

AMOS-2 Satellite Technical Handbook

*In-Orbit Version 2.1
November 2009*

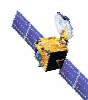


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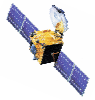
1. General Information

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■ *AMOS System Information*

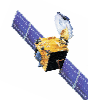
AMOS-2 was launched in 2003, joining AMOS-1 and creating a "hot spot" at the **4°W** orbital location.

AMOS-2 provides three Ku-band beams, covering Europe, the Middle-East and the US East Coast. Its powerful transponders deliver a full range of services, including Direct-To-Home (DTH) TV, video distribution and broadband Internet

AMOS-2 in co-location with AMOS-3 at the **4°W** orbital slot means in-orbit satellite redundancy, enabling backup capabilities and the highest service reliability.

AMOS-2 advanced features also include the **AMOS Atlantic Bridge** service, enabling direct, two-way connectivity between the US East Coast and the Middle East or Europe

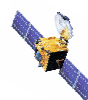
Spacecom Ltd is the AMOS satellites operator and service provider.



■ *General Satellite Information*

Orbital Location	4°W
Dimensions in stowed configuration:	2.4 x 2.3 x 2.5 m
Solar panels in deployed configuration:	~ 11 m
Net mass (On ground / “dry”)	640 Kg.
Mass at launch	1,360 Kg.
Satellite Power (Beginning Of Life)	2,400 W
(End Of Life)	1,850 W
Estimated operational lifetime	13 years (until 2017)
Station Keeping Accuracy	$\pm 0.1^\circ$ N-S / $\pm 0.08^\circ$ E-W
Beam Pointing Accuracy	Better than 0.12°





■ *Communication Payload Information*

Service Areas:	• Europe (EU) • Middle East (ME) • North America (NA)
Number of transponders	11 Ku Band (+3 Redundant)
TWT Output Power	75 W
Transponders' Usable Bandwidth	72 MHz
Transponder Gain Modes	■ ALC (Automatic Level Control) ■ FGM (Fix Gain Mode)



2. EIRP and G/T Performance

- The EIRP and G/T values below are maximum values based on actual values measured during the AMOS-2 In-Orbit Tests (IOT), including BPE.
- Detailed EIRP and G/T maps are provided at the end of this document.(including BPE)

■ *EIRP (Effective Isotropic Radiated Power) at beam-peak per beam*

Beam	ME-H	ME-V	EU-H	NA-H
EIRP [dBW]	57.2	57.5	56.5	53.2

■ *G/T at beam peak per Each Beam*

Beam	ME-V	ME-H	EU-V	NA-H
G/T [dB/K]	15	15	14.5	9

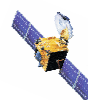
ME-H : Middle-East Horizontal polarization

ME-V : Middle-East Vertical polarization

EU-H : Europe Horizontal polarization

NA-H : North-America Horizontal polarization

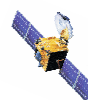
(See Detailed EIRP coverage maps).



3. EIRP and G/T Minimum Performance

■ *Sample EIRP and G/T values over the Middle-East*

Pol. →	V		H	
Location	G/T [dB/K]	EIRP[dBW]	G/T [dB/K]	EIRP[dBW]
Cairo	9	54.5	10	53.5
Riyad	-5	43.5	-1	39
Jerusalem	14	57.5	14.5	57
Eilat	13	56	12.5	55.5
Amman	14	57	14.5	57
Damascus	13	57	14.5	57
Kuwait	5.5	49	0	44
Beirut	12	56.5	14	56.5
Nicosia	8	52.5	11.5	55.5
Ankara	3.5	44.5	0	46.5
Baghdad	10.5	53	11.5	55
Tehran	6	48	9	51.5
Abu-Dhabi	-28	37	-1.5	44

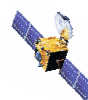


■ *Sample EIRP and G/T values over the Europe*

Pol →	V	H
<i>Location</i>	<i>G/T [dB/K]</i>	<i>EIRP[dBW]</i>
<i>Lugansk</i>	7	49
<i>Budapest</i>	9	56
<i>Sofia</i>	8.5	54.5
<i>Bucharest</i>	9	55
<i>Warsaw</i>	8.5	55
<i>Zagreb</i>	8	54
<i>Belgrad</i>	10	56
<i>Sarajevo</i>	9	55
<i>Tirane</i>	8	53.5
<i>Athens</i>	5.5	48
<i>Istanbul</i>	5	48.5
<i>Prague</i>	8	51.5
<i>Vilnius</i>	9.5	54
<i>Riga</i>	8	52
<i>Viena</i>	8	54
<i>Paris</i>	2	44
<i>London</i>	1	42.5
<i>Moscow</i>	7.0	49.5
<i>Rome</i>	5	48.5
<i>Amsterdam</i>	1	45

■ *Sample EIRP and G/T values over North America*

<i>Location</i>	<i>G/T [dB/K]</i>	<i>EIRP[dBW]</i>
<i>NYC</i>	9	52
<i>Boston</i>	9	52
<i>Montreal</i>	6.5	50
<i>Norfolk</i>	7	50.5



Communication Payload Characteristics

■ Saturated Flux Density

Beam	SFD @ Min. Gain Setting [dBW/m ²]	SFD @ Max. Gain Setting [dBW/m ²]
ME-H	-65.3-G/T	-90.3-G/T
ME-V	-64.7-G/T	-89.7-G/T
EU-V	-65.3-G/T	-90.3-G/T
NA-H	-64.8-G/T	-89.8-G/T

Gain Setting Step < 1dB

Range = 25 dB

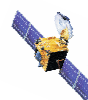
Operational Modes: Fix Gain or Automatic Level Control

■ Transponder Gain Variation

24 Hours	1[dB ptp] (Max.)
Year	1.6[dB ptp] (Max.)
Life	2.2[dB ptp] (Max.)

■ Usable bandwidth

72 MHz for all Transponders.



■ *Beams Polarization Capability*

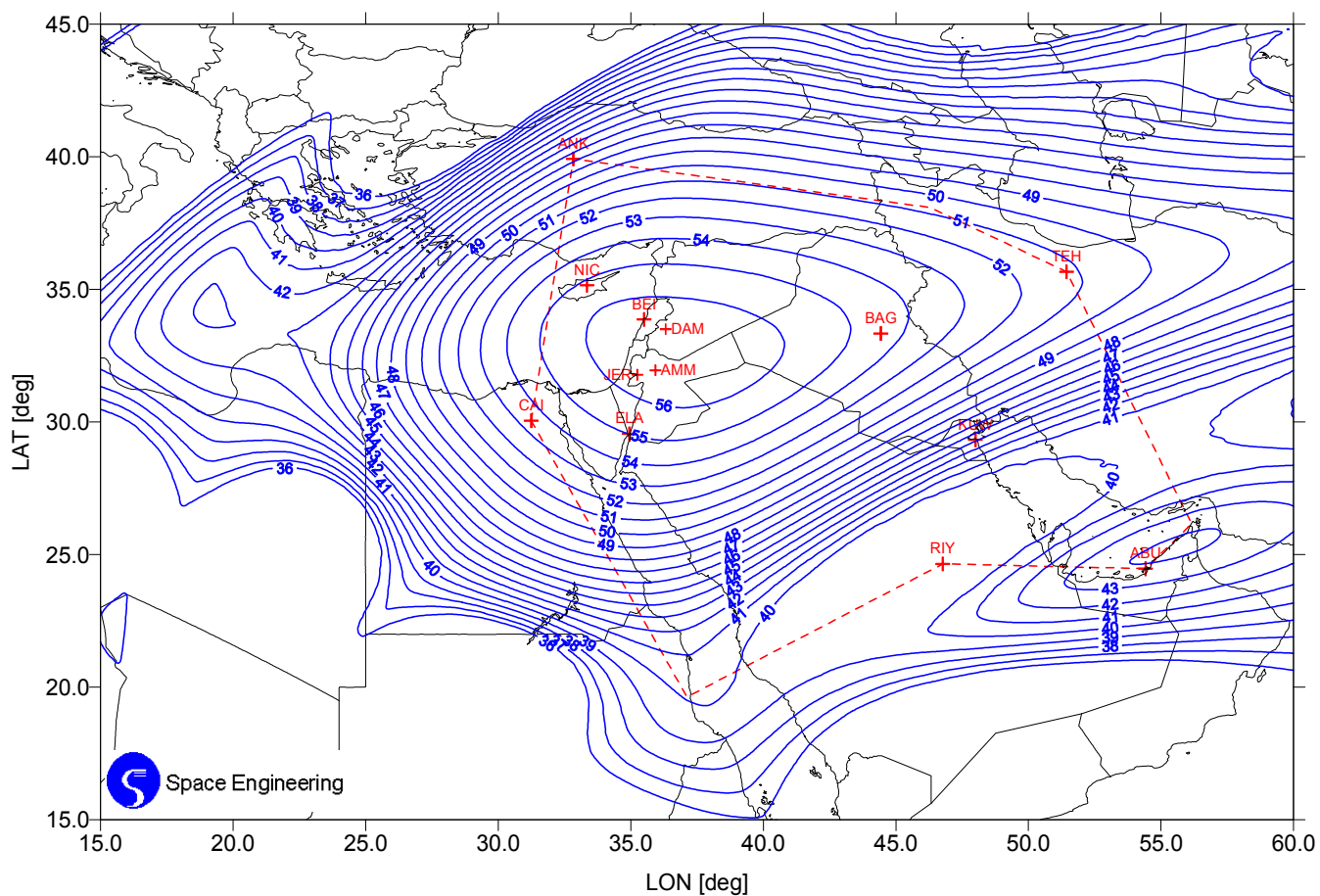
- Europe -
 - i. Uplink polarization - Vertical
 - ii. Downlink polarization - Horizontal
- Middle East -
 - i. Uplink polarization- Vertical or Horizontal
 - ii. Downlink polarization - Vertical or Horizontal
- North America -
 - i. Uplink polarization - Horizontal
 - ii. Downlink polarization - Horizontal

