LRIT/HRIT System

Reliable, high performance solution for receiving, archiving, processing and displaying LRIT and HRIT data from EUMETCast, HimawariCast, MSG, GOES, COMS-1 and Electro services
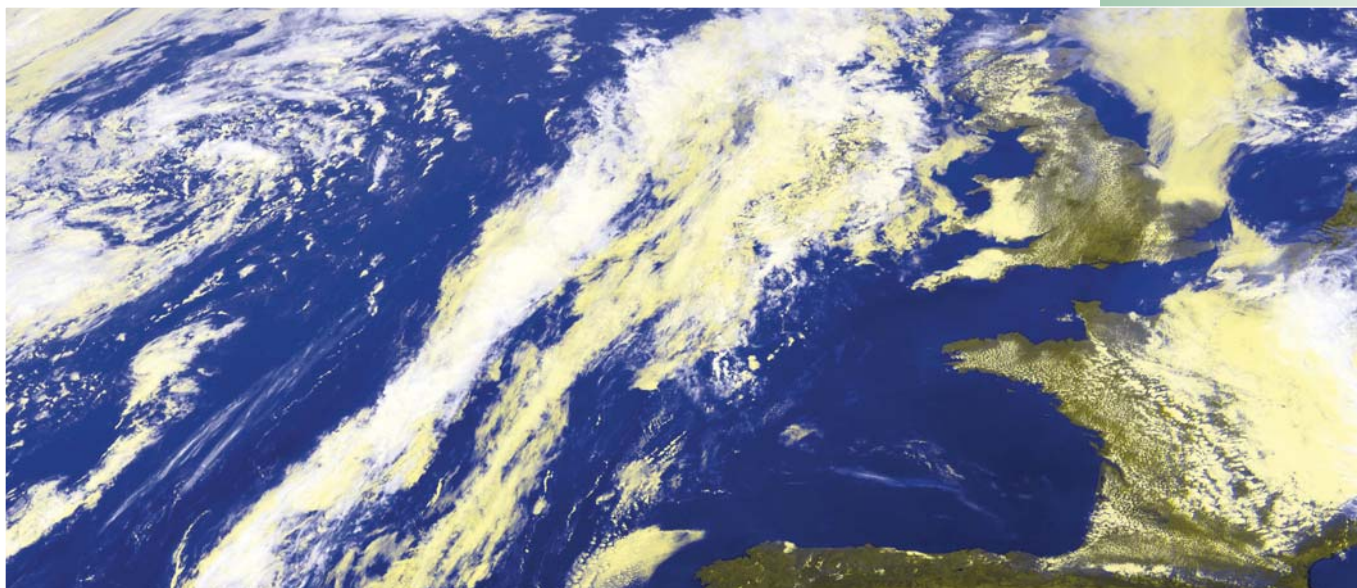
▲ *Meteosat 10 HRIT and Electro-L LRIT false colour images showing weather systems in the Atlantic, and snow and cloud over the Himalayas*

▲ *Dartcom 1.2m Ku-Band antenna*

The Dartcom LRIT/HRIT System can receive, archive, process and display LRIT and HRIT data from EUMETCast, HimawariCast, MSG direct broadcast, GOES, COMS-1 and Electro services.

LRIT and HRIT data is an important source of information for nowcasting, numerical weather prediction, climate monitoring and research. The latest imagery and products are available as frequently as every 15 minutes, allowing major improvements in the forecasting of severe weather.

Antenna and receiver options are available to suit different services, geographical locations and requirements. All types of transmission are supported – Ku-Band and C-Band DVB services, and L-Band direct broadcast services.

Ingested data can be viewed and processed using the Dartcom iDAP/MacroPro software. Outputs are also available for popular image processing software packages such as PCI Geomatica, ERDAS IMAGINE and ENVI/IDL, as well as standard interchange formats such as GeoTIFF.
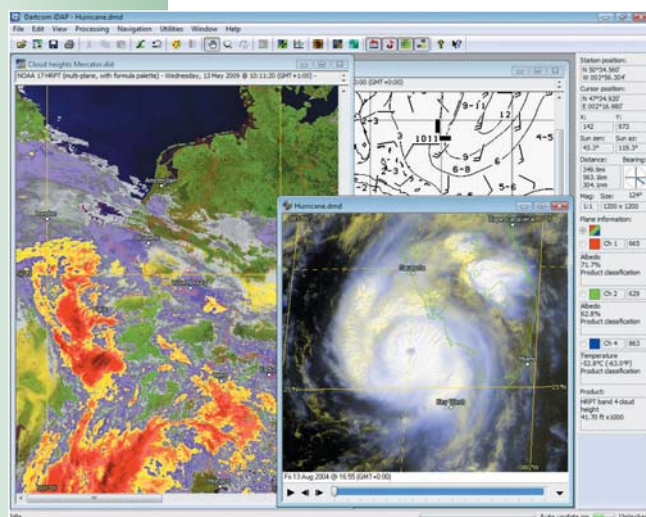
DARTCOM

LRIT/HRIT System Overview

▲ *Dartcom 1.2m L-Band antenna installed at the University of Huaraz in Peru*

▲ *Dartcom 3.0m L-Band antenna*

▲ *Dartcom iDAP and MacroPro software*

Components

- **Antenna** – various sizes available, or customers can source their own locally, or upgrade a disused WEFAX antenna if suitable.

- **Receiver** – various options available to suit different services.

- **Ingest and visualisation PC** – running Dartcom XRIT Ingester and Dartcom iDAP/MacroPro software. Customers can either supply their own PC, or for a turnkey solution Dartcom can supply a PC fully set-up and tested.

Dartcom can also provide on-site installation and training services.

Features

- Fully automatic reception, decryption, decompression, archiving, output and processing of LRIT and HRIT data.

- All current services supported, including EUMETCast LRIT, HRIT and SAF, HimawariCast LRIT and HRIT, MSG direct broadcast LRIT, GOES LRIT, COMS-1 LRIT and HRIT, and Electro-L LRIT.

- Simple hardware installation with little or no civil engineering works required in most cases.

- Advanced multi-threaded software architecture allowing ingest from multiple services simultaneously.

- Proven, robust, reliable hardware and software, with installations all over the world in all climates, temperatures and environments.

- Comprehensive hardware and software diagnostics at all levels, with on-screen and email alarms, and full logging if required.

- Can be integrated with the Dartcom HRPT/AHRPT System to provide a full polar-orbiter and geostationary reception station.

Software

- **Dartcom XRIT Ingester** – provides automatic ingest, archiving and output of LRIT and HRIT data.

- **Dartcom iDAP** – provides a wide range of image manipulation and processing facilities such as animation, enhancement, product creation, reprojection, masking, printing and exporting to third-party formats such as PCI Geomatica, ERDAS IMAGINE, ENVI/IDL and GeoTIFF.

