

## 5. Communications Payload Configuration

In the primary operating mode the uplink signals are received on the two spot receive beams and the CONUS receive antenna is not used. Four active receivers are employed to provide the required connectivity between uplink and downlink spot beams and channels. For channels downlinked to the CONUS+ beam the primary operating mode employs two active 120 Watt TWTAs per channel, to give 16 operating channels from a total of 32 active TWTAs. For the spot beam downlinks, there are ten active 120 Watt TWTAs which are used to transmit the 25 spot beam channels. The channels at the outputs of the spot beam TWTAs are sent to the appropriate downlink spot beam using output multiplexers.

The EchoStar-7 communications payload can be reconfigured to alternatively transmit up to 32 downlink channels (using the corresponding 32 uplink channels) into the CONUS+ downlink beam using all the available channels from the ITU Region 2 BSS Plan.

## 6. TT&C

The EchoStar-7 satellite and associated TT&C earth stations will operate TT&C signals at the following frequencies:

- Command frequencies: 17.302 GHz and 17.303 GHz
- Telemetry frequencies: 12.204 GHz and 12.6975 GHz

The primary TT&C earth station location will be in Cheyenne, WY.

Telecommand (including ranging) signals can be received by the satellite using an omni-directional antenna (horizontal polarization), a wide-angle horn antenna (horizontal polarization) or the CONUS antenna (vertical polarization). The command signal format is PCM-RZ/FSK with command tones of 35 KHz, 43 KHz and 50 KHz. Frequency modulation is used with a deviation of  $\pm 400$  kHz. The command data rate is up to 1024 bits/s. The satellite telecommand receive signal flux density levels for the different modes of operation are  $-74$  dBW/m<sup>2</sup> in transfer orbit,  $-80$  dBW/m<sup>2</sup> during orbit anomalies, and  $-90$  dBW/m<sup>2</sup> when in normal mode on-station.

Telemetry transmissions can utilize an omni-directional antenna (vertical polarization), a wide-angle horn antenna (vertical polarization) or the CONUS antenna (vertical polarization). The telemetry signal format is PCM/PSK Bi-Phase L with subcarriers at 49.152 kHz (normal mode) and 73.728 kHz (auxiliary mode). Phase modulation is used with deviations of 1.0, 0.7 and 0.6 radians for 1, 2 and 3 subcarriers respectively. The telemetry data rate is 2048 bits/s.

The telemetry downlink EIRP will not exceed 2.5 dBW in transfer orbit (through the omni-directional and wide-angle horn antennas) and 9 dBW when in normal mode on-station (through the CONUS antenna).

Ranging is accomplished with ranging tones of 27777 Hz (fine) and 35.4 Hz, 283.4 Hz and 3968.2 Hz (coarse). The coarse tones are frequency modulated onto a 277778 Hz subcarrier, with a peak frequency deviation of  $\pm 1$  kHz. The uplink carrier is subsequently frequency

modulated with a deviation of  $\pm 400$  kHz. Simultaneous ranging and telemetry downlink can be used.

#### 7. Spacecraft Description and Launch Vehicle

EchoStar-7 will use the Lockheed Martin A2100 AX spacecraft bus equipped with two 5-panel solar arrays. The spacecraft dry mass is approximately 1.943 Kg and the launch mass 4.172 Kg.

Two antenna reflectors are deployed from the east and west sides of the spacecraft (for the CONUS+ and spot beam antennas, respectively), with a third CONUS receive antenna mounted on the Earth face.

The design life of the satellite is 15 years.

The EchoStar-7 spacecraft is compatible with a number of commercially available launch vehicles, including Atlas III, Ariane 4, Ariane 5, Proton and Sea Launch.

#### 8. Feeder Links

The EchoStar-7 feeder link earth stations will be located at EchoStar's existing facilities in Cheyenne, WY and Gilbert, AZ. EchoStar has already filed or will file the necessary earth station applications with the FCC for the EchoStar-7 feeder link earth stations.

#### 9. ITU Submissions

Appendix 1 to this Technical Annex provides the ITU submission of ApS4 (ITU Appendix S4 of the Radio Regulations) data for the downlinks from the EchoStar-7 satellite. Appendix 2 to this Technical Annex contains the corresponding information concerning the feeder uplinks to the EchoStar-7 satellite.

#### 10. Compliance with ITU Annex 1 to Appendices S30 and S30A

Appendices 3 and 4 to this Technical Annex provide the necessary showings for compliance with ITU Annex 1 of Appendices S30 and S30A. Because of the unconventional use of spot beams in the EchoStar-7 satellite, and the corresponding frequency re-use that this involves, some of the requirements of the ITU Annex 1 cannot be directly applied to EchoStar-7, and so all of the requirements of ITU Annex 1 cannot be completed at this time. Further discussion with ITU-BR will be necessary to establish their preferred methods for determining compliance with Appendices S30 and S30A in this case.

B

**Appendix 1 to Technical Annex  
(EchoStar-7)**

**ITU APPENDIX S4 INFORMATION FOR  
USABSS-14 at 119° W.L. for APS30 BSS**

A. A.1 Identity of the satellite network

- a) Identity of a satellite network: USABSS-14
- c) Country and Beam Identification:  
USA and BSS-14C, BSS-14S1, BSS-14S2, BSS-14S3, BSS-14S4, BSS-14S5, BSS-14S6, BSS-14S7, BSS-14S8, BSS-14S9, BSS-14S10, BSS-14S11, BSS-14S12, BSS-14S13, BSS-14S14, BSS-14S15
- f) Country symbol of the notifying administration: USA

A.2 Date of Bringing Into Use

- a) Date of Bringing into Use: December 15, 2001

A.3 Operation administration or agency

A.3 Operating administration or agency: 120

A.4 Orbital information

- a)1) Nominal geographical longitude on the GSO: 119°W
- a)2) Planned longitudinal tolerance and inclination excursion:  $\pm 0.05^\circ$  E-W;  $\pm 0.05^\circ$  N-S

A.5 Coordination

None

A.6 Agreements

None

A.11 Regular hours of operation

00:00 – 24:00, 365 days/year

B.1 Designation of the satellite antenna beams

BSS-14C	BSS-14S8
BSS-14S1	BSS-14S9
BSS-14S2	BSS-14S10
BSS-14S3	BSS-14S11
BSS-14S4	BSS-14S12
BSS-14S5	BSS-14S13
BSS-14S6	BSS-14S14
BSS-14S7	BSS-14S15

**B.3 Geostationary Space Station Antenna Characteristics**

- d) Pointing accuracy of the antenna: 0.15° (BSS-14C beam): 0.12° (BSS-14S1 to 15 beams)
- g) Case of space station submitted under Appendix S30:
- 1a) Max co-polar gain of beam BSS-14C antenna: 37.5 dBi.  
Max cross-polar gain of beam BSS-14C antenna: -7.6 dBi.
- 1b) Max co-polar gain of beams BSS-14S1 to S15 See Table below.  
Max cross-polar gain of beams BSS-14S1 to S15 See Table below.

<b>Beam # BSS14S-</b>	<b>Co-Polar Gain (dBi)</b>	<b>Cross-polar Gain (dBi)</b>
1	44.0	11.4
2	47.1	12.1
3	46.7	10.5
4	47.9	12.5
5	47.3	18.0
6	48.0	24.2
7	47.5	11.2
8	48.3	13.5
9	47.7	5.6
10	48.4	12.3
11	48.0	19.5
12	47.7	19.7
13	47.7	10.0
14	47.3	20.9
15	48.0	8.3

- 4) For elliptical beams: Not Applicable – all beams are treated as “shaped beams”
- 5) For beams of other than circular or elliptical shape:

Co-polar and cross-polar gain contours:

Refer to electronic files named as follows:

Beam BSS-14C: BSS-14CTC.gxt and BSS-14CTX.gxt

Beams BSS-14S1 to S15: BSS-14S1TC.gxt to BSS-14S15TC.gxt (co-polar)  
and BSS-14S1TX.gxt to BSS-14S15TX.gxt (cross-polar)

Beam aim point longitude and latitude: See Table below.

Beam Designation	Beam Aim Points	
	Longitude (°W)	Latitude (°N)
BSS-14C	100.5	36.7
BSS-14S1	157.82	21.37
BSS-14S2	148.37	62.32
BSS-14S3	122.40	47.34
BSS-14S4	121.38	38.76
BSS-14S5	117.60	32.81
BSS-14S6	111.15	33.31
BSS-14S7	112.10	41.06
BSS-14S8	99.17	19.33
BSS-14S9	96.60	37.44
BSS-14S10	97.00	29.23
BSS-14S11	88.33	40.80
BSS-14S12	88.90	31.81
BSS-14S13	72.74	41.37
BSS-14S14	80.50	33.61
BSS-14S15	80.79	25.75

**C.2 Assigned frequency**

- a) In accordance with Appendix S30:  
 For beam BSS-14C: channels 2, 4, 6, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 and 21  
 For beams BSS-14S1 – S15: see table below

BSS-14S1	9
	9
BSS-14S3	1, 3
BSS-14S4	5, 7
BSS-14S5	1, 3
BSS-14S6	5, 7
BSS-14S7	9
BSS-14S8	9
BSS-14S9	1, 3
BSS-14S10	5, 7
BSS-14S11	5, 7
BSS-14S12	9
BSS-14S13	1, 3
BSS-14S14	5, 7
BSS-14S15	1, 3

C.3 Assigned frequency band

a) Bandwidth of the assigned frequency band in kHz: 24000

C.4 Class of station(s) and nature of service

Class of station: EV

Nature of service: CR

C.6 Polarization

Type of polarization: Circular

Sense of polarization:

Left Hand and Right Hand for beam BSS14-C

Right hand only for beams BSS-14S1 – S15

C.7 Class of emission and necessary bandwidth

a) Class of emission: 24M0G7W

Necessary bandwidth: 24 MHz

C.8 Power characteristics of the transmission

h) Power supplied to the antenna:

Beam	Power to Antenna (dBW)	Maximum Power Density in Reference Bandwidth (dBW/Hz)			
		5 MHz	4 kHz	27 MHz	40 kHz
BSS-14C	21.4	-52.4	-52.4	-52.4	-52.4
BSS-14S1	7.0	-66.8	-66.8	-66.8	-66.8
BSS-14S2	8.5	-65.3	-65.3	-65.3	-65.3
BSS-14S3	9.3	-64.5	-64.5	-64.5	-64.5
BSS-14S4	8.0	-65.8	-65.8	-65.8	-65.8
BSS-14S5	10.3	-63.5	-63.5	-63.5	-63.5
BSS-14S6	7.9	-65.9	-65.9	-65.9	-65.9
BSS-14S7	8.2	-65.6	-65.6	-65.6	-65.6
BSS-14S8	8.8	-65.0	-65.0	-65.0	-65.0
BSS-14S9	12.5	-61.3	-61.3	-61.3	-61.3
BSS-14S10	12.3	-61.5	-61.5	-61.5	-61.5
BSS-14S11	14.0	-59.8	-59.8	-59.8	-59.8
BSS-14S12	15.5	-58.3	-58.3	-58.3	-58.3
BSS-14S13	12.5	-61.3	-61.3	-61.3	-61.3
BSS-14S14	14.1	-59.7	-59.7	-59.7	-59.7
BSS-14S15	12.7	-61.1	-61.1	-61.1	-61.1

C.9 Information on modulation characteristics

b) In case of space station submitted in accordance with Appendix S30

- 1) Type of modulation: QPSK
- 2) Pre-emphasis characteristics: not applicable
- 3) TV standard: not applicable
- 4) Sound broadcasting characteristics:  
time division multiplexed compressed digital audio and data
- 5) Frequency deviation: not applicable

- 6) Composition of the baseband:  
time division multiplexed compressed digital video and audio
- 7) Type of multiplexing of the video and sound signal: time division multiplex
- 8) Energy dispersal characteristics: carrier will always be modulated
- 9) Effective and transmitted bit/symbol rate:  
Transmitted Rate: 40 Mbits/s 20 Msymbols/s  
Effective Rate: 27.6 Mbits/s 13.8 Msymbols/s
- 10) Roll-off factor of the filter of the receiver: 0.35

C.10 Type and identity of the associated station(s)

- c) For an associated earth station (whether specific or typical):

45 cm Dish

- 2) Isotropic gain of the antenna in the direction of maximum radiation: 34.0 dBi
- 3) Beamwidth in degrees between the half power points: 3.5°
- 4) Radiation pattern of the antenna: Region 2 reference antenna pattern in APS30
- 6) Equivalent diameter of the antenna: 0.45 metres

60 cm Dish

- 2) Isotropic gain of the antenna in the direction of maximum radiation: 36.5 dBi
- 3) Beamwidth in degrees between the half power points: 2.8°
- 4) Radiation pattern of the antenna: Region 2 reference antenna pattern in APS30
- 6) Equivalent diameter of the antenna: 0.60 metres

90 cm Dish

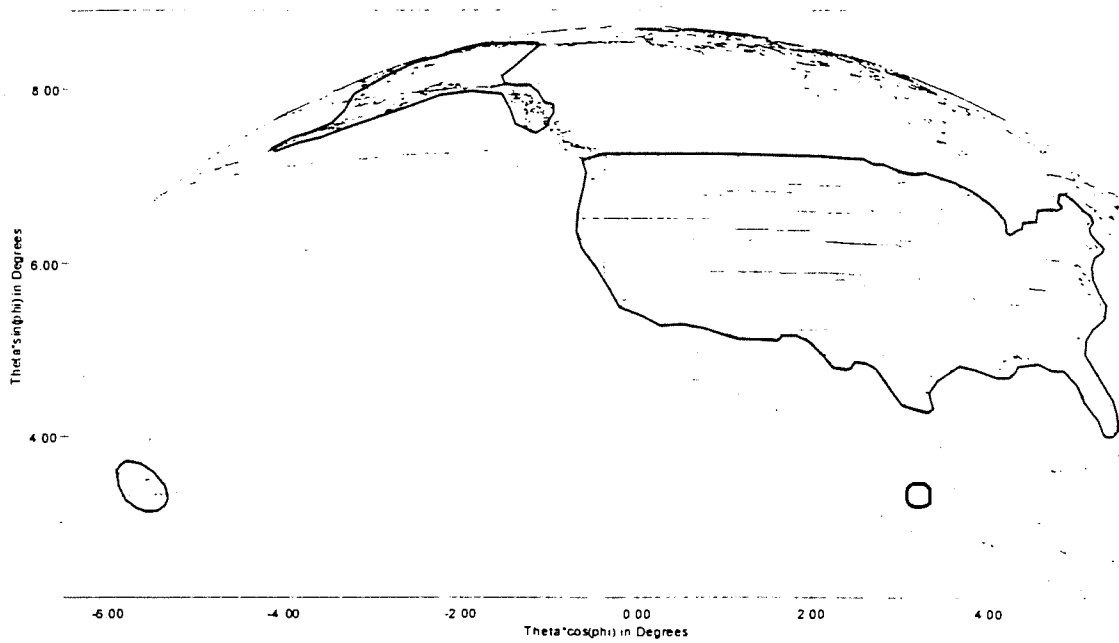
- 2) Isotropic gain of the antenna in the direction of maximum radiation: 39.6 dBi
- 3) Beamwidth in degrees between the half power points: 1.85°
- 4) Radiation pattern of the antenna: Region 2 reference antenna pattern in APS30
- 6) Equivalent diameter of the antenna: 0.90 metres

1.2 m Dish

- 2) Isotropic gain of the antenna in the direction of maximum radiation: 42.0 dBi
- 3) Beamwidth in degrees between the half power points: 1.55°
- 4) Radiation pattern of the antenna: Region 2 reference antenna pattern in APS30
- 6) Equivalent diameter of the antenna: 1.20 metres

B. C.11 Service area

- b) Service area:  
Contiguous USA, Hawaii, Alaska and Mexico City (200 km radius circle), as shown below:



Test points for BSS-14C Beam:

Test Point #	Latitude (°N)	Longitude (°W)
1	21.37	157.82
2	62.32	148.37
3	47.34	122.40
4	38.76	121.38
5	32.7	116.8
6	33.31	111.15
7	41.06	112.10
8	19.33	99.17
9	37.44	96.60
10	29.23	97.00
11	40.80	88.33
12	31.81	88.90
13	41.37	72.74
14	33.61	80.50
15	25.75	80.79
16	47.0	69.0
17	43.3	78.5
18	47.7	90.8
19	48.8	108.3
20	29.2	103.2

Test points for BSS-14S1 Beam:

Test Point #	Latitude (°N)	Longitude (°W)
1	21.37	157.82
2	20.87	157.32
3	21.87	158.32
4	20.87	158.32
5	21.87	157.32



Test points for BSS-14S2 Beam:

Test Point #	Latitude (°N)	Longitude (°W)
1	62.32	148.37
2	61.82	147.82
3	62.82	148.87
4	61.82	148.87
5	62.82	147.82

Test points for BSS-14S3 Beam:

Test Point #	Latitude (°N)	Longitude (°W)
1	47.34	122.40
2	46.84	121.90
3	47.84	122.90
4	46.84	122.90
5	47.84	121.90

Test points for BSS-14S4 Beam:

Test Point #	Latitude (°N)	Longitude (°W)
1	38.76	121.38
2	38.26	120.88
3	39.26	121.88
4	38.26	121.88
5	39.26	120.88

Test points for BSS-14S5 Beam:

Test Point #	Latitude (°N)	Longitude (°W)
1	32.81	117.60
2	32.51	117.10
3	33.31	118.10
4	32.51	118.10
5	33.31	117.10

Test points for BSS-14S6 Beam:

Test Point #	Latitude (°N)	Longitude (°W)
1	33.31	111.15
2	32.81	110.65
3	33.81	111.65
4	32.81	111.65
5	33.81	110.65

Test points for BSS-14S7 Beam:

Test Point #	Latitude (°N)	Longitude (°W)
1	41.06	112.10
2	40.56	111.60
3	41.56	112.60
4	40.56	112.60
5	41.56	111.60

Test points for BSS-14S8 Beam:

Test Point #	Latitude (°N)	Longitude (°W)
1	19.33	99.17
2	18.83	98.67
3	19.83	99.57
4	18.83	99.57
5	19.83	98.67

Test points for BSS-14S9 Beam:

Test Point #	Latitude (°N)	Longitude (°W)
1	37.44	96.60
2	36.94	96.10
3	37.94	97.10
4	36.94	97.10
5	37.94	96.10

Test points for BSS-14S10 Beam:

Test Point #	Latitude (°N)	Longitude (°W)
1	29.23	97.00
2	28.73	97.50
3	29.73	96.50
4	28.73	96.50
5	29.73	97.50

Test points for BSS-14S11 Beam:

Test Point #	Latitude (°N)	Longitude (°W)
1	40.80	88.33
2	40.30	87.83
3	41.30	88.83
4	40.30	88.83
5	41.30	87.83

Test points for BSS-14S12 Beam:

Test Point #	Latitude (°N)	Longitude (°W)
1	31.81	88.90
2	31.31	88.40
3	32.31	89.40
4	31.31	89.40
5	32.31	88.40

Test points for BSS-14S13 Beam:

Test Point #	Latitude (°N)	Longitude (°W)
1	41.37	72.74
2	40.87	72.24
3	41.87	73.24
4	40.87	73.24
5	41.87	72.24

Test points for BSS-14S14 Beam:

Test Point #	Latitude (°N)	Longitude (°W)
1	33.61	80.50
2	33.11	80.00
3	34.11	81.00
4	33.11	81.00
5	34.11	80.00

Test points for BSS-14S15 Beam:

Test Point #	Latitude (°N)	Longitude (°W)
1	25.75	80.79
2	25.25	80.29
3	26.25	81.29
4	25.25	81.29
5	26.25	80.29

C.15 Description of groups required in the case of non-simultaneous emissions

The USABSS-14 spot beams (BSS-14S1 to BSS-14S15) and the beam BSS-14C are not grouped between themselves. There will be simultaneous co-frequency transmissions in several of these beams. However, spot beams (BSS-14S1 to BSS-14S15) should be grouped with the Plan beam USAEH004, and space stations USABSS-3, USABSS-4, USABSS-10, and USABSS-12 at 119°W.L, as they cannot be operated at the same time as any of those beams. Similarly the USABSS-14C beam is to be grouped with the Plan beam USAEH004, and space stations USABSS-3, USABSS-4, USABSS-10, and USABSS-12 at 119°W.L.

D. Overall link characteristics

1) Connection between Earth-to-space and space-to-Earth frequencies in the network:

Uplink Channel	Uplink Beam	Downlink Channel	Downlink Beam
1	BSS-14RSC	1	BSS-14S5
1	BSS-14RSC	1	BSS-14S9
2	BSS-14RSC	2	BSS-14C
2	BSS-14RSC	1	BSS-14S15
3	BSS-14RSC	3	BSS-14S5
3	BSS-14RSC	3	BSS-14S9
4	BSS-14RSC	4	BSS-14C
4	BSS-14RSC	3	BSS-14S15
5	BSS-14RSC	5	BSS-14S6
5	BSS-14RSC	5	BSS-14S4
6	BSS-14RSC	6	BSS-14C
6	BSS-14RSC	5	BSS-14S11
7	BSS-14RSC	7	BSS-14S6
7	BSS-14RSC	7	BSS-14S4
8	BSS-14RSC	8	BSS-14C
8	BSS-14RSC	7	BSS-14S11
9	BSS-14RSC	9	BSS-14S1

9	BSS-14RSC	9	BSS-14S8
10	BSS-14RSC	10	BSS-14C
10	BSS-14RSC	9	BSS-14S2
11	BSS-14RSC	11	BSS-14C
11	BSS-14RSC	1	BSS-14S13
12	BSS-14RSC	12	BSS-14C
12	BSS-14RSC	1	BSS-14S3
13	BSS-14RSC	13	BSS-14C
13	BSS-14RSC	3	BSS-14S13
14	BSS-14RSC	14	BSS-14C
14	BSS-14RSC	3	BSS-14S3
15	BSS-14RSC	15	BSS-14C
15	BSS-14RSC	5	BSS-14S10
16	BSS-14RSC	16	BSS-14C
16	BSS-14RSC	5	BSS-14S14
17	BSS-14RSC	17	BSS-14C
17	BSS-14RSC	7	BSS-14S10
18	BSS-14RSC	18	BSS-14C
19	BSS-14RSC	19	BSS-14C
19	BSS-14RSC	9	BSS-14S7
20	BSS-14RSC	20	BSS-14C
20	BSS-14RSC	9	BSS-14S12
21	BSS-14RSC	21	BSS-14C

C  
M...

