



Test report No:

NIE: 46631REM.002

Test Report

FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B (10-01-14 Edition); ICES-003 ISSUE 5 (2012)

&

ANSI C63.4-2014: American National standard for methods of measurements of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9kHz to 40GHz.

Identification of item tested.....:	POLAR A360 FITNESS TRACKER WITH WRIST-BASED HEART RATE
Trade	Polar
Model and /or type reference.....:	A360, model 1C
Other identification of the product	FCC ID: INW1C IC: 6248A-1C
Final HW version	45963.06
Final SW version	0.1.158
Features	Bluetooth Low Energy, OHR
Manufacturer	POLAR ELECTRO OY Professorintie 5, 90440 Kempele. Finland.
Test method requested, standard.....:	FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B (10-01-14 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2014
Summary	IN COMPLIANCE
Approved by (name / position & signature).....:	Rafael López EMC Lab Manager
Date of issue.....:	2015-09-24
Report template No.....:	FDT08_17

Index

Competences and guarantees	3
General conditions	3
Usage of samples	4
Test sample description	4
Identification of the client	4
Testing period	4
Environmental conditions	5
Remarks and comments	6
Testing verdicts (Legend)	6
List of equipment used during the test	6
Appendix A – Test result	7
Appendix B - Photographs	22

Competences and guarantees

AT4 wireless is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

In order to assure the traceability to other national and international laboratories, AT4 wireless has a calibration and maintenance program for its measurement equipment.

AT4 wireless guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at AT4 wireless at the time of performance of the test.

AT4 wireless is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of AT4 wireless, S.A.

General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of AT4 wireless.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of AT4 wireless and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the AT4 wireless internal document PODT000.

Usage of samples

Samples under test have been selected by: the Client.

Sample S/01 is composed of the following elements:

Control N°	Description	Model	Serial number	Reception date
46631/056	POLAR A260 FITNESS TRACKER WITH WRIST-BASED HEART RATE	A360, model 1C	C5341C1200335	2015-09-10
46631/064	USB cable	---	---	2015-09-10

Auxiliary element used with the sample S/01:

LENOVO Thinkpad laptop to power the EUT.

Test sample description

The test sample consists of a POLAR A360 fitness tracker with wrist-based heart rate.

Identification of the client

POLAR ELECTRO OY
Professorintie 5, 90440 Kempele, Finland.

Testing period

The performed test started on 2015-09-10 and finished on 2015-09-21.

The tests have been performed at AT4 wireless.

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 80 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 30 °C
Relative humidity	Min. = 45 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω
Normal site attenuation (NSA)	< ±4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Site VSWR	< ±6 dB at 3m distance between item under test and receiver antenna, (1 GHz to 18 GHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 18 GHz).

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 30 °C
Relative humidity	Min. = 45 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω

Remarks and comments

The test has been performed by the technical personnel: Antonio Jurado, Alberto Parada & Mario Alberto Ureña.

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 30 MHz to 1 GHz is $I = \pm 4,57$ dB for quasi-peak measurements, $I = \pm 4,48$ dB for peak measurements ($k = 2$) and from 1 to 12,75 GHz is $I = \pm 3,43$ dB for average and peak measurements.

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 12,75 GHz to 26 GHz is $I = \pm 4,09$ dB for average and peak measurements.

Testing verdicts (Legend)

Not applicable	N/A
Pass	P
Fail	F
Not measured	N/M

List of equipment used during the test					
CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
2942	EMI Receptor	ROHDE & SCHWARZ	ESU 40	2014-02-27	2016-02-27
2932	Biconilog Antenna	ETS LINDGREN	3142E	2014-03-17	2017-03-17
4656	Horn Antenna	SCHWARZBECK	BBHA 9170	2014-03-28	2017-03-28
1975	RF Amplifier	MITEQ	JS4	2014-05-22	2016-05-22
3783	RF Amplifier	BONN ELEKTRONIK	BLMA 0118-3A	2015-05-15	2016-05-15
4662	Transient Limiter	SCHWARZBECK	VTSD 9561-D	2014-02-12	2016-02-12
0224	Artificial Network	ROHDE & SCHWARZ	ESH2-Z5	2015-02-06	2017-02-06
4575	Digital temperature and humidity meter	T&D	TR-702W	2015-04-01	2016-04-01

Appendix A – Test result

CONTENT

DESCRIPTION OF THE OPERATION MODES	9
RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE.	10
CONTINUOUS CONDUCTED EMISSION ON POWER LEADS.....	17

DESCRIPTION OF THE OPERATION MODES

The operation modes used by the samples to which the present report refers, are shown in the following table:

OPERATION MODE	DESCRIPTION
OM#01	EUT ON. BTLE in IDLE mode. Power supply: 5Vdc. Powered by USB port.
OM#02	EUT ON. BTLE in TX mode. Power supply: 5Vdc. Powered by USB port.

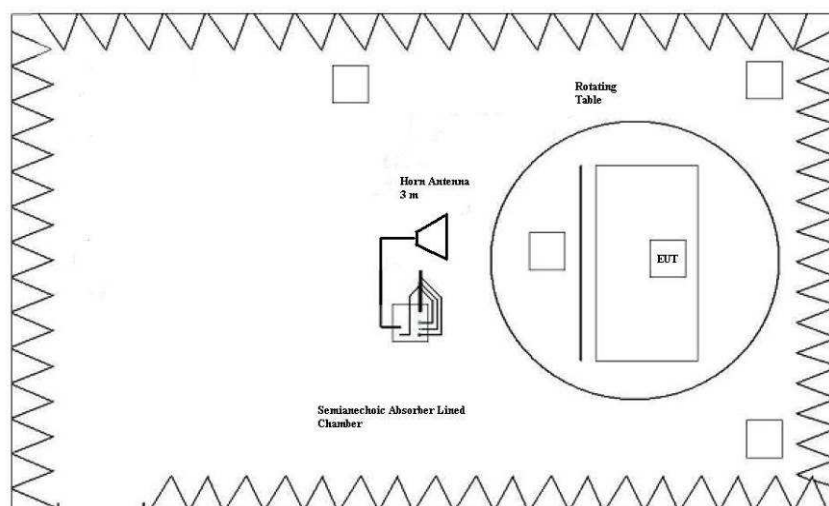
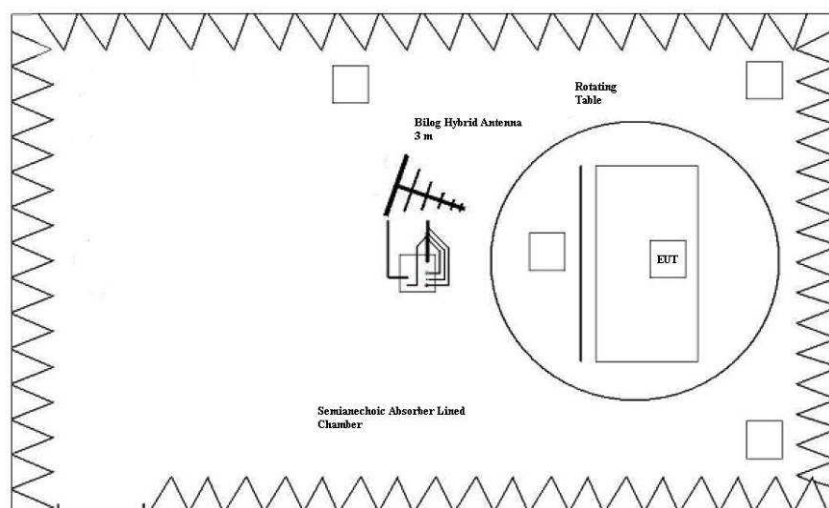
RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE.

LIMITS:	Product standard:	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-14 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2014
	Test standard:	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-14 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2014

LIMITS OF INTERFERENCE CLASS B:

The applied limit for radiated emissions, 3 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15.109, Subpart B (10-01-14 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2014 in the frequency range 30 MHz to 26 GHz, for Class B equipment, which is a transmitter in a band over 500 MHz, was:

Frequency range (MHz)	QP Limit for 3 m ($\mu\text{V/m}$)	QP Limit for 3 m ($\text{dB}\mu\text{V/m}$)
30 to 88	100	40
88 to 216	150	43,52
216 to 960	200	46,02
Above 960	500	53,98
Above 1000	Limit for 3m AVG	Limit for 3m PK
	53.98 $\text{dB}\mu\text{V/m}$	73.98 $\text{dB}\mu\text{V/m}$



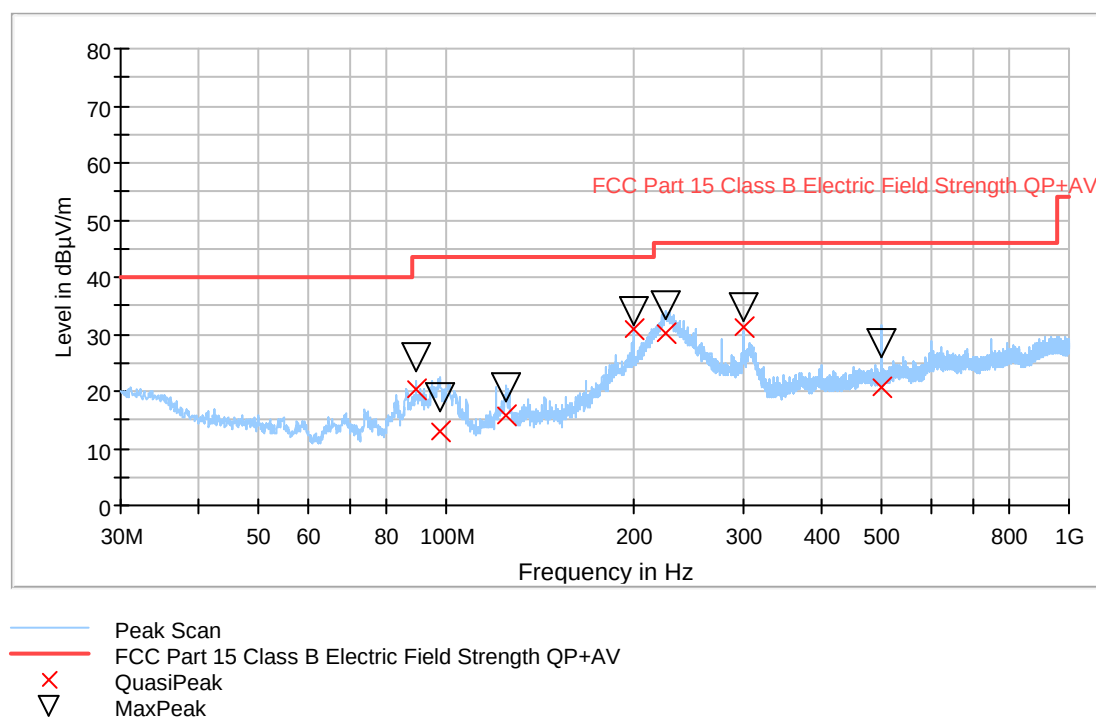
TESTED SAMPLES:	S/01
TESTED OPERATION MODES:	OM#01
TEST RESULTS :	CRmmnn: CR, Condición de Radiación; mm: Sample number; nn: Operation mode; xx: Measurement range; yy: Antenna polarization.

CRmmnnxxyy	Description	Result
CR0101	Range: 30MHz o 1GHz.	P
CR0101_RA1_PH	Range: 1GHz o 18GHz. Horizontal polarization.	P
CR0101_RA1_PV	Range: 1GHz o 18GHz. Vertical polarization.	P
CR0101_RA2_PH	Range: 18GHz o 26GHz. Horizontal polarization.	P
CR0101_RA2_PV	Range: 18GHz o 26GHz. Vertical polarization.	P

Radiated Emission: CR0101

Project: 46631REM.002
 Company: POLAR ELECTRO OY
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. BTLE in IDLE mode. Power Supply 5 VDC (USB port)

Full Spectrum



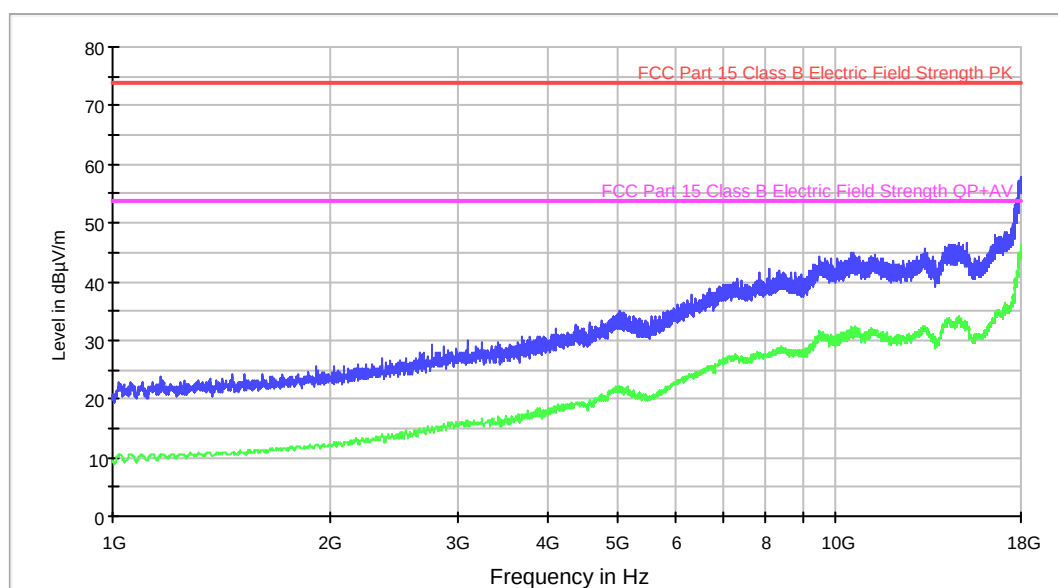
Maximizations

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)
89.409091	20.51	26.00
97.750649	13.08	18.98
124.796104	15.69	20.58
200.000000	30.95	33.90
224.515584	30.25	35.03
300.038961	31.25	34.91
500.000000	20.77	28.44

Radiated Emission: CR0101RA1_PH

Project: 46631REM.002
 Company: POLAR ELECTRO OY
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. BTLE in IDLE mode. Power Supply 5 VDC (USB port)

ER EMI FCC 15 Class B



— Peak Scan
 — FCC Part 15 Class B Electric Field Strength PK
 — Average Scan
 — FCC Part 15 Class B Electric Field Strength QP+AV

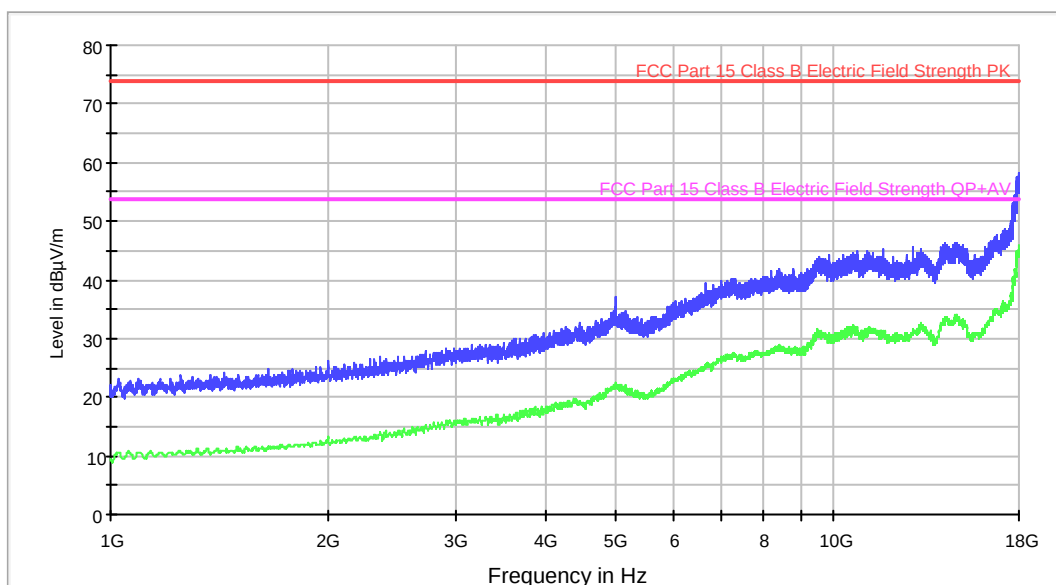
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
1166.000000	23.7	10.5
1609.000000	24.3	11.2
2361.000000	26.8	13.7
3094.000000	30.0	16.3
4102.000000	32.1	17.9
5031.000000	35.2	22.0
7290.000000	40.4	26.9
9491.000000	44.4	31.2
13262.000000	45.8	32.4
17998.000000	58.0	46.1

Radiated Emission: CR0101RA1_PV

Project: 46631REM.002
Company: POLAR ELECTRO OY
Sample: S/01
Operation mode: OM#01
Description: EUT ON. BTLE in IDLE mode. Power Supply 5 VDC (USB port)

ER EMI FCC 15 Class B



— Peak Scan
— FCC Part 15 Class B Electric Field Strength PK
— Average Scan
— FCC Part 15 Class B Electric Field Strength QP+AV

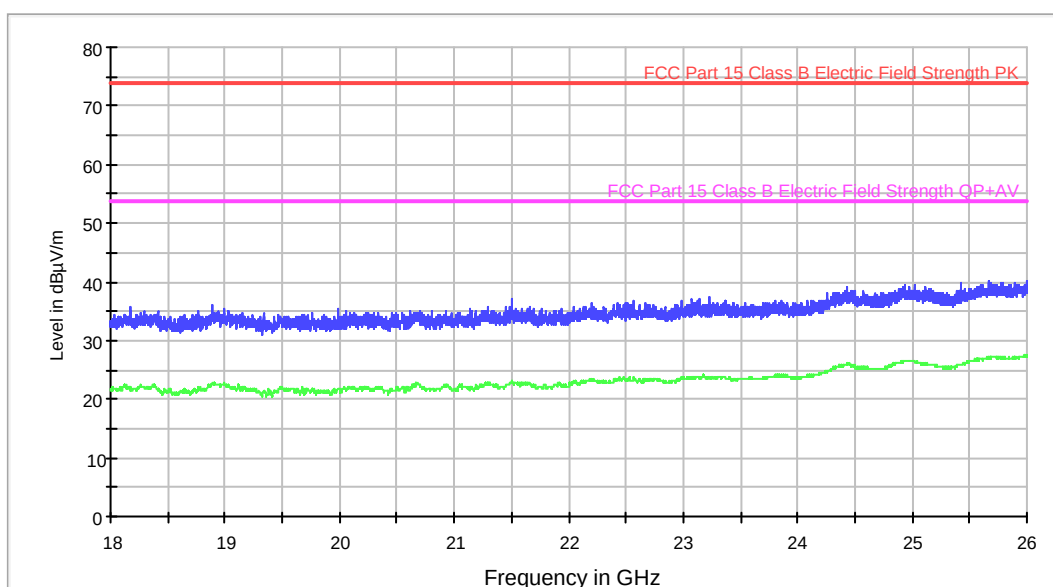
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
1252.000000	23.9	10.6
1650.000000	24.7	11.3
2353.000000	26.9	13.9
3164.000000	29.0	16.2
4196.000000	31.7	19.1
4991.000000	37.2	22.4
7203.000000	40.2	27.1
9867.000000	44.1	30.7
12865.000000	45.5	31.3
17965.000000	58.1	45.1

Radiated Emission: CR0101RA2_PH

Project: 46631REM.002
Company: POLAR ELECTRO OY
Sample: S/01
Operation mode: OM#01
Description: EUT ON. BTLE in IDLE mode. Power Supply 5 VDC (USB port)

ER EMI FCC 15 Class B



— Peak Scan
— FCC Part 15 Class B Electric Field Strength PK
— Average Scan
— FCC Part 15 Class B Electric Field Strength QP+AV

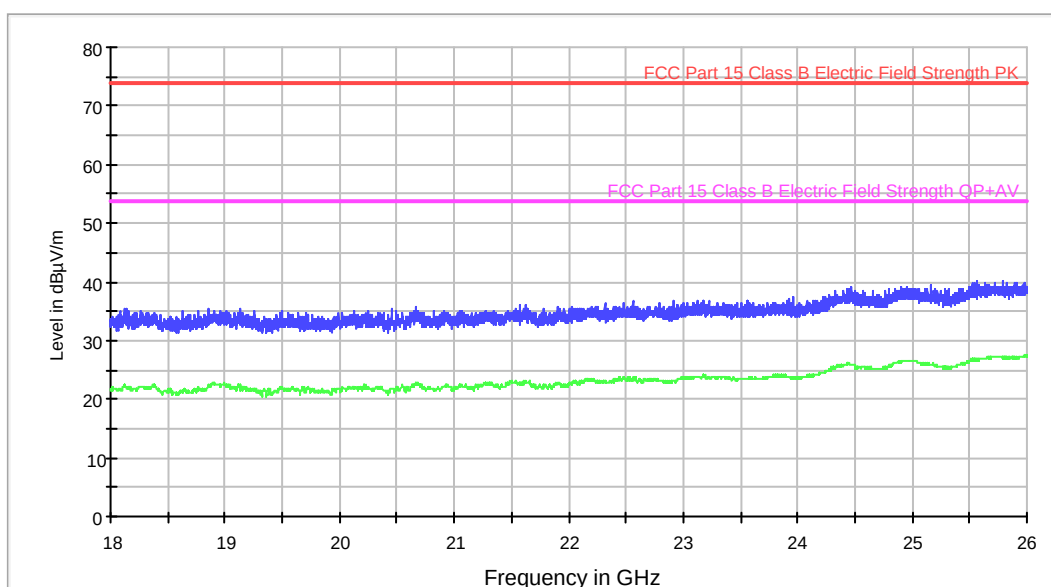
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
18176.000000	35.8	22.0
18891.000000	36.0	22.7
19982.000000	35.5	21.7
20804.000000	35.0	21.8
21508.000000	37.0	23.0
22432.000000	36.6	23.4
23233.000000	37.4	23.7
24085.000000	36.8	24.0
25020.000000	39.4	26.5
25998.000000	40.1	27.4

Radiated Emission: CR0101RA2_PV

Project: 46631REM.002
 Company: POLAR ELECTRO OY
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. BTLE in IDLE mode. Power Supply 5 VDC (USB port)

ER EMI FCC 15 Class B



— Peak Scan
 — FCC Part 15 Class B Electric Field Strength PK
 — Average Scan
 — FCC Part 15 Class B Electric Field Strength QP+AV

Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
18126.000000	35.5	22.2
18849.000000	35.4	22.1
19499.000000	35.2	21.8
20674.000000	35.7	22.9
21630.000000	36.0	22.9
22314.000000	36.5	23.1
22908.000000	36.9	23.1
23966.000000	37.6	23.7
24952.000000	39.1	26.6
25796.000000	40.1	27.0

CONTINUOUS CONDUCTED EMISSION ON POWER LEADS

LIMITS:	Product standard :	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-14 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2014
	Test standard :	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-14 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2014

CLASS B

The applied limit for continuous conducted emissions in power leads, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-01-14 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2014, in the frequency range 0,15 to 30 MHz, for Class B equipment was:

Frequency range (MHz)	Limit (dBµV)	
	Quasi-peak	Average
0,15 to 0,5	66-56	56-46
0,5 to 5	56	46
5 to 30	60	50

TESTED SAMPLES:	S/01
TESTED OPERATION MODES:	OM#01 & OM#02
TEST RESULTS :	CCmmnnhh: CC, Conducted Condition; mm: Sample number; nn: Operation mode; hh: wire

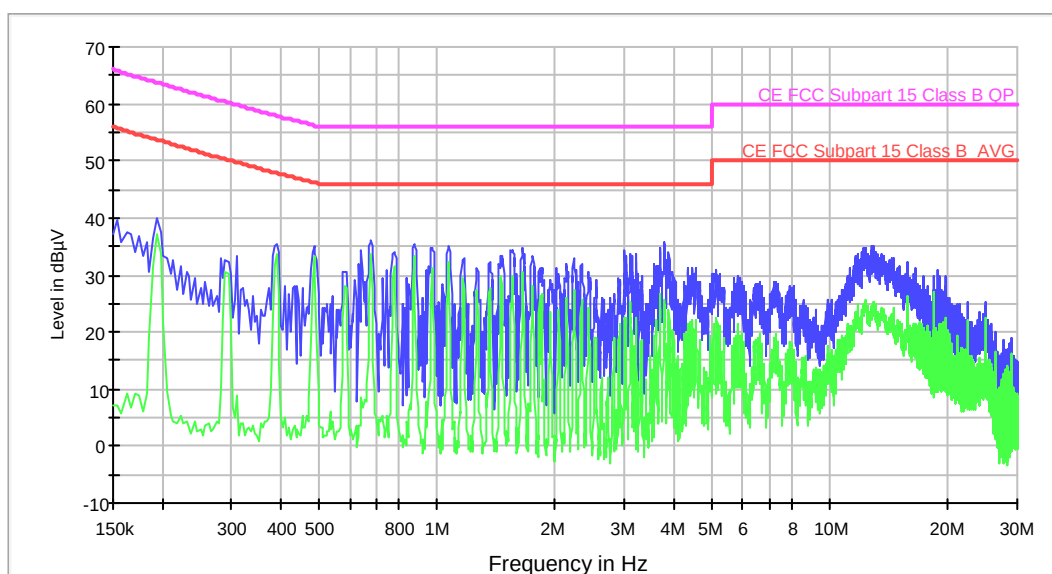
CCmmnnhh	Description	Result
CC01010N	Neutral wire noise. Part 15.107.	P
CC0101L1	Phase wire noise. Part 15.107.	P
CC01020N	Neutral wire noise. Part 15.207.	P
CC0102L1	Phase wire noise. Part 15.207.	P

Continuous Conducted Emission : CC01010N

Detector : Peak / Average / Cuasi-peak

Project: 46631REM.002
 Company: POLAR
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. BTLE in IDLE mode. Power Supply 5 VDC (USB port).
 Neutral Noise.

