



Test report No:
NIE: 59572REM.002

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-16 Edition) & ICES-003 Issue 6 (Updated 04-2017)

Identification of item tested	Fitness watch
Trademark	Polar
Model and /or type reference	2Z
Other identification of the product	HW Version: 00772057 SW Version: 0.4.2 S/N: 5340C820
Features	BLE, GPS, Glonass
Manufacturer	POLAR ELECTRO OY Professorintie 5, 90440 Kempele, Finland.
Test method requested, standard	FCC CFR 47, Part 15, Subpart B (10-1-16 Edition) & ICES-003 (Updated 04-2017)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López EMC LAB Manager
Date of issue	2019-03-21
Report template No	FDT08_21

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Competences and guarantees

DEKRA Testing and Certification 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.

DEKRA Testing and Certification is a FCC recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report, FCC designation number ES0004.

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

DEKRA Testing and Certification 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 DEKRA Testing and Certification at the time of performance of the test.

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

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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 DEKRA Testing and Certification.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Testing and Certification internal document PODT000.

The total uncertainty of the measurement system for the measured conducted disturbance characteristics of EUT from 150kHz to 30 MHz is $I = \pm 3,9$ dB for quasi-peak measurements, $I = \pm 3,2$ dB for average measurements ($k = 2$)

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 30 MHz to 1000 MHz is $I = \pm 4,9$ dB for quasi-peak measurements, $I = \pm 4,6$ dB for peak measurements ($k = 2$)

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 1000 MHz to 26 GHz is $I = \pm 2,6$ dB for peaks and average measurements ($k = 2$)

Data provided by the client

The sample consists of a GPS sports watch with Bluetooth low-energy connectivity and wrist-based heartrate.

DEKRA declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

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 N°	Date of reception
59572/009	Fitness Watch	2Z	5340D02B	2019-02-19
59572/012	USB charger cable	---	---	2019-02-19

Test sample description

Ports..... :	Port name and description	Cable					
		Specified length [m]	Attached during test	Shielded			
	USB port	0.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
	N/A		<input type="checkbox"/>	<input type="checkbox"/>			
Supplementary information to the ports..... :	N/A						
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/>	DC: 3.8V					
<input type="checkbox"/>	DC:						
Rated Power	0,6 W						
Clock frequencies	26MHz, 32MHz, 32.768kHz						
Other parameters..... :	Not provided data						
Software version	0.4.2						
Hardware version..... :	00772057						
Dimensions in cm (W x H x D)..... :	Not provided data						

Mounting position	<input type="checkbox"/>	Table top equipment		
	<input type="checkbox"/>	Wall/Ceiling mounted equipment		
	<input type="checkbox"/>	Floor standing equipment		
	<input checked="" type="checkbox"/>	Hand-held equipment		
	<input type="checkbox"/>	Other:		
Modules/parts	Module/parts of test item	Type	Manufacturer	
	N/A			
	N/A			
	N/A			
	N/A			
	N/A			
Accessories (not part of the test item)	Description	Type	Manufacturer	
	N/A			
	N/A			
	N/A			
	N/A			
	N/A			
Documents as provided by the applicant.....	Description	File name	Issue date	
	N/A			
	N/A			
	N/A			
	N/A			
	N/A			

Identification of the client

POLAR ELECTRO OY
 Professorintie 5, 90440 Kempele, Finland.

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2019-02-19
Date (finish)	2019-03-07

Document history

Report number	Date	Description
59572REM.002	2019-03-21	First release

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. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The test have been performed by the technical personnel: Daniel López, Alberto Parada & David Rubio.

