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# DELTA Test Report



TEST Reg. no. 19

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## EMC emission test of CURO Mk0

### Performed for MyoDynamik ApS

DANAK-19/17786

Project no.: 117-24570

Page 1 of 31

10 May 2017

#### DELTA

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<b>Title</b>	EMC emission test of CURO Mk0
<b>Test object</b>	CURO Mk0
<b>Report no.</b>	DANAK-19/17786
<b>Project no.</b>	117-24570
<b>Test period</b>	10 March to 03 April 2017
<b>Client</b>	MyoDynamik ApS Thorvaldsensgade 19, 2. th. 1871 Frederiksberg C Denmark Tel.: + 45 2077 9880
<b>Contact person</b>	Henrik Mikkelsen E-mail: hm@ect.dk
<b>Manufacturer</b>	MyoDynamik ApS
<b>Specifications</b>	FCC part 15 Subpart B Class B ICES-003:2016 Class B
<b>Results</b>	The test object was found to be in compliance with the specifications
<b>Test personnel</b>	Niels Møller, DELTA Morten Lindberg Hansen, DELTA
<b>Test site</b>	DELTA, Agro Food Park 13, 8200 Aarhus N, Denmark

**Date** 10 May 2017

**Project Manager**



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Niels Møller  
Senior Specialist, EMC  
DELTA

**Responsible**



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Martin Randrup Villadsen  
Specialist, EMC  
DELTA

<b>Table of contents</b>		<b>Page</b>
<b>1.</b>	<b>Summary of tests</b>	<b>5</b>
<b>2.</b>	<b>Test object and auxiliary equipment</b>	<b>6</b>
2.1	Test object	6
2.2	Auxiliary equipment	8
<b>3.</b>	<b>General test conditions</b>	<b>10</b>
3.1	Test setup during test	10
3.1.1	Description of test setup	11
3.1.2	Description and intended use of test object	11
3.2	Test sequence	11
<b>4.</b>	<b>Test results</b>	<b>12</b>
4.1	Measurement of radio frequency electromagnetic field, charging mode	12
4.2	Measurement of radio frequency electromagnetic field, USB-transfer mode	15
4.3	Measurement of radio frequency electromagnetic field, Wi-Fi mode	18
4.4	Measurement of radio frequency electromagnetic field, all modes (above 1 GHz)	21
4.5	Measurement of radio frequency voltage on mains, charging mode	24
4.6	Measurement of radio frequency voltage on mains, USB-transfer mode	27
<b>5.</b>	<b>National registrations and accreditations</b>	<b>30</b>
5.1	DANAK Accreditation	30
5.2	FCC Registrations	30
<b>6.</b>	<b>List of instruments</b>	<b>31</b>



## 1. Summary of tests

Tests	Test methods	Results
Measurement of radio frequency voltage on mains	ANSI C63.4:2014	Passed
Measurement of radio frequency electromagnetic field	ANSI C63.4:2014	Passed

The given result is based on a shared risk principle with respect to the measurement uncertainty.

### Conclusion

The test object mentioned in this report meets the requirements of the standards stated below, with respect to the test listed above.

- FCC part 15 Subpart B Class B
- ICES-003:2016 Class B

The test results relate only to the object tested.



## 2. Test object and auxiliary equipment

### 2.1 Test object



Photo 2.1.1 Test object.

#### Test object 2.1.1

Name of test object	CURO Mk0
Model / type	V1.0.0
Part no.	-
Serial no.	20160248
FCC ID	-
Manufacturer	MyoDynamik
Supply voltage	110 VAC / 60 Hz
Software version	0.1.4
Hardware version	1.0
Cycle time	< 1 sec
Highest frequency generated or used	700 MHz
Comment	-
Received	Date: 10 March 2017. Status: Test object sampled and provided by customer.



### Test object 2.1.2

Name of test object	CURO
Model / type	Mk. 1
Part no.	-
Serial no.	20160247
FCC ID	-
Manufacturer	MyoDynamik
Supply voltage	110 VAC, 60 Hz
Software version	-
Hardware version	-
Cycle time	-
Highest frequency generated or used	-
Comment	-
Received	Date: 10 March 2017. Status: Test object sampled and provided by customer.



## 2.2 Auxiliary equipment

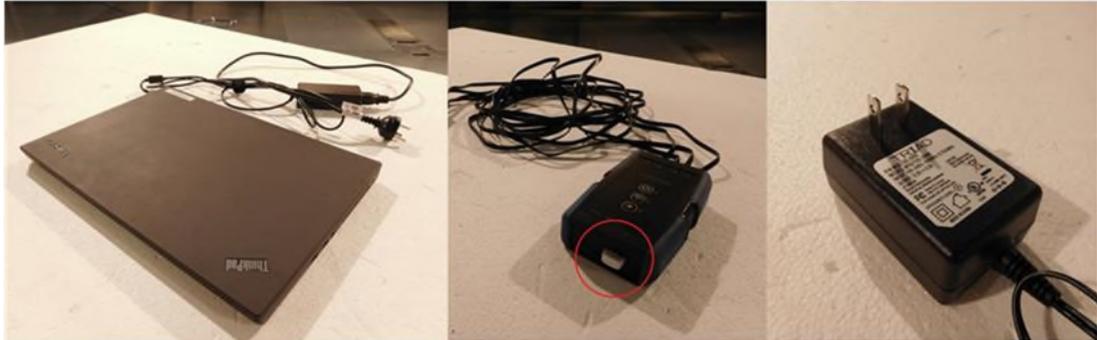


Photo 2.2.1 Auxiliary equipment.

### Auxiliary equipment 2.2.1

Name of auxiliary equipment	Lenovo laptop
Model / type	Thinkpad T550 20CK-003LFR
Part no.	20CK-003LFR
Serial no.	R9-0H13C8 15/08
FCC ID	-
Manufacturer	Lenovo
Supply voltage	110-230 VAC
Highest frequency generated or used	-
Comment	Auxiliary equipment supplied by the client, who also has the responsibility for its correct function and setup.

### Auxiliary equipment 2.2.2

Name of auxiliary equipment	TRIAD 12VDC PSU
Model / type	WSU120-2000
Part no.	WSU120-2000
Serial no.	N/A
FCC ID	N/A
Manufacturer	TRIAD
Supply voltage	100 – 240 VAC
Highest frequency generated or used	-
Comment	Auxiliary equipment supplied by the client, who also has the responsibility for its correct function and setup.



### **Auxiliary equipment 2.2.3**

Name of auxiliary equipment	300Mbps Wireless Mini USB Adapter
Model / type	EW-7722UTn V2
Part no.	-
Serial no.	6CCB00639
FCC ID	NDD9578221026
Manufacturer	Edimax
Supply voltage	From USB
Highest frequency generated or used	2.40000 to 2.4835 GHz
Comment	Auxiliary equipment supplied by the client, who also has the responsibility for its correct function and setup.

