



AT4 wireless, S.A.

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Libro 82, Folio 133, Hoja MA3729

TEST REPORT (Modification 1)

REFERENCE STANDARD:

FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B (10-01-12 Edition)

&

ANSI C63.4 (2009)

FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B:

Radio frequency devices Subpart B. Unintentional radiators

&

American National Standard for Methods of Measurement of Radio Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

NIE : 39402REM.006A1

Approved by Rafael López
(name / position & signature) : EMC LAB Manager

Elaboration date : 2014-01-27



Firmado digitalmente
por Rafael López Martín
Fecha: 2014.01.30
09:55:51 +01'00'

Identification of item tested : Polar V800

Trademark : Polar

Model and/or type reference : Z0

Other identification of the product : S/N : C348Z00900445

HW Version: 1.0

SW Version: 0.8.10

FCC ID: INWZ0

IC: 6248A-Z0 MODEL: Z0

Features : Bluetooth Low Energy and Basic Rate / EDR, GPS

Description : Activity monitor samples with normal SW controlled with R&D
Polar training computer for regulatory testing.

Applicant : POLAR ELECTRO OY.

Address..... : Professorintie 5, 90440 Kempele, FINLAND

CIF/NIF/Passport..... : VAT FI02099112

Contact person..... : Antti Häggman

Telephone / Fax : +358 8 5202100 / +358 8 5202220

e-mail..... : antti.haggman@polar.com

Test samples supplier	POLAR ELECTRO OY.
Address.....	Professorintie 5, 90440 Kempele, FINLAND
CIF/NIF/Passport.....	VAT FI02099112
Contact person.....	Antti Häggman
Telephone / Fax	+358 8 5202100 / +358 8 5202220
e-mail.....	antti.haggman@polar.com
Manufacturer	POLAR ELECTRO OY.
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Contact person.....	Antti Häggman
Telephone / Fax	+358 8 5202100 / +358 8 5202220
e-mail.....	antti.haggman@polar.com
Test method requested	
Standard.....	FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B (10-01-12 Edition).
Test procedure.....	PEEM103
Report template No.....	FDT11_14

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Competences and guarantees

This certificate of conformity was issued in accordance with the decision Nº 3/2000 of the Joint Committee established under the Agreement on Mutual Recognition between the European Community and the United States of America. By this decision, AT4 wireless can act as Conformity Assessment Body (CAB) on Electromagnetic Compatibility. This Certificate applies to the samples listed at technical reports.

This laboratory is designed by the Federal Communications Commission (ES0004)

AT4 wireless is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, AT4 wireless has a calibration and maintenance programme 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.

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 following AT4 wireless's internal documents:

1. PODT000: Procedure for the measure uncertainty calculation.

Usage of samples

Samples under test have been selected by: The client.

Sample S/01 is composed of the following element:

<u>Control Nº</u>	<u>Description</u>	<u>Model</u>	<u>Serial Nº</u>	<u>Date of reception</u>
39402/60	Polar V800	Z0	C348Z00900445	2013-12-17

Auxiliary elements used with the sample S/01:

<u>Control Nº</u>	<u>Description</u>	<u>Model</u>	<u>Serial Nº</u>	<u>Date of reception</u>
36156B/18	Pulse simulator	---	---	2012-10-29
38879/48	Bluetooth device	H7	C346X00782314	2013-12-04
2862	Laptop PC	Toshiba A100-121 Model: PSAA8E – 0XY04SSP	X6255337Q	N/A
---	Keyboard	---	---	N/A
---	Mouse	---	---	N/A

Testing period

The performed test started on 2013-12-22 and finished on the 2014-01-07.

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	< 0,5 Ω

In the semianechoic chamber (21 meters x 11 meters x 8 meters), 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	< 0,5 Ω
Normal site attenuation (NSA)	< ±4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 1000 MHz).

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	< 0,5 Ω

Modifications to the reference test report

It was introduced the following modifications in respect to the test report number 39402REM.006 related with the same samples, in the next clauses and sub-clauses:

By client requirement it was added the ANSI C63.4 (2009) standard, it was added new photographs with the auxiliary laptop PC as part of the setup and it was added the auxiliary PC and elements description to the page 5 table.

Summary

Considering the results of the performed test according to standard **FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B (10-01-12 Edition) & ANSI C63.4 (2009)**, the items under test are **IN COMPLIANCE** with the requested specifications specified in the standard.

NOTE: The results presented in this Test Report apply only to the particular item under test established in page 1 of this document, as presented for test on the date(s) shown in section, "USAGE OF SAMPLES, TESTING PERIOD AND ENVIRONMENTAL CONDITIONS".

Remarks and comments

The tests have been realized by the technical personnel: Pedro Manuel Valenzuela Comino.

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

Not applicable : NA

Pass..... : P

Fail : F

Not measured..... : NM

List of equipment used during the test

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
1999	EMI Receptor	ROHDE & SCHWARZ	ESIB 26	2013-05-30	2015-05-30
2942	EMI Receptor	ROHDE & SCHWARZ	ESU 40	2012-03-05	2014-03-05
245	Horn Antenna	HEWLETT PACKARD	11966E	2011-03-18	2014-03-18
246	Horn Antenna	HEWLETT PACKARD	11966E	2013-03-06	2015-03-06
1658	RF Amplifier	SCHAFFNER	CPA9231A	2013-06-15	2015-06-15
3541	Bilog Hybrid antenna	SUNOL SCIENCES CORPORATION	JB6	2012-06-01	2015-06-01
3643	Thermohygrometer and probe	TESTO	625	2013-03-06	2015-03-06
3822	Horn Antenna	ROHDE & SCHWARZ	HF907	2012-08-29	2015-08-29

APPENDIX A

Test Result

APPENDIX A CONTENT:

DESCRIPTION OF THE OPERATION MODES.....	9
RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE.	10
CONTINUOUS CONDUCTED EMISSION ON POWER LEADS	16

DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. Every operation mode takes a failure criteria for the immunity test that they were applying to it and a monitoring to guarantee performance of the same ones.

In the following table appears the operation modes used by the samples tested to that it refers the present test report.

OPERATION MODE	DESCRIPTION
OM#01	EUT ON. Bluetooth in Idle mode. Equipment charging batteries by means of a 5Vdc USB connection.
OM#02	EUT ON. Equipment with the Bluetooth linked to a device and realizing a “Fitness Test – Relax and Start the test”. Equipment charging batteries by means of a 5Vdc USB connection.

RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE.

LIMITS:	Product standard:	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-12 ED) & ANSI C63.4 (2009)
	Test standard:	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-12 ED) & ANSI C63.4 (2009)

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 (10-01-12 Edition) & ANSI C63.4 (2009) in the frequency range 30 MHz to 25 GHz, for Class B equipment, which is a transmitter in a band over 500 MHz, was:

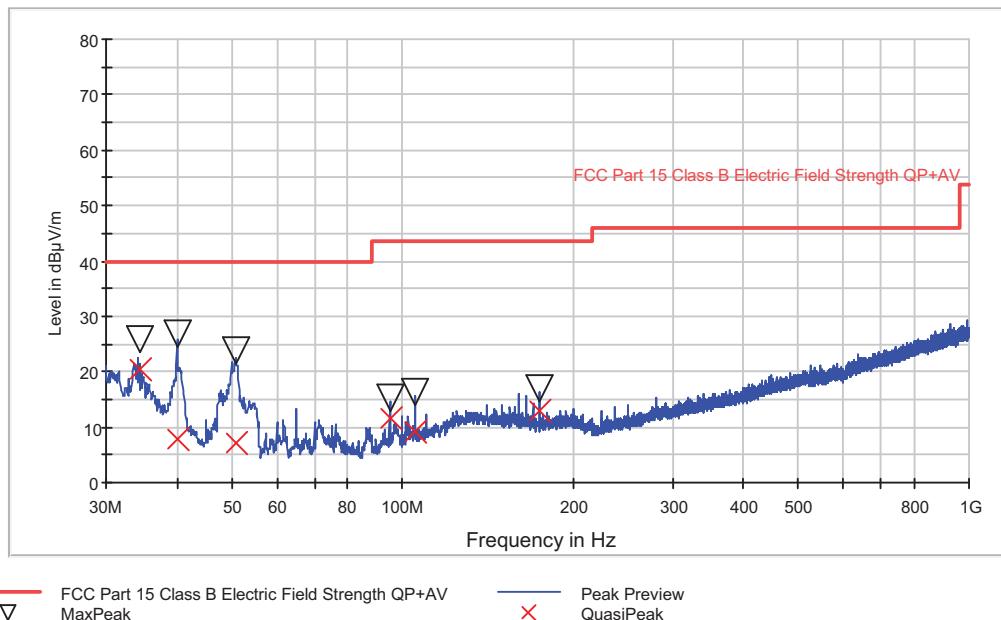
Frequency range (MHz)	Limit for 3 m (μ V/m)	Limit for 3 m (dB μ V/m)
30 to 88	100	40
88 to 216	150	43,52
216 to 960	200	46,02
Above 960	500	53,98

TESTED SAMPLES:	S/01
TESTED OPERATION MODES:	OM#01
TEST RESULTS :	CRmmnn: CR, Radiation Condition; mm: Sample number; nn: Operation mode, xx: Polarisation.