DEKRA declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Testing verdicts

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

Summary

Emission Test		
Requirement – Test case	Verdict	Remark
Radiated emission. Electromagnetic field measure (30 KHz – 1000 MHz)	P	---
Radiated emission. Electromagnetic field measure (1 GHz – 18 GHz)	P	---
Radiated emission. Electromagnetic field measure (18 GHz – 26 GHz)	P	---
Continuous conducted emission (150 KHz – 30 MHz)	P	---
<u>Supplementary information and remarks:</u>		

List of equipment used during the test

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
4526	EMI TEST Receiver	ROHDE & SCHWARZ	ESU26	2018-02-21	2020-02-21
4578	Bilog Antenna	ETS LINDGREN	3142E	2017-04-03	2020-04-03
4612	Horn Antenna	SCHWARZBECK	BBHA 9120 D	2016-12-19	2019-12-19
3783	Preamplifier	BONN ELEKTRONIK	BLMA 0118-3A	2018-03-28	2019-03-28
4656	Horn Antenna	SCHWARZBECK	BBHA 9170	2017-03-24	2020-03-24
4570	Thermohigrometer	HW GROUP	HWg-STE	2018-04-03	2019-04-03
4567	Thermohigrometer	HW GROUP	HWg-STE	2018-04-04	2019-04-04
4522	EMC measurement software	ROHDE & SCHWARZ	EMC32 V9.01	---	---
6121	Preamplifier	BONN ELEKTRONIK	BLNA 0160-01N	2018-03-20	2019-03-20
4729	Preamplifier	BONN ELEKTRONIK	BLMA 1840-1M	2018-02-23	2020-02-23
1650	Artificial network	SCHWARZBECK	NNLK8121	2017-09-20	2019-09-20

Appendix A: Test results

APPENDIX A CONTENT

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RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE.....	11
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DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. 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. BLE OFF. GNSS interfaces in RX mode. Transferring data via USB. Equipment charging batteries. Power supply: 3.8Vdc (By USB port). Auxiliary laptop power supply: 115Vac.

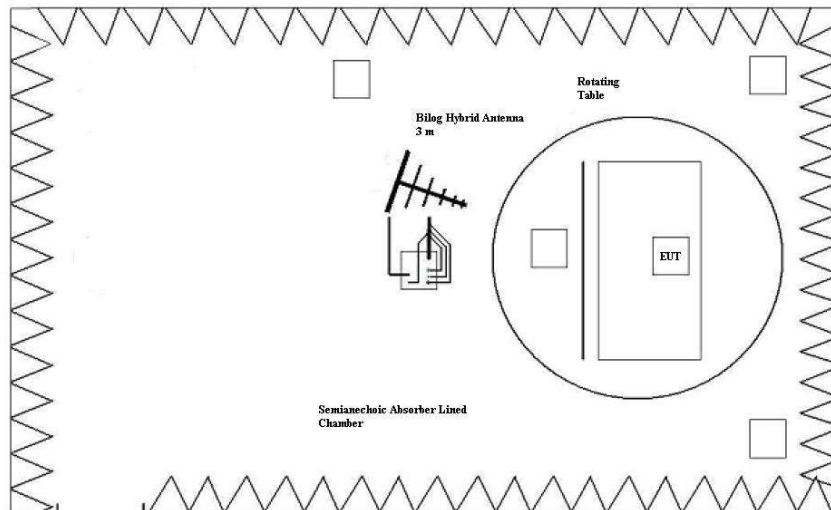
RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE

LIMITS:	Product standard:	FCC CFR 47, Part 15, Subpart B (10-1-16 Edition), Secs. 15.109 & ICES-003 Issue 6 (Updated 04-2017)
	Test standard:	FCC CFR 47, Part 15, Subpart B (10-1-16 Edition), Secs. 15.109 & ICES-003 Issue 6 (Updated 04-2017)

