

FCC TEST REPORT	
FCC 47 CFR Part 15C Industry Canada RSS-210 Intentional radiator operating within the 902 – 928 MHz band	
Report Reference No.....	G0M-1503-4568-TFC249DT-V02
Testing Laboratory	Eurofins Product Service GmbH
Address.....	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	  A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Filed Test Laboratory, Reg.-No.: 96970 IC OATS Filing assigned code: 3470A
Applicant's name	ELDAT GmbH
Address.....	Im Gewerbepark 14 15711 Königs Wusterhausen GERMANY
Test specification:	
Standard	47 CFR Part 15C RSS-210, Issue 8, 2010-12 RSS-Gen, Issue 4, 2014-11 ANSI C63.4:2009
Test scope.....	complete Radio compliance test
Equipment under test (EUT):	
Product description	Handsender, 916MHz, FSK
Model No.	RT44
Additional Model(s)	None
Brand Name(s)	None
Hardware version	None
Firmware / Software version	None
	FCC-ID: RZZNZ80248 IC: N/A
Test result	Passed

Possible test case verdicts:

- neither assessed nor tested: N/N
- required by standard but not appl. to test object.....: N/A
- required by standard but not tested.....: N/T
- not required by standard for the test object: N/R
- test object does meet the requirement.....: P (Pass)
- test object does not meet the requirement.....: F (Fail)

Testing:

Test Lab Temperature.....: 20 – 23 °C

Test Lab Humidity: 32 – 38 %

Date of receipt of test item: 2015-03-18

Date (s) of performance of tests: 2015-03-27

Compiled by: Burkhard Pudell

Tested by (+ signature): Burkhard Pudell
(Responsible for Test)

Approved by (+ signature): Toralf Jahn

Date of issue: 2016-04-22

Total number of pages: 29


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:

Version History

Version	Issue Date	Remarks	Revised by
01	2015-06-18	Initial Release	
02	2016-04-22	FCC ID added; antenna gain corrected.	B. Pudell

REPORT INDEX

1	EQUIPMENT (TEST ITEM) DESCRIPTION	5
1.1	Photos – Equipment External	6
1.2	Photos – Equipment internal	7
1.3	Photos – Test setup	8
1.4	Supporting Equipment Used During Testing	9
1.5	Test Modes	10
1.6	Test Equipment Used During Testing	11
1.7	Sample emission level calculation	12
2	RESULT SUMMARY	13
3	TEST CONDITIONS AND RESULTS	14
3.1	Test Conditions and Results – Occupied Bandwidth	14
3.2	Test Conditions and Results – Fundamental field strength emissions	16
3.3	Test Conditions and Results – Emissions radiated outside the specified frequency band	18
ANNEX A	Transmitter radiated spurious emissions	20

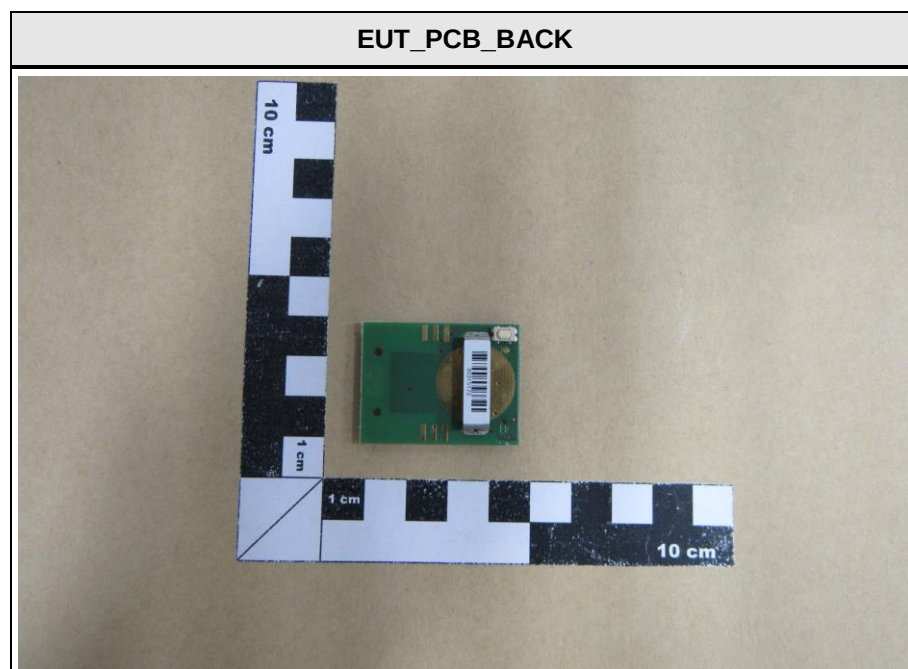
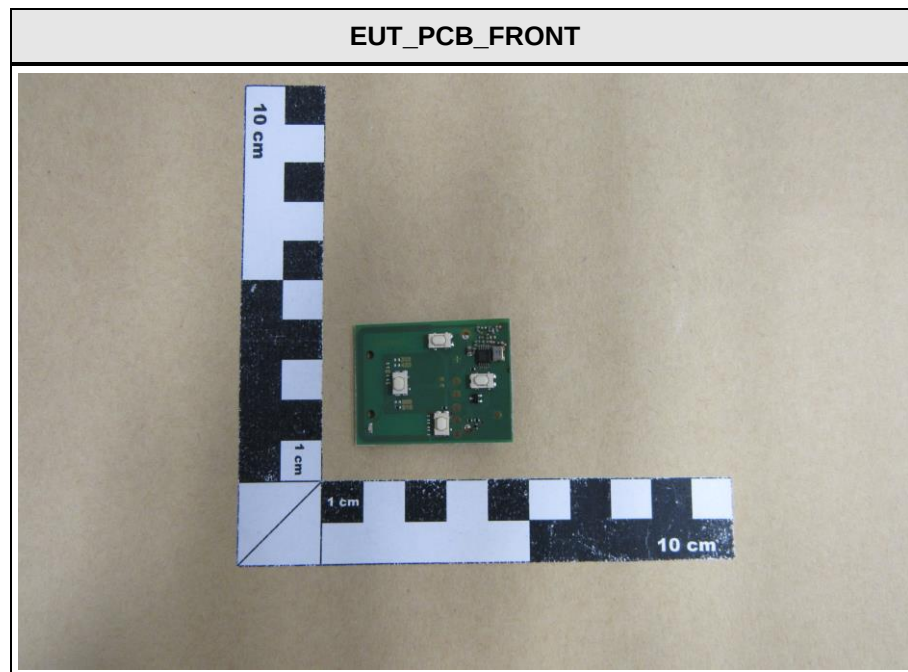
1 Equipment (Test item) Description

