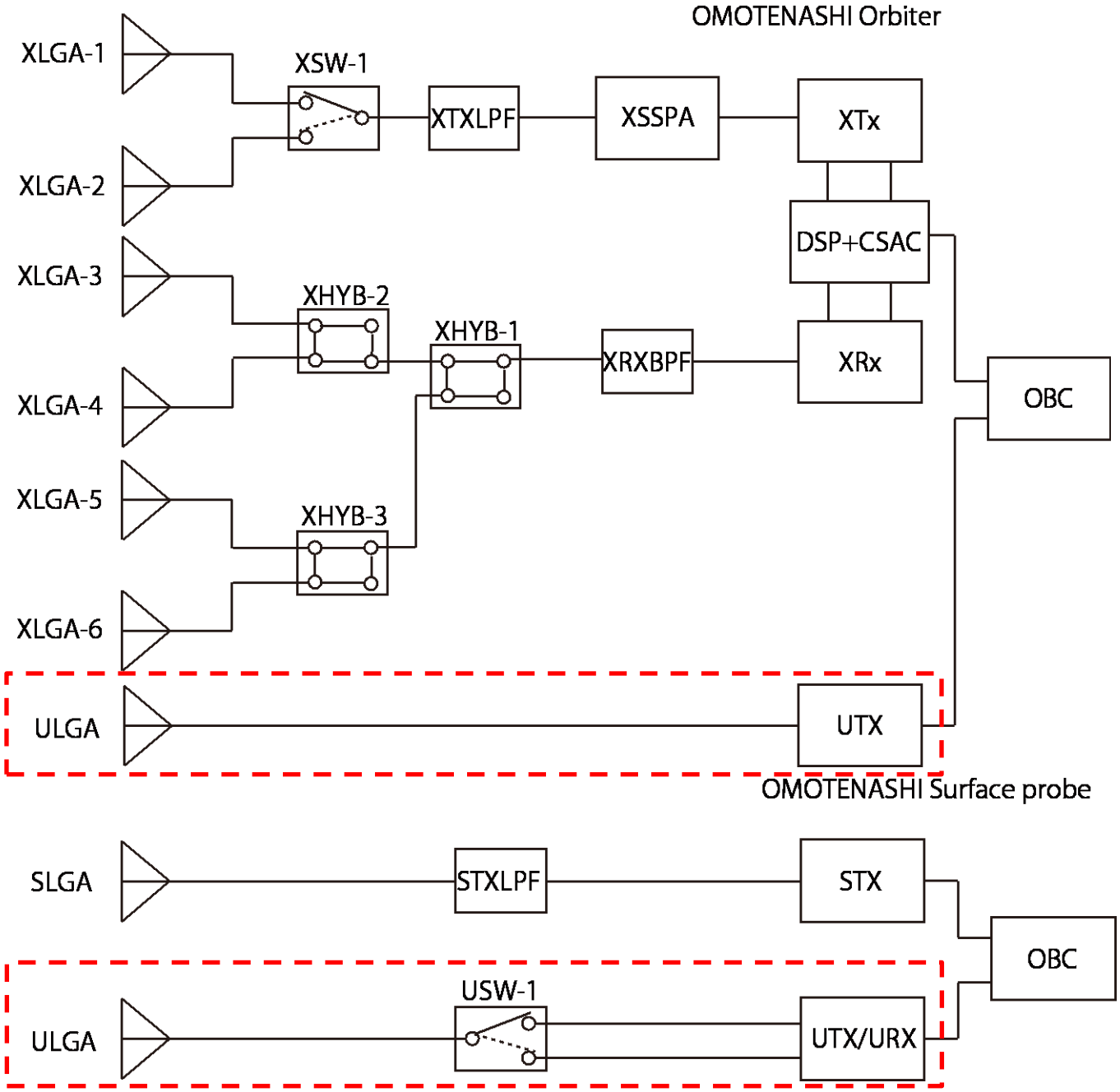
OMOTENASHI Telecommunication system



Link budget (Command: FSK 300bps)

Distance: 20000km

Parameter	Unit	Uplink		
Frequency	MHz	435	435-436MHz	
Transmit. Power	dBm	60.0	1	kW
Transmit. Feeder Loss	dB	-1.7		
Transmit. Ant Gain	dBi	28.9	BW: ±2deg	
EIRP	dBm	87.3		
Transmit. Point. Loss	dB	-1.0	±0.5deg	
Polarization Loss	dB	-3.0		
Range	AU	0.000133692	20000	km
Space Loss	dB	-171.2		
Absorb. Loss	dB	-0.3		
Rain Loss	dB	0.0	Fine weather	
Receiv. Point. Loss	dB	0.0		
Receiv. Ant. Gain	dBi	0.0	UHF LGA	
Receiv. Feeder Loss	dB	-0.5		
Receiv. Signal Power	dBm	-88.8	Ta: 10K	
System Noise temp.	K	190.3	NF: 1.6dB	
Noise Power Density	dBm/Hz	-175.8	Loss: 0.5dB	
G/T	dB/K	-23.3		
C/No	dB･Hz	87.0		