CRmmnn	Description	Result
CR0101	EUT ON. Idle Bluetooth. Range 30MHz-1 GHz.	P
CR0101_RA1_PH	EUT ON. Idle Bluetooth. Range 1-18 GHz. Horizontal Pol.	P
CR0101_RA1_PV	EUT ON. Idle Bluetooth. Range 1-18 GHz. Vertical Pol.	P
CR0101_RA2_PH	EUT ON. Idle Bluetooth. Range 18-26 GHz. Horizontal Pol.	P
CR0101_RA2_PV	EUT ON. Idle Bluetooth. Range 18-26 GHz. Vertical Pol.	P

Radiated Emission: CR0101 (30MHz to 1GHz)

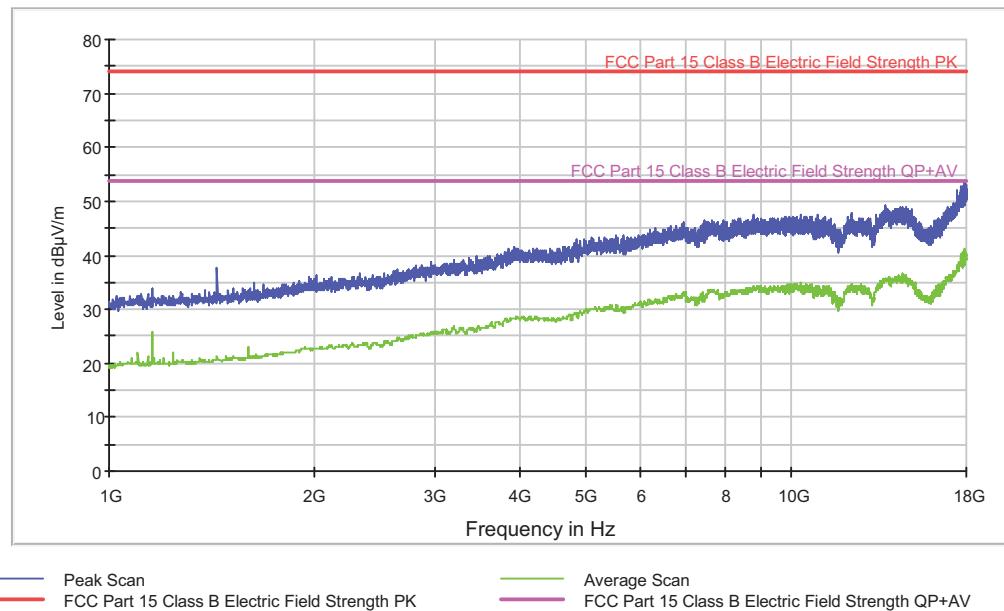
Project: 39402REM.006
 Company: POLAR ELECTRO OY
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. Bluetooth in Idle mode. Equipment charging batteries by means of a 5Vdc USB connection.

FCC class B Bilog Hybrid

Maximizations

Frequency (MHz)	MaxPeak (dB μ V/m)	QuasiPeak (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)
34.545691	25.9	20.3	98.0	V	6.0
40.067134	27.0	7.8	358.0	V	118.0
50.832866	23.9	7.2	118.0	V	330.0
94.976954	15.4	11.7	312.0	H	341.0
104.978958	16.2	9.2	98.0	V	71.0
175.009018	16.9	12.9	320.0	V	167.0

Radiated Emission: CR0101_RA1_PH (1 – 18 GHz)

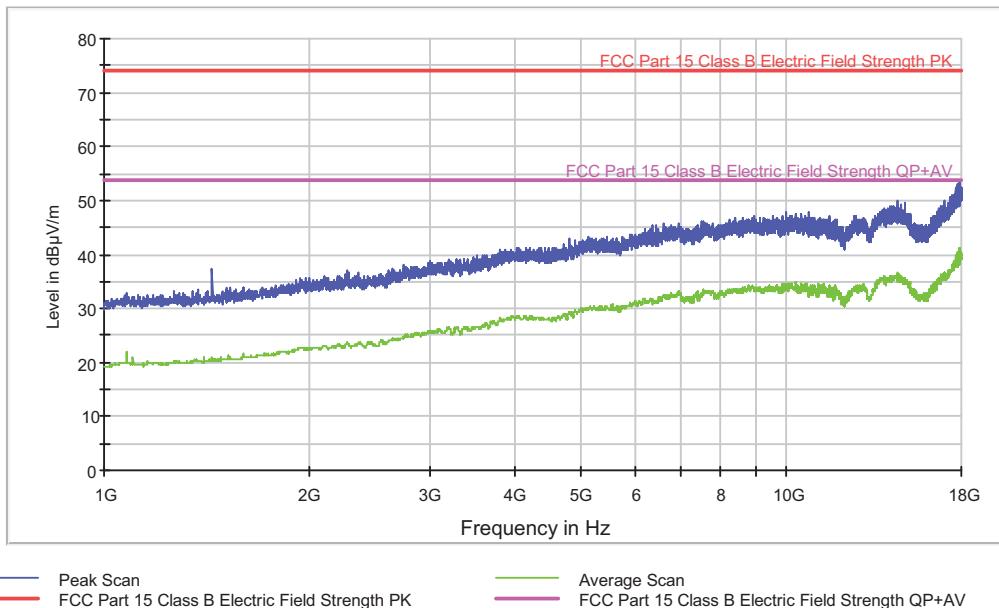
Project: 39402REM.006
 Company: POLAR ELECTRO OY
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. Bluetooth in Idle mode. Equipment charging batteries by means of a 5Vdc USB connection. Horizontal polarization.

FCC 1-18GHz class B ESIB Horn0245 AMP3783

Max PK-AVG

Frequency (MHz)	MaxPeak-ClearWrite (dB μ V/m)	Average-ClearWrite (dB μ V/m)
1160.000000	34.0	25.7
1440.000000	37.6	21.4
2010.000000	36.3	22.7
2619.000000	37.1	24.1
3196.000000	39.2	26.7
3918.000000	41.5	28.3
5085.000000	43.5	30.0
6774.000000	45.5	32.6
8405.000000	46.7	33.6
10280.000000	47.6	34.9
13657.000000	49.1	35.5
17915.000000	53.6	41.0

Radiated Emission: CR0101_RA1_PV (1 – 18 GHz)

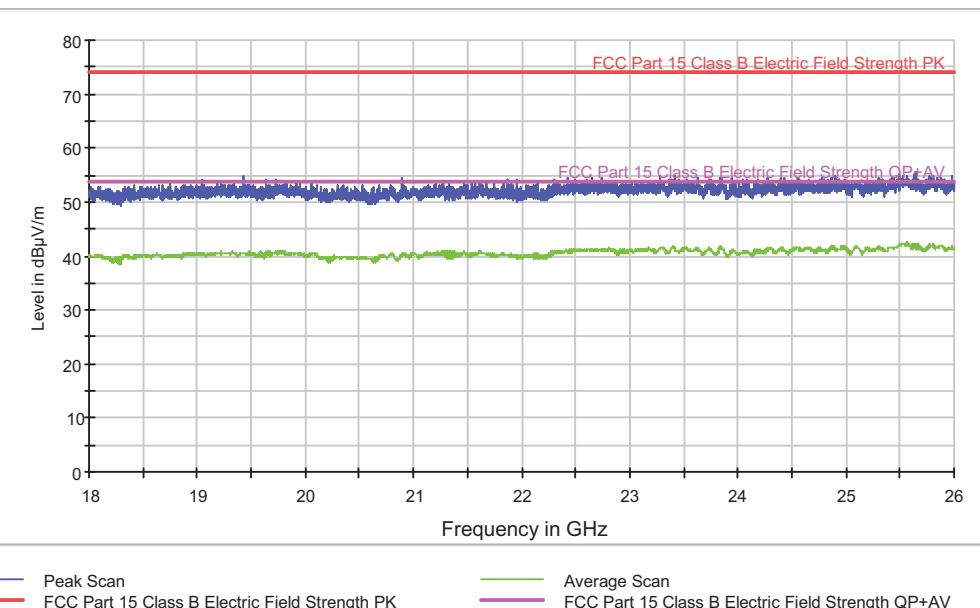
Project: 39402REM.006
 Company: POLAR ELECTRO OY
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. Bluetooth in Idle mode. Equipment charging batteries by means of a 5Vdc USB connection. Vertical polarization.

FCC 1-18GHz class B ESIB Horn0245 AMP3783

Max PK-AVG

Frequency (MHz)	MaxPeak-ClearWrite (dB μ V/m)	Average-ClearWrite (dB μ V/m)
1262.000000	33.3	20.1
1440.000000	37.4	21.0
1972.000000	35.8	22.4
2604.000000	37.2	23.9
3188.000000	39.2	26.3
4149.000000	41.4	28.2
5109.000000	43.3	30.1
6609.000000	45.6	32.3
8404.000000	46.9	33.4
9961.000000	47.7	34.6
14048.000000	48.7	35.5
17926.000000	53.5	40.9

Radiated Emission: CR0101_RA2_PH (18 – 26 GHz)

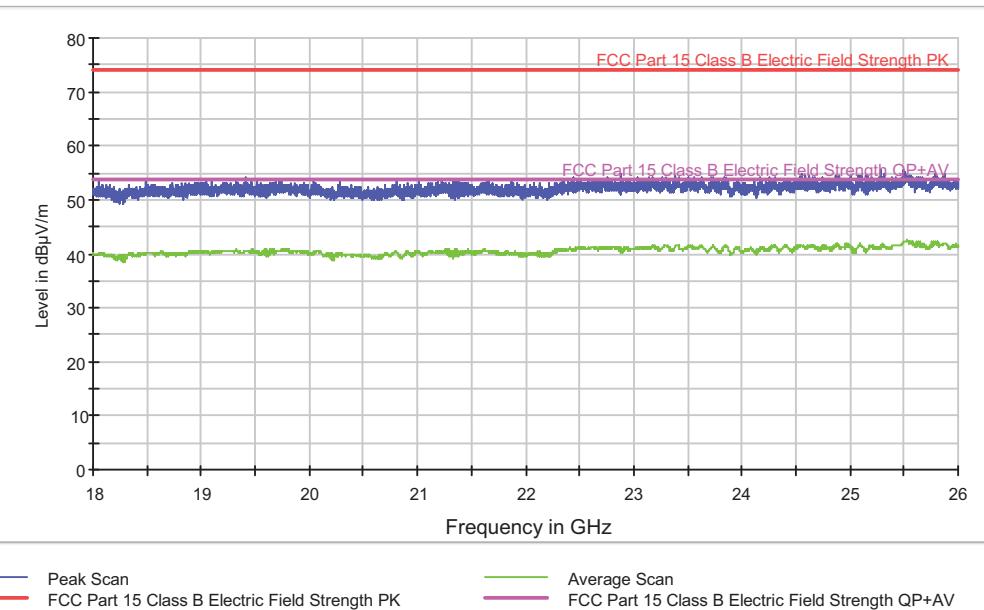
Project: 39402REM.006
 Company: POLAR ELECTRO OY
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. Bluetooth in Idle mode. Equipment charging batteries by means of a 5Vdc USB connection. Horizontal polarization.

FCC 18-26GHz class B ESIB Horn1920 AMP1975

Max PK-AVG

Frequency (MHz)	MaxPeak-ClearWrite (dB μ V/m)	Average-ClearWrite (dB μ V/m)
18421.000000	52.9	39.7
19038.000000	54.2	40.4
19433.000000	54.9	40.6
19922.000000	53.9	40.4
20901.000000	54.4	40.5
21575.000000	53.9	40.4
22303.000000	54.2	40.8
22650.000000	54.7	41.1
23415.000000	54.8	41.6
24401.000000	54.5	41.3
24899.000000	54.8	41.4
25653.000000	55.5	41.8

Radiated Emission: CR0101_RA2_PV (18 – 26 GHz)

Project: 39402REM.006
 Company: POLAR ELECTRO OY
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. Bluetooth in Idle mode. Equipment charging batteries by means of a 5Vdc USB connection. Vertical polarization.

FCC 18-26GHz class B ESIB Horn1920 AMP1975

Max PK-AVG

Frequency (MHz)	MaxPeak-ClearWrite (dB μ V/m)	Average-ClearWrite (dB μ V/m)
18486.000000	53.5	40.2
19094.000000	53.4	40.3
19417.000000	54.1	40.5
19738.000000	53.8	40.7
20814.000000	53.3	40.2
21329.000000	53.9	40.6
21656.000000	53.7	40.3
22877.000000	54.8	41.1
23380.000000	54.7	41.2
23721.000000	54.3	41.3
24551.000000	54.7	41.6
25288.000000	55.6	41.5

CONTINUOUS CONDUCTED EMISSION ON POWER LEADS

LIMITS:	Product standard :	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-12 ED) & ANSI C63.4 (2009)
	Test standard :	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-12 ED) & ANSI C63.4 (2009)

