

**Application to Modify TerreStar Gateway Earth Station
License at North Las Vegas**

1. Introduction

Since the successful launch of TerreStar-1 satellite in early July 2009, TerreStar has been testing and operating its system using both of its Ku-band gateway earth stations: one located at North Las Vegas, Nevada and the other one located at Allan Park, Ontario, Canada. The North Las Vegas (NLV) gateway station consists of a 9.3m Ku-band antenna and a 6.3m Ku-band antenna, plus other RF, IF, and baseband equipment. The station has been operated under the license granted by the Commission to TerreStar on November 13, 2008 plus a series of Special Temporary Authority (STA) grants from the Commission in connection with in-orbit testing of the satellite and the testing of ground based satellite beamforming network as well as satellite base station equipment.

From operational experience during the last year, TerreStar has found that it is necessary to modify some of the parameters authorized by its NLV license. In particular, in order to achieve the required throughput under certain operational conditions, it is necessary to operate certain carriers at higher maximum eirp levels, in some cases using a wider bandwidth. All modifications requested in this application are relatively minor and are within the values that Comsearch coordinated for the 9.3m and 6.3m antennas on May 15, 2007. Copies of the 2007 coordination report and a letter from Comsearch confirming that no further coordination is needed in connection with the modifications requested in this application are attached to this exhibit.

The requested modifications fall into two categories. The first category consists of Command signal modifications for spacecraft control and Calibration signal modifications for the Ground Based Beam Forming (GBBF) network. The second category consists of modifications for the Ku-band traffic and control carriers.¹

2. Command and Calibration Signals

2.1 For the 9.3m antenna

¹ Comsearch is coordinating a similar change to the parameters for the Ku-band uplink Pilot signal operating at 12992 MHz. This change will be the subject of a separate modification application once coordination has been completed.

As shown in Table 1 below, the requested modifications are highlighted in **bold**. These modifications and the reasons for the request are listed below:

Carrier Frequency (MHz)	Type	Currently Authorized Polarization	Revised Polarization	Currently Authorized Emission Designator	Carrier Bandwidth (kHz)	Revised Emission Designator	Currently Authorized Max EIRP (dBW) 9.3m	Revised Max EIRP (dBW) 9.3m
12999 and 12751	Command (with ranging)	L	L	700KF9D	832.0	832KF3D	54.02	74.00
12750 to 13000	Calibration signal	L,R	L,R	50K0G7D	50.0	50K0G7D	51.40	61.80
Table 1. Comparison of Currently Authorized command and calibration signals vs. the Revised signals for the 9.3m antenna								

- Command carriers at 12999 MHz and 12751 MHz

TerreStar proposes to change the bandwidth of the FM-modulated command carriers from 700 kHz to 832 KHz. Furthermore, based on experience with the full satellite payload flux density range, aging effect, and the transmit capability of the NLV radio equipment, TerreStar has determined that the maximum transmit eirp needs to be increased to 74.0 dBW. Taking into account the 832 kHz carrier bandwidth, the proposed maximum eirp value of 74.0 dBW corresponds to the 50.8 dBW/4 KHz eirp density that Comsearch coordinated in 2007.

- Calibration signals

Based on experience gained during SBN testing, TerreStar has determined that in some circumstances it will need to increase the maximum eirp of the calibration signals to 61.8 dBW. In light of the 50 KHz bandwidth that the calibration signals occupy, this 61.8 dBW maximum value corresponds to the 50.8 dBW/4 KHz eirp density coordinated by Comsearch in 2007.

2.2 For the 6.3m antenna

As shown in Table 2 below, the requested modifications are highlighted in **bold**. These modifications and the reasons for the request are listed below:

Carrier Frequency (MHz)	Type	Currently Authorized Polarization	Revised Polarization	Currently Authorized Emission Designator	Carrier Bandwidth (kHz)	Revised Emission Designator	Currently Authorized Max EIRP (dBW) 6.3m	Revised Max EIRP (dBW) 6.3m
12999 and 12751	Command (with ranging)	L	L	700KF9D	832.0	832KF3D	54.02	70.80
12750 to 13000	Calibration signal	L,R	L,R	50K0G7D	50.0	50K0G7D	47.98	58.60
Table 2. Comparison of Currently Authorized command and calibration signals vs. the Revised signals for the 6.3m antenna								

- Command carriers at 12999 MHz and 12751 MHz

TerreStar proposes to change the bandwidth of the FM-modulated command carriers from 700 kHz to 832 KHz. Furthermore, based on experience with the full satellite payload flux density range, aging effect, and the transmit capability of the NLV radio equipment, TerreStar has determined that the maximum transmit eirp needs to be increased to 70.8 dBW. Taking into account the 832 kHz carrier bandwidth, the proposed maximum eirp value of 70.8 dBW corresponds to the 47.6 dBW/4 KHz eirp density that Comsearch coordinated in 2007.

- Calibration signals

Based on experience gained during SBN testing, TerreStar has determined that in some circumstances it will need to increase the maximum eirp of the calibration signals to 58.6 dBW. In light of the 50 KHz bandwidth that the calibration signals occupy, this 58.6 dBW maximum value corresponds to the 47.6 dBW/4 KHz eirp density coordinated by Comsearch in 2007.

3. Traffic and Control Signals

3.1 For the 9.3m antenna

As shown in Table 3 below, the requested modifications are highlighted in **bold**. These modifications and the reasons for the request are listed below:

Carrier Frequency (MHz)	Type	Polarization	Carrier Bandwidth (kHz)	Currently Authorized Emission Designator	Revised Emission Designator	Currently Authorized Max EIRP (dBW) 9.3m	Revised Max EIRP (dBW) 9.3m	Revised Max EIRP density (dBW/4 kHz) 9.3m
12750 to 13000	data	L,R	31.25	31K3G7D	31K3G7D	45.70	58.5	50.8
12750 to 13000	data	L,R	312.5	313KG7D	313KG7D	55.13	68.5	50.8
12750 to 13000	data	L,R	1250	1M25G7D	1M25G7D	55.13	68.5	43.6
Table 3. Comparison of Currently Authorized traffic signals vs. the Revised signals for the 9.3m antenna								

- Increased transmit eirp

The transmit eirp limits for the currently licensed carriers needs to be increased to the levels shown in Table 3 above. The request springs from TerreStar’s experience operating the satellite. Since launch in July 2009, TerreStar has conducted a detailed examination of modes of operation using the full range of satellite payload Ku-band attenuator gain step, flux density range, aging effect, and the transmit capability of the NLV radio equipment. Taking into account the bandwidths of the carriers, the requested maximum levels of TX eirp do not exceed the TX eirp densities coordinated by Comsearch in 2007.

3.2 For the 6.3m antenna

As shown in Table 4 below, the requested modifications are highlighted in **bold**. These modifications and the reasons for the request are listed below:

Carrier Frequency (MHz)	Type	Polarization	Carrier Bandwidth (kHz)	Currently Authorized Emission Designator	Revised Emission Designator	Currently Authorized Max EIRP (dBW) 6.3m	Revised Max EIRP (dBW) 6.3m	Revised Max EIRP density (dBW/4 kHz) 6.3m
12750 to 13000	data	L,R	31.25	31K3G7D	31K3G7D	42.50	55.3	47.6
12750 to 13000	data	L,R	312.5	313KG7D	313KG7D	51.93	65.3	47.6
12750 to 13000	data	L,R	1250	1M25G7D	1M25G7D	51.93	65.3	40.4
Table 4. Comparison of Currently Authorized traffic signals vs. the Revised signals for the 6.3m antenna								

- Increased transmit eirp

The transmit eirp limits for the currently licensed carriers needs to be increased to the levels shown in Table 4 above. The request springs from TerreStar's experience operating the satellite. Since launch in July 2009, TerreStar has conducted a detailed examination of modes of operation using the full range of satellite payload Ku-band attenuator gain step, flux density range, aging effect, and the transmit capability of the NLV radio equipment. Taking into account the bandwidths of the carriers, the requested maximum levels of TX eirp do not exceed the TX eirp densities coordinated by Comsearch in 2007.