Description	Handsender, 916MHz, FSK	
Model	RT44	
Additional Model(s)	None	
Brand Name(s)	None	
Serial number	None	
Hardware version	None	
Software / Firmware version	None	
FCC-ID	RZZNZ80248	
Equipment type	End product	
Radio type	Transmitter only	
Radio technology	SRD	
Operating frequency range	916.5 MHz	
Assigned frequency band	902 - 928 MHz	
Frequency range	F _{MID}	916.5 MHz
Spreading	None	
Modulations	FSK	
Number of channels	1	
Channel spacing	None	
Number of antennas	1	
Antenna	Type	integrated
	Model	PCB antenna
	Manufacturer	Eldat GmbH
	Gain	-8.25dBi (by manufacturer)
Manufacturer	ELDAT GmbH Im Gewerbepark 14 15711 Königs Wusterhausen GERMANY	
Power supply	V _{NOM}	3.0 VDC (Lithium-Battery)
	V _{MIN}	N/A
	V _{MIN}	N/A
AC/DC-Adaptor	Model	N/A
	Vendor	N/A
	Input	N/A
	Output	N/A

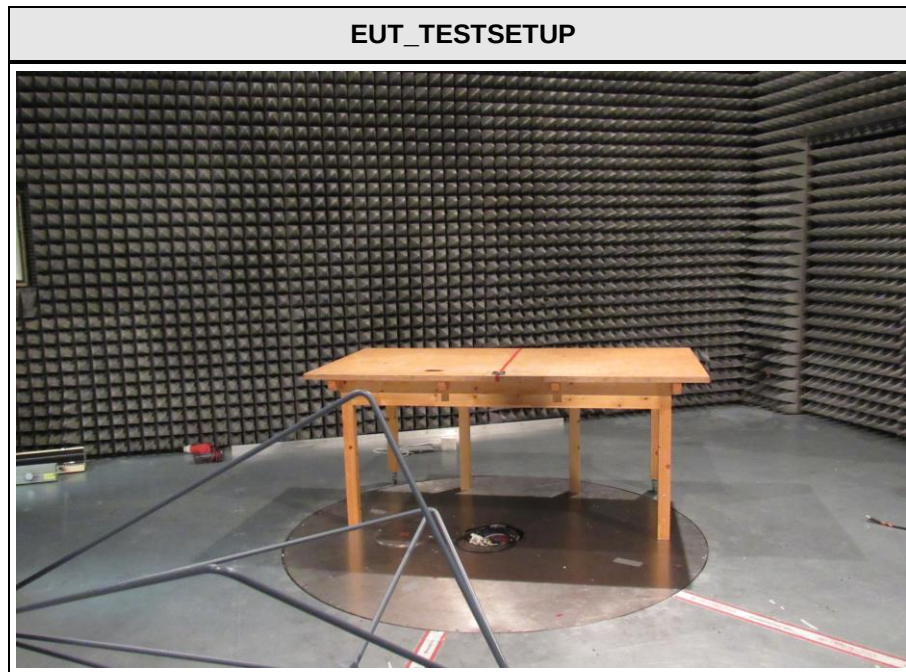
1.1 Photos – Equipment External



1.2 Photos – Equipment internal



1.3 Photos – Test setup



1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
None				
*Note: Use the following abbreviations: AE : Auxiliary/Associated Equipment, or SIM : Simulator (Not Subjected to Test) CABL : Connecting cables				

1.5 Test Modes

Mode #	Description	
Single	General conditions:	EUT powered by fully charged battery
	Radio conditions:	Mode = standalone transmit Modulation = FSK Power level = Maximum

1.6 Test Equipment Used During Testing

Measurement Software			
Description	Manufacturer	Name	Version
EMC Test Software	Dare Instruments	Radimation	2014.1.15

Occupied Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2015-02	2016-02

Field strength emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Semi-anechoic chamber	Frankonia	AC 1	EF00062	-	-
Spectrum Analyzer	R&S	FSIQ26	EF00242	2014-03	2015-03
Biconical Antenna	R&S	HK 116	EF00012	2013-02	2016-02
LPD Antenna	R&S	HL 223	EF00187	2014-03	2017-03
Horn antenna	Schwarzbeck	BBHA 9120D	EF00018	2013-09	2016-09

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:

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

Net:

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

Limit:

This is the FCC Class B radiated emission limit (in units of 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:

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

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:

$$\begin{array}{rclcl} \text{Reading} & + & \text{AF} & = & \text{Net Reading} & : & \text{Net reading - FCC limit} & = & \text{Margin} \\ 21.5 \text{ dB}\mu\text{V} & + & 26 \text{ dB} & = & 47.5 \text{ dB}\mu\text{V/m} & : & 47.5 \text{ dB}\mu\text{V/m} - 57.0 \text{ dB}\mu\text{V/m} & = & -9.5 \text{ dB} \end{array}$$

2 Result Summary

FCC 47 CFR Part 15C, IC RSS-210				
Product Specific Standard Section	Requirement – Test	Reference Method	Result	Remarks
RSS-Gen 6.6	Occupied Bandwidth	RSS-Gen 6.6	N/R	Informational only
FCC 15.249(a),(c),(e) IC RSS-210 A2.9(a)	Fundamental field strength emissions	ANSI C63.4	PASS	
FCC 15.249(a),(c),(d),(e) IC RSS-210 A2.9(a),(b)	Emission radiated outside the specified frequency band	ANSI C63.4	PASS	
IC RSS-210 Section 2.3 IC RSS-Gen 7.1	Receiver radiated spurious emissions	ANSI C63.4	N/A	Transmitter only
FCC § 15.207 IC RSS-Gen 8.8	AC power line conducted emissions	ANSI C63.4	N/A	EUT exclusively battery powered
Remarks:				

