



Informe de ensayo nº:
Test report No:

NIE: 42238REM.009

Test report

FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B (10-01-13 Edition); ICES-003 ISSUE 5 (2012)

&

ANSI C63.4-2009: 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.

Identificación del objeto ensayado.....: Identification of item tested	POLAR A300
Marca Trade	POLAR
Modelo y/o referencia tipo Model and /or type reference	0X
Other identification of the product	N/S: F4470X0100432 FCC ID: INW0X IC ID: 6248A-0X MODEL: 0X
Final HW version	B2.5
Final SW version	0.0.211
Características Features	BLE
Peticionario Applicant	POLAR ELECTRO OY Professorintie 5, 90440. Kempele, Finland. VAT FI02099112 Antti Häggman +358-8-5202100 antti.haggman@polar.com
Método de ensayo solicitado, norma.....: Test method requested, standard	FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B (10-01-13 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2009: 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.
Resultado.....: Summary	IN COMPLIANCE
Aprobado por (nombre / cargo y firma) Approved by (name / position & signature)	Rafael López EMC LAB Manager
Fecha de realización Date of issue	2014-12-10
Formato de informe No. Report template No	FDT08_15

Index

Competences and guarantees.....	3
General conditions.....	3
Uncertainty	3
Usage of samples.....	4
Test sample description	4
Test samples supplier	4
Testing period.....	4
Environmental conditions.....	4
Remarks and comments.....	5
Testing verdicts.....	6
Appendix A – Test result.....	7
Appendix B - Photographs	25

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.

This certificate of conformity was issued in accordance with the decision N° 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 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.

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 Nº	Description	Model	Serial number	Reception date
42238/306	Pulsometer	R300	F4470X0100432	2014-11-25

Sample S/02 is the sample S/01 adding a laptop as host equipment, a keyboard and a mouse as peripheral of host equipment.

Test sample description

The sample consists of a Polar Training Computer with Bluetooth Low Energy.

Test samples supplier

POLAR ELECTRO OY
Professorintie 5, 90440. Kempele, Finland.
VAT FI02099112
Antti Häggman
+358-8-5202100
antti.haggman@polar.com

Testing period

The performed test started on 2014-11-26 and finished on 2014-12-03.

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 k Ω
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 k Ω
Reference resistance to earth	< 1 Ω
Normal site attenuation (NSA)	< ± 4 dB at 10 m & 3m 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 k Ω
Reference resistance to earth	< 1 Ω

Remarks and comments

The tests have been realized by the technical personnel: Mario Alberto Ureña & Antonio Ruiz.

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 150 kHz to 30 MHz is $I = \pm 3,60$ dB for quasi-peak measurements, $I = \pm 3,48$ dB for peak measurements ($k = 2$).

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
1999	EMI Receptor	ROHDE & SCHWARZ	ESIB 26	2013-05-30	2015-05-30
1935	EMI Receptor	ROHDE & SCHWARZ	ESPI 3	2013-12-11	2015-12-11
2932	Bilog Hybrid Antenna	SUNOL	JB6	2014-05-11	2017-05-11
0246	Horn Antenna	HP	11966E	2012-04-27	2015-04-27
1658	RF Amplifier	SCHAFFNER	CPA9231A	2013-06-11	2015-06-11
1975	RF Amplifier	MITEQ	JS4	2014-05-22	2016-05-22
3783	RF Amplifier	BONN ELEKTRONIK	BLMA 0118-3A	2013-04-23	2015-05-19
0258	Transient Limiter	HP	119471A	2014-10-02	2016-10-02
1650	Artificial Network	SCHWARZBECK	NNLK - 8121	2013-06-25	2015-06-25
3545	Temperature & Humidity probe	PICO TECHNOLOGY	HUMIDIPROBE	2014-01-21	2015-01-21
3548	Temperature & Humidity probe	PICO TECHNOLOGY	HUMIDIPROBE	2014-01-21	2015-01-21
3556	Temperature & Humidity probe	T & D	TR-72W	2014-01-21	2015-01-21

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	22

DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. 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. Equipment charging batteries. Power supply: 3.7Vdc.
OM#02	EUT ON. Equipment charging batteries (USB port PC Laptop). Pired with HR sensor. Live BLE connection established. Running program executed.

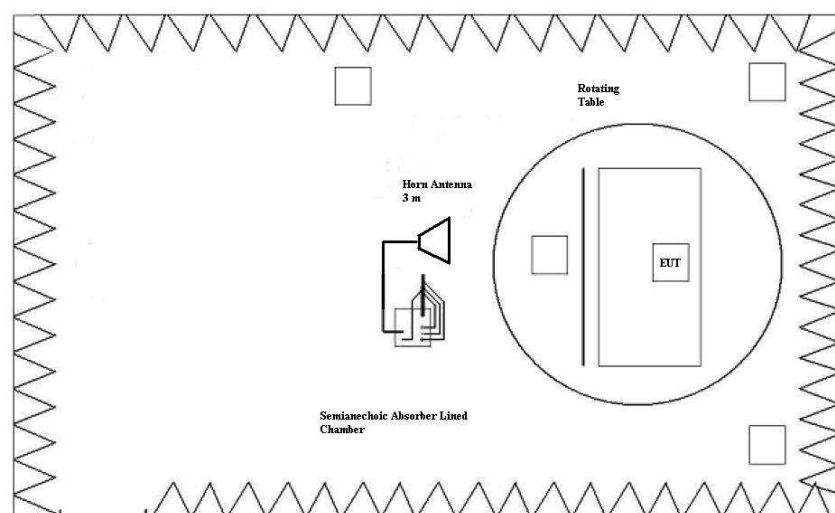
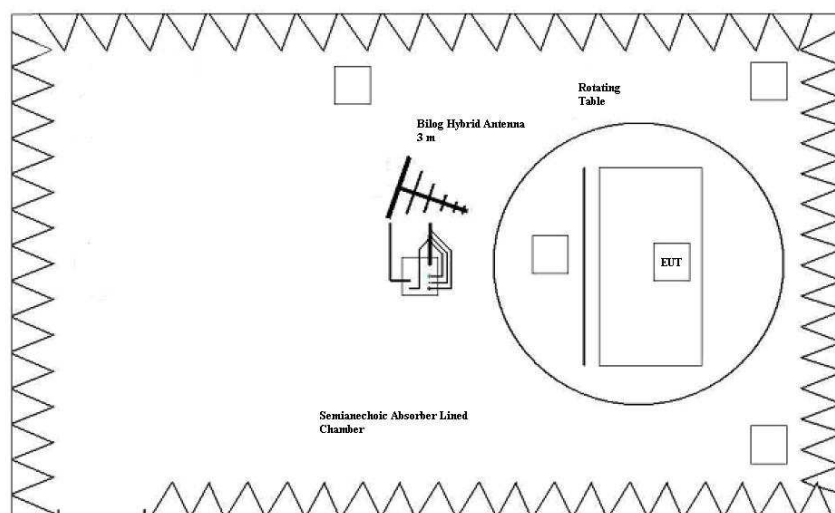
RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE.

LIMITS:	Product standard:	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-13 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2009
	Test standard:	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-13 Edition); ICES-003 ISSUE 5 (2012) & 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 (10-01-13 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2009 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)	Limit for 3 m ($\mu\text{V/m}$)	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	73.98

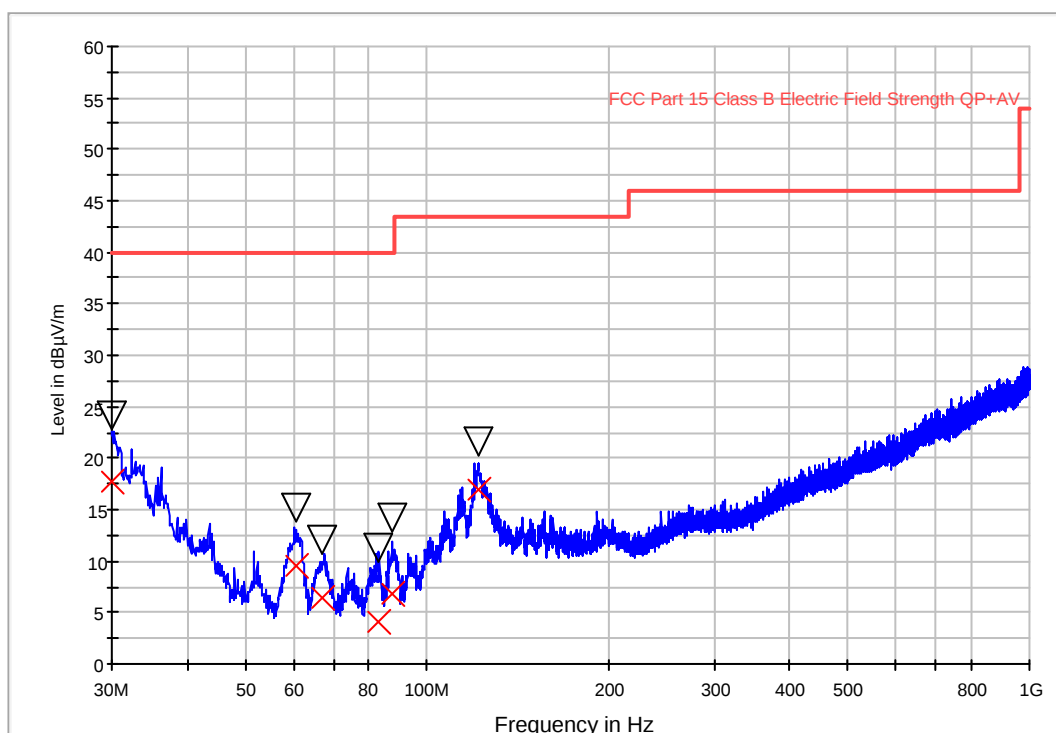


TESTED SAMPLES:	S/01 & S/02	
TESTED OPERATION MODES:	OM#01	
TEST RESULTS :	CRmmnn: CR, Radiation Condition; mm: Sample number; nn: Operation mode, xx: Polarisation.	
CRmmnn	Description	Result
CR0101	EUT ON. Equipment charging batteries. Power supply: 3.7Vdc. Range 30-1000 MHz.	P
CR0101_RA1_PH	EUT ON. Equipment charging batteries. Power supply: 3.7Vdc. Range 1-18 GHz. Horizontal pol.	P
CR0101_RA1_PV	EUT ON. Equipment charging batteries. Power supply: 3.7Vdc. Range 1-18 GHz. Vertical pol.	P
CR0101_RA2_PH	EUT ON. Equipment charging batteries. Power supply: 3.7Vdc. Range 18-26 GHz. Horizontal pol.	P
CR0101_RA2_PV	EUT ON. Equipment charging batteries. Power supply: 3.7Vdc. Range 18-26 GHz. Vertical pol.	P
CR0201	EUT ON. Equipment charging batteries. Power supply: 3.7Vdc. Range 30-1000 MHz.	P
CR0201_RA1_PH	EUT ON. Equipment charging batteries. Power supply: 3.7Vdc. Range 1-18 GHz. Horizontal pol.	P
CR0201_RA1_PV	EUT ON. Equipment charging batteries. Power supply: 3.7Vdc. Range 1-18 GHz. Vertical pol.	P
CR0201_RA2_PH	EUT ON. Equipment charging batteries. Power supply: 3.7Vdc. Range 18-26 GHz. Horizontal pol.	P
CR0201_RA2_PV	EUT ON. Equipment charging batteries. Power supply: 3.7Vdc. Range 18-26 GHz. Vertical pol.	P

Radiated Emission: CR0101 (30MHz to 1GHz)

Project: 42238REM.009
 Company: POLAR
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. Charging batteries. 3.7 Vdc

FCC class B Bilog Hybrid



— FCC Part 15 Class B Electric Field Strength QP+AV
— Peak Preview
▽ MaxPeak X QuasiPeak

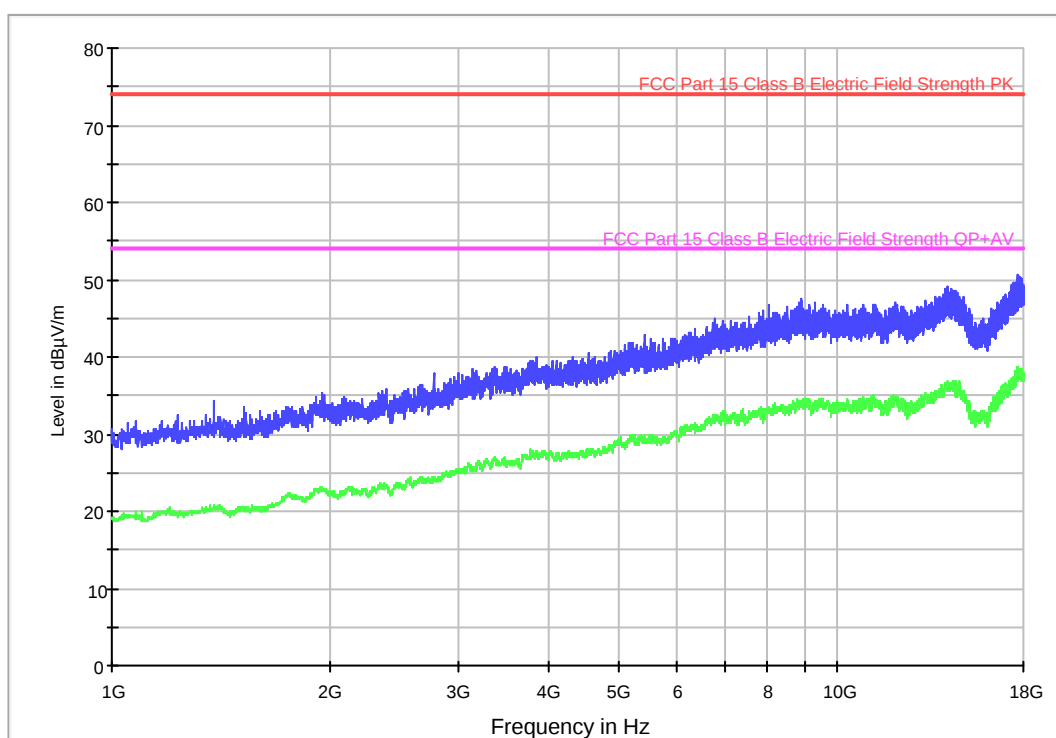
Maximizations

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)
30.014429	24.1	17.8	129.0	V	355.0
60.511623	15.1	9.6	98.0	V	138.0
67.156313	12.1	6.4	111.0	V	125.0
83.134669	11.3	4.1	120.0	V	204.0
87.811423	14.2	6.8	123.0	V	80.0
122.085571	21.6	17.0	98.0	V	178.0

Radiated Emission: CR0101_RA1_PH (1 – 18 GHz)

Project: 42238REM.009
Company: POLAR
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Charging batteries. 3.7 Vdc. Horizontal Polarization.

FCC 1-18GHz class B ESIB Bocina0245 AMP3783



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

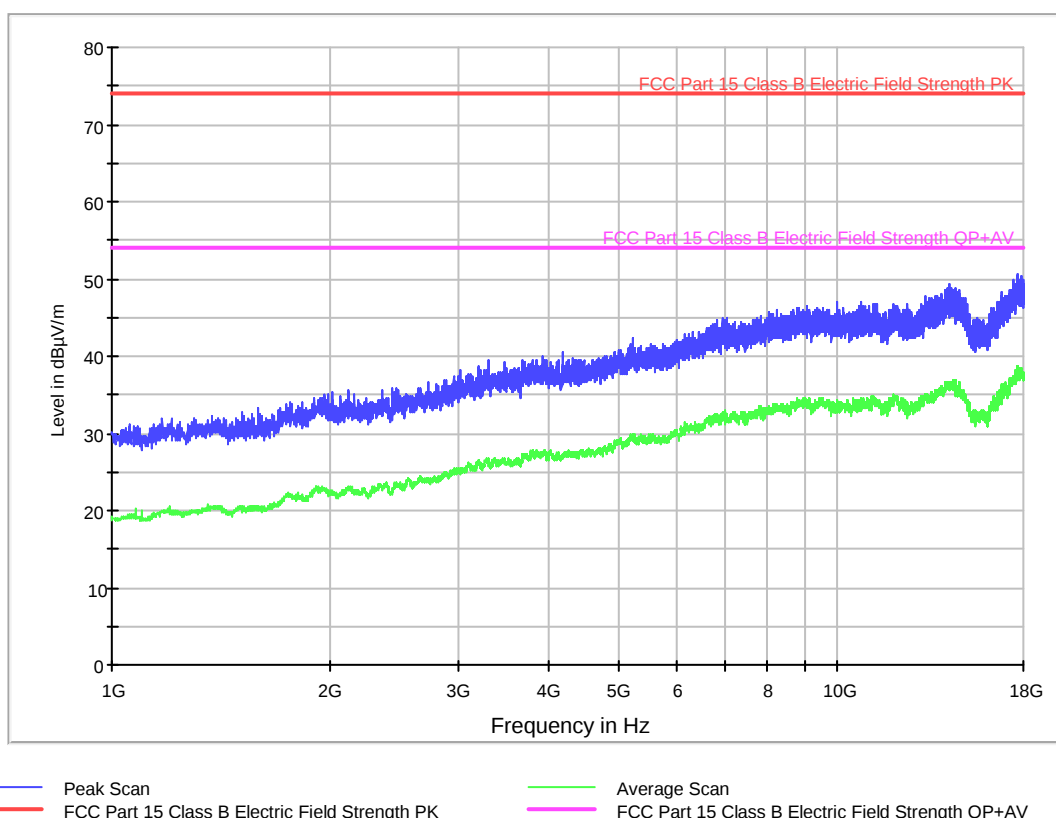
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBμV/m)	Average-ClearWrite (dBμV/m)
1236.000000	32.4	19.6
1382.000000	34.2	20.5
2352.000000	35.6	23.2
3144.000000	38.3	25.6
3851.000000	39.9	27.5
5413.000000	42.9	29.1
7527.000000	45.1	32.7
8876.000000	47.5	34.1
13208.000000	47.3	34.7
17713.000000	50.7	38.4

Radiated Emission: CR0101_RA1_PV (1 – 18 GHz)

Project: 42238REM.009
 Company: POLAR
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. Charging batteries. 3.7 Vdc. Vertical Polarization.

