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RF Exposure Evaluation Report

Report No.:	CQASZ20200800940E-03
Applicant:	Ocean Digital Technology Ltd.
Address of Applicant:	Flat B, 12/F., Yeung Yiu Chung (No.8) Ind. Bldg., 20 Wang Hoi Road, Kowloon

Equipment Under Test (EUT):

Product:	Internet Radio
Model No.:	WR-210N, WR-210, MA-210, MA-210N
Test Model No.:	MA-210N
Brand Name:	N/A
FCC ID:	2ABD3MS-WR210N
Standards:	47 CFR Part 1.1307
	47 CFR Part 2.1093
	KDB447498D01 General RF Exposure Guidance v06
Date of Receipt:	2020-08-28
Date of Test:	2020-08-28 to 2020-09-04
Date of Issue:	2020-09-04
Test Result:	**PASS***

***In the configuration tested, the EUT complied with the standards specified above**

Tested By: Jun Li

(Jun Li)

Reviewed By: Sheek . Luo

(Sheek Luo)

Approved By:

(Jack Ai)

1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20200800940E-03	Rev.01	Initial report	2020-09-04

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3 General Information

3.1 Client Information

Applicant:	Ocean Digital Technology Ltd.
Address of Applicant:	Flat 12B, Yeung Yiu Chung (No.8) Ind. Bldg., 20 Wang Hoi Road, Kowloon Bay
Manufacturer:	Ocean Digital Technology Ltd.
Address of Manufacturer:	Flat 12B, Yeung Yiu Chung (No.8) Ind. Bldg., 20 Wang Hoi Road, Kowloon Bay

3.2 General Description of EUT

Product Name:	Internet Radio
Model No.:	WR-210N, WR-210, MA-210, MA-210N
Test Model No.:	MA-210N
Trade Mark:	N/A
EUT Supports Radios application:	Bluetooth: 2402-2480MHz 2.4G Wi-Fi: 802.11b/g/n(HT20): 2412MHz ~2462 MHz
Hardware Version:	V1.1
Software Version:	20200813.1410
Sample Type:	☐ Mobile ☒ Portable ☐ Fix Location
Power Supply:	lithium battery: DC 7.4V, 2000mAh, Charge by DC 5V

3.3 General Description of BT

Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	V4.2
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Transfer Rate:	1Mbps/2Mbps/3Mbps
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Test Software of EUT:	EspRFtestTool (manufacturer declare)
Antenna Type:	PCB antenna
Antenna Gain:	0dBi

3.4 General Description of 2.4G WIFI

Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE for 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20): OFDM (64QAM, 16QAM, QPSK, BPSK)
Transfer Rate:	IEEE for 802.11b: 1Mbps/2Mbps/5.5Mbps/11Mbps IEEE for 802.11g:

	6Mbps/9Mbps/12Mbps/18Mbps/24Mbps/36Mbps/48Mbps/54Mbps IEEE for 802.11n(HT20): 6.5Mbps/13Mbps/19.5Mbps/26Mbps/39Mbps/52Mbps/58.5Mbps/65Mbps
Test Software of EUT:	EspRFtestTool (manufacturer declare)
Antenna Type:	PCB antenna
Antenna Gain:	0dBi

Note:

Model No.: WR-210N, WR-210, MA-210, MA-210N

Only the model MA-210N was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being color of appearance and model name.

4 SAR Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

4.1.2 Limits

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

□f(GHz) is the RF channel transmit frequency in GHz
□Power and distance are rounded to the nearest mW and mm before calculation[17]
□The result is rounded to one decimal place for comparison
The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

4.1.3 EUT RF Exposure

Measurement Data

BT:

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-0.930	-1.5±1	-0.5	0.891
Middle(2441MHz)	-0.490	-1.0±1	0	1.000
Highest(2480MHz)	-0.790	-1.5±1	-0.5	0.891
π/4DQPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	1.410	0.5±1	1.5	1.413
Middle(2441MHz)	1.880	1.0±1	2.0	1.585
Highest(2480MHz)	1.600	0.5±1	1.5	1.413
8DPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	1.760	1.0±1	2.0	1.585
Middle(2441MHz)	2.170	1.5±1	2.5	1.778
Highest(2480MHz)	1.920	1.0±1	2.0	1.585

Worst case: 8DPSK mode						
Channel	Maximum Peak Conducted Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power		Calculated value	Exclusion threshold
			(dBm)	(mW)		
Lowest (2402MHz)	1.760	1.0±1	2.0	1.585	0.491	3.0
Middle (2441MHz)	2.170	1.5±1	2.5	1.778	0.556	
Highest (2480MHz)	1.920	1.0±1	2.0	1.585	0.499	
Conclusion: the calculated value ≤3.0, SAR is exempted.						

Remark: The Max Conducted Peak Output Power data refer to report Report No.: CQASZ20200800940E-01

2.4G WIFI:

802.11b mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	8.82	8.0±1	9.0	7.943
Middle(2437MHz)	8.79	8.0±1	9.0	7.943
Highest(2462MHz)	8.77	8.0±1	9.0	7.943
802.11g mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	7.89	7.0±1	8.0	6.310
Middle(2437MHz)	7.86	7.0±1	8.0	6.310
Highest(2462MHz)	7.76	7.0±1	8.0	6.310
802.11n(HT20)mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	7.42	6.5±1	7.5	5.623
Middle(2437MHz)	7.37	6.5±1	7.5	5.623
Highest(2462MHz)	7.46	6.5±1	7.5	5.623

Worst case: 802.11b mode						
Channel	Maximum Peak Conducted Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power		Calculated value	Exclusion threshold
			(dBm)	(mW)		
Lowest (2412MHz)	8.82	8.0±1	9.0	7.943	2.467	3.0
Middle (2437MHz)	8.79	8.0±1	9.0	7.943	2.480	
Highest (2462MHz)	8.77	8.0±1	9.0	7.943	2.493	
Conclusion: the calculated value ≤3.0, SAR is exempted.						

Remark: The Max Conducted Average Output Power data refer to report Report No.:CQASZ20200800940E-02
BDR, EDR and WIFI can not simultaneous transmitting at same time.