

## B – Remote Units

Remote Units distribute wireless signals throughout the area to be covered ; they can be installed up to 20km (12.4miles) from the Master Unit site.

Remote Units can be Single, Dual or Tri-band with different power classes: Very High, High, Medium and Low.



Single, Dual or Tri-band Very High, High and Medium Power Remote Unit



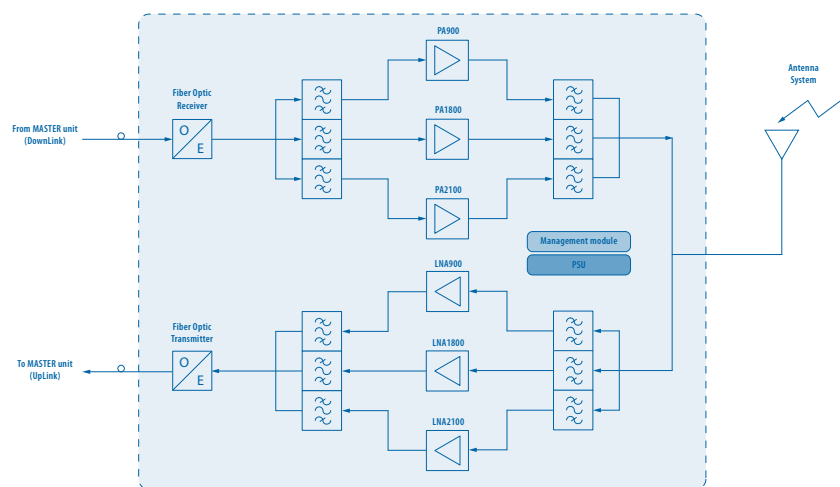
Single, Dual or Tri-band Low Power Remote Unit

Remote Units are equipped with the Fiber Optic Receiver and Transmitter module (for Optical to RF and RF to Optical conversion) power amplifiers and filtering.

A single Master Unit can drive up to 144 Remote Units. Various network structures can be supported by the Master Unit: the Remote Units of the same Optical System can be deployed with a point-to-point connection (star-configuration - using one fiber optic per Remote Unit) or with cascading of up to 5 Remote Units using a single fibre and optimized optical couplers.

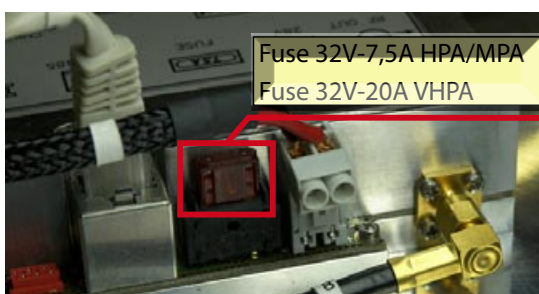
The following figure shows the Tri-band Remote Unit block diagram: in down-link the optical signal from Master Unit is converted into an RF signal by the Fiber Optic Receiver module. RF signals, filtered by the triplexer, are amplified by Low, Medium, High or Very High Power amplifiers (Low, Medium, High or Very High Power Remote Units), filtered and transmitted through an antenna or a passive distribution system.

In up-link the RF signal is filtered by the triplexer. The three RF signals are amplified by Low-Noise Amplifiers, filtered and then converted into an optical signal by the Fiber Optic Transmitter module. The signal is transmitted via fiber optics to the Master Unit.

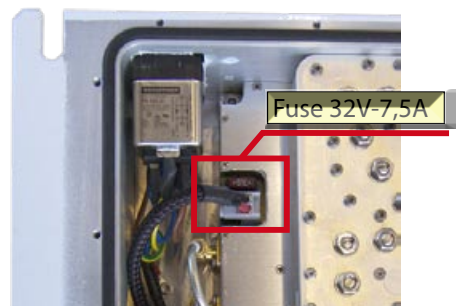


Example: Tri-band Remote Unit block diagram

**Please Note:** each final power amplifier is protected by a fuse.



Very High Power/High Power/Medium Power final amplifiers fuse position and electrical rating



Low Power final amplifier fuse position and electrical rating

The management module collects information relevant to the various modules. An RF modem allows data communication over fiber between Remote Unit and Master Unit.

**TRL7S8SC8A9S19AWAS 6-BAND LOW POWER REMOTE UNIT**

**TRL7S8SC8A9S19AWAS** 6-Band Low Power Remote Unit operating in the SMR700, SMR800 Commercial, AMPS850, SMR900, PCS1900 and AWS1721 bands, belongs to TEKO TELECOM Optical System, the most advanced cost-effective flexible Multi-Band and Multi-Operator solution for cellular coverage and capacity distribution.

