

STEPTOE & JOHNSON LLP  
ATTORNEYS AT LAW

ORIGINAL

Philip Malet  
202.429.6239  
pmalet@step toe.com

1330 Connecticut Avenue, NW  
Washington, DC 20036-1795  
Tel 202.429.3000  
Fax 202.429.3902  
step toe.com

VIA HAND DELIVERY

September 1, 2004

Marlene H. Dortch  
Federal Communications Commission  
Office of the Secretary  
445 12th Street, SW  
Washington, DC 20554

SEP 23 10:00  
Satellite and  
Radiocommunications Division  
International Bureau

RECEIVED

SEP - 1 2004

Federal Communications Commission  
Office of Secretary

**Re: The Boeing Company Application to Modify Blanket AMSS Earth Station Authorization  
Call Sign E000723; File No. SES-MOD-20040301-00304**

Dear Ms. Dortch:

The Boeing Company ("Boeing"), at the request of the Commission staff and pursuant to Section 1.65 of the Rules, 47 C.F.R. § 1.65, hereby submits the attached information for association with the above-referenced application. Specifically, Boeing is submitting additional technical information regarding its proposed Aeronautical Mobile-Satellite Service ("AMSS") operations with the AsiaSat-3S, SESAT and Yamal satellites, as well as confirmation letters from the operators of the AsiaSat-3S and SESAT satellites that Boeing's proposed operations are within the coordinated parameters of the satellites.<sup>1</sup>

Any questions regarding this matter may be directed to the undersigned.

Respectfully submitted,

*Carlos M. Nalda* / (CN)

Philip L. Malet  
Carlos M. Nalda  
Counsel for The Boeing Company

cc: Robert Nelson

<sup>1</sup> Boeing is working with the operator of the Yamal satellite to finalize a similar confirmation letter and will provide it to the Commission as soon as possible.



Our Ref. TP18/270804/0249

27 August 04

Deanna C. Johnson  
Supplier Management & Procurement  
Connexion by Boeing  
THE BOEING COMPANY  
PO Box 3707, Mail Code 14-81  
Seattle, WA 98124-2207  
United States

Dear Ms. Johnson,

Pursuant to your request, Asia Satellite Telecommunications Company Limited (AsiaSat) hereby confirms that the proposed Ku-band Aeronautical Mobile-Satellite Service ("AMSS") operations of The Boeing Company, acting through its business unit Connexion by Boeing, with the AsiaSat 3S satellite at 105.5° East, which are governed by the Allotment Agreement CX-01-870-037 dated 3 October 2003 and amended 20 January 2004, are within the operational parameters of the satellite coordinated by AsiaSat with neighboring satellite networks in accordance with the ITU Radio Regulations.

Yours sincerely,  
Asia Satellite Telecommunications Company Limited

A handwritten signature in black ink, appearing to read "S. Barry Turner". The signature is fluid and cursive, written over a horizontal line.

S. Barry Turner  
General Manager, Engineering

BT/SC/jl

cc: GMM

Asia Satellite Telecommunications Co. Ltd.

23-24/F, East Exchange Tower, 38 Leighton Road, Hong Kong

Telephone: +852 2805 6666 Facsimile: +852 2576 4111

Telex: 68345 ASAT HX Internet: <http://www.asiasat.com>



**eutelsat**  
communications via satellite

DSE FREQ/004/155/JCR/jcr

Paris, 30 August 2004

Ms. Deanna Johnson  
Connexion by Boeing  
The Boeing Company  
PO Box 3707, Mail Code 14-81  
Seattle,  
WA 98124-2207  
USA

Fax: +1-206-655-4239

Subject: CbB operations with SESAT at 36° E.L.

Dear Ms. Johnson,

Pursuant to your request, Eutelsat S.A. hereby confirms that the proposed Ku-band Aeronautical Mobile-Satellite Service ("AMSS") operations of The Boeing Company, acting through its business unit Connexion by Boeing, with the SESAT satellite at 36° East, which are governed by the Allotment Agreements CX-01-870-DJ03-027 and CX-01-870-DJ03-028 dated 11 July 2003 and amended 9 September 2003, are within the operational parameters of the satellite coordinated by Eutelsat S.A. with neighboring satellite networks in accordance with the ITU Radio Regulations.

Sincerely,

J.C. Halson  
Head, Access to Spectrum & Orbit Resources  
Eutelsat S.A.

Copy (fax): Mr Ron Samuel, Eutelsat Inc., Washington

[www.eutelsat.com](http://www.eutelsat.com)

**The Boeing Company**  
**AMSS Modification Application**  
**File No. SES-MOD-20040301-00304**

**Supplementary Technical Data**

**September 1, 2004**

**Annex A. YAMAL 200**  
**Annex B. Asiasat 3S, East Asia Beam**  
**Annex C. Asiasat 3S, South Asia Beam**  
**Annex D. SESAT**

**Annex A. YAMAL 200 data**

#	§25.114 (c) Subsection	Data Item Description	Data	
			Forward Link	Return Link
1		Satellite Name	Yamal 200	
2		ITU-R name	Express-7	
3	1,2,3,4	Applicant information	See Form FCC-312	
4	5	Transponder Designation, Transponder Center Frequency, Transponder Bandwidth, Transponder Polarization	K4 11.5 GHz 72 MHz Vertical	K1 14.040 GHz 72 MHz Horizontal
		CBB Center frequency CBB Bandwidth	11.5 GHz 31.01 MHz	14.055 GHz 13.5 MHz
5	5	Emission designator Allocated bandwidth	31M1G7D	13M5G7D
6	5	Final amplifier maximum output power and e.i.r.p.	49 dBW e.i.r.p.	--
7	5	Power of CBB emission	45.5 dBW e.i.r.p.	--
8	5	Identification of Antenna beam	Ku CIS Beam (SKR)	Ku CIS Beam (SKR)
9	5	TT&C information	Not applicable	
10	5	Satellite receiver noise temperature	--	794 K (1.5 dB/K)
11	5	Satellite Saturation Flux density	--	-96 dBW/m <sup>2</sup> (@ G/T = 0 dB/K)
12	5	Gain step through the satellite	Not required	
13	6(i)	Orbit location	90° East	
14	6(ii)	NGSO data	Not applicable	
15	7	Satellite antenna radiation patterns, showing gain contours, for beams used	see Figure A-1	see Figure A-2
16	8	Link budgets for service links	see Table A-1	see Table A-2
17	9	GSO station keeping	+/- 0.1 ° E-W +/- 0.2 ° N-S	
18	10	Conformance with §25.208 and ITU PFD limits on the downlink	--	See Annex B of Application
19	11-13	Not applicable	--	
20	14	Non-common-carrier statement	Service is already authorized on a non- common carrier basis	
21	15	Not applicable	--	

#	§25.114 (c) Subsection	Data Item Description	Data	
			Forward Link	Return Link
22	16	Public interest statement	See Application Narrative	
23	17-21	Not applicable	--	
24	§25.114 (d)	Not applicable	--	

