

**S1. GENERAL INFORMATION** Complete for all satellite applications.

|                                                     |                          |                                                                           |  |                                                                                                                    |  |
|-----------------------------------------------------|--------------------------|---------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------|--|
| a. Space Station or Satellite Network Name:<br>XM-3 |                          | e. Estimated Date of Placement into Service:<br>4/20/2005                 |  | i. Will the space station(s) operate on a Common Carrier Basis:<br>N                                               |  |
| b. Construction Commencement Date:                  |                          | f. Estimated Lifetime of Satellite(s):<br>15 Years                        |  | j. Number of transponders offered on a common carrier basis:                                                       |  |
| c. Construction Completion Date:                    |                          | g. Total Number of Transponders:<br>2                                     |  | k. Total Common Carrier Transponder Bandwidth:<br>MHz                                                              |  |
| d1. Est Launch Date Begin:                          | d2. Est Launch Date End: | h. Total Transponder Bandwidth (no. transponders x Bandwidth)<br>3.68 MHz |  | i. Orbit Type: Mark all boxes that apply:<br><input checked="" type="checkbox"/> GSO <input type="checkbox"/> NGSO |  |

**S2. OPERATING FREQUENCY BANDS** Identify the frequency range and transmit/receive mode for all frequency bands in which this station will oper  
Also indicate the nature of service(s) for each frequency band.

| Frequency Band Limits |                 |                       |                 | e. T/R Mode | f. Nature of Service(s): List all that apply to this band |
|-----------------------|-----------------|-----------------------|-----------------|-------------|-----------------------------------------------------------|
| Lower Frequency (.Hz) |                 | Upper Frequency (.Hz) |                 |             |                                                           |
| a. Numeric            | b. Unit (K/M/G) | c. Numeric            | d. Unit (K/M/G) |             |                                                           |
| 2332.5                | M               | 2345.0                | M               | T           | Satellite Digital Audio Radio Service                     |
| 7025                  | M               | 7075                  | M               | R           | Satellite Digital Audio Radio Service                     |

**S3. ORBITAL INFORMATION FOR GEOSTATIONARY SATELLITES ONLY:**

|                                                         |               |                                                            |  |                                                                                                                                                                    |  |
|---------------------------------------------------------|---------------|------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| a. Nominal Orbital Longitude (Degrees E/W):<br>85.083 W |               | b. Alternate Orbital Longitude (Degrees E/W):              |  | c. Reason for orbital location selection:<br>Optimal Look Angle for CONUS/CANADA. Colocation with Primary Satellite XM Repeaters fed from 85.083 location of XM-3. |  |
| Longitudinal Tolerance or E/W Station-Keeping:          |               | f. Inclination Excursion or N/S Station-Keeping Tolerance: |  | Range of orbital are in which adequate service can be provided (Optional):<br><u>      Degrees      </u> <u>      E/W      </u>                                    |  |
| d. Toward West:                                         | 0.033 Degrees | e. Toward East:                                            |  | g. Westernmost:                                                                                                                                                    |  |
|                                                         | 0.033 Degrees | 0.05 Degrees                                               |  | h. Easternmost:                                                                                                                                                    |  |
| i. Reason for service are selection (Optional):         |               |                                                            |  |                                                                                                                                                                    |  |

**FEDERAL COMMUNICATIONS COMMISSION  
SATELLITE SPACE STATION AUTHORIZATIONS  
FCC Form 312 - Schedule S: (Technical and Operational Description)**

S4. ORBITAL INFORMATION FOR NON-GEOSTATIONARY SATELLITES ONLY

S4a. Total Number of Satellites in Network or System:

S4c. Celestial Reference Body (Earth, Sun, Moon, etc.):

S4b. Total Number of Orbital Planes in Network or System:

S4d. Orbit Epoch Date:

For each Orbital Plane Provide:

| (e) Orbital Plane No. | (f) No. of Satellites in Plane | (g) Inclination Angle (degrees) | (h) Orbital Period (Seconds) | (i) Apogee (km) | (j) Perigee (km) | (k) Right Ascension of the Ascending Node (Deg.) | (l) Argument of Perigee (Degrees) | Active Service Arc Range (Degrees) |               |           |
|-----------------------|--------------------------------|---------------------------------|------------------------------|-----------------|------------------|--------------------------------------------------|-----------------------------------|------------------------------------|---------------|-----------|
|                       |                                |                                 |                              |                 |                  |                                                  |                                   | (m) Begin Angle                    | (n) End Angle | (o) Other |
|                       |                                |                                 |                              |                 |                  |                                                  |                                   |                                    |               |           |

S5. INITIAL SATELLITE PHASE ANGLE For each satellite in each orbital plane, provide the initial phase angle.

| (a) Orbital Plane No. | (b) Satellite Number | (c) Initial Phase Angle (Degrees) |
|-----------------------|----------------------|-----------------------------------|
|                       |                      |                                   |

**NO NGSO DATA FILED**

**FEDERAL COMMUNICATIONS COMMISSION  
 SATELLITE SPACE STATION AUTHORIZATIONS  
 FCC Form 312 - Schedule S: (Technical and Operational Description)**

S6. SERVICE AREA CHARACTERISTICS for each service area provide:

| (a) Service Area ID | (b) Type of Associated Station (Earth or Space) | (c) Service Area Diagram File Name (GXT File) | (d) Service Area Description. Provide list of geographic areas (state postal codes or ITU 3-ltr codes), satellites or Figure No. of Service Area Diagram. |
|---------------------|-------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| USA                 | S                                               |                                               | USA                                                                                                                                                       |
| CAN                 | S                                               |                                               | CAN                                                                                                                                                       |

**FEDERAL COMMUNICATIONS COMMISSION**  
**SATELLITE SPACE STATION AUTHORIZATIONS**  
**FCC Form 312 - Schedule S: (Technical and Operational Description)**

S7. SPACE STATION ANTENNA BEAM CHARACTERISTICS For each antenna beam provide:

| (a)<br>Beam<br>ID | (b)<br>T/R<br>Mode | Isotropic Antenna<br>Gain |                   | (e)<br>Pointing<br>Error<br>(Degrees) | (f)<br>Rotational<br>Error<br>(Degrees) | (g) Min.<br>Cross-<br>Polar Iso-<br>lation (dB) | (h) Polar-<br>ization<br>Switch-<br>able?<br>(Y/N) | (i) Polarization<br>Alignment Rel.<br>Equatorial<br>Plane (Degrees) | (j) Service<br>Area ID | Transmit                       |                                      |                              | Receive                            |                                       |                                                    | Input Attenuator (dB) |                  |
|-------------------|--------------------|---------------------------|-------------------|---------------------------------------|-----------------------------------------|-------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------------|------------------------|--------------------------------|--------------------------------------|------------------------------|------------------------------------|---------------------------------------|----------------------------------------------------|-----------------------|------------------|
|                   |                    | (c) Peak<br>(dBi)         | (d) Edge<br>(dBi) |                                       |                                         |                                                 |                                                    |                                                                     |                        | (k)<br>Input<br>Losses<br>(dB) | (l) Effective<br>Output<br>Power (W) | (m)<br>Max.<br>EIRP<br>(dBW) | (n)<br>System<br>Noise<br>Temp (k) | (o) G/T<br>Max.<br>Gain Pt.<br>(db/K) | (p) Min.<br>Saturation<br>Flux Density<br>(dBW/m2) | (q) Max.<br>Value     | (r) Step<br>Size |
|                   |                    |                           |                   |                                       |                                         |                                                 |                                                    |                                                                     |                        |                                |                                      |                              |                                    |                                       |                                                    |                       |                  |
| XM2T              | T                  | 34.6                      | 27                | 0.1                                   | 0.1                                     | 17                                              | N                                                  |                                                                     | USA                    | 1                              |                                      | 71                           |                                    |                                       |                                                    |                       |                  |
| XM2               | R                  | 18.61                     | 18                | 0.1                                   | 0.1                                     | 30                                              | Y                                                  |                                                                     | USA                    |                                |                                      |                              | 509                                | -5.3                                  | -92                                                | 22                    | 1                |

**FEDERAL COMMUNICATIONS COMMISSION  
 SATELLITE SPACE STATION AUTHORIZATIONS  
 FCC Form 312 - Schedule S: (Technical and Operational Description)**

S8. ANTENNA BEAM DIAGRAMS For each beam pattern provide the reference to the graphic image and numerical data:  
 Also provide the power flux density levels in each beam that result from the emission with the highest power flux density.

