

Attachment B – Regulatory Compliance Matrix

Reference	Reference Location	Topic / Reason for (n/a)
25.114(a)(1)	FCC Form 312, Schedule S, Attachment C	See generally Application Materials
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)	Form 312	Applicant information
25.114(c)(2)	Form 312	Info for correspondence person
25.114(c)(3)	Form 312	Type of authorization
25.114(c)(4)(i)	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	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	Operational Lifetime
25.114(c)(11)	Schedule-S	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)	Attachment D - Orbital Debris	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	Reference Location	Topic / Reason for (n/a)
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)		24.75-25.25 GHz band
25.140(a)(3)(v)	n/a	AP30B limits
25.140(a)(3)(vi)	n/a	2° spacing interference analysis
25.202(e)	Attachment C - Section 7	Frequency Tolerance
25.202(f)(1-3)	Attachment C - Section 8	Out of band - emissions
25.208(a-g)	Attachment C - Section 12	PFD Analysis
25.210(f)	Attachment C - Section 9	Full Frequency Reuse
25.210(j)	Schedule-S	EW Station keeping tolerance
25.283(a-c)	Attachment D – Space Debris Mitigation Plan	Space Debris Mitigation Plan
25.207	Attachment C - Section 10	Cessation of Emissions

Attachment C - Engineering Statement

1. Scope

This Attachment contains additional information regarding the EUTELSAT 8 West B satellite required by Section 25.114 and other sections of the Part 25 rules that cannot be entered into the Schedule S online submission system.

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

The EUTELSAT 8 West B satellite is currently operating at the 8° W.L. orbital location. It was launched on August 20, 2015 and initiated commercial service on September 30, 2015. The EUTELSAT 8 West B satellite provides predominantly DTH services in the Ku-band over Europe, Middle East, North Africa, South America, the Caribbean and the Bahamas. The EUTELSAT 8 West B satellite also operates in C-band frequencies, but Eutelsat does not seek market access in the C-band and certain Ku-band, AP30B band and Ka-band spectrum on-board EUTELSAT 8 West B satellite.

The EUTELSAT 8 West B satellite employs 40 Ku-band operational transponders using both linear polarizations thereby providing dual-frequency reuse. The satellite employs four (4) fixed Ku-band beams for each of the uplink and downlink bands. However, only the American Ku-band uplink / downlink beams are implicated by this submission.

3. Spacecraft Overview

EUTELSAT 8 West B was manufactured and supplied by Thales Alenia Space and is based on the Spacebus 4000-C4 bus platform. The satellite is 3-axis stabilized and uses a bi-propellant propulsion (hydrazine propellant) system for spacecraft orientation and for correction of the spacecraft orbit.

The EUTELSAT 8 West B offers the following characteristics:

- 18-year operational life
- 3-axis stabilized
- 10 C-band transponders, 1 pair of C-band uplink/downlink beams
- 40 Ku-band transponders, 4 pair of Ku-band uplink/downlink beams
- 15 kW total power at end of life

The spacecraft will operate over U.S. territory in the Ku-band frequencies listed below:

Table 1 Ku-Band Frequencies

Uplink	13.75 - 14.0 GHz
	14.0 – 14.5 GHz
Downlink	10.95 – 11.2 GHz
	11.45 – 11.7 GHz

The spacecraft provides the following Ku-band coverage (illustrations of the beam coverage area for the American Service Area is provided in Exhibit 2).

Table 2 Ku-Band Beams

MENA (fixed)	Middle East and North Africa
Eastern (fixed)	Middle East and NE Africa
Europe (fixed)	Europe
Americas (fixed)	Eastern North America, Bahamas, Caribbean, South America

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

The EUTELSAT 8 West B TT&C sub-system provides for communications during on-station operations, as well as during spacecraft emergencies. Ku-band telecommand transmissions are received and Ku-band telemetry communications are transmitted by the spacecraft through a nadir-pointed directional antenna during on-station operations and through a near omni-directional antenna during both transfer orbit and emergency operations.

EUTELSAT 8 West B utilizes four Ku-band telemetry channels and three Ku-band commanding channels. The Ku-band telemetry channel center frequencies are 11199.5 MHz, 11200.2 MHz, 12501.0 MHz and 12500.5 MHz all with a bandwidth of 0.4 MHz. The Ku-band commanding channel center frequencies are 13752.5 MHz with a bandwidth of 0.3 MHz and 14248.0 MHz and 14497.5 MHz with a bandwidth of 1.0 MHz. TT&C operations will be conducted from Paris, France.

