

Corning Optical Network Evolution (ONE™) Solutions Mid-Power Remote Unit (MRU)



features and benefits |

Multi-frequency/multiservice platform	Supports LTE 700, ESMR, CELL, PCS, AWS1/3, and WCS (including an integrated 2.5 GHz add-on port), accommodating GSM, CDMA, UMTS, LTE, and more
Multioperator-optimized platform	Services from a number of operators can be distributed by the same unit
Cost-effective higher power	Optimizes and reduces the number of antennas required to cover open areas by offering up to 33 dBm (2 W) composite power per frequency band
Operator-grade performance	Advanced signal handling, RF filtering, and management ensures operator-grade performance
Optical fiber savings	All services routed to an MRU are routed over a single optical fiber pair
Design and deployment flexibility	MRU available in AC or DC power supply options Antenna splitting schemes are possible due to the higher power output capability
Modular and scalable design	Modular design enables adding new wireless services easily and cost-effectively without disruption to workspaces or existing services Supports external 2.5 GHz RF source
Simple installation and maintenance	All connections and status LEDs located on front panel Modular, hot swappable, and field upgradable
Management and control	Alarm forward to NOC or standard element management system (EMS) via SNMP, software-controlled output power, and optical link auto gain control

Corning’s mid-power remote unit (MRU) provides remote indoor and outdoor coverage for the Corning optical network evolution (ONE™) solutions. It is a fiber-fed, compact, and scalable multiservice solution designed to complement the ONE platform by providing complete RF open space coverage for large-scale public venues such as campus applications.

The MRU supports up to seven bands. It enables multiple wireless technologies and operator services to be distributed over a single broadband infrastructure.

The MRU can be deployed in new sites or alongside existing lower-power RAU/RAU5 remotes, sharing a common headend and element management system.

Alongside ONE solutions deployments, the MRU provides a comprehensive indoor and outdoor coverage solution for varying site requirements, supporting everything from high-rise buildings and campus topologies to stadiums and airports.

Management and configuration options are provided for each MRU service via a Web session to the headend control module (HCM).



Mid-Power Remote Unit (MRU) | Figure 1

Corning Optical Network Evolution (ONE™) Solutions Mid-Power Remote Unit (MRU)

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system description |

The MRU complements the Corning optical network evolution (ONE™) solutions, providing a complete solution consisting of headend elements (i.e., HEUs, OIUs and/or IHUs) and MRUs at the remote locations alongside any other system remotes (e.g., RAUs) that are either installed or being installed at the site.

In the downlink, at the headend, BTS/BDA RF signals are conditioned by service-specific RIMs installed in the headend unit (i.e., HEU/IHU), ensuring a constant RF level. The conditioned signals are then forwarded to the OIU and converted by the OIMs to an optical signal for transporting over single-mode fiber to the MRUs at the remote locations. All mobile services are combined and distributed through a single antenna port over the broadband antenna infrastructure installed at the remote locations. In the uplink, the process is reversed. Figure 5 provides an example of the system deployment with an MRU alongside RAU5x remotes.

The headend control module (HCM v1.6 and higher) enables centralized, single-source local and remote management of all ONE solutions elements.



