

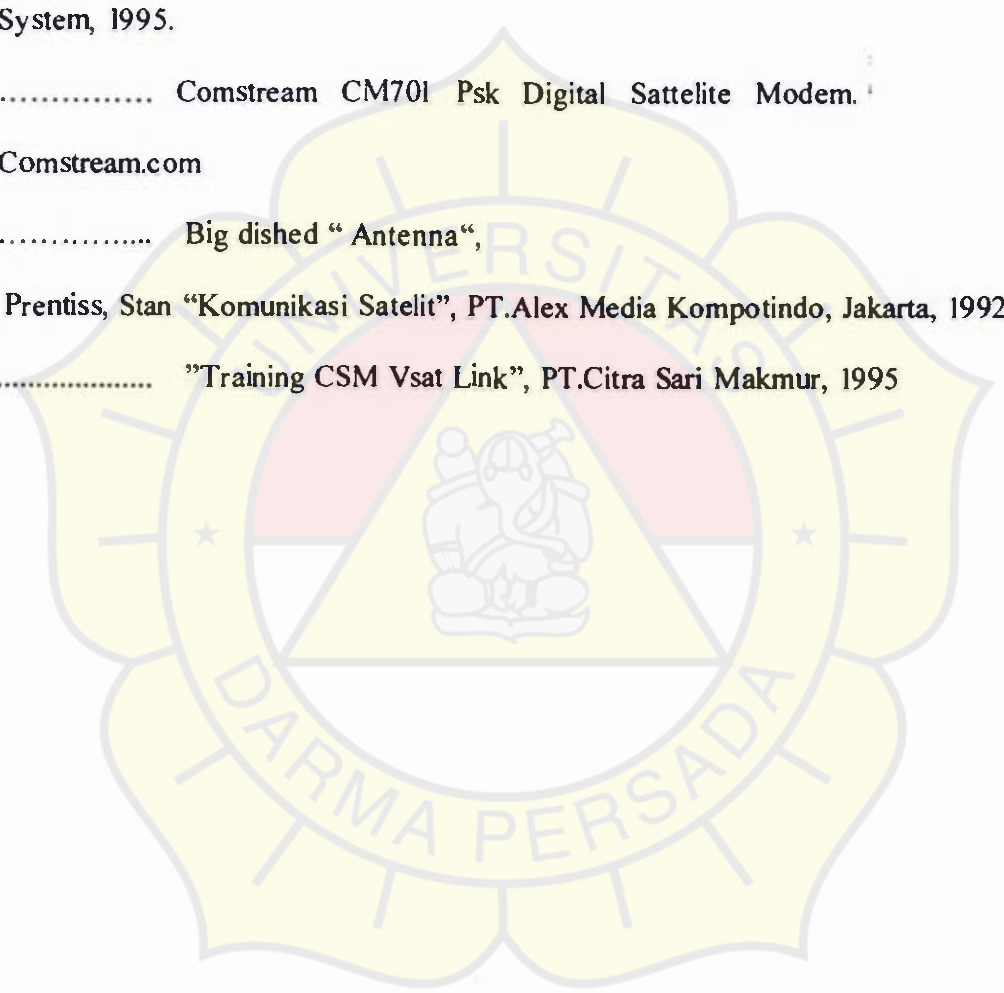
## BAB V

### KESIMPULAN

1. Dari hasil analisis dapat disimpulkan bahwa IRL dari hub ke satelit sebesar  $-146.22$  dBw, dan dari satelit ke hub sebesar  $-145.06$ . Sedangkan standart IRL Sat min sebesar  $-130,6$  dBw, jadi masih memenuhi standart. Dari arah satelit ke remote didapat hasil RSL  $-118.75$  dBW dan C/N  $46.09$  dB. Sedangkan untuk dari arah satelit ke hub didapat RSL  $-116.25$  dBW dan C/N  $48.09$  dB dibandingkan C/N standart QPSK  $12,6$  dB, maka kualitas dari satelit ke hub bagus.
2. Dari arah Hub ke remote didapat hasil Eb/No  $45.81$  dB, sedangkan dari arah Remote ke Hub di dapat Eb/No  $48.31$  dB dibandingkan dengan Eb/No untuk standart modulasi QPSK adalah  $10,6$  dB maka dapat dikatakan pengiriman data sangat baik sekali.
3. Dari hasil analisa yang telah di hitung menyatakan bahwa dengan menggunakan diameter antenna  $1.8$ m Gain antenna  $35.5$  dB tidak terlalu efektif, maka dari itu lebih efisien dengan menggunakan ukuran diameter antenna yang lebih kecil yaitu antena  $1.2$  meter dengan Gain antena  $31.91$  dB.

## DAFTAR PUSTAKA

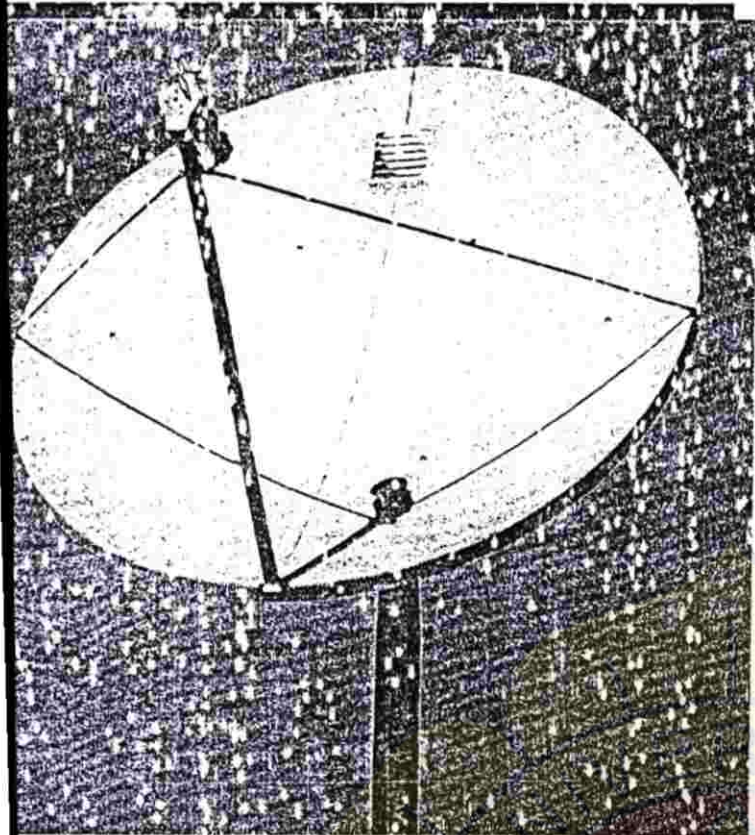
1. Ha Tri T. " Digital Sattelite Communication "Second Edition, Mc Graw – International, 1996.
2. Maral G, " VSAT Network", Willey Series In Communication And Distributed System, 1995.
3. .... Comstream CM701 Psk Digital Sattelite Modem.  
Comstream.com
4. .... Big dished " Antenna",
5. Prentiss, Stan "Komunikasi Satelit", PT.Alex Media Kompotindo, Jakarta, 1992.
6. .... "Training CSM Vsat Link", PT.Citra Sari Makmur, 1995



# LAMPIRAN 1

Spesifikasi alat



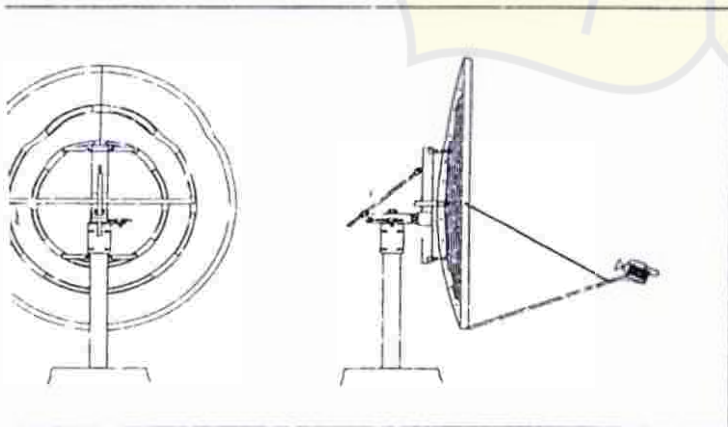


## 2.4 Meter C and Ku-Band Receive/ Transmit Antenna System Series 1251

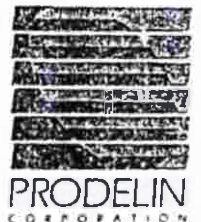
### FEATURES

- Piece Compression Molded Offset Reflector
- Extended C-Band Available
- Installation Time Reduced with Improved Mount Design
- Easily in Standard Air Freight Containers
- Penetrating Roof Mounts and King Post Available
- Kits For All C and Ku-Band RF Heads in Stock
- Azis Tracking Configuration Available
- Dry/Feed Electrical Anti-Icing Available

Prodelin Corporation specializes in the design and manufacture of small aperture antennas. The Company has invested heavily in the manufacture of antenna products, especially for direct reception of signals by commercial customers. Prodelin is committed to the production of high quality, low cost and easily deployed antenna systems for operation at frequencies up to 30 GHz. Each system features a sturdy galvanized steel support structure and is available with a variety of feed, mount and pedestal configurations. The Company's products are marketed worldwide.



PRODELIN  
ISO 9002 registered  
certificate no. A2421



*"Quality is reflected in everything we do"*

# SPECIFICATIONS

Series 125

## ELECTRICAL








Antenna Size	2.4M (96 in.)	C-Band		Ku-Band
		Linear	Circular	
Operating Frequency	Receive	3.625-4.2 GHz	3.625 -4.2 GHz	10.95-12.75 GHz
	Transmit	5.850-6.425 GHz	5.850-6.425 GHz	14.0-14.5 GHz
Band Gain (+/-2dB)	Receive	38dBi	38 dBi	47.6 dBi
	Transmit	42.0 dBi	42.0dBi	49.2 dBi
Antenna Noise Temperature				
10° elevation		52°K	30°K	42°K
20° elevation		46°K	23°K	32°K
30° elevation		45°K	20°K	28°K
40° elevation		44°K	19°K	27°K
Co-Pol Isolation(Linear)		>30 dB (on axis)	N/A	>30 dB(on axis)
Ratio(Circular)	Receive	N/A	2.2	N/A
	Transmit	N/A	1.94	N/A
Wave Envelope, Co-Pol				
100λ / Dθ ≤ 20°		29-25 Log θ dBi	29-25 Log θ dBi	29-25 Log θ dBi
20° < θ ≤ 26.3°		-3.5dBi	-3.5dBi	-3.5 dBi
26.3° < θ ≤ 48°		32-25 Log θ dBi	32-25 Log θ dBi	32-25 Log θ dBi
θ > 48°		-10 dBi (averaged)	-10dB(averaged)	-10 dBi (averaged)
Ratio		1.3:1Max.	1.3:1Max.	1.3:1 Max.
Interface	Receive	CPR 229 F	CPR 229 F	WR 75
	Transmit	CPR 137 or Type N	CPR 137 or Type N	WR 75 or Direct Radio Mounting

