



312 File Number: **SATLOA2017030100028**

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## Filing Description

| Question    | Response  |
|-------------|---|
| Description | The Boeing Company requests authority to launch and operate a non-geostationary satellite orbit ("NGSO") fixed satellite service ("FSS") operating in the 37.5-42.0 GHz (space-to-Earth), and the 47.2-50.2 and 50.4-51.4 GHz (Earth-to-space) bands. |

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**Satellite  
Information**

| Question   | Response                |
|--|-------------------------|
| Select Orbit Type  | NGSO                    |
| Space Station or Satellite Network Name                      | V-band<br>Constellation |
| Estimated Lifetime of Satellite(s) From Date of Launch       | 10 Years                |
| Will the space station(s) operate on a Common Carrier basis? | No                      |

## Operating Frequency Bands (3)

| Nature of service              | Description | Frequency Band(s)        | Mode Type |
|--------------------------------|-------------|--------------------------|-----------|
| <b>Fixed-Satellite Service</b> |             | 47200.0 MHz -50200.0 MHz | Receive   |
| <b>Fixed-Satellite Service</b> |             | 50400.0 MHz -51400.0 MHz | Receive   |
| <b>Fixed-Satellite Service</b> |             | 37500.0 MHz -42000.0 MHz | Transmit  |

**Orbital  
Information For  
Non-  
Geostationary  
Satellites**

| Question   | Response   |
|--|------------|
| Total Number of Satellites in the active constellation | 147        |
| Orbit Epoch Date                                       | 01/01/2018 |
| Celestial Reference Body                               | Earth      |

## Orbital Plane 1:

| Question  | Response       |
|---|----------------|
| Number of Satellites in Plane                                 | 12             |
| Inclination Angle   | 54.0 degrees   |
| Right Ascension of Ascending Node                             | 32.7 degrees   |
| Argument of Perigee   | 0.0 degrees    |
| Orbital Period  | 6379.1 seconds |
| Apogee  | 1056.0 km      |
| Perigee   | 1056.0 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees    |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees  |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 330.0  |
| 2                | 300.0  |
| 3                | 270.0  |
| 4                | 240.0  |
| 5                | 210.0  |
| 6                | 180.0  |
| 7                | 150.0  |
| 8                | 120.0  |
| 9                | 90.0   |
| 10               | 60.0   |
| 11               | 30.0   |
| 12               | 0.0  |

## Orbital Plane 2:

| Question  | Response       |
|---|----------------|
| Number of Satellites in Plane                                 | 12             |
| Inclination Angle   | 54.0 degrees   |
| Right Ascension of Ascending Node                             | 65.5 degrees   |
| Argument of Perigee   | 0.0 degrees    |
| Orbital Period  | 6379.1 seconds |
| Apogee  | 1056.0 km      |
| Perigee   | 1056.0 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees    |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees  |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 330.0  |
| 2                | 300.0  |
| 3                | 270.0  |
| 4                | 240.0  |
| 5                | 210.0  |
| 6                | 180.0  |
| 7                | 150.0  |
| 8                | 120.0  |
| 9                | 90.0   |
| 10               | 60.0   |
| 11               | 30.0   |
| 12               | 0.0  |

## Orbital Plane 3:

| Question  | Response       |
|---|----------------|
| Number of Satellites in Plane                                 | 12             |
| Inclination Angle   | 54.0 degrees   |
| Right Ascension of Ascending Node                             | 98.2 degrees   |
| Argument of Perigee   | 0.0 degrees    |
| Orbital Period  | 6379.1 seconds |
| Apogee  | 1056.0 km      |
| Perigee   | 1056.0 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees    |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees  |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 330.0  |
| 2                | 300.0  |
| 3                | 270.0  |
| 4                | 240.0  |
| 5                | 210.0  |
| 6                | 180.0  |
| 7                | 150.0  |
| 8                | 120.0  |
| 9                | 90.0   |
| 10               | 60.0   |
| 11               | 30.0   |
| 12               | 0.0  |

**Orbital Plane 4:**

| Question  | Response       |
|---|----------------|
| Number of Satellites in Plane                                 | 12             |
| Inclination Angle   | 54.0 degrees   |
| Right Ascension of Ascending Node                             | 130.9 degrees  |
| Argument of Perigee   | 0.0 degrees    |
| Orbital Period  | 6379.1 seconds |
| Apogee  | 1056.0 km      |
| Perigee   | 1056.0 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees    |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees  |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 330.0  |
| 2                | 300.0  |
| 3                | 270.0  |
| 4                | 240.0  |
| 5                | 210.0  |
| 6                | 180.0  |
| 7                | 150.0  |
| 8                | 120.0  |
| 9                | 90.0   |
| 10               | 60.0   |
| 11               | 30.0   |
| 12               | 0.0  |

**Orbital Plane 5:**



| Question  | Response       |
|---|----------------|
| Number of Satellites in Plane                                 | 12             |
| Inclination Angle   | 54.0 degrees   |
| Right Ascension of Ascending Node                             | 163.6 degrees  |
| Argument of Perigee   | 0.0 degrees    |
| Orbital Period  | 6379.1 seconds |
| Apogee  | 1056.0 km      |
| Perigee   | 1056.0 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees    |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees  |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 330.0  |
| 2                | 300.0  |
| 3                | 270.0  |
| 4                | 240.0  |
| 5                | 210.0  |
| 6                | 180.0  |
| 7                | 150.0  |
| 8                | 120.0  |
| 9                | 90.0   |
| 10               | 60.0   |
| 11               | 30.0   |
| 12               | 0.0  |

**Orbital Plane 6:**

| Question  | Response       |
|---|----------------|
| Number of Satellites in Plane                                 | 12             |
| Inclination Angle   | 54.0 degrees   |
| Right Ascension of Ascending Node                             | 196.4 degrees  |
| Argument of Perigee   | 0.0 degrees    |
| Orbital Period  | 6379.1 seconds |
| Apogee  | 1056.0 km      |
| Perigee   | 1056.0 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees    |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees  |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 330.0  |
| 2                | 300.0  |
| 3                | 270.0  |
| 4                | 240.0  |
| 5                | 210.0  |
| 6                | 180.0  |
| 7                | 150.0  |
| 8                | 120.0  |
| 9                | 90.0   |
| 10               | 60.0   |
| 11               | 30.0   |
| 12               | 0.0  |

**Orbital Plane 7:**

| Question  | Response       |
|---|----------------|
| Number of Satellites in Plane                                 | 12             |
| Inclination Angle   | 54.0 degrees   |
| Right Ascension of Ascending Node                             | 229.1 degrees  |
| Argument of Perigee   | 0.0 degrees    |
| Orbital Period  | 6379.1 seconds |
| Apogee  | 1056.0 km      |
| Perigee   | 1056.0 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees    |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees  |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 330.0  |
| 2                | 300.0  |
| 3                | 270.0  |
| 4                | 240.0  |
| 5                | 210.0  |
| 6                | 180.0  |
| 7                | 150.0  |
| 8                | 120.0  |
| 9                | 90.0   |
| 10               | 60.0   |
| 11               | 30.0   |
| 12               | 0.0  |

