TransCell 1900TM
47CFR2.10XX Compliance

Document No. X24

March 9, 2001

Revision –

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LIST OF ILLUSTRATIONS

In addition to exhibits already submitted, the following details are furnished in response to the notice generated by Elite regarding outstanding issues with the current application for FCC certification of the TransCell 1900TM system.

1.0 47CFR2.1033

This section had been written up as of February 16th as a separate document, 47cfr2_1033.pdf. Please refer to 47cfr2_1033.pdf for sections not appearing here. Also, these sections supercede the equivalent sections in 47cfr2_1033.pdf.

1.1 2.1033C(4)

The TransCell 1900TM system is an intentional radiator which employs two transmitter types. One type is designed for PCS frequency transmission of TIA/EIA-136 "TDMA" modulated signals under 47CFR Part 24. The other transmission type is designed for point-to-point data-link communications utilizing spread spectrum techniques in the ISM band under 47CFR Part 15.247. However, the requirement for this second transmitter *description* falls under 47CFR2.1033B, not paragraph c(4).

1.2 2.1033C(12)

In addition to photos furnished by Transcept in exhibits C and D, and in 47cfr2_1033.pdf, the following figures are offered.

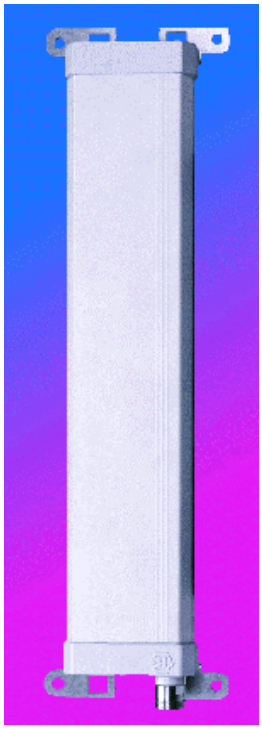

Figure 1-1. Typical PCS Flat Panel Antenna.

Figure 1-2. Typical ISM Dish Antenna.

1.3 2.1033C(13)

The only digital modulation present in the TransCell 1900TM system is the data-link bit stream covered in 47cfr15.247. It utilizes 11 megabits per second CCK. A digitized (base-band) version of the original IF TDMA signal is digitally filtered and taken as input to be modulated as spread spectrum at 5.8 GHz. Three bits per packet are set aside for internal system communications. The resulting RF is shaped by a diplexer before transmission. A sample plot of this output is included in **/15_247/attach4.tif** of the CD-ROM furnished to NTS by Transcept. It has been reprinted in this section as Figure 1-3. At the data-link receiver, the 5.8 GHz signal is demodulated back to base-band and the internal system communications bits are stripped from the data stream in preparation for conversion to a TDMA analog IF. The original TDMA signal modulation and synthesis is done in the mobile handset and at the base station, outside of our system.

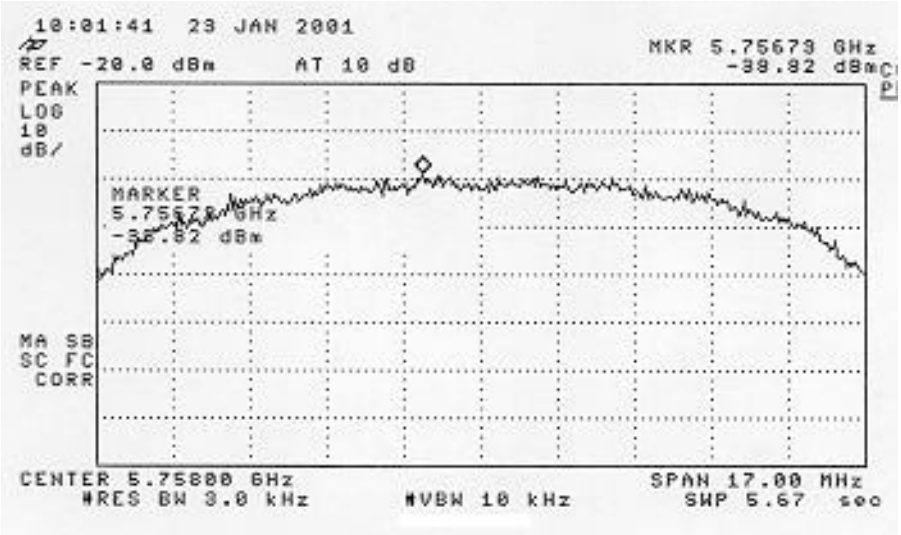

Figure 1-3. 5.8 GHz Spread Spectrum.

2.0 47CFR2.1046

2.1 2.1046A, C

The RF output measurements were made in conjunction with 47CFR part 24 testing. Therefore, please reference Exhibit E as furnished by Transcept for the following figures. Figure 4 shows the test setup. As shown in Figure 5 of the referenced document, the load is an Inmet 2N75W-30-296, which is an N-type (50 ohm) 30 dB attenuator (at 2 GHz). In fact, the total path loss from antenna port of the EUT to the spectrum analyzer is shown to be 38 dB, at 2 GHz, in Figure 21. Figure 14 shows a typical PCS "E-band" output as set up using the tuning procedure outlined in Exhibit D. The spectrum analyzer was configured to record peak output power (MAX HOLD) in a 30 kHz bandwidth. As this bandwidth corresponds to the TDMA channel bandwidth, there is no conversion factor to be made regarding absolute power in the face of aggregate noise power. (This is proven by reviewing the spectrum analyzer power sensing algorithm shown in Figure 2-1 of this section.)

