Cisco Connected Grid Cellular Modules for the Cisco 1000 Series Connected Grid Routers

Contents

The Cisco® Connected Grid Cellular Modules include 4G LTE and 4G LTE Advanced for the Cisco 1000 Series Connected Grid Routers (CGR 1000 Series). Our ruggedized cellular modules and CGR 1000 routers together provide a versatile communications platform for a diverse set of Field Area Network (FAN) and Internet-of-Things (IoT) deployments. They also support and extend utility applications such as Advanced Metering Infrastructure (AMI), Distribution Automation (DA), integration of Distributed Energy Resources (DER), Street Lighting and remote workforce automation.

Product overview

Cisco Connected Grid Cellular Modules deliver service-provider-based (public) wireless WAN connectivity for Cisco 1000 Series Connected Grid Routers (CGR 1000). These modules support, 4G LTE Advanced, 4G LTE, High-Speed Packet Access (HSPA+), and Evolution-Data Optimized (EV-DO) Rev A. The Connected Grid Cellular Modules support the latest Third-Generation Partnership Project (3GPP) Release 9 Category 4 LTE standards. The latest release of CGR 1000 Cisco IOS® Software supports one or two cellular modules in the CGR 1000 starting with IOS Release 15.6(3)M1.

Figure 1 Displays the Cisco Connected Grid Cellular Modules

Figure 1.
Cisco Connected Grid Cellular Modules

There are several generations (including legacy 3G modules listed at beginning of Table 1) in the Cisco Connected Grid Cellular Module family. They offer utilities a choice of different technologies, carriers, and regions, as defined in Table 1.

Note the end of sale (EOS) of the 3G modules in 2017.

Table 1.   End Of Life Modules

SKU	Description	Region	Technology and supported frequency bands
CGM-3G-HSPA-AB-G	Connected Grid Module - 3G (all bands) HSPA+/UMTS/GSM/EDGE	Global	GSM, GPRS, EDGE: 850 MHz, 900 MHz, 1800 MHz, and 1900 MHz UMTS, HSPA+: 900 MHz, and 2100 MHz
CGM-3G-HSPA-G	Connected Grid Module - 3G (global) HSPA+/UMTS/GSM/GPRS/EDGE	North America and rest of world (900 MHz AMI)[1]	GSM, GPRS, EDGE: 850 MHz, 1800 MHz, and 1900 MHz UMTS, HSPA+: 2100 MHz

SKU	Description	Region	Technology and supported frequency bands
CGM-3G-HSPA-A	Connected Grid Module - 3G AT&T HSPA+/UMTS/GSM/GPRS/EDGE	AT&T (USA)	GSM, GPRS, EDGE: 850 MHz, 1800 MHz, and 1900 MHz UMTS, HSPA+: 850 MHz, 1900 MHz, and 2100 MHz
CGM-3G-EVDO-V	Connected Grid Module - 3G Verizon EV-DO Rev A/0/1xRTT	Verizon (USA)	CDMA/EVDO: 800-900 MHz cellular band and 1800-1900 MHz PCS band
CGM-3G-EVDO-S	Connected Grid Module - 3G Sprint EV-DO Rev A/0/1xRTT	Sprint (USA)	GSM, GPRS, EDGE: 850 MHz, 900 MHz, 1800 MHz, and 1900 MHz UMTS, HSPA+: 850 MHz, 1900 MHz, and 2100 MHz

