ESD-TARGET2 for calibration of the ESD discharge current waveform, target type SMD as proposed for gun comparison.

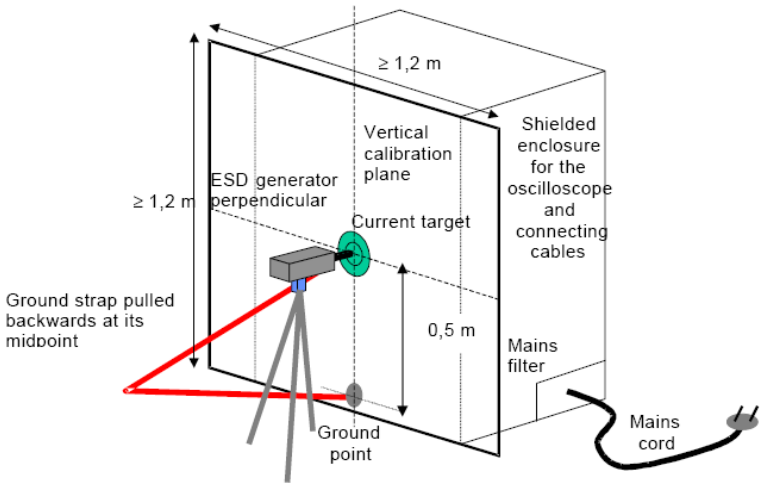
Revised: 16.06.2014
PN 103630
PN103635

1 General Information

The target - attenuator - cable chain always should be considered as one entity. As soon as one element gets exchanged, or even when it gets disassembled and re assembled, the whole chain needs re-calibration in order to insure compliance with the specification.

ESD-TARGET2

Proposed test set-up



The target shall be mounted at the centre of the vertical calibration plane of at least 1.2m x 1.2m. The connection for the ESD generator return cable (ground strap) to the calibration plane shall be made directly below the target at a distance of 0.5 below the target. The ground strap shall be pulled backwards at the middle of the cable, forming an isosceles triangle. It is not allowed to let the ground strap lay on the floor during the calibration.

2 Technical data of ESD-TARGET2

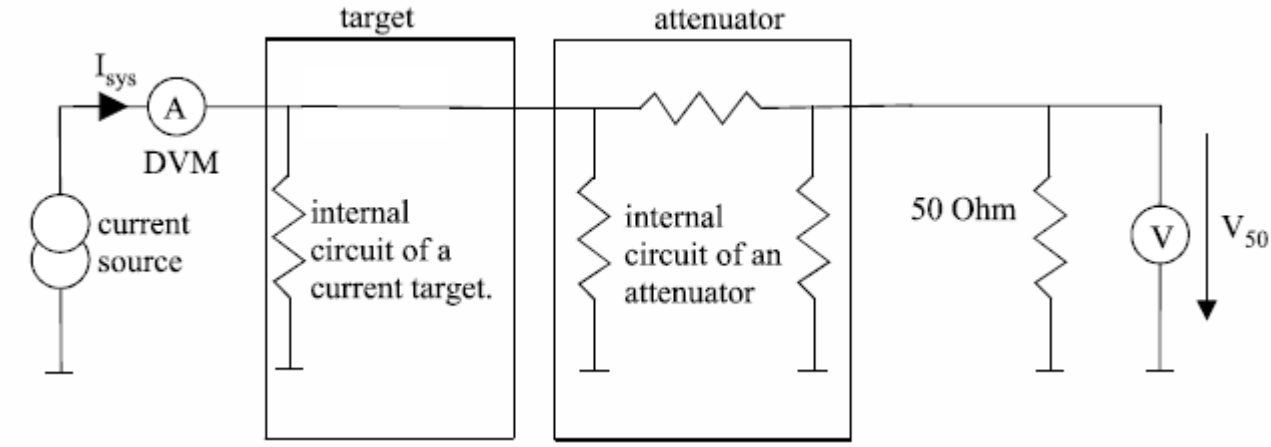
Resistor	2 Ohm	
Frequency range: chain target, cable and attenuator	> 3 GHz	+/- 0.5 dB up to 1GHz (incl.) +/- 1.2 dB GHz up to 3GHz
Standard	IEC 61000-4-2 Ed.2	
Current range	0 up to 120A *	First ns peak
Screws for fixing	8 x M3	not included in delivery
Dimension	70 x 40 mm	diameter x thickness

* Note: the current range is influenced by the attenuator and the DSO voltage input limit.

3 ESD-TARGET2 Calibration

Two measurements must be carried out: The low frequency transfer impedance and the Insertion loss over the frequency range of the network analyser.

3.1 Low frequency system transfer impedance



The low frequency system transfer impedance of the target - attenuator - cable chain can be determined by:
Injecting a current Isys of approximately 1 A into the front side of the current target. The front side is the side to which discharges are made. The current needs to be known within ± 1 %.

Measure the voltage V_{50} across the precision 50 Ohm load. Calculate the transfer impedance by:

$Z_{sys} = V_{50} / I_{sys}$ Example:

The Zsys value can be found in the EMC PARTNER calibration report. The value of the calibration report must be used to calculate the current amplitudes of the ESD discharge current wave shape.

$I_{ESD} = V_{ESD} / Z_{sys}$

If a repeated DC-transfer impedance measurement shows a result which differs from the original measurement by less than 1 %, the user may assume that the insertion loss of the target-adapter-cable chain has not changed providing the same cable and attenuators are used and no other indications (e.g., loose or damaged connectors) indicate the opposite.

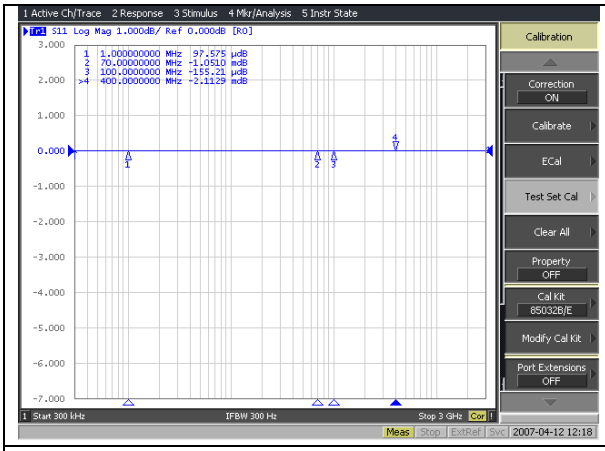
3.2 Insertion loss over the frequency range of the network analyser

The variation of the insertion loss of the target-attenuator-cable chain shall be:
+/- 0,5 dB, between DC and 1 GHz, see note.
+/- 1,2 dB, between 1 and 4 GHz.

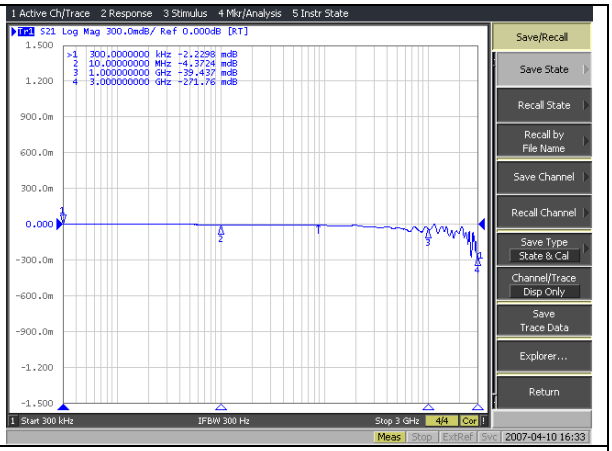
Instead of DC the lowest frequency available with the network analyser shall be used, The DC characteristics are measured separately.

3.2.1 Adapter calibration

The adapter line must be calibrated before the insertion loss measurement can be carried out. For the adapter line calibration two adapters are connected face to face to measure the reflection and the transmission.



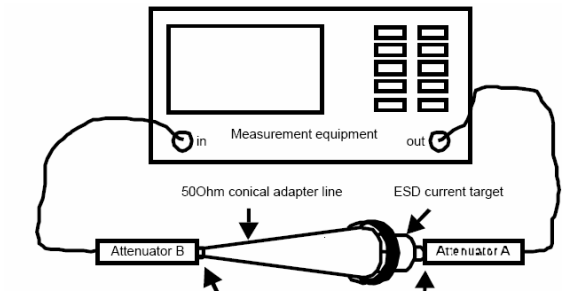
Reflection measurement with cable and termination



Reflection measurement with two adapters, cable and termination

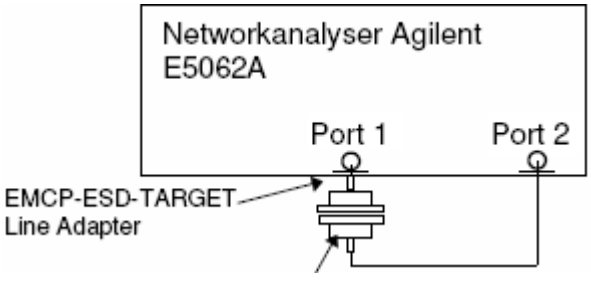
Further information about the adapter can be found in the instruction sheet of the ESD-TARGET2-ADAPTER

3.2.2 Insertion loss over the frequency range of the network analyser



IEC test set up for insertion loss measurement

Note: Other shapes than conical are acceptable



EMCP set up for insertion loss measurement

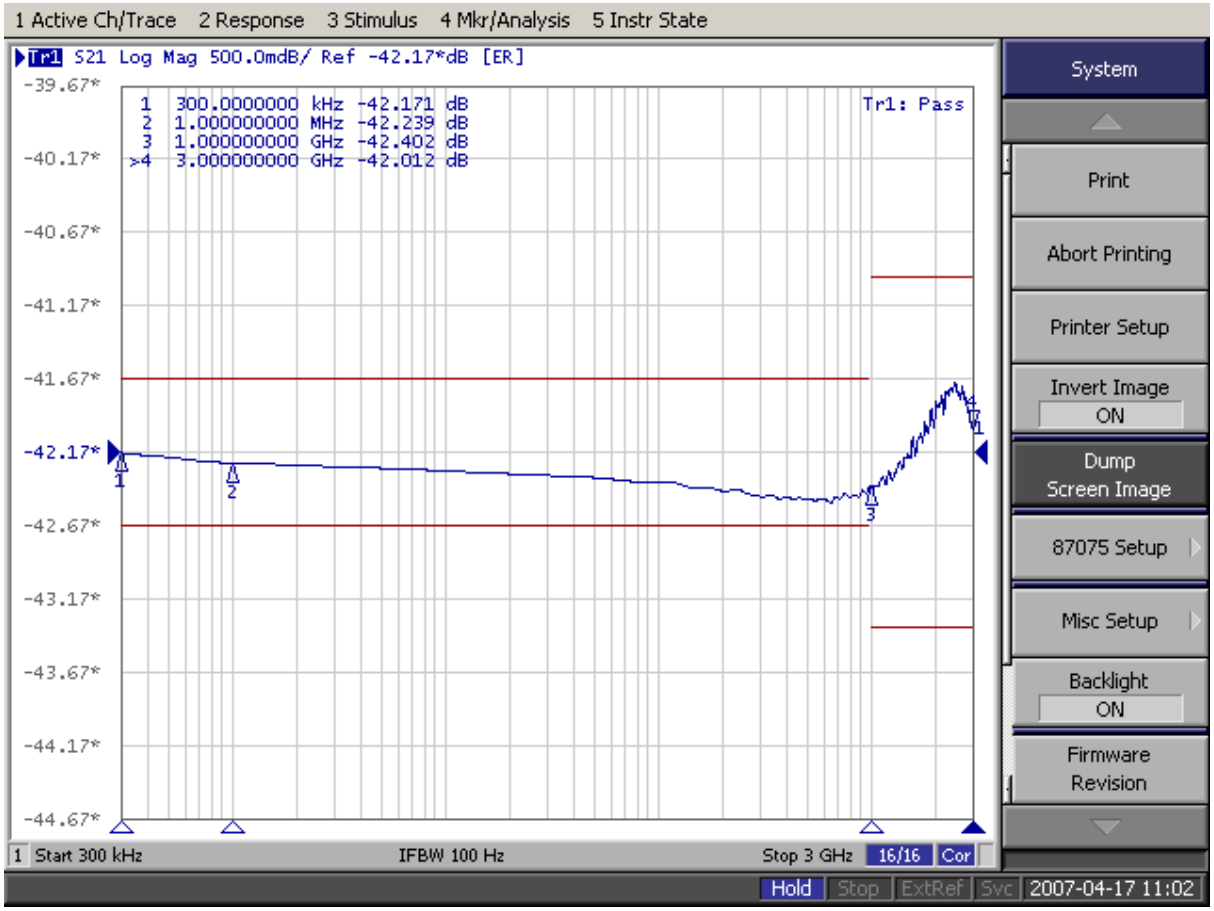
Note: same shape as the target itself is used as adapter

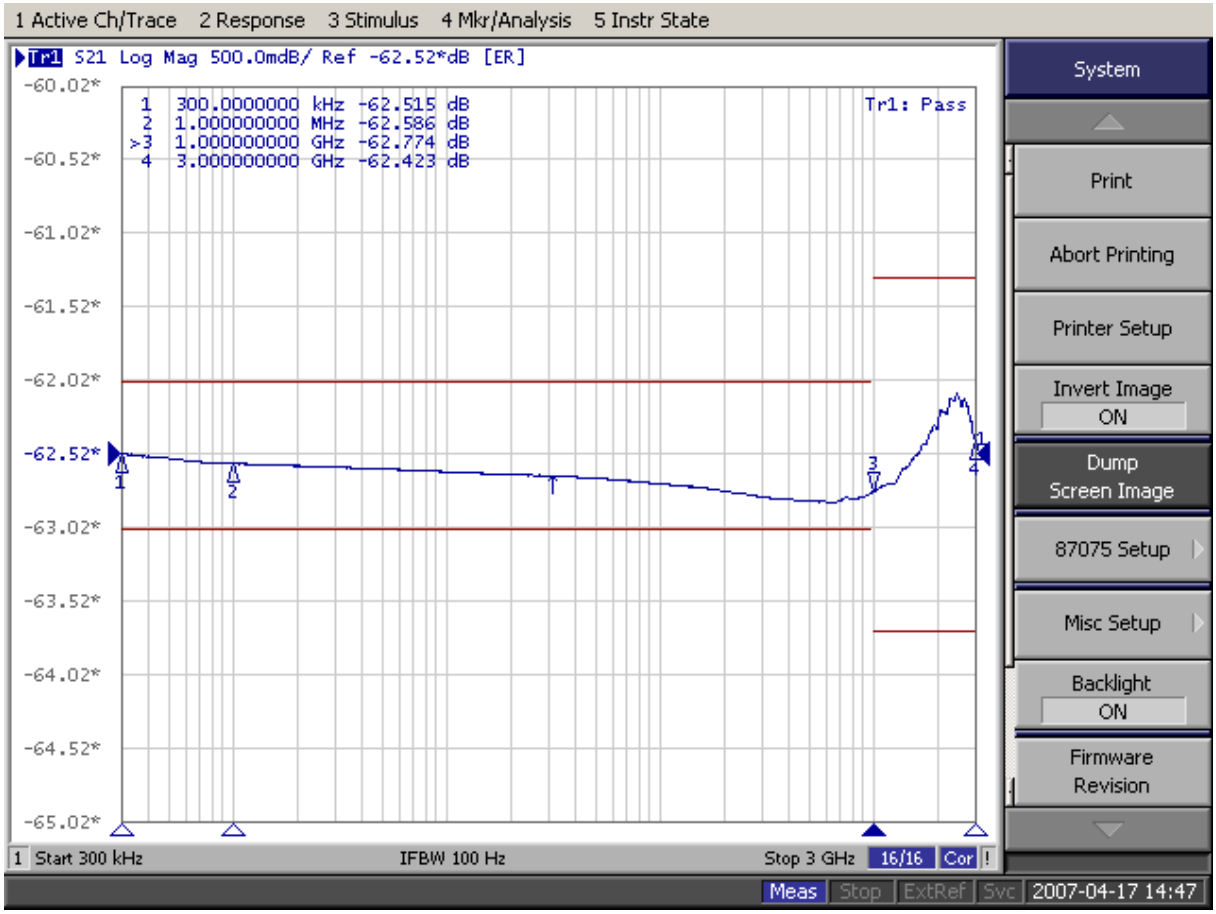
3.2.3 Definition of the nominal value

The nominal dB value can be defined as follow:

The dB value at the lowest frequency of the network analyser approx 300'000 Hz is equal to the d.c. value measured with the system transfer impedance, or calculated with the measured resistors values.

The actual insertion loss diagrams are shown in the calibration report. On next page two plots are shown:
First plot ESD-TARGET2 with 20dB attenuator and 1 m cable for application up to 37.5A (10kV) with DM modules.
Second plot ESD-TARGET2 OPTION DN for current range up to 120A (30kV) with DN Networks.

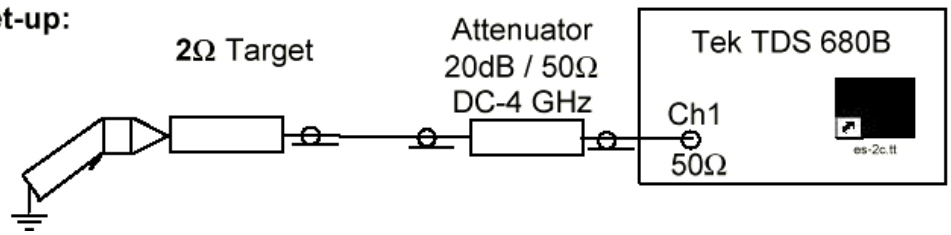




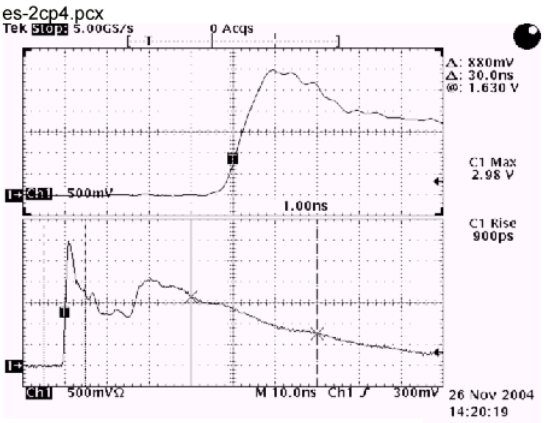
The target, attenuator and cable chain is over the frequency range within the tolerances. The nominal value is 42.17 or 62.52 dB +/-0.5dB up to 1 GHz and +/-1.2dB up to 4 GHz.

4 Example ESD discharge measurement

Verification set-up:



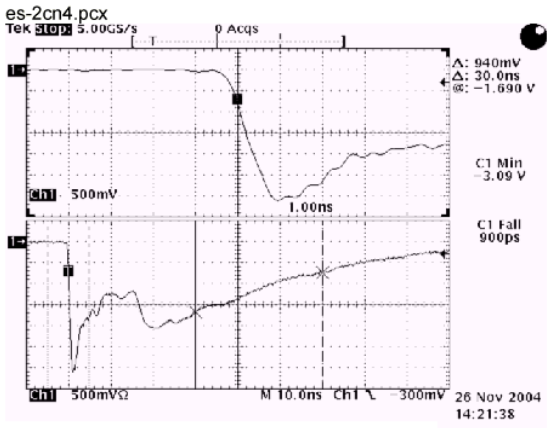
4.1 Example ESD3000 with ESD3000DM1 measured with ESD-TARGET2



8000V positive, contact discharge

Rise time:	**700 to 1000 ps**	
First peak:	27 to 33 A	**(30 A)**
Duration 30 ns:	11.2 to 20.4 A	**(16 A)**
Duration 60 ns:	5.6 to 10.4 A	**(8 A)**

8 kV Level positive

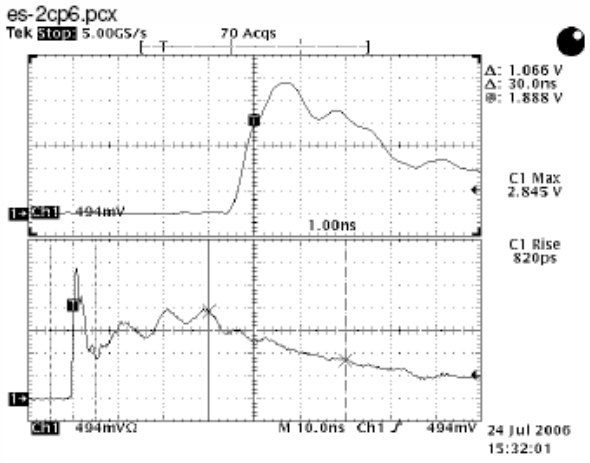


8000V negative, contact discharge

Rise time:	**700 to 1000 ps**	
First peak:	27 to 33 A	**(30 A)**
Duration 30 ns:	11.2 to 20.4 A	**(16 A)**
Duration 60 ns:	5.6 to 10.4 A	**(8 A)**

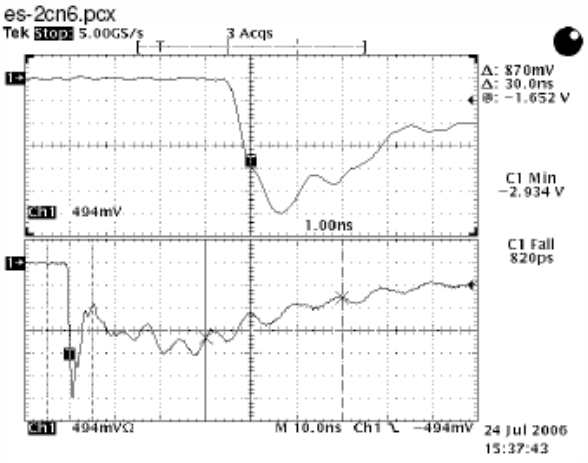
8 kV level negative

4.2 Example ESD3000 with ESD3000DN1 measured with ESD-TARGET2 OPTION DN



25kV positive, contact discharge

Rise time:	**700 to 1000 ps**	
First peak:	84.38 to 103.1A	**(93.75A)**
or	2.67 to 3.26V	(2.96V)
Duration 30 ns:	35.0 to 65.0A	**(50 A)**
or	1.11 to 2.06V	(1.58V)
Duration 60 ns:	17.5 to 32.5A	**(25 A)**
or	0.553 to 1.03V	(0.79V)



25kV negative, contact discharge

Rise time:	**700 to 1000 ps**	
First peak:	84.38 to 103.1A	**(93.75A)**
or	2.67 to 3.26V	(2.96V)
Duration 30 ns:	35.0 to 65.0A	**(50 A)**
or	1.11 to 2.06V	(1.58V)
Duration 60 ns:	17.5 to 32.5A	**(25 A)**
or	0.553 to 1.03V	(0.79V)

5 Standard accessory, dimensions

5.1 Included articles, dimensions

ESD-TARGET2 DN (Article No. 103635)

Mechanical Dimensions

Unit Height:	
Length:	28 cm
Width:	22 cm
Height:	9 cm
Net Weight:	1 kg

Included Articles

According to STL-Variante 20, STL-Version 1

Qty	*PN*	*Description*
1	103194	CD-UM-IN-ALL includes all User Manuals and Instruction sheets of all EMC PARTNER AG sales products.
1	104802	Standard calibration cerificate
1	104836	Brochure ESD Test System
1	103191	Standard accessories pack

5.2 Standard accessories

Accessories to ESD-TARGET2 (Article No. 103630)

Qty	PN	Description	Weight (kg)	Length (cm)	Width (cm)	Height (cm)
8	102211	Nut M3	0	0	0	0
8	102233	Washer M3	0	0	0	0
8	102244	Shakeproof washer M3	0	0	0	0
1	103015	Plastic pack for standard accessories 90x75mm	0	9	7.5	0
1	103182	Target box blue	0	0	0	0

Accessories to ESD-TARGET2 DN (Article No. 103635)

Qty	PN	Description	Weight (kg)	Length (cm)	Width (cm)	Height (cm)
1	100623	Attenuator 20dB SMA with a greater tolerance range	0	0	0	0
8	102211	Nut M3	0	0	0	0
8	102233	Washer M3	0	0	0	0
8	102244	Shakeproof washer M3	0	0	0	0
1	103029	Plastic back 50x75mm	0	0	0	0
1	103182	Target box blue	0	0	0	0

6 Recycling / Disposal

6.1 RoHS directive 2002/95/EG

The ESD-TARGET2 complies with the directive 2002/95/EG (RoHS - Restriction of certain Hazardous Substances).

From December 2005, all EMC PARTNER products either hand soldered or by machine are produced using lead-free solder.

6.2 WEEE directive 2002/96/EG

The EMC PARTNER ESD-TARGET2 is exempted from the directive 2002/96/EG (WEEE) under category 9.

The product should be recycled through a professional organisation with appropriate experience for the disposal and recycling of electronic products. EMC PARTNER are also available to help with questions relating to the recycling of this product.

6.3 Information for dismantling

There is no special danger involved in dismantling the ESD-TARGET2.

6.4 Parts which can be recycled

The ESD-TARGET2 contains parts made from steel, aluminium, PVC, two-component sealing compound. The impulse capacitors are filled with non-poisonous mineral oil. The various parts can be separated and recycled.

6.5 Parts which can not be recycled

All parts in the ESD-TARGET2 can be recycled.

7 Service Information

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