

AP133

Cellular 4G Screw Mounting Antenna

Part Number	AP-133a (esC33-4G0-4850-0A)
Product Name	-
Application	GSM850/900/1800/1900 UMTS-2.1, LTE 1/2/3/4/5/7/12/17/20
Frequency	699~960 MHz, 1710~2690 MHz
Dimension	48 * 50 mm
Feature	High Efficiency, Extreme Robustness and Reliability
Compliant	RoHS, IP-67



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Antenna Provider
ready antenna solutions

Dear Customers,

Antenna Provider is a RF-antenna engineering company based in Finland.

Proudly we are, in the country where the new era of telecommunication was born, where the first GSM call was made (1991), and where the first fully-digital mobile phone was built (Nokia 1011 first GSM phone mass-produced). Our Office is just few kilometers from the place where this dream became real.

Antenna Provider Finland Ltd is focused to offer antenna solutions for 2G/3G/4G cellular applications (LTE/UMTS/CDMA/GSM), for positioning ap-

plications (GPS/Glonass/Beidou), for short range communication applications (Wifi/BT/ZigBee), Radio Paging, WM-Bus, Mesh Low Power, Star Network, SigFox, and for contact less applications RFID, NFC. Our antenna solutions are dedicated to Machine to Machine (M2M) industry, Smart Metering, Telematics, and Security applications.

Our engineer team is highly specialized in RF-Antenna, with a multinational working experience at top technology companies. This valuable knowledge with a full antenna measurement system (Satimo Starlab) and design capabilities allows to create innovative solutions, and fulfill your requirements.



Innovation and high commitment are our most valuable identity.

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Introduction

1.1. Description

AP-133a offers high performance for 4G applications (GSM850/900/1800/1900, UMTS2100, LTE) in a compact size. The antenna cover is made by a durable, robust and UV resistant ABS plastic (figure 1.1).



Figure 1.1: AP-133a screw mounting 4G antenna.



Figure 1.2: AP-133a screw mounting 4G antenna.

AP-133a is widely used for external screw mounting

4G cellular solutions on fleet management, indoor and outdoor cellular applications (figures 1.2, 1.3).



Figure 1.3: Outdoor telemetry application.

AP-133a is the best compromise between size, robustness and performance for external screw mounting 4G antenna solution (figure 1.4).

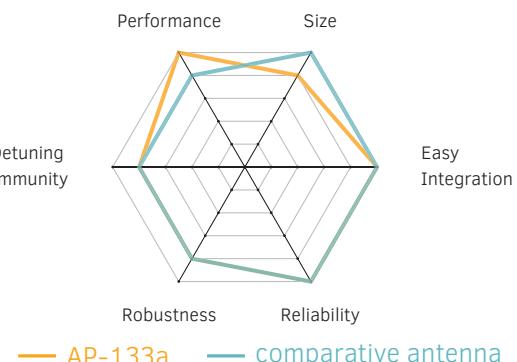


Figure 1.4: AP-133a vs a comparative antenna

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Characteristics

2.1. Summary

The AP-133a typical characteristic is summarized in the table below (table 2.1). Data is measured using the setup shown in figure 2.1, where the antenna is mounted on the center of a metal plate of 30cm by 30cm.

RF/Antenna test is performed accordingly to the IEEE Standard Test Procedures for Antennas (IEEE Std 149) and antenna terms definition follow the IEEE Standard Antenna Terms (IEEE Std 145).

Parameter	Value
Frequency	699~960 MHz, 1710~2690 MHz
E-UTRA Bands	GSM850/900/1800/1900, UMTS 2.1 LTE 1/2/3/4/5/7/12/17/20
Impedance	50 Ω
Return Loss	≥ 7 dB
VSWR	≤ 2.6
Efficiency ^a	≥ -3.0 dB (50 %) at 699~960 MHz ≥ -2.9 dB (51 %) at 1710~2170 MHz ≥ -2.2 dB (60 %) at 2500~2690 MHz
Polarization	linear
Realized Peak Gain ^a	0.5~3.1 dBi at 699~960 MHz 1.6~5.8 dBi at 1710~2170 MHz 4.2~5.4 dBi at 2500~2690 MHz
Polarization	linear
Temperature range	-40°C~105 °C
Dimension	48 * 50 mm
Mounted location ^b	on metallic or non-metallic surface
Compliant	RoHS, TS16949, IP-67

Table 2.1: AP-133a characteristics

^a Includes antenna impedance mismatch loss (according to IEEE std 145).^b Recommended setup see figure 2.1

2.2. Test Setup

The characteristic data present in this document are based using the following setup shown in figure 2.1, where the antenna is mounted on the center of a square metal board (30cm * 30cm).

AP-133a is suitable for different mounting cases, as metallic cabinet, plastic enclosure. Please contact the Antenna Provider engineer team for detailed information at info@antennaprovider.com.

