1. General Descriptions of EUT

Equipment	*Referenced Device*	*Model variant*
ID	*TVE-3417T0696*	*TVE-2317069*
Granted Date	11/03/2020 12/17/2020(adding UNII-2a and UNII-2c)	*N/A*
Product	*Secured Wireless Access Point*	*Secured Wireless Access Point*
Brand	*Fortinet*	*Fortinet*
Test Model	*FAP-231F*	*FAP-231FL*
RF characteristics	*WLAN 2.4GHz 802.11b/g/n/ac/ax*	*WLAN 2.4GHz 802.11b/g/n/ac/ax*
	WLAN 5GHz 802.11a/n/ac/ax	*WLAN 5GHz 802.11a/n/ac/ax*
	BLE 4.0 / 5.0	
	Zigbee	
Difference between two devices	N/A	Remove BLE / Zigbee and a apply as a new FCC ID
The identical parts between two devices	WLAN 2.4GHz and 5GHz	WLAN 2.4GHz and 5GHz
	Design layout of RF main board.	Design layout of RF main board.
	WLAN Antenna and Antenna design	WLAN Antenna and Antenna design
	Output power.	Output power.

2. Referenced Device RF characteristics

For WLAN 802.11abgn/ac/ax mode

WLAN 2.4GHz mode

Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA	
Modulation Technology	DSSS, OFDM, OFDMA	
Operating Frequency	Channel Bandwidth 20/40MHz	2400MHz ~ 2483.5MHz

WLAN 5GHz mode

Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA	
Modulation Technology	OFDM, OFDMA	
Operating Frequency	Channel Bandwidth 20/40/80 MHz	5180MHz ~ 5825MHz

BLE mode

Modulation Type	GFSK
Transfer Rate	BLE 4.0 : 1Mbps BLE 5.0 : 2Mbps
Operating Frequency	2402MHz ~ 2480MHz

Zigbee mode

Modulation Type	O-QPSK
Operating Frequency	2405MHz ~ 2475MHz

3. Variant Device RF characteristics

WLAN 2.4GHz mode

Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA	
Modulation Technology	DSSS, OFDM, OFDMA	
Operating Frequency	Channel Bandwidth 20/40 MHz	2400MHz ~ 2483.5MHz

WLAN 5GHz mode

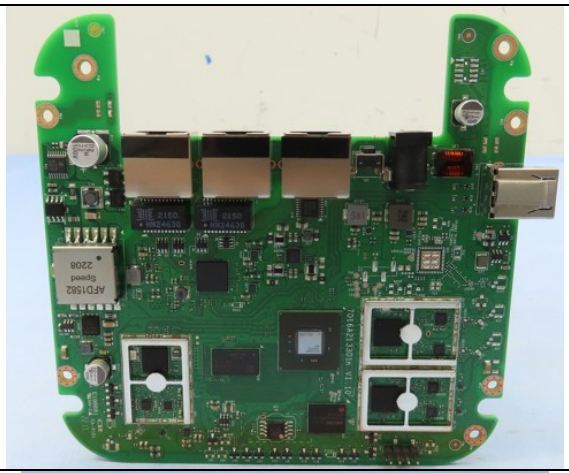
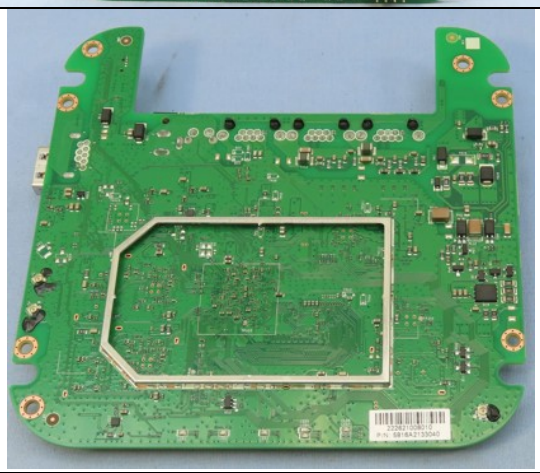
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA
Modulation	OFDM, OFDMA

Technology		
Operating Frequency	Channel Bandwidth 20/40/80 MHz	5150MHz ~ 5825MHz

4. Device Materials

Referenced Device	Model variant
FCC ID: *TVE-3417T0696*	FCC ID: *TVE-2317069*
Plastic	Plastic
	

PCB Photos

Referenced Device	Model variant
FCC ID: *TVE-3417T0696*	FCC ID: *TVE-2317069*
	
	

The new equipment to be Granted in this new application (Model: FAP-231FL), only differs from the initial version, (Model: FAP-231F) are with the only 1 following point:

- **Remove BLE / Zigbee.**

Except **Remove BLE / Zigbee** which not involves RF parameter, and antenna gain. Also, both of these two equipment have the same following points.

- **The Same of 2.4GHz / 5GHz WLAN chip.**
- **The Same common design layout and components of RF main board.**
- **The Same of output power.**

The changes described above do not affect the radio characteristics (WLAN 2.4GHz / 5GHz) of the equipment. Based on engineering judgment of the device design, radio test data retrieved from the initial application Model: FAP-231F can be re-used for the Model: FAP-231FL equipment.

- **Referencing test items**

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Referenced Test Data	Note
15.207	AC Power Conducted Emission	Yes	
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Yes	
15.247(d)	Antenna Port Emission	Yes	
15.247(a)(2)	6dB bandwidth	Yes	
15.247(b)	Conducted power	Yes	
15.247(e)	Power Spectral Density	Yes	
15.203	Antenna Requirement	Yes	

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Referenced Test Data	Note
15.407(b)(9)	AC Power Conducted Emissions	Yes	
15.407(b) (1/2/3/4(i/ii)/9)	Radiated Emissions & Band Edge Measurement	Yes	
15.407(a)(1/2/3)	Max Average Transmit Power	Yes	
---	Occupied Bandwidth Measurement	-	
15.407(a)(1/2/3)	Peak Power Spectral Density	Yes	
15.407(e)	6dB bandwidth	Yes	
15.407(g)	Frequency Stability	Yes	
15.203	Antenna Requirement	Yes	
15.407(a)(2)	26 dB Bandwidth	Yes	

5. Spot- Check Test Plan

The format and amount of spot–check test data are decided as below,

- Sample amount: 1
- Spot–check rule part, test items, frequency band and test modes, if the output power is not higher than original application.

FCC/ ISED Rule Part	Test Items	Frequency Band	Test Modes
15.247 / RSS-247 (WLAN 2.4G)	Conducted output power	2412-2462 MHz	802.11 b/g/n/ax
	Radiated emission – Band edge and Harmonics		One worst channel with maximum power among 802.11 b/g/n/ax
15.407 / RSS-247 (WLAN 5G)	Conducted output power	5180-5240MHz, 5260-5320MHz 5500-5720MHz 5745-5825MHz	802.11 a/n/ac/ax
	Radiated emission – Band edge and Harmonics		One worst channel with maximum power among 802.11 a/n/ac/ax

Note: RF conducted output power were confirmed and has the same conducted power as Referenced Device (FCC ID: TVE-3417T0696)

6. RF Exposure (MPE) Evaluation

RF Exposure data will re-used WLAN 2.4G & WLAN 5G result of initial application Model: FAP-231F and add WLAN 5G result of variant Model: FAP-231FL.

7. Acceptance criteria for spot check

Test Items	Frequency	Deviation Tolerance	Acceptance criteria
Conducted Output power	All operating band	+/ -1.0dB	The test result compare to the test result of Referenced device must be within Deviation Tolerance and calculated EIRP must be lower than limitation for each operating band.
Spurious Emission up to 1GHz	9kHz~30MHz	+/- 3.04dB	The each band worst value of test result for variant device compare to the test result of Referenced device must be within Deviation Tolerance and must be lower than limitation.
	30MHz~200MHz	+/- 3.86dB	
	200MHz~1000MHz	+/- 3.87dB	
Spurious Emission above 1GHz	1GHz~18GHz	+/- 2.29dB	The each band worst value of test result for variant device compare to the test result of Referenced device must be within Deviation Tolerance and must be lower than limitation.
	18G~40GHz	+/- 2.29dB	

***Spot check test result comply with Acceptance Criteria, data referencing is applicable.**

8. Report reference.

	Original Application (11/3/2020)	Add DFS (12/17/2020)
Report No.	RFBDYS-WTW-P20080137	RFBDYS-WTW-P20100799
Report No.	RFBDYS-WTW-P20080137-1	SABDYS-WTW-P20100799
Report No.	RFBDYS-WTW-P20080137-2	FZ092224
Report No.	RFBDYS-WTW-P20080137-3	
Report No.	SABDYS-WTW-P20080137	