



System Specifications

This appendix provides the following specifications for the Cisco uBR7100 series universal broadband routers:

- [Physical Specifications, page A-1](#)
- [RF Specifications, page A-3](#)
- [DOCSIS Upstream and Downstream Specifications, page A-3](#)
- [EuroDOCSIS Upstream and Downstream Specifications, page A-5](#)

Physical Specifications

Table A-1 Physical Specifications and Power Requirements

Description	Specification
Dimensions (H x W x D)	3.5 x 17.5 x 18.25 in. (8.89 x 44.45 x 46.36 cm)
Weight	~ 32 lb (14.5 kg)
Heat dissipation	370 W (1262 Btu ¹)
Input voltage, AC power supply	100 to 240 VAC
Current	5 to 2.5 A ²
Frequency	50/60 Hz
Power factor	0.80 to 0.95
Input AC power	525 W ³ (maximum)
AC-input cables	18-QEG4 3-wire cable, with a 3-lead IEC-320 receptacle on the power supply end, and a country-dependent plug on the power source end
Airflow	~120 cfm ⁴
Temperature	32 to 104•F (0 to 40•C) operating; –4 to 149•F (–20 to 65•C) nonoperating
Humidity	10 to 90% noncondensing
LAN interfaces	2 Ethernet 10BASE-T/100BASE-TX autosensing (RJ-45)
Console port	Asynchronous serial (RJ-45)
Auxiliary port	Asynchronous serial (RJ-45) with hardware flow-control

Table A-1 Physical Specifications and Power Requirements (continued)

Description	Specification
WAN interface options	For a list of supported port adapters, refer to the “ Port Adapters ” section on page 1-7 and Table 1-1 on page 1-8. Note Additional port adapters may be added in future Cisco IOS software releases. See the Cisco IOS software release notes for your software release for the most recent list of supported port adapters.
Recommended minimum software requirements	Cisco IOS Release 12.1(5)EC or later release for DOCSIS operations Cisco IOS Release 12.1(7)EC or later release for EuroDOCSIS operations
Compliance marking	CE, CSA, TUV, FCC, ICES, VCCI, AS/NZS, BSMI
Safety	UL 1950, CSA 22.2 No. 950, EN60950, ACA TS001, AS/NZS 3260, IEC 60950
EMC Emissions ⁵	CFR 47 part 15:1998 Class B; EN55022:1994 [incl AMD1+AMD2] Class B; AS/NZS 3548:1995; CISP22:1997 Class B; VCCI:1997 ClassB; ICES-003:1994; CNS13438:1997 Class B
EMC Immunity	EN61000-3-2:1995; EN61000-3-2:1995 ⁶

1. Btu = British thermal units.
2. A = amperes.
3. W = watts.
4. cfm = cubic feet per minute.
5. EMC = electromagnetic compatibility.
6. Refer to *Regulatory Compliance and Safety Information for the Cisco uBR7100 and Cisco uBR7100E Series Universal Broadband Routers* for more information.

Table A-2 Cisco uBR7100 Series Cable Interface Specifications

Router Model	Downstream Modulation	Upstream Modulation	IF Output ¹
uBR7111	64 QAM	QPSK	+35 to +43 dBmV
uBR7114	64 QAM	QPSK	+35 to +43 dBmV
uBR7111E	64 QAM	QPSK	+33 to +38 dBmV
uBR7114E	64 QAM	QPSK	+33 to +38 dBmV

1. This table shows the output from the DS0 downstream port, which does not use the integrated upconverter.

RF Specifications

Table A-3 Typical RF Upstream Bandwidth and Modulation

Upstream Bandwidth	QPSK Data Throughput	16 QAM Data Throughput
200 kHz	0.3 Mbs	0.6 Mbs
400 kHz	0.6 Mbs	1.2 Mbs
800 kHz	1.2 Mbs	2.3 Mbs
1600 kHz	2.3 Mbs	4.5 Mbs
3200 kHz	4.6 Mbs	9.0 Mbs

Table A-4 Typical RF Downstream Modulation

Downstream Bandwidth	64 QAM Data Throughput	256 QAM Data Throughput
6 MHz	27.0 Mbs	38.0 Mbs
8 MHz	38.0 Mbs	56.0 Mbs

DOCSIS Upstream and Downstream Specifications

The recommended settings listed in the following tables are based on a hybrid fiber-coaxial cable (HFC) network in which the digital signal is carried 10 dB below the adjacent analog video channel. If the digital signal on your network is carried 6 dB below the adjacent analog video channel, add 4 dB to the recommended settings in [Table A-5](#) and [Table A-6](#).