### 3. General test conditions

#### 3.1 Test setup during test

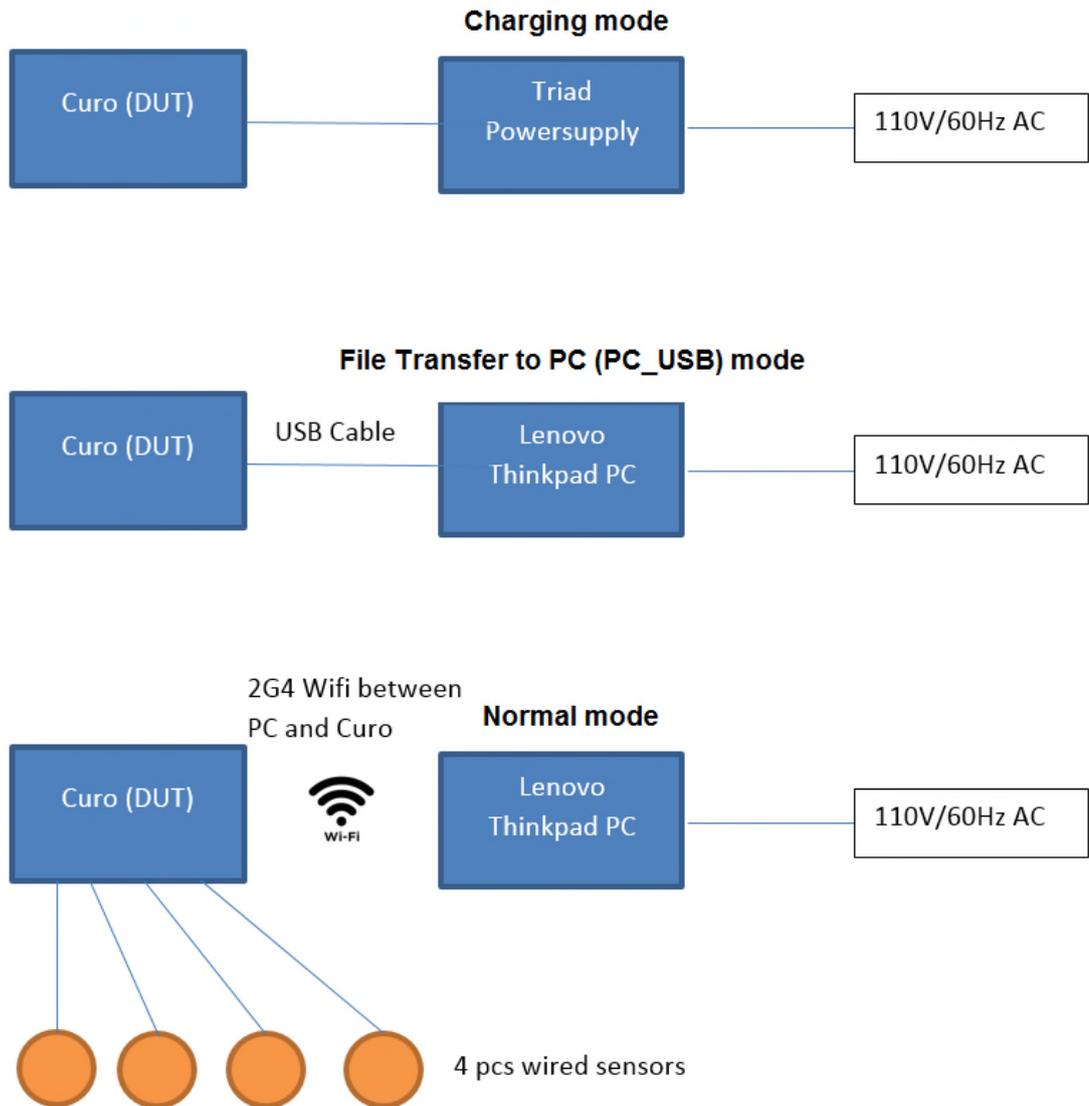


Figure 3.1.1 Block diagram of test object with cables and auxiliary equipment.

### 3.1.1 Description of test setup

The 3 modes tested are: “Charging mode”, “USB-transfer mode”, and “Normal mode”.

#### 1) Charging mode:

Connect the Curo with the Triad power supply. Connect the power supply to a 110 VAC/60 Hz source – the Curo will turn on automatically if not already active. Do not connect sensors, USB cable or activate Wi-Fi.

#### 2) USB-transfer mode:

For transferring recorded files to PC through USB cable:

Connect the Curo to the laptop PC through the USB cable. Do not connect sensors or charging power. Connect the laptop PC through the laptop power supply to a 110 VAC / 60 Hz power source. The laptop is running OS Windows 7, start shell script for automatic copying of files from the Curo as the Curo will be detected as an external FAT32 drive in Windows 7.

#### 3) Normal mode:

Connect all 4 sensors to the Curo, insert the Wi-Fi USB dongle if not inserted already. Turn on the Curo on the on/off button and wait for the steady green led. Press the Wi-Fi button, which enables the Wi-Fi – wait for the green led to light steady. Connect a laptop PC and attach the laptop power supply to a 110 VAC/60 Hz power source, OS: Windows 7, connect laptop Wi-Fi to the Curo (AMG Access Point), start the amgproc application for receiving sensor data by pressing connect and start streaming. For monitoring the signals, start the oscilloscope integrated in the amgpoc application (load OSC and then run OSC – reducing sensitivity if needed).

### 3.1.2 Description and intended use of test object

The Curo is a device to measure acoustic signals (AMG) from muscles on horses. The Curo is connected with up to 4 sensors mounted on the muscles of the horse through gel and snögg (tape). The Curo is battery driven and connected through wireless communication (Wi-Fi 2G4) to any mobile device including laptops for live recording/monitoring of data.

## 3.2 Test sequence

The tests described in this test report were performed in the following sequence:

1. Measurement of radio frequency electromagnetic field
2. Measurement of radio frequency voltage on mains
3. Measurement of radio frequency electromagnetic field (above 1 GHz)

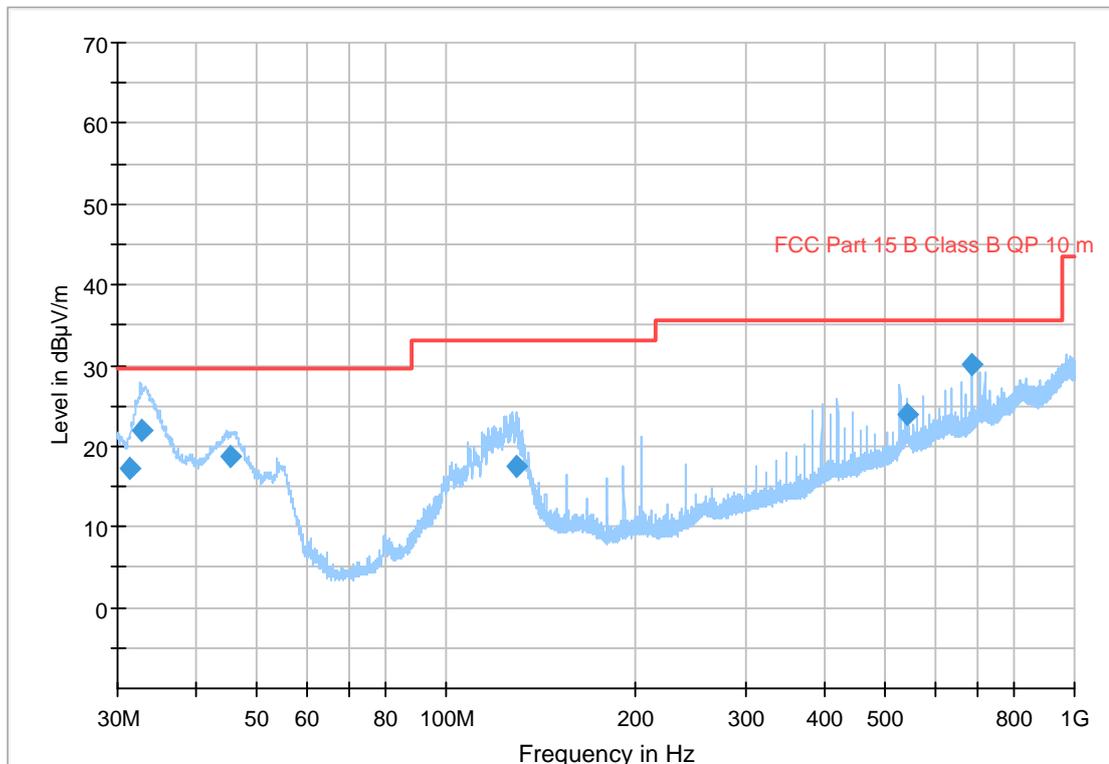
## 4. Test results

### 4.1 Measurement of radio frequency electromagnetic field, charging mode

Test object	CURO Mk0	Sheet	RE-1
Type	V1.0.0	Project no.	117-24570
Serial no.	20160247	Date	3 Apr. 2017
Client	MyoDynamik ApS	Initials	MLHA
Specification	FCC part 15 Subpart B Class B ICES-003:2016 Class B	Frequency	30-1000 MHz

Test method	ANSI C63.4:2014	Temperature	23 °C
Characteristics	Complete search, antenna distance 10 m	Humidity	36 % RH
Detector	Peak and quasi peak	Bandwidth	120 kHz
Test equipm.	Room 1 Aarhus Setup AEC1	Uncertainty	5.5 dB

