APPROVAL SHEET

MODEL : TB-1900T

HYUNDAI ELECTRONICS INDUSTRIES CO., LTD		CHECKED	APPROVED
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HANKOOK ANTENNA CO., LTD.

CONTENTS

1. GENERAL

1.1 Product description

A sleeve dipole antenna, consisting of copper cylinder and a thin radiator which is a inner conductor of a coaxial line, is a half wave dipole antenna used for a portable and base station unit for wireless communication.

1.2 Product Number

Hankook Antenna Product No. : TB-1900T

Hyundai Product No. : HWT-210

1.3 Units and Definitions

Tx	Transmit Band
Rx	Receive Band
V.S.W.R	Voltage Standing Wave Ratio
dBd	Antenna gain in dB relative to a dipole
g	Acceleration of gravity (about 9.8 m/sec^2)
RH	Relative Humidity

1.4 Conditions

Unless otherwise stated all temperature tolerance are ±3°C and all RH tolerance are ±5 percentage.

Unless otherwise stated all values are valid at +20°C and 50%RH.

2. ELECTRICAL PROPERTIES

2.1 Frequency Band

Transmit Band (Tx) : 1850 – 1910 MHz

Receive Band (Rx) : 1930 – 1990 MHz

2.2 Impedance

Nominal Value : 50Ω

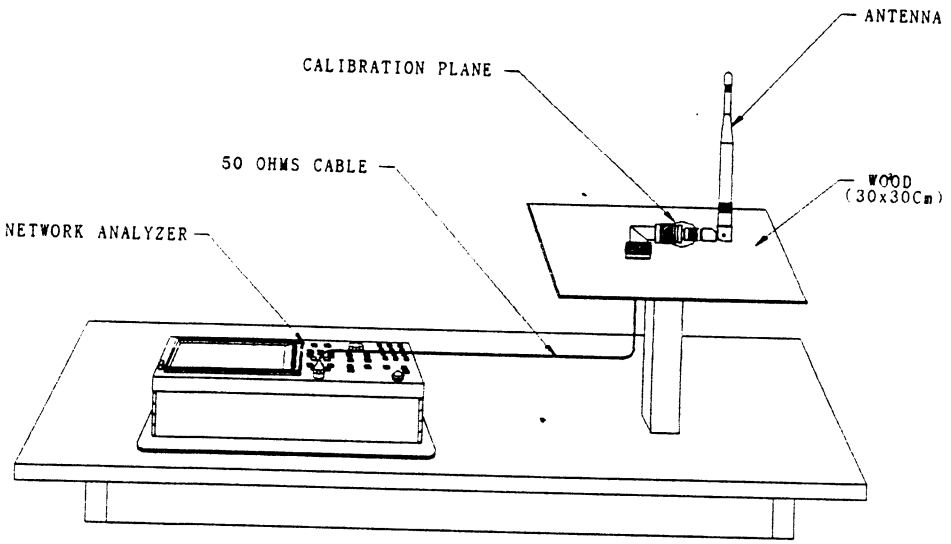
2.3 VSWR

2.3.1 Maximum Values

2.0 : 1

2.3.2 Measuring Method

A 50 ohms coaxial cable is connected to the antenna connector. In the other end the coaxial cable is connected to a network analyzer. The analyzer calibrated so that the reference plane is at the end the coaxial cable connected to the antenna.



2.4 Gain

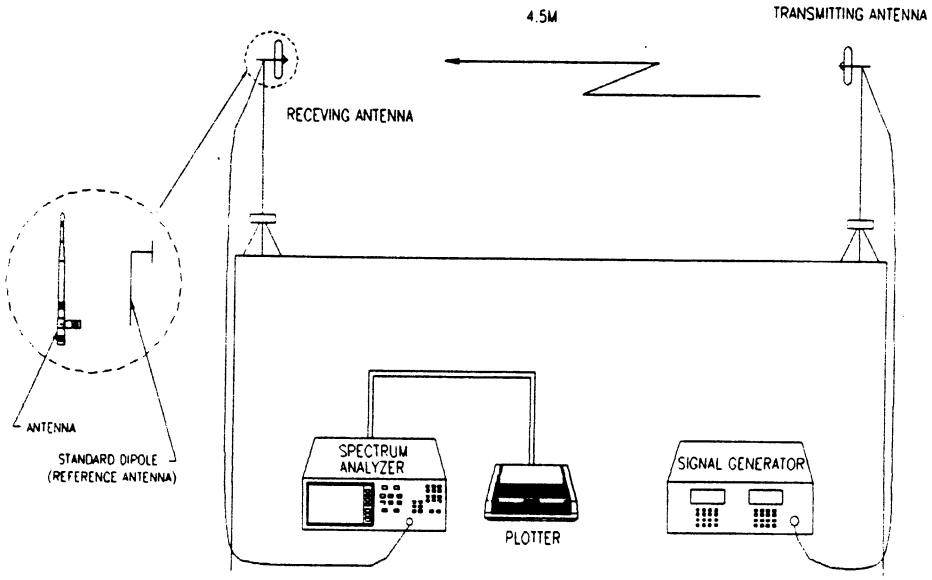
2.4.1 Maximum Gain

1.5 dBi

2.4.2 Measuring Method

The connection is done according to figure. Radiation patterns are measured at the lowest, middle and highest frequency for each band (Tx and Rx band). The measurement performed so as to minimize the influence of the cables. Calibration for absolute measurements

is done with a reference antenna, which is in turn calibrated by a certified calibration company.



