

TEST REPORT

Nr. R22174301

Federal Communication Commission (FCC)

Report Reference No.	R22174301
Date of issue:	07.10.2022
Total number pages:	107
Customer name	Atlas Copco BLM S.r.l.
Address	Via Guglielmo Pepe, 11 – 20037 Paderno Dugnano (MI) – Italy
Test specification:	
Standards	FCC Rules & Regulations, Title 47:2021 Part 15 paragraph(s): 203, 204, 205, 207, 209, 215 and 249
Non-standard test method	N/A
Test Report Form No.	15-249DEKRA
Test Report Form(s) Originator ..	DEKRA Testing and Certification S.r.l.
Master TRF	2022-10
General disclaimer:	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of DEKRA Testing and Certification S.r.l.	
(*) Test item description	Gateway between the Power Focus 6000 and the Mechatronic Wrench MWR
(*) Trademark	Atlas Copco
(*) Manufacturer	Atlas Copco AB
(*) Model / Type reference	MWR-KIT
(*) FCC ID	2AIPFMWRKIT
(*) Rating(s)	100-240 V ~ 50/60 Hz single-phase + earth
Report	
Tested by (name + signature)	C. Panozzo
Approved by (name + signature)	F. Marenda

(*) information provided by the customer

1 Summary

1	Summary.....	2
2	Reference standard	3
3	List of attachments.....	3
4	Deviation(s) from test specification.....	3
5	Testing location.....	3
6	General description of tested item and testing condition(s)	5
6.1	Photos of the test item	7
7	Verdict summary section	9
8	Test conditions.....	11
8.1	General	11
9	Test results	12
9.1	Antenna requirements	12
9.2	Conducted emission	13
9.3	Radiated emissions and spurious emission	27
9.4	Peak Output Power.....	80
9.5	20 dB bandwidth	87
9.6	Band edge	94

2 Reference standard	
FCC Rules and Regulation Title 47 part 15:2021	--
3 List of attachments	
Attachment 1: Instruments list, measurement uncertainty, judgement of compliance and quality manual references	
4 Deviation(s) from test specification	
None	
5 Testing location	
DEKRA Testing and Certification S.r.l. Via della Fisica, 20 – 36016 Thiene (VI) – Italy Test site facility's FCC registration number: 182474	

Revision index	Date	Change history
1.0	07.10.2022	--

Testing and sampling:	
Date of receipt of test item	05.09.2022
Testing start date	29.09.2022
Testing end date	04.10.2022
Sampling procedure.....	Equipment used for testing was picked up by the customer
Internal identification	Adhesive label with the product number P220866
General remarks:	
This report shall not be reproduced, except in full, without the written approval of DEKRA Testing and Certification S.r.l.. The test results presented in this report relate only to the object tested. “(see appended table)”: refers to a table appended to the report. Throughout this report a comma is used as the decimal separator.	
Possible test case verdicts:	
Test case does not apply to the test object:	N/A (Not Applicable)
Test object does meet the requirement:	P (Pass)
Test object does not meet the requirement:	F (Fail)
Test object does not performed:	N/E (Not Executed)
Definition of symbols used in this test report:	
☒ Indicates that the listed condition, standard or equipment is applicable for this report. ☐ Indicates that the listed condition, standard or equipment is not applicable for this report.	

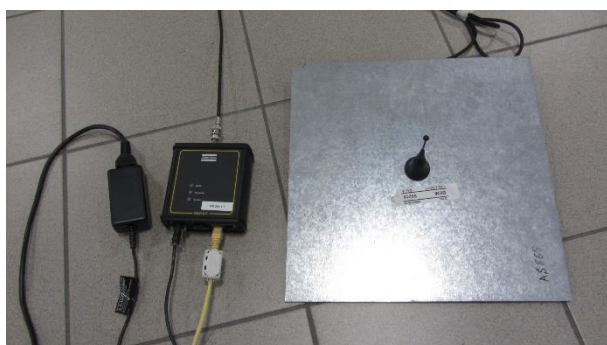
6 General description of tested item and testing condition(s)

