



High-speed railway line coverage

LONG CELL™ GSM/UMTS/GSM-R/LTE-R

Application

- High-speed train, highways coverage
- E-GSM / GSM-R / UMTS / LTE

Key Features

- Exclusive Patent
- Single cell of up to 40 km
- GSM 900, GSM-R, UMTS 900, LTE800 at the same time
- Only one optical fiber

Benefits

- QoS enhancement with less handover
- More services : voice + data
- Cost effective alternative to BTS

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To ensure GSM/GSM-R/UMTS/LTE QoS at high-speed

The coverage of the high-speed train and highways with BTS doesn't allow sufficient Quality of Service inboard. For sufficient power inboard, the cell width cannot exceed 5 km, and the handovers are very frequent because of the speed. The mobile phone calls are poor quality and cut unexpectedly.

The "Long Cell™ 800/900 GSM/GSM-R/UMTS/LTE" extends the cells with an exclusive patent. From a main BTS, through optical fiber, up to 7 repeaters are installed along the rail- highway, to create a single cell up to 40 km length with a constant power level. Less handovers and the best power level inboard, the QoS is incredibly improved.

Adapted for standards E-GSM / GSM-R / GPRS / UMTS / EDGE / LTE in the same time, high quality data and voice services are now available for the users, especially the business class.

The equipment can be monitored with the embedded WEB/SNMP server. Remote access is available through GPRS modem.

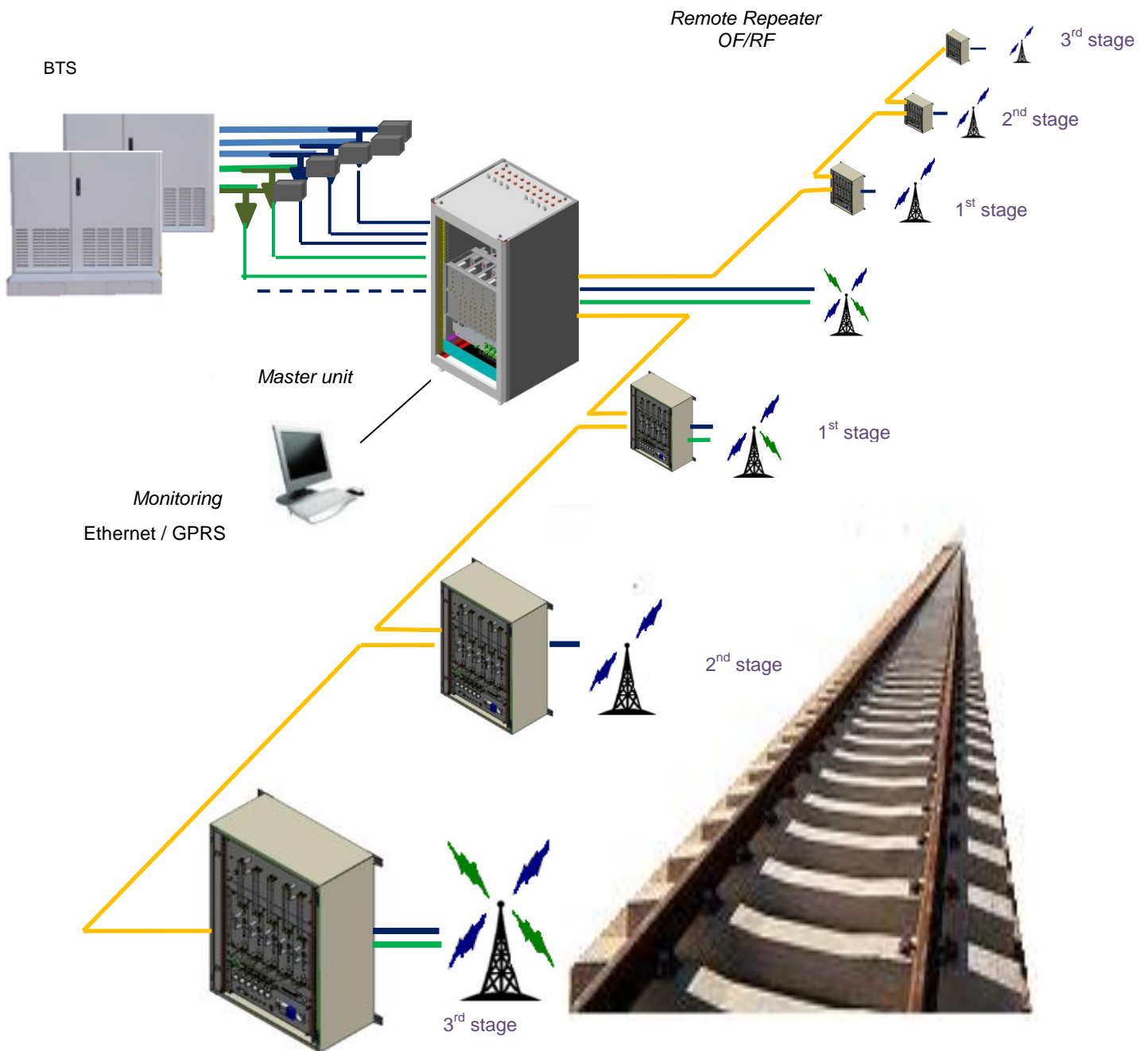




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Operation of GSM /GSM-R / UMTS / LTE Repeater RF-OF



High-speed railway line antennas

Village antennas

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Optical Master Unit RF Combiner



❖ RF Interface		800	900	2100
Frequency range		791~862 MHz	870~960 MHz	1710~1880
Number of RF I/O	<i>BTS access</i>	4 BTS access TX / RX		
	<i>Splitter access</i>	2 access : 1 input RX / 1 output TX		
Insertion loss		7.5 dB typ.		
VSWR		1.3 : 1		
Isolation		20 dB		
MTBF		260 000 h		
❖ Mechanical				
Dimensions		81 mm x 177 mm (4U) x 400 mm		
RF connectors		QMA female		

Optical Master Unit RF Splitter



❖ RF Interface

Frequency range

791~2690 MHz

Number of RF I/O

Combiner access

1 access RX
1 access TX

Splitter access

4 access RX
4 access TX

Insertion loss

6 dBm typ.

VSWR

1.3 : 1

Isolation

18 dB

MTBF

260 000 h

❖ Mechanical

Dimensions

81 mm × 133 mm (4U) × 400 mm

RF connectors

QMA female

Optical Master Unit RF-OF Transceiver



❖ RF Interface

Frequency range	300~2700 MHz
RF Input power	< 0 dBm ; -10 dBm typ.
RF Output power	< -15 dBm
VSWR	1.3 : 1
RF connector	QMA female

❖ Optical Interface

Wavelength	DL : 1310 nm UL : 1550 nm	DL : 1290 nm UL : 1530 nm
Optical output power	4 dBm ± 2 dB	
Output IP3	≥ +30 dBm	
Optical connector	E2000 APC	
Fiber Optic	SMF (G652 and G655)	
Number of optical outputs	1 per transceiver (DL + UL on the same fiber)	
MTBF	≥ 180 000 h	

❖ Mechanical and electrical

Dimensions (L x H x D)	35 mm x 133 (3U) x 100 mm
Weight	0.535 kg
Power consumption (for each transceiver module)	6 W
Maintenance	Plug & Play
Monitoring	Centralized to the Monitoring Module through a serial bus link

Optical Master Unit Monitoring Module



❖ Monitoring features

Protocols	HTTP, SNMPv2
Remote control	GPRS modem <i>SIM card M2M (Machine-to-Machine) mandatory</i>
Connectors	RJ45 Slot for SIM card M2M
❖ Mechanical and electrical	
Dimensions (L x H x D)	35 mm x 133 mm (3U) x 160 mm
Weight	0.615 kg
Power consumption	5 W
Maintenance	Plug & Play
MTBF	180 000 h