## Mechanical

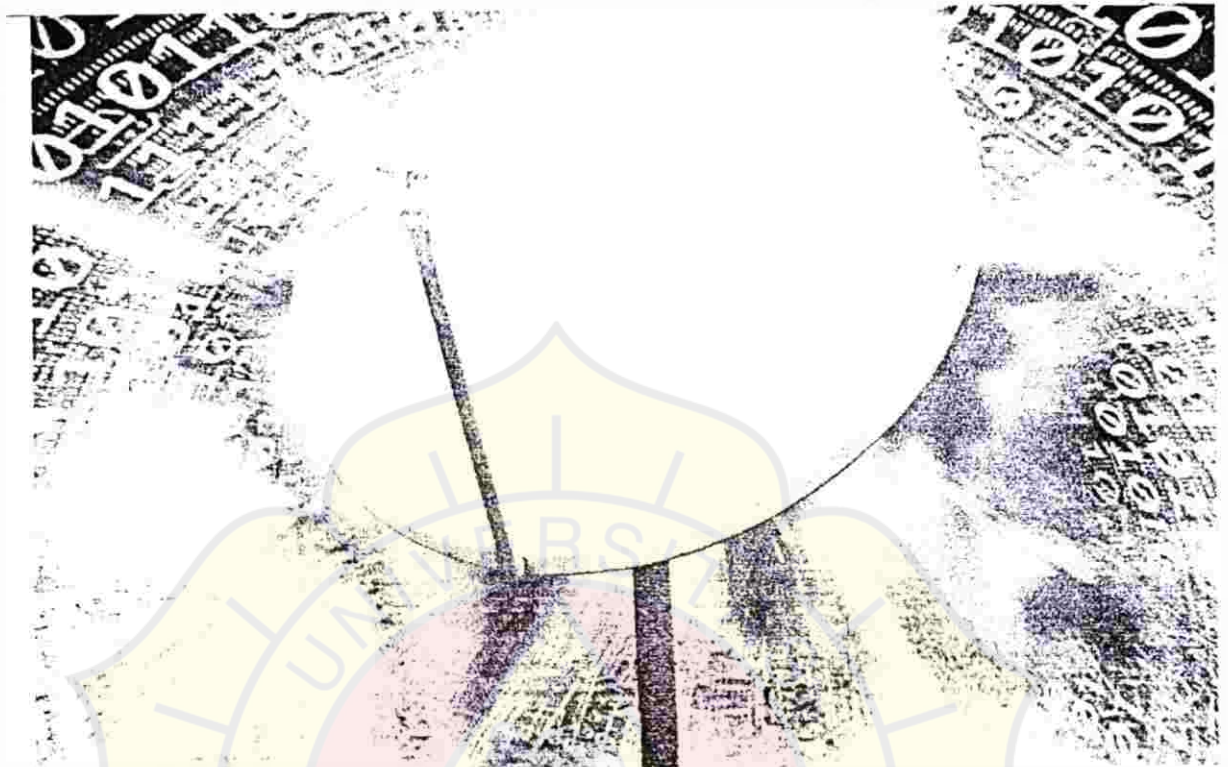
Construction Material	Glass Fiber Reinforced Polyester LPMC
Antenna Optics	Primary Focus, Offset Feed, Two Piece Divided Along Major Axis
Type	Elevation over Azimuth
Elevation Adjustment Range	5° to 90°, Continuous Fine Adjustment
Azimuth Adjustment Range	360° Continuous, +45° Fine Adjustment
Pipe Size	6" SCH40 Pipe (6.63" OD) 16.8 cm.

## ENVIRONMENTAL PERFORMANCE

Wind Loading	Operational	50 mph (80km/h)
	Survival	125 mph (201km/h)
Temperature	Operational	-40° to 140° F (-40° to 60° C)
	Survival	-50° to 160° F (-46° to 71° C)
	Operational	1/2" /hr
	Survival	2" /hr
	Operational	
	Survival	1/2" radial
Atmospheric Conditions		Salt, Pollutants and Contaminants as Encountered in Coastal and Industrial Areas
Radiation		360 BTU/h/ft²
Weight Specifications		385 lbs. (174kg)

 Prodelin Corporation  
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 1700 NE Cable Drive  
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Prodelin Corporation is the world's largest manufacturer of Rx/Tx VSAT antennas. We have the broadest product line in the industry including Receive Only, Rx/Tx and Rural Telephony antenna systems. Prodelin offers nineteen antenna sizes, 47cm to 4.5M. Prodelin is the leader in obtaining type certifications and approvals for Intelsat, AsiaSat and Eutelsat. Prodelin antennas provide the best quality in the market due to the sophisticated, precision SMC compression molding process technology. Prodelin provides the best value antenna solution to the market with competitive prices, the highest quality products and superb engineering support. Prodelin is ISO registered, KEMA # 70022.01. *Prodelin - The Market Leader in VSAT Antennas.*



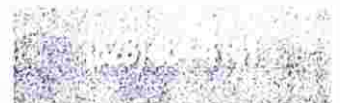
Back View  
1.8M Rx/Tx



Option  
Ku-Band Feed

## Key Features

- Precision compression molded offset reflector
- Intelsat approvals: C-Band # 1A010C00 and Ku-Band # 1A005A00
- Non penetrating roof mounts and king posts available
- Interface kits for all C & Ku-Band RF heads in stock
- Two axis tracking configuration available
- Reflector/Feed electrical anti-icing available
- Insat extended C-band available



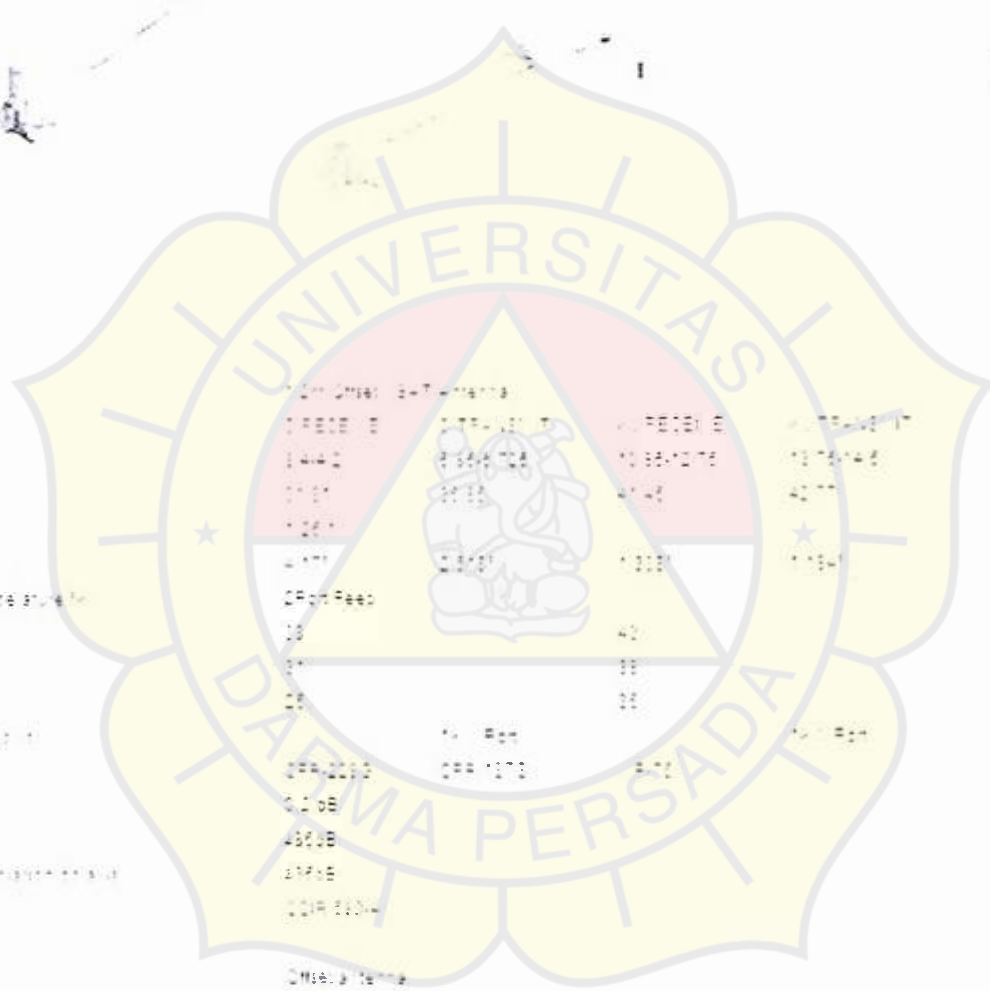
Antenna Size		1.8M (71 in.)	1.8M(71in.)	1.8M(71in.)
Operating Frequency	Receive	3.625 -4.2 GHz	3.625-4.2 GHz	10.95-12.75 GHz
	Transmit	5.850-6.425 GHz	5.850-6.425 GHz	14.0-14.5 GHz
Midband Gain ( $\pm 2$ dB)	Receive	35.5 dBi	35.5 dBi	45.0dBi
	Transmit	39.5dBi	39.5dBi	46.5 dBi
Antenna Noise Temperature				
10° elevation		56K	30K	44K
20° elevation		49K	23K	38K
30° elevation		47K	21K	35K
40° elevation		46K	20K	33K
Sidelobe Envelope, Co-Pol				
Mainbeam $<\theta < 7^\circ$		29-25 Log $\theta$ dBi	29-25 Log $\theta$ dBi	29-25 Log $\theta$ dBi
$7^\circ < \theta < 9.2^\circ$		+8 dBi	+8 dBi	+8 dBi
$9.2^\circ < \theta < 4.8^\circ$		32-25 Log $\theta$ dBi	32-25 Log $\theta$ dBi	32-25 Log $\theta$ dBi
$4.8^\circ < \theta < 180^\circ$		-10dBi(averaged)	-10dBi(averaged)	-10dBi(averaged)
Cross-Polarization (Linear)		>30 dB on axis	N/A	>30 dB on axis
Axial Ratio (Circular)	Receive	N/A	2.28	N/A
	Transmit	N/A	1.60	N/A
VS WR		1.3:1 Max.	1.3:1 Max.	1.3:1 Max.
Feed Interface	Receive	CPR 229 F	CPR 229 F	Available in a variety of designs
	Transmit	CPR 137 or Type N	CPR 137 or Type N	Available in a variety of designs
Reflector Material		Glass Fiber Reinforced Polyester SMC		
Antenna Optics		Prime Focus, One-Piece Offset Feed		
Mast Pipe Size		3.5" SCH 40 Pipe (4.00" OD) 10.16 cm.		
Elevation Adjustment Range		5° to 90°, Continuous Fine Adjustment		
Azimuth Adjustment Range		$\pm 45^\circ$ Fine Adjustment, 360° Continuous		
Mount Type		Elevation over Azimuth		
Shipping Specifications		225 lbs.(103kg.)		240lbs.(109kg.)
Wind Loading	Operational	50 mph (80 km/h)		
	Survival	125mph (201km/h)		
Temperature	Operational	-40° to 140°F (-40° to 60° C)		
	Survival	-50° to 160°F (-46° to 71°C)		
Rain	Operational	1/2" /hr		
	Survival	2" /hr		
Ice	Operational	—		
	Survival	1/2" radial		
Atmospheric Conditions		Salt, Pollutants and Contaminants as Encountered in Coastal and Industrial Areas		
Solar Radiation		360 BTU/hr/ft <sup>2</sup>		

