

### ADDENDUM NO. 3

DATE: April 12, 2020

TO: All Bidders

FROM: Penny Owens, Purchasing Agent

SUBJECT: Addendum No. 3 – RFP Transit Integrated Advanced Technology

RFPs TO BE OPENED: April 22, 2020\*\*\* at 11:00:00 a.m. Eastern Time

This addendum is being published to provide items of clarification and answer questions from potential proposers on the referenced RFP. This addendum becomes a part of the Contract Document and modifies the original specifications as noted.

#### Items for Clarification:

**ITEM #1: \*\*\*Postponement of RFP Due Date:** Due to the travel restrictions imposed by the State of Tennessee, the due date for the RFP for Transit Integrated Advanced Technology is hereby postponed until **June 12, 2020 at 11:00:00 a.m.** Should travel restrictions continue past April 30, 2020, this may be further delayed.

**ITEM #2: Site Visit:** In response to requests for a site visit, a site visit shall be scheduled for May 20, 2020 at 9:00 am (EST). The visit shall begin in the Transit Center Community Room at 301 E. Church Avenue, Knoxville, TN.

**ITEM #3: Extension of Question Deadline:** Due to the delays in the RFP process, the Question for Deadlines is hereby extended until May 22, 2020 at 4:30 pm (EST).

#### **ITEM #4: Response to Questions**

**Question #1:** Is there a DBE requirement goal for this specific RFP?

Response: No

**Question #2:** Please provide the following statistical information for Knoxville Area Transits' system usage for the most recently completed fiscal year:

- Total Sales of each pass broken down by sales channel (i.e. ticket windows, online, TVMs, etc.).
- Total passenger boardings by payment method used (cash, pass, transfer slip, change card, etc.).

Response: Please see the Annual Revenue and Ridership Report attached.

**Question #3:** Please review and approve the following below requested revisions to the Commercial General Liability requirements in section 6.8.A of the RFP (page 34-36):

A. Commercial General Liability:

(c.) At the sole discretion of the City, ~~dedicated~~ limits of liability for this specific project may be required.

F. Other Insurance Requirements.

Prior to commencement of services, furnish the City with original certificates and amendatory endorsements effecting coverage required by this section and provide that such insurance shall not be cancelled, ~~allowed to expire, or be materially reduced in coverage~~ except on 30 days' prior written notice to the City Attorney of Knoxville; P.O. Box 1631; Knoxville, Tennessee 37901 **or 10 days for Non-Payment of Premium.**

Response: This is the City's standard insurance language and we do not allow exceptions.

**Question #4:** Please delete the requirement found in Section 6.8, first paragraph (page 36) for certified copies of endorsements and policies, or approve the following revision to that requirement:

“Upon the City's request, provide ~~certified~~ copies of endorsements and policies ~~if requested by the City~~ in lieu of or in addition to certificates of insurance.

Response: This is the City's standard insurance language and we do not allow exceptions. Per Section 6.8(F) of the RFP, endorsements will be required.

**Question #5:** Sections 3.4.3 and 3.4.4 include requirements for bidders to propose one or more solutions for integration with the existing SPX Genfare farebox and TVM systems. Please confirm that data from those systems can be extracted in a .csv or similar format.

Response: Please obtain this information by contacting the SPX Genfare representative listed within the RFP, paragraph 3.4.4.

**Question #6:** In light of the questions and detail requested in the RFP, and to provide KAT with the best solution and cost, will KAT kindly please extend the due date of at least 4 weeks from the current proposal due date?

Response: See Item #1 above.

**Question #7:** The RFP restricts page size to 8 ½ X 11-inch paper. For complex documents like Microsoft Project plans and complex graphics, may Bidders use larger paper such as 11x17, folded down to 8 ½ X 11-inch size?

Response: Yes.

**Question #8:** Can Bidders exclude each of the following from the sequential numbering requirement due to issues with source file compatibility?

- signed forms
- attachments

Response: Yes.

**Question #9:** We may be submitting some pre-existing documents that have existing page numbering and some pages may not be numbered. Because these may be long and complex documents, may we leave them unaltered?

Can Bidders number the pages by major section (i.e., A-1, B-1)?

Response: Yes.

**Question #10:** Section 5.5 Base items and option items. The base item list does not include:

- 5.6.14 Voice Radio Integration

The capability would seem to be core functions that ought to be included in the base item list.

Can KAT clarify how the bidder should address this item is not included as part of the base?

For the items listed above:

In the absence of Voice Radio integration, is open microphone communication acceptable as a Baseline capability?

Response: KAT is pursuing AVL system integration with existing B.K. Technologies P25 compliant radios to achieve a closed loop communication. To us, close loop means the dispatch office can control who communicates with whom. This capability will significantly cut down in “chatter” and unnecessary transmissions. KAT is not pursuing a different communication system. If your base system inherently includes a different communication system and you are unable to offer integration with our existing system, then please state so in your proposed solution.

**Question #11:** Section 5.5 Base items and option items. The base items list does not include:

- 5.6.23 HRO Integration

The capability would seem to be core functions that ought to be included in the base item list.

1) Was it KAT’s intention to include HRO in the base items?

2) If not, Can KAT clarify how the bidder should address this item is not included as part of the base?

Response: Proposers are welcome to include HRO integration in their base offering if their system inherently includes this capability. If not, then the integration capability should be offered and priced separately as an option.

**Question #12:** Section 5.5 Base items and option items. The base items list does not include:

- 5.6.26 Fixed Route “Run-cut” Scheduling System

The capability would seem to be core functions that ought to be included in the base item list.

Can KAT clarify how the bidder should address this item if not included as part of the base?

Regarding Fixed Route and “Run cut” capability, is there an export of the schedule data available to the bidders from the existing KAT systems. Can an interface control document (ICD) or point of contact be provided?

Response: Proposers are welcome to include a fixed route run-cut system in their base offering if that capability is inherent to their system or necessary for their proposed solution. Otherwise, proposers should offer and price this capability as an option. The existing run cut system will export a GTFS feed of schedule data. For an interface control document or other information, we suggest contacting Trapeze Customer Care at 877.411.8727. A GTFS feed export is provided with this addendum.

**Question #13:** The RFP identifies a variety of vehicles and facilities where systems and equipment are to be installed. Will KAT support a pre-bid site visit to allow bidders a more detailed look at the existing operation and vehicles so that a more accurate proposal may be provided?

Response: See Item #2 above.

**Question #14:** Section 5.6.7 Automatic Bicycle Counter Solution. The requirement has very little detail/context.

1. Can KAT clarify the requirement?
2. If it is bike rack oriented, Can KAT advise of points of contact and bike rack vendor it uses?

Response: KAT desires to capture bicycle data and run reports showing how many times, where and when a transit vehicle bicycle rack is deployed and returned to the stowed position. Reports should cover user defined time periods (hours, days, weeks, months), and routes. If possible, reports should indicate how many bicycles were being carried in the rack when in use. KAT utilizes Byk-Rak and Sportworks bicycle racks.

**Question #15:** Destination Signs. In order to support 3<sup>rd</sup> party control and update of sign codes, it may be necessary to update the destination sign firmware to enable the required functionality. The cost of such upgrades may be within the scope of existing maintenance agreements that KAT has with its sign vendors. Can KAT advise: are firmware updates included at no additional cost in the KAT Maintenance agreements it has with the destination sign vendors?

Response: KAT has no such maintenance agreements with destination sign manufacturers.

**Question #16:** In order to support 3<sup>rd</sup> party logon of the fare box, it may be necessary to update the fare box firmware to enable the required functionality. The cost of such upgrades may be within the scope of existing maintenance agreements that KAT has with its fare box vendor. Can KAT advise: are firmware updates included at no additional cost in the KAT Maintenance agreements it has with its fare box vendor?

Response: KAT has no such maintenance agreements with the farebox manufacturer.

**Question #17:** The 4<sup>th</sup> bullet of 3.4.2 indicates that there is already passenger WIFI on-board KAT buses. However, 5.6.12 appears to be asking for Passenger WIFI again along with some additional requirements. These details seem inconsistent. Can KAT confirm that the existing Passenger WIFI on fixed route buses is to be replaced? Further to this, the addition of a new internet-use splash page is also required for Fixed Route buses.

Response: The existing Digi Routers enabling WIFI on fixed route buses are an integral part of the existing AVL equipment installed on each bus. Once all the old AVL bus hardware is removed (less the Digi Router), the WIFI will not work due to removal of the AVL system antenna. Proposals are to integrate use of existing Digi Routers into their AVL solution and ensure vehicles have WIFI for passenger use. Additionally, proposals shall **NOT** include a splash page and filtering solution but shall integrate with the City's existing system provided by Web-Titan.

**Question #18:** Will KAT provide additional details and specifications for desired electronic signs and displays?

Response: The twenty (20) bus bays and two (2) multi-line information signs exist outside on the bus platform. These signs reside within metal casings. Available space within bus bay casings measure 7 ½" H X 30" W X 3" D. Available space within multi-line sign casings measure 28 ¾" H X 43" W X 4 3/8" D. The information sign inside the transit center are wall mounted and not within any protective casing.

**Question #19:** Can vendors provide supplemental pricing exhibits for clarification of proposed services?

Response: Yes.

**Question #20:** Does Knoxville wish to see a breakdown of pricing for "base items" vs. "option items"? (pg 12 of RFP)

Response: Yes.

**Question #21:** How many fixed-route vehicles have double doors? How many fixed-route buses have single doors?

Response: Currently KAT operates sixty-one (61) heavy-duty buses with two double doors and fourteen (14) cutaways with one double door on fixed route service.

**Question #22:** Can Knoxville provide information on existing control units for the destination signage?

Response: Two Luminator control units – part # 510496305 and part # 510632344; one Hanover control unit – part # E420F.

**Question #23:** Can Knoxville provide detailed fleet breakdown detailing make, model and type of vehicles across the 76 vehicle fleet? How many of the vehicles are "heavy-duty buses"?

Response: See Fleet Information spreadsheet attached. All Gillig buses are heavy-duty.

**Question #24:** Can Knoxville provide a project budget and/or details on how the project will be funded?

Response: The City of Knoxville does not disclose funding information during the solicitation period. The project will be funded by a combination of multiple grants and local match funds.

**Question #25:** How much monthly data per vehicle is to be provided for passenger wifi?

Response: Solutions shall incorporate use of the City of Knoxville's wireless service plan with Verizon or Sprint.

**Question #26:** Does Knoxville currently have a yard management system?

Response: No.

**Question #27:** For section 5.6.3, can Knoxville clarify how many overall signs are needed? Are the existing Digital Recorders signs to be replaced or to be integrated?

Response: Section 5.6.3 refers to the single point log-in requirement. Heavy-duty buses have three destination signs – one front, one side and one rear. Cutaways have two destination signs – one front and one side. Destination sign manufacturers are Luminator and Hanover.

**Question #28:** Can Knoxville provide more details as to the existing Garage WLAN infrastructure and additional specifications as to the desired integration?

Response: KAT utilizes Fortinet FAP222C Access Points. Please refer to the product matrix included with this addendum.

**Question #29:** Can KAT confirm that the existing WLAN infrastructure at bus parking and storage facilities:

1. Provides sufficient saturated WLAN coverage in all parts of the facilities
2. Supports an average throughput (upload and download) of 50Mbps or better to a designated machine on the internet.

Response: Please refer to the Fortinet product matrix included with this addendum.

**Question #30:** Requirement: Automatic Vehicle Monitoring. Does this capability apply to Fixed Route or both Fixed Route and Paratransit Vehicles?

Response: The Automatic Vehicle Monitoring requirement applies to J1939, not OBD-II.

**Question #31:** Requirement: Voice Radio Communication Integration. Does this capability apply to Fixed Route or both Fixed Route and Paratransit Vehicles?

Response: This requirement applies to radios installed in both fixed route and demand response vehicles.

**Question #32:** Requirement: Pedestrian Warning System. Does this capability apply to Fixed Route or both Fixed Route and Paratransit Vehicles?

Response: This requirement applies to Fixed Route only.

**Question #33:** Requirement: Driver Training Vehicle Simulation System. Should there be separate simulations, i.e. one for Fixed Route and One for Paratransit?

Response: The proposed system should be for Fixed Route only.

**Question #34:** In Section 5.6.13 on page 19, does "kiosk" refer to Ticket Vending Machines, or retail/agency point of sale terminals? How many of these units should be included in the pricing?

Response: This requirement refers to Ticket Vending Machines that can be installed at the transit center and/or high-use bus stops that contain robust passenger amenities. Pricing should be per each. We envision one at the transit center and up to four bus stop locations for this capability subject to availability of funds.

**Question #35:** What is the City's total budget for this procurement? Can the budget be broken down for (a) base items as laid out in Section 5.5, and (b) optional items?

Response: The City of Knoxville does not disclose funding information during the solicitation period.

**Question #36:** Can the City rank the relative importance of the optional items? Specifically, we are interested in where the fare collection component falls amongst the City's priorities.

Response: All elements of the fare collection solution with exception of replacement of existing validating fareboxes is high priority. Farebox replacement is currently medium priority.

**Question #37:** Section 5.6.29. Typically, wayside systems provide ETA of buses in Real Time. Is it really required to provide both Arrival & Departure?

Response: Proposed solutions may provide for predicted arrival information only.

**Question #38:** Section 5.6.30. Can Knoxville define extreme weather, at least temperature wise?

Response: Proposers should refer to historical data for Knoxville/Knox County available from the National Oceanic and Atmospheric Administration.