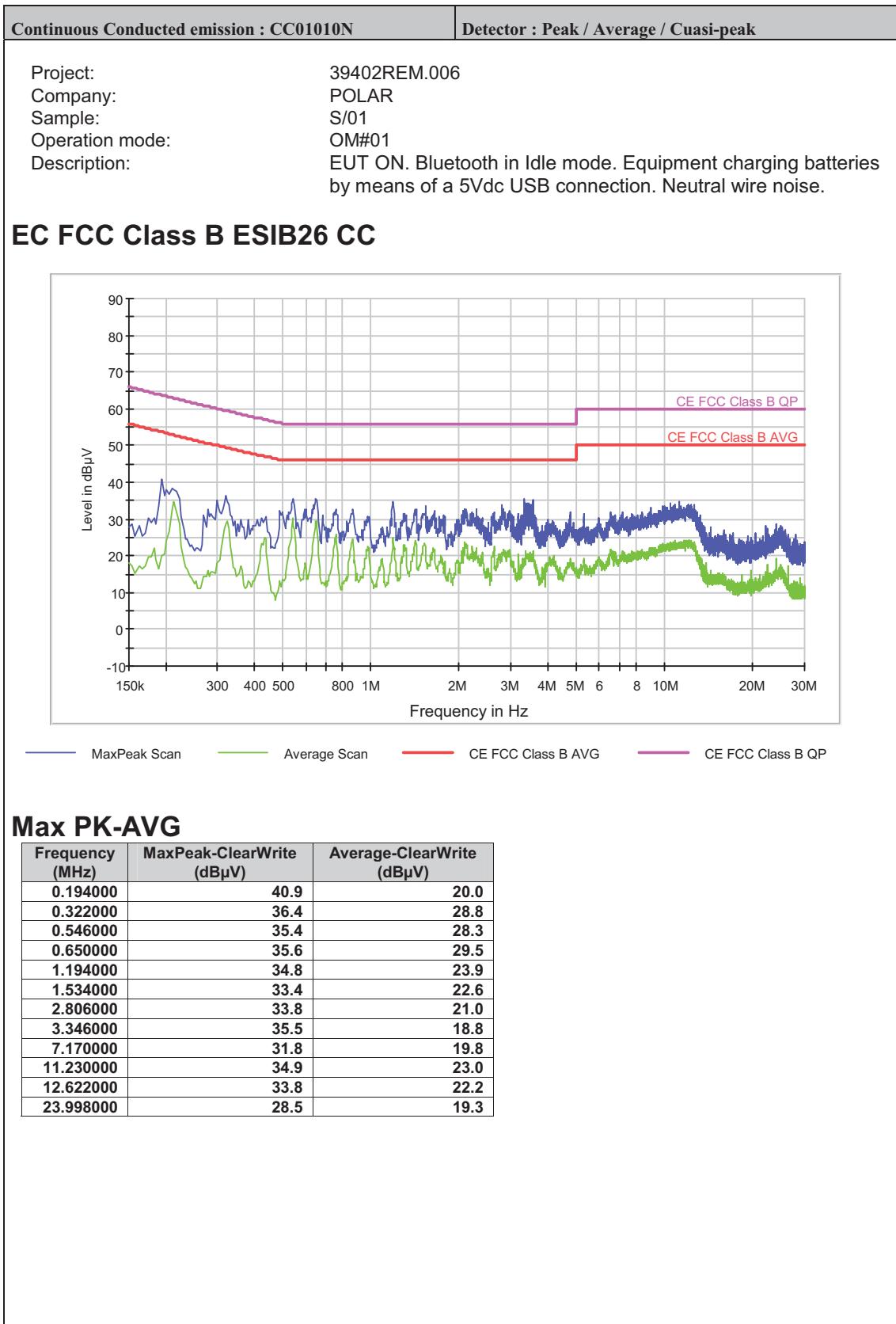
CLASS B

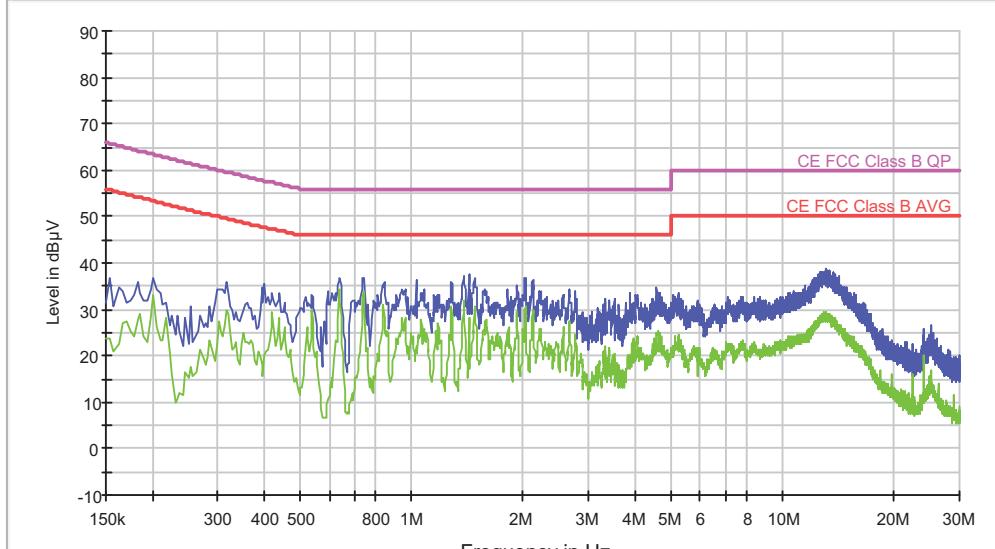
The applied limit for continuous conducted emissions in power leads, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-01-12 Edition) & ANSI C63.4 (2009) in the frequency range 0,15 to 30 MHz, for Class B equipment was:

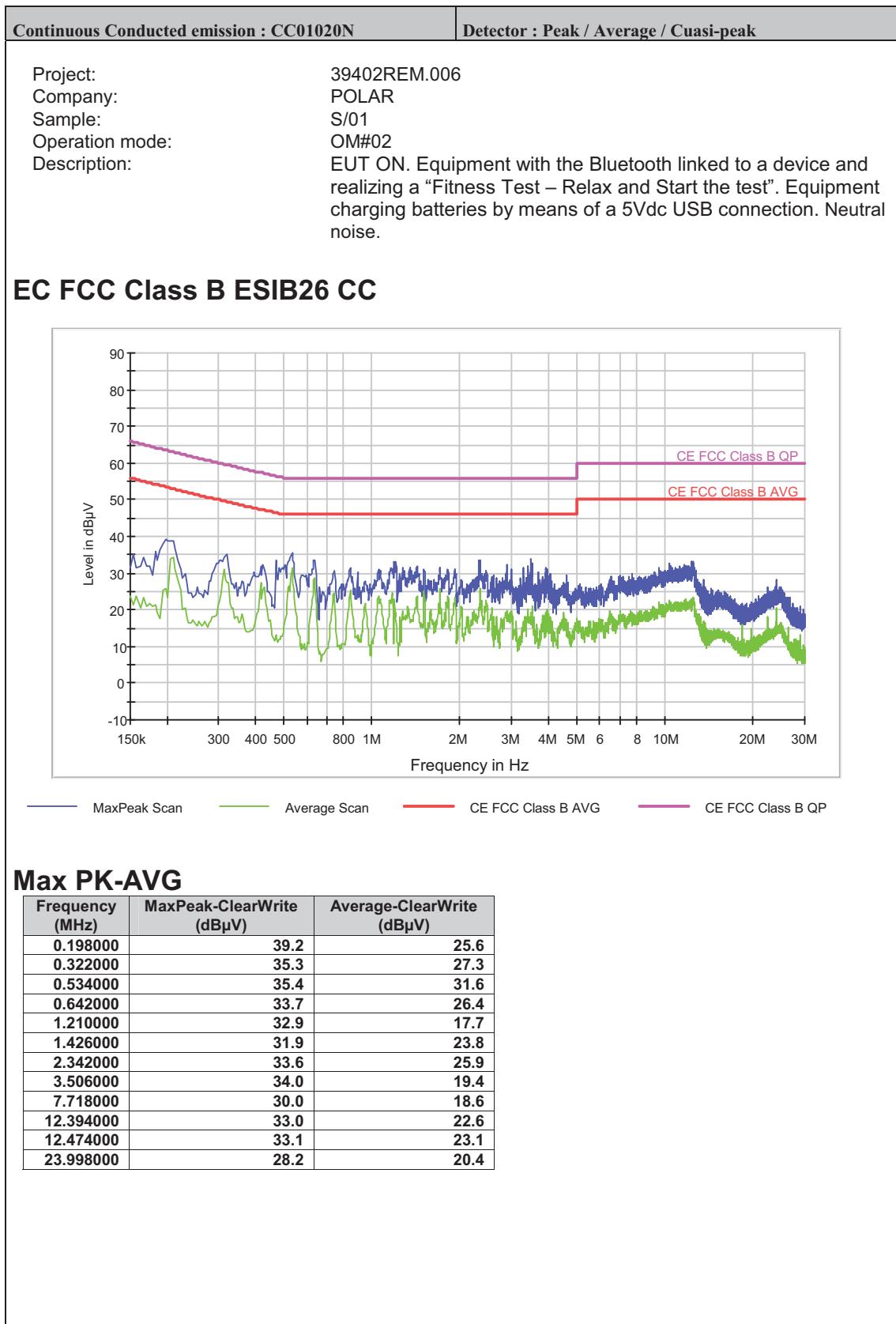
Frequency range (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0,15 to 0,5	66-56	56-46
0,5 to 5	56	46
5 to 30	60	50

