

Appendix 1 to
Attachment A (Technical Information to Supplement Schedule S)

Analysis of ANNEX 1 of Appendix 30

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

Not Applicable to Region 2.

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 is considered as being affected if the overall equivalent protection margin 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. (WRC-03)*

An MSPACE analysis was performed utilizing the Region 2 BSS Plan as contained in IFIC 2661 and using the technical characteristics of the EHOSTAR-6 satellite network at 61.65°W. The MSPACE results showed that four networks were deemed to be potentially affected. Three are USA networks at the 61.5°W cluster and the fourth is the UK's INTELSAT KUEXT 304.5 network at 55.5°W. With respect to the latter network, the relevant details are:

- The worst case OEPM degradation to the UK network is 0.534 dB;
- The affected channels of the UK network are 21, 23, 25, 27, 29 and 31;
- Only beam E005 (the Caribbean beam) of the UK network was affected by the EHOSTAR-6 satellite. This beam has not been brought into use. The beam of the INTELSAT KUEXT 304.5 network that has been brought into use is unaffected by the EHOSTAR-6 network.

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

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 is considered as being affected if the proposed modification to the Region 2 Plan would result in exceeding the following power flux-density values, at any test point in the service area of its overlapping frequency assignments:

$-147 \text{ dB}(W/(m^2 \cdot 27 \text{ MHz}))$	<i>for</i> $0^\circ \leq \theta < 0.23^\circ$
$-135.7 + 17.74 \log \theta \text{ dB}(W/(m^2 \cdot 27 \text{ MHz}))$	<i>for</i> $0.23^\circ \leq \theta < 2.0^\circ$
$-136.7 + 1.66 \theta^2 \text{ dB}(W/(m^2 \cdot 27 \text{ MHz}))$	<i>for</i> $2.0^\circ \leq \theta < 3.59^\circ$
$-129.2 + 25 \log \theta \text{ dB}(W/(m^2 \cdot 27 \text{ MHz}))$	<i>for</i> $3.59^\circ \leq \theta < 10.57^\circ$
$-103.6 \text{ dB}(W/(m^2 \cdot 27 \text{ MHz}))$	<i>for</i> $10.57^\circ \leq \theta$

where θ is the minimum geocentric orbital separation in degrees between the wanted and interfering space stations, taking into account the respective East-West station-keeping accuracies. (WRC-03)

The closest Regions 1 and 3 BSS network is the Russia's INTERSPUTNIK-47.5W-B network at 47.5°W, which is greater than 10.57 degrees from the EHOSTAR-6 network, therefore the –103.6 dB(W/(m² · 27 MHz)) PFD level applies for this network and all other Regions 1 and 3 networks. The GIMs Appendix 30 pfd tool was used to assess compliance with this Section. Using the antenna gain contours and power levels of the EHOSTAR-6 downlink beam, the GIMS pfd tool showed that no administrations are affected. Therefore the EHOSTAR-6 network is compliant with this Section.

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

With respect to § 4.1.1 d) of Article 4, an administration in Region 1, 2 or 3 is considered as being affected if the consequence of the proposed modified assignment in the Regions 1 and 3 List 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 Plan or List for Regions 1 and 3 as established by WRC-2000. The same administration is 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 is 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 is 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 § 4.1.1 d) or § 4.2.3 d) of Article 4, an administration in Region 1, 2 or 3 is considered as being affected if the proposed new assignment in the Regions 1 and 3 List, or 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:

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

where θ represents the angle of arrival. (WRC-03)

The GIMS pfd tool was used to determine the administrations whose terrestrial services may be affected by the ECHOSTAR-6 network. Using the antenna gain contours and power levels of the ECHOSTAR-6 downlink beam, the GIMS pfd tool showed that no administrations are affected. Therefore the ECHOSTAR-6 network is compliant with this Section.

5 Limits to the change in the power flux-density of assignments in the Regions 1 and 3 Plan or List 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

With respect to § 4.1.1 e) of Article 4, an administration is considered as being affected if the proposed new or modified assignment in the Regions 1 and 3 List would result in an increase in the power flux-density over any portion of the service area of its overlapping frequency assignments in the fixed-satellite service in Region 2 or Region 3 of 0.25 dB or more above that resulting from the frequency assignments in the Plan or List for Regions 1 and 3 as established by WRC-2000.

With respect to § 4.2.3 e), an administration is considered as being affected if the proposed modification to the Region 2 Plan would result in an increase in the power flux-density over any portion of the service area of its overlapping frequency assignments in the fixed-satellite service in Region 1 or 3 of 0.25 dB or more above that resulting from the frequency assignments in the Region 2 Plan at the time of entry into force of the Final Acts of the 1985 Conference.

