

Microdata Telecom Innovation AB



In The Beginning...

Microdata, has been active in the filter and microwave business since 1981.



In 1993, LGP Telecom AB was spun off, aiming for the mobile telephony infrastructure market.

LGP introduced a product portfolio with Tower Mounted Amplifiers (TMA) for all cellular bands, which more or less becomes the global industry standard



In The Beginning...

In 2003, LGP and Allgon merged to form a new constellation with a wider product range, Allgon bringing one of the world's best antenna program.



A New Beginning

Microdata has recruited several senior engineers that previously worked together at LGP and Allgon on development of TMAs and RF filters.

A unique line of TMAs and filters designed to customers' specification for all mobile system bands are offered and delivered to the international market.

We offer cavity filter design with integrated LNA and power feeding by external PDUs.

The Road Ahead

The WiMAX market is expanding and the broad band 3G are offering HSPA services the wireless communication market is ever growing.



Our know-how is in understanding the market requirements, design and development of products for Telecom.

Stay Tuned

In our road map, we have innovative products that will multiply the capacity and service of wireless networks and mobile applications.



Our Competitive Edge

- R&D of TMAs for international mobile standards
- Mechanical construction and cavity filter design
- Circuit development of LNA and TMA electronics
- CAD/CAM layout and production considerations
- Quality assurance
- Using highly competitive and certified partners for outsourced production

Most Important : We have come back to offer the industry a choice, Freedom.

A journey of a thousand miles begins with a single step



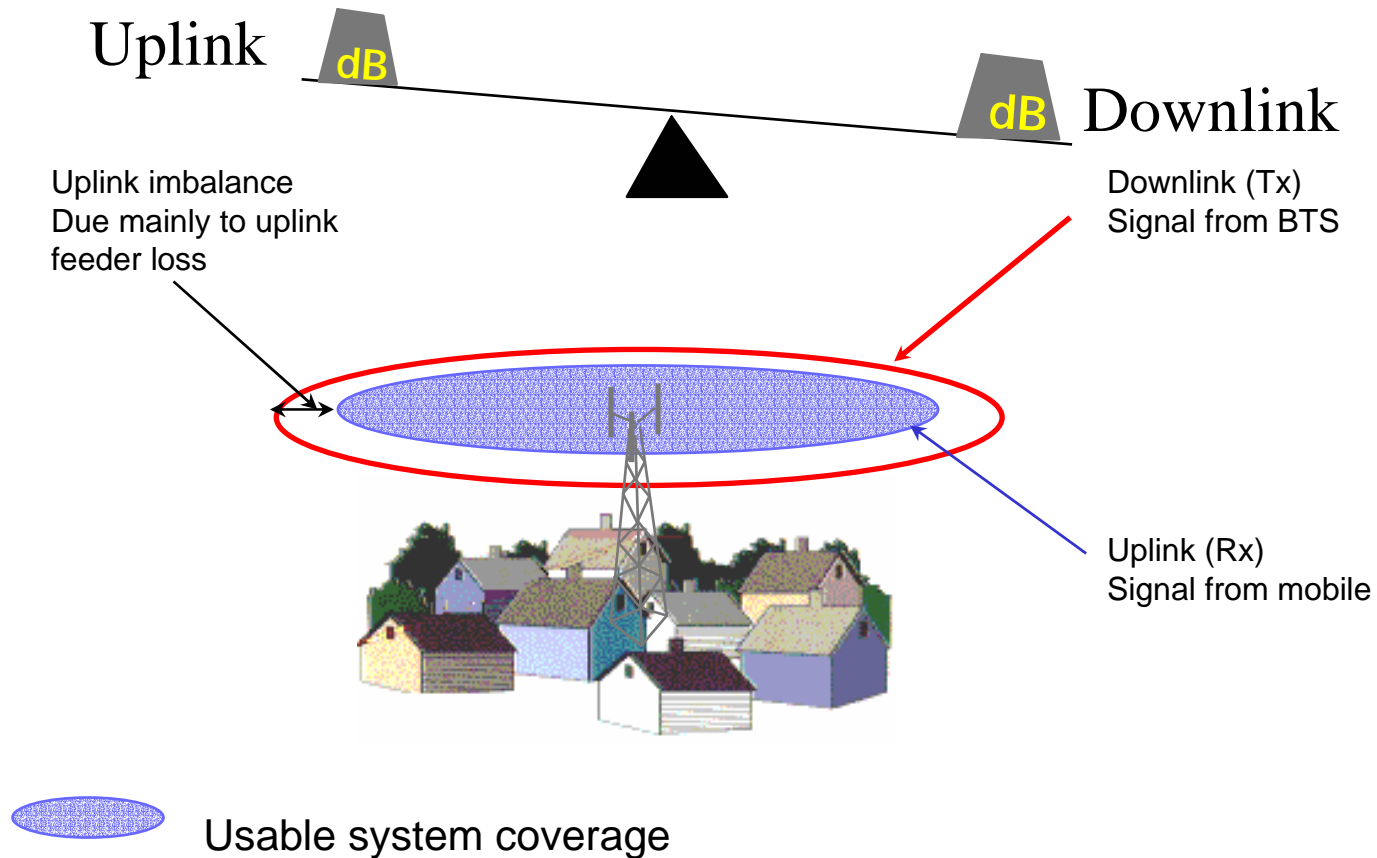
Why TMA?

