ECHOSTAR-18

ATTACHMENT A (TECHNICAL ANNEX)

Technical Information to Supplement Schedule S

A.1 Scope

This attachment contains the information required by § 25.114(c) and other sections of Part 25 of the Commission's rules that cannot be entered into the Schedule S software.

A.2 General Description of Overall System Facilities, Operations and Services (§25.114(d)(1))

The ECHOSTAR-18 satellite will operate at the 61.35° W.L. orbital location as an in-orbit spare satellite in the Broadcasting-Satellite Service/Direct Broadcast Satellite ("BSS" or "DBS") service.

The ECHOSTAR-18 satellite will operate within the 17.3-17.8 GHz BSS feeder uplink band (ITU Appendix 30A) and the 12.444-12.7 GHz BSS downlink band (ITU Appendix 30). The channel center frequencies are identical to that prescribed in the ITU's Region 2 BSS Plan. The bandwidth of each channel is 26 MHz. On the uplink, the satellite is capable of using all 32 ITU Region 2 BSS channels. On the downlink, the satellite is capable of using the upper sixteen channels defined by the ITU Region 2 BSS Plan (*i.e.,* channels 17 through to 32, inclusive).

The ECHOSTAR-18 satellite solely utilizes spot beams for transmission of the communications carriers. There are five uplink spot beams (operating in both circular polarizations). The five feeder link sites are located at Cheyenne, WY, Gilbert, AZ, Monee, IL, Mount Jackson, VA, and New Braunfels, TX. There are a total of forty-eight downlink spot beams. Details regarding

uplink and downlink beam inter-connectivity, including strapping between the uplink and downlink channels, are provided in the associated Schedule S form.

There will be one wideband digitally modulated signal transmitted in each of the active transponders, supporting a range of information data rates depending on the order of the modulation (e.g., QPSK, 8PSK) and the type and degree of FEC coding used. Typical modulation/coding schemes are as follows:

a) QPSK; rates 5/6 and 7/8 inner coding (27 MHz bandwidth[1]);

b) 8PSK; rates 2/3 and 3/4 inner coding (25.8 MHz bandwidth).

Spot beam operation, in both the uplink and downlink directions, achieves full frequency re-use through a combination of dual orthogonal polarizations and spatial isolation.

Spacecraft Telemetry, Tracking and Control ("TT&C") functions will take place from FCC-authorized, fully redundant TT&C earth station and satellite control facilities, including those located in Cheyenne, WY, Gilbert, AZ, and Summerset, SD. The TT&C transmissions will take place at the edges of the 17.3-17.8 GHz uplink band and 12.2-12.7 GHz downlink band, for all phases of the mission.

A radio frequency autotrack ("RFAT") system is used to provide highly accurate downlink spot beam pointing. This involves the transmission of a beacon at 17,308 MHz from the ground. The satellite is capable of receiving RFAT transmissions uplinked from earth stations, including those in Cheyenne, WY, Gilbert, AZ, and Monee, IL.

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[1] The 27 MHz carriers will be transmitted in the 26 MHz channels. These emissions can be accommodated within the useful bandwidth of the channel filters.

A.3 Space Station Transmit and Receive Capabilities (§25.114(c)(4)(ii) and §25.114(c)(4)(v))

The maximum downlink EIRP levels of the spot beams range between 55.5 dBW and 60 dBW. The maximum downlink EIRP level of each the spot beam is stated in the associated Schedule S form. The maximum downlink EIRP density of each spot beam can be derived from the formula:

Maximum EIRP Density = Maximum EIRP – 10*log (25.8E6/4E3) dBW/4kHz

For all uplink spot beams, the minimum and maximum saturating flux densities, respectively, are: -100 dBW/m^2 and -80 dBW/m^2.