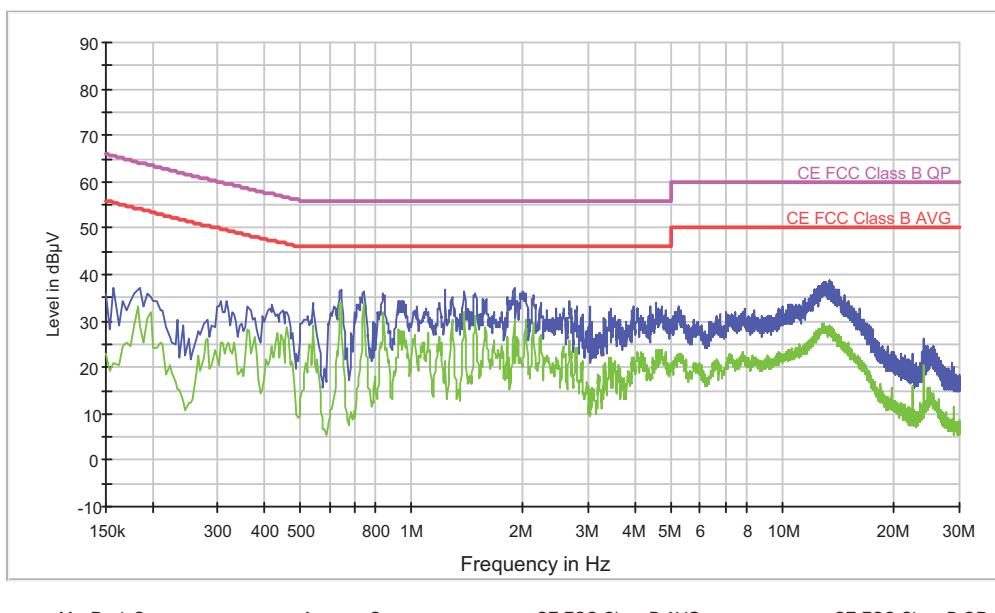
TESTED SAMPLES:	S/01
TESTED OPERATION MODES:	OM#01 & 02
TEST RESULTS :	CCmnnhh: CC, Conducted Condition; mm: Sample number; nn: Operation mode; hh: wire

CCmnnhh	Description	Result
CC01010N	Neutral wire noise	P
CC0101L1	Phase wire noise	P
CC01020N	Neutral wire noise	P
CC0102L1	Phase wire noise	P



Continuous Conducted emission : CC0101L1	Detector : Peak / Average / Cuasi-peak																																							
Project: 39402REM.006 Company: POLAR Sample: S/01 Operation mode: OM#01 Description: EUT ON. Bluetooth in Idle mode. Equipment charging batteries by means of a 5Vdc USB connection. Phase wire noise.																																								
<h3>EC FCC Class B ESIB26 CC</h3>  <p>Level in dBμV</p> <p>Frequency in Hz</p> <p>Legend:</p> <ul style="list-style-type: none"> MaxPeak Scan (Blue line) Average Scan (Green line) CE FCC Class B AVG (Red line) CE FCC Class B QP (Purple line) 																																								
<h3>Max PK-AVG</h3> <table border="1"> <thead> <tr> <th>Frequency (MHz)</th> <th>MaxPeak-ClearWrite (dBμV)</th> <th>Average-ClearWrite (dBμV)</th> </tr> </thead> <tbody> <tr><td>0.154000</td><td>36.8</td><td>23.8</td></tr> <tr><td>0.318000</td><td>36.1</td><td>29.7</td></tr> <tr><td>0.402000</td><td>35.6</td><td>20.1</td></tr> <tr><td>0.742000</td><td>36.9</td><td>34.0</td></tr> <tr><td>1.030000</td><td>36.3</td><td>22.0</td></tr> <tr><td>1.430000</td><td>37.5</td><td>28.2</td></tr> <tr><td>2.122000</td><td>36.5</td><td>30.0</td></tr> <tr><td>4.590000</td><td>34.8</td><td>24.9</td></tr> <tr><td>5.258000</td><td>33.4</td><td>23.9</td></tr> <tr><td>12.394000</td><td>36.9</td><td>27.0</td></tr> <tr><td>13.090000</td><td>38.6</td><td>28.2</td></tr> <tr><td>25.078000</td><td>26.7</td><td>16.0</td></tr> </tbody> </table>		Frequency (MHz)	MaxPeak-ClearWrite (dB μ V)	Average-ClearWrite (dB μ V)	0.154000	36.8	23.8	0.318000	36.1	29.7	0.402000	35.6	20.1	0.742000	36.9	34.0	1.030000	36.3	22.0	1.430000	37.5	28.2	2.122000	36.5	30.0	4.590000	34.8	24.9	5.258000	33.4	23.9	12.394000	36.9	27.0	13.090000	38.6	28.2	25.078000	26.7	16.0
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Continuous Conducted emission : CC0102L1	Detector : Peak / Average / Cuasi-peak																																							
Project: 39402REM.006 Company: POLAR Sample: S/01 Operation mode: OM#02 Description: EUT ON. Equipment with the Bluetooth linked to a device and realizing a "Fitness Test – Relax and Start the test". Equipment charging batteries by means of a 5Vdc USB connection. Phase noise.																																								
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5.238000	33.2	22.3																																						
12.334000	36.9	27.2																																						
13.442000	39.0	28.1																																						
24.002000	26.0	20.4																																						