

## NETWORK OPERATOR DETAILS

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## TECHNICAL SPECIFICATIONS OF ESV TYPES USED INTO THE NETWORKS

### • Antenna type AL-7103

<u>ESV Antenna</u>	AL-7103
Antenna type	Orbit AL-7103
Antenna size	1.15 m
Transmit frequency bands	13.75 – 14.50 GHz
Transmit peak gain	42.5 dBi @ 14.25 GHz
Max e.i.r.p. per carrier	53.5 dBW (with 16 watts BUC)
Min. operating elevation	10°
Pointing accuracy	0.1° RMS

#### Waveform definition

Number(s) of carriers per ESV	1
Maximum occupied bandwidth(s) per carrier	3 MHz
Modulation	BPSK, QPSK, 8PSK
Multiple access scheme	FDMA, TDMA

### • Antenna type 4009

<u>ESV Antenna</u>	4009
Antenna type	Cobham Seatel 4009
Antenna size	1.00 m
Transmit frequency bands	13.75 – 14.50 GHz
Transmit peak gain	40.6 dBi @ 14.25 GHz
Max e.i.r.p. per carrier	48.6 dBW (with 8 watts BUC)
Min. operating elevation	10°
Pointing accuracy	0.2° RMS

## Waveform definition

Number(s) of carriers per ESV	1
Maximum occupied bandwidth(s) per carrier	2 MHz
Modulation	BPSK, QPSK, 8PSK
Multiple access scheme	FDMA, TDMA

### • **Antenna type 5010**

#### ESV Antenna

Antenna type	5010
Antenna size	Cobham Seatel 5010
Transmit frequency bands	1.20 m
Transmit peak gain	13.75 – 14.50 GHz
Max e.i.r.p. per carrier	42.1 dBi @ 14.25 GHz
Min. operating elevation	53.1 dBW (with 16 watts BUC)
Pointing accuracy	10°
	0.1° RMS

## Waveform definition

Number(s) of carriers per ESV	1
Maximum occupied bandwidth(s) per carrier	3 MHz
Modulation	BPSK, QPSK, 8PSK
Multiple access scheme	FDMA, TDMA

### • **Antenna type 5012**

#### ESV Antenna

Antenna type	5012
Antenna size	Cobham Seatel 5012
Transmit frequency bands	1.24 m
Transmit peak gain	13.75 – 14.50 GHz
Max e.i.r.p. per carrier	43.0 dBi @ 14.25 GHz
Min. operating elevation	54.0 dBW (with 16 watts BUC)
Pointing accuracy	10°
	0.1° RMS

## Waveform definition

Number(s) of carriers per ESV	1
Maximum occupied bandwidth(s) per carrier	3 MHz
Modulation	BPSK, QPSK, 8PSK
Multiple access scheme	FDMA, TDMA

### • **Antenna type Sailor 900**

## ESV Antenna

Antenna type	Sailor 900
Antenna size	Cobham Sailor 900
Transmit frequency bands	1.03 m
Transmit peak gain	13.75 – 14.50 GHz
Max e.i.r.p. per carrier	41.6 @ 14.25 GHz
Min. operating elevation	50.1 dBW
Pointing accuracy	10°
	0.2° RMS

## Waveform definition

Number(s) of carriers per ESV	1
Maximum occupied bandwidth(s) per carrier	2 MHz
Modulation	BPSK, QPSK, 8PSK
Multiple access scheme	FDMA, TDMA

### • Antenna type Sailor 800

## ESV Antenna

Antenna type	Sailor 800
Antenna size	Cobham Sailor 800
Transmit frequency bands	0.83 m
Transmit peak gain	13.75 – 14.50 GHz
Max e.i.r.p. per carrier	40.6 @ 14.25 GHz
Min. operating elevation	48.1 dBW
Pointing accuracy	10°
	0.2° RMS

## Waveform definition

Number(s) of carriers per ESV	1
Maximum occupied bandwidth(s) per carrier	2 MHz
Modulation	BPSK, QPSK, 8PSK
Multiple access scheme	FDMA, TDMA

