TANCELL

5G GSM Mobile Integration

Technical Design & Architecture

Document owner	Tancell Engineering
Revision	1.0
Date	14 September 2026
Classification	Technical / Engineering Reference
Standards basis	3GPP 5GS / 5G NR; O-RAN architecture concepts

Important: This package is a Tancell engineering reference design. Test values marked 'sample' or 'simulated' are not third-party certification results and must be replaced by measured laboratory/site data before regulatory submission or customer acceptance.

Document scope

This document set defines a vendor-neutral 5G mobile integration baseline covering UE-to-RAN connectivity, radio unit integration, transport/fronthaul, synchronization, DC power, grounding, mechanical installation, commissioning, alarms and acceptance testing. It is intended for engineering, tender, installation and FAT/SAT preparation.

Reference standards

Primary architecture reference: 3GPP TS 23.501 (5G System architecture). Radio/base-station reference: 3GPP TS 38.104 / ETSI TS 138 104. Open RAN transport drawings use O-RAN split 7-2x concepts. Always validate band, power, emissions, EMC, electrical safety and local spectrum/licensing requirements for the target country.

1. 5G system architecture

End-to-end logical integration from user equipment to radio access, transport, 5G core and edge services.

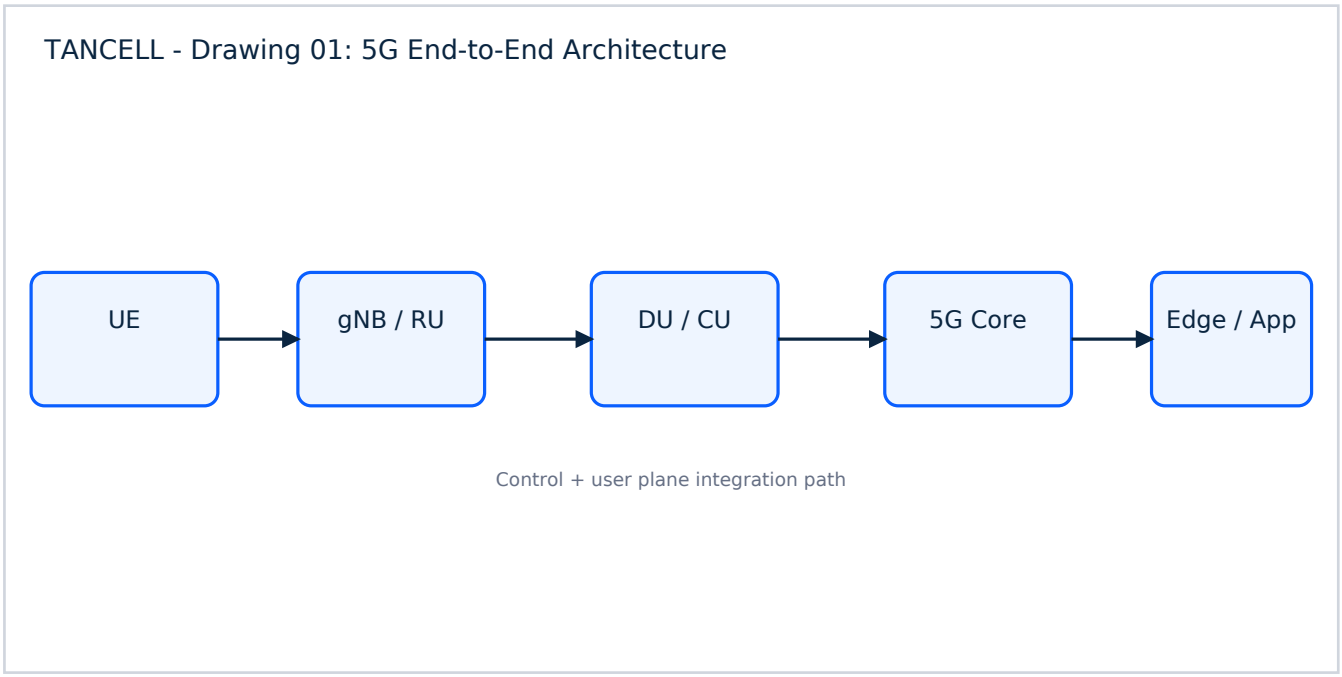

Figure 1. 5G End-to-End Architecture. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

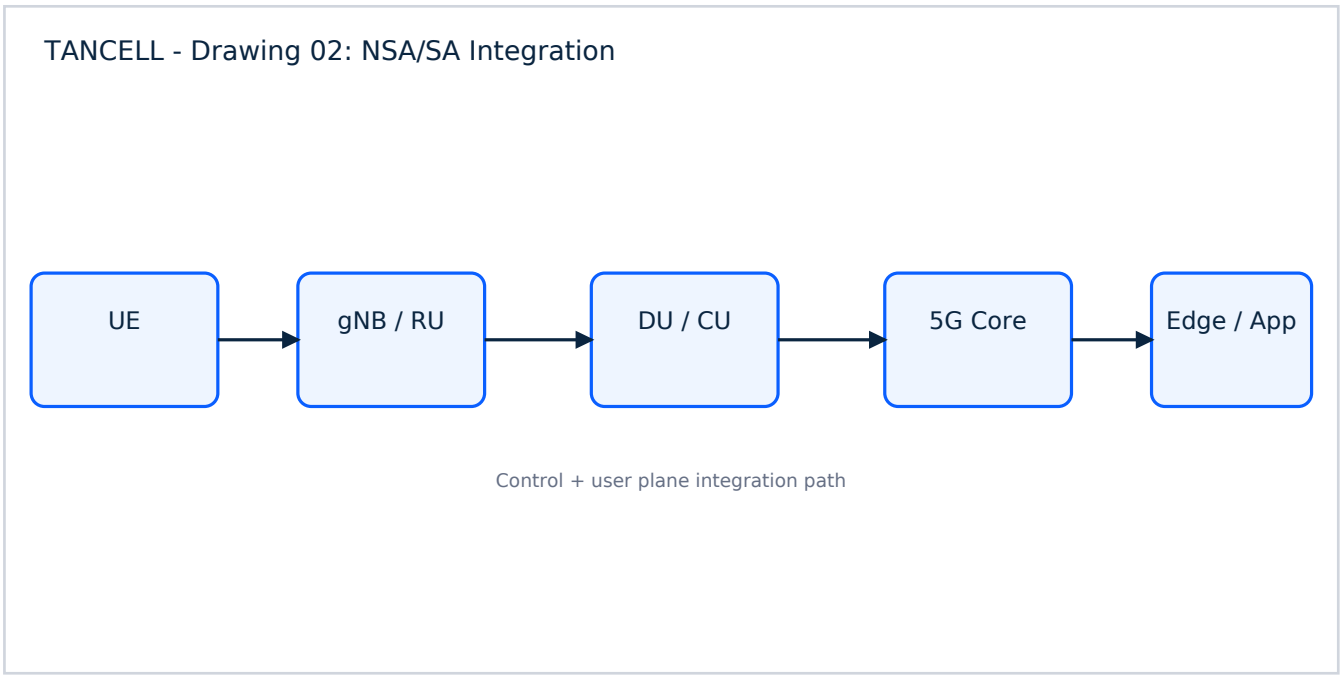

Figure 2. NSA/SA Integration. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

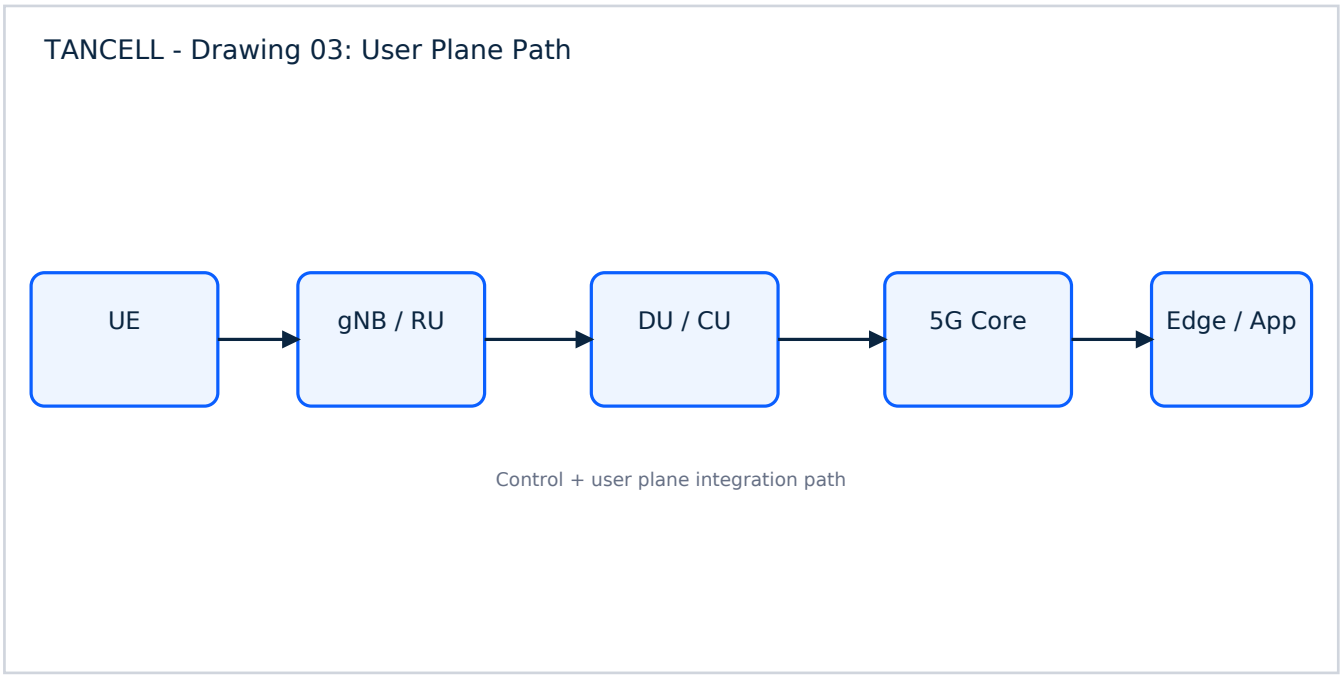

Figure 3. User Plane Path. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

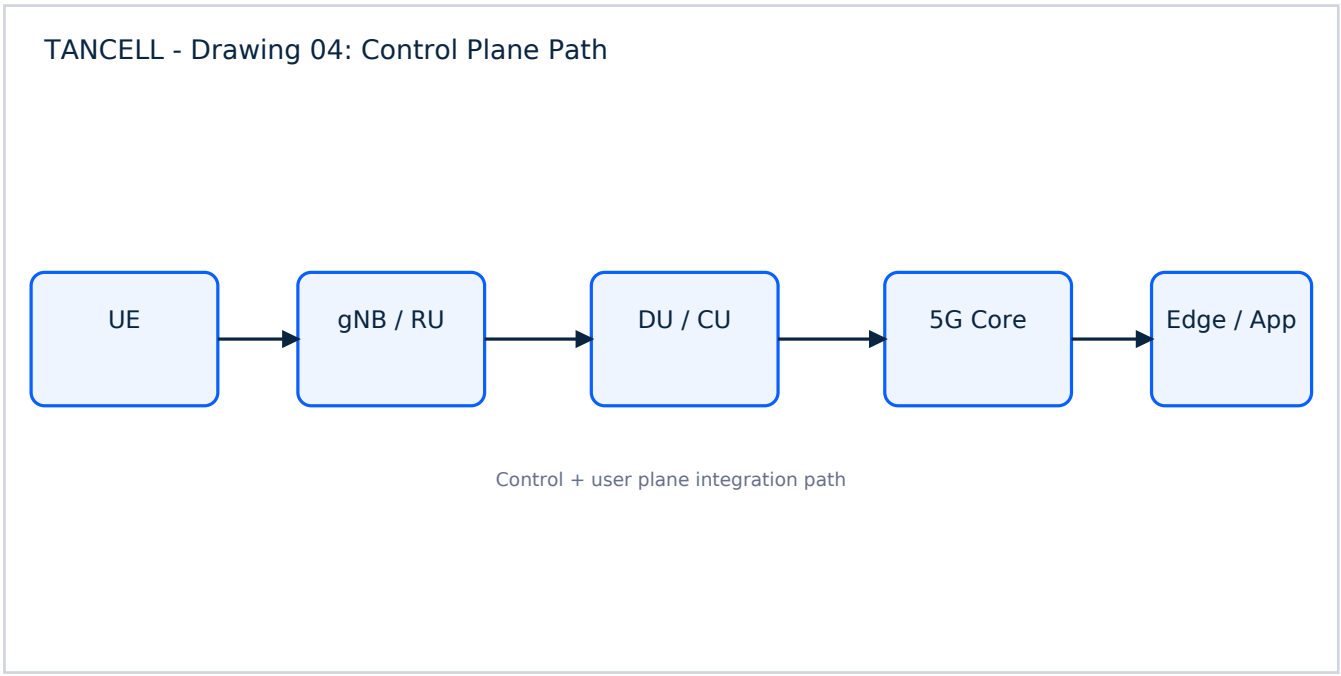

Figure 4. Control Plane Path. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

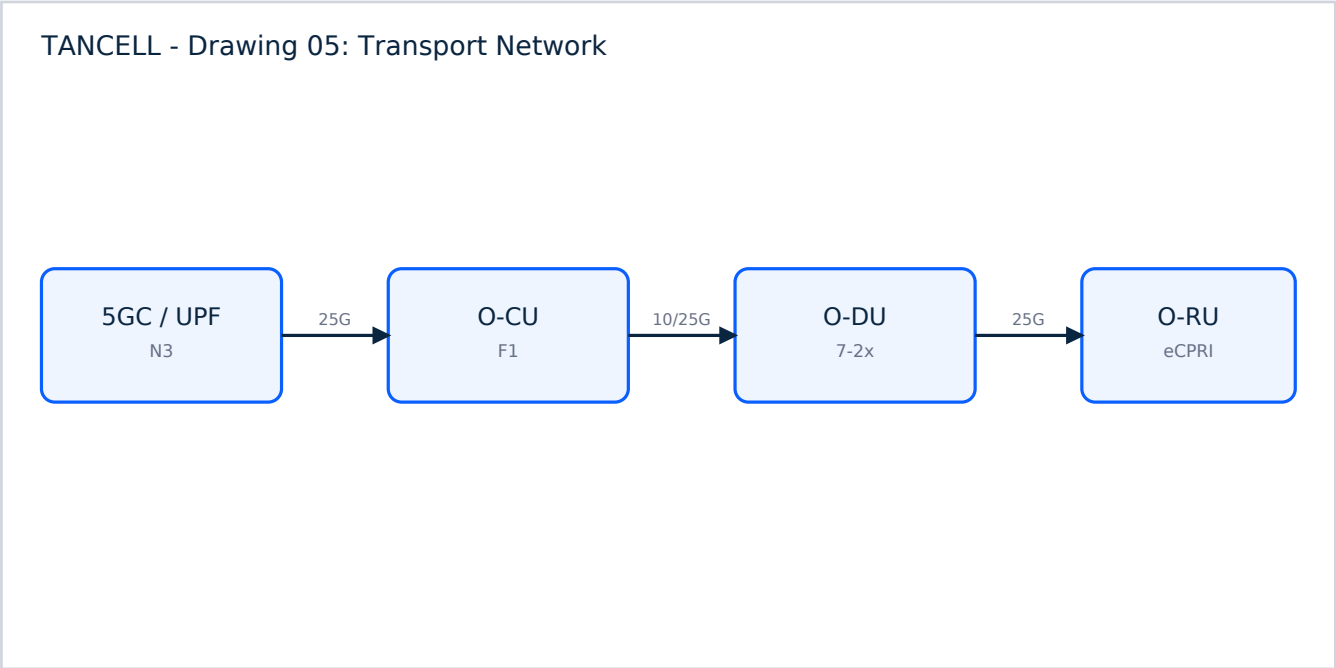

Figure 5. Transport Network. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

