RF EXPOSURE EVALUATION REPORT

FCC ID	:	**2ANZL-2474**
Equipment	:	**Digital Media Receiver**
Model Name	:	**DW84JL**
Applicant	:	**Microstrip LLC** **83 Wooster Heights Rd, Suite 125, Danbury, Connecticut, 06810**
Standard	:	**47 CFR Part 2.1091**

We, SPORTON INTERNATIONAL INC has been evaluated this product in accordance with 47 CFR Part 2.1091 and it complies with applicable limit.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC evaluation.

The results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full

Approved by: Cona Huang / Deputy Manager

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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History of this test report

Report No.	Version	Description	Issued Date
FA7D0544-05	Rev. 01	Initial issue of report	Mar. 26, 2021

1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Digital Media Receiver
Model Name	DW84JL
FCC ID	2ANZL-2474
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.5GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8GHz Band: 5725 MHz ~ 5825 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz Zigbee: 2405 MHz ~ 2475 MHz
Mode	WLAN: 802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE Zigbee: BPSK

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

Reviewed by: Jason Wang

Report Producer: Carlie Tsai

2. Maximum RF average output power among production units

Mode / Band	Average Power (dBm)	
2.4 GHz ZigBee	Others channel	CH26
	19.0	8.5

Mode / Band	Average Power (dBm)			
	1Mbps (GFSK)	2Mbps (π/4-DQPSK)	3Mbps (8-DPSK)	BT4.0-LE (GFSK)
2.4 GHz Bluetooth	10.5	6.5	6.5	6.5

Band / Mode		IEEE 802.11 Average Power (dBm)								
		11b			11g			HT20		
		Ant 1	Ant 2	Ant 1+2	Ant 1	Ant 2	Ant 1+2	Ant 1	Ant 2	Ant 1+2
2.4GHz WLAN	CH1	19.5	19.5		18.5	18.5	19.5	17.5	17.5	19.0
	CH6	21.0	21.0		20.0	20.0	22.0	20.0	20.0	23.0
	CH11	20.5	20.5		18.5	18.5	20.5	18.0	18.0	20.5
	CH12	16.5	16.5		17.0	17.0	19.0	17.0	17.0	19.0
	CH13	13.5	13.5		15.5	15.5	18.0	15.5	15.5	18.0

	Mode	Channel	Average Power (dBm)		
			Ant 1	Ant 2	Ant 1+2
5.2GHz WLAN	802.11a 6Mbps	36	16.50	17.00	15.00
		40	16.50	20.00	15.00
		44	16.50	20.00	15.00
		48	16.50	20.00	15.00
	802.11n-HT20 MCS0	36	16.50	17.00	15.00
		40	16.50	20.00	15.00
		44	16.50	20.00	15.00
		48	16.50	20.00	15.00
	802.11n-HT40 MCS0	38	13.00	13.00	13.00
		46	16.50	19.00	16.00
	802.11ac-VHT20 MCS0	36	16.50	17.00	15.00
		40	16.50	20.00	15.00
		44	16.50	20.00	15.00
		48	16.50	20.00	15.00
	802.11ac-VHT40 MCS0	38	13.00	13.00	13.00
		46	16.50	19.00	16.00
	802.11ac-VHT80 MCS0	42	12.00	12.00	12.00

	Mode	Channel	Average Power (dBm)		
			Ant 1	Ant 2	Ant 1+2
5.3GHz WLAN	802.11a 6Mbps	52	20.00	19.00	21.50
		56	20.00	19.00	21.50
		60	20.00	19.00	21.50
		64	18.00	17.50	20.00
	802.11n-HT20 MCS0	52	20.00	19.00	21.50
		56	20.00	19.00	21.50
		60	20.00	19.00	21.50
		64	18.00	16.50	20.00
	802.11n-HT40 MCS0	54	21.00	19.50	22.50
		62	15.00	16.00	16.50
	802.11ac-VHT20 MCS0	52	20.00	19.00	21.50
		56	19.50	19.00	21.50
		60	19.50	19.00	21.50
		64	18.00	16.50	20.00
	802.11ac-VHT40 MCS0	54	20.50	19.50	22.50
		62	15.00	15.50	16.50
	802.11ac-VHT80 MCS0	58	16.50	16.00	16.50