Full Spectrum



— Preview Result 1-PK+    
 — FCC Part 15 B Class B QP 10 m    
 ◆ Final\_Result QPK

Comments

None





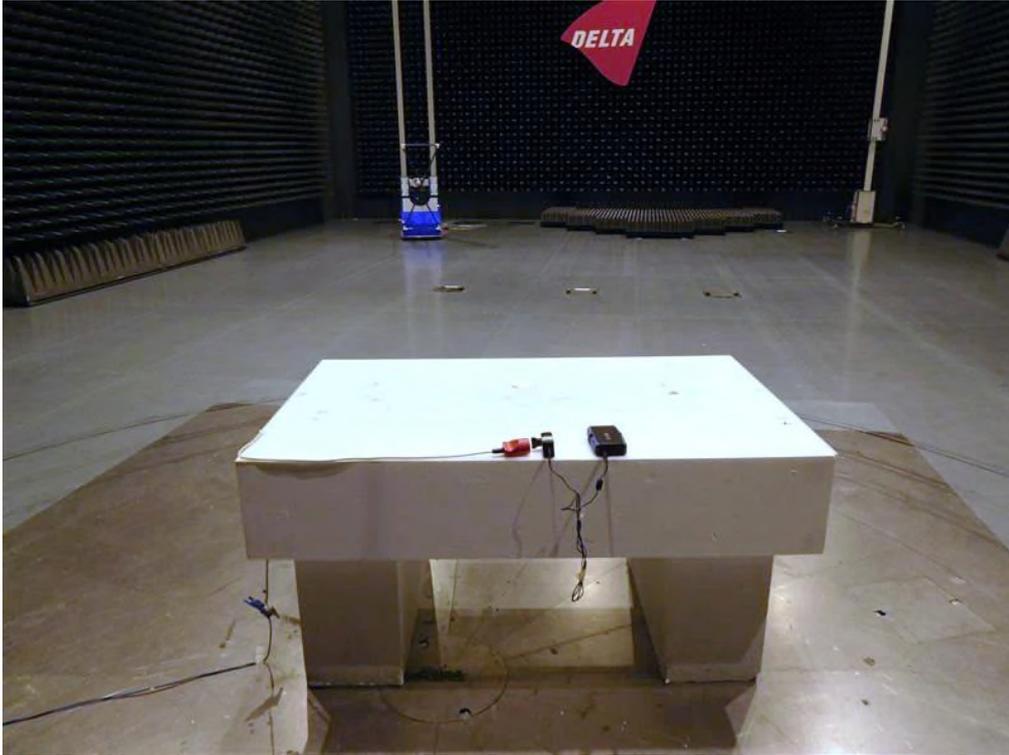


Photo 4.1.1 Test setup regarding measurement of radio frequency electromagnetic field.

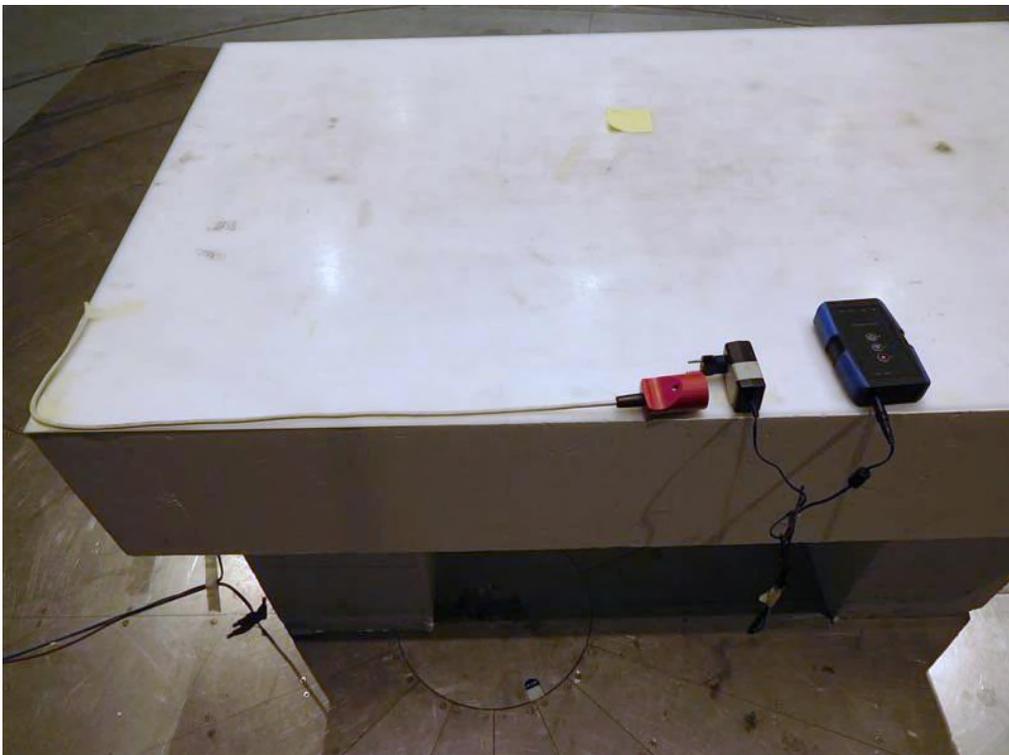


Photo 4.1.2 Test setup regarding measurement of radio frequency electromagnetic field.

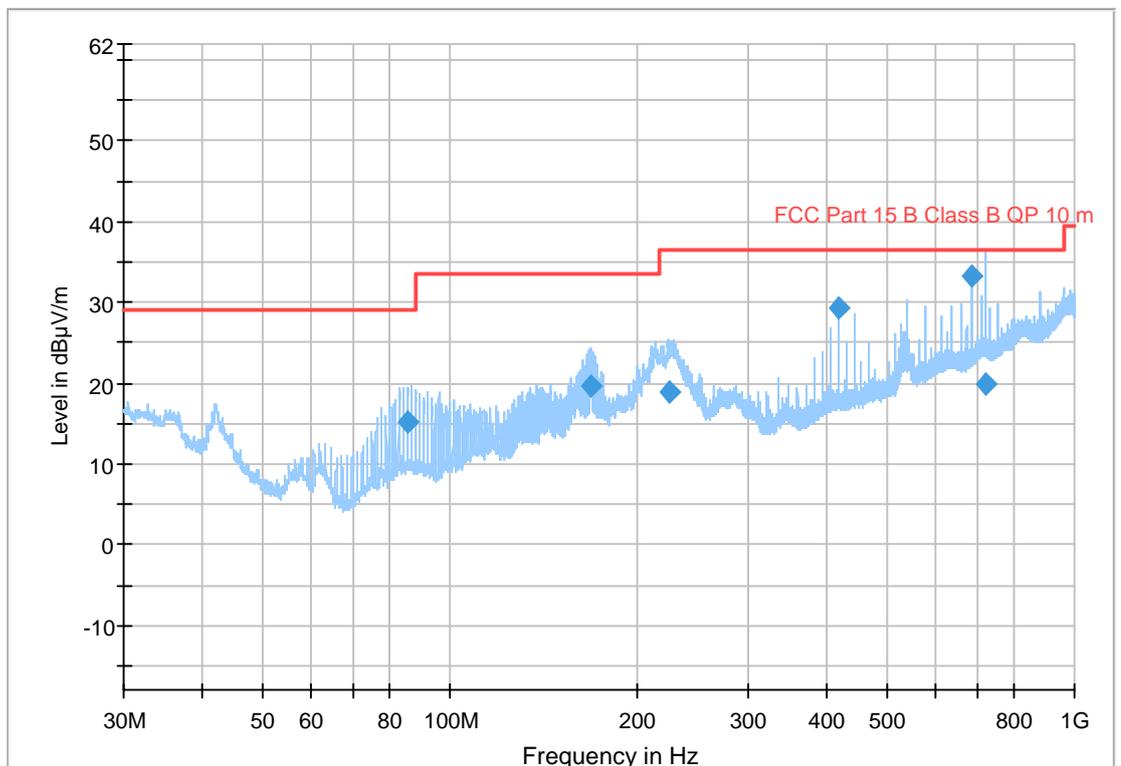


## 4.2 Measurement of radio frequency electromagnetic field, USB-transfer mode

Test object	CURO Mk0	Sheet	RE-3
Type	V1.0.0	Project no.	117-24570
Serial no.	20160248	Date	10 Mar. 2017
Client	MyoDynamik ApS	Initials	MLHA
Specification	FCC part 15 Subpart B Class B ICES-003:2016 Class B	Frequency	30-1000 MHz

Test method	ANSI C63.4:2014	Temperature	23 °C
Characteristics	Complete search, antenna distance 10 m	Humidity	34 % RH
Detector	Peak and quasi peak	Bandwidth	120 kHz
Test equipm.	Room 1 Aarhus Setup AEC1	Uncertainty	5.5 dB

Full Spectrum



— Preview Result 1-PK+    — FCC Part 15 B Class B QP 10 m    ◆ Final\_Result QPK

Comments                      None





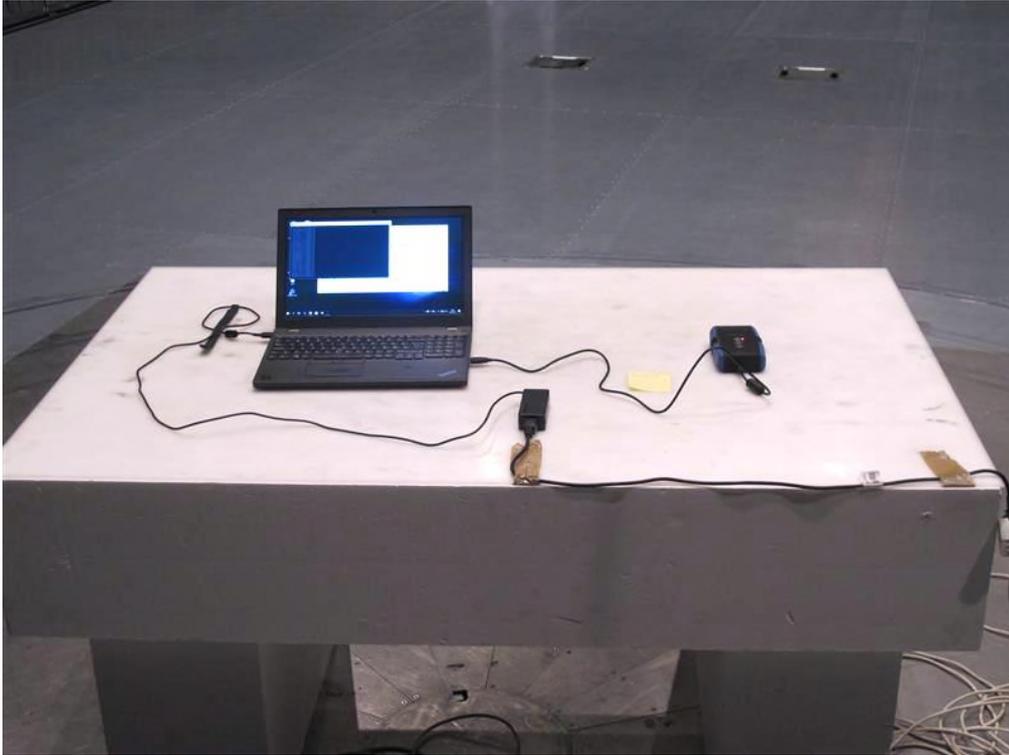


Photo 4.2.1 Test setup regarding measurement of radio frequency electromagnetic field.

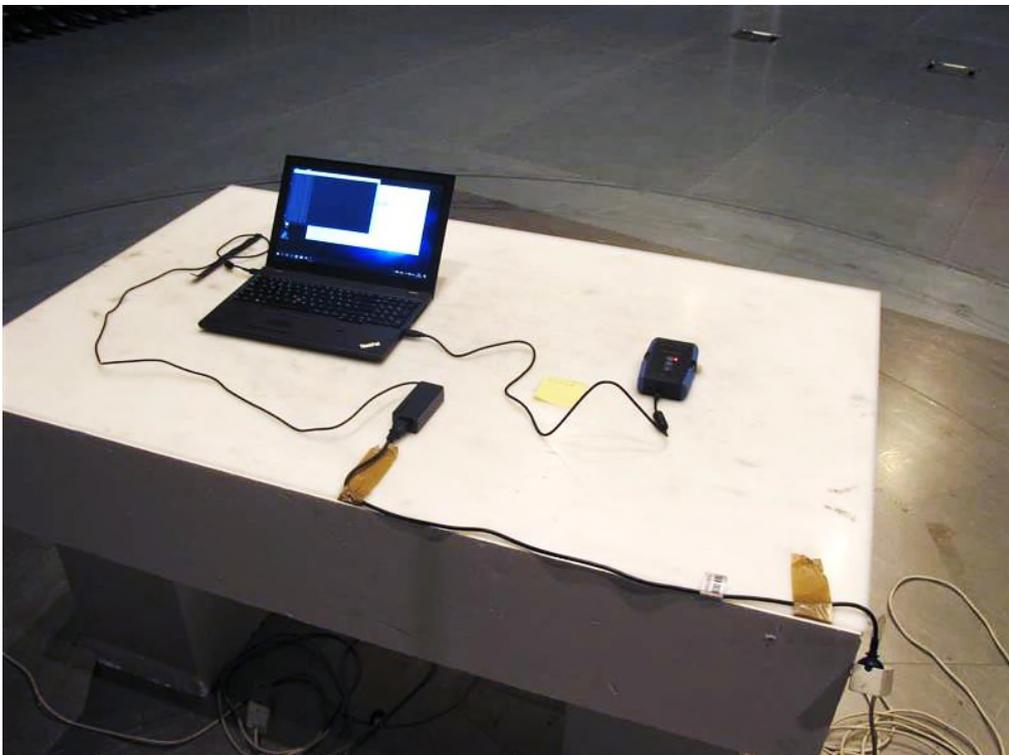


Photo 4.2.2 Test setup regarding measurement of radio frequency electromagnetic field.

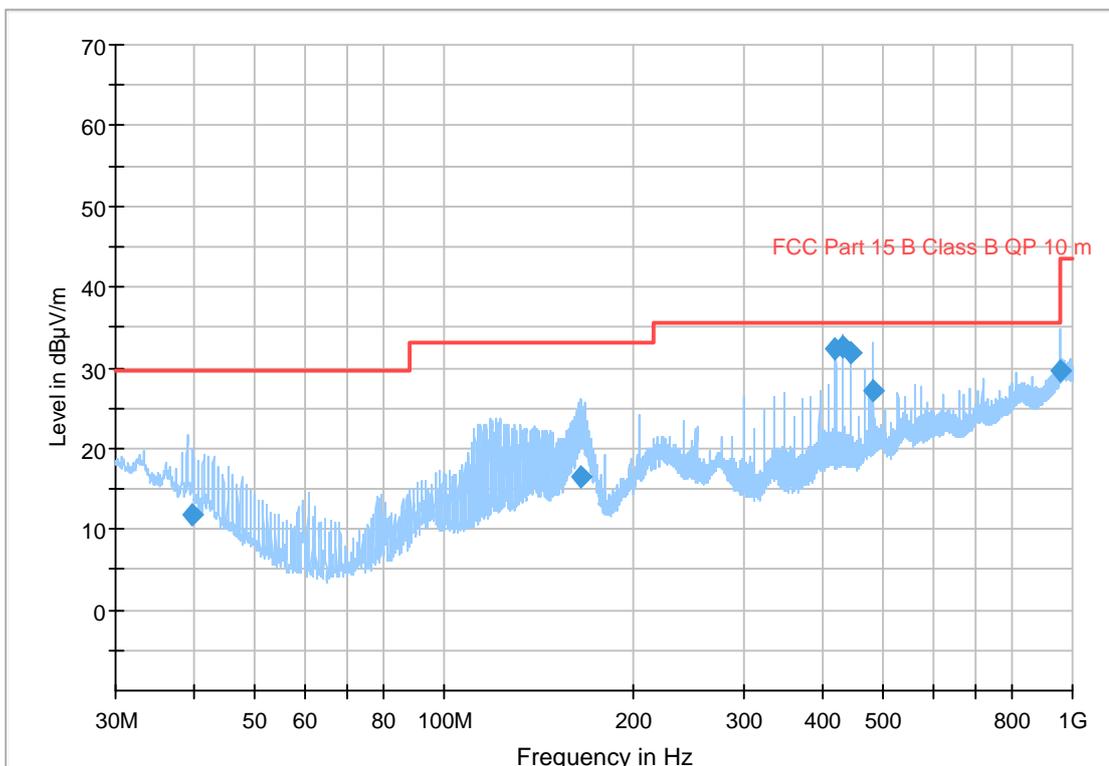


### 4.3 Measurement of radio frequency electromagnetic field, Wi-Fi mode

Test object	CURO Mk0	Sheet	RE-5
Type	V1.0.0	Project no.	117-24570
Serial no.	20160248	Date	24 Mar. 2017
Client	MyoDynamik ApS	Initials	MLHA
Specification	FCC part 15 Subpart B Class B ICES-003:2016 Class B	Frequency	30-1000 MHz