### • Antenna type KNS Z8

## ESV Antenna

Antenna type	KNS Z8
Antenna size	KNS Z8 MKII
Transmit frequency bands	0.83 m
Transmit peak gain	13.75 – 14.50 GHz
Max e.i.r.p. per carrier	39.9 @ 14.50 GHz
Min. operating elevation	47.9 dBW
Pointing accuracy	10°
	0.1° RMS

## Waveform definition

Number(s) of carriers per ESV	1
Maximum occupied bandwidth(s) per carrier	2 MHz
Modulation	BPSK, QPSK
Multiple access scheme	FDMA, TDMA

- **Antenna type KNS Z7**

<u>ESV Antenna</u>	KNS Z7
Antenna type	KNS Z7 MKII
Antenna size	0.75 m
Transmit frequency bands	13.75 – 14.50 GHz
Transmit peak gain	39.2 @ 14.5 GHz
Max e.i.r.p. per carrier	47.2 dBW
Min. operating elevation	10°
Pointing accuracy	0.1° RMS

Waveform definition

Number(s) of carriers per ESV	1
Maximum occupied bandwidth(s) per carrier	2 MHz
Modulation	BPSK, QPSK
Multiple access scheme	FDMA, TDMA

- **Antenna type KNS Z10**

<u>ESV Antenna</u>	KNS Z10
Antenna type	KNS Z10 MKII
Antenna size	100 cm
Transmit frequency bands	13.75 – 14.50 GHz
Transmit peak gain	41.1 @ 14.50 GHz
Max e.i.r.p. per carrier	50.1 dBW
Min. operating elevation	10°
Pointing accuracy	0.1° RMS

Waveform definition

Number(s) of carriers per ESV	1
Maximum occupied bandwidth(s) per carrier	2 MHz
Modulation	BPSK, QPSK, 8PSK
Multiple access scheme	FDMA, TDMA

- **Antenna type KNS Z12**

<u>ESV Antenna</u>	KNS Z12
Antenna type	KNS Z12 MKII
Antenna size	1.20 m

Transmit frequency bands	13.75 – 14.50 GHz
Transmit peak gain	42.5 @ 14.5 GHz
Max e.i.r.p. per carrier	51.5 dBW
Min. operating elevation	10°
Pointing accuracy	0.1° RMS

#### Waveform definition

Number(s) of carriers per ESV	1
Maximum occupied bandwidth(s) per carrier	2 MHz
Modulation	BPSK, QPSK, 8PSK
Multiple access scheme	FDMA, TDMA

#### • **Antenna type INTELLIAN V80**

##### ESV Antenna

Antenna type	INTELLIAN V80
Antenna size	83 cm
Transmit frequency bands	13.75 – 14.50 GHz
Transmit peak gain	40.0 @ 14.50 GHz
Max e.i.r.p. per carrier	49.0 dBW
Min. operating elevation	10°
Pointing accuracy	0.2° RMS

#### Waveform definition

Number(s) of carriers per ESV	1
Maximum occupied bandwidth(s) per carrier	2 MHz
Modulation	BPSK, QPSK, 8PSK
Multiple access scheme	FDMA, TDMA

#### • **Antenna type INTELLIAN V100**

##### ESV Antenna

Antenna type	INTELLIAN V100
Antenna size	103 cm
Transmit frequency bands	13.75 – 14.50 GHz
Transmit peak gain	41.6 @ 14.5 GHz
Max e.i.r.p. per carrier	50.6 dBW
Min. operating elevation	10°
Pointing accuracy	0.2° RMS

#### Waveform definition

Number(s) of carriers per ESV	1
Maximum occupied bandwidth(s) per carrier	2 MHz
Modulation	BPSK, QPSK, 8PSK

