FCC 312 Schedule S	FEDERAL COMMUNICATIONS COMMISSION SATELLITE SPACE STATION AUTHORIZATIONS (Technical and Operational Description)	Page 1: General, Frequency Bands, and GSO Orbit

S1. GENERAL INFORMATION Complete for all satellite applications.

a. Space Station or Satellite Network Name:		e. Estimated Date of Placement into Service:	i Will the space station(s) operate on a Common Carrier Basis:
CANSAT-24		11/30/2008	N
b. Construction Commencement Date:		f. Estimated Lifetime of Satellite(s):	j. Number of transponders offered on a common carrier basis:
3/31/2005		15 Years	
c. Construction Completion Date:		g. Total Number of Transponders:	k. Total Common Carrier Transponder Bandwidth:
8/31/2007		448	MHz
d1. Est Launch Date Begin:	d2. Est Launch Date End:	h. Total Transponder Bandwidth (no. transponders x Bandwidth)	l. Orbit Type: Mark all boxes that apply:
11/1/2007	11/30/2007	2240 MHz	[X] GSO [ ] 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)		
2180	M	2200	M	T	Mobile Satellite Service
10.7	M	10.95	G	T	Feeder Link for Mobile Satellite Service in FSS
11.2	M	11.45	G	T	Feeder Link for Mobile Satellite Service in FSS
13.75	G	13.753	G	R	Fixed Satellite Service - Transfer Orbit and Emergency Operations
2000	M	2020	M	R	Mobile-Satellite Service
12.75	G	13.25	G	R	Fixed Satellite Service

S3. ORBITAL INFORMATION FOR GEOSTATIONARY SATELLITES ONLY:

a. Nominal Orbital Longitude (Degrees E/W):	b. Alternate Orbital Longitude (Degrees E/W):		c. Reason for orbital location selection:
111.1 W			TerreStar (ITU designator CANSAT-24) will operate at -111.1WL that is an available Canadian ITU Appendix 30B Ku-Band orbital location and TerreStar will use that band for feeder link and TTC.operation.
Longitudinal Tolerance or E/W Station-Keeping: d. Toward West: 0.05 Degrees e. Toward East: 0.05 Degrees	f. Inclination Excursion or N/S Station-Keeping Tolerance: 6 Degrees	Range of orbital are in which adequate service can be provided (Optional): Degrees E/W g. Westernmost: h. Easternmost:	
i. Reason for service are selection (Optional):			

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S4. ORBITAL INFORMATION FOR NON-GEOSTATIONARY SATELLITES ONLY

S4a. Total Number of Satellites in Network or System:

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

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

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 intital phase angle.

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

NO NGSO DATA FILED

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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.
SA1	S	E_SD1sa.gxt	Conus, Alaska, Canada as required by Canadian Authority
SA2	S	E_SD2a.gxt	Hawaii
SA3	S	E_SD3prsa.gxt	Puerto Rico and US Virgin Islands
SAFL	S	E_SAFL.gxt	Conus, Southern Canada
OMNI	S	E_OMSA.gxt	Global

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

(a) Beam ID	(b) T/R Mode	Isotropic Antenna Gain		(e) Pointing Error (Degrees)	(f) Rotational Error (Degrees)	(g) Min. Cross-Polar Iso-lation (dB)	(h) Polar-ization Switch-able? (Y/N)	(i) Polarization Alignment Rel. Equatorial Plane (Degrees)	(j) Service Area ID	Transmit			Receive				
		(c) Peak (dBi)	(d) Edge (dBi)							(k) Input Losses (dB)	(l) Effective Output Power (W)	(m) Max. EIRP (dBW)	(n) System Noice Temp (k)	(o) G/T Max. Gain Pt. (db/K)	(p) Min. Saturation Flux Density (dBW/m2)	Input Attenuator (dB)	
																(q) Max. Value	(r) Step Size
SU1	R	47	46.2	0.03		21.3	N		SA1				331	21.8	-158.2	31	1
SD1	T	48	47.2	0.03		18.8	N		SA1	2.3	269	72.3					
SU2	R	39.9	38.6	0.03		21.3	N		SA2				282	15.4	-152.1	31	1
SD2	T	40.8	39.1	0.03		18.3	N		SA2	2.3	107	61.1					
SU3	R	43.6	41.5	0.03		21.3	N		SA3				417	17.4	-154.8	31	1
SD3	T	43.85	41.43	0.03		18.3	N		SA3	2.3	106	64.1					
KU1	R	46.7	43.9	0.16		30	N		SAFL				617	18.8	-112	36	1
KU1	T	46.4	43.6	0.16		30	N		SAFL	2.6	3.8	52.15					
CMD	R	46.7	43.9	0.16		30	N		SAFL				32767	-0.5	-112		
TLM	T	46.4	43.6	0.16		30	N		SAFL	10	0.0034	21.7					
BCN	T	46.4	43.6	0.16		30	N		SAFL	10	0.0046	23					
PLT	R	46.7	43.9	0.16		30	N		SAFL				32767	-0.5	-107		
CES	R	43.42	28.91	0.16		19	N		SA1				982	13.5	-158.2	31	1
CES	T	43.42	28.91	0.16		19	N		SA1	3.4	0.47	40.1					
OMN	R	3	-4	0		30	N		OMNI				2042	-30.1	-82.3		
OMN	T	3	-4	0		30	N		OMNI	3.39	11	13.41					
CES	R	43.42	28.91	0.16		19	N		SA1				982	13.5	-158.2	31	1