- What is a TMA?
 - A Low noise receiver amplifier used to improve the up-link sensitivity of the BTS
- Why is it necessary?
 - To extend coverage by providing network balance
 - To reduce no of BTS sites
 - To improve the quality of service to the subscriber
 - To reduce the infrastructure cost to the operator
 - To increase data transmission rate in GPRS, EDGE and WCDMA systems

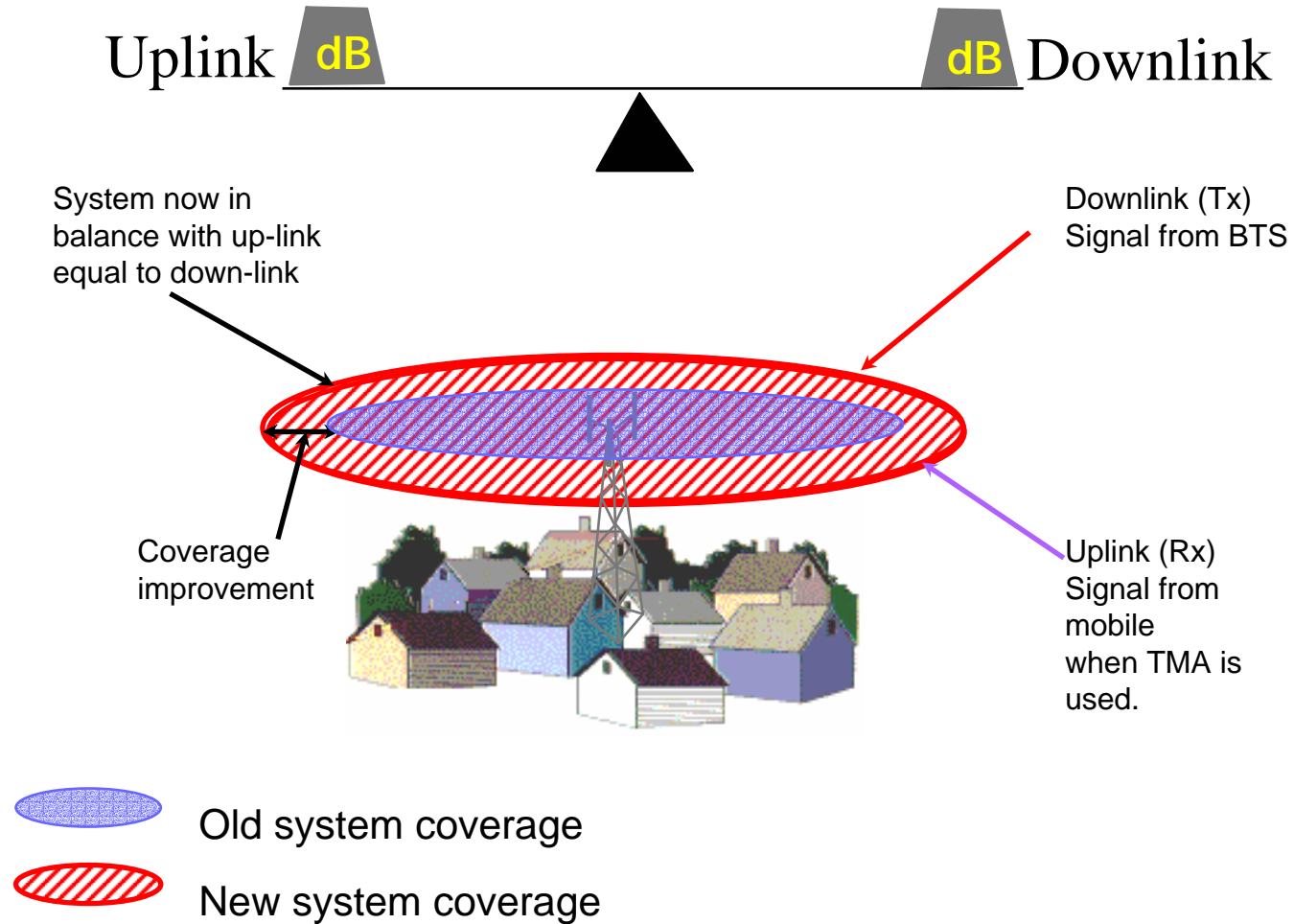
Why TMA?

- Extended network coverage
 - Increased “Revenue Generating Area”
 - Greater user satisfaction
- Improved “Quality of service”
 - Fewer dropped calls
 - Improved speech quality
 - Improved data speed in mobile broadband services
 - Coverage when indicated
 - Improved mobile stand-by time

