

AEX-QCA9882-NX



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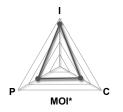
@ OxfordTEC

866Mbps Two Chain, Dual Band 802.11ac/abgn WLAN – Extended Temperature Grade, Full Size MiniPCle Express Module

Based on QUALCOMM ATHEROS Reference Design XB140 (Peregrine)

DATASHEET

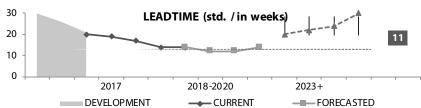




A B A 2 2 11 weeks

TECHPOINT LIFESPOT VAROD VERTICALS DCO ELT

* Page 2 for key legend. Commercial data refresh: July 2018











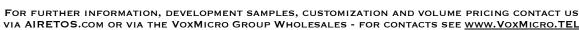
















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Revision History

Releases Date Notes	Prepared	Approved
Official Release Specifications Aligned PID to Qualcomm-Atheros Added Market Orientation Index Name of chipset correction	Joanna	Chris
Version 1.5 2018/07/05 Leadtime and pinout definition update	A Stamatis	LTu

* Commercial Key Legend

Indicators that assess the specific product for its position in the technology curve and the supply chain responsiveness it enjoys. They combine an inner-outer view: both from outside factors and from internal corporate and production support.

MOI [Market Orientation Index]

A value calculated from the grading of the factors below. Used as a rule-of-thumb to aid design-in and procurement evaluation. MOI depicts the present product affinity to Innovation (I), Customer Empathy (C) and Price Focus (P).

TECHPOINT

The position of the product within the specific technology-innovation curve for its class. VALUES: Advanced (A), Barring (B), Common (C), Dissolving (D).

LIFESPOT

Estimated lifespan indicator. VALUES: Agonist (A), Bold (B), Current (C), Distressed (D); the earlier the letter the earlier the position in the specific product lifecycle.

VAROD [Variants On-Demand]

An indicator of the depth and difficulties On-Demand product variations can reach and encounter. VALUES: Auxiliary (A), Basic (B), Core (C), Deep (D).

It is an index of the spread of product applications in different vertical markets. **VERTICALS** VALUES: 1 to 4; the more the target markets the higher the number, the less the

product specificity to markets. Commodity index related to the cost point for the product's design conception.

DCO [Design Cost Orientation]

VALUES: 1 to 4; the higher the number the more cost aware is the core design.

Adjusted lead-time in weeks. This is a compound value based on the timeframe for ELT [Effective Lead Time] the fulfillment of the 90% of unscheduled orders received accounting also for the

industrial lead-time and internal inventory buffering. VALUE: number of ELT weeks

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866MBPS TWO CHAIN, DUAL BAND 802.11AC/ABGN WLAN – EXTENDED TEMPER	RATURE GRADE, FULL
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1. Description

11AC Dual Band (DB): The AEX-AR99882-NX Series IEEE 802.11ac/abgn PCI-E WLAN is the first Qualcomm-Atheros Dual Band modular design compliant with the IEEE 802.11AC standard. It follows the 11AC protocol by supporting wider channel bandwidth (80 MHz) at 5Ghz and wider 256-QAM, plus other features that improve network bandwidth, reliability and the efficiency of wireless connections.

New Performance Heights: With advanced QFN, On-chip CPU for Host Wi-Fi offload, 80Mhz channel bandwidth, 4 Gbit/s bus bandwidth, evolved QAM base band modulation technologies and 866Mbps WLAN peak throughput the AEX-QCA9882-NX is setting new standards.

Extended Temperature Grade: The AEX-QCA9882-NX is built with end quality components from the multi-layered PCB to the front end high quality RF and qualifies also through extended testing for operating temperature ranges from -20° to +70° Celsius.

2. **Top Features**















- IEEE 802.11ac Dual Band (backwards compatible with 802.11abgn)
- Extended operating temperature grade (-20°C ~ 70°C)
- Two antenna connectors, for MIMO 2Tx2R (2 Transmit & 2 Receive) technology
- Transmission Beamforming (TxBF) with enhanced Tx power accuracy and high aggregate power
- PCI-E 2.0 standard specification with up to 4 Gbit/s bandwidth (backwards compatible to 1.x)



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3. Specifications

COLUTION	Chipset	Qualcomm Atheros QCA9882-BR4A
SOLUTION DESIGN	Standard	IEEE 802.11 a/b/g/n/ac Wi-Fi
<i>3</i>	Industrial Reference	Qualcomm Atheros reference design XB140 (Peregrine) Version 2
APPEARANCE	Communications Interface	Mini PCIE format, PCI Express Standard 2.0 host I/O
	Form Factor	Mini PCIE format, standard mPCIe dimensions – Full size card
ANTENNA	Configuration	Two Streams (2 chains), 2x2, 2 Connectors, MIMO
ANTENNA	Туре	Two on board I-PEX U.FL antennas
WIRELESS PARAMETERS	Frequency Band	2.4 GHz ISM Bands 2.412-2.472 GHz, 2.484 GHz 5.15-5.25 GHz (FCC UNII-low band) for US/Canada, Japan and Europe 5.25-5.35 GHz (FCC UNII-middle band) for US/Canada and Europe 5.47- 5.725 GHz for Europe 5.725-5.825 GHz (FCC UNII-high band) for US/Canada WLAN 2.4GHz: 11n: Up to 450Mbps (dynamic)
	Data Transfer Rates	11g: Up to 54Mbps (dynamic) 11b: Up to 11Mbps (dynamic) WLAN 5GHz: 11ac: Up to 1300Mbps (dynamic) 11n: Up to 450Mbps (dynamic) 11a: Up to 54Mbps (dynamic)
	Media Access Control	CSMA/CA with ACK
	Channel	2.4GHz: 1-13 (14 only for Japan) 5GHz: 36-48 149-165
	Channel Spacing	5MHz
	Spreading / B02.11ac/g/n: OFDM (BPSK,QPSK,16-QAM,64-QAM), MR Demodulation 802.11b: CCK (11, 5.5Mbps), DQPSK (2Mbps), BPSK (1Mbps)	



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	RF Output Power	802.11a: Typical 13 dBm at 54M / 16dBm at 6M +- 2dBm 802.11b: Typical 18dBm +/- 2 dBm 802.11g: Typical 13 dBm at 54M / 18dBm at 6M +- 2dBm 802.11n 5G HT20: Typical 21 dBm at MCS0 / 16dBm at MCS7 +/- 2dBm 802.11n 5G HT40: Typical 21 dBm at MCS0 / 16dBm at MCS7 +/- 2dBm 802.11n 2.4G HT20: Typical 22 dBm at MCS0 / 16dBm at MCS7 +/- 2dBm 802.11n 2.4G HT40: Typical 22 dBm at MCS0 / 16dBm at MCS7 +/- 2dBm 802.11ac 5G VHT20: Typical 21 dBm at MCS0 / 15dBm at MCS8 +/- 2dBm 802.11ac 5G VHT40: Typical 21 dBm at MCS0 / 15dBm at MCS8 +/- 2dBm 802.11ac 5G VHT80: Typical 21 dBm at MCS0 / 14dBm at MCS8 +/- 2dBm 802.11ac 5G VHT80: Typical 21 dBm at MCS0 / 14dBm at MCS8 +/- 2dBm • DBm values reflect single RF chain output power performance. • Three chain combined output power can be calculated as the single chain output power above plus 5dB (3Tx = 1Tx + 5dB).		
	RF Receive Sensitivity (Typical)	802.11a: 54M less than -70 dBm 802.11b: 11M less than -85 dBm 802.11g: 54M less than -70 dBm 802.11n 2.4G: HT20 MCS7 less than -72 dBm HT40 MCS7 less than -69 dBm 802.11n 5G: HT20 MCS7 less than -72 dBm HT40 MCS7 less than -69 dBm 802.11ac 5G: VHT20 MCS8 less than -68 dBm		
	Operating Range	Open Space: ~300 m; Indoor: :~100 m (Coverage vary according to environment, antenna and topography)		
	Wireless Security	WEP 64-bit and 128-bit encryption WPA (Wi-Fi Protected Access) WPA2 (Wi-Fi Protected Access)		
WORKING MODES	Infrastructure, Client, Bridg	ge, Ad-hoc		
SAFETY, EMISSION & REGULATORY	Compliant with FCC, CE and Compliant with RoHS.	d IC.		
	IEEE WLAN Network	802.11ac, 802.11n , 802.11g, 802.11b, 802.11a, 802.11d, 802.11e, 802.11j and 802.11i		
PROTOCOLS	Other Standards			
	Industry Standards			
HOST SYSTEM REQUIREMENTS	Operating System	Linux, Linux Open Source, Qualcomm-Atheros Embedded Platform (Windows on request)		
	Operating Temperature	-20° ∼ +70° Celsius		
ENVIRONMENT	Storage Temperature	-40°~+80° Celsius		
ENVINONIVILINI	Operating Humidity	10%~90% non-condensing		
	Storage Humidity	5%~90% non-condensing		
ELECTRICAL	I/O Voltage	3.3V +/-5%		