| (a)<br>Beam<br>ID | (b)<br>T/R<br>Mode | (c) Co-or<br>Cross<br>Polar<br>Mode ("C"<br>or" X") | (d) GSO<br>Ref.<br>Orbital<br>Longitude<br>(Deg. E/W) | (e) NGSO Antenna Gain<br>Contour Description<br>(Figure/Table/ Exhibit) | (f) GSO Antenna<br>Gain Contour Data<br>(GXT File) | Max. Power Flux Density (dBW/M2/Hz)                                  |            |            |            |            |
|-------------------|--------------------|-----------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------|----------------------------------------------------------------------|------------|------------|------------|------------|
|                   |                    |                                                     |                                                       |                                                                         |                                                    | At Angle of Arrival above horizontal (for emission with highest PFD) |            |            |            |            |
|                   |                    |                                                     |                                                       |                                                                         |                                                    | (g) 5 Deg                                                            | (h) 10 Deg | (i) 15 Deg | (j) 20 Deg | (k) 25 Deg |
| XM2T              | T                  | C                                                   | 85.083                                                |                                                                         | 5083WL_Gain Conto                                  | -132                                                                 | -130       | -127       | -124       | -121.5     |
| XM2               | R                  | C                                                   | 85.083                                                |                                                                         | 3WL_Receive Gain C                                 |                                                                      |            |            |            |            |

**FEDERAL COMMUNICATIONS COMMISSION  
SATELLITE SPACE STATION AUTHORIZATIONS  
FCC Form 312 - Schedule S: (Technical and Operational Description)**

S9. SPACE STATION CHANNELS For each frequency channel provide: S10. SPACE STATION TRANSPONDERS For each transponder provide:

| (a)<br>Channel<br>No. | (B) Assigned<br>Bandwidth<br>(kHz) | (c)<br>T/R<br>Mode | (d) Center<br>Frequency<br>(MHz) | (e)<br>Polarization<br>(H, V, L, R) | (f) TTC<br>or Comm<br>Channel<br>(T or C) |
|-----------------------|------------------------------------|--------------------|----------------------------------|-------------------------------------|-------------------------------------------|
| 1                     | 1840                               | T                  | 2333.465                         | L                                   | C                                         |
| 2                     | 1840                               | T                  | 2335.305                         | L                                   | C                                         |
| 3                     | 1840                               | T                  | 2342.205                         | L                                   | C                                         |
| 4                     | 1840                               | T                  | 2344.045                         | L                                   | C                                         |
| 1R                    | 1840                               | R                  | 7063.993                         | R                                   | C                                         |
| 2R                    | 1840                               | R                  | 7061.561                         | R                                   | C                                         |
| 3R                    | 1840                               | R                  | 7065.965                         | R                                   | C                                         |
| 4R                    | 1840                               | R                  | 7068.397                         | R                                   | C                                         |
| CMD1                  | 800                                | R                  | 7047.0                           | L                                   | T                                         |
| CMD2                  | 800                                | R                  | 7072.0                           | L                                   | T                                         |
| TLM1                  | 100                                | T                  | 2337.7                           | R                                   | T                                         |
| TLM2                  | 100                                | T                  | 2338.2                           | R                                   | T                                         |
| TLM3                  | 100                                | T                  | 2333.0                           | R                                   | T                                         |
| TLM4                  | 100                                | T                  | 2341.5                           | R                                   | T                                         |
| 5                     | 1840                               | T                  | 2338.75                          | L                                   | C                                         |
| 5R                    | 1840                               | T                  | 7058.521                         | R                                   | C                                         |

| (a)<br>Transponder<br>ID | (b)<br>Transponder<br>Gain (dB) | Receive Band       |                | Transmit Band      |             |
|--------------------------|---------------------------------|--------------------|----------------|--------------------|-------------|
|                          |                                 | (c) Channel<br>No. | (d) Beam<br>ID | (e) Channel<br>No. | (f) Beam ID |
| 1                        | 150                             | 1R                 | XM2R           | 1                  | XM2T        |
| 2                        | 150                             | 2R                 | XM2R           | 2                  | XM2T        |
| 3                        | 150                             | 3R                 | XM2R           | 3                  | XM2T        |
| 4                        | 150                             | 4R                 | XM2R           | 4                  | XM2T        |
| CMD1                     |                                 | CMD1               | XM2R           |                    |             |
| CMD2                     |                                 | CMD2               | XM2R           |                    |             |
| TLM1                     |                                 |                    |                | TLM1               | XM2T        |
| 5                        | 150                             | 5R                 | XM2R           | 5                  | XM2T        |
| TLM2                     |                                 |                    |                | TLM2               | XM2T        |
| TLM3                     |                                 |                    |                | TLM3               | XM2T        |
| TLM4                     |                                 |                    |                | TLM4               | XM2T        |