- **Dartcom MacroPro** – automates the powerful processing facilities provided by iDAP.
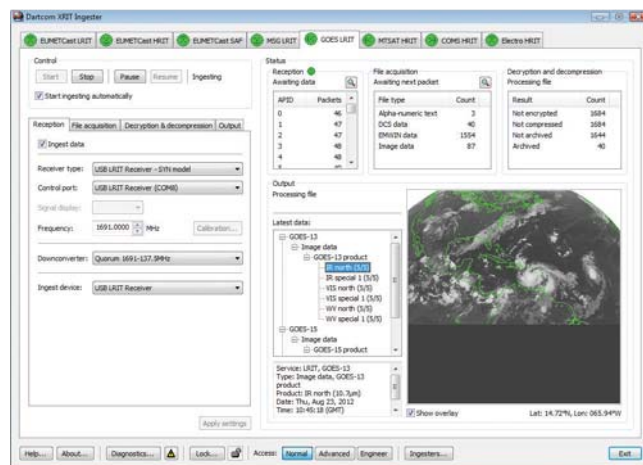
▲ *Dartcom XRIT Ingester software*

Ku-Band hardware

Required for Ku-Band EUMETCast LRIT/HRIT reception. See the *Service availability* section for coverage.

85cm, 1.2m or 1.8m offset dish and LNB

• High-quality powder-coated aluminium (85cm, 1.2m) or glass-fibre reinforced compression moulded polyester (1.8m) reflector.

• 2.4–4.5m antennas also available for fringe area reception.

• Supplied with azimuth/elevation mounting bracket (85cm, 1.2m), 50m of CT100 75Ω co-axial cable and F-type connectors.

• 1.8m antenna supplied with 4" tubular pedestal (optional non-penetrating roof mount also available).

• State-of-the-art weatherproof LNB with a noise figure of 0.3dB.

DVB receiver and software

• Ayecka SR1 (desk or 19" rack mount) or TBS 6983 (PCIe card) DVB-S2 receiver, both recommended by EUMETSAT.

• Supplied with drivers and T-Systems Business TV-IP software.

▲ *85cm Ku-Band antenna*

▲ *1.8m Ku-Band antenna*

▼ *Colour availabilities for Ku-Band dish antennas*

Size	Slate grey	Beige	Brick red	Light grey
85cm	✔	✔	✔	
1.2m				✔
1.8m				✔

▼ *Ku-Band LNB specifications*

Feed type	Scalar horn
Polarisation	Linear
RF input	10.7–12.75GHz
Noise figure	0.3dB typical
Total gain	50–60dB
LO frequency	Low: 9.75GHz High: 10.6GHz
RF output	950–2150MHz

▲ *Ayecka SR1 DVB-S2 receiver, desk mount version*
► *TBS 6983 PCIe DVB-S2 receiver card*

▲ *Ayecka SR1 DVB-S2 receiver, rack mount version*

▼ *Ayecka SR1 DVB-S2 receiver specifications*

RF input frequency	950–2150MHz
RF input connector	75Ω F-type
Symbol rates	100ksps to 45Msps
Channel rate	Up to 120Mbps

▼ *TBS 6983 PCIe DVB-S2 receiver card specifications*

RF input frequency	950–2150MHz
RF input connector	75Ω F-type
Symbol rates	1Msps to 45Msps
Channel rate	Up to 190Mbps

▼ *Ku-Band antenna specifications*

	85cm antenna	1.2m antenna	1.8m antenna
Reflector type	21˚ offset	21.3˚ offset	Offset
Reflective material	Solid aluminium, powder coated	Solid aluminium, powder coated	Glass-fibre reinforced polyester
Reflector diameter	0.85m	1.2m	1.8m
F/D ratio	0.67	0.66	0.66
Gain	38.2dBi	41.3dBi	45.5dBi
Polarisation	Linear	Linear	Linear
G/T @ 5˚ elevation	17.2dB/K	19.2dB/K	26.0dB/K
Wind speeds	80km/h operational 120km/h survival	80km/h operational 120km/h survival	72km/h operational 201km/h survival

▲ *2.4m C-Band dish antenna and LNB*

▲ *3.0m/3.7m C-Band dish antenna and LNB*

▲ *C-Band LNB*

C-Band hardware

Required for C-Band EUMETCast LRIT/HRIT and HimawariCast LRIT/HRIT reception. See the *Service availability* section for coverage.

2.4m, 3.0m or 3.7m parabolic dish and LNB

- Three-segment (2.4m) or eight-segment (3.0m, 3.7m) glass-fibre reinforced precision compression moulded polyester reflector.
- Supplied with galvanised steel azimuth/elevation mount and pedestal, and 50m of CT100 75Ω co-axial cable.
- Phase locked loop LNB in weatherproof powder-coated housing.

DVB receiver and software

- TechniSat SkyStar 2 internal PCI DVB receiver card for EUMETCast.
- TBS 6983 internal PCIe DVB-S2 receiver card for HimawariCast.
- Supplied with drivers and data acquisition software (Tellicast for EUMETCast, KenCast FAZZT for HimawariCast).

▼ *C-Band LNB specifications*

Feed type	Scalar horn
Polarisation	Circular
RF input	3.4–4.2GHz
Noise figure	0.35dB typical
Total gain	>60dB
RF output	950–1750MHz

▼ *DVB receiver specifications*

	SkyStar 2	TBS 6983
RF input frequency	950–2150MHz	950–2150MHz
RF input connector	75Ω F-type	75Ω F-type
Symbol rates	2Msps to 45Msps	1Msps to 45Msps
Data rates	Up to 90Mbps	Up to 190Mbps

▲ *TechniSat SkyStar 2 receiver card*

▲ *TBS 6983 PCIe DVB-S2 receiver card*

▼ *C-Band antenna specifications*

	2.4m antenna	3.0m antenna	3.7m antenna
Reflector type	Prime focus parabolic	Prime focus parabolic	Prime focus parabolic
Reflective material	3-segment glass-fibre reinforced polyester	8-segment glass-fibre reinforced polyester	8-segment glass-fibre reinforced polyester
Reflector diameter	2.4m	3.0m	3.7m
F/D ratio	0.37	0.30	0.37
Gain	37.5dBi	40.0dBi	40.9dBi
Polarisation	Circular	Circular	Circular
G/T @ 5˚ elevation	17.7dB/K	19.8dB/K	21.7dB/K
Wind speeds	80km/h operational 201km/h survival	72km/h operational 201km/h survival	72km/h operational 201km/h survival

L-Band hardware

Required for L-Band direct broadcast MSG LRIT, GOES LRIT, LRIT/HRIT, COMS-1 LRIT/HRIT and Electro LRIT/HRIT reception. See the *Service availability* section for coverage.

1.2m, 1.8m, 2.4m, 3.0m or 3.7m parabolic dish

• Solid powder-coated aluminium (1.2m, 1.8m) or glass-fibre reinforced precision compression moulded polyester reflector with three segments (2.4m) or eight segments (3.0m, 3.7m).

• Supplied with galvanised steel azimuth/elevation mount and pedestal, and up to 100m of RG213 50Ω co-axial cable.

Feed and downconverter

• Integrated feed/downconverter (1.2m, 1.8m, 2.4m, 3.0m) or scalar horn (3.7m) with N-type output.

• LNA/downconverter designed for harsh radio environments with pre-select filter to reduce cellular phone and radar interference.

• Low noise figure of 1.2dB (92K) typical.

• Weatherproof O-ring sealed machined case and connectors.

