Product Brief

Intel® Wi-Fi 6E AX211 Module
2nd Generation Wi-Fi 6 with extended Wi-Fi 6E (6GHz band) support

Intel® Wi-Fi 6E AX211 (Gig+) Module

Maximize speed, latency, and reliability benefits of Wi-Fi 6 across new radio frequencies free from legacy device interference

The Intel® Wi-Fi 6E AX211 (Gig+), a CRF[1] (Companion RF), is designed to support Wi-Fi 6E technology. The product supports dual-stream Wi-Fi in the 2.4GHz, 5GHz and 6GHz bands as well as Bluetooth® 5.3. It also supports Wi-Fi 6 R2 features, including UL MU-MIMO[2]. These new features maximize the benefits of Wi-Fi 6, including Gigabit speed, ultra-low latencies, and enhanced reliability benefits across new radio frequencies exclusive to Wi-Fi 6E devices, and deliver a significant improvement in user experience in dense deployments. Combined with Intel® Core™ processors and exceptional Intel wireless innovations, the Intel® Wi-Fi 6E AX211 module can dramatically improve your connected experience at home, work, or on the go.

2nd Generation Intel Wi-Fi 6 Wireless with Extended Wi-Fi 6E (6GHz Band) Support	
Greater Network Flexibility **Faster Speed** **Reduced Latency** **Wi-Fi 6E Tri Band 2x2 160MHz**	The Intel® Wi-Fi 6E AX211 module supports Wi-Fi 4, 5, 6, and Wi-Fi 6E, including Wi-Fi 6 R2 features. By implementing Wi-Fi 6E technology supporting the 6GHz band that includes 1200MHz of contiguous spectrum (>2x compared to 5GHz) with more Gigabit Wi-Fi options and exclusivity to Wi-Fi 6 products, the Intel® Wi-Fi 6E AX211 module maximizes Wi-Fi 6 and Gigabit Wi-Fi benefits, enabling greater network flexibility, faster downloads, sharing and backups, as well as reduced latency and improved reliability. When using Wi-Fi 6 technology with 1024QAM and 160MHz channels, the Intel® Wi-Fi 6 AX211 module can deliver nearly 3x higher peak data rates[3] (up to 2.4Gbps) and up to 4x capacity improvement in dense or congested environments compared to Wi-Fi 5[4].
Bluetooth® 5.3	On top of existing features, Bluetooth® 5.3 includes an Isochronous Channel feature, which lays the foundation for implementation of the next generation of Bluetooth® Audio – Low Energy Audio. The Bluetooth® 5.3 Core specification also provides the capability of changing the transmit power of the devices (local and peer) to improve link quality while optimizing power consumption.
Microsoft* Windows*	Full support for latest Microsoft* Windows 10*, Windows 11* OS.
Form Factors **(M.2 2230 and 1216)**	M.2 2230 modules enable system configuration and platform usage flexibility with the use of a standard Key E socket for attaching the module. M.2 1216 modules enable platform design optimization with the use of an Intel CNVio interface between the CNVi[5] and Intel® Wi-Fi 6 AX211 module[6], providing savings on motherboard space, BOM and PCIe* port, plus allowing for flexible motherboard routing up to 10".

Experience the Intel® Difference

Worldwide Regulatory Support **Intel® Dynamic Regulatory Solution**	Enables performance-optimized worldwide regulatory compliance SKU. The Intel® Wi-Fi 6E AX211 module detects its location and automatically optimizes the Wi-Fi settings to local regulatory requirements, maximizing performance in each geography, simplifying travel experience and global enterprise procurement. Future regulatory changes are easily managed during the product life cycle.
Wireless Functionality in Pre-boot Environment	Support for Wi-Fi network and BLE HID connectivity in the platform's UEFI (Unified Extensible Firmware Interface) environment during its boot stage. This capability enables use cases like OS recovery over Wi-Fi and Bluetooth® Low energy-based keyboard and mouse connectivity in this pre-boot environment.
Wirelessly Project to the Big Screen	Project your 2-in-1 or laptop content instantly, without wires, on the big HD screen with stunning image clarity and sound using Wi-Fi Miracast*. Stream movies, videos, games, photos, connect with friends, and more. Experience it all, bigger and better than ever before.

Business Class Wireless

Intel® vPro® Technology[7]	Supports Intel's hardware-based security and management features built into Intel® Core™ vPro® processors and chipsets that enable IT to manage PCs virtually anywhere, anytime, while reducing deployment costs, improving security and ROI.
Intel® Active Management Technology[8]	Using integrated platform capabilities and popular third-party management and security applications, Intel® AMT allows IT or managed service providers to better discover, repair, and help protect their networked computing assets. Intel® AMT is a feature of Intel® Core™ processors with Intel® vPro® technology.

Intel® Wi-Fi 6E AX211 Module Technical Specifications

GENERAL

Dimensions (H x W x D)	M.2 2230: 22mm x 30mm x 2.4mm [1.5mm Max (Top Side)/ 0.1mm Max (Bottom Side)] M.2 1216: 12mm x 16mm x 1.7 (+/– 0.1) mm
Weight	M.2 2230: 2.83 +/– 0.3 g M.2 1216: 0.67 +/– 0.1 g
Radio ON/OFF Control	Supported
Connector Interface	M.2: CNVio2[9]
Operating Temperature (Adapter Shield)	0°C to +80°C
Humidity Non-Operating	50% to 90% RH non-condensing (at temperatures of 25°C to 35°C)
Operating Systems	Microsoft* Windows 11*, Microsoft* Windows 10*, Linux* (limited feature support), Chrome OS*
Wi-Fi Alliance[10]	Wi-Fi CERTIFIED* 6 with Wi-Fi 6E, Wi-Fi CERTIFIED* a/b/g/n/ac, WMM*, WMM*-Power Save, WPA3*, PMF*, Wi-Fi Direct*, and Wi-Fi Agile Multiband*, Wi-Fi Location R2 HW readiness[11]
IEEE WLAN Standard	IEEE 802.11-2020 and select amendments (selected feature coverage) IEEE 802.11a, b, d, e, g, h, i, k, n, r, u, v, w, ac, ax; Fine Timing Measurement based on 802.11-2016, 802.11az HW readiness[12]
Bluetooth®	Bluetooth® 5.3

SECURITY FEATURES[12]

Security Methods	WPA3* personal and enterprise including WPA2* transition mode
Authentication Protocols	802.1X EAP-TLS, EAP-TTLS/MSCHAPv2, PEAPv0 -MSCHAPv2 (EAP-SIM, EAP-AKA, EAP-AKA')
Encryption	128-bit AES-CCMP, 256-bit AES-GCMP

COMPLIANCE

Regulatory	For a list of country approvals, please contact your local Intel representatives.
US Government	FIPS[13] 140-2
Product Safety	UL, C-UL, CB (IEC 60950-1)

Product Name	Model Number	Version
Intel® Wi-Fi 6E AX211	AX211NGW	Wi-Fi 6E (6GHz), 2x2, Bluetooth® 5.3, M.2 2230
	AX211D2W	Wi-Fi 6E (6GHz), 2x2, Bluetooth® 5.3, M.2 1216
	AX211D2WL	Wi-Fi 6E (6GHz), 2x2, Bluetooth® 5.3, M.2 1216, LTE Coex

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[1] CRF: Companion RF module in M.2 form factor.
[2] Wi-Fi 6 Uplink Multi-User MIMO (Multiple Input Multiple Output) supports up to 8 streams of UL data from multiple stations improving UL network capacity in dense environment.
[3] "Nearly 3X higher peak data rates" Intel® Wi-Fi 6 AX claims are based on the comparison of the expected maximum theoretical data rates for similarly configured Wi-Fi 6 (802.11ax) and standard Wi-Fi 5 (802.11ac) Wi-Fi solutions as documented in IEEE 802.11ax D4.0 spec and IEEE 802.11 wireless standard specifications, and require the use of similarly configured 802.11ax wireless network routers.
[4] Wi-Fi 5 = 802.11ac. In accordance with the IEEE 802.1ax PAR. For additional details visit: https://mentor.ieee.org/802.11/dcn/14/11-14-0165-01-0hew-802-11-hew-sg-proposed-par.docx.
[5] CNVi; Refers to the integrated wireless IP portion residing in the Intel SOC/PCH.
[6] Integrated: Solution comprised of CNVi and a CRF.
[7] Intel® vPro® Technology is sophisticated and requires setup and activation. Availability of features and results will depend upon the setup and configuration of your hardware, software and IT environment. To learn more visit: http://www.intel.com/technology/vpro.
[8] Requires activation and a system with a corporate network connection, an Intel® AMT-enabled chipset, network hardware and software. For notebooks, Intel® AMT may be unavailable or limited over a host OS-based VPN, when connecting wirelessly, on battery power, sleeping, hibernating or powered off. Results dependent upon hardware, setup and configuration. For more information, visit http://www.intel.com/technology/platform-technology/intel-amt.
[9] The CNVio signals connect the CRF module and the CNVi IP in the Intel SoC/PCH. The CNVio protocol is Intel proprietary.
[10] Support of Wi-Fi Alliance certifications is OS-dependent.
[11] IEEE 802.11az hardware readiness per expected Wi-Fi Location R2 feature support and based on draft 2.1 of the IEEE802.11az amendment and is subject to change.
[12] Some security solutions may not be supported by your device operating system and/or by your device manufacturer or may require additional hardware (e.g., UICC – SIM card). Check with your device manufacturer for details on availability.
[13] On Microsoft* Windows*.

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Tests document performance of components on a particular test, in specific systems. Differences in hardware, software, or configuration will affect actual performance. Consult other sources of information to evaluate performance as you consider your purchase. For more complete information about performance and benchmark results, visit **www.intel.com/benchmarks**.

Estimated results were obtained prior to implementation of recent software patches and firmware updates intended to address exploits referred to as "Spectre" and "Meltdown". Implementation of these updates may make these results inapplicable to your device or system.

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Cost reduction scenarios described are intended as examples of how a given Intel-based product, in the specified circumstances and configurations, may affect future costs and provide cost savings. Circumstances will vary. Intel does not guarantee any costs or cost reduction.

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Required End Product Labeling (FCC+IC)
Any device incorporating this module must include an external, visible, permanent marking or label which states: “Contains FCC ID: 2AZR6-FRANBBAT10” and “Contains IC : 27217-FRANBBAT10”