

RADIO REPORT FCC 47 CFR Part 15C ISED Canada RSS-247 Digital transmission systems operating within the 902.0 MHz - 928.0 MHz band	
Report Reference No	G0M-2302-1909-TFC247DT-V02
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	    DAkkS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	senTec Elektronik GmbH
Address	Robert-Bosch-Ring 2 98693 Ilmenau GERMANY
Test Specification	47 CFR Part 15C RSS-247, Issue 3, 2023-08 RSS-Gen, Issue 5, Amendment 2, 2021-02
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	Radio Modul 868MHz
Model(s)	Modul 868MHz IX
Additional Model(s)	None
Brand Name(s)	None
Hardware Version(s)	Release 1.x
Software Version(s)	Version 9.x
FCC ID	2BB4J-WM09A
IC	31013-WM09A
Test Result	PASSED

Possible test case verdicts:		
Required by standard but not tested	N/T	
Not required by standard	N/R	
Not applicable to EUT	N/A	
Test object does meet the requirement	P(PASS)	
Test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 °C - 30 °C	
Test Lab Humidity	25 % - 55 %	
Date of receipt of test item	2023-08-31	
Report:		
Compiled by	Ehsan Sohrabi	
Tested by (+ signature) (Responsible for Test)	Ehsan Sohrabi	
Approved by (+ signature) (Test Lab Engineer)	Wilfried Treffke	
Date of Issue	2024-02-26	
Total number of pages	71	
General Remarks:		
The test results presented in this report relate only to the object tested. The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.		
Additional Comments:		
None		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2023-11-14	Initial Release	--
02	2023-02-26	Replaced document: G0M-2302-1909-TFC247DT-V01 Replaced by: G0M-2302-1909-TFC247DT-V02 Reason: Update of Section "3.3 Maximum peak conducted output power"	St. Liebich

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

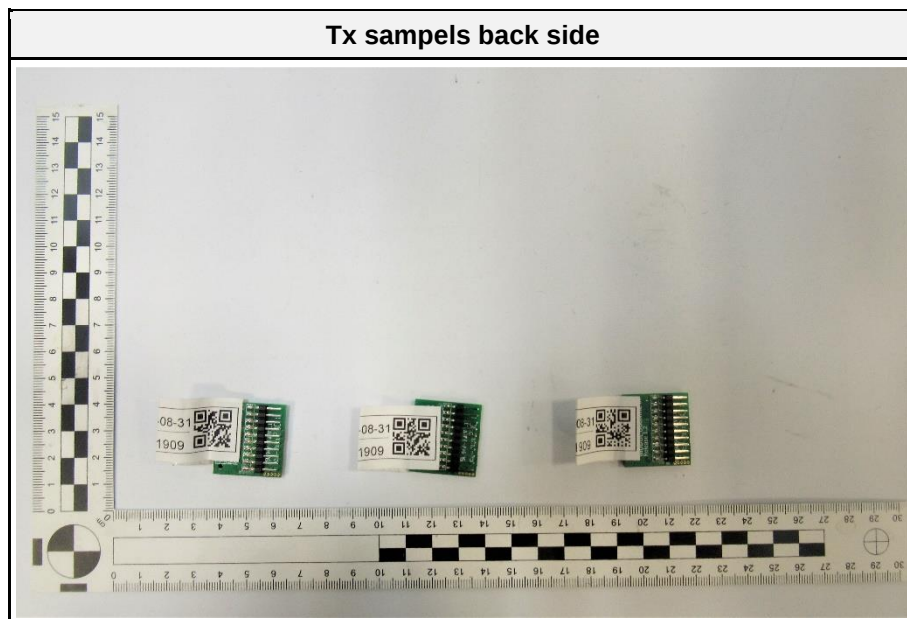
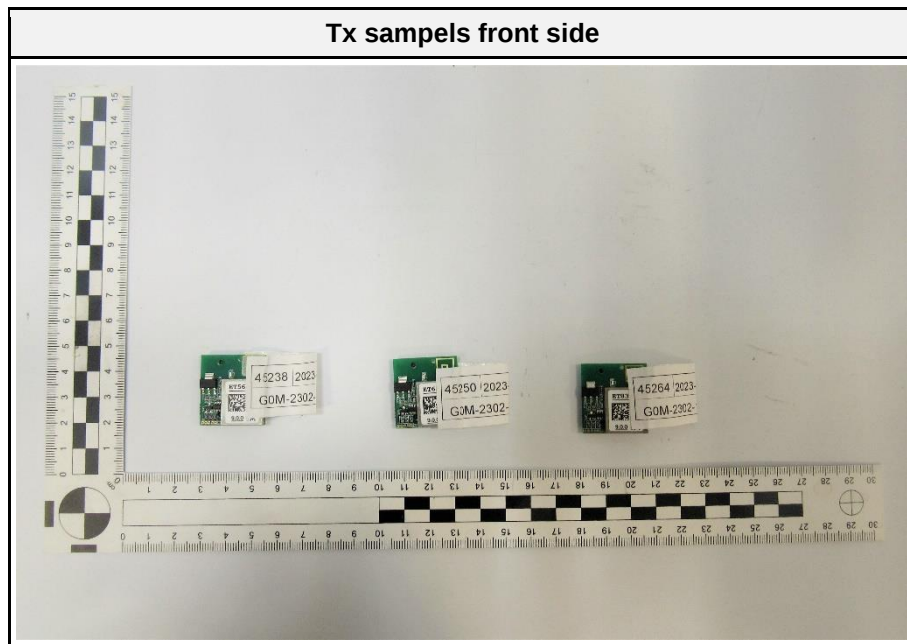
REPORT INDEX

1	Equipment (Test Item) Under Test.....	6
1.1	Photos – Equipment External	7
1.2	Photos – Equipment Internal	11
1.3	Support Equipment.....	13
1.4	Test mode duty cycle	13
1.5	Test Modes	14
1.6	Test Frequencies.....	14
1.7	Sample emission level calculation.....	15
2	Result Summary.....	16
3	Test Conditions and Results.....	17
3.1	Test Conditions and Results - Occupied bandwidth.....	17
3.2	Test Conditions and Results - 6 dB bandwidth.....	21
3.3	Test Conditions and Results - Maximum peak conducted output power	25
3.4	Test Conditions and Results - Power spectral density	30
3.5	Test Conditions and Results - Band-edge compliance.....	35
3.6	Test Conditions and Results - Conducted spurious emissions.....	39
3.7	Test Conditions and Results - Transmitter radiated emissions	44
3.8	Test Conditions and Results - Receiver radiated emissions	51
ANNEX A	Transmitter spurious emissions	57
ANNEX B	Receiver spurious emissions	66

1 Equipment (Test Item) Under Test

Description	Radio Modul 868MHz	
Model	Modul 868MHz IX	
Additional Model(s)	None	
Brand Name(s)	None	
Serial Number(s)	Conducted: 6000604000496900ET84 (ET84), Tx:927.50 MHz Conducted: 6000604000496900ET70 (ET70), Tx:915.50 MHz Conducted: 6000604000496900ET56 (ET56), Tx:903.50 MHz Radiated : 6000604000496900ET55 (ET55), Tx:903.50 MHz Radiated : 6000604000496900ET69 (ET69), Tx:915.50 MHz Radiated : 6000604000496900ET83 (ET83), Tx:927.50 MHz Radiated : 6000604000496900ET52 (ET52), Tx:903.50 MHz Radiated : 6000604000496900ET66 (ET66), Tx:915.50 MHz Radiated : 6000604000496900ET80 (ET80), Tx:927.50 MHz	
Test Sample Id(s)	Conducted: 45238 (ET56), 45252 (ET70), 45266 (ET84) Radiated: 45236 (ET55), 45250 (ET69), 45264 (ET83), 45230 (ET52), 45244 (ET66), 45258 (ET80)	
Hardware Version(s)	Release 1.x	
Software Version(s)	Version 9.x	
PMN	MODUL 868MHZ IX	
HVIN	MODUL 868MHZ IX	
FVIN	Version 9.x	
HMN	N/A	
FCC ID	2BB4J-WM09A	
IC	31013-WM09A	
Equipment type	Radio Module	
Radio type	Transceiver	
Assigned frequency bands	902.0 MHz - 928.0 MHz	
Radio technology	Digital Modulation	
Modulation	2GFSK	
Number of antenna ports	1	
Antenna	Type	Integrated antenna
	Model	PCB antenna
	Manufacturer	—
	Gain	-3.7 dBi
Supply Voltage	V _{NOM}	10 VDC
Operating Temperature	T _{NOM}	23 °C
AC/DC-Adaptor	Model	—
	Vendor	—
	Input	—
	Output	—
Manufacturer	senTec Elektronik GmbH Robert-Bosch-Ring 2 98693 Ilmenau GERMANY	

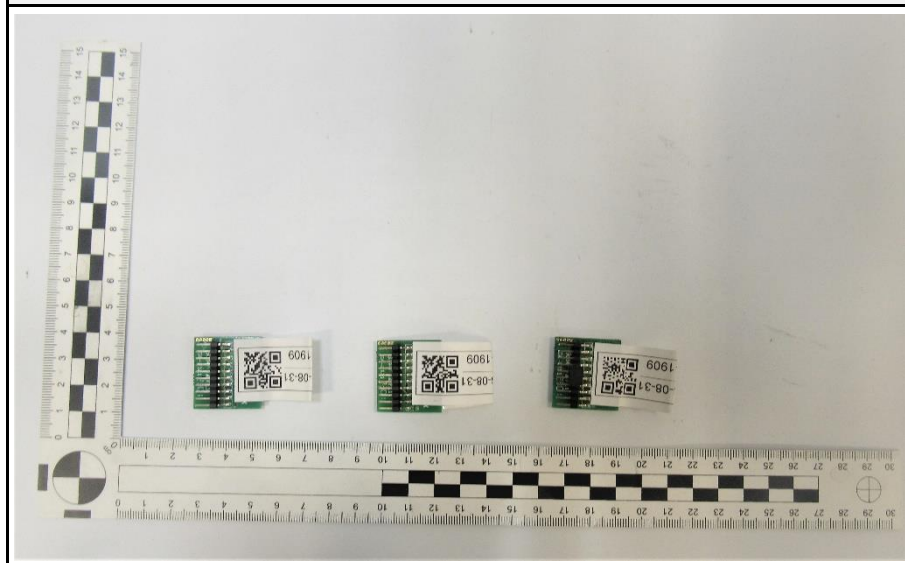
1.1 Photos – Equipment External



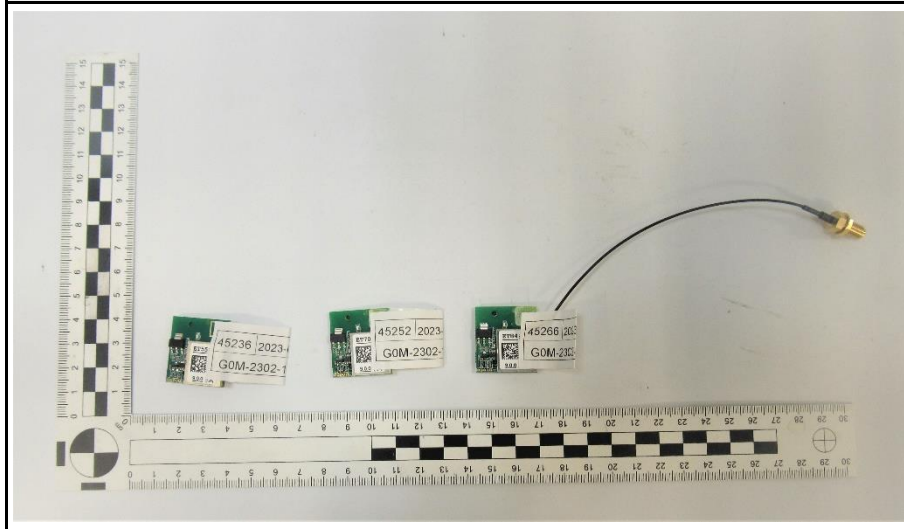
Rx sampels front side



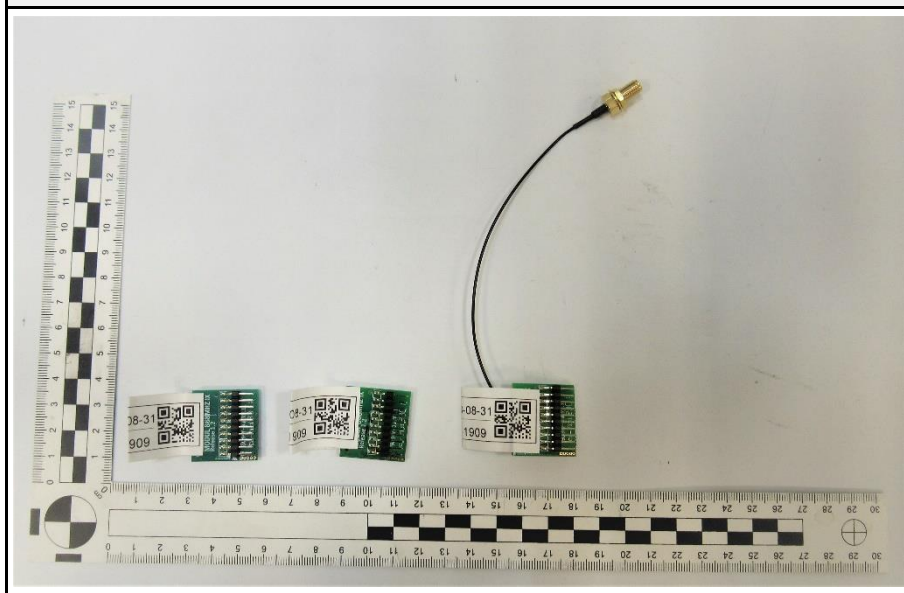
Rx sampels back side

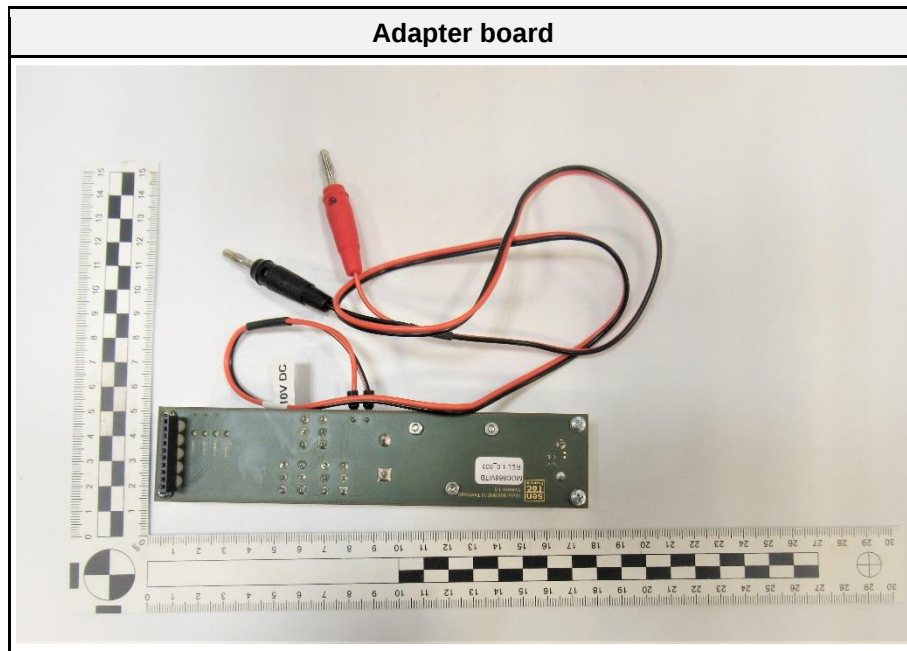


Conducted Sampels front side

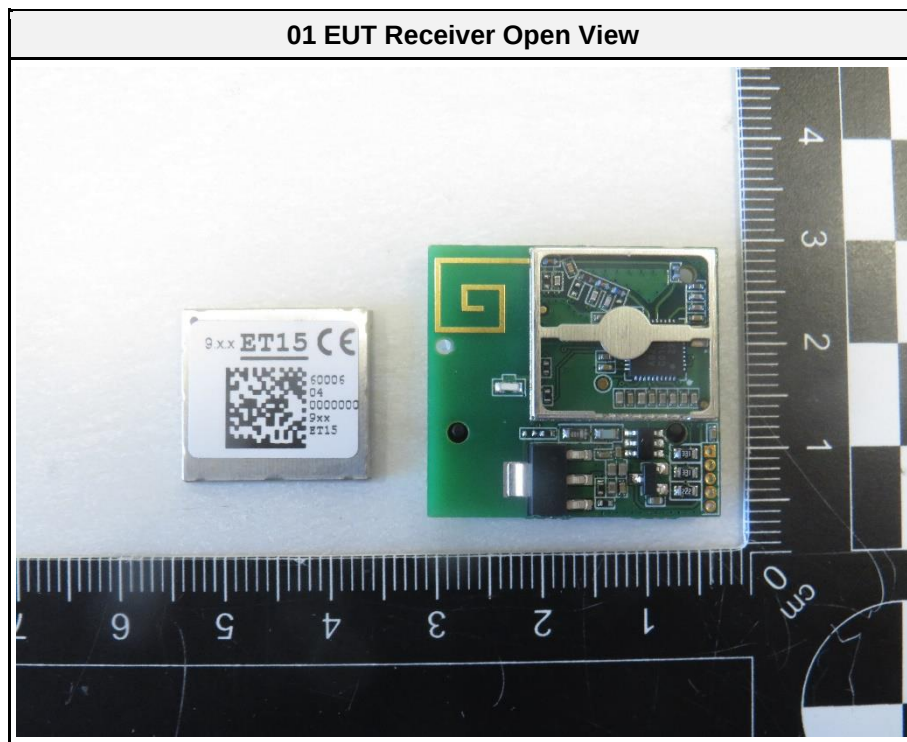
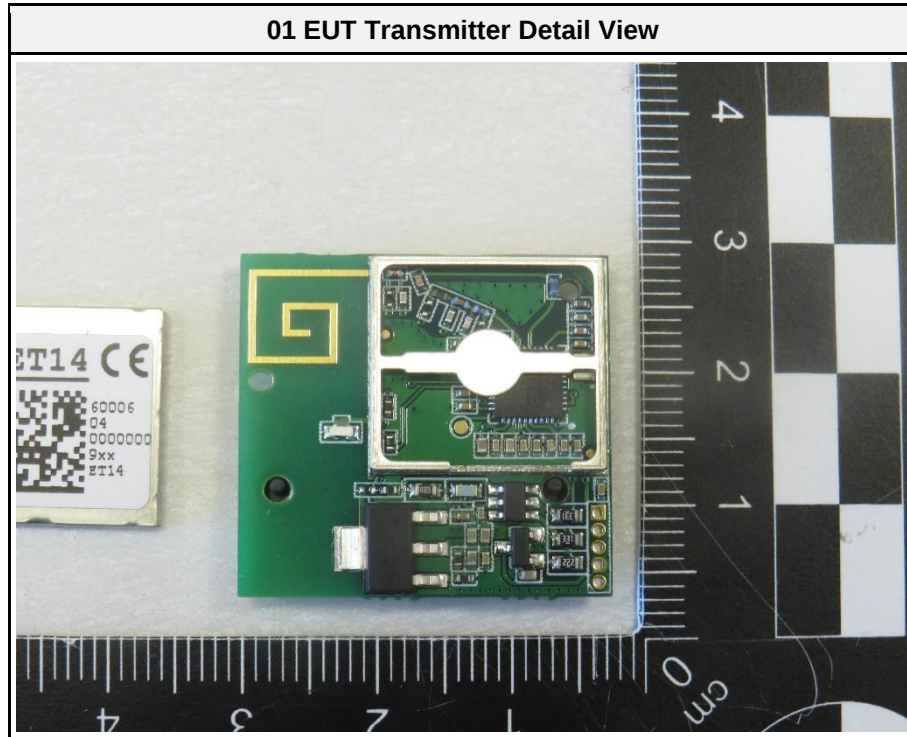


Conducted Sampels back side

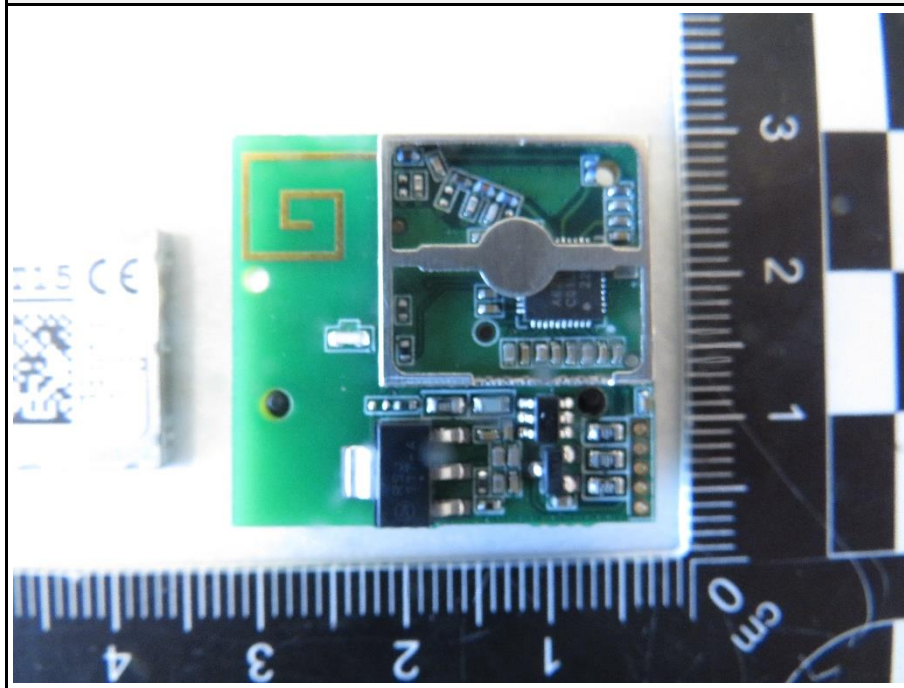




1.2 Photos – Equipment Internal



02 EUT Receiver Detail View



1.3 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	Module 868MHz VI Test board	senTec Elektronik GmbH	Realease 1.0	Power for EUT
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.4 Test mode duty cycle

