

3March 11, 2002

Federal Communications Commission
Equipment Authorization Division
7435 Oakland Mills Road
Columbia, MD 21046

**FCC ID:
TCB approval E5M-TRANSNET900**

Applicant: Microwave Data Systems, Incorporated
Correspondence Reference Number: 3632
731 Confirmation Number: TC194785
Date of Original Email: 03/04/2002

To whom it may concern:

In response to the clarifications requested on the E5M-TRANSNET900 in the e-mail dated 03/04/2002 please accept the following explanations:

FCC Issue 1:

The Test Report (Page 14 System Receiver Hopping Capability) states that there is receiver synchronization. Is the hopping done in lock step at the same frequencies in TDMA or do they hop in lock step at different frequencies?

MDS Response 1:

The master station sends out a synchronizing message at a precise instant on each channel, which allow the remotes to know where time Zero is, and when they should move to the next channel in the table. If additional details are required please refer to the MDS TransNet 900 "Theory of Operations and Block Diagram" dated 1/10/02 which was supplied with the original submission package. Specifically, Section 3 "Description of Device Operation" Paragraphs 4 and 5 describe the hopping and synchronization process in detail.

FCC Issue 2:

The Test Report states that the dwell channel for each channel is 1.029 ms. With a CPFSK 2-level modulation, 118.6 ms 20 dB BW, a maximum of 336 bytes of data sent, SYNCH messages, and preamble/header for synchronization and addressing on each hop it is not clear that the data is the average dwell time required by Part 15.247(a)(1)(i). Please clarify that the data represents the average dwell time.

MDS Response 2:

The tests are correct, however the plots detail only the transmission of synchronization messages which is the least amount of data transmitted in a given hop. Attached (Figures 1-6) you will find plots that detail the hop dwell time measured with maximum data throughput. You will notice that these plots clearly show that the maximum amount of data sent during a 28 ms hop occupies 26.00 ms and during a 7 ms hop the maximum amount of data sent occupies 5.2 ms. It is worth noting here that in the limiting case, the TransNet supports a minimum of 64 channels and thus, the theoretical maximum amount of time spent on a given channel during any 20 second period is 312.5 ms. This is much less then the required maximum of 400 ms. The actual amounts are shown in figures 7-9 for the 7 ms hop period and figures 10-12 for the 28 ms hop period.

Figures...

Figure 1 (Dwell Time @ 902.2 MHz: 7 ms Hop Dwell Setting)



MICROWAVE DATA SYSTEMS INC.
902-928 MHz OEM Radio Transceiver
Channel: *Low*, Tx. Frequency: *902.2* MHz
Modulation: FM modulation 2 Level
Frequency Hopping Spread Spectrum
Time of Occupancy (Dwell Time)

Date: March 8, 2002
Tested by: Hung Trinh

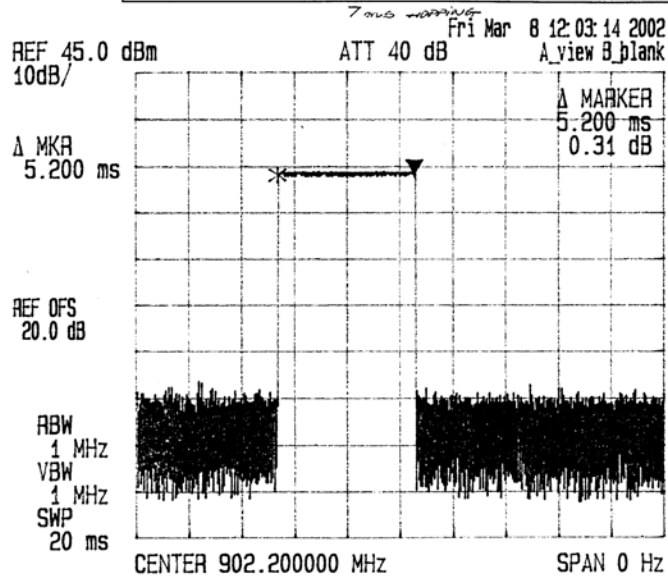


Figure 2 (Dwell Time @ 915.0 MHz: 7 ms Hop Dwell Setting)



MICROWAVE DATA SYSTEMS INC.
902-928 MHz OEM Radio Transceiver
Channel: *M/D*, Tx. Frequency: *915* MHz
Modulation: FM modulation 2 Level
Frequency Hopping Spread Spectrum
Time of Occupancy (Dwell Time)

Date: March 2 2002
Tested by: Hung Trinh

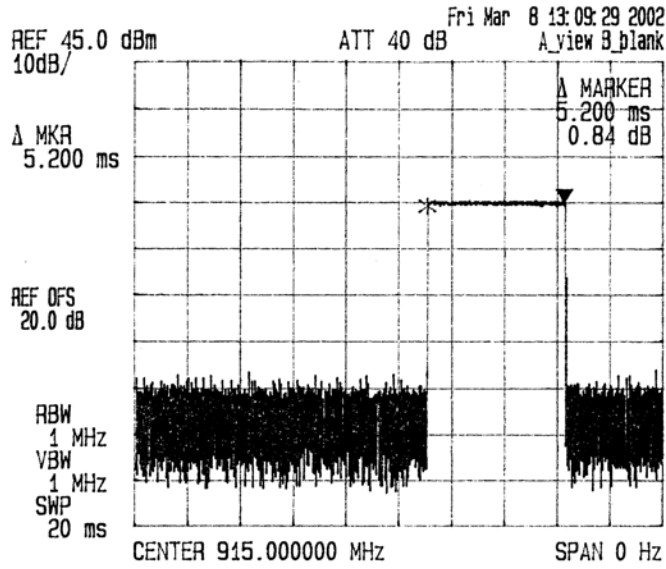


Figure 3 (Dwell Time @ 927.8 MHz: 7 ms Hop Dwell Setting)



MICROWAVE DATA SYSTEMS INC.
902-928 MHz OEM Radio Transceiver
Channel: ~~412.2~~ Tx. Frequency: 927.8 MHz
Modulation: FM modulation 2 Level
Frequency Hopping Spread Spectrum
Time of Occupancy (Dwell Time)

Date: March 9, 2002
Tested by: Hung Trinh

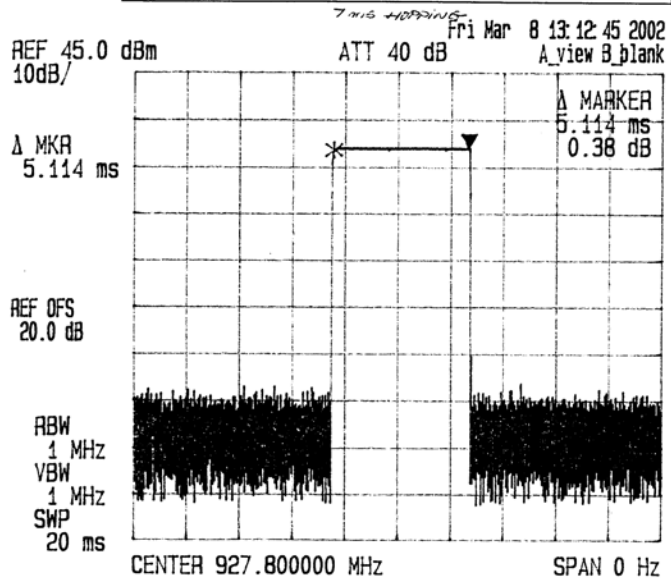


Figure 4 (Dwell Time @ 902.2 MHz: 28 ms Hop Dwell Setting)



MICROWAVE DATA SYSTEMS INC.
902-928 MHz OEM Radio Transceiver
Channel: 40V, Tx. Frequency: 902.2 MHz
Modulation: FM modulation 2 Level
Frequency Hopping Spread Spectrum
Time of Occupancy (Dwell Time)

Date: March 8, 2002
Tested by: Hung Trinh

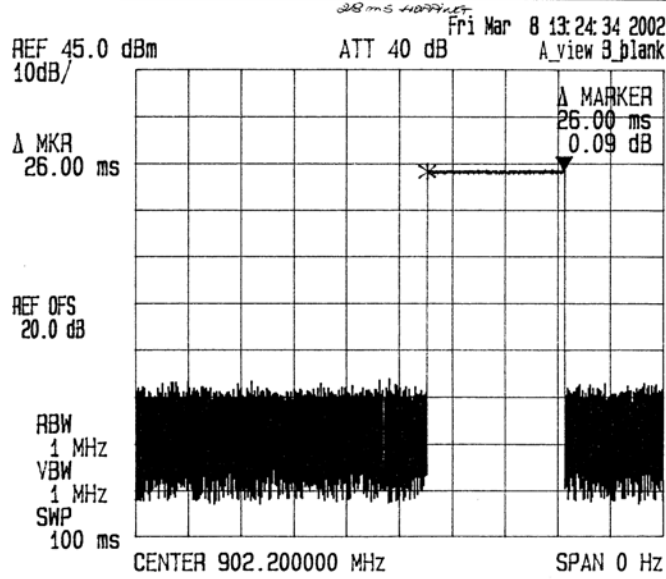


Figure 5 (Dwell Time @ 915.0 MHz: 28 ms Hop Dwell Setting)



