


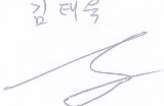



ethertronics
AN AVX GROUP COMPANY

DESIGN SPECIFICATION
Part Number: LT31300 (SM-R180)
Rev. A

DESIGN SPECIFICATION

DESIGN	INTERNAL ANTENNA
MODEL / TYPE	SM-R180 / Left[BT] INTENNA
ETHERTRONICS P/N	LT31300
SEC CODE	GH42-06577A
CUSTOMER	SAMSUNG ELECTRONICS CO., LTD.
SUPPLIER	ETHERTRONICS INC.

ENGINEERING MANAGER CHECKED	MECHANICAL MANAGER CHECKED	DESIGN MANAGER CHECKED
 JH Jeong	 TW Kim	 KJ Chun



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DESIGN SPECIFICATION
Part Number: LT31300 (SM-R180)
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CONTENTS

1. Purpose and Scope.....	3
2. Abbreviations and Definitions.....	3
3. ELECTRICAL SPECIFICATION FOR SM-R180.....	4
3.1. Frequency Band.....	4
3.2. Electrical Characteristics	5
3.2.1. VSWR.....	5
3.3. Passive Measurement	6
3.3.1. Input Return Loss and VSWR	6
3.4. Radiation Patterns.....	7
3.4.1 SM-R180 Phone Left[BT] ANTENNA.....	7
4. <u>TEST METHOD</u>	<u>8</u>
4.1. <u>Return Loss & VSWR Test</u>	<u>8</u>
4.2. <u>Radiation Pattern Test</u>	<u>8</u>
4.3. <u>Test Method (Manufacturing)</u>	<u>9</u>
4.4. <u>Corrosion (Salt Spray) Test</u>	<u>9</u>



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DESIGN SPECIFICATION
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Rev. A

1. Purpose and Scope

The purpose of this document is to establish a design specification for the antenna DESIGN that Ethertronics is developing for the Samsung SM-R750A wireless handset. Any changes or additions to this specification can affect schedule and/or cost or the DESIGN and should be negotiated between Ethertronics and Samsung before being incorporated into the specification. Upon agreement of this specification, Ethertronics will make no changes without the written approval from Samsung. Any changes requested by Samsung will be given to Ethertronics with sufficient time to evaluate the cost impact and react as required.

2. Abbreviations and Definitions

AVG	Average
°	Degree
°C	Celsius (degrees Centigrade)
cm	Centimeter
G	Gravitational Force
g	Grams
Hz	Hertz
In	Inches
IQC	Incoming Quality Control
MHz	Megahertz
m	Meter
mm	Millimeter
N	Newton
PCB	Printed Circuit Board
TX	Transmit Band
RH	Relative Humidity
RX	Receive Band
VSWR	Voltage Standing Wave Ratio
W	Watt

Design specification: A target specification to guide design process.
DESIGN Specification: A final specification for the qualified DESIGN.



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DESIGN SPECIFICATION
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Rev. A

3. ELECTRICAL SPECIFICATION FOR SM-R180

3.1. Frequency Band

Mode	Frequency Band (MHz)
Left[BT]	2,400 MHz ~ 2,500 MHz



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DESIGN SPECIFICATION
Part Number: LT31300 (SM-R180)
Rev. A

3.2. Electrical Characteristics

3.2.1. VSWR

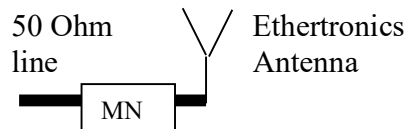
< Phone mounted typical measurements >

Frequency Range	2400 MHz	2500 MHz
V.S.W.R	3.2 ± 0.5:1	1.9 ± 0.5:1

<Left[BT] Antenna>

Matching Requirements

In order to assure the best performance of the antenna, the matching will be evaluated in free space and in talk position. The antenna will comply with the Electrical Specification requirements, as set out below, while mounted on the handset containing the PCB. The handset and PCB are to be provided by the customer and should be representative of the latest design version of all parts. Any modifications in the handset or PCB can affect the performance of the antenna and should be discussed with Ethertronics to determine the affect of such changes on the antenna performance and delivery requirements.



Optional matching network to be determined by SAMSUNG RF team if needed.



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Rev. A

3.3. Passive Measurement

3.3.1. Input Return Loss and VSWR



<Left|BT| Antenna>



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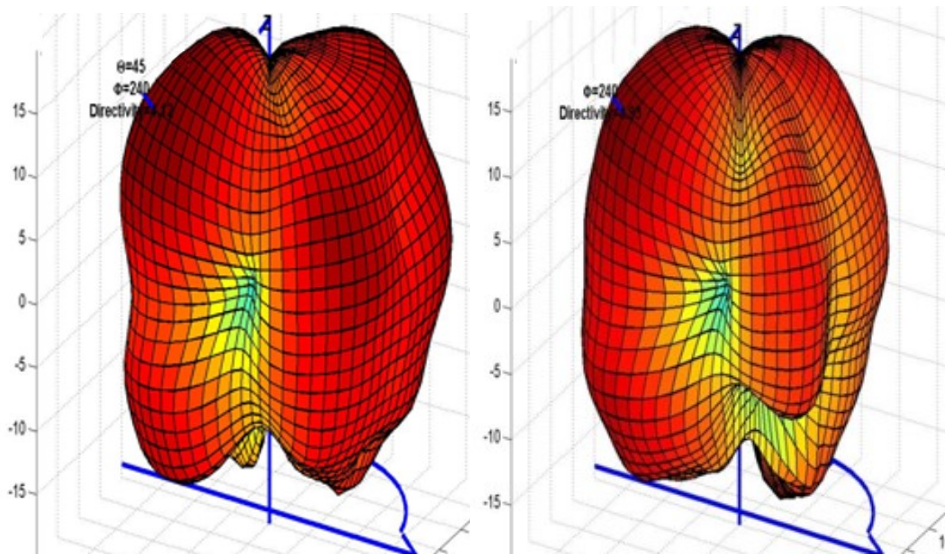
DESIGN SPECIFICATION

Part Number: LT31300 (SM-R180)

Rev. A

3.4. Radiation Patterns

3.4.1 SM-R180 Phone Left[BT] INTENNA



<Phone mounted typical measurements>

Frequency	Efficiency	Average Gain			Max Gain		
		Ver	Hor	Total	Ver	Hor	Total
2,400,000,000 Hz	9.5 %	-11.6 dBi	-16.0 dBi	-10.2 dBi	-8.6 dBi	-8.9 dBi	-7.5 dBi
2,420,000,000 Hz	9.6 %	-11.7 dBi	-15.5 dBi	-10.2 dBi	-9.4 dBi	-9.3 dBi	-7.5 dBi
2,440,000,000 Hz	9.3 %	-11.9 dBi	-15.6 dBi	-10.3 dBi	-9.9 dBi	-9.6 dBi	-7.6 dBi
2,460,000,000 Hz	6.8 %	-12.7 dBi	-18.3 dBi	-11.7 dBi	-10.9 dBi	-9.7 dBi	-8.3 dBi
2,480,000,000 Hz	5.7 %	-13.8 dBi	-18.2 dBi	-12.5 dBi	-11.2 dBi	-10.5 dBi	-8.7 dBi
2,500,000,000 Hz	4.9 %	-14.6 dBi	-18.4 dBi	-13.1 dBi	-12.0 dBi	-11.8 dBi	-9.3 dBi



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Rev. A

4. TEST METHOD

4.1. Return Loss & VSWR Test

The VSWR measurement of antennas assembled into a fully operating SM-R180 phone handset is measured on the Network Analyzer. The handset is set up with a 50 Ohm coaxial cable connected to the 50 Ohm point. Calibration is done at the end of the 50 Ohm coaxial cable connection. The other end of the 50 Ohm coaxial cable is connected to a network analyzer. The handset is positioned on a non-conductive table for free space measurements.



Figure 1: Testing with network analyzer

4.2. Radiation Pattern Test

Antennas tested for Gain and Efficiency must be assembled into the enclosure and tested in the fully assembled and operating SM-R180 handset. The antenna is tested in free space in the anechoic chamber in the H, E1 and, E2 planes. The radiation patterns are measured at the center of transmit and receive bands.

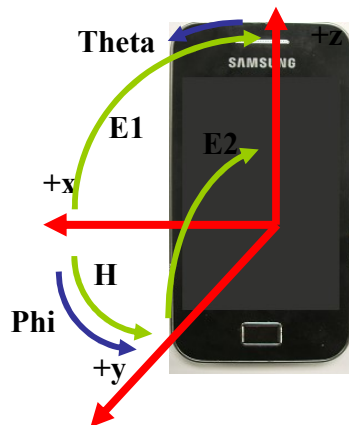


Figure 4: Geometry for SM-R180 for Radiation patterns.



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4.3. Test Method (Manufacturing)

In manufacturing it is not practical to electrically test all antennas until it is heat staked into a fully assembled and operating handset supplied by the customer. To ensure the customer has the ability to sample test the antennas prior to heat staking and assembling them into a phone handset, Ethertronics typically designs a test fixture for use to electrically sample test the antennas.

4.4. Corrosion (Salt Spray) Test

Place the antennas into the Corrosion (Salt Spray) environmental chamber with 5% sodium atmosphere at 35°C for 72 hours. Then remove antennas from chamber and allow to stabilize at room temperature before measurement.

Post Test Requirements: There will be no evidence of mechanical damage.

Electrical characteristics should be within +/-0.5% of their initial value.