iDEN/SMR Remote Hub Unit

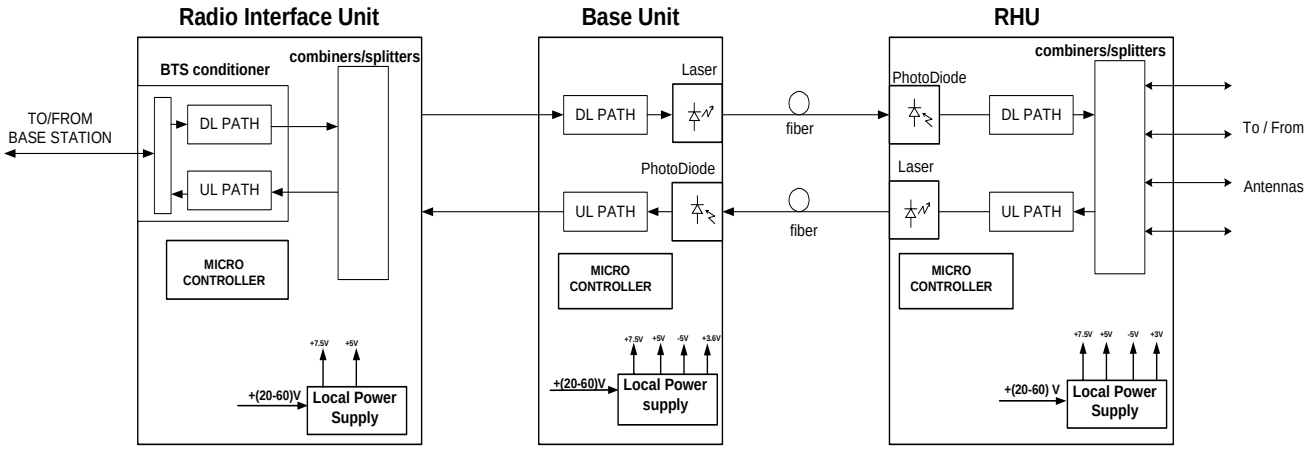
PRODUCT DESCRIPTION and

DESCRIPTION OF THE CIRCUIT FUNCTIONS AND BLOCK DIAGRAM.

The following is a copy of description of the circuit functions and block diagram of MobileAccess 1000

MobileAccess1000 SYSTEM DESCRIPTION

The MobileAccess1000 system (MA1000) intended to provide in-building coverage and capacity for mobile telephone services. These qualities achieved by linking the Base Station to distributed antennas inside the buildings through the MA100.
The system includes two major components, a Base Unit, which interfaces typically with microcell equipment, and Remote Units, which are distributed throughout the building and are hubs for antennas.
The signals in the forward direction (downlink) from the microcell to the mobile telephones are carried via optical fibers from the Base Unit to the Remote Units.
The signals in the reverse direction (Uplink) from the mobile to the microcell are similarly carried along a different fiber to the Base Unit.
Other relative system components are the optional RIU and controller units.
The RIU (Radio Interface Unit) is attended to control the levels of the inputs/output signals to/from the Base Unit including an AGC function.
The controller is a unit attended to control the components mentioned above in all aspects of the of the variety controlled/monitored functions of the system.
Functionally, the system behaves as a repeater, with gain/attenuation as appropriate. No signal processing/modification, or RF modulation takes place in the system.
The base unit is connected via coaxial cable (and attenuators, splitters…) to the microcell equipment, or an off-air repeater. The remote unit ports connect via coaxial cables to indoor antennae, which we do not supply.