**Orbital Plane 8:**

| Question  | Response       |
|---|----------------|
| Number of Satellites in Plane                                 | 12             |
| Inclination Angle   | 54.0 degrees   |
| Right Ascension of Ascending Node                             | 261.8 degrees  |
| Argument of Perigee   | 0.0 degrees    |
| Orbital Period  | 6379.1 seconds |
| Apogee  | 1056.0 km      |
| Perigee   | 1056.0 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees    |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees  |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 330.0  |
| 2                | 300.0  |
| 3                | 270.0  |
| 4                | 240.0  |
| 5                | 210.0  |
| 6                | 180.0  |
| 7                | 150.0  |
| 8                | 120.0  |
| 9                | 90.0   |
| 10               | 60.0   |
| 11               | 30.0   |
| 12               | 0.0  |

**Orbital Plane 9:**

| Question  | Response       |
|---|----------------|
| Number of Satellites in Plane                                 | 12             |
| Inclination Angle   | 54.0 degrees   |
| Right Ascension of Ascending Node                             | 294.5 degrees  |
| Argument of Perigee   | 0.0 degrees    |
| Orbital Period  | 6379.1 seconds |
| Apogee  | 1056.0 km      |
| Perigee   | 1056.0 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees    |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees  |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 330.0  |
| 2                | 300.0  |
| 3                | 270.0  |
| 4                | 240.0  |
| 5                | 210.0  |
| 6                | 180.0  |
| 7                | 150.0  |
| 8                | 120.0  |
| 9                | 90.0   |
| 10               | 60.0   |
| 11               | 30.0   |
| 12               | 0.0  |

**Orbital Plane 10:**

| Question  | Response       |
|---|----------------|
| Number of Satellites in Plane                                 | 12             |
| Inclination Angle   | 54.0 degrees   |
| Right Ascension of Ascending Node                             | 327.3 degrees  |
| Argument of Perigee   | 0.0 degrees    |
| Orbital Period  | 6379.1 seconds |
| Apogee  | 1056.0 km      |
| Perigee   | 1056.0 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees    |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees  |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 330.0  |
| 2                | 300.0  |
| 3                | 270.0  |
| 4                | 240.0  |
| 5                | 210.0  |
| 6                | 180.0  |
| 7                | 150.0  |
| 8                | 120.0  |
| 9                | 90.0   |
| 10               | 60.0   |
| 11               | 30.0   |
| 12               | 0.0  |

**Orbital Plane 11:**

| Question  | Response       |
|---|----------------|
| Number of Satellites in Plane                                 | 12             |
| Inclination Angle   | 54.0 degrees   |
| Right Ascension of Ascending Node                             | 0.0 degrees    |
| Argument of Perigee   | 0.0 degrees    |
| Orbital Period  | 6379.1 seconds |
| Apogee  | 1056.0 km      |
| Perigee   | 1056.0 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees    |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees  |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 0.0  |
| 2                | 30.0   |
| 3                | 60.0   |
| 4                | 90.0   |
| 5                | 120.0  |
| 6                | 150.0  |
| 7                | 180.0  |
| 8                | 210.0  |
| 9                | 240.0  |
| 10               | 270.0  |
| 11               | 300.0  |
| 12               | 330.0  |

**Orbital Plane 12:**

| Question  | Response        |
|---|-----------------|
| Number of Satellites in Plane                                 | 2               |
| Inclination Angle   | 63.4 degrees    |
| Right Ascension of Ascending Node                             | 205.4 degrees   |
| Argument of Perigee   | 180.0 degrees   |
| Orbital Period  | 86170.5 seconds |
| Apogee  | 44221.4 km      |
| Perigee   | 27354.9 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees     |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees   |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 201.1  |
| 2                | 0.1  |

### Orbital Plane 13:

| Question                          | Response        |
|-----------------------------------|-----------------|
| Number of Satellites in Plane     | 2               |
| Inclination Angle                 | 63.4 degrees    |
| Right Ascension of Ascending Node | 133.4 degrees   |
| Argument of Perigee               | 180.0 degrees   |
| Orbital Period                    | 86170.5 seconds |
| Apogee                            | 44221.4 km      |
| Perigee                           | 27354.9 km      |



|   |               |
|---|---------------|
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees   |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 273.1  |
| 2                | 72.1   |

## Orbital Plane 14:

| Question  | Response        |
|---|-----------------|
| Number of Satellites in Plane                                 | 2               |
| Inclination Angle   | 63.4 degrees    |
| Right Ascension of Ascending Node                             | 61.3 degrees    |
| Argument of Perigee   | 180.0 degrees   |
| Orbital Period  | 86170.5 seconds |
| Apogee  | 44221.4 km      |
| Perigee   | 27354.9 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees     |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees   |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 345.0  |
| 2                | 144.0  |

## Orbital Plane 15:

| Question | Response |
|----------|----------|
|----------|----------|

|   |                 |
|---|-----------------|
| Number of Satellites in Plane                                 | 2               |
| Inclination Angle   | 63.4 degrees    |
| Right Ascension of Ascending Node                             | 349.4 degrees   |
| Argument of Perigee   | 180.0 degrees   |
| Orbital Period  | 86170.5 seconds |
| Apogee  | 44221.4 km      |
| Perigee   | 27354.9 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees     |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees   |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 56.9   |
| 2                | 215.9  |

### Orbital Plane 16:

| Question  | Response        |
|---|-----------------|
| Number of Satellites in Plane                                 | 2               |
| Inclination Angle   | 63.4 degrees    |
| Right Ascension of Ascending Node                             | 277.4 degrees   |
| Argument of Perigee   | 180.0 degrees   |
| Orbital Period  | 86170.5 seconds |
| Apogee  | 44221.4 km      |
| Perigee   | 27354.9 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees     |

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Active Service Arc End Angle with respect to Ascending Node 360.0 degrees

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### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 129.0  |
| 2                | 288.0  |

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### Orbital Plane 17:

| Question  | Response        |
|---|-----------------|
| Number of Satellites in Plane                                 | 1               |
| Inclination Angle   | 63.4 degrees    |
| Right Ascension of Ascending Node                             | 205.4 degrees   |
| Argument of Perigee   | 270.0 degrees   |
| Orbital Period  | 86170.5 seconds |
| Apogee  | 40004.7 km      |
| Perigee   | 31571.5 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees     |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees   |

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### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 3.6  |

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### Orbital Plane 18:

| Question                      | Response     |
|-------------------------------|--------------|
| Number of Satellites in Plane | 1            |
| Inclination Angle             | 63.4 degrees |

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|   |                 |
|---|-----------------|
| Right Ascension of Ascending Node                             | 133.4 degrees   |
| Argument of Perigee   | 270.0 degrees   |
| Orbital Period  | 86170.5 seconds |
| Apogee  | 40004.7 km      |
| Perigee   | 31571.5 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees     |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees   |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 75.6   |

### Orbital Plane 19:

| Question  | Response        |
|---|-----------------|
| Number of Satellites in Plane                                 | 1               |
| Inclination Angle   | 63.4 degrees    |
| Right Ascension of Ascending Node                             | 61.3 degrees    |
| Argument of Perigee   | 270.0 degrees   |
| Orbital Period  | 86170.5 seconds |
| Apogee  | 40004.7 km      |
| Perigee   | 31571.5 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees     |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees   |

### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 147.6  |

**Orbital Plane 20:**

| Question  | Response        |
|---|-----------------|
| Number of Satellites in Plane                                 | 1               |
| Inclination Angle   | 63.4 degrees    |
| Right Ascension of Ascending Node                             | 349.4 degrees   |
| Argument of Perigee   | 270.0 degrees   |
| Orbital Period  | 86170.5 seconds |
| Apogee  | 40004.7 km      |
| Perigee   | 31571.5 km      |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees     |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees   |

**Mean Anomaly For Each Satellite**

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 219.5  |

**Orbital Plane 21:**

| Question                          | Response        |
|-----------------------------------|-----------------|
| Number of Satellites in Plane     | 1               |
| Inclination Angle                 | 63.4 degrees    |
| Right Ascension of Ascending Node | 277.4 degrees   |
| Argument of Perigee               | 270.0 degrees   |
| Orbital Period                    | 86170.5 seconds |

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|   |               |
|---|---------------|
| Apogee  | 40004.7 km    |
| Perigee   | 31571.5 km    |
| Active Service Arc Begin Angle with respect to Ascending Node | 0.0 degrees   |
| Active Service Arc End Angle with respect to Ascending Node   | 360.0 degrees |

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### Mean Anomaly For Each Satellite

| Satellite Number | Mean Anomaly (degrees) at the Orbit Epoch Date |
|------------------|--|
| 1                | 291.6  |

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## Receiving Beams 1:

| Question  | Response                                   |
|---|--|
| Beam ID   | L2L0                                       |
| Receive Beam Frequency                                  | 47200.0 MHz -50200.0 MHz                   |
| Beam Type   | Both Steerable and Shapeable               |
| Polarization  | LHCP                                       |
| Peak Gain   | 49.8 dBi                                   |
| Antenna Pointing Error                                  | 0.03 degrees                               |
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| G/T at Max. Gain Point                                  | 19.1 dB/K                                  |
| Min. Saturation Flux Density                            | -113.8 dBW/m <sup>2</sup>                  |
| Max. Saturation Flux Density                            | -68.1 dBW/m <sup>2</sup>                   |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 90 deg elevation angle |

## Receiving Beams 2:

| Question                 | Response                     |
|--------------------------|------------------------------|
| Beam ID                  | L2L1                         |
| Receive Beam Frequency   | 47200.0 MHz -50200.0 MHz     |
| Beam Type                | Both Steerable and Shapeable |
| Polarization             | LHCP                         |
| Peak Gain                | 42.2 dBi                     |
| Antenna Pointing Error   | 0.03 degrees                 |
| Antenna Rotational Error | 0.0 degrees                  |

|   |  |
|---|--|
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| G/T at Max. Gain Point                                  | 11.5 dB/K                                  |
| Min. Saturation Flux Density                            | -106.2 dBW/m2                              |
| Max. Saturation Flux Density                            | -61.5 dBW/m2                               |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 25 deg elevation angle |

**Receiving Beams 3:**

| Question  | Response                                   |
|---|--|
| Beam ID   | L3L0                                       |
| Receive Beam Frequency                                  | 50400.0 MHz -51400.0 MHz                   |
| Beam Type   | Both Steerable and Shapeable               |
| Polarization  | LHCP                                       |
| Peak Gain   | 49.8 dBi                                   |
| Antenna Pointing Error                                  | 0.03 degrees                               |
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| G/T at Max. Gain Point                                  | 19.1 dB/K                                  |
| Min. Saturation Flux Density                            | -113.8 dBW/m2                              |
| Max. Saturation Flux Density                            | -68.1 dBW/m2                               |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 90 deg elevation angle |



## Receiving Beams 4:

| Question  | Response                                   |
|---|--|
| Beam ID   | L3L1                                       |
| Receive Beam Frequency                                  | 50400.0 MHz -51400.0 MHz                   |
| Beam Type   | Both Steerable and Shapeable               |
| Polarization  | LHCP                                       |
| Peak Gain   | 42.2 dBi                                   |
| Antenna Pointing Error                                  | 0.03 degrees                               |
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| G/T at Max. Gain Point                                  | 11.5 dB/K                                  |
| Min. Saturation Flux Density                            | -106.2 dBW/m <sup>2</sup>                  |
| Max. Saturation Flux Density                            | -61.5 dBW/m <sup>2</sup>                   |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 25 deg elevation angle |

## Receiving Beams 5:

| Question                 | Response                     |
|--------------------------|------------------------------|
| Beam ID                  | LTLC                         |
| Receive Beam Frequency   | 51150.0 MHz -51400.0 MHz     |
| Beam Type                | Both Steerable and Shapeable |
| Polarization             | LHCP                         |
| Peak Gain                | 5.0 dBi                      |
| Antenna Pointing Error   | 0.2 degrees                  |
| Antenna Rotational Error | 0.0 degrees                  |
| Polarization Switchable  |                              |

|   |  |
|---|--|
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| G/T at Max. Gain Point                                  | -25.5 dB/K                                 |
| Min. Saturation Flux Density                            | -107.5 dBW/m2                              |
| Max. Saturation Flux Density                            | -61.5 dBW/m2                               |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 25 deg elevation angle |

**Receiving Beams 6:**

| Question  | Response                                   |
|---|--|
| Beam ID   | L2R0                                       |
| Receive Beam Frequency                                  | 47200.0 MHz -50200.0 MHz                   |
| Beam Type   | Both Steerable and Shapeable               |
| Polarization  | RHCP                                       |
| Peak Gain   | 49.8 dBi                                   |
| Antenna Pointing Error                                  | 0.03 degrees                               |
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| G/T at Max. Gain Point                                  | 19.1 dB/K                                  |
| Min. Saturation Flux Density                            | -113.8 dBW/m2                              |
| Max. Saturation Flux Density                            | -68.1 dBW/m2                               |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 90 deg elevation angle |

**Receiving Beams 7:**

| Question | Response |
|----------|----------|
|----------|----------|

|   |  |
|---|--|
| Beam ID   | L2R1                                       |
| Receive Beam Frequency                                  | 47200.0 MHz -50200.0 MHz                   |
| Beam Type   | Both Steerable and Shapeable               |
| Polarization  | RHCP                                       |
| Peak Gain   | 42.2 dBi                                   |
| Antenna Pointing Error                                  | 0.03 degrees                               |
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| G/T at Max. Gain Point                                  | 11.5 dB/K                                  |
| Min. Saturation Flux Density                            | -106.2 dBW/m <sup>2</sup>                  |
| Max. Saturation Flux Density                            | -61.5 dBW/m <sup>2</sup>                   |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 25 deg elevation angle |

**Receiving Beams 8:**

| Question  | Response                     |
|---|------------------------------|
| Beam ID   | L3R0                         |
| Receive Beam Frequency                                  | 50400.0 MHz -51400.0 MHz     |
| Beam Type   | Both Steerable and Shapeable |
| Polarization  | RHCP                         |
| Peak Gain   | 49.8 dBi                     |
| Antenna Pointing Error                                  | 0.03 degrees                 |
| Antenna Rotational Error                                | 0.0 degrees                  |
| Polarization Switchable                                 |                              |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                 |

|                              |  |
|------------------------------|--|
| G/T at Max. Gain Point       | 19.1 dB/K                                  |
| Min. Saturation Flux Density | -113.8 dBW/m2                              |
| Max. Saturation Flux Density | -68.1 dBW/m2                               |
| Co- or Cross Polar Mode      | C  |
| Service Area Description     | Visible Earth above 90 deg elevation angle |

### Receiving Beams 9:

| Question  | Response                                   |
|---|--|
| Beam ID   | L3R1                                       |
| Receive Beam Frequency                                  | 50400.0 MHz -51400.0 MHz                   |
| Beam Type   | Both Steerable and Shapeable               |
| Polarization  | RHCP                                       |
| Peak Gain   | 42.2 dBi                                   |
| Antenna Pointing Error                                  | 0.03 degrees                               |
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| G/T at Max. Gain Point                                  | 11.5 dB/K                                  |
| Min. Saturation Flux Density                            | -106.2 dBW/m2                              |
| Max. Saturation Flux Density                            | -61.5 dBW/m2                               |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 25 deg elevation angle |

### Receiving Beams 10:

| Question | Response |
|----------|----------|
| Beam ID  | G2L0     |

|   |  |
|---|--|
| Receive Beam Frequency                                  | 47200.0 MHz -50200.0 MHz                   |
| Beam Type   | Both Steerable and Shapeable               |
| Polarization  | LHCP                                       |
| Peak Gain   | 55.9 dBi                                   |
| Antenna Pointing Error                                  | 0.1 degrees                                |
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| G/T at Max. Gain Point                                  | 25.3 dB/K                                  |
| Min. Saturation Flux Density                            | -149.0 dBW/m2                              |
| Max. Saturation Flux Density                            | -69.6 dBW/m2                               |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 90 deg elevation angle |

**Receiving Beams 11:**

| Question  | Response                     |
|---|------------------------------|
| Beam ID   | G3L0                         |
| Receive Beam Frequency                                  | 50400.0 MHz -51400.0 MHz     |
| Beam Type   | Both Steerable and Shapeable |
| Polarization  | LHCP                         |
| Peak Gain   | 55.9 dBi                     |
| Antenna Pointing Error                                  | 0.1 degrees                  |
| Antenna Rotational Error                                | 0.0 degrees                  |
| Polarization Switchable                                 |                              |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                 |
| G/T at Max. Gain Point                                  | 25.3 dB/K                    |

|                              |  |
|------------------------------|--|
| Min. Saturation Flux Density | -149.0 dBW/m2                              |
| Max. Saturation Flux Density | -69.6 dBW/m2                               |
| Co- or Cross Polar Mode      | C  |
| Service Area Description     | Visible Earth above 90 deg elevation angle |

**Receiving Beams 12:**

| Question  | Response                                   |
|---|--|
| Beam ID   | GTLC                                       |
| Receive Beam Frequency                                  | 51150.0 MHz -51400.0 MHz                   |
| Beam Type   | Both Steerable and Shapeable               |
| Polarization  | LHCP                                       |
| Peak Gain   | 5.0 dBi                                    |
| Antenna Pointing Error                                  | 0.2 degrees                                |
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| G/T at Max. Gain Point                                  | -25.5 dB/K                                 |
| Min. Saturation Flux Density                            | -110.6 dBW/m2                              |
| Max. Saturation Flux Density                            | -70.4 dBW/m2                               |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 25 deg elevation angle |

**Receiving Beams 13:**

| Question               | Response                 |
|------------------------|--------------------------|
| Beam ID                | G2R0                     |
| Receive Beam Frequency | 47200.0 MHz -50200.0 MHz |

|   |  |
|---|--|
| Beam Type   | Both Steerable and Shapeable               |
| Polarization  | RHCP                                       |
| Peak Gain   | 55.9 dBi                                   |
| Antenna Pointing Error                                  | 0.1 degrees                                |
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| G/T at Max. Gain Point                                  | 25.3 dB/K                                  |
| Min. Saturation Flux Density                            | -149.0 dBW/m2                              |
| Max. Saturation Flux Density                            | -69.6 dBW/m2                               |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 90 deg elevation angle |

**Receiving Beams 14:**

| Question  | Response                     |
|---|------------------------------|
| Beam ID   | G3R0                         |
| Receive Beam Frequency                                  | 50400.0 MHz -51400.0 MHz     |
| Beam Type   | Both Steerable and Shapeable |
| Polarization  | RHCP                         |
| Peak Gain   | 55.9 dBi                     |
| Antenna Pointing Error                                  | 0.1 degrees                  |
| Antenna Rotational Error                                | 0.0 degrees                  |
| Polarization Switchable                                 |                              |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                 |
| G/T at Max. Gain Point                                  | 25.3 dB/K                    |
| Min. Saturation Flux Density                            | -149.0 dBW/m2                |

|                              |  |
|------------------------------|--|
| Max. Saturation Flux Density | -69.6 dBW/m <sup>2</sup>                   |
| Co- or Cross Polar Mode      | C  |
| Service Area Description     | Visible Earth above 90 deg elevation angle |

**Receiving Beams 15:**

| Question  | Response                                   |
|---|--|
| Beam ID   | GTRC                                       |
| Receive Beam Frequency                                  | 51150.0 MHz -51400.0 MHz                   |
| Beam Type   | Both Steerable and Shapeable               |
| Polarization  | RHCP                                       |
| Peak Gain   | 5.0 dBi                                    |
| Antenna Pointing Error                                  | 0.2 degrees                                |
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| G/T at Max. Gain Point                                  | -25.5 dB/K                                 |
| Min. Saturation Flux Density                            | -110.6 dBW/m <sup>2</sup>                  |
| Max. Saturation Flux Density                            | -70.4 dBW/m <sup>2</sup>                   |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 25 deg elevation angle |

**Receiving Beams 16:**

| Question               | Response                     |
|------------------------|------------------------------|
| Beam ID                | LTRC                         |
| Receive Beam Frequency | 51150.0 MHz -51400.0 MHz     |
| Beam Type              | Both Steerable and Shapeable |



---

|   |  |
|---|--|
| Polarization  | RHCP                                       |
| Peak Gain   | 5.0 dBi                                    |
| Antenna Pointing Error                                  | 0.2 degrees                                |
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| G/T at Max. Gain Point                                  | -25.5 dB/K                                 |
| Min. Saturation Flux Density                            | -107.5 dBW/m <sup>2</sup>                  |
| Max. Saturation Flux Density                            | -61.5 dBW/m <sup>2</sup>                   |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 25 deg elevation angle |

---

**Receiving  
Channels (9)**

| <b>Channel ID</b> | <b>Channel Bandwidth (MHz)</b> | <b>Center Frequency s (MHz)</b> | <b>Feeder Link, Service Link or TT&amp;C</b> |
|-------------------|--------------------------------|---------------------------------|--|
| <b>VF03</b>       | 1000.0                         | 50900.0                         | Feeder Link                                  |
| <b>VTC</b>        | 250.0                          | 51275.0                         | TT&C   |
| <b>VF04</b>       | 1000.0                         | 50900.0                         | Feeder Link                                  |
| <b>VS01</b>       | 3000.0                         | 48700.0                         | Service Link                                 |
| <b>VS02</b>       | 3000.0                         | 48700.0                         | Service Link                                 |
| <b>VS03</b>       | 1000.0                         | 50900.0                         | Service Link                                 |
| <b>VS04</b>       | 1000.0                         | 50900.0                         | Service Link                                 |
| <b>VF02</b>       | 3000.0                         | 48700.0                         | Feeder Link                                  |
| <b>VF01</b>       | 3000.0                         | 48700.0                         | Feeder Link                                  |

## Transmitting Beams 1:

| Question  | Response                     |
|---|------------------------------|
| Beam ID   | L0L0                         |
| Transmit Beam Frequency                                 | 37500.0 MHz -40000.0 MHz     |
| Beam Type   | Both Steerable and Shapeable |
| Polarization  | LHCP                         |
| Peak Gain   | 49.8 dBi                     |
| Antenna Pointing Error                                  | 0.03 degrees                 |
| Antenna Rotational Error                                | 0.0 degrees                  |
| Polarization Switchable                                 |                              |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                 |
| Max. Transmit EIRP Density                              | -33.6 dBW/Hz                 |
| Max. Transmit EIRP                                      | 60.4 dBW                     |
| Co- or Cross Polar Mode                                 | C                            |
| Service Area Description                                | Beam at boresight            |

### Max. Power Flux Density

|                | * 0° - 5°           | * 5° - 10°          | * 10° - 15°         | * 15° - 20°         | * 20° - 25°         | * 25° - 90°         |
|----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| *              | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> |
| BW:            | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               |
| <b>1.0 MHz</b> | -120.0              | -116.3              | -112.5              | -108.8              | -105.0              | -105.0              |

## Transmitting Beams 2:

| Question                | Response                 |
|-------------------------|--------------------------|
| Beam ID                 | L0L1                     |
| Transmit Beam Frequency | 37500.0 MHz -40000.0 MHz |

|   |  |
|---|--|
| Beam Type   | Both Steerable and Shapeable               |
| Polarization  | LHCP                                       |
| Peak Gain   | 42.2 dBi                                   |
| Antenna Pointing Error                                  | 0.03 degrees                               |
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| Max. Transmit EIRP Density                              | -28.1 dBW/Hz                               |
| Max. Transmit EIRP                                      | 65.9 dBW                                   |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 25 deg elevation angle |

### Max. Power Flux Density

|                | * 0° - 5°           | * 5° - 10°          | * 10° - 15°         | * 15° - 20°         | * 20° - 25°         | * 25° - 90°         |
|----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| *              | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> |
| BW:            | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               |
| <b>1.0 MHz</b> | -120.0              | -116.3              | -112.5              | -108.8              | -105.0              | -105.0              |

### Transmitting Beams 3:

| Question                | Response                     |
|-------------------------|------------------------------|
| Beam ID                 | L1L0                         |
| Transmit Beam Frequency | 40000.0 MHz -42000.0 MHz     |
| Beam Type               | Both Steerable and Shapeable |
| Polarization            | LHCP                         |
| Peak Gain               | 48.8 dBi                     |
| Antenna Pointing Error  | 0.03 degrees                 |

|   |                   |
|---|-------------------|
| Antenna Rotational Error                                | 0.0 degrees       |
| Polarization Switchable                                 |                   |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees      |
| Max. Transmit EIRP Density                              | -33.6 dBW/Hz      |
| Max. Transmit EIRP                                      | 59.4 dBW          |
| Co- or Cross Polar Mode                                 | C                 |
| Service Area Description                                | Beam at boresight |

### Max. Power Flux Density

|                | * 0° - 5°<br>(dBW/m <sup>2</sup> )<br>/BW: | * 5° - 10°<br>(dBW/m <sup>2</sup> )<br>/BW: | * 10° - 15°<br>(dBW/m <sup>2</sup> )<br>/BW: | * 15° - 20°<br>(dBW/m <sup>2</sup> )<br>/BW: | * 20° - 25°<br>(dBW/m <sup>2</sup> )<br>/BW: | * 25° - 90°<br>(dBW/m <sup>2</sup> )<br>/BW: |
|----------------|--|---|--|--|--|--|
| <b>1.0 MHz</b> | -115.0                                     | -112.5                                      | -110.0                                       | -107.5                                       | -105.0                                       | -105.0                                       |

### Transmitting Beams 4:

| Question  | Response                     |
|---|------------------------------|
| Beam ID   | L1L1                         |
| Transmit Beam Frequency                                 | 40000.0 MHz -42000.0 MHz     |
| Beam Type   | Both Steerable and Shapeable |
| Polarization  | LHCP                         |
| Peak Gain   | 41.2 dBi                     |
| Antenna Pointing Error                                  | 0.03 degrees                 |
| Antenna Rotational Error                                | 0.0 degrees                  |
| Polarization Switchable                                 |                              |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                 |
| Max. Transmit EIRP Density                              | -28.1 dBW/Hz                 |

|                          |  |
|--------------------------|--|
| Max. Transmit EIRP       | 64.9 dBW                                   |
| Co- or Cross Polar Mode  | C  |
| Service Area Description | Visible Earth above 25 deg elevation angle |

### Max. Power Flux Density

|                | * 0° - 5°           | * 5° - 10°          | * 10° - 15°         | * 15° - 20°         | * 20° - 25°         | * 25° - 90°         |
|----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| *              | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> |
| BW:            | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               |
| <b>1.0 MHz</b> | -115.0              | -112.5              | -110.0              | -107.5              | -105.0              | -105.0              |

### Transmitting Beams 5:

| Question  | Response                                   |
|---|--|
| Beam ID   | LTLT                                       |
| Transmit Beam Frequency                                 | 41750.0 MHz -42000.0 MHz                   |
| Beam Type   | Both Steerable and Shapeable               |
| Polarization  | LHCP                                       |
| Peak Gain   | 5.0 dBi                                    |
| Antenna Pointing Error                                  | 0.2 degrees                                |
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| Max. Transmit EIRP Density                              | -31.1 dBW/Hz                               |
| Max. Transmit EIRP                                      | 12.0 dBW                                   |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 25 deg elevation angle |



|            |        |        |        |        |        |        |
|------------|--------|--------|--------|--------|--------|--------|
| <b>1.0</b> | -120.0 | -116.3 | -112.5 | -108.8 | -105.0 | -105.0 |
| <b>MHz</b> |        |        |        |        |        |        |

## Transmitting Beams 7:

| Question  | Response                                   |
|---|--|
| Beam ID   | L0R1                                       |
| Transmit Beam Frequency                                 | 37500.0 MHz -40000.0 MHz                   |
| Beam Type   | Both Steerable and Shapeable               |
| Polarization  | RHCP                                       |
| Peak Gain   | 42.2 dBi                                   |
| Antenna Pointing Error                                  | 0.03 degrees                               |
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| Max. Transmit EIRP Density                              | -28.1 dBW/Hz                               |
| Max. Transmit EIRP                                      | 65.9 dBW                                   |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 25 deg elevation angle |

## Max. Power Flux Density

|            | * 0° - 5°           | * 5° - 10°          | * 10° - 15°         | * 15° - 20°         | * 20° - 25°         | * 25° - 90°         |
|------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|            | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> |
|            | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               |
| <b>1.0</b> | -120.0              | -116.3              | -112.5              | -108.8              | -105.0              | -105.0              |
| <b>MHz</b> |                     |                     |                     |                     |                     |                     |

## Transmitting Beams 8:

| Question | Response |
|----------|----------|
|----------|----------|



|   |                              |
|---|------------------------------|
| Beam ID   | L1R0                         |
| Transmit Beam Frequency                                 | 40000.0 MHz -42000.0 MHz     |
| Beam Type   | Both Steerable and Shapeable |
| Polarization  | RHCP                         |
| Peak Gain   | 48.8 dBi                     |
| Antenna Pointing Error                                  | 0.03 degrees                 |
| Antenna Rotational Error                                | 0.0 degrees                  |
| Polarization Switchable                                 |                              |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                 |
| Max. Transmit EIRP Density                              | -33.6 dBW/Hz                 |
| Max. Transmit EIRP                                      | 59.4 dBW                     |
| Co- or Cross Polar Mode                                 | C                            |
| Service Area Description                                | Beam at boresight            |

### Max. Power Flux Density

|                | * 0° - 5°<br>(dBW/m <sup>2</sup> )<br>/BW): | * 5° - 10°<br>(dBW/m <sup>2</sup> )<br>/BW): | * 10° - 15°<br>(dBW/m <sup>2</sup> )<br>/BW): | * 15° - 20°<br>(dBW/m <sup>2</sup> )<br>/BW): | * 20° - 25°<br>(dBW/m <sup>2</sup> )<br>/BW): | * 25° - 90°<br>(dBW/m <sup>2</sup> )<br>/BW): |
|----------------|---|--|---|---|---|---|
| <b>1.0 MHz</b> | -115.0                                      | -112.5                                       | -110.0  | -107.5  | -105.0  | -105.0  |

### Transmitting Beams 9:

| Question                | Response                     |
|-------------------------|------------------------------|
| Beam ID                 | L1R1                         |
| Transmit Beam Frequency | 40000.0 MHz -42000.0 MHz     |
| Beam Type               | Both Steerable and Shapeable |
| Polarization            | RHCP                         |

|   |  |
|---|--|
| Peak Gain   | 41.2 dBi                                   |
| Antenna Pointing Error                                  | 0.03 degrees                               |
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| Max. Transmit EIRP Density                              | -28.1 dBW/Hz                               |
| Max. Transmit EIRP                                      | 64.9 dBW                                   |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 25 deg elevation angle |

### Max. Power Flux Density

|            | * 0° - 5°           | * 5° - 10°          | * 10° - 15°         | * 15° - 20°         | * 20° - 25°         | * 25° - 90°         |
|------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|            | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> |
| *          | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               |
| <b>1.0</b> | -115.0              | -112.5              | -110.0              | -107.5              | -105.0              | -105.0              |
| <b>MHz</b> |                     |                     |                     |                     |                     |                     |

### Transmitting Beams 10:

| Question                 | Response                     |
|--------------------------|------------------------------|
| Beam ID                  | LTRT                         |
| Transmit Beam Frequency  | 41750.0 MHz -42000.0 MHz     |
| Beam Type                | Both Steerable and Shapeable |
| Polarization             | RHCP                         |
| Peak Gain                | 5.0 dBi                      |
| Antenna Pointing Error   | 0.2 degrees                  |
| Antenna Rotational Error | 0.0 degrees                  |
| Polarization Switchable  | No                           |

|   |  |
|---|--|
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| Max. Transmit EIRP Density                              | -31.1 dBW/Hz                               |
| Max. Transmit EIRP                                      | 12.0 dBW                                   |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 25 deg elevation angle |

### Max. Power Flux Density

|                | * 0° - 5°           | * 5° - 10°          | * 10° - 15°         | * 15° - 20°         | * 20° - 25°         | * 25° - 90°         |
|----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> |
| * BW:          | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               |
| <b>1.0 MHz</b> | -118.0              | -115.5              | -113.0              | -110.5              | -108.0              | -108.0              |

### Transmitting Beams 11:

| Question  | Response                     |
|---|------------------------------|
| Beam ID   | G0L0                         |
| Transmit Beam Frequency                                 | 37500.0 MHz -40000.0 MHz     |
| Beam Type   | Both Steerable and Shapeable |
| Polarization  | LHCP                         |
| Peak Gain   | 55.9 dBi                     |
| Antenna Pointing Error                                  | 0.1 degrees                  |
| Antenna Rotational Error                                | 0.0 degrees                  |
| Polarization Switchable                                 |                              |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                 |
| Max. Transmit EIRP Density                              | -1.8 dBW/Hz                  |
| Max. Transmit EIRP                                      | 92.2 dBW                     |

|                          |           |
|--------------------------|-----------|
| Co- or Cross Polar Mode  | C         |
| Service Area Description | Spot beam |

### Max. Power Flux Density

|                | * 0° - 5°<br>(dbW/m <sup>2</sup><br>/BW): | * 5° - 10°<br>(dbW/m <sup>2</sup><br>/BW): | * 10° - 15°<br>(dbW/m <sup>2</sup><br>/BW): | * 15° - 20°<br>(dbW/m <sup>2</sup><br>/BW): | * 20° - 25°<br>(dbW/m <sup>2</sup><br>/BW): | * 25° - 90°<br>(dbW/m <sup>2</sup><br>/BW): |
|----------------|---|--|---|---|---|---|
| <b>1.0 MHz</b> | -120.0                                    | -116.3                                     | -112.5                                      | -108.8                                      | -105.0                                      | -105.0                                      |

### Transmitting Beams 12:

| Question  | Response                     |
|---|------------------------------|
| Beam ID   | G1L0                         |
| Transmit Beam Frequency                                 | 40000.0 MHz -42000.0 MHz     |
| Beam Type   | Both Steerable and Shapeable |
| Polarization  | LHCP                         |
| Peak Gain   | 54.9 dBi                     |
| Antenna Pointing Error                                  | 0.1 degrees                  |
| Antenna Rotational Error                                | 0.0 degrees                  |
| Polarization Switchable                                 |                              |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                 |
| Max. Transmit EIRP Density                              | -1.8 dBW/Hz                  |
| Max. Transmit EIRP                                      | 91.2 dBW                     |
| Co- or Cross Polar Mode                                 | C                            |
| Service Area Description                                | Spot beam                    |

### Max. Power Flux Density

|                | * 0° - 5°           | * 5° - 10°          | * 10° - 15°         | * 15° - 20°         | * 20° - 25°         | * 25° - 90°         |
|----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| *              | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> |
| BW:            | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               |
| <b>1.0 MHz</b> | -115.0              | -112.5              | -110.0              | -107.5              | -105.0              | -105.0              |

## Transmitting Beams 13:

| Question  | Response                                   |
|---|--|
| Beam ID   | GTLT                                       |
| Transmit Beam Frequency                                 | 41750.0 MHz -42000.0 MHz                   |
| Beam Type   | Both Steerable and Shapeable               |
| Polarization  | LHCP                                       |
| Peak Gain   | 5.0 dBi                                    |
| Antenna Pointing Error                                  | 0.2 degrees                                |
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| Max. Transmit EIRP Density                              | -4.5 dBW/Hz                                |
| Max. Transmit EIRP                                      | 36.3 dBW                                   |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 25 deg elevation angle |

## Max. Power Flux Density

|                | * 0° - 5°           | * 5° - 10°          | * 10° - 15°         | * 15° - 20°         | * 20° - 25°         | * 25° - 90°         |
|----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| *              | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> |
| BW:            | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               |
| <b>1.0 MHz</b> | -118.0              | -115.5              | -113.0              | -110.5              | -108.0              | -108.0              |

## Transmitting Beams 14:

| Question  | Response                     |
|---|------------------------------|
| Beam ID   | G0R0                         |
| Transmit Beam Frequency                                 | 37500.0 MHz -40000.0 MHz     |
| Beam Type   | Both Steerable and Shapeable |
| Polarization  | RHCP                         |
| Peak Gain   | 55.9 dBi                     |
| Antenna Pointing Error                                  | 0.1 degrees                  |
| Antenna Rotational Error                                | 0.0 degrees                  |
| Polarization Switchable                                 |                              |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                 |
| Max. Transmit EIRP Density                              | -1.8 dBW/Hz                  |
| Max. Transmit EIRP                                      | 92.2 dBW                     |
| Co- or Cross Polar Mode                                 | C                            |
| Service Area Description                                | Spot beam                    |

### Max. Power Flux Density

|                | * 0° - 5°           | * 5° - 10°          | * 10° - 15°         | * 15° - 20°         | * 20° - 25°         | * 25° - 90°         |
|----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| *              | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> |
| BW:            | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               |
| <b>1.0 MHz</b> | -120.0              | -116.3              | -112.5              | -108.8              | -105.0              | -105.0              |

## Transmitting Beams 15:

| Question                | Response                 |
|-------------------------|--------------------------|
| Beam ID                 | G1R0                     |
| Transmit Beam Frequency | 40000.0 MHz -42000.0 MHz |

|   |                              |
|---|------------------------------|
| Beam Type   | Both Steerable and Shapeable |
| Polarization  | RHCP                         |
| Peak Gain   | 54.9 dBi                     |
| Antenna Pointing Error                                  | 0.1 degrees                  |
| Antenna Rotational Error                                | 0.0 degrees                  |
| Polarization Switchable                                 |                              |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                 |
| Max. Transmit EIRP Density                              | -1.8 dBW/Hz                  |
| Max. Transmit EIRP                                      | 91.2 dBW                     |
| Co- or Cross Polar Mode                                 | C                            |
| Service Area Description                                | Spot beam                    |

### Max. Power Flux Density

|                | * 0° - 5°           | * 5° - 10°          | * 10° - 15°         | * 15° - 20°         | * 20° - 25°         | * 25° - 90°         |
|----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> |
| *              | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               |
| <b>1.0 MHz</b> | -115.0              | -112.5              | -110.0              | -107.5              | -105.0              | -105.0              |

### Transmitting Beams 16:

| Question                | Response                     |
|-------------------------|------------------------------|
| Beam ID                 | GTRT                         |
| Transmit Beam Frequency | 41750.0 MHz -42000.0 MHz     |
| Beam Type               | Both Steerable and Shapeable |
| Polarization            | RHCP                         |
| Peak Gain               | 5.0 dBi                      |
| Antenna Pointing Error  | 0.2 degrees                  |

|   |  |
|---|--|
| Antenna Rotational Error                                | 0.0 degrees                                |
| Polarization Switchable                                 |  |
| Polarization Alignment Relative to the Equatorial Plane | 45.0 degrees                               |
| Max. Transmit EIRP Density                              | -4.5 dBW/Hz                                |
| Max. Transmit EIRP                                      | 36.3 dBW                                   |
| Co- or Cross Polar Mode                                 | C  |
| Service Area Description                                | Visible Earth above 25 deg elevation angle |

### Max. Power Flux Density

|            | * 0° - 5°           | * 5° - 10°          | * 10° - 15°         | * 15° - 20°         | * 20° - 25°         | * 25° - 90°         |
|------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| *          | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> | (dBW/m <sup>2</sup> |
| BW:        | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               | /BW):               |
| <b>1.0</b> | -118.0              | -115.5              | -113.0              | -110.5              | -108.0              | -108.0              |
| <b>MHz</b> |                     |                     |                     |                     |                     |                     |



**Transmitting Channels (10)**

| <b>Channel ID</b> | <b>Channel Bandwidth (MHz)</b> | <b>Center Frequency s (MHz)</b> | <b>Feeder Link, Service Link or TT&amp;C</b> |
|-------------------|--------------------------------|---------------------------------|--|
| VTT2              | 250.0                          | 41875.0                         | TT&C   |
| VS06              | 2500.0                         | 38750.0                         | Service Link                                 |
| VS07              | 2000.0                         | 41000.0                         | Service Link                                 |
| VTT1              | 250.0                          | 41875.0                         | TT&C   |
| VS08              | 2000.0                         | 41000.0                         | Service Link                                 |
| VF05              | 2500.0                         | 38750.0                         | Feeder Link                                  |
| VF06              | 2500.0                         | 38750.0                         | Feeder Link                                  |
| VF07              | 2000.0                         | 41000.0                         | Feeder Link                                  |
| VF08              | 2000.0                         | 41000.0                         | Feeder Link                                  |
| VS05              | 2500.0                         | 38750.0                         | Service Link                                 |

## Certification Questions

| Question  | Response |
|---|----------|
| Are the applicable service area coverage requirements of 25.143(b)(2) (ii) and (iii), or 25.144(a)(3)(i), or 25.145 (c)(1) and (2), or 25.146(i)(1) and (2), or 25.148(c), or 25.225 met? | Yes      |
| Are the applicable frequency tolerances of 25.202(e) and out-of-band emission limits of 25.202(f)(1),(2), and (3) met?  | Yes      |
| Are the cessation of emissions requirements of 25.207 met?  | Yes      |
| Are the applicable power-flux-density limits of 25.208 met, and is the appropriate technical showing provided within the application?   | Yes      |
| For NGSO applications, are the applicable equivalent-power-flux-density limits of 25.208 met, and is the appropriate technical showing provided within the application?                   | N/A      |
| Are the applicable full-frequency-reuse requirements of 25.210 met?   | Yes      |
| If the application is for a 17/24 GHz BSS space station, will it be operated at an offset location with full power and interference protection in accordance with 25.262(b)?              |          |

## Attachments

| File Name                | Beam | Field                  | Attachment Type  | Description |
|--------------------------|------|------------------------|------------------|-------------|
| <a href="#">LTLT.gxt</a> | LTLT | NGSO Antenna Gain Data | GXT file (*.gxt) |             |
| <a href="#">G2L0.gxt</a> | G2L0 | NGSO Antenna Gain Data | GXT file (*.gxt) |             |
| <a href="#">G2R0.gxt</a> | G2R0 | NGSO Antenna Gain Data | GXT file (*.gxt) |             |
| <a href="#">G3L0.gxt</a> | G3L0 | NGSO Antenna Gain Data | GXT file (*.gxt) |             |
| <a href="#">GTRC.gxt</a> | GTRC | NGSO Antenna Gain Data | GXT file (*.gxt) |             |
| <a href="#">G3R0.gxt</a> | G3R0 | NGSO Antenna Gain Data | GXT file (*.gxt) |             |
| <a href="#">GTLC.gxt</a> | GTLC | NGSO Antenna Gain Data | GXT file (*.gxt) |             |
| <a href="#">L2L0.gxt</a> | L2L0 | NGSO Antenna Gain Data | GXT file (*.gxt) |             |
| <a href="#">L2L1.gxt</a> | L2L1 | NGSO Antenna Gain Data | GXT file (*.gxt) |             |
| <a href="#">LTLC.gxt</a> | LTLC | NGSO Antenna Gain Data | GXT file (*.gxt) |             |
| <a href="#">L2R0.gxt</a> | L2R0 | NGSO Antenna Gain Data | GXT file (*.gxt) |             |
| <a href="#">L2R1.gxt</a> | L2R1 | NGSO Antenna Gain Data | GXT file (*.gxt) |             |
| <a href="#">L3L0.gxt</a> | L3L0 | NGSO Antenna Gain Data | GXT file (*.gxt) |             |
| <a href="#">L3L1.gxt</a> | L3L1 | NGSO Antenna Gain Data | GXT file (*.gxt) |             |
| <a href="#">L3R0.gxt</a> | L3R0 | NGSO Antenna Gain Data | GXT file (*.gxt) |             |
| <a href="#">L3R1.gxt</a> | L3R1 | NGSO Antenna Gain Data | GXT file (*.gxt) |             |

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|                 |      |                           |                  |
|-----------------|------|---------------------------|------------------|
| <u>LTRC.gxt</u> | LTRC | NGSO Antenna Gain<br>Data | GXT file (*.gxt) |
| <u>G0L0.gxt</u> | G0L0 | NGSO Antenna Gain<br>Data | GXT file (*.gxt) |
| <u>G0R0.gxt</u> | G0R0 | NGSO Antenna Gain<br>Data | GXT file (*.gxt) |
| <u>G1L0.gxt</u> | G1L0 | NGSO Antenna Gain<br>Data | GXT file (*.gxt) |
| <u>G1R0.gxt</u> | G1R0 | NGSO Antenna Gain<br>Data | GXT file (*.gxt) |
| <u>GTLT.gxt</u> | GTLT | NGSO Antenna Gain<br>Data | GXT file (*.gxt) |
| <u>GTRT.gxt</u> | GTRT | NGSO Antenna Gain<br>Data | GXT file (*.gxt) |
| <u>L0L0.gxt</u> | L0L0 | NGSO Antenna Gain<br>Data | GXT file (*.gxt) |
| <u>L0L1.gxt</u> | L0L1 | NGSO Antenna Gain<br>Data | GXT file (*.gxt) |
| <u>L0R0.gxt</u> | L0R0 | NGSO Antenna Gain<br>Data | GXT file (*.gxt) |
| <u>L0R1.gxt</u> | L0R1 | NGSO Antenna Gain<br>Data | GXT file (*.gxt) |
| <u>L1L0.gxt</u> | L1L0 | NGSO Antenna Gain<br>Data | GXT file (*.gxt) |
| <u>L1L1.gxt</u> | L1L1 | NGSO Antenna Gain<br>Data | GXT file (*.gxt) |
| <u>L1R0.gxt</u> | L1R0 | NGSO Antenna Gain<br>Data | GXT file (*.gxt) |
| <u>L1R1.gxt</u> | L1R1 | NGSO Antenna Gain<br>Data | GXT file (*.gxt) |
| <u>LTRT.gxt</u> | LTRT | NGSO Antenna Gain<br>Data | GXT file (*.gxt) |

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