

RF Exposure Evaluation Report

APPLICANT : Amazon.com Services LLC
EQUIPMENT : Digital Media Receiver
MODEL NAME : E78T24
FCC ID : 2A4DH-7824
STANDARD : 47 CFR Part 2.1091
FCC KDB 447498 D01 V06

The product evaluation date was started from Apr. 08, 2025 and completed on Apr. 08, 2025. We, Sporton International Inc. (Kunshan), would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091 and FCC KDB 447498 D01 v06, and pass the limit. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.



Approved by: Si Zhang

Sporton International Inc. (Kunshan)

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA4O1117-02	Rev. 01	Initial issue of report.	Apr. 11, 2025
FA4O1117-02	Rev. 02	Updated Low Power Wideband Radio in Wi-Fi 5GHz relevant data. This report is an updated version, replacing the report issued on Apr. 11, 2025.	Jun. 23, 2025



1. Administration Data

1.1. Testing Laboratory

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Testing Laboratory			
Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR01-KS	CN1257	314309

Applicant	
Company Name	Amazon.com Services LLC
Address	410 Terry Avenue N Seattle, WA 98109-5210 United States

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Digital Media Receiver
Model Name	E78T24
FCC ID	2A4DH-7824
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2472 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz WLAN 6GHz U-NII-5: 5925 MHz ~ 6425 MHz WLAN 6GHz U-NII-6: 6425 MHz ~ 6525 MHz WLAN 6GHz U-NII-7: 6525 MHz ~ 6875 MHz WLAN 6GHz U-NII-8: 6875 MHz ~ 7125 MHz Low Power Wideband Radio in Wi-Fi 5GHz: 5725 MHz ~ 5875 MHz Bluetooth: 2402 MHz ~ 2480 MHz ZigBee: 2405 MHz ~ 2480 MHz
Mode	WLAN 2.4GHz 802.11b/g/n/ax HT20/HE20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80/VHT160 WLAN 5GHz 802.11ax HE20/ HE40/HE80/HE160 WLAN 6GHz 802.11a/ax HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE Low Power Wideband Radio in Wi-Fi 5GHz: FMCW ZigBee: O-QPSK
Antenna Gain	Ant.1 Bluetooth: 2.8 dBi ZigBee: 2.8 dBi Ant.0 WLAN2.4GHz: 3.9 dBi WLAN5.2GHz: 3.2 dBi WLAN5.3GHz: 3.6 dBi WLAN5.5GHz: 3.8 dBi WLAN5.8GHz: 3.8 dBi WLAN 6GHz U-NII-5: 3.8 dBi WLAN 6GHz U-NII-6: 3.8 dBi WLAN 6GHz U-NII-7: 3.5 dBi WLAN 6GHz U-NII-8: 3.5 dBi Low Power Wideband Radio in Wi-Fi 5GHz: 3.8 dBi
Antenna Type	Bluetooth: Yagi Uda Antenna WLAN/Low Power Wideband Radio in Wi-Fi 5GHz: IFA Antenna ZigBee: Yagi Uda Antenna

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Comments and Explanations:

1. The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.
2. The maximum RF output tune up power, antenna gain also the safe distance used for evaluate RF exposure were declared by manufacturer.



3. Maximum RF average output tune up power among production units

<Bluetooth>

Mode		Maximum Average power(dBm)
Bluetooth	BR/EDR	15.0
	LE	15.0

<ZigBee>

Mode		Maximum Average power(dBm)
2.4GHz	ZigBee	13.5

<2.4GHz WLAN >

Mode		Maximum Average Power (dBm)
2.4GHz	802.11b	15.0
	802.11g	16.0
	802.11n-HT20	15.0
	802.11ax-HE20	15.5

<5GHz WLAN >

Mode		Maximum Average Power (dBm)
5.2GHz	802.11a	20.0
	802.11n-HT20	19.0
	802.11n-HT40	19.0
	802.11ac-VHT20	19.0
	802.11ac-VHT40	19.0
	802.11ac-VHT80	15.0
	802.11ac-VHT160	13.5
	802.11ax-HE20	19.0
	802.11ax-HE40	19.0
	802.11ax-HE80	15.0
5.3GHz	802.11a	20.5
	802.11n-HT20	19.5
	802.11n-HT40	19.0
	802.11ac-VHT20	19.5
	802.11ac-VHT40	19.0
	802.11ac-VHT80	16.0
	802.11ax-HE20	20.0
	802.11ax-HE40	19.0
5.5GHz	802.11a	20.5
	802.11n-HT20	19.5
	802.11n-HT40	19.5
	802.11ac-VHT20	19.5
	802.11ac-VHT40	19.5
	802.11ac-VHT80	19.5
	802.11ac-VHT160	13.0
	802.11ax-HE20	19.5
	802.11ax-HE40	20.0
	802.11ax-HE80	20.0
5.8GHz	802.11ax-HE160	13.5
	802.11a	20.5
	802.11n-HT20	19.0
	802.11n-HT40	19.0