3 Test Conditions and Results

3.1 Test Conditions and Results – Occupied Bandwidth

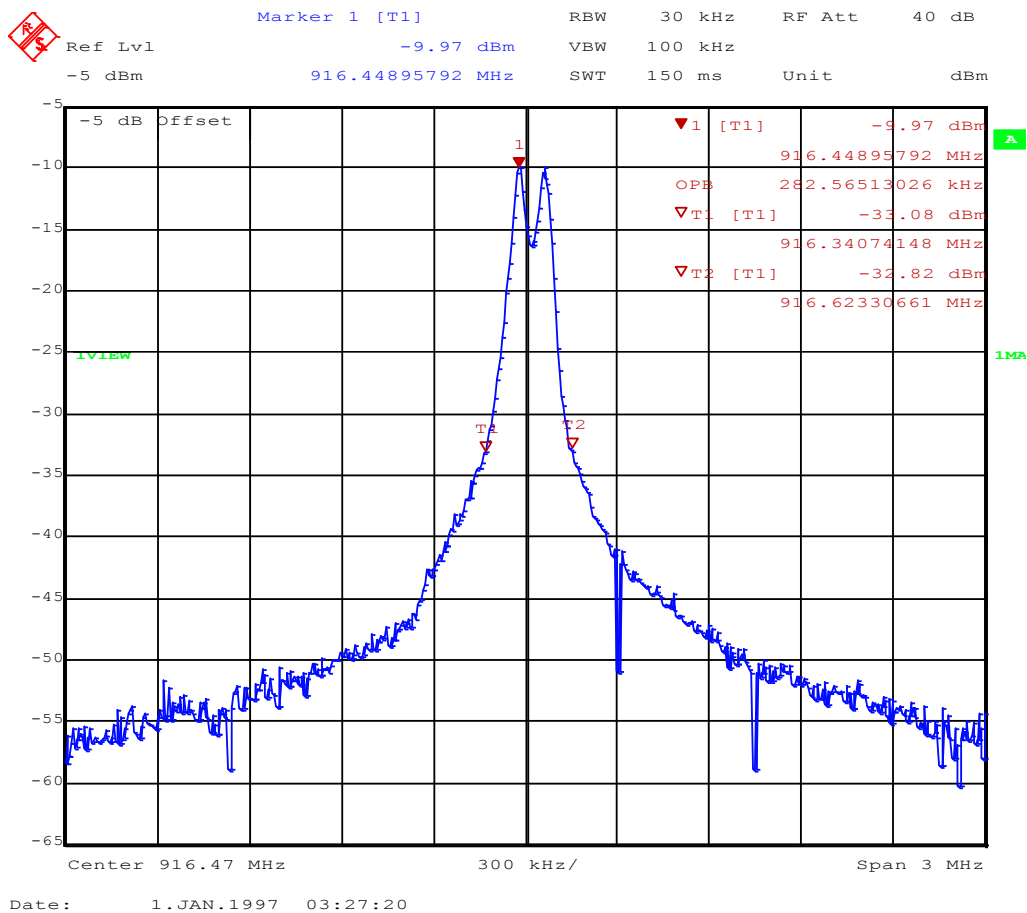
Occupied Bandwidth acc. to IC RSS-Gen			Verdict: PASS
Test according to measurement reference		Reference Method	
		RSS-Gen 6.6	
Test frequency range		Tested frequencies	
		F _{MID}	
EUT test mode		Single	
Limits			
None (Informational only)			
Test setup			
Spectrum Analyzer EUT			
Test procedure			
1. EUT set to test mode (Communication tester is used if needed) 2. Span set to at least twice the emission spectrum 3. Resolution bandwidth set to 1 % of span 4. Occupied Bandwidth (99 %) measurement with spectrum analyzer built in measurement function			
Test results			
Channel	Frequency [MHz]	Occupied Bandwidth [kHz]	
F _{MID}	916.5	282.565	
Comments: Measurement is applicable to all variants			

Occupied Bandwidth - F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1503-4568

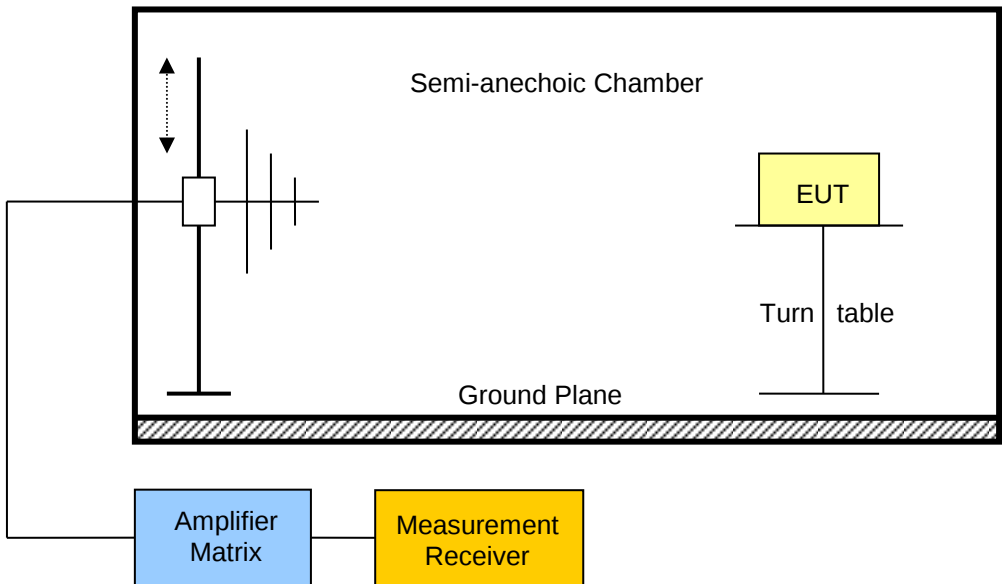
Applicant: ELDAT GmbH
EUT Name: Handsender, 916MHz
Model: RT44
Test Site: Eurofins Product Service GmbH
Operator: Burkhard Pudell
Test Conditions: Tnom / Vnom
Mode: SRD / 916.5 MHz / FSK
Test Date: 2015-03-30
Verdict: NONE (INFORMATION ONLY)
Note 1: A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2: OBW = 282.565 kHz



Test Report No.: G0M-1503-4568-TFC249DT-V02

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

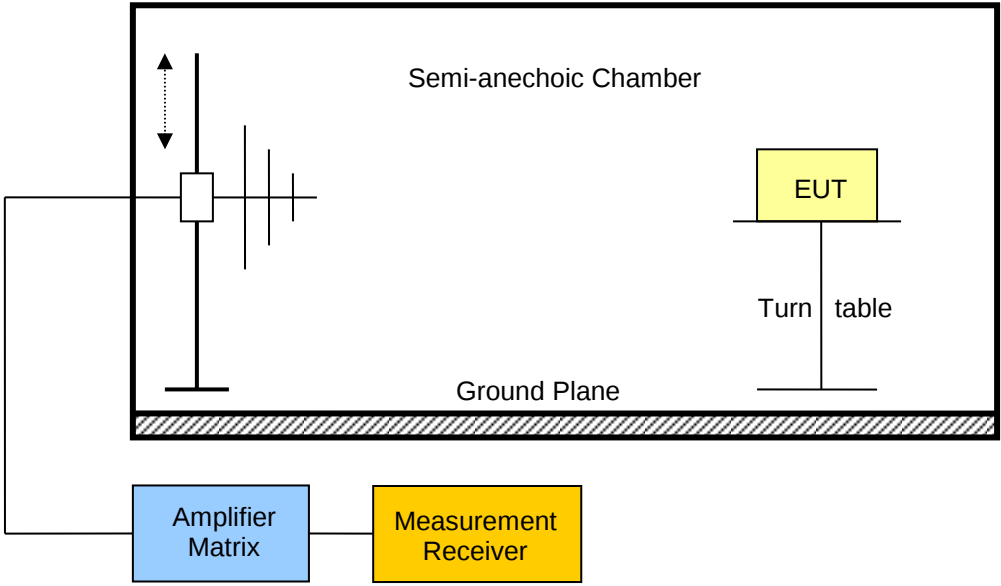
3.2 Test Conditions and Results – Fundamental field strength emissions

Field strength emissions acc. to FCC 47 CFR 15.249 / IC RSS-210				Verdict: PASS
Test according referenced standards	Reference Method			
	FCC 15.249(a),(c),(e) / IC RSS-210 A2.9(a)			
Test according to measurement reference	Reference Method			
	ANSI C63.4			
Test frequency range	Tested frequencies			
	F _{MID}			
EUT test mode	Single			
Limits				
Frequency range [MHz]	Detector	Limit [mV/m]	Limit [dBμV/m]	Limit Distance [m]
902 – 928	Quasi-Peak	50	94	3
2400 – 2483.5	Average	50	94	3
5725 - 5875	Average	50	94	3
FCC 15.249(e) : for frequencies above 1000 MHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.				
Below 1GHz a CISPR quasi-peak detector is used.				
Test setup				
				

Test procedure							
1. EUT set to test mode 2. Span it set according to measurement range 3. Resolution bandwidth below 1 GHz is set according to CISPR 16 with peak/quasi-peak detector and RBW of 1 MHz with peak/average detector is used above 1 GHz 4. Markers are set to maximum emission levels							
Test results							
Channel	Frequency [MHz]	Level [db μ V/m]	Detector	Pol.	Limit [db μ V/m]	Limit distance [m]*	Margin [dB]
F _{MID}	916.5	80.44	QP	ver	94.00	3	-13.56
F _{MID}	916.5	93.87	QP	hor	94.00	3	-0.13
Comments: * Physical distance between EUT and measurement antenna.							