Table 2.   Cisco Connected Grid Cellular Modules for the CGR 1000 Series

SKU	Description	Region	Technology and supported frequency bands
CGM-4G-LTE-MNA	Connected Grid Module - 4GLTE - North America Designed to be co-located with CGM-WPAN-FSK-NA Designed to be co-located with WPAN 902-928 MHz products in the same chassis such as CGM-WPAN-FSK-NA and CGM-WPAN-OFDM-FCC	North America (CGR 1240)	LTE: 700 MHz (band 17), 1900 MHz (band 2 PCS), 700 MHz (band 13), 1900 MHz (band 25 extended PCS) networks; or 1700/2100 MHz (band 4 AWS) UMTS and HSPA+: 850 MHz (band 5), 1900 MHz (band 2 PCS), and 1700/2100 MHz (band 4 AWS) EVDO Rev A, CDMA 1x BC0, BC1, BC10 Firmware image switching from flash (FW-MC7354-LTE-AT, FWMC7354-LTE- CA or FW-MC7350-LTE-VZ)
CGM-4G-LTE-MNA-AB	Connected Grid Module - 4G LTE – North America	North America (CGR 1120)	LTE: 700 MHz (band 17), 900 MHz (band 8), 1900 MHz (band 2 PCS), 700 MHz (band 13), 1900 MHz (band 25 extended PCS) networks; or 1700/2100 MHz (band 4 AWS) UMTS and HSPA+: 850 MHz (band 5), 1900 MHz (band 2 PCS), and 1700/2100 MHz (band 4 AWS) EVDO Rev A, CDMA 1x BC0, BC1, BC10 Firmware image switching from flash (FW-MC7354-LTE-AT, FWMC7354-LTE- CA or FW-MC7350-LTE-VZ)
CGM-4G-LTE-GA	Connected Grid Module - 4G LTE – Global	Global (CGR1120 or CGR1240)	LTE: 800 MHz (band 20), 900 MHz (band 8), 1800 MHz (band 3), 2100 MHz (band 1), or 2600 MHz (band 7) UMTS and HSPA+: 850 MHz (band 5), 900 MHz (band 8), 1900 MHz (band 2), and 2100 MHz (band 1) Firmware image switching from flash (FW-MC7304-LTE-AU or FWMC7304- LTE-GB)

SKU	Description	Region	Technology and supported frequency bands
CGM-4G-LTE-EA-AB	Connected Grid Module – 4G LTE – North America and EMEA (CGR1120 or CGR1240)	North America and EMEA (CGR1120 or CGR1240)	LTE FDD 2100 MHz (band 1), 1900 MHz (band 2, band 25), 1800 MHz (band 3), 1700 MHz (band 4), 850 MHz (band 5, band 26), 2600 MHz (band 7), 700 MHz (band 12, band 13, band 29), 700 MHz (band 17), 800 MHz (band 20), and TDD LTE 2500 MHz (band 41) at Category 4 LTE speeds. Backward compatibility: UMTS and HSPA+: 2100 MHz (band 1), 1900 MHz (band 2), 1800 MHz (band 3), 1700 MHz (band 4), 850 MHz (band 5), 900 MHz (band 8) Firmware images could be FW-7455-LTE-VZ FW-7455-LTE-AT FW-7455-LTE- GN
CGM-4G-LTE-EA-900	Connected Grid Module – 4G LTE – North America not intended for EMEA, does not support Band 8 *Designed to be co-located with CGM-WPAN-FSK-NA *Designed to be co-located with WPAN 902-928 MHz products in the same chassis such as CGM-WPAN-FSK-NA and CGM-WPAN-OFDM-FCC	North America not intended for EMEA, does not support Band 8 (CGR1120 or CGR1240)	Cisco LTE FDD 2100 MHz (band 1), 1900 MHz (band 2, band 25), 1800 MHz (band 3), 1700 MHz (band 4), 850 MHz (band 5, band 26), 2600 MHz (band 7), 700 MHz (band 12, band 13, band 29), 800 MHz (band 20), and TDD LTE 2500 MHz (band 41) at Category 4 LTE speeds. Backward compatibility: UMTS and HSPA+: 2100 MHz (band 1), 1900 MHz (band 2), 1800 MHz (band 3), 1700 MHz (band 4) and 850 MHz (Band 5) Firmware images could be FW-7455-LTE-VZ FW-7455-LTE-AT FW-7455-LTE- GN
CGM-4G-LTE-LA-AB	Connected Grid Module – 4G LTE - APJC and LATAM	APJC and LATAM (CGR1120 or CGR1240)	Cisco LTE FDD 2100 MHz (band 1), 1800 MHz (band 3), 850 MHz (band 5), 2600 (band 7), 900 (band 8), 850 (band18, band19), 1500 (band 21), 700 (band 28) and TDD LTE 2600 (band 38), 1900 (band 39), 2300 (band 40), and 2500 (band 41) at Category 4 LTE speeds. Backward compatibility: UMTS and HSPA+: 2100 MHz (band 1), 850 MHz (band 5), 800 MHz (band 6, band 19), 900 MHz (band 8), 1700 MHz (band 9) and TD-SCDMA 1900 MHz (band 39) Firmware images could be FW-7430-LTE-JN FW-7430-LTE-JN-KD FW-7430- LTE-JN-SB FW-7430-LTE-GN

Table 3 provides 4G LTE specifications for the CGM-4G-LTE modules by SKU numbers.