Description	Gateway between the Power Focus 6000 and the Mechatronic Wrench MWR						
Model Number	MWR-KIT						
FCC ID	2AIPFMWRKIT						
Serial Number	--						
Brand name	Atlas Copco						
Frequency band	902 – 928 MHz						
Nominal frequency	F _L : 902,791 MHz		F _M : 912,271 MHz		F _H : 925,963 MHz		
Test power supply		Voltage and Frequency	Reference poles				
			N	L1	L2	L3	PE
	☒	AC: 120 V, 60 Hz	☒	☒	☐	☐	☒
	☐	AC:	☐	☐	☐	☐	☐
	☐	DC:					☐
Firmware version	1.6.0						
Type of equipment	☒ Transmitter unit ☐ Receiver unit						
Type of station	☒ Portable station ☐ Mobile station						
Test arrangements of EUT	<i>Intended operational arrangement(s) of EUT</i>			<i>Test arrangement (see basic standard)</i>			
	☐ Table-top only			Table-top			
	☐ Floor-standing only			Floor-standing			
	☐ Can be floor-standing or table-top			Table-top			
	☐ Rack mounted			In rack or table-top			
	☒ Other, for example wall mounted, ceiling mounted, handheld, body worn			Table-top			
Operating modes	No.	Operating mode of test item					
	1	EUT in continuous transmission at maximum power					
General product information	Measurements have been performed on the following 3 antenna types:						
	Type		Model Name				
	1/4 λ Whip		Antenna MWR-KIT (SMA) 868/915 MHz				
	Vertical stilus		Extended Cable Antenna, 5 m (BNC) 868/915 MHz				
	Quarter wave ground plane antenna		Cable Antenna 2,5 m (BNC) 868/915 MHz				

Declination of responsibility:	Information relating to the description of the sample, components list and software/hardware version (if reported) are provided by the customer. DEKRA Testing and Certification S.r.l. cannot be considered responsible for these information, for any other document sent by the customer and for any difference between the software version present in the tested sample and that present in the object intended for final sale. In some cases, the software in the tested sample is in a version dedicated exclusively to the test, and therefore does not represent the software installed in the final version of the product.
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6.1 Photos of the test item





7 Verdict summary section

FCC Rules & Regulations, Title 47:2020 Part 15 paragraph(s): 203, 204, 205, 207, 209, 215 and 249			
Clause	Requirement – Test case	Basic standard	Verdict
Part 15.203	Antenna requirements	ANSI C63.10	P
Part 15.207	Conducted emissions	ANSI C63.10	P
Part 15.209	Radiated emissions and spurious emission	ANSI C63.10	P
Part 15.209 and 15.249	Peak Output Power	ANSI C63.10	P
Part 15.215	20 dB Bandwidth	ANSI C63.10	P
Part 15.249	Band edge	ANSI C63.10	P

Normative references	
Reference no.	Description
FCC Rules and Regulation Title 47 part 15:2021	--
ANSI C63.4:2014	American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz
ANSI C63.10:2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

8 Test conditions

8.1 General

Environmental reference conditions.....:	The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:		
	Temperature	Humidity	Atmospheric pressure
	15 °C – 35 °C	30 % - 60 %	800 hPa – 1060 hPa
	If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.		
Measurement uncertainties	Attachment 1		

9 Test results

9.1 Antenna requirements

Tested by	C. Panozzo	
Test date	29.09.2022	
Reference standards	FCC Rules and Regulation; Titles 47 Part. 15.203 and 15.204	
Test specification	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded	
Antenna type.....	☐	Integral antenna
	☒	External antennas
Antenna gain.....	3 dBi for 1/4 λ whip antenna 3 dBi for vertical stilus antenna 5 dBi for quarter wave ground plane antenna	
External R.F. power amplifier	Not Present	