Table A-5 DOCSIS Cable Upstream RF Specifications

Specification	DOCSIS Specifications ¹	Minimum Settings ²	Your Headend Settings
System/Channel			
Frequency range	5 to 42 MHz	5 to 42 MHz	
Transit delay, CMTS to furthest customer	< 0.800 μsec	< 0.800 μsec	
Carrier to noise ratio	> 25 dB (QPSK ³) ⁴ > 25 dB (16 QAM ⁵) ⁴	> 21 dB (QPSK) ⁴ > 24 dB (16 QAM) ⁴	
Carrier to ingress power ratio	> 25 dB	> 25 dB	
Carrier to interference ratio	> 25 dB (QPSK) ⁴ > 25 dB (16 QAM) ⁴	> 21 dB (QPSK) ⁴ > 24 dB (16 QAM) ⁴	
Carrier hum modulation	< -23 dBc ⁶ (7%)	< -23 dBc (7%)	
Burst noise	< 10 μsec	< 10 μsec	
Amplitude ripple	0.5 dB/MHz	0.5 dB/MHz	
Group delay ripple	200 ns/MHz	200 ns/MHz	
Micro reflections (single echo)	-10 dBc @ < 0.5 μsec -20 dBc @ < 1.0 μsec	-10 dBc @ < 0.5 μsec -20 dBc @ < 1.0 μsec	

Table A-5 DOCSIS Cable Upstream RF Specifications (continued)

Specification	DOCSIS Specifications ¹	Minimum Settings ²	Your Headend Settings
Seasonal/diurnal signal level variation	< 8 dB	< 8 dB	
Carrier to second order	< -50 dBc	< -50 dBc	
Digital Signal Levels			
From cable modem (upstream)	+8 to +58 dBmV (QPSK) +8 to +55 dBmV (16 QAM)	+8 to +58 dBmV (QPSK) +8 to +55 dBmV (16 QAM)	
Input amplitude to modem card (upstream)	-16 to +26 dBmV	-10 to +25 dBmV	
Signal as relative to adjacent video signal	-6 to -10 dBc	-6 to -10 dBc	

- DOCSIS specifications are baseline settings for a DOCSIS-compliant, two-way data-over-cable system.
- Minimum settings are slightly different than the DOCSIS settings to account for cable system variations over time and temperature. Using these settings should increase the reliability of DOCSIS-compliant, two-way data-over-cable systems.
- QPSK = Quadrature Phase-Shift Keying: a method of modulating digital signals onto a radio-frequency carrier signal using four phase states to code two digital bits.
- These settings are measured relative to the digital carrier. Add 6 or 10 dB, as determined by your company's policy and derived from the initial cable network setup, relative to the analog video signal.
- QAM = Quadrature Amplitude Modulation: a method of modulating digital signals onto a radio-frequency carrier signal involving both amplitude and phase coding.
- dBc = decibels relative to carrier.

Table A-6 DOCSIS Cable Downstream RF Specifications

Specification	DOCSIS Specifications ¹	Minimum Settings ²	Your Headend Settings
System/Channel			
RF channel spacing (bandwidth)	6 MHz	6 MHz	
Transit delay ³	0.800 µsec	0.800 µsec	
Carrier to noise ratio	> 30 dB (64 QAM ⁴) ⁵ > 35 dB (256 QAM) ⁵	>30 dB (64 QAM) ⁵ > 33 dB (256 QAM) ⁵	
Carrier to ingress power ratio	> 35 dB	> 35 dB	
Composite triple beat distortion	< -50 dBc ⁶	< -50 dBc	
Carrier to second order	< -50 dBc	< -50 dBc	
Cross-modulation level	< -40 dBc	< -40 dBc	
Amplitude ripple	0.5 dB in 6 MHz	0.5 dB in 6 MHz	
Group delay	75 ns ⁷ in 6 MHz	75 ns in 6 MHz	
Micro reflections bound for dominant echo	-10 dBc @ < 0.5 µsec -15 dBc @ < 1.0 µsec -20 dBc @ < 1.5 µsec -30 dBc @ < 1.5 µsec	-10 dBc @ < 0.5 µsec -15 dBc @ < 1.0 µsec -20 dBc @ < 1.5 µsec -30 dBc @ < 1.5 µsec	
Carrier hum modulation	< -26 dBc (5%)	< -26 dBc (5%)	
Burst noise	< 25 µsec	< 25 µsec	
Seasonal/diurnal signal level variation	8 dB	8 dB	