**A TriPoint Global Company**

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## 1.2m Offset VSAT antenna



Parameter	Value	Parameter	Value
Frequency (MHz)	144.0	Frequency (MHz)	144.0
Power (dBm)	20.0	Power (dBm)	20.0
Beamwidth (deg)	1.2	Beamwidth (deg)	1.2
Gain (dB)	20.0	Gain (dB)	20.0
Antenna Type	Offset Feed	Antenna Type	Offset Feed
Feed Position	30	Feed Position	40
Feed Intentional Loss	0.2 dB	Feed Intentional Loss	0.2 dB
Feed Loss	0.3 dB	Feed Loss	0.3 dB
Feed Loss Factor	0.99	Feed Loss Factor	0.99
Feed Loss Coefficient	0.01	Feed Loss Coefficient	0.01
Feed Loss Exponent	0.01	Feed Loss Exponent	0.01
Feed Loss Constant	0.01	Feed Loss Constant	0.01
Feed Loss Variable	0.01	Feed Loss Variable	0.01
Feed Loss Taper	0.01	Feed Loss Taper	0.01
Feed Loss Slope	0.01	Feed Loss Slope	0.01
Feed Loss Curvature	0.01	Feed Loss Curvature	0.01
Feed Loss Asymmetry	0.01	Feed Loss Asymmetry	0.01
Feed Loss Offset	0.01	Feed Loss Offset	0.01
Feed Loss Rotation	0.01	Feed Loss Rotation	0.01
Feed Loss Tilt	0.01	Feed Loss Tilt	0.01
Feed Loss Twist	0.01	Feed Loss Twist	0.01
Feed Loss Wobble	0.01	Feed Loss Wobble	0.01
Feed Loss Jitter	0.01	Feed Loss Jitter	0.01
Feed Loss Drift	0.01	Feed Loss Drift	0.01
Feed Loss Noise	0.01	Feed Loss Noise	0.01
Feed Loss Interference	0.01	Feed Loss Interference	0.01
Feed Loss Distortion	0.01	Feed Loss Distortion	0.01
Feed Loss Harmonics	0.01	Feed Loss Harmonics	0.01
Feed Loss Spurious	0.01	Feed Loss Spurious	0.01
Feed Loss Leakage	0.01	Feed Loss Leakage	0.01
Feed Loss Radiation	0.01	Feed Loss Radiation	0.01
Feed Loss Emission	0.01	Feed Loss Emission	0.01
Feed Loss Scattering	0.01	Feed Loss Scattering	0.01
Feed Loss Reflection	0.01	Feed Loss Reflection	0.01
Feed Loss Diffraction	0.01	Feed Loss Diffraction	0.01
Feed Loss Refraction	0.01	Feed Loss Refraction	0.01
Feed Loss Dispersion	0.01	Feed Loss Dispersion	0.01
Feed Loss Absorption	0.01	Feed Loss Absorption	0.01
Feed Loss Emission	0.01	Feed Loss Emission	0.01
Feed Loss Scattering	0.01	Feed Loss Scattering	0.01
Feed Loss Reflection	0.01	Feed Loss Reflection	0.01
Feed Loss Diffraction	0.01	Feed Loss Diffraction	0.01
Feed Loss Refraction	0.01	Feed Loss Refraction	0.01
Feed Loss Dispersion	0.01	Feed Loss Dispersion	0.01
Feed Loss Absorption	0.01	Feed Loss Absorption	0.01