Network Imbalance

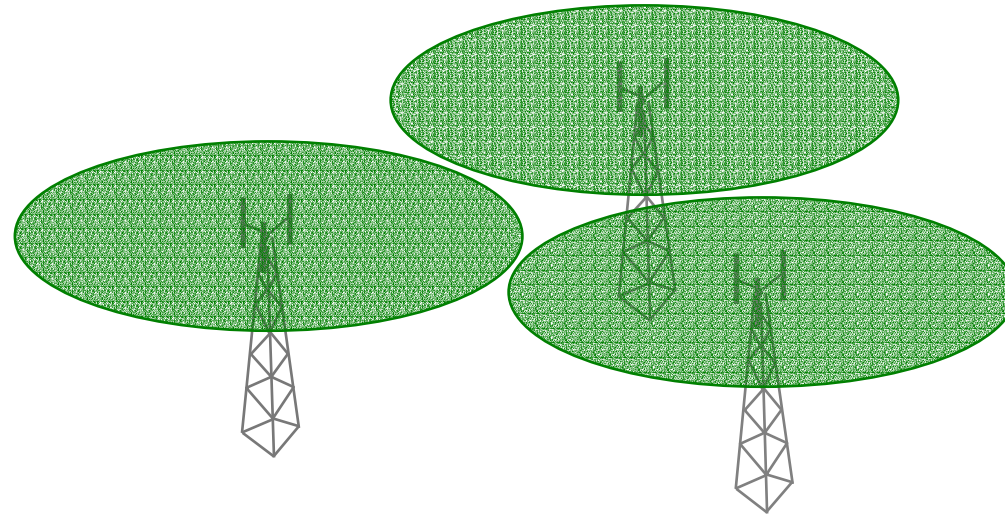


Network Imbalance with TMA



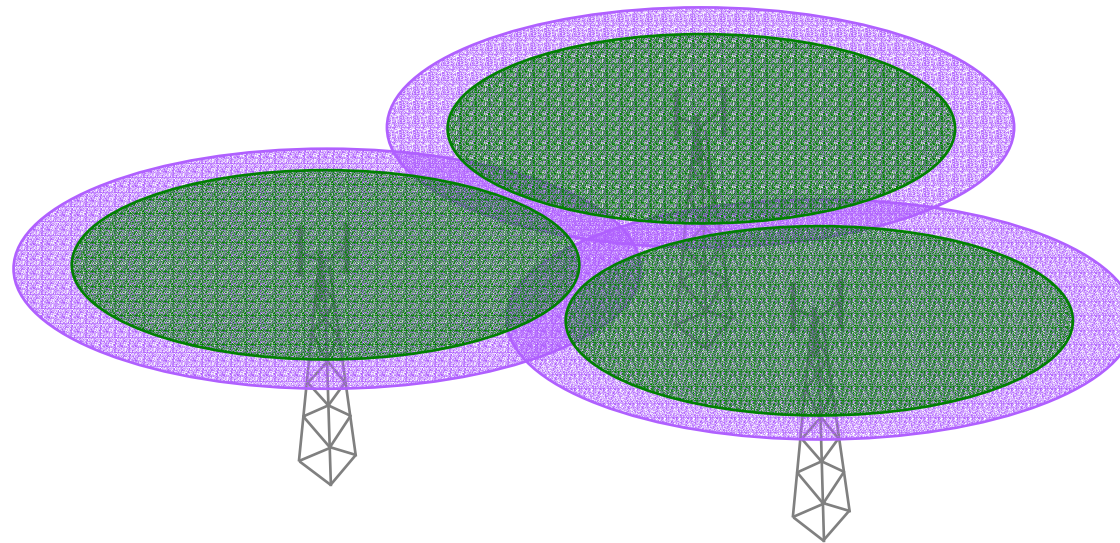
TMA Benefits - Coverage

- Existing network with skeletal coverage

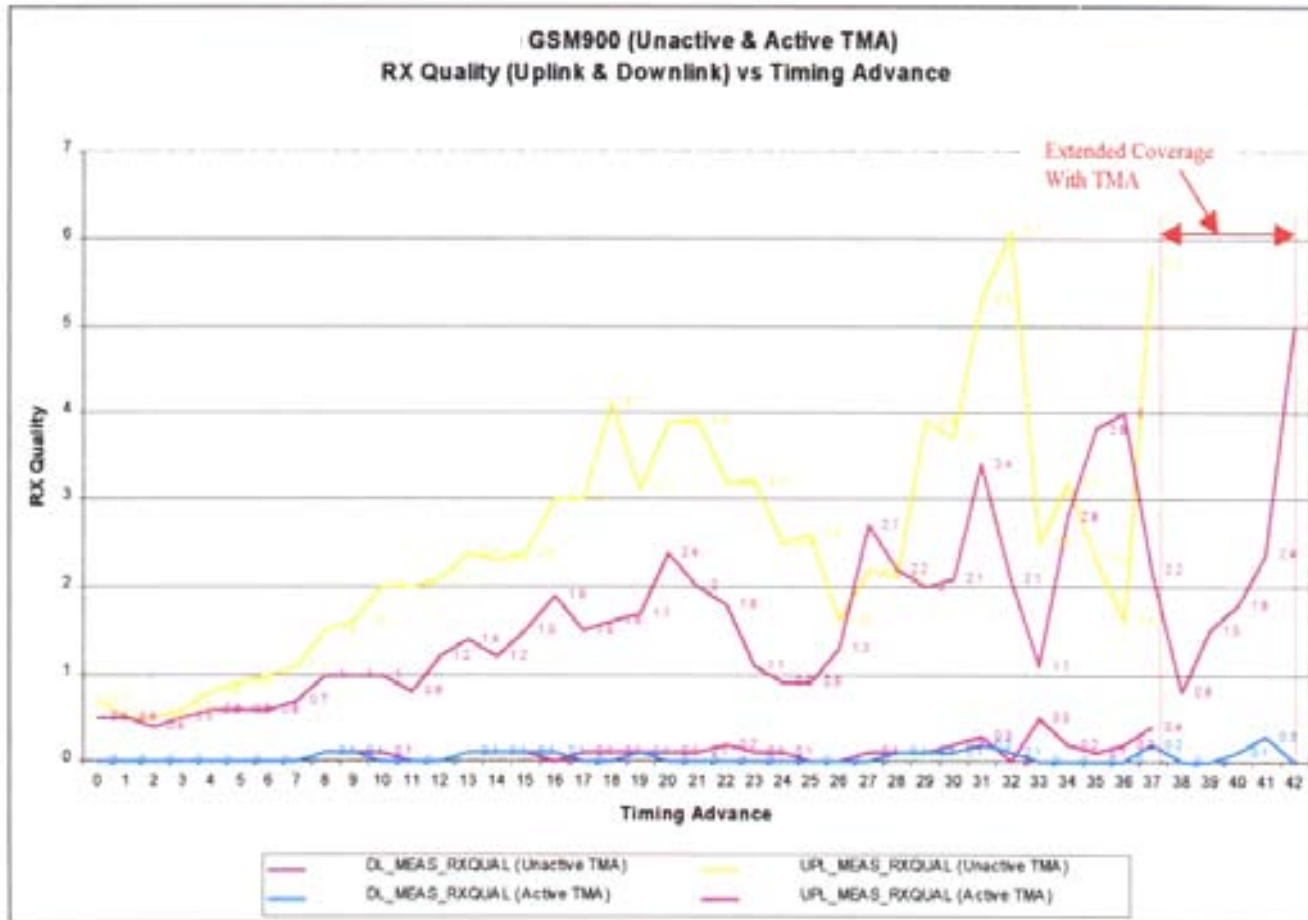


