TECHNOLOGY BRIEF

Mobile Unit Power Plus:

Maximizing the battery life of your mobile units through the WLAN switch

Power Plus Overview

Power Plus – This is a unique feature of Motorola wireless mobile devices that allows the mobile devices to automatically adjust its output power based upon the power settings of the associated Motorola AP. There are two settings in the mobile device's user interface: Automatic and Power Plus. When associated to a non-Motorola AP, the mobile device will use full power.

In Automatic mode, the mobile device sets its transmit power to the mu-power setting defined for the associated AP.

In Power Plus mode, the mobile device sets its power to the next highest available power setting than the associated AP.

This setting is irrelevant if the AP configuration is set for maximum power. The Power Plus logic is engaged only when lower power settings are used in AP. Lower AP power settings are becoming more popular to provide for a smaller collision domain, or a pico cell arrangement.

Smaller collision domains, in conjunction with using non-overlapping RF channels, support a larger number of mobile devices, and is architecturally analogous to a comparing an Ethernet hub to an Ethernet switch. A Pico cell arrangement is more costly to acquire and deploy (more APs, more cable runs, and more ethernet switch ports), but can offer superior performance in a congested mobile device environment. Additionally, lower AP power settings provide an avenue for infrastructure "self-healing" in the event of an AP failure.

How to set Power Plus feature in Motorola's enterprise wireless LAN (WS5100 switch):

In the WS5100 (ver 3.x) environment the AP output power and mobile device output power adjustments are performed in two different areas of the WS configuration and have different meanings.

- The AP power setting controls AP transmit power only and doesn't affect the mobile device's transmit power.
- The mu-power setting is a proprietary beacon element setting to configure the mobile device output power. If the mu-power is not set or modified, the default is 0 dBm and the mobile device will transmit at full power. If the mu-power setting has been modified, the mobile device will incorporate a power determined by the beacon setting and the Mobile Companion/Fusion power setting.

Important note: *The MU power feature is Motorola/Symbol proprietary and will only affect Motorola/Symbol mobile clients.*

Note: The AP transmit power setting can be set in either the switch's GUI or CLI. The mu-power setting can only be viewed / set in the CLI.

CLI command in WS5100 3.x code base to show the mu-power value for a specific AP can be viewed with the 'show running-config' command.

The mu-power configuration can be set on one AP or on any/all APs. To configure the mu-power uniformly for site's WS, the default configuration for adopted APs should be changed. The command to change all adopted .11bg AP radios is:

WS5100(config-wireless)*#radio all-11bg mu-power 0

Further, to ensure all newly adopted APs have this configuration the following command should be entered:

WS5100(config-wireless)*#radio default-11bg mu-power 0

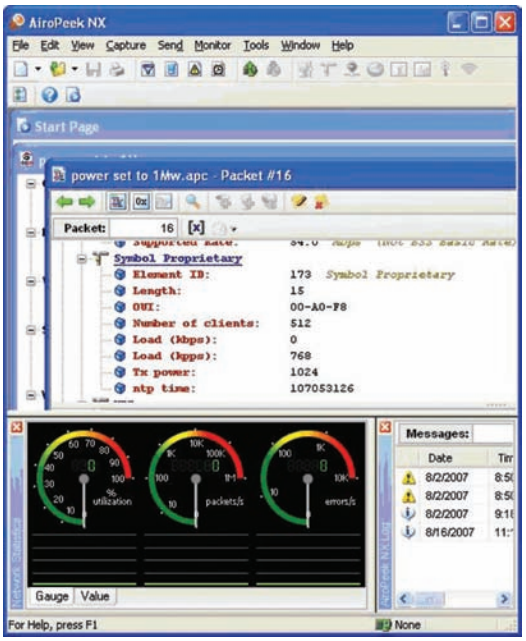
The mu-power element is transmitted in the beacon from the AP and is recognized by the Motorola/Symbol mobile device in proprietary beacon element 173. It's an index from 0-4, where 0 represents Full power, 1 – 30mW, 2 – 15mW, 3 – 5mW and 4 is 1 mW.

Infrastructure power settings are in dBM units and translation from dBM to mW is done as following:

MU-power on Wireless Switch	Wireless trace value (decimal)	Converted value (hex)	Byte-swapped value (hex)	Power index	Actual MU transmit power
0-3 dBM	0	0	0	0	Full power
4-7 dBM	256	0x100	0x001	1	30 mW
8-11 dBM	512	0x200	0x002	2	15 mW
12-15 dBM	768	0x300	0x003	3	5 mW
16-20 dBM	1024	0x400	0x004	4	1 mW

The following is the Airopeek trace that shows element 173:

Note: Airopeek shows Tx power as 1024, which is a bit flipped value, meaning – 1024 (decimal) is 0x0400 in hex. Flipping the bits will make it 0x0004, or value 4 for MU Tx power, causing the mobile device to transmit at 1 mW power. Therefore, the values to look for in the wireless trace are shown in the chart above.



Further, combining the WS's mu-power setting with the mobile device's automatic / Power Plus settings, the following chart shows the net result of the power output on the device (an MC-70 in this case with Fusion 2.5).

WS mu-power setting	Beacon value	MU Automatic	MU Power Plus
0-3	0	40mw	40mw
4-7	256	32mw	40mw
8-11	512	16mw	32mw
12-15	768	5mw	16mw
16-20	1024	1mw	5mw

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