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Date: August 19, 2002

Federal Communications Commision
Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

Attention: Andy Leimer

FCC ID: A9SAT155

In reference to your letter dated August 14th 2002 regarding denial of approval for the AT155, we believe the frequency tolerance you have referenced applies to DME airborne transmitters. The frequency tolerance for the ATC transponder system is defined in FAA document TSO C74c paragraph 2.10 as 1090MHz ± 3MHz. Note that the 3MHz authorized by the FAA is a significantly tighter tolerance (TSO C74c pages 1 to 6 are enclosed) than that authorized by the FCC part 87.133.d which would be equal to the authorized frequency band less 1.5/T relative to the upper and lower authorized band edges. In this instance it would be equal to the authorized bandwidth less 1.5/.45µs or 3.3MHz from the upper and lower frequency. TSO C74c 2.13d defines the maximum occupied bandwidth as that which would be created by a trapezoidal waveform having the minimum specified rise and fall times. This calculates a maximum occupied bandwidth of about 20MHz. This equates to an FCC frequency tolerance of (20-6.66MHz)/2 which is ±6.667MHz. Since the FAA is the stricter of the two it is regarded as the applicable limit.

14MHz was chosen as the nominal bandwidth for the emission designator as it represents the worst case spectrum for the pulse rise and fall times for the design parameters implemented.

TSO C74c 2.11.a specifies a peak pulse power of 21db above 1 watt at the antenna end of the transmission line. This translates to 125.9 watts at the antenna. Eight feet of RG-223 was used between the AT155 and the power detector. This represents 1.32db loss in the test setup. (RG223 loss=16.5db/100ft@ 1Ghz). With an indicated 200W output (Re: the test report), this represents 270W at the rear connector of the transponder. With the maximum allowable Narco specified cable loss of 2db this results in 170 watts at the antenna, comfortably above the minimum of 125.9 watts specified

To confirm the peak power data used in the submission, measurements were made using a spectrum analyzer . A calibrated pulse generator (ATC1400 Y4 , LT176-1, Cal date Jan. 25, 2002) was driven directly into the input terminals (0 dbm) of an IFR AN1820 spectrum analyzer. With a rate of 1000 replies per second, 2 pulses per reply and a pulse width of 0.45 µs the analyzer displayed a main lobe response of –43dbm. This represents the "measurement losses" due to the bandwidths of the analyzer. The AT155 transmitter with pulses identical to the signal generator was then substituted through a variable attenuator. The attenuator was then adjusted for the identical main lobe on the analyzer. The attenuation required was 54 db. 54db above 0 dbm is a power of 252 watts. Since the granularity of the attenuator was 1db (+25%, -21% in power) this is considered good confirmation of the actual peak power.

Enclosed is a photograph of the spectrum analyzer screen showing monotonic decreasing sideband energy beyond that shown in the IITRI R&B Laboratories report on occupied bandwidth.

If you have any questions please contact me.

Sincerely,

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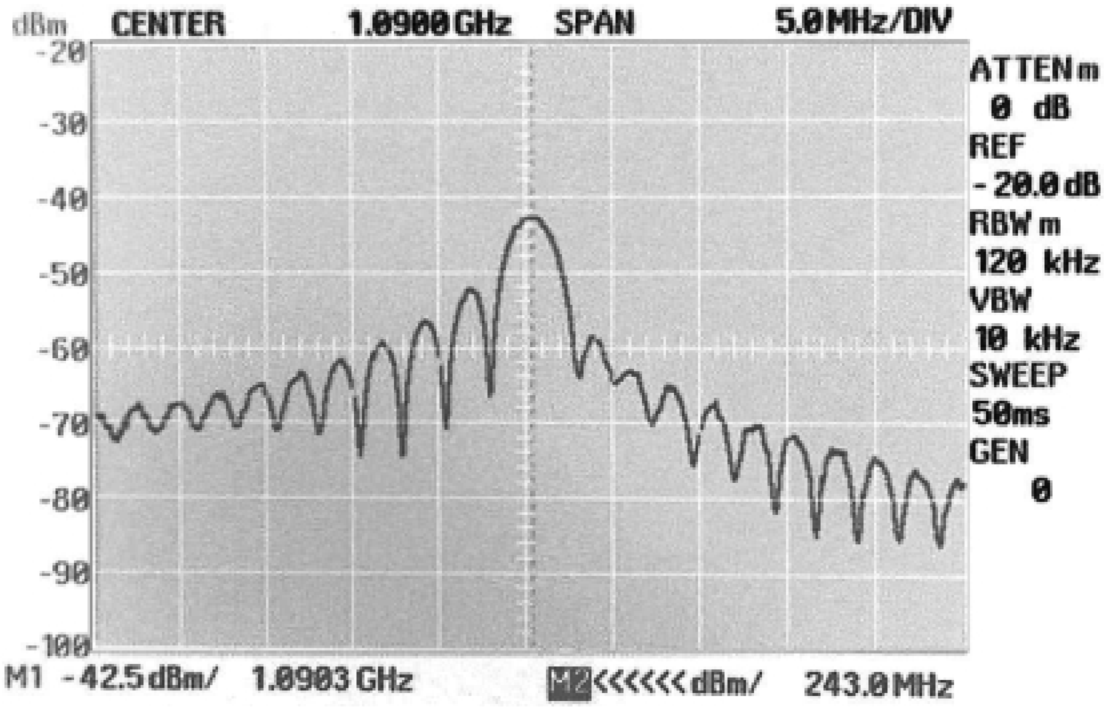

dBm
CENTER 1.0900 GHz SPAN 5.0 MHz/DIV
-20
-30
-40
-50
-60
-70
-80
-90
-100
ATTEN m
0 dB
REF
-20.0 dB
RBW m
120 kHz
VBW
10 kHz
SWEEP
50ms
GEN
0
M1 -42.5 dBm/ 1.0903 GHz
M2 <<<<<<< dBm/ 243.0 MHz