# Broadband Equity, Access, and Deployment (BEAD) Program: Unlicensed Fixed Wireless (ULFW) Service Evidence Template Instructions and Schema

This document is intended to guide BEAD applicants in completing the **Unlicensed Fixed Wireless Service Evidence Template**. The evidence is required to demonstrate the applicant has taken the steps necessary to resolve potential interference and capacity constraints associated with such technology and these steps address the problem of interference from other Part 15 users[[1]](#footnote-1) competing for the same spectrum. The evidence will be used to ensure the applicant is compliant with 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).

## ULFW Service Evidence Template Submission Instructions

1. Refer to the schema below for detailed instructions on how to complete each tab and its associated fields. All fields are required unless otherwise stated.
2. Save your completed ULFW Service Evidence Template with the following file name format: <<CompanyName>>\_ULFWEvidence\_<<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.

## ULFW Service Evidence Template Schema

The ULFW Service Evidence Template contains eight tabs:

|  |  |
| --- | --- |
| **Tab number** | **Description** |
| 1 | Instructions |
| 2 | Logical network diagram |
| 3 | Network assumptions |
| 4 | Tower sites |
| 5 | Sectors |
| 6 | BSLs (Broadband Serviceable Locations) |
| 7 | Uplink MCS table |
| 8 | Downlink MCS table |

Information must be entered for all fields in Tabs 2 – 8. All supplemental evidence files and documents must be submitted with the completed ULFW Service Evidence Template.

### Tab 2. Logical Network Diagram Tab

| Field | Data type | Example | Description | Constraints |
| --- | --- | --- | --- | --- |
| Logical network diagram | Image | Diagram | Provide a logical diagram showing backhaul connection between the Internet and provider demarcation; provider-operated backbone fiber or wireless network to base station site(s); towers/vertical structures; radio access network (RAN); frequency bands and channels used; example premises installation(s) (vertical structure where applicable, connection from antenna to CPE, connection from CPE to user equipment) | Illustrate a worst-case scenario for link capacities and number of subscribers served per network segment |