TEKO TELECOM Low Power Remote Units have been expressly conceived for high quality of service and easy set-up:

- Automatic Gain Control (AGC) on the optical link with the Master Unit, for constant gain independently from optical losses;
- Linear Power Amplifiers expressly designed for IMD reduction over the entire bandwidth;
- Automatic Level Control (ALC) in the UL path independent for each band, for maximum quality of service;
- RF Antenna Combiners expressly designed for Multi-Operator functioning, providing high insulation and low passive intermodulation (PIM);
- Wavelength Division Multiplexing (WDM) for Tx/Rx communications with the Master Unit over the same optical fibre;

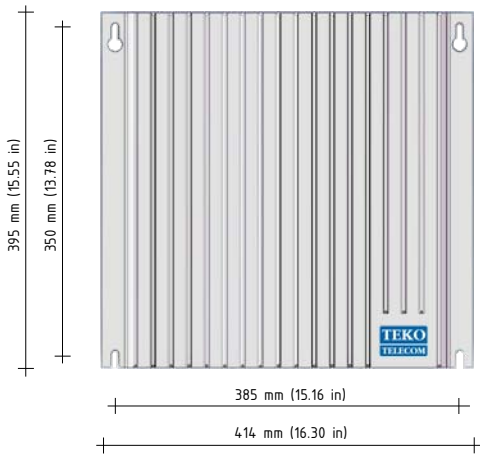
- Point-to-point and cascade connection with the Master Unit, for maximum flexibility of installation;
- Optical remote link up to 20 km (12.4 miles);
- New and innovative mechanical design, for easy installation and professional visual impact;
- Optional kit providing IP66 protection degree, for installation in harsh environments.

TEKO TELECOM Remote Units are available in a wide range of different executions as for:

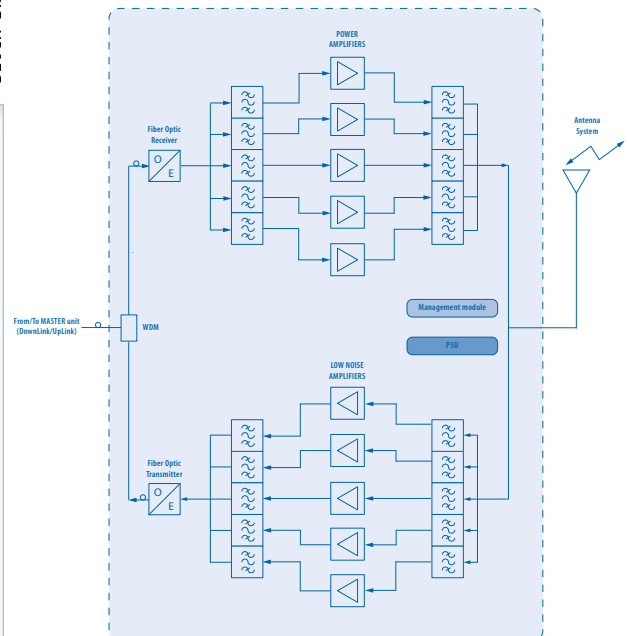
- Single-Band – Multi-Band,
- Operating frequencies from 380 to 2700MHz, complying with all the most important international standards for Mobile Communications and Public Safety,
- Low – Medium – High – Very High Power classes.

They represent the ideal solution for cellular coverage extension and capacity distribution in any indoor application, campuses, long tunnels as well as in several outdoor scenarios.

REMOTE UNIT DRILLING TEMPLATE



REMOTE UNIT BLOCK DIAGRAM



TRL7S8SC8A9S19AWAS 6-BAND LOW POWER REMOTE UNIT

SYSTEM SPECIFICATIONS		SMR700	SMR800(*)+AMPS	SMR900	PCS	AWS	
6-BAND MULTI-OPERATOR OPTICAL SYSTEM WITH SMR700/SMR800 Commercial/AMPS/SMR900/PCS/AWS LOW POWER REMOTE UNIT	Uplink operating frequency band	698-716MHz 776-787MHz	817-848.5MHz	896.5-902MHz	1850 ÷ 1915 MHz	1710 ÷ 1755 MHz	
	Downlink operating frequency band	728-757MHz	862-893.5MHz	935.5-941MHz	1930 ÷ 1995 MHz	2110 ÷ 2155 MHz	
	Downlink Output Power GSM/TDMA (**) / CDMA (**)	29dBm (1 carrier)	29dBm (1 carrier) <sup>o</sup>	29dBm (1 carrier)	29dBm (1 carrier)	29dBm (1 carrier)	29dBm (1 carrier)
		23dBm (4 carriers)	23dBm (4 carriers) <sup>o</sup>	23dBm (4 carriers)	23dBm (4 carriers)	23dBm (4 carriers)	23dBm (4 carriers)
		17dBm (16 carriers)	17dBm (16 carriers) <sup>o</sup>	17dBm (16 carriers)	17dBm (16 carriers)	17dBm (16 carriers)	17dBm (16 carriers)
	Downlink Output Power WCDMA (***) / LTE (****)	29dBm (1 carrier)	29dBm (1 carrier) <sup>o</sup>	29dBm (1 carrier)	29dBm (1 carrier)	29dBm (1 carrier)	29dBm (1 carrier)
		26dBm (2 carriers)	26dBm (2 carriers) <sup>o</sup>	26dBm (2 carriers)	26dBm (2 carriers)	26dBm (2 carriers)	26dBm (2 carriers)
		23dBm (4 carriers)	23dBm (4 carriers) <sup>o</sup>	23dBm (4 carriers)	23dBm (4 carriers)	23dBm (4 carriers)	23dBm (4 carriers)
	Spurious emissions and intermodulation products		< -13 dBm (in the frequency band 9 kHz ÷ 12.75 GHz)				
	UL setting 1 (0 dB digital attenuation)	Noise Figure	6 dB	6 dB	6 dB °°	5.5 dB	5 dB
		IIP3	-17 dBm	-17 dBm	-17 dBm	-17 dBm	-17 dBm
	UL setting 2 (5 dB digital attenuation)	Noise Figure	7 dB	7 dB	7 dB °°	6.5 dB	6 dB
		IIP3	-12 dBm	-12 dBm	-12 dBm	-12 dBm	-12 dBm
	UL setting 3 (10 dB digital attenuation)	Noise Figure	10.5 dB	10.5 dB	10.5 dB °°	10 dB	9.5 dB
		IIP3	-7 dBm	-7 dBm	-7 dBm	-7 dBm	-7 dBm
UL setting 4 (15 dB digital attenuation)	Noise Figure	15 dB	15 dB	15 dB °°	14.5 dB	14 dB	
	IIP3	-3 dBm	-3 dBm	-3 dBm	-3 dBm	-3 dBm	
Downlink RF gain, in Master Unit Tx		34 dB	34 dB	34 dB	34 dB	34 dB	
Uplink RF gain, out Master Unit Rx		4.7 dB	4.7 dB	4.7 dB	4.7 dB	4.7 dB	
Pass band ripple		± 1.5 dB	± 2 dB	± 1.5 dB	± 1.5 dB	± 1.5 dB	
Total processing delay (each path)/1m fiber		0.5 µs					

6-BAND LOW POWER REMOTE UNIT TRL7S8SC8A9S19AWAS	Optical output power	6dBm
	Optical connectors	SC-APC
	Fibre type	Single mode SMR 9/125
	Optical Link Budget	10 dB (AGC)
	Nominal Optical Input Power	+6 dBm up to -4 dBm
	RF connector	N (f)
	RF return loss	13dB
	Operating Wavelength	1550 nm ± 20 nm
	Operating temperature range	-20°C up to +55°C (-4°F up to +131°F)
	Cooling	Passive (natural convection)
	Power supply	85÷264Vac (50-60Hz) (/AC version); -72 ÷ -36Vdc (/48 version)
	Power consumption	150 W
	Dimensions	approx 414 x 395 x 144 mm (24.41 x 16.34 x 10.24 in) (max volume - heat sinks, handles and connectors included)
	Weight	approx 19 Kg (41.9lbs)
	Degree of protection	IP32 (box) IP66 (with optional protection kit)

SYSTEM SUPERVISION AND CONTROL	
Commands	RF on/off · RF attenuation on each DL and UL path · 4 external control ports
Supervision and alarms	Summary · Power Supply · Optical UL and DL failure · RF UL and DL failure Temperature · 4 external alarm inputs - Composite output power
Remote Control	Signalling and supervision over fibre from Master Unit to Remote Unit and vice versa

All values are typical at 25°C (77°F) and 0 dBm received optical power unless otherwise specified. Downlink output power measured at antenna port.

(\*) Commercial portion of SMR800 band

(\*\*) Compliant with CDMA2000-3GPP2 specifications (C.S0051-0) and FCC regulations, 8.5dB PAR.

(\*\*\*) WCDMA carriers TM1-64DPCH 60% clipping, 8.5dB PAR, compliant with 3GPP specifications (TS 25.143) and FCC regulations.

(\*\*\*\*) Compliant with 3GPP specifications (TS 36.143) and FCC regulations, 8.5dB PAR.

° At band edges 891.5-893.5MHz 27dBm composite

°° At band edges 896.5-898.5MHz Noise Figure 2dB higher

Specifications subject to change without notice.

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