

PRODUCT SPECIFICATION



Product specification for product no. 39240.1 Retractable
Bottom Helical Antenna System for *Samsung* model *FP-CDMA*
hand portable unit.

DOCUMENT 39240.1 Issue 0 for FP-CDMA

See page 18 changes from earlier issues.

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An international patent application is filed for the product described in
this document (PCT/SE93/00886 or PCT/SE94/00391).

Prepared RF, date: 27 November 1997

Irene Lasson

Irene Lasson
RF-Engineer

Prepared Mech., date: 27 November 1997

Hans Svelder

Hans Svelder
Mechanical Engineer

Approved date: 27 November 1997

ALLGON MOBILE COMMUNICATIONS

Anders Sandgren

Anders Sandgren
Project Manager

Approved date: , 1997

SAMSUNG ELECTRONICS CO LTD

on behalf of

Christer Sporrang
Global Account Manager

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1 THE PRODUCT

1.1 FEATURES

A *retractable bottom helical antenna system*, consisting of a *helical element fixed* in the fitting and a *retractable whip through* the helical element, for use in a hand portable cellular telephone unit (referred to as a *handset*).

1.2 PRODUCT NUMBER

Allgon Product Number **39240.1**

1.3 UNITS AND DEFINITIONS

Unless otherwise stated, SI units are used.

Tx	Transmit Band
Rx	Receive Band
PCB	Printed Circuit Board
VSWR	Voltage Standing Wave Ratio
Room Temperature	+20 ±3 °C
dBd	dB relative to a dipole
CW	Continuous Wave
g	acceleration of gravity $\approx 9.81 \text{ m/s}^2$

2 ELECTRICAL DATA

2.1 FREQUENCY BANDS

2.1.1 Transmit Band (Tx)

824 - 849 MHz

2.1.2 Receive Band (Rx)

869 - 894 MHz

2.2 IMPEDANCE

2.2.1 Nominal Value

50 Ω

2.2.2 Method

Allgon will supply engineering assistance to get the best possible matching of the antenna system both in extended and retracted modes. The impedance over the frequency bands shall be as close as possible to 50 Ω after matching. Both free space and talk position are considered.

2.3 HANDSET REVISION

2.3.1 PCB Revision

Received at Allgon November 20, 1997

Allgon reference number for Chassis and PCB: 487

2.3.2 Matching

No matching circuit.

2.4 VSWR¹

2.4.1 Free Space

Mode	Maximum Values	
	Tx	Rx
Extended	2:1	2:1
Retracted	3.2:1	3.2:1

2.4.2 Measuring Method

A 50 Ω coaxial cable is connected (soldered) to the 50 Ω point, at the duplex-filter connection (ANT.), on the PCB. The connection of the coaxial cable shall be done to introduce a minimum of mismatch. As much as possible the coaxial cable arrangement shall prevent influences from induced currents on the cable. In the other end, the coaxial cable is connected to a network analyzer. The measurements are performed at room temperature. The handset, including the PCB, must not in any significant way differ from the mass produced handset, i.e. the antenna feeding network has to be equivalent to the network in mass production. The specification shall be met in the entire frequency band. Free space means that the handset is placed on a non-conductive surface of cellular plastic. Talk position means that the handset is held in the left hand to the left ear with the microphone directed towards the mouth.

2.4.3 Reference (REF) Antenna

From early production, *ten* antennas are selected; *five* defining the lower frequency limit, marked "Approved VSWR low", and *five* defining the higher frequency limit, marked "Approved VSWR high". See figure 2.4.3. These ten antennas are our REF antennas. Only the helical elements are considered when finding the REF antennas.

¹ The specified values implies that a correct handset (see 2.3) has been received from Samsung.

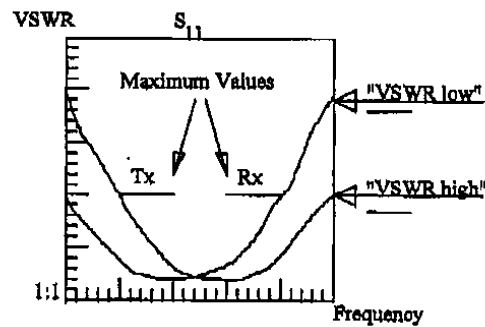


Figure 2.4.3. Two REF antennas defining the low and high VSWR limits.

2.5 GAIN¹

2.5.1 Minimum Values in Maximum Direction

Mode	Tx	Rx
Extended	-3.5 dBd	-3.5 dBd
Retracted	-5.5 dBd	-5.5 dBd

2.5.2 Maximum Lobe Tilt

Mode	Tx	Rx
Extended	45°	45°
Retracted	45°	45°

2.5.3 Measuring Method

The connection is done according to 2.4.2. Radiation patterns are measured at 6 different frequencies: Tx_{min} , Tx_{mid} , Tx_{max} , Rx_{min} , Rx_{mid} , and Rx_{max} . The specified values shall be found within $\pm 45^\circ$ from the horizontal plane according to figure 2.5.3 a) and b). The antenna is measured in 2 orthogonal E-planes, according to figure 2.5.3 c), in free space. The antenna is also measured in the H-plane as well as in talk position.

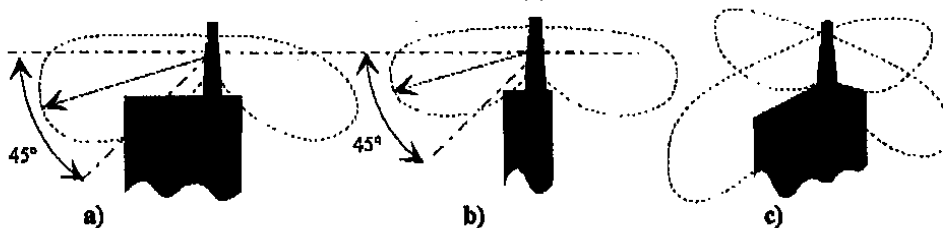


Figure 2.5.3. Radiation patterns. a) Anterior view. b) Lateral view. c) 3-D view.

¹ The specified values implies that a correct handset (see 2.3) has been received from Samsung.

2.6 POWER RATING

2.6.1 Maximum Value

$P = 2 \text{ W (CW)}$

2.6.2 Demands

No visual deterioration shall occur during the test. The antenna shall satisfy the electrical demands, according to 2.4.1, after the test.

2.6.3 Measuring Method

The connection is according to 2.4.2. The specified power, P , is applied for 10 minutes at room temperature.