**Question #39:** Section 5.6.31

- a. Is Power provided at "Super Stops"?
- b. Is Ethernet provided at "Super Stops"?
- c. Is Total number of initial "Super Stops" 3?

d. Is there a preferred digital signage technology: LED, Epaper, LCD?

Response: The City of Knoxville shall provide required power and Ethernet capabilities at Super Stops. KAT prefers LED signage.

**Question #40:** Under 5.8 Warranty, Training, & Maintenance. It is mentioned that warranty is 2 years, but Knoxville might be interested in extended warranty. Then for maintenance, proposal is to include a two-year program, but Knoxville wants pricing for years 3 to 5. Please confirm that Knoxville interest in EXTENDED warranty is covered by extended maintenance contract.

Response: The City of Knoxville expects warranties to apply to hardware and maintenance contracts to apply to software related services.

**Question #41:** To fully respond, we need to better understand the nature of the interface between the KAT time-keeping system and the City payroll system. At this juncture, we only need a high-level description of the data to be exchanged. If we were to be the successful bidder, we'd probably need to get more information to implement the interface. If there is any documentation that you can share that will help us understand the interface, please forward it if possible.

Response: KAT's timekeeping/payroll system is independent of the City payroll system. KAT's payroll system generates the documentation necessary to impound the funds from the City's account. The integration capability we are desiring is the ability to utilize a vehicle operator's AVL log-in and log-out to act as an electronic record substitution for clocking in and clocking out on a time-clock type device. No documentation is available at this time.

**Question #42:** If there are fees payable to a current KAT vendor to enable one of the requested integrations with CAD/AVL, should those fees be included in the proposer's bid? Or will KAT pay the integration fees directly to the 3<sup>rd</sup> party (vendor of existing system (e.g. StarTran TransitFleet)) through KAT's current contract with that vendor?

Response: Fees are to be included in the proposer's proposal.

**Question #43:** Page 12: Item 5.5 includes a list of base items for the proposal. The section states that "all other items shall be offered as 'options' for purchase throughout the contract term as funding becomes available." However, many of these items have requirements say that the "Proposer shall" or "Proposer must". Furthermore, this list includes "AVL/CAD". An AVL/CAD system typically encompasses a set of features and functionalities, such as Voice Integration and Service Restoration. However, these items are not specifically listed as "Base Items". Can KAT please confirm that the following items should be included in the base?

- Real-Time Passenger Information (RTPI) System
- Pre-Trip Inspection
- Single-Point Logon
- Ridership Reporting
- Operational Reporting
- Destination Sign Integration
- Apollo Video Surveillance System Integration
- Voice Radio / Closed Loop FM Communication Integration



Response: At a minimum our intent is to replace KAT's existing, aged CAD/AVL and related passenger information technology, subject to availability of funds. Should a proposer's standard CAD/AVL system contain items listed in the RFP as optional, then proposers should state this in their proposal. Also, regarding RFP language references to "shall" or "must", proposers should utilize the response coding described in paragraph 5.4 within their proposal to each item indicating how well their product/service meets the RFP specification.

**Question #44:** Page 68: The current Pricing Proposal only lists "Fixed Route 'Run-Cut' Scheduling Service as an option. Can KAT please update the price sheet to reflect the base items and the optional items, as well as lines for the warranty/maintenance years?

Response: See the attached, revised pricing sheet.

**QUESTION #45:** Page 14: Requirement 5.6.4 KAT requests new interior speakers for the fleet. Can proposers assume that exterior speakers are to be reused?

Response: For clarification, the quantity of speakers described in 5.6.4 includes the external speaker.

**QUESTION #46:** Page 13: Item 5.6.2 requests a "portable device" for pre-trip inspection. Would KAT be open to a solution that utilizes a fixed device, which minimizes chance of loss, damage, or theft?

Response: Proposers should utilize the response coding described in paragraph 5.4 within their response to each item indicating how well their product/service meets the RFP specification.

**QUESTION #47:** Page 5 & 13: Item 5.6.1 requests that "The VLU shall include an embedded cellular modem or external modem compatible with the City of Knoxville selected cellular service provider." However, Page 5 (Item 3.4.2) requests integration with the existing Digi Routers on the vehicles. Can KAT please confirm that proposers should reuse the existing Digi Routers on the vehicles and not provide an additional embedded cellular modem or external router? Also, if any of the vehicles do not already have a Digi Router, should bidders propose a Digi router for those vehicles?

Response: Proposers should reuse existing Digi Routers where vehicles are currently equipped and not provide an additional embedded cellular modem or external router. Proposals, however, must include provision and installation of Digi Routers for revenue vehicles not so equipped (twenty-five para-transit vans).

**QUESTION #48:** Page 17: Item 5.6.7 requests proposers to provide Automatic Bicycle Counters (ABCs). Does KAT currently have ABCs on any of the buses? If so, what make/model? Does KAT desire the same make/model on the other buses? Is there a Discrete I/O available to indicate when the rack is deployed and stowed? Is there a signal on the rack that would allow us to tell if a space is occupied or empty after stowing?

Response: KAT does not possess any Automatic Bicycle Counters.

**QUESTION #49:** Page 17: Item 5.6.11 requests two 24-inch LCD signs for On-Board Infotainment Systems. Would KAT consider screens of another size, such as a 29-inch ultra-wide screen? This would allow more screen area for video and improved install location.

Response: Yes, this is acceptable.

**QUESTION #50:** Page 19: Item 5.6.11 mentions workstation hardware. Does KAT plan on reusing existing workstations or providing their own? If reusing, please provide specifications for the existing workstations. If procuring your own new workstation hardware, would you like vendors to provide minimum required specifications with our proposal? If bidders are to propose/price workstations, can KAT please clarify the below:

- If so, how many dispatch positions are required?
- If so, how many Oversight/Management Monitoring Positions are required?
- How many Data Admin workstations are required?

Response: The City of Knoxville provides all workstations connected to the City I.T. network. KAT intends to utilize existing workstations to the extent possible. Proposers should include hardware and operating system requirements for their proposed systems. If the awarded proposal requires workstation and operating system capabilities not currently used, KAT will address required upgrades separately with City Information Systems. Proposals do not need to include provisions for workstation hardware and operating system.

**QUESTION #51:** Page 30 (Item 5.6.31): For the 3 Super-Stop signs, does KAT desire LCD or LED signage?

Response: KAT prefers LED signage.

**QUESTION #52:** Page 27 (Item 5.6.25): Can KAT please confirm that the agency will provide the existing equipment (i.e. fare collection devices, destination signs, and radios) to support the simulator?

Response: KAT will only provide an existing GFI Odyssey electronic validating farebox with TRiM and a P25 compliant FM radio for the proposed driver training vehicle simulation system.

**QUESTION #53:** Page 13: Item 5.6.2 states that the Pre-Trip Inspection Form would be attached/provided. We were unable to find this sample in the RFP. Could KAT please direct us to the form or please provide?

Response: KAT's current pre-trip inspection form is attached.

**Question #54:** Assuming the current fixed-route scheduling software remains in place, is an export available from that current system? If so, can KAT please provide us a sample of the export? If not, are proposers required to provide all interface costs in their pricing?

Response: The existing run cut system will export a GTFS feed of schedule data. Proposers are required to provide all interface costs in their pricing.

**QUESTION #55:** During what days and hours can vehicle installations occur? What is the mandatory stop time for pull-outs? Also, how many buses will KAT make available per day? Once we finish installation on a bus, will another bus be made available during the same shift, assuming we have enough time to complete before pull-out?

Response: KAT vehicles are available for de-installation of old equipment and installation of new equipment from 8:00 p.m. until 5:00 a.m. (Eastern Standard Time), 7 days per week with exception of the four days per year KAT is closed, (New Year's day, Fourth of July, Thanksgiving day, and Christmas day). KAT maintenance shop area can be made available for de-installation/installation for up to two vehicles at a time. KAT mechanics will position and rotate vehicles within the shop area as needed for the awarded Contractor's de-installation/installation personnel. The awarded Contractor is responsible for de-installation of old equipment being replaced and installation of new equipment. All de-installed equipment shall be provided to KAT's maintenance department for disposition/disposal.

**QUESTION #56:** Will the agency be able to provide secure storage for bus kits, which are required for installation and would be shipped prior to the start of installation?

Response: Yes. The awarded Contractor's equipment should be shipped to KAT's maintenance department at 1135 E. Magnolia Avenue, Knoxville, TN 37917. Equipment will be stored within KAT's secure warehouse building one block from the maintenance shop.

**QUESTION #57:** Does the installation require removal of any existing equipment? If so, please specify what equipment needs to be removed from the vehicles. If so, who is responsible for equipment disposal?

Response: See response to question # 14 above. Also, de-installation should only involve de-installation of electronic equipment inside of vehicle electronic cabinets (less Digi Router), external antenna devices and related cabling/wiring.

**QUESTION #58:** We have reached out to the contact at Cummins that the RFP indicated was correct, and have been advised by Todd Mysak that he is NOT the correct contact, but also he was unable to direct us to the right person.

Response: That has now been corrected and Todd Mysak is the correct contact.

**END OF ADDENDUM NO. 3**

# ANNUAL REVENUE AND RIDERSHIP REPORT

JULY 2018 - JUNE 2019

KNOXVILLE AREA TRANSIT

## Revenue and Ridership

Period	Bus Probed	Current Revenue	Ridership	Token Count	Ticket Count	Pass Count	Bill Count	\$1.00 Count	\$5.00 Count	\$10.00 Count	\$20.00 Count	Unclassified Revenue
<b>Monthly Summary</b>												
July 2018	1,635	72,381.67	222,595	0	0	127,161	46,774	44,648	1,831	184	79	1,168.40
August 2018	1,791	83,484.72	250,575	0	0	146,286	53,674	51,133	2,181	224	107	1,352.35
September 2018	1,695	78,573.14	239,479	0	0	140,682	49,930	47,450	2,108	201	125	1,242.09
October 2018	1,796	85,563.07	257,048	0	0	155,168	55,354	52,806	2,216	206	101	1,457.67
November 2018	1,649	72,006.25	227,091	0	0	128,281	46,538	44,392	1,849	199	80	1,132.53
December 2018	1,616	70,001.24	199,047	0	0	118,617	45,722	43,674	1,789	180	56	1,166.80
January 2019	1,726	71,085.86	211,350	0	0	125,678	45,427	43,283	1,853	176	81	1,006.05
February 2019	1,596	69,667.14	210,345	0	0	126,024	44,505	42,357	1,886	165	78	1,092.07
March 2019	1,757	75,489.71	231,111	0	0	137,864	47,927	45,644	1,990	168	104	1,140.90
April 2019	1,707	73,008.53	232,066	0	0	136,171	46,107	43,895	1,876	211	101	1,308.52
May 2019	1,799	80,228.60	227,142	0	0	138,258	51,408	49,076	1,989	224	98	1,386.32
June 2019	1,677	73,507.60	205,901	0	0	125,742	47,382	45,226	1,891	159	83	1,281.61
<b>Total</b>	<b>20,444</b>	<b>904,997.53</b>	<b>2,713,750</b>	<b>0</b>	<b>0</b>	<b>1,605,932</b>	<b>580,748</b>	<b>553,584</b>	<b>23,459</b>	<b>2,297</b>	<b>1,093</b>	<b>14,735.31</b>

# ANNUAL REVENUE AND RIDERSHIP REPORT

JULY 2018 - JUNE 2019

KNOXVILLE AREA TRANSIT

## Token, Ticket, and Pass Count

Period	TTP 1 RegBasic	TTP 2 SDSBasic	TTP 3 TRLY	TTP 4 TRLY2BU	TTP 5 SDS T2B	TTP 6 Courtesy	TTP 7 30D Rect	TTP 8 30D SDS	TTP 9 7D Recpt	TTP 10 7D SDS	TTP 11 20R Rect	TTP 12 UT Pass	TTP 13 SEM	TTP 14	TTP 15 SDS	TTP 16 SDS
<b>Monthly Summary</b>																
July 2018	6,833	1,723	0	0	0	802	0	0	0	0	0	0	886	0	8,512	2,070
August 2018	7,483	1,867	0	0	0	937	0	0	0	0	0	0	4,627	0	9,307	2,300
September 2018	7,077	1,704	0	0	0	969	0	0	0	0	0	0	10,552	0	8,326	2,073
October 2018	7,559	1,888	0	0	0	1,026	0	0	0	0	0	0	12,375	0	8,824	2,283
November 2018	6,464	1,496	0	0	0	951	0	0	0	0	0	0	10,981	0	7,510	1,814
December 2018	6,162	1,564	0	0	0	944	0	0	0	0	0	0	4,069	0	7,815	1,931
January 2019	6,305	1,594	0	0	0	891	0	0	0	0	0	0	8,536	0	7,698	1,925
February 2019	6,160	1,592	0	0	0	492	0	0	0	0	0	0	10,937	0	7,762	1,947
March 2019	6,290	1,667	0	0	0	536	0	0	0	0	0	0	8,378	0	8,656	2,039
April 2019	6,175	1,878	0	0	0	480	0	0	0	0	0	0	9,745	0	8,481	2,236
May 2019	6,844	2,252	0	0	0	557	0	0	0	0	0	0	2,538	0	9,671	2,694
June 2019	6,246	1,842	0	0	0	486	0	0	0	0	0	0	1,159	0	8,691	2,212
<b>Total</b>	<b>79,598</b>	<b>21,067</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9,071</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>84,783</b>	<b>0</b>	<b>101,253</b>	<b>25,524</b>