	802.11ac-VHT20	19.0
	802.11ac-VHT40	19.5
	802.11ac-VHT80	19.0
	802.11ax-HE20	19.5
	802.11ax-HE40	19.5
	802.11ax-HE80	19.0

<6GHz WLAN >

Mode		Maximum Average Power (dBm)
6GHz	802.11a	6.0
	802.11ax-HE20	6.5
	802.11ax-HE40	9.5
	802.11ax-HE80	12.0
	802.11ax-HE160	14.0



4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna

5. Radio Frequency Radiation Exposure Evaluation

5.1. Standalone Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
Bluetooth	2402.0	2.80	15.00	17.800	60.256	0.012	1.000	0.012
2.4GHz WLAN	2412.0	3.90	16.00	19.900	97.724	0.019	1.000	0.019
5.2GHz WLAN	5180.0	3.20	20.00	23.200	208.930	0.042	1.000	0.042
5.3GHz WLAN	5260.0	3.60	20.50	24.100	257.040	0.051	1.000	0.051
5.5GHz WLAN	5500.0	3.80	20.50	24.300	269.153	0.054	1.000	0.054
5.8GHz WLAN	5745.0	3.80	20.50	24.300	269.153	0.054	1.000	0.054
6GHz WLAN	5925.0	3.80	14.00	17.800	60.256	0.012	1.000	0.012
Zigbee	2405.0	2.80	13.50	16.300	42.658	0.008	1.000	0.008
Low Power Wideband Radio in Wi-Fi 5GHz	5725.0			-6.710	0.213	0.00004	1.000	0.00004

Note:

- For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.
- Chose the maximum power to do MPE analysis.
- Low Power Wideband Radio in Wi-Fi 5GHz maximum EIRP power calculate from Low Power Wideband Radio in Wi-Fi 5GHz E-Field level from RF test report which can be referred to Sporton No: 4O1117-02A.
 - This device maximum E-Field level is 88.52 dBuV/m at 3m, so the EIRP power is -6.71dBm(0.213mW).
 - Pout EIRP (dBm) = Field Strength of Fundamental (dBuV/m) - 95.23 (dB)

5.2. Collocated Power Density Calculation

Bluetooth Power Density / Limit	WLAN 2.4GHz Power Density / Limit	Σ(Power Density / Limit) of Bluetooth + WLAN 2.4GHz
0.012	0.019	0.031

Bluetooth Power Density / Limit	WLAN 5GHz Power Density / Limit	Σ(Power Density / Limit) of Bluetooth + WLAN 5GHz
0.012	0.054	0.066

Bluetooth Power Density / Limit	Low Power Wideband Radio in Wi-Fi 5GHz Power Density / Limit	Σ(Power Density / Limit) of Bluetooth + Low Power Wideband Radio in Wi-Fi 5GHz
0.012	0.00004	0.012

Bluetooth Power Density / Limit	WLAN 6GHz Power Density / Limit	Σ(Power Density / Limit) of Bluetooth +WLAN 6GHz
0.012	0.012	0.024

Zigbee Power Density / Limit	WLAN 2.4GHz Power Density / Limit	Σ(Power Density / Limit) of Zigbee + WLAN 2.4GHz
0.008	0.019	0.027

Zigbee Power Density / Limit	WLAN 5GHz Power Density / Limit	Σ(Power Density / Limit) of Zigbee + WLAN 5GHz
0.008	0.054	0.062

Zigbee Power Density / Limit	Low Power Wideband Radio in Wi-Fi 5GHz Power Density / Limit	Σ(Power Density / Limit) of Zigbee + Low Power Wideband Radio in Wi-Fi 5GHz
0.008	0.00004	0.008



Zigbee Power Density / Limit	WLAN 6GHz Power Density / Limit	Σ (Power Density / Limit) of Zigbee +WLAN 6GHz
0.008	0.012	0.020

Note:

1. According to the EUT characteristic, WLAN 2.4GHz (or WLAN6GHz or WLAN5GHz) and Low Power Wideband Radio in Wi-Fi 5GHz cannot transmit simultaneously.
2. According to the EUT characteristic, Bluetooth and Zigbee cannot transmit simultaneously.
3. According to the EUT characteristic, Bluetooth (or Zigbee) and Low Power Wideband Radio in Wi-Fi 5GHz can transmit simultaneously.
4. According to the EUT characteristic, Bluetooth (or Zigbee) and WLAN (or 2.4GHz or 5GHz or 6GHz) can transmit simultaneously.
5. Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for Bluetooth + Low Power Wideband Radio in Wi-Fi 5GHz & WLAN2.4GHz & WLAN5GHz & WLAN6GHz, Zigbee + Low Power Wideband Radio in Wi-Fi 5GHz & WLAN2.4G & WLAN 5GHz & WLAN 6GHz.
6. Considering all transmitters of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 2 collocated transmitters is compliant.

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.

-----THE END-----