

EMC TEST REPORT FCC 47 CFR Part 15B, ISED ICES-003 Issue 6	
Report Reference No	G0M-1903-8127-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	peiker Consumer Electronics Evolution GmbH
Address	Gartenstraße 25 61352 Bad Homburg GERMANY
Test Specification	
Standard	47 CFR Part 15 Subpart B ISED ICES-003 Issue 6 ANSI C63.4:2014
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	Audio Communication Device
Model(s)	C3
Additional Model(s)	None
Brand Name(s)	None
Hardware Version(s)	1.00
Software Version(s)	1.00
FCC-ID	2ANUYC3
IC	n/a
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	2019-03-25	
Report:		
Compiled by	Matthias Handrik	
Tested by (+ signature) (Responsible for Test)	Matthias Handrik	
Approved by (+ signature) (Deputy Head of Lab)	Jens Marquardt	
Date of Issue	2019-08-29	
Total number of pages	32	
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	2019-08-29	Initial Release	

REPORT INDEX

1	Equipment (Test Item) Under Test.....	6
1.1	Equipment Ports.....	7
1.2	Equipment Photos - Internal.....	8
1.3	Equipment Photos - External.....	10
1.4	Support Equipment.....	12
1.5	Operational Modes.....	13
1.6	EUT Configuration.....	14
1.7	Sample emission level calculation.....	15
2	Result Summary.....	16
2.1	Test Conditions and Results - Radiated emissions acc. to ANSI C63.4.....	17
2.2	Test Conditions and Results - Conducted emissions acc. to ANSI C63.4.....	27

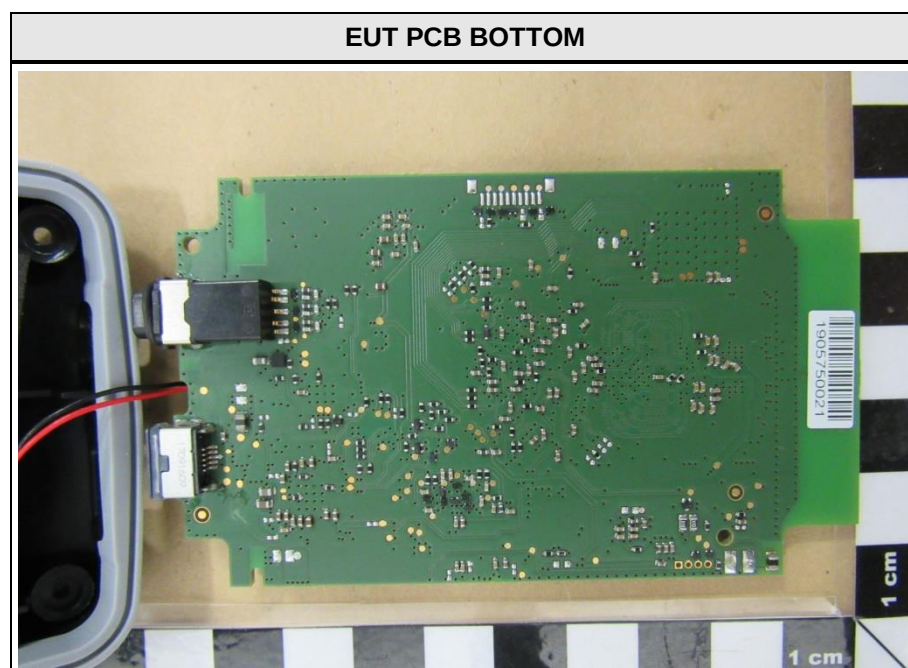
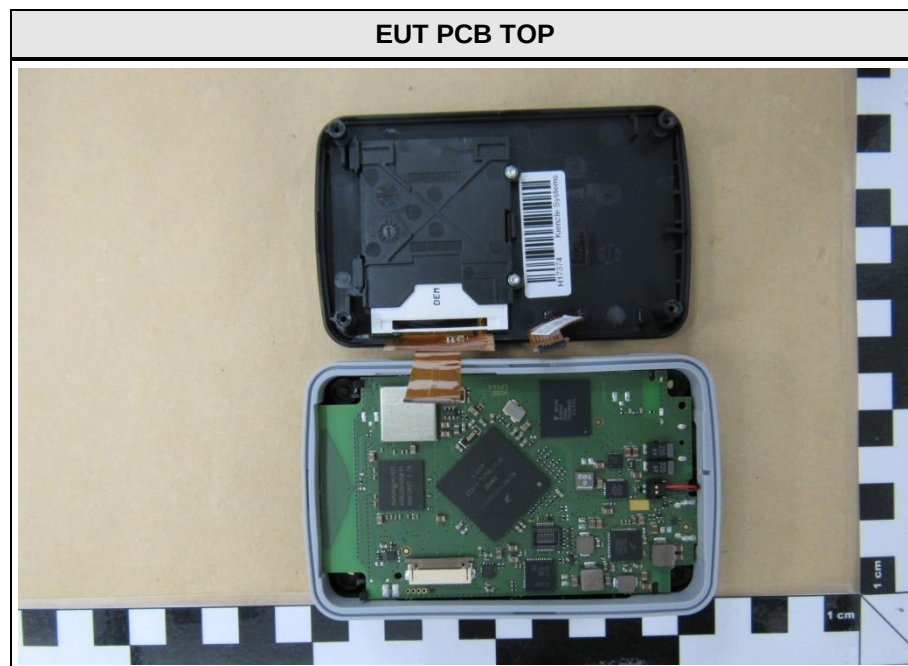
1 Equipment (Test Item) Under Test

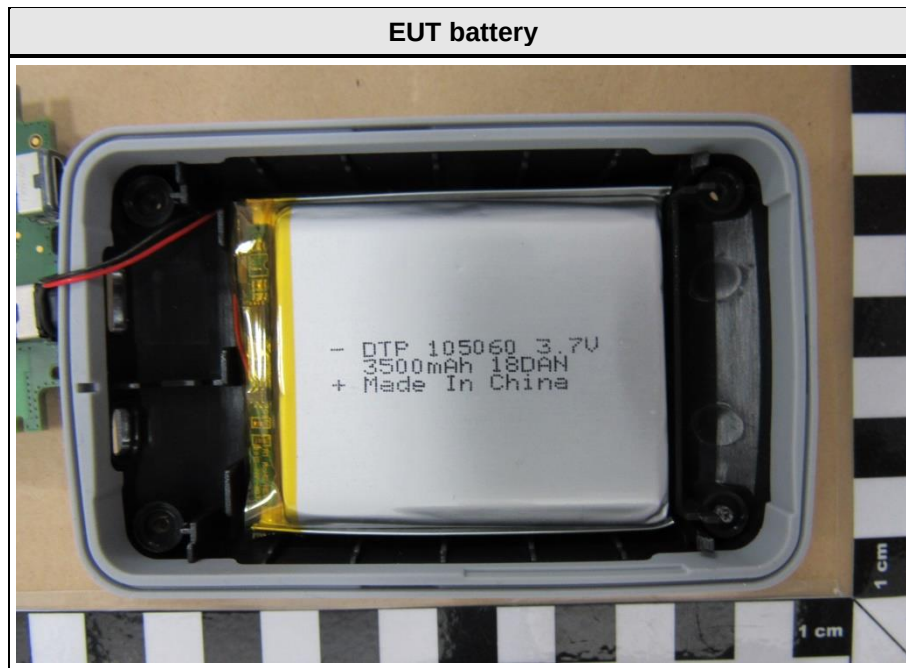
Description	Audio Communication Device	
Model	C3	
Additional Model(s)	None	
Brand Name(s)	None	
Serial Number(s)	991018	
Hardware Version(s)	1.00	
Software Version(s)	1.00	
FCC-ID	2ANUYC3	
IC	n/a	
Class	Class B	
Equipment type	Table top	
Highest internal frequency [MHz]	2500	
Radio Module	Type	Bluetooth / WLAN module
	Model	WL1835MOD
	Manufacturer	Texas Instruments
	FCC-ID	Z64-WI18SBMOD
	IC	451I-WL18SBMOD
Supply Voltage	V _{NOM}	3.7V DC (Lithium battery)
AC/DC-Adaptor	none	
Manufacturer	peiker Consumer Electronics Evolution GmbH Gartenstraße 25 61352 Bad Homburg GERMANY	

