Monday, August 20, 2001

To: Joe Dichoso
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FCC Application Processing Branch
From: Gregory Snyder, Washington Laboratories, Ltd.

Re: FCC ID PB8P4432-052
Applicant: Dassault Automatismes & Telecommunications
Correspondence Reference Number: 19468
731 Confirmation Number: EA100701

Following are the questions raised by the FCC review of the above referenced application. Each question has been answered (see italicized text) and, where appropriate, new exhibits have been uploaded.

1) Block diagram showing all frequencies and oscillators.

A new block diagram of the Stamptronics FHSS radio block has been uploaded.
File: "Stamptronics Block Diagram.pdf"

2) The technical description indicates that the transmitter synchronizes with multiple transmitters. This does not appear to comply with Section 15.247(h). Please explain. The transmitter cannot coordinate its hopping sequence with the hopping sequence of other transmitters, or vice versa, for the purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters.

Once the radios have been configured and completed the "acquisition procedure", the radios in the network operate completely independently of any other radios in the local area. Eight different hopping tables are available for each network, and this provides an additional method to minimize collisions between networks.

3) The technical description indicates an output power of 12 dBm 2 dB for at total of 14 dB. You measusred only 10.67 dBm. Please explain. Correct/supply any data or exhibits. The RF safety calculations must use the appropriate output power.

The unit should be listed as 10.67dBm maximum power as measured. The new "Description of Transmission" document ("Artema FHSS Description.pdf") has been updated to reflect this.

4) Indicate the antenna and antenna gain, and antenna location to justify the 1.5 cm distance RF separation distance.
The antenna is a unipole, quarter wave type and the gain is lower than 0dBi. A drawing of the antenna, Model 4432-601A501, has been uploaded as "Artema FHSS Antenna.pdf". Also, the distance from the antenna to the outside of the case is approximately 0.5cm. Since this distance does not provide the necessary calculated distance, Power spectral density measurements were performed around the unit near the antenna and in all directions and the highest recorded levels for each 3 channels tested were:

Channel	*Measured Level*	*Limit*
Channel 0, 903.8MHz:	*0.169mW/cm^2*	*0.61mW/cm^2*
Channel 24, 907.4MHz:	*0.155mW/cm^2*	*0.61mW/cm^2*
Channel 49, 911.15MHz:	*0.141mW/cm^2*	*0.61mW/cm^2*

5) The pseudorandom sequence provided was for test purposes only. Provide samples of the actual sequence and indicate how they are derived.

The pseudorandom sequences are described on page 6 of the new "Description of Transmission" (see Channel Table). What is called "Table 0" is actually a feature used only for test purposes. The operational tables (Table 1, 2 & 3) are pseudorandom.

The 8 pseudorandom hopping tables are burned into the EEPROM memory, and do not change. All 8 tables have the following characteristics: they use each channel only once per 50 hops, and they move randomly both in direction and in number of channels hopped. They were derived with the following procedure:
The three tables were created with an algorithm based on the RANDOM() function, with rejection of frequencies already used.

6) Each frequency must be used equally on the average by each transmitter.
Except for voice systems, each new transmission must start at a different point in the sequence so that on average the full sequence is used. Therefore, Describe where the next transmission starts when all frequencies are not used for a previous message. This is required because some transmissions may need only a few frequency hops to be completed. i.e. If the transmission started on the same frequency each time, this frequency would be used more than the others if many short transmissions were sent.

The next transmission starts with the next channel in the hopping table sequence. For example, if a short transmission starts with the first channel in the hopping table and needs only 8 hops to complete the transmission, the next transmission will start with the ninth channel in the hopping table sequence.

7) Section 15.247(a)1 indicates that the system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals. Please explain how the device complies with this rule when a packet is repeated or when multiple packets are sent. What is the receiver input bandwidth? How does the receiver shift frequencies and determine which frequency to shift to in order to synchronize with this transmitter?

The receiver uses a VCO to rapidly shift frequencies in synchronization with the transmitted signals, based on the hopping table that was chosen during the acquisition procedure.

When a packet is repeated, it is transmitted on the next hopping channel, which is a different frequency.

The receiver input bandwidth is limited by the filters on the receiver, which have a passband of +/- 50kHz at 3 dB.
The adjacent channel rejection is 20dB

The receiver shifts frequencies with the following procedure:
After changing to a new hopping frequency, the microcontroller sends a command to the VCO to shift frequencies. It waits until the VCO has stabilized, then activates the receiver chip, and starts to process the data from the received signals.