

BAB V

KESIMPULAN

1. Dengan menggunakan ketinggian antenna yang sama terhadap perubahan frekuensinya menunjukkan *Line Of Sight* dari hasil rancangan (frekuensi = 18 GHz) masih memungkinkan dan lebih baik dibandingkan dengan keadaan lama (frekuensi = 15 GHz).
2. Secara keseluruhan dari hasil perhitungan, maka dalam perancangan ulang ini ditetapkan antenna yang digunakan adalah antenna berdiameter 0,2 m. Sedangkan perhitungan *parameter - parameter* yang digunakan untuk menentukan kualitas penerimaan, diperoleh hasil *downlink* : $RSL = (-46,23 \text{ dBm})$, dan hasil *uplink* : $RSL = (-46,72 \text{ dBm})$. Dari hasil *parameter* tersebut baik lintasan *downlink* dan *uplink* memenuhi *standart power threshold* ($P_{th} = -83,0 \text{ dBm}$).
3. Pada BER 10^{-6} besarnya E_b/N_0 untuk *standart* QPSK adalah 10,6 dB, maka untuk hasil perhitungan *uplink* $E_b/N_0 = 50,63 \text{ dB}$ sedangkan *downlink* $E_b/N_0 = 50,14 \text{ dB}$ sudah diatas kualitas yang ditentukan.

DAFTAR PUSTAKA

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3. Gouzali Syadam Drs, BC, TT, "Kamus Istilah Telekomunikasi", Djambatan, Bandung, 1992
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8., NEC Corp, "Instruction Manual Pasolink Digital Radio System", 2001



INDI MANGGA DUA

RUKO SHINTA

Latitude	06 08 04.60 S	06 08 35.90 S
Longitude	106 49 33.40 E	106 49 32.50 E
True azimuth (°)	181 38 54.46	001 38 54.56
Calculated Distance (km)		0.962
Profile Distance (km)		0.962
Datum	WGS 1984	
UTM zone	48S	48S
Easting (km)	702.060	702.029
Northing (km)	9321.571	9320.610
Elevation (m)	1.00	1.41

Distance (km)	Elevation (m)	Ground	Structure (m)
0.000	1.00	AG	
0.050	1.00	AG	
0.073	1.00	AG	12.0 m Building
0.100	1.00	AG	
0.150	1.00	AG	
0.200	1.00	AG	
0.250	1.00	AG	
0.300	1.00	AG	
0.350	1.02	AG	
0.400	1.05	AG	12.5 m Tree
0.450	1.08	AG	
0.500	1.12	AG	16.0 m Building
0.550	1.15	AG	
0.600	1.18	AG	13.0 m Building
0.650	1.21	AG	
0.700	1.24	AG	
0.750	1.28	AG	
0.800	1.31	AG	
0.850	1.34	AG	13.0 m Building
0.900	1.37	AG	
0.950	1.40	AG	
0.962	1.41	AG	

Ground Elevations - AMSL, Structure & Antenna Heights - AGL

Ground Type

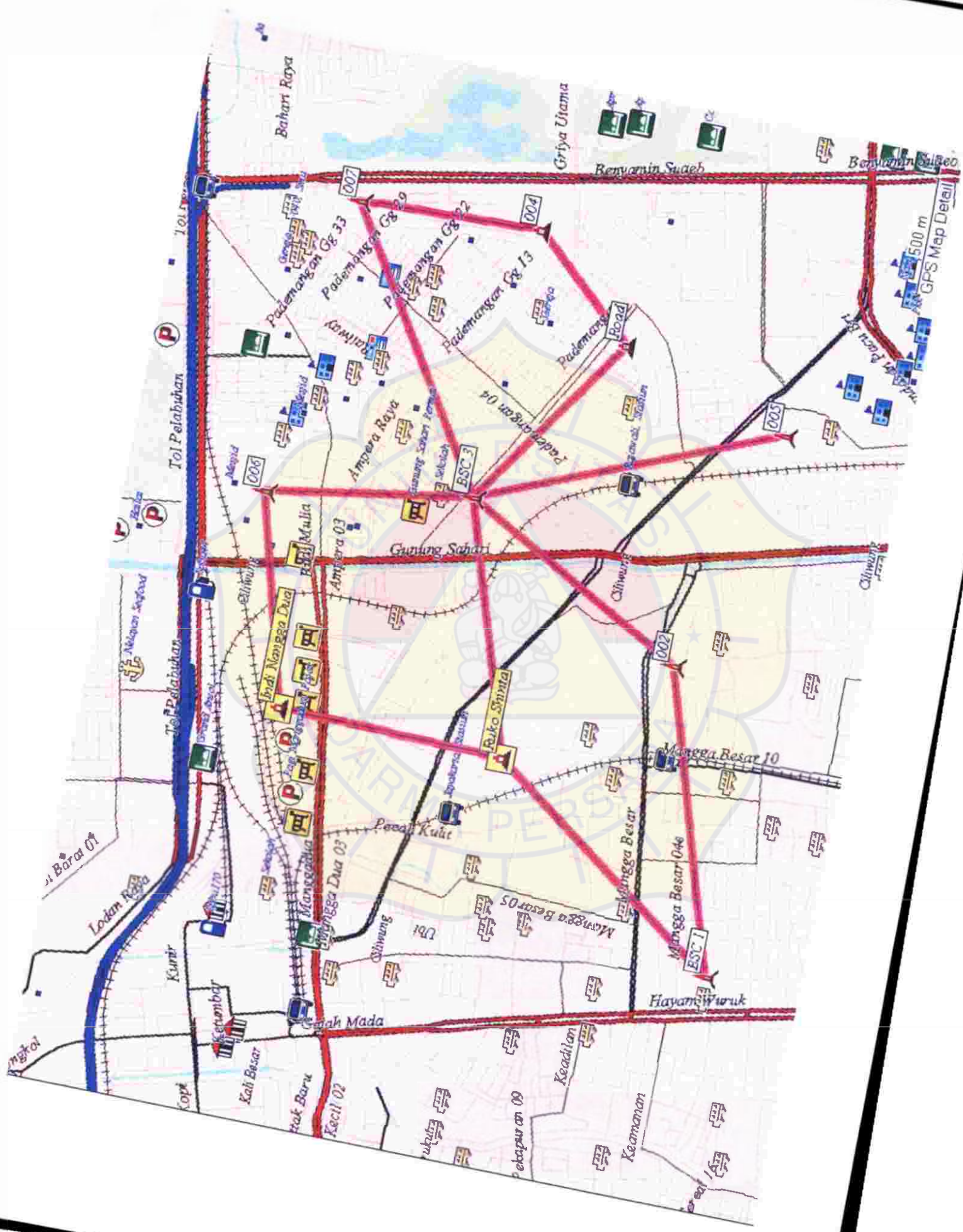
PG-Poor, AG - Average, GG - Good, FW- Fresh Water, SW- Salt Water

LAMPIRAN II



LAMPIRAN 2



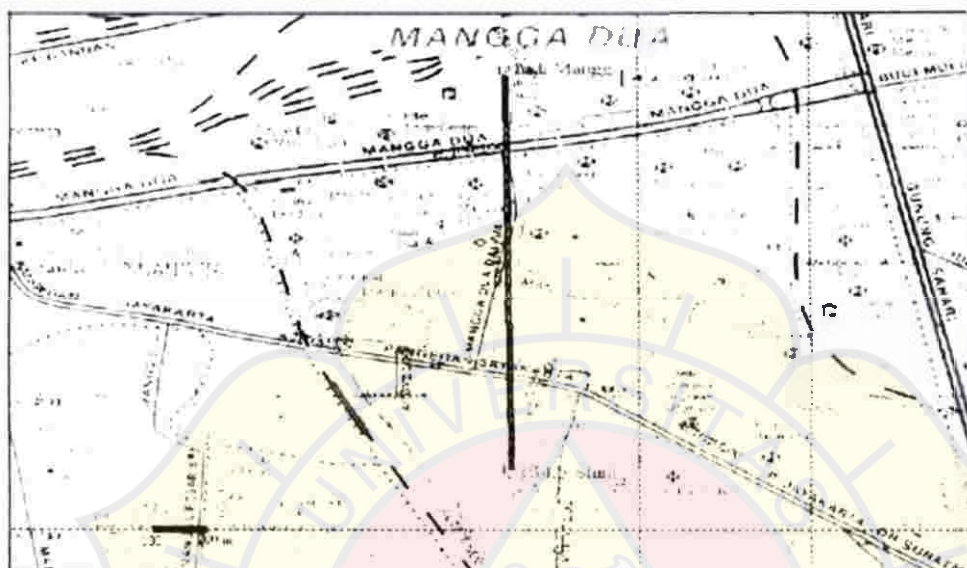


GUIDE MAP

Area Name : PASAR GROSIR TEXTILE MANGG

Site Name : INDI MANGGA 2

Site ID :



Map Reference : FA...KPLAN JABOTABEK

Map Scale

LAMPIRAN III



SURVEY REPORT



Project : INDOSAT ROL OUT 2006
 Area Name : PASAR GROSIR TEXTILE MANGGA 2
 Site Name : INDI MANGGA 2
 Site ID :
 Batch : 1
 Region District : DKI JAKARTA/ MANGGA 2
 Date Of Report : 29.03.2006
 Document No :

No.	Priority	Candidate Site	Alternative End Link	<input type="checkbox"/> New	<input type="checkbox"/> Existing
1.	1.	INDI MANGGA 2	RUKO SHINTA	<input type="checkbox"/> New	<input checked="" type="checkbox"/> Existing
2.	2.			<input type="checkbox"/> New	<input type="checkbox"/> Existing
3.	3.			<input type="checkbox"/> New	<input type="checkbox"/> Existing
4.	4.			<input type="checkbox"/> New	<input type="checkbox"/> Existing
5.	5.			<input type="checkbox"/> New	<input type="checkbox"/> Existing
6.	6.			<input type="checkbox"/> New	<input type="checkbox"/> Existing

Surveyor Participants

Name : Achmad Gunawan Signature
 Company : DSK Telecom PT.
 Date Survey : 29-Maret-06

Name : Signature
 Company :
 Date Survey : 29-Maret-06

Name : Signature
 Company : INDOSATPT.
 Date Survey : 29-Maret-06

PROJEC INDOSAT ROLL OUT 2006 MICROWAVE LINK

Site Name: **INDIYANGGA 2**
 Area Name: **FASAR GROSIR TEXTILE MANGGA 2**
 Site Status: **Existing** Date Survey: **29 Maret 06**

Site Information:

Station Address: **MANGGA 2**
 Contact Person: **MANAGEMENT BUILDING**

Telp No:
 Coordinates:

	GPS Coordinates	Actual Coordinates
Latitude	7° 09' 30.64" S	7° 09' 34.67" S
Longitude	101° 09' 47.31" E	101° 09' 33.47" E
Number of Channels	10	10
DCP	4	4
Datum	WGS 84	WGS 84

Altitude (m ASL):
 Map Reference: **FAUK PLAN JABOTABEK**
 On Field Topograph Engineer: **Achmad Gurawan** **Lahmi Fahrudin**

Equipments To Be Installed:

Radio :

Type	Capacity	Configuration	Max Power Consumption	Space Needed
NEC PASOLINK	8 x 2 Mbps	1 + 1	---	800 x 600 mm
---	---	---	---	---
---	---	---	---	---

Microwave Antennas :

Direction	Dia. (m)	Azimuth (°)	Height (m)	Sector Width	Thickness	Slope (°)	Bracing		
							Type	DW	T
RUKO SHINTA	0.6	181.65	28	---	---	---	---	---	---
---	---	---	---	---	---	---	---	---	---
---	---	---	---	---	---	---	---	---	---

Length Of Wave Guide / Coaxial Cable:

		RUKO SHINTA	
1	Antenna Height	20	---
2	Cable Tray To Antenna	1	---
3	Outside Horizontal Feeder Tray	2.5	---
4	Inside Horizontal Feeder Tray	6	---
5	Radio Room Output Up To Feeder Tray	2.5	---
6	Additional Loss (If Any)	0	---
7	Outside Horizontal Tray Height	11	---
	Total:	29.4	---

Site Access:

Car	✓	Semi Trailer Truck	---	2.5 Ton Truck	---
4 x 4 Wheel	---	Truck	---	Crane Transport	---

Technical Room:

Radio Room:	Air Conditioner	Ventilator By Fan	Aerated by Window
Existing	✓	---	---



Existing Facilities :

Rectifier :

Manufacturer	Voltage (V)	Capacity (Ampere)	Feeder Load (A)
SAFT KNIFE	48.0	3 x 3.0	0.5
---	---	---	---
---	---	---	---

Batteries :

Manufacturer	Voltage (V)	Capacity (Ah)	No Of Bank
Sonnenschein	12	50	2
---	---	---	---
---	---	---	---

ACPDB :

Voltage	Existing	---
	220 V	Existing
220 V	New	---
	New	---

DCPDB :

Voltage	Existing	---
	24 V	Existing
24 V	New	---
	New	---

Wave Guide Window:

Existing	20
Free Space	2
New	---

Cable Tray :

	Technical Room
Available	✓
Extended	---
New	---

Feeder Tray :

	Horizontal	Vertical
Available	✓	✓
To Be Extended	---	---
New	---	---

Existing Tower:

Supplier :	---	Corrosion	<input type="checkbox"/>
Type :	SST	Painting	<input checked="" type="checkbox"/>
Height (m) :	20	Lighting Protection	<input checked="" type="checkbox"/>
Material :	Steel	Grounding Earthing	<input checked="" type="checkbox"/>
		Beacon Lamp	<input checked="" type="checkbox"/>

Existing Antennas:

Direction To	Azimuth (°)	Type	Polarization	Diameter (m)	Height (m)
RUKOMANGGA 2	191	Parabolic	Vertical	0.5	28
---	---	---	---	---	---
---	---	---	---	---	---
---	---	---	---	---	---

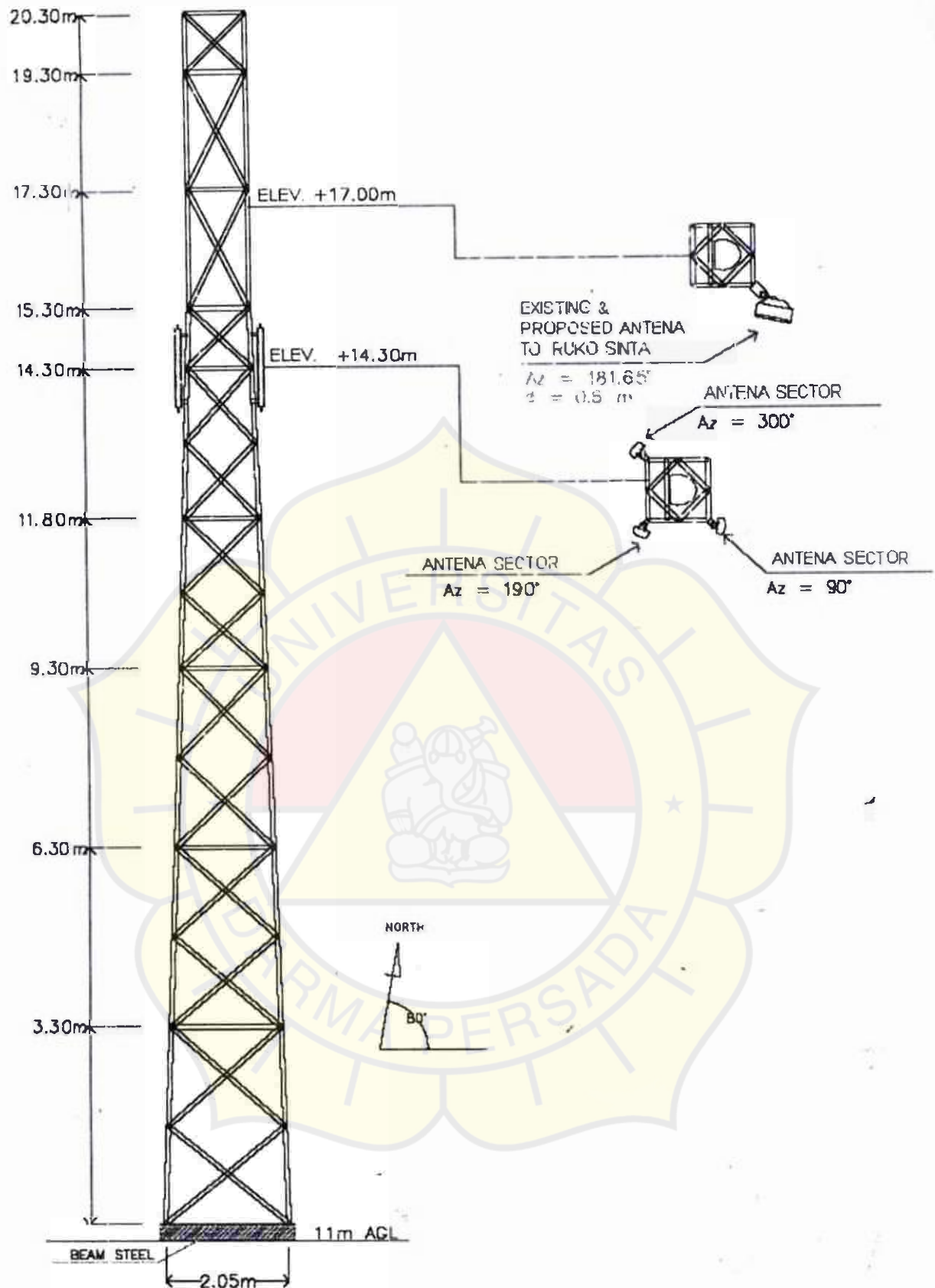
List Of Existing Radio Equipments:

Radio Type	Frequencies		Voltage (V)	Capacity	Direction
	Tx (MHz)	Rx (MHz)			
ALCATEL 9470 UXXLX	---	---	48	4 x 2 M Bps	RUKOMANGGA 2
---	---	---	---	---	---
---	---	---	---	---	---
---	---	---	---	---	---

Remark

TOWER HIGHT IS 20 M + BUILDING HICHEL 1 M
TOTALY ARE 31 M

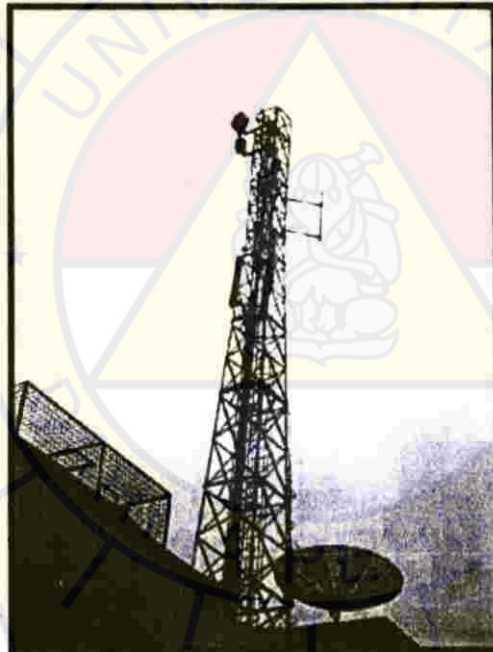
Action To Be Taken By INDOSAT P T.



DI MANGGA 2	SITE DRAWING			Drawn by : HENDRA	Page : 3 of 3
SAR GROSIR TEXTILE	TOWER			Modified by: -	Scale : 1 : 100
BOTABEK	Edition : -			Date :	
NEC Corporation	Satelindo (NIP&C)	Satelindo FNP (NP&D)	Satelindo RNP (NP&D)	Building Management	
App. Name : -	Name :	Name :	Name :	Name :	
Signature :	Signature :	Signature :	Signature :	Signature :	
Date :	Date :	Date :	Date :	Date :	
1.)	2.)	3.)	4.)	5.)	



OVERVIEW SHELTER CONDITION



OVER VIEW ALL TOWER CONDITION

STATION	PASAR GROSIR TEXTIL_INDI MANGGA 2	PHOTOGRAPH	NEC
OBJECT	SITE CONDITION		
PHOTO BY	Fahmi Fahrindra/ Achmad		INDOSAT ROL OUT 2006

SURVEY REPORT

NEC

Project: : INDOSAT ROL OUT 2006
 Area Name: : JL. PANGERAN JAYAKARTA
 Site Name: : RUKO SHINTA
 Site ID: :
 Batch: : 1
 Region District: : DKI JAKARTA
 Date Of Report: : 29-03-2006
 Document No: :

No.	Priority	Candidate Site	Alternative End Link		
1.	1.	RUKO SHINTA	INDIMANANGA 2	<input type="checkbox"/> New	<input checked="" type="checkbox"/> Existing
2.	2.			<input type="checkbox"/> New	<input type="checkbox"/> Existing
3.	3.			<input type="checkbox"/> New	<input type="checkbox"/> Existing
4.	4.			<input type="checkbox"/> New	<input type="checkbox"/> Existing
5.	5.			<input type="checkbox"/> New	<input type="checkbox"/> Existing
6.	6.			<input type="checkbox"/> New	<input type="checkbox"/> Existing

Surveyor Participants

Name : Achmad Gunawan Signature
 Company : DSK Telecom PT.
 Date Survey : 29-Maret-06

Name : Signature
 Company :
 Date Survey : 29-Maret-06

Name : Signature
 Company : INDOSAT PT.
 Date Survey : 29-maret-06

PROJEC INDOSAT ROLL OUT 2006 MICROWAVE LINK

Site Name: RUKO SHINTA
 Area Name: J.L. PANGERAN JAYAKARTA
 Site Status: Existing Data Survey: 29-Maret-06

Site Information :

Station Address: RUKO SHINTA MANGGA 2
 Contact Person: MANAGEMENT BUILDING
 Tel No:
 Coordinates:

	GPS Coordinates	Actual Coordinates
Latitude	S 6° 18' 35.1"	S 6° 18' 35.9"
Longitude	E 101° 49' 32.5"	E 101° 49' 32.5"
Number Of Satellite	10	10
CRP	4	4
Defin	WGS84	WGS84

Altitude (m ASL):
 Map Reference: PAKULAN, NEGOTAREK
 On Field Topographic Engineer: Achmad Darawan, Wina Palmitia

Equipments To Be Installed:

Radio:

Type	Capacity	Configuration	Max Power Consuming	Space Needed
NEC PASCLINK	8 x 2 MBps	1 + 1	---	60 x 60 cm
---	---	---	---	---
---	---	---	---	---

Microwave Antennas :

Direction	Dia. (m)	Azimuth (°)	Height (m)	Section Width	Thickness	Slope (°)	Bracing		
							Type	DN	T
INDI MANGGA 2	0.6	1.65	20	---	---	---	---	---	---
---	---	---	---	---	---	---	---	---	---
---	---	---	---	---	---	---	---	---	---

Length Of Wave Guide / Coaxial Cable :

	INDI MANGGA 2		
1 Antenna height	+	20	---
2 Cable Tray To Antenna	-	1	---
3 Outside Horizontal Feeder Tray	+	3	---
4 Inside Horizontal Feeder Tray	-	7	---
5 Radio Room Out/Up To Feeder Tray	+	2.5	---
6 Additional Loss (if any)	-	0	---
7 Outside Horizontal Tray Height	-	11	---
Total:		22.5	

Site Access:

Car	√ *	Semi Trailer Truck	---	2.5 Ton Truck	---
4 x 4 Wheel	---	Truck	---	Other Transport	---

Technical Room :

Radio Room:	Air Conditioner	Ventilated By Fan	Aerated by Window
Existing	√	---	---

Existing Facilities :

Rectifier :

Manufacture	Voltage(V)	Capacity (Ampere)	Present Load (A)
SAFT KNIFE	40.0	3x 20	0.55
---	---	---	---
---	---	---	---

Batteries :

Manufacturer	Voltage (V)	Capacity (Ah)	No. Of Bank
Sonnenschein	12	20	2
---	---	---	---
---	---	---	---

ACPDB:

Voltage	Existing	---
	110 V	Existing
220 V	Existing	---
	New	---

DCPDB:

Voltage	Existing	---
	24 V	Existing
48 V	Existing	---
	New	---

Wave Guide Window:

Existing	---
Free Space	---
New	---

Cable Tray :

Technical Room	
Available	---
Extended	---
New	---

Feeder Tray :

	Horizontal	Vertical
	Available	---
To Be Extended	---	---
New	---	---

Existing Tower :

Supplier :
 Type :
 Height (m) :
 Material :

Top Node Plate Available
 60T
 12
 Steel

Corrosion	<input type="checkbox"/>
Painting	<input checked="" type="checkbox"/>
Lightning Protection	<input checked="" type="checkbox"/>
Grounding Earthing	<input checked="" type="checkbox"/>
Search Lamp	<input checked="" type="checkbox"/>

Existing Antennas :

Direction To	Azimuth (°)	Type	Polarization	Distance (m)	Height (m)
SE JAMET	300	Yagi	Vertical	2.5	22.6
SE JAMET	300	Yagi	Vertical	2.5	22.4
NEI MANUSIA	2	Yagi	Vertical	2.5	20
---	---	---	---	---	---

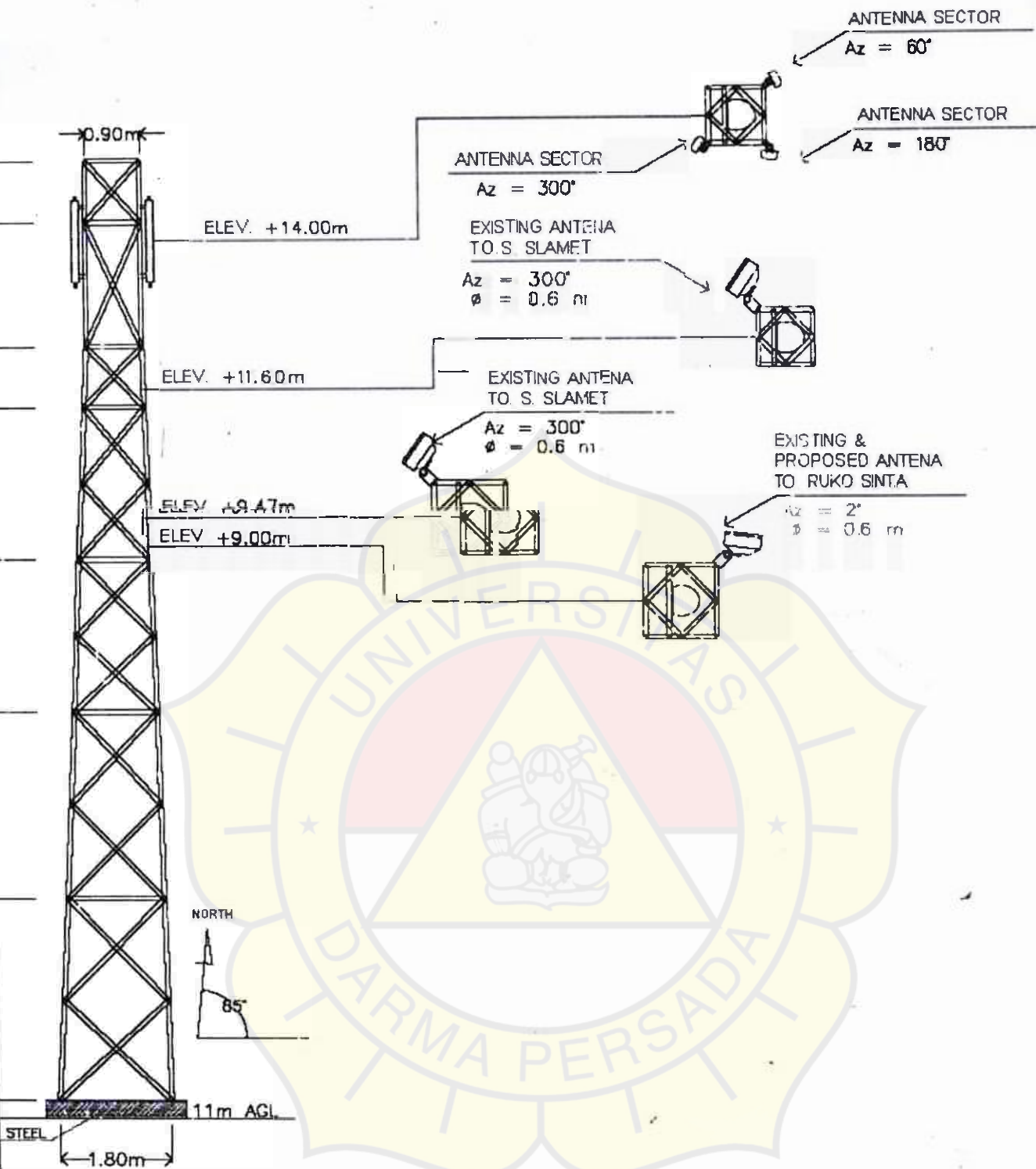
List Of Existing Radio Equipments :

