

SECTION 25.114 (c) TECHNICAL INFORMATION

SECTION 25.114 (c) INFORMATION FOR AMAZONAS-3 SPACE STATION

(1) Name, address, and telephone number of the applicant;

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17º andar
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(2) Name, address, and telephone number of the person(s), to whom inquiries or correspondence should be directed;

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Bethesda, Md. 20817
Tel: 202 467 46 00
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(3) Type of authorization requested (e.g., launch authority, station license, modification of authorization);

HISPAMAR SATÉLITES, S.A. (hereinafter HISPAMAR SATÉLITES) requests the Commission to add the AMAZONAS-3 satellite on the "Permitted Space Station List" created by the Commission in *Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic and International Satellite Service in the United States*.

The AMAZONAS-3 satellite is foreseen to be launched on 4th Q. 2012 and be operated at the 61 W.L. orbital location.

The AMAZONAS-3 satellite will be a replacement of the AMAZONAS-1 satellite, located in the same orbital location. The AMAZONAS-3 will keep the same C and Ku frequency bands and will add Ka frequency band.

Once AMAZONAS-3 will be fully in operation, Amazonas-1 is planned to be relocated into another orbital slot yet to be decided or utilized as a back-up satellite for Amazonas-3. The definitive plan will be informed to the Commission as soon as the decision is made concerning this matter.

(4) (i) Radio frequencies and polarization plan (including beacon, telemetry and telecommand functions); center frequency and polarization of transponders (both receiving and transmitting frequencies);

The receive and transmit center frequencies and polarizations of the AMAZONAS-3 transponders which will provide service to America in C, Ku and Ka bands are shown in Figures 1, 2, 3a, 3b and Tables 1, 4 and 7.

In general, the AMAZONAS-3 satellite will use the 28.1-29.5 GHz, 29.5-30.0 GHz, 18.3-19.7 GHz and 19.7-20.2 GHz segments of the Ka band. However, over the USA territory, the Amazonas-3 satellite will operate in the frequency ranges 28.1 – 28.6 GHz and 29.5 – 30.0 GHz for Earth-to-space transmission and 18.3 – 18.8 GHz and 19.7 – 20.2 GHz for space-to-Earth transmission. Therefore, Hispamar seeks authority to use spectrum in the 28.1-28.6 GHz, 29.5-30.0 GHz, 18.3-18.8 GHz and 19.7-20.2 GHz ranges, to support operations for AMAZONAS-3, seeking authority to use spectrum in the 28.1-28.35 GHz band to support gateway uplink operations on a secondary basis¹, noting that the Commission has previously authorize secondary gateway operations in this band, and has recognized that such operations may coexist with primary LMDS operations².

C Band

The bandwidth of each transponder is given in Table 1.

Polarization V and H are orthogonal linear polarizations and are defined as follows:

- Horizontal polarization (H) is defined as being parallel to the equatorial plane.
- Vertical polarization (V) is orthogonal to that of polarization H

The total number of operating C-band transponders in the Amazonas-3 satellite is 19 (all of them could provide service to America), which can be selected by ground command.

The following frequency and polarization will be used for the beacon functions:

4199.75 MHz horizontal polarization.

Ku Band

The bandwidth of each transponder is given in Table 4.

Polarization V and H are orthogonal linear polarizations and are defined as follows:

- Horizontal polarization (H) is defined as being parallel to the equatorial plane.

¹ See Rulemaking to Amend Parts 1, 2, 21 and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Bands, To Reallocate the 29.5-30.0 GHz Frequency Band, To Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, 12 FCC Rcd 12545, at ¶ 45 (1998) ("At 27.5-28.35 GHz we designate 850 MHz for LMDS on a primary basis. GSO/FSS....will be permitted on a non-interference basisfor the purpose of providing limited gateways-type services.").

² See Teledesic Corporation, 14 FCC Rcd 2261, at ¶ 19 (1999) (recognizing that in granting space station authority in the LMDS band, issues regarding how earth stations would successfully operate on a secondary, non-interference basis should be resolved as part of future earth station applications).
See Teledesic Corporation, 12 FCC Rcd 3154. at ¶ 19 (1997).

- Vertical polarization (V) is orthogonal to that of polarization H

The total number of operating Ku-band transponders in the Amazonas-3 satellite is 33 (as a maximum 16 of them could provide service to USA), which can be selected individually by ground command.

The following frequencies and polarizations will be used for the telecommand and telemetry and beacon functions from Rio de Janeiro:

TM/Ranging 1: 11.70025 MHz horizontal polarization.
 TM/Ranging 2: 12.1995 MHz vertical polarization.
 TC 1: 14001.5 MHz, horizontal polarization.
 TC 2: 14494 MHz, horizontal polarization.

