

EMC TEST REPORT FCC 47 CFR Part 15B, ISED ICES-003 Issue 6	
Report Reference No	G0M-2006-9064-EF0115B-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	    DAKKS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A-2 DAKKS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	Andreas Stihl AG & Co. KG
Address	Badstraße 115 71336 Waiblingen Germany
Test Specification Standard(s)	47 CFR Part 15 Subpart B ISED ICES-003 Issue 6 ANSI C63.4:2014+A1:2017
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	battery pack with Bluetooth-Modul
Model(s)	AP 500 S
Additional Model(s)	None
Brand Name(s)	STIHL
Hardware Version(s)	03.0
Software Version(s)	00.70
FCC-ID	2ALP8AP1
IC	23431-AP1
Test Result	PASSED

Possible test case verdicts:		
required by standard but not tested	N/T	
not required by standard	N/R	
required by standard but not appl. to test object	N/A	
test object does meet the requirement	P(PASS)	
test object does not meet the requirement	F(FAIL)	
Testing:		
Date of receipt of test item	2020-06-19	
Report:		
Compiled by	Stephan Liebich	
Tested by (+ signature) (Responsible for Test)	Stephan Liebich	
	Matthias Handrik	
Approved by (+ signature) (Head of Lab)	Christian Weber	
Date of Issue	2020-08-07	
Total number of pages	51	
General Remarks:		
The test results presented in this report relate only to the object tested. The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.		
Additional Comments:		

ABBREVIATIONS AND ACRONYMS

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

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2020-08-10	Initial Release	

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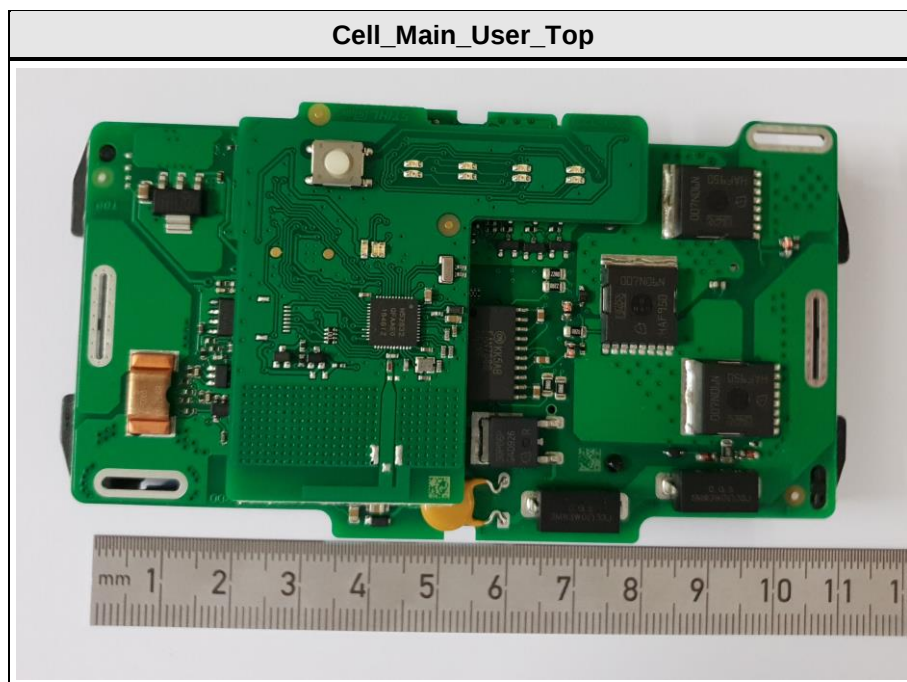
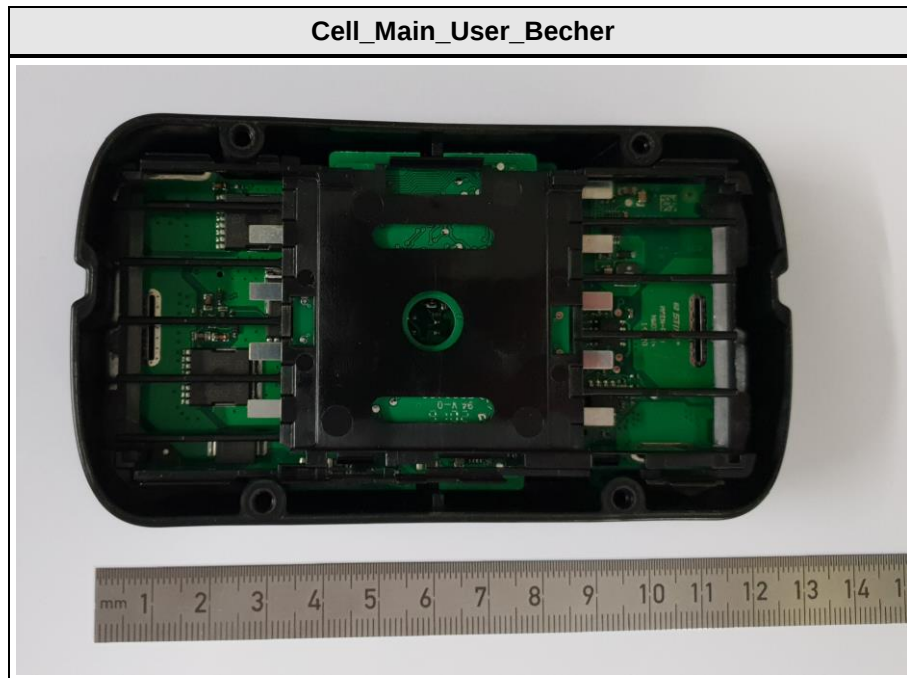
1 Equipment (Test Item) Under Test

Description	battery pack with Bluetooth-Modul	
Model	AP 500 S	
Additional Model(s)	None	
Brand Name(s)	STIHL	
Serial Number(s)	WE231-A09-926000698	
Sample ID	29809	
Hardware Version(s)	03.0	
Software Version(s)	00.70	
FCC-ID	2ALP8AP1	
IC	23431-AP1	
Class	Class B	
Equipment type	Table top	
Highest internal frequency [MHz]	2480	
Radio Module	Type	Bluetooth LE
	Model	nRF52 - S132
	Manufacturer	Nordic Semiconductor ASA
	FCC-ID	None
	IC	None
Supply Voltage	V _{NOM}	36 V DC via Battery Charger 36 V DC via internal battery
Battery Charger	Model	AL 500
	Vendor	STIHL
	Input	120 V AC
	Output	25.6 V – 36 V DC
Manufacturer	Andreas Stihl AG & Co. KG Badstraße 115 71336 Waiblingen Germany	

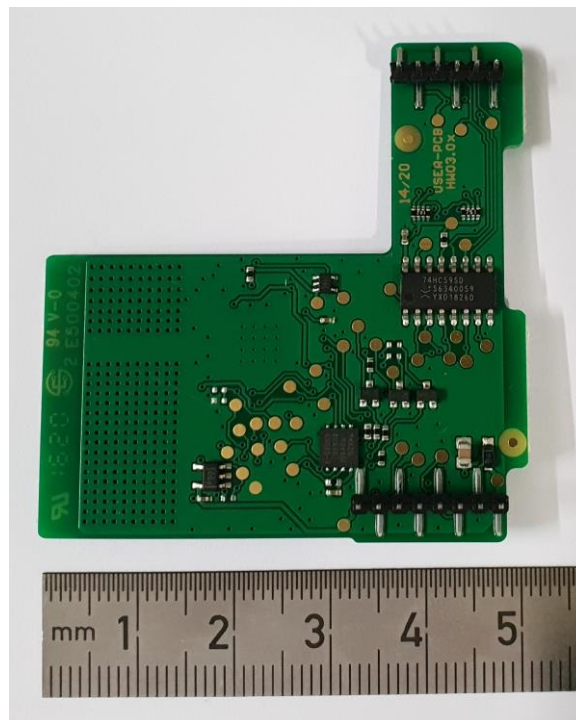
1.1 Equipment Ports

Name	Type	Attributes	Comment
Mains	AC;DC	Count: 1 Direction: IO Service only: No	36 V DC input via Battery Charger by 120 V AC external power supply; 36 V DC output via external load
Description:			
AC	AC mains power input/output port		
DC	DC power input/output port		
BAT	DC power input port connected to external battery		
IO	Input/Output port		
TP	Telecommunication port		
NE	Non-electrical port		

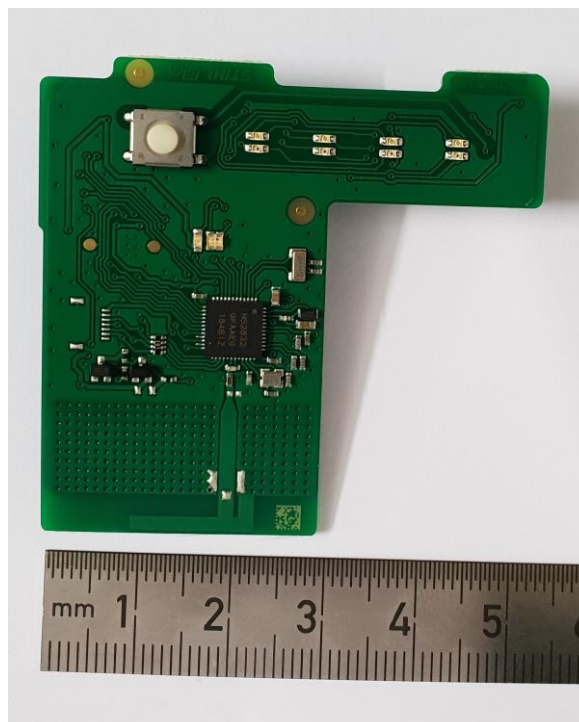
1.2 Equipment Photos internal



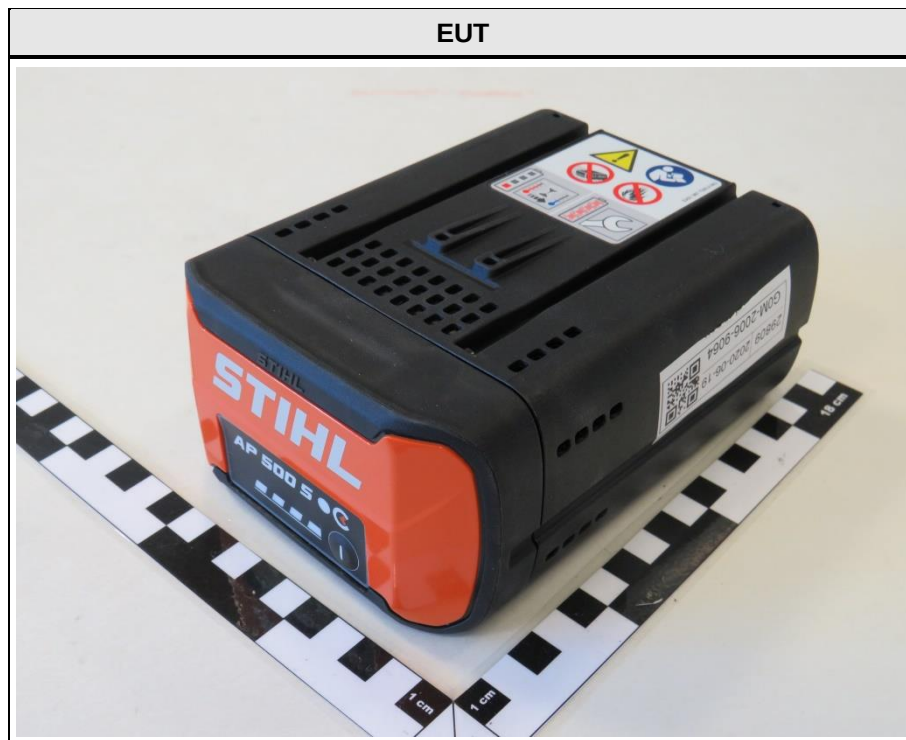
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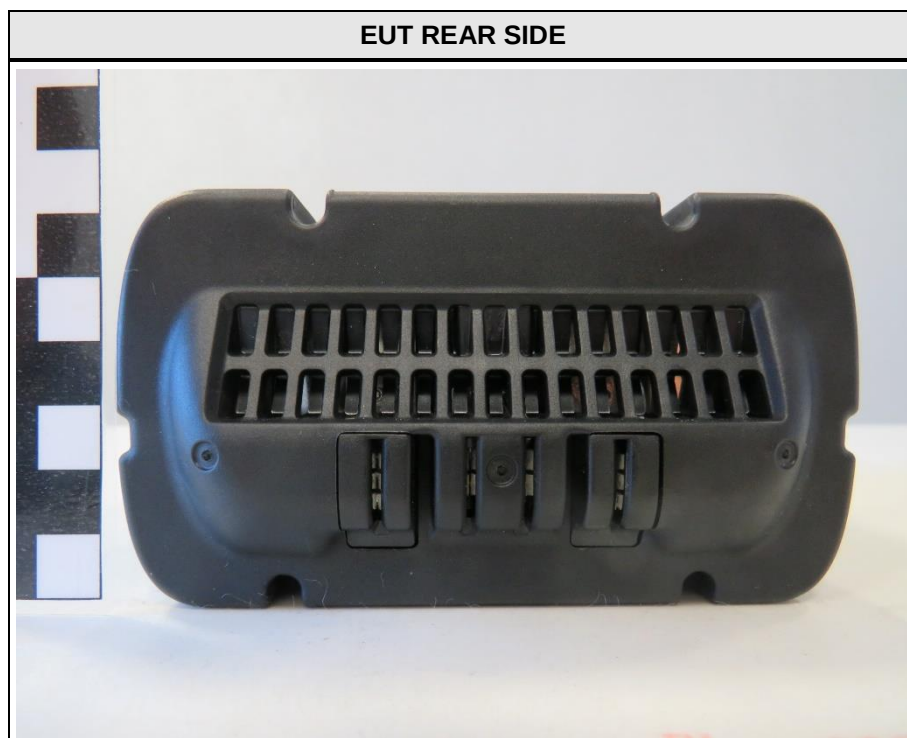
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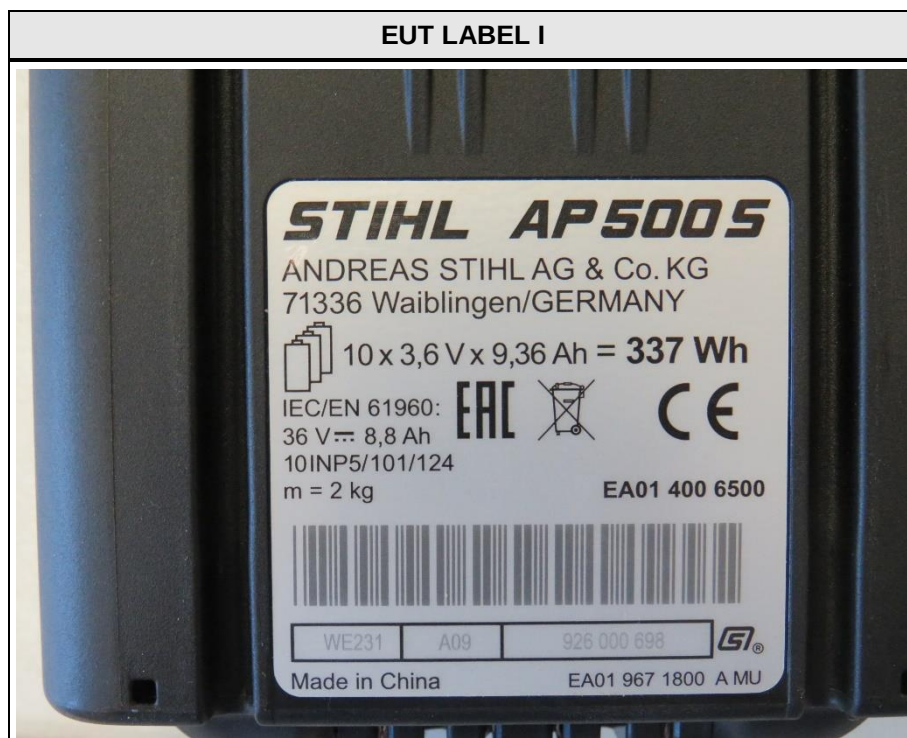


