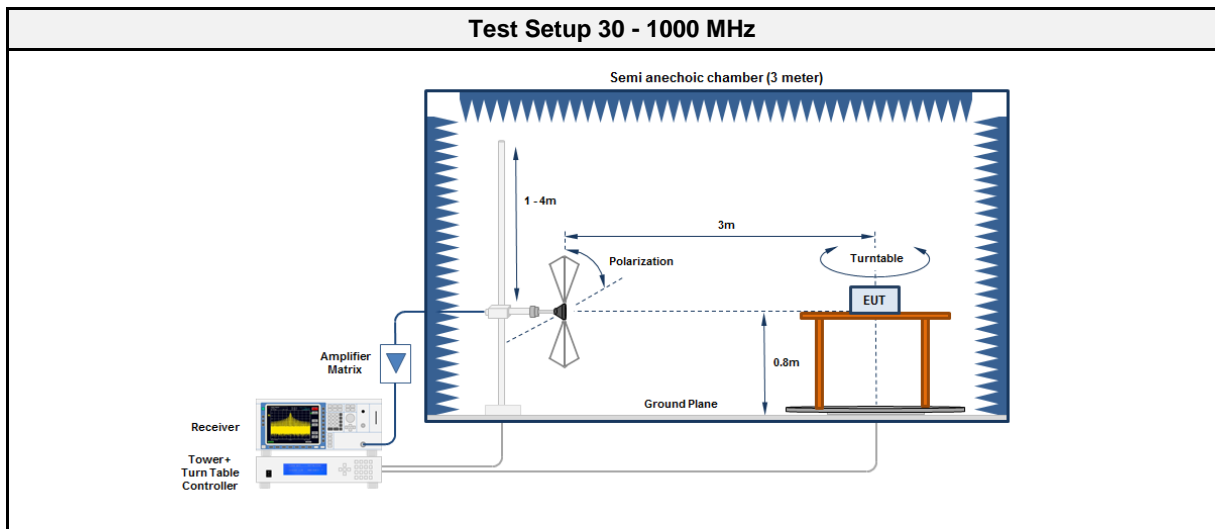
3.11.1 Information

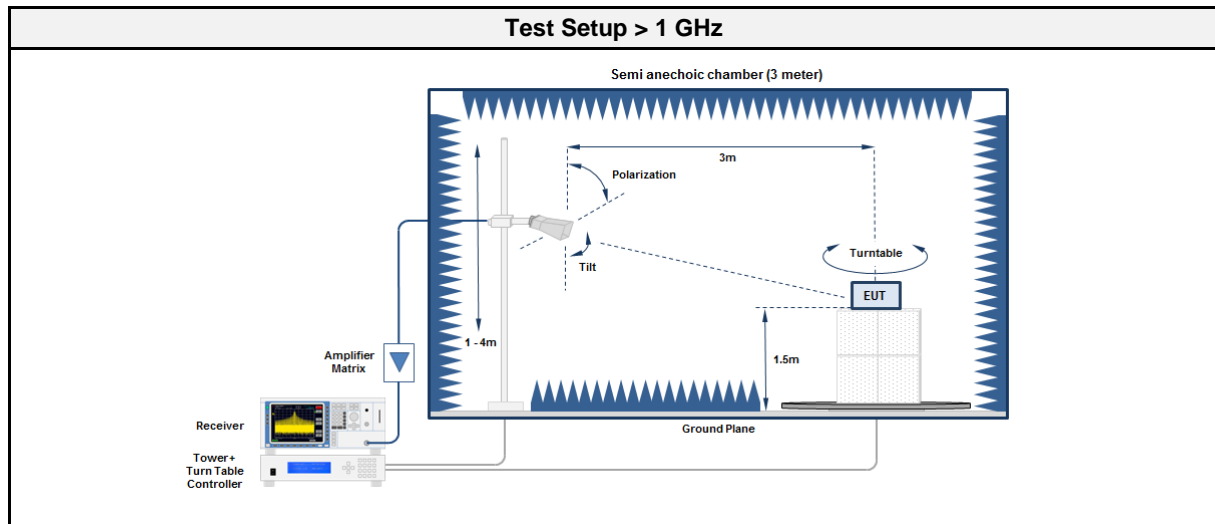
Test Information	
Reference	ISED RSS-247, Issue 2 (section 3.1)
Measurement Method	ANSI C63.10 6.5, 6.6, 11.12
Measurement Uncertainty:	± 5.95 dB
Operator	Wilfried Treffke
Date	2020-09-15

3.11.2 Limits

Limits			
Frequency [MHz]	Detector	Field strength [$\mu\text{V}/\text{m}$]	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

3.11.3 Setup





3.11.4 Equipment

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

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2020-06	2021-06
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00187	2019-05	2022-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2020-06	2021-06
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2019-10	2022-10

3.11.5 Procedure

Test Procedure 30 - 1000 MHz
<ol style="list-style-type: none"> 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

3.11.6 Results

Test Results

Channel [MHz]	Emission [MHz]	Level [dB μ V/m]	Det.	Pol.	Limit [dB μ V/m]	Margin [dB]
914.975	1827	35.46	pk	hor	53.98	-18.52
914.975	1827	30.30	pk	ver	53.98	-23.68

ANNEX A Transmitter spurious emissions

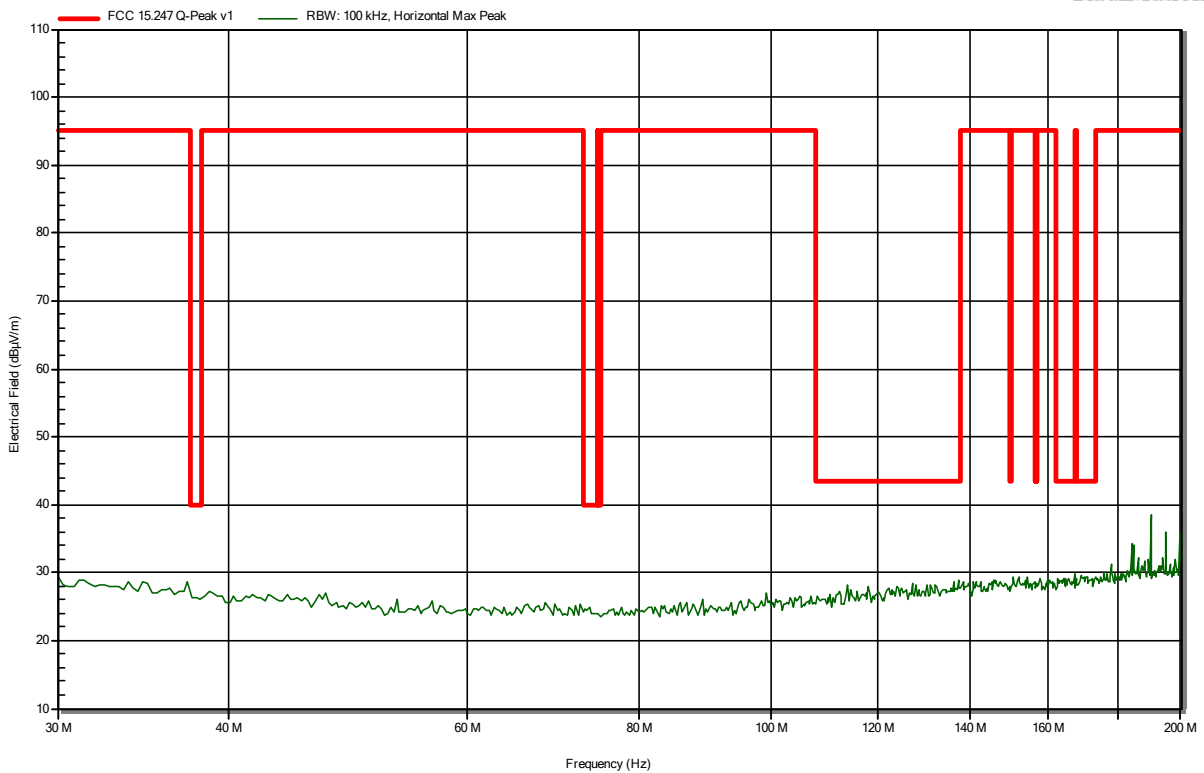
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: TX; GFSK; 903.050 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



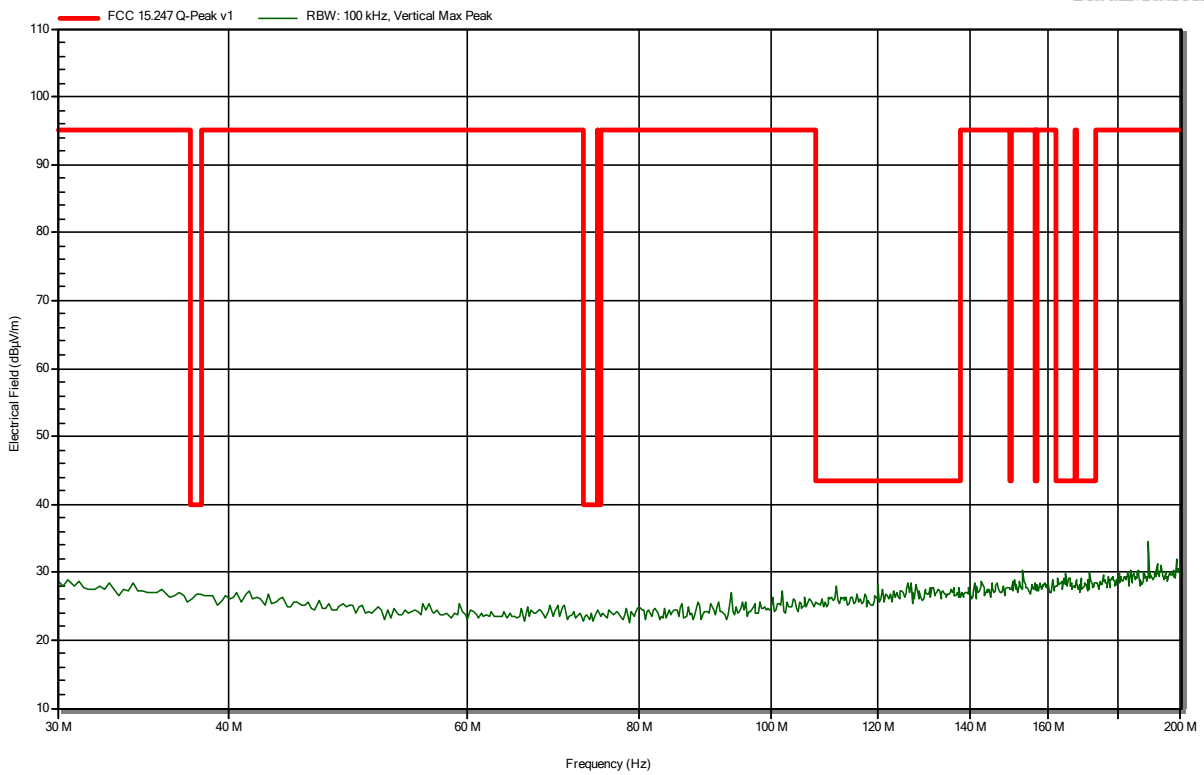
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: TX; GFSK; 903.050 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



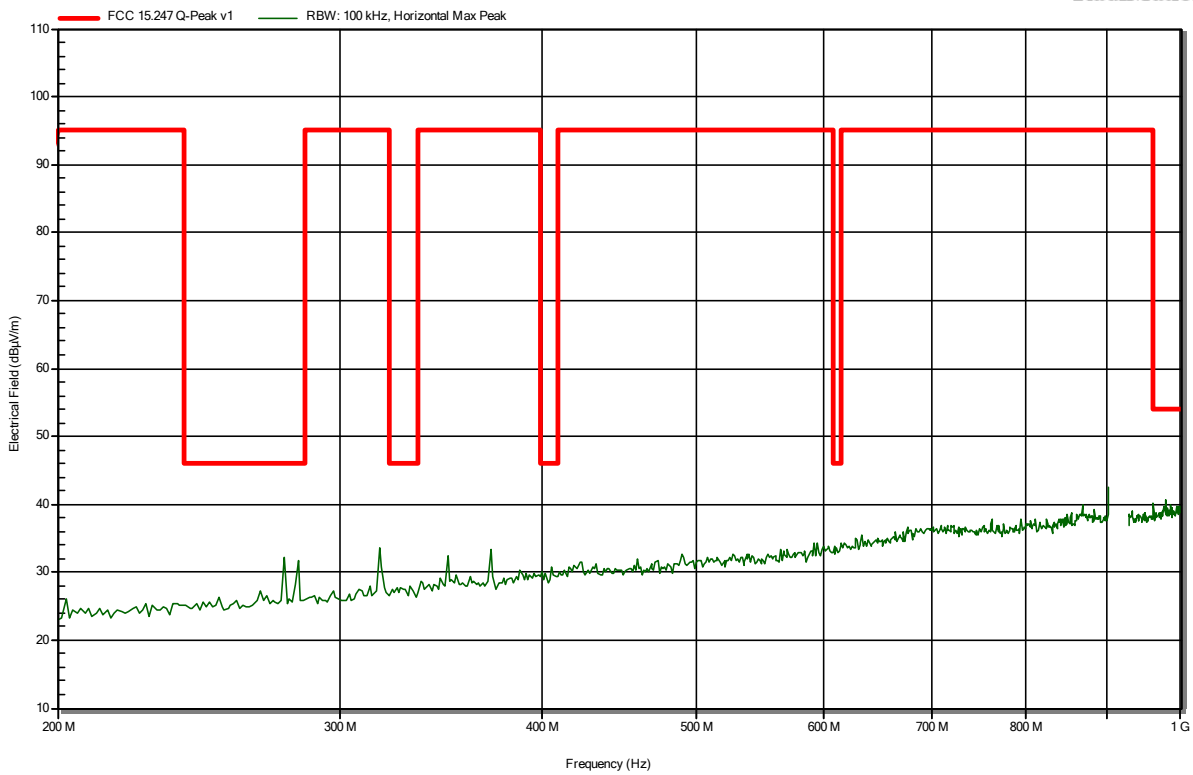
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: TX; GFSK; 903.050 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



