# Broadband Equity, Access, and Deployment (BEAD) Program: Low-Earth Orbit (LEO) Satellite Service Evidence Template Instructions and Schema

This document is intended to guide BEAD applicants in completing the **LEO Satellite Service Evidence Template.** The evidence is required to demonstrate the applicant has taken the steps necessary to ensure compliance with technical requirements for consideration as a Priority Broadband Project as established in the NTIA’s [BEAD Restructuring Policy Notice](https://www.ntia.gov/sites/default/files/2025-06/bead-restructuring-policy-notice.pdf) (issued June 6, 2025).

## LEO Satellite Service Evidence Template Submission Instructions

1. Refer to the schema below for detailed instructions on how to complete each tab of the template and its associated fields. All fields are required unless otherwise stated.
2. Save your completed LEO Satellite Service Evidence Template with the following file name format: <<CompanyName>>\_LEOEvidence\_<<yyyy-mm-dd>>.xlsx.
3. For applications proposing to use multiple technology types in the network (e.g., fiber and licensed fixed wireless), please upload a template for each technology type used.

## LEO Satellite Service Evidence Template Schema

The LEO Satellite Service Evidence Template contains six tabs:

|  |  |
| --- | --- |
| **Tab number** | **Description** |
| 1 | Logical network diagram |
| 2 | Access layer |
| 3 | Customer premises equipment |
| 4 | Gateway infrastructure & satellite uplinks |
| 5 | Reliability & quality of service |
| 6 | Performance calculations |

Information must be entered for all fields in Tabs 1 – 6. All supplemental evidence files and documents must be submitted with the completed LEO Satellite Service Evidence template.

### Tab 1. Logical Network Diagram Tab

| Field | Data type | Example | Description | Constraints |
| --- | --- | --- | --- | --- |
| Logical Network Diagram | Image | Diagram | Provide a logical diagram showing terrestrial backhaul, terrestrial gateways, gateway to satellite uplink and downlink, inter-satellite connectivity, and satellite to CPE pathways | Illustrate spatial multiplexing, beams superimposed on the proposed project area, CPE placement, and CPE to user connectivity |

### Tab 2. Access Layer Tab

| Field | Data type | Example | Description |
| --- | --- | --- | --- |
| 2.1: Link Characteristics | | | |
| What is the downlink channel size (in MHz) per beam? | Number |  | Size in MHz |
| What is the uplink channel size (in MHz) per beam? | Number |  | Size in MHz |
| What modulation and coding schemes are used for uplink and downlink transmissions? | Narrative |  |  |
| What are the typical and peak spectral efficiency values (bps/Hz) achieved with these schemes? | Number |  | Bps/Hz |
| What are the minimum receive sensitivities or required SNR values (in dB) for each supported modulation and coding level? | Number |  | dB |
| What is the fade margin (in dB) available for both uplink and downlink paths under worst-case conditions (e.g., heavy rain, atmospheric attenuation)?  If more than one type of CPE is offered, provide fade margin values for each type. | Number |  | dB |
| 2.2: Beam & Spectrum Architecture | | | |
| How many beams are generated per satellite? | Number |  |  |
| What is the physical footprint (diameter in km) and shape of each beam at the Earth’s surface? | Number |  |  |
| What is the approximate physical separation (in km) between adjacent beams? | Number |  |  |
| What is the frequency reuse pattern? | Text |  |  |
| How is co-channel interference mitigated between reused beams? | Narrative |  |  |
| What is the estimated worst-case number of active users per beam, accounting for BEAD-funded users as well as other LEO subscribers in the coverage area? | Number |  |  |
| 2.3: Connection Management & Mobility | | | |
| Describe how the system select or switch satellite connections for a CPE. For example, Does the CPE connect to the satellite with the strongest signal, does the CPE maintain connections to multiple satellites simultaneously, is beam or satellite assignment managed by the network based on congestion, satellite pass duration, or other optimization criteria? | Narrative |  |  |
| Please provide a statistical distribution of the number of satellites in view of the proposed Broadband Serviceable Locations (BSLs) over time. Include a table or chart showing the percentage of time that 1, 2, 3, or more satellites are simultaneously visible from a typical BSL in the proposed service area. | Table |  | Complete the table provided showing the percentage of time that 1, 2, 3, or more satellites are simultaneously visible from a typical BSL in the proposed service area |

### Tab 3. Customer Premises Equipment Tab

| Field | Data type | Example | Description |
| --- | --- | --- | --- |
| 3.1: CPE & Connectivity | | | |
| What spectrum is used for the link betwen the CPE and the satellite, and what is the link capacity? | Narrative |  |  |
| What type of connection does the CPE provide to end-user devices at the premises (e.g., Ethernet, Wi-Fi), and what is its maximum supported throughput? | Narrative |  |  |
| Does the proposed service include professional installation? | Narrative |  |  |
| Will the provider install the service on rooftops or other elevated locations if necessary to obtain an unobstructed view of the sky? | Narrative |  |  |
| 3.2: Sky View Requirements | | | |
| What is the minimum area of unobstructed sky view required at a customer location for reliable service? |  |  |  |
| What is the expected impact on performance (e.g., throughput, latency, packet loss, connection stability) if the sky view is partially obstructed? |  |  |  |
| 3.3: Obstruction Impact & Coverage Limitations | | | |
| What is the estimated frequency and duration of service interruptions or performance degradation over a 24-hour period if 10% of the required sky view is obstructed? |  |  |  |
| What is the estimated frequency and duration of service interruptions or performance degradation over a 24-hour period if 50% of the required sky view is obstructed? |  |  |  |
| What percentage of locations in the proposed project area are expected to lack sufficient unobstructed sky view due to terrain, foliage, or buildings, and how does the applicant plan to serve these locations? |  |  |  |

### Tab 4. Gateway Infrastructure and Satellite Uplinks Tab

| Field | Data type | Example | Description |
| --- | --- | --- | --- |
| 4.1: Gateway Side Location and Design | | | |
| How are gateway sites selected and constructed to manage the effects of local weather, foliage, terrain, and radio frequency interference? | Narrative |  |  |
| What operational or design measures are taken to ensure resiliency and consistent link quality under adverse conditions? | Narrative |  |  |
| 4.2: Backhaul and Capacity from Gateway to Internet Backbone | | | |
| Describe the upstream and downstream terrestrial backhaul used to connect gateway sites to the internet backbone and data centers. | Narrative |  |  |
| What is the current capacity of these backhaul connections? | Narrative |  |  |
| How is capacity scaled over time as demand increases? | Narrative |  |  |
| 4.3: Gateway to Satellite Link Characteristics | | | |
| What is the typical downlink and uplink channel size per gateway-to-satellite link? |  |  |  |
| What modulation and coding schemes are used for these links, and what is the resulting spectral efficiency? |  |  |  |
| What are the receive sensitivity and minimum SNR requirements for each supported data rate and modulation/coding level? |  |  |  |
| What fade margin is maintained on uplink and downlink transmissions to mitigate signal degradation due to rain, humidity, and other atmospheric conditions? |  |  |  |
| What is the aggregate throughput capacity from a single gateway site to the satellite constellation? |  |  |  |
| How many satellites can a single gateway maintain simultaneous connections with? | Number |  |  |
| Is the same frequency spectrum reused for multiple gateway-to-satellite links? If so, describe the reuse strategy and any limitations. | Narrative |  |  |

### Tab 5. Reliability and Quality of Service Tab

| Field | Data type | Example | Description |
| --- | --- | --- | --- |
| 5.1: Performance Threshold | | | |
| How does the applicant monitor and ensure that roundtrip latency, real-time packet loss, and jitter remain within the following thresholds during typical and peak operating conditions? |  | Latency: ≤ 100 ms  Packet loss: ≤ 2% over any 15-second interval  Jitter: ≤ 30 ms over any 15-second interval |  |
| 5.2: Network Management & Redundancy | | | |
| How is network congestion detected in real time? | Narrative |  |  |
| What mechanisms are used to prioritize or shape traffic during periods of congestion? | Narrative |  |  |
| How does the system mitigate packet loss or disruption during handoffs between satellites? | Narrative |  |  |
| What redundancy is built into the last-mile access path to preserve session continuity during brief interruptions or link degradation? | Narrative |  |  |
| 5.3: Handoff Performance Metrics | | | |
| In a worst-case scenario, what is the measured duration of MAC-layer link loss during a satellite handoff? | Narrative |  |  |
| What is the impact of satellite handoff on end-to-end latency, including any mitigation techniques? | Narrative |  |  |
| What is the expected instantaneous packet loss (in % or packet count) during satellite handoff or gateway reassignment? | Number |  |  |

### Tab 6. Performance Calculations Tab

| Field | Data type | Example | Description |
| --- | --- | --- | --- |
| 6.1: Demonstration of Capacity | | | |
| Using worst-case design assumptions, please provide calculations demonstrating that the network can provide to each location at the time of activation:  (1) A minimum of 100 Mbps download and 20 Mbps upload  (2) ≤ 100 ms roundtrip latency  (3) Simultaneous 5 Mbps to all connected locations sharing the beam, including BEAD and non-BEAD users | Number |  | Calculations should be for the proposed design specific to the BSLs and all network components encompassed the application.  Please include the following in your calculations:   1. Existing network components upon which the application is dependent 2. Oversubscription ratios   Your calculations must account for total spectrum usage within the beam(s) serving the proposed project area as well as total spectrum usage and capacity between the satellite(s) and terrestrial gateway(s). |
| 6.2: Demonstration of Scalability | | | |
| Please demonstrate, using calculations based on the submitted technical information, how the proposed network will meet the following performance targets five years after initial deployment, assuming a 25% annual increase in capacity demand:  (1) Provide at least 240 Mbps download and 48 Mbps upload capacity to each Broadband Serviceable Location (BSL)  (2) Maintain roundtrip latency no greater than 100 ms under projected peak load  (3) Support simultaneous 12 Mbps throughput for all connected users sharing beam capacity (including BEAD-funded and non-BEAD users) | Number |  | Your response must:   1. Account for total spectrum usage within the beam(s) serving the proposed project area 2. Account for total spectrum usage and capacity between satellite(s) and terrestrial gateway(s) 3. Describe if and how spectrum can be added to the network to meet future demand, including required U.S. and international regulatory approvals, expected approval timelines, and associated risks 4. Describe if and how additional satellites may be deployed to meet future demand, including required U.S. and international regulatory approvals, expected approval timelines, and associated risks. |
| 6.3: Demonstration of Support for 5G and Advanced Services | | | |
| Please demonstrate, using calculations based on the submitted technical information, how the proposed network will support deployment of 5G, successor wireless technologies, and other advanced services.  For the purpose of this demonstration, calculations should be based on one of the following two scenarios:  (1) Rural capacity backhaul to one provider at each of three locations, or  (2) Three separate providers at one location each | Number |  | The calculations must demonstrate that the following performance targets can be met:   1. Deliver at least 300 Mbps download and 30 Mbps upload capacity to each of three 5G mobile providers collocated at a location within the proposed project area (totaling 900/90 Mbps aggregate capacity) 2. Maintain roundtrip latency no greater than 100 ms on each of these links.   Your response must:   1. Account for all spectrum use within the beam(s) serving the proposed area, including BEAD-funded and other active users 2. Account for all spectrum use and throughput capacity between the satellite(s) and terrestrial gateway(s) |