

# EVALUATION REPORT

EUT Description	WLAN and BT, 2x2 PCIe M.2 1216 SD adapter card
Brand Name	Intel® Wi-Fi 6E AX211
Model Name	AX211D2WH
FCC ID	PD9AX211D2H
Date of Test Start/End	2022-09-23 / 2022-09-23
Features	802.11ax, Tri Band, 2x2 Wi-Fi 6E + Bluetooth® 5.2 (see section 3)

Applicant	Intel Mobile Communications
Address	100 Center Point Circle, Suite 200/Columbia, SC 29210/United States
Contact Person	Steven Hackett
Telephone/Fax/ Email	Steven.hackett@intel.com

Reference Standards	FCC 47 CFR 1.1310 FCC 47 CFR 2.1091 (see section 1)
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Test Report identification	220916-01.TR11
Revision Control	Rev. 00 This test report revision replaces any previous test report revision (see section 5)

Reference to accreditation shall be used only by full reproduction of test report

Issued by

Reviewed by

Adel LOUNES  
(Test Lead Engineer)

Zayd OUACHICHA  
(Technical Manager)

Intel Corporation SAS – WRF Lab  
425 rue de Goa – Le Cargo B6 - 06600 Antibes, France  
Tel. +33493001400 / Fax +33493001401

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## 1. Standards, reference documents and applicable test methods

FCC	FCC 47 CFR Part §1.1310 Radiofrequency radiation exposure limits. Edition October 2020 FCC 47 CFR Part §2.1091 Radiofrequency radiation exposure evaluation: mobile devices. Edition October 2020
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## 2. General conditions, competences and guarantees

- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2017 laboratory accredited by the American Association for Laboratory Accreditation (A2LA) with the certificate number 3478.01.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm recognized by the FCC, with Designation Number FR0011
- ✓ Intel WRF Lab only provides testing services and is committed to providing reliable, unbiased test results and interpretations.
- ✓ Intel WRF Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.
- ✓ Intel WRF Lab has developed calibration and proficiency programs for its measurement equipment to ensure correlated and reliable results to its customers.
- ✓ This report is only referred to the item that has undergone the test.
- ✓ This report does not imply an approval of the product by the Certification Bodies or competent Authorities.

### 3. EUT Features

The herein information is provided by the customer

Intel WRF Lab declines any responsibility for the accuracy of the stated customer provided information, especially if it has any impact on the correctness of test results presented in this report.

Brand Name	Intel® Wi-Fi 6E AX211																																																										
Model Name	AX211D2WH																																																										
Supported Radios	<div>802.11b/g/n/ax2.4GHz (2400.0 – 2500.0 MHz)</div> <div>802.11a/n/ac/ax5.2GHz (5150.0 – 5250.0 MHz) 5.4GHz (5250.0 – 5470.0 MHz) 5.6GHz (5470.0 – 5725.0 MHz) 5.8GHz (5725.0 – 5925.0 MHz) 6.2GHz (5925.0 – 6425.0MHz) 6.5GHz (6425.0 – 6525.0MHz) 6.6GHz (6525.0 – 6875.0MHz) 7.0GHz (6875.0 – 7125.0MHz)</div> <div>Bluetooth 5.22.4GHz (2400.0 – 2500.0 MHz)</div>																																																										
Antenna Information	<div><div>2.4GHz Antenna:</div><table><tr><td>Transmitter</td><td>Main/Chain A/Chain 1</td><td>Aux/Chain B/Chain 2</td></tr><tr><td>Manufacturer</td><td>Intel WRF Lab</td><td>Intel WRF Lab</td></tr><tr><td>Antenna type</td><td>Monopole</td><td>Monopole</td></tr><tr><td>Part number</td><td>WRF-6dBi-Monopole-2.4G</td><td>WRF-6dBi-Monopole-2.4G</td></tr></table><div>5GHz Antenna:</div><table><tr><td>Transmitter</td><td>Main/Chain A/Chain 1</td><td>Aux/Chain B/Chain 2</td></tr><tr><td>Manufacturer</td><td>Intel WRF Lab</td><td>Intel WRF Lab</td></tr><tr><td>Antenna type</td><td>Monopole</td><td>Monopole</td></tr><tr><td>Part number</td><td>WRF-8dBi-Monopole-5G</td><td>WRF-8dBi-Monopole-5G</td></tr></table><div>6GHz Antenna:</div><table><tr><td>Transmitter</td><td>Main/Chain A/Chain 1</td><td>Aux/Chain B/Chain 2</td></tr><tr><td>Manufacturer</td><td>Intel WRF Lab</td><td>Intel WRF Lab</td></tr><tr><td>Antenna type</td><td>Monopole</td><td>Monopole</td></tr><tr><td>Part number</td><td>WRF-8dBi-Monopole-6G</td><td>WRF-8dBi-Monopole-6G</td></tr></table><table><tr><th>Frequency Band</th><th>Peak gain w/cable loss (dBi)</th></tr><tr><td>2.4 GHz (2400.0 – 2500.0 MHz)</td><td>6.11 dBi</td></tr><tr><td>5.2 GHz (5150MHz-5250MHz)</td><td>7.91 dBi</td></tr><tr><td>5.4 GHz (5250MHz-5470MHz)</td><td>7.73 dBi</td></tr><tr><td>5.6 GHz (5470MHz-5725MHz)</td><td>7.39 dBi</td></tr><tr><td>5.8 GHz (5725MHz-5925MHz)</td><td>8.26 dBi</td></tr><tr><td>6.2 GHz (5925MHz-6425MHz)</td><td>7.75 dBi</td></tr><tr><td>6.5 GHz (6425MHz-6525MHz)</td><td>6.84 dBi</td></tr><tr><td>6.6 GHz (6525MHz-6875MHz)</td><td>7.45 dBi</td></tr><tr><td>7.0 GHz (6875MHz-7125MHz)</td><td>7.75 dBi</td></tr></table></div>			Transmitter	Main/Chain A/Chain 1	Aux/Chain B/Chain 2	Manufacturer	Intel WRF Lab	Intel WRF Lab	Antenna type	Monopole	Monopole	Part number	WRF-6dBi-Monopole-2.4G	WRF-6dBi-Monopole-2.4G	Transmitter	Main/Chain A/Chain 1	Aux/Chain B/Chain 2	Manufacturer	Intel WRF Lab	Intel WRF Lab	Antenna type	Monopole	Monopole	Part number	WRF-8dBi-Monopole-5G	WRF-8dBi-Monopole-5G	Transmitter	Main/Chain A/Chain 1	Aux/Chain B/Chain 2	Manufacturer	Intel WRF Lab	Intel WRF Lab	Antenna type	Monopole	Monopole	Part number	WRF-8dBi-Monopole-6G	WRF-8dBi-Monopole-6G	Frequency Band	Peak gain w/cable loss (dBi)	2.4 GHz (2400.0 – 2500.0 MHz)	6.11 dBi	5.2 GHz (5150MHz-5250MHz)	7.91 dBi	5.4 GHz (5250MHz-5470MHz)	7.73 dBi	5.6 GHz (5470MHz-5725MHz)	7.39 dBi	5.8 GHz (5725MHz-5925MHz)	8.26 dBi	6.2 GHz (5925MHz-6425MHz)	7.75 dBi	6.5 GHz (6425MHz-6525MHz)	6.84 dBi	6.6 GHz (6525MHz-6875MHz)	7.45 dBi	7.0 GHz (6875MHz-7125MHz)	7.75 dBi
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Simultaneous Transmission Configurations	WLAN 2.4GHz Main + BT Aux WLAN 2.4GHz Main + WLAN 2.4GHz Aux WLAN 5GHz Main + BT Aux WLAN 5GHz Main + WLAN 5GHz Aux WLAN 5GHz Main + WLAN 5GHz Aux + BT Aux WLAN 6GHz Main + WLAN 6GHz Aux* WLAN 6GHz Main + WLAN 6GHz Aux + BT Aux*																																																										

#### 4. Evaluation Verdicts summary

##### Power Density Calculations

Mode	Highest Power Density @ 20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Verdict
DTS	0.10	1.00	P
UNII 5GHz	0.18	1.00	P
UNII 6GHz	0.01	1.00	P
BT	0.01	1.00	P