**Table A-1. Forward Link Budget**

<b>Satellite</b>	<b>Yamal 200</b>
Latitude (deg)	37.6
Longitude (deg)	55.75
Satellite Longitude (deg)	90
Transponder Center Frequency (GHz)	11.518
<b>Spread Bandwidth (MHz)</b>	<b>31.01</b>
<b>Transponder EIRP (dBW)</b>	<b>45.5</b>
Spherical Spreading Loss (dB)	205.337
Atmospheric Loss (dB)	0.197664
Rain Availability	0.999
Pol-mismatch Loss (dB)	0.064503
Pointing Loss (dB)	0.093529
Aircraft Altitude (Km)	0
Rain Loss (dB)	1.86802
Aircraft Antenna Gain w/radome (dBi)	29.447
Receive Power at Receiver (dBW)	-132.614
Crosspol Isolation (dB)	15
Aircraft Received Noise Temp (dBK)	20.6024
Noise pwr (dBW/Hz)	-207.997
Adjacent Satellite Interference (dBW)	-140.606
Crosspol Interference (dBW)	-147.614
Total Interference (dBW)	-139.817
No+Io (dBW/Hz)	-207.395
C/(No+Io) Downlink(dB/Hz)	74.7805
Eb/No Uplink (dB)	23.2916
Eb/No End-to-End (dB)	7.6701
Datarate (Mb/s)	5
Eb/No Requirement (dB)	3.8
Eb/No Margin	3.8701

**Table A-2. Return Link Budget**

Satellite	Yamal 200
Latitude (deg)	37.6
Longitude (deg)	55.75
Satellite Longitude (deg)	90
Transponder Center Frequency (GHz)	14.282
<b>Spread Bandwidth (MHz)</b>	<b>13.5</b>
Transmit EIRP (dBW)	42.8059
Spherical Spreading Loss (dB)	207.206
Atmospheric Loss (dB)	0.299459
Aircraft Altitude (Km)	0
Rain Availability	0.999
Rain Loss (dB)	3.17483
Pol-mismatch Loss (dB)	0.064503
Pointing Loss (dB)	0.082734
Satellite Antenna Gain (dBi)	30.5
Receiver Input Power (dBW)	-137.374
No (dBW/Hz)	-199.599
CDMA Self-Interference reduce (dB)	0
Total Interference (dB/Hz)	-201.512
No+Io Uplink (dBW/Hz)	-197.441
C/(No+Io) Uplink (dBHz)	60.0666
C/No Groundlink single gndlink (dBHz)	81.052
C/No End-to-End single link (dBHz)	60.0321
<b>Datarate (Kb/s)</b>	<b>450</b>
Eb/No Requirement (dB)	3.5
Power Margin (dB)	3.82191

**Note:** The data rate of the return link is variable. The AES e.i.r.p. varies proportionally to the data rate.



Figure A-1. Yamal 200 @ 90° East, Downlink e.i.r.p.

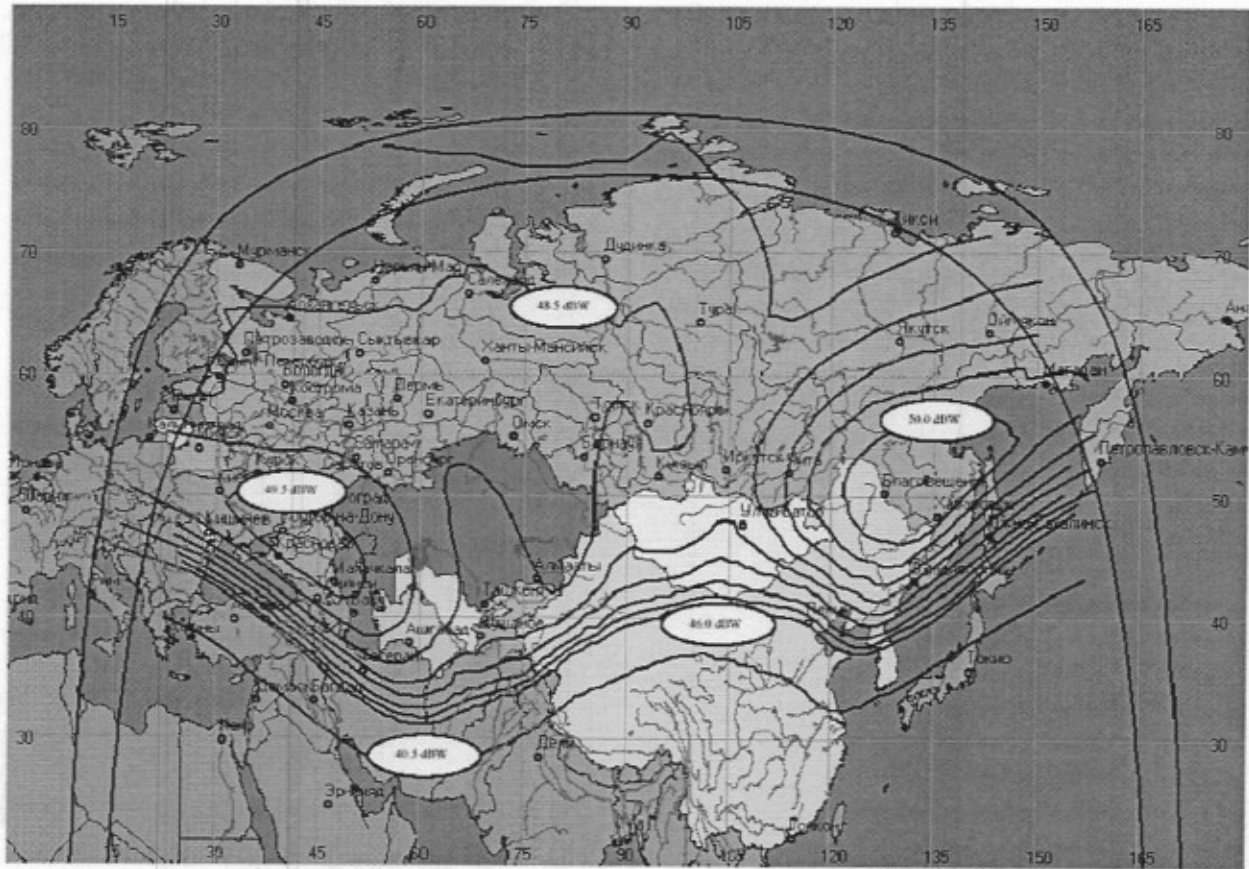
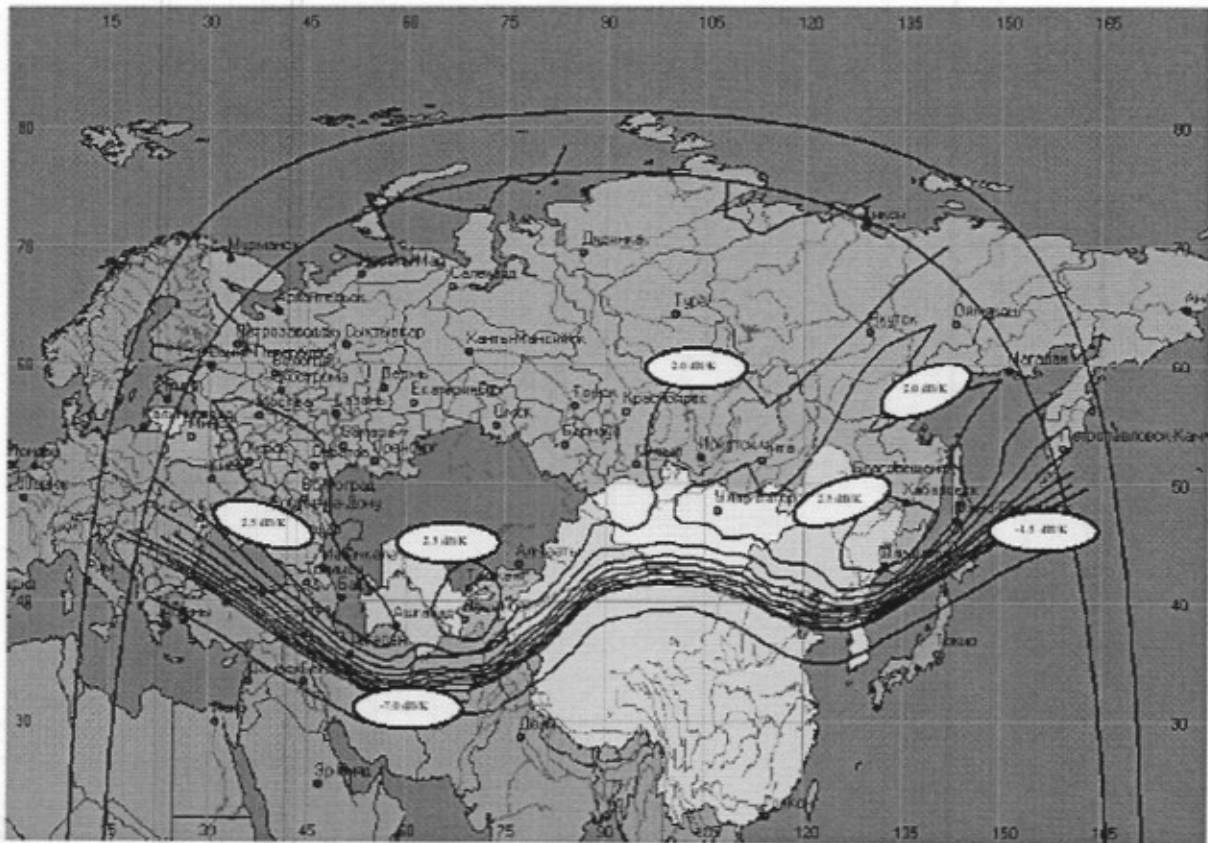


