Wi-Fi Performance Test Report
For Leading AC1900 Cable Modem/Routers

August 2016

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Introduction

Objective

Customers live in a wide range of homes and use products in different capacities, and that's why Netperian's primary goal is to measure product performance in the real world. The objective of this report is to measure the Wi-Fi performance of three leading AC1900 cable modem/routers.

This report captures the true customer experience of each device in multiple locations with different client devices. Testing was conducted in a 3,000 square foot single family unit (SFU), a 1,000 square foot multi-dwelling unit (MDU) and an open field at a rural home. The SFU was used to represent the typical North American large home, the MDU was used to measure the routers' ability to handle high Wi-Fi traffic situations, and the open field was used to measure maximum reach capabilities outdoors.

Multiple test scenario were used to paint a clear picture of overall product performance of the devices under test in the real world.

About Netperian

Netperian is an independent organization with expertise in real-world Wi-Fi equipment testing. Major broadband providers and wireless equipment manufacturers rely on Netperian's test methodology to insure strong performance. Please see page 43 for details, and also see http://www.netperian.com

The cable modem/router devices under test (DUT):

- Arris SBG6900AC 16x4 Cable Modem with built-in AC1900 Wi-Fi Router
- Motorola MG7550 16x4 Cable Modem with built-in AC1900 Wi-Fi Router
- Netgear C7000 24x8 Cable Modem with built-in AC1900 Wi-Fi Router

All three were tested with the latest firmware available in early August 2016. For Arris this was D30GW-OSPREY-1.5.0.0-GA-08-NOSH , for Motorola this was 7550-5.7.1.17 , and for Netgear this was v1.01.20.

Conclusion:

The Motorola MG7550 performed best, very strong for all tests. The Netgear C7000 placed second, and the Arris SBG6900AC placed last. See report details that follow.

Test Procedure

Testing Procedures:

- Test clients
  - *MacBook Pro 3x3 Dual Band*
  - *iPhone 6s*

- Upload and download throughput tests to each client at multiple locations .
  - *Single Family Unit tests included 26 locations covering every room in the home. Larger rooms had a measurement in the middle and corner of the room.*
  - *Multi-Dwelling unit tests covered 10 locations throughout the apartment.*
  - *Open field tests included measurements at 100 and 1,000 feet from the DUT*
  - *(see page 5-7 for test location and environment details)*

- iPerf 3 was used as the traffic generator with the following settings:
  - Window size of 512K. (–w512k)
  - 10 parallel streams. (-P10)
  - Three 60 second tests per location and direction. (-t60)
  - The average result of all three tests was selected as the throughput for that location.

- Channel choice and channel bandwidth setting was left to the individual modem/ router's default setting.

- Default router settings were used to measure the true "out of the box" customer experience.

SFU Test Environment

Single Family Unit (SFU) Test Home:

Netperian offers several test environments that cover a wide range of real world situations. For the SFU test, Netperian's 3,000 square foot 3 story SFU was chosen to represent a typical large North American home.

MDU Test Environment

Multi-Dwelling Unit (MDU):

This unit is a 1,000 square foot apartment on the top floor of a low rise building. This environment is in a densely populated neighbourhood with competing Wi-Fi signals from both residential and commercial sources. It's an ideal environment to test the routers' ability to handle high Wi-Fi traffic situations.

Open Field Test Environment

Open Field Test Location:

To test the routers' ability for long distance reach, a rural farm location was selected. Testing was conducted on the farm's private road which is a 1,200 foot straight line from road to farm house. Measurements took place at 100 and 1,000 feet from the AC1900 cable modem/routers.

Top view

Road view

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Summary Results

SFU - Average Results for All Test Locations

Results in Mbps

	MacBook Pro				iPhone 6s			
	Download		Upload		Download		Upload	
	2.4 GHz	5.0 GHz	2.4 GHz	5.0 GHz	2.4 GHz	5.0 GHz	2.4 GHz	5.0 GHz
Arris SBG6900AC	106	112	58	109	71	50	26	37
Motorola MG7550	131	450	112	295	91	264	76	145
Netgear C7000	127	350	115	295	53	138	58	73

SFU - Average Results for Far Test Locations (All test locations worse than -65 dBm)

	MacBook Pro				iPhone 6s			
	Download		Upload		Download		Upload	
	2.4 GHz	5.0 GHz	2.4 GHz	5.0 GHz	2.4 GHz	5.0 GHz	2.4 GHz	5.0 GHz
Arris SBG6900AC	54	64	13	73	36	28	5	16
Motorola MG7550	89	345	58	148	70	161	51	64
Netgear C7000	85	273	62	134	39	74	39	34

MDU - Average Results*

	MacBook Pro				iPhone 6s			
	Download		Upload		Download		Upload	
	2.4 GHz	5.0 GHz	2.4 GHz	5.0 GHz	2.4 GHz	5.0 GHz	2.4 GHz	5.0 GHz
Arris SBG6900AC	114	120	63	115	79	67	45	86
Motorola MG7550	143	513	122	348	102	296	103	214
Netgear C7000	117	387	107	291	94	289	88	184

Open Field - 100 Feet Test Results

	MacBook Pro				iPhone 6s			
	Download		Upload		Download		Upload	
	2.4 GHz	5.0 GHz	2.4 GHz	5.0 GHz	2.4 GHz	5.0 GHz	2.4 GHz	5.0 GHz
Arris SBG6900AC	136	131	32	137	99	57	32	69
Motorola MG7550	138	521	120	362	116	429	117	104
Netgear C7000	69	349	66	354	62	281	48	185

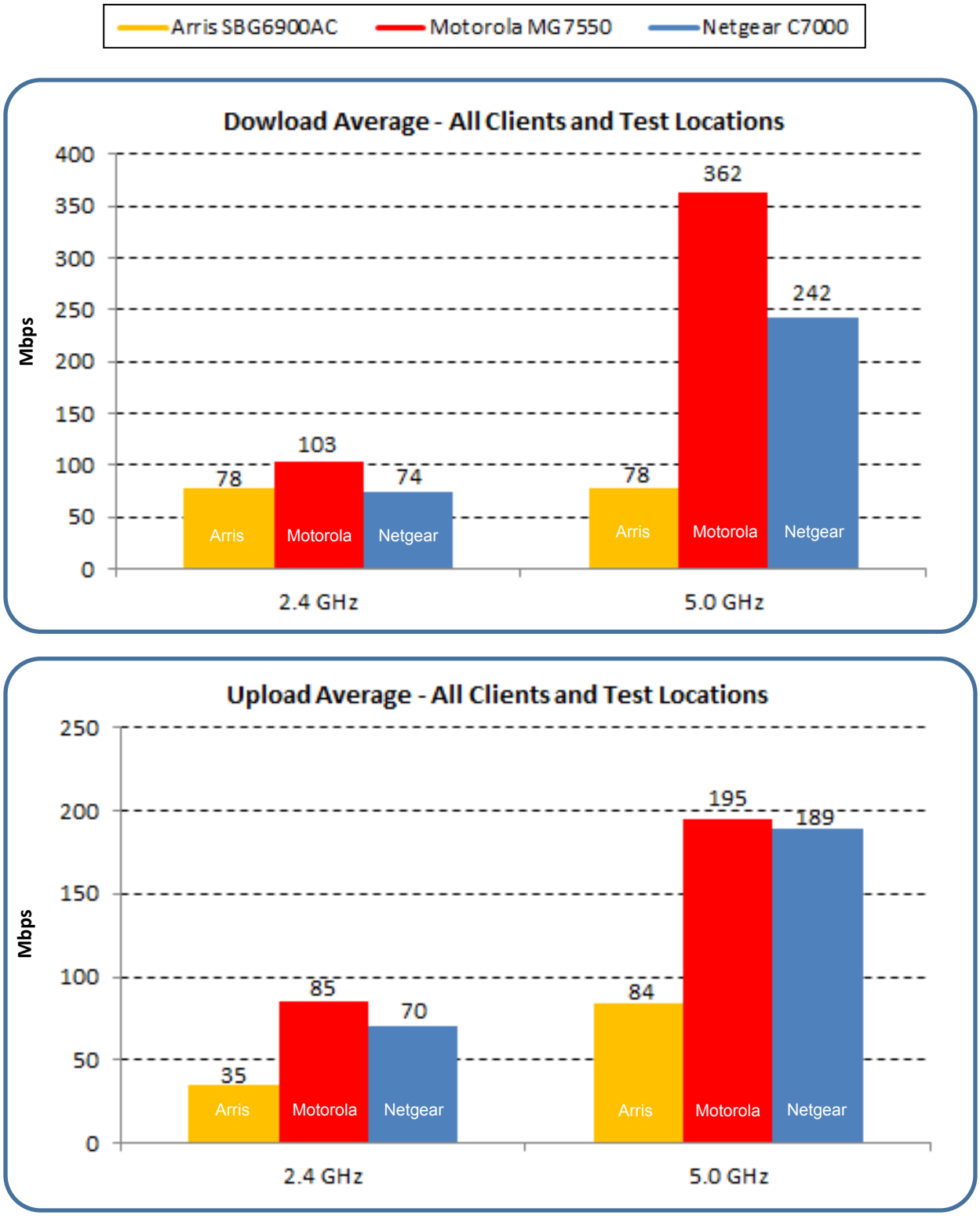
Open Field - 1,000 Feet Test Results

	MacBook Pro				iPhone 6s			
	Download		Upload		Download		Upload	
	2.4 GHz	5.0 GHz	2.4 GHz	5.0 GHz	2.4 GHz	5.0 GHz	2.4 GHz	5.0 GHz
Arris SBG6900AC	2	49	2	59	15	37	20	58
Motorola MG7550	51	190	20	62	52	233	15	30
Netgear C7000	48	94	31	68	20	50	48	62

Indicates highest average throughput for the category

* MDU Far location averages are not shown on this summary due to low volume of locations worse than -65 dBm

Average Throughput – All Clients & Test Locations



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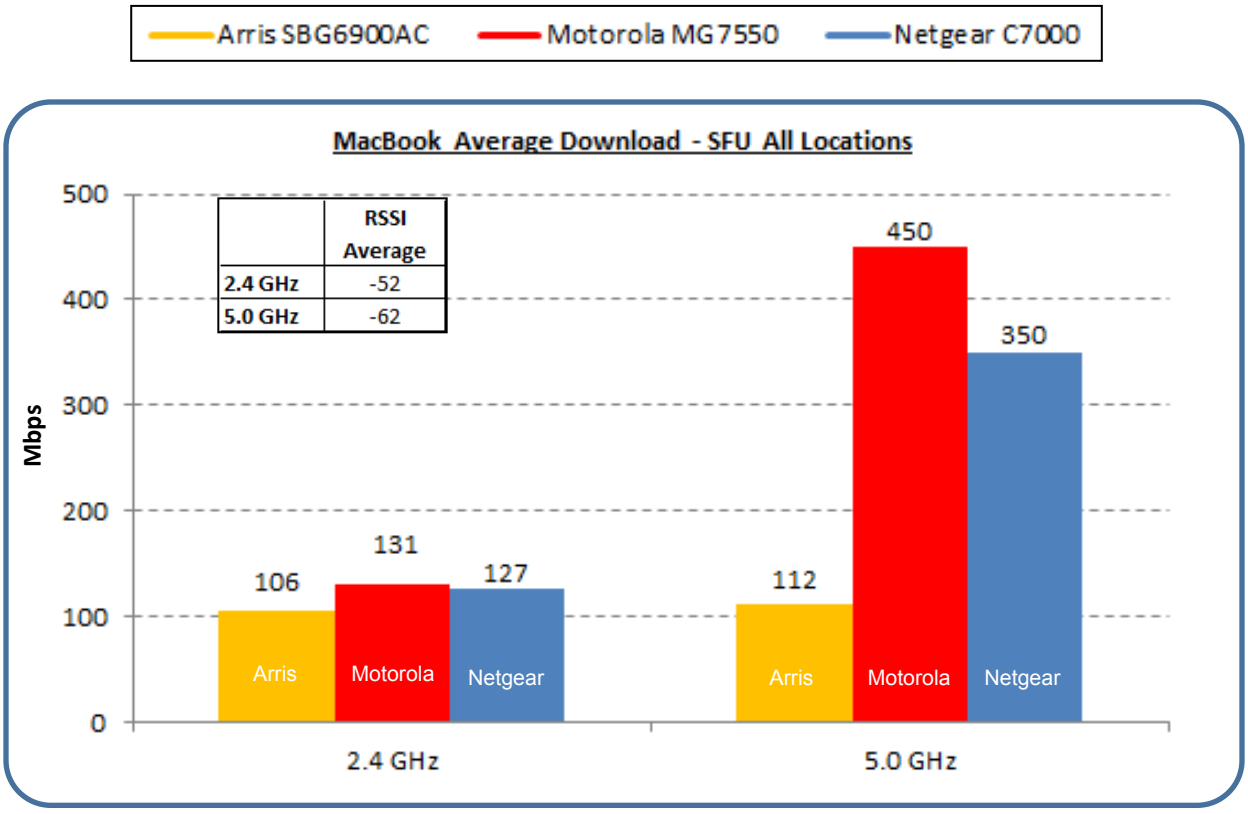
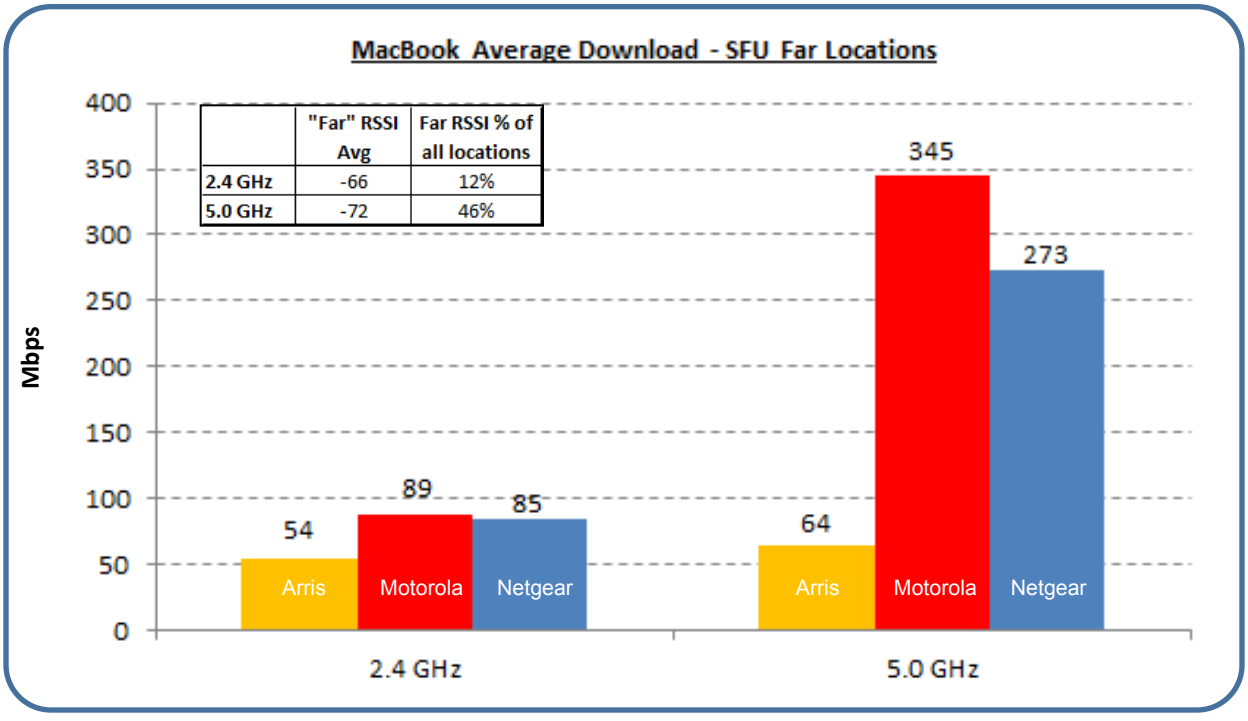
SFU Download Throughput Results

MacBook Client

Average Download Throughput - MacBook Client -SFU





* Far locations include all test results with RSSI readings worse than -65 dBm

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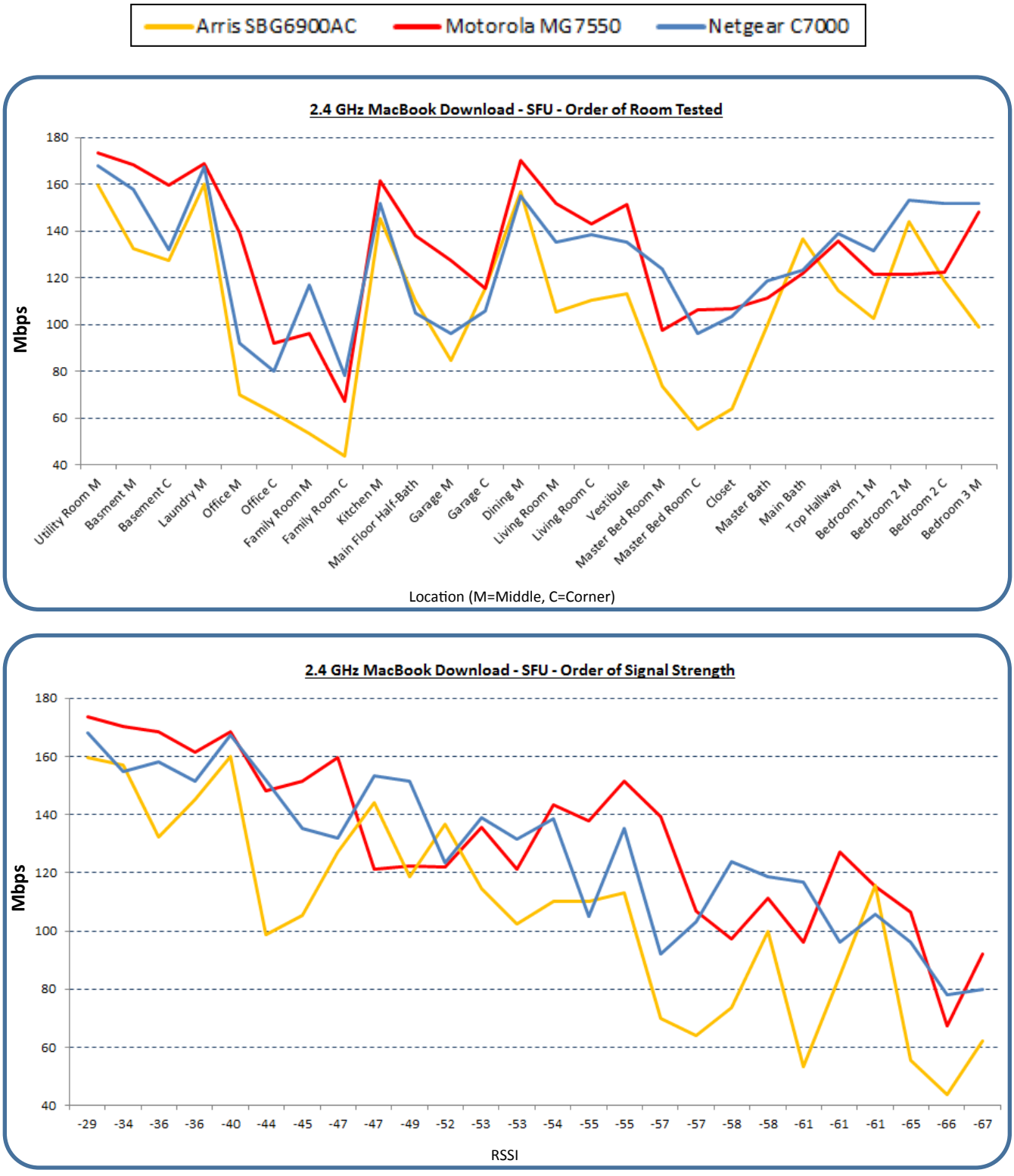
2.4 GHz Download MacBook Client -SFU



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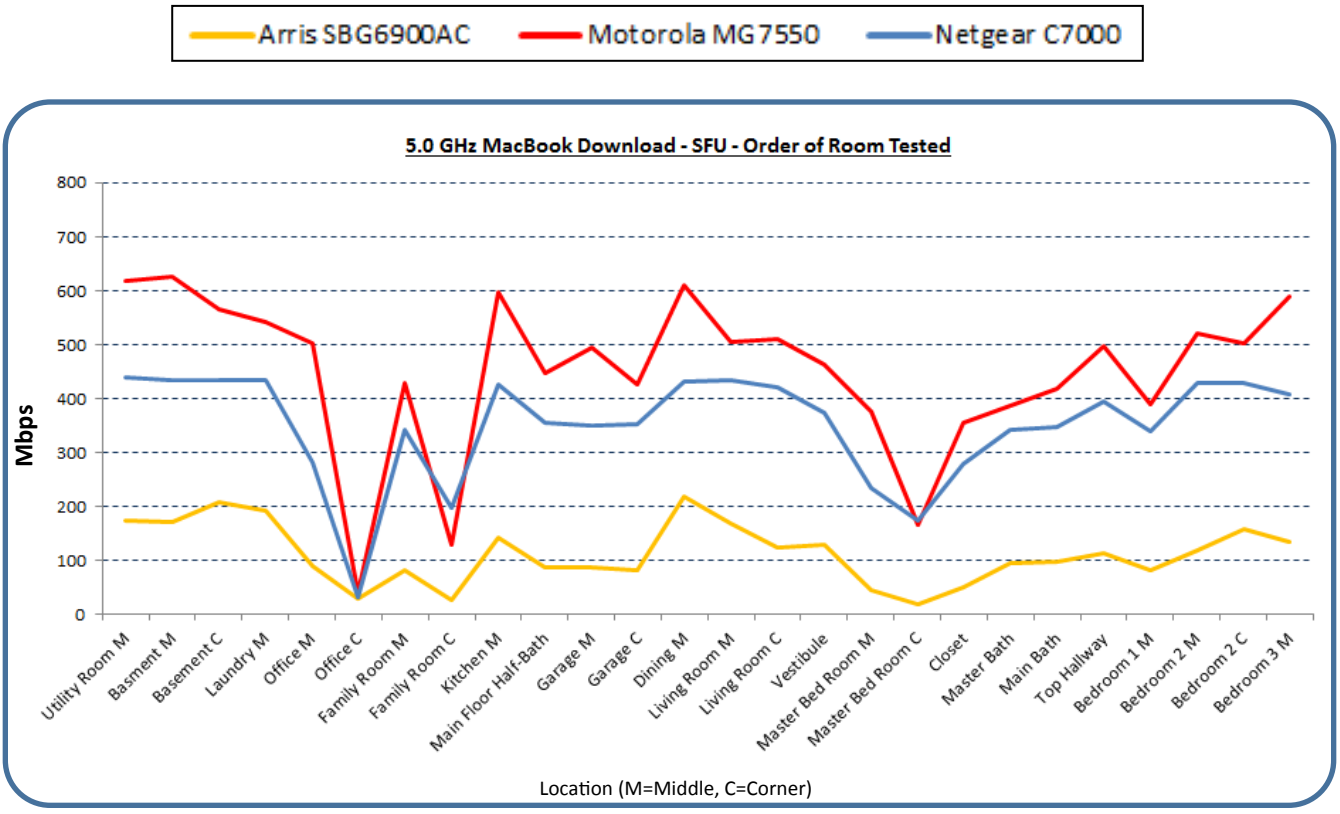
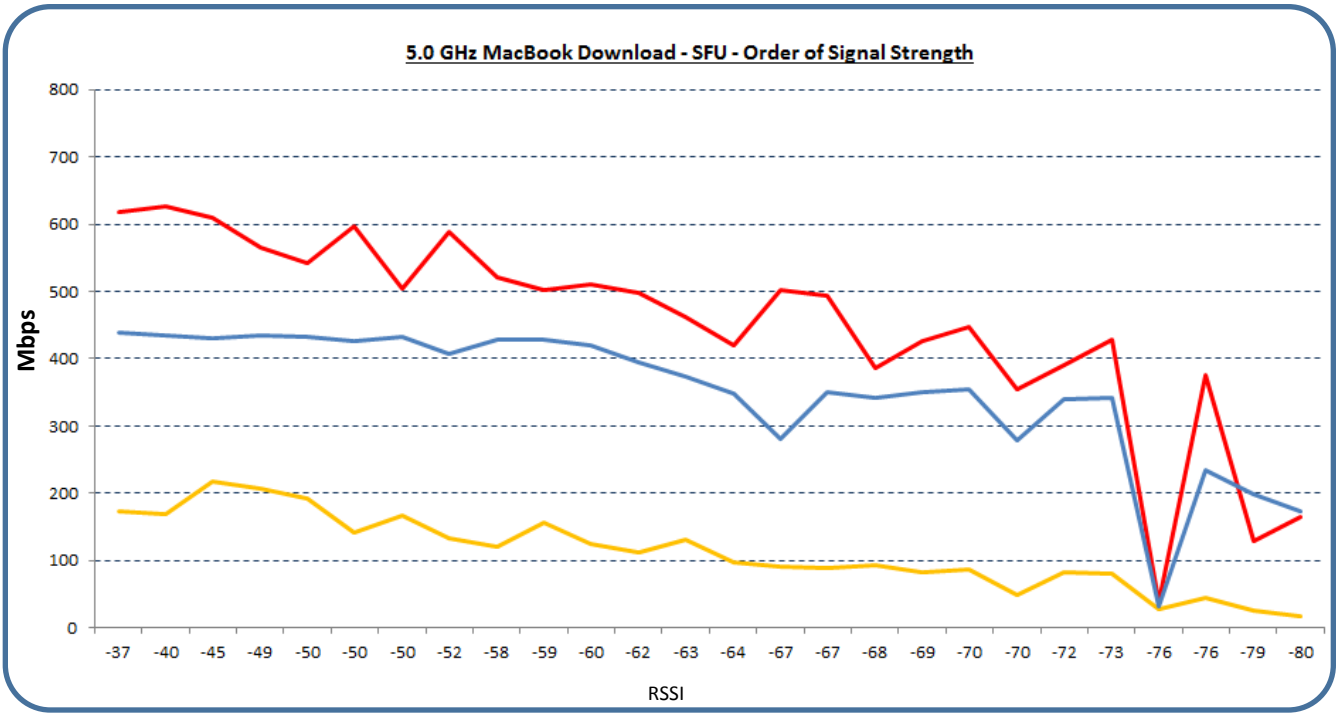
5.0 GHz Download MacBook Client -SFU





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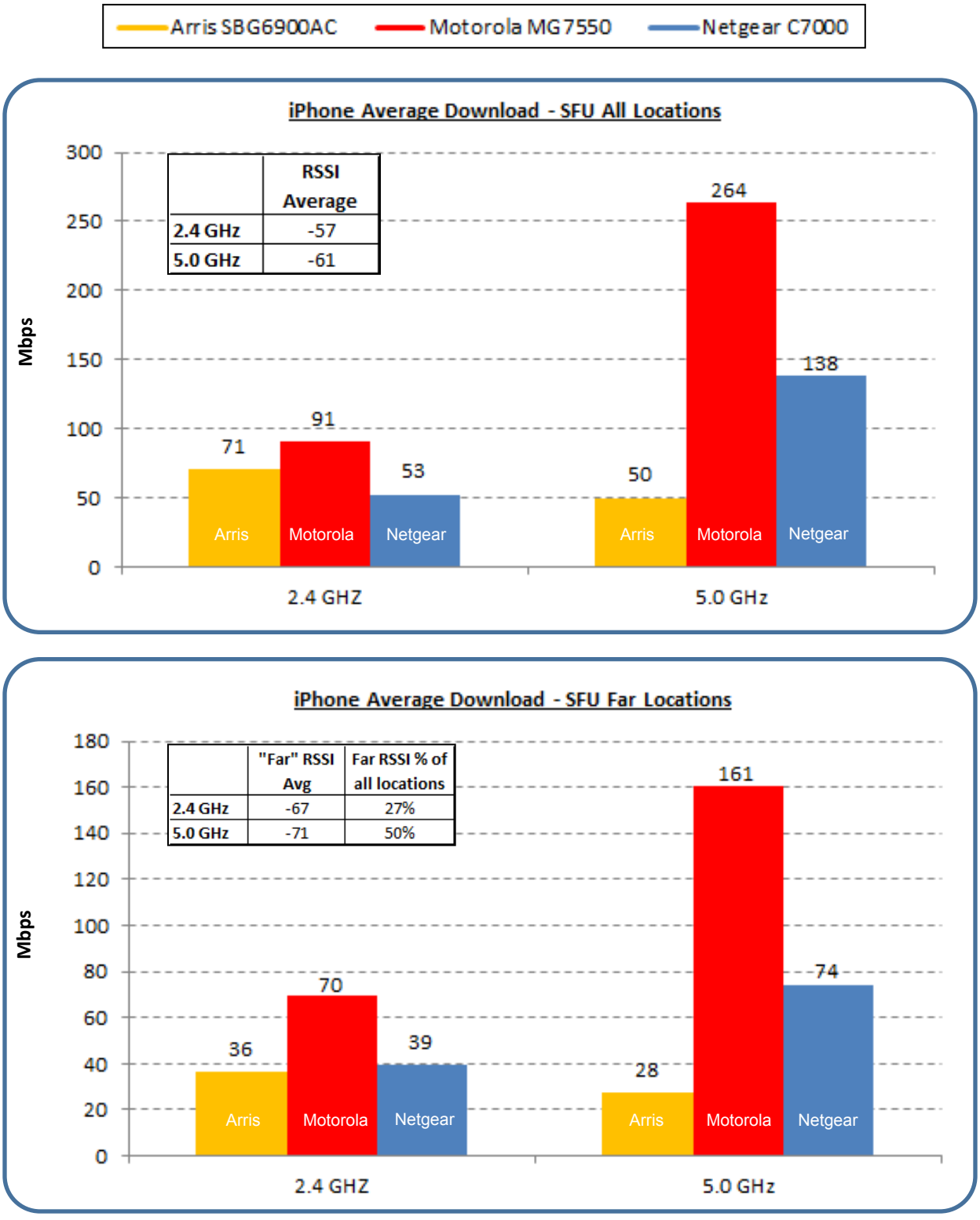
SFU Download Throughput Results

iPhone 6s Client

Average Download Throughput – iPhone 6s Client -SFU



* Far locations include all test results with RSSI readings worse than -65 dBm

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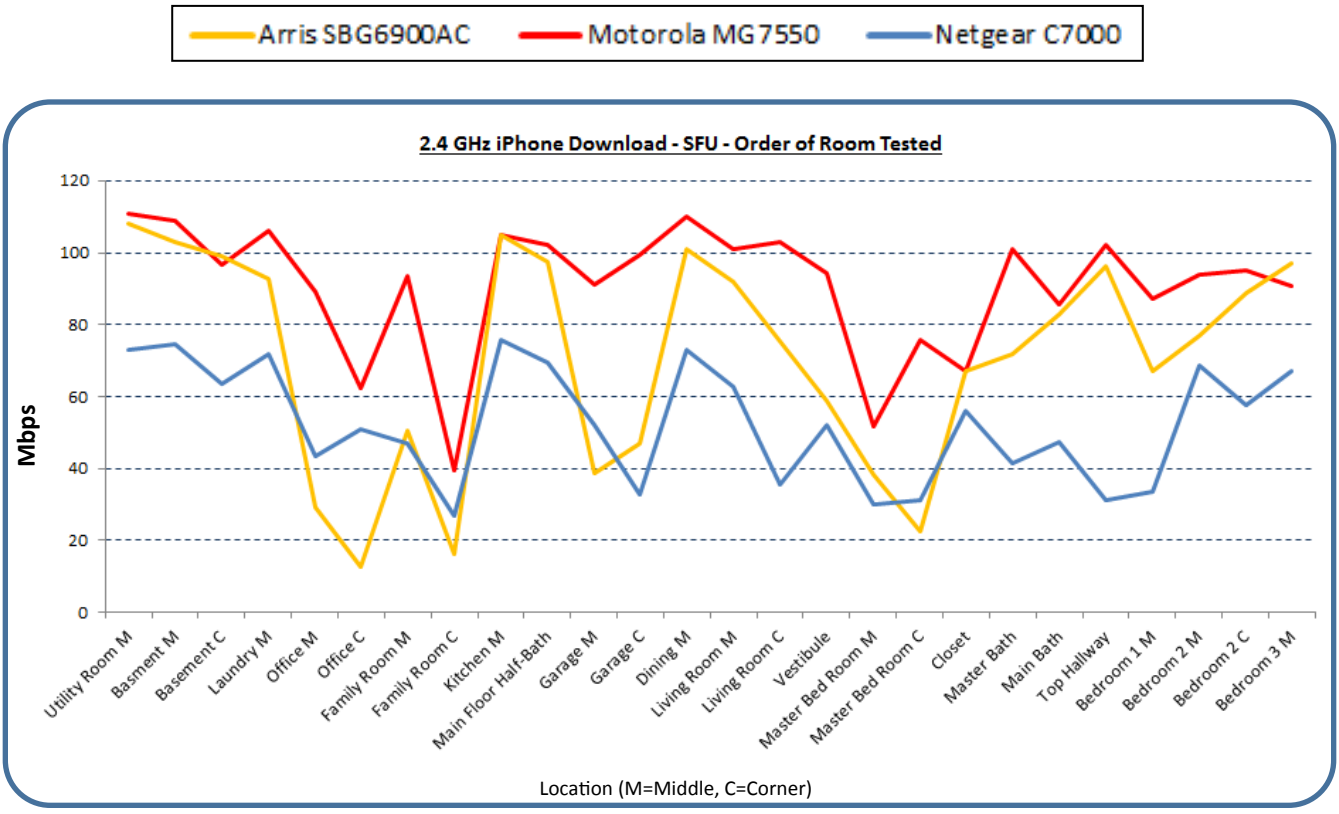
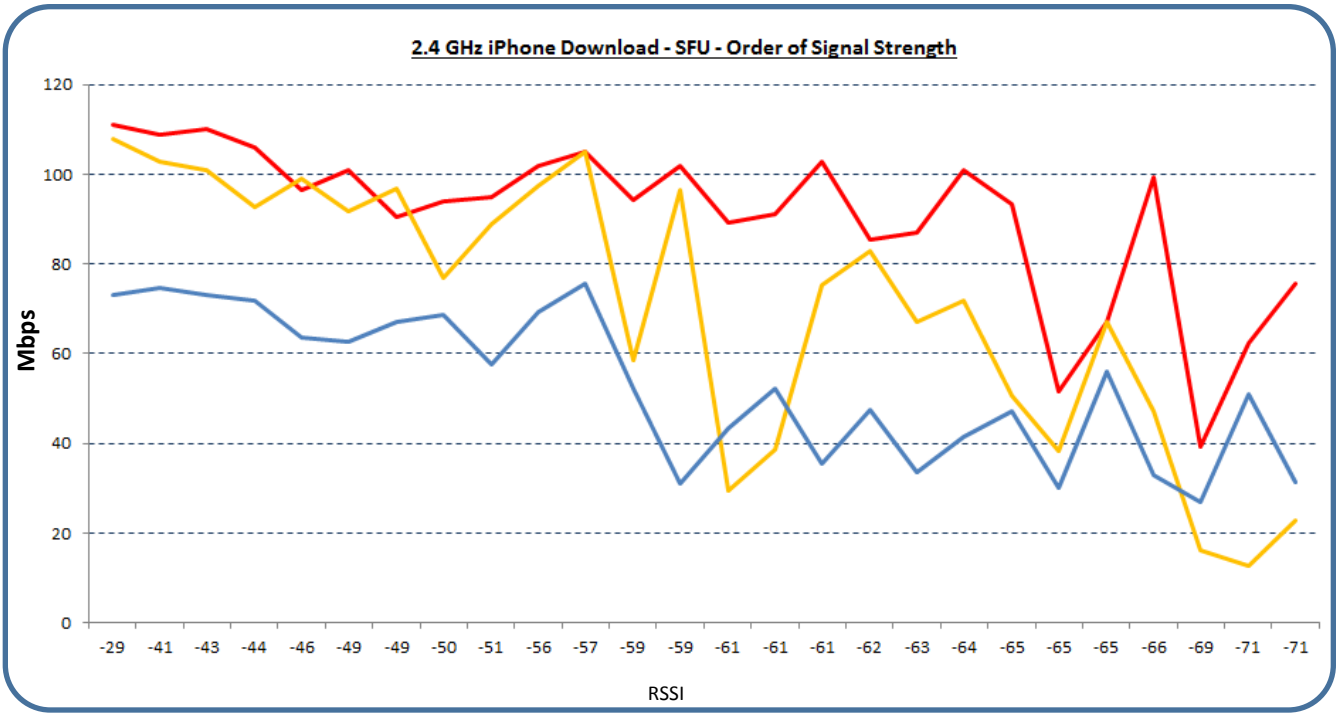
2.4 GHz Download iPhone 6s Client -SFU





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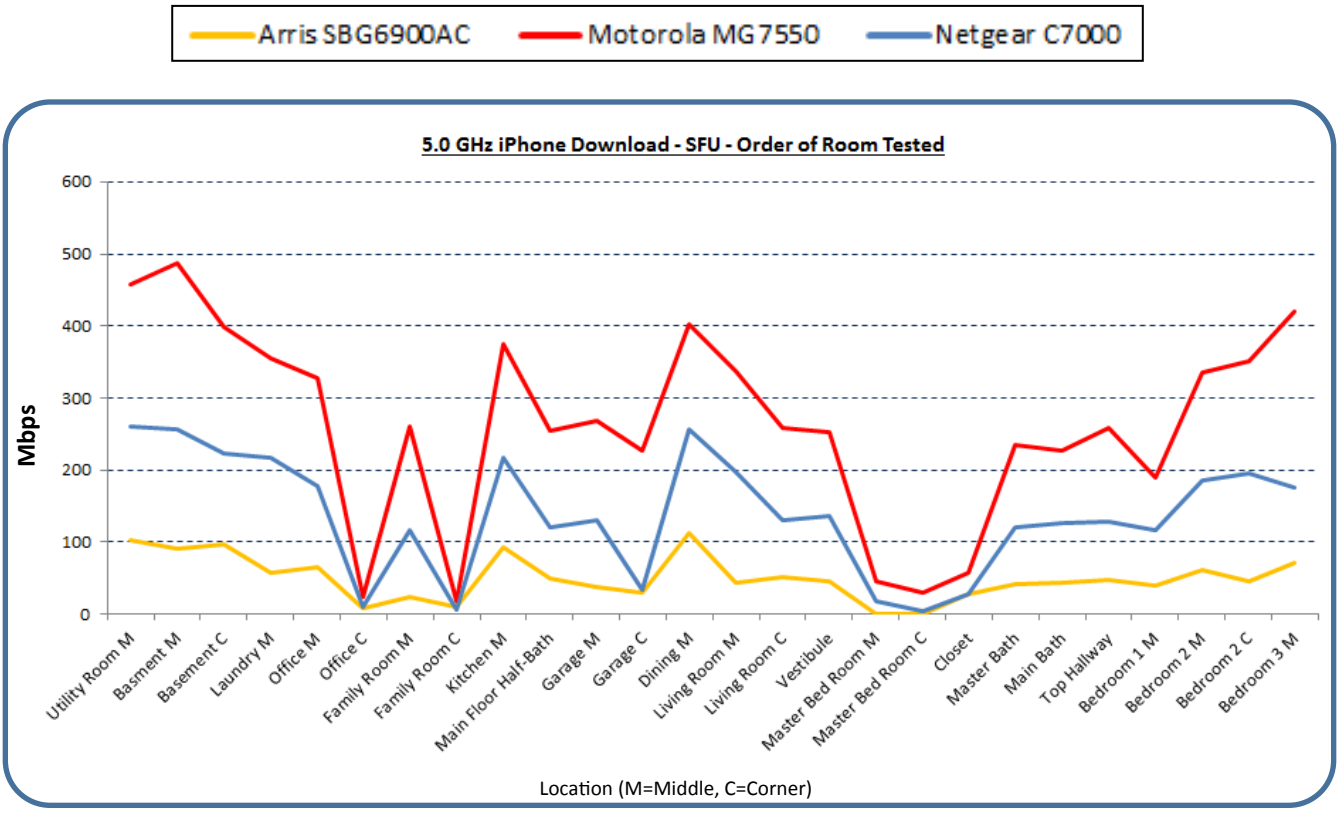
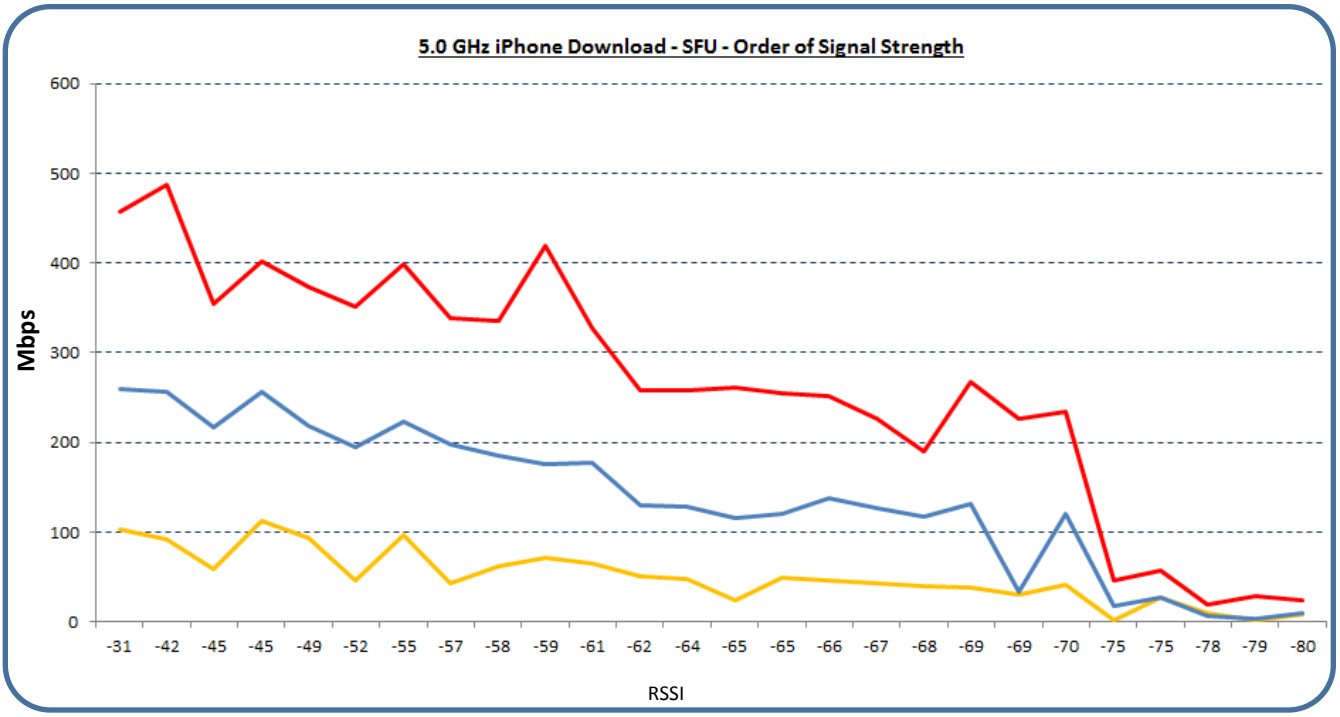
5.0 GHz Download iPhone 6s Client -SFU





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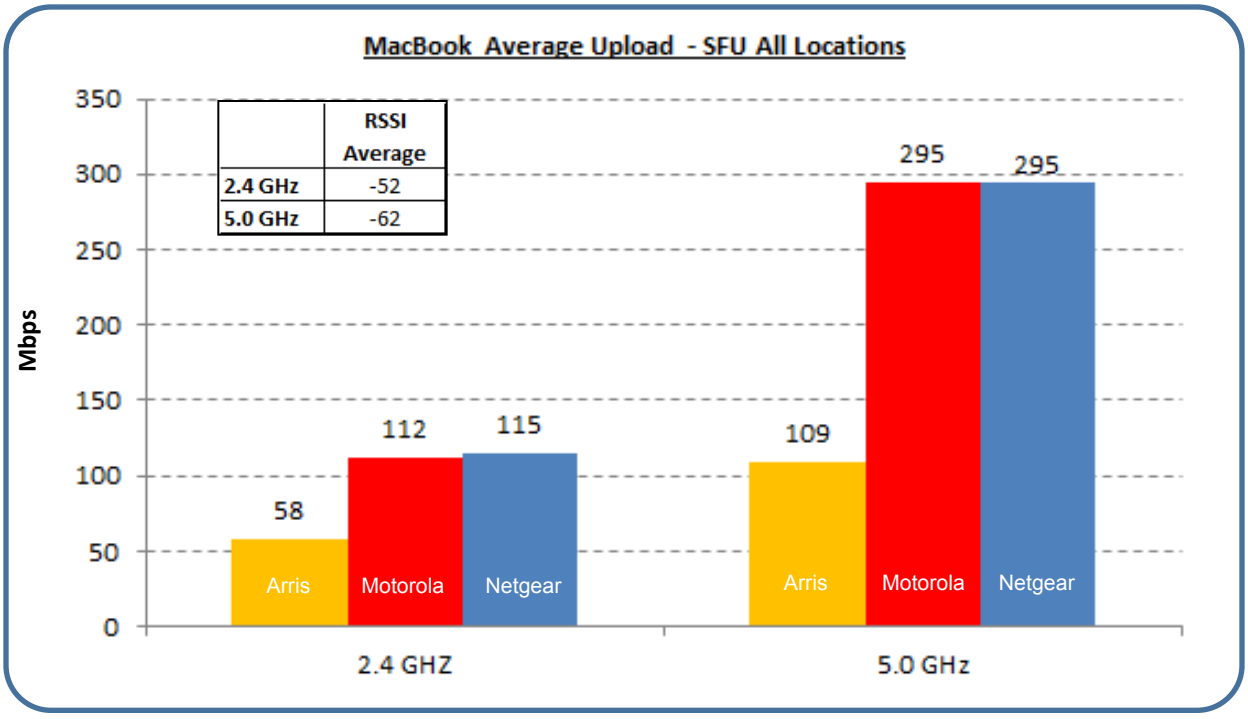
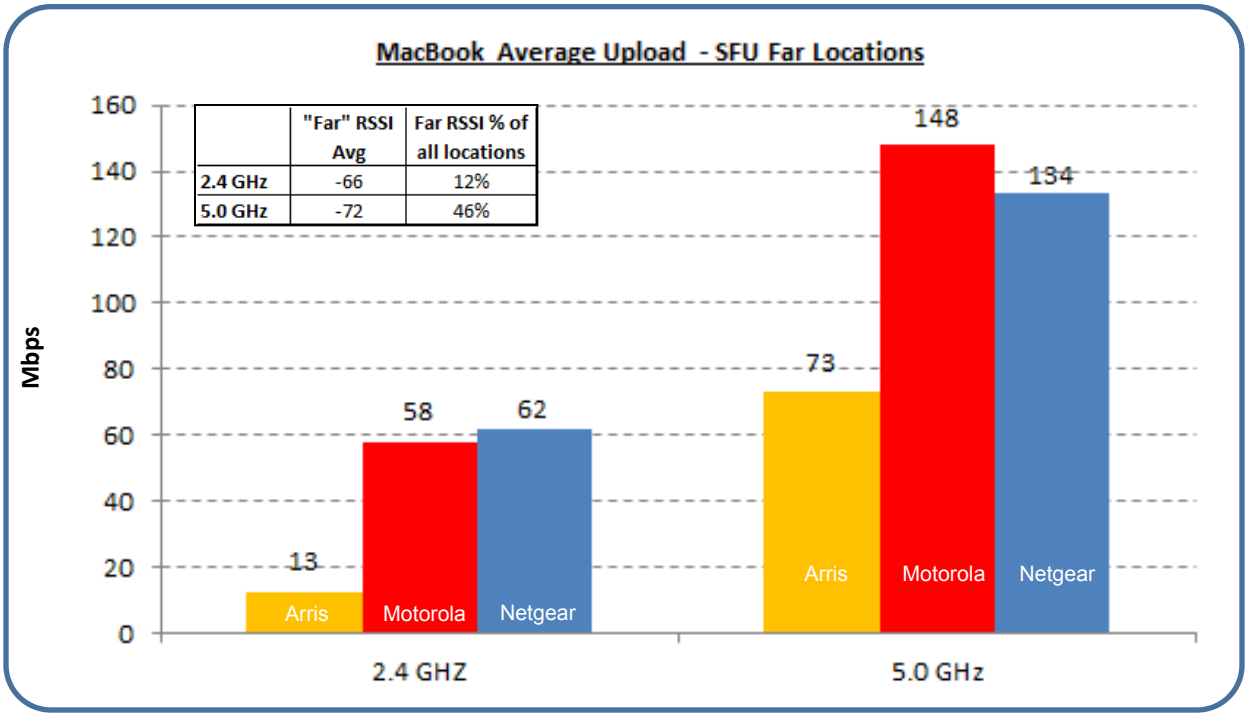
SFU Upload Throughput Results

MacBook Client

Average Upload Throughput - MacBook Client - SFU





* Far locations include all test results with RSSI readings worse than -65 dBm

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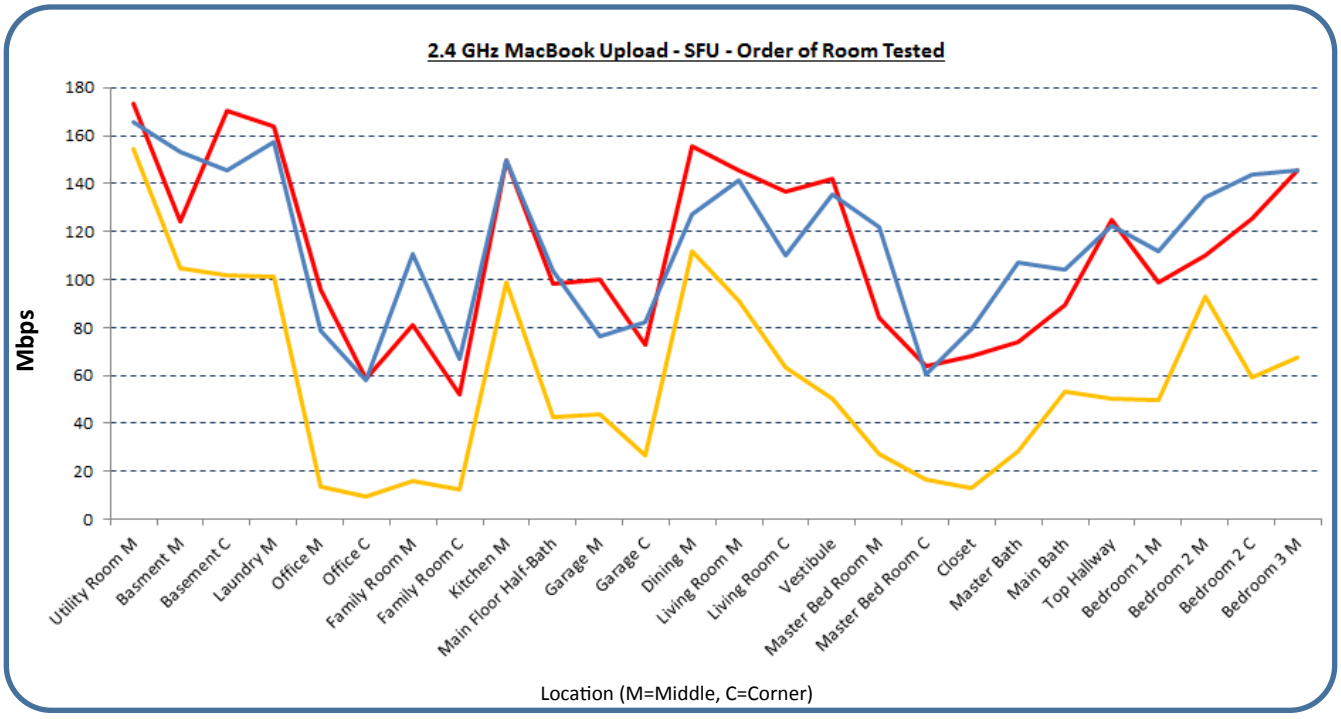
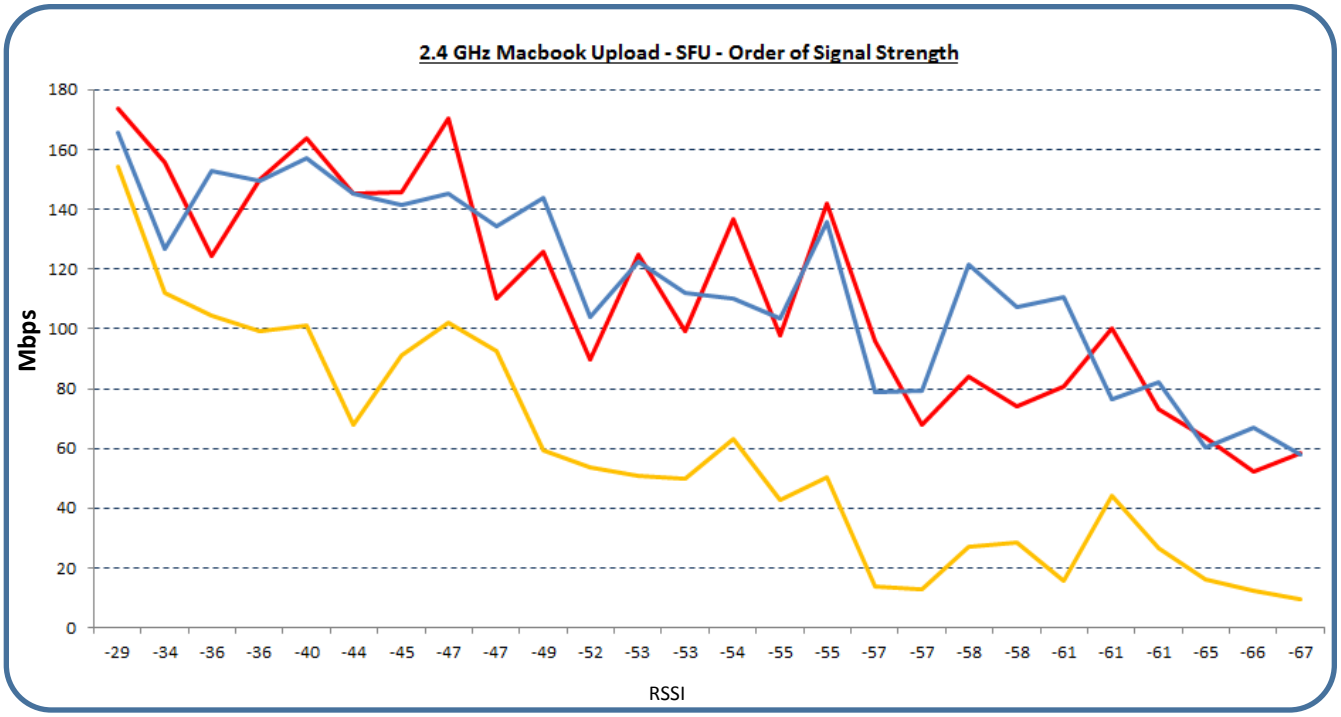
2.4 GHz Upload MacBook Client -SFU





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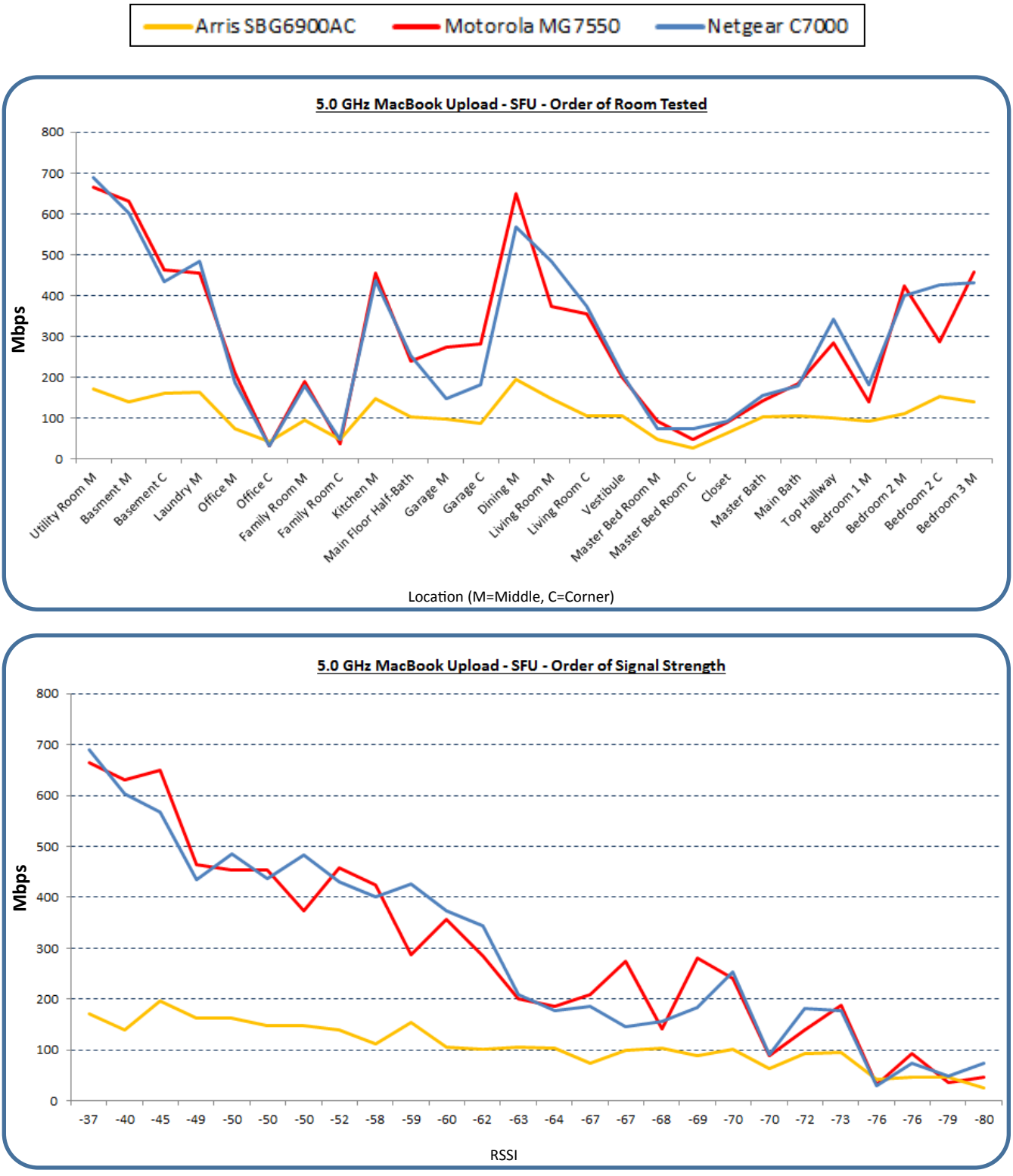
5.0 GHz Upload MacBook Client -SFU



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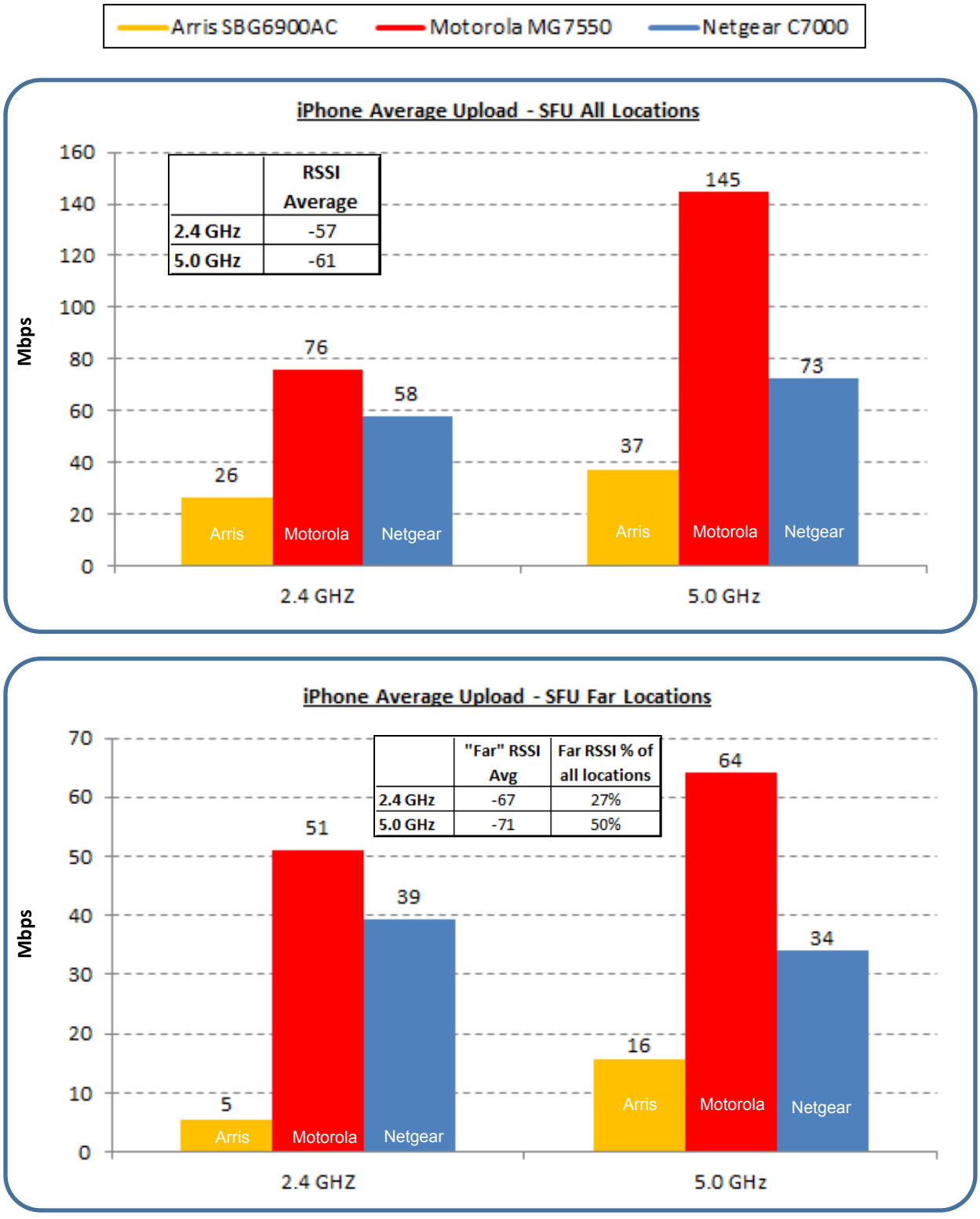
SFU Upload Throughput Results

iPhone 6s Client

Average Upload Throughput – iPhone 6s Client -SFU



* Far locations include all test results with RSSI readings worse than -65 dBm

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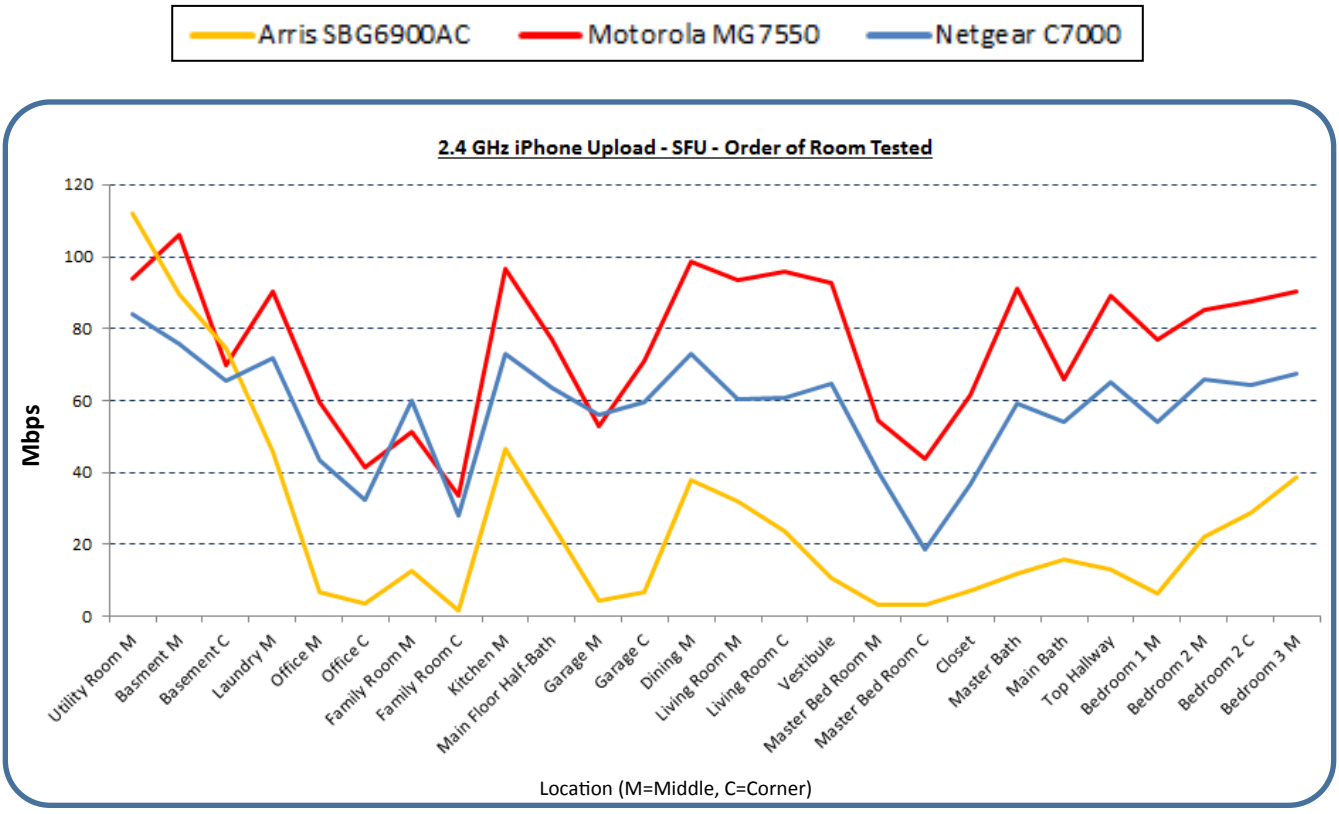
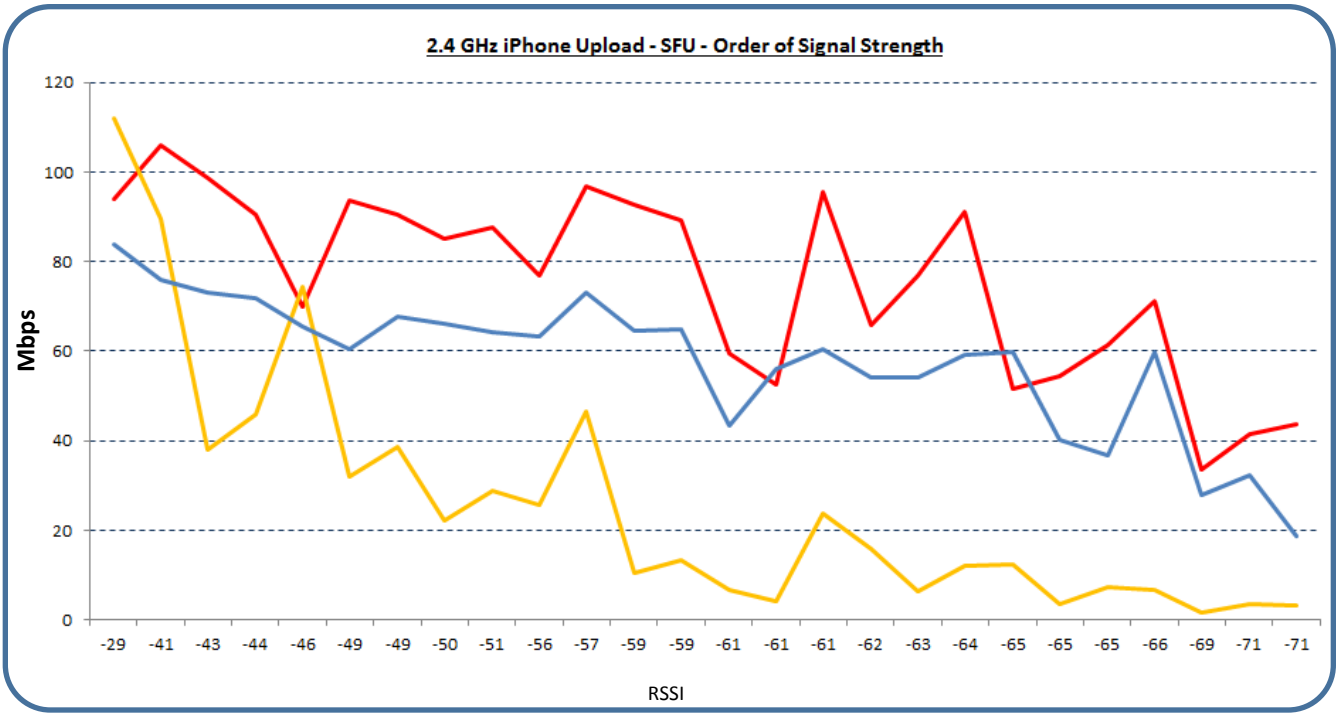
2.4 GHz Upload iPhone 6s Client -SFU





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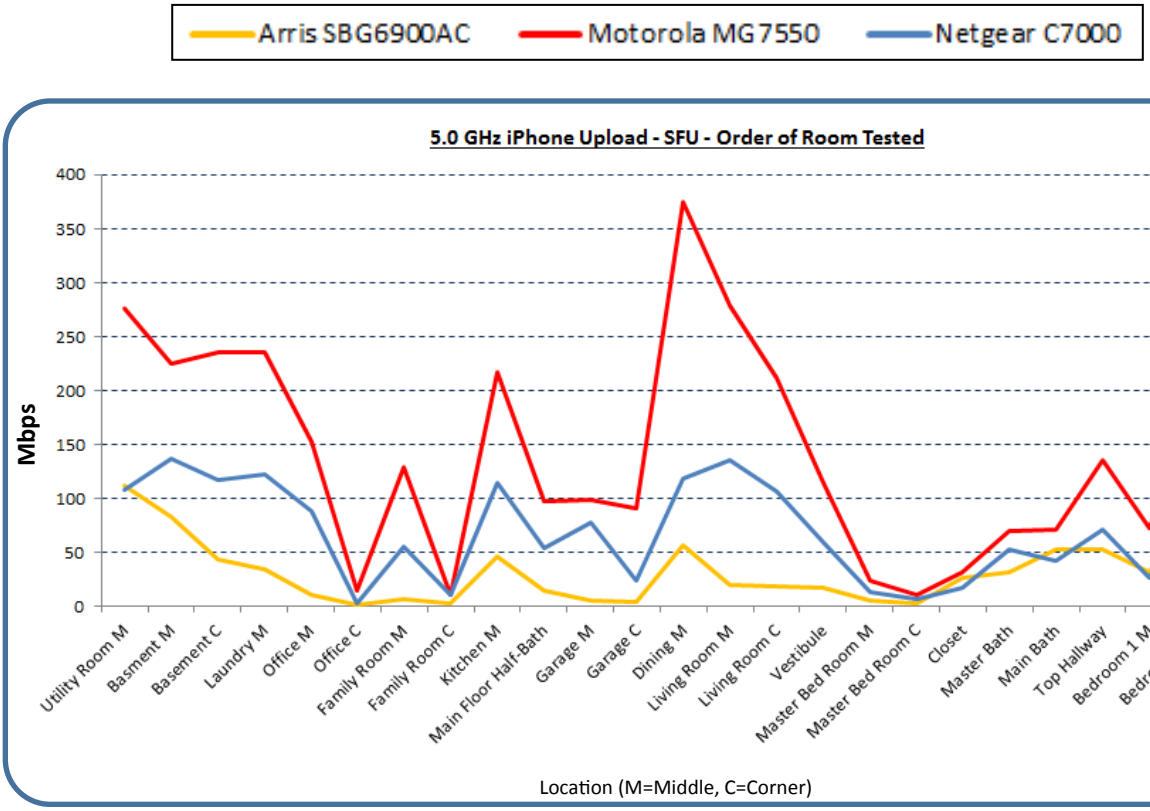
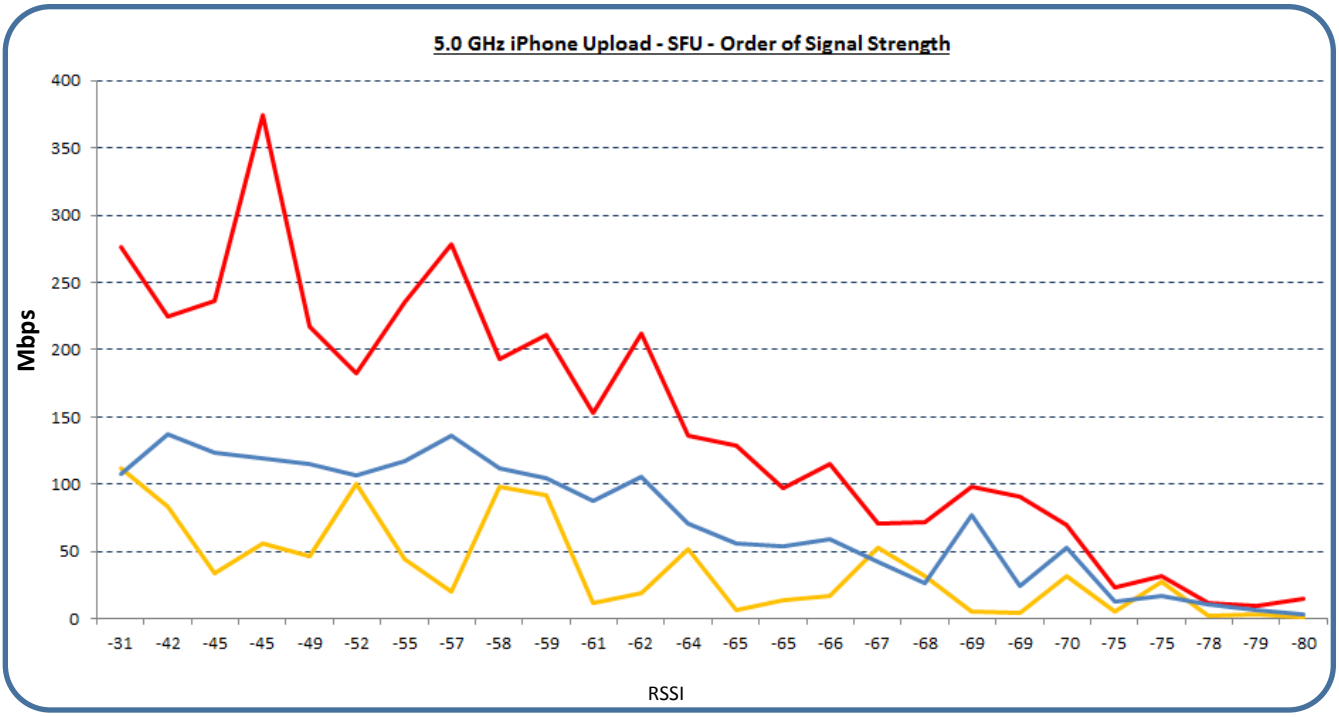
5.0 GHz Upload iPhone Client -SFU





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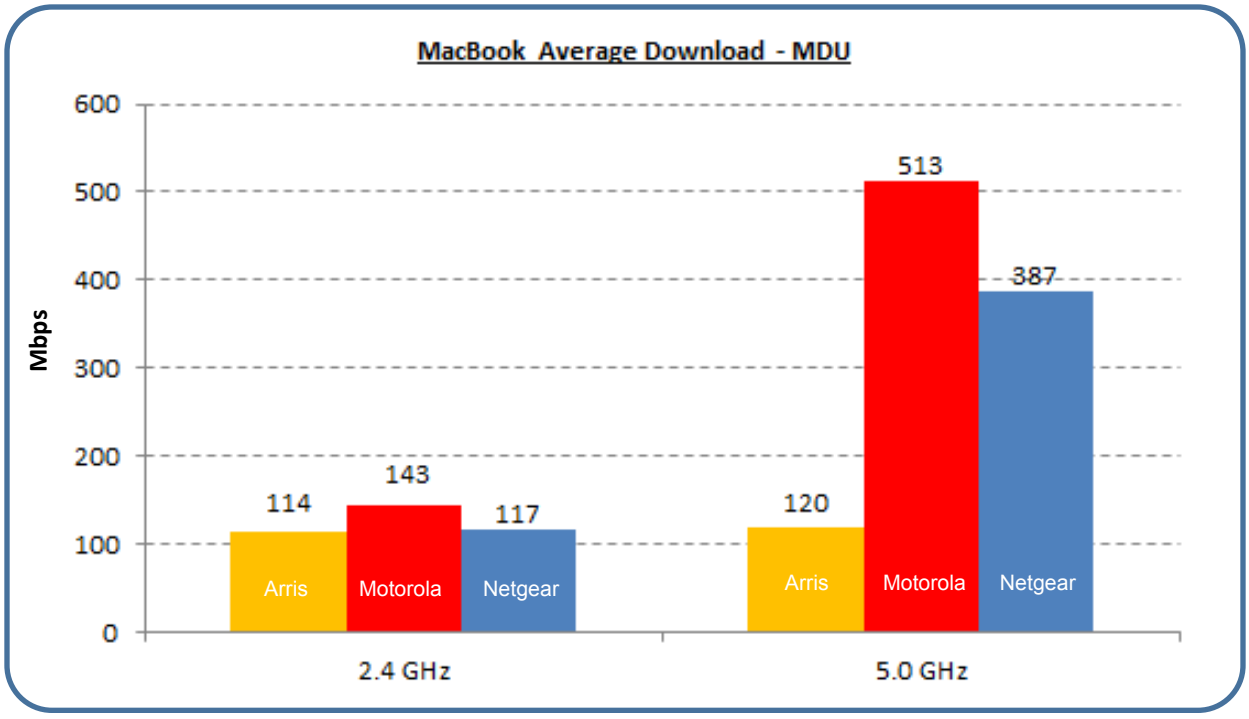
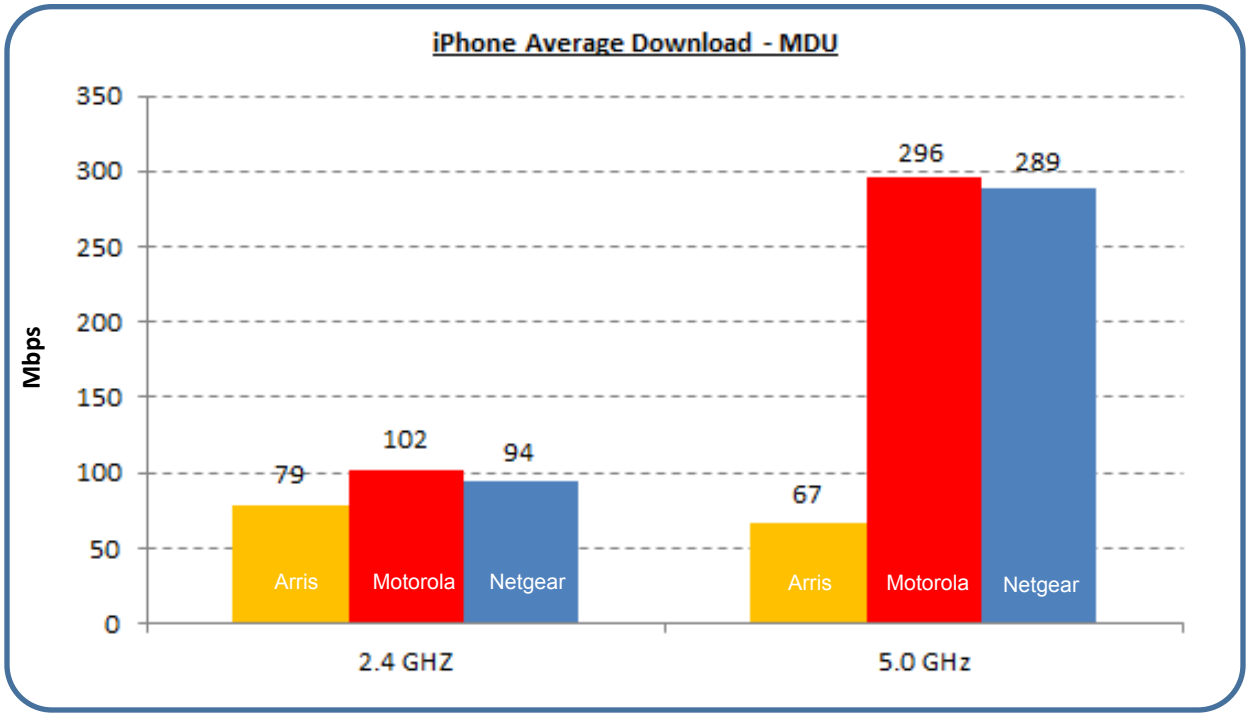
Multi-Dwelling Unit Download Throughput Results

MacBook and iPhone Clients

Average Download Throughput - MDU





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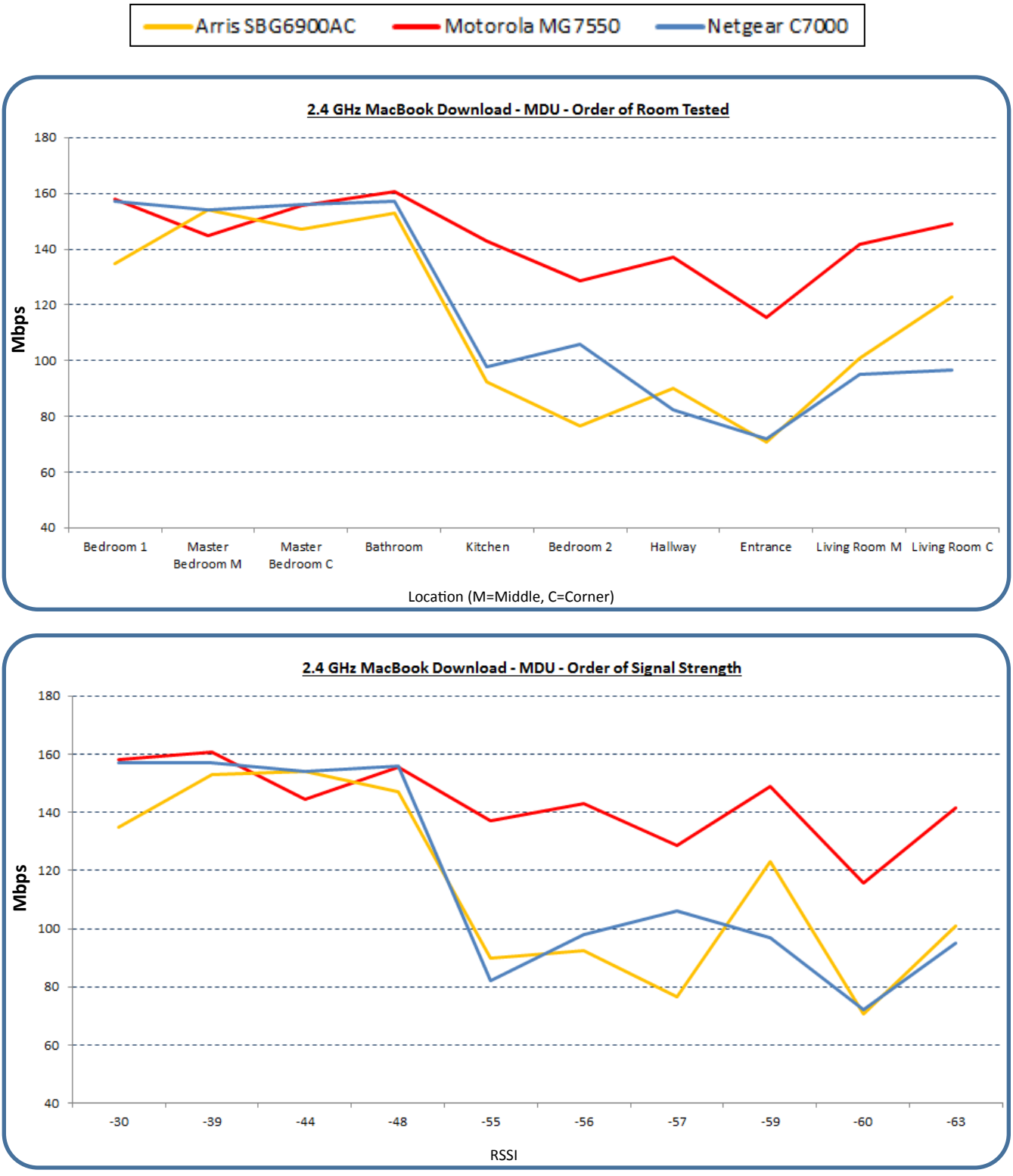
2.4 GHz Download MacBook Client - MDU



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5.0 GHz Download MacBook Client - MDU

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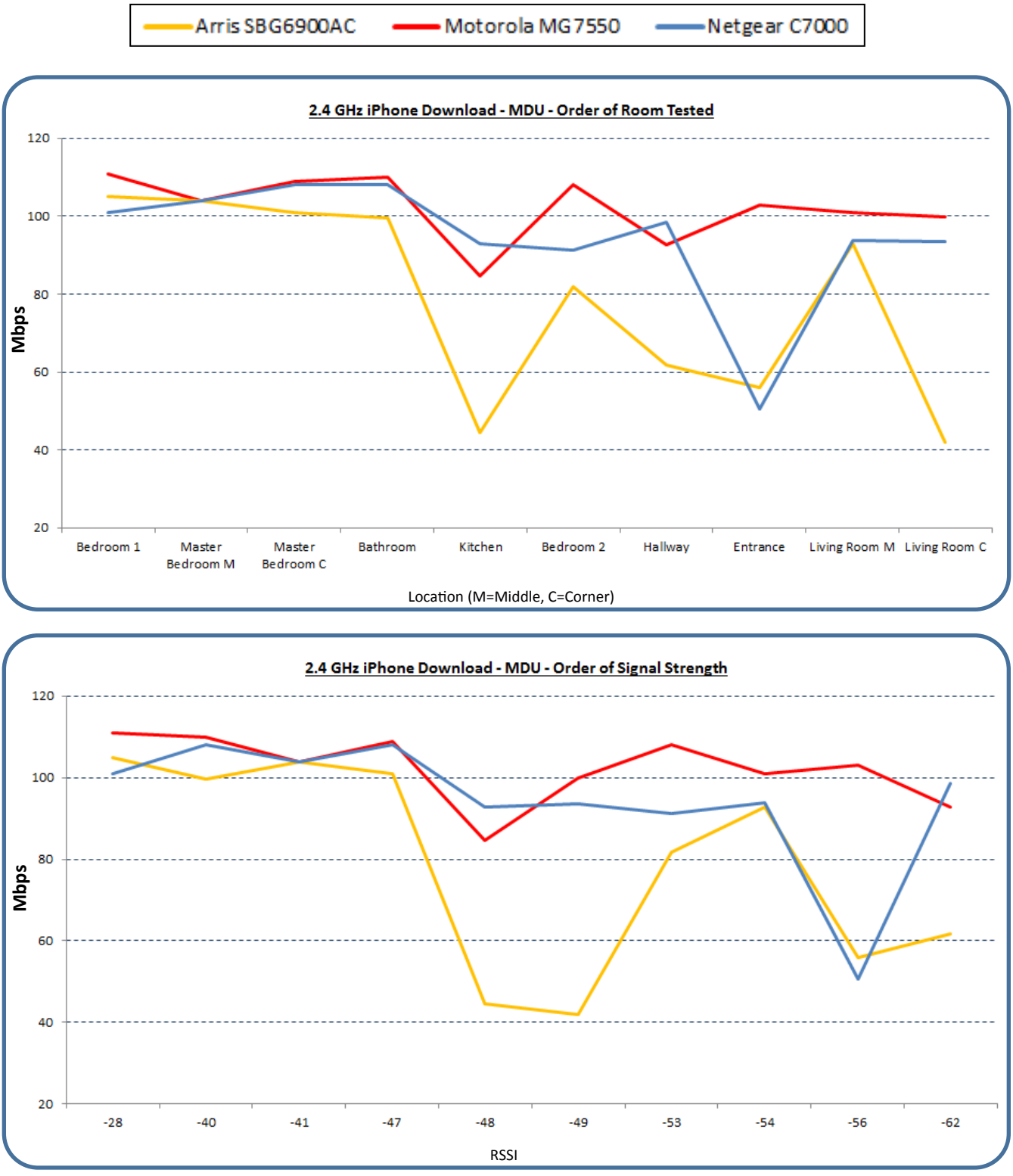
2.4 GHz Download iPhone Client - MDU



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5.0 GHz Download iPhone Client - MDU

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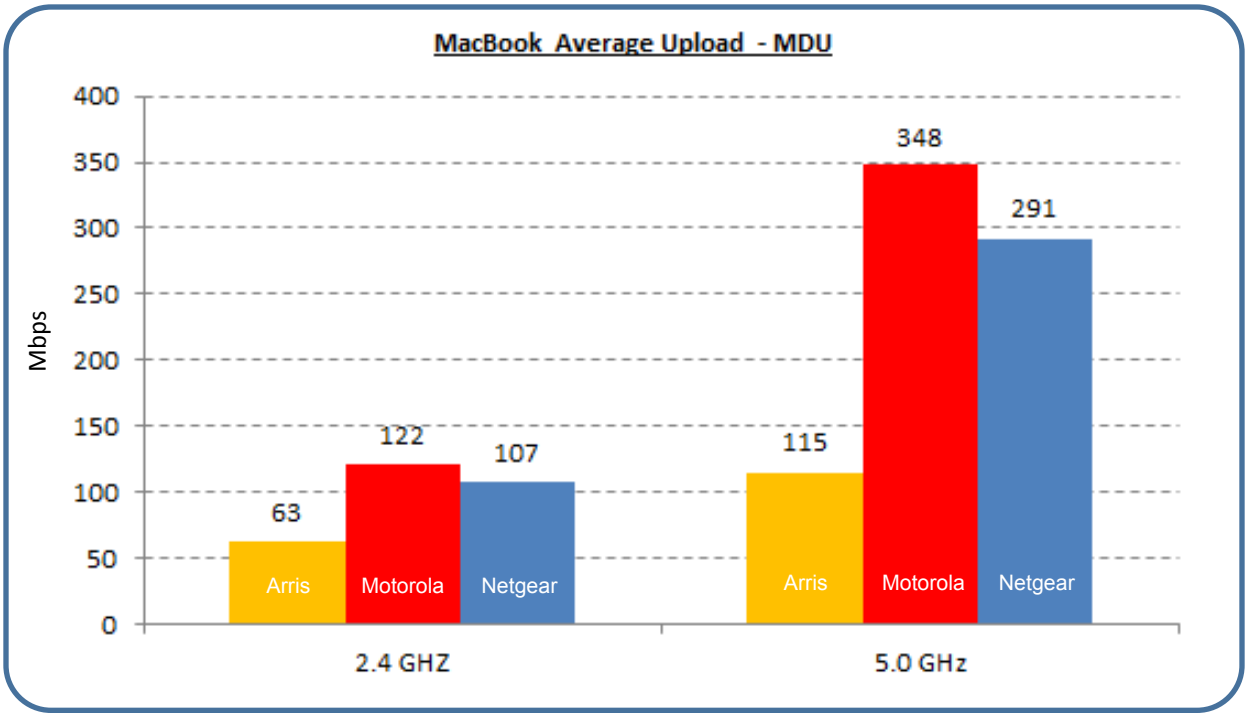
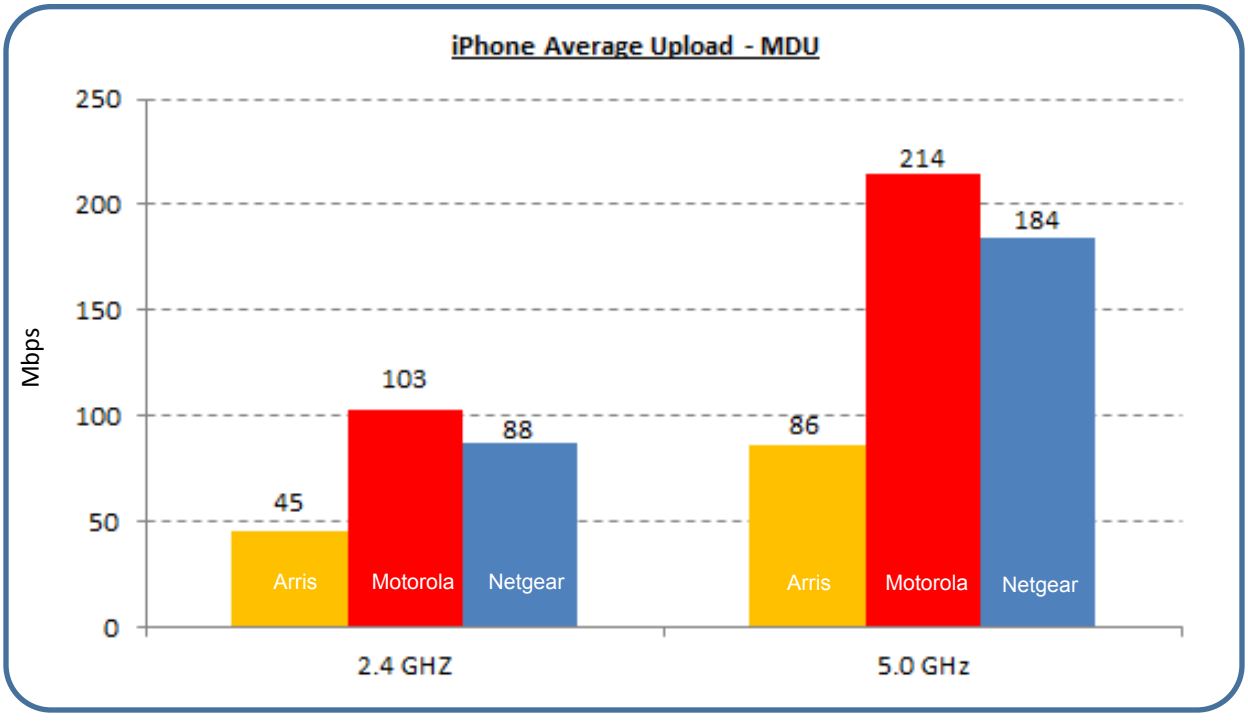
Multi-Dwelling Unit
Upload
Throughput Results

MacBook and iPhone Clients

Average Upload Throughput - MDU





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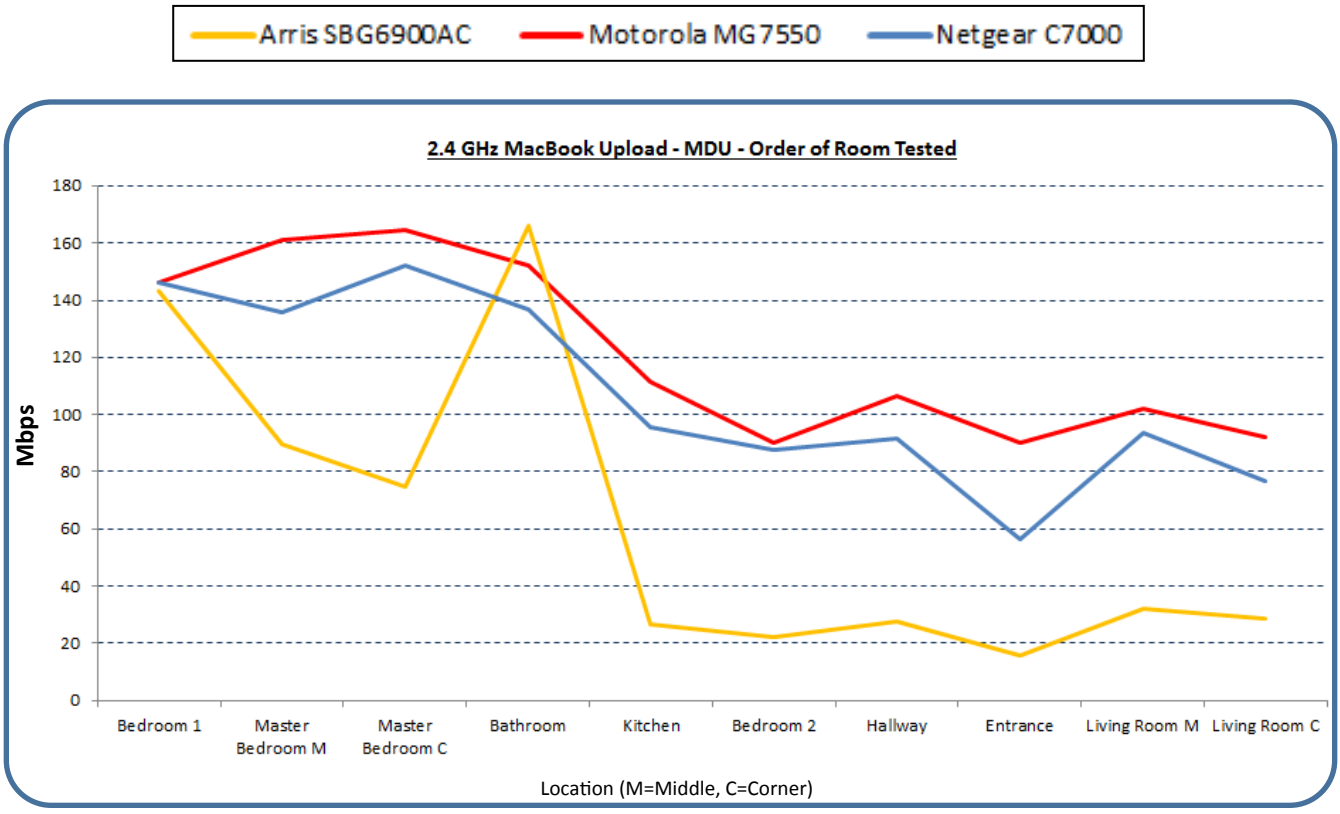
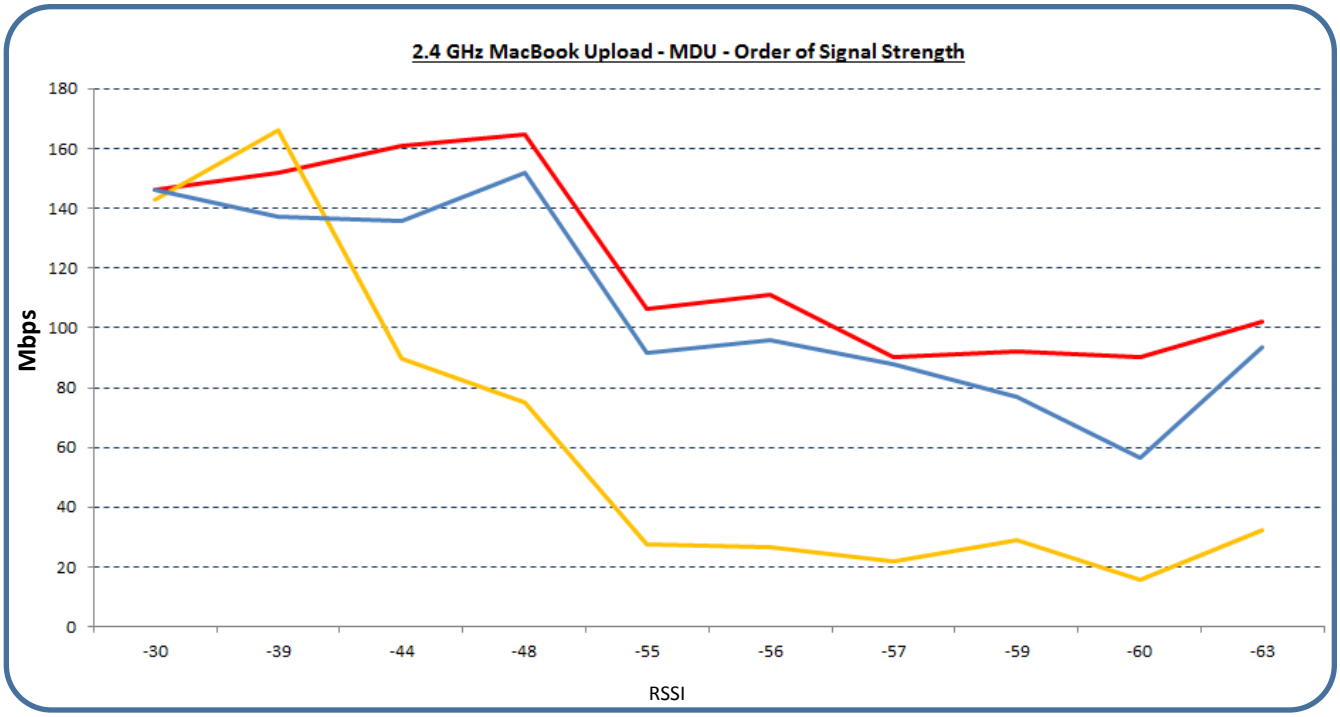
2.4 GHz Upload MacBook Client - MDU





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5.0 GHz Upload MacBook Client - MDU

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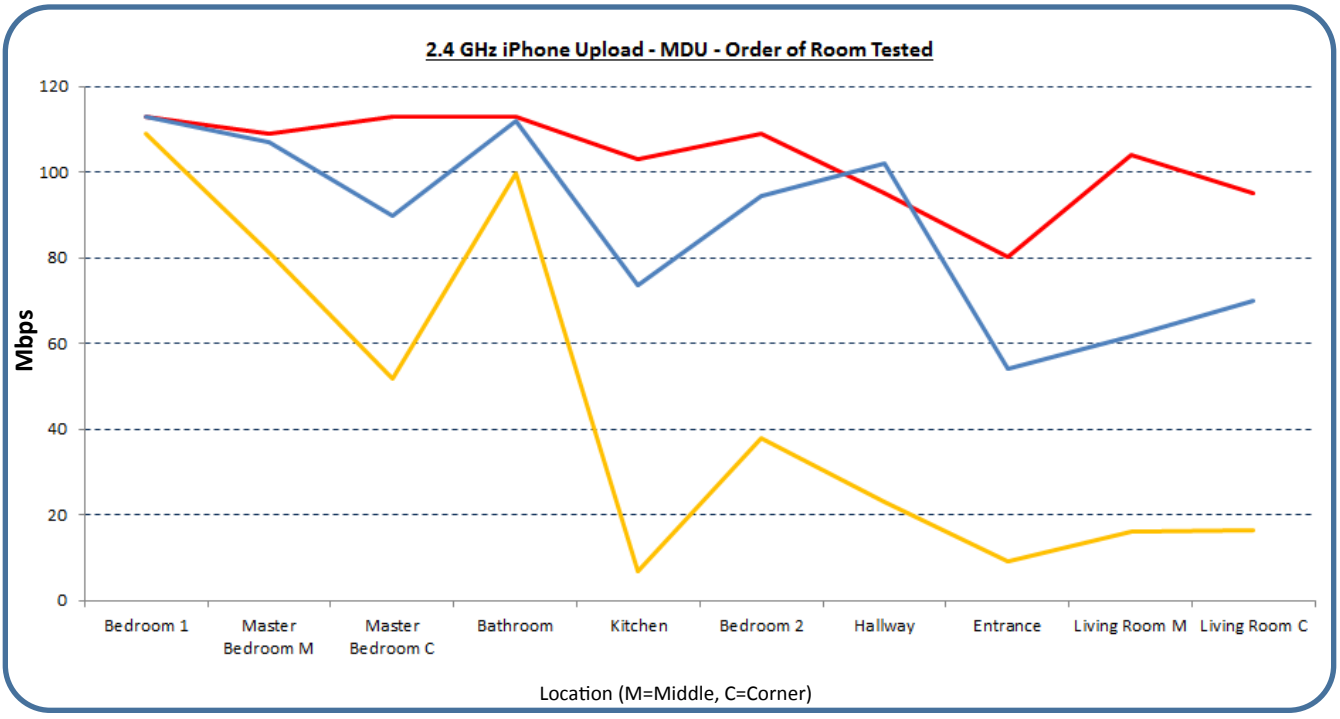
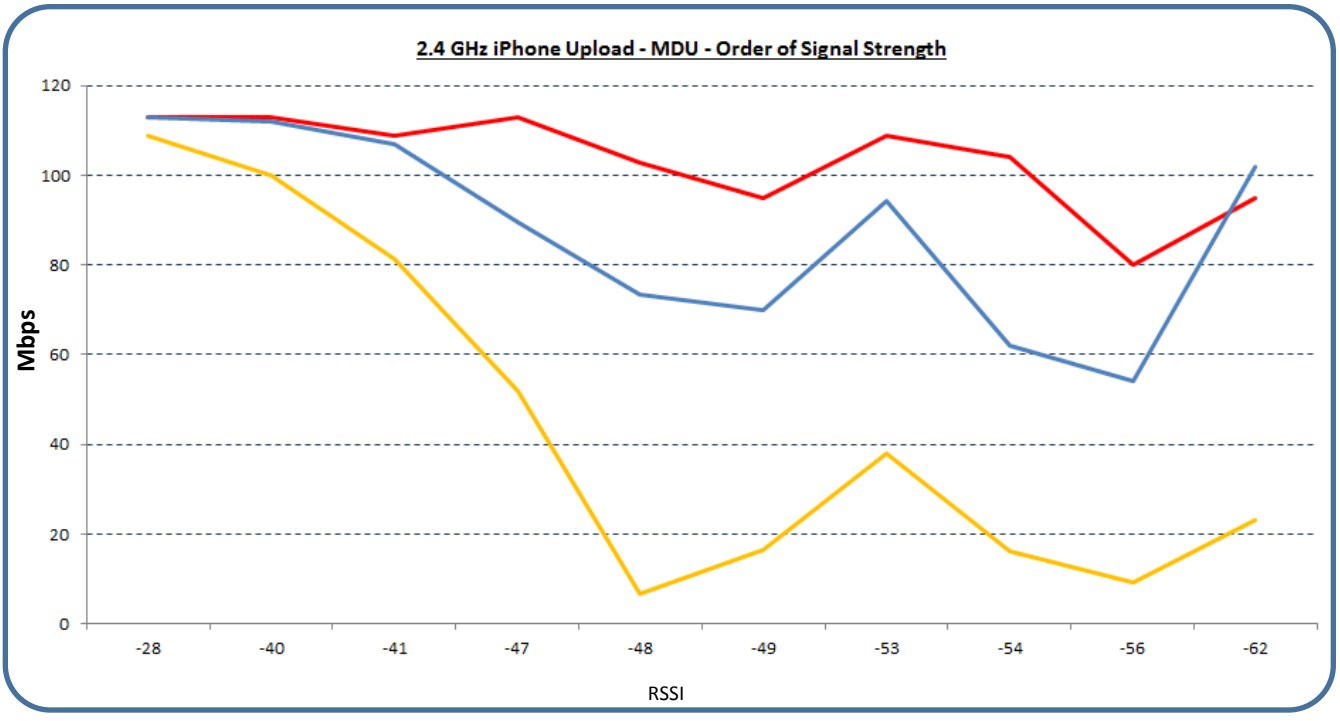
2.4 GHz Upload iPhone Client - MDU





5.0 GHz Upload iPhone Client - MDU

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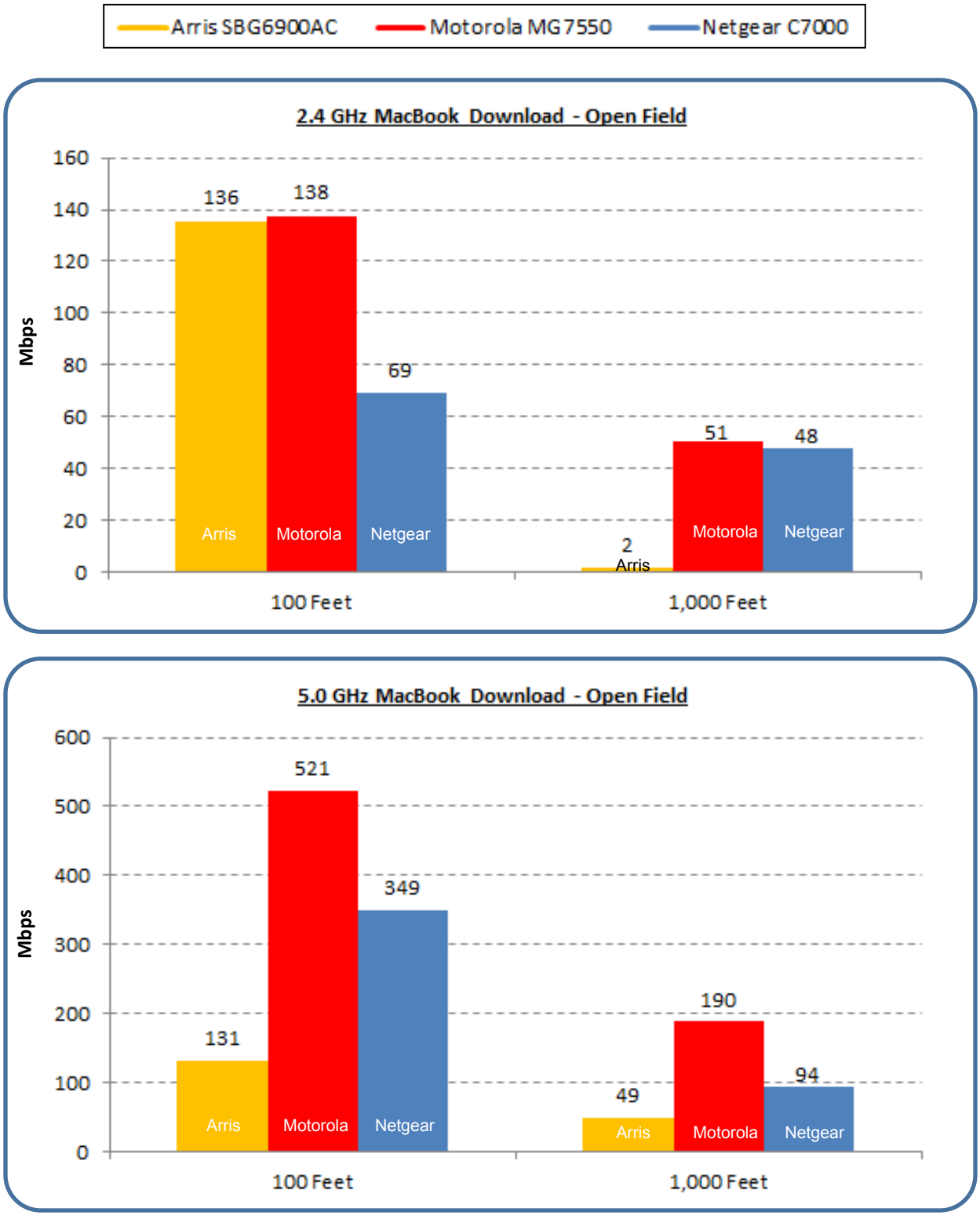
Open Field
Throughput Results

Download Throughput – MacBook Client –Open Field



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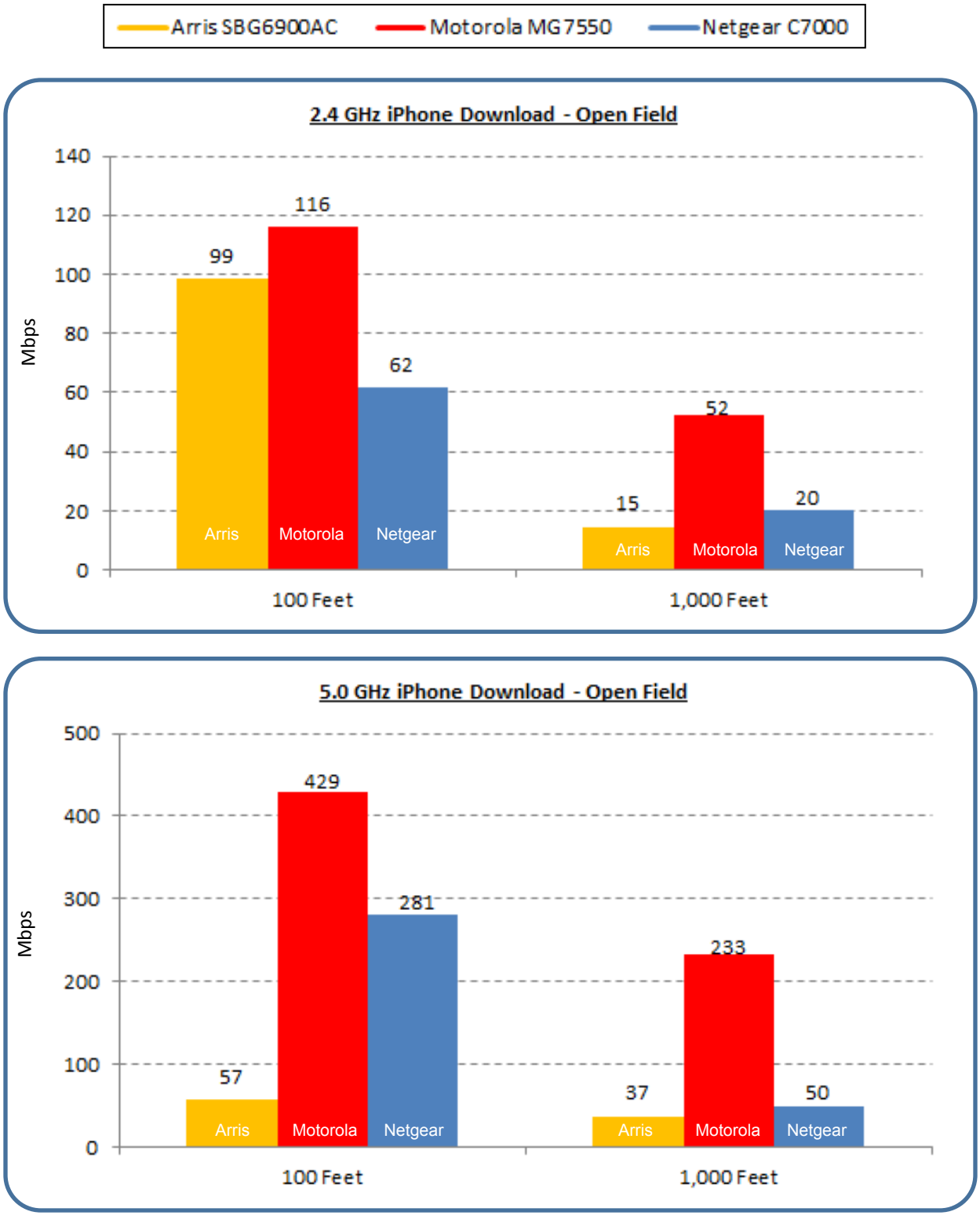
Download Throughput – iPhone 6s Client –Open Field



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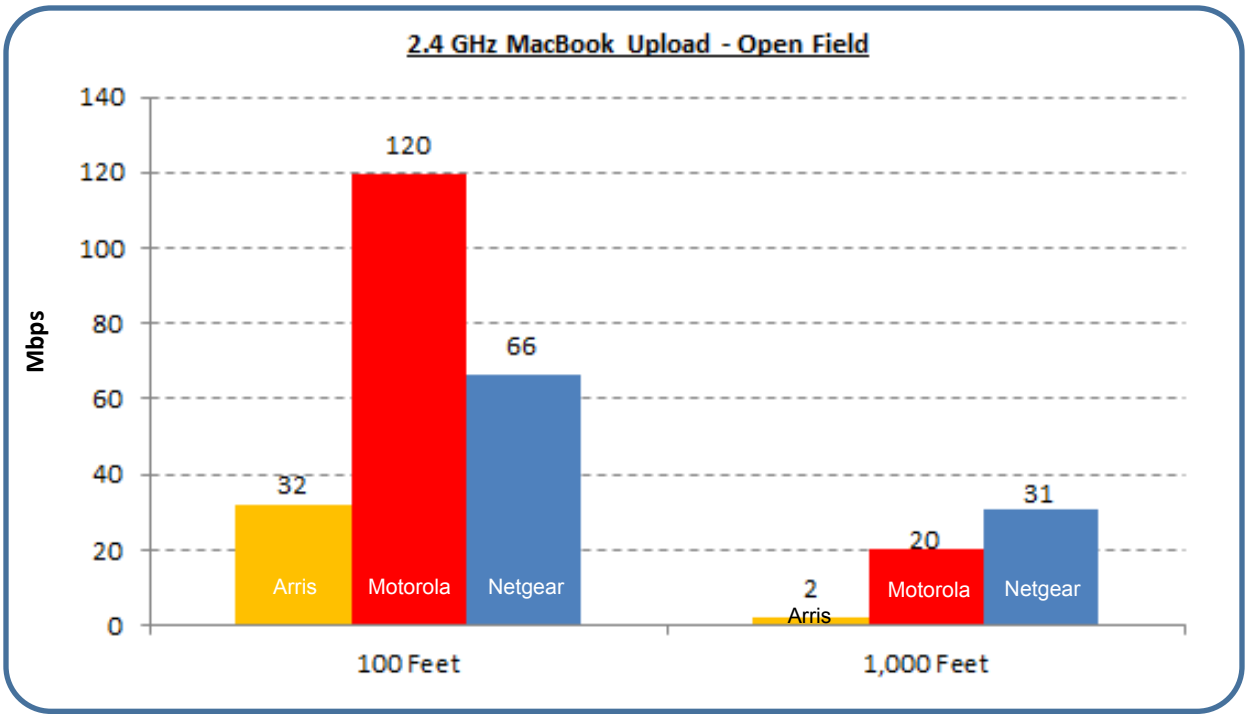
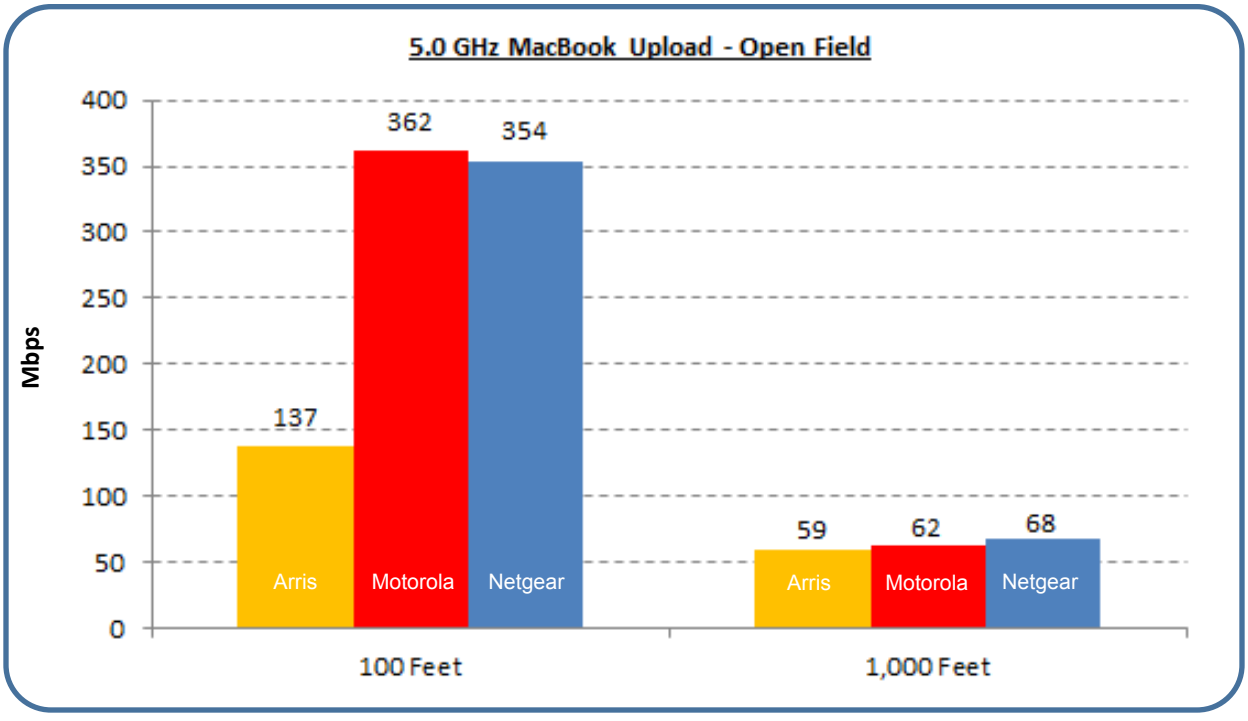
Upload Throughput – MacBook Client –Open Field





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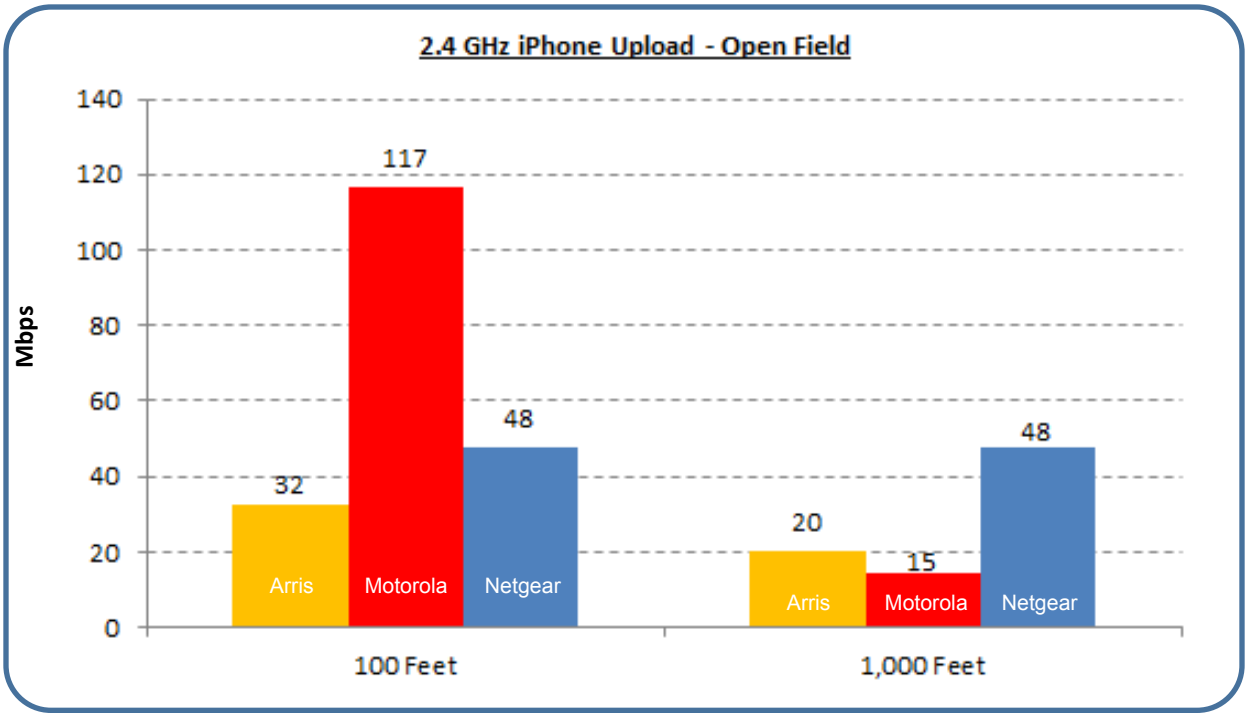
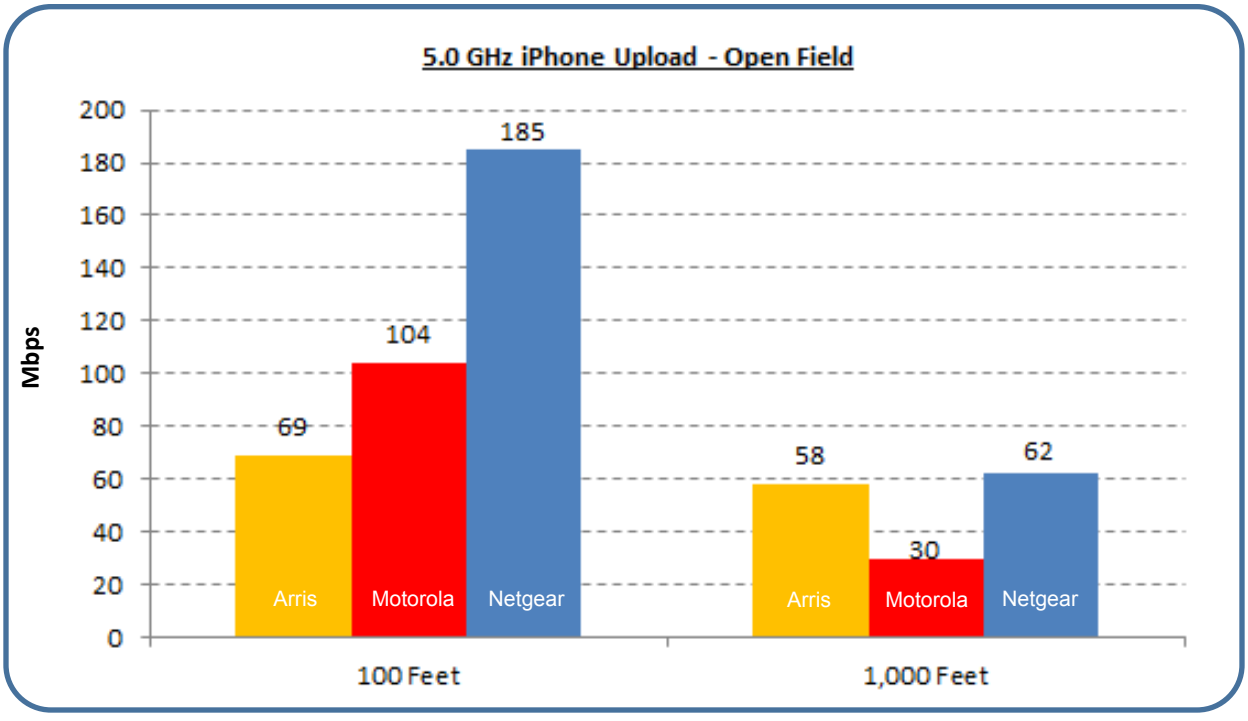
Upload Throughput – iPhone 6s Client –Open Field





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About Netperian

Netperian is an independent, internationally recognized organization specializing in real-world Customer Premise Equipment testing. Netperian is a pioneer in leveraging a wide variety of real world environments for Wi-Fi testing to accurately capture the true customer experience. Netperian believes real word Wi-Fi testing is the only way to truly assess and compare wireless performance across devices. Netperian's test procedures and environments are designed to help customers validate product Wi-Fi performance with lab-like test procedures in multiple real-world locations.

Netperian is trusted by major industry players including Rogers Communications, Xplornet Communications, Sigma Designs, SmartRG and Sagemcom Broadband SAS.

Netperian is headed by Peter Vandenengel. Peter is a telecommunication executive with more than 16 years of experience and a proven track record of leading edge CPE product development and operations management. Prior to Netperian, Peter was with Bell Canada where he led hardware product development and operations, overseeing the largest CPE portfolio of any Canadian Telco. This included management and development of a nationwide equipment base of more than 10 million in-service CPE; launching North America's first a 4x4 wireless set top box; and launching the first 5GHz 802.11ac gateway in Canada.

For more information about Netperian, please see http://www.netperian.com

End of Report