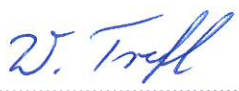


RADIO REPORT FCC 47 CFR Part 15C ISED Canada RSS-247 Digital transmission systems operating within the 2400.0 MHz - 2483.5 MHz band	
Report Reference No	G0M-2007-9184-TFC247BL-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	    DAkkS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A-2 DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	Festool GmbH
Address	Wertstraße 20 73240 Wendlingen 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	Vacuum Cleaner
Model(s)	CTC SYS I
Additional Model(s)	None
Brand Name(s)	None
Hardware Version(s)	10268880
Software Version(s)	10491558 index B
FCC ID	2AL2E-CTCSYS
IC	22501-CTCSYS
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	2021-03-26	
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	2021-05-28	
Total number of pages	106	
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 History			
Version	Issue Date	Remarks	Revised By
01	2021-05-28	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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1 Equipment (Test Item) Under Test

Description	Vacuum Cleaner	
Model	CTC SYS I	
Additional Model(s)	None	
Brand Name(s)	None	
Serial Number(s)	None	Radiated Test Sample ID 33947
	None	Conducted Test Sample ID 33422
Hardware Version(s)	10268880	
Software Version(s)	10491558 index B	
PMN	CTC SYS I	
HVIN	CTC SYS I	
FVIN	10491558 Index B	
HMN	n/a	
FCC ID	2AL2E-CTCSYS	
IC	22501-CTCSYS	
Equipment type	End Product	
Radio type	Transceiver	
Assigned frequency bands	2400.0 MHz - 2483.5 MHz	
Radio technology	Bluetooth LE 5.1	
Bluetooth Specification	LE 1M PHY	Yes
	LE 2M PHY	Yes
	LE Coded PHY S=8 (125 kbit)	No
	LE Coded PHY S=2 (500 kbit)	No
	Stable Modulation Index - Transmitter	No
	Stable Modulation Index - Receiver	No
Modulation	GFSK	
Number of antenna ports	1	
Antenna	Type	Integrated antenna
	Model	PCB- antenna
	Manufacturer	Festool
	Gain	3.1 dBi (antenna pattern measurement)
Supply Voltage	V _{NOM}	36 VDC
Operating Temperature	T _{NOM}	25 °C
AC/DC-Adaptor	Model	None
Manufacturer	Festool GmbH Wertstraße 20 73240 Wendlingen GERMANY	

1.1 Photos – Equipment External

EUT FRONT SIDE

EUT LEFT SIDE

EUT RIGHT SIDE**EUT REAR SIDE**

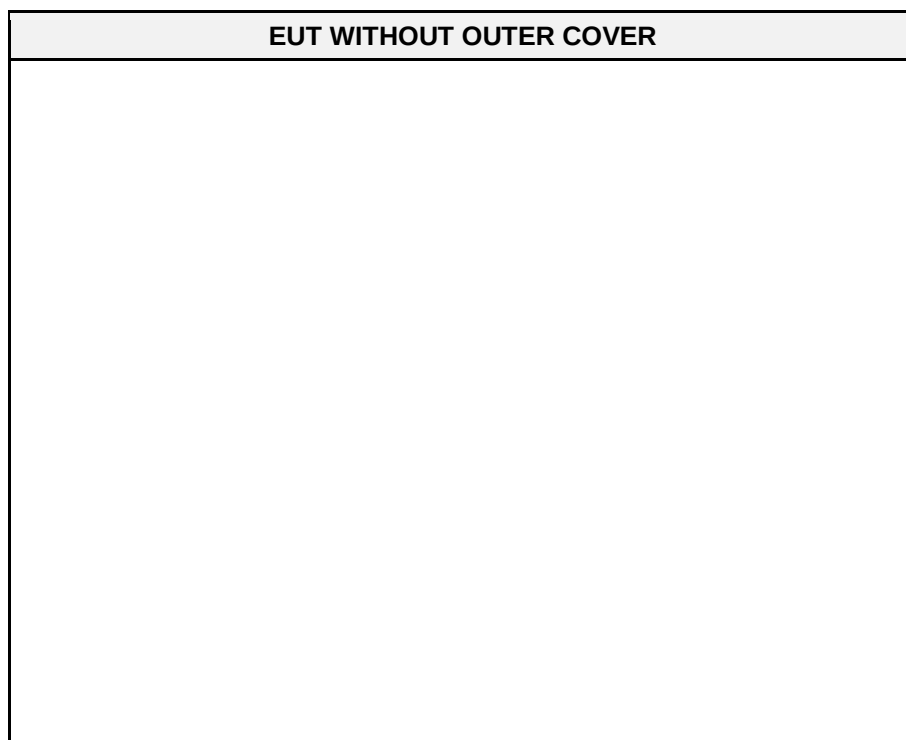
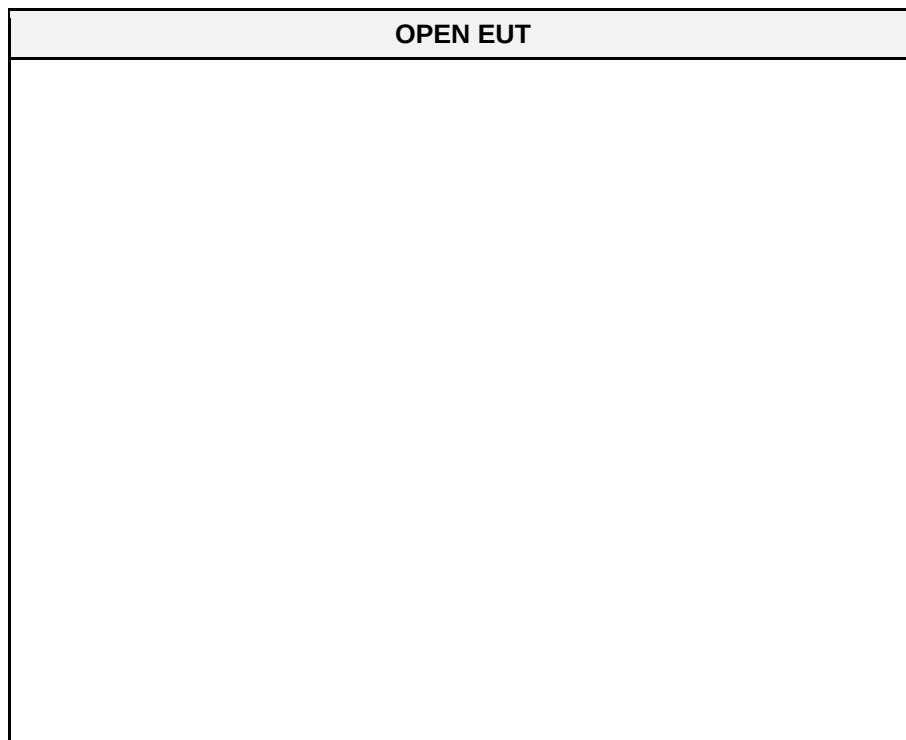
EUT IN PERSPECTIVE I

EUT IN PERSPECTIVE II

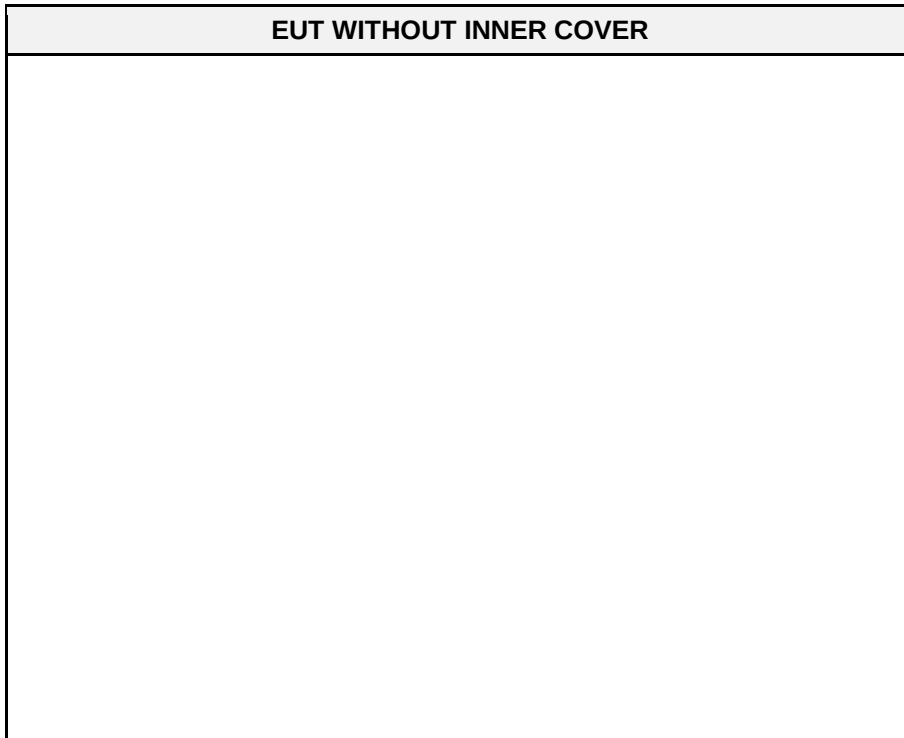
EUT LABEL**AE BATTERY PACK**

AE BATTERY PACK LABEL

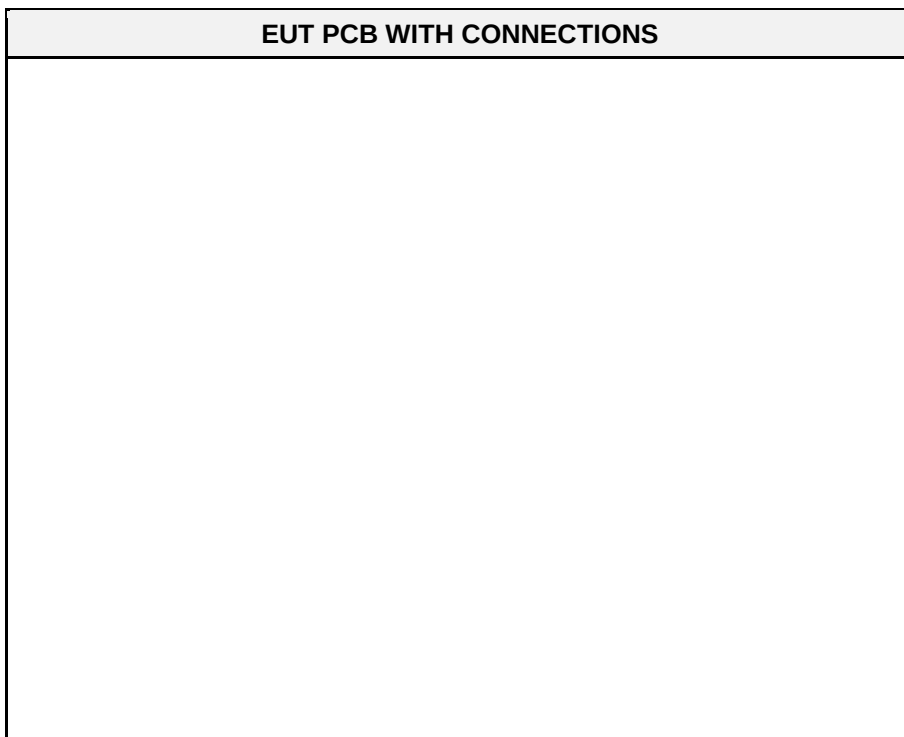
1.2 Photos – Equipment Internal

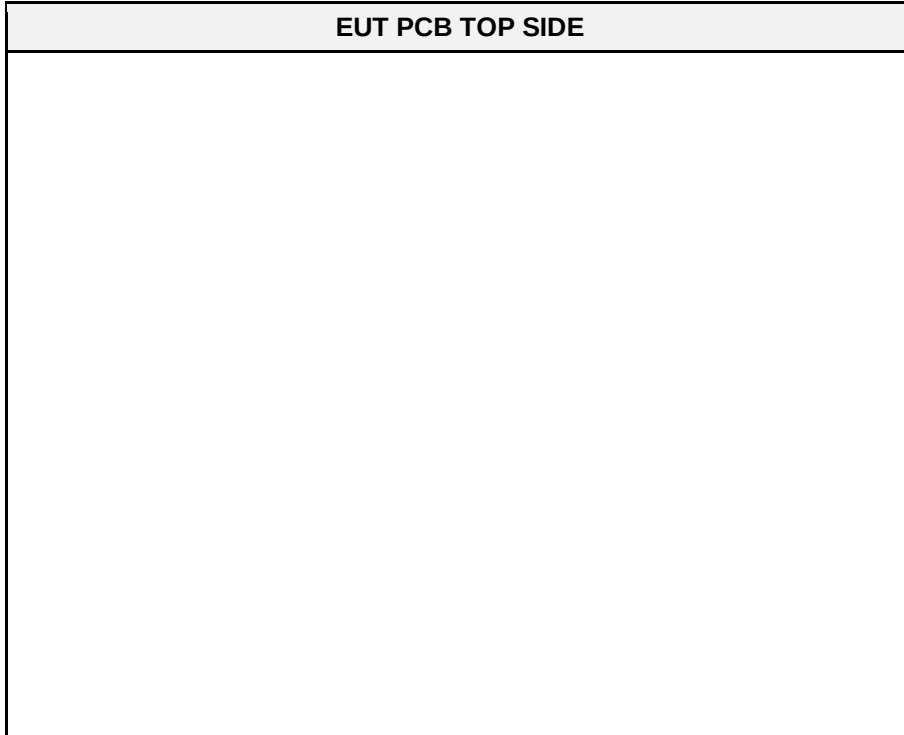
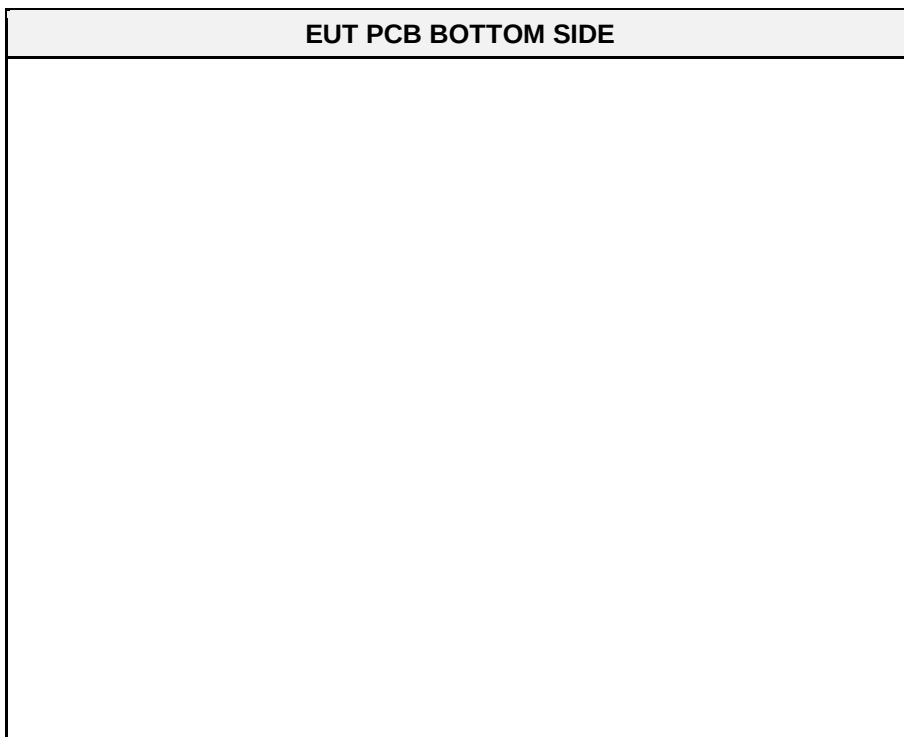


EUT WITHOUT INNER COVER

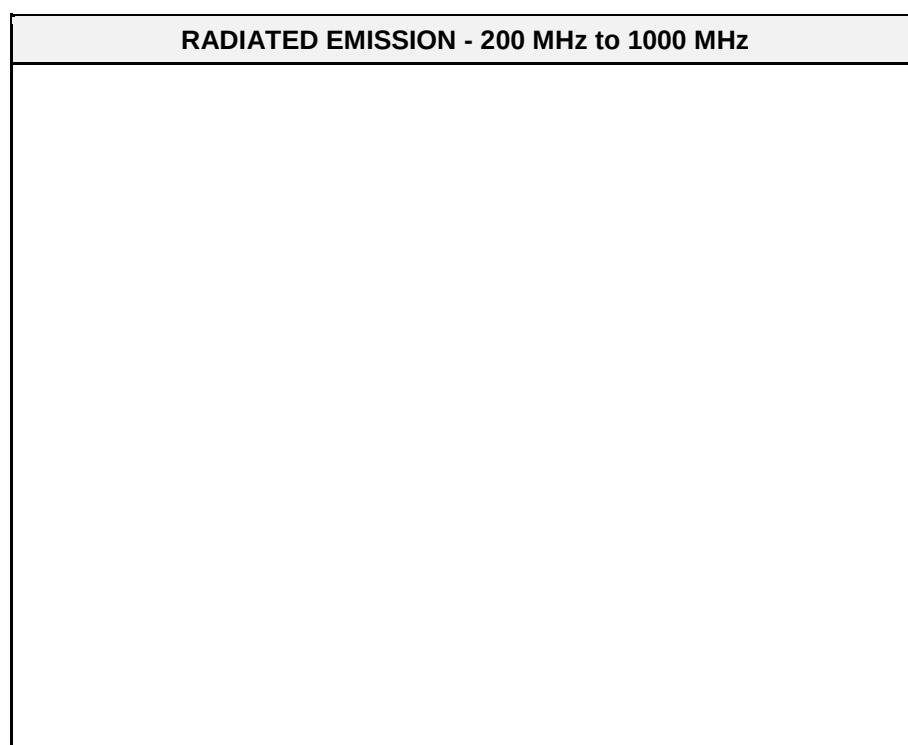
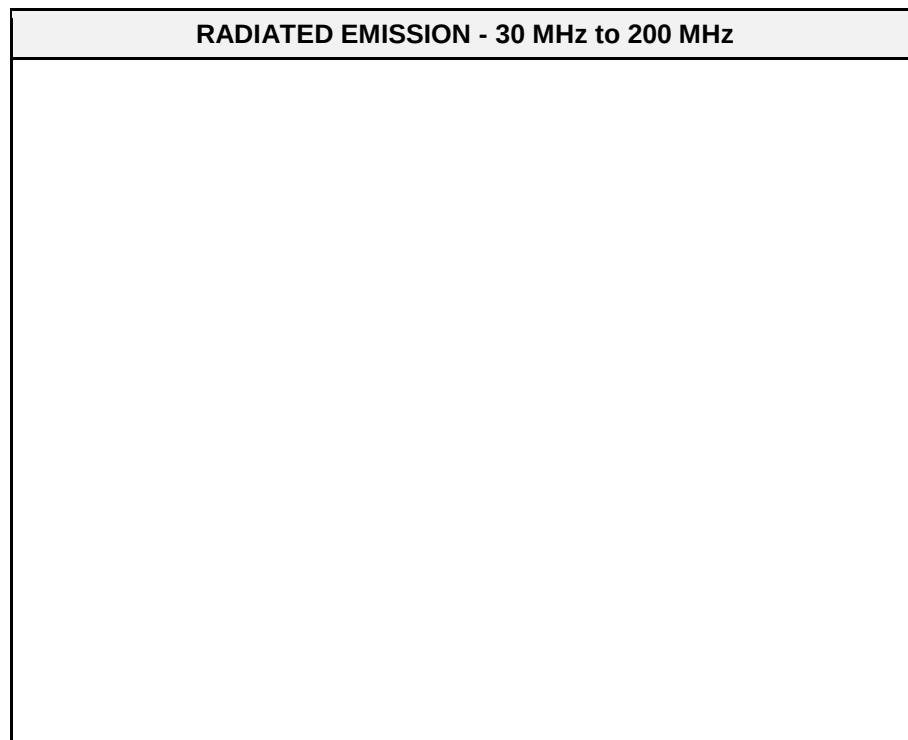


EUT PCB WITH CONNECTIONS



EUT PCB TOP SIDE**EUT PCB BOTTOM SIDE**

1.3 Photos – Test Setup



RADIATED EMISSION - 1000 MHz to 13000 MHz

RADIATED EMISSION - FOCUS

1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
None				
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
SFT Note: The Equipment Under Test used an operating system with a test firmware. The driver for the tested technology was running in a manufacturer mode.				
Comment:				

1.5 Test Modes

Mode	Description
1Mbps	Mode = Transmit Modulation = GFSK Spreading = None Duty cycle = 87%
2Mbps	Mode = Transmit Modulation = GFSK Spreading = None Duty cycle = 81%
Receive	Mode = Receive
Comment:	

1.6 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	0	2402
F2	Tx / Rx	19	2440
F3	Tx / Rx	39	2480

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 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 6.7)	Occupied Bandwidth	ANSI C63.10-2013	N/R	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	No powered (directly or indirectly) via AC-Mains
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

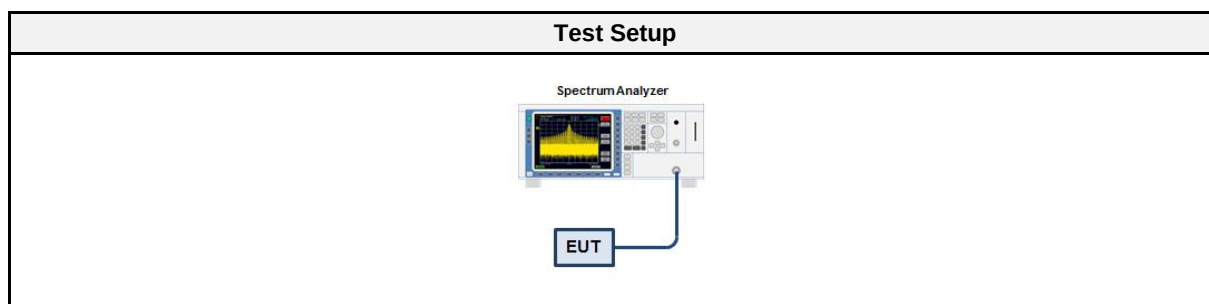
3.1.1 Information

Test Information	
Reference	ISED RSS-Gen, Issue 5 (section 6.7)
Measurement Method	ANSI C63.10 6.9.3
Measurement Uncertainty	$\pm 1.26 \%$
Test Sample ID	33422
Operator	Wilfried Treffke
Date	2021-04-08

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 Analyser	R&S	FSU 26	EF01709	2021-02	2022-02
Cable	Gigalane	SMS111B	EF00779 CAA AZ	2020-12	2021-12

3.1.5 Procedure

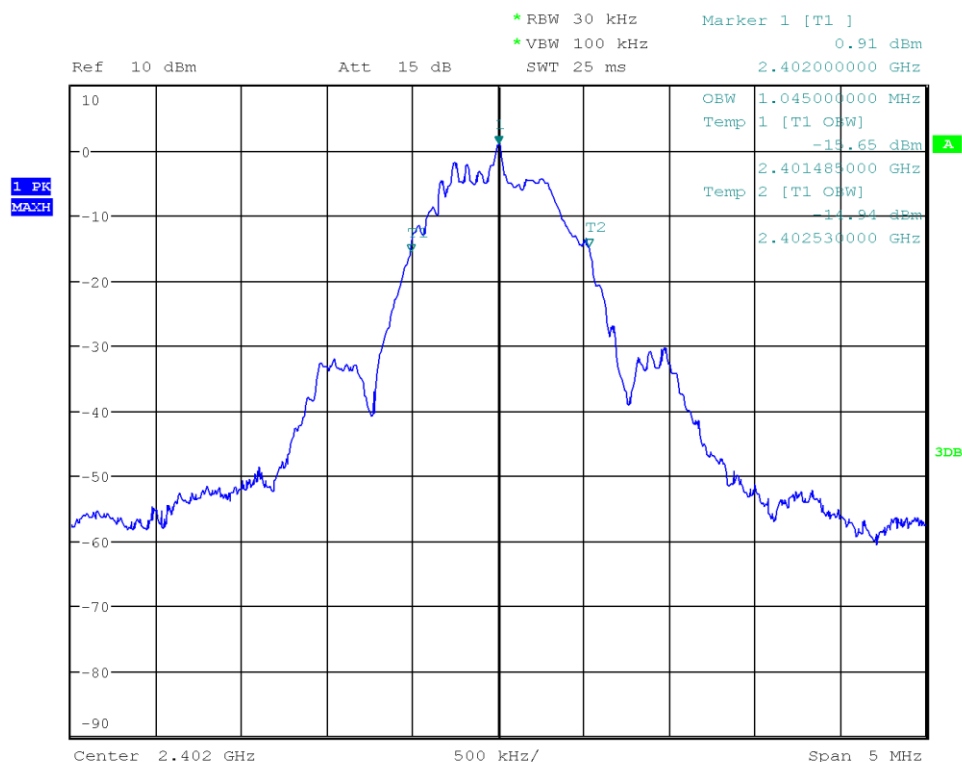
Test Procedure
1. EUT transmitter is activated in test mode under normal conditions 2. The spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum 3. The resolution bandwidth is set to the range of 1 % to 5 % of the occupied bandwidth 4. The occupied bandwidth is measured with the build-in analyzer function

3.1.6 Results

Test Results		
Mode	Frequency [MHz]	Bandwidth [MHz]
1 Mbps	2402	1.045
1 Mbps	2440	1.045
1 Mbps	2480	1.045
2 Mbps	2402	2.050
2 Mbps	2440	2.055
2 Mbps	2480	2.060

Occupied Bandwidth

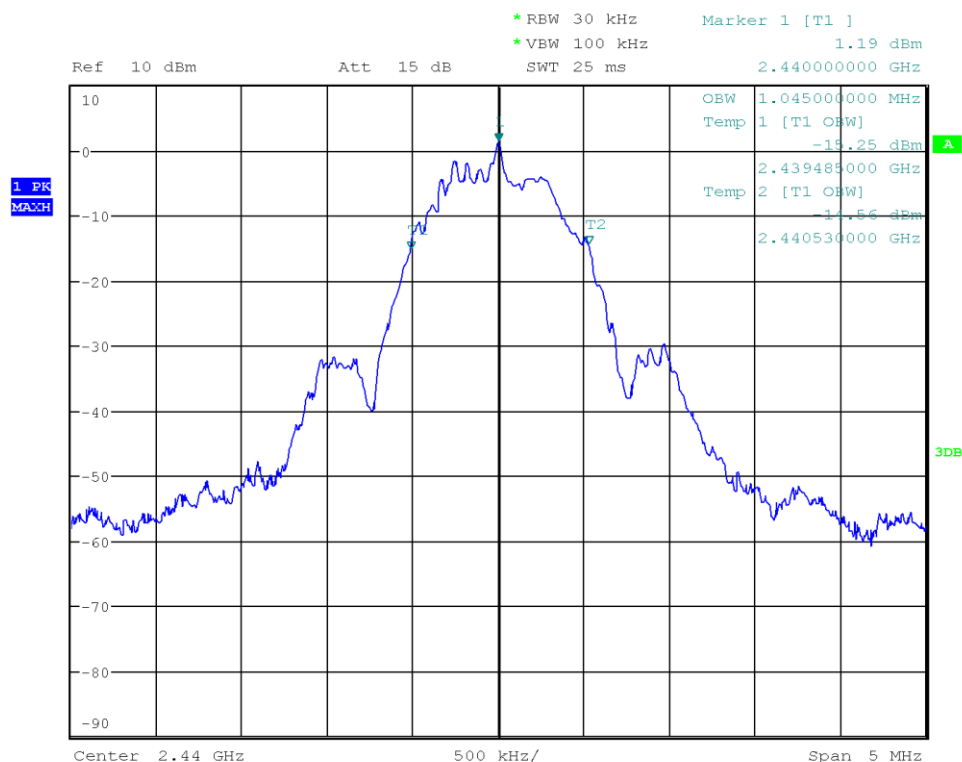
Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 1 Mbps
 Occupied Bandwidth [MHz]: 1.045



Date: 8.APR.2021 21:37:10

Occupied Bandwidth

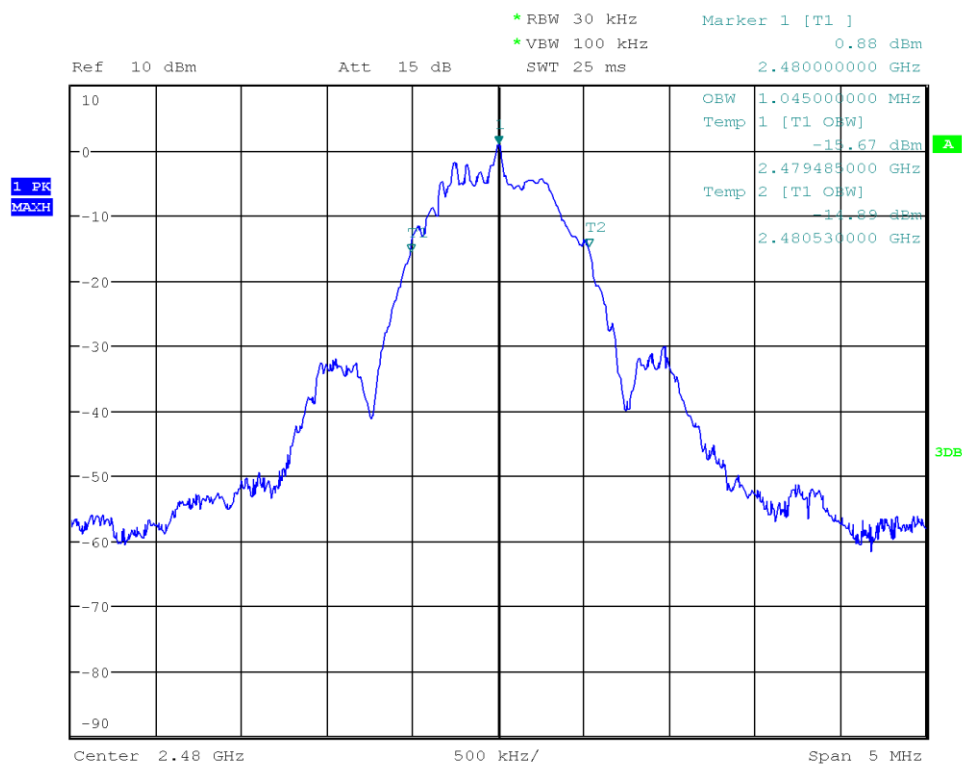
Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 1 Mbps
 Occupied Bandwidth [MHz]: 1.045