TMA Benefits - Coverage

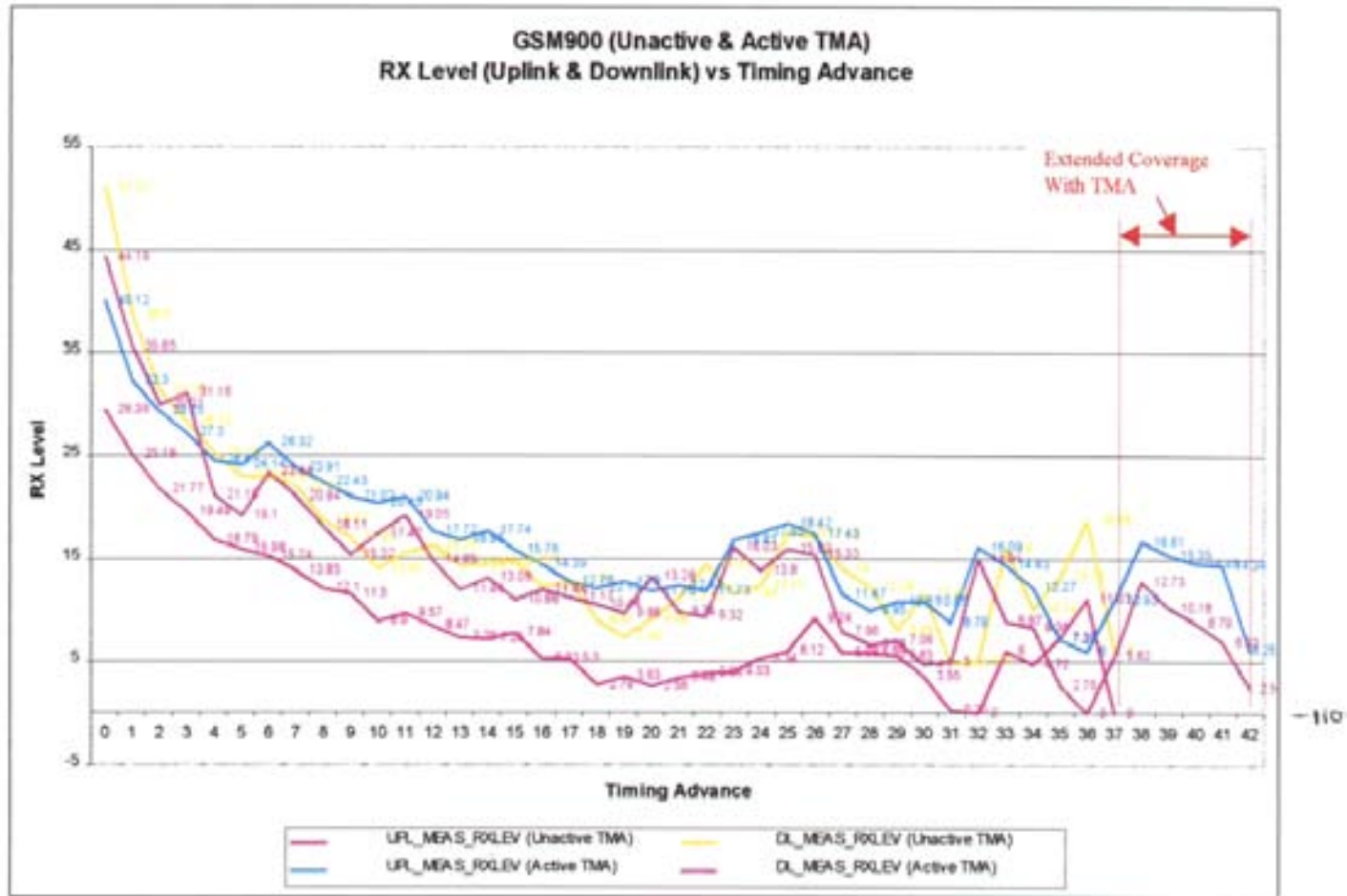
Adding TMAs completes the coverage



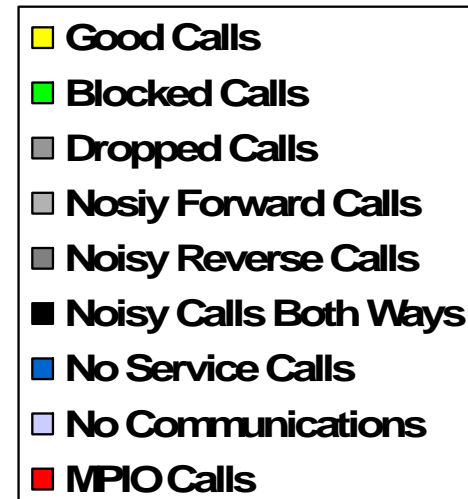
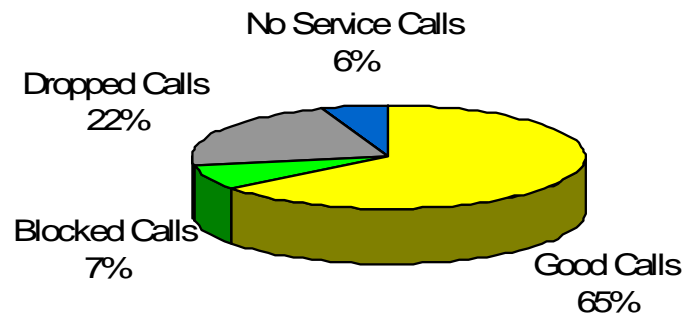
Coverage Extension