# 1/2" Foam Dielectric, LDF Series – 50-ohm



## LDF4-50A

Description	Type No.	Attenuation and Average Power Ratings			
		Frequency MHz	Attenuation dB/100 ft	Attenuation dB/100 m	Average Power, kW
<b>Cable Ordering Information</b>					
Standard Cable		0.5	0.045	0.149	40.0
1/2" Standard Cable, Standard Jacket	LDF4-50A	1	0.064	0.211	35.8
		1.5	0.079	0.259	29.2
		2	0.091	0.299	25.3
<b>Fire Retardant Cables</b>					
1/2" Fire Retardant Jacket (CATVX)	LDF4RN-50A	10	0.205	0.672	11.3
1/2" Fire Retardant Jacket (CATVR)	LDF4RN-50A	20	0.291	0.954	7.93
		30	0.357	1.17	6.46
		50	0.463	1.52	4.98
<b>Low VSWR and Specialized Cables</b>					
1/2" Low VSWR, specify operating band	LDF4P-50A-(**)	88	0.619	2.03	3.73
Phase Stabilized and Phase Measured Cable	See page 590	100	0.661	2.17	3.49
		108	0.688	2.26	3.36
		150	0.815	2.67	2.83
<b>Jumper Cable Assemblies – See page 584</b>					
		174	0.880	2.89	2.62
		200	0.946	3.10	2.44
** Insert suffix number from "Low VSWR Specifications" table, page 498					
<b>Characteristics</b>					
<b>Electrical</b>					
Impedance, ohms	50 ± 1	512	1.55	5.08	1.49
Maximum Frequency, GHz	8.8	600	1.69	5.53	1.37
Velocity, percent	88	700	1.83	6.01	1.26
Peak Power Rating, kW	40	800	1.97	6.46	1.17
dc Resistance, ohms/1000 ft (1000 m)		824	2.00	6.56	1.15
Inner	1.45 (1.48)	894	2.09	6.85	1.10
Outer	0.58 (1.90)	960	2.17	7.12	1.06
dc Breakdown, volts	4000	1000	2.22	7.28	1.04
Jacket Spark, volts RMS	8000	1250	2.51	8.23	0.921
Capacitance, pF/ft (m)	23.1 (75.8)	1500	2.77	9.09	0.833
Inductance, µH/ft (m)	0.058 (0.19)	1700	2.97	9.74	0.777
<b>Mechanical</b>					
Outer Conductor	Copper	2000	3.25	10.7	0.710
Inner Conductor	Copper-Clad Aluminum	2100	3.34	11.0	0.691
Diameter over Jacket, in (mm)	0.63 (16)	2200	3.43	11.2	0.673
Diameter over Copper Outer Conductor, in (mm)	0.55 (14)	2300	3.52	11.5	0.657
Diameter Inner Conductor, in (mm)	0.189 (4.6)	3000	4.09	13.4	0.565
Nominal Inside Transverse Dimensions, cm	1.11	3400	4.39	14.4	0.526
Minimum Bending Radius, in (mm)	5 (12.5)	4000	4.82	15.8	0.479
Number of Bends, minimum (typical)	15 (50)	5000	5.49	18.0	0.421
Bending Moment, lb-ft (N*m)	2.8 (3.8)	6000	6.11	20.1	0.378
Cable Weight, lb/ft (kg/m)	0.15 (0.22)	8000	7.26	23.8	0.318
Tensile Strength, lb (kg)	250 (113)	8800	7.69	25.2	0.300
Flat Plate Crush Strength, lb/in (kg/mm)	110 (2.0)				

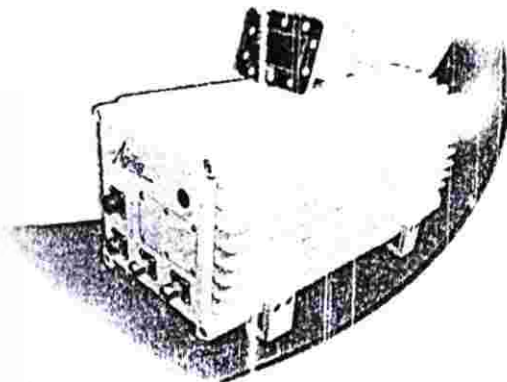
**Standard Conditions:**

For attenuation, VSWR 1.0, ambient temperature 20°C (68°F).

For Average Power, VSWR 1.0, ambient temperature 40°C (104°F), inner conductor temperature 100°C (212°F), no solar loading.



# AAV 813 Series C-Band VSAT Outdoor Transceiver



Agilis AAV 813 Series C-Band SPT (C-Band Single Package Transceiver) is a highly cost-effective RF ODU (Outdoor Unit) for satellite communication. It is designed for voice, data and broadband application, operating in different modulation formats including BPSK, QPSK, QAM and FM.

Agilis AAV 813 SPT is a highly integrated ODU that comprises of Power Supply, Upconverter, SSPA (Solid State Power Amplifier), Downconverter and low phase noise synthesizers. It has a built-in M&C for remote and local monitor and control. In addition, a wide range of SSPA booster options are available for higher power applications.

Agilis AAV 880 SPT is suitable for SCPC (Single Channel Per Carrier), MCPC (Multi-Channel Per Carrier), DAMA (Demand Assigned Multiple Access) or TDMA (Time Division Multiple Access) applications.

## Features

- Available for all C-Band frequencies
- Broadband data transmission
- Easy installation & configuration
- Built-in monitor and control
- Higher power options
- Built-in image rejection filter
- Very stable OCXO reference oscillator
- Output power monitoring
- Electrically tuneable synthesizer
- 2.5MHz frequency step size
- Redundancy ready
- Surge protection
- 70 or 140 MHz IF interface

## Enhanced Monitoring and Control

Agilis AAV 880 C-SPT offers M&C via RS232/485. It features full remote M&C through Windows using PC or WinCE PDA.

These include:

- Tx/Rx level monitoring
- Temperature monitoring
- RF output ON/OFF
- Frequency selection
- Gain control
- Automatic fault identification & alarm

## Reliability

Field-proven under harsh environmental conditions, Agilis ODUs can withstand temperature ranging from -20°C to +60°C with up to 100% humidity.

## Quality Assurance

All Agilis ODUs go through 72 hours burn-in at +60°C with performance being monitored. In addition, all units undergo 100% waterproof test equivalent to IP65 to ensure operation in tropical, cold and harsh environment.

## Applications

- Hub and VSAT terminals
- Video conferencing
- Broadcast
- Rural telephony
- Emergency link restoration
- Point-of-sales

Agilis Communication Technologies Pte Ltd

(Registration No.: 199703601W)