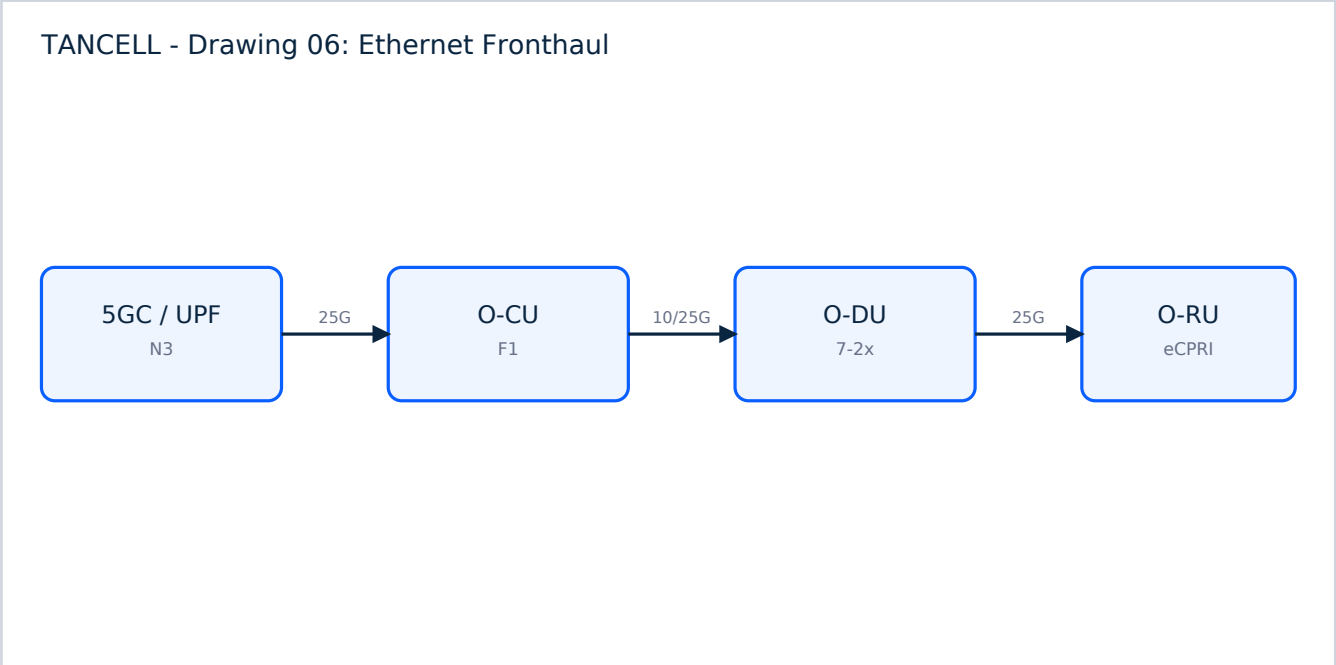

Figure 6. Ethernet Fronthaul. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

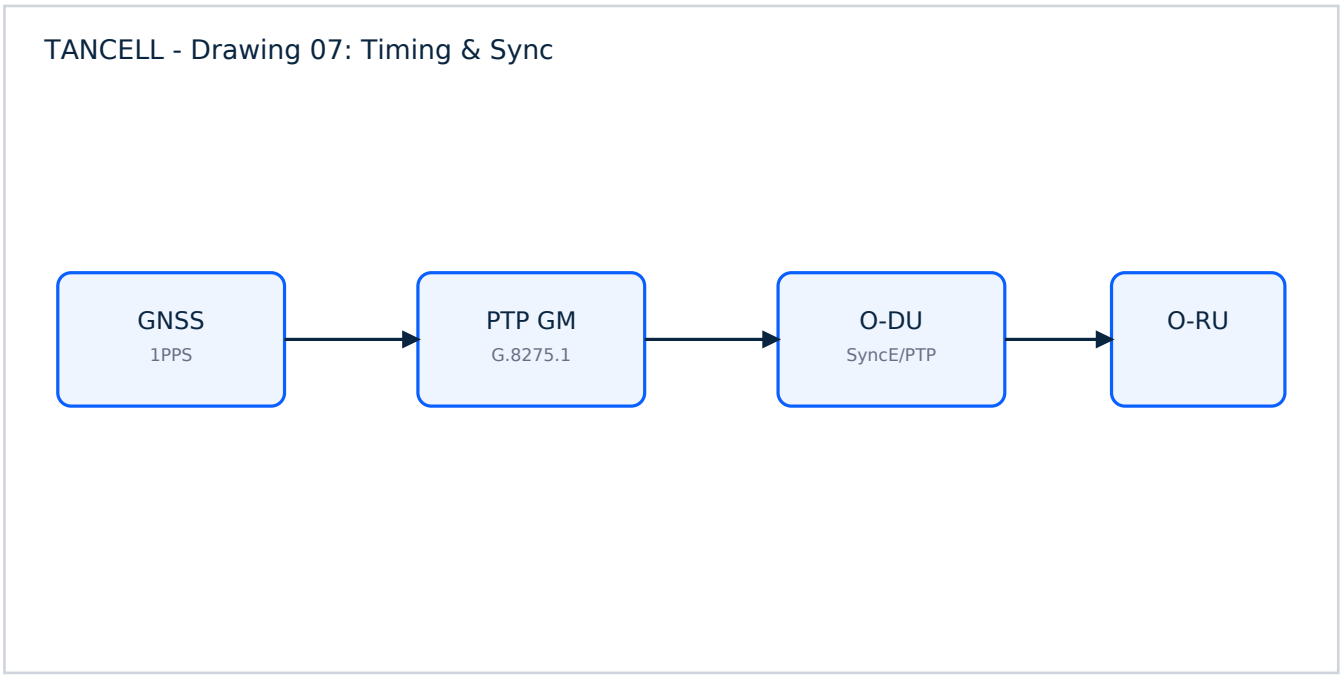

Figure 7. Timing & Sync. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

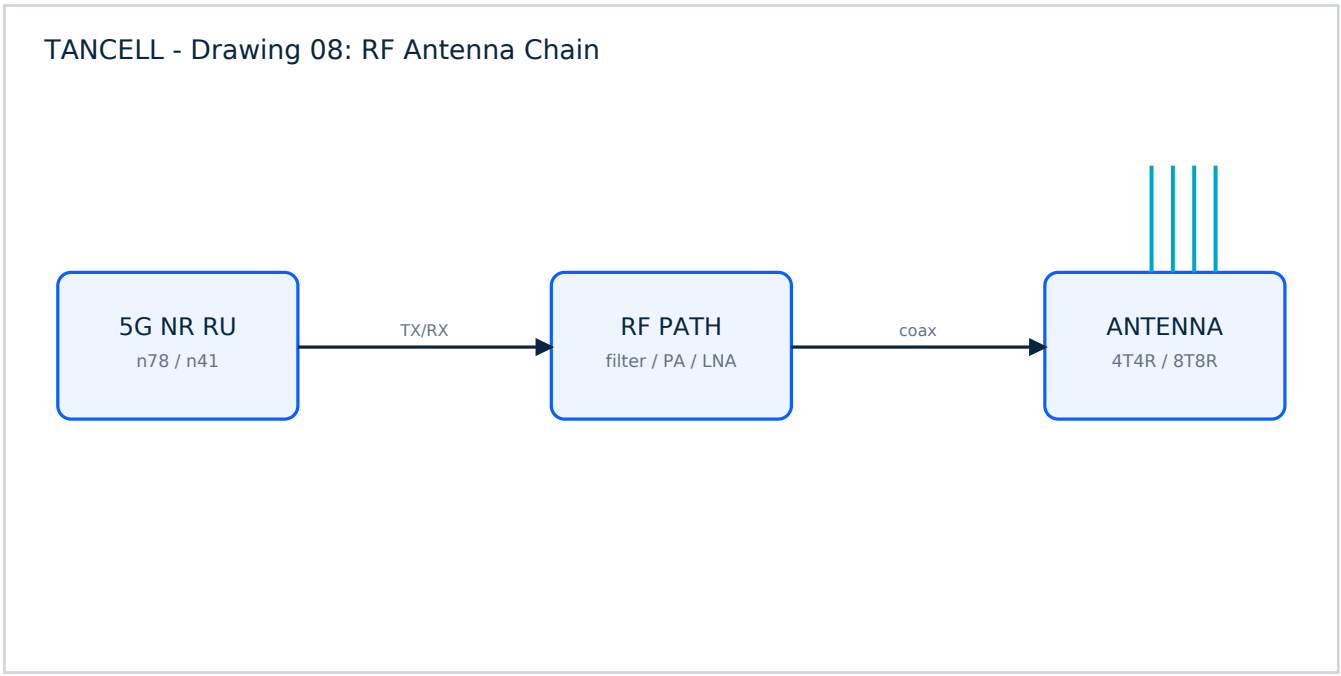

Figure 8. RF Antenna Chain. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

2. RAN and Open RAN integration

Reference decomposition for O-CU, O-DU and O-RU with fronthaul, synchronization and management paths.

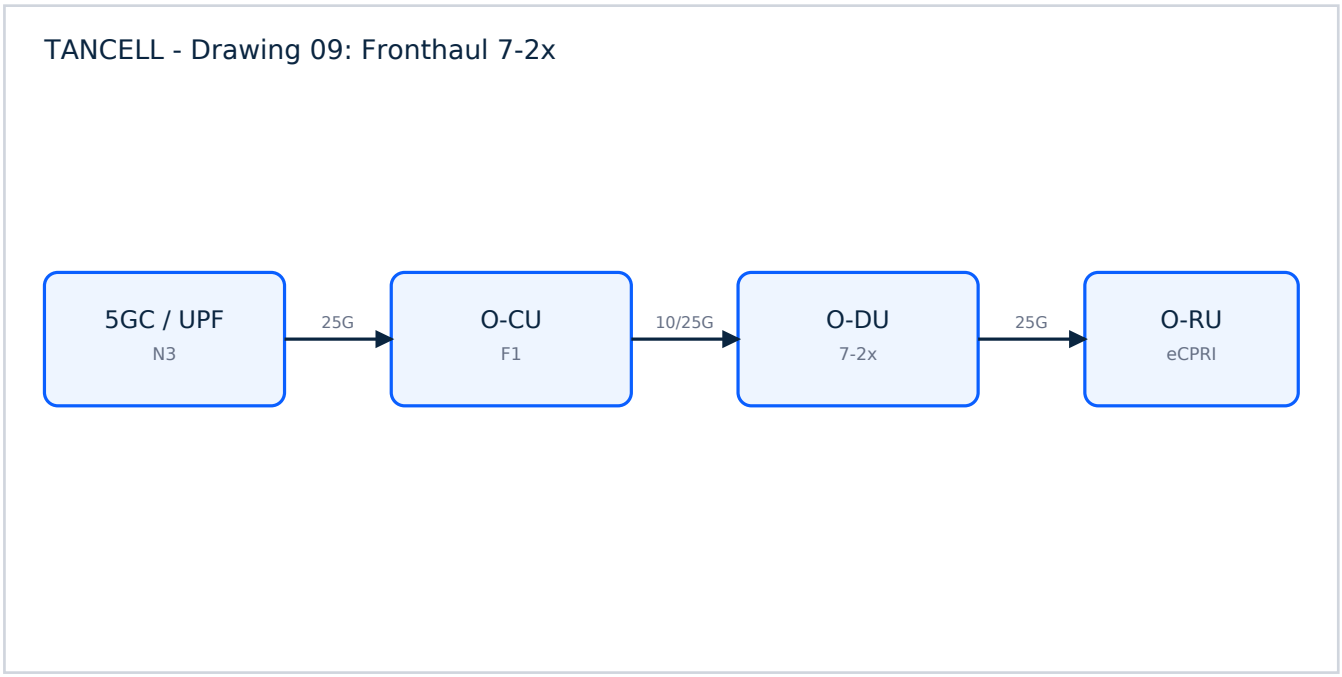

Figure 9. Fronthaul 7-2x. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

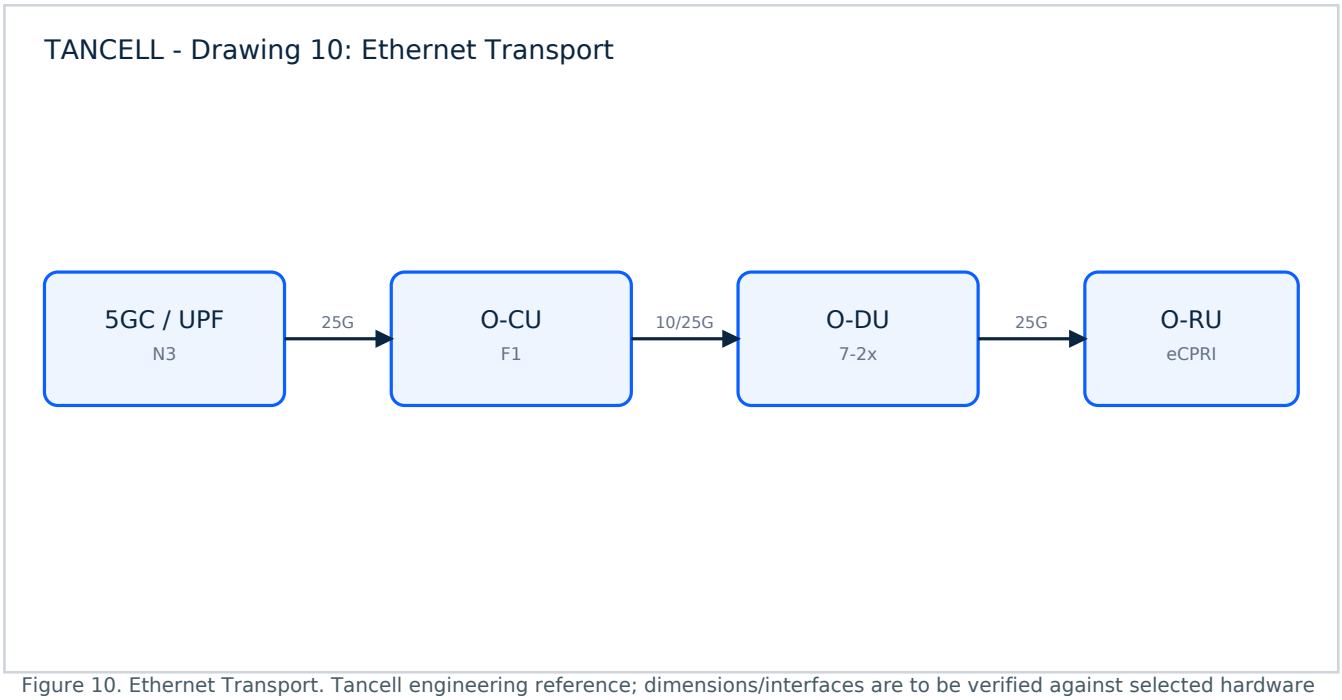

Figure 10. Ethernet Transport. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

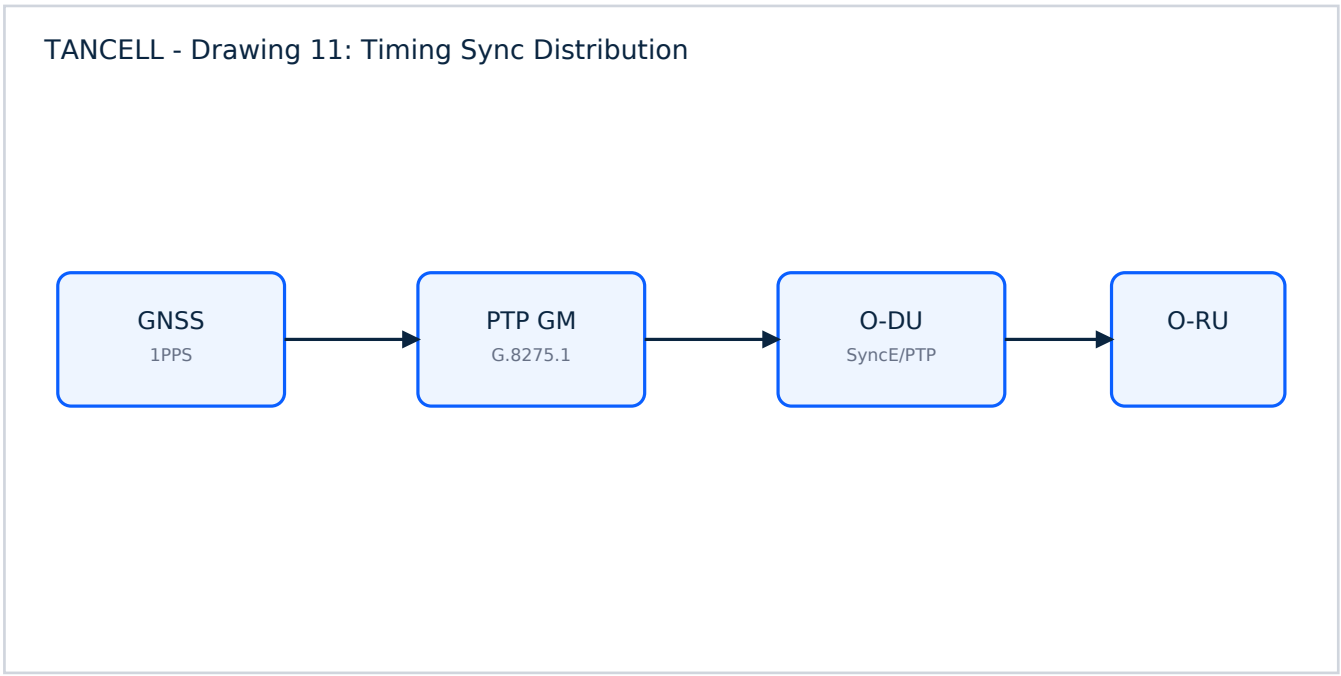

Figure 11. Timing Sync Distribution. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

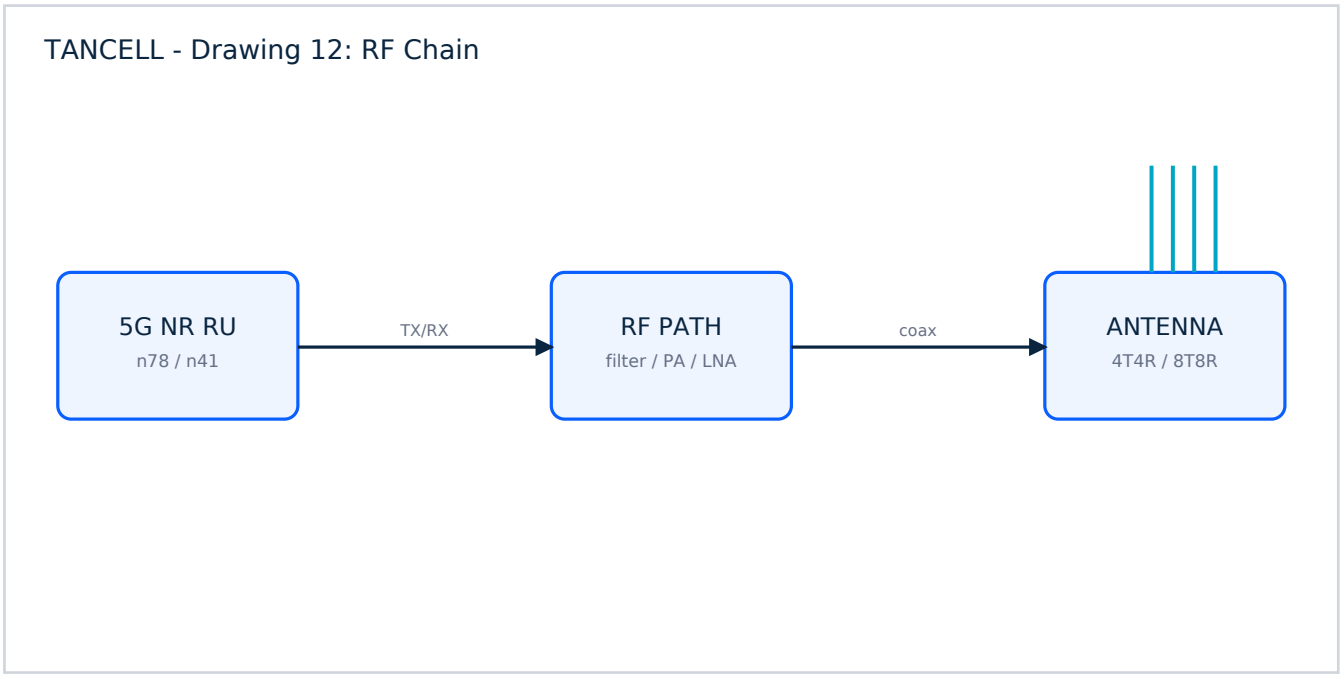

Figure 12. RF Chain. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

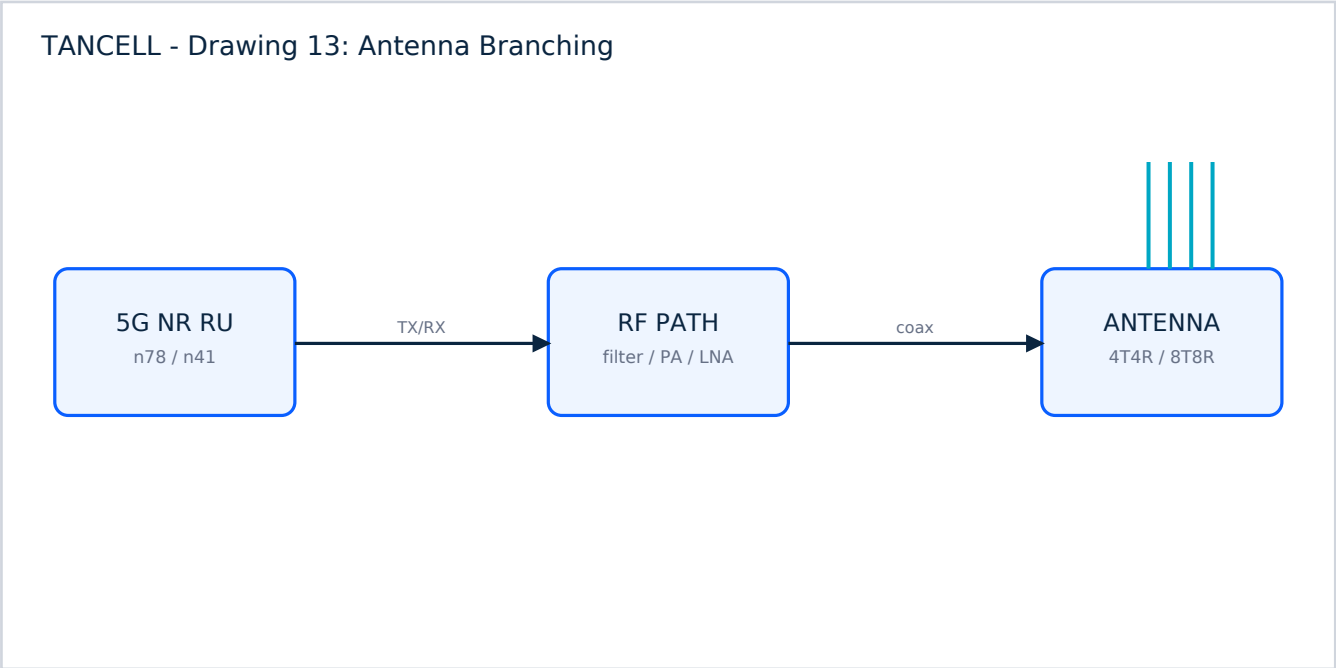

Figure 13. Antenna Branching. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

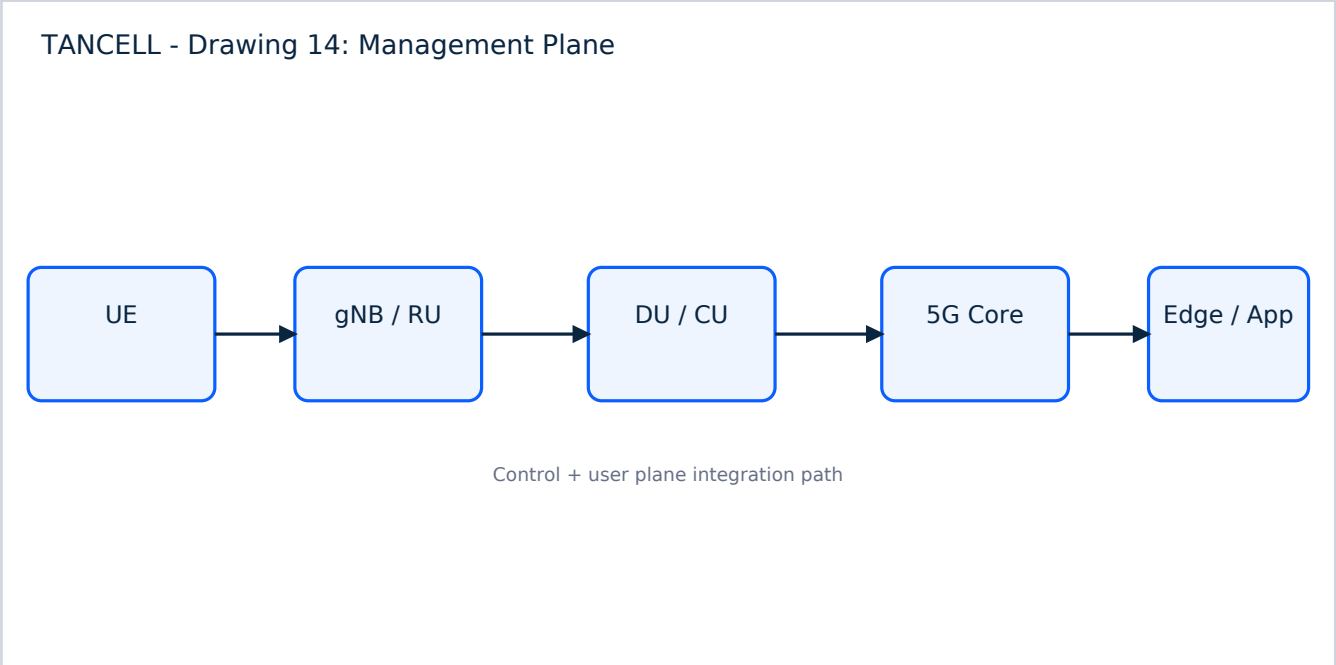

Figure 14. Management Plane. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

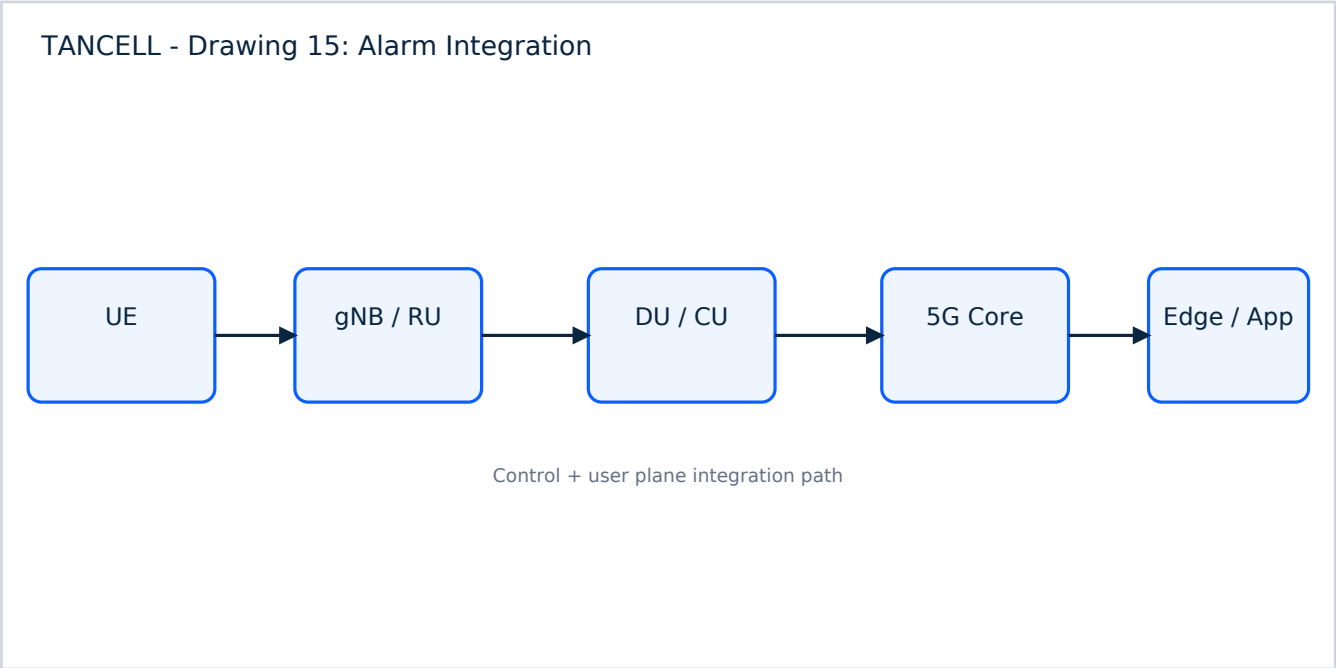

Figure 15. Alarm Integration. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

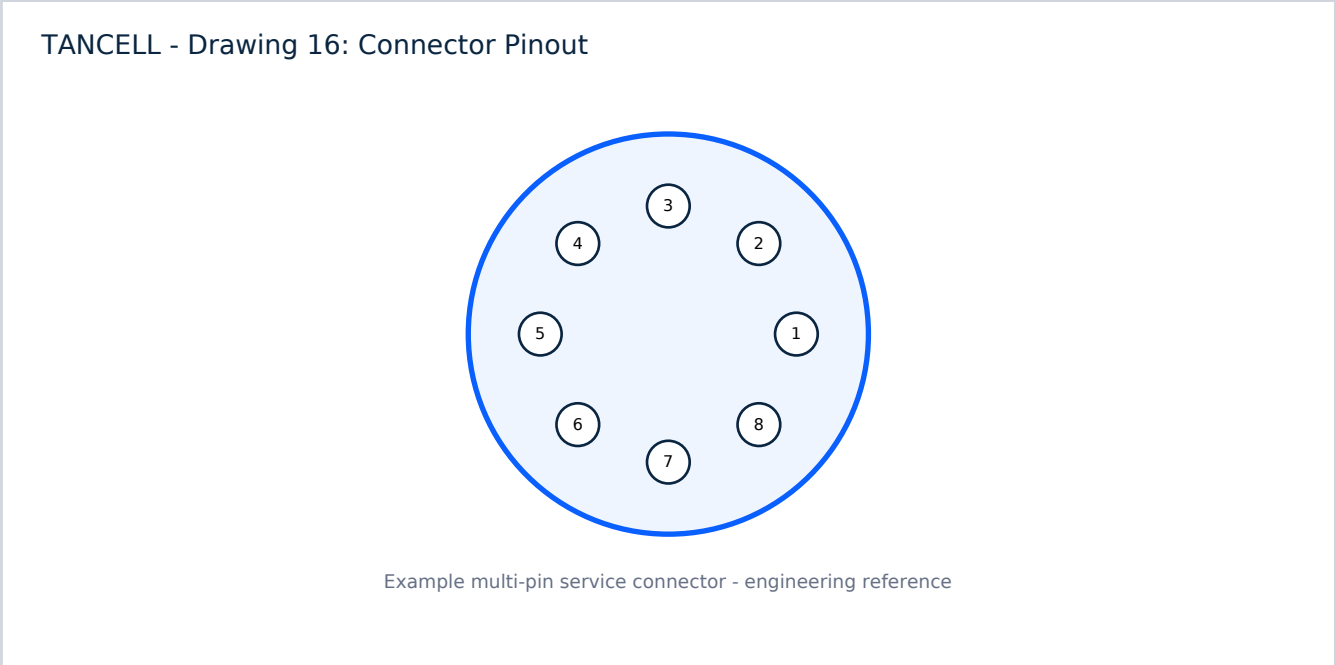

Figure 16. Connector Pinout. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

3. Power, grounding and protection

48 VDC distribution, surge protection, grounding, cabinet feeds and redundancy concepts.

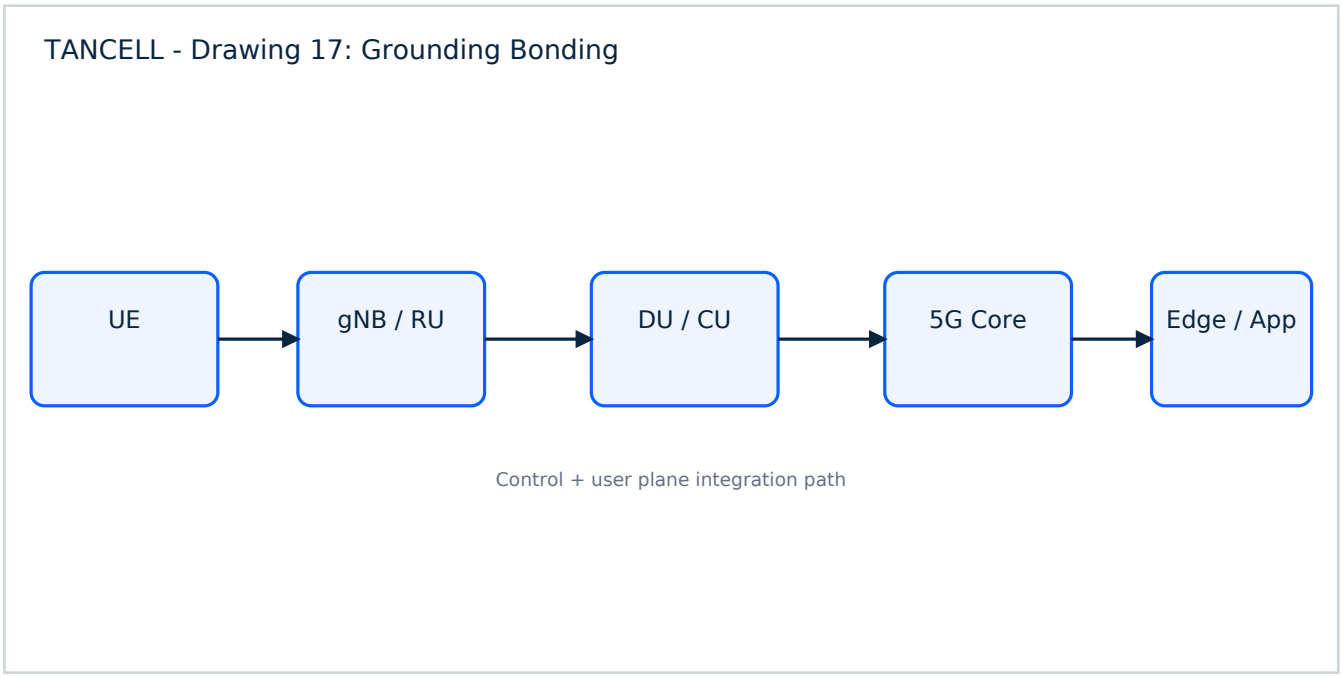

Figure 17. Grounding Bonding. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

