

OPERATIONAL REQUIREMENTS

The requirements set forth in Article I of this Appendix shall apply to each Service for which NewSat does not provide *all* earth station facilities for transmitting signals to the relevant Satellite.

The requirements set forth in Article II of this Appendix shall apply to all Services.

Article I. Earth Station Transmit/Receive Requirements.

1. **Non-Interference and Use Restrictions.** The Customer's transmissions to and from the Satellite shall comply with all applicable governmental laws, rules and regulations. The Customer will follow established practices and procedures for frequency coordination and will not use the Service, or any portion thereof, in a manner which would or could be expected to, under standard engineering practice, harm the Service or interfere with the use of or harm any portion of the Transponder from which the Service is provided, any other Transponder on the Satellite, the Satellite, or any other in-orbit satellite or transponder on such other satellite. NewSat reserves the right to require that any programming service or other transmissions be encrypted.
2. **Transmission Plan.** Prior to commencing transmissions to and from the Satellite, the Customer shall submit its transmission plan for NewSat's prior written approval. The Customer shall be permitted, subject to NewSat's prior written approval, to modify this transmission plan from time to time.
3. **Terrestrial Facilities.** The Customer shall be responsible for the provision, installation, operation, maintenance of, and for securing all necessary licenses and other consents, permissions, concessions, permits and authorisations for, the earth station and antenna facilities and equipment that are used for transmitting signals to, or receiving signals from, the Satellite ("Customer-Provided Facilities").
4. **Earth Station Requirements**
 - 4.1 **General Requirements.**
 - (a) The Customer will configure, equip and operate its transmit facilities so that the interface of these facilities, in outer space, with the Satellite shall conform to the characteristics and technical parameters of the Satellite. The Customer will follow NewSat's procedures for initiating and terminating any transmissions to the Satellite. The Customer will operate all transmit facilities in a manner that allows for cessation of, and will cease, transmissions immediately upon receiving electronic, telephone or facsimile notice from NewSat in accordance with section 11, or if other technical requirements are not being adhered to. The Customer will furnish information regarding the technical parameters of its transmissions on a continuing basis as required by NewSat to prepare for, initiate, maintain and immediately discontinue the use of the Services upon notice by NewSat.
 - (b) NewSat shall have the right, but not the obligation, to inspect any Customer transmit facilities, together with associated facilities and equipment used by the Customer, or by a third party under the authority of the Customer, to transmit to the Satellite. NewSat will use all reasonable efforts to schedule inspections to minimise the disruption of the operation of such facilities, and the Customer shall make such facilities available for inspection at all reasonable times. The Customer shall, upon NewSat's request, provide measured proof that any transmit facility meets or exceeds the required sidelobe envelope.
 - 4.2 **Earth Station EIRP.** For saturated Transponder operations, the Customer's earth stations must be capable of transmitting a modulated carrier with a maximum EIRP sufficient to achieve the nominal EIRP assigned in the transmission line-up message with a margin of at least 3 dB. For multiple carrier operation through the same HPA, the Customer's earth stations must have sufficient power to enable operation at nominal power with nominal 6 dB output back-off from saturation. For partial Transponder allocations the actual assigned operating EIRP for a given earth station will be determined by NewSat in consultation with the Customer, taking into account the actual Transponder performance and loading prior to the time of the transmission.
 - 4.3 **Uplink EIRP Stability.** In clear-sky conditions, the uplink EIRP in the direction of the Satellite must be maintained to within +/-0.5 dB of the assigned operating EIRP. Under no circumstances may the EIRP exceed the value assigned in the transmission line-up message by more than 1 dB. Automatic uplink power control systems may be employed by the Customer provided that prior approval for the particular system and use is obtained from NewSat.
 - 4.4 **HPA Requirement.** In determining the HPA size for a given earth station, it is necessary not only for the Customer's transmitting earth station to meet the maximum EIRP requirements, but also to meet the emission constraints set forth in Section 5.3 and comply with the uplink restrictions set forth in Section 4.7.

4.5 **Antenna Sidelobes.** All earth stations shall satisfy the following transmit sidelobe performance envelopes:

$$\begin{array}{lll} G \leq 29 - 25 \log_{10}(\theta) \text{ dBi}, & 10 < & \theta = 70 \\ G \leq 8 \text{ dBi}, & 70 < & \theta \leq 9.20 \\ G \leq 32 - 25 \log_{10}(\theta) \text{ dBi} & 9.20 < & \theta \leq 480 \\ G \leq -10 \text{ dBi}, & & \theta > 480 \end{array}$$

where G is the gain of the sidelobe envelope, relative to an isotropic antenna, in the direction of the geostationary orbit and θ is the angle in degrees between the main beam axis and the direction considered. For θ greater than 7 degrees, the envelope may be exceeded by 10% of the sidelobes, but no individual sidelobe may exceed the envelope by more than 3 dB. The receive sidelobes should also conform to the envelope described above to provide adjacent satellite interference isolation.

4.6 **Earth Station Polarization.** Earth stations transmitting signals to, and receiving signals from, the Satellite must be circularly or linearly polarized on both the uplink and downlink as determined by Transponder assignment. All such earth stations shall be polarization agile in either circular or linear modes and shall be able to simultaneously transmit and receive in the same polarization. Except as may be expressly permitted, the earth station cross-polarization isolation must be a minimum of 30 dB within the main beam of the earth station's transmit antenna pattern.

4.7 **Uplink Restrictions.** Except as may be expressly permitted by NewSat during a coordinated test period, no earth station operator shall transmit an unmodulated carrier through a Transponder. The operation of each earth station must be in strict adherence with a transmission plan submitted by the Customer and approved by NewSat. Any deviation from that transmission plan must be approved in advance by NewSat. Under no circumstances shall the earth station transmit an RF carrier to the Satellite on a frequency not authorised by NewSat, whether or not that frequency is in use by other stations.

5. Service Requirements.

5.1 **Video Service Requirements.** The Customer may use any video exciter which meets the minimum requirements listed below, provided that IF filtering is included to constrain the output spectrum. For analog video transmissions, an energy dispersal waveform shall be used. The Customer may add one or more audio or data subcarriers to the normal video baseband, provided that: (a) the EIRP of the composite carrier does not exceed the value specified in the transmission line-up message, and (b) the emission constraints set forth in this Appendix are maintained.

5.2 **Data Service Modem Requirements.** The Customer may use any digital, SCPC/PSK, MCPC/PSK satellite modem that meets their particular requirements, subject to the following constraints which are designed to ensure excess interference is not experienced by adjacent satellites or by other users of the Satellite:

- (a) Digital Modems - Scrambling must be provided to ensure that uniform spectral spreading is applied to the transmitted carrier at all times. A data scrambler built in accordance with ITU-T Rec. V.35, or a functionally equivalent unit with similar spectrum spreading characteristics, must be employed.
- (b) SCPC and MCPC/PSK - In general, any SCPC/PSK or MCPC/PSK modem which meets all relevant ITU-R and ITU-T recommendations is allowed, subject to prior approval by NewSat.
- (c) Other Modems - The use of other modem types is also permitted, subject to prior approval by NewSat.

5.3 **Emission Constraints.** The transmit earth station must be equipped and operated in such a manner that spurious emission at the output of the antenna due to all sources does not exceed 4 dBW/4 kHz outside of the assigned Transponder bandwidth. The EIRP density of each carrier, outside the bandwidth allocation of the Transponder or partial Transponder, which results from spectral re-growth due to earth station non-linearities shall be at least 26 dB below the main carrier spectral density, and shall not exceed 4 dBW in any 4 kHz band within the C- and Ku-band frequency range of the Satellite as measured at the output of the HPA.

6. **Customer Uplink Providers.** The Customer may contract with other parties to transmit its signals to, or receive its signals from, the Satellite; provided, that the Customer requires its contractors to comply with all of the requirements of this Agreement regarding transmissions to, or reception from, the Satellite and makes NewSat an intended third party beneficiary entitled to enforce such agreement (or to the extent that it may be required for enforceability, gives NewSat direct privity with respect to such agreement). If the Customer retains third parties as permitted by the previous sentence, those third parties' facilities shall be deemed to be Customer-Provided Facilities and the acts and omissions of those third parties in connection with the transmission or reception of the Customer's signals shall be deemed to be the acts and omissions both of such third parties and of the Customer.

7. **Customer Cooperation.** If a Service fails to meet the relevant Service Specifications, the Customer shall use all reasonable efforts to cooperate and aid NewSat in curing such failure by modifying the terrestrial facilities so that there is no net loss in performance, in which event the Service Specifications shall be deemed still to be met; provided that all reasonable efforts can be done at no expense to the Customer, unless reimbursed by NewSat. These obligations of the Customer shall include, but shall not be limited to, the following:

- 7.1 at the request of NewSat, if there is a problem that can be compensated for by increasing the power of its transmission(s) to the Satellite, without affecting its use of the Services, the Customer shall do so to the extent it can with existing equipment; and
- 7.2 permitting NewSat, at NewSat' sole discretion, and at NewSat' cost and expense, to upgrade the Customer-Provided Facilities.

Article II. General Requirements

8. **Carrier Frequency Assignments.** The assigned centre frequency of each carrier will be determined by NewSat in consultation with the Customer. It is required that all transmit and receive earth stations be capable of operation across the entire satellite frequency band and in both senses of polarization. It may, from time to time, be necessary to change carrier frequency assignments (a) to meet unforeseen changes in the Customer's requirements, (b) to avoid mutual interference with carriers in adjacent or co-frequency transponders, or (c) to enable efficient capacity utilisation and Transponder loading.
9. **Third Party Use.** Without implying any right of the Customer to permit any third party use of the Services, the Customer shall be responsible to NewSat for any third party use or transmissions that is permitted by the Customer to the same extent as it would be for the Customer's own use or transmissions and references in this Agreement with respect to the Customer's responsibilities to NewSat regarding the Customer's use or transmissions shall be interpreted accordingly.
10. **Satellite Power Constraint.** As the Satellite increases in age, because of an overall power constraint on the Satellite, it may be necessary in order to protect the overall health and performance of the Satellite to cease operating (or interrupt operation of) one or more Transponders on the Satellite. If a Service will be affected, and such action reasonably can be anticipated, NewSat will give the Customer thirty days notice, or such lesser period of notice as is practical under the circumstances.
11. **Pre-emptive Rights In Abnormal Circumstances.** The Customer recognises that it may be necessary, in unusual or abnormal technical situations or other unforeseen conditions, for NewSat to deliberately cease or interrupt the Customer's use of a Service, solely in order to protect the overall health and performance of the Satellite and/or to reassign certain amplifiers among Transponders on the Satellite to make use of a spare or redundant equipment unit. Such decisions shall be made by NewSat in its sole discretion. The Customer shall immediately cease transmissions to the affected Transponder(s) on the Satellite at such time as its Service is ceased or interrupted pursuant to this Section. The Customer acknowledges and agrees that the spare redundancy plan of the Satellite may require NewSat to reassign certain SSPAs or TWTAs, as applicable, among Transponders to make use of a spare. In circumstances in which a spare SSPA or TWTA is required to be employed and to do so requires a change in the SSPA or TWTA assigned to the Customer, the Customer shall, on notice from NewSat, immediately cease transmitting to the Satellite to allow the SSPA or TWTA that is assigned to its Transponder to be reassigned and a different unit (that meets the Service's Specifications) to be put in its place.
12. **Testing in the Event of Transponder Failure.** If a Transponder that is used to provide a Service is not meeting the Service Specifications, but the Customer elects to continue to use (and pay for) such Service, as degraded, NewSat may interrupt the Customer's use as necessary to perform testing or take any other action that may be appropriate to attempt to restore the affected Transponder to the Service Specifications.
13. **Telephone Notices.** For the purpose of receiving notices from NewSat regarding preemption, interference or other technical problems, including with respect to Transponder failure and restoration and denial of access, the Customer shall maintain at each earth station transmitting signals to the Satellite, a telephone that is continuously staffed at all times during which the Customer is transmitting signals to the Satellite and an automatic facsimile machine in operation and capable of receiving messages from NewSat at all times. **Those persons staffing the earth station, for the purposes of receiving such messages from NewSat, must have the technical capability and absolute authority immediately to terminate or modify the transmissions if notified by NewSat.** NewSat shall also maintain a telephone that is continuously staffed for the purposes of receiving notices regarding the matters identified above. All such notices shall be made in English and shall be effective upon the placement of a telephone call from one party to the other.

End of Appendix