		FSK		
Modulation Index	rad	0.0		
Modulation Loss	dB	0.0		
Hardware Loss	dB	1.0		
Bit Rate or Band width	dB･Hz	24.8	300	bps
Coding Gain	dB			
Required Eb/No or S/N	dB	12.3	1.0E-04	BER
Required C/No	dB･Hz	38.1		

Margin	dB	48.9	

Distance: 400000km

Parameter	Unit	Uplink		
Frequency	MHz	435	435-436MHz	
Transmit. Power	dBm	60.0	1	kW
Transmit. Feeder Loss	dB	-1.7		
Transmit. Ant Gain	dBi	28.9	BW: ±2deg	
EIRP	dBm	87.3		
Transmit. Point. Loss	dB	-1.0	±0.5deg	
Polarization Loss	dB	-3.0		
Range	AU	0.002673833	400000	km
Space Loss	dB	-197.3		
Absorb. Loss	dB	-0.3		
Rain Loss	dB	0.0	Fine weather	
Receiv. Point. Loss	dB	0.0		
Receiv. Ant. Gain	dBi	0.0	UHF LGA	
Receiv. Feeder Loss	dB	-0.5		
Receiv. Signal Power	dBm	-114.8	Ta: 10K	
System Noise temp.	K	190.3	NF: 1.6dB	
Noise Power Density	dBm/Hz	-175.8	Loss: 0.5dB	
G/T	dB/K	-23.3		
C/No	dB･Hz	61.0		

		FSK		
Modulation Index	rad	0.0		
Modulation Loss	dB	0.0		
Hardware Loss	dB	1.0		
Bit Rate or Band width	dB･Hz	24.8	300	bps
Coding Gain	dB			
Required Eb/No or S/N	dB	12.3	1.0E-04	BER
Required C/No	dB･Hz	38.1		

Margin	dB	22.9	

Link budget (CW)

Distance: 20000km

Parameter	Unit	Downlink		
Frequency	MHz	437.31		
Transmit. Power	dBm	30.0	1	W
Transmit. Feeder Loss	dB	-0.5		
Transmit. Ant Gain	dBi	0.0	UHF LGA	
EIRP	dBm	29.5		
Transmit. Point. Loss	dB	0.0		
Polarization Loss	dB	-3.0		
Range	AU	0.000133692	20000	km
Space Loss	dB	-171.3		
Absorb. Loss	dB	-0.3		
Rain Loss	dB	0.0	Fine weather	
Receiv. Point. Loss	dB	-1.0	±0.5deg	
Receiv. Ant. Gain	dBi	28.9	BW: ±2deg	
Receiv. Feeder Loss	dB	-1.7		
Receiv. Signal Power	dBm	-118.8	Ta: 300K	
System Noise temp.	K	525.7	NF: 1.0dB	
Noise Power Density	dBm/Hz	-171.4	Loss: 1.5dB	
G/T	dB/K	-1.0		
C/No	dB･Hz	52.6		

Distance: 400000km

Parameter	Unit	Downlink		
Frequency	MHz	437.31		
Transmit. Power	dBm	30.0	1	W
Transmit. Feeder Loss	dB	-0.5		
Transmit. Ant Gain	dBi	0.0	UHF LGA	
EIRP	dBm	29.5		
Transmit. Point. Loss	dB	0.0		
Polarization Loss	dB	-3.0		
Range	AU	0.002673833	400000	km
Space Loss	dB	-197.3		
Absorb. Loss	dB	-0.3		
Rain Loss	dB	0.0	Fine weather	
Receiv. Point. Loss	dB	-1.0	±0.5deg	
Receiv. Ant. Gain	dBi	28.9	BW: ±2deg	
Receiv. Feeder Loss	dB	-1.7		
Receiv. Signal Power	dBm	-144.8	Ta: 300K	
System Noise temp.	K	525.7	NF: 1.0dB	
Noise Power Density	dBm/Hz	-171.4	Loss: 1.5dB	
G/T	dB/K	-1.0		
C/No	dB･Hz	26.5		

Link budget (Telemetry: PSK31 31.25bps)

Distance: 20000km

Parameter	Unit	Downlink		
Frequency	MHz	437.31		
Transmit. Power	dBm	30.0	1	W
Transmit. Feeder Loss	dB	-0.5		
Transmit. Ant Gain	dBi	0.0	UHF LGA	
EIRP	dBm	29.5		
Transmit. Point. Loss	dB	0.0		
Polarization Loss	dB	-3.0		
Range	AU	0.000133692	20000	km
Space Loss	dB	-171.3		
Absorb. Loss	dB	-0.3		
Rain Loss	dB	0.0	Fine weather	
Receiv. Point. Loss	dB	-1.0	±0.5deg	
Receiv. Ant. Gain	dBi	28.9	BW: ±2deg	
Receiv. Feeder Loss	dB	-1.7		
Receiv. Signal Power	dBm	-118.8	Ta: 300K	
System Noise temp.	K	525.7	NF: 1.0dB	
Noise Power Density	dBm/Hz	-171.4	Loss: 1.5dB	
G/T	dB/K	-1.0		
C/No	dB･Hz	52.6		

		PSK31		
Modulation Index	rad	0.0		
Modulation Loss	dB	0.0		
Hardware Loss	dB	1.0		
Bit Rate or Band width	dB･Hz	14.9	31.25	bps
Coding Gain	dB	0.0		
Required Eb/No or S/N	dB	9.6	1.0E-05	BER
Required C/No	dB･Hz	25.5		

Margin	dB	27.0		

Distance: 400000km

Parameter	Unit	Downlink		
Frequency	MHz	437.31		
Transmit. Power	dBm	30.0	1	W
Transmit. Feeder Loss	dB	-0.5		
Transmit. Ant Gain	dBi	0.0	UHF LGA	
EIRP	dBm	29.5		
Transmit. Point. Loss	dB	0.0		
Polarization Loss	dB	-3.0		
Range	AU	0.002673833	400000	km
Space Loss	dB	-197.3		
Absorb. Loss	dB	-0.3		
Rain Loss	dB	0.0	Fine weather	
Receiv. Point. Loss	dB	-1.0	±0.5deg	
Receiv. Ant. Gain	dBi	28.9	BW: ±2deg	
Receiv. Feeder Loss	dB	-1.7		
Receiv. Signal Power	dBm	-144.8	Ta: 300K	
System Noise temp.	K	525.7	NF: 1.0dB	
Noise Power Density	dBm/Hz	-171.4	Loss: 1.5dB	
G/T	dB/K	-1.0		
C/No	dB･Hz	26.5		

		PSK31		
Modulation Index	rad	0.0		
Modulation Loss	dB	0.0		
Hardware Loss	dB	1.0		
Bit Rate or Band width	dB･Hz	14.9	31.25	bps
Coding Gain	dB	0.0		
Required Eb/No or S/N	dB	9.6	1.0E-05	BER
Required C/No	dB･Hz	25.5		

Margin	dB	1.0		

Link budget (Telemetry: PCM/PSK/PM 31.25bps)

Distance: 20000km

Parameter	Unit	Downlink					
Frequency	MHz	437.31					
Transmit. Power	dBm	30.0	1	W			
Transmit. Feeder Loss	dB	-0.5					
Transmit. Ant Gain	dBi	0.0	UHF LGA				
EIRP	dBm	29.5					
Transmit. Point. Loss	dB	0.0					
Polarization Loss	dB	-3.0					
Range	AU	0.000133692	20000	km			
Space Loss	dB	-171.3					
Absorb. Loss	dB	-0.3					
Rain Loss	dB	0.0	Fine weather				
Receiv. Point. Loss	dB	-1.0	±0.5deg				
Receiv. Ant. Gain	dBi	28.9	BW: ±2deg				
Receiv. Feeder Loss	dB	-1.7					
Receiv. Signal Power	dBm	-118.8	Ta: 300K				
System Noise temp.	K	525.7	NF: 1.0dB				
Noise Power Density	dBm/Hz	-171.4	Loss: 1.5dB				
G/T	dB/K	-1.0					
C/No	dB･Hz	52.6					

		CARRIER			TLM		
Modulation Index	rad	1.0			1.0		
Modulation Loss	dB	2.3	Sine wave		4.1	Sine wave	
Hardware Loss	dB				1.0		
Bit Rate or Band width	dB･Hz	10.0	2BL(Hz)=	10	14.9	31.25	bps
Coding Gain	dB				0.0		
Required Eb/No or S/N	dB	13.5			9.6	1.0E-05	BER
Required C/No	dB･Hz	25.8			29.7		
Margin	dB	26.7			22.9		