

Test Report

23-1-0017601T028a-C2


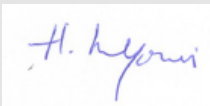
Number of pages:	18	Date of Report:	2024-Oct-09
Testing company:	<div>cetecom advanced GmbH Untertuerkheimer Str. 6-10 66117 Saarbruecken GERMANY</div>	Applicant:	<div>VALEO Telematik und Akustik GmbH</div>
Product:	Emergency call control unit		
Model:	MBECALL-NAR-01		
FCC ID:	QWY-MBECALL-NAR01	IC:	6588A-MBECALLNAR1
Testing has been carried out in accordance with:	<div>FCC Regulations Title 47 CFR, Chapter I, Subchapter A, Part 15 Subpart B Unintentional Radiators § 15.107 Conducted limits § 15.109 Radiated emission limits ISED-Regulations ICES-003, Issue 7 Information Technology Equipment (including Digital Apparatus)</div>		
Test Results:	<div><input checked="" type="checkbox"/> The EUT complies with the requirements in respect of all parameters subject to the test. The test results relate only to devices specified in this document The current version of Test Report 23-1-0017601T028a-C2 replaces the test report 23-1-0017601T028a-C1 dated 2024-Oct-01. The replaced test report is herewith invalid.</div>		
Signatures:	<div><div><div>Wolfgang Markus Lab Manager Authorization of test report</div></div><div><div>Hicham Laayouni Testing Manager Responsible of test report</div></div></div>		

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1 General information

1.1 Disclaimer and Notes

The test results of this test report relate exclusively to the test item specified in this test report as specified in chapter 2.7. cetecom advanced does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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Also we refer on special conditions which the applicant should fulfill according §2.927 to §2.948, special focus regarding modification of the equipment and availability of sample equipment for market surveillance tests.

1.2 Attestation

I declare that all measurements were performed by me or under my supervision and that all measurements have been performed and are correct to my best knowledge and belief to Industry Canada standards. All of the above requirements are met in accordance with enumerated standards.

1.3 Summary of Test Results

Test case	Reference in FCC ☒	Reference in ISED ☒	Page	Remark	Result
AC-Power Lines Conducted Emissions	§15.107	ICES-003, Issue 7	--	--	--
Radiated field strength emissions 30 MHz – 1 GHz	§15.109 §15.33 §15.35	ICES-003, Issue 7	9	--	PASS
Radiated field strength emissions above 1 GHz	§15.109 §15.33 §15.35	ICES-003, Issue 7	13	--	PASS

PASSED The EUT complies with the essential requirements in the standard.
 FAILED The EUT does not comply with the essential requirements in the standard.
 N/A Test case does not apply to the test object.
 NP The test was not performed by the cetecom advanced laboratory.

Decision Rule: cetecom advanced GmbH follows [ILAC G8:2019 chapter 4.2.1 \(Simple Acceptance Rule\)](#).

1.4 Summary of Test Methods

Test case	Test method
AC-Power Lines Conducted Emissions	ANSI C63.4-2014 chapter 7
Radiated field strength emissions 30 MHz – 1 GHz	ANSI C63.4-2014 chapter 8.2.3
Radiated field strength emissions above 1 GHz	ANSI C63.4-2014 chapter 8.3

2 Administrative Data

2.1 Identification of the Testing Laboratory

Company name:	cetecom advanced GmbH
Address:	Untertuerkheimer Str. 6-10 66117 Saarbruecken Germany
Responsible for testing laboratory:	Niels Jeß
Accreditation scope:	DAkkS Webpage: FCC ISED
IC Lab company No. / CAB ID:	3462D / DE0001
Test location 1:	Im Teelbruch 116; 45219 Essen
Test location 2:	--

2.2 General limits for environmental conditions

Temperature:	22±2 °C
Relative. humidity:	45±15% rH

2.3 Test Laboratories sub-contracted

Company name:	--
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2.4 Organizational Items

Responsible test manager:	Hicham Laayouni
Receipt of EUT:	2023-Sep-28
Date(s) of test:	2024-Mar-07 to 2024-Mar-08
Version of template:	23.0401

2.5 Applicant's details

Applicant's name:	VALEO Telematik und Akustik GmbH
Address:	Max-Planck-Str. 28-32 61381 Friedrichsdorf Hesse Germany
Contact Person:	Martin Fleckenstein
Contact Person's Email:	martin.fleckenstein@valeo.com

2.6 Manufacturer's details

Manufacturer's name:	VALEO Telematik und Akustik GmbH
Address:	Max-Planck-Str. 28-32 61381 Friedrichsdorf Germany

2.7 Equipment under Test (EUT)

EUT No. *)	Sample No.	Product	Model	Type	SN	HW	SW
EUT 1	23-1-00176S31_C01	Emergency call control unit	MBECALL-NAR-01	-	EB10NAFH24000000009	D2	E120 R551

*) EUT short description is used to simplify the identification of the EUT in this test report.

2.8 Untested Variant (VAR)

VAR No. *)	Sample No.	Product	Model	Type	SN	HW	SW
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*) The listed additional untested model variant(s) (VAR) is/are not object of evaluation of compliance. For further information please see Annex 5: Declaration of applicant of model differences.

If the table above does not show any other line than the headline, no untested variants are available.

2.9 Auxiliary Equipment (AE)

AE No. *)	Sample No.	Auxiliary Equipment	Model	SN	HW	SW
AE 1	23-1-00176S18_C01	external GNSS antenna	ZB ANTENNE GNSS	343	A 174 905 00 02	n/a
AE 2	23-1-00176S38_C01	external cellular antenna	ZB ANTENNE TEL (Hutablagenantenne)	N/A	A 213 905 28 03	n/a
AE 3	23-1-00148S125_C01	EMC Load Box	N/A	N/A	N/A	N/A

*) AE short description is used to simplify the identification of the auxiliary equipment in this test report. If the table above does not show any other line than the headline, no AE was used during testing nor was taken into account for evaluation

2.10 Connected cables (CAB)

CAB No. *)	Sample No.	Cable Type	Connectors / Details	Length
CAB1	23-1-00148S125_C01	Cable harness	--	--
CAB 2	23-1-00176S78_C01	Fakra cable	--	--

*) CAB short description is used to simplify the identification of the connected cables in this test report. If the table above does not show any other line than the headline, no cable was used during testing nor was taken into account for evaluation

2.11 Software (SW)

SW No. *)	Sample No.	SW Name	Description	SW Status
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*) SW short description is used to simplify the identification of the used software in this test report. If the table above does not show any other line than the headline, no SW was used during testing nor was taken into account for evaluation.

2.12 EUT set-ups

set-up no. *)	Combination of EUT and AE	Description
1	EUT1 + AE1 + AE2 + AE3+ CAB1 + CAB2	Used for All measurements

*) EUT set-up no. is used to simplify the identification of the EUT set-up in this test report.

2.13 EUT operation modes

EUT operating mode no. *)	Operating modes	Additional information
	GSM 850 IDLE Ping Mode	The EUT is synchronized to the GSM base station Ping test on LAN ports during the test

*) EUT operating mode no. is used to simplify the test report.

3 Equipment under test (EUT)

3.1 General Data of Main EUT as Declared by Applicant

Firmware	<input checked="" type="checkbox"/> for normal use	<input type="checkbox"/> Special version for test execution
Power supply	<input type="checkbox"/> AC Mains	
	<input checked="" type="checkbox"/> DC Mains	12 V DC
	<input type="checkbox"/> Battery	
Operational conditions	T _{nom} = +21 °C	Value assumed, if not specified different by the manufacturer
EUT sample type	Pre-Production	
Weight	0.240 kg	
Size [LxWxH]	17.5 cm x 10.0 cm x 5.0 cm	
Interfaces/Ports	--	
Highest internal frequency generated by EUT and required upper frequency of radiated disturbance measurement	<input checked="" type="checkbox"/> GSM 850-1900	Test up to 5 th harmonic of the operating frequency regarding KDB 996369 D04, Section 15.33 (b)(1).
For further details refer Applicants Declaration & technical documents		