▲ *3.0m/3.7m L-Band dish antenna and LNB*

▲ *1.2m/1.8m/2.4m L-Band dish antenna and LNB*

▼ *L-Band feed and downconverter specifications*

Feed type	PCB patch IFD (1.2/1.8/2.4/3.0m) Scalar horn (3.7m)
Polarisation	Linear (RHC for Electro)
RF input	1691MHz ±25MHz
LNA noise figure	1.2dB typical
Pre-LNA filter	3-pole, −3dB ±60MHz
Total gain	>50dB
LO frequency	1553.5MHz
RF output	137.5MHz ±25MHz

► *L-Band scalar feed (3.7m antenna)*

▲ *L-Band downconverter*

▼ *L-Band antenna specifications*

|	1.2m antenna	1.8m antenna	2.4m antenna	3.0m antenna	3.7m antenna
Reflector type	Prime focus parabolic	Prime focus parabolic	Prime focus parabolic	Prime focus parabolic	Prime focus parabolic
Reflective material	Solid aluminium, powder coated	Solid aluminium, powder coated	3-segment glass-fibre reinforced polyester	8-segment glass-fibre reinforced polyester	8-segment glass-fibre reinforced polyester
Reflector diameter	1.2m	1.8m	2.4m	3.0m	3.7m
F/D ratio	0.38	0.42	0.37	0.30	0.37
Gain	24.0dBi	27.5dBi	30.3dBi	32.2dBi	34.1dBi
Polarisation	Linear	Linear	Linear	Linear	Linear
G/T @ 5° elevation	2.2dB/K	6.0dB/K	9.6dB/K	11.7dB/K	13.5dB/K
Wind speeds	112km/h operation 201km/h survival	112km/h operation 201km/h survival	80km/h operation 201km/h survival	72km/h operation 201km/h survival	72km/h operation 201km/h survival

LRIT/HRIT System L-Band receivers
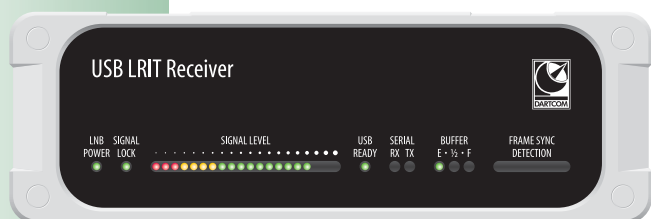
▲ *Dartcom USB LRIT receiver*
▼ *Specifications*

RF input frequency	135–144MHz (1688.5–1697.5MHz from a 1691MHz to 137.5MHz LNB)
Frequency resolution	5kHz
RF input connector	50Ω BNC
RF input level	–15dBm to –75dBm
Symbol rates	64ksps to 1024ksps
Viterbi decoding	$\frac{1}{2}$, K=7, G1=171, G2=133
Demodulator modes	QPSK, BPSK
Data encodings	NRZ-S, NRZ-M, NRZ-L
Digital interface	USB port
Power requirements	15V DC @ 2A
LNB power	14–15V DC nominal @ 0.75A via RF input
PSU	External switch mode, input 100–240V AC 47–63Hz @ 1.2A
Dimensions (W×H×D)	175×60×240mm
Weight	1.7kg (including PSU)
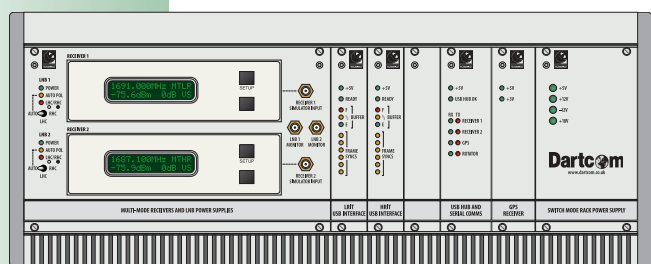
▲ *Dartcom USB LRIT/HRIT receiver rack*
▼ *Specifications*

RF input frequency	126–154MHz
RF input connector	50Ω N-type
IF conversion	Direct, 70MHz, 50MSPS, 10-bit
Frequency resolution	25kHz
Symbol rates	0.1Msps to 3.5Msps
Viterbi decoding	$\frac{1}{2}$, K=7, G1=171, G2=133, 5.2dB coding gain at 1:10⁵ BER
Demodulator modes	QPSK, BPSK, PSK
Data encodings	NRZ, NRZ-S, NRZ-M, Biphase-L
Performance	QPSK/BPSK within 1dB of theoretical, 0.5dB typical
Digital interface	USB port
Power requirements	100–240V AC 50–400Hz

USB LRIT receiver

- High-quality, low-cost receiver for direct broadcast LRIT transmissions from MSG, GOES, COMS-1 and Electro services.
- Fully compatible with the forthcoming GOES-R HRIT service.
- Housed in a sleek, compact, durable extruded aluminium case with styled ABS bezels.
- USB interface for fast, reliable data transfer to the host computer.
- Fully software controlled, with detailed status reports available.
- Built-in time-stamped fault logging.
- 20-LED real-time signal level display for easy dish alignment and operational signal monitoring.
- Status LEDs for LNB power, signal lock, USB ready, control communications, data buffer status and frame synchronisation detection.
- Adjustable RF attenuator to accommodate LNB signal inputs between –15dBm and –75dBm.
- Supports QPSK and BPSK demodulation.
- Built-in hardware Viterbi decoding.
- Supplies power to the LNB via the RF input.
- Powered by an external switch mode PSU (supplied).
- DC–DC converter PSU also available for battery or portable operation (input 10.6–15V DC).
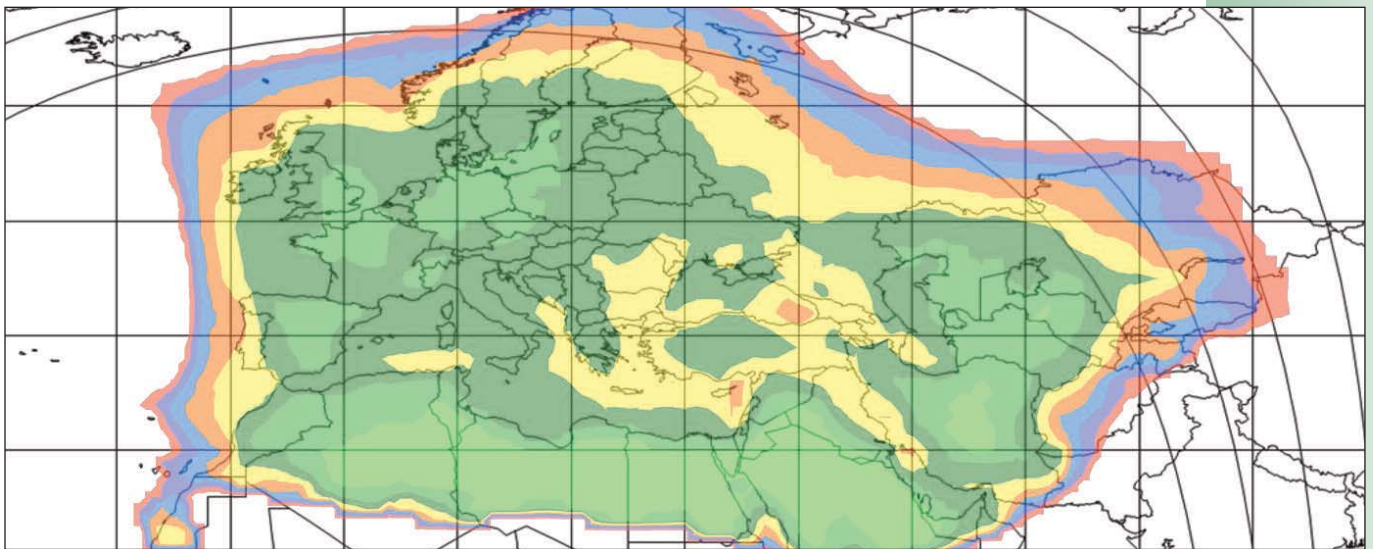
USB LRIT/HRIT receiver rack