100 Jurong East Street 21, ST Jurong East Building Level 4, Singapore 609602

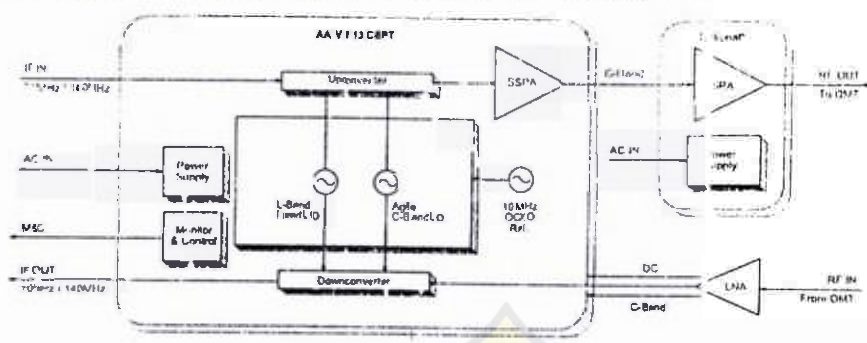
T: 65 6562 6791 F: 65 6557 6370

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www.agilis.st.com.sg

# TECHNICAL SPECIFICATIONS

VSAT Transceivers



## C-Band Frequency Band (GHz)

Frequency	Transmit	Receive
Intelsat	5.850 - 6.425	3.625 - 4.200
Horizont	5.725 - 6.75	3.400 - 3.950
In-sat	6.725 - 7.025	4.500 - 4.800
ET-1/Palapa C	6.425 - 6.725	3.400 - 3.700

Power	Output @ P1dB (dBm) min.	Min Gain (dB)	Max AC power consumption (VA)
1mW	5	28 - 33	30
2W	33	58 - 63	50
5W	37	62 - 67	70
10W	40	65 - 70	120
20W*	43	68 - 73	200
50W*	47	72 - 77	400
80W*	49	73 - 78	700
130W*	50	75 - 80	800
125W*	51	76 - 81	1000
150W*	51.8	77 - 82	1200
200W*	53	78 - 83	1400

Input Frequency	70/140 ± 18 MHz (Optional) 140 ± 36 MHz (Optional) C-Band
Output Frequency	C-Band
Frequency Step Size	2.5 MHz
IF Input Power for Output P1dB	-30 dBm min
Gain Flatness for Full BW	± 2.0 dB max
Gain Flatness for 36 MHz BW	± 1.25 dB max
Gain Stability (-20°C to +60°C)	± 2.0 dB max
Gain Adjustment	31 dB @ 1 dB steps
Intermodulation Product (with 2 carriers at 3 dB OPEO compressible power)	-30 dBc max
Spurious (36 MHz BW)	-55 dBc max
Phase Noise @ 100Hz offset	-60 dBc/Hz max
@ 1kHz offset	-70 dBc/Hz max
@ 10kHz offset	-80 dBc/Hz max
@ 100kHz offset	-90 dBc/Hz max
IF Input Interface	50Ω N-type Female
RF Output Interface	50Ω N-type Female

Operating Temperature	-20°C to +60°C
Relative Humidity	up to 100%

Low Noise Amplifier	C-Band
Input Frequency	35°K
Noise Temperature at 25°C	55 dB typ
Gain	± 0.25 dB
Gain Flatness (36 MHz BW)	WR22B/G
RF Input Interface	50Ω N-type Female
RF Output Interface	

Receive (exclude LNA)	
Input Frequency	C-Band
Output Frequency	70/140 ± 18 MHz 140 ± 36 MHz (Optional)
Frequency Step Size	2.5 MHz
Gain	40 dB min
Gain Adjustment	31 dB @ 1 dB steps
Gain Flatness (36 MHz BW)	± 1.25 dB max
Gain Stability (-20°C to +60°C)	± 3 dB max
3rd Order ICP 26 dBm min	
Spurious (36 MHz BW)	-55 dBc max
Phase Noise @ 100Hz offset	-60 dBc/Hz max
@ 1kHz offset	-70 dBc/Hz max
@ 10kHz offset	-80 dBc/Hz max
@ 100kHz offset	-90 dBc/Hz max
RF Input Interface	50Ω N-type Female
RF Output Interface	

Monitor And Control Interface	RS 232/485
Form 'C' Relay Contacts	Optional

Power Supply	
Input Voltage (Factory Preset)	220V ac, 110V ac or 48V dc
DC Output Voltage to LNA	+13V dc at RF IN Connector

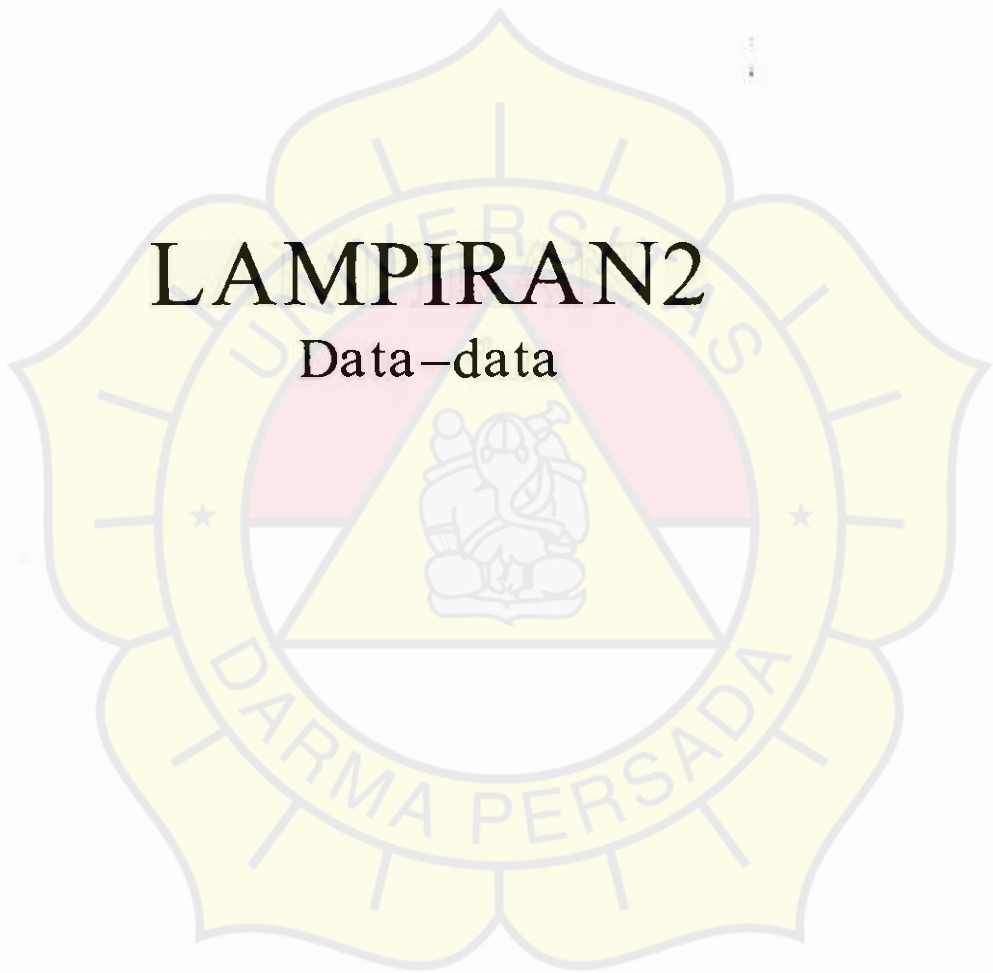
Mechanical	
Dimensions	440L x 220W x 220H mm (1mW, 2W, 5W, 10W SPT) ~10L x 175W x 270H mm (20W Booster) 342L x 278W x 173H mm (50W Booster) 420L x 290W x 290H mm (80W, 100W, 125W, 150W, 200W Booster)