Multiple access scheme

FDMA, TDMA

- **Antenna type SEA TEL 4006**

ESV Antenna

Antenna type

Antenna size

Transmit frequency bands

Transmit peak gain

Max e.i.r.p. per carrier

Min. operating elevation

Pointing accuracy

SEA TEL 4006

SEA TEL 4006

100 cm

13.75 – 14.50 GHz

40.0 @ 14.00 GHz

49.0 dBW

10°

0.1° RMS

Waveform definition

Number(s) of carriers per ESV

Maximum occupied bandwidth(s) per carrier

Modulation

Multiple access scheme

1

2 MHz

BPSK, QPSK, 8PSK

FDMA, TDMA

- **Antenna type SEA TEL 4010**

ESV Antenna

Antenna type

Antenna size

Transmit frequency bands

Transmit peak gain

Max e.i.r.p. per carrier

Min. operating elevation

Pointing accuracy

SEA TEL 4010

SEA TEL 4010

100 cm

13.75 – 14.50 GHz

39.90 @ 14.25 GHz

48.9 dBW

10°

0.1° RMS

Waveform definition

Number(s) of carriers per ESV

Maximum occupied bandwidth(s) per carrier

Modulation

Multiple access scheme

1

2 MHz

BPSK, QPSK, 8PSK

FDMA, TDMA

## OPERATING DETAILS OF EACH SATELLITES

ITU Filing satellite name	<b>EUTELSAT 3-4E</b>
Satellite operator name	EUTELSAT
GEO longitude	3.1° EAST
Satellite service area (text description and/or a figure of the area)	European coverage

### Forward Channel details (Satellite to ESV)

Transponder downlink centre frequency	10.991,67 MHz
Transponder downlink bandwidth	72 MHz

### Return Channel details (ESV to satellite)

Transponder uplink centre frequency	14.291,67 MHz
Transponder uplink bandwidth	72 MHz

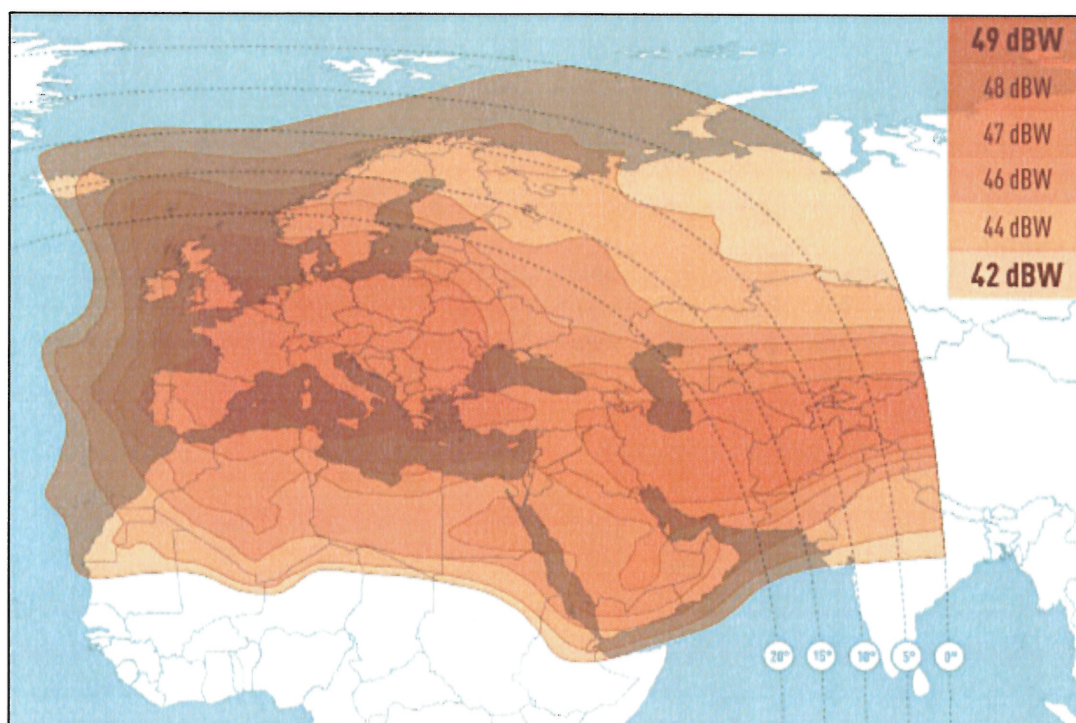


Figure 1: EUTELSAT 3-4E downlink European coverage

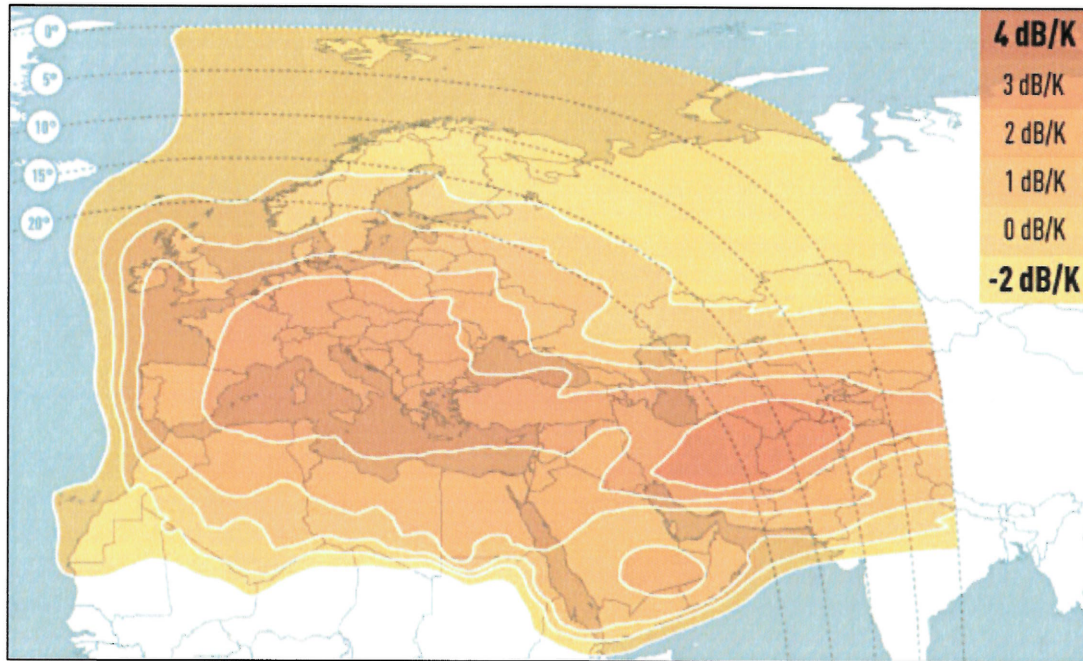


Figure 2: EUTELSAT 3-4E uplink European coverage

**ITU Filing satellite name**

**YAMAL-402**

Satellite operator name

GAZPROM SPACE SYSTEMS

GEO longitude

55° EAST

Satellite service area (text description and/or a figure of the area)