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	Power Consumption	Transmit Packet Test HT 40*: Receiver Packet Test HT 40*:	TBC mA max TBC mA max
Dimensions		50.95mm x 30mm x 3.15mm (with shielding)	
MECHANICAL	Weight	6.1 g	
Packing style		ESD Sleeves in Carton Bulk Package	
PACKAGING	Package Contents	AEX-AR9882-NX IEEE 802.11 ac/al	bgn mPCI-E modules

4. Ratings / Characteristics

4-1. Absolute Maximum Ratings

Symbol	Parameter	Max. Rating	Unit
V _{dd33}	Maximum I/O supply voltage	3.63	V
RFin	Maximum RF input (reference to 50 Ω)	+10	dBm
T _{store}	Storage temperature	-40~+80	°C

4-2. Recommended Operating Conditions

Symbol	Parameter	Rating	Unit
V_{dd33}	I/O voltage	2.97~3.63	V

4-3. GPIO Interface Characteristics

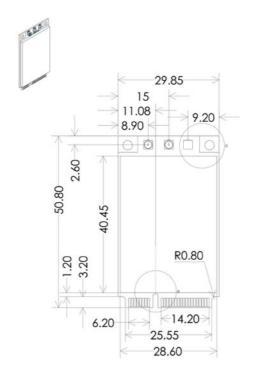
Signal Name (To chip GPIO PIN)	Mini PCI-E PIN	Туре	Driver	PU/PD Resistance
WLAN_LED	44	0	24 mA (Max)	1 KΩ PD
WLAN_DISABLE	20	I	_	10 ΚΩ PU

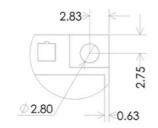


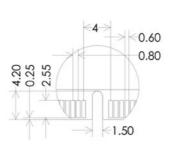
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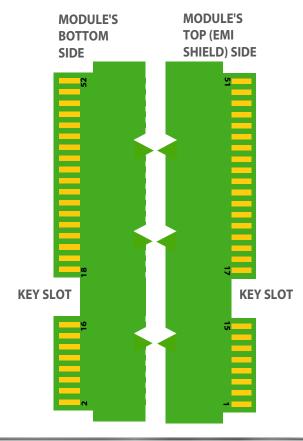
6. **Connector Pin-out Definitions**