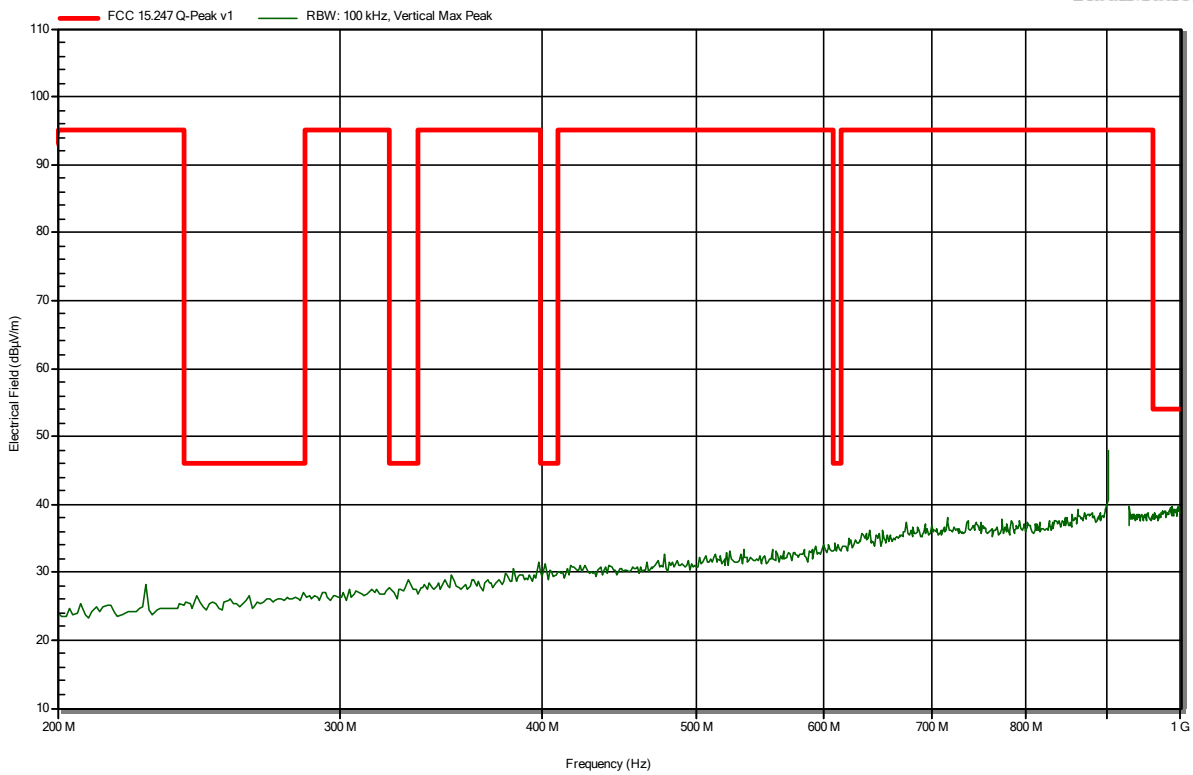
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: TX; GFSK; 903.050 MHz
 Test Date: 2020-09-14
 Note:

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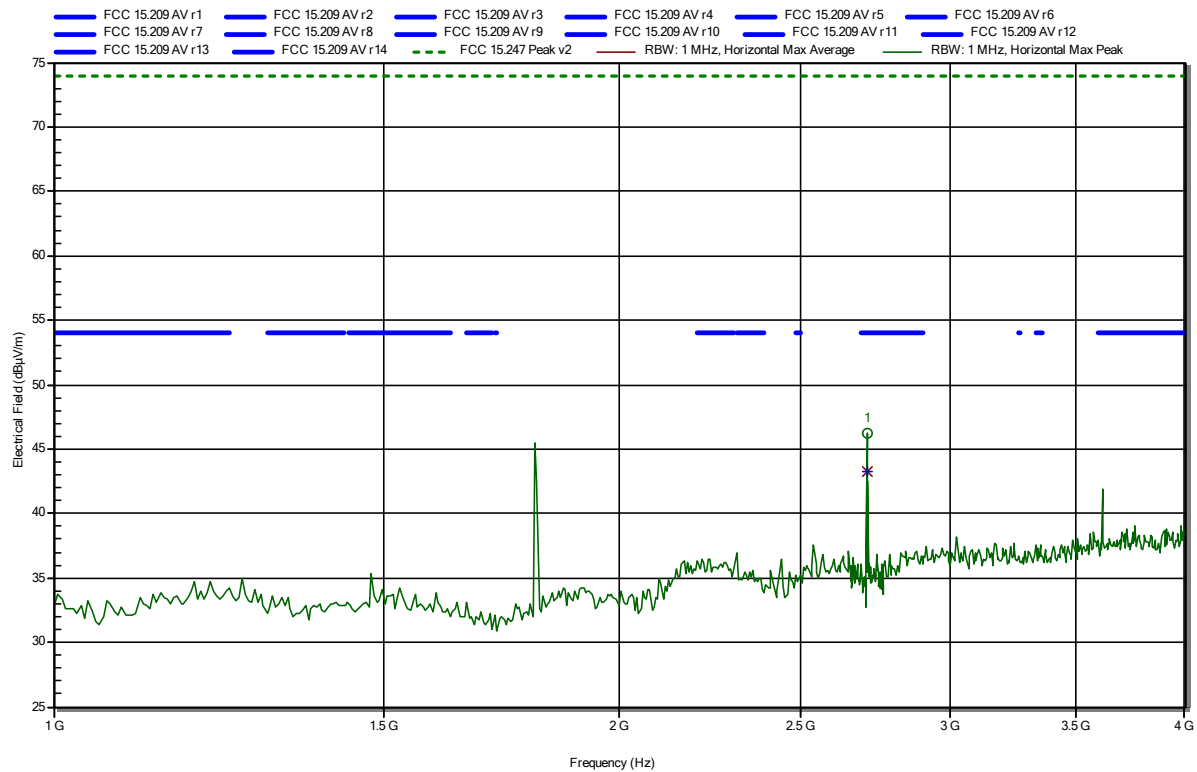


Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; GFSK; 903.050 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Height
2.709 GHz	46.19 dBµV/m	74 dBµV/m	-27.81 dB	Pass	1.2 m

Frequency	Average	Average Limit	Average Difference	Average Status	Height
2.709 GHz	43.3 dBµV/m	54 dBµV/m	-10.7 dB	Pass	1.2 m

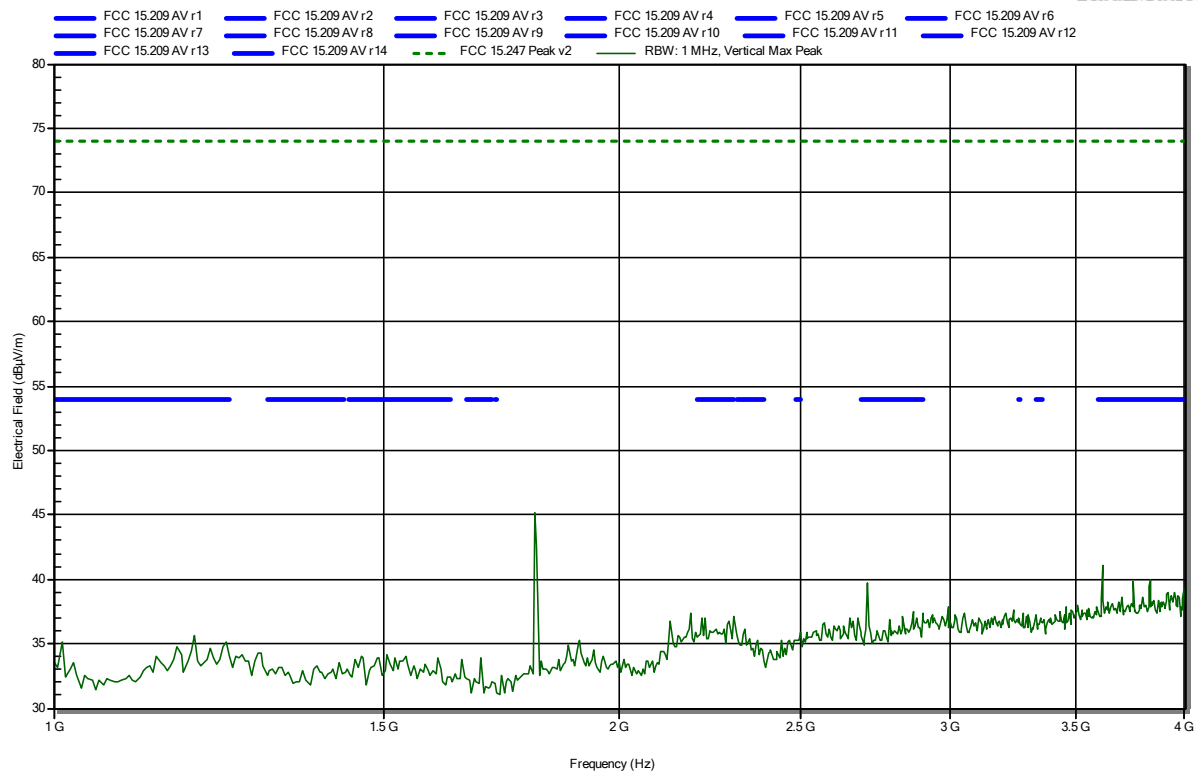
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; GFSK; 903.050 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



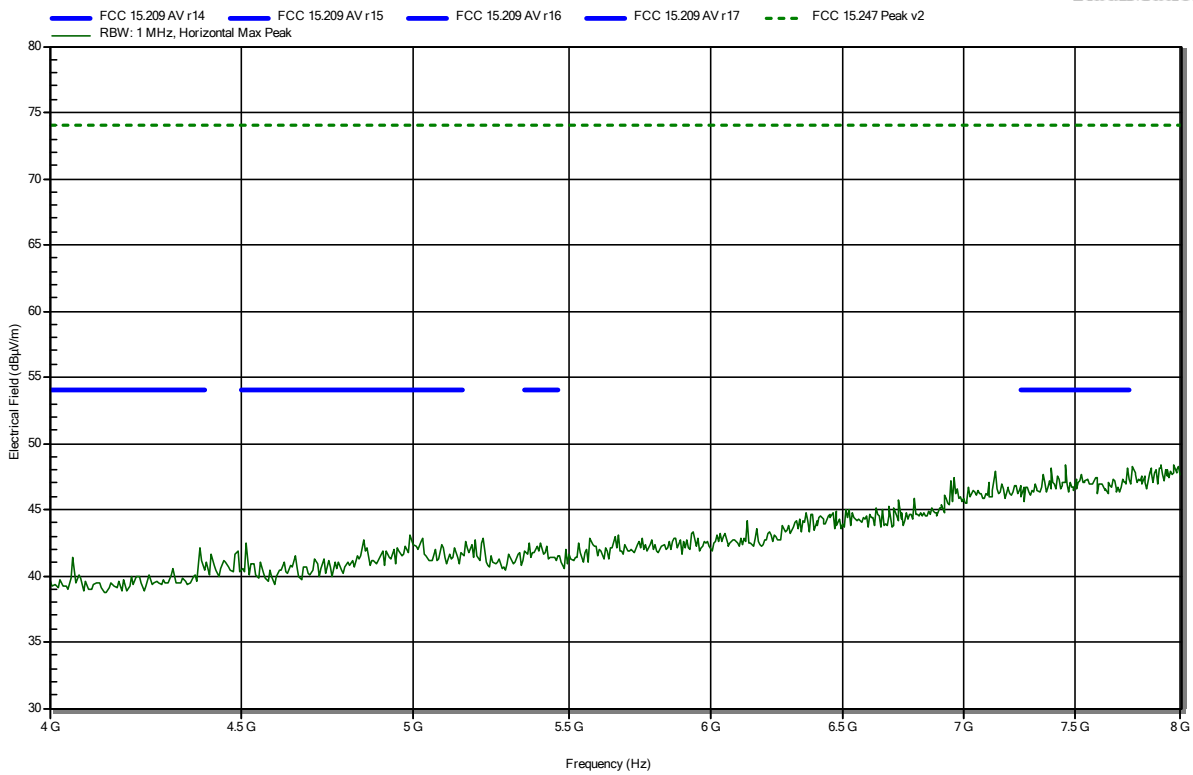
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; GFSK; 903.050 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



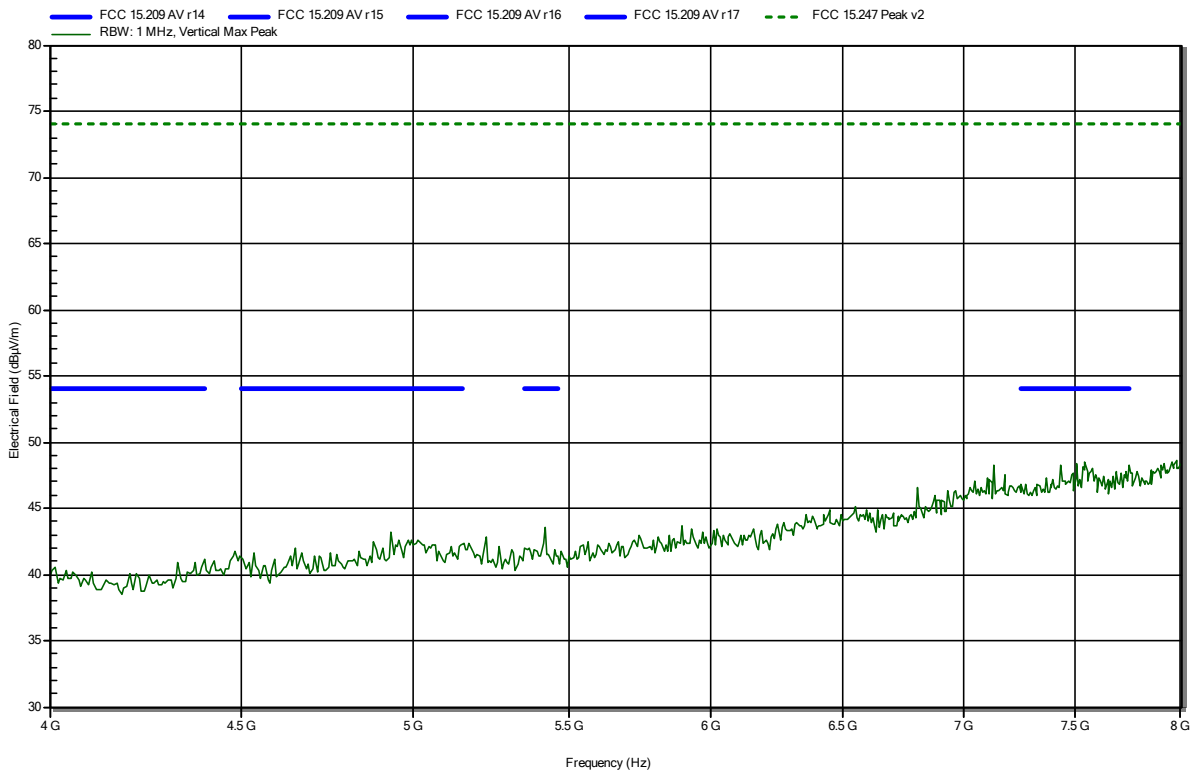
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; GFSK; 903.050 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



