Laboratories GSD SRL

CE MARKING

ELECTROMAGNETIC COMPATIBILITY
ELECTRICAL SAFETY
LASER SPECTROSCOPY
ENVIRONMENTAL PHYSICS

G.S.D. S.r.l.
Certified in accordance with
UNI EN ISO 9001:2015
by
TÜV Rheinland Italia S.r.l.
Certificate N. 39 00 1850509

Report n. 23130-T

Customer: **UR Fog S.r.l.**
Via Collegno, 11
10143 Torino
Italy

Test Item Name: **Tempest Bat 300**

Pisa, 2023 March 15

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Report Revision History

Revision details

Date	***Page No.(s)***	***Details***
2023 March 15	22	Rev. *00* Initial issue

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1 MANUFACTURER AND EUT IDENTIFICATION

Customer	**UR Fog S.r.l.**
Address	Via Collegno, 11 10143 Torino Italy
Test Item Name	**Tempest Bat 300**
Date of reception	**2023 February 09**
Test date	**2023 March 13-15**
Sampling	**Random from production**
Power	**24 Vdc (with internal battery)**
Test Item Description	**Fogging System**

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2 REFERENCE STANDARDS

Tests and measurements are performed accordingly to the reference standards given in the table below:

TEST	*STANDARD*
Emission: Conducted	CEI EN IEC 61000-6-3:2021
Emission: Radiated	CEI EN IEC 61000-6-3:2021
Radio Frequency Electromagnetic Fields radiated susceptibility	CEI EN 50130-4:2012 + /A1:2015
ESD immunity test	CEI EN 50130-4:2012 + /A1:2015

Performance criteria

In order to conform to the emission standards the equipment shall meet the limits of conducted and radiated emission.

- *Performance Criterion* **A**

The EUT shall continue to operate as intended during and after the test.

- *Performance Criterion* **B**

The EUT shall continue to operate as intended after the test.

- *Performance Criterion* **C**

Temporary degradation or loss of function or performance is allowed during the test, provided the function is self recoverable, or can be restored at the end of the test by operation of the controls, as defined in the relevant equipment standard and in the technical specification published by the manufacturer.

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3 TEST GENERALITY

Immunity performance criteria are performed accordingly to the reference standards given in the table below:

IMMUNITY TEST	*MINIMUM CRITERION*
Radio Frequency Electromagnetic Fields radiated susceptibility	A
ESD immunity test	B

Evaluation criteria

Functional test

Disposition of test and measure

Test and/or measure disposition is compliance with the relative reference standard. The configuration of the test sample has been varied to achieve maximum disturbance and susceptibility.

Environmental Conditions

Temperature = (293 ± 4) K

Relative humidity = (50 ± 5) %

Summary of Test Results

TEST	*RESULT*
Emission: Conducted	*Pass*
Emission: Radiated	*Pass*
Radio Frequency Electromagnetic Fields radiated susceptibility	*Pass*
ESD immunity test	*Pass*

Extensions

The results refer only to the sampled EUT *Tempest Bat 300* and under the specified conditions.

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4 RADIATED EMISSIONS

In the following table you can find the limits established by the reference standard:

DISTANCE (m)	FREQUENCY RANGE (MHz)	PEAK LIMITS [dB (µV/m)]	QUASI-PEAK LIMITS [dB (µV/m)]	AVERAGE LIMITS [dB (µV/m)]
3	30 - 230	--	40	--
3	230 - 1000	--	47	--
3	1000 - 3000	70	--	54
3	3000 - 6000	74	--	50

If the highest frequency of internal sources of EUT is less than 108MHz, the measurement shall only be made up to 1GHz

If the highest frequency of internal sources of the EUT is between 108MHz and 500MHz, the measurement shall be made up to 2 GHz

If the highest frequency of internal sources of the EUT is between 500MHz and 1GH, the measurement shall be made up to 5 GHz

If the highest frequency of internal sources of the EUT is above 1 GHz, the measurement shall be made up to 6GHz.

Where the highest frequency is not known, test shall be performed up to 6GHz

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	NEXT CALIBRATION
EMI Receiver	Keysight	N9038A	07/2023
Anechoic Chamber	Comtest	CSA01	07/2023
Bilog Antenna	Teseq	CBL6112D	07/2023
Horn Antenna	EMCO	3115	07/2023

Test procedure: RE22R02

Notes

Azimuth position EUT-Antenna corresponding to 0° identifies the rotating table orientation (TT) in which the instrument to be tested shows the front part turned towards the antenna. Positive grades individuate clockwise rotations of TT when this one is observed from the top. For negative degrees, TT rotation is counter clockwise.

Antenna height respect to the mass plane is conventionally individuated with: MA=XXX where XXX indicates the height (always positive for e>100) expressed in cm.

Antenna horizontal polarization is indicated by POL=H.

Antenna vertical polarization is indicated by POL=V.

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Results and conclusions
In all the operative conditions, equipment complied with the standard limits. Graphics in following figures show the most significant registrations of the performed measurements.

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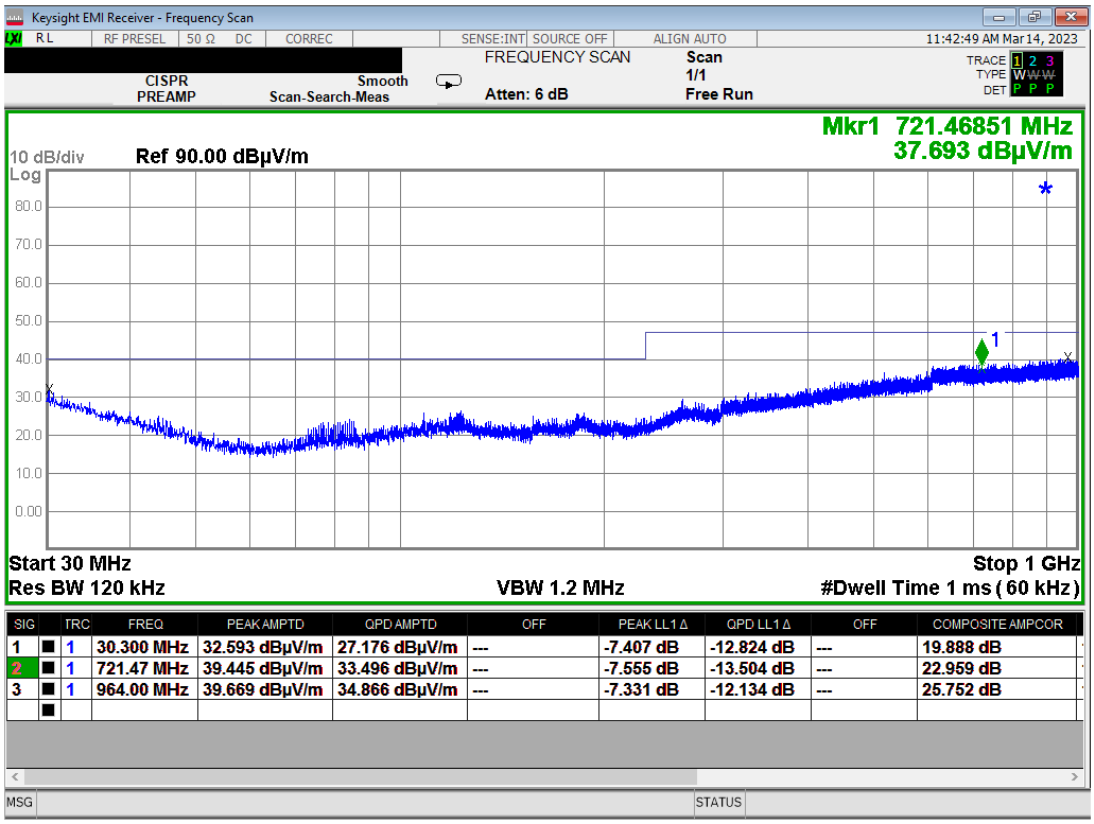
Job Number	23130-T
Test Name	Radiated Emissions EN 61000-6-3
EUT Name	UR Fog S.r.l. - Tempest Bat 300



Notes:
Pol.=V
TT=0°
MA=100cm

Fig. 4 1

Record of the measurement of radiated emissions.

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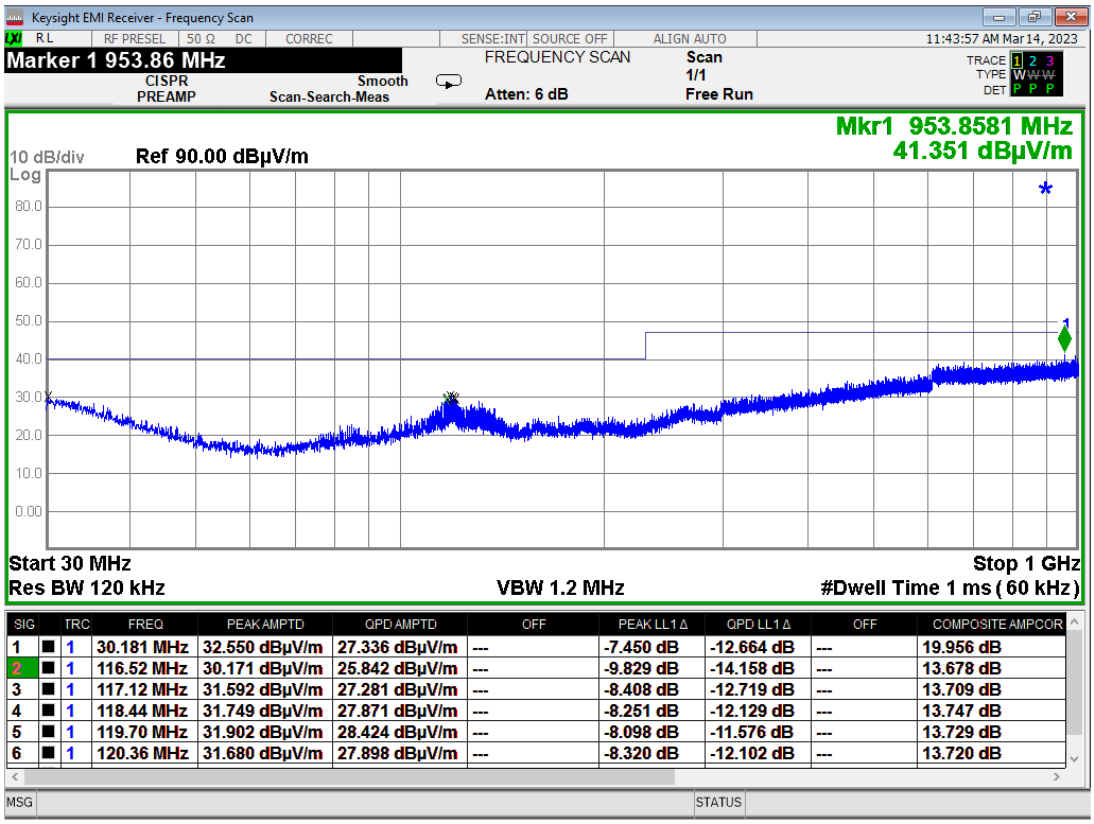

SIG	TRC	FREQ	PEAK AMPTD	QPD AMPTD	OFF	PEAK LL1 Δ	QPD LL1 Δ	OFF	COMPOSITE AMPCOR
1	1	30.181 MHz	32.550 dBµV/m	27.336 dBµV/m	---	-7.450 dB	-12.664 dB	---	19.956 dB
2	1	116.52 MHz	30.171 dBµV/m	25.842 dBµV/m	---	-9.829 dB	-14.158 dB	---	13.678 dB
3	1	117.12 MHz	31.592 dBµV/m	27.281 dBµV/m	---	-8.408 dB	-12.719 dB	---	13.709 dB
4	1	118.44 MHz	31.749 dBµV/m	27.871 dBµV/m	---	-8.251 dB	-12.129 dB	---	13.747 dB
5	1	119.70 MHz	31.902 dBµV/m	28.424 dBµV/m	---	-8.098 dB	-11.576 dB	---	13.729 dB
6	1	120.36 MHz	31.680 dBµV/m	27.898 dBµV/m	---	-8.320 dB	-12.102 dB	---	13.720 dB

Notes:
Pol.=H
TT=0°
MA=100cm

Fig. 4 2

Record of the measurement of radiated emissions.

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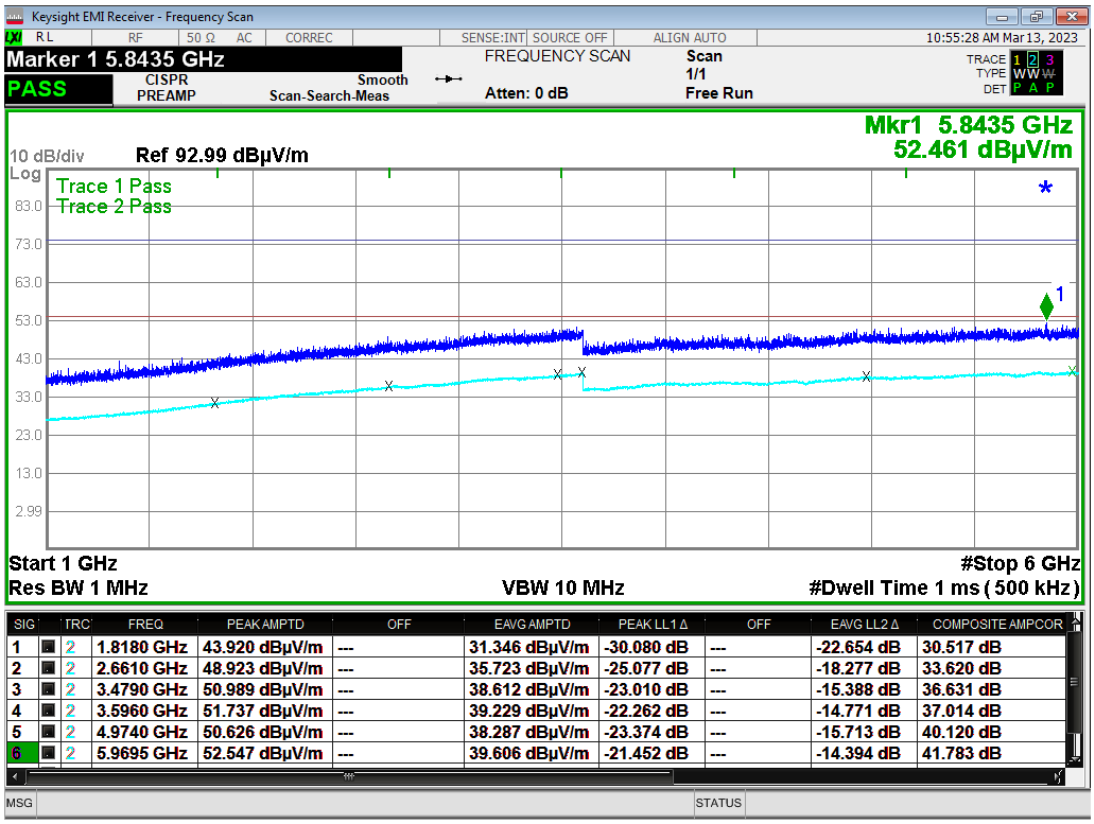

SIG	TRC	FREQ	PEAK AMPTD	OFF	EAVG AMPTD	PEAK LL1 Δ	OFF	EAVG LL2 Δ	COMPOSITE AMPCOR
1	2	1.8180 GHz	43.920 dBµV/m	---	31.346 dBµV/m	-30.080 dB	---	-22.654 dB	30.517 dB
2	2	2.6610 GHz	48.923 dBµV/m	---	35.723 dBµV/m	-25.077 dB	---	-18.277 dB	33.620 dB
3	2	3.4790 GHz	50.989 dBµV/m	---	38.612 dBµV/m	-23.010 dB	---	-15.388 dB	36.631 dB
4	2	3.5960 GHz	51.737 dBµV/m	---	39.229 dBµV/m	-22.262 dB	---	-14.771 dB	37.014 dB
5	2	4.9740 GHz	50.626 dBµV/m	---	38.287 dBµV/m	-23.374 dB	---	-15.713 dB	40.120 dB
6	2	5.9695 GHz	52.547 dBµV/m	---	39.606 dBµV/m	-21.452 dB	---	-14.394 dB	41.783 dB

Notes:
Pol.=V
TT=0°
MA=100cm

Fig. 4 3

Record of the measurement of radiated emissions.

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Job Number	23130-T
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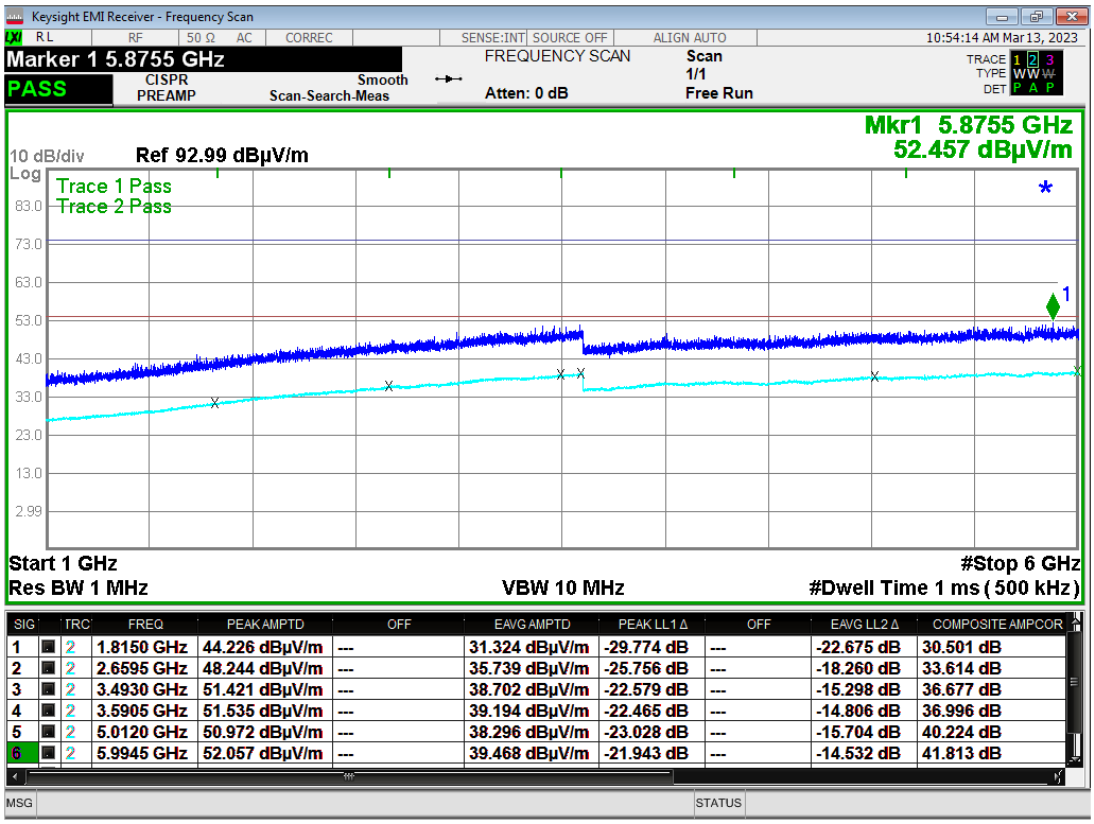
EUT Name	UR Fog S.r.l. - Tempest Bat 300



SIG	TRC	FREQ	PEAK AMPTD	OFF	EAVG AMPTD	PEAK LL1 Δ	OFF	EAVG LL2 Δ	COMPOSITE AMPCOR
1	2	1.8150 GHz	44.226 dBµV/m	---	31.324 dBµV/m	-29.774 dB	---	-22.675 dB	30.501 dB
2	2	2.6595 GHz	48.244 dBµV/m	---	35.739 dBµV/m	-25.756 dB	---	-18.260 dB	33.614 dB
3	2	3.4930 GHz	51.421 dBµV/m	---	38.702 dBµV/m	-22.579 dB	---	-15.298 dB	36.677 dB
4	2	3.5905 GHz	51.535 dBµV/m	---	39.194 dBµV/m	-22.465 dB	---	-14.806 dB	36.996 dB
5	2	5.0120 GHz	50.972 dBµV/m	---	38.296 dBµV/m	-23.028 dB	---	-15.704 dB	40.224 dB
6	2	5.9945 GHz	52.057 dBµV/m	---	39.468 dBµV/m	-21.943 dB	---	-14.532 dB	41.813 dB

Notes:
Pol.=H
TT=0°
MA=100cm

Fig. 4 4

Record of the measurement of radiated emissions.

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5 CONDUCTED EMISSIONS

Equipment shall meet the limits below when using a CISPR16 quasi-peak and average detector receivers.

DC power port limit:

FREQUENCY RANGE (MHz)	*QUASI-PEAK LIMIT* [dB(μV)]	*AVERAGE LIMIT* [dB(μV)]
0.15 - 0.50	79	66
0.50 - 30	73	60

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	NEXT CALIBRATION
EMI Receiver	Keysight	N9038A	07/2023
LISN	GSD	GSDA01	07/2023

Test procedure: CE32

Test method

Test method was in accordance with the reference standard.

EUT modes of operations were tested in order to achieve the maximum level of emission.

Results

Graphics in following figures show some registrations of the frequency spectrum of the conducted emissions.

As regards intermittent disturbances, no click were observed: Equipment complied with the test specification limits.

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Job Number	23130-T
Test Name	Conducted Emissions
EUT Name	UR Fog S.r.l. - Tempest Bat 300

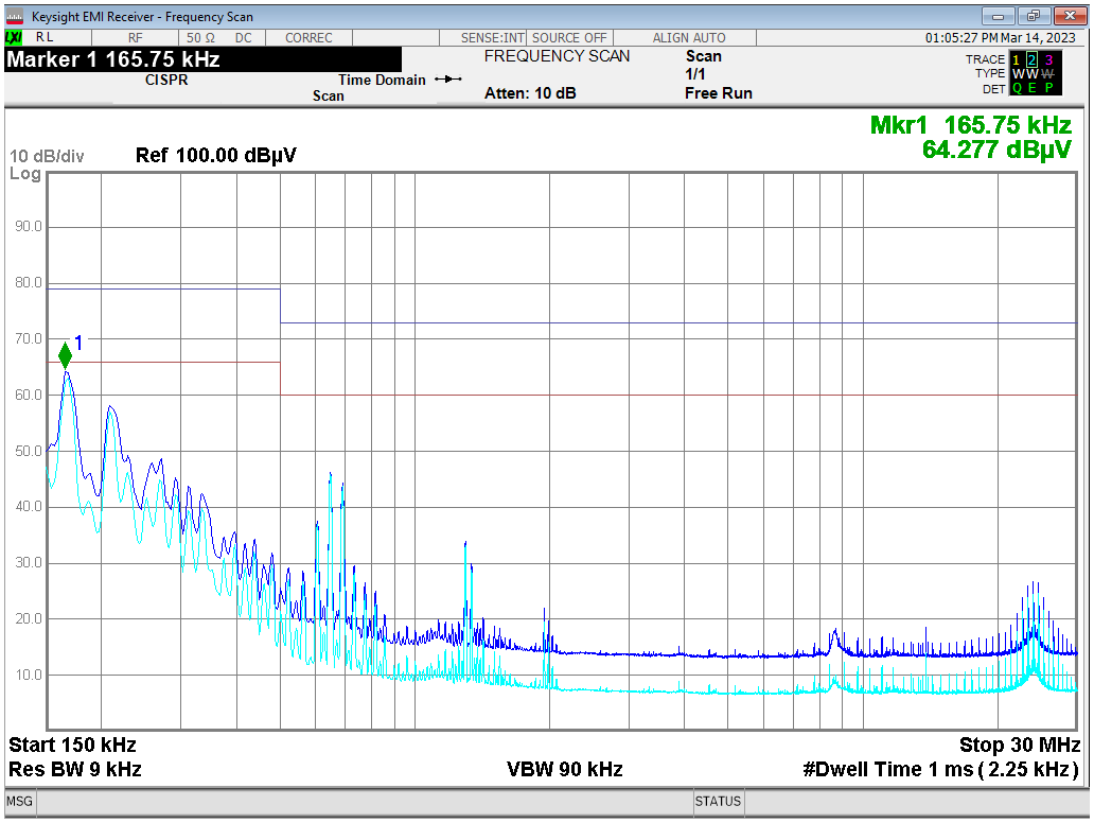

Fig. 5 1

B Band (0.15 – 30 MHz): phase 1

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EUT Name	UR Fog S.r.l. - Tempest Bat 300

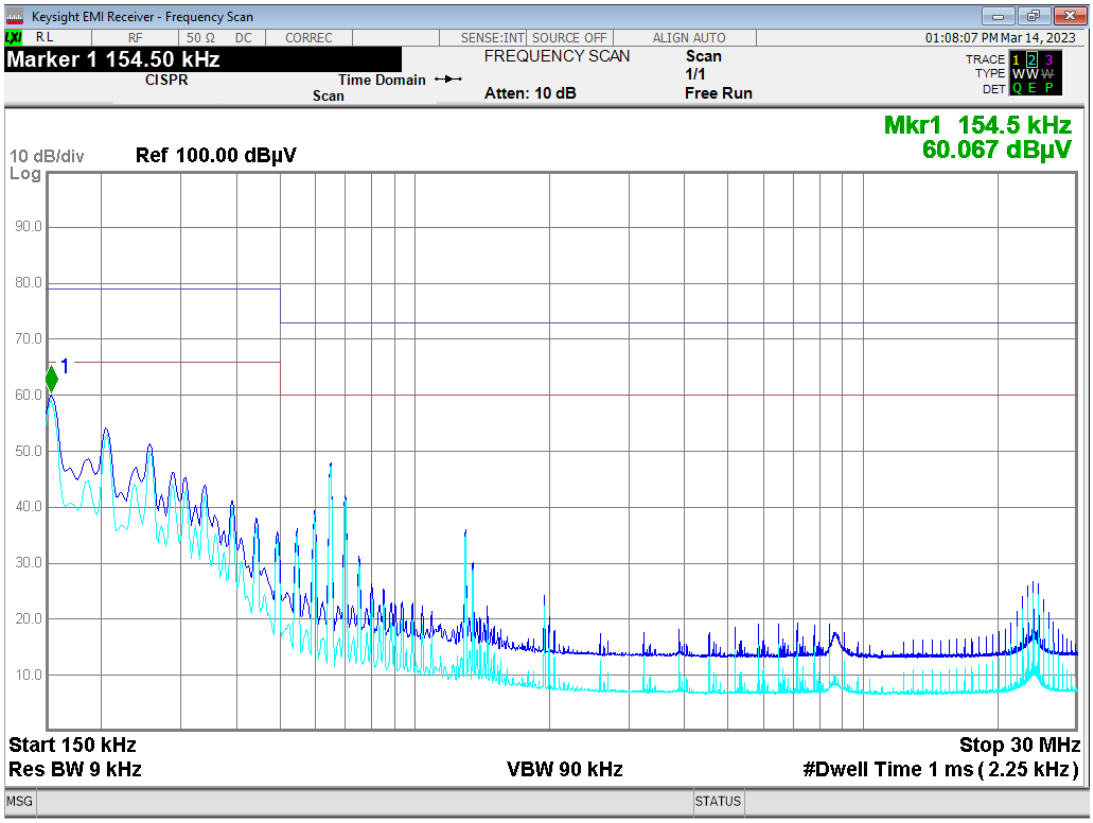

Fig. 5 2

B Band (0.15 – 30 MHz): phase 2

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6 Radio Frequency Electromagnetic Fields Radiated Susceptibility

The following table shows the e.m. field parameters:

Amplitude (unmodulated) [*] *(V/m)*	*Frequency (MHz)*	*Modulation (Frequency/Deep)*	*Step Size (%)*
10	80 ÷ 2700	1 kHz / AM 80% 1 Hz (0.5 s ON; 0.5 s OFF)	1

[*] R.M.S. EFFECTIVE VALUE

Test Equipment

Equipment	Manufacturer	Model	Next Calibration
RF Signal Generator	HP	8648A	07/2023
Amplifier	Amplifier Research	30W1000M7	07/2023
Amplifier	Amplifier Research	75A250	07/2023
Amplifier	GTC	GRF5016A	07/2023
Power Meter	HP	HPE4419B	07/2023
Power Sensor	HP	HP8481D	07/2023
Power Sensor	HP	HP8482A	07/2023
Directional Coupler	HP	778D-012	07/2023
Directional Coupler	Amplifier Research	DC3010	07/2023
Stacked Logarithmic-Periodic Antenna	Schwarzbeck Mess-Elektronik	STLP 9128D	07/2023
Anechoic Chamber	Comtest	CSA01	07/2023

Test procedure: RS43R02

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Results and conclusions			
FRONT ***RESULT** (Pass/Fail)*		***BACK*** ***RESULT** (Pass/Fail)*	
Vertical Polarization	Horizontal Polarization	Vertical Polarization	Horizontal Polarization
Pass	*Pass*	*Pass*	*Pass*
RIGHT ***RESULT** (Pass/Fail)*		***LEFT*** ***RESULT** (Pass/Fail)*	
Vertical Polarization	Horizontal Polarization	Vertical Polarization	Horizontal Polarization
Pass	*Pass*	*Pass*	*Pass*
The equipment continued to operate as intended during the test.			

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7 Electrostatic Discharge (ESD) Immunity test

Equipment shall meet the immunity limits given in the following table: characteristics of pulses are shown (EN 61000-4-2).

Voltage (kV)	*first current peak (±10%) (A)*	*rise time (ns)*	*current (±30%) at 30 ns (A)*	*current (±30%) at 60 ns (A)*
6	22,5	0.7 - 1	12	6
8	30	0.7 - 1	16	8

Test method

Test method was in accordance with §6.1 of the reference standard and §7 - §8 of EN 61000-4-2. 10 positive and 10 negative discharges with intervals of at least 1 second between discharges were applied in each test point.

Test Equipment

Equipment	Manufacturer	Model	Next calibration
ESD Generator	EMTest	ESD 30N	07/2023
Screened Chamber	GSD	CSC01	07/2023

Test procedure: ESD42R01

Results

contact discharge	*Direct Result (Pass/Fail)*	*Indirect VCP Result (Pass/Fail)*	*Indirect HCP Result (Pass/Fail)*
+ 2, 4, 6 kV	*Pass*	*Pass*	*Pass*
- 2, 4, 6 kV	*Pass*	*Pass*	*Pass*
Air discharge	***Direct Result (Pass/Fail)***	***Indirect VCP Result (Pass/Fail)***	***Indirect HCP Result (Pass/Fail)***
+ 2, 4, 8 kV	*Pass*	*Pass*	*Pass*
- 2, 4, 8 kV	*Pass*	*Pass*	*Pass*

The equipment continued to operate as intended after the test.

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8 PHOTOS









Fig. 8 1

EUT

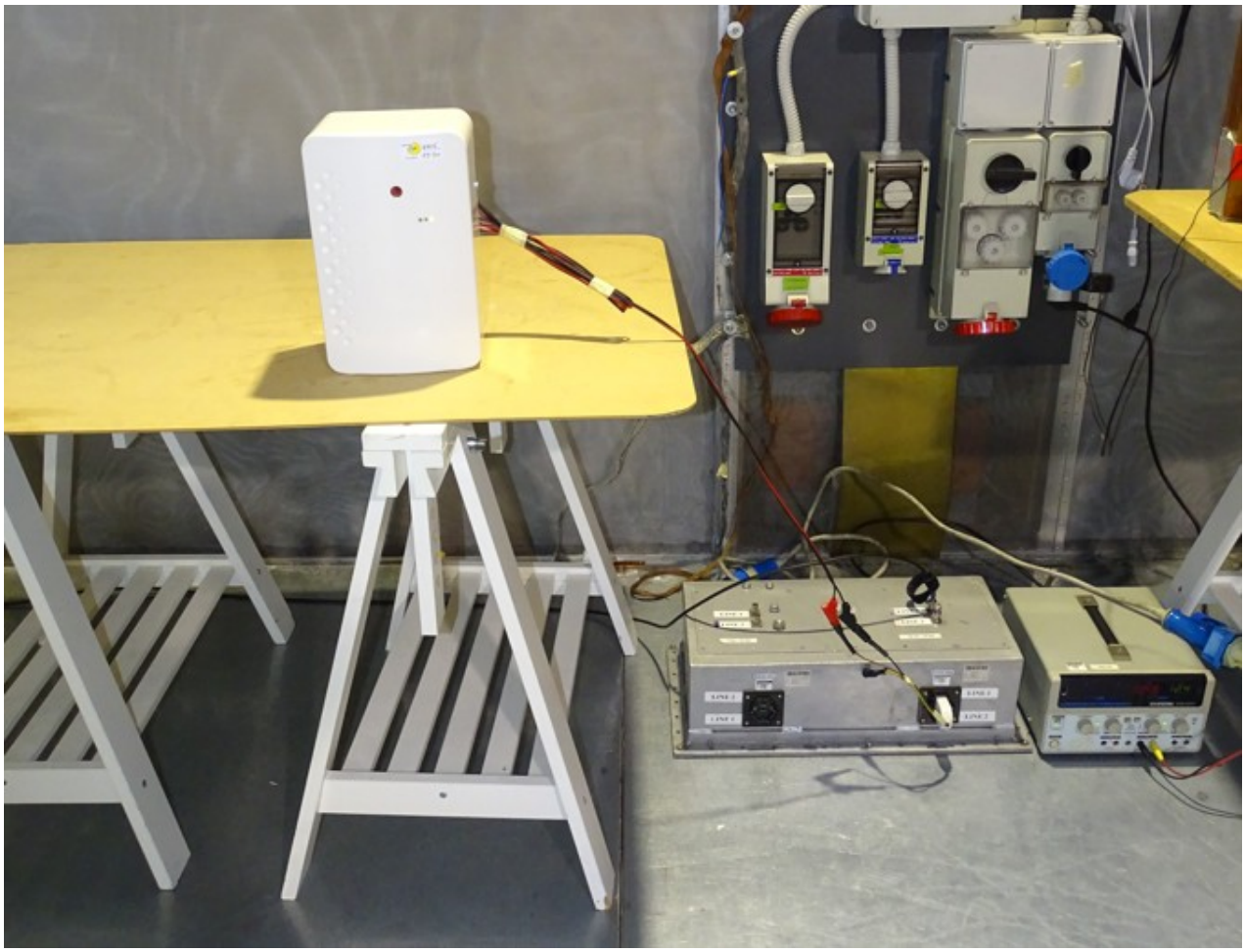

Fig. 8 2
Conducted Emissions Test Setup

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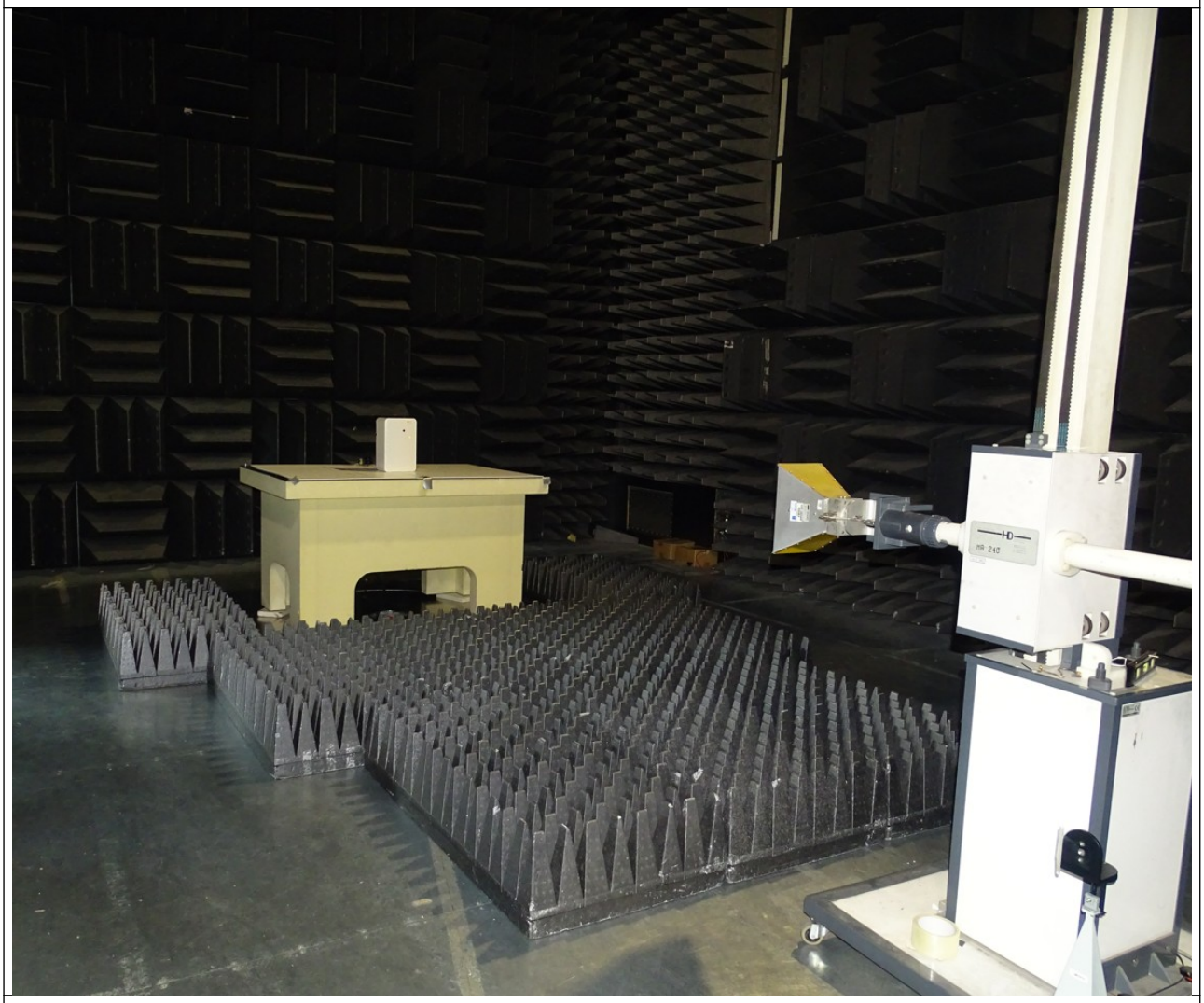

Fig. 8 3
Radiated Emissions Test Setup

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Fig. 8 4
Radiated Immunity Test Setup

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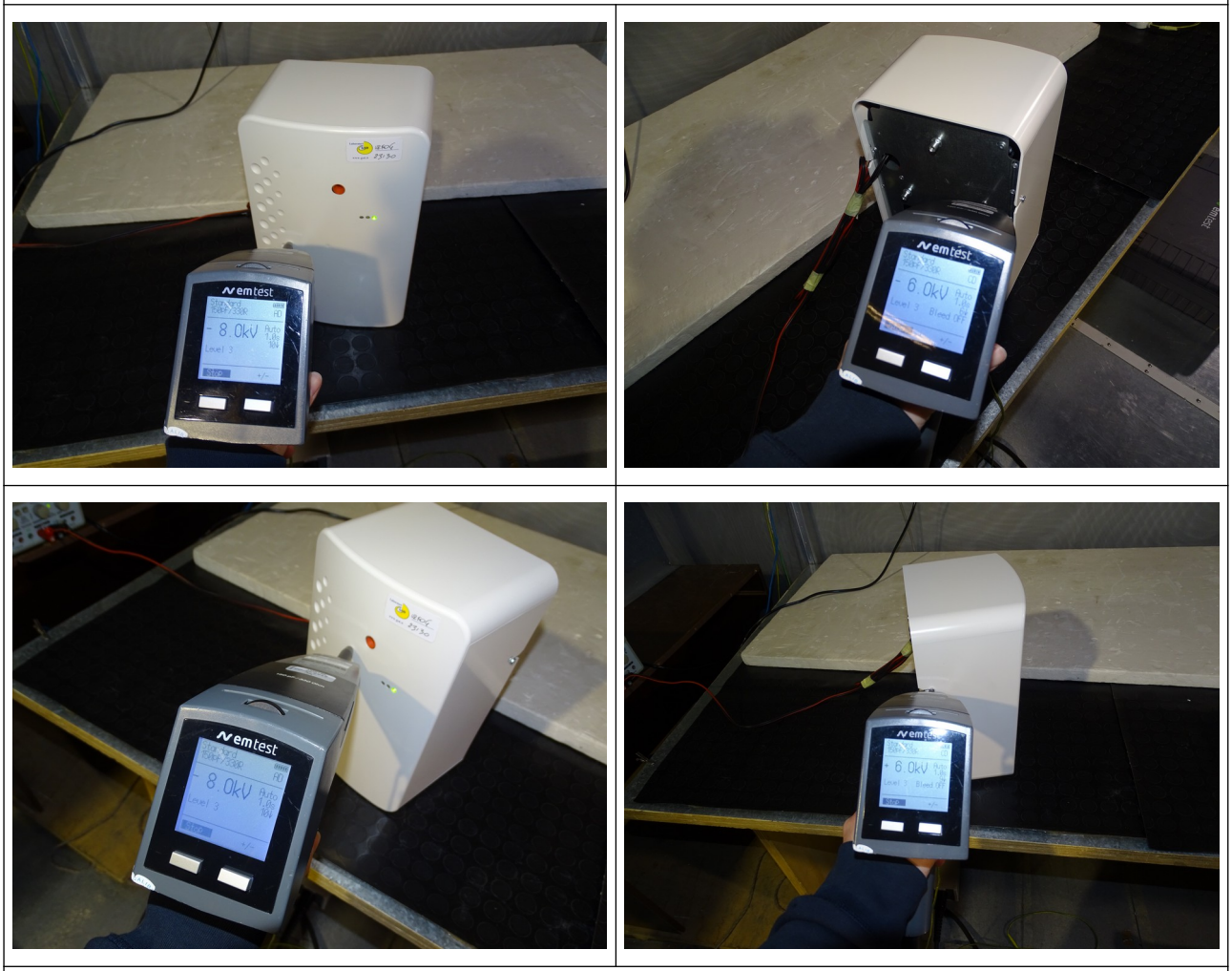

Fig. 8 5
ESD Test Setup

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