Optical Master Unit Power Supply Module



Dimensions (L x H x D)	50 mm x 133 mm (3U) x 160 mm
Weight	0.720 kg
Main power	230 VAC or 48 VDC
Maintenance	Plug & Play
MTBF	≥ 88 000 h



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Optical Master Unit Cabinet			
❖ Mechanical and electrical	22 U	36 U	42 U
Total Dimensions (L x H x D)	600 x 1118 x 600 mm	600 x 1740 x 600 mm	600 x 2007 x 600 mm
Rating class	IP20		
Environment specifications	Compliant ETS 300-019		

Optical Remote Unit Slot RF Repeater

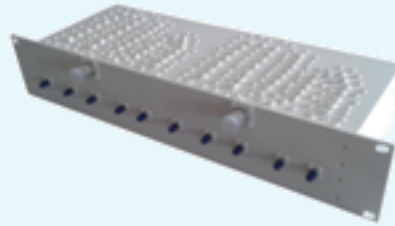


❖ RF Features		800	900	900-R	2100
Frequency range	Down-Link (TX)	791~821 MHz	925~960 MHz	921~925 MHz	2110~2170 MHz
	Up-Link (RX)	832~862 MHz	880~915 MHz	876~880 MHz	1920~1980 MHz
Nominal output power TX ⁽¹⁾	1 carrier 2 carriers 4 carriers		+39 dBm +36 dBm +33 dBm		
Noise factor			≤ 5 dB @ Gain max		
Ripple in bandwidth			≤ 2dB		
Downlink / uplink rejection			≥ 80dB		
Intermodulation			≤ -36 dBm		
Group delay			≤ 5 μs		
Delay time tuned adjustable by 1μs step			1 to 100μs		
RF Connector			QMA female		
❖ Mechanical Features					
MTBF			≥ 175 000 h		
Dimensions (L x H x D)			120 mm x 445 mm (10U) x 300 mm		
Weight			13.6 kg		
Monitoring		Centralized to the Monitoring Module through a serial bus link			

⁽¹⁾ for a PAR (Peak Average Ratio) ≤ 8.5 dBc.

Optical Remote Unit FO Diplexer				
❖ RF Features		800	900	2100
Frequency range	<i>Down-Link (TX)</i>	791~821 MHz	921~960 MHz	2110~2170 MHz
	<i>Up-Link (RX)</i>	832~862 MHz	876~915 MHz	1920~1980 MHz
Connector		QMA female		
❖ Optical Interface				
Wavelength		DL : 1310 nm UL : 15xx nm		
Optical connector		E2000 APC		
Fiber Optic		SMF (G652 and G655)		
MTBF		260 000 h		
❖ Mechanical				
Dimensions (L x H x D)		19" x 45 mm (1 U) x 300 mm		

MS/BS Multiplexer



❖ RF Features

		Standard	800	900	2100
Frequency range	<i>Down-Link (TX)</i>		791~821 MHz	925~960 MHz	2110~2170 MHz
	<i>Up-Link (RX)</i>		832~862 MHz	880~915 MHz	1920~1980 MHz
Insertion loss			1 dB		0.7 dB
Isolation			≥ 50 dB		
VSWR			1.39		
❖ Mechanical features					
Dimensions (L x H x D)			483 mm x 89 mm (2 U) x 300 mm		
Weight			12 kg		
Connectors	<i>To Antennas</i>		2x Nf (1x Nf for wideband + MIMO1, 1x Nf for MIMO2)		
	<i>To RF slots</i>		10x QMA female		
MTBF			≥ 262 000 h		

Optical Remote Unit
Power supply voltage



❖ **Electrical**

Voltage

230V ADC – 48V DC

Power consumption

135 W by High Power repeater

❖ **Interface**

Electrical connector

XK 12 up to 5 repeaters

❖ **Mechanical**

Dimensions

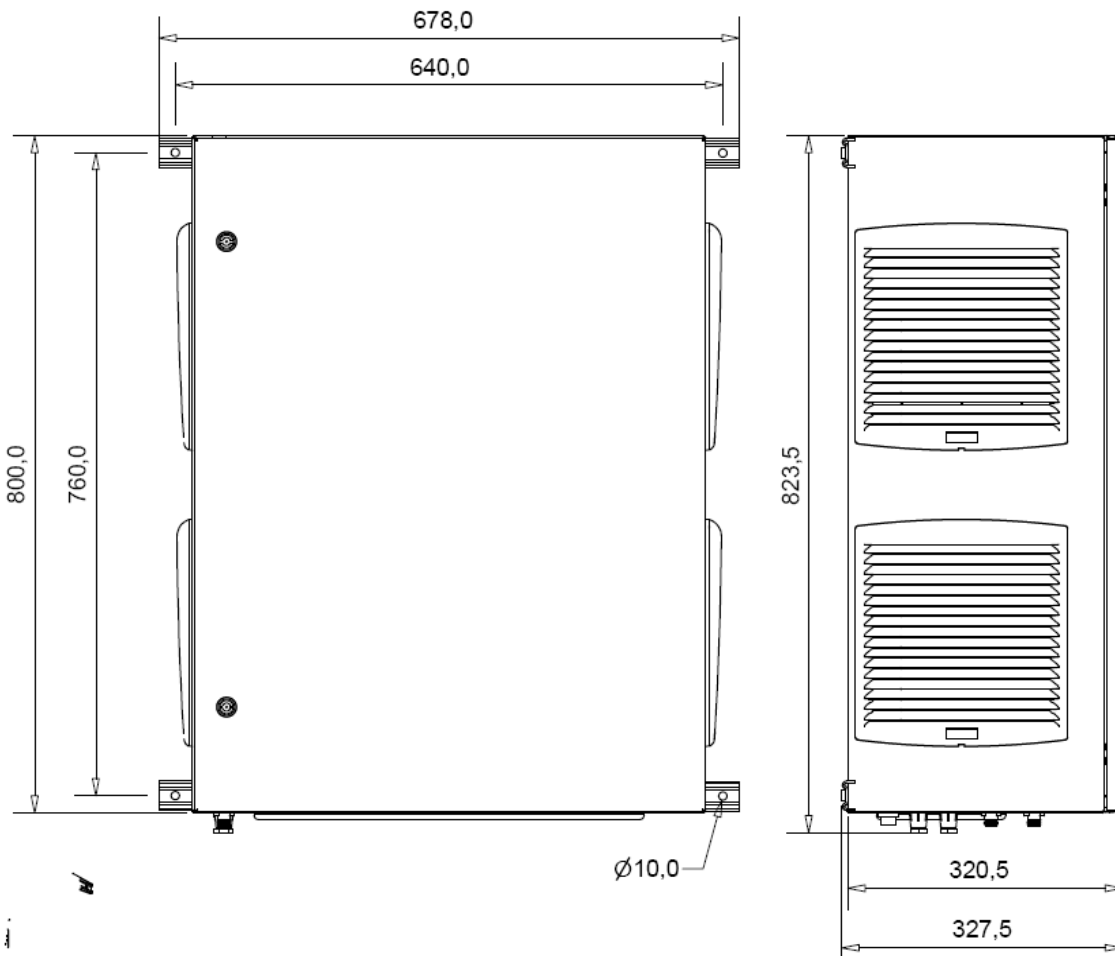
19" x 89 mm (2 U) x 320 mm

❖ **Options**

Lightning Protection - Automatic Re-starter

Optical Remote Unit Wall mounted cabinet (optional)	
❖ Mechanical and electrical	17 U
RF connectors	Nf or 7/16f (to specify at the order)
Rating class	IP54
Cooling system	Air forced
Dimensions	800 x 600 x 320
Environmental features	Compliant ETS 300-019

Optical Remote Unit - Wall mounted cabinet





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Ordering Information

Optical Master Unit

		Designation	Ordering Code
Variable Coupler		Adjustment Coupler and Load	FLEXIDAS-MU-VARCOUP
		Wall bracket for 4 couplers	FLEXIDAS-MU-WBRACKET4COUP
RF Combiner & Splitter System	Rack	RF Combiner rack 4U (for Slots RF Combiner)	FLEXIDAS-MU-RACK-COMB
	Slots RF Combiner	Slot RF Combiner 800 (4 TX/RX inputs / 1 TX/RX output)	FLEXIDAS-MU-COMB-08
		Slot RF Combiner 900 (4 TX/RX inputs / 1 TX/RX output)	FLEXIDAS-MU-COMB-09
		Slot RF Combiner 2100 (4 TX/RX inputs / 1 TX/RX output)	FLEXIDAS-MU-COMB-21
Splitter	Slot RF Splitter 4 ways	FLEXIDAS-MU-SPLIT4	
RF & Optical System	Rack	Main rack 3U (for 8 optical outputs)	FLEXIDAS-MU-RACK-OPT
	Optical Transceiver	Transceiver RF-OF DL 1310 UL 1550 (High-speed railway line)	FLEXIDAS-MU-RFFO-1310-1550
		Transceiver RF-OF DL 1470 UL 1570 (village)	FLEXIDAS-MU-RFFO-1470-1570
	Monitoring Module	Monitoring Module	FLEXIDAS-MU-MTG
	Power supply	Power supply unit 230 VAC (up to 2 per OMU)	FLEXIDAS-MU-PS230
		Power supply unit 48 DC (up to 2 per OMU)	FLEXIDAS-MU-PS48
MUX FO	FO multiplexer from 1 to 3 remotes (if High-speed railway line + Village)	FLEXIDAS-MU-MUXOPT	
Options	Rack indoor	Indoor cabinet 22U	FLEXIDAS-MU-OPT-INDOORCAB



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Optical Remote Unit

Designation		Ordering Code
RACK	Rack 6U up to 5 slots RF	LONGCELL-RU-RACK-RU5
Slot FO/RF High Power	Slot RF Repeater 800 High Power	LONGCELL-RU-FORF-08
	Slot RF Repeater 900 High Power	LONGCELL-RU-FORF-09
	Slot RF Repeater 900-R High Power	LONGCELL-RU-FORF-09R
	Slot RF Repeater 2100 High Power	LONGCELL-RU-FORF-21
FO Diplexer	FO Diplexer 1 st stage	LONGCELL-RU-FODIPLEX-1S
	FO Diplexer 1 st stage with Village	LONGCELL-RU-FODIPLEX-1SV
	FO Diplexer 2 nd stage	LONGCELL-RU-FODIPLEX-2S
	FO Diplexer 2 nd stage with Village	LONGCELL-RU-FODIPLEX-2SV
	FO Diplexer 3 rd stage	LONGCELL-RU-FODIPLEX-3S
	FO Diplexer 3 rd stage with Village	LONGCELL-RU-FODIPLEX-3SV
RF Multiplexer	RF Multiplexer 800/900/2100	FLEXIDAS-RU-MUX-080921
Power Supply	Power supply 230 VAC up to 5 slot RF Repeaters	FLEXIDAS-RU-PS230
	Power supply 48 VDC up to 5 slot RF Repeaters	FLEXIDAS-RU-PS48
OPTIONS	Rack cooling system	FLEXIDAS-RU-COOL
	Wall Mounted cabinet 600x800x320 19" IP54	FLEXIDAS-RU-WALL-INCAB