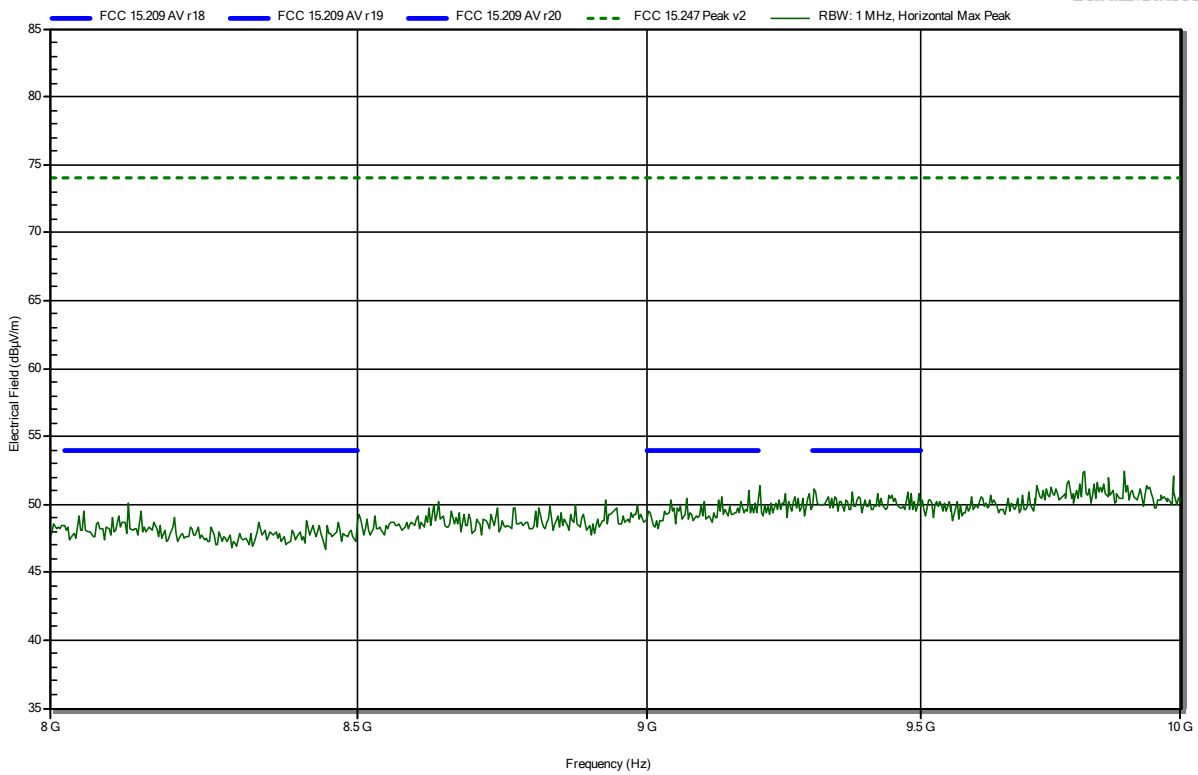
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; GFSK; 903.050 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



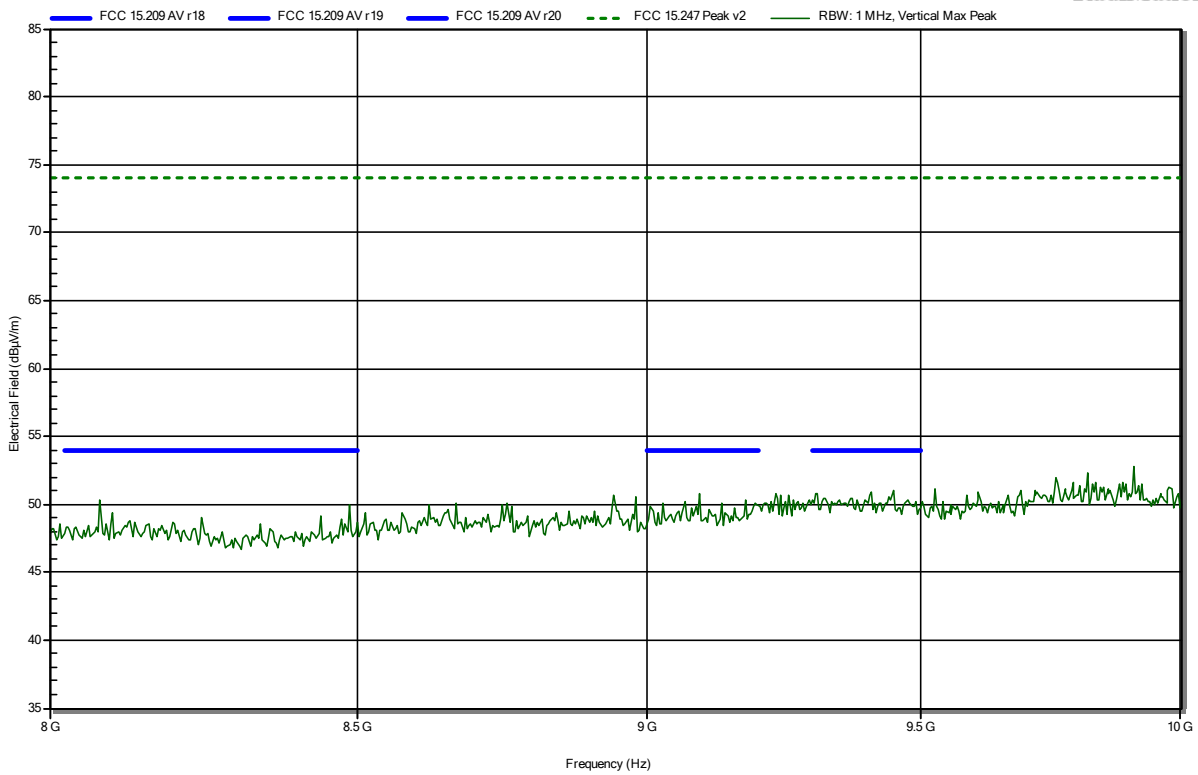
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; GFSK; 903.050 MHz
 Test Date: 2020-09-14
 Note:

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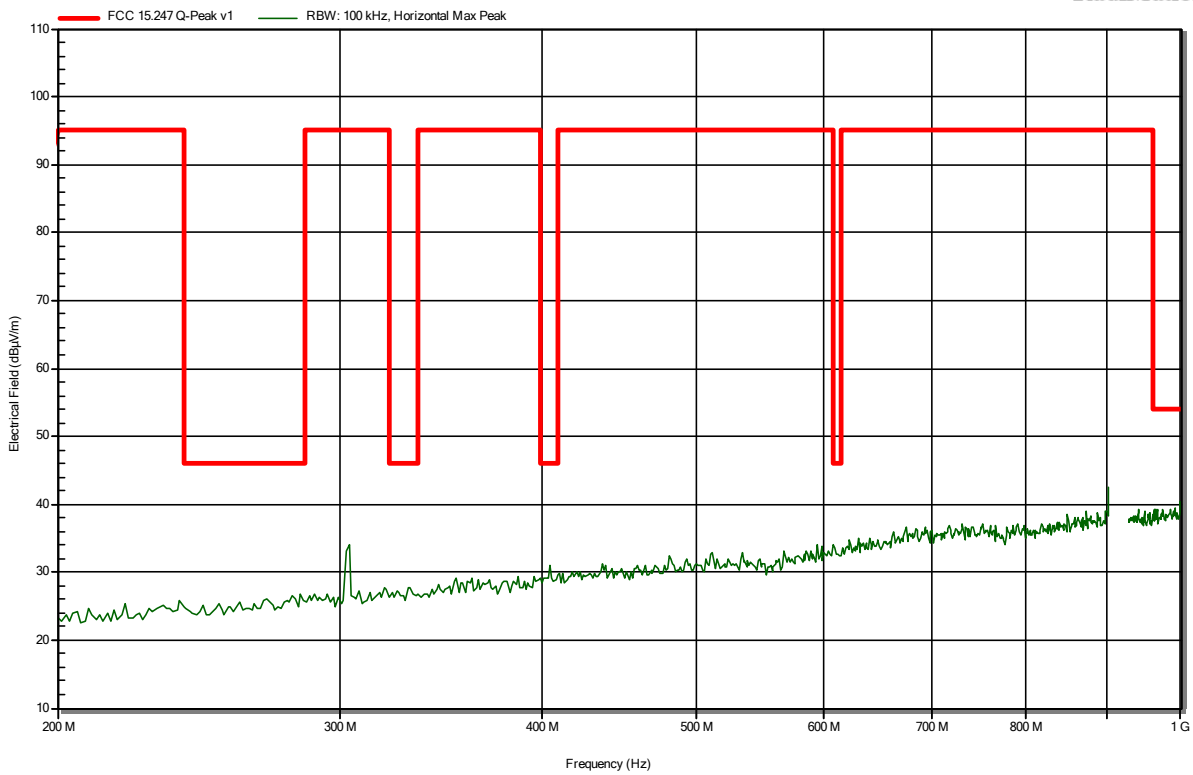
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: TX; GFSK; 914.975 MHz
 Test Date: 2020-09-14
 Note:

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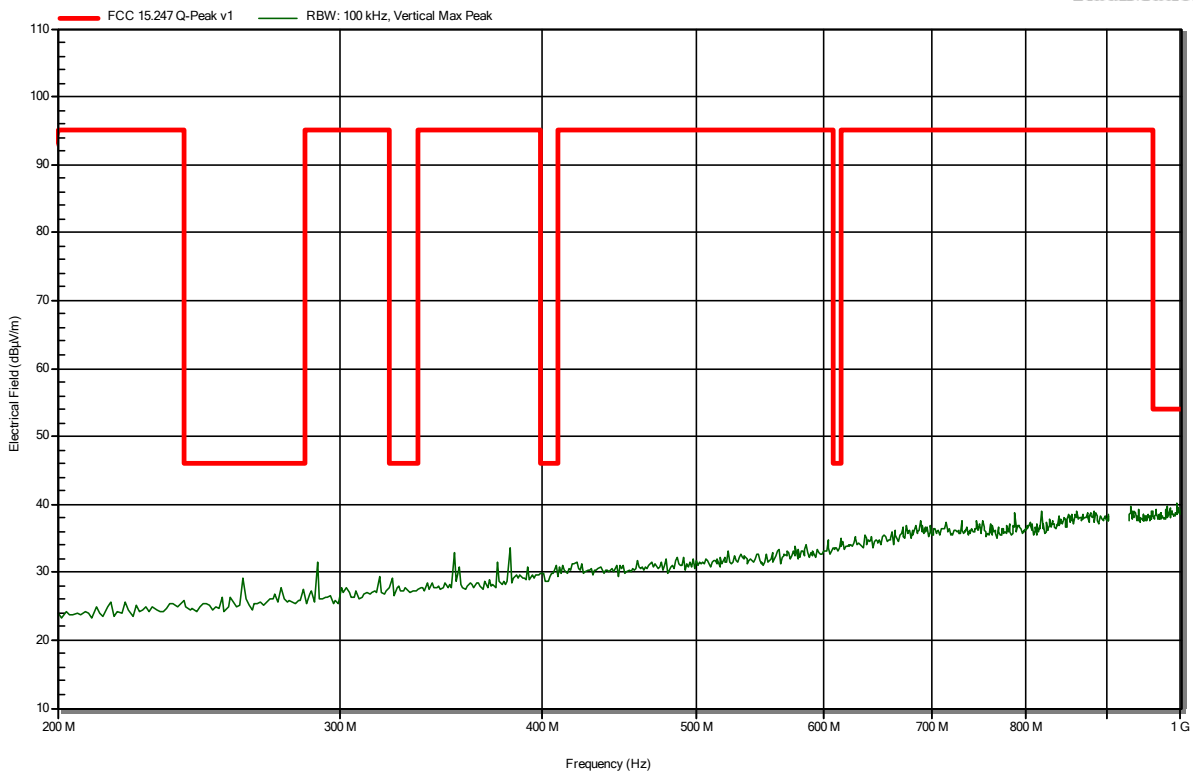
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: TX; GFSK; 914.975 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation

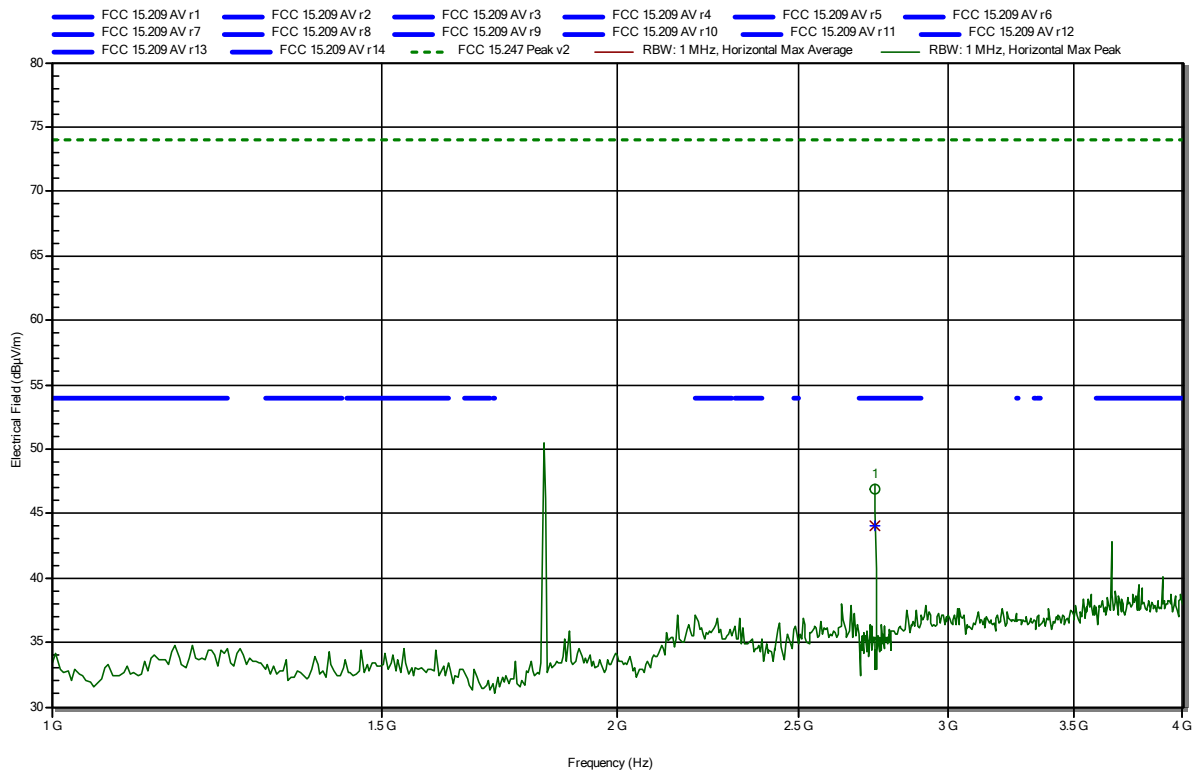


Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; GFSK; 914.975 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Height
2.745 GHz	46.84 dBµV/m	74 dBµV/m	-27.16 dB	Pass	1.2 m

