BAB V

KESIMPULAN

1. Telah didapat hasil analisa throughput data sebesar 50.102,63377 bps dengan bandwidth yang tersedia pada BRI Tambun sebesar 128 Kbps. Maka dari hasil analisa throughput, bandwidth yang terpakai saat ini sebesar 23,48 Kbps. Dari hasil analisa dan perbandingan, throughput pada BRI Tambun masih rendah dan masih bisa dimungkinkan untuk menambah trafik lagi.
2. Dari hasil analisa delay time yang didapat pada layanan komuniikasi data VSAT pada BRI Tambun, Delay time yang diperlukan sebesar 0,0028 detik sedangkan delay time maksimum yang dikehendaki sebesar 700 ms (0,7 detik). Jadi waktu tunggu yang dibutuhkan untuk pengiriman data pada layanan komunikasi VSATdi BRI Tambun masih memenuhi syarat.
3. Jumlah remote VSAT yang dapat ditampung pada komunikasi VSAT pada BRI Tambun sejumlah 80 remote VSAT, dengan memperlihatkan kesetabilan jaringan. Sedangkan untuk saat ini jumlah remote VSAT yang terdapat pada BRI area Tambun sejumlah 17 remote VSAT. Jadi untuk memaksimalkan jumlah kapasitas kanal yang disediakan sebesar 128 Kbps masih bisa menambahkan jumlah remote VSAT.

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Lampiran I

SURAT KETERANGAN

P.T. CITRA SARI MAKMUR
Satellite & Terrestrial Network
Plaza Chase 16th Floor, Jl. Jend. Sudirman Kav. 21, Jakarta 12910, Indonesia
☎ (021) 5700194, 5208311, Fax. 5704656

Kami selaku pembimbing tugas akhir di PT. CSM Cikarang memberikan pernyataan benar adanya bahwa :

1. BRI Tambun mengunakan :
   a. Frekuensi Up Link sebesar : 6.120 MHz
   b. Frekuensi Down Link sebesar : 3.980 MHz
   c. Inroute sebesar : 128 Kbps
   d. Outroute sebesar : 5,6 Mbps
2. Delay Propagasi Satelit : 0,25 detik
3. Waktu Pemprosesan atau Pelayanan Paket : 0,015625 detik
4. BRI Tambun memakai Satelit Telkom 1.

Demikian pernyataan ini dibuat agar dapat dipergunakkan dengan sebaik-baiknya.

PT. CITRA SARI MAKMUR

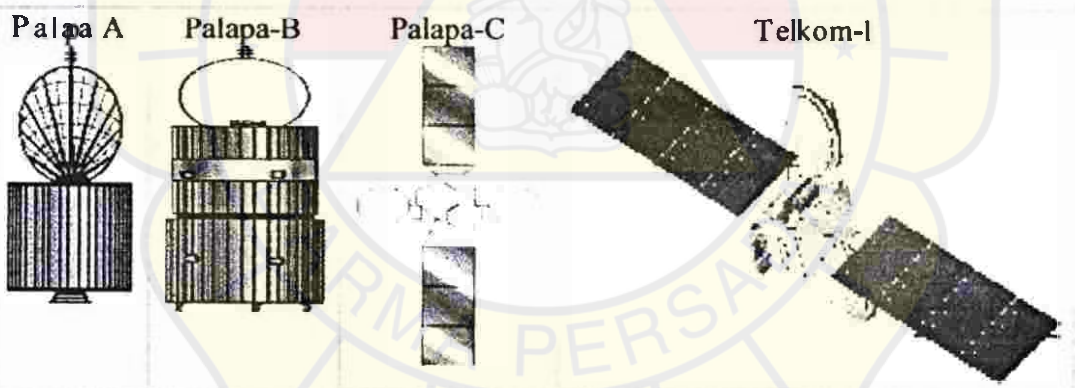
Lampiran II

MACAM MACAM SATELIT

MACAM-MACAM SATELIT

Name	Palapa-A	Palapa-B	Palapa-C	Telkom-1
Date of Launch	9 Jul 76	16 Jun 83	14 May 92	13 Aug 99
End of Op.	1983	1992	2005	2016
Life Time	7 Tahun	9 Tahun	13 Tahun	15 tahun
Manufac.	HS-333 Hughes	HS-376 Hughes	HS-601 Hughes	A2100A Lockheed Martin
Launcher	Delta 2914	Space Shuttle	Ariane-4	Ariane-5
No. of Trans-ponders	12 Transponders	24 Transponders	34 Transponders	36 Transponders
EIRP	30dBW	33dBW	37 dBW	38/41 dBW
G /T	1dBK	1dBK	1dBK	1 dBK
Reliability	0.7	0.7	0.75	0.8
Weight Kg	297	1475	1761	1761
Orbital Slot	83° E	113° E	118° E	108° E

Gambaran Visual

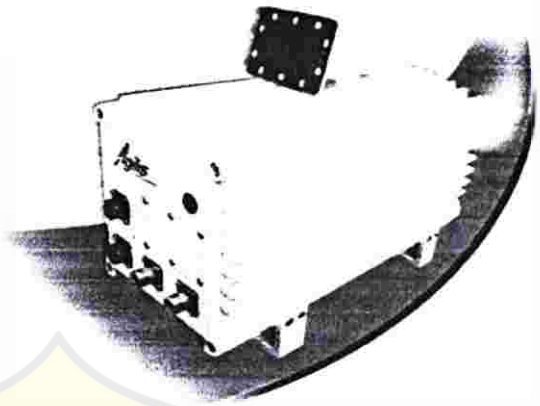


Lampiran III

SPESIFIKASI LNA

Agilis®
Connecting Globally

AV 813 Series
-Band VSAT
utdoor Transceiver



AV 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 ce, data and broadband application, operating in different modulation formats including BPSK, QPSK, QAM and FM.

AV 880 SPT is a highly integrated ODU that comprises of Power Supply, Upconverter, SSPA (Solid State Power Amplifier), Downconverter and low phase noise sizers. 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 tions.

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

atures

- 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
- Electronically tuneable synthesizer
- 2.5 MHz frequency step size
- Redundancy ready
- Surge protection
- 70 or 140 MHz IF interface

plications

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

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
- Frequencies selection
- Gain control
- Automatic fault identification & alarm

Reliability

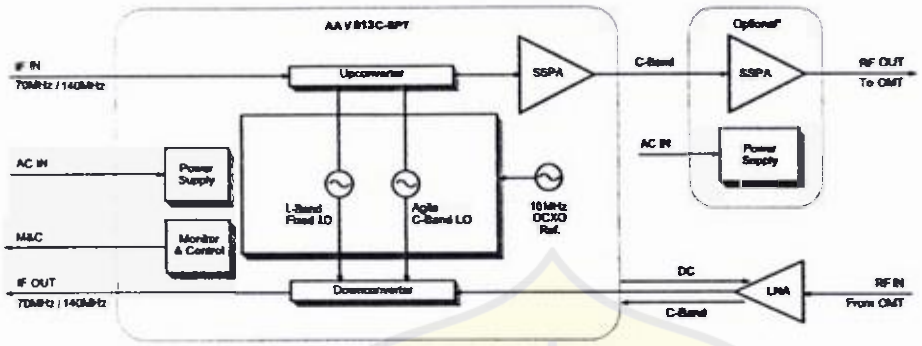
Field proven under harsh environmental conditions. Agilis ODUs can withstand temperature ranging from -20°C to +60°C with up to 100% humidity.

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.

lis Communication Technologies Pte Ltd
gistration No.:199103901W)
Jurong East Street 21 ,ST Jurong East Building Level 4, Singapore 609602
5 6567 6791 F. 65 6567 6370 mktg@agilis.st.com.sg www.agilis.st.com.sg

TECHNICAL SPECIFICATIONS



Band Frequency Band (GHz)

requency	Transmit	Receive
telsat	5.850 – 6.425	3.625 – 4.200
orizont	5.725 – 6.275	3.400 – 3.950
sat	6.725 – 7.025	4.500 – 4.800
T-1/ Palapa C	6.425 – 6.725	3.400 – 3.700

nsmit

wer	Output @P1dB (dBm) min	Min Gain (dB)	Max AC power consumption (VA)
mW	0	28 - 33	30
W	33	58 - 63	50
W	37	62 - 67	70
W	40	65 - 70	120
W*	43	68 - 73	200
W*	47	72 - 77	400
W*	49	73 - 78	700
0W*	50	75 - 80	800
5W*	51	76 - 81	1000
0W*	51.8	77 - 82	1200
0W*	53	78 - 83	1400

ut Frequency	70/140± 18 MHz (Optional)
	140±36 MHz (Optional)
tput Frequency	C-Band
equency Step Size	2.5 MHz
nput Power for Output P1dB	-30 dBm min
in Flatness for Full BW	±2.0 dB max
for 36 MHz BW	±1.25 dB max
in Stability (-20°C to +60°C)	±2.0 dB max
in Adjustment	31 dB @ 1 dB steps
ermodulation Product	-30 dBc max
h 2 carriers at 3 dB OPBO composite power)	
urious (36 MHz BW)	-55 dBc max
se 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
nput Interface	50Ω N-type Female
Output Interface	50Ω N-type Female

ronmental

erating Temperature	-20°C to +60°C
ative Humidity	up to 100%

Low Noise Amplifier

Input Frequency	C-Band
Noise Temperature at 25°C	35°K
Gain	55 dB typ
Gain Flatness (36 MHz BW)	±0.25 dB
RF Input Interface	WR229/ G
RF Output Interface	50Ω N-type Female

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 / IF Output Interface	50Ω N-type Female

Monitor And Control

Interface	RS 232/485
Form 'C' Relay Contacts	Optional

Power Supply

Input Voltage (Factory Preset)	220Vac, 110Vac or 48Vdc
DC output Voltage to LNA	+13Vdc at RF IN Connector

Mechanical

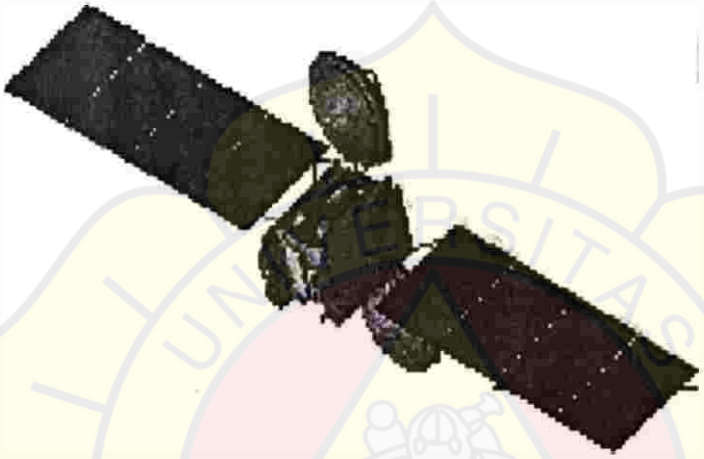
Dimensions	440L x 220W	x 220H mm	(1mW, 2W, 5W, 10W SPT)
	410L x 175W	x 275H mm	(20W Booster)
	342L x 278W	x 173H mm	(50W Booster)
	420L x 290W	x 290H mm	(80W, 100W, 125W, 150W, 200W Booster)
Weight	12.5 kg		(1mW, 2W, 5W, 10W SPT)
	13.0 kg		(20W, 50W Booster)
	23.5 kg		(80W, 100W, 125W, 150W, 200W Booster)

** Booster with 1mW driver*
Note: All specifications are subject to changes without notice

Lampiran IV

PARAMETER SATELIT TELKOM-1

PARAMETER SATELIT TELKOM-1



Satelit	Telkom-1
Alokasi frekuensi	C-Band
Longtitude	108° Bujur Timur
SFD	-88 dBW/M2
Gain (Averange)	164,9 dBi
EIRP (Sat)	34,3 dBW
G/T	-4,1 dB/K
Ketingian Satelit	±36.000 Km
Delay Propagasi Satelit	0,25 detik

Lampiran V

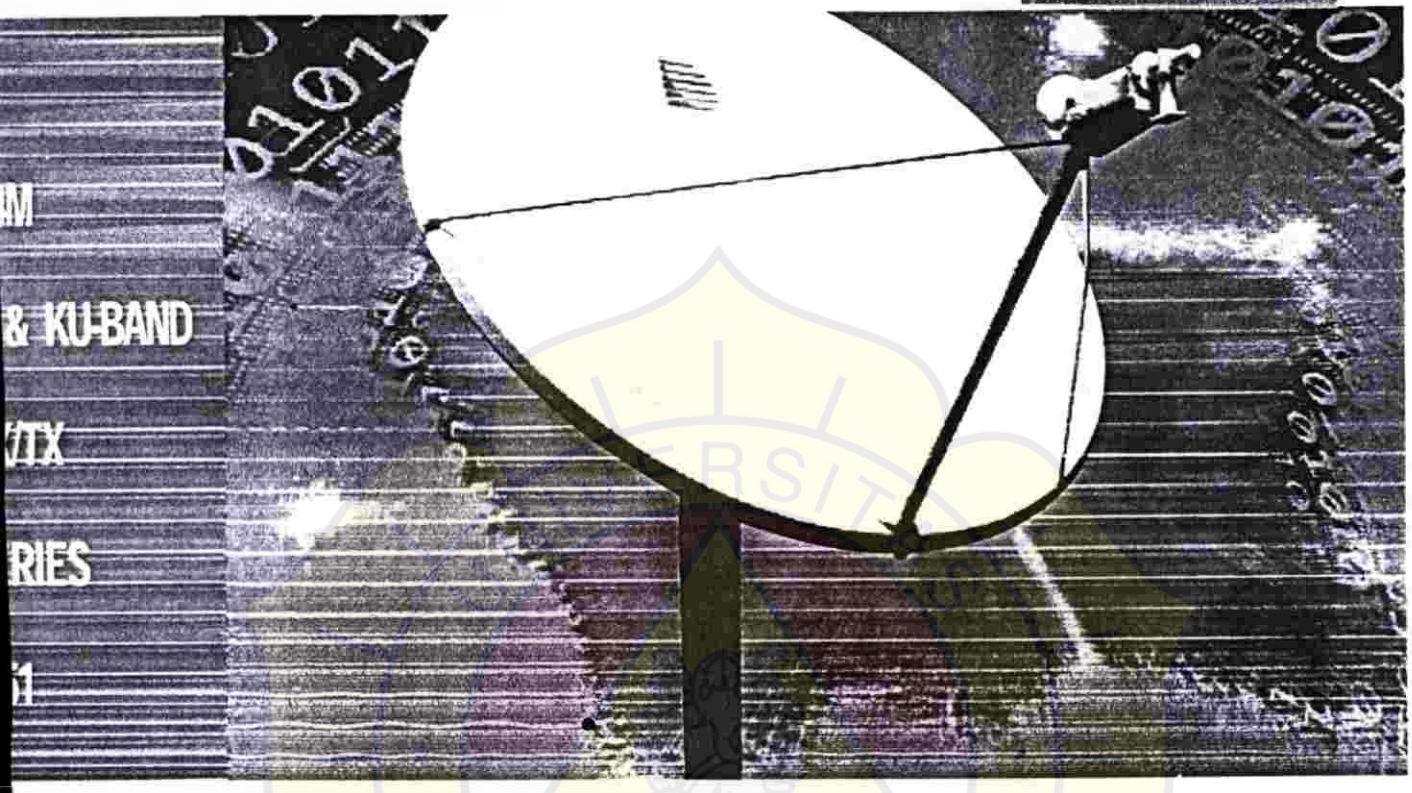
SPESIFIKASI ANTENA VSAT

PRODELIN.

A TriPoint Global Company

Receive/Transmit

Series 1251



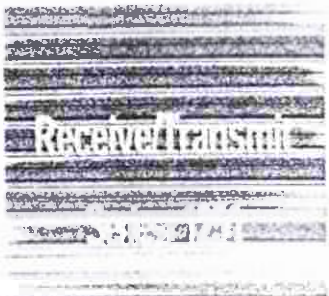
Prodelin Corporation is the world's largest manufacturer of Rx/Tx VSAT antennas. We have the broadest product line in the industry including Receive Only, Rx/Tx and Rural Telephony antenna systems. Prodelin offers nineteen antenna sizes, 47cm to 4.5M. Prodelin is the leader in obtaining type certifications 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
2.4M Rx/Tx

Option
Ku-Band Feed

Key Features

- Two piece compression molded offset reflector
- C-Band Intelsat approved # IA022A00
- Installation time reduced with improved mount design
- Ships easily in standard air freight containers
- Non penetrating roof mounts and king post available
- Interface kits for all C & Ku-Band RF heads in stock
- Insat extended C-Band available
- Two axis tracking configuration available
- Reflector/Feed electrical anti-icing available



Electrical		C-Band		
		Linear	Circular	Ku Band
Antenna Size		2.4M (96 in.)	2.4M (96 in.)	2.4M (96 in.)
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	13.75 - 14.5 GHz
Midband Gain (±.2dB)	Receive	38.0 dBi	38.0 dBi	47.6 dBi
	Transmit	42.0 dBi	42.0 dBi	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
Sidelobe Envelope, Co-Pol (dBi)				
100λ / D θ ≤ 20°		29 - 25 Log θ dBi	29 - 25 Log θ dBi	29 - 25 Log θ dBi
20° < θ ≤ 26.3°		-3.5 dBi	-3.5 dBi	-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)	-10 dBi (averaged)	-10 dBi (averaged)
Cross-Pol Isolation (Linear)		> 30 dB on axis	N/A	>30 dB on axis
Axial Ratio (Circular)	Receive	N/A	2.28	N/A
	Transmit	N/A	1.94	N/A
VSWR		1.3:1 Max.	1.3:1 Max.	1.3:1 Max.
Feed Interface	Receive	CPR 229F	CPR 229F	WR75
	Transmit	CPR 137 or Type N	CPR 137 or Type N	WR75 or Direct Radio Mounting

Mechanical	
Reflector Material	Glass Fiber Reinforced Polyester SMC
Antenna Optics	Prime Focus, Offset Feed, Two-Piece Divided Along Major Axis
Mast Pipe Size	6" SCH 40 Pipe (6.63" OD) 16.83 cm.
Elevation Adjustment Range	5° to 90°, Continuous Fine Adjustment
Azimuth Adjustment Range	±45° Fine Adjustment, 360° Continuous
Mount Type	Elevation over Azimuth
Shipping Specifications	385 lbs. (174 kg.)

Environmental Performance		
Wind Loading	Operational	50 mph (80 km/h)
	Survival	125 mph (201 km/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/h/ft²

tcom Resources

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n, Colorado 81620 USA
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5-2000)

PRODELIN

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PRODELIN.

A TriPoint Global Company

Receive/Transmit

Series 1101

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 # IA010C00 and Ku-Band #IA005A00
- 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

(828) 464-4141

Receive/Transmit

Series 1184

KU-BAND

Electrical		C-Band Linear	C-Band Circular	Ku-Band
Antenna Size		1.8M (71 in.)	1.8M (71 in.)	1.8M (71 in.)
Operating Frequency	Receive	3.625 - 4.2GHz	3.625 - 4.2GHz	10.95-12.75 GHz
	Transmit	5.850-6.425 GHz	5.850-6.425 GHz	14.0-14.5 GHz
Midband Gain (±.2dB)	Receive	35.5dBi	35.5dBi	45.0 dBi
	Transmit	39.5dBi	39.5dBi	46.5 dBi
Antenna Noise Temperature				
10° elevation		56 K	30 K	44 K
20° elevation		49 K	23 K	38 K
30° elevation		47 K	21 K	35 K
40° elevation		46 K	20 K	33 K
Sidelobe Envelope, Co-Pol				
Mainbeam $< \theta < 7°$		29-25Log θ dBi	29-25Log θ dBi	29-25 Log θ dBi
$7° < \theta < 9.2°$		+8 dBi	+8 dBi	+8 dBi
$9.2° < \theta < 48°$		32-25 Log θ dBi	32-25 Log θ dBi	32-25 Log θ dBi
$48° < \theta < 180°$		-10dBi (averaged)	-10 dBi (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
VSWR		1.3:1 Max.	1.3:1 Max.	1.3:1 Max.
Feed Interface	Recieve	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

Mechanical	
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	±45° Fine Adjustment, 360° Continuous
Mount Type	Elevation over Azimuth
Shipping Specifications	225 lbs. (103 kg.) / 240 lbs. (109 kg.)

Environmental Performance		
Wind Loading	Operational	50 mph (80 km/h)
	Survival	125 mph (201 km/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/h ft²

PRODELIN
A TriPoint Global Company

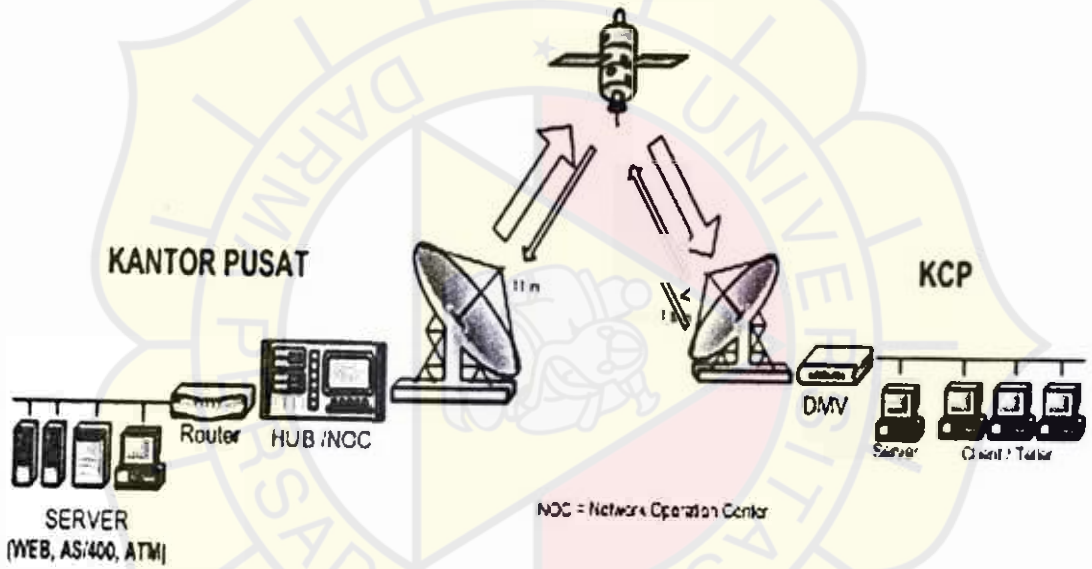
1700 NE Cable Drive • Conover, NC 28613 USA
Tel: (828) 464-4141 • Fax: (828) 466-0860
www.prodelin.com

LAMPIRAN VI

JARINGAN KOMUNIKASI DATA BRI

KCP NETWORK CONFIGURATION

Sistem : VSAT TDM/TDMA Broadband



	Port 1 (999999) on unit_Tambun Bandwidth Traffic IN kbyte	Port 1 (999999) on unit_Tambun Bandwidth Traffic IN kbit/second	Port 1 (999999) on unit_Tambun Bandwidth Traffic OUT kbyte	Port 1 (999999) on unit_Tambun Bandwidth Traffic OUT kbit/second	Port 1 (999999) on unit_Tambun SUM (kbyte)	Port 1 (999999) on unit_Tambun SUM (kbit/second)	Port 1 (999999) on unit_Tambun Coverage (%)
1/11/2009 11:15 AM - 11:20 AM	441,939	12,068	603,294	16,474	1.045,23	28,542	100
2/11/2009 9:55 AM - 10:00 AM	108,191	2,954	462,036	12,617	570,228	15,571	100
3/11/2009 1:25 PM - 1:30 PM	1.046,01	28,564	340,839	9,307	1.386,85	37,871	100
4/11/2009 9:45 AM - 9:50 AM	385,066	10,515	411,868	11,247	796,935	21,762	100
5/11/2009 8:40 AM - 8:45 AM	435,682	11,897	573,769	15,668	1.009,45	27,565	100
6/11/2009 8:15 AM - 8:20 AM	584,689	15,966	1.438,00	39,267	2.022,69	55,233	100
7/21/2009 8:10 AM - 8:15 AM	399,271	10,903	730,39	19,945	1.129,66	30,847	100
8/11/2009 10:50 PM - 10:55 PM	61,571	1,681	52,748	1,44	114,319	3,122	100
9/11/2009 12:05 PM - 12:10 PM	110,454	3,016	464,552	12,686	575,006	15,702	100
10/11/2009 8:30 AM - 8:35 AM	615,851	16,817	803,369	21,937	1.419,22	38,754	100
11/11/2009 8:55 AM - 9:00 AM	432,617	11,814	565,307	15,437	997,924	27,251	100
12/11/2009 10:35 AM - 10:40 AM	436,309	11,914	588,477	16,07	1.024,79	27,984	100
13/11/2009 7:55 AM - 8:00 AM	404,411	11,043	807,51	22,051	1.211,92	33,094	100
14/11/2009 8:30 AM - 8:35 AM	514,671	14,054	1.165,71	31,832	1.680,38	45,886	100
15/11/2009 2:35 PM - 2:40 PM	117,295	3,203	472,218	12,895	589,513	16,098	100
16/11/2009 7:40 AM - 7:45 AM	398,713	10,888	381,709	10,424	780,422	21,311	100
17/11/2009 7:55 AM - 8:00 AM	332,461	9,078	564,721	15,421	897,182	24,5	100
18/11/2009 7:45 AM - 7:50 AM	366,559	10,009	326,388	8,913	692,946	18,922	100
19/11/2009 7:55 AM - 8:00 AM	414,713	11,324	1.117,68	30,52	1.532,40	41,845	100
20/11/2009 9:05 AM - 9:10 AM	415,143	11,337	569,535	15,553	984,678	26,889	100