Test method	ANSI C63.4:2014	Temperature	24 °C
Characteristics	Complete search, antenna distance 10 m	Humidity	39 % RH
Detector	Peak and quasi peak	Bandwidth	120 kHz
Test equipm.	Room 1 Aarhus Setup AEC1	Uncertainty	5.5 dB

Full Spectrum



— Preview Result 1-PK+    — FCC Part 15 B Class B QP 10 m    ◆ Final\_Result QPK

Comments                      None







Photo 4.3.1 Test setup regarding measurement of radio frequency electromagnetic field.

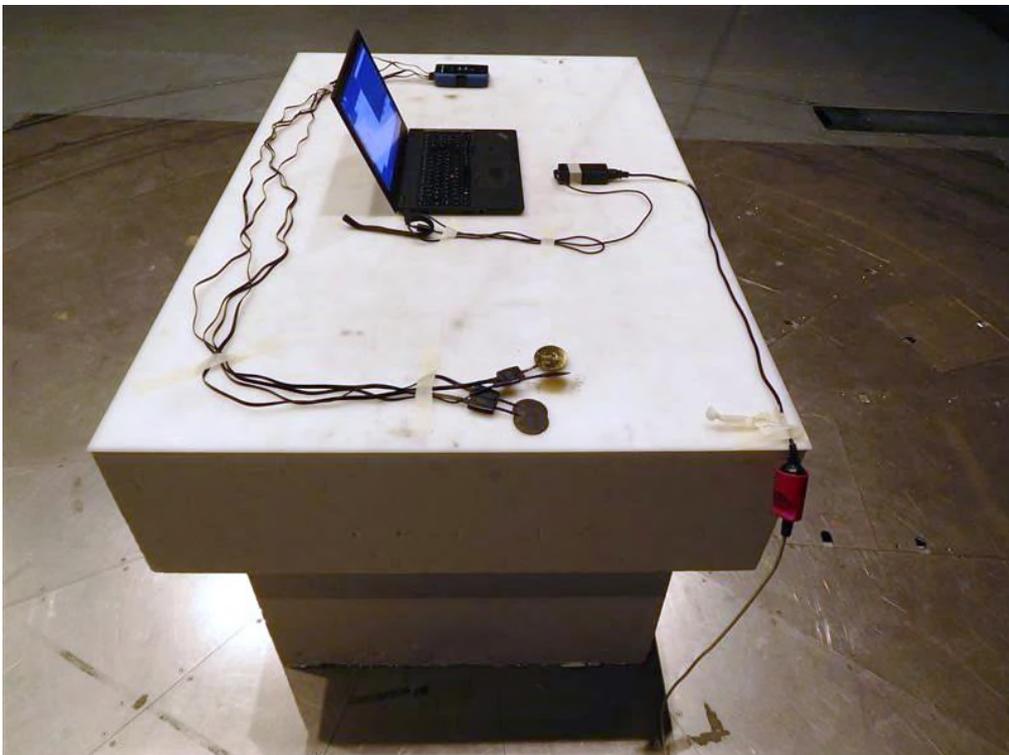


Photo 4.3.2 Test setup regarding measurement of radio frequency electromagnetic field.

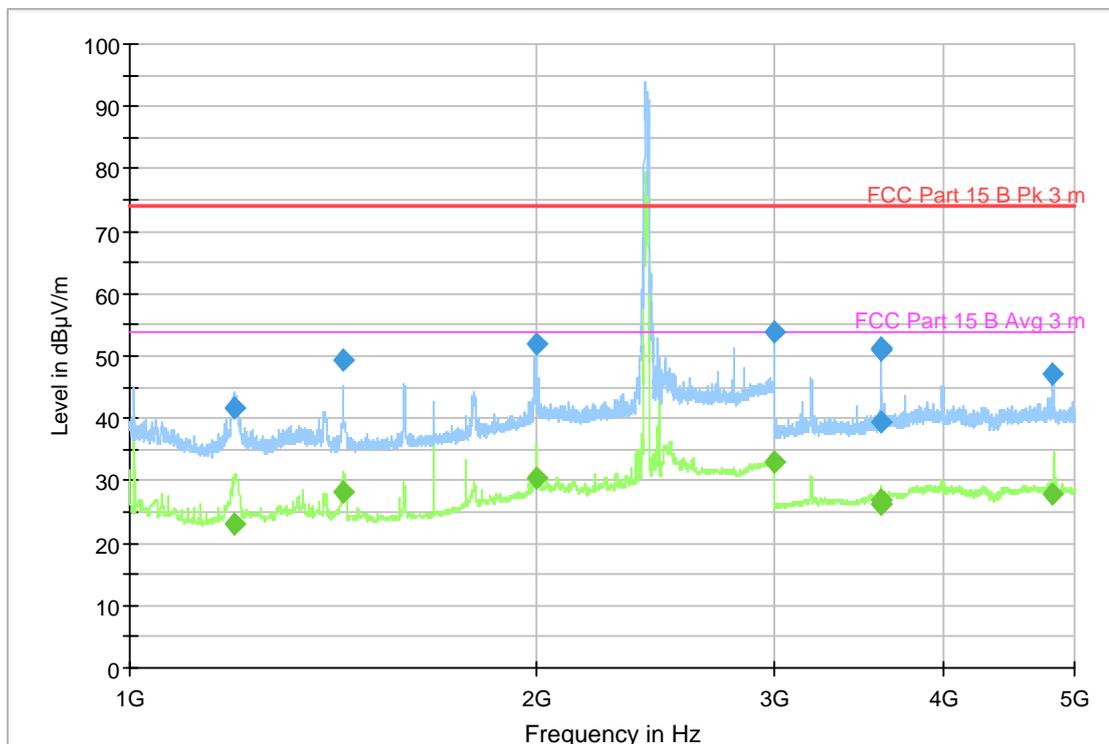


#### 4.4 Measurement of radio frequency electromagnetic field, all modes (above 1 GHz)

Test object	CURO Mk0	Sheet	RE-7
Type	V1.0.0	Project no.	117-24570
Serial no.	20160247	Date	5 Apr. 2017
Client	MyoDynamik ApS	Initials	MLHA
Specification	FCC part 15 Subpart B Class B ICES-003:2016 Class B	Frequency	1-6 GHz

Test method	ANSI C63.4:2014	Temperature	23 °C
Characteristics	Complete search, antenna distance 3 m	Humidity	29 % RH
Detector	Peak and average	Bandwidth	1 MHz
Test equipm.	Room 1 Aarhus Setup AEC2	Uncertainty	4.6 dB

Full Spectrum



— Preview Result 2-AVG     — Preview Result 1-PK+     — FCC Part 15 B Pk 3 m  
— FCC Part 15 B Avg 3 m     ◆ Final\_Result PK+     ◆ Final\_Result AVG

Comments

Measurements at 2.4 GHz is intended USB Wi-Fi, ok.