European coverage

**Forward Channel details (Satellite to ESV)**

Transponder downlink centre frequency

11.095 MHz

Transponder downlink bandwidth

54 MHz

**Return Channel details (ESV to satellite)**

Transponder uplink centre frequency

14.095 MHz

Transponder uplink bandwidth

54 MHz



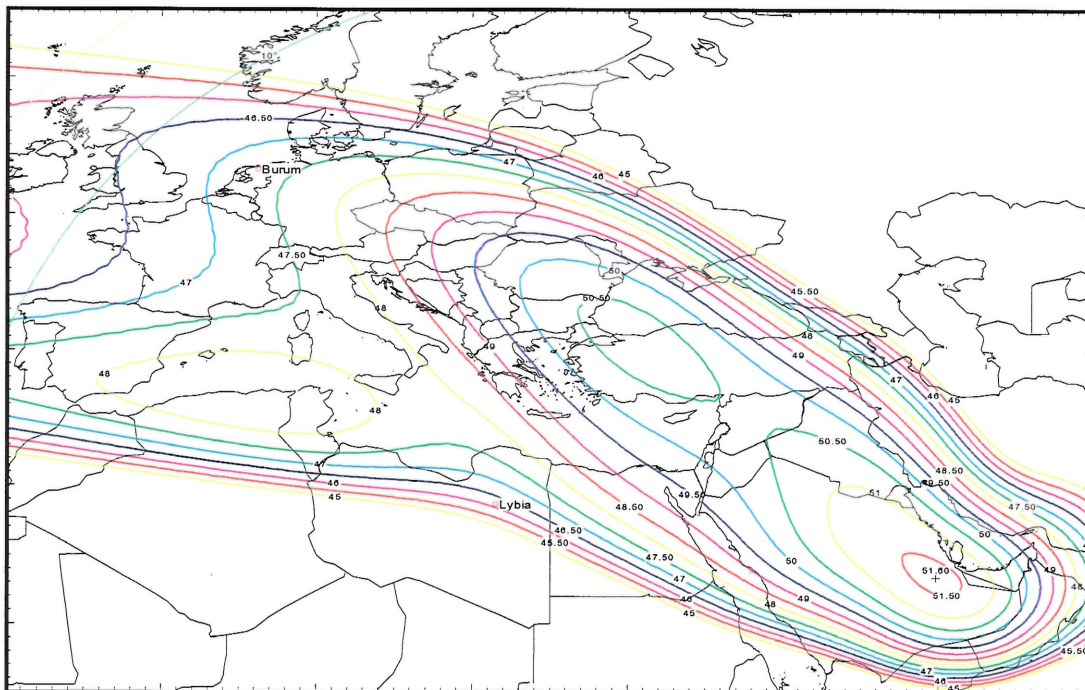
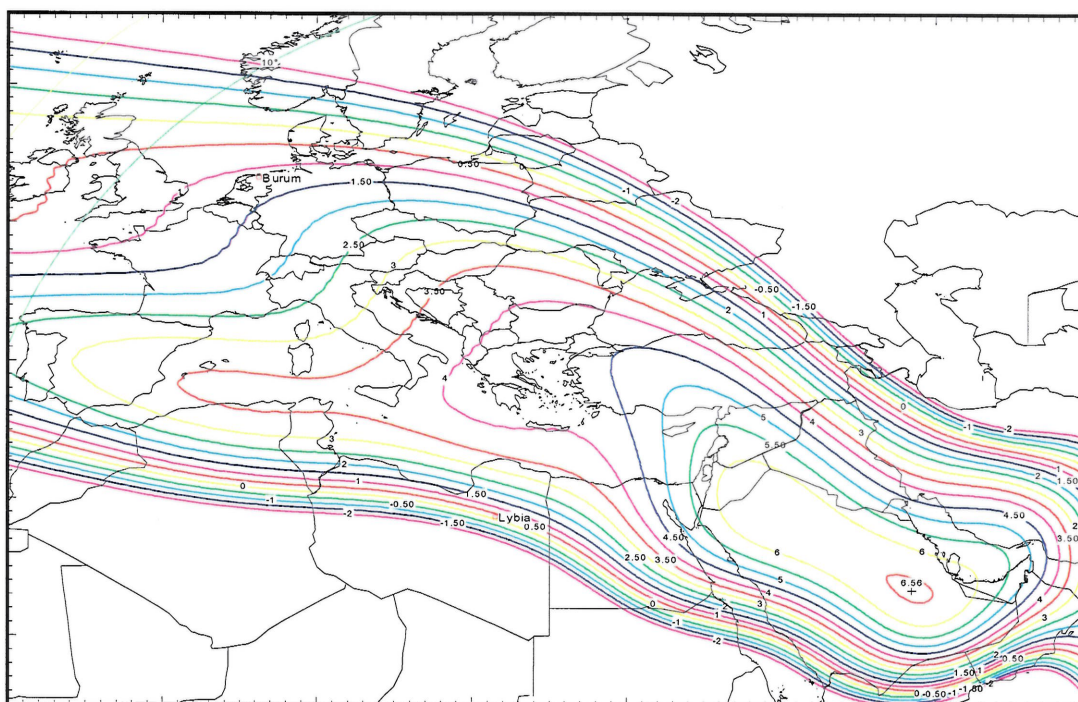


Figure 3: YAMAL-402 downlink European coverage





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*Figure 4: YAMAL-402 uplink European coverage*