FCC 1-18GHz class B ESIB Bocina0245 AMP3783



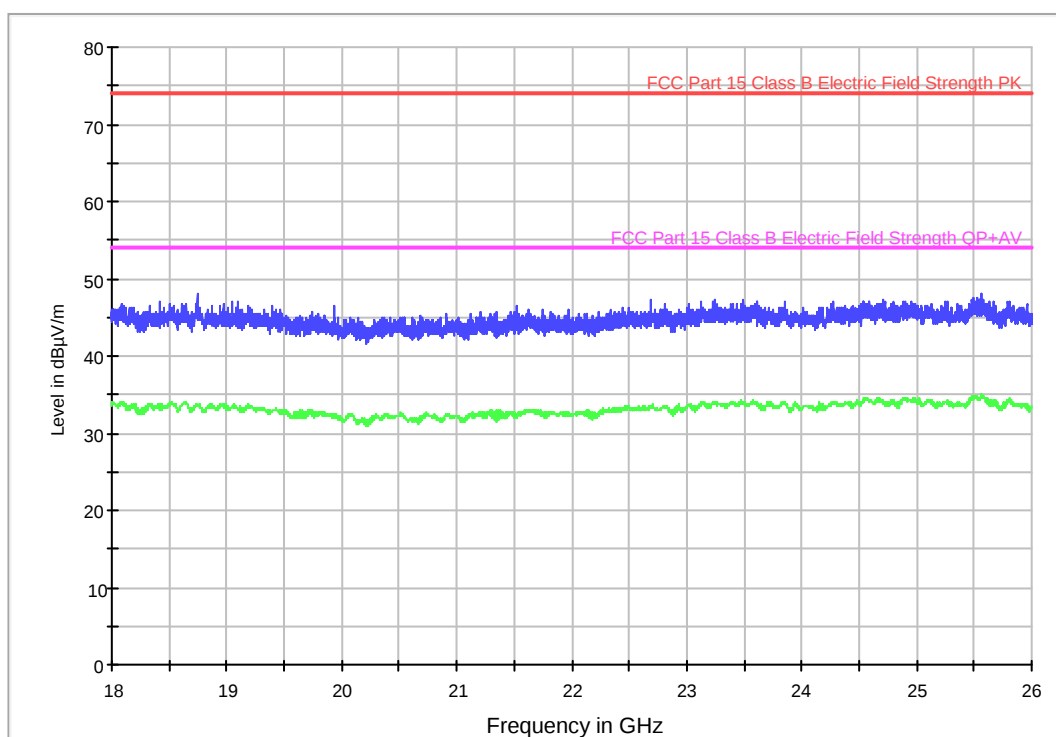
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
1297.000000	31.9	19.8
1758.000000	34.1	22.0
2112.000000	35.6	22.8
3022.000000	38.2	25.1
4177.000000	40.6	27.4
5208.000000	42.3	29.2
7039.000000	45.0	31.8
9945.000000	46.9	34.0
13154.000000	47.8	34.8
17704.000000	50.6	38.6

Radiated Emission: CR0101_RA2_PH (18 – 26 GHz)

Project: 42238REM.009
Company: POLAR
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Charging batteries. 3.7 Vdc. Horizontal Polarization.

FCC 18-26GHz class B ESIB Bocina4657 AMP1975



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

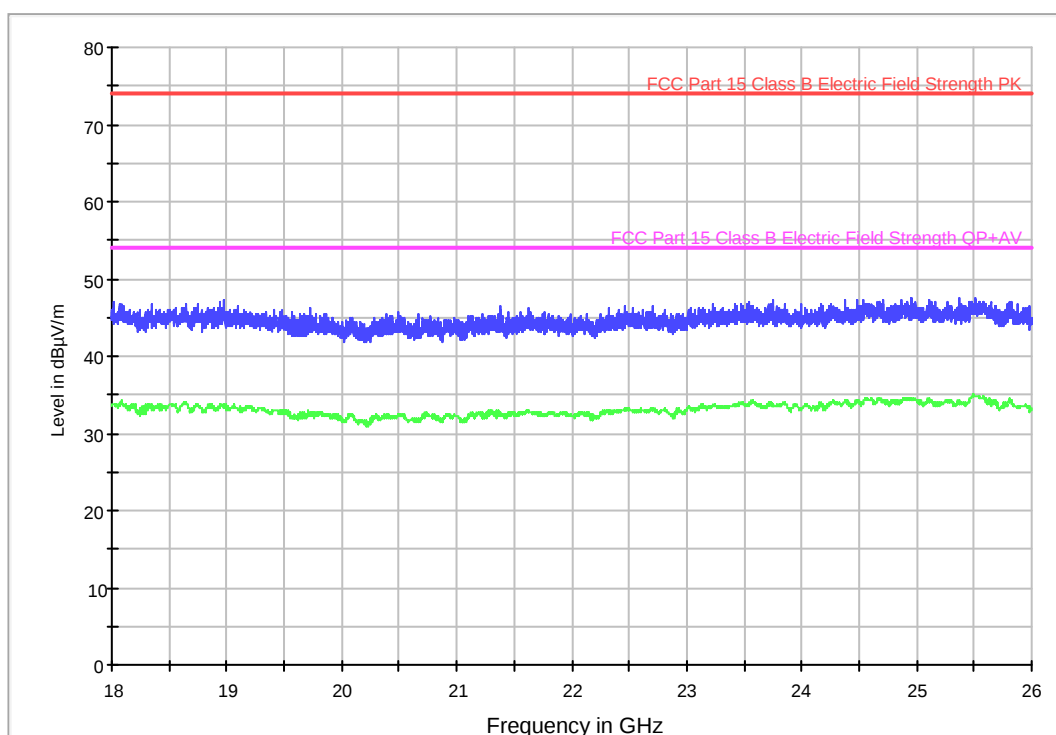
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
18414.000000	47.0	33.8
18741.000000	48.0	33.6
19399.000000	46.5	33.0
20679.000000	45.1	31.8
21516.000000	46.4	32.1
21741.000000	46.0	32.8
22683.000000	47.3	33.4
23498.000000	47.4	34.1
24712.000000	47.3	33.9
25567.000000	48.0	34.5

Radiated Emission: CR0101_RA2_PV (18 -26 GHz)

Project: 42238REM.009
Company: POLAR
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Charging batteries. 3.7 Vdc. Vertical Polarization.

