

BAB V

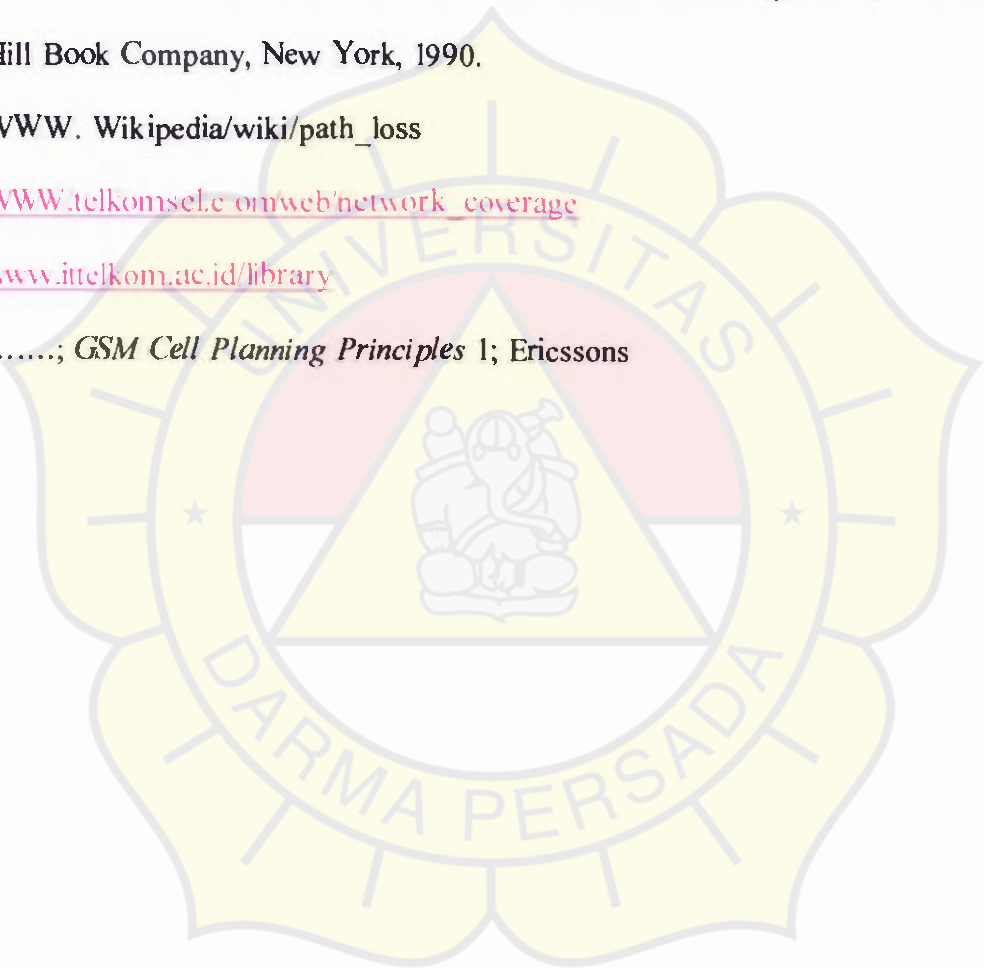
KESIMPULAN

Berdasarkan pembahasan yang telah dijelaskan pada bab –bab yang sebelumnya maka dapat disimpulkan sebagai berikut :

1. Dari hasil pengamatan *coverage area* jaringan maka diketahui wilayah Mak Kawing pada titik koordinat *Latitude* : N 0° 6' 37.8", *Longitude* E 110° 4' 29.6004" belum tercover oleh jaringan Telkomsel. Oleh karena itu perlu dibangun BTS baru untuk mengcover wilayah tersebut.
2. Dari hasil perhitungan luas cakupan site sebesar 25,70 km, maka didapat luas tiap sel sektornya sebesar 8,56 km.
3. Berdasarkan data lokasi, radius cakupan, standart penerimaan serta spesifikasi alat yang digunakan, maka daya yang dibutuhkan oleh BTS untuk mengcover MS adalah 42,12 dBm.
4. Dengan menggunakan standart GSM untuk MS kelas 4, maka daya pancar yang dibutuhkan dari MS ke BTS adalah - 75,76dBm. Nilai tersebut masih sesuai dengan besar *RX sensitivity* - 116 dBm.

DAFTAR PUSTAKA

1. Suhana, Ir, "Buku Pegangan Teknik Telekomunikasi, Jakarta
2. Lee, William C.Y, "*Mobile Cellular Telecommunication systems*", Mc Graw Hill Book Company, New York, 1990.
3. WWW. Wikipedia/wiki/path_loss
4. WWW.telkomsele.com/web/network_coverage
5. www.itelkom.ac.id/library
6.; *GSM Cell Planning Principles 1*; Ericssons

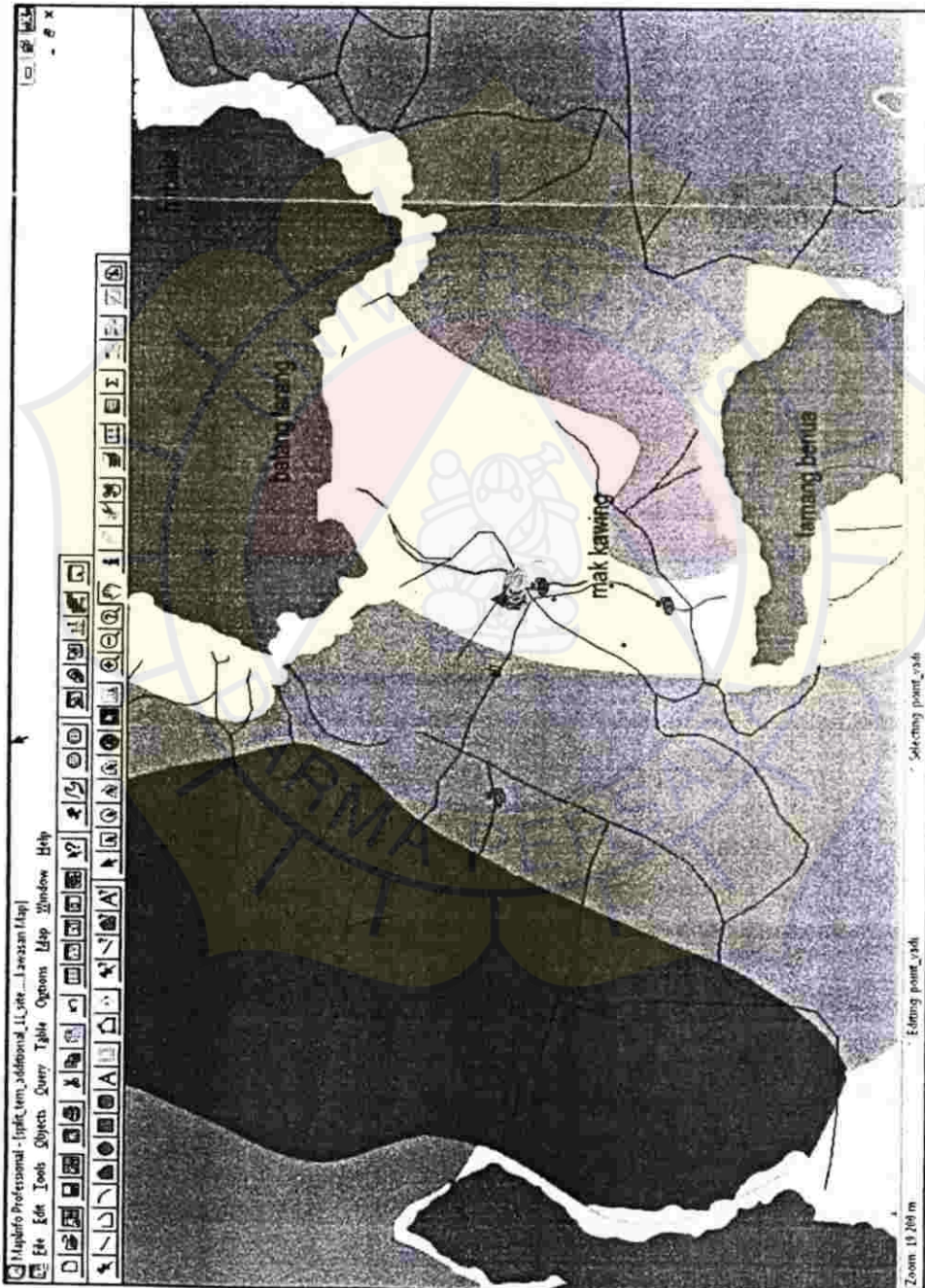




LAMPIRAN A

Identitas lokasi	: SAG193	Nama Lokasi	Mak Kawing ex Kampung TobaCP
(Site ID)		(Site name)	
Kandidat/Peringkat	: P / 2 of 4	Propinsi	Kal-Bar
(Candidate Rank)		(province)	
Execution Order (E.O)	:		

