

**PROFESSIONAL SERVICES
WI-FI 6 RF SURVEY AND DESIGN
STATEMENT OF WORK
TO VERIZON PROFESSIONAL SERVICES SERVICE ATTACHMENT**

This Statement of Work (SOW) is entered into between the entities identified as, respectively, Verizon and Customer in the related Service Order Form (SOF).

1. **PROJECT DESCRIPTION.** Verizon’s Wi-Fi 6 RF Survey and Design (Wi-Fi 6 RF SD) service provides information required to deploy new or expanded 802.11 Wi-Fi environment commonly referred to as wireless local area network (WLAN). Wi-Fi 6 RF SD can diagnose performance issues with existing Wi-Fi Radio Frequency (RF) environment or provide Access Point (AP) planning for a new Wi-Fi RF environment. Verizon offers onsite and remote (predictive) wireless survey and design and will deliver the option (onsite or remote) set forth in the SOF. As part of the onsite survey, Verizon engineers measure actual 802.11 RF signal throughout Customer facility using industry standard 802.11 survey tool, and then will provide Customer with a Wi-Fi 6 RF SD Onsite Survey Report (Onsite Report) documenting Verizon’s analysis and findings. As part of a remote or predictive site survey, Verizon engineers use a tools-based virtual survey which imports floor plans of the site into the tool, the tool assigns attenuation values (how much RF energy is absorbed) for walls, floors, cubicles, windows and other objects on the floor plans, and the tool predicts the number and location of APs required to meet the desired coverage and performance goals. Verizon will provide a Wi-Fi 6 RF SD Predictive Survey Report (Predictive Report) documenting its analysis and findings.

2. **SCOPE OF WORK**

2.1 **Advanced Network Infrastructure – Consulting.** Verizon will conduct an onsite or remote Wi-Fi RF wireless local area network survey for the Customer facility as set forth in the SOF and the size provided in Table 1 below. The analysis will consider any current issues and/or design recommendations and focus on the WLAN and AP, RF design, and RF coverage. The Wi-Fi survey results will be used to create the Onsite Report or Predictive Report that will show and/or verify the recommended AP placements and include AP coverage per band, channel allocation, co-channel interference, AP location, interference location and any throughput testing results, as applicable.

2.2 **Core Packages.** The size of the core package selected will be determined by the square footage of Customer’s existing facility at the time of the Order and is available in Small, Medium, and Large. If during the Service Commitment, the square footage of Customer’s facility changes, Customer will be notified and an updated quote will be provided to the Customer. Core package sizes are available in the following levels:

Product	Facility Type	Facility Size Small	Facility Size Medium	Facility Size Large
Onsite or Remote Site Survey Design Analysis	Office Space Warehouse School/Colleges Retail Store Manufacturing	0 to 100,000 Square Foot	100,000 to 300,000 Square Foot	300,000 to 500,000 Square Foot

2.3 **Project Initiation.** Verizon will initiate the Scope of Work for Wi-Fi 6 RF SD (the Project) which includes the following work:

- Work with Customer to schedule a kick-off meeting to initiate the Project. Verizon and Customer will collaborate to determine required stakeholders and other attendees, agenda, and meeting details.
- Conduct Project planning discussions that may cover such topics as: Customer and Verizon team introductions, collection of Customer contact information, identification of Verizon contacts, review of roles and responsibilities, review of the Project scope.
- Conduct a Project kick-off meeting with Customer.
- Gather from Customer current floor plans for the facility. Verizon will utilize Customer’s existing site information and floor plans to prepare for the remote Wi-Fi RF site survey.

- Review existing WLAN network implementation documentation and configuration(s), as applicable, for the facility.
- Review and document Customer requirements for the WLAN Wi-Fi 6 RF SD including:
 - Coverage to support the maximum people, use, and capacity of the floors and areas within the floors of the facility.
 - Usage, number of people, and number and type of devices in use (within the facility and per user type).

2.4 **Onsite WLAN RF Survey and Analysis.** Verizon will perform an onsite Wi-Fi RF passive and active survey and analysis for the facility which includes the following work:

- For onsite Wi-Fi 6 RF SD, establish a schedule and site logistics for the onsite survey services at the facility with Customer.
 - Prepare for the onsite survey, including loading the site map(s) (floor plans) into the Wi-Fi survey tool.
 - Identify requirements and contacts for access to Customer's campus and escort requirements (if any).
 - Local Contact (LCON) or Manager on Duty (MOD) and Alternate LCON (ALCON).
- Meet with Customer's onsite personnel for access to the facility.
- Verify that floor plan drawings provided by Customer for each floor of the facility are to scale.
- At the facility, for each floor, gather and/or verify information for survey in areas requiring AP coverage, to consist of: wall materials, ceiling heights, AP placement locations, potential cabling restrictions, and potential RF interference problems.
- For each area of the facility, using Wi-Fi RF survey tool, perform RF coverage and spectrum analysis throughout entire Location for currently-installed APs.
 - Identify potential sources of interference (neighboring WLANs, cordless phones, cameras, microwave ovens, etc.).
 - Identify RF coverage gaps.
- Perform throughput testing (if required) using an iPerf server. Connect via the survey tool to one of the Customer SSIDs as a client, with the iPerf application running on a wired machine that is reachable from that SSID. Data packets are sent between the two devices during the survey to test the throughput of the network. The data is captured in a continuous manner during the onsite Wi-Fi survey.