3. MECHANICAL PROPERTIES

3.1 Appearance

The appearance shall be according to specification drawing as attached.

3.2. Tensile Load

3.2.1 Force

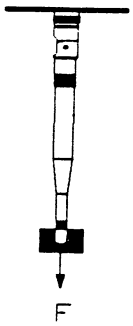
5 Kgf

3.2.2 Demands

Without mechanical damage, electrical performance according to 2.3.1 and 2.4.1 after test.

3.2.3 Measuring Method

The antenna is assembled to the test equipment according to figure. The specified force is applied during 30sec to the top of the sleeve parallel to the antenna axis.



3.3 Drop

3.3.1 Drop height
0.75 m

3.3.2 Number of Drops
1 drop to ensure set lands on antenna

3.3.3 Set weight
2 Kg

3.3.4 Demand

No visual change and the fitting and mold shall be unchanged mechanically and satisfy the electrical data after test.

3.3.5 Measuring Method

The antenna is attached to set (if available, otherwise to test fixture of equal weight). The set is dropped with antenna downwards onto a steel surface covered with 20 sheets of copy paper .

4. ENVIRONMENTAL RESISTANCE PROPERTIES

4.1 Operational Temperature

4.1.1 Temperature : − 40℃ ~ +70℃ at 50%RH

4.1.2 Demand

No visual change and the fitting and mold shall be unchanged mechanically and satisfy the electrical data during the test.

4.1.3 Measuring method

The antenna is kept at +20°C and 50%RH for at least 1 hour. The antenna is placed at low temperature. The antenna is taken out after 1 hour, and the V.S.W.R is immediately measured. The antenna is kept at +20°C and 50%RH for at least 1 hour. The antenna is placed at high temperature. The antenna is taken out after 1 hour,. and the V.S.W.R is immediately measured.

4.2 Temperature Cycling

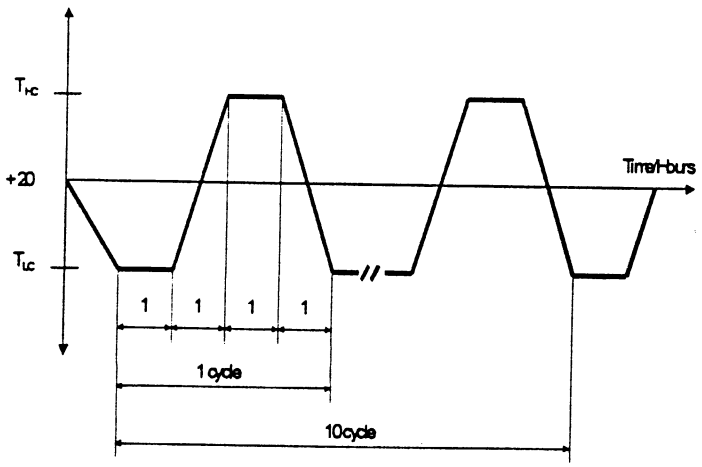
4.2.1 Cycling Temperature : −40℃ ~ +80℃ at 50%RH

4.2.2 Demand

No visual change and the fitting and mold shall be unchanged mechanically and satisfy the electrical data after a 1 hour relaxing period at +20℃ and 50%RH .

4.2.3 Measuring method

The antenna is placed in a climatic chamber. The temperature is cycled as follows: The temperature is kept constant at low cycling temperature for 1hour, increased to high cycling temperature during 1 hour, kept constant for 1hour and then decreased to low cycling temperature during 1 hour. This procedure is repeated 10 times ending at room temperature, see figure



4.3 Humidity

4.3.1 Condition : +40℃ and 95%RH

4.3.2 Demand

No visual change and the fitting and mold shall be unchanged mechanically and satisfy the electrical data after the test.

4.3.3 Measuring method

The antenna is placed in climatic chamber for 24 hours. The antenna is taken out from the chamber and measured after another 24 hours in room temperature.

