

APEX

WIRELESS, INC.

2525 Frontier Av. Suite 200
Boulder, CO 80301
(303) 443-6699
FAX: (303) 442-7123
EMAIL:mark@apexwireless.com

Mr Dennis Ward
American TCB
6731 Whittier Ave
McLean, VA 22101

Dear Mr. Ward,

Thank you for commenting on our Application (FCC ID:R21-ETSTX1_ATCB001687). Please allow us to make the following clarifications regarding our application:

- 1) **Pseudo Random Frequency Sequence**: Each transmitter is assigned a unique psuedo-random hopping sequence, which is generated by performing a mathematical operation on the transmitter ID. (see section described "Transmitter operation"). This helps to minimize the probability of interference between co-located systems. If required, we can provide a typical hopping sequence, provide the source code for the pseudo-random sequence generator, or provide an executable program that generates the hopping sequence based on any 16 bit number. Please make a recommendation regarding what if any further clarification is required.
- 2) **Incorrect MPE Report**: This report was sent by mistake. The correct MPE report (ETR_RF_EXPOSURE_REPORT#1.doc) will be uploaded by Bill P.
- 3) **Incorrect Label on Conducted Emissions**: This is a mistake. We will correct on next version.
- 4) **Occupied BW**: Please clarify the meaning of "occupied bandwidth". My understanding is that this is the frequency difference between the -20dB points for a single channel. The "Channel Bandwidth" chart on page 22 shows that the occupied BW is approximately 200 KHz, which is much greater than 25 KHz required by 15.247. This chart also shows the channel spacing of 400 KHz, which is also indicated on frequency list. Since the channels are spaced at a distance of more than 25 KHz and more than the

20dB BW (200 KHz) of the hopping channel (400 KHz), I believe we meet the occupied BW requirements of 15.247. Based on your recommendation, we will modify language on page 8.

- 5) **Peak Power Measurements**: We felt that the wideband sweep on page 23 shows that the maximum conducted output power (about 22dBm) is well below the limit of 30dBm. This wide band sweep shows good correlation at 905.05 MHz, with the fixed frequency reading at 21.1 dBm and (max hold) hopping measurement at about 21dBm. Reading at 908.94 is 21.6 dBm, which is reasonably close. Please indicate if additional data is required.
- 6) **Analyzer Settings**: We will modify report with this information. I assume that conducted measurements with RBW and VBW on plot are OK.
- 7) **Units**: We will include units on next revision of report.
- 8) **Factored Values**: The “factored value” is the raw reading at the spectrum analyzer with compensation for the antenna factor, attenuator and cable loss. Please indicate if you need additional information. I will have Criterion address this issue.

9 – 12) **Missing Header, Table 3**: There appears to have been a formatting error in the construction of this chart, leaving out the headings, and causing confusion regarding the meaning of the data. We will correct this problem. FYI here are the headings, from left to right:

- Frequency
- Peak raw Level: Level at input to S/A
- Peak Level with Factors: Actual Peak level with AF, ATTN, & Cable Loss Factors
- Amount added to Peak Level for “averaging”. This (17dB) is $10 \log 50$, which accounts for the fact that the average power at any one frequency is $1/50^{\text{th}}$ of the peak power at that frequency due to the nature of frequency hopping with 50 channels.
- Average level of signal
- FCC Limit (54dBuV/M)
- Margin to limit

Could you please confirm that we comply with the rules based on this clarification of the headings.

13) **Dwell Time**: Channel occupancy and dwell time are fixed in microcode, meaning that dwell time at one frequency is always 100 ms or less, and frequency channel always changes to the next in table after this period. If we provided a spectrum analyzer plot set at one frequency on zero span, showing the time on one frequency would this be an adequate

representation? If not could you suggest an alternate way of representing this “dwell”. Alternatively, we could provide source code for these functions, indicating their proper operation.

Thanks in advance for your prompt response to these issues.

Best Regards,

Mark Matlin
CTO
Apex Wireless, Inc.