Headend Elements | Figure 2



Mid-Power Remote Unit – DC Model | Figure 3

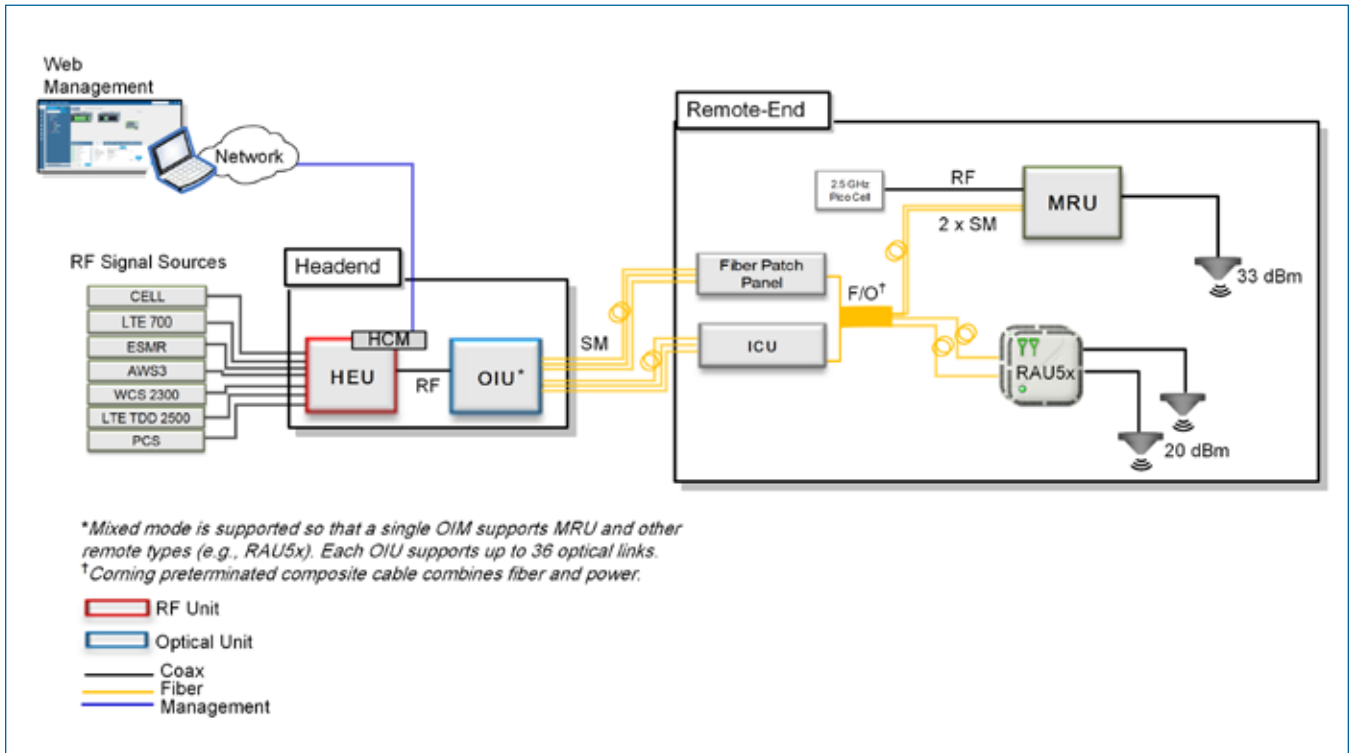


Mid-Power Remote Unit – AC Model | Figure 4

Corning Optical Network Evolution (ONE™) Solutions Mid-Power Remote Unit (MRU)



system description |



Example of MRU System Deployment | Figure 5

Acronyms:

- HEU = Headend Unit
- ICU = Interconnect Unit
- OIU = Optical Interface Unit
- OIM = Optical Interface Module
- RAU5x = Five-Band Remote Access Unit

Corning Optical Network Evolution (ONE™) Solutions Mid-Power Remote Unit (MRU)



specifications |

Supported Services

Technology	Frequency Range (MHz)		
	Service/Band	Uplink (UL)	Downlink (DL)
LTE	700 MHz Lower ABC	699-716	729-746
	700 MHz Upper C	777-787	746-756
CDMA/LTE	ESMR 800	817-824	862-869
CDMA/GSM/LTE/UMTS	CELL 850	824-849	869-894
CDMA/LTE/GSM/UMTS	PCS + G 1900	1850-1915	1930-1995
UMTS/LTE	AWS + AWS3	1710-1778	2110-2180
LTE	WCS	2305-2315	2350-2360

Corning Optical Network Evolution (ONE™) Solutions Mid-Power Remote Unit (MRU)



specifications | (continued)

RF Parameters per Service

Service/Band	LTE 700 MHz		ESMR 800/ CELL 850 MHz		AWS 1700 MHz		AWS1/3 [‡] 1700 MHz	
	DL	UL	DL	UL	DL	UL	DL	UL
Frequency Range (MHz)	729-746 746-756	699-716 777-787	862-869/ 869-894	817-824/ 824-849	2110-2155	1710-1755	2110-2180	1710-1778
Nominal Passband Gain (dB)	30		30		34		34	
Max Output Power Per Antenna Port (dBm)	30		30		34		34	
Input Power (dBm)	0-37		0-37		0-37		0-37	
UL Gain Range (dB)		-19 to 15		-19 to 15		-19 to 15		-19 to 15
SFDR* (dB)		60		64		60		60
Maximum Intermod Distortion (dBm)	≤ -13		≤ -13		≤ -13		≤ -13	
UL NF [†] (dB)		12		12		12		12
Gain Flatness/Ripple (dB)	± 2.0		± 2.0		± 2.0		± 2.0	
Nominal Bandwidth (MHz)	29		32		70		70	
Rated Mean Output Power (dBm)	30		30		34		34	
Input and Output Impedance (Ohm)	50		50		50		50	

*SFDR calculated with bandwidth of 1.23 MHz for the CELL and PCS and with 5 MHz for the LTE, AWS, and WCS.

[†]Typical for single remote unit

[‡]AWS1/3 supported only with MRU-PAM-A17E

Corning Optical Network Evolution (ONE™) Solutions Mid-Power Remote Unit (MRU)

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specifications | (continued)

RF Parameters per Service (continued)

Service/Band	PCS 1900 MHz		WCS 2300 MHz	
	DL	UL	DL	UL
Frequency Range (MHz)	1930-1995	1850-1915	2350-2360	2305-2315
Nominal Passband Gain (dB)	33	0	–	–
Max Output Power Per Antenna Port (dBm)	33		33	
Input Power (dBm)	0-37		0-37	
UL Gain Range (dB)		-19 to 15		-19 to 15
SFDR* (dB)		64		60
Maximum Intermod Distortion (dBm)	≤ -13		≤ -13	
UL NF†(dB)		12		12
Gain Flatness/Ripple (dB)	± 2.0		± 2.0	
Nominal Bandwidth (MHz)	65			
Rated Mean Output Power (dBm)	33			
Input and Output Impedance (Ohm)	50		50	

*SFDR calculated with bandwidth of 1.23 MHz for the CELL and PCS and with 5 MHz for the LTE, AWS, and WCS.

†Typical for single remote unit

*AWS1/3 supported only with MRU-PAM-A17E

Corning Optical Network Evolution (ONE™) Solutions Mid-Power Remote Unit (MRU)



specifications | (continued)

Coupling Specifications

Center Frequency of Supported Bands (MHz)	Typical Coupling (dB)*
742.5	26.0
878.0	26.0
1962.5	26.0
2145.0	26.0
2355.0	26.0

*The typical coupling value for the supported bands is -26 dB; however, a delta of +/- 3 dB can be expected. As such, the actual coupling value for each unit (measured for the DL center frequency of supported bands) is specified on a label on the unit. Note that the test port is bidirectional, so that a UL signal can also be injected and measured with a -26 dB loss.