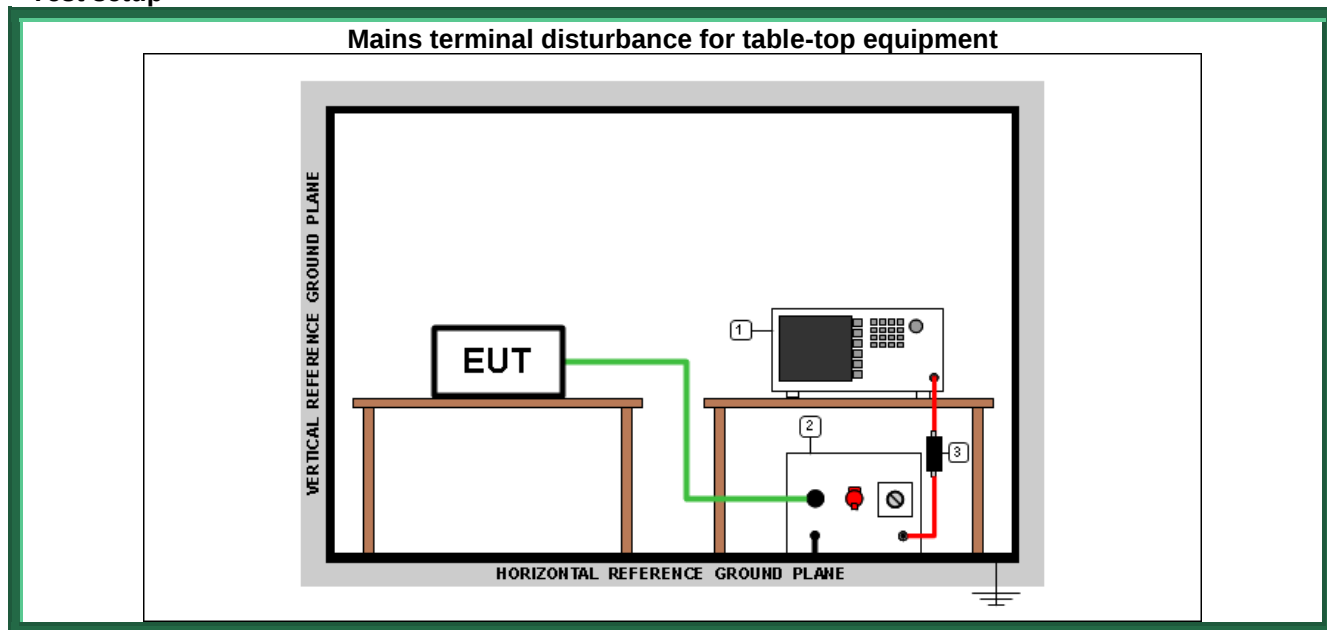
9.2 Conducted emission

Tested by	C. Panozzo	
Test date	04.10.2022	
Test location (stand)	Shielded chamber (CMC A001)	
Reference standards	FCC Rules and Regulation; Titles 47 Part. 15.207 ANSI C63.10 cl. 6.2	
Test set-up description	☒	Table top equipment set-up (80 cm above the reference ground plane)
	☐	Floor standing equipment set-up (insulating material up to 12 mm thick)
	☐	False floor installation equipment set-up (insulating material up to 34 cm above the reference ground plane)
Supplementary Test set-up description	--	
Test method applied	☒	Artificial mains network, 50 μ H/50 Ω LISN
	☐	Other:

Acceptance limits

Frequency range (MHz)	<i>dB(μV) Quasi-peak</i>	<i>dB(μV) Average</i>
0,15 to 0,50	66 to 56	56 to 46
0,5 to 5	56	46
5 to 30	60	50

Test setup



Test setup PE001_01

Nr.	Id. Number	Manufacturer	Model	Description
3	CMC S010	Rohde & Schwarz	ESH3-Z2	Pulse limiter
2	CMC S200	Schwarzbeck	NSLK 8128	V-LISN
1	CMC S206	Rohde & Schwarz	ESCI 7	EMC Receiver 9KHz-7GHz

