DEKRA Certification, Inc.
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DEKRA

ACCREDITED
Test Lab
Cert 2764.01

FCC LISTED, REGISTRATION NUMBER: 2764.01

ISED LISTED REGISTRATION NUMBER: 23595-1

Test report No:
2714ERM.003A1

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-18 Edition) & ICES-003 ISSUE 6 – Update April (2017)

Identification of item tested	GPS multisports watch
Trademark	Polar
Model and /or type reference	3N
Other identification of the product	FCC ID: INW3N IC: 6248A-3N
Features	Bluetooth LE, GPS, Glonass, Galileo, SBAS
Manufacturer	POLAR ELECTRO OY Professorintie 5, 90440 Kempele, Finland
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-18 Edition) ICES-003 ISSUE 6 – Update April (2017)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager Digitally signed by Domingo Galvez DN: cn=Domingo Galvez, o=DEKRA Certification Inc., ou=Regulatory Lab, email=dgalvez@dekra.com, c=US Date: 2020.03.05 07:21:58 -05'00'
Date of issue	03-03-2020
Report template No	FDT08_21

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Competences and guarantees

DEKRA Certification Inc. is a testing laboratory accredited by A2LA (The American Association for Laboratory Accreditation), to perform the tests indicated in the Certificate 2764.01

DEKRA Certification Inc. 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, DEKRA Certification Inc. has a calibration and maintenance program for its measurement equipment.

DEKRA Certification Inc. 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 Certification at the time of performance of the test.

DEKRA Certification Inc. 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.

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

Uncertainty

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

	Frequency (MHz)	U(k=2)	Units
Conducted emission	0,009 - 30	2.69	dB
Radiated emission	30-180	3.82	dB
	180-1000	2.61	dB
	1000-18000	2.92	dB
	18000-40000	2.15	dB

Data provided by the client

Polar 3N is GPS multi-sports watch with following features supported: Bluetooth LE, GPS, GLONASS, Galileo, SBAS.

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 undergoing test have been selected by: The client.

Sample S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
2714/11	Polar Watch GRITX B3-10(Radiated)	GRIT X	6BF5A92C	12/19/2019

Sample S/01 was used in following testing: Radiated Emission

Following accessory items were used to Charge the DUT

Control Nº	Description	Model	Serial Nº	Date of reception
2714/15	Polar Watch GRITX B3-20 USB charger	--	--	12/19/2019

Following Auxiliary items were used with the DUT

Control Nº	Description	Serial Number
CTC-8997-8	Laptop	IPOMG92

Test sample description

Ports……. :	Port name and description			Cable			
				Specified length [m]		Attached during test	Shielded
	USB Port			0.8		☒	
						☐	
						☐	
Supplementary information to the ports……. :	*No Data Provided*						
Rated power supply .....:	Voltage and Frequency			Reference poles			
				L1	L2		L1	L2
	☐	AC:		☐	☐	AC:	☐	☐
	☐	AC:		☐	☐	AC:	☐	☐
	☒	DC: 3.8 Vdc						
	☐	DC:						
Rated Power .....:	*1.33 W*						
Clock frequencies .....:	*32MHz, 32,768kHz, 26 MHz*						
Other parameters.....:							
Software version .....:	*0.3.1*						
Hardware version.....:	*0077982*						
Dimensions in cm (L x W x D) ....:							
Mounting position.....:	☐	Table top equipment					
	☐	Wall/Ceiling mounted equipment					
	☐	Floor standing equipment					
	☒	Hand-held equipment					
	☐	Other: Body Worn – off the ear					
Modules/parts .....:	Module/parts of test item			Type		Manufacturer	
Accessories (not part of the test item) .....:	Description			Type		Manufacturer	

Documents as provided by the applicant.....:	Description	File name	Issue date
	FDT30_15 Declaration Equipment Data_62524B		*11/01/2019*

Copy of marking plate:

Identification of the client

POLAR ELECTRO OY
Professorintie 5, 90440 Kempele, Finland

Testing period and place

Test Location	DEKRA Certification, Inc
Date (start)	12-27-2019
Date (finish)	01-03-2020

Document history

Report number	Date	Description
2714ERM.003	01-20-2020	First release
2714ERM.003A1	03-03-2020	2nd release

Modifications to the reference test report

It was introduced the following modifications in respect to the test report number 2714ERM.003 related with the same samples, in the next clauses and sub-clauses:

Clauses/ Sub-Clauses	Modification	Justification
Page 12 /Description of Operation modes	Operation mode #3 introduces	To include DUT`s non-peripheral Operation mode Per Certification body comments
Page 12 / A.1.RADIATED EMISSION ELECTROMAGNETIC FIELD TEST	Test results updated	Results updated according to new elaborated Operation modes

This modification test report cancels and replaces the test report 2714ERM.003

Environmental conditions

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

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

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

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

Remarks and comments

The tests have been performed by the technical personnel: Koji Nishimoto & Poojita Bhattu

Testing verdicts

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

Summary

Emission Test			
Report Section	**Requirement – Test case**	**Verdict**	**Remark**
A.1.	Radiated emission electromagnetic field test (30 MHz – 1000 MHz)	P	N/A
A.1.	Radiated emission electromagnetic field test (1 GHz – 18 GHz)	P	N/A
-	Radiated emission electromagnetic field test (18 GHz – 40 GHz)	N/A	Refer 1
A.2	Conducted emission test (150 kHz to 30 MHz)	P	N/A

Supplementary information and remarks:

1) As per standard 47 CFR §15.33 due to the highest frequency generated or used in the device is above 1000MHz the upper frequency of measurement range is up to 5th harmonic of the highest frequency or 40GHz, whichever is lower.

List of equipment used during the test

1. Equipment's used for Radiated Emission

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
0981	Preamplifier	BONN ELEKTRONIK	BLMA 0118-2A	2018/10	2020/10
1017	EMC measurement software	ROHDE & SCHWARZ	EMC32 V9.01	---	---
1014	Signal Analyzer	ROHDE & SCHWARZ	FSV40	2019/04	2021/04
1012	EMI Test Receiver	Rohde & Schwarz	ESR26	2018/09	2020/09
1057	Horn Antenna	ETS LINDGREN	3115	2017/03	2020/03
1064	Biconilog Antenna	ETS LINDGREN	3142E	2017/03	2020/03
1108	Ethernet SNMP Thermometer- CR room	HW GROUP	HWg-STE Plain	N/A	N/A
1110	Ethernet SNMP Thermometer- SAC	HW GROUP	HWg-STE Plain	N/A	N/A

2. Equipment's used for Conducted Emission

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
1010	EMI Test Receiver	Rohde & Schwarz	ESR7	2019/08	2021/08
997	Artificial Mains Network (LISN)	NARDA	PMM L3-32	2019/06	2021/06
1074	Pulse Limiter	NARDA	PMM PL-01	2017/08	2020/08
1110	Ethernet SNMP Thermometer- SAC	HW GROUP	HWg-STE Plain	N/A	N/A

Appendix A: Test results

Appendix A Content

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 failure criteria for the immunity test that they were applying to it and a monitoring to guarantee performance of the same ones.

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. Powered by PC USB Port (5 Vdc) from laptop (120 Vac/60Hz) • BLE Idle mode • GNSS in RX mode • Battery charging and transferring data with PC
OM#02	EUT ON. Power supply: 5Vdc. (By USB port) • BLE Idle mode • GNSS in RX mode • Battery charging by USB Port
OM#03	EUT ON. Power by internal battery • BLE Idle mode • GNSS in RX mode • Battery not charging

*Worst configurations detected

A.1.RADIATED EMISSION. ELECTROMAGNETIC FIELD TEST

LIMITS:	Product standard:	FCC CFR 47, Part 15, Subpart B (10-1-18 Edition), Secs. 15.109 & ICES-003 Issue 6 – Update April (2017)
	Test standard:	FCC CFR 47, Part 15, Subpart B (10-1-18 Edition), Secs. 15.109 & ICES-003 Issue 6 – Update April (2017); 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, Subpart B (10-01-18 Edition), Secs. 15.109 & ICES-003 Issue 6 – Update April (2017) in the frequency range 30 MHz to 40 GHz for class B equipment.

Frequency range (MHz)	QP Limit for 3 m	
	(μV/m)	(dBμV/m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46
Above 960	500	54

Frequency range (MHz)	AVG Limit for 3 m		PK Limit for 3 m (1)
	(μV/m)	(dBμV/m)	(dBμV/m)
Above 1000	500	54	74

Frequencies above 1 GHz, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test, as per §15.35(b

TEST SETUP

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30-1000 MHz (Bilog antenna) and 1-18GHz (Double ridge horn antennas). A distance of 1m is used for the frequency range 18-40 GHz (Double ridge horn antennas).

For radiated emissions in the range 18-40 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

TEST SETUP (Cont.)	

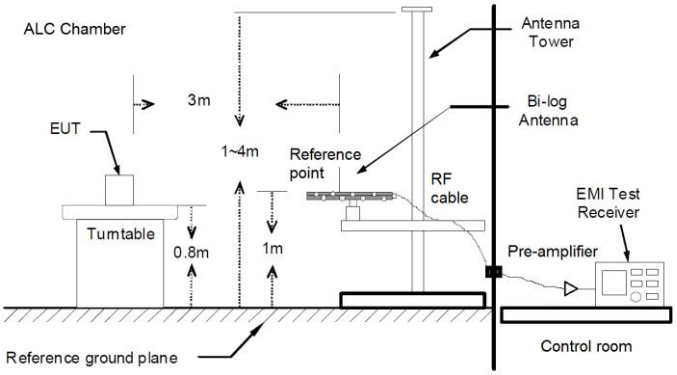


Fig A1: Generic setup for measurements from 30 to 1000MHz

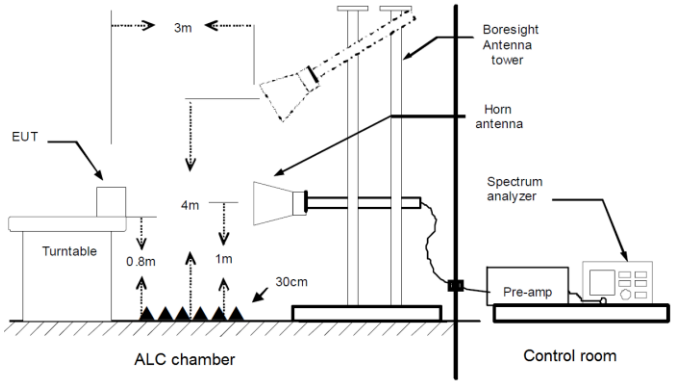


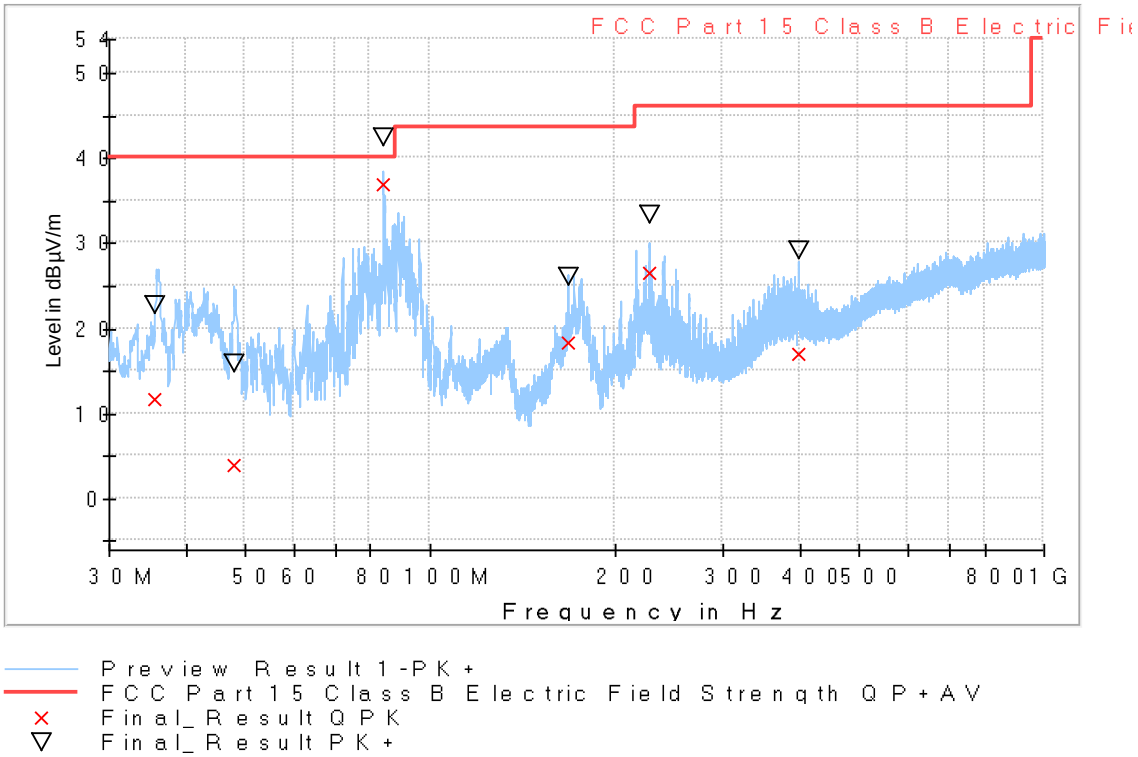
Fig A2: Generic setup for measurements from 1 to 18GHz (Analyzer outside the chamber)