Environmental Specifications

Operating Temperature	-40° to 65°C (-40° to 149°F)
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Storage Temperature	-30° to 85°C (-22° to 185°F)
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Standards and Approvals

Laser Safety	FDA/CE 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50 and IEC 60825-1
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EMC/Radio	FCC 47 CFR Part 15, 22, 24, 27
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Safety	UL 60950 IEC 60825-1:2007 IEC 60825-2:2010 CAN/CSA-C22.2 No. 60950-1-03
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NEBS	GR-63, GR-1089, GR-487 (with outdoor enclosure)
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Corning Optical Network Evolution (ONE™) Solutions Mid-Power Remote Unit (MRU)



specifications | (continued)

Optical Specifications

Optical Output Power	< 9 dBm
Maximum Optical Budget	7 dB (5 dB over any temperature and optical variations)
Back Reflectance	-60 dB
Optical Connector	LC APC SM
Fiber Type	Corning® SMF-28® fiber or compatible
Wavelength	1310 ± 10 nm (at 25°C)

Corning Optical Network Evolution (ONE™) Solutions Mid-Power Remote Unit (MRU)



specifications | (continued)

Physical Specifications

MRU Hosting Capabilities	<ol style="list-style-type: none"> 1. Five service-specific power amplifier modules (PAM) 2. One optical module (OPTM) 3. One fan module (FAM) 4. One AC or DC (model dependent) power supply module (PSM) 	
Interfaces	<p>One 4.3-10 type duplexed RF antenna port One LC APC port for fiber optic connection One QMA coupling “Test Port” (used for UL and DL measurements during system operation) One 4.3-10 type RF port for 2.5 GHz external RF source One RJ45 MGMT (local) connection One two-hole, standard-barrel grounding lug; for use with stranded copper wire conductors; 10-14 AWG; holes – 1/4 in “DC In” connectors (model dependent): One “DC In” 2-pin “Class 1” terminal block Two “DC In” 8-pin “Class 2” terminal block connectors: one pair for each PAM (total of five pairs) and one pair for the FAM + OPTM; one RSV pair One QMA input connector for EXP UL One QMA output connector for EXP DL One DB-9 female external alarm connector for external dry contact alarm connections</p>	
Power	Power Consumption:	DC Version: 330 W (maximum), AC Version: 360 W (maximum)
	AC Power Input:	100-240 VAC/50-60 Hz
	Maximum AC Current Consumption:	5 A
	DC Power Input:	Power amplifier consumption per pair: 50 W Maximum power consumption: 330 W Maximum current consumption: 1.75 A per pair Maximum current draw per pair: 64 W
Management	Managed via the headend control module (HCM)	
Physical Characteristics	Mounting:	19-in rack (6U rack height) Wall mount (separately ordered accessory kit)
	Dimensions (H x W x D):	10.5 x 17.5 x 15.75 in (266.7 x 445 x 400 mm)
	Weight:	Chassis without PAMs: 48 lbs (21.8 kg) Each PAM: 4.7 lbs (2.15 kg)

Corning Optical Network Evolution (ONE™) Solutions Mid-Power Remote Unit (MRU)



ordering information |

MRU Assembly Configurations Upgraded for Future AWS1/3 Support

Part Number	Description
MRU-E-78171923-DC	MRU-DC — AWSe Supported Assembly with five PAMs supporting: LTE 700, ESMR, CELL, PCS, AWS1, and WCS
MRU-E-781719-DC	MRU-DC — AWSe Supported Assembly with four PAMs supporting: LTE 700, ESMR, CELL, PCS, and AWS1
MRU-E-81719-DC	MRU-DC — AWSe Supported Assembly with three PAMs supporting: ESMR, CELL, AWS1, and PCS
MRU-E-71719-DC	MRU-DC — AWSe Supported Assembly with three PAMs supporting: LTE 700, AWS1, and PCS
MRU-E-78171923-AC	MRU-AC — AWSe Supported Assembly with five PAMs supporting: LTE 700, ESMR, CELL, PCS, AWS1, and WCS
MRU-E-781719-AC	MRU-AC — AWSe Supported Assembly with four PAMs supporting: LTE 700, ESMR, CELL, PCS, and AWS1
MRU-E-81719-AC	MRU-AC — AWSe Supported Assembly with three PAMs supporting: ESMR, CELL, AWS1, and PCS
MRU-E-71719-AC	MRU-AC — AWSe Supported Assembly with three PAMs supporting: LTE 700, AWS1, and PCS
MRU-E-ASM-AC-B	MRU-AC — AWSe Supported Assembly with OPTM, FAM, and AC PSM
MRU-E-ASM-DC-B	MRU-DC — AWSe Supported Assembly with OPTM, FAM, and DC PSM modules

