

WELCOME

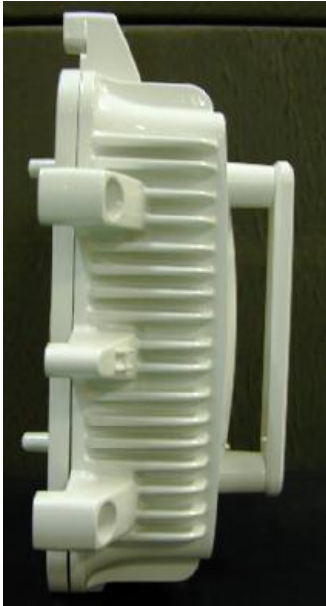
PASOLINK

Point-to-Point PDH Radio

IDU (Indoor unit)

- Modem
- Converts to Intermediate Frequency





ODU (outdoor unit)

- Converts the Intermediate Frequency to much higher Frequency
- Converts the received signal frequency to Much lower Frequency
- Direct reading of the received power level is possible

Feature of PASOLINK (1/4)

- Compact & Light Weight microwave radio link based on 2 Mbit/s signal
- Outdoor/Indoor split mount composition connected by a single IF cable (up to 300 m by 8D-FB Cable)
 - Automatic Level Equalization
- Wide range for frequency menu
 - 7 / 8 / 13 / 15 / 18 / 23 / 26 / 38 GHz
- LAN interfaces for 4/8/16x2MB systems (Optional)
 - Throughput : 2/8/16/32MB (software selectable)
 - CH number : 2 channels
- IDU transmission capacity
 - 1) 2 to 16 x 2MB Bit Rate Free Type
 - 2) 2 to 8 x 2MB Bit Rate Free Type
 - 3) 4 x 2MB Fix Rate type

Feature of PASOLINK (2/4)

- Common Modem Unit for all frequency bands
- Very quick and easy installation
- Ideal system for short hop transmission application
 - Mobile networks (Cell to Cell communication)
 - Public/Private network distribution
 - Entrance link of radio access system
- System Flexibility
 - 1+1 Hot-Standby / 1+0 Unprotected
 - Tributary interface : 120 Ω bal. / 75 Ω unbal.
 - Abundant DSC / ASC channels
 - ODU waveguide, antenna direct mount
(for 7/8 GHz Coaxial cable)

Feature of PASOLINK (3/4)

- ATPC function
- 4PSK modulation
(Spectrally efficient and better threshold level)
- High system gain
- Broadband frequency synthesizer providing multiple channels in a single unit
- Easy adjustment of frequency and TX power by PC
- Standard hitless switch for 1+1 system

Feature of PASOLINK (4/4)

➤ Maintenance facility

Full front access IDU

- Engineering Orderwire (EOW)
- Local provisioning / monitor using PC HyperTerminal mode
- PC Windows / UNIX base NMS
- Remote control of frequency and TX power
- Remote channel loop back for each 2 Mbps
- Firmware download function

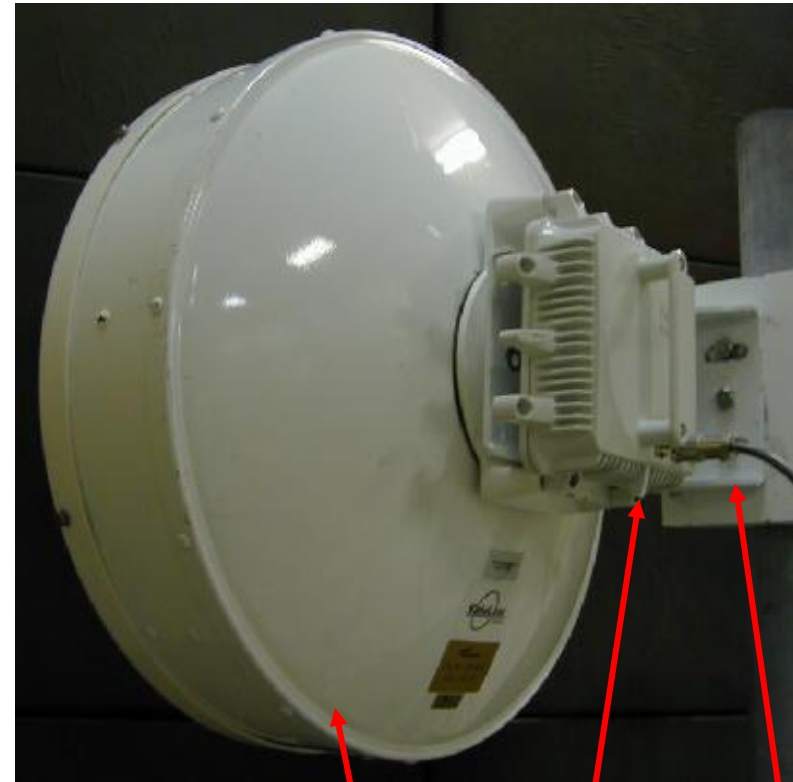
PASOLINK ODU



RX LEV MON

IF IN/OUT

FG



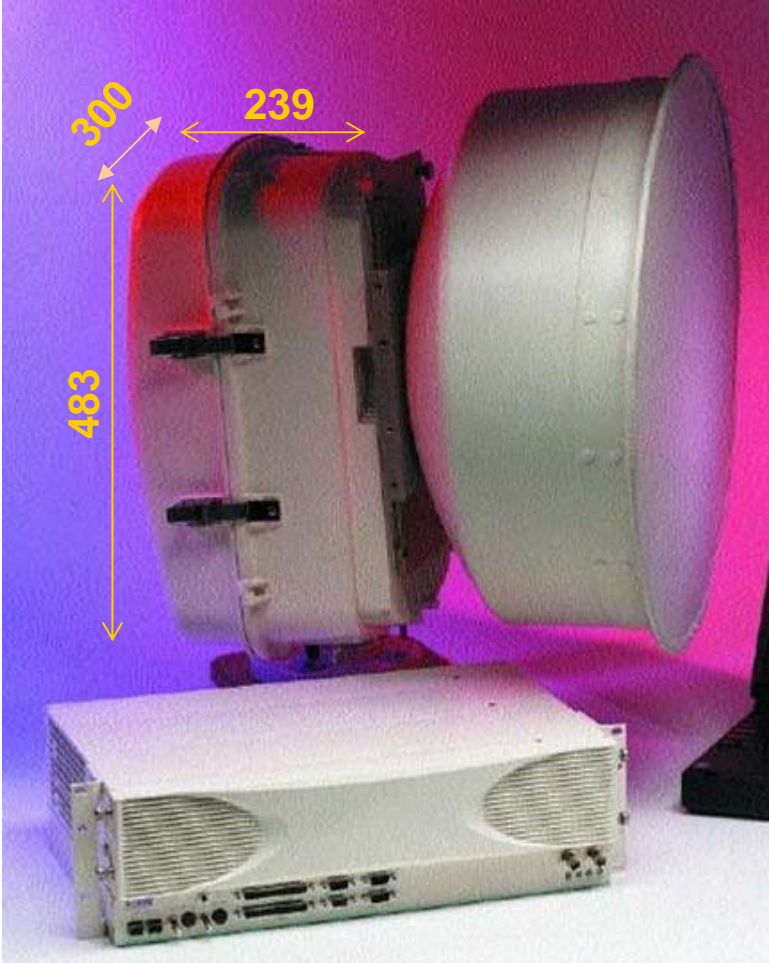
M/W Antenna

ODU

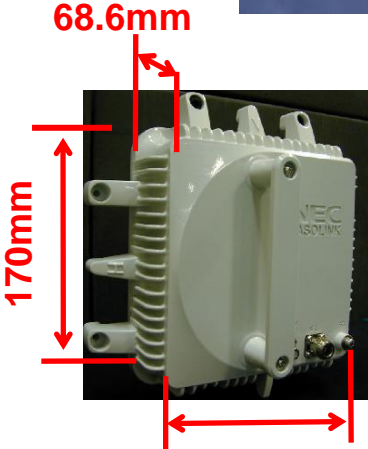
ODU Bracket

Comparison of PASOLINK ODU

A Company



B Company

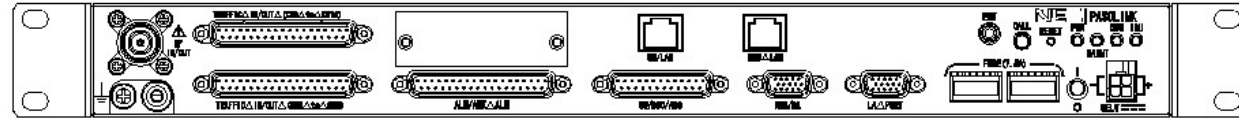


NEC

**Cubage = 1982.5cm³
Weight = 3kg**

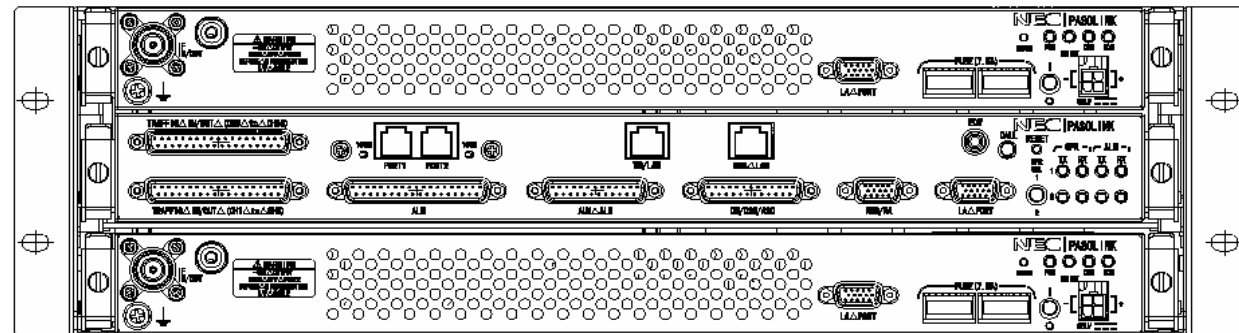
PASOLINK IDU (1/3)

1+0 System (1U)



Dimensions : 482 (W) x 240 (D) x 44 (H) mm
Weight : 4 kg

1+1 System (3U)



Dimensions : 482 (W) x 240 (D) x 132 (H) mm
Weight : 11 kg

Power Supply : DC \pm 48 V (\pm 20 to \pm 60 V)

	<u>1+0</u>	<u>1+1</u>
Power Consumption :	Approx. 41 W	86 W (for 16E1 Rate free w/o Optional module)C

PASOLINK IDU (2/3)

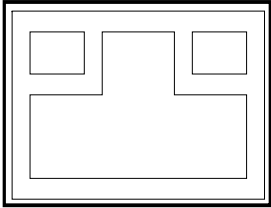
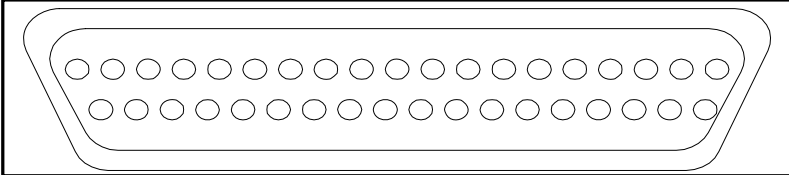
LAN Interface (Optional)