Table A-6 DOCSIS Cable Downstream RF Specifications (continued)

Specification	DOCSIS Specifications ¹	Minimum Settings ²	Your Headend Settings
Signal level slope (50 to 750 MHz)	16 dB	16 dB	
Maximum analog video carrier level (at CM)	+17 dBmV	+17 dBmV	
Minimum analog video carrier level (at CM)	-5 dBmV	-5 dBmV	
Digital Signal Levels			
From headend	-15 to +15 dBmV	-15 to +15 dBmV	
Signal as relative to adjacent video signal	-6 or -10 dBc	-6 or -10 dBc	

- DOCSIS specifications are baseline settings for an DOCSIS-compliant, two-way data-over-cable system.
- Minimum settings are slightly different than the DOCSIS settings to account for cable system variations over time and temperature. Using these settings should increase the reliability of DOCSIS-compliant, two-way data-over-cable systems.
- Transit delay is defined as the “round trip” from the cable headend to the furthest customer and back.
- QAM = Quadrature Amplitude Modulation: a method of modulating digital signals onto a radio-frequency carrier signal involving both amplitude and phase coding.
- These settings are measured relative to the digital carrier. Add 6 or 10 dB, as determined by your company’s policy and derived from the initial cable network setup, relative to the analog video signal.
- dBc = decibels relative to carrier.
- ns = nanoseconds.

EuroDOCSIS Upstream and Downstream Specifications

The recommended settings listed in the following tables are based on a hybrid fiber-coaxial cable (HFC) network in which the digital signal is carried 10 dB below the adjacent analog video channel. If the digital signal on your network is carried 6 dB below the adjacent analog video channel, add 4 dB to the recommended settings in [Table A-7](#) and [Table A-8](#).

Table A-7 EuroDOCSIS Cable Upstream RF Specifications

Specification	EuroDOCSIS Specifications ¹	Minimum Settings ²	Your Headend Settings
System/Channel			
Frequency range	5 to 65 MHz	5 to 65 MHz	
Transit delay, CMTS to furthest customer	< 0.800 ms	< 0.800 ms	
Carrier to noise ratio	> 25 dB (QPSK ³) ⁴ > 25 dB (16 QAM ⁵) ⁴	> 21 dB (QPSK) ⁴ > 24 dB (16 QAM) ⁴	
Carrier to ingress power ratio	> 25 dB	> 25 dB	
Carrier to interference ratio	> 25 dB (QPSK) ⁴ > 25 dB (16 QAM) ⁴	> 21 dB (QPSK) ⁴ > 24 dB (16 QAM) ⁴	
Carrier hum modulation	< -23 dBc ⁶ (7%)	< -23 dBc (7%)	
Burst noise	< 10 ms	< 10 ms	
Amplitude ripple	0.5 dB/MHz	0.5 dB/MHz	
Group delay ripple	200 ns/MHz	200 ns/MHz	

Table A-7 EuroDOCSIS Cable Upstream RF Specifications (continued)

Specification	EuroDOCSIS Specifications ¹	Minimum Settings ²	Your Headend Settings
Micro reflections (single echo)	-10 dBc @ < 0.5 ms -20 dBc @ < 1.0 ms	-10 dBc @ < 0.5 ms -20 dBc @ < 1.0 ms	
Seasonal/diurnal signal level variation	< 8 dB	< 8 dB	
Carrier to second order	< -50 dBc	< -50 dBc	
Digital Signal Levels			
From cable modem (upstream)	+8 to +58 dBmV (QPSK) +8 to +55 dBmV (16 QAM)	+8 to +58 dBmV (QPSK) +8 to +55 dBmV (16 QAM)	
Input amplitude to modem card (upstream)	-10 to +25 dBmV	-10 to +25 dBmV	
Signal as relative to adjacent video signal	-6 to -10 dBc	-6 to -10 dBc	