## Appendix 2 to Technical Annex (EchoStar-7)

### ITU APPENDIX S4 INFORMATION FOR USABSS-14 at 119 W.L. for APS30A Feeder Links

#### C. A.1 Identity of the satellite network

- a) Identity of a satellite network: USABSS-14
- c) Country and Beam Identification: USA and BSS-14RCS
- f) Country symbol of the notifying administration: USA

#### A.2 Date of Bringing Into Use

- a) Date of Bringing into Use: December 15, 2001

#### A.3 Operation administration or agency

- A.3 Operating administration or agency: 120

#### A.4 Orbital information

- a)1) Geographical longitude on the GSO: 119°W
- a)2) Planned longitudinal tolerance and inclination excursion:  $\pm 0.05^\circ$  E-W;  $\pm 0.05^\circ$  N-S

#### A.5 Coordination

None

#### A.6 Agreements

None

#### A.7 Earth station site characteristics

- a) Horizon elevation angle in degrees for each azimuth around the earth station:

Cheyenne earth station:

Azimuth (Deg)	Horizon Elevation Angle (Deg)	Azimuth (Deg)	Horizon Elevation Angle (Deg)
0	0.9	180	0.7
5	0.6	185	0.6
10	0.6	190	0.7
15	0.6	195	0.7
20	0.6	200	0.8
25	0.6	205	0.8
30	0.3	210	0.9
35	0.4	215	0.9
40	0.4	220	0.9
45	0.3	225	1.0

50	0.3	230	1.0
55	0.3	235	1.0
60	0.3	240	1.0
65	0.3	245	1.0
70	0.0	250	1.0
75	0.0	255	1.0
80	0.0	260	1.0
85	0.0	265	1.1
90	0.2	270	1.2
95	0.2	275	1.2
100	0.0	280	1.2
105	0.0	285	1.2
110	0.0	290	1.2
115	0.0	295	1.2
120	0.2	300	1.2
125	0.3	305	1.1
130	0.4	310	1.1
135	0.3	315	1.2
140	0.3	320	0.9
145	0.3	325	1.0
150	0.3	330	1.0
155	0.3	335	1.0
160	0.4	340	0.9
165	0.7	345	0.9
170	0.7	350	0.9
175	0.7	355	0.9

Gilbert earth station:

Azimuth (Deg)	Horizon Elevation Angle (Deg)	Azimuth (Deg)	Horizon Elevation Angle (Deg)
0	0.00	180	0.00
5	0.00	185	0.00
10	0.00	190	0.00
15	0.00	195	0.00
20	0.00	200	0.00
25	0.00	205	0.00
30	0.00	210	0.00
35	0.00	215	0.00
40	0.00	220	0.00
45	0.00	225	0.00
50	0.00	230	0.00
55	0.00	235	0.00
60	0.00	240	0.00
65	0.00	245	0.00
70	0.00	250	0.00

75	0.00	255	0.00
80	0.00	260	0.00
85	0.00	265	0.00
90	0.00	270	0.00
95	0.00	275	0.00
100	0.00	280	0.00
105	0.00	285	0.00
110	0.00	290	0.00
115	0.00	295	0.00
120	0.00	300	0.00
125	0.00	305	0.00
130	0.00	310	0.00
135	0.00	315	0.00
140	0.00	320	0.00
145	0.00	325	0.00
150	0.00	330	0.00
155	0.00	335	0.00
160	0.00	340	0.00
165	0.00	345	0.00
170	0.00	350	0.00
175	0.00	355	0.00

e) Altitude (meters) of the antenna above mean sea level:

Cheyenne earth station: 1808.4 meters

Gilbert earth station: 371.2 meters

A.11 Regular hours of operation

00:00 – 24:00, 365 days/year

A.12 Range of automatic gain control

Cheyenne earth station: 9 dB under operator control

Gilbert earth station: 9 dB under operator control

B.1 Designation of the satellite antenna beam

BSS-14RSC

B.3 Geostationary space station antenna characteristics

d) Pointing accuracy of the antenna: 0.12°

g) Case of space station submitted under Appendix S30A:

1) Max co-polar gain of beams BSS-14RSC: 52.0 dBi.

Max cross-polar gain of beams BSS-14RSC: 22.0 dBi.

4) For elliptical beams:

Not Applicable – uplink beams are treated as “shaped beams”

For beams of other than circular or elliptical shape:

Co-polar/Cross-polar gain contours:

Refer to electronic files named:  
Co-polar: BSS-14RSCC.gxt  
Cross-polar: BSS-14RSCX.gxt  
Beam Aim Point: 111.6W, 33.3N

C.2 Assigned frequency

- a) In accordance with Appendix S30A: Channels 1 to 21 inclusive

C.3 Assigned frequency band

- a) Bandwidth of the assigned frequency band in kHz: 24000

C.4 Class of station(s) and nature of service

Class of station: EV

Nature of service: CR

C.5 Receiving system noise temperature

- a) Lowest total receiving system noise temperature: 15850 K

C.6 Polarization

Type of polarization: Circular

Sense of Polarization: Left Hand and Right Hand for all beams

C.7 Class of emission and necessary bandwidth

- a) Class of emission: 24M0G7W  
b) Necessary bandwidth: 24 MHz

C.8 Power characteristics of the transmission

- i) In the case of an earth station submitted in accordance with Appendix S30A:

Cheyenne earth station:

Total transmitting power (dBW) in the assigned frequency band supplied to the input of the antenna: 22.4

over worst 1 MHz:

-51.4 dBW/Hz

over 24 MHz RF bandwidth:

-51.4 dBW/Hz

Range of Power Control: 9 dB under operator control

Gilbert earth station:

Total transmitting power (dBW) in the assigned frequency band supplied to the input of the antenna: 22.4

over worst 1 MHz:

-51.4 dBW/Hz

over 24 MHz RF bandwidth:



-51.4 dBW/Hz

Range of Power Control: 9 dB under operator control

C.9 Information on modulation characteristics

- b) In case of space station submitted in accordance with Appendix S30A
- 1) Type of modulation: QPSK
  - 2) Pre-emphasis characteristics: not applicable
  - 3) TV standard: not applicable
  - 4) Sound broadcasting characteristics:  
time division multiplexed compressed digital audio and data
  - 5) Frequency deviation: not applicable
  - 6) Composition of the baseband:  
time division multiplexed compressed digital video and audio
  - 7) Type of multiplexing of the video and sound signal: time division multiplex
  - 8) Energy dispersal characteristics: carrier will always be modulated
  - 9) Effective and transmitted bit/symbol rate:  
Transmitted Rate: 40 Mbits/s 20 Msymbols/s  
Effective Rate: 27.6 Mbits/s 13.8 Msymbols/s
  - 10) Roll-off factor of the filter of the receiver: 0.35

C.10 Type and identity of the associated station(s)

Chevenne earth station

- b) For a specific associated earth station, identity of the earth station and geographical coordinates of the antenna site:  
Latitude: 41°7'56" N Longitude: 104°44'9" W
- c) For associated earth station:
- 2) Isotropic gain of the antenna in the direction of maximum radiation: 65 dBi
  - 3) Beamwidth in degrees between the half power points: 0.1°
  - 4) Radiation pattern of the antenna:

Co-polar :	29-25log(theta)	for 1° < θ <= 7°
	+8 dBi	for 7° < θ <= 9.2°
	32-25log(θ) dBi	for 9.2° < θ <= 48°
	-10 dBi	for 48° < θ <= 180°
Cross-polar:	19-25log(theta)	for 1.8° < θ <= 7°
	-2 dBi	for 7° < θ <= 180°
- 6) Equivalent diameter of the antenna: 13.2 metres

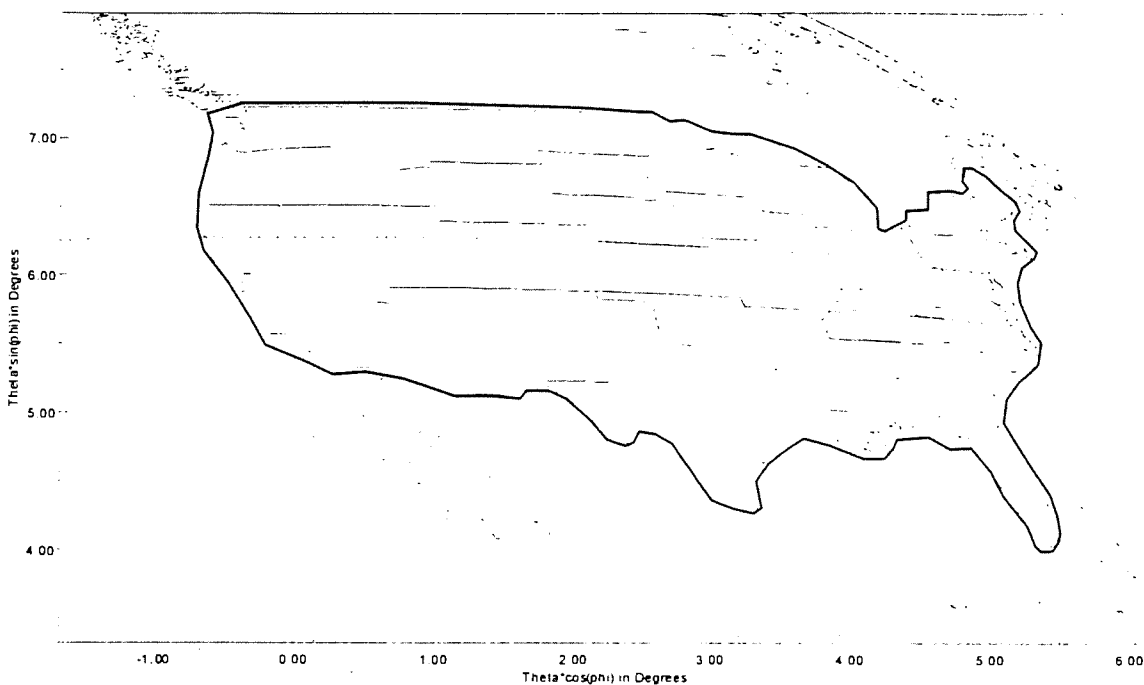
Gilbert earth station:

- b) For a specific associated earth station, identity of the earth station and geographical coordinates of the antenna site:  
Latitude: 33°21'55.7" N; Longitude: 111°48'48.8" W
- c) For associated earth station:
- 2) Isotropic gain of the antenna in the direction of maximum radiation: 65 dBi

- 3) Beamwidth in degrees between the half power points:  $0.1^\circ$
- 4) Radiation pattern of the antenna:
  - Co-polar :  $29-25\log(\theta)$  dBi for  $1^\circ < \theta \leq 7^\circ$
  - $+8$  dBi for  $7^\circ < \theta \leq 9.2^\circ$
  - $32-25\log(\theta)$  dBi for  $9.2^\circ < \theta \leq 48^\circ$
  - $-10$  dBi for  $48^\circ < \theta \leq 180^\circ$
  - Cross-polar:  $19-25\log(\theta)$  for  $1.8^\circ < \theta \leq 7^\circ$
  - $-2$  dBi for  $7^\circ < \theta \leq 180^\circ$
- 6) Equivalent diameter of the antenna: 13.2 metres

D. C.11 Service Area

b) Service area: USA



Test points for beam BSS14-RSC:

Latitude (°N)	Longitude (°W)
41	104
42	105
34	112
33	111

E. C.15 Description of Groups

The USABSS-14 beam BSS-14RSC is to be grouped with the Plan beam USAEH004, and space stations USABSS-3, USABSS-4, USABSS-10 and USABSS-12 at 119°W.L. as it cannot be operated at the same time as any of those beams.

D. Overall Link Characteristics

1) Connection between Earth-to-space and space-to-Earth frequencies in the network:

Uplink Channel	Uplink Beam	Downlink Channel	Downlink Beam
1	BSS-14RSC	1	BSS-14S5
1	BSS-14RSC	1	BSS-14S9
2	BSS-14RSC	2	BSS-14C
2	BSS-14RSC	1	BSS-14S15
3	BSS-14RSC	3	BSS-14S5
3	BSS-14RSC	3	BSS-14S9
4	BSS-14RSC	4	BSS-14C
4	BSS-14RSC	3	BSS-14S15
5	BSS-14RSC	5	BSS-14S6
5	BSS-14RSC	5	BSS-14S4
6	BSS-14RSC	6	BSS-14C
6	BSS-14RSC	5	BSS-14S11
7	BSS-14RSC	7	BSS-14S6
7	BSS-14RSC	7	BSS-14S4
8	BSS-14RSC	8	BSS-14C
8	BSS-14RSC	7	BSS-14S11
9	BSS-14RSC	9	BSS-14S1
9	BSS-14RSC	9	BSS-14S8
10	BSS-14RSC	10	BSS-14C
10	BSS-14RSC	9	BSS-14S2
11	BSS-14RSC	11	BSS-14C
11	BSS-14RSC	1	BSS-14S13
12	BSS-14RSC	12	BSS-14C
12	BSS-14RSC	1	BSS-14S3
13	BSS-14RSC	13	BSS-14C
13	BSS-14RSC	3	BSS-14S13
14	BSS-14RSC	14	BSS-14C
14	BSS-14RSC	3	BSS-14S3
15	BSS-14RSC	15	BSS-14C
15	BSS-14RSC	5	BSS-14S10
16	BSS-14RSC	16	BSS-14C
16	BSS-14RSC	5	BSS-14S14
17	BSS-14RSC	17	BSS-14C
17	BSS-14RSC	7	BSS-14S10
18	BSS-14RSC	18	BSS-14C
18	BSS-14RSC	7	
19	BSS-14RSC	19	BSS-14C
19	BSS-14RSC	9	BSS-14S7
20	BSS-14RSC	20	BSS-14C
20	BSS-14RSC	9	BSS-14S12
21	BSS-14RSC	21	BSS-14C

A

**Appendix 3 to Technical Annex  
(EchoStar-7)**

**ITU ANNEX 1 OF APPENDIX S30  
FOR USABSS-14 AT 119° W.L.**

**Section 1** Limits for the interference into frequency assignments in conformity with the Regions 1 and 3 Plan or with the Regions 1 and 3 List or into new or modified assignments in the Regions 1 and 3 List.