1.1 Equipment Ports

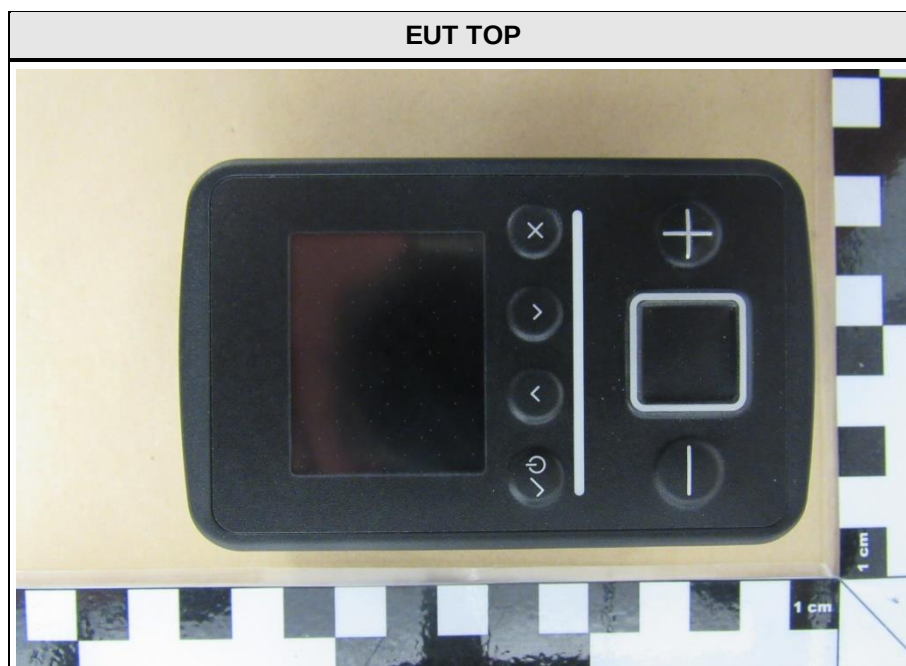
Name	Type	Attributes	Comment
USB	DC;IO	Count: 1 Direction: In Service only: No	
Audio Jack	IO	Count: 1 Direction: In Service only: No	
Description:			
AC	AC mains power input/output port		
DC	DC power input/output port		
IO	Input/Output port		
TP	Telecommunication port		
NE	Non-electrical port		

1.2 Equipment Photos - Internal





1.3 Equipment Photos - External



EUT BACK



1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	Laptop	Lenovo	Thinkpad X250	
AE	AC/DC adaptor	Lenovo	ADLX65NCC3A	
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
Comment:				

1.5 Operational Modes

Mode #	Description
1	EUT powered up. WLAN connection to second EUT. Bluetooth connection to laptop
2	EUT powered up. WLAN connection to second EUT. USB connection to Laptop. Bluetooth connection to laptop
Comment:	

1.6 EUT Configuration

Configuration #	Description
1	EUT powered via internal battery. 2.4 GHz WLAN connection between two EUTs. Bluetooth connection with one EUT to Laptop. On laptop run MP3 file. Listen MP3 file via headset on EUTs
2	EUT connected via USB to laptop 2.4 GHz WLAN connection between two EUTs. Bluetooth connection with one EUT to Laptop. On laptop run MP3 file. Listen MP3 file via headset on EUTs
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, 8, 6.1	Radiated emissions	ANSI C63.4:2014	PASS	
FCC 15.107 ICES-003, 8, 6.2	AC power line conducted emissions	ANSI C63.4:2014	PASS	
Comment:				

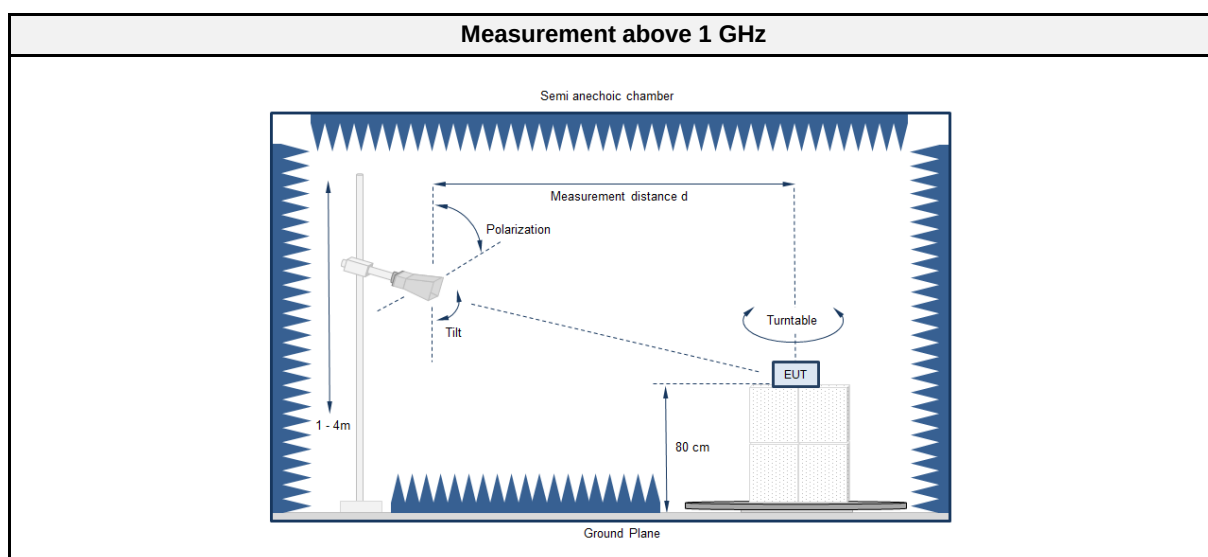
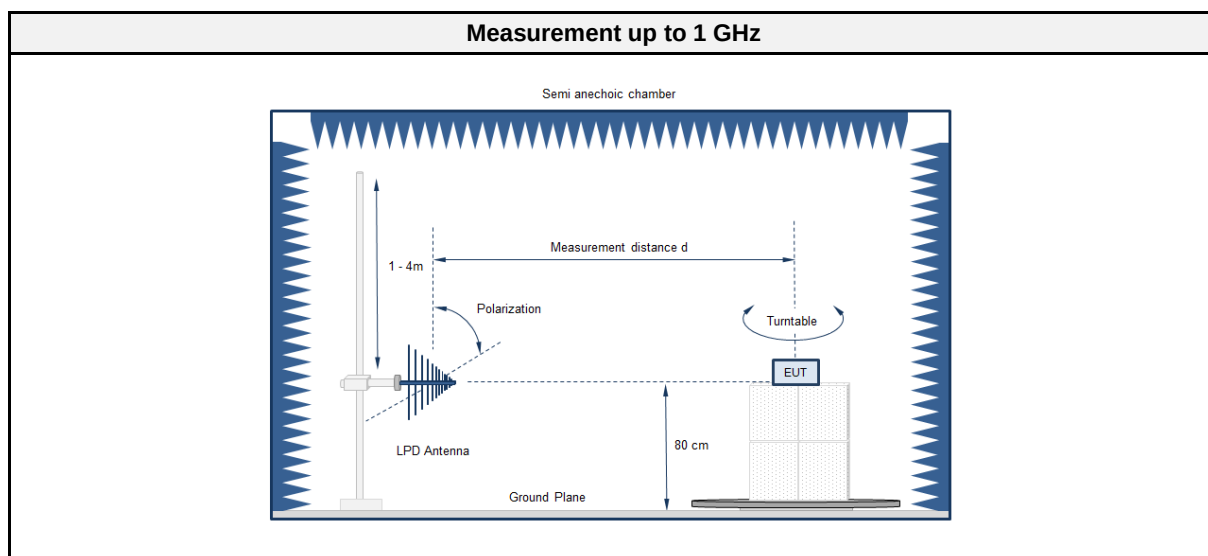
Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

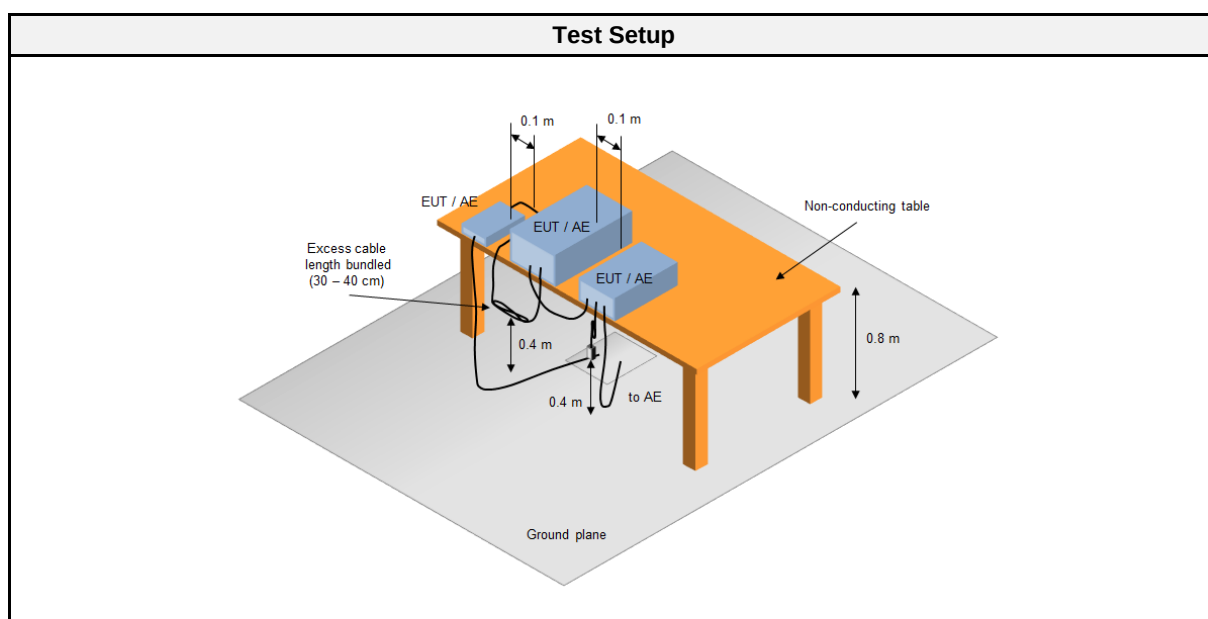
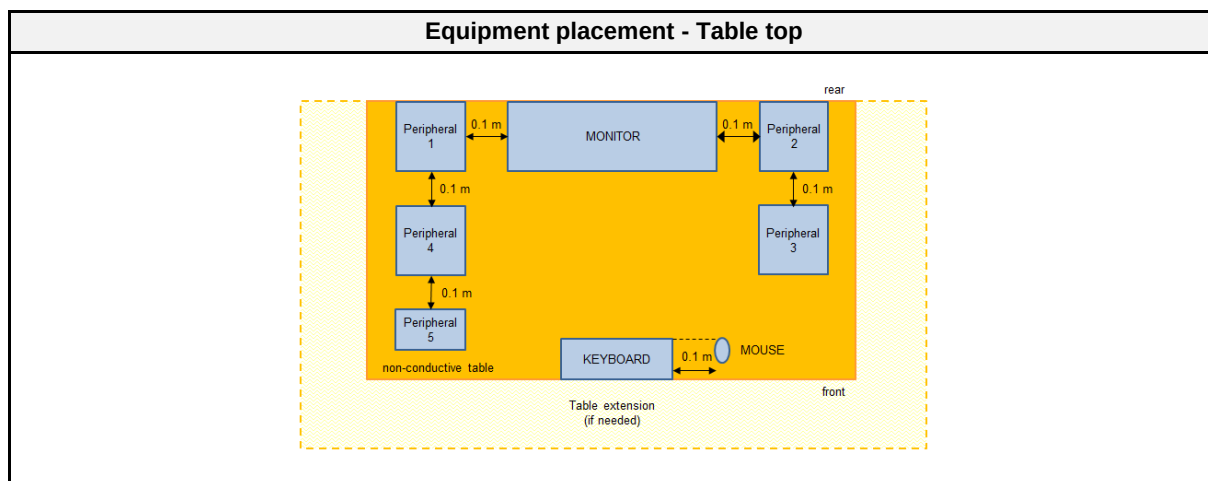
2.1 Test Conditions and Results - Radiated emissions acc. to ANSI C63.4

2.1.1 Information

Test Information	
Reference	FCC 15.109, ICES-003, 8, 6.1
Reference method	ANSI C63.4:2014 Section 8
Equipment class	Class B
Equipment type	Table top
Highest internal frequency [MHz]	2500
Measurement range	30 MHz to 12500 MHz
Temperature [°C]	22
Humidity [%]	43
Operator	Matthias Handrik
Date	2019-05-23

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	Keysight	N9038A-526/WXP	EF01070	2018-08	2019-08
Biconical Antenna	R&S	HK 116	EF00030	2019-04	2022-04
LPD Antenna	R&S	HL 223	EF00202	2018-03	2020-03
Horn Antenna	ETS-Lindgren	3117	EF00018	2016-09	2019-09

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

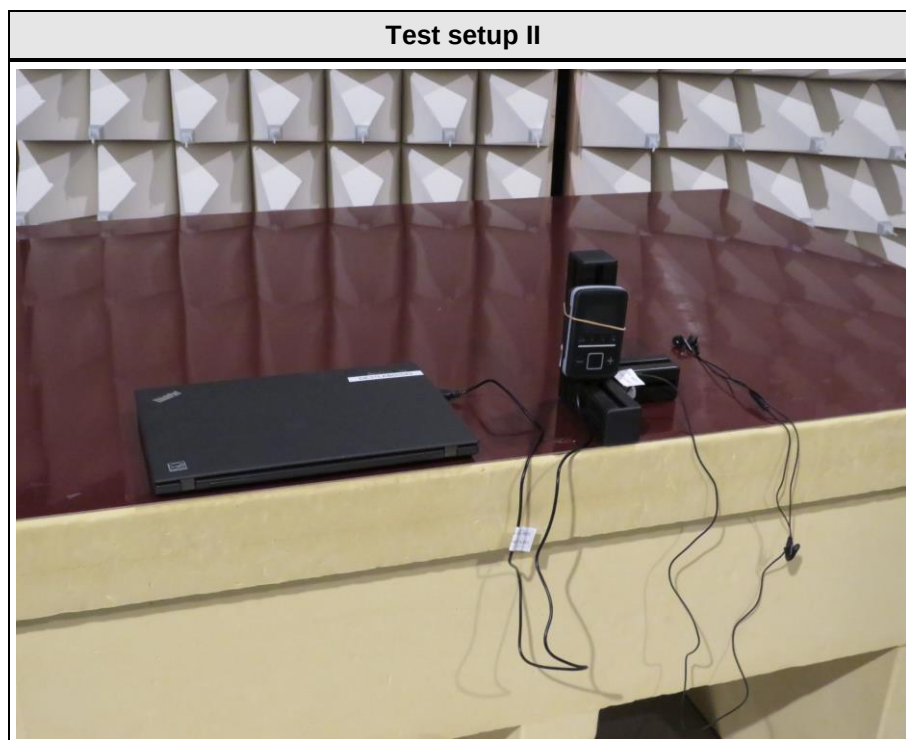
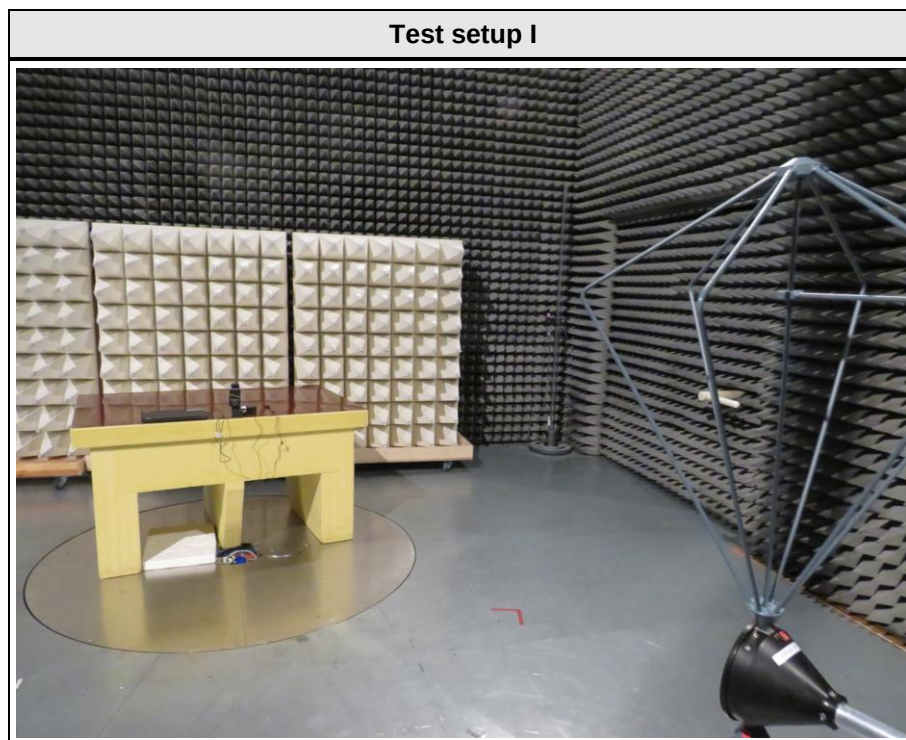
Class B @ 3 m		
Frequency [MHz]	Detector	Limit [dB μ V/m]
30 - 88	Quasi-peak	40
88 - 216	Quasi-peak	43.5
216 - 960	Quasi-peak	46
960 - 1000	Quasi-peak	54
> 1000	Peak	74
	Average	54