Table 3.   4G LTE Specifications

Region theaters	CGM-4G-LTE-GA	CGM-4G-LTE-MNA	CGM-4G-LTE-MNA-AB
Bands	LTE bands 1, 3, 7, 8, 20	LTE band 2, 4, 13, 17, 25	LTE band 2, 4, 8, 13, 17, 25
Theoretical download/upload speeds*	100 Mbps DL and 50 Mbps UL UE CAT 3	100 and 50 Mbps UE CAT 3	100 and 50 Mbps UE CAT 3
Australia	Yes	No	No
Europe	Yes	No	No

Region theaters	CGM-4G-LTE-GA	CGM-4G-LTE-MNA	CGM-4G-LTE-MNA-AB
Middle East	Yes	No	No
LATAM and APAC	Yes (dependent upon the carrier's support for the LTE bands)	Yes (dependent upon the carrier's support for the LTE bands)	Yes (dependent upon the carrier's support for the LTE bands)
United States	No	Yes ATT, Verizon, (firmware image switching)	Yes
Canada	No	Yes	Yes

Region theaters	CGM-4G-LTE-EA-AB	CGM-4G-LTE-EA-900	CGM-4G-LTE-LA-AB
Bands	LTE bands 1, 2, 3, 4, 5, 7, 12,13, 17, 20, 25, 26,29, 41	LTE bands 1, 2, 3, 4, 5, 7, 12,13, 20, 25, 26, 29, 41	LTE bands 1, 3, 5, 7, 8, 18, 19, 21, 28, 38, 39, 40, 41
Theoretical download/upload speeds	150 and 50 Mbps UE CAT4	150 and 50 Mbps UE CAT4	150 and 50 Mbps UE CAT4
Australia	No	No	Yes
Europe	Yes	No	No
Middle East	Yes	No	No
LATAM and APAC	No	No	Yes
United States	Yes	Yes (use with WPAN)	No
Canada	Yes	Yes (use with WPAN)	No

Utilities that need to improve business continuity and reduce operating costs should consider these modules. When they add a service provider's wireless data plan, utilities gain a rapidly deployable solution for remote sites. And these modules make full use of the network services provided by Cisco CGR 1000 routers.

Connected Grid Cellular Modules offer embedded intelligence (such as intelligent WAN sensing and modem reset). Links can be restored automatically, with no need for a service visit.

In addition, Connected Grid Cellular Modules provide detailed diagnostic information about the 3G and 4G WAN links so that utilities can troubleshoot connectivity issues and provide detailed performance logs to their service providers. Refer to the software specifications in Table 4 for more details.

Since Connected Grid Cellular Modules can be deployed in a variety of utility environments worldwide, a variety of antenna and cabling options are offered to address different deployment needs. Please refer to the antenna specifications (Table 6), cable specifications (Table 7), and accessories specifications (Table 7) for more details.

Table 4 shows the hardware specifications for Cisco Connected Grid Cellular Modules, plus a partial listing of regulatory compliance and safety data.[1]

[1] For more information, consult the Cisco Product Approval Database or consult your local Cisco representative (Cisco.com login required).

Table 4.   Hardware Specifications

Feature	Description
Form factor	• CGM-4G-LTE-EA-900: It is allowed to have qty 2 x -900 per CGR platform • CGM-4G-LTE-EA-AB and CGM-4G-LTE-LA-AB: Max 2 allowed per platform • All other modules: 1 allowed per platform
Dimensions (H x W x D)	• 1.50 in. x 4.24 in. x 5.25 in. • 3.81 cm x 10.77 cm x 13.34 cm
Weight	• 0.5 lb

External interfaces	• Cellular Radio Frequency (RF)
	  ◦ M0/MAIN - Primary RF port; QMA - female
	  ◦ M1/DIV - Diversity RF port; QMA – female

Subscriber Identity Module (SIM) card	• Dual SIM[2] card socket; compliant with ISO-7816-2 (SIM mechanical)

LEDs	• Wireless WAN modem status: LED color (green)
	  ◦ Off-modem is in reset
	  ◦ Solid green modem is powered, associated, and authenticated on network
	  ◦ Slow blink modem is powered, searching for service
	  ◦ Fast blink data is being transmitted
	• Received signal strength indication (RSSI): LED color (green/amber; bi-color)
	  ◦ Off: RSSI less than or equal to -110
	  ◦ Solid amber: -110 less than RSSI less than or equal to -90
	  ◦ Fast green blink: -90 less than RSSI less than or equal to -75
	  ◦ Slow green blink: -75 less than RSSI less than or equal to -60
	  ◦ Solid green: RSSI greater than -60
	• SVC: LED color (green/amber; bi-color)
	  ◦ Solid green: LTE or HSPA+ service is enabled
	  ◦ Blinking green: EV-DO service is enabled
	  ◦ Off: Neither HSPA+ nor EVDO service is available

Operating conditions	
Operating temperature	• -40° C to +65° C (-40° F to 140° F) continuous operating temperature range
Shock and vibration	IEC 61850-3 Class 2
Operating seismic earthquake	IEC 61850-3 Class 2
Altitude	10,000 ft. (3048 m)
Relative humidity	5 to 95 percent non-condensing

Feature	Description
Non-operating conditions	
Temperature	-40° to +185° F (-40° C to +85° C)
Non-operating relative humidity	5 to 95 percent non-condensing
Altitude	10,000 ft. (3000 m); optimum operating temperature is derated with increasing altitude per IEEE 1613a-2008
Non-operating free-fall drop	4 in. (100 mm)
Non-operating shock and vibration	50 - 60 G (3.76 m/s minimum)
EMC emissions	FCC 47 CFR Part 15 Subpart B CISPR32: Edition 2: 2015, EN 55032:2015, EN 55032:2012/AC:2013 EN 55022 AS/NZS CISPR 32 KN32: 2015 ICES-003 Issue 6: 2016 (CAN/CSA-CISPR 22-10) V-3/2015.04 (rules V-2/2015.04) EN61000-3-2: 2014, EN61000-3-3: 2013 KN 61000-3-2, KN 61000-3-12: 2014, EN61000-3-11: 2000
EMC immunity	CISPR 35, EN 55024 KN 35 IEC 61000-4-2,3,4,5,6,8,9,16,17,18,29
Industry standards	IEC 61850-3, 2013 IEEE 1613, 2009 EN61000-6-2,4 Industrial EMC ANSI C63.26
Radio-Cellular	AS/CA S042.1/4:2015 - Communications Alliance EN 301 489-1, 52 v2.1.1 EN 301 908 – 1, 2, 13, v1.11.1 EN 62311 RF exposure FCC 47 CFR Part 22, 24, 27 FCC 47 CFR Part 2 MPE RSS 102,132,133
Safety	USA: UL 60950-1 Canada: CAN/CSA C22.2 No. 60950-1 Europe: EN 60950-1 China: GB 60950-1 Australia and New Zealand: AS/NZS 60950-1 Rest of world: IEC 60950-1

Feature	Description
	CSA-certified to UL/CSA 60950-1, Second Edition CB report to IEC60950-1, Second Edition, covering all group differences and national deviations
Product modems	CGM-4G-LTE-EA-AB: SWI MC7455MOBILE CGM-4G-LTE-EA-900: SWI MC7455MOBILE CGM-4G-LTE-LA-AB: SWI MC7430 CGM-4G-LTE-MNA: SWI MC7354MNA CGM-4G-LTE-MNA-AB: SWI MC7354 CGM-4G-LTE-GA: SWI MC7304

[2] Dual Sim is supported from 15.4(1)CG and later

[3] Software support for Sierra Wireless MC74xx only one Cisco IOS Software Release 15.6(3)M1 and later.