### Tab 3. Network Assumptions Tab

| Field | Data type | Example | Description | Constraints |
| --- | --- | --- | --- | --- |
| Maximum downlink user throughput (Mbps) | Float | 1000.0 | Absolute maximum downlink throughput can be provided to a single user | Range: 1.0 to 4,000.0  At least one decimal place |
| Maximum uplink user throughput (Mbps) | Float | 200.0 | Absolute maximum uplink throughput can be provided to a single user | Range: 1.0 to 4,000.0  At least one decimal place |
| Maximum latency of the network (milliseconds) | Float | 10.0 | End-to-end latency (CPE to internet gateway) | Range: 1.0 to 1,000.0  At least one decimal place |
| Maximum coverage distance (mi) | Float | 7.0 | Maximum coverage allowable by the manufacturer timeslot configuration (if applicable) | Range: 0.1 to 1000.0  At least one decimal place  Specify 999 if network is FDD |
| Design network availability per month (%) | Percentage | 99.999% | Design network availability percentage time including RAN and backhaul components | At least three decimal places |
| Design oversubscription percentage | Float | 20.0 | Also known as contention ratio. How many end users share the same network capacity or bandwidth resources | Range: 1.0 to 1,000.0  At least one decimal place |
| For TDD channels; DL to UL channel ratio | String | 4:5:1 | TDD (Time Division Duplex) ratio defines how time slots are allocated between uplink and downlink transmissions in wireless networks that use TDD technology |  |
| Network-Specific | | | | |
| Radio Access Network (RAN) manufacturer | String | Acme Technologies | Name of radio manufacturer |  |
| Maximum number of MIMO layers supported | String | 4 Layers Downlink 2 Layers Uplink | Number of independent streams each antenna supports |  |
| Beamforming mechanism/technique and expected capacity gains used to improve throughput and capacity | String | Massive MIMO with expected capacity gains of 2X-6X | Description of beamforming and massive MIMO scheme | Limit of 255 characters  N/A if passive antennas are being used |
| Carrier aggregation techniques to improve throughput and capacity | String | 5X20 MHz CA Downlink 3x20 MHz Uplink | Description of channel aggregation methods | Limit of 255 characters |
| Description of security to prevent unauthorized devices and users from having access to the network | String |  | Description of the security algorithms the network uses | Limit of 255 characters |
| Description of user prioritization | String |  | Description of the scheduler of the RAN and its features | Limit of 255 characters |
| Description of system redundancy | String |  | List of features that describe the redundancies in the network that eliminate single point of failures | Limit of 255 characters |
| Does your system operate solely on the unlicensed spectrum? | String | Yes | Indicate whether the RAN solely operates on unlicensed spectrum such as 5.8 GHz | Valid responses: ‘Yes’ or ‘No’ |
| Describe any coverage threshold margins that should account for interference. How are these margins accounted for in planning? | String |  | Describe the derivations of margins that account for external interference set in RSL and C/N thresholds in MCS tables | Limit of 255 characters |
| Describe the effects of unlicensed interference on system capacity. | String |  | Describe impact of external interference based on applicant experience (if applicable) | Limit of 255 characters |
| Description of interference cancelation at the CPE. Provide the typical interference suppression in dB | String |  | Describe any CPE interference cancelation mechanisms | Limit of 255 characters |
| Description of interference cancelation at the base station. Provide the typical interference suppression in dB. | String |  | Describe any base station interference cancelation mechanisms | Limit of 255 characters |
| Describe how the proposed network will meet the following performance targets five years after initial deployment: (1) Provide at least 240 Mbps download and 48 Mbps upload capacity to each Broadband Serviceable Location (BSL), (2)Support simultaneous 12 Mbps throughput for all connected users (BEAD and non-BEAD users) |  |  |  | Please include the following in your calculations:  (1) Existing and future network components upon which the application is dependent  (2) Oversubscription ratios  (3) Number of anticipated subscribers that will utilize shared capacity along any segment of the network as of the activation date  Calculations should be for the proposed design specific to the BSLs and all network components encompassed the application |
| Describe how the proposed network will support deployment of 5G, successor wireless technologies, and other advanced services. How will your network be able to support rural capacity backhaul of at least 300 Mbps download and 30 Mbps upload capacity to each of three mobile carriers within the proposed project area? |  |  |  | Your response must include a description of the technology used for the backhaul (if different from the one serving the BSLs) and any modifications that need to be made to the network. |

### Tab 4. Tower Sites Tab

| Field | Data type | Example | Description | Constraints |
| --- | --- | --- | --- | --- |
| Site name | String | LIZ001 | String identifier of the site | All sites **must** have a unique site name |
| Latitude | Float | 36.243600 | Geographic coordinate in decimal degrees (WGS84), indicating the north–south position of the tower site | Range: -90.000000 to 90.000000  At least six decimal places |
| Longitude | Float | -77.931100 | Geographic coordinate in decimal degrees (WGS84), indicating the east–west position of the tower site | Range:  -180.000000 to 180.000000  At least six decimal places |
| Elevation (feet) | Float | 5.0 | The elevation of the site above mean sea level | Range:  -32,000.0 to 32,000.0  At least one decimal place |
| Address line 1 | String | 1312 Mockingbird Lane | Primary street address or physical location of the site (e.g., street number and name) |  |
| Address line 2 | String | Unit. 1 | Additional address information such as unit, suite, apartment, or building number for the tower site |  |
| Address line 3 | String | Anytown, USA 00000 | City, state, and ZIP code for the tower site |  |
| Backhaul type | String | Wireless | Type of network connection used to link the tower site to the core network |  |
| Backhaul capacity (Mbps) | Float | 2000.0 | Maximum data transmission capacity of the backhaul connection serving the tower site | Range: 1.0 - 20,000.0  At least one decimal place |
| Structure type | String | Monopole | Type of physical structure supporting the tower site equipment |  |
| Call signs for FCC licenses | String | WLX123,WLX456 | FCC-assigned call signs associated with the licenses required for operation at the site; for unlicensed spectrum use “Unlicensed”; for 3.65 GHz GAA spectrum use “GAA” | Valid responses: Unlicensed, GAA, or list of FCC call signs |
| Existing or new tower | String | Existing | Indicates whether the tower is an existing structure or if applicant is proposing to build a new tower | Valid responses: ‘Existing’ or ‘New’ |