Ka Band

The bandwidth of each transponder is given in Table 7.

Polarization LHCP and RHCP are orthogonal circular polarizations and are defined as follows:

- RHCP: Right Hand Circular Polarization. The electric field vector, observed in any fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a right hand or clockwise direction.
- LHCP: Left Hand Circular Polarization. The electric field vector, observed in any fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a left hand or counter clockwise direction.

The total number of operating Ka-band transponders in the Amazonas-3 satellite is 13 (as a maximum of 4 of them can provide service to USA), which can be selected by ground command.

The following frequency and polarization will be used for the beacon function:

TM/Ranging 1: 20.1995 GHz RHCP polarization.

Hispamar request a partial waiver of Section 25.210 (a) of the Commission's rules for the C band and a partial waiver of Sections 25.210 (a) and (b) of the Commission's rules for the Ka band that requires all space stations in the Fixed-Satellite Service (FSS) to be capable of switching polarization sense upon ground command. As it has been indicated above, Amazonas-3 will use both senses of orthogonal polarization in the C, Ku and Ka bands, employing state-of-the-art full frequency reuse through the use of orthogonal polarizations within the same beam and through the use of spatially independent beams for the Ka band, fulfilling sections 25.210(d) and 25.210(f) and consequently, this requirement could not be met. Therefore, Hispamar respectfully requests that the Commission waive the sections 25.210(a) and (b).

(ii) Emission designators and allocated bandwidth of emission; final amplifier output power (identify any net losses between output of final

amplifier and input of antenna and specify the maximum EIRP for each antenna beam),

C Band

Emission designators: 14K0G7W-- to 54M0G7X--
Allocated bandwidth: 14 KHz to 54 MHz

Final amplifier output power AMERICA beam: 15.7 dBW (net losses between output of final amplifier and input of antenna: 1.5 dB)

Maximum EIRP at saturation in each transmit beam:

- AMERICA transmit beam:41 dBW

Ku Band

Emission designators: 14K0G7W-- to 54M0G7X--
Allocated bandwidth: 14 KHz to 54 MHz

Final amplifier output power NORTH AMERICA beam: 18.1 dBW (net losses between output of final amplifier and input of antenna: 1.9 dB)

Maximum EIRP at saturation in each transmit beam:

- NORTH AMERICA transmit beam:48 dBW

Ka Band

Emission designators: 1M00G7W-- to 450M0G7X--
Allocated bandwidth: 1 MHz to 450 MHz

Final amplifier output power SPOT beams: 17 dBW (net losses between output of final amplifier and input of antenna: 2.5 dB)

Maximum EIRP at saturation in each transmit beam:

- SPOT BEAMS transmit beam:65 dBW

(iii) Identification of which antenna beams are connected or switchable to each transponder and TT&C function,

C Band

The AMAZONAS-3 satellite uses for the C-Band payload a fixed receive beam over the Americas and a fixed transmit beam over the Americas for the Fixed Satellite Service.

The C-Band coverage zone is:

- South America and North America.

Figure 1 and Table 1 show which receive beam and transmit beam can be connected to each transponder.

Ku Band

The AMAZONAS-3 satellite uses for the Ku-Band payload 4 fixed receive beams over North America, South America, Brazil and Europe and 4 fixed transmit beams over North America, South America, Brazil and Europe for the Fixed Satellite Service.

The Ku-Band coverage zone is:

- South America
- North America
- Brazil
- Part of Europe.

Figure 2 and Table 4 show which receive beam and transmit beam can be connected to each transponder.

Ka Band

The AMAZONAS-3 includes several spot beams in Ka band over the main cities of South America: Sao Paulo, Rio de Janeiro, Buenos Aires, Santiago de Chile, Piura (Peru), Bogota, Brasilia, Mexico DF, and three gateways: Gateway 1 is defined as Laredo (USA), Gateway 2 is defined as Tucson and Gilbert (USA) and Gateway 3 as Arica (Chile).

The Ka-Band coverage zone is:

- The cities of South America and North America referenced in the paragraph above.

Figures 3a, 3b and Table 7 show which receive beam and transmit beam can be connected to each transponder.

(iv) Receiving system noise temperature,

- 446K for AMERICA, receive antenna in C band.
- 428K for NORTH AMERICA, receive antenna in Ku band.
- 2570K for the spots, receive antennas in Ka band.

(v) Relationship between satellite receive antenna gain pattern and gain-to-temperature ratio and saturation flux density for each antenna beam (may be indicated on antenna gain plot),

C Band

The G/T beam peak for the AMERICAN receive beam is -1 dB/K.

