DEKRA Testing and Certification S.r.l. Sede Operativa: Via della Fisica 20, 36016 Thiene (VI), Tel. +39 0445 367702 - info.thiene@dekra.com

TEST REPORT
Nr. R24218501

Federal Communication Commission (FCC)

Report Reference N......:	R24218501
Date of issue: .....:	07.02.2025
Total number pages: .....:	13
Customer name .....:	Atlas Copco BLM S.r.l.
Address .....:	Via Guglielmo Pepe, 11 – 20037 Paderno Dugnano (MI) – Italy
Test specification:	
Standard(s) .....:	KDB 447498 D01 General RF Exposure Guidance v06
Non-standard test method .....:	N/A
Test Report Form N......:	15-247_HoppingDEKRA
Test Report Form(s) Originator ...:	DEKRA Testing and Certification S.r.l.
Master TRF .....:	2024-11

General disclaimer:

The test results presented in this report relate only to the object tested.
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(*) Test item description .....:	Mechatronic wrench
(*) Trademark .....:	Atlas Copco
(*) Manufacturer .....:	Atlas Copco AB Industrial Technique SE-105 23 - Stockholm – Sweden
(*) Model / Type reference .....:	MTRwench 85
(*) FCC ID .....:	2AIPFMTR
(*) Rating(s) .....:	1,2 Vdc from battery

Report

Tested by (name + signature) .....:	C. Panozzo	.....
Approved by (name + signature) .....:	F. Marenda	.....

(*) information provided by the customer

1 Summary

2 Reference standard(s)	
KDB 447498 D01 General RF Exposure Guidance v06	RF exposure procedures and equipment authorization policies for mobile and portable devices
3 List of attachments	
Attachment 1: 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	07.02.2025	

Testing and sampling:	
Date of receipt of test item .....:	19.11.2024
Testing start date .....:	07.02.2025
Testing end date .....:	07.02.2025
Sampling procedure .....:	Sample used for testing chosen by the customer; DEKRA Testing and Certification S.r.l. cannot be considered responsible for the selection of the sample
Internal identification .....:	Adhesive label with the product number P241155
General remarks:	
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Possible test case verdicts:	
Test case does not apply to the test object:	N/A (Not Applicable)
Test object meets the requirement:	P (Pass)
Test object does not meet the requirement:	F (Fail)
Test object was not evaluated for the requirement:	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 ..... :	Mechatronic wrench						
Model Number ..... :	MTRwench 85						
FCC ID ..... :	2AIPFMTR						
Serial Number ..... :	--						
Brand name ..... :	Atlas Copco						
Frequency band ..... :	902 – 928 MHz 2400 – 2483,5 MHz						
Nominal frequencies ..... :	F_L: 902,132 MHz F_L: 2405 MHz	F_M: 917,129 MHz F_M: 2440 MHz	F_H: 927,440 MHz F_H: 2480 MHz				
Test power supply ..... :		Voltage and Frequency	Reference poles				
			N	L1	L2	L3	PE
	☐	AC:	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☒	DC: 1,2 V from battery					☐
Software release ..... :	01.02.01.19RT10						
Type of equipment ..... :	☑ Transmitter unit ☑ Receiver unit						
Type of station ..... :	☑ Portable station ❑ Mobile station						
Test arrangements of EUT ..... :	*Intended operational arrangement(s) of EUT*		*Test arrangement (see basic standard)*				
	❑ 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					
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 this 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.						

6.1 Photos of the test item





7 Verdict summary section

KDB 447498 D01 General RF Exposure Guidance v06			
Clause	**Requirement – Test case**	**Basic standard**	**Verdict**
7.1	RF Exposure Analysis	--	P

8 Test conditions

8.1 General

<table>
<tr><td>Environmental reference conditions.....:</td><td>
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:
<table>
<tr><th>Temperature</th><th>Humidity</th><th>Atmospheric pressure</th></tr>
<tr><td>15 °C – 35 °C</td><td>30 % - 60 %</td><td>800 hPa – 1060 hPa</td></tr>
</table>
If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.
Environmental conditions have been monitored with the following instrument.
<table>
<tr><th>Id. Number</th><th>Manufacturer</th><th>Model</th><th>Serial number</th><th>Description</th><th>Last calibration date</th><th>Calibration expiration</th></tr>
<tr><td>CMC S302</td><td>Testo</td><td>175H1</td><td>40370182 610</td><td>Data Logger</td><td>May 2024</td><td>May 2025</td></tr>
</table>
</td></tr>
<tr><td>Measurement uncertainties .....:</td><td>Attachment 1</td></tr>
</table>

9 Test results

9.1 RF Exposure Analysis

Tested by .....:	C. Panozzo
Test date .....:	07.02.2025
Test location (stand) .....:	Laboratory
Basic standard(s) .....:	KDB 447498 D01 cl. 7.1 ANSI C63.10
Supplementary information .....:	--

Acceptance limits
Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition(s), listed below, is (are) satisfied.

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

[(max. power of channel, including tune-up tolerance, mW)/(min. separation distance, mm)]x(√f(GHz)) ≤ 3 for 1-g SAR and ≤ 7,5 for 10-g SAR

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	*SAR Test Exclusion Threshold* (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

10-g Extremity SAR Test Exclusion Power Thresholds are 2,5 times higher than the 1-g SAR Test Exclusion Thresholds indicated above.

Result

Transmission channel (MHz)	*Measured level (dBm)*	*Peak Output Power (mW)*
2405	11,24	13,30
2440	11,12	12,94
2480	10,82	12,08

Standalone 10-g extremity
Using separation distance of 10 mm with the formula above results:

(13,30 mW / 10 mm) * √2,405 GHz = 2,06 ≤ 7,5

Thus for portable use the SAR exclusion condition is fulfilled and SAR evaluation is not required for separation distance of 10 mm or more.

Remarks: the measured levels have been derived from Test Report nr. R24217901.

Transmission channel (MHz)	*Measured level (dBµV/m)*	*Peak Output Power (mW)*
902,132	93,96	9,10
917,129	90,57	4,17
927,440	87,86	2,23

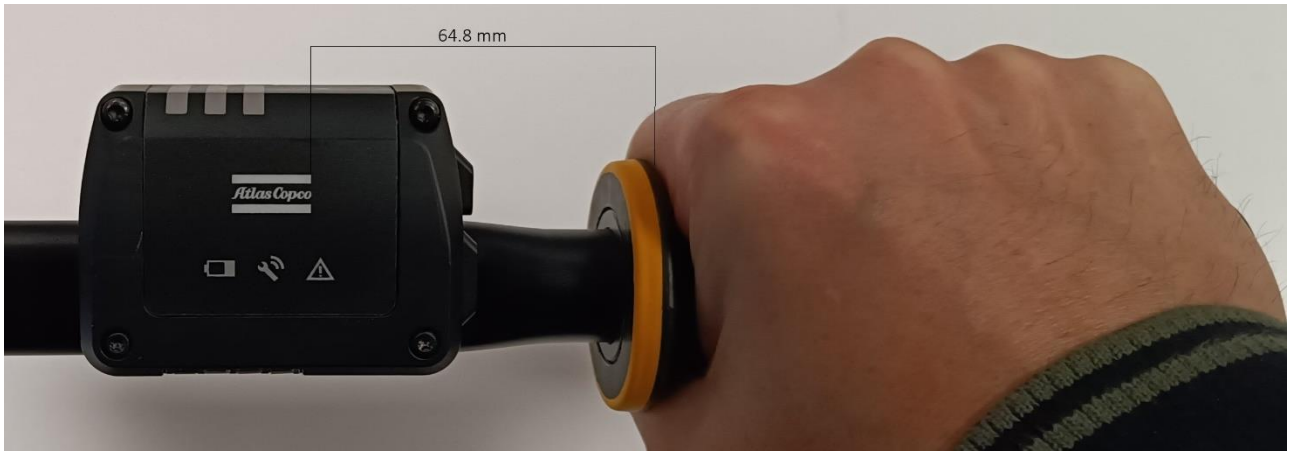
Remarks
$P = (E \times d)^2 / (30 \times G)$
Where:
E = the measured maximum fundamental field strength in V/m
G = the numeric gain of the transmitting antenna: 0,912 (-0,4 dBi)
d = the distance in meters from which the field strength was measured (10 m)
P = the power in watts

Standalone 10-g extremity
Using separation distance of 10 mm with the formula above results:

(9,10 mW / 10 mm) * √0,902132 GHz = 1,41 ≤ 7,5

Thus for portable use the SAR exclusion condition is fulfilled and SAR evaluation is not required for separation distance of 10 mm or more.

Remarks: the measured levels have been derived from Test Report nr. R24218101.



Attachment 1

Measurement uncertainty

Test	*Test Setup*	*Expanded uncertainty*				*Note*
Conducted emission CISPR 16 LISN 50uH 0,009-0,0150 MHz	PE001_01			3,6	dB	1
Conducted emission CISPR 16 LISN 50uH 0,150-30,0 MHz	PE001_01			2,9	dB	1
Conducted emission CISPR 16 Voltage Probe 0,15-30 MHz	PE001_02			2,3	dB	1
Conducted emission CISPR 16 Current Probe 0,15-30 MHz	PE001_03			2,5	dB	1
Conducted emission CISPR 16 ISN 0,15-30 MHz	PE001_04			4,7	dB	1
Clic CISPR 16 LISN 50uH 0,150-30,0 MHz	PE001_05			2,9	dB	1
Radiated Emission CDNE 30-300 MHz	PE001_06			3,3	dB	1
Disturbance Power 30-300 MHz	PE002_X1			3,8	dB	1
Radiated Emission LAS 0,15-30 MHz	PE003_01			2,0	dB	1
Radiated Emission CISPR 16 Loop Ant. 0,15-30 MHz	PE004_X1			4,1	dB	1
Radiated Emission CISPR 16 Bicon. Ant. 30-300 MHz	PE004_X2			4,7	dB	1
Radiated Emission CISPR 16 LogP. Ant. 300-1000 MHz	PE004_X3			4,6	dB	1
Radiated Emission CISPR 16 Horn Ant. 1-18 GHz	PE004_X4			4,7	dB	1
Human Exposure to electromagnetic fields	PE005_01			14,2	%	1
Harmonics	PE006_01	10 mA	+	2,9	%	1
Flicker	PE007_01			3,40	%	1
Radiated Immunity 80 MHz - 6 GHz	PE102_XX	2,26	dB	0,89	V/m a 3V/m	1
Conducted Immunity 0,15 - 230 MHz	PE105_XX	1,26	dB	0,47	V a 3V	1
AC Magnetic field	PE106_01	1,55	%	0,15	A/m a 10A/m	1
Pulse Magnetic field	PE107_01	6,21	%	18,6	A/m a 300A/m	1
Dumped Magnetic field	PE108_01	6,21	%	1,86	A/m a 30A/m	1
Common mode conducted immunity	PE112_01	2,11	%	0,21	V a 10V	1

Attachment 1

Test	*Test Setup*	*Expanded uncertainty*	*Note*
Power/Spurious 9kHz-30MHz	PR001_X1	4,1 dB	1
Power/Spurious ERP 30-1000MHz d=10m/3m	PR001_X2+X3	4,8 dB	1
Misura della potenza EiRP 1-18GHz d=3m	PR001_X4+X5	4,7 dB	1
Misura della potenza EiRP 18-40GHz d=3m	PR001_X6	5,1 dB	1
Frequency error	PR002_01+02	< 1x10-7	1
Timing zero span (1001pts.)	PR002_01+02	0,2 % SWT	1
Modulation bandwidth	PR002_01+02	< 1x10-7	1
Conducted RF power and spurious emission	PR002_01+02	1,1 dB	1
Adjacent channel power	PR002_01+02	1,1 dB	1
Blocking	PR002_01+02	1,1 dB	1

Test	*Test Setup*	*Expanded uncertainty*	*Note*
Electrostatic discharge immunity test	PE101_0X		2
Electrical fast transients / burst immunity test	PE103_0X		2
Surge immunity test	PE104_0X		2
Short interruption immunity test	PE109_01		2
Ring Wave immunity test	PE110_01		2
Low frequency immunity test	PE111_01		2
Dumped Oscillotary immunity test	PE113_01		2
Rev_24_01 date 03/02/2024			

Note 1:

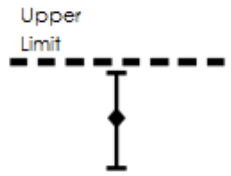
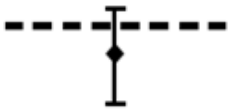
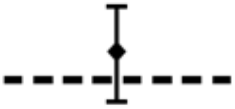
The expanded uncertainty reported according to the document EA-4-02 is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of p = 95%

Note 2:

It has been demonstrated that the used test equipment meets the specified requirements in the standard with at least a 95% confidence, covering factor k=2

Attachment 1

Judgement of compliance

Case 1	Case 2	Case 3	Case 4
			
The sample complies with the requirements. The measurement results is within the specification limit when the measurement uncertainty is taken into account.	The sample complies with the requirements. It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty although the measurement result is below the limit.	The sample does not comply with the requirements. It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty also the measurement result is upper the limit.	The sample does not comply with the requirements. The measurement results is outside the specification limit when the measurement uncertainty is taken into account.

In agreement with ILAC-G8:09/2019 cl.4.2.1 Guidelines on Decision Rules and Statements of Conformity

Quality manual references – Internal procedure

Internal Procedure PM001 rev. 4.1 (Quality Manual)	Measure procedure
Internal Procedure INC_M rev. 10.1 (Quality Manual)	Measurement uncertainty calculation