Date: 8.APR.2021 21:38:09

Occupied Bandwidth

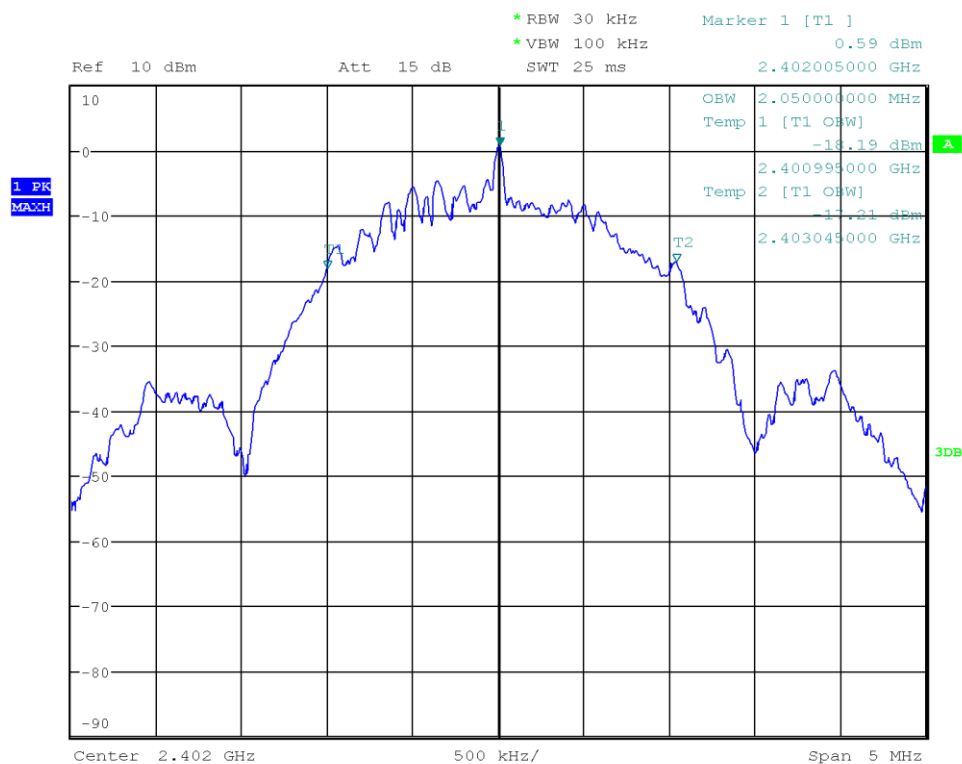
Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 1 Mbps
 Occupied Bandwidth [MHz]: 1.045



Date: 8.APR.2021 21:39:47

Occupied Bandwidth

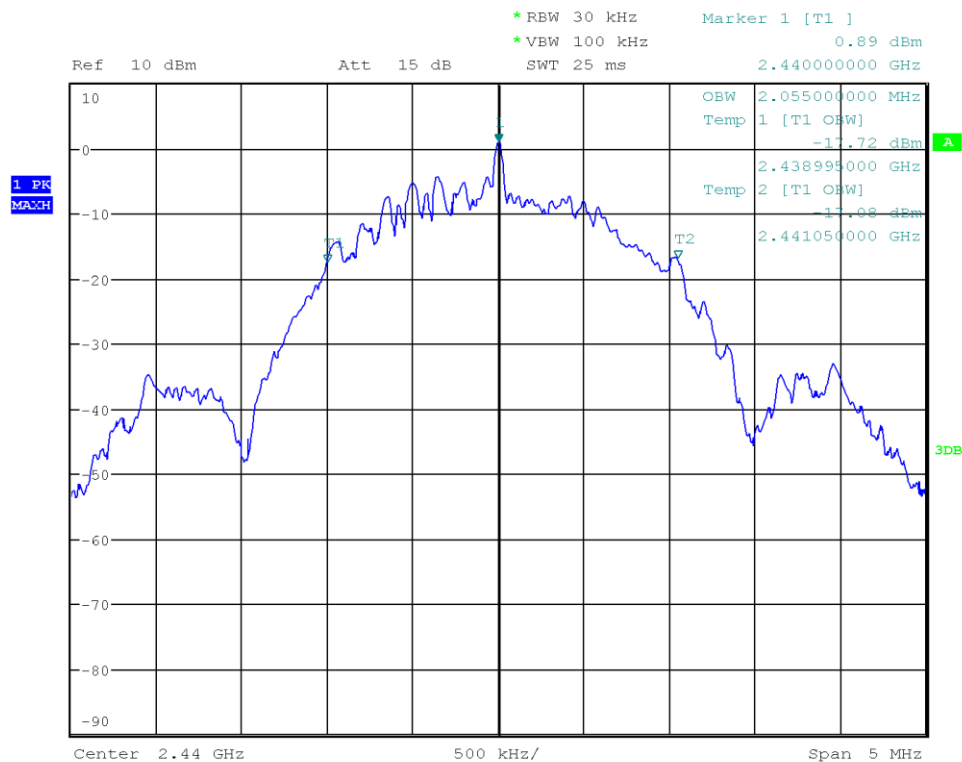
Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 2 Mbps
 Occupied Bandwidth [MHz]: 2.050



Date: 8.APR.2021 21:41:19

Occupied Bandwidth

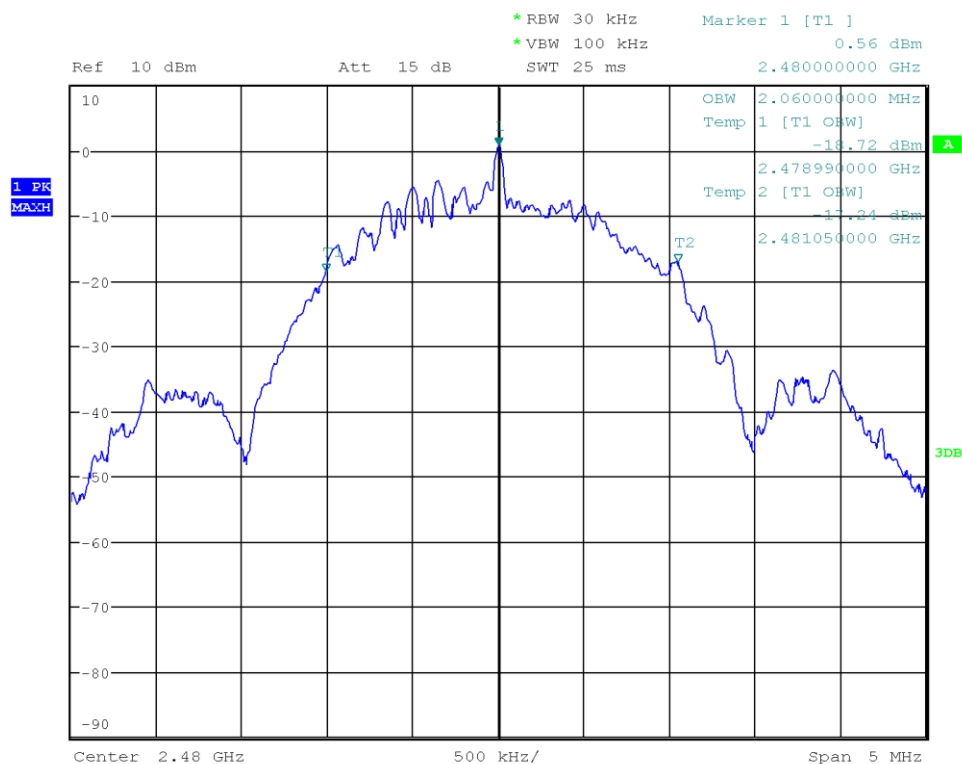
Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 2 Mbps
 Occupied Bandwidth [MHz]: 2.055



Date: 8.APR.2021 21:43:29

Occupied Bandwidth

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 2 Mbps
 Occupied Bandwidth [MHz]: 2.060



Date: 8.APR.2021 21:44:43

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

3.2 Test Conditions and Results - 6 dB bandwidth

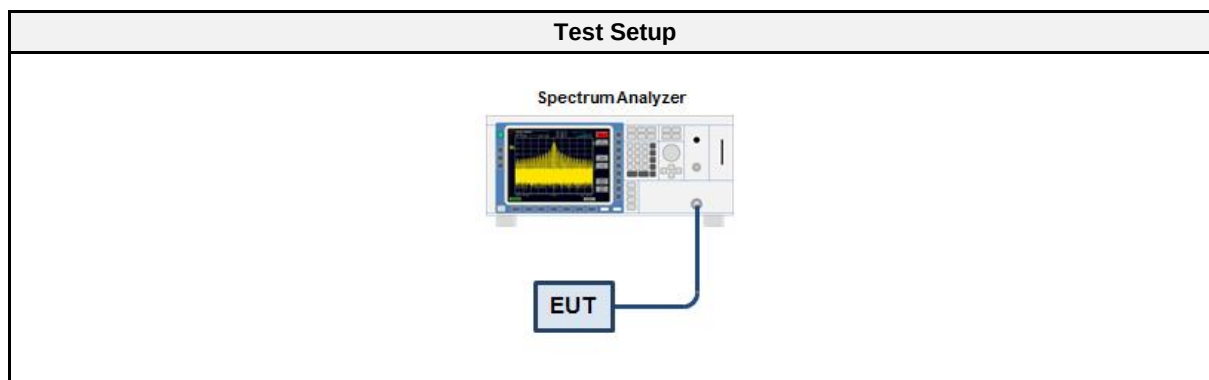
3.2.1 Information

Test Information	
Reference	FCC § 15.247(a)(2); ISED RSS-247, Issue 2 (section 5.2)
Measurement Method	ANSI C63.10 11.8
Measurement Uncertainty	± 1.26 %
Operator	Wilfried Treffke
Date	2021-04-08

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 26	EF01709	2021-02	2022-02
Cable	Gigalane	SMS111B	EF00779 CAAZ	2020-12	2021-12

3.2.5 Procedure

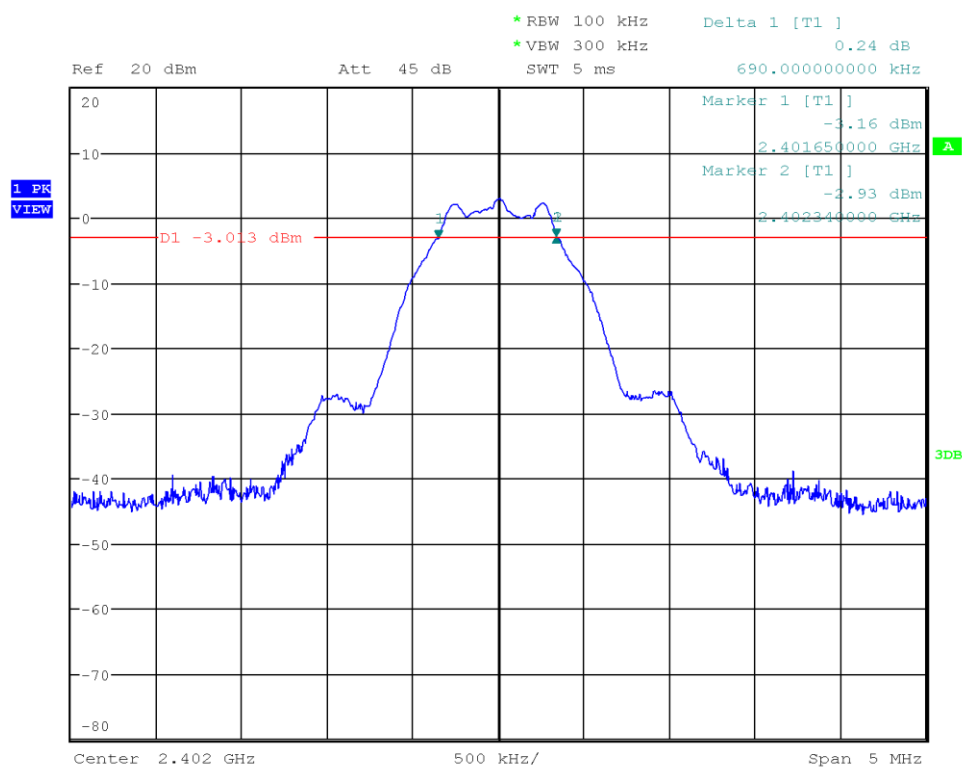
Test Procedure
1. EUT set to test mode 2. Span set to at least twice the emission spectrum 3. Detector set to peak and max hold and RBW is set to 100 kHz 4. Envelope peak value of emission spectrum is selected 5. Marker on envelope of spectrum is set to level of -6 dB to the left of the peak 6. Marker 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
1 Mbps	2402	690	500	PASS
1 Mbps	2440	690	500	PASS
1 Mbps	2480	695	500	PASS
2 Mbps	2402	1155	500	PASS
2 Mbps	2440	1145	500	PASS
2 Mbps	2480	1150	500	PASS

DTS (6 dB) Bandwidth

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 1 Mbps
 Lower Frequency [MHz]: 2401.650
 Upper Frequency [MHz]: 2402.340
 6 dB Bandwidth [kHz]: 690



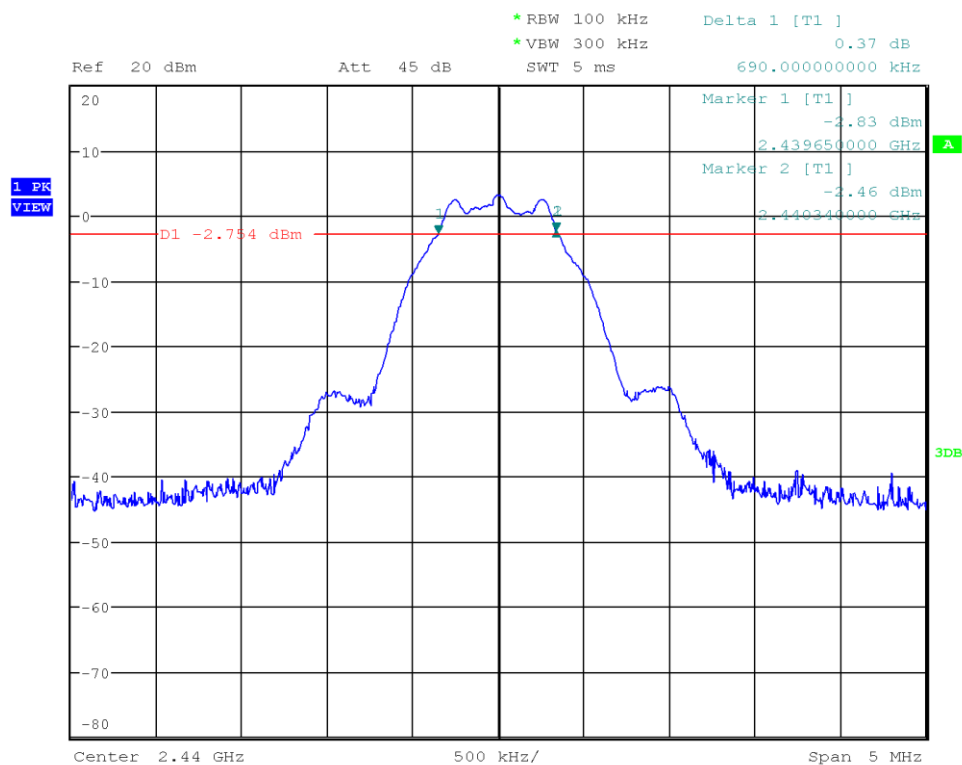
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Test Report No.: G0M-2007-9184-TFC247BL-V01

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

DTS (6 dB) Bandwidth

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 1 Mbps
 Lower Frequency [MHz]: 2439.650
 Upper Frequency [MHz]: 2440.340
 6 dB Bandwidth [kHz]: 690



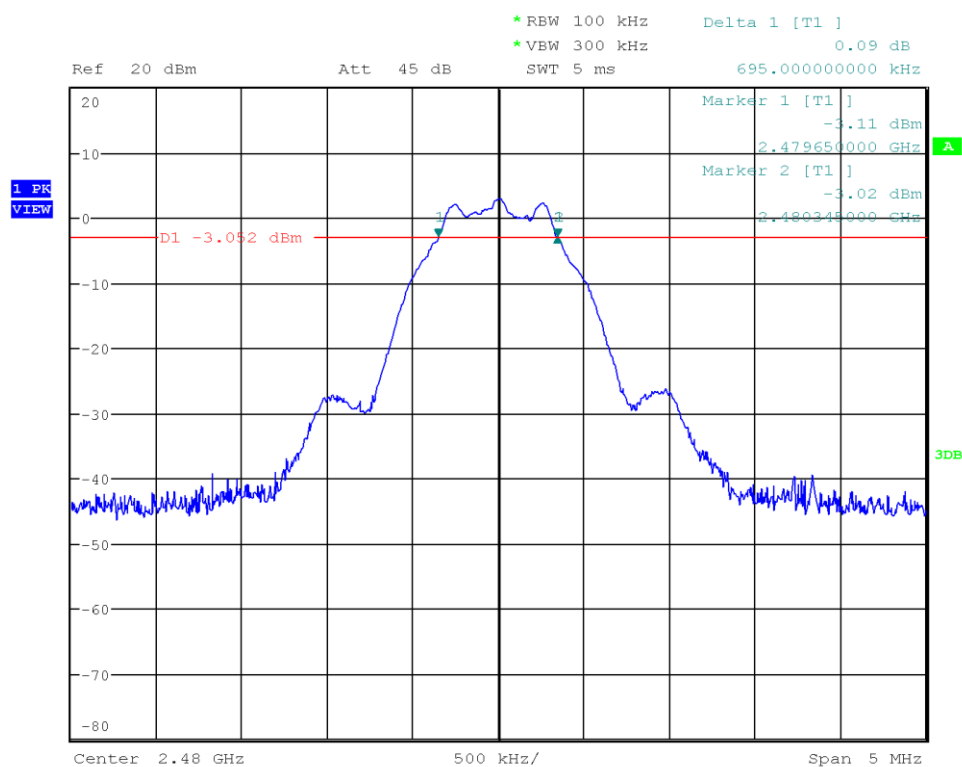
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Test Report No.: G0M-2007-9184-TFC247BL-V01

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

DTS (6 dB) Bandwidth

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 1 Mbps
 Lower Frequency [MHz]: 2479.650
 Upper Frequency [MHz]: 2480.345
 6 dB Bandwidth [kHz]: 695



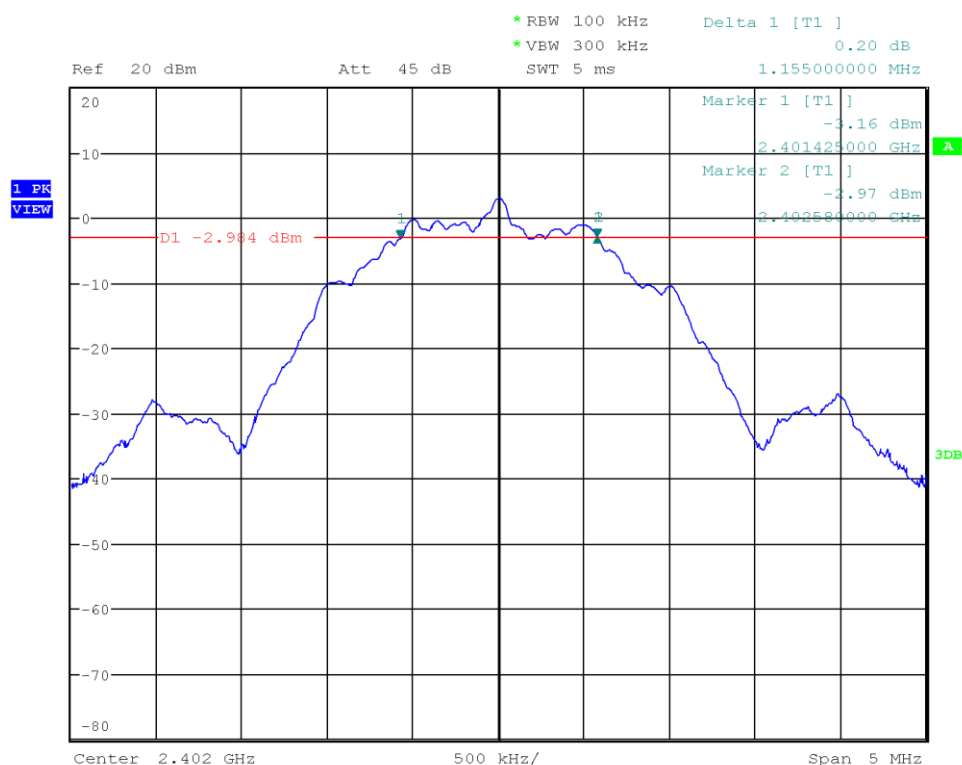
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Test Report No.: G0M-2007-9184-TFC247BL-V01

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

DTS (6 dB) Bandwidth

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 2 Mbps
 Lower Frequency [MHz]: 2401.425
 Upper Frequency [MHz]: 2402.580
 6 dB Bandwidth [kHz]: 1155



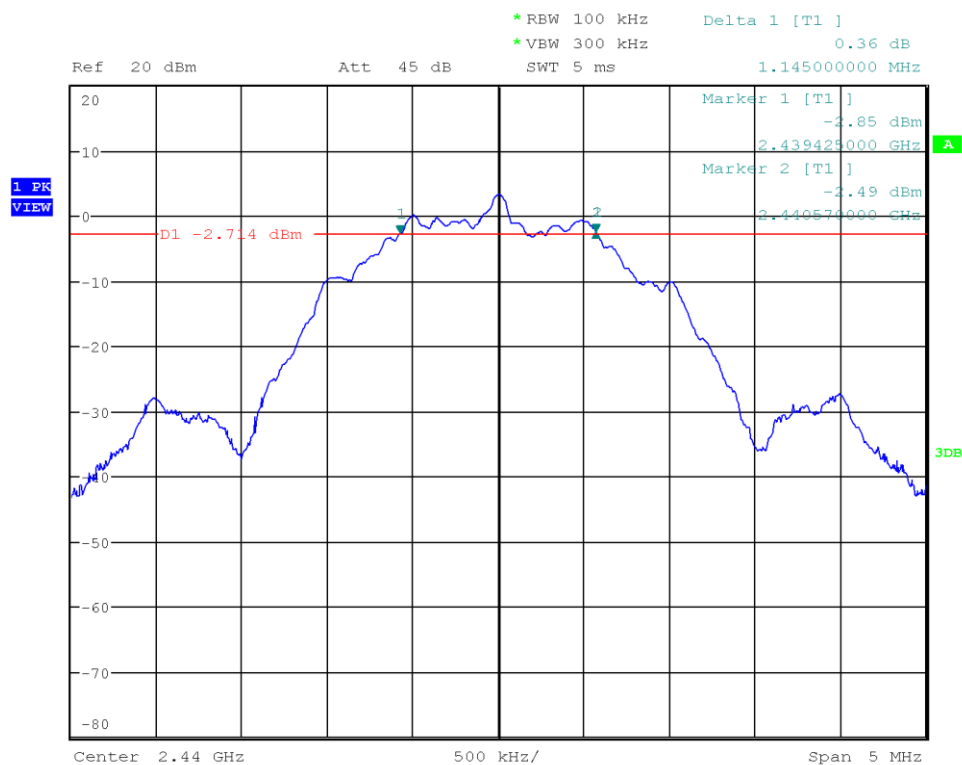
Date: 8.APR.2021 21:28:42

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

DTS (6 dB) Bandwidth

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 2 Mbps
 Lower Frequency [MHz]: 2439.425
 Upper Frequency [MHz]: 2440.570
 6 dB Bandwidth [kHz]: 1145



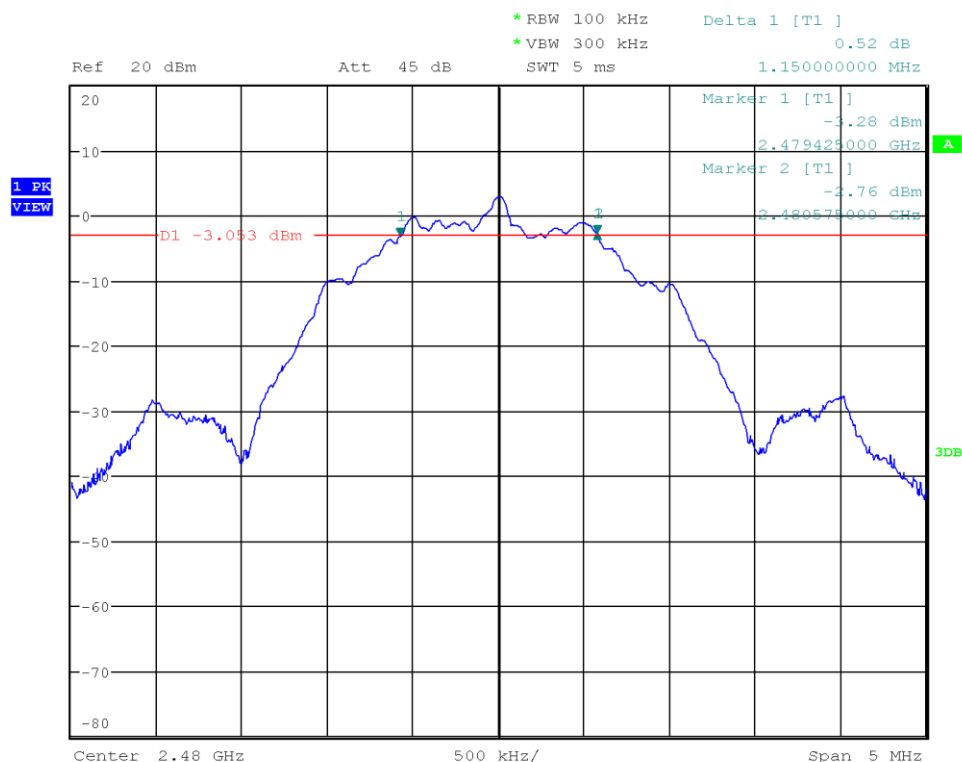
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Test Report No.: G0M-2007-9184-TFC247BL-V01

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

DTS (6 dB) Bandwidth

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 2 Mbps
 Lower Frequency [MHz]: 2479.425
 Upper Frequency [MHz]: 2480.575
 6 dB Bandwidth [kHz]: 1150



Date: 8.APR.2021 21:31:15

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

3.3 Test Conditions and Results - Maximum peak conducted output power

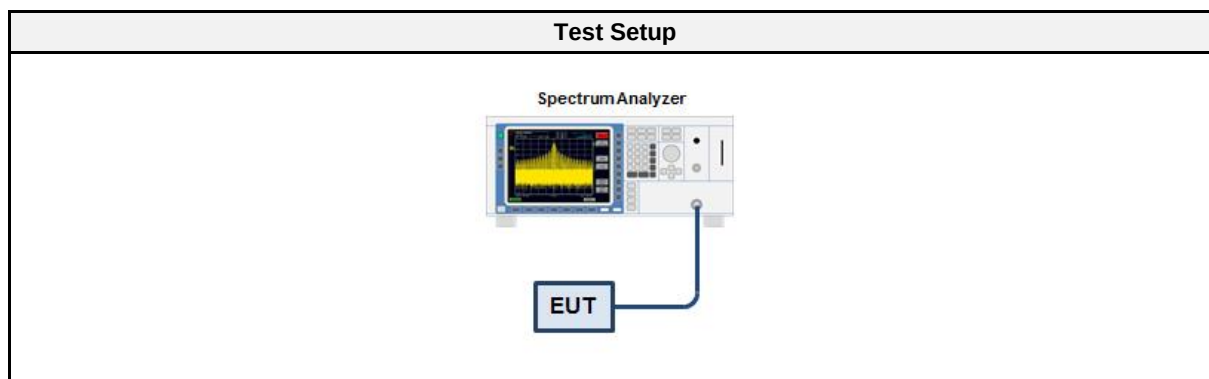
3.3.1 Information

Test Information	
Reference	FCC § 15.247(b); ISSED RSS-247, Issue 2 (section 5.4)
Measurement Method	ANSI C63.10 11.9.1
Measurement Uncertainty	± 2.86 dB
Operator	Wilfried Treffke
Date	2021-04-08

3.3.2 Limits

Limits
1 W (30 dBm)
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.