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
2	2	PASS	comment
Comment: worst case after short check via spectrum analyser.			

2.1.7 Setup Photos



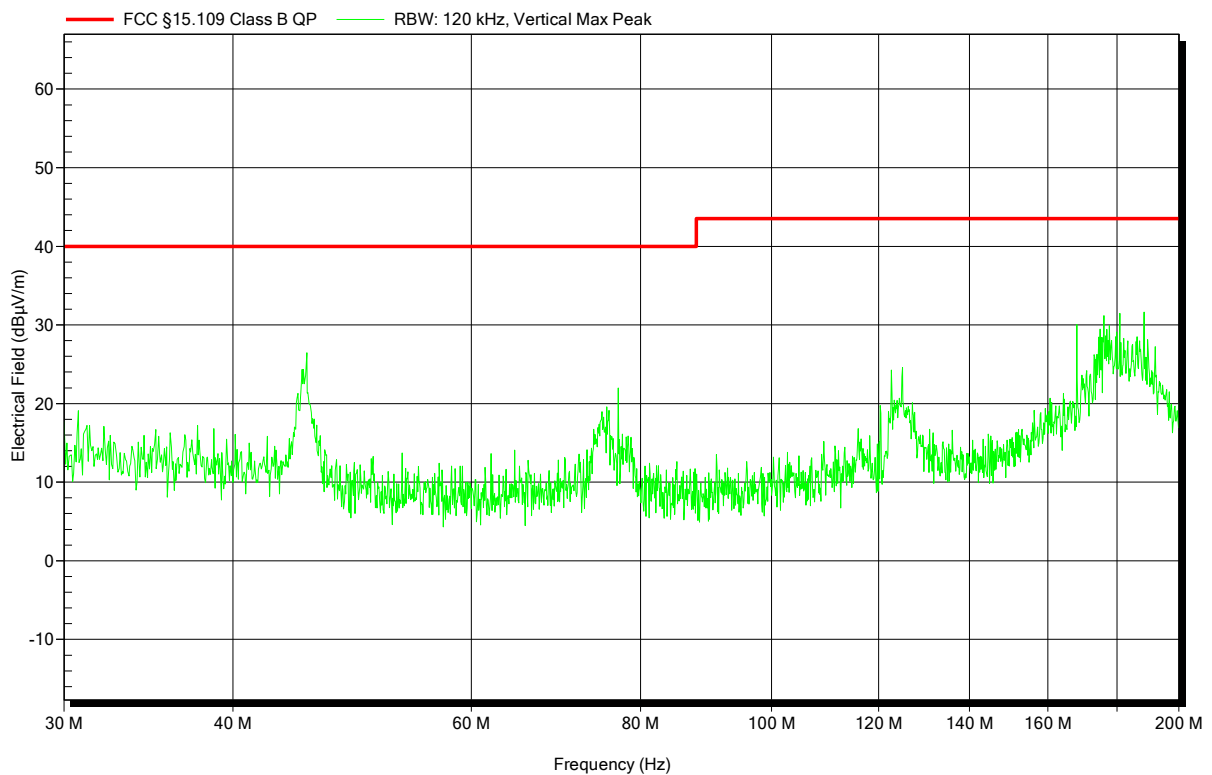
2.1.8 Records

Radiated emissions under normal conditions according to FCC part 15B

Project number: G0M-1903-8127

Applicant:	peiker Consumer Electronics Evolution GmbH
EUT Name:	Audio Communication Device
Model:	C3
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 21°C, Unom: USB via Laptop
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3m
Mode:	2
Test Date:	2019-05-23
Note:	

Index 119

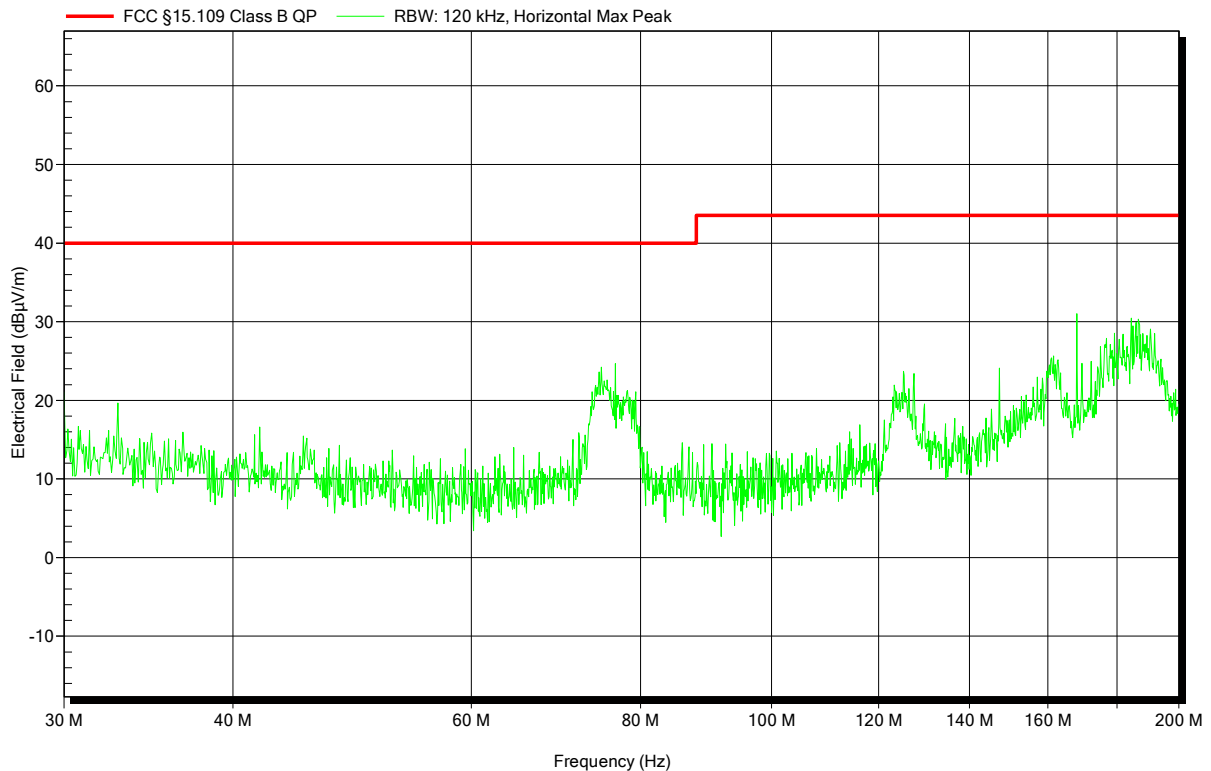


Radiated emissions under normal conditions according to FCC part 15B

Project number: G0M-1903-8127

Applicant: peiker Consumer Electronics Evolution GmbH
 EUT Name: Audio Communication Device
 Model: C3
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 21°C, Unom: USB via Laptop
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3m
 Mode: 2
 Test Date: 2019-05-23
 Note:

Index 118

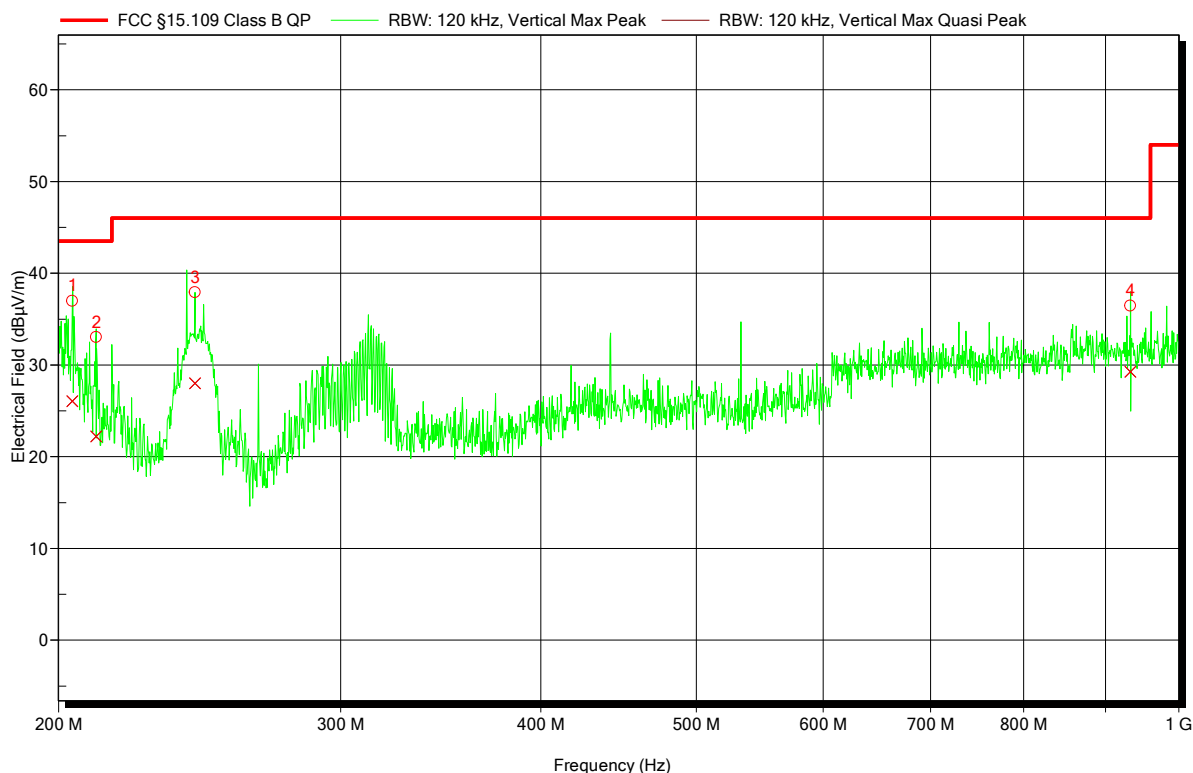


Radiated emissions under normal conditions according to FCC part 15B

Project number: G0M-1903-8127

Applicant: peiker Consumer Electronics Evolution GmbH
 EUT Name: Audio Communication Device
 Model: C3
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 21°C, Unom: USB via Laptop
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3m
 Mode: 2
 Test Date: 2019-05-23
 Note:

Index 112



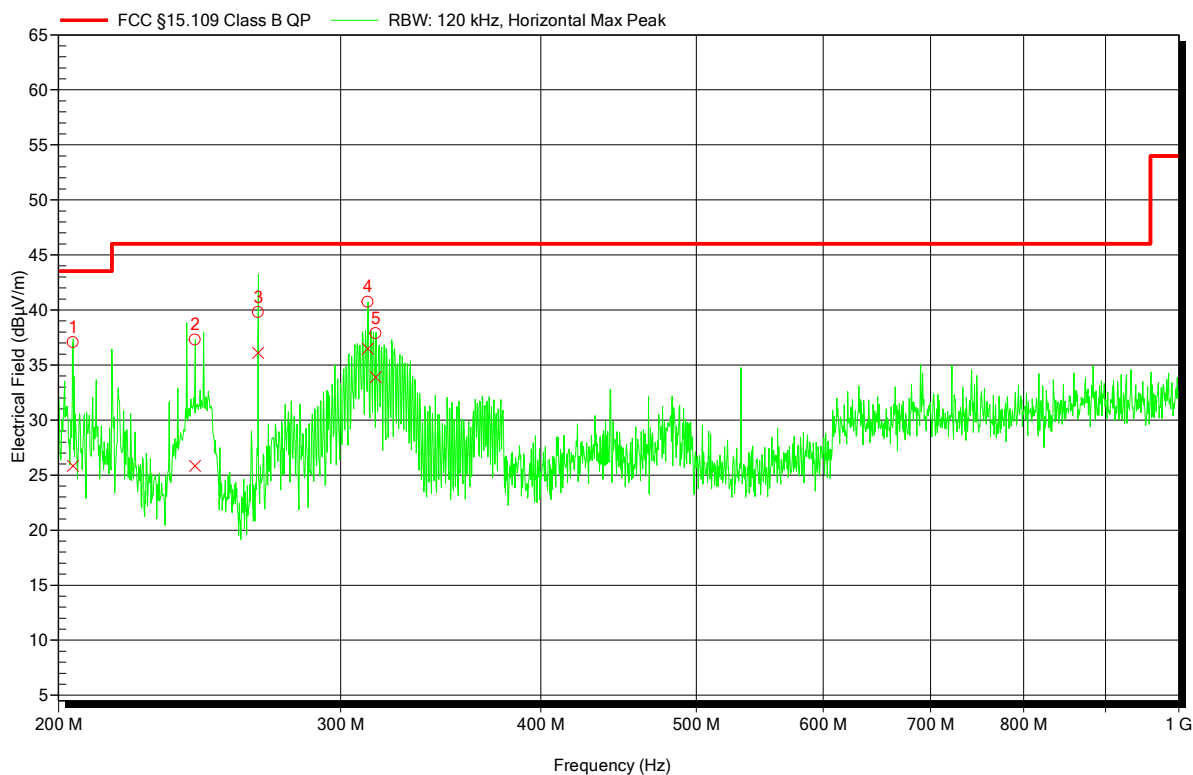
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	204.149 MHz	26.04 dBµV/m	43.52 dBµV/m	-17.48 dB	Pass	180 Degree	1 m
2	211.198 MHz	22.2 dBµV/m	43.52 dBµV/m	-21.32 dB	Pass	180 Degree	1 m
3	243.422 MHz	28 dBµV/m	46.02 dBµV/m	-18.02 dB	Pass	1800 Degree	1 m
4	932.705 MHz	29.25 dBµV/m	46.02 dBµV/m	-16.77 dB	Pass	0 Degree	1 m

Radiated emissions under normal conditions according to FCC part 15B

Project number: G0M-1903-8127

Applicant: peiker Consumer Electronics Evolution GmbH
 EUT Name: Audio Communication Device
 Model: C3
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 21°C, Unom: USB via Laptop
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3m
 Mode: 2
 Test Date: 2019-05-23
 Note:

Index 113



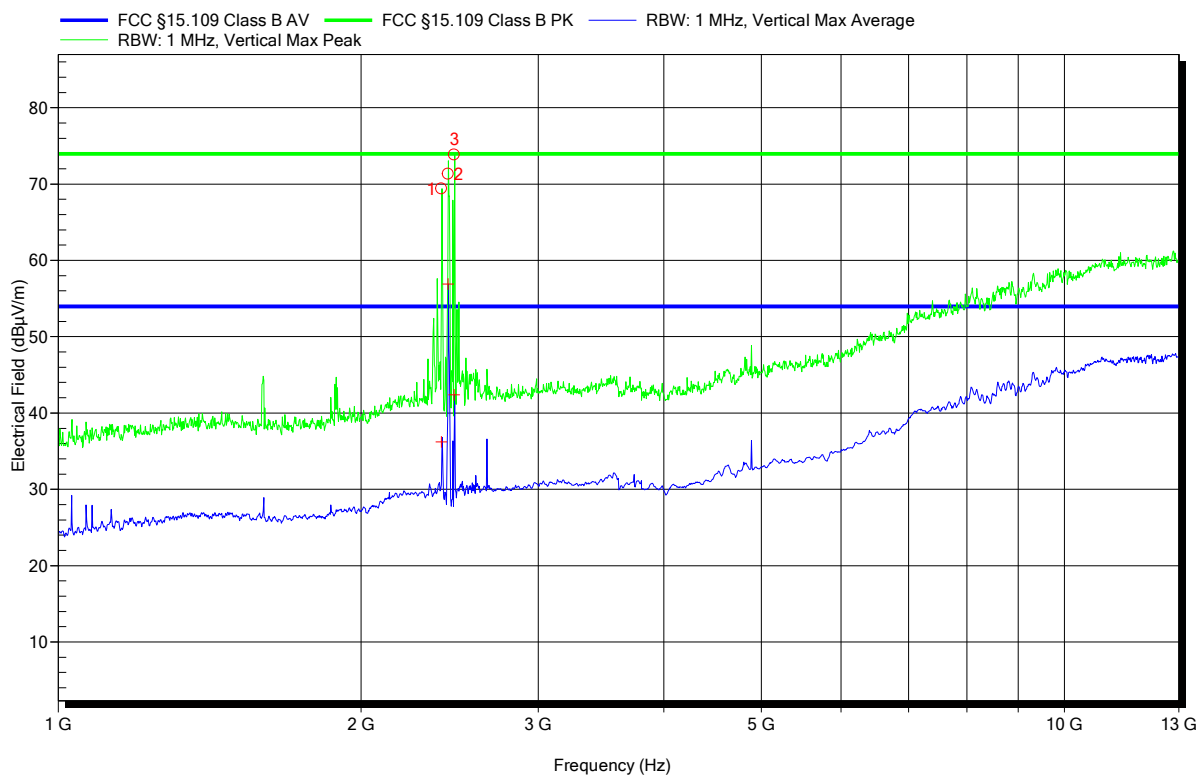
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	204.275 MHz	25.83 dBµV/m	43.52 dBµV/m	-17.7 dB	Pass	180 Degree	1 m
2	243.398 MHz	25.84 dBµV/m	46.02 dBµV/m	-20.18 dB	Pass	180 Degree	1 m
3	266.509 MHz	36.11 dBµV/m	46.02 dBµV/m	-9.91 dB	Pass	180 Degree	1 m
4	312.02 MHz	36.48 dBµV/m	46.02 dBµV/m	-9.54 dB	Pass	180 Degree	1 m
5	315.611 MHz	33.9 dBµV/m	46.02 dBµV/m	-12.12 dB	Pass	180 Degree	1 m

Radiated emissions under normal conditions according to FCC part 15B

Project number: G0M-1903-8127

Applicant: peiker Consumer Electronics Evolution GmbH
 EUT Name: Audio Communication Device
 Model: C3
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 21°C, Unom: USB via Laptop
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3m
 Mode: 2
 Test Date: 2019-05-23
 Note:

Index 109



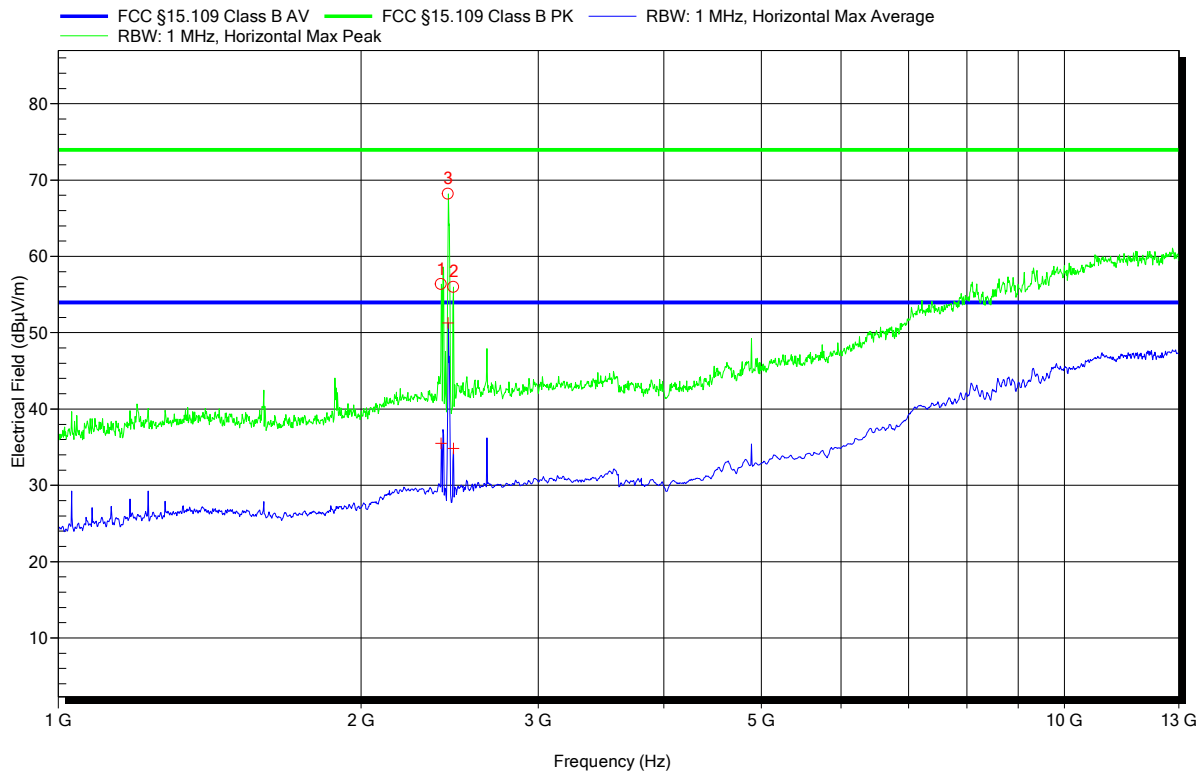
Peak Number	Frequency	Peak	Angle	Height
1	2.405 GHz			
2	2.441 GHz	BT/WLAN carrier		
3	2.475 GHz			

Radiated emissions under normal conditions according to FCC part 15B

Project number: G0M-1903-8127

Applicant: peiker Consumer Electronics Evolution GmbH
 EUT Name: Audio Communication Device
 Model: C3
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 21°C, Unom: USB via Laptop
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3m
 Mode: 2
 Test Date: 2019-05-23
 Note:

Index 110



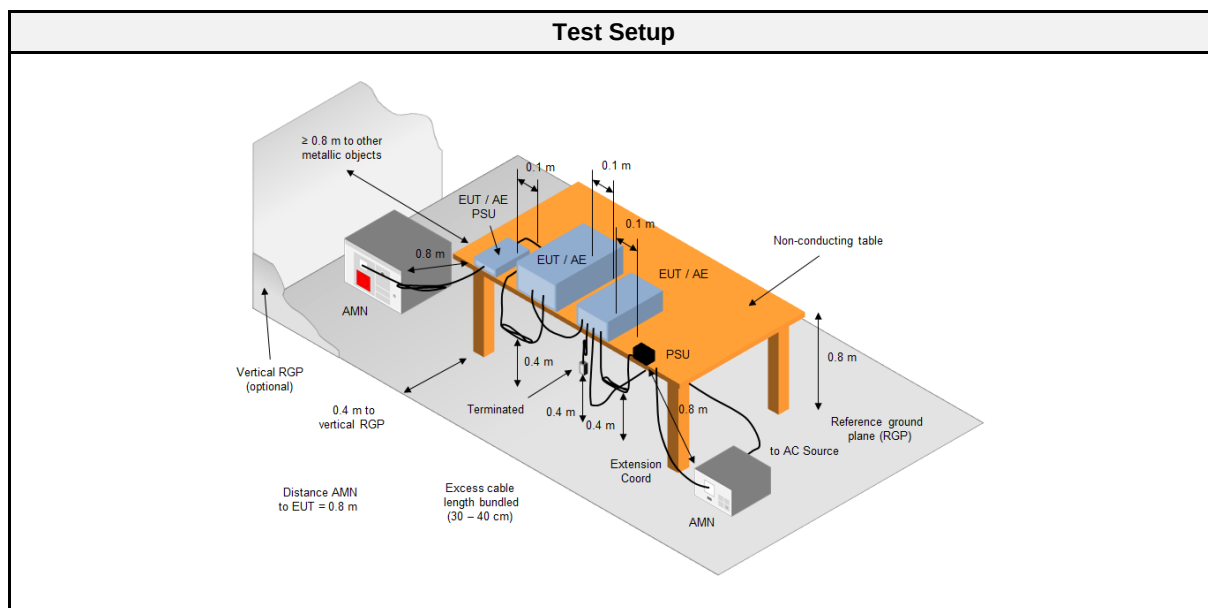
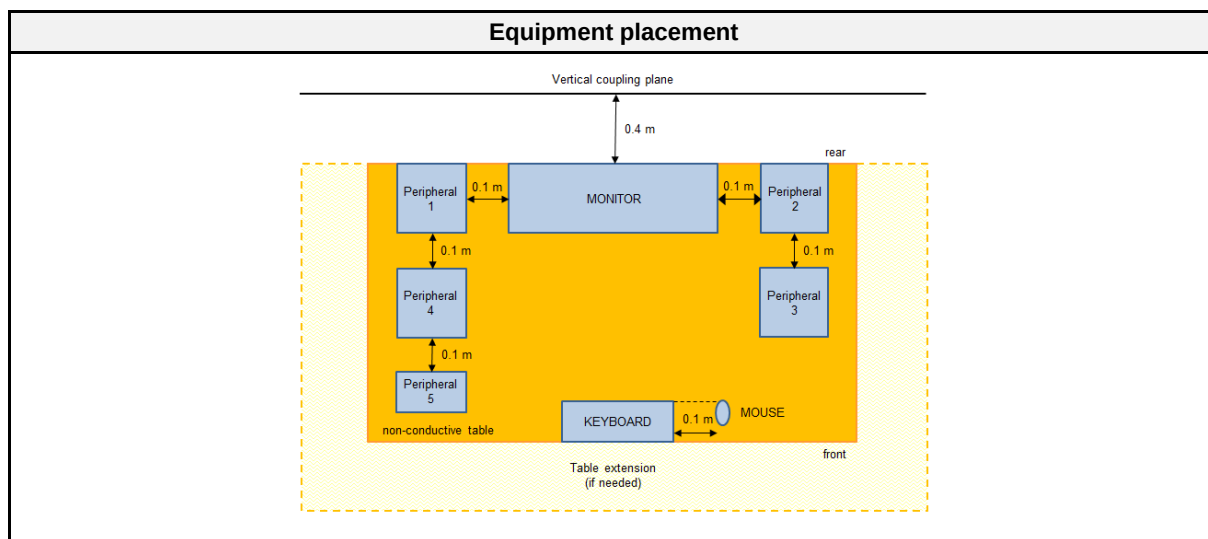
Peak Number	Frequency	Peak	Angle	Height
1	2.402 GHz			
2	2.472 GHz	BT/WLAN carrier		
3	2.441 GHz			

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, 8, 6.2
Reference method	ANSI C63.4:2014 Section 12
Measurement range	150 kHz to 30 MHz
Equipment class	Class B
Equipment type	Table top
Temperature [°C]	27
Humidity [%]	23
Operator	Matthias Handrik
Date	2019-05-14

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	R&S	ESH3-Z5	EF00036	2017-01	2019-07
Pulse Limiter	R&S	ESH3-Z2	EF01063	2018-07	2019-07
EMI Test Receiver	R&S	ESR 7	EF00943	2018-07	2019-07

2.2.4 Procedure

Exploratory measurement	
1.	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)
2.	The power cord that is normally supplied or recommended by the manufacturer was connected to the LISN.
3.	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).
4.	The LISN measurement port was connected to a measurement receiver
5.	I/O cables were bundled not longer than 0.4 m
6.	Measurement was performed in the frequency range 0.15 – 30MHz on each current-carrying conductor
7.	To maximize the emissions the cable positions were manipulated
8.	The worst configuration of EUT and cables is shown on a test setup picture at item 1.3

Final measurement	
1.	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)
2.	The power cord that is normally supplied or recommended by the manufacturer was connected to the LISN.
3.	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).
4.	The LISN measurement port was connected to a measurement receiver
5.	The EUT and cable arrangement were based on the exploratory measurement results
6.	The test data of the worst-case conditions were recorded and shown on the next pages