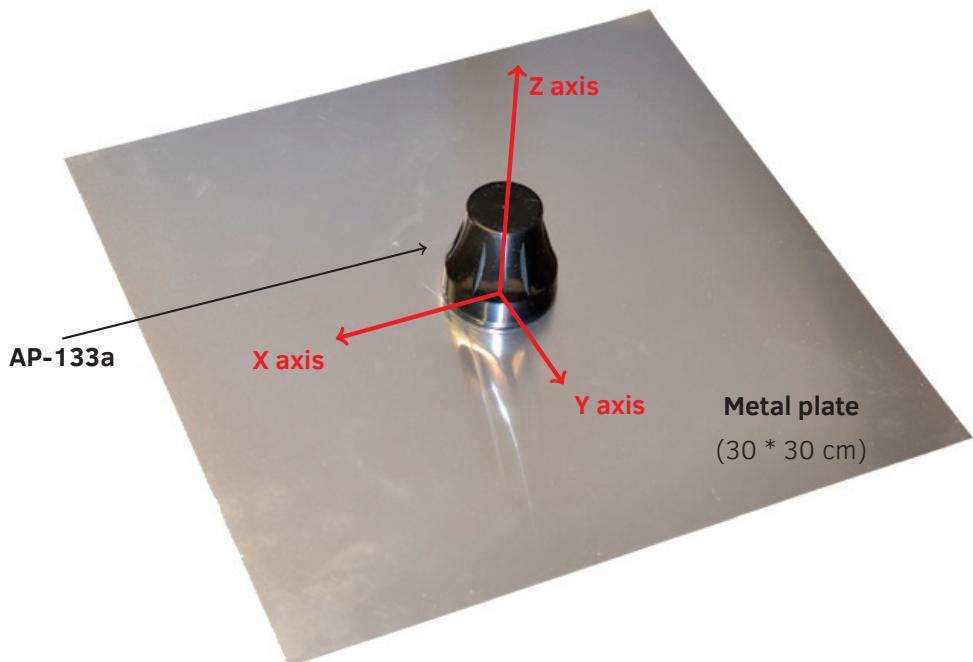


Figure 2.1: AP-133a on a metal board (size 30 * 30 cm)

2.3. Electrical

The AP-133a shows a Return Loss level (RL) better than 7 dB (figure 2.2) and a voltage standing wave ratio (VSWR) less than 2.5 (figure 2.2), which means

that a mismatch loss level is less than 1.0 dB with a 50Ω impedance line.

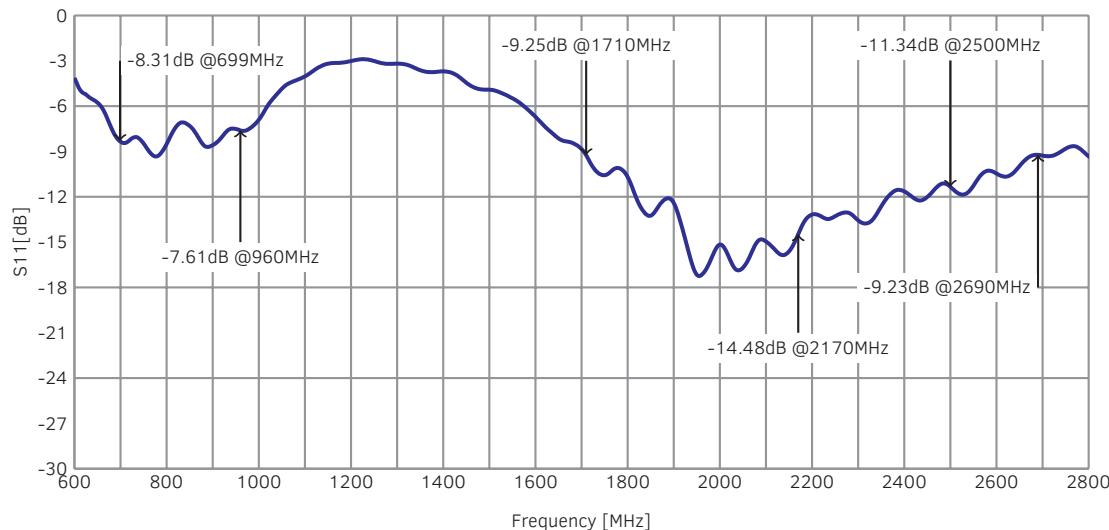


Figure 2.2: Return Loss level (RL = $-S_{11}\text{dB}$).

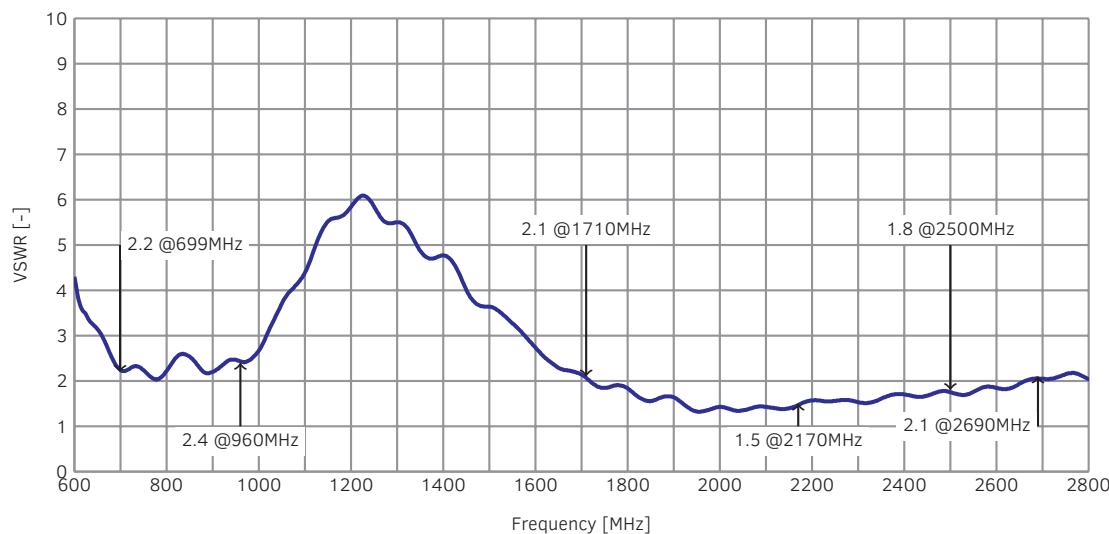


Figure 2.3: Voltage standing wave ratio (VSWR).

2.4. Radiation

Radiation pattern, efficiency, with the electrical parameters are the key parameters of any antenna. AP-133a efficiency level on 30 * 30 cm metal board is better than -3.0/-2.9/-2.2 dB in the frequency target bands, as shown in figure 2.4.

Radiation patterns at 900MHz, 1800MHz, 1950MHz and 2550MHz along the main cuts, X-Y (horizontal), Z-X and Z-Y (verticals) are reported in figures 2.5, 2.6, 2.7 respectively.

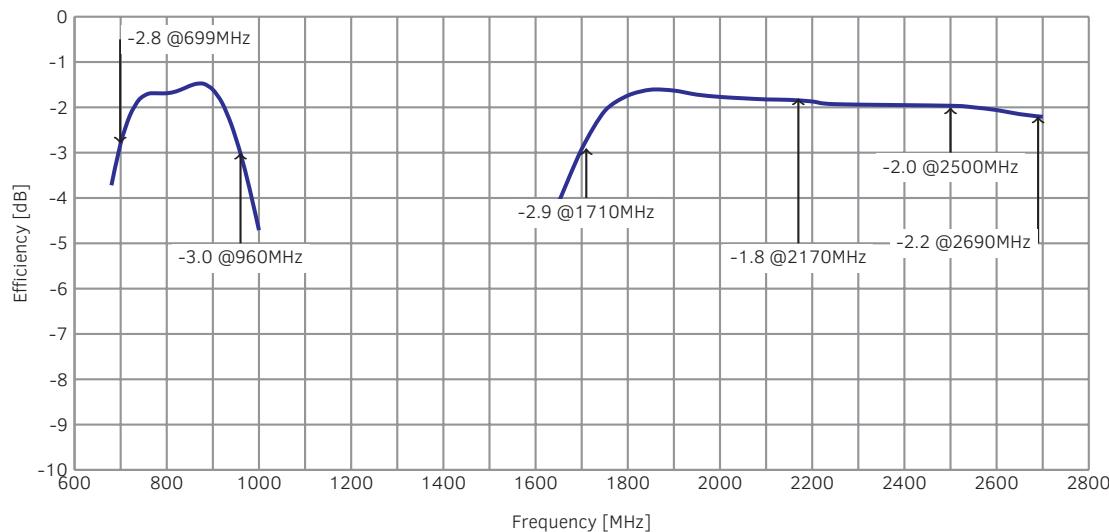


Figure 2.4: Antenna Efficiency, including mismatch loss.