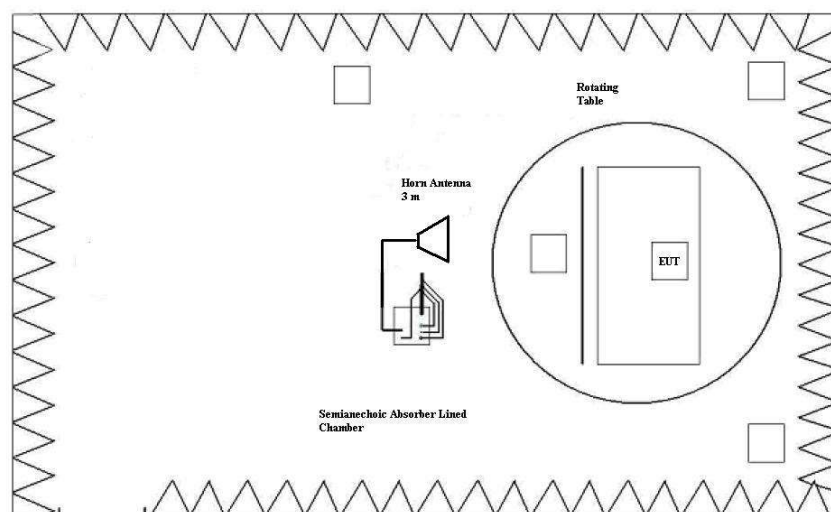
Limits of interference Class B

The applied limit for radiated emissions, 3 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-16 Edition), Secs. 15.109 & ICES-003 Issue 6 (Updated 04-2017) in the frequency range 30 MHz to 26 GHz for class B equipments.

Frequency range (MHz)	QP Limit for 3 m		PK Limit for 3 m
	($\mu\text{V/m}$)	($\text{dB}\mu\text{V/m}$)	($\text{dB}\mu\text{V/m}$)
30 to 88	100	40	---
88 to 216	150	43.5	---
216 to 960	200	46	---
Above 960	500	54	74



Setup for measurements < 1GHz.



Setup for measurements > 1GHz.

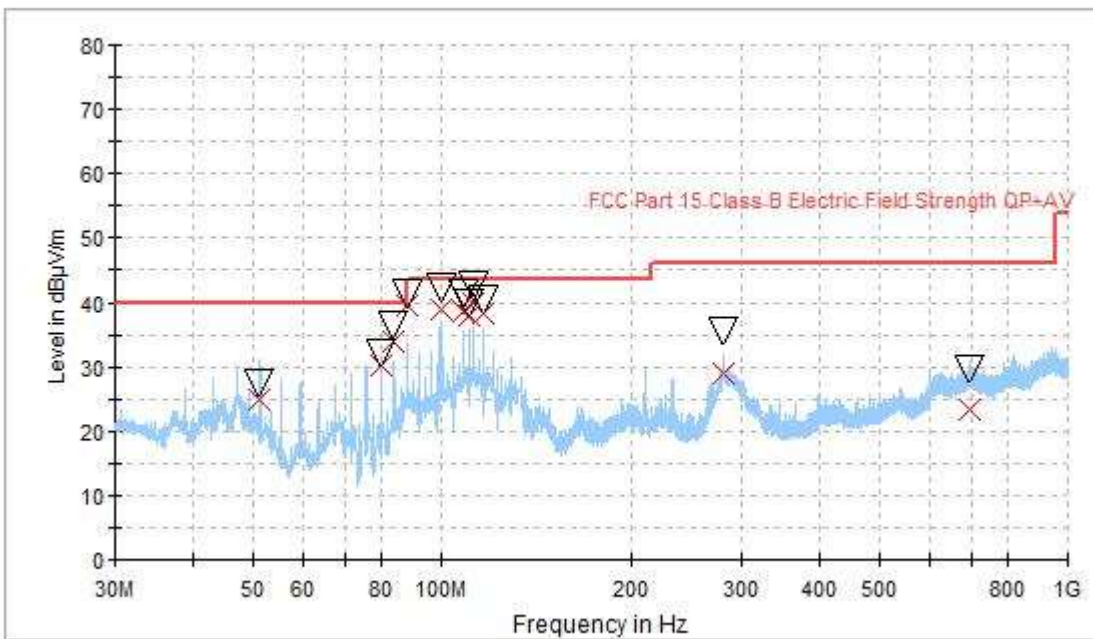
TESTED SAMPLE:	S/01
TESTED OPERATION MODES:	OM#01
TEST RESULTS:	CRmmnnRRPP: CR, Radiated Condition; mm: Sample number; nn: Operation mode; RR: Range; PP: Polarization.