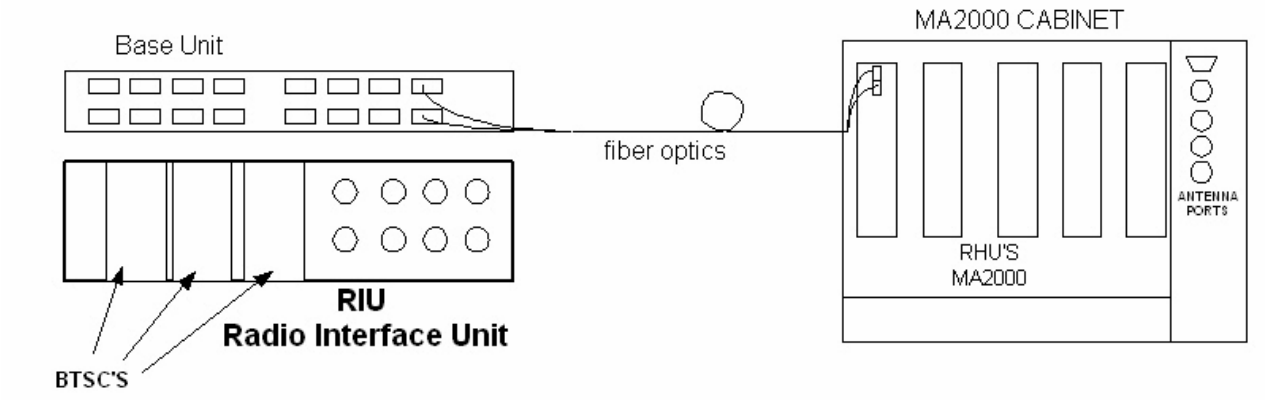


As mentioned before, the MA1000 system consists of two main RF components and an optional interface unit:
The Radio Interface Unit has a place to a three BTSC units (Base Station Conditioner) Inside it.
Each BTSC can support different communication bands areas (such as cellular frequencies, PCS frequencies, UMTS frequencies etc.). The signals from/to the BTS conditioners are combined/splitted (DL/UL respectively) inside the RIU to 8 inputs/outputs in order to support up to 32 Remote Hub Units (up to 128 antennas) in the other side of the optical link.
Each output of the RIU is connected to an Uplink path in the Base Unit, which converts the RF signal to light and transmits it through the optical link to the Remote Hub Unit.
The RHU (Remote Hub Unit) converts the light back to RF signal and after amplifications, transmits the signal to four antennas.
In the Uplink path, the signals transmitted from the mobile telephones, received by the RHU.
The RHU amplifies the signals and converts the signals into light.
The light received by the BU and converted back to RF signals.
The signals, after amplification, can be directly connected to the microcell (or the Base Station), or through the Radio Interface Unit.
All products controlled by a microcontroller located inside these units.
Some parameters are dynamically controlled, such as “AGC like mechanism” in order to prevent overload signals or the Lasers bias, and some of the parameters are only for monitoring (antennas configurations, signal strength received by the system etc).
This digital section is only for internal monitoring of the units functions.
A communication between the Base Unit and RHU unit is performed by communication through the optical link.

The iDEN/SMR RHU intended to provide two bands of cellular operation.
The iDEN band operates between 851~869MHz for DL and 806~821MHz for UL.
The SMR band operates between 929~941MHz for DL and 896~902MHz for UL.

The SMR Uplink course has an optional passive cavity filter to make it possible to have higher bands rejection that customers can demand (thus it is not necessary for most of multi bands operations).
As mentioned the filter related only to the UL course (the signals that pass through the system from the mobile phone to the BTS or equivalent equipment). The use of it has no relation or influence to the DL course.

The iDEN/SMR RHU can be put in a MA2000 cabinet.
This structure enables multi band operations in one cabinet due to high filtering
The RHU's passively changed to allow high external filtering.
All the RHU's outputs (up to five inside one cabinet) combined to 4 antenna ports (instead of 4 antenna ports to each regular MA1000 RHU's).