Pin No.	Definition	Basic Description	Туре
1	PCIE WAKE L	PCIe Wake	Output
2	+3.3V aux	3.3V power supply	Power
4	GND	Ground	GND
7	CLKREQ_L	Reference clock request, open drain	Output
9	GND	Ground	GND
11	REFCLK-	Differential reference clock	Input
13	REFCLK+	Differential reference clock	Input
15	GND	Ground	GND
18	GND	Ground	GND
		WLAN disable control.	
20	W_DISABLE_L	Low disables WLAN. Module P.U	Input
21	GND	Ground	GND
22	PERST_L	PCI express fundamental reset	Input
23	PERn0	Differential transmit (PCIE TX N)	Output
24	+3.3V aux	3.3V power supply	Power
27		Differential transmit	TOVVCI
25	PERp0 MODULE'S	CPCIE_TY 2	Output
26	GN®rtom side	und TOP (EMI SHIELD) SII	
27	GND	und	GND
29	GND	📙 und 📕	GND
31	PETn0	renti peive KEYSLOT	Input
33	PETp0	Differential receive (PCIE RX P)	Input
34	GND 50 GND	Ground RESERVED 51	GND
35	GND 48 RESERVED LED_WPAN_L	Ground RESERVED 47 RESERVED 45	GND
37	GND 44 LED_WLAN_L RESERVED	Ground GND 43 RESERVED 41	GND
39	+3.3V aux GND USB D+	3.3V power supple SERVED 39 37	Power
40	GND 36 USB_D-	Ground GND 35	GND
41	+3 3V AUX RESERVED	3.3V power supply on suppl	Power
43	GND 28 RESERVED	Ground GND 27	GND
13	26 GND 24 RESERVED	Active low signal. Plane 25	OND
44	LED_Wella Perst_L 18 GND	signal is used to provide. WLAN LED indicate	Output
46	LED_W*PA RSERVED 12 RESERVED 10 RESERVED	Active low signal. The signal is used to provide: BT LED indicate SECUL: STATE ST	Output
50	GND 8 RESERVED	Ground CLKREQ_L 7	GND
52	+3.3V aux GND	3.3V power supplyerved 3	Power

Interface type	Bus Signaling	Standard
NGFF Edge	PCle	PCI-SIG v1.1

* Physical Layer Form Factor follows standard PCIe definitions. Graphic representation below.

** Pin/Contact Numbers not appearing in the pinout table are either reserved or unused.



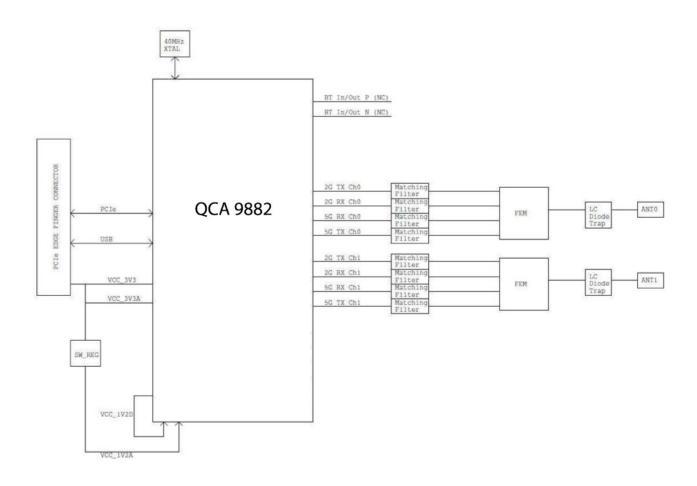
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7. Block Diagram



8. **Environmental Performance Qualification**

At the time of writing this document, throughput test at controlled thermal conditions are to be scheduled. Any related enquiries can be addressed to your sales / account manager.



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9. Standard Domain Code & Identification

The Regulatory Domains pre-programmed as standard are 0x6c,0x1f.

Other regulatory domain codes can be pre-programmed on-request at production batch level.

Implemented as standard are identifiers following Qualcomm Atheros XB140 reference design:

	Vendor ID (VID)	Subststem Vendor ID (SVID)	Device ID (DID)	Subsystem ID (SSID)
STANDARD WLAN	0x168C	n/a	0x3C	n/a

10. Product Label

10-1. Front (Shield) Side Regulatory Label

Standard label is shown here. It includes the required marking for the following regulatory areas: FCC (USA), ETSI (Europe), EU Safety & Environmental.

Wireless LAN NIC MAC ID label (human legible and barcode).

Serial Number label (human legible and barcode) plus Variant Number.