Result

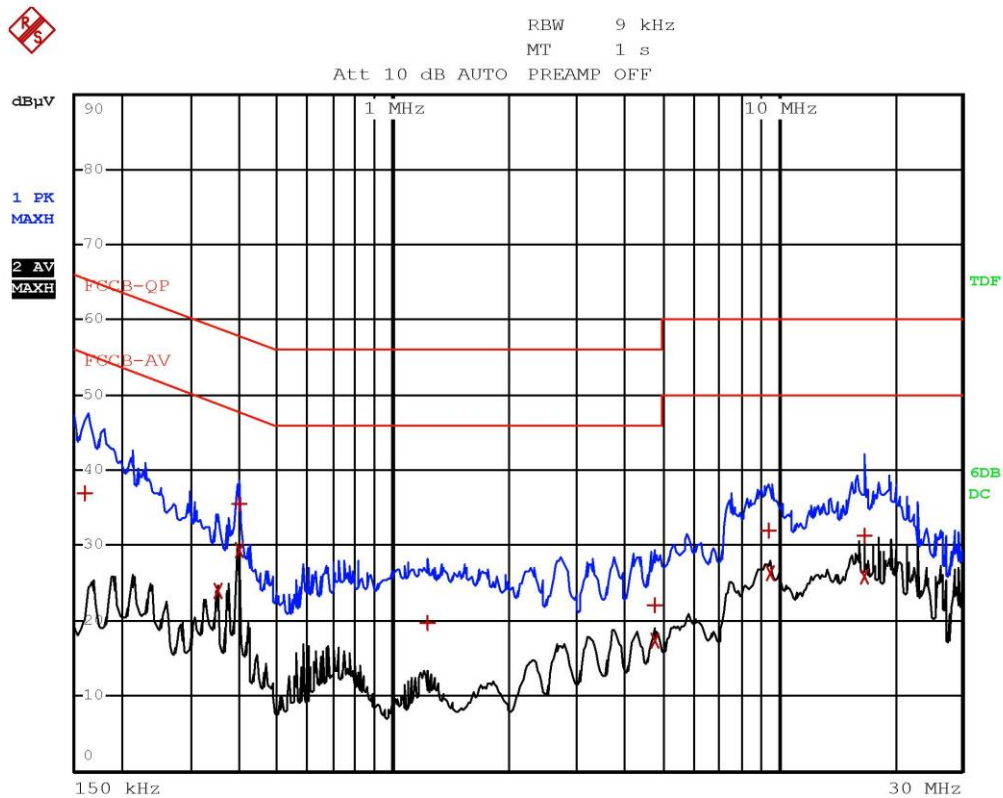
Antenna	Line	Frequency Range (MHz)	Graphs	Result
1/4 λ whip antenna	N	0,15 – 30	G22174380	P
1/4 λ whip antenna	L1	0,15 – 30	G22174381	P
Vertical stilus antenna	L1	0,15 – 30	G22174382	P
Vertical stilus antenna	N	0,15 – 30	G22174383	P
Quarter wave ground plane antenna	N	0,15 – 30	G22174384	P
Quarter wave ground plane antenna	L1	0,15 – 30	G22174385	P