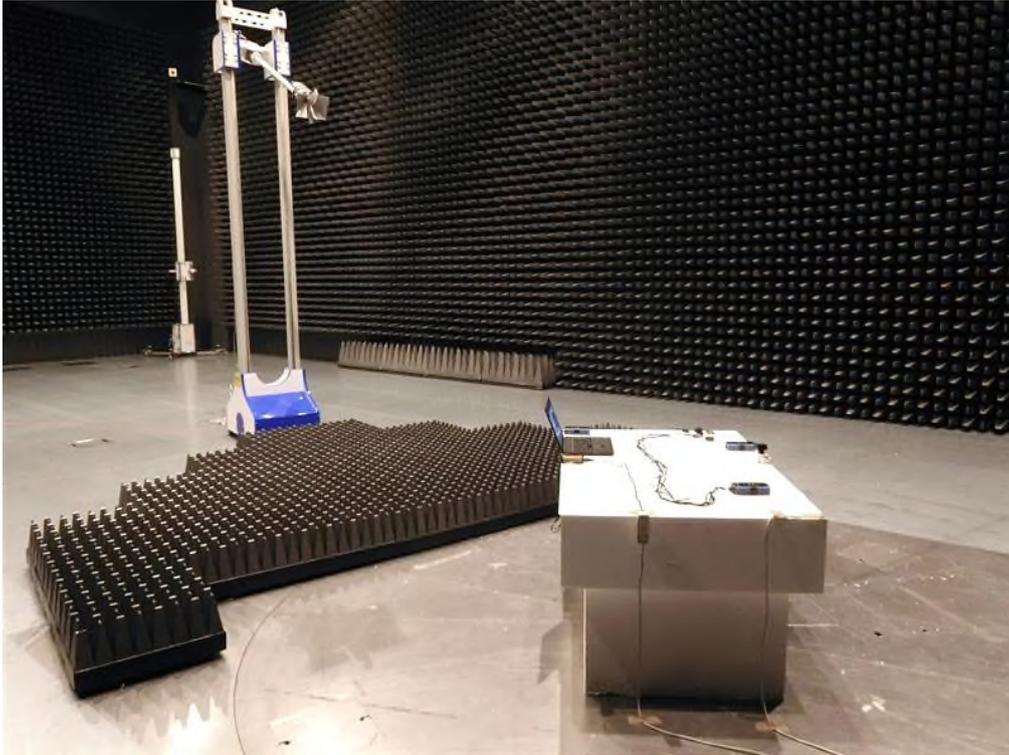


Photo 4.4.1 Test setup regarding measurement of radio frequency electromagnetic field (above 1 GHz).



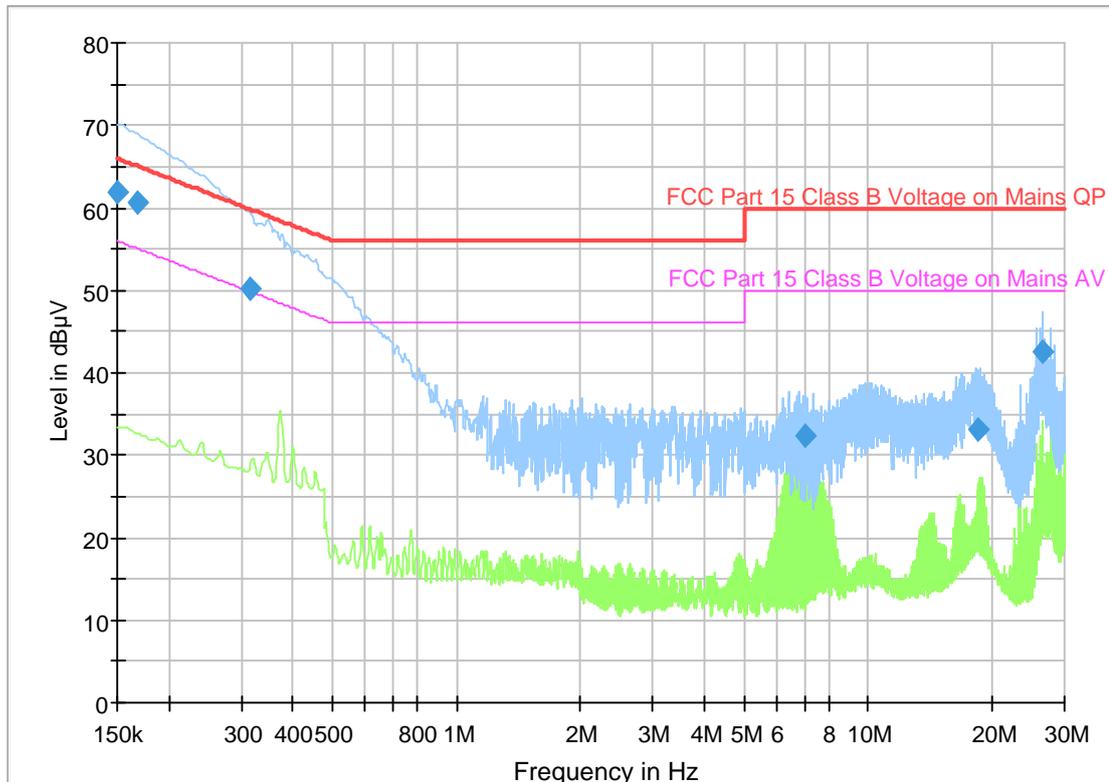
Photo 4.4.2 Test setup regarding measurement of radio frequency electromagnetic field (above 1 GHz).



#### 4.5 Measurement of radio frequency voltage on mains, charging mode

Test object	CURO Mk0	Sheet	CE-1
Type	V1.0.0	Project no.	117-24570
Serial no.	20160247	Date	3 Apr. 2017
Client	MyoDynamik ApS	Initials	MLHA
Specification	FCC part 15 Subpart B Class B ICES-003:2016 Class B	Frequency	0.15-30 MHz
Test method	ANSI C63.4:2014	Temperature	23 °C
Characteristics	Artificial mains network: 50 Ω, 50 μH	Humidity	36 % RH
Detector	Peak and average	Bandwidth	10 kHz
Test equipm.	Room 4 Aarhus Setup AEA1	Uncertainty	3.5 dB

Full Spectrum



— Preview Result 2-AVG  
— FCC Part 15 Class B Voltage on Mains QP  
— Preview Result 1-PK+  
— FCC Part 15 Class B Voltage on Mains AV  
◆ QuasiPeak-QPK  
◆ Average-AVG

Line under test

Maximum of Line and Neutral



Test object	CURO Mk0	Sheet	CE-2
Type	V1.0.0	Project no.	117-24570
Serial no.	20160247	Date	3 Apr. 2017
Client	MyoDynamik ApS	Initials	MLHA
Specification	FCC part 15 Subpart B Class B ICES-003:2016 Class B	Frequency	0.15-30 MHz

Test method	ANSI C63.4:2014	Temperature	23 °C
Characteristics	Artificial mains network: 50 Ω, 50 μH	Humidity	36 % RH
Detector	Quasi peak	Bandwidth	10 kHz
Test equipm.	Room 4 Aarhus Setup AEA1	Uncertainty	3.5 dB

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE
0.150000	61.81	---	66.00	4.19	1000.0	9.000	N	FLO
0.168000	60.55	---	65.06	4.51	1000.0	9.000	N	FLO
0.316500	50.20	---	59.80	9.60	1000.0	9.000	L1	FLO
6.999000	32.42	---	60.00	27.58	1000.0	9.000	N	FLO
18.521250	33.17	---	60.00	26.83	1000.0	9.000	L1	FLO
26.394000	42.48	---	60.00	17.52	1000.0	9.000	L1	FLO

Line under test                      Maximum of Line and Neutral

Test result                              The measured voltages were below the limit

Compliant                                Yes

Comments                                Mains voltage: 110 VAC / 60 Hz.



