REPORT OF THE SEISMIC QUALIFICATION TETS OF A

"*TWO (2) ELECTRICAL PANELS*"

FROM GMS PANO,
ACCORDING TO:

EDF DOCUMENT NUMBER BTR 91 C 112 EPRUK.00
AND EUROPEAN STANDARD EN 60068-3-3: 1993

ENAC ENSAYOS
Nº 54/LE131

NOTE: *According to Section 5.10.2 of Standard ISO-IEC 17025:2005, it is stated that:*

- *The results of the present report apply only and exclusively to the samples subjected to test.*
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Date	Carried out by	Revised and authorized by
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SEISMIC
Qualification Certificate

Nº 54/LE131

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References:

- **VIRLAB** test procedure number **181116E1**, issue 0, dated 16/11/2018: "*PROCEDURE FOR THE SEISMIC QUALIFICATION OF "A DT 4000 FLOOR-STANDING PANEL AND A DT 250 WALL-MOUNTED PANEL" MANUFACTURED BY GMS PANO, ACCORDING TO EDF DOCUMENT NUMBER BTR 91.C.112EPRUK.00*".
- International Electrotechnical Commission standard **IEC 60980:1999:** "*Recommended Practices for Seismic Qualification of Electrical Equipment of the Safety System for Nuclear Generating Stations".*
- **RCC-E**: "*Design and Construction Rules for Electrical components of nuclear islands*".
- Book of Technical Rules (**BTR**):«Equipment seismic qualificatin testing – Generic provisions for the biaxial time history test», document numéro **BTR 91 C 112 EPRUK**, Revision 00, dated 31/07/2012, from *Electricité de France*, EDF.
- European standard **EN 60068-3-3: 1993**: *Environmental testing – Part 3: Guidance. Seismic tests methods for equipments*.
- European standard **EN 60068-2-6: 2008***: Environmental testing – Part 2: Tests – Fc: Vibration (sinusoidal).*
- European standard **EN 60068-2-47: 2005**: "*Environmental testing - Part 2-47: Tests. Mounting of specimens for vibration, impact and similar dynamic tests*".
- European Standard **EN 60068-2-57:2013**: "*Environmental testing - Part 2-57: Test Ff: Vibration - Time-history method*"**.**

Laboratory Name: **VIRLAB, S.A.** (accredited by ENAC, Spanish National Accreditation Entity).
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Client: **GMS Pano Elektrik Sanayi ve Ticaret A.Ş. (TURKEY)**

Modified reference to point 5.10.2 of Standard ISO-IEC 17025:2005, updating it to point 7.8.2.1 of edition of 2017

NOTE: *According to Section 7.8.2.1 of Standard ISO-IEC 17025:2017, it is stated that the results of the present certificate apply only and exclusively to the samples subjected to test.*

***Equipment tested**: **Two (2) Electric Panels**, manufactured by* **GMS Pano**:

	Panel	
	DT 4000 Floor-standing	***DT 250 Wall-mounted***
Serial number	18.083.GMS.0895	18.083.GMS.0896
Drawing number	18.083.GMS.0895	18.083.GMS.0896
Dimension (HxWxD)	2050x(800+700)x600	700x600x200
Weight (kg)	573	30
Components:	3P * [5 * (100x5mm)] tin plated copper busbars Cubicle +NA001 1 pc 3P 4000 ACB 1 pc 3P 250A MCCB Cubicle +NA002 1 pc 3P 1000A ACB 1 pc 3P 630A MCCB	17 pcs 1P B-curve 6A 6kA MCB's 14 pcs Klemsan 2,5mm² push-in type, 2 deck terminal blocks 1 pc Klemsan 2,5mm² push-in type, blue terminal block

Pictures included here below show the **Panels** tested on the test platform, in *front-to-back*, "X", and *side-to-side*, "Y", directions, in both cases, simultaneously with the vertical, "Z", direction.

" XZ" Direction

" YZ" Direction

Modified reference to point 5.10.2 of Standard ISO-IEC 17025:2005, updating it to point 7.8.2.1 of edition of 2017

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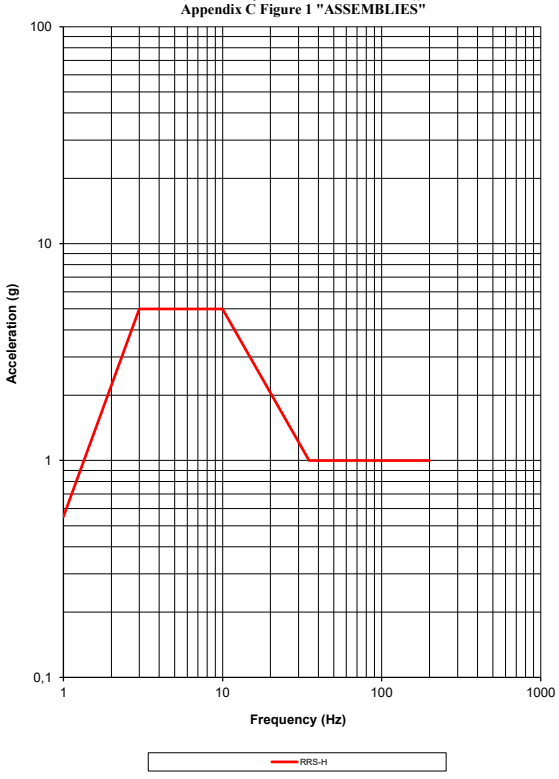
VIRLAB, S.A., certifies that the ***Equipments*** described here above have been tested in its laboratory of ASTEASU (Spain) between the November 19th and 21st 2018, as described in VIRLAB document number **181116E1,** revision 0, dated 16/11/2018, elaborated according to European standard **EN 60068-3-3: 1993,** International Electrotechnical Commission standard **IEC 60980:1999** and EDF document number **BTR 91.C.112EPRUK.00**.

The **Panels** have been submitted to the tests described here below:

- Resonance search tests, between 1 and 55 Hz, with an acceleration level of 0.1 g, independently performed in each one of the three main directions of it, *front-to-back (X)*, *side-to-side* (Y) and *vertical (Z)*.
- Seismic biaxial tests, consisting of five (5) **S1** (50% **S2**) level tests and one (1) **S2** level test, 20 seconds duration, applied in both "XZ" (*front-to-back and vertical*) and "YZ" (*side-to-side and vertical*) directions. The applicable Required Response Spectra, **RRS (***5% damping*), defined in appendix C of EDF document **BTR 91.C.112 EPRUK.00,** for **S2** level, considers:
  - ✓ *Zero Period Acceleration*: 1 g in horizontal direction, 0.8 g in vertical direction
  - ✓ *Maximum spectral acceleration*: 5 g in horizontal direction, 4 g in vertical direction, for 5% damping.

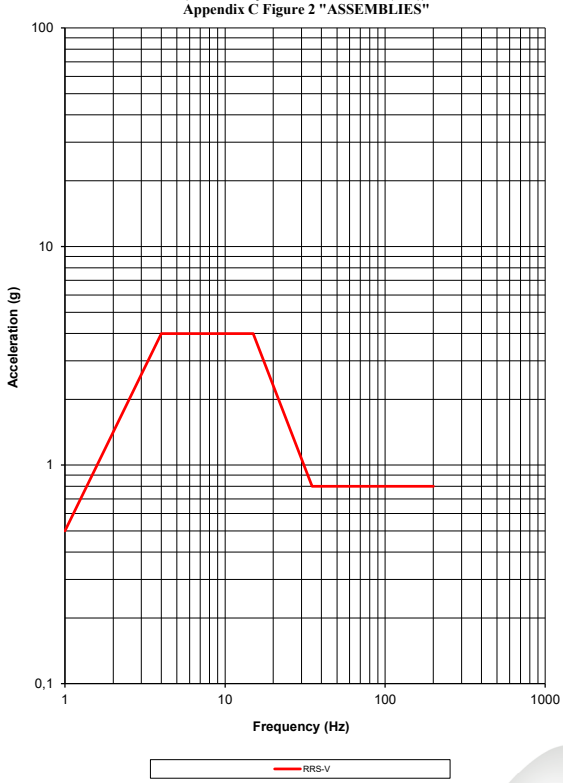
Test Response Spectra, TRS

S2-H Level - *(Damping: 5%)* **Horizontal Direction**
BTR 91 C 112 EPRUK.00 2012 (EDF)
(Translation of CRT 91 C 112 00: 2007 (EDF))
Appendix C Figure 1 "ASSEMBLIES"



Required Response Spectra, RRS

S2-V Level - *(Damping: 5%)* **Vertical Direction**
BTR 91 C 112 EPRUK.00 2012 (EDF)
(Translation of CRT 91 C 112 00: 2007 (EDF))
Appendix C Figure 2 "ASSEMBLIES"



Modified reference to point 5.10.2 of Standard ISO-IEC 17025:2005, updating it to point 7.8.2.1 of edition of 2017

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The **Panels DT4000 & DT250** have successfully passed the Seismic Tests, to which they have been subjected, maintaining its structural integrity and properly running before, during and after the seismic tests, without having detected any electrical discontinuity.

Test report number **182850 of VIRLAB, S.A.**, will include all the information obtained, with tables, photographs, used measuring devices calibration certificates, and other relevant information.

VIRLAB, S.A.
Division of URBAR INGENIEROS, S.A.

Revised and authorized by:

Juan Antonio PÉREZ
Director of Laboratory

Carried out by:

Julen ALBERDI
Laboratory Engineer

Modified reference to point 5.10.2 of Standard ISO-IEC 17025:2005, updating it to point 7.8.2.1 of edition of 2017

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