This Section is not applicable to Region 2 modifications.

**Section 2** Limits to the change in the overall equivalent protection margin for frequency assignments in conformity with the Region 2 Plan.

*With respect to § 4.2.3 c) of Article 4, an administration in Region 2 shall be considered as being affected if the overall equivalent protection margin<sup>16</sup> corresponding to a test point of its entry in the Region 2 Plan, including the cumulative effect of any previous modification to that Plan or any previous agreement, falls more than 0.25 dB below 0 dB, or, if already negative, more than 0.25 dB below the value resulting from:*

- the Region 2 Plan as established by the 1983 Conference; or*
- a modification of the assignment in accordance with this Appendix; or*
- a new entry in the Region 2 Plan under Article 4; or*
- any agreement reached in accordance with this Appendix.*

EchoStar will provide a detailed MSPACE interference analysis to indicate which administrations and assignments are affected.

**Section 3** Limits to the change in the power flux-density to protect the broadcasting-satellite service in Regions 1 and 2 in the band 12.2-12.5 GHz and in Region 3 in the band 12.5-12.7 GHz.

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<sup>16</sup> For the definition of the overall equivalent protection margin, see § 1.11 of Annex 5.

With respect to § 4.2.3 a), 4.2.3 b) or 4.2.3 f) of Article 4, as appropriate, an administration in Region 1 or 3 shall be considered as being affected if the proposed modification to the Region 2 Plan would result in exceeding the power flux-densities given below, at any test point in the service area affected.

$$\begin{aligned}
 & -147 \text{ dB}(W/(m^2 \cdot 27 \text{ MHz})) && \text{for } 0^\circ \leq \theta < 0.44^\circ \\
 & -138 + 25 \log \theta \text{ dB}(W/(m^2 \cdot 27 \text{ MHz})) && \text{for } 0.44^\circ \leq \theta < 19.1^\circ \\
 & -106 \text{ dB}(W/(m^2 \cdot 27 \text{ MHz})) && \text{for } \theta \geq 19.1^\circ
 \end{aligned}$$

where  $\theta$  is:

- the difference in degrees between the longitudes of the broadcasting-satellite space station in Region 2 and the broadcasting-satellite space station affected in Region 1 or 3.

The closest Regions 1 and 3 BSS orbital location in the Regions 1 and 3 Plan or List is the French OCE10100 assignment at 160°W, which is 41° from the 119°W orbital location of USABSS-14. Therefore the –106 dBW/m<sup>2</sup>/27 MHz level from the above limits applies in this case.

The following table shows the pfd level calculated using the *minimum* isolation of the beams of USABSS-14 towards Regions 1 and 3 territories. The pfd limit is met with significant margin. Therefore USABSS-14 is compliant with this Section.

USABSS-14 Beam		Minimum Isolation to R1 and R3	Calculated PFD in 27 MHz		Margin
BSS-14C	58.9	13.00	-115.6	-106	9.6
BSS-14S1	51.0	30.00	-140.5	-106	34.5
BSS-14S2	55.6	10.00	-115.9	-106	9.9
BSS-14S3	56.0	30.00	-135.5	-106	29.5
BSS-14S4	55.9	30.00	-135.6	-106	29.6
BSS-14S5	57.6	40.00	-143.9	-106	37.9
BSS-14S6	55.9	40.00	-145.6	-106	39.6
BSS-14S7	55.7	30.00	-135.8	-106	29.8
BSS-14S8	57.1	40.00	-144.4	-106	38.4
BSS-14S9	60.2	40.00	-141.3	-106	35.3
BSS-14S10	60.7	40.00	-140.8	-106	34.8
BSS-14S11	62.0	40.00	-139.5	-106	33.5
BSS-14S12	63.2	40.00	-138.3	-106	32.3
BSS-14S13	60.2	30.00	-131.3	-106	25.3
BSS-14S14	61.4	30.00	-130.1	-106	24.1
BSS-14S15	60.7	30.00	-130.8	-106	24.8

#### Section 4 Limits to the power flux-density to protect the terrestrial services of other administrations.

With respect to § 4.2.3 d) of Article 4, an administration in Region 1, 2 or 3 shall be considered as being affected if the consequence of the proposed modification to an existing assignment in

the Region 2 Plan is to increase the power flux-density arriving on any part of the territory of that administration by more than 0.25 dB over that resulting from that frequency assignment in the Region 2 Plan at the time of entry into force of the Final Acts of the 1985 Conference. The same administration shall be considered as not being affected if the value of the power flux-density anywhere in its territory does not exceed the limits expressed below.

With respect to ... § 4.2.3 d) of Article 4, an administration in Region 1, 2 or 3 shall be considered as being affected if the ... proposed new frequency assignment in the Region 2 Plan, would result in exceeding a power flux-density, for any angle of arrival, at any point on its territory, of:

$$\begin{aligned}
 & -148 \text{ dB}(W/(m^2 \cdot 4 \text{ kHz})) && \text{for } \theta \leq 5^\circ \\
 & -148 + 0.5 (\theta - 5) \text{ dB}(W/(m^2 \cdot 4 \text{ kHz})) && \text{for } 5^\circ < \theta \leq 25^\circ \\
 & -138 \text{ dB}(W/(m^2 \cdot 4 \text{ kHz})) && \text{for } 25^\circ < \theta \leq 90^\circ
 \end{aligned}$$

