

## INM-KA RETURN LINK BUDGET (COMMS. HCP )

| General                                            | Unit                 |                    |
|----------------------------------------------------|----------------------|--------------------|
| User terminal type                                 | -                    | Typ-150cm          |
| Carrier designator                                 | -                    | 4M78G7W            |
| Data rate (kbps)                                   | (kbps)               | 6366               |
| Coding rate                                        | -                    | 2/3                |
| Modulation                                         | -                    | 8PSK               |
| Occupied bandwidth                                 | (kHz)                | 3981.1             |
| Allocated bandwidth                                | (kHz)                | 4777.3             |
| <b>Uplink</b>                                      |                      |                    |
| Beam                                               |                      | User-Spot<br>(HCP) |
| Frequency                                          | (GHz)                | 29.25              |
| User Terminal EIRP                                 | (dBW)                | 59.5               |
| Antenna tx gain                                    | dBi                  | 51.4               |
| Uplink power                                       | (dBW)                | 8.1                |
| <i>Uplink p.s.d.</i>                               | <i>(dBW/Hz)</i>      | <i>-57.9</i>       |
| Path loss                                          | (dB)                 | 213.5              |
| Rain loss                                          | (dB)                 | 7.0                |
| Mean Atmospheric loss                              | (dB)                 | 1.7                |
| Satellite G/T (EOC)                                | (dB/K)               | 11.0               |
| Up-path C/No                                       | (dBHz)               | 76.7               |
| Up-path C/N                                        | (dB)                 | 10.7               |
| <b>Downlink</b>                                    |                      |                    |
| Beam                                               |                      | Feeder             |
| Frequency                                          | (GHz)                | 18                 |
| <i>Max pfd per crx @ earth surface (beam peak)</i> | <i>(dBW/m2/1MHz)</i> | <i>-135.9</i>      |
| Beam Peak to Edge of Coverage                      | (dB)                 | 3.0                |
| <i>Max pfd per crx @ earth surface (EOC)</i>       | <i>(dBW/m2/1MHz)</i> | <i>-138.9</i>      |
| Satellite EIRP (EOC)                               | (dBW)                | 29.1               |
| Path loss                                          | (dB)                 | 209.3              |
| Rain loss                                          | (dB)                 | 5.6                |
| Mean Atmospheric loss                              | (dB)                 | 0.7                |
| Earth Station G/T                                  | (dB/K)               | 42.0               |
| G/T degradation due to rain                        | (dB)                 | 2.6                |
| Rx terminal Pointing loss                          | (dB)                 | 0.1                |
| Co-Channel / adj . beam interf. (dn)               | (dBHz)               | 89.0               |
| Down-path C/No                                     | (dBHz)               | 80.8               |
| Down-path C/N                                      | (dB)                 | 14.8               |
| <b>Total</b>                                       |                      |                    |
| Mean satellite C/Imo                               | (dBHz)               | 86.1               |
| Mean Overall C/No                                  | (dBHz)               | 74.9               |
| Total C/I (adjacent satellite interference)        | (dB)                 | 23.1               |
| Mean Overall C/N (incl. a.s.i)                     | (dB)                 | 8.7                |
| <b>Margin</b>                                      |                      |                    |
| C/N required                                       | (dB)                 | 8.2                |

|            |      |     |
|------------|------|-----|
| C/N margin | (dB) | 0.5 |
|------------|------|-----|

### **C/I calculations**

|                                   |        |      |
|-----------------------------------|--------|------|
| Orbital separation (interferor 1) | degree | 2.0  |
| Worst case topocentric angle (1)  | degree | 2.09 |

#### **Uplink C/I**

|                                           |          |       |
|-------------------------------------------|----------|-------|
| Interferor 1                              |          |       |
| Max. uplink p.s.d                         | (dBW/Hz) | -56.0 |
| Other's sidelobe at 2 deg. sep X-25log(t) |          | 29.0  |
| Tx Sidelobe gain at 2 deg sep             | dBi      | 21.0  |
| Inm-Ka C/I up1                            | dB       | 25.5  |

#### **Downlink C/I**

|                                                    |              |             |
|----------------------------------------------------|--------------|-------------|
| Interferor 1                                       |              |             |
| Max. ground PFD                                    | (dBW/m2/MHz) | -121.1      |
| Max. downlink EIRP s.d                             | (dBW/Hz)     | -19.0       |
| Inm Rx sidelobe gain at 2 deg sep                  | dBi          | 21.0        |
| Inm-Ka C/I dn1                                     | dB           | 26.9        |
| <b>Total C/I (adjacent satellite interference)</b> | <b>dB</b>    | <b>23.1</b> |