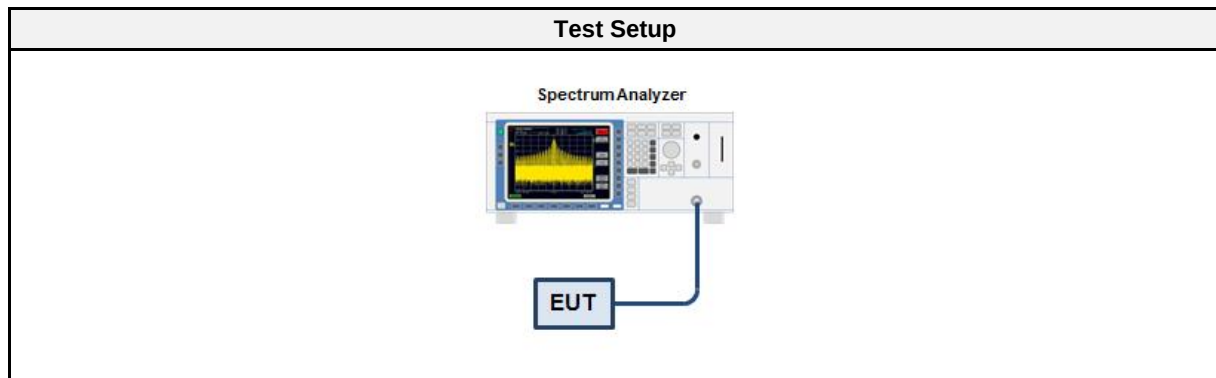
1.4.1 Information

Test Information	
Measurement Method	ANSI C63.10 11.6

1.4.2 Requirements

Requirements	
Duty cycle	Duty cycle correction
≥ 98 %	No correction required
< 98 %	Correction required (10 x Log ₁₀ (1/DC))

1.4.3 Setup



1.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 43	EF01631	2023-08	2024-08

1.4.5 Procedure

Test Procedure	
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 $DC = 10 \times \log_{10}(T_{ON} / (T_{ON} + T_{OFF}))$

1.4.6 Results

Duty Cycle Results		
Mode	Duty Cycle	Correction Factor [dB]
Transmit	0.631	-1.99

1.5 Test Modes

Mode	Description
Transmit	Mode = Transmit Modulation = 2GFSK Duty cycle = 63 %
Receive	Mode = Receive Modulation = 2GFSK
Comment:	

1.6 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	1	903.50
F2	Tx / Rx	2	915.50
F3	Tx / Rx	3	927.50

1.7 Sample emission level calculation

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

Reading:

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

A.F.:

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

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

Net:

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

Margin:

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

Field strength limit:

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

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

Example only for radiated field strength:

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

2 Result Summary

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

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

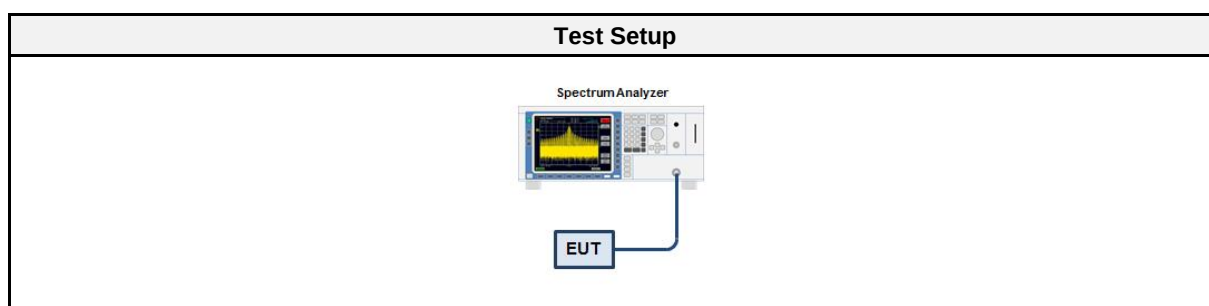
3 Test Conditions and Results

3.1 Test Conditions and Results - Occupied bandwidth

3.1.1 Information

Test Information	
Reference	ISED RSS-Gen, Issue 5 A2 (section 6.7)
Measurement Method	ANSI C63.10 6.9.3
Measurement Uncertainty	$\pm 1.26 \%$
Test Sample ID	45238 (ET56), 45252 (ET70), 45266 (ET84)
Operator	Ehsan Sohrabi
Date	2023-09-15

3.1.2 Setup



3.1.3 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 43	EF01631	2023-08	2024-08
Cable (CAABA)	Gigalane	GIGALANE 1730	EF00779	2023-03	2024-03

3.1.4 Procedure

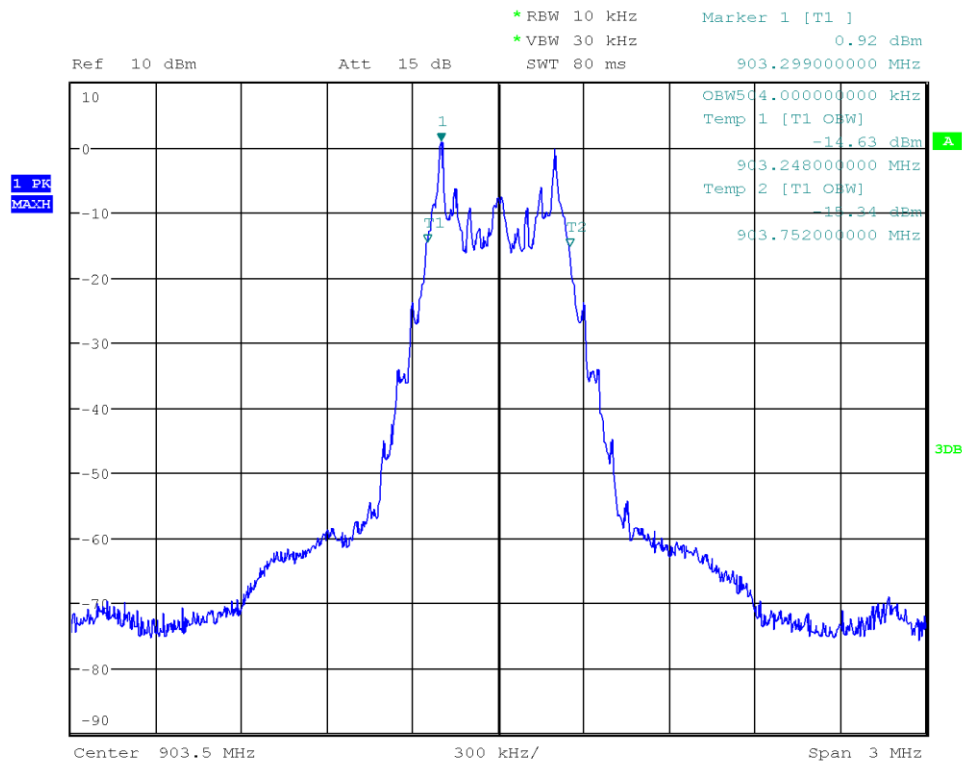
Test Procedure
- EUT transmitter is activated in test mode under normal conditions - The spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum - The resolution bandwidth is set to the range of 1 % to 5 % of the occupied bandwidth - The occupied bandwidth is measured with the build-in analyzer function
Limit : None (Informational only)

3.1.5 Results

Test Results		
Mode	Frequency [MHz]	Bandwidth [MHz]
Transmit	903.50	0.504
Transmit	915.50	0.504
Transmit	927.50	0.504

Occupied Bandwidth

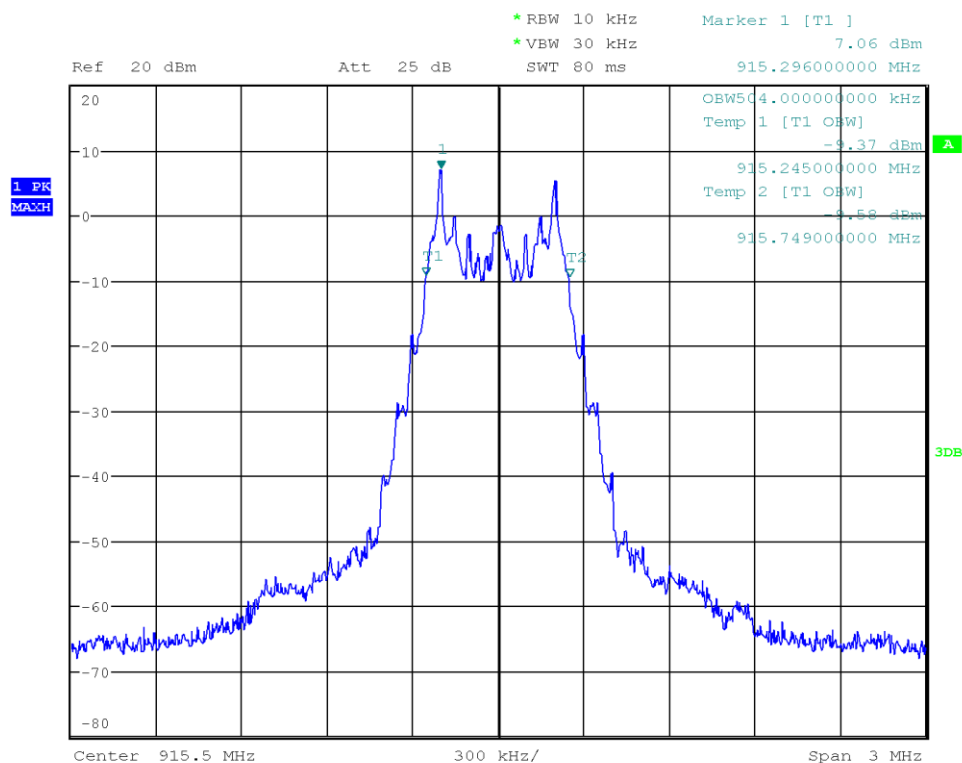
Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45238
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: 2GFSK, Channel: 903.50 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Occupied Bandwidth [MHz]: 0.504



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Occupied Bandwidth

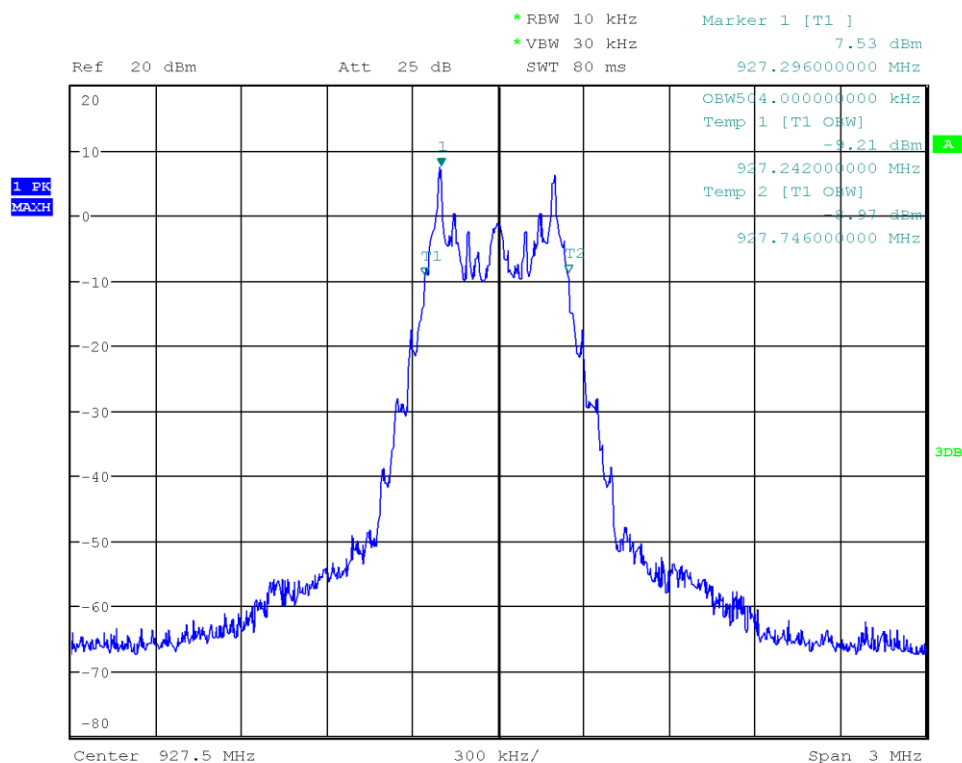
Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45252
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: 2GFSK, Channel: 915.50 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Occupied Bandwidth [MHz]: 0.504



Date: 15.SEP.2023 14:06:16

Occupied Bandwidth

Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45266
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: 2GFSK, Channel: 927.50 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Occupied Bandwidth [MHz]: 0.504



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3.2 Test Conditions and Results - 6 dB bandwidth

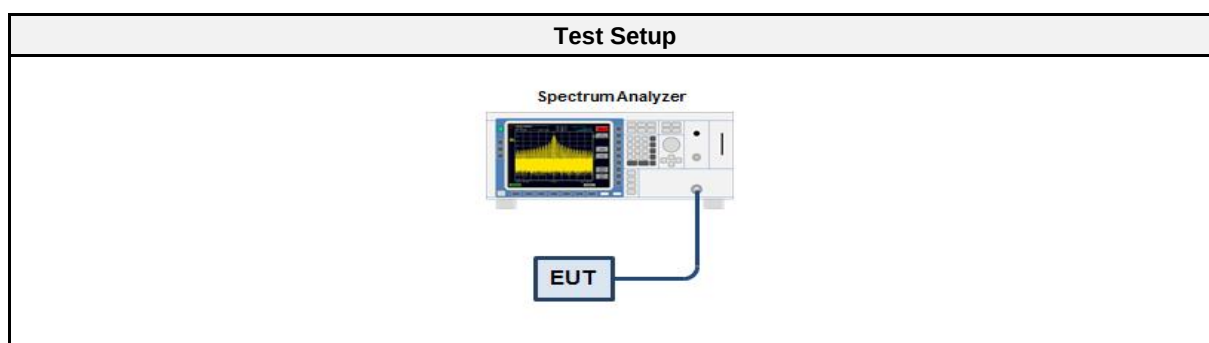
3.2.1 Information

Test Information	
Reference	FCC § 15.247(a)(2); ISSED RSS-247, Issue 3 (section 5.2)
Measurement Method	ANSI C63.10 11.8
Measurement Uncertainty	± 1.26 %
Operator	Ehsan Sohrabi
Date	2023-09-15

3.2.2 Limits

Limits
≥ 500kHz

3.2.3 Setup



3.2.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 43	EF01631	2023-08	2024-08
Cable (CAABA)	Gigalane	GIGALANE 1730	EF00779	2023-03	2024-03

3.2.5 Procedure

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

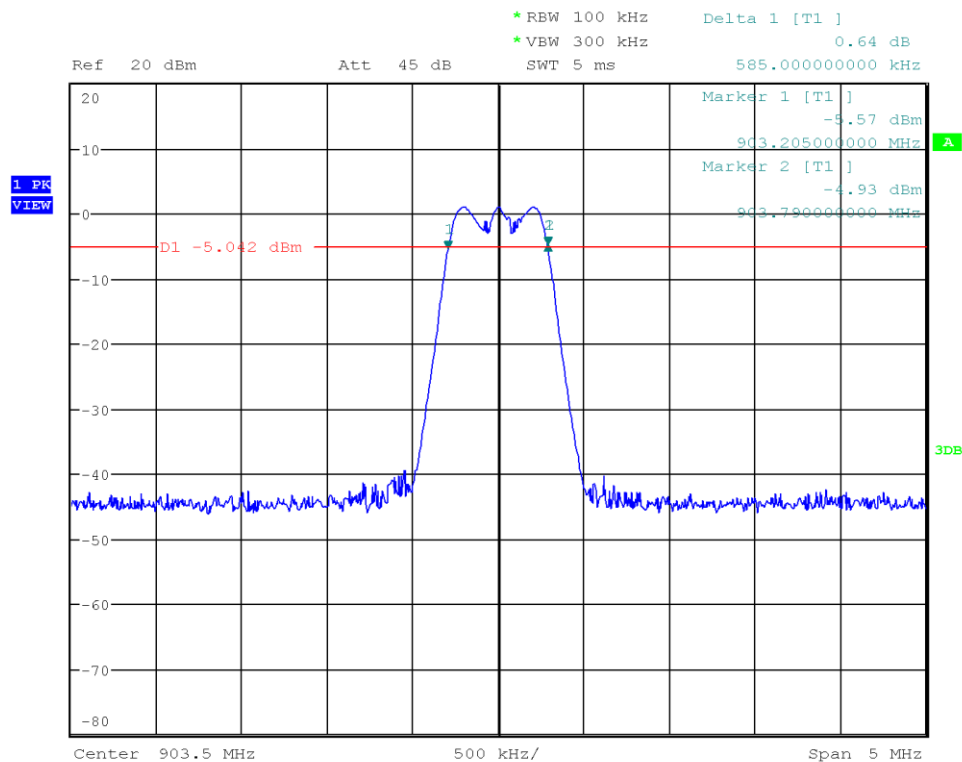
3.2.6 Results

Test Results				
Mode	Frequency [MHz]	Bandwidth [kHz]	Limit [kHz]	Verdict
Transmit	903.50	585	500	PASS
Transmit	915.50	575	500	PASS
Transmit	927.50	575	500	PASS

Test Report No.: G0M-2302-1909-TFC247DT-V02

DTS (6 dB) Bandwidth

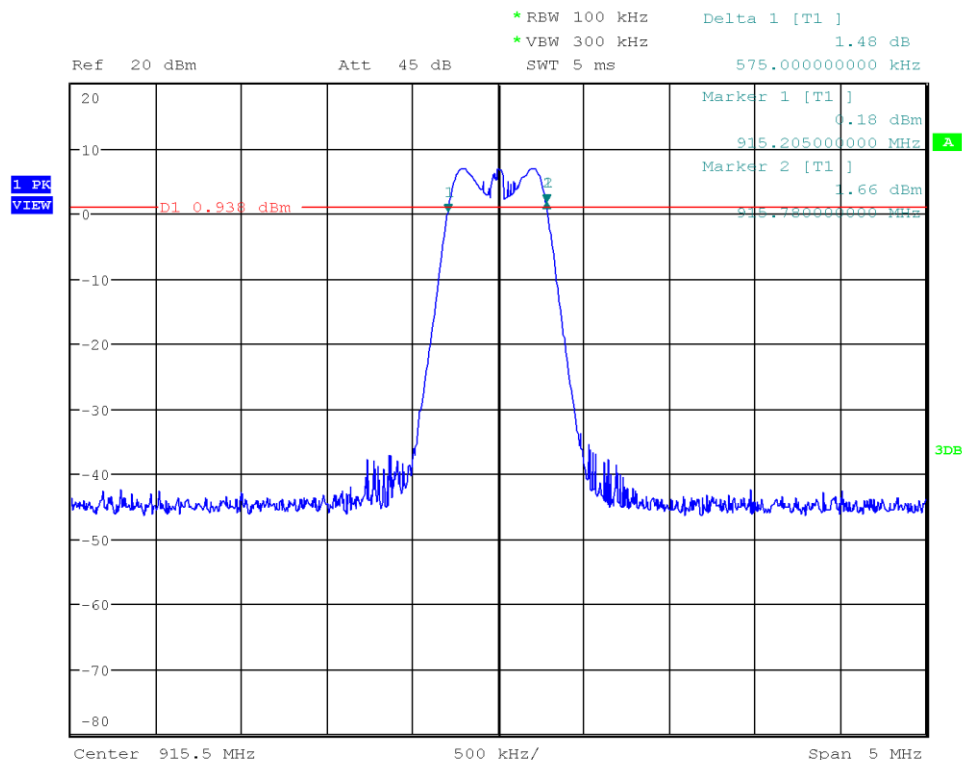
Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45238
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: 2GFSK, Channel: 903.50 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Note: Power= 20 dBm
 Lower Frequency [MHz]: 903.205
 Upper Frequency [MHz]: 903.790
 6 dB Bandwidth [kHz]: 585



Date: 15.SEP.2023 13:47:20

DTS (6 dB) Bandwidth

Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45252
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: 2GFSK, Channel: 915.50 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Note: Power= 20 dBm
 Lower Frequency [MHz]: 915.205
 Upper Frequency [MHz]: 915.780
 6 dB Bandwidth [kHz]: 575



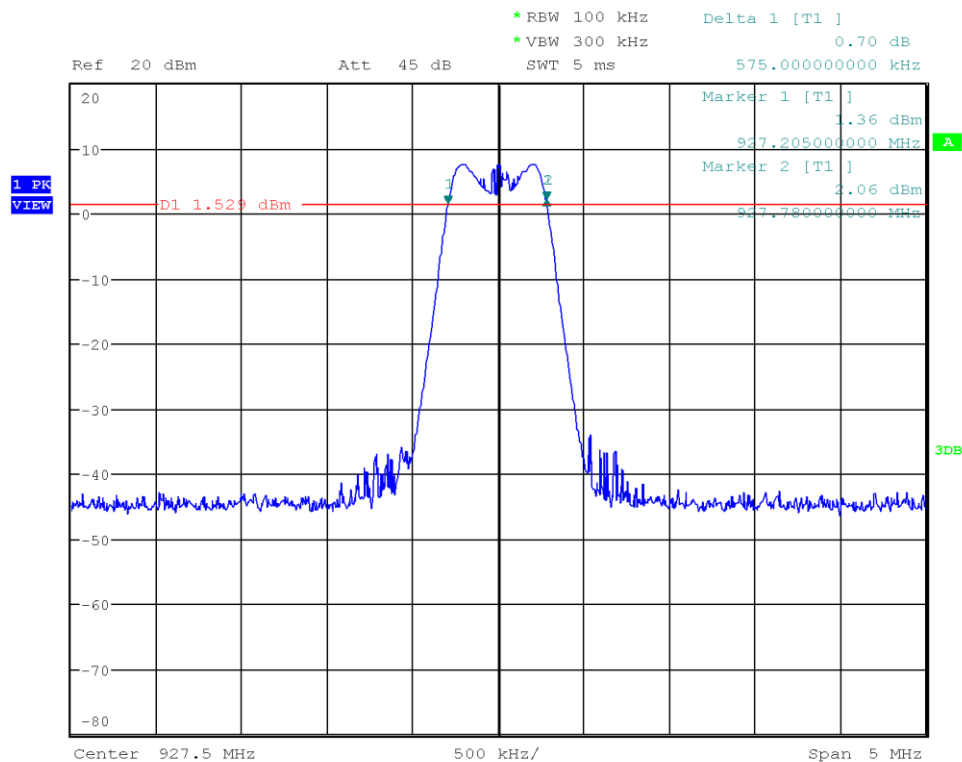
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Test Report No.: G0M-2302-1909-TFC247DT-V02

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

DTS (6 dB) Bandwidth

Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45266
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: 2GFSK, Channel: 927.50 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Note: Power= 20 dBm
 Lower Frequency [MHz]: 927.205
 Upper Frequency [MHz]: 927.780
 6 dB Bandwidth [kHz]: 575



Date: 15.SEP.2023 14:24:10

Test Report No.: G0M-2302-1909-TFC247DT-V02

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

3.3 Test Conditions and Results - Maximum peak conducted output power

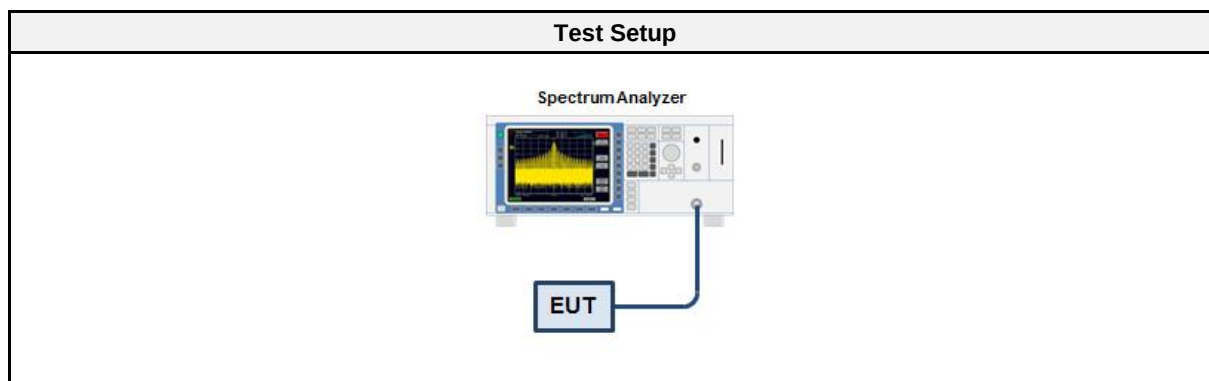
3.3.1 Information

Test Information	
Reference	FCC § 15.247(b); ISED RSS-247, Issue 3 (section 5.4)
Measurement Method	ANSI C63.10 11.9.1
Measurement Uncertainty	± 2.86 dB
Operator	Ehsan Sohrabi
Date	2023-09-15

3.3.2 Limits

Limits
1 W (30 dBm)
FCC: The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
ISED: The e.i.r.p. shall not exceed 4 W.