■ *Tele-Command and Beacon Characteristics*

	F1	F2	Polarization
Telecommand	14249.0 MHz	14251.0 MHz	V or H
Telemetry	11200.0 MHz	10949.0MHz	RHCP or LHCP



Figure 3: Middle-East EIRP Coverage Map - H pol (incl. BPE)



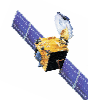


Figure 4: Middle-East EIRP Coverage Map - V pol (incl. BPE)

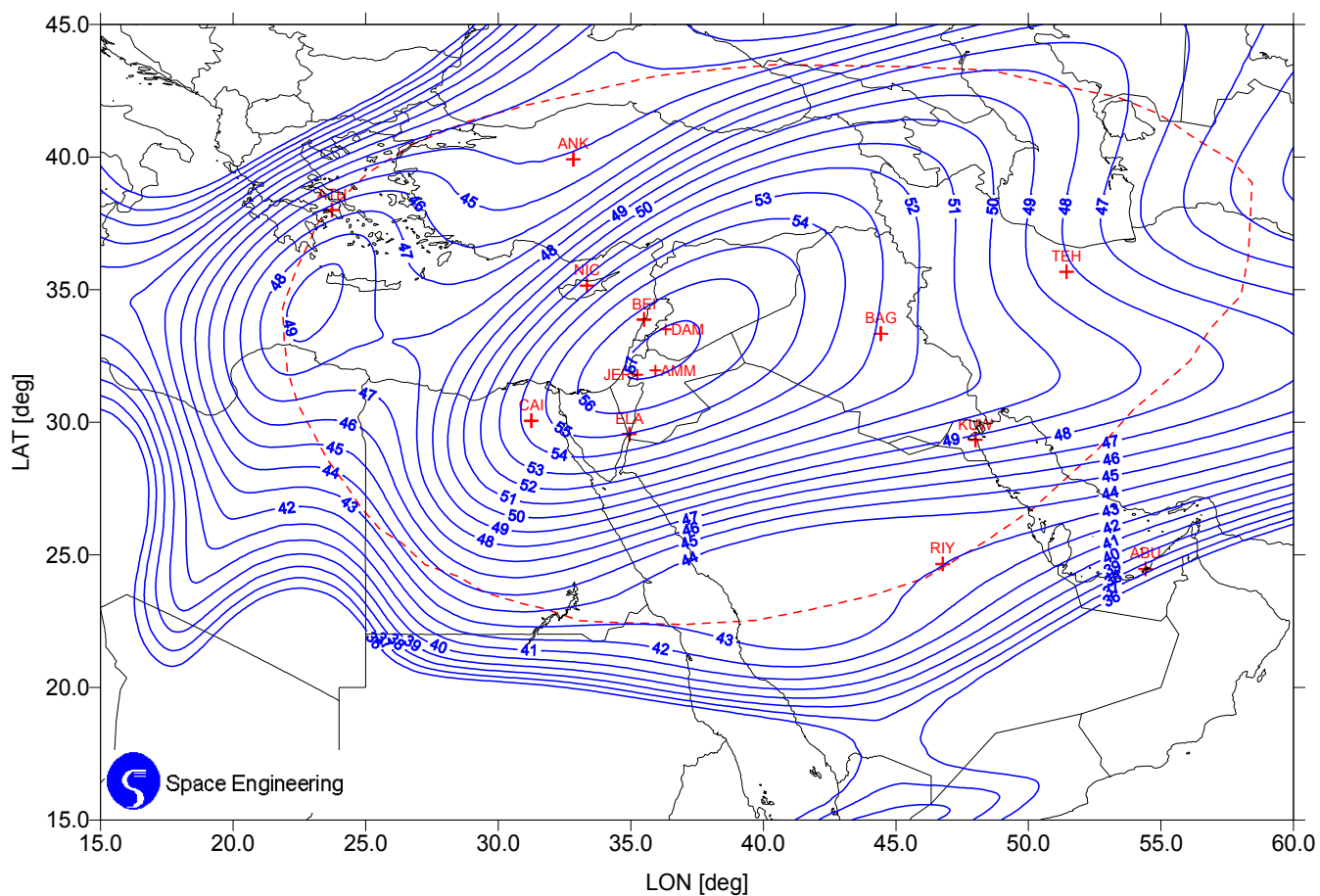




Figure 5: Central-East Europe EIRP Coverage Map – H pol (incl. BPE)

