CESIUM

FCC Form 442, Exhibit: Directional Antenna

Cesium Mission 1

(Satellite Antennas)

FRN: 0029768140

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1 INTRODUCTION

As required by reporting the use of a directional antenna (other than radar), this exhibit provides the required antenna information as prompted. This exhibit reports the requested information for the antennas mounted on the Cesium Mission 1 (CM1) spacecraft, Cesium Satellite 1 (CS1) and Cesium Satellite 2 (CS2).

2 SATELLITE ANTENNAS

Both CM1 satellites contain six transmitting antennas: The Cesium Nightingale 1 active phased array antenna (APA), an IQ Spacecom S band patch antenna for the SRS-3, the NearSpace Launch EyeStar-D2 duplex radio antenna, the NearSpace Launch EyeStar-S3 simplex radio antenna, and one Cesium CommPack system with two antennas.

2.1 ORIENTATION

Since these antennas are all mounted on the non-geostationary satellite, their orientation in the horizontal and vertical plane are not defined. For normal operation, CS1 and CS2 will orbit the Earth in a sun synchronous orbit at an initial altitude of 550 km. In this orientation, both the duplex and simplex antennas will have a boresight direction orthogonal to the earth-spacecraft line, while the APA and IQ Spacecom antenna will face towards Earth. The CommPack antennas are mounted on opposite faces of the satellites, so they will point in the direction of the velocity and anti-velocity vector of the spacecraft.

2.2 HALF-POWER BEAM WIDTH

The width of beam in degrees at half power point are listed below for the four directional antennas used on the Cesium Satellite 1.

2.2.1 Nightingale 1 APA Antenna

The Nightingale 1 APA antenna has a half-power beam width of 7 degrees for both axes.

2.2.2 IQ Spacecom

The IQ Spacecom antenna has a half-power beam width of 80 degrees for both axes.

2.2.3 EyeStar-D2

The EyeStar-D2 antenna has a half-power beam width of 110 degrees for both axes.

2.2.4 EyeStar-S3

The EyeStar-S3 antenna has a half-power beam width of 100 degrees for both axes.

2.2.5 CommPack Antennas

The CommPack antennas have a half-power beam width of 79.4 degrees for Phi = 90, and 31.2 degrees for Phi = 0.