# ANNUAL REVENUE AND RIDERSHIP REPORT

JULY 2018 - JUNE 2019

KNOXVILLE AREA TRANSIT

## Token, Ticket, and Pass Count

Period	TTP 17 SDS	TTP 18 EX	TTP 19 ULLFAR	TTP 20 TRANSFEID	TTP 21 DAYPASS	TTP 22 CHANGE	TTP 23 30-DAY	TTP 24 30D SDS	TTP 25 7-DAY	TTP 26 7DAY	TTP 27 UT Pass	TTP 28 1-DAY	TTP 29 1D SDS	TTP 30 TRLY	TTP 31 20-RIDE	TTP 32 20R SDS
<b>Monthly Summary</b>																
July 2018	3,851	0	24,090	7,673	3,880	8,723	25,570	32,350	9,589	2,364	0	17,505	13,497	0	2,156	635
August 2018	4,197	0	27,810	8,571	4,587	9,977	26,193	37,013	11,489	2,650	0	20,761	15,420	0	2,339	765
September 2018	3,753	0	26,689	8,182	4,207	9,862	23,253	32,702	11,176	2,641	0	19,405	13,776	0	2,191	663
October 2018	4,228	0	28,865	8,729	4,741	10,426	25,510	36,827	11,640	3,135	0	21,472	15,367	0	2,311	819
November 2018	3,422	0	24,207	7,449	4,055	8,904	20,400	30,431	9,346	1,916	0	18,624	12,342	0	1,915	659
December 2018	3,546	0	22,662	7,096	4,128	8,980	18,531	29,335	9,345	1,801	0	18,439	12,459	0	2,147	814
January 2019	3,482	0	23,992	7,238	3,948	8,915	20,437	29,476	8,626	2,283	0	18,340	12,599	0	2,435	782
February 2019	3,516	0	23,493	7,048	3,770	8,558	19,877	28,886	10,091	1,782	0	17,870	12,785	0	2,086	751
March 2019	3,945	0	25,258	7,220	4,095	9,390	21,925	35,917	10,852	2,099	0	19,060	14,558	0	2,126	843
April 2019	3,574	0	24,495	7,028	3,968	8,969	20,707	35,763	10,179	2,455	0	18,728	13,395	0	2,297	861
May 2019	4,252	0	26,488	7,806	4,335	9,623	20,930	37,406	10,668	3,255	0	20,585	15,685	0	2,312	797
June 2019	3,887	0	24,009	7,162	4,071	9,200	19,498	32,353	10,664	2,667	0	20,151	14,506	0	1,782	880
<b>Total</b>	<b>45,653</b>	<b>0</b>	<b>302,058</b>	<b>91,202</b>	<b>49,785</b>	<b>111,527</b>	<b>262,831</b>	<b>398,459</b>	<b>123,665</b>	<b>29,048</b>	<b>0</b>	<b>230,940</b>	<b>166,389</b>	<b>0</b>	<b>26,097</b>	<b>9,269</b>

# ANNUAL REVENUE AND RIDERSHIP REPORT

JULY 2018 - JUNE 2019

KNOXVILLE AREA TRANSIT

## Token, Ticket, and Pass Count

Period	TTP 33 1RIDE	TTP 34 1R SDS	TTP 35 COMP	TTP 36 CHANGE	TTP 37	TTP 38	TTP 39	TTP 40	TTP 41	TTP 42	TTP 43	TTP 44	TTP 45	TTP 46	TTP 47	TTP 48
<b>Monthly Summary</b>																
July 2018	1,979	427	0	10,845	0	0	0	0	0	0	0	0	0	0	0	0
August 2018	2,316	385	12	12,029	0	0	0	0	0	0	0	0	0	0	0	0
September 2018	1,972	333	73	12,195	0	0	0	0	0	0	0	0	0	0	0	0
October 2018	2,186	307	51	12,695	0	0	0	0	0	0	0	0	0	0	0	0
November 2018	1,942	339	14	10,461	0	0	0	0	0	0	0	0	0	0	0	0
December 2018	1,845	399	21	10,742	0	0	0	0	0	0	0	0	0	0	0	0
January 2019	2,063	401	17	10,893	0	0	0	0	0	0	0	0	0	0	0	0
February 2019	1,900	317	11	10,487	0	0	0	0	0	0	0	0	0	0	0	0
March 2019	1,847	276	17	11,473	0	0	0	0	0	0	0	0	0	0	0	0
April 2019	1,950	312	5	11,241	0	0	0	0	0	0	0	0	0	0	0	0
May 2019	2,068	425	28	11,908	0	0	0	0	0	0	0	0	0	0	0	0
June 2019	2,090	275	9	11,134	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>24,158</b>	<b>4,196</b>	<b>258</b>	<b>136,103</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

# ANNUAL REVENUE AND RIDERSHIP REPORT

JULY 2018 - JUNE 2019

KNOXVILLE AREA TRANSIT

## Key Count

Period	Preset	Key 1 30D	Key 2 30D SDS	Key 3 7D RCPT	Key 4 7D SDS	Key 5 PASSINOF	Key 6 20R	Key 7 SENIOR	Key 8 TALLY	Key 9 FREE	Key *	Key A VHLC	Key B BICYCLE	Key C 'OURTES'	Key D \$1
<b>Monthly Summary</b>															
July 2018	0	0	1	6	1	2,324	0	4	49	63,618	0	1,350	2,105	2,485	49
August 2018	0	0	0	3	0	3,109	0	10	65	67,298	0	1,378	2,222	3,327	67
September 2018	0	3	1	12	0	3,144	0	22	61	64,851	0	1,308	2,034	3,105	83
October 2018	0	3	0	4	2	3,758	0	14	131	64,145	0	1,456	2,180	3,119	68
November 2018	0	0	2	4	1	3,539	0	9	119	66,529	0	1,182	1,569	2,950	55
December 2018	0	0	1	2	1	2,930	0	13	68	50,078	0	1,080	1,468	3,024	49
January 2019	0	2	0	3	0	2,600	0	56	73	54,789	0	938	1,484	2,867	53
February 2019	0	1	2	5	2	2,252	0	9	66	54,006	0	1,082	1,370	2,102	72
March 2019	0	1	3	2	0	2,601	0	12	95	60,153	0	1,286	1,282	2,361	68
April 2019	0	1	3	6	0	2,499	0	12	81	64,107	0	1,440	1,722	2,111	50
May 2019	0	0	1	2	1	2,683	0	21	66	53,342	0	1,510	1,835	2,569	67
June 2019	0	0	2	1	1	2,318	0	6	45	48,311	0	1,238	1,739	2,481	60
<b>Total</b>	<b>0</b>	<b>11</b>	<b>16</b>	<b>50</b>	<b>9</b>	<b>33,757</b>	<b>0</b>	<b>188</b>	<b>919</b>	<b>711,227</b>	<b>0</b>	<b>15,248</b>	<b>21,010</b>	<b>32,501</b>	<b>741</b>



# ANNUAL REVENUE AND RIDERSHIP REPORT

JULY 2018 - JUNE 2019

KNOXVILLE AREA TRANSIT

## Preset Count

Period	Preset	Preset 1	Preset 2	Preset 3	Preset 4	Preset 5	Preset 6	Preset 7	Preset 8	Preset 9	Preset 10
<b>Monthly Summary</b>											
July 2018	0	0	0	0	0	0	0	0	0	0	0
August 2018	0	0	0	0	0	0	0	0	0	0	0
September 2018	0	0	0	0	0	0	0	0	0	0	0
October 2018	0	0	0	0	0	0	0	0	0	0	0
November 2018	0	0	0	0	0	0	0	0	0	0	0
December 2018	0	0	0	0	0	0	0	0	0	0	0
January 2019	0	0	0	0	0	0	0	0	0	0	0
February 2019	0	0	0	0	0	0	0	0	0	0	0
March 2019	0	0	0	0	0	0	0	0	0	0	0
April 2019	0	0	0	0	0	0	0	0	0	0	0
May 2019	0	0	0	0	0	0	0	0	0	0	0
June 2019	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

# ANNUAL REVENUE AND RIDERSHIP REPORT

JULY 2018 - JUNE 2019

## KNOXVILLE AREA TRANSIT

### Ridership Fare Structure Definition

**Ridership is defined as the sum of the following items:**

Key 5	Key 5 - Pass Inoperable	Key 7	Key 7 - Free Senior	Key 9	Key 9 - Free	TTP 1	Regular BasicTransfer
TTP 2	SDS Basic Transfer	TTP 6	Courtesy Transfer	TTP 12	University Pass	TTP 13	Semester Pass
TTP 15	LA1 SDS Fare - Cash	TTP 17	LA3 Issue SDS Daypass	TTP 18	LA4 Express Local - Cash	TTP 19	RA1 Full Fare - Cash
TTP 21	RA3 Issue Daypass	TTP 23	30-Day Pass	TTP 24	30-Day SDS Pass	TTP 25	7-Day Pass
TTP 26	7-Day SDS Pass	TTP 27	UT Semester Pass	TTP 28	1-Day Pass	TTP 29	1-Day SDS Pass
TTP 30	Trolley Daypass	TTP 31	20-Ride	TTP 32	20-Ride SDS	TTP 33	1-Ride Card
TTP 34	1-RideSDS Card	TTP 35	Complimentary Day Pass	Preset	Preset		

**The following items are excluded from the ridership calculation:**

Key 1	Key 1 - 30-Day Pass Receipt	Key 2	Key 2 - 30-Day SDS Pass Received	Key 3	Key 3 - 7-Day Pass Receipt	Key 4	Key 4 - 7-Day SDS Pass Receipt
Key 6	Key 6 - 20-RIDE Receipt	Key 8	Key 8 - Tally Only Special Count	Key *	Key *	Key A	Key A - Wheelchair Count
Key B	Key B - Bicycle Count	Key C	Key C Issue Courtesy Transfer	Key D	Key D \$1Bill Override	TTP 3	Trolley Transfer
TTP 4	Trolley to bus transfer	TTP 5	SDS Trolley to bus transfer	TTP 7	30-Day Pass Receipt	TTP 8	30-Day SDS Pass Receipt
TTP 9	7-Day Pass Receipt	TTP 10	7-Day SDS Pass Receipt	TTP 11	20-Ride Pass Receipt	TTP 14	TTP 14
TTP 16	LA2 Issue SDS Transfer	TTP 20	RA2 Issue Transfer	TTP 22	RA4 Change Card	TTP 36	Change Card
TTP 37	TTP 37	TTP 38	TTP 38	TTP 39	TTP 39	TTP 40	TTP 40
TTP 41	TTP 41	TTP 42	TTP 42	TTP 43	TTP 43	TTP 44	TTP 44
TTP 45	TTP 45	TTP 46	TTP 46	TTP 47	TTP 47	TTP 48	TTP 48

### Search Criteria:

Location: 1

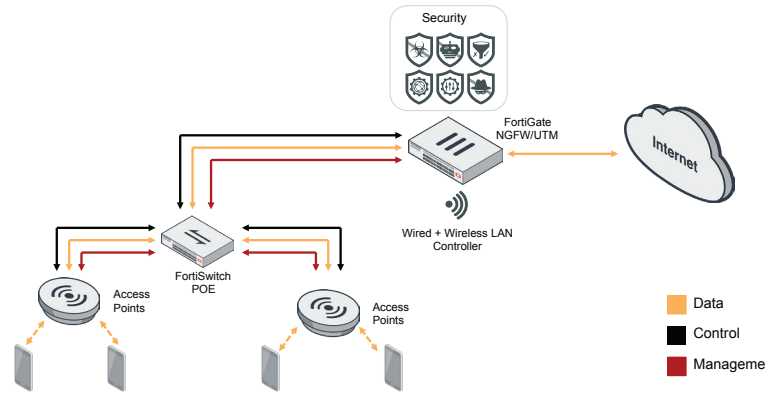
**Fleet Information**

<b>Veh ID #</b>	<b>Type/Model</b>	<b>Manufacturer</b>	<b>VIN</b>	<b>Model Year</b>	<b>Use</b>
T-31	Gillig Trolley Bus	Gillig / Cable Car Classics	15GGB211581079725	2008	Fixed Route
T-32	Gillig Trolley Bus	Gillig / Cable Car Classics	15GGB211781079726	2008	Fixed Route
T-33	Gillig Trolley Bus	Gillig / Cable Car Classics	15GGB211981079727	2008	Fixed Route
T-34	Gillig Trolley Bus	Gillig / Cable Car Classics	15GGB211081079728	2008	Fixed Route
T-35	Gillig Trolley Bus	Gillig / Cable Car Classics	15GGB2713D1181715	2013	Fixed Route
T-36	Gillig Trolley Bus	Gillig / Cable Car Classics	15GGB2715D1181716	2013	Fixed Route
T-37	Gillig Trolley Bus	Gillig / Cable Car Classics	15GGB2717D1181717	2013	Fixed Route
T-38	Gillig Trolley Bus - Hybrid	Gillig / Cable Car Classics	15GGB3010E1182473	2014	Fixed Route
T-39	Gillig Trolley Bus - Hybrid	Gillig / Cable Car Classics	15GGB3012E1182474	2014	Fixed Route
T-40	Gillig Trolley Bus - Hybrid	Gillig / Cable Car Classics	15GGB3014E1182475	2014	Fixed Route
5001	40 Foot Lowfloor Bus	Gillig	15GGD271491176692	2009	Fixed Route
5002	40 Foot Lowfloor Bus	Gillig	15GGD271691176693	2009	Fixed Route
5003	40 Foot Lowfloor Bus	Gillig	15GGD271891176694	2009	Fixed Route
5004	40 Foot Lowfloor Bus	Gillig	15GGD271X91176695	2009	Fixed Route
5005	40 Foot Lowfloor Bus	Gillig	15GGD271191176696	2009	Fixed Route
5006	40 Foot Lowfloor Bus	Gillig	15GGD271391176697	2009	Fixed Route
5007	40 Foot Lowfloor Bus	Gillig	15GGD2718D1181712	2013	Fixed Route
5008	40 Foot Lowfloor Bus	Gillig	15GGD271XD1181713	2013	Fixed Route
5009H	40 Foot Lowfloor Hybrid Bus	Gillig	15GGD3012E1182470	2014	Fixed Route
5010H	40 Foot Lowfloor Hybrid Bus	Gillig	15GGD3014E1182471	2014	Fixed Route
5011H	40 Foot Lowfloor Hybrid Bus	Gillig	15GGD3016E1182472	2014	Fixed Route
4001	35 Foot Lowfloor Bus	Gillig	15GGB271791176689	2009	Fixed Route
4002	35 Foot Lowfloor Bus	Gillig	15GGB271391176690	2009	Fixed Route
4003	35 Foot Lowfloor Bus	Gillig	15GGB271591176691	2009	Fixed Route
4004	35 Foot Lowfloor Bus	Gillig	15GGB2714B1179524	2011	Fixed Route
4005	35 Foot Lowfloor Bus	Gillig	15GGB2716B1179525	2011	Fixed Route
4006	35 Foot Lowfloor Bus	Gillig	15GGB2718B1179526	2011	Fixed Route
4007	35 Foot Lowfloor Bus	Gillig	15GGB271XB1179527	2011	Fixed Route
4008	35 Foot Lowfloor Bus	Gillig	15GGB2711B1179528	2011	Fixed Route
4009	35 Foot Lowfloor Bus	Gillig	15GGB2713B1179529	2011	Fixed Route
4010	35 Foot Lowfloor Bus	Gillig	15GGB271XB1179530	2011	Fixed Route
4011	35 Foot Lowfloor Bus	Gillig	15GGB2711B1179531	2011	Fixed Route
4012	35 Foot Lowfloor Bus	Gillig	15GGB2713B1179532	2011	Fixed Route
4013	35 Foot Lowfloor Bus	Gillig	15GGB2715B1179533	2011	Fixed Route
4014	35 Foot Lowfloor Bus	Gillig	15GGB2717B1179534	2011	Fixed Route
4015	35 Foot Lowfloor Bus	Gillig	15GGB2719B1179535	2011	Fixed Route
4016	35 Foot Lowfloor Bus	Gillig	15GGB2714C1180433	2012	Fixed Route
4017	35 Foot Lowfloor Bus	Gillig	15GGB2716C1180434	2012	Fixed Route
4018	35 Foot Lowfloor Bus	Gillig	15GGB2718C1180435	2012	Fixed Route
4019	35 Foot Lowfloor Bus	Gillig	15GGB271XC1180436	2012	Fixed Route
4020	35 Foot Lowfloor Bus	Gillig	15GGB2711C1180437	2012	Fixed Route
4021	35 Foot Lowfloor Bus	Gillig	15GGB2713C1180438	2012	Fixed Route
4022	35 Foot Lowfloor Bus	Gillig	15GGB2716D1181729	2013	Fixed Route
4023	35 Foot Lowfloor Bus	Gillig	15GGB2712D1181730	2013	Fixed Route
4024	35 Foot Lowfloor Bus	Gillig	15GGB2714D1181731	2013	Fixed Route
4025	35 Foot Lowfloor Bus	Gillig	15GGB2716D1181732	2013	Fixed Route
4026	35 Foot Lowfloor Bus	Gillig	15GGB2718D1181733	2013	Fixed Route
4027	35 Foot Lowfloor Hybrid Bus	Gillig	15GGB3017H3189669	2017	Fixed Route
4028	35 Foot Lowfloor Hybrid Bus	Gillig	15GGB3013H3189670	2017	Fixed Route
4029	35 Foot Lowfloor Hybrid Bus	Gillig	15GGB3015H3189671	2017	Fixed Route
4030	35 Foot Lowfloor Hybrid Bus	Gillig	15GGB3017H3189672	2017	Fixed Route
4031	35 Foot Lowfloor Hybrid Bus	Gillig	15GGB3019H3189673	2017	Fixed Route
4032	35 Foot Lowfloor Hybrid Bus	Gillig	15GGB3010H3189674	2017	Fixed Route
4033	35 Foot Lowfloor Hybrid Bus	Gillig	15GGB3012H3189675	2017	Fixed Route
4034	35 Foot Lowfloor Hybrid Bus	Gillig	15GGB301XJ3191292	2018	Fixed Route
4035	35 Foot Lowfloor Hybrid Bus	Gillig	15GGB3011J3191293	2018	Fixed Route

4036	35 Foot Lowfloor Hybrid Bus	Gillig	15GGB3013J3191294	2018	Fixed Route
4037	35 Foot Lowfloor Hybrid Bus	Gillig	15GGB3015J3191295	2018	Fixed Route
3001	ADA-Paratransit Bus	Ford/Goshen	1FDDE4FS3CDA02720	2012	Fixed Route
3002	ADA-Paratransit Bus	Ford/Goshen	1FDDE4FS7CDA02719	2012	Fixed Route
3003	ADA-Paratransit Bus	Ford/Goshen	1FDDE4FS5CDA02718	2012	Fixed Route
3004	ADA-Paratransit Bus	Ford/Goshen	1FDDE4FS3CDA02717	2012	Fixed Route
3005	ADA-Paratransit Bus	Ford/Goshen	1FDDE4FSXCDA02715	2012	Fixed Route
3006	ADA-Paratransit Bus	Ford/Goshen	1FDDE4FS1CDA02716	2012	Contingency Fleet
3007	Low-Floor Cutaway Bus	Ford/Champion	1FDDE4FS7GDC30712	2016	Fixed Route
3008	Low-Floor Cutaway Bus	Ford/Champion	1FDDE4FS9GDC30713	2016	Fixed Route
3009	Low-Floor Cutaway Bus	Ford/Champion	1FDDE4FS0GDC30714	2016	Fixed Route
3010	Low-Floor Cutaway Bus	Ford/Champion	1FDDE4FS2GDC30715	2016	Fixed Route
3011	Low-Floor Cutaway Bus	Ford/Champion	1FDDE4FS4GDC30716	2016	Fixed Route
3012	Low-Floor Cutaway Bus	Ford/Champion	1FDDE4FS6GDC30717	2016	Fixed Route
3013	30 Foot Lowfloor Hybrid Bus	Gillig	15GGE3017K3093622	2019	Fixed Route
3014	30 Foot Lowfloor Hybrid Bus	Gillig	15GGE3019K3093623	2019	Fixed Route
3015	30 Foot Lowfloor Hybrid Bus	Gillig	15GGE3010K3093624	2019	Fixed Route
1001	ADA-Paratransit Van	Ford/Goshen	1FDEE3FS5BDB12303	2011	Demand Response
1002	ADA-Paratransit Van	Ford/Goshen	1FDEE3FS5BDB22667	2011	Demand Response
1003	ADA-Paratransit Van	Ford/Goshen	1FDEE3FS7BDB22668	2011	Demand Response
1004	ADA-Paratransit Van	Ford/Goshen	1FDEE3FS9BDB22669	2011	Demand Response
1005	ADA-Paratransit Van	Ford/Goshen	1FDEE3FS0GDC39564	2016	Demand Response
1006	ADA-Paratransit Van	Ford/Goshen	1FDEE3FS2GDC39565	2016	Demand Response
1007	ADA-Paratransit Van	Ford/Goshen	1FDEE3FS4GDC39566	2016	Demand Response
1008	ADA Ford Transit 20'	Ford T350	1FDZX2XGKKKB31568	2019	Demand Response
1009	ADA Ford Transit 20'	Ford T350	1FDZX2XG4KKKB47653	2019	Demand Response
1010	ADA Ford Transit 20'	Ford T350	1FDZX2XG2KKKB47652	2019	Demand Response
1011	ADA Ford Transit 20'	Ford T350	1FDZX2XG0KKKB47651	2019	Demand Response
1012	ADA Ford Transit 22'	Ford T350	1FDVU4XG2KKKB56970	2019	Demand Response
1013	ADA Ford Transit 22'	Ford T350	1FDVU4XG4KKKB56971	2019	Demand Response
1014	ADA Ford Transit 22'	Ford T350	1FDVU4XG6KKKB56972	2019	Demand Response
1015	ADA Ford Transit 22'	Ford T350	1FDVU4XG8KKKB56973	2019	Demand Response
1511	ADA-Paratransit Van	Ford/Elkhart	1FDEE3FS8KDC42091	2019	Demand Response
1512	ADA-Paratransit Van	Ford/Elkhart	1FDEE3FS5KDC46745	2019	Demand Response
1513	ADA-Paratransit Van	Ford/Elkhart	1FDEE3FS5KDC47250	2019	Demand Response
1514	ADA-Paratransit Van	Ford/Elkhart	1FDEE3FS7KDC47251	2019	Demand Response
1515	ADA-Paratransit Van	Ford/Elkhart	1FDEE3FS9KDC47252	2019	Demand Response
1516	ADA-Paratransit Van	Ford/Elkhart	1FDEE3FS1KDC51182	2019	Demand Response
1517	ADA-Paratransit Van	Ford/Elkhart	1FDEE3FS6KDC52702	2019	Demand Response
1518	ADA-Paratransit Van	Ford/Elkhart	1FDEE3FSXKDC52704	2019	Demand Response
1519	ADA-Paratransit Van	Ford/Elkhart	1FDEE3FS5KDC52707	2019	Demand Response
1520	ADA-Paratransit Van	Ford/Elkhart	1FDEE3FS9KDC52709	2019	Demand Response

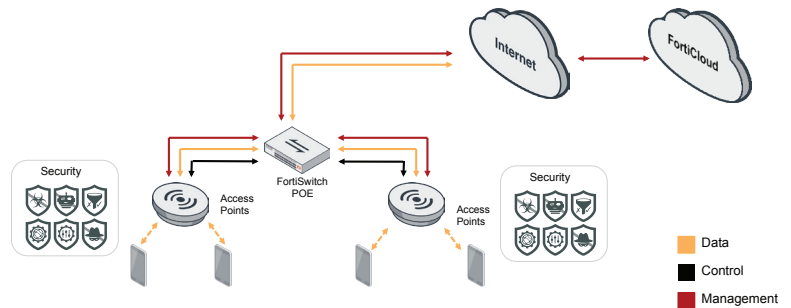
## Integrated - FortiGate-Managed

Our Integrated offering leverages the wireless controller built into our FortiOS operating system. It features a family of controller-managed access points which function in cooperation with a FortiGate, our industry leading enterprise firewall. In addition to consolidating all the functions of a network firewall, IPS, anti-malware, VPN, WAN optimization, Web filtering, and application control in a single platform, FortiGate also has an integrated Wi-Fi controller. Wi-Fi is either integrated directly into the FortiGate (FortiWiFi) or connected as an access point (FortiAP) directly to a FortiGate to provide comprehensive wireless coverage.



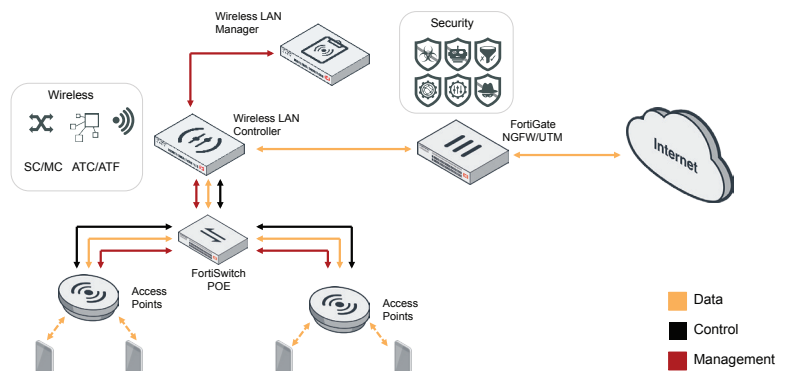
## Cloud-Managed

Our cloud managed WLAN option contains capabilities unlike any other cloud Wi-Fi offering in the industry. This includes the FortiAP-S series which combines the elements of UTM protection at the network edge with the simplicity and convenience of cloud management through our FortiCloud service. FortiCloud management capabilities also extend beyond the management of Wi-Fi, to FortiGate and more.







## Controller-Managed







Our Infrastructure wireless offering, formerly Meru Networks, combines on-premises controller-based management, open application appliances, and a range of high-performance indoor and outdoor access points. This is the ideal solution for large scale complex RF environment, or when an organization needs to separate the access infrastructure from the underlying network's security infrastructure. With network controlled roaming, users benefit from the best possible mobility experience. The Infrastructure solution offers multiple channel configuration options and layering to simplify deployment while increasing performance, traffic segmentation, and capacity. This solution scales for implementation in small, medium, and large enterprises of all types.