3.3.3 Setup



3.3.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 43	EF01631	2023-08	2024-08
Cable (CAABA)	Gigalane	GIGALANE 1730	EF00779	2023-03	2024-03

3.3.5 Procedure

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

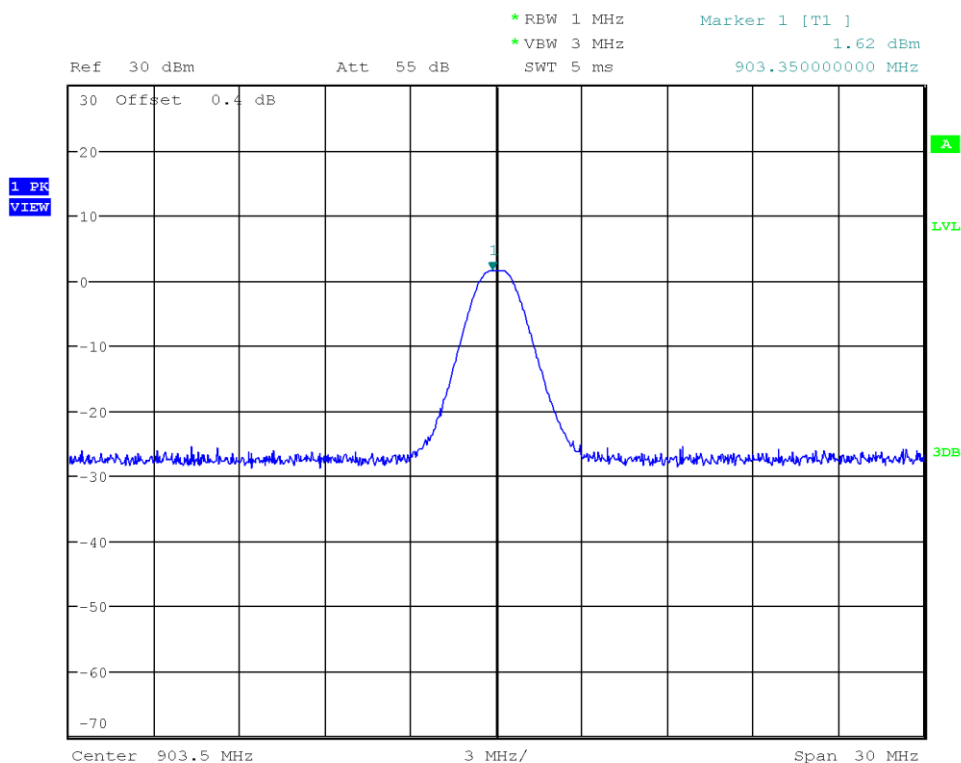
3.3.6 Results

Test Results – FCC				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
903.50	1.617	0.0015	1.0	PASS
915.50	7.465	0.0056	1.0	PASS
927.50	8.059	0.0064	1.0	PASS

Test Results - ISED							
Channel [MHz]	Conducted Power [dBm]	Conducted Power [W]	Conducted Limit [W]	EIRP Power [dBm]	EIRP Power [W]	EIRP Limit [W]	Verdict
903.50	1.617	0.0015	1.0	-2.083	0.0006	4.0	PASS
915.50	7.465	0.0056	1.0	3.765	0.0024	4.0	PASS
927.50	8.059	0.0064	1.0	4.359	0.0027	4.0	PASS

Peak Conducted Output Power

Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45238
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: 2GFSK, Channel: 903.50 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Note: Power max= 20 dBm
 Peak Power [dBm]: 1.617
 Peak Power [W]: 0.0015



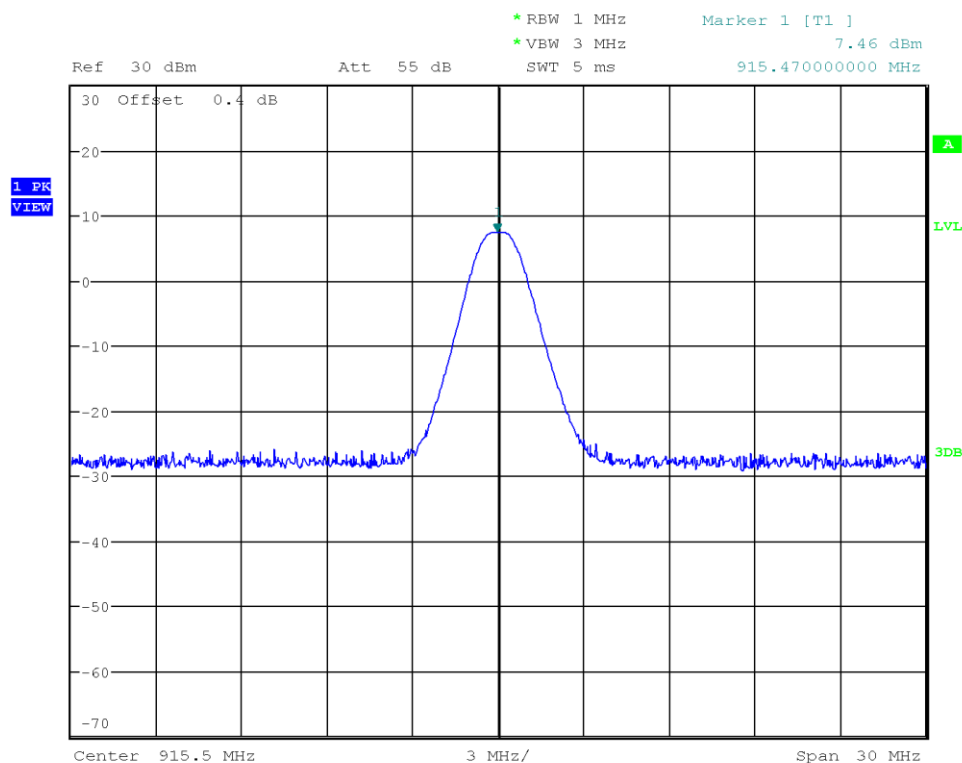
Date: 15.SEP.2023 13:39:24

Test Report No.: G0M-2302-1909-TFC247DT-V02

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

Peak Conducted Output Power

Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45252
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: 2GFSK, Channel: 915.50 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Note: Power max= 20 dBm
 Peak Power [dBm]: 7.465
 Peak Power [W]: 0.0056



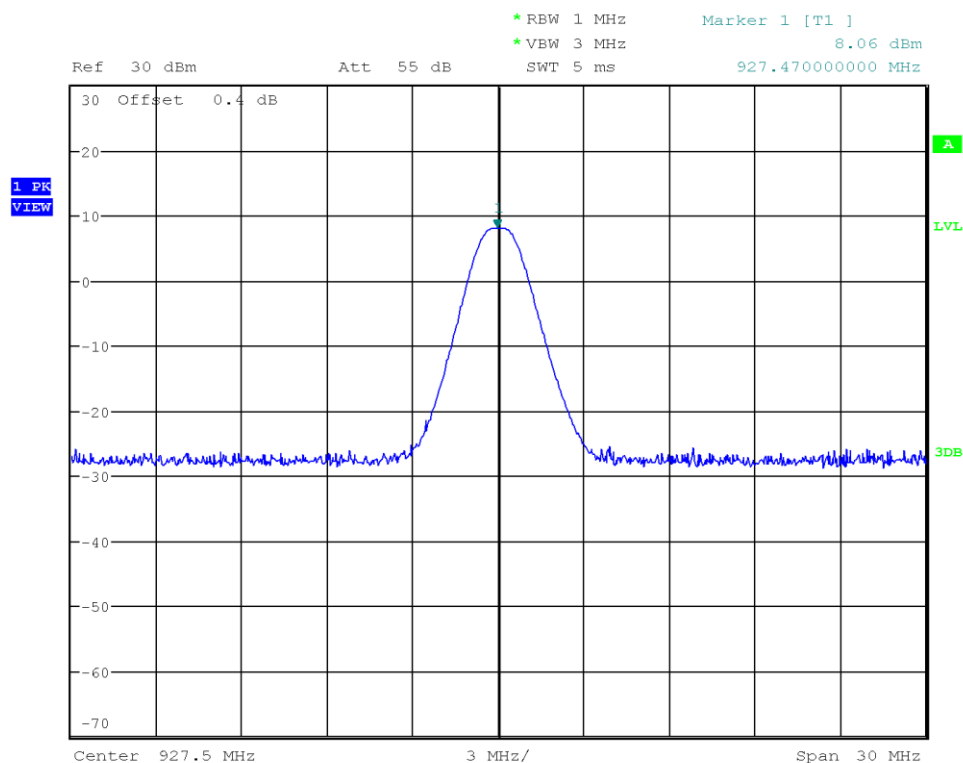
Date: 15.SEP.2023 14:04:12

Test Report No.: G0M-2302-1909-TFC247DT-V02

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

Peak Conducted Output Power

Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45266
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: 2GFSK, Channel: 927.50 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Note: Power max= 20 dBm
 Peak Power [dBm]: 8.059
 Peak Power [W]: 0.0064



Date: 15.SEP.2023 14:20:37

Test Report No.: G0M-2302-1909-TFC247DT-V02

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

3.4 Test Conditions and Results - Power spectral density

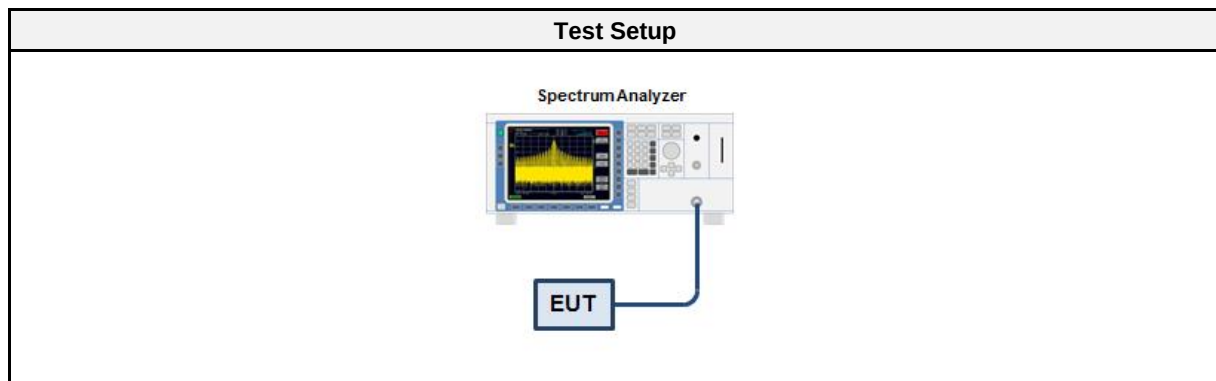
3.4.1 Information

Test Information	
Reference	FCC § 15.247(e); ISSED RSS-247, Issue 3 (section 5.2)
Measurement Method	ANSI C63.10 11.10.2, 14.3.2
Measurement Uncertainty	± 2.86 dB
Operator	Ehsan Sohrabi
Date	2023-09-15

3.4.2 Limits

Limits
8 dBm / 3 kHz

3.4.3 Setup



3.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 43	EF01631	2023-08	2024-08
Cable (CAABA)	Gigalane	GIGALANE 1730	EF00779	2023-03	2024-03

3.4.5 Procedure

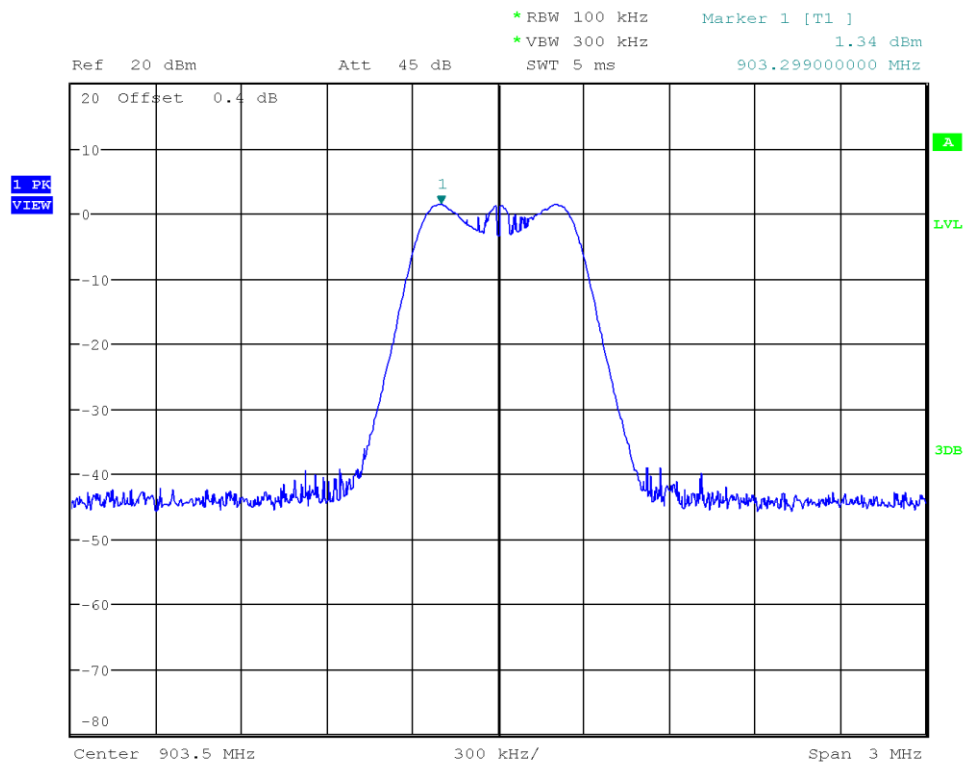
Test Procedure
1. EUT set to test mode 2. The analyzer is set to DTS channel center frequency with a span of 1.5 times the DTS bandwidth 3. The RBW is set to 100 kHz with VBW $\geq$ RBW and the detector is set to peak with max hold 4. After the trace has stabilized a marker is set to the envelope maximum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

3.4.6 Results

Test Results			
Channel [MHz]	PSD [dBm/RBW]	Limit [dBm/3kHz]	Verdict
903.50	1.343	8.0	PASS
915.50	7.343	8.0	PASS
927.50	7.944	8.0	PASS
RBW = 100 kHz			

Peak Power Spectral Density

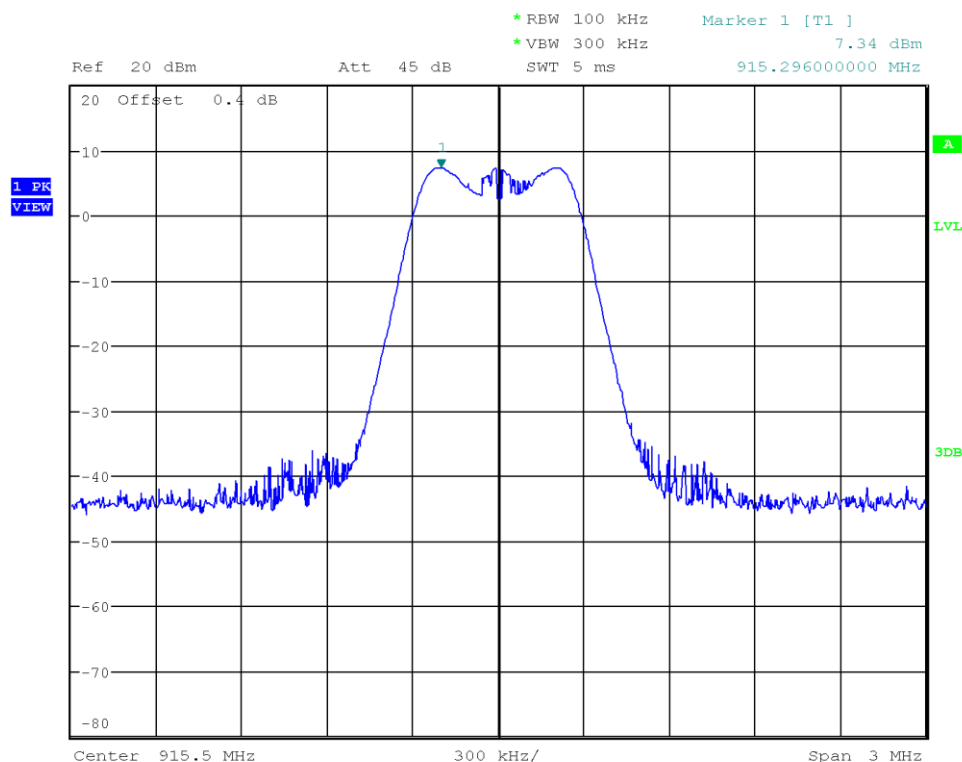
Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45238
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: 2GFSK, Channel: 903.50 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Note: Power= 20 dBm
 Peak Frequency [MHz]: 903.299
 Spectral Density [dBm/RBW]: 1.343
 Resolution Bandwidth [kHz]: 100 kHz



Date: 15.SEP.2023 13:50:42

Peak Power Spectral Density

Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45252
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: 2GFSK, Channel: 915.50 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Note: Power= 20 dBm
 Peak Frequency [MHz]: 915.296
 Spectral Density [dBm/RBW]: 7.343
 Resolution Bandwidth [kHz]: 100 kHz



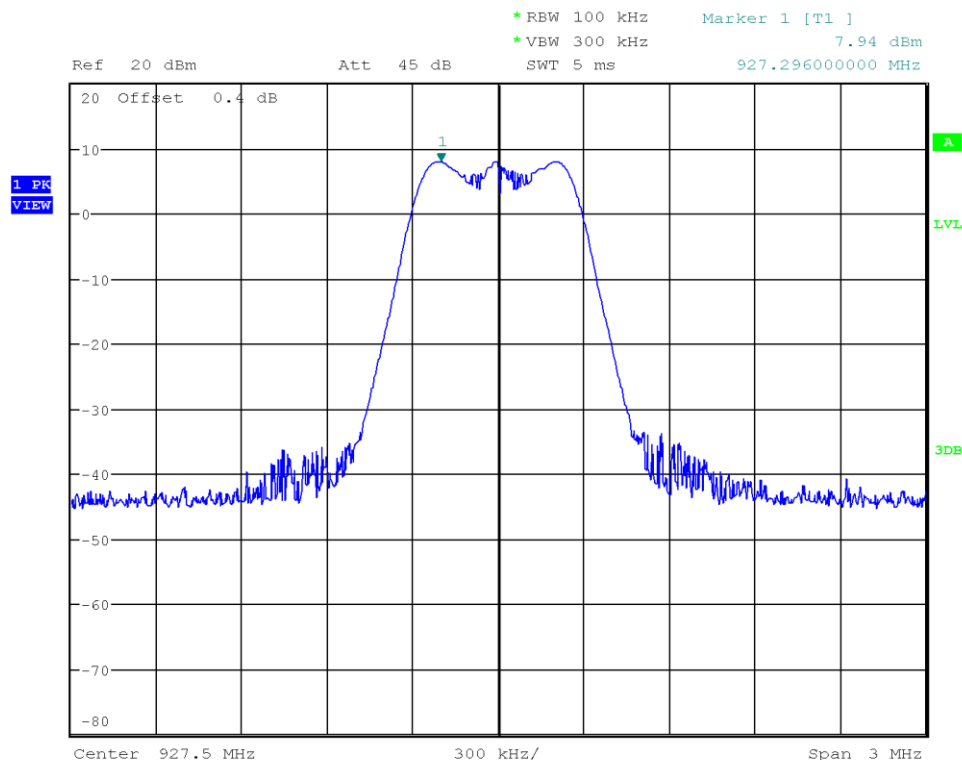
Date: 15.SEP.2023 14:10:02

Test Report No.: G0M-2302-1909-TFC247DT-V02

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

Peak Power Spectral Density

Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45266
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: 2GFSK, Channel: 927.50 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Note: Power= 20 dBm
 Peak Frequency [MHz]: 927.296
 Spectral Density [dBm/RBW]: 7.944
 Resolution Bandwidth [kHz]: 100 kHz



Date: 15.SEP.2023 14:27:11

Test Report No.: G0M-2302-1909-TFC247DT-V02

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

3.5 Test Conditions and Results - Band-edge compliance

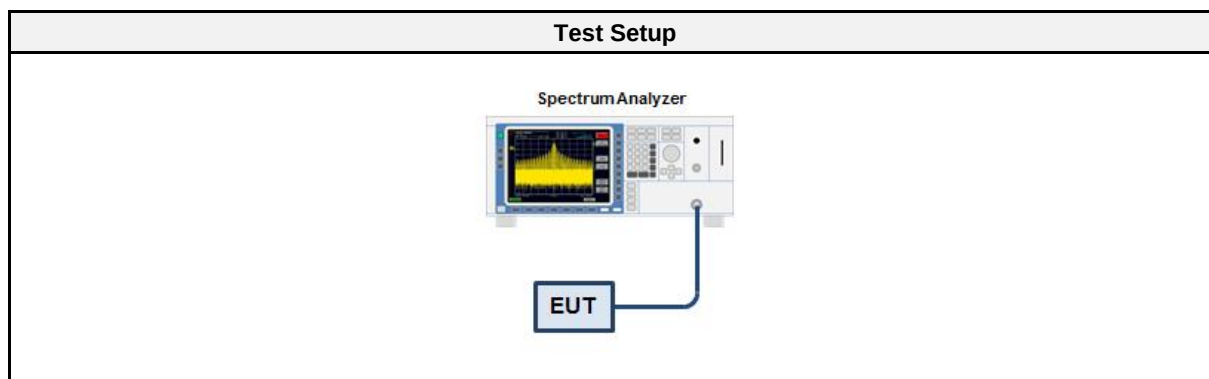
3.5.1 Information

Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 3 (section 5.5)
Measurement Uncertainty	± 3.64 dB
Measurement Method	ANSI C63.10 11.13
Operator	Ehsan Sohrabi
Date	2023-09-15

3.5.2 Limits

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

3.5.3 Setup



3.5.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 43	EF01631	2023-08	2024-08
Cable (CAABA)	Gigalane	GIGALANE 1730	EF00779	2023-03	2024-03

3.5.5 Procedure

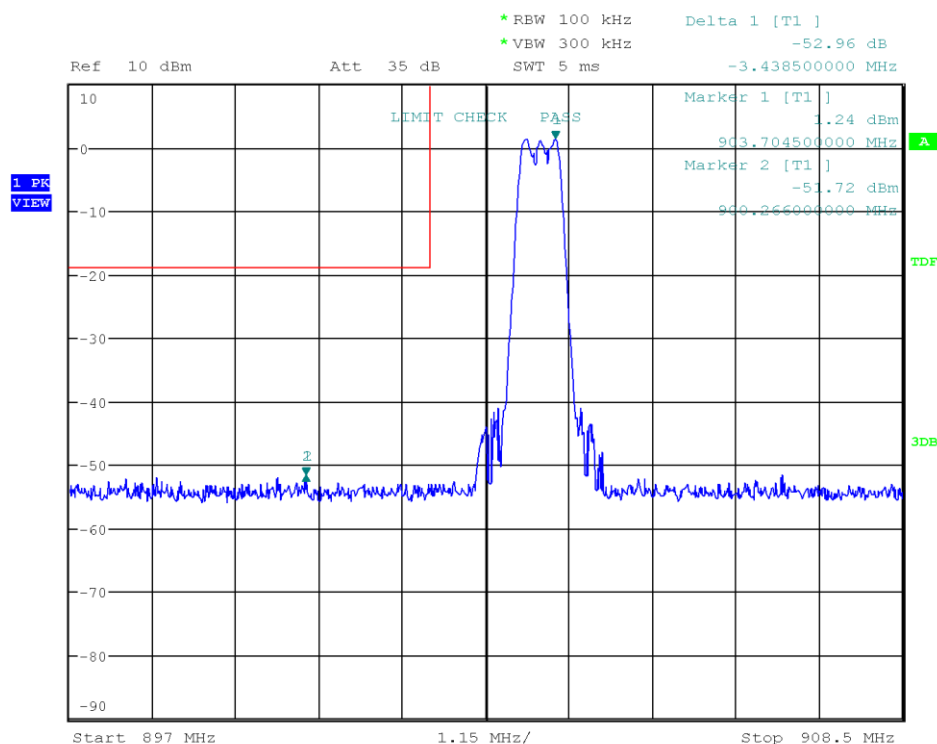
Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels within frequency band and outside frequency band 5. Band edge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

3.5.6 Results

Test Results				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
Single	903.50	-51.721	-20	PASS
Single	927.50	-34.487	-20	PASS

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45238
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.10
 Operational Mode: single frequency, Channel: 903.5 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Note: Power= 20 dBm
 Band-edge: Lower
 In-band Frequency [MHz]: 903.705
 Max. in-band Level [dBm/100 kHz]: 1.242
 Out-of-band Frequency [MHz]: 900.266
 Max. out-of-band Level [dBm/100 kHz]: -51.721
 Attenuation [dB]: -52.96



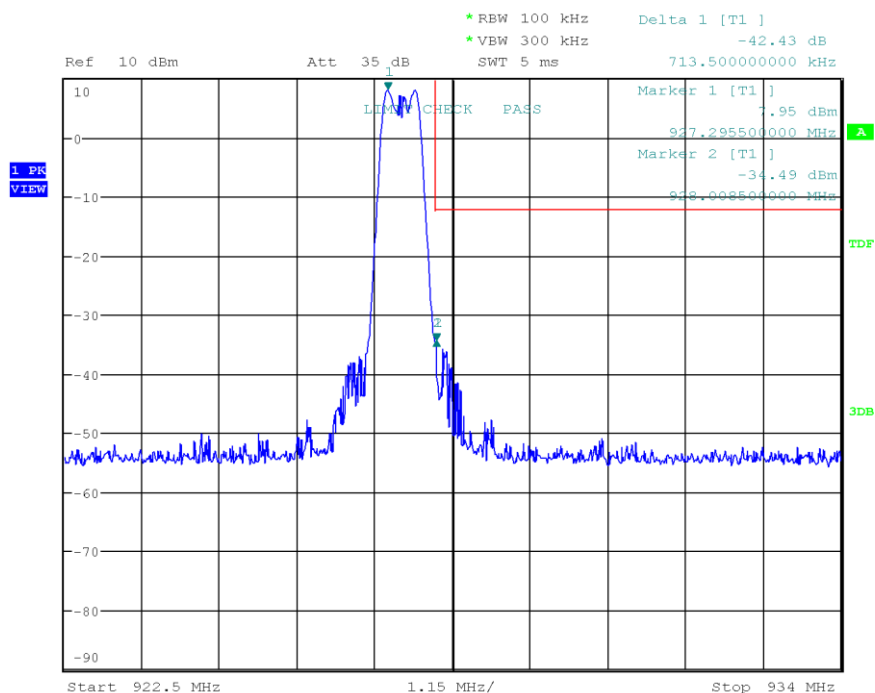
Date: 15.SEP.2023 13:53:59

Test Report No.: G0M-2302-1909-TFC247DT-V02

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

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45266
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.10
 Operational Mode: single frequency, Channel: 927.5 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Note: Power= 20 dBm
 Band-edge: Upper
 In-band Frequency [MHz]: 927.295
 Max. in-band Level [dBm/100 kHz]: 7.947
 Out-of-band Frequency [MHz]: 928.009
 Max. out-of-band Level [dBm/100 kHz]: -34.487
 Attenuation [dB]: -42.43



Date: 15.SEP.2023 14:29:29

Test Report No.: G0M-2302-1909-TFC247DT-V02

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

3.6 Test Conditions and Results - Conducted spurious emissions

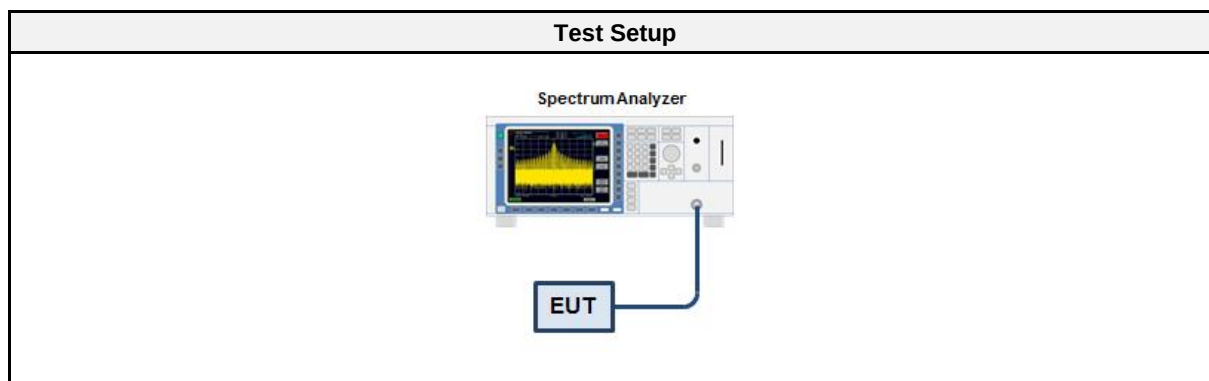
3.6.1 Information

Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 3 (section 5.5)
Measurement Uncertainty	± 4.25 dB
Measurement Method	ANSI C63.10 11.11
Operator	Ehsan Sohrabi
Date	2023-09-15

3.6.2 Limits

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

3.6.3 Setup



3.6.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 43	EF01631	2023-08	2024-08
Cable (CAABA)	Gigalane	GIGALANE 1730	EF00779	2023-03	2024-03

3.6.5 Procedure

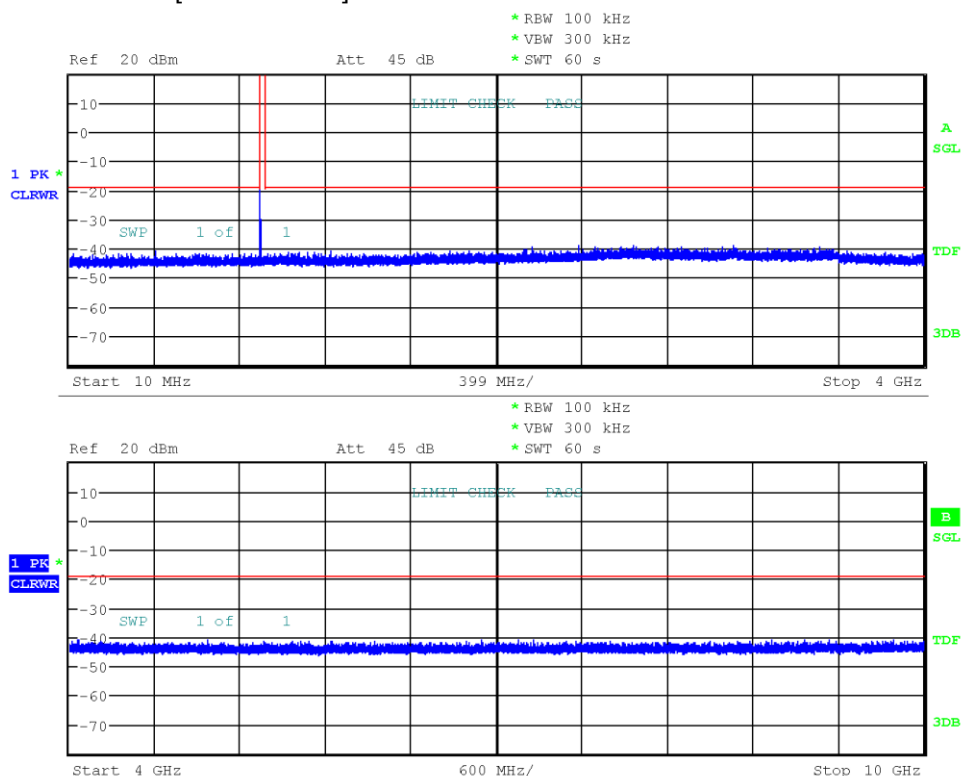
Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels outside frequency band

3.6.6 Results

Test Results		
Mode	Channel [MHz]	Verdict
Transmit	903.50	PASS
Transmit	915.50	PASS
Transmit	927.50	PASS

Conducted Spurious Emissions

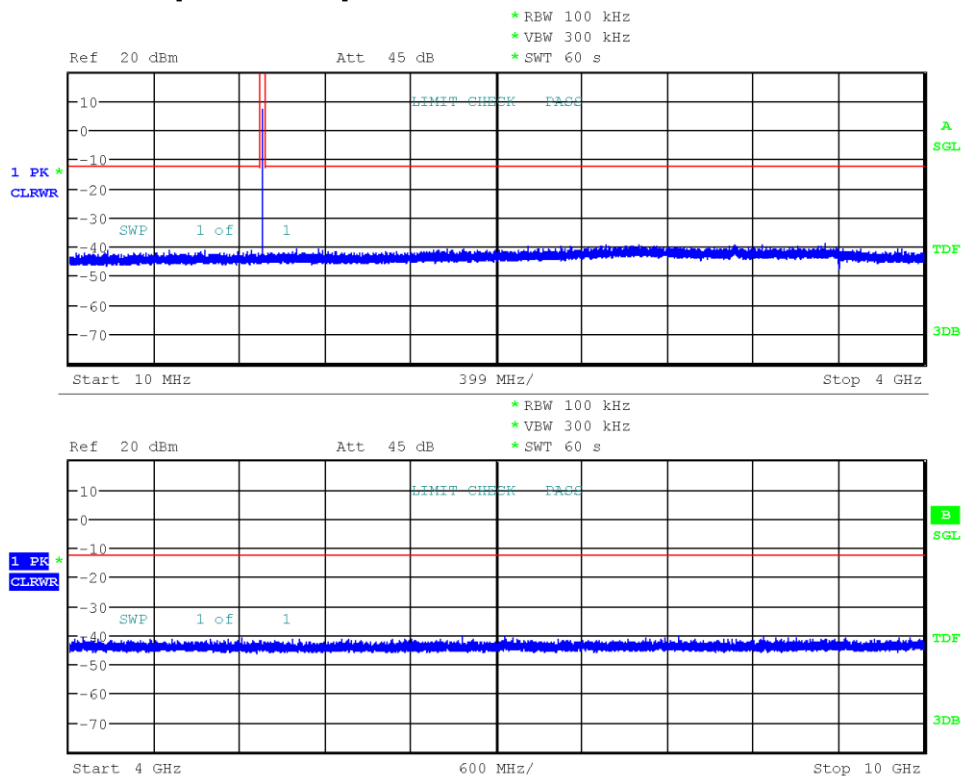
Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45238
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: 2GFSK, Channel: 903.50 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Note: Power= 20 dBm
 Max. in-band Frequency [MHz]: 903.5
 Max. in-band Level [dBm/100 kHz]: 1.3
 Out-of-band Limit [dBm/100 kHz]: -18.7



Date: 15.SEP.2023 13:59:18

Conducted Spurious Emissions

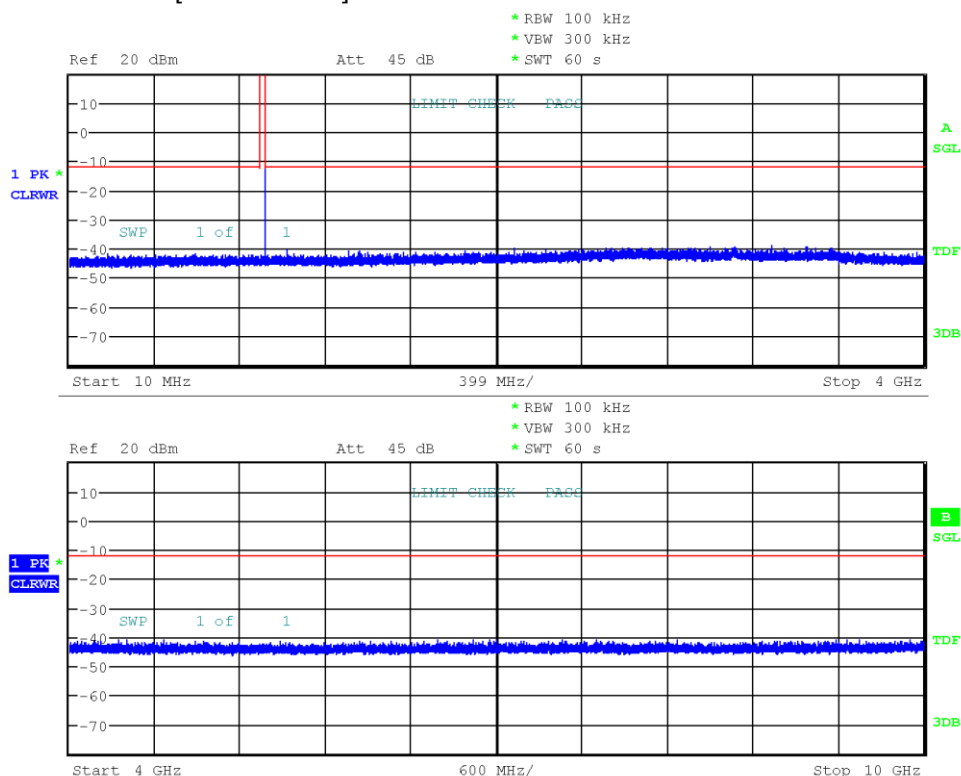
Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45252
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: 2GFSK, Channel: 915.50 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Note: Power= 20 dBm
 Max. in-band Frequency [MHz]: 915.3
 Max. in-band Level [dBm/100 kHz]: 7.3
 Out-of-band Limit [dBm/100 kHz]: -12.7



Date: 15.SEP.2023 14:14:51

Conducted Spurious Emissions

Project Number: G0M-2302-1909
 Applicant: senTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45266
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: 2GFSK, Channel: 927.50 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Ehsan Sohrabi
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-15
 Note: Power= 20 dBm
 Max. in-band Frequency [MHz]: 927.3
 Max. in-band Level [dBm/100 kHz]: 7.9
 Out-of-band Limit [dBm/100 kHz]: -12.1



Date: 15.SEP.2023 14:33:10

Test Report No.: G0M-2302-1909-TFC247DT-V02

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

3.7 Test Conditions and Results - Transmitter radiated emissions

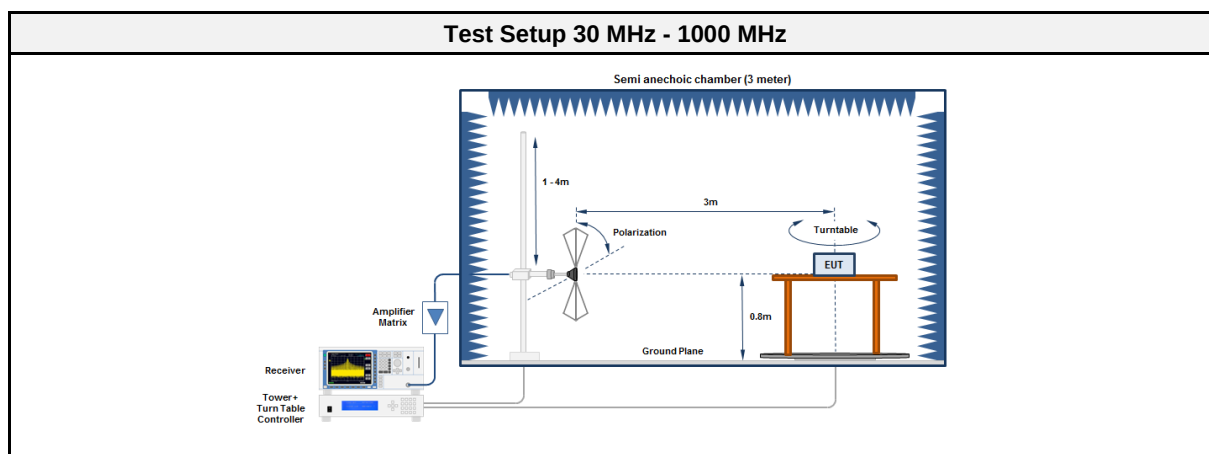
3.7.1 Information

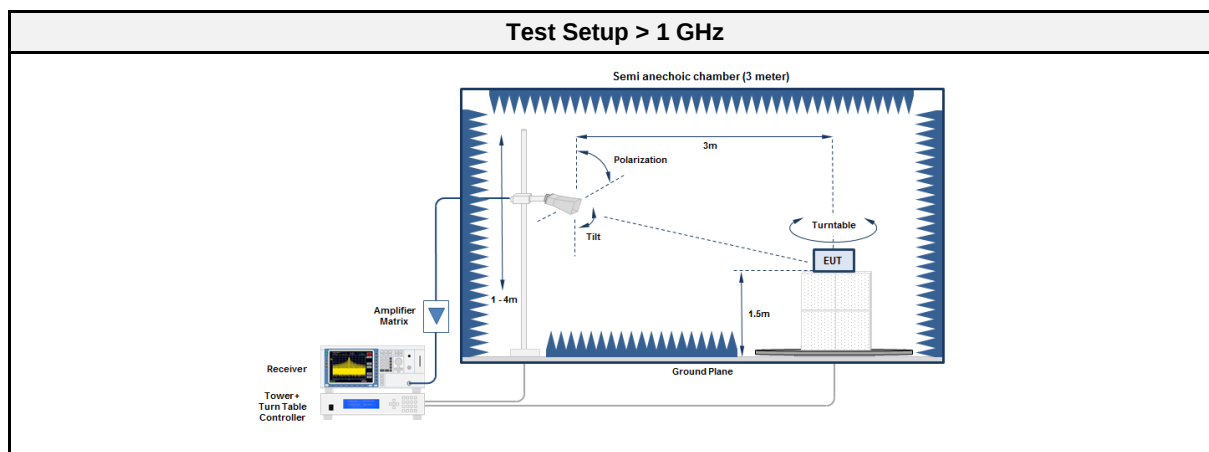
Test Information	
Reference	FCC § 15.247(d); FCC § 15.209; ISSED RSS-Gen, Issue 5 A2 (section 6.13)
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6, 11.12
Operator	Ehsan Sohrabi
Date	2023-09-15