CH1/CH2: 10Base-T/100Base-TX

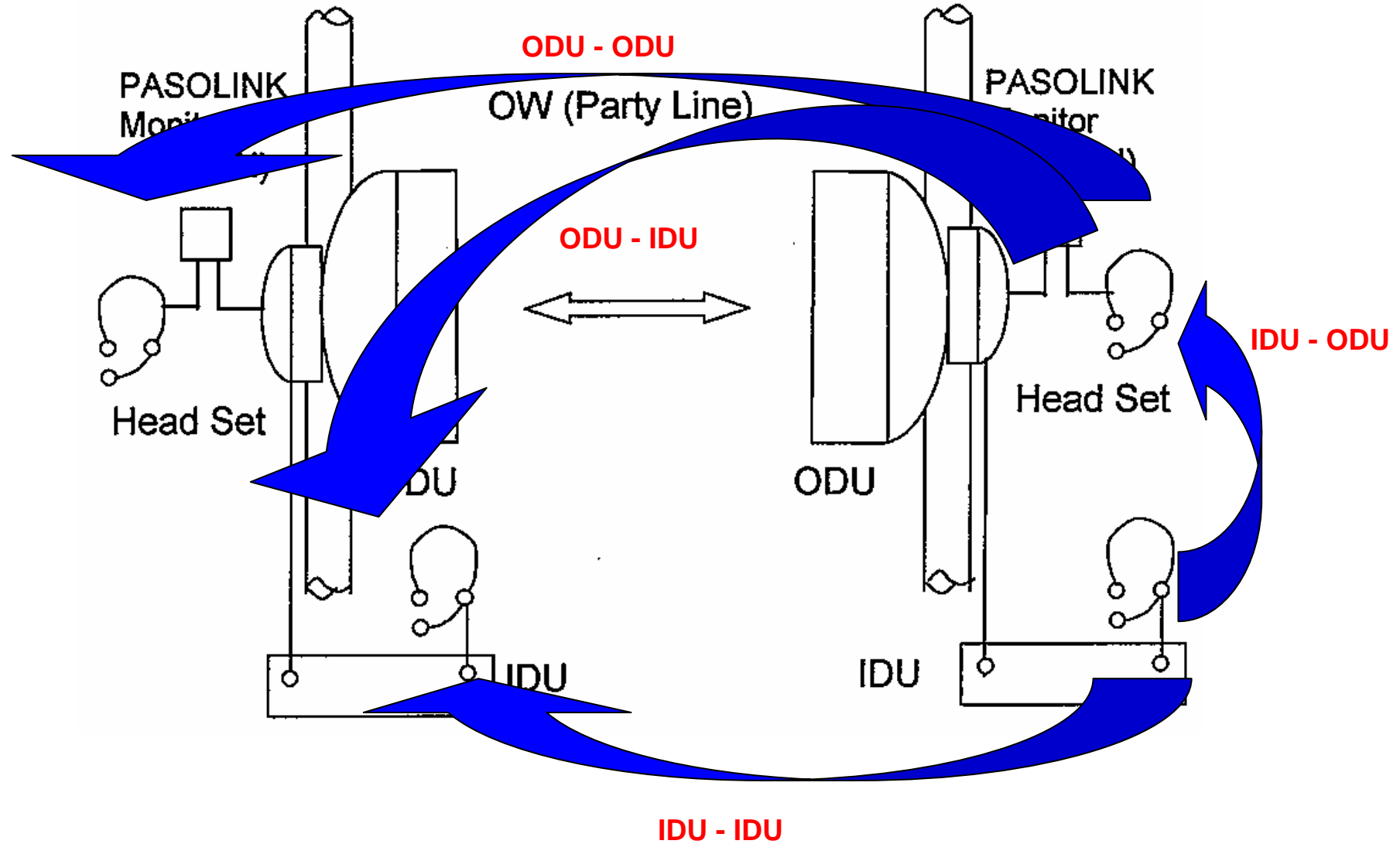


E1 Interface 75/120 ohm Selectable

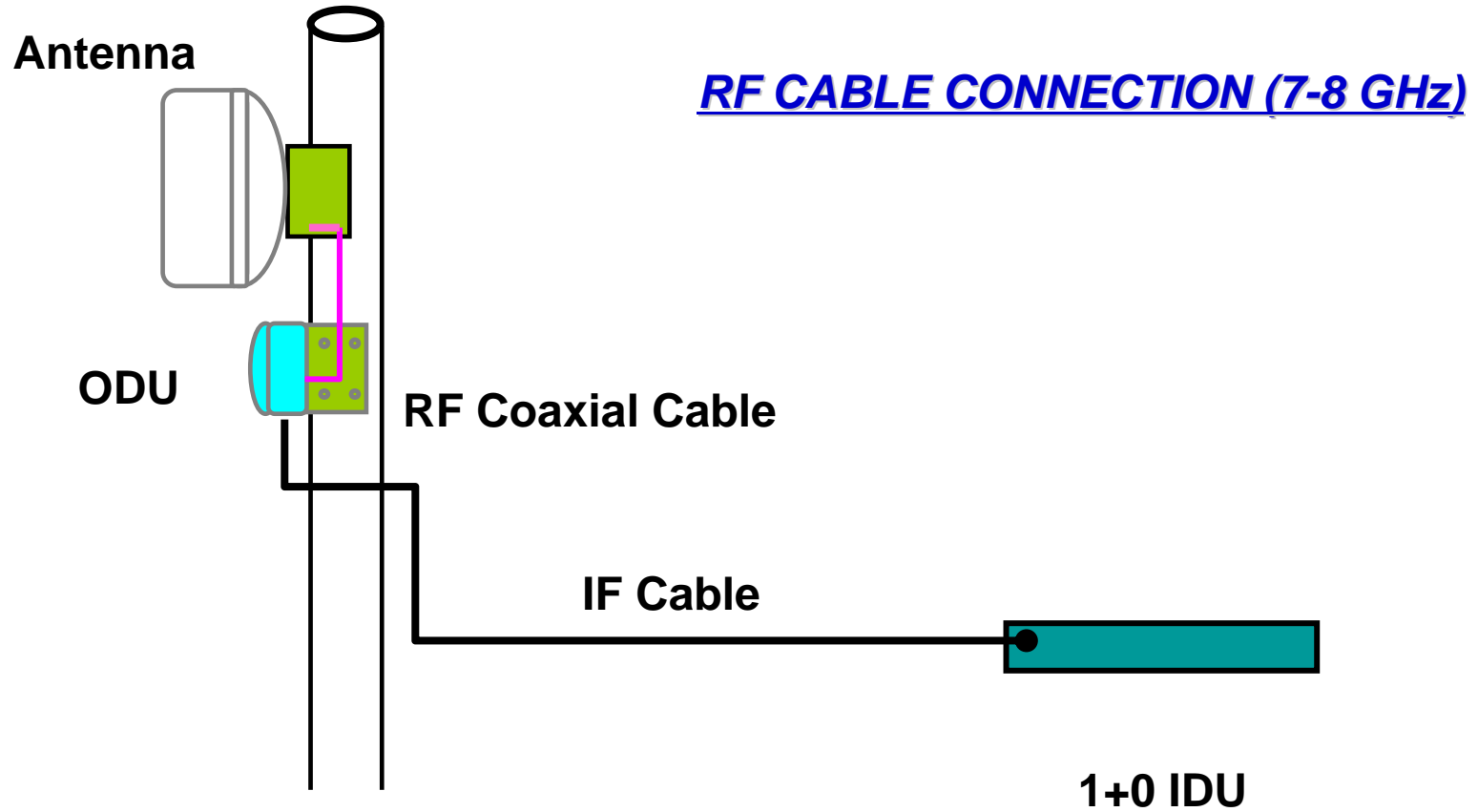
PASOLINK IDU (3/3)

10Base-T/100Base-TX		G.703 75/120ohm E1	
RJ-45		D-SUB	
			
LAN P1 throughput	LAN P2 throughput	E1 Available CH	E1 Available CH
--	--	CH1-8(8CH)	CH9-16(8CH)
2MB	2/-MB	CH2-8(7CH)	CH10-16(7CH)
4MB	4/2/-MB	CH3-8(5CH)	CH12-16(5CH)
8MB	8/4/2/-/MB	CH5-8(4CH)	CH13-16(4CH)
16MB	16/8/4/2/-MB	--	--
32MB	--	--	--

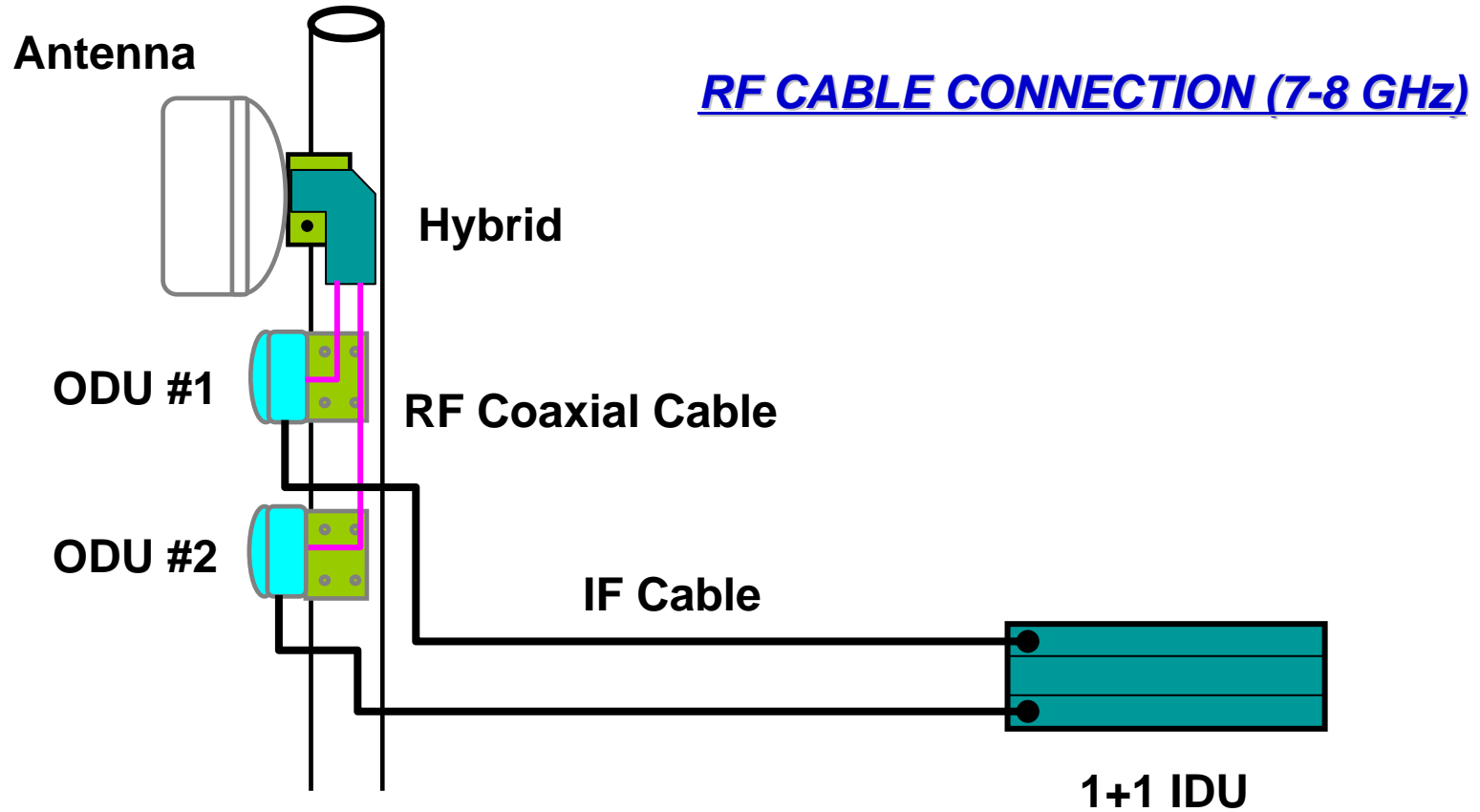
Engineering Orderwire (EOW)



Mounting Configuration for 1+0 HS System (1/5)

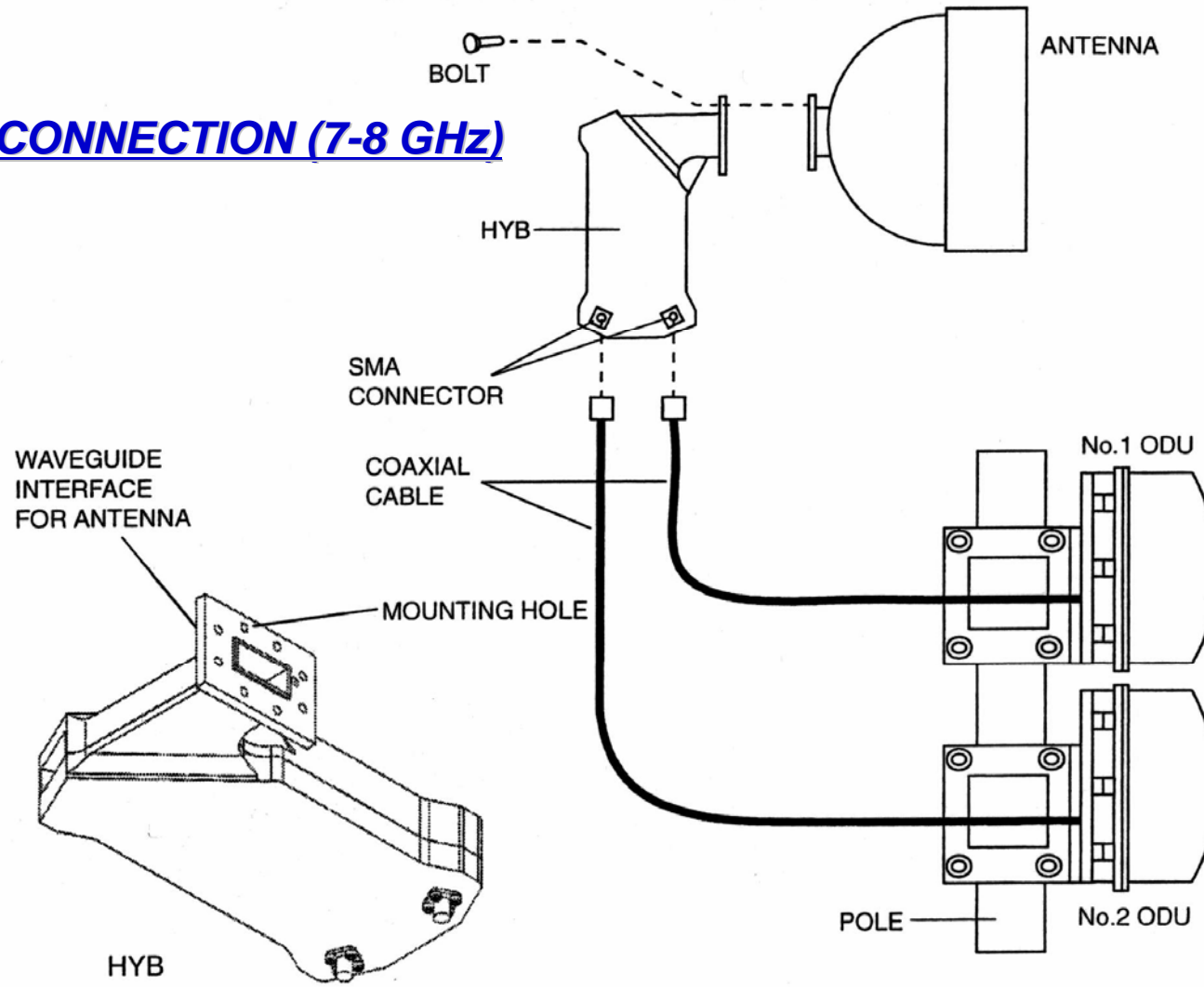


Mounting Configuration for 1+1 HS System (2/5)