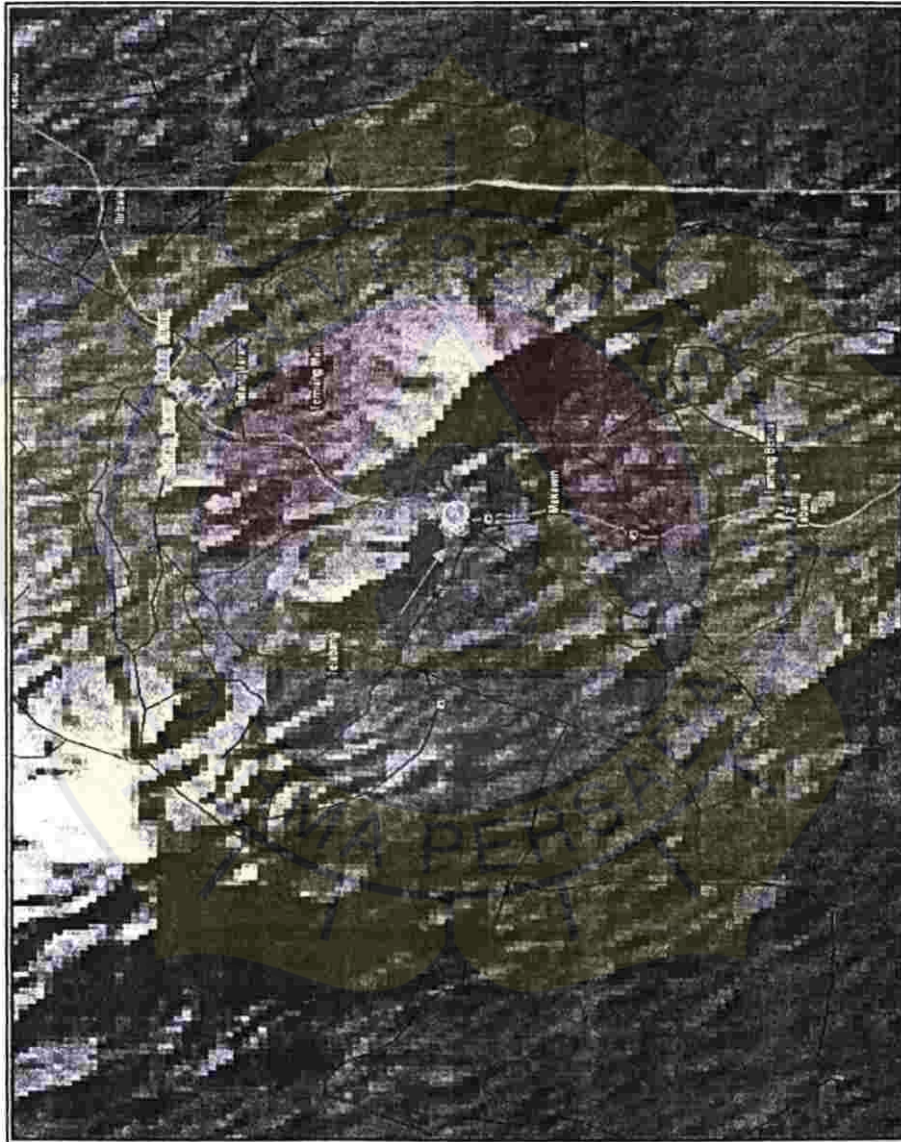
Coverage Area





Identitas lokasi <i>(Site ID)</i>	: SAG193	Nama Lokasi <i>(Site name)</i>	Mak Kawing ex Kampung Toba CP
Kandidat/Peringkat <i>(Candidate Rank)</i>	: P / 2 of 4	Propinsi <i>(province)</i>	Kal-Bar
Execution Order (E.O)	:		

Site Map/ Area Topograpy (menggunakan Peta Kontur)



Identitas lokasi <i>(Site ID)</i>	: SAG193	Nama Lokasi <i>(Site name)</i>	Mak Kawing ex Kampung Toba CP
Kandidat/Peringkat <i>(Candidate Rank)</i>	: P / 2 of 4	Propinsi <i>(province)</i>	Kal-Bar
Execution Order (E.O)	:		

NetAct Planner V6.0.0

Location: 2010.02.18

Kampung Toba-CP

Band Server

2010.02.18 11:28

Band Setup

Dist. Coverage

Coverage

100% 0 - 1000m Urban

75% 0 - 1000m Suburban

50% 0 - 1000m Rural

25% 0 - 1000m Open

10% 0 - 1000m Water

5% 0 - 1000m Mountain

1% 0 - 1000m Other

0% 0 - 1000m Unknown

0% 0 - 1000m Empty

0% 0 - 1000m Road

0% 0 - 1000m Power

0% 0 - 1000m Other

0% 0 - 1000m Other

0% 0 - 1000m Other

0% 0 - 1000m Other

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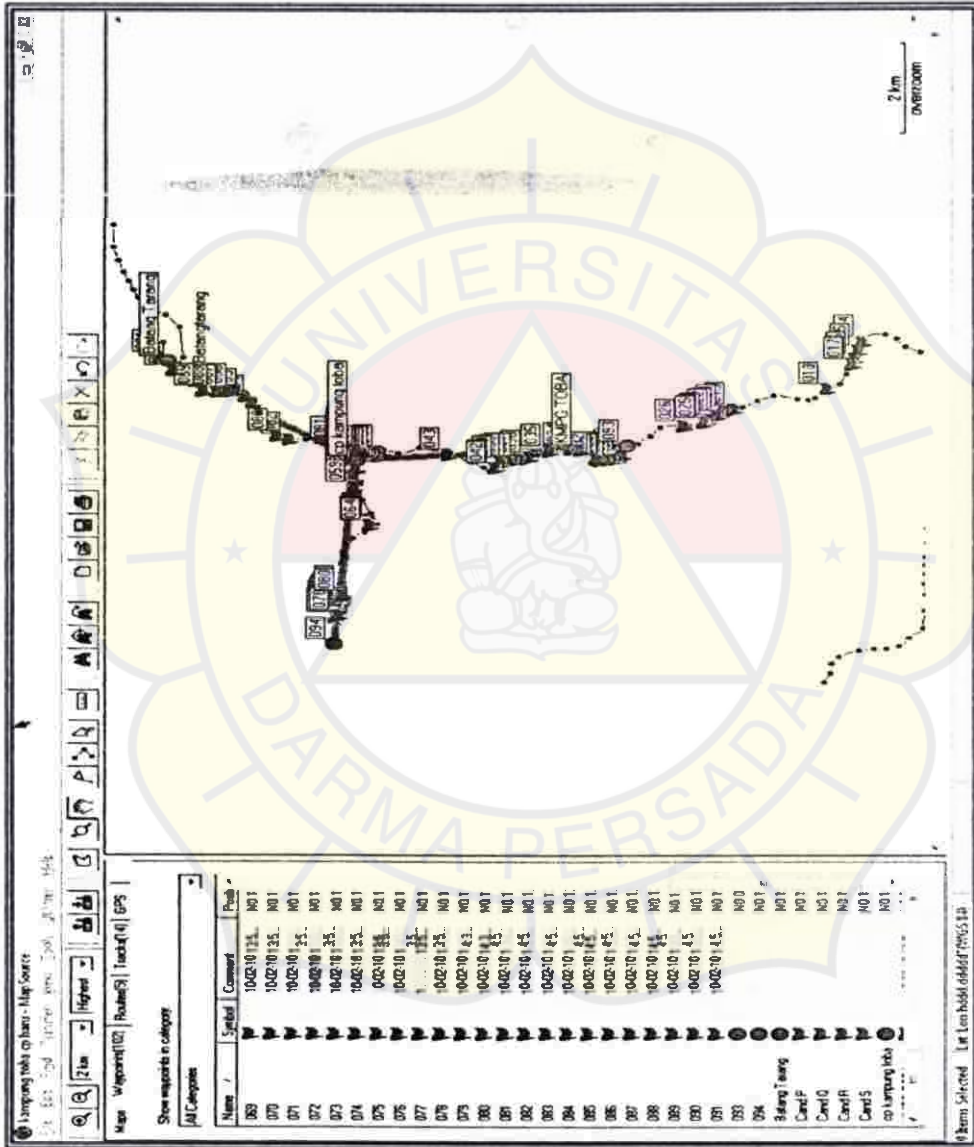




LAMPIRANC

Identitas lokasi <i>(Site ID)</i>	SA GI93	Nama Lokasi <i>(Site name)</i>	Mak Kawing ex Kampung Toba CP
Kandidat/Peringkat <i>(Candidate Rank)</i>	P / 2 of 4	Propinsi <i>(province)</i>	Kal-Bar
Execution Order (E.O)			