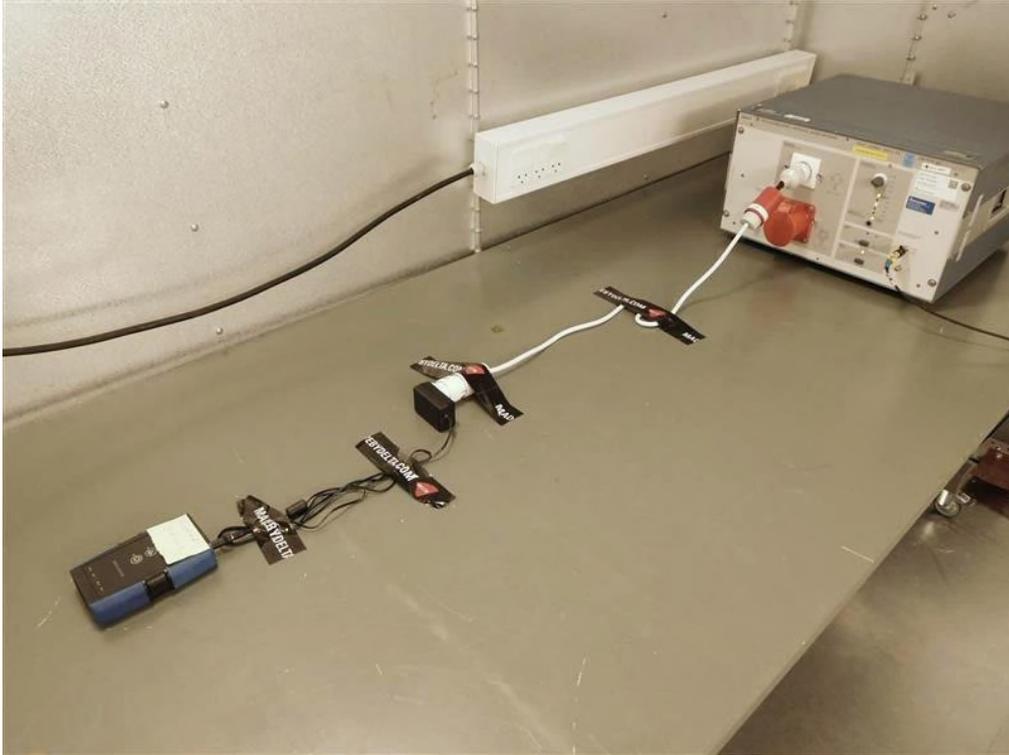


Photo 4.5.1 Test setup regarding measurement of radio frequency voltage on mains.

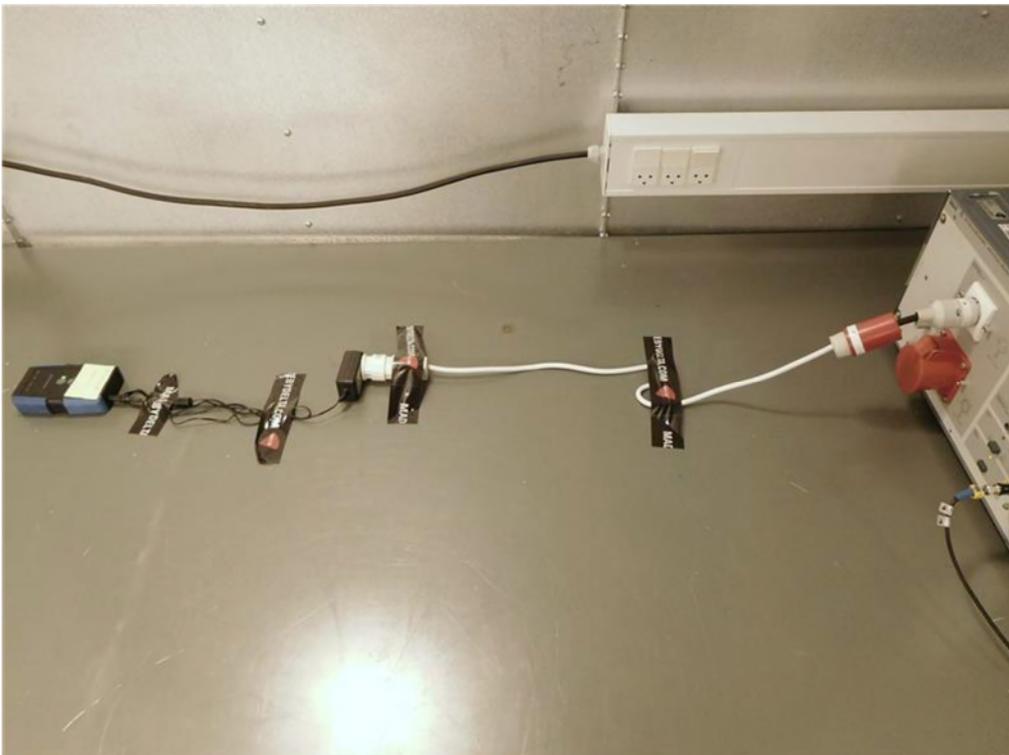
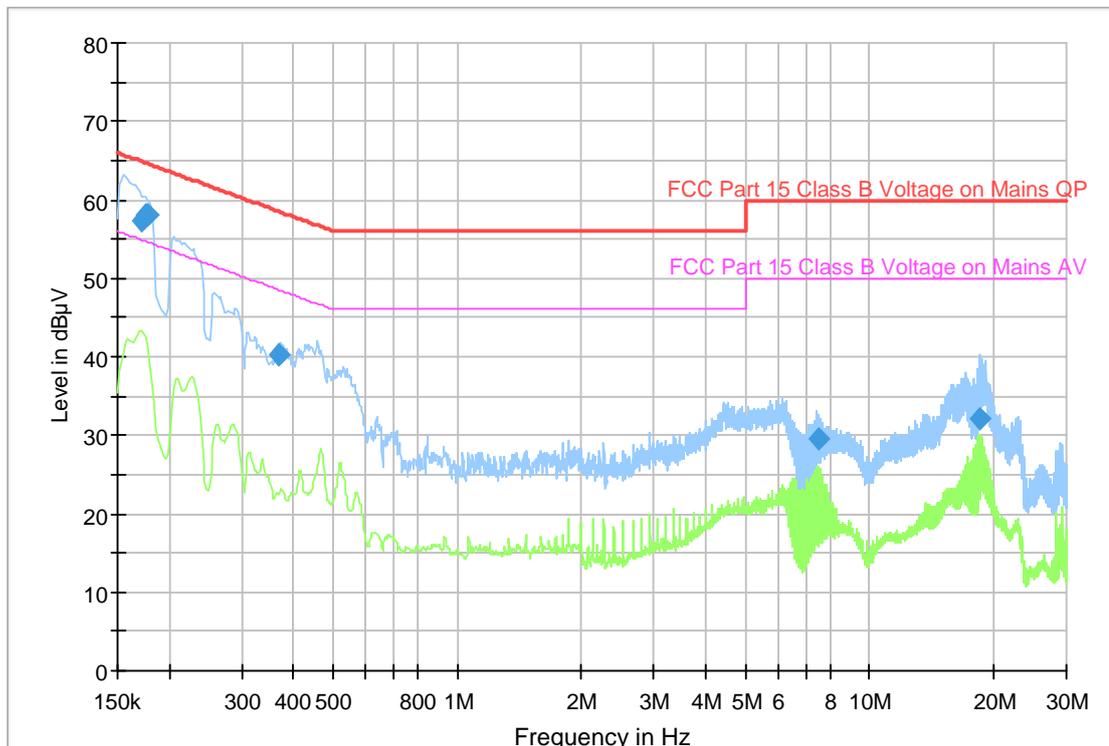


Photo 4.5.2 Test setup regarding measurement of radio frequency voltage on mains.

#### 4.6 Measurement of radio frequency voltage on mains, USB-transfer mode

Test object	CURO Mk0	Sheet	CE-3
Type	V1.0.0	Project no.	117-24570
Serial no.	20160247	Date	3 Apr. 2017
Client	MyoDynamik ApS	Initials	MLHA
Specification	FCC part 15 Subpart B Class B ICES-003:2016 Class B	Frequency	0.15-30 MHz
Test method	ANSI C63.4:2014	Temperature	23 °C
Characteristics	Artificial mains network: 50 Ω, 50 μH	Humidity	36 % RH
Detector	Peak and average	Bandwidth	10 kHz
Test equipm.	Room 4 Aarhus Setup AEA1	Uncertainty	3.5 dB

Full Spectrum



- Preview Result 2-AVG
- Preview Result 1-PK+
- FCC Part 15 Class B Voltage on Mains QP
- FCC Part 15 Class B Voltage on Mains AV
- ◆ QuasiPeak-QPK
- ◆ Average-AVG

Line under test

Maximum of Line and Neutral



Test object	CURO Mk0	Sheet	CE-4
Type	V1.0.0	Project no.	117-24570
Serial no.	20160247	Date	12 Apr. 2017
Client	MyoDynamik ApS	Initials	MLHA
Specification	FCC part 15 Subpart B Class B ICES-003:2016 Class B	Frequency	0.15-30 MHz

Test method	ANSI C63.4:2014	Temperature	23 °C
Characteristics	Artificial mains network: 50 Ω, 50 μH	Humidity	36 % RH
Detector	Quasi peak	Bandwidth	10 kHz
Test equipm.	Room 4 Aarhus Setup AEA1	Uncertainty	3.5 dB

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE
0.172500	57.38	---	64.84	7.46	1000.0	9.000	N	FLO
0.174750	57.99	---	64.73	6.74	1000.0	9.000	L1	FLO
0.177000	58.12	---	64.63	6.51	1000.0	9.000	L1	FLO
0.368250	40.32	---	58.54	18.22	1000.0	9.000	L1	FLO
7.498500	29.57	---	60.00	30.43	1000.0	9.000	N	FLO
18.525750	32.04	---	60.00	27.96	1000.0	9.000	N	FLO

Line under test                      Maximum of Line and Neutral

Test result                              The measured voltages were below the limit

Compliant                                Yes

Comments                                Mains voltage: 110 VAC / 60 Hz.





Photo 4.6.1 Test setup regarding measurement of radio frequency voltage on mains.

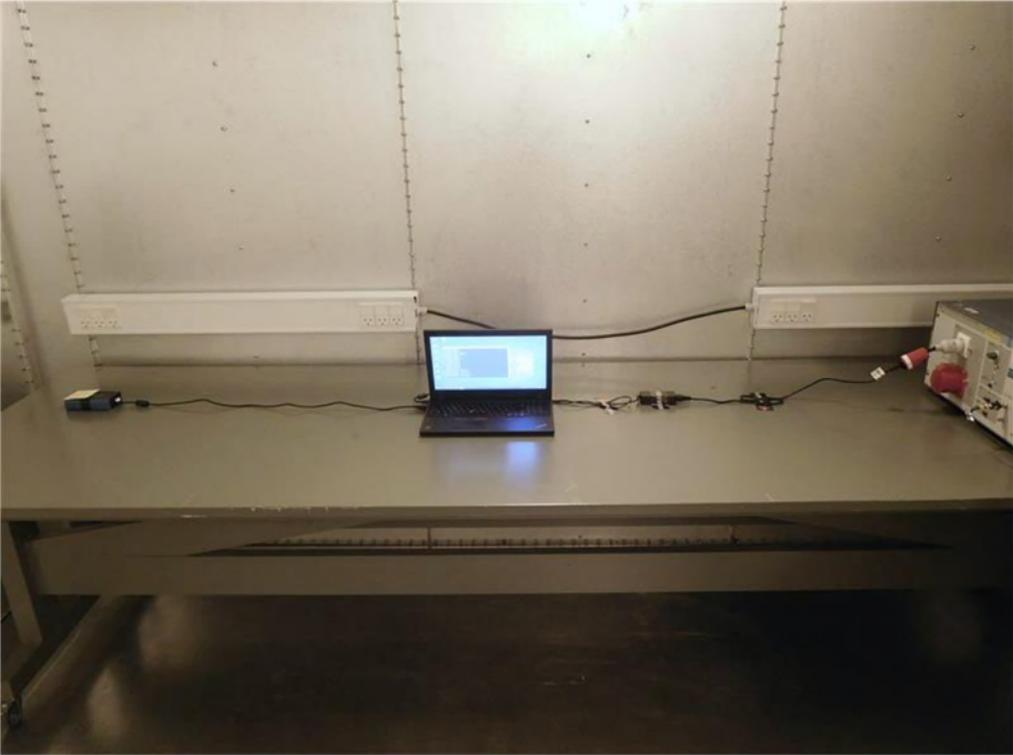


Photo 4.6.2 Test setup regarding measurement of radio frequency voltage on mains.



## 5. National registrations and accreditations

### 5.1 DANAK Accreditation

**Organization:** Danish Accreditation and Metrology Fund - DANAK,  
see [www.danak.dk](http://www.danak.dk) and [www.ilac.org](http://www.ilac.org)

**Registration Number:** 19

**Area Number:** K

DANAK is part of ILAC (International Laboratory Accreditation Cooperation) including its MRA (Mutual Recognition Arrangement). The MRA includes the Australian NATA and Canadian SCC.

The Swedish Transport Agency has designated DELTA to Technical Service for Sweden according to the regulatory acts 72/245/EEG, 97/24EG Chapter 8 and ECE-regulation No. 10. Date of designation 2014-09-23 expiry data 2017-09-23.

### 5.2 FCC Registrations

**Organization:** Federal Communications Commission, USA

**Registration Number:** 913950

**Facilities:** EMI room 1 Aarhus



## 6. List of instruments

<b>Setup AEA2</b>						
<b>Measurement of radio frequency voltage on mains</b>						
<b>ID no.</b>	<b>Description</b>	<b>Manufacturer</b>	<b>Type no.</b>	<b>Cal. date</b>	<b>Cal. exp.</b>	<b>Setup uncertainty</b>
162	Measuring receiver	Rohde & Schwarz	ESHS 10	20-06-2017	20-06-2018	3.5 dB
D010	Fuse	Anritsu	MP 612 A	16-01-2017	16-01-2018	
D116	Puls Limiter	Rohde & Schwarz	ESH3-Z2	16-01-2017	16-01-2018	
D024	Attenuator	Bird	8303-060-N	16-01-2017	16-01-2018	
K004	Coaxial cable	Suhner	RG 214	10-01-2017	10-01-2018	
K006	Coaxial cable	Suhner	RG 214	10-01-2017	10-01-2018	
D020	Attenuator	Bird	8302-060-BNC	10-01-2017	10-01-2018	
49567	AMN	Rohde & Schwarz	ESH2-Z5	20-07-2016	20-07-2017	

<b>Setup AEC1</b>						
<b>Measurement of radio frequency electromagnetic field 30-1000 MHz</b>						
<b>ID no.</b>	<b>Description</b>	<b>Manufacturer</b>	<b>Type no.</b>	<b>Cal. date</b>	<b>Cal. exp.</b>	<b>Setup uncertainty</b>
49555	Measuring receiver	Rohde & Schwarz	ESU 26	18-07-2017	18-07-2018	5.5 dB (10 m)
664	Pre-amplifier	Mini Circuit	ZX60-4016E-S+	17-11-2017	17-11-2018	
237	Bilog Antenna	Chase	CBL 6111 A	26-01-2016	26-01-2018	
667	RF Relay switch unit	DELTA	DC-18GHz relays	15-01-2016	01-07-2017	
K169	Coaxial cable	Huber+Suhner	Sucoflex 104	03-08-2016	03-08-2018	
K179	Coaxial cable	Huber+Suhner	Sucoflex 104	04-08-2016	04-08-2017	
K181	Coaxial cable	Huber+Suhner	Sucoflex 104B	04-08-2016	04-08-2017	
K214	Coaxial cable	Huber+Suhner	Sucoflex 404A	04-08-2016	04-08-2017	

<b>Setup AEC2</b>						
<b>Measurement of radio frequency electromagnetic field 1-18 GHz</b>						
<b>ID no.</b>	<b>Description</b>	<b>Manufacturer</b>	<b>Type no.</b>	<b>Cal. date</b>	<b>Cal. exp.</b>	<b>Setup uncertainty</b>
49555	Measuring receiver	Rohde & Schwarz	ESU 26	17-07-2016	17-07-2017	4.6 dB (3 m)
654	Pre-amplifier with selectable filters	Miteq	AFS4-00501800-40-20P-6 (2 pices)	18-11-2016	18-11-2017	
645	Horn Antenna	Rohde & Schwarz	HF907	24-06-2016	24-06-2018	
K174	Coaxial cable	Huber+Suhner	Sucoflex 404	03-08-2016	03-08-2017	
K180	Coaxial cable	Huber+Suhner	Sucoflex 104	02-08-2016	02-08-2017	
K181	Coaxial cable	Huber+Suhner	Sucoflex 104B	18-08-2016	04-08-2017	