Radio Type	Frequency		Voltage (V)	Capacity	Location
	TX (MHz)	RX (MHz)			
ALCATEL 9400	147-143.5	152312.5	48	15 x 2 Mbat	SE JAMET
ERISSON 9400	---	---	48	15 x 2 Mbat	SE JAMET
ALCATEL 9400	---	---	48	15 x 2 Mbat	NEI MANUSIA
---	---	---	---	---	---

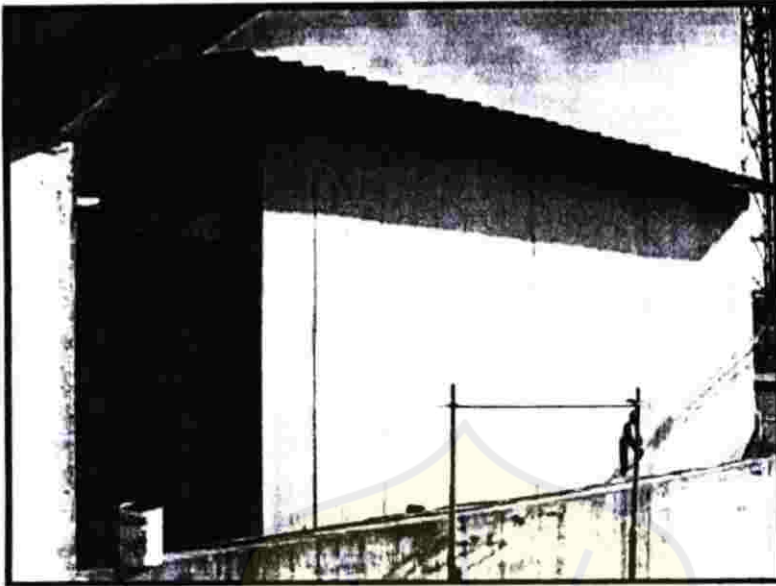
Remark

TOWER HEIGHT 12m + 8.10 IN G. HEIGHT 11m

Action To Be Taken By INDISAT P.T.



RUKO SHINTA		SITE DRAWING		Drawn by : HENDRA	Page : 3 of 3
PANGERAN JAYAKARTA		TOWER		Modified by: -	Scale : 1 : 100
BOBOTABEK		Edition : -		Date :	
NEC Corporation		Satelindo (NIP&C)	Satelindo RNP (NIP&D)	Satelindo RNP (NIP&D)	Building Management
App. Name : -	Name :	Name :	Name :	Name :	Name :
Signature :	Signature :	Signature :	Signature :	Signature :	Signature :
Date :	Date :	Date :	Date :	Date :	Date :
1.)	2.)	3.)	4.)	5.)	



OVERVIEW SHELTER CONDITION



OVER VIEW ALL TOWER CONDITION

STATION	P JAYAKARTA_RUKO SHINTA	PHOTOGRAPH	NEC
OBJECT	SITE CONDITION		
PHOTO BY	Fahmi Fahrindra/Achmad Gunawan		INDOSAT ROL OUT 2006

LAMPIRAN IV



KETENTUAN PERANCANGAN

No	PAMPUKAYAN	LOKASI	SATUAN
Lokasi Koordinat			
1.	Pasar Grosir Indi Mangga Dua	-	-
	# <i>Latitude</i>	06° 08' 04,60"	LS
	# <i>Longitude</i>	106° 49' 33,40"	BT
2.	Ruko Shinta	-	-
	# <i>Latitude</i>	06° 08' 35,90"	LS
	# <i>Longitude</i>	106° 49' 32,50"	BT
Perangkat yang digunakan pada BTS Indi mangga Dua dan Ruko Shinta			
1.	NEC PASOLINK	-	-
Frekuensi kerja PT. Indosat			
1.	Link Pasar Grosir Indi Mangga Dua	17,733	GHz
2.	Link Ruko Shinta	18,743	GHz
Tinggi Antena yang digunakan			
1.	Link Pasar Grosir Indi Mangga Dua	28	m
2.	Link Ruko Shinta	20	m
Panjang <i>Waveguide</i> yang digunakan			
1.	Link Pasar Grosir Indi Mangga Dua	29,4	m
2.	Link Ruko Shinta	22,5	m
Hasil <i>Survey</i>			
1.	<i>Survey</i> dilakukan pada tanggal 29 Maret 2006	-	-

Menyetujui

Pembimbing Riset RNP DSK Telecom


Achamad Gunawan

LAMPIRAN V



Alcatel 9400 UX Short-Haul Low/Medium Capacity Digital Microwave Radio Links

Radio System		Alcatel 9470 UX/UX												
Frequency band (GHz)		7.1-8.5												
Reference system standard		ETSI DE/TMO4044 - EN 301 216												
Modulation		ITU-R Rec 385-7 Ann. 1-2, Contel standard, ITU-R Rec 386-6, Ann. 1-2-3, OIRT-2												
Capacity		2E1			4E1			8E1			16E1-E3			
Output power (standard) 4/16 QAM (dBm)		+24.5/+21												
RX receiver threshold 4/16 QAM (dBm)		-97/-			-94/-90			-91/-87			-88.5/-84			
System gain for 10 ⁻³ BER in 1+1 (without branching loss) 4/16 QAM (dB)		121.5/-			118.5/111			115.5/108			113/105			
Branching loss (Tx-Rx) in 1+1 FD (dB)		7.5												
Radio System		Alcatel 9413 UX				Alcatel 9415 UX				Alcatel 9418 UX				
Frequency band (GHz)		12.75-13.25				14.4-15.35				17.7-19.7				
Reference system standard		EN 301 128				EN 301 128				EN 301 128				
Modulation		ITU-R Rec 457-6 ERC 12-02				ITU-R Rec 636-3 ERC 12-07				ITU-R Rec 595-8 ERC 12-03				
Capacity		2E1	4E1	8E1	16E1	2E1	4E1	8E1	16E1	2E1	4E1	8E1	16E1	
Transmitted power (*) 4/16 QAM (dBm)		+24/+20				+24/20(**)				+16.5(+24.5 High Power) 22/+19(**)				
Automatic power control range 4/16 QAM (dB)		20/20 30/30(**)				30/30(**)				30/30(**)				
RX receiver threshold (*) (dBm)		4 QAM	-92	-92	-89	-86	-84	-91	-88	-85	-93	-90	-87	-84
		16 QAM	-	-	-83	-80	-	-	-85**	-82**	-	-	-83**	-80**
System gain for 10 ⁻³ BER in 1+1 (standard transmitted power) (*) (dB)		4 QAM	119	116	113	110	116	115	112	109	110	107	104	101
		16 QAM	-	-	103	100	-	-	105**	102**	-	-	102**	99**
Radio System		Alcatel 9423 UX				Alcatel 9425 UX				Alcatel 9438 UX				
Frequency band (GHz)		21.2-23.6				24.5-26.5				37.0-40				
Reference system standard		EN 300 198				EN 300 431				EN 300 197				
Modulation		ITU-R Rec. 637-3 ERC 13-02 annex A				ITU-R Rec. 748-3 ERC 13-02				ITU-R Rec. 749-1 ERC 12-01				
Capacity		2E1	4E1	8E1	16E1	2E1	4E1	8E1	16E1	2E1	4E1	8E1	16E1	
Transmitted power (*) 4/16 QAM (dBm)		+19/+17				+18/+16(+14**)				+16/+14				
Automatic power control range 4/16 QAM (dB)		30/20 (30**)				30/20 (30**)				30/20 (30**)				
RX receiver threshold (*) (dBm)		4 QAM	-92	-89	-86	-83	-91	-83	-85	-82	-87	-84	-81	-78
		16 QAM	-	-	-82	-79	-	-	-81	-78	-	-	-77	-74
System gain for 10 ⁻³ BER in 1+1 (standard transmitted power) (*) (dB)		4 QAM	111	108	105	102	109	106	103	100	103	100	97	94
		16 QAM	-	-	99	96	-	-	96	93	-	-	91	88

