

Exhibit 1: Modification of Experimental License

Space Data Corporation (“Space Data”), pursuant to Section 5.59(b) of the Commission’s rules,¹ requests a modification to its experimental license (call sign: WC2XVM) to include access to the 895.5-895.7 MHz frequencies in order to test a single off-the-shelf Global System for Mobile Communications (“GSM”) mobile handset with Space Data’s system. The tests would be confined to various locations within the state of Arizona, each of which will be located at least 90 miles from the only stationary site licensed in Arizona to operate within the 895.5-895.7 MHz band (specifically, at 895.4055-895.5973 MHz).

Space Data’s experimental license authorizes Space Data to perform experimental operations of its balloon-based communications system using GSM and other transmission protocols and channel bandwidths of up to 200 kHz over various Narrowband Personal Communications Services (“NPCS”) frequencies. Space Data now seeks to test the ability of its system to carry standard GSM-based wireless calls, using a GSM handset to communicate with its system’s airborne balloon-based repeaters.

Because standard GSM handsets use a 200 kHz channel bandwidth and a 45 MHz offset between the send and receive channels, Space Data requires access to additional frequencies. Accordingly, Space Data requests FCC authorization to undertake the GSM experiment using the 895.5-895.7 MHz frequencies for the “uplink” from the GSM handset on the ground to the airborne balloon-based repeater. Frequencies currently authorized under its experimental license will be used for the “downlink” segment from the balloon-based repeater to the handset.² Space Data requires no further amendments to its existing experimental authorization to carry out the proposed experimental operation.

The 895.5-895.7 MHz frequencies are assigned as Channel Block 2 spectrum (895.6055-895.7973 MHz) and Channel Block 3 spectrum (895.4055-895.5973 MHz) in the Air-Ground Service.³ As indicated above, the location for the GSM testing will be limited to the state of Arizona, and no GSM handset used in the experiment will be operated within 90 miles of any ground station licensed to operate with mobile stations in the Air-Ground service Channel Block 2 or Channel Block 3 spectrum. Specifically, only one license has been granted for access to mobile station Channel Block 3 spectrum

¹ 47 C.F.R. § 5.59(b).

² The test would use a 200 kHz channel centered at 940.6 MHz for the “downlink” from the airborne balloon-based repeater to the GSM handset on the ground. Space Data’s existing experimental license authorizes the use of this bandwidth. The GSM handset would provide a 200 kHz “uplink” transmission centered at 895.6 MHz, in keeping with the standard 45 MHz frequency offset used with GSM base-mobile station communications.

³ See 47 C.F.R. § 22.857, Table G-2 (Airborne Mobile Station Channels).

in the state of Arizona. This license is issued to Claircom Licensee Corporation (call sign: KNKG801, Location #117) and authorizes communications between mobile stations installed in airplanes on the ground at the Tucson airport and a low-power (1-watt) ground station also located at the Tucson airport (operating at 850.4055-850.6055 MHz). There are no stations licensed in the state of Arizona to operate on Channel Block 2 spectrum.⁴

Space Data operations in the 895.5-895.7 MHz band will be more than adequately separated from any Air-Ground licensee and will not create harmful interference or raise any interference concerns. Even under worst-case conditions, the ground-level operation of a single 2-watt GSM handset proposed by Space Data cannot present any interference concerns to the Tucson base station located 90 miles away.⁵ Specifically, even without any consideration for signal path losses and attenuation, a ground-based 2 watt transmission from a GSM handset located at least 90 miles away from the Tucson airport would have to originate at an elevation of at least 6600 feet above sea level to overcome the curvature of the earth before it could theoretically be detected by a receiver located at the Tucson airport. Because the ground-level elevations at all points at or beyond a 90-mile radius of Tucson are in fact well below the minimum 6600-foot altitude at which point interference becomes theoretically possible, interference cannot occur.⁶

⁴ The nearest assigned Air-Ground Service ground station using Channel Block 2 is in Green River, UT, more than 400 miles from the Phoenix metropolitan area.

⁵ In the 895 MHz frequency range, the free space path loss for a distance of 90 miles is 134.5 dB ($96.6 + 20\log D + 20\log F$, where D is the line-of-sight distance in miles and F is the frequency in GHz). GSM phones typically transmit at 2 watts or 36 dBm peak power (which itself is conservative since the average power is only 0.25 watts). Without any consideration for signal losses that exist in the signal path (mountains, trees, man-made obstructions, reflections, fading, etc.), the line-of-sight signal level in Tucson from a GSM phone 90 miles away would be -98.5 dBm, which can be detected by most receivers. However, once the curvature of the earth is factored into the equation (line of sight distance is $D = \text{SQR}(2*H)$, where D is the distance to the radio horizon in miles, H is the height of the transmitting antenna above the ground, and SQR represents the square root), an emitter would have to be located at an altitude 4000 feet above the Tucson elevation, which is 2600 feet above sea level, in order to have a clear line-of-sight with the Tucson airport from 90 miles away such that its signal could be detected by a receiver located at the Tucson airport. In other words, the emitter – in this case, Space Data's GSM handset – would have to be operating at an altitude of at least 6600 feet in order to create any possibility of interference with the Claircom base station at the Tucson airport.

⁶ Because the Air-Ground service uses the 895.5-895.7 MHz band for air-to-ground transmissions (*i.e.*, from the phones installed aboard commercial aircraft to stationary base stations), the only stations that could receive interference are Air-Ground base stations licensed on a paired basis with mobile stations using the Channel Block 2 or Channel Block 3 spectrum. That is, the only station receiving transmissions on any portion of the 895.5-895.7 MHz band in the state of Arizona is the ground station located at the Tucson airport.

Contribution to the Radio Art

As the Commission has recognized, large portions of the United States do not have access to adequate telecommunications services, including emergency support services, because provision of such services to these areas is prohibitively costly. The Space Data system specifically is designed to offer advanced telecommunications services to underserved and unserved areas on an affordable basis. Thus, the proposed experimentation also will assist the Commission in finding economically viable solutions to the complex problem of providing other types of advanced telecommunications services to underserved areas of the United States.