### Tab 5. Sectors Tab

| Field | Data type | Example | Description | Constraints |
| --- | --- | --- | --- | --- |
| Sector ID | String | LIZ\_A | String identifier of sector | All sectors listed **must** have a unique Sector ID |
| Name of parent site (the “site name” as referenced in the Tower Sites tab) | String | LIZ001 | Name of the parent site that the sector resides |  |
| Radio make and model number | String | Acme RRH 7 | Manufacturer make and model of sector radio |  |
| Transmit antenna gain (dBi) | Float | 16.0 | Gain of sector antenna relative to an isotropic antenna | Range: 0 to 100.0  At least one decimal place |
| Transmit antenna height (feet) | Float | 100.0 | Height above ground of sector antenna centerline | Range: 0 to 10,000.0  At least one decimal place |
| Antenna pointing azimuth (referenced to true north) | Float | 0 | The direction that sector antenna is point referenced to true north | Range: 0 to 359.9  At least one decimal place |
| Antenna down tilt (electrical or mechanical in degrees) | Float | -2.0 | The vertical tilt of sector antenna (negative is down positive is up) | Range: -30.0 to 30.0  At least one decimal place |
| Antenna Beamwidth (Degrees) | Float | 20.0 | The 3 dB beam width of the base station antenna; for antennas that use beamforming, use the minimum beamwidth of a single beam | Range: 0 to 360 |
| Antenna make and model number | String | Acme Antenna SD2500B90 | Manufacturer make and model of sector antenna |  |
| Transmit antenna pattern (provide pattern file) | String | Antenna File.PDF | File that contains cut sheet and antenna pattern information |  |
| Transmit max transmitter power per channel (dBmW) | Float | 40.0 | Maximum transmitted power referenced at radio output | Range: 0 to 1,000.0  At least one decimal place |
| Total transmit transmission line loss (dB) | Float | 1.0 | Losses between radio and antenna | Range: 0 to 100.0  At least one decimal place |
| Effective Isotropic Radiated Power (EIRP) (dBm) | Float | 55.0 | Power radiated out of antenna | Range: 0 to 1,000.0  At least one decimal place |
| Operating frequency bands | String | 2500, 3700 | Frequency band(s) in operation | Must be a list of center frequencies |
| Total channel bandwidth for all operating bands (MHz) | Float | 200.0 | Total bandwidth of all channels radiating from a given sector | Range: 1.0 to 10,000.0  At least one decimal place |
| Duplexing scheme TDD (Time Division Duplex) or FDD (Frequency Division Duplex) | String | TDD | Duplexing scheme | Valid responses: FDD’ or ‘TDD’ |

### Tab 6. BSLs (Broadband Serviceable Locations) Tab

| Field | Data type | Example | Description | Constraints |
| --- | --- | --- | --- | --- |
| FCC/NTIA Location ID | Integer | 1111111111 | The FCC/NTIA Location ID is a unique 10-digit number assigned by the FCC to identify a location where broadband Internet service is available. These IDs are used in the Broadband Serviceable Location Fabric, a geospatial dataset that maps locations with potential access to fixed broadband internet | All BSLs **must** have a unique FCC/NTIA Location ID |
| Elevation (feet) | Float | 5.0 | The elevation of the serviceable location above mean sea level | Range: -32,000.0 to 32,000.0  At least one decimal place |
| CPE make and model number | String | ACME CPE V4 | Manufacturer and model number of the customer premises equipment (CPE) installed at the location | Limit of 255 characters |
| CPE EIRP (dBm) | Float | 30.0 | Effective Isotropic Radiated Power (EIRP) of the customer premises equipment (CPE) measure in decibels relative to one milliwatt (dBm) | Range: 0 to 1,000.0  At least one decimal place |
| Losses from CPE unit to CPE antenna (dB) | Float | 0 | Signal losses between the CPE unit and its external antenna, measured in decibels (dB) | Range: 0 to 100.0  At least one decimal place |
| CPE antenna gain (dBi) | Float | 16.0 | Gain of the CPE antenna, measured in decibels relative to an isotropic radiator (dBi) | Range: 0 to 1000.0  At least one decimal place |
| Indoor or outdoor installation | String | Outdoor | Indicates whether the Customer Premises Equipment (CPE) is installed indoors or outdoors | Valid responses: ‘Indoor’ or ‘Outdoor’ |
| Signal intensity (e.g., Received Signal Power (RSRP)) (dBm) | Float | -81.1 | Measured strength of the received signal (or RSRP for 3GPP type deployments) at the CPE | Range: -200.0 to –30.0  At least one decimal place |
| Signal quality (e.g., Received Signal Quality (RSRQ), Signal to Noise Ratio (SNR)) (dB) | Float | 10.0 | Quality of the received signal at the CPE based on metrics such as SNR or RSRQ | Range: -20.0 to 50.0  At least one decimal place |
| Serving sector ID | String | LIZ\_A | String identifier of the sector | Must be one of the sector IDs in the sectors tab |
| Downlink Maximum Throughput (Mbps) based on MCS (Modulation Coding Scheme) Table | Float | 110.0 | Maximum achievable data transfer rate from the network to the CPE in Mbps based upon propagation losses and vendor MCS tables (do not use nominal or provisioned throughputs) | Range: 0 to 10,000.0  At least one decimal place  Do not use nominal or provisioned throughputs |
| Uplink Maximum Throughput (Mbps) based on MCS table | Float | 23.0 | Maximum achievable data transfer rate from the CPE to the network in Mbps based upon propagation losses and vendor MCS tables | Range: 0 to 10,000.0  At least one decimal place  Do not use nominal or provisioned throughputs |

### Tab 7. Uplink MCS Table Tab

| Field | Data type | Example | Description | Constraints |
| --- | --- | --- | --- | --- |
| Modulation type | String | QPSK | Modulation scheme used for the uplink transmission | Each row **must** have a unique modulation type |
| Channel bandwidth (MHz) | Float | 200.0 | Width of the radio channel in MHz used for uplink data transmission | Range: 1.0 to 1,000.0  At least one decimal place |
| Signal quality (e.g., RSRQ, SNR) (dB) | Float | 9.0 | Uplink signal clarity measured in dB (typically RSRQ for 3GPP technologies or SNR for proprietary technologies). | Range: -20.0 to 50.0  At least one decimal place |
| Corresponding signal intensity (e.g., RSRP, Received Power) (dBm) | Float | -80.0 | Uplink signal strength measured in dBm (typically RSRP for 3GPP technologies or RSL or RSSI for proprietary technologies) | Range: -200.0 to –30.0  At least one decimal place |
| Corresponding throughput (Mbps) | Float | 23.0 | Uplink data rate achieved under the MCS conditions measure in Mbps | Range: 0 to 10,000.0  At least one decimal place |

### Tab 8. Downlink MCS Table Tab

| Field | Data type | Example | Description | Constraints |
| --- | --- | --- | --- | --- |
| Modulation type | String | QPSK | Modulation scheme used for the downlink transmission | Each row **must** have a unique modulation |
| Channel bandwidth (MHz) | Float | 200.0 | Width of the radio channel in MHz used to transmit downlink data | Range: 1.0 to 1,000.0  At least one decimal place |
| Signal quality (e.g., RSRQ, SNR) (dB) | Float | 9.0 | Downlink signal clarity measured in dB | Range: -20.0 to 50.0  At least one decimal place |
| Corresponding signal intensity (e.g., RSRP, received power) (dBm) | Float | -80.0 | Downlink signal strength measured in dBm | Range: -200.0 to –30.0  At least one decimal place |
| Corresponding throughput (Mbps) | Float | 23.0 | Downlink data rate achieved under the MCS conditions measured in Mbps | Range: 0 to 10,000.0  At least one decimal place |

1. 47 CFR Part 15 (Radio Frequency Devices) [↑](#footnote-ref-1)