10-3. On-Demand Labeling

Labels can be tailored to report customer's part number and regulatory compliance following Qualcomm Atheros XB140 (Peregrine) reference design certifications for any of the countries and domains required.

11. ESD Processes

See Notices appended.



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12. Standard Packaging, Storage & Shipping

ESD Sleeve, Inner Box & Outer Carton level standard packing schematic *:



	Module in ESD Sleeve	Inner Box Kit (K)	Master Carton (M)
CONTENT (UNITS)	1	60	960
INVENTORY SKU	AEX-QCA9882-NX	AEX-QCA9882-NX-K	AEX-QCA9882-NX-M
OUTER DIMENSIONS	70 x 60 x 3.5 mm	204 x 165 x 65 mm	430 x 350 x 285 mm
GROSS WEIGHT	6.2 gr	430 gr	8000 gr
PICK & PACK METHOD	Padded envelope or carton box depending on quantity. Padded & separated.	In outer carton packaging.	As-is.
PACKAGING COMPLIANCE **	ANSI/ESD S20.20, IEC 61340-5-1, RoHS2	RoHS2	RoHS2
HTS CODE (HS)	8517.62	8517.62	8517.62
NAFTA / ECCN	On request	On request	On request

^{*} Packaging modality and artwork can be designed as per customer's requirements.

The AEX-QCA9882-NX constitutes a sensitive electronic device and caution is required when handling it. ESD handling, shipment and storage notices apply:



DO NOT OPEN OR **HANDLE EXCEPT AT A** STATIC-FREE WORKSTATION



DO NOT SHIP OR STORE NEAR STRONG ELECTROSTATIC, **ELECTROMAGNETIC OR** RADIOACTIVE FIELDS

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^{**} The Packaging modality and the selection of its materials is made with environmental responsibility and commitment to resource preservation. Please reuse and recycle where possible.

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13. Ordering information

Public variants, their differential characteristics and ordering information:

	Ordering P/N	Variant IDs	Description
STANDARD PRODU CT	AEX-AR9882-NX	D / 05	- Standard product - Standard packaging

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14. **NOTICES**

STORAGE: The product shall be stored and the package shall remain closed according to storage environmental conditions noted within this datasheet.

- The product shall be stored in non-corrosive gas (Cl2, NH3, SO2, Nox, etc.). - No excess mechanical shock shall be applied including, but not limited to, sticking the packing materials by sharp object and dropping the product, in order to avoid damaging the packing materials.

SHELVE LIFE: Products left more than two years after reception need to have their specifications confirmed prior to use.

HANDLING: Care in handling or transporting products is required as excessive stress or mechanical shock may break products. – Cracks or damages on products' terminals may lead to changes in their characteristcs. Products are not to be touched with bare hands as this may result in electrostatic damage. - Application of static electricity or overvoltage may cause defect in the product or deterioration of its reliability, and caution must be taken against exposure to any static electricity generated by electrified items such as workbenches, soldering irons, tools, carrying containers, etc.

LAND PATTERN & DIMENSIONS: All ground terminals should be connected to the ground patterns. Furthermore, the ground pattern should be provided between IN and OUT terminals. Please refer to the specifications for standard land dimensions.

MECCHANICAL PLACEMENT: When mounting products connected to other components, products may be stressed and broken by uneven forces. To prevent such damages, compliance with specifications for the tools and interfaces being used is required.

CLEANING: As this Product is Moisture Sensitive, no cleaning is permitted.

OPERATIONAL EVNIRONMENTAL CONDITIONS: Products are designed to work as part of electronic compositions under normal environmental conditions (ambient temperature, humidity and pressure). Operation under the following circumstances may damage the products and leakage of electricity and abnormal temperature may occur:

- In an atmosphere containing corrosive gasses (Cl2, NH3, SOx, NOx) or combustible and volatile gases Dusty places Places of direct sunlight
- Water splashing places Humid places where water condenses Freezing places etc.

In the instance of potential operation in such environments, consult with AIRETOS before actual use. Application of static electricity or excessive voltage while assembling and measuring is discouraged as it might be a cause of degradation or destruction.

