SpectraPoint WIRELESS

February 29, 2000

Federal Communications Commission
Applications Processing Branch
Columbia MD

Atten: Mr. Andy Leimer

Re: Correspondence Reference Number 12245, 18 February 2000
FCC ID NNSTX2000-HG-99
731 Confirmation Number EA95814

This letter is in response to your Request for Information Number 12245, dated February 18, 2000.

1) It was unclear how the conducted power of 1 watt, as listed in the application, was derived. Is it a measured value? Please explain how you arrived at this figure and how the limit of 30 dBW/MHz was derived. A sample calculation will help clarify the issue.

The conducted power level of 1 watt is a measured value at the "coupled" output of a directional coupler (see Figure A-7, page 13 of the test report and attached sketch, page 4 of this letter). The loss at the coupled port for this directional coupler is nominally 10 dB; the IF input to the transmitter was adjusted for an output indication on the power meter of +20 dBm, i.e., +30 dBm at the transmitter output.

The Power Spectral Density was measured with an HP 8564E spectrum analyzer using the "noise marker" function. Table A-1 indicates the correction factors applied to the measured data (Figures A-1 through A-6) to arrive at the EIRP power density; these include directional coupler "through" port loss, WR28-to-"K" connector loss, cable loss and dBm/Hz→dBW/MHz correction.

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For example, for the test frequency of 27.520 GHz, the Power Spectral Density as measured on the HP8564E spectrum analyzer is –59.17 dBm/Hz. Conversion from dBm/Hz to dBW/MHz is 30 dB (60 dB for Hz→ MHz and -30 dB for dBm → dBW). The loss of the directional coupler, 10 dB pad and cable connecting the transmitter to the spectrum analyzer was 13.8 dB resulting in a power level at the antenna input of -15.37 dBW/MHz. (Note that the occupied bandwidth is 32.5 MHz and the calculated power for this unit is -15.37 dBW/MHz + 10 Log_{10} (32.5) = -0.25 dBW = +29.75 dBm, fairly close agreement with the measured power level of +30 dBm).

With an antenna gain of 22 dBi, the EIRP of the transmitter is 6.6 dBW/MHz.

We did not derive the limit of 30 dBW/MHz – that is the maximum allowable EIRP specified in the table of Part 101 paragraph 101.113 (a) for LMDS transmitters operating in the 27500 to 28350 MHz band.

2) The frequency range in the application is 27.5 GHz to 27.86 GHz. 27.5 GHz is the band edge and cannot be listed in the Grant. I need the center frequency of the carrier for the lowest and highest frequency of the EUT. You have a similar application for a subscriber unit that lists 27.8 GHz to 28.35 GHz. Please verify the frequency range for this unit.

We apologize if any information in the application was misleading. This transmitter operates in the low end of the LMDS authorized spectrum (i.e., 27.500 to 27.860 GHz) whereas our other transmitter (a subscriber transceiver, CPE Roof Unit, FCC ID NNSRTU2000-99, EA95653), operates in the high end of the band (27.890 to 28.350 GHz).

For this transmitter, the center frequency of the carrier at the lowest tuned QPSK signal will be 27.520 GHz. The center frequency of the carrier at the highest tuned QPSK signal will be 27.840 GHz. The QPSK signals are just under 40 MHz wide each. One transmitter may have one, two or three adjacent 40 MHz wide QPSK signals. Figures A-1 through A-3 of the test report show a single QPSK signal at low, mid and high tuned frequencies, Figure A-4 shows two adjacent QPSK signals at the low end of the band, and Figure A-5 shows three adjacent QPSK signals also at the low end of the band.

Additionally, this transmitter will be used for CW transmission of a Pilot Tone at 27.510 GHz (refer to page 46 of the test report, Exhibit 6).

Figure C-1b of the test report shows the lowest tuned single-carrier QPSK signal at 27.520 GHz with the emission mask at band edge. Figure C-1a shows the same signal but with a scan that covers the - to + 250% portion of the band where the emission limit is 56 dB below the carrier mean power output level. Similar scans are included in Appendix C for the multiple-carrier operation.

The wide span (5 GHz) scans were done with a Resolution Bandwidth of 1 MHz. The narrower span scans showing compliance at the band edge were done with an RBW of 300 kHz to better define the edges of the QPSK signal. The mask was adjusted accordingly (5.23 dB) to compensate for the resolution bandwidth difference between the measurement and the spec.

3) The occupied BW measurements were made with a Resolution BW of 300 KHz. The Resolution BW should be 1 MHz. I tried to adjust for this difference by adding 6 dB to the spectrum plot. I was unable to confirm compliance with the emissions mask using this method. Please provide new spectrum plots with the Occupied BW set to 1 MHz.

Comparative Occupied Bandwidth measurements at 1 MHz RBW are attached per your request on pages 5 of this letter. These were produced by Motorola, Scottsdale AZ, the lab that performed the original certification tests on this transmitter and prepared the test report submitted as Exhibit 6 to this application.

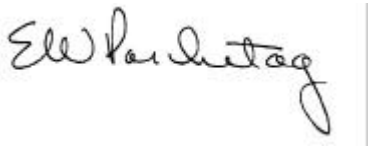
We were not aware that a 1 MHz Resolution Bandwidth was required for measurement of Occupied Bandwidth. The RBW of 300 kHz was used to better define the edge of the QPSK modulation for both Occupied Bandwidth and Emission Limitation measurements.

As you can see in the attached data on page 5, there is no significant difference between Occupied Bandwidth measured at RBWs of 300 kHz and 1 MHz RBW. You will note also, by comparing these scans with those in the test report, that a 1 MHz RBW does "broaden" the QPSK spectrum slightly, which we believe to be a "penalty" for Emission Limitation measurements.

The emission limit at the band edge is 40.3 dB below the mean output power level of the transmitter. The transmitter mean power output level is +30 dBm. The Resolution Bandwidth Correction factor is 10 Log_{10} (.3 MHz/1 MHz), i.e., 5.23 dB. Therefore, the emission limit at band edge is –15.53 dBm (-45.53 dBc). The Reference Level (+10.1 dBm) on Figures C-1b, C-4b and C-5b was selected during the test to compensate for all inline attenuation between the transmitter output port and the spectrum analyzer so that the emission limit mask at band edge was equivalent to 40.3 dB below the Reference Level in a 1 MHz band. These scans were repeated using a 1 MHz RBW and are shown on page 6 of this report.

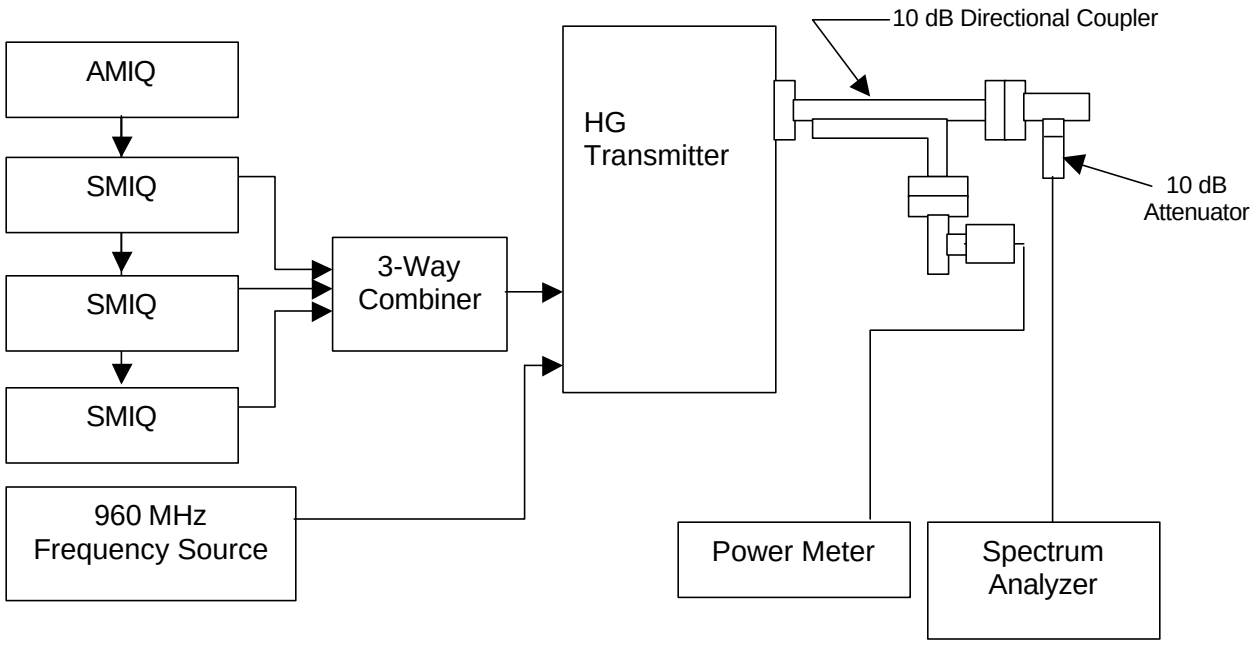
We hope that we have satisfactorily answered your questions and provided the data that you require to complete your review of our application. Please advise if you require further data or explanation regarding the testing or test results.

Sincerely,

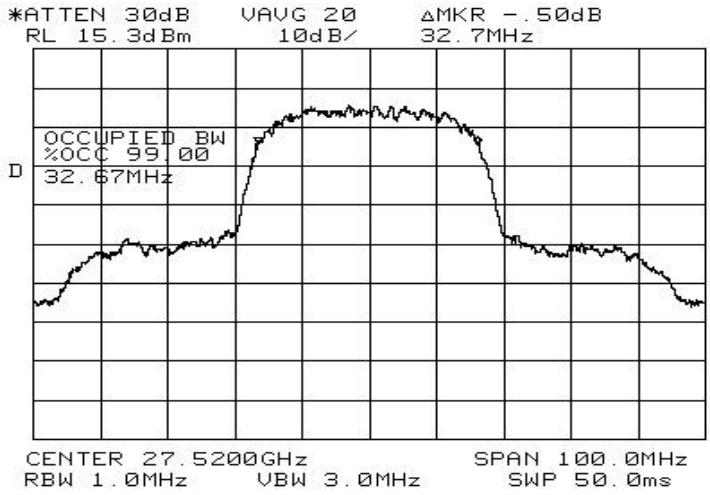


E. W. Paschetag

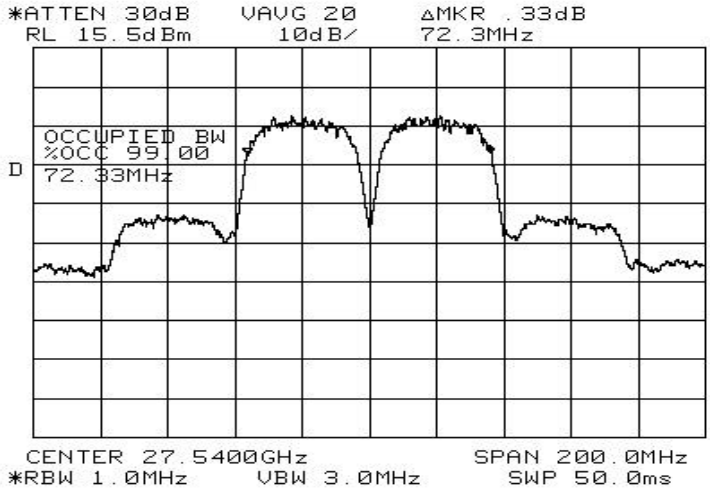
EMI/EMC Engineering
Spectrapoint Wireless LLC



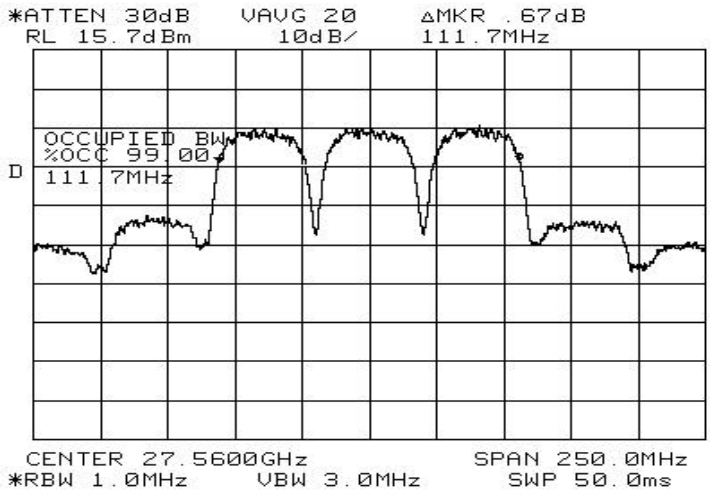
Test Setup for Antenna Conducted Testing on the SpectraPoint High Gain Transmitter
(RF Power Measurement, Occupied Bandwidth & Emission Limitations)



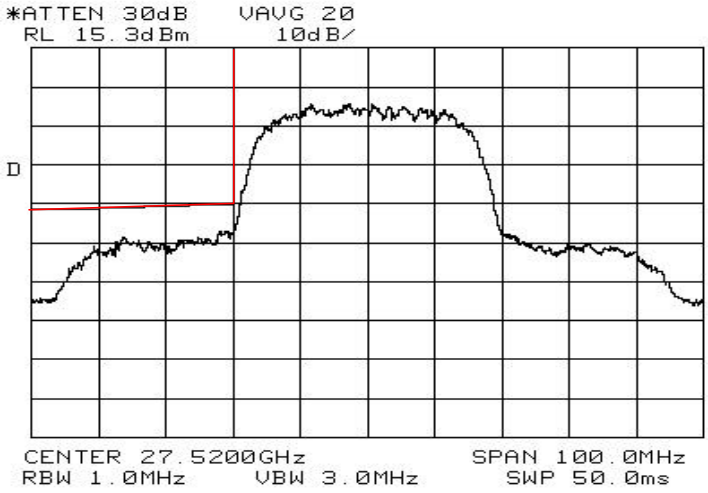
Occupied Bandwidth Measurement
Single-Carrier QPSK Modulation
Tuned Frequency = 27.520 GHz



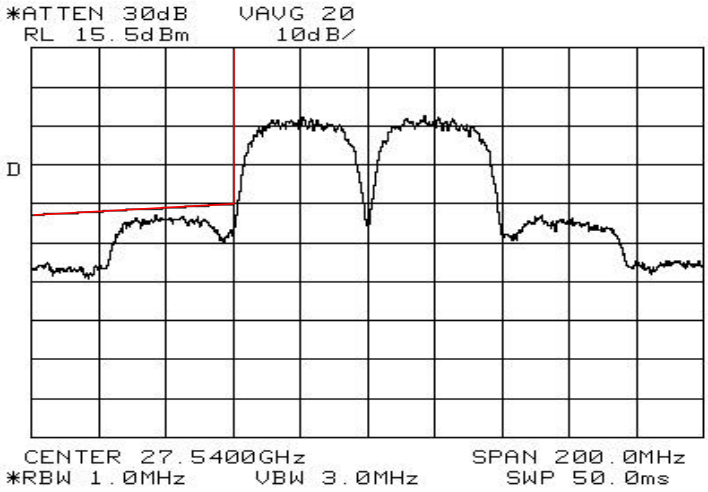
Occupied Bandwidth Measurement
Two-Carrier QPSK Modulation
Tuned Frequencies = 27.520 GHz
and 27.560 GHz



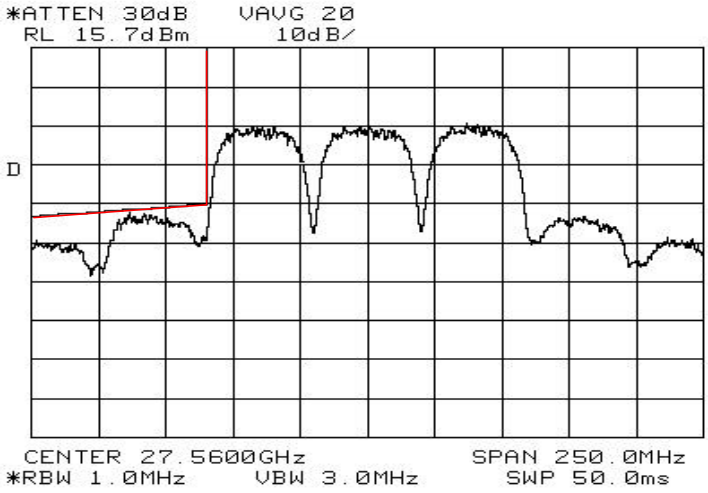
Occupied Bandwidth Measurement
Three-Carrier QPSK Modulation
Tuned Frequencies = 27.520 GHz,
27.560 GHz
and 27.600 GHz



Emission Limit Measurement
Single-Carrier QPSK Modulation
Tuned Frequency = 27.520 GHz



Emission Limit Measurement
Double-Carrier QPSK Modulation
Tuned Frequencies = 27.520 GHz
and 27.560 GHz



Emission Limit Measurement
Triple-Carrier QPSK Modulation
Tuned Frequencies = 27.520 GHz
27.560 GHz
and 27.600 GHz