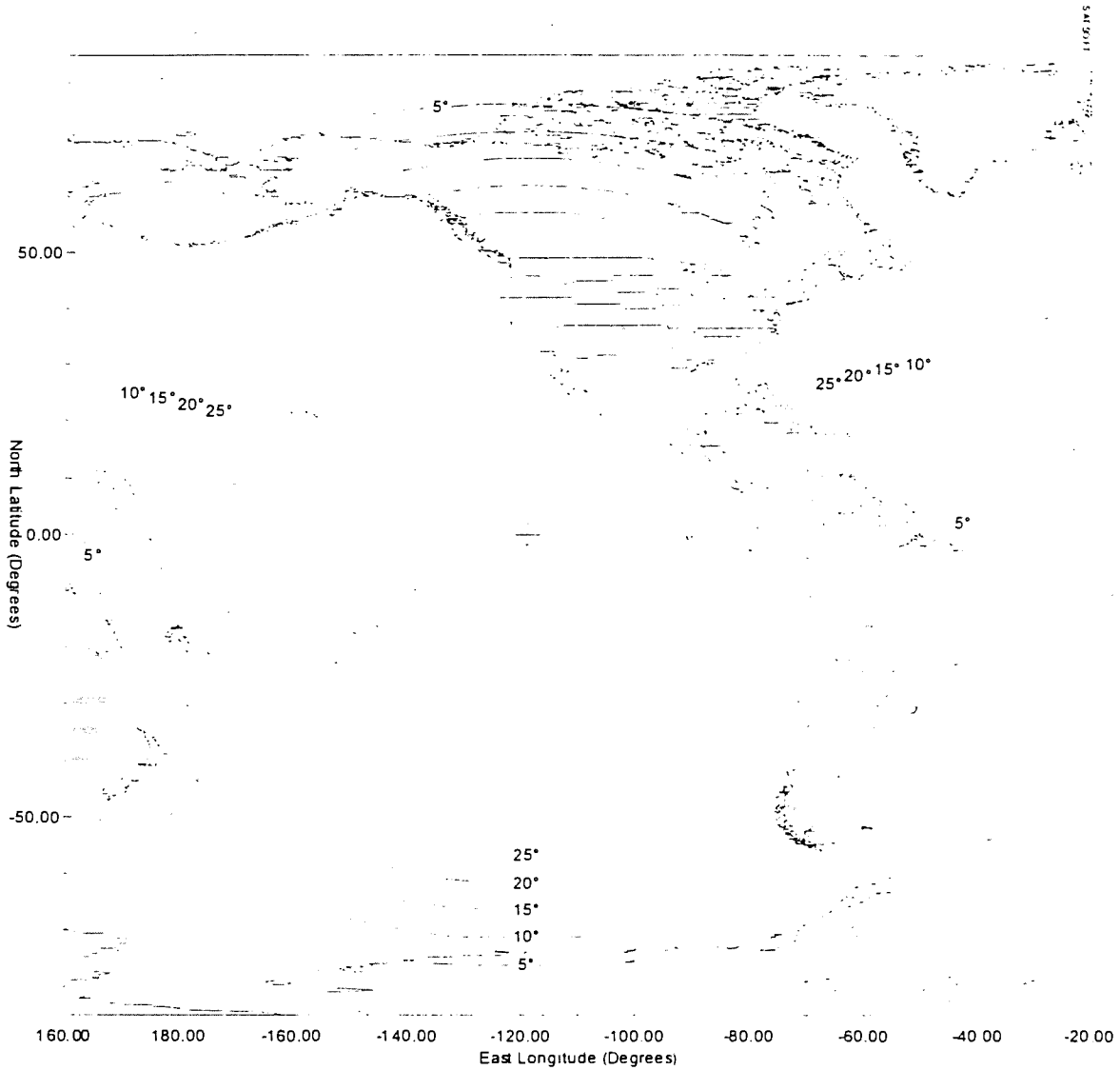
where  $\theta$  represents the angle of arrival.

For territories of Regions 1 and 3 a PFD analysis similar to that for Section 3 was performed. As shown in the table below, using the minimum isolation values towards Regions 1 and 3 and the most stringent pfd limit that could be applicable ( $-148 \text{ dB}(W/(m^2 \cdot 4 \text{ kHz}))$ ) the limits of this Section are met with significant margin.

USABSS-14 Beam		Minimum Isolation to R1 and R3	Calculated PFD in 4 kHz		Margin
BSS-14C	58.9	13.00	-153.9	-148	5.9
BSS-14S1	51.0	30.00	-178.8	-148	30.8
BSS-14S2	55.6	10.00	-154.2	-148	6.2
BSS-14S3	56.0	30.00	-173.8	-148	25.8
BSS-14S4	55.9	30.00	-173.9	-148	25.9
BSS-14S5	57.6	40.00	-182.2	-148	34.2
BSS-14S6	55.9	40.00	-183.9	-148	35.9
BSS-14S7	55.7	30.00	-174.1	-148	26.1
BSS-14S8	57.1	40.00	-182.7	-148	34.7
BSS-14S9	60.2	40.00	-179.6	-148	31.6
BSS-14S10	60.7	40.00	-179.1	-148	31.1
BSS-14S11	62.0	40.00	-177.8	-148	29.8
BSS-14S12	63.2	40.00	-176.6	-148	28.6
BSS-14S13	60.2	30.00	-169.6	-148	21.6
BSS-14S14	61.4	30.00	-168.4	-148	20.4
BSS-14S15	60.7	30.00	-169.1	-148	21.1

For the territories of Region 2 countries a different approach is used. Firstly, dealing with the immediately adjacent countries of Canada and Mexico, 4.2.3 d) of Article 4 of Appendix S30 is pertinent. This provision states that the above pfd limits apply to countries not having frequency assignments in the broadcasting-satellite service in the channel concerned. Since both Canada and Mexico are assigned all 32 channels in the Plan, and therefore will not be deploying co-frequency terrestrial services, these limits do not need to be met on their territory.

For other Region 2 countries a detailed analysis was performed, and the results are summarized in the table below. The figure below illustrates the elevation angle contours from the 119W orbital location. As shown most Region 2 countries that are close to the U.S. are at an elevation angle of greater than 25 degrees.



An analysis was performed using the minimum isolation for Region 2 countries with greater than 25 degree elevation angle and the results are shown in the following table.

USABSS-14 Beam		Minimum Isolation to R2	Calculated PFD in 4 kHz		Margin
BSS-14C	58.9	1.0	-141.88	-138	3.88
BSS-14S1	51.0	30.00	-178.78	-138	40.78
BSS-14S2	55.6	30.00	-174.18	-138	36.18
BSS-14S3	56.0	30.00	-173.78	-138	35.78
BSS-14S4	55.9	30.00	-173.83	-138	35.88
BSS-14S5	57.6	30.00	-172.18	-138	34.18
BSS-14S6	55.9	30.00	-173.88	-138	35.88
BSS-14S7	55.7	30.00	-174.08	-138	36.08
BSS-14S8	57.1	30.00	-172.68	-138	34.68
BSS-14S9	60.2	30.00	-169.58	-138	31.58
BSS-14S10	60.7	30.00	-169.08	-138	31.08
BSS-14S11	62.0	30.00	-167.78	-138	29.78
BSS-14S12	63.2	30.00	-166.58	-138	28.58
BSS-14S13	60.2	30.00	-169.58	-138	31.58
BSS-14S14	61.4	20.00	-158.38	-138	20.38
BSS-14S15	60.7	0.00	-139.08	-138	1.08

As shown all the beams met the required pfd level for elevation angles greater than 25 degrees. In fact the pfd level for elevation angles of less than 5 dB are also met by all beams except BSS-14S15. It is noted that the isolation for Region 2 countries with elevation angles less than 25 degrees is greater than that listed in the Table. Further analysis of the BSS14S15 beam shows that for Region 2 countries with elevation angles less than 25 dB the minimum isolation is 20 dB which produces a pfd of -169.08 dBW/m<sup>2</sup>/4 kHz which is well within the specified -148 dBW/m<sup>2</sup>/4kHz pfd level.

Therefore USABSS-14 is compliant with this Section.

**Section 5** (Not used)

**Section 6** Limits to the change in the power flux-density of assignments in the Regions 1 and 3 Plan to protect the fixed-satellite service (space-to-Earth) in the band 11.7-12.2 GHz in Region 2 or in the band 12.2-12.5 GHz in Region 3, and of assignments in the Region 2 Plan to protect the fixed-satellite service (space-to-Earth) in the band 12.5-12.7 GHz in Region 1 and in the band 12.2-12.7 GHz in Region 3.

The provisional limits that were adopted at WRC-00 are included in Resolution 540. These limits replace the ones in § 4.2.3 e). The limits applicable to Region 2 BSS are reproduced below.

