2 Equipment overview
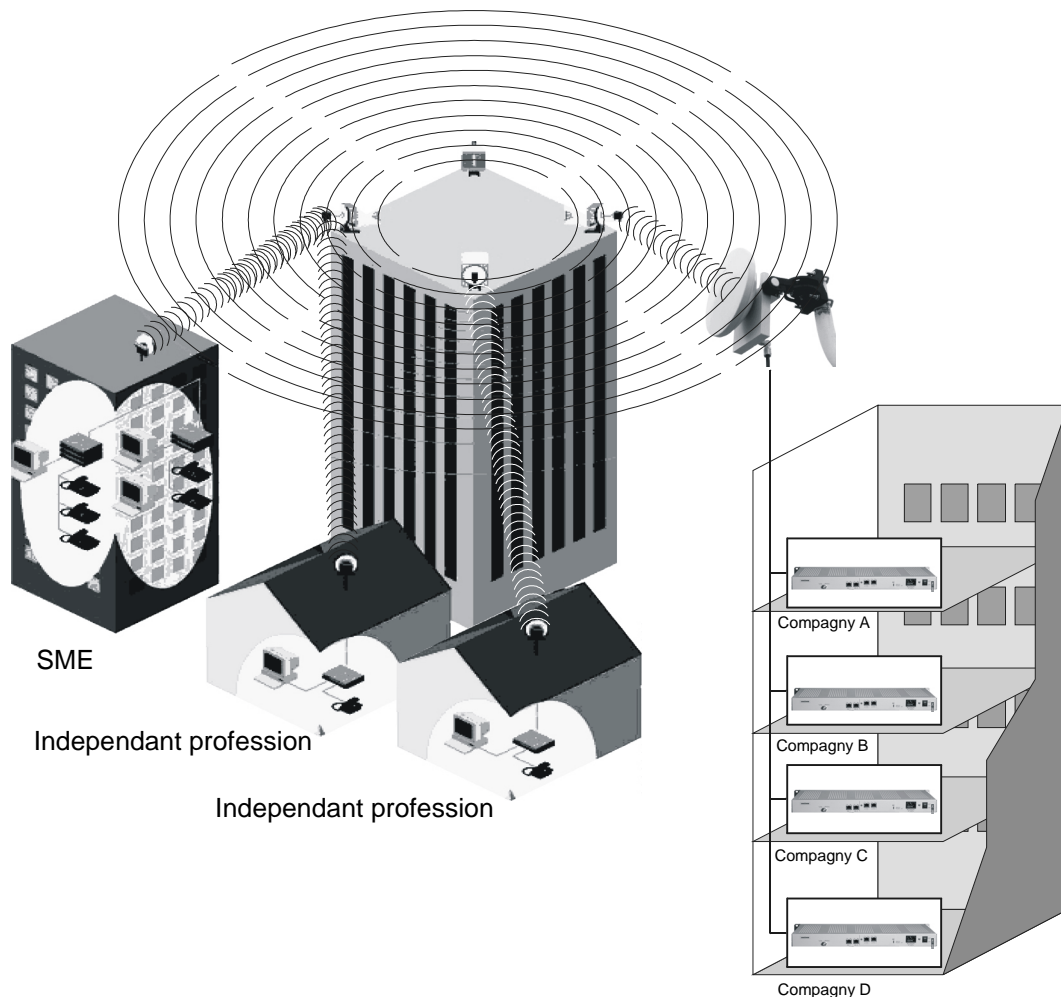
2.1 Overview of the A7390 system

The **Alcatel 7390** is a multi-service **broadband wireless local loop** system designed to provide telecom services to small and medium-sized enterprises.

Broad band WLL (Wireless Local Loop) system, Alcatel 7390 allows **operators** to offer rapid provision - to a large number of client sites - of a comprehensive range of telephone and data transmission **services**.

For **cellular phone network** operators, Alcatel 7390 offers the possibility of linking **base stations** to base station **controllers**. This makes Alcatel 7390 an economical transmission solution, for the implementation or extension of high traffic density areas coverage.

For **mixed network** operators (fixed and mobile), Alcatel 7390 enables to connect, with the same system, fixed professional end user as well as **base stations of cellular telephony**.


SME

Independant profession

Independant profession

Compagny A

Compagny B

Compagny C

Compagny D

Figure 1 – A7390 System - Local point - multipoint service distribution -

2.2 Composition of the A7390 system

An A7390 network cell consists of the following:

– a common **base station** designated 7390BS;

– and several **terminal stations** distributed across the user sites, and designated **7390TS**.
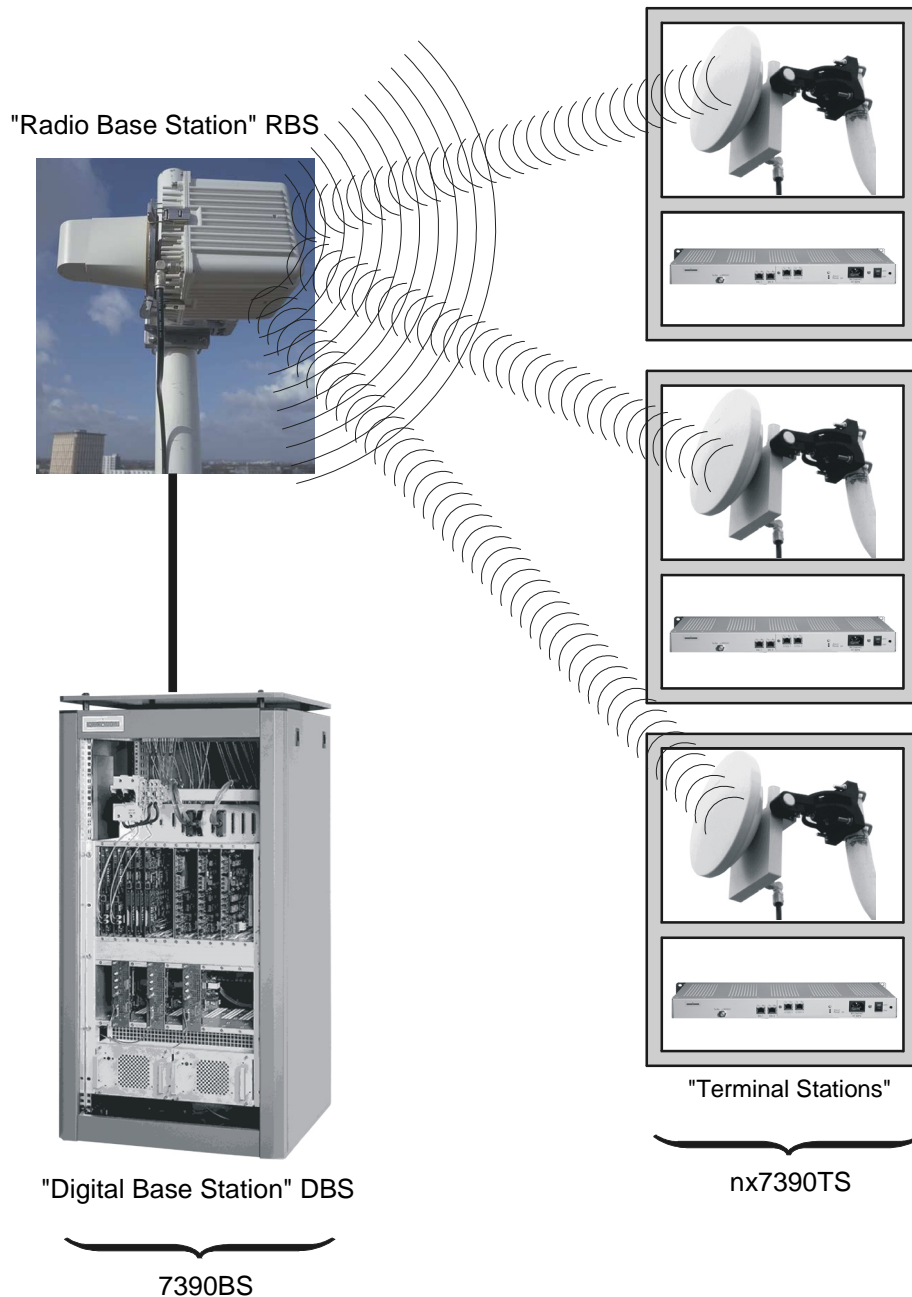
Figure 2 – Base Station and Terminal Stations

2.3 A7390 system specifications

2.3.1 Frequency bands used

25 GHz frequency band:

– CEPT T/R 13-02E European recommendation 24.5 - 26.5 GHz

26 GHz frequency band:

– MPT (Japan) 25.25 - 27 GHz

– Korea 24.25 - 24.59 ; 25.73 - 26.07 GHz

28 GHz frequency band:

– 27 GHz (LMCS - Canada) 27.35 - 28.35

– 28 GHz (CEPT) 28.0 - 28.5, 29.0 - 29.5

– 29 GHz (LMDS - USA) 27.5 - 28.35, 29.10 - 29.25

2.3.2 Radio transmission specifications (typical values)

The following table gives the main radio characteristics of the A7390 wireless system.

A downstream (BS to TS) carrier is combined with up to four upstream (TS to BS) carriers.

Channel bandwidth	Downstream			
	14 MHz		**28 MHz**	
Occupied bandwidth	13.63 MHz		27.25 MHz	
Roll-off factor	35%		35%	
Modulation	QPSK		QPSK	
Gross bit rate	20.19 Mbit/s		40.37 Mbit/s	
Inner Code	Convol. 7/8 (k=7)		Convol.7/8 (k=7)	
Interleaving	depth 12		depth 12	
Outer Code	Reed-Solomon (204,188,8)		Reed-Solomon (204,188,8)	
Bit rate before coding	16.19 Mbit/s		32.38 Mbit/s	
Radio	**25 GHz**	**28 GHz**	**25 GHz**	**28 GHz**
RBS output power (antenna port)	17 dBm	17 dBm	17 dBm	17 dBm
Transmit antenna gain (case of standard 90° antenna)	15 dB	15 dB	15 dB	15 dB
Receive antenna gain (with radome)	35 dB	34.5 dB	35 dB	34.5 dB

	Upstream			
Channel bandwidth	**3.5 MHz**		**7 MHz**	
Occupied bandwidth	3.36 MHz		6.72 MHz	
Roll-off factor	25%		25%	
Modulation	D-QPSK		D-QPSK	
Gross bit rate	5.38 Mbit/s		10.75 Mbit/s	
Outer Code	Reed-Solomon (63,53,5)		Reed-Solomon (63,53,5)	
Bit rate before coding	4.19 Mbit/s		8.38 Mbit/s	
Radio	**25 GHz**	**28 GHz**	**25 GHz**	**28 GHz**
TS output power (antenna port)	14 dBm	14 dBm	14 dBm	14 dBm
Transmit antenna gain	35 dB	34.5 dB	35 dB	34.5 dB
Receive antenna gain (with radome)	15 dB	15 dB	15 dB	15 dB

2.3.3 Capacity

The system capacity depends on the **traffic** mix between data services (transported on ATM cells) and leasedlines or telephony services (transported on TDM circuits).

It also depends on the **channeling** and the **number of upstream channels**.

Figures are given in the following tables for three mix examples : **minimum**, **medium** and **maximum** circuit capacity but any intermediate mix is possible.

Downlink: 28 MHz **Uplink: 1 x 7 MHz**	Trafic MIX: circuit capacity		
	Minimum	Medium	Maximum
Nb of circuits: 64 kbit/s	0	60	120
ATM uplink capacity (cells/s)	18.823	9.412	0
ATM downlink capacity (cells/s)	75.512	66.530	57.399

Downlink : 28 MHz **Uplink : 2 x 7 MHz**	Trafic MIX: circuit capacity		
	Minimum	Medium	Maximum
Nb of circuits: 64 kbit/s	0	120	240
ATM uplink capacity (cells/s)	37.647	18.823	0
ATM downlink capacity (cells/s)	75.512	57.548	39.286

Downlink : 28 MHz Uplink : 3 x 7 MHz	Trafic MIX: circuit capacity		
	Minimum	Medium	Maximum
Nb of circuits: 64 kbit/s	0	180	360
ATM uplink capacity (cells/s)	56.471	28.235	0
ATM downlink capacity (cells/s)	75.512	48.566	21.173

Downlink : 28 MHz Uplink : 4 x 7 MHz	Trafic MIX: circuit capacity		
	Minimum	Medium	Maximum
Nb of circuits: 64 kbit/s	0	240	480
ATM uplink capacity (cells/s)	75.294	37.647	0
ATM downlink capacity (cells/s)	75.512	39.585	3.084

Downlink: 14 MHz Uplink: 1 x 3.5 MHz	Trafic MIX: circuit capacity		
	Minimum	Medium	Maximum
Nb of circuits: 64 kbit/s	0	30	60
ATM uplink capacity (cells/s)	9.412	4.706	0
ATM downlink capacity (cells/s)	38.047	33.519	28.990

Downlink : 14 MHz Uplink : 2 x 3.5 MHz	Trafic MIX: circuit capacity		
	Minimum	Medium	Maximum
Nb of circuits: 64 kbit/s	0	60	120
ATM uplink capacity (cells/s)	18.824	9.412	0
ATM downlink capacity (cells/s)	38.047	28.990	19.934

Downlink : 14 MHz Uplink : 3 x 3.5 MHz	Trafic MIX: circuit capacity		
	Minimum	Medium	Maximum
Nb of circuits: 64 kbit/s	0	90	180
ATM uplink capacity (cells/s)	28.235	14.118	0
ATM downlink capacity (cells/s)	38.047	24.462	10.877

Downlink : 14 MHz	Trafic MIX: circuit capacity		
Uplink : 4 x 3.5 MHz	Minimum	Medium	Maximum
Nb of circuits: 64 kbit/s	0	120	240
ATM uplink capacity (cells/s)	37.647	18.824	0
ATM downlink capacity (cells/s)	38.047	19.934	1.821

2.4 Simplified description of the Base Station (7390BS)

The A7390 system Base Station (**7390BS**) consists of the following main elements:

- – one or more (up to 4) external transceivers, comprising the **radio and the antenna** part and designated "**RBS**" (Radio Base Station);

- – one modem rack, including the power supply unit and interfaces; this is the "**indoor**" part and designated **DBS** (Digital Base Station);

- – a **cable** linking the RBS and the DBS ("RBS/DBS link");

- – a network management and configuration station (**7390LT**), based on the use of a PC with appropriate software.

2.5 Examples of configuration of the Base Station (7390BS)
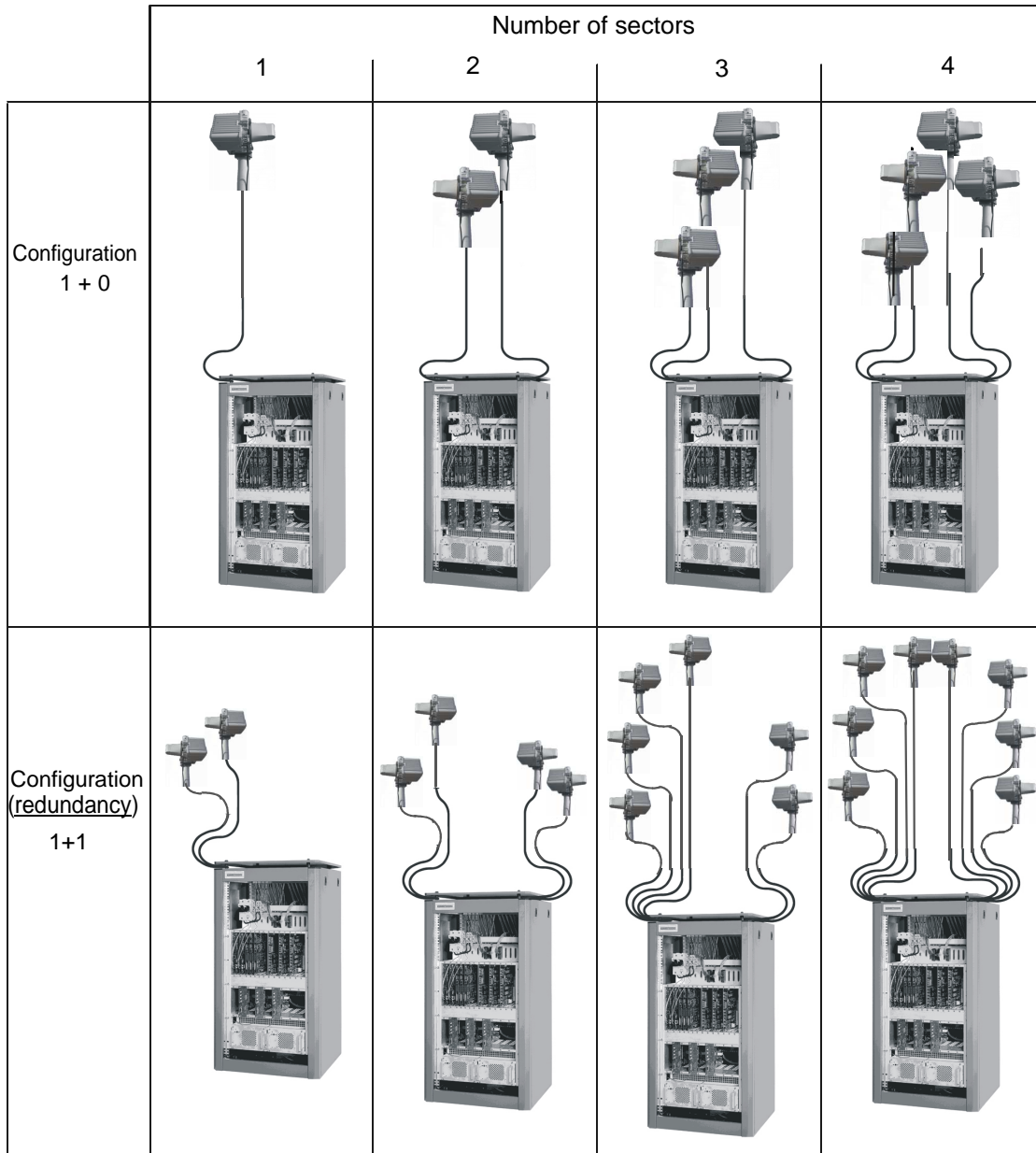
Figure 3 – Examples of configuration of the 7390BS

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2.6 Technical specifications of the Base Station (7390BS)

2.6.1   RBS specifications

Designation	Description	Standards	Observations
Mechanical specifications of the RBS assembly (antenna + pole mounting)			
HxLxD	644(mm)x221(mm)x720(mm)	-	D taken from axial tube (diameter = 50 to 114mm) cf. diagram in § 3 Installation
Weight	15 kg	-	-
Physical interfaces: RBS/DBS indoor-outdoor cable			
Connector type	N/female	-	weatherproof
Medium	50Ω coaxial cable	-	-
Environmental specifications			
RBS Classification	-	ETS 300 019-2-4 IEC 721 3-4/ classes 4K2-4Z1-4Z5-4Z7-4B1-4C2-4S2-4M5	equipment for premises not sheltered from the weather
Operating temperature	-33°C to + 55°C	-	-
Relative humidity at 30°C	100%	-	-

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2.6.2 DBS specifications

Designation	Description	Standards	Observations
Mechanical specifications: Rack-mounted DBS assembly standard 19"			
HxLxD	1250(mm)x600(mm)x600(mm)	ETS 300-119	cf. diagram in § 3 Installation
Weight	<135 kg (including 85 kg for empty rack)		-
Mechanical specifications: DBS shelf without rack			
HxLxD	844.55(mm)x482.6(mm)x540(mm)	ETS 300-119	19-inch cf. diagram in § 3 Installation
Weight	< 50 kg		-
Power supply and consumption			
Primary voltage range	36 V to 60 V	ETS 300-132	48 V rated voltage
Maximum con-sumption	750 W		including 8 RBS
Protection	overvoltage, short-circuit (40 A fuse), polarity inversion, thermal protection (ventilation failure)		-

Note: *Power supplies are floating level voltages; the ground cable can be connected to + 48V or - 48V according to the country standards.*

Designation	Description	Standards	Observations
Physical interfaces: ATM network interface optical			
Connector type	SC/PC socket	ITU-T I.432.2/§3.1	1300 nm 1 for each direction
Media	Single-mode Fiber (SMF; 9/125 μm)	ITU-T G.652	1300 nm 1 for each direction
Environment	Laser product Class 1	IEC 825	
Bit rate Nominal Timing	 155.520 Mbps ± 20 ppm	ITU-T I.432.2/§3.1	Free run mode, i.e. under synchronization source fault conditions
Line coding	NRZ		
Jitter	Refer to standard masks	ITU-T G.958	
Signalling	UNI 4.0	ATM Forum Af-sig-0061.000	

Designation	Description	Standards	Observations
Physical interfaces: E3 G703 (34 Mbps) (75 Ω)			
Connector type 75Ω interface	 1,6/5,6		
Media 75Ω interface	 Coaxial cable	ITU-T G.703/§8.3	
Environment Safety EMC/EMI		ETSI ETS 300-418/§4.3, 4.4 ETSI ETS 300-418/§4.5	
Bit rate Nominal Tolerance	 34.368 Mbps ± 20 ppm	ITU-T G.703/§8.1	
Line coding	HDB3		
Jitter Input tolerated jitter Output residual jitter	Refer to standard masks	 ITU-T G.823/§3 ITU-T G.823/§2	

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Designation	Description	Standards	Observations
Physical interfaces: E1, TDM circuit interface (75/120 Ω)			
Connector type DBS Standard 75Ω interface 120Ω interface	 Sub-D/37 pins/fem. BNC or 1,6/5,6 STP specific connector		8 connectors; 8 TDM interfaces per connector 1 for each direction 1 for each direction
Media 75Ω interface 120Ω interface	 Coaxial cable STP	ITU-T G.703/§6.3	 1 pair for each direction 1 pair for each direction
Environment Safety EMC/EMI		 ETSI ETS 300-418/ §4.3, 4.4 ETSI ETS 300-418/ §4.5	
Bit rate Nominal Tolerance	 2.048 Mbps ± 50 ppm	ITU-T G.703/§6.1	 Synchronous stream Under synchronization source fault conditions
Line coding	HDB3		
Jitter Input tolerated jitter Output residual jitter	Refer to standard masks	 ITU-T G.823/§3 ITU-T G.823/§2	

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Designation	Description	Standards	Observations
Physical interfaces: T1 , TDM circuit interface (100 Ω)			
Connector type 100Ω interface	Sub-D 37 points		
Media 100Ω interface	Shielded twisted Pair	ANSI T1.403	
Bit rate Nominal Tolerance	1.544 Mbit/s ± 32 ppm	ANSI T1.102 ANSI T1.403	
Line coding	AMI or B8ZS		Software configurable
Jitter Input tolerated jitter Output residual jitter	Refer to standard masks	ANSI T1.102 ANSI T1.102	

Environmental specifications			
DBS Classification	-	ETS 300 019-2-3 IEC 721 3-3/classes 3K5-3Z2-3Z4-3B1-3C2-3S2-3M1	-
Operating temperature	-5°C to +55°C	-	-
Relative humidity at 30°C	93%		

2.6.3 Common characteristics of the RBS and DBS

Designation	Description	Standards	Observations
Logistics			
Transport	Public transport: class 2.3	ETS 300 019-2-2 IEC 721-3-2 classes 2K4, 2B2, 2C2, 2S2, 2M3	-
Ambient temperature	-40°C to+ 70°C	-	-
Relative humidity at 55°C	95%	-	-
Storage	Class 1.2	ETS 300 019-2-1 IEC 721-3-1 classes 1K4, 1Z2, 1Z3, 1Z5, 1B2, 1C2, 1S3, 1M2	storage premises sheltered from the weather, without air-conditioning
Ambient temperature	-40°C to + 70°C	IEC 721-3-1/class 1K5	-
Relative humidity at 30°C Condensation	100% 90 to 100 %	-	-

2.7 Equipment power consumption

2.7.1 RBS

The typical power consumption of the **RBS** is **31 W** (RBS cube) / **25 W** (RBS flat).

2.7.2 DBS

DBS configuration type	Typical power consumption
basic configuration (1 sector, 1+0)	130 W
per additional sector	100 W
1+1 redundancy (per sector)	100 W
ANT board (per board)	25 W
TNT board (per board)	30 W

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