

# **CERIO Outdoor AP**

## **7KM using External Directional Antenna**

### **Throughput Test Report**

Model No. **[OW-300N2-A2]**



By

**Tested using ANT-19FN-P2 Antenna**  
**External N-Type 19dBi Directional Panel Antenna**  
**(Select Antenna options in software UI)**

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### 1. Test Product model.

**OW-300N2-A2** eXtreme Power 11n 2.4GHz 2x2 Outdoor Access Point (1000mW)  
**ANT-19FN-P2** 2.4GHz 2x2 Outdoor Directional Panel 19dBi Pole Mount Antenna

### 2. Introduction

Cerio’s OW-300N2-A2 Outdoor AP integrated our original OW-300 series conveniently into one device. By combining two antenna options into a single device, this versatile access point can be perfect for a wide range of deployment environments and applications.

This test is representative of our dedication to product development and progression. Regarding our product design, we are constantly working towards improved performance and usability. This progressive mentality has been key to our success in the enterprise wireless market.

### 3. Test Date and Personnel

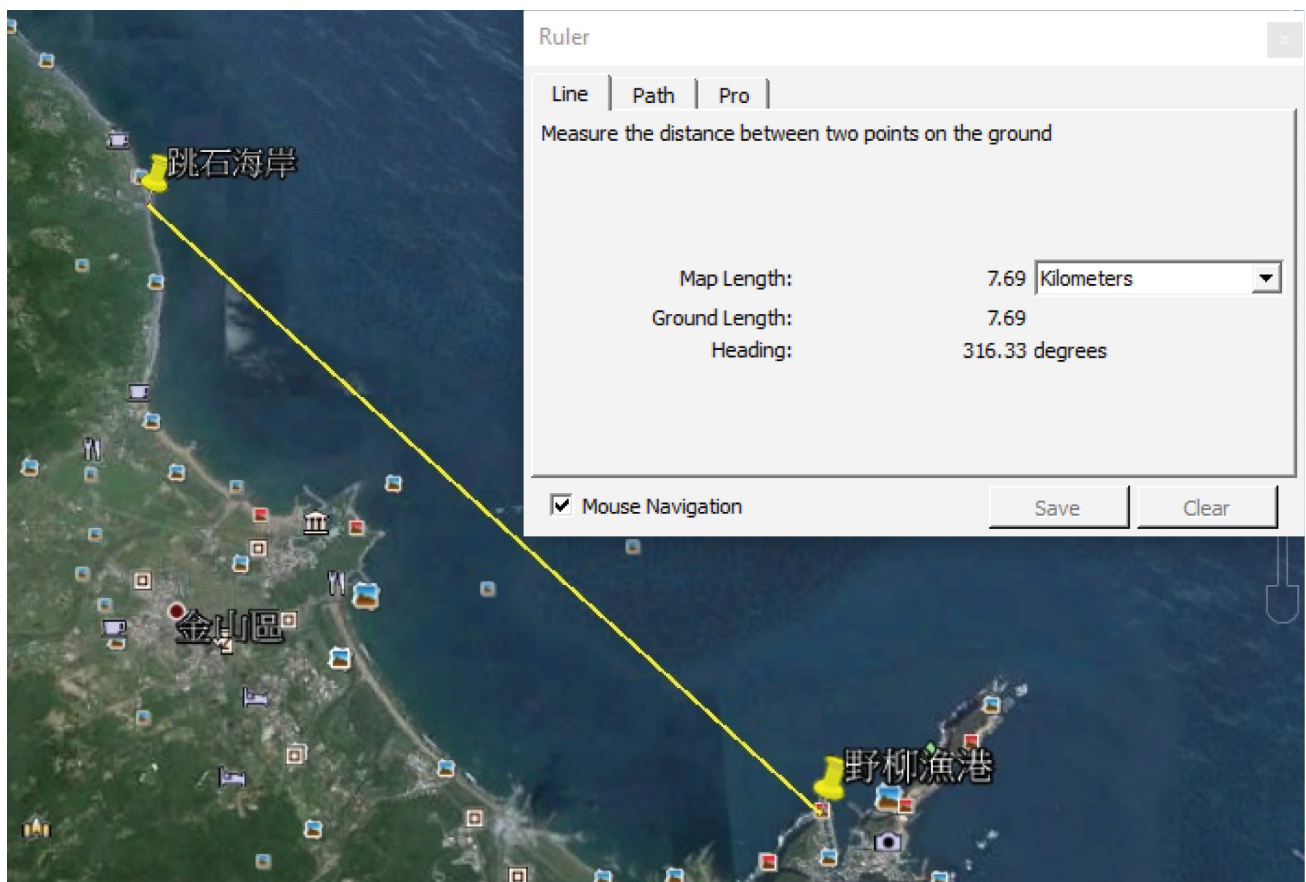
Date	2016 / 05 / 02			
Test Personnel				
				

## 4. Test Environment

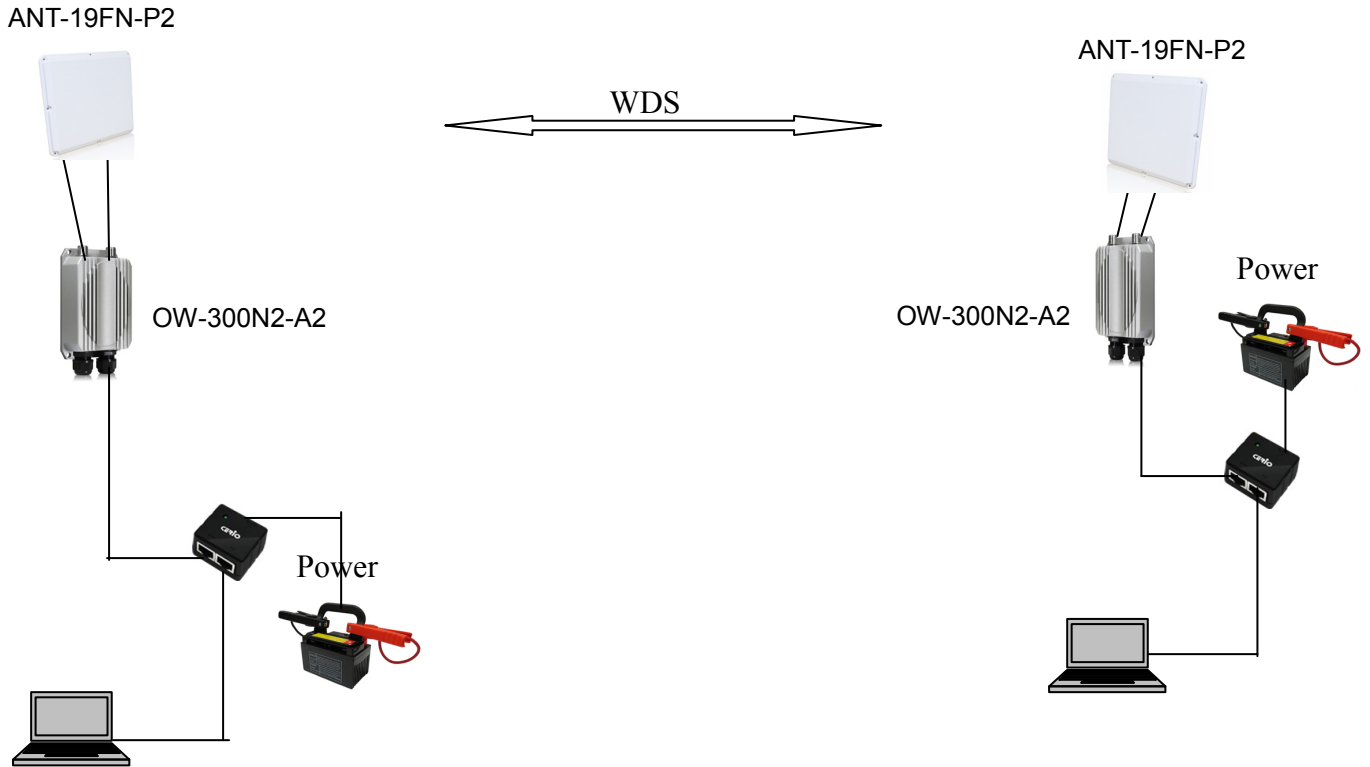
Location A: Tiao Shi Northeast Coast

Location B: Yehliu Fishing Port

The distance from Location A to Location B is approximately 7km, determined by Google Earth. There are no substantial variations of elevator to factor in.