EC FCC Class B ESU CC



— Peak Scan
 — CE FCC Subpart 15 Class B AVG
 — Average Scan
 — CE FCC Subpart 15 Class B QP

Subrange Maxima

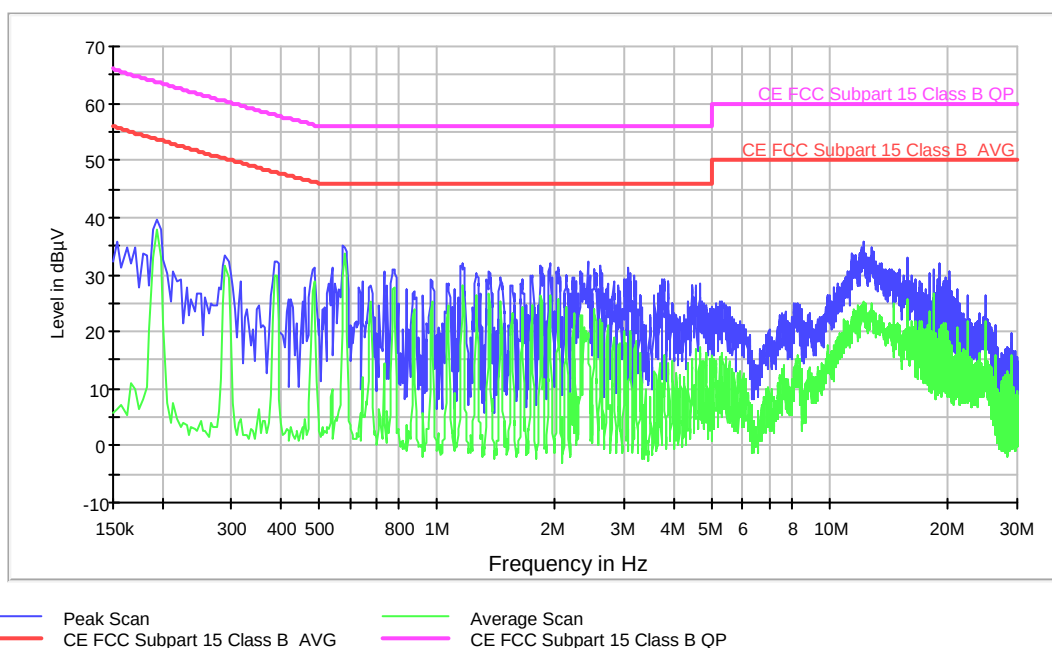
Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.194000	39.9	37.2
0.390000	35.3	33.8
0.682000	36.1	33.7
0.874000	35.3	33.2
1.650000	34.6	29.5
3.010000	34.4	22.5
3.794000	35.7	22.1
7.190000	28.8	18.4
12.766000	35.0	23.2
18.750000	30.9	19.9

Continuous Conducted Emission : CC0101L1

Detector : Peak / Average / Cuasi-peak

Project: 46631REM.002
 Company: POLAR
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. BTLE in IDLE mode. Power Supply 5 VDC (USB port).
 Phase Noise.

EC FCC Class B ESU CC



Subrange Maxima

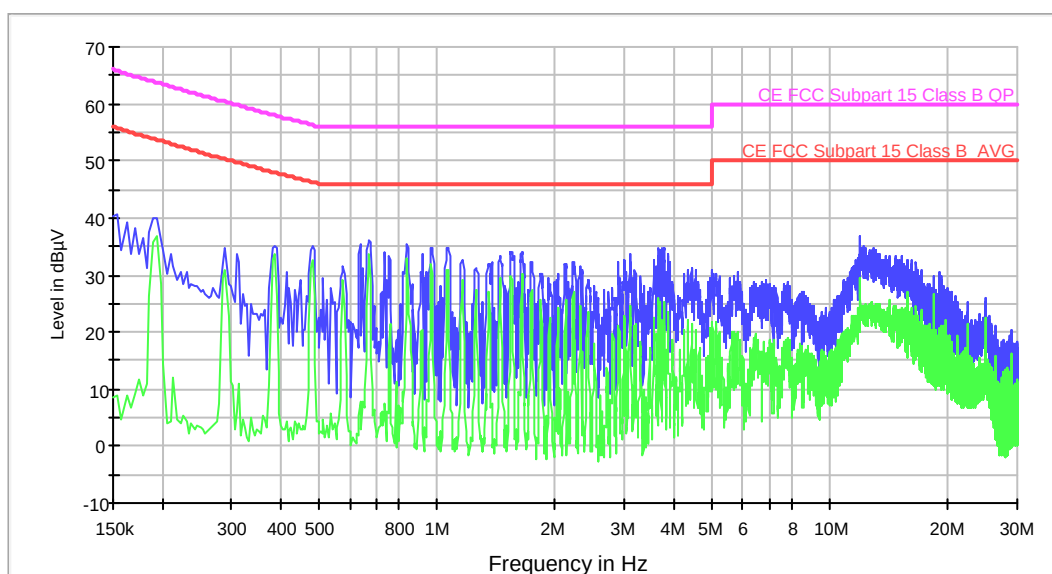
Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.194000	39.8	38.0
0.290000	33.3	31.6
0.578000	34.9	29.5
1.162000	31.8	27.9
1.942000	31.9	26.2
2.414000	32.4	19.0
3.778000	29.2	14.5
10.266000	27.6	17.5
12.158000	35.9	24.1
18.934000	31.8	15.9

Continuous Conducted Emission : CC01020N

Detector : Peak / Average / Cuasi-peak

Project: 46631REM.002
 Company: POLAR
 Sample: S/01
 Operation mode: OM#02
 Description: EUT ON. BTLE in Tx mode. Power Supply 5 VDC (USB port).
 Neutral Noise.

EC FCC Class B ESU CC



— Peak Scan
 — CE FCC Subpart 15 Class B AVG
 — Average Scan
 — CE FCC Subpart 15 Class B QP

Subrange Maxima

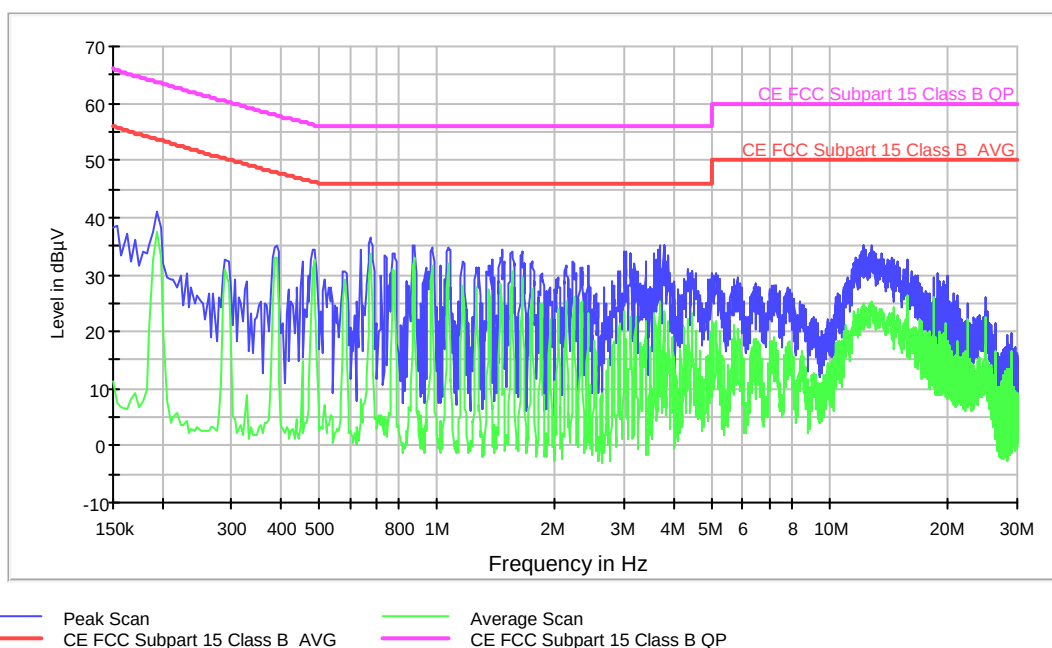
Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.154000	40.8	9.0
0.386000	35.0	33.5
0.674000	36.0	33.6
0.842000	35.3	33.1
1.554000	34.1	26.9
3.094000	33.6	24.6
3.786000	34.9	22.5
6.858000	29.1	16.2
11.970000	36.8	29.5
19.054000	30.7	19.7

Continuous Conducted Emission : CC0102L1

Detector : Peak / Average / Cuasi-peak

Project: 46631REM.002
 Company: POLAR
 Sample: S/01
 Operation mode: OM#02
 Description: EUT ON. BTLE in Tx mode. Power Supply 5 VDC (USB port).
 Phase Noise.

EC FCC Class B ESU CC



Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.194000	41.1	37.6
0.390000	35.0	32.9
0.678000	36.3	33.8
0.870000	35.2	31.1
1.466000	34.2	20.5
3.002000	34.0	22.5
3.786000	35.2	23.4
6.494000	28.3	18.4
12.238000	35.1	25.1
18.746000	30.1	17.7