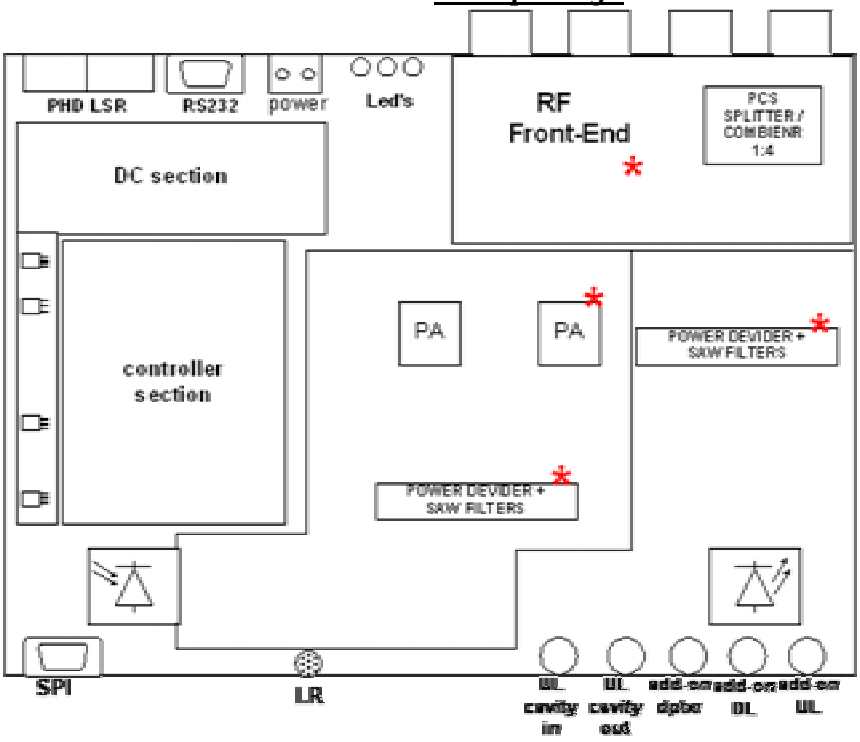


MA2000 iDEN/SMR results

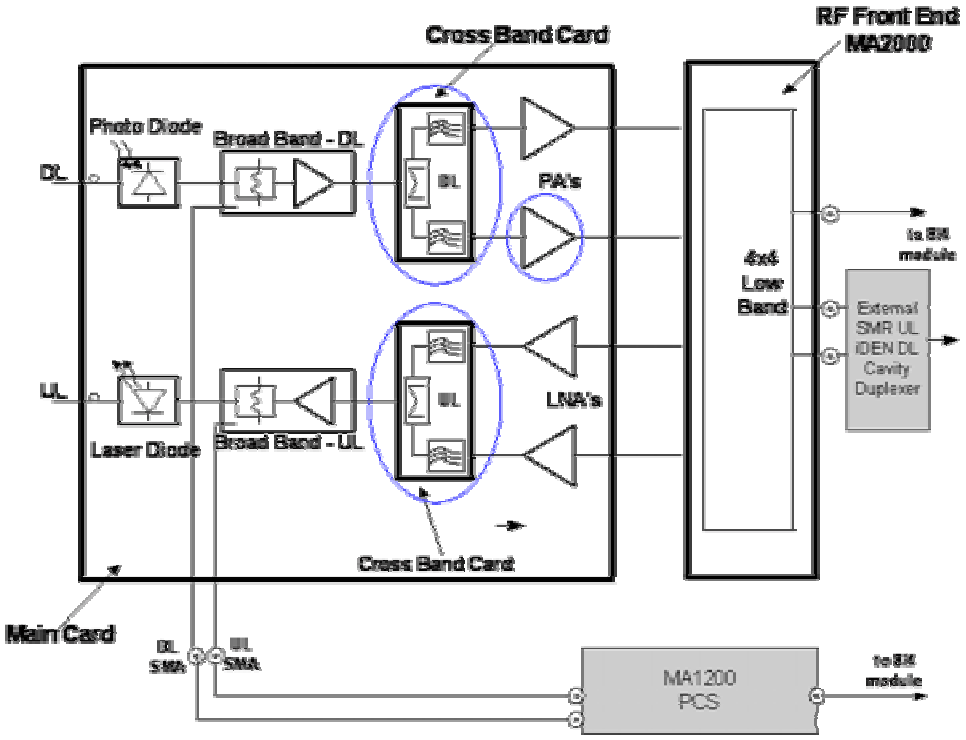
Test	Test Description	Units	Min	Max	Ant			
					1	2	3	4
Downlink Mean Gain								
1	IDEN	dB		0	0.9	0.5	0.7	0.7
2	SMR			0	0.4	1.3	0.4	1.6
Downlink Ripple (p-p)								
1	IDEN	dB		4	2.4	2.0	2.3	2.6
2	SMR			4	2.3	1.4	1.8	1.9
Uplink Mean Gain								
1	IDEN	dB		7	7.7	8.1	8.3	7.6
2	SMR			7	7.5	6.8	7.8	7.4
Uplink Ripple (p-p)								
1	IDEN	dB		4	1.3	0.8	2.6	2.6
2	SMR			4	1.4	1.1	1.7	1.6

1	IDEN 851 MHz & 856 MHz	dBc	45		50
2	SMR 934 MHz & 938 MHz		45		45
	Uplink IIP3				
1	IDEN	dBm	-5		0
2	SMR		-5		-1
Uplink Noise Figure					
1	IDEN @ 806MHz	dB		20	19.5
2	IDEN @ 813MHz	dB		20	18.7
3	IDEN @ 821MHz	dB		20	17.7
4	SMR @ 896MHz	dB		20	18
5	SMR @ 902MHz	dB		20	16.8

Concept design



Block Diagram MA 2000



•

MA2000 Implementation

- **MA2000 RF.F.E inside the MA800-900 unit. DPLXR connects the SMR UL band and the iDEN DL band.**

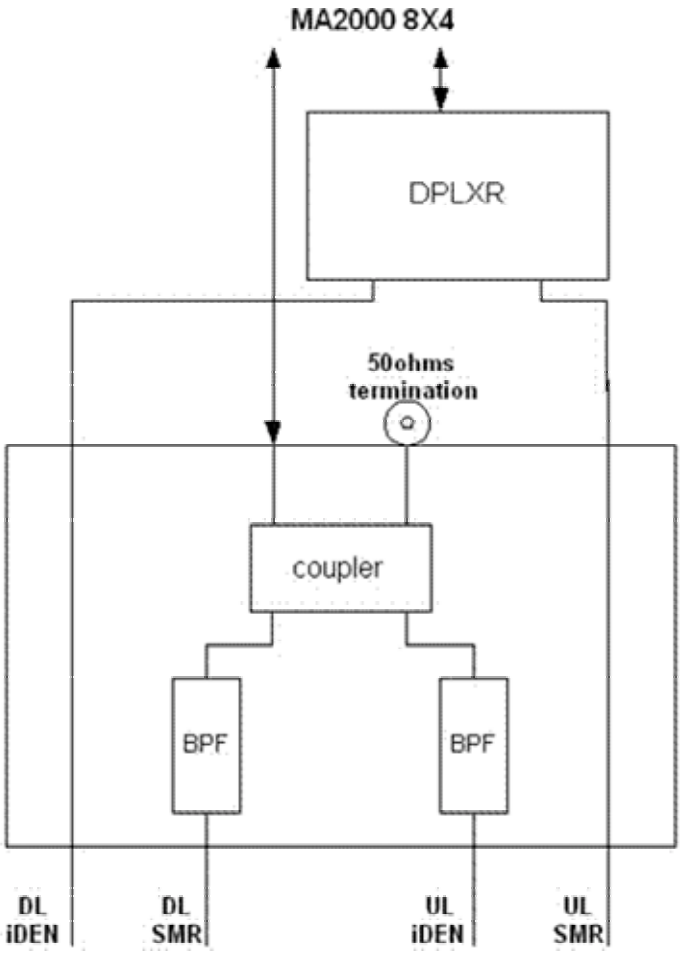
.....

Advantages:

- **front panel connections only (N-type X 3).**
- **cost effective-one cavity duplexer**
- **no internal coax is required**
- **standard PCB MA2000 RF Front End**

Disadvantages:

- **non standard duplexer TBD**
- **two ports of 8/4 are required even only one service in use**



For more information refer to the MA1000/MA2000 datasheets and user's manuals.