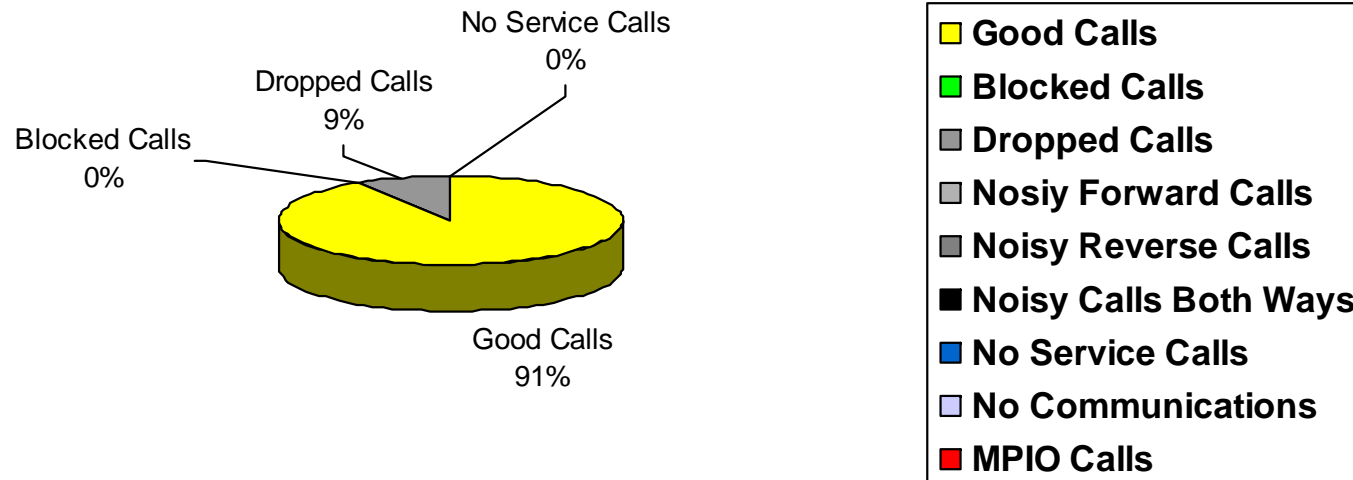
Coverage Extension



Call % without TMA



Call % with TMA



Improvement

System Call Statistics

Number of Good Calls

Number of Dropped Calls

Number of no service

Call setup failure / Blocked calls

Using TMA

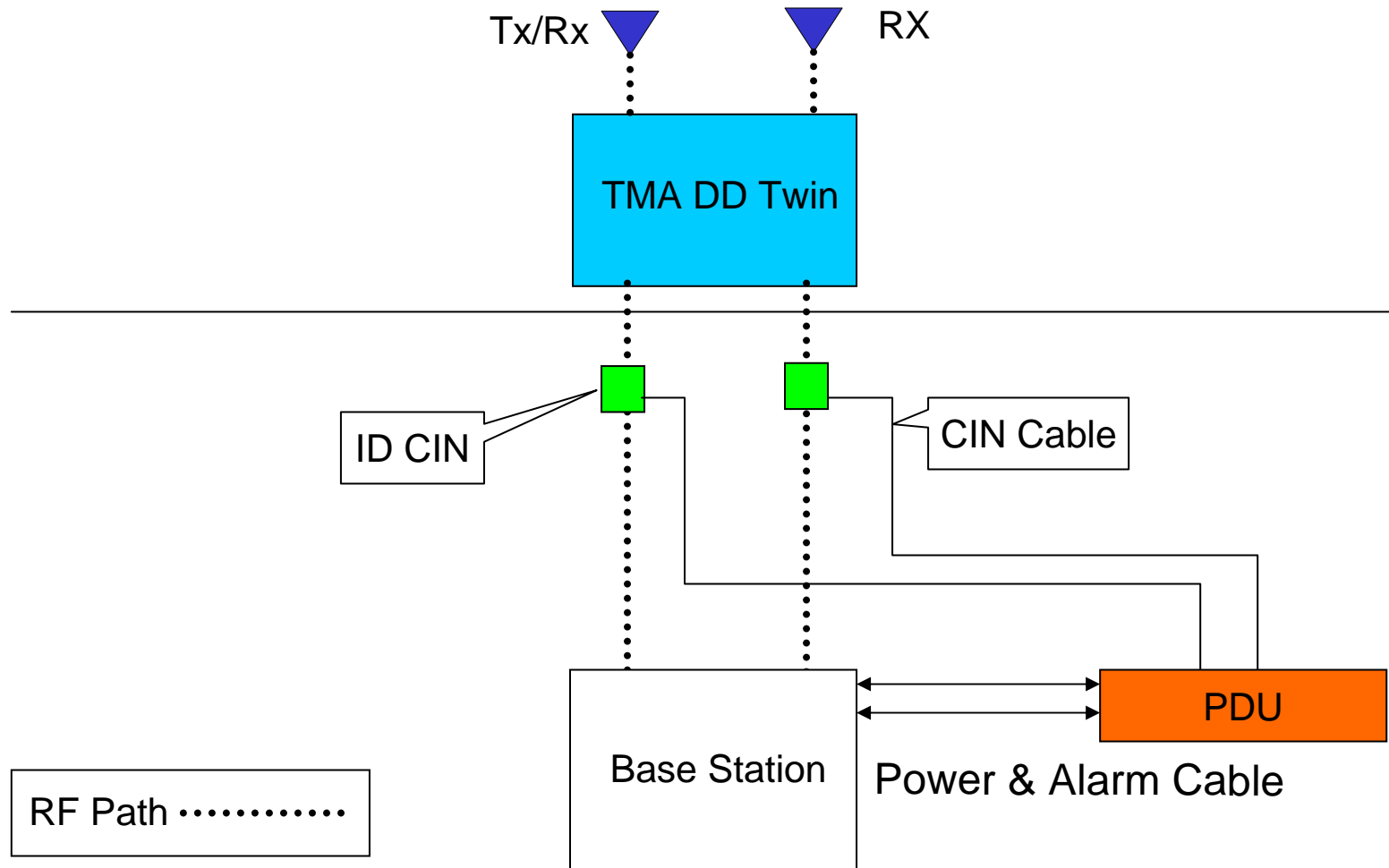
Increased by 26 %

Reduced by 13.4%

Reduced by 5.56%

Reduced by 7.41%

Typical 1 Sector with Diversity



Benefits of TMA

- Extended network coverage
 - By removing up-link limitation
 - Reduce no of BTS sites
- Improved Network Quality
 - Fewer dropped calls
 - Higher call throughput
 - Satisfied subscribers