3.7.2 Limits

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

3.7.3 Setup





3.7.4 Equipment

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

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

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC2	EF01616	2022-10	2023-10
Spectrum Analyzer	Frankonia	FSW 43	EF00896	2023-08	2024-08
Antenna	Schwarzbeck	BBHA 9120B	EF01678	2021-03	2024-03
Antenna	Schwarzbeck	HWRD 650	EF01679	2021-03	2024-03

3.7.5 Procedure

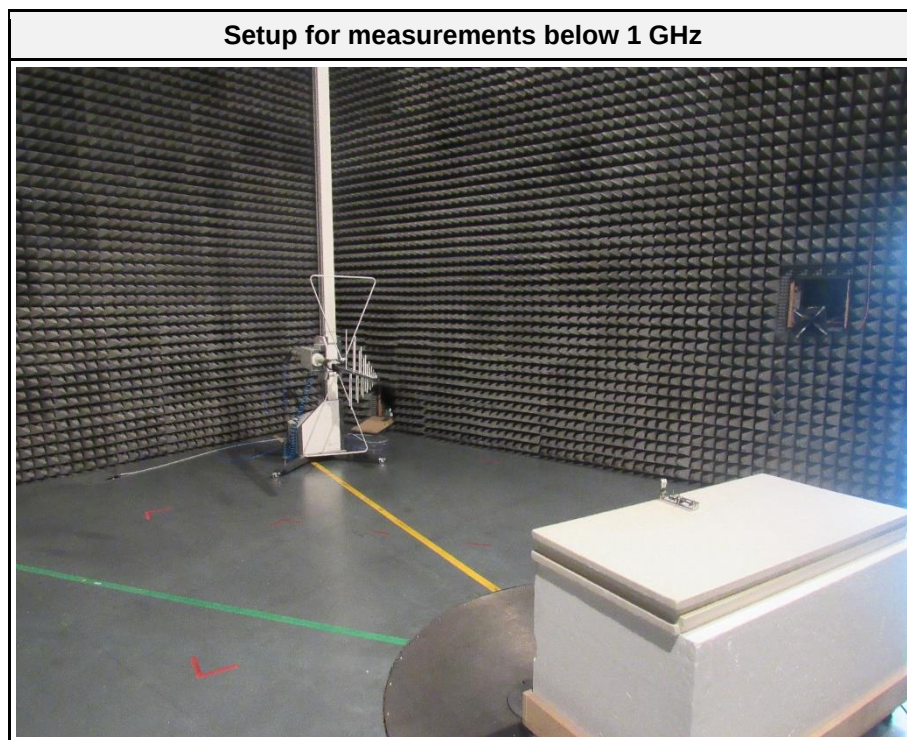
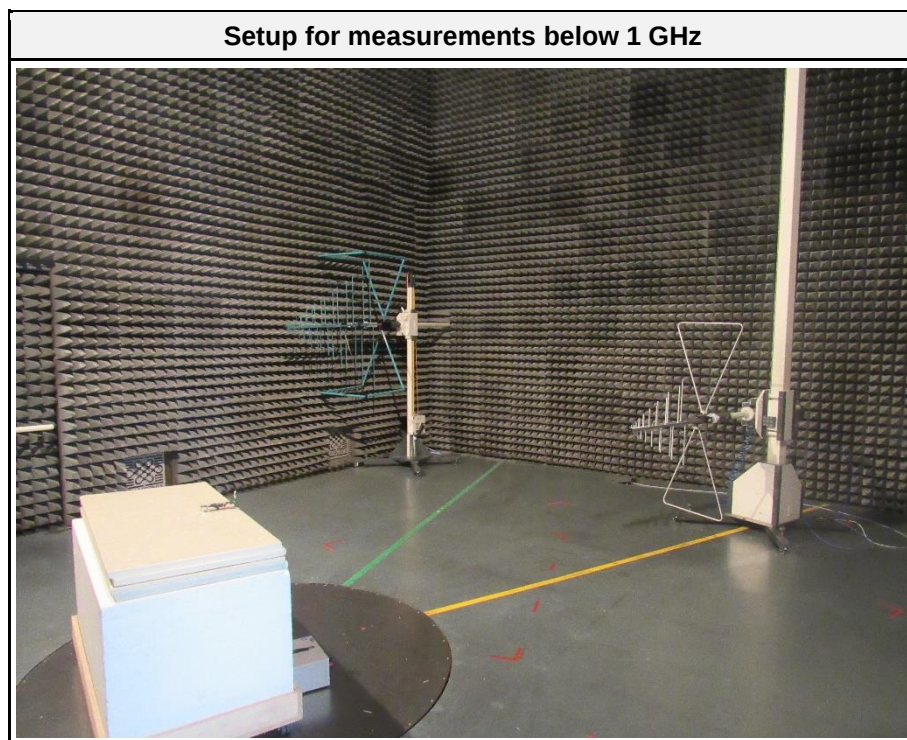
Test Procedure 30 MHz - 1000 MHz	
- EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground - EUT set to test mode - The receiver is set to peak detection with max hold - The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m - All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

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

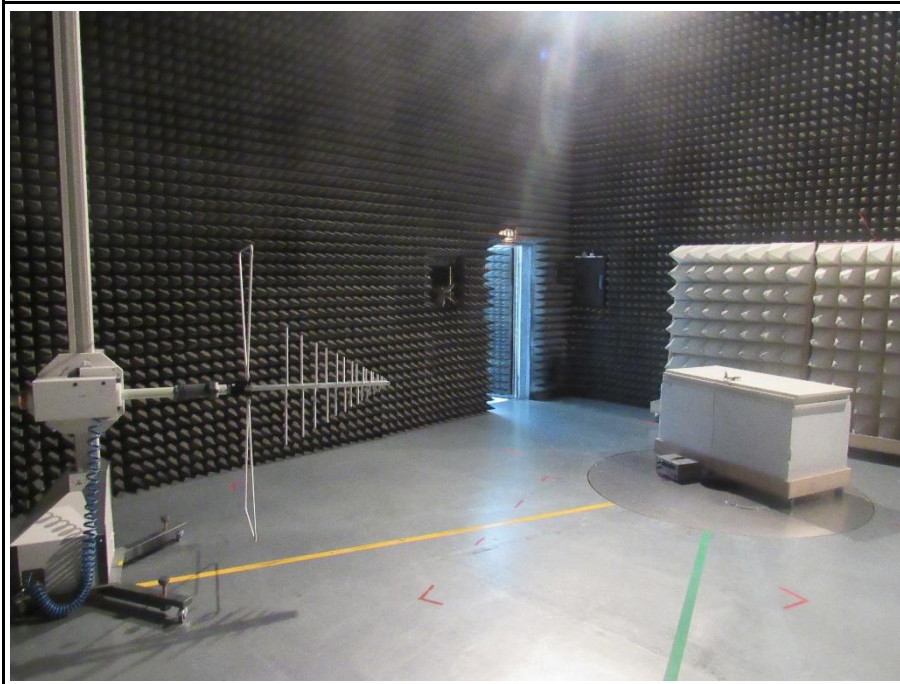
3.7.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
903.50	611.6562	30.20	qpk	hor	46.00	-15.80
903.50	4516.5	49.22	pk	ver	74.00	-24.78
903.50	4516.5	47.19	avg	ver	54.00	-06.81
903.50	8130	50.31	pk	ver	74.00	-23.69
903.50	8130	49.07	avg	ver	54.00	-04.93
915.50	613.3445	30.40	qpk	hor	46.00	-15.64
915.50	4576.3	51.03	pk	ver	74.00	-22.97
915.50	4576.3	49.22	avg	ver	54.00	-04.78
915.50	8238	51.37	pk	ver	74.00	-22.63
915.50	8238	50.37	avg	ver	54.00	-03.63
927.50	612.8335	30.30	qpk	ver	46.00	-15.67
927.50	4636.4	52.82	pk	ver	74.00	-21.18
927.50	4636.4	51.87	avg	ver	54.00	-02.13
927.50	8346	52.85	pk	ver	74.00	-21.15
927.50	8346	51.82	avg	ver	54.00	-02.18

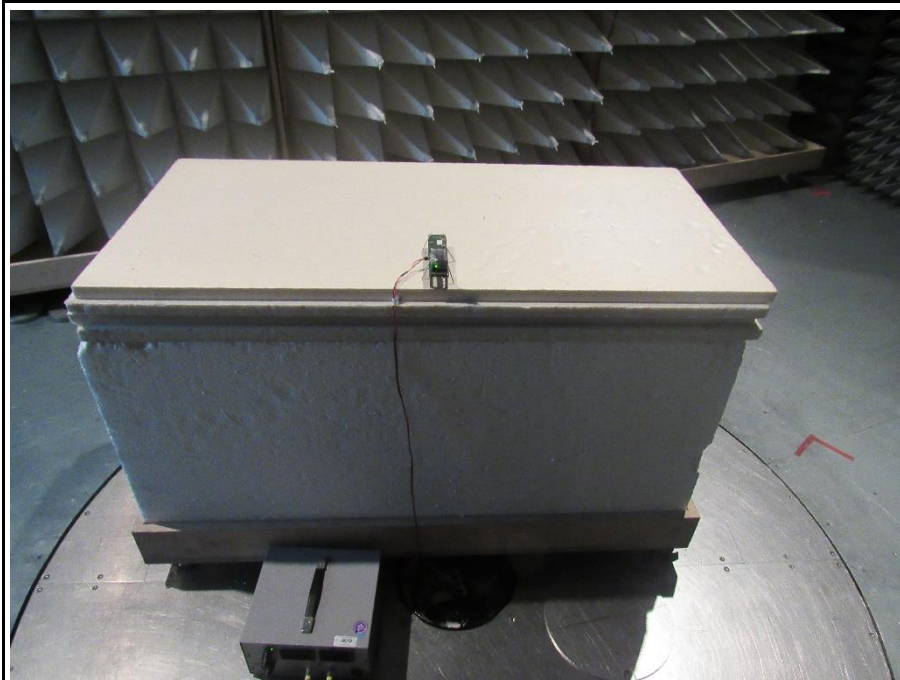
3.7.7 Setup Photos



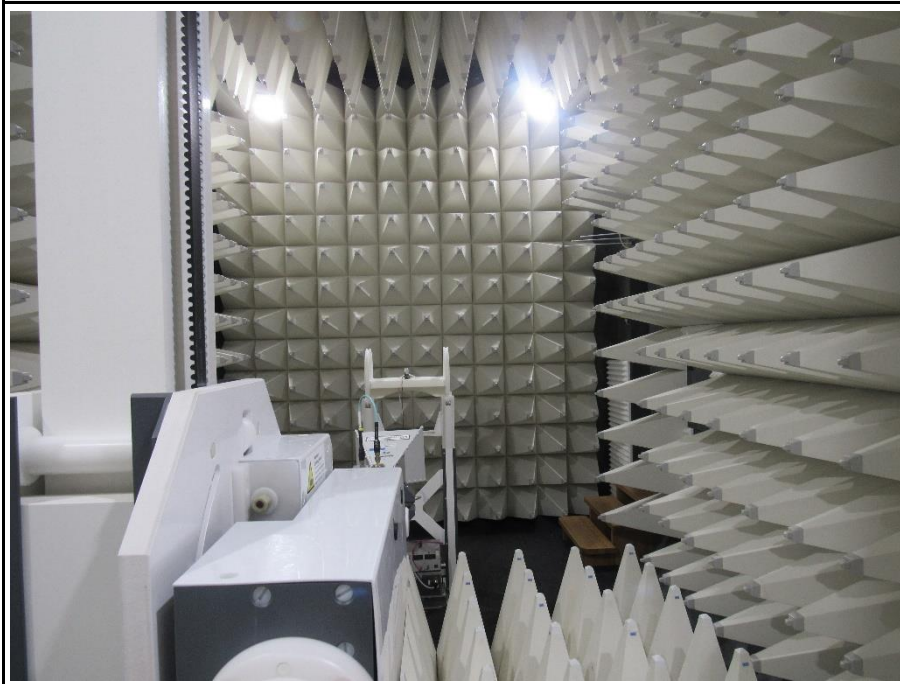
Setup for measurements below 1 GHz



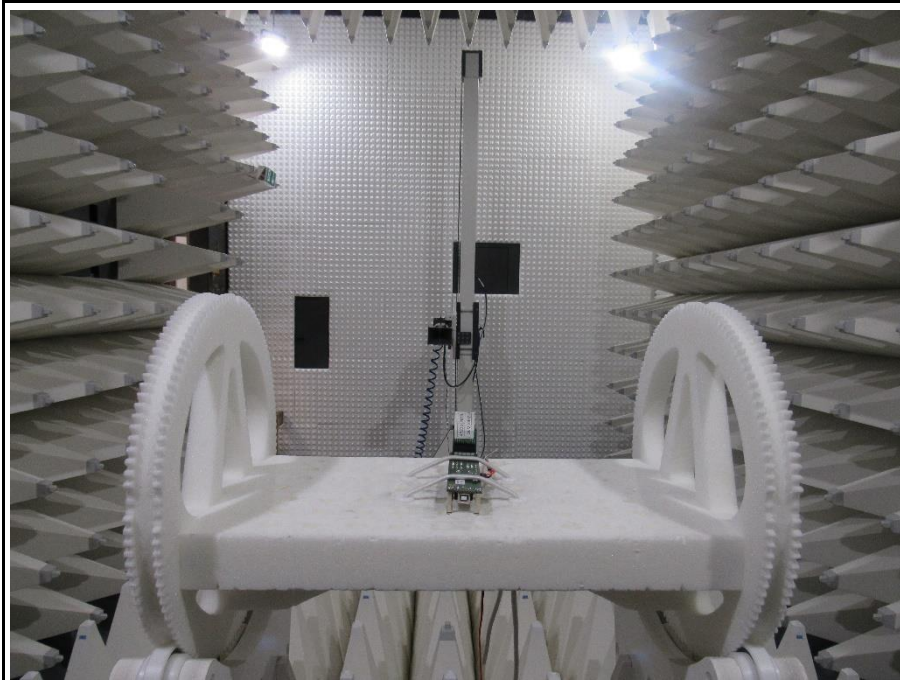
EUT Test Setup

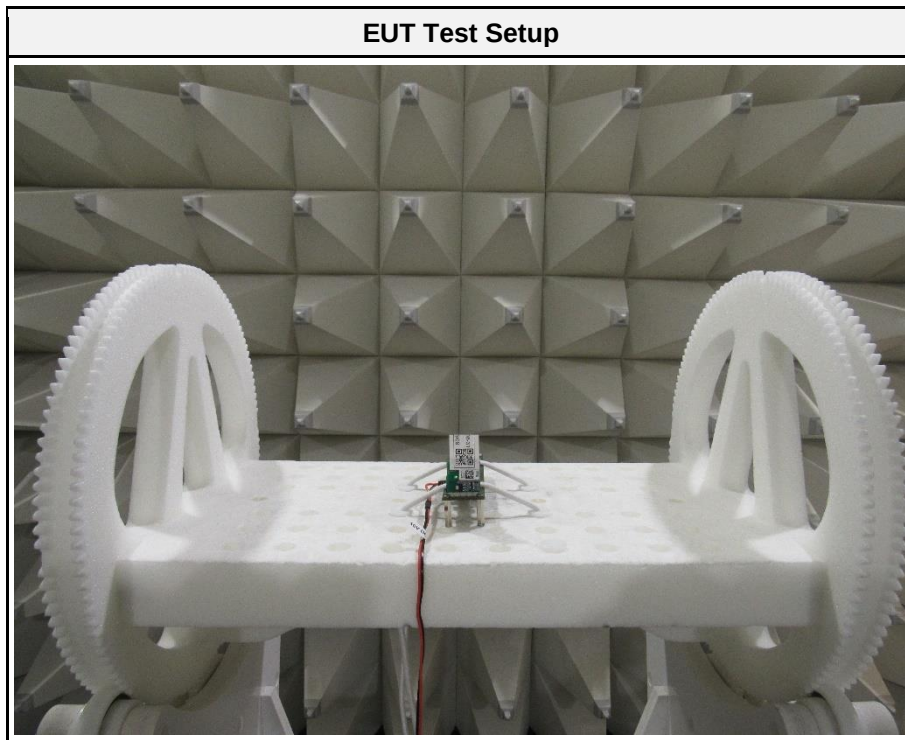


Setup for measurements above 1 GHz



Setup for measurements above 1 GHz





3.8 Test Conditions and Results - Receiver radiated emissions

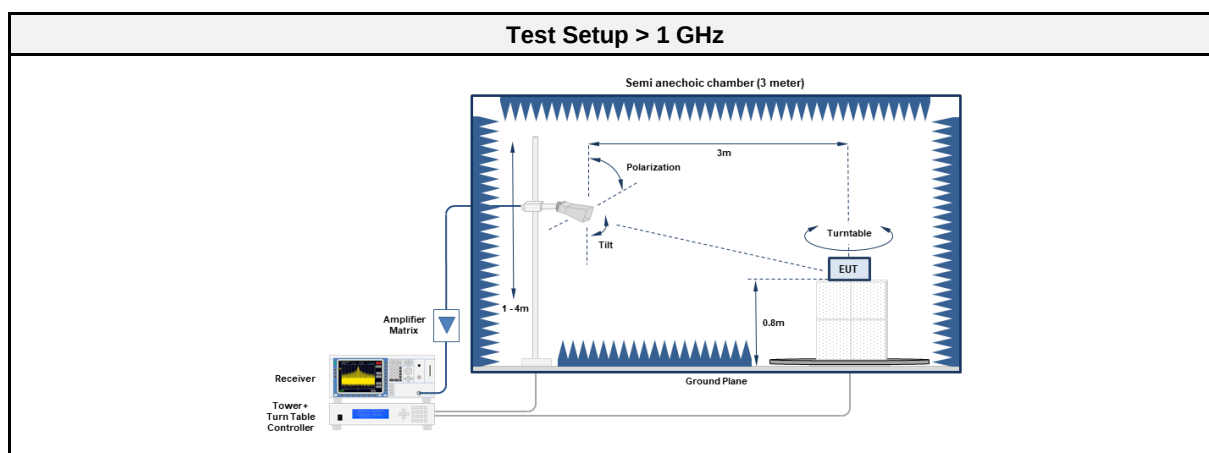
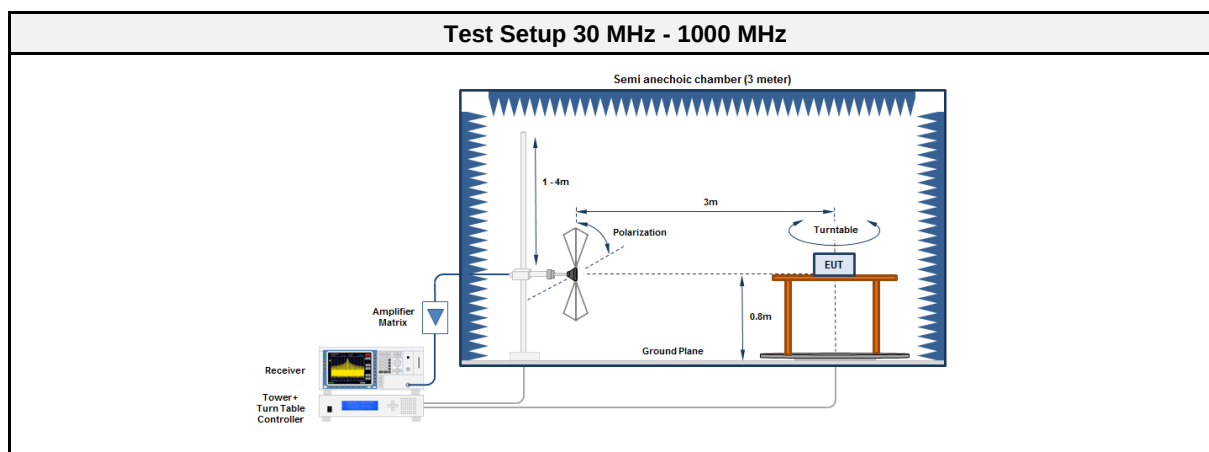
3.8.1 Information

Test Information	
Reference	ISED RSS-247, Issue 3 (section 3.1)
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.4-2014 8.1-8.3
Operator	Ehsan Sohrabi
Date	2023-09-21

3.8.2 Limits

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

3.8.3 Setup



3.8.4 Equipment

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

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

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF01011	2022-11	2023-11
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2023-02	2024-02
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2022-12	2025-12