Weight	12.5 kg (1mW, 2W, 5W, 10W SPT) 13.0 kg (20W, 50W Booster) 23.5 kg (80W, 100W, 125W, 150W, 200W Booster)
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\* Booster with 1mW carrier  
Note: All specifications are subject to change without notice

# LAMPIRAN 2

Data-data



Dengan ini kami selaku Pembimbing dari PT. CSM, memberitahukan benar adanya data yang dipakai BRI Bandung adalah sebagai berikut:

1. Frekuensi Uplink : 6080 Mhz
2. Frekuensi Downlink : 3860 Mhz
3. Upstream : 64 Kbps
4. Downstream : 64 Kbps
5. Bandwidth : 60KHz
6. Gain Satelit : 194.6 dBi

Demikian pemberitahuan ini kami buat, semoga dapat digunakan sebagaimana mestinya.

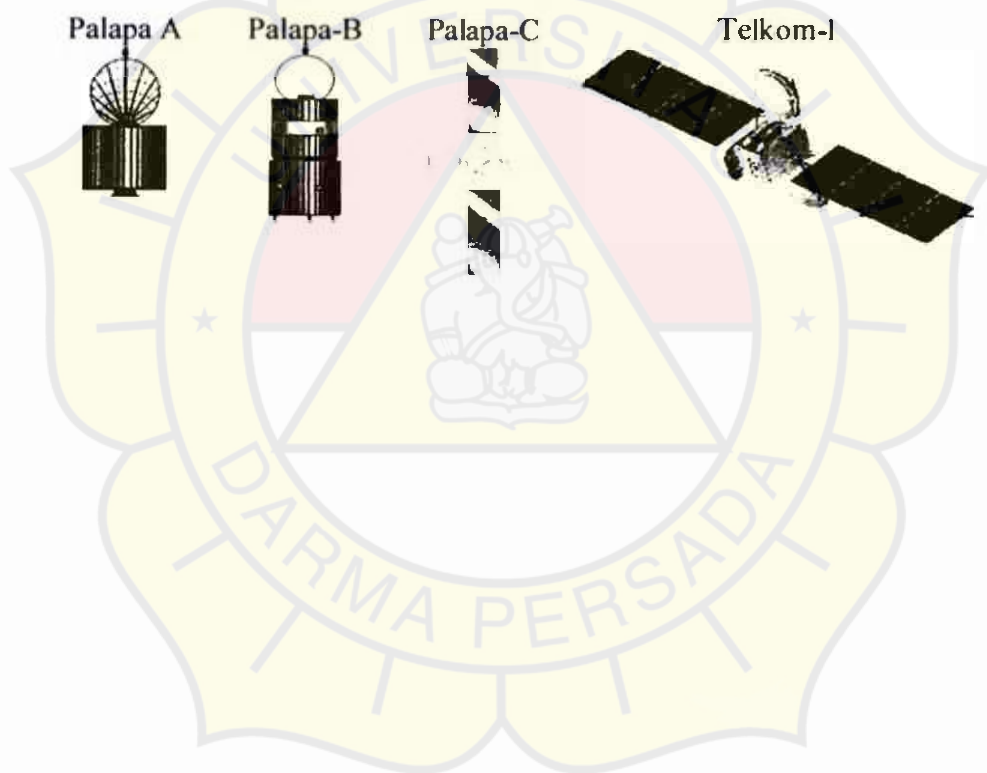
Terima kasih



## MACAM – MACAM SATELIT

Nama	Palapa-A	Palapa-B	Palapa-C	Telkom-1
Type	HS-333	HS-376	HS-601	LM-A2100
Kapasitas	12	24	34	36 Transponder
	Transponder	Transponder	Transponder	
EIRP	30dBW	33dBW	37dBW	38/41 dBW
G/T	1dBK	1dBK	1dBK	1dBK
Reliability	0.7	0.7	0.75	0.8
Life Time	7 Tahun	9 Tahun	12 Tahun	15 tahun
Peluncur	Delta 2914	Space Shuttle	Ariane-4	Ariane-5

Gambaran Visual



## DATA PRIBADI PENULIS



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