

Attachment B – Regulatory Compliance Matrix

Reference Section	Reference Location	Topic / Reason for (n/a)
25.114(a)(1)	FCC Form 312; Schedule S; Narrative; Attachment C	Overall description of filing
25.114(a)(2)	n/a	NGSO constellation
25.114(a)(3)	n/a	Application filed pursuant to two-step procedure
25.114(b)	Form 312	Waiver required by 47 U.S.C §304
25.114(c)(1)	FCC Form 312; Schedule-S	Applicant information
25.114(c)(2)	Schedule-S	Applicant points of contact
25.114(c)(3)	FCC Form 312; Narrative; Schedule-S	Type of authorization
25.114(c)(4)(i)	Attachment C – Section 6; Schedule-S	Channel frequency, bandwidth and polarization
25.114(c)(4)(ii)	Schedule-S	Maximum EIRP and EIRP density of TX beams
25.114(c)(4)(v)	Schedule-S	RX beam: G/T, SFD
25.114(c)(4)(vi)(A)	Schedule-S	GSO: Antenna Gain Contours
25.114(c)(4)(vi)(B)	n/a	NGSO: Antenna Gain Contours
25.114(c)(4)(vi)(C)	n/a	Shapeable Beams: Antenna Gain Contours
25.114(c)(4)(vi)(D)	n/a	Steerable, non-shapeable beams
25.114(c)(4)(vii)(A-C)	n/a	GSO: Large number of spot beams
25.114(c)(5)(i-v)	Schedule-S	GSO: Orbital parameters
25.114(c)(6)(i-ix)	n/a	NGSO: Orbital parameters
25.114(c)(7)	Schedule-S; Attachment C – Sections 3, 6, and Exh. 3; Narrative	Frequency Bands, Types of Service and Coverage Areas
25.114(c)(8)	Schedule-S, See §25.208	TX Beams: PFD
25.114(c)(10)	Schedule-S; Narrative	Operational Lifetime
25.114(c)(11)	FCC Form 312	Common Carrier Status
25.114(c)(13)	n/a	17/24 GHz BSS polarization isolation
25.114(d)(1)	Narrative; Attachment C - Section 2	Overall description
25.114(d)(6)	Narrative	Public Interest
25.114(d)(7)	See §25.140(a)	Interference Analysis
25.114(d)(8)	n/a	L-Band MSS
25.114(d)(9)	n/a	MSS: Multiple Satellites
25.114(d)(10)	n/a	L/S-Band MSS
25.114(d)(11)	n/a	DBS
25.114(d)(12)	n/a	NGSO FSS
25.114(d)(13)(i-ii)	n/a	DBSS
25.114(d)(14)(i-v)	Narrative; Attachment D	Space Debris Mitigation Plan
25.114(d)(15)(i-v)	n/a	17/24 GHz BSS
25.114(d)(16)	n/a	17/24 GHz BSS
25.114(d)(17)	n/a	17/24 GHz BSS
25.114(d)(18)	n/a	17/24 GHz BSS

Reference Section	Reference Location	Topic / Reason for (n/a)
25.137(a)	Narrative	Requirements for U.S. market access request
25.137(b)	FCC Form 312, Schedule S, Attachment C, Narrative	Legal and technical information required for U.S. market access
25.137(c)	Narrative (see § 25.158)	Petition processing; queue placement
25.137(d)	Narrative	Non-U.S.-licensed satellite requirements
25.137(e-g)	n/a	Changes/modifications
25.140(a)(3)(i)	n/a	C-band limits
25.140(a)(3)(ii)	Attachment C - Section 14	Ku-band limits
25.140(a)(3)(iii)	n/a	Ka-band limits
25.140(a)(3)(iv)	n/a	24.75-25.25 GHz band
25.140(a)(3)(v)	n/a	AP30B limits
25.140(a)(3)(vi)	Attachment C - Section 14, Exhibit 1, Exhibit 2	2°-spacing interference analysis
25.140(d)	n/a	Non-routine transmission levels
25.156(a)	Narrative	Petition consideration - general
25.158	Narrative	Petition consideration – GSO satellite
25.159	n/a	Unbuilt systems
25.172(a)(1-4)	Attachment C – Section 4	TT&C Reporting
25.202(e)	Attachment C - Section 7	Frequency Tolerance
25.202(f)(1-3)	Attachment C - Section 8	Out of band - emissions
25.202(g)	Attachment C – Section 4	TT&C on band edge
25.208(a-g)	Attachment C - Section 12	PFD Analysis
25.210(f)	Attachment C - Section 9	Full Frequency Reuse
25.210(j)	Narrative, Schedule S	EW Station keeping tolerance
25.283(a-c)	Narrative; Attachment D	Space Debris Mitigation Plan
25.207	Attachment C - Section 10	Cessation of Emissions

Attachment C - Engineering Statement

1. Scope

As required by Section 25.114 and other sections of the Part 25 rules, this Attachment contains additional information that cannot be entered into the Schedule S online submission system regarding the proposed relocation and operations of the EUTELSAT 139 WEST A satellite at the nominal 139° W.L. orbital location.