- High quality, high performance, professional grade receiver for direct broadcast LRIT and HRIT transmissions from MSG, GOES and COMS-1 services.
- Available in LRIT, HRIT or combined LRIT/HRIT configurations.
- Rugged 4U-high 19" rack.
- Plug-in modules for ease of maintenance and to allow for future upgrades.
- USB interface for fast, reliable data transfer to the host computer.
- Fully software controlled, with detailed status reports available.
- Comprehensive LED and character matrix status displays and diagnostic points on the front panel.
- Supplied with up to two state-of-the-art multi-mode DSP receiver modules and USB interface modules.
- Each receiver module supplies power to the LNB via its RF input.
- Supports QPSK, BPSK and PSK demodulation.
- Built-in hardware Viterbi decoding.
- Rack or desk mount versions available.
- Powered by 100–240V AC mains, 50–400Hz.
- Upgradable to also provide HRPT/AHRPT reception by purchasing additional plug-in modules together with a tracking antenna system and Dartcom Polar Orbiter Ingester software.
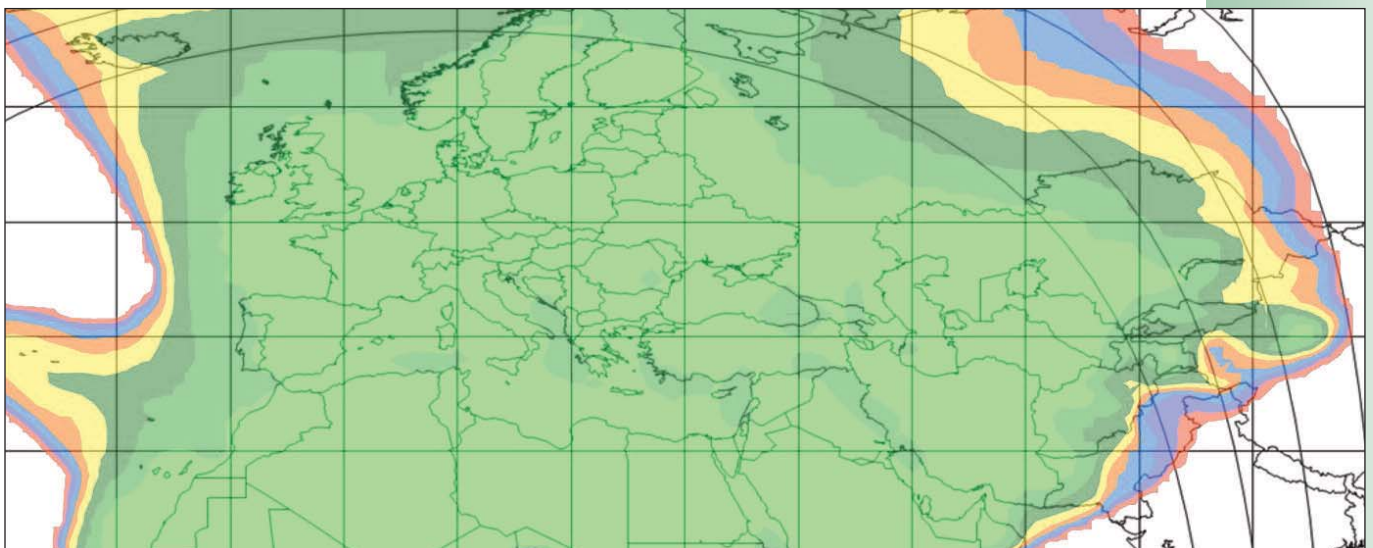
>98%	>99%	>99.5%	>99.8%	>99.9%	>99.95%	>99.98%	>99.99%

▲ *EUMETCast Ku-Band basic service availability – 85cm antenna (G/T @ 12.5GHz = 18.5dB/K)*
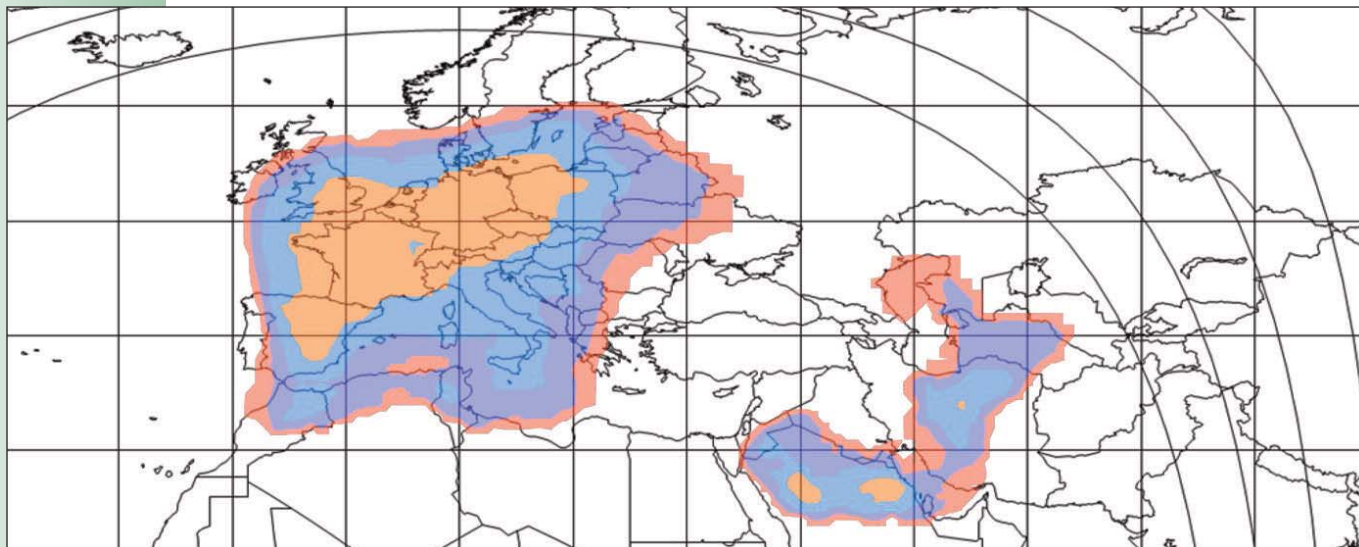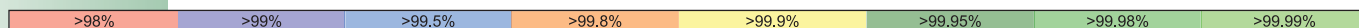