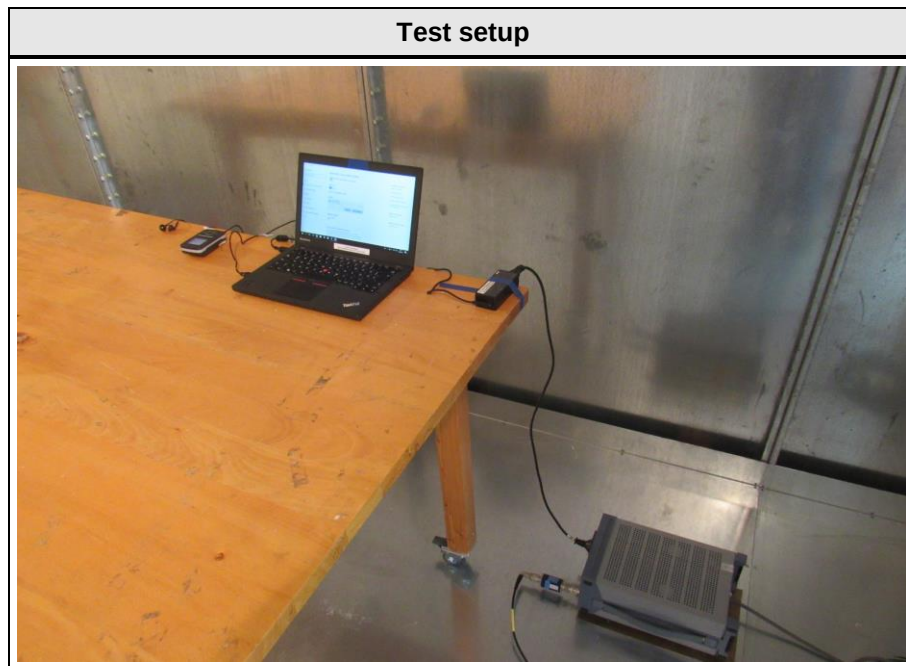
2.2.5 Limits

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
USB	AMN	2	2	PASS	

2.2.7 Setup Photos



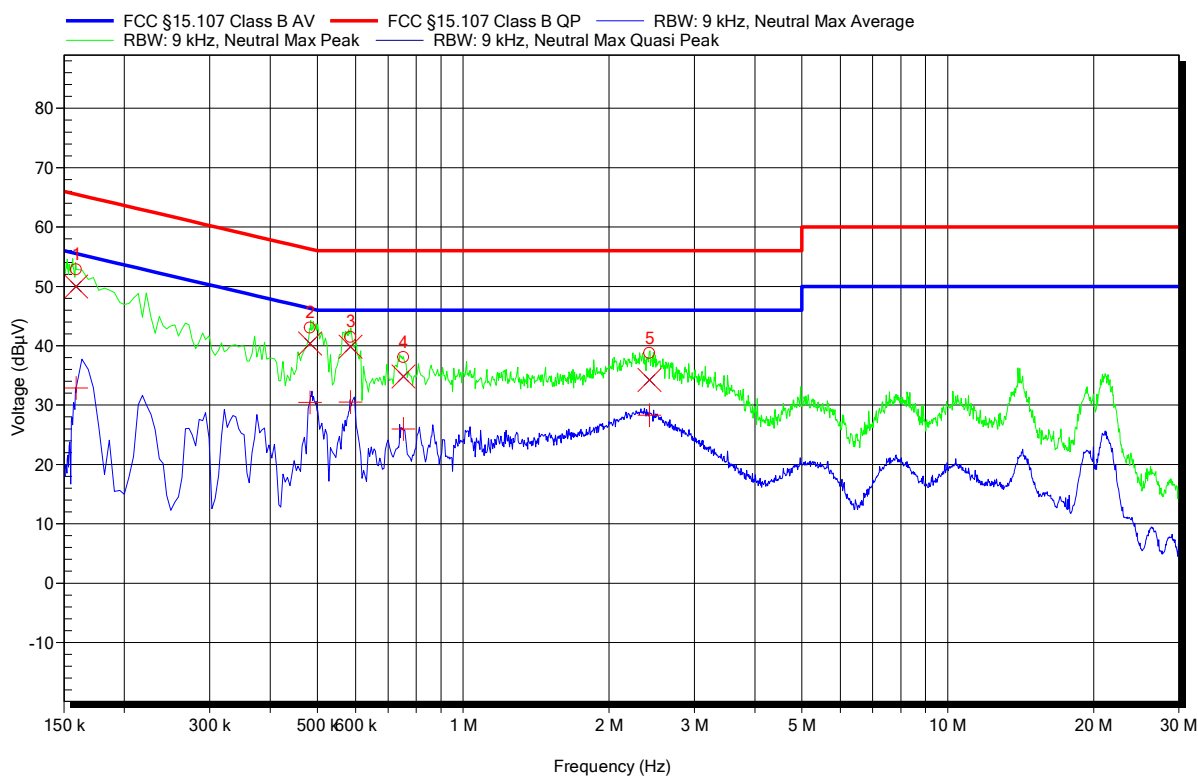
2.2.8 Records

EMI voltage test in the ac-mains according to FCC part 15B

Project number: G0M-1903-8127

Applicant: peiker Consumer Electronics Evolution GmbH
 EUT Name: Audio Communication Device
 Model: C3
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 27°C, Unom: 120V AC (AC/DC adaptor)
 LISN: ESH3-Z5 (N)
 Mode: 2
 Test Date: 2019-05-14
 Note:

Index 106



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
1	159 kHz	49.96 dBμV	65.52 dBμV	-15.56 dB	Pass
2	483 kHz	40.36 dBμV	56.29 dBμV	-15.93 dB	Pass
3	586.05 kHz	39.81 dBμV	56 dBμV	-16.19 dB	Pass
4	752.55 kHz	34.85 dBμV	56 dBμV	-21.15 dB	Pass
5	2.422 MHz	34.25 dBμV	56 dBμV	-21.75 dB	Pass

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status
1	159 kHz	32.88 dBμV	55.52 dBμV	-22.63 dB	Pass
2	483 kHz	30.43 dBμV	46.29 dBμV	-15.86 dB	Pass
3	586.05 kHz	30.5 dBμV	46 dBμV	-15.5 dB	Pass
4	752.55 kHz	26 dBμV	46 dBμV	-20 dB	Pass
5	2.422 MHz	28.32 dBμV	46 dBμV	-17.68 dB	Pass

Test Report No.: G0M-1903-8127-EF0115B-V01

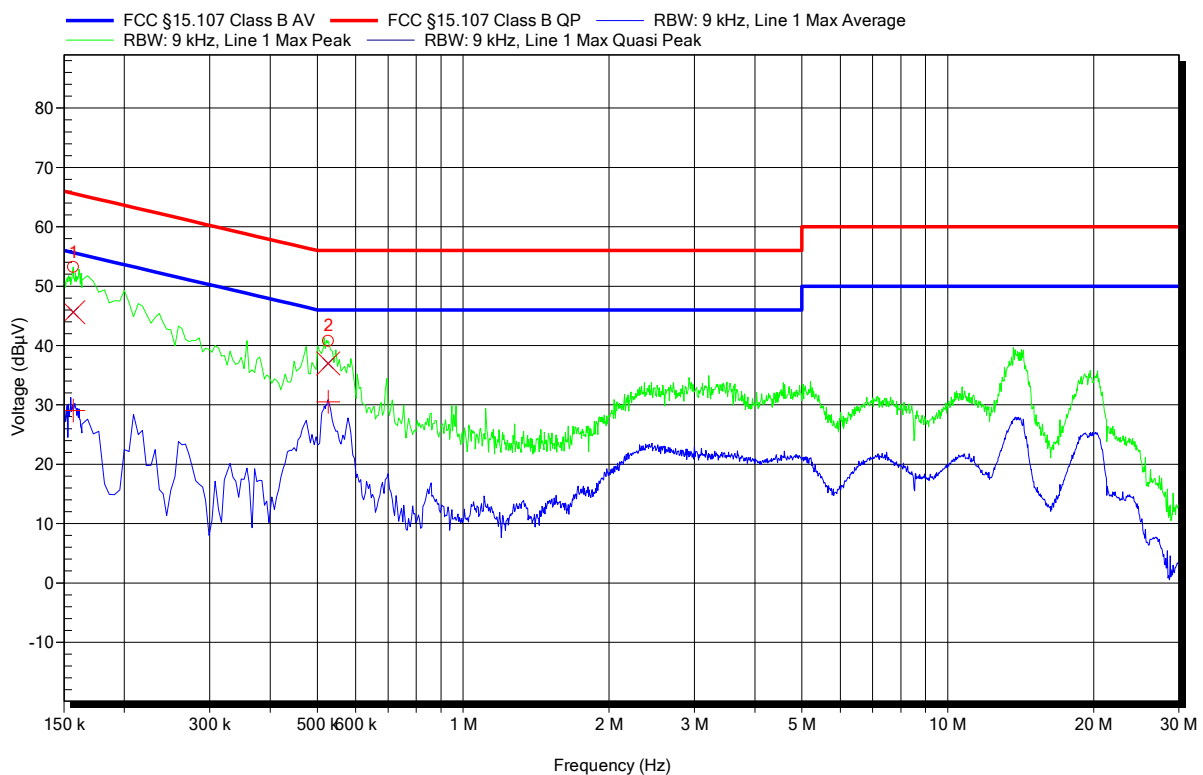
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

EMI voltage test in the ac-mains according to FCC part 15B

Project number: G0M-1903-8127

Applicant: peiker Consumer Electronics Evolution GmbH
EUT Name: Audio Communication Device
Model: C3
Test Site: Eurofins Product Service GmbH
Operator: Mr. Handrik
Test Conditions: Tnom: 27°C, Unom: 120V AC (AC/DC adaptor)
LISN: ESH3-Z5 (L)
Mode: 2
Test Date: 2019-05-14
Note:

Index 107



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
1	156.75 kHz	45.62 dBμV	65.63 dBμV	-20.01 dB	Pass
2	526.65 kHz	36.97 dBμV	56 dBμV	-19.03 dB	Pass

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status
1	156.75 kHz	29.07 dBμV	55.63 dBμV	-26.57 dB	Pass
2	526.65 kHz	30.49 dBμV	46 dBμV	-15.51 dB	Pass