

APPENDIX A :
DRAWING AND SPECIFICATION OF
WIRELESS LAN SYSTEM

APPENDIX A DRAWING AND SPECIFICATION OF WIRELESS LAN SYSTEM

Report of Construction Wireless LAN in Kota Marudu for the Study on Enhancement of Info-Communications Access in Rural Communities

A.1 Work Schedule

Description	Date of Completion	Remarks
Tender Awarded	21 st August 2002	Contract signed
Site Survey	28 th August 2002	Completed
Installation Work	3 rd September 2002	Begin
Soft Launching	9 th September 2002	Installation work stop for 1 day
Installation Work	12 th September 2002	Completed
Installation of IP router	12 th September 2002	Completed
Commissioning of Wireless router	12 th September 2002	Partially
Confirming the routing of Wireless LAN	14 th September 2002	Successful
Measuring transmission rate between station	14 th September 2002	Completed
Measuring Radio Frequency interference rate	25 th September 2002	Completed
Measuring Internet Access transmission rate	25 th September 2002	Completed
Delivery of equipments	25 th September 2002	1 unit of wireless router 1 unit of IP router 3 set of LAN card 1 unit of analog modem
Fencing	28 th September 2002	Completed
Final reporting date	30 th September 2002	Completed

A.2 Construction LAN Installation Survey and Planning Report

A.2.1 Survey Summary

Survey Summary

Link	Post Office to Library Post office to Community Hall Community Hall to District office
Distance	Post Office to Library- 139 meters Post office to Community Hall- 189 meters Community Hall to District office- 332 meters
Region	Sabah

A.2.2 Site Survey

(1) Objectives

The purpose of this survey to recommend the most practical and economical configuration and additional infrastructure in the wireless LAN installation layout for JICA study team.

(2) Site Survey

The particulars of the survey are as follow:

The Particulars

Site Survey Date	28 th August 2002
Site Survey Team	a) C.L. Yoon b) C.K. Tan

(3) Site Information

1) Post Office

Site Information of Post Office (1)

Name	Post Office
Address	Kota Marudu
Contact Person	En. Paulus

Site Information of Post Office (2)

Line of Site	Clear
Latitude	N6 49.340
Longitude	E 116 77.613
Building Earthling	Nil
Lighting Protection	Nil
Location of Wireless System	Install 3m 2" G.I pole c/w mounting flat plate and concrete foundation on the ground outside Post office building.
Location of PC location	Ground Floor- Public Space
Cable Distance	N/A
Cable type	Coax & UIP
Power Supply Location	Existing 13A TNB SSO at Counter
Power Cable Distance	35 meters
Comment on Installation	Nil
Comment on Cabling	Nil

2) Library

Site Information of Library (1)

Name	Library
Address	Kota Marudu
Contact Person	None

Site Information of Library (2)

Line of Site	Clear
Latitude	N6 49.215
Longitude	E 116 77.619
Building Earthling	N/A
Distance from Post Office	139 meters
LOS bearing	177 True
Building High	7 meters
Building Earthling	Nil
Lighting Protection	Nil
Line of Site	Clear
Latitude	N6 49.215
Longitude	E 116 77.619
Building Earthling	N/A
Distance from Post Office	139 meters
LOS bearing	177 True
Building High	7 meters
Building Earthling	Nil
Lighting Protection	Nil
Location of Wireless System	Install 1.5m 2" G.I pole at side wall of the building
Location of PC location	1 st Floor
Cable Distance	N/A
Cable type	Coax & UIP
Power Supply Location	Existing 13A TNB SSO at PC location
Power Cable Distance	35 meters
Comment on Installation	Nil
Comment on Cabling	Nil
Location of Wireless System	Install 1.5m 2" G.I pole at side wall of the building
Location of PC location	1 st Floor
Cable Distance	N/A
Cable type	Coax & UIP
Power Supply Location	Existing 13A TNB SSO at PC location
Power Cable Distance	35 meters
Comment on Installation	Nil
Comment on Cabling	Nil

3) Community Hall

Site Information of Community Hall (1)

Name	Community Hall
Address	Kota Marudu
Contact Person	None

Site Information of Community Hall (2)

Line of Site	Clear
Latitude	N6 49.215
Longitude	E 116 77.619
Building Earthling	N/A
Distance from Post Office	139 meters
LOS bearing	177 True
Building High	7 meters
Building Earthling	Nil
Lighting Protection	Nil
Line of Site	Clear
Latitude	N6 49.347
Longitude	E 116 77.447
Building Earthling	N/A
Distance from Post Office	184 meters
LOS bearing	272 True
Building High	N/A
Building Earthling	Nil
Lighting Protection	Nil
Location of Wireless System	Install 3m 2" G.I pole c/w mounting flat plate and concrete foundation on ground
Location of PC location	Non
Cable Distance	N/A
Cable type	Coax & UIP
Power Supply Location	Existing 13A TNB SSO inside the hall
Power Cable Distance	10 meters
Comment on Installation	Nil
Comment on Cabling	Nil

4) District Office

Site Information of District Office (1)

Name	District Office
Address	Kota Marudu
Contact Person	Ms. Jane Tan

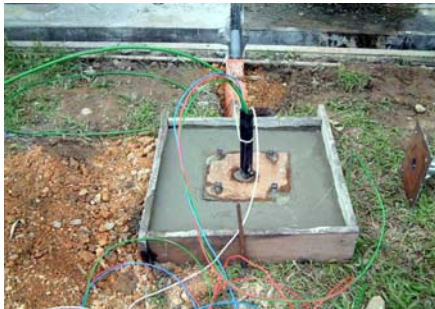
Site Information of District Office(2)

Line of Site	Clear
Latitude	N6 49.528
Longitude	E 116 77.380
Building Earthling	N/A
Distance from Community Hall	332 meters
LOS bearing	309 True
Building High	4 meters
Building Earthling	Nil
Lighting Protection	Nil
Location of Wireless System	Install 3m 2" G.I pole c/w mounting flat plate and concrete foundation on ground
Location of PC location	Public space in 1 st Floor
Cable Distance	N/A
Cable type	Coax & UIP
Power Supply Location	Existing 13A TNB SSO public area
Power Cable Distance	70 meters
Comment on Installation	Nil
Comment on Cabling	Nil

A.3 Installation Work and Wiring Layout

A.3.1 Installation Work

(1) Installation work at Post Office



Construction of the concrete. This foundation is used to support the G.I. Pole.



G.I 3m pole erected. Cable are used to ensure the stability of the pole.



The wireless router and antenna on the G.I. pole



This shows the complete installation of the wireless equipments at Post Office site



The PCs are located inside the Post office main hall. The leased line modem that provides the Internet access for the Kota Marudu RIC project is located here.

(2) Installation work at Library site



A 1.5m G.I. pole was erected at the side of the building where the Library is located.



This is the PC located the library. Wireless LAN connection established between the library and post office to enable the users to

(3) Installation work at Community Hall



The laying of the brick on top the underpass ducting for protection for the cabling that provides power and wireless interface.



The completed work for the G.I. with the wireless equipment mounted and stabilized at the Community Hall.



The box is located inside the community hall that the wireless interfaces were

(4) Installation Work at District Office



This is the concrete foundation that supports the G.I. pole and wires equipment.



This shows the wireless equipment mounted on the pole providing the final wireless link to the post office.



This is the existing electrical DB for the new 13A point inside outdoor box at G.I. pole.

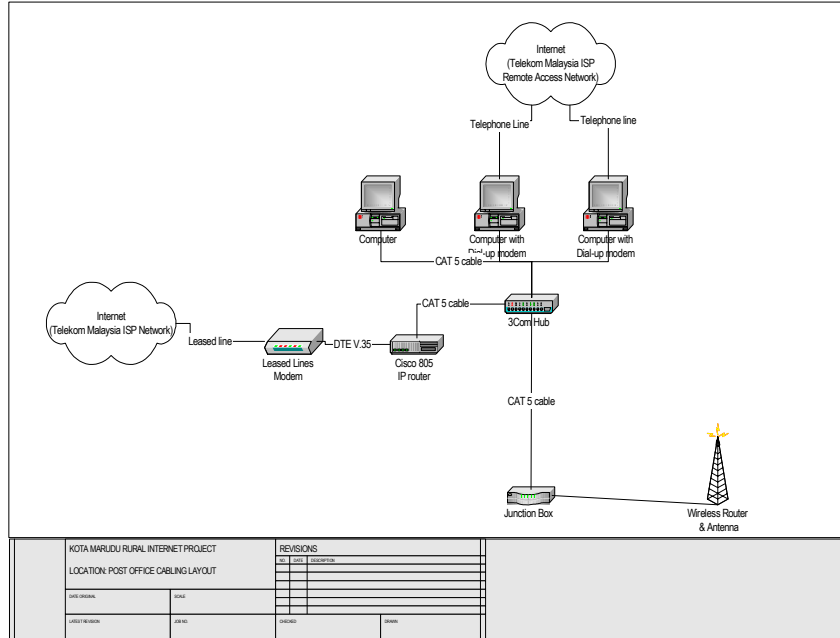


PC is located inside the first floor of the district office. The installed wireless equipment at this site is to enable the wireless LAN connection to the post office for the Internet access.

A.3.2 Cabling Layout in Each Site

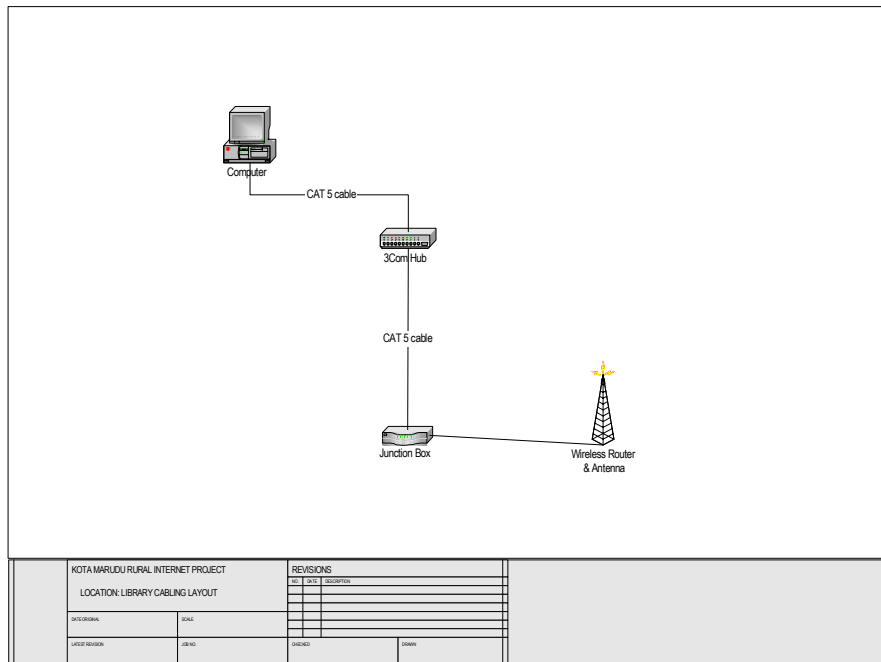
(1) Post office

Cabling Layout at Post Office



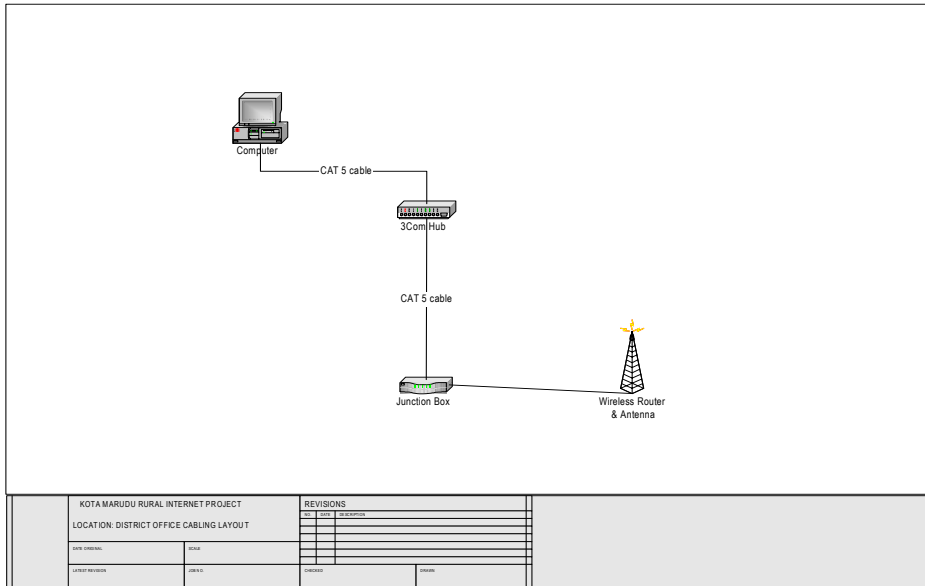
(2) Library

Cabling Layout at Library

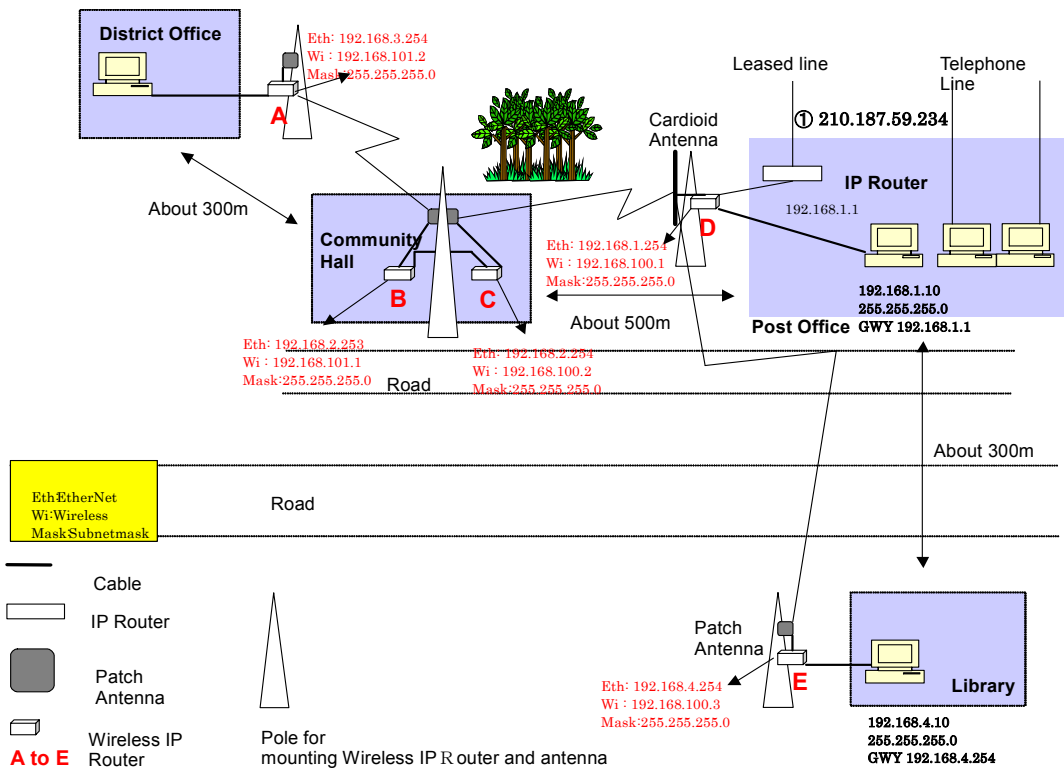


(3) District office

Cabling Layout at District Office



(4) Wireless LAN Communication Diagram



A.4 Acceptance Test Report

This test document will serve as a checklist to ensure the RGW wireless router is tested according to the specification. At such, it will act as a baseline reference document to ensure the project is commissioned accordingly.

A.4.1 The Test of the Equipment

The test will cover 3 aspect of the equipment:

(1) Hardware Verification

This will aimed to ensure the entire hardware component, especially the link and the route is working properly without error.

(2) Configurations

This will ensure the router is configured with the entire basic requirement such as routing, IP addressing, network definitions, etc.

(3) Layer 3 Reach ability

This surpass the previous 2 as it verify that the end functionality of the router and the correctness of the routing process. It should perform the entire test flawlessly without any packet loss or corruption. And it would also verified the path taken is via proper path.

1) Hardware Configurations(1)

Test Scope	Expected Results	Pass / Fail	Remark
Verify all layer transmission is free of error for the following interface	Show no error in layer 2 transmission statistics and all layer 3 point-to-point functions are working properly without loss of packet.	Pass	
Route Processor Board	The result of the show status is correct without error.	Pass	
Power Supply	Show status is OK status.	Pass	

2) Hardware Configurations(2)

Test Scope	Expected Results	Pass / Fail	Remark
IP Address	All IP address is assigned accordingly to specifications.	Pass	
Routing Protocol	All configurations for the routing protocol are configured accordingly to specifications.	Pass	
Interface Configurations	All interface is configured	Pass	
System Configurations	All basic system configurations are configured properly.	Pass	

3) Layer 3 Route & Reach Ability

Ping Test	Expected Results	Pass/ Fail	Remark
Ping Nodes address :- 192.168.1.254 192.168.2.253 192.168.2.254 192.168.3.254 192.168.4.243	All pings Test are 100% successful without any error.	Pass	
Ping RGW address :- 192.168.100.1 192.168.101.1	All pings Test are 100% successful without any error.	Pass	
Ping external address Example – IP Router - 192.168.1.1 PC Desktop – 192.168.1.10 WAN Leased lined – 210.187.59.234	All pings Test are 100% successful without any error.	Pass	

A.4.2 Test Report

This test report will serve as a checklist to ensure the RGW wireless router is tested according to the specification. At such, it will act as a baseline reference document to ensure the project is commissioned accordingly.

The test will cover 3 aspect of the equipment: -

(1) Hardware Verification

This will aimed to ensure the entire hardware component, especially the link and the route is working properly without error.

(2) Configurations

This will ensure the router is configured with the entire basic requirement such as routing, IP addressing, network definitions, etc.

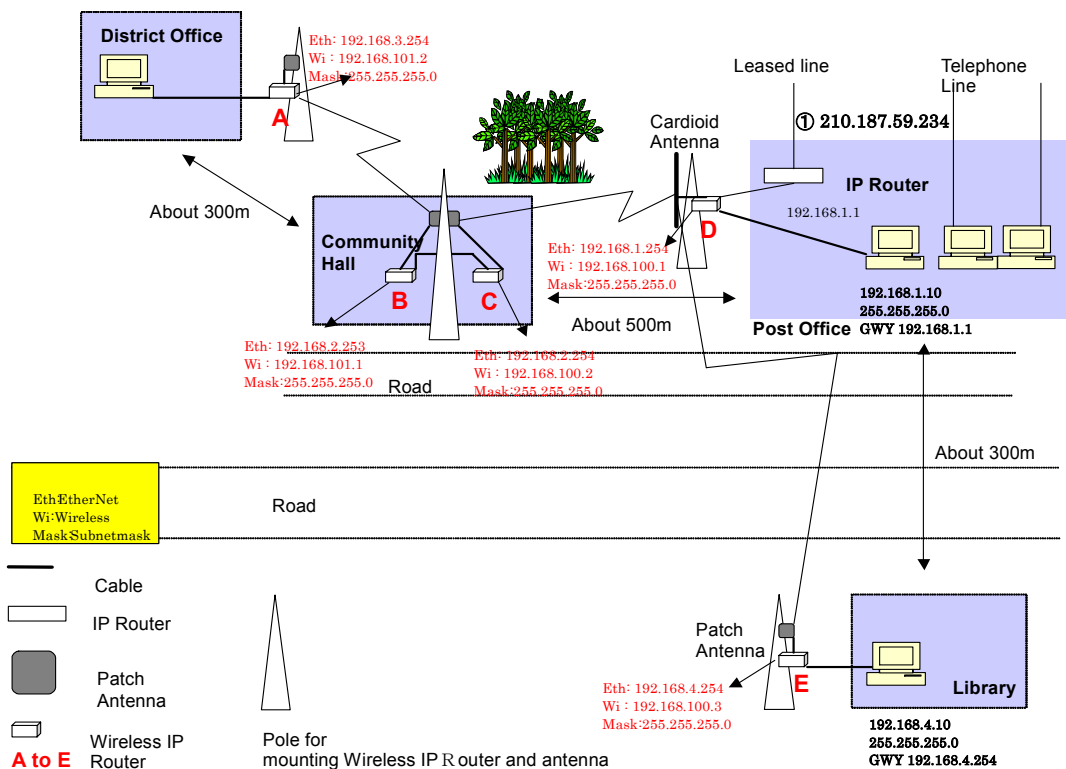
(3) Layer 3 Reach Ability

This surpass the previous 2 as it verify that the end functionality of the router and the correctness of the routing process. It should perform the entire test flawlessly without any packet loss or corruption. And it would also verified the path taken is via proper path.

The report consists of status and configuration print out captured during the time of the acceptance test for reference.

Date: 14th September 2002

A.4.3 Report of Router Configuration Test



(1) RGW (A)-District Office

```

show config
#
# Setup file saved by command line shell.
#      Fri Aug 30 02:33:15 2002
#
hostname rgw
ip address ne0 192.168.3.254 255.255.255.0
ip address wi0 192.168.101.2 255.255.255.0
ip route delete default
ip route add default 192.168.101.1
    
```

```

        wireless channel 13
        wireless txrate 11
    wireless wep encryption disable
        wireless wep key use 1
        wireless port 3
        wireless ssid NetBSD_IBSS
    wireless station NetBSD_WaveLAN/IEEE_node
        rip disable
        rip static-supply disable
        rip action ne0 supply
        rip version ne0 ripv2
        rip action wi0 supply
        rip version wi0 ripv2
        snmp enable
        snmp community public
    snmp location Root Inc. 2F KS Bldg. 1-17-8 Nishikata Bunkyo-ku Tokyo Japan
        snmp contact Phone:+81-3-5840-7601 E-mail:support@root-hq.com
        dhcp pool 192.168.3.10 192.168.3.50
            dhcp expire 3600
            dhcp dns add 202.188.0.133
            dhcp dns add 202.188.1.5
            dhcp domain
            dhcp defaultroute 192.168.3.254
            dhcp relay disable
            dhcp enable
            filter disable
            nat disable
        nat add map 11 wi0 0/0 -> 0/32 proxy port ftp ftp/tcp
        nat add map 12 wi0 0/0 -> 0/32 portmap tcp/udp auto
        nat add map 13 wi0 0/0 -> 0/32
        ip icmp redirect enable
        access telnet all
        access monitor all
        access ssh all
        syslog disable
        syslog host 172.30.100.1
        syslog add * emerg
        syslog add auth info
        syslog add syslog notice
        syslog add user info
        ssh version v1
        ssh authentication both
    wireless BSS AP mode disable
    $ show setup

```

[Hostname]

rgw

[IP address]

Interface	IPaddress	Netmask
ne0	192.168.3.254	255.255.255.0
wi0	192.168.101.2	255.255.255.0

[Static ARP]

IPaddress	MACaddress
-----------	------------

```

-----
                                [Static Routes]
Destination      Netmask          Gateway          Info
-----
default          :          192.168.101.1  Static

                                [ICMP]
                                redirect : enable

                                [Wireless LAN settings]
Channel          : 13 (2472MHz)
TX rate         : 11 (11->2->1Mbps)
Port type       : ad-hoc
SSID            : NetBSD_IBSS
                IBSS Network :
Station         : NetBSD_WaveLAN/IEEE_node
WEP encryption  : Off
TX encryption key : 1
Encryption key 1 :
Encryption key 2 :
Encryption key 3 :
Encryption key 4 :

                                [Wireless AP]
wireless BSS AP mode : disable

                                [RIP]
rip              : disable
static supply    : disable
ne0              : RIPv2, supply
wi0              : RIPv2, supply

                                [SNMP]
snmp            : enable
access         : ALL
community      : public
syslocation    : Root Inc. 2F KS Bldg. 1-17-8 Nishikata Bunkyo-ku Tokyo Japan
syscontact     : Phone:+81-3-5840-7601 E-mail:support@root-hq.com
trapsink       : disable
trap2sink      : disable
informsink     : disable

                                [DHCP]
dhcp           : ne0
pool          : 192.168.3.10 - 192.168.3.50
expire        : 3600 sec
DNS           : 202.188.0.133 202.188.1.5
              domain :
default route: 192.168.3.254
relay         : disable

                                [Filter]
filter: disable

                                [NAT]
nat: disable

```



```

11: map wi0 0/0 -> 0/32 proxy port ftp ftp/tcp
12: map wi0 0/0 -> 0/32 portmap tcp/udp auto
13: map wi0 0/0 -> 0/32

```

[Access]

```

telnet : ALL
monitor : ALL
ssh : ALL

```

[SYSLOG]

```

syslog : disable
host : 172.30.100.1
facility/level : */emerg
facility/level : auth/info
facility/level : syslog/notice
facility/level : user/info

```

[Load]

```

load tftp : disable
server :
file :

```

[SSH]

```

SSH Version : 1
KeyAuthentication : yes
PasswdAuthentication : yes
$ hs show wireless status

```

```

NIC serial number: [ AJA020302407 ]
Station name: [ NetBSD_WaveLAN/IEEE_node ]
SSID for IBSS creation: [ NetBSD_IBSS ]
Current netname (SSID): [ NetBSD_IBSS ]
Desired netname (SSID): [ ]
Current BSSID: [ 00:00:00:00:00:00 ]
Channel list: [ 8191 ]
IBSS channel: [ 13 ]
Current channel: [ 13 ]
Comms quality/signal/noise: [ 0 27 27 ]
Promiscuous mode: [ Off ]
Port type (1=BSS, 3=ad-hoc): [ 3 ]
MAC address: [ 00:07:b5:00:26:28 ]
TX rate (selection): [ 11 ]
TX rate (actual speed): [ 8 ]
Maximum data length: [ 2304 ]
RTS/CTS handshake threshold: [ 2347 ]
Create IBSS: [ Off ]
Access point density: [ 1 ]
Power Mgmt (1=on, 0=off): [ 0 ]
Max sleep time: [ 100 ]
WEP encryption: [ Off ]
TX encryption key: [ 1 ]
Encryption keys: [ ][ ][ ][ ]

```

```

$

```

(2) RGW (B)-Community Hall

```
show config
#
# Setup file saved by command line shell.
#     Fri Aug 30 02:44:59 2002
#
hostname rgw
ip address ne0 192.168.2.253 255.255.255.0
ip address wi0 192.168.101.1 255.255.255.0
ip route delete default
ip route add default 192.168.2.254
ip route add 192.168.3.0 255.255.255.0 192.168.101.2
wireless channel 13
wireless txrate 11
wireless wep encryption disable
wireless wep key use 1
wireless port 3
wireless ssid NetBSD_IBSS
wireless station NetBSD_WaveLAN/IEEE_node
rip disable
rip static-supply disable
rip action ne0 supply
rip version ne0 ripv2
rip action wi0 supply
rip version wi0 ripv2
snmp enable
snmp community public
snmp location Root Inc. 2F KS Bldg. 1-17-8 Nishikata Bunkyo-ku Tokyo Japan
snmp contact Phone:+81-3-5840-7601 E-mail:support@root-hq.com
dhcp relay disable
dhcp disable
filter disable
nat disable
nat add map 11 wi0 0/0 -> 0/32 proxy port ftp ftp/tcp
nat add map 12 wi0 0/0 -> 0/32 portmap tcp/udp auto
nat add map 13 wi0 0/0 -> 0/32
ip icmp redirect enable
access telnet all
access monitor all
access ssh all
syslog disable
syslog host 172.30.100.1
syslog add * emerg
syslog add auth info
syslog add syslog notice
syslog add user info
ssh version v1
ssh authentication both
wireless BSS AP mode disable
$ show setup

[Hostname]
  rgw
```

```

[IP address]
Interface      IPAddress      Netmask
-----
ne0            192.168.2.253  255.255.255.0
wi0            192.168.101.1  255.255.255.0

[Static ARP]
IPAddress      MACAddress
-----

[Static Routes]
Destination    Netmask        Gateway        Info
-----
default        255.255.255.0  192.168.2.254  Static
192.168.3.0    255.255.255.0  192.168.101.2  Static

[ICMP]
redirect : enable

[Wireless LAN settings]
Channel       : 13 (2472MHz)
TX rate       : 11 (11->2->1Mbps)
Port type     : ad-hoc
SSID          : NetBSD_IBSS
IBSS Network  :
Station       : NetBSD_WaveLAN/IEEE_node
WEP encryption : Off
TX encryption key : 1
Encryption key 1 :
Encryption key 2 :
Encryption key 3 :
Encryption key 4 :

[Wireless AP]
wireless BSS AP mode : disable

[RIP]
rip           : disable
static supply : disable
ne0           : RIPv2, supply
wi0           : RIPv2, supply

[SNMP]
snmp         : enable
access       : ALL
community    : public
syslocation  : Root Inc. 2F KS Bldg. 1-17-8 Nishikata Bunkyo-ku Tokyo Japan
syscontact   : Phone:+81-3-5840-7601 E-mail:support@root-hq.com
trapsink     : disable
trap2sink    : disable
informsink   : disable

[DHCP]
dhcp         : disable
pool         :
expire       :
DNS          :
domain       :

```

```

default route:
  relay          : disable

[Filter]
  filter: disable

[NAT]
  nat: disable

    11: map wi0 0/0 -> 0/32 proxy port ftp ftp/tcp
    12: map wi0 0/0 -> 0/32 portmap tcp/udp auto
    13: map wi0 0/0 -> 0/32

[Access]
  telnet  : ALL
  monitor : ALL
  ssh     : ALL

[SYSLOG]
  syslog          : disable
  host            : 172.30.100.1
  facility/level : */emerg
  facility/level : auth/info
  facility/level : syslog/notice
  facility/level : user/info

[Load]
  load tftp : disable
  server    :
  file      :

[SSH]
  SSH Version          : 1
  KeyAuthentication   : yes
  PasswdAuthentication : yes
$ show wireless status
NIC serial number:      [ AJA020302368 ]
Station name:          [ NetBSD_WaveLAN/IEEE_node ]
SSID for IBSS creation: [ NetBSD_IBSS ]
Current netname (SSID): [ NetBSD_IBSS ]
Desired netname (SSID): [ ]
Current BSSID:         [ 00:00:00:00:00:00 ]
Channel list:          [ 8191 ]
IBSS channel:          [ 13 ]
Current channel:       [ 13 ]
Comms quality/signal/noise: [ 12 59 17 ]
Promiscuous mode:      [ Off ]
Port type (1=BSS, 3=ad-hoc): [ 3 ]
MAC address:           [ 00:07:b5:00:26:01 ]
TX rate (selection):   [ 11 ]
TX rate (actual speed): [ 2 ]
Maximum data length:   [ 2304 ]
RTS/CTS handshake threshold: [ 2347 ]
Create IBSS:           [ Off ]
Access point density:  [ 1 ]
Power Mgmt (1=on, 0=off): [ 0 ]
Max sleep time:        [ 100 ]
WEP encryption:        [ Off ]

```

```
TX encryption key:          [ 1 ]
Encryption keys:           [ ][ ][ ][ ]
$
```

(3) RGW (C)—Community Hall

```
show config
#
# Setup file saved by command line shell.
#      Fri Aug 30 03:00:37 2002
hostname rgw
ip address ne0 192.168.2.254 255.255.255.0
ip address wi0 192.168.100.2 255.255.255.0
ip route delete default
ip route add default 192.168.100.1
ip route add 192.168.3.0 255.255.255.0 192.168.2.253
ip route add 192.168.4.0 255.255.255.0 192.168.100.1
ip route add 192.168.100.3 192.168.100.1
ip route add 192.168.101.0 255.255.255.0 192.168.2.253
wireless channel 1
wireless txrate 11
wireless wep encryption disable
wireless wep key use 1
wireless port 3
wireless ssid NetBSD_IBSS
wireless station NetBSD_WaveLAN/IEEE_node
rip disable
rip static-supply disable
rip action ne0 supply
rip version ne0 ripv2
rip action wi0 supply
rip version wi0 ripv2
snmp enable
snmp community public
snmp location Root Inc. 2F KS Bldg. 1-17-8 Nishikata Bunkyo-ku Tokyo Japan
snmp contact Phone:+81-3-5840-7601 E-mail:support@root-hq.com
dhcp pool 192.168.2.10 192.168.2.50
dhcp expire 3600
dhcp dns add 202.188.0.133
dhcp dns add 202.188.1.5
dhcp domain
dhcp defaultroute 192.168.2.254
dhcp relay disable
dhcp enable
filter disable
nat disable
nat add map 11 wi0 0/0 -> 0/32 proxy port ftp ftp/tcp
nat add map 12 wi0 0/0 -> 0/32 portmap tcp/udp auto
nat add map 13 wi0 0/0 -> 0/32
ip icmp redirect enable
access telnet all
access monitor all
access ssh all
syslog disable
syslog host 172.30.100.1
syslog add * emerg
syslog add auth info
```

```

syslog add syslog notice
syslog add user info
ssh version v1
ssh authentication both
wireless BSS AP mode disable
$ show setup

```

```

[Hostname]
  rgw

```

```

[IP address]
  Interface      IPAddress          Netmask
  -----
  ne0            192.168.2.254     255.255.255.0
  wi0            192.168.100.2     255.255.255.0

```

```

[Static ARP]
  IPAddress          MACAddress
  -----

```

```

[Static Routes]
  Destination      Netmask            Gateway            Info
  -----
  default          255.255.255.0     192.168.100.1     Static
  192.168.3.0     255.255.255.0     192.168.2.253     Static
  192.168.4.0     255.255.255.0     192.168.100.1     Static
  192.168.100.3   255.255.255.255   192.168.100.1     Static
  192.168.101.0   255.255.255.0     192.168.2.253     Static

```

```

[ICMP]
  redirect : enable

```

```

[Wireless LAN settings]
  Channel          : 1 (2412MHz)
  TX rate         : 11 (11->2->1Mbps)
  Port type       : ad-hoc
  SSID            : NetBSD_IBSS
  IBSS Network    :
  Station         : NetBSD_WaveLAN/IEEE_node
  WEP encryption  : Off
  TX encryption key : 1
  Encryption key 1 :
  Encryption key 2 :
  Encryption key 3 :
  Encryption key 4 :

```

```

[Wireless AP]
  wireless BSS AP mode : disable

```

```

[RIP]
  rip          : disable
  static supply : disable
  ne0         : RIPv2, supply
  wi0         : RIPv2, supply

```

```

[SNMP]
  snmp        : enable
  access     : ALL

```

```

community      : public
syslocation    : Root Inc. 2F KS Bldg. 1-17-8 Nishikata Bunkyo-ku Tokyo Japan
syscontact     : Phone:+81-3-5840-7601 E-mail:support@root-hq.com
trapsink       : disable
trap2sink      : disable
informsink     : disable

[DHCP]
dhcp           : ne0
pool           : 192.168.2.10 - 192.168.2.50
expire         : 3600 sec
DNS            : 202.188.0.133 202.188.1.5
domain         :
default route : 192.168.2.254
relay          : disable

[Filter]
filter: disable

[NAT]
nat: disable

    11: map wi0 0/0 -> 0/32 proxy port ftp ftp/tcp
    12: map wi0 0/0 -> 0/32 portmap tcp/udp auto
    13: map wi0 0/0 -> 0/32

[Access]
telnet        : ALL
monitor       : ALL
ssh           : ALL

[SYSLOG]
syslog        : disable
host          : 172.30.100.1
facility/level : */emerg
facility/level : auth/info
facility/level : syslog/notice
facility/level : user/info

[Load]
load tftp    : disable
server       :
file         :

[SSH]
SSH Version      : 1
KeyAuthentication : yes
PasswdAuthentication : yes
$ show wireless status
NIC serial number:      [ AJA020302387 ]
Station name:          [ NetBSD_WaveLAN/IEEE_node ]
SSID for IBSS creation: [ NetBSD_IBSS ]
Current netname (SSID): [ NetBSD_IBSS ]
Desired netname (SSID): [ ]
Current BSSID:         [ 00:00:00:00:00:00 ]
Channel list:          [ 8191 ]
IBSS channel:          [ 1 ]
Current channel:       [ 1 ]

```

```

Comms quality/signal/noise:          [ 0 27 27 ]
Promiscuous mode:                    [ Off ]
Port type (1=BSS, 3=ad-hoc):        [ 3 ]
MAC address:                          [ 00:07:b5:00:26:14 ]
TX rate (selection):                  [ 11 ]
TX rate (actual speed):               [ 2 ]
Maximum data length:                  [ 2304 ]
RTS/CTS handshake threshold:          [ 2347 ]
Create IBSS:                          [ Off ]
Access point density:                 [ 1 ]
Power Mgmt (1=on, 0=off):            [ 0 ]
Max sleep time:                       [ 100 ]
WEP encryption:                       [ Off ]
TX encryption key:                    [ 1 ]
Encryption keys:                      [ ][ ][ ][ ]
$

```

(4) RGW (D)—Post office

```

#
# Setup file saved by command line shell.
#   Fri Aug 30 04:13:39 2002
#
hostname rgw
ip address ne0 192.168.1.254 255.255.255.0
ip address wi0 192.168.100.1 255.255.255.0
ip route delete default
ip route add default 192.168.1.1
ip route add 192.168.2.0 255.255.255.0 192.168.100.2
ip route add 192.168.3.0 255.255.255.0 192.168.100.2
ip route add 192.168.4.0 255.255.255.0 192.168.100.3
ip route add 192.168.101.0 255.255.255.0 192.168.100.2
wireless channel 1
wireless txrate 11
wireless wep encryption disable
wireless wep key use 1
wireless port 3
wireless ssid NetBSD_IBSS
wireless station NetBSD_WaveLAN/IEEE_node
rip disable
rip static-supply disable
rip action ne0 supply
rip version ne0 ripv2
rip action wi0 supply
rip version wi0 ripv2
snmp enable
snmp community public
snmp location Root Inc. 2F KS Bldg. 1-17-8 Nishikata Bunkyo-ku Tokyo Japan
snmp contact Phone:+81-3-5840-7601 E-mail:support@root-hq.com
dhcp pool 192.168.1.10 192.168.1.50
dhcp expire 3600
dhcp dns add 202.188.0.133
dhcp dns add 202.188.1.5
dhcp domain
dhcp defaultroute 192.168.1.1
dhcp relay disable
dhcp enable

```



```

filter disable
nat disable
nat add map 11 wi0 0/0 -> 0/32 proxy port ftp ftp/tcp
nat add map 12 wi0 0/0 -> 0/32 portmap tcp/udp auto
nat add map 13 wi0 0/0 -> 0/32
ip icmp redirect disable
access telnet all
access monitor all
access ssh all
syslog disable
syslog host 172.30.100.1
syslog add * emerg
syslog add auth info
syslog add syslog notice
syslog add user info
ssh version v1
ssh authentication both
wireless BSS AP mode disable
$ show setup

```

[Hostname]

```
rgw
```

[IP address]

Interface	IPAddress	Netmask
ne0	192.168.1.254	255.255.255.0
wi0	192.168.100.1	255.255.255.0

[Static ARP]

IPAddress	MACAddress
-----------	------------

[Static Routes]

Destination	Netmask	Gateway	Info
default		192.168.1.1	Static
192.168.2.0	255.255.255.0	192.168.100.2	Static
192.168.3.0	255.255.255.0	192.168.100.2	Static
192.168.4.0	255.255.255.0	192.168.100.3	Static
192.168.101.0	255.255.255.0	192.168.100.2	Static

[ICMP]

```
redirect : disable
```

[Wireless LAN settings]

```

Channel          : 1 (2412MHz)
TX rate         : 11 (11->2->1Mbps)
Port type       : ad-hoc
SSID            : NetBSD_IBSS
IBSS Network    :
Station         : NetBSD_WaveLAN/IEEE_node
WEP encryption  : Off
TX encryption key : 1
Encryption key 1 :
Encryption key 2 :
Encryption key 3 :
Encryption key 4 :

```

```
[Wireless AP]
  wireless BSS AP mode : disable

[RIP]
  rip          : disable
  static supply : disable
  ne0         : RIPv2, supply
  wi0         : RIPv2, supply

[SNMP]
  snmp        : enable
  access      : ALL
  community   : public
  syslocation : Root Inc. 2F KS Bldg. 1-17-8 Nishikata Bunkyo-ku Tokyo Japan
  syscontact  : Phone:+81-3-5840-7601 E-mail:support@root-hq.com
  trapsink    : disable
  trap2sink   : disable
  informsink  : disable

[DHCP]
  dhcp        : ne0
  pool        : 192.168.1.10 - 192.168.1.50
  expire      : 3600 sec
  DNS         : 202.188.0.133 202.188.1.5
  domain      :
  default route: 192.168.1.1
  relay       : disable

[Filter]
  filter: disable

[NAT]
  nat: disable

    11: map wi0 0/0 -> 0/32 proxy port ftp ftp/tcp
    12: map wi0 0/0 -> 0/32 portmap tcp/udp auto
    13: map wi0 0/0 -> 0/32

[Access]
  telnet : ALL
  monitor : ALL
  ssh    : ALL

[SYSLOG]
  syslog        : disable
  host          : 172.30.100.1
  facility/level : */emerg
  facility/level : auth/info
  facility/level : syslog/notice
  facility/level : user/info

[Load]
  load tftp : disable
  server    :
  file      :
```

```

[SSH]
  SSH Version          : 1
  KeyAuthentication   : yes
  PasswdAuthentication : yes
$ show wireless status
NIC serial number:      [ AJA020302366 ]
Station name:          [ NetBSD_WaveLAN/IEEE_node ]
SSID for IBSS creation: [ NetBSD_IBSS ]
Current netname (SSID): [ NetBSD_IBSS ]
Desired netname (SSID): [   ]
Current BSSID:         [ 00:00:00:00:00:00 ]
Channel list:          [ 8191 ]
IBSS channel:          [ 1 ]
Current channel:       [ 1 ]
Comms quality/signal/noise: [ 0 27 27 ]
Promiscuous mode:     [ Off ]
Port type (1=BSS, 3=ad-hoc): [ 3 ]
MAC address:          [ 00:07:b5:00:25:ff ]
TX rate (selection):   [ 11 ]
TX rate (actual speed): [ 2 ]
Maximum data length:   [ 2304 ]
RTS/CTS handshake threshold: [ 2347 ]
Create IBSS:          [ Off ]
Access point density:  [ 1 ]
Power Mgmt (1=on, 0=off): [ 0 ]
Max sleep time:       [ 100 ]
WEP encryption:       [ Off ]
TX encryption key:    [ 1 ]
Encryption keys:      [ ][ ][ ][ ]
$

```

(5) RGW (D) – Post Office

```

#
# Setup file saved by command line shell.
#   Fri Aug 30 04:13:39 2002
#
hostname rgw
ip address ne0 192.168.1.254 255.255.255.0
ip address wi0 192.168.100.1 255.255.255.0
ip route delete default
ip route add default 192.168.1.1
ip route add 192.168.2.0 255.255.255.0 192.168.100.2
ip route add 192.168.3.0 255.255.255.0 192.168.100.2
ip route add 192.168.4.0 255.255.255.0 192.168.100.3
ip route add 192.168.101.0 255.255.255.0 192.168.100.2
wireless channel 1
wireless txrate 11
wireless wep encryption disable
wireless wep key use 1
wireless port 3
wireless ssid NetBSD_IBSS
wireless station NetBSD_WaveLAN/IEEE_node
rip disable
rip static-supply disable
rip action ne0 supply
rip version ne0 ripv2

```

```

rip action wi0 supply
rip version wi0 ripv2
snmp enable
snmp community public
snmp location Root Inc. 2F KS Bldg. 1-17-8 Nishikata Bunkyo-ku Tokyo Japan
snmp contact Phone:+81-3-5840-7601 E-mail:support@root-hq.com
dhcp pool 192.168.1.10 192.168.1.50
dhcp expire 3600
dhcp dns add 202.188.0.133
dhcp dns add 202.188.1.5
dhcp domain
dhcp defaultroute 192.168.1.1
dhcp relay disable
dhcp enable
filter disable
nat disable
nat add map 11 wi0 0/0 -> 0/32 proxy port ftp ftp/tcp
nat add map 12 wi0 0/0 -> 0/32 portmap tcp/udp auto
nat add map 13 wi0 0/0 -> 0/32
ip icmp redirect disable
access telnet all
access monitor all
access ssh all
syslog disable
syslog host 172.30.100.1
syslog add * emerg
syslog add auth info
syslog add syslog notice
syslog add user info
ssh version v1
ssh authentication both
wireless BSS AP mode disable
$ show setup

```

[Hostname]

rgw

[IP address]

Interface	IPaddress	Netmask
ne0	192.168.1.254	255.255.255.0
wi0	192.168.100.1	255.255.255.0

[Static ARP]

IPaddress	MACaddress

[Static Routes]

Destination	Netmask	Gateway	Info
default		192.168.1.1	Static
192.168.2.0	255.255.255.0	192.168.100.2	Static
192.168.3.0	255.255.255.0	192.168.100.2	Static
192.168.4.0	255.255.255.0	192.168.100.3	Static
192.168.101.0	255.255.255.0	192.168.100.2	Static

[ICMP]

redirect : disable

```
[Wireless LAN settings]
Channel          : 1 (2412MHz)
TX rate         : 11 (11->2->1Mbps)
Port type       : ad-hoc
SSID            : NetBSD_IBSS
IBSS Network    :
Station         : NetBSD_WaveLAN/IEEE_node
WEP encryption  : Off
TX encryption key : 1
Encryption key 1 :
Encryption key 2 :
Encryption key 3 :
Encryption key 4 :

[Wireless AP]
wireless BSS AP mode : disable

[RIP]
rip              : disable
static supply   : disable
ne0              : RIPv2, supply
wi0              : RIPv2, supply

[SNMP]
snmp            : enable
access         : ALL
community      : public
syslocation    : Root Inc. 2F KS Bldg. 1-17-8 Nishikata Bunkyo-ku Tokyo Japan
syscontact     : Phone:+81-3-5840-7601 E-mail:support@root-hq.com
trapsink       : disable
trap2sink      : disable
informsink     : disable

[DHCP]
dhcp           : ne0
pool           : 192.168.1.10 - 192.168.1.50
expire        : 3600 sec
DNS            : 202.188.0.133 202.188.1.5
domain         :
default route : 192.168.1.1
relay          : disable

[Filter]
filter: disable

[NAT]
nat: disable

    11: map wi0 0/0 -> 0/32 proxy port ftp ftp/tcp
    12: map wi0 0/0 -> 0/32 portmap tcp/udp auto
    13: map wi0 0/0 -> 0/32

[Access]
telnet  : ALL
monitor : ALL
ssh     : ALL
```

```

[SYSLOG]
  syslog          : disable
  host            : 172.30.100.1
  facility/level : */emerg
  facility/level : auth/info
  facility/level : syslog/notice
  facility/level : user/info

[Load]
  load tftp : disable
  server    :
  file      :

[SSH]
  SSH Version          : 1
  KeyAuthentication   : yes
  PasswdAuthentication : yes
$ show wireless status
NIC serial number:          [ AJA020302366 ]
Station name:              [ NetBSD_WaveLAN/IEEE_node ]
SSID for IBSS creation:    [ NetBSD_IBSS ]
Current netname (SSID):    [ NetBSD_IBSS ]
Desired netname (SSID):    [ ]
Current BSSID:             [ 00:00:00:00:00:00 ]
Channel list:              [ 8191 ]
IBSS channel:              [ 1 ]
Current channel:           [ 1 ]
Comms quality/signal/noise: [ 0 27 27 ]
Promiscuous mode:         [ Off ]
Port type (1=BSS, 3=ad-hoc): [ 3 ]
MAC address:               [ 00:07:b5:00:25:ff ]
TX rate (selection):       [ 11 ]
TX rate (actual speed):    [ 2 ]
Maximum data length:       [ 2304 ]
RTS/CTS handshake threshold: [ 2347 ]
Create IBSS:               [ Off ]
Access point density:      [ 1 ]
Power Mgmt (1=on, 0=off):  [ 0 ]
Max sleep time:            [ 100 ]
WEP encryption:            [ Off ]
TX encryption key:         [ 1 ]
Encryption keys:           [ ][ ][ ][ ]
$

```

(6) RGW (E) - Library

```

show config
#
# Setup file saved by command line shell.
#   Fri Aug 30 04:29:36 2002
#
hostname rgw
ip address ne0 192.168.4.254 255.255.255.0
ip address wi0 192.168.100.3 255.255.255.0
ip route delete default
ip route add default 192.168.100.1
ip route add 192.168.2.0 255.255.255.0 192.168.100.1
ip route add 192.168.3.0 255.255.255.0 192.168.100.1

```

```

ip route add 192.168.100.2 192.168.100.1
ip route add 192.168.101.0 255.255.255.0 192.168.100.1
wireless channel 1
wireless txrate 11
wireless wep encryption disable
wireless wep key use 1
wireless port 3
wireless ssid NetBSD_IBSS
wireless station NetBSD_WaveLAN/IEEE_node
rip disable
rip static-supply disable
rip action ne0 supply
rip version ne0 ripv2
rip action wi0 supply
rip version wi0 ripv2
snmp enable
snmp community public
snmp location Root Inc. 2F KS Bldg. 1-17-8 Nishikata Bunkyo-ku Tokyo Japan
snmp contact Phone:+81-3-5840-7601 E-mail:support@root-hq.com
dhcp pool 192.168.4.10 192.168.4.50
dhcp expire 3600
dhcp dns add 202.188.0.133
dhcp dns add 202.188.1.5
dhcp domain
dhcp defaultroute 192.168.4.254
dhcp relay disable
dhcp enable
filter disable
nat disable
nat add map 11 wi0 0/0 -> 0/32 proxy port ftp ftp/tcp
nat add map 12 wi0 0/0 -> 0/32 portmap tcp/udp auto
nat add map 13 wi0 0/0 -> 0/32
ip icmp redirect enable
access telnet all
access monitor all
access ssh all
syslog disable
syslog host 172.30.100.1
syslog add * emerg
syslog add auth info
syslog add syslog notice
syslog add user info
ssh version v1
ssh authentication both
wireless BSS AP mode disable
$ show setup

```

[Hostname]

rgw

[IP address]

Interface	IPaddress	Netmask
ne0	192.168.4.254	255.255.255.0
wi0	192.168.100.3	255.255.255.0

[Static ARP]

IPAddress	MACAddress

[Static Routes]

Destination	Netmask	Gateway	Info

default		192.168.100.1	Static
192.168.2.0	255.255.255.0	192.168.100.1	Static
192.168.3.0	255.255.255.0	192.168.100.1	Static
192.168.100.2	255.255.255.255	192.168.100.1	Static
192.168.101.0	255.255.255.0	192.168.100.1	Static

[ICMP]

redirect : enable

[Wireless LAN settings]

Channel : 1 (2412MHz)
 TX rate : 11 (11->2->1Mbps)
 Port type : ad-hoc
 SSID : NetBSD_IBSS
 IBSS Network :
 Station : NetBSD_WaveLAN/IEEE_node
 WEP encryption : Off
 TX encryption key : 1
 Encryption key 1 :
 Encryption key 2 :
 Encryption key 3 :
 Encryption key 4 :

[Wireless AP]

wireless BSS AP mode : disable

[RIP]

rip : disable
 static supply : disable
 ne0 : RIPv2, supply
 wi0 : RIPv2, supply

[SNMP]

snmp : enable
 access : ALL
 community : public
 syslocation : Root Inc. 2F KS Bldg. 1-17-8 Nishikata Bunkyo-ku Tokyo Japan
 syscontact : Phone:+81-3-5840-7601 E-mail:support@root-hq.com
 trapsink : disable
 trap2sink : disable
 informsink : disable

[DHCP]

dhcp : ne0
 pool : 192.168.4.10 - 192.168.4.50
 expire : 3600 sec
 DNS : 202.188.0.133 202.188.1.5
 domain :
 default route: 192.168.4.254
 relay : disable


```

[Filter]
  filter: disable

[NAT]
  nat: disable

      11: map wi0 0/0 -> 0/32 proxy port ftp ftp/tcp
      12: map wi0 0/0 -> 0/32 portmap tcp/udp auto
      13: map wi0 0/0 -> 0/32

[Access]
  telnet : ALL
  monitor : ALL
  ssh : ALL

[SYSLOG]
  syslog : disable
  host : 172.30.100.1
  facility/level : */emerg
  facility/level : auth/info
  facility/level : syslog/notice
  facility/level : user/info

[Load]
  load tftp : disable
  server :
  file :

[SSH]
  SSH Version : 1
  KeyAuthentication : yes
  PasswdAuthentication : yes
$ show s wireless status
NIC serial number: [ AJA020301219 ]
Station name: [ NetBSD_WaveLAN/IEEE_node ]
SSID for IBSS creation: [ NetBSD_IBSS ]
Current netname (SSID): [ NetBSD_IBSS ]
Desired netname (SSID): [ ]
Current BSSID: [ 00:00:00:00:00:00 ]
Channel list: [ 8191 ]
IBSS channel: [ 1 ]
Current channel: [ 1 ]
Comms quality/signal/noise: [ 0 27 27 ]
Promiscuous mode: [ Off ]
Port type (1=BSS, 3=ad-hoc): [ 3 ]
MAC address: [ 00:07:b5:00:21:84 ]
TX rate (selection): [ 11 ]
TX rate (actual speed): [ 2 ]
Maximum data length: [ 2304 ]
RTS/CTS handshake threshold: [ 2347 ]
Create IBSS: [ Off ]
Access point density: [ 1 ]
Power Mgmt (1=on, 0=off): [ 0 ]
Max sleep time: [ 100 ]
WEP encryption: [ Off ]
TX encryption key: [ 1 ]
Encryption keys: [ ][ ][ ][ ]
$

```

(7) CISCO 805 IP ROUTER Configuration

```

Current configuration : 1769 bytes
!
version 12.2
no parser cache
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime

```

```

service password-encryption
!
hostname Router
!
boot system flash c805-sy6-mw.122-2.T.bin
logging rate-limit console 10 except errors
enable secret 5 $1$QRlB$grLiEiyJOI2.1yujdqYxK0
!
username Router password 7 107E080A16001D1908
ip subnet-zero
no ip source-route
!
no ip domain-lookup
no ip dhcp-client network-discovery
!
!
interface Ethernet0
 ip address 192.168.1.1 255.255.255.0
 ip access-group 121 in
 no ip proxy-arp
 ip nat inside
!
interface Serial0
 description ISP
 ip address 210.187.59.234 255.255.255.252
 no ip proxy-arp
 ip nat outside
!
ip nat inside source list 18 interface Serial0 overload
ip http server
ip classless
ip route 0.0.0.0 0.0.0.0 Serial0
ip route 0.0.0.0 0.0.0.0 192.168.1.254
ip route 192.168.2.0 255.255.255.0 192.168.1.254
ip route 192.168.3.0 255.255.255.0 192.168.1.254
ip route 192.168.4.0 255.255.255.0 192.168.1.254
ip route 192.168.100.0 255.255.255.0 192.168.1.254
ip route 192.168.101.0 255.255.255.0 192.168.1.254
!
access-list 18 permit 0.0.0.254 255.255.255.0
access-list 18 permit 0.0.0.253 255.255.255.0
access-list 18 permit 192.168.1.0 0.0.0.255
access-list 18 permit 192.168.2.0 0.0.0.255
access-list 18 permit 192.168.3.0 0.0.0.255
access-list 18 permit 192.168.4.0 0.0.0.255
access-list 121 deny    udp any eq netbios-dgm any
access-list 121 deny    udp any eq netbios-ns any
access-list 121 deny    udp any eq netbios-ss any
access-list 121 deny    tcp any eq 137 any
access-list 121 deny    tcp any eq 138 any
access-list 121 deny    tcp any eq 139 any
access-list 121 permit ip any any
!
!
!
line con 0
 exec-timeout 120 0
 stopbits 1
line vty 0 4
 exec-timeout 0 0
 login local
!
end

```

A.4.4 Ping Test Results

```

> ping 192.168.4.254
PING 192.168.4.254 (192.168.4.254): 56 data bytes

```

```

64 bytes from 192.168.4.254: icmp_seq=0 ttl=255 time=0.003 ms
64 bytes from 192.168.4.254: icmp_seq=1 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=2 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=3 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=4 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=5 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=6 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=7 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=8 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=9 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=10 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=11 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=12 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=13 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=14 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=15 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=16 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=17 ttl=255 time=0.011 ms
64 bytes from 192.168.4.254: icmp_seq=18 ttl=255 time=0.011 ms

```

```

----192.168.4.254 PING Statistics----
19 packets transmitted, 19 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 0.003/0.011/0.011/0.002 ms

```

(1) Post Office (D) to Community Hall (C)

```

> ping 192.168.2.254
PING 192.168.2.254 (192.168.2.254): 56 data bytes
64 bytes from 192.168.2.254: icmp_seq=1 ttl=255 time=0.011 ms
64 bytes from 192.168.2.254: icmp_seq=2 ttl=255 time=0.011 ms
64 bytes from 192.168.2.254: icmp_seq=3 ttl=255 time=0.011 ms
64 bytes from 192.168.2.254: icmp_seq=4 ttl=255 time=0.011 ms
64 bytes from 192.168.2.254: icmp_seq=5 ttl=255 time=0.011 ms
64 bytes from 192.168.2.254: icmp_seq=6 ttl=255 time=0.011 ms
64 bytes from 192.168.2.254: icmp_seq=7 ttl=255 time=0.011 ms
64 bytes from 192.168.2.254: icmp_seq=8 ttl=255 time=0.011 ms
64 bytes from 192.168.2.254: icmp_seq=9 ttl=255 time=0.011 ms
64 bytes from 192.168.2.254: icmp_seq=10 ttl=255 time=0.011 ms
64 bytes from 192.168.2.254: icmp_seq=11 ttl=255 time=0.011 ms
64 bytes from 192.168.2.254: icmp_seq=12 ttl=255 time=0.011 ms
64 bytes from 192.168.2.254: icmp_seq=13 ttl=255 time=0.011 ms
64 bytes from 192.168.2.254: icmp_seq=14 ttl=255 time=0.011 ms
64 bytes from 192.168.2.254: icmp_seq=15 ttl=255 time=0.011 ms

```

```

----192.168.2.254 PING Statistics----
16 packets transmitted, 16 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 0.003/0.010/0.011/0.002 ms

```

Post Office (D) to Community Hall (B)

```

> ping 192.168.2.253
PING 192.168.2.253 (192.168.2.253): 56 data bytes
64 bytes from 192.168.2.253: icmp_seq=0 ttl=254 time=15.618 ms
64 bytes from 192.168.2.253: icmp_seq=1 ttl=254 time=0.011 ms
64 bytes from 192.168.2.253: icmp_seq=2 ttl=254 time=0.011 ms
64 bytes from 192.168.2.253: icmp_seq=3 ttl=254 time=0.011 ms
64 bytes from 192.168.2.253: icmp_seq=4 ttl=254 time=0.011 ms
64 bytes from 192.168.2.253: icmp_seq=5 ttl=254 time=0.011 ms
64 bytes from 192.168.2.253: icmp_seq=6 ttl=254 time=0.011 ms
64 bytes from 192.168.2.253: icmp_seq=7 ttl=254 time=0.011 ms
64 bytes from 192.168.2.253: icmp_seq=8 ttl=254 time=0.011 ms

```

```
64 bytes from 192.168.2.253: icmp_seq=9 ttl=254 time=0.011 ms
64 bytes from 192.168.2.253: icmp_seq=10 ttl=254 time=0.011 ms
64 bytes from 192.168.2.253: icmp_seq=11 ttl=254 time=0.011 ms
64 bytes from 192.168.2.253: icmp_seq=12 ttl=254 time=0.011 ms
64 bytes from 192.168.2.253: icmp_seq=13 ttl=254 time=0.011 ms
64 bytes from 192.168.2.253: icmp_seq=14 ttl=254 time=0.011 ms
64 bytes from 192.168.2.253: icmp_seq=15 ttl=254 time=0.011 ms
64 bytes from 192.168.2.253: icmp_seq=16 ttl=254 time=0.011 ms
64 bytes from 192.168.2.253: icmp_seq=17 ttl=254 time=0.011 ms
64 bytes from 192.168.2.253: icmp_seq=18 ttl=254 time=0.011 ms
```

```
----192.168.2.253 PING Statistics----
```

```
19 packets transmitted, 19 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 0.011/0.832/15.618/3.580 ms
```

(2) District Office (A) to Post Office (D)

```
> ping 192.168.1.254
PING 192.168.1.254 (192.168.1.254): 56 data bytes
64 bytes from 192.168.1.254: icmp_seq=0 ttl=253 time=0.003 ms
64 bytes from 192.168.1.254: icmp_seq=1 ttl=253 time=0.011 ms
64 bytes from 192.168.1.254: icmp_seq=2 ttl=253 time=0.011 ms
64 bytes from 192.168.1.254: icmp_seq=3 ttl=253 time=0.011 ms
64 bytes from 192.168.1.254: icmp_seq=4 ttl=253 time=0.011 ms
64 bytes from 192.168.1.254: icmp_seq=5 ttl=253 time=0.011 ms
64 bytes from 192.168.1.254: icmp_seq=6 ttl=253 time=0.011 ms
64 bytes from 192.168.1.254: icmp_seq=7 ttl=253 time=0.011 ms
64 bytes from 192.168.1.254: icmp_seq=8 ttl=253 time=0.011 ms
64 bytes from 192.168.1.254: icmp_seq=9 ttl=253 time=0.011 ms
64 bytes from 192.168.1.254: icmp_seq=10 ttl=253 time=0.011 ms
64 bytes from 192.168.1.254: icmp_seq=11 ttl=253 time=0.011 ms
64 bytes from 192.168.1.254: icmp_seq=12 ttl=253 time=0.011 ms
64 bytes from 192.168.1.254: icmp_seq=13 ttl=253 time=0.011 ms
64 bytes from 192.168.1.254: icmp_seq=14 ttl=253 time=0.011 ms
64 bytes from 192.168.1.254: icmp_seq=15 ttl=253 time=0.011 ms
64 bytes from 192.168.1.254: icmp_seq=16 ttl=253 time=0.011 ms
64 bytes from 192.168.1.254: icmp_seq=17 ttl=253 time=0.011 ms

----192.168.1.254 PING Statistics----
43 packets transmitted, 43 packets received, 0.0% packet loss

> r> round-trip min/avg/max/stddev = 0.003/0.011/0.011/0.001 ms
```

A.5 Radio Frequency Survey

A.5.1 Frequency Survey

Frequency Survey shall be performed on existing microwave stations and newly built microwave stations after the Line-of-Sight Survey (LOS) (performed under the scope of work of Radio Path Survey) had been carried out for the proposed Microwave Link to determine the suitable antenna heights.

The main objective of this task is to determine whether a proposed Microwave Link using a certain frequency band is suitable for implementation from a Maximum Permissible Interference Level (MPIL) point of view.

Following equipment are necessary for conducting the Frequency Survey:

- (1) Standard Gain Horn Antennae (16dB) covering the frequency bands concerned. These standard Gain Horn Antennae are to be provided by SEL.
- (2) Low Noise Amplifiers (Minimum 20 dB Gain) covering the frequency bands concerned. The necessary Low Noise Amplifiers are to be provided by SEL.
- (3) Spectrum Analyzer to be provided by SEL.
- (4) Scope Camera and films to be provided by SEL.
- (5) Compass to be provided by SEL.

A telescopic mast is not included as existing high-rise structure (Building, Tower/Mast) is assumed to be available in all stations.

Following data are to be obtained and recorded during the survey :

Pictures of RF signal Spectrum detected by the Spectrum Analyzer.

- Azimuth of the RF source.
- RF level measured on Vertical and Horizontal Antenna polarization.
- RF signal frequency and bandwidth.

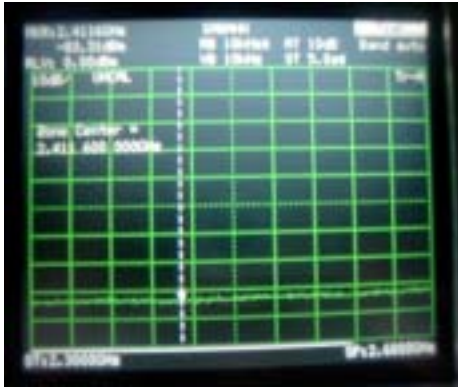
The above data, which represent the state of RF interference signals received at the station at the time of survey, shall be embodied in a Frequency Survey Report and submitted to the customer.

SEL shall not be responsible for any consequences due to any sporadic and/or new interference sources undetected during the Frequency Survey.

The Frequency Survey work will be performed by a highly qualified and experienced Transmission Engineer. Transportation shall be provided by the Customer.

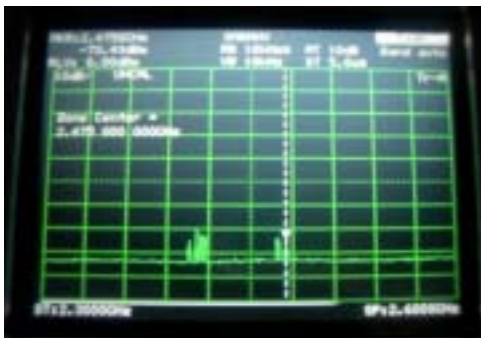
A.5.2 Survey Result

Survey results are shown in below:



Date: 26/09/2002
Frequency: 2.3 - 2.6 GHz
Polarization: V/H
Azimuth: 0 - 360 deg.
Note: Setup Gain=36 - 5=31

Interferes
 None detected at $-83-31=114$ dBm
 From 2.3 - 2.6 GHz at V/H polarization
 from all direction.



Date: 26/09/2002
Frequency: 2.3 - 2.6 GHz
Polarization: V
Azimuth: 90 deg.
Note: Setup Gain=36 - 5=31

Interferes
 None detected at $-83-31=114$ dBm
 From 2.3 - 2.6 GHz at V/H polarization
 from all direction.
 The signal detection were generated by the
 customer's wireless equipment.