**FEDERAL COMMUNICATIONS COMMISSION**  
**SATELLITE SPACE STATION AUTHORIZATIONS**  
**FCC Form 312 - Schedule S: (Technical and Operational Description)**

S11. DIGITAL MODULATION PARAMETERS For each digital emission provide:

| (a) Digital Mod. ID | (b) Emission Designator | (c) Assigned Bandwidth (kHz) | (d) No. of Phases | (e) Uncoded Data Rate (kbps) | (f) FEC Error Correction Coding Rate | (g) CDMA Processing Gain (dB) | (h) Total C/N Performance Objective (dB) | (i) Single Entry C/I Objective (dB) |
|---------------------|-------------------------|------------------------------|-------------------|------------------------------|--------------------------------------|-------------------------------|------------------------------------------|-------------------------------------|
| TDM                 | 1M84G1ED                | 1840                         | 4                 | 2048                         | 0.75                                 |                               | 69.1                                     | 85                                  |
| CMD                 | 800KF2DC                | 800                          | 1                 | 1                            |                                      |                               |                                          |                                     |
| TLM                 | 100KG2DC                | 100                          | 2                 | 4                            |                                      |                               | 48                                       |                                     |





**FEDERAL COMMUNICATIONS COMMISSION**  
**SATELLITE SPACE STATION AUTHORIZATIONS**  
**FCC Form 312 - Schedule S: (Technical and Operational Description)**

S13. TYPICAL EMISSIONS For each planned type of emission provide:

| Associated Transponder ID Range<br>(a) Start    (b) End |      | Modulation ID           |                        | (e) Carriers per Transponder | (f) Carrier Spacing (kHz) | (g) Noise Budget Reference (Table No.) | (h) Energy Dispersal Bandwidth (kHz) | Receive Band (Assoc. Transmit Stn)      |                                     |          | Transmit Band (This Space Station) |    |                                                      |                                |
|---------------------------------------------------------|------|-------------------------|------------------------|------------------------------|---------------------------|----------------------------------------|--------------------------------------|-----------------------------------------|-------------------------------------|----------|------------------------------------|----|------------------------------------------------------|--------------------------------|
|                                                         |      | (c) Digital (Table S11) | (d) Analog (Table S12) |                              |                           |                                        |                                      | (i) Assoc. Stn. Max. Antenna Gain (dBi) | Assoc. Station Transmit Power (dBW) |          | EIRP (dBW)                         |    | (n) Max. Power Flux Density (dBW/m <sup>2</sup> /Hz) | (o) Assoc. Stn Rec. G/T (dB/K) |
|                                                         |      |                         |                        |                              |                           | (j) Min.                               | (k) Max.                             |                                         | (l) Min.                            | (m) Max. |                                    |    |                                                      |                                |
| 1                                                       | 5    | TDM                     |                        | 1                            |                           |                                        | 0                                    | 52.3                                    | 41                                  | 64       | 60                                 | 71 | -118                                                 | -20                            |
| CMD1                                                    | CMD2 | CMD                     |                        | 1                            |                           |                                        | 0                                    | 52.4                                    | 64                                  | 78       |                                    |    |                                                      |                                |
| TLM1                                                    | TLM1 | TLM                     |                        | 1                            |                           |                                        |                                      |                                         |                                     |          | 24                                 | 32 | -157                                                 | 21.8                           |

**FEDERAL COMMUNICATIONS COMMISSION  
SATELLITE SPACE STATION AUTHORIZATIONS  
FCC Form 312 - Schedule S: (Technical and Operational Description)**

S14. Is the space station(s) controlled and monitored remotely? If Yes, provide the location and telephone number of the TT and C control point(s): No

**Remote Control (TT C) Location(s):**

|                                                     |                          |                                                                 |                          |
|-----------------------------------------------------|--------------------------|-----------------------------------------------------------------|--------------------------|
| S14a: Street Address:<br>2875 Fork Creek Church Rd. |                          |                                                                 |                          |
| S14b. City:<br>Ellenwood                            | S14c. County:<br>Clayton | S14d. State/Country<br>GA                                       | S14e. Zip Code:<br>30294 |
| S14f. Telephone Number:<br>4043812000               |                          | S14g. Call Sign of Control Station (if appropriate):<br>E040204 |                          |