Figure A-2. Yamal 200 @ 90° East, Uplink G/T



### Annex B. Asiasat 3S East Asia beam

#	§25.114 (c) Subsection	Data Item Description	Data	
			Forward Link	Return Link
1		Satellite Name	AsiaSat 3S East Asia Beam	
2		ITU-R name	AsiaSat-Ck, CK1, CKX	
3	1,2,3,4	Applicant information	See Form FCC-312	
4	5	Transponder Designation, Transponder Center Frequency, Transponder Bandwidth, Transponder Polarization	K4V 12.48 GHz 54 MHz Vertical	K2V 14.108 GHz 72 MHz Horizontal
		CBB Center frequency CBB Bandwidth	12.48 GHz 30.24 MHz	14.123 GHz 13.5 MHz
5	5	Emission designator Allocated bandwidth	30M3G7D	13M5G7D
6	5	Final amplifier maximum output power and e.i.r.p.	53 dBW e.i.r.p.	--
7	5	Power of CBB emission	46 dBW e.i.r.p.	--
8	5	Identification of Antenna beam	East Asia	East Asia
9	5	TT&C information	Not applicable	
10	5	Satellite receiver noise temperature	--	794.33 K (6 dB/K)
11	5	Satellite Saturation Flux density	--	-93 dBW/m <sup>2</sup> (@ G/T = 0 dB/K)
12	5	Gain step through the satellite	Not required	
13	6(i)	Orbit location	90° East	
14	6(ii)	NGSO data	Not applicable	
15	7	Satellite antenna radiation patterns, showing gain contours, for beams used	see Figure B-1	see Figure B-1
16	8	Link budgets for service links	see Table B-1	see Table B-2
17	9	GSO station keeping	+/- 0.1 ° E-W +/- 3.0 ° N-S	
18	10	Conformance with §25.208 and ITU PFD limits on the downlink	--	See Annex B of Application
19	11-13	Not applicable	--	
20	14	Non-common-carrier statement	Service is already authorized on a non-common carrier basis	
21	15	Not applicable	--	

#	§25.114 (c) Subsection	Data Item Description	Data	
			Forward Link	Return Link
22	16	Public interest statement	See Application Narrative	
23	17-21	Not applicable	--	
24	§25.114 (d)	Not applicable	--	

**Table B-1. Forward Link Budget**

Sat name=	AsiaSat3S_EastAsia - Vpol
Sat lon (deg)	105.5
# Satellite-Aircraft Geometry:	
ALnk lat (deg)	35
ALnk lon (deg)	145
ALnk alt (Km)	9
# Satellite-Aircraft:	
ALnk Freq (GHz)	12.48
ALnk Sat Polarization	VPOL
ALnk EIRP from sat (dBW)	46
# Satellite-Aircraft Channel:	
ALnk Loss path (dB)	206.069
ALnk Loss atmospheric (dB)	0.0232336
ALnk Rain availability	0.999
ALnk Loss rain (dB)	0
ALnk Loss other (dB)	0
ALnk Loss total channel (dB)	206.093
# Satellite-Aircraft Link:	
ALnk Loss radome (dB)	0.21
ALnk Gain ant w/radome (dBi)	29.8919
ALnk Loss - pol mismatch (dB)	0.0645031
ALnk Loss - ptg errors (dB)	0.0935294
ALnk Pwr rcvd signal (dBW)	-130.359
ALnk Temp radome (dB)	20.3019
ALnk Temp ant w/radome (dBi)	20.823
ALnk Temp noise rcvr sys (K)	120.865
ALnk Temp noise rcvr sys (dBK)	20.823
ALnk Partial spread bandwidth (MHz)	30.24
ALnk Noise pwr (dBW/Hz)	-207.776
ALnk I_adjacent (dBW)	-140.527
ALnk Isat EIRP (dBW)	46
ALnk Isat Loss atmos (dB)	0.6
ALnk Xpol isolation (dB)	15
ALnk I_xpol signal sat (dBW)	-145.359
ALnk I_total (dBW)	-139.293
ALnk I_reduction (dB)	0
ALnk I_total reduced (dBW)	-139.293
ALnk Io (dBW/Hz)	-213.749
ALnk No+Io (dBW/Hz)	-206.797
ALnk C/(No+Io) (dB/Hz)	76.4388
Modem specified datarate (Mb/s)	6.5
Modem Eb/No (dB)	8.17394
Modem Eb/No rqmt at spec rate (dB)	2.7
Modem Eb/No extra margin (dB)	1.1
Modem margin at specified datarate	4.37394

Note: ALnk indicates a link to or from the aircraft.  
 GLnk indicates a link to or from the ground station.  
 E2E indicates "end-to-end", that is the entire link.