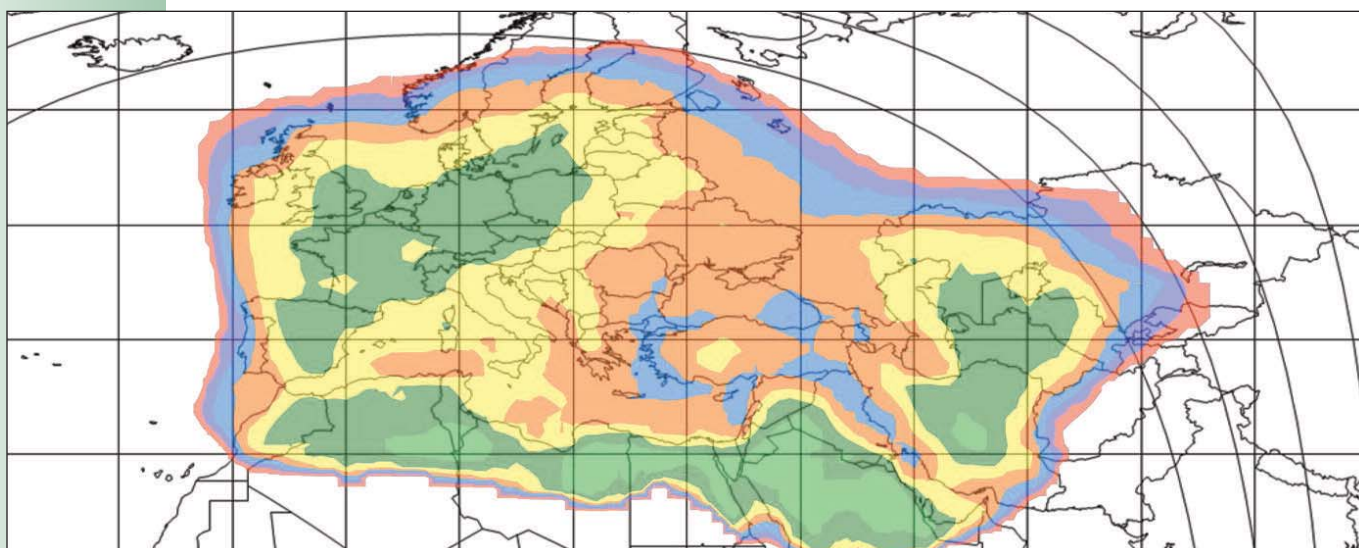▲ *EUMETCast Ku-Band basic service availability – 1.2m antenna (G/T @ 12.5GHz = 20.5dB/K)*

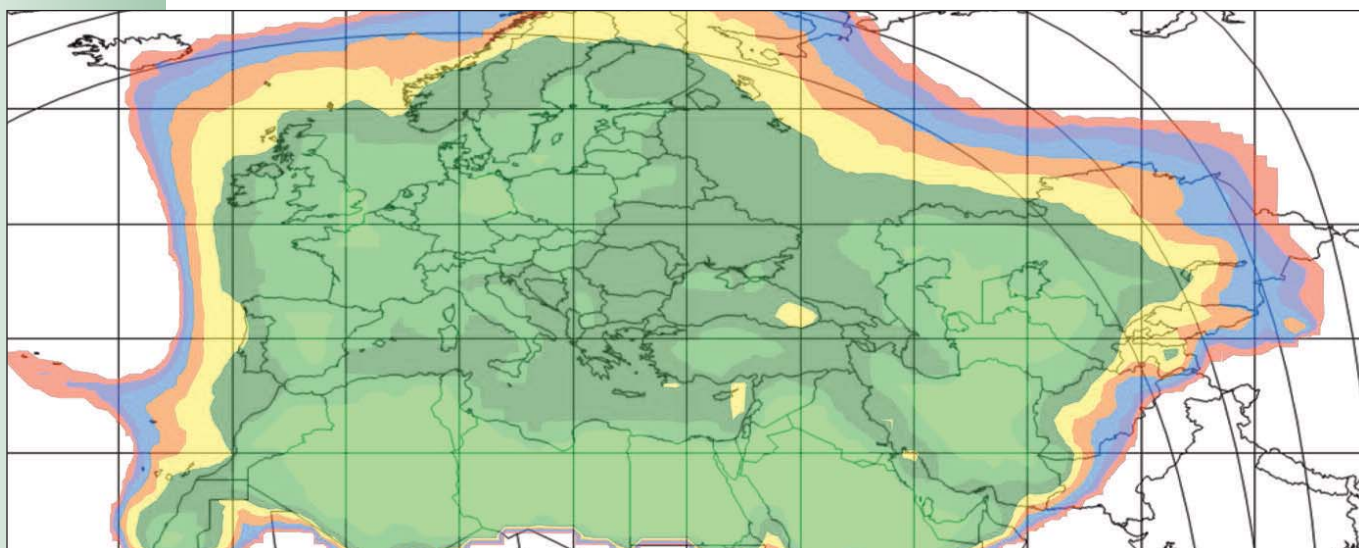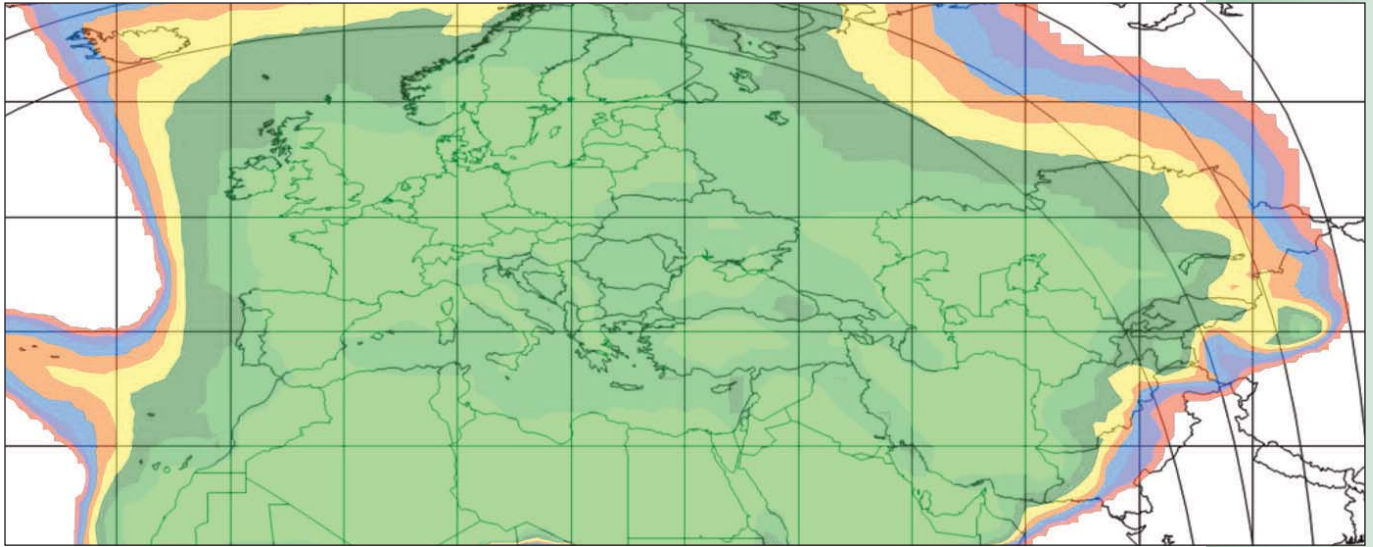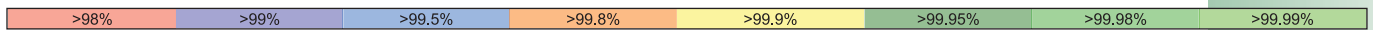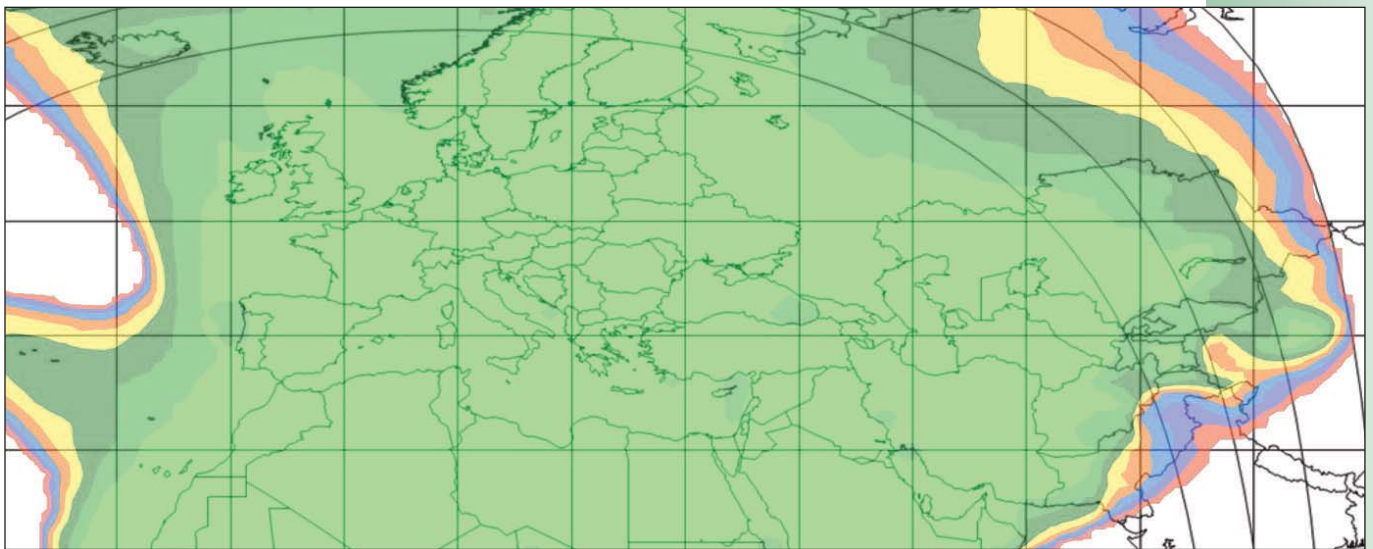▲ *EUMETCast Ku-Band basic service availability – 1.8m antenna (G/T @ 12.5GHz = 23.5dB/K)*

