MPE CALCULATION

FCC ID: I28-ZBRZQ3BT

I28-RFIDM6EM

I28MD-FXLAN11AC

RF Exposure Requirements:	47 CFR §1.1307(b)
RF Radiation Exposure Limits:	47 CFR §1.1310
RF Radiation Exposure Guidelines:	FCC OST/OET Bulletin Number 65
EUT Frequency Band:	902.75-927.25 MHz; 2402-2480 MHz, 2412-2462 MHz; 5180-5825 MHz
Limits for General Population/Uncontrolled Exposure in the band of:	300-1500MHz: Limit = f/1500 mW / cm^2
Power Density Limit:	1500-100,000MHz: Limit = 1 mW / cm^2

Equation: $S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

Where, S = Power Density

P = Power Input to Antenna

G = Antenna Gain

R = distance to the center of radiated antenna

EUT: Thermal Printer, Model No.: ZC150, ZC300, and ZC350

Prediction distance 22cm

ZQ3BT Radio (BT/BLE Module):

(Bluetooth LE): Max Power = 5.72 dBm, Antenna Gain = 1.69 dBi, Power density = 0.0009 mW/cm2

(Bluetooth BDR/EDR): Max Power = 8.09 dBm, Antenna Gain = 1.69 dBi, Power density = 0.0015 mW/cm2

Type	CH Freq (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Tune-Up Tolerance	Tolerance Max Power (dBm)	Measurement Distance (cm)	Calculated MPE (mW/cm^2)	MPE Limit (mW/cm^2)	Pass/ Fail
BLE	2402	4.72	1.69	±1dB	5.72	22	0.0009	1	Pass
BT-EDR	2402	7.09	1.69	±1dB	8.09	22	0.0015	1	Pass

M6e-Micro (UHF RFID Module):

UHF RFID: Max Power = 29.11 dBm, Antenna Gain = 3 dBi, Power density = 0.2612 mW/cm2

Type	CH Freq (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Tune-Up Tolerance	Tolerance Max Power (dBm)	Measurement Distance (cm)	Calculated MPE (mW/cm^2)	MPE Limit (mW/cm^2)	Pass/ Fail
RFID	902.75	28.01	3	±1dB	29.01	22	0.2612	0.602	Pass

WYSBHVGXG (AC Radio WLAN Module):

(Bluetooth LE): Max Power = 9.43 dBm, Antenna Gain = 3.66 dBi, Power density = 0.0033 mW/cm2

(Bluetooth BDR/EDR): Max Power = 11.27 dBm, Antenna Gain = 3.66 dBi, Power density = 0.0051 mW/cm2

(WLAN-2.4GHz): Max Power = 17.77 dBm, Antenna Gain =3.66 dBi, Power density = 0.0228 mW/cm2

(WLAN-5GHz): Max Power = 14.95 dBm, Antenna Gain =3.19 dBi, Power density = 0.0107 mW/cm2

Type	CH Freq (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Tune-Up Tolerance	Tolerance Max Power (dBm)	Measurement Distance (cm)	Calculated MPE (mW/cm^2)	MPE Limit (mW/cm^2)	Pass/ Fail
BLE	2402	8.43	3.66	±1dB	9.43	22	0.0033	1	Pass
BT-BDR	2402	10.27	3.66	±1dB	11.27	22	0.0051	1	Pass
WLAN-2.4GHz	2412	16.77	3.66	±1dB	17.77	22	0.0228	1	Pass
WLAN-5GHz	5550	13.95	3.19	±1dB	14.95	22	0.0107	1	Pass

M6e-Micro Co-location with ZQ3BT: PASS

RFID = (0.2612/0.602) x 100 = 43.38%

BT-EDR = (0.0015/1) x 100 = 0.15%

Total MPE Percentage = (43.38%+0.15%) = 43.53% < 100%

M6e-Micro Co-location with WYSBHVGXG (AC Radio): PASS

RFID = (0.2612/0.602) x 100 = 43.38%

WLAN-2.4GHz = (0.0228/1) x 100 = 2.28%

Total MPE Percentage = (43.38%+2.28%) = 45.66% < 100%

***Note: 2.4GHz and 5GHz do not transmit simultaneously**

ZQ3BT Co-location with WYSBHVGXG: PASS

BT-EDR = (0.0015/1) x 100% = 0.15%

WLAN-2.4GHz = (0.0228/1) x 100% = 2.28%

Total MPE Percentage = (0.15%+2.28%) = 2.43% < 100%

The Above Result had shown that the Device complied with MPE requirement.

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Date: 02/27/2019