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

CRmmnnxx	Description	Result
CR0101LR	Range: 30 MHz - 1000 MHz, Both Polarizations	P
CR0101HR	Range: 1-18 GHz, Both Polarizations	P

Radiated Emission. CR0101LR

Project:	02714ERM003
Company:	Polar
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. BLE in idle.GNSS in RX mode. Powered by PC USB Port (5 Vdc) from laptop (120 Vac/60Hz)

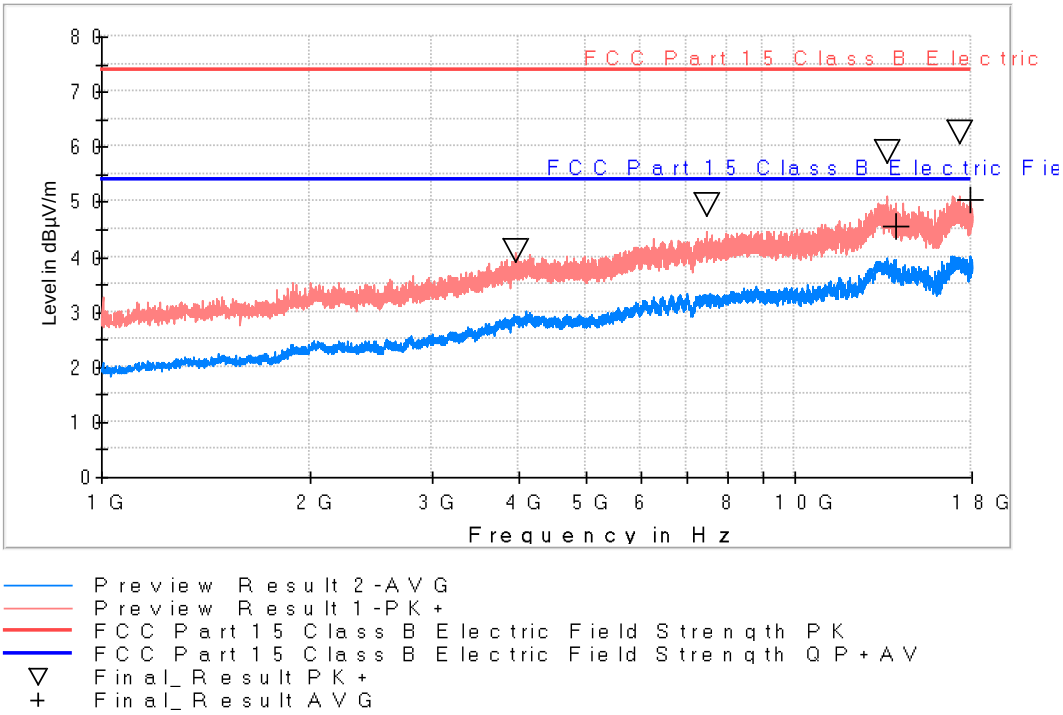


Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Azimuth (deg)
35.600000	22.83	11.69	V	-180.0
48.050000	16.02	4.07	V	90.0
83.990000	42.38	37.03	H	-17.0
167.970000	26.19	18.43	V	-15.0
228.010000	33.46	26.45	H	-21.0
398.470000	29.26	16.94	V	51.0

Radiated Emission. CR0101HR

Project:	02714ERM003
Company:	Polar
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. BLE in idle. GNSS in RX mode. Powered by PC USB Port (5 Vdc) from laptop (120 Vac/60Hz)



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Pol	Azimuth (deg)
3949.950000	41.01	---	V	105.0
7444.800000	49.34	---	H	-7.0
13610.250000	59.08	---	V	-149.0
13962.350000	---	45.60	V	13.0
17237.950000	62.55	---	V	25.0
17911.700000	---	50.30	V	138.0

A.2. CONTINOUS CONDUCTED EMISSION ON POWER LEADS

LIMITS:	Product standard:	FCC CFR 47, Part 15, Subpart B (10-1-18 Edition), Secs. 15.107 & ICES-003 Issue 6 – Update April (2017)
	Test standard:	FCC CFR 47, Part 15, Subpart B (10-1-18 Edition), Secs. 15.107 & ICES-003 Issue 6 – Update April (2017); ANSI C63.4 (2014)

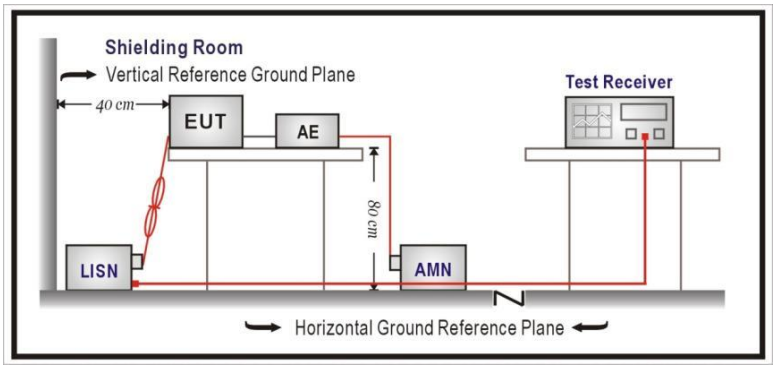
LIMITS

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 (10-01-18 Edition), Secs. 15.107 & ICES Issue 6 (2017), in the frequency range 0,15 to 30 MHz, for Class B equipment was:

Frequency range (MHz)	**Limit**	
	Quasi-peak [dB(µV)[1)]]	**Average [dB(µV)[1)]]**
0,15 to 0,5	66-56 [2)]	56-46[2)]
0,5 to 5	56	46
5 to 30	60	50

[1)] At the transition frequency, the lower limit applies.
[2)] The limit decreases linearly with the logarithm of the frequency.

TEST SETUP	

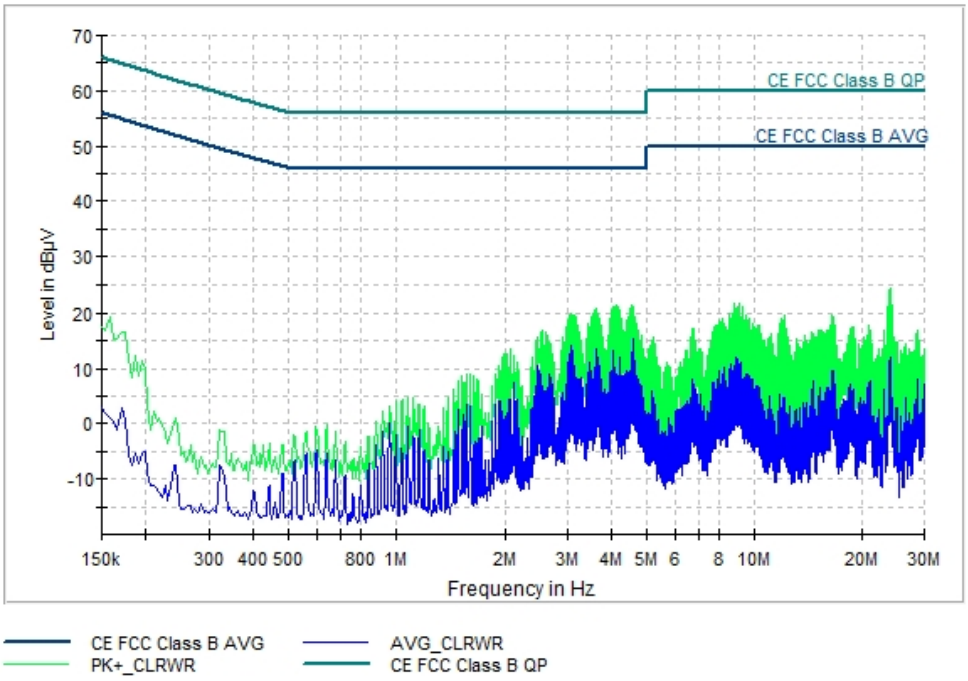


TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	OM#01
TEST RESULTS:	CCmmnnhh:CC, Conducted Condition; mm: Sample number; nn: Test condition mode; hh: wire

CRmmnnhh	**DESCRIPTION**	**RESULT**
CC01010N	Neutral wire noise.	P
CC0101L1	Phase wire noise.	P

TEST RESULTS (Cont.):	CC01010N

Project: 2714ERM003
Company: Polar
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Connected to PC for Charging and Data Synchronizing. PC Powered by 120VAC Adaptor. N wire.

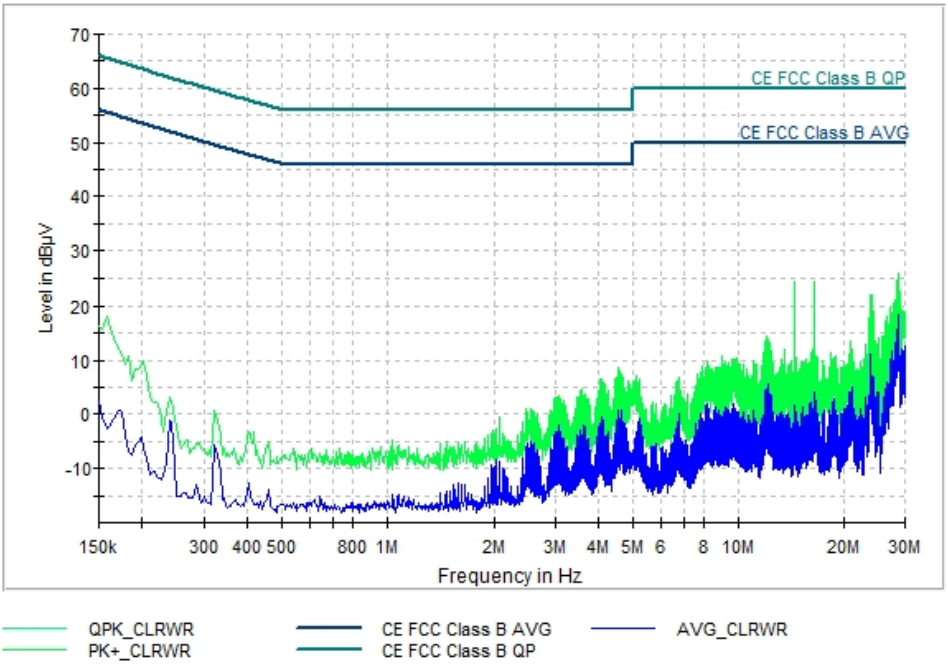


Maximizations

Frequency (MHz)	PK+_CLRWR (dBµV)	AVG_CLRWR (dBµV)
3.082000	19.8	18.1
4.522000	21.1	18.3
8.842000	21.6	11.7
9.318000	21.0	12.3
12.122000	19.5	15.7
16.598000	19.7	15.8
20.958000	17.8	10.4
23.998000	23.9	14.5
24.042000	24.2	14.1
28.602000	17.0	11.5

TEST RESULTS (Cont.):	CC0101L1

Project: 2714ERM003
Company: Polar
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Connected to PC for Charging and Data Synchronizing. PC Powered by 120VAC Adaptor. L1 wire



Maximizations

Frequency (MHz)	PK+_CLRWR (dBµV)	AVG_CLRWR (dBµV)
0.158000	18.1	-2.6
4.538000	8.8	3.8
8.962000	10.8	2.5
12.074000	14.6	8.9
14.510000	24.3	10.4
16.454000	24.3	11.2
20.922000	13.5	2.5
23.998000	21.9	17.1
24.042000	21.7	16.2
28.686000	25.7	17.7