3.3 Test Conditions and Results – Emissions radiated outside the specified frequency band

Radiated out-of-band band emissions acc. to FCC 47 CFR 15.249 / IC RSS-210				Verdict: PASS	
Test according referenced standards		Reference Method			
		FCC 15.249(a),(c),(d),(e) / IC RSS-210 A2.9(a),(b)			
Test according to measurement reference		Reference Method			
		ANSI C63.4			
Test frequency range		Tested frequencies			
		30 MHz – 10 th hamonic			
EUT test mode		Single			
Limits - Harmonics					
Frequency range [MHz]		Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
902 – 928		Quasi-Peak	500	54	3
2400 – 2483.5		Average	500	54	3
5725 - 5875		Average	500	54	3
Limits - General					
Frequency range [MHz]		Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
30 – 88		Quasi-Peak	100	40	3
88 – 216		Quasi-Peak	150	43.5	3
216 – 960		Quasi-Peak	200	46	3
960 – 1000		Quasi-Peak	500	54	3
> 1000		Average	500	54	3
FCC 15.249(e) : for frequencies above 1000 MHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.					
Except the higher order harmonics, emission radiated outside the specified frequency band shall be attenuated by at least 50 dB below the level of the fundamental or to the general field strength limits listed in 15.209 / RSS-Gen, whichever is less stringent.					

Test setup								
								
Test procedure								
5. EUT set to test mode 6. Span it set according to measurement range 7. Resolution bandwidth below 1 GHz is set according to CISPR 16 with peak/quasi-peak detector and RBW of 1 MHz with peak/average detector is used above 1 GHz 8. Markers are set to maximum emission levels								
Test results								
Channel	Frequency [MHz]	Emission [MHz]	Level [dB μ V/m]	Detector	Pol.	Limit [dB μ V/m]	Limit distance [m]*	Margin [dB]
F _{MID}	916.5	900.596	31.63	pk	hor	46.00	3	-14.37
F _{MID}	916.5	928.576	40.01	pk	hor	46.00	3	-05.99
Comments: * Physical distance between EUT and measurement antenna.								

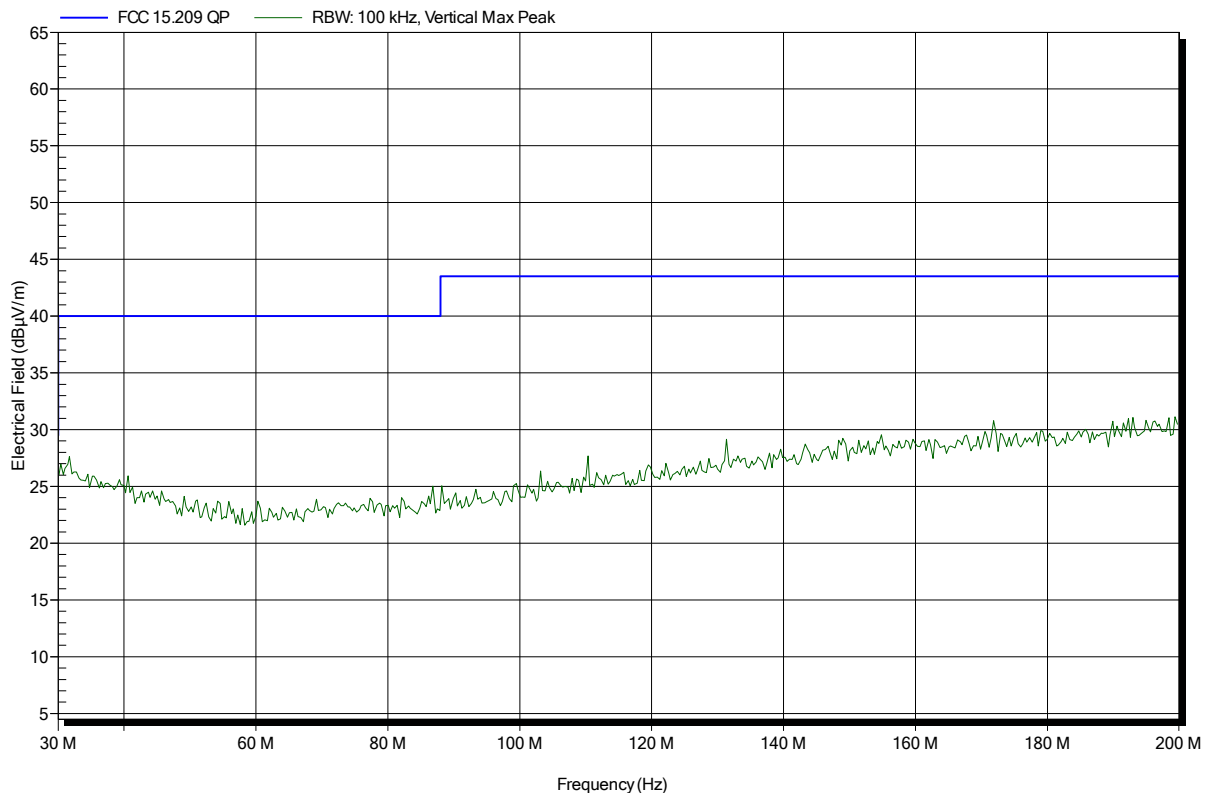
ANNEX A Transmitter radiated spurious emissions

Spurious emissions according to FCC part 15 Subpart C § 15.249

Project number: G0M-1503-4568

Applicant: ELDAT GmbH
 EUT Name: Funkhandsender, 916 MHz
 Model: RT44
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3 VDC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: TX; SRD; 916.5 MHz; TX-Mode; FSK
 Test Date: 2015-03-27
 Note: EUT horizontal