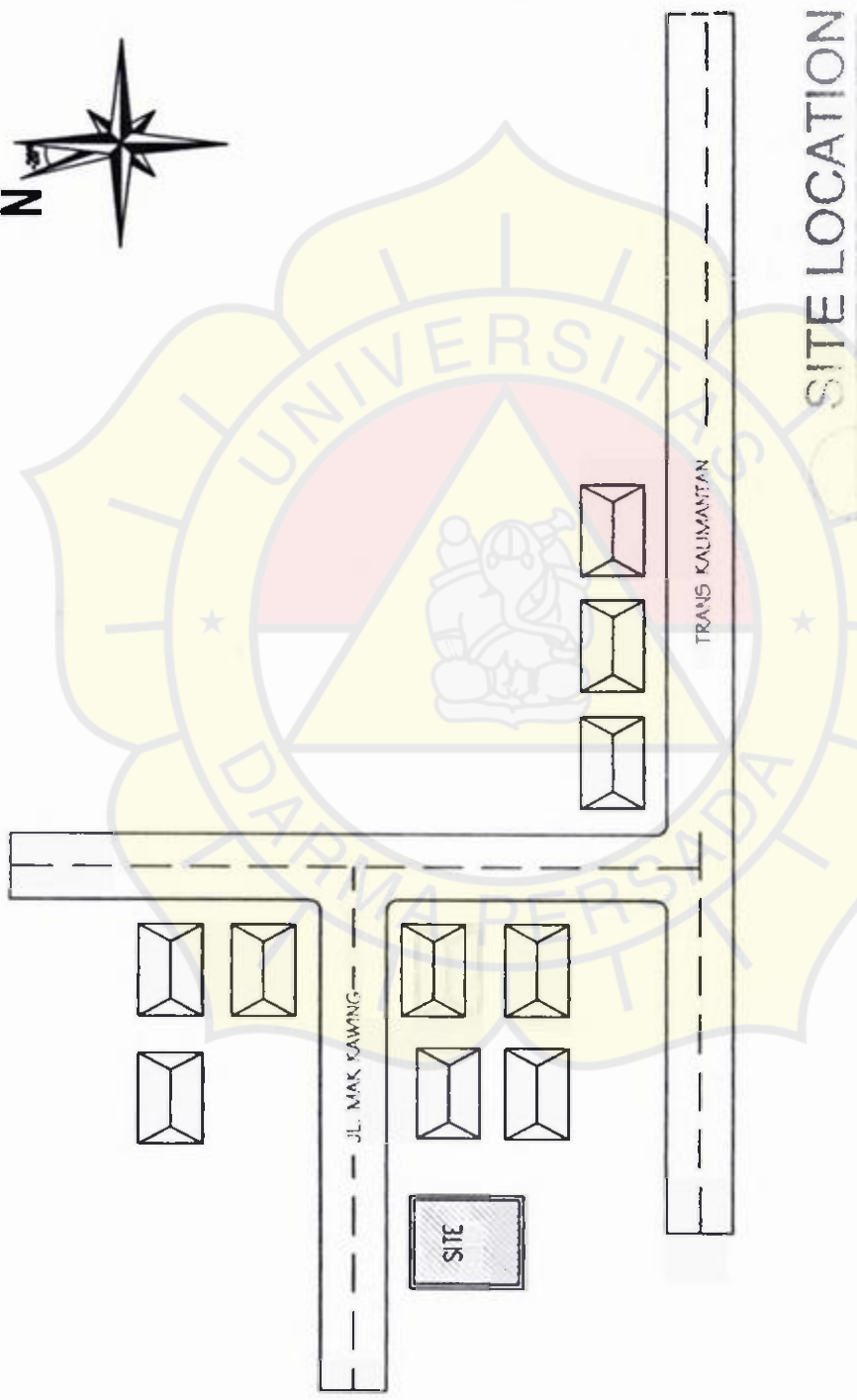
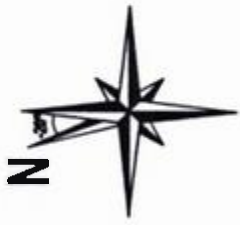
Tracking Map (menggunakan map source)





LAMPIRAND

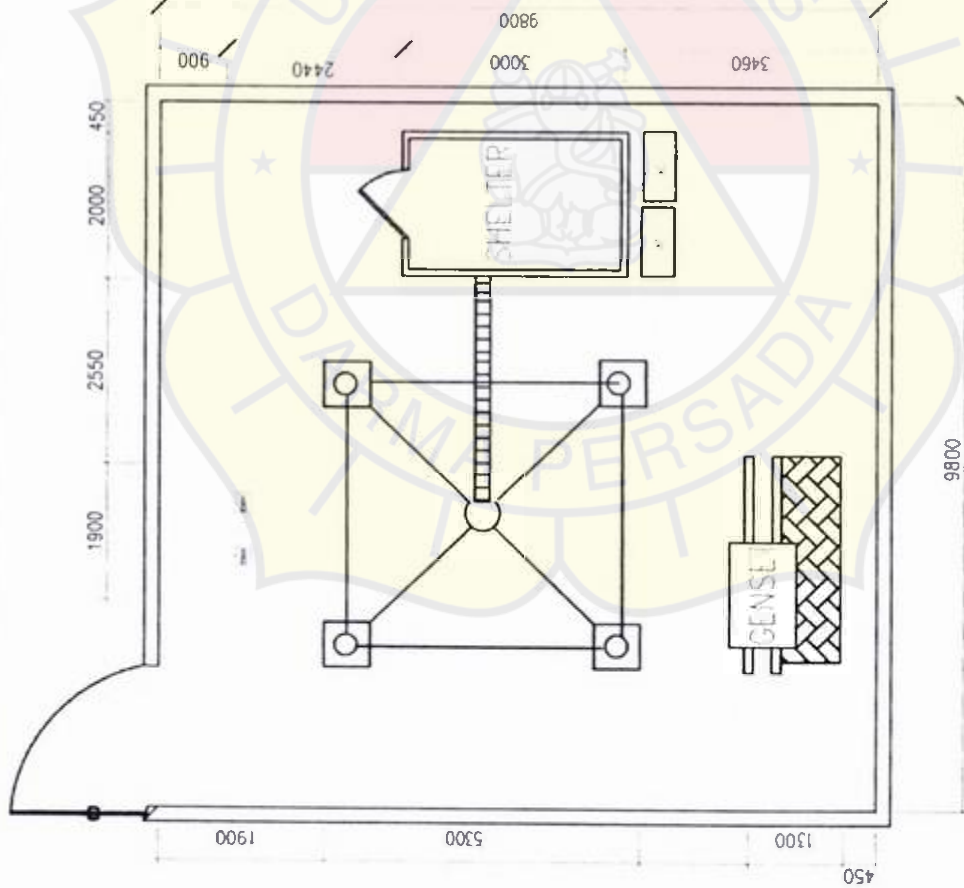
PT. GLOBAL SEJAHTERA BINA MANDIRI	
NEW SITE KALIMANTAN PROJECT	
KAMPUNG TOBA CP	
SITE LOCATION	



Note : 1. Net height 3000mm, Raised floor height 0mm
 2. Legend :

	NEW CABINET		Front		FUTURE CABINET		EXISTING CABINET
	Dptic cable		Power cable		Its cable		Network cable
	GPS cable		Clock cable				






SITE LAYOUT
SKALA 1:85

Note : 1. Net height 300mm, Raised floor height 0mm

2. Legend :

-  NEW CABINET
-  Front
-  FUTURE CABINET
-  EXISTING CABINET
-  Optic cable
-  Power cable
-  Data cable
-  Network cable
-  GPS cable
-  Clock cable

PT GLOBAL SEJAHTERA RINA
MANDIRI

NEW SITE KALAMANTAN PROJECT

KAMPUNG TOBA CP

SITE LAYOUT

REVISI

NO. DRAWING NUMBER

1/85

SHEET





NO. 101



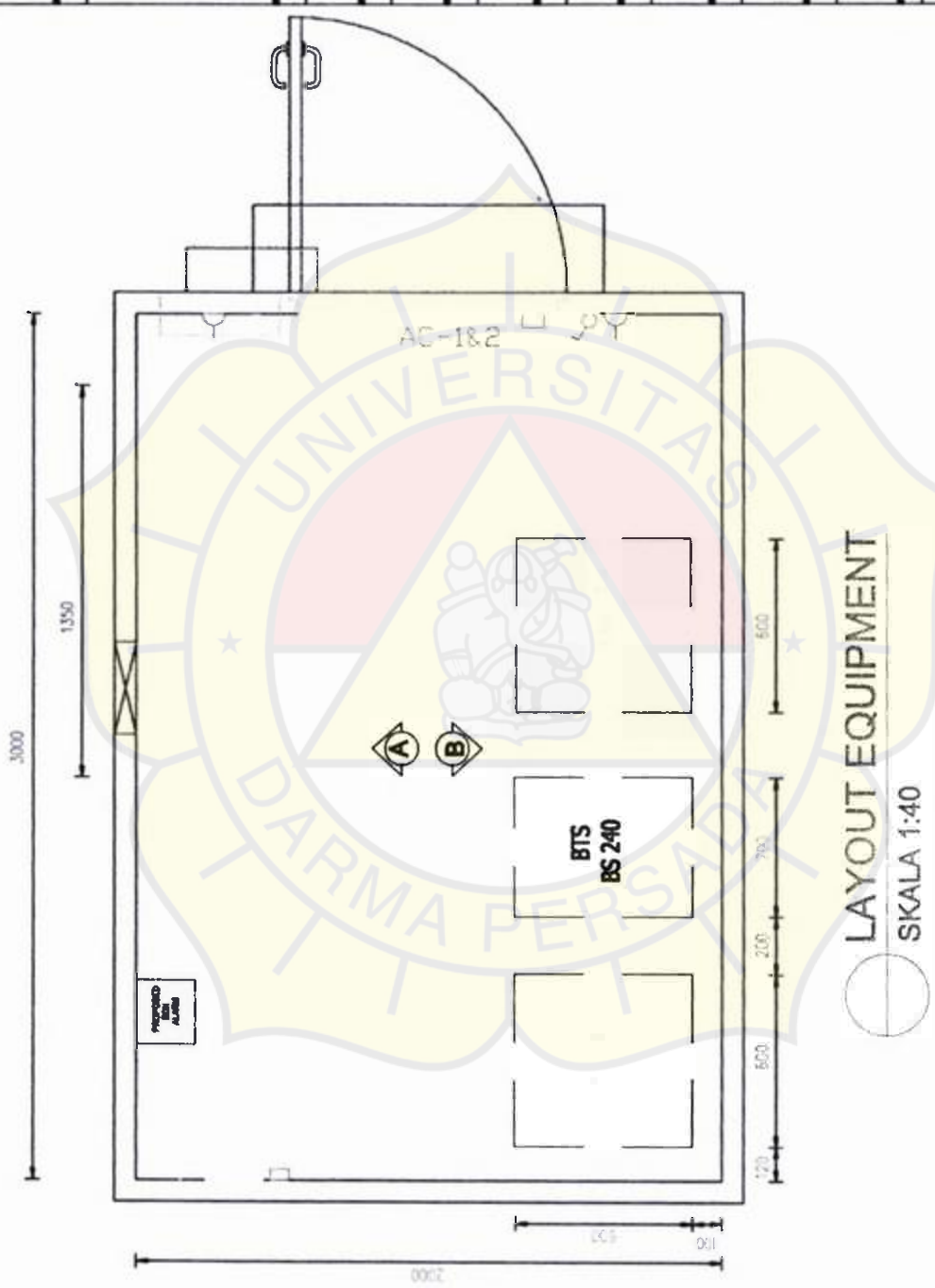
PT. CLOPPAL SEJAHTERA BINA WANDUPI

NEW SITE KALIMANTAN PROJECT

KAMPUNG TOGA CP

LAY OUT EQUIPMENT









1:40



LAYOUT EQUIPMENT
 SKALA 1:40

Note : 1. Net Height 3000mm, Raised floor height 0mm

2. Legend :

-  NEW CABINET
-  FUTURE CABINET
-  EXISTING CABINET
-  Power cable
-  Data cable
-  Network cable
-  GPS cable
-  Clock cable



NOTE

THOR : PT. NOKIA SIEMENS NETWORKS



CONTRACTOR :
PT. GLOBAL SAKHITERA BINA
MAHAR

CONSULTANT :

PROJECT NAME :
NEW SITE KALIMANTAN PROJECT

SITE NAME :
KAMPUNG TOSA CP

DRAWING TITLE :

CABLE TRAY

DRAWN BY :
KESRI

CHECKED BY :
TELKOMSEL

INDOOR

REVISIONS

DATE

CHANGE

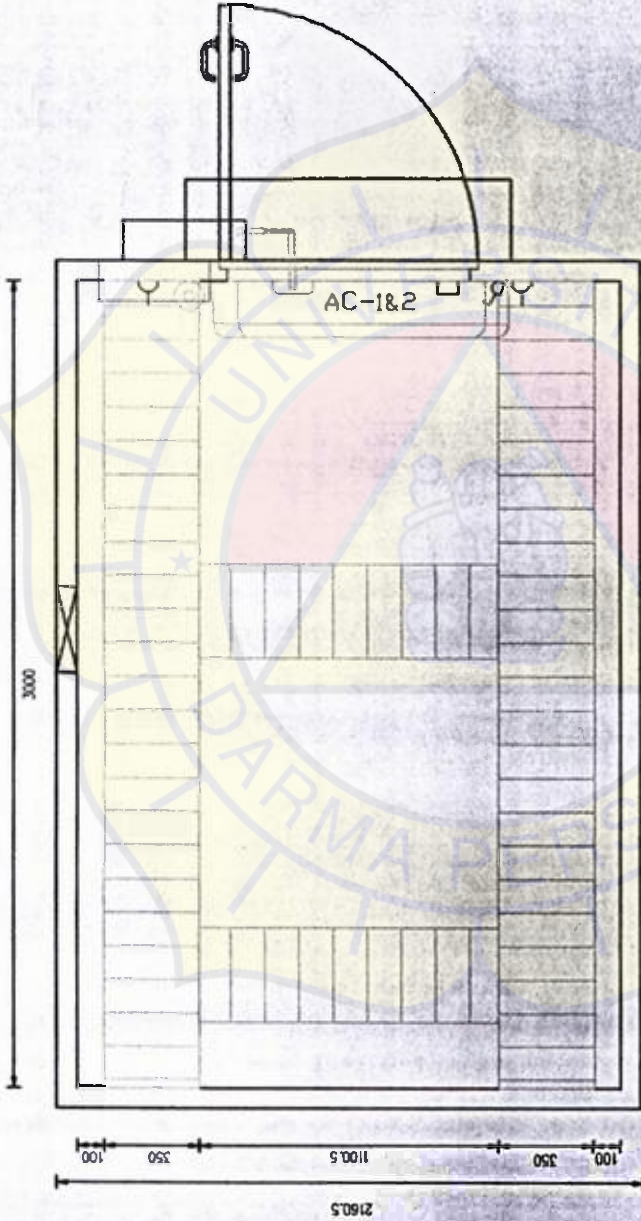
CHECKED

SCALE

DRAWING NUMBER

SHEET

120



LAYOUT EQUIPMENT CABLE TRAY

SKALA 1:20

Note : 1. Net height 300mm. Raised floor height 80mm

2. Legend :

NEW CABINET

▲ FUTURE CABINET

EXISTING CABINET

Optic cable

Power cable

In tra cable network cable

GPS cable

Dock cable





LAMPIRAN G



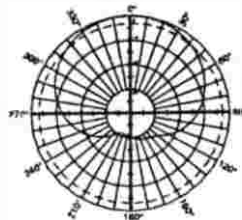
Kathrein's X-polarized antennas are designed for use in digital polarization diversity systems.

X-polarized (+45° and -45°).

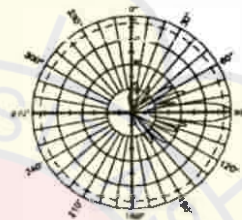
UV resistant fiberglass radomes.

Wideband vector dipole technology.

DC Grounded metallic parts for impulse suppression.



Horizontal pattern
±45° polarization



Vertical pattern
±45° polarization

General specifications:

Frequency range	806–960 MHz
VSWR	<1.5:1
Impedance	50 ohms
Intermodulation (2x20w)	IM3: <-150 dBc
Polarization	+45° and -45°
Maximum input power	500 watts per input (at 50°C)
Connector	2 x 7-16 DIN female
Isolation	>30 dB
Weight	37.5 lb (17 kg)
Dimensions	88.7 x 10.2 x 3.9 inches (2254 x 259 x 99 mm)
Wind load	at 93 mph (150kph)
Front/Side/Rear	178 lbf / 84 lbf / 246 lbf (790 N) / (370 N) / (1090 N)
Wind survival rating*	120 mph (200 kph)
Shipping dimensions	94.5 x 11.5 x 7.6 inches (2400 x 292 x 192 mm)
Mounting	Fixed and tilt mount options are available for 2 to 4.6 inch (50 to 115 mm) OD masts.

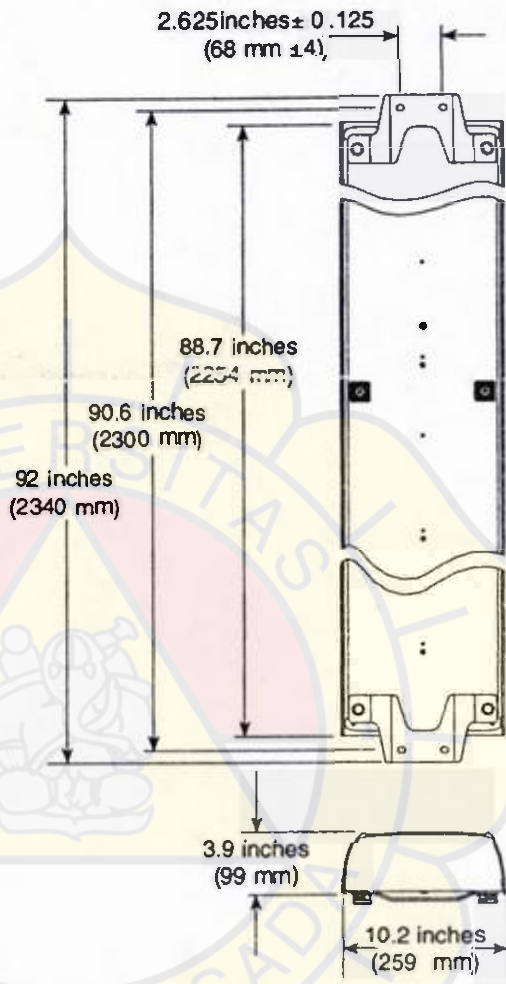
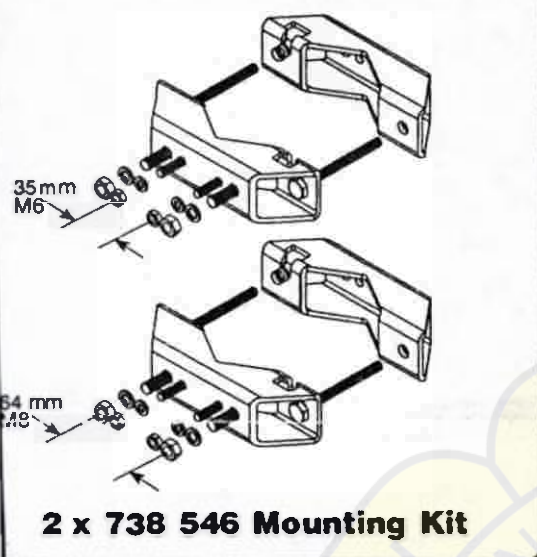
See reverse for order information.

Mechanical design is based on environmental conditions as stipulated in MIL-STD-883C (December 2009) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.

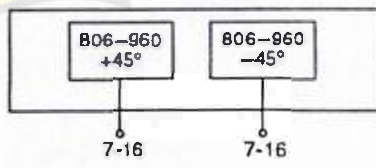
Specifications:	806–866 MHz	824–894 MHz	880–960 MHz
Gain	16.5 dBi	16.6 dBi	16.8 dBi
+45° and -45° polarization horizontal beamwidth	85° (half-power)	85° (half-power)	88° (half-power)
+45° and -45° polarization vertical beamwidth	8.7° (half-power)	8.5° (half-power)	8° (half-power)
Front-to-back ratio	>28 dB (co-polar)	>28 dB (co-polar)	>27 dB (co-polar)
Side lobe suppression for 1st sidelobe above horizon	>18 dB	>18 dB	>18 dB
Loss polar ratio			
in direction	0°	20 dB (typical)	20 dB (typical)
factor	±30°	>20 dB	>17 dB
factor	±60°	>15 dB	>14 dB



19-B
2852/c



Profile PC2



Options:

	Description
546	Mounting Kit for 2 to 4.6 inch (50 to 115 mm) OD mast.
8	Three-panel Sector Mounting Kit (120 deg. ea.) for 4.5 inch (114.3 mm) OD mast.
9	Three-panel Sector Mounting Kit (120 deg. ea.) for 5.5 inch (139.7 mm) OD mast.
13	Tilt Mount Kit 0-9 degrees down/tilt angle.

Options:

	Description
3	Antenna with 7-16 DIN connectors

Specifications are subject to change without notice. The latest specifications are available at www.kathrein-scala.com.

Kathrein Inc., Scala Division Post Office Box 4580 Medford, OR 97501 (USA) Phone: (541) 779-6500 Fax: (541) 779-3991
 Email: communications@kathrein.com Internet: www.kathrein-scala.com



LAMPIRAN I

7/8" Foam Dielectric, LDF Series - 50-ohm



LDF5-50A

Attenuation and Average Power

Description	Type No.
Cable Ordering Information	
Standard Cable	
7/8" Standard Cable, Standard Jacket	LDF5-50A
Fire Retardant Cable	
7/8" Fire Retardant Jacket (CATVR)	LDF5RN-50A
Low VSWR and Specialized Cables	
7/8" Low VSWR, specify operating band	LDF5P-50A-(**)

** insert suffix number from "Low VSWR Specifications" table, page 508.

Characteristics

Electrical	
Impedance, ohms	50 ± 1
Maximum Frequency, GHz	5.0
Velocity, percent	89
Peak Power Rating, kW	91
dc Resistance, ohms/1000 ft (1000 m)	
Inner	0.32 (1.05)
Outer	0.36 (1.18)
dc Breakdown, volts	6000
Jacket Spark, volts RMS	8000
Capacitance, pF/ft (m)	22.8 (75.0)
Inductance, µH/ft (m)	0.057 (0.187)
Mechanical	
Outer Conductor	Copper
Inner Conductor	Copper
Diameter over Jacket, in (mm)	1.09 (28)
Diameter over Copper Outer Conductor, in (mm)	0.98 (24.9)
Diameter Inner Conductor, in (mm)	0.355 (9.0)
Nominal Inside Transverse Dimensions, cm	2.11
Minimum Bending Radius, in (mm)	10 (250)
Number of Bends, minimum (typical)	15 (50)
Bending Moment, lb-ft (N-m)	12 (16.3)
Cable Weight, lb/ft (kg/m)	0.33 (0.49)
Tensile Strength, lb (kg)	325 (147)
Flat Plate Crush Strength, lb/in (kg/mm)	80 (1.4)

* A75-ohm 7/8" diameter cable is available. Contact Andrew for further information.

Frequency MHz	Attenuation dB/100 ft	Attenuation dB/100 m	Average Power, kW
0.5	0.025	0.081	91.0
1	0.035	0.115	78.6
1.5	0.043	0.141	64.1
2	0.050	0.163	55.5
10	0.112	0.366	24.6
20	0.159	0.521	17.3
30	0.195	0.641	14.1
50	0.254	0.833	10.8
88	0.340	1.12	8.08
100	0.364	1.19	7.56
108	0.378	1.24	7.26
150	0.449	1.47	6.12
174	0.486	1.59	5.66
200	0.523	1.72	5.26
300	0.649	2.13	4.24
400	0.758	2.49	3.63
450	0.808	2.65	3.41
500	0.855	2.81	3.22
512	0.866	2.84	3.17
600	0.945	3.10	2.91
700	1.03	3.37	2.67
800	1.11	3.63	2.48
824	1.13	3.69	2.44
894	1.18	3.87	2.34
960	1.23	4.02	2.24
1000	1.25	4.12	2.19
1250	1.42	4.67	1.93
1500	1.58	5.18	1.74
1700	1.70	5.56	1.62
1800	1.75	5.75	1.57
2000	1.86	6.11	1.48
2100	1.92	6.29	1.44
2200	1.97	6.46	1.40
2300	2.02	6.63	1.36
3000	2.37	7.76	1.16
3400	2.55	8.37	1.08
4000	2.81	9.23	0.978
5000	3.23	10.6	0.853

Standard Conditions:

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

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

ANDREW.

Customer Service Center - Call toll-free from: • U.S.A., Canada and Mexico 1-800-255-1479

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



LDF4-50A

Description	Type No.
-------------	----------

Cable Ordering Information

Standard Cable	
1/2" Standard Cable, Standard Jacket	LDF4-50A
Fire Retardant Cables	
1/2" Fire Retardant Jacket (CATVX)	LDF4RN-50A
1/2" Fire Retardant Jacket (CATVR)	LDF4RN-50A
Low VSWR and Specialized Cables	
1/2" Low VSWR, specify operating band	LDF4P-50A-(**)
Phase Stabilized and Phase Measured Cable	See page 590
Jumper Cable Assemblies - See page 584	

** insert suffix number from "Low VSWR Specifications" table, page 498

Characteristics

Electrical	
Impedance, ohms	50 ± 1
Maximum Frequency, GHz	8.8
Velocity, percent	88
Peak Power Rating, kW	40
dc Resistance, ohms/1000 ft (1000 m)	
Inner	0.45 (1.48)
Outer	0.58 (1.90)
dc Breakdown, volts	4000
Jacket Spark, volts RMS	8000
Capacitance, pF/ft (m)	23.1 (75.8)
Inductance, µH/ft (m)	0.058 (0.19)
Mechanical	
Outer Conductor	Copper
Inner Conductor	Copper-Clad Aluminum
Diameter over Jacket, in (mm)	0.63 (16)
Diameter over Copper Outer Conductor, in (mm)	0.55 (14)
Diameter Inner Conductor, in (mm)	0.189 (4.6)
Nominal Inside Transverse Dimensions, cm	1.11
Minimum Bending Radius, in (mm)	5 (125)
Number of Bends, minimum (typical)	15 (50)
Bending Moment, lb-ft (N·m)	2.8 (3.8)
Cable Weight, lb/ft (kg/m)	0.15 (0.22)
Tensile Strength, lb (kg)	250 (113)
Flat Plate Crush Strength, lb/in (kg/mm)	110 (2.0)

Attenuation and Average Power Ratings

Frequency MHz	Attenuation dB/100 ft	Attenuation dB/100 m	Average Power, kW
0.5	0.045	0.149	40.0
1	0.064	0.211	35.8
1.5	0.079	0.259	29.2
2	0.091	0.299	25.3
10	0.205	0.672	11.3
20	0.291	0.954	7.93
30	0.357	1.17	6.46
50	0.463	1.52	4.98
88	0.619	2.03	3.73
100	0.661	2.17	3.49
108	0.688	2.26	3.36
150	0.815	2.67	2.83
174	0.880	2.89	2.62
200	0.946	3.10	2.44
300	1.17	3.83	1.97
400	1.36	4.46	1.70
450	1.45	4.75	1.59
500	1.53	5.02	1.51
512	1.55	5.08	1.49
600	1.69	5.53	1.37
700	1.83	6.01	1.26
800	1.97	6.46	1.17
824	2.00	6.56	1.15
894	2.09	6.85	1.10
960	2.17	7.12	1.06
1000	2.22	7.28	1.04
1250	2.51	8.23	0.921
1500	2.77	9.09	0.833
1700	2.97	9.74	0.777
1800	3.07	10.1	0.753
2000	3.25	10.7	0.710
2100	3.34	11.0	0.691
2200	3.43	11.2	0.673
2300	3.52	11.5	0.657
3000	4.09	13.4	0.565
3400	4.39	14.4	0.526
4000	4.82	15.8	0.479
5000	5.49	18.0	0.421
6000	6.11	20.1	0.378
8000	7.26	23.8	0.318
8800	7.69	25.2	0.300

Standard Conditions:

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

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



Customer Service Center - Call toll-free from: • U.S.A., Canada and Mexico 1-800-255-1479

Revised 9/00



SIEMENS

RSC BTS ?

BS-240 / BS-241

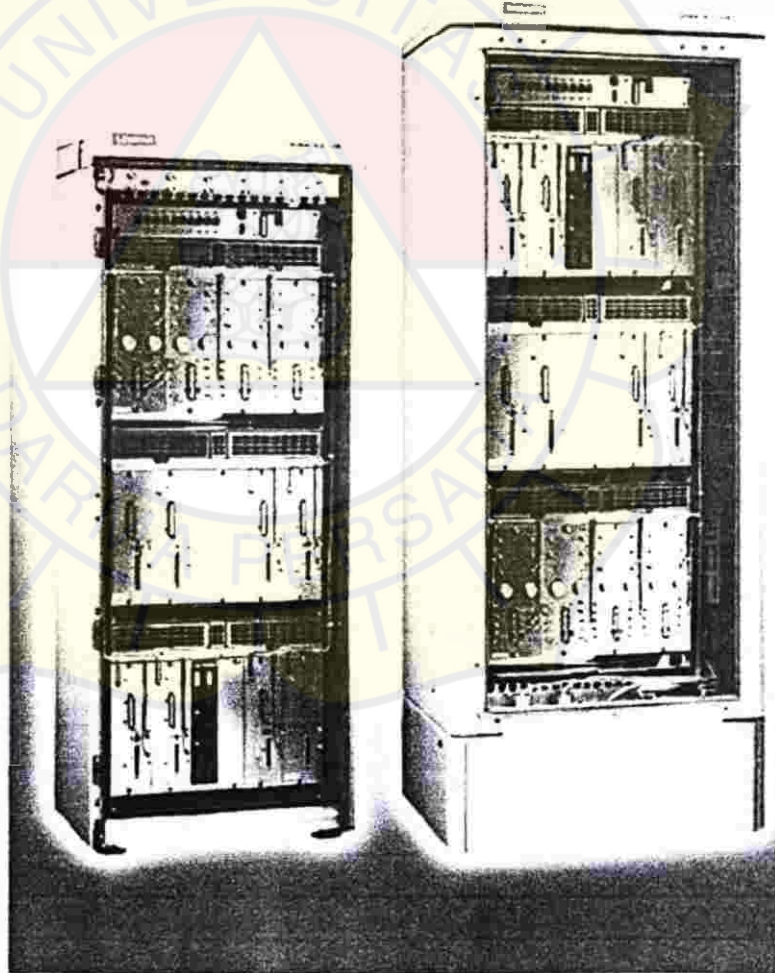
Base Transceiver Stations

BS-240/241 is the new future-proof evolution of Siemens' BTS hardware. Highlights are 24 TRX in 3 racks with 8TRX each, significantly reduced volume per TRX, and a future-oriented platform for new GSM features. Siemens' latest base stations are already prepared for UMTS.

Product Profile

Increasing demands for higher capacity are met by BS-240/241 through reduced volume and an expanded number of 24 TRX in 3 racks with a modularity of 8TRX per rack. This also makes the BS-240/241 a powerful dualband base station for GSM900 and GSM1800, as well as for GSM900 and GSM1900.

A full spectrum of combining equipment means high output power and a minimized number of antennas for all cell configurations. High receiver sensitivity is also guaranteed. A future SDMA option is planned. The modular architecture and the flexible internal structure with data rates of up to 2MBit/s enables the BS-240/241 to provide new GSM features such as EDGE. This platform ensures that network evolution is as smooth as possible. The use of latest technology reduces power consumption and improves reliability.



Information and
Communications

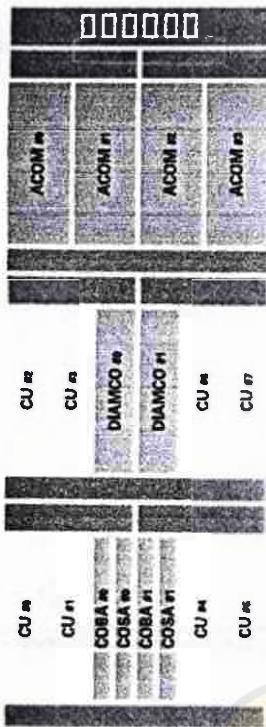


Fig.: Front view of BS-240

Technical Data BS-240

Indoor application	
Carriers per rack	8
Height x width x depth	1600 x 600 x 450 mm
Volume net	432l
Weight	210 kg
Operation acc. to	ETSI 3.1E
Temperature range	-5°C to +55°C
Power supply	-48V DC; 230/400 VAC or 110/207 V AC
Max. power consumption	1.3 kW
Output power GSM900	60W
Output power GSM1800	40W
Output power GSM1900	40W
Batterie backup	available

Customer Benefits

- Compatibility with existing SBS ensures easy integration into the already installed infrastructure
- Possible site configurations of up to 72TRX/site prepares for increasing capacity requirements
- Highest reliability thanks to redundancy for all core modules
- Reduced investment costs due to integrated Abis cross connect (8 PCM lines)
- Fast network rollout: approximately 50% fewer sites required due to high RX sensitivity and high output power
- BS-240/241 can consist of up to 8 racks: 1 base rack, 1 or 2 extension racks and up to 5 service racks
- Pre-installed commissioning reduces installation time to less than one hour
- No service interruption for rack extension or TRX exchange
- Smart antennas (beam switching) option increases capacity
- High site efficiency due to reduced volume of 54 liters/TRX and small footprint
- Architecture prepared for future GSM features (e.g. EDGE): functional, modular internal structure, highly flexible signal processing capacity, exchangeable RF frontend

Compatibility

The BS-240/241 are compatible with the existing Siemens BS-20/21/22 and BS-60/61 products. An easy expansion of installed networks with the new BS-240/241 is possible. Software features will run independently on all BTS types.

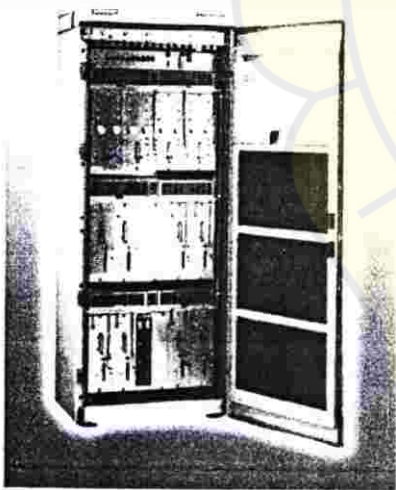


Fig: BS-240

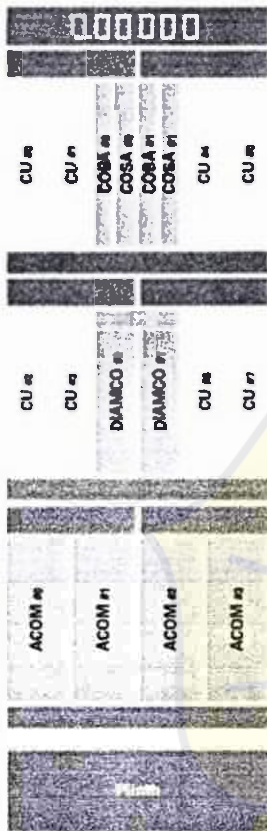


Fig: Front view of BS-241

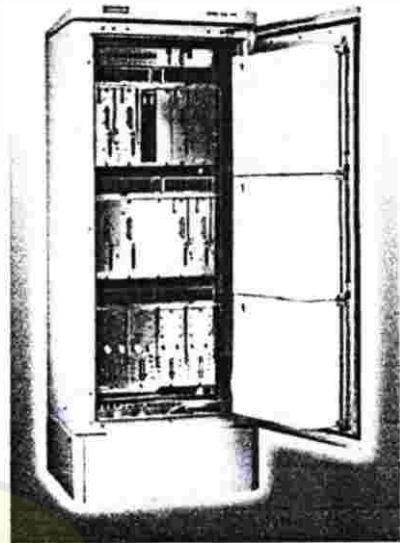


Fig: BS-241

Technical Data BS-241

Outdoor application	
Carriers per rack	8
Height x width x depth	1750 (incl. plinth) x 700 x 650 mm
Volume net	705 l
Weight	265 kg
Operation acc. to	ETSI 4.1E
Temperature range (including solar radiation)	- 45 °C to + 50°C
Integrated Power Supply	230/400 V AC or 110/207 V AC
Max. power consumption	1.85 kW
Output power GSM900	60 W
Output power GSM1800	40 W
Output power GSM1900	40 W
Battery backup	available
Microwave hardware	available

Feature Overview

Frequency bands: GSM900/
GSM-RE/GSM1800/GSM 1900
Dual band
GSM900/1800 and GSM900/1900
in the same BTS rack)
Site configurations up to
2 TRX/site, up to 24 TRX/cell
and 36 cells/site
High power amplifier (60W) and
opto-116 dBm RX sensitivity
Core redundancy and AC/DC
redundancy
Duplex combiner
Filter combiner
Filter combiner
with High Power Duplexer (HPDU)

- Tower Mounted Amplifier (TMA) with intelligent reliability management
- Smart antennas (beam switching) option
- Integrated Abis cross connect (8 PCM24/30 lines)
- Integrated NTPM and μ -wave equipment, optional battery backup in a service rack
- High flexibility of site configurations thanks to service rack
- State-of-the-art technology, environmentally friendly, recyclable
- 48 external alarms, 8 site outputs per rack
- Rack extension without service interruption
- Hot plug-in ability of TRXs
- Short software upgrade time
- Improved MTBF

Technical Data RF BS-240/241

GSM900	Prim. Band	Ext. Band
Uplink range	890-915 MHz	880-890 MHz
Downlink range	935-960 MHz	925-935 MHz

GSM-RE	Frequency Band
Uplink range	876-901 MHz
Downlink range	921-946 MHz

GSM1800	Frequency Band
Uplink range	1710-1785 MHz
Downlink range	1805-1880 MHz

GSM1900	Frequency Band
Uplink range	1850-1910 MHz
Downlink range	1930-1990 MHz

Abbreviations

AC	Alternating Current	HPDU	High Power Duplexer
ACOM	Antenna Combining	MTBF	Mean-Time Between Failures
BS	Base Station	NTPM	Network Termination Primary Multiplex
BTS	Base Transceiver Station	PCM	Pulse Code Modulation
COBA	COre BASic module	RF	Radio Frequency
COSA	COre SAteLLite module	RX	Receiver
CU	Carrier Unit	SBS	Siemens Base Station System
DC	Direct Current	SDMA	Space Division Multiple Access
DIAMCO	Diversity Amplifier Multi COupler	TMA	Tower Mounted Amplifier
EDGE	Enhanced Data rates for GSM Evolution	TRX	Transceiver
ETSI	European Telecommunications Standard Institute	UMTS	Universal Mobile Telecommunications System
GSM	Global System for Mobile Communication		
GSM-RE	GSM Railway Extension		

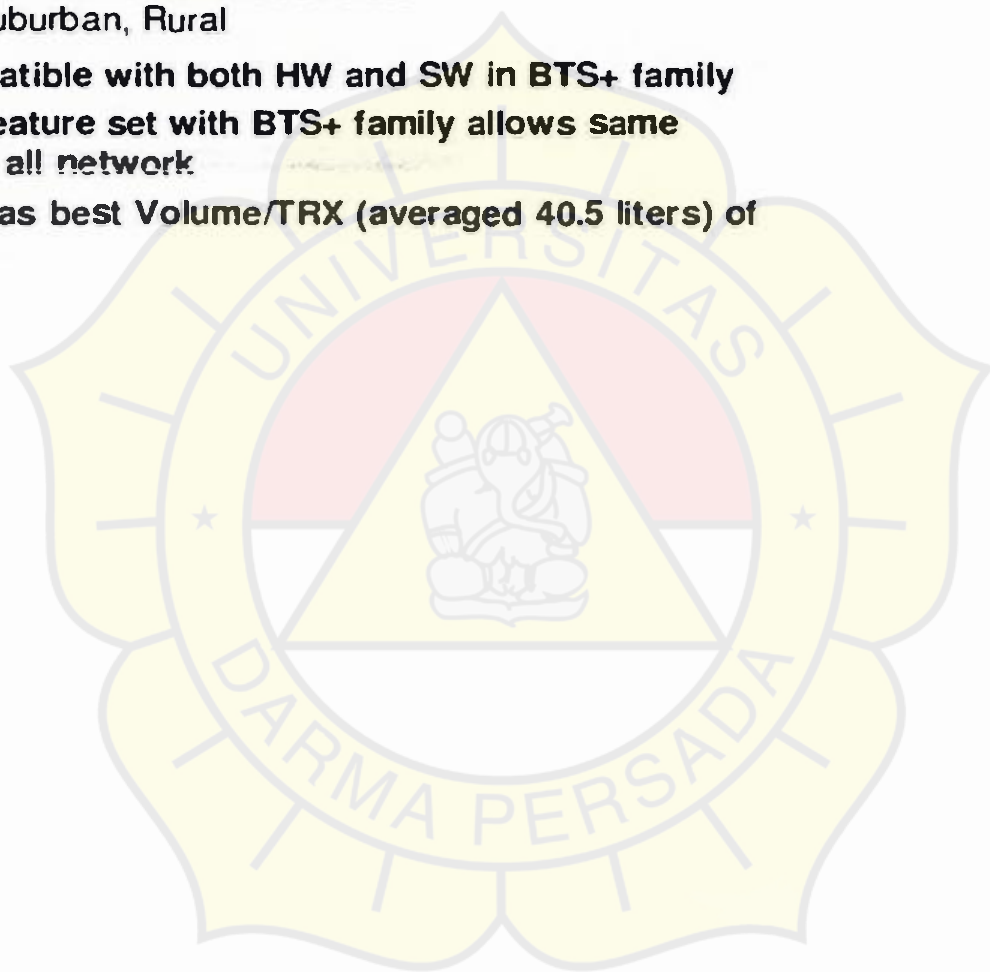
Contact us!

Visit our website at
<http://www.siemens.com/ic/networks/ca>

Key messages for BS240 (BS240,240XL) Common

SIEMENS
Mobile

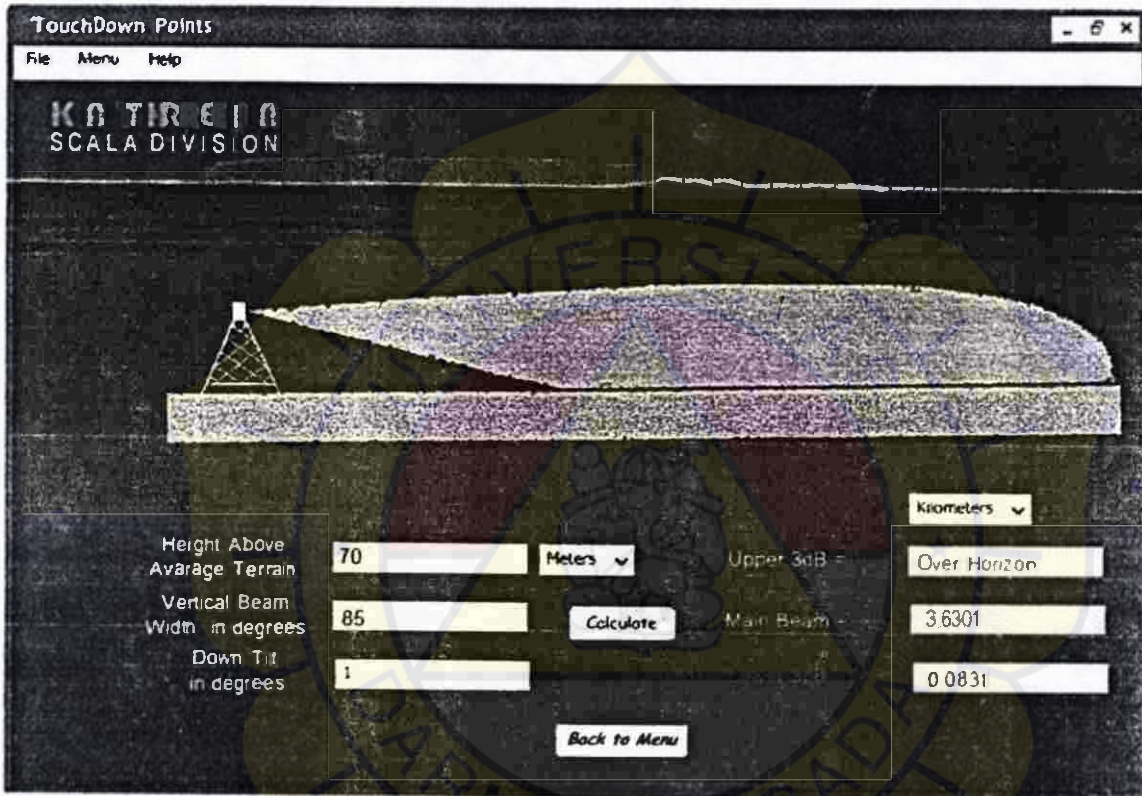
- **Advance technology with cost optimized elements**
 - Guarantee the best coverage with highest Rx.sensitivity (-116dBm) and output power (60W)
- **Reduction of Life Cycle Costs:**
 - Only three board types vs. our competitors
 - Low inside temp. leads to higher MTBF
 - BTS core redundancy is available
- **Suitable for all kinds of indoor sites**
 - Urban, Suburban, Rural
- **Fully compatible with both HW and SW in BTS+ family**
- **Common feature set with BTS+ family allows same services in all network**
- **BS240XL has best Volume/TRX (averaged 40.5 liters) of all BTS**



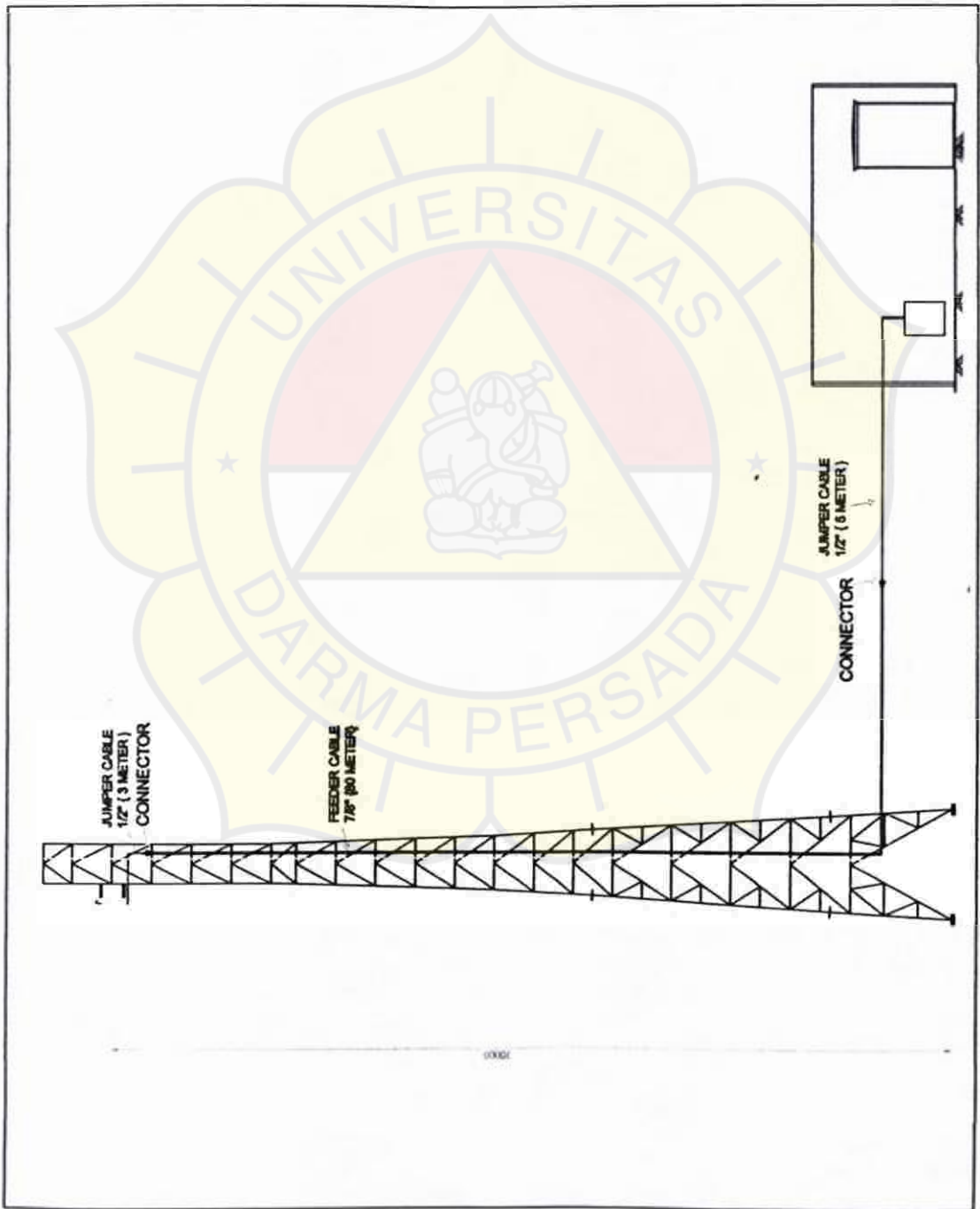


Identitas lokasi <i>(Site ID)</i>	: SAG193	Nama Lokasi <i>(Site name)</i>	Mak Kawing ex Kampung TobaCP
Kandidat/Peringkat <i>(Candidate Rank)</i>	: P / 2 of 4	Propinsi <i>(province)</i>	Kal-Bar
Execution Order (E.O)	:		

Jarak maksimum antara BTS dengan MS









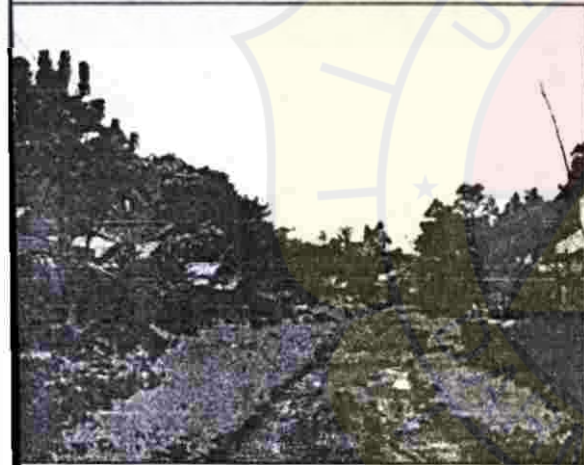
Akses road



kantor desa mak kawing



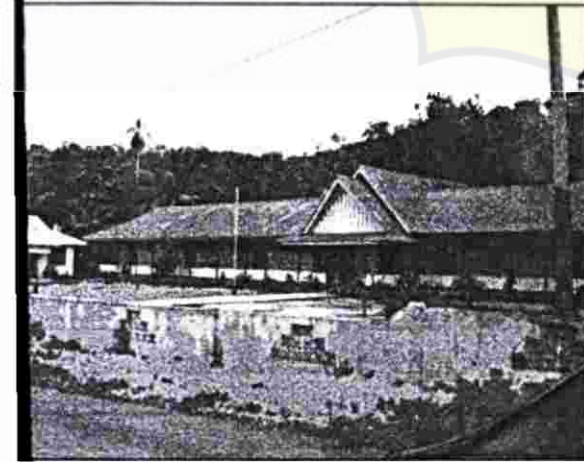
Pemukiman penduduk



pemukiman penduduk



Sekolahmakawing



road trans kalimantan





LAMPIRAN N