

FCC ID: W6UHMAWS1M

IC ID:

CT Project:P1440026

From: Shawn McMillen

Date: 05/23/2014

1. The internal pictures provided are illegible also there are pictures of unpopulated boards.  
CT –DW Please find updated photos.

2. The test report indicates this product was tested to parts 22H, 24E and 27 however only part 27 has been included.

CT – Mike Graffeo: Report has been modified to remove reference to part 22 and part 24 since 2110 to 2155MHz is a part 27 device.

3. No RF exposure evaluation was submitted with this application. Please note that since this device is a MIMO considerations for array gain may need to be taken into account.

CT – Mike Graffeo: In the past projects with SOLID, we have created one RF exposure report for calculating maximum power if all three plugins were running at the same time. It was been added to the TCB uploaded Docs directory (p1440024-25-26\_FCC\_Part 1.1310\_Rev 1.0.pdf)

SM -- This is still confusing. The maximum gain of the antenna per the data sheet for this band is 11.6dBi however the maximum gain per the MPE is 14.45dBi. Is the data sheet per element or a total gain when all elements are operating in a MIMO condition? If this gain is per element you will need to add 3dB for the additional again for MIMO mode operation. Also you mention three plugins. I'm assuming that they are all the same type. If so will the resulting antennas for the final setup be collocated? Can all three transmitters operate simultaneously? If so the user's manual may need to address the additional gain of 4.77 dB. Please advise.

CT Mike Graffeo notes 6/3/14: FCC has given specific guidance on how the want DAS units tested when it comes to RF exposure (i.e. all amplifiers engaged at maximum power using the maximum antenna gain with the most strictest limit).

SM 6/4/14 -- For the RF exposure question please include the specific guidance that the FCC has provided which appears to be different then the published KDB for calculating RF exposure from multiple simultaneous bands.

CT MG 6/4/14 -- The following two questions came from a PBA response for an identical type of device. We amended the RF exposure test report using the method used in the current filing under review and the FCC indicated this was satisfactory. We provided the same in formation for IC and they also agreed with our reporting method. It is the absolute worst possible case therefore the most conservative by definition.

7) b) Further to e.g. the following from KDB pub 865664, in general whatever is the largest separation distance (i.e. most conservative) across all bands capable of transmitting needs to be specified in grant conditions AND DETAILED IN DEVICE INSTALL AND OPERATING INSTRUCTIONS. TCB please coordinate with applicant and/or agent to revise filings accordingly. "When multiple or varying exposure conditions exist, the most conservative conditions must be considered to determine compliance."

Q8) Conceivably this booster system could be transmitting into a coverage area one channel in each of the 700, 800, 1900, 2100 bands each at 5 W. Therefore at minimum RF exposure compliance



demonstration and install/operate instructions need to address such aggregate 20 W transmit condition. Or please amend filings to demonstrate how and why such condition is prevented by the system.

4. Cannot locate the list of antenna to be used with this device.

CT – Mike Graffeo: XEA-FRO-130 antenna info.pdf has been added to TCB uploaded Docs directory.

5. This device is described as a MIMO however it appears only one port was tested in the EMC report.

CT – Mike Graffeo: Report has been modified to describe which port was tested with each frequency.

SM -- The guidance for licensed MIMO requires each port to be measured and for some items such as power the ports need to be summed. I can attach the licensed MIMO guidance if necessary.

SM -- Each port in a MIMO device will need to be addressed.

CT - MG notes 6/2/14: RF exposure report (p1440024-25-26\_FCC\_Part 1.1310\_Rev 1.0 .pdf) has the necessary information showing maximum power if both antennas were summed. For the RF exposure question please include the specific guidance that the FCC has provided which appears to be different then the published KDB for calculating RF exposure from multiple simultaneous bands.

SM 6/4/14 -- For the MIMO question this has not been addressed yet. This is not an MPE concern, its an emission requirement. I've attached the MIMO guidance.

CT – MG 6/4/14: This device is not a MIMO. It is a multiple transmitter system with each transmitter in a different band. The fact that they connect to a common antenna port is not relevant. There are several KDBs in regards to the measurement of emissions for "Boosters" and our method is consistent with those published KDBs.

SM 6/4/14: From the block diagrams provided this unit appears to operate with multiple ports i.e. > than 1 for the purposes of enhanced data rates. The block diagram even shows this device having multiple ports. By definition this is referred to as a MIMO device so I am not certain I follow what you are saying when you indicate that it only has one port.

CT –6/11/14: Here is the response from John Erhard:

The device under certification is the plug-in unit itself and not the entire system which can contain 1 or more plug-in transmitters. These plug-ins are not restricted to use in just a single chassis and conversely a single chassis is not restricted to a specific set of plug-ins. There is no set configuration including the number and type of antenna ports. Each plug-in is considered a separate unique system in all regards except for RF exposure and permissive changes could be required if the various plug-ins are used in configurations which are outside the original RF exposure evaluation. Because of this we have been instructed to assume the worst possible case for RF exposure which is a single antenna port and a single antenna with all transmitters operating at maximum power.

In short these are individual certifications and all recent FCC filings are handled in the same or a similar manner to the filing under consideration. These are under PBA review and we have had other devices already granted from the same manufacturer using the same process.



SM 6/12/14: This 700MHz in this application, unlike the other units in the main host, makes use of an additional radio, assuming of the same type, that is meant to enhance the data rate of a particular carrier on the same frequency. Please correct me if I'm wrong. If so then you are applying under this ID to have one unit with multiple port separated from each other within the host. Even though the antenna ports are separated out by different units, from a conducted perspective they would appear to be completely separate, however from a radiated perspective you have a multi-port system combining multiple port on a single carrier in the same band. If my interpretation of this is correct you will need to take into account the combined emissions from all ports. Alternatively, if this device is not making use of MIMO in the traditional sense then it might make more sense to remove any reference to MIMO operation and identify this as a multi carrier unit.

6/20/14 response from JE: Not necessarily, again these are certified independent of each other or the host chassis. The fact that the particular sample we received contains 2 of the same radio is not relevant. As indicated in the past responses the FCC has directed that these are to be evaluated individually except for the RF exposure which is a combined report as if all devices are operating at maximum power through a single antenna port.

SM 6/24/14: It's best to get the FCC to respond here. My take is that you are combining this radio with another under the same ID. As a MIMO it is no long just two radios operating independently of each other. I will generate a KDB.

Response by:

Submitted by:

Date: