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March 21, 2005

Mr. William Graff  
American Telecommunications Certification Body Inc.  
6731 Whittier Ave  
McLean, VA 22101

RE: Comments of March 21, 2005  
APPLICATION: NB5-MB-49-HP YDI Wireless

Dear Mr. Graff:

Below are the comments that you have provided regarding the application for certification referenced above. Our responses to those comments are in ***bold italic***. Many responses refer you to additional exhibit(s) which has been uploaded to the application folder at the ATCB website.

Thank you for your attention. Please feel free to contact us for any additional information that you may require.

New exhibits uploaded:

- 1) MPE Report
- 2) Test Report

Regards,

*Mike Violette*  
President

WLL Project: 8441

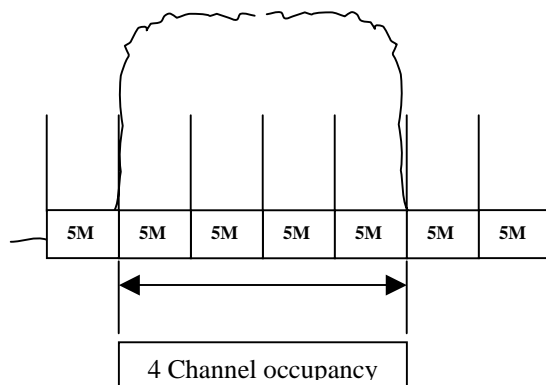
I have a few comments on this Application. Depending on your responses, kindly understand there may be additional comments. There are multiple discrepancies between DA 04-3165, FCC 04-265 and the most current rules available online from the GPO. You may find the published versions of Part 90 Subpart Y to which I refer at: <http://www.gpoaccess.gov/ecfr/index.html>

Thank you for the documents you provided. In essence FCC 04-265 calls out for changes to the RF power and emission masks [Appendix B], while DA 04-3165 calls out for changes in licensing. This leaves still much room for discussion on a number of issues.

1.) The channel plan of 90.1213 does not appear to be affected. You state in your response that a single channel 20MHz wide at 4965 is utilized. My reading of 90.213 still seems to expect that the center frequency of each emission must fall directly upon the center channel frequencies called out in this table. Please review.

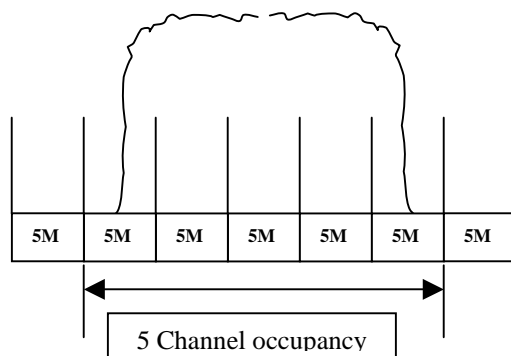
***R. We don't agree. The Rules allow for the aggregation of four 5MHz channels to create a 20MHz wide data channel. We submit that the aggregation of Channels 8 through 11 create the 20 MHz wide "channel" that is allowed under the rules. 4965 MHz simply is the center of the four channels.***

***Hence, our implementation would map out as follows:***



***To look at it another way, if we set the center of a 20MHz wide channel at the center of one of the 5MHz data channels, the resulting 20 MHz spectrum would fully occupy three 5MHz channels and portions of two other 5MHz channels.***

***If the center of the emission had to fall in the center of one of the channels, five of the channels would be affected as follows:***



2.) I accept your test method for using the spectrum analyzer RMS detection function of this complex OFDM signal. However, I still have some concerns. Using the instrument manufacturer's explanation, the RMS value is computed for each "bucket" within the trace and then algebraically summed together. Looking at your plot, we do not have a smooth, symmetrical emission; we have a "lumpy" emission characteristic of multi carrier OFDM signals. I would like to know if the measured RMS values are affected by both sweep time and RBW settings. Moreover, using the standard 1% rule, a RBW less than 16.5MHz/100 usually should not be used unless additional explanation is provided. My preference is to know if this RMS measurement would be effected by an RBW of 300KHz or more and a sweep time greater than 50 seconds. Best accuracy is also obtained when the emission is near the top of the reference level due to errors in the log amp. Kindly help me understand the RMS detection function of this instrument. In addition, please confirm that the measurement was made over a "continuous interval" without any periods of "Tx off". Kindly refer to 90.1215(b).

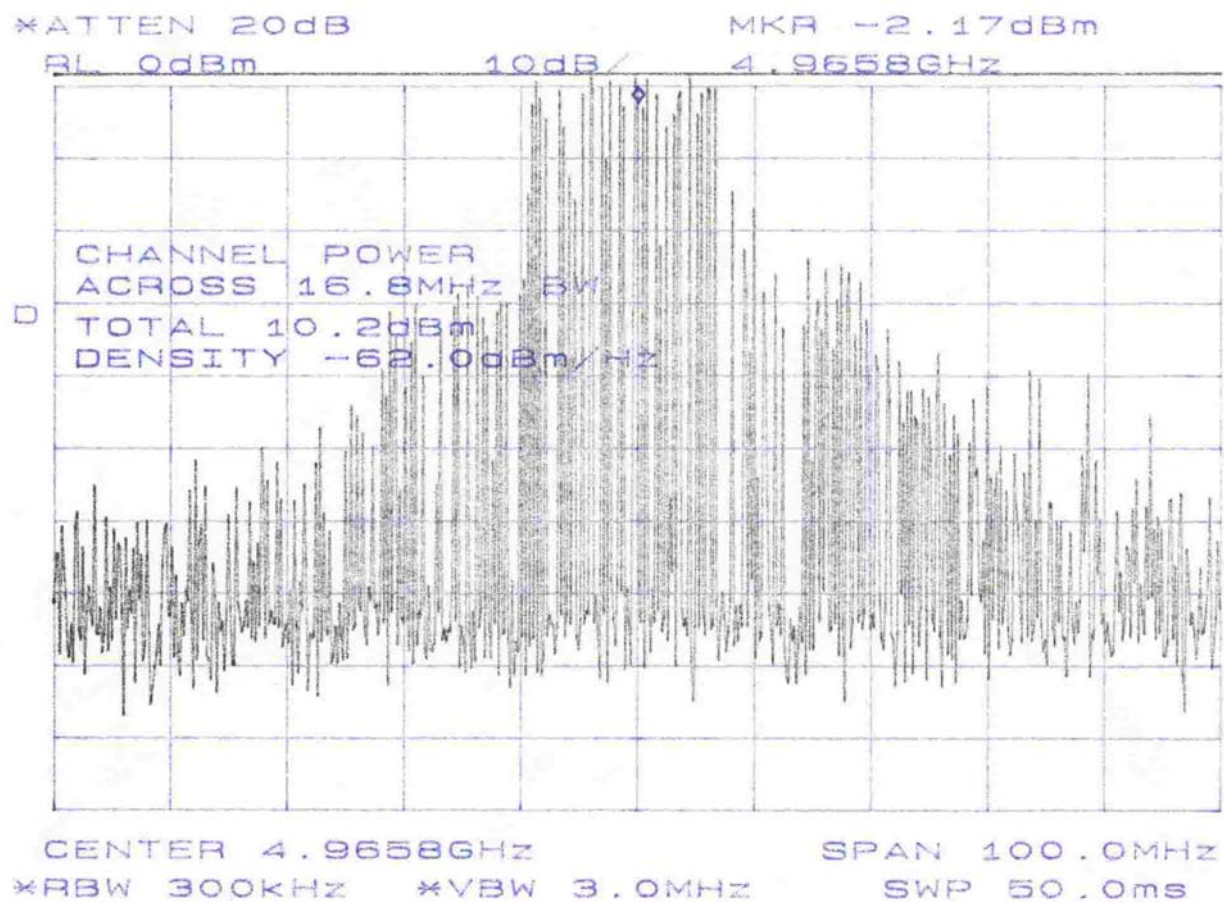
***R. Additional plots have been taken. The "lumpy" emission is characteristic of the SAMPLE mode that the analyzer needs to be in to take the correct rms measurement (as directed in the User's Manual for the instrument). MAX HOLDing the signal places it back into Peak mode.***

***Three plots are provided; the reference level has been adjusted to bring the emission to the top of the screen. In summary, the sweep time affects the channel power a great deal; thus, the channel power is reported with the fastest sweep time. The channel power is nominally the same between this re-measured data and the previously-reported values (10.8dBm vs 10.2dBm).***

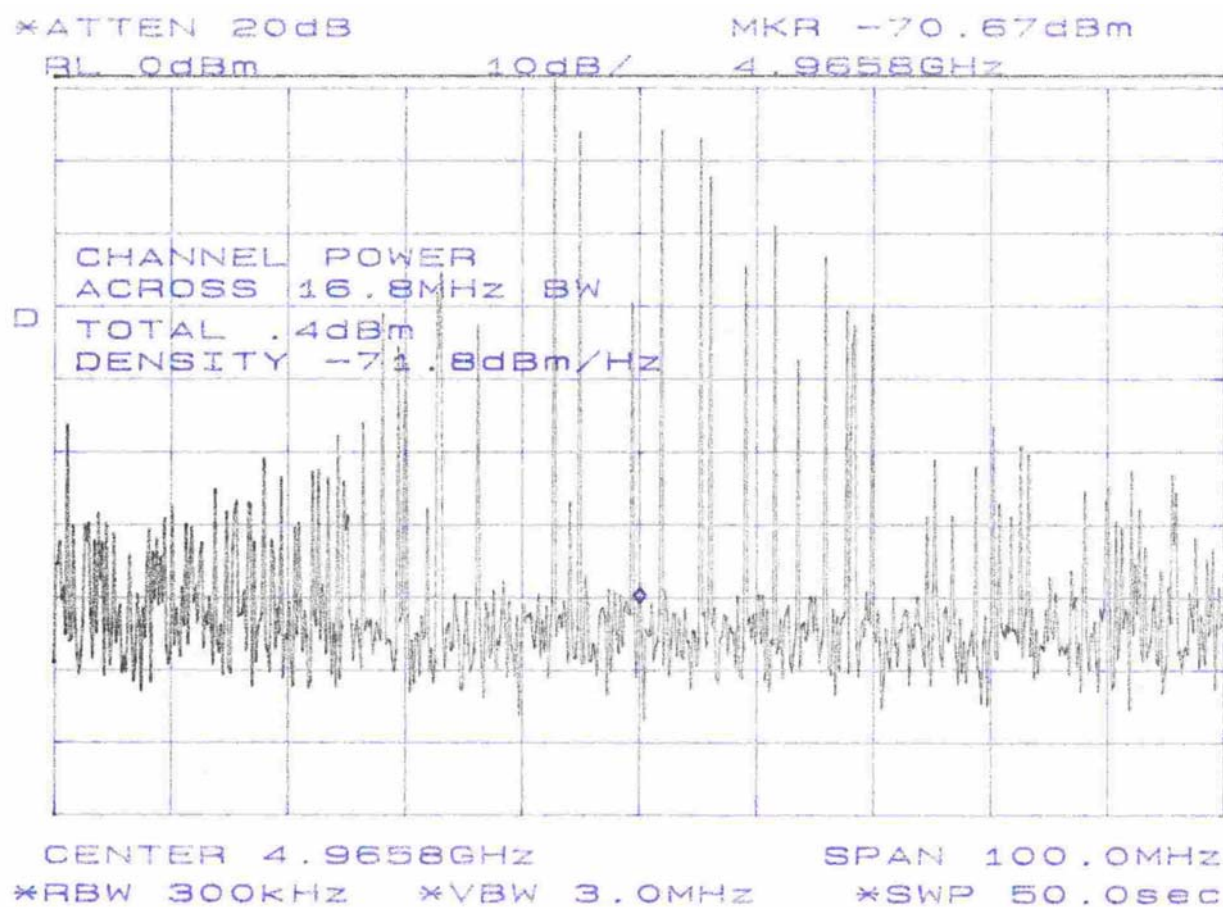
***Plot 1: Channel power with RBW=300kHz and VBW=3MHz; sweep time 50 ms***

***Plot 2: Channel power with RBW=300kHz and VBW=3MHz; sweep time 50 seconds***

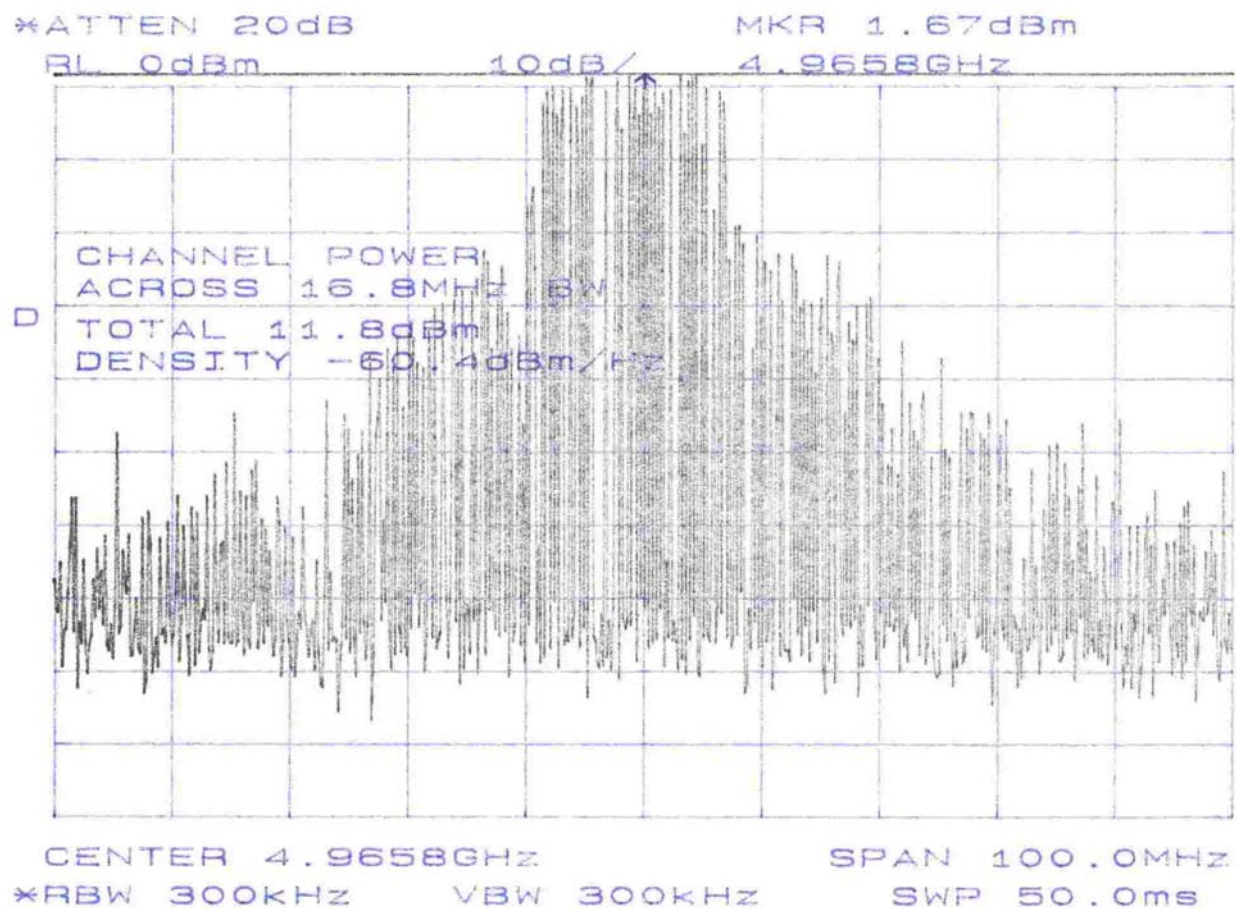
***Plot 3: Channel power with RBW=300kHz and VBW=300kHz; sweep time 50 ms***



**PLOT #1: Channel power with RBW=300kHz and VBW=3MHz; sweep time 50 ms**



Plot 2: Channel power with RBW=300kHz and VBW=3MHz; sweep time 50 seconds



**Plot 3: Channel power with RBW=300kHz and VBW=300kHz; sweep time 50 ms**

3.) I accept your comments on the RF Tune Up procedure. However, my goal was to find the “set points” or target RF output values for this device. These target values can be provided to the Commission as part of a Confidential document, if so desired. In addition I have some confusion over the frequencies available for this device. The tune-up indicates a frequency “list” is available in software, but elsewhere you indicate this is a single-channel device which only transmits on 4965MHz. Please review.

***R. We use a custom tool to set frequencies and RF power values to those that are certified. The same tool is used throughout the entire Marquee product family. Each unit, after full build, is tested and calibrated to this in production.***

***Additionally, the settings are logged for future records and as a protection, our customers cannot modify these settings***

***The units tested by WLL for FCC certification went through the same procedure. We have programmed that tool, for the 4.9 GHz final-assemblies, to set a "single frequency" of 4965 MHz with output power of ~23 dBm peak (+/- tolerance).***

***So, yes, we have a tool, and yes, it sets a single frequency for these systems <-- these are NOT in conflict.***

4.) Your response to item 12 appears to indicate that antennas with an expected gain of up to 26dBi are possible with this device. However, the RF Exposure evaluation only shows antennas at 10dBi. Please review. RF exposure evaluation also shows a channel of 4955MHz – different from what is claimed elsewhere in this filing.

***R. We have recalculated the RF exposure information; the report was not updated when the new data were taken. A new report is submitted with the values calculated with the highest gain antenna.***

5.) It is unlikely that the full 36-60VDC supply is providing power to the final amplifying circuitry. For voltage and current through the finals, use the regulated voltage that actually appears on the output stage. The reason for this rule is to compare the total power consumed with the total RF power output as a “reality check” for the examiner.

***R. The regulated voltage is 5V into the final stage (U4) of the power amp. The current draw is approximately 250mA into that part.***



6.) Kindly provide a calculation of how you determined the limits of Table 6.

**R. We recalculated the limit and updated the radiated emissions test report. Following is an excerpt from the report.**

### Calculation of Spurious Emission Limit

The emissions outside the band are to be reduced by  $55+10\log(P)$ ; the absolute radiated power limit for emissions for this equipment, then becomes -25dBm.

**Table 1: Spurious Radiated Emissions, EIRP Levels**

|                                |                        |                                  |               |
|--------------------------------|------------------------|----------------------------------|---------------|
| CLIENT:                        | TERABEAM WIRELESS      | DATE:                            | March 9, 2004 |
| TESTER:                        | Mike Violette          | JOB #:                           | 8441          |
| <b><u>EUT Information:</u></b> |                        | <b><u>Test Requirements:</u></b> |               |
| EUT:                           | Marquee Bridge 4.9 GHz | TEST STANDARD:                   | FCC 90        |
| CONFIGURATION:                 | In full speed mode     | DISTANCE:                        | 3m            |
| S/N:                           | N/A                    |                                  |               |

| Frequency<br>(MHz) | Polarity<br>H/V | Azimuth<br>Degree | Ant.<br>Height<br>(m) | SA Level<br>(dBμV) | Ant. Gain<br>dBi | Sig. Gen.<br>Level<br>dBm | EIRP<br>Level<br>dBm | Limit<br>(dBm) | Margin<br>dB |
|--------------------|-----------------|-------------------|-----------------------|--------------------|------------------|---------------------------|----------------------|----------------|--------------|
| 109.98             | H               | 270               | 3                     | 4.7                | -3.6             | -72                       | -75.6                | -25            | -50.6        |
| 319.99             | H               | 90                | 1.4                   | 5.2                | 6.7              | -77.7                     | -71                  | -25            | -46          |
| 330.21             | H               | 90                | 1.2                   | 8                  | 6.9              | -74.5                     | -67.6                | -25            | -42.6        |
| 1162               | H               | 180               | 1                     | 48.6               | 5.3              | -64.1                     | -58.8                | -25            | -33.8        |
| 1200               | H               | 45                | 1                     | 42.6               | 5.6              | -67.5                     | -61.9                | -25            | -36.9        |
| 1558.33            | H               | 180               | 1                     | 40.5               | 6.4              | -78.3                     | -71.9                | -25            | -46.9        |
| 1726.5             | H               | 90                | 1                     | 50.5               | 6.9              | -65.6                     | -58.7                | -25            | -33.7        |
| 4965               | H               | 100               | 1                     | 52.1               | 10.5             | -54.2                     | -43.7                |                |              |
| 9930.1             | H               | 0                 | 1                     | 30.3               | 10.2             | -65.9                     | -55.7                | -25            | -30.7        |
| 14895.2            | H               | 0                 | 1                     | 32                 | 12               | -58.9                     | -66.1                | -25            | -41.1        |
| 109.98             | V               | 0                 | 1                     | 8.5                | -3.6             | -70                       | -73.6                | -25            | -48.6        |
| 319.99             | V               | 45                | 2                     | 3.5                | 6.7              | -78.1                     | -71.4                | -25            | -46.4        |
| 330.21             | V               | 0                 | 2.5                   | 5                  | 6.9              | -76.4                     | -69.5                | -25            | -44.5        |
| 1162               | V               | 190               | 1                     | 37.2               | 5.3              | -79.1                     | -73.8                | -25            | -48.8        |
| 1200               | V               | 200               | 1                     | 39.2               | 5.6              | -77.5                     | -71.9                | -25            | -46.9        |
| 1558.33            | V               | 90                | 1                     | 36.2               | 6.4              | -76.3                     | -69.9                | -25            | -44.9        |
| 1726.5             | V               | 180               | 1                     | 43.2               | 6.9              | -68.5                     | -61.6                | -25            | -36.6        |
| 4965               | V               | 45                | 1                     | 78                 | 10.5             | -29.4                     | -18.9                |                |              |
| 9930.1             | V               | 180               | 1                     | 30.5               | 10.2             | -65.2                     | -55                  | -25            | -30          |
| 14895.2            | V               | 0                 | 1                     | 30                 | 12               | -58.9                     | -46.9                | -25            | -21.9        |

No emissions were detected above 14.861GHz.

a=Ambient Levels



7.) I do not agree with your response about testing three orthogonal planes. Even case radiation at 4.9GHz can be very “peaky”. Consequently, it is important to follow this procedure regardless of the form factor of the device.

***R. We re-scanned the unit with the additional orientations requested. Although the second harmonic was detectable at 1 meter, at 3 meters harmonics of the emission were at the noise floor of the measurement system.***

***Data are presented above.***