



部份工程項目參考 PARTIAL PROJECT REFERENCE

工程項目 PROJECT	使用者 END USER	採用產品 PRODUCTS USED
	Drainage Services Department	EMC Floor-Standing 600 x 2000 x 1000 mm
Equipment cubicles in HK electric primary substations	The Hong Kong Electric Co., Ltd.	EMC Floor-Standing 800 x 1600 x 800 mm 800 x 2000 x 800 mm
MTRC Contract 760	MTR	EMC Floor-Standing 600 x 2000 x 800 mm 600 x 2000 x 1000 mm
MTRC Express Rail Link (XRL) - 846 trackside auxiliaries	MTR	EMC Wall-Mount 400 x 400 x 200 mm
MTRC-J705-274 MTRC-J705-309	MTR	EMC Floor-Standing 600 x 2000 x 800 mm
MTRC South Island Line (East Section)	MTR	EMC Floor-Standing 600 x 2000 x 600 mm 600 x 2000 x 1000 mm



THIS ISSUE COVERS 本期報導



意達, 意大利
ETA, ITALY

ENCLOSURE SOLUTIONS FOR
INDUSTRIAL & ELECTRONIC APPLICATIONS
應用於工業和電子領域的箱體解決方案



意大利製造
MADE IN ITALY

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IEC 61000-5-7
電磁兼容性 (EMC)
IEC 61000-5-7
Electromagnetic
Compatibility (EMC)

IEC 61000-5-7
電磁兼容性 (EMC)
第5-7部分: 安裝和緩解指南
箱體提供對電磁干擾 (EM代碼)
的防護程度

IEC 61000-5-7
Electromagnetic Compatibility (EMC)
Installation and mitigation guidelines –
Degree of protection provided by enclosures
against electromagnetic disturbances (EM Code)

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意達ETA EMC箱體
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THE ATTENUATION TEST

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部份工程項目參考
PARTIAL
PROJECT REFERENCE

IEC 61000 的這一部分描述空箱體對頻率在10kHz和40GHz之間的電磁干擾中提供保護程度的性能要求、試驗方法和分類情況。在電氣和/或電子設備和元件進行內部安裝前對電磁屏蔽性能進行測試，是為了表明箱體提供足夠屏蔽電磁能量以支援系統組裝後對IEC標準進行測試時的可接受的性能要求。

這包括來自外部的電磁應力對箱體內的設備的保護，以及從內部產生的電磁應力對外部設備的保護。

This part of IEC 61000 describes performance requirements, test methods and classification procedures for degrees of protection provided by empty enclosures against electromagnetic disturbances for frequencies between 10kHz and 40GHz. The shielding performance is to be measured prior to the installation of internal electrical and/or electronic equipment and components. This shielding protection is measured for the purpose of demonstrating that the enclosure provides adequate shielding of electromagnetic energy to support acceptable performance of the complete assembled units when tested to applicable IEC standards.

This includes protection of equipment inside the enclosure from external electromagnetic stresses, as well as protection of external equipment from internally generated electromagnetic stresses.

一般的測試方法

使用這種方法進行所需的頻率範圍測試，測定箱體的屏蔽效能。使用的方法根據每個頻率範圍不同測試。

三個頻率範圍是：

- 低頻率範圍10 kHz至30 MHz；
- 中頻率範圍30 MHz到1 GHz；
- 高頻率範圍1 GHz至40 GHz。

對於低頻率範圍，使用環路天線。而對於中頻率範圍，使用單極或偶極天線，分別測量在這兩個區域中的磁和電場位。利用喇叭天線測量高頻率範圍內電磁場的強度。

GENERAL TEST

Testing is performed using this approach for the frequency range for which determination of the shielding effectiveness of the enclosure is required. The methods to be used vary as a function of frequency to utilize practical approaches for each frequency band.

The three frequency ranges addressed are:

- Low frequency range 10 kHz to 30 MHz;
- Mid frequency range 30 MHz to 1 GHz;
- High frequency range 1 GHz to 40 GHz.

For the low frequency range loop antennas are used, while for the mid frequency range monopole or dipole antennas are used. The magnetic and electric fields, respectively, are measured in these two ranges. Horn antennas are utilised for the high frequency range and the power received due to the electromagnetic field is measured.

ETA 電磁兼容性箱體 ETA EMC ENCLOSURE

電磁兼容性指引是和那些會釋放電磁波(EM)的元件有關。

但ETA的產品都不帶電磁波源，因此不需要符合EMC指令，不過他們可以屏蔽由內部或外部信號源所引起的電磁波傳播，大大減少相關的電磁波的強度和對設備造成的干擾。

由於其固有的電導率特性，一般用低碳鋼製造的箱體都能夠提供對電磁波強度中等程度的衰減。可通過各個部件（安裝板、面板、門、框架）接地的等電位連接方式增加衰減。

尤其是，EMC箱體（在以下指定的結構特點）能夠大大減少電氣和磁性元件（高保護）在電磁場的輻射強度，因此為用戶用它來符合電磁兼容性指令，提供寶貴的支援。

The electromagnetic compatibility Directive concerns those components which release electromagnetic waves (EM).

ETA products are not EM wave sources they are not subject to the EMC directive, however they can provide a barrier to EM waves propagating from the internal or external source, and significantly reduce the intensity of such EM waves and the related disturbance caused to the equipment.

Cabinets manufactured in painted mild steel are able to provide a medium attenuation of electromagnetic intensity thanks to their intrinsic conductivity characteristics. This attenuation is increased by connecting the various parts (mounting plate, panels, doors, frame) among them to earth in an equipotential way.



從箱體的前面發放在 0.01-30 MHz 的磁場 (H) 和 30 MHz-1 GHz 的電場 (E) 範圍的信號源。

The issuing source in the band 0.01-30 MHz for Magnetic field (H) and 30 MHz-1 GHz for the electric field (E) from the front to the housing environment.



兩個接收天線——考慮頻率範圍。
Two receiving antennas in the frequency band considered.

EMC 箱體

提供對電磁波高保護的
具體技術特徵

安裝板

材料：熱一鍍鋅鋼
（森吉米爾法）
表面外觀：開花最小化
塗層：275 gr/m² 鋅
品質和公差標準：
EN 10142; EN 10327

箱體框架

材料：電鍍鋅鋼

鉸 鏈

材料：銅覆蓋鋼

箱體的面板、頂板

材料：兩面均為熱一鍍鋅鋼——森吉米爾方法，外面塗與環氧聚脂粉（根據ETA標準）

墊 片

EMC導電金屬墊片裝配整個箱體的框架邊上，給予框架與面板之間的導電連續性。

底 部

材料：電鍍鋅鋼
帶EMC墊片的一體電纜入線板

Nemko	
Report No. 212131TRFEMC	
TEST REPORT EN 61000-5-7	
Electromagnetic compatibility (EMC) – Part 5-7: Installation and mitigation guidelines Degrees of protection provided by enclosures against electromagnetic disturbances (EM code)	
Report Reference No.:	212131TRFEMC
Tested by (name + signature):	P. Barbieri
Approved by (name + signature):	G. Curioni
Date of issue:	2012-07-05
Testing Laboratory:	Nemko Spa
Address:	Via del Carroccio, 4 – 20853 Blassono (MB) – Italy
Testing location:	Nemko Spa
Address:	Via del Carroccio, 4 – 20853 Blassono (MB) – Italy
Applicant's name:	Eta Spa
Address:	Via Monte Barzaghino, 6 – 22035 Canzo (CO) – Italy
Test specification:	
Standard:	EN 61000-5-7 (2001)
	Full application of the standards <input type="checkbox"/>
	Partial application of the standards <input checked="" type="checkbox"/>
Test procedure:	Nemko WM L0077, WM L0177 and WM L1002
Test Report Form No.:	61000-5-7TRFEMC
TRF Originator:	Nemko Spa
Master TRF:	2008-12
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Test item description:	Metallic cabinet
Trade Mark:	eta
Manufacturer:	Eta Spa
Address of manufacturer:	Via Monte Barzaghino, 6 – 22035 Canzo (CO) – Italy
Model:	ENUX
Dimensions:	80 cm x 80 cm x 210 cm
This test report may not be partially reproduced, except with the prior written permission of Nemko Spa. The test report merely corresponds to the tested sample.	

EN 61000-5-7 Test Report

In particular, the EMC cabinet (whose structural characteristics are specified here below) is able to significantly reduce the electromagnetic field intensity in the electric and magnetic component (high protection), therefore providing a precious support to the customer who uses it to comply with the electromagnetic compatibility Directive.

EMC CABINET

Specific technical features for
high protection from e.m. waves

MOUNTING PLATE

Materials: Hot galvanized steel
(sendzimir method)
Surface appearance: Flowered minimized
Coating: 275 gr/m² Zinc
Quality and tolerance standard:
EN 10142; EN 10327

FRAME OF CABINETS / BODY OF BOXES

Materials: Electro-galvanized

HINGES

Materials: Copper clad steel

PANELS, ROOF OF CABINETS

Materials: Hot-galvanized steel on both the sides with sendzimir method, painted only externally with epoxy-polyester powder (as per standard E.T.A cycle).

GASKET

An EMC conductive metallic gasket is assembled on the whole perimeter of the opening, granting continuity between frame and panels.

BOTTOM

Materials: Electro-galvanized steel
One part cable entry with EMC gasket

eta 衰減測試 THE ATTENUATION TEST

測試方法

- 箱體用作屏蔽
- EMC源在 0.01-30 MHz 和 30 MHz-1 GHz 頻段為 H 和 E 欄位的範圍
- 天線在指定範圍內接收

測試說明

- 根據IEC61000-5-7描述的方法，天線放置在無屏蔽的信號源前面，開啟信號後，測試所產生的信號。它用來衡量信號源頻率範圍的SE衰減趨勢 (dB)。
- 信號源放在箱體內，然後如前述在相同情況下開啟信號源。由此建立SE趨勢。最後，衰減的分貝值是由第一和第二點記錄的值之間的差異計算出來。

如何讀取圖形

- 考慮使用頻率的範圍（報告在水平軸上）
- 在垂直軸上，閱讀對應的衰減範圍。此值表示為dB，表示無屏蔽（自由場）和帶屏蔽（機櫃或箱體）的差異值。

有證據表明在許多情況下，在安裝元件和模塊組件後箱體將展出高屏蔽效能。在其他情況下箱體安裝額外的貫穿件後會表現出低的屏蔽性能。製造商應考慮在每個特定的應用上這些潛在的影響。

TEST METHOD

- Enclosures used as barriers
- EMC Source in the range of 0.01-30 MHz and 30MHz-1GHz band for H field and E field
- Receiving antennas in the considered ranges

TEST DESCRIPTION

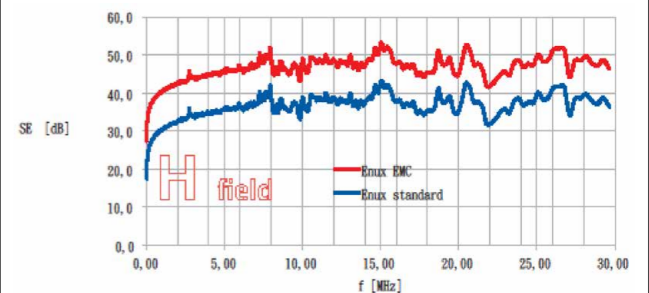
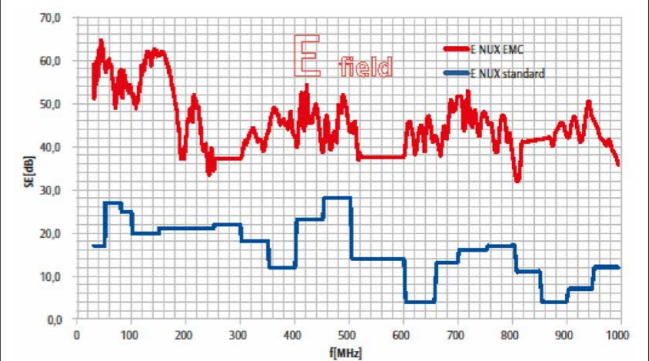
- The source is switch on and the produced signals are measured by the antenna placed in the front of the source without barriers, according to the methods described in IEC61000-5-7. It is measured the SE attenuation trend (dB), received by antennas in the frequency range considered for the source.
- The source is placed inside the cabinet and switch on in the same conditions of open-field described previously. As per point 1), it is built the SE trend (dB). At the end the decibel value of the attenuation is calculated being the difference between the values of the field in point 1) and those recorded in point 2).

HOW TO READ THE GRAPHIC

- Consider the range of frequencies used (reported on the horizontal axis)
- Read the correspondent attenuation range on the vertical axis. This value, expressed in dB, represents the difference of the field value without barriers (free field) and with barrier (cabinet or box).

There is evidence that for many cases an enclosure will exhibit a higher shielding effectiveness after installation of components and modules than does the empty enclosure. In other cases an enclosure will exhibit a low shielding effectiveness after installing additional penetrations. Manufacturers should consider these potential impacts for each particular application.

ENUX EMC vs ENUX Standard



ST EMC vs ST Standard