Table 1. Part Numbers for MRU Assembly Configurations Upgraded for Future AWS1/3 Support

Corning Optical Network Evolution (ONE™) Solutions Mid-Power Remote Unit (MRU)



ordering information | (continued)

MRU Stand-Alone Modules

Note: Stand-alone modules can be ordered for upgrade or maintenance purposes.

Part Number	Description
MRU-OPTM-P	Mid-Power Unit Optical Module supporting IF and listening mode
MRU-PAM-17	Mid-Power Unit Power Amplifier Module supporting AWS 1700 MHz
MRU-PAM-8	Mid-Power Unit Amplifier Module supporting ESMR 800 and CELL 850
MRU-PAM-7	Mid-Power Unit Power Amplifier Module supporting LTE 700 MHz
MRU-PAM-19	Mid-Power Unit Power Amplifier Module supporting PCS 1900 MHz
MRU-PAM-23	Mid-Power Unit Power Amplifier Module supporting PCS 2300 MHz
MRU-PAM-L26	Mid-Power Remote Unit Power Amplifier Module supporting LTE 2600 MHz
MRU-PSM-AC	Mid-Power Unit AC Power Supply Module
MRU-PSM-DC	Mid-Power Unit DC Power Supply Module
MRU-FAM	Mid-Power Unit Modular Fan Module

Table 2. Part Numbers for MRU Stand-Alone Modules

Accessories

Part Number	Description
BR-MRU-W	Mid-Power Remote Unit Wall-Mounting Bracket (vertical installation)
AK-MRU-DCA-CBL	Mid-Power Remote Unit Dry Contact Cable Assembly (optional)

Table 3. Part Numbers for MRU Accessories

Corning Optical Network Evolution (ONE™) Solutions Mid-Power Remote Unit (MRU)



ordering information | (continued)

Cable Assembly

[H]	[R]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	8	[]	[]	[]	[]	[]	F -	[]	[]
		1		2		3	4	5	6		7		8		9				10	11

|1
Select connector.
00 = None
18 = LC APC duplex
66 = SC APC duplex

|4
Select cu conductor count.
0 = No conductors
2 = 2 conductors
4 = 4 conductors
6 = 6 conductors

|7
Select cable type.
U = Fiber and copper conductors
G = Fiber only

|2
Select connector.
8 = LC APC duplex
66 = SC APC duplex

|5
Select cu connectors.
C = With connectors
N = No connectors

|8
Select armored or non-armored.
20 = Non-armored
A3 = Armored indoor plenum

|3
Select cu wire gauge.
F = 12 AWG
G = 14 AWG
H = 16 AWG

|6
Select fiber count.
04 = 4 fibers
06 = 6 fibers
24 = 24 fibers (see Note 1)
48 = 48 fibers (see Note 1)
72 = 72 fibers (see Note 1)
96 = 96 fibers (see Note 1)
E4 = 144 fibers

|9
Select cable length.
010-999 ft (see Note 2)

|10
Select pulling grip.
P = One-sided pulling grip
N = No pulling grip

|11
Select kit.
K = Two strain-relief trunk holders (see Note 3)
N = None

Note 1: Fiber-only trunk cables (no conductive pairs); MTP® connector is standard. For other options, please contact Corning Customer Care.

Note 2: Cable lengths:
• Preconnectorized cable assemblies can only be ordered in 10 ft increments.
• Non-connectorized bulk cabling can only be ordered in 50 ft increments.

Note 3: Available for 24 and above fiber cables only.

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