>98%	>99%	>99.5%	>99.8%	>99.9%	>99.95%	>99.98%	>99.99%

▲ *EUMETCast Ku-Band high-rate service availability – 85cm antenna (G/T @ 12.5GHz = 18.5dB/K)*

▲ *EUMETCast Ku-Band high-rate service availability – 1.2m antenna (G/T @ 12.5GHz = 20.5dB/K)*

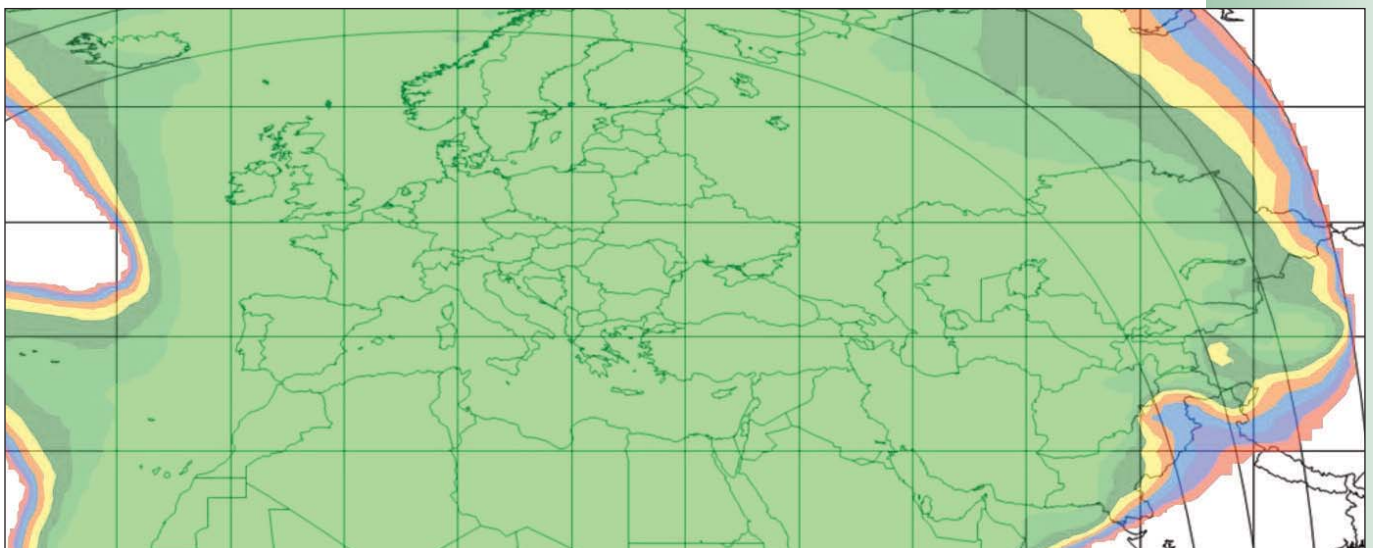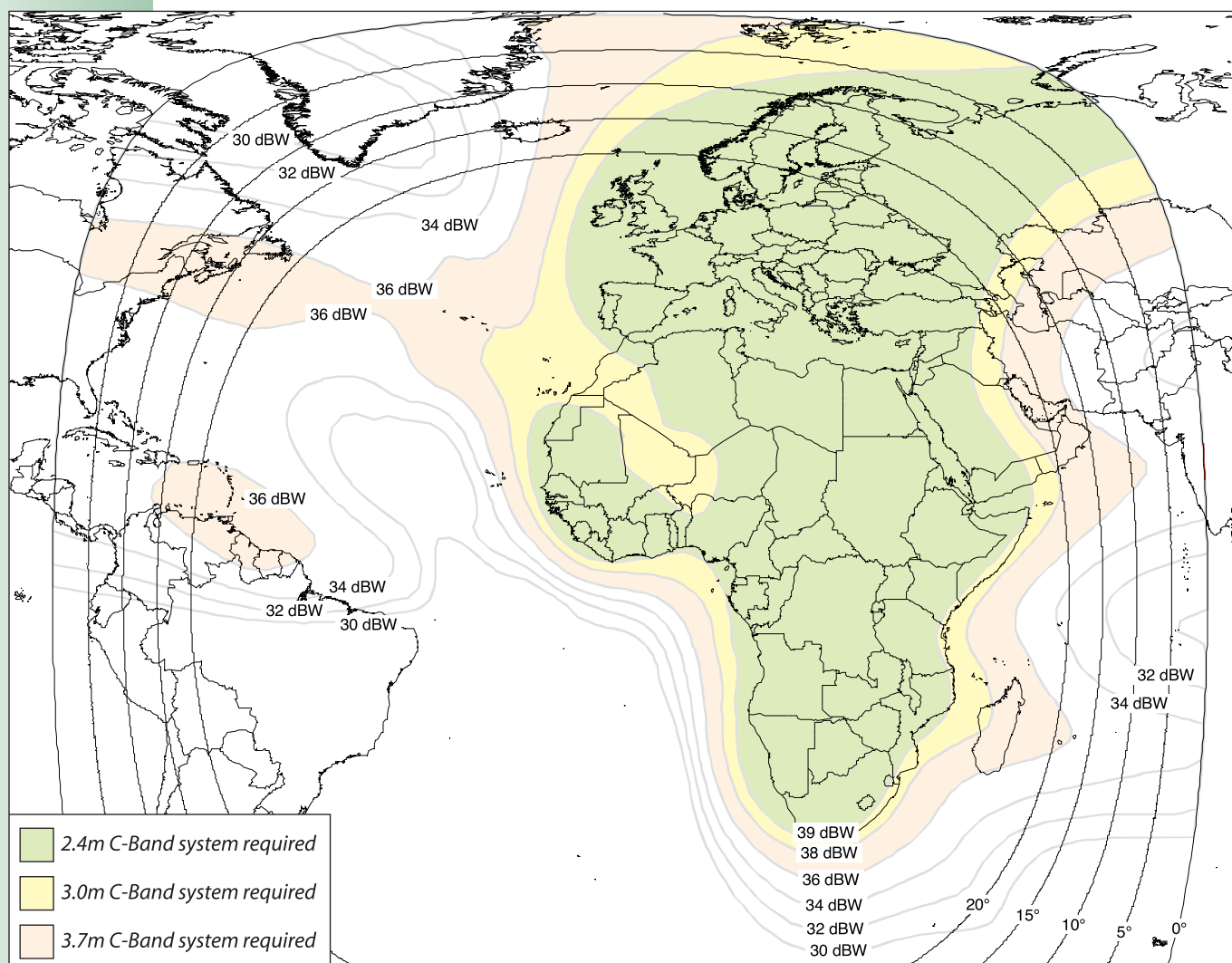▲ *EUMETCast Ku-Band high-rate service availability – 1.8m antenna (G/T @ 12.5GHz = 23.5dB/K)*