FCC 18-26GHz class B ESIB Bocina4657 AMP1975



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

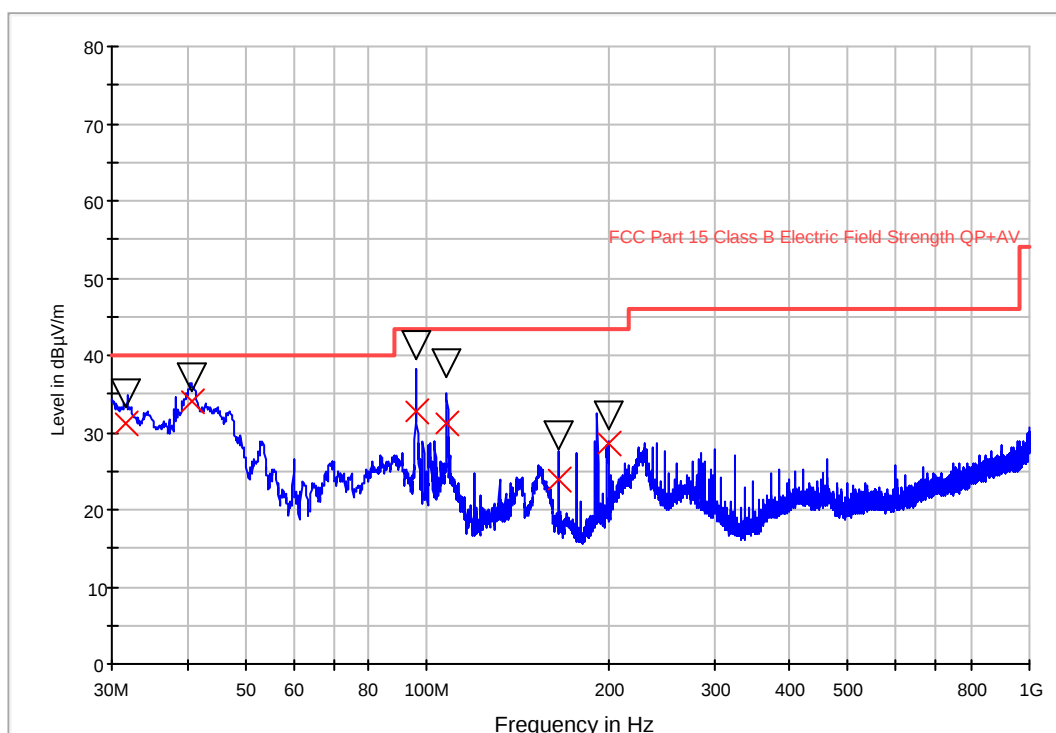
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
18016.000000	47.0	33.7
18969.000000	47.2	33.6
19724.000000	46.3	32.8
20489.000000	45.8	32.3
21388.000000	46.6	32.2
22325.000000	46.2	33.0
23228.000000	46.8	33.5
23747.000000	47.3	33.6
24950.000000	47.6	34.3
25517.000000	47.6	34.8

Radiated Emission: CR0201 (30MHz to 1GHz)

Project: 42238REM.009
Company: POLAR
Sample: S/02
Operation mode: OM#01
Description: EUT ON. Charging batteries. 3.7 Vdc

FCC class B Bilog Hybrid



▽ FCC Part 15 Class B Electric Field Strength QP+AV MaxPeak
× Peak Preview QuasiPeak