# FortiAP™ Integrated Indoor or Cloud Managed Indoor (802.11ac Wave 2) Access Points

	FAP-221E	FAP-223E	FAP-421E	FAP-423E
				
Suggested Use Case	Medium density 802.11ac indoor	Medium density 802.11ac indoor	High density, high performance 802.11ac indoor	High density, high performance 802.11ac indoor
<b>Hardware</b>				
Number of Radios	2	2	2	2
Number of Antennas	4 Internal	4 External (RP-SMA)	8 Internal	8 External (RP-SMA)
Antenna Type and Peak Gain	Patch: 4 dBi for 2.4 GHz, 5 dBi for 5 GHz	Dipole: 4 dBi for 2.4 GHz, 5 dBi for 5 GHz	PIFA: 4 dBi for 2.4 GHz, 5 dBi for 5 GHz	Dipole: 3 dBi for 2.4 GHz, 3 dBi for 5 GHz
Radio 1 Capabilities	2.4 GHz b/g/n (2x2:2) 20/40 MHz (256 QAM)	2.4 GHz b/g/n (2x2:2) 20/40 MHz (256 QAM)	2.4 GHz b/g/n (4x4:4) 20/40 MHz (256 QAM)	2.4 GHz b/g/n (4x4:4) 20/40 MHz (256 QAM)
Radio 2 Capabilities	5 GHz a/n/ac (2x2:2) 20/40/80 MHz (256 QAM)	5 GHz a/n/ac (2x2:2) 20/40/80 MHz (256 QAM)	5 GHz a/n/ac (4x4:4) 20/40/80 MHz (256 QAM)	5 GHz a/n/ac (4x4:4) 20/40/80 MHz (256 QAM)
Maximum Data Rate	Radio 1: up to 400 Mbps Radio 2: up to 867 Mbps	Radio 1: up to 400 Mbps Radio 2: up to 867 Mbps	Radio 1: up to 800 Mbps Radio 2: up to 1,733 Mbps	Radio 1: up to 800 Mbps Radio 2: up to 1,733 Mbps
Bluetooth (BT/BLE)				
Interfaces	1x GE RJ45	1x GE RJ45	2x GE RJ45, 1x Type A USB, 1x RS-232 RJ45 Serial Port	2x GE RJ45, 1x Type A USB, 1x RS-232 RJ45 Serial Port
Power over Ethernet (PoE)	IEEE 802.3af	IEEE 802.3af	Dual redundant PoE power ports, IEEE 802.3at or 2x2 operation with 802.3af	Dual redundant PoE power ports, IEEE 802.3at or 2x2 operation with 802.3af
Power Consumption (Max.)	12.36 W	12.36 W	23 W max power draw in 802.3at mode, 12.95 W max power draw when in 802.3af power mode	23 W max power draw in 802.3at mode, 12.95 W max power draw when in 802.3af power mode
Simultaneous SSIDs	16 (14 client, 2 monitor)	16 (14 client, 2 monitor)	16 (14 client, 2 monitor)	16 (14 client, 2 monitor)
Maximum Tx Power	2.4 GHz: 23 dBm / 200 mW (2 chains combined)** 5 GHz: 24 dBm / 251 mW (2 chains combined)**	2.4 GHz: 23 dBm / 200 mW (2 chains combined)** 5 GHz: 24 dBm / 251 mW (2 chains combined)**	2.4 GHz: 24 dBm / 251 mW (4 chains combined)* 5 GHz: 25 dBm / 316 mW (4 chains combined)*	2.4 GHz: 24 dBm / 251 mW (4 chains combined)* 5 GHz: 25 dBm / 316 mW (4 chains combined)*
Kensington Lock	•	•	•	•
SSID Types Supported	Local-Bridge, Tunnel, Mesh	Local-Bridge, Tunnel, Mesh	Local-Bridge, Tunnel, Mesh	Local-Bridge, Tunnel, Mesh
Per Radio Client Capacity	Up to 512	Up to 512	Up to 512	Up to 512
UL2043 Plenum Material	•	•	•	•
Mounting Options	Ceiling, T-Rail and Wall	Ceiling, T-Rail and Wall	Ceiling, T-Rail and Wall	Ceiling, T-Rail and Wall
Cellular Coexistence**	•	•	•	•
LED Off Mode	•	•	•	•
<b>Advanced 802.11 Features</b>				
802.11ac Wave 2 MU-MIMO	•	•	•	•
Transmit Beam Forming (TxBF)	•	•	•	•
Low-Density Parity Check (LDPC) Encoding	•	•	•	•
Max Likelihood Demodulation (MLD)	•	•	•	•
Max Ratio Combining (MRC)	•	•	•	•
802.11ac 20/40/80 MHz Channel	•	•	•	•
A-MPDU and A-MSDU Packet Aggregation	•	•	•	•
MIMO Power Save	•	•	•	•
Short Guard Interval	•	•	•	•
<b>Wireless Monitoring Capabilities</b>				
Rogue Scan Radio Modes	Background, Full-time	Background, Full-time	Background, Full-time	Background, Full-time
WIPS / WIDS Radio Modes	Background, Full-time	Background, Full-time	Background, Full-time	Background, Full-time
Packet Sniffer Mode	•	•	•	•
Spectrum Analyzer	•	•	•	•
<b>Certifications</b>				
Wi-Fi Alliance Certified	•	•	•	•
DFS Certified	FCC, IC, CE, Japan, Taiwan	FCC, IC, CE, Japan, Taiwan	FCC, IC, CE, Japan, Taiwan, Korea	FCC, IC, CE, Japan, Taiwan, Korea

# FortiAP™ Integrated or Cloud Managed Indoor, Outdoor and Wall Plate Access Points






	FAP-320C	FAP-321C	FAP-222C	FAP-222E	FAP-224E	FAP-C24JE
						
<b>Suggested Use Case</b>	High density, high performance 802.11ac indoor	Medium density 802.11ac indoor	IP67 High density 802.11ac outdoor	IP67 High density 802.11ac (wave2) outdoor	IP67 High density 802.11ac (wave2) outdoor	Indoor Wall Plate AP for hotel and dorm rooms
<b>Hardware</b>						
<b>Number of Radios</b>	2	2	2	2 + 1 BT/BLE	2 + 1 BT/BLE	2
<b>Number of Antennas</b>	6 Internal	6 Internal	4 External (Type N)	4 External (Type N) + 1 BT/BLE External (RP-SMA)	4 Internal + 1 BT/BLE Internal	4 Internal
<b>Antenna Type and Peak Gain</b>	PIFA: 5 dBi for 2.4 GHz, 6 dBi for 5 GHz	PIFA: 4 dBi for 2.4 GHz, 5 dBi for 5 GHz	Dipole: 3.5 dBi for 2.4 GHz, 6 dBi for 5 GHz	Dipole: 5 dBi for 2.4 GHz, 7 dBi for 5 GHz	Dipole: 6 dBi for 2.4 GHz, 8 dBi for 5 GHz	Chip: 1.5 dBi for 2.4 GHz, 2 dBi for 5 GHz
<b>Radio 1 Capabilities</b>	2.4 GHz b/g/n (3x3:3) 20/40 MHz (64 QAM)	2.4 GHz b/g/n (3x3:3) 20/40 MHz (64 QAM)	2.4 GHz b/g/n (2x2:2) 20/40 MHz (64 QAM)	2.4 GHz b/g/n (2x2:2) 20/40 MHz (256 QAM)	2.4 GHz b/g/n (2x2:2) 20/40 MHz (256 QAM)	2.4 GHz b/g/n (2x2:2) 20/40 MHz (64 QAM)
<b>Radio 2 Capabilities</b>	5 GHz a/n/ac (3x3:3) 20/40/80 MHz (256 QAM)	5 GHz a/n/ac (3x3:3) 20/40/80 MHz (256 QAM)	5 GHz a/n/ac (2x2:2) 20/40/80 MHz (256 QAM)	5 GHz a/n/ac (2x2:2) 20/40/80 MHz (256 QAM)	5 GHz a/n/ac (2x2:2) 20/40/80 MHz (256 QAM)	5 GHz a/n/ac (2x2:2) 20/40/80 MHz (256 QAM)
<b>Maximum Data Rate</b>	Radio 1: Up to 450 Mbps Radio 2: Up to 1300 Mbps	Radio 1: up to 450 Mbps Radio 2: up to 1,300 Mbps	Radio 1: Up to 300 Mbps Radio 2: Up to 867 Mbps	Radio 1: up to 400 Mbps Radio 2: up to 867 Mbps	Radio 1: up to 400 Mbps Radio 2: up to 867 Mbps	Radio 1: up to 300 Mbps Radio 2: up to 867 Mbps
<b>Bluetooth (BT/BLE)</b>				•	•	
<b>Interfaces</b>	2x GE RJ45, 1x Type A USB, 1x RJ45 Serial Port	1x GE RJ45	1x GE RJ45	1x GE RJ45	1x GE RJ45, 1x GE RJ45 (PoE), 1x SFP slot	2 + 6x GE RJ45 Ports (1x 802.3at PoE (PD), 1x 802.3af PoE (PSE), 1x pass-thru in, 1x pass-thru out), 1x RS-232 RJ45 Serial Port
<b>Power over Ethernet (PoE)</b>	Dual redundant PoE power ports, IEEE 802.3af	IEEE 802.3af	IEEE 802.3at or proprietary PoE injector	IEEE 802.3af/at	IEEE 802.3af/at	802.3af (max PSE output of 4W) or 802.3at (full 802.3af PSE output)
<b>Power Consumption (Max.)</b>	12.08 W	12.6 W	18.4 W	12.95 W	12.95 W	Depends on PoE connected
<b>Simultaneous SSIDs</b>	16 (14 client, 2 monitor)	16 (14 client, 2 monitor)	16 (14 client, 2 monitor)	16 (14 client, 2 monitor)	16 (14 client, 2 monitor)	4
<b>Maximum Tx Power</b>	2.4 GHz: 23.7 dBm / 234 mW (3 chains combined)* 5 GHz: 24.7 dBm / 295 mW (3 chains combined)*	2.4 GHz: 24 dBm / 251 mW (3 chains combined)* 5 GHz: 25 dBm / 316 mW (3 chains combined)*	2.4 GHz: 30 dBm / 1 W (2 chains combined)* 5 GHz: 27 dBm / 501 mW (2 chains combined)*	2.4 GHz: 27.2 dBm / 525 mW (2 chains combined)* 5 GHz: 29.5 dBm / 891 mW (2 chains combined)*	2.4 GHz: 24 dBm / 251 mW (2 chains combined)* 5 GHz: 24 dBm / 251 mW (2 chains combined)*	23 dBm / 100mW (2 chains combined)*
<b>Kensington Lock</b>	•	•	•	•	•	•
<b>SSID Types Supported</b>	Local-Bridge, Tunnel, Mesh	Local-Bridge, Tunnel, Mesh	Local-Bridge, Tunnel, Mesh	Local-Bridge, Tunnel & Mesh (when managed by controller)	Local-Bridge, Tunnel & Mesh (when managed by controller)	Local-Bridge, Tunnel
<b>Per Radio Client Capacity</b>	Up to 128	Up to 128	Up to 128	Up to 512	Up to 512	Up to 64
<b>UL2043 Plenum Material</b>	•	•	•	•	•	•
<b>Mounting Options</b>	Ceiling, T-Rail and Wall	Ceiling, T-Rail and Wall	Wall Mount or Pole Mount	Wall Mount or Pole Mount	Wall Mount or Pole Mount	Wall Plate
<b>Cellular Coexistence**</b>				•	•	•
<b>LED Off Mode</b>	•	•	•	•	•	•
<b>Advanced 802.11 Features</b>						
<b>802.11ac Wave 2 MU-MIMO</b>				•	•	•
<b>Transmit Beam Forming (TxBF)</b>				•	•	•
<b>Low-Density Parity Check (LDPC) Encoding</b>	•	•	•	•	•	•
<b>Maxi Likelihood Demodulation (MLD)</b>	•	•	•	•	•	•
<b>Maxi Ratio Combining (MRC)</b>	•	•	•	•	•	•
<b>802.11ac 20/40/80 MHz Channel</b>	•	•	•	•	•	•
<b>A-MPDU and A-MSDU Packet Aggregation</b>	•	•	•	•	•	•
<b>MIMO Power Save</b>	•	•	•	•	•	•
<b>Short Guard Interval</b>	•	•	•	•	•	•
<b>Wireless Monitoring Capabilities</b>						
<b>Rogue Scan Radio Modes</b>	Background, Full-time	Background, Full-time	Background, Full-time	Background, Full-time	Background, Full-time	Background, Full-time
<b>WIPS / WIDS Radio Modes</b>	Background, Full-time	Background, Full-time	Background, Full-time	Background, Full-time	Background, Full-time	Background, Full-time
<b>Packet Sniffer Mode</b>	•	•	•	•	•	•
<b>Spectrum Analyzer</b>	•	•	•	•	•	•
<b>Certifications</b>						
<b>Wi-Fi Alliance Certified</b>	•	•	•	•	•	•
<b>DFS Certified</b>	CE, Japan	CE, Japan	CE, Japan, Korea	FCC, IC, CE	In Process	In Process