1.3 Equipment Photos









EUT LABEL II



BATTERY CHARGER



BATTERY CHARGER TOP SIDE



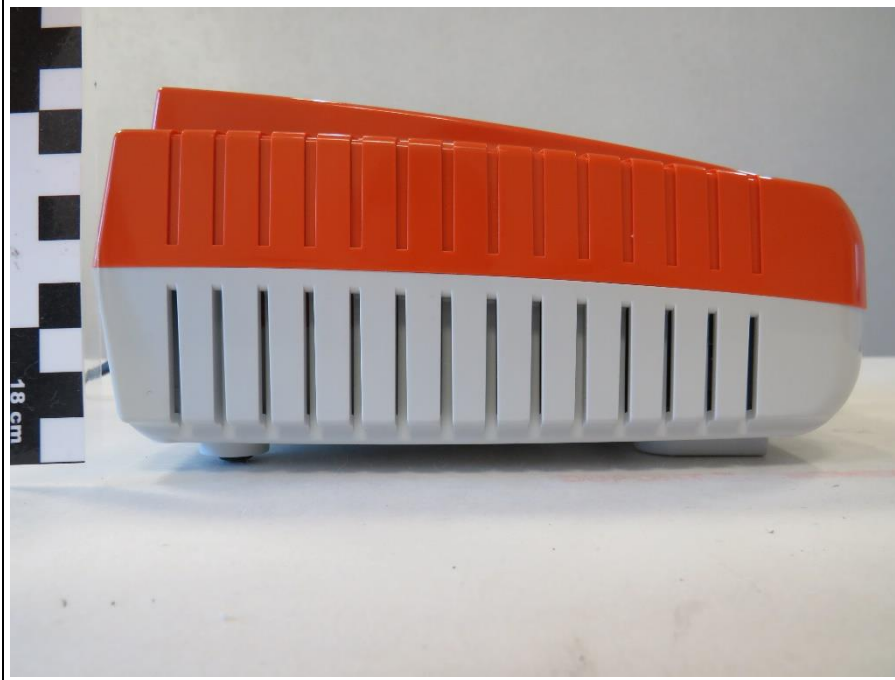
BATTERY CHARGER BOTTOM SIDE



Test Report No.: G0M-2006-9064-EF0115B-V01

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

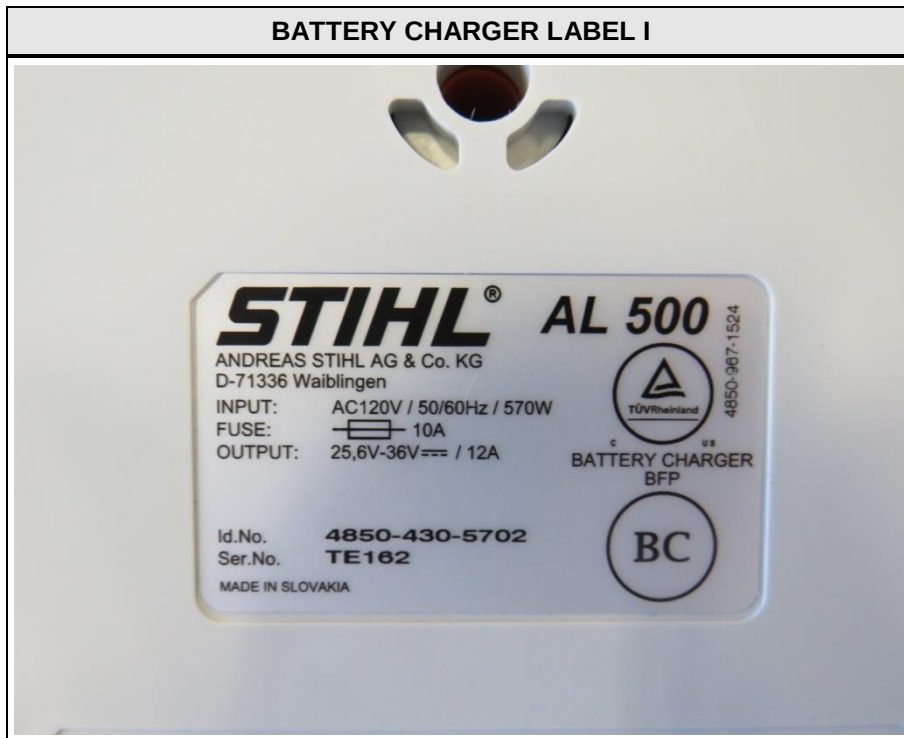
BATTERY CHARGER LEFT SIDE



BATTERY CHARGER REAR SIDE



BATTERY CHARGER LABEL I



BATTERY CHARGER LABEL II



EUT CONFIGURATION I



EUT CONFIGURATION II



1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	Leaf blower	STIHL	BGA XXX	-
MON	Smartphone	Samsung	SM-A505FN	-
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
MON	Monitoring Equipment			
CBL	Connecting Cable			
Comment:				

1.5 Operational Modes

Mode #	Description
1	Bluetooth LE Tx (EUT is connected with Smartphone via Bluetooth LE and sends its status information to it.)
Comment:	

1.6 EUT Configuration

Configuration #	Description
1	EUT is powered up and powered by Battery Charger. Battery Charger is powered by 120 V / 60 Hz external power supply.
2	EUT is full charged (internal battery). EUT is connected with Leaf blower and is continuously discharging by it. Leaf blower is powered up, set on tier 1 and powered by EUT.
Comment:	

1.7 Sample emission level calculation

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

Reading:

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

A.F.:

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

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

Net:

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

Limit:

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

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

Margin:

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

Example only:

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

2 Result Summary

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

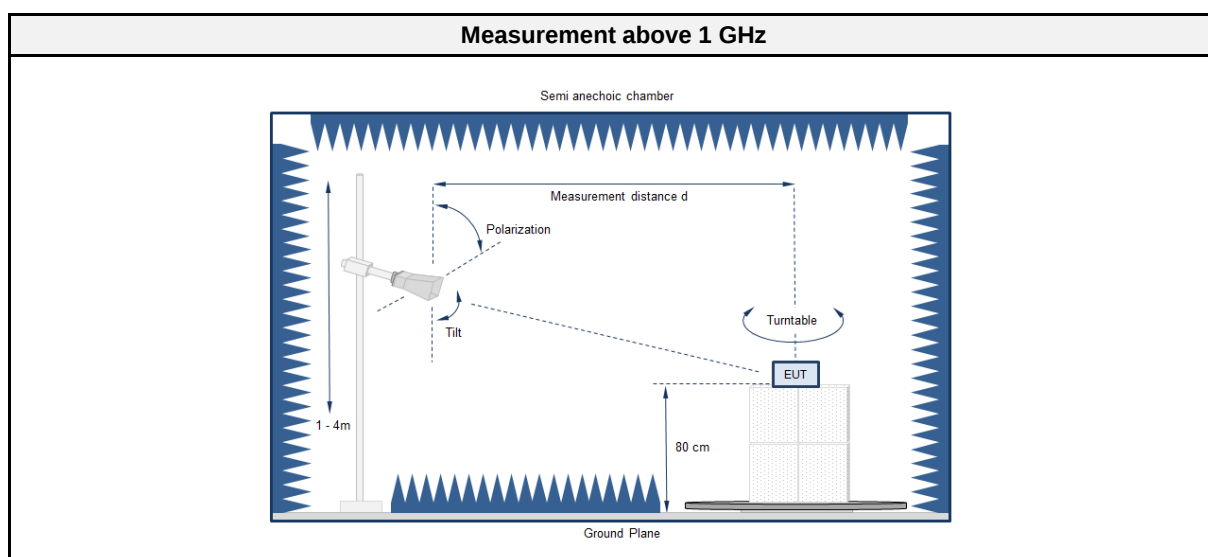
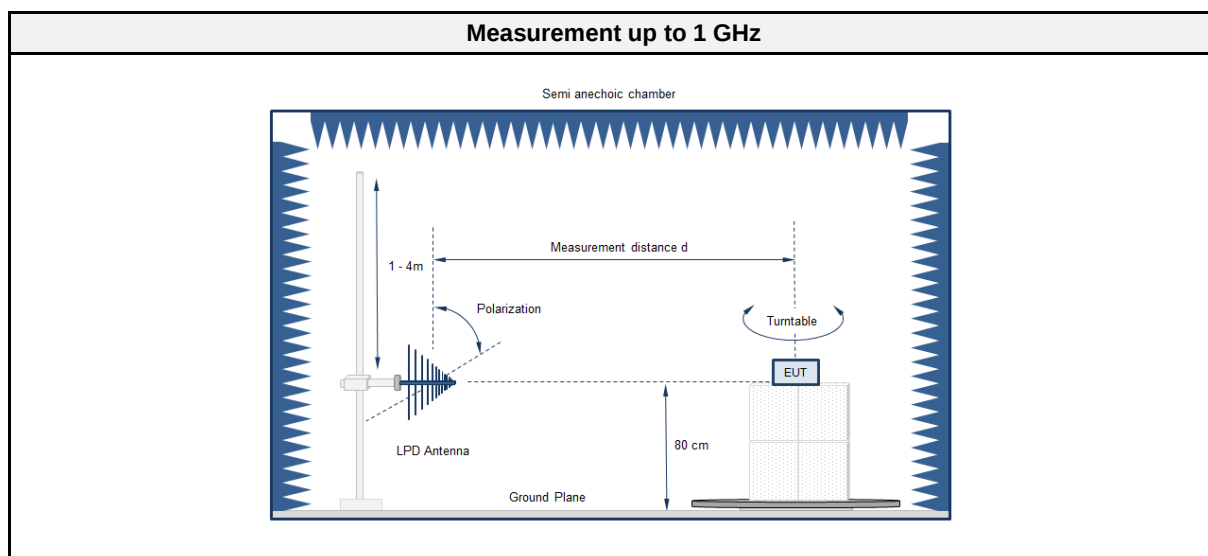
Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

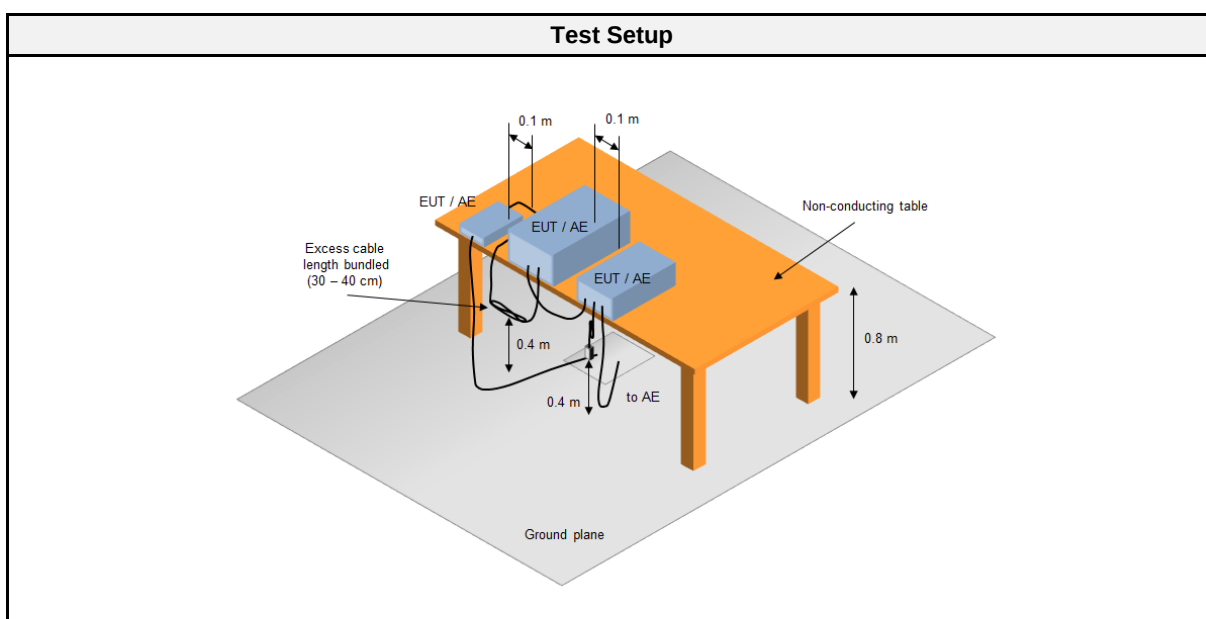
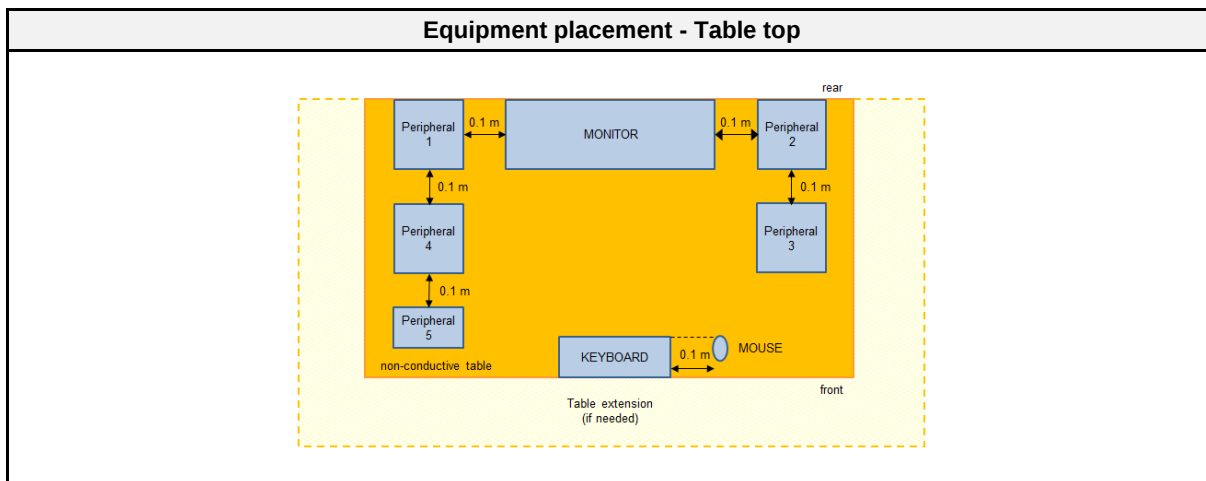
2.1 Test Conditions and Results - Radiated emissions acc. to ANSI C63.4

2.1.1 Information

Test Information	
Reference	FCC 15.109, ICES-003, 6.2
Reference method	ANSI C63.4:2014+A1:2017 Section 8
Equipment class	Class B
Equipment type	Table top
Highest internal frequency [MHz]	2480
Measurement range	30 MHz to 13000 MHz
Temperature [°C]	22 - 24
Humidity [%]	47 - 52
Operator	Stephan Liebich
Date	2020-06-22

2.1.2 Setup





2.1.3 Equipment

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

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic chamber	Frankonia	AC1	EF00062	2018-07	2021-07
EMI Test Receiver	Rohde & Schwarz Vertriebs GmbH	ESR7	EF00943	2019-10	2020-10
Spectrum analyzer	Rohde & Schwarz Vertriebs GmbH	FSW43	EF00896	2019-07	2020-07
Biconical Antenna	R&S	HK 116	EF00030	2019-04	2022-04
LPD Antenna	R&S	HL 223	EF00187	2019-05	2022-05
Horn Antenna	Schwarzbeck	BBHA9120D	EF00018	2019-10	2022-10
Climatic Sensor	Embedded Data Systems, LLC.	2800100000254 17E	EF01054	2020-03	2021-03

2.1.4 Procedure

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

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

2.1.5 Limits

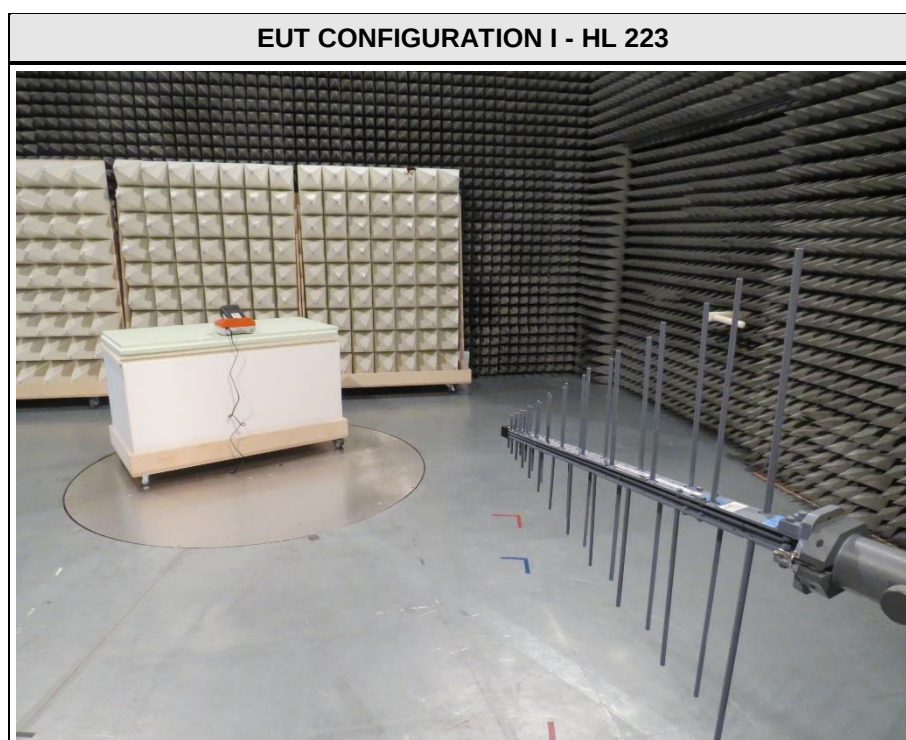
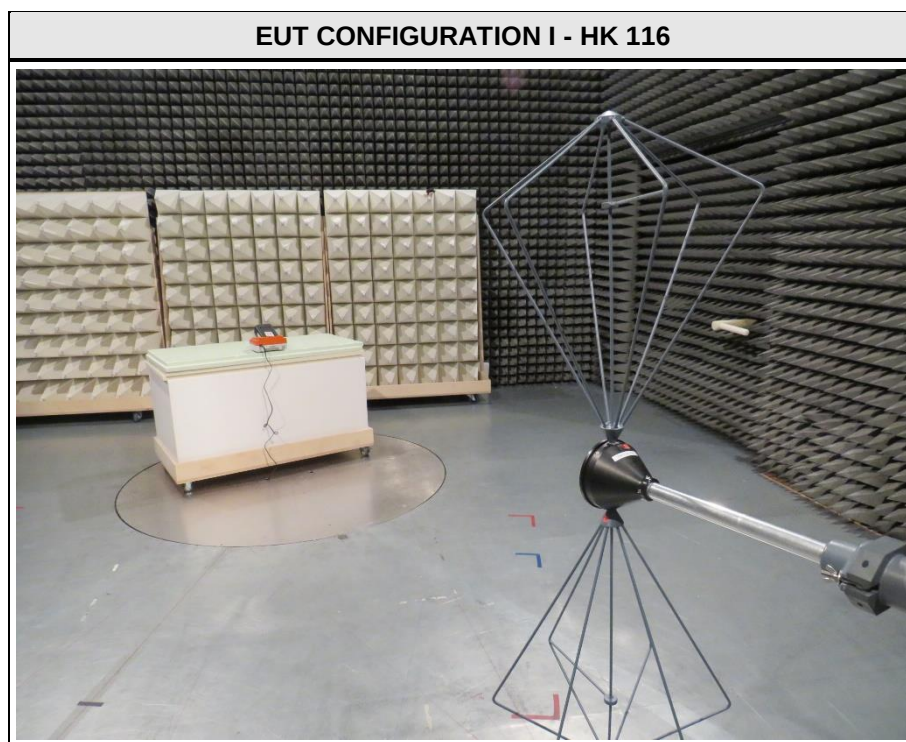
Class B @ 3 m		
Frequency [MHz]	Detector	Limit [dB μ V/m]
30 - 88	Quasi-peak	40
88 - 216	Quasi-peak	43.5
216 - 960	Quasi-peak	46
960 - 1000	Quasi-peak	54
> 1000	Peak	74
	Average	54

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

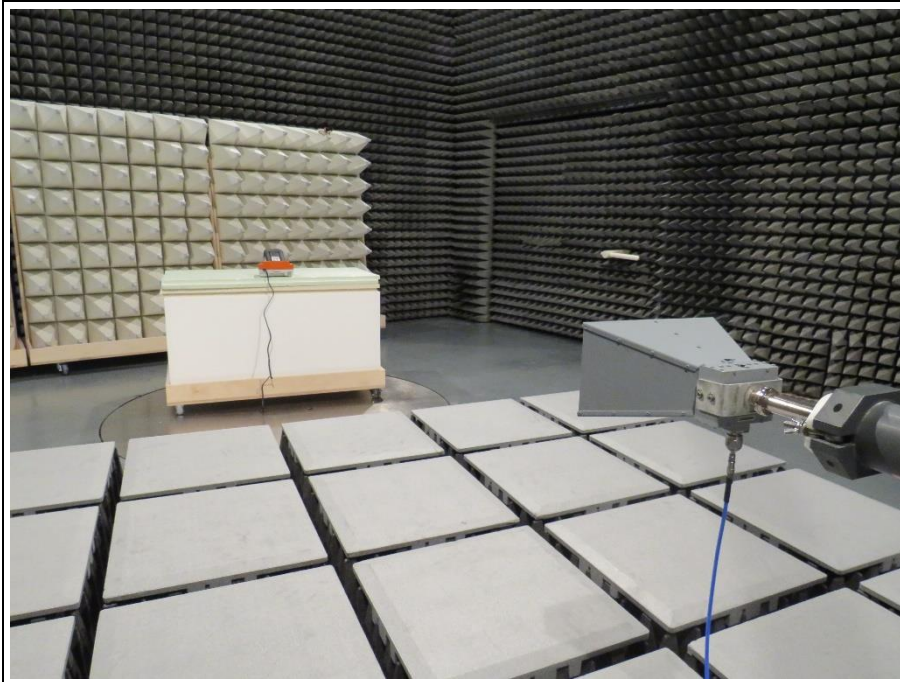
2.1.6 Results

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

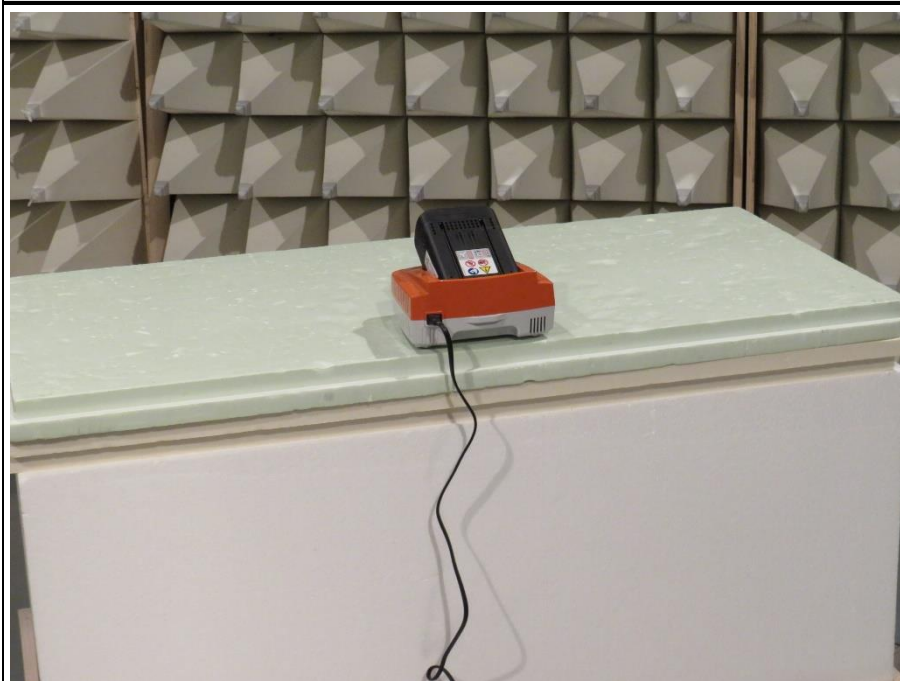
2.1.7 Setup Photos



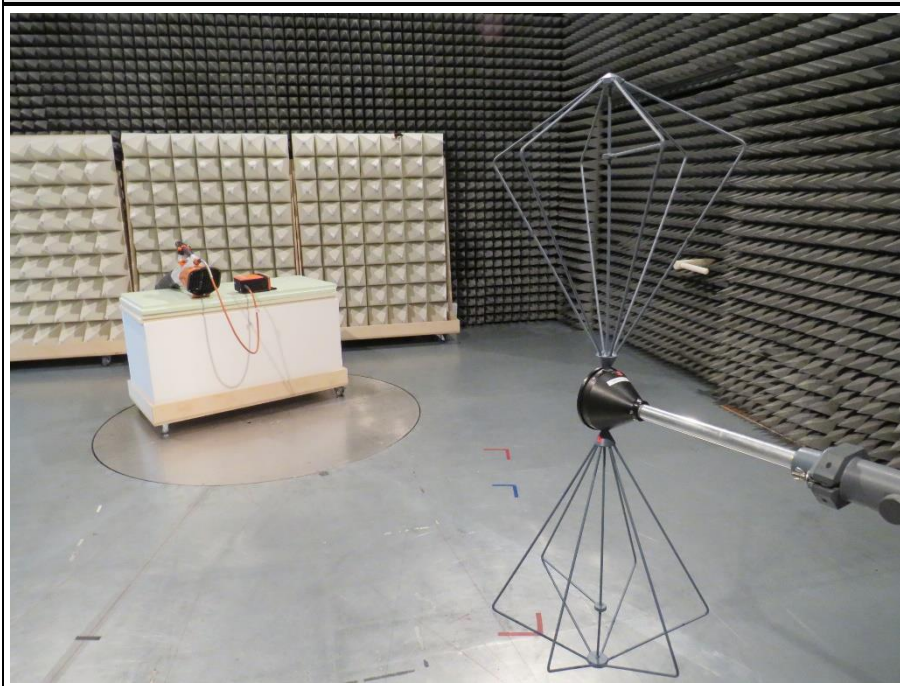
EUT CONFIGURATION I - BBHA9120D



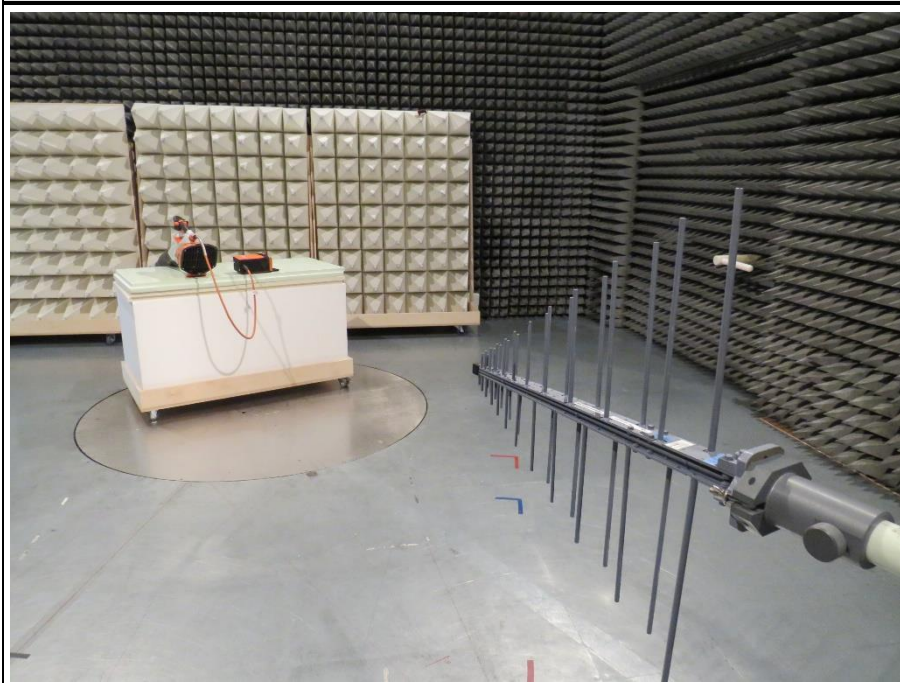
EUT CONFIGURATION I - FOCUS



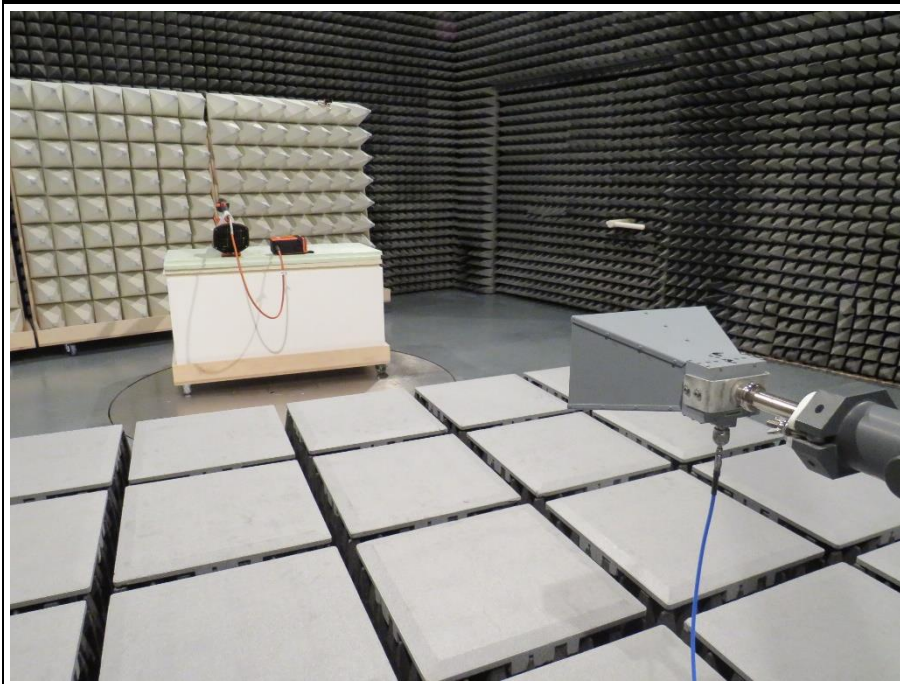
EUT CONFIGURATION II - HK 116



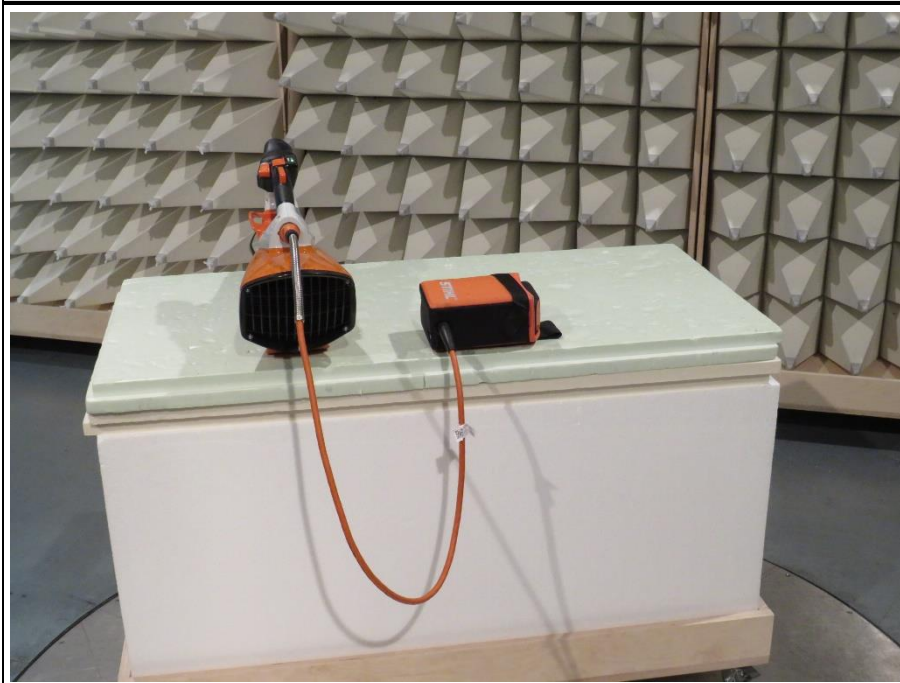
EUT CONFIGURATION II - HL 223



EUT CONFIGURATION II - BBHA9120D



EUT CONFIGURATION II - FOCUS

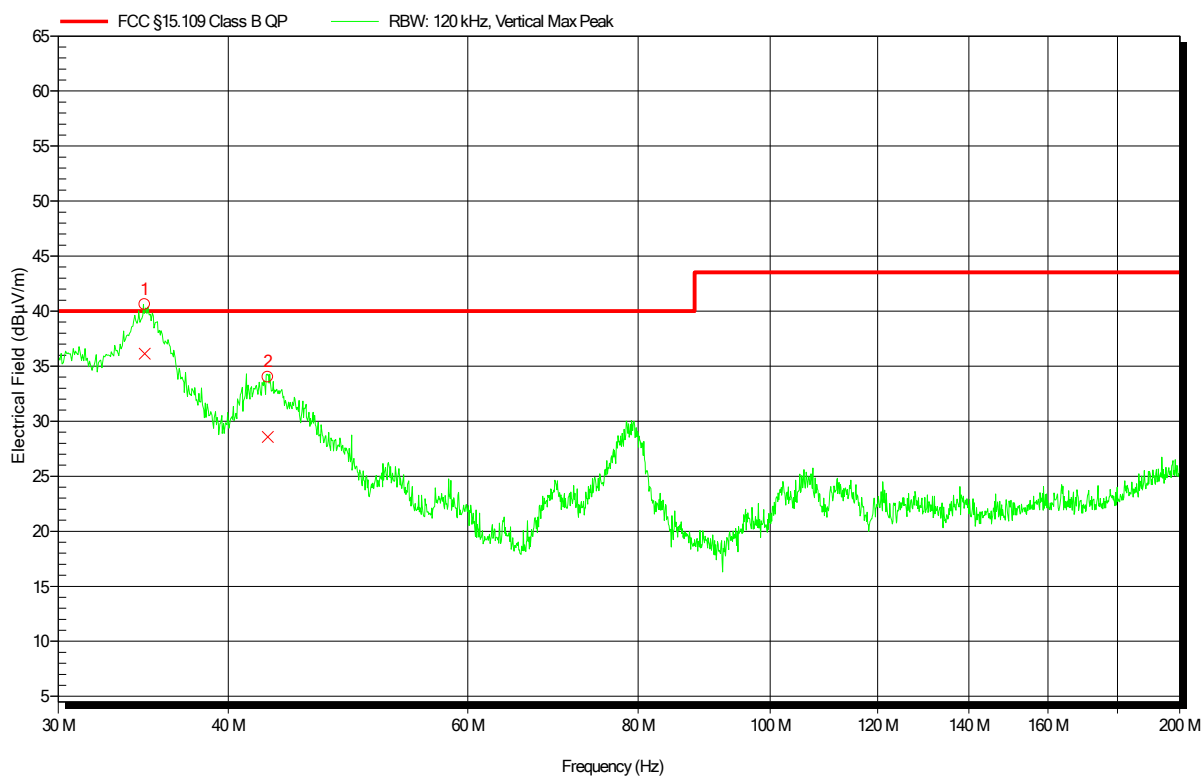


2.1.8 Records

Radiated emissions according to FCC part 15B

Project Number: G0M-2006-9064
 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809 + 29808
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 22°C
 power input: 36 V DC via Battery Charger by 120 V / 60 Hz
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement Distance: 3m
 Mode: 1

Index 1

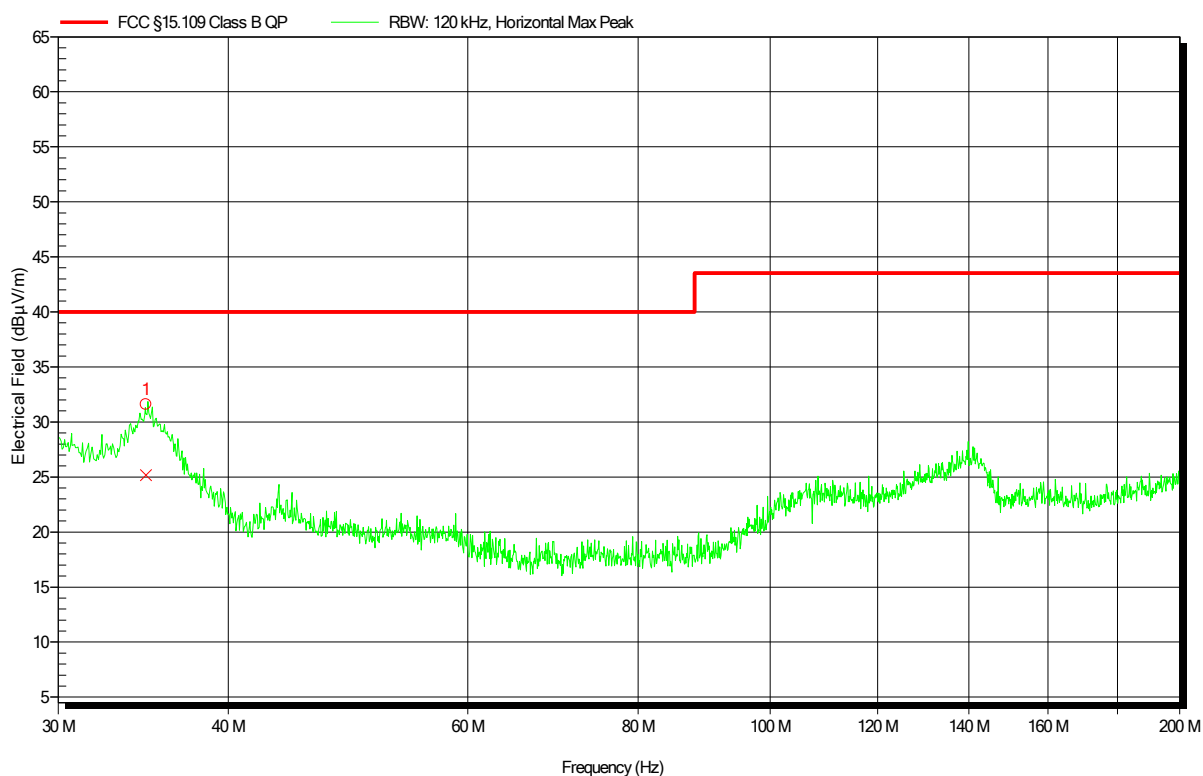


Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	34.74 MHz	36.12 dBµV/m	40 dBµV/m	-3.88 dB	Pass	180 Degree	1.3 m
2	42.78 MHz	28.58 dBµV/m	40 dBµV/m	-11.42 dB	Pass	180 Degree	1.3 m

Radiated emissions according to FCC part 15B

Project Number: G0M-2006-9064
 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809 + 29808
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 22°C
 power input: 36 V DC via Battery Charger by 120 V / 60 Hz
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement Distance: 3m
 Mode: 1

Index 2

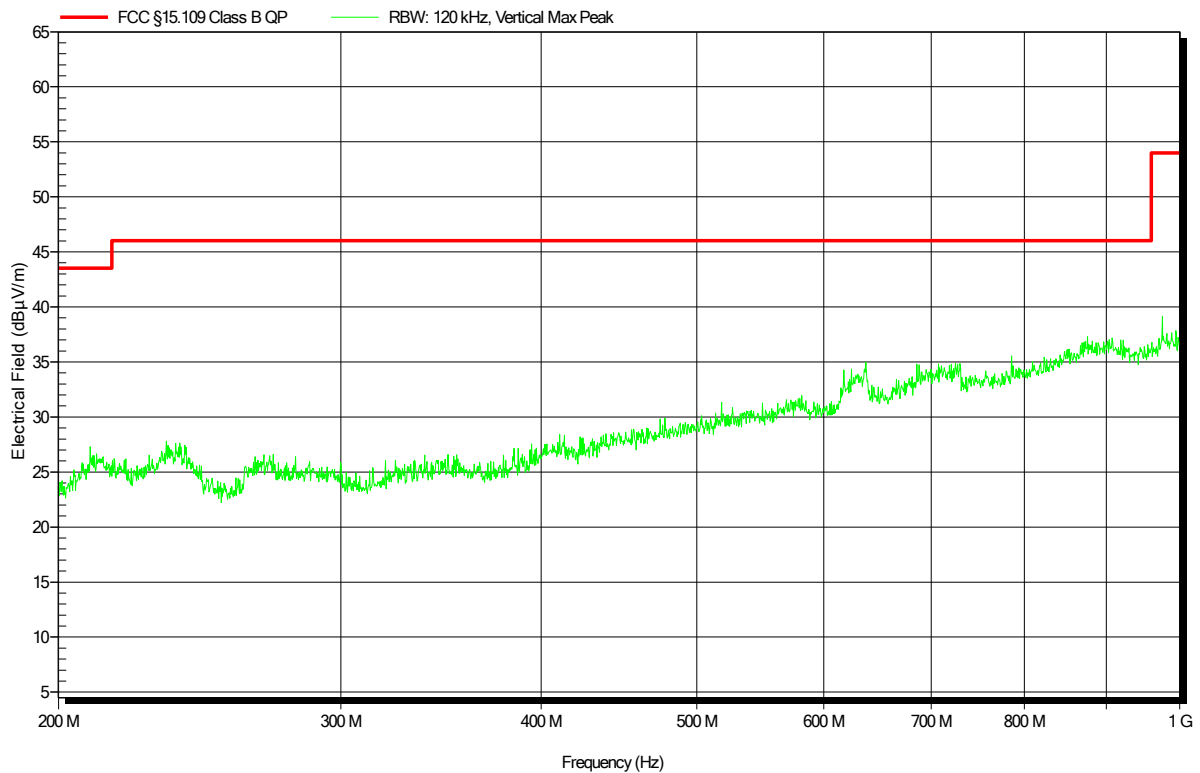


Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	34.8 MHz	25.15 dBµV/m	40 dBµV/m	-14.85 dB	Pass	0 Degree	2.2 m

Radiated emissions according to FCC part 15B

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 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809 + 29808
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 22°C
 power input: 36 V DC via Battery Charger by 120 V / 60 Hz
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement Distance: 3m
 Mode: 1

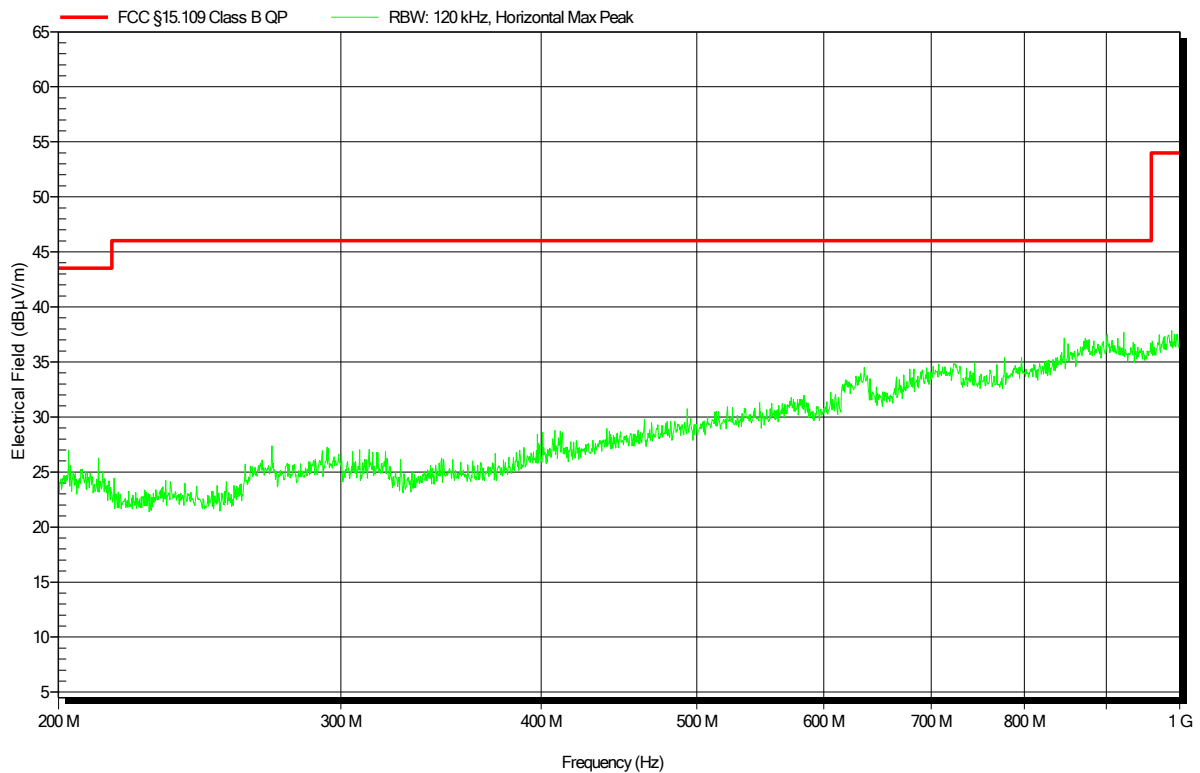
Index 3



Radiated emissions according to FCC part 15B

Project Number: G0M-2006-9064
 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809 + 29808
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 22°C
 power input: 36 V DC via Battery Charger by 120 V / 60 Hz
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement Distance: 3m
 Mode: 1

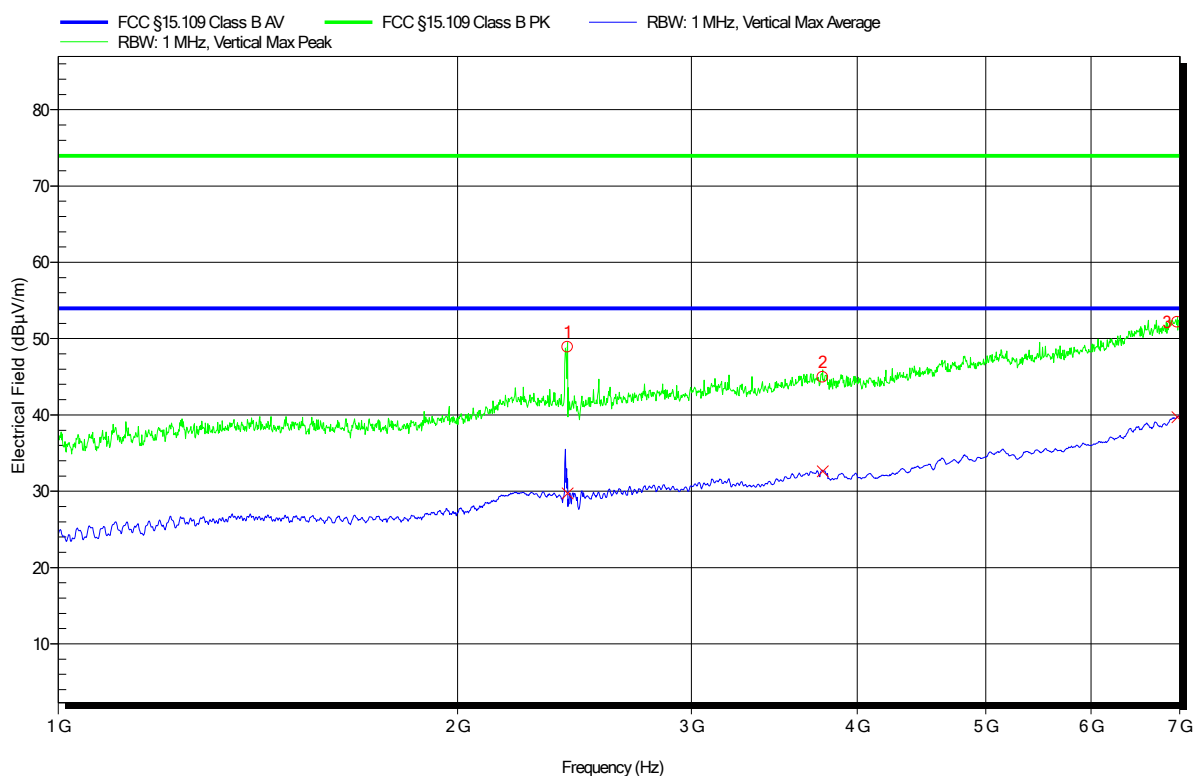
Index 4



Radiated emissions according to FCC part 15B

Project Number: G0M-2006-9064
 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809 + 29808
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 23°C
 power input: 36 V DC via Battery Charger by 120 V / 60 Hz
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement Distance: 3m
 Mode: 1

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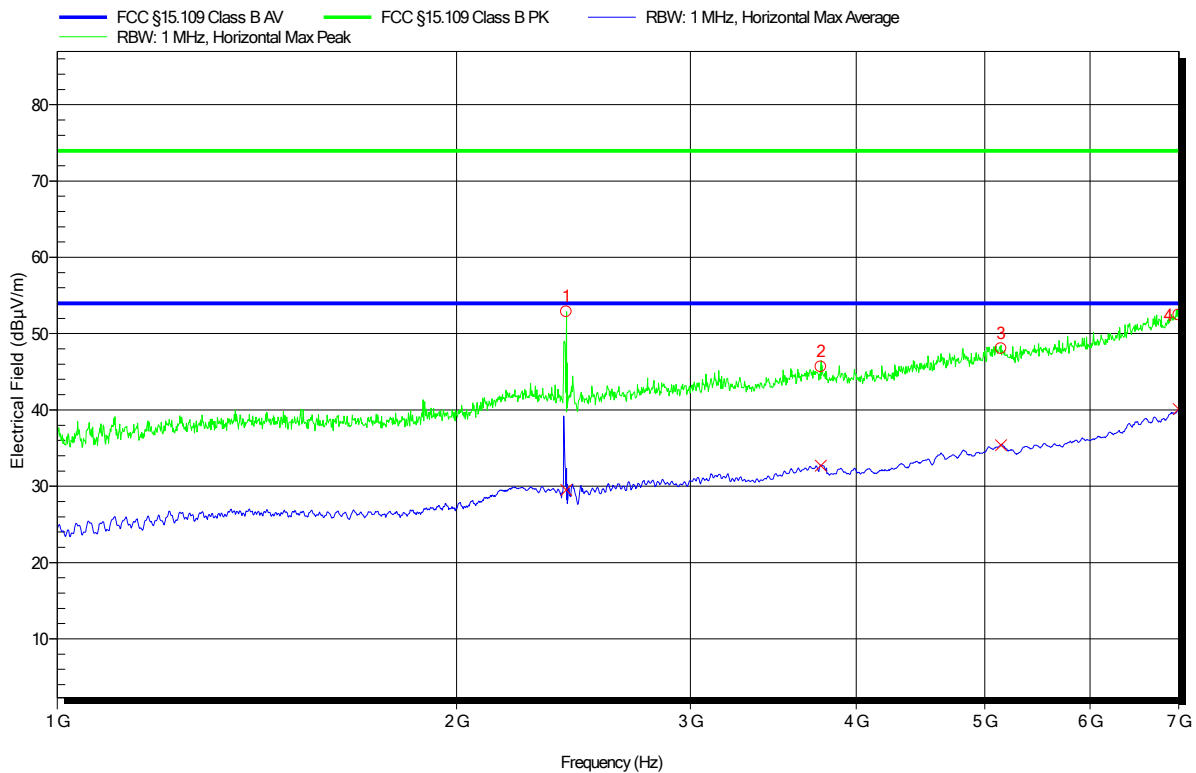


Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	2.42 GHz				BLE-Carrier		
2	3.767 GHz	44.93 dBμV/m	73.98 dBμV/m	-29.05 dB	Pass	0 Degree	1 m
3	6.972 GHz	52.17 dBμV/m	73.98 dBμV/m	-21.81 dB	Pass	0 Degree	1 m
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height
1	2.42 GHz				BLE-Carrier		
2	3.767 GHz	32.63 dBμV/m	53.98 dBμV/m	-21.35 dB	Pass	0 Degree	1 m
3	6.972 GHz	39.71 dBμV/m	53.98 dBμV/m	-14.27 dB	Pass	0 Degree	1 m

Radiated emissions according to FCC part 15B

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 Model: AP 500 S
 Test Sample ID: 29809 + 29808
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 23°C
 power input: 36 V DC via Battery Charger by 120 V / 60 Hz
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m
 Mode: 1

Index 12



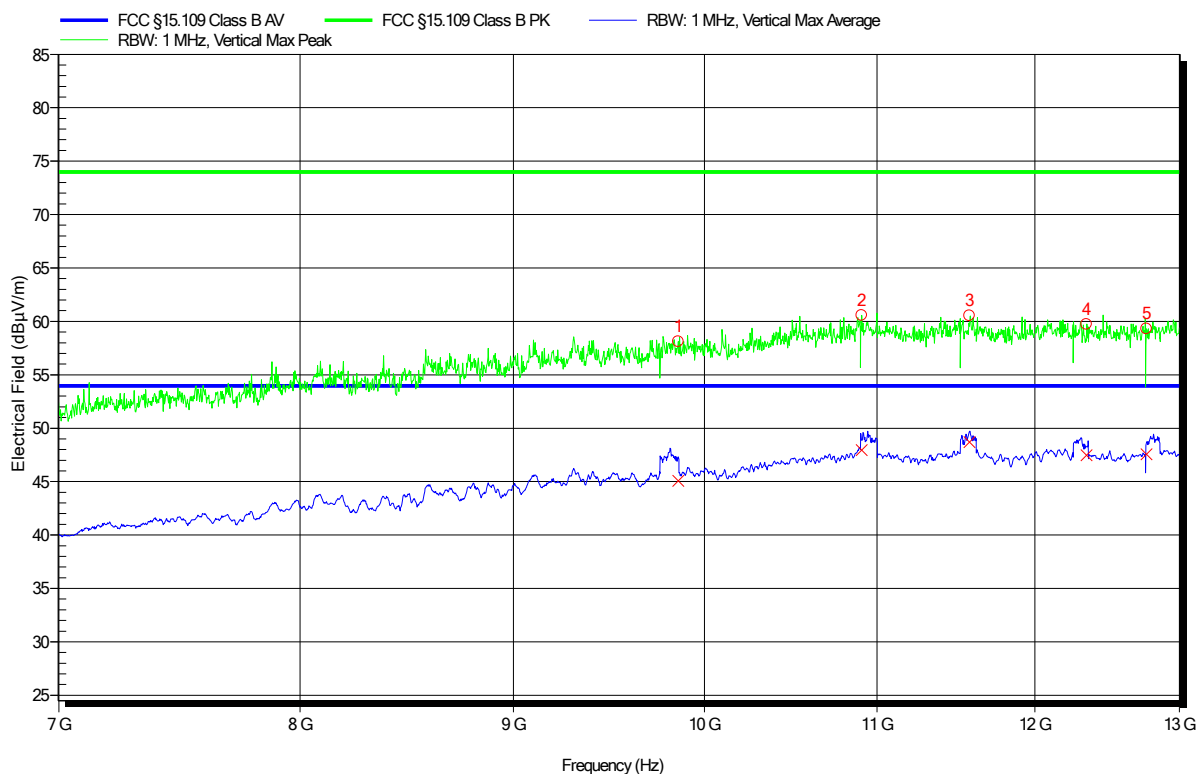
Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	2.419 GHz				BLE-Carrier		
2	3.762 GHz	45.64 dBµV/m	73.98 dBµV/m	-28.34 dB	Pass	0 Degree	1 m
3	5.141 GHz	48.05 dBµV/m	73.98 dBµV/m	-25.93 dB	Pass	0 Degree	1 m
4	6.999 GHz	52.47 dBµV/m	73.98 dBµV/m	-21.51 dB	Pass	0 Degree	1 m

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height
1	2.419 GHz				BLE-Carrier		
2	3.762 GHz	32.7 dBµV/m	53.98 dBµV/m	-21.28 dB	Pass	0 Degree	1 m
3	5.141 GHz	35.39 dBµV/m	53.98 dBµV/m	-18.59 dB	Pass	0 Degree	1 m
4	6.999 GHz	40.13 dBµV/m	53.98 dBµV/m	-13.85 dB	Pass	0 Degree	1 m

Radiated emissions according to FCC part 15B

Project Number: G0M-2006-9064
 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809 + 29808
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 24°C
 power input: 36 V DC via Battery Charger by 120 V / 60 Hz
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement Distance: 3m
 Mode: 1

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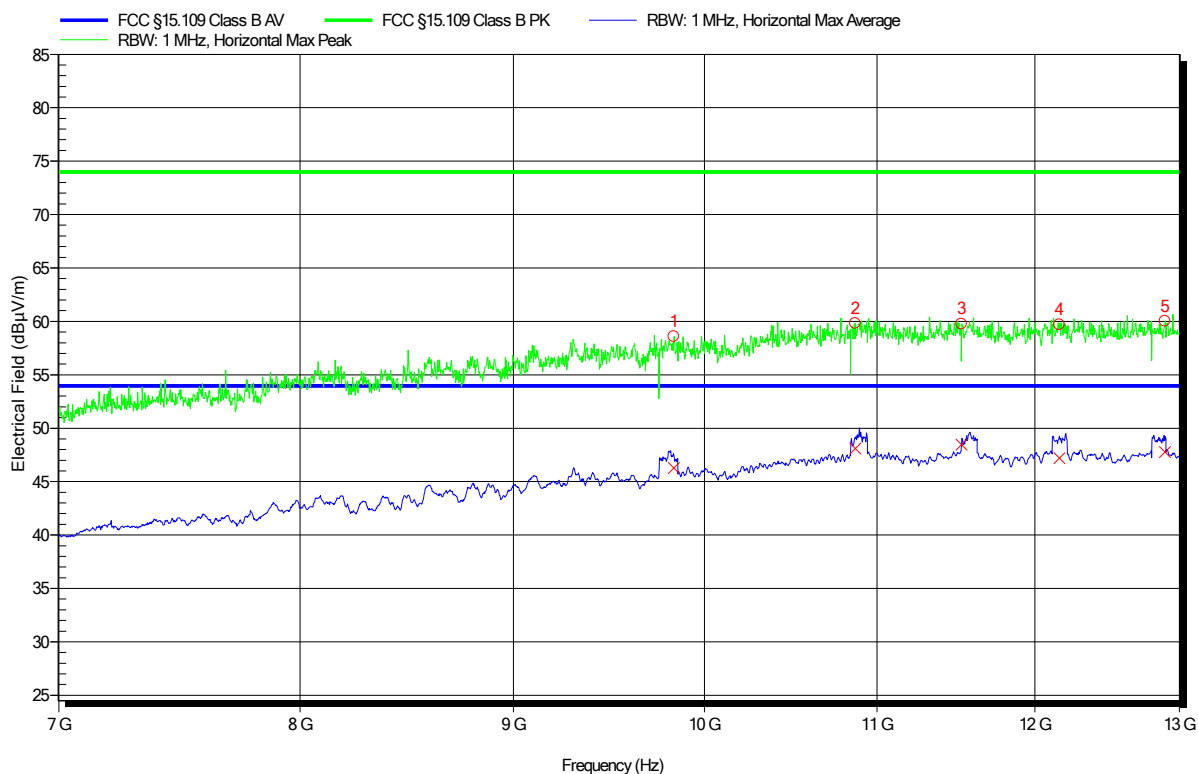
Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	9.856 GHz	58.11 dBµV/m	73.98 dBµV/m	-15.87 dB	Pass	0 Degree	1 m
2	10.906 GHz	60.56 dBµV/m	73.98 dBµV/m	-13.42 dB	Pass	0 Degree	1 m
3	11.576 GHz	60.52 dBµV/m	73.98 dBµV/m	-13.46 dB	Pass	0 Degree	1 m
4	12.348 GHz	59.71 dBµV/m	73.98 dBµV/m	-14.27 dB	Pass	0 Degree	1 m
5	12.762 GHz	59.31 dBµV/m	73.98 dBµV/m	-14.67 dB	Pass	0 Degree	1 m

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height
1	9.856 GHz	45.07 dBµV/m	53.98 dBµV/m	-8.91 dB	Pass	0 Degree	1 m
2	10.906 GHz	47.94 dBµV/m	53.98 dBµV/m	-6.04 dB	Pass	0 Degree	1 m
3	11.576 GHz	48.68 dBµV/m	53.98 dBµV/m	-5.3 dB	Pass	0 Degree	1 m
4	12.348 GHz	47.46 dBµV/m	53.98 dBµV/m	-6.52 dB	Pass	0 Degree	1 m
5	12.762 GHz	47.56 dBµV/m	53.98 dBµV/m	-6.42 dB	Pass	0 Degree	1 m

Radiated emissions according to FCC part 15B

Project Number: G0M-2006-9064
 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809 + 29808
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 24°C
 power input: 36 V DC via Battery Charger by 120 V / 60 Hz
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m
 Mode: 1