>98%	>99%	>99.5%	>99.8%	>99.9%	>99.95%	>99.98%	>99.99%

▲ *EUMETCast Ku-Band high-rate service availability – 2.4m antenna (G/T @ 12.5GHz = 26.0dB/K)*

▲ *EUMETCast Ku-Band high-rate service availability – 3.7m antenna (G/T @ 12.5GHz = 28.9dB/K)*

▲ *EUMETCast Ku-Band high-rate service availability – 4.5m antenna (G/T @ 12.5GHz = 31.5dB/K)*

2.4m C-Band system required

3.0m C-Band system required

3.7m C-Band system required

30 dBW
32 dBW
34 dBW
36 dBW
36 dBW
36 dBW
34 dBW
32 dBW
30 dBW

32 dBW
34 dBW

39 dBW
38 dBW
36 dBW
34 dBW
32 dBW
30 dBW

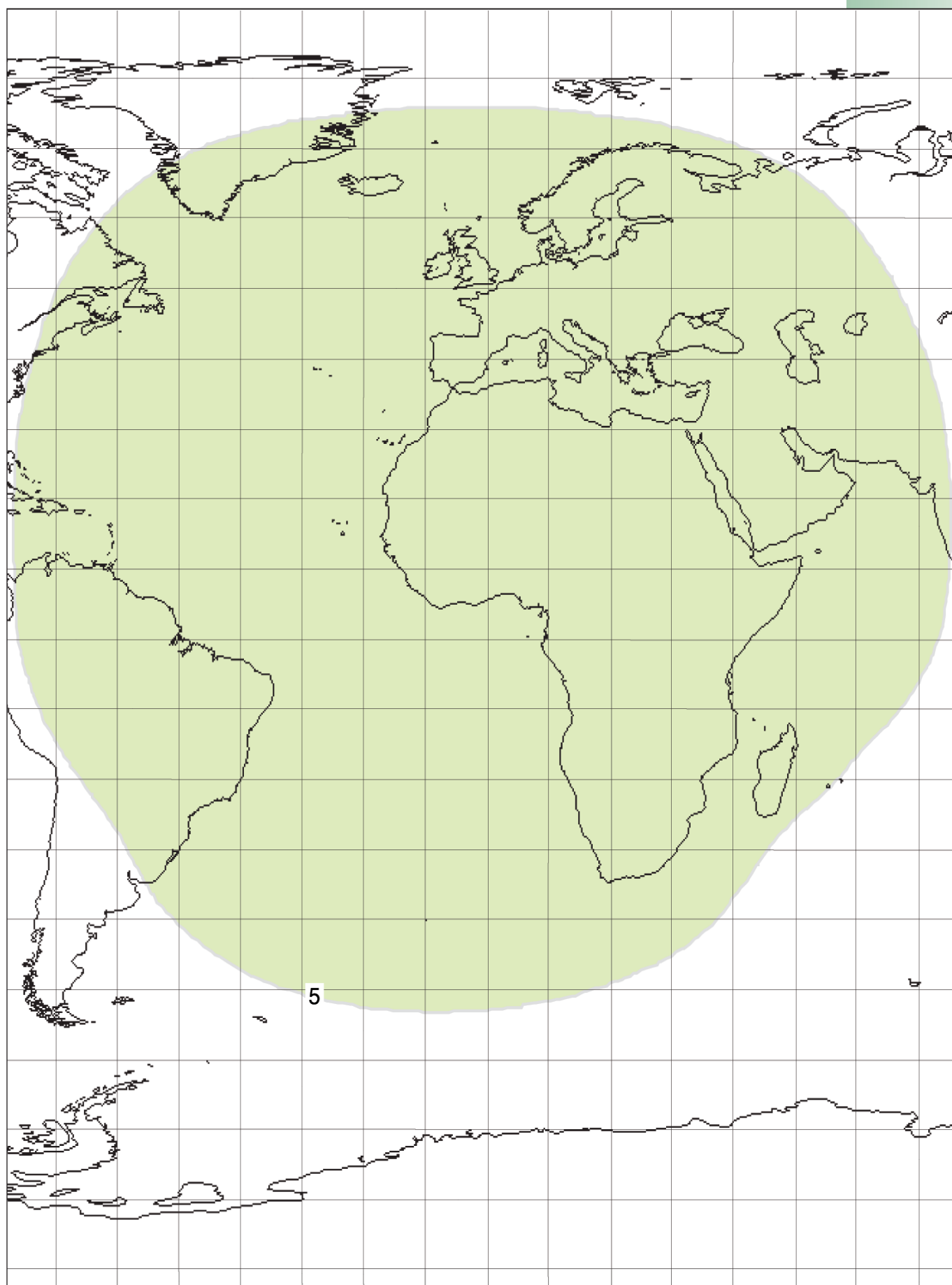20°   15°   10°   5°   0°

▲ EUMETCast C-Band service availability

▲ GOES East L-Band coverage, centred on 75°W – 1.2m antenna required
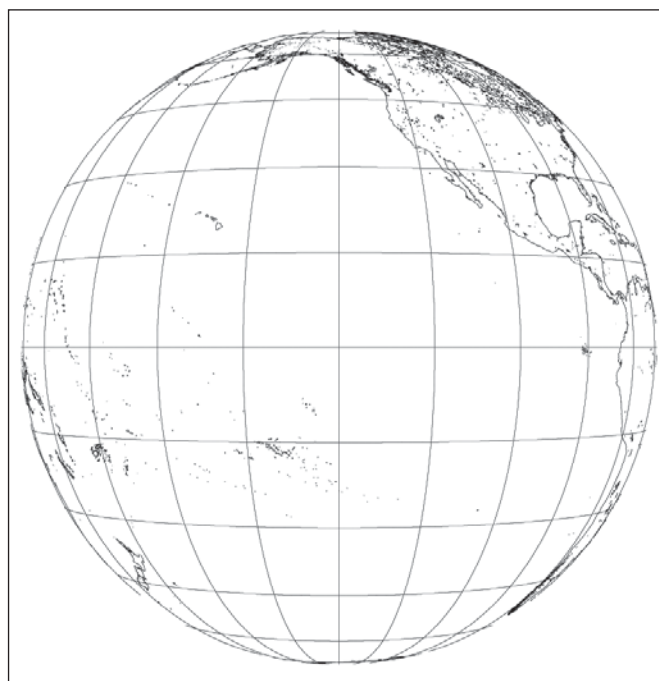
