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EVALUATION REPORT

EUT Description	WLAN and BT, 2x2 PCIe M.2 2230 adapter card
Brand Name	Intel® Wi-Fi 6E AX211
Model Name	AX211NGW
FCC ID	PD9AX211NG
Date of Test Start/End	2021-08-19 / 2021-08-19
Features	802.11ax, Dual Band, 2x2 Wi-Fi + Bluetooth® 5.2 (see section 3)

Applicant	Intel Mobile Communications
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Reference Standards	FCC 47 CFR 1.1310 FCC 47 CFR 2.1091 (see section 1)
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Test Report identification	210628-02.TR02
Revision Control	Rev. 00 This test report revision replaces any previous test report revision (see section 6)

The test results relate only to the samples tested.

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

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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 2019
FCC 47 CFR Part §2.1091 Radiofrequency radiation exposure evaluation: mobile devices. Edition October 2019

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 declines any responsibility with respect to the identified information provided by the customer and that may affect the validity of results.
- ✓ 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

Brand Name	Intel® Wi-Fi 6E AX211		
Model Name	AX211NGW		
Supported Radios	802.11b/g/n/ax	2.4GHz (2400.0 – 2483.5 MHz)	
	802.11a/n/ac/ax	5.2GHz (5150.0 – 5350.0 MHz)	
		5.6GHz (5470.0 – 5725.0 MHz)	
	802.11ax	5.8GHz (5725.0 – 5895.0 MHz)	
	Bluetooth 5.2	6.0GHz (5925.0 - 7125.0 MHz)*	
		2.4GHz (2400.0 – 2483.5 MHz)	
Antenna Information	Transmitter	Main	Aux
	Manufacturer	WIESON	WIESON
	Antenna type	Dipole antenna	Dipole antenna
	Part number	ARY121-0009-002-H0	ARY121-0009-002-H0
Antenna Information	Frequency Band	Peak gain w/cable loss (dBi)	
	6.2 GHz (5925MHz-6425MHz)	5.06 dBi	
	6.5GHz (6425MHz-6525MHz)	4.71 dBi	
	6.7 GHz (6525MHz-6875MHz)	4.49 dBi	
	6.9 GHz (6875MHz-7125MHz)	5.34 dBi	
Simultaneous Transmission Configurations	WLAN 2.4GHz Main + BT Aux WLAN 2.4GHz Main + WLAN 2.4GHz Aux UNII Main + BT Aux* UNII Main + UNII Aux* UNII Main + UNII Aux + BT Aux*		

*Only these bands are treated on this document since this report is limited to WiFi 6E capabilities

4. Remarks and comments

1. This report is limited to WiFi 6E capabilities. For all the modes DTS, UNII-1, UNII-2A, UNII-2C, UNII-3 and BT please refer to the relative legacy report.

5. Evaluation Verdicts summary

Power Density Calculations

Mode	Highest Power Density @ 20cm (mW/cm ²)	Limit (mW/cm ²)	Verdict
UNII	0.02	1.0	P
BT	0.006	1.0	P

Collocated Power Density Calculations

Mode	$\sum \frac{Power\ Density}{Limit}$	Ratio Max	Verdict
WLAN + BT	0.046	1	P

P: Pass

F: Fail

NM: Not Measured

NA: Not Applicable

6. Document Revision History

Revision #	Modified by	Revision Details
Rev. 00	I.KHARRAT	First Issue

Annex A. Evaluation Description

A.1 RF Exposure Limit

According to the FCC part 1.1310:

- At operating frequencies above 6 GHz, the MPE limits listed in the table below shall be used in all cases to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b) of this part.

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 ²)	Averaging time (minutes)
(ii) 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
300-1,500	-	-	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 totalled 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)
UNII 5	13.5 dBm
UNII 6	13.5 dBm
UNII 7	13.5 dBm
UNII 8	13.5 dBm

B.2 RF Exposure Evaluation Results

B.2.1 UNII5

Band	Avg Power [dBm]	Peak antenna Gain (dBi)	ERP/EIRP Avg [dBm]	ERP/EIRP Avg [mW]	Power density @ 20cm [mW/cm ²]	Limit [mW/cm ²]	Ratio (Power density/Limit)
UNII 5	13.5	5.06	18.56	71.78	0.01	1.0	0.01

B.2.2 UNII6

Band	Avg Power [dBm]	Peak antenna Gain (dBi)	ERP/EIRP Avg [dBm]	ERP/EIRP Avg [mW]	Power density @ 20cm [mW/cm ²]	Limit [mW/cm ²]	Ratio (Power density/Limit)
UNII 6	13.5	4.71	18.21	66.22	0.01	1.0	0.01

B.2.3 UNII7

Band	Avg Power [dBm]	Peak antenna Gain (dBi)	ERP/EIRP Avg [dBm]	ERP/EIRP Avg [mW]	Power density @ 20cm [mW/cm ²]	Limit [mW/cm ²]	Ratio (Power density/Limit)
UNII 7	13.5	4.49	17.99	62.95	0.01	1.0	0.01

B.2.4 UNII8

Band	Avg Power [dBm]	Peak antenna Gain (dBi)	ERP/EIRP Avg [dBm]	ERP/EIRP Avg [mW]	Power density @ 20cm [mW/cm ²]	Limit [mW/cm ²]	Ratio (Power density/Limit)
UNII 8	13.5	5.34	18.84	76.56	0.02	1.0	0.02

The maximum exposure for collocated transmitters is:

Band	Ratio (Power density/Limit)	\sum Ratio _i	Limit
UNII 8	0.02	0.046	1.0
UNII 8	0.02		
Bluetooth	0.006		

End of the Report

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