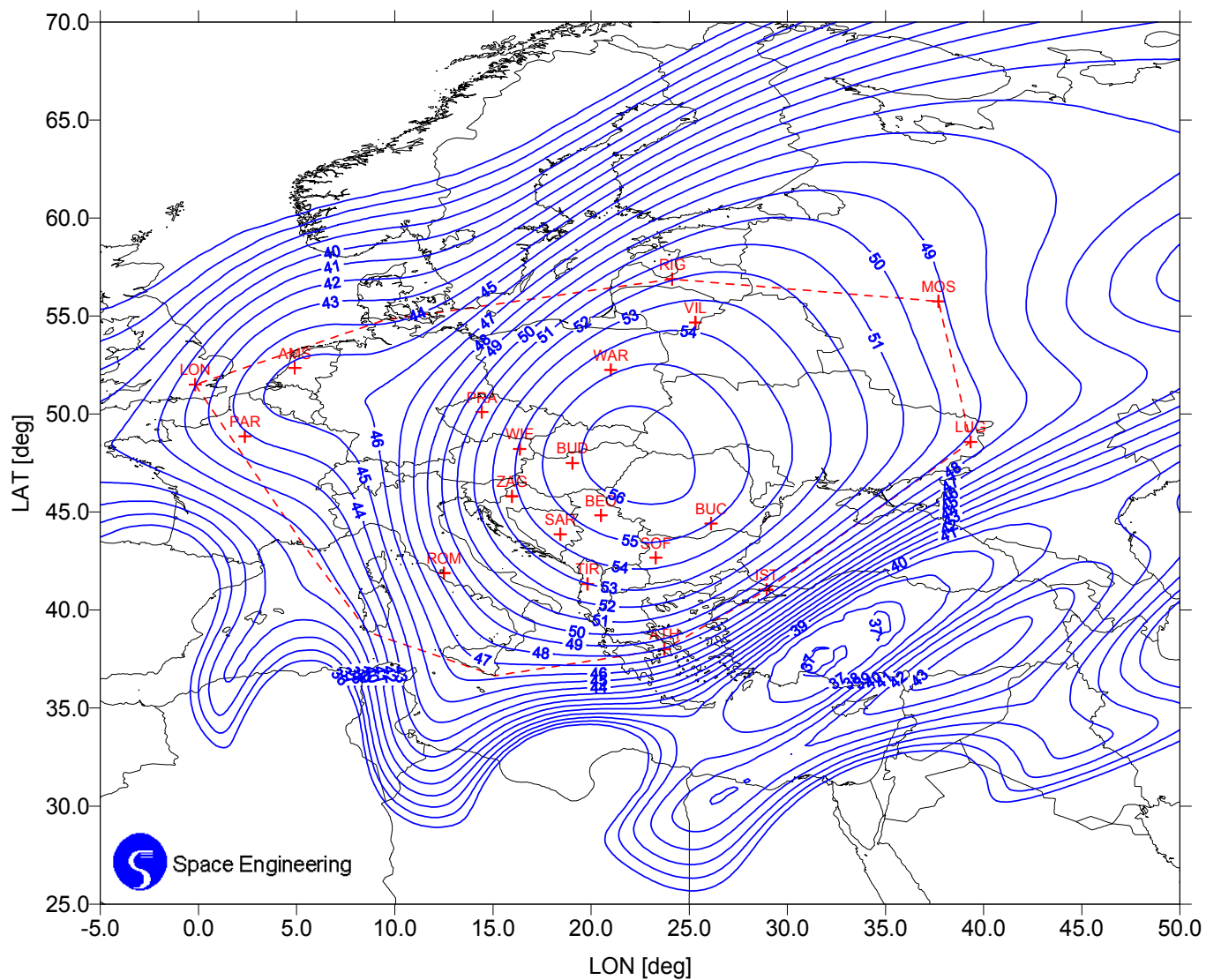




Figure 6: Middle-East G/T Coverage Map – H pol (incl. BPE)

Amos-2 - BPE-Net G/T [dB/K] Contour Plot - Middle-East Beam - Front Shell (FH_opt#11_07.MP2)
Horizontal Polarization - Up-link (CH 15' - 14.12 GHz)