MICROWAVE DATA SYSTEMS INC.
902-928 MHz OEM Radio Transceiver
Channel: 822, Tx. Frequency: 915.0 MHz
Modulation: FM modulation 2 Level
Frequency Hopping Spread Spectrum
Time of Occupancy (Dwell Time)

Date: March 8, 2002
Tested by: Hung Trinh

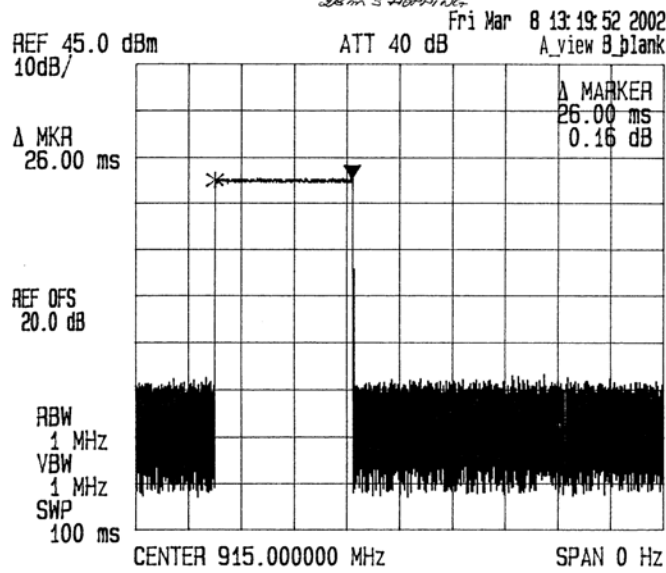


Figure 6 (Dwell Time @ 927.8 MHz: 28 ms Hop Dwell Setting)



MICROWAVE DATA SYSTEMS INC.
902-928 MHz OEM Radio Transceiver
Channel: ~~927.8~~ Tx. Frequency: ~~927.8~~ MHz
Modulation: FM modulation 2 Level
Frequency Hopping Spread Spectrum
Time of Occupancy (Dwell Time)

Date: March 8, 2002
Tested by: Hung Trinh

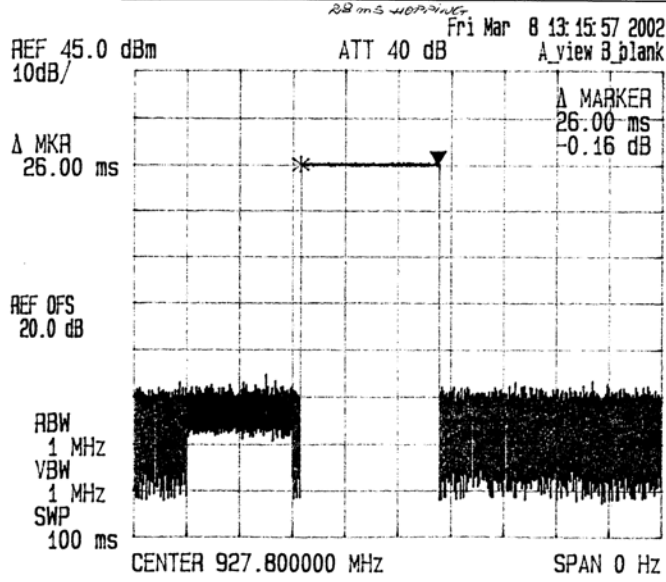


Figure 7 (Worst Case Channel Occupancy @ 902.2 MHz: 7 ms Hop Dwell Setting)

(20 second sweep: 45 hop dwells * 5.2 ms/dwell = 234 ms)

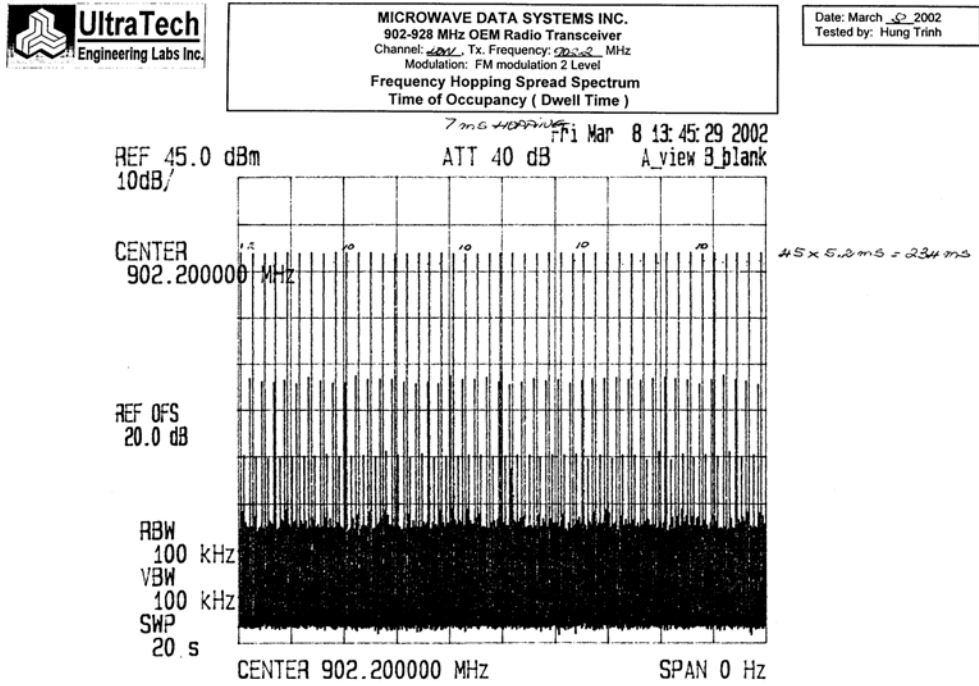


Figure 8 (Worst Case Channel Occupancy @ 915.0 MHz: 7 ms Hop Dwell Setting)

(20 second sweep: 45 hop dwells * 5.2 ms/dwell = 234 ms)



MICROWAVE DATA SYSTEMS INC.
902-928 MHz OEM Radio Transceiver
Channel: 442, Tx. Frequency: 915.0 MHz
Modulation: FM modulation 2 Level
Frequency Hopping Spread Spectrum
Time of Occupancy (Dwell Time)

Date: March 08 2002
Tested by: Hung Trinh

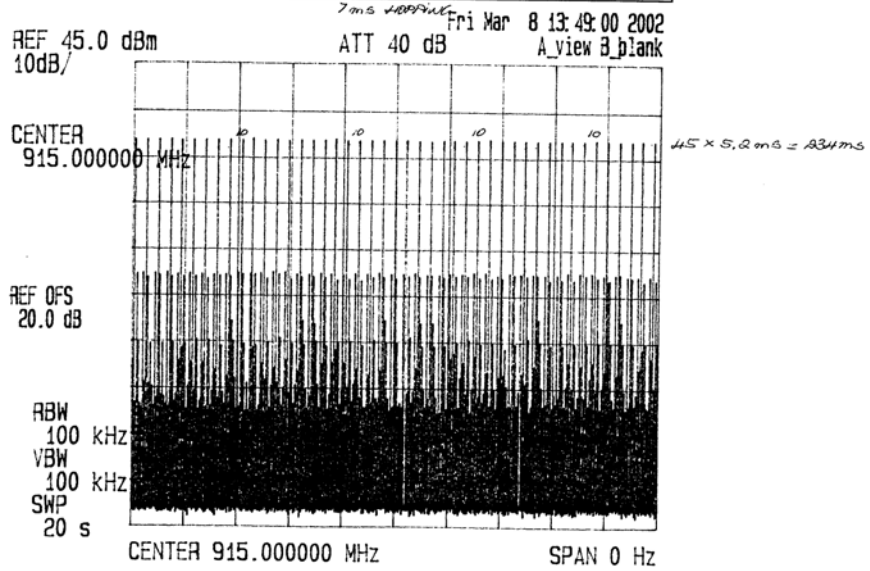


Figure 9 (Worst Case Channel Occupancy @ 927.6 MHz: 7 ms Hop Dwell Setting)

(20 second sweep: 45 hop dwells * 5.2 ms/dwell = 234 ms)



MICROWAVE DATA SYSTEMS INC.
902-928 MHz OEM Radio Transceiver
Channel: ~~902.928~~, Tx. Frequency: ~~927.52~~ MHz
Modulation: FM modulation 2 Level
Frequency Hopping Spread Spectrum
Time of Occupancy (Dwell Time)

Date: March 8, 2002
Tested by: Hung Trinh

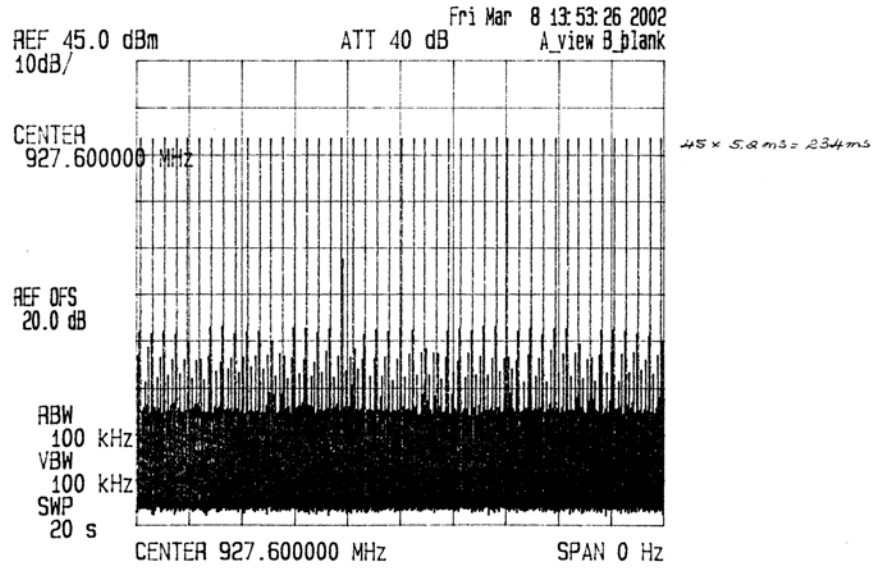


Figure 10 (Worst Case Channel Occupancy @ 902.2 MHz: 28 ms Hop Dwell Setting)

(20 second sweep: 11 hop dwells * 26 ms/dwell = 286 ms)

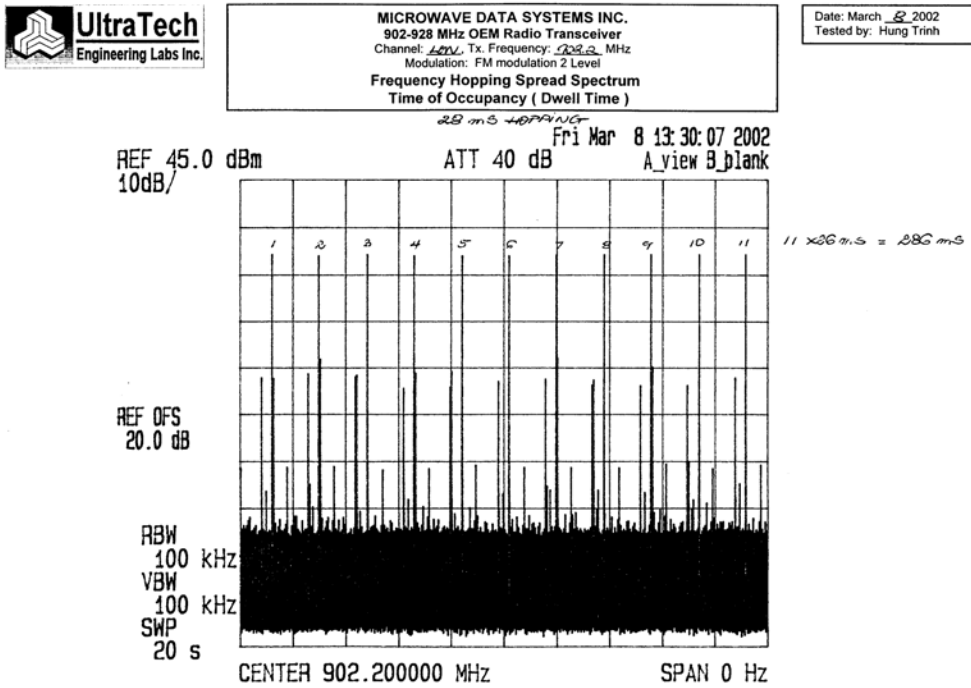


Figure 11 (Worst Case Channel Occupancy @ 915.0 MHz: 28 ms Hop Dwell Setting)

(20 second sweep: 11 hop dwells * 26 ms/dwell = 286 ms)

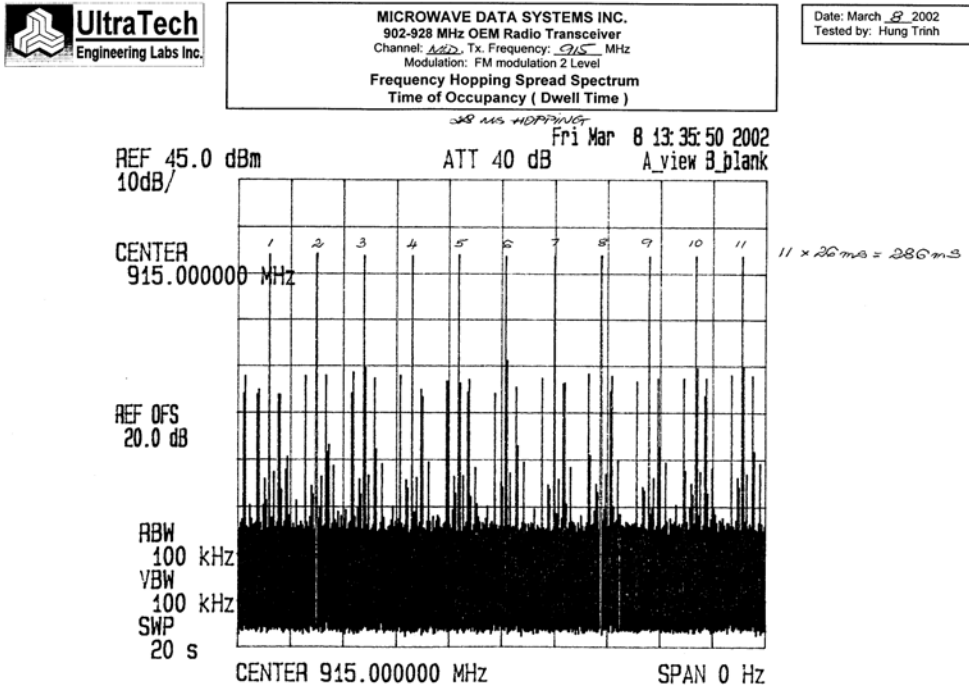


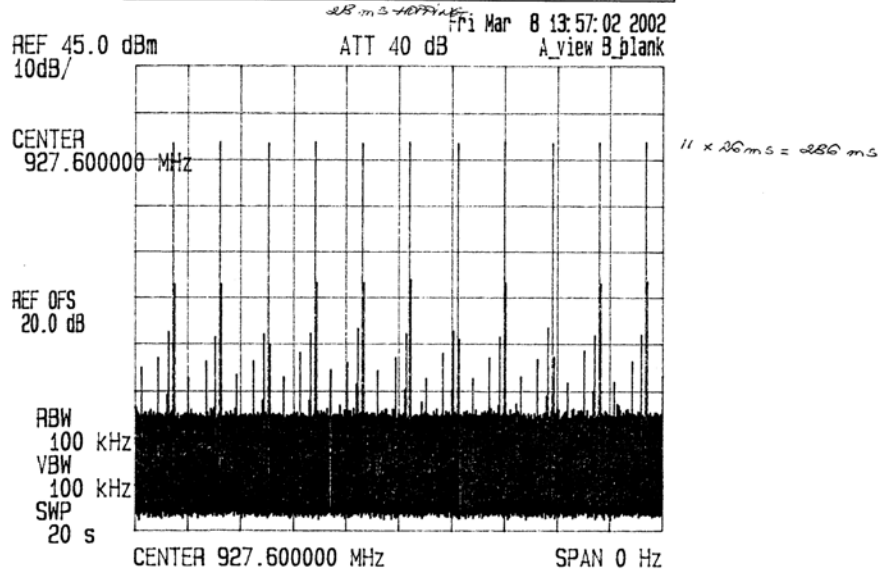
Figure 12 (Worst Case Channel Occupancy @ 927.6 MHz: 28 ms Hop Dwell Setting)

(20 second sweep: 11 hop dwells * 26 ms/dwell = 286 ms)



MICROWAVE DATA SYSTEMS INC.
902-928 MHz OEM Radio Transceiver
Channel: ~~400~~, Tx. Frequency: ~~927.6~~ MHz
Modulation: FM modulation 2 Level
Frequency Hopping Spread Spectrum
Time of Occupancy (Dwell Time)

Date: March 8, 2002
Tested by: Hung Trinh



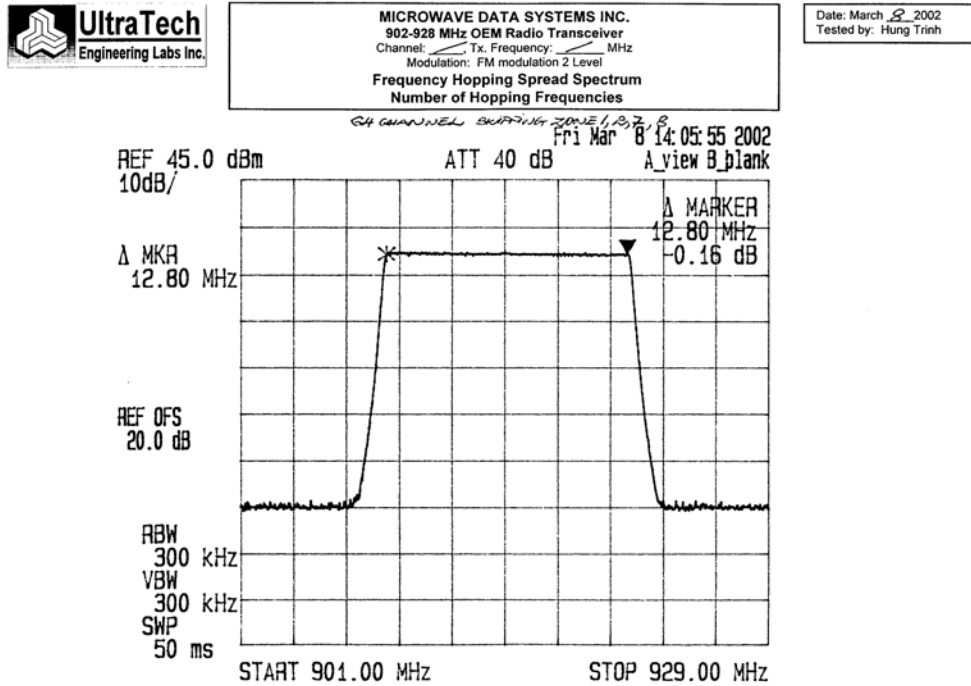
Fri Mar 8 13:57:02 2002
A_view B_blank

FCC Issue 3:

The User's Manual says that the number of hopping channels is selectable from 64 to 128 in increments of 16. Upload data/plots showing the minimum number of hopping channels.

MDS Response 3:

Figure 13 (Number of Hopping Channels (Minimum): Zones 1,2,7,8 Skipped)



FCC Issue 4:

The band frequencies are listed in the Grant. The Grant should have the lowest and highest fundamental frequency that the device transmits. Correct the Grant.

MDS Response 4:

The minimum frequency is 902.2 MHz and the maximum frequency is 927.6 MHz.

FCC Issue 5:

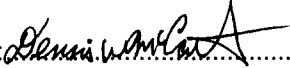
The Grant condition states that this is a "Limited Modular Approval" for use in the manufacturer products only. Please remove from the Grant conditions any reference to "module" or "limited modular approach". Typically, the only mention of modules is "Modular Approval" when all conditions of A00-1407 have been met.

MDS Response 5:

The observation noted in FCC request 5 has been fully addressed by redrafting the grant notes as below. We further believe that this draft not only addresses the concerns expressed under Issue 5 but also is in accordance with FCC Public Notice DA 00-1407 of June 26th 2000 and previous grants by the bureau.

Antennas used for this transmitter must be professionally installed on fixed mounted permanent outdoor structures. Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance. This transmitter can only be used in enclosures designed by Microwave Data Systems, Inc. such that compliance of the end product is assured.

Kind Regards,

Signed:  Name: Dennis McCarthy

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