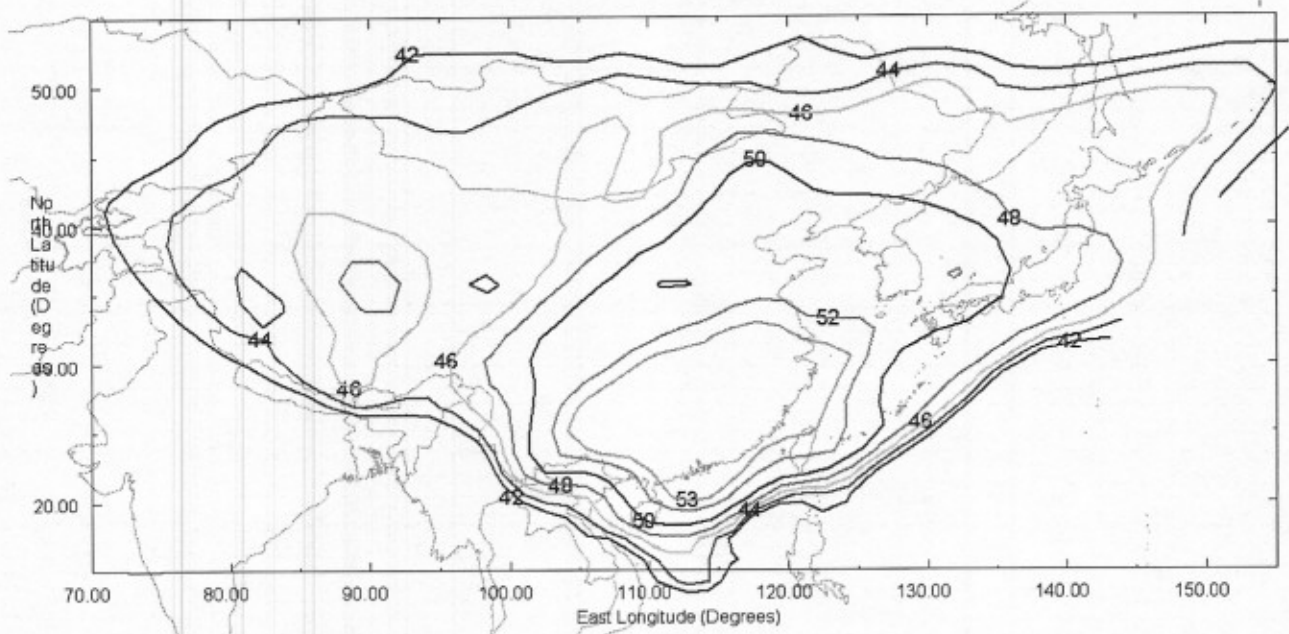
**Table B-2. Return Link Budget**

Sat name	AsiaSat3S_EastAsia
Sat lon (deg)	105.5
# Aircraft:	
Air lat (deg)	35
Air lon (deg)	145
Air alt (Km)	9
# Satellite-Aircraft Geometry:	
ALnk range (Km)	38446.9
ALnk azimuth (deg)	123.237
ALnk elevation (deg)	33.4866
ALnk ant phi (deg)	0
ALnk ant theta (deg)	0
ALnk ant elevation (deg)	90
# Satellite-Aircraft Channel:	
ALnk Freq (GHz)	14.108
ALnk Sat Polarization	HPOL
ALnk Partial spread bandwidth (MHz)	13.5
ALnk Loss path (dB)	207.134
ALnk Loss atmospheric (dB)	0.0250273
ALnk Rain availability	0.999
ALnk Loss rain (dB)	0
ALnk Loss other (dB)	0
ALnk Loss total channel (dB)	207.159
ALnk aircraft rate (Kb/s)	64
ALnk spread bandwidth (MHz)	13.5
# Aircraft Uplink Performance:	
ALnk aircraft EIRP (dBW)	37.3798
ALnk Loss - pol mismatch (dB)	0.0645031
ALnk Loss - ptg errors (dB)	0.0827336
ALnk Loss - channel (dB)	207.159
ALnk Gain ant (dBi)	25
ALnk Pwr rcvr in (dBW)	-144.78
ALnk I adjsat (dB/Hz)	-200
ALnk I adjsat reduce (dB)	0
ALnk I CDMA (dB/Hz)	-214.831
ALnk I CDMA reduce (dB)	0
ALnk Io (dB/Hz)	-199.86
ALnk Noise Temp ant (K)	794.33
ALnk No (dBW/Hz)	-199.599
ALnk No+Io sat (dBW/Hz)	-196.717
ALnk C/(No+Io) uplink (dBHz)	51.9375
GLnk C/(No+Io) (dBHz)	62.3772
# End-to-End Link Performance:	
ALnk C/(No+Io) single uplink (dBHz)	51.9375
GLnk C/(No+Io) single gndlink (dBHz)	62.3772

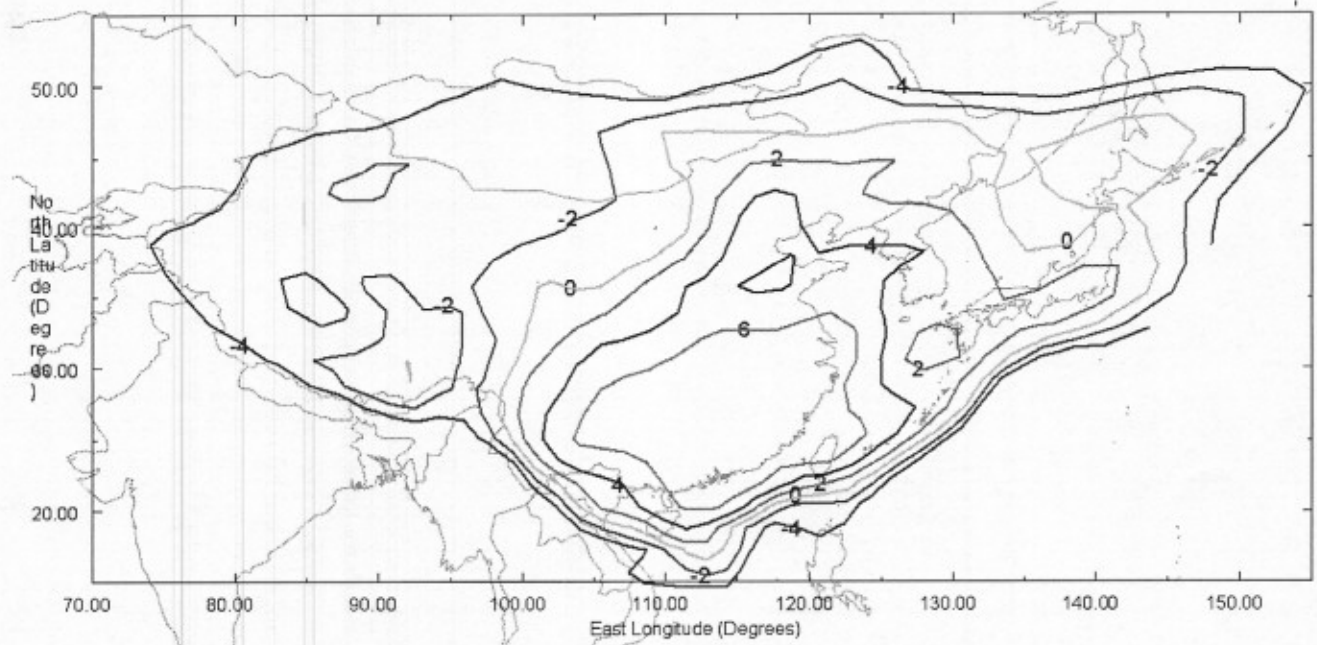
E2E C/(No+lo) single link (dBHz)	51.5618
E2E Eb/No required (dB)	3.5
E2E Datarate (Kb/s)	64
E2E Number of links	2.33407
E2E Bitrate aggregate (Kb/s)	149.381
E2E Aircraft PSD Fraction (%)	42.8436
E2E Power margin at spec rate (dB)	9.25473

Note: ALnk indicates a link to or from the aircraft.  
 GLnk indicates a link to or from the ground station.  
 E2E indicates end-to-end (the entire link).  
 The data rate of the return link is variable. The AES e.i.r.p. varies proportionally to the data rate.

**Figure B-1. Asiasat 3S East Asia Beam, Downlink e.i.r.p.**



**Figure B-2. Asiasat 3S East Asia Beam, Uplink G/T**





**Annex C. Asiasat 3S South Asia Beam**

#	§25.114 (c) Subsection	Data Item Description	Data	
			Forward Link	Return Link
1		Satellite Name	AsiaSat 3S South Asia Beam	
2		ITU-R name	AsiaSat-Ck, CK1, CKX	
3	1,2,3,4	Applicant information	See Form FCC-312	
4	5	Transponder Designation, Transponder Center Frequency, Transponder Bandwidth, Transponder Polarization	K1V 12.3 GHz 54 MHz Vertical	K3V 14.168 GHz 54 MHz Horizontal
		CBB Center frequency CBB Bandwidth	12.3 GHz 30.24 MHz	14.153 GHz 13.5 MHz
5	5	Emission designator Allocated bandwidth	30M3G7D	13M5G7D
6	5	Final amplifier maximum output power and e.i.r.p.	53 dBW e.i.r.p.	--
7	5	Power of CBB emission	xx dBW e.i.r.p.	--
8	5	Identification of Antenna beam	South Asia	South Asia
9	5	TT&C information	Not applicable	
10	5	Satellite receiver noise temperature	--	xx K (6 dB/K)
11	5	Satellite Saturation Flux density	--	-93 dBW/m <sup>2</sup> (@ G/T = 0 dB/K)
12	5	Gain step through the satellite	Not required	
13	6(i)	Orbit location	105.5° East	
14	6(ii)	NGSO data	Not applicable	
15	7	Satellite antenna radiation patterns, showing gain contours, for beams used	see Figure C-1	see Figure C-2
16	8	Link budgets for service links	see Table C-1	see Table C-2
17	9	GSO station keeping	+/- 0.1 ° E-W +/- 3.0 ° N-S	
18	10	Conformance with §25.208 and ITU PFD limits on the downlink	--	See Annex B of Application
19	11-13	Not applicable	--	
20	14	Non-common-carrier statement	Service is already authorized on a non-common carrier basis	

#	§25.114 (c) Subsection	Data Item Description	Data	
			Forward Link	Return Link
21	15	Not applicable	--	
22	16	Public interest statement	See Application Narrative	
23	17-21	Not applicable	--	
24	§25.114 (d)	Not applicable	--	

**Table C-1. Asiasat 3S South (West) Asia Forward Link Budget**

Sat name=	AsiaSat3S_SWAsia - Vpol
Sat lat (deg)	0
# Satellite-Aircraft Geometry:	
ALnk lat (deg)	35
ALnk lon (deg)	35
ALnk alt (Km)	9
# Satellite-Aircraft:	
ALnk Freq (GHz)	12.3
ALnk Sat Polarization	VPOL
ALnk EIRP from sat (dBW)	46
# Satellite-Aircraft Channel:	
ALnk Loss path (dB)	206.477
ALnk Loss atmospheric (dB)	0.0959083
ALnk Rain availability	0.999
ALnk Loss rain (dB)	0
ALnk Loss other (dB)	0
ALnk Loss total channel (dB)	206.572
# Satellite-Aircraft Link:	
ALnk Loss radome (dB)	0.38
ALnk Gain ant w/radome (dBi)	29.7219
ALnk Loss - pol mismatch (dB)	0.0645031
ALnk Loss - ptg errors (dB)	0.0935294
ALnk Pwr rcvd signal (dBW)	-131.008
ALnk Temp radome (dB)	20.3019
ALnk Temp ant w/radome (dBi)	20.8283
ALnk Temp_noise rcvr sys (K)	121.012
ALnk Temp_noise rcvr sys (dBK)	20.8283
ALnk Partial spread bandwidth (MHz)	30.24
ALnk Noise pwr (dBW/Hz)	-207.771
ALnk I_adjacent (dBW)	-137.784
ALnk Isat EIRP (dBW)	46
ALnk Isat Loss atmos (dB)	0.6
ALnk Xpol isolation (dB)	15
ALnk I_xpol signal sat (dBW)	-146.008
ALnk I_total (dBW)	-137.175
ALnk I_reduction (dB)	0
ALnk I_total reduced (dBW)	-137.175
ALnk Io (dBW/Hz)	-211.631
ALnk No+Io (dBW/Hz)	-206.275
ALnk C/(No+Io) (dB/Hz)	75.2667
Modem specified datarate (Mb/s)	6.5
Modem Eb/No (dB)	7.03355
Modem Eb/No rqmt at spec rate (dB)	2.7
Modem Eb/No extra margin (dB)	1.1
Modem margin at specified datarate	3.23355

Note: ALnk indicates a link to or from the aircraft.  
 GLnk indicates a link to or from the ground station  
 E2E indicates end-to-end, that is the entire link

**Table C-2. Asiasat 3S South (West) Asia Return Link Budget**

Sat name=	AsiaSat3S_SWAsia - Hpol
Sat lon (deg)	105.5
# Aircraft:	
Air lat (deg)	35
Air lon (deg)	35
Air alt (Km)	9
Air roll (deg)	0
Air pitch (deg)	3
Air heading (deg)	0
# Satellite-Aircraft Geometry:	
ALnk range (Km)	40881.9
ALnk azimuth (deg)	-101.093
ALnk elevation (deg)	7.81319
ALnk ant phi (deg)	0
ALnk ant theta (deg)	0
ALnk ant elevation (deg)	90
# Satellite-Aircraft Channel:	
ALnk Freq (GHz)	14.168
ALnk Sat Polarization	HPOL
ALnk Partial spread bandwidth (MHz)	13.5
ALnk Loss path (dB)	207.705
ALnk Loss atmospheric (dB)	0.104403
ALnk Rain availability	0.999
ALnk Loss rain (dB)	0
ALnk Loss other (dB)	0
ALnk Loss total channel (dB)	207.809
ALnk aircraft rate (Kb/s)	64
ALnk spread bandwidth (MHz)	13.5
# Aircraft Uplink Performance:	
ALnk aircraft EIRP (dBW)	36.6659
ALnk Loss - pol mismatch (dB)	0.0645031
ALnk Loss - ptg errors (dB)	0.0827336
ALnk Loss - channel (dB)	207.809
ALnk Gain ant (dBi)	27
ALnk Pwr rcvr in (dBW)	-144.143
ALnk I adjsat (dB/Hz)	-200
ALnk I adjsat reduce (dB)	0
ALnk I CDMA (dB/Hz)	-203.996
ALnk I CDMA reduce (dB)	0
ALnk lo (dB/Hz)	-198.544
ALnk Noise Temp ant (K)	794.33
ALnk No (dBW/Hz)	-199.599
ALnk No+lo sat (dBW/Hz)	-196.029
ALnk C/(No+lo) uplink (dBHz)	51.886
GLnk C/(No+lo) (dBHz)	62.9929

# End-to-End Link Performance:	
ALnk C/(No+Io) single uplink (dBHz)	51.886
GLnk C/(No+Io) single gndlink (dBHz)	62.9929
E2E C/(No+Io) single link (dBHz)	51.5618
E2E Eb/No required (dB)	3.5
E2E Datarate (Kb/s)	64
E2E Number of links	14.9641
E2E Bitrate aggregate (Kb/s)	957.704
E2E Aircraft PSD Fraction (%)	6.68265
E2E Power margin at spec rate (dB)	9.92705
# EIRP Per Aircraft calculation:	
GLnk EIRP max (dBW)	49
GLnk FD_ant (dBW/m2)	-126.601
GLnk SFD at EOC (dB)	-85
GLnk SFD smsig adjust (dB)	4.5
GLnk G_comp_for_satEOC_dB	-2
GLnk EIRP_sat (dBW)	9.8988
GLnk Loss channel - Gant (dB)	152.038
GLnk Carrier (dBW)	-142.14
GLnk No (dBWpHz)	-205.192
GLnk C/(No+Io) (dBHz)	63.0529
# End-to-End Link Performance:	
ALnk C/(No+Io) single uplink (dBHz)	51.8814
GLnk C/(No+Io) single gndlink (dBHz)	63.0529
E2E C/(No+Io) single link (dBHz)	51.5618
E2E Eb/No required (dB)	3.5
E2E Datarate (Kb/s)	64
E2E Number of links	16.0655
E2E Bitrate aggregate (Kb/s)	1028.19
E2E Aircraft PSD Fraction (%)	6.22451
E2E Power margin at spec rate (dB)	9.86704

Note: ALnk indicates a link to or from the aircraft.  
 GLnk indicates a link to or from the ground station.  
 E2E indicates end-to-end (the entire link).  
 The data rate of the return link is variable. The AES e.i.r.p. varies proportionally to the data rate.

Figure C-1. Asiasat 3S South Asia beam, Downlink e.i.r.p.

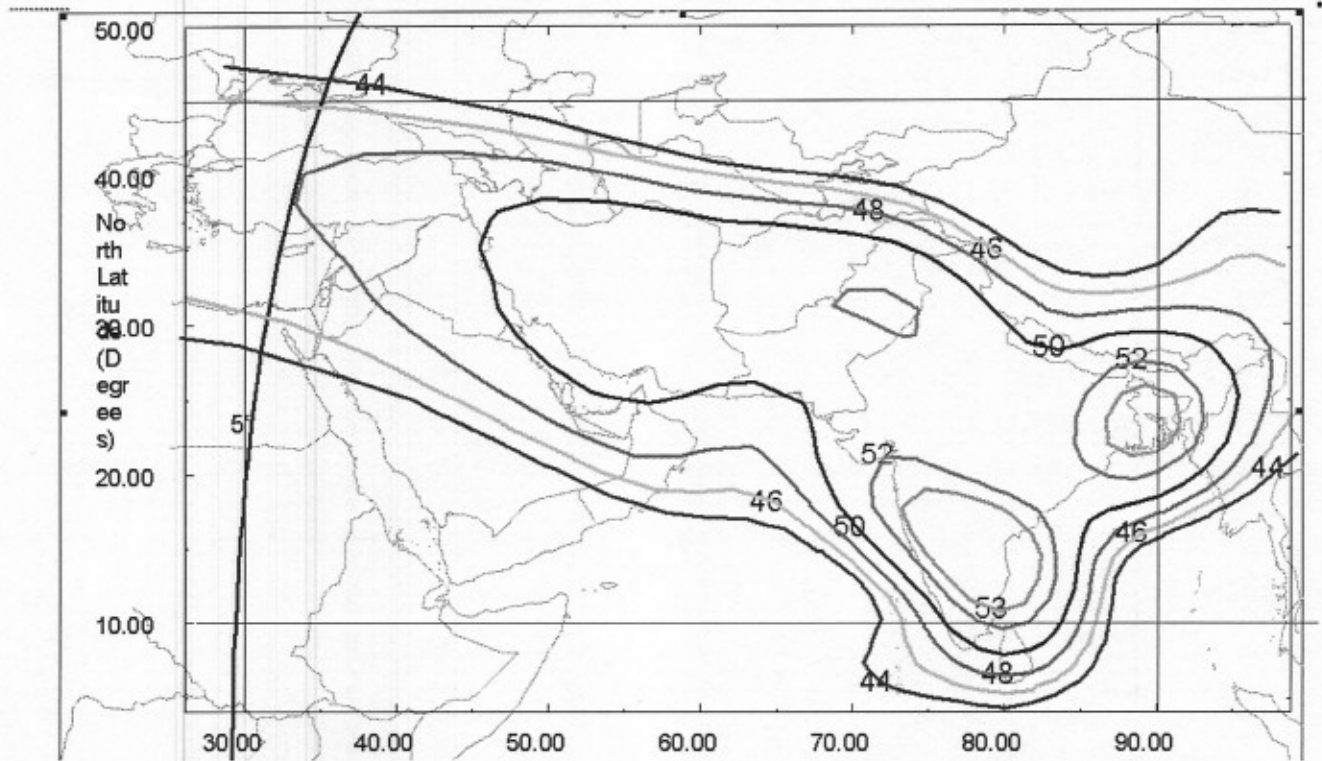
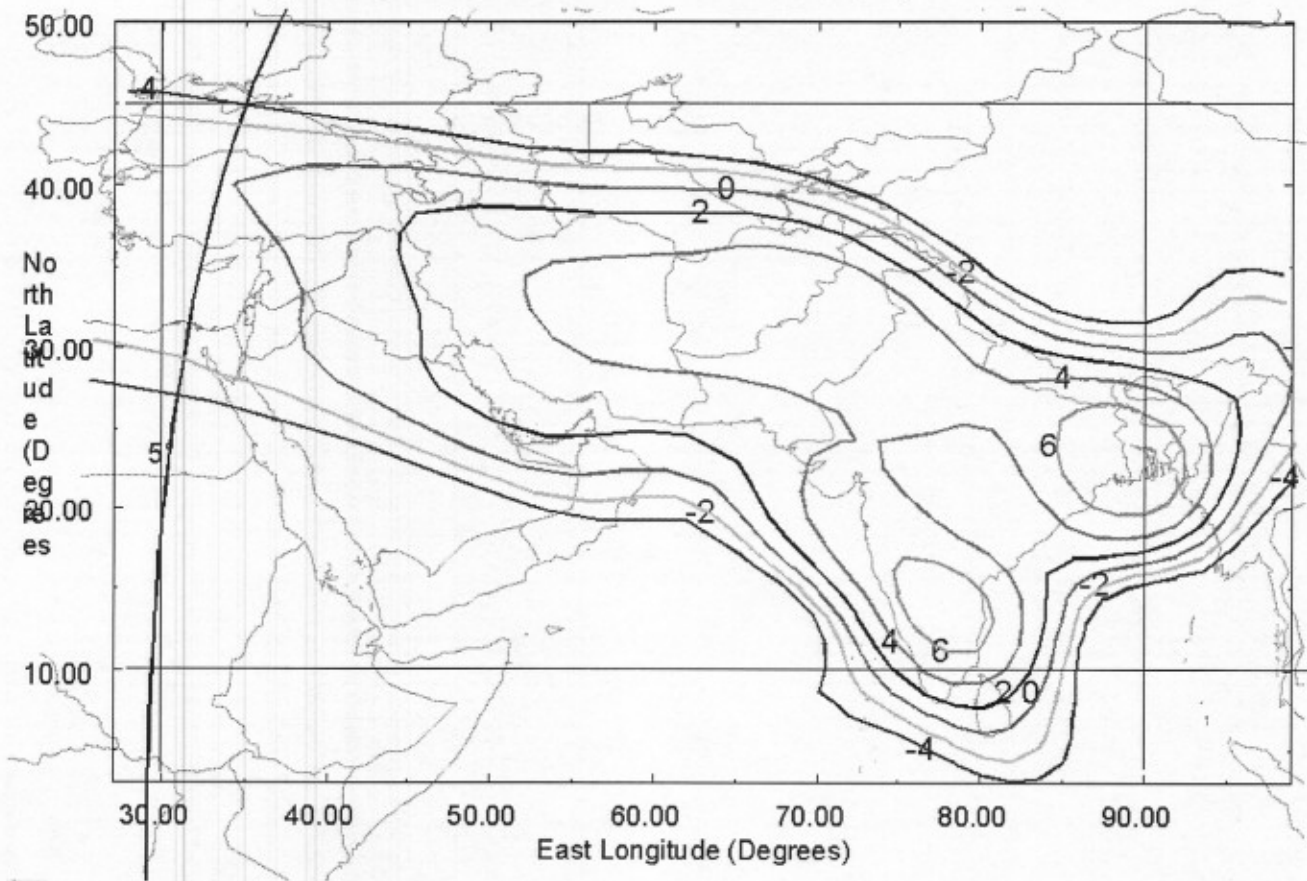