# FortiAP-S Integrated or Cloud Managed Smart (802.11ac Wave 2) Access Points



	FAP-S221E	FAP-S223E	FAP-S421E		
					
Suggested Use Case	High density, high performance 802.11ac indoor	High density, high performance 802.11ac indoor	High density, high performance 802.11ac indoor		
<b>Hardware</b>					
Number of Radios	2 + 1 BT/BLE	2 + 1 BT/BLE	2		
Number of Antennas	4 Internal + 1 BT/BLE internal	4 External (RP-SMA) + 1 BT/BLE internal	8 Internal		
Antenna Type and Peak Gain	PIFA: 3 dBi for 2.4 GHz, 5 dBi for 5 GHz	Dipole: 4 dBi for 2.4 GHz, 5 dBi for 5 GHz	PIFA: 4 dBi for 2.4 GHz, 5 dBi for 5 GHz		
Radio 1 Capabilities	2.4 GHz b/g/n (2x2:2) 20/40 MHz (64 QAM)	2.4 GHz b/g/n (2x2:2) 20/40 MHz (64 QAM)	2.4 GHz b/g/n (4x4:4) 20/40 MHz (64 QAM)		
Radio 2 Capabilities	5 GHz a/n/ac (2x2:2) 20/40/80 MHz (256 QAM)	5 GHz a/n/ac (2x2:2) 20/40/80 MHz (256 QAM)	5 GHz a/n/ac (4x4:4) 20/40/80 MHz (256 QAM)		
Maximum Data Rate	Radio 1: up to 300 Mbps Radio 2: up to 867 Mbps	Radio 1: up to 300 Mbps Radio 2: up to 867 Mbps	Radio 1: up to 600 Mbps Radio 2: up to 1,733 Mbps		
Bluetooth (BT/BLE)	•	•			
Interfaces	2x GE RJ45, 1x Type A USB, 1x RS-232 RJ45 Serial Port	2x GE RJ45, 1x Type A USB, 1x RS-232 RJ45 Serial Port	2x GE RJ45, 1x Type A USB, 1x RS-232 RJ45 Serial Port		
Power over Ethernet (PoE)	Dual redundant PoE power ports with support for IEEE 802.3af & 802.3at	Dual redundant PoE power ports with support for IEEE 802.3af & 802.3at	Dual redundant PoE power ports with support for IEEE 802.3af & 802.3at		
Power Consumption (Max.)	24 W	24 W	24 W		
Simultaneous SSIDs	16 (14 client, 2 monitor)	16 (14 client, 2 monitor)	16 (14 client, 2 monitor)		
Maximum Tx Power	2.4 GHz: 23 dBm / 200 mW (2 chains combined)* 5 GHz: 22 dBm / 158 mW (2 chains combined)*	2.4 GHz: 23 dBm / 200 mW (2 chains combined)* 5 GHz: 22 dBm / 158 mW (2 chains combined)*	2.4 GHz: 28 dBm / 631 mW (4 chains combined)* 5 GHz: 26 dBm / 398 mW (4 chains combined)*		
Kensington Lock	•	•	•		
SSID Types Supported	Local-Bridge, Tunnel & Mesh (when managed by controller)	Local-Bridge, Tunnel & Mesh (when managed by controller)	Local-Bridge, Tunnel & Mesh (when managed by controller)		
Per Radio Client Capacity	Up to 512	Up to 512	Up to 512		
UL2043 Plenum Material			•		
Mounting Options	Ceiling, T-Rail, and Wall	Ceiling, T-Rail, and Wall	Ceiling, T-Rail, and Wall		
Cellular Coexistence**	•	•	•		
LED Off Mode	•	•	•		
<b>Advanced 802.11 Features</b>					
802.11ac Wave 2 MU-MIMO	•	•	•		
Transmit Beam Forming (TxBF)	•	•	•		
Low-Density Parity Check (LDPC) Encoding	•	•	•		
Max Likelihood Demodulation (MLD)	•	•	•		
Max Ratio Combining (MRC)	•	•	•		
802.11ac 20/40/80 MHz Channel	•	•	•		
A-MPDU and A-MSDU Packet Aggregation	•	•	•		
MIMO Power Save	•	•	•		
Short Guard Interval	•	•	•		
<b>Wireless Monitoring Capabilities</b>					
Rogue Scan Radio Modes	Background, Full-time	Background, Full-time	Background, Full-time		
WIPS / WIDS Radio Modes	Background, Full-time	Background, Full-time	Background, Full-time		
Packet Sniffer Mode	•	•	•		
Spectrum Analyzer	•	•	•		
<b>Certifications</b>					
Wi-Fi Alliance Certified	•	•	•		
DFS Certified	FCC, IC, CE, Japan	FCC, IC, CE, Japan	FCC, IC, CE, Japan, Taiwan, Korea		





# FortiAP-U Universally Manageable Indoor Access Points

	FAP-U221EV	FAP-U223EV	FAP-U321EV	FAP-U323EV	FAP-U421EV	FAP-U423EV
						
Suggested Use Case	Medium Density, 802.11ac indoor	Medium Density, 802.11ac indoor	High density, high performance 802.11ac W2 indoor	High density, high performance 802.11ac W2 indoor	High density, high performance 802.11ac W2 indoor	High density, high performance 802.11ac W2 indoor
<b>Hardware</b>						
Number of Radios	2 + 1 BT/BLE	2 + 1 BT/BLE	2 + 1 BT/BLE	2 + 1 BT/BLE	2 + 1 BT/BLE	2 + 1 BT/BLE
Number of Antennas	4 Internal + 1 BT/BLE Internal	4 External (RP-SMA) + 1 BT/BLE Internal	6 Internal + 1 BT/BLE Internal	6 External (RP-SMA) + 1 BT/BLE Internal	8 Internal + 1 BT/BLE Internal	8 External (RP-SMA) + 1 BT/BLE Internal
Antenna Type and Peak Gain	Patch: 3 dBi for 2.4 GHz, 4 dBi for 5 GHz	Dipole: 3 dBi for 2.4 GHz, 4 dBi for 5 GHz	Patch: 4.5 dBi for 2.4 GHz, 6.5 dBi for 5 GHz	Dipole: 3.5 dBi for 2.4 GHz, 5 dBi for 5 GHz	Patch: 4 dBi for 2.4 GHz, 5 dBi for 5 GHz	Dipole: 3 dBi for 2.4 GHz, 3 dBi for 5 GHz
Radio 1 Capabilities	2.4 GHz b/g/n (2x2:2) 20/40 MHz (64 QAM)	2.4 GHz b/g/n (2x2:2) 20/40 MHz (64 QAM)	2.4 GHz b/g/n (3x3:3) 20/40 MHz (64 QAM)	2.4 GHz b/g/n (3x3:3) 20/40 MHz (64 QAM)	2.4 GHz b/g/n (4x4:4) 20/40 MHz (64 QAM)	2.4 GHz b/g/n (4x4:4) 20/40 MHz (64 QAM)
Radio 2 Capabilities	5 GHz a/n/ac (2x2:2) 20/40/80 MHz (256 QAM)	5 GHz a/n/ac (2x2:2) 20/40/80 MHz (256 QAM)	5 GHz a/n/ac (3x3:3) 20/40/80 MHz (256/1024 QAM)	5 GHz a/n/ac (3x3:3) 20/40/80 MHz (256/1024 QAM)	5 GHz a/n/ac (4x4:4) 20/40/80/160 MHz (256/1024 QAM)	5 GHz a/n/ac (4x4:4) 20/40/80/160 MHz (256/1024 QAM)
Maximum Data Rate	Radio 1: up to 300 Mbps Radio 2: up to 867 Mbps	Radio 1: up to 300 Mbps Radio 2: up to 867 Mbps	Radio 1: up to 450 Mbps Radio 2: up to 2,600 Mbps	Radio 1: up to 450 Mbps Radio 2: up to 2,600 Mbps	Radio 1: up to 600 Mbps Radio 2: up to 3,466 Mbps	Radio 1: up to 600 Mbps Radio 2: up to 3,466 Mbps
Bluetooth (BT/BLE)	•	•	•	•	•	•
Interfaces	1x GE RJ45, 1x Type A USB	1x GE RJ45, 1x Type A USB	2x GE RJ45, 1x Type A USB, 1x RS-232 RJ45 Serial Port	2x GE RJ45, 1x Type A USB, 1x RS-232 RJ45 Serial Port	2x GE RJ45, 1x Type A USB, 1x RS-232 RJ45 Serial Port	2x GE RJ45, 1x Type A USB, 1x RS-232 RJ45 Serial Port
Power over Ethernet (PoE)	IEEE 802.3af or 802.3at	IEEE 802.3af or 802.3at	Dual redundant PoE power ports with support for IEEE 802.3af & 802.3at	Dual redundant PoE power ports with support for IEEE 802.3af & 802.3at	Dual redundant PoE power ports with support for IEEE 802.3af & 802.3at	Dual redundant PoE power ports with support for IEEE 802.3af & 802.3at
Power Consumption (Max.)	12.5 W	12.5 W	15 W when supplied by 802.3at power and 12.8 W when in 802.3af power mode	15 W when supplied by 802.3at power and 12.8 W when in 802.3af power mode	24.5 W when supplied by 802.3at power and 12.5 W when in 802.3af power mode	24.5 W when supplied by 802.3at power and 12.5 W when in 802.3af power mode
Simultaneous SSIDs	16 (14 client, 2 monitor)	16 (14 client, 2 monitor)	16 (14 client, 2 monitor)	16 (14 client, 2 monitor)	16 (14 client, 2 monitor)	16 (14 client, 2 monitor)
Maximum Tx Power	2.4 GHz: 25 dBm / 316 mW (2 chains combined)* 5 GHz: 23 dBm / 200 mW (2 chains combined)*	2.4 GHz: 25 dBm / 316 mW (2 chains combined)* 5 GHz: 23 dBm / 200 mW (2 chains combined)*	2.4 GHz: 26.7 dBm / 468 mW (3 chains combined)* 5 GHz: 24.7 dBm / 295 mW (3 chains combined)*	2.4 GHz: 26.7 dBm / 468 mW (3 chains combined)* 5 GHz: 24.7 dBm / 295 mW (3 chains combined)*	2.4 GHz: 28 dBm / 631 mW (4 chains combined)* 5 GHz: 26 dBm / 398 mW (4 chains combined)*	2.4 GHz: 28 dBm / 631 mW (4 chains combined)* 5 GHz: 26 dBm / 398 mW (4 chains combined)*
Kensington Lock	•	•	•	•	•	•
SSID Types Supported	Local-Bridge, Tunnel & Mesh	Local-Bridge, Tunnel & Mesh	Local-Bridge, Tunnel & Mesh	Local-Bridge, Tunnel & Mesh	Local-Bridge, Tunnel & Mesh	Local-Bridge, Tunnel & Mesh
Per Radio Client Capacity	Up to 128	Up to 128	Up to 256	Up to 256	Up to 256	Up to 256
UL2043 Plenum Material					•	•
Mounting Options	Ceiling, T-Rail and Wall	Ceiling, T-Rail and Wall	Ceiling, T-Rail and Wall	Ceiling, T-Rail and Wall	Ceiling, T-Rail and Wall	Ceiling, T-Rail and Wall
Cellular Coexistence**	•	•	•	•	•	•
LED Off Mode	•	•	•	•	•	•
<b>Advanced 802.11 Features</b>						
802.11ac Wave 2 MU-MIMO			•	•	•	•
Transmit Beam Forming (TxBF)	•	•	•	•	•	•
Low-Density Parity Check (LDPC) Encoding	•	•	•	•	•	•
Max Likelihood Demodulation (MLD)	•	•	•	•	•	•
Max Ratio Combining (MRC)	•	•	•	•	•	•
802.11ac 20/40/80 MHz Channel	•	•	•	•	•	•
A-MPDU and A-MSDU Packet Aggregation	•	•	•	•	•	•
MIMO Power Save	•	•	•	•	•	•
Short Guard Interval	•	•	•	•	•	•
<b>Wireless Monitoring Capabilities</b>						
Rogue Scan Radio Modes	Background, Full-time	Background, Full-time	Background, Full-time	Background, Full-time	Background, Full-time	Background, Full-time
WIPS / WIDS Radio Modes	Background, Full-time	Background, Full-time	Background, Full-time	Background, Full-time	Background, Full-time	Background, Full-time
Packet Sniffer Mode	•	•	•	•	•	•
Spectrum Analyzer	•	•	•	•	•	•
<b>Certifications</b>						
Wi-Fi Alliance Certified	•	•	•	•	•	•
DFS Certified	FCC, CE, Japan	FCC, CE, Japan	FCC, CE, IC, Japan	FCC, CE, IC, Japan	FCC, CE, IC, Japan, Taiwan, Korea	FCC, CE, IC, Japan, Taiwan, Korea