Index 194

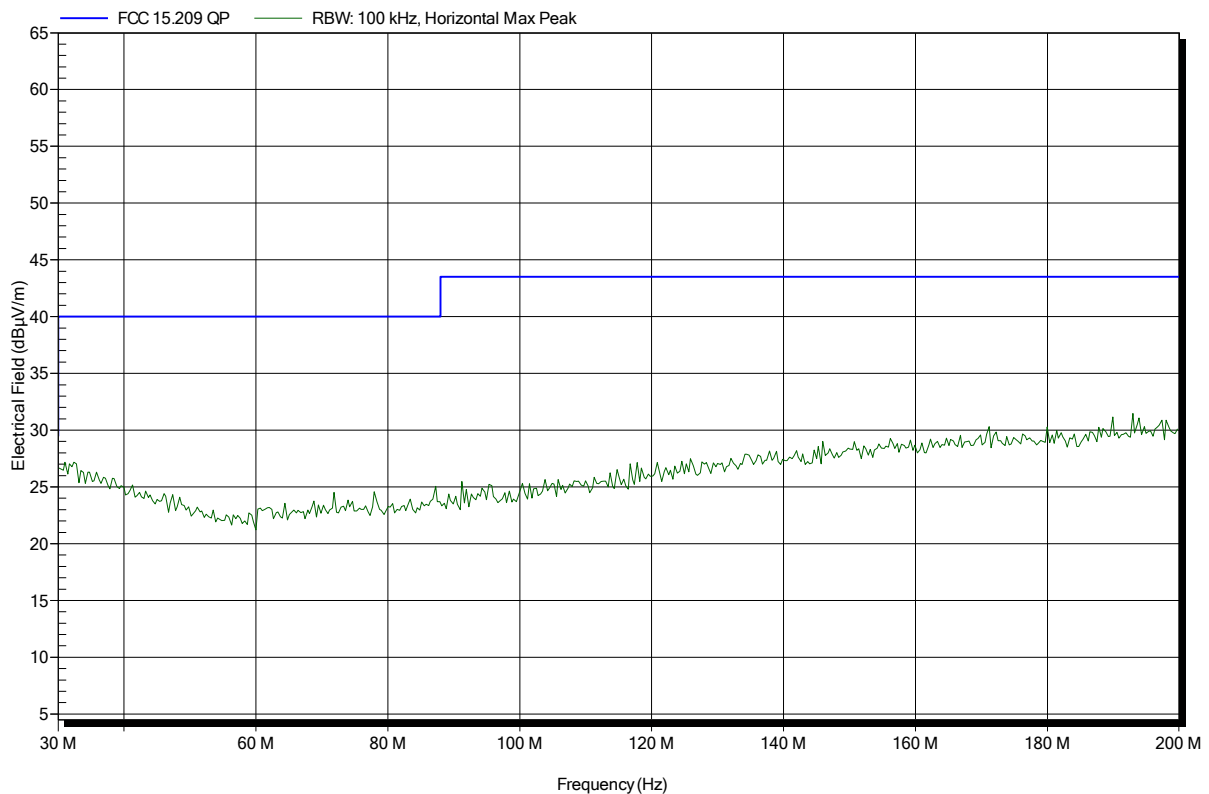


Spurious emissions according to FCC part 15 Subpart C § 15.249

Project number: G0M-1503-4568

Applicant:	ELDAT GmbH
EUT Name:	Funkhandsender, 916 MHz
Model:	RT44
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 3 VDC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; SRD; 916.5 MHz; TX-Mode; FSK
Test Date:	2015-03-27
Note:	EUT horizontal

Index 195

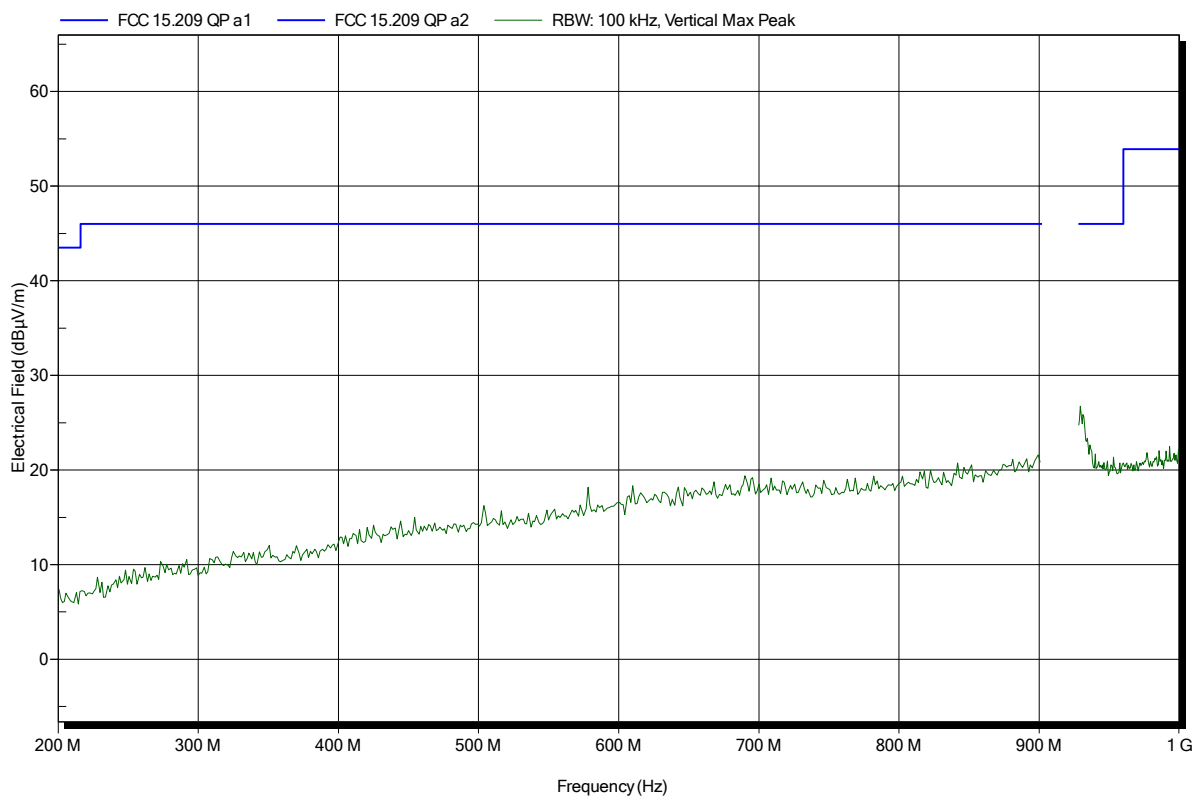


Spurious emissions according to FCC part 15 Subpart C § 15.249

Project number: G0M-1503-4568

Applicant: ELDAT GmbH
 EUT Name: Funkhandsender, 916 MHz
 Model: RT44
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3 VDC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: TX; SRD; 916.5 MHz; TX-Mode; FSK
 Test Date: 2015-03-27
 Note: EUT horizontal