INPUT POWER CAPACITY: Products shall be used in the input power capacity specified in this datasheet. If components are to be used beyond the documented input power capacity range, prior consultation with AIRETOS is advised.

LIMITATION OF APPLICATIONS: The product is designed and manufactured for consumer application only and is not available for any application listed below which requires signficanlty high reliability for the prevention of defects that may directly cause damage to the third party's life, body or property.

- Aircraft equipment - Aerospace equipment - Undersea equipment - Power plant control equipment - Medical equipment - Transportation equipment (vehicles, trains, ships, etc.) - Traffic signal equipment - Disaster prevention / crime prevention equipment - Data-processing equipment - Application of similar complexity and/ or reliability requirements to the applications listed in the above.

If the product is to be used in equipment or electric circuit that requires high safety or reliability function / performances, sufficient reliability evaluation check for safety shall be performed prior to commercial shipment and consideration for the installation of a protective circuit at customer's design stage is strongly recommended. Please provide and appropriate fail-safe function on the customer's product to prevent any damages that may be caused by the abnormal function or the failure of our product.

QUALITY CONTROL: Testing and other quality control techniques are applied to the extent AIRETOS deems necessary. Unless mandated by government requirements, AIRETOS does not necessarily test all parameters of each product.

LIFECYCLE: Please note that AIRETOS may discontinue the manufacture of products, due to reasons such as end of supply of materials and/or components from our suppliers.

CONFORMITY: Please make sure that your product has been evaluated and confirmed against your specifications when the AIRETOS product is mounted to your product. Please conduct validation and verification of the products in actual condition of mounting and operating environment before commercial shipment of the equipment. All the items and parameters in this product specification have been prescribed on the premise that our product is used for the purpose, under the condition and in the environment agreed upon between you and us. You are requested not to use our product deviating from such agreement. We consider it not appropriate to include other terms and conditions for transaction warranty in product specifications, drawings or other technical documents. Therefore, even if your original part of this product specification includes such terms and conditions as warranty clause, product liability clause, or intellectual property infringement liability clause, we are not able to accept such terms and conditions in this product specification unless they are based on the governmental regulation or what we have agreed otherwise in a separate contact. We would like to suggest that you propose to discuss them under negotiation of contract.

DISCLAIMER: Please note that the only warranty that AIRETOS (DBA part of the VoxMicro LTD Group) provides regarding the products is its conformance to the specifications provided herein. Accordingly, AIRETOS shall not be responsible for any defects in products or equipment incorporating such products, which are caused under the conditions other than those specified in this specification.

AIRETOS HEREBY DISCLAIMS ALL OTHER WARRANTIES REGARDING THE PRODUCTS, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, THAT THEY ARE DEFECT-FREE, OR AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. YOU AGREE TO INDEMNIFY AND DEFEND AIRETOS AND ITS AFFILIATES AGAINST ALL CLAIMS, DAMAGES, COSTS, AND EXPENSES THAT MAY BE INCURRED, INCLUDING WITHOUT LIMITATION, ATTORNEY FEES AND COSTS, DUE TO THE USE OF PRODUCTS.

AIRETOS's liability under this warranty shall be limited to products that are returned during the warranty period to the address designated by AIRETOS and that are determined by AIRETOS not to conform to such warranty. If AIRETOS elects to repair or replace such products, AIRETOS shall have reasonable time to repair such products or provide replacements. Repaired products shall be warranted for the remainder of the original warranty period. Replaced products shall be warranted for a new full warranty period.

For avoidance of doubt, AIRETOS shall not be liable for any defects that are caused by neglect, misuse or mistreatment by an entity other than AIRETOS including improper installation or testing, or for any products that have been altered or modified in any way by an entity other than AIRETOS. Moreover, AIRETOS shall not be liable for any defects that result from your or third party's design, specifications or instructions for such products.

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5 Locations - 80% Direct Market Coverage - Affiliate Support



Quality Functions at all Stages



Behind the Scenes



World Distribution & Samples via OxfordTEC®



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