Table 5 shows the software specifications for Cisco Connected Grid Cellular Modules.

Table 5.   Software Specifications

Feature	Description
Software compatibility	• 15.5(3)M minimum supported Cisco IOS release for 4G LTE modules with modem firmware 5.5.58 or later • 15.6(3)M minimum supported Cisco IOS release for 4G LTE modules with modem MC73xx family • 15.7(3)M minimum supported Cisco IOS release for 4G Dual LTE modules with modem MC74xx family
Important features	• Auto-switch failover between primary and backup link • Multichannel Interface Processor (MIP) profile configuration • Code Division Multiple Access (CDMA) data retry • Remotely initiated data call back using voice • Remotely initiated data call back using SMS • Remote firmware upgrade over cellular • Virtual diagnostic monitoring • Maintenance end point (MEP) lock/unlock capability • SIM lock/unlock capability
MIBs	• Cellular MIB and traps • ENTITY MIB • IF MIB • Cellular WWAN MIB persistence
Network management and diagnostics	• In-band and out-of-band management using Telnet (Cisco IOS Software Command-Line interface [CL]) and Simple Network Management Protocol (SNMP), including MIB II and other extensions • Industry-standard cellular diagnostics and monitoring tools [QUALCOMM CDMA Air Interface Tester (CAIT), and Spirent Universal Diagnostic Monitor (UDM)]

Table 6 lists the antenna options for Connected Grid Cellular Modules.

Table 6.   Antenna Options

Item	Specification
ANT-MP2-I-O-SS-M	• Multipurpose integrated antenna designed to support a Cisco 1240 Connected Grid Router (CGR 1240) for 4G/LTE modules • Outdoor
ANT-4G-CM-IN-TNC	• Ceiling mount, indoor low-profile antenna • Integrated 15 ft. LMR-195 cable
ANT-4G-OMNI-OUT-N	• Omnidirectional, stick antenna • Outdoor
ANT-4G-PNL-OUT-N	• Flat-panel antenna • Outdoor
ANT-4G-SR-OUT-TNC	• Low-profile outdoor saucer antenna
LTE-ANTM-D	• Dipole, swivel-mount, indoor
ANT-3-4G2G1-O	• Cellular 3-in-1 Two port 2G, 3G, 4G and 1 port GPS Vehicle Mount and Fixed Infrastructure Antenna, with three ports. • For use with CGR1120

Note: For an extensive description of antenna options and their potential deployment scenarios, see the Antenna Installation deployment guide

Table 7 lists the RF cable and accessory options for Connected Grid Cellular Modules.

Table 7.   RF Cable and Accessory Options

Item	Specification
Indoor RF cable options for the Cisco 1120 Connected Grid Router (CGR 1120)	
CAB-L240-10-Q-N	10-ft (3 m) low-loss LMR 240 cable with QMA and N connectors
CAB-L240-15-Q-N	15-ft (4.5 m) low-loss LMR 240 cable with QMA and N connectors
CAB-L240-20-Q-N	20-ft (6 m) low-loss LMR 240 cable with QMA and N connectors
Outdoor RF cable options for the Cisco CGR 1120 and CGR 1240 models	
CAB-L400-5-N-N	5-ft (1.5 m) low-loss LMR 400 cable with N connectors (straight to right angle)
CAB-L400-5-N-NS	5-ft (1.5 m) low-loss LMR 600 cable with N connectors (straight to straight)
CAB-L400-20-N-N	20-ft (6 m) low-loss LMR 400 cable with N connectors
CAB-L600-30-N-N	30-ft (9.14 m) ultra-low-loss LMR 600 cable with N connectors

Item	Specification
RF accessories	
CGR-LA-NM-NF	Lightning arrestor
CGR-LA-NF-NF	Lightning arrestor
ANT-ADPTR-Q-TNC	QMA to TNC(f) coaxial adapter

Note: For an extensive description of antenna and cable options and their potential deployment scenarios, see Antenna Installation deployment guide

Ordering information

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For more information

Learn more about Cisco Connected Grid Cellular Modules for the Cisco 1000 series Connected Grid Routers.

Find out more about the Cisco CGR 1000.

Find more information on the Cisco Field Area Network (FAN) solution.