Graphs Legend

PK: Peak; QP [1s] (quasi-peak at 1 second) values are marked with a +

AV: Average; AV [1s] (average at 1 second) values are marked with a X

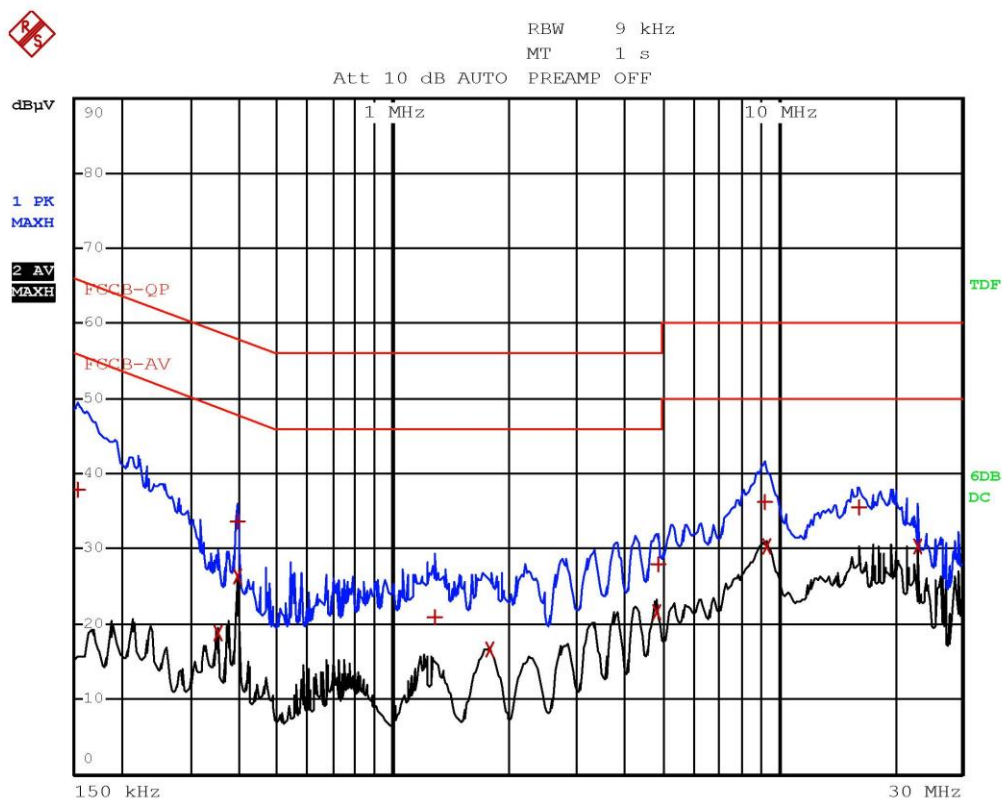
Graphs



Panozzo 22174380 Line N Worst Case

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	FCCB-QP			
Trace2:	FCCB-AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBpV	DELTA LIMIT dB	
1 Quasi Peak	162 kHz	37.00	-28.35	
2 Average	350 kHz	23.96	-24.99	
1 Quasi Peak	398 kHz	35.47	-22.42	
2 Average	398 kHz	29.51	-18.37	
1 Quasi Peak	1.238 MHz	19.60	-36.39	
2 Average	4.802 MHz	17.34	-28.65	
1 Quasi Peak	4.81 MHz	22.02	-33.97	
1 Quasi Peak	9.414 MHz	32.12	-27.87	
2 Average	9.514 MHz	26.27	-23.72	
1 Quasi Peak	16.726 MHz	31.22	-28.77	
2 Average	16.726 MHz	25.80	-24.19	

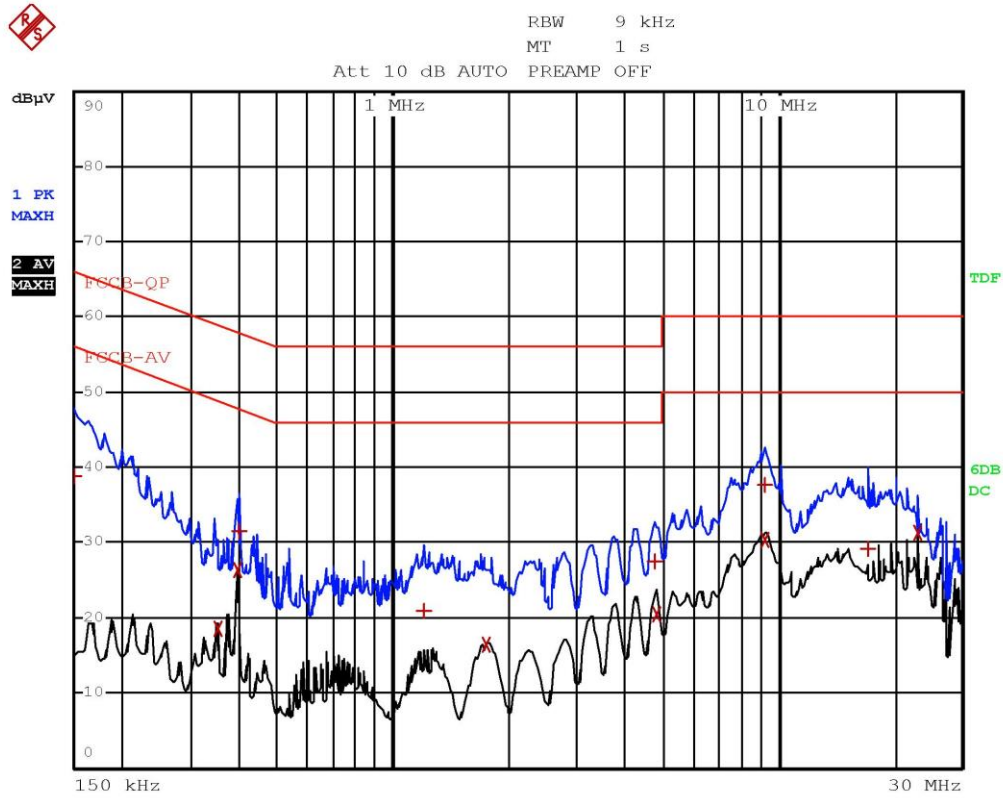
Panozzo 22174380 Line N Worst Case



Panozzo 22174381 Line L Worst Case

EDIT PEAK LIST (Final Measurement Results)				
Trace1:		FCCB-QP		
Trace2:		FCCB-AV		
Trace3:		---		
TRACE		FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1	Quasi Peak	154 kHz	37.84	-27.93
2	Average	350 kHz	18.83	-30.12
1	Quasi Peak	394 kHz	33.76	-24.21
2	Average	394 kHz	26.27	-21.70
1	Quasi Peak	1.282 MHz	20.91	-35.08
2	Average	1.79 MHz	16.59	-29.40
2	Average	4.822 MHz	21.60	-24.39
1	Quasi Peak	4.914 MHz	28.05	-27.94
1	Quasi Peak	9.27 MHz	36.27	-23.73
2	Average	9.306 MHz	30.46	-19.53
1	Quasi Peak	16.226 MHz	35.51	-24.48
2	Average	23.13 MHz	30.30	-19.69