# FortiAP-U Universally Manageable Wi-Fi 6 (802.11ax) Access Points

	FAP-U431F	FAP-U433F
		
Suggested Use Case	High performance 802.11ax indoor	High performance 802.11ax indoor
<b>Hardware</b>		
Number of Radios	3 + 1 BT/BLE	3 + 1 BT/BLE
Number of Antennas	10 Internal + 1 BT/BLE Internal	10 External (RP-SMA) + 1 BT/BLE Internal
Antenna Type and Peak Gain	PIFA: 4 dBi for 2.4 GHz, 5 dBi for 5 GHz	Dipole: 4 dBi for 2.4 GHz, 5 dBi for 5 GHz
Radio 1 Capabilities	5.0 GHz a/n/ac/ax (4x4:4) 20/40/80/160 MHz (64, 1024 QAM)	5.0 GHz a/n/ac/ax (4x4:4) 20/40/80/160 MHz (64, 1024 QAM)
Radio 2 Capabilities	2.4/5.0 GHz a/b/g/n/ac/ax (4x4:4) 20/40/80/160 MHz (64, 1024 QAM)	2.4/5.0 GHz a/b/g/n/ac/ax (4x4:4) 20/40/80/160 MHz (64, 1024 QAM)
Radio 3 Capabilities	2.4/5.0 GHz b/g/n/ac (2x2:2) 20/40 MHz (64 QAM)	2.4/5.0 GHz b/g/n/ac (2x2:2) 20/40 MHz (64 QAM)
Maximum Data Rate	Radio 1: up to 4,804 Mbps Radio 2: up to 4,804 Mbps Radio 3: up to 300 Mbps	Radio 1: up to 4,804 Mbps Radio 2: up to 4,804 Mbps Radio 3: up to 300 Mbps
Bluetooth (BT/BLE)	•	•
Interfaces	1x 2.5GE RJ45, 1x GE RJ45, 1x Type A USB, 1x RS-232 RJ45 Serial Port	1x 2.5GE RJ45, 1x GE RJ45, 1x Type A USB, 1x RS-232 RJ45 Serial Port
Power over Ethernet (PoE)	Dual redundant PoE power ports with support for IEEE 802.3af & 802.3at	Dual redundant PoE power ports with support for IEEE 802.3af & 802.3at
Power Consumption (Max.)	24.5 W	24.5 W
Simultaneous SSIDs	16 (14 client, 2 monitor)	16 (14 client, 2 monitor)
Maximum Tx Power	Radio 1: 5 GHz: 24 dBm / 251 mW (4 chains combined)* Radio 2: 2.4 GHz: 26 dBm / 398 mW (4 chains combined)* 5 GHz: 24 dBm / 251 mW (4 chains combined)* Radio 3: 2.4 GHz: 22 dBm / 158 mW (2 chains combined)*	Radio 1: 5 GHz: 24 dBm / 251 mW (4 chains combined)* Radio 2: 2.4 GHz: 26 dBm / 398 mW (4 chains combined)* 5 GHz: 24 dBm / 251 mW (4 chains combined)* Radio 3: 2.4 GHz: 22 dBm / 158 mW (2 chains combined)*
Kensington Lock	•	•
SSID Types Supported	Local-Bridge, Tunnel & Mesh	Local-Bridge, Tunnel & Mesh
Per Radio Client Capacity	Up to 512	Up to 512
UL2043 Plenum Material	•	•
Mounting Options	Wall Mount or Pole Mount	Wall plate or desk stand
Cellular Coexistence**	•	•
LED Off Mode	•	•
<b>Advanced 802.11 Features</b>		
802.11ac Wave 2 MU-MIMO	•	•
Transmit Beam Forming (TxBF)	•	•
Low-Density Parity Check (LDPC) Encoding	•	•
Max Likelihood Demodulation (MLD)	•	•
Max Ratio Combining (MRC)	•	•
802.11ac 20/40/80 MHz Channel	•	•
A-MPDU and A-MSDU Packet Aggregation	•	•
MIMO Power Save	•	•
Short Guard Interval	•	•
<b>Wireless Monitoring Capabilities</b>		
Rogue Scan Radio Modes	Background, Full-time	Background, Full-time
WIPS / WIDS Radio Modes	Background, Full-time	Background, Full-time
Packet Sniffer Mode	•	•
Spectrum Analyzer	•	•
<b>Certifications</b>		
Wi-Fi Alliance Certified		
DFS Certified		

# FortiAP-U Universally Manageable Outdoor and Wall Plate Access Points

	FAP-U422EV	FAPU24JEV
		
Suggested Use Case	High performance 802.11ac W2 outdoor	Low cost, compact 802.11ac wallplug/wall plate
<b>Hardware</b>		
Number of Radios	2 + 1 BT/BLE	1 or 2 + 1 BT/BLE
Number of Antennas	8 External (Type N) + 1 BT/BLE Internal	2 Internal + 1 BT/BLE Internal
Antenna Type and Peak Gain	Dipole: 5 dBi for 2.4 GHz, 7 dBi for 5 GHz	Patch: 3 dBi for 2.4 GHz, 4 dBi for 5 GHz
Radio 1 Capabilities	2.4 GHz b/g/n (4x4:4) 20/40 MHz (64 QAM)	2.4 GHz b/g/n (2x2:2) 20/40 MHz (64 QAM) or 5 GHz a/n/ac (2x2:2) 20/40/80 MHz (256 QAM)
Radio 2 Capabilities	5 GHz a/n/ac (4x4:4) 20/40/80/160 MHz (256/1024 QAM)	or 2.4 GHz b/g/n (1x1:1) 20/40 MHz (64 QAM) & 5 GHz a/n/ac (1x1:1) 20/40/80 MHz (256 QAM)
Maximum Data Rate	Radio 1: up to 600 Mbps Radio 2: up to 3,466 Mbps	up to 867 Mbps
Bluetooth (BT/BLE)	•	•
Interfaces	2x GE RJ45, 1x RS-232 RJ45 Serial Port	2 + 4x GE RJ45 Ports (1x 802.3at PoE (PD), 1x 802.3af PoE (PSE), 1x pass-thru in, 1x pass-thru out)
Power over Ethernet (PoE)	Proprietary or 802.3at	802.3af (max PSE output of 4W) or 802.3at (full 802.3af PSE output)
Power Consumption (Max.)	22 W	24W (Depends on PoE connected and USB power consumed)
Simultaneous SSIDs	16 (14 client, 2 monitor)	16 (14 client, 2 monitor)
Maximum Tx Power	2.4 GHz: 24 dBm / 251 mW (4 chains combined)* 5 GHz: 24 dBm / 251 mW (4 chains combined)*	2.4 GHz: 23 dBm / 200 mW (2 chains combined)* 5 GHz: 21 dBm / 126 mW (2 chains combined)*
Kensington Lock		
SSID Types Supported	Local-Bridge, Tunnel & Mesh	Local-Bridge, Tunnel
Per Radio Client Capacity	Up to 256	Up to 128
UL2043 Plenum Material		
Mounting Options	Wall Mount or Pole Mount	Wall plate or desk stand
Cellular Coexistence**	•	•
LED Off Mode	•	•
<b>Advanced 802.11 Features</b>		
802.11ac Wave 2 MU-MIMO	•	•
Transmit Beam Forming (TxBF)	•	•
Low-Density Parity Check (LDPC) Encoding	•	•
Max Likelihood Demodulation (MLD)	•	•
Max Ratio Combining (MRC)	•	•
802.11ac 20/40/80 MHz Channel	•	•
A-MPDU and A-MSDU Packet Aggregation	•	•
MIMO Power Save	•	•
Short Guard Interval	•	•
<b>Wireless Monitoring Capabilities</b>		
Rogue Scan Radio Modes	Background, Full-time	Background, Full-time
WIPS / WIDS Radio Modes	Background, Full-time	Background, Full-time
Packet Sniffer Mode	•	•
Spectrum Analyzer	•	•
<b>Certifications</b>		
Wi-Fi Alliance Certified	•	•
DFS Certified	FCC, IC, CE, Japan	CE, Japan

# FortiWiFi™ Firewall and WiFi Gateway

	FWF-30E	FWF-50E	FWF-50E-2R	FWF-60D	FWF-60E	FWF-90D
<b>Suggested Deployment</b>	Home/small office	Home/small office	Distributed office	Distributed office	Distributed office	Indoor Motels, Clinics, Small Enterprise, Retail
<b>Hardware</b>						
<b>Form Factor</b>	Desktop, wall mountable	Desktop, wall mountable	Desktop, wall mountable	Desktop, wall mountable	Desktop, wall mountable	Desktop, wall mountable
<b>Dimension</b>	1.61 x 8.27 x 5.24 in	1.44 x 5.5 x 8.52	1.44 x 5.5 x 8.52	1.50 x 8.50 x 5.83 in	1.5 x 8.5 x 6.3 in	1.72 x 8.5 x 8.78 in
<b>Kensington Lock</b>						•
<b>Ethernet Interfaces</b>	1 x GE RJ45 WAN, 4 x GE RJ45 Switch ports	2 x GE RJ45 WAN, 5 x GE RJ45 Switch ports	2 x GE RJ45 WAN, 5 x GE RJ45 Switch ports	3 x GE RJ45 WAN/DMZ, 7 x GE RJ45 Switch ports	3 x GE RJ45 WAN/DMZ, 7 x GE RJ45 Switch ports	2 x GE RJ45 WAN ports, 14 x GE RJ45 Switch ports
<b>Mesh Root</b>		•		•		•
<b>Other WiFi Variants</b>	—	+ Storage (FWF-51E)	—	POE (PSE)	—	POE (PSE)
<b>Wireless</b>						
<b>IEEE Standard</b>	802.11 a/b/g/n	802.11 a/b/g/n	802.11 a/b/g/n/ac	802.11 a/b/g/n	802.11 a/b/g/n/ac	802.11a/b/g/n
<b>Number of Radios</b>	1	1	2	1	1	1
<b>Radio 1 Band (association rate)</b>	2.4GHz / 5GHz (300Mbps)	2.4GHz / 5GHz (300Mbps)	2.4GHz (300Mbps)	2.4GHz / 5GHz (300Mbps)	2.4GHz / 5GHz (300Mbps)	2.4GHz / 5GHz (300Mbps)
<b>Radio 2 Band (association rate)</b>	—	—	5GHz (867 Mbps)	—	—	—
<b>MIMO</b>	2x2	2x2	2x2	2x2	2x2	2x2
<b>Max / recommended number of concurrent clients</b>	128 / 30	128 / 30	128 / 30	128 / 30	128 / 30	128 / 30
<b>Antenna Type and Count</b>	2 F-type antennas (RP-SMA)	2 F-type antennas (RP-SMA)	2 F-type antennas (RP-SMA)	2 di-pole antennas (RP-SMA)	2 di-pole antennas (RP-SMA)	2 di-pole antennas (RP-SMA)
<b>Antenna Gain</b>	3 dBi/(3dBi-5GHz)	3 dBi/(3dBi-5GHz)	3 dBi/(6dBi-5GHz)	3 dBi/(6dBi-5GHz)	3 dBi/(6dBi-5GHz)	up to 5dB
<b>Max TX Power</b>	17dBm	17dBm	2.4G:20.5 dBm, 5G:16.5dBm	17dBm	17dBm	17dBm
<b>Number of SSIDs</b>	8 (7 client, 1 monitor)	8 (7 client, 1 monitor)	8 (7 client, 1 monitor)	8 (7 client, 1 monitor)	8 (7 client, 1 monitor)	8 (7 client, 1 monitor)
<b>Traffic Queues</b>	4 queues	4 queues	4 queues	4 queues	4 queues	4 queues
<b>802.11n 20/40MHz HT</b>	•	•	•	•	•	•
<b>Short Guard</b>	•	•	•	•	•	•
<b>802.11ac 80 MHz channel</b>						
<b>MAC Service Data Unit (MSDU) aggregation and MAC Protocol Data Unit (MPDU) frame aggregation</b>	•	•	•	•	•	•
<b>Cyclic-delay diversity (CDD)</b>	•	•	•	•	•	•
<b>Power Save (WME-PS)</b>	•	•	•	•	•	•
<b>802.11n Max ratio combining (MRC)</b>	•	•	•	•	•	•
<b>Transmit Beam Forming (TxBF)</b>	•	•	•	•	•	•
<b>Low Density Parity Check encoding (LDPC)</b>	•	•	•	•	•	•
<b>802.11n Maximum Likelihood Detection (MLD)</b>	•	•	•	•	•	•
<b>Rogue AP scanning</b>						
<b>Dual Band Scanning</b>	•	•	•	•	•	•
<b>Background Scan</b>	•	•	•	•	•	•
<b>Full-time dedicated monitor</b>	•	•	•	•	•	•
<b>Single Radio Dual band scanning</b>	•	•	•	•	•	•
<b>Management</b>						
<b>WebUI &amp; CLI</b>	•	•	•	•	•	•
<b>Max managed APs</b>	2	10	10	10	20	32
<b>Cloud deployment support</b>	•	•	•	•	•	•
<b>Certifications</b>						
<b>Wi-Fi Alliance Certified</b>						
<b>DFS Certified</b>				Region: J		Region: J




\* Certification covers following specifications: - 802.11a/b/g/n, Short Guard Interval, TX A-MPDU, STBC, 40 MHz operation in 5 GHz/WPA™ Personal, WPA™ Enterprise /Personal, WPA2™, Enterprise / Personal, WMM™, EAP-TLS, EAP-TTLS/MSCHAPv2, PEAPv0/EAP-MSCHAPv2, PEAPv1/EAP-GTC, EAP-SIM, EAP-AKA, EAP-FAST, 802.11 d/h, WMM Power Save.

\*\* Additional filtration added to reduce interference in 2.4GHz band from nearby cellular equipment.






