Update on the ATCA chassis

Procurement Framework

Current procurement framework for ATCA shelf and - 48V rectifier

(Since 2017)

- nVent/Schroff ATCA shelves
  - 14 ATCA slots w. RTM
  - Vertical or Horizontal cooling
  - DS or FM topology
  - 40G backplane (100G optional)
  - Bussed IPMB
  - 1 Shelf man. included
- - 48Vdc rectifier system (Eltek)
  - Up to 18 kW max output pwr (w. expansion unit)
  - 9 kW with N+1 redund. (w. one 1U unit)
  - Based on 5 pwr bricks
  - Bulk power output
  - Ctrl module (SNMP over eth.)

Open commitment for up to 190 kCHF

Spending limit exceeded since a few months !

Schroff ATCA chassis	DO-30700	unit price
	Batch size	DAP CERN
Shelf type A, vertical, DS, 40G. Mfg. ref. 11990-190	1 unit	6,461 €
	3 units	6,120 €
	5 units	5,783 €
	10 units	5,510 €
type B, FM, 40G. 11990-191	1 unit	7,611 €
	3 units	7,283 €
	5 units	6,999 €
	10 units	6,713 €

tpackS -48 c PS	DO-31625	unit price
	Batch size	DAP CERN
base unit controller and 5 1.8kW rectifiers)	1 unit	1,539.18 €
	2 units	1,510.23 €
	5 units	1,497.68 €
	10 units	1,425.79 €
Flatpack S expansion unit (incl. 6 1.8kW rectifiers)	1 unit	1,577.78 €
	2 units	1,546.42 €
	5 units	1,532.42 €
	10 units	1,521.32 €

https://espace.cern.ch/ph-dep-ESE-BE-ATCAEvaluationProject/Procurement/SitePages/Home.aspx

Procurement framework for ATCA shelf and - 48V rectifier

Information received during the 2019 xTCA interest group
Confirmed during the December 2019 ECB

- Requirements:
  - ATLAS: 100 - 130 units
  - CMS: 100 - 130 units
- No change on the technical requirements

Total estimated cost (250 chassis): 2+ MCHF

Blanket purchase contracts

- CERN procurement asks for MS + IT
  (+ Finance committee authorization)
- Rectifier system can be based on IT only

ATCA shelf

- 14 ATCA slots w. RTM
- Vertical (or Horizontal) cooling
- DS or FM topology
- 40G backplane (100G optional TBC)
- Bussed IPMB
- 1 Shelf man. Included (PP ShMM 700)

- 48Vdc rectifier system (Eltek)

- Up to 18 kW max output pwr (w. expansion unit)
- 9 kW with N+1 redund. (one 1U unit)
- Based on 5 pwr bricks
- Single bulk power output
- Ctrl module (SNMP over eth.)

https://espace.cern.ch/ph-dep-ESE-BE-ATCAEvaluationProject/Procurement/SitePages/Home.aspx

Procurement framework for ATCA shelf and - 48V rectifier

Status of MS + IT process for the ATCA chassis

• *First draft of MS documents*	*April 2020*	✓
• *Finalisation of MS documents*	*End April*	✓
• *Technical auditing*	*Mid May*	✓
• *Dispatch of MS documents*	*Mid May*	○
• *First draft of IT documents*	*Beginning July*	
• *Finalisation of IT documents*	*End July*	
• *Specification Committee date*	*Mid August*	
• *Dispatch of IT documents*	*Mid August*	
• *Submission deadline for bidders*	*Mid September*	
• *Date of FC meeting*	*Dec 2020*	
• ***Blanket contract start date***	***Jan 2021***	

June-July review of the tech specifications via the ECB for both, the ATCA shelf and the rectifier system

Same steps for the -48V rectifier (IT only)

Procurement framework for ATCA shelf and - 48V rectifier

Existing procurement framework

- *Based on open commitment*
- Only for limited quantities !
- *Release purchase orders as needed*
  - *At fixed negotiated prices*
  - *Individual DAI from users directly*
  - *Order can be placed whenever needed*
  - *No equipment tracking upon reception*

New procurement framework (after the MS)

- *Based on framework contracts (as for Wiener VME crates today)*
- *Ok for large quantities*
- *Purchase orders placed in common at the end of every quarter*
  - *Requests to be submitted via dedicated online DB*
  - *Fixed negotiated prices*
  - *TID (money transfer) to a common account prior to common PO (DAI)*
  - *Equipment tracked in the DB from common PO on*

ATCA equipment available at the Epool *(Reminder)*

AdvancedTCA available at the electronics pool

- ❑ nVent/Schroff reference: 11990-707
- ❑ 2 slots Shelf
- ❑ 2 cooling units and 2 AC-DC included
- ❑ 3U rackable solution

https://schroff.nvent.com/en/schroff/11990-707

Thanks for your attention

ATCA shelf and - 48V rectifier specification summary

Physical shelf baseline:

- 19” rack system compatible card cage
- 14 ATCA blade slots with RTM
- 2 shelf manager slots
- 2 redundant power entry module (PEM) slots (-48Vdc input)
- Removable cable management trays (front and rear)
- Hot-swappable cooling units
- Cooling variants:
    - Variant 1: Shelf compatible with in-rack vertical air flow
    - Variant 2: Shelf compatible with PICMG standard front to back air flow
- Shelf maximum height: 14U with variant 1; 16U with variant 2

Backplane requirements:

- Topology 1: Dual star
- Topology 2: Full mesh
- Fabric lane bit rate: 40Gbase-KR4
- Option: 100Gbase-KR4 (for phase 2)

Module location and accessibility:

- Front access:
    - 14 ATCA blades
    - 2 shelf managers
    - Air filter
- Rear access:
    - 14 RTM
    - 2 PEM

ATCA shelf and - 48V rectifier specification summary

Other requirements:

Electrical

- Shelf power distribution for minimum: 400W (front blade) + 50W (RTM) to each slot

Shelf manager

- Based on Pigeon Point Systems ShMM700 or newer
- Support the following protocols and interfaces: RMCP, SNMP, SSH
- Support for HPM.1 and HPM.3

Standards, Rules and Regulations:

- PICMG standard:
  - AdvancedTCA base specification PICMG-3.0 Revision-3.0
  - AdvancedTCA base extensions specification PICMG-3.7 Revision-1.0 section 5 for cooling aspects
- Intel specification: IPMI v2.0
- EMC compliance: CISPR22 and CISPR24 Class A and IEC/EN 61000-6-3
- Safety standard: IEC/EN 60950-1 and CERN IS-23 and IS-41
- Ethernet standard: IEEE standard 802.3
- ROHS compliance: WEEE Directive 2012/19/EU
- CE compliance and related regulations

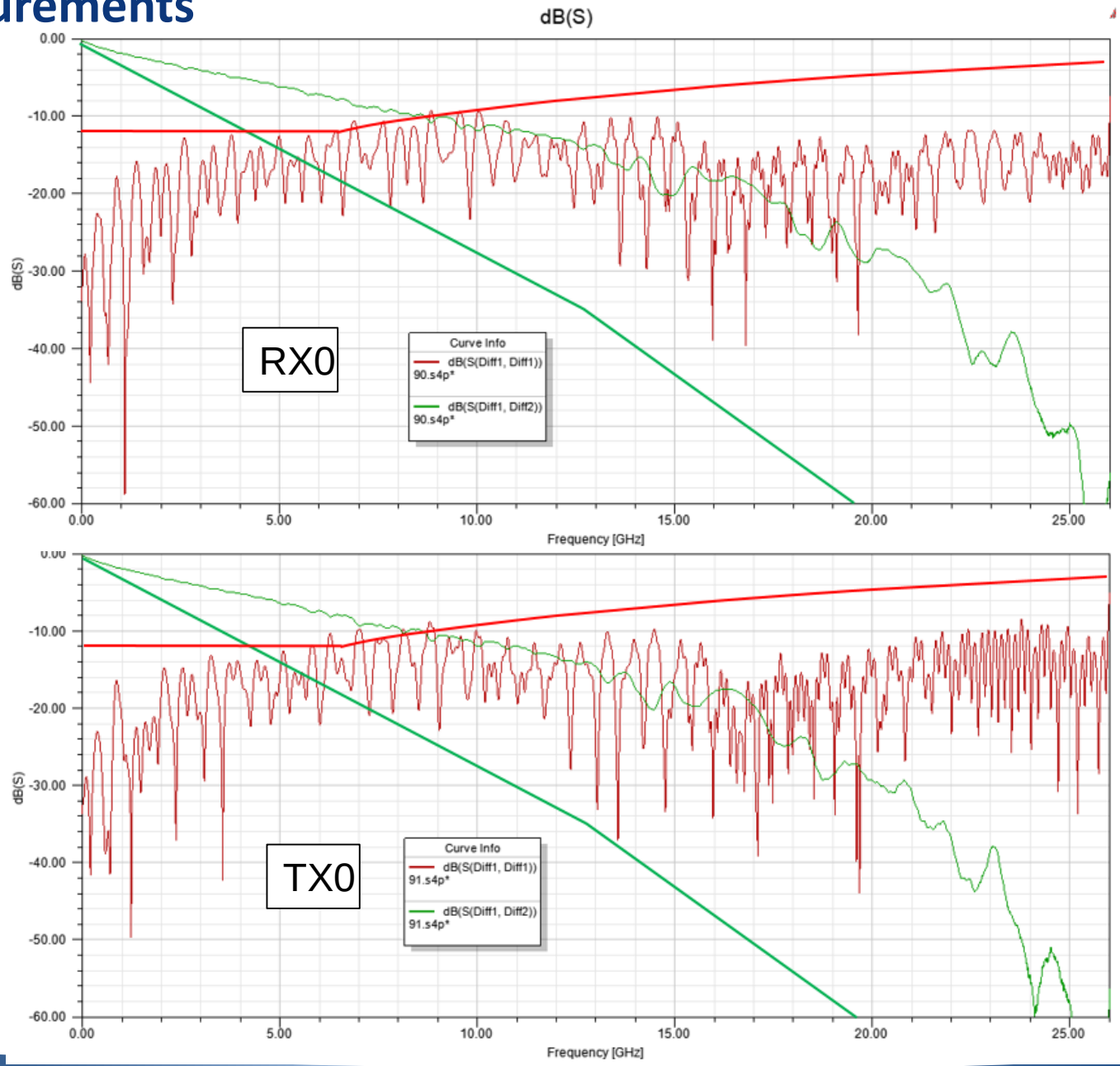
ATCA Schroff 100G backplane – VNA measurements

Measurements performed on the dual star 100G backplane for Schroff standard airflow shelves

- Measurements between adjacent slots
- Slot 1 to Slot 2

- Reference lines:

  IEEE 802.3 100Gbase-KR4



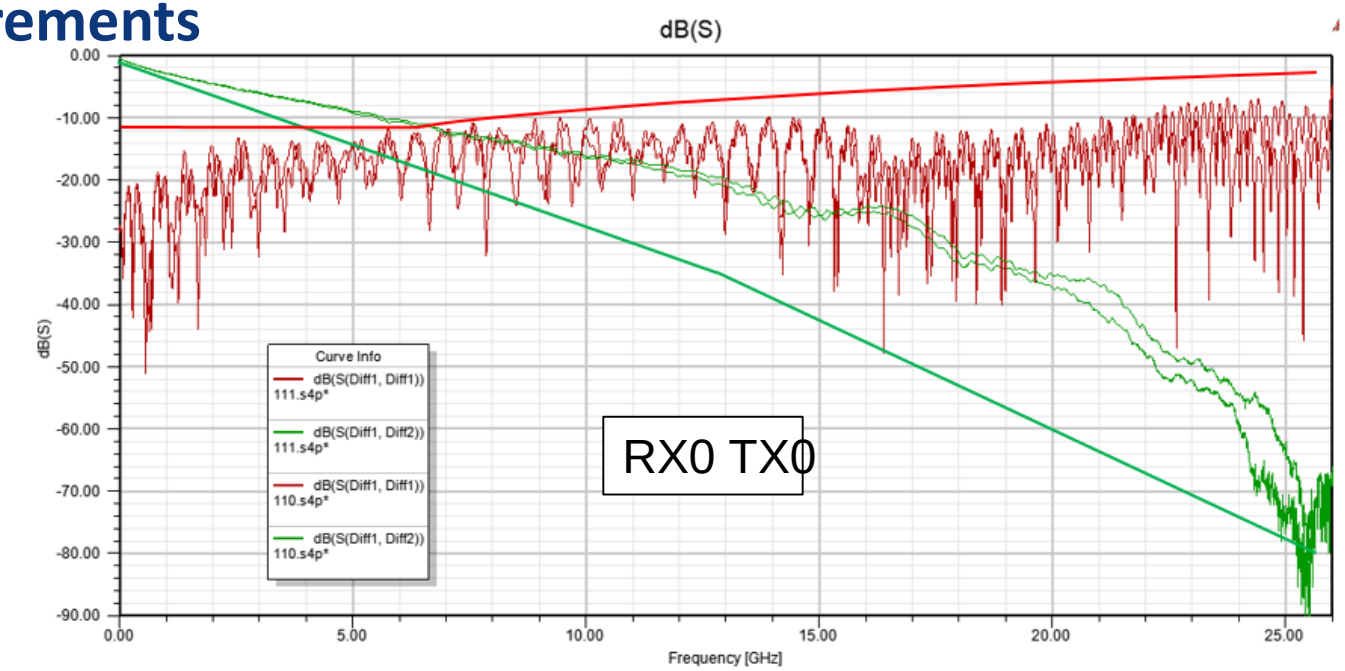
ATCA Schroff 100G backplane – VNA measurements