2. General Description (Section 25.114(d)(1))

The EUTELSAT 139 WEST A satellite was formerly the EUTELSAT 7A satellite located at 7° E.L. The satellite is being relocated to 139.2° W.L. and is expected to reach its new orbital location in April 2020. The EUTELSAT 139 WEST A satellite will provide fixed-satellite service (“FSS”) and mobility services in the United States from the nominal 139° W.L. orbital location.¹ It should be noted that the Schedule S rounds the new orbital location to 139 W.L. EUTELSAT 139 WEST A will begin operations at 139.2° W.L. with an inclination of 0.3° and the inclination will increase by approximately 0.9°/year.

EUTELSAT 139 WEST A will employ 23 Ku-band primary transponders using both linear polarizations, thereby providing dual-frequency reuse. The satellite will employ one regional fixed Ku-band uplink beam and two regional fixed Ku-band downlink beams. The fixed Ku-band beams will be configured to provide service to the contiguous United States (CONUS) and neighboring regions.

The EUTELSAT 139 WEST A satellite has additional Ku-band frequencies on these regional beams and other regional fixed uplink and downlink beams in Ku-band and Ka-band frequencies. However, they are not the subject of this filing.

The EUTELSAT 139 WEST A satellite is capable of conducting emergency TT&C operations in S-band. However, no U.S. market access is requested and therefore the S-band capabilities are not a part of this application.

¹ The satellite will actually operate at 139.2° W.L. to avoid overlap of its station-keeping box with that of the AMC 8 and AMC 18 satellites located at 139.0° W.L. The Spaceway 1 satellite also operates at 138.9° W.L.

3. Spacecraft Overview

EUTELSAT 139 WEST A was manufactured and supplied by EADS Astrium based on the Eurostar-3000 bus platform. The satellite is 3-axis stabilized and uses bi-propellant chemical propulsion for attitude, on-station control, repositioning and end-of-life deorbit.

The satellite will operate in Ku-band at the frequencies listed below, in addition to some specific frequencies for TT&C and ULPC functions:

Ku-band Uplink	Ku-band Downlink
13.75 – 14.0 GHz	10.95 – 11.2 GHz
14.0 – 14.5 GHz	11.45 – 11.7 GHz
	12.5 – 12.75 GHz

EUTELSAT 139 WEST A provides the following coverage (illustrations of the beam coverage areas are provided in Exhibit 3):

Ku-band Uplink	CONUS A	CONUS, parts of Canada, Mexico, and portions of the north Pacific Ocean
Ku-band Downlink	CONUS A	CONUS, parts of Canada, Mexico, and portions of the north Pacific Ocean
	CONUS B	CONUS, parts of Canada, Mexico, and portions of the north Pacific Ocean

4. Telemetry, Tracking and Control (TT&C)

As required by 25.172(a), this section describes how TT&C operations will be conducted for the EUTELSAT 139 WEST A satellite. No TT&C sites within the United States will be employed for operation of the satellite.

The TT&C sub-system provides for communications during on-station operations, as well as during spacecraft emergencies. Ku-band telecommand transmissions are normally received and Ku-band telemetry communications are normally transmitted by the spacecraft through wide-beam uplink and downlink horn antennas. During emergency operations, TT&C communications are transmitted and received through a near omni-directional S-band antenna.

TT&C communication channels have been selected at the edge of the assigned Ku-bands in accordance with Section 25.202(g). The satellite utilizes two Ku-band telemetry channels. The Ku-band telemetry channel center frequencies are 11699.8 MHz and 11700.4 MHz with a bandwidth of 300 kHz and horizontal polarization. The satellite utilizes one Ku-band command channel. The Ku-band command channel center frequency is 13752.5 MHz with a bandwidth of 600 kHz and employs horizontal polarization. TT&C operations will be conducted from earth station facilities located in Mexico.

The coverage patterns of the Ku-band uplink and downlink TT&C beams (TCH & TMH) have been included as GXT files with a GIMS container database in the Schedule S.

Contact details for the control stations are provided below:

[EUTELSAT 139 WEST A](#) TT&C station 1:

Hermosillo
Carretera Bahía Kino, Km. 5.5
Col. El Llano
CP 83210
Hermosillo, Sonora
Mexico

[EUTELSAT 139 WEST A](#) TT&C station 2:

Iztapalapa
Av. de las Telecomunicaciones s/n
Col. Leyes de Reforma
CP 09310
Mexico, D.F.
Mexico

Satellite control center addresses and telephone numbers:

[EUTELSAT 139 WEST A](#) Control Center

Address: Eutelsat
70 rue Balard
75015 Paris
France

[EUTELSAT 139 WEST A](#) control contact info:

Email: csc@eutelsat.com
24/7 hours number(s): +33 1 45 57 06 66

5. Uplink Power Control

EUTELSAT 139 WEST A utilizes four Ku-band ULPC channels in three beacon beams. The Ku-band ULPC channel center frequencies are 11,200.0 and 12,500.0 MHz and have bandwidths of 100 kHz and employ horizontal polarization. In addition, the telemetry channels 11699.8 and 11700.4 MHz also operate as ULPC channels via the TT&C downlink beam with bandwidths of 300 kHz and also employ horizontal polarization.

The coverage patterns of the Ku-band ULPC beacon beams have been included as GXT files with a GIMS container database in the Schedule S.

6. Frequency Plan

The following tables list the uplink and downlink Ku-band channel plan for EUTELSAT 139 WEST A. This information is also provided in the accompanying Schedule S but is included here for clarity.

Table 1 Ku-Band Uplink Frequency Plan

Channel ID	Bandwidth (kHz)	Center Frequency (MHz)	Polarization
B1	72000	14291.67	V
B2	72000	14291.67	H
B3	72000	14375.00	V
B4	72000	14375.00	H
B5	72000	14458.33	V
B6	72000	14458.33	H
D1	36000	13771.41	V
D2	36000	13792.16	H
D3	36000	13812.91	V
D4	36000	13833.66	H
D5	36000	13854.41	V
D6	36000	13875.16	H
D7	36000	13895.91	V
D8	36000	13916.66	H
D9	36000	13937.41	V
D10	36000	13967.75	H
D11	49500	13978.91	V
F1	72000	14041.67	V
F2	72000	14041.67	H
F3	72000	14125.00	V
F4	72000	14125.00	H
F5	72000	14208.33	V
F6	72000	14208.33	H
TC1	600	13752.5	H

Table 2 Ku-Band Downlink Frequency Plan

Channel ID	Bandwidth (kHz)	Center Frequency (MHz)	Polarization
B1	72000	10991.67	H
B2	72000	10991.67	V
B3	72000	11075.00	H
B4	72000	11075.00	V
B5	72000	11158.33	H
B6	72000	11158.33	V
D1	36000	11471.41	H
D2	36000	11492.16	V
D3	36000	11512.91	H
D4	36000	11533.66	V
D5	36000	11554.41	H
D6	36000	11575.16	V
D7	36000	11595.91	H
D8	36000	11616.66	V
D9	36000	11637.41	H
D10	49500	11667.75	V
D11	36000	11678.91	H
F1	72000	12541.67	H
F2	72000	12541.67	V
F3	72000	12625.00	H
F4	72000	12625.00	V
F5	72000	12708.33	H
F6	72000	12708.33	V
BC2	100	12500.00	H
BC3	100	11200.00	H
TM1	300	11699.8	H
TM2	300	11700.4	H

7. Frequency Tolerance

Section 25.202(e) requires that the carrier frequency of each space station transmitter be maintained within 0.002% of the reference frequency. These frequency tolerance requirements will be met.

8. Out of Band Emissions

The out-of-band emission limits of Section 25.202(f)(1), (2) and (3) will be met.

9. Frequency Reuse

EUTELSAT 139 WEST A employs full frequency reuse on the Ku-band uplink and downlink by employing dual orthogonal linear polarization and frequency reuse across multiple regional beams.

10. Cessation of Emissions

As required by Section 25.207 of the FCC's rules, all downlink transmissions can be turned on and off by ground telecommand, thereby causing cessation of emissions from the satellite.

11. ITU Filings

The EUTELSAT 139 WEST A satellite will operate in Ku-bands (10.95-11.2, 11.45-11.701, 12.499-12.75 and 13.75-14.5 GHz) at the 139.2° W.L. orbital location under the F-SAT-N4-139W and F-SAT-N6-139W ITU satellite network filings. The satellite will operate in the AP30B Ku-band (11.199-11.2 GHz for a beacon channel) at the 139.2° W.L. orbital location under the F-SAT-30B-139W ITU satellite network filing. The operation of the satellite will fall within the envelope of the parameters disclosed in these ITU satellite network filings.

12. PFD Analysis

The power flux density ("PFD") limits for space stations operating in the 10950–11200 MHz and 11450–11700 MHz bands are specified in Section 25.208 of the Commission's rules. Neither the Commission's rules nor rule No. 21.16 of the International Telecommunication Union ("ITU") Radio Regulations specify a PFD limit for FSS in the 12.5-12.75 GHz band in Region 2. However, the PFD limits specified by ITU No. 21.16 for Regions 1 and 3 are considered applicable to EUTELSAT 139 WEST A in Region 2 as well.

The maximum PFD levels for the EUTELSAT 139 WEST A transmissions were calculated for the bands 10950–11200 MHz, 11450–11700 MHz, and 12500-12750 MHz.² The results, provided in Schedule S, show that the downlink PFD levels of EUTELSAT 139 WEST A's carriers do not exceed the limits specified in either Section 25.208 of the Commission's rules or in the ITU Radio Regulations.

Should the EUTELSAT 139 WEST A satellite be reoriented, the orientation of the beams and/or the downlink power density will be adjusted to ensure the downlink PFD will still be compliant with applicable PFD limits.

13. Link Budgets

Link analysis for EUTELSAT 139 WEST A was conducted for representative carriers in the Ku-band CONUS A and CONUS B regional fixed beam. The results of the link analysis are shown in Exhibit 1.

² PFD compliance of beacon and telemetry carriers overlapping the service band edges is also demonstrated.

14. Interference Analysis

In this section, the information specified in Section 25.140(a) is presented (as required by Section 25.114(d)(7)).

The downlink EIRP density of EUTELSAT 139 WEST A transmissions in the conventional or extended Ku-bands will not exceed levels provided in Section 25.140(a)(3)(ii). Associated uplink transmissions will not exceed applicable EIRP density envelopes in Sections 25.218, unless the non-routine uplink and/or downlink operation is coordinated with operators of authorized co-frequency space stations at assigned locations within six degrees of the satellite.

The EUTELSAT 139 WEST A satellite seeks to operate FSS links in spectrum that may be governed by Section 25.140(a)(3)(vi) (i.e., 12-5-12.75 GHz, albeit on a non-conforming basis). Out of an abundance of caution, Eutelsat is including a 2°-spacing compatibility analysis. Since there are no commercial satellites operating within 2° of EUTELSAT 139 WEST A and providing coverage of CONUS, the impact from the operations of hypothetical satellites having the same or worst case 2°-spacing operating characteristics as EUTELSAT 139 WEST A located at 141.2° W.L. and 137.2° W.L. was analyzed. The results of this interference configuration are included in the link budget provided in Exhibit 1. Furthermore, separate C/I calculations were conducted for the 2°-spacing analysis and are provided in Exhibit 2.

CIEL-2 is the closest BSS satellite to EUTELSAT 139 WEST A operating at 128.85° W.L. This results in a nominal spacing separation of 10.35° which exceeds the 9° spacing criteria for BSS satellites.

CERTIFICATION OF PERSON RESPONSIBLE FOR PREPARING ENGINEERING INFORMATION

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this application, that I am familiar with Part 25 of the Commission's rules, that I have either prepared or reviewed the engineering information submitted in this application, and that it is complete and accurate to the best of my knowledge and belief.

/s/

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EXHIBIT 1: SATELLITE LINK BUDGETS – Nominal Interference Conditions

Link Budget Summary

Link Name	FWD_0m8	RTN_0m8	FWD_0m6	RTN_0m6	FWD_0m45	RTN_0m45
Tx/Rx Link Name	Miami (25.8Â°N, 80.2Â°W) / Remote	Remote / Miami (25.8Â°N, 80.2Â°W)	Miami (25.8Â°N, 80.2Â°W) / Remote	Remote / Miami (25.8Â°N, 80.2Â°W)	Miami (25.8Â°N, 80.2Â°W) / Remote	Remote / Miami (25.8Â°N, 80.2Â°W)
Satellite	E7A	E7A	E7A	E7A	E7A	E7A
Transponder	D01	B02	D01	B02	D01	B02
Antenna Diameters Tx/Rx (m)	9 / 0.8	0.8 / 9	9 / 0.6	0.6 / 9	9 / 0.45	0.45 / 9
Modulation + Fec	4PSK 1/2	4PSK 3/4	4PSK 2/5	4PSK 2/5	4PSK 1/4	4PSK 1/4
Info Bit Rate (Mbps)	28.96	2.905	23.119	1.542	14.358	0.958
Symbol Rate (Mbaud)	30	2	30	2	30	2
Bandwidth Consumption (MHz)	36	2.4	36	2.4	36	2.4
Power Consumption (MHz)	36	1.437	36	0.556	36	0.256
HPA Rating (W)	98.29	12.73	98.29	8.75	98.29	7.16
Throughput Spectral Efficiency (bps/Hz)	0.9654	1.4521	0.7707	0.7707	0.4786	0.4786
Clear Sky Link Margin (dB)	2.89	2.61	2.38	2.76	2.74	1.76
Availability	99.957	99.665	99.952	99.701	99.963	99.463

Link Budget Details

Space Segment

Satellite	E7A	E7A	E7A	E7A	E7A	E7A
Orbital Position	139.2 ° W	139.2 ° W	139.2 ° W	139.2 ° W	139.2 ° W	139.2 ° W
Transponder	D01	B02	D01	B02	D01	B02
Transponder Bandwidth (MHz)	36	72	36	72	36	72
Uplink Coverage	EuropeA West Receive	EuropeA West Receive	EuropeA West Receive	EuropeA West Receive	EuropeA West Receive	EuropeA West Receive
Uplink Frequency (MHz)	13,771.4100	14,291.6700	13,771.4100	14,291.6700	13,771.4100	14,291.6700
Uplink Polarization	Y	X	Y	X	Y	X
Downlink Coverage	EuropeB Transmit X	EuropeA East Transmit	EuropeB Transmit X	EuropeA East Transmit	EuropeB Transmit X	EuropeA East Transmit
Downlink Frequency (MHz)	11,471.4100	10,991.6700	11,471.4100	10,991.6700	11,471.4100	10,991.6700
Downlink Polarization	X	Y	X	Y	X	Y
Transponder Mode	ALC Single carrier	Linear	ALC Single carrier	Linear	ALC Single carrier	Linear
SFD (dBW/m²)	-83	-86	-83	-86	-83	-86
IBO Multicarrier (dB)	6.4	5.6	6.4	5.6	6.4	5.6
OBO Multicarrier (dB)	4.2	3.7	4.2	3.7	4.2	3.7

Carrier Parameters And Resources

Topology	OUTBOUND	INBOUND	OUTBOUND	INBOUND	OUTBOUND	INBOUND
Modem Manufacturer	Other	Other	Other	Other	Other	Other
Modem Reference						
Technology	DVB-S2	DVB-S2	DVB-S2	DVB-S2	DVB-S2	DVB-S2
Pilots	ON	ON	ON	ON	ON	ON
Frame	Normal	Normal	Normal	Normal	Normal	Normal
Modulation	4	4	4	4	4	4
FEC	1/2	3/4	2/5	2/5	1/4	1/4
Spreading Factor	1	1	1	1	1	1
Info Bit Rate (Mbps)	28.96	2.905	23.119	1.542	14.358	0.958
Symbol Rate (Mbaud)	30	2	30	2	30	2
Modulation Spectral Efficiency (bit/sym)	0.9654	1.4521	0.7707	0.7707	0.4786	0.4786
E _b /N ₀ (dB)	1.7	3	1.4	1.4	1.1	1.1
E _s /N ₀ (dB)	1.55	4.62	0.27	0.27	-2.1	-2.1
IPFD Carrier (dBW/m²)	-86.82	-113.04	-86.82	-117.17	-86.82	-120.54
IBO Carrier (dB)	0	22.6	0	26.73	0	30.1
OBO Carrier (dB)	0	20.7	0	24.83	0	28.2
Roll Off (%)	20	20	20	20	20	20
Bandwidth Consumption (MHz)	36	2.4	36	2.4	36	2.4
Power Consumption (MHz)	36	1.437	36	0.556	36	0.256
Throughput Spectral Efficiency (bps/Hz)	0.9654	1.4521	0.7707	0.7707	0.4786	0.4786

Uplink Ground Segment

Earth Station Code	Other		Other		Other	
Country	United States of America - US		United States of America - US		United States of America - US	
Location	Miami (25.8Â°N, 80.2Â°W)	Remote	Miami (25.8Â°N, 80.2Â°W)	Remote	Miami (25.8Â°N, 80.2Â°W)	Remote
Longitude (°)	-80.2	-102.7	-80.2	-102.7	-80.2	-102.7
Latitude (°)	25.77	29.7	25.77	29.7	25.77	29.7
Distance To Satellite (km)	39,604.28	37,993.37	39,604.28	37,993.37	39,604.28	37,993.37
Atmospheric Losses (dB)	0.2	0.2	0.2	0.2	0.2	0.2
Antenna Size (m)	9	0.8	9	0.6	9	0.45
Satellite G/T Towards Transmit Station (dB/K)	3.83	4.45	3.83	4.45	3.83	4.45
Elevation Angle (°)	19.44	37.39	19.44	37.39	19.44	37.39
Azimuth Angle (°)	255.37	236.2	255.37	236.2	255.37	236.2
Uplink EIRP (dBW)	76.32	49.75	76.32	45.62	76.32	42.25
Operating HPA Power (clear sky) (W)	49.27	12.73	49.27	8.75	49.27	7.16
HPA OBO + Cable Losses (dB)	4	1	4	1	4	1

Downlink Ground Segment

Earth Station Code	Other United States of America - US		Other United States of America - US		Other United States of America - US	
Country	Miami (25.8°N, 80.2°W)		Miami (25.8°N, 80.2°W)		Miami (25.8°N, 80.2°W)	
Location	Remote		Remote		Remote	
Longitude (°)	-102.7	-80.2	-102.7	-80.2	-102.7	-80.2
Latitude (°)	29.7	25.77	29.7	25.77	29.7	25.77
Distance To Satellite (m)	37,993.37	39,604.28	37,993.37	39,604.28	37,993.37	39,604.28
Atmospheric Losses (dB)	0.3	0.3	0.3	0.3	0.3	0.3
Antenna Size (m)	0.8	9	0.6	9	0.45	9
Antenna G/T Towards Satellite (dB/K)	17.11	36.27	14.61	36.27	12.11	36.27
System Temperature (K)	117	165	117	165	117	165
Elevation Angle (°)	37.39	19.44	37.39	19.44	37.39	19.44
Azimuth Angle (°)	236.2	255.37	236.2	255.37	236.2	255.37
Satellite EIRP Towards Receive Station (dBW)	50.9	48.35	50.9	48.35	50.9	48.35

Clear Sky Analysis

Thermal Uplink C/N (dB)	26.6	12.44	26.6	8.31	26.6	4.94
Aggregated C/I Uplink (dB)	25.23	10.75	25.23	6.49	25.23	3.12
Uplink Propagation Losses (dB)	0.2	0.2	0.2	0.2	0.2	0.2
Thermal Downlink C/N (dB)	16.31	23.98	13.81	19.85	11.31	16.48
Aggregated C/I Downlink (dB)	4.79	13.55	3.04	9.38	1.06	6.01
Downlink Propagation Losses (dB)	0.3	0.3	0.3	0.3	0.3	0.3
C/N+I Overall (dB)	4.43	7.23	2.65	3.03	0.64	-0.34
E _b /N ₀ Overall (dB)	4.59	5.61	3.78	4.16	3.84	2.86
Clear Sky Link Margin (dB)	2.89	2.61	2.38	2.76	2.74	1.76

Rain Fade Analysis

UPPC Maximum Rain Fade Compensation (dB)	0	0	0	0	0	0
Uplink Rain Fade Assumed In Link Budget (dB)	18.23	2.61	18.89	2.76	21.68	1.76
Carrier IBO Under Assumed Uplink Rain Fade (dB)	18.23	25.21	18.89	29.49	21.68	31.86
Carrier OBO Under Assumed Uplink Rain Fade (dB)	0	23.31	0	27.59	0	29.96
Provision To Downlink Degradation Due To Interference Scaled To Downlink Fade Conditions (dB)	2.82	1.07	3.3	0.99	2.89	1.61
Downlink Rain Fade Assumed In Link Budget (dB)	7.41	12.08	5.97	12.45	6.21	10.14
Downlink G/T Degradation Due To Rain (dB)	4.5	3.95	4.25	3.96	4.3	3.85
Downlink C/N Under Assumed Rain Fade (dB)	4.4	7.97	3.6	3.45	0.8	2.51

Link Availability Prediction

Uplink Reference Rain Rate (ITU-R P.837) (mm/hr)	89.02	49.39	89.02	49.39	89.02	49.39
Availability Corresponding To Assumed Uplink Rain Fade	99.969	99.692	99.972	99.725	99.982	99.503
Downlink Reference Rain Rate (ITU-R P.837)	49.39	89.02	49.39	89.02	49.39	89.02
Availability Corresponding To Assumed Downlink Rain Fade (%)	99.988	99.974	99.981	99.977	99.982	99.961
Availability Corresponding To Assumed (uncorrelated) Uplink And Downlink Rain Fade	99.957	99.665	99.952	99.701	99.963	99.463

EXHIBIT 2: C/I Calculations for 2°-Spacing Analysis

The following tables demonstrate the C/I calculations for the 2°-spacing analysis. Satellites have been placed on either side of EUTELSAT 139 WEST A at 139.2° W.L. spaced exactly 2° away and operating at the peak uplink and downlink PSD level allowed for 2°-spacing. Results are shown for both a single interfering satellite and two interfering satellites each spaced 2° away.

EUTELSAT 139 WEST A				
Uplink			Downlink	
	On-axis PSD	2° PSD	EUT location PSD	EUT peak PSD
FWD B2	1.5	-37.0	-23.9	-22.4
RTN D1	-13.3	-28.5	-35.4	-33.5
FWD B2	1.5	-37.0	-23.9	-22.4
RTN D1	-17.5	-28.5	-39.5	-37.6
FWD B2	1.5	-37.0	-23.9	-22.4
RTN D1	-20.8	-28.5	-42.9	-41

Table 1 EUTELSAT 139 WEST A PSD for 2°-Spacing Analysis

Adjacent 1			Adjacent 2	
Uplink		Downlink	Uplink	Downlink
PSD towards EUT		Peak PSD	PSD towards EUT	Peak PSD
FWD B2	-28.5	-22	-28.5	-22
RTN D1	-28.5	-22	-28.5	-22
FWD B2	-28.5	-22	-28.5	-22
RTN D1	-28.5	-22	-28.5	-22
FWD B2	-28.5	-22	-28.5	-22
RTN D1	-28.5	-22	-28.5	-22

Table 2 Adjacent Satellite PSD for 2°-Spacing Analysis

1 adj sat			2 adj sat	
Uplink C/I		Downlink C/I	Uplink C/I	Downlink C/I
FWD B2	30.0	7.9	27.0	4.9
RTN D1	15.2	23.2	12.2	20.2
FWD B2	30.0	6.1	27.0	3.1
RTN D1	11.0	19.1	8.0	16.1
FWD B2	30.0	4.1	27.0	1.1
RTN D1	7.7	15.7	4.7	12.7

Table 3 C/I Analysis for 2°-Spacing

Exhibit 3: Service Areas

This document illustrates the service areas for the uplink and downlink beams of EUTELSAT 139 WEST A at 139.2° W.L. in the accompanying Schedule S.

The Ku-band CONUS-A fixed uplink service area includes much of CONUS, Canada, Mexico, and portions of the north Pacific Ocean and is illustrated in Figure 1. Figure 1 reflects the service area for uplink beams F1H1, F1H2, F1V1 and F1V2.

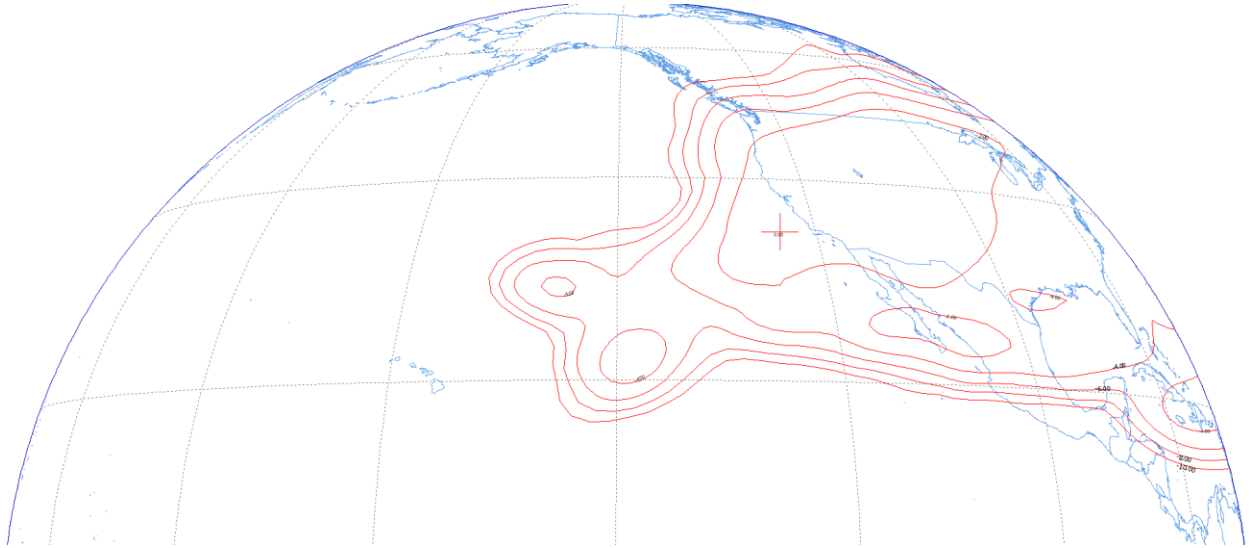


Figure 1 Ku-band CONUS-A Fixed Uplink Service Area from 139.2° W.L.

The Ku-band CONUS-A fixed downlink service area includes much of CONUS, Canada, Mexico, and portions of the north Pacific Ocean and is illustrated in Figure 2. Figure 2 reflects the service area for uplink beams F2H1, F2H2, F2H3, F2V1, F2V2 and F2V3.

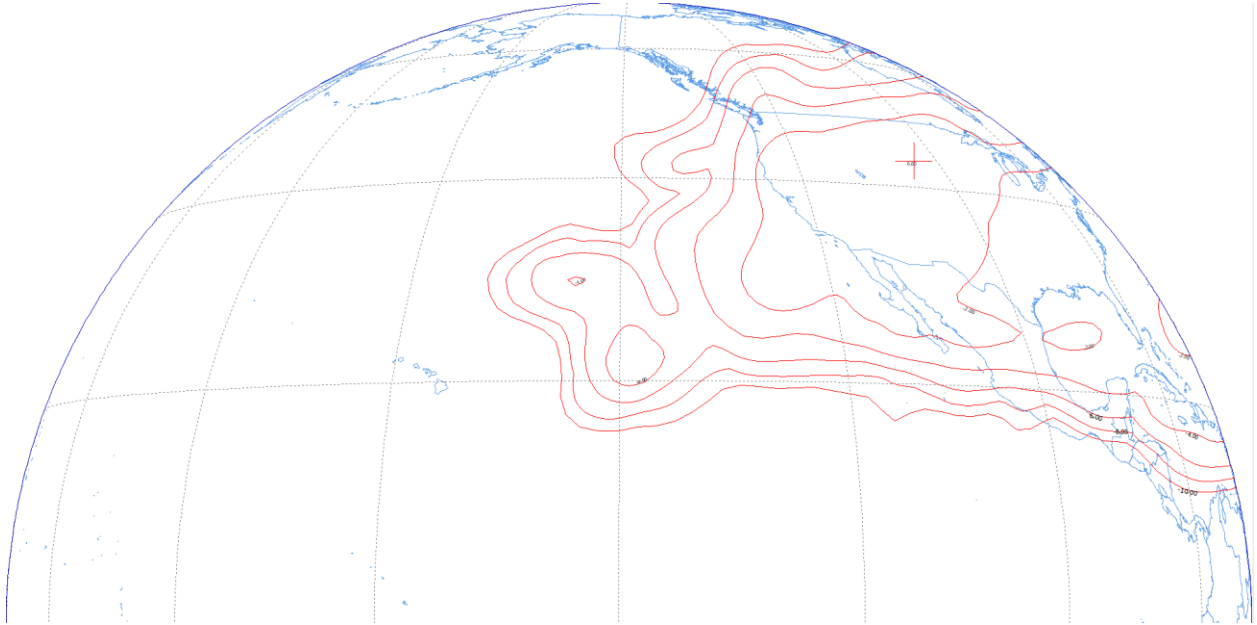


Figure 2 Ku-band CONUS-A Fixed Downlink Service Area from 139.2° W.L.

The Ku-band CONUS-B fixed downlink service area includes much of CONUS, Canada, Mexico, and portions of the north Pacific Ocean and is illustrated in Figure 3. Figure 3 reflects the service area for downlink beams F3H1, F3H2, F3H3, F3V1, F3V2 and F3V3.

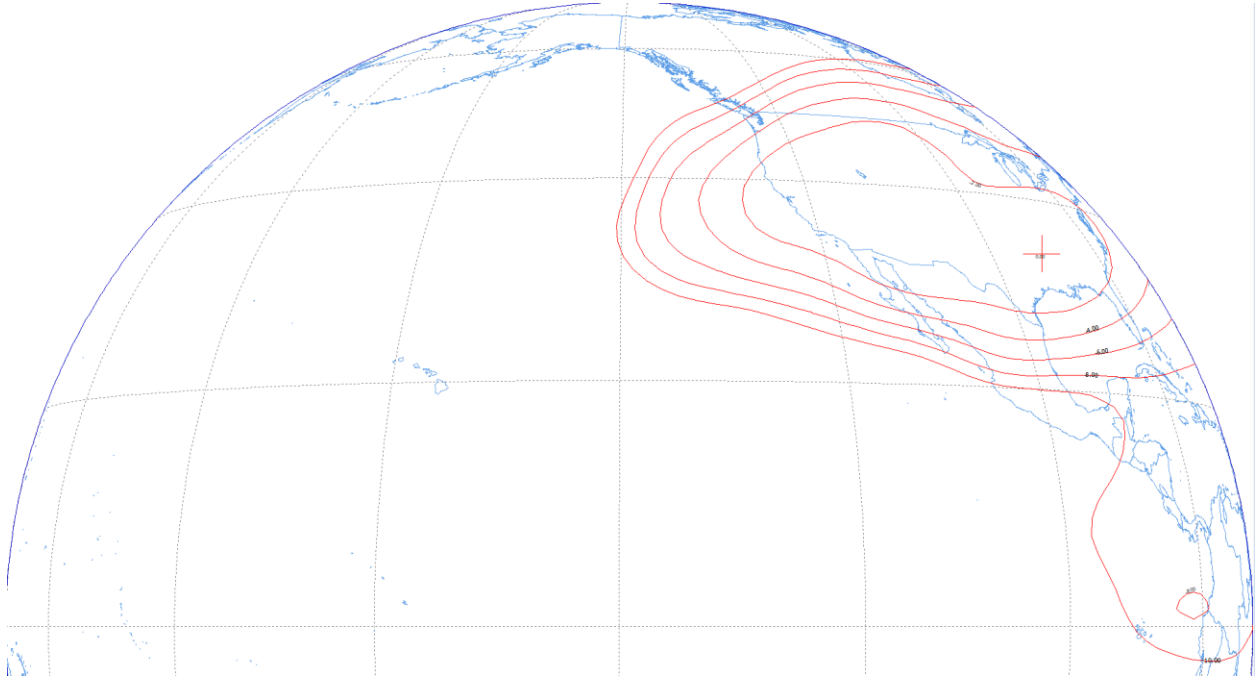


Figure 3 Ku-band CONUS-B Fixed Downlink Service Area from 139.2° W.L.

The Ku-band regional beacon service area includes North America, Central America and the North Pacific and is illustrated in Figure 4. Figure 4 reflects the service area for downlink beams BH1 and BH2.

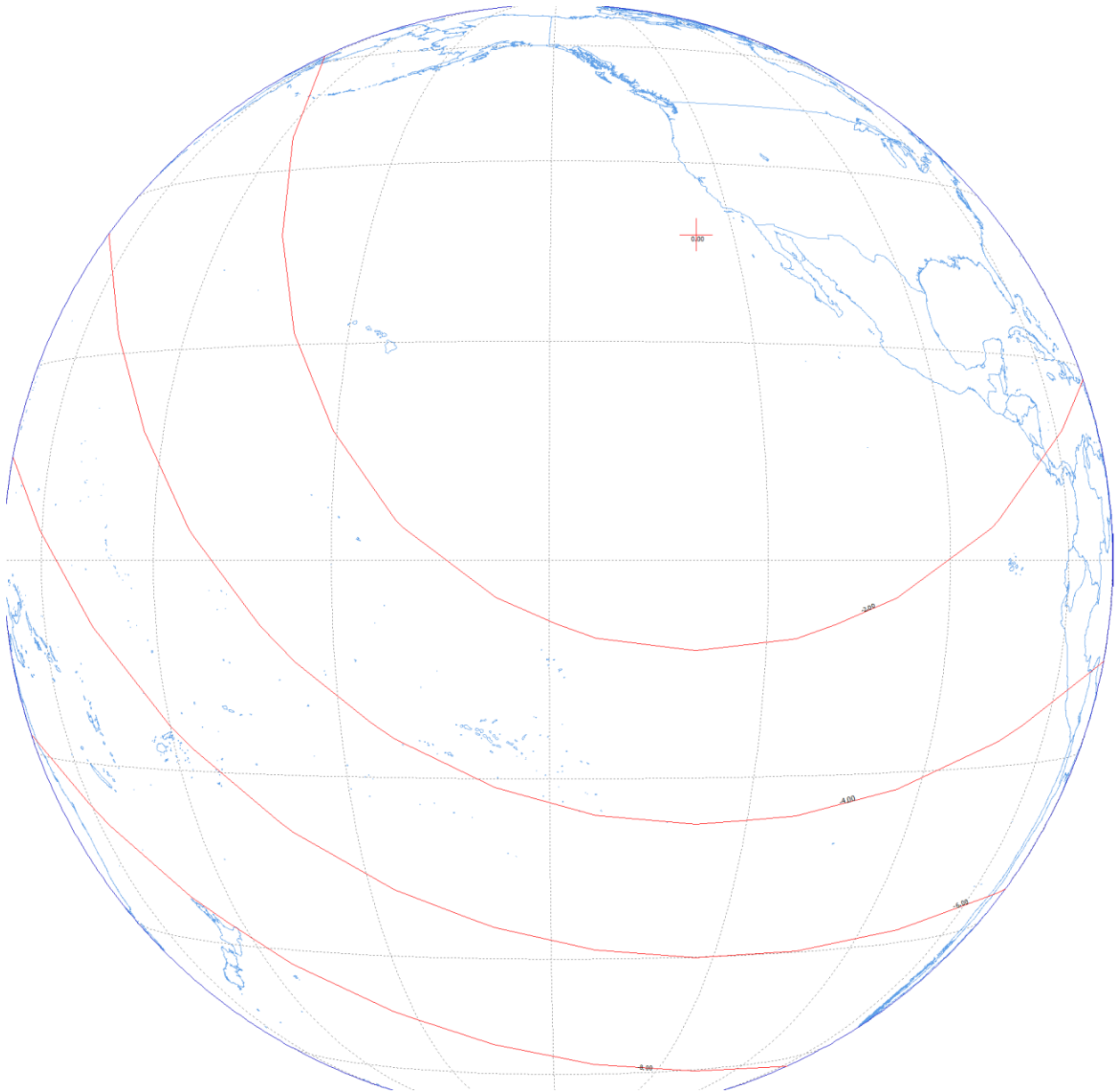


Figure 4 Ku-band Regional Service Area from 139.2° W.L.