

RE: Andrew Corporation

FCC ID: BCR-M5B8019

After a review of the submitted information, I have a few comments on the above referenced Application. Depending on your responses, kindly understand there may be additional comments.

1) There is still a disconnect of component values on several schematics. We either need to ensure that all schematics contain appropriate component values, or if a BOM is used in conjunction with the schematics that the designation for components matches so component values can be determined. Currently the designation on the schematics does not match designation on the BOM. Please correct.

Please find enclosed schematics with the component values listed on the schematics. There are four schematics included:

- 1) RF00862A main schematic – This is the rf schematic for the PCS and AWS bands.
- 2) RF5001944A control schematic 1900-2100 – This is the schematic for the electronic circuits that control the amplifiers for PCS and AWS bands.
- 3) RF501037B Contr. 800-900 schematic – This is the schematic for the electronics that control the amplifiers for the 800 and 900 MHz bands (AMPS, SMR, PMR)
- 4) RF501038A 800-900 schematic – This is the rf schematic for the 800 and 900 MHz bands (AMPS, SMR, PMR).

2) Regarding MPE, note that you reference the FCC allows for indoor fixed installation. This may be allowed, but note that what we are concerned with is the location of the antennas and not the unit itself. For instance, if antenna can be located in hallways of buildings, depending on the building, this may only meet 20 cm requirements (i.e. I've seen leaky coax installations for subways and underground shopping areas where the cable is placed at head height along stairwells and initial cable runs and certain hallways and therefore these situations would be subject to mobile classification). Remember that mobile classification is simply meaning that the EUT to user antenna distance only meets a 20 cm distance and does not actually deal with the logical meaning of the word mobile (such as device as movable or mounted in position). Without fully understanding antenna types, gains, and installation procedures which clearly show/explain how antennas are mounted indoor, 20 cm would seem reasonable. If you wish to adjust this for fixed indoor installation (referring to antenna locations), please provide further information regarding types of antennas, user installation instructions to support this, etc. Typically there is information showing how antennas must be mounted on permanent indoor structures and located in such a way that their antennas meet minimum spacing requirements (as shown in appropriate MPE calculations – however this must take into consideration all RF output from the antenna, not just a band – see 3) below). Otherwise we will continue based on the information provided for indoor mobile operation. You may wish to clarify what is meant by an indoor fixed installation (i.e. in these situations where is the antennas mounted). If the antennas are still mounted outdoors, on towers or roof tops, etc – then this would be a fixed installation. However if the manufacturer expects to use antennas such as leaky coax (or other indoor antenna installations) to be used in subway runs, underground areas, tunnels, inside buildings, etc. – then many of these situations could be deemed mobile installations unless detailed installation information clearly shows otherwise.

Please clarify.

Note: Generally speaking FCC has stated that Pico-base stations, Micro-base stations and other fixed-mounted transmitters operating with indoor antenna(s) meet MPE Categorical Exclusion Limits established in §2.1091. If not, it must be clear how antenna to user installation is ensure to meet with necessary distances.

Since this is a licensed device the type of antenna used is not defined by the equipment manufacturer. I am not sure how we can predict the MPE without a clear definition of the antenna(s). This is the reason we included maximum antenna gain and separation distance in the installation manual. In the case of leaky coaxial cable the loss associated with the propagation characteristics of this type of radiator would correlate to an “antenna

gain” of about -50 dBi. My contention is that RF Exposure is dealt with as part of the site licensing procedure and that we must demonstrate for equipment authorization that the device can meet rf exposure requirements if properly installed (i.e. that the user manual does not recommend any installation that would violate the rf exposure rules.

3) Depending on 2) above, if mobile installations will exist or fixed indoor antenna installations, then MPE must consider all possible RF output for purposes of its calculations. For instance you would calculate maximum RF exposure of all RF power out of a single antenna and using the same distance in each equation (much as has already been provided in the MPE exhibits. However you must then take this one step further and show that the sum of the ratios of density to the respective limits is < 1 such as:

$\text{Power Density}_1/\text{Limit}_1 + \text{Power Density}_2/\text{Limit}_2 + \text{repeat for } n \text{ number of outputs} \dots < 1$
Given the current ratio shown (i.e. 800 MHz is about 0.87 or 87%, and 1900 MHz is about 0.50 or 50%, the sum is > 1 or 100%). Note that this calculation must be for the worse case sum of all possible RF into a single antenna element.

Again this has to be dealt with under the site license and this product should not be seen as mobile installation as relates to the method of installation OR minimum separation distance from nearby persons.

4) While we understand your concern regarding previous comment 9, kindly understand that if a 17 dBi gain antenna was to be used and the maximum output utilized, then the ERP limitations are exceeded. We will assume that the 17 dBi gain is this just a value selected for purposes of showing compliance to various limitations (i.e. RF exposure, EIRP or ERP)? You are correct that for this type of device a specific antenna is not necessarily approved, but there are limitations on its gain. Note that some installations may allow for 1000 W limits, but others must abide by 500 W for the Part 22 bands and will be dependent on the location and license. Please confirm that our understanding is correct that that a 17 dBi gain antenna is not a set or typical antenna planned for all installations. Note that it appears that a 16 dBi gain antenna would be required to meet the ERP limitation in some instances.

17 dBi is only mentioned as the maximum antenna gain for rf exposure purposes. This antenna gain is not recommended by the manufacturer for all bands and installations.

5) Kindly show where the -20 dBm requirement of 90.691 is met for the 851 – 869 MHz bands. Many of the plots are wideband and clearly show compliance to -13 dBm, but -20 dBm may not be met, especially only 37.5 kHz from bandedge. Kindly explain which plots show compliance to this requirement.

Please refer to the enclosed graphs that have been extracted from the test report.