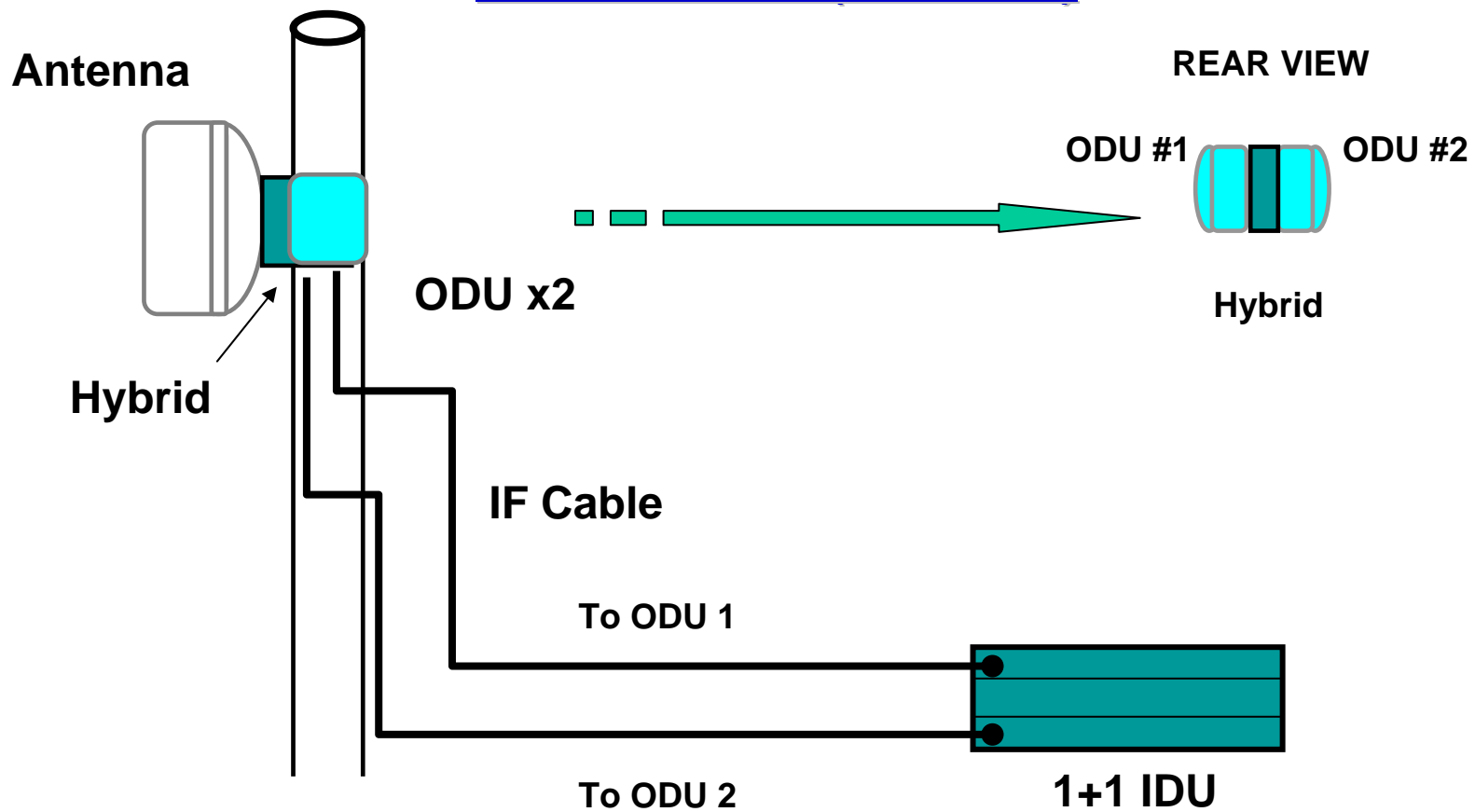
Mounting Configuration for 1+1 HS System (3/5)

RF CABLE CONNECTION (7-8 GHz)

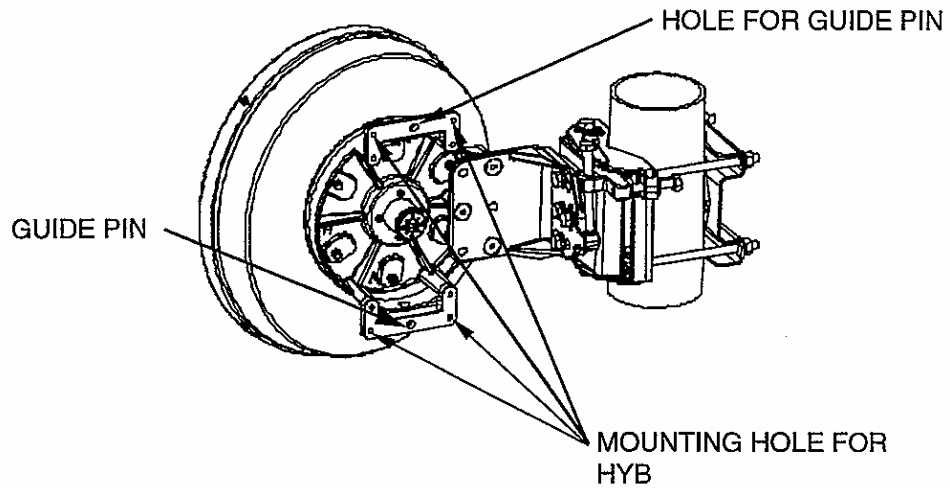


Mounting Configuration for 1+1 HS System (4/5)

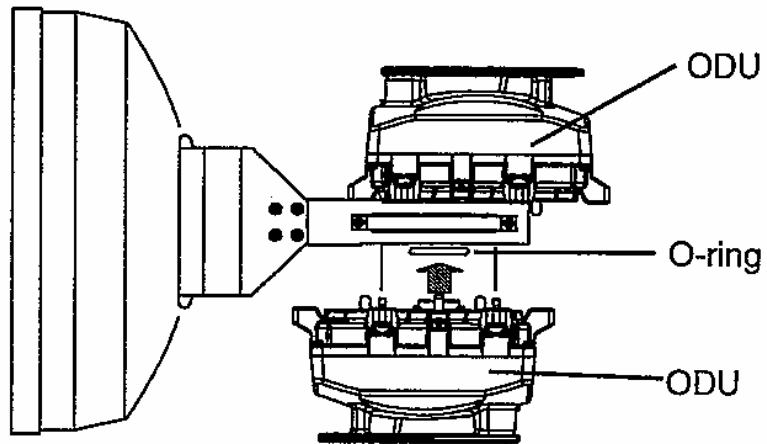
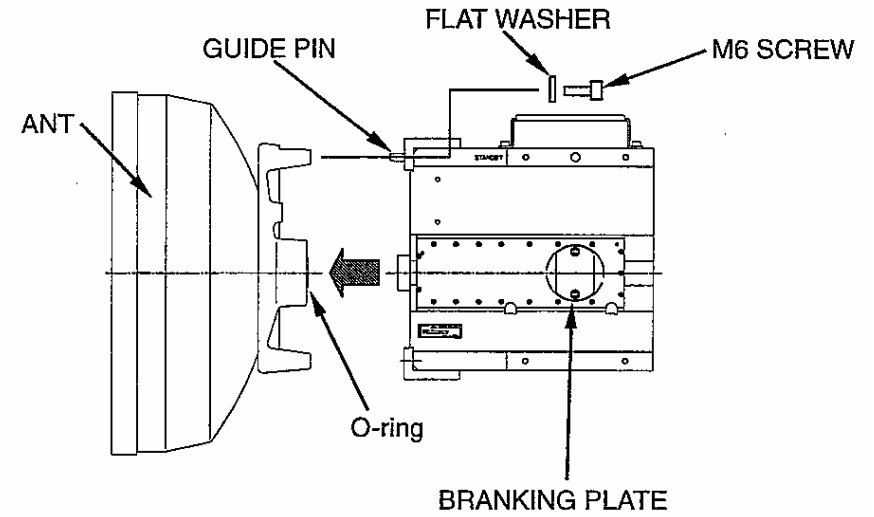
DIRECT MOUNT (13-38 GHz)



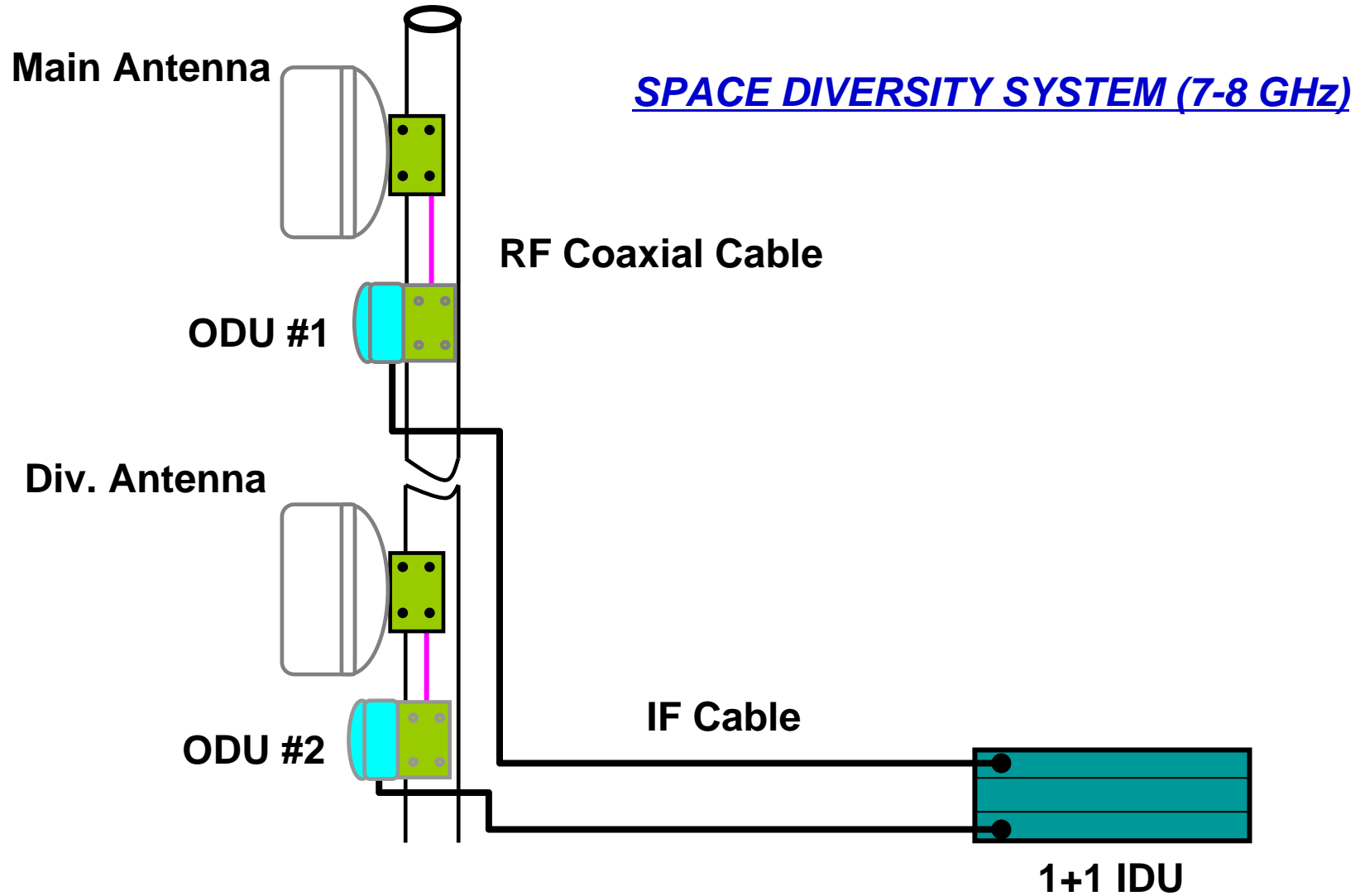
Mounting Configuration for 1+1 HS System (5/5)



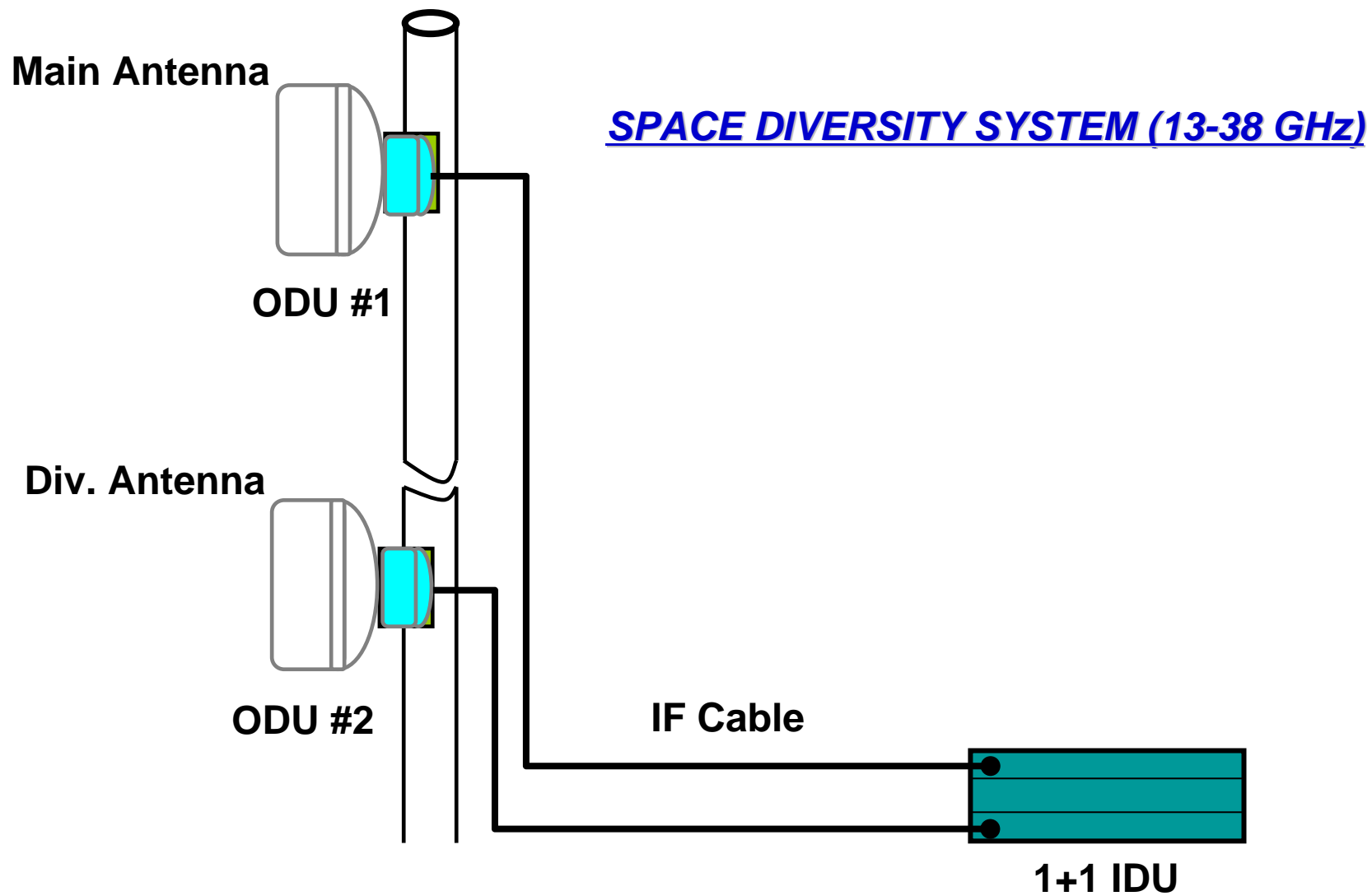
DIRECT MOUNT (13-38 GHz)



