

RF Exposure Evaluation Report

APPLICANT : Amazon.com Services LLC
EQUIPMENT : Digital Media Receiver
MODEL NAME : MA49CA
FCC ID : 2A4DH-4935
STANDARD : 47 CFR Part 2.1091
FCC KDB 447498 D01 V06

The product evaluation date was started from Feb. 19, 2025 and completed on Feb. 19, 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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Table of Contents

1. ADMINISTRATION DATA	4
1.1. Testing Laboratory	4
2. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)	5
3. MAXIMUM RF AVERAGE OUTPUT TUNE UP POWER AMONG PRODUCTION UNITS	6
4. RF EXPOSURE LIMIT INTRODUCTION	8
5. RADIO FREQUENCY RADIATION EXPOSURE EVALUATION	9
5.1. Standalone Power Density Calculation	9
5.2. Collocated Power Density Calculation.....	9



Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA480602-01	Rev. 01	Initial issue of report.	Mar. 18, 2025
FA480602-01	Rev. 02	Updated tune up of WLAN 2.4GHz 802.11ax-HE20 on page 6. This report is an updated version, replacing the report issued on Mar. 18, 2025.	Apr. 24, 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	MA49CA
FCC ID	2A4DH-4935
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: 2.20 dBi ZigBee: 2.20 dBi Ant.2 WLAN2.4GHz: 1.90 dBi WLAN5.2GHz: 1.50 dBi WLAN5.3GHz: 1.20 dBi WLAN5.5GHz: 1.60 dBi WLAN5.8GHz: 1.90 dBi WLAN 6GHz U-NII-5: 2.00 dBi WLAN 6GHz U-NII-6: 2.20 dBi WLAN 6GHz U-NII-7: 2.30 dBi WLAN 6GHz U-NII-8: 1.80 dBi Low Power Wideband Radio in Wi-Fi 5GHz: 2.20 dBi
Antenna Type	Bluetooth: IFA Antenna WLAN/Low Power Wideband Radio in Wi-Fi 5GHz: IFA Antenna ZigBee: IFA Antenna

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two samples, the only difference between them is the manufacturer of WIFI module. And the manufacturer declares that the with the same conducted output power level are the same, and the differences do not affect the MPE analysis results.
3. Ant.3 is Rx only.

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	14.0
	LE	12.5

<ZigBee>

Mode		Maximum Average power(dBm)
2.4GHz	ZigBee	14.5

< Low Power Wideband Radio in Wi-Fi 5GHz >

Mode		Maximum Average Power (dBm)
Low Power Wideband Radio in Wi-Fi 5GHz		7.0

<2.4GHz WLAN >

Mode		Maximum Average Power (dBm)
2.4GHz	802.11b	14.5
	802.11g	15.5
	802.11n-HT20	15.5
	802.11ax-HE20	16.5

<5GHz WLAN >

Mode		Maximum Average Power (dBm)
5.2GHz	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	16.5
	802.11ac-VHT160	13.0
	802.11ax-HE20	19.5
	802.11ax-HE40	19.5
	802.11ax-HE80	16.5
	802.11ax-HE160	13.0
5.3GHz	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	15.5
	802.11ax-HE20	19.5
	802.11ax-HE40	20.0
	802.11ax-HE80	15.5
5.5GHz	802.11a	21.0
	802.11n-HT20	19.5
	802.11n-HT40	20.0
	802.11ac-VHT20	19.5
	802.11ac-VHT40	20.0
	802.11ac-VHT80	19.5
	802.11ac-VHT160	14.5
	802.11ax-HE20	19.5
	802.11ax-HE40	20.0
	802.11ax-HE80	19.5



5.8GHz	802.11ax-HE160	15.0
	802.11a	20.5
	802.11n-HT20	19.5
	802.11n-HT40	19.5
	802.11ac-VHT20	19.5
	802.11ac-VHT40	20.0
	802.11ac-VHT80	19.0
	802.11ax-HE20	20.0
	802.11ax-HE40	20.0
	802.11ax-HE80	19.0

<6GHz WLAN >

Mode		Maximum Average Power (dBm)
6GHz	802.11a	7.0
	802.11ax-HE20	7.5
	802.11ax-HE40	10.5
	802.11ax-HE80	13.5
	802.11ax-HE160	15.0

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	2.20	14.00	16.200	41.687	0.008	1.000	0.008
2.4GHz WLAN	2412.0	1.90	16.50	18.400	69.183	0.014	1.000	0.014
5.2GHz WLAN	5180.0	1.50	20.50	22.000	158.489	0.032	1.000	0.032
5.3GHz WLAN	5260.0	1.20	20.50	21.700	147.911	0.029	1.000	0.029
5.5GHz WLAN	5500.0	1.60	21.00	22.600	181.970	0.036	1.000	0.036
5.8GHz WLAN	5745.0	1.90	20.50	22.400	173.780	0.035	1.000	0.035
6GHz WLAN	5925.0	2.30	15.00	17.300	53.703	0.011	1.000	0.011
Zigbee	2405.0	2.20	14.50	16.700	46.774	0.009	1.000	0.009
Low Power Wideband Radio in Wi-Fi 5GHz	5725.0	2.20	7.00	9.200	8.318	0.002	1.000	0.002

Note:

1. For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.
2. Chose the maximum power to do MPE analysis.

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
0.008	0.014	0.022

Bluetooth Power Density / Limit	WLAN 5GHz Power Density / Limit	Σ(Power Density / Limit) of Bluetooth + WLAN 5GHz
0.008	0.036	0.044

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
0.008	0.002	0.010

Bluetooth Power Density / Limit	WLAN 6GHz Power Density / Limit	Σ(Power Density / Limit) of Bluetooth +WLAN 6GHz
0.008	0.011	0.019

Zigbee Power Density / Limit	WLAN 2.4GHz Power Density / Limit	Σ(Power Density / Limit) of Zigbee + WLAN 2.4GHz
0.009	0.014	0.023

Zigbee Power Density / Limit	WLAN 5GHz Power Density / Limit	Σ (Power Density / Limit) of Zigbee + WLAN 5GHz
0.009	0.036	0.045

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
0.009	0.002	0.011

Zigbee Power Density / Limit	WLAN 6GHz Power Density / Limit	Σ (Power Density / Limit) of Zigbee +WLAN 6GHz
0.009	0.011	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-----