*For interference caused by Region 2 BSS to Regions 1 and 3 FSS (space-to-Earth in the band 12.5-12.7 GHz in Region 1 and in the band 12.2-12.7 GHz in Region 3):*

$$\begin{aligned}
 & -160 \text{ dB}(W/(m^2 \cdot 27 \text{ MHz})) && \text{for } 0^\circ \leq \theta < 0.054^\circ \\
 & -137.46 + 17.74 \log \theta \text{ dB}(W/(m^2 \cdot 27 \text{ MHz})) && \text{for } 0.054^\circ \leq \theta < 3.67^\circ \\
 & -141.56 + 25 \log \theta \text{ dB}(W/(m^2 \cdot 27 \text{ MHz})) && \text{for } 3.67^\circ \leq \theta < 11.54^\circ
 \end{aligned}$$



$$-115 \text{ dB}(W/(m^2 \cdot 27 \text{ MHz}))$$

$$\text{for } 11.54^\circ \leq \theta$$

where  $\theta$  corresponds to the minimum geocentric angular separation between the interfering BSS and the interfered-with FSS space station. It is understood that, in the implementation of these criteria, the Bureau should take into account the pertinent station-keeping accuracy of the BSS and FSS space stations as filed by the notifying administrations.

*NOTE – In addition, the 0.25 dB allowed increase over the pfd resulting from the original Plan assignments of all Regions should be maintained.*

All Regions 1 and 3 FSS satellites are greater than  $11.54^\circ$  from the  $119^\circ\text{W}$  location. Therefore the  $-115 \text{ dB}(W/(m^2 \cdot 27 \text{ MHz}))$  level applies. As shown in the table provided in Section 3 above the pfd per 27 MHz from USABSS-14 in the territories of Regions 1 and 3 is less than this level. Therefore USABSS-14 is compliant with this Section.

**Section 7** Limits to the change in equivalent noise temperature to protect the fixed-satellite service (Earth-to-space) in Region 1 from modifications to the Region 2 Plan in the band 12.5-12.7 GHz.

*With respect to § 4.2.3 e) of Article 4, an administration of Region 1 shall be considered as being affected if the proposed modification to the Region 2 Plan would result in:*

- the value of  $\Delta T / T$  resulting from the proposed modification is greater than the value of  $\Delta T / T$  resulting from the assignment in the Region 2 Plan as of the date of entry into force of the Final Acts of the 1985 Conference; and*
- the value of  $\Delta T / T$  resulting from the proposed modification exceeds 4%.*

*using the method of Appendix S8 (Case II).*

From a thorough review of the available ITU space network databases there are no assignments registered in the Earth-to-space direction in the frequency band 12.5-12.7 GHz. Therefore no Region 1 space station can be affected and USABSS-14 is compliant with this Section.

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**Appendix 4 to Technical Annex  
(EchoStar-7)**

**ITU ANNEX 1 OF APPENDIX S30A  
FOR USABSS-14 AT 119° W.L.**

**Section 1**     Not Used.

**Section 2**     Not Used.

**Section 3**     Limits to the change in the overall equivalent protection margin with respect to frequency assignments in conformity with the Region 2 feeder-link Plan.

*With respect to the modification to the Region 2 feeder-link Plan and when it is necessary under this Appendix to seek the agreement of any other administration of Region 2, except in cases covered by Resolution 42 (Rev.Orb-88), an administration shall be considered affected if the overall equivalent protection margin corresponding to a test point of its entry in that Plan, including the cumulative effect of any previous modification to that Plan or any previous agreement, falls more than 0.25 dB below 0 dB, or, if already negative, more than 0.25 dB below the value resulting from:*

- the feeder-link Plan as established by the 1983 Conference; or*
- a modification of the assignment in accordance with this Appendix; or*
- a new entry in the feeder-link Plan under Article 4; or*
- any agreement reached in accordance with this Appendix except for Resolution 42 (Rev.Orb-88).*

F.     EchoStar will provide a detailed MSPACE interference analysis to indicate which administrations and assignments are affected.

**Section 4**     Limits to the interference into frequency assignments in conformity with the Regions 1 and 3 feeder-link Plan or with the Regions 1 and 3 feeder-link Lists or proposed new or modified assignments in the Regions 1 and 3 feeder-link Lists.

This Section is not applicable to Region 2 modifications.

**Section 5**     Limits applicable to protect a frequency assignment in the bands 17.3-18.1 GHz (Regions 1 and 3) and 17.3-17.8 GHz (Region 2) to a receiving space station in the fixed-satellite service (Earth-to-space).

An administration in Region 1 or 3 shall be considered affected by a proposed modification in Region 2 or an administration in Region 2 shall be considered affected by a proposed new or modified assignment in the Regions 1 and 3 feeder-link Lists when the power flux-density arriving at the receiving space station of a broadcasting-satellite feeder-link would cause an increase in the noise temperature of the feeder-link space station which exceeds the threshold value of  $\Delta T / T$  corresponding to 3%, where  $\Delta T / T$  is calculated in accordance with the method given in Appendix S8, except that the maximum power densities per hertz averaged over the worst 1 MHz are replaced by power densities per hertz averaged over the total RF bandwidth of the feeder-link carriers (24 MHz for Region 2 and 27 MHz for Regions 1 and 3).

Interim systems of Region 2 in accordance with Resolution 42 (Rev.Orb-88) shall not be taken into consideration when applying this provision to proposed modifications to the Regions 1 and 3 feeder-link Plan. However, this provision shall be applied to Region 2 interim systems with respect to the Regions 1 and 3 feeder-link Plan.

The table below shows the results of  $\Delta T / T$  calculations for the closest spaced Region 1 and 3 orbital locations. Data is provided for all Region 1 and 3 orbital locations that are visible from either of the two feeder link earth station sites of the USABSS-14 network. The calculation of  $\Delta T / T$  assumes the peak receive gain of the Region 1 and 3 space stations, and a 900K receive system noise temperature. Note that the results are all well below the 3%  $\Delta T / T$  criterion. Therefore USABSS-14 is compliant with this Section.

(a) Closest Region 1 or 3 Feeder Link				
Beam Name	Orbital Position	Peak Receive Antenna Gain (dBi)	Orbital Separation from USABSS-14 at 119°W	Calculated $\Delta T / T$ (%)
F – OCE10100	160°W	32.58	41°	0.019%
FJI – FJI19300	178°W	44.16	59°	0.172%
SMO – SMO05700	178°W	48.88	59°	0.509%
KIR – KIR 100	176°E	42.60	65°	0.117%
TUV – TUV00000	176°E	46.93	65°	0.317%
TON – TON21500	170.75°E	44.64	70.25°	0.182%
IRL – IRL21100	37.2°W	48.08	81.8°	0.408%
NGR – NGR11500	37.2°W	38.47	81.8°	0.045%
AND – AND34100	37°W	48.88	82°	0.490%
GMB – GMB30200	37°W	47.69	82°	0.373%
GUI – GUI19200	37°W	42.29	82°	0.107%
POR – POR 100	37°W	47.17	82°	0.331%
MTN – MTN 100	36.8°W	37.55	82.2°	0.036%
SMR – SMR31100	36.8°W	48.88	82.2°	0.490%
CPV – CPV30100	33.5°W	47.56	85.5°	0.356%
DNK – DNK090XR	33.5°W	43.48	85.5°	0.139%
DNK – DNK091XR	33.5°W	44.73	85.5°	0.186%
G – G02700	33.5°W	43.23	85.5°	0.131%
ISL – ISL04900	33.5°W	46.67	85.5°	0.290%
ISL – ISL05000	33.5°W	44.67	85.5°	0.183%
LBR – LBR24400	33.5°W	45.13	85.5°	0.204%
SRL – SRL25900	33.5°W	47.20	85.5°	0.328%

**Section 6** Limits applicable to protect a frequency assignment in the band 17.8-18.1 GHz (Region 2) to a receiving feeder-link space station in the fixed-satellite service (Earth-to-space).

This Section is not Applicable to Region 2 modifications.