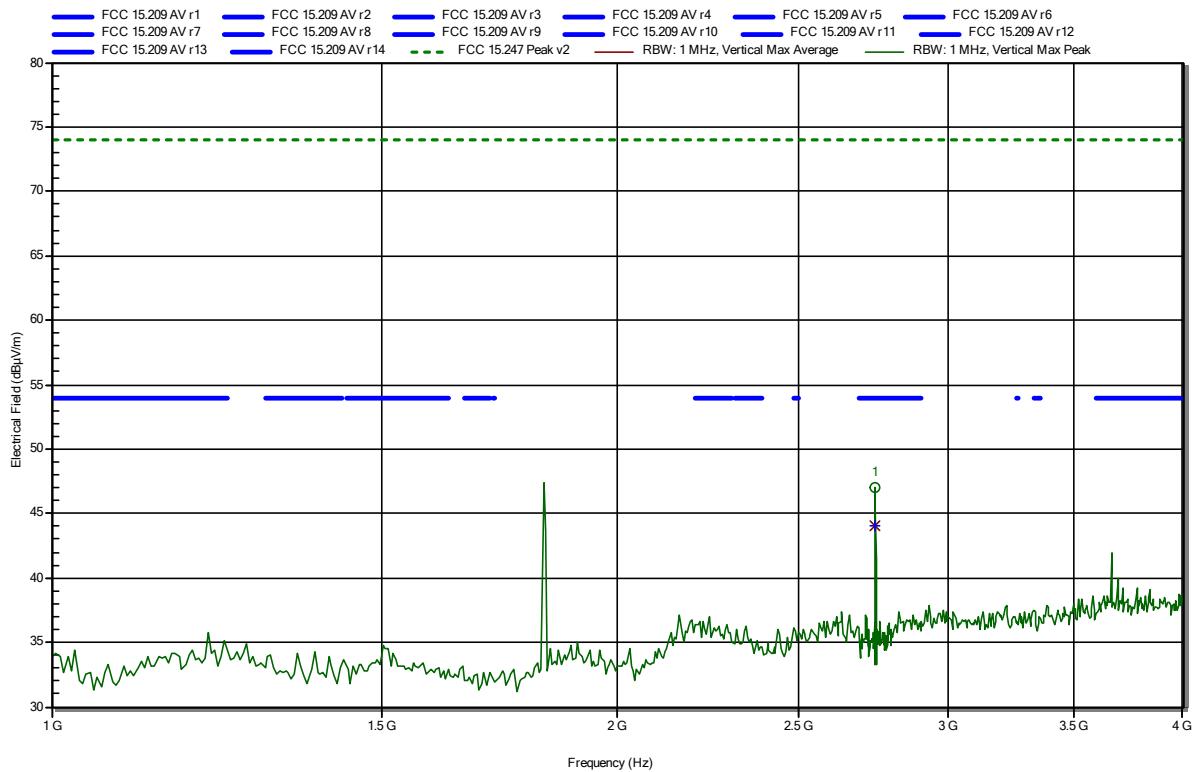
Frequency	Average	Average Limit	Average Difference	Average Status	Height
2.745 GHz	44.06 dBµV/m	54 dBµV/m	-9.94 dB	Pass	1.2 m

Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; GFSK; 914.975 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Height
2.745 GHz	46.96 dBµV/m	74 dBµV/m	-27.04 dB	Pass	1.2 m

Frequency	Average	Average Limit	Average Difference	Average Status	Height
2.745 GHz	44.11 dBµV/m	54 dBµV/m	-9.89 dB	Pass	1.2 m

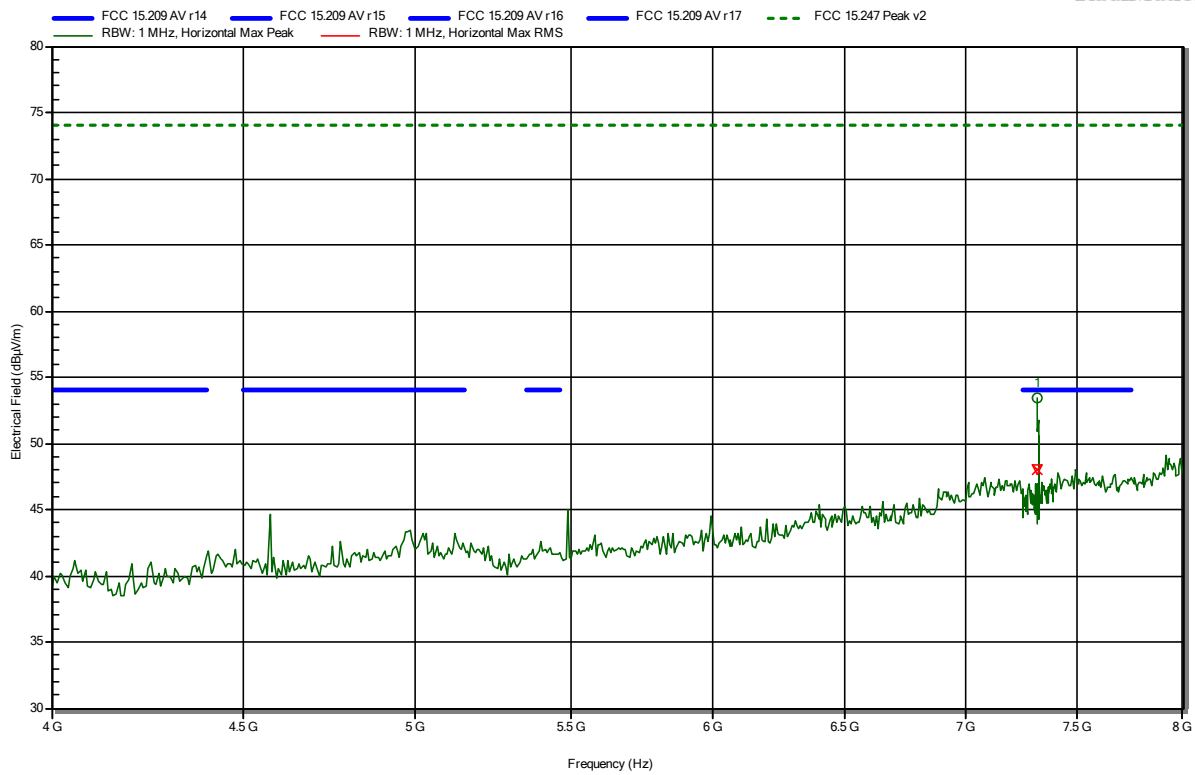
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; GFSK; 914.975 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.32 GHz	53.47 dBµV/m	74 dBµV/m	-20.53 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
7.32 GHz	47.96 dBµV/m	54 dBµV/m	-6.04 dB	Pass

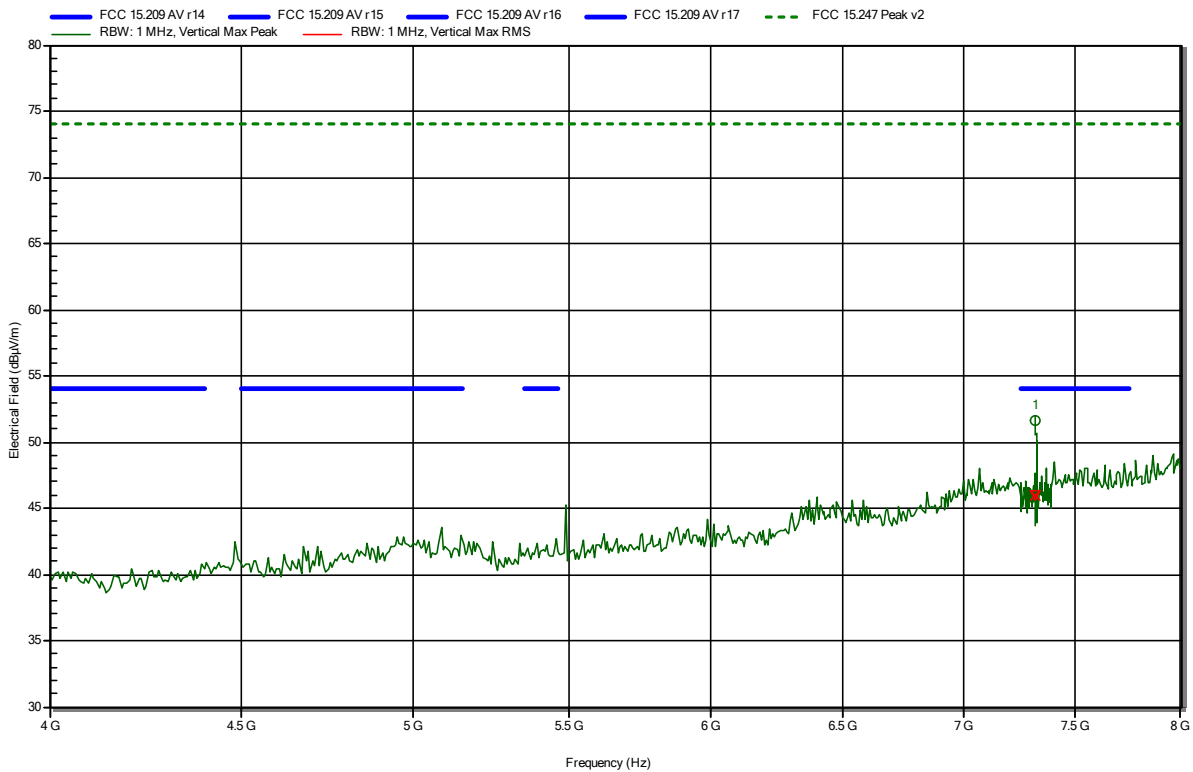
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; GFSK; 914.975 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Height
7.32 GHz	51.65 dBµV/m	74 dBµV/m	-22.35 dB	Pass	1.2 m
Frequency	Average	Average Limit	Average Difference	Average Status	Height
7.32 GHz	46 dBµV/m	54 dBµV/m	-8 dB	Pass	1.2 m

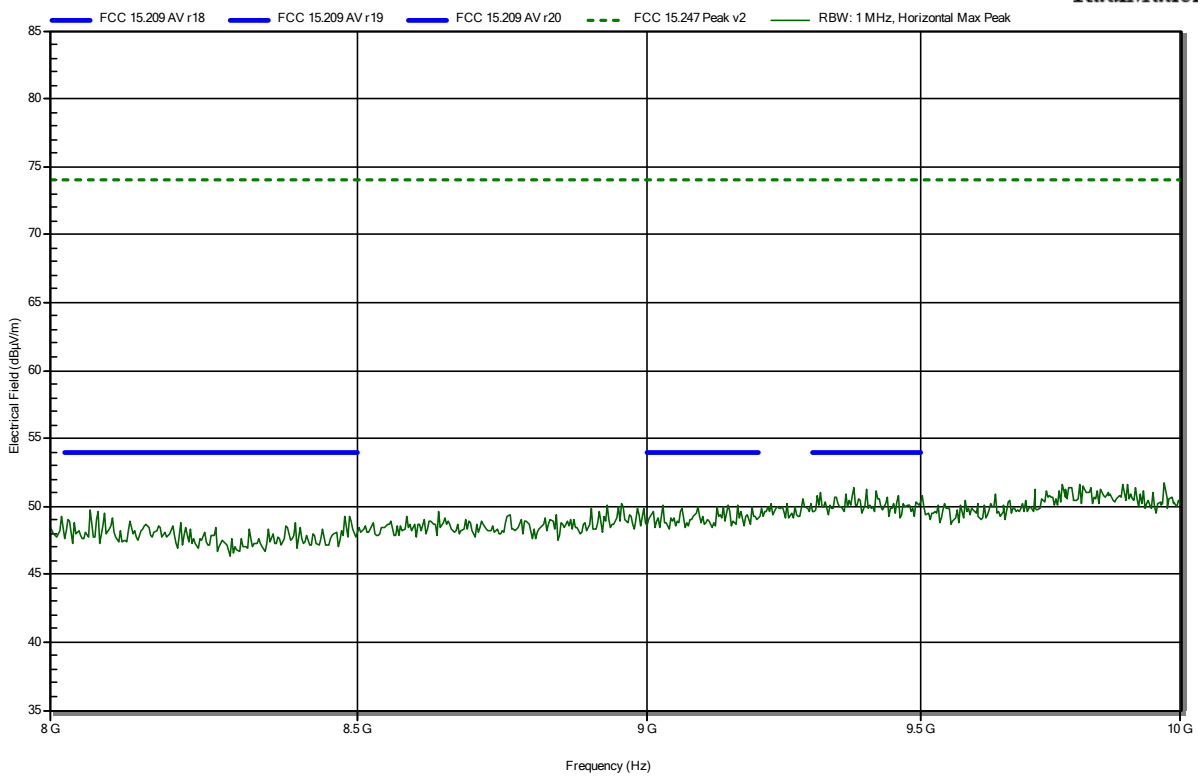
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; GFSK; 914.975 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