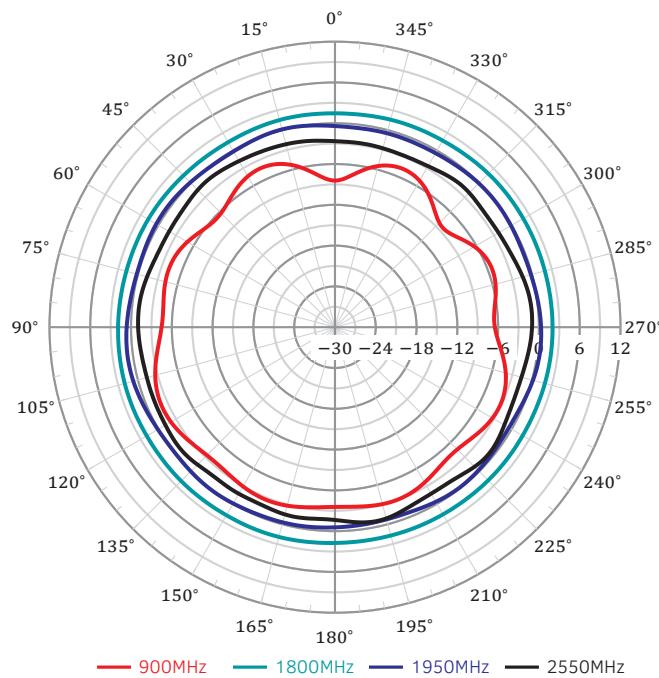


Figure 2.5: Radiation Pattern: X-Y Horizontal Gain cut in dBi.

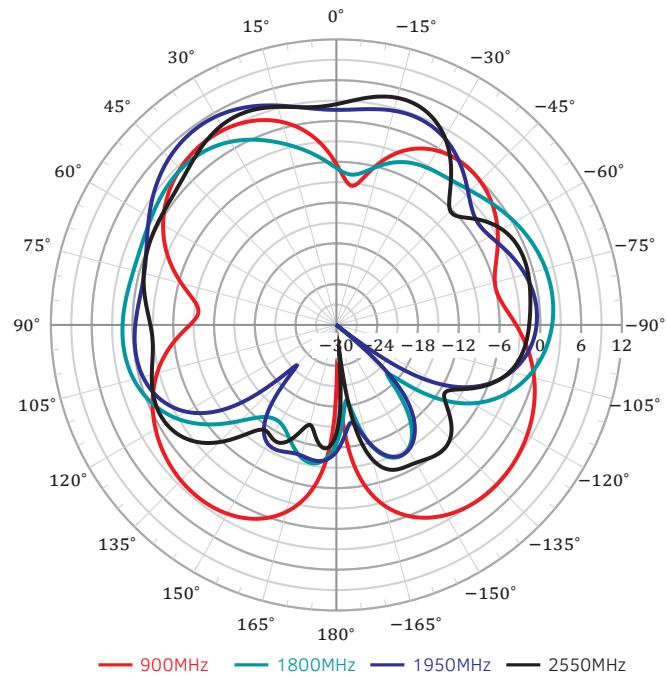


Figure 2.6: Radiation Pattern: Z-X Vertical Gain cut in dBi.

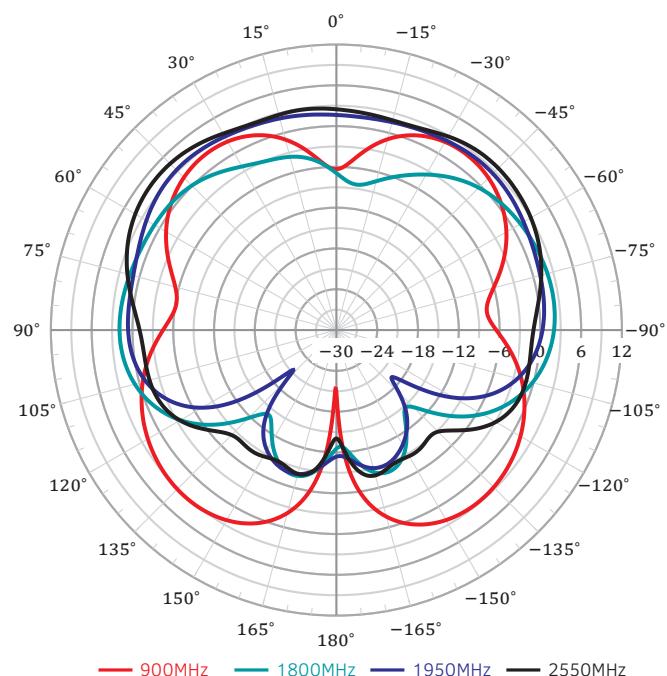


Figure 2.7: Radiation Pattern: Z-Y Vertical Gain cut in dBi.

2.5. Mechanical

The AP-133a is made by a robust, UV resistant ABS plastic cover, with overall dimensions of 48mm by 50mm (height by diameter), and overall weight of 110g (figures 2.8, 2.9). The antenna has a M12 nuts (recommend tightening torque 3.4 N*m), with a rec-

ommended hole size of 13.2mm.

The antenna cable type, length and connector type are customizable, the standard configuration is with 1 meter of RG316 cable and SMA male connector.