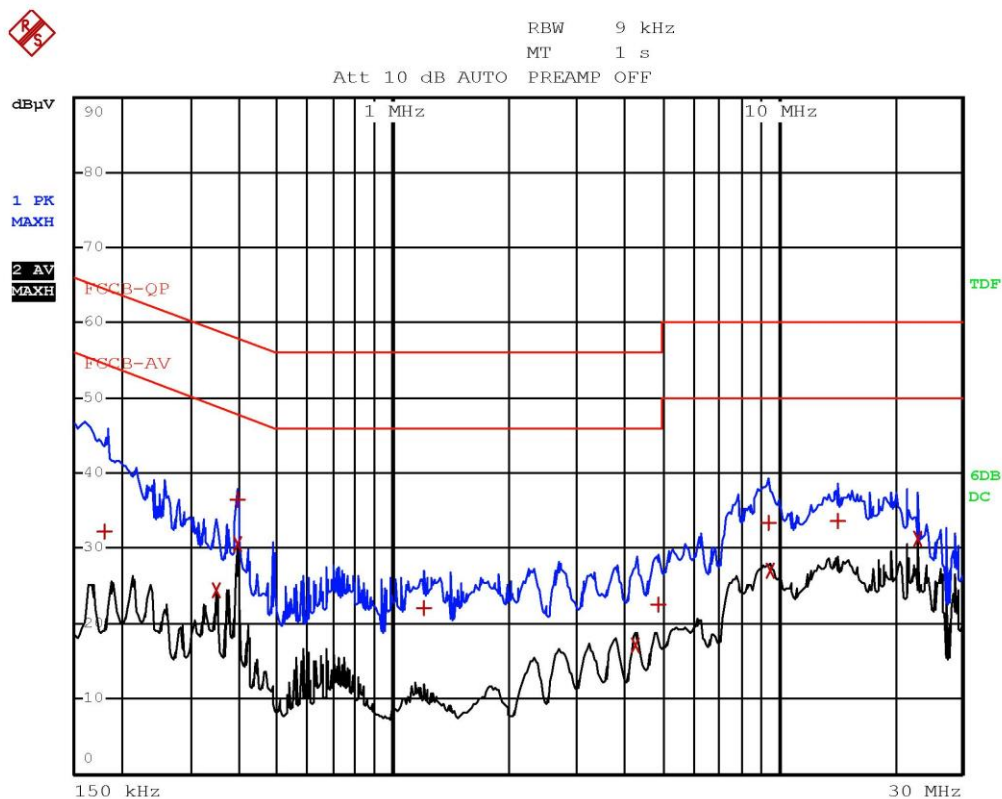
Panozzo 22174381 Line L Worst Case



Panozzo 22174382 Line L Worst Case

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	FCCB-QP			
Trace2:	FCCB-AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB	
1 Quasi Peak	150 kHz	38.89	-27.10	
2 Average	350 kHz	18.46	-30.49	
2 Average	394 kHz	26.31	-21.66	
1 Quasi Peak	398 kHz	31.45	-26.43	
1 Quasi Peak	1.21 MHz	20.89	-35.10	
2 Average	1.742 MHz	16.47	-29.52	
1 Quasi Peak	4.818 MHz	27.46	-28.53	
2 Average	4.842 MHz	20.43	-25.56	
2 Average	9.206 MHz	30.37	-19.62	
1 Quasi Peak	9.25 MHz	37.78	-22.21	
1 Quasi Peak	17.186 MHz	29.06	-30.93	
2 Average	23.13 MHz	31.19	-18.80	