Therefore, the actual power per channel is shown by the simple equation $\mathbf{P = P_{sa} + L}$, where $\mathbf{P_{sa}}$ is the power reading on the analyzer at center frequency of the test channel and **L** is the path loss between the antenna port and the spectrum analyzer. In this case:

P = 2dBm + 38dB = 40 dBm per channel.

Notice, however, that in Figure 4 of the referenced document there is a combiner employed. This is because the six transmit carriers are actually split between the primary and diversity port of each active sector. The primary port transmits two carriers, and the diversity port transmits four carriers. Therefore, the maximum total at an antenna port during normal operation is **4 x 10W = 40W.**

$$P = 10 \times \log\left[B_s \times \frac{(1/n) \times \sum_{i=1}^{n} \left(10^{\frac{P(i)}{10}}\right)}{NBW} \right]$$

where:

P = total power in the channel bandwidth

BS = channel bandwidth

NBW = equivalent noise bandwidth of the spectrum analyzer

n = number of sample points within the channel bandwidth

P(i) = power reading on spectrum analyzer at trace element *i*.

Figure 2-1. Spectrum Analyzer Power Measurement Algorithm.

3.0 47CFR2.1047D

The TransCell 1900TM is to be licensed as a PCS system, and therefore must comply with 47cfrPart24 frequency band restrictions. Figures 8 through 19 of FCC24_238.doc (exhibit E) show that this system meets FCC band edge requirements for PCS transmitters.

4.0 47CFR2.1049

4.1 2.1049C

The occupied bandwidth is shown in Figure 3 of Exhibit E to be 34.6 kHz.

4.2 2.1049C(4)

The nominal TDMA input signal used is shown in Figure 4-1 below. This modulated TDMA signal was generated using the Agilent E4433 specified in FCC24_238.doc. As the TransCell 1900TM system does not originate modulated TDMA signals, the subsequent output TDMA quality is limited by the quality of the original TDMA input signal supplied by a BTS. All output intermodulation products are shown to be below 53 dBc in Figure 20 of FCC24_238.doc as furnished by Transcept.

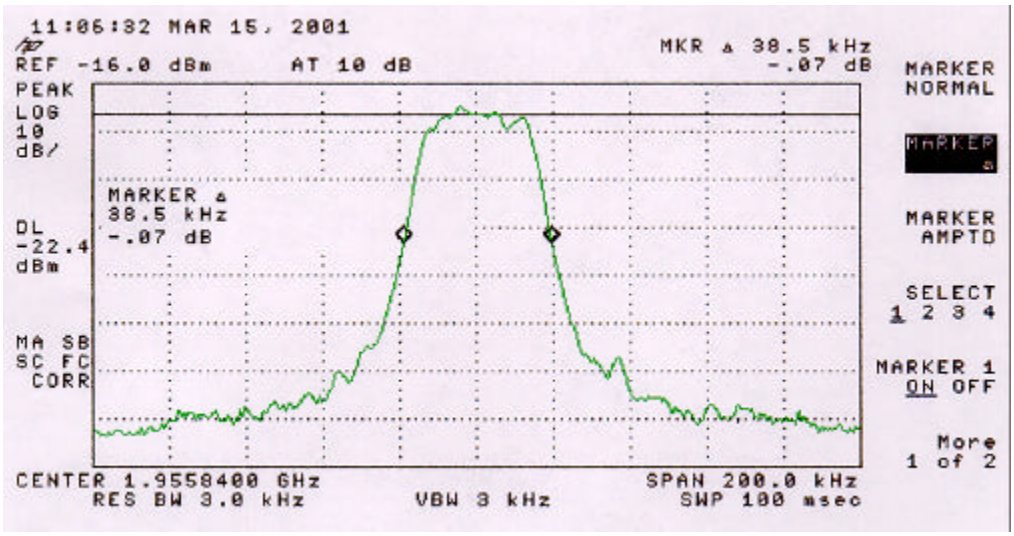

Figure 4-1. TDMA Input Signal.

5.0 47CFR2.1051

This spurious data test is documented in Exhibit E. See Figure 20 for a series of spectrum analyzer plots.

6.0 47CFR2.1053

This emissions testing was performed at NTS, and should be included in the NTS test report. The TransCell 1900TM passes the more stringent 15.207 and 15.209 intentional radiator limits.

7.0 47CFR2.1055

This frequency stability testing was performed at NTS and the corresponding data is captured in 47CFR2.1055.PDF, furnished by Transcept.

8.0 47CFR2.1057

This spurious data test is documented in Exhibit E. Testing was done out to 26 GHz, well past the tenth harmonic of the TransCell 1900TM PCS transmitter. See Figure 20 of the referenced document for a series of spectrum analyzer plots.