CRmmnnRRPP	Description	Result
CR0101LR	Range: 30 MHz - 1000 MHz.	P
CR0101HR1_H	Range: 1 GHz - 18 GHz. Horizontal polarization.	P
CR0101HR1_V	Range: 1 GHz - 18 GHz. Vertical polarization.	P
CR0101HR2_H	Range: 18 GHz - 26 GHz. Horizontal polarization.	P
CR0101HR2_V	Range: 18 GHz - 26 GHz. Vertical polarization.	P

Radiated Emission. CR0101LR

Project: 59572REM.002
 Company: POLAR ELECTRO OY
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. BLE OFF. GNSS interfaces in RX mode. Transferring data via USB. Equipment charging batteries.
 Power supply: 3.8 Vdc (By USB port).
 Auxiliary laptop power supply: 115 Vac.

Full Spectrum



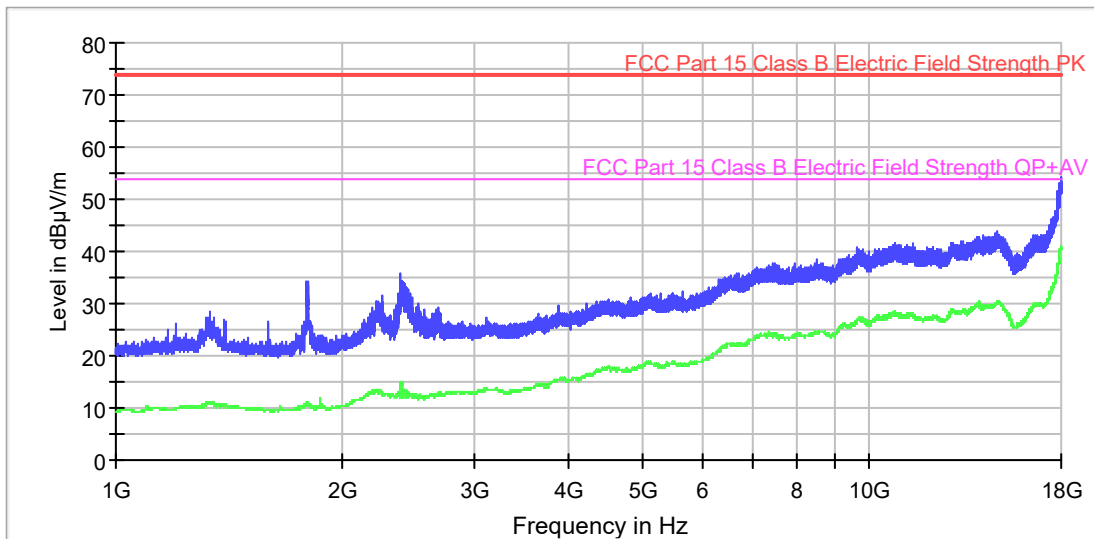
Maximizations

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Height (cm)	Pol	Azimuth (deg)
51.165000	24.88	27.36	125.0	H	72.0
79.882500	30.32	32.04	229.0	H	251.0
83.950000	34.08	36.53	301.0	H	258.0
88.057500	39.55	41.37	202.0	V	146.0
99.587500	39.19	42.25	202.0	V	147.0
108.577500	38.76	41.36	247.0	V	181.0
110.592500	38.26	40.12	241.0	V	175.0
112.640000	39.98	42.62	212.0	V	180.0
116.725000	38.43	40.28	196.0	V	172.0
281.085000	28.92	35.58	118.0	V	0.0
695.307500	23.50	29.76	199.0	V	165.0

Radiated Emission. CR0101HR1_H

Project: 59572REM.002
 Company: POLAR
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. BLE OFF. GNSS interfaces in RX mode. Transferring data via USB. Equipment charging batteries.
 Power supply: 3.8 Vdc (By USB port).
 Auxiliary laptop power supply: 115 Vac. Horizontal polarization.