1. EuroDOCSIS specifications are baseline settings for a EuroDOCSIS-compliant, two-way cable system.
2. Minimum settings are slightly different than the EuroDOCSIS settings to account for cable system variations over time and temperature. Using these settings should increase the reliability of EuroDOCSIS-based, two-way cable systems.
3. QPSK = Quadrature Phase-Shift Keying: a method of modulating digital signals onto a radio-frequency carrier signal using four phase states to code two digital bits.
4. These settings are measured relative to the digital carrier. Add 6 or 10 dB, as determined by your company's policy and derived from the initial cable network setup, relative to the analog video signal.
5. QAM = Quadrature Amplitude Modulation: a method of modulating digital signals onto a radio-frequency carrier signal involving both amplitude and phase coding.
6. dBc = decibels relative to carrier.

Table A-8 EuroDOCSIS Cable Downstream RF Specifications

Specification	EuroDOCSIS Specifications ¹	Minimum Settings ²	Your Headend Settings
System/Channel			
RF channel spacing (bandwidth)	8 MHz	8 MHz	
Transit delay ³	0.800 ms	0.800 ms	
Carrier to noise ratio	> 28 dB (64 QAM ⁴) ⁵ > 33.5 dB (256 QAM) ⁵	> 28 dB (64 QAM) ⁵ > 31.5 dB (256 QAM) ⁵	
Carrier to ingress power ratio	> 35 dB	> 35 dB	
Composite triple beat distortion	< -50 dBc ⁶	< -50 dBc	
Carrier to second order	< -50 dBc	< -50 dBc	
Cross-modulation level	< -40 dBc	< -40 dBc	
Amplitude ripple	0.5 dB in 8 MHz	0.5 dB in 8 MHz	
Group delay	75 ns ⁷ in 8 MHz	75 ns in 8 MHz	
Micro reflections bound for dominant echo	-10 dBc @ < 0.5 ms -15 dBc @ < 1.0 ms -20 dBc @ < 1.5 ms -30 dBc @ < 1.5 ms	-10 dBc @ < 0.5 ms -15 dBc @ < 1.0 ms -20 dBc @ < 1.5 ms -30 dBc @ < 1.5 ms	
Carrier hum modulation	< -26 dBc (5%)	< -26 dBc (5%)	

Table A-8 EuroDOCSIS Cable Downstream RF Specifications (continued)

Specification	EuroDOCSIS Specifications ¹	Minimum Settings ²	Your Headend Settings
Burst noise	< 25 ms	< 25 ms	
Seasonal/diurnal signal level variation	8 dB	8 dB	
Signal level slope (50 to 750 MHz)	16 dB	16 dB	
Maximum analog video carrier level	+17 dBmV	+17 dBmV	
Minimum analog video carrier level	-5 dBmV	-5 dBmV	
Digital Signal Levels			
From headend	-15 to +15 dBmV	-15 to +15 dBmV	
Signal as relative to adjacent video signal	-6 or -10 dBc	-6 or -10 dBc	

1. EuroDOCSIS specifications are baseline settings for an EuroDOCSIS-compliant, two-way cable system.
2. Minimum settings are slightly different than the EuroDOCSIS settings to account for cable system variations over time and temperature. Using these settings should increase the reliability of EuroDOCSIS-based, two-way cable systems.
3. Transit delay is defined as the “round trip” from the cable headend to the furthest customer and back.
4. QAM = Quadrature Amplitude Modulation: a method of modulating digital signals onto a radio-frequency carrier signal involving both amplitude and phase coding.
5. These settings are measured relative to the digital carrier. Add 6 or 10 dB, as determined by your company’s policy and derived from the initial cable network setup, relative to the analog video signal.
6. dBc = decibels relative to carrier.
7. ns = nanoseconds.

Integrated Upconverter Specifications

The integrated upconverter that is installed in the Cisco uBR7100 series chassis meets all DOCSIS and EuroDOCSIS specifications. The upconverter outputs an RF signal and operates in the frequency range of 55 to 858 MHz (band center). The output range is +50 to +63 dBmV at 64 and 256 QAM; the output can go down to +45 dBmV but with degraded power accuracy.



Note

The integrated upconverter output is available on the downstream port labeled DS0 RF. The downstream labeled DS0 outputs an IF signal that must be put through an external upconverter before use.



Note

On the Cisco uBR7111E and Cisco uBR7114E routers, the DS0 connector is automatically muted when the DS0 RF port is enabled.