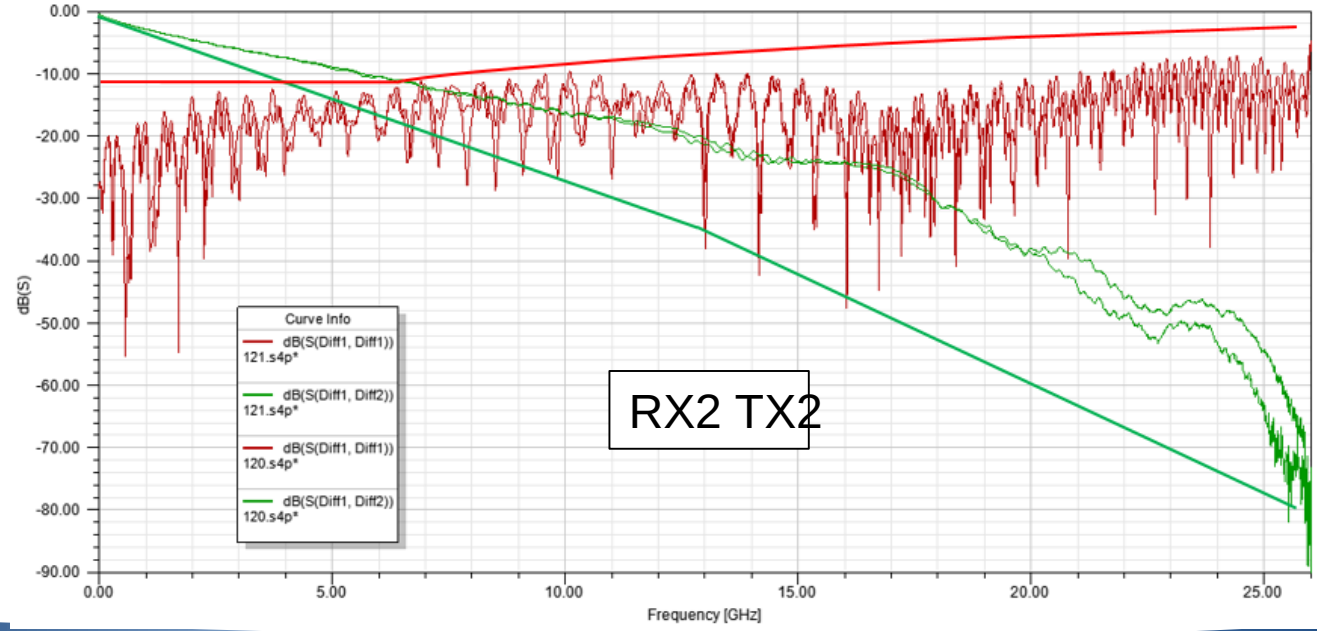
Measurements performed on the dual star 100G backplane for Schroff standard airflow shelves

- Measurements between distant slots
- Slot 1 to Slot 14

- Reference lines:

  IEEE 802.3 100Gbase-KR4



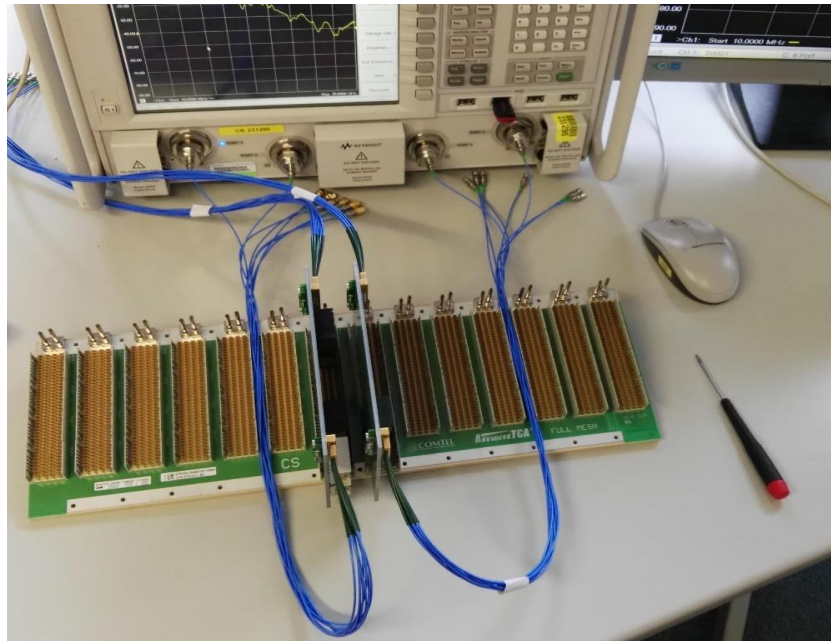


ATCA Schroff 100G backplane – VNA measurements

Backplane is compliant with IEEE 802.3 100Gbase-KR4

Few very minor reflection peaks on adjacent slots might be induced by the test setup (adapter cards)

In comparison the Comtel 100G backplane has slightly worst results



Measurements tools:

- *Keysight N5225A PNA 50 GHz*
- *Comtel ATCA adapter cards with coaxial cables*