With respect to § 4.1.1 e) or 4.2.3 e) of Article 4, with the exception of cases covered by Note 1 below, an administration is considered as not being affected if the proposed new or modified assignment in the Regions 1 and 3 List, or if a proposed modification to the Region 2 Plan, gives a power flux-density anywhere over any portion of the service area of its overlapping frequency assignments in the fixed-satellite service in Region 1, 2 or 3 of less than:

$$\begin{array}{ll} -186.5 \text{ dB}(W/(m^2 \cdot 40 \text{ kHz})) & \text{for } 0^\circ \leq \theta < 0.054^\circ \\ -164.0 + 17.74 \log \theta \text{ dB}(W/(m^2 \cdot 40 \text{ kHz})) & \text{for } 0.054^\circ \leq \theta < 2.0^\circ \\ -165.0 + 1.66 \theta^2 \text{ dB}(W/(m^2 \cdot 40 \text{ kHz})) & \text{for } 2.0^\circ \leq \theta < 3.59^\circ \end{array}$$

$$\begin{array}{ll}
 -157.5 + 25 \log \theta \text{ dB}(W/(m^2 \cdot 40 \text{ kHz})) & \text{for } 3.59^\circ \leq \theta < 10.57^\circ \\
 -131.9 \text{ dB}(W/(m^2 \cdot 40 \text{ kHz})) & \text{for } 10.57^\circ \leq \theta
 \end{array}$$

where θ is the minimum geocentric orbital separation in degrees between the wanted and interfering space stations, taking into account the respective East-West station-keeping accuracies.

The ECHOSTAR-6 network causes lower PFD levels over all territories in Regions 1 and 3 than those caused by USA Original Plan networks at 61.5°W and therefore the network is compliant with this Section.

6 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 is 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 6%, using the method of Appendix 8 (Case II). (WRC-03)*

From a 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 the ECHOSTAR-6 network is compliant with this Section.

Appendix 2 to
Attachment A (Technical Information to Supplement Schedule S)

Analysis of ANNEX 1 of Appendix 30A

1 Limits to the change in the overall equivalent protection margin with respect to frequency assignments in conformity with the Region 2 feeder-link Plan (WRC-2000)

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.WRC-03), an administration is considered as being 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.WRC-03). (WRC-03)*

See the discussion provided in Section 2 of the Appendix 30 Annex 1 Analysis.

2 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 List or proposed new or modified assignments in the Regions 1 and 3 feeder-link List (WRC-03)

Not Applicable to Region 2.

3 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 is considered as being affected by a proposed modification in Region 2, with respect to § 4.2.2 a) or 4.2.2 b) of Article 4, or an administration in Region 2 is considered as being affected by a proposed new or modified assignment in the Regions 1 and 3 feeder-link List, with respect to § 4.1.1 c) of Article 4, 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 6%, where $\Delta T / T$ is calculated in accordance with the method given in Appendix 8, except that the maximum power densities per hertz averaged over the worst 1 MHz are replaced by power densities per hertz averaged over the necessary bandwidth of the feeder-link carriers. (WRC-03)

The following Table calculates the $\Delta T / T$ for the closest Regions 1 and 3 feeder link space stations, based on the Region 1 and 3 List. As shown the $\Delta T / T$'s are well below the allowed 6% level. Therefore EHOSTAR-6 is in conformity with this Section.

Closest Region 1 or 3 Feeder Link Space Station			E/S Lat (°N)	E/S Long (°E)	E/S Gain towards Victim Satellite (dBi)	Victim Satellite Rx System Noise Temp (K)	Calculated $\Delta T / T$ (%)
Network Name	Orbital Position	Peak Receive Antenna Gain (dBi)					
INTERSPUTNIK-47.5W-B	-47.5	37	33.3	-111.8	-0.4	600	0.22%
MCO-BSS-40.5W	-40.5	35.9	33.3	-111.8	-4.6	600	0.06%
IRL21100	-37.2	48.08	33.3	-111.8	-6.2	600	0.71%
NGR11500	-37.2	38.47	33.3	-111.8	-6.2	600	0.08%
DBL-G4-37.2W	-37.2	35	33.3	-111.8	-6.2	300	0.06%
AND34100	-37	48.88	33.3	-111.8	-6.3	600	0.84%
GMB30200	-37	47.69	33.3	-111.8	-6.3	600	0.64%
GUI19200	-37	42.29	33.3	-111.8	-6.3	600	0.18%
POR_100	-37	47.17	33.3	-111.8	-6.3	600	0.57%
MTN_100	-36.8	37.55	33.3	-111.8	-6.3	600	0.06%
SMR31100	-36.8	48.88	33.3	-111.8	-6.3	600	0.82%

4 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) (WRC-03)

With respect to § 4.1.1 d) of Article 4, an administration is considered affected by a proposed new or modified assignment in the Regions 1 and 3 feeder-link List when the power flux-density arriving at the receiving space station of a broadcasting-satellite feeder-link in Region 2 of that administration would cause an increase in the noise temperature of the receiving feeder-link space station which exceeds the threshold value of $\Delta T/T$ corresponding to 6%, where $\Delta T/T$ is calculated in accordance with the method given in Appendix 8, except that the maximum power densities per hertz averaged over the worst 1 MHz are replaced by power densities per hertz averaged over the necessary bandwidth of the feeder-link carriers. (WRC-03)

Not Applicable to Region 2.

**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 submission of data, 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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