ER EMI FCC 15 Class B (1-18GHz)



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

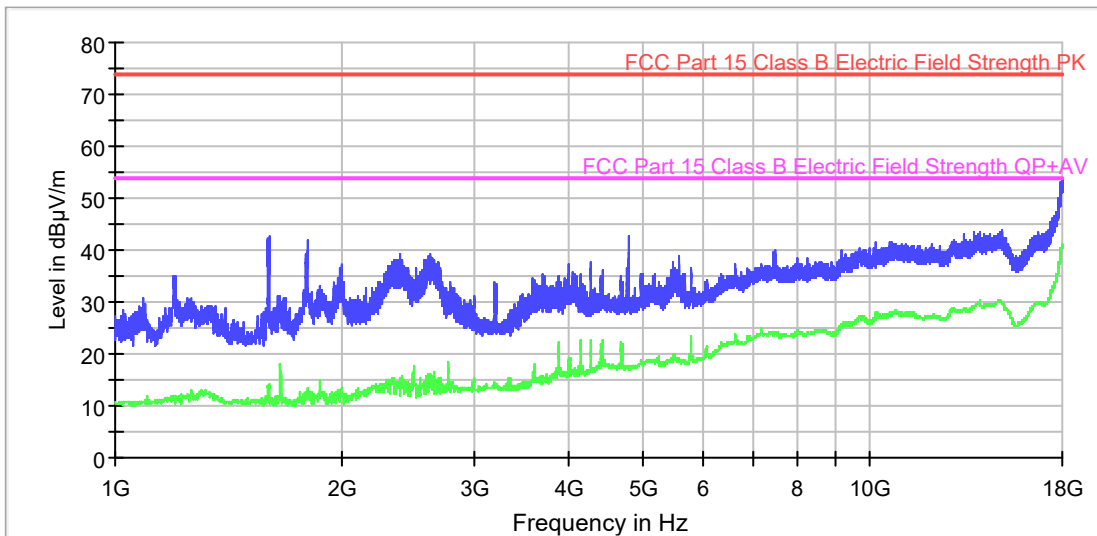
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV/m)	AVG CLRWR (dBµV/m)
2390.800000	35.7	13.5
4347.600000	30.5	17.3
6089.600000	32.5	19.3
7460.800000	37.8	24.2
9419.200000	39.2	25.5
10841.600000	41.5	28.4
12886.000000	41.7	28.9
14184.400000	42.9	29.1
14765.200000	43.9	30.3
17975.200000	54.1	40.7

Radiated Emission. CR0101HR1_V

Project: 59572REM.002
 Company: POLAR
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. BLE OFF. GNSS interfaces in RX mode. Transferring data via USB. Equipment charging batteries.
 Power supply: 3.8 Vdc (By USB port).
 Auxiliary laptop power supply: 115 Vac. Vertical polarization.

ER EMI FCC 15 Class B (1-18GHz)



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

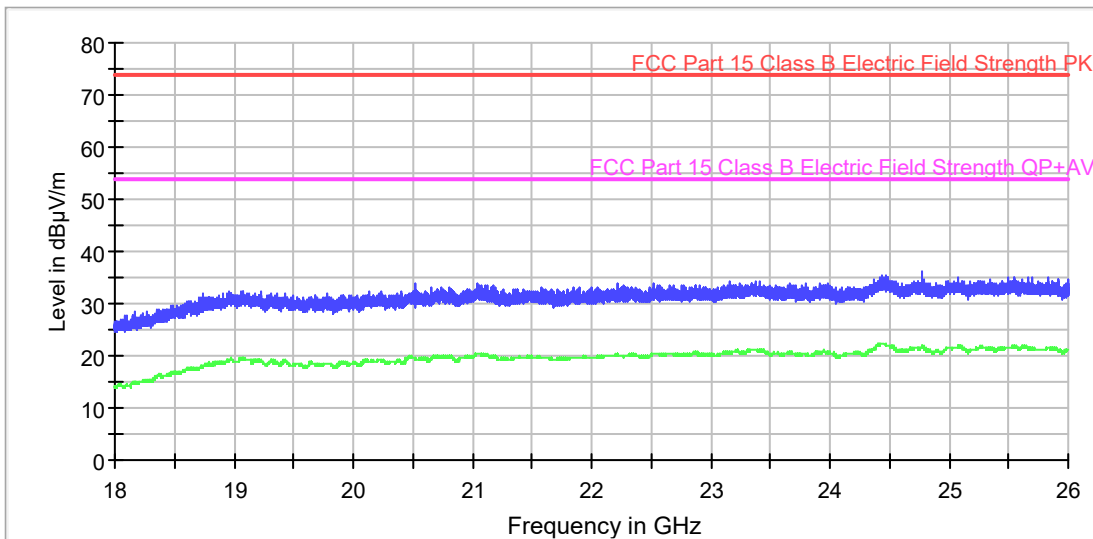
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV/m)	AVG CLRWR (dBµV/m)
1599.200000	42.7	13.7
4278.800000	37.7	20.2
4798.000000	42.5	17.8
7485.200000	40.0	24.4
9177.200000	39.8	25.5
10213.600000	41.7	27.9
12877.200000	41.7	28.7
13752.800000	43.4	29.0
14954.800000	43.8	29.9
17994.000000	54.0	41.1

Radiated Emission. CR0101HR2_H

Project: 59572REM.002
 Company: POLAR
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. BLE OFF. GNSS interfaces in RX mode. Transferring data via USB. Equipment charging batteries.
 Power supply: 3.8 Vdc (By USB port).
 Auxiliary laptop power supply: 115 Vac. Horizontal polarization.

ER EMI FCC 15 Class B (18-26GHz)



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

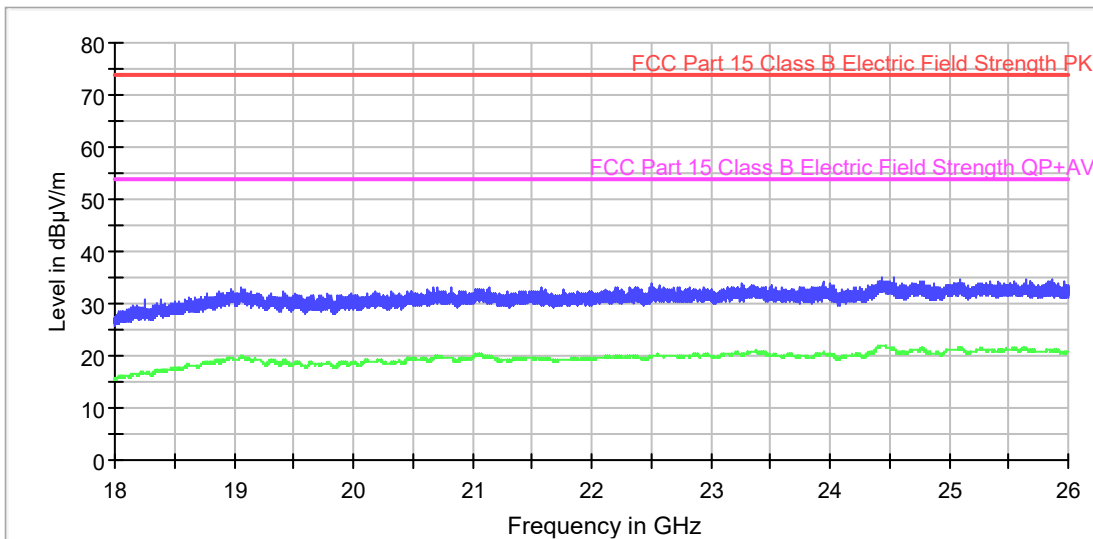
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV/m)	AVG CLRWR (dBµV/m)
18747.200000	31.7	18.3
19074.400000	32.4	19.4
20235.200000	32.3	19.2
20527.600000	33.8	19.3
21847.600000	33.1	19.7
22513.600000	33.7	20.4
23374.400000	34.4	21.2
24368.400000	34.7	21.1
24774.400000	36.3	21.8
25668.400000	35.1	21.5

Radiated Emission. CR0101HR2_V

Project: 59572REM.002
 Company: POLAR
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. BLE OFF. GNSS interfaces in RX mode. Transferring data via USB. Equipment charging batteries.
 Power supply: 3.8 Vdc (By USB port).
 Auxiliary laptop power supply: 115 Vac. Vertical polarization.

ER EMI FCC 15 Class B (18-26GHz)



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

Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV/m)	AVG CLRWR (dBµV/m)
18776.000000	31.8	18.8
19054.000000	32.9	19.8
20316.000000	32.4	18.6
20668.000000	33.2	19.6
21579.600000	32.9	19.4
22500.800000	33.9	19.9
23259.600000	33.8	20.2
23941.200000	34.1	20.4
24538.000000	35.0	21.2
25639.200000	34.6	21.2

CONTINUOUS CONDUCTED EMISSION

LIMITS:	Product standard :	FCC CFR 47, Part 15, Subpart B (10-1-16 Edition), Secs. 15.107; ICES-003 Issue 6 (January 2016)
	Test standard :	FCC CFR 47, Part 15, Subpart B (10-1-16 Edition), Secs. 15.107; ICES-003 Issue 6 (January 2016)

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 (10-1-16 Edition), Secs. 15.107 & ICES-003 Issue 6 (January 2016), 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

*Decreases with the logarithm of the frequency.

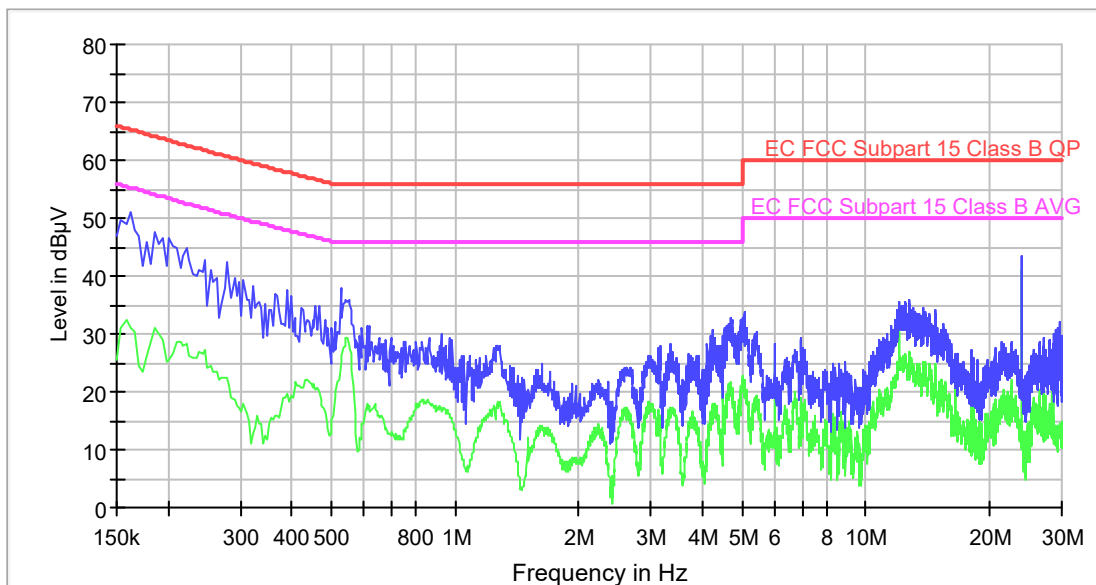
TESTED SAMPLES:	S/01
TESTED OPERATION MODES:	OM#01
TEST RESULTS:	CCmmnnhh: CC, Conducted Condition; mm: Sample number; nn: Operation mode; hh: wire