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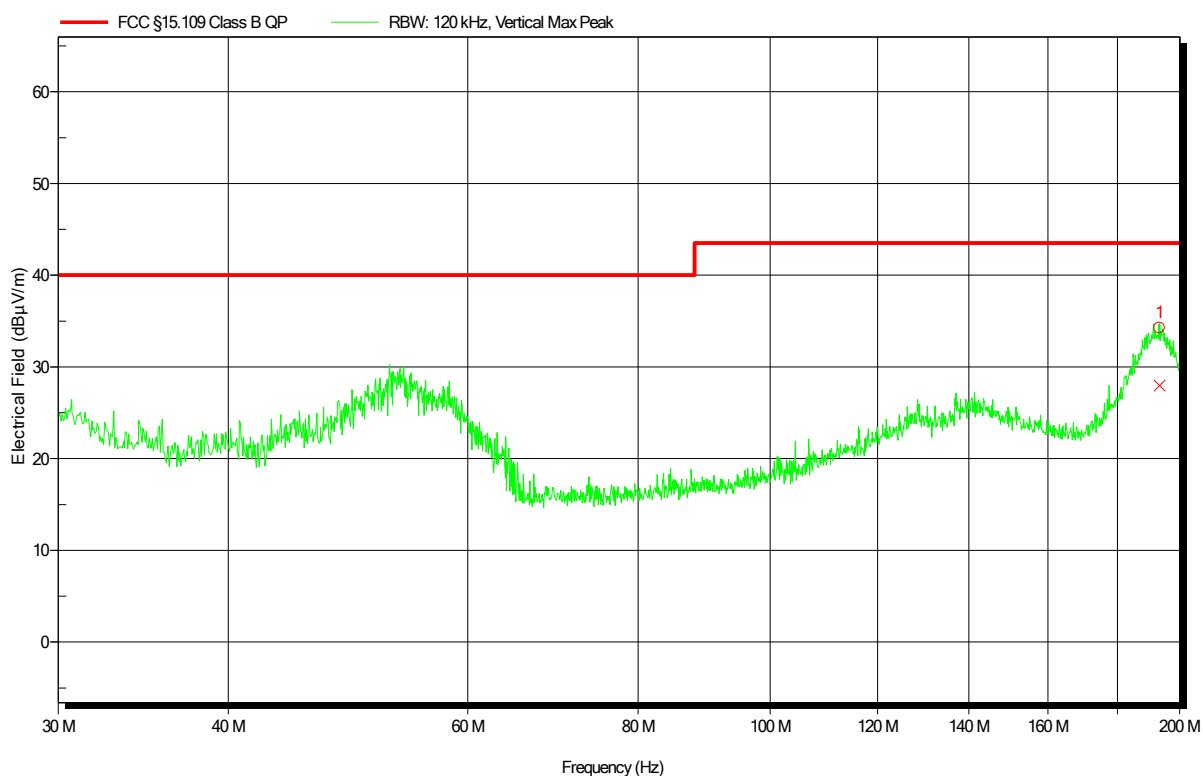
Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	9.833 GHz	58.58 dBµV/m	73.98 dBµV/m	-15.4 dB	Pass	0 Degree	1 m
2	10.869 GHz	59.82 dBµV/m	73.98 dBµV/m	-14.16 dB	Pass	0 Degree	1 m
3	11.525 GHz	59.75 dBµV/m	73.98 dBµV/m	-14.23 dB	Pass	0 Degree	1 m
4	12.165 GHz	59.69 dBµV/m	73.98 dBµV/m	-14.29 dB	Pass	0 Degree	1 m
5	12.893 GHz	60.03 dBµV/m	73.98 dBµV/m	-13.95 dB	Pass	0 Degree	1 m

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height
1	9.833 GHz	46.26 dBµV/m	53.98 dBµV/m	-7.72 dB	Pass	0 Degree	1 m
2	10.869 GHz	48.08 dBµV/m	53.98 dBµV/m	-5.9 dB	Pass	0 Degree	1 m
3	11.525 GHz	48.47 dBµV/m	53.98 dBµV/m	-5.51 dB	Pass	0 Degree	1 m
4	12.165 GHz	47.19 dBµV/m	53.98 dBµV/m	-6.79 dB	Pass	0 Degree	1 m
5	12.893 GHz	47.77 dBµV/m	53.98 dBµV/m	-6.21 dB	Pass	0 Degree	1 m

Radiated emissions according to FCC part 15B

Project Number: G0M-2006-9064
 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 23°C
 power input: 36 V DC via internal battery
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement Distance: 3m
 Mode: 1

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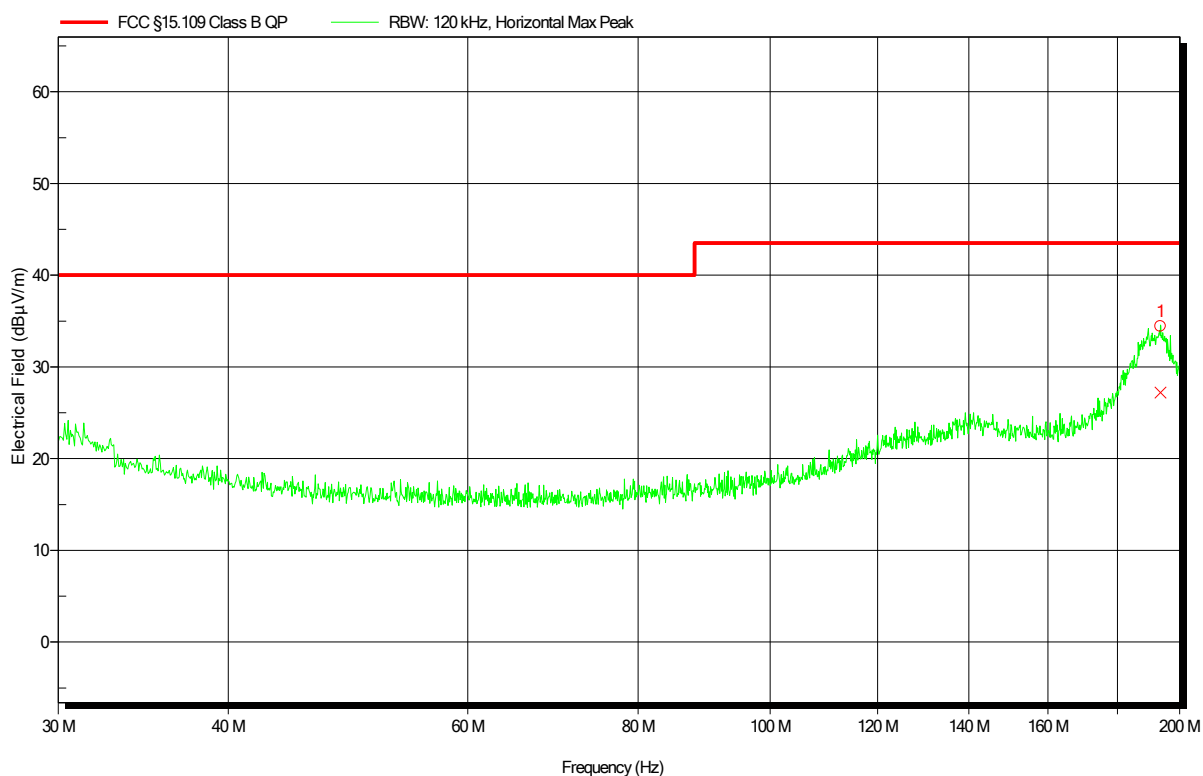


Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	193.26 MHz	27.96 dBµV/m	43.52 dBµV/m	-15.56 dB	Pass	180 Degree	1 m

Radiated emissions according to FCC part 15B

Project Number: G0M-2006-9064
 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 23°C
 power input: 36 V DC via internal battery
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement Distance: 3m
 Mode: 1

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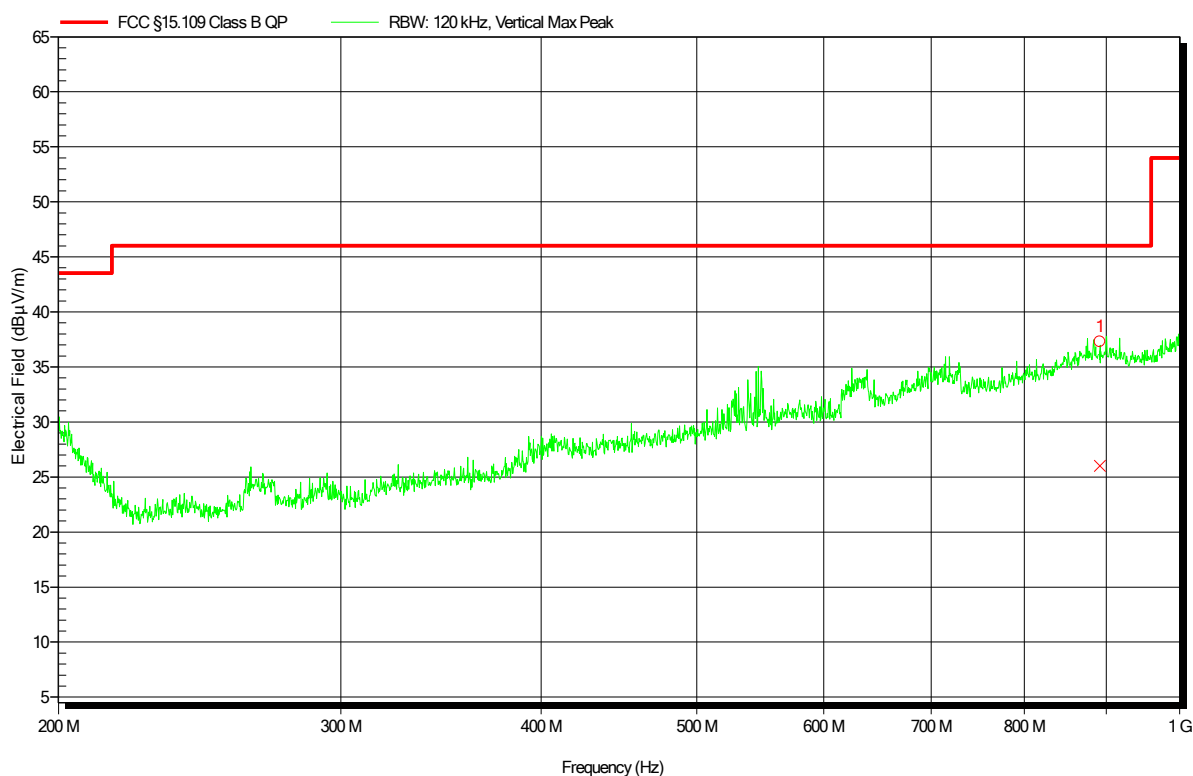


Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	193.56 MHz	27.2 dBµV/m	43.52 dBµV/m	-16.32 dB	Pass	70 Degree	1 m

Radiated emissions according to FCC part 15B

Project Number: G0M-2006-9064
 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 23°C
 power input: 36 V DC via internal battery
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement Distance: 3m
 Mode: 1

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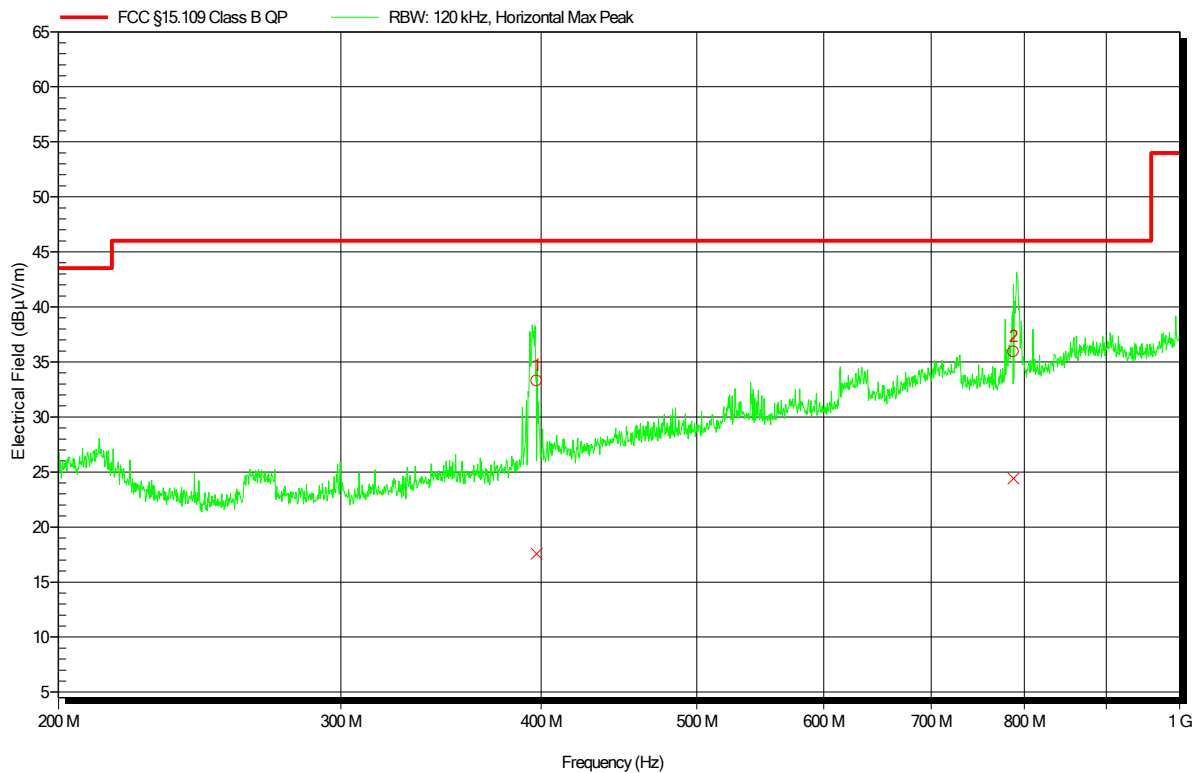


Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	891.8 MHz	26 dBµV/m	46.02 dBµV/m	-20.02 dB	Pass	160 Degree	1.1 m

Radiated emissions according to FCC part 15B

Project Number: G0M-2006-9064
 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 23°C
 power input: 36 V DC via internal battery
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement Distance: 3m
 Mode: 1

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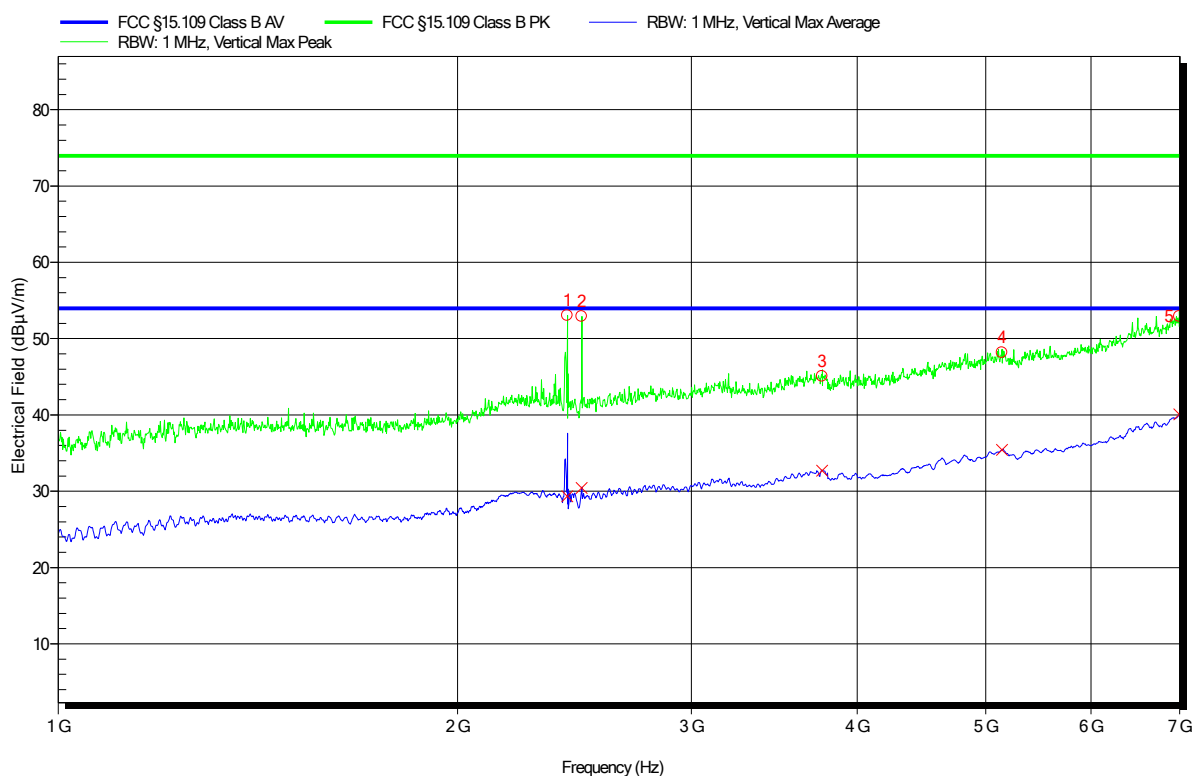


Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	397.352 MHz	17.58 dBμV/m	46.02 dBμV/m	-28.44 dB	Pass	180 Degree	1 m
2	787.652 MHz	24.4 dBμV/m	46.02 dBμV/m	-21.62 dB	Pass	180 Degree	1 m