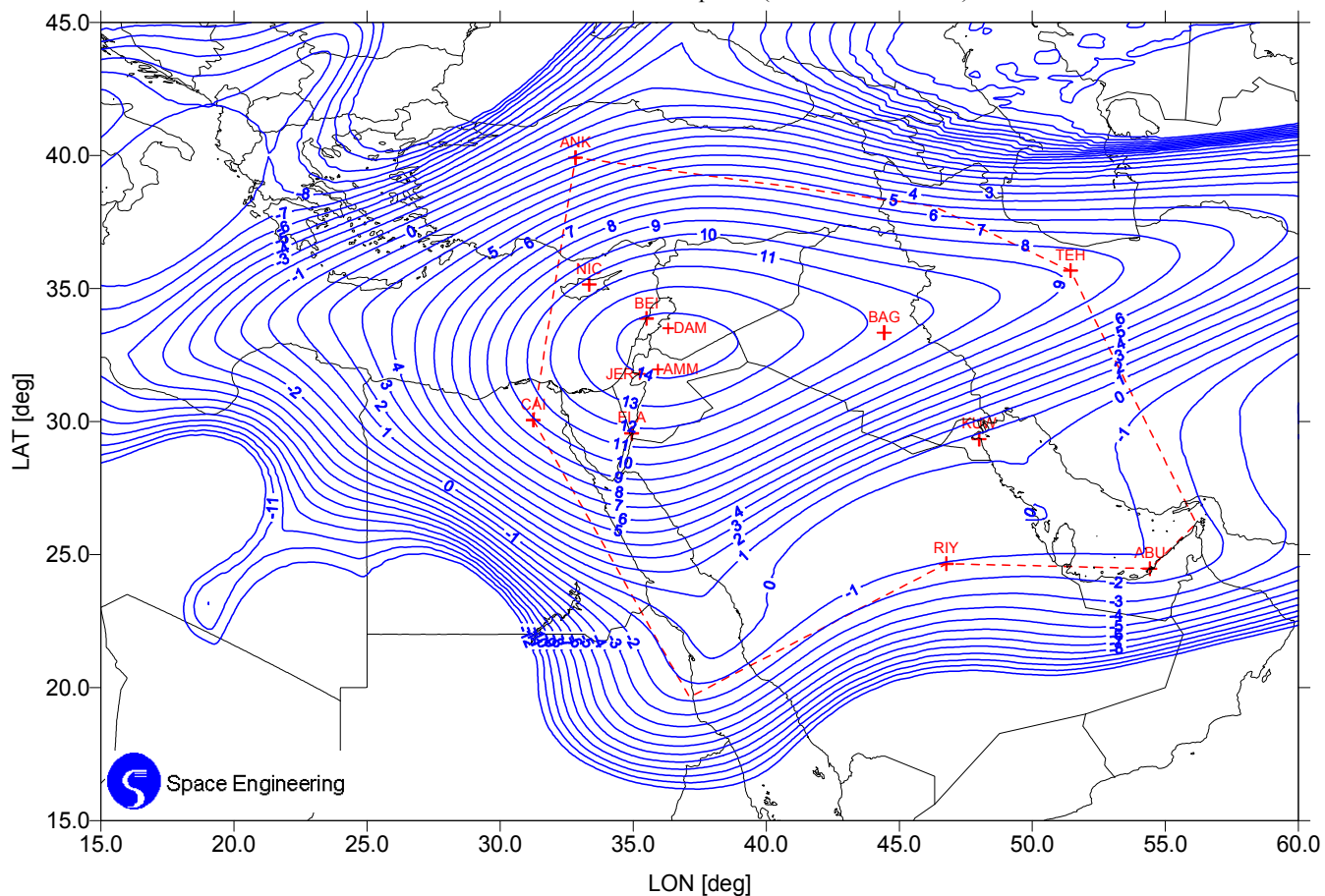




Figure 7: Middle-East G/T Coverage Map – V pol (incl. BPE)

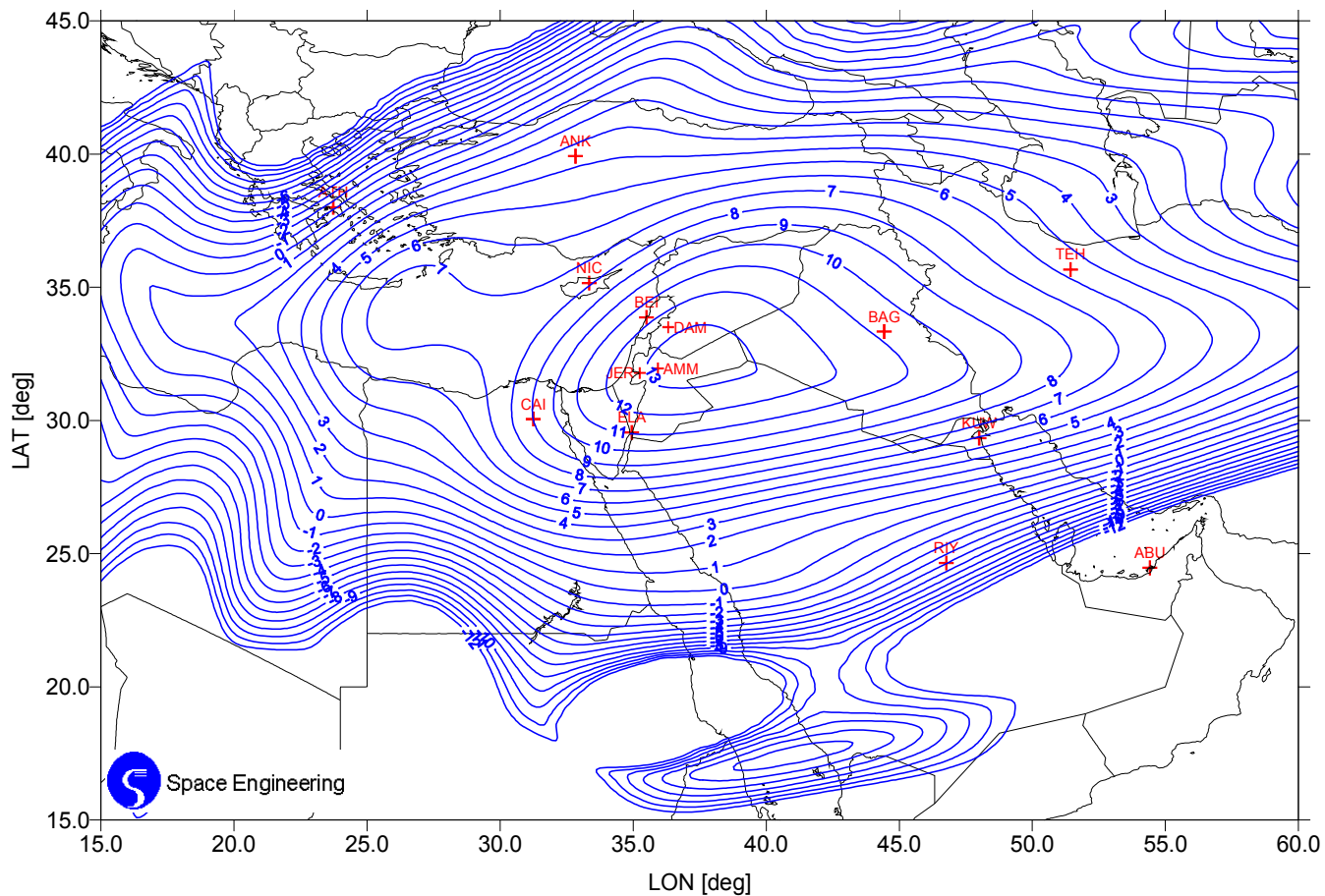
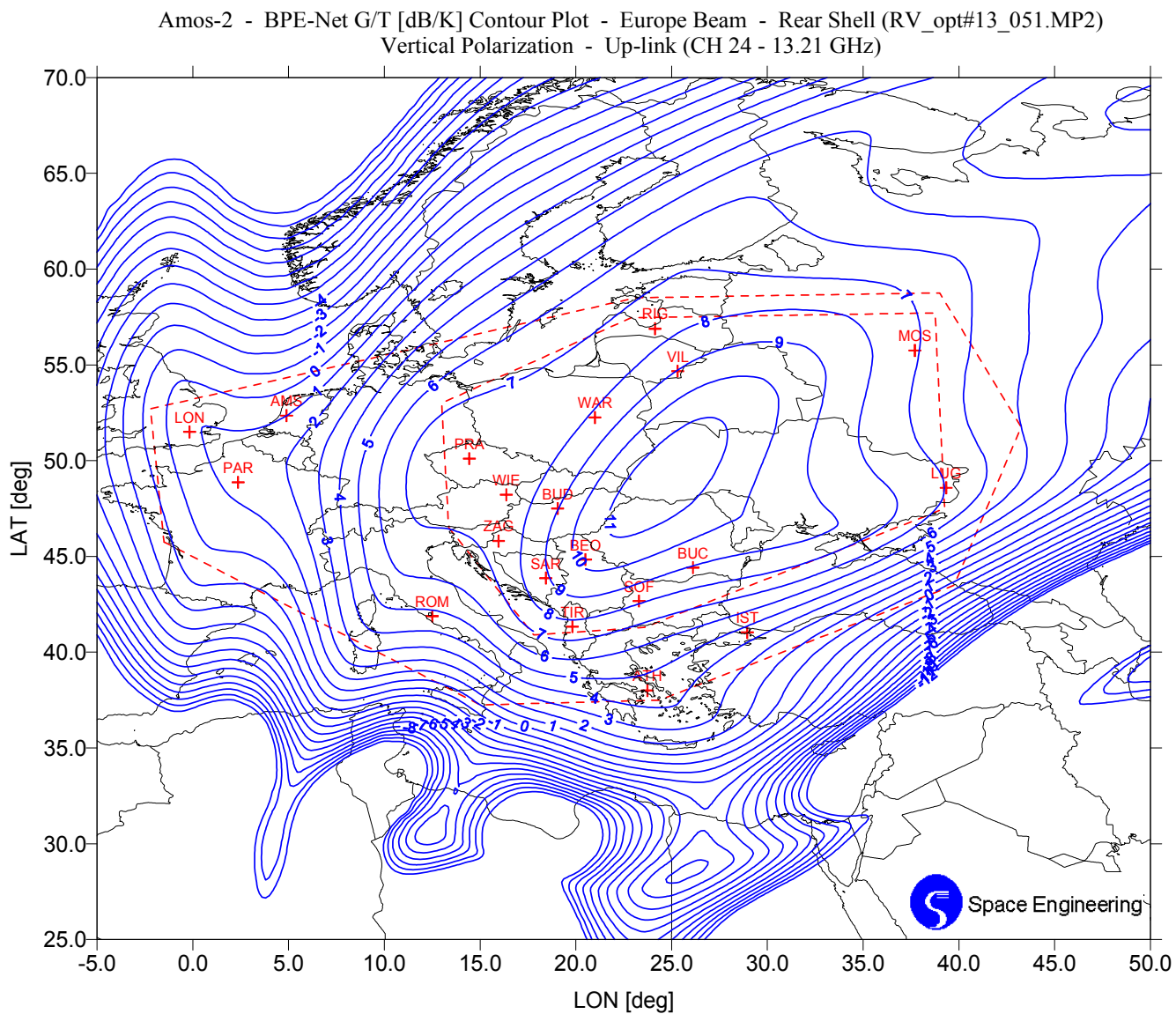




Figure 8: Central East-Europe G/T Coverage Map – V pol (incl. BPE)



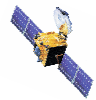
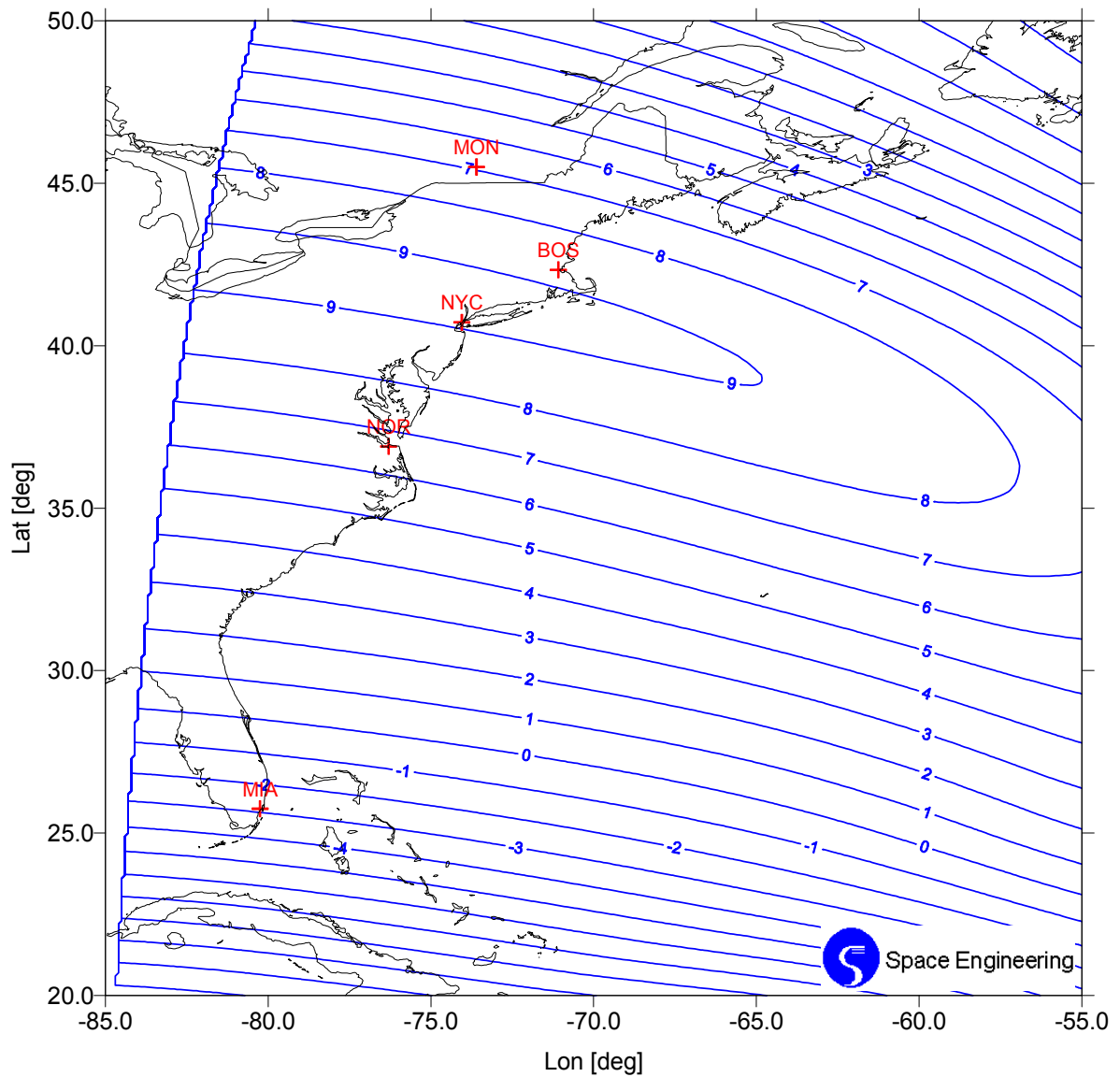