Both the TT&C beams used for nominal on-station operations and the TT&C beams for orbital maneuvers and on-station emergencies have gain contours that vary by less than 8 dB across the surface of the Earth, and accordingly the gain at 8 dB below the peak falls beyond the edge of the Earth. Therefore, pursuant to Section 25.114(c)(4)(vi)(A) of the Commission's rules, contours for these beams are not required to be provided and the associated GXT files have not been included in Schedule S.

Contact details for the control stations are provided below:

TT&C Teleport: Rambouillet Teleport Route de Cerqueuse 78660 Prunay en Yvelines France Telephone 24/7: +33 1 45 57 06 66 Email: csc@eutelsat.com	Control Center: Eutelsat 70 rue Balard 75015 Paris France Telephone 24/7: +33 1 45 57 06 66 Email: csc@eutelsat.com
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5. Uplink Power Control

EUTELSAT 8 West B utilizes four Ku-band ULPC beacon channels. The Ku-band ULPC channel center frequencies are 11199.5 MHz, 11200.2 MHz, 12501.0 MHz and 12500.5 MHz. The beacon polarizations are Vertical for 12501.0 MHz & 12500.5 MHz and Horizontal for 11199.5 MHz & 11200.2 MHz.

6. Frequency Plan

The following tables list the uplink and downlink Ku-band channels planned for EUTELSAT 8 West B. This information is also provided in the accompanying Schedule S but is included here for completeness.

Table 1 Ku-Band Downlink Frequency Plan

Channel ID	Bandwidth (kHz)	Center Frequency (MHz)	Polarization
UB1	0.4	12501.0	V
UB2	0.4	12500.5	V
UB3	0.4	11200.2	H
UB4	0.4	11199.5	H
BA02	54	10981.25	V
BA04	54	11043.75	V
BA06	54	11106.25	V
BA08	54	11168.75	V
BE02	54	10981.25	V
BE04	54	11043.75	V
BE06	54	11106.25	V
BE08	54	11168.75	V
DA01	36	11470.75	H
DA03	36	11512.25	H
DA05	36	11553.75	H
DA07	36	11595.25	H
DA09	36	11636.75	H
DA11	36	11678.25	H
DA02	36	11470.75	V

DA04	36	11512.25	V
DA06	36	11553.75	V
DA08	36	11595.25	V
DA10	36	11636.75	V
DA12	36	11678.25	V
DE02	36	11470.75	V
DE04	36	11512.25	V
DE06	36	11553.75	V
DE08	36	11595.25	V
DE10	36	11636.75	V
DE12	36	11678.25	V
DU01	36	11470.75	H
DU03	36	11512.25	H
DU05	36	11553.75	H
DU07	36	11595.25	H
DU09	36	11636.75	H
DU11	36	11678.25	H
GA02	72	11491.67	V
GA04	72	11575	V
GA06	72	11658.33	V
KA01	72	10991.67	H
KA03	72	11075	H
KA05	36	11137.25	H
KA07	36	11178.75	H
KU01	72	10991.67	H
KU03	72	11075	H
KU05	36	11137.25	H
KU07	36	11178.75	H

Table 2 Ku-Band Uplink Frequency Plan

Channel ID	Bandwidth (kHz)	Center Frequency (MHz)	Polarization
UTC1	0.3	13752.5	H
UTC2	1	14248	H
UTC3	1	14497.5	H
BA02	54	13781.25	H
BA04	54	13843.75	H
BA06	54	13906.25	H
BA08	54	13968.75	H
BE02	54	13781.25	H
BE04	54	13843.75	H
BE06	54	13906.25	H
BE08	54	13968.75	H

DA01	36	14270.753	V
DA03	36	14312.253	V
DA05	36	14353.753	V
DA07	36	14395.253	V
DA09	36	14436.753	V
DA11	36	14478.253	V
DE02	36	14270.753	H
DE04	36	14312.253	H
DE06	36	14353.753	H
DE08	36	14395.253	H
DE10	36	14436.753	H
DE12	36	14478.253	H
DU01	36	14270.753	V
DU03	36	14312.253	V
DU05	36	14353.753	V
DU07	36	14395.253	V
DU09	36	14436.753	V
DU11	36	14478.253	V
GA02	72	14041.67	H
GA04	72	14125	H
GA06	72	14208.33	H
KA01	72	14041.67	V
KA03	72	14125	V
KA05	36	14187.25	V
KA07	36	14228.75	V
KU01	72	14041.67	V
KU03	72	14125	V
KU05	36	14187.25	V
KU07	36	14228.75	V

7. Frequency Tolerance

The frequency tolerance requirements of Section 25.202(e) that the carrier frequency of each space station transmitter be maintained within 0.002% of the reference frequency 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 8 West B 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

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

11. ITU Filings

The EUTELSAT 8 West B satellite is operating in Ku-band based on the VIDEOSAT-6, F-SAT-N-E-8W and TELECOM-30B ITU 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. The maximum PFD levels for the EUTELSAT 8 West B transmissions were calculated for the bands 10950–11200 MHz and 11450–11700 MHz. The results are provided in Schedule S and show that the downlink power flux density levels of the EUTELSAT 8 West B carriers do not exceed the limits specified in Section 25.208 of the Commission's rules.

13. Link Budgets

Link analysis for EUTELSAT 8 West B was conducted for representative carriers in the Ku-band American regional fixed beam. The results of the link analysis are shown in Exhibit 1.

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 8 West B transmissions in the conventional or extended Ku-bands will not exceed levels provided in Section 25.140(a)(3)(ii), and associated uplink transmissions will not exceed applicable EIRP density envelopes in Sections 25.218, 25.222(a)(1), 25.226(a)(1) or 25.227(a)(1) 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 EUTELSAT 8 West B at 8.0° W.L.

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: EUTELSAT 8 West B LINK BUDGETS



	FWD	RTN
SPACE SEGMENT		
Satellite	E8WB	E8WB
Orbital Position	-8	-8
Transponder	GAA02	GAA02
Bandwidth (MHz)	72	72
Uplink frequency (MHz)	14041.6700	14041.6700
Downlink frequency (MHz)	11491.6700	11491.6700
Uplink Coverage	Ku Band Americas Receive	Ku Band Americas Receive
Downlink Coverage	Ku Band Americas Transmit	Ku Band Americas Transmit
Uplink Polarization	X	X
Downlink Polarization	Y	Y
IPFD setting (dBW/m ²)	-81.3	-81.3
IBO Multicarrier (dB)	5.6	5.6
OBO Multicarrier (dB)	3.7	3.7
CARRIER PARAMETERS		
Service category	DATA	DATA
Topology	OUTBOUND	INBOUND
Modem Manufacturer	Other	Other
Modem reference		
Technology	DVB-S2	DVB-S2
Pilots	ON	ON
Frame	Normal	Normal
Modulation	16 APSK	8 PSK
FEC	2/3	3/4
Spreading Factor	1	1
Roll Off (%)	20	20
Spectral efficiency (bps)	2.57	2.18
Reed Solomon (n/k)	1	1
Symbol rate (Mbaud)	60	2
Useful Bit rate (Mbps)	154.477	4.355
Overall Bit rate (Mbps)	154.477	4.355
E/N ₀ (dB)	6.7	5.3
E _s /N ₀ (dB)	10.81	8.68
BER		
CARRIER RESOURCES		
Transponder mode	Linear	Linear
IBO carrier (dB)	5.6	20.37
OBO carrier (dB)	3.7	18.47
Bandwidth consumption (MHz)	72	2.4
Power consumption (MHz)	72	2.4
IPFD carrier (dBW/m ²)	-89.21	-109.24
GROUND SEGMENT - UPLINK		
Earth Station Code	Hub	Remote
Country	United States of America - US	Brazil - BR
Longitude (°)	-74.97	-46.54
Latitude (°)	40.18	-24.06
Distance (km)	40704.09	37880.32
satellite G/T towards transmit station (dB/K)	2.31	7.57
Elevation angle (°)	8.8	38.81
Azimuth angle (°)	105.34	62.9
Antenna size (m)	6.3	3.7
Atmospheric losses (dB)	0.2	0.2
Uplink EIRP (dBW)	74.17	53.52
Post PA losses (dB)	4	4
Operating HPA Power (clear sky) (W)	58.95	1.47
HPA Rating (W)	117.63	2.94
GROUND SEGMENT - DOWNLINK		
Earth Station	Remote	Hub
Country	Brazil - BR	United States of America - US
Longitude (°)	-46.54	-74.97
Latitude (°)	-24.06	40.18
Distance (km)	37880.32	40704.09
Antenna G/T towards satellite (dB/K)	29.49	33.8
Elevation angle (°)	38.81	8.8
Azimuth angle (°)	62.9	105.34
Antenna size (m)	3.7	6.3
Atmospheric Losses (dB)	0.3	0.3
Satellite EIRP towards receive station (dBW)	52.78	43.17
System temperature (K)	145	155.67
RESULTS		
Uplink Path Length (km)	40704.09	37880.32
Thermal Uplink C/N (dB)	19.52	19.52
Aggregated C/I Uplink (dB)	21.93	21.7
Uplink Propagation Losses (dB)	207.58	206.96
Downlink Path Length (km)	37880.32	40704.09
Thermal Downlink C/N (dB)	23.87	17.95
Aggregated C/I Downlink (dB)	16.58	15.87
Downlink Propagation Losses (dB)	205.22	205.84
C/N+I Overall (dB)	13.6	12.23
E _s /N ₀ Overall (dB)	9.49	8.85
Clear Sky Link Margin (dB)	2.79	3.55
SUMMARY		
Bandwidth (MHz)	72	2.4
Power Equivalent Bandwidth (MHz)	72	2.4

Exhibit 2: Service Areas

This document illustrates the service areas for the uplink and downlink beams in the accompanying Schedule S.

Americas

The Americas Service Area includes the Eastern third of North America, most of South America, the Bahamas and the Caribbean and is illustrated in Figure 1.

It reflects the service area for:

Uplink beams: UUH1, UUH2, UUV1 and UUV2

Downlink beams: UDH1, UDH2, UDV1 and UDV2

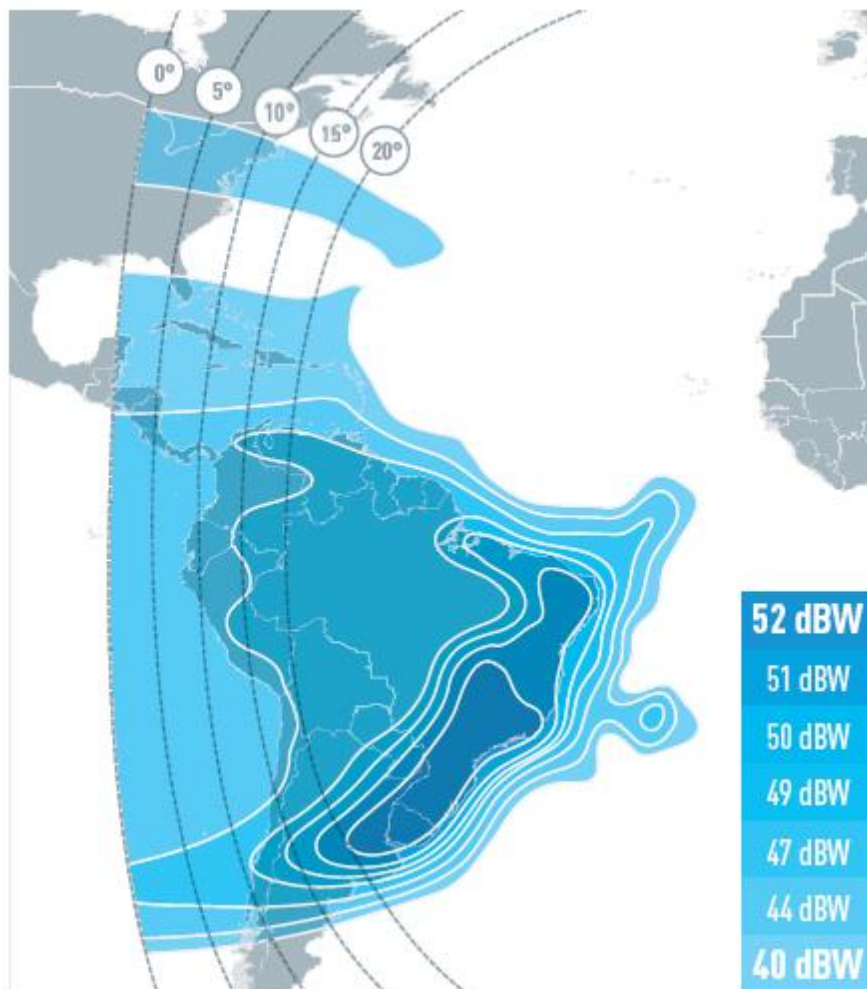


Figure 1 American Service Area of EUTELSAT 8 West B