Figure A-2. Asiasat 3S South Asia beam, Uplink G/T



**Annex D. SEASAT**

#	§25.114 (c) Subsection	Data Item Description	Data	
			Forward Link	Return Link
1		Satellite Name	SESAT	
2		ITU-R name	EUTELSAT 2-36E	
3	1,2,3,4	Applicant information	See Form FCC-312	
4	5	Transponder Designation, Transponder Center Frequency, Transponder Bandwidth, Transponder Polarization	D4 11.575 GHz 72 MHz Vertical	F3 14.125 GHz 54 MHz Horizontal
		CBB Center frequency CBB Bandwidth	11.575 GHz 23.26 MHz	14.10558 GHz 13.5 MHz
5	5	Emission designator Allocated bandwidth	23M3G7D	13M5G7D
6	5	Final amplifier maximum output power and e.i.r.p.	49 dBW e.i.r.p.	--
7	5	Power of CBB emission	45 dBW e.i.r.p.	--
8	5	Identification of Antenna beam	Fixed Widebeam	Fixed Widebeam
9	5	TT&C information	Not applicable	
10	5	Satellite receiver noise temperature	--	794 K (6 dB/K)
11	5	Satellite Saturation Flux density	--	-83 dBW/m <sup>2</sup> (@ G/T = 0 dB/K)
12	5	Gain step through the satellite	Not required	
13	6(i)	Orbit location	35.9° East	
14	6(ii)	NGSO data	Not applicable	
15	7	Satellite antenna radiation patterns, showing gain contours, for beams used	see Figure D-1	see Figure D-2
16	8	Link budgets for service links	see Table D-1	see Table D-2
17	9	GSO station keeping	+/- 0.05 ° E-W +/- 0.05 ° N-S	
18	10	Conformance with §25.208 and ITU PFD limits on the downlink	--	See Annex B of Application
19	11-13	Not applicable	--	
20	14	Non-common-carrier statement	Service is already authorized on a non- common carrier basis	



			<b>Data</b>
21	15	Not applicable	--
22	16	Public interest statement	See Application Narrative
23	17-21	Not applicable	--
24	§25.114 (d)	Not applicable	--

**Table D-1. Forward Link Budget**

Sat name=	SESAT_EU_RFP - Vpol
Sat lon (deg)	36
# Satellite-Aircraft Geometry:	
ALnk lat (deg)	35
ALnk lon (deg)	-15
ALnk alt (Km)	9
# Satellite-Aircraft:	
ALnk Freq (GHz)	11.575
ALnk Sat Polarization	VPOL
ALnk EIRP from sat (dBW)	45
# Satellite-Aircraft Channel:	
ALnk Loss path (dB)	205.596
ALnk Loss atmospheric (dB)	0.03033
ALnk Rain availability	0.999
ALnk Loss rain (dB)	0
ALnk Loss other (dB)	0
ALnk Loss total channel (dB)	205.626
# Satellite-Aircraft Link:	
ALnk Loss radome (dB)	0.43
ALnk Gain ant w/radome (dBi)	29.4194
ALnk Loss - pol mismatch (dB)	0.0645031
ALnk Loss - ptg errors (dB)	0.0935294
ALnk Pwr rcvd signal (dBW)	-131.365
ALnk Temp radome (dB)	20.1494
ALnk Temp ant w/radome (dBi)	20.6267
ALnk Temp_noise rcvr sys (K)	115.524
ALnk Temp_noise rcvr sys (dBK)	20.6267
ALnk Partial spread bandwidth (MHz)	23.26
ALnk Noise pwr (dBW/Hz)	-207.972
ALnk I_adjacent (dBW)	-139.728
ALnk Isat EIRP (dBW)	45
ALnk Isat Loss atmos (dB)	0.6
ALnk Xpol isolation (dB)	15
ALnk I_xpol signal sat (dBW)	-146.365
ALnk I_total (dBW)	-138.875
ALnk I_reduction (dB)	0
ALnk I_total reduced (dBW)	-138.875
ALnk Io (dBW/Hz)	-213.331
ALnk No+Io (dBW/Hz)	-206.863
ALnk C/(No+Io) (dB/Hz)	75.4976
Modem specified datarate (Mb/s)	7.5
Modem Eb/No (dB)	6.65181
Modem Eb/No rqmt at spec rate (dB)	2.9
Modem Eb/No extra margin (dB)	1.1
Modem margin at specified datarate	2.65181

Note: ALnk indicates a link to or from the aircraft.  
 GLnk indicates a link to or from the ground station.  
 E2E indicates end-to-end (the entire link).