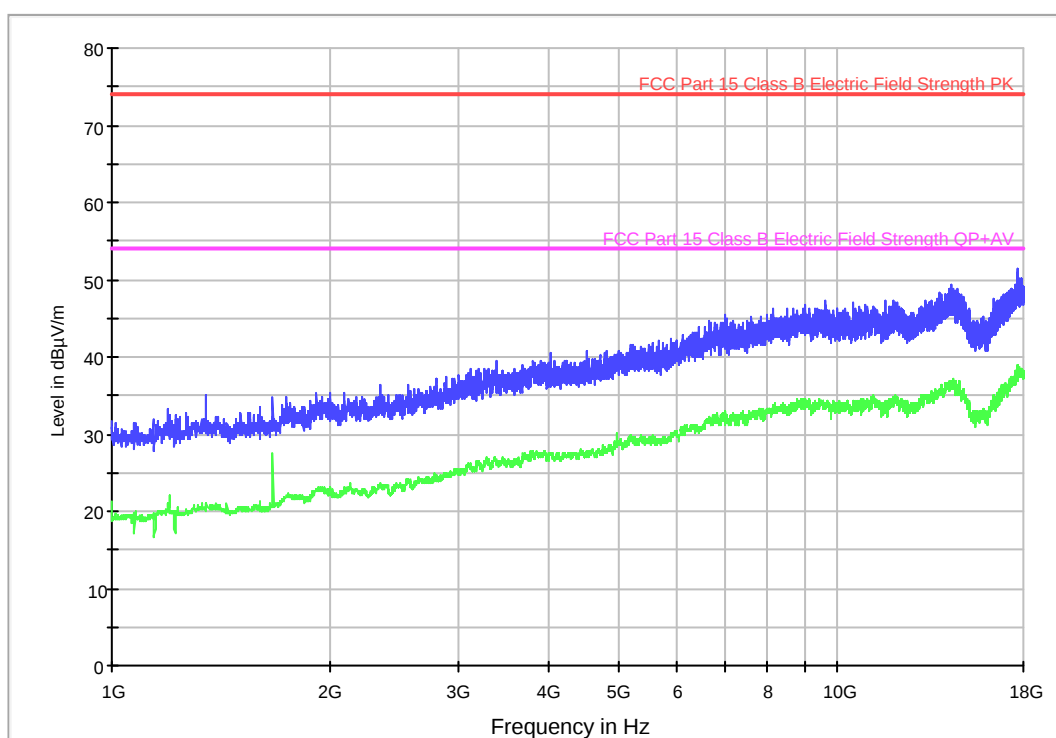
Maximizations

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)
31.644489	35.2	31.1	98.0	V	203.0
40.601002	37.2	34.0	98.0	V	103.0
95.986974	41.4	32.8	332.0	H	335.0
108.005010	38.9	31.2	278.0	H	339.0
165.796994	29.6	23.9	181.0	H	51.0
199.975150	32.1	28.5	169.0	H	269.0
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Radiated Emission: CR0201_RA1_PH (1 – 18 GHz)

Project: 42238REM.009
Company: POLAR
Sample: S/02
Operation mode: OM#01
Description: EUT ON. Charging batteries. 3.7 Vdc. Horizontal Polarization.

FCC 1-18GHz class B ESIB Bocina0245 AMP3783



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

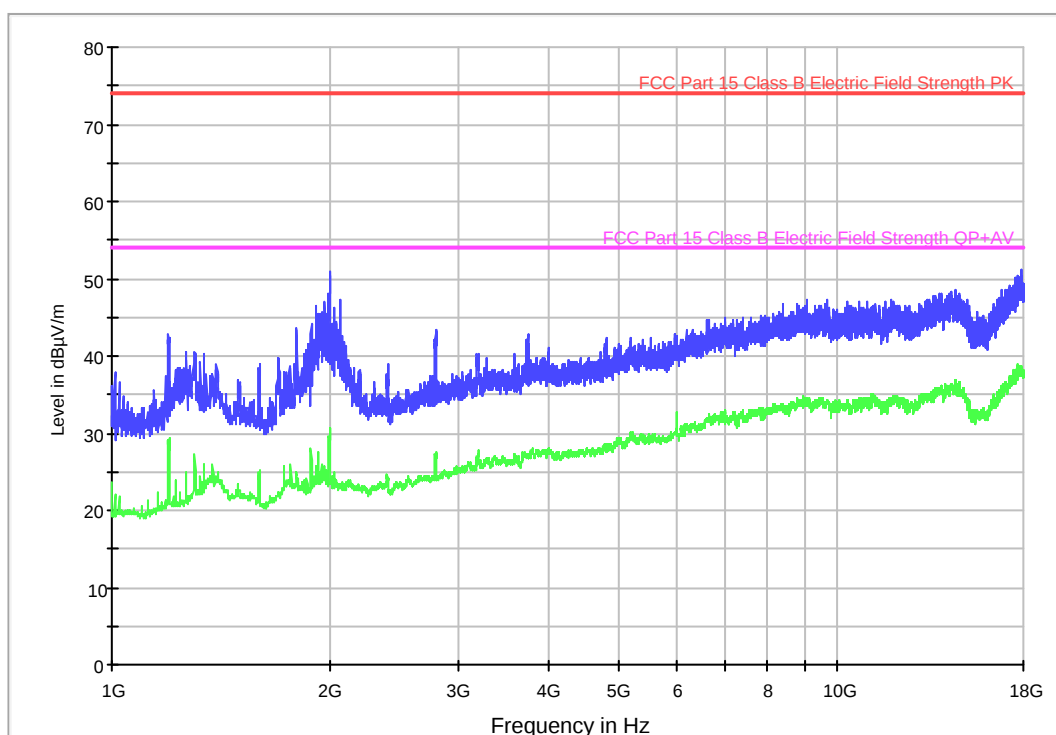
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
1195.000000	33.1	21.1
1350.000000	35.0	21.0
2344.000000	36.4	23.5
3118.000000	38.5	25.8
4026.000000	40.6	27.3
5662.000000	42.0	29.5
6990.000000	45.5	32.9
9588.000000	47.2	33.5
13440.000000	47.3	35.2
17691.000000	51.4	38.4

Radiated Emission: CR0201_RA1_PV (1 – 18 GHz)

Project: 42238REM.009
Company: POLAR
Sample: S/02
Operation mode: OM#01
Description: EUT ON. Charging batteries. 3.7 Vdc. Vertical Polarization

FCC 1-18GHz class B ESIB Bocina0245 AMP3783



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

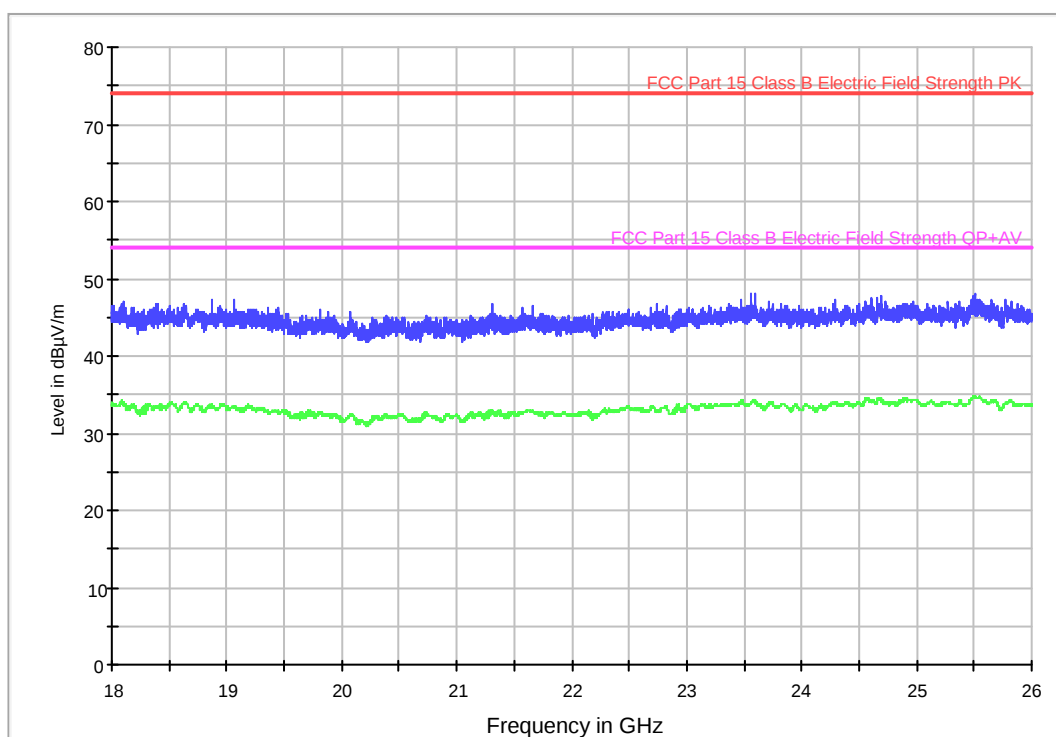
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
1198.000000	42.8	28.7
1341.000000	40.3	24.1
1995.000000	51.0	30.6
2800.000000	43.3	26.2
3737.000000	42.8	27.0
4796.000000	42.4	28.2
6979.000000	45.0	32.5
9039.000000	47.4	34.6
11857.000000	47.3	34.4
17909.000000	51.1	38.3