A.4 Predicted Space Station Antenna Gain Contours (§25.114(c)(4)(vi)(A))

The ECHOSTAR-18 satellite's antenna gain contours for the receive and transmit beams, as required by §25.114(c)(4)(vi)(A), are being provided to the Commission in a GIMS database container. All near-omni-directional beams, used for emergency TT&C operations once the satellite is on-station, have gain contours that vary by less than 8 dB below peak across the surface of the visible Earth. Therefore, gain contours for these beams (beams OMNUR, OMNUL, OMNDR and OMNDL) have not been included in the GIMS container file.

A.5 TT&C Characteristics (§25.114(c)(4)(i) and §25.114(c)(4)(v))

The information provided in this section complements that provided in the associated Schedule S form.

The ECHOSTAR-18 TT&C sub-system provides for communications during pre-launch, transfer orbit and on-station operations, as well as during spacecraft emergencies. The TT&C sub-system

will operate at the edges of the uplink and downlink frequency ranges during all phases of the mission.

During transfer orbit and on-station emergencies the TT&C signals will be received and transmitted by the satellite using a combination of wide-angle antennas on the satellite that create a near omni-directional gain pattern. During normal on-station operation, the TT&C signals will be received and transmitted by the satellite using large-coverage horn antennas.

There are four command receivers: one operating at 17.7935 GHz and two that operate at 17.303 GHz. In addition, there is one "flex" receiver that can be tuned anywhere within the 17.790 - 17.795 GHz and 17.795-17.800 GHz bands by ground command. There are three telemetry transmitters: one operating at 12.203 GHz or 12.204 GHz, one operating at 12.695 GHz or 12.696 GHz, and one "flex" transmitter that can be tuned anywhere within the 12.690 - 12.695 GHz and 12.695-12.700 GHz bands by ground command.

A summary of the TT&C subsystem is given in Table A.5-1.

Table A.5-1: Summary of the TT&C Subsystem

Command/Ranging Frequencies	17,793.5 MHz (RHCP) 17,303 MHz (LHCP) 17,790 - 17,795 MHz (RHCP) 17,795 - 17,800 MHz (RHCP)
Uplink Flux Density (Minimum)	Omni Rx antenna: -83 dBW/m^2 (Command) -78 dBW/m^2 (Ranging) Horn Rx antenna: -93 dBW/m^2 (Command) -87 dBW/m^2 (Ranging)
Telemetry/Ranging Frequencies	12,695 MHz (RHCP) 12,696 MHz (RHCP) 12,203 MHz (LHCP) 12,204 MHz (LHCP) 12,690 - 12,695 MHz (RHCP) 12,695 - 12,700 MHz (RHCP)
Maximum Downlink EIRP	14.6 dBW (Omni antenna) 14.3 dBW (Horn antenna)

The maximum flux density for all command beams is -57 dBW/m^2.

A.6 Interference Analyses (§25.214(d)(13))

The analyses of the ECHOSTAR-18 satellite network with respect to the limits in Annex 1 to Appendices 30 and 30A are given in Appendices 1 and 2 to this document.

A.7 Orbital Debris Mitigation Plan (§25.114(d)(14))

A.7.1 Spacecraft Hardware Design

Space Systems/Loral ("Loral") is the manufacturer of the ECHOSTAR-18 satellite. Loral has assessed the launch, orbit raising, deployment and normal operations portions of the mission and determined that no debris will be released by the spacecraft except for the following case. The only portion of the mission in which portions of the spacecraft are separated from the main spacecraft body is during deployment. Separation and deployment mechanisms are intended to contain the debris generated when activated. There are several reflector deployment hold-down electro-explosive devices ("EED"s) that have the potential to expel a small amount of debris — up to 3 milligrams of titanium debris from the hold-down and 2 milligrams of "soot" per firing. These EEDs have flown on over 36 spacecraft and had no failures. The assessment found no other sources for debris throughout the mission.

To protect the spacecraft from small body collisions, including debris less than one centimeter in diameter, the design of the ECHOSTAR-18 spacecraft allows for individual faults without losing the entire spacecraft. All critical components are built within the structure and shielded from external influences. Items that cannot be built within the spacecraft nor shielded (such as antennas) are either redundant or are able to withstand impact. The ECHOSTAR-18 spacecraft can be controlled through both the large-coverage horn antenna and the wide angle antennas. The

likelihood of all antennas being damaged during a small body collision is minimal. The wide angle antennas on the spacecraft are similar to open waveguides that point towards the Earth (there is one set on each side of the spacecraft; either set could be used to successfully de-orbit the spacecraft). These wide angle antennas would continue to operate even if struck and bent.