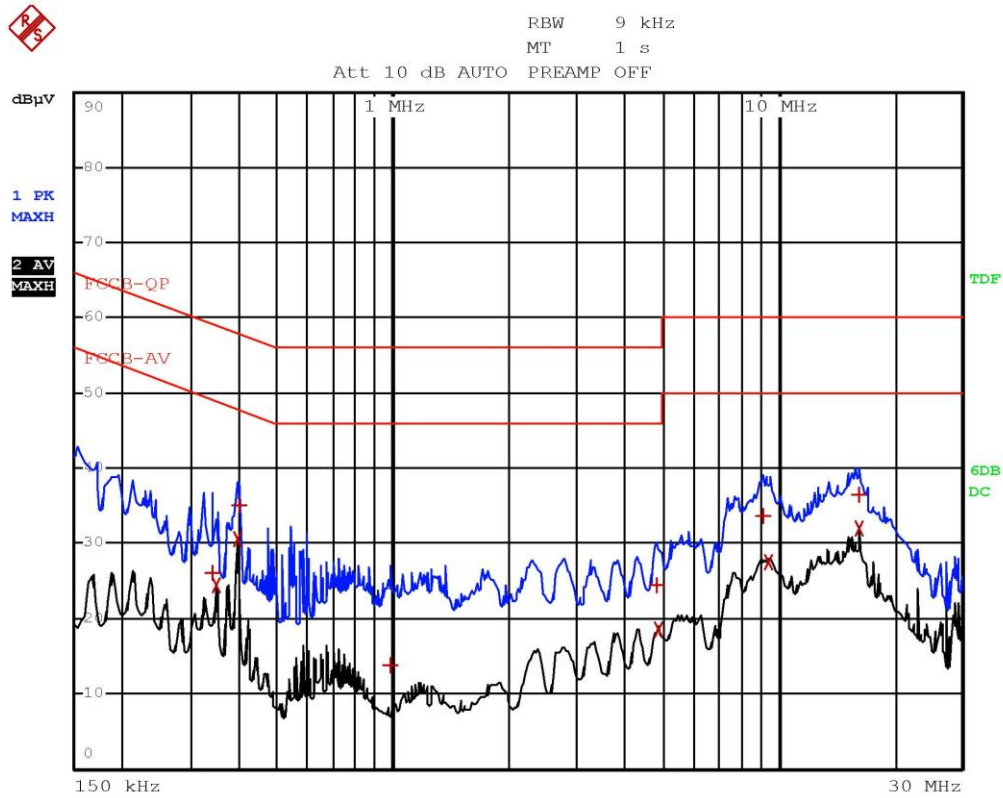
Panozzo 22174382 Line L Worst Case



Panozzo 22174383 Line N Worst Case

EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCCB-QP		
Trace2:	FCCB-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBpV	DELTA LIMIT dB
1 Quasi Peak	182 kHz	32.25	-32.14
2 Average	346 kHz	24.43	-24.62
1 Quasi Peak	394 kHz	36.51	-21.46
2 Average	394 kHz	30.49	-17.48
1 Quasi Peak	1.206 MHz	21.98	-34.01
2 Average	4.258 MHz	17.16	-28.83
1 Quasi Peak	4.902 MHz	22.52	-33.47
1 Quasi Peak	9.494 MHz	33.38	-26.61
2 Average	9.51 MHz	27.01	-22.99
1 Quasi Peak	14.274 MHz	33.73	-26.26
2 Average	23.13 MHz	31.20	-18.79