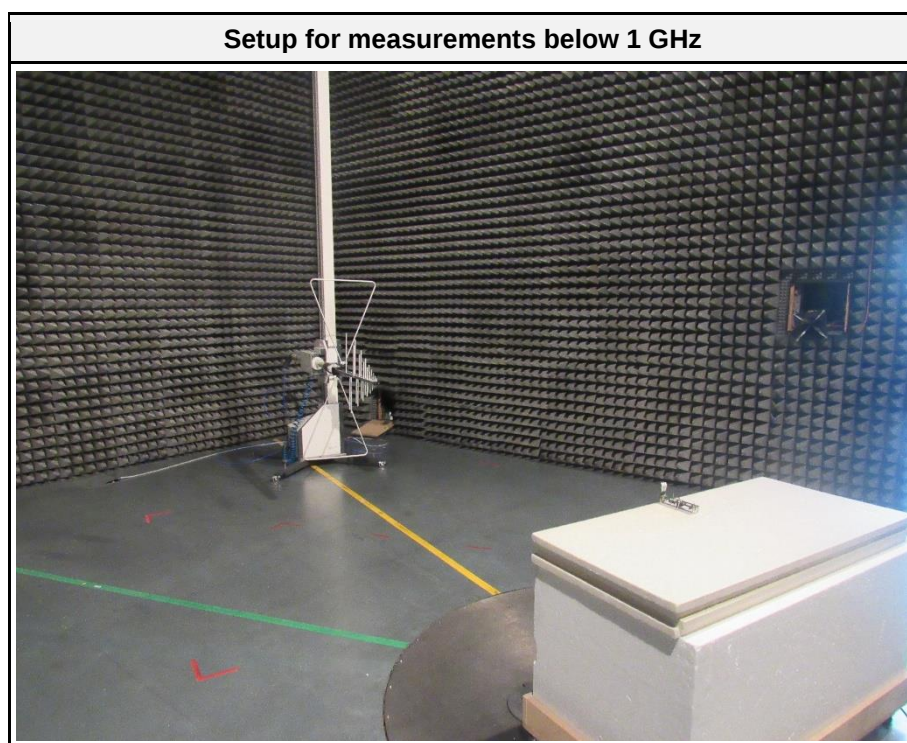
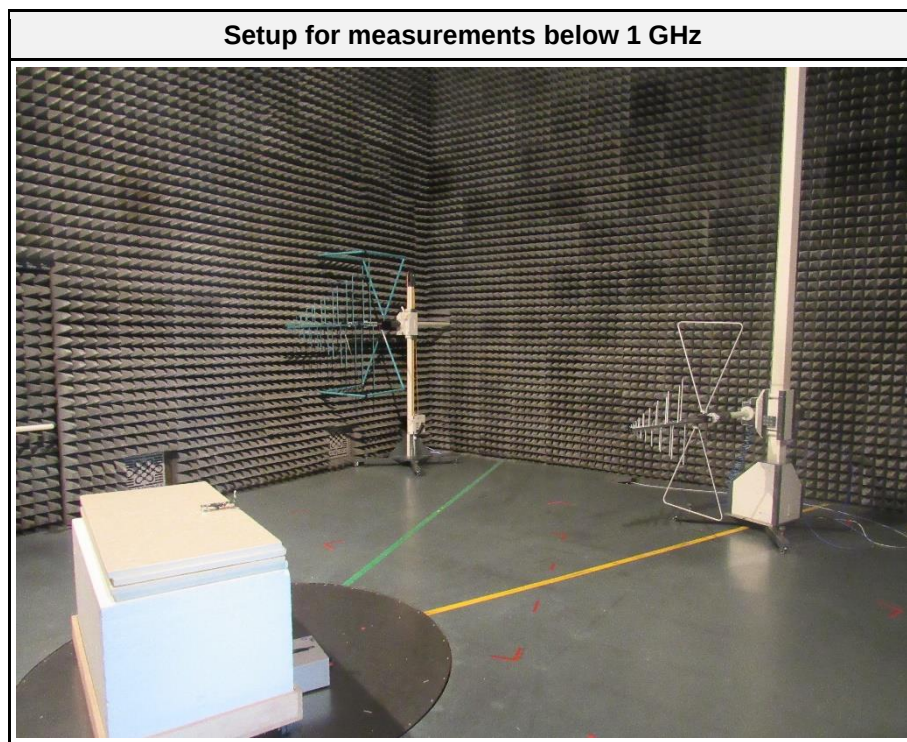
3.8.5 Procedure

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

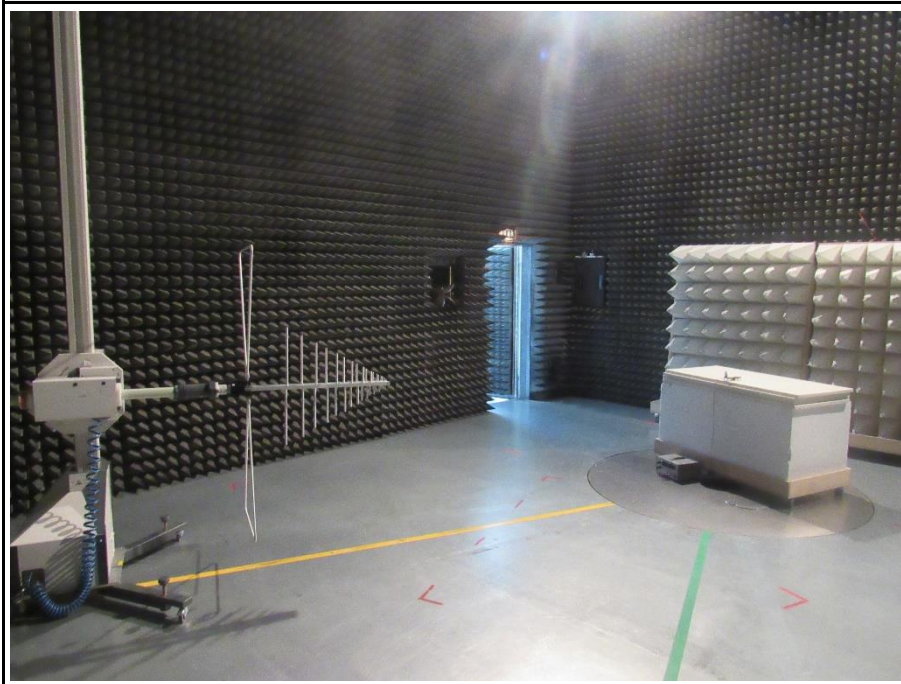
3.8.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
915.50	922.8365	35.30	pk	ver	46.00	-10.74
927.50	956.5683	35.10	pk	hor	46.00	-10.95

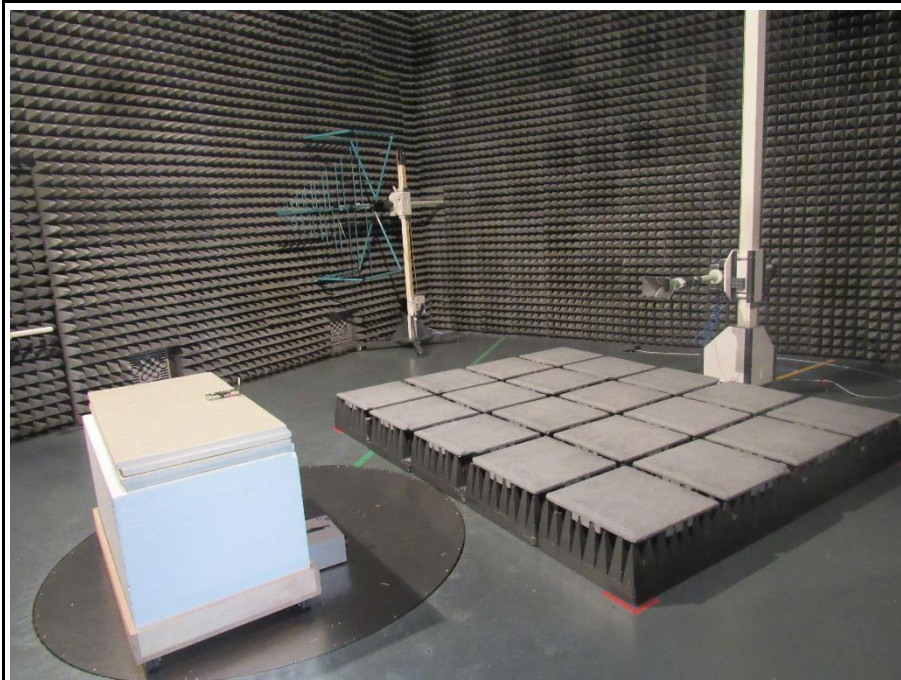
3.8.7 Setup Photos



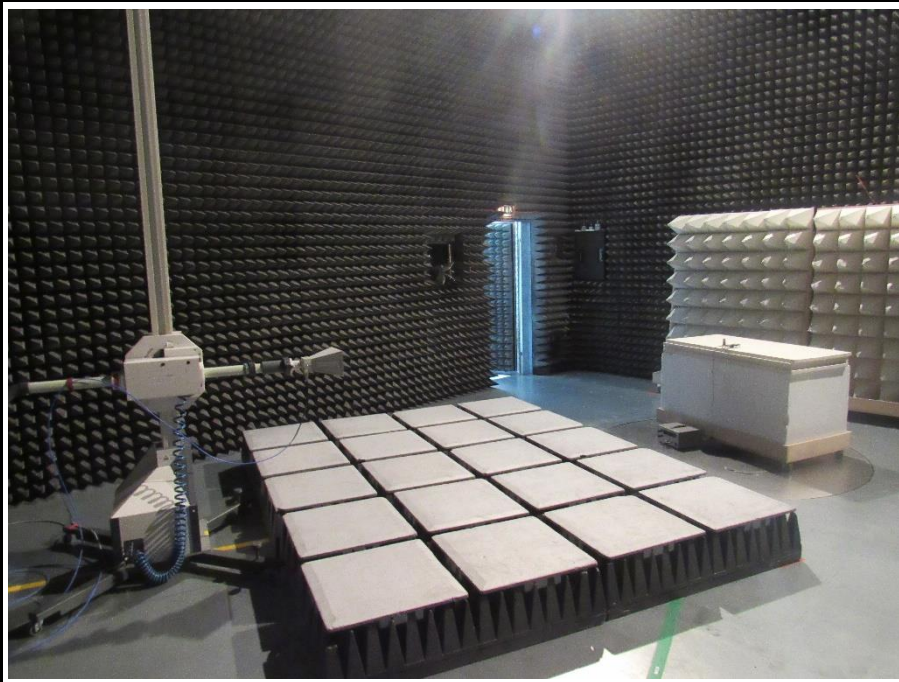
Setup for measurements below 1 GHz



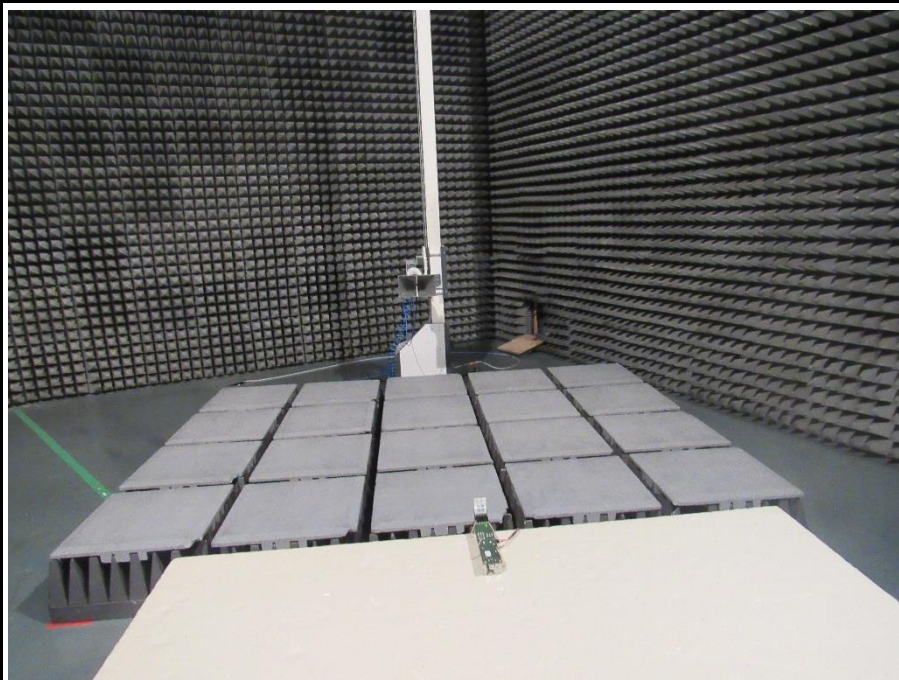
Setup for measurements above 1 GHz



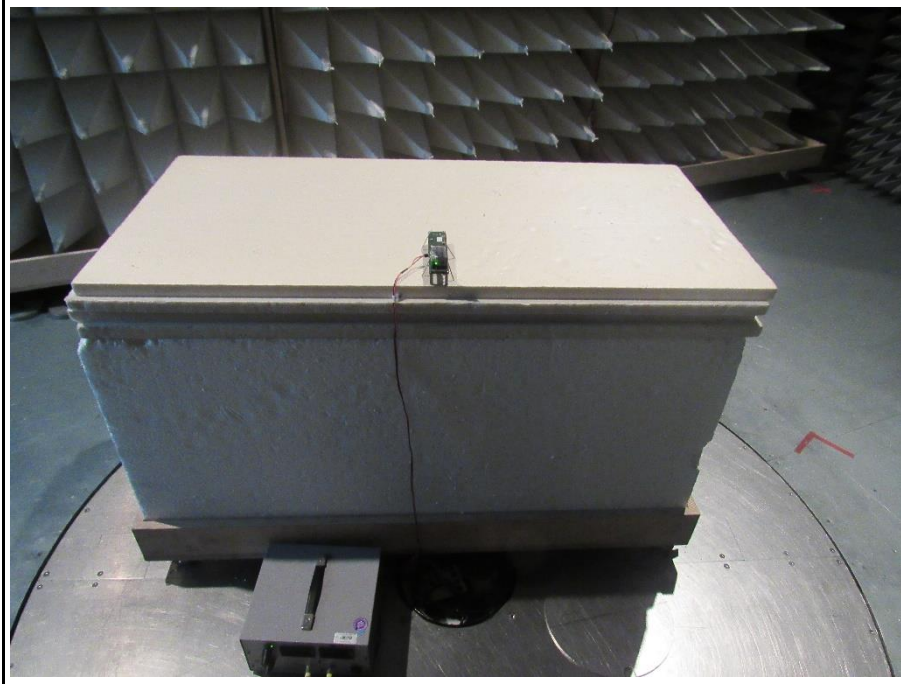
Setup for measurements above 1 GHz



Setup for measurements above 1 GHz



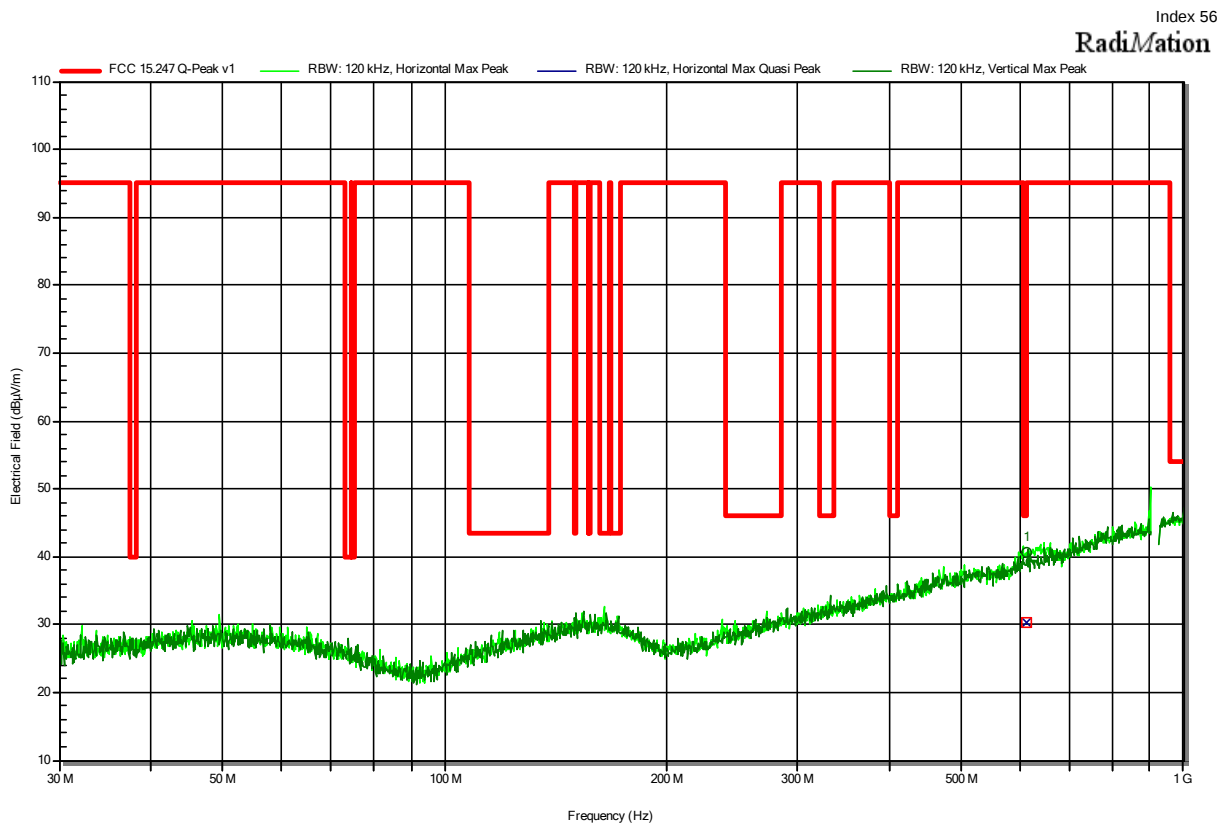
EUT Test Setup



ANNEX A Transmitter spurious emissions

Radiated Spurious Emissions according to 47 CFR Part 15.247

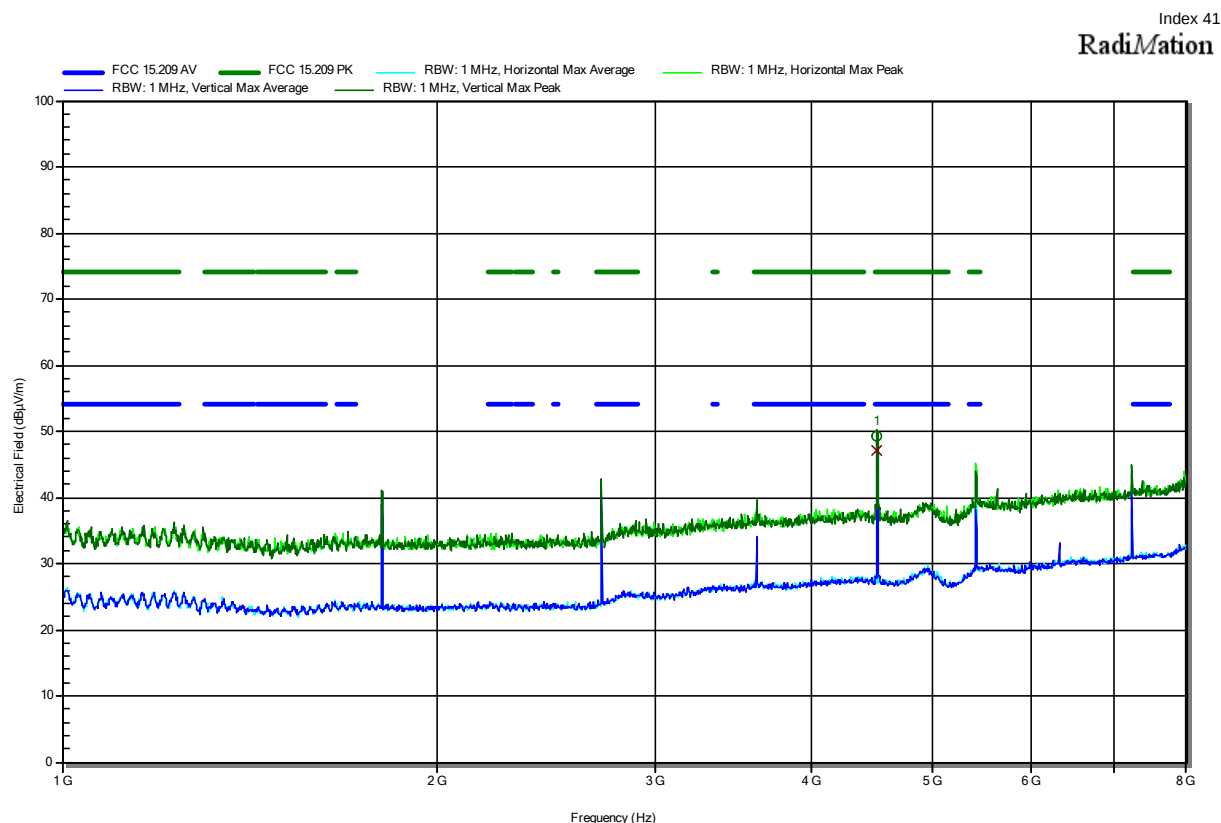
Project Number: G0M-2302-1909
 Applicant: SenTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45236 (ET55)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 10 V DC
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Tx; SRD_903.50 MHz_2GFSK, Power max= 20 dBm
 Test Date: 2023-09-21
 Note:



Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Polarization
611.6562 MHz	30.2 dBμV/m	46 dBμV/m	-15.8 dB	Pass	Horizontal

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1909
 Applicant: SenTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45236 (ET55)
 Test Site: Eurofins Product Service GmbH
 Operator: Ehsan Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 10 V DC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; SRD_903.5 MHz_2GFSK, Power max= 20 dBm
 Test Date: 2023-09-15
 Note:



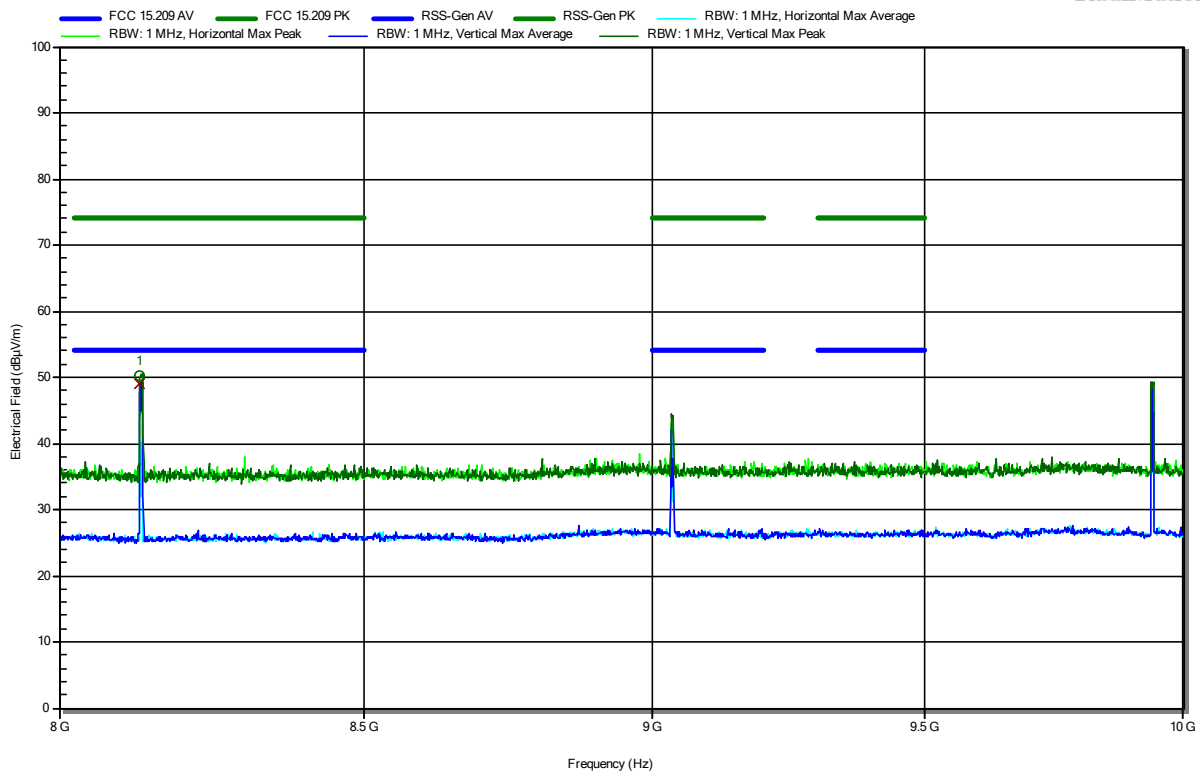
Frequency 4.5165 GHz	Peak 49.22 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -24.78 dB	Peak Status Pass	Polarization Vertical
Frequency 4.5165 GHz	Average 47.19 dBµV/m	Average Limit 54 dBµV/m	Average Difference -6.81 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1909
 Applicant: SenTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45236 (ET55)
 Test Site: Eurofins Product Service GmbH
 Operator: Ehsan Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 10 V DC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; SRD_903.50 MHz_2GFSK, power max= 20 dBm
 Test Date: 2023-09-15
 Note:

Index 48

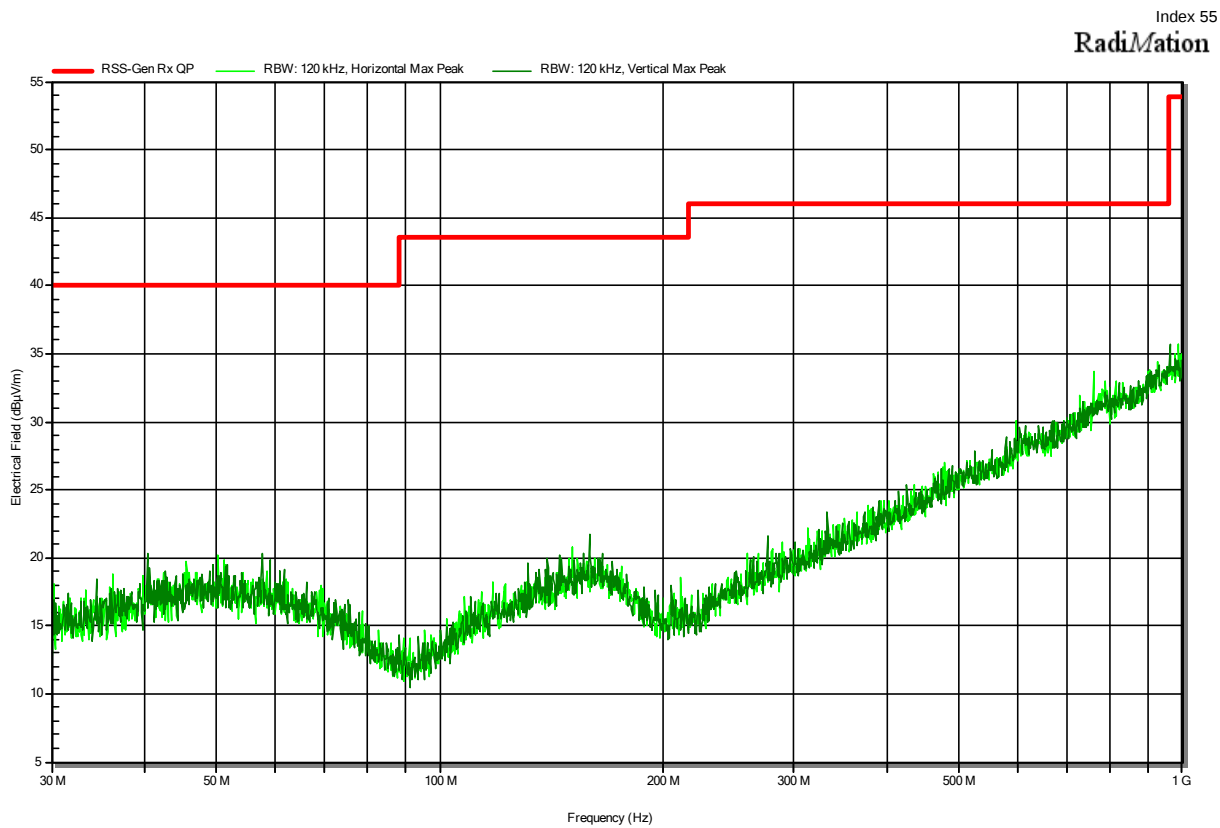
RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
8.13 GHz	50.31 dBµV/m	74 dBµV/m	-23.69 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
8.13 GHz	49.07 dBµV/m	54 dBµV/m	-4.93 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1909
 Applicant: SenTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45250 (ET69)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 10 V DC
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Tx; SRD_915.50 MHz_2GFSK, Power= 19 dBm
 Test Date: 2023-09-21
 Note:



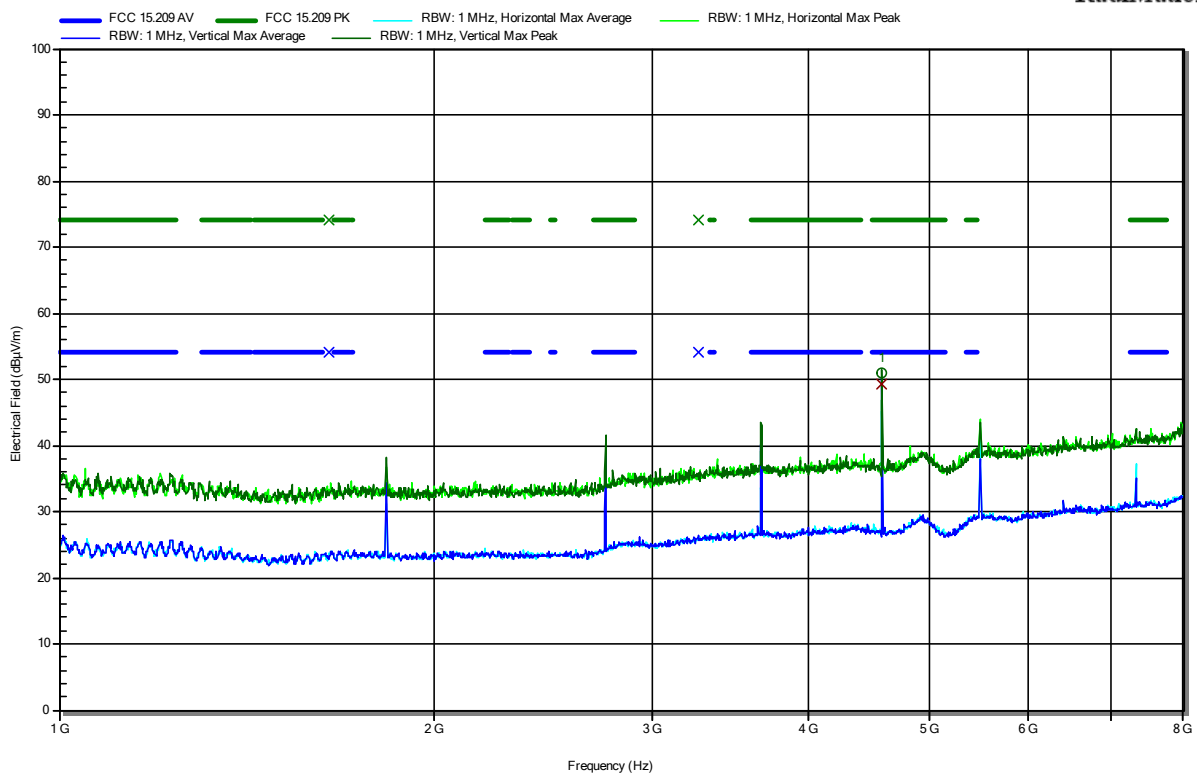
Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Polarization
613.3445 MHz	30.4 dBµV/m	46 dBµV/m	-15.64 dB	Pass	Horizontal

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1909
 Applicant: SenTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45250 (ET69)
 Test Site: Eurofins Product Service GmbH
 Operator: Ehsan Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 10 V DC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; SRD_915.50 MHz_2GFSK, power= 19 dBm
 Test Date: 2023-09-15
 Note:

Index 44

RadiMation



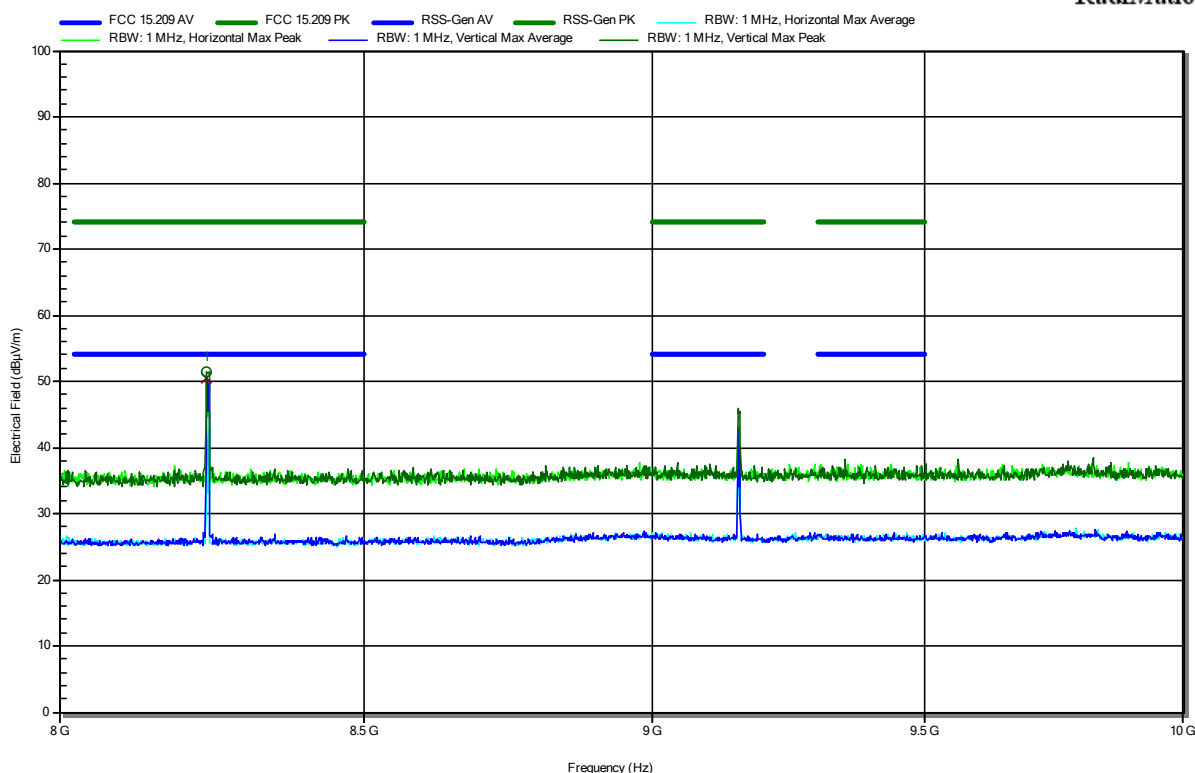
Frequency 4.5763 GHz	Peak 51.03 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -22.97 dB	Peak Status Pass	Polarization Vertical
Frequency 4.5763 GHz	Average 49.22 dBµV/m	Average Limit 54 dBµV/m	Average Difference -4.78 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1909
 Applicant: SenTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45250 (ET69)
 Test Site: Eurofins Product Service GmbH
 Operator: Ehsan Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 10 V DC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; SRD_915.50 MHz_2GFSK, power= 19 dBm
 Test Date: 2023-09-15
 Note:

Index 47

RadiMation



Frequency 8.238 GHz	Peak 51.37 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -22.63 dB	Peak Status Pass	Polarization Vertical
Frequency 8.238 GHz	Average 50.37 dBµV/m	Average Limit 54 dBµV/m	Average Difference -3.63 dB	Average Status Pass	Polarization Vertical

Test Report No.: G0M-2302-1909-TFC247DT-V02

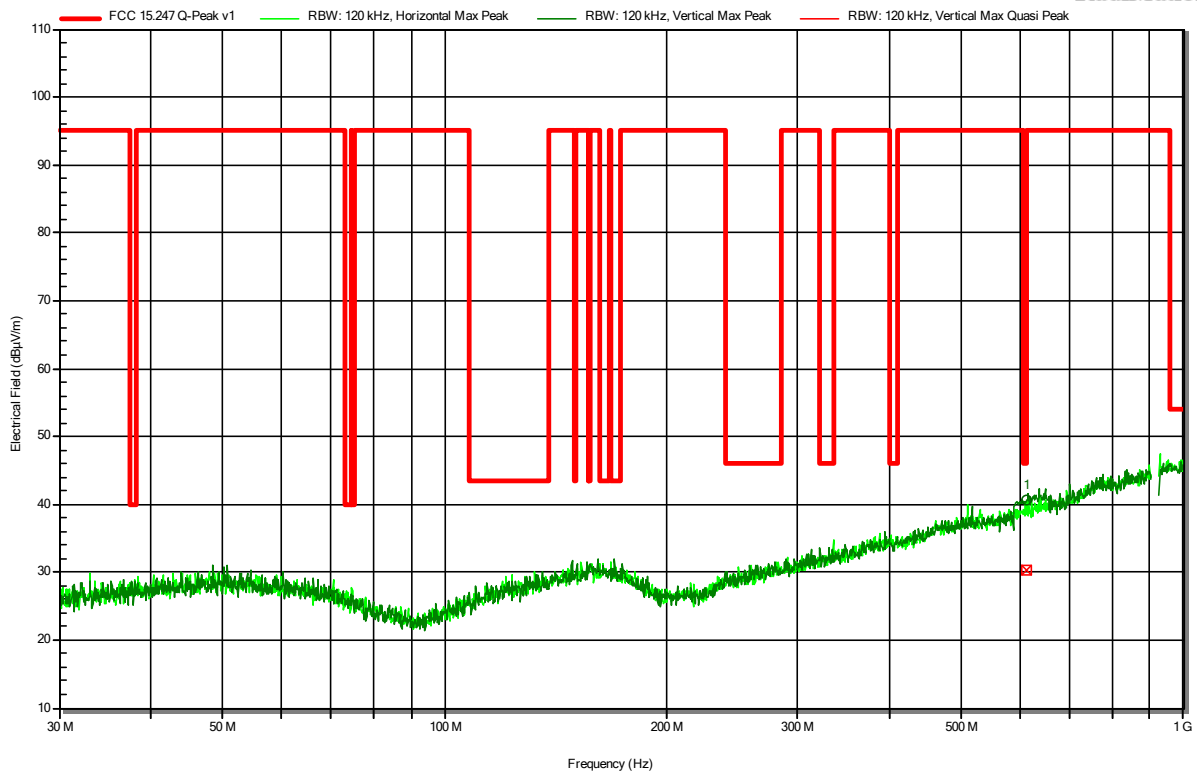
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1909
 Applicant: SenTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45264 (ET83)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 10 V DC
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Tx; SRD_927.50 MHz_2GFSK, Power= 19 dBm
 Test Date: 2023-09-21
 Note:

Index 58

RadiMation



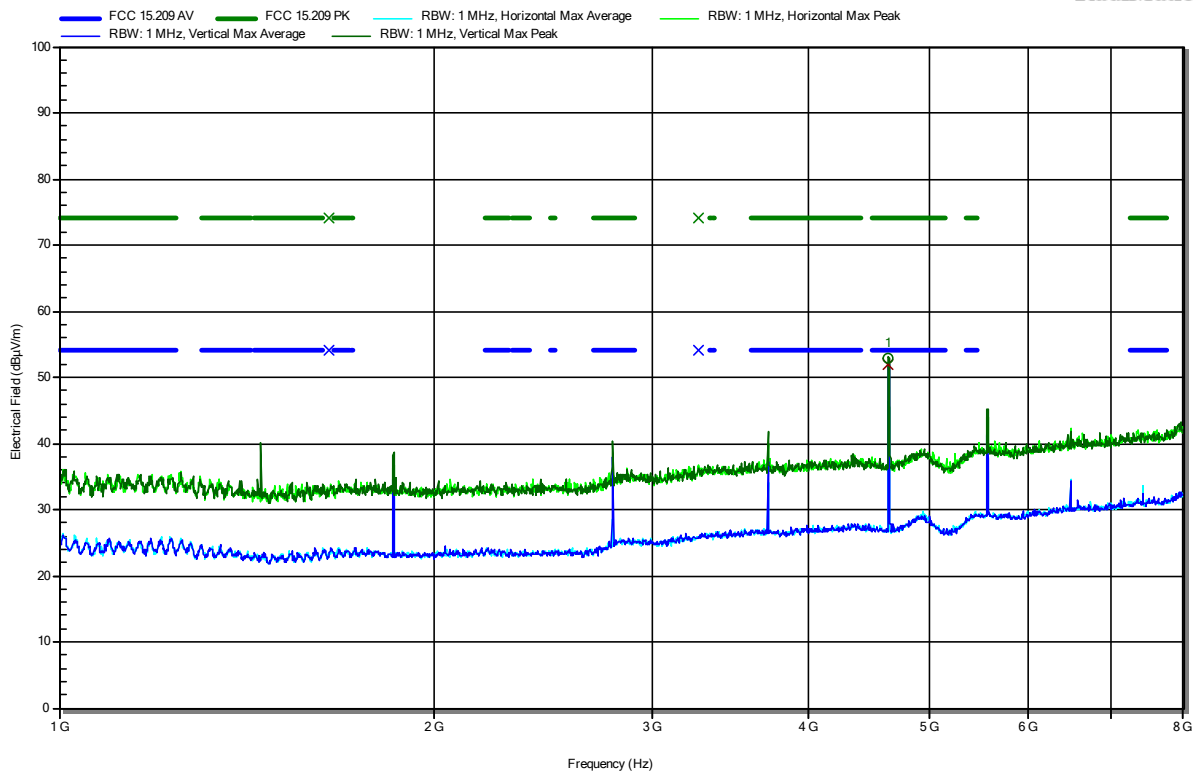
Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Polarization
612.8335 MHz	30.3 dBμV/m	46 dBμV/m	-15.67 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1909
 Applicant: SenTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45264 (ET83)
 Test Site: Eurofins Product Service GmbH
 Operator: Ehsan Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 10 V DC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; SRD_927.50 MHz_2GFSK, power= 19 dBm
 Test Date: 2023-09-15
 Note:

Index 45

RadiMation



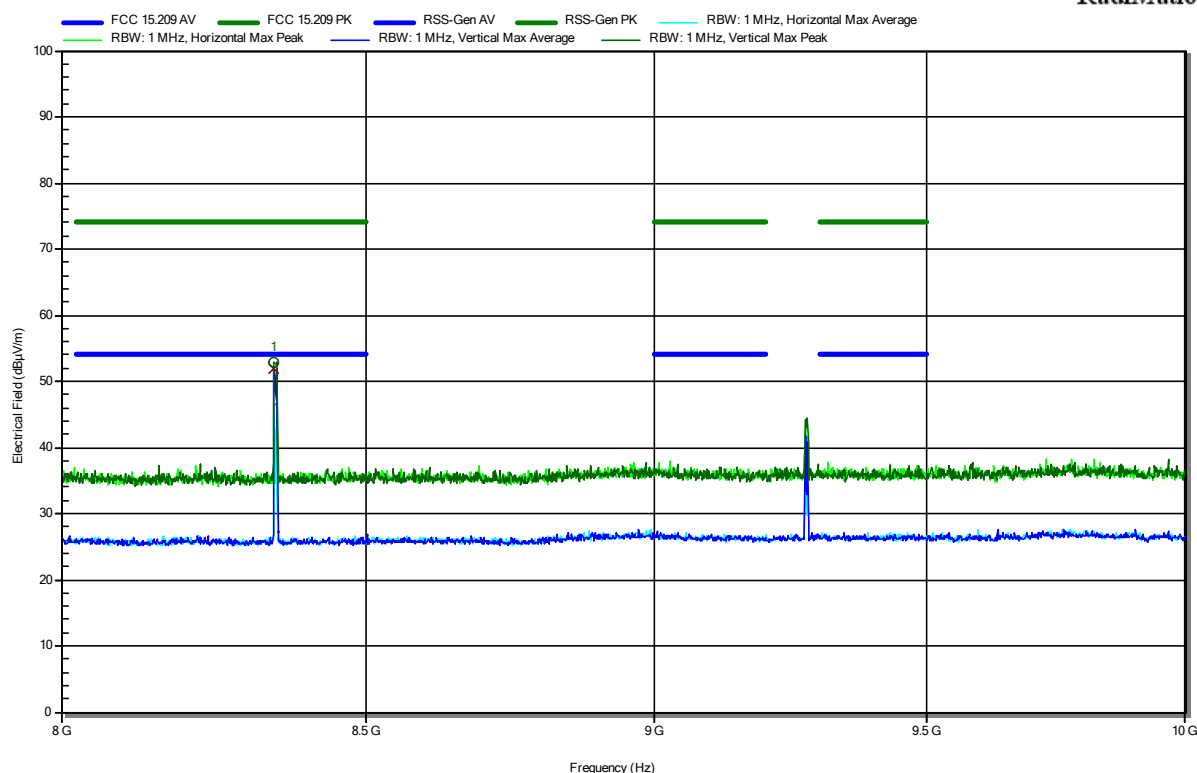
Frequency 4.6364 GHz	Peak 52.82 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -21.18 dB	Peak Status Pass	Polarization Vertical
Frequency 4.6364 GHz	Average 51.87 dBµV/m	Average Limit 54 dBµV/m	Average Difference -2.13 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2302-1909
 Applicant: SenTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45264 (ET83)
 Test Site: Eurofins Product Service GmbH
 Operator: Ehsan Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 10 V DC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; SRD_927.50 MHz_2GFSK, power= 19 dBm
 Test Date: 2023-09-15
 Note:

Index 46

RadiMation



Frequency 8.346 GHz	Peak 52.85 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -21.15 dB	Peak Status Pass	Polarization Vertical
Frequency 8.346 GHz	Average 51.82 dBµV/m	Average Limit 54 dBµV/m	Average Difference -2.18 dB	Average Status Pass	Polarization Vertical

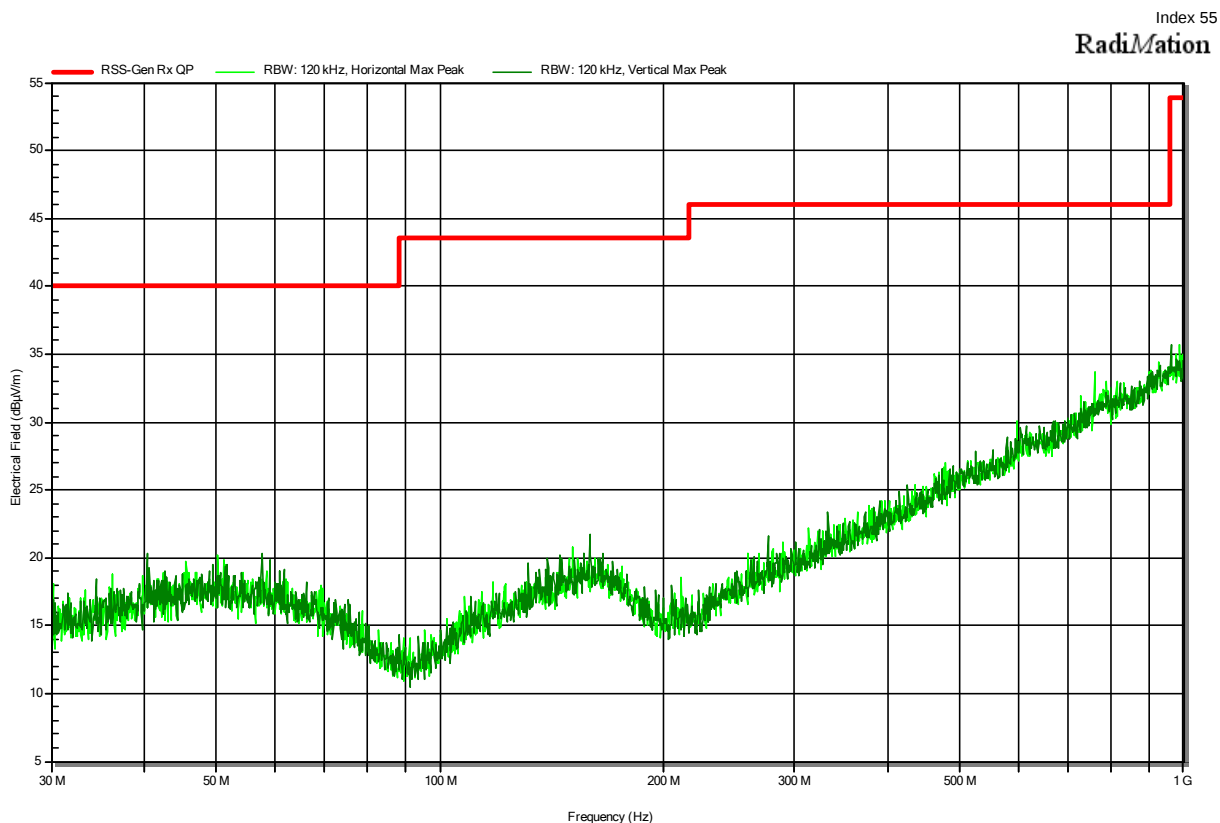
Test Report No.: G0M-2302-1909-TFC247DT-V02

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

ANNEX B Receiver spurious emissions

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 3

Project Number: G0M-2302-1909
 Applicant: SenTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45230 (ET52)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 10 V DC
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Rx; SRD_903.50 MHz_2GFSK- Rx Mode
 Test Date: 2023-09-21
 Note:

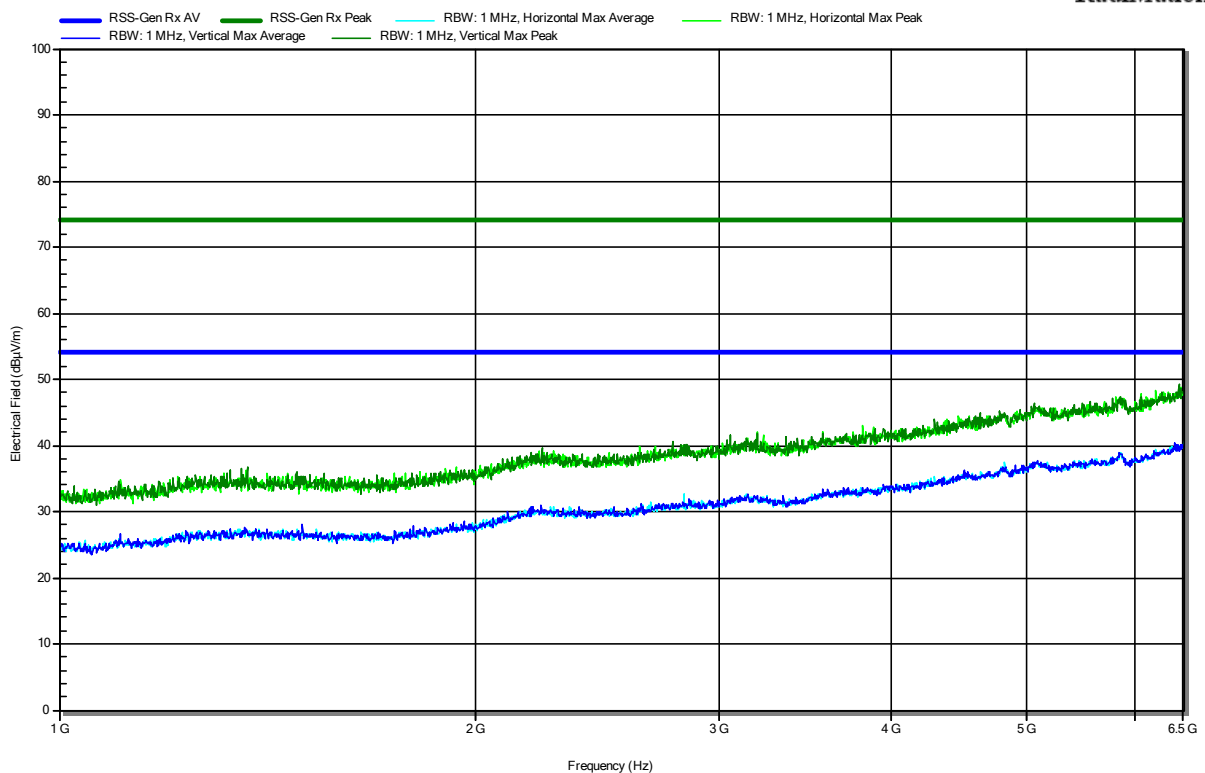


Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 3

Project Number: G0M-2302-1909
 Applicant: SenTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45230 (ET52)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 10 V DC
 Antenna: Schwarzbeck BBHA 9120D
 Measurement distance: 3 m
 Mode: Rx; SRD_903.50 MHz_2GFSK- Rx Mode
 Test Date: 2023-09-21
 Note:

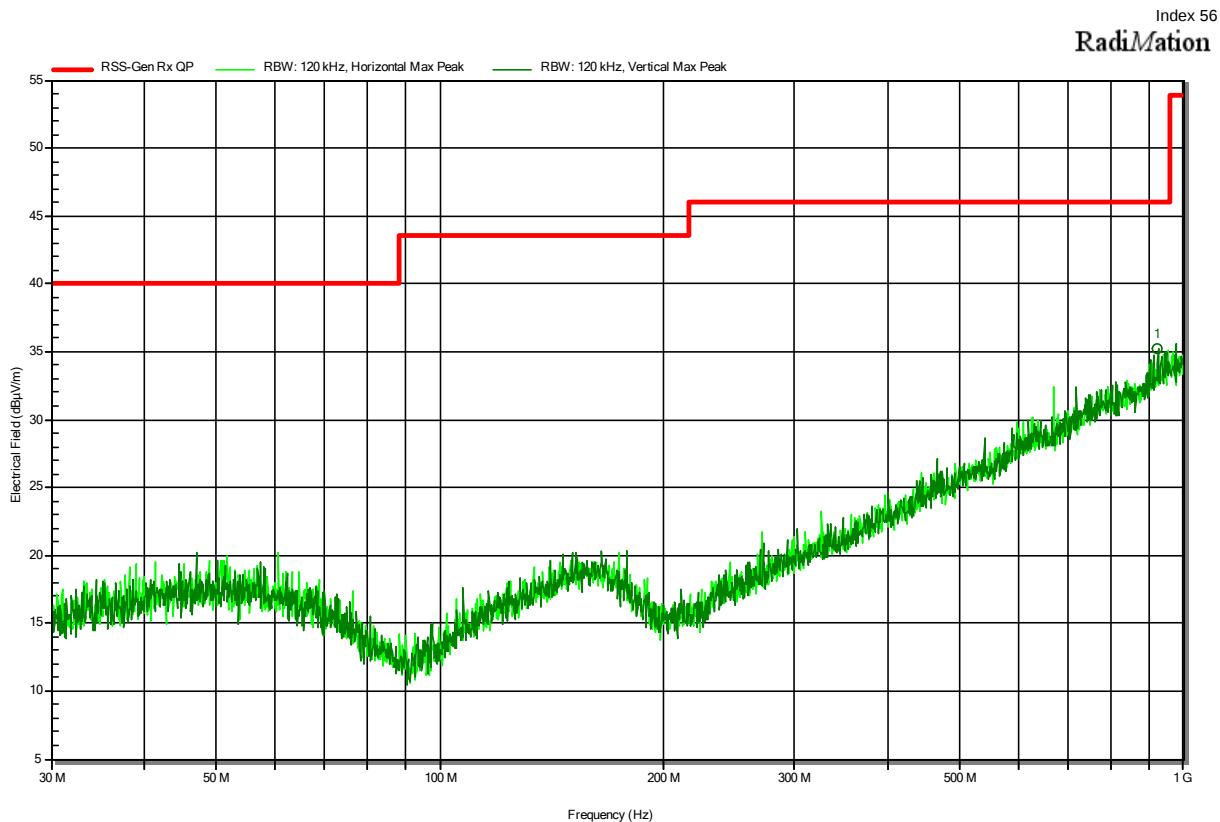
Index 60

RadiMation



Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 3

Project Number: G0M-2302-1909
 Applicant: SenTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45244 (ET66)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 10 V DC
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Rx; SRD_915.50 MHz_2GFSK- Rx Mode
 Test Date: 2023-09-21
 Note:



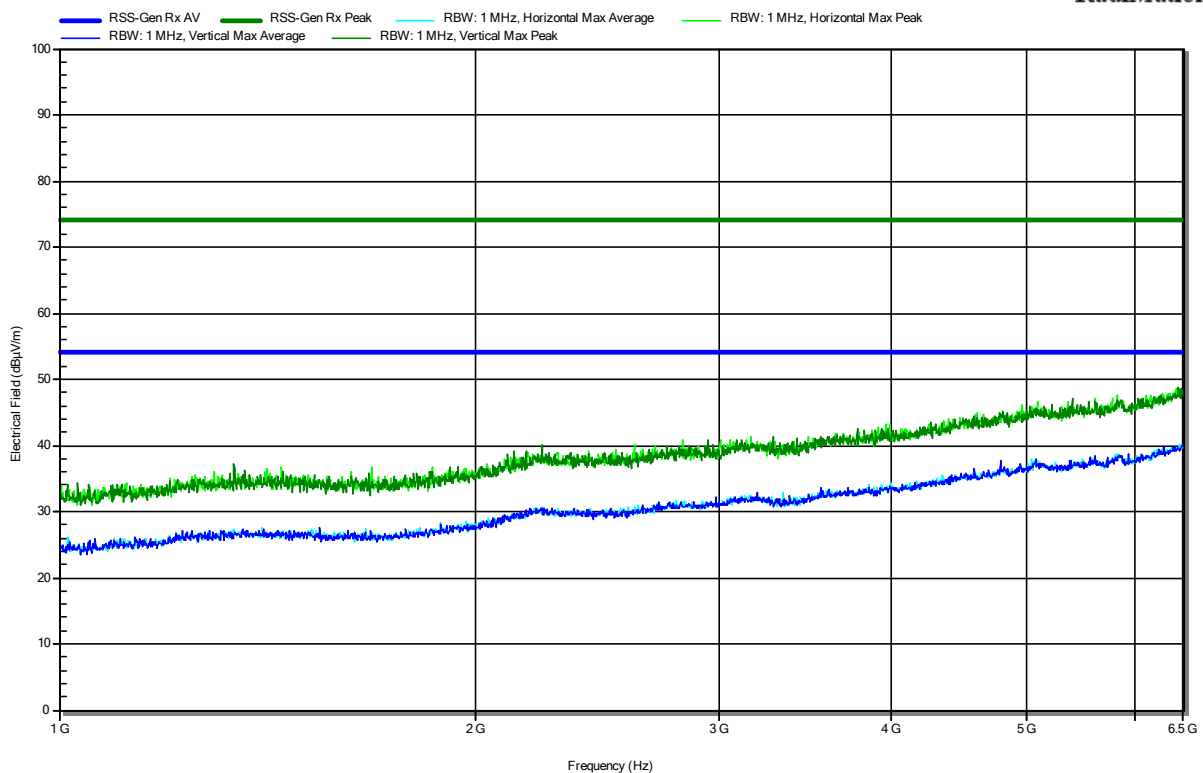
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
922.8365 MHz	35.3 dBµV/m	46 dBµV/m	-10.74 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 3

Project Number: G0M-2302-1909
 Applicant: SenTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45244 (ET66)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 10 V DC
 Antenna: Schwarzbeck BBHA 9120D
 Measurement distance: 3 m
 Mode: Rx; SRD_915.50 MHz_2GFSK- Rx Mode
 Test Date: 2023-09-21
 Note:

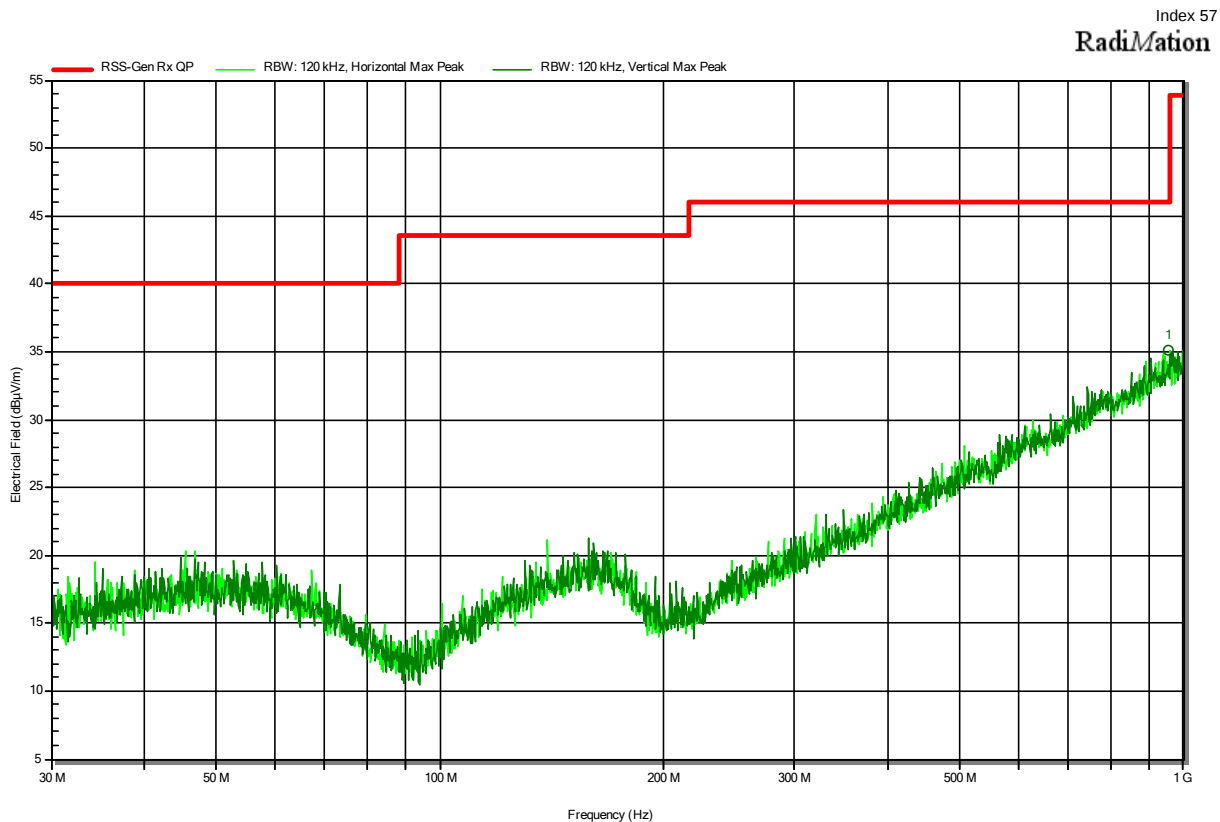
Index 59

RadiMation



Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 3

Project Number: G0M-2302-1909
 Applicant: SenTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45258 (ET80)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 10 V DC
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Rx; SRD_927.50 MHz_2GFSK- Rx Mode
 Test Date: 2023-09-21
 Note:



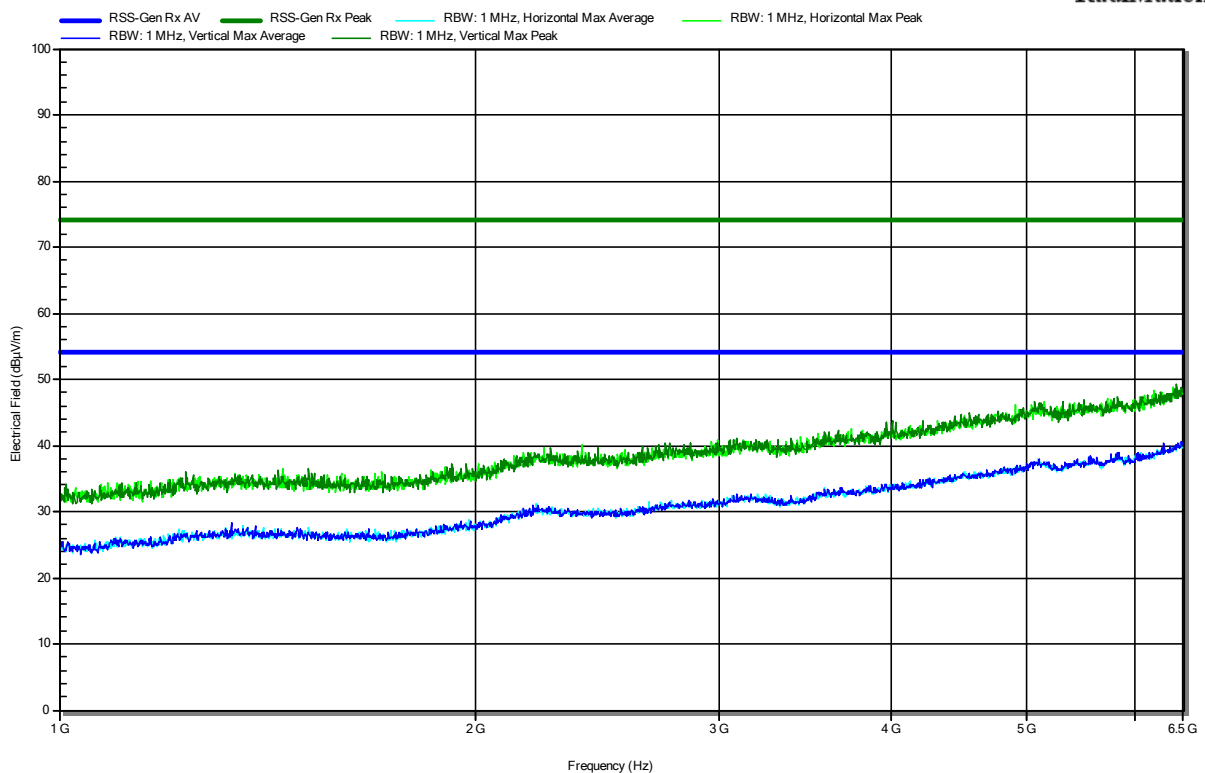
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
956.5683 MHz	35.1 dBµV/m	46 dBµV/m	-10.95 dB	Pass	Horizontal

Radiated Spurious Emissions according to 47 CFR Part 15.247, RSS-247 Issue 3

Project Number: G0M-2302-1909
 Applicant: SenTec Elektronik GmbH
 Model Description: Radio Modul 868MHz
 Model: Modul 868MHz IX
 Test Sample ID: 45258 (ET80)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Sohrabi
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 10 V DC
 Antenna: Schwarzbeck BBHA 9120D
 Measurement distance: 3 m
 Mode: Rx; SRD_927.50 MHz_2GFSK- Rx Mode
 Test Date: 2023-09-21
 Note:

Index 58

RadiMation



== = END OF TEST REPORT == =