▲ GOES West L-Band coverage, centred on 135°W – 1.2m antenna required

▲ *MSG LRIT L-Band direct broadcast service availability – 1.8m antenna required*
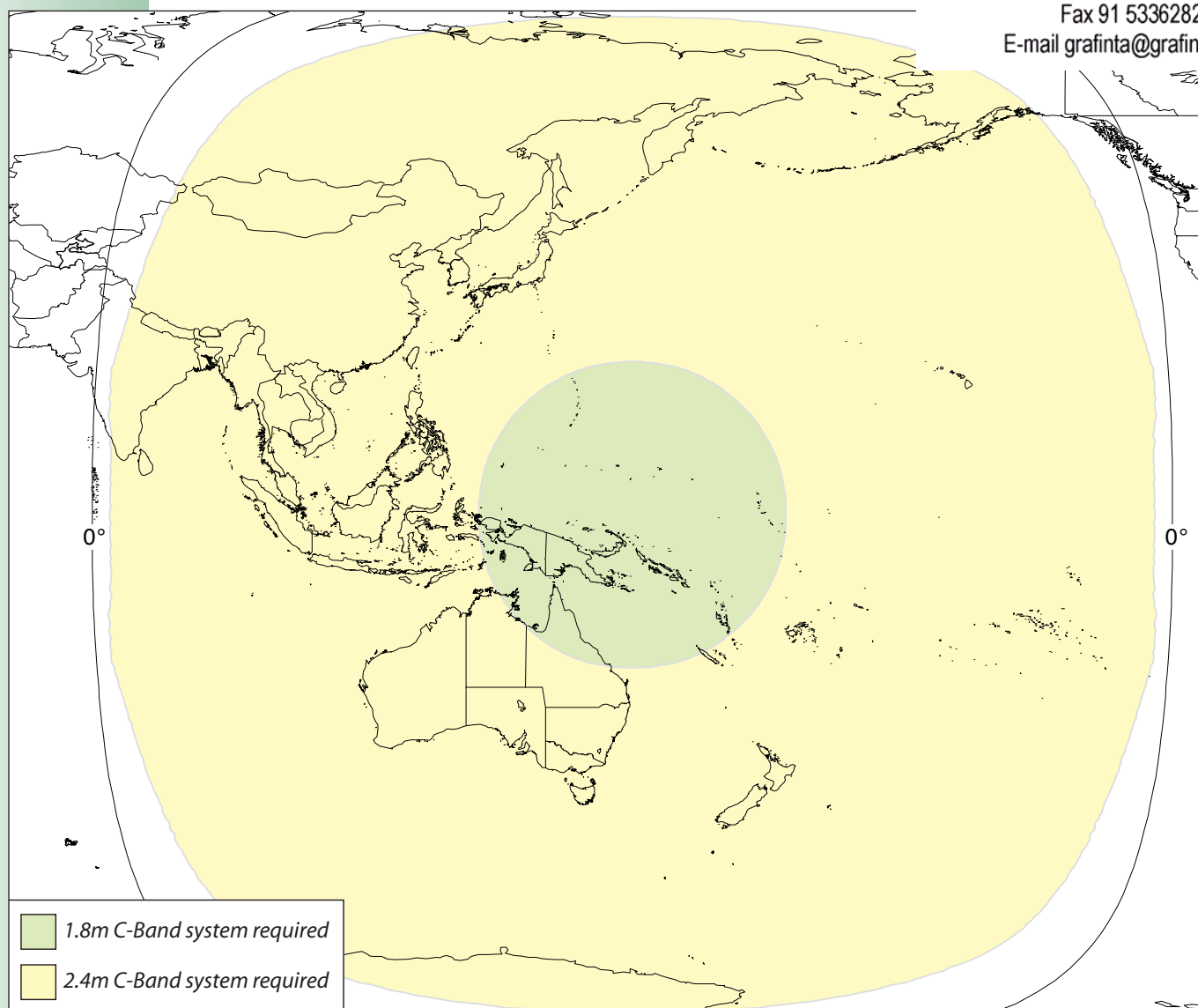
Grafinta
Avda. Filipinas, 46
28003 Madrid
Tfo. 91 5537207
Fax 91 5336282
E-mail grafinta@grafinta.com

0°

0°

1.8m C-Band system required

2.4m C-Band system required

▲ *HimawariCast C-Band service availability*

▲ *COMS-1 L-Band coverage, centred on 128.2˚E – 1.2m antenna required for LRIT, 3.0m/3.7m for HRIT*

▲ *Electro-L L-Band coverage, centred on 76˚E – 1.8m antenna required for LRIT, 3.0m/3.7m for HRIT*

Dartcom

Powdermills, Postbridge, Yelverton, Devon, PL20 6SP, UK
Phone (01822) 880253 • International +44 1822 880253
Web *www.dartcom.co.uk* • Email *sales@dartcom.co.uk*