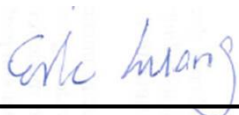


RF Exposure Evaluation Report

APPLICANT : Microstrip LLC
EQUIPMENT : Digital Media Receiver
MODEL NAME : DW84JL
FCC ID : 2ANZL-2474
STANDARD : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC., would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091, and pass the limit. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.



Reviewed by: Eric Huang / Manager



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.)



Table of Contents

1. ADMINISTRATION DATA	4
1.1. Testing Laboratory	4
2. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)	4
3. MAXIMUM RF AVERAGE OUTPUT POWER AMONG PRODUCTION UNITS	4
4. RF EXPOSURE LIMIT INTRODUCTION	6
5. RADIO FREQUENCY RADIATION EXPOSURE EVALUATION	7
5.1. Standalone Power Density Calculation	7
5.2. Collocated Power Density Calculation.....	7

**Revision History**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA7D0544-01	Rev. 01	Initial issue of report	May 14, 2018
FA7D0544-01	Rev. 02	Update description in section5.2	Jun. 20, 2018

1. Administration Data

1.1. Testing Laboratory

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978

Applicant	
Company Name	Microstrip LLC
Address	83 Wooster Heights Rd, Suite 125, Danbury, Connecticut, 06810

2. 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: 2412 MHz ~ 2472 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz Zigbee: 2405 MHz ~ 2480 MHz
Mode	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.

3. Maximum RF average output power among production units

Mode / Band	Average Power (dBm)	
	Others channel	CH26
2.4 GHz ZigBee	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	17.00	17.00	19.50
		40	20.00	20.00	21.00
		44	20.00	20.00	21.00
		48	20.00	20.00	21.00
	802.11n-HT20 MCS0	36	17.00	17.00	19.50
		40	20.00	20.00	21.00
		44	20.00	20.00	21.00
		48	19.50	20.00	21.00
	802.11n-HT40 MCS0	38	13.00	13.00	13.00
		46	19.00	19.00	21.00
	802.11ac-VHT20 MCS0	36	17.00	17.00	19.50
		40	20.00	20.00	21.00
		44	20.00	20.00	21.00
		48	20.00	20.00	21.00
	802.11ac-VHT40 MCS0	38	13.00	13.00	13.00
		46	19.00	19.00	21.00
	802.11ac-VHT80 MCS0	42	12.00	12.00	12.00

	Mode	Channel	Average Power (dBm)		
			ANT 1	ANT 2	ANT 1+2
5.8GHz 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

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)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
2.4GHz WLAN	2412.0	2.80	23.00	25.800	0.380	380.189	0.076	1.000	0.076
5GHz WLAN	5180.0	7.24	23.00	30.240	1.057	1056.818	0.210	1.000	0.210
Bluetooth	2402.0	3.03	10.50	13.530	0.023	22.542	0.004	1.000	0.004
Zigbee	2405.0	2.31	19.00	21.310	0.135	135.207	0.027	1.000	0.027

Note: For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band

5.2. 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 transmit at the same time 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.