CCmmnnhh	DESCRIPTION	RESULT
CC01010N	Range: 150kHz – 30MHz. Neutral wire noise.	P
CC0101L1	Range: 150kHz – 30MHz. Phase wire noise.	P

Conducted Emission. CC01010N

Project: 59572REM.002
 Company: POLAR
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. BLE OFF. GNSS interfaces in RX mode. Transferring data via USB. Equipment charging batteries.
 Power supply: 3.8 Vdc (By USB port).
 Auxiliary laptop power supply: 115 Vac. Neutral wire noise.

EMI EC FCC Subpart 15 Class B CC



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

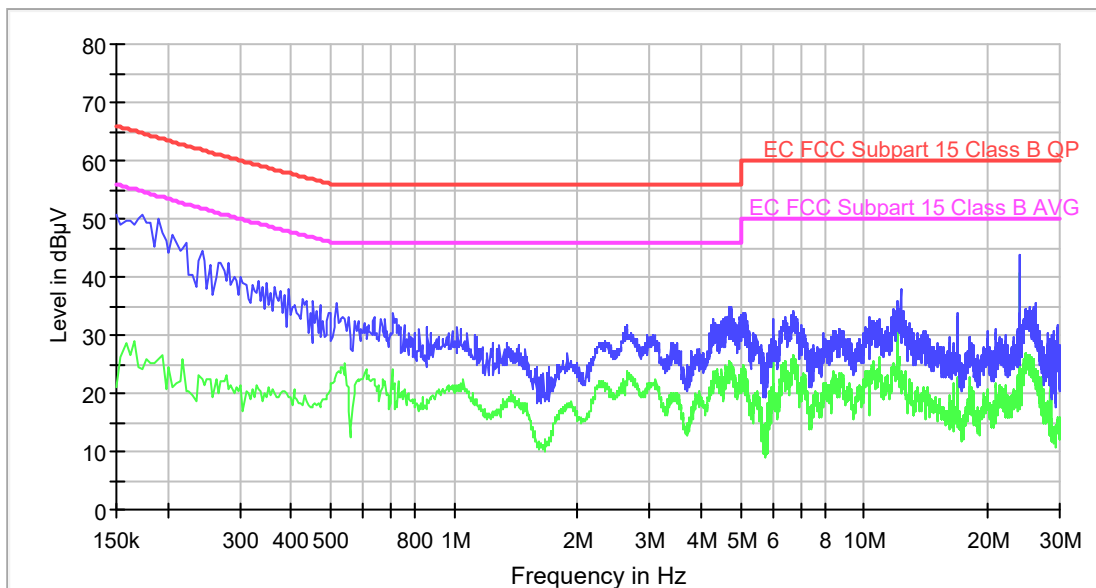
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV)	AVG CLRWR (dBµV)
0.162000	50.9	31.1
0.278000	42.4	22.4
0.526000	37.8	25.2
0.926000	29.8	17.3
1.286000	28.1	18.4
3.350000	28.3	17.1
5.070000	33.7	22.2
6.974000	29.4	17.6
12.798000	36.0	25.9
24.014000	43.3	41.0

Conducted Emission. CC0101L1

Project: 59572REM.002
 Company: POLAR
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. BLE OFF. GNSS interfaces in RX mode. Transferring data via USB. Equipment charging batteries.
 Power supply: 3.8 Vdc (By USB port).
 Auxiliary laptop power supply: 115 Vac. Phase wire noise.

EMI EC FCC Subpart 15 Class B CC



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

Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV)	AVG CLRWR (dBµV)
0.150000	50.6	21.2
0.282000	42.6	20.6
0.454000	35.8	17.8
0.754000	31.7	20.8
1.346000	28.6	18.6
2.634000	31.7	22.7
4.722000	34.9	25.1
6.718000	34.0	26.5
12.270000	37.8	22.7
24.014000	43.8	40.8