

DATE: February 1, 2006

TO: Richard Engleman, Chief Engineer, International Bureau

FROM: John Wong, Chief, Engineering Division, Media Bureau

SUBJECT: Request for more information for Peer Review of the report -- *Development of Possible HDFS/FSS Gateway Earth Station Sharing Criteria*

The Media Bureau convened its first Peer Review meeting on January 30, 2006 of the above report. We are requesting additional information and have the following comments. We also request additional time to complete the peer review.

- 1) It would be very helpful if the pages in the Appendix A report were numbered. Also, there is a discrepancy in the numbering of tables and figures. For example, there is a 4.1 Table and a 4.1 Figure. The Tables and Figures for each section are numbered in parallel, so the first table is "Table 4.1", and the first Figure is "Figure 4.1". Table 1- Monte Carlo Study Assumption, is superimposed over text and we can't see what is underneath. (We are not clear whether this is a printer problem at our end but do need a clean copy.) Done.
- 2) There are a number of statements throughout the document that should have cites to the source of the information. For example, footnotes 16 and 20 would benefit from citations. Fn 20 has been expanded. We're not sure of a single source for Fn 16. The description of the physical reasons for hydrometer attenuation at V-band frequencies comes from reading multiple sources over the years. For the reference to the peak H₂O absorption at 22.235 GHz see ITU-R Rec. P676-6 Table 2 (where the first peak of the water-vapor attenuation line occurs at 22.235080 GHz.) ITU-R Rec. P.840-3. titled "Attenuation due to Clouds and Fog," describes the situation with respect to hydrometer scattering thus: "For clouds or fog consisting entirely of small droplets, generally less than 0.01 cm, the Rayleigh [scattering] approximation is valid for frequencies below 200 GHz". ITU-R Rec. P.618-8, on page 1, contains the following information: "absorption in atmospheric gases; absorption, scattering and depolarization by hydrometeors (water and ice droplets in precipitation, clouds, etc.); and emission noise from absorbing media; all of which are especially important at frequencies above about 10 GHz" The study was, principally, based on attenuation due to hydrometers. These ITU-R Recs. are available on the IB CD server via the intranet. We will edit footnote 16 to include references to these ITU documents.
- 3) In footnote 5, where do these reliability standards come from? Is this standard for this type of service? FN expanded to include sources.
- 4) In Section 3.1, discussing FS characteristics, is this including both transmit and receive antennas and elevation angles and please clarify which is which. Text modified for clarification.
- 5) In Figure 4.1 and associated text, why were 32 cities chosen, why is this a good sample and where are the cities located? Does this sample reflect where gateway earth stations are to be

located? What does the phrase "at the location of the city" mean? Is this the weather monitoring location? We've added a FN to explain the source of the 32 cities.

6) Note 45, is the ITU the definitive source for this information? While there are a number of different propagation models, the ITU Rec. used (P.618-7), which is an internationally accepted model developed with the input from NTIS, among others. Additionally, the WP3M paper that detailed how to calculate the upper-bound probability of a point on the ground experiencing an increase in PFD as a function of distance from the FSS Earth station was closely tied to the other ITU propagation models. This upper bound estimate is central to the study and we don't know how to obtain it based on any other propagation model.

7) In Table 4.2, what is the significance of 38 and 38.1 where all the numbers are in tens? There is an apparent discontinuity in the curves at a value 38. The curve was therefore divided into 2 separate linear portions one from 0 to 38 and a second one from 38.1 to 100. Text has been added to explain this.

8) Can we get a copy of the JWP4-9S report referred to in section 3.0? Yes. An electronic copy is attached. The V-band part of the Chairman's report starts with Attachment 4 on page 68.