Microdata TMA portfolio



Tower Mounted Amplifier

Current Injector



Power Distribution Unit



Product – TMA DD TWIN

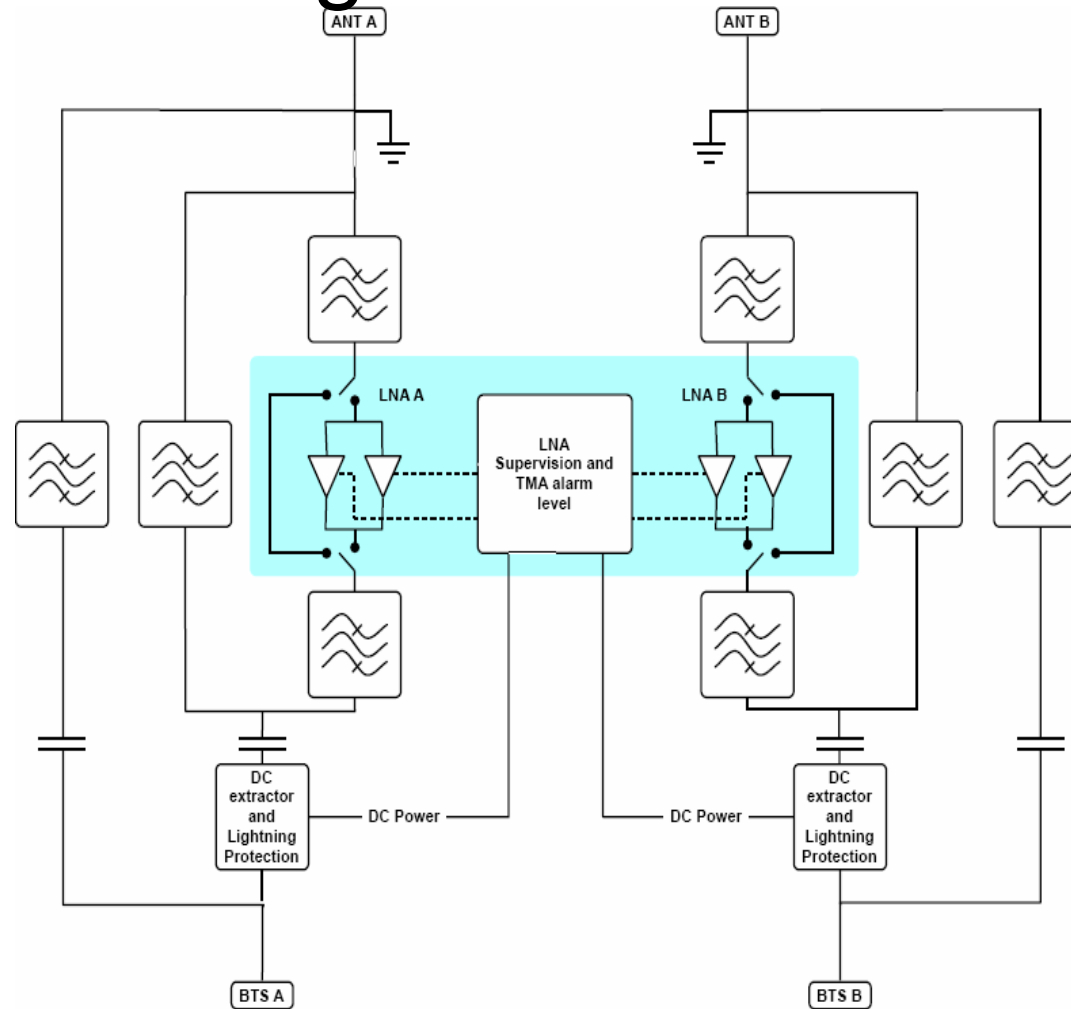
Our product range covers

- 850 MHz
- 900 MHz both 30 and 25 MHz bandwidth
- 1800 MHz only and 1800 with 900 MHz bypass. Products are available with bypass for multi band antenna or for separate antennas
- 1900 MHz only and 1900 with 850 MHz bypass. Products are available with bypass for multi band antenna or for separate antennas
- 2100 MHz UMTS (AISG compliant)



TMA Twin 900
235 x 280 x 83mm
8kg

Block Diagram – TMA DD TWIN



Product - CIN

Wideband 824-2170Mhz

Low insertion loss 0.1dB

Return Loss: 20dB

Max RF power: 500W

DC Current: 1.6A

Compliant to AISG signaling 1-11Mhz

Temperature: -40 °C to +65 °C

Ingress Protection: IP 44

Lightning Protection: 10 kA 8/20 μs, 3 kA 10/350 μs



Product - PDU

20-60 VDC, positive or negative

Input polarity protection

Output 12VDC

Output voltage and current protection

Support up to 6 TMAs (3 sector configuration)

Three pin alarm with NC and NO contacts

Connectors:

CIN 6 x SMB Male

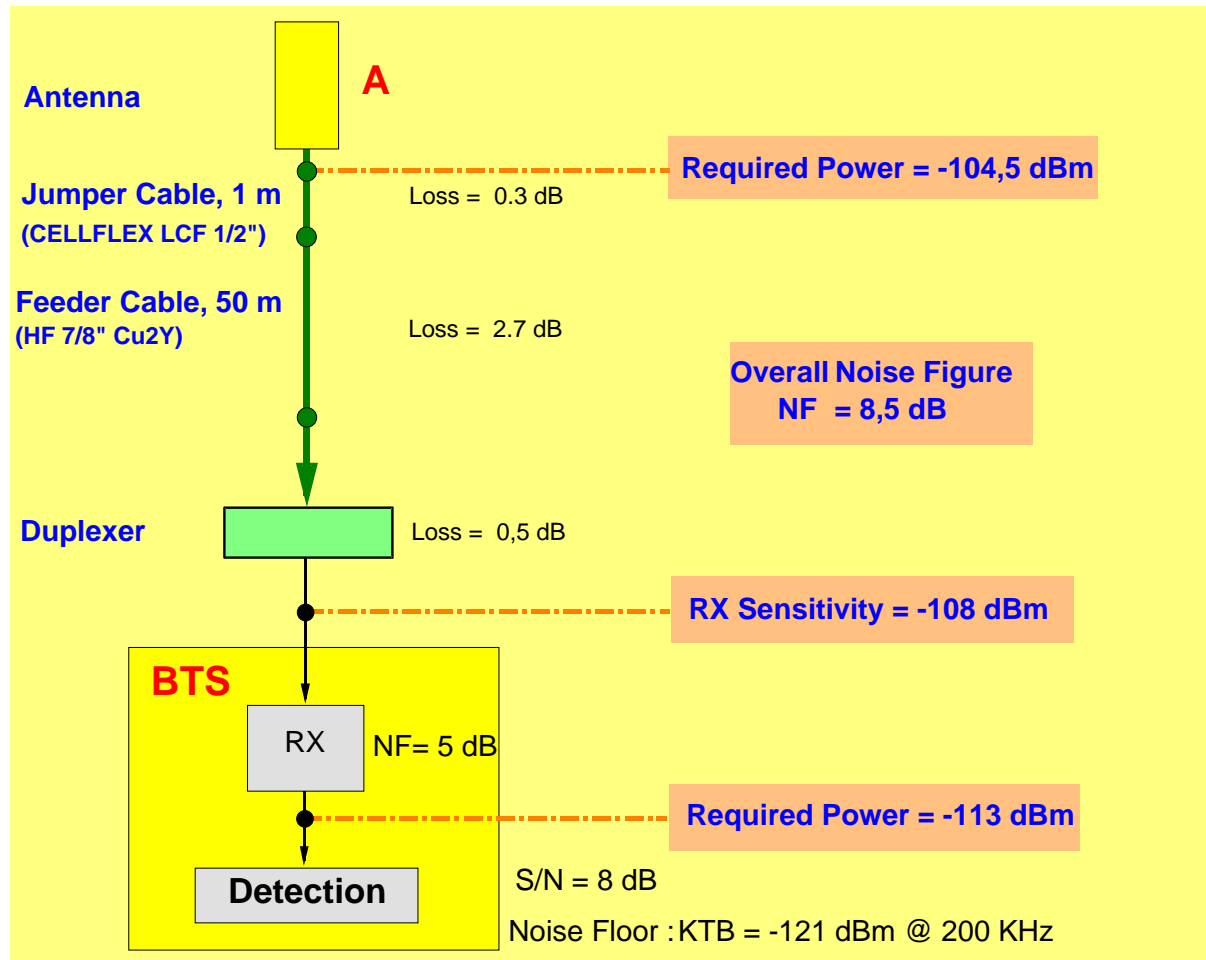
DC Molex Microfit 2 x 2

Alarm Molex Microfit 1 x 3

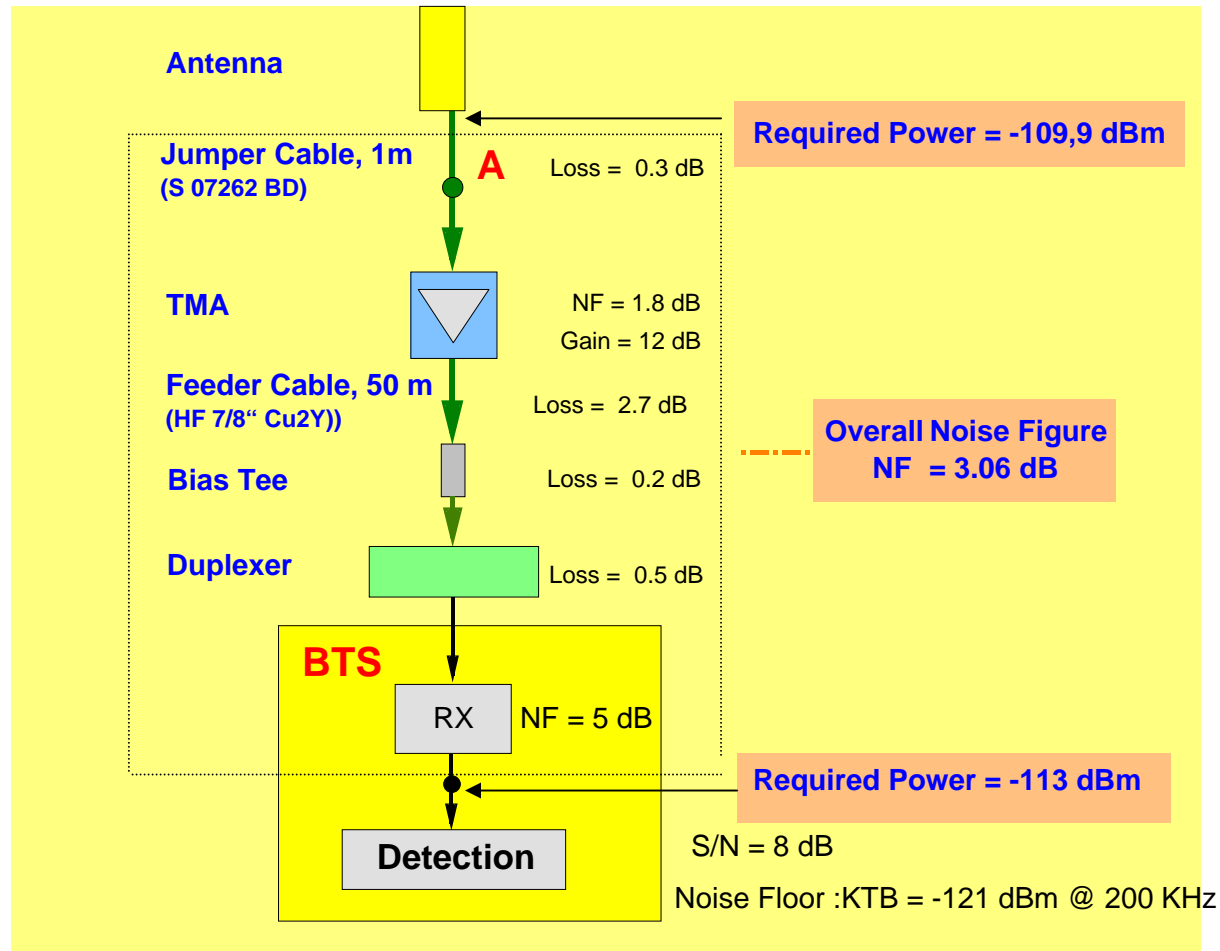


Theoretical explanation for TMA system

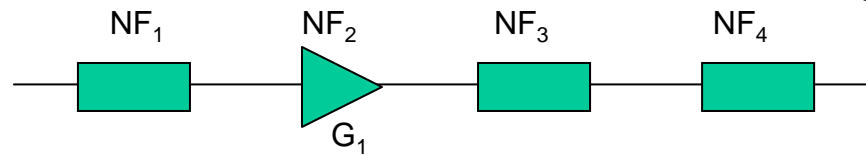
Typical Site Configuration



Site Configuration with TMA



Friis formula for noise figure



$$NF = NF_1 + NF_2 - 1/G_1 + NF_3 - 1/G_1 \cdot G_2 + \dots$$

Values has to be converted to absolute value.

$$\text{dB} = 10 \log(X)$$

$$X = 10^{(\text{dB}/10)}$$

Thus, after the amplifiers

$$NF = 0.3\text{dB} + 10 \log \left\{ 10^{\left(\frac{1.8}{10}\right)} + \frac{10^{\left(\frac{2.7 + 0.2 + 0.5 + 5}{10}\right)} - 1}{10^{\left(\frac{12}{10}\right)}} \right\}$$

$$NF = 0.3\text{dB} + 10 \log (1.51 + 5.92/15.84)$$

$$NF = \underline{\underline{3.06 \text{ dB (Improvement of 5.44dB)}}}$$