3.2 Modifications on Test sample

Additions/deviations or exclusions	--
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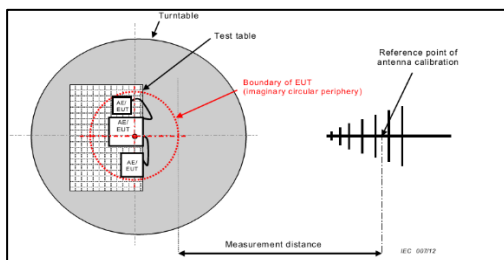
4 Measurements

4.1 Radiated field strength emissions 30 MHz – 1 GHz

4.1.1 Description of the general test setup and methodology, see below example:

Test site: Measurements between 30 MHz and 1 GHz are performed in the NSA compliant Semi Anechoic Chamber (SAC) according to EMC basic standard. The test site is compliant to CISPR 16-1-4:2019 chap. 5.3 and ANSI C63.4:2014 chap. 5.4.2 to 5.4.4.

Schematic below 1 GHz:



Testing method below 1 GHz:

Step 1:

Pre-measurement, variation of turntable positions: The EUT is set in the worst case operating mode determined. The tests are also carried out as a pre-measurement with peak detector (PK), repetitive scan and max-hold mode. Azimuth step of turntable = 90°, antenna heights = 1.0 m & 1.82 m, both polarisations (H/V). If the mounting/usual operating position is defined, the under and the top side of the EUT/test set-up will not be measured. The results are documented in a diagram. The peak values shown in this graphic are not finally maximized. Peak values closer than 6 dB to the limit line are displayed explicitly in a table. If no critical frequencies are found (margin to limit >6 dB) the final measurement will be omitted.

Step 2:

Based on the exploratory measurements, the most critical frequencies are re-measured by main-taining the EUT's worst-case operation mode, cable position, etc. either on 10 m OATS or 5 m or 3 m semi-anechoic room.

Final measurement: For the critical frequencies a maximum search is done with PK and CISPR QP detectors: First a frequency zoom within +/- 1.2 MHz (= 10*IF-BW) of the critical frequencies, then the EUT/test set-up is rotated continuously (if applicable, the EUT orientation will be changed to measure the under and the top side) and the antenna height changed between 1 m & 4 m in order to find the worst case position. The final measurement with the QP detector is carried out in this position and the values are stored in the final result table, which can be found after the diagram.

Formula:

$$E_C = E_R + AF + C_L + D_F - G_A \quad (1)$$

$$M = L_T - E_C \quad (2)$$

AF = Antenna factor

C_L = Cable loss

D_F = Distance correction factor (if used)

E_C = Electrical field – corrected value

E_R = Receiver reading

G_A = Gain of pre-amplifier (if used)

L_T = Limit

M = Margin

All units are dB-units, positive margin means value is below limit.

4.1.2 Test receiver settings

Detector	Peak	Quasi peak
Min. attenuation	0 dB	0 dB
Resolution bandwidth	120 kHz	120 kHz
Dector Meas-time	10 ms	1 s
Step size	40 kHz	Selected frequencies
Preamp	Off	Off

4.1.3 Measurement Protocol(s)

Measurement No.	P1M1
Environmental conditions	Temperature: 21.0 °C Humidity: 42.0% rH
Test date	2024-Mar-07
Operator	Hicham Laayouni
EuT power supply:	DC +12.0 V
Operating mode	01
Setup	01
Remarks	

Diagram	Measurement Details		Result
3.01	EUT position	<input type="checkbox"/> standing <input checked="" type="checkbox"/> laying	PASS
		<input type="checkbox"/> Mounting position / usual operating position is defined (under and top side of EUT are not measured) <input checked="" type="checkbox"/> Mounting position / usual operating position undefined (under and top side of EUT are measured)	
	Critical frequencies found:	<input type="checkbox"/> no, margin to limit > 10 dB (only Step 1 carried out) <input checked="" type="checkbox"/> yes, final measurement (Step 2 carried out)	

Remark: for more information and graphical plot see annex A1 **TR23-1-0017601T028a-C2-A1**

Measurement No.	P1M2
Environmental conditions	Temperature: 21.0 °C Humidity: 42.0% rH
Test date	2024-Mar-07
Operator	x_emv
EuT power supply:	DC +12.0 V
Operating mode	01
Setup	01
Remarks	

Diagram	Measurement Details		Result
3.02	EUT position	<input checked="" type="checkbox"/> standing <input type="checkbox"/> laying	PASS
		<input type="checkbox"/> Mounting position / usual operating position is defined (under and top side of EUT are not measured) <input checked="" type="checkbox"/> Mounting position / usual operating position undefined (under and top side of EUT are measured)	
	Critical frequencies found:	<input type="checkbox"/> no, margin to limit > 10 dB (only Step 1 carried out) <input checked="" type="checkbox"/> yes, final measurement (Step 2 carried out)	

Remark: for more information and graphical plot see annex A1 **TR23-1-0017601T028a-C2-A1**

4.1.4 Limits

Frequency Range [MHz]	Class B <input checked="" type="checkbox"/> (3 meters)		Class A <input type="checkbox"/> (3 meters)	
	Limit [μV/m]	Limit [dBμV/m]	Limit [μV/m]	Limit [dBμV/m]
30 - 88	100	40.0	90	49.0
88 - 216	150	43.5	150	53.5
216 - 960	200	46.0	210	56.4
960 - 1000	500	54.0	300	59.5

4.1.5 Result

Test case	Reference in FCC <input checked="" type="checkbox"/>	Reference in ISCED <input checked="" type="checkbox"/>	Reference in RSS-GEN <input checked="" type="checkbox"/>	Remark	Result
Radiated field strength emissions 30 MHz – 1 GHz	§15.109 §15.33 §15.35	ICES-003, Issue 7	RSS-Gen., Issue 5 Chapter 8.9, Chapter 7.3	--	Pass / OK

4.1.6 Measurement Location and Equipment list

ID	Description	Manufacturer	SerNo	CheckType	Last Check	Interval	Next Check
	120901 - SAC3 - Radiated Emission <1GHz			calchk	cal: 2015-Jul-21 chk: 2021-Jul-27	cal: 10Y chk: 12M	cal: 2025-Jul-21 chk: 2022-Jul-27
20341	Digital Multimeter Fluke 112	Fluke Deutschland GmbH / Glottertal	81650455	cal	cal: 2022-May-18	cal: 24M	cal: 2024-May-18
20442	Semi Anechoic Chamber	ETS-Lindgren GmbH / Taufkirchen	without	cnn	cal: - chk: -	cal: - chk: -	cal: - chk: -
20482	filter matrix Filter matrix SAR 1	cetecom advanced GmbH / Essen	without	cnn	cal: - chk: -	cal: - chk: -	cal: - chk: -
20574	Biconilog Hybrid Antenna BTA-L	Frankonia GmbH / Heideck	980026L	cal	cal: 2022-Jun-15	cal: 36M	cal: 2025-Jun-15
20620	Test Receiver ESU26	Rohde & Schwarz Messgerätebau GmbH / Memmingen	100362	cal	cal: 2023-May-24	cal: 12M	cal: 2024-May-24
20885	Power Supply EA3632A	Agilent Technologies Deutschland GmbH	75305850	cnn	cal: - chk: -	cal: - chk: -	cal: - chk: -
25038	Loop Antenna HFH2-Z2	Rohde & Schwarz Messgerätebau GmbH / Memmingen	879824/13	cal	cal: 2022-Jul-04	cal: 24M	cal: 2024-Jul-04

Tools used in 'P1M1'

4.1.7 Legend

Note / remarks	Interval of calibration & Verification
2W	2 weeks
12M	12 months
24M	24 months
36M	36 months
10Y	10 Years

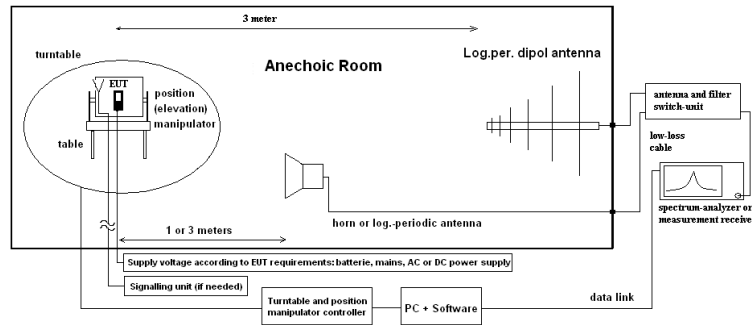
Abbreviation Check Type	Description
cnn	Calibration and verification not necessary
cal	Calibration
calchk	Calibration plus intermediate Verification
chk	Verification
cpu	Verification before usage

4.2 Radiated field strength emissions above 1 GHz

4.2.1 Description of the general test setup and methodology, see below example:

Measurements above 1 GHz are performed in the Semi Anechoic Chamber (SAC) with additional floor absorber (=> FAC). This site is compliant to CISPR 16-1-4:2019 and ANSI (IEEE) C63.4a:2017. Measurement distance $d = 3$ m.

Schematic:



Testing method above 1 GHz:

Step 1:

Pre-measurement, variation of turntable positions: The EUT is set in the determined worst case operating mode. The tests are carried out as a pre-measurement with PK and CISPR AV detector, repetitive scan and max-hold mode, azimuth step of turntable = 15° , antenna height = 1.0 m, both polarisations (H/V). If the mounting/usual operating position is defined, the under and the top side of the EUT/test set-up will not be measured. If required, a height scan of the RX-Antenna is also performed (Step size = $0.8 \times$ smallest applicable w) while aimed to the EUT. The results are documented in a diagram with separate traces for each detector, upper trace = PK, lower trace = CISPR AV. The values shown in this graphic are not finally maximized. Values closer than 10 dB to the corresponding limit line are displayed explicitly in a table. If no critical frequencies are found (margin to limit >10 dB for PK, 3 dB for CISPR AV) the final measurement will be omitted.

Step 2:

Based on the exploratory measurements, the most critical frequencies are re-measured by main-taining the EUT's worst-case operation mode, cable position, etc.

First a frequency zoom around the critical frequency is done to locate the frequency more precisely. After this step, for all identified critical frequencies, the maximum peak was determined.

Following parameters were varied: the turntable angle continuously in the range 0 to 360 degree, the EUT itself over 3-orthogonal axis and the height for EUT with large dimensions or three axis scan for portable/small equipment.

On the determined worst-case position, a final measurement with necessary bandwidth and detector according standard has been carried out.

Formula:

$$E_C = E_R + A_F + C_L + D_F - G_A \quad (1)$$

$$M = L_T - E_C \quad (2)$$

E_C = Electrical field – corrected value

E_R = Receiver reading

M = Margin

L_T = Limit

A_F = Antenna factor

C_L = Cable loss

D_F = Distance correction factor (if used)

G_A = Gain of pre-amplifier (if used)

All units are dB-units, positive margin means value is below limit.

All units are dB-units, positive margin means value is below limit.

4.2.2 Test receiver / spectrum analyzer settings

Detector	Peak	Average
Min. attenuation	10 dB	10 dB
Resolution bandwidth	1 MHz	1 MHz
Detector Meas-time	Pre-measurement 10 ms Final measurement 1 s	Pre-measurement 10 ms Final measurement 1 s
Step size	Pre-measurement: 400 kHz Final measurement: selected frequencies	Pre-measurement: 400 kHz Final measurement: selected frequencies
Preamp	Off below 6 GHz 30 dB above 6 GHz	Off below 6 GHz 30 dB above 6 GHz

4.2.1 Measurement Protocol(s)

Measurement No.	P2M1
Environmental conditions	Temperature: 20.0 °C Humidity: 40.0% rH
Test date	2024-Mar-08
Operator	Hicham Laayouni
EuT power supply:	DC +12.0 V
Operating mode	01
Setup	01
Remarks	

Diagram	Measurement Details		Result
4.01	EUT position	<input checked="" type="checkbox"/> standing <input checked="" type="checkbox"/> laying	PASS
		<input type="checkbox"/> Mounting position / usual operating position is defined (under and top side of EUT are not measured)	
	Critical frequencies found:	<input checked="" type="checkbox"/> no, margin to limit > 10 dB (only Step 1 carried out) <input type="checkbox"/> yes, final measurement (Step 2 carried out)	

Remark: for more information and graphical plot see annex A1 **TR23-1-0017601T028a-C2-A1**

4.2.2 Limits

Frequency Range [MHz]	Class B <input checked="" type="checkbox"/> (3 meters)		Class A <input type="checkbox"/> (3 meters)		Detector
	Limit [μV/m]	Limit [dBμV/m]	Limit [μV/m]	Limit [dBμV/m]	
Above 1000	500	54	950	59.5	Average
Above 1000	5000	74	9500	79.5	Peak

4.2.3 Result

Test case	Reference in FCC ☒	Reference in ISED ☒	Reference in RSS-GEN ☒	Remark	Result
Radiated field strength emissions above 1 GHz	§15.109 §15.33 §15.35	ICES-003, Issue 7	RSS-Gen., Issue 5 Chapter 8.9, Chapter 7.3	--	Pass / OK

4.2.4 Measurement Location and Equipment list

ID	Description	Manufacturer	SerNo	CheckType	Last Check	Interval	Next Check
	225912 - SAC1 (5m) - Radiated Emission >1GHz			calchk	cal: 2016-May-04 chk: 2022-Nov-02	cal: 120M chk: 12M	cal: 2026-May-04 chk: 2023-Nov-02
25316	Multifunction AC/DC Power Source Netwave 20	EM TEST GmbH / Kamen	V1227113059	cal	cal: 2021-May-20	cal: 36M	cal: 2024-May-20
25348	Test Receiver ESR7	Rohde & Schwarz Messgerätebau GmbH / Memmingen	101600	cal	cal: 2023-May-25	cal: 24M	cal: 2025-May-25
25352	Open Switch and control Platform OSP120	Rohde & Schwarz Messgerätebau GmbH	101542-rV	cpu			
25358	Semi Anechoic Chamber SAC1	Albatross Projects GmbH / Nattheim	P27281-016	cal	cal: 2022-Aug-12	cal: 120M	cal: 2032-Aug-12
25360	Antenna Mast BAM 4.5-P	mature GmbH / Pfreimd	BAM 4.5-P/091/17791115	cnn	cal: - chk: -	cal: - chk: -	cal: - chk: -
25361	Controller NCD	mature GmbH	NCD/202/17791115	cnn	cal: - chk: -	cal: - chk: -	cal: - chk: -
25362	Test Table PTT1.5x1.0x0.8-5_127	mature GmbH / Pfreimd	without	cnn	cal: - chk: -	cal: - chk: -	cal: - chk: -
25376	Measurement Software EMC32 [SACS]	Rohde & Schwarz Messgerätebau GmbH	v10.60.10	cnn	cal: - chk: -	cal: - chk: -	cal: - chk: -

Tools used in 'P2M1'

4.2.5 Legend

Note / remarks	Interval of calibration & Verification
2W	2 weeks
12M	12 months
24M	24 months
36M	36 months
10Y	10 Years

Abbreviation Check Type	Description
cnn	Calibration and verification not necessary
cal	Calibration
calchk	Calibration plus intermediate Verification
chk	Verification
cpu	Verification before usage

5 Results from external laboratory

None

-

6 Opinions and interpretations

None

-

7 List of abbreviations

None

-

8 Measurement Uncertainty valid for conducted/radiated measurements

The reported uncertainties are calculated based on the standard uncertainty multiplied with the appropriate coverage factor **k**, such that a confidence level of approximately 95% is achieved. For uncertainty determination, each component used in the concrete measurement set-up was taken in account and its contribution to the overall uncertainty according its statistical distribution calculated.

RF-Measurement	Reference	Frequency range	Calculated uncertainty based on a confidence level of 95%	Remarks
Conducted emissions (U_{CISPR})	CISPR 16-2-1	9 kHz - 150 kHz 150 kHz - 30 MHz	4.00 dB 3.58 dB	-
Radiated emissions Enclosure	CISPR 16-2-3	30 MHz - 300 MHz 300 MHz - 1 GHz 1 GHz - 6 GHz 1 GHz - 18 GHz	SAC1: 2.60 dB SAC2: 2.62 dB SAC3: 4.20 dB SAC1: 2.90 dB SAC2: 3.00 dB SAC3: 4.20 dB SAC2: 4.10 dB SAC1: 4.98 dB SAC3: 5.10 dB	E-Field

9 Versions of test reports (change history)

Version	Applied changes	Date of release
--	Initial release	2024-Apr-03
C1	Insert highest frequency of EUT	2024-Oct-01
C2	Test method updated in chapter 4.2.1-	2024-Oct-09

End Of Test Report