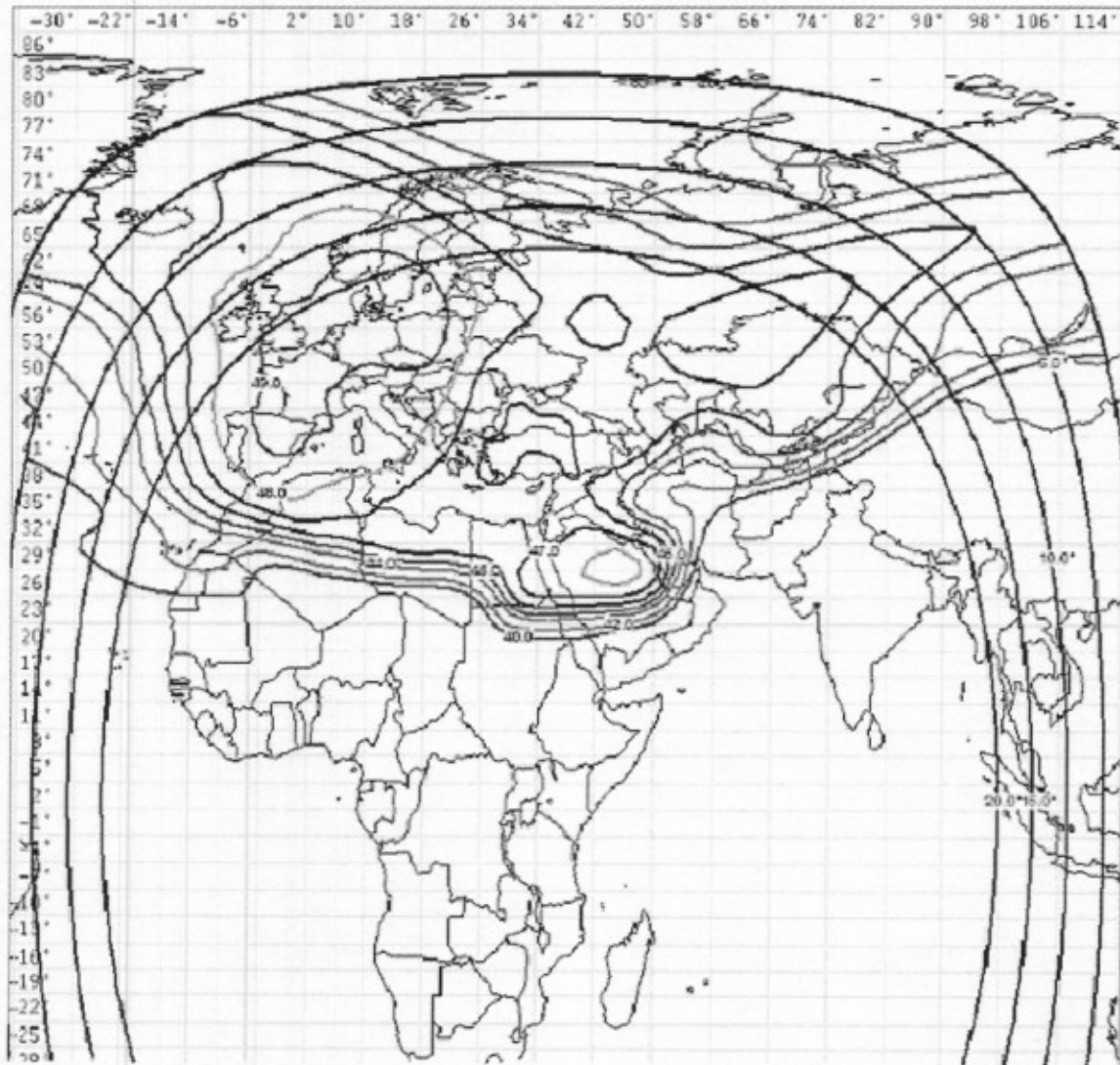
**Table D-2. Return Link Budget**

Sat name=	SESAT_EU_RFP - Vpol
Sat lon (deg)	36
# Aircraft:	
Air lat (deg)	35
Air lon (deg)	-15
Air alt (Km)	9
# Satellite-Aircraft Geometry:	
ALnk range (Km)	39254.9
ALnk azimuth (deg)	-113.717
ALnk elevation (deg)	24.2526
ALnk ant phi (deg)	0
ALnk ant theta (deg)	0
ALnk ant elevation (deg)	90
# Satellite-Aircraft Channel:	
ALnk Freq (GHz)	14.125
ALnk Sat Polarization	VPOL
ALnk Partial spread bandwidth (MHz)	6.75
ALnk Polangle - air (deg)	-47.9812
ALnk Polangle - ant (deg)	-47.9812
ALnk Loss path (dB)	207.325
ALnk Loss atmospheric (dB)	0.0337673
ALnk Rain availability	0.999
ALnk Loss rain (dB)	0
ALnk Loss other (dB)	0
ALnk Loss total channel (dB)	207.359
ALnk aircraft rate (Kb/s)	64
ALnk spread bandwidth (MHz)	13.5
# Aircraft Uplink Performance:	
ALnk aircraft EIRP (dBW)	36.9219
ALnk Loss - pol mismatch (dB)	0.0645031
ALnk Loss - ptg errors (dB)	0.0827336
ALnk Loss - channel (dB)	207.359
ALnk Gain ant (dBi)	29
ALnk Pwr rcvr in (dBW)	-141.437
ALnk I adjsat (dB/Hz)	-195
ALnk I adjsat reduce (dB)	0
ALnk I CDMA (dB/Hz)	-201.411
ALnk I CDMA reduce (dB)	0
ALnk Io (dB/Hz)	-194.106
ALnk Noise Temp ant (K)	794.33
ALnk No (dBW/Hz)	-199.599
ALnk No+Io sat (dBW/Hz)	-193.026
ALnk C/(No+Io) uplink (dBHz)	51.589
GLnk C/(No+Io) (dBHz)	73.6

# End-to-End Link Performance:	
ALnk C/(No+Io) single uplink (dBHz)	51.589
GLnk C/(No+Io) single gndlink (dBHz)	73.6
E2E C/(No+Io) single link (dBHz)	51.5618
E2E Eb/No required (dB)	3.5
E2E Datarate (Kb/s)	64
E2E Number of links	7.79113
E2E Bitrate aggregate (Kb/s)	498.632
E2E Aircraft PSD Fraction (%)	12.8351
E2E Power margin at spec rate (dB)	9.71784

Note: ALnk indicates a link to or from the aircraft.  
 GLnk indicates a link to or from the ground station.  
 E2E indicates end-to-end (the entire link).  
 The data rate of the return link is variable. The AES e.i.r.p. varies proportionally to the data rate.

**Figure D-1. SESAT @ 35.9° East, Downlink**



**Figure D-2. SESAT @ 35.9° East, Uplink**