The ECHOSTAR-18 satellite has separate TT&C and propulsion subsystems that are necessary for end-of-life disposal. The spacecraft TT&C system is extremely rugged with regard to meteoroids smaller than 1 cm, by virtue of its redundancy, shielding, separation of components and physical characteristics. The command receivers and decoders and telemetry encoders and transmitters are located within a shielded area and are redundant and physically separated. A single rugged thruster and shielded propellant tank provides the energy for orbit raising. Otherwise, there are no single points of failure in the system.

A.7.2 Accidental Explosion Assessment (§25.144(d)(14)(ii))

Loral has reviewed failure modes for all equipment to assess the possibility of an accidental explosion onboard the spacecraft. In order to ensure that the spacecraft does not explode on orbit, the satellite controller will take specific precautions. All batteries and fuel tanks are monitored for pressure or temperature variations. Alarms in the Satellite Control Center ("SCC") inform controllers of any variations. Additionally, long term trending analysis will be performed to monitor for any unexpected trends.

Operationally, batteries will be operated utilizing the manufacturer's automatic recharging scheme. Doing so will ensure that charging terminates normally without building up additional heat and pressure. As this process occurs wholly within the spacecraft, it also affords protection from command link failures.

In order to protect the propulsion system, fuel tanks will all be operated in a blow down mode. At the completion of orbit raising, the pressurant will be isolated from the fuel system. This will cause the pressure in the tanks to decrease over the life of the spacecraft. This will also protect

against a pressure valve failure that might otherwise cause the fuel tanks to become over pressurized.

In order to ensure that the spacecraft has no explosive risk after it has been successfully de-orbited, all stored energy onboard the spacecraft will be removed. Upon successful de-orbit of the spacecraft, all propulsion lines and latch valves will be vented and left open. All battery chargers will be turned off and batteries will be left in a permanent discharge state. These steps will ensure that no buildup of energy can occur resulting in an explosion in the years after the spacecraft is de-orbited.

A.7.3 Safe Flight Profiles (§25.144(d)(14)(iii))

In considering current and planned satellites that may have a station-keeping volume that overlaps the ECHOSTAR-18 satellite, DISH has reviewed the lists of FCC-licensed satellite networks, as well as those that are currently under consideration by the FCC. In addition, networks for which a request for coordination has been submitted to the ITU within ±0.15 degrees of 61.35° W.L. have also been reviewed.

There are currently four satellites that operate within the 61.5° W.L. cluster, as follows:

- ECHOSTAR-3 at 61.8° W.L.
- ECHOSTAR-15 at 61.65° W.L.
- ECHOSTAR-16 at 61.5° W.L.
- ECHOSTAR-12 at 61.35° W.L.

All four satellites operate with an east-west station-keeping of ±0.05 degrees.

Before the ECHOSTAR-18 satellite is located at 61.35° W.L., the ECHOSTAR-12 satellite will be located at 61.2° W.L., subject Commission approval.

By locating the ECHOSTAR-18 satellite at 61.35° W.L., and maintaining an east-west station-keeping tolerance of ±0.05 degrees, there will be no overlap of station-keeping volume with any of the other four satellites, and hence no risk of collision.

There are no pending applications before the Commission for an additional satellite to be located at an orbital location in the immediate vicinity of 61.35° W.L. In addition, there are no non-USA networks filed with the ITU for an orbital location within ±0.15 degrees of 61.35° W.L.

Based on the preceding, DISH concludes there is no requirement to physically coordinate the ECHOSTAR-18 satellite with another satellite operator at the present time.