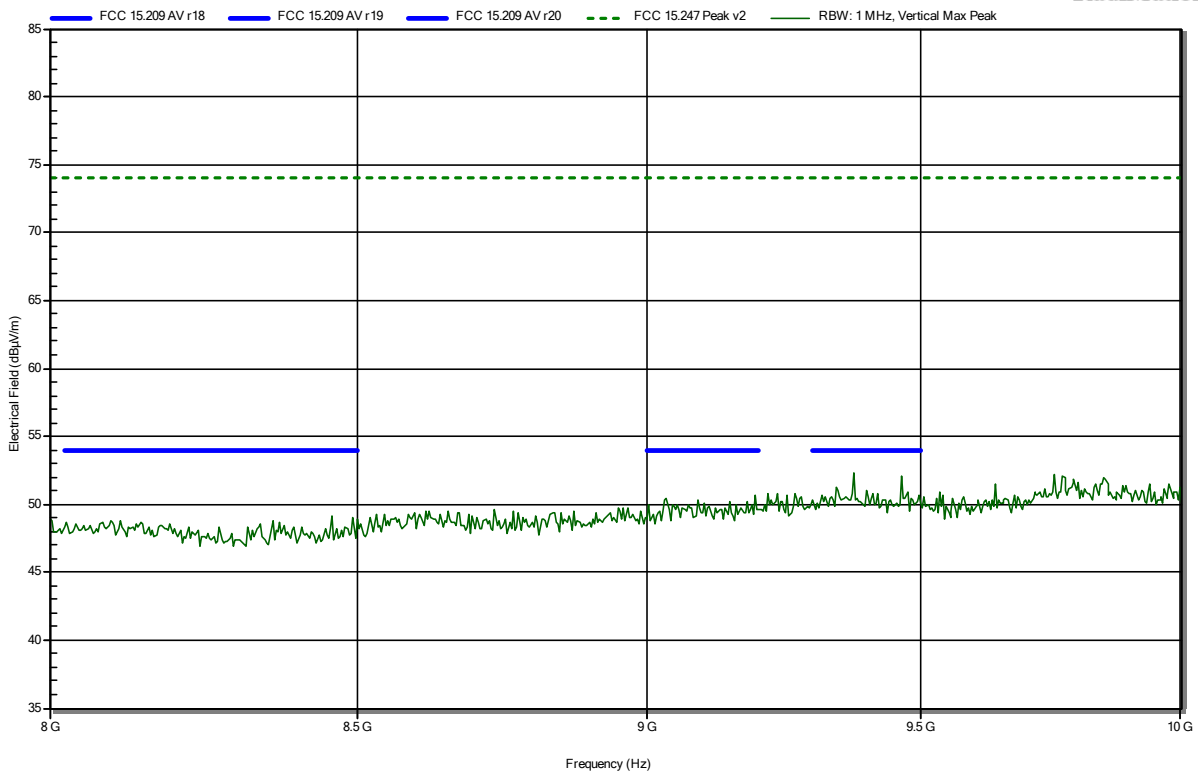
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; GFSK; 914.975 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



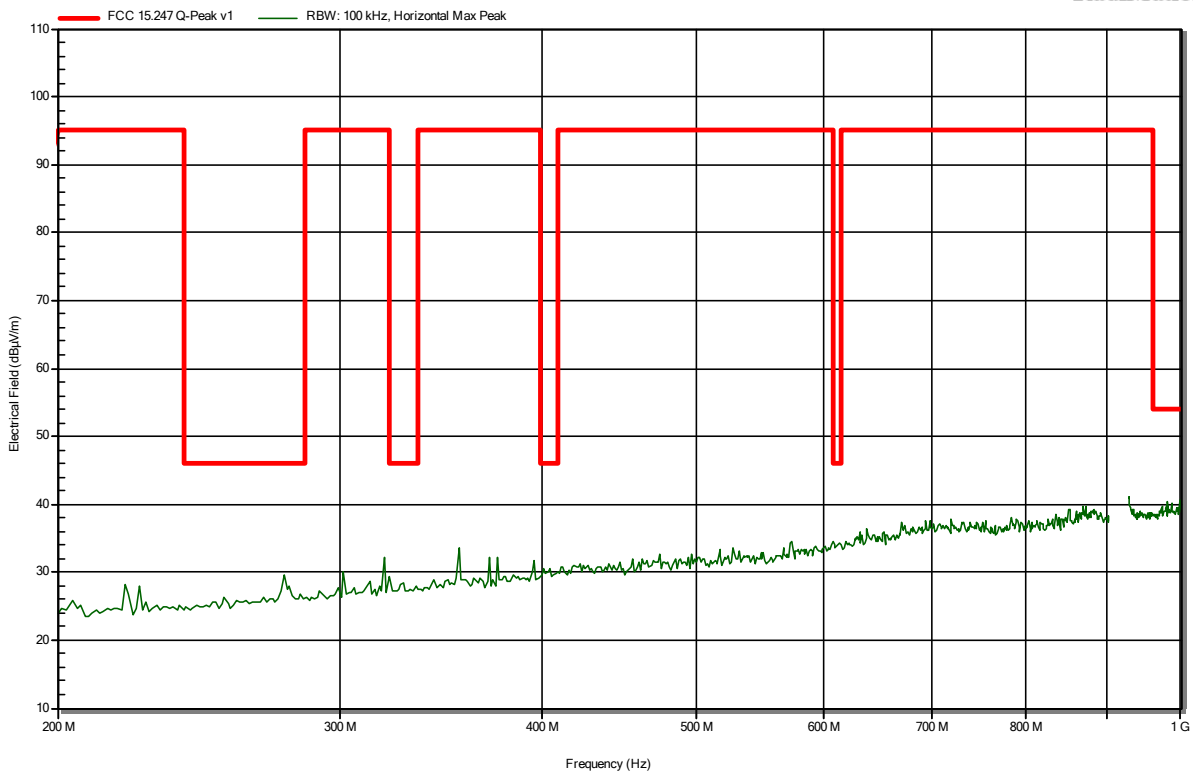
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: TX; GFSK; 926.975 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



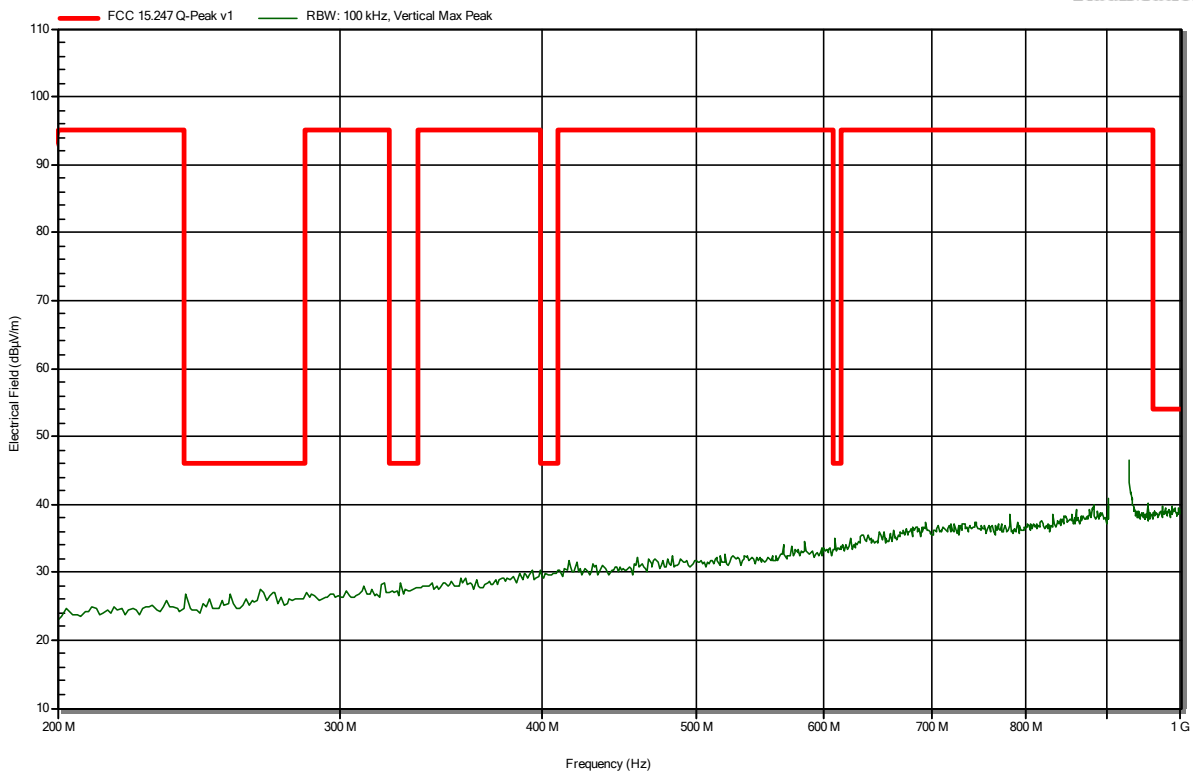
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: TX; GFSK; 926.975 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation

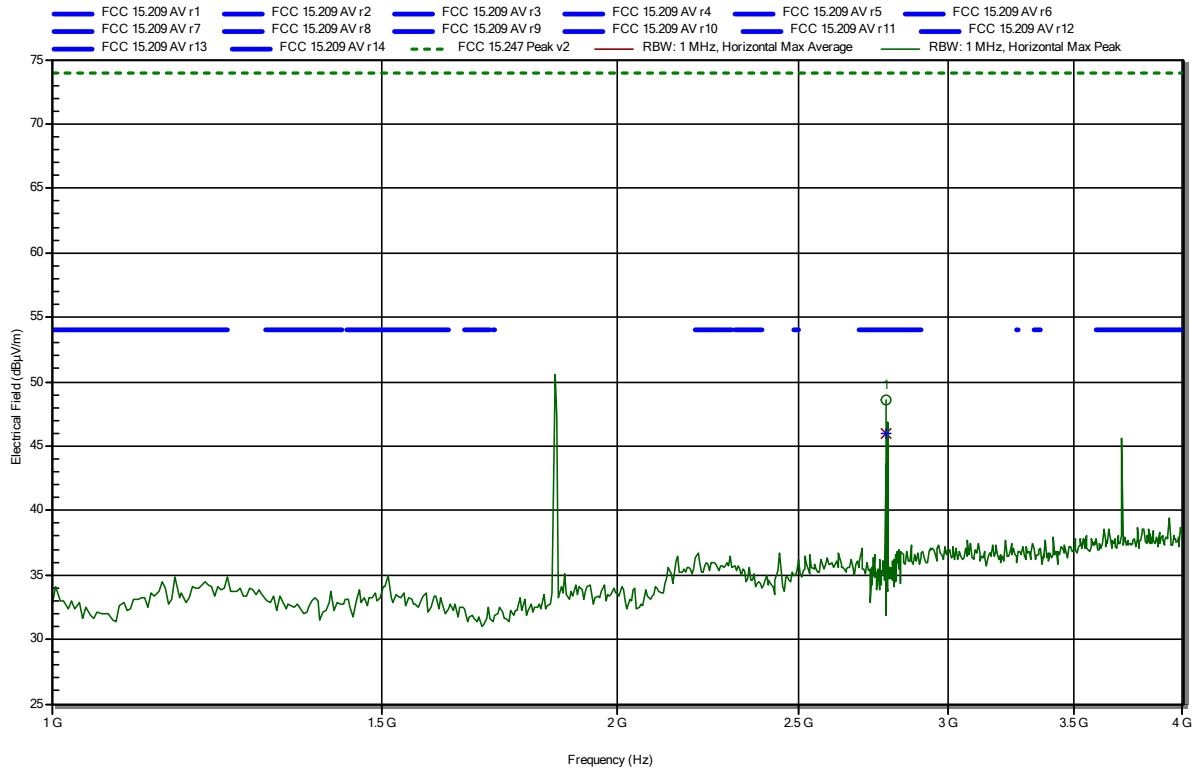


Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; GFSK; 926.975 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Height
2.781 GHz	48.54 dBµV/m	74 dBµV/m	-25.46 dB	Pass	1.2 m

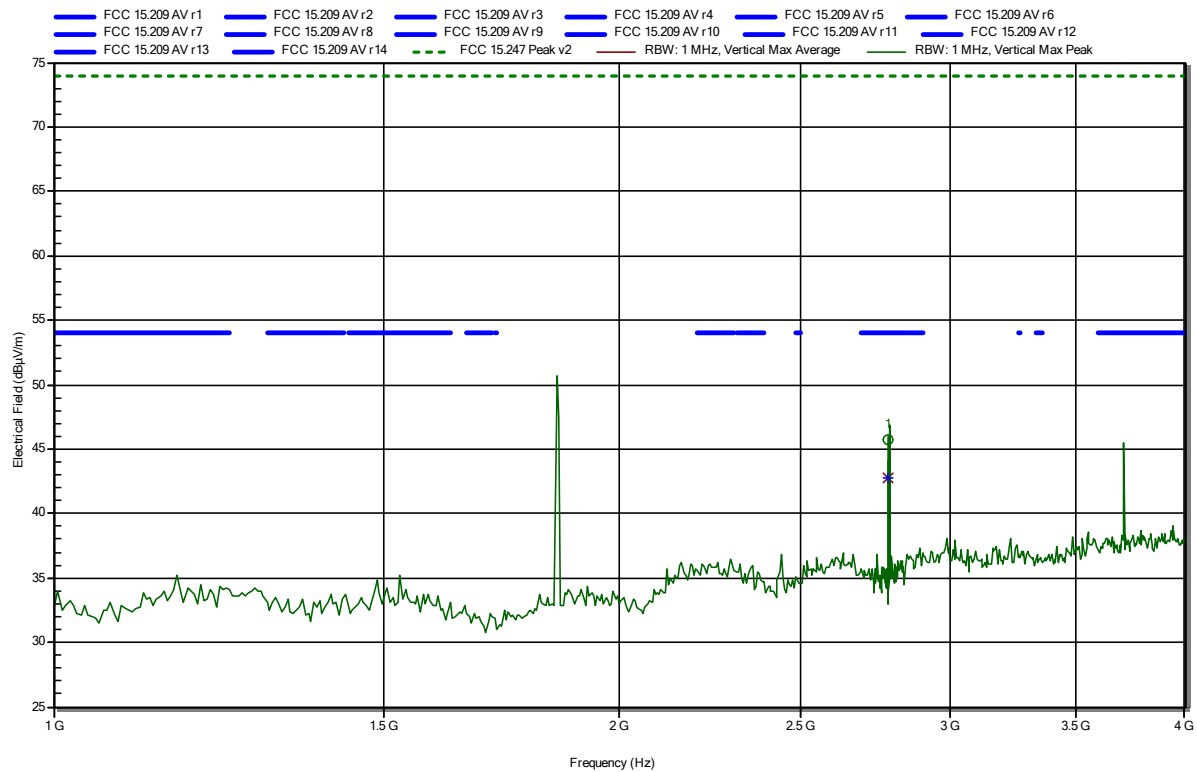
Frequency	Average	Average Limit	Average Difference	Average Status	Height
2.781 GHz	45.95 dBµV/m	54 dBµV/m	-8.05 dB	Pass	1.2 m

Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955
 Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; GFSK; 926.975 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Height
2.781 GHz	45.73 dBµV/m	74 dBµV/m	-28.27 dB	Pass	1.2 m

Frequency	Average	Average Limit	Average Difference	Average Status	Height
2.781 GHz	42.77 dBµV/m	54 dBµV/m	-11.23 dB	Pass	1.2 m

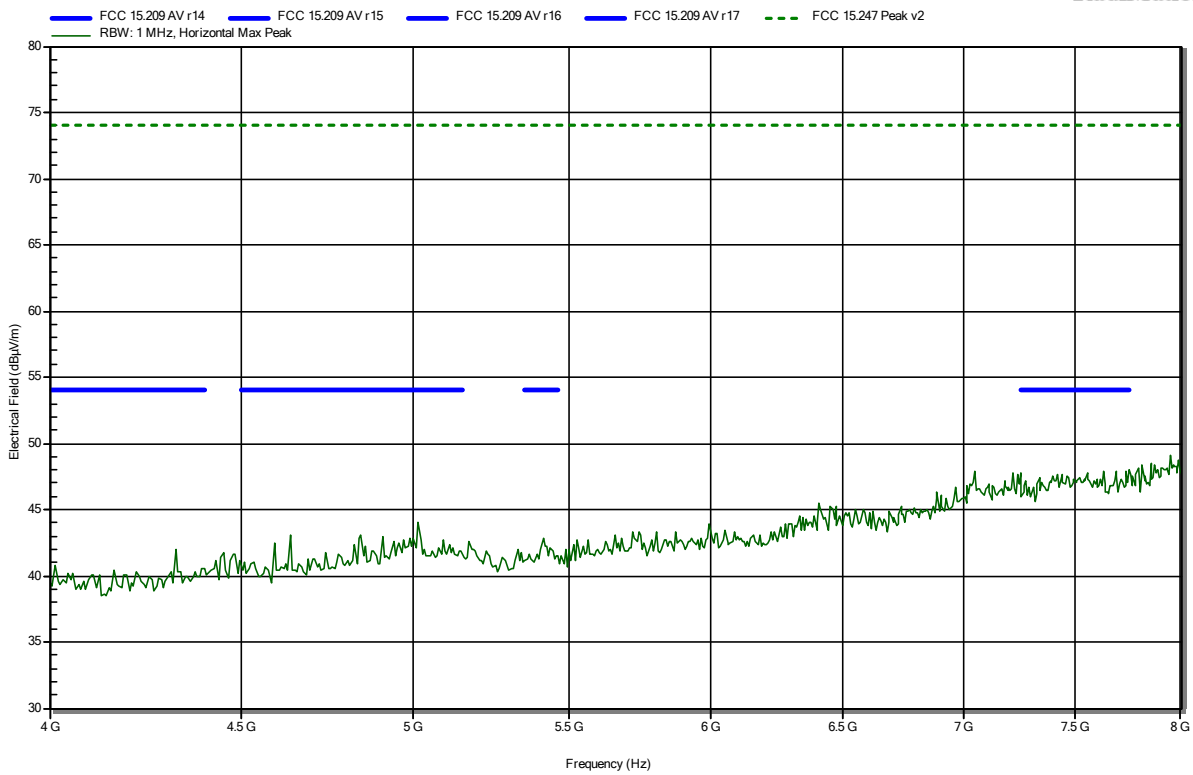
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; GFSK; 926.975 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



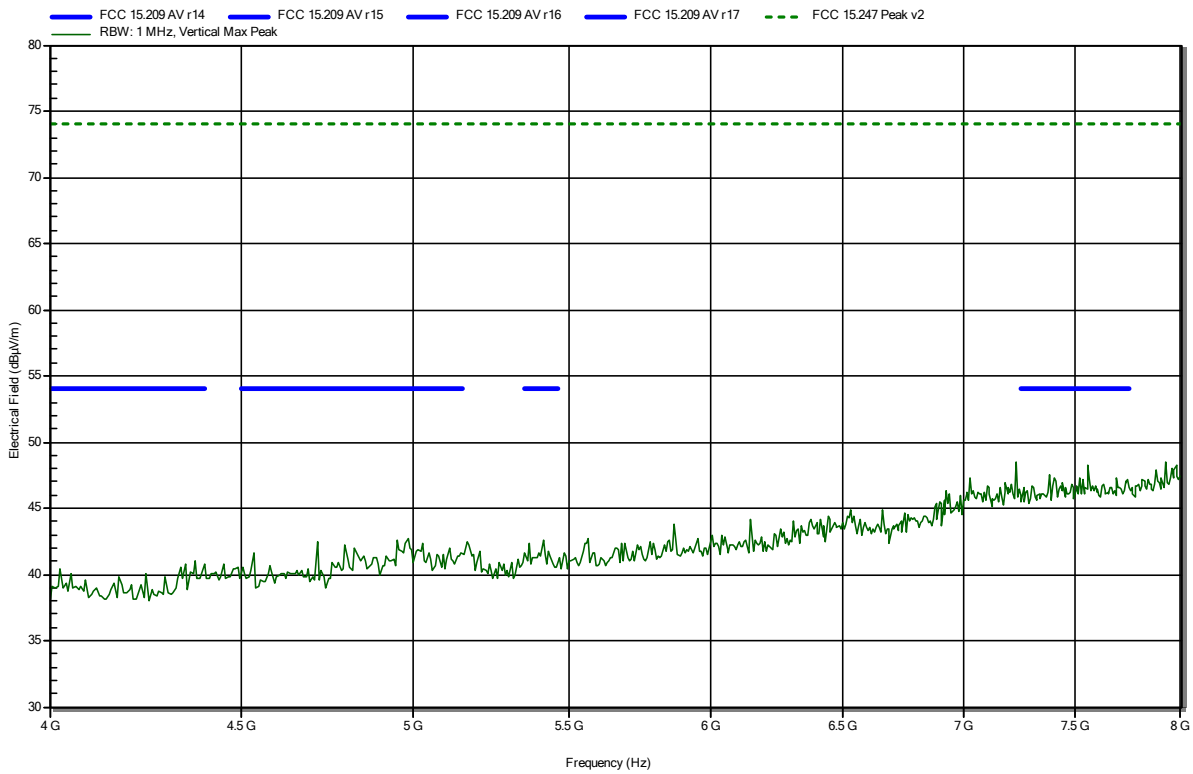
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; GFSK; 926.975 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



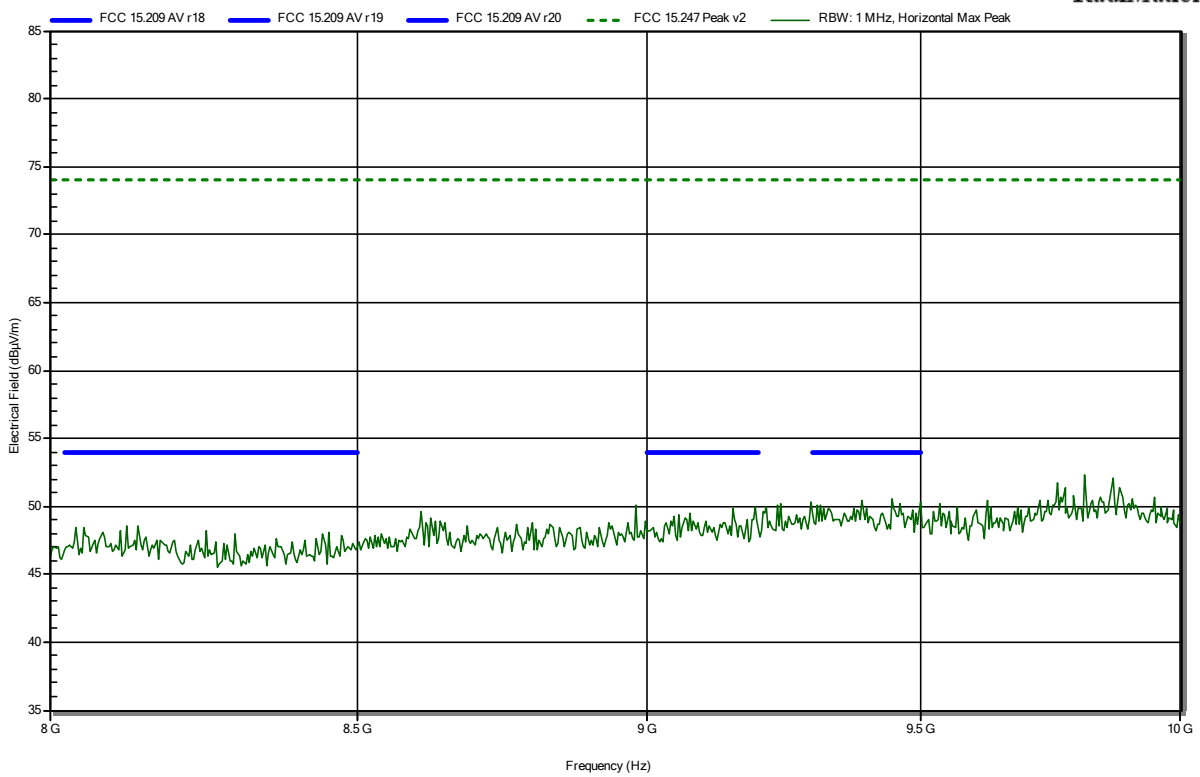
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; GFSK; 926.975 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



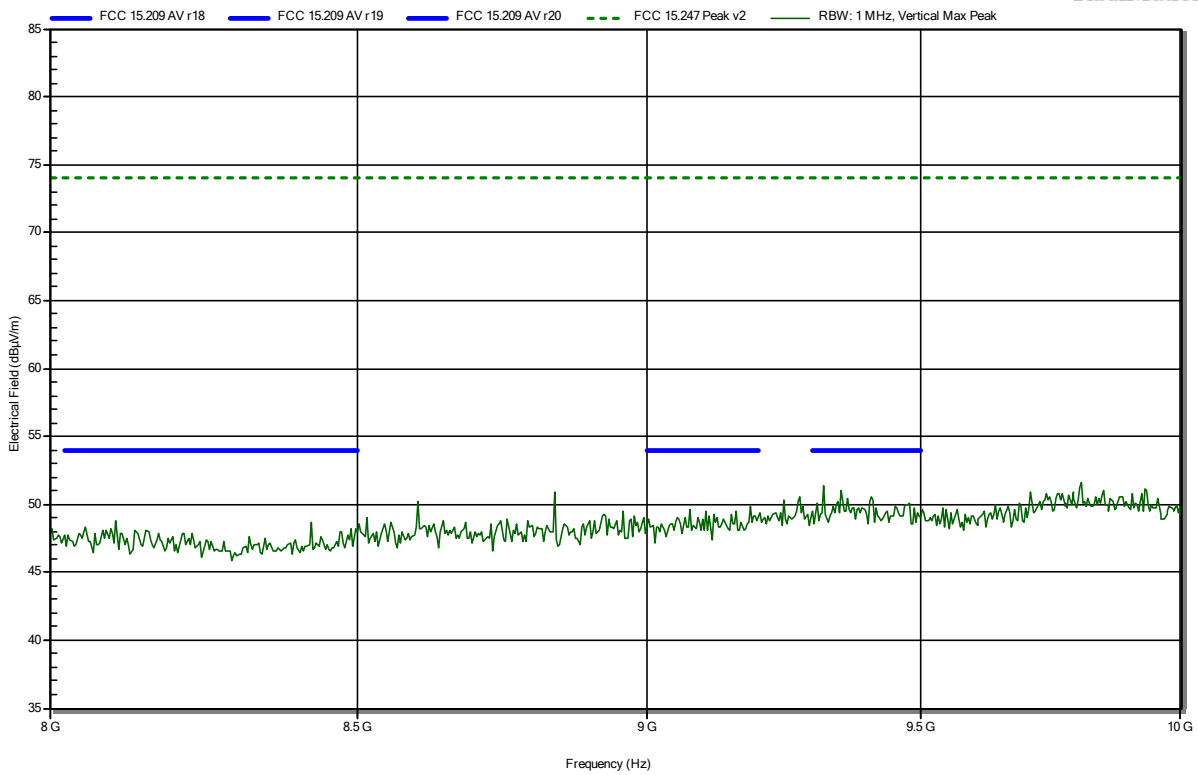
Spurious emissions according to FCC 47 CFR 15.247

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 21 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; GFSK; 926.975 MHz
 Test Date: 2020-09-14
 Note:

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RadiMation



ANNEX B Receiver spurious emissions

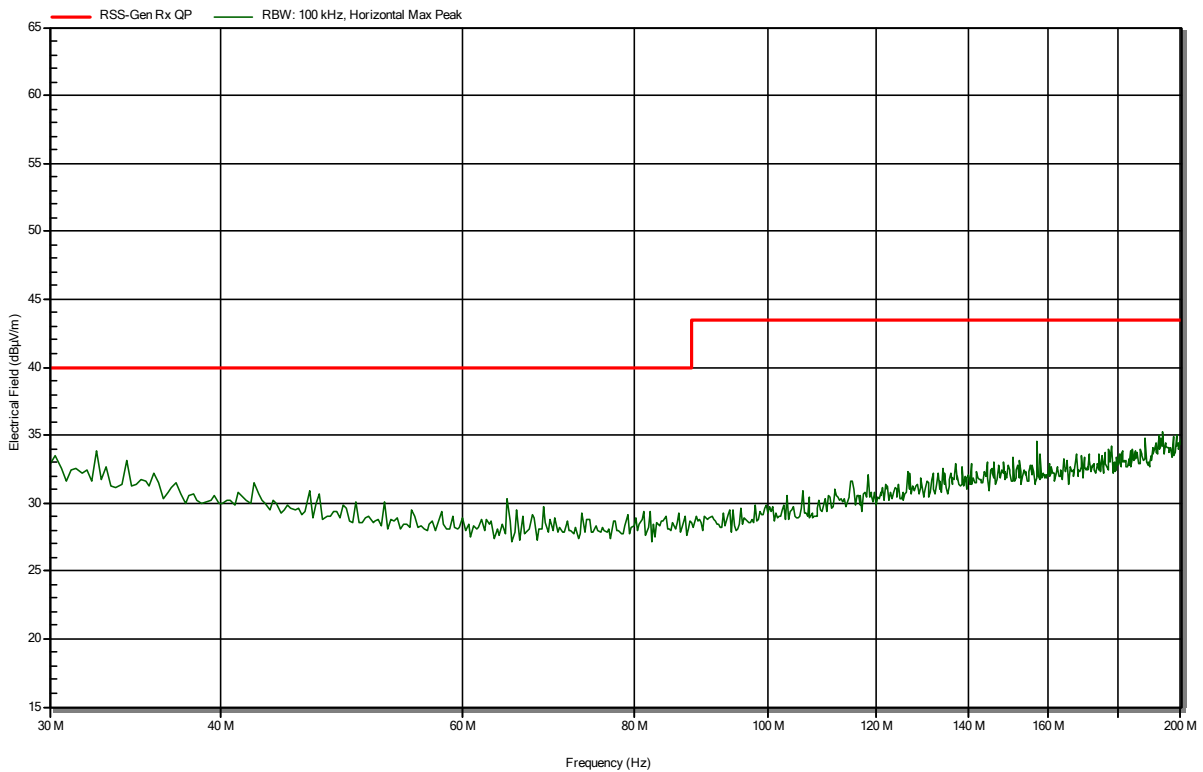
Spurious emissions according to ISED RSS-247 Issue 2 (February 2017)

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.6 V DC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: RX; 914.975 MHz
 Test Date: 2020-09-14
 Note: EUT horizontal

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RadiMation



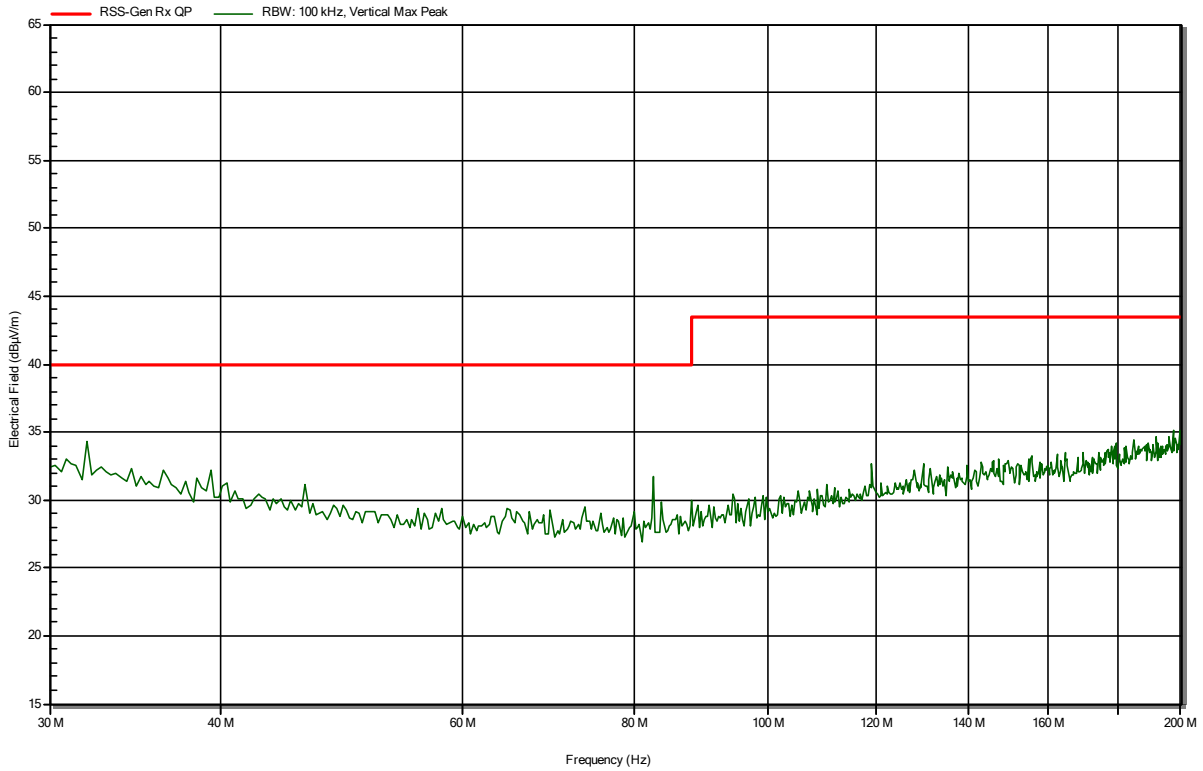
Spurious emissions according to ISED RSS-247 Issue 2 (February 2017)

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.6 V DC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: RX; 914.975 MHz
 Test Date: 2020-09-14
 Note: EUT horizontal

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RadiMation

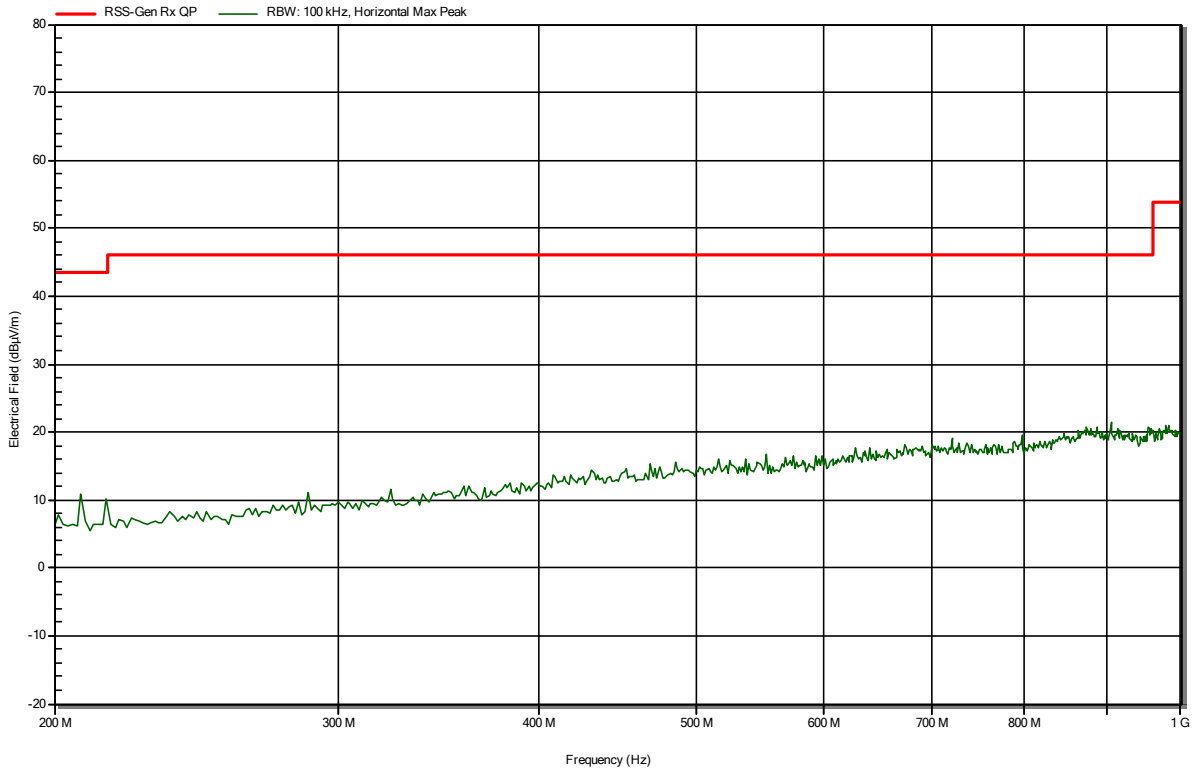


Spurious emissions according to ISED RSS-247 Issue 2 (February 2017)

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.6 V DC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: RX; 914.975 MHz
 Test Date: 2020-09-14
 Note: EUT horizontal

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RadiMation



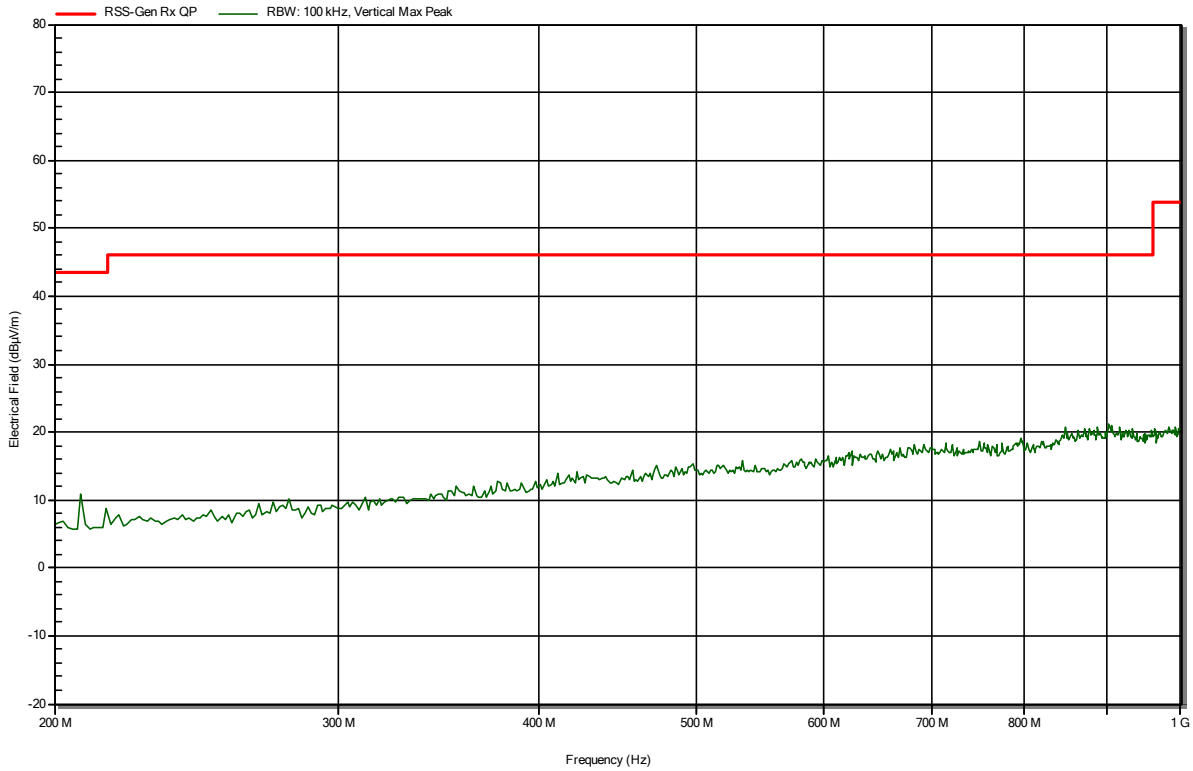
Spurious emissions according to ISED RSS-247 Issue 2 (February 2017)

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.6 V DC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: RX; 914.975 MHz
 Test Date: 2020-09-14
 Note: EUT horizontal

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RadiMation



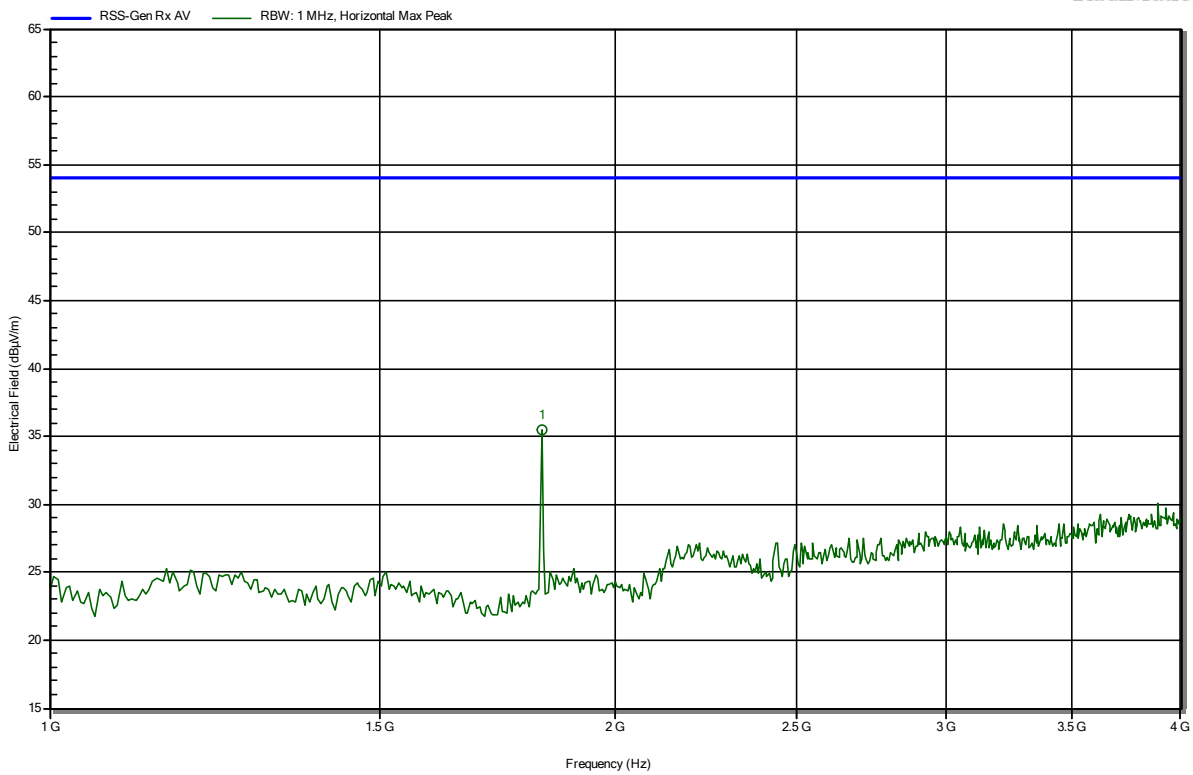
Spurious emissions according to ISED RSS-247 Issue 2 (February 2017)

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: RX; 914.975 MHz
 Test Date: 2020-09-15
 Note: EUT horizontal

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.827 GHz	35.46 dBµV/m	53.98 dBµV/m	-18.52 dB	Pass

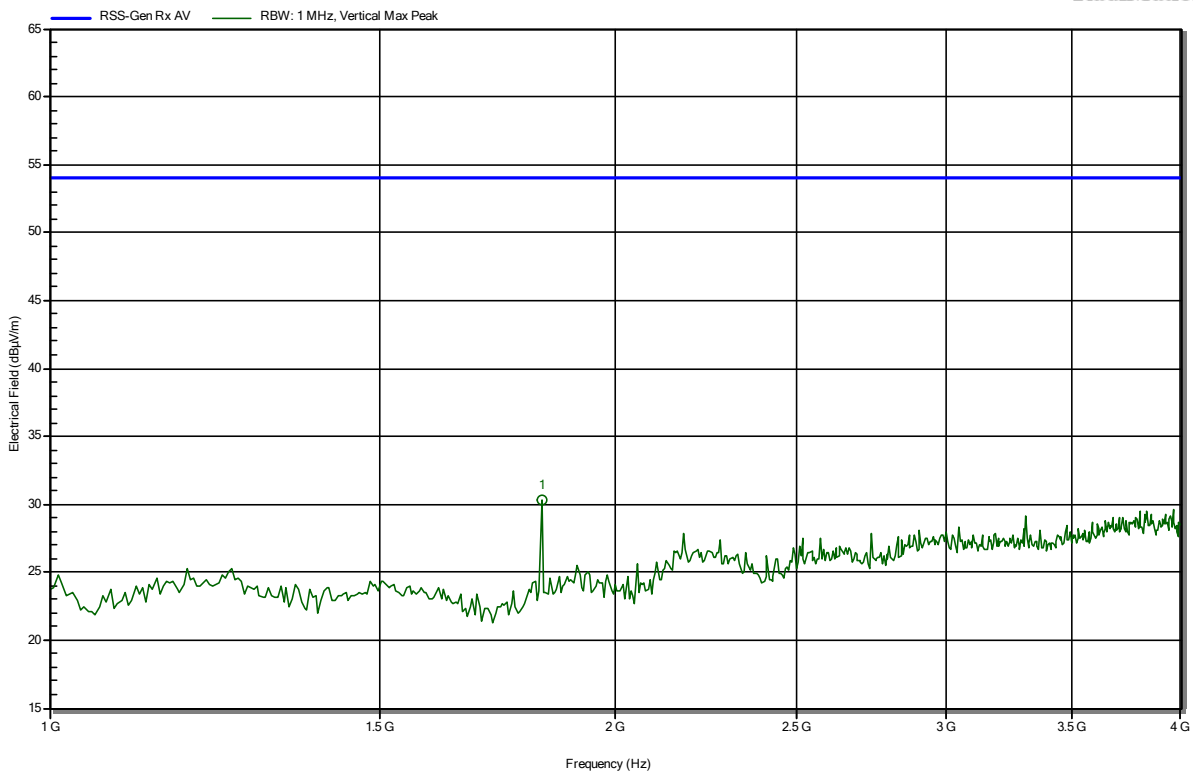
Spurious emissions according to ISED RSS-247 Issue 2 (February 2017)

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: RX; 914.975 MHz
 Test Date: 2020-09-15
 Note: EUT horizontal

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.827 GHz	30.3 dBµV/m	53.98 dBµV/m	-23.68 dB	Pass

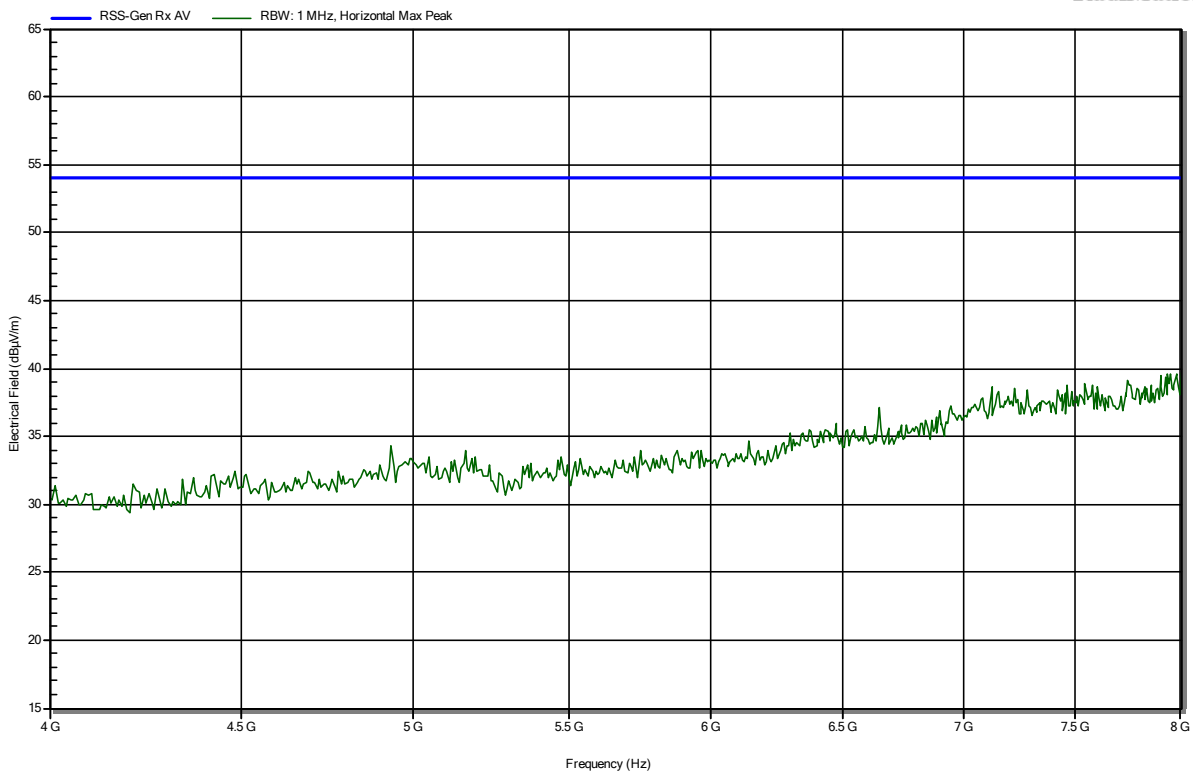
Spurious emissions according to ISED RSS-247 Issue 2 (February 2017)

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: RX; 914.975 MHz
 Test Date: 2020-09-15
 Note: EUT horizontal

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RadiMation



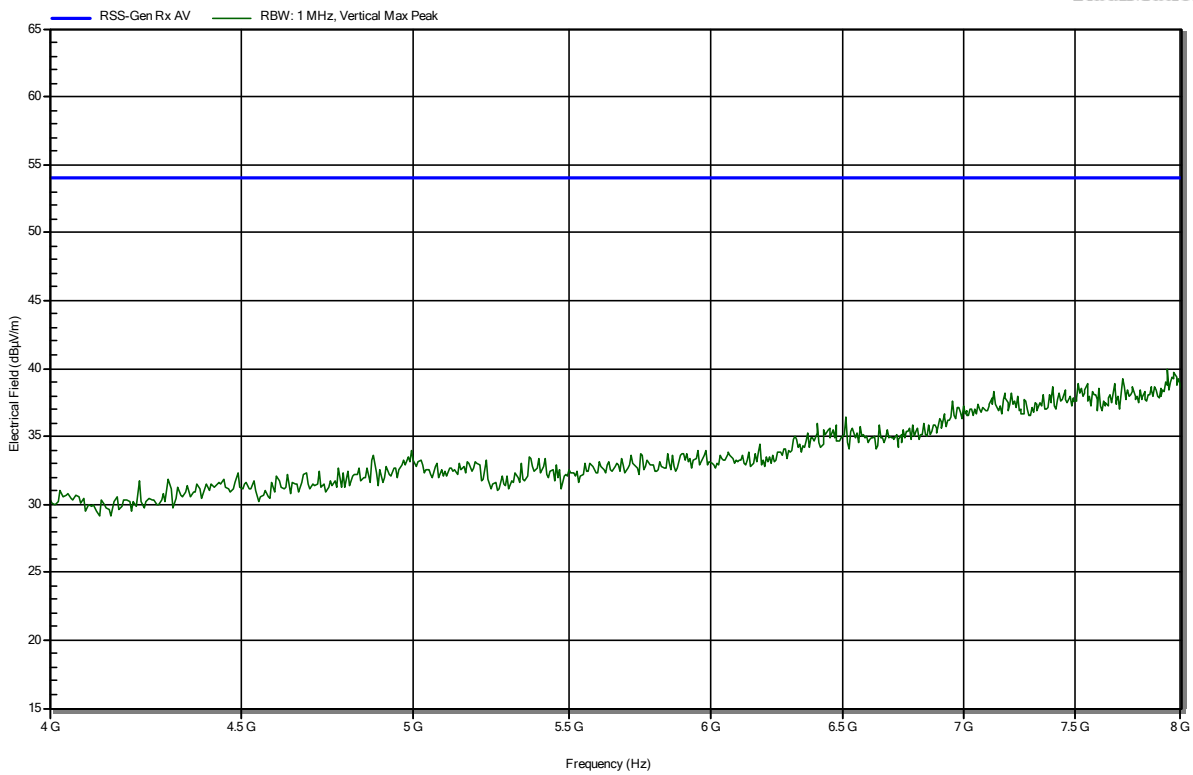
Spurious emissions according to ISED RSS-247 Issue 2 (February 2017)

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: RX; 914.975 MHz
 Test Date: 2020-09-15
 Note: EUT horizontal

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RadiMation



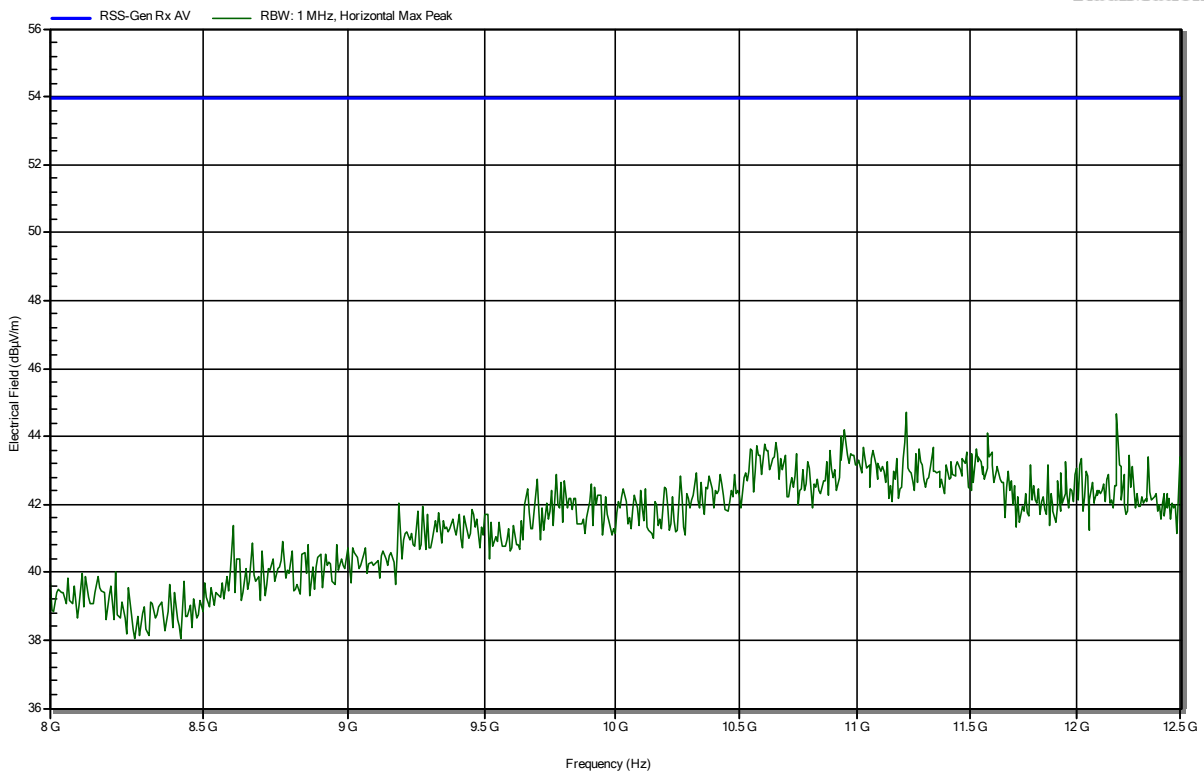
Spurious emissions according to ISED RSS-247 Issue 2 (February 2017)

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: RX; 914.975 MHz
 Test Date: 2020-09-15
 Note: EUT horizontal

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RadiMation



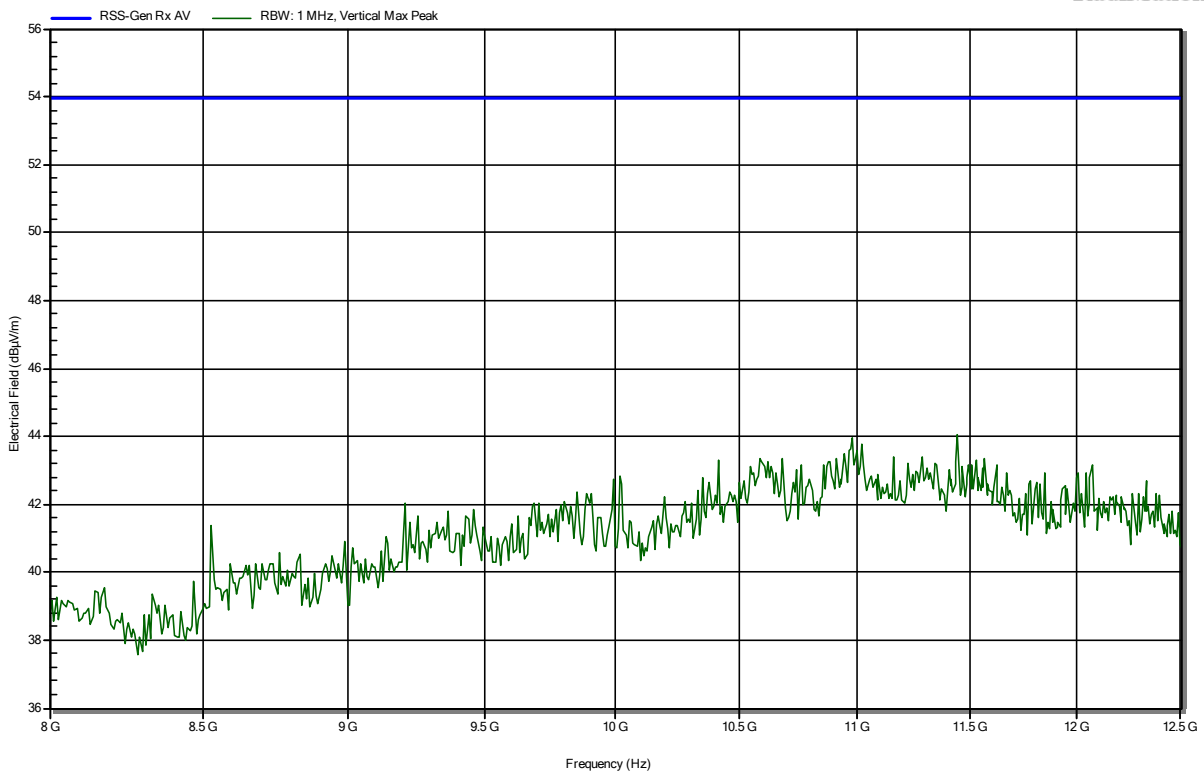
Spurious emissions according to ISED RSS-247 Issue 2 (February 2017)

Project number: G0M-2004-8955

Applicant: HBC-radiomatic GmbH
 EUT Name: Radio module for industrial application
 Model: TC792.1
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.6 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: RX; 914.975 MHz
 Test Date: 2020-09-15
 Note: EUT horizontal

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RadiMation



=== END OF TEST REPORT ===

Test Report No.: G0M-2004-8955-TFC247FH-V01

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