



May 30, 2012

RE: ATCB012146 - Original Equipment & Single Certification Applications - Model: AF24

FCC ID: SWX-AF24 & IC: 6545A-AF24 for Ubiquiti Networks, Inc.

1. Please see UBNT response to the following questions:

- (a) The submitted test report has field strength measurements made distances less than 3 meters. The attached millimeter wave test procedure shows distance attenuation factors vary with the distance from the device and the size of both the transmitting and receiving horn antennas. How have these factors been taken into account in the submitted test report? Please elaborate on this matter in an amended test report.

**UBNT: The extrapolation factor used for the measurements made at 5cm from the EUT were 20dB/decade or -35.6dB as stated in the test report. If we apply a 40dB/decade factor (per the MM Wave procedure) from the test distance to the far field point, which for the AirFiber antenna diameter of 25cm is ~20 meters, it will only provide more margin. My best guess on the diameter of the AirFiber antenna is 25cm, but even if I somewhat off, the far field point is much greater than even the specified 3 meter test distance. Applying a 40dB/decade factor to the measured value at 5cm would result in an additional 35.6dB to the margin. I would also point out that the test report notes that, even at 5cm, no signal could be detected above the noise floor of the test equipment which is why we moved so close to the AirFiber for the test.**

- (b) The submitted operation description indicates this is a MIMO device where 2 transmitters operate simultaneously. In the operational description it is unclear what exactly is happening. (e.g., Do the two transmitters send different information or the exact same information? How are they polarized with respect to each other? Etc.) Also the MIMO KDBs attached state that unless circularly polarized antennas are used, the field strength measured from each transmitter must be added together to establish the total (e.g., real) field strength of the transmitter. Please elaborate on this matter in an amended test report and a more detailed operational description. (e.g., Were both transmitters operating during radiated emission measurements? Etc.) Once these matters are resolved for the FCC, IC will accept the results too.

**UBNT: The MIMO transmitters in the AirFiber data transmissions are completely uncorrelated and independent data streams. Since both transmitter streams are uncorrelated the KDBs 662911 D01 and D02 (attached) explain:**



The following text is taken from the KDB 662911 D01 (page 5 bottom and page 6 top):

Completely uncorrelated signals include those transmitted in the following modes, if they are not combined with any correlated modes, such as beamforming:

- Space Time Block Codes (STBC) or Space Time Codes (STC) for which different digital data is carried by each transmit antenna during any symbol period (e.g., WiMAX Matrix A [Alamouti coding]).

- Spatial Multiplexing MIMO (SM-MIMO), for which independent data streams are sent to each transmit antenna (e.g., WiMAX Matrix B. WiMAX Matrix C, which adds diversity, also produces uncorrelated transmit signals).

[Note that under previous guidelines, only SM-MIMO signals could be considered uncorrelated for purposes of directional gain computation.]

The following text is taken from the KDB 662911 D02 (page 2 bottom and page 3 top):

#### Rules That Specify Radiated Limits

(1) If the transmitter output signals are completely uncorrelated as defined in Attachment 662911 D01, of this publication, then each of the two EIRPs or ERPs (total or spectral density) must individually be below the limit.

Sincerely,

A handwritten signature in black ink that reads "Jennifer Sanchez".

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