Saturation flux density for AMERICAN receive beam is:

$-(77.0 + X) \text{ dBW/m}^2$ at maximum minimum gain setting (see 4 (vi) below)

$-(97.0 + X)$ dBW/m² at minimum gain setting (see 4 (vi) below)

where X is the G/T value in the direction considered

Ku Band

The G/T beam peak for the NORTH AMERICA receive beam is 4.7 dB/K.

Saturation flux density for NORTH AMERICA receive beam is:

$-(74.0 + X)$ dBW/m² at maximum minimum gain setting (see 4 (vi) below)

$-(94.0 + X)$ dBW/m² at minimum gain setting (see 4 (vi) below)

where X is the G/T value in the direction considered

Ka Band

The G/T beam peak for the SPOT receive beams is 18 dB/K.

Saturation flux density for SPOT receive beams is:

$-(75.0 + X)$ dBW/m² at maximum minimum gain setting (see 4 (vi) below)

$-(95.0 + X)$ dBW/m² at minimum gain setting (see 4 (vi) below)

where X is the G/T value in the direction considered

(vi) Gain of each transponder channel (between output of receiving antenna and input of transmitting antenna) including any adjustable gain step capabilities,

C Band

The gain of each transponder channel, between output of receiving antenna and input of transmitting antenna, will be adjustable by lower than 0.5 dB between a minimum gain of 104.2 dB and a maximum gain of 124.2 dB for AMERICA – AMERICA receive-transmit connectivity.

Ku Band

The gain of each transponder channel, between output of receiving antenna and input of transmitting antenna, will be adjustable by lower than 1 dB between a minimum gain of 107.1 dB and a maximum gain of 127.1 dB for NORTH AMERICA – NORTH AMERICA receive-transmit connectivity.

Ka Band

The gain of each transponder channel, between output of receiving antenna and input of transmitting antenna, will be adjustable by lower than 0.5 dB between a minimum gain of 93.4 dB and a maximum gain of 113.4 dB for SPOT – SPOT receive-transmit connectivity.

(vii) Predicted receiver and transmitted channel filter response characteristics;

Channel filter response characteristics are described in tables 2, 3, 5, 6, 8, 9.

(5) For satellites in geostationary-satellite orbit,

(i) Orbital location, or locations if alternatives are proposed, requested for the satellite,

The AMAZONAS-3 satellite will be operated at the 61°W.L. orbital location.

(ii) The factors that support the orbital assignment or assignments proposed in paragraph (c)(5)(i) of this section,

This position was granted by the Administration of Brazil. Operation has been coordinated with United States.

(iii) Longitudinal tolerance or east-west station-keeping capability;

The AMAZONAS-3 satellite will be maintained at 61° W.L. with an accuracy of +/-0.05 degree.

(iv) Inclination incursion or north-south station-keeping capability.

Its orbital inclination will be maintained within +/- 0.07 degree.

(6) For satellites in non-geostationary-satellite orbit,

- (i) The number of space stations and applicable information relating to the number of orbital planes,**
- (ii) The inclination of the orbital plane(s),**
- (iii) The orbital period,**
- (iv) The apogee,**
- (v) The perigee,**
- (vi) The argument(s) of perigee,**
- (vii) Active service arc(s), and**
- (viii) Right ascension of the ascending node(s).**

(N/A)

(7) For satellite in geostationary-satellite orbit, accuracy with which the orbital inclination, the antenna axis attitude, and longitudinal drift will be maintained;

The AMAZONAS-3 satellite will be maintained at 61° W.L. with an accuracy of +/-0.05 degree. Its orbital inclination will be maintained within +/- 0.05 degree.

Antenna axis stability: 0.05 degree for C and Ku bands and 0.1 for Ka band.

- (8) Calculation of power flux density levels within each coverage area and of the energy dispersal, if any, needed for compliance with Sec.25.208;**

C Band

In all the C downlink frequency range, the power flux density at the Earth's surface produced by emissions from a space station for all conditions and for all methods will not exceed -159.7 dBW/m^2 4 KHz over the US territory and all the Americas:

$-59.0 \text{ dBW/Hz max psd} + 25.3 \text{ (max gain dBi)} - 162 \text{ spreading losses (dB)}$ (worst case).

Ku Band

In all the Ku downlink frequency range, the power flux density at the Earth's surface produced by emissions from a space station for all conditions and for all methods will not exceed -132.5 dBW/m^2 1 MHz over the US territory and all the Americas:

$-60.4 \text{ dBW/Hz max psd} + 29.9 \text{ (max gain dBi)} - 162 \text{ spreading losses (dB)}$ (worst case).

Ka Band

In all the Ka downlink frequency range, the power flux density at the Earth's surface produced by emissions from a space station for all conditions and for all methods will not exceed -123.5 dBW/m^2 1 MHz over the US territory and all the Americas:

$-69.5 \text{ dBW/Hz max psd} + 48 \text{ (max gain dBi)} - 162 \text{ spreading losses (dB)}$ (worst case).

- (9) Arrangement for tracking, telemetry and control;**

TTC functions are performed at Rio de Janeiro, Brazil (Longitude -43.28°W , Latitude -22.88°N)

- (10) Physical characteristics of the space station including weight and dimensions of spacecraft, detailed mass (on ground and in-orbit) and power (beginning and end of life) budgets, and estimated operational lifetime and reliability of the space station and the basis for that estimate;**

Physical characteristics of the AMAZONAS-3 satellite:

Dimensions	Deployed:	8.11m x 8.82m x 26m
Mass	on ground	2778 Kg
	at launch	6254Kg

Power	beginning of life	17.5 Kw (Equinox)
	end of life	15.9 Kw (Equinox)
Estimated operational lifetime		15 years
Reliability		0.75 for 15 years

- (11) Clear and detailed statement of whether the space station is to be operated on a common carrier basis, or whether non-common carrier transactions are proposed. If non-common carrier transactions are proposed, describe the nature of the transactions and specify the number of transponders to be offered on a non-common carrier basis;**

The AMAZONAS-3 satellite will be operated on a non-common carrier basis and all the transponders will be available for use on a non-common carrier basis. HISPAMAR leases capacity pursuant to commercial contracts.

It is not HISPAMAR's customary practice to hold itself out as a common carrier for hire, and HISPAMAR does not intend to make capacity available on a common carrier basis.

- (12) Dates by which construction will be commenced and completed, launch date, and estimated date of placement into service;**

The AMAZONAS-3 construction was commenced on 3rd Quarter 2010. The AMAZONAS-3 satellite is foreseen to be launched at the end of 2012, and its foreseen date of placement into service will be on March 2013.

- (13) The polarization information specified in §§25.210(a)(1), (a)(3), and (i), to the extent applicable.**

Polarization V and H (used in C and Ku bands) are orthogonal linear polarizations and are defined as follows:

- Horizontal polarization (H) is defined as being parallel to the equatorial plane.
- Vertical polarization (V) is orthogonal to that of polarization H

Polarization LHCP and RHCP (used in Ka band) are orthogonal circular polarizations and are defined as follows:

- RHCP: Right Hand Circular Polarization. The electric field vector, observed in any fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a right hand or clockwise direction.
- LHCP: Left Hand Circular Polarization. The electric field vector, observed in any fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a left hand or counter clockwise direction.

As stated above, Hispamar request a partial waiver of Section 25.210 (a) of the Commissions' rules for the C band and a partial waiver of Sections 25.210 (a) and (b) of the Commissions' rules for the Ka band that requires all space stations in the Fixed-Satellite Service (FSS) to be capable of switching polarization sense upon ground command. Amazonas-3 will use both senses of orthogonal polarization in the C, Ku and Ka bands and therefore this requirement could not be met. Therefore, Hispamar respectfully requests that the Commission waive the sections 25.210(a) and (b).

The cross-polarization isolation performance of the AMAZONAS-3 antennas are given in Schedule S and are better than 30 dB required by Section 25.210(i) for the primary coverage areas of the satellite except for the Ka band antennas. The cross-polarization isolation performance for the AMAZONAS-3 satellite in the Ka band is 26 dB. Such cross-polarization isolation performance level will have a negligible impact on adjacent satellites³ and have been taken into account in the link budgets and interference analysis. Hispamar respectfully requests a waiver of Section 25.210(i) for Amazonas-3 for the Ka band.

³ See, e.g. *Viasat-1 Satellite Grant File No SAT-LOA-20110722-00132 (March 19, 2008)* and *EchoStar Satellite Operating Corporation, Application for Authority to Operate the EchoStar 9 Satellite in the Lower 500 MHz Portion of the Ka-band Frequencies at the 121° W.L. Orbital Location*, Files Nos. SAT-MOD-2006830-00092, SAT-STA-20050608-00116, Order Authorization, DA 06-2590 ¶¶7-8 (rel. Dec. 22, 2006).

ANNEX
(Tables and Figures)

C Band

TRANSPONDER	BW(MHZ)	FREQUENCY (MHz)		POLARIZATION		COVERAGE	
		UPLINK	DOWNLINK	UPLINK	DOWNLINK	UPLINK	DOWNLINK
1	54	5886	3661	H	V	AMERICA	AMERICA
2	54	5947	3722	H	V	AMERICA	AMERICA
3	54	6008	3783	H	V	AMERICA	AMERICA
4	54	6069	3844	H	V	AMERICA	AMERICA
5	54	6130	3905	H	V	AMERICA	AMERICA
6	54	6191	3966	H	V	AMERICA	AMERICA
7	54	6252	4027	H	V	AMERICA	AMERICA
8	54	6313	4088	H	V	AMERICA	AMERICA
9	36	6365	4140	H	V	AMERICA	AMERICA
10	36	6405	4180	H	V	AMERICA	AMERICA
11	54	5877	3652	V	H	AMERICA	AMERICA
12	54	5938	3713	V	H	AMERICA	AMERICA
13	54	5999	3774	V	H	AMERICA	AMERICA
14	54	6060	3835	V	H	AMERICA	AMERICA
15	54	6121	3896	V	H	AMERICA	AMERICA
16	54	6195	3970	V	H	AMERICA	AMERICA
17	54	6256	4031	V	H	AMERICA	AMERICA
18	54	6317	4092	V	H	AMERICA	AMERICA
19	54	6378	4153	V	H	AMERICA	AMERICA

Table 1.- AMAZONAS-3 C-band Frequency Plan Definition.

% OF CHANNEL BANDWIDTH		55%	85%	90%	100%
INPUT SECTION GAIN FLATNESS	dBpp	0.65	0.7	1.2	2.3
TOTAL GAIN FLATNESS	dBpp	0.85	1.3	2.4	4.6
INPUT SECTION GAIN SLOPE	dB/MHz	0.15	0.2	0.5	1.3
TOTAL GAIN SLOPE	dB/MHz	0.25	0.4	1.0	2.9

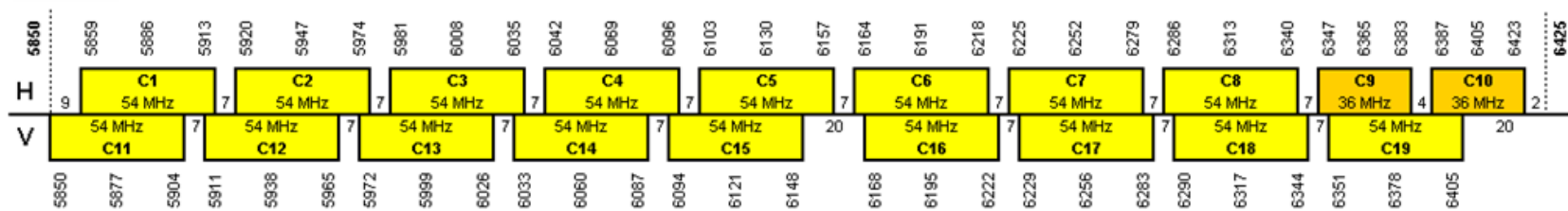
Table 2.- Amplitude in C-band response

Frequency Spacing from Fc ($\pm$ MHz)	BW·0.61	BW·0.83	BW·1.25
Input Demultiplexer (dB)	18	35	40
Output Multiplexer (dB) (contiguous channels)	11	25	30
Output Multiplexer (dB) (non contiguous channels)	5	20	27
Overall Out of Band Response(dB)	11	25	30

NOTES: BW means transponder bandwidth

Table 3.- Minimum out of band rejection (dB) for C band

UPLINK



2225 MHz

DOWNLINK

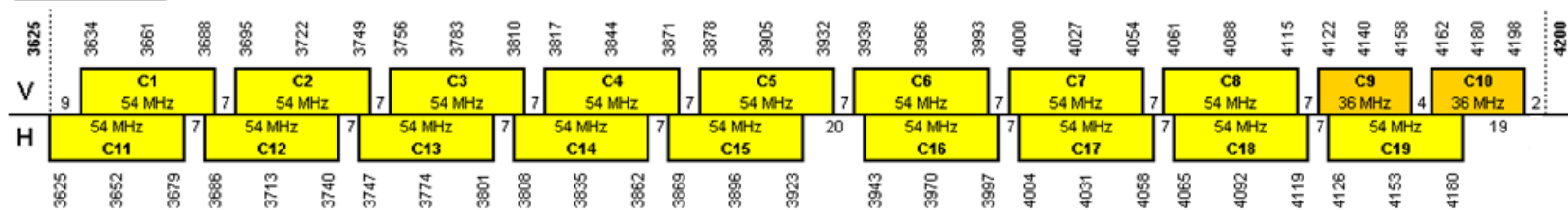


Figure 1.- AMAZONAS-3 C-Band Frequency Plan

Ku Band

TRANSPONDER	BW(MHZ)	FREQUENCY (MHz)		POLARIZATION		COVERAGE	
		UPLINK	DOWNLINK	UPLINK	DOWNLINK	UPLINK	DOWNLINK
93	36	13772	11972	H	V	NA/SA	NA/SA
94	36	13812	12012	H	V	NA/SA	NA/SA
95	36	13852	12052	H	V	NA/SA	NA/SA
96	36	13892	12092	H	V	NA/SA	NA/SA
97	36	13932	12132	H	V	NA/SA	NA/SA
98	36	13972	12172	H	V	NA/SA	NA/SA
99	36	13772	11972	V	H	NA/SA	NA/SA
100	36	13812	12012	V	H	NA/SA	NA/SA
101	36	13852	12052	V	H	NA/SA	NA/SA
102	36	13892	12092	V	H	NA/SA	NA/SA
103	36	13932	12132	V	H	NA/SA	NA/SA
104	36	13972	12172	V	H	NA/SA	NA/SA
105	54	14034	11738	H	V	BR/NA/SA	BR/NA/SA
106	54	14095	11799	H	V	BR/NA/SA	BR/NA/SA
109	54	14034	11738	V	H	BR/NA/SA	BR/NA/SA
110	54	14095	11799	V	H	BR/NA/SA	BR/NA/SA

NOTES: BR = Brazil / NA = North America / SA = South America

Table 4.- AMAZONAS-3 Ku-band Frequency Plan Definition. Transponders from/to USA.

% OF CHANNEL BANDWIDTH		55%	85%	90%	100%
INPUT SECTION GAIN FLATNESS	dBpp	0.65	0.7	1.2	2.3
TOTAL GAIN FLATNESS	dBpp	0.85	1.3	2.4	4.6
INPUT SECTION GAIN SLOPE	dB/MHz	0.15	0.2	0.5	1.3
TOTAL GAIN SLOPE	dB/MHz	0.25	0.4	1.0	2.9

Table 5.- Amplitude in Ku-band response

Frequency Spacing from Fc ($\pm$ MHz)	BW·0.61	BW·0.83	BW·1.25	TM/Beacon
Input Demultiplexer (dB)	18	35	40	>25
Output Multiplexer (dB) (contiguous channels)	11	25	30	>25
Output Multiplexer (dB) (non contiguous channels)	5	20	27	>25
Overall Out of Band Response(dB)	11	25	30	>25

NOTES: BW means transponder bandwidth

Table 6.- Minimum out of band rejection (dB) for Ku band

UPLINK

AMERICA

NA/SA

BRAZIL/NA/SA

BRAZIL

EUROPA

DOWNLINK

AMERICA

LO: 3296 MHz

BRAZIL

BRAZIL/NA/SA

BRAZIL

NA/SA

EUROPA

LO: 1249,7 MHz

18

Ka Band

TRANSPONDER	BW(MHZ)	FREQUENCY (MHz)		POLARIZATION		COVERAGE	
		UPLINK	DOWNLINK	UPLINK	DOWNLINK	UPLINK	DOWNLINK
1	450	28350	19950	RHCP	RHCP	Laredo USA	Mexico MEX
2	450	28350	19950	LHCP	LHCP	Laredo USA	Mexico MEX
3	450	29750	19950	RHCP	RHCP	Laredo USA	B. Aires ARG
4	450	29750	19950	LHCP	LHCP	Laredo USA	Rio BR
5	450	28350	19950	RHCP	RHCP	Tucson USA/Arica CHL	Sao Paulo BR
6	450	28350	19950	LHCP	LHCP	Tucson USA/Arica CHL	Santiago CHL
7	450	29750	19950	RHCP	RHCP	Tucson USA/Arica CHL	Bogota CLM
8	450	29750	19950	LHCP	RHCP	Tucson USA/Arica CHL	Lima PRU
9	450	29750	18550	LHCP	LHCP	Mexico MEX	Laredo USA
10	450	29750	18550	RHCP	RHCP	Mexico MEX	Laredo USA
11	450	29750	19950	LHCP	LHCP	B. Aires ARG	Laredo USA
12	450	29750	19950	RHCP	RHCP	Rio BR	Laredo USA
13	450	29750	18550	LHCP	LHCP	Sao Paulo BR	Tucson USA/Arica CHL
14	450	29750	18550	RHCP	RHCP	Santiago CHL	Tucson USA/Arica CHL
15	450	29750	19950	LHCP	LHCP	Bogota CLM	Tucson USA/Arica CHL
16	450	29750	19950	LHCP	RHCP	Lima PRU	Tucson USA/Arica CHL

NOTES: BR = Brazil / MEX = Mexico / ARG = Argentina / CHL = Chile / CLM = Colombia / PRU = Peru

Table 7.- AMAZONAS-3 Ka-band Frequency Plan Definition. Transponders from/to USA .

% OF CHANNEL BANDWIDTH		55%	85%	90%	100%
INPUT SECTION GAIN FLATNESS	dBpp	0.65	0.7	1.2	2.3
TOTAL GAIN FLATNESS	dBpp	0.85	1.3	2.4	4.6
INPUT SECTION GAIN SLOPE	dB/MHz	0.15	0.2	0.5	1.3
TOTAL GAIN SLOPE	dB/MHz	0.25	0.4	1.0	2.9

Table 8.- Amplitude in Ka-band response

Frequency Spacing from Fc ($\pm$ MHz)	BW·0.61	BW·0.83	BW·1.25	TM/Beacon
Input Demultiplexer (dB)	18	35	40	>25
Output Multiplexer (dB) (contiguous channels)	11	25	30	>25
Output Multiplexer (dB) (non contiguous channels)	5	20	27	>25
Overall Out of Band Response(dB)	23	50	65	>25

NOTES: BW means transponder bandwidth

Table 9.- Minimum out of band rejection (dB) for Ka band

FORWARD

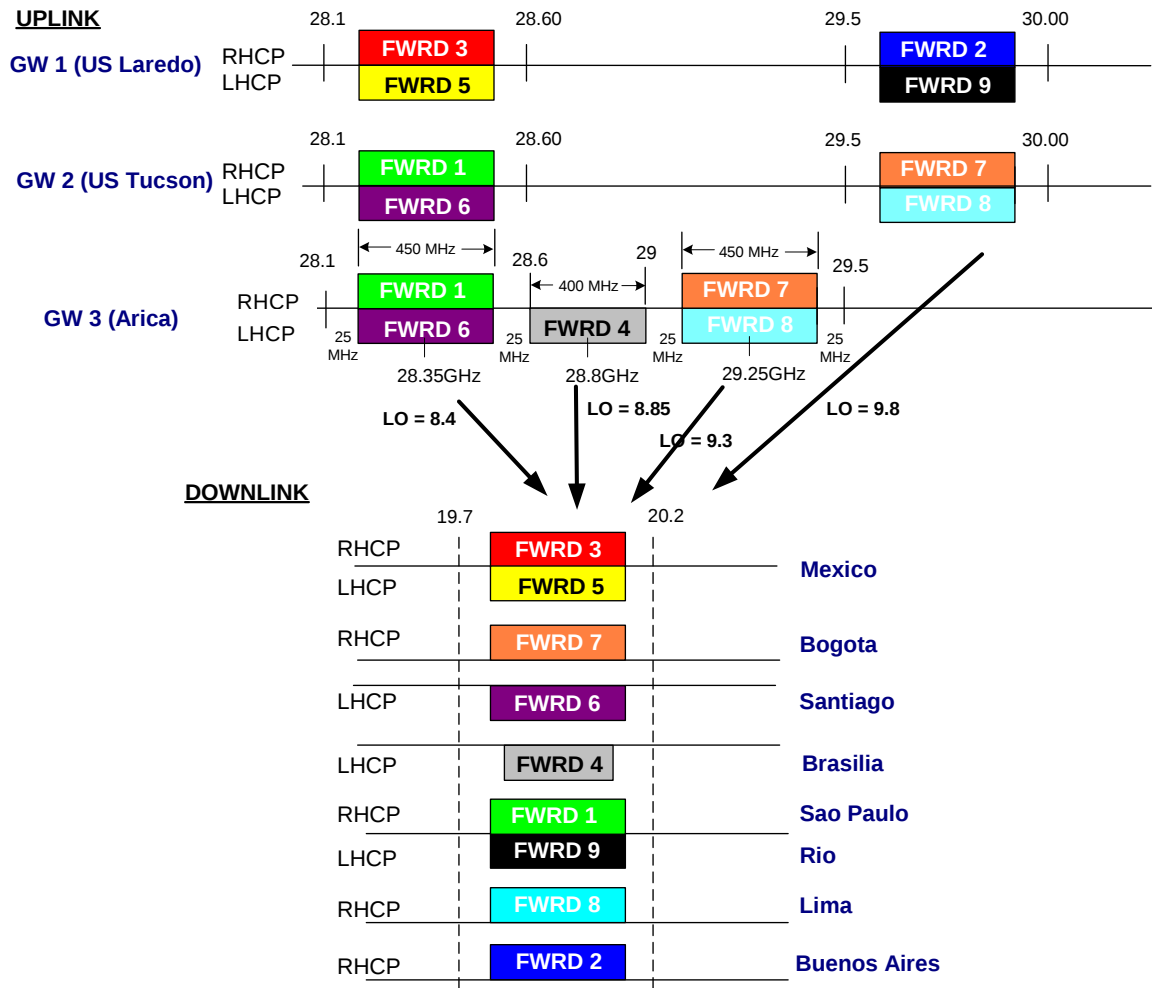


Figure 3.a- AMAZONAS-3 Ka-Band Forward Frequency Plan.

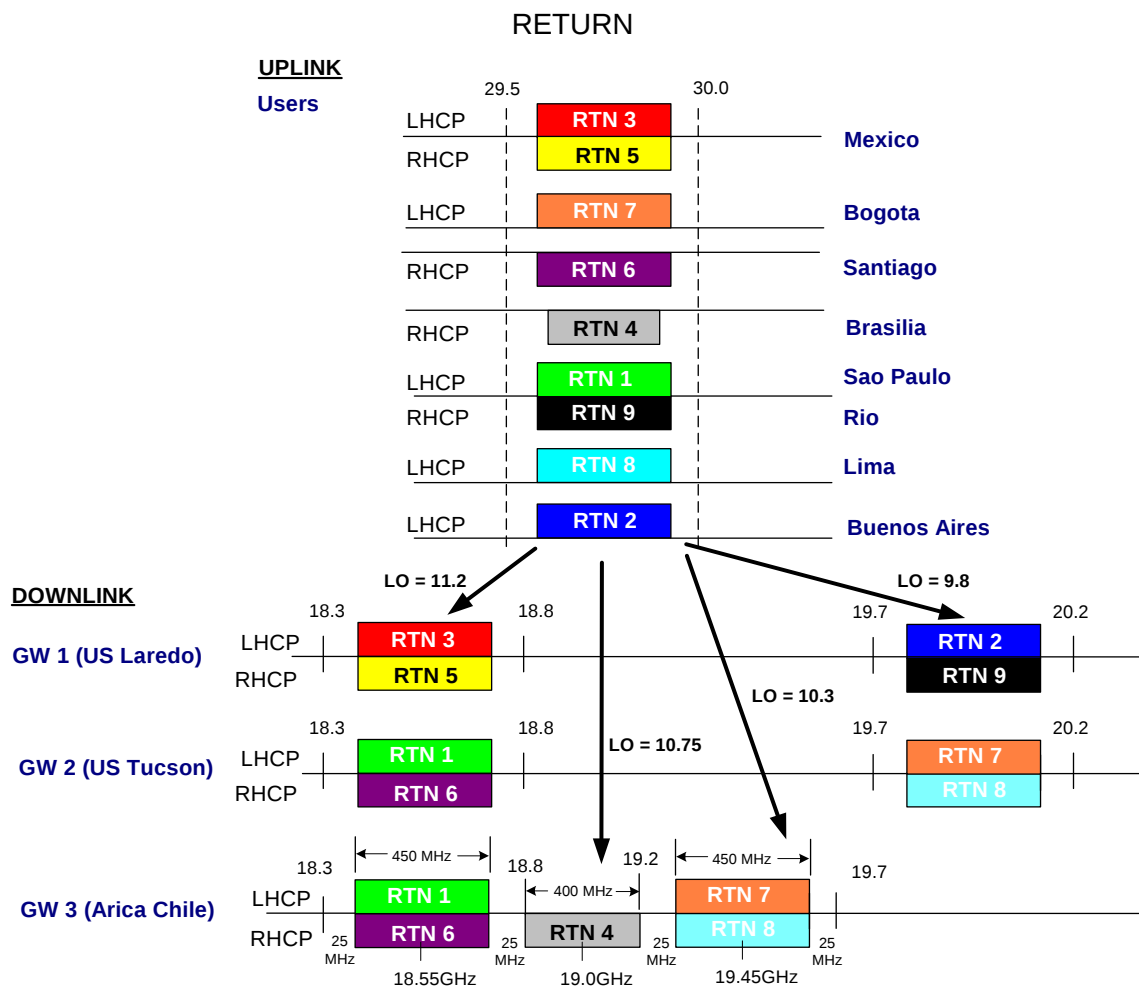


Figure 3.b- AMAZONAS-3 Ka-Band Return Frequency Plan.