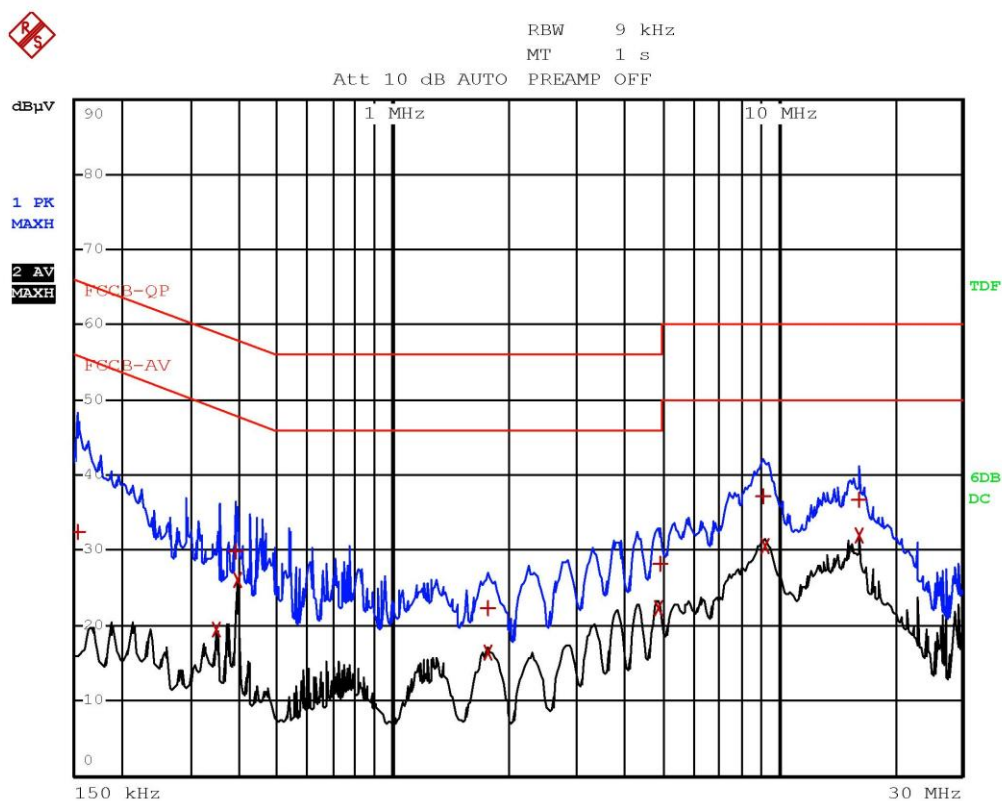
Panozzo 22174383 Line N Worst Case



Panozzo 22174384 Line N Worst Case

EDIT PEAK LIST (Final Measurement Results)				
Trace1:		FCCB-QP		
Trace2:		FCCB-AV		
Trace3:		---		
TRACE		FREQUENCY	LEVEL dBpV	DELTA LIMIT dB
1	Quasi Peak	338 kHz	26.04	-33.20
2	Average	346 kHz	24.39	-24.65
2	Average	394 kHz	30.48	-17.49
1	Quasi Peak	398 kHz	35.12	-22.76
1	Quasi Peak	990 kHz	13.82	-42.17
1	Quasi Peak	4.862 MHz	24.45	-31.54
2	Average	4.89 MHz	18.49	-27.50
1	Quasi Peak	9.146 MHz	33.60	-26.39
2	Average	9.49 MHz	27.53	-22.46
2	Average	16.226 MHz	32.02	-17.97
1	Quasi Peak	16.23 MHz	36.61	-23.38

Panozzo 22174384 Line N Worst Case



Panozzo 22174385 Line L Worst Case

EDIT PEAK LIST (Final Measurement Results)				
Trace1:		FCCB-QP		
Trace2:		FCCB-AV		
Trace3:		---		
TRACE		FREQUENCY	LEVEL dBpV	DELTA LIMIT dB
1	Quasi Peak	154 kHz	32.58	-33.20
2	Average	346 kHz	19.56	-29.49
1	Quasi Peak	390 kHz	29.83	-28.23
2	Average	394 kHz	26.16	-21.81
1	Quasi Peak	1.766 MHz	22.24	-33.76
2	Average	1.766 MHz	16.38	-29.61
2	Average	4.886 MHz	22.20	-23.79
1	Quasi Peak	4.934 MHz	28.27	-27.72
1	Quasi Peak	9.19 MHz	37.16	-22.83
2	Average	9.23 MHz	30.50	-19.49
1	Quasi Peak	16.23 MHz	36.67	-23.32
2	Average	16.23 MHz	31.91	-18.08

Panozzo 22174385 Line L Worst Case

9.3 Radiated emissions and spurious emission

Tested by	C. Panozzo
Test date	03.10.2022
Test location (stand)	Semi-anechoic chamber (CMC A070)
Reference standards	FCC Rules and Regulation; Titles 47 Part. 15.209 and 15.249 (a) and (d) ANSI C63.10 cl. 6.3, 6.4, 6.5 and 6.6
Test set-up description	☒ Table top equipment set-up (80 cm above the reference ground plane) ☐ Floor standing equipment set-up (insulating material up to 12 mm thick) ☐ False floor installation equipment set-up (insulating material up to 34 cm above the reference ground plane)
Supplementary test set-up description	--
Test method applied	SAC with measurement distance [m]: 10 m at frequencies ≤ 1 GHz 3 m at frequencies > 1 GHz
Supplementary information.....	--

Acceptance limits

Acceptance limits for emissions in restricted frequency bands ($f < 1000$ MHz)		
Frequency range (MHz)	Test distance (m)	Limits [dB(μ V/m)]
0,009 to 0,490	300	48,5 to 13,8
0,490 to 1,705	30	33,8 to 22,9
1,705 to 30	30	29,5
30 to 88	3	40
88 to 216	3	43,5
216 to 960	3	46,0
960 to 1000	3	54

Remarks: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz and 110–490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector. The results have been extrapolated to the specified distance using an extrapolation factor

Acceptance limits for emissions in restricted frequency bands ($f \geq 1000$ MHz)			
Frequency (MHz)	Test distance (m)	AV limits [dB(μ V/m)]	Peak limits [dB(μ V/m)]
> 1000	3	54	74