# FortiGate/FortiWiFi® Wireless Controller (with FortiOS 6.0)

	FortiGate/FortiWiFi 30D/E, 50E & 60D/E Series	FortiGate/FortiWiFi 70D, 80D, 90D, 90E, 92D Series	FortiGate 100D Series	FortiGate 200D Series	FortiGate 300D, 400D & 500D
<b>Hardware</b>					
Product Range / Form Factor	Entry / Desktop	Entry / Desktop-2 RU	Mid Range / 1 RU	Mid Range / 1-2 RU	Mid Range / 1 RU
GE Interfaces	5-10	4 - 78	8 - 40	18 - 88	10 - 18
GE PoE/PoE+ Interfaces	2 / - (FG-60D-POE)	4 / - (FG-90D/70D-POE)	16 (FG-140D-POE)	8 (FG-200D-POE) 24 (FG-240D-POE) 32 (FG-280D-POE)	-
10 GE Interfaces	-	-	-	-	-
40 GE Interfaces	-	-	-	-	-
<b>Capacity</b>					
Maximum Supported APs (Tunnel Mode)	2 - 5	16	32	64	256
Maximum Supported APs (Total)	2 - 20	32	64	128	512
Max number of SSIDs	32	32	256	256	256
Max CAPWAP throughput	250 Mbps - 1.9 Gbps	260 Mbps - 2.2 Gbps	1.2 Gbps	1.8 Gbps	5.4 - 10 Gbps
Max Concurrent Sessions	500 K - 1.8 Mil	1.5 - 2 Mil	3 Mil	3.2 Mil	5.5 - 6 Mil
	FortiGate 600C, 600D, 800C, 800D & 900D	FortiGate 1000,2000 & 3000 Series	FG-5000 Series	FG-VM Series	
<b>Hardware</b>					
Product Range / Form Factor	Mid Range / 1 RU	High End / 2-3 RU	High End / 3-13 RU	-	
GE Interfaces	16-34	18 - 34	2 - 28	Refer to Data Sheet	
GE PoE/PoE+ Interfaces	-	-	-	-	
10 GE Interfaces	0 - 2	2 - 48	2 - 112	Refer to Data Sheet	
40 GE Interfaces	-	4	-	-	
100 GE Interfaces	-	6	2	-	
<b>Capacity</b>					
Maximum Supported APs (Tunnel Mode)	512	1,024	Up to 14,336 (1,024/blade)	32 - 1,024	
Maximum Supported APs (Total)	1,024	4,096	Up to 57,344 (4,096/blade)	64 - 4,096	
Max number of SSIDs	256	1,024	Up to 14,336 (1,024/blade)	32 - 1,024	
Max CAPWAP throughput	5.5 Gbps - 11 Gbps	11 Gbps - 22 Gbps	Refer to Datasheet	Refer to Data Sheet	
Max Concurrent Sessions	3 - 11 Mil	11 - 95 Mil	10 - 100 Mil	Refer to Data Sheet	



# Fortinet Infrastructure Wi-Fi Access Points

	AP 122	AP 822i/822e	OAP 832e		
					
<b>Suggested Use Case</b>	In-room hotel, hospital, dormitory	Classrooms, Dormitory Common Areas, Moderate Density Enterprise	Parking Lots, Courtyards, University Grounds		
<b>Hardware</b>					
<b>Form Factor</b>	Small, wall mountable	Wall or ceiling wall mountable	Outdoor 67 rated, wall or pole wall mountable		
<b>Dimension</b>	5.51 x 5.35 x 1.18 in	7.1 x 7.1 x 2.7 in	11.0 x 8.54 x 2.0 in		
<b>Ethernet Interfaces</b>	1x GE RJ45 (PD), 1x FE, 1x FE PoE (PSE), 1x pass through RJ45 pair	1x GE RJ45 (PD), 1x GE RJ45 (disabled)	1x GE RJ45 (PD), 1x GE RJ45		
<b>PoE</b>	802.3af, 802.3at	802.3af, 802.3at	802.3at		
<b>Included accessories</b>	Mounting kit	Mounting kits, omnidirectional antennas for AP822e	Mounting kits and omnidirectional antennas		
<b>Mesh capable</b>		•	•		
<b>Wireless</b>					
<b>IEEE Standard</b>	802.11 a/b/g/n/ac	802.11 a/b/g/n/ac	802.11 a/b/g/n/ac		
<b>Number of Radios</b>	2	2	2		
<b>Radio 1 Band (association rate)</b>	2.4 GHz / 5 GHz (300 Mbps)	2.4 GHz / 5 GHz (300 Mbps)	2.4 GHz (450 Mbps)		
<b>Radio 2 Band (association rate)</b>	5 GHz a/n/ac (867 Mbps)	5 GHz a/n/ac (867 Mbps)	5 GHz a/n/ac (1,300 Mbps)		
<b>MIMO</b>	2x2 (dual stream)	2x2 (dual stream)	3x3 (3 stream)		
<b>Max / recommended number of concurrent clients</b>	128 / 20 per radio	128 / 50 per radio	128 / 50 per radio		
<b>Antenna Type and Count</b>	4 - Internal	822i: 4 - Internal 822e: 4 - External	6 N-type External		
<b>Antenna Gain</b>	3.6 dBi / (5 dBi for 5 GHz)	AP 822i :3.3 dBi / (6 dBi for 5 GHz) AP 822e :3.3 dBi / (6 dBi for 5 GHz)	6 dBi / (7dBi for 5 GHz)		
<b>Max TX Power</b>	20 dBm (2.4 GHz) 20 dBm (5 GHz)	AP 822i : 23 & 22 dBm - 2.4/5 GHz AP 822e : 24 & 24 dBm - 2.4/5 GHz	29 dBm (2.4 GHz) 23 dBm (5 GHz)		
<b>Number of SSIDs</b>	64	64	64		
<b>802.11n 20/40MHz HT</b>	•	•	•		
<b>802.11ac 80 MHz channel</b>	•	•	•		
<b>Security</b>					
<b>WEP, WPA-PSK, WPA-TKIP, WPA2-AES, 802.11i, 802.1X (EAP-TLS, EAP-TTLS, PEAP, LEAP, EAP-FAST, EAP-SIM, EAP-AKA, and EAP-MD5)</b>	•	•	•		
<b>802.1X and captive portal authentication against local database on the controller, RADIUS, and Active Directory</b>	•	•	•		
<b>RADIUS-assisted per-user and per-ESSID access control via MAC filtering</b>	•	•	•		
<b>Operation Mode</b>					
<b>Centralized deployment mode</b>	•	•	•		
<b>Distributed deployment mode</b>	•	•	•		
<b>Remote VPN tunnel mode</b>	•	•	•		
<b>Certifications</b>					
<b>Wi-Fi Alliance Certified*</b>	•	•	•		
<b>DFS Certified**</b>	Region A, K, J, E	Region A, K, J, E	Region A, J, E		

## FortiWLC Wireless Controllers

	FWC-50D	FWC-200D	FWC-500D	FWC-1000D	FWC-3000D
					
<b>Suggested Use Case</b>	Small enterprises, remote offices	Medium enterprises, branch offices	Large enterprises, regional offices	Large enterprises	Large enterprises
<b>Hardware</b>					
<b>Form Factor</b>	1 RU	1 RU	1 RU	2 RU	2 RU
<b>Ethernet Interfaces</b>	4x GE RJ45	4x GE RJ45	4x GE RJ45, 4x GE SFP, 2x 10GE SFP+	2x GE RJ45, 4x 10GE SFP+	2x GE RJ45, 8x 10GE SFP+
<b>Capacity</b>					
<b>Max. Access Points</b>	50	200	500	1,000	3,000
<b>Max. Clients</b>	1,500	2,500	7,500	20,000	45,000
	FWC-50D-VM	FWC-200D-VM	FWC-500D-VM	FWC-1000D-VM	FWC-3000D-VM
<b>Suggested Use Case</b>	Small enterprises, remote offices	Medium enterprises, branch offices	Large enterprises, regional offices	Large enterprises	Large enterprises
<b>Hardware</b>					
<b>Max. vCPU</b>	4	4	8	24	48
<b>Max. PAM</b>	4 GB	8 GB	16 GB	32 GB	64 GB
<b>Min. HDD Size</b>	16 GB	16 GB	16 GB	16 GB	16GB
<b>Capacity</b>					
<b>Max. Access Points</b>	50	200	500	1,000	3,000
<b>Max. Clients</b>	1,250	2,500	6,250	10,000	30,000

## FortiWLM Wireless Manager

	FWM-100D	FWM-1000D	FWM-VM
			
<b>Suggested Use Case</b>	Small enterprises	Medium to large enterprises	—
<b>Hardware</b>			
<b>Form Factor</b>	1 RU	1 RU	Supports VMware, Hyper-V, AWS and KVM hypervisors.
<b>Ethernet Interfaces</b>	4x GE RJ45	4x GE RJ45, 4x GE SFP	—
<b>Capacity</b>			
<b>Number of Infrastructure APs</b>	1,000	15,000	15,000
<b>Number of Stations</b>	5,000	75,000	75,000



www.fortinet.com

This document is provided as a convenient comparison of Fortinet products and services. The datasheet for any product or service can be found on [www.fortinet.com](http://www.fortinet.com) should be consulted for the most updated specifications.

Copyright © 2019 Fortinet, Inc. All rights reserved. Fortinet®, FortiGate®, FortiCare® and FortiGuard®, and certain other marks are registered trademarks of Fortinet, Inc., and other Fortinet names herein may also be registered and/or common law trademarks of Fortinet. All other product or company names may be trademarks of their respective owners. Performance and other metrics contained herein were attained in internal lab tests under ideal conditions, and actual performance and other results may vary. Network variables, different network environments and other conditions may affect performance results. Nothing herein represents any binding commitment by Fortinet, and Fortinet disclaims all warranties, whether express or implied, except to the extent Fortinet enters a binding written contract, signed by Fortinet's General Counsel, with a purchaser that expressly warrants that the identified product will perform according to certain expressly-identified performance metrics and, in such event, only the specific performance metrics expressly identified in such binding written contract shall be binding on Fortinet. For absolute clarity, any such warranty will be limited to performance in the same ideal conditions as in Fortinet's internal lab tests. Fortinet disclaims in full any covenants, representations, and guarantees pursuant hereto, whether express or implied. Fortinet reserves the right to change, modify, transfer, or otherwise revise this publication without notice, and the most current version of the publication shall be applicable.

WLMTX-2019-R62-JUN

**PRE TRIP INSPECTION**

DATE: \_\_\_\_\_ VEH #: \_\_\_\_\_ CARD #: **155501**

If faults are found on any of the items listed below that renders the vehicle unsafe or inoperative, place a check mark (✓) next to the related item, write details in the comments section at the bottom of this form, and notify dispatch for further instructions.

OKAY	DEFECT	OKAY	DEFECT	OKAY	DEFECT
<input type="checkbox"/> Operator's Seat	<input type="checkbox"/>	<input type="checkbox"/> Windshield Defroster	<input type="checkbox"/>	<input type="checkbox"/> Stop Request	<input type="checkbox"/>
<input type="checkbox"/> Seat Belt	<input type="checkbox"/>	<input type="checkbox"/> Mirrors	<input type="checkbox"/>	<input type="checkbox"/> Emergency Exits	<input type="checkbox"/>
<input type="checkbox"/> Emergency Equipment	<input type="checkbox"/>	<input type="checkbox"/> Engine/Trans Warn Lights	<input type="checkbox"/>	<input type="checkbox"/> Passenger Seats	<input type="checkbox"/>
<input type="checkbox"/> Air & Oil Pressure	<input type="checkbox"/>	<input type="checkbox"/> Climate Control	<input type="checkbox"/>	<input type="checkbox"/> Handrails	<input type="checkbox"/>
<input type="checkbox"/> AVL Annunciator System	<input type="checkbox"/>	<input type="checkbox"/> Interior Lights	<input type="checkbox"/>	<input type="checkbox"/> Destination Sign	<input type="checkbox"/>
<input type="checkbox"/> Engine Temperature	<input type="checkbox"/>	<input type="checkbox"/> Service Brakes	<input type="checkbox"/>	<input type="checkbox"/> Tires	<input type="checkbox"/>
<input type="checkbox"/> Voltage	<input type="checkbox"/>	<input type="checkbox"/> Parking Brake	<input type="checkbox"/>	<input type="checkbox"/> Missing Lugs	<input type="checkbox"/>
<input type="checkbox"/> Horn	<input type="checkbox"/>	<input type="checkbox"/> Passenger Doors	<input type="checkbox"/>	<input type="checkbox"/> Exterior Lights	<input type="checkbox"/>
<input type="checkbox"/> Radio	<input type="checkbox"/>	<input type="checkbox"/> W/C Ramp/Lift	<input type="checkbox"/>	<input type="checkbox"/> Body Damage	<input type="checkbox"/>
<input type="checkbox"/> Farebox	<input type="checkbox"/>	<input type="checkbox"/> W/C Securement Devices	<input type="checkbox"/>	<input type="checkbox"/> Fluid Leaks	<input type="checkbox"/>
<input type="checkbox"/> Windshield	<input type="checkbox"/>	<input type="checkbox"/> Passenger Windows	<input type="checkbox"/>	<input type="checkbox"/> Steering	<input type="checkbox"/>
<input type="checkbox"/> Windshield Wipers	<input type="checkbox"/>	<input type="checkbox"/> Schedule Rack	<input type="checkbox"/>	<input type="checkbox"/> Camera System OK	<input type="checkbox"/>

	PRINTED NAME	SIGNATURE
1.		
2.		
3.		
4.		
5.		

**DETAILED COMMENTS**

---



---



---



---



---



---



---



---



---



---



---



---



---



---



---



---



---



---



---



---



---



---



---

WORK ORDER #: