From: Clive Winkler <clive.winkler@Cubic.COM>, on 10/23/00 6:25 PM: To: smtp@DAN7@Servers[<timothy.ganea@cubic.com>],Mary Washington@EMC@PSSDG

To Tim Ganea & Mary Washington,

I have examined Annex J entitled "Guidance for Determination of Necessary Bandwidth". I note the highest Order of Preference in determining the necessary bandwidth is item 1 in the General paragraph 2.1. For FM voice, they generally follow Carson's Rule. The particular formula is spelled out for this case in Table A.III.2.

## CALCULATION

Following the formula for FM telephony from Table A (formula III.2) for our case where the deviation is 5kHz, then D=5000, M=3000 (for average voice) and this gives Bn=16000Hz. This leads to the emission designator of 16K00F3E.

## COMMENTS

I note that the measurement undertaken by TUV at the -20dB points gives a slightly higher bandwidth for the 1kHz test tone than 12kHz (Carson's Rule for the test tone). They measure 13.9kHz. This is partly due to the resolution bandwidth of the spectrum analyser (300Hz) which contributes approximately 900Hz at the -20dB points, and partly due to the difference between the bandwidths at -20dB (TUV's measurement point) and -3dB (theoretical using Carson's rule). This total error is then 1.9kHz.

We choose to follow para 2.1 section 1 and use the preferred theoretical formula. Can you please amend the certificate and forward to Tim Ganea at CCI?

Dr Clive Winkler VP Advanced Development CUBIC Communications Inc An ISO-9001 Certified Company