2.4.1 **Data Analysis in Connection With Preparation of the Onsite Report.** Verizon will perform an analysis in connection with preparing the Onsite Report for the facility, and confirm and document the technical assessment and Wi-Fi survey results. The data analyzed for preparation of the Onsite Report will include the following information:

- Heat maps using the survey data and a review of heat maps for coverage gaps.
- Identification of potential and existing sources of interference on 5.0 GHz. Provide 5.0 GHz channelization plan.
- Quantity of APs, suggested AP locations, and updated number of APs and their associated locations using the tool.
- Wi-Fi survey results, including AP placement, cell overlap, and received signal strength indication (RSSI) to identify recommendations, settings, and configurations to deliver optimal performance for Wi-Fi traffic at the facility.
- Any recommended changes required to AP and/or WLAN settings or configurations to meet Customer's coverage requirements to be documented in the Onsite Report.
- Any issues, recommendations, and/or remediation relating to the current design and/or implementation.

If, after this analysis, Verizon needs additional information, Verizon will meet with Customer to review the data collected and obtain any other needed information from the Customer. Prior to delivery of the Onsite Report, Verizon may also meet with the Customer to discuss: data collected to date, any findings and/or recommendations, Wi-Fi 6 RF SD survey results from the onsite visit along with any findings and/or recommendations, any aspect of the draft Onsite Report in need of discussion, and anticipated delivery of the Onsite Report.

2.4.2 **Onsite Report.** The Onsite Report will document the results of the onsite Wi-Fi 6 RF SD survey along with any recommendations and include the following sections:

- RF coverage heat maps.
- Quantities and location of APs, per the design.
- Interference on both 2.4 and 5.0 GHz spectrums.
- Actual channelization parameters on both the 2.4 and 5.0 GHz spectrum.
- Recommendations on power level settings and channel assignments (if applicable).
- Coverage gaps or concerns, if applicable.
- After two weeks of delivery of the Onsite Report, the Project will be deemed completed and closed.

2.5 **Remote (Predictive) Wi-Fi 6 RF SD Survey.** Verizon will load the facility floor plans into the survey tool and conduct the following work:

- Identify and utilize any known information in the survey tool (as applicable):
 - Physical obstructions and potential problem areas (e.g., glass, metal, sculptures, moving walls).
 - User population data (e.g. at capacity, identification of maximum number of WLAN users at the facility).
 - Denote any areas where cabling/mounting of APs may be a challenge.
 - Denote critical areas of operation that may be affected by the implementation process.
 - Denote areas NOT to be covered: any area not within the Customer-provided facility floor plans as well as any area that Customer deems not required (bathrooms, stairwells, elevators, etc.).
- Run a predictive survey within the survey tool(s) to provide initial coverage and WLAN information on the 2.4 and 5.0 GHz spectrums.
- Create estimated heat maps using the proposed design and offline modelling tools.

2.5.1 **Predictive Report.** Verizon will prepare the Predictive Report and document the results of the remote (predictive) Wi-Fi RF survey along with any recommendations. The Predictive Report will consist of diagrams, supplemented with text and tabular data and include quantity of APs, modified floor plans showing recommended locations for additional APs with channel and power assignments noted, predictive RF coverage heat maps, and coverage gaps or concerns and/or design recommendations, if applicable. In addition, the Predictive Report will include the following information:

- Initial RF design using the pre-deployment/offline estimated and Customer specifications.
- Simulated heat maps using the proposed design and offline modeling tools.
- Proposed design/heat maps to show coverage gaps.
- Quantity of APs, suggested AP locations, and updated quantity of APs and their associated locations using the tool.

Verizon will meet with Customer to review the Predictive Report, results from the survey for each facility along with any findings and/or recommendations, and close out the Project.

3. **DELIVERABLES.** Deliverables are intended for Customer and Verizon use only. Customer may disclose a Deliverable to a third party pursuant to the Agreement's Confidentiality terms. Verizon will submit all final deliverable documentation to Customer in soft copy form via a secure web site provided by Verizon. Verizon will provide Customer with the applicable report (i.e. Onsite Report or Predictive Report) in .pdf, Word, and/or Visio files.

4. **CUSTOMER OBLIGATIONS.** Customer will provide timely access to the applicable facility, facility contacts, WLAN documentation, building floor plan(s), number of users expected to use the WLAN, number and types of devices that require access to the WLAN, type of WLAN (data or voice) for each floor, login credentials to a SSID propagated to Verizon to perform the survey (if onsite) and provision of a machine to install iPerf application for onsite survey (as applicable).

5. **OUT OF SCOPE.** Any work not specifically listed in this SOW is out of scope and must be contracted separately. Such out of scope work includes, but is not limited to, the following:

- Any changes, updates, installation, and/or configuration of Wireless APs and/or the Wireless LAN Controller.

- Survey, design, or quotation of services for AP installation (mounting and cabling), antenna placement, cable runs and mounting details.
- Physical implementation, AP mounting and cabling or rack, stack, and cabling of Wireless LAN Controller or other devices.