Figure 9: North-America G/T Coverage Map – H pol (incl. BPE)



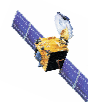
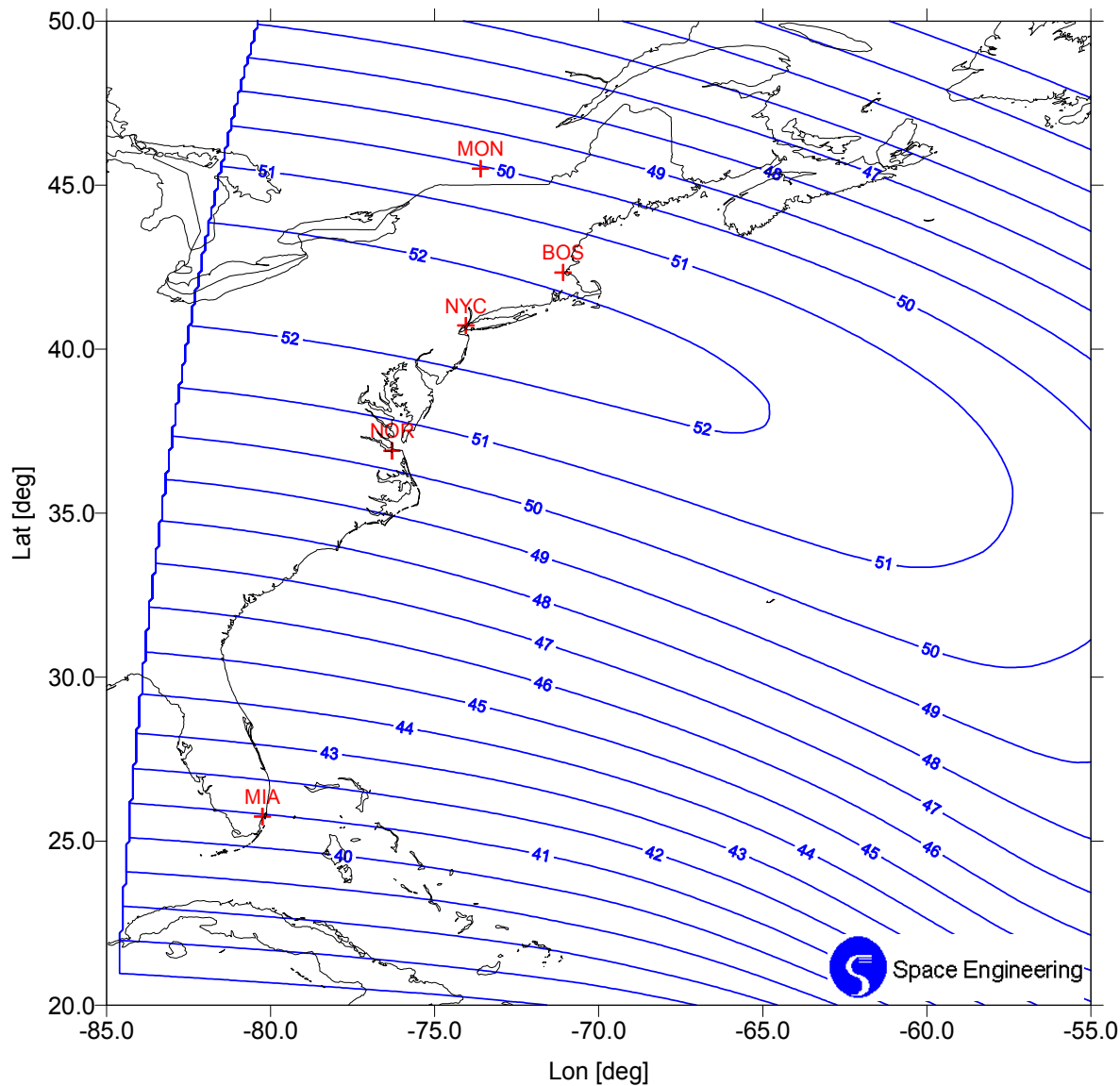


Figure 10: North-America EIRP Coverage Map – H pol (incl. BPE)

Amos-2 - BPE-Net EIRP [dBW] Contour Plot - North-America Beam - Front Shell (FH_opt#11_07.MP2)
Horizontal Polarization - Down-link (CH 28 - 11.49 GHz)



AMOS-2 Technical Specifications - Space-Communication Ltd.

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