	Mode	Channel	Average Power (dBm)		
			Ant 1	Ant 1	Ant 1
5.5GHz WLAN	802.11a 6Mbps	100	19.00	18.50	21.00
		116	20.50	20.00	21.00
		124	18.00	19.00	20.50
		132	18.00	19.00	20.50
		140	18.00	17.50	20.00
		144	20.00	20.00	20.50
	802.11n-HT20 MCS0	100	18.00	18.50	20.50
		116	20.00	20.00	20.50
		124	18.50	19.00	20.50
		132	18.00	19.00	20.00
		140	17.50	18.50	20.00
		144	20.00	20.00	20.50
	802.11n-HT40 MCS0	102	15.50	16.00	18.50
		110	21.00	21.00	22.00
		126	18.50	19.00	21.00
		134	18.00	19.00	20.50
		142	21.00	21.00	21.50
	802.11ac-VHT20 MCS0	100	18.00	18.50	20.50
		116	20.00	19.50	20.50
		124	19.00	19.50	20.00
		132	18.00	18.50	20.00
		140	17.50	18.50	20.00
		144	20.00	20.00	20.50
	802.11ac-VHT40 MCS0	102	15.00	16.00	18.50
		110	21.00	21.00	21.50
		126	18.50	19.00	21.00
		134	18.00	19.00	20.50
		142	20.50	21.00	21.50
	802.11ac-VHT80 MCS0	106	10.50	12.50	14.00
		122	18.50	19.00	21.00
		138	20.50	20.50	21.50

	Mode	Channel	Average Power (dBm)		
			Ant 1	Ant 2	Ant 1+2
5.8GHz WLAN	802.11a MCS0	149	20.50	20.50	23.00
		157	20.50	20.50	23.00
		165	20.50	20.50	23.00
	802.11n-HT20 MCS0	149	20.50	20.50	23.00
		157	20.50	20.50	23.00
		165	20.50	20.50	23.00
	802.11n-HT40 MCS0	151	20.50	20.50	23.00
		159	20.50	20.50	23.00
	802.11ac-VHT20 MCS0	149	20.50	20.50	23.00
		157	20.50	20.50	23.00
		165	20.50	20.50	23.00
	802.11ac-VHT40 MCS0	151	20.50	20.50	23.00
		159	20.50	20.50	23.00
	802.11ac-VHT80 MCS0	155	20.50	20.50	23.00

3. 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/f2)	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/f2)	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

4. Radio Frequency Radiation Exposure Evaluation

4.1. Standalone Power Density Calculation

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm^2)	Limit (mW/cm^2)	Power Density / Limit
WLAN2.4GHz Band	2.80	23.00	25.8	0.38	380.19	0.076	1.000	0.076
WLAN5GHz Band	7.24	23.00	30.2	1.06	1056.82	0.210	1.000	0.210
Bluetooth	3.03	10.50	13.5	0.02	22.54	0.004	1.000	0.004
Zigbee	2.31	19.00	21.3	0.14	135.21	0.027	1.000	0.027

4.2. Collocated Power Density Calculation

WLAN Power Density / Limit	Bluetooth Power Density / Limit	Zigbee Power Density / Limit	Σ(Power Density / Limit) of WLAN+Bluetooth+Zigbee
0.210	0.004	0.027	0.241

Note:

1. Σ(Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WLAN + Bluetooth + Zigbee.
2. Considering the WLAN / Bluetooth / Zigbee transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 3 collocated transmitters is compliant

Conclusion:

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