3.3.3 Setup



3.3.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01709	2021-02	2022-02
Cable	Gigalane	SMS111B	EF00779 CAA AZ	2020-12	2021-12

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

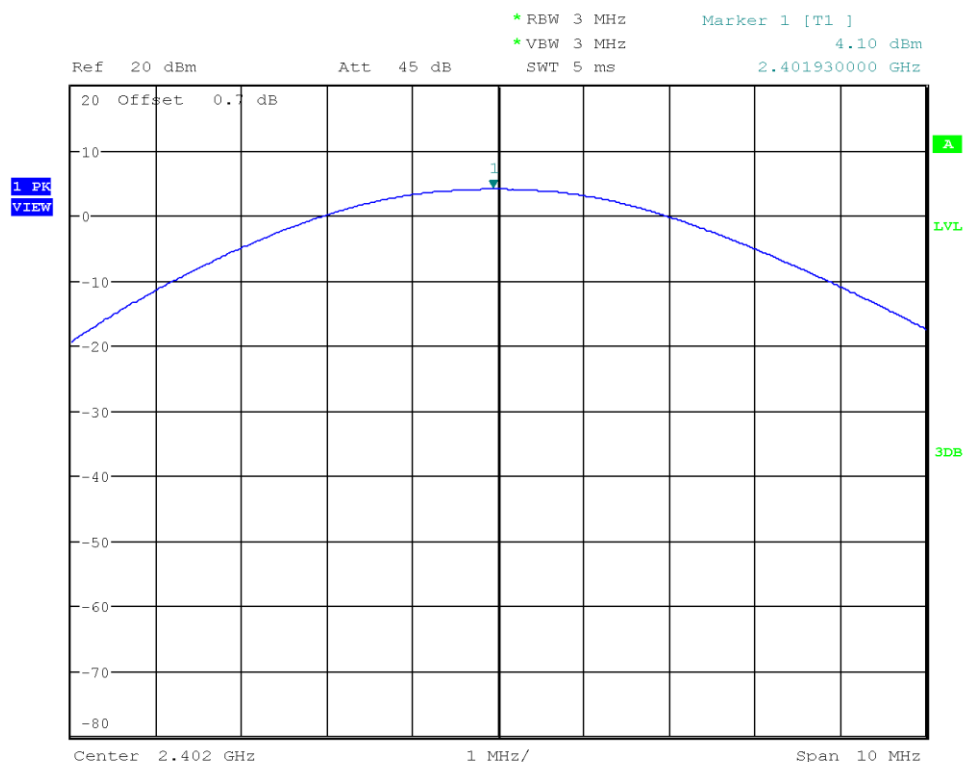
3.3.6 Results

Test Results – 1Mbps				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
2402	4.099	0.0026	1.0	PASS
2440	4.365	0.0027	1.0	PASS
2480	4.064	0.0025	1.0	PASS

Test Results – 2Mbps				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
2402	4.102	0.0026	1.0	PASS
2440	4.424	0.0028	1.0	PASS
2480	4.098	0.0026	1.0	PASS

Peak Conducted Output Power

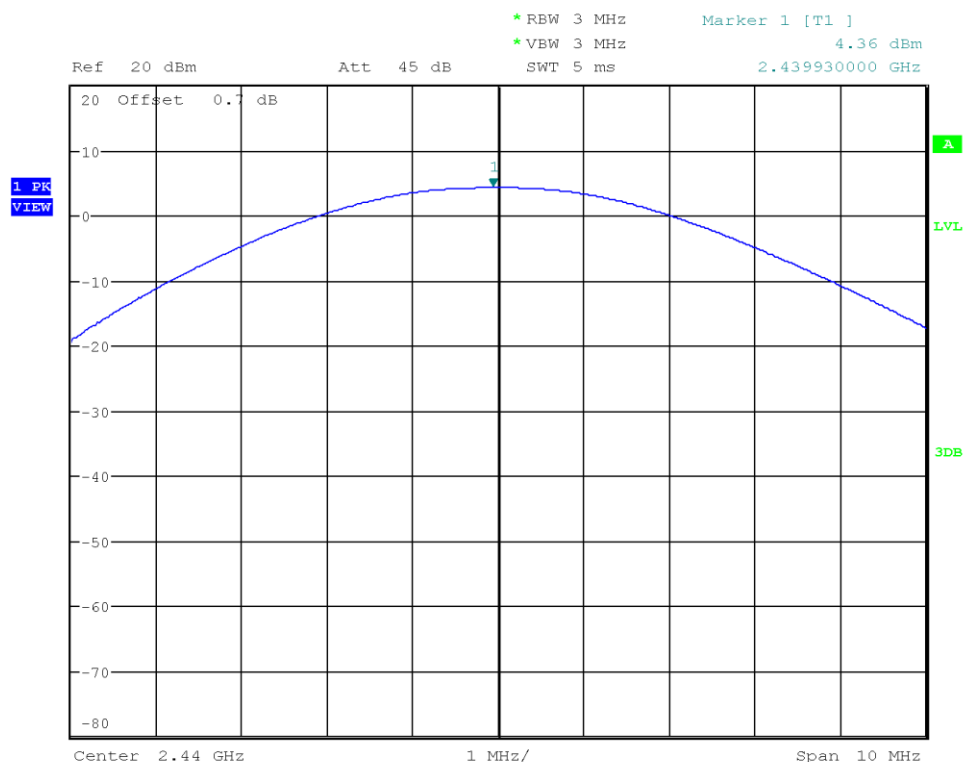
Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Peak Power [dBm]: 4.099
 Peak Power [W]: 0.0026



Date: 8.APR.2021 21:53:55

Peak Conducted Output Power

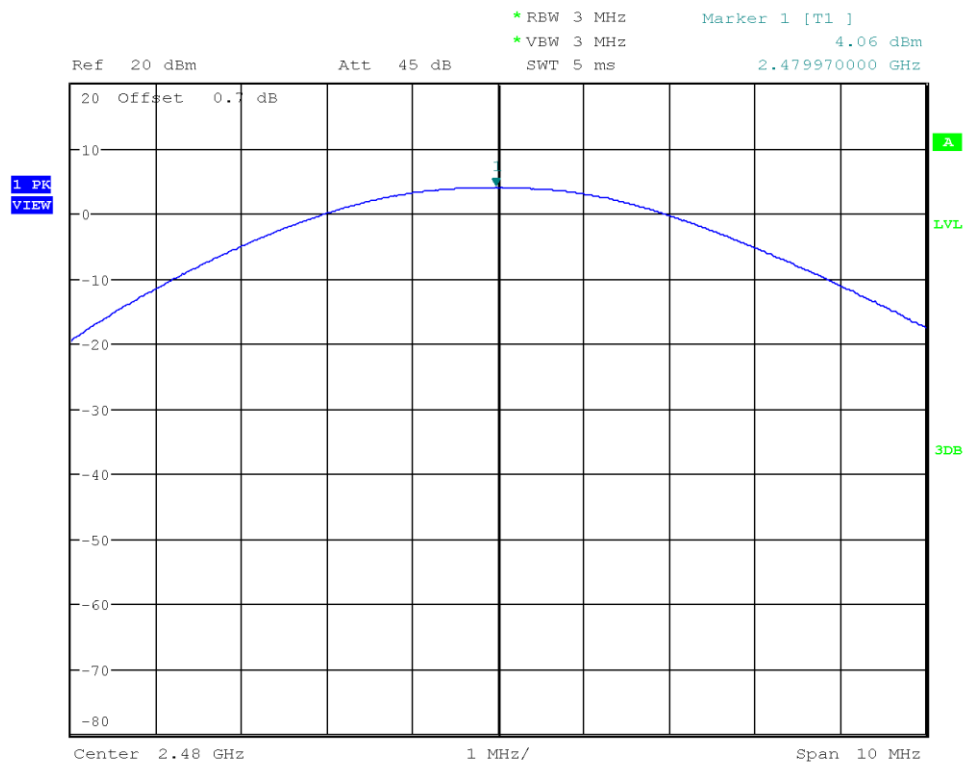
Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Peak Power [dBm]: 4.365
 Peak Power [W]: 0.0027



Date: 8.APR.2021 21:55:09

Peak Conducted Output Power

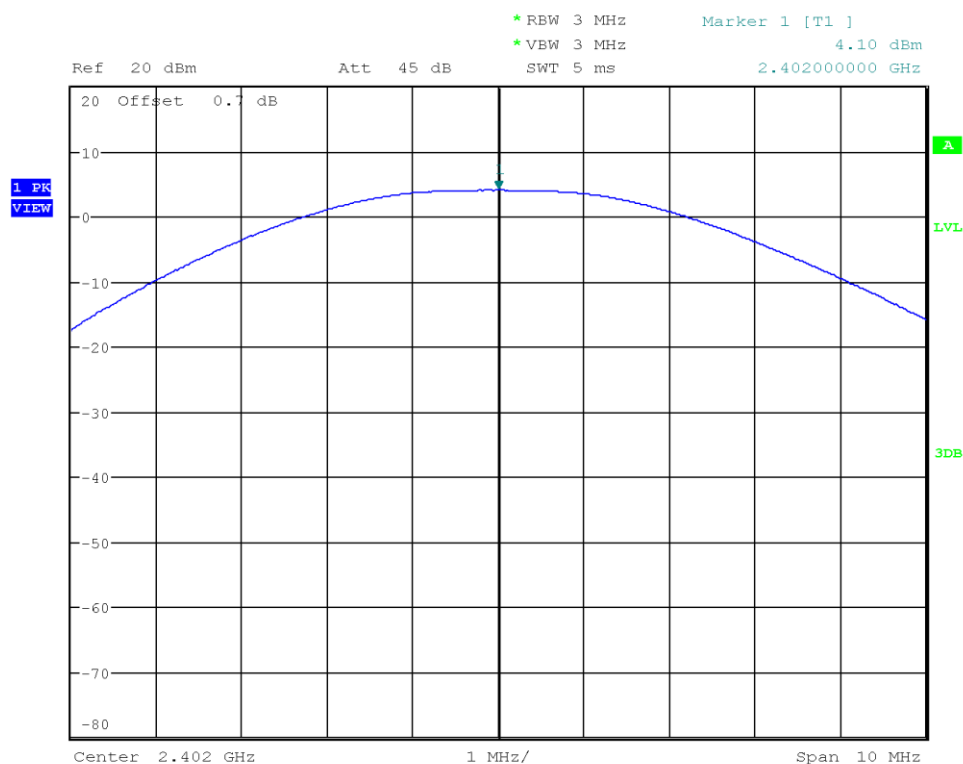
Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Peak Power [dBm]: 4.064
 Peak Power [W]: 0.0025



Date: 8.APR.2021 21:56:21

Peak Conducted Output Power

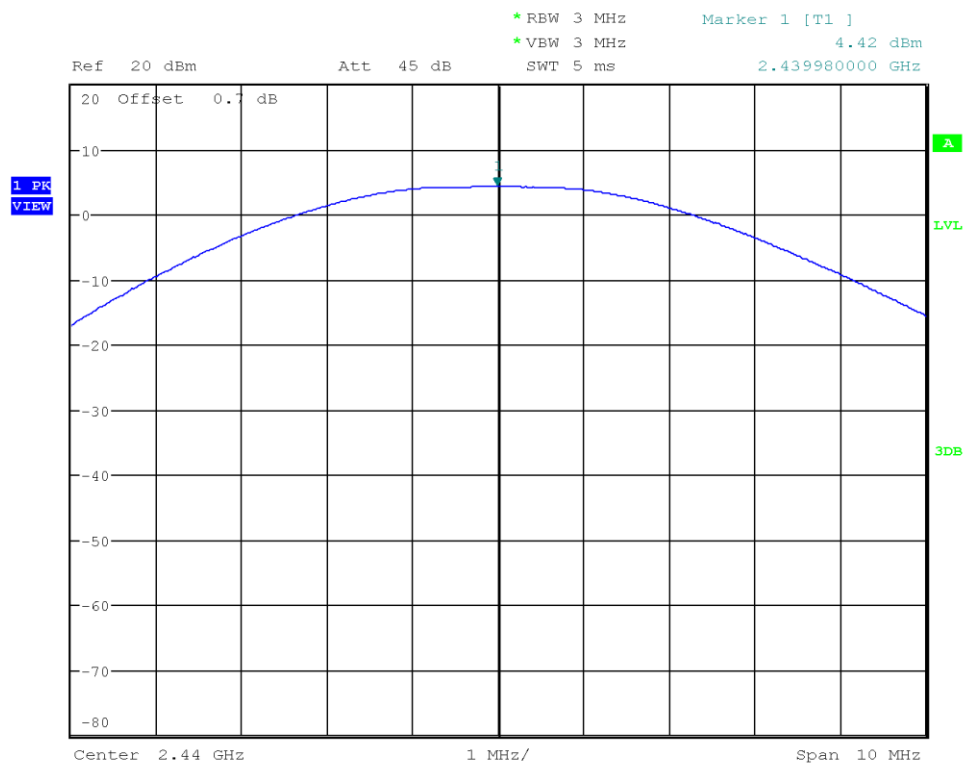
Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 2 Mbps
 Peak Power [dBm]: 4.102
 Peak Power [W]: 0.0026



Date: 8.APR.2021 21:57:44

Peak Conducted Output Power

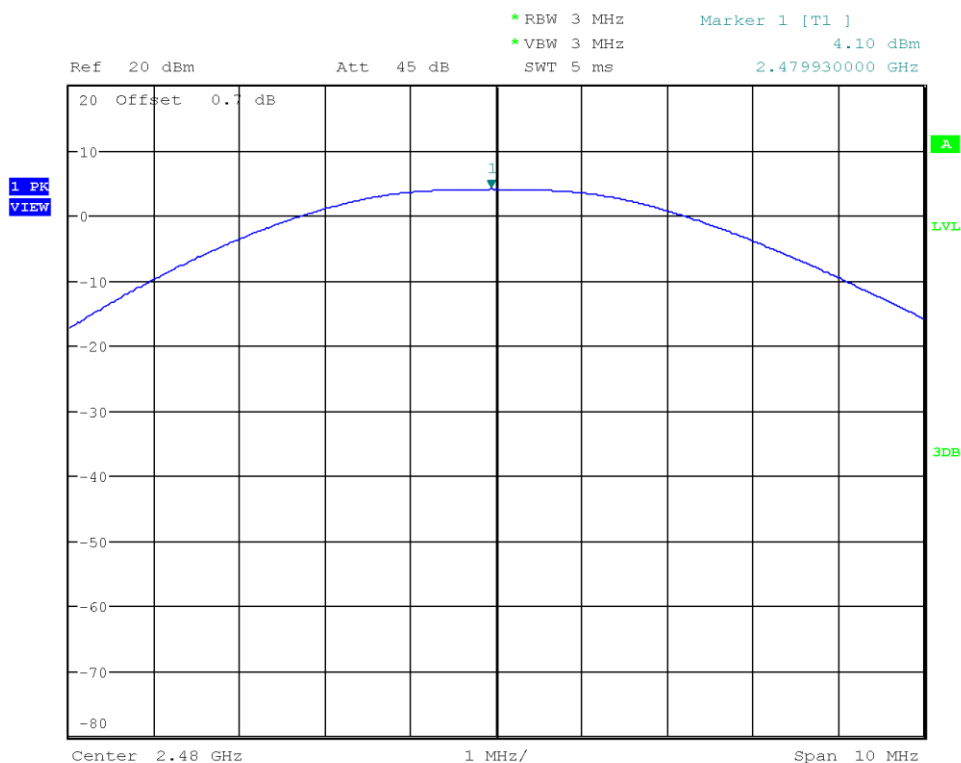
Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 2 Mbps
 Peak Power [dBm]: 4.424
 Peak Power [W]: 0.0028



Date: 8.APR.2021 21:58:48

Peak Conducted Output Power

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 2 Mbps
 Peak Power [dBm]: 4.098
 Peak Power [W]: 0.0026



Date: 8.APR.2021 21:59:54

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

3.4 Test Conditions and Results - Power spectral density

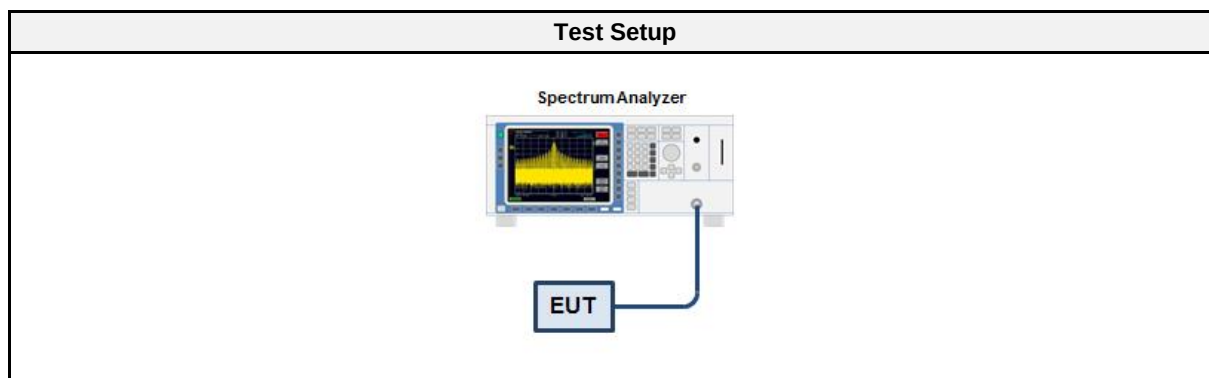
3.4.1 Information

Test Information	
Reference	FCC § 15.247(e); ISSED RSS-247, Issue 2 (section 5.2)
Measurement Method	ANSI C63.10 11.10.2, 14.3.2
Measurement Uncertainty	± 2.86 dB
Operator	Wilfried Treffke
Date	2021-04-08

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 26	EF01709	2021-02	2022-02
Cable	Gigalane	SMS111B	EF00779 CAAZ	2020-12	2021-12

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 ≥ 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

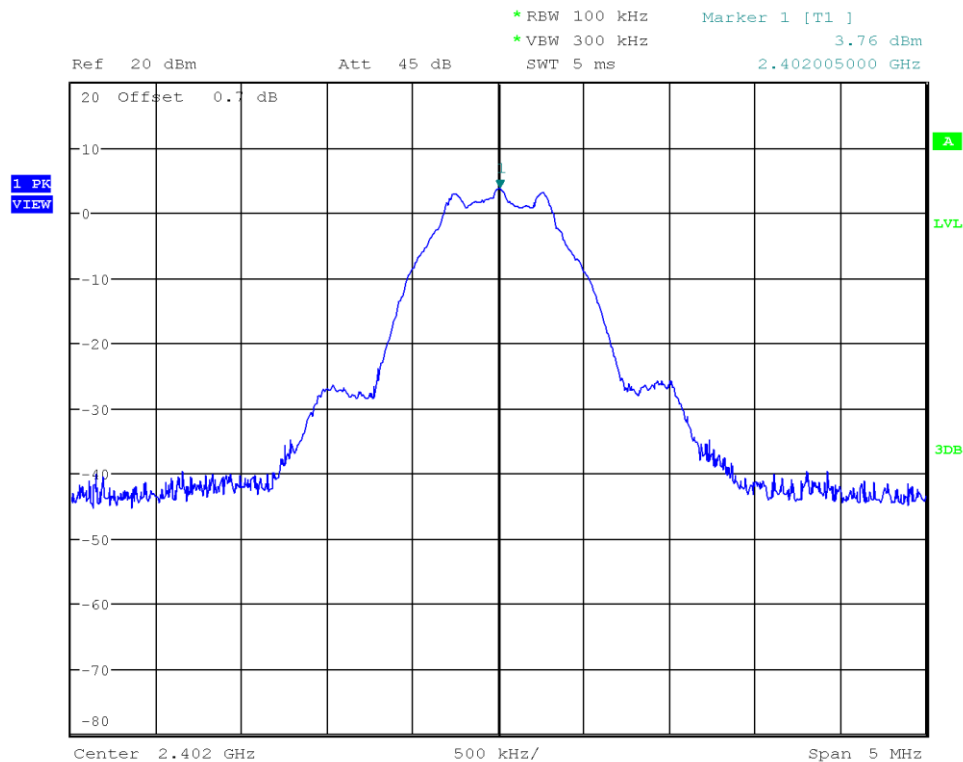
3.4.6 Results

Test Results – 1 Mbps			
Channel [MHz]	PSD [dBm/RBW]	Limit [dBm/3kHz]	Verdict
2402	3.763	8.0	PASS
2440	4.058	8.0	PASS
2480	3.687	8.0	PASS
RBW = 100 kHz			

Test Results – 2 Mbps			
Channel [MHz]	PSD [dBm/RBW]	Limit [dBm/3kHz]	Verdict
2402	3.755	8.0	PASS
2440	4.030	8.0	PASS
2480	3.694	8.0	PASS
RBW = 100 kHz			

Peak Power Spectral Density

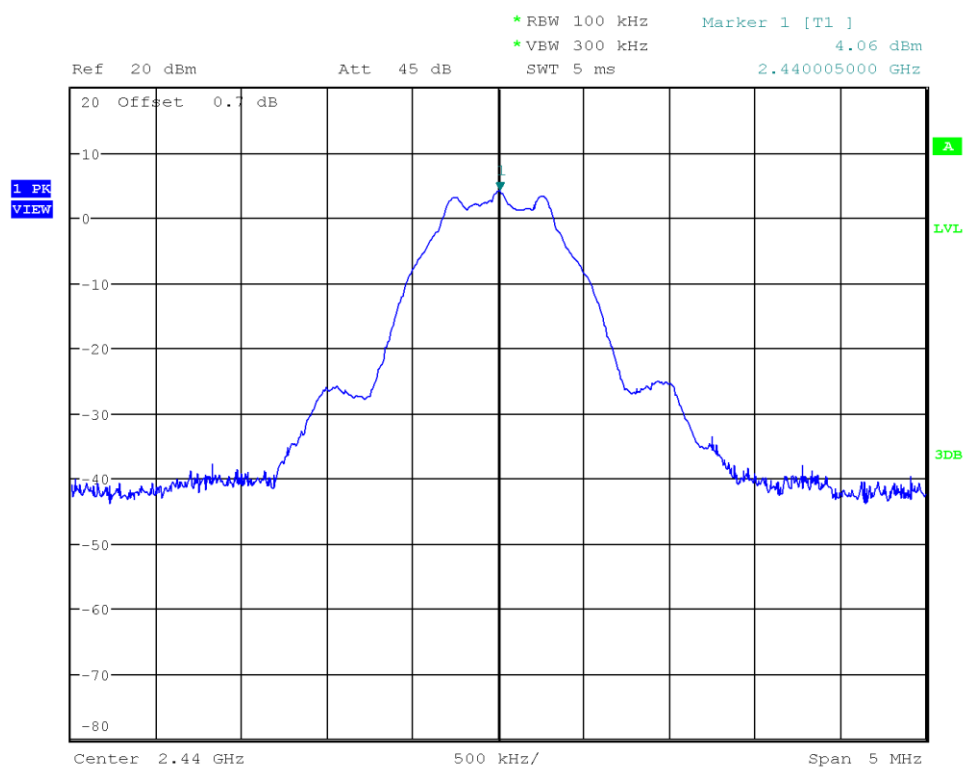
Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 1 Mbps
 Peak Frequency [MHz]: 2402.005
 Spectral Density [dBm/RBW]: 3.763
 Resolution Bandwidth [kHz]: 100 kHz



Date: 8.APR.2021 22:03:06

Peak Power Spectral Density

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 1 Mbps
 Peak Frequency [MHz]: 2440.005
 Spectral Density [dBm/RBW]: 4.058
 Resolution Bandwidth [kHz]: 100 kHz



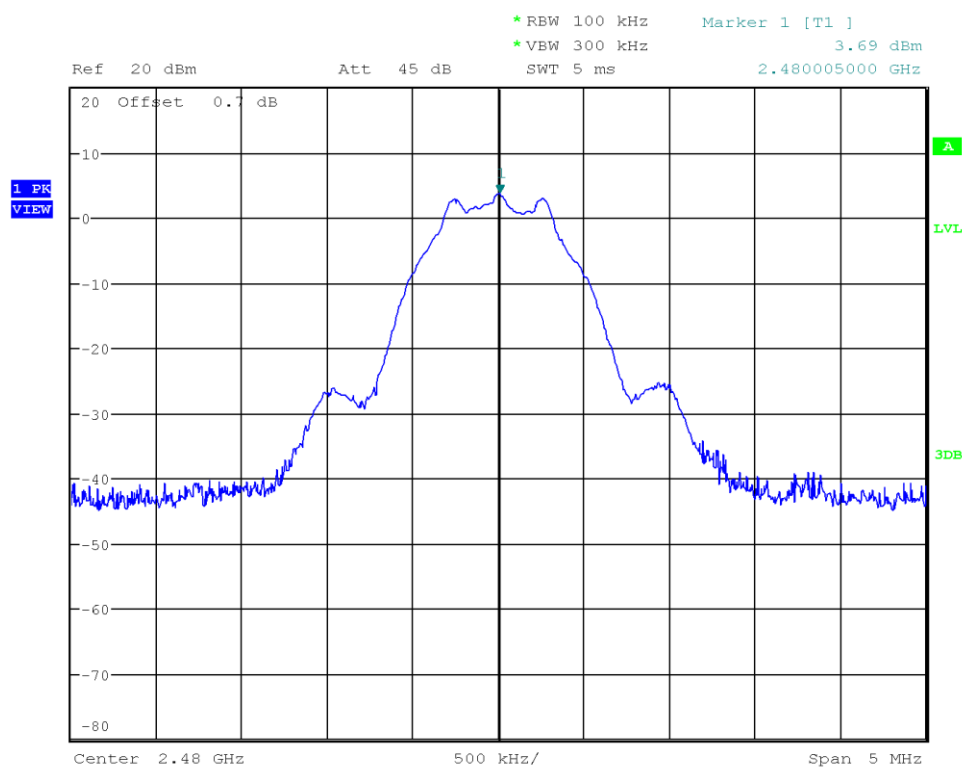
Date: 8.APR.2021 22:04:33

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

Peak Power Spectral Density

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 1 Mbps
 Peak Frequency [MHz]: 2480.005
 Spectral Density [dBm/RBW]: 3.687
 Resolution Bandwidth [kHz]: 100 kHz



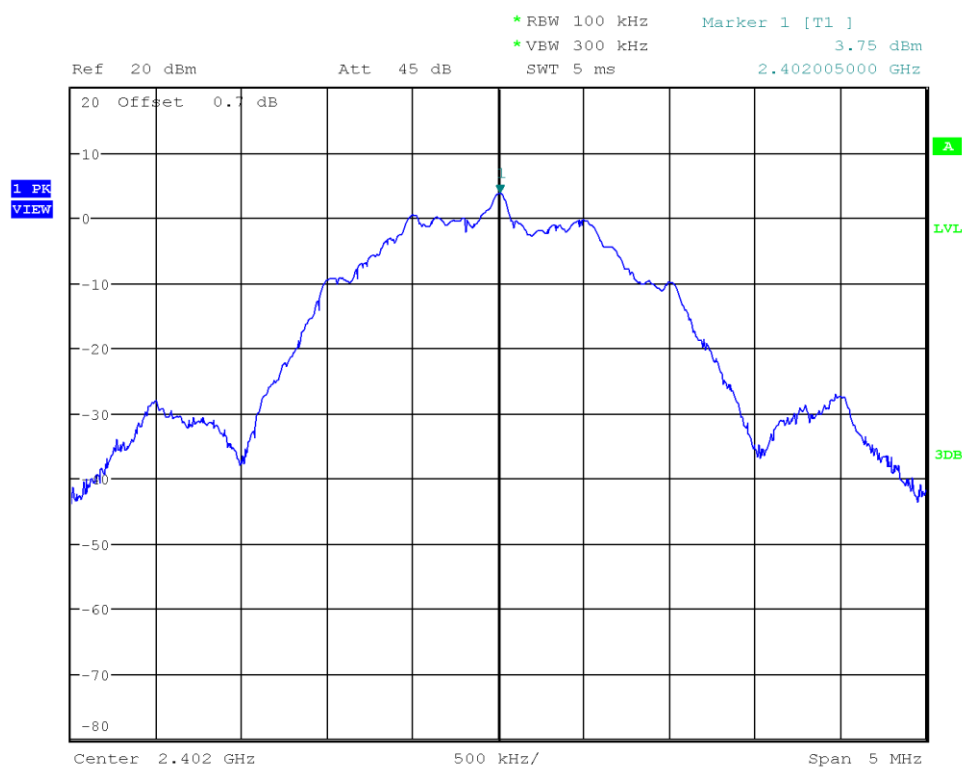
Date: 8.APR.2021 22:05:41

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

Peak Power Spectral Density

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 2 Mbps
 Peak Frequency [MHz]: 2402.005
 Spectral Density [dBm/RBW]: 3.755
 Resolution Bandwidth [kHz]: 100 kHz



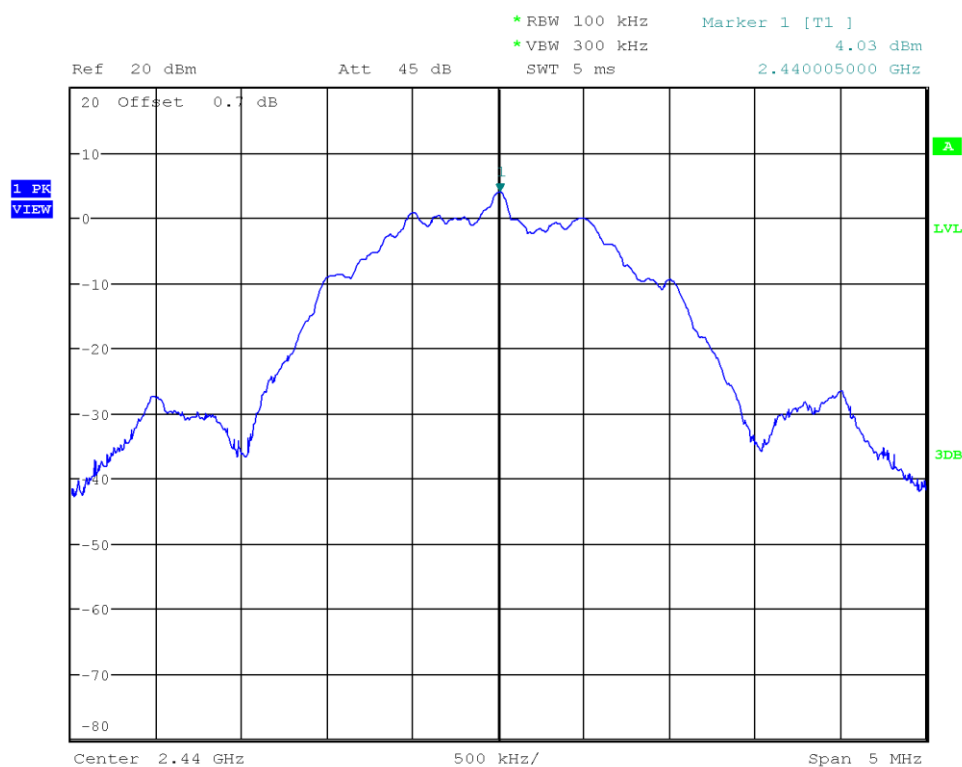
Date: 8.APR.2021 22:06:50

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

Peak Power Spectral Density

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 2 Mbps
 Peak Frequency [MHz]: 2440.005
 Spectral Density [dBm/RBW]: 4.030
 Resolution Bandwidth [kHz]: 100 kHz



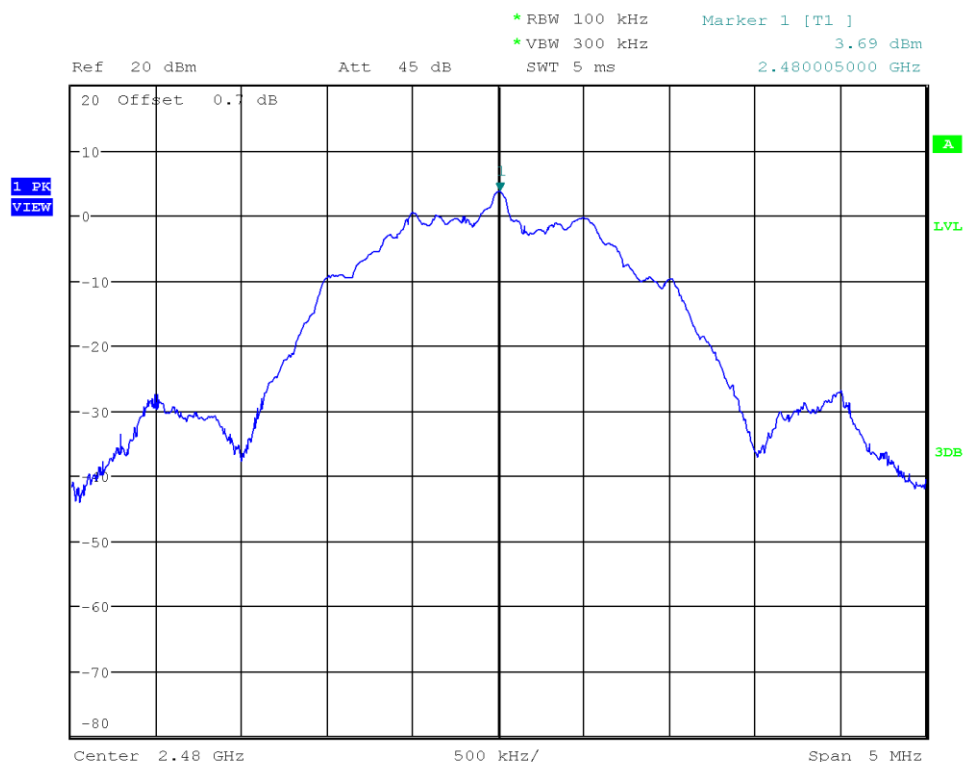
Date: 8.APR.2021 22:08:16

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

Peak Power Spectral Density

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 2 Mbps
 Peak Frequency [MHz]: 2480.005
 Spectral Density [dBm/RBW]: 3.694
 Resolution Bandwidth [kHz]: 100 kHz