##### Collocated Power Density Calculations

Mode	$\sum \frac{\text{Power Density}}{\text{Limit}}$	Ratio Max	Verdict
WLAN + BT	0.37	1	P

P: Pass  
F: Fail  
NM: Not Measured  
NA: Not Applicable

## 5. Document Revision History

Revision #	Modified by	Revision Details
Rev. 00	A.LOUNES	First Issue

# Annex A. Evaluation Description

## A.1 RF Exposure Limit

According to the FCC part 1.1310:

- For operations within the frequency range of 300 kHz and 6 GHz (inclusive), the limits for maximum permissible exposure (MPE), derived from whole-body SAR limits and listed in the table below.

### Limits for Maximum Permissible Exposure (MPE) (TABLE 1 TO §1.1310(E)(1))

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(ii) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	<30
30-300	27.5	0.073	0.2	<30
300-1,500	-	-	f/1500	<30
1,500-100,000	-	-	1.0	<30

f = frequency in MHz. \* = Plane-wave equivalent power density.

For the purpose of this evaluation, a distance of 20cm was used to calculate the equivalent plan wave power density, to be compared with the limit described in the table above:

$$S_{eq} = \frac{P_{avg} \cdot G}{4 \cdot \pi \cdot R^2}$$

Where:

$S_{eq}$  = Equivalent Plane Wave Power Density

$P_{avg}$  = Average Power at antenna terminals in Watts

$G$  = Gain of the Transmitting Antenna

$R$  = Distance from the Transmitting Antenna in meters

## A.2 Exposure from source with Multiple Frequencies

If the device is designed such that more than one antenna can functionally transmit at the same time, the RF exposure evaluation shall be conducted while all antennas are transmitting. The individual exposure level ratios shall be totaled and used for compliance purposes.:

$$\sum \frac{S_{eq_i}}{S_{Limit_i}} < 1$$

# Annex B. RF Exposure Evaluation Results

## B.1 Declared Maximum Output Power

According to the applicant, the maximum conducted transmit power (including the upper tolerance) for the EUT under evaluation are as follows:

Mode	Max Output Power (incl. Tolerance)
DTS	21.00 dBm
UNII 5GHz	21.25 dBm
UNII 6GHz	10.75 dBm
BT	10.75 dBm

## B.2 RF Exposure Evaluation Results

### B.2.1 2.4GHz

Band	Avg Power [dBm]	Peak antenna Gain (dBi)	ERP/EIRP Avg [dBm]	ERP/EIRP Avg [mW]	Power density @ 20cm [mW/cm <sup>2</sup> ]	Limit [mW/cm <sup>2</sup> ]	Ratio (Power density/Limit)
DTS	21.00	6.11	27.11	514.04	0.10	1.00	0.10
BT	10.75		16.86	48.53	0.01	1.00	0.01

### B.2.2 UNII 5GHz

Band	Avg Power [dBm]	Peak antenna Gain (dBi)	ERP/EIRP Avg [dBm]	ERP/EIRP Avg [mW]	Power density @ 20cm [mW/cm <sup>2</sup> ]	Limit [mW/cm <sup>2</sup> ]	Ratio (Power density/Limit)
UNII 5GHz	21.25	8.26	29.51	893.31	0.18	1.00	0.18

### B.2.3 UNII 6GHz

Band	Avg Power [dBm]	Peak antenna Gain (dBi)	ERP/EIRP Avg [dBm]	ERP/EIRP Avg [mW]	Power density @ 20cm [mW/cm <sup>2</sup> ]	Limit [mW/cm <sup>2</sup> ]	Ratio (Power density/Limit)
UNII 6GHz	10.75	7.75	18.50	70.79	0.01	1.00	0.01



The maximum exposure for collocated transmitters is:

Band	Ratio (Power density/Limit)	$\sum \text{Ratio}_i$	Limit
UNII 5GHz	0.18	0.37	1.00
UNII 5GHz	0.18		
Bluetooth	0.01		

## **End of the Report**

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