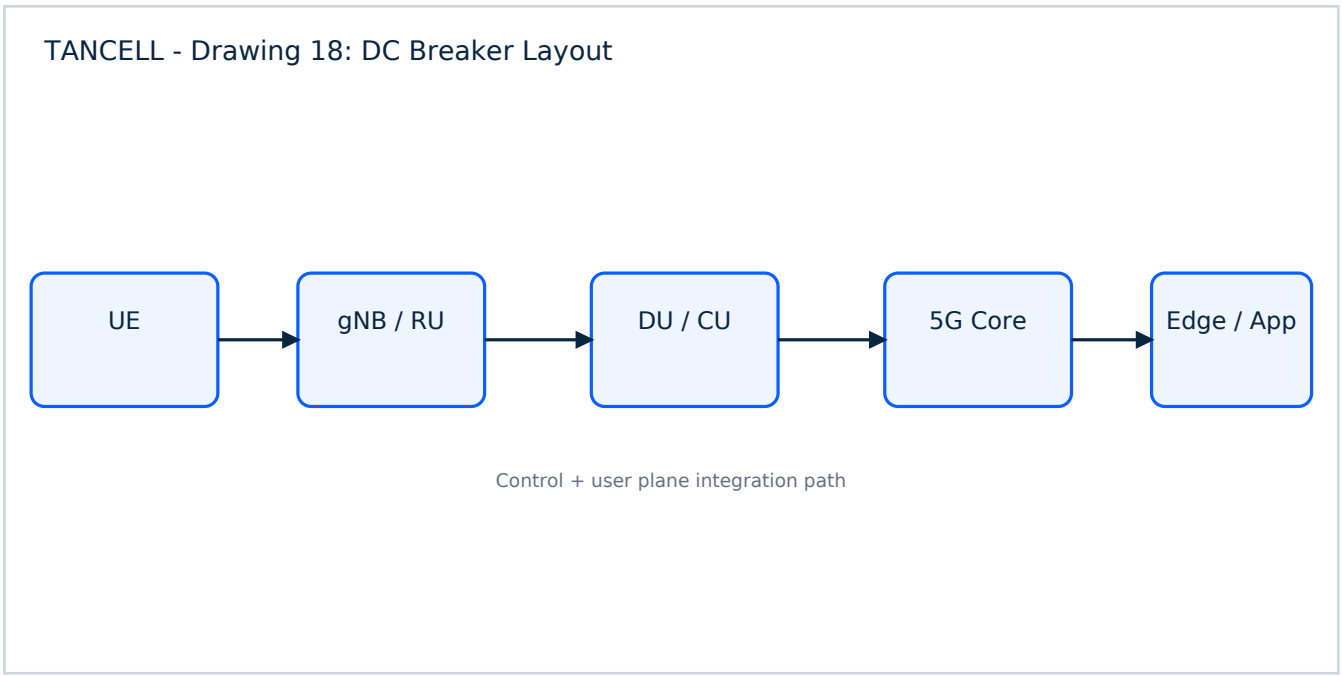

Figure 18. DC Breaker Layout. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

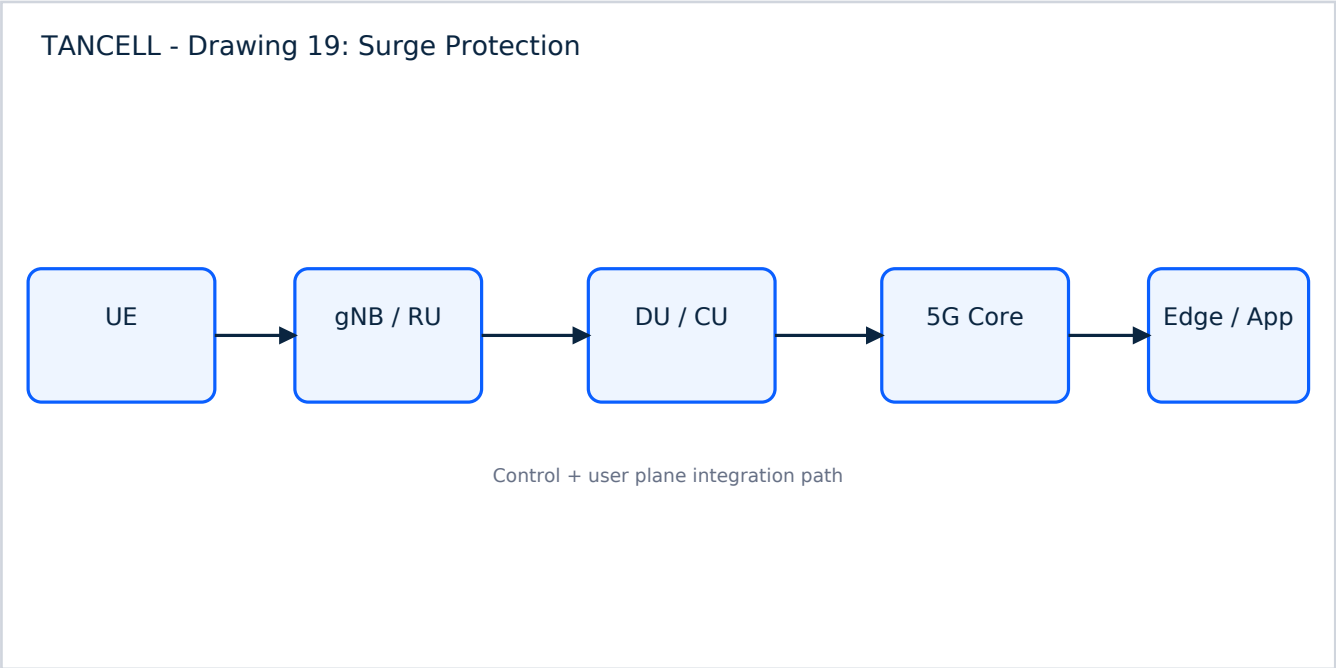

Figure 19. Surge Protection. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

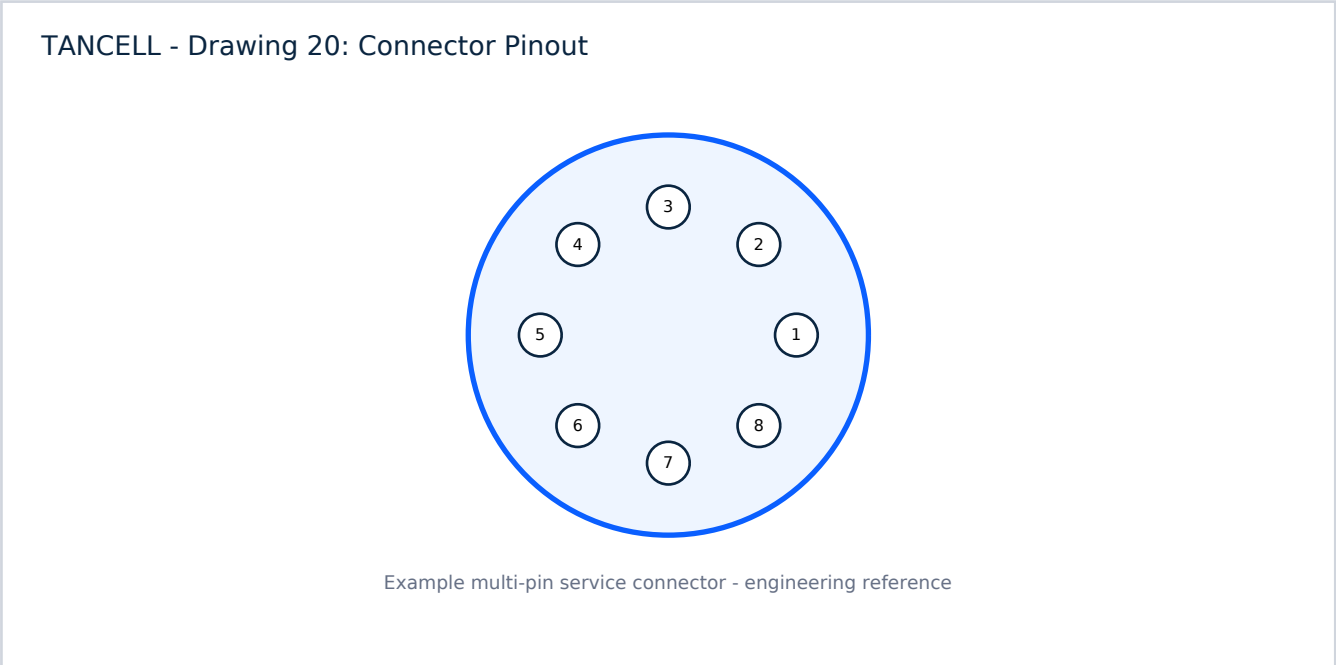

Figure 20. Connector Pinout. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

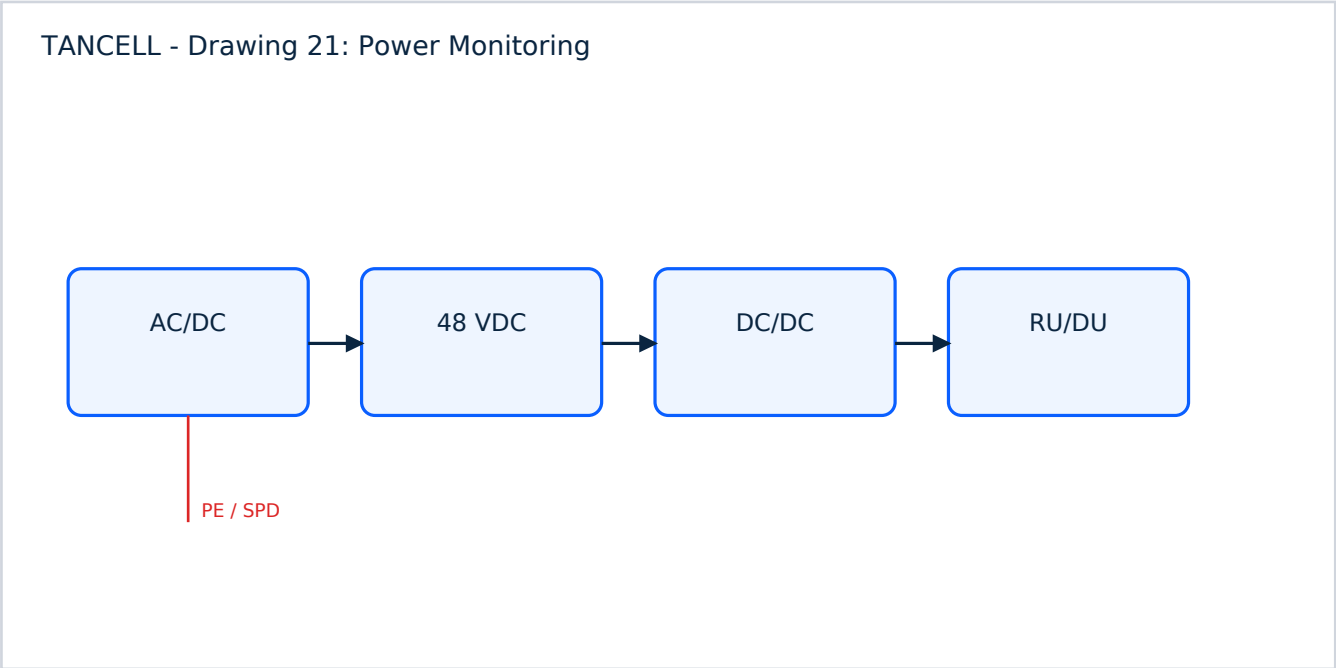

Figure 21. Power Monitoring. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

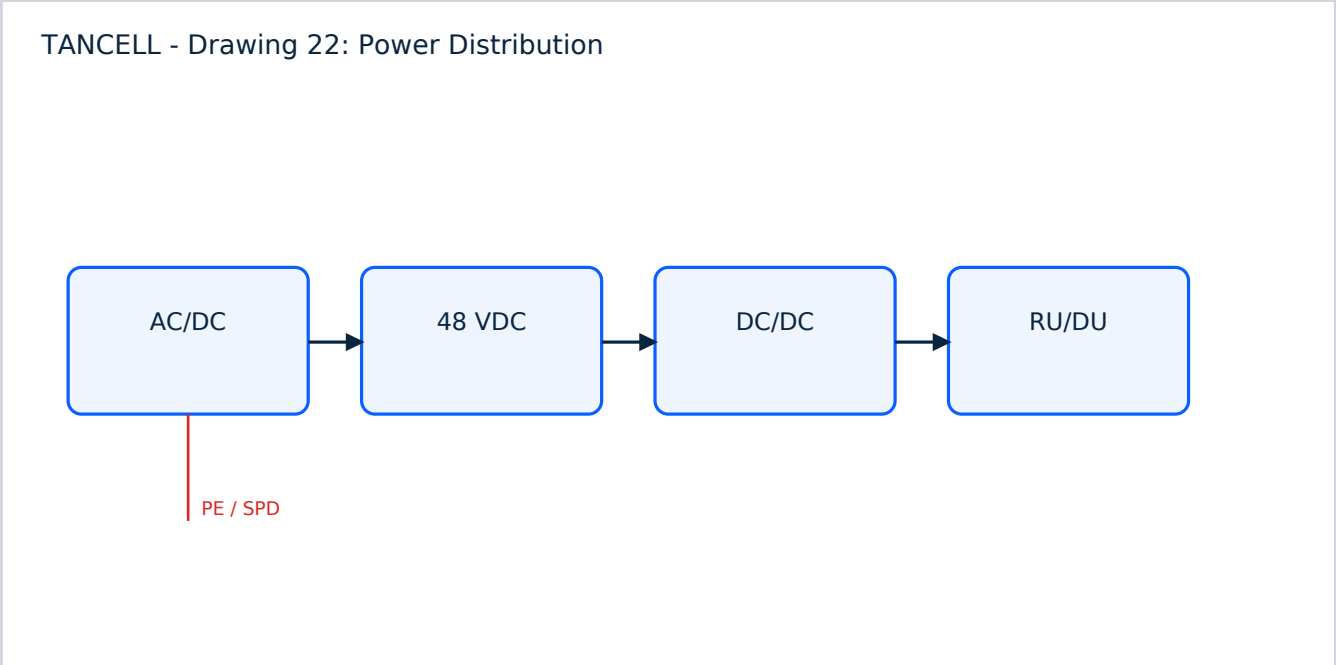

Figure 22. Power Distribution. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.

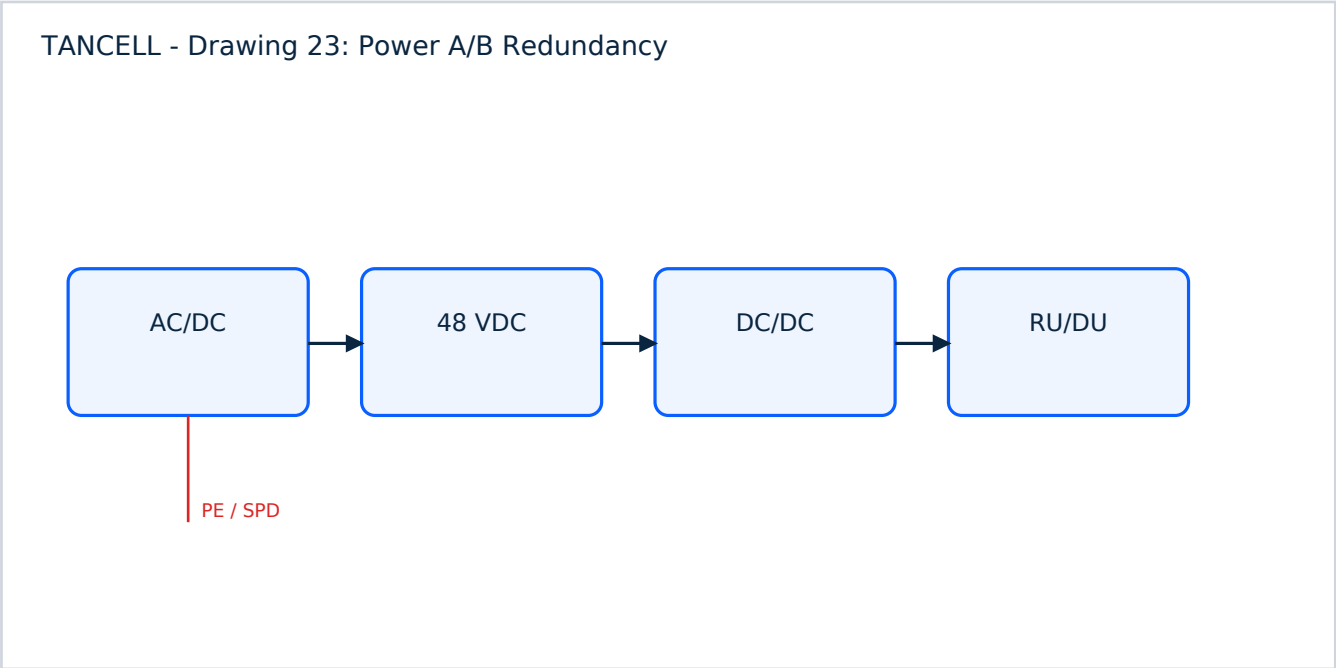

Figure 23. Power A/B Redundancy. Tancell engineering reference; dimensions/interfaces are to be verified against selected hardware BOM.