A.7.4 Post Mission Disposal Plan (§25.144(d)(14)(iv))

At the end of the operational life of the ECHOSTAR-18 satellite, DISH will maneuver the satellite to a disposal orbit with a minimum perigee of 300 km above the normal GSO operational orbit. This proposed disposal orbit altitude exceeds the minimum required by §25.283, which is calculated below.

The input data required for the calculation is as follows:

Total Solar Pressure Area "A" = 91 m^2

"M" = Dry Mass of Satellite = 3346 kg

"C_R" = Solar Pressure Radiation Coefficient = 1.5

Using the formula given in §25.283, the Minimum Disposal Orbit Perigee Altitude is calculated as follows:

= 36,021 km + 1000 x C_R x A/m

= 36,021 km + 1000 x 1.5 x 91/3346

= 36,062 km

= 276 km above GSO (35,786 km)

Thus, the designed disposal orbit of 300 km above GSO exceeds the required minimum by a margin of 24 km. Maneuvering the satellite to the disposal orbit will require 15.2 kg of propellant, and this quantity of fuel, taking account of all fuel measurement uncertainties, will be reserved to perform the final orbit raising maneuvers.

DISH will apply all available propellant accounting methodologies to track propellant usage. For the ECHOSTAR-18 satellite, these methodologies include the bookkeeping method, the pressure-volume-temperature ("PVT") method, and the propellant depletion gauge operations ("PDGO") method.

The bookkeeping method, whereby the estimated propellant used during a thruster-firing event is subtracted from the beginning of life propellant mass, will be applied after every thruster-firing event. The PVT method, which uses current state pressure and temperature telemetry received from the satellite to estimate the remaining propellant, will be applied once a month. The PDGO method uses propellant temperature measurements taken while tank heaters are activated to determine more accurately the amount of oxidizer and fuel in tanks at the end of mission life. The PDGO method will be applied annually until propellant analysis shows 60 kg or less propellant remaining, after which the PDGO method will be applied after every north-south station-keeping maneuver. Combined, these methods will ensure the necessary amount of fuel is reserved to perform deorbit procedures as well as maximize fuel depletion when the ECHOSTAR-18 satellite reaches its disposal orbit.

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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APPENDIX 1 TO ATTACHMENT A

The ECHOSTAR-18 satellite will operate under the USABSS-37 network. This network was published in IFIC 2733. Accordingly, all analyses contained within this Appendix have been performed against the networks that were published as of IFIC 2733.

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

Does not apply to the Region 2 Plan.

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[28] 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 2733. The results of the analysis are contained in Annex 1 to this Appendix. Note that networks that were found to be affected, but have since expired, have not been included in the table.

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[28] For the definition of the overall equivalent protection margin, see § 1.11 of Annex 5.

As shown, there are three adjacent Region 2 BSS networks filed. The results are discussed below for each of the affected networks:

- The UK's INTELSAT KU-EXT 304.5 network at 55.5° W.L. is deemed to be affected. The USA and UK have an existing coordination agreement that encompasses their respective operations at the nominal 61.5° W.L. and 55.5° W.L. orbital locations.

- Holland's NSS-BSS 58W at 58° W.L. is deemed to be affected. This network includes a beam that has partial CONUS coverage. This network/beam needs to be coordinated with USA networks at 61.5° W.L. before it can be implemented. This network expires in July 2018.

- The UK's USAT-S5 MOD-A network at 66.3° W.L. is deemed to be affected. This network needs to be coordinated with USA networks at 61.5° W.L. before it can be implemented. This network expires in October 2017.

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 dB(W/(m^2 · 27 MHz))	for $0° \le \theta < 0.23°$
$-135.7 + 17.74 \log \theta$ dB(W/(m^2 · 27 MHz))	for $0.23° \le \theta < 2.0°$
$-136.7 + 1.66\ \theta^2$ dB(W/(m^2 · 27 MHz))	for $2.0° \le \theta < 3.59°$
$-129.2 + 25 \log \theta$ dB(W/(m^2 · 27 MHz))	for $3.59° \le \theta < 10.57°$
-103.6 dB(W/(m^2 · 27 MHz))	for $10.57° \le \theta$

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 GIMS PFD tool was used to assess compliance with this Section. Using the antenna gain contours and power levels of the beams the GIMS PFD tool showed that no administrations are affected. Therefore the ECHOSTAR-18 satellite network is compliant with this Section.

4 Limits to the power flux-density to protect the terrestrial services of other administrations[29, 30, 31]

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:

-148 *dB(W/(m^2 · 4 kHz))* *for* $\theta \leq 5°$

$-148 + 0.5\,(\theta - 5)$ *dB(W(m^2 · 4 kHz)* *for* $5° < \theta \leq 25°$

-138 *dB(W/(m^2 · 4 kHz))* *for* $25° < \theta \leq 90°$

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

The GIMS PFD tool was used to assess compliance with this Section. Using the antenna gain contours and power levels of the beams, the GIMS PFD tool showed that no administrations are affected. Therefore the ECHOSTAR-18 satellite network is compliant with this Section.

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[29] See § 3.18 of Annex 5.

[30] In the band 12.5-12.7 GHz in Region 1, these limits are applicable only to the territory of administrations mentioned in Nos. **5.494** and **5.496**.

[31] See Resolution **34**.

5 **(Not used.)**

6 **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[32] 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 § 4.2.3 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, 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:

-186.5 dB(W/(m^2 · 40 kHz))	for $0° \le \theta < 0.054°$
$-164.0 + 17.74 \log \theta$ dB(W/(m^2 · 40 kHz))	for $0.054° \le \theta < 2.0°$
$-165.0 + 1.66\ \theta^2$ dB(W/(m^2 · 40 kHz))	for $2.0° \le \theta < 3.59°$
$-157.5 + 25 \log \theta$ dB(W/(m^2 · 40 kHz))	for $3.59° \le \theta < 10.57°$
-131.9 dB(W/(m^2 · 40 kHz))	for $10.57° \le \theta$

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.

Using the transmission parameters of the ECHOSTAR-18 satellite, the ITU's GIBC software tool was used to assess compliance with this Section. Several networks were deemed to be affected as listed in the table immediately below. DISH will coordinate with the administrations / operators of these networks as appropriate.

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[32] Including assignments operating under No. **5.485**.

GIBC Results (Annex 1, Section 6):

ADM	Orbital Position (°W)	Network
CAN	129.0	CAN-BSS7 TT&C
UK	105.5	USAT-S1 MOD-A TT&C
UK	86.45	IOMSAT-S21-TT&C
MEX	77.0	QUETZSAT-77 TTC
B	44.9	B-SAT-3A-2 TT&C
B	61.0	B-SAT-Q

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 is considered as being affected if the proposed modification to the Region 2 Plan would result in:

– *the value of ΔT/T resulting from the proposed modification is greater than the value of ΔT/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 ΔT/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 stations can be affected and hence the ECHOSTAR-18 satellite network is compliant with this Section.

Annex 1 to Appendix 1 to Technical Annex

ECHOSTAR-18

MSPACE Results

ADM	Orbital Position (° W)	Network	Max. OEPM Degradation (dB)
UK	55.5	INTELSAT KUEXT 304.5	0.492
HOL	58.0	NSS-BSS 58W	0.341
UK	66.3	USAT-S5 MOD-A	1.294

APPENDIX 2 TO ATTACHMENT A

Analysis of ANNEX 1 of Appendix 30A

1 (SUP - WRC-2000)

2 (SUP - WRC-2000)

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**[33] (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[34] *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 results described under Section 2 of the Appendix 30 Annex 1 Analysis.

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[33] With respect to § 3 the limit specified relates to the overall equivalent protection margin calculated in accordance with § 1.12 of Annex 3.

[34] For the definition of the overall equivalent protection margin, see § 1.11 of Annex 5 to Appendix **30**.

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

Does not apply to the Region 2 Plan.

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 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 ΔT/T corresponding to 6%, where ΔT/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 analysis shows that there are no affected Region 1 or Region 3 networks.

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) (WRC-03)

Does not apply to the Region 2 Plan.