**Remote Control (TT C) Location(s):**

|                                                  |               |                                                                 |                          |
|--------------------------------------------------|---------------|-----------------------------------------------------------------|--------------------------|
| S14a: Street Address:<br>1500 Eckington Place NE |               |                                                                 |                          |
| S14b. City:<br>Washington                        | S14c. County: | S14d. State/Country<br>DC                                       | S14e. Zip Code:<br>20002 |
| S14f. Telephone Number:<br>2023804000            |               | S14g. Call Sign of Control Station (if appropriate):<br>E000158 |                          |

**Remote Control (TT C) Location(s):**

|                                             |                          |                                                      |                            |
|---------------------------------------------|--------------------------|------------------------------------------------------|----------------------------|
| S14a: Street Address:<br>1780 Centre Ave NE |                          |                                                      |                            |
| S14b. City:<br>Calgary                      | S14c. County:<br>Alberta | S14d. State/Country                                  | S14e. Zip Code:<br>T2E 0A6 |
| S14f. Telephone Number:<br>4032355751       |                          | S14g. Call Sign of Control Station (if appropriate): |                            |

**Remote Control (TT C) Location(s):**

|                                               |                          |                                                      |                            |
|-----------------------------------------------|--------------------------|------------------------------------------------------|----------------------------|
| S14a: Street Address:<br>133438 Allan Park Rd |                          |                                                      |                            |
| S14b. City:<br>Allan Park                     | S14c. County:<br>Ontario | S14d. State/Country                                  | S14e. Zip Code:<br>N4N 3B8 |
| S14f. Telephone Number:<br>5193641013         |                          | S14g. Call Sign of Control Station (if appropriate): |                            |

**FEDERAL COMMUNICATIONS COMMISSION  
SATELLITE SPACE STATION AUTHORIZATIONS  
FCC Form 312 - Schedule S: (Technical and Operational Description)**

Page 11:  
Characteristics and  
Certifications

S15. SPACECRAFT PHYSICAL CHARACTERISTICS:

|                                                                 |                                   |                                                       |
|-----------------------------------------------------------------|-----------------------------------|-------------------------------------------------------|
| S15a. Mass of spacecraft without fuel (kg):<br>2746             | Spacecraft Dimensions<br>(meters) | Probability of Survival to<br>End of Life (0.0 - 1.0) |
| S15b. Mass of fuel and disposables at launch (kg):<br>1981      |                                   |                                                       |
| S15c. Mass of spacecraft and fuel at launch (kg):<br>4727       | S15f. Length (m):<br>6.75         | S15i. Payload:<br>0.8795                              |
| S15d. Mass of fuel, in orbit, at beginning of life (kg):<br>231 | S15g. Width (m):<br>14.24         | S15j. Bus:<br>0.8665                                  |
| S15e. Deployed Area of Solar Array (square meters):<br>76       | S15h. Height (m):<br>43.9         | S15k. Total:<br>0.762                                 |

S16. SPACECRAFT ELECTRICAL CHARACTERISTICS:

| Spacecraft Subsystem            | Electrical Power (Watts) At Beginning of Life |             | Electrical Power (Watts) At End of Life |             |
|---------------------------------|-----------------------------------------------|-------------|-----------------------------------------|-------------|
|                                 | At Equinox                                    | At Solstice | At Equinox                              | At Solstice |
| Payload (Watts):                | (a): 12844                                    | (f): 12844  | (k): 12844                              | (p): 12844  |
| Bus (Watts):                    | (b): 971                                      | (g): 908    | (l): 971                                | (q): 908    |
| Total (Watts):                  | (c): 13815                                    | (h): 13752  | (m): 13815                              | (r): 13752  |
| Solar Array (Watts):            | (d): 20000                                    | (i): 19500  | (n): 17842                              | (s): 15672  |
| Depth of Battery Discharge (%): | (e) 78.5 %                                    | (j) 13.6 %  | (o) 78.5 %                              | (t) 13.6 %  |

S17. CERTIFICATIONS:

|                                                                                                                        |                                         |                             |                                         |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-----------------------------|-----------------------------------------|
| a. Are the power flux density limits of § 25.208 met?                                                                  | <input checked="" type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A            |
| b. Are the appropriate service area coverage requirements of § 25.143(b)(ii) and (iii), or § 25.145(c)(1) and (2) met? | <input type="checkbox"/> YES            | <input type="checkbox"/> NO | <input checked="" type="checkbox"/> N/A |
| c. Are the frequency tolerances of § 25.202(e) and the out-of-band emission limits of § 25.202(f)(1), (2) and (3) met? | <input checked="" type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A            |

**In addition to the information required in this Form, the space station applicant is required to provide all the information specified in Section 25.114 of the Commission's rules, 47 C.F.R § 25.114.**