DESCRIPTION OF EXPERIMENTATION

Lockheed Martin Corporation ("Lockheed Martin") hereby seeks experimental authority under Part 5 of the Commission's rules to study the effects of troposcatter radio equipment emissions. In pursuit of this objective, Lockheed Martin needs to test the characterization of the Troposcatter emissions at various C-band frequencies – including fading and Doppler effects. The feedback from the program will be used to study potential integration of the technology into 3G and 4G techniques.

This program of research is an attempt to demonstrate beyond line of sight (BLOS) microwave communications using troposcatter propagation. The system sends a microwave signal above the horizon and particles in the upper troposphere randomly scatter a portion of the energy back toward earth. Using a high gain antenna, the signal can be received and used to create a highly secure data link.

BLOS communication has been demonstrated successfully in the past using lower frequencies. Demonstrating higher frequency communications links will allow BLOS systems to increase their bandwidth, achieve higher data rates, and continue to grow smaller in size for faster mobile deployments.

The instant application seeks an ERP to account for operations in the C-band and to satisfy customer requirements for a discernable signal in two different bands, in order to perform a two-tone test to characterize the channel's frequency coherence function. This test must be performed at the rate of the short-term fading – i.e., sufficient power at the receiver to obtain sufficient signal-to-noise ratio (SNR) in both lower and upper bands.

Lockheed Martin has selected discrete frequencies for the purposes of these operations, rather than seeking authority across a full band, as a mitigation strategy for any inline interference from the directional antenna in use.

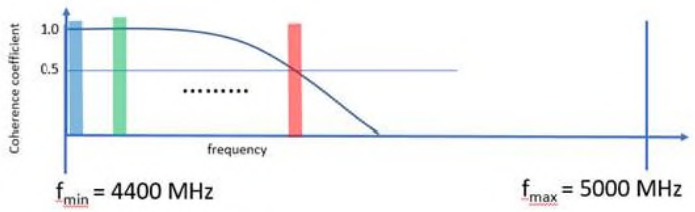
Furthermore, to ensure that these operations will not interfere with other services, Lockheed Martin has performed analyses of the band use:

- We anticipate no interference with Fixed-Satellite Service (FSS) earth stations, due to our azimuthal direction of 241 degrees. In addition, there are no potential victims of interference for FSS earth stations or satellites as our power would be too low at the satellite's receiver even to be discernible and because FSS earth stations are pointing in a far more southerly direction.
- We anticipate no interference with fixed microwave relays based on previous operations conducted in the same band.

A pictorial and technical representation of the operations follows:

Frequency coherence with two tone signals

- We sample the channel at two frequencies



- Let $[f_a,f_b]$ denote the span of frequencies from f_a to f_b
- For f_{low} transmit at frequencies $[f_{min},f_{min}+1\ MHz]$ = [4400 MHz,4401 MHz] (blue in graph)For f_{high} transmit at $[f_i,f_i+1\ MHz]$, where $f_i = f_{min} + i \times 5MHz$ (green in graph)
  - That is, sample the channel 1 MHz bandwidths every 5 MHz, [4405 MHz,4406 MHz],[4410 MHz,4411 MHz],... simultaneously with f_{low}
- Sample the channel with an increasing f_{high} up to the e.g. 50% coherence point (red in graph)