Index 201

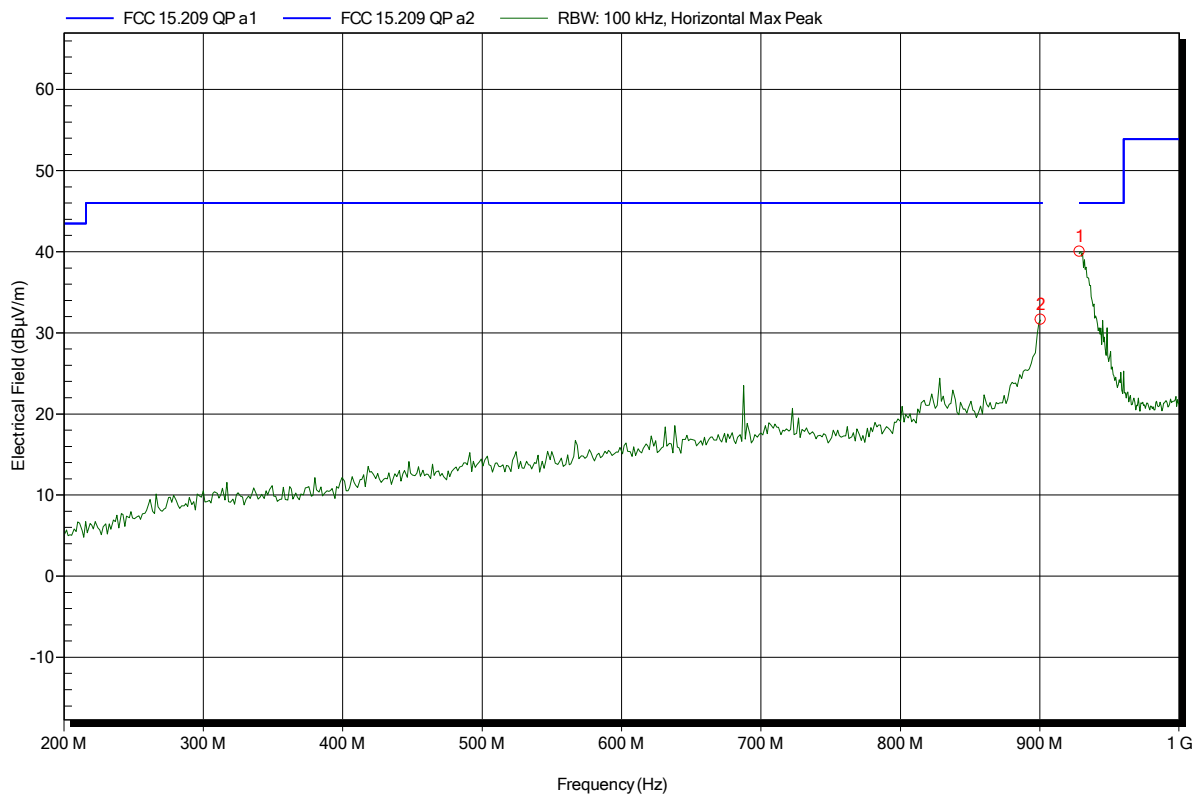


Spurious emissions according to FCC part 15 Subpart C § 15.249

Project number: G0M-1503-4568

Applicant: ELDAT GmbH
 EUT Name: Funkhandsender, 916 MHz
 Model: RT44
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3 VDC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: TX; SRD; 916.5 MHz; TX-Mode; FSK
 Test Date: 2015-03-27
 Note: EUT horizontal

Index 202



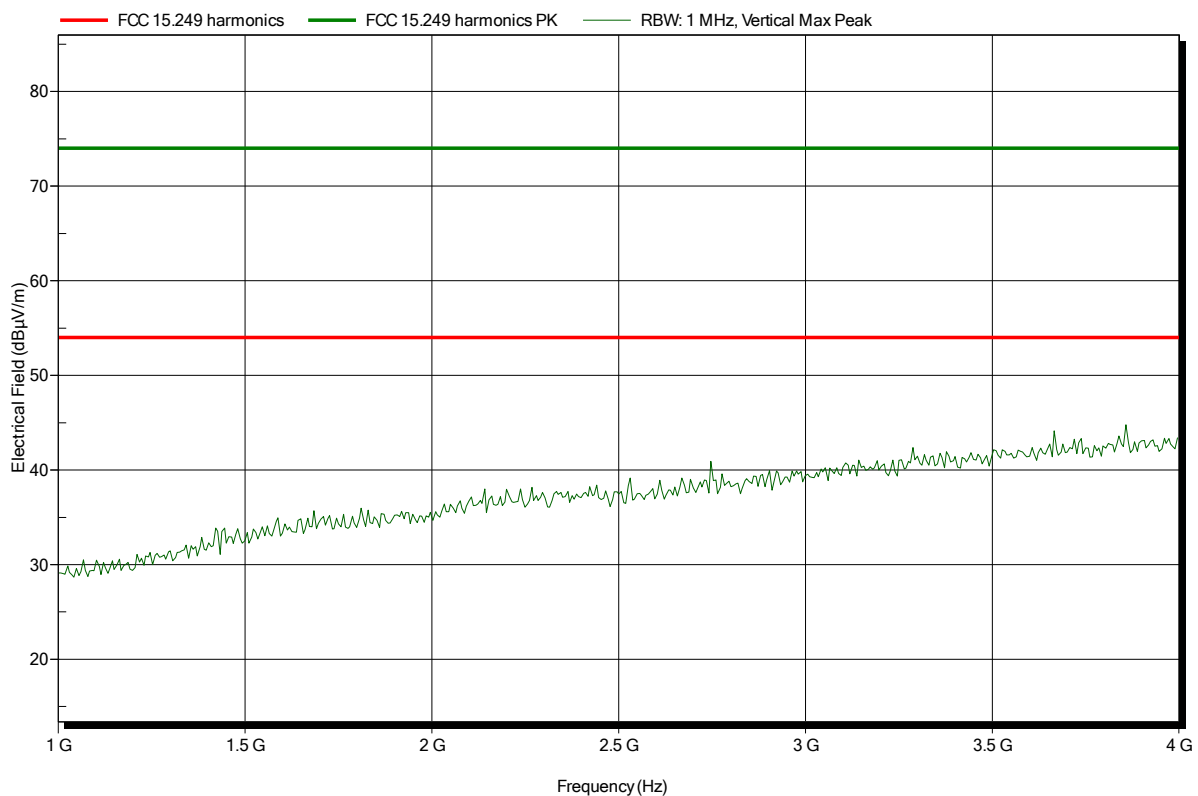
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
900.596 MHz	31.63 dBµV/m	46 dBµV/m	-14.37 dB	Pass
928.576 MHz	40.01 dBµV/m	46 dBµV/m	-5.99 dB	Pass

Spurious emissions according to FCC part 15 Subpart C § 15.249

Project number: G0M-1503-4568

Applicant: ELDAT GmbH
 EUT Name: Funkhandsender, 916 MHz
 Model: RT44
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3 VDC
 Antenna: Rohde & Schwarz HL 025, Vertical
 Measurement distance: 3 m
 Mode: TX; SRD; 916.5 MHz; TX-Mode; FSK
 Test Date: 2015-03-27
 Note: EUT horizontal

Index 203

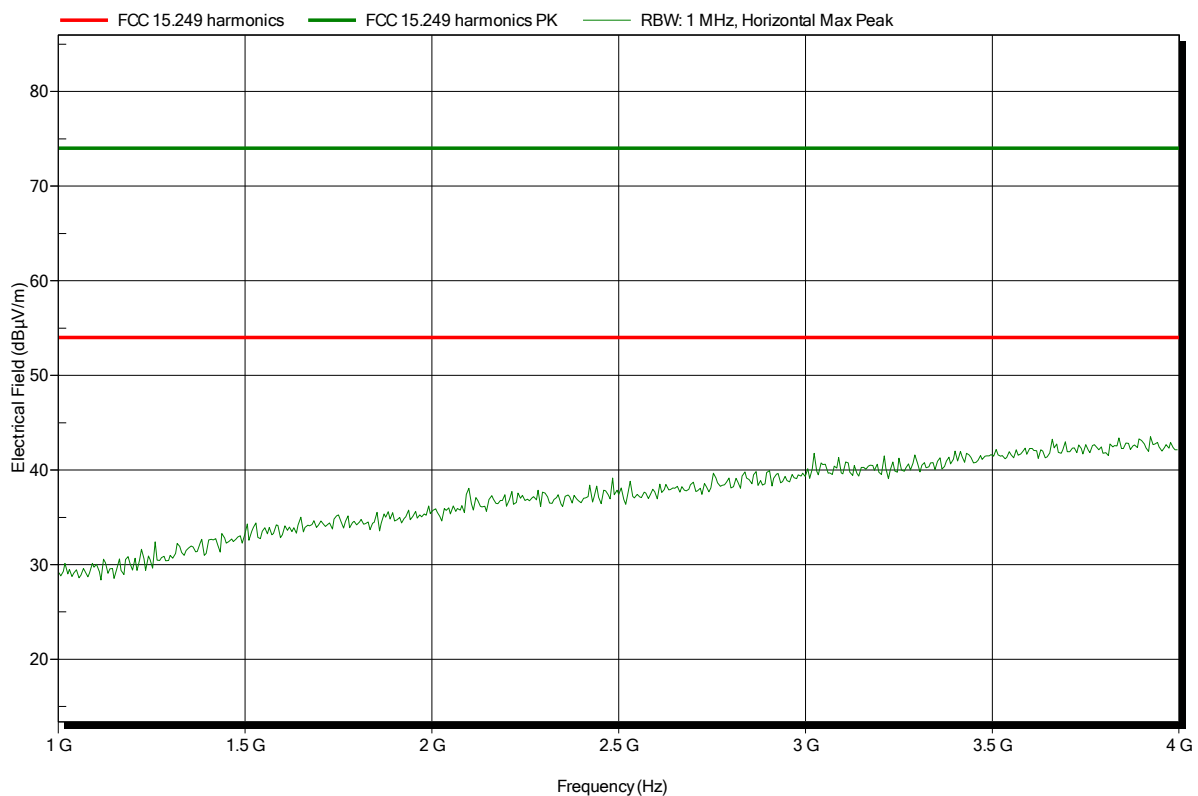


Spurious emissions according to FCC part 15 Subpart C § 15.249

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 EUT Name: Funkhandsender, 916 MHz
 Model: RT44
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3 VDC
 Antenna: Rohde & Schwarz HL 025, Horizontal
 Measurement distance: 3 m
 Mode: TX; SRD; 916.5 MHz; TX-Mode; FSK
 Test Date: 2015-03-27
 Note: EUT horizontal

Index 206

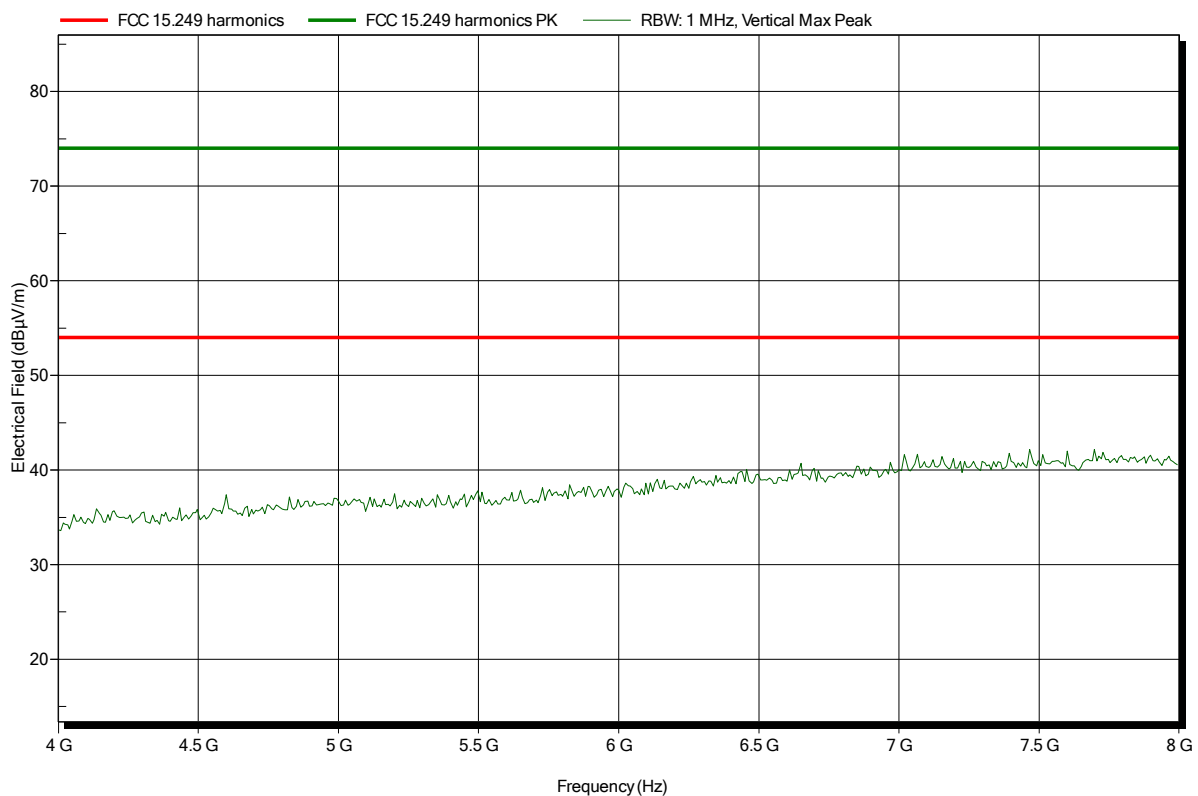


Spurious emissions according to FCC part 15 Subpart C § 15.249

Project number: G0M-1503-4568

Applicant: ELDAT GmbH
 EUT Name: Funkhandsender, 916 MHz
 Model: RT44
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3 VDC
 Antenna: Rohde & Schwarz HL 025, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; SRD; 916.5 MHz; TX-Mode; FSK
 Test Date: 2015-03-27
 Note: EUT horizontal

Index 204

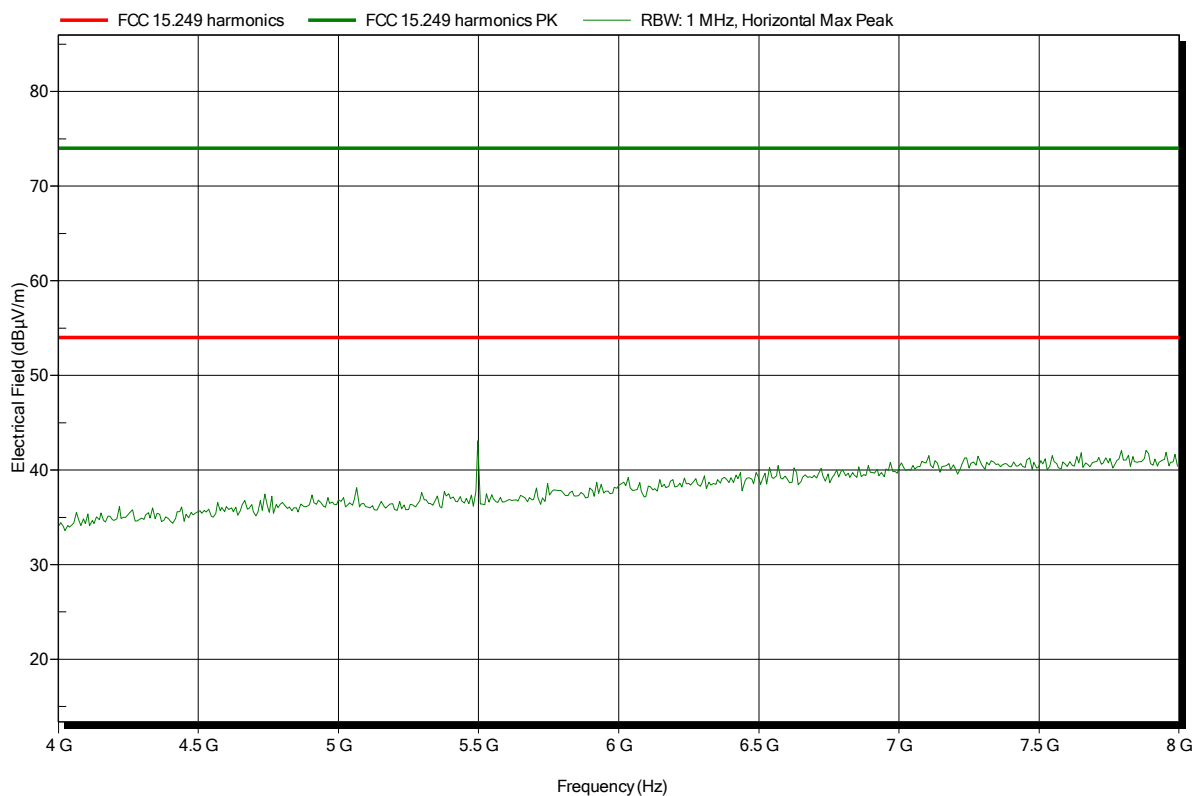


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 EUT Name: Funkhandsender, 916 MHz
 Model: RT44
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3 VDC
 Antenna: Rohde & Schwarz HL 025, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; SRD; 916.5 MHz; TX-Mode; FSK
 Test Date: 2015-03-27
 Note: EUT horizontal

Index 207

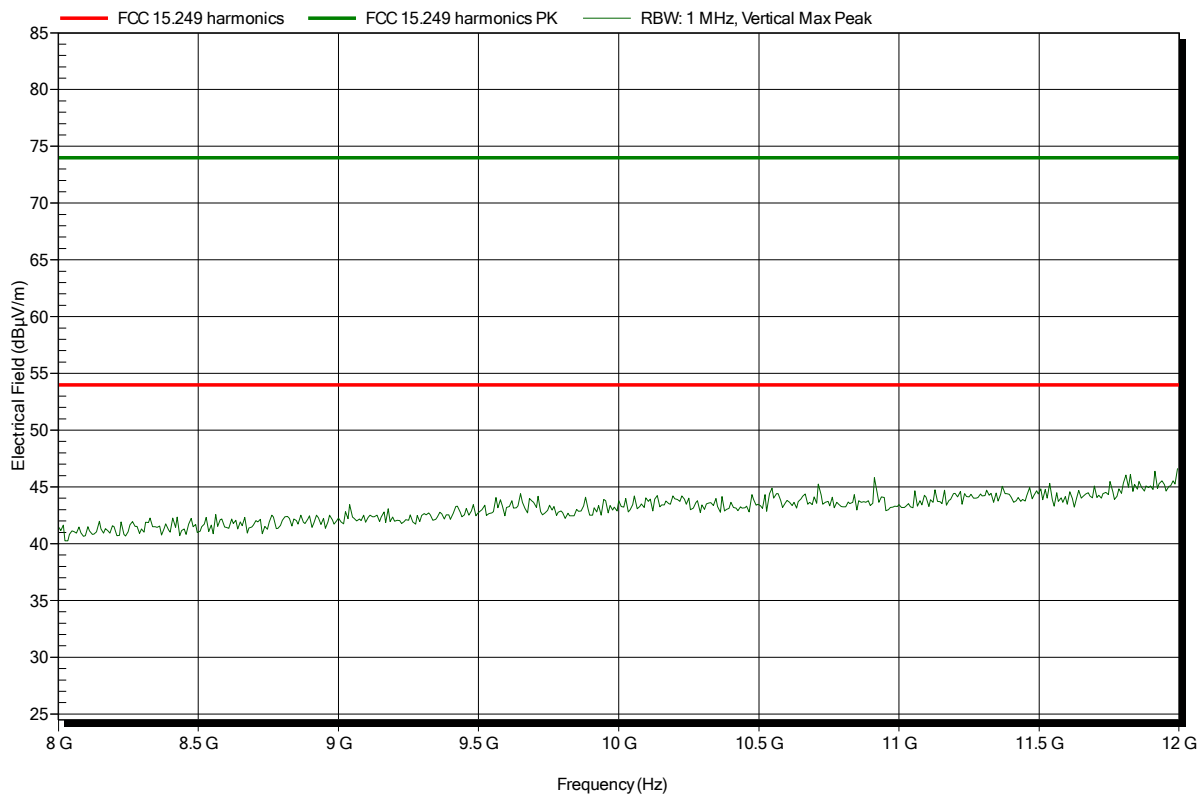


Spurious emissions according to FCC part 15 Subpart C § 15.249

Project number: G0M-1503-4568

Applicant: ELDAT GmbH
 EUT Name: Funkhandsender, 916 MHz
 Model: RT44
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 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3 VDC
 Antenna: Rohde & Schwarz HL 025, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; SRD; 916.5 MHz; TX-Mode; FSK
 Test Date: 2015-03-27
 Note: EUT horizontal

Index 205



Spurious emissions according to FCC part 15 Subpart C § 15.249

Project number: G0M-1503-4568

Applicant: ELDAT GmbH
 EUT Name: Funkhandsender, 916 MHz
 Model: RT44
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3 VDC
 Antenna: Rohde & Schwarz HL 025, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; SRD; 916.5 MHz; TX-Mode; FSK
 Test Date: 2015-03-27
 Note: EUT horizontal

Index 208