## 5. Wireless Network Configuration



The connection between point A and point B in this network structure utilizes WDS Bridge mode. Our test results are based off this operation mode, and records transmission rates and transmission throughput statuses for data analysis.

## 6. Throughput test

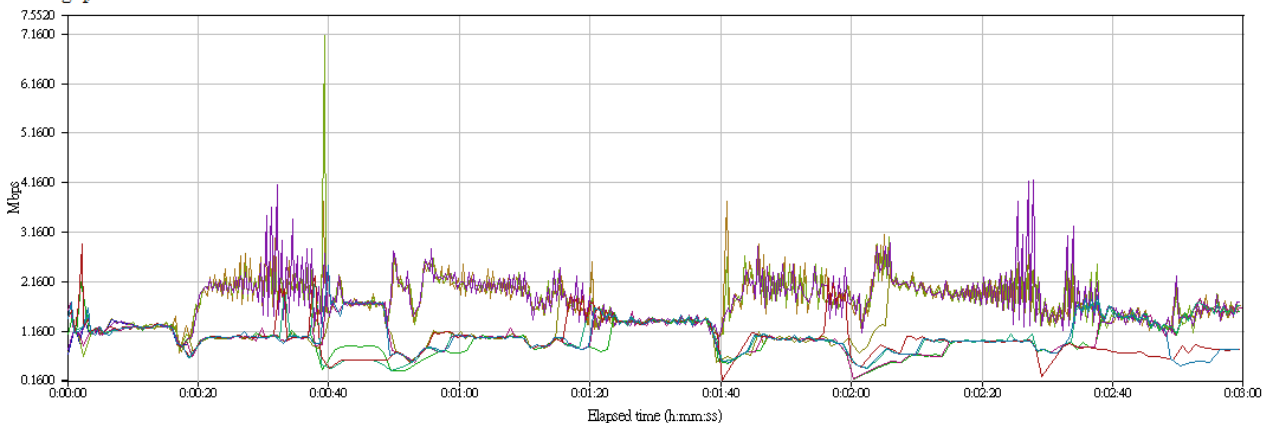
OW-300N2-A2 + ANT-19FN-P2 (TX + RX)

Channel	Up/down load	Throughput (Mbps)		
		Average	Min.	Max.
6	UP + Down	<b>11.702</b>	0.174	7.143
6	Down	<b>19.578</b>	0.271	25.807
6	up	<b>5.397</b>	0.071	5.714

### Average throughput test results (Upload and Download)

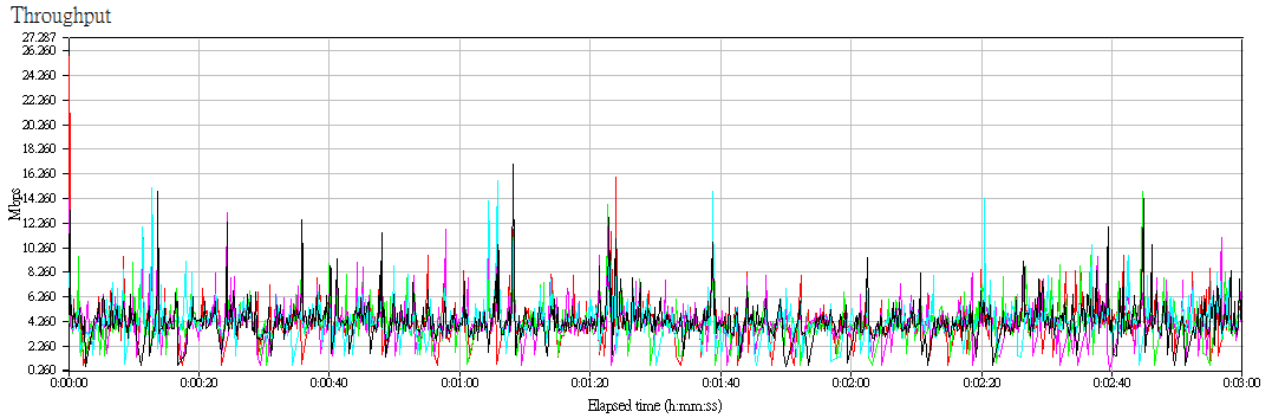
Test Setup		Throughput	Transaction Rate	Response Time	Raw Data Totals	Endpoint Configuration				
Group	Pair Group Name	Run Status	Timing Records Completed	95% Confidence Interval	Average (Mbps)	Minimum (Mbps)	Maximum (Mbps)	Measured Time (sec)	Relative Precision	
<b>All Pairs</b>			<b>2,632</b>		<b>11.702</b>	<b>0.174</b>	<b>7.143</b>			
	Pair 6	No Group Finished	292	n/a	1.308	0.520	2.768	179.288	n/a	
	Pair 7	No Group Finished	387	n/a	1.725	0.658	3.792	179.486	n/a	
	Pair 8	No Group Running	27	n/a	1.170	0.710	1.404	18.467	n/a	
	Pair 9	No Group Finished	386	n/a	1.728	0.659	7.143	179.272	n/a	
	Pair 10	No Group Finished	387	n/a	1.727	0.786	4.211	179.276	n/a	
	Pair 11	No Group Finished	221	n/a	0.965	0.202	2.151	179.412	n/a	
	Pair 12	No Group Finished	340	n/a	1.068	0.201	2.454	179.381	n/a	

Throughput



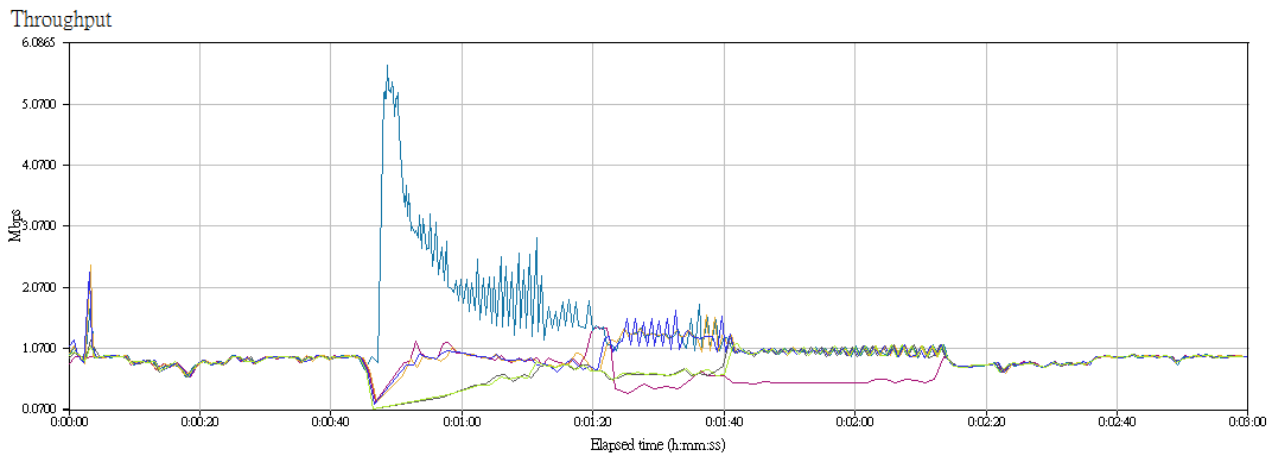
### Average throughput test results (Download)

Test Setup		Throughput	Transaction Rate	Response Time	Raw Data Totals	Endpoint Configuration				
Group	Pair Group Name	Run Status	Timing Records Completed	95% Confidence Interval	Average (Mbps)	Minimum (Mbps)	Maximum (Mbps)	Measured Time (sec)	Relative Precision	
<b>All Pairs</b>			<b>4,405</b>		<b>19.578</b>	<b>0.271</b>	<b>25.807</b>			
	Pair 1	No Group Finished	871	-0.161 : +0.161	3.890	0.694	25.807	179.140	4.142	
	Pair 2	No Group Finished	888	-0.153 : +0.153	3.960	0.676	14.815	179.390	3.854	
	Pair 3	No Group Finished	859	-0.191 : +0.191	3.828	0.271	14.286	179.533	4.977	
	Pair 4	No Group Finished	898	-0.133 : +0.133	4.004	0.707	15.686	179.422	3.321	
	Pair 5	No Group Finished	889	-0.161 : +0.161	3.962	0.570	17.021	179.486	4.075	

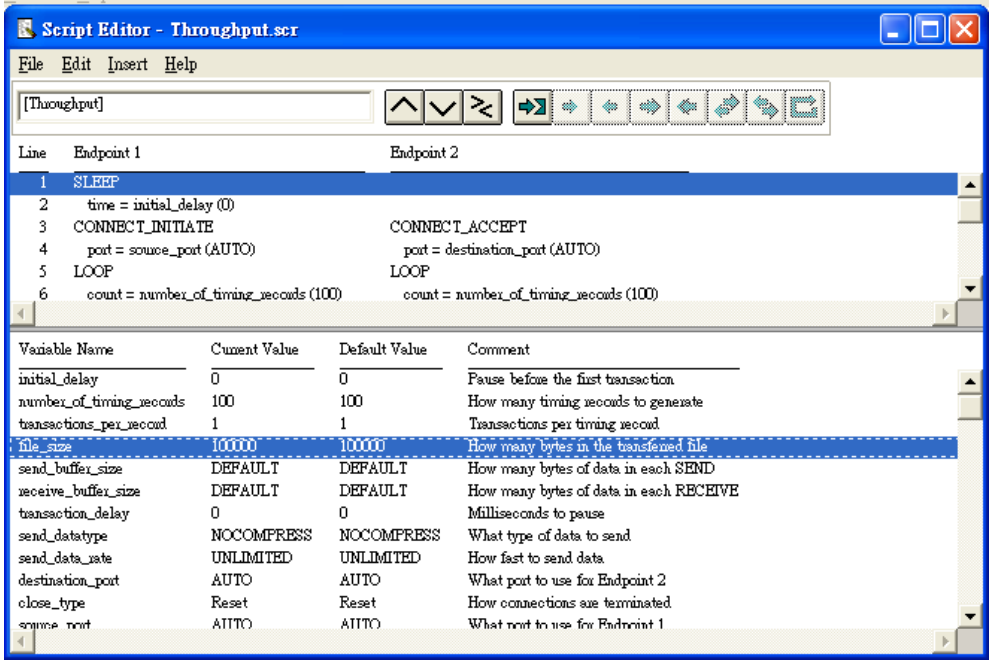


### Average throughput test results (Upload)

Test Setup	Throughput	Transaction Rate	Response Time	Raw Data Totals	Endpoint Configuration					
Group	Pair Group Name	Run Status	Timing Records Completed	95% Confidence Interval	Average (Mbps)	Minimum (Mbps)	Maximum (Mbps)	Measured Time (sec)	Relative Precision	
<b>All Pairs</b>			<b>1,214</b>		<b>5.397</b>	<b>0.071</b>	<b>5.714</b>			
	Pair 12 No Group	Finished	173	-0.043 : +0.043	0.771	0.187	1.421	179.529	5.612	
	Pair 15 No Group	Finished	270	-0.059 : +0.059	1.204	0.613	5.714	179.343	4.872	
	Pair 16 No Group	Finished	178	-0.090 : +0.090	0.793	0.075	1.268	179.680	11.295	
	Pair 17 No Group	Finished	208	-0.038 : +0.038	0.929	0.202	2.439	179.085	4.070	
	Pair 18 No Group	Finished	208	-0.046 : +0.046	0.925	0.164	2.312	179.804	4.939	
	Pair 19 No Group	Finished	177	-0.094 : +0.094	0.790	0.071	1.141	179.248	11.846	



## 7. TEST Tools

TEST Equipment																																																						
Notebook	HP Pavilion dv4 x1 RAM : 4G CPU : Intel Core Duo 2.4GHz OS : Windows XP sp3	HP Pavilion dm4-1108TX 4GB DDR3-1333 Intel Core i5 560M 2.66GHz OS : Windows XP sp3																																																				
Power	350W x 2																																																					
Tripod	3																																																					
Antenna	ANT-19FN-P2 x 2 2.4GHz 2x2 Outdoor Directional Panel 19dBi Pole Mount Antenna																																																					
Test products	<b>OW-300N2-A2</b> 1000mW 11bgn 300Mbps Outdoor Bridge x2																																																					
TEST Software																																																						
Chariot Version 6.7	 <p>The screenshot shows the Chariot Script Editor interface. At the top, there's a menu bar (File, Edit, Insert, Help) and a toolbar with navigation icons. Below that is a script editor window titled 'Script Editor - Throughput.scr' containing a script with the following lines:</p> <pre> 1 SLEEP 2 time = initial_delay (0) 3 CONNECT_INITIATE                CONNECT_ACCEPT 4 port = source_port (AUTO)       port = destination_port (AUTO) 5 LOOP                             LOOP 6 count = number_of_timing_records (100)    count = number_of_timing_records (100) </pre> <p>Below the script editor is a table of variables:</p> <table border="1"> <thead> <tr> <th>Variable Name</th> <th>Current Value</th> <th>Default Value</th> <th>Comment</th> </tr> </thead> <tbody> <tr> <td>initial_delay</td> <td>0</td> <td>0</td> <td>Pause before the first transaction</td> </tr> <tr> <td>number_of_timing_records</td> <td>100</td> <td>100</td> <td>How many timing records to generate</td> </tr> <tr> <td>transactions_per_record</td> <td>1</td> <td>1</td> <td>Transactions per timing record</td> </tr> <tr> <td>file_size</td> <td>100000</td> <td>100000</td> <td>How many bytes in the transferred file</td> </tr> <tr> <td>send_buffer_size</td> <td>DEFAULT</td> <td>DEFAULT</td> <td>How many bytes of data in each SEND</td> </tr> <tr> <td>receive_buffer_size</td> <td>DEFAULT</td> <td>DEFAULT</td> <td>How many bytes of data in each RECEIVE</td> </tr> <tr> <td>transaction_delay</td> <td>0</td> <td>0</td> <td>Milliseconds to pause</td> </tr> <tr> <td>send_datatype</td> <td>NOCOMPRESS</td> <td>NOCOMPRESS</td> <td>What type of data to send</td> </tr> <tr> <td>send_data_rate</td> <td>UNLIMITED</td> <td>UNLIMITED</td> <td>How fast to send data</td> </tr> <tr> <td>destination_port</td> <td>AUTO</td> <td>AUTO</td> <td>What port to use for Endpoint 2</td> </tr> <tr> <td>close_type</td> <td>Reset</td> <td>Reset</td> <td>How connections are terminated</td> </tr> <tr> <td>source_port</td> <td>AUTO</td> <td>AUTO</td> <td>What port to use for Endpoint 1</td> </tr> </tbody> </table> <p>At the bottom of the window, there is a 'Run' section with a radio button selected for 'Run for a fixed duration' and input fields for 0 Hrs, 3 Min, and 0 Sec.</p>		Variable Name	Current Value	Default Value	Comment	initial_delay	0	0	Pause before the first transaction	number_of_timing_records	100	100	How many timing records to generate	transactions_per_record	1	1	Transactions per timing record	file_size	100000	100000	How many bytes in the transferred file	send_buffer_size	DEFAULT	DEFAULT	How many bytes of data in each SEND	receive_buffer_size	DEFAULT	DEFAULT	How many bytes of data in each RECEIVE	transaction_delay	0	0	Milliseconds to pause	send_datatype	NOCOMPRESS	NOCOMPRESS	What type of data to send	send_data_rate	UNLIMITED	UNLIMITED	How fast to send data	destination_port	AUTO	AUTO	What port to use for Endpoint 2	close_type	Reset	Reset	How connections are terminated	source_port	AUTO	AUTO	What port to use for Endpoint 1
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## 8. Conclusion

Our testing of OW-300N2-A2 focuses on the viability and convenience of our new optional antenna PCB design. Our goal was to confirm strong and reliable performance over short distances (see 1.9km test report) and longer 7km distances. From the results of our OW-300N2-A2 7km tests while using an external 19 dBi N-Type antenna, we conclude that our transmission performance is extremely stable, with significant throughput levels over varying long distance connections. Our outdoor wireless testing proves to be a very valuable reference tool for users deploying our products in a variety of outdoor environments.

This product is ideal for expanding a network from a location with internet service access (Location A) to a remote area (Location B) using a WDS + AP Mode connection. Operating best as an AP station or signal extender over the 2.4GHz frequency band, OW-300N2-A2 is the perfect device for network planners wishing to build an expansive Wi-Fi network.