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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) Beam ID	(b) T/R Mode	(c) Co-or Cross Polar Mode ("C" or" X")	(d) GSO Ref. Orbital Longitude (Deg. E/W)	(e) NGSO Antenna Gain Contour Description (Figure/Table/ Exhibit)	(f) GSO Antenna Gain Contour Data (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
SU1	R	C	-111.1		r-Composite-Rx-updat					
SD1	T	C	-111.1		r-Composite-Tx-updat					
SU2	R	C	-111.1		R_SU2co.gxt					
SD2	T	C	-111.1		E_SD2co.gxt					
SU3	R	C	-111.1		R_SU3co.gxt					
SD3	T	C	-111.1		E_SD3co.gxt					
KU1	R	C	-111.1		ku-lv-12750L.gxt					
KU1	T	C	-111.1		ku-lv-10700L.gxt	-153.7	-153.6	-153.5	-153.4	-153.3
OMN	T	C	-111.1		OMNID.gxt					

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S9. SPACE STATION CHANNELS For each frequency channel provide:

(a) Channel No.	(B) Assigned Bandwidth (kHz)	(c) T/R Mode	(d) Center Frequency (MHz)	(e) Polarization (H, V, L, R)	(f) TTC or Comm Channel (T or C)
KLDU	250000	R	12875	L	C
KRDU	250000	R	12875	R	C
KLDD1	250000	T	10825	L	C
KRDD1	250000	T	10825	R	C
KLDD2	250000	T	11325	L	C
KRDD2	250000	T	11325	R	C
SLD	10000	T	2190	L	C
SLU	10000	R	2010	L	C
SRU	10000	R	2010	R	C
CMD1	800	R	12751	L	T
CMD2	800	R	12999	L	T
TLM1	100	T	11200.5	R	T
TLM2	100	T	11449.5	R	T
ELOU1	800	R	13750.5	L	T
ELOU2	800	R	13752.5	L	T
BEAC	0.001	T	11448	R	T
PILOT	0.001	T	12992	L	T
CES	50	T	2190	L	C
CES	50	R	2010	R	C

S10. SPACE STATION TRANSPONDERS For each transponder provide:

(a) Transponder ID	(b) Transponder Gain (dB)	Receive Band		Transmit Band	
		(c) Channel No.	(d) Beam ID	(e) Channel No.	(f) Beam ID
FLINK	153	KLDU	KU1U	SLD	SD1
RLINK	145	SRU	SU1	KLDD1	KU1D

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)
CDMAR	1M25G7W	1250	4	63	0.2		-2.98	-3.484154
CDMAR	1M25G7W	1250	4	5.64	0.2		-2.98	-13.96477
GMR1R	31K3G7W	31.25	4	35.1	0.75		5.5	17.97154
GMR1R	156KG7W	156.25	4	156	0.67		4.4	16.87154
FDMAR	6K50G7W	6.5	4	5.64	0.58		3.4	15.87154
FDMAR	26K0G7W	26	12	38.9	0.5		7.4	19.87154
GMR2R	50K0G7W	50	4	45.1	0.67		4.4	16.87154
GMR2R	200KG7W	200	4	180.7	0.68		4.4	16.87154
OFDMA	54K7G7W	54.7	12	50.8	0.5		7.4	19.87154
OFDMA	54K7G7W	54.7	4	33.9	0.67		4.4	18.87154
EVDOF	1M25G7W	1250	4	964	0.5		1.51	12.85321
EVDOF	1M25G7W	1250	4	5.64	0.2		-3.53	-14.51477
GMR1F	31K3G7W	31.25	4	35.1	0.75		4.76	17.23154
GMR1F	313KG7W	312.512	12	624	0.67		9.58	22.05154
GMR2F	200KG7W	200	12	361.1	0.67		9.58	22.05154
GMR2F	200KG7W	200	4	180.5	0.67		3.72	16.19154
OFDMF	1M25G7W	1250	12	1445.1	0.67		9.58	22.05154
OFDMF	1M25G7W	1250	4	372.57	0.67		3.72	16.19154
CESF	50K0G7W	50	2		1		38	14.67154
CESR	50K0G7W	50	2		1		26	6.43154
CESPR	50K0G7W	50	2		1		32	12.43154

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S12. ANALOG MODULATION PARAMETERS For each analog emission provide:

(a) Analog Mod. ID	(b) Emission Designator	(c) Assigned Bandwidth (kHz)	(d) Signal Type	(e) Channels per Carrier	Multi-channel Telephony				(j) Video Standard NTSC, PAL, etc.	(k) Video Noise-Weighting (dB)	(l) Video and SCPC/FM Modulation Index	(m) SCPC/FM Compander, Preemphasis, and Noise Weighting (dB)	(n) Total C/N Performance Objective (dB)	(o) Single Entry C/I Objective (dB)
					(f) Ave. Companded Talker Level (dBm0)	(g) Bottom Baseband Freq. (MHz)	(h) Top Baseband Freq. (MHz)	(i) RMS Modulation Index						
TLM	138KGXD	100	PM											
CMD	700KF9D	1000	FM											

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

Associated Transponder ID Range		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)			
								(i)Assoc. Stn. Max. Antenna Gain (dBi)	Assoc. Station Transmit Power (dBW)		EIRP (dBW)		(n) Max. Power Flux Density (dBW/m2/Hz)	(o)Assoc. Stn Rec. G/T (dB/K)
(a) Start	(b) End	(c) Digital (Table S11)	(d) Analog (Table S12)						(j) Min.	(k) Max.	(l) Min.	(m) Max.		
RLINK	RLINK	CDMAR		129	1250	LB1.doc		0	-9	-6	-1.32	6.95	-181	34.5
RLINK	RLINK	GMR1R		13	31.25	LB2.doc		0	-9	-6	9.2	14.5	-164	34.5
RLINK	RLINK	FDMAR		64	6.5	LB3.doc		0	-9	-6	2.6	8.5	-162	34.5
RLINK	RLINK	GMR2R		8	50	LB4.doc		0	-9	-6	10.6	14.5	-165	34.5
RLINK	RLINK	OFDMA		8	43.8	LB5.doc		0	-9	-6	9.7	9.7	-162	34.5
FLINK	FLINK	EVDOF		1		LB6.doc		61	-12.1	-5.9	52.86	75.1	-112	-28
FLINK	FLINK	GMR1F		4	31.25	LB7.doc		61	-18.5	-5.9	46.4	73.6	-108	-28
FLINK	FLINK	GMR2F		1		LB8.doc		61	-13.8	-9.8	52.6	69.9	-110	-28
FLINK	FLINK	OFDMF		17	10.94	LB9.doc		61	-20	-20	40.7	63.9	-121	-28

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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): #Error

Remote Control (TT C) Location(s):

S14a: Street Address: 133438 Allan Park Rd.			
S14b. City: Allan Park	S14c. County:	S14d. State/Country ON	S14e. Zip Code: N4N B8
S14f. Telephone Number: 519-371-7490	S14g. Call Sign of Control Station (if appropriate): NEW		

Remote Control (TT C) Location(s):

S14a: Street Address: One Aerojet Way			
S14b. City: North Las Vegas	S14c. County:	S14d. State/Country NV	S14e. Zip Code: 89030
S14f. Telephone Number: 571-223-6604	S14g. Call Sign of Control Station (if appropriate): NEW		

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S15. SPACECRAFT PHYSICAL CHARACTERISTICS:

S15a: Mass of spacecraft without fuel (kg): 3801	Spacecraft Dimensions (meters)	Probability of Survival to End of Life (0.0 - 1.0)
S15b. Mass of fuel and disposables at launch (kg): 2899		
S15c. Mass of spacecraft and fuel at launch (kg): 6700	S15f. Length (m): 32	S15i. Payload: 0.84
S15d. Mass of fuel, in orbit, at beginning of life (kg): 334.8	S15g. Width (m): 26.3	S15j. Bus: 0.84
S15e. Deployed Area of Solar Array (square meters): 58.25	S15h. Height (m): 7.6	S15k. Total: 0.7

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): 10270	(f): 10270	(k): 10270	(p): 10270
Bus (Watts):	(b): 1535	(g): 1535	(l): 1535	(q): 1535
Total (Watts):	(c): 13193	(h): 11805	(m) 12905	(r): 10890
Solar Array (Watts):	(d): 15808	(i): 14218	(n): 15560	(s): 14020
Depth of Battery Discharge (%):	(e) 74 %	(j) 0 %	(o) 74 %	(t) 0 %

S17. CERTIFICATIONS:

a. Are the power flux density limits of § 25.208 met?:	[X] YES	[ ] NO	[ ] 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?	[X] YES	[ ] NO	[ ] 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?	[X] YES	[ ] NO	[ ] 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.