Branching loss included
DU Flat

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7. PERFORMANCE

7.1 General

Item	13 GHz	15GHz	18 GHz	23 GHz	26 GHz	28 GHz	38 GHz
Frequency Range [GHz]	1275-1325	145-1535	17.7-19.7	212-236	245-265	275-295	370-395
Frequency Plan ITU-R	F.497-6	F.636-3	F.595-5 F.151	F.627-3	F.748-3		F.749-1
Channel Separation	35MHz (4MB)/ 7 MHz (8MB)/11MHz (17MB) 15.75 MHz also for 18G/12.5 MHz (34MB, 27.5 MHz also for 18G)						
RF TX/RX Spacing [MHz]	266	420 720 315	1038 1013 340 1560	1000 1200 1232	1008		1260
EMC	Conform to ETS300 385 Class B						
Power Supply	-20% to +20% / +20 to +60 VDC						
Power Consumption	★		1+0 Approx. 50 W Approx. 52 W Approx. 55 W	1+1 50W (4/8 Mb) 95W (17MB) 100W (34/18)	★		

7.2 1+0 ODU (Outdoor Unit)

No.	Item	13 GHz	15GHz	16GHz	23GHz	26 GHz 28 GHz	38GHz	Guaranteed									
1	Output Power (dBm nominal) (Measured at Ant. port)	+25	+23	+23	+23	+20	+15	± 1.5									
2	Power Control	0 to 30 dB, in 1 dB steps, variable						± 1.0 dB									
3	Frequency Stability	± 5ppm						± 10 ppm									
4	Receiver Noise Figure (at Ant. port)	4.0 dB	4.0 dB	5.0 dB	6.5 dB	7.0 dB	7.5 dB	+2 dB (13/15/18G) +15dB (23/38G)									
5	Threshold Level (dBm measured at Ant. port)																
									BER = 10 ⁻⁴	34 MB	-84.5	-84.5	-83.0	-82.5	-82.0	-81.5	+2.5 dB
										17 MB	-87.5	-87.5	-86.5	-85.5	-85.0	-84.5	+2.5 dB
										8 MB	-90.5	-90.5	-89.5	-88.5	-88.0	-87.5	+2.5 dB
										4 MB	-93.5	-93.5	-92.5	-91.5	-91.0	-90.5	+2.5 dB
									BER = 10 ⁻⁶	34 MB	-81.0	-81.0	-80.0	-79.0	-78.5	-78.0	+2.5 dB
										17 MB	-84.0	-84.0	-83.0	-82.0	-81.5	-81.0	+2.5 dB
										8 MB	-87.0	-87.0	-86.0	-85.0	-84.5	-84.0	+2.5 dB
	4 MB	-90.0	-90.0	-89.0	-88.0	-87.5	-87.0	+2.5 dB									
6	System gain (db measured at Ant. port)																
									BER = 10 ⁻³	34 MB	109.5	107.5	106.5	105.5	102.0	96.5	-4.0 dB
										17 MB	112.5	110.5	109.5	108.5	105.0	99.5	-4.0 dB
										8 MB	115.5	112.5	112.0	111.5	108.0	102.5	-4.0 dB
										4 MB	118.5	116.5	115.5	114.5	111.0	105.5	-4.0 dB
									BER = 10 ⁻⁵	34 MB	106.0	104.0	103.0	102.0	98.5	93.0	-4.0 dB
										17 MB	109.0	107.0	106.0	105.0	101.5	96.0	-4.0 dB
										8 MB	112.0	110.0	109.0	108.0	104.5	99.0	-4.0 dB
	4 MB	115.0	113.0	112.0	111.0	107.5	102.0	-4.0 dB									
7	Frequency Agility (MHz without changing filters)	56	56	252	280			-									
8	Maximum Input Level	-15 dBm (No Error)						-									
9	Metering Access	a) RX Signal Level						-									
10	Temperature range	-						-33°C to + 50°C									

* Alarm items are shown in Table 2.

Also applicable for 1 + 1 System with dual antenna configuration as shown in Figure 5(b).
In case of using the NEC BR UNIT, the additional loss is 7 dB (TX + RX).

7.3 Interconnection (between ODU and IDU)

No	Item	Specification
1	Interconnection	Single coaxial cable (per channel)
2	Standard Type of Cable	5D-FB, 8D-FB, 10D-FB or 12D-FB
3	Signals	IF signal, alarms, control, monitoring, power source and orderwire
4	Maximum Cable Length	150 m (5D-FB) 300 m (8D-FB) 350 m (10D-FB) 450 m (12D-FB)
5	Cable Equalization	Automatic level equalization
6	Guaranteed temperature range	-33°C to +50°C

Note 1 : In case of employing hitless protection, set each length of two IF cables to same and not to exceed 50 meter.

Note2 : Salt damage

In case of operating in the sea or around the coast area (within 3 km from coastline), measure must be taken for the ODU against salt damage. Please ask NEC for the countermeasure.

7.4 IDU (Indoor Unit)

No	Item	Specification
1	Modulation Type	4PSK (with differential coding)
2	Baseband Interface 1 x 34 Mbit/s 16 x 2 Mbit/s 8 x 2Mbit/s 1 x 8 Mbit/s 4 x 2 Mbit/s 2 x 2Mbit/s	34 Mbit/s ± 20 ppm 2.048 Mbit/s ± 50 ppm 2.048 Mbit/s ± 50 ppm 8.448 Mbit/s ± 30 ppm 2.048 Mbit/s ± 50 ppm 2.048 Mbit/s ± 50 ppm
3	Service Channels	See details in Table 1
4	Loop Back	Far End Baseband Loop Back Near End Baseband Loop Back
5	Spectrum shaping	Root roll-off (α=0.5)
6	Residual BER	Less than 10 ⁻¹² at RSL = -30 dBm
7	BER Alarm Output	Adjustable 10 ⁻³ /10 ⁻⁴ /10 ⁻⁵ /10 ⁻⁶ (AIS injection point)
8	ODU Monitor Items	Metering access Received signal level (AGC V) Output power level (TX PWR) ODU primary supply voltage (ODU PS)
9	LED Display	a) Operating PWR (Green) b) IDU Alarm (Red)* c) ODU Alarm (Red)* d) Maintenance (Yellow)*
10	Guaranteed Temperature Range	0°C to +50°C
11	Dimensions 1) 2 x 2 MB/4 x 2 MB/8 x 2 MB(75 ohm interface) 16 x 2 MB (120 ohm interface)/ 1 x 8MB/1 x 34 MB (fixed bit rate)/ 2/4 x 2 MB bit rate free/ 16 x 2 MB bit rate free (120 ohm interface) 2) 16 x 2 MB (fixed bit rate for 75 ohm interface)/ 8/16x 2 MB bit rate free (75 ohm interface) Weight 1) 2 x 2MB/4 x 2 MB/8 x 2 MB(75 ohm interface)/16x 2 MB(120 ohm interface)/1 x 8 MB/1 x 34 MB 2) 16 x 2 MB (75 ohm interface)	482 (W) x 240 (D) x 44 (H) mm (1+0) 482 (W) x 240 (D) x 132 (H) mm (1+1) 482 (W) x 240 (D) x 66 (H) mm (1+0) 482 (W) x 240 (D) x 154 (H) mm (1+1) Approx. 4.0 kg, including all options (1+0) Approx. 11.0 kg, including all options (1+1) Approx. 5.0 kg, including all options (1+0) Approx. 12.0 kg including all options (1+1)

*Alarm items are shown in Table 2.

8. APPLICATIONS

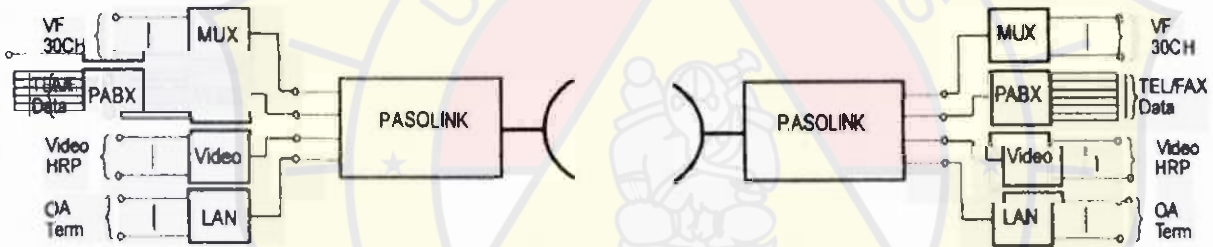
8.1 Service Applications



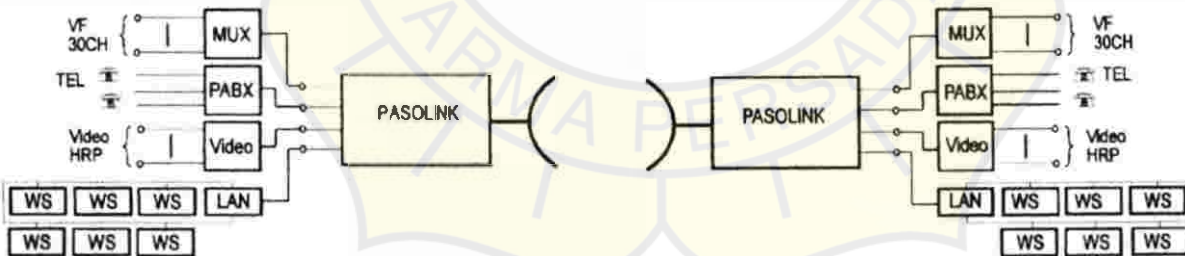
(a) Lease Service



(b) Voice / Data Service



(c) Multi-media Service-1



(d) Multi-media Service-2

Figure 13. Application Services

INSTALLATION

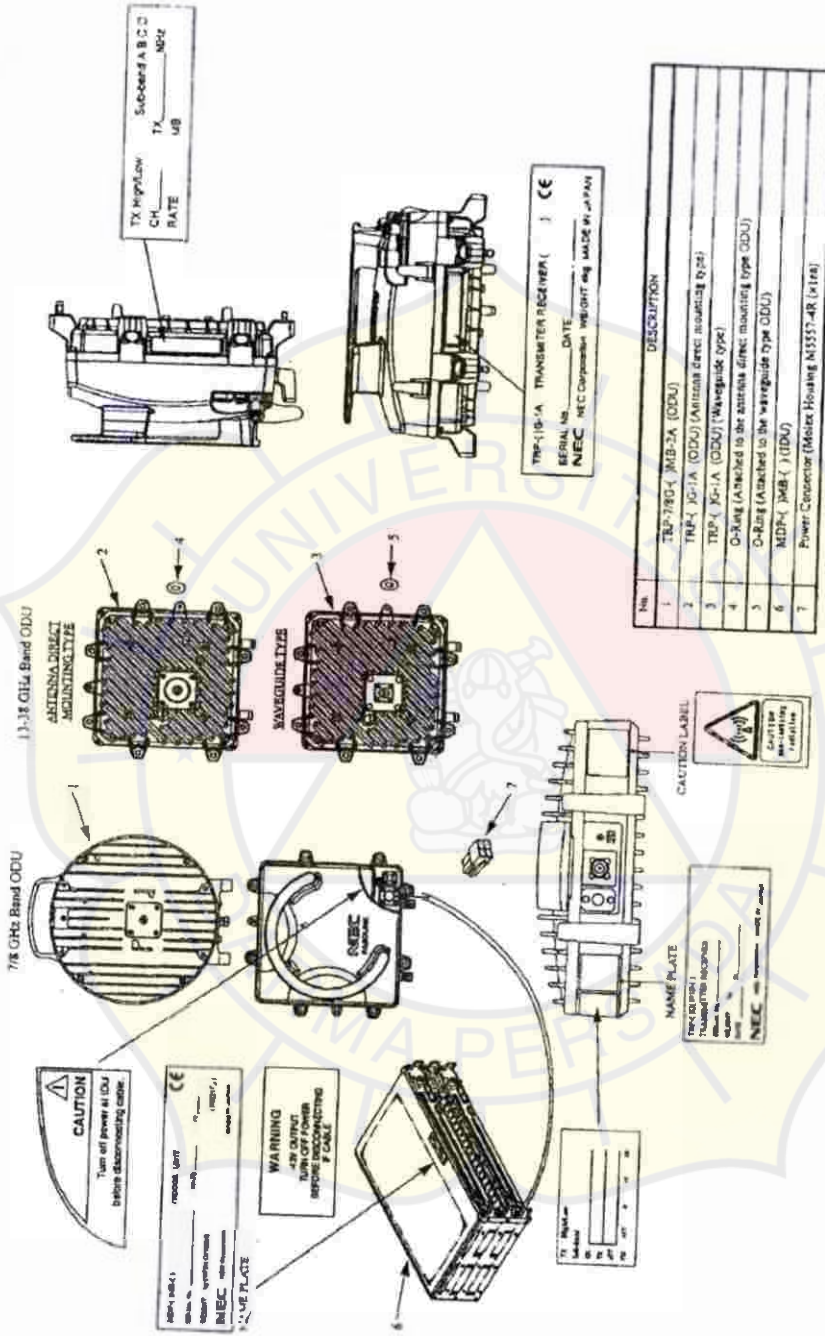


Fig. 2-2 Packing List for ODU, ODU and ANT

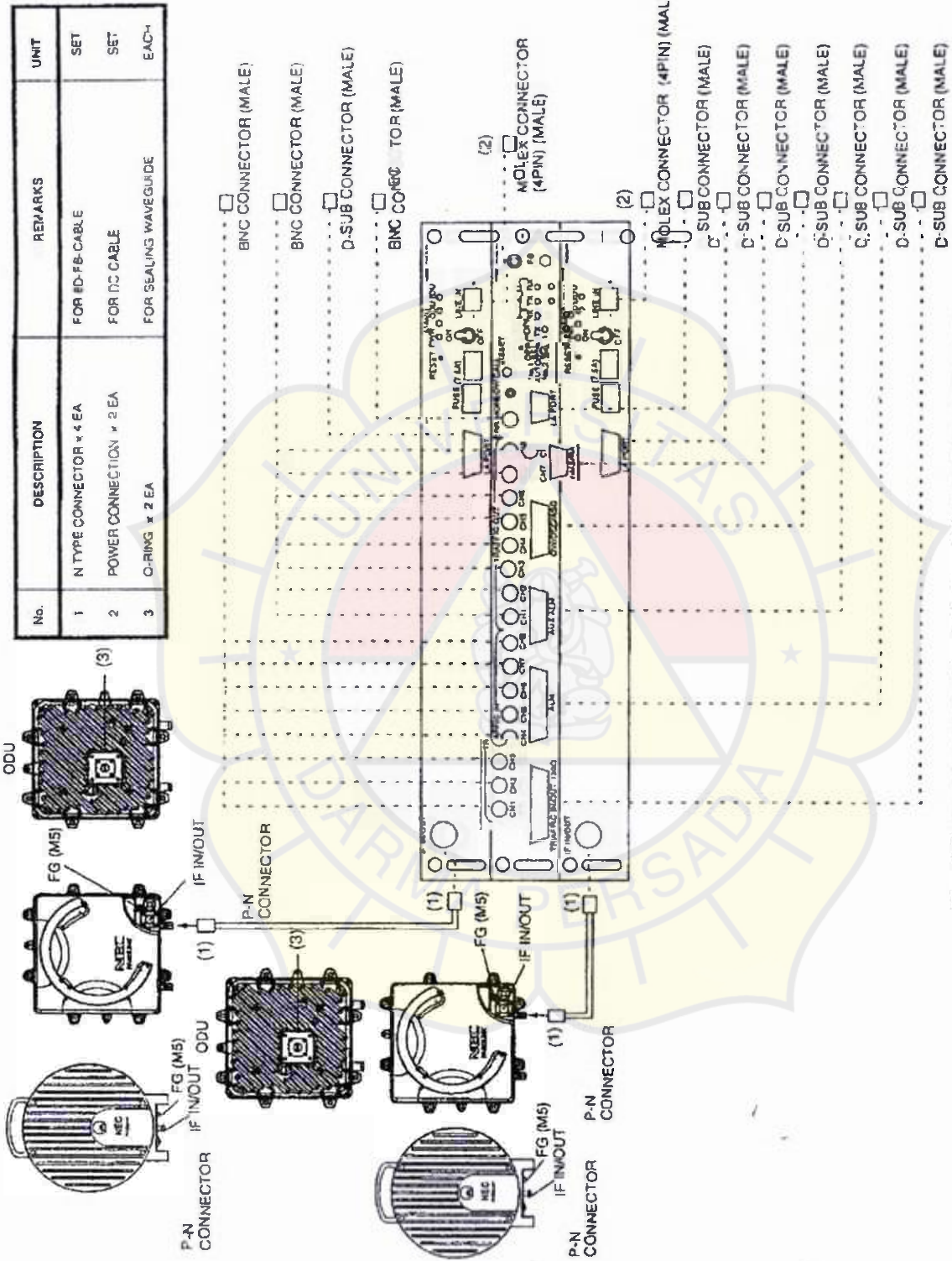


Fig. 2-5 Packing List of Installation Kit for 2 MB x 8 System



Information for Waveguide Assemblies

Frequency* GHz	Waveguide Type	Flange Type ^{††}	Connector [†]		Pressure Window	Flex-Twist 2 ft (0.6 m)
			Tunable	Fixed-Tuned		
Standard Waveguide Assemblies						
14.97	EWP180-180	UG-595/U ^{†††}	1180DCT	1180SC	55000A-42	F042PA0240BS VSWR 1.08 (28.3)**
		PBR220	1180DCMT	1180SCM	112587	F042MK0600KS
		PDR180	-	2180SEM	223306-180	F051MH0600HS
Standard Waveguide Assemblies						
14.97	EW180-180	UG-595/U ^{†††}	1180DCT	1180SC	55000A-42	F042PA0240BS VSWR 1.15 (23.1)**
		PBR220	1180DCMT	1180SCM	112587	F042MK0600KS
		PDR180	-	2180SEM	223306-180	F051MH0600HS

* Refer to other frequency bands.
 † VRL (dB) Up to 360ft (90 m). The indicated maximum VSWR characteristics are guaranteed for factory assemblies and are typical for field assemblies.
 ‡ Connectors ordered with factory assemblies are factory tuned.
 †† Information on nutting flanges refer to pages 214-218.
 ††† Cover flange with gasket groove. Males with UG choke or cover flanges.

Accessories – Photos and detailed descriptions on pages 194-200

Description	Type No.	Description	Type No.
Adapters		Other Accessories	
Kit of 10, Recommended maximum spacing on installation is 3 ft (0.91 m)	43211A	Flaring Tool Kit for connector attachment	201439
Cap-In Flange Kit of 10, Recommended spacing for outdoor is 3 ft (0.91 m)	EWSH-180	Splice	1180DZ
Kit of 10, 3/8" bolts, lock washers, nuts (19 mm) long	31769-5	Grounding Kit with factory attached, one-hole lug	204989-1
(25 mm) long	31769-1	Grounding Kit with factory attached, two-hole lug	241088-1
Adapter Kit of 10, Stainless steel	3176CA	Grounding Kit with field attachable crimp-on, one-hole lug	204989-21
Adapter Kit of 10, Galvanized	242774	Grounding Kit with field attachable crimp-on, two-hole lug	241088-6
Hardware	242774-M	Grounding Kit with field attachable screw-on lug	204989-31
Adapter Kit of 10, Stainless steel	31670-1	Crimping Tool to field attach lug to Grounding Kit	207270
Diameter, in (mm)	31670-2	Hoisting Grip	43094
(3-50)	31670-3	Cending Tool Kit One each E and H Plane tool	33586-1
(3-75)	31670-4	Connector Reattachment Kit	33544-42
(3-100)	31670-5	Wall-Roof Feed Thru	245314-180
(3-125)	42334	Waveguide Boot for Plates (below)	
(3-150)		4 in (102 mm) dia.	WG84-180
Flange Kit of 10, Galvanized steel		5 in (127 mm) dia.	WG85-180
Rod Support, 3/8" rod, nuts, washers, ceiling bracket		Feed-Thru Plate for Boots (above)	
(105 mm) long, kit of 1	31771	Openings	For 4 in Boots
(105 mm) long, kit of 5	31771-4	1	204673-1
(130 mm) long, kit of 1	31771-9	1	204673-2
(130 mm) long, kit of 5	31771-6	2	48940-2
Standoff Kit of 10, 1/2" (125 mm) standoff		3	48940-3
Diameter, in (mm)		4	204673-4
(20-40)	30848-5	6	48940-4
(40-75)	30848-4	8	48940-6
(75-100)	30848-1	* Standard conditions: 125 mph (200 km/h) survival wind velocity, 0.5 in (13 mm) radial ice. For other conditions see page 196.	
(75-125)	30848-2		
(75-150)	30848-3		
Standoff Kit of 10, 2.5 in (60 mm) standoff			
Diameter, in (mm)			
(100)	41108A-1		
(125)	41108A-2		
(150)	41108A-3		



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- # Graduated from SD Negeri 09 Jakarta, June 1994