Radiated emissions according to FCC part 15B

Project Number: G0M-2006-9064
 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 23°C
 power input: 36 V DC via internal battery
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement Distance: 3m
 Mode: 1

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Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	2.419 GHz						
2	2.48 GHz						
3	3.764 GHz	45.05 dBμV/m	73.98 dBμV/m	-28.93 dB	Pass	0 Degree	1 m
4	5.143 GHz	48.15 dBμV/m	73.98 dBμV/m	-25.83 dB	Pass	0 Degree	1 m
5	6.995 GHz	52.93 dBμV/m	73.98 dBμV/m	-21.05 dB	Pass	0 Degree	1 m
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height
1	2.419 GHz						
2	2.48 GHz						
3	3.764 GHz	32.69 dBμV/m	53.98 dBμV/m	-21.29 dB	Pass	0 Degree	1 m
4	5.143 GHz	35.41 dBμV/m	53.98 dBμV/m	-18.57 dB	Pass	0 Degree	1 m
5	6.995 GHz	40.09 dBμV/m	53.98 dBμV/m	-13.89 dB	Pass	0 Degree	1 m

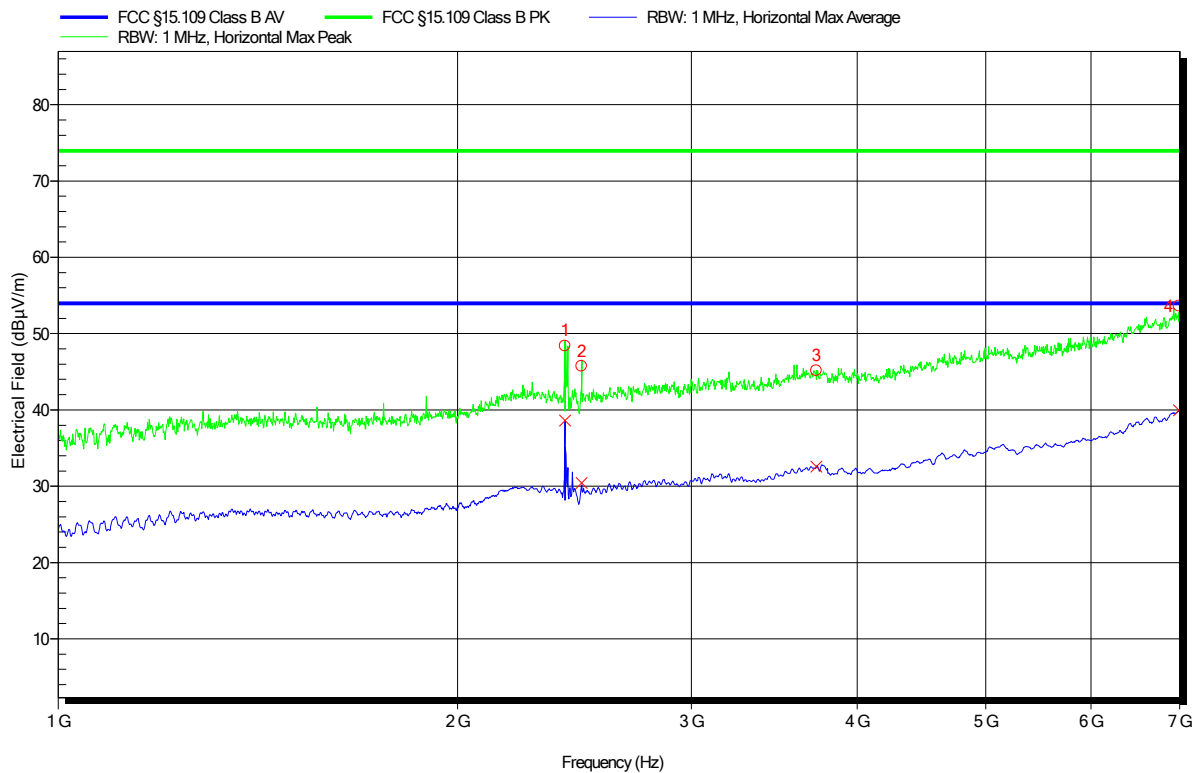
Test Report No.: G0M-2006-9064-EF0115B-V01

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

Radiated emissions according to FCC part 15B

Project Number: G0M-2006-9064
 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 23°C
 power input: 36 V DC via internal battery
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m
 Mode: 1

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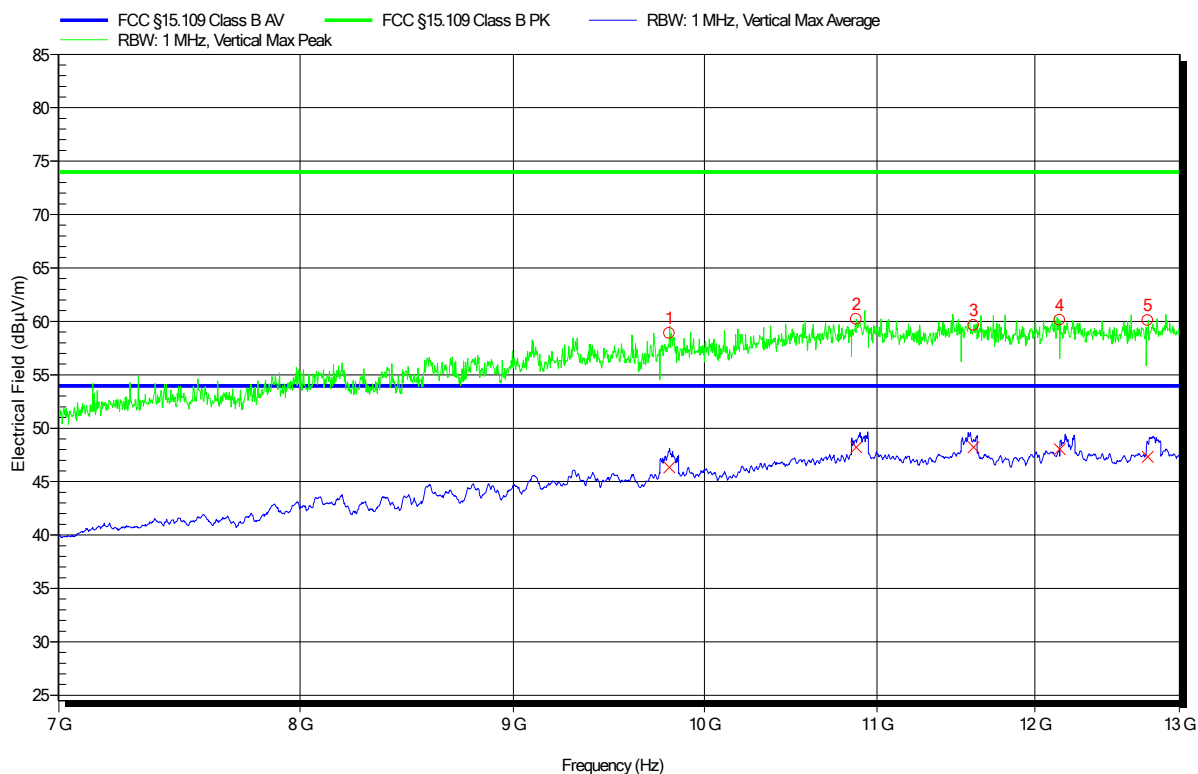


Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	2.409 GHz				BLE-Carrier		
2	2.48 GHz						
3	3.727 GHz	45.15 dBµV/m	73.98 dBµV/m	-28.83 dB	Pass	0 Degree	1 m
4	6.989 GHz	53.62 dBµV/m	73.98 dBµV/m	-20.36 dB	Pass	0 Degree	1 m
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height
1	2.409 GHz				BLE-Carrier		
2	2.48 GHz						
3	3.727 GHz	32.57 dBµV/m	53.98 dBµV/m	-21.41 dB	Pass	0 Degree	1 m
4	6.989 GHz	39.95 dBµV/m	53.98 dBµV/m	-14.03 dB	Pass	0 Degree	1 m

Radiated emissions according to FCC part 15B

Project Number: G0M-2006-9064
 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 24°C
 power input: 36 V DC via internal battery
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement Distance: 3m
 Mode: 1

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Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	9.809 GHz	58.88 dBμV/m	73.98 dBμV/m	-15.1 dB	Pass	0 Degree	1 m
2	10.874 GHz	60.19 dBμV/m	73.98 dBμV/m	-13.79 dB	Pass	0 Degree	1 m
3	11.602 GHz	59.64 dBμV/m	73.98 dBμV/m	-14.34 dB	Pass	0 Degree	1 m
4	12.167 GHz	60.11 dBμV/m	73.98 dBμV/m	-13.87 dB	Pass	0 Degree	1 m
5	12.773 GHz	60.1 dBμV/m	73.98 dBμV/m	-13.88 dB	Pass	0 Degree	1 m

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height
1	9.809 GHz	46.32 dBμV/m	53.98 dBμV/m	-7.66 dB	Pass	0 Degree	1 m
2	10.874 GHz	48.23 dBμV/m	53.98 dBμV/m	-5.75 dB	Pass	0 Degree	1 m
3	11.602 GHz	48.21 dBμV/m	53.98 dBμV/m	-5.77 dB	Pass	0 Degree	1 m
4	12.167 GHz	48.04 dBμV/m	53.98 dBμV/m	-5.94 dB	Pass	0 Degree	1 m
5	12.773 GHz	47.33 dBμV/m	53.98 dBμV/m	-6.65 dB	Pass	0 Degree	1 m

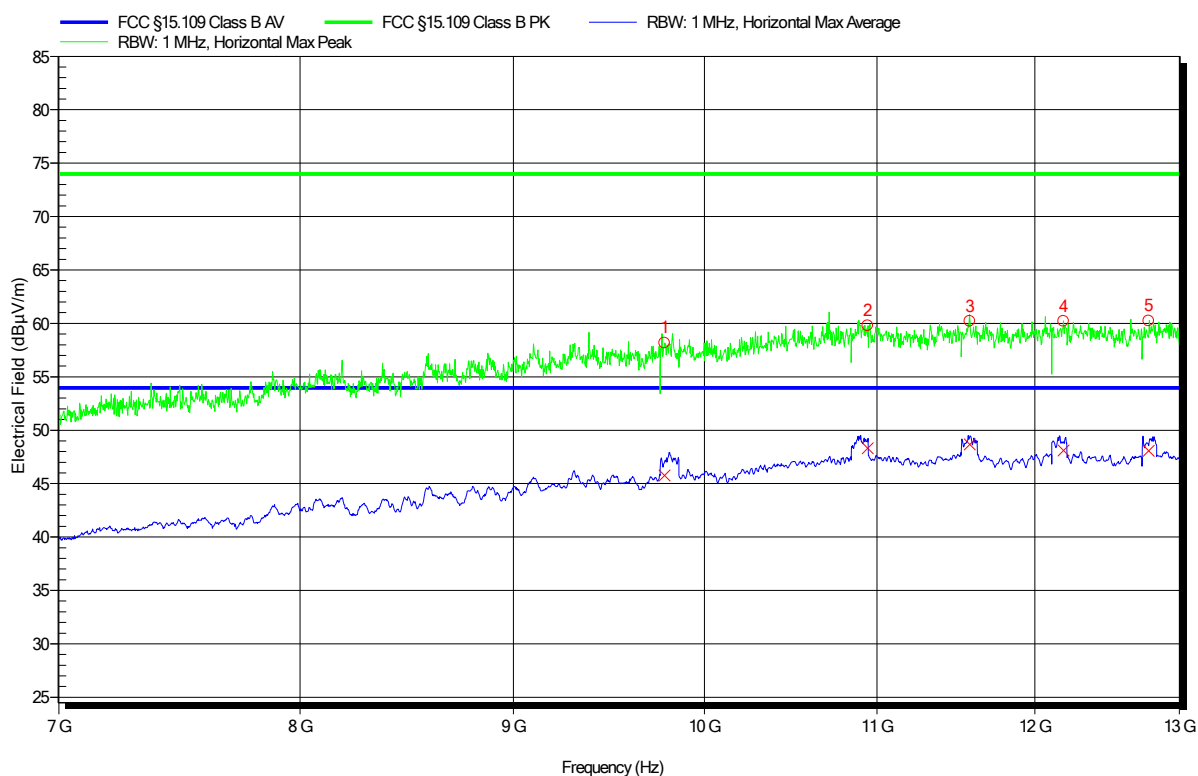
Test Report No.: G0M-2006-9064-EF0115B-V01

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

Radiated emissions according to FCC part 15B

Project Number: G0M-2006-9064
 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 24°C
 power input: 36 V DC via internal battery
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement Distance: 3m
 Mode: 1

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Peak Number	Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Angle	Height
1	9.783 GHz	58.17 dBμV/m	73.98 dBμV/m	-15.81 dB	Pass	0 Degree	1 m
2	10.943 GHz	59.78 dBμV/m	73.98 dBμV/m	-14.2 dB	Pass	0 Degree	1 m
3	11.576 GHz	60.21 dBμV/m	73.98 dBμV/m	-13.77 dB	Pass	0 Degree	1 m
4	12.191 GHz	60.21 dBμV/m	73.98 dBμV/m	-13.76 dB	Pass	0 Degree	1 m
5	12.78 GHz	60.25 dBμV/m	73.98 dBμV/m	-13.73 dB	Pass	0 Degree	1 m
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height
1	9.783 GHz	45.75 dBμV/m	53.98 dBμV/m	-8.23 dB	Pass	0 Degree	1 m
2	10.943 GHz	48.29 dBμV/m	53.98 dBμV/m	-5.69 dB	Pass	0 Degree	1 m
3	11.576 GHz	48.67 dBμV/m	53.98 dBμV/m	-5.31 dB	Pass	0 Degree	1 m
4	12.191 GHz	48.1 dBμV/m	53.98 dBμV/m	-5.87 dB	Pass	0 Degree	1 m
5	12.78 GHz	48.07 dBμV/m	53.98 dBμV/m	-5.91 dB	Pass	0 Degree	1 m

Test Report No.: G0M-2006-9064-EF0115B-V01

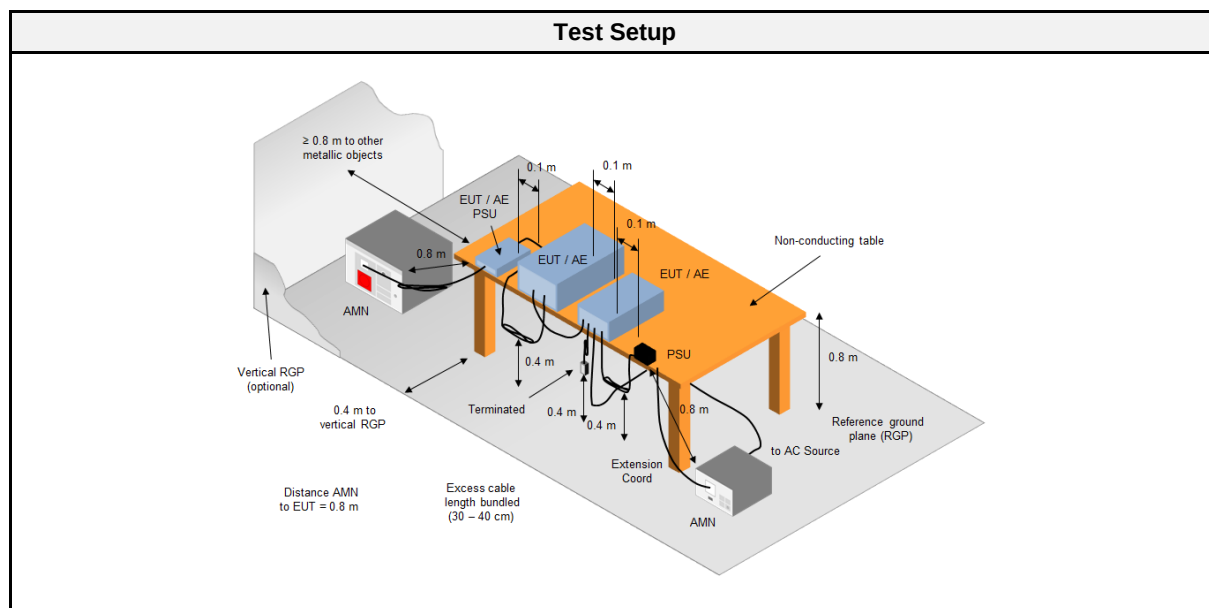
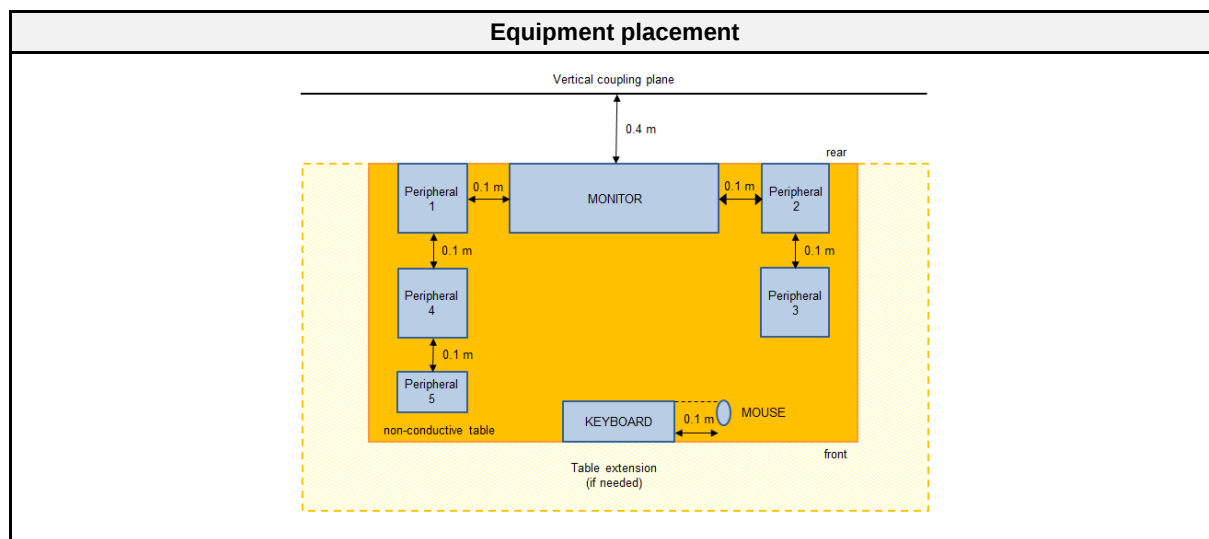
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

2.2 Test Conditions and Results - Conducted emissions acc. to ANSI C63.4

2.2.1 Information

Test Information	
Reference	FCC 15.107, ICES-003, 6.1
Reference method	ANSI C63.4:2014+A1:2017 Section 12
Measurement range	150 kHz to 30 MHz
Equipment class	Class B
Equipment type	Table top
Temperature [°C]	21 - 25
Humidity [%]	44 - 46
Operator	Stephan Liebich
Date	2020-06-22 and 2020-06-23

2.2.2 Setup



2.2.3 Equipment

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

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
AMN	Schwarzbeck	NSLK 8127	EF01592	2019-10	2020-10
Pulse Limiter	R&S	ESH3-Z2	EF01063	2019-07	2020-07
EMI Test Receiver	Rohde & Schwarz Vertriebs GmbH	ESCS 30	EF00295	2019-07	2020-07
Climatic Sensor	Embedded Data Systems, LLC.	2800100000254 17E	EF01054	2020-03	2021-03

2.2.4 Procedure

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

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

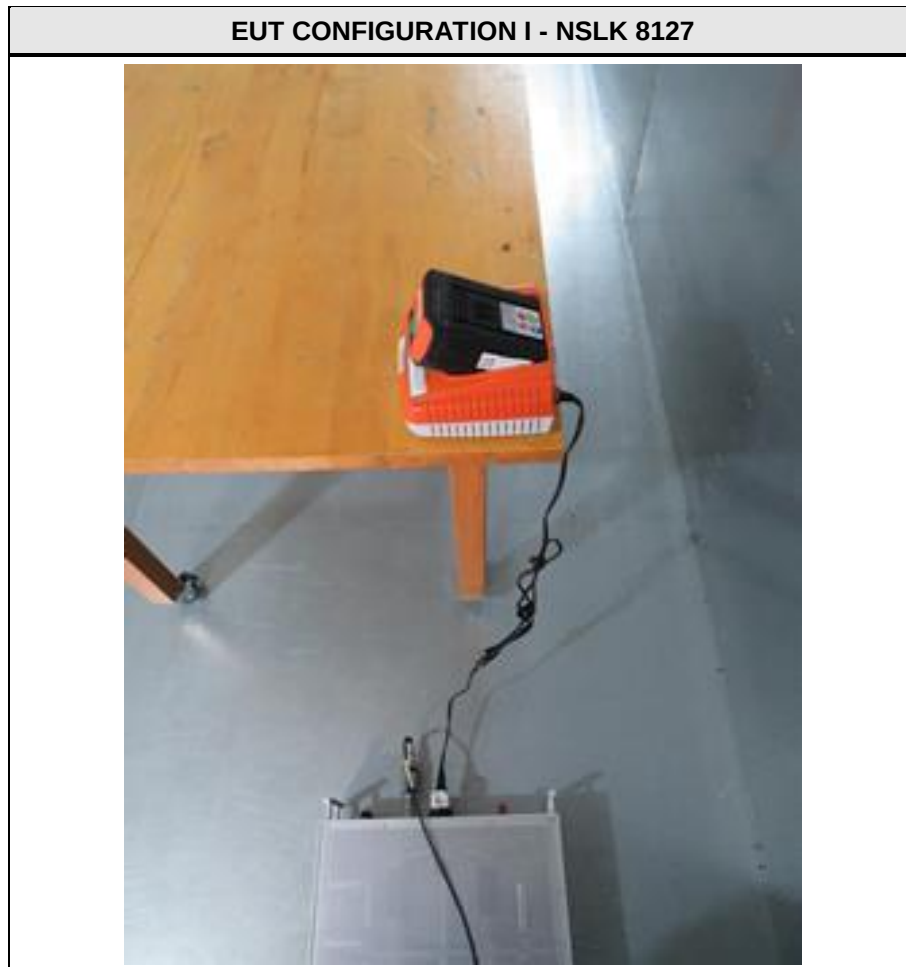
2.2.5 Limits

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

2.2.6 Results

AC power line conducted emissions					
Port	Coupling	Operational mode	EUT Configuration	Verdict	Remark
Mains	AMN	1	1	PASS	-

2.2.7 Setup Photos

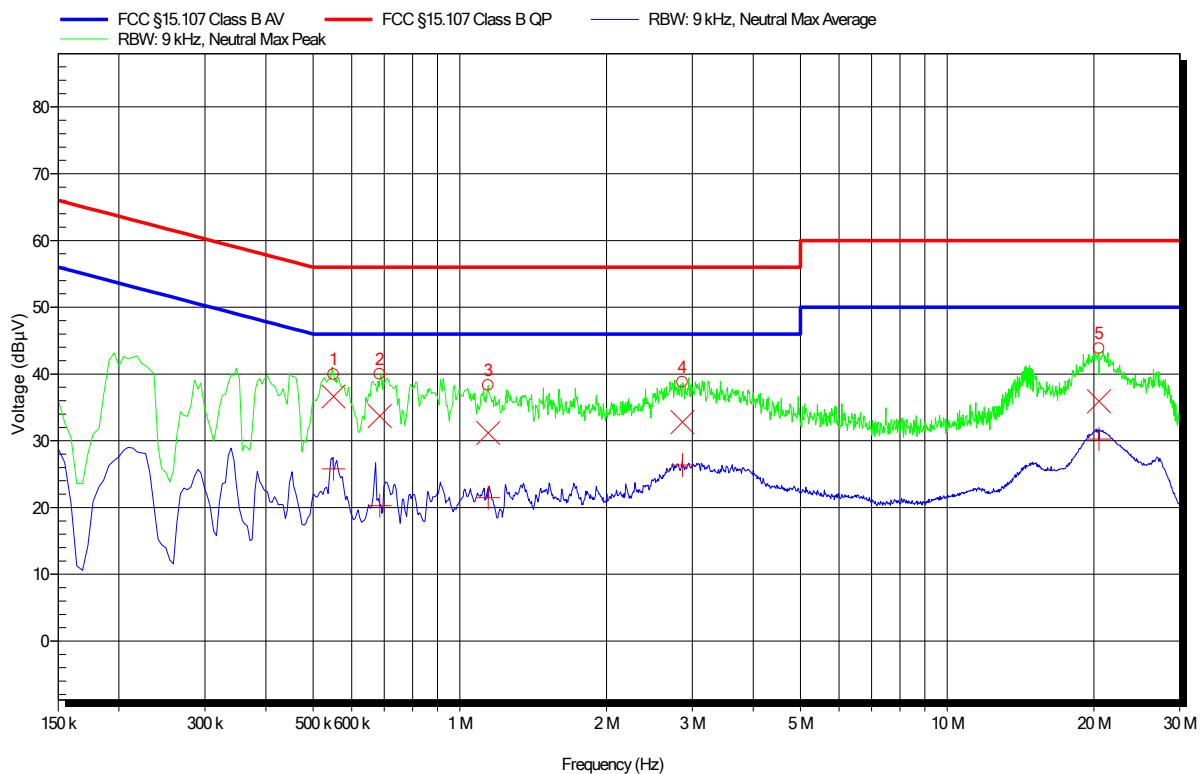


2.2.8 Records

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

Project Number: G0M-2006-9064
 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809 + 29808
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-22
 Operating Conditions: ambient temperature: 25°C
 power input: 36 V DC via Battery Charger by 120 V / 60 Hz
 LISN: Schwarzbeck NSLK 8127 RC N
 Mode: 1
 Applied to Port: Mains

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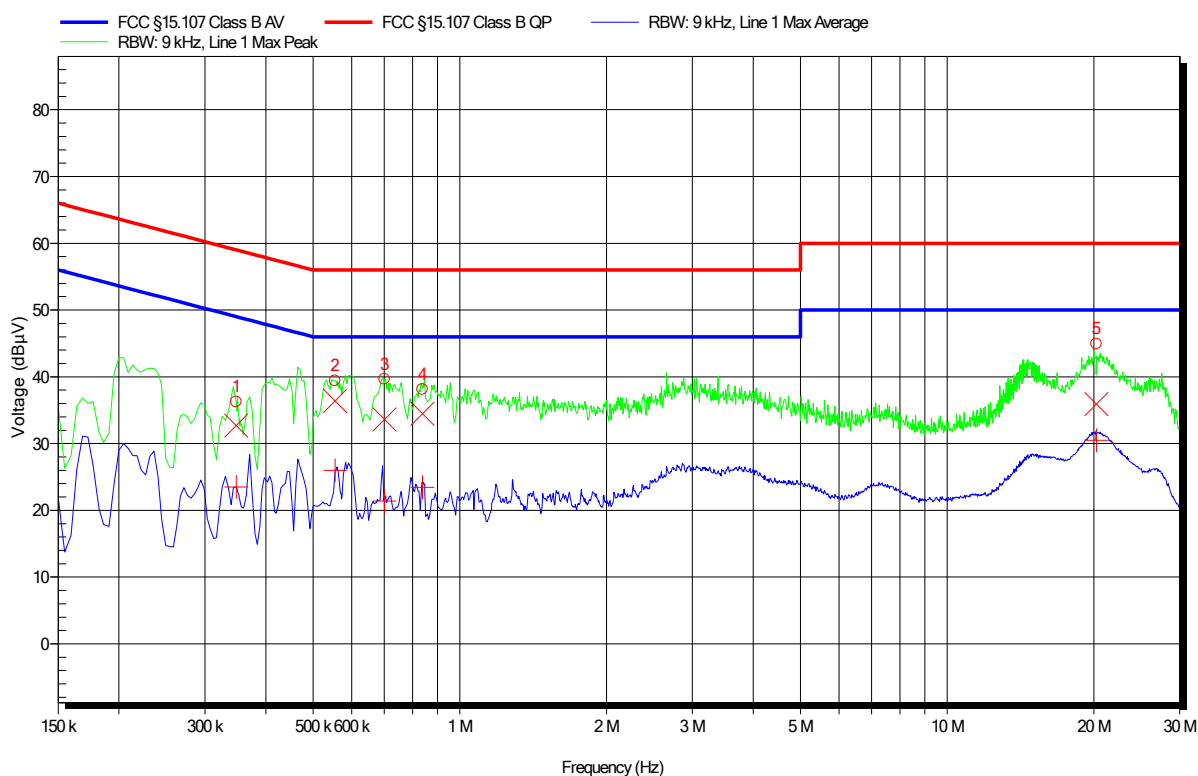


Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	550.5 kHz	36.64 dBµV	56 dBµV	-19.36 dB	Pass	Neutral
2	685.5 kHz	33.72 dBµV	56 dBµV	-22.28 dB	Pass	Neutral
3	1.143 MHz	31.15 dBµV	56 dBµV	-24.85 dB	Pass	Neutral
4	2.864 MHz	32.79 dBµV	56 dBµV	-23.21 dB	Pass	Neutral
5	20.49 MHz	35.92 dBµV	60 dBµV	-24.08 dB	Pass	Neutral
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	550.5 kHz	25.79 dBµV	46 dBµV	-20.21 dB	Pass	Neutral
2	685.5 kHz	20.27 dBµV	46 dBµV	-25.73 dB	Pass	Neutral
3	1.143 MHz	21.47 dBµV	46 dBµV	-24.53 dB	Pass	Neutral
4	2.864 MHz	26.37 dBµV	46 dBµV	-19.63 dB	Pass	Neutral
5	20.49 MHz	30.25 dBµV	50 dBµV	-19.75 dB	Pass	Neutral

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

Project Number: G0M-2006-9064
 Applicant: Andreas Stihl AG & Co. KG
 Model Description: battery pack with Bluetooth-Modul
 Model: AP 500 S
 Test Sample ID: 29809 + 29808
 Test Site: Eurofins Product Service Germany
 Operator: Mr. Liebich
 Test Date: 2020-06-23
 Operating Conditions: ambient temperature: 21°C
 power input: 36 V DC via Battery Charger by 120 V / 60 Hz
 LISN: Schwarzbeck NSLK 8127 RC L
 Mode: 1
 Applied to Port: Mains

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Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	348 kHz	32.68 dBμV	59.01 dBμV	-26.33 dB	Pass	Line 1
2	555 kHz	36.39 dBμV	56 dBμV	-19.61 dB	Pass	Line 1
3	700.8 kHz	33.6 dBμV	56 dBμV	-22.4 dB	Pass	Line 1
4	838.05 kHz	34.49 dBμV	56 dBμV	-21.51 dB	Pass	Line 1
5	20.22 MHz	35.91 dBμV	60 dBμV	-24.09 dB	Pass	Line 1
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	348 kHz	23.47 dBμV	49.01 dBμV	-25.54 dB	Pass	Line 1
2	555 kHz	25.99 dBμV	46 dBμV	-20.01 dB	Pass	Line 1
3	700.8 kHz	21.37 dBμV	46 dBμV	-24.63 dB	Pass	Line 1
4	838.05 kHz	23.43 dBμV	46 dBμV	-22.57 dB	Pass	Line 1
5	20.22 MHz	30.48 dBμV	50 dBμV	-19.52 dB	Pass	Line 1

End of Report