4.4 Sinusoidal Vibration

4.4.1 Vibration Frequencies : 5 - 55 - 5 Hz (1 cycle)

4.4.2 Sweep Rate : 0.5 octave/min (logarithmic)

4.4.3 Maximum Amplitude

A = 1 mm

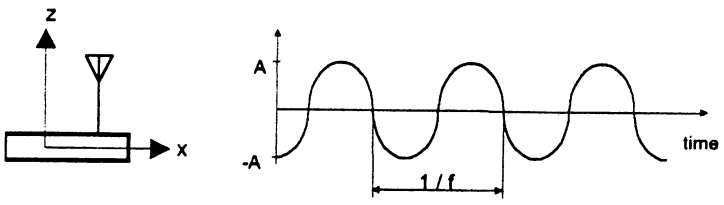
4.4.4 Maximum Acceleration : 2 g

4.4.5 Demand

No visual change and the fitting and mold shall be unchanged mechanically and satisfy the electrical data after the test.

4.4.6 Measuring method

The antenna is assembled in the test equipment. The vibration is done both in x- and z- directions, according to figure, with a duration of 2 hours in each direction.



a) Vibration directions. b) Vibration form.

5. TEST EQUIPMENTS

Network Analyzer (HP-8753C)	:	VSWR, Impedance
RF Signal Generator(HP-8350B)	:	Required signal
Spectrum Analyzer (HP-8563A)	:	Receiving signal

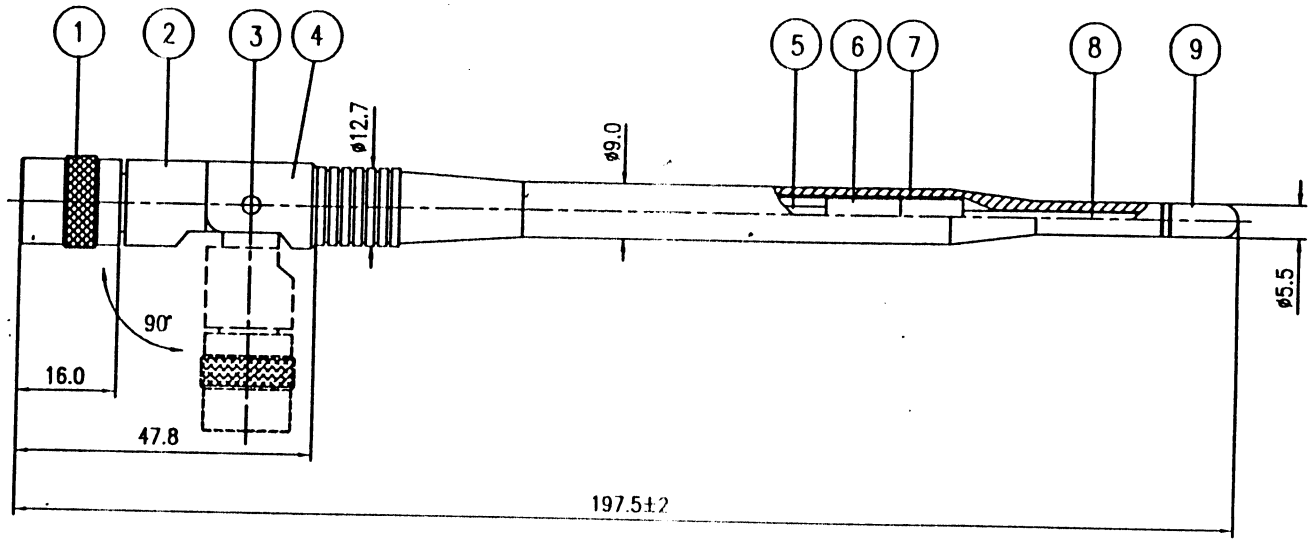
6. DRAWINGS

As attached

Satena®

개발 2팀

REV. NO.	DESCRIPTION	DATE
1		
2		
3		
4		



NO.	PARTS NAME	MATERIAL	FINISH	CODE NO.
9	SLEEVE	URETHANE	BLACK COLOR	
8	ELEMENT	Cu		120-04-00-001
7	PIPE	Bs		160-02-01-004
6	GUIDE RING	TEFLON	WHITE COLOR	290-04-00-001
5	CABLE	RG-316		120-04-00-001
4	BASE 'B'	NYLON66	BLACK COLOR	180-04-01-002
3	JOINT PIN	Bs	BLACK Cr-PLATING	330-00-00-001
2	BASE 'A'	NYLON66	BLACK COLOR	180-04-01-001
1	TNC CONNECTOR	Bs	Ni-PLATING	100-16-01-012

출도 No. 1999. 11. 0 1

NOTE	TOL. UNLESS NOTED X = ±1 X.X = ±0.5			UNIT	mm	TITLE	TB-1900T
				SCALE	N / S		
DRAWN	M. Y. KIM	CHECKED	J. R. PARK	FILE NAME	TB1900T	ORDER CO.	
REV. NO.	0	APPROVED		DATE	1999.10. 4	DWG. NO.	TB1900T

Hankook Antenna Co., Ltd.