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August 3, 2006

Mr. Tim Johnson
American Telecommunications Certification Body Inc.
6731 Whittier Ave
McLean, VA 22101

RE: Comments of June 27, 2006
APPLICATION: T3S-PPC-1000-E ELVA-1 Ltd.

Dear Mr. Johnson:

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.

Regards,

Michael Violette
President

Brian J. Dettling
Documentation Specialist WLL Project: 9096

1) Please explain the different block diagrams. Are these for 2 different versions of the device (PPC155 vs. PPC1000)? Comparing the 155 to the 1000 information provided appears to show different designs which would yield different construction, different internal photographs, and likely a different FCC ID for the different versions. Also, note the filter frequencies of the 155 do not appear to correlate to the approval frequencies for this application. Please explain/correct as necessary.

R. The PPC1000 is the only unit under consideration. This was a mistake. The PPC155 should not have been submitted. A new test report is submitted.

2) Label uses an incorrect grantee code in the FCC ID. Please correct to T3S.

R. The label has been corrected

3) The labeling exhibit shows the 2 part FCC statement from 15.19(a)(3). However it would appear that 15.19(a)(1) may be more appropriate. Please review.

R. The label has been corrected

4) It does not appear that information regarding both DC voltages AND currents applied into the several elements of the final radio frequency amplifying device for normal operation over the power range has been provided? (2.1033(c)(8)). Please review.

R. The report has been updated with this information:

Power into final stages:

Frequency Range	DC Voltage V	DC Current mA
71,000-76,000	18	130
81,000-86,000	16	130

5) It does not appear that a Tune up procedure over the power range has been provided? (2.1033(c)(9)). Please review.

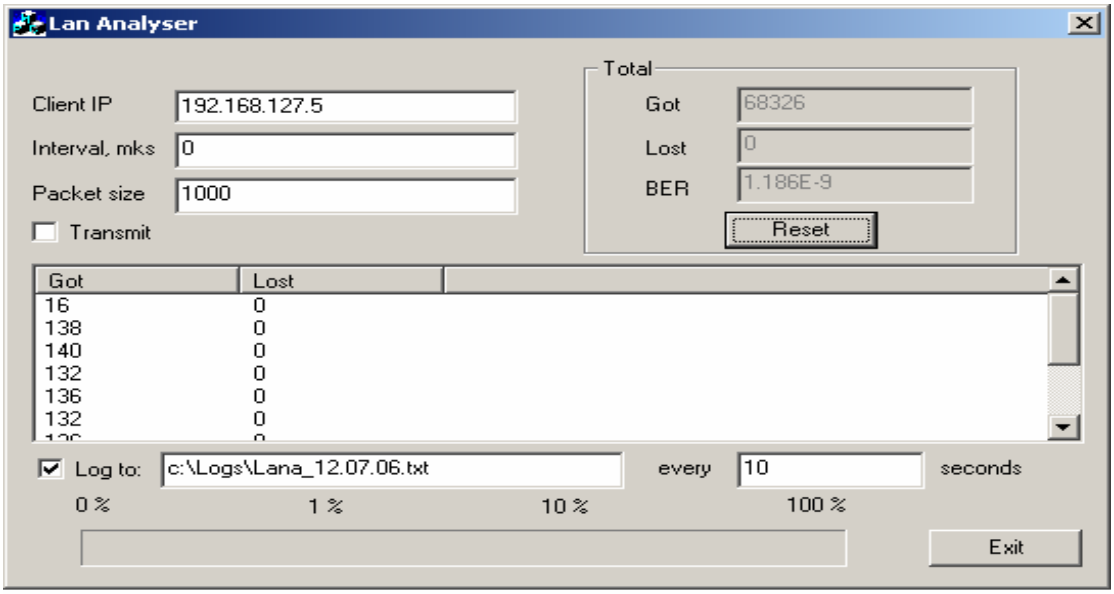
R. The report has been updated with this information:

During equipment tune up, the following equipment is used: Power Meter, Spectrum Analyzer with external mixer and mm-wave source. Output power and spectrum width are measured for each radio.

For additional information we compare theoretical sensitivity of receiver and measured sensitivity at BER 10^-9. If the spectrum or output power are not correct, then BER will be affected.

The radio is connected over a waveguide path and Gigabit Ethernet traffic is sent from PC to another one over the radio link. We increase attenuation and check Voltage of AGC output of the radio and BER on a PC.

The following is a typical display from BER tester.



6) It does not appear that the schematics include the RF circuitry portion of the device. Please provide schematics of the components of the RF chain.

R. Schematics Uploaded

7) Confidentiality has been requested on the Block Diagram, but the test report also has included the Block Diagram. The test report may not be held confidential. Please review/correct as necessary.

R. The report has been updated with this change

The diagram has been removed from the report and will be held confidential under its own exhibit.

8) It appears that a power meter is used for measuring power. This device is considered as a mmwave device and should follow mm-wave methods for measurement specified by the FCC. Note: The term “millimeter wave” is derived from the wavelengths of radio frequency signals between 30 GHz and 300 GHz, which range between 1 and 10 millimeters as given in FCC 03-248. The mmwave procedures (see attached) preferred method is to follow a radiated measurement due to many reasons given in the document. However the document does mention that a conducted method of measurement could be employed for certain tests if EUT and mixer waveguides both are accessible and of the same type. Additionally, it is uncertain as to the range capability and linearity of the power meter to the frequency range measured. Please provide additional information to support acceptability of the method used and also to cover the concerns raised by the mm-wave procedure in utilizing conducted methods. Alternatively, please provide appropriate RF power measured following the radiated methods specified by the mm-wave procedures. (see provided document)

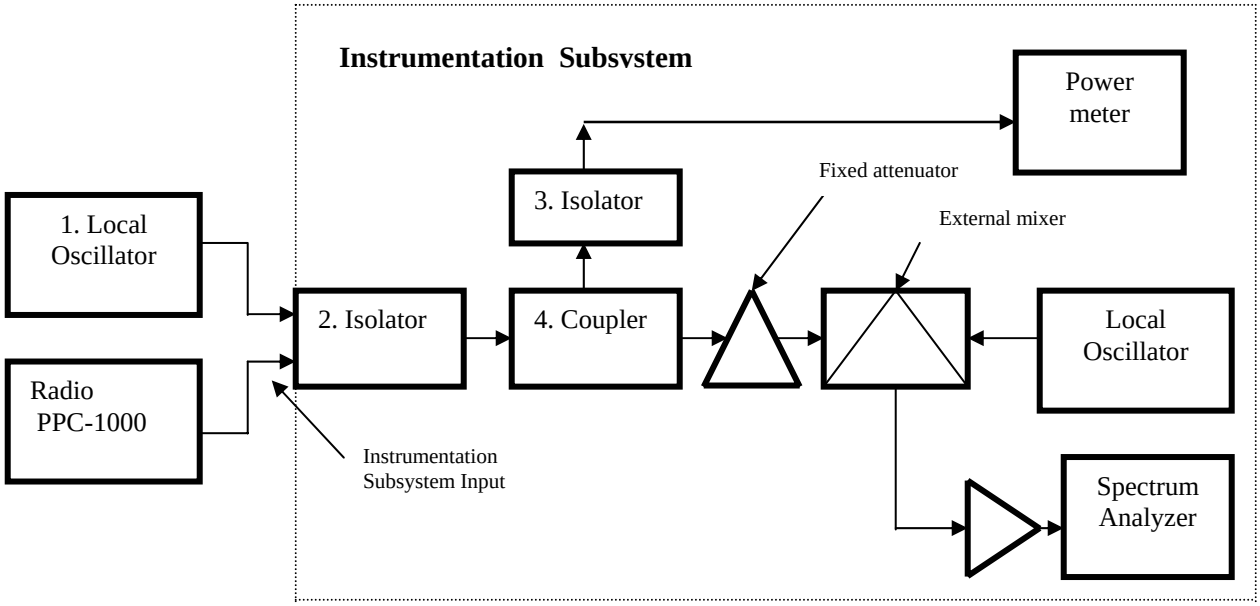
R. Measurements were made using suitable waveguide and down-conversion to measure the signal path losses

The linearity of the power meter is verified according to the attached document. “Measurement Linearity of Power Meter.pdf”. This document has been uploaded.

9) There are some questions regarding the calibration of the system in section 4.1. Please explain: how -10 dBm at the power meter ensure an input = 0 dBm at the isolator input? Isn't the purpose to determine the loss? How does the additional attenuator in the spectrum analyzer path factor into this? Additionally, how does the calibration factor in any linearity concerns?

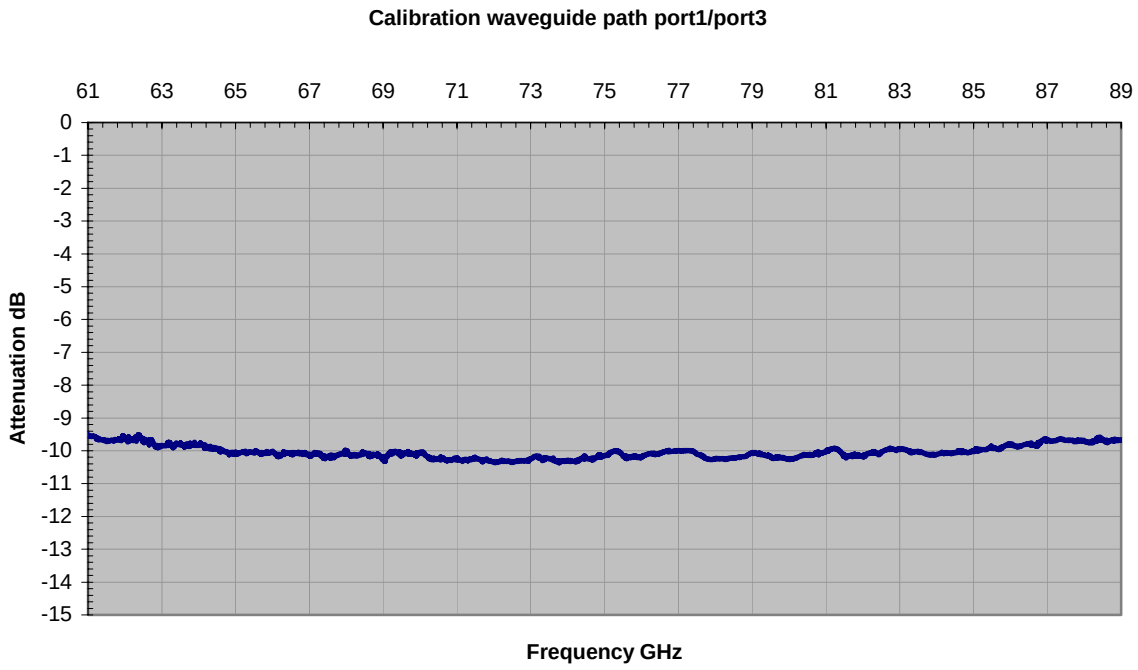
R. The report has been updated with this change

The Local Oscillator output was adjusted to show -10dBm at the power meter; this corresponds with 0dBm at the isolator input. During the sweep, minus 10dBm was maintained at the power meter and the response of the spectrum analyzer was recorded over the frequency range. This allowed for a frequency versus amplitude calibration factor relative to minus 10dBm at the power meter input. Hence, when the PPC radio was connected to the input of the isolator, the response at each frequency, *relative to the -10dBm calibrated level on the power meter*, was established. A correction factor was assembled over the frequency range. This factor appears as an adjusted limit line on the spurious emissions graphs.



Calibration file was applied for keeping power level at the isolator input 0 dBm. Corresponding corrections for each particular frequency were applied according to the calibration file data.

A sample of the calibration plot is presented below.



10) Please correct Table 5 to include units where appropriate.

R. Correction Made

11) Limits for power are radiated, but results are only conducted. Please correct to show proper EIRP.

R. Changes have been made to the report to report the power in EIRP.

12) Please justify listing of occupied bandwidth given on the 731 vs. the report and what is given in the report for occupied bandwidth. Please provide either the calculated Necessary bandwidth or use the occupied bandwidth (see 101.109) that is measured. Note that Part 2 cites: (a) Occupied bandwidth. The frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission. In some cases, for example multichannel frequency-division systems, the percentage of 0.5 percent may lead to certain difficulties in the practical application of the definitions of occupied and necessary bandwidth; in such cases a different percentage may prove useful.

R. The report has been updated with this change:

Changed emission designator to 1400M3X1D to reflect the occupied bandwidth.

13) For table 9, please explain limits uses and also a sample calculation if necessary. Note limit at 3 meter does not appear familiar and also the fact that data was taken at 1 m.

R. The radiated spurious emissions data above 1 GHz.

The data were collected at a distance of 1meter; the theoretical field strength at an EIRP limit of minus 13dBm is adjusted for one meter distance. The salient feature of the data is that the emissions are many orders of magnitude below the theoretical EIRP spurious emissions limit. The report has been changed to reflect a 1 meter limit.

14) Tables 10 and 11 show about 128 dBuV/m. What was the RBW/VBW settings. Taking this value and calculating theoretical EIRP (EIRP dBm = dBuV/m – 95.3) yields EIRP of 32.44 dBm. Taking into consideration antenna gain and RBW to EBW correction would appear to suggest an inconsistency with output power measured conducted. Please resolve discrepancy.

R. The discrepancy can be explained as follows:

Only a sample of the power density is measurable close to the antenna. The close-field measurement of the transmit signal only samples a portion of the signal emanating from the antenna. If one considers that the near-field measurement is in the near-field of the radiating signal, the spatial power density of the transmitted signal is low. That is, the antenna pattern has not fully developed and the measurement antenna is in an area of "quasi-static" field. There is no pattern and the gain is not valid.

For antenna dimensions, D $\geq$ wavelength, the far field develops at a distance in meters, equal to:

$$r = (D^2)/(2*\lambda)$$

where:

D is the dimension of the antenna
λ is wavelength in meters

For the ELVA-1 system, there are three possible antennas, 300, 400 and 600 mm diameter. At a nominal frequency of 70 GHz and an antenna diameter of 300 meters, the near-far-field transition develops at the following distance:

$$r = (D^2)/(2*\lambda)$$

$$= (0.3)^2 / (2 * 300/f_{MHz})$$

$$= 0.09 / 0.0086$$

$$r = 10.5 \text{ m}$$

Hence, the measurement of radiated field strength at any distance less than this distance will yield a sample of the spatial power distributed over some area. To fully measure the radiated field, it is necessary to integrate the power over an area sufficiently large enough to capture the energy. This area is unknown and likely unpredictable; nor is it a necessary measurement for proving compliance with the FCC Rules.

Therefore, the measurements provided in Tables 10 and 11 are really only reference and are indicated for the spurious emissions only; they do not represent the true transmitted energy at the frequency of operation.

15) Please explain compliance to the spectral efficiency requirements of 101.139(h).

R. The report has been changed to reflect the following:

For equipment employing digital modulation techniques, the minimum bit rate requirement is 0.125 bit per second per Hz. The data rate is 1250 Mbps over 1360 MHz bandwidth, which corresponds to a bit rate per second of of 0.92 bits per second per Hz.

The device complies with the Spectral Efficiency requirements of 101.139(h).

16) The test report provided mentions compliance to WT Docket No. 02-146. However, please note that there has been an additional docket (WT Docket No. 02–146; FCC 05–45) further released since the original. Please review (see attachment) for compliance with the test report updated and adjust if necessary.

R. The new docket is referenced in the test report. No changes have occurred between the older version of 02-146 and the latest version that affect compliance to this Rule part.

17) Section 5.10 does not provide information to show compliance to 101.115.

R. Antenna information has been placed in the report.

18) Please show compliance to 101.111(a)(2)(v) for each channel edge.

R. As we understand the intent of the requirement, The major part of the spectrum is below -13dBm/MHz level. Any sub-channel placed within the 1400MHz bandwidth close to the edge of the channel will be less than -13dBm/MHz at the edge. The channel width is assigned on -20dBc level which is about 17 dB below -13dBm/MHz absolute power limit.

19) Manual (page 10 & 29) suggests several antennas, however application appears to cover only one. Please explain.

R. Additional information on antennas has been placed in the report. See Section 5.10

20) Users manual does not appear to provide RF exposure information. Please correct.

R. Please note that the requirements of § 1.1307 does not include routine environmental evaluation for devices operating in the 70,80, 90 GHz bands if the ERP is < 1640W. Also, requirements for labeling are left to the licensee, not the grantee of this equipment.

21) Please provide an appropriate RF exposure exhibit.

R. A report has been prepared. However, please note that § 1.1307 does not require routine environmental evaluation for devices operating in the 70,80, 90 GHz bands if the ERP is < 1640W. The ERP of the device is 1000W (30dBW).