Date: 8.APR.2021 22:09:15

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

3.5 Test Conditions and Results - Band-edge compliance

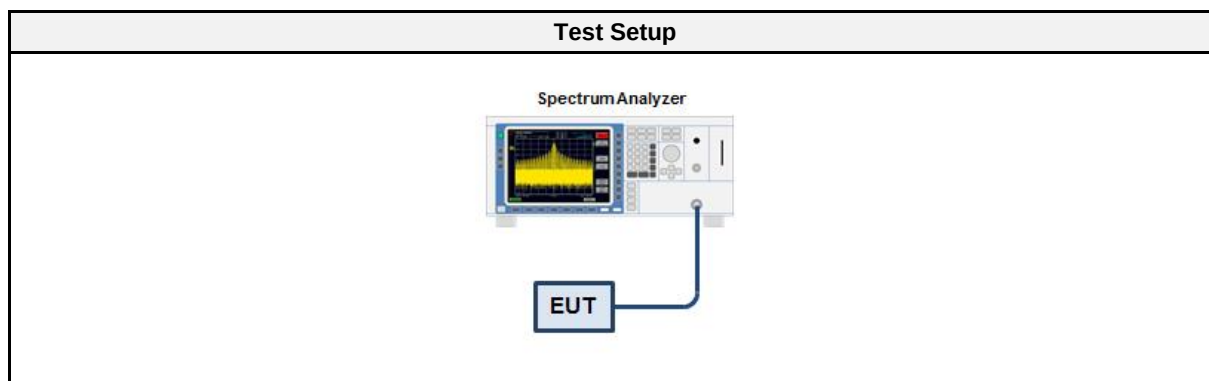
3.5.1 Information

Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Uncertainty	± 3.64 dB
Measurement Method	ANSI C63.10 11.13
Operator	Wilfried Treffke
Date	2021-04-08

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 26	EF01709	2021-02	2022-02
Cable	Gigalane	SMS111B	EF00779 CAA AZ	2020-12	2021-12

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

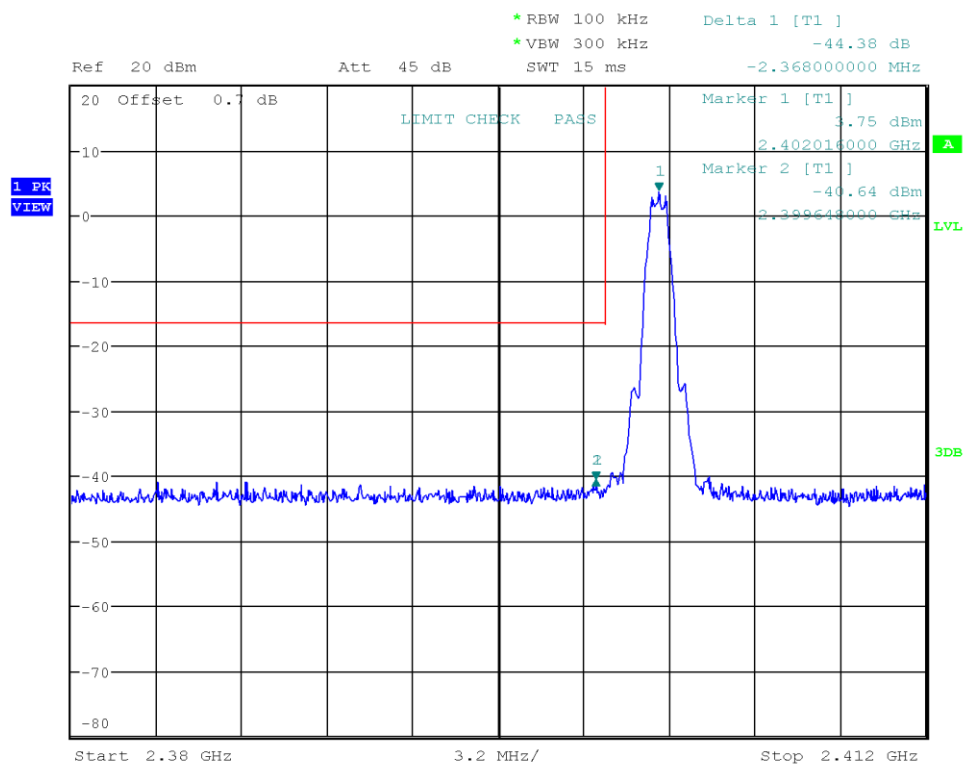
3.5.6 Results

Test Results – 1 Mbps				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
GFSK	2402	-44.38	-20	PASS
GFSK	2480	-43.73	-20	PASS

Test Results – 2 Mbps				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
GFSK	2402	-31.41	-20	PASS
GFSK	2480	-43.14	-20	PASS

Emissions in nonrestricted frequency bands at the Band-edge

Project Number:	G0M-2007-9184
Applicant:	Festool GmbH
Model Description:	Vacuum Cleaner
Model:	CTC SYS L
Test Sample ID:	33422
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-04-08
Note:	1 Mbps
Band-edge	Lower
In-band Frequency [MHz]:	2402.016
Max. in-band Level [dBm/100 kHz]:	3.746
Out-of-band Frequency [MHz]:	2399.648
Max. out-of-band Level [dBm/100 kHz]:	-40.637
Attenuation [dB]:	-44.38



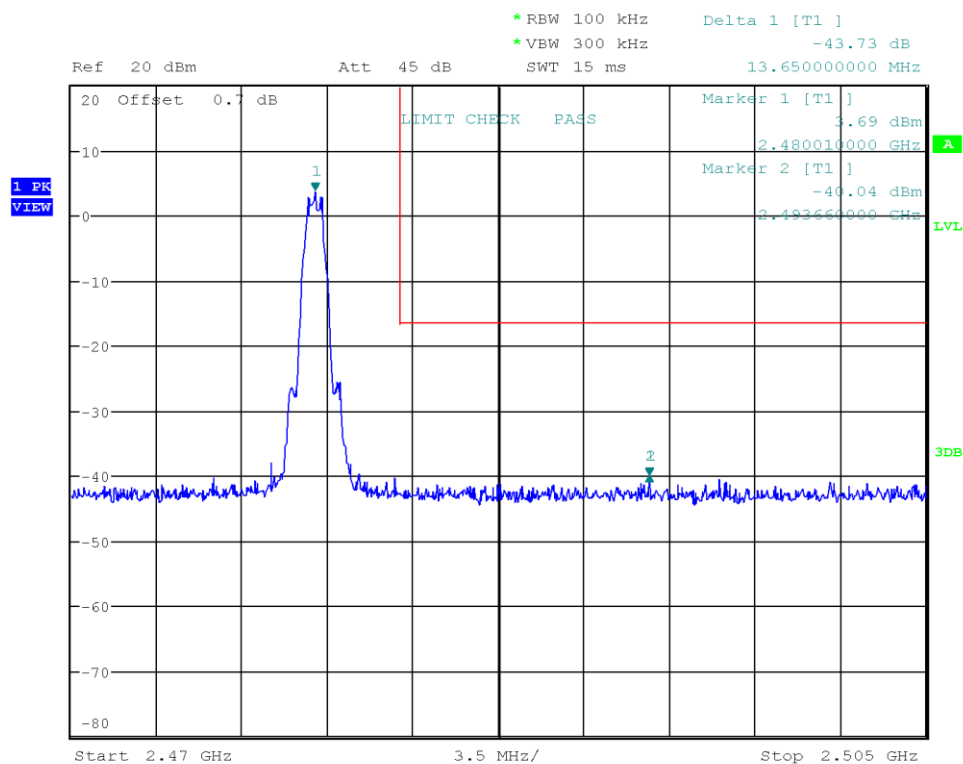
Date: 8.APR.2021 22:13:02

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

Emissions in nonrestricted frequency bands at the Band-edge

Project Number:	G0M-2007-9184
Applicant:	Festool GmbH
Model Description:	Vacuum Cleaner
Model:	CTC SYS L
Test Sample ID:	33422
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-04-08
Note:	1 Mbps
Band-edge	Upper
In-band Frequency [MHz]:	2480.01
Max. in-band Level [dBm/100 kHz]:	3.685
Out-of-band Frequency [MHz]:	2493.66
Max. out-of-band Level [dBm/100 kHz]:	-40.042
Attenuation [dB]:	-43.73



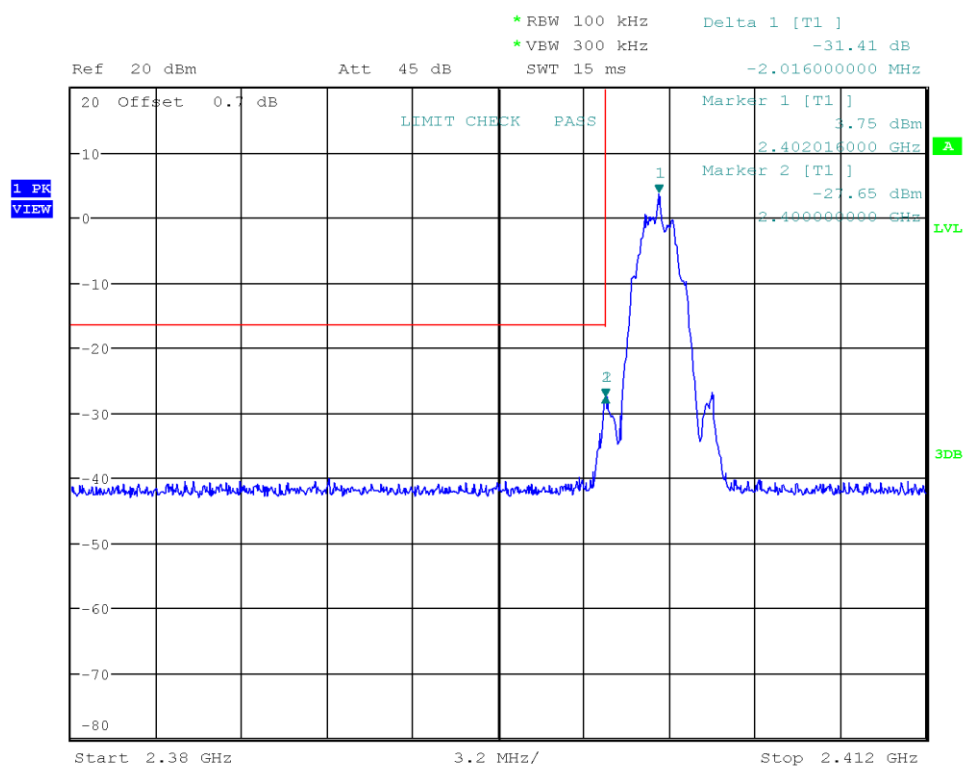
Date: 8.APR.2021 22:14:15

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

Emissions in nonrestricted frequency bands at the Band-edge

Project Number:	G0M-2007-9184
Applicant:	Festool GmbH
Model Description:	Vacuum Cleaner
Model:	CTC SYS L
Test Sample ID:	33422
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-04-08
Note:	2 Mbps
Band-edge	Lower
In-band Frequency [MHz]:	2402.016
Max. in-band Level [dBm/100 kHz]:	3.753
Out-of-band Frequency [MHz]:	2400.0
Max. out-of-band Level [dBm/100 kHz]:	-27.653
Attenuation [dB]:	-31.41



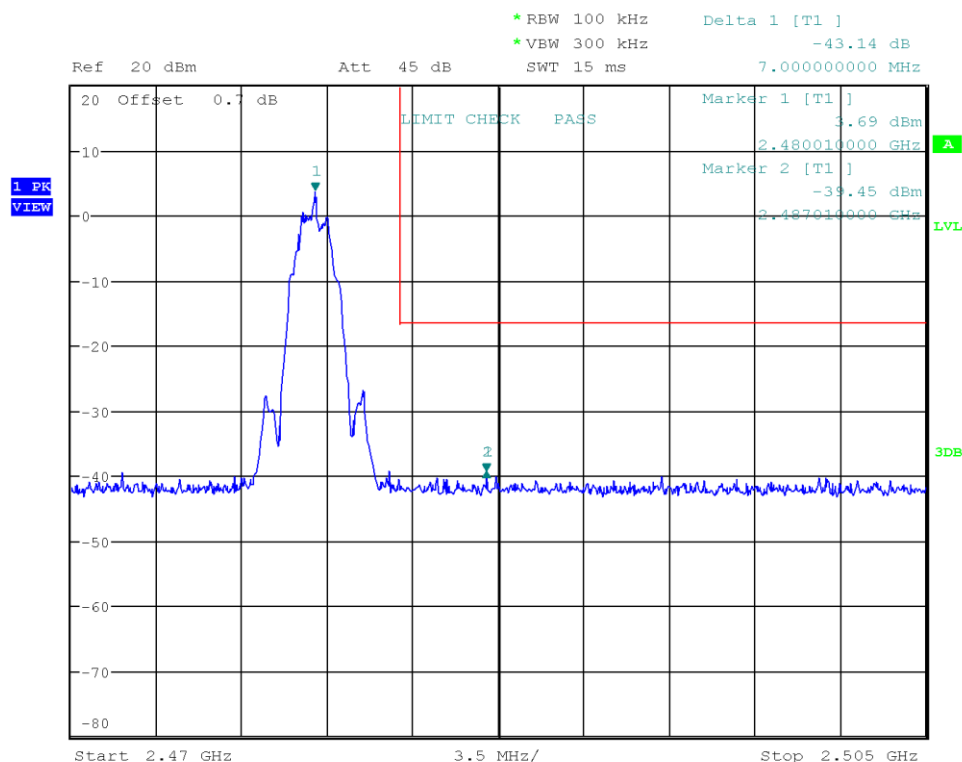
Date: 8.APR.2021 22:24:28

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 2 Mbps
 Band-edge: Upper
 In-band Frequency [MHz]: 2480.01
 Max. in-band Level [dBm/100 kHz]: 3.691
 Out-of-band Frequency [MHz]: 2487.01
 Max. out-of-band Level [dBm/100 kHz]: -39.449
 Attenuation [dB]: -43.14



Date: 8.APR.2021 22:30:10

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

3.6 Test Conditions and Results - Conducted spurious emissions

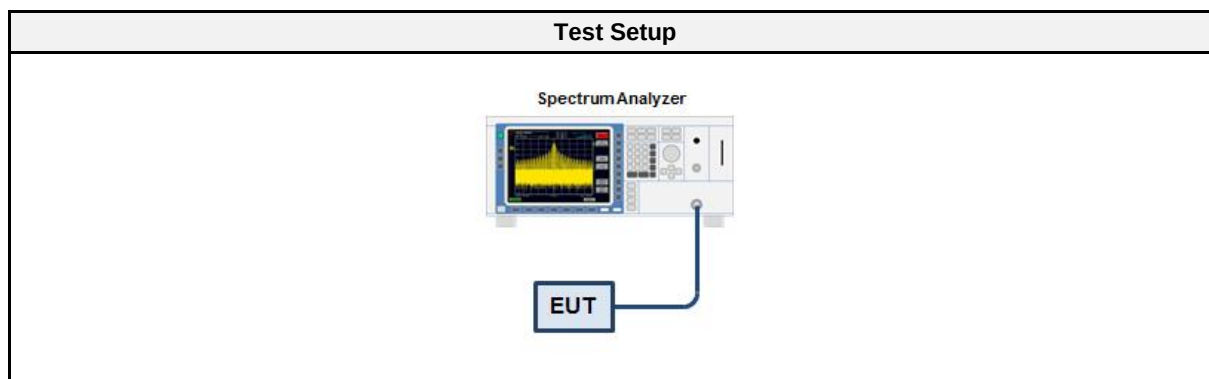
3.6.1 Information

Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Uncertainty	± 4.25 dB
Measurement Method	ANSI C63.10 11.11
Operator	Wilfried Treffke
Date	2021-04-08

3.6.2 Limits

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

3.6.3 Setup



3.6.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01709	2021-02	2022-02
Cable	Gigalane	SMS111B	EF00779 CAAZ	2020-12	2021-12

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

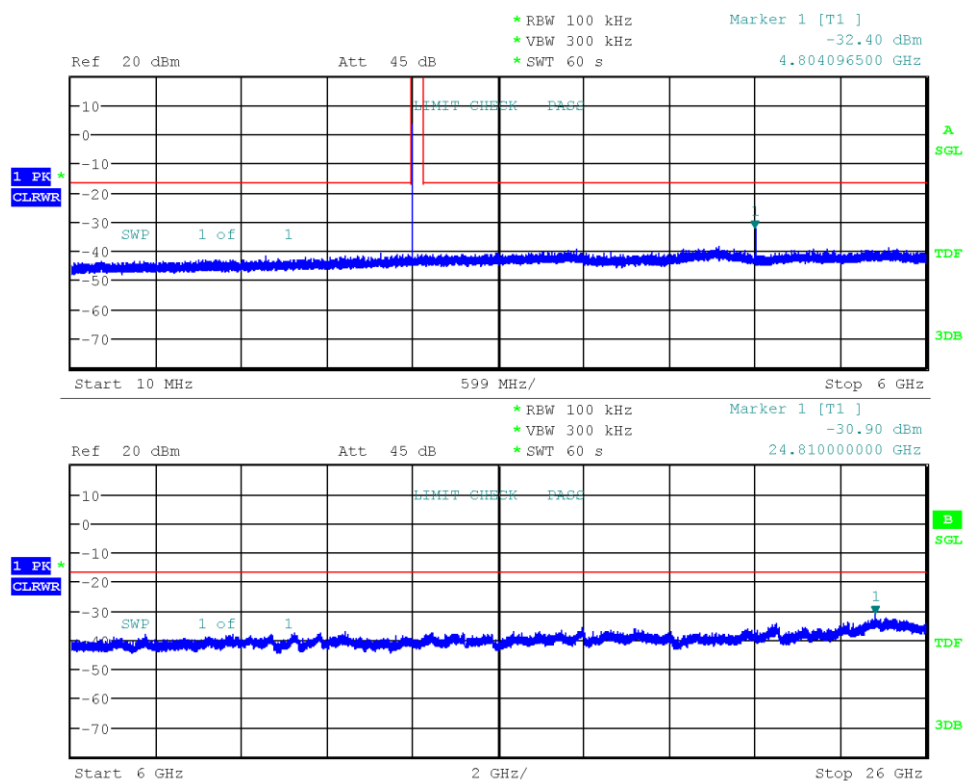
3.6.6 Results

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

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

Conducted Spurious Emissions

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 1 Mbps
 Max. in-band Frequency [MHz]: 2402.0
 Max. in-band Level [dBm/100 kHz]: 3.6
 Out-of-band Limit [dBm/100 kHz]: -16.4



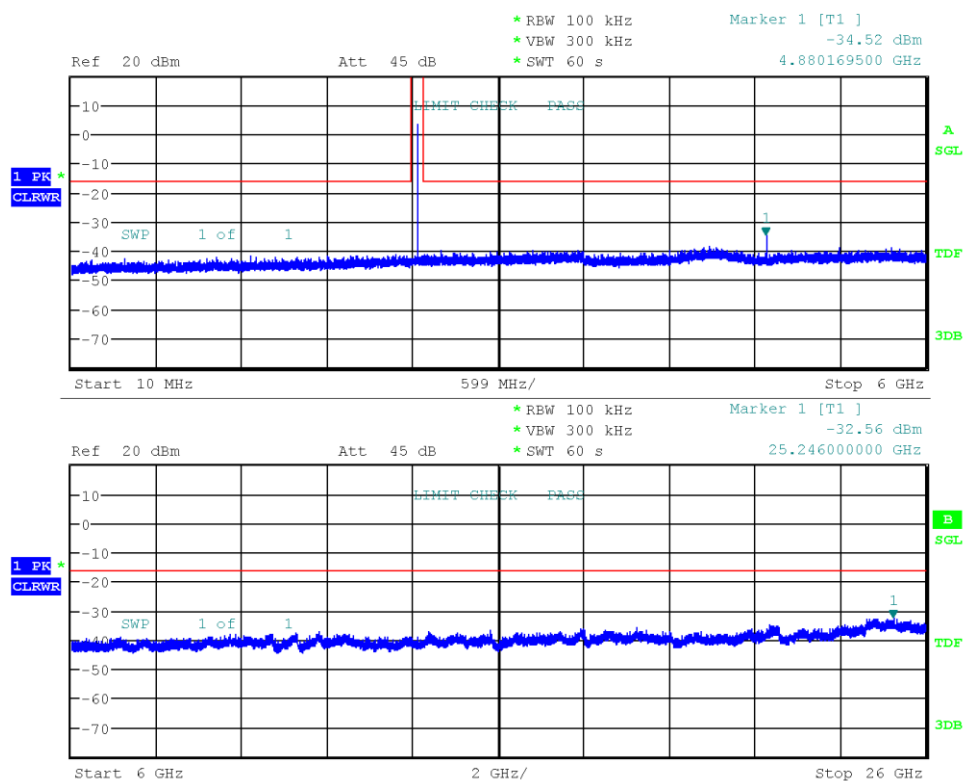
Date: 8.APR.2021 22:39:32

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

Conducted Spurious Emissions

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 1 Mbps
 Max. in-band Frequency [MHz]: 2440.0
 Max. in-band Level [dBm/100 kHz]: 3.9
 Out-of-band Limit [dBm/100 kHz]: -16.1



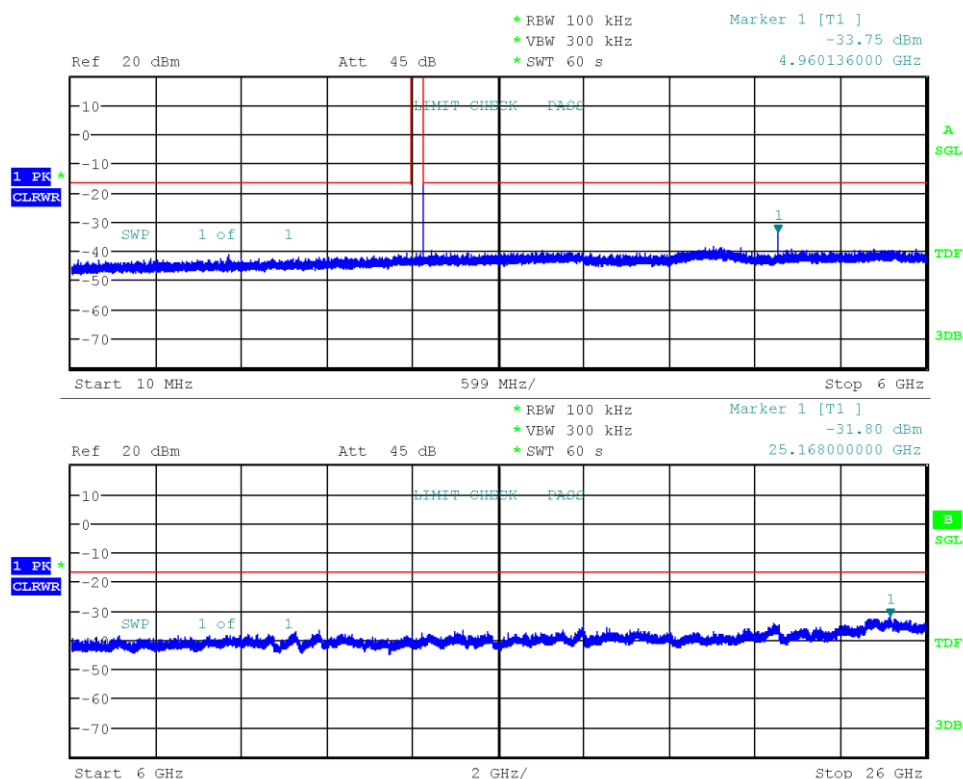
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Test Report No.: G0M-2007-9184-TFC247BL-V01

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

Conducted Spurious Emissions

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 1 Mbps
 Max. in-band Frequency [MHz]: 2480.0
 Max. in-band Level [dBm/100 kHz]: 3.6
 Out-of-band Limit [dBm/100 kHz]: -16.4



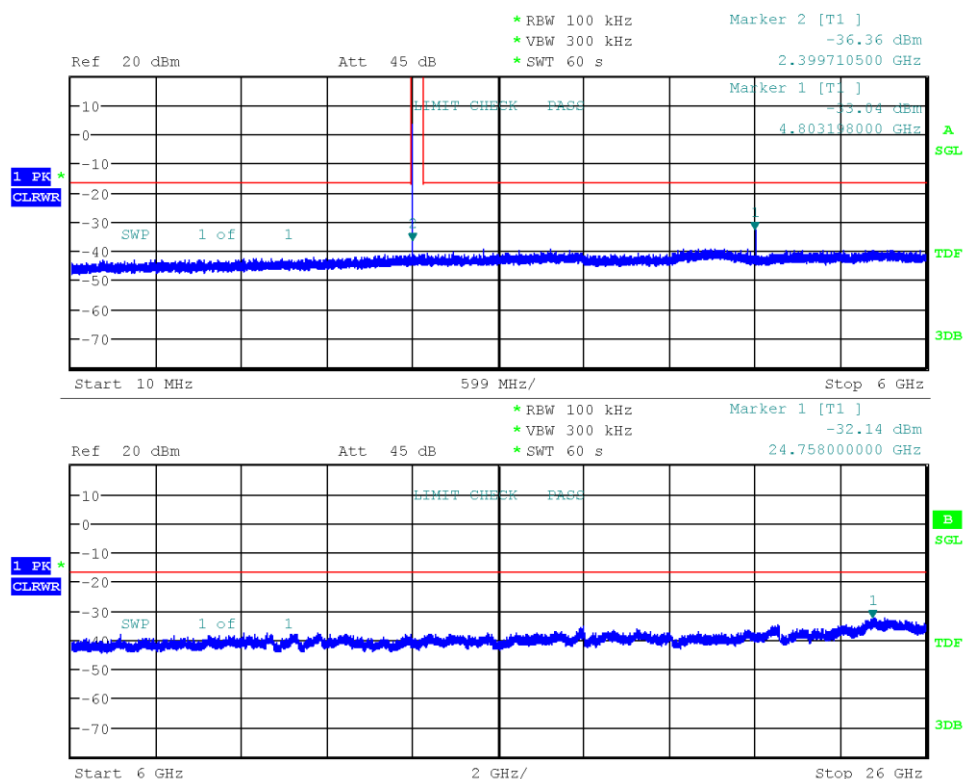
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Test Report No.: G0M-2007-9184-TFC247BL-V01

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

Conducted Spurious Emissions

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 2 Mbps
 Max. in-band Frequency [MHz]: 2402.0
 Max. in-band Level [dBm/100 kHz]: 3.6
 Out-of-band Limit [dBm/100 kHz]: -16.4



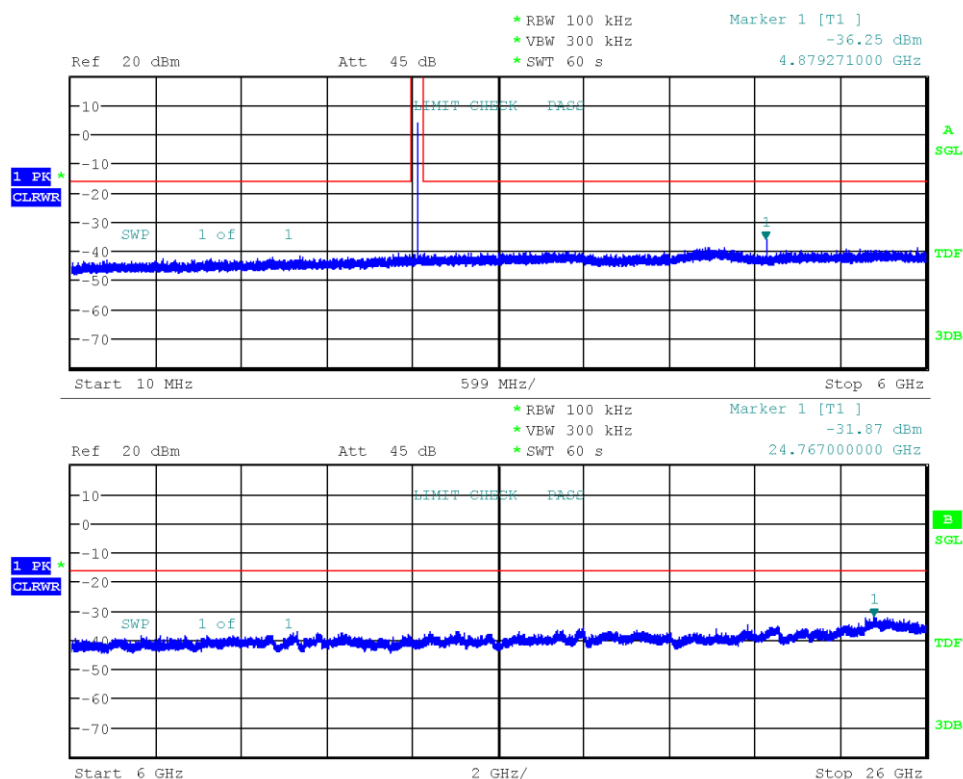
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Test Report No.: G0M-2007-9184-TFC247BL-V01

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

Conducted Spurious Emissions

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 2 Mbps
 Max. in-band Frequency [MHz]: 2440.0
 Max. in-band Level [dBm/100 kHz]: 3.9
 Out-of-band Limit [dBm/100 kHz]: -16.1



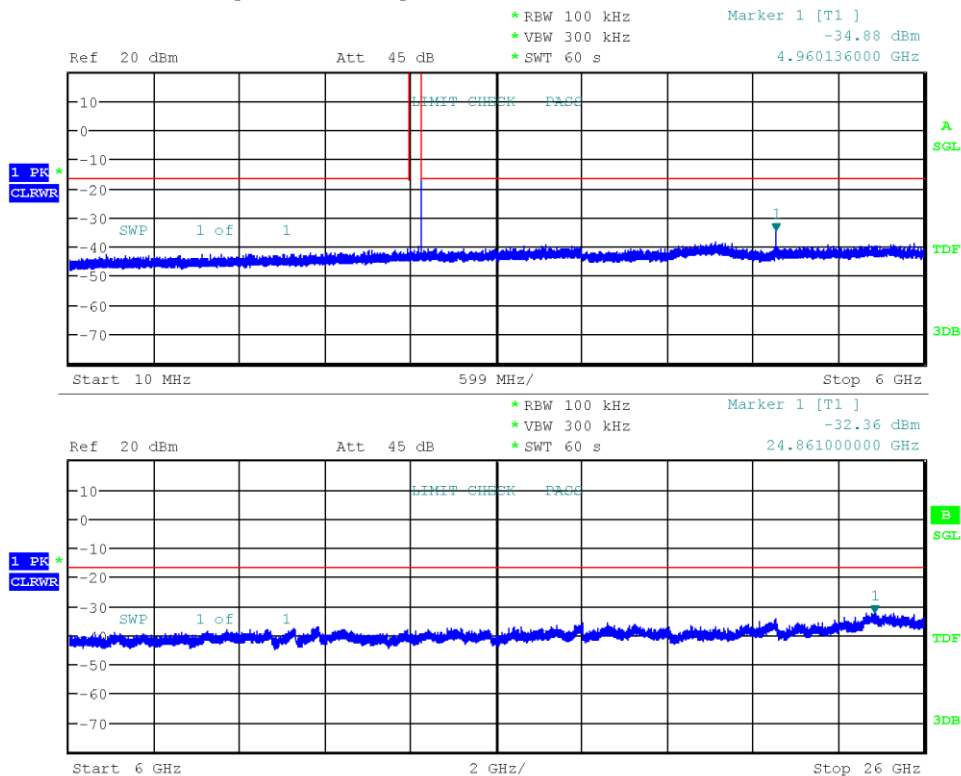
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Test Report No.: G0M-2007-9184-TFC247BL-V01

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

Conducted Spurious Emissions

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-04-08
 Note: 2 Mbps
 Max. in-band Frequency [MHz]: 2480.0
 Max. in-band Level [dBm/100 kHz]: 3.6
 Out-of-band Limit [dBm/100 kHz]: -16.4



Date: 8.APR.2021 23:10:30

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

3.7 Test Conditions and Results - Transmitter radiated emissions

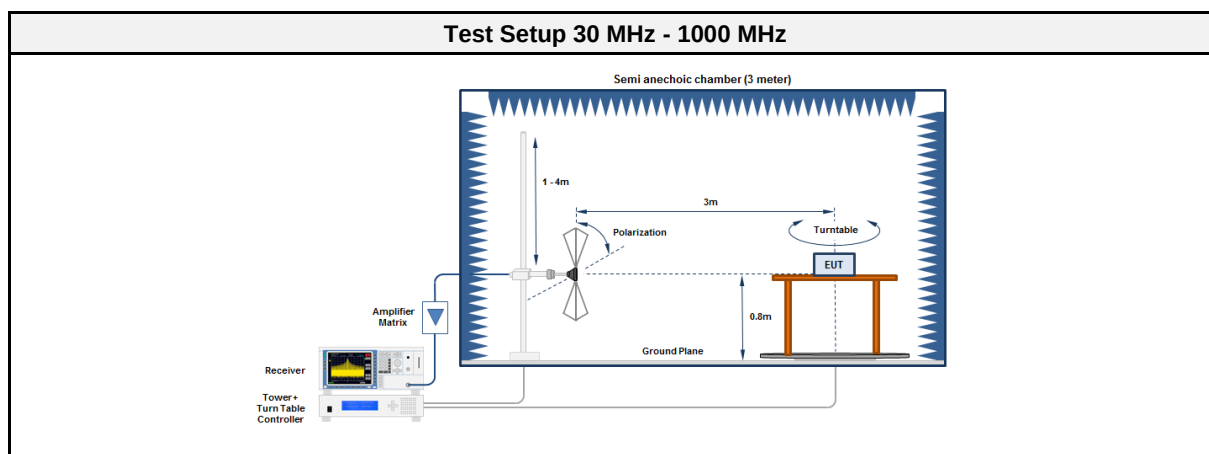
3.7.1 Information

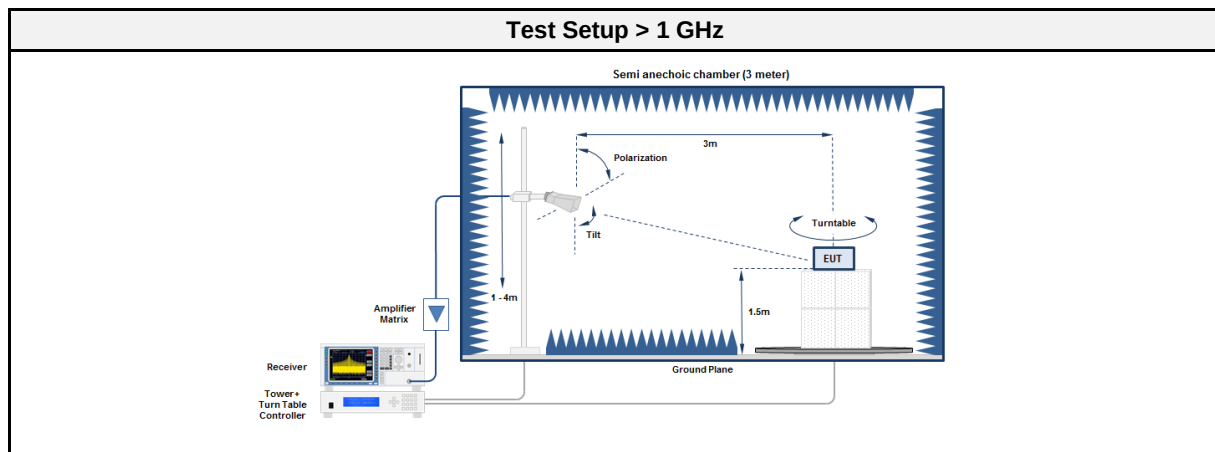
Test Information	
Reference	FCC § 15.247(d); FCC § 15.209; ISSED RSS-Gen, Issue 5 (section 6.13)
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6, 11.12
Operator	Wilfried Treffke
Date	2021-04-15

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	2021-02	2024-02
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	2021-02	2024-02
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2020-06	2021-06
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2019-10	2022-10
Antenna	Amplifier Research	AT4560	EF00302	2019-05	2021-05

3.7.5 Procedure

Test Procedure 30 MHz - 1000 MHz	
1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector	

Test Procedure > 1 GHz	
1. EUT is placed on a non conducting support at the center of a turn table 1.5 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector	

3.7.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
2402	2329.6	50.76	pk	hor	74.00	-23.24
2402	2329.6	41.50	avg	hor	54.00	-12.50
2402	2330	50.44	pk	ver	74.00	-23.56
2402	2330	39.99	avg	ver	54.00	-14.01
2402	2389.9	58.68	pk	hor	74.00	-15.32
2402	2389.9	27.88	avg	hor	54.00	-26.12
2402	2389.9	56.84	pk	ver	74.00	-17.16
2402	2389.9	26.59	avg	ver	54.00	-27.41
2440	7319.2	59.18	pk	hor	74.00	-14.82
2440	7319.2	50.74	avg	hor	54.00	-03.26
2440	7319.2	58.03	pk	ver	74.00	-15.97
2440	7319.2	51.73	avg	ver	54.00	-02.27
2480	2483.5	62.30	pk	hor	74.00	-11.70
2480	2483.5	37.56	avg	hor	54.00	-16.44
2480	2483.6	57.94	pk	ver	74.00	-16.06
2480	2483.6	32.78	avg	ver	54.00	-21.22
2480	7441	59.31	pk	hor	74.00	-14.69
2480	7441	49.06	avg	hor	54.00	-04.94
2480	7441	55.40	pk	ver	74.00	-18.60
2480	7441	44.51	avg	ver	54.00	-09.49

3.8 Test Conditions and Results - Receiver radiated emissions

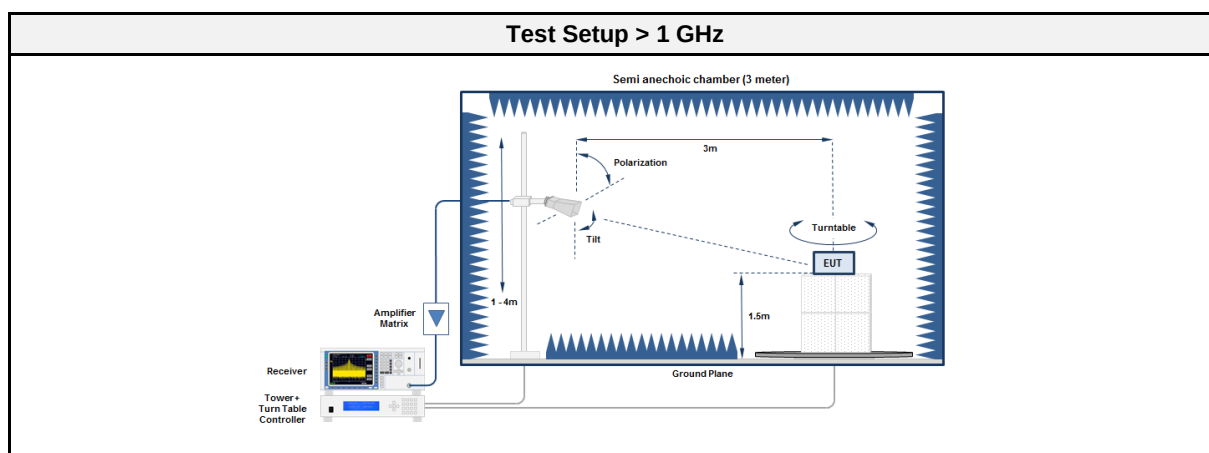
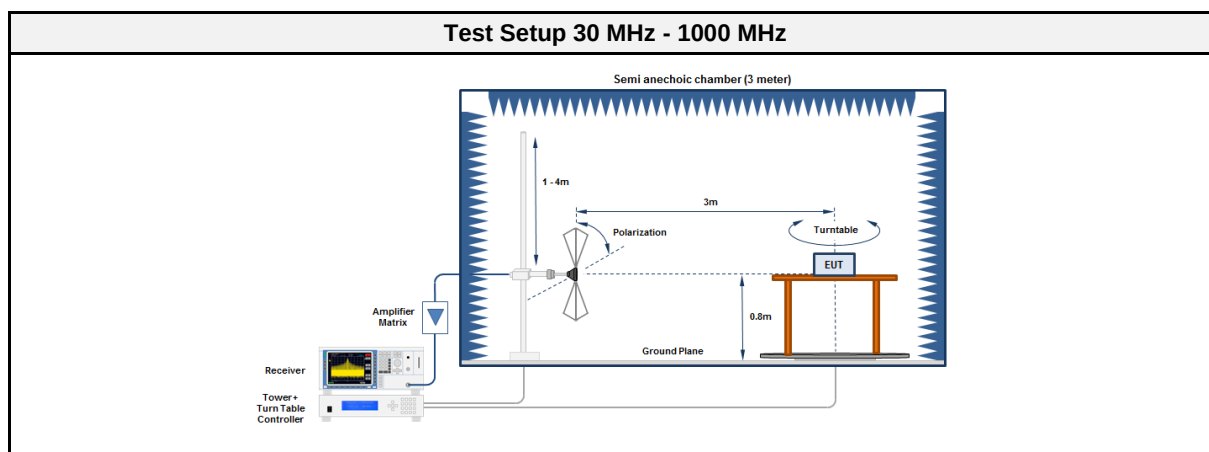
3.8.1 Information

Test Information	
Reference	ISED RSS-247, Issue 2 (section 3.1)
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.10 6.5, 6.6, 11.12
Operator	Wilfried Treffke
Date	2021-04-19

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 Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2020.1.8

Test Equipment 30 MHz - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2021-02	2024-02
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	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	2021-02	2024-02
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2020-06	2021-06
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2019-10	2022-10

3.8.5 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	

3.8.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
2440	1216	36.99	pk	ver	53.98	-16.99
2440	2808	37.07	pk	ver	53.98	-16.91
2440	7910	41.76	pk	ver	53.98	-12.22
2440	10538	48.38	pk	hor	53.98	-05.60
2440	10538	36.97	avg	hor	53.98	-17.01
2440	11462	48.79	pk	ver	53.98	-05.19
2440	474.359	18.83	pk	hor	46.00	-27.17

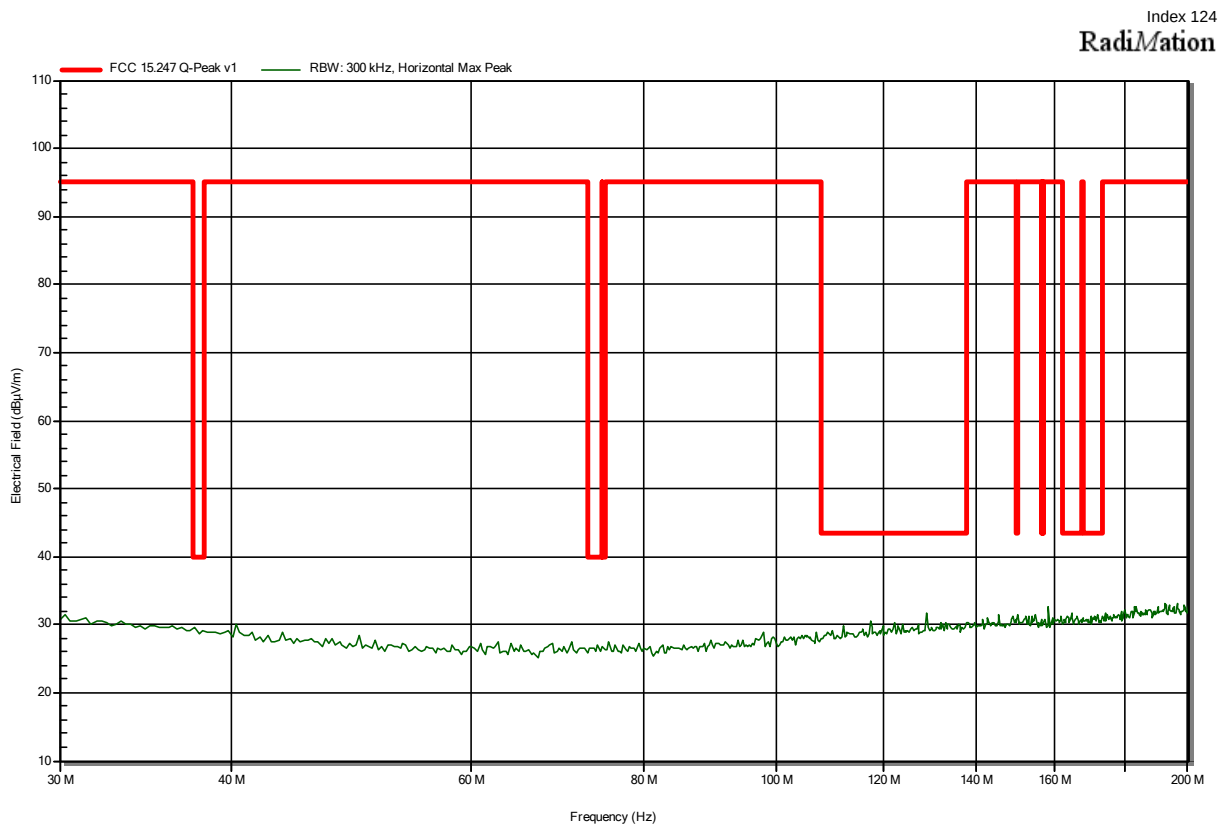
Test Report No.: G0M-2007-9184-TFC247BL-V01

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

ANNEX A Transmitter spurious emissions

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2402 MHz
 Test Date: 2021-04-15
 Note: 0 dg

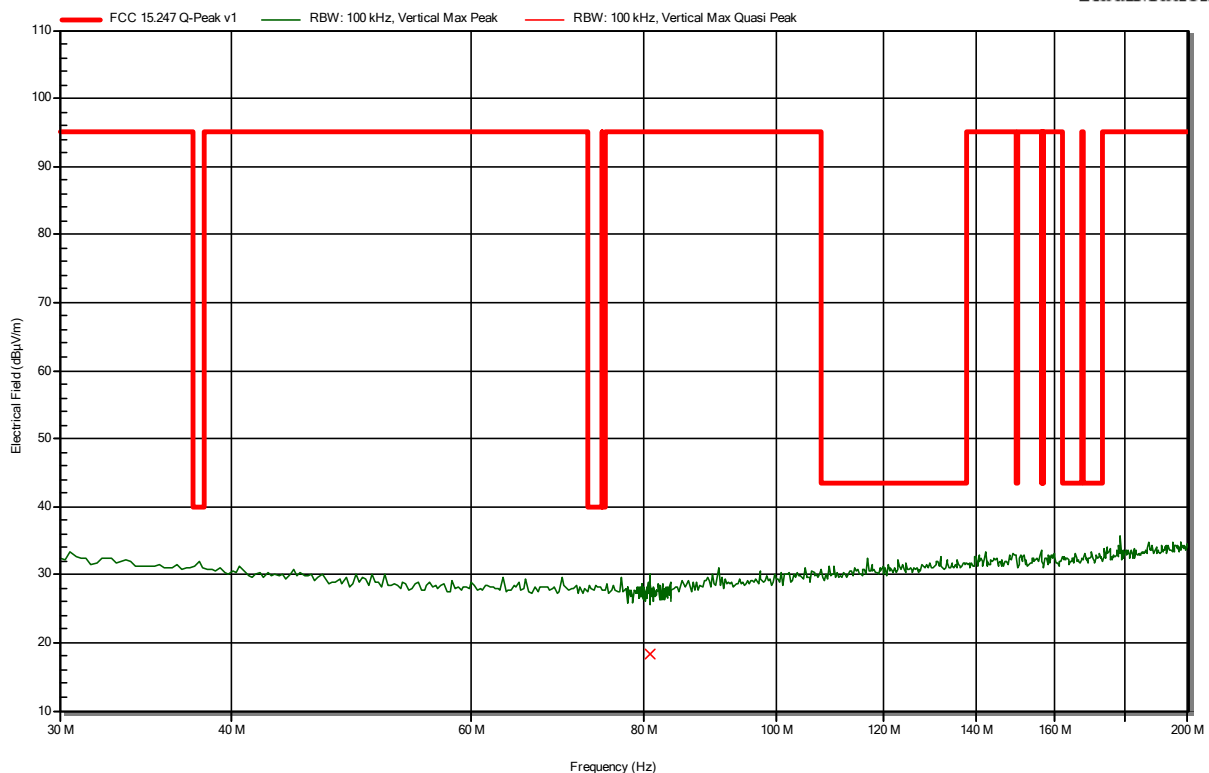


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2402 MHz
 Test Date: 2021-04-15
 Note: 0 dg

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RadiMation

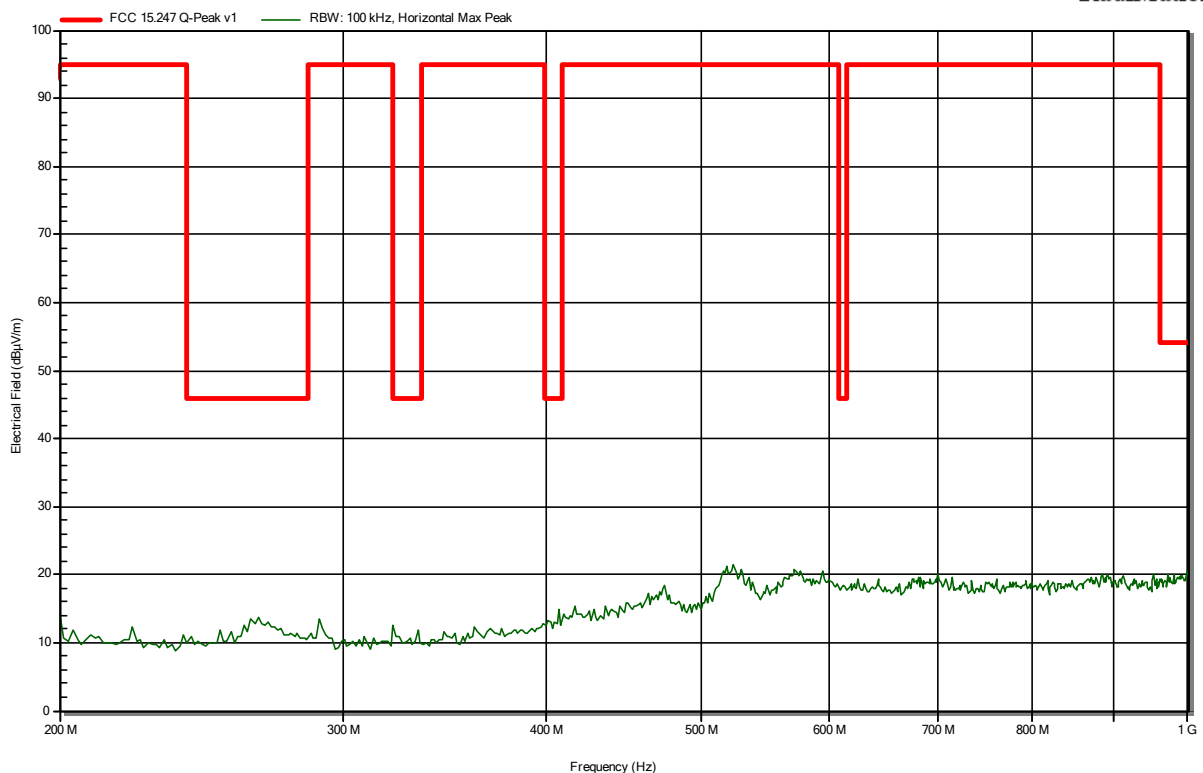


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2402 MHz
 Test Date: 2021-04-15
 Note: 0 dg

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RadiMation

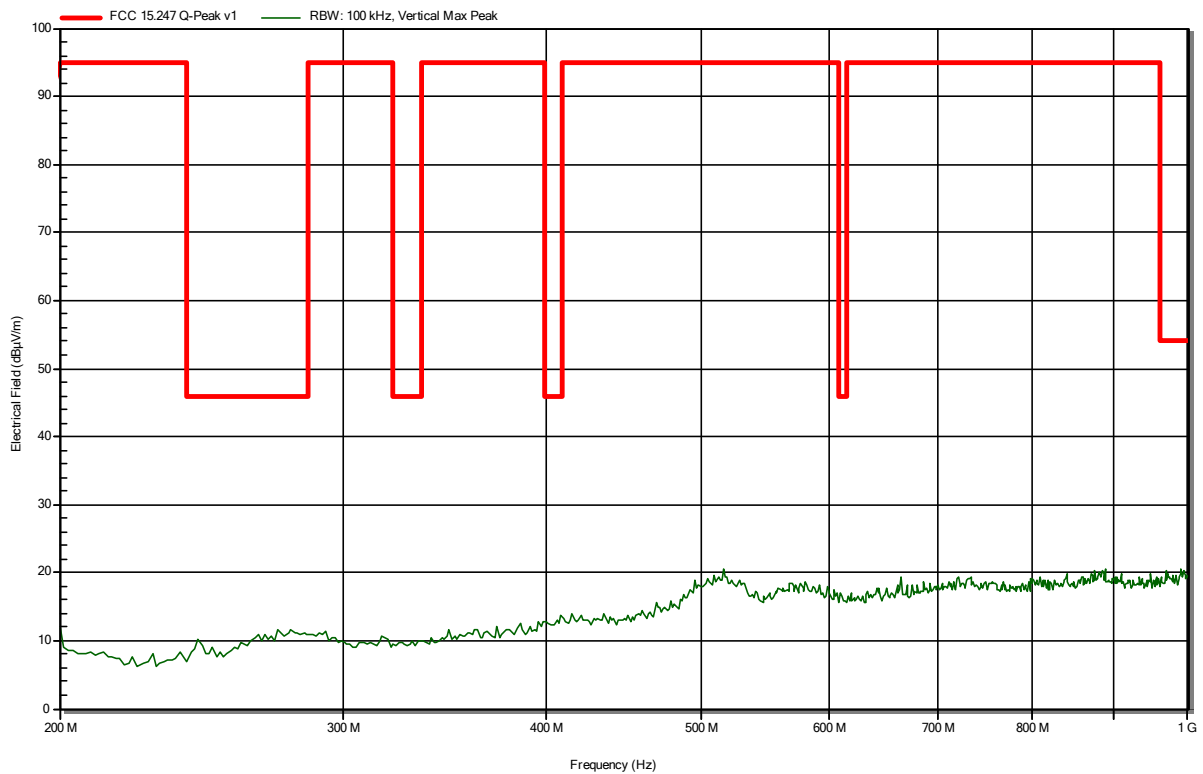


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2402 MHz
 Test Date: 2021-04-15
 Note: 0 dg

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RadiMation

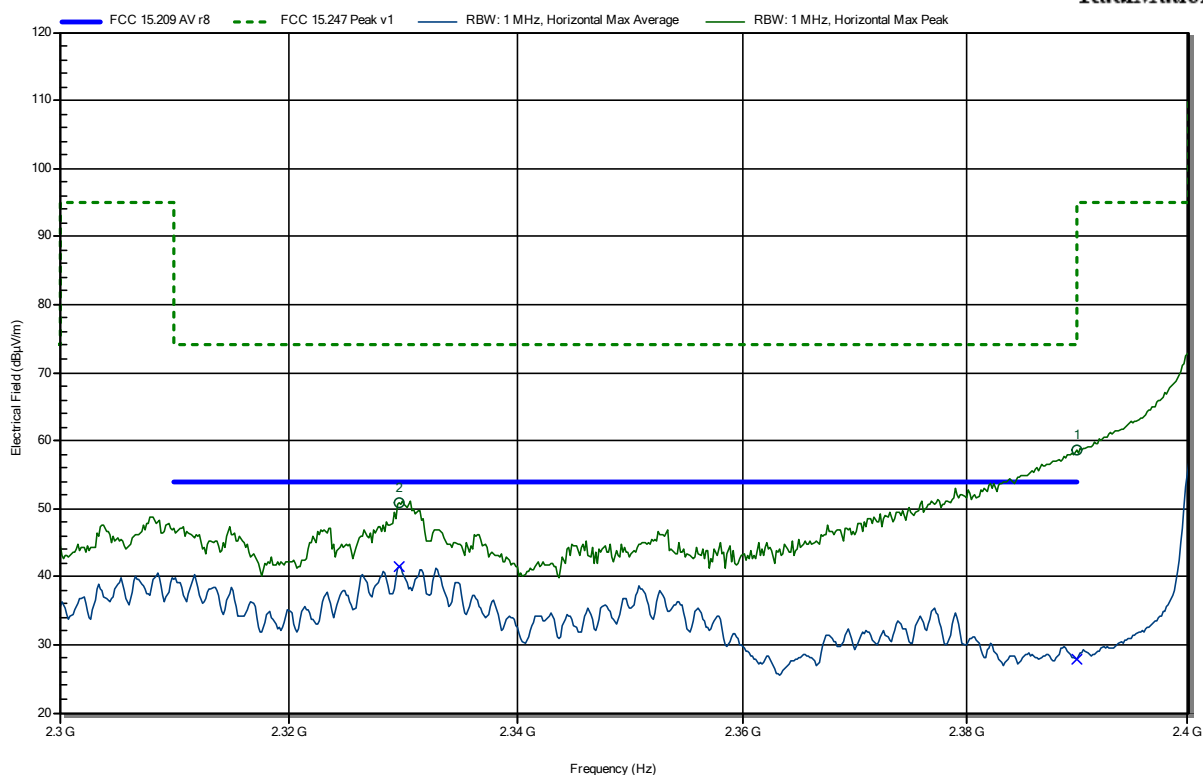


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Schwarzbeck BBHA 9120B, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2402 MHz
 Test Date: 2021-04-14
 Note: lower bandedge, 90 dg

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.3296 GHz	50.76 dBµV/m	74 dBµV/m	-23.24 dB	Pass
2.3899 GHz	58.68 dBµV/m	74 dBµV/m	-15.32 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
2.3296 GHz	41.5 dBµV/m	54 dBµV/m	-12.5 dB	Pass
2.3899 GHz	27.88 dBµV/m	54 dBµV/m	-26.12 dB	Pass

Test Report No.: G0M-2007-9184-TFC247BL-V01

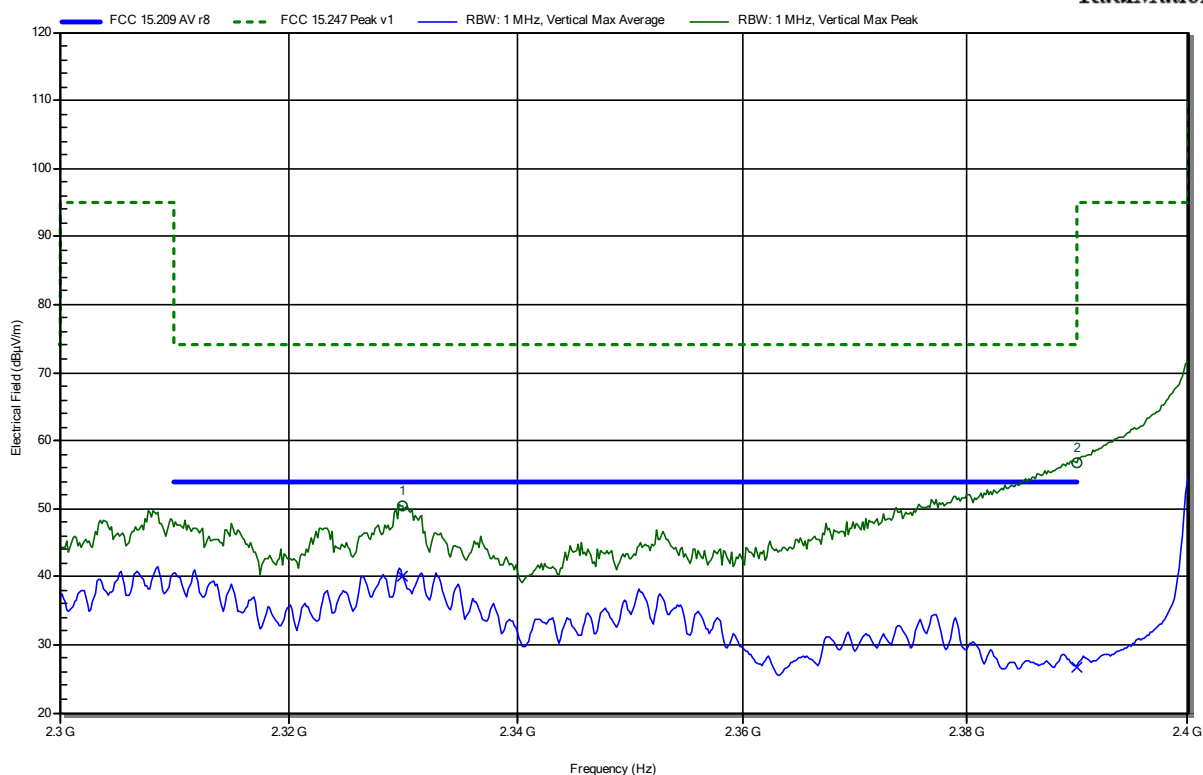
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Schwarzbeck BBHA 9120B, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2402 MHz
 Test Date: 2021-04-14
 Note: lower bandedge, 0 dg

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.33 GHz	50.44 dBµV/m	74 dBµV/m	-23.56 dB	Pass
2.3899 GHz	56.84 dBµV/m	74 dBµV/m	-17.16 dB	Pass
2.3899 GHz				

Frequency	Average	Average Limit	Average Difference	Average Status
2.33 GHz	39.99 dBµV/m	54 dBµV/m	-14.01 dB	Pass
2.3899 GHz	26.59 dBµV/m	54 dBµV/m	-27.41 dB	Pass

Test Report No.: G0M-2007-9184-TFC247BL-V01

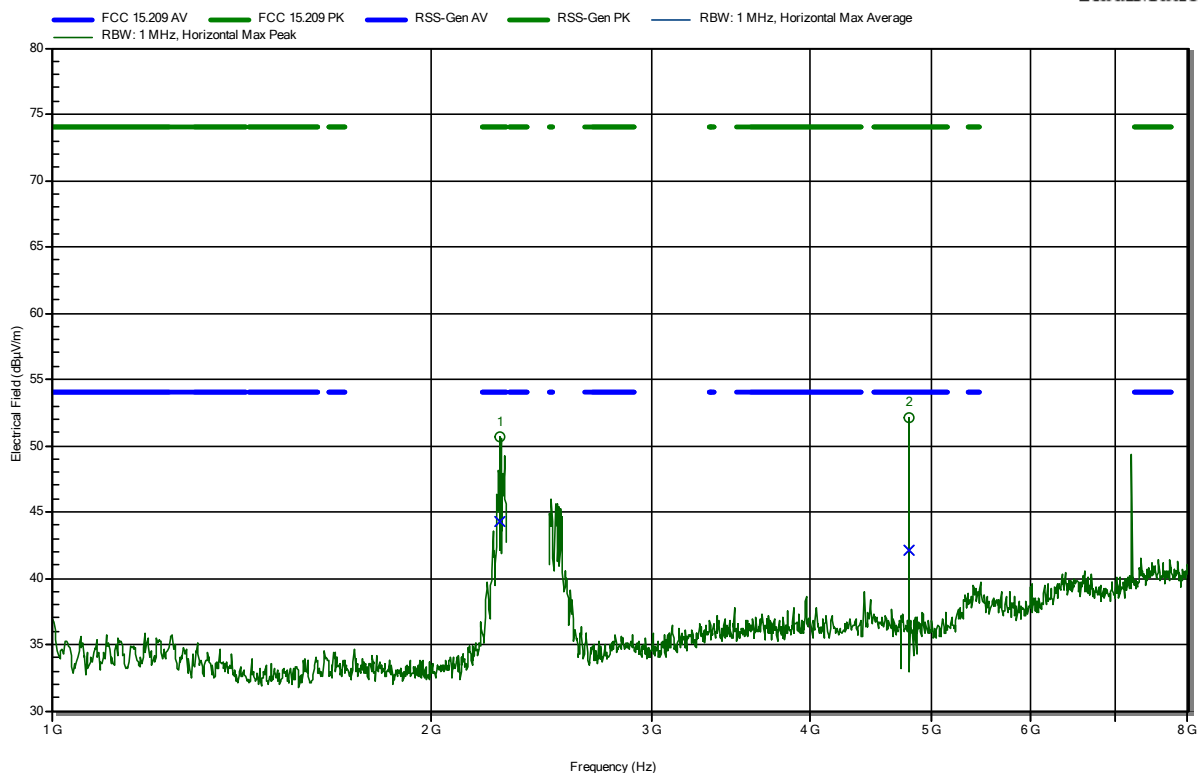
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Schwarzbeck BBHA 9120B, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2402 MHz
 Test Date: 2021-04-12
 Note: 120dg

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.274 GHz	50.68 dBμV/m	74 dBμV/m	-23.32 dB	Pass
4.804 GHz	52.07 dBμV/m	74 dBμV/m	-21.93 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
2.274 GHz	44.23 dBμV/m	54 dBμV/m	-9.77 dB	Pass
4.804 GHz	42.08 dBμV/m	54 dBμV/m	-11.92 dB	Pass

Test Report No.: G0M-2007-9184-TFC247BL-V01

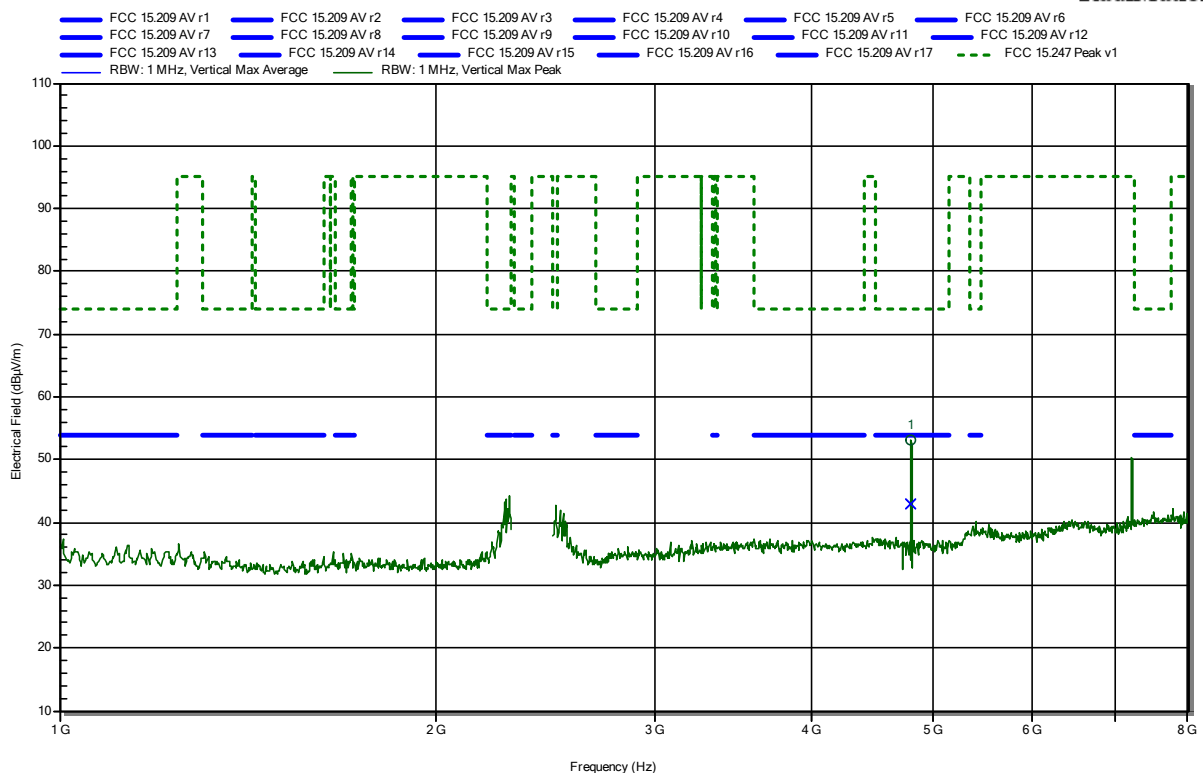
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Schwarzbeck BBHA 9120B, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2402 MHz
 Test Date: 2021-04-12
 Note: 60 dg

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RadiMation



Frequency 4.8041 GHz	Peak 53.07 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -20.93 dB	Peak Status Pass
Frequency 4.8041 GHz	Average 43.03 dBμV/m	Average Limit 54 dBμV/m	Average Difference -10.97 dB	Average Status Pass

Test Report No.: G0M-2007-9184-TFC247BL-V01

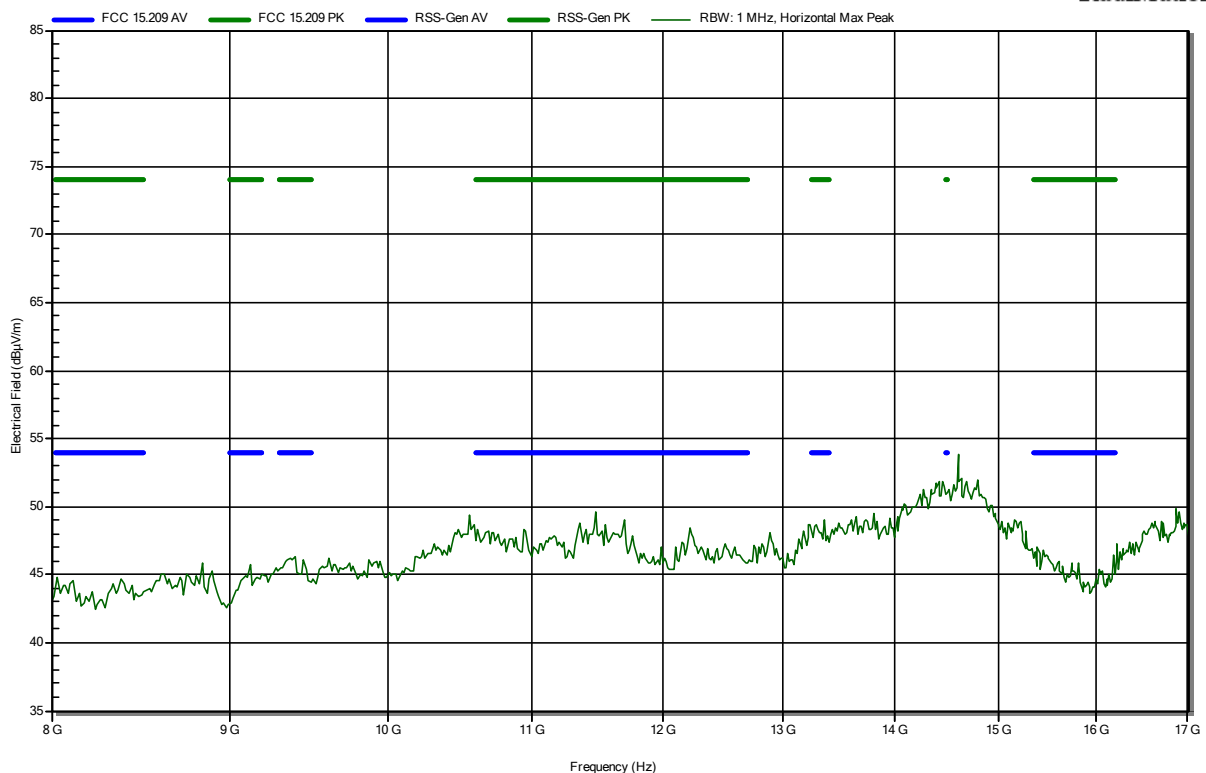
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Rohde & Schwarz BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2402 MHz
 Test Date: 2021-04-13
 Note: 0 dg

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RadiMation

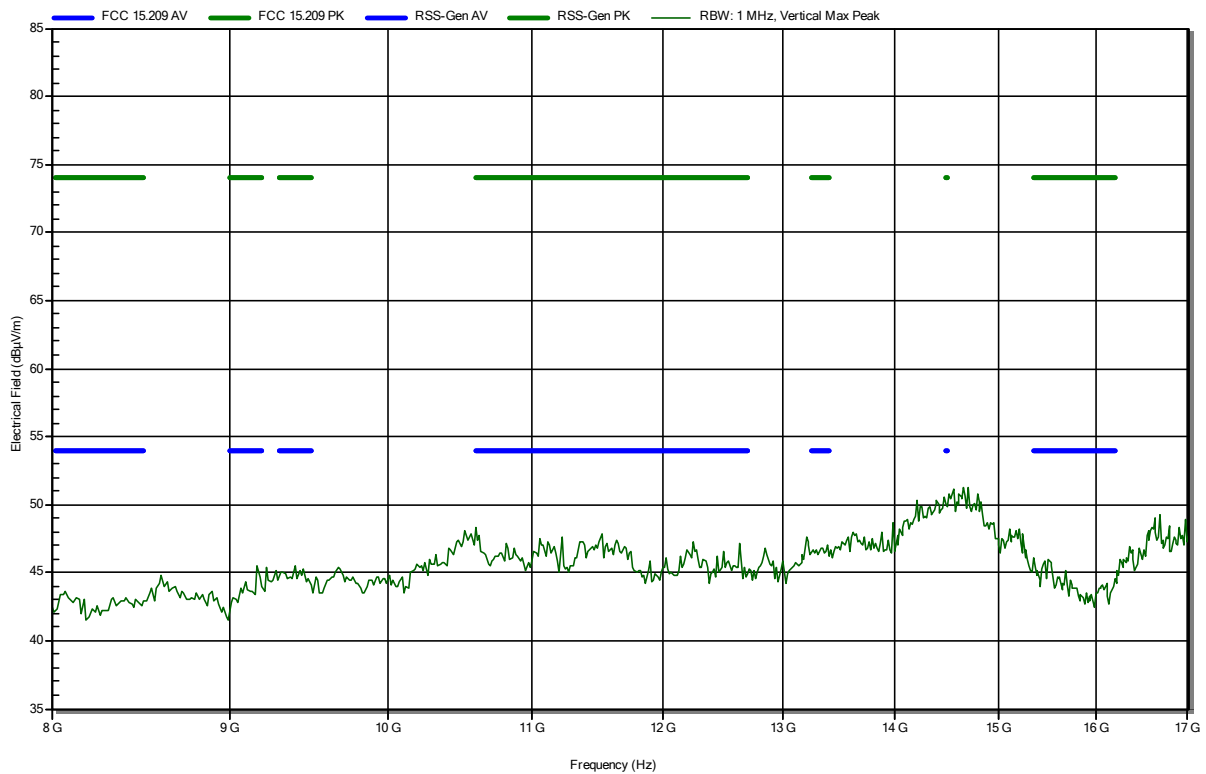


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Rohde & Schwarz BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2402 MHz
 Test Date: 2021-04-13
 Note: 150 dg

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RadiMation

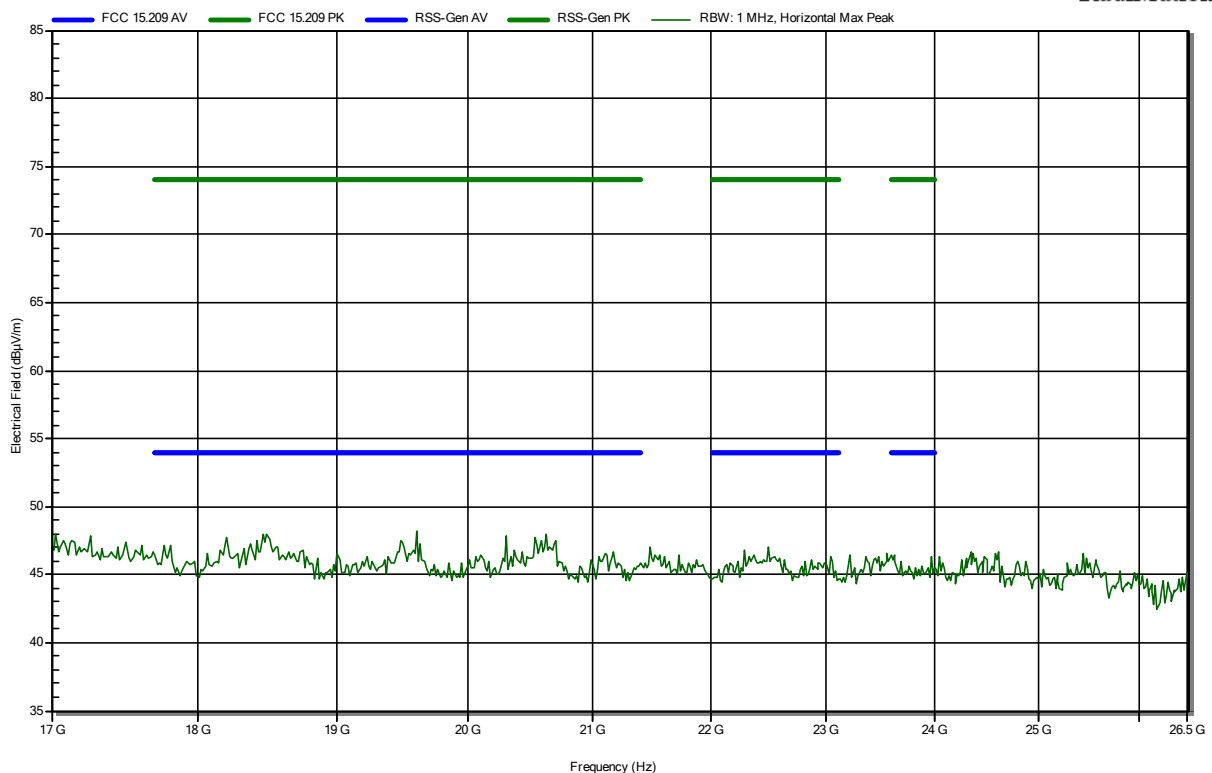


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Amplifier Research AT4560, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2402 MHz
 Test Date: 2021-04-13
 Note: 0 dg

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RadiMation

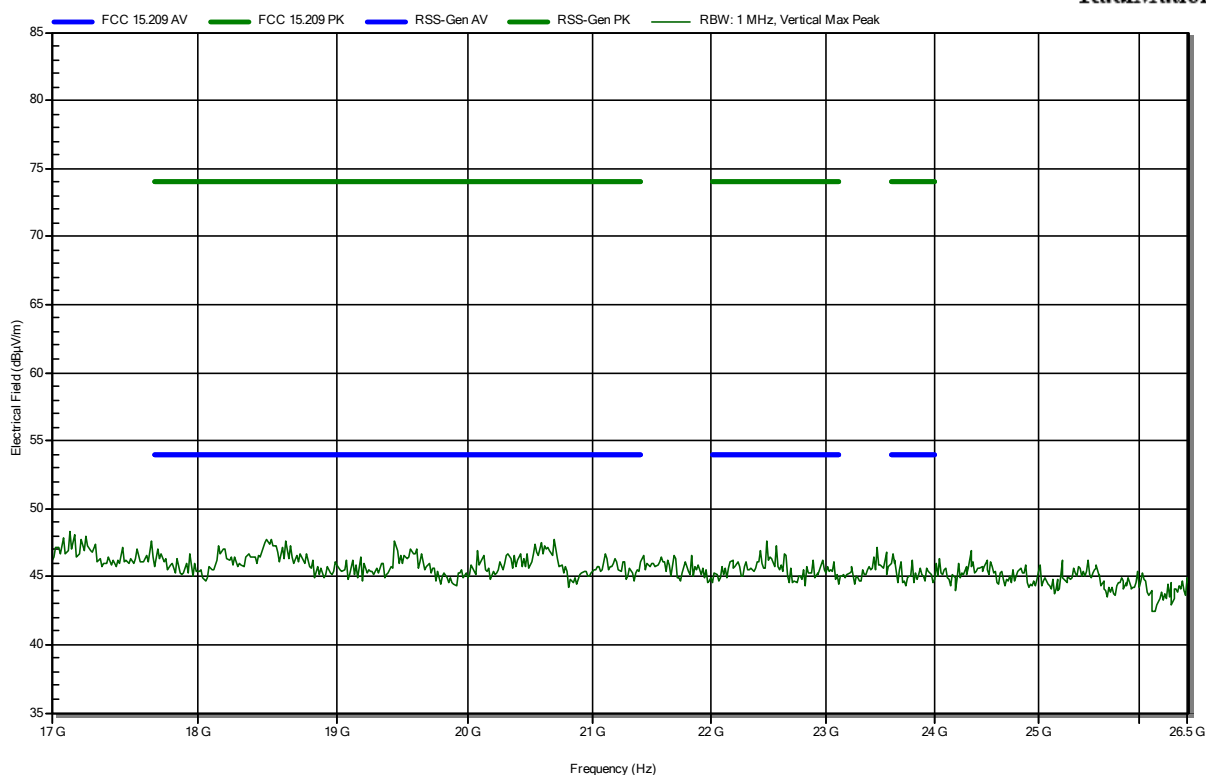


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Amplifier Research AT4560, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2402 MHz
 Test Date: 2021-04-13
 Note: 30 dg

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RadiMation

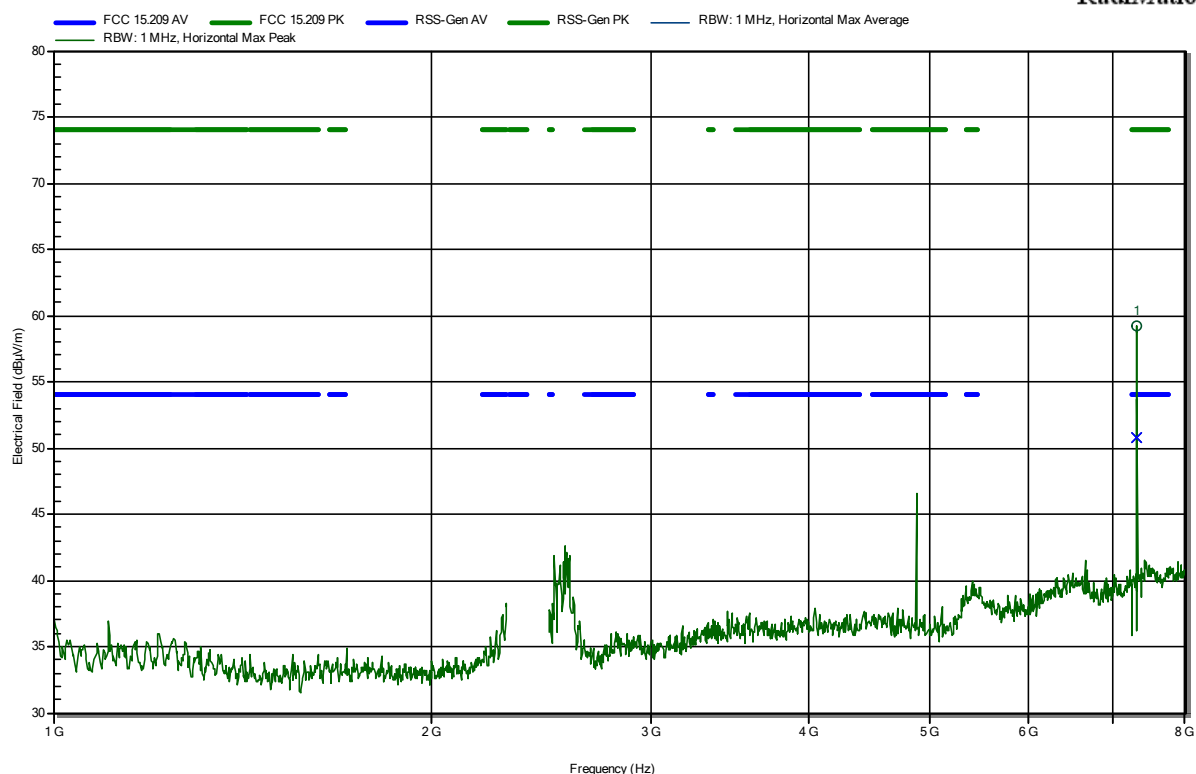


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Schwarzbeck BBHA 9120B, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2440 MHz
 Test Date: 2021-04-13
 Note: 0 dg

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RadiMation



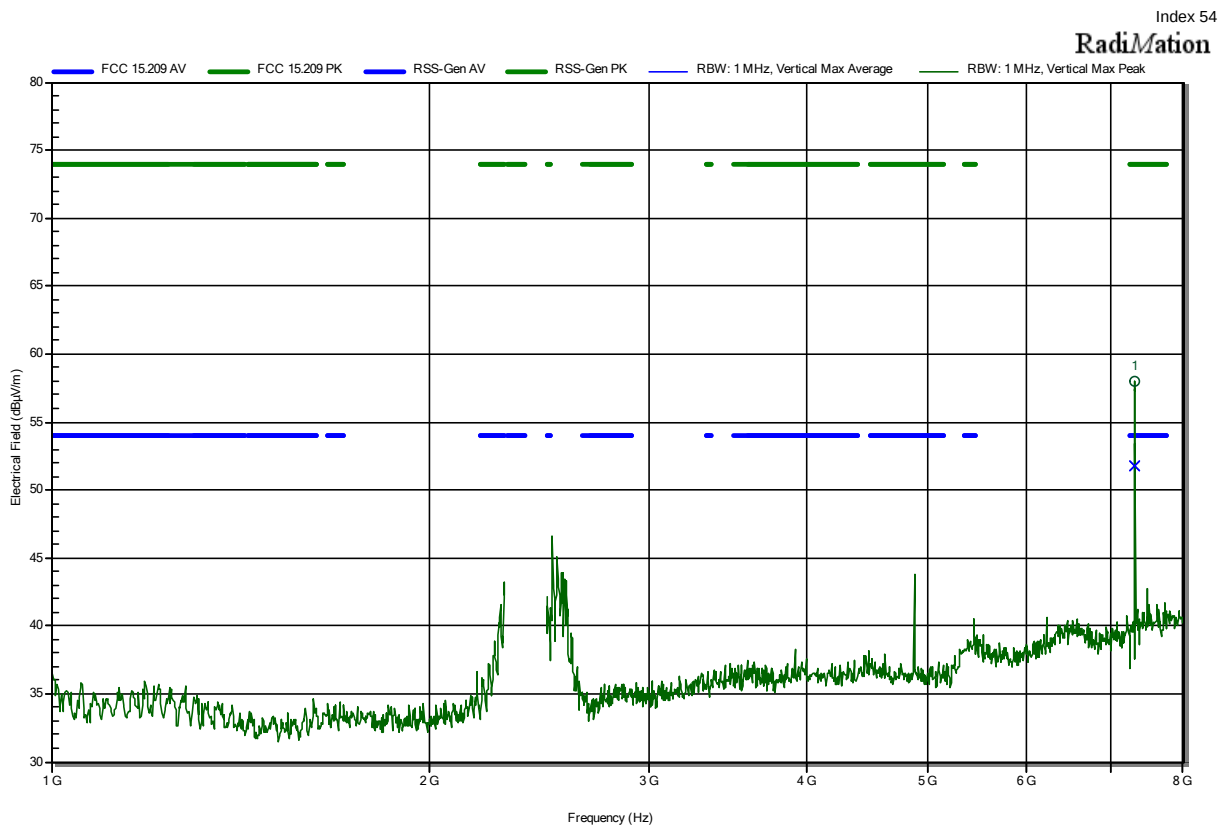
Frequency 7.3192 GHz	Peak 59.18 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -14.82 dB	Peak Status Pass
Frequency 7.3192 GHz	Average 50.74 dBµV/m	Average Limit 54 dBµV/m	Average Difference -3.26 dB	Average Status Pass

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Schwarzbeck BBHA 9120B, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2440 MHz
 Test Date: 2021-04-13
 Note: 0 dg



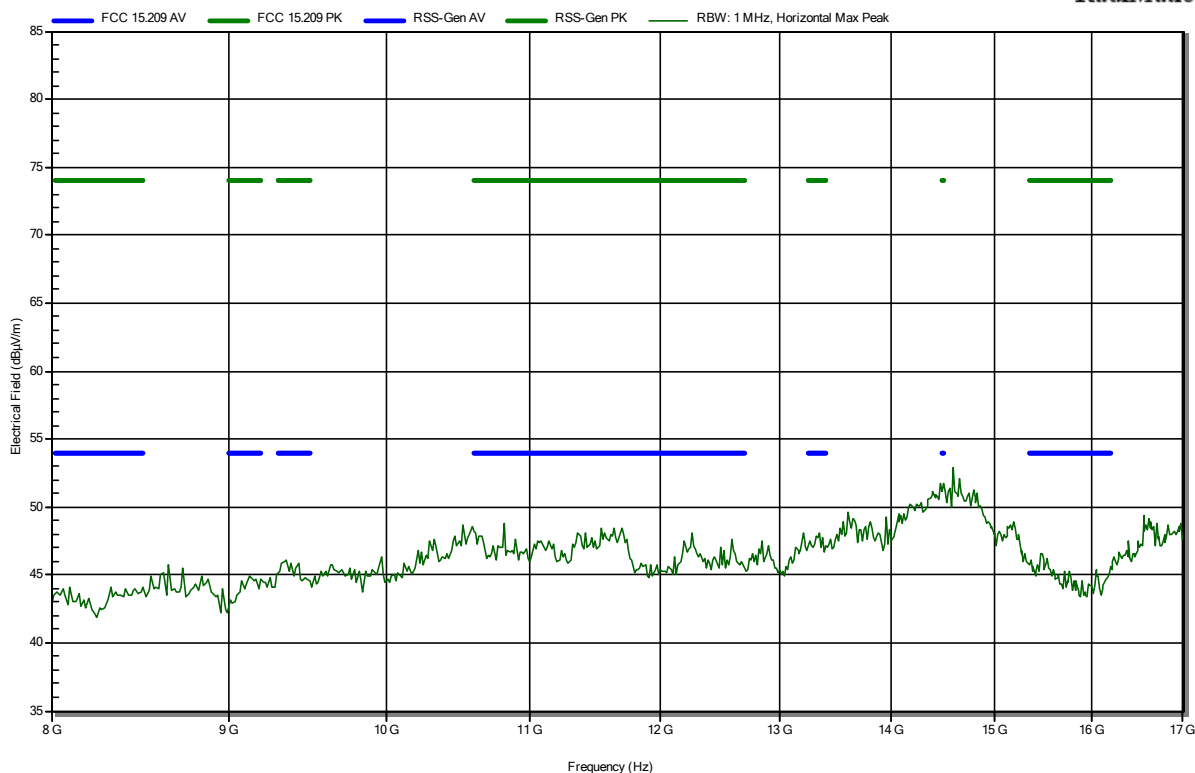
Frequency 7.3192 GHz	Peak 58.03 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -15.97 dB	Peak Status Pass
Frequency 7.3192 GHz	Average 51.73 dBµV/m	Average Limit 54 dBµV/m	Average Difference -2.27 dB	Average Status Pass

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Rohde & Schwarz BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2440 MHz
 Test Date: 2021-04-13
 Note: 30 dg

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RadiMation

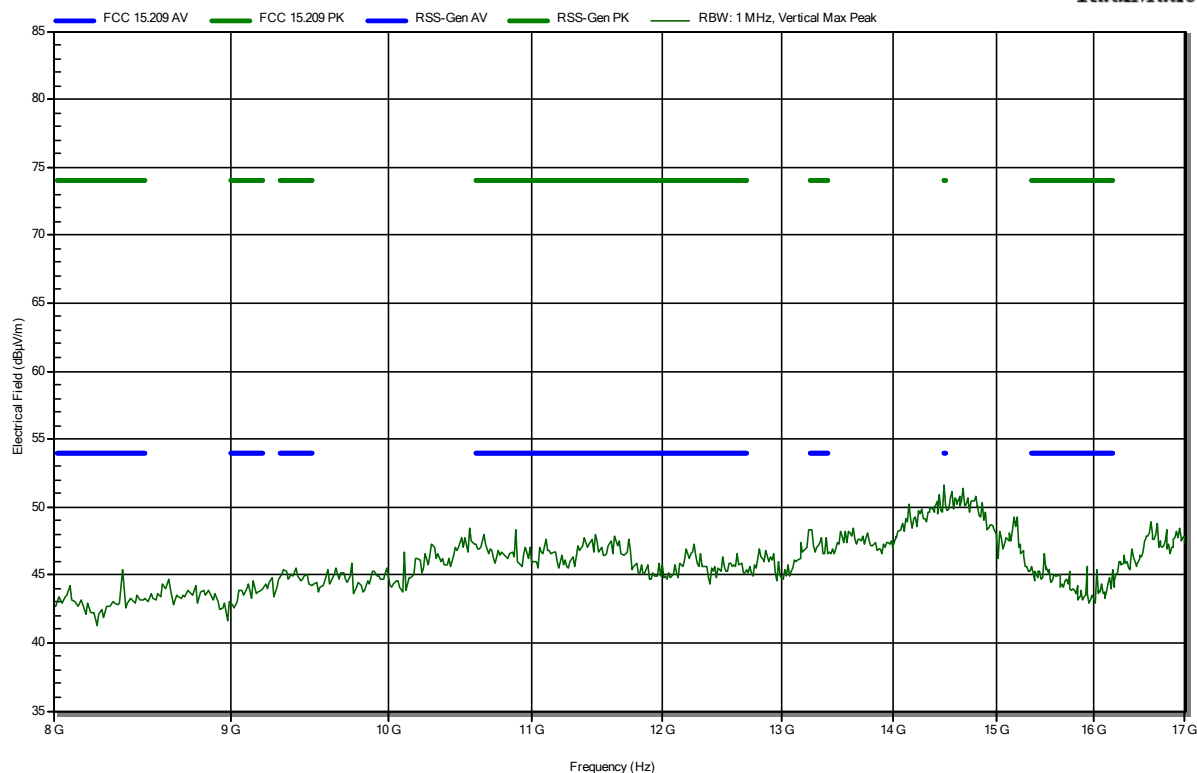


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Rohde & Schwarz BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2440 MHz
 Test Date: 2021-04-13
 Note: 90 dg

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RadiMation

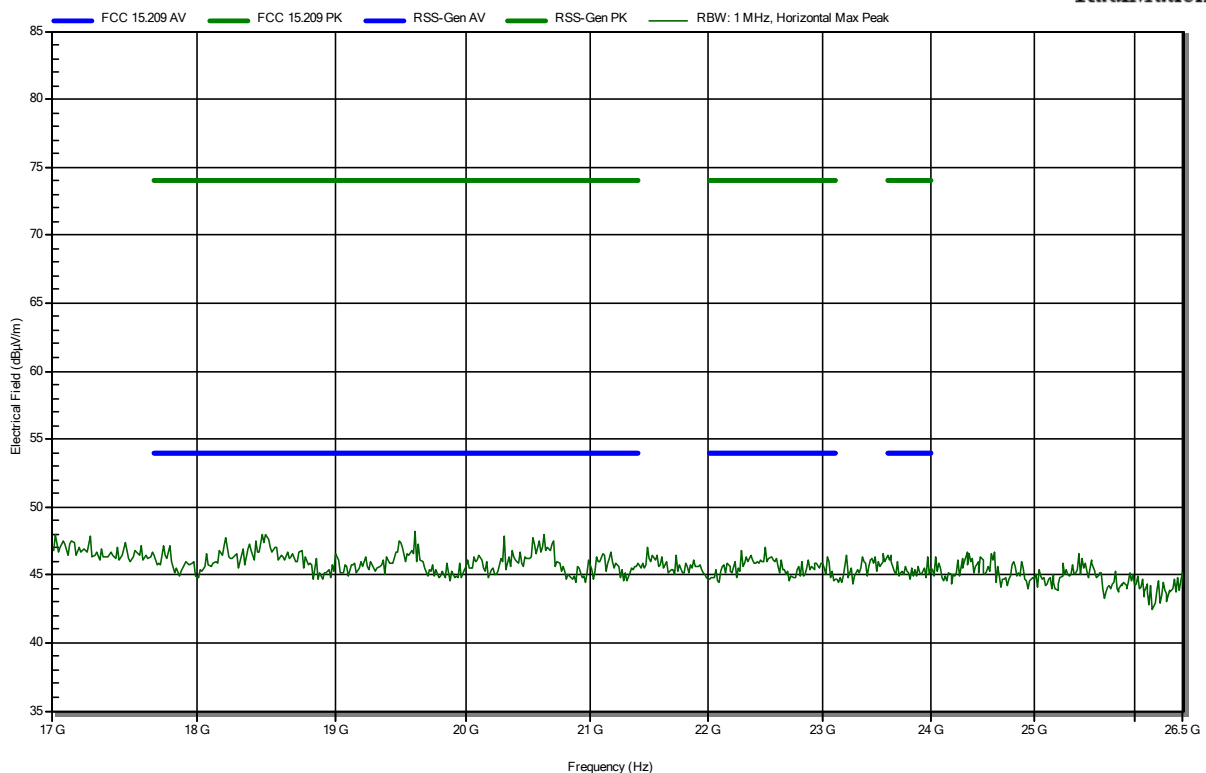


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Amplifier Research AT4560, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2440 MHz
 Test Date: 2021-04-13
 Note: 0 dg

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RadiMation

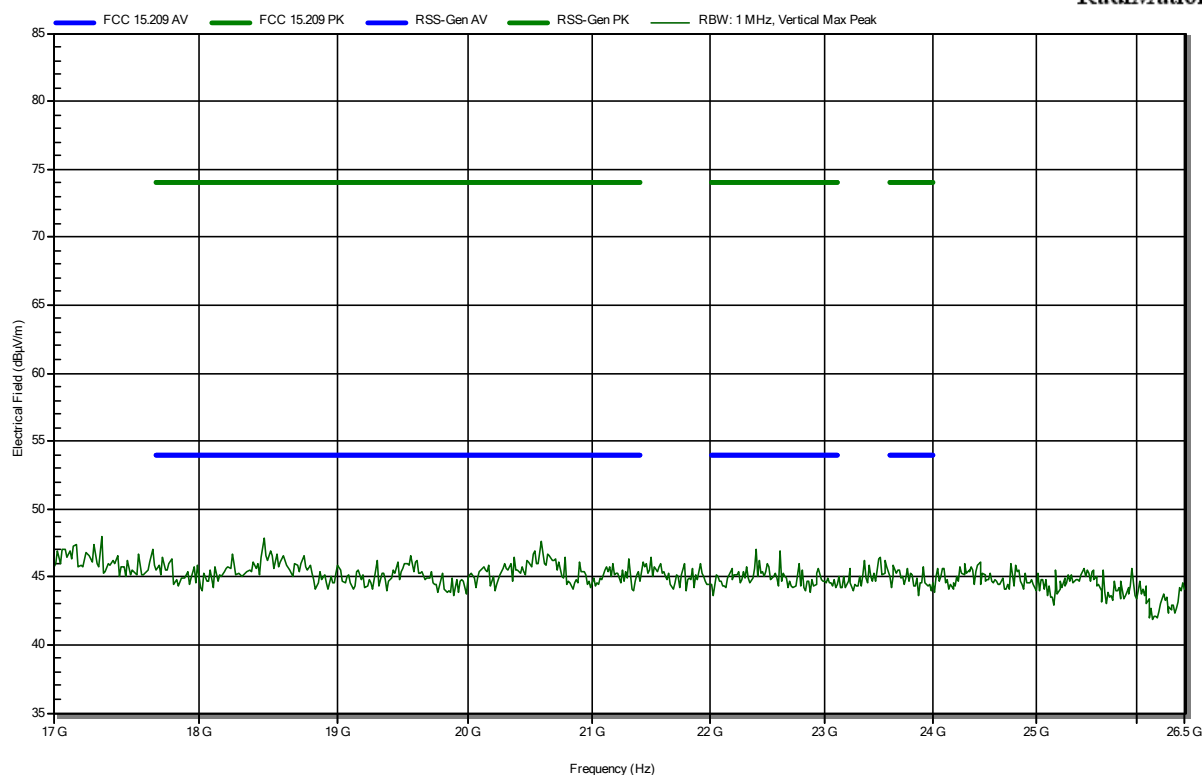


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Amplifier Research AT4560, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2440 MHz
 Test Date: 2021-04-13
 Note: 120 dg

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RadiMation

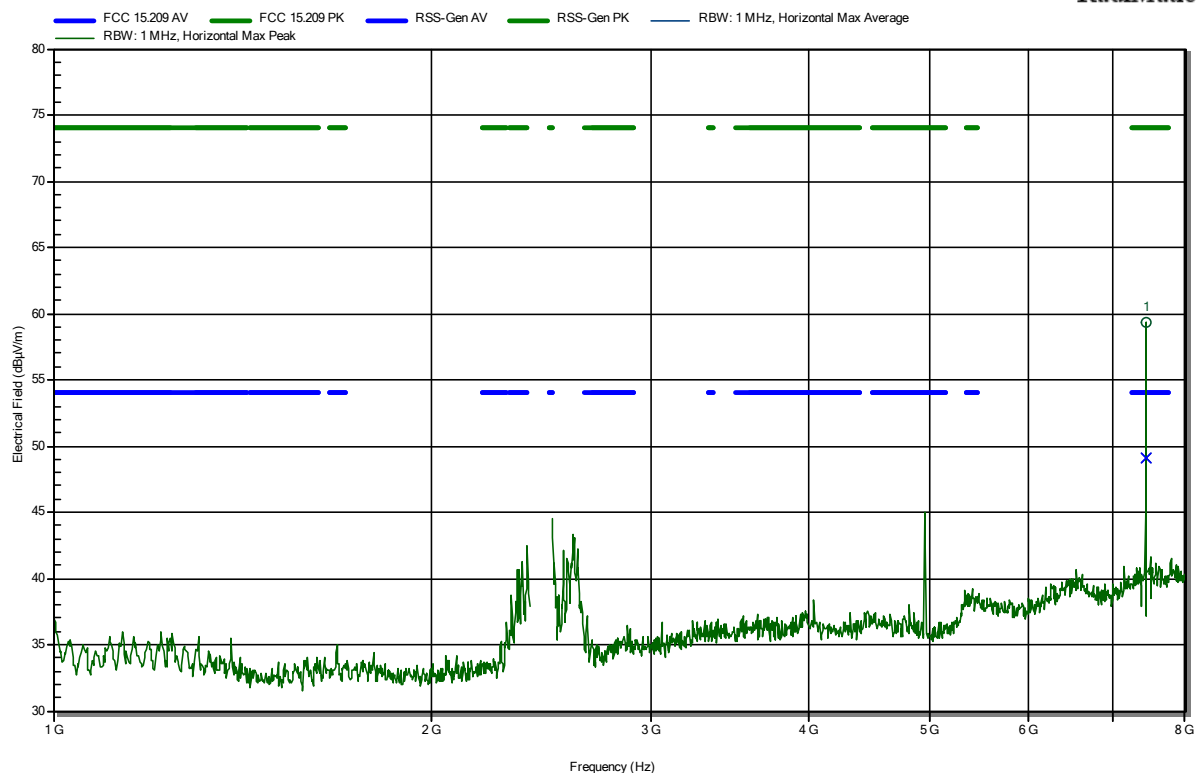


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Schwarzbeck BBHA 9120B, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2480 MHz
 Test Date: 2021-04-14
 Note: 0 dg

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RadiMation



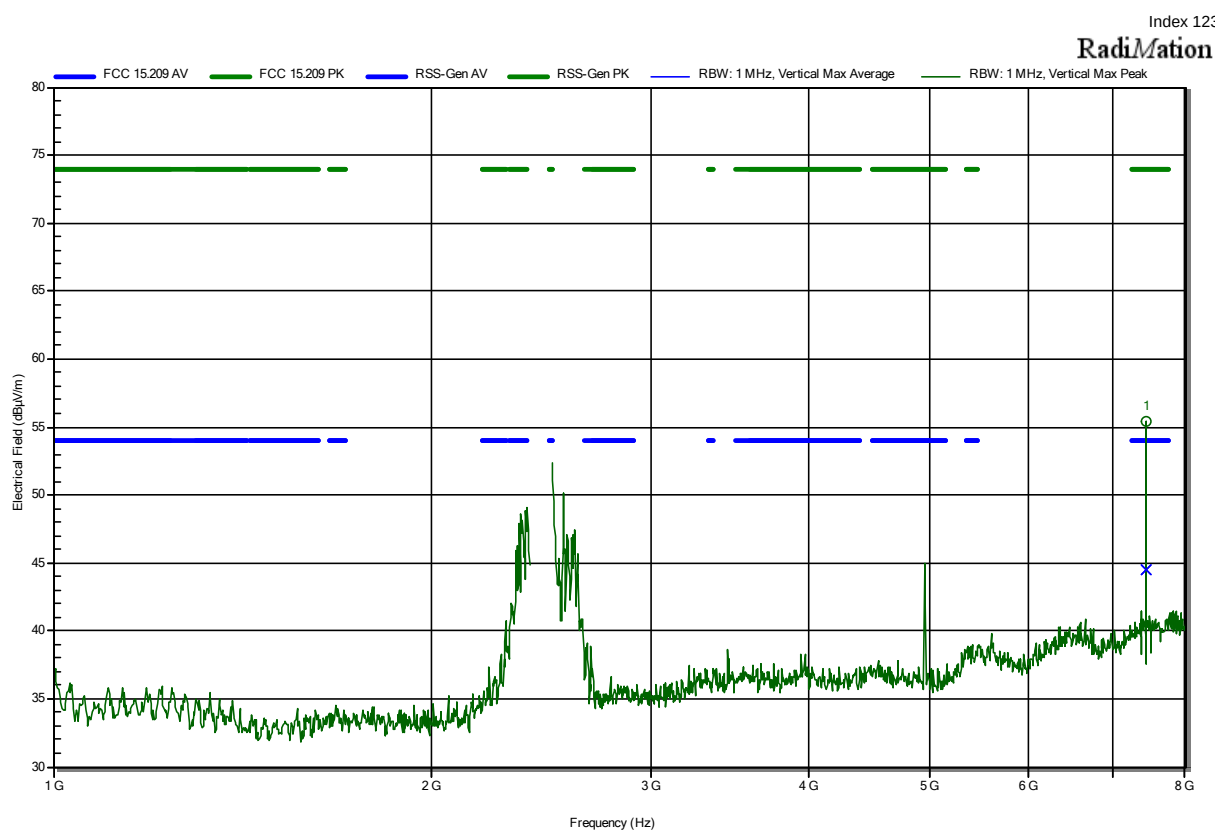
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.441 GHz	59.31 dBμV/m	74 dBμV/m	-14.69 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
7.441 GHz	49.06 dBμV/m	54 dBμV/m	-4.94 dB	Pass

Test Report No.: G0M-2007-9184-TFC247BL-V01

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

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Schwarzbeck BBHA 9120B, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2480 MHz
 Test Date: 2021-04-15
 Note: 150 dg



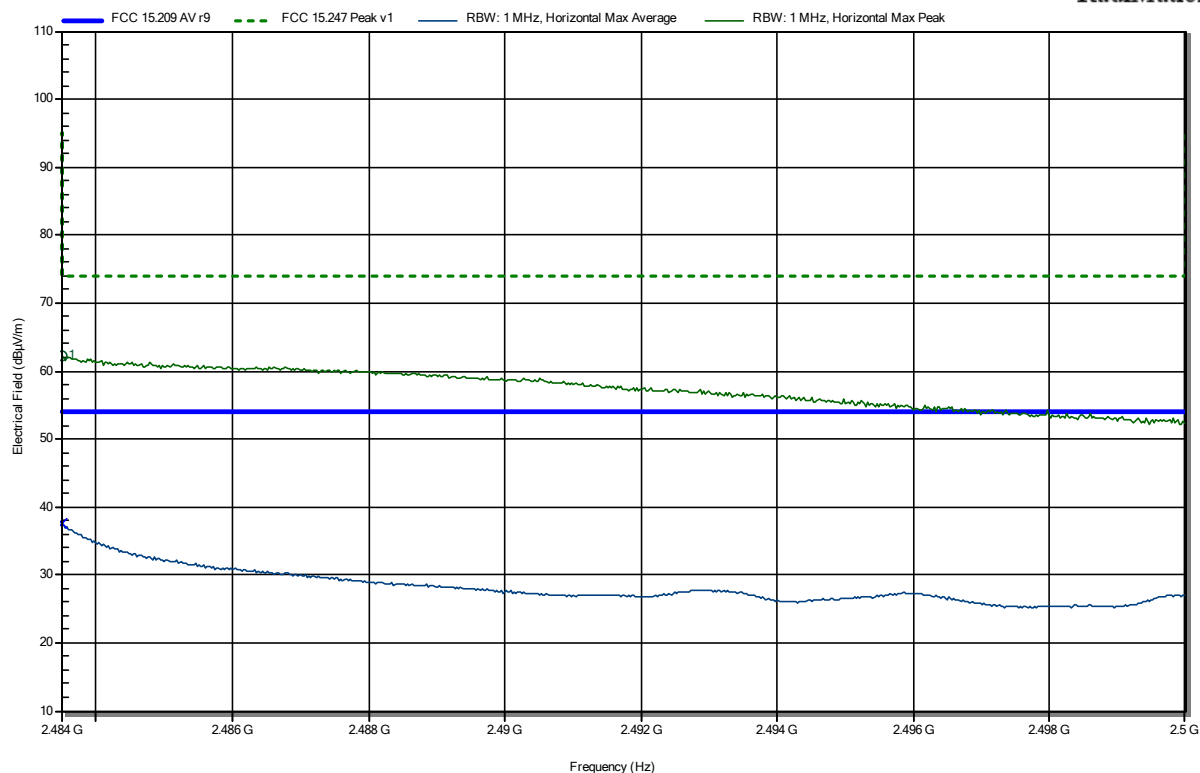
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.441 GHz	55.4 dBµV/m	74 dBµV/m	-18.6 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
7.441 GHz	44.51 dBµV/m	54 dBµV/m	-9.49 dB	Pass

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Schwarzbeck BBHA 9120B, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2480 MHz
 Test Date: 2021-04-14
 Note: upper bandedge

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RadiMation



Frequency 2.4835 GHz	Peak 62.3 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -11.7 dB	Peak Status Pass
Frequency 2.4835 GHz	Average 37.56 dBµV/m	Average Limit 54 dBµV/m	Average Difference -16.44 dB	Average Status Pass

Test Report No.: G0M-2007-9184-TFC247BL-V01

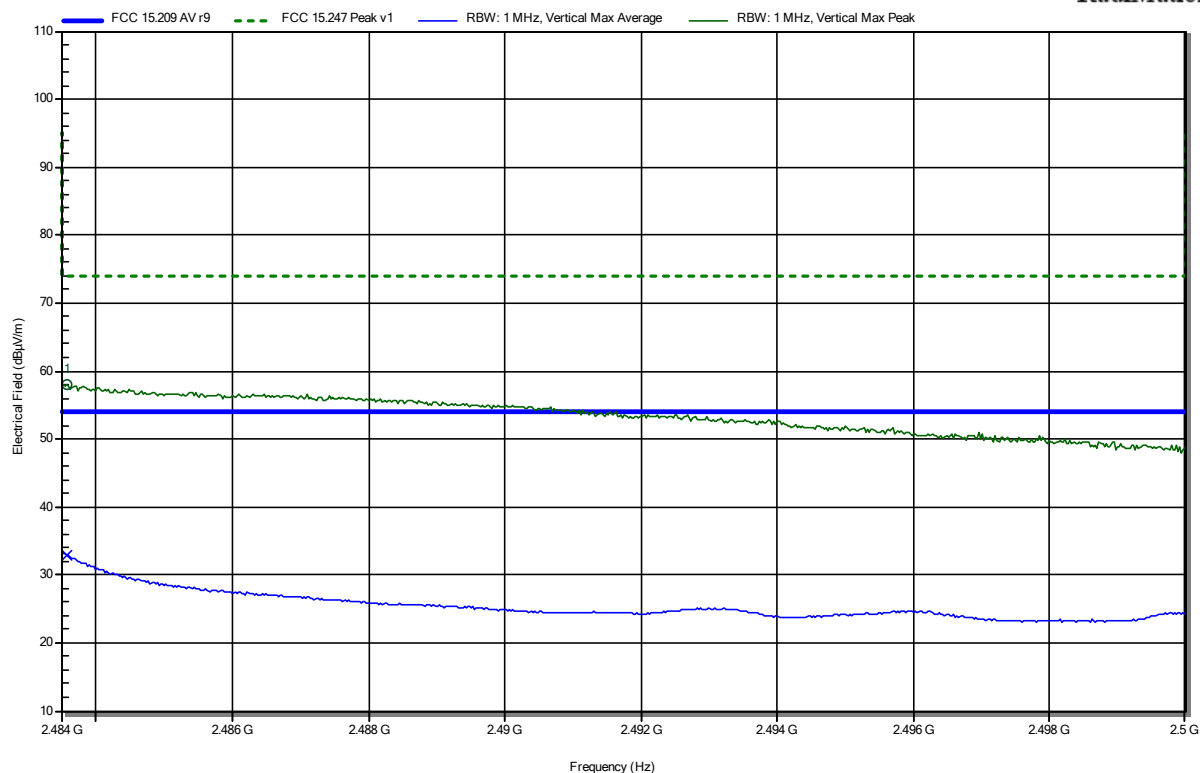
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Schwarzbeck BBHA 9120B, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2480 MHz
 Test Date: 2021-04-14
 Note: upper bandedge

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Frequency 2.4836 GHz	Peak 57.94 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -16.06 dB	Peak Status Pass
Frequency 2.4836 GHz	Average 32.78 dBµV/m	Average Limit 54 dBµV/m	Average Difference -21.22 dB	Average Status Pass

Test Report No.: G0M-2007-9184-TFC247BL-V01

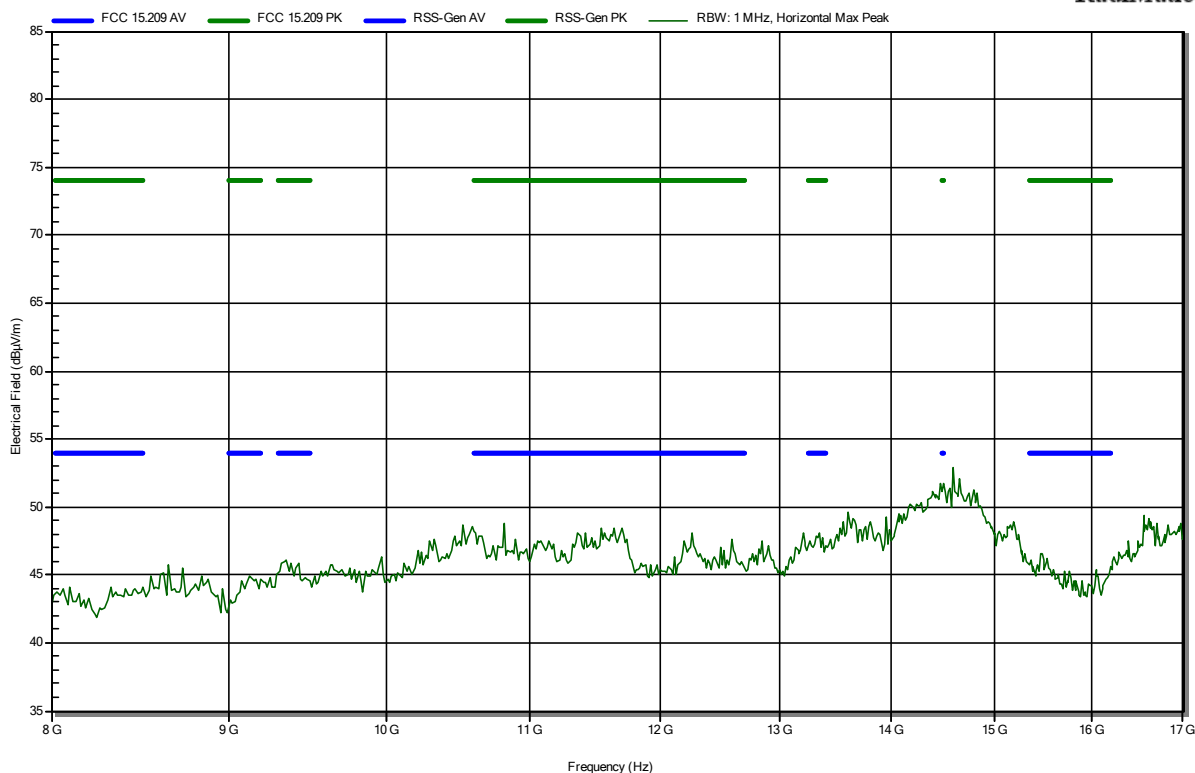
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Rohde & Schwarz BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2480 MHz
 Test Date: 2021-04-13
 Note: 30 dg

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RadiMation

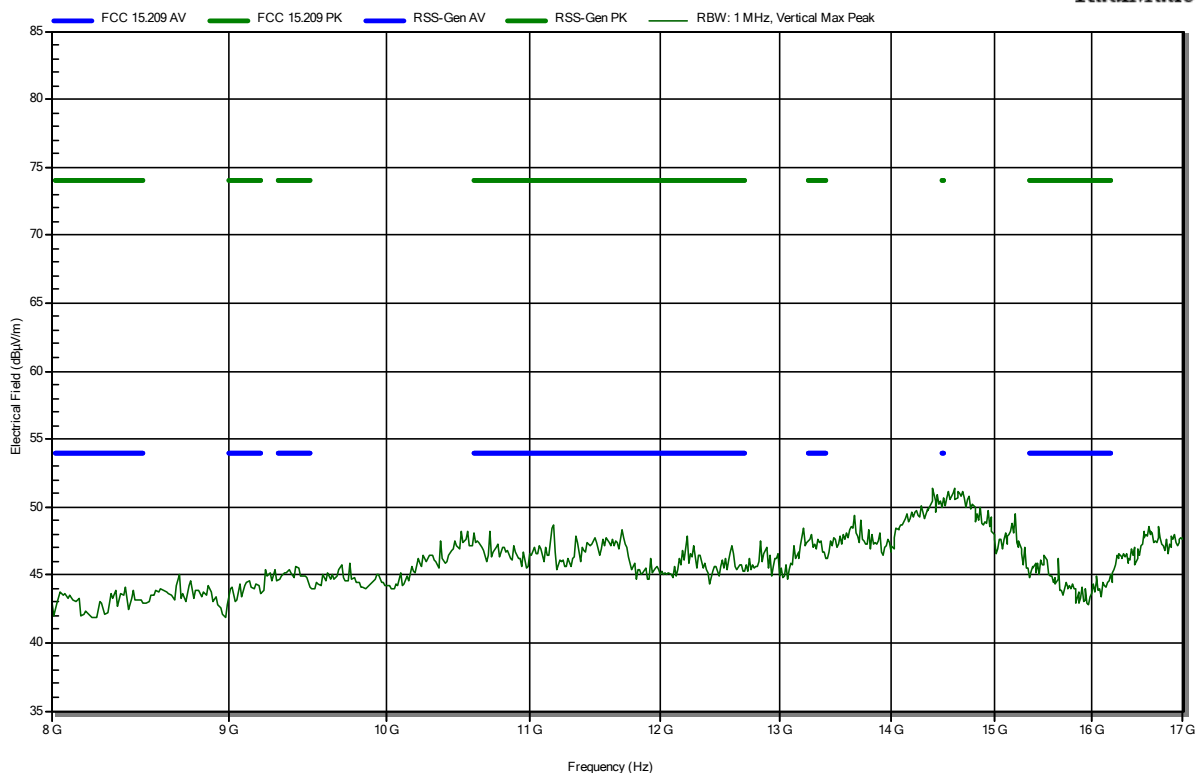


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Rohde & Schwarz BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2480 MHz
 Test Date: 2021-04-13
 Note: 60 dg

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RadiMation

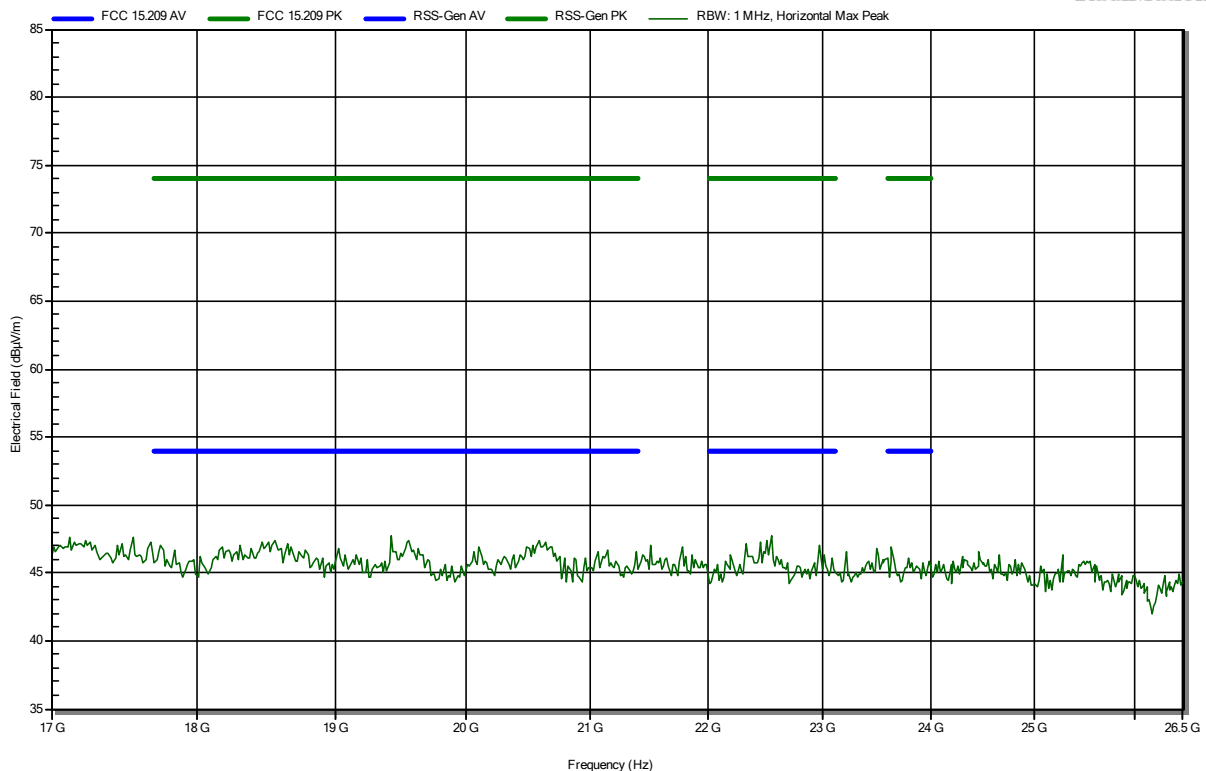


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Amplifier Research AT4560, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2480 MHz
 Test Date: 2021-04-13
 Note: 30 dg

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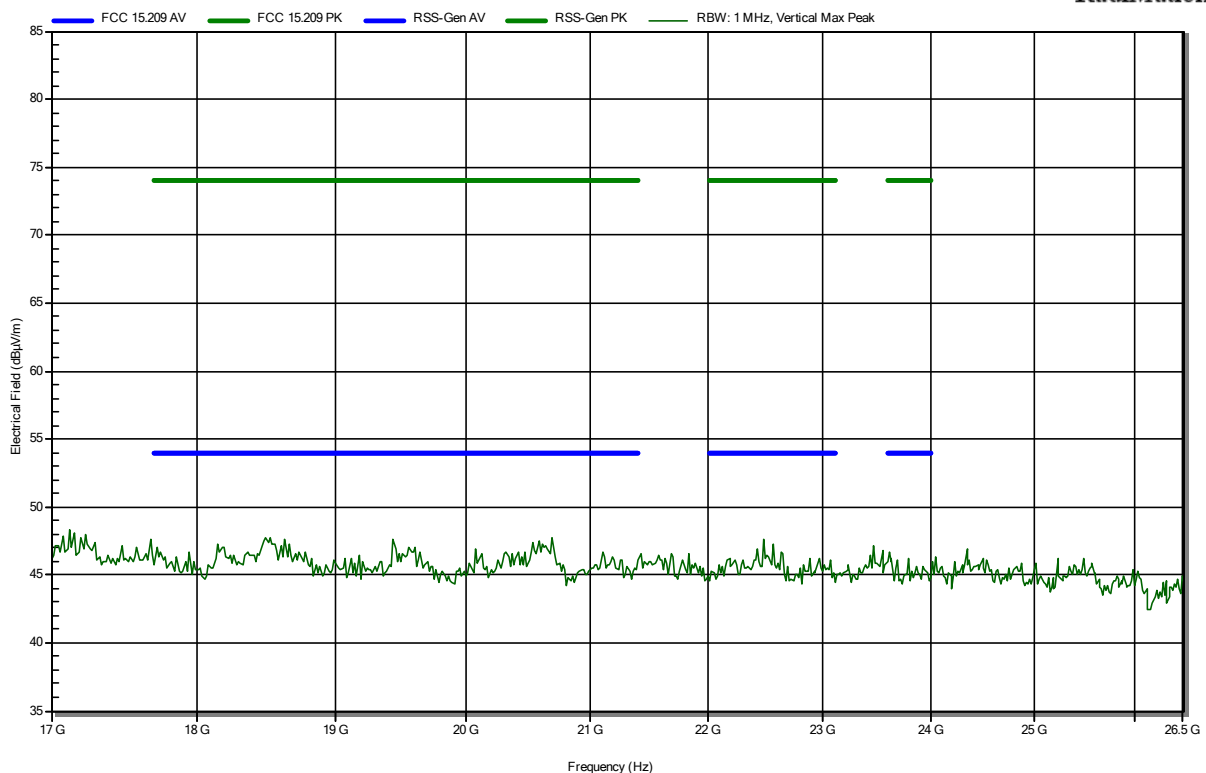


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom: 36 VDC
 Antenna: Amplifier Research AT4560, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE; GFSK; 2480 MHz
 Test Date: 2021-04-13
 Note: 30 dg

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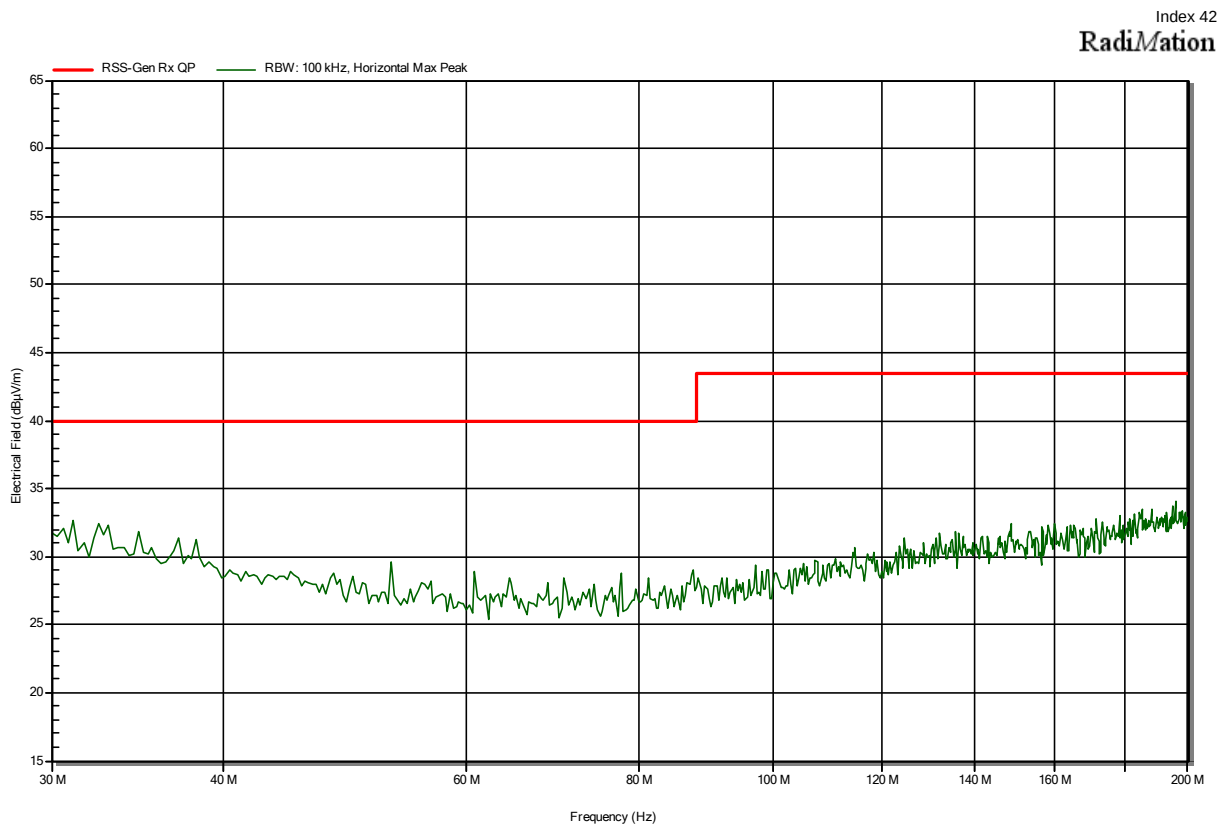
RadiMation



ANNEX B Receiver spurious emissions

Radiated Spurious Emissions according to RSS-247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 21.2 °Celsius, Vnom: 36 VDC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: RX; BLE, 2440 MHz
 Test Date: 2021-04-19
 Note: EUT horizontal

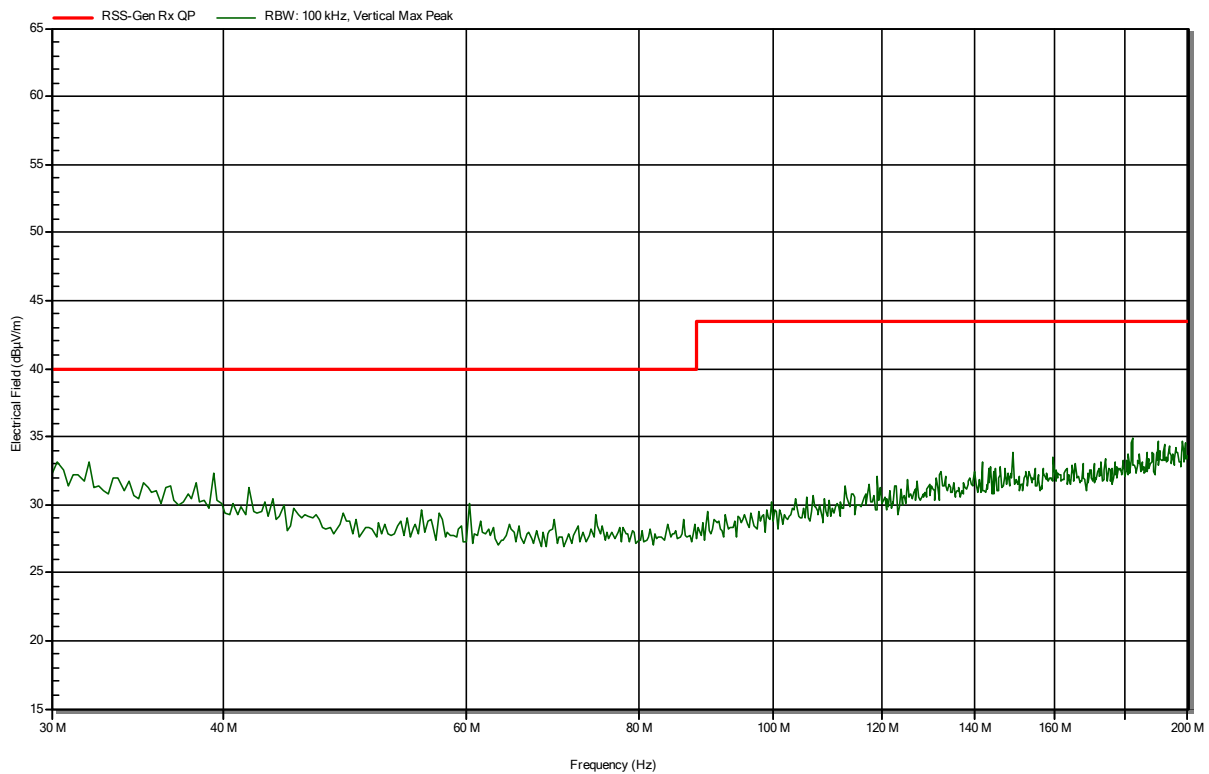


Radiated Spurious Emissions according to RSS-247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 21.2 °Celsius, Vnom: 36 VDC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: Rx; BLE, 2440 MHz
 Test Date: 2021-04-19
 Note: EUT horizontal

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RadiMation

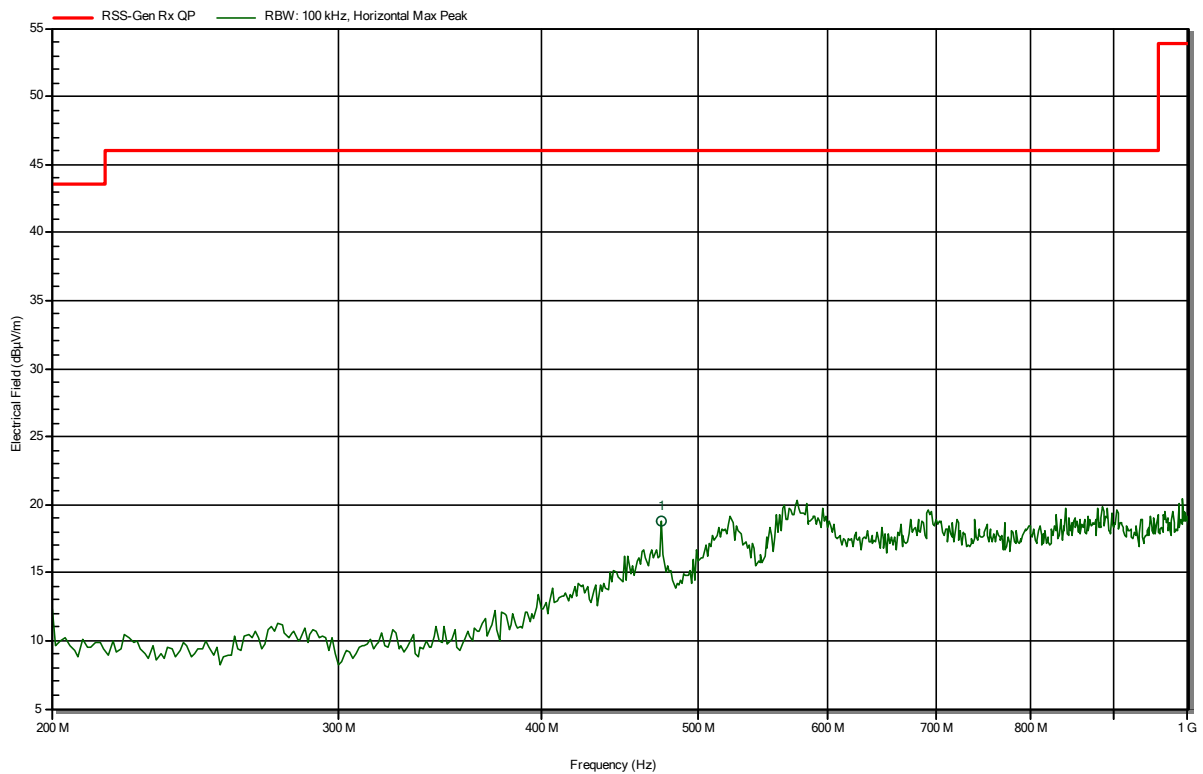


Radiated Spurious Emissions according to RSS-247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 21.8 °Celsius, Vnom: 36 VDC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: Rx; BLE, 2440 MHz
 Test Date: 2021-04-15
 Note: EUT horizontal

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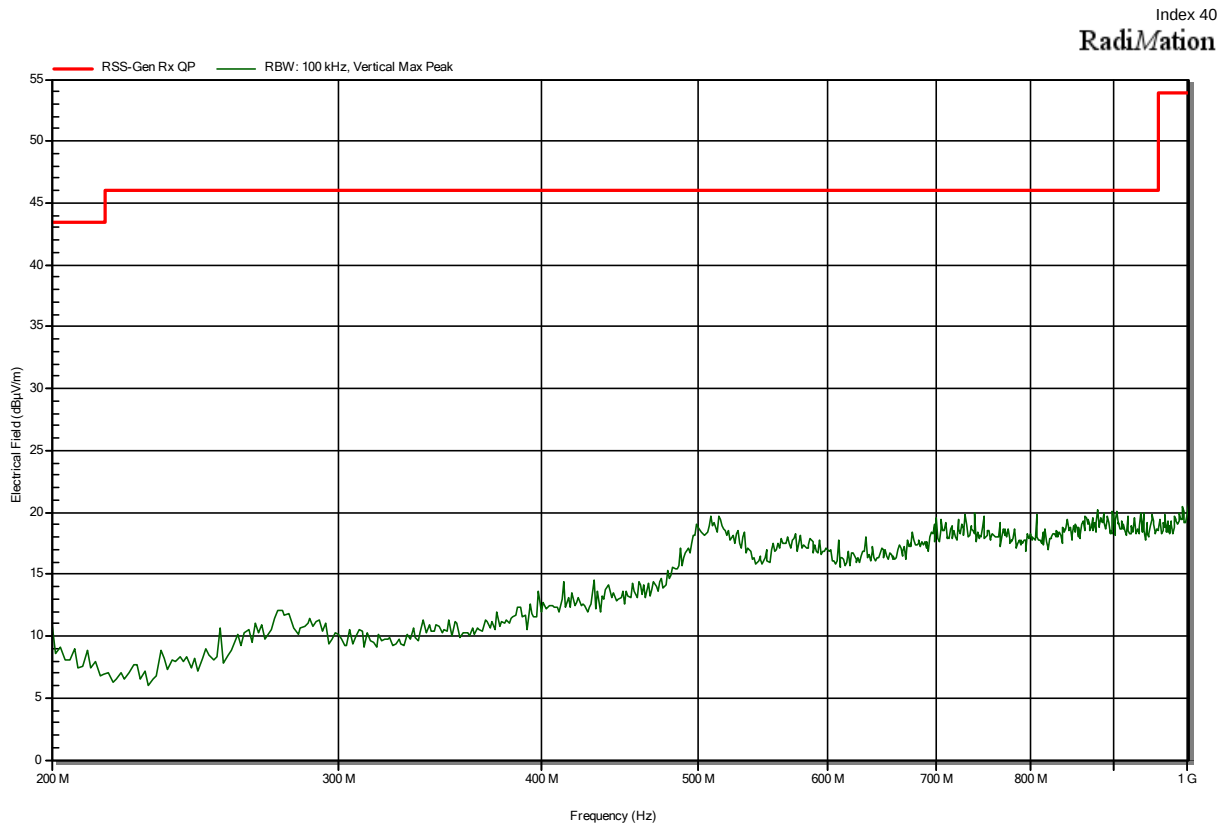
RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
474.359 MHz	18.83 dBµV/m	46 dBµV/m	-27.17 dB	Pass

Radiated Spurious Emissions according to RSS-247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 21.8 °Celsius, Vnom: 36 VDC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: Rx; BLE, 2440 MHz
 Test Date: 2021-04-15
 Note: EUT horizontal

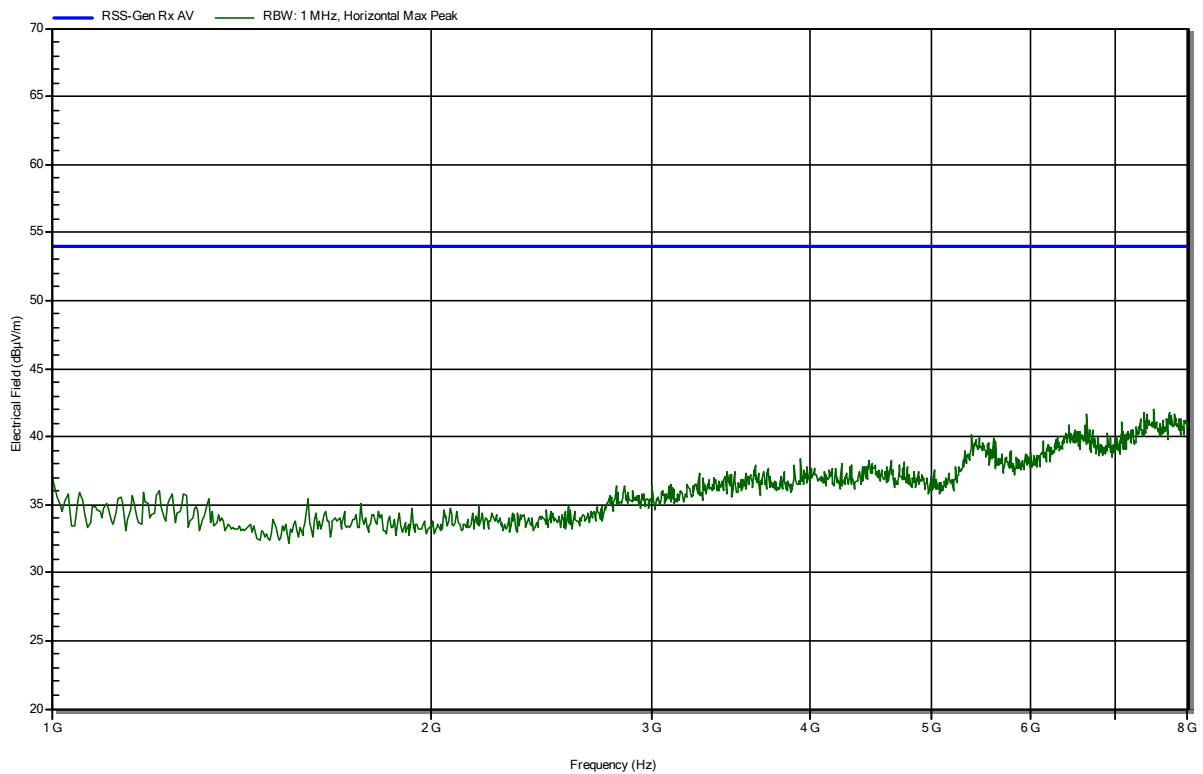


Radiated Spurious Emissions according to RSS-247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 21.2 °Celsius, Vnom: 36 VDC
 Antenna: Schwarzbeck BBHA 9120B, Horizontal
 Measurement distance: 3 m
 Mode: Rx; BLE, 2440 MHz
 Test Date: 2021-04-19
 Note: EUT horizontal

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RadiMation

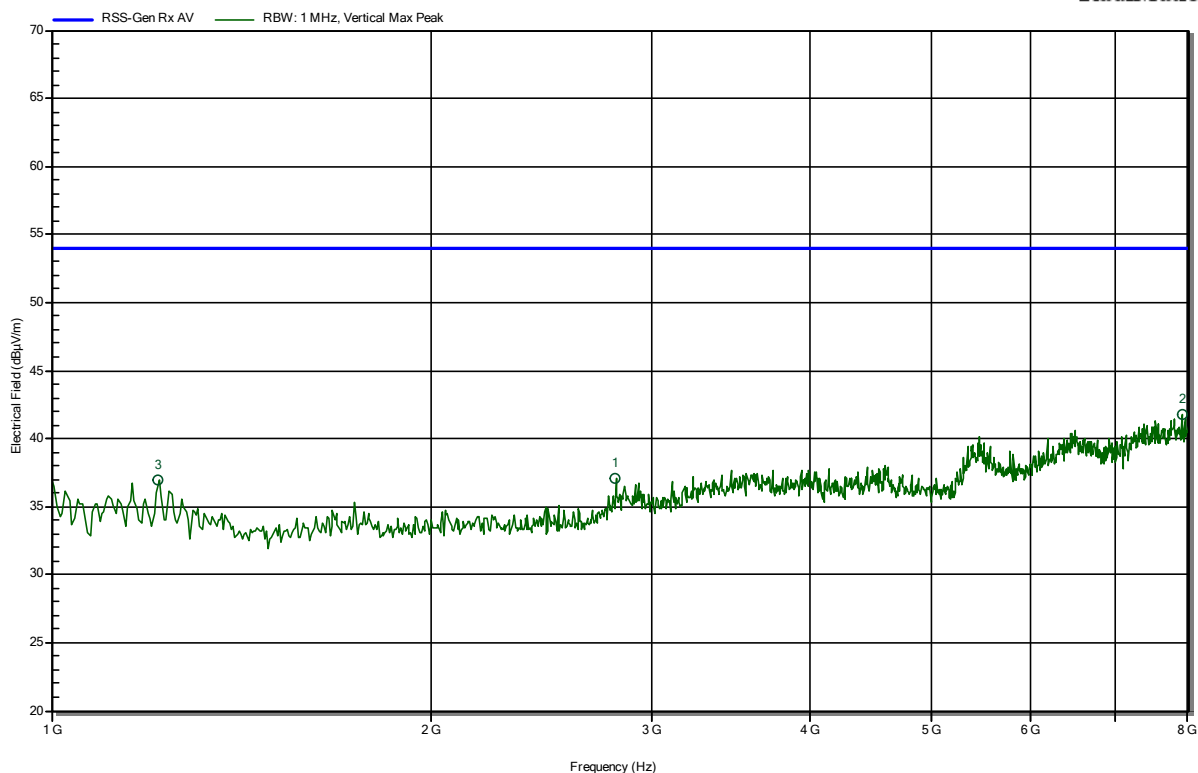


Radiated Spurious Emissions according to RSS-247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 21.2 °Celsius, Vnom: 36 VDC
 Antenna: Schwarzbeck BBHA 9120B, Vertical
 Measurement distance: 3 m
 Mode: Rx; BLE, 2440 MHz
 Test Date: 2021-04-19
 Note: EUT horizontal

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RadiMation



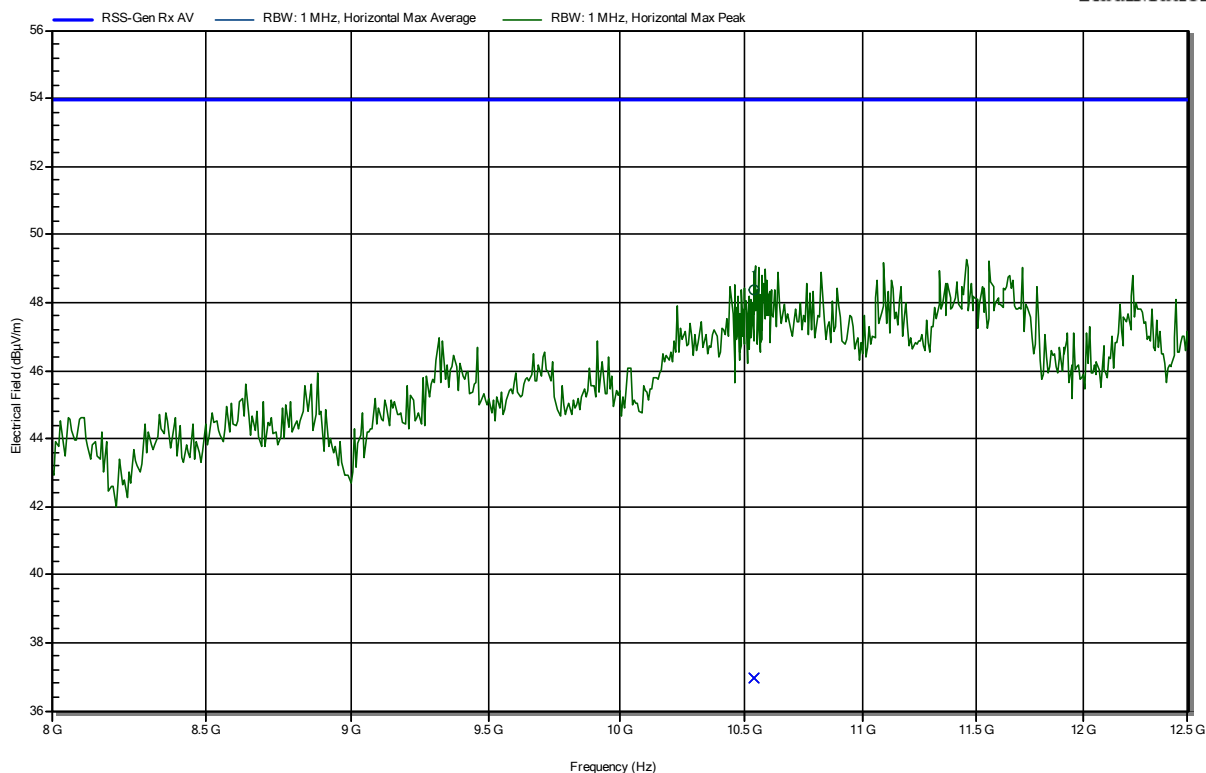
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.216 GHz	36.99 dBµV/m	53.98 dBµV/m	-16.99 dB	Pass
2.808 GHz	37.07 dBµV/m	53.98 dBµV/m	-16.91 dB	Pass
7.91 GHz	41.76 dBµV/m	53.98 dBµV/m	-12.22 dB	Pass

Radiated Spurious Emissions according to RSS-247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 21.2 °Celsius, Vnom: 36 VDC
 Antenna: Rohde & Schwarz BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: Rx; BLE, 2440 MHz
 Test Date: 2021-04-19
 Note: EUT horizontal

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RadiMation



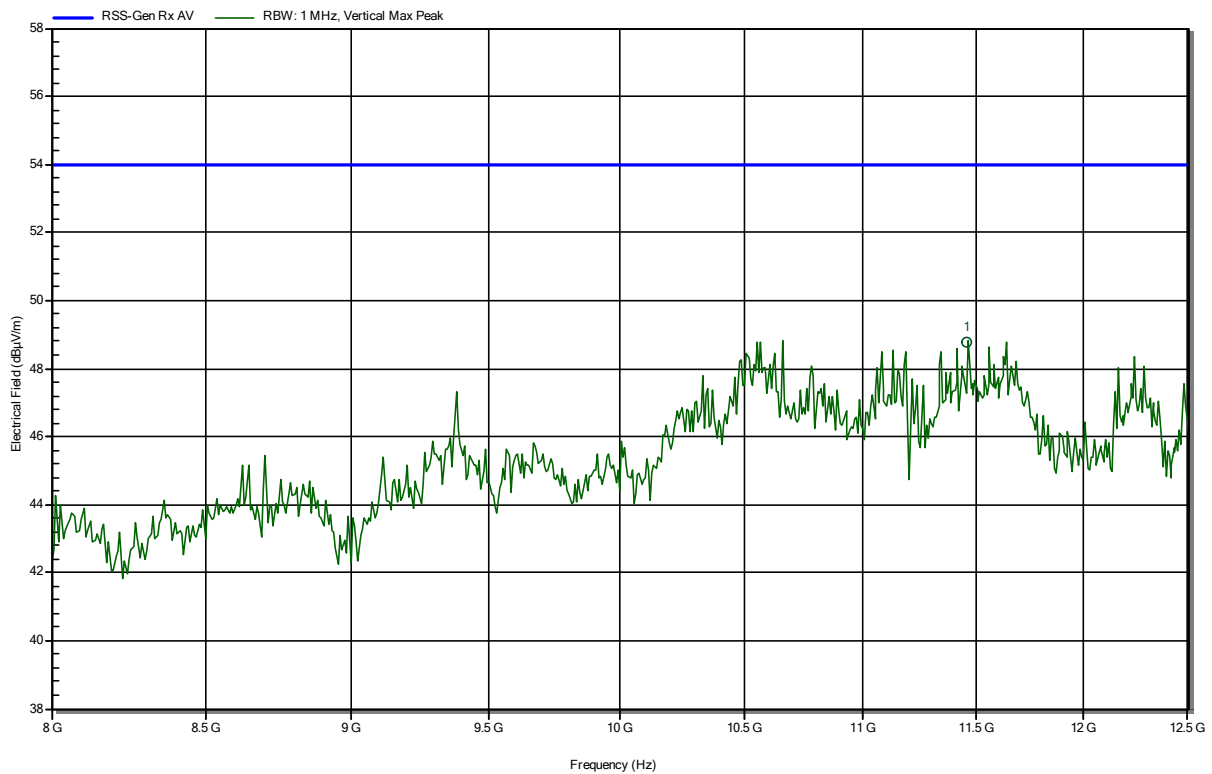
Frequency 10.538 GHz	Peak 48.38 dBμV/m	Peak Limit 53.98 dBμV/m	Peak Difference -5.6 dB	Peak Status Pass
Frequency 10.538 GHz	Average 36.97 dBμV/m	Average Limit 53.98 dBμV/m	Average Difference -17.01 dB	Average Status Pass

Radiated Spurious Emissions according to RSS-247

Project Number: G0M-2007-9184
 Applicant: Festool GmbH
 Model Description: Vacuum Cleaner
 Model: CTC SYS L
 Test Sample ID: 33422
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 21.2 °Celsius, Vnom: 36 VDC
 Antenna: Rohde & Schwarz BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: Rx; BLE, 2440 MHz
 Test Date: 2021-04-19
 Note: EUT horizontal

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
11.462 GHz	48.79 dBµV/m	53.98 dBµV/m	-5.19 dB	Pass

== END OF TEST REPORT ==

Test Report No.: G0M-2007-9184-TFC247BL-V01

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