ANALISIS KEHANDALAN KINERJA JARINGAN KOMUNIKASI DATA VSAT IP (*VERY SMALL APERTURE TERMINAL*) PADA REMOTE *MOBILE* KU-BAND

SAMLAWI
5235129022

Skripsi ini Ditulis untuk Memenuhi Sebagian Persyaratan dalam Memperoleh Gelar Sarjana

PENDIDIKAN TEKNIK INFORMATIKA DAN KOMPUTER
FAKULTAS TEKNIK
UNIVERSITAS NEGERI JAKARTA
2015

/$1 ,3$GGUHVV !

/$1 6XEQHWPDVN !

/$1 ,3$GGUHVV !

/$1 6XEQHWPDVN !

1XPEHURI5HWU\DWWHPSWVWR6HQG7UDS !

,3*DWHZD\,3$GGUHVV !

6'/&RQWUROOHU,3$GGUHVV !

96$70DQDJHPHQW,3$GGUHVV !

'HIDXOW*DWHZD\IRU0DQDJHPHQW,QWHUIDFH !

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)RUPDWWKHSDUDPHWHUVIRUVHULDOSRUWDFFHVV

3DUDOOHO3DULW\ &5 IRUSRUWFRQQHFWLRQ

&RQWURO

0DLQPHQX &5 IRUSRUW

x 6HOHFWWKHFRQILJXUDWLRQPHQXLWHPRWKHUSRUWRUWUDQVLW

\RXUFRQILJXUDWLRQSDUDPHWHUVLQWKHSRUW

VDPSOH96$7,30DQDJHPHQWFRQILJXUDWLRQ

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&RQWURO

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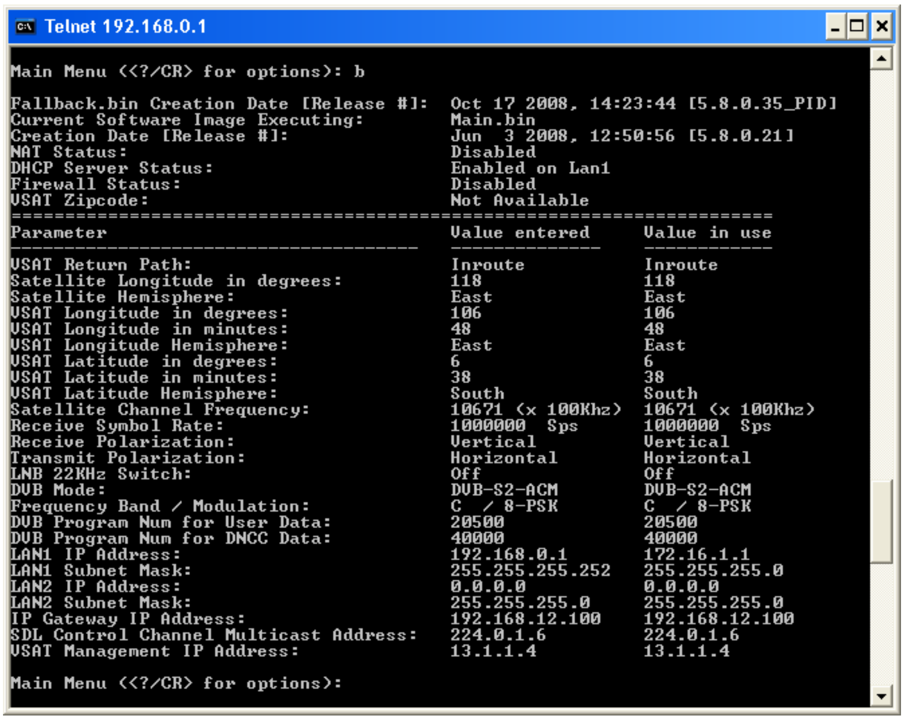

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Telnet 192.168.0.1

Main Menu (<?/CR> for options): b

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Creation Date [Release #]:                  Jun  3 2008, 12:50:56 [5.8.0.21]
NAT Status:                                 Disabled
DHCP Server Status:                         Enabled on Lan1
Firewall Status:                            Disabled
VSAT Zipcode:                               Not Available
=========================================================================
Parameter                                   Value entered       Value in use
--------------------------------------      --------------      ------------
VSAT Return Path:                           Inroute             Inroute
Satellite Longitude in degrees:             118                 118
Satellite Hemisphere:                       East                East
VSAT Longitude in degrees:                  106                 106
VSAT Longitude in minutes:                  48                  48
VSAT Longitude Hemisphere:                  East                East
VSAT Latitude in degrees:                   6                   6
VSAT Latitude in minutes:                   38                  38
VSAT Latitude Hemisphere:                   South               South
Satellite Channel Frequency:                10671 (x 100Khz)    10671 (x 100Khz)
Receive Symbol Rate:                        1000000  Sps        1000000  Sps
Receive Polarization:                       Vertical            Vertical
Transmit Polarization:                      Horizontal          Horizontal
LNB 22KHz Switch:                           Off                 Off
DVB Mode:                                   DVB-S2-ACM          DVB-S2-ACM
Frequency Band / Modulation:                C  / 8-PSK          C  / 8-PSK
DVB Program Num for User Data:              20500               20500
DVB Program Num for DNCC Data:              40000               40000
LAN1 IP Address:                            192.168.0.1         172.16.1.1
LAN1 Subnet Mask:                           255.255.255.252     255.255.255.0
LAN2 IP Address:                            0.0.0.0             0.0.0.0
LAN2 Subnet Mask:                           255.255.255.0       255.255.255.0
IP Gateway IP Address:                      192.168.12.100      192.168.12.100
SDL Control Channel Multicast Address:      224.0.1.6           224.0.1.6
VSAT Management IP Address:                 13.1.1.4            13.1.1.4

Main Menu (<?/CR> for options):
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7&3 ,3,1*PHQJJXQDQ NWDHQURQHWVHRV3UHRWR,&R3(FKR

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6KDPLOD\HO6XSHU*,7DJ-DQJRDNRPSXWDHUQHN\VLDVPHGLD
-DNDUWD(DO

D N K L U D O N L W R Q H N V L G D S D W L W D G L E D U W V D Z D Q N S H U J L S U R W R N R O G W U L S

G D E Q H V D M X P D O D K H Q K L O D S D Q J F N R W V H P D N H Q N L H O G D X D J N D

W H U V H E P X D W N L D Q X D O N L R W Q D H N V R L Q P S D H W Q X Q L Q W E H Q O L W K H D W W

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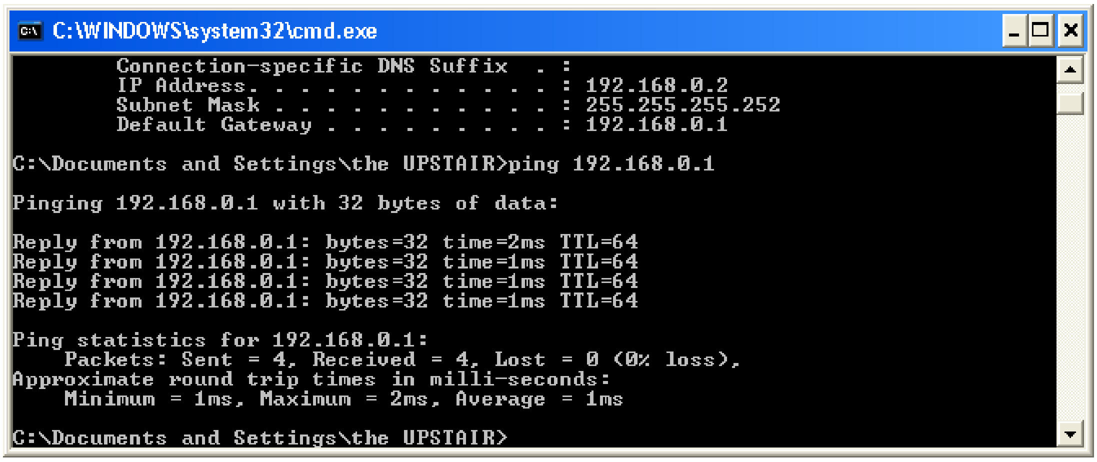

* D P E D U 7 H V W 3 L Q J , 3 / D Q R G H P

- % \ W H V U X S D N D Q S D F N H W D Q G L N L U L P X N R P S X W H U D Q 0 L V D O % \ W H V $ S D E L O D W D P H Q H Q W E H V D U Q \ D S D F N H W D Q J D N D Q N L U L P N H F R P S X W H U W X R O D Q K H E \ H V D U E \ W H L V N D X N L W D P H Q H Q W N D Q G H U V D F N H W D X N L W D N L U G L P S D H Q U L Q W D U K D G G U H V X P S D N H W U L Q W D U K G H Q P D H Q H Q W X R G D K D X D G D Q O D E R U L V

- 7 L P H G D G D K U Z D N W D X Q G L E X W X K F N H W G L N L U L P W X N V D P S D L W X M X D Q N W D Q G L E X W R X K H Q H X Q R P E H U L N D Q U H V S R Q S D F N H W G L W H , Q L J D W N D O N L R W Q D H N D V U L D Q J D Q V H P D N L Q E V Z D N W X Q \ D S L H U N L S U H D U D V D S D N D Q D Q P L O L V H F R Q G

- 7 7 / 7 L P H W R / L Y H G D V H D K D S H P D Q G N D W J X S U D F N H W L S D Q J W L G D N P X Q H W X H U N 7 L 7 U L P H Q D Q G E D N D S D F N H W K D U X V

EHUDGD GL NHOXUDKDQ ZDNDWX HUWHQWX VHVXDL GHQJDQ SHUDWXUDQ WHUVHEXW NRPSXWHU \DQJ EHUQLODL WHPSDW WLQJJDO
NRPSXWHU \DQJ EHUQLODL VHEDJDL SHOHSDV WHUKXEXQJ GHQJDQ NRPSXWHU
EHUNXDOLWDV VHSHUWL LQL \DQJ VHVXDL GHQJDQ NRQGLVL
QLODL LQL\D

426 4XDOLWDV 6XDQD \DQJ GLUHNRPHQGDVLNDQ 03,3

4XDOLWDV VXDQD \DQJ GLUHNRPHQGDVLNDQ PHUXSDNDQ NRPSRQHQ \DQJ PHQHQWXNDQ NDQDO VPHH
\DQJ PHQMDPLQ IRUPDW GDWD \DQJ GLWUDQVPLVLNDQ XQWXN PHQJJXQDNDQ NDQDO \DQJ GLVHGLDNDQ
OD\DQDQ \DQJ PHQJJXQDNDQ EDQGZLGWK NDQDO
GLJXQDNDQ XQWXN DSOLNDVL \DQJ PHPEXWXKNDQ NHFHSDWDQ WLQJJL GDQ GHOD\ NHFLO SDGD ODSLVDQ
SHQJLULPDQ \DQJ WLGDN WHUODOX EHVDU GDQ ZLGWK

'HOD

'HOD\ DGDODK ZDNWX \DQJ GLEXWXKNDQ ROHK SDNHW GDWD XQWXN VDPSDL NH WXMXDQ
VDPSDL GL WXMXDQ \DQJ GLWHQWXNDQ ROHK SHQJLULPDQ GDQ NRQGLVL MDULQJDQ WHUVHEXW
MDULQJDQ \DQJ GLVHEDENDQ ROHK MDUDN DWDX NRQJHVWL 'HOD\ GDSDW GLSHQJDUXKL
ROHK SHUDQJNDW NHUDV GDQ SHUDQJNDW OXQDN \DQJ GLJXQDNDQ GDODP /$1
'HOD\ GLGDODP ODPSLUDQ 7,3+21 +2/7HOHFRPPXQLFDWLRQ 1HW
3URWRFRO 2YHU ,QWHUQHW 3URWRFRO GDQ VWDQGDU \DQJ EHUODNX

7DEHO :DNWX 'HOD\

.DWHJRUL GHOD\	%HVDU GHOD\	,QGHNV
6DQJDW EDJXV	PV	
%DJXV	V G PV	
6HGDQJ	V G PV	
-HOHN	! PV	

6XPEHU 3+21

,3XWUD 3UDWDPD 6DPDOD %DPEDQJ +DUMR 7HOHNRPXQLNDVL 'DWD %DQGXQJ +DO

5XPXV DQJ GLJXQDNDQ XQWXN PHQFDUL GDHUDK GD\D EDLZDQDK

$$'HOD\D WDWD = \frac{WRWDO HOD\D}{WRWDO NDED\ DQJ GLWHULPD}$$ «

D 'HOD\ DQWULDQ 7D\D\JWD

'HOD\ DQWDUG DQDR DZQD N WD XQG L E X W X K D Q W X N ... V H E H S DQ W R P WHU V GHLEWXK W U N H V ... D Q 'HOD\ DQG L G D S D W L

K DVLO DS URS L DQ ...D D W D   U D W D

E 'HOD\ SURSDJDVL

'HOD\ SURSDJDVL DGDODK ZDNWX \DQJ GLEXWXKNDQ XQWXN PHQ\DOXUNDQ LQIRUPDVL

XQWXN EHUJHUDN GDUL NRPXQLNDVL DQWDU SHQJLULP GDQ SHQHULPD ... DWHOLW

JHRVWDVLRQHU ... 3\ URSDJDVL

7\

$$T_p = \frac{d}{c}$$

«

GLPDQD MDUDN VDWHOLW

F NHFHSDWDQ   P   V

F 'HOD\ WUDQVPLVL

'HOD\ WUDQVPLVL DGDODK ZDNWX \DQJ GLEXWXKNDQ XQWXN PHQJLULP VHOXUXK ELW

PHOHZDWL VDOXUDQ NRPXQLNDVL ... SHQJLULP NH SHQHULPD

GDQ NHFHSDWDQ ... 'HOD\

WUDQVPLVL GDSDW GLWXOLV

'HOD\ WUDQVPLVL

7V 6 /   ««

GLPDQD ELWV   .ESV EDQGZLGWK PHGLD

d Delimitasi total

Delimitasi total (*Ttotal*) adalah penjumlahan dari hasil delimitasi yang didapat

$$T_{tot} = T_s + T_{avg} \quad \ldots\ldots$$

Packet Loss

Merupakan suatu parameter yang menggambarkan suatu kondisi yang menunjukkan jumlah total paket yang hilang dapat terjadi karena *collision* *congestion* pada jaringan dan hal ini berpengaruh pada aplikasi karena retransmisi akan mengurangi efisiensi jaringan secara keseluruhan meskipun jumlah *bandwidth* cukup tersedia untuk aplikasi-aplikasi tersebut. Kategori Packet Loss di dalam versi TIPHON (Telecommunication and Internet Protocol Harmonization Over Network) dapat digolongkan sebagai berikut

Tabel Standar Parameter *Packet Loss*

Kategori Degradasi	Packet Loss	Indeks
Sangat Bagus		
Bagus		
Sedang		
Jelek		

Sumber: TIPHON

Persamaan perhitungan Packet Loss

$$\text{Packet Loss} = \frac{\text{Paket data dikirim} - \text{Paket data diterima}}{\text{Paket data diterima}} \times \quad \ldots\ldots$$

'DWUDDWH

'DWUDDWHEDXQGZGLGWKWHEXWDKULQGLJWDHQGWDWXNDPHDWW

\DQGJDSGDWWUDQVPLVLNDQDQLGDJLDVQXPDUWHXQWZDQWWXHUWHQWX

%DQGZLGWKQJXQDNHEQVDDWLXQROQPVXHFHSWDUWDDQVIHU

GDWWDUDQDWHULWXPOGDKWDDQGDSDWEDGZDUHEXWDKWHN

WLWLNDNGQODMDQJNDNWWXHUWHSQGDSXPQ\GDODGHWLN

EDQGZLGWKQRHWSHQJEDUXKUQH\FHSWDWDQGDIWDUGDODP

MDULQJDQJLQJXQSNGPREDNLNXHEDQGPDNHVDUQGZLGWKQ\D

VHKLQJJDMDODHEELKFSDHWFHSWDWDQQGDWDQHEDQGZLGWK

EDVDQL\DNGXDOHEVELWSHUVHFRQGGDQGZLGWKGDODPULQJDQ

YHU7,3+21*7HOHFRPPXQLFDWLRQV,QWHUQHW3URWRFRO+DUPRQL]DWLRQ*

*2YHU1HWZRUN*GDSDWLORRVHQJNDEXWDQLNXW

7DEHO6WDQG3HUIRUPDQVLDQGZLGWK

.DWHJRUL EXJ	7KURXJK	,QGHNV
6DQ%DWJXV		
%DJXV		
6HGDQJ		
-HOHN		

6XPEHU7,3+21

3HUVDPDDQLQWXNWDDWGDQ

'DWUDDWH $= \frac{\text{SDNHWDWHUEDPSDNHELW}}{\text{ODPSHQJLULPDQ}}$ ««

3RLQ$QWHQD

3RVLWLDEXPHPHJDSHQJUDPGLVDQPXQLNDVDWHOLW

6HGDQJNDKWDQDPDQGHUSVHHUEDQJHQLJXOUDHSH8QWXNWXWDVLXQ

E X P K L D U G X L V O H W V D W H O L W P D Q V L D V Q L W H S D W H Q H U D S G H G D D H U D K X S D Q

V D W H O L W L Q \ D Q G L N L U L G U D L S P G L W W H V L D W H D Q G L V S D Q F D U N D Q

N H P E D $ O U L D K Q W H P H R Q E D L N O X H E D K Q G S X D V G S D R V L D V Q L W H S D J W E U L V D

E H U N R P X Q L H Q J D Q W H Q L W X W S X H U G L X O D N S X H N Q D J Q D U D D Q K W D H Q D

D Q W H S Q R Q L D Q W 7 L H Q U X W S D D P G H D R E L N O X H E D \ Q Q G D R N D V W L H Q O D O X

E H U S L Q G H P D S K R M D W W D Y E L X P Q D Q E H U E P H G P D H U O S X H N Q D J Q D U D K D Q

D Q W \ H D Q E H U E H G D Q S \ H D U S L Q P G R D E K L N O X Q H E D Q W H U M V H P E D K J N D D L Q

S H U X E S D R K V D Q O V L Q W G D Q X M V X W D Y E L X P Q V H U S W H D U X E D K W D Q Q J J L D Q

V W D E V X R G D W S D H V U P X Q N D G K H Q J N D H F H S W D H W U D W Q H Q W X

/ 2 6 *L Q R I 6 L J K W H* U X S D Y N D U Q D X W W O G D L N P D S Q R D V D Q L W H Q D

P H Q J K D N G H D U S D V H D W K H D O U E X W H E G D K D O D Q E J D D L S Q R K F E Q D Q J X Q D Q

D W D X N S H X R Q X Q J N O L D Q O D X Q O N D H Q D G Q D E U H D V D B Q Q W K W K X D \ D Q S H U O X

G L S H U K V D D W O L D K D W \ Q G \ D N O H W H S H Q J D Q V D X K G D X Q W V P H R Q E D L N O X H

E D Q 3 G H U K L W S X H Q J D D Q V D X K G D X Q W W H D Q D *V H S R Q L Q W G D Q S G D L W* D N X N D Q

M L Q G D N H W S R K W L W D E X R G Q D V Q D W 6 H X O G L S X R *L Q D L Q L Q V W H Q D E X P Q*

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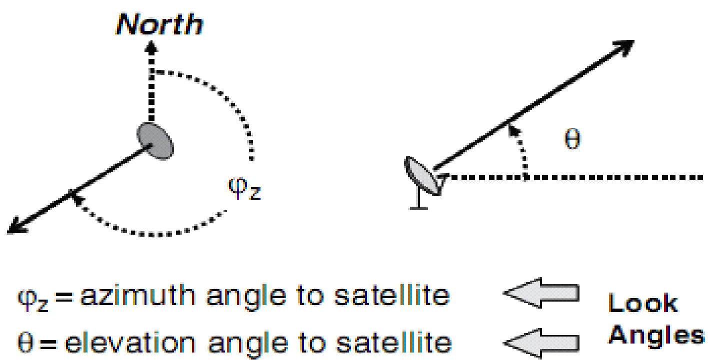

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6 X G H X OWH Y (D VG D YD OX DK D XQ G L K D VR LOEHKDQK DV HKE H Q D U Q \ D

G D W L WD LQ D N D Q S D VD Q J WG HQ J D U Q\ D K U WD LQ WD U WD G HQ L JW D Q

D Q W H X QG D] L P X $ WD K G D Y X D K\ D X Q G L E H Q W D K N D Y K W G HQ L JW D Q

D U D K V D D U Q J H E H Q D G U L Q X ED K H U O D Z D U Q D U X D P X G D] L P X W K

G D Q O H G D S L H U X Q X W P X H Q E D Q H W Q J D U D K N D Y Q L W P H R Q E D L N X H

E D Q N G H D U D K Q W V H Q W D H D O U L H W Q D U D Q N W D Q U W G H Q Q D W \ H E Q W V Q J D W

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N X D O V L W Q D Y H U L N X L W Q J N D D K Q J F D U R K H O D N S R L D Q W D Q L Q J H Q D

P R E L N X H E D Q G

/ D Q J N S D K U W V D H P D H P H Q K G D S D W R U D G Q L R Q N D O V R Q J L G W D X Q G H

O D W W L W H X Q W D H U N D K Q \ H Q G W D N E H U G S H D U G D W D U W D K V D U D

G D E Q H U D X G N X H W P L U L Q J D Q Q \ D

N L W H P D V X , 3 D Q P R G H S P D G E D J L V H Q D S D K P D] L D W D \ D X Q J

O D L Q D Q J \ D U L E W L D V P D D V X K G D O W D P S V L H W D Q R L Q H J H P Q Q D Q W L

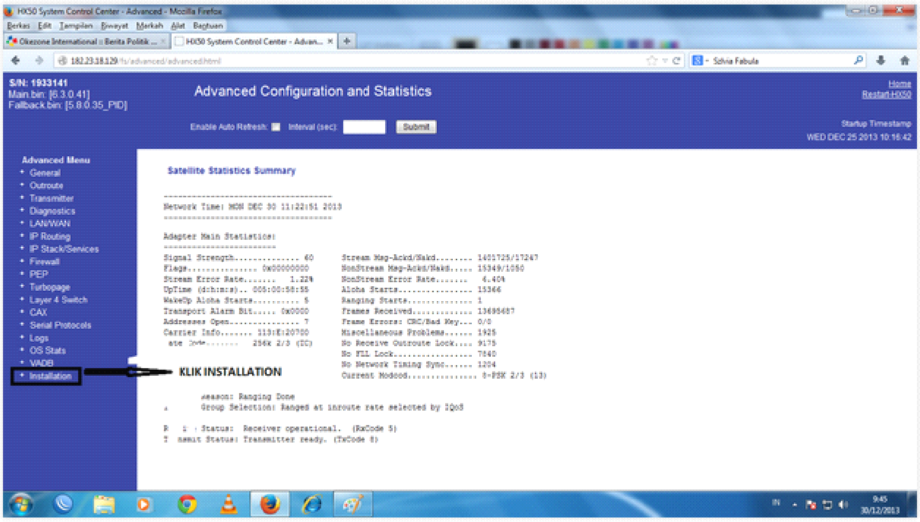
D N D Q W H D W

3 D G W D D K L D Q S L O P H Q L X Q V W D D O J D U L W P D V Q X K H P H Q V X H O D Q M X W Q \ D

S D G P H Q L X Q E L H W D F H D O D Y W H Q H X Q D E X W H R I G H E Q H D Q J N D

S D G L Q W H V L H Q H D O Q G L L P D N V D G M U H Q V L H F R Q G V D D P S L O D Q

D N D P H U H I V H H F V H K W R P D W L V



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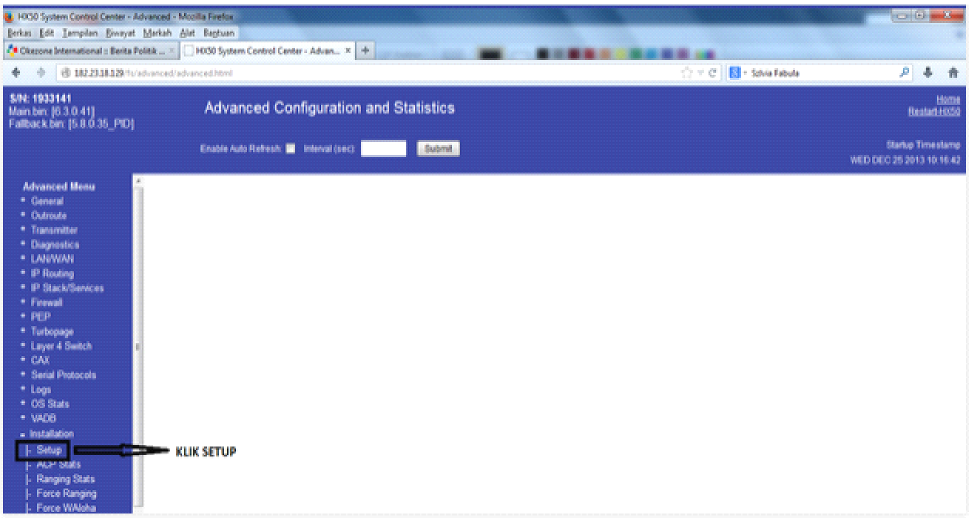

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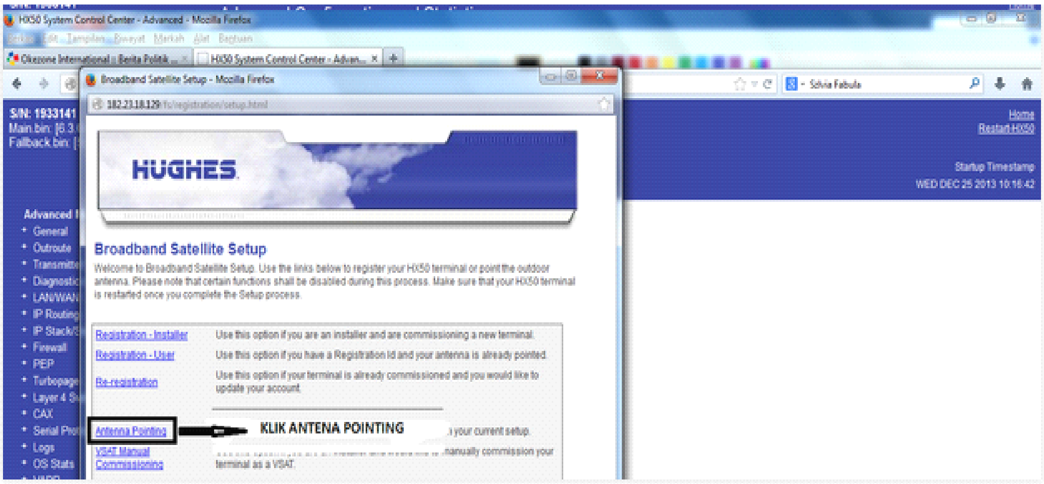

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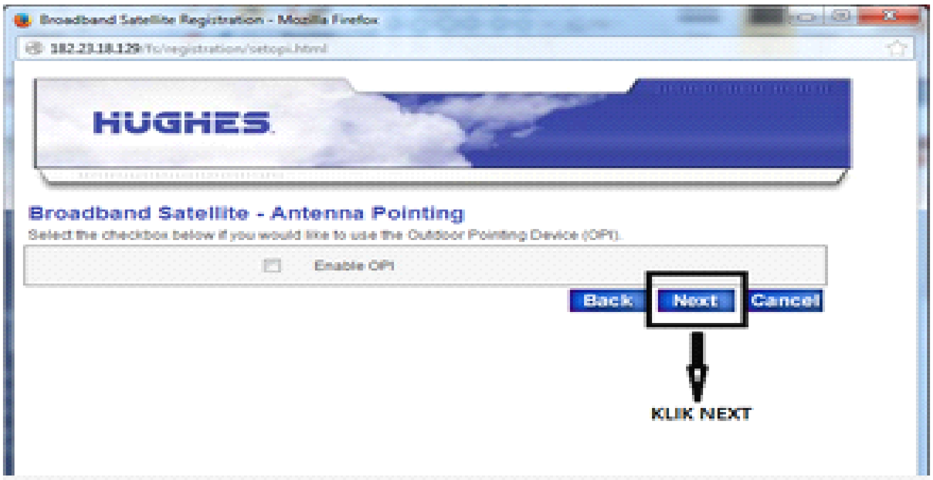

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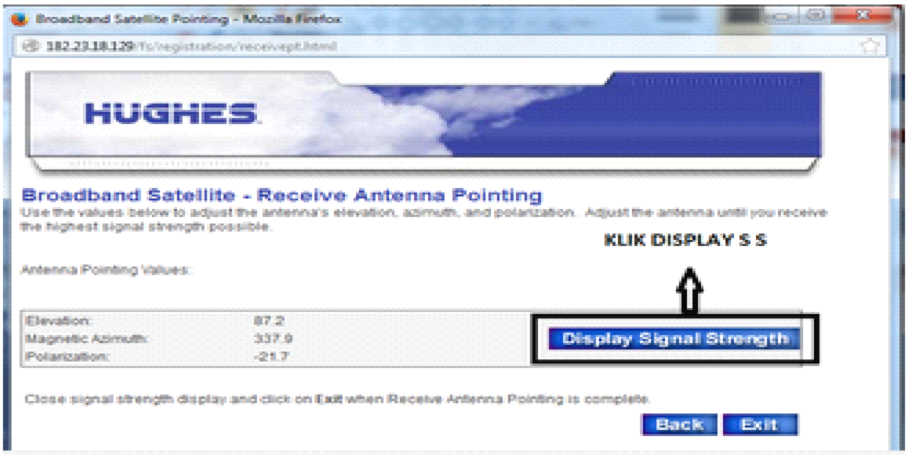

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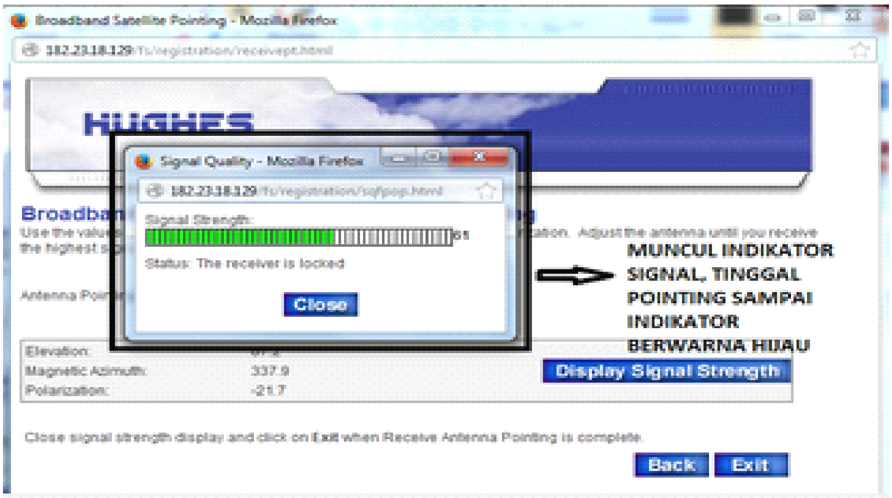

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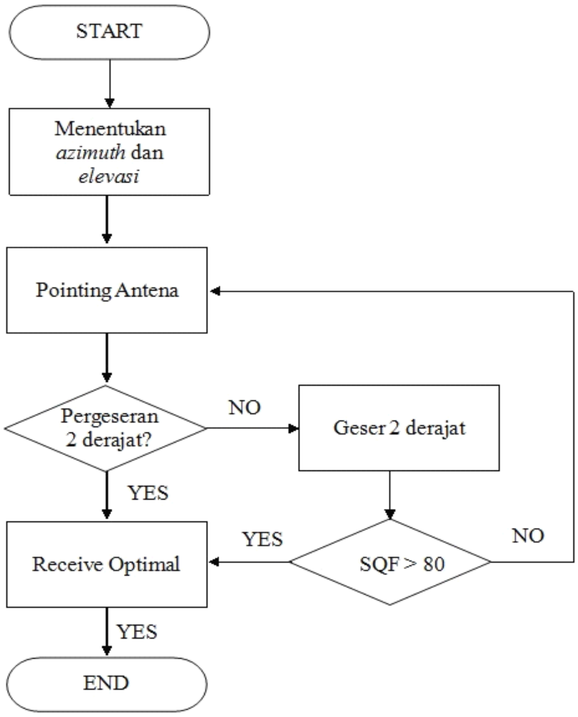

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$ Q D O L V D 4 2 6 4 X D O L W \ R I 6 H U Y L F H P H Q J J X Q D N D Q S H Q G X N X Q J

\ D L W X 7 R R O 3 U R I L O H 6 X L W H ... W X N P H Q J X N X U D E D Q G Z L G W K O D O L Q

S D F N H W O R V V S D G D V H U Y H U P R E L O H N X E D Q G

8 Q W X N P H Q J D Q D O L V D N D Q G D W D K D V L O S H Q J X N X U D Q L Q W H U Q H W

P H P S H Q J D U X K L N H D Q G D O D Q N L Q H U M D D N D Q G L O D N X N D Q

S H Q J X N X U D Q G D U L 9 6 $ 7 , 3 S D G D P R E L O H N X E D Q G E H U G D V D U N D Q

S D U D P H W H U 4 2 6 4 X D O L W \ R I 6 H U Y L F H S D U D P H W H U W U D Q V P L W

6 H K L Q J J D G L S H U O X N D Q D Q D O L V D 9 6 $ 7 , 3 S D G D P R E L O H E D Q G

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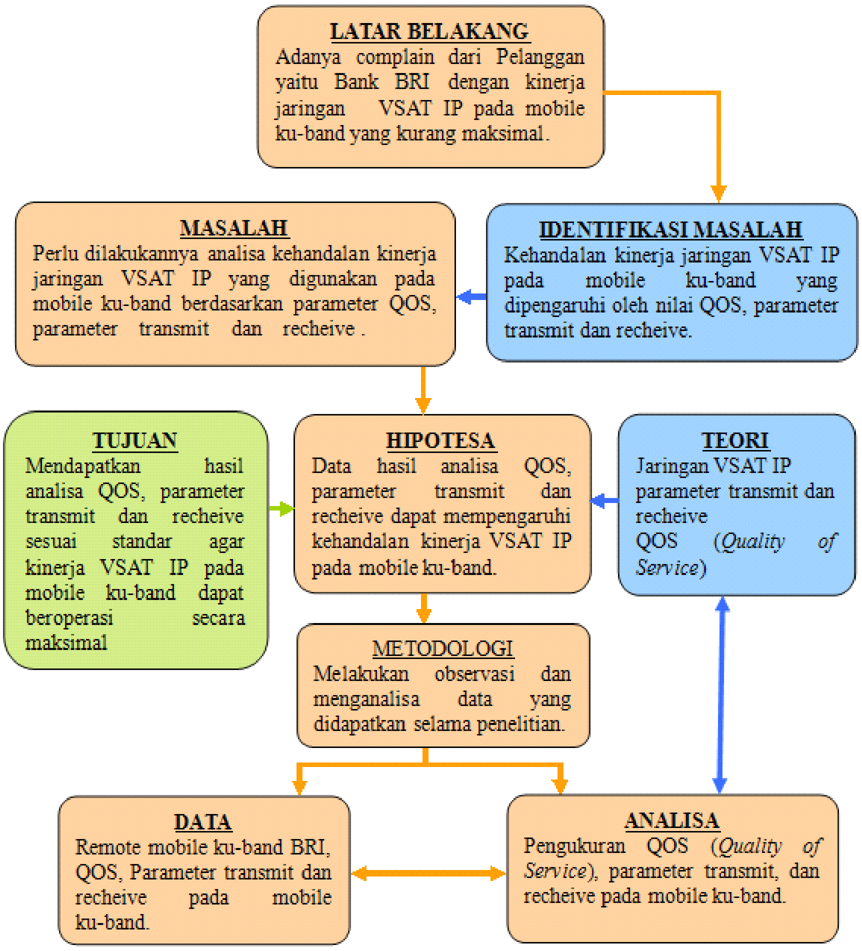

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PDND KLSRWHVLV GDODP SHQHOLWLDQ LQL DGDODK %HUVDUDQDQ

PRELOLWDV NHOXDUJD GDQ VWDWXV NHOXDUJD SHQJDUXK

SDGD EHUWDV GDQ VRVLDO SHUNRPEDQJDQ DQDN

DWDX SHQJDUXK WDPEDKDQ SDGD DQDN DWDX NDMLDQ

SDUDPHWHU KDUXV EDQJXQ SDGD DQDN

MDWXK NHOXDUJD VWDWXV HNRQRPL GDQ VRVLDO

DNDQ PHQJXDWNDQ NHPDPSXDQ

%$%,,

0(72'(/2*, 3(1(/,7,$1

7XMXDQ3HQHOLWLDQ

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'DWDSULPHUXSDGDODKWHJDQJDQSHQHOLWL

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D G D G D W D Q G L G D S G D W K D O D S L H Q J X N S X O U D D Q R U H H W F H L Y H \ D O

4 X D O)LDWF W RU D Q G V D P S L H W Q J D Q D N X L D V O L Q V D \ D Q V 4 X D Q ORL W \

6 H U Y L P F H Q J J X Q S D H N U D D Q Q J X D Q Q W H I W I D R Z O G] D Q H W 7 R R O V

S U R I H V V G D R W Q D H O P H E X L V S X O S D \ F D R W D G D W D W H

% ' D W D H N X Q G H U

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\ D Q P H O L S X W D P U H H W F H H G L D Y Q U D Q S V D P G L D R E L N X H E D G D Q D Q

S H Q J D Q D 4 X L D V O L V W H Q U Y E L H F V H S U D W D P H G H O S Q D E N O H R W V

G D Q D W D W H

, Q V W U X P H Q H O L W L D Q

, Q V W U X P H Q H O P L H W U L X D S D D N D D Q X Q G L D D V Q H E X 3 D H Q H O L W L D Q

, Q V W U X P H Q W X K D W D X Q D N H K D Q G D Q H D Q W D 9 6 $ 7 , 3 S D G D

P R E L N X H E D Q G L W X N X E \ D Q H Q G X N W X H Q R U L \ D W Q H R Q G D V D U L

S H Q H O G L D W Q H Q W X H Q E \ X N D R K P S X E W H H V U H L Q W D H \ D Q H P W H P E D Q W X

P H Q M D O D D S Q O N L D Q Q H W L D R Z O G] D Q H W 7 R S R U R M H V V L \ R Q D O

G L J X Q D N D Q S H D Q H O E L H W U L O D D Q Q J X V X Q D S H Q J X P S G X D O W D Q

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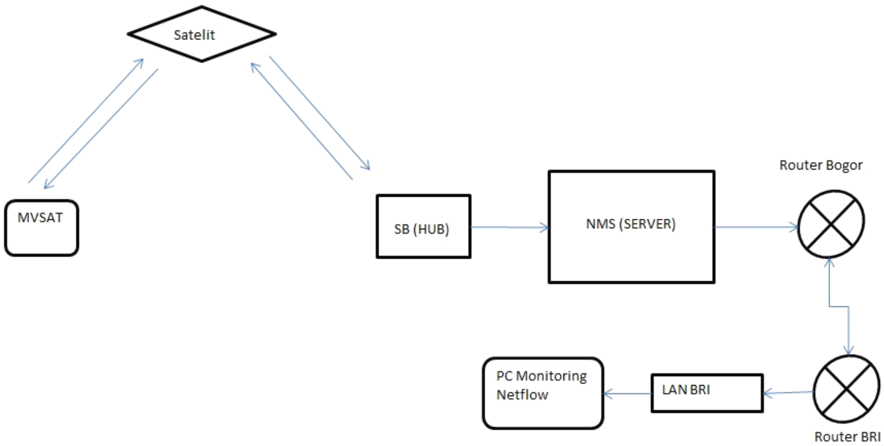

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V W D QGGHDQUDLWSLHQ J X NWXHUDKQD G U D LSQ QDJQ W L P D O

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F D UH H Q J F R PQRV RHUPH GHWDULWWD +X LE Q

3 D U D P HUWHH U HPYHU X S DVNLDQQSHQ H UVLEHXDKPR\DQJ

G L S D Q FRDOUHXKDE3QU D P \HEWHQGLS D NQDWPXHNQ J H WN X N XWQ \ D O

\ D QG L W HRUOLPKEXDKPRWHUX S EHN VDQQQ Q6 4)G L W H Q W X N D Q

G D VHEHUPDSDV L P DSR Q QDDQ WHQD VHE X WDQQ 6 4)

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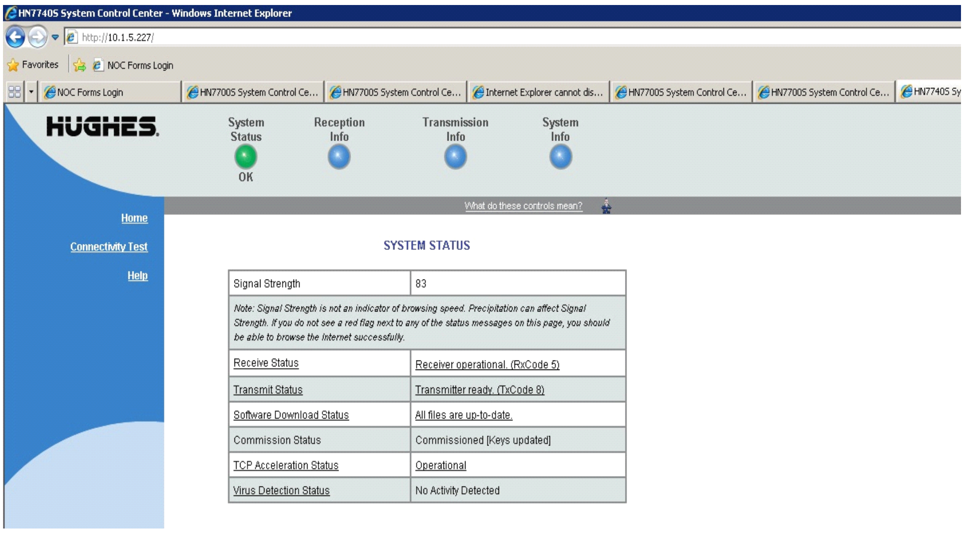
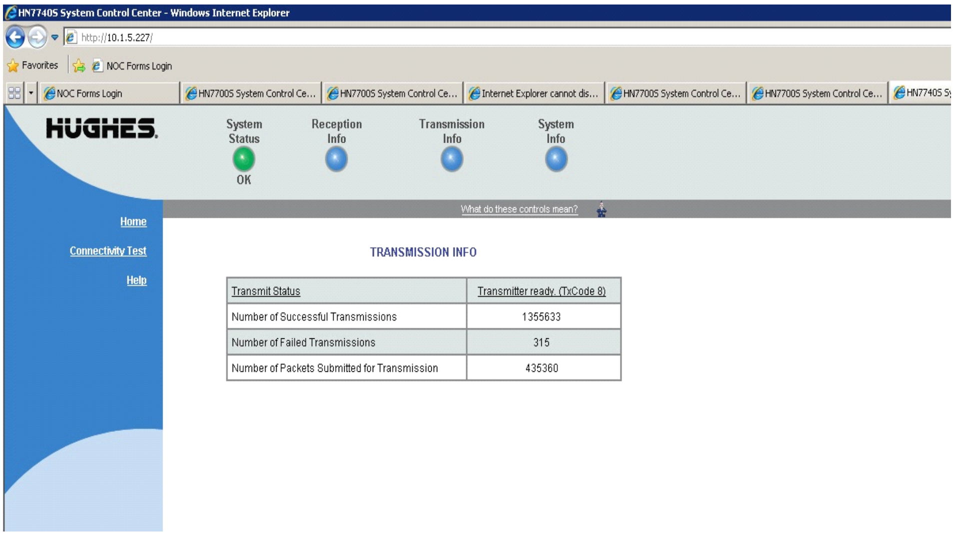


* D P E D U5 H S U H VHQWDVL URE LNXHE D Q G

Parameter transmisi *remote* [illegible] menunjukkan [illegible] code sehingga *remote* [illegible] komunikasi [illegible]. Berikut tampilan sinyal transmisi [illegible] *remote*.



Gambar [illegible]

Pengukuran Parameter *Quality of Service*

Pengecekan [illegible] bandwidth [illegible] satelit [illegible] monitoring [illegible] netflow analyzer [illegible] status [illegible]

[illegible]

Pengukuran *Quality of Service* [illegible]

[illegible]

Pengukuran *[illegible]*

Pada sistem komunikasi satelit [illegible]

[illegible]

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LQGLVHE ROHNSDKHQ JDNUHXKHQ JEXPLDGSQRVQLVWLD EXPSQDGD

SRVOLVQ WDEQXJM\ XQEJHU EDHGWDDWHXQ JDQJJDZ LQDNSRRUGLQDW

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KDQV\HGLNLW

)ORZFK $QDOLVD 3HQHOLWLDQ

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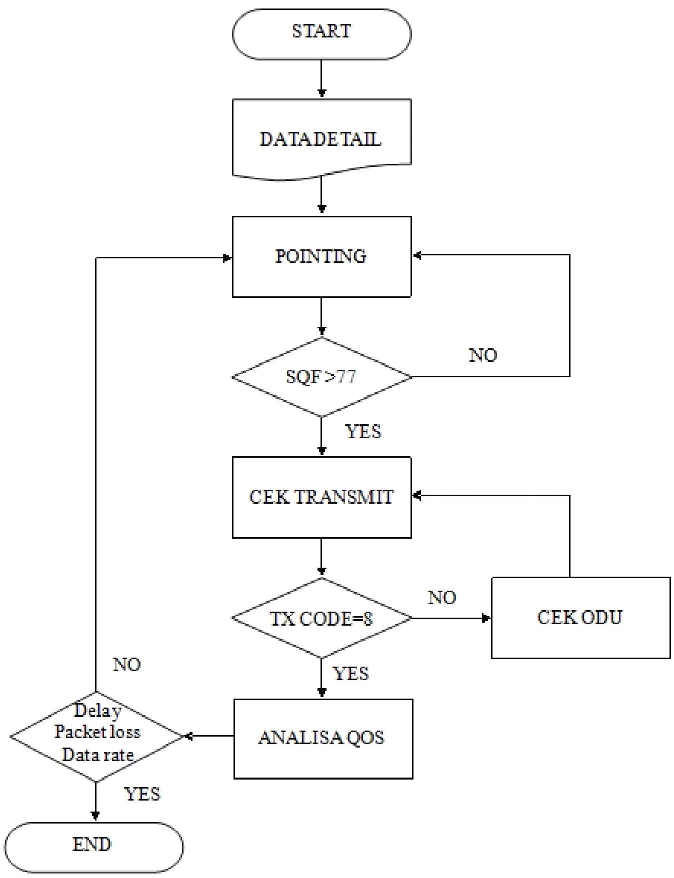

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\ D Q D J N D G Q L W %HOHUWGD VGDUW NDDQ S R J U D Q Q J X D Q E D X O D J X V W X V

W H U G H D P S S D E W X D U K H P R P W R E L N X H E D Q G L P D K Q D V S L H Q J H F H N D Q

P D V L Q D V L P R J E L N X H E P H Q S X Q \ D L D P U H H W F H G U D Y Q H U D Q D Q L W

Q L O D L H Q Q G D N K H P X O K L D V Q R Q L W V R H U L D Q D 4 R L P D V L Q D V L Q J

U H P R W H U V P H E P X L W V S L H N U L I R P \ D Q N U D E Q L + N D H U L N X D W Q J \ D

G L O D N L X D N O D S K W L P D S O L U V D P W H L H W F H G L D Y W U D Q G V H P Q J V D R Q L Q W L Q J

D Q W G H D Q S Q D H Q J H F S H H N U D Q G J D N Q D H P P D N G L O D R Q E D Y L H Q J H Q J X M L D Q

N H F H S D Z D G D U L D U L Q 6 J $ D 7 Q 3 S D G P D R E L N X H E D Q H G Q X Q M X N D Q

S H Q L Q J Q N L D G V D D U L Q D P U H H W F H U L Y H D Q G V D P Q L X W D O L D W \ D V *4 D X Q O R L W *

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V H O D Q \ D X Q W Q O D N D X G N D D R Q H R E X N D H W L P S E X H O U D G Q D V G D U N D V L O

S H Q H O L W L D Q

7 H N Q $ L Q D O ' D W D

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V H K L Q N D J L D D N W D H W V D L X V D W G W H U W G H E S D H W Q P D X Q G D K S D K D P L

G D Q H U P D Q X I Q D V D R W H Q M D Z D E D O D K P D Q E H D K D G L H W Q J D Q

N H J L D S W Q H O 3 L D W G S L D Q H O L Q W G D D Q G L G D G S D G W D V U D L P G H D U Q

G D W H D N X Q G R G D R H Q M D G E X D Q V X D Q U W P X H Q H Q W N D Q D O D Q

N L Q H U D U D L 6 J $ D 7 Q 3 S D G P D R E L N X H E D Q H G Q J D Q U D P U H H W F H U L Y H

W U D Q G V D *L H O S D F N R W V G D U D W H*

/ D Q J N D K D Q J \ D Q G L O D N X Q N W P X H N D N D X Q D Q G L D V W L D O D P

S H Q H O L Q W G D Q H K J F D Q P H P S H U G R D W H D O D S R J U D Q Q J X D Q D

M D U L P Q R E D Q N O X H E D G Q L G G D S O H D Q P J D P L D Q W L H Q J J X Q H D F N S D E Q X W D K

U H P R P W R E H L N O X H E H D Q G G L P D P Q D D V L Q P J D V L P Q H J P S X Q S \ D D U L D F U H H W F H H U Y H

G D W Q U D Q \ V D P Q Q W V H D U L H Q Q G D F K Q D V L Q D V L U Q H J P R W V H U V P H H E P X L W L N L

S D U D P 4 H R V 6 \ H D U Q N X U D E Q D J L . N H H P S U D H W P R P W R E H L N O X H E D Q W G H U V H E X W

P H Q J J X Q S D H N U D D Q Q L J Q N G D R W R X U W G H R H F Q U J V D S H V L \ D N Q W D V L P D X P O D K

E D Q G Z \ L D G Q W J K D P G D \ Q D Q P H P E H G D N H E H Q S H D W R W V H H U V \ E E X W X

O R N D V H Q J D N Q W D D L Q D G D W D D Q G L O D N D X G N D P Q H K E D Q G L Q J N D Q

G D W X D O O L D W \ D W D Q L V Q H J E H O X G F H Q \ J K D D Q V S L H Q J X N S X D U D D Q P H W H U

S D U D P N H X W D H O O L D W \ D Y D D Q Q L G D D S S D D W V S D K U D P W H H W U H W H H E V X X W D W L D X

W L G D H Q J D W Q D Q X G D D O O L D W \ D \ Q D Q Q X G G D L K W H Q W X N D Q

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+$6,/3(1(/,7,$1 '$1 3(0%$+$6$1

+DVLO3HQHOLWLDQ

'DODP PHODNXNDQ DQDOLVLV SHQJHPEDQJDQ MDULQJDQ 96$7 ,3 SDGD HPSDW ORNDVL *PDVVDEL\ODK \DQJ EHUDGD GL DWDV PRGHP VDWHOLW L'LUHFW LQ 6.Q,

SDGD EDOLW $JUL NHDQ ,WHUDVL %HUL LQ\DQJ GLDWDV SHQJXNXUDQ SDUDPHWHU UHFHLYH WUDQVPLVL FRGH 6LJQDO 4XDOLW\ )DFWRU GHYLFH

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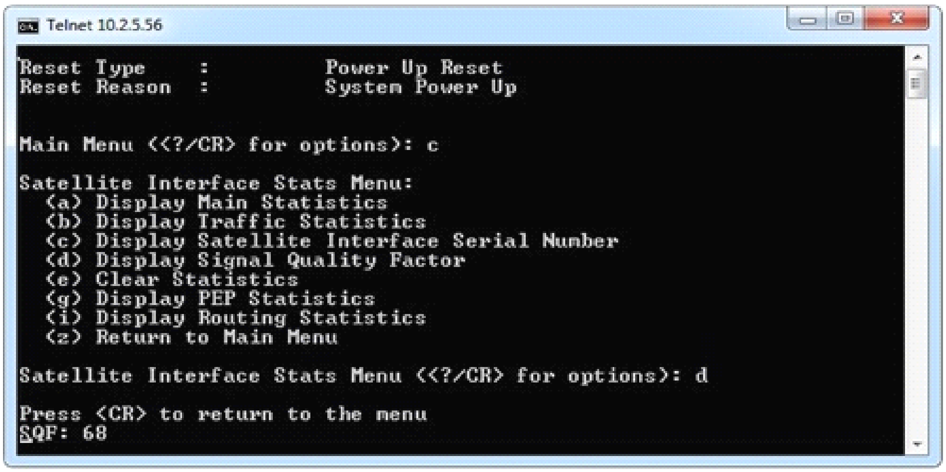

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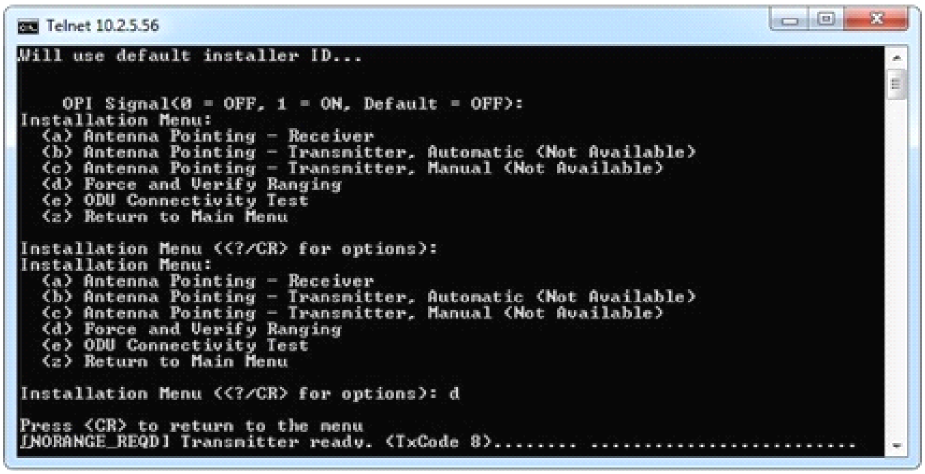

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1DPD	,S/DQ	,S0DQ	^Y&	dÆ }
0REL0XHEDQG			ðó	dÆ }ò
0REL0XHEDQG			ññ	dÆ }ô
0REL0XHEDQG			òï	dÆ }ô
0REL0XHEDQG			òô	dÆ }ô

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D Q W S H D Q P D P *E* L N O X *H* E D Q G

3 H U K L W X Q J D Q ***% H E D Q /*** ***) U H N X H Q V L*** **6 /**

' D O D P S H U K L W X Q J D Q J D Q J J X D Q Q W S H D Q U D D D W R U *P D V* *$ Q W* W H Q D

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G H Q J D D K Q N X V H S Q O V L L Q *+ N* * +] G D I Q U H N X G H R Q Z V Q *L O L + N* * +]

8 Q W P X H N Q J K L Q W L X O D J *V H S D Q F R X V S O* *G Q G R Z Q O L Q* X Q V D N *D Q W*

U D Q S J H V P L *R E* L N O X *H* E D H G D N *D W* E H O D S D

5 X P X V Q W P X H Q J K L W *X Q W X N* *S D Q F R X V S O L Q N*

$$/_X \left[\frac{S\, I_X\, G_X}{Q_X} \right] \left[\frac{S\, I_X\, G_X}{F} \right]$$

$$/_X \left[\frac{u \quad u \quad u \quad u \qquad u}{u} \right]$$

$$/_X \qquad G\, \%$$

I U H N V H S D Q F R X G R Z Q O L Q G Q N D H K G D Y P D D Q Q G L D O V D L F Q L \ **D Q** J

G L N L V U D L W R N H H O W L W L H N G D D H Q J L V U L L Q F N D H O P E D O L

5 X P X V Q W P X H Q J K L W *X Q W X N* *S D Q F R G R Z Q O L Q N*

$$/_G \left[\frac{S\, I_G\, G_G}{Q_G} \right] \left[\frac{S\, I_G\, G_G}{F} \right]$$

$$/_G \left[\frac{u \quad u \quad [\quad u \qquad u}{u} \right]$$

$$/_G \qquad G\, \%$$

, P D P 3 % : D K \ X 8 D P X Q J 6 N L D V W *W R H P X Q L 6 N D W V* *E & 9 $ Q* G 2 L I V H W

< R J \ D N D U W D O

7DEHO +DVLO 3HQJXNXUDQ 6SHHG $FFHVV

1DPD	,S/DQ	6ODQV 5DQJH N	IUHVSD ORXVSO G%	IUHVSDFH ORGVRZQOLQN G%
0RELOH EDQG				
0RELOH EDQG				
0RELOH EDQG				
0RELOH EDQG				

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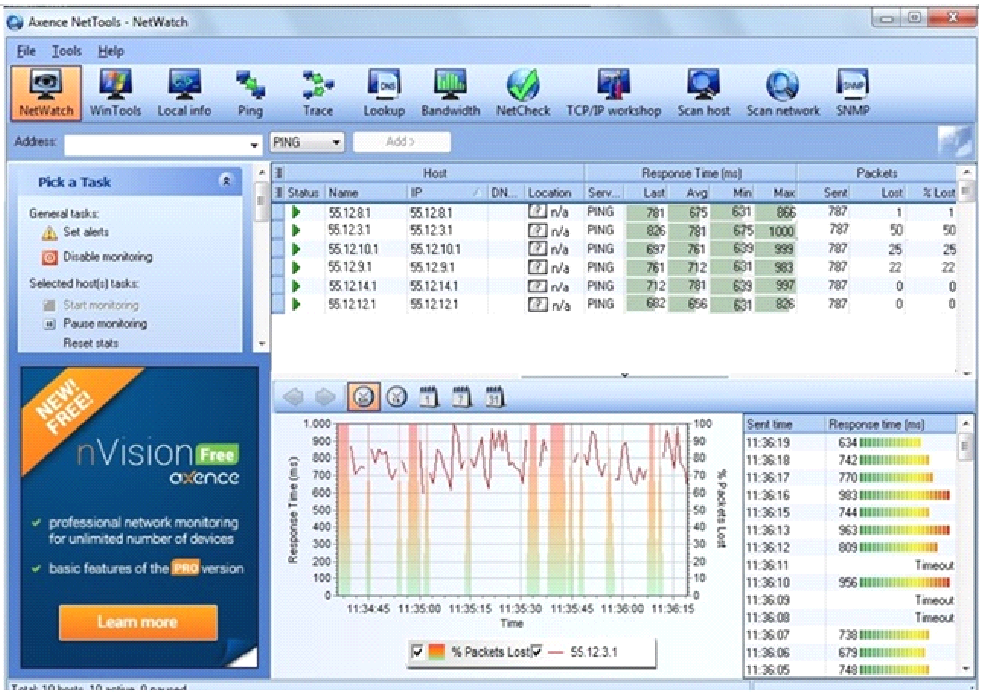

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OLQWDEQXJMDXQEJHUEDHQGWDDWHXQJDQQJDPLQNGDOSDHPQXOLVDQ

7XJDVWKLQDNDPHQJXUSDHLQJDSHUKLWXQJDQNDQWDUDEVLKRQ

NHDWNHQEHWUEGHLGVDHWWLWDLSN

3HQJXNXUDQRWDQRW

3HQJXNXUDQQWEHDUGDWDHUSHUNDQRQHQJJXQDDSNODLNDVL

1HW7RSRORJ VSLDRQDPOEDUXQW,3XN PHQXQMXNDQ

PV

$ 3HQJXN*XUDQ5DQJH*

'LNHWDKXL

+ -DUDNWEDXUNLHDWHOLWP

5H MDULMDUELXPL .P

G √ 5H+ 5H 5H5H+ FRV

G √ FRV

G .P

% 3HQJXNXUDQ3URSDJDVL

'HOSURSDJDVMDUDNDWNHUDQVPLWEHNHOWDQ\D

'LNHWDKXL

d = jarak [illegible]

c = kecepatan cahaya = [illegible] x [illegible] m/s

$$T_y = \frac{d}{c}$$

$$T_y = \frac{x}{x}$$

$T_y =$ [illegible] ms

C. Pengukuran Durasi Transmisi

$$T_s = \frac{S}{L}$$

$$T_s = \frac{\text{bits}}{\text{Kbps}}$$

$T_s =$ [illegible] ms

D. Pengukuran Delay Total

$T_{tot} = T_y + T_s + T_{avg}$

$T_{tot} =$ [illegible] ms + [illegible] ms + [illegible] ms

$T_{tot} =$ [illegible] ms

Tabel [illegible] Hasil Pengukuran Total Delay Mobile Broadband

Nama	IP Lan	Azimuth Elevasi	Slant Range (km)	Delay Total (ms)
Mobile Broadband		° °		
Mobile Broadband		° °		
Mobile Broadband		° °		
Mobile Broadband		° °		

3HQJXNXUDQ *%DQGZLGWK*

%DQGZLGWK DGDODK \DQJ GLJXQDNDQ XQWXN PHQJJDPEDUNDQ EDQ\DNQ\D LQIRUPDVL \DQJ GDSDW GLNLULP PHODOXL NRQHNVL MDULQJDQ GDODP VDWXDQ ZDNWX *%DQGZLGWK* VDQJDW PHPSHQJDUXKL NHFHSDWDQ WUDQVIHU GDWD GDODP MDULQJDQ VHPDNLQ EHVDU *EDQGZLGWK* VHKLQJJD PHQMDGL OHELK FHSDW NHFHSDWDQ WUDQVIHU GDWD ... GLNRQWURO ... GHQJDQ PHQJJXQDNDQ EDQGZLGWK

$ 8WLOLWDV 7UDILN *PRELOH* EDQG

3HQJXNXUDQ XWLOLWDV WUDILN *PRELOH* EDQG GDODP SHQHOLWLDQ PHQJJXQDNDQ DSOLNDVL \DQJ GLVHGLDNDQ ROHK 1HWIORZ DQDO\]HU ...

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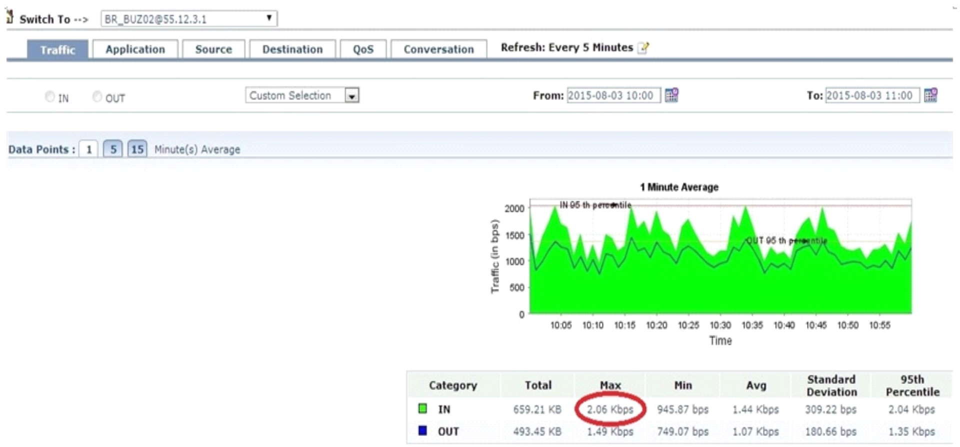

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% 8WLOLWDV 7UDILN *PRELOH* EDQG

3HQJXNXUDQ XWLOLWDV WUDILN *PRELOH* EDQG GDODP SHQHOLWLDQ PHQJJXQDNDQ DSOLNDVL \DQJ GLVHGLDNDQ ROHK 1HWIORZ

D Q D O G] H Q L L O D N S X D N G D D Q Q J $ D J X V W X V G M D P L E X D N L S/ X N X O

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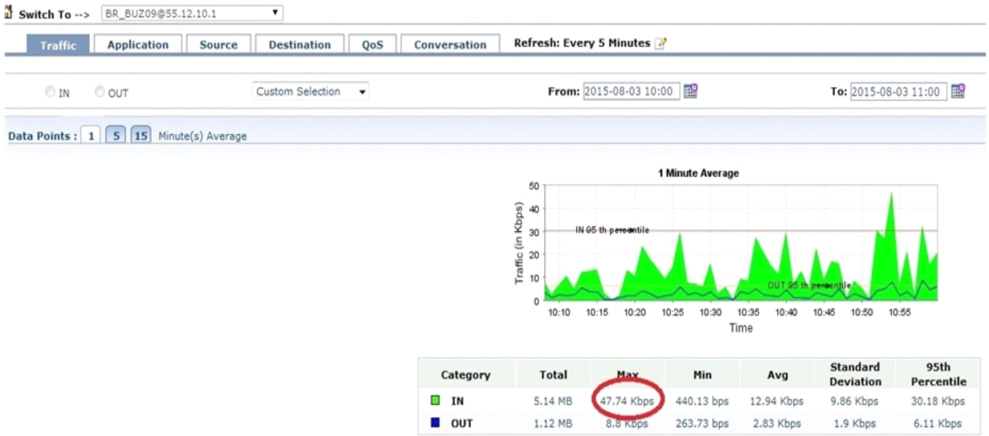

Category	Total	Max	Min	Avg	Standard Deviation	95th Percentile
IN	5.14 MB	47.74 Kbps	440.13 bps	12.94 Kbps	9.86 Kbps	30.18 Kbps
OUT	1.12 MB	8.8 Kbps	263.73 bps	2.83 Kbps	1.9 Kbps	6.11 Kbps

* D P E D U 8 W L O 7 U D I S D F R E N X E D Q G

& 8 W L O 7 U D I D O R E L O H E D Q G

3 H Q J X N X U D Q W D I D R E L O H E D Q G O D S H Q H O L Q L D Q

P H Q J J X Q D S L N D Q X G G K V H G R D N R Q H W U D V L D Q W I O R Z

D Q D O G] H Q L L O D N S X D N G D D Q Q J $ D J X V W X V G M D P L E X D N L S/ X N X O

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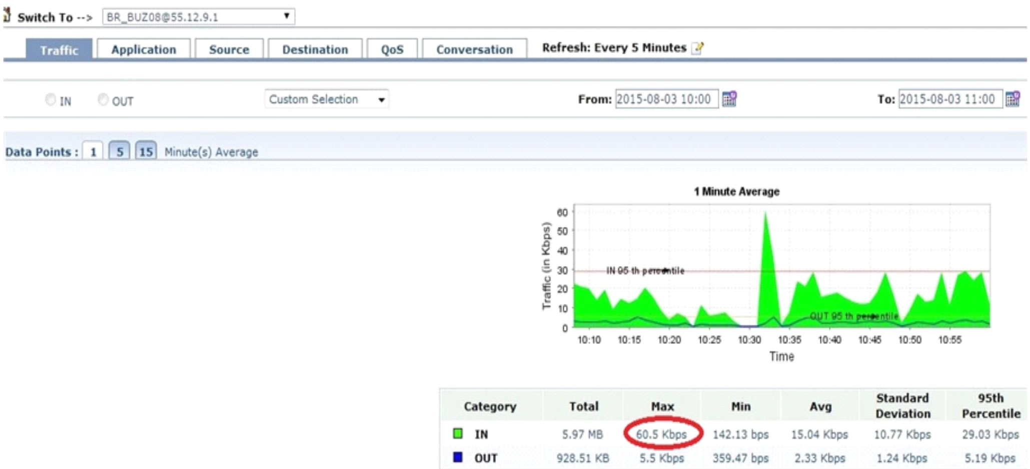

Category	Total	Max	Min	Avg	Standard Deviation	95th Percentile
IN	5.97 MB	60.5 Kbps	142.13 bps	15.04 Kbps	10.77 Kbps	29.03 Kbps
OUT	928.51 KB	5.5 Kbps	359.47 bps	2.33 Kbps	1.24 Kbps	5.19 Kbps

* D P E D U 8 W L O 7 U D I S D F R E N X E D Q G

' 8WLOLWDV 7UDILN 0RELOH EDQG

3HQJXNXUDQ XWLOLWDV WUDILN PRELOH EDQG GDODP SHQHOLWLDQ PHQJJXQDNDQ DSOLNDVL \DQJ GLVHEXW 0DQDJH(QJLQH 1HW)ORZ DQDO\]HU DSOLNDVL LQL PHQJJXQDNDQ SURWRNRO 6103 GDQ 1HW)ORZ XQWXN DQDOLVLV WUDILN MDULQJDQ GDQ VXGDK EDQ\DN GLSDNDL VHEDJDL DOLNDVL XWDPD 0DQDJH(QJLQH 1HW)ORZ DQDO\]HU 6WDWLVWLN %HULNXW KDVLO XWLOLWDV WUDILN PRELOH EDQG

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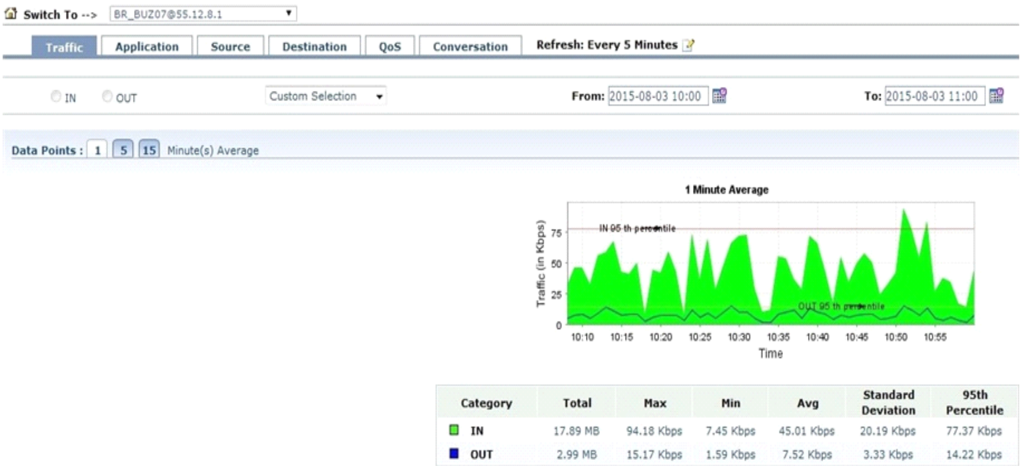

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7DEHO +DVLO 3HQJXNXUDQ %DQGZLGWK GDQ 3DFNHWV

1DPD	,S/DQ	%: .ESV	3DFNHWV
0RELOHEDQG			
0RELOHEDQG			
0RELOHEDQG			
0RELOHEDQG			

3HPDND$SOLNDVLSDGD7HOR EDUXHEDQG

3HPDNDLQQPGXLPKDUDDSQGDLQWHWRDSSNHDQD QDJDLDWQX %DQ%N5, GDEUDQGZ\DGQWLKVHG\DDLNWDXQNE$[V .ESDVJDGDSEDHWURSHUGDHVQLEDQDNO

7DEHO8NXUDQDWD$SOL%DQNLQJ

Aplikasi Banking System	Ukuran Data (kb)/Transaksi
Utama :	
ATM	0.54
Fast Teller System	0.54
AS/400 (terminal)	5,2
EMX Treasury System	32
CardPro System	20
Lain-lain :	
Money Gram	7.4
UKM System	15.7
Appraisal System	11.1
AutoPay	5.6
KYC System	10.9
Webmail	18.92

-XPOSDDKGHDWXQWDXSNO LENDDQVJLNWLHQJVDHGEDXOWDK

1

.E WUDQVDNVL

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.E WUDQVDNVD
.EV

VWUDQVDNVL

3HPEDKDVDQ3HQHOLWLDQ

%HUGDVSDHUQJXNXUDQEHUKLWXQJDQEHQHOLWLDQSDGD PDVLQJ PDVLQJEXHEDVHGEDJDLNXW

7DEHO 7DEH+DVLO3HQJHPLRWELOXEHDQG

1DPD	,S$GGU	426			3DUDPHWHU PRGHP	
		6ODP5QW NP	'HOD\ 7RWDO	%: .ESV	64)	7[FRGH
0RELOXEHDQG						
0RELOXEHDQG						
0RELOXEHDQG						
0RELOXEHDQG						

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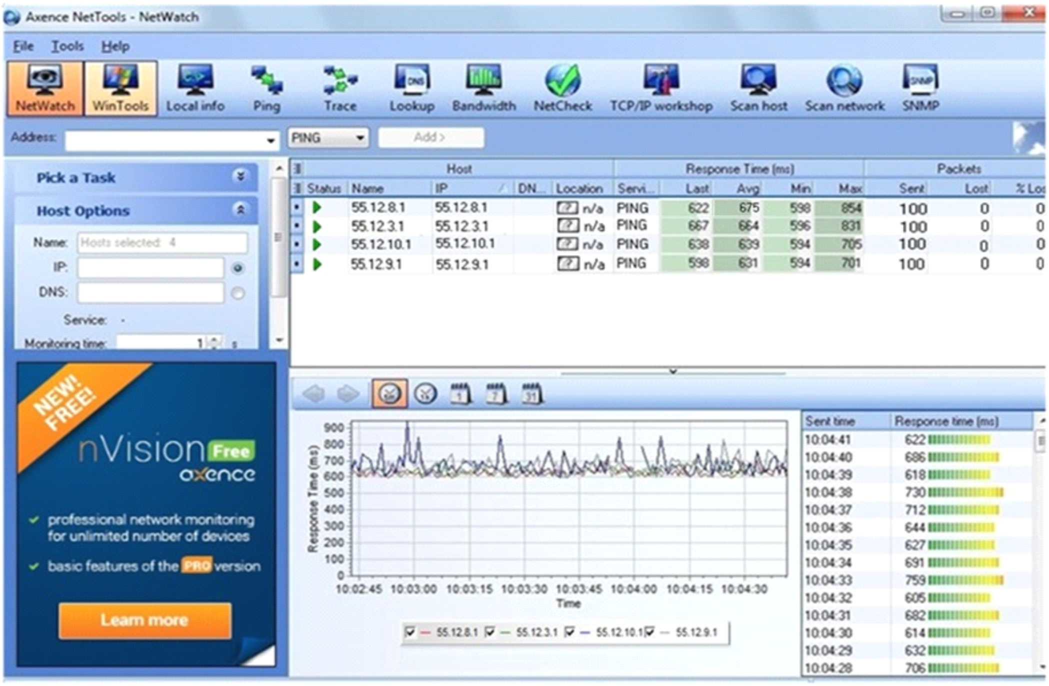
SDGD PRELOXEHDQG



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SHUEDSLHNUDJQ %Q8V&GDSQR LQDWQLW+HDQVDLROQ LWSRDUGWDOQJ QJJDO

$JXVWXW DDOQWLD VSLHQ JX NOXHUEDLNGNDUHL EHOX 4P)Q \DGDQ

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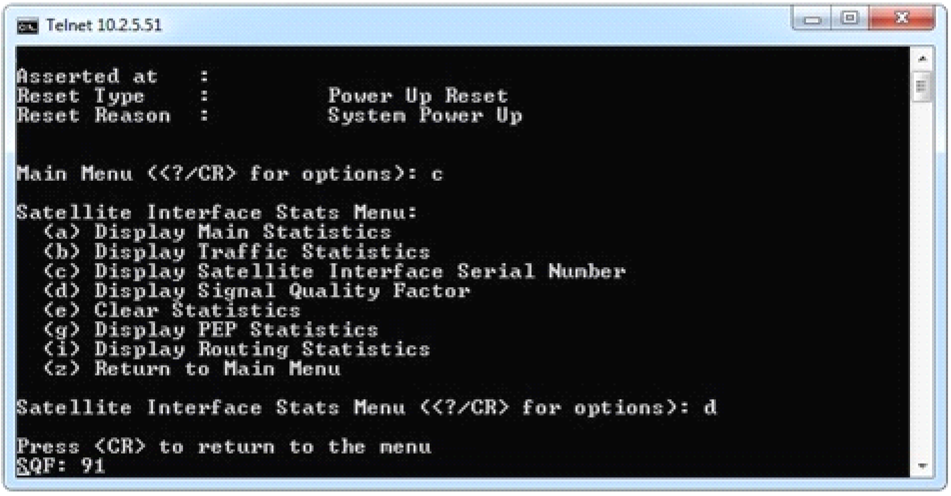
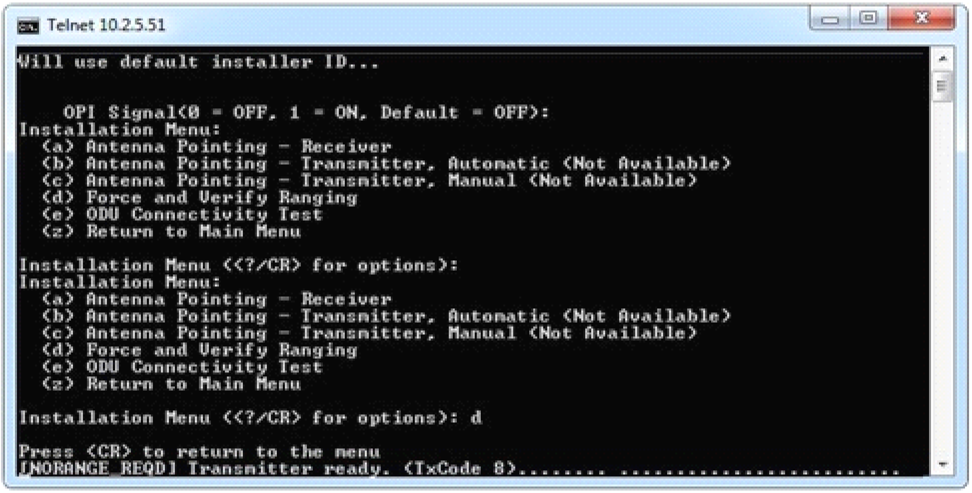


*DPEDU +DVLO 2SWLPDVL 5HFHLYH 6LGH *0RELOH* EDQG



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' L P D Q D ' L O D N X N D Q D Q D O L V D E D Q G Z L G W K P H Q J J X Q D N D Q S H U K L W X Q J D Q

G H Q J D Q V H E D U D Q V H E H V D U

' L P D Q D 7 V P V

7 V 6 / E L W V . E S V

P V

7 D Y J P V

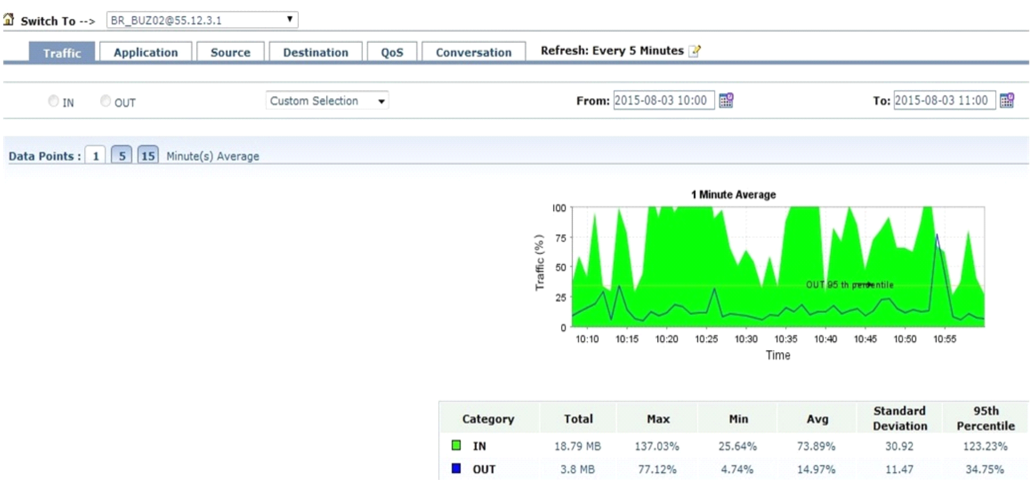
7 W R W D O 7 V 7 D Y J

P V P V P V

P V

3 H U X E D K D Q N H E X W X K D Q E D Q G Z L G W K X Q W X N N R Q W U D N D Q W D U D L Q W H U Q H W G D Q J D P E D U X W L O L W L V D V L J D U L V P D N V L P X P S D G D W D Q J J D O $ J X V W X V M D P

± G L O L K D W G D U L J D P E D U \ D L W X $ G D Q \ D E H Q L Q J N D W D Q V H E H V D U ± G D U L E H E H O X P Q \ D 6 H K L Q J J D J D U L V X W L O L V D V L N H U D V G L D Q J J D S N R Q G L V L P D V L K E L V D G L N D W D N D Q R R G R S H U D W L R Q D O



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'HWDLO$QDOLVD/LQN%XGJHW%DQG%5B%8=,3

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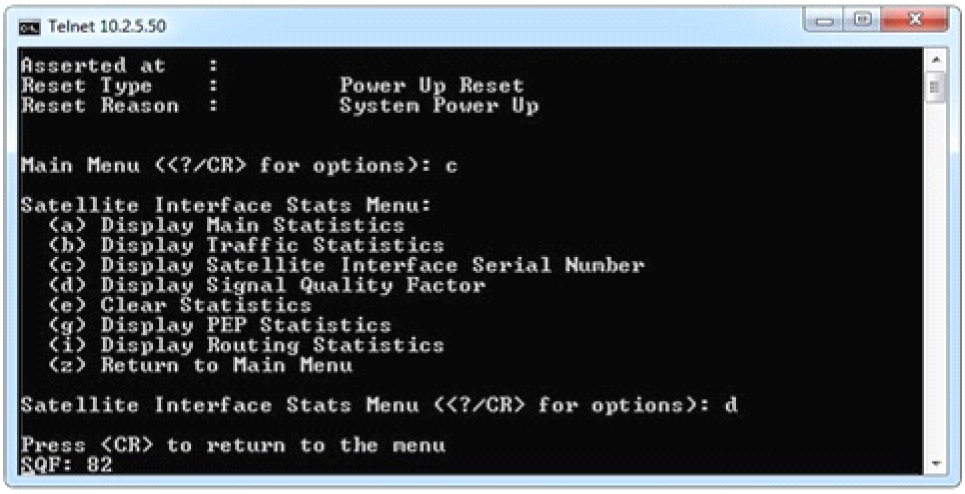

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'LPDQD QLODL GHOD\ WUDQVPLVL SDGD VDWHOLW GDSDW GLKLWXQJ GHQJDQ UXPXV ODWHQF\ GHOD\

GHOD\ WRWDO VDU

'LPDQD 'D PV

7V 6 / ELWV .ESV

PV

7DYJ PV

7WR7DO 7V 7DYJ

PV PV PV

PV

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EHVDQQQXDWLLOWLWKDOWSLHQJDFDWDSPDQSDWDDQJJ$DJXVWXV

GLOLGKDOWDPEDU\DLWX $GDQSHQLQJNDWDQEHEDQDU

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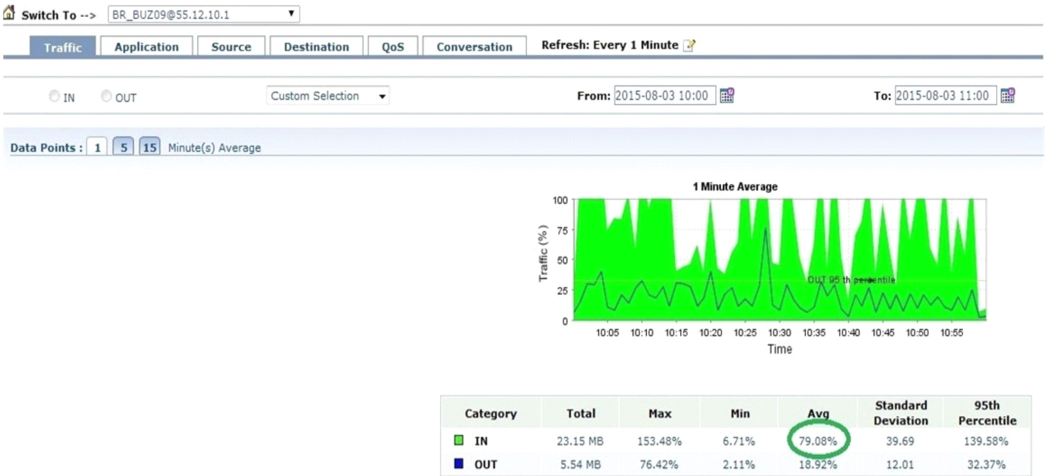

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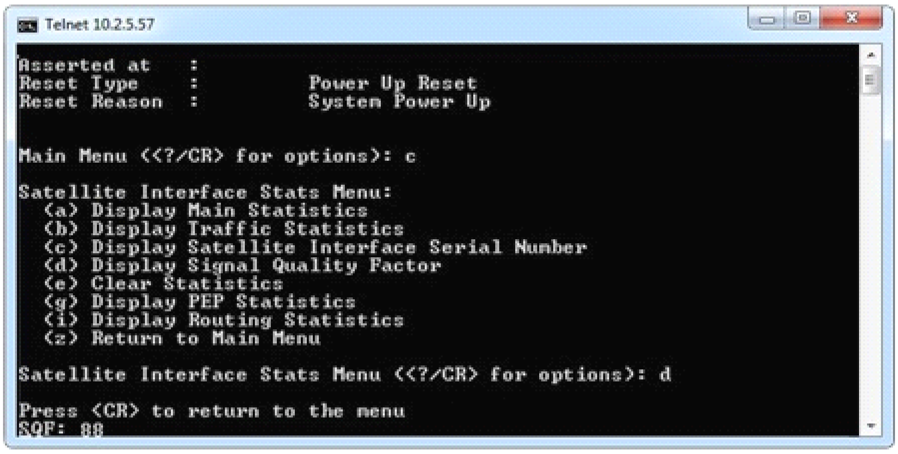

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GHOWDRWHDEOHVDU

'LPDQ'D PV

7V 6 / ELWV .ESV

PV

7DYJ PV

7WR7W 7V 7DYJ

PV PV PV

PV

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QLOD LOWLUWDLSHQJDPDVSDGSDWDQJJDJXVWXVMDP

± GLOLGDWDPEDU \DLWX .ESVDUKDVLO

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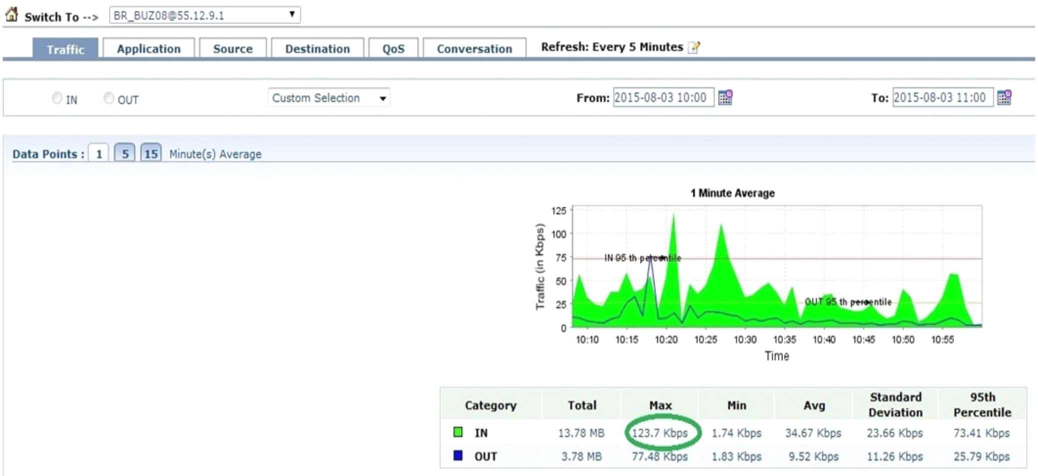

*

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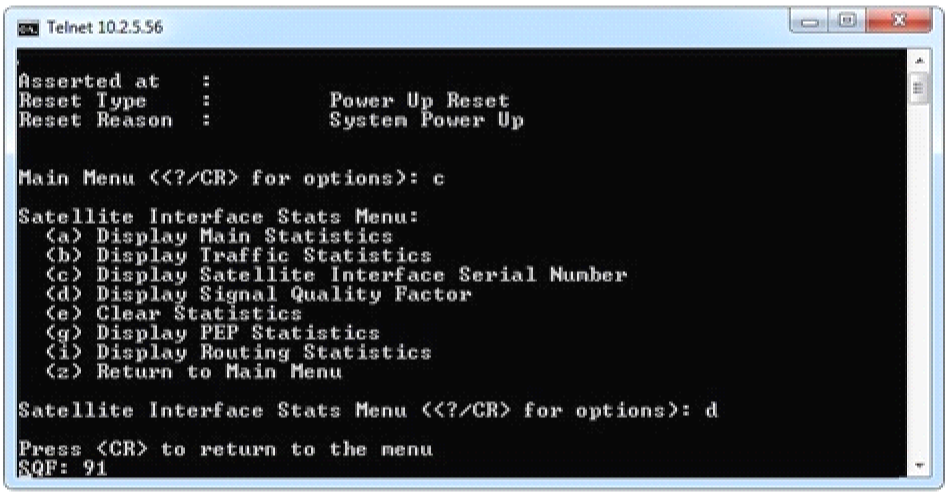
'HWDLO...%5B%8=,3

%HUGDVDUNDQ...

SHUED...

LQID...

SHQJXU...



*DPEDU+DV2SWLPDVL...

% H V D U G H Q W D R W D O D Q W L H E D L K G N D Q U L O G D H O W D R W H D E O H O X P Q \ D

' L P D Q D L O G D H L O U D D \ ± W U D D E W H D U X E H D O X M O D H G E H L D K X Q W Q X L N O D L

G H O W D R W H D E O H V D U

' L P D Q 7 ' D P V

7 V 6 / E L W V . E S V

P V

7 D Y J P V

7 W R 7 W \ 7 V 7 D Y J

P V P V P V

P V

3 H U X E D Q K D 4 R 6 E H U S H Q J D G Q X L K O X D W L L O W L W D G L N P D Q D

E H V D Q Q X D W L L O W L W K D L O H Q J D F D D S D Q S D D G D Q J $ D J X V W X V

G L O L G K D D O W D P E D U \ D L W X $ G D Q S D H Q L Q J W K H D E H D V Q D U

± G D U H E H O X 6 P H Q \ L D Q J W D X L N Q H U W H D E D W W

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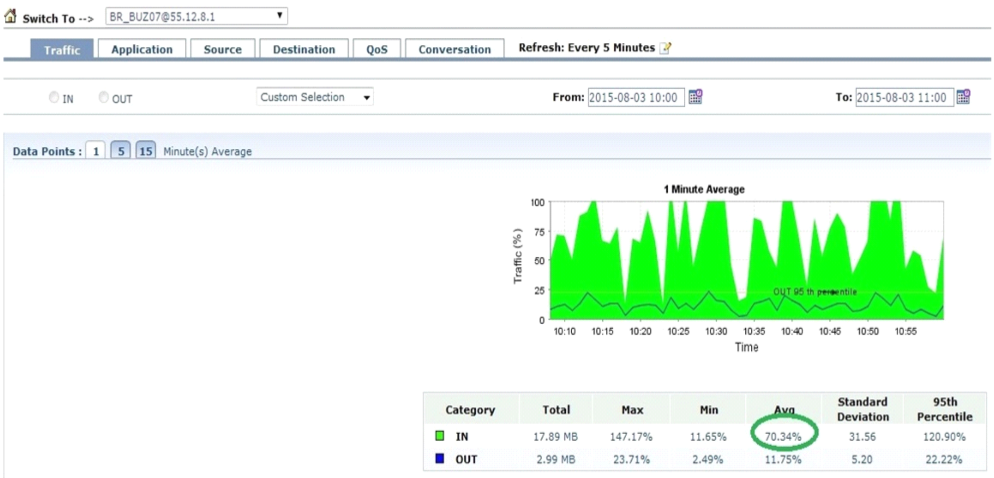

* D P E D U 8 W L O 7 U D D *R E L X H* E D Q 6 H W H O K D L N D Q

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%HUGDV SHQNDSDWGDQ L1HDW\IJ$QRZO\'DHUWRNWRU \DQJPHPSHQJEHUXKSHQ'DL QJNLDQOVDWDLQWLUWDDLVLKDQGDDUL QL66 4)LV DQWDPXQXP WLRSKWHPFD N3D&LGDQSEDHUW SHQMXDJDKDU XWLWLUWPDPHQFDSDL QDPXQ WSXHNPDNEDL QQ ZLSHWKGDN PDNVLPDDOSHQHQLLVWLDVXD GOMR ELNXH EDQG RSWLPDOLVDVL GLODNXNDQQSHDQUSDHQJXUD3QJGLOQRNDVHDO DPWDQGDU RSHUDVLGRQQDWLDWLUWDDLSHPDNGDQEDKZDKXQWXNDQJ GGDSDVHWDUXDQVLDPDO

7DEHO+DVLOPWLPD3OHQVLDQJSHWHGDQ

1DPD	,S/DQ	-XPOI 3&	-XPOPDHKV $70	3HQJDPDWDQ MDP	
				7UDIIL	6SHHG .ESV
0RELOXHEDQG					
0RELOXHEDQG					
0RELOXHEDQG					
0RELOXHEDQG					

6DDLWQJXKQWXSNHGDQ GLGDSDWGDWDUEHQV XGDK PHPHQXKLDQGRSHUDVLRQDOEHVDU.ESV\DNQSHUVHQWDVH SHPDNDLDQ GDEDQGZLGWKVHGLDNRNDOQHUVHXEGXDWK GDONHOD\RSHQDVLDOGXPDQLDOXDWL WLUWDLN GDQ SHPDNDQEDQGZLGWKPHQFDSDL GDUEDQGZLGWK GLVHGLDNDQEHVDU .ESV

3HQJD3UHXUK XEDK6KDQQWWH KDS3 FDOF7RWDO

7DEHO +DV2LSOWLPDVL 'HU'GHDOSHWDO7RWDO

1DPD	6ODQ 5DQJH	/DWHQFEUD WD		'HOWD7RWPV	
		6HEHO	6HVX	6HEHO	6HVXGDK
0RELO XHEDQG					
0RELO XHEDQG					
0RELO XHEDQG					
0RELO XHEDQG					

%HUGD WDUDEHUEDQ *PRELO XHEDQGHQ JDQWHGDQ *DWHQF\ UD\WUD WDQ EHUWSHQSJDGDKHKWDU WDQ VSDNDWUDQDSDQLNDVL SHUEDQNDQ

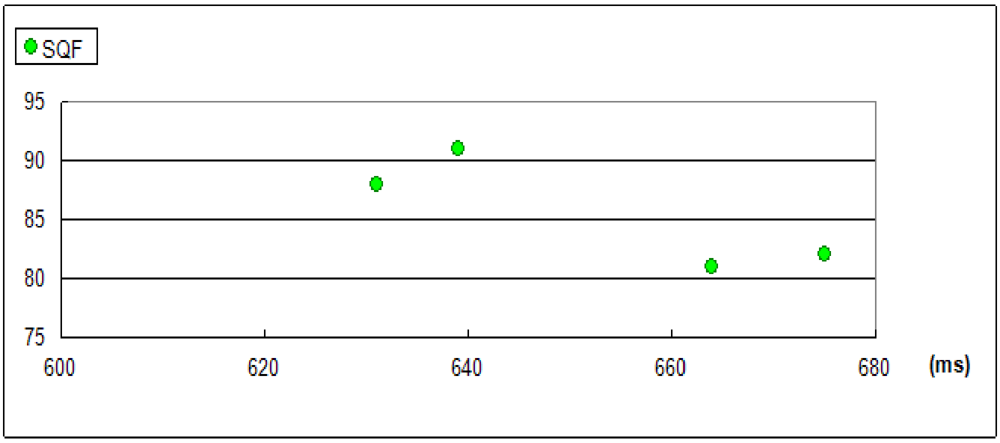
3HQJD3UHXUK XEDK6K4)DQHUKD8WGDDSLUDD3HP DNDLDQ

3HUEDLDNDQGDQODNSXDNDQ RNPRELOXHEDQ-DUDSDWDGD SRLQWQJ2QWLPDWLHUDVHEXJDHUSHQJDGXRKQHNWLYLWDV MDULQJDOLQPHQMDJHKDQGLDQEHUDL96$7Q3 SHUDOHXELK GLSHUKSDWDUDNDHQFHDLVH4 6LJQDXDO)DFWRUSHQJHFHNDQ WUDQVFULSWHUKDVGLDRSDWLPDSHLQJNDQSDGDQWDULIDN VLJQLILNDQ

Tabel Peningkatan Utilitas Trafik

Nama	SQF		Latensi Interaksi Tavg (ms)		Peningkatan Utilitas Trafik
	Sebelum	Sesudah	Sebelum	Sesudah	
Mobile Wideband				664	
Mobile Wideband				675	
Mobile Wideband				631	
Mobile Wideband				639	

Dari data nilai SQF pada tabel hasil menunjukkan pengaruh pada besaran latensi interaksi Tavg



Gambar Grafik SQF terhadap Tavg (ms)

Semakin besar nilai parameter *receiver* SQF (*Signal Quality Factor*) [illegible] mempengaruhi besar kecilnya delay [illegible] SQF sangat berpengaruh terhadap kualitas [illegible] pada *mobile* [illegible]band

%$%9

.(6,038/$1 '$1 6$5$1

.HVLPSXODQ

%HUGDVDUNDQ KDVLO SHQHOLWLDQ GDQ DQDOLVLV GDWD \DQJ WHODK GLODNXNDQ GDSDW GLVLPSXONDQ EDKZD NHEHUKDVLODQ SHQJJXQDDQ ... GLVLPSXONDQ VHEDJDL EHULNXW

1LOSDLUD PUHHWFYHD L6V4X) 6LJQ 4XDO)DFWRU GDSDQ DUDP HW WUDQ VIRUPDVL ... Q LODG LQ \ DQ J D NWLD ... PRE LNXHE DQN G Q VXOWLHWU K X GEHX Q JWD Q D 8% ... HE DS EDNFDQ HW OR 8%Q W L WSXHUDOGXD ... PRE LNXHE DQG

0HQJ LQXJ DLWWLUWD LQWV HGUS ... \D QG L W HOUHLEDK Q \GD NG D W H U N P DL DS D ELNDFD H S DWD Q WHUG PDWD ... P D NND H S X SHO D Q ... WL Q J N D W N D Q

+DVLO SHQJXNXUDQ ... DQ WDUDQ ... PRE LNXHE DV ... \DQJ WHUVHEXW GDSDW ... UDVLRQDO

%HUGDVDUNDQ ... QLODL ... WHUG DS DW ... XWLOLWDV ... DQG D ... PRE LNXHE DQG

3HPDNDLDQ PLQLPXP ... GDULNEDSDQ ... RSHUDVLRQD

G H Q JEDDQL'DUKDVSLHOQ J X NVXHUWDKQHDKDULDNWDQDGUDDQWD

S H Q L Q J NGDLWDWDQ 6 H K L Q XJQDWXDNDQWDL QGDODORQ G L V L

Q R U PDQDQ D SEDHWU R S H UGDHVQLEDQDNRRGS H U D W L R Q D O

6 D U D Q

$ G D S X Q U SDHQ X VOHLWHPDDKXNXSNHDQHOLLQWDQQ

P X Q J NELHQU J XQQDSGDLWWHUSDSDRDVDHGD W $ Q D S X Q

V D UGDDQV X WDHQUVDHQEWDDLDQ

3 H U D QMNDDLWQJDDNRQ G L WLHQEHS MDQRUDQDXQJ N L Q

G D SGDLWDNSXHNDQHFUHXNWDHQEHUDNSDDGDPRENXH

E D Q GUHYHQDWLQWHH-QDDFDLL W X MDXJNDDQSDHEL K

P H P L Q L PNDHOULXVLDUN D Q\DNHDUGXDHDWDDD W L E D

8 Q WGXNSPDHQJ D Q WWLHVULMDN6 Q HODNDVPLESDWDDPM D P

V L E XNHUDGXDQHDP D N V L PSDRLNQDQVQGHLQDPRENXH

E D Q6GH K L QGJDJSPDHWP L Q L PNDHOFLXVQLJUWLHQUDVDNRQHWDV L

O D P EDWDXHU S X W X V

'DUEHEHUVDDSUD Q GVLDDUDHQV XPOHLQVJ K D UDHSQJDDQ

D G D Q'QDD OLQVLD VPDHWP E DRQWHXUG DWXRXQ J NGLDQSDHWQ M D G L

L Q I R UVPHDUWDEXDGQOPDHPO D NRXSNHDQDVPEHQDXHEDDQGU

M D U L\QJDQHEDKEN WDH UGLDPJDVHQ G D W D Q J

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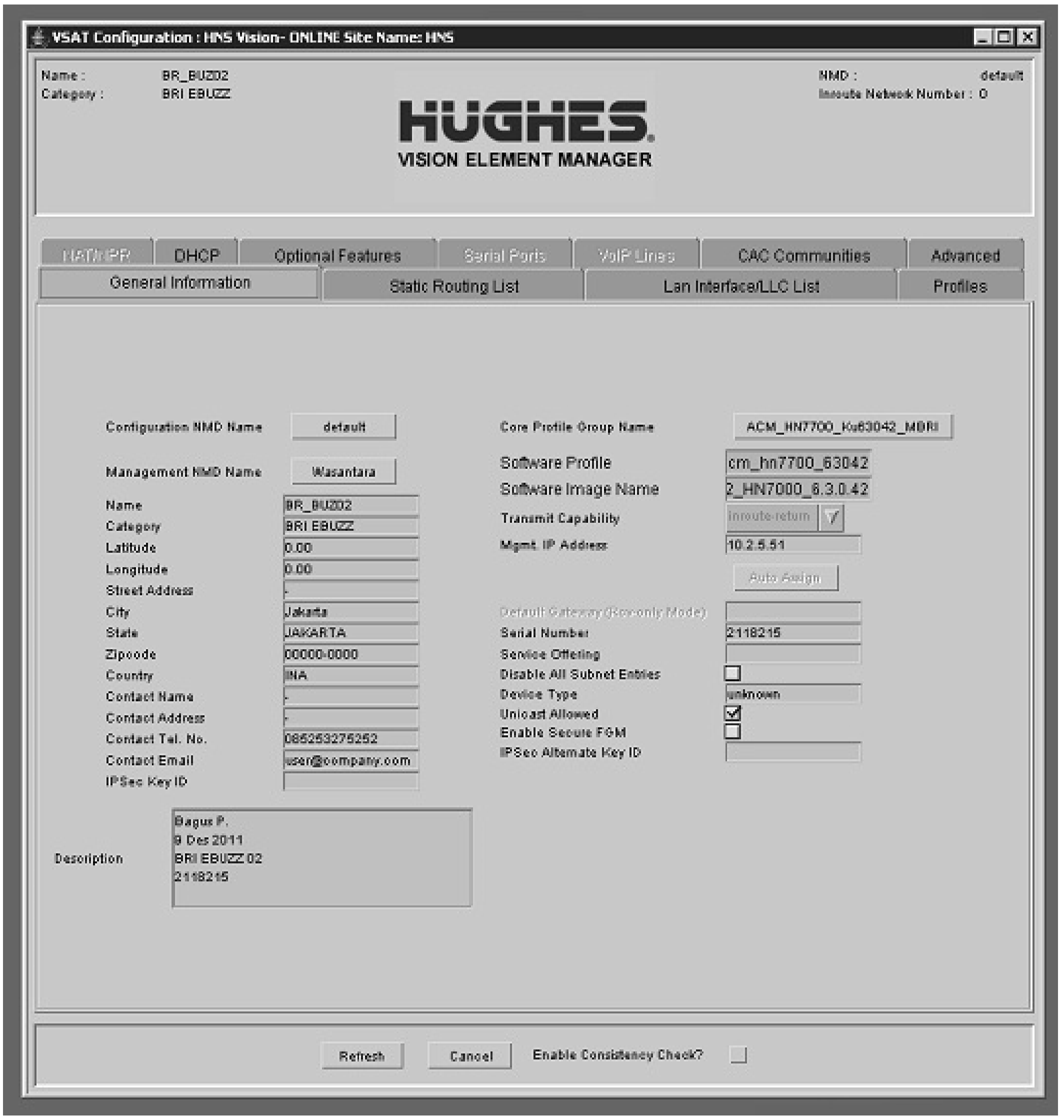
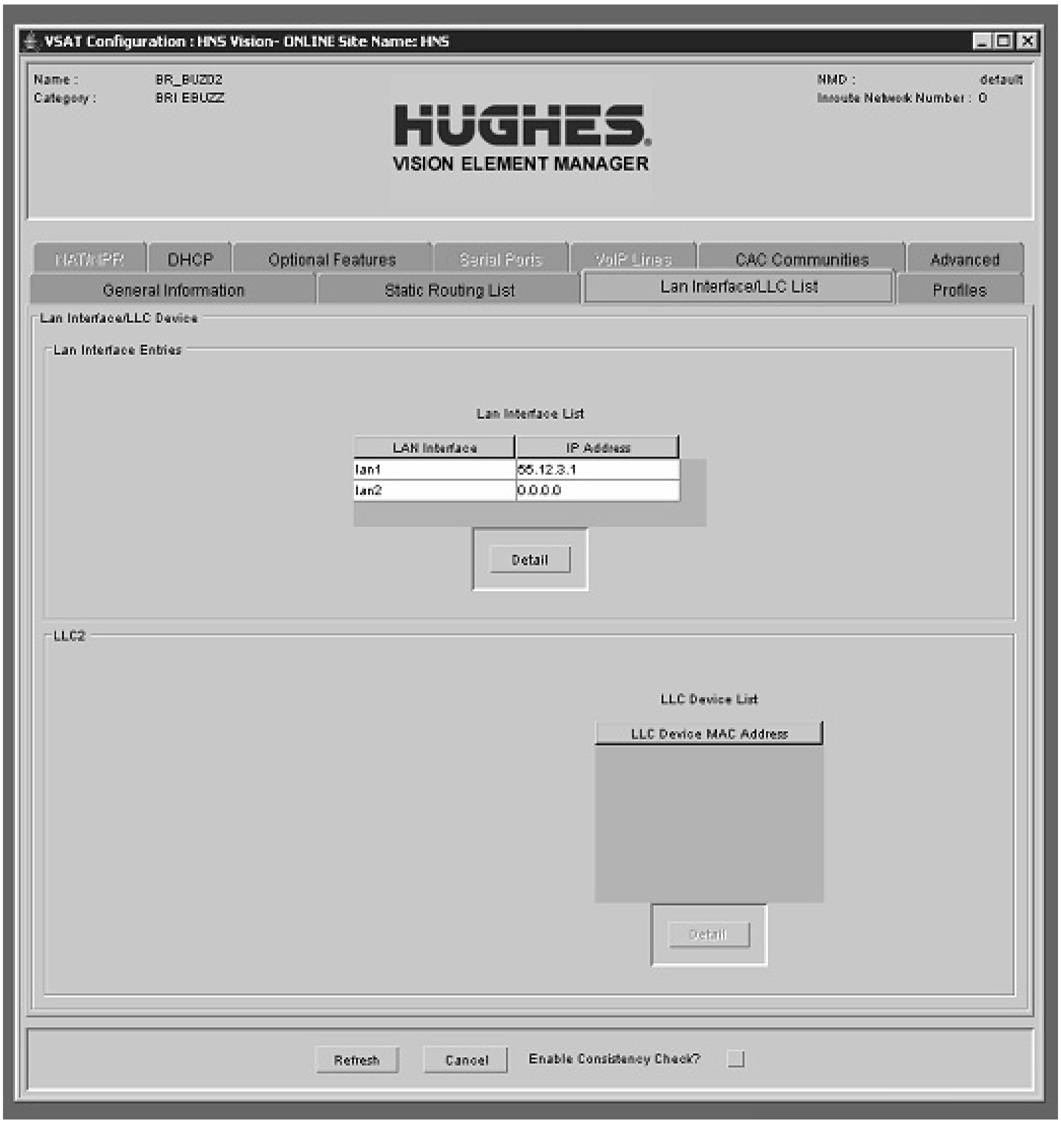
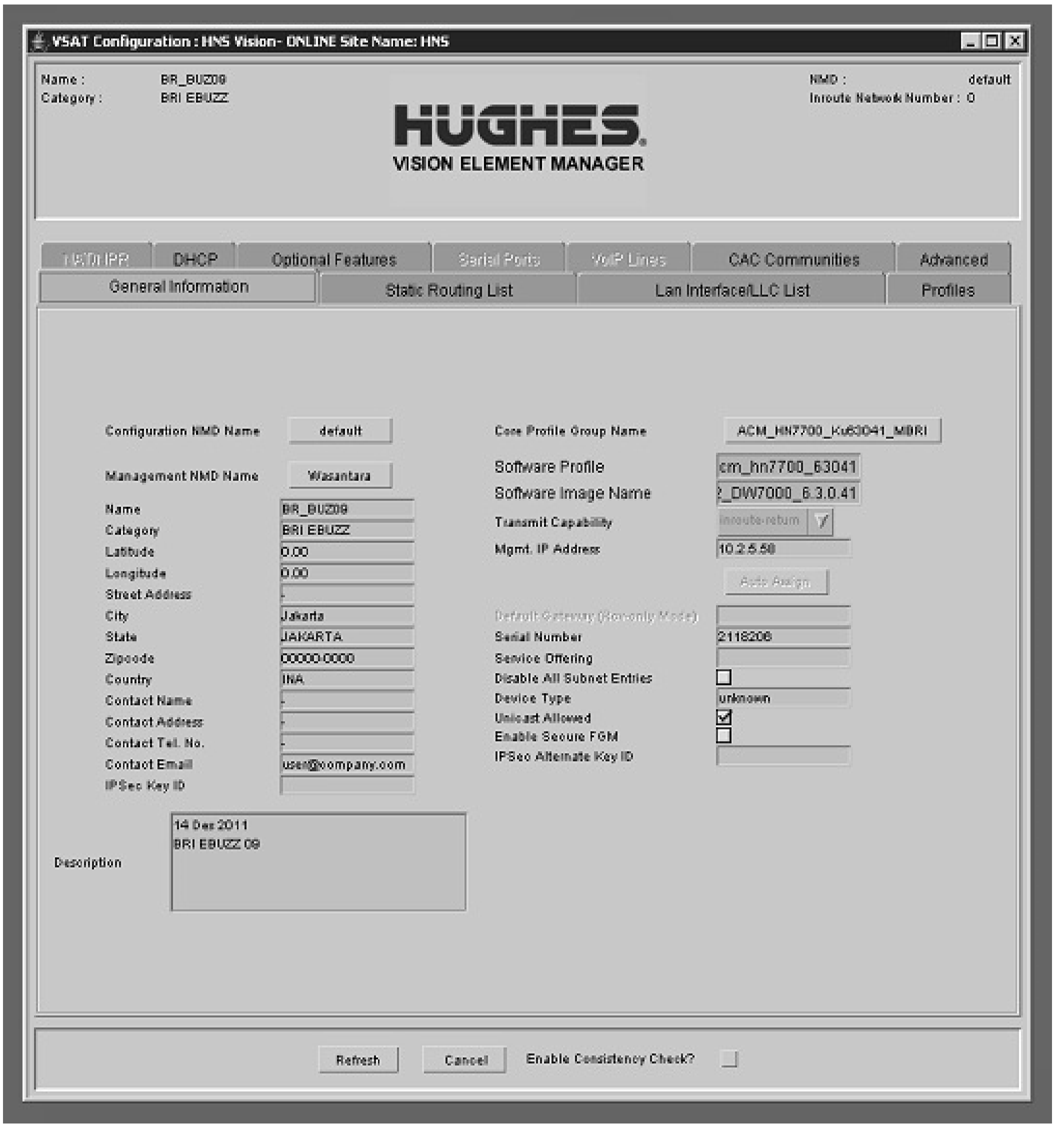
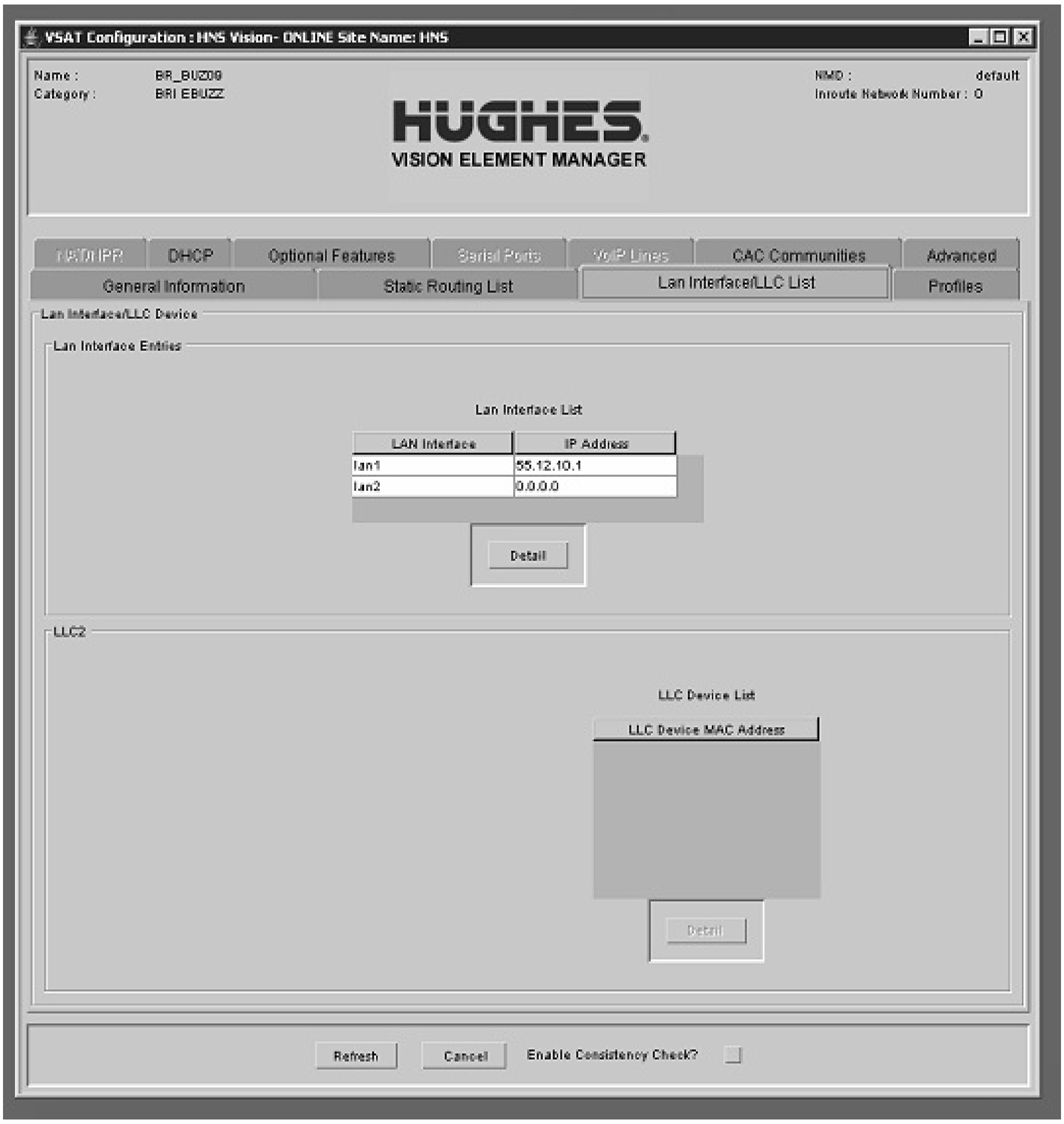
LAMPIRAN 1 - DATA REMOTE MOBILE KU-BAND 01



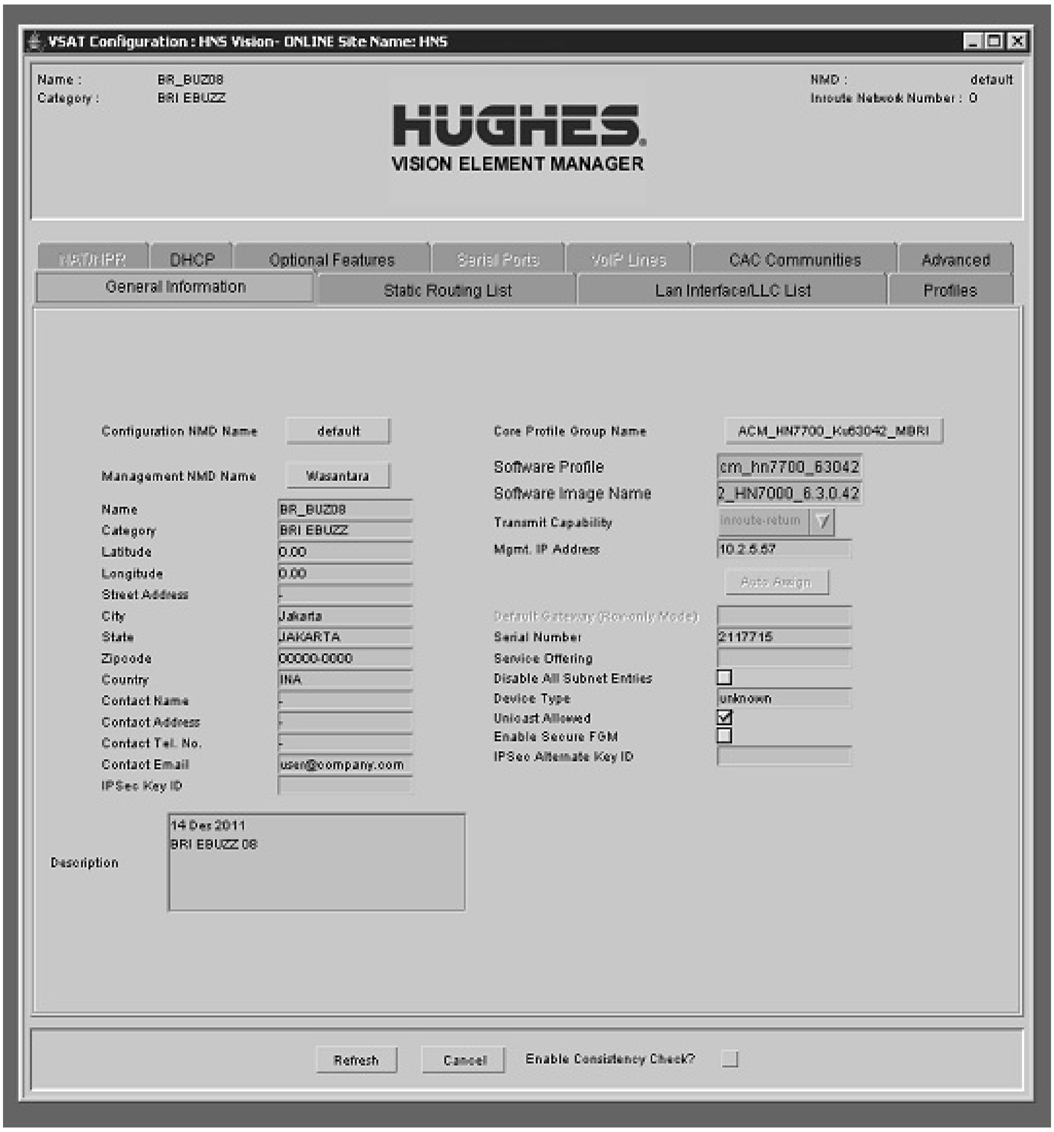

VSAT Configuration : HNS Vision- ONLINE Site Name: HNS
Name : BR_BUZ02
Category : BRI EBUZZ
NMD : default
Inroute Network Number : 0
VISION ELEMENT MANAGER
NAT/IPR
DHCP
Optional Features
Serial Ports
VoIP Lines
CAC Communities
Advanced
General Information
Static Routing List
Lan Interface/LLC List
Profiles
Lan Interface/LLC Device
Lan Interface Entries
Lan Interface List
LAN Interface
IP Address
lan1
55.12.3.1
lan2
0.0.0.0
Detail
LLC2
LLC Device List
LLC Device MAC Address
Detail
Refresh
Cancel
Enable Consistency Check?

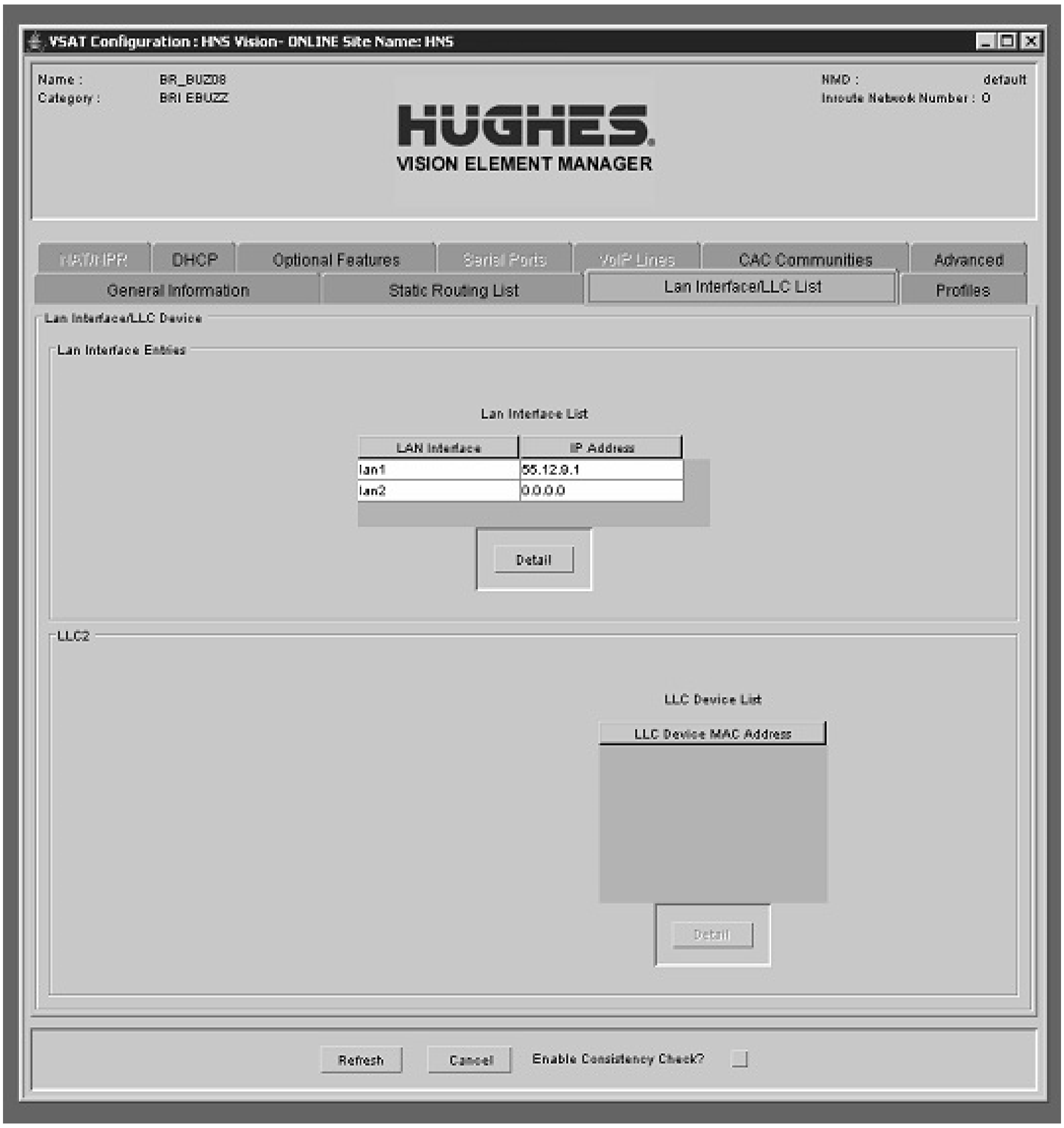
LAMPIRAN 2 - DATA REMOTE MOBILE KU-BAND 02



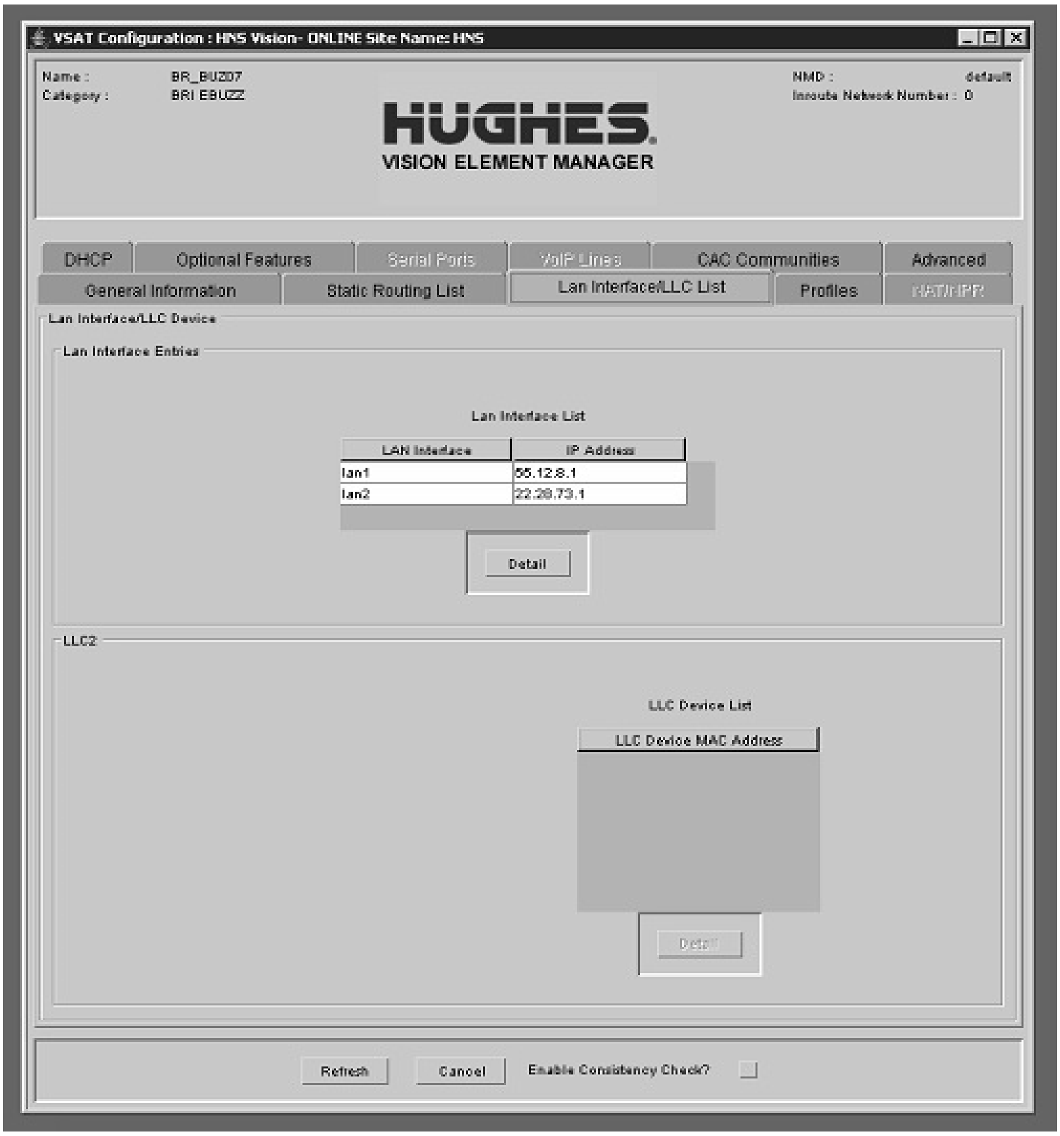

VSAT Configuration : HNS Vision- ONLINE Site Name: HNS
Name : BR_BUZ09
Category : BRI EBUZZ
NMD : default
Inroute Network Number : 0
HUGHES
VISION ELEMENT MANAGER
NAT/IPR
DHCP
Optional Features
Serial Ports
VoIP Lines
CAC Communities
Advanced
General Information
Static Routing List
Lan Interface/LLC List
Profiles
Lan Interface/LLC Device
Lan Interface Entries
Lan Interface List
LAN Interface
IP Address
lan1
55.12.10.1
lan2
0.0.0.0
Detail
LLC2
LLC Device List
LLC Device MAC Address
Detail
Refresh
Cancel
Enable Consistency Check?

LAMPIRAN 3 - DATA REMOTE MOBILE KU-BAND 03




VSAT Configuration : HNS Vision- ONLINE Site Name: HNS
Name : BR_BUZ08
Category : BRI EBUZZ
NMD : default
Inroute Network Number : 0
HUGHES.
VISION ELEMENT MANAGER
NAT/IPR
DHCP
Optional Features
Serial Ports
VoIP Lines
CAC Communities
Advanced
General Information
Static Routing List
Lan Interface/LLC List
Profiles
Lan Interface/LLC Device
Lan Interface Entries
Lan Interface List
LAN Interface
IP Address
lan1
55.12.9.1
lan2
0.0.0.0
Detail
LLC2
LLC Device List
LLC Device MAC Address
Detail
Refresh
Cancel
Enable Consistency Check?

LAMPIRAN 4 - DATA REMOTE MOBILE KU-BAND 04


VSAT Configuration : HNS Vision- ONLINE Site Name: HNS
Name : BR_BUZ07
Category : BRI EBUZZ
NMD : default
Inroute Network Number : 0
HUGHES
VISION ELEMENT MANAGER
DHCP
Optional Features
Serial Ports
VoIP Lines
CAC Communities
Advanced
General Information
Static Routing List
Lan Interface/LLC List
Profiles
NAT/NPR
Lan Interface/LLC Device
Lan Interface Entries
Lan Interface List
LAN Interface
IP Address
lan1
55.12.8.1
lan2
22.28.73.1
Detail
LLC2
LLC Device List
LLC Device MAC Address
Detail
Refresh
Cancel
Enable Consistency Check?

LAMPIRAN 5 - DATA AZIMUT DAN ELEVASI MOBILE KU-BAND

NO	KANWIL	KANCA INDUK	BRI UNIT INDUK	Satelit Palapa D (113)	
				Azimut	Elevasi
	Provinsi NAD			105.7	70.2
1	Banda Aceh	Banda Aceh	BRI Unit Setui	106.97	68.29
2	Banda Aceh	Lhokseumawe	BRI Unit Cunda	107.55	70.45
3	Banda Aceh	Langsa	BRI Unit Iskandar Muda	106.20	71.61
4	Banda Aceh	Sigli	BRI Unit Kota Sigli	107.00	69.04
	Provinsi SUMUT			98.8	74.0
5	Medan	Iskandar Muda	BRI Unit Peringgan	103.72	72.63
6	Medan	Pematang Siantar	BRI Unit Batu Anam	101.80	73.21
7	Medan	Pdg Sidempuan	BRI Unit Sm Raja	95.39	73.68
8	Medan	Rantau Prapat	BRI Unit Agus Salim	98.78	74.26
9	Medan	Kabanjahe	BRI Unit Tiga Baru	101.9	72.5
10	Medan	Lubuk Pakam	BRI Unit T. Morawa	103.8	72.9
	Provinsi SUMATERA BARAT			86.6	75.6
11	Padang	Padang	BRI Unit Kuranji	85.91	75.09
12	Padang	Bukittinggi	BRI Unit Biaro	88.67	75.10
13	Padang	Solok	BRI Unit Sumani	86.4	75.4
14	Padang	Payakumbuh	BRI Unit Nusantara Barat	88.9	75.4
	Provinsi RIAU			94.4	76.7
15	Pekanbaru	Pekanbaru	BRI Unit Sudirman	92.66	76.26
16	Pekanbaru	Bangkinang	BRI Unit Bangkinang Kota	91.7	76.0
17	Pekanbaru	Rengat	BRI Unit Rengat Kota	87.66	77.73
18	Pekanbaru	P. Batam	BRI Unit Batam Center	96.6	79.4
19	Pekanbaru	Tembilahan	BRI Unit Tembilahan Kota	88.0	78.4
20	Pekanbaru	Teluk Kuantan	BRI Unit Teluk Kuantan 1	90.8	76.3
	Provinsi SUMATERA SELATAN			70.1	78.6
21	Palembang	Sriwijaya	BRI Unit Jaka Baring	70.2	79.9
22	Palembang	Teluk Betung	BRI Unit Bambu Kuning	79.1	72.3
23	Palembang	Kotabumi	BRI Unit Baradatu	59.5	78.9
24	Palembang	Bangko	BRI Unit Kota Bangko	70.2	79.7
25	Palembang	Argamakmur	BRI Unit Penarik	70.2	79.7
26	Palembang	Pangkal Pinang	BRI Unit Pangkal Pinang 3	72.1	81.5
27	Palembang	Muara Bulian	BRI Unit Sungai Bahar	80.1	78.3
28	Palembang	Baturaja	BRI Unit Rawa Bening	68.3	79.5
	Provinsi DKI JAKARTA			44.9	79.7
29	Jakarta 1	Kemayoran	BRI Unit Bedungan Hilir	45.1	79.8
30	Jakarta 1	Otista	BRI Unit Menteng Kecil	44.7	79.7
31	Jakarta 2	Pasar Minggu	BRI Unit Kebayoran	44.5	79.6

NO	KANWIL	KANCA INDUK	BRI UNIT INDUK	Satelit Palapa D (113)	
				Azimut	Elevasi
32	Jakarta 2	Bogor Dewi Sartika	BRI Unit Cimanggu	44.1	79.5
33	Jakarta 2	Bekasi	BRI Unit Pinang Ranti	44.1	79.8
34	Jakarta 2	Depok	BRI Unit Cibubur	44.1	79.5
35	Jakarta 3	Jakarta Daan Mogot	BRI Unit Daan Mogot	45.7	79.7
36	Jakarta 3	Tangerang	BRI Unit Kebon Besar	46.0	79.6
37	Jakarta 3	Pontianak	BRI Unit Sungai Raya	44.1	79.8
38	Jakarta 3	BSD	BRI Unit BSD	45.2	79.6
39	Jakarta 3	Singkawang	BRI Unit Sambas	44.9	79.7
40	Jakarta 3	Serang	BRI Unit Kibin	45.1	79.8
	Provinsi JAWA BARAT			37.1	79.6
41	Bandung	Bandung Nasution	BRI Unit Ujungberung	37.7	79.8
42	Bandung	Cimahi	BRI Unit Cikalong Wetan	39.7	79.7
43	Bandung	Cirebon	BRI Unit Harjamukti	38.1	79.7
44	Bandung	Bandung Naripan	BRI Unit Cibaduyut	38.0	79.6
45	Bandung	Banjar	BRI Unit Padaherang	47.5	79.7
46	Bandung	Majalengka	BRI Unit Leuwimunding	38.0	79.7
47	Bandung	Tasikmalaya	BRI Unit Nagasari	38.0	79.7
48	Bandung	Garut	BRI Unit Cilawu	35.2	79.5
	Provinsi JAWA TENGAH			21.9	80.9
49	Semarang	Semarang Patimura	BRI Unit Mugas	20.3	80.3
50	Semarang	Tegal	BRI Unit Pagongan	29.5	80.7
51	Semarang	Purwodadi	BRI Unit Danyang	16.5	81.3
52	Semarang	Pati	BRI Unit Margorejo	16.2	80.7
53	Semarang	Brebes	BRI Unit Kersana	30.0	80.7
54	Semarang	Pemalang	BRI Unit Taman	28.0	80.8
55	Semarang	Pekalongan	BRI Unit Doro	25.9	81.0
	Provinsi DI YOGYAKARTA			18.7	80.3
56	Yogyakarta	Yogyakarta Katamso	BRI Unit Katamso	18.7	80.3
57	Yogyakarta	Solo S. Riyadi	BRI Unit Kleco	18.7	80.3
58	Yogyakarta	Purwokerto	BRI Unit Wiryaatmaja	26.9	80.3
59	Yogyakarta	Klaten	BRI Unit Delanggu	17.4	80.5
60	Yogyakarta	Sragen	BRI Unit Katelan	15.0	80.9
61	Yogyakarta	Wonogiri	BRI Unit Wonoboyo	15.0	80.5
62	Yogyakarta	Sleman	BRI Unit Demangan	19.2	80.4
63	Yogyakarta	Cilacap	BRI Unit Saliwangi	27.4	79.8
	Provinsi JAWA TIMUR			5.8	81.1
64	Surabaya	Surabaya Kertajaya	BRI Unit Kertajaya	2.0	80.4
65	Surabaya	Sidoarjo	BRI Unti Porong	2.1	81.2

NO	KANWIL	KANCA INDUK	BRI UNIT INDUK	Satelit Palapa D (113)	
				Azimut	Elevasi
66	Surabaya	HR Muhammad	BRI Unit Demak	19.0	81.4
67	Surabaya	Jombang	BRI Unit Peterongan	5.9	81.1
68	Surabaya	Bojonegoro	BRI Unit Tambakrejo	9.0	81.5
69	Malang	Malang Kawi	BRI Unit Blimbing	4.0	80.7
70	Malang	Kediri	BRI Unit Semen	7.2	80.7
71	Surabaya	Lamongan	BRI Unit Lamongan Kota	4.7	81.6
72	Malang	Banyuwangi	BRI Unit Genteng	350.5	80.2
73	Malang	Blitar	BRI Unit Kartini	5.9	80.4
74	Malang	Jember	BRI Unit Kencong	355.1	80.3
75	Malang	Madiun	Perintis Kemerdekaan	11.1	80.8
	Provinsi BALI			345.4	79.8
76	Denpasar	Denpasar	BRI Unit Gunung Agung	345.6	79.5
77	Denpasar	Mataram	BRI Unit Sayang-Sayang	339.9	79.3
78	Denpasar	Kupang	BRI Unit Kelapa Lima	313.4	72.8
79	Denpasar	Sumbawa Besar	BRI Unit Labuhan	332.3	78.7
80	Denpasar	Singaraja	BRI Unit Pasar Anyar	345.3	80.0
81	Denpasar	Tabanan	BRI Unit Yeh Gangga	346.0	79.6
	ProvinsiKALIMANTAN SELATAN			69.6	87.1
82	Banjarmasin	Banjarmasin	BRI Unit Kuripan	334.4	85.7
83	Banjarmasin	Balikpapan	BRI Unit Soekarno Hatta	288.4	85.2
84	Banjarmasin	Samarinda	BRI Unit Sungai Pinang	276.8	85.1
85	Banjarmasin	Pangkalan Bun	BRI Unit Karang Mulya	334.5	85.7
86	Banjarmasin	Tenggarong	BRI Unit Mangkurawang	276.0	85.3
	Provinsi SULAWESI UTARA			266.8	77.1
87	Manado	Manado	BRI Unit Bahu	262.9	76.0
88	Manado	Palu	BRI Unit Tatura	277.5	81.9
89	Manado	Kotamobagu	BRI Unit Molibagu	266.4	76.7
90	Manado	Gorontalo	BRI Unit Andalas	267.0	78.1
	Provinsi SULAWESI UTARA			266.8	77.1
91	Makassar	Somba Opu	BRI Unit Pannampu	308.6	80.3
92	Makassar	Palopo	BRI Unit Kappuna	292.5	80.8
93	Makassar	Kendari	BRI Unit Wawotobi	292.3	77.8
94	Makassar	Sungguminasa	BRI Unit Pallangga	308.3	80.2
95	Makassar	Sidrap	BRI Unit Pangkajene	299.9	80.8
96	Makassar	Soppeng	BRI Unit Pattojo	302.0	80.4
97	Makassar	Watampone	BRI Unit Palakka	301.6	79.9
	Provinsi PAPUA			278.7	58.8
98	Jayapura	Jayapura	BRI Unit Ampera	274.8	57.5

NO	KANWIL	KANCA INDUK	BRI UNIT INDUK	Satelit Palapa D (113)	
				Azimut	Elevasi
	Provinsi PAPUA			278.7	58.8
99	Jayapura	Sorong	BRI Unit Aimas	272.6	68.6
100	Jayapura	Merauke	BRI Unit Ampera	285.9	56.6

LAMPIRAN 6 - DETAIL SPESIFIKASI SATELIT PALAPA D

Satellite:	PAPALA D		H U G H E S
409.6 kbps	HN Inroute QPSK FEC 4/5		NETWORK SYSTEMS
South Tx Site:	1.20 m		
South Rx Site:	6.30 m		

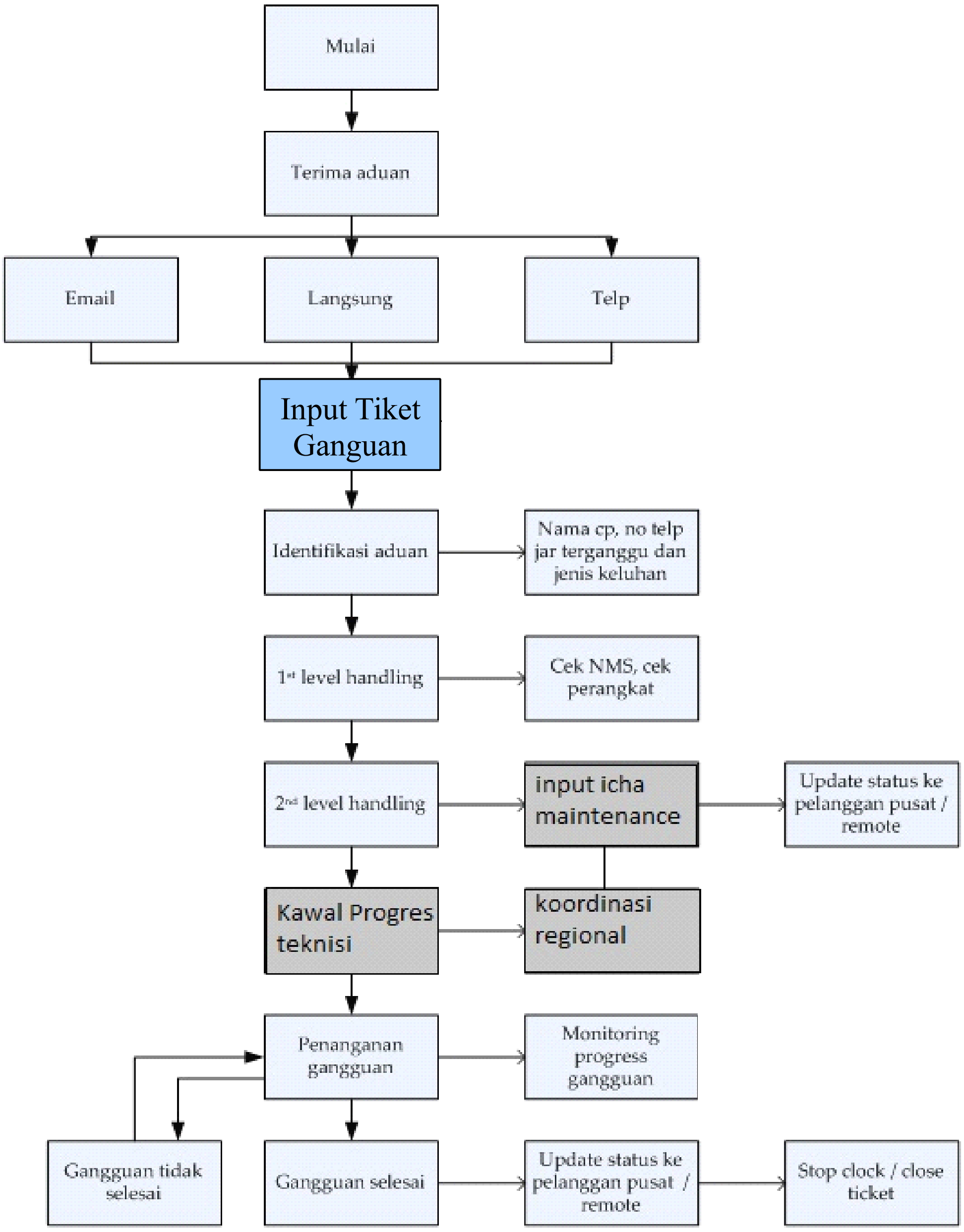
	BASELINE PARAME	Value	Unit
CARRIER DATA	Carrier Symbol Rate	256	Ksps
	Carrier Info Rate	409.60	Kbps
	FEC Code Rate	4/5	
	Crr Xmission Rate	512.0	Kbps
	Threshold Ebt/No	7.6	dB
	No of bits/symbol	2	Bits
	Demod BT Product	1.00	
	Crr Noise Bandwth	256.0	KHz
	RS Rate	1/1	
	Channel Spacing	1.41	
	Carrier Spacing	360.96	KHz
SATELLITE DATA	Satellite	PAPALA D	
	Location	113	East
	Saturation EIRP	53.00	dBW
	G/T	4.00	dB/K
	Gain Step	10.00	dB
	Reference G/T	4.00	dB/K
	Reference SFD	-99.00	dBW/m2
	SFD	-89.0	dBW/m2
	Xponder Bandwidth	36	MHz
	Agg Input BO	6.00	dB
	Agg Output BO	4.00	dB
	Uplink Frequency	14.000	GHz
	Dnlink Frequency	12.000	GHz
GROUND SEGMENT DATA	Tx Antenna Dia	1.20	meters
	Tx Antenna Effcy	60	%
	Tx Antenna Gain	42.7	dBi
	Tx Pointing Losses	0.5	dB
	Tx Polarization	0	deg
	Rx Antenna Dia	6.30	meters
	Rx Antenna Effcy	70	%
	Rx Antenna Gain	56.4	dBi
	Rx Pointing Losses	0.5	dB
	Pre LNA Losses	0.2	dB
	LNA Noise Temp	84	K
	Ant,etc Temp	29	K
	Cl Sky Noise Temp	126	K
	Rx Polarization	90	deg
	Rx Clr Sky G/T	35.2	dB/K
RAIN MARGINS	Tx Site Rain Availabil	99.50	%
	Rx Site Rain Availabil	99.50	%
	Tx Site Rain Rate	1.35	mm/hr
	Rx Site Rain Rate	13.09	mm/hr
	Uplink Rain Attn	0.67	dB
	Dnlink Rain Attn	2.61	dB
	UpLink Pwr Cntrl	0.0	dB
SITE GEOGRAPHIC DATA	Tx E/S Location	South	
	Tx E/S Latitude	62.00	S
	Tx E/S Longitude	110.00	E
	Tx E/S Elev Angle	19.80	deg
	Tx E/S Altitude	0.00	Km
	Rx E/S Location	South	
	Rx E/S Latitude	10.00	S
	Rx E/S Longitude	105.00	E
	Rx E/S Elev Angle	74.98	deg
	Rx E/S Altitude	0.00	Km
MISC LOSSES	Uplnk Free Sp Loss	207.3	dB
	Dnlnk Free Sp Loss	205.2	dB
	Uplink Atmos Attn	0.3	dB
	Dnlink Atmos Attn	0.1	dB

S U M M A R Y

% Avail S/C Power Reqd/Crr	**0.28**	%
% Xponder Bandwidth Reqd/Crr	**1.00**	%
Occupied Bandwidth	0.36096	MHz
Power Equivalent Bandwidth	0.10	MHz
Clear Sky Link Margin	0.7	dB
Maximum PER	1.0E-05	
Power/Crr Reqd in Watts	**1.39**	Watts
HPA Power Required	**1.56**	Watts

	LINK PERFORMANCE	Cl Sky	Up Fade	Dn Fade	Unit
UPLINK BUDGET	Satellite SFD	-89.0	-89.0	-89.0	dBW/m2
	Agg Input B.O.	6.0	6.0	6.0	dB
	Input Backoff/Crr	31.6	32.3	31.6	dB
	Crr Flux Density	-120.6	-121.3	-120.6	dBW/m2
	Gain of a Sq meter	44.4	44.4	44.4	dBi
	Uplink Path Losses	208.1	208.8	208.1	dB
	Carrier Up EIRP	43.1	43.1	43.1	dBW
	Satellite G/T	4.0	4.0	4.0	dB/K
	C/N Uplink	13.5	12.9	13.5	dB
DOWNLINK BUDGET	Saturation EIRP	53.0	53.0	53.0	dBW
	Agg Output B.O.	4.0	4.0	4.0	dB
	Output Backoff/Crr	29.6	30.3	29.6	dB
	Carrier Dn EIRP	23.4	22.7	23.4	dBW
	Dnlink Path Losses	205.2	205.2	207.8	dB
	Rx Pointing Losses	0.5	0.5	0.5	dB
	Cl Sky E/S G/T	35.2	35.2	35.2	dB/K
	Degradation in G/T	0.0	0.0	3.1	dB
	C/N Downlink	27.4	26.8	21.7	dB
COMPOSITE LINK	C/N Uplink	13.5	12.9	13.5	dB
	C/N Downlink	27.4	26.8	21.7	dB
	C/I Total	17.00	16.3	17.0	dB
		17			
	C/N COMPOSITE	11.8	11.1	11.5	dB
	Minimum Reqd C/N	11.1	11.1	11.1	dB
	LINK MARGIN	0.7	0.0	0.4	dB
MODEM	Required Maximum PER		1.00E-05		
	Expected ACI		6 dB		
	Minimum Reqd Ebi/No		8.6	dB	
	Minimum Reqd Ebt/No		7.6	dB	
EARTH STATION HPA	Tx Amplifier to Antenna Losses		1.0	dB	
	Tx Antenna Gain		42.7	dBi	
	Tx Pointing Losses		0.5	dB	
	E/S EIRP/Crr Reqd (incl Pt. Loss)		43.1	dBW	
	Power/Crr Reqd in dBW		1.4	dBW	
	Power/Crr Reqd in Watts		**1.39**	Watts	
	Number of Tx Carriers		1.0		
	Uplink Power Control		0.0	dB	
	HPA Output Backoff		0.5	dB	
	HPA Power Required		**1.56**	Watts	

LAMPIRAN 7 - ALUR PENANGANAN LAPORAN GANGGUAN



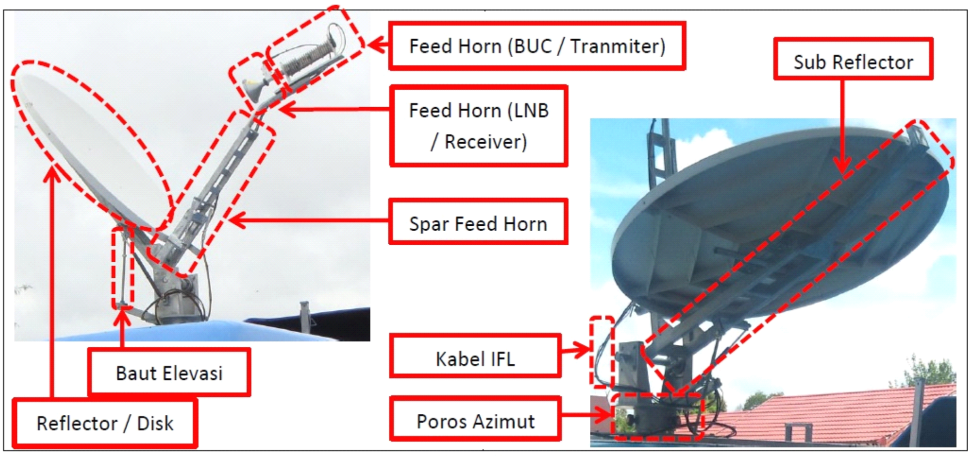
LAMPIRAN 8 - SOP POINTING ANTENA MOBILE KU-BAND

STANDAR OPERASI PROSEDUR POINTING ANTENA MOBILE KU-BAND

1) Pengenalan Perangkat VSAT

- VSAT adalah terminal pemancar dan penerima transmisi satelit yang tersebar di banyak lokasi dan terhubung ke hub sentral.

2) Perangkat VSAT yang terdapat pada M-PLIK terdiri dari :



Gambar Antena VSAT

ODU (Outdoor Unit)

- Reflector (disk putih antena).
- Sub Reflector (besi penyangga disk reflector).
- Feed Horn, yang terdiri dari BUC (transmiter sat out) dan LNB (receiver sat-in).
- Spar Feed Horn (tiang penyangga feed horn).
- Baut Elevasi (untuk menentukan tinggi sudut elevasi dengan angel level dibalik reflector).
- Poros Azimut (penggerak arah azimut ke arah satelit).
- Kabel IFL (terhubung ke modem VSAT, Tx / sat out dari BUC dan Rx / sat

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in dari LNB.

IDU (Indoor Unit)

• Modem VSAT IP Hughes.
• Kabel LAN (Local Area Network).

3) Indikator 5 lampu led yang menyala pada Modem VSAT IP Hughes :
• Lan : indikator modem sudah terkoneksi dengan PC/Server melalui kabel LAN.
• Transmit : indikator sat out pada modem dan transmiter pada BUC siap untuk mengirim data.
• Receive : indikator sat in pada modem dan receiver pada LNB sudah baik dan modem siap menerima data.
• System : indikator modem sudah terdownload software dan terhubung ke Hub NOC Metrasat.
• Power : indikator modem sudah aktif dan ada arus listrik dari adaptor modem.
</td></tr>
<tr><td>
4) Menghidupkan Perangkat VSAT
• Perangkat Modem VSAT hidup (ON) secara otomatis setelah perangkat UPS dihidupkan (ON).

5) Menyiapkan Antena VSAT
• Posisi antena VSAT sebelum dioperasikan selalu dalam posisi tertelungkup.
</td><td>

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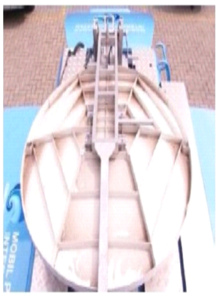
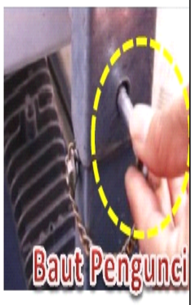
</table>

- Buka kait pengaman pijakan kaki tambahan sebelah kiri dan sebelah kanan yang berada di atas mobil.
- Untuk membuka antena, lepas baut pengunci yang ada di atas antena di besi penyangga saat antena tertelungkup.

- Lepaskan mur pengunci pada baut elevasi.
- Kendurkan tuas / engkol pengunci tiang antena agar antena bisa dinaikkan.


- Naikkan antena dengan cara memegang bagian sub reflektor dan secara bersamaan angkat serta tarik ke atas.
- Masukkan baut elevasi ke lubang pengunci serta kunci dengan mur pada bagian bawahnya.


PERHATIAN :
- Saat mengangkat disk antena / piringan parabola, harus selalu memegang bagian besi sub reflector.

6) Melakukan pointing (mengarahkan) Antena VSAT
- Pointing azimut dapat diputar melalui pemutaran pada poros azimut ke arah satelit yang sudah diketahui sebelumnya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dengan kompas. Referensi derajat azimut dapat dilihat pada SOP ini pada Panduan Arah Antena VSAT/dapat juga dilihat di website www.dishpointer.com

Gunakan tiga buah gagang baut pengencang di bawah tiang antena/ poros azimut, untuk mengendurkan dan mengencangkan arah azimut.
Setelah gagang poros azimut di kendurkan, arahkan azimut antena terlebih dulu dengan memutar Poros azimut ke arah satelit palapa D 113E.
Tentukan sudut elevasi dengan menggunakan angel level. Besaran level elevasi terdapat di buku SOP Instalasi VSAT M-PLIK Metrasat.
Atur baut elevasi untuk mengunci posisi level pada baut elevasi.
Siapkan juga notebook yang sudah disediakan untuk console ke modem satelit untuk memastikan signal SQF pointing lebih besar atau sama dengan (>85 dBm). Pastikan 5 buah lampu indikator pada modem menyala.

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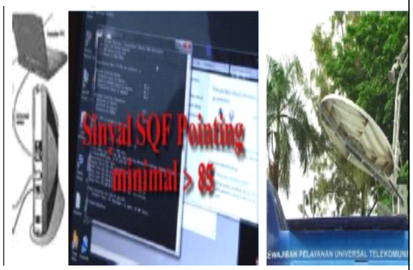

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PERHATIAN :

- Saat memutar poros azimut, perhatikan jalur kabel IFL jangan sampai tertarik atau terputus.
- Saat melakukan pointing, pastikan anda memengang besi pada sub reflector antena.

7) Mematikan Perangkat VSAT

- Perangkat modem VSAT akan otomatis mati (OFF) setelah perangkat UPS dimatikan (OFF).

PERHATIAN :

- Jangan memutuskan langsung aliran listrik dari sumber listrik PLN atau genset sebelum seluruh perangkat M-PLIK dimatikan (OFF).

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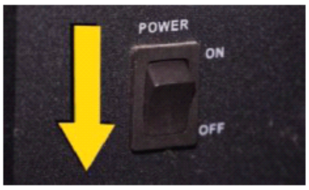

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LAMPIRAN 9 - SOP MAINTENANCE JARINGAN VSAT IP

STANDARD OPERATIONAL PROCEDURE
MAINTENANCE JARINGAN VSAT IP

1. TUJUAN

SOP ini bertujuan sebagai pedoman untuk melakukan maintenance pada Remote Site.

2. PERALATAN

Peralatan yang dibutuhkan dalam melakukan maintenance adalah sebagai berikut:

- Kunci inggris 12, 15, dan 17 inch
- Kunci Pas, Kunci ring no 10, 11, 13, 17, 19
- Kunci Y 10, 11, 12
- Multi Tester Digital
- Solder 100 – 200 Watt
- Timah
- Kompas
- Waterpass
- Angle meter
- Spectrum Analyzer (optional)
- GPS (Global Positioning System) (optional)
- Tang potong, Tang buaya dan Tang kombinasi
- Obeng plus (+) dan minus (-)
- Kabel console router, modem dan voip.
- Pisau cutter, Kikir, Palu
- Alat ukur panjang (meteran)
- Isolasi rubber 3M
- Tie wrap
- Crimping tools RJ 11 dan RJ 45.
- Laptop

3. URAIAN PROSEDUR

3.1. Prosedur Pengecekan Antenna

- Memastikan pondasi antenna kokoh.
- Pemasangan F Connector indoor dan Outdoor harus sesuai dengan procedure.
- Memastikan dish antenna (reflector) bersih dari lumut.

- Memastikan arah antenna tidak terhalang oleh obstacle dan LOS (Line Of Sight).

3.2. Prosedur Pengecekan Perangkat

- Memastikan kondisi fisik dalam LNB dan BUC kering.
- Memastikan Nilai RSL di modem antara (-90dBm) sampai dengan (-30dBm).
- Memastikan Led indikator BUC menyala warna hijau.
- Memastikan nilai input Tegangan dari modem ke BUC sebesar 24 atau 8VDC dengan toleransi ±10%.
- Memastikan Nilai Eb/No diatas Threshold sesuai modulasi dan coding yang digunakan. (Dapat dilihat di lampiran).
- Melakukan pengecekan Loop IF pada modem, dengan nilai Eb/No > 16dB.
- Memastikan suhu modem di bawah 50^0.
- Memastikan Fan Modem Berfungsi dengan baik.

3.3. Prosedur Pengecekan Konektor

- Pemasangan F Connector indoor dan Outdoor harus sesuai dengan procedure.
- Memastikan kondisi inner pada konektor kuat.
- Memastikan antara serabut kabel dengan inner konektor tidak terhubung.
- Memastikan konektor terbungkus dengan rubber 3M.

3.4 Prosedur Pengecekan Kabel

- Memastikan kondisi kabel tidak short ketika dilakukan pengetesan menggunakan multi tester.

3.5 Prosedur Pengecekan Tegangan Source Power

- Memastikan nilai tegangan input modem sebesar 200 – 220 V AC.
- Memastikan nilai Line dengan Neutral sebesar 220 Volt AC.
- Memastikan nilai Line dengan Ground sebesar 220 Volt AC.
- Memastikan nilai Neutral dengan Ground = 0 V.

3.6 Prosedur Pengecekan Grounding

- Memastikan kabel grounding pada modem terpasang.
- Memastikan tegangan 0-1V.

LAMPIRAN 10 - REMOTE TERMINAL INSTALLATION GUIDE

HUGHES®

HN System

Remote Terminal Installation Guide

Models: HN7000S, HN7700S

1037072-0001
Revision D
August 13, 2007

11717 Exploration Lane, Germantown, MD 20876 T: 301.428.5500 F: 301.428.1868/2830

In a multiple-host configuration, the hosts on the LAN share satellite Internet or internet connectivity through an Ethernet hub, router, or wireless base station. The remote terminal is connected to the hub, router, or wireless base station.

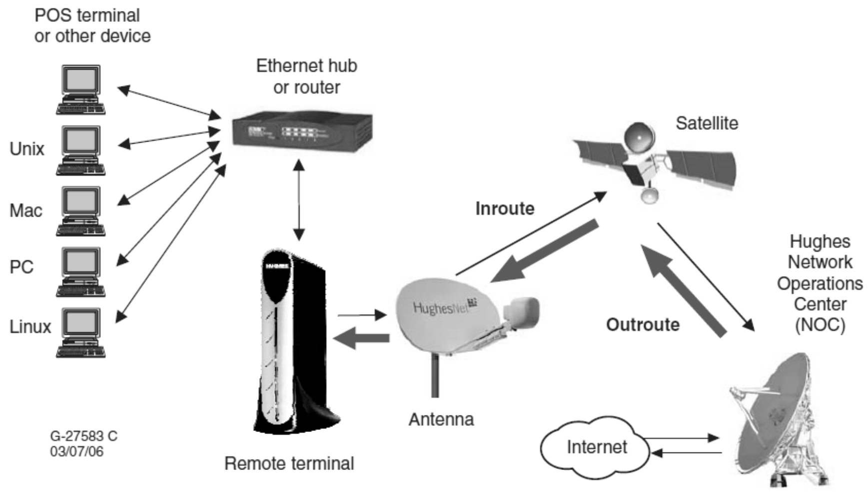

Figure 1 : VSAT IP Configuration:(HN7700S)

If you are installing a model HN7000S terminal, make sure you have all the items shown in Figure 4. The items shown are provided in the HN7000S shipping carton.

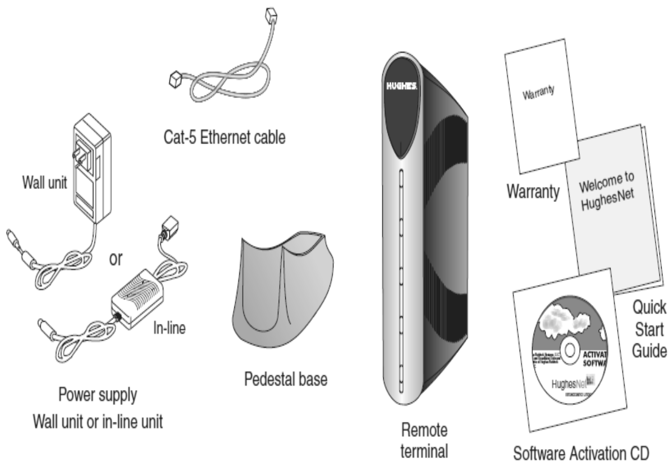

Figure 2 : HN7700S Component Instalation

Table 1: General specifications for HN7000S and HN7700S remote terminals

Weight	2.4 lb (1.089 kg)
Width	1.7 inch (4.32 cm) 4.5 inch (11.43 cm) with pedestal base
Height	9.5 inch (24.13 cm) 9.75 inch (24.77 cm) with pedestal base
Depth	10.5 inch (26.67 cm)
Safe operating temperature range	5 to 40°C (Above 5000 ft altitude, reduce maximum temperature by 1°C per 1000 ft)
Safe operating humidity range	5% to 95% non-condensing
Safe altitude	10,000 ft
Cooling method	Convection
Main processor	133 MHz
Main memory	64 Mbyte
Flash memory	16 Mbyte
Protocol support	TCP/IP (Transmission Control Protocol/Internet Protocol) protocol suite
Interfaces/ports	**HN7000S:** • One Ethernet port supporting 10BaseT or 100BaseT operation, RJ45-switched
	HN7700S: • Two Ethernet ports supporting 10BaseT or 100BaseT operation, RJ45-switched • Telephone line port • Serial port, DTE/DCE RS-232, which supports the following protocols: – VISA (Veriphone 3200 and 3300) (the asynchronous protocol of Vanguard International Service Association credit card) – X.25 International Telecommunication Union-Telecommunication Standardization Sector (ITU-T) protocol standard for WAN communications – XPAD (X.25 Packet Assembler/Disassembler) – SDLC (Synchronous Data Link Control) – LLC (Logical Link Control)
Power supplies and power requirements	*See Table 2 on page 20.*

The remote terminal installation consists of the following steps:

• Preparing for the installation:

– Inventory the items required for installation.

– Confirm the customer's computer meets the requirements to use the service (not required for enterprise or international customers).

– Conduct a site survey.

• Installing the hardware:

– Assemble and point the antenna assembly.

– Attach the remote terminal to the pedestal base.

– Connect traffic and power cables.

–Power up and observe the remote terminal's LEDs.

• Commissioning the remote terminal:

– Commission the terminal using satellite-based commissioning.

– Commission the terminal using manual commissioning only if your service provider tells you to.

• Configuring the remote terminal for VADB operation

• Completing the installation:

– Confirm that all files are current.

– Connect the remote terminal to the customer’s computer.

– Connect serial devices (if required) to the remote terminal.

– Print the System Information page (may not be required for enterprise or international customers).

– Create a shortcut to the System Control Center (may not be required for enterprise or international customers).

Note : Configuring the remote terminal for VADB operation is applicable only to enterprise customers, which are typically large businesses. If you are installing the remote terminal for an enterprise customer, refer to the installation specification to determine if the customer requires configuration for VADB.

Preparing for installation

If you are installing a model HN7700S terminal, make sure you have all the items shown in Figure 3. The items shown are provided in the HN7700S shipping carton.

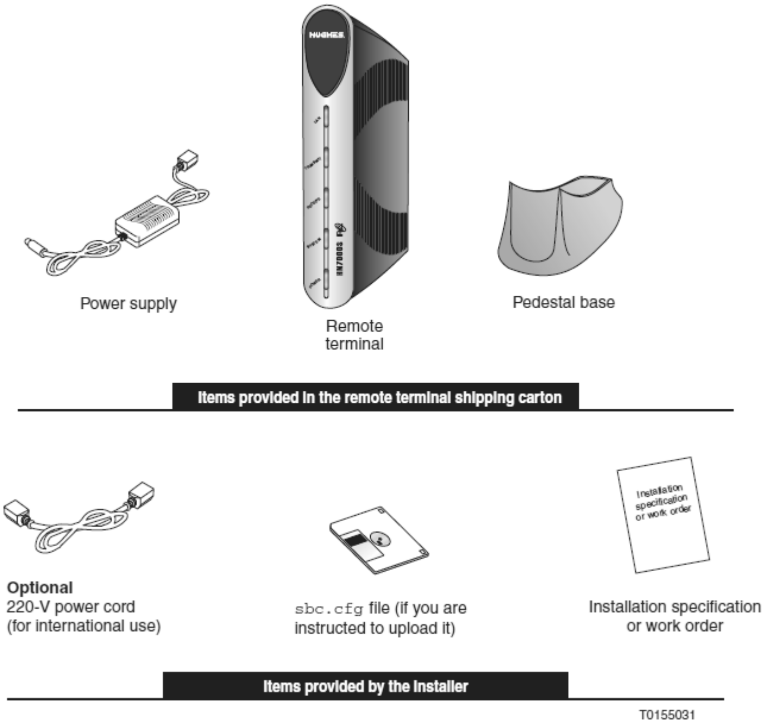

Figure 3 : item HN7700S Component

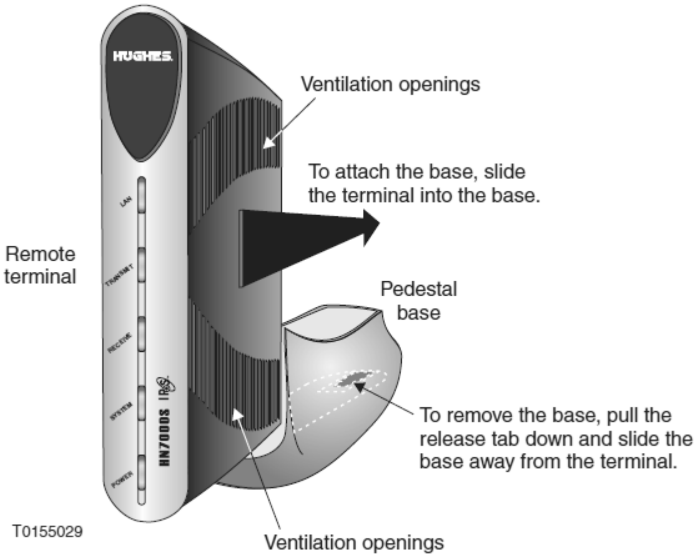

Figure 4: Attaching the terminal to the pedestal base

Installing the hardware

Instruct the customer to follow the on-screen instructions provided by the Activation CD and to stop when the Connect Your Modem via Ethernet screen appears as shown in Figure 4. Do not connect the HN7000S Ethernet port to the customer's PC until after this screen appears. You will make the Ethernet connections later, after you commission the terminal, as explained in Connecting the terminal to the customer's computer.

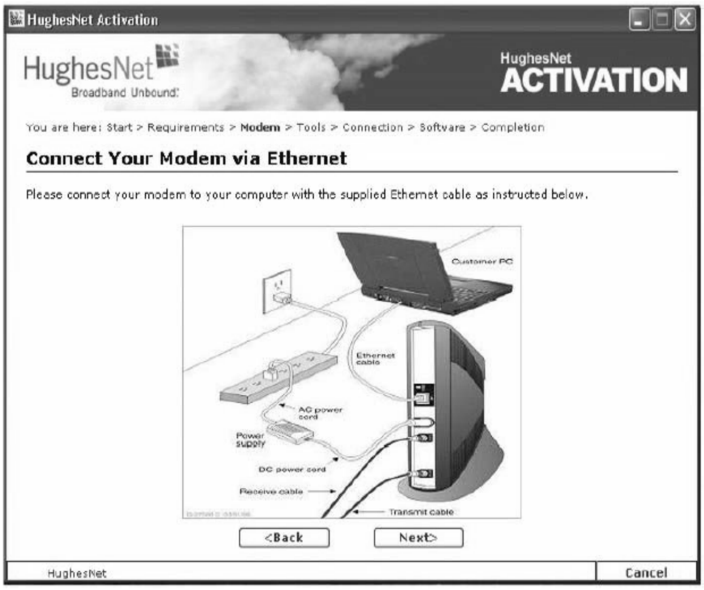

Figure 5 : Connect Your Modem via Ethernet screen

Connect the receive cable to the SAT IN connector on the remote terminal and the transmit cable to the SAT OUT connector as shown in Figure 5.

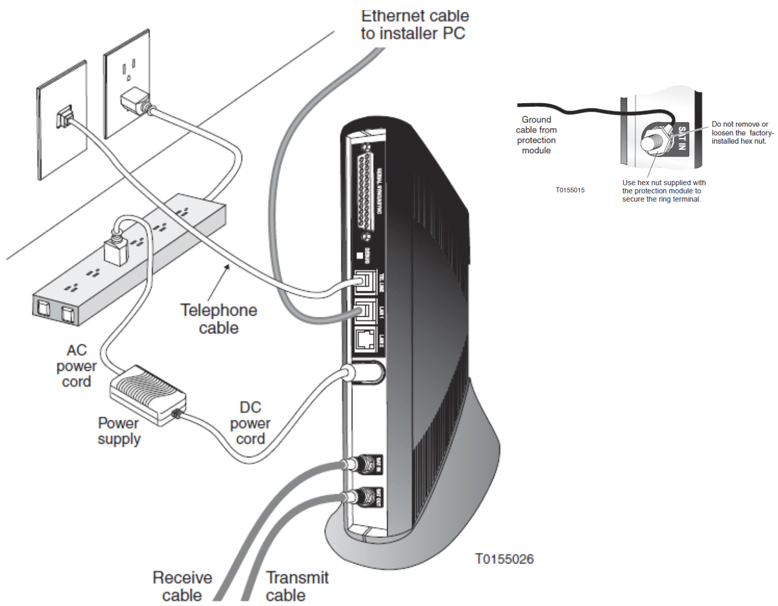

Figure 6 : IFL cable connections

Connect the remote terminal to the installer PC with an Ethernet cable, as shown in Figure 6.

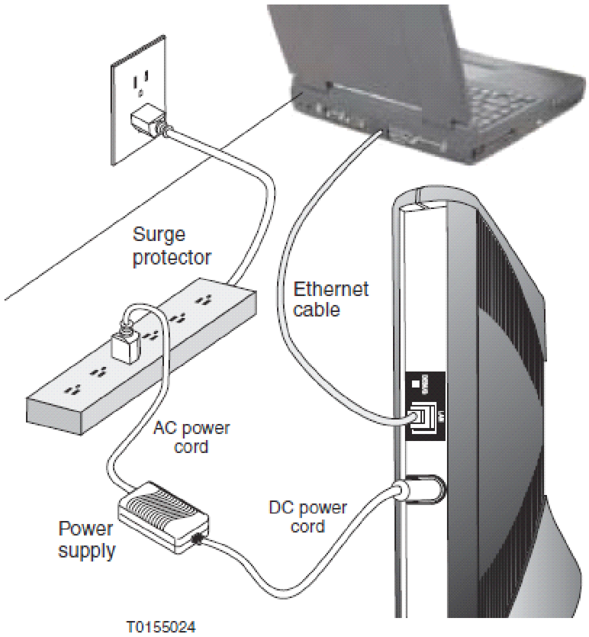

Figure 6 : AC power supply with surge protector

The power supply is shipped with the remote terminal. Before proceeding, make sure you have the correct power supply. Check the power supply part number and refer to Table 2 and Figures 6 and 7. Make sure you have the correct power supply type (AC/DC or DC/DC) and that you have the correct power supply for the radio to be used.

Table 2: Available power supplies for HN7000S and HN7700S remote terminals

Application	Radio type	Power supply type	Part number	Electrical requirements	Power cord
HN7000S or HN7700S.	1 W or 2 W	AC/DC (64 W)	1031105-0001 or 1500089-0001	Input line voltage: 100 – 240 V, 2 A max. Input line frequency: 50 – 60 Hz AC Rated power consumption: 64 W	Detachable, for 110 VAC outlet type
	1 W or 2 W	DC/DC	1033554-0001	Input line voltage: 12.7 – 25 V, 10 A max. Rated power consumption: 64 W	Detachable power input cables and connector
For HN7000S only. **For United States and Canada only.**	1 W	AC/DC (45 W)	1500081-0001	Input line voltage: 100 – 120 V, 2 A max. Input line frequency: 50 – 60 Hz AC Rated power consumption: 45 W	Attached, for 110 VAC outlet type

As the remote terminal powers up, observe the LEDs as shown in Figure 13 to make sure that the remote terminal is working properly. When power is applied to the terminal or after a terminal reset, the LEDs light up in the following order, indicating normal operation:

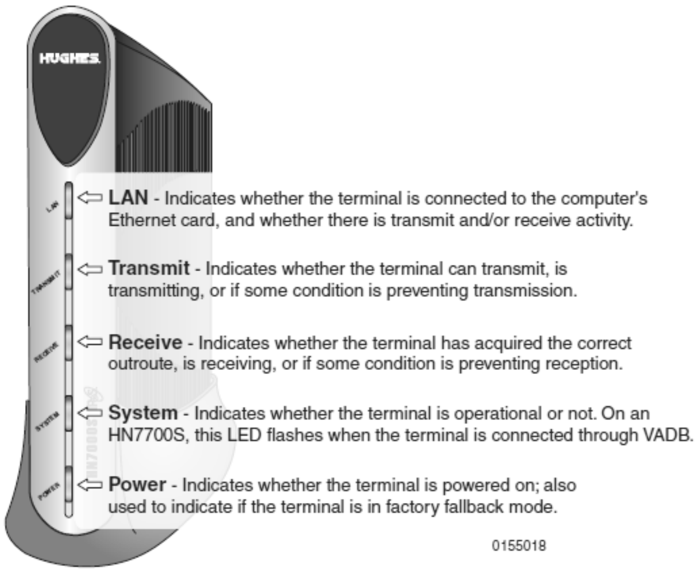

Figure 8 : Remote terminal HN7700S LEDs

Table 6: Remote terminal front panel LED operation

LED	Appearance	Description
LAN	On	The terminal is connected to the computer's Ethernet card.
	Blinking	The terminal is transmitting and/or receiving data.
Transmit	On	OK.
	Blinking, mostly on	Transmitting data.
	Blinking, mostly off	The terminal is ranging (measuring the distance to the satellite to calibrate transmit timing and transmit power).
	Off	Condition preventing transmission.
Receive	On	OK.
	Blinking	Receiving data.
	Off	Condition preventing acquisition of outroute (preventing receipt of data).
System	On (HN7000S and HN7700S)	The terminal has established a connection with the NOC.
	Flashing (HN7700S)	System is operating normally and is connected through Virtual Private Network Automatic Dial Backup (VADB).
	Off	Condition preventing full operation.
Power	Solid	Power is on and the terminal is functioning normally
	Flashing	Terminal is operating with the `fallback.bin` (backup) version of software.
	Off	No power.
Shaded cells – Operational problem indicated. Unshaded cells – Normal operation.		

Figure 7 shows an AC/DC power supply connected to a remote terminal and to a surge protector.

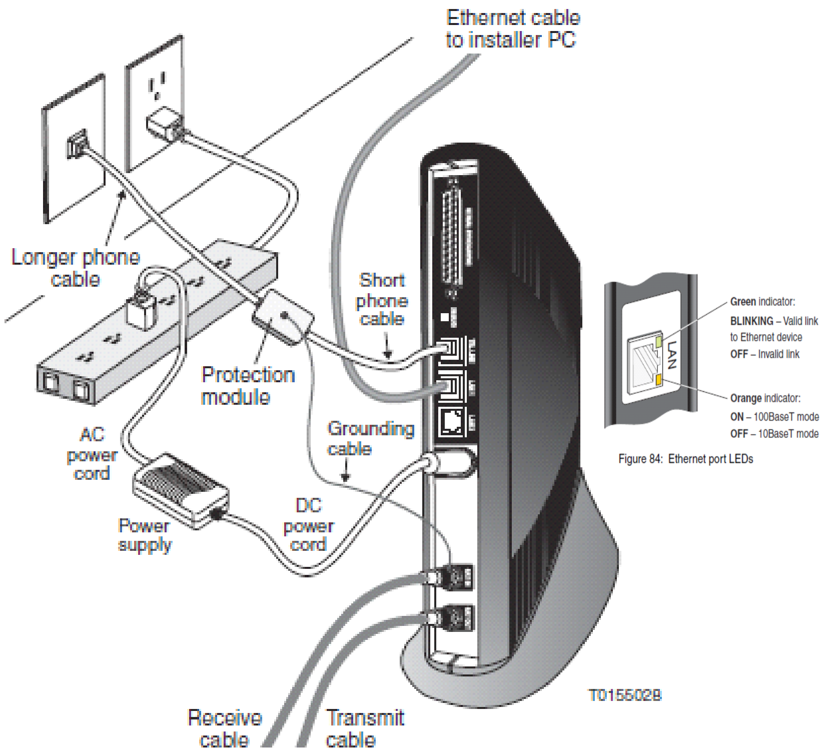

Figure 9 : HN7700S power and cable connections

Configuring a computer to support DHCP

This appendix explains how to configure a computer to support Dynamic Host Configuration Protocol (DHCP). All HN7000S and HN7700S remote terminals come from the factory with DHCP enabled. Therefore, the computer must have DHCP enabled and set to obtain IP addresses automatically.

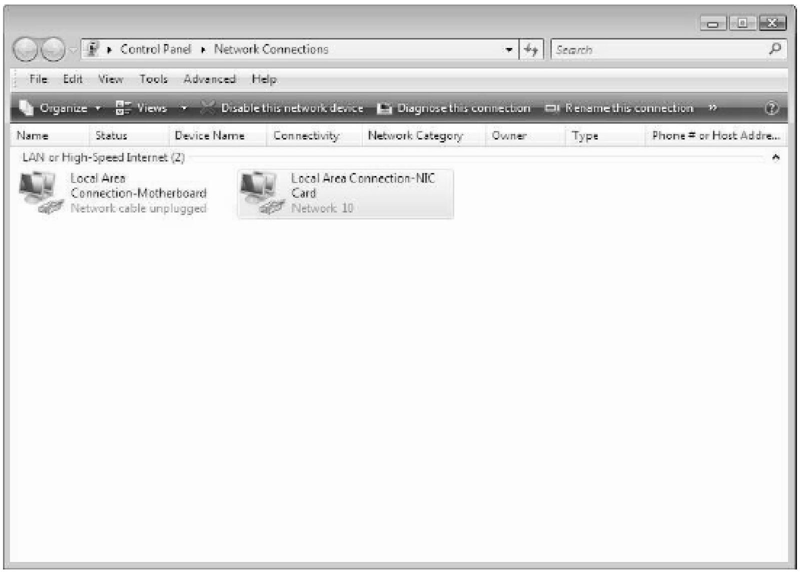

Figure 10: Network Connections - Windows

Local Area Connection Properties

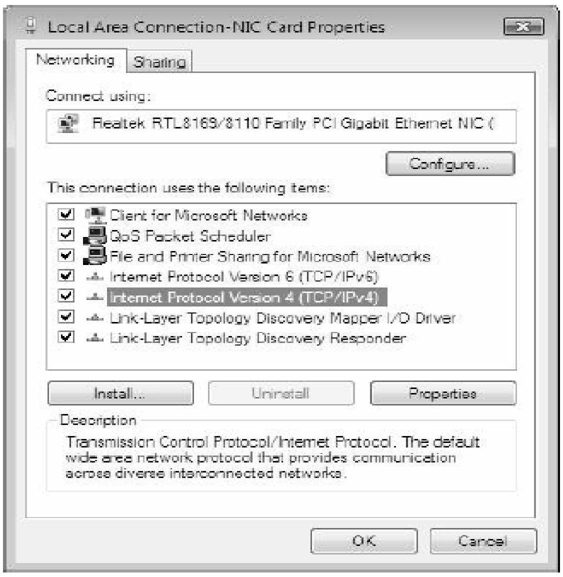

Figure 11 : Local Area Connection Properties - Windows

Ensure that both the Obtain an IP address automatically and Obtain DNS server address automatically options are selected. If not, select them.

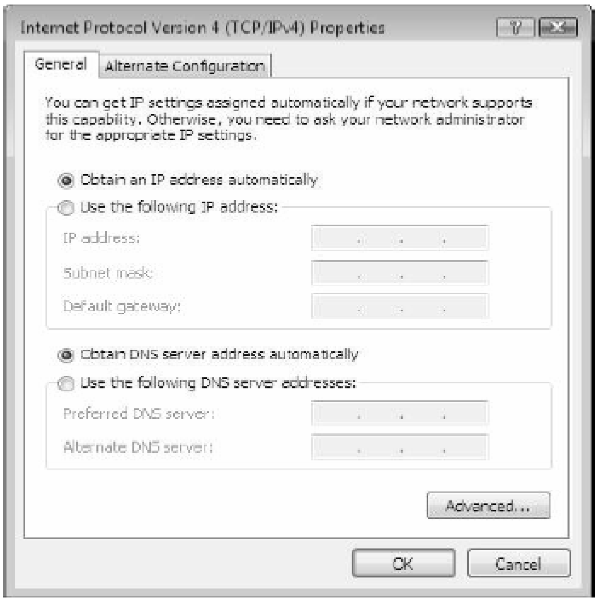

Figure 12 : Internet Protocol Properties - Windows

Execute a ping test to verify that the Ethernet connection between the remote terminal and laptop PC is active:

1.Open a command prompt or window on the installer PC.

2.Type ping 192.168.0.1.

3.Press ENTER.

If the ping is successful, the ping results show that all sent packets were received, as in Figure 11.

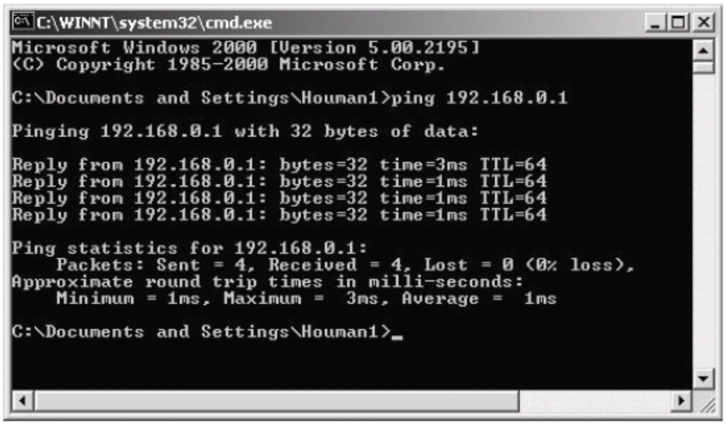

Figure 13 : Successful ping test

Commissioning the remote terminal

This chapter explains how to register a remote terminal for service. Type http://192.168.0.1/fs/registration/setup.html

Figure 14 : Icon for creating a shortcut

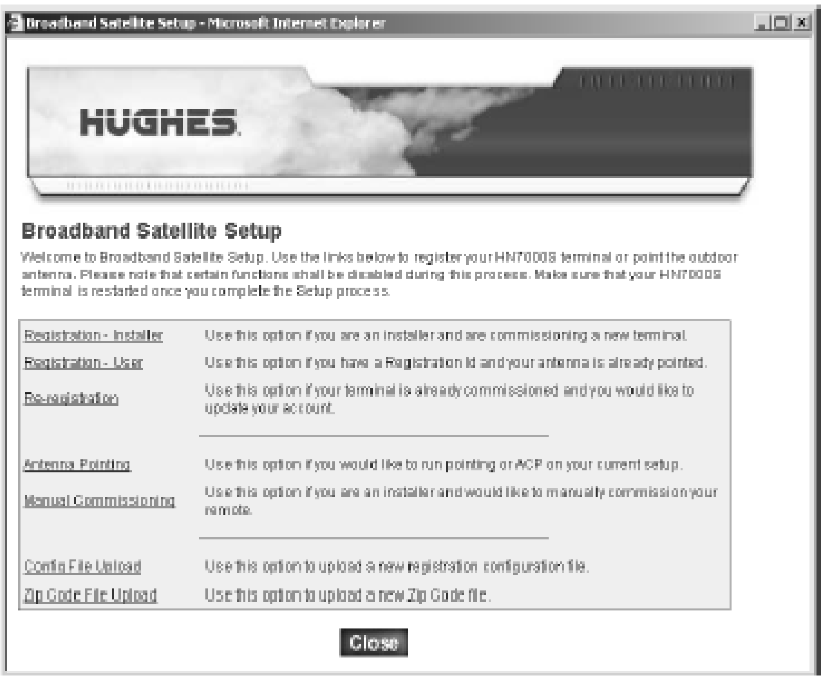

Figure 13 : Setup screen

Click Browse on the Configuration File Upload screen shown in Figure 14

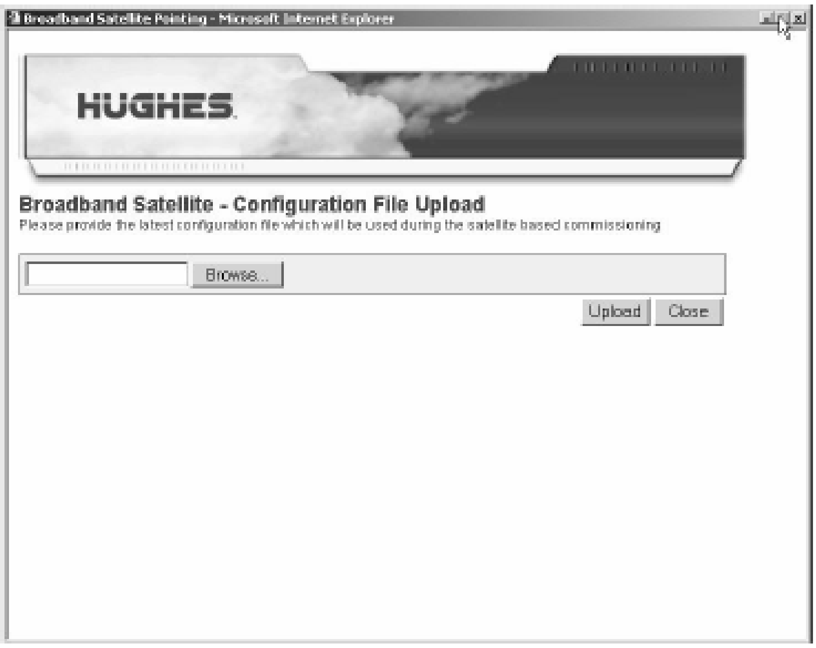

Figure 14 : Configuration File Upload screen

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After the upload completes, click Close on the Configuration File Upload screen shown in Figure 18 to return to the Setup screen.

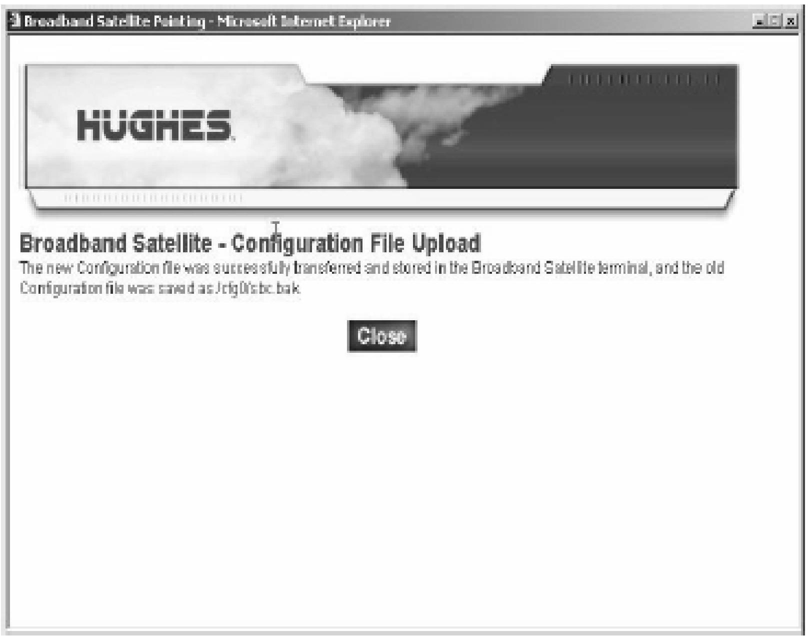

Figure 15 : Confirming sbc.cfg file upload to the remote terminal

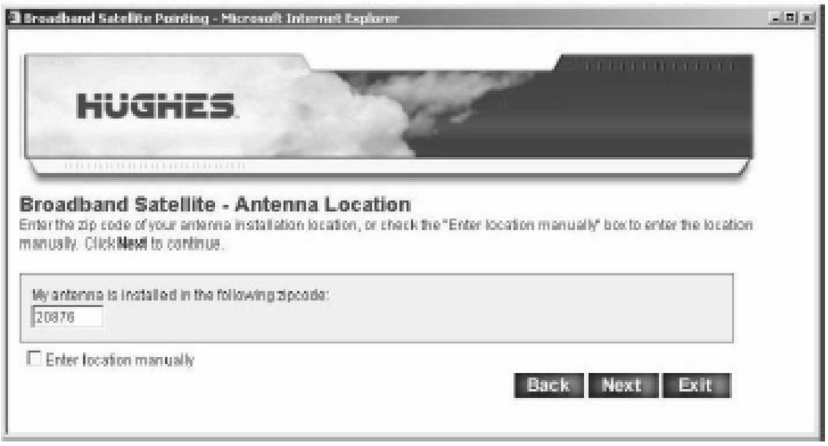

Figure 20: Antenna Location screen

Figure 16. Antenna Location screen

Enter the longitude and latitude for your location on the Manual Entry of Antenna Location screen shown in Figure 17.

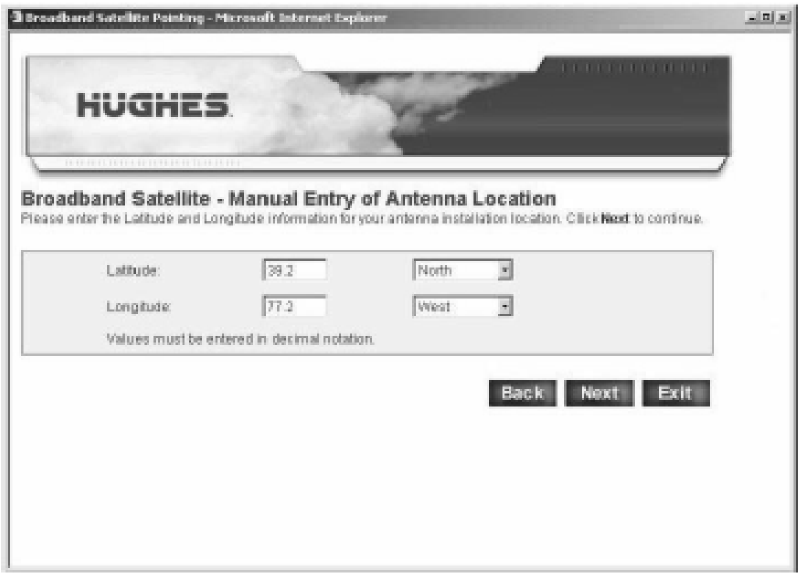

Figure 17. Entering location manually

If you entered the ZIP code (step 5), the Location of Antenna Verification screen appears as shown in Figure 18. If you manually entered the antenna location, the Verification screen does not appear.

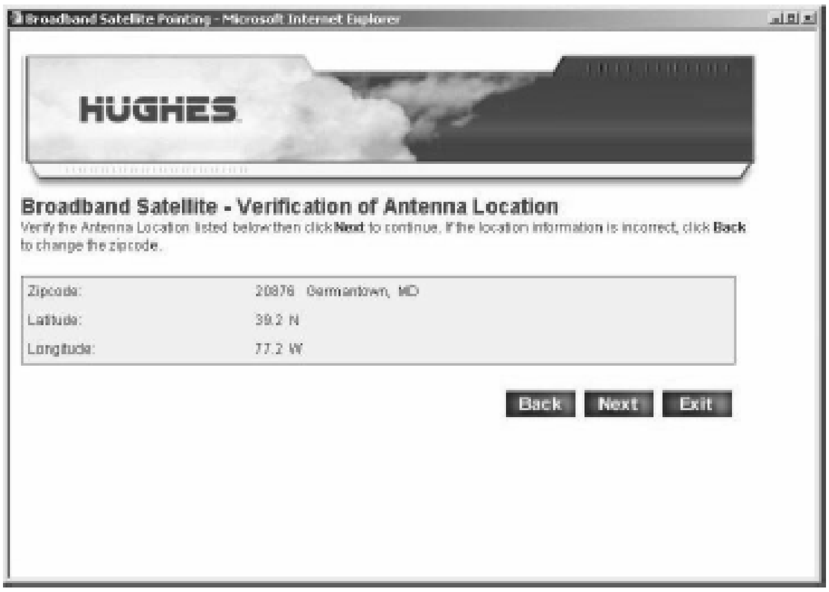

Figure 18. Verifying the antenna location

Click the Satellite Transponders drop-down menu on the Satellite Parameters screen shown in Figure 20 and select the satellite and transponder listed on the work order or in the installation specification; then click Next.

Figure 19 : Selecting the satellite and transponder

Enter or select the parameters on the Manual Entry of Satellite Parameters screen shown in Figure 21:

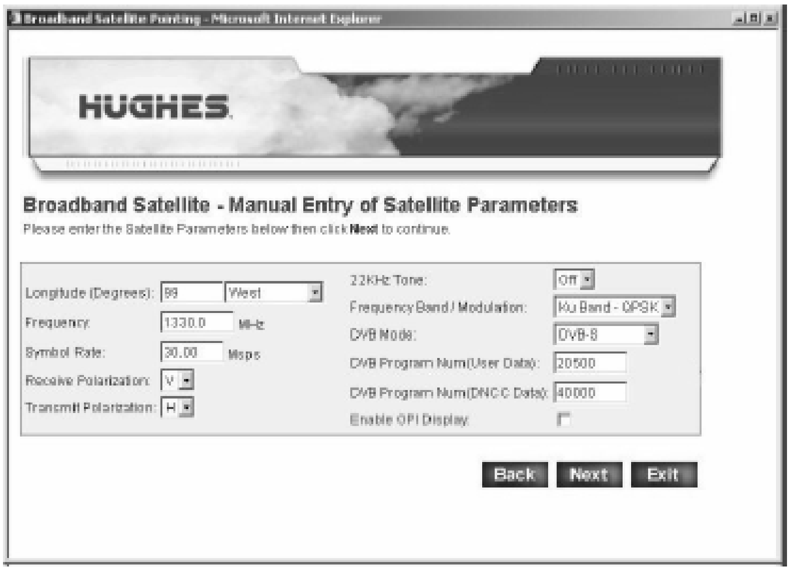

Figure 20 : Entering satellite parameters manually

On the Transmit Radio Parameters screen shown in Figures 21, select the radio part number if you know it. The radio part number should be on the work order or installation specification. If you do not have the P/N, select the transmit radio type (1 Watt or 2 Watt).

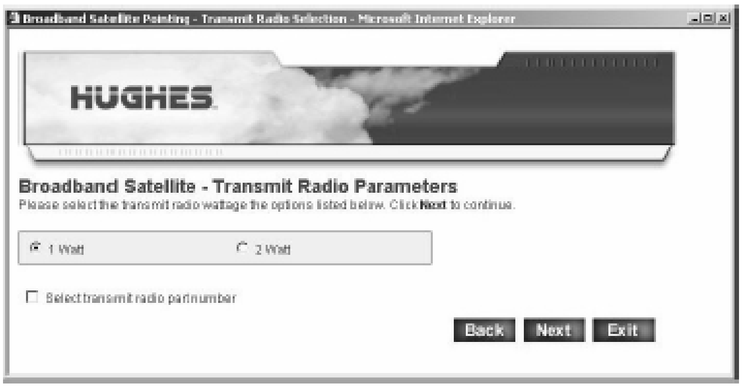

Figure 21 : Selecting the transmit radio by type (wattage)

Click Display Signal Strength on the Receive Antenna Pointing screen to open the Signal Quality window.

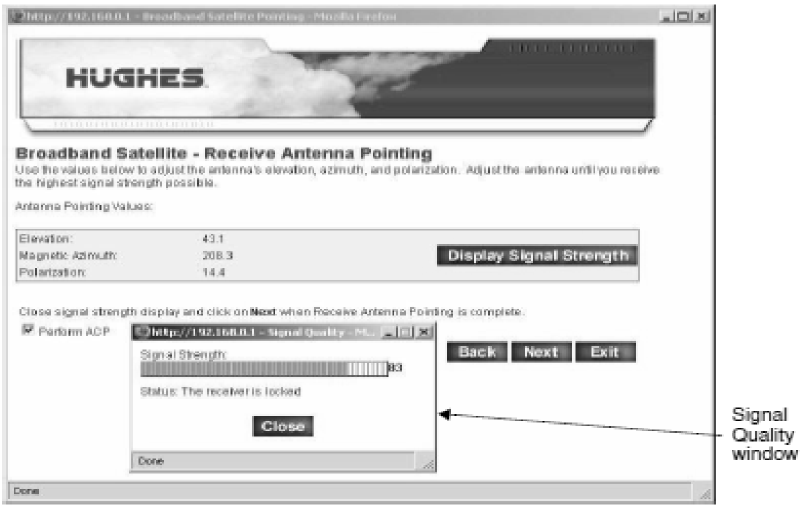

Figure 22. Receive pointing screen

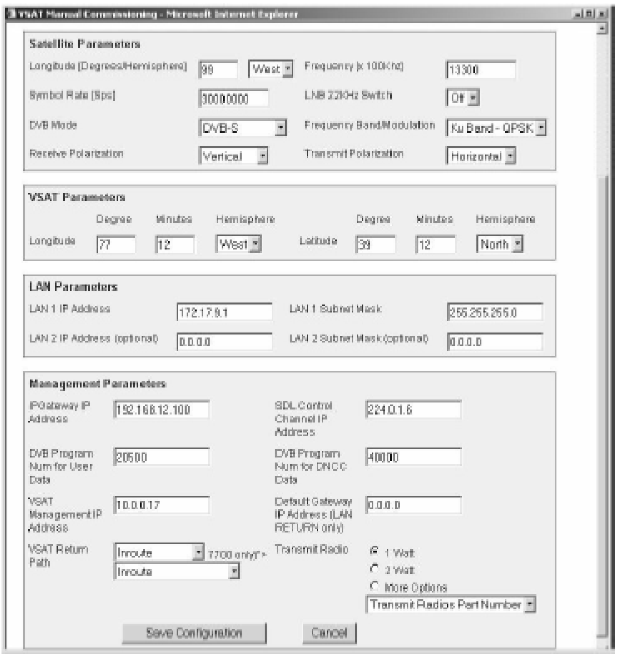

Figure 44: Manual Commissioning page

Figure 23. Manual Commissioning page

Completing the installation

This chapter discusses tasks that must be completed after the remote terminal is installed and commissioned.

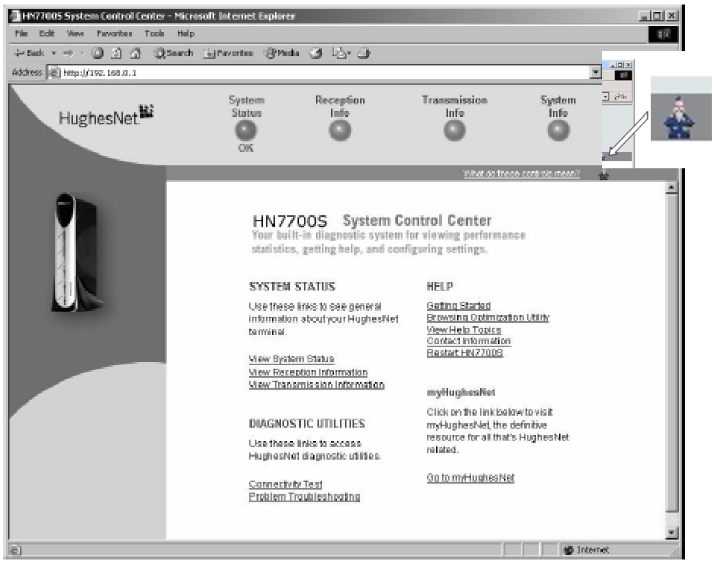

Figure 24. System Control Center home page

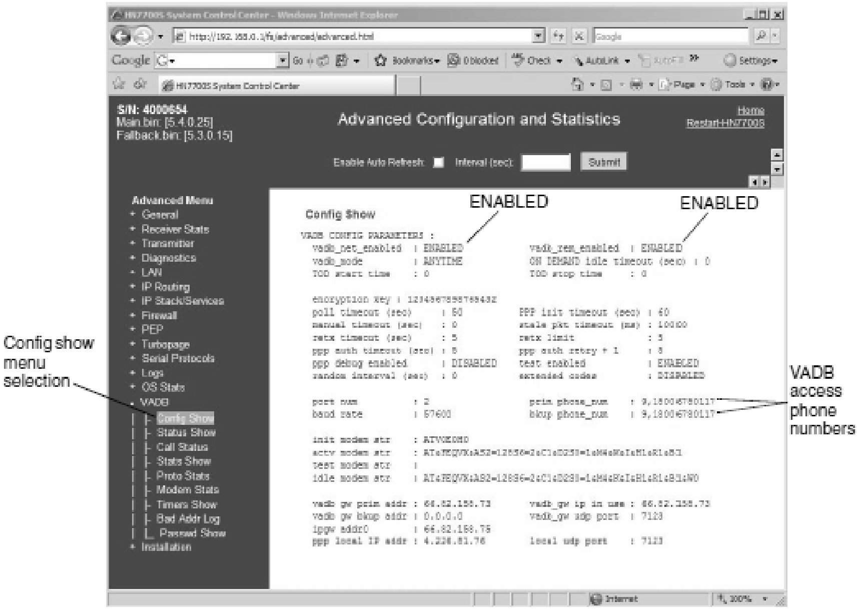

Figure 25. Verifying that the VADB profile is loaded

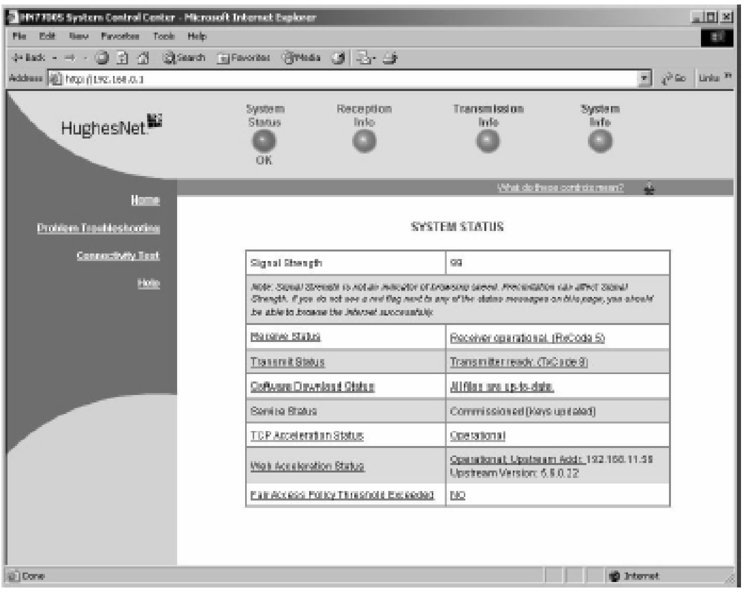

Figure 26: System Status page

The System Control Center home page includes links to remote terminal features and important information regarding operation of the remote terminal. The System Status button is an indicator button which changes color to indicate the current system status. The different colors indicate the following:

- Green - no problem detected, OK
- Red - problem detected
- Yellow - may be a problem with Web Acceleration.
- Orange - indicates the Fair Access Policy (FAP) has been exceeded.

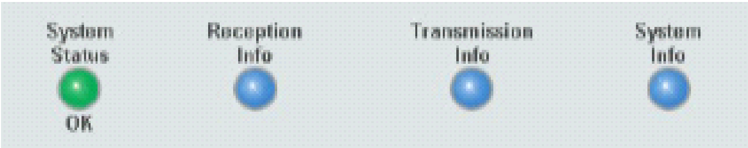

Figure 27: Links to System Control Center pages

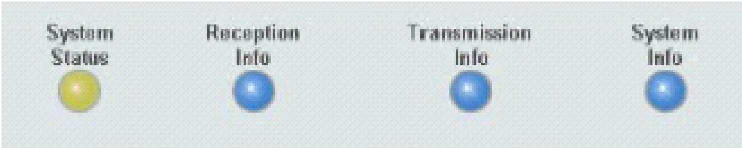

Figure 28: System Status indicator reporting Web Acceleration feature down

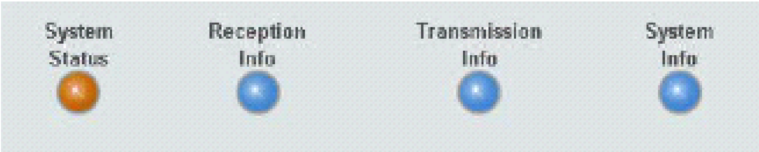

Figure 29 : System Status indicator reporting FAP threshold exceeded

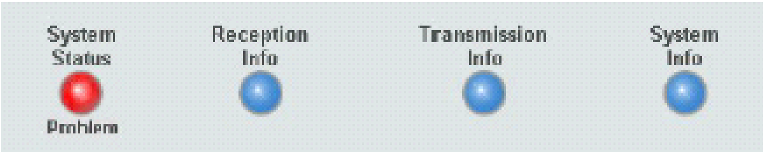

Figure 30 : System Status indicator reporting a problem

LAMPIRAN 11 - SURAT UNTUK PENELITIAN

KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
UNIVERSITAS NEGERI JAKARTA
Kampus Universitas Negeri Jakarta, Jalan Rawamangun Muka, Jakarta 13220
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Laman : www.unj.ac.id

Building Future Leaders

Nomor : 2276A/UN39.12/KM/2014 — 13 Oktober 2014
Lamp. : -
H a l : **Permohonan Izin Penelitian Untuk Skripsi**

Yth. **HRD PT. Metra Telkom**

Kami mohon kesediaan Saudara untuk dapat menerima Mahasiswa Universitas Negeri Jakarta :

N a m a	: **Samlawi**	No. Telp/HP : -
Nomor Registrasi	: 5235129022	
Program Studi	: Pendidikan Teknik Informatika dan Komputer	
Fakultas	: Teknik	
Untuk Mengadakan	: Penelitian Untuk Skripsi	

Di : **PT. Metra Telkom,**
Jl. KH. Soleh Iskandar, Km.6, Tanah Sareal,
Bogor 16161

Untuk mendapatkan data yang diperlukan dalam rangka Penyusunan Skripsi. Skripsi tersebut dengan judul :
"Optimalisasi Performansi MPLIK Berdasarkan Servis Level dan Utilitas Traffik Pada Sistem Remote"

Atas perhatian dan kerjasama Saudara, kami sampaikan terima kasih.

Kepala Biro Administrasi
Akademik dan Kemahasiswaan,

KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN UNIVERSITAS NEGERI JAKARTA

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2. Kaprog / Jurusan Teknik Elektro

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Pengalaman kerja di PT Metrasat Telkom, pada bagian Operasional Maintenance VSAT IP (2011 sampai sekarang), ditempatkan di bagian Enginer on Site Bank BRI dan Team Suport EoS USO Perbatasan. Peneliti menempuh Program Sarjana Pendidikan di jurusan Pendidikan Informatika dan Komputer, Fakultas Teknik di Universitas Negeri Jakarta, kegiatan selama kuliah di Universitas Negeri Jakarta antara lain Program Keterampilan Mengajar (PKM) di SMK BPSK Pondok Kopi, Jakarta Timur tahun 2014 dan Kuliah Kerja Nyata di Kecamatan Sukamakmur, Kabupaten Bogor.