Mounting Configuration for 1+1 HS/SD System (1/2)



Mounting Configuration for 1+1 HS/SD System (2/2)



PASOLINK Field MTBF

PASOLINK has low potential for failure

Supplied from Mar 2000 >> Oct 2004 for PASOLINK 4x2MB
Equipment

In service volume >> 24,950 systems

IDU MTBF = 213 years (291,416,000/156=1,868kH)

ODU MTBF = 189 years (418,317,000/252=1,660kH)

LINK MTBF = >50 years

PERFORMANCE OF PASOLINK M/W EQUIPMENT

Power Consumption (Approx. at -48 VDC INPUT)		
	1+0	1+1
IDU	16W (4x2 Mbps, Fixed rate)	35W (4x2 Mbps, Fixed rate)
	18W (Rate Free)	40W (Rate free)
ODU	23W	23W x 2
Optional Card	PM Card	4.5W
	DSC INTFC	1W
	WAYSIDE INTFC	1W
	ASC INTFC	1W
	ALM INTFC	1W
	64K INTFC	1W
	LAN INTFC	9W

GENERAL OUTLOOK

INTERCONNECTION BETWEEN IDU AND ODU

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 (workable : -40°C to +55°C)

Indoor Unit (IDU)

No	Item	Specification
1	Modulation Type	4PSK (with differential coding)
2	Baseband Interface 16 x 2 Mbps 8 x 2 Mbps 4 x 2 Mbps 2 x 2 Mbps	2.048 Mbps \pm 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 ($\alpha=0.5$)
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)

Indoor Unit (IDU)

8	ODU Monitor Items	Metering access Received signal level (AGC V) Output power level (TX PWR)
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 (workable : -10°C to +60°C) (storage : -33°C to +70°C)
11	Dimensions 4 x 2 Mbps fixed rate (75/120 ohms) 2/4/8/16x2 Mbps bit rate fee (75/120 ohms) Weight 4 x 2 Mbps fixed rate (75/120 ohms) 2/4/8/16x2 Mbps bit rate free (75/120 ohms)	 482 (W) x 240 (D) x 44 (H) mm (1+0) 482 (W) x 240 (D) x 132 (H) mm (1+1) Approx. 4.0 kg, including all options (1+0) Approx. 11.0 kg, including all options (1+1)

ALARM ITEMS FOR (1+0)

#	Alarm Item displayed on PC	Condition	ALM Indication LED
#	Alarm Item displayed on PC	Condition	ALM Indication LED
16	TX PWR ALM	Transmitter output power decrease <Activated when 3 to 5dB lower than preset value>	ODU
17	RX LEV ALM	Receiving level decrease <Activated when less than -95dBm+/-5dB>	ODU
18	APC1 ALM	RF 1st local APC loop out of lock	ODU
19	APC2 ALM	RF 2nd local APC out of lock	ODU
20	IF INPUT ALM	TX IF input level decrease <Activated when less than approx. -63dBm>	ODU
21	MAINT	System under maintenance < This alarm is used for triggering of AIS injection >	MAINT
13	MOD ALM	MOD 850MHz PLL APC loop is out of lock	IDU
14	DEM ALM	Carrier Asynchronous	IDU
15	OPR ALM	CPU communication error between IDU and ODU	IDU/ODU blinking

Outdoor Unit (ODU)1+0

No.	Item	13 GHz	15GHz	18GHz	23GHz	26 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 step, variable						± 1.0 dB
3	ATPC range	0 to 30 dB, in 1 dB step						
4	Frequency Stability	± 5 ppm						±10 ppm
5	Receiver Noise Figure (at Ant. port)	4.5 dB	4.5 dB	5.5 dB	6.5 dB	7.0 dB	7.5 dB	+2 dB (13/15/18G) +1.5 dB(23/38G)
6	Threshold Level (dBm measured at Ant. port)							
	BER = 10 ⁻³ 34 MB	-84.5	-84.5	-83.5	-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

Outdoor Unit (ODU)1+0

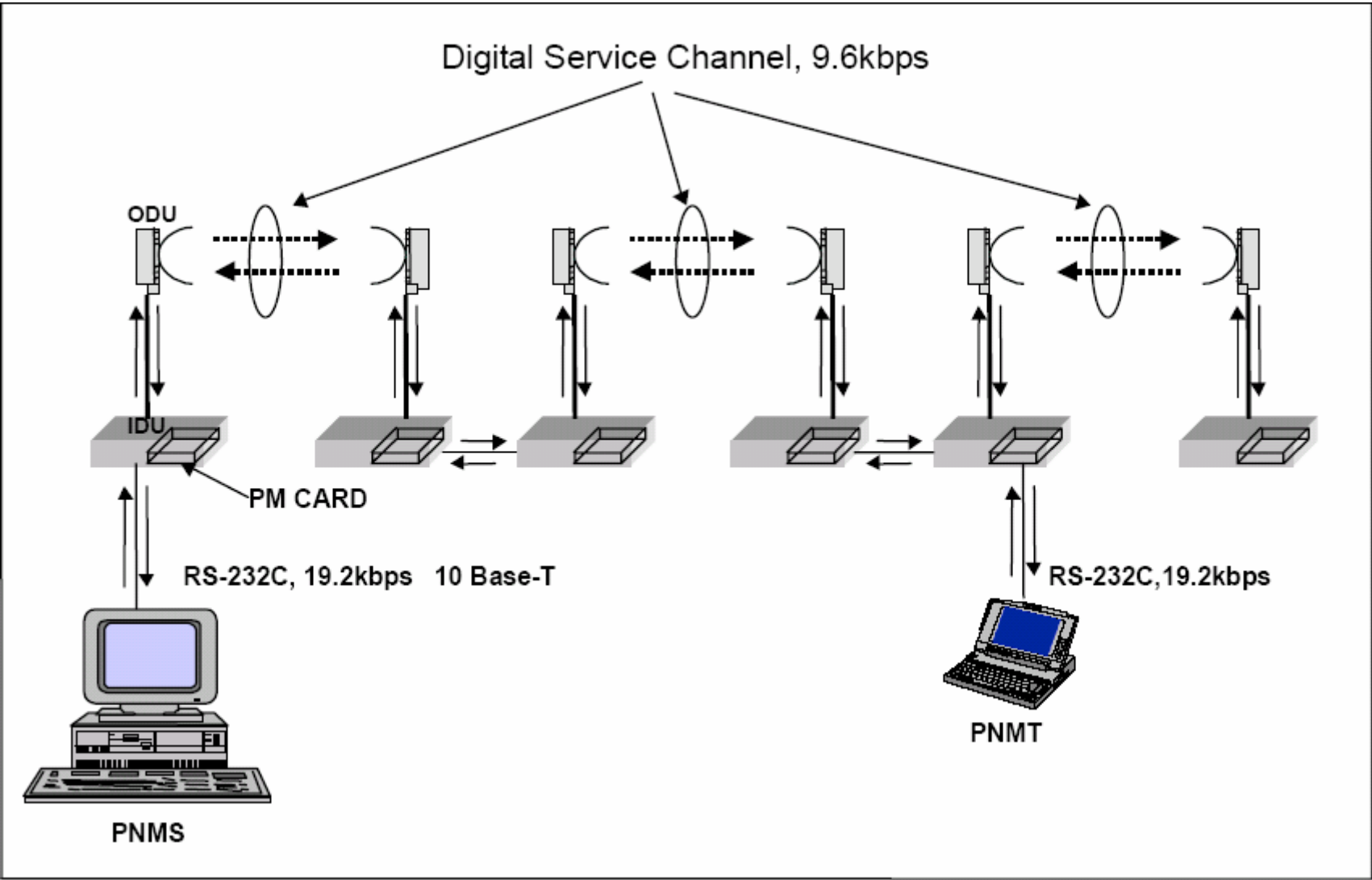
No.	Item	13 GHz	15GHz	18GHz	23GHz	26 GHz	38GHz	Guaranteed
7	System gain (dB measured at Ant. port)							
	BER = 10 ⁻³ 34 MB	109.5	107.5	106.5	105.5	102.0	96.5	-4.0 dB
	17 MB	112.5	110.5	109.5	108.5	105.0	99.5	-4.0 dB
	8 MB	115.5	113.5	112.5	111.5	108.0	102.5	-4.0 dB
	4 MB	118.5	116.5	115.5	114.5	111.0	105.5	-4.0 dB
	BER = 10 ⁻⁶ 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	
8	Frequency Agility(MHz without changing filters)	56	56 - 100	252	280			-
9	Maximum Input Level	-15 dBm (No Error)						-
10	Metering Access	RX Signal Level						-
11	Temperature range	-						-33°C to + 50°C (-40°C to + 55°C)* *workable

Network Management System (OPTIONAL)

Key elements of NMS for PASOLINK are as follows

- Central computer : PASOLINK Network Management System (PNMS)
- Mobile Terminal : PASOLINK Network Management Terminal (PNMT)
- PASOLINK Management card : (PM card)

Network Management System (OPTIONAL)

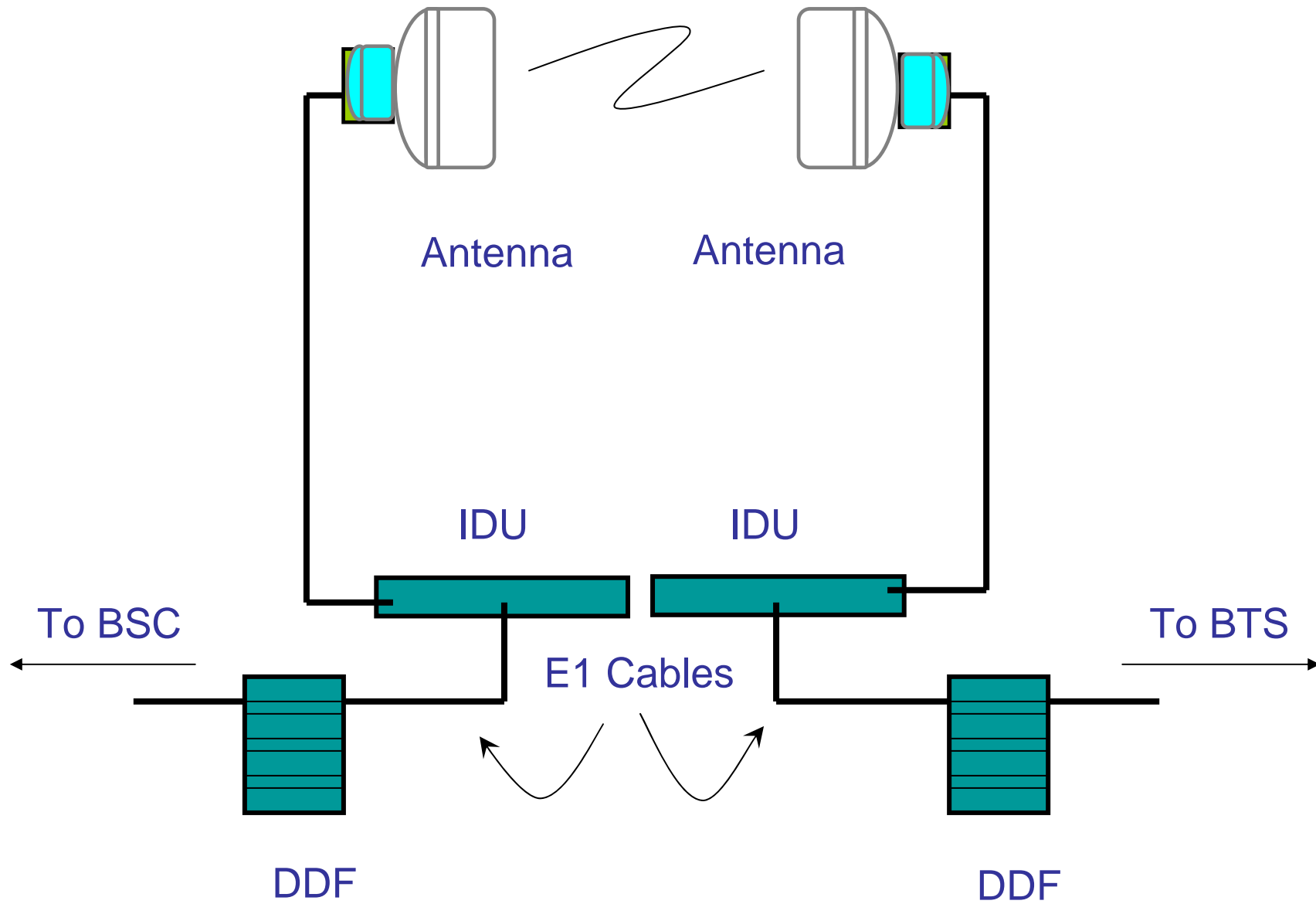


NMS CONCEPT

PNMT Features

- Standard Platform
- User-friendly Operation
- Link oriented M&C
- Remote access and control
- Event Logging
- Alarm Management PNMS only
- ITU-T G826 performance monitor
- security
- SNMP interface (PNMS only, OPTIONAL)

SCOPE OF M/W LINK



Thank You