Radiated Emission: CR0201_RA2_PH (18 – 26 GHz)

Project: 42238REM.009
Company: POLAR
Sample: S/02
Operation mode: OM#01
Description: EUT ON. Charging batteries. 3.7 Vdc. Horizontal Polarization.

FCC 18-26GHz class B ESIB Bocina4657 AMP1975



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

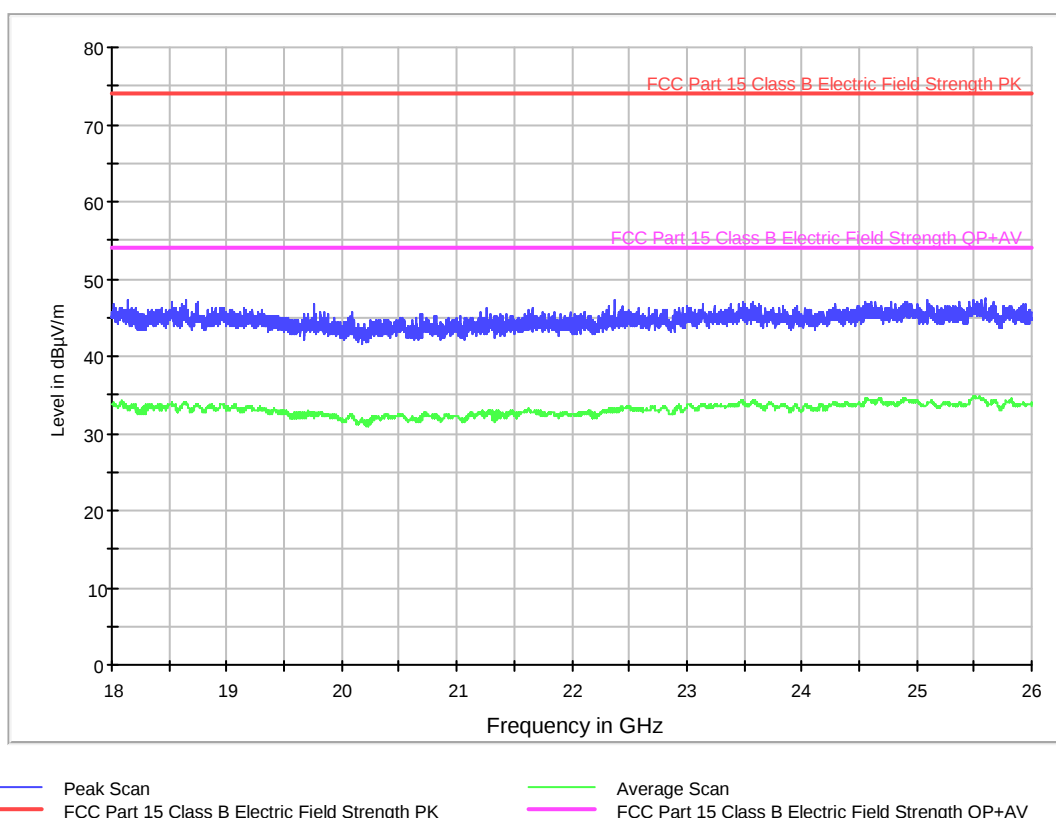
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
18101.000000	47.0	33.7
18877.000000	47.3	33.7
19445.000000	46.3	32.7
20735.000000	45.1	32.7
21313.000000	46.7	32.9
21663.000000	46.4	32.7
22739.000000	46.8	32.9
23593.000000	48.0	34.2
24687.000000	47.7	34.4
25504.000000	48.0	34.8

Radiated Emission: CR0201_RA2_PV (18 -26 GHz)

Project: 42238REM.009
Company: POLAR
Sample: S/02
Operation mode: OM#01
Description: EUT ON. Charging batteries. 3.7 Vdc. Vertical Polarization.

FCC 18-26GHz class B ESIB Bocina4657 AMP1975



Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
18137.000000	47.3	33.4
18751.000000	46.9	33.6
19758.000000	46.6	32.7
20694.000000	45.5	32.2
21260.000000	46.2	32.7
22378.000000	47.2	33.2
23149.000000	46.7	33.6
23487.000000	47.1	34.1
24782.000000	47.1	33.9
25591.000000	47.4	34.3

CONTINUOUS CONDUCTED EMISSION ON POWER LEADS

LIMITS:	Product standard :	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-13 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2009
	Test standard :	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-13 Edition); ICES-003 ISSUE 5 (2012) & 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 (10-01-13 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2009, in the frequency range 0,15 to 30 MHz, for Class B equipment was:

Frequency range (MHz)	Limit (dB μ V)	
	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/02
TESTED OPERATION MODES:	OM#02
TEST RESULTS :	CCmmnnhh: CC, Conducted Condition; mm: Sample number; nn: Operation mode; hh: wire

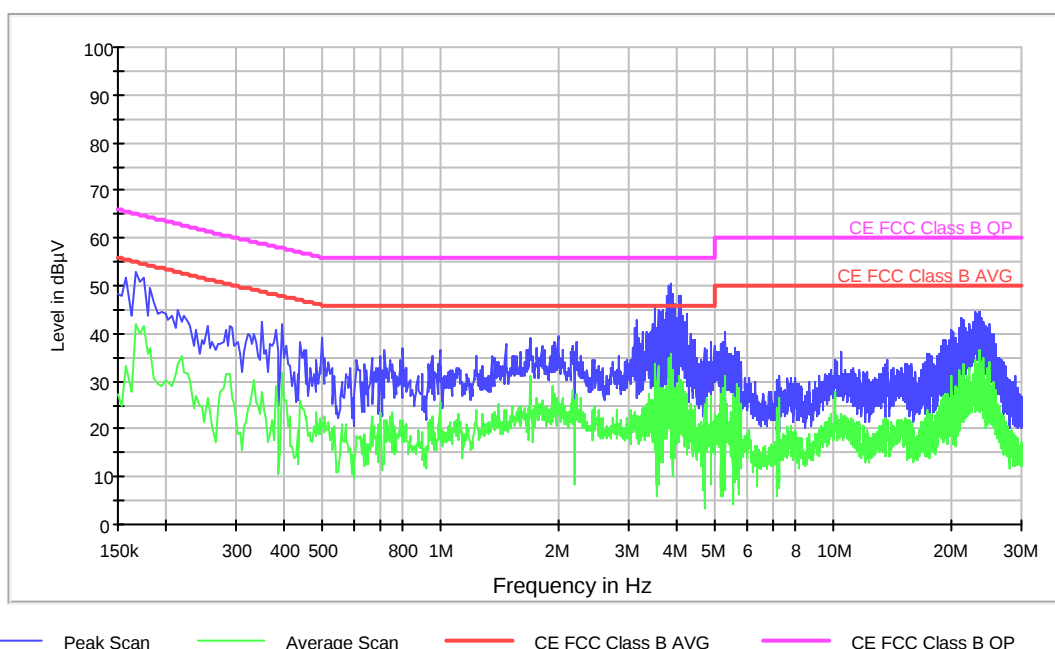
CCmmnnhh	Description	Result
CC02020N	Neutral wire noise	P
CC0202L1	Phase wire noise	P

Continuous Conducted emission : CC02020N

Detector : Peak / Average / Cuasi-peak

Project: 42238REM.009
Company: POLAR
Sample: S/02
Operation mode: OM#02
Description: EUT ON. Charging batteries (USB port PC Laptop). Pired with HR sensor. Live BLE connection stablished. Neutral Wire Noise

EC FCC Class B ESPI CC



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

Subrange Maxima

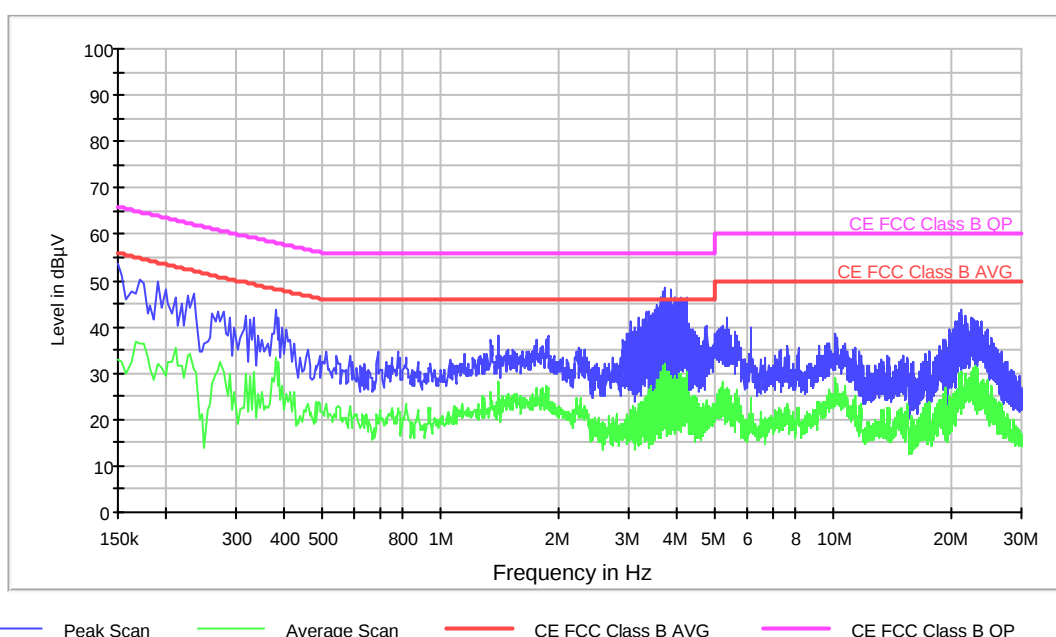
Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.166000	52.9	42.1
0.350000	42.3	27.6
0.498000	39.1	21.6
0.798000	37.1	21.9
1.978000	39.6	25.3
3.486000	45.4	27.7
3.846000	50.5	35.3
10.374000	36.3	23.2
17.386000	35.7	19.9
23.346000	44.7	29.4

Continuous Conducted emission : CC0202L1

Detector : Peak / Average / Cuasi-peak

Project: 42238REM.009
Company: POLAR
Sample: S/02
Operation mode: OM#02
Description: EUT ON. Charging batteries (USB port PC Laptop). Pired with HR sensor. Live BLE connection established. Running program executed. . Phase Wire Noise

EC FCC Class B ESPI CC



Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.150000	53.7	32.9
0.378000	43.8	33.2
0.458000	35.2	23.4
0.774000	34.7	22.4
1.866000	38.0	26.7
3.550000	44.6	28.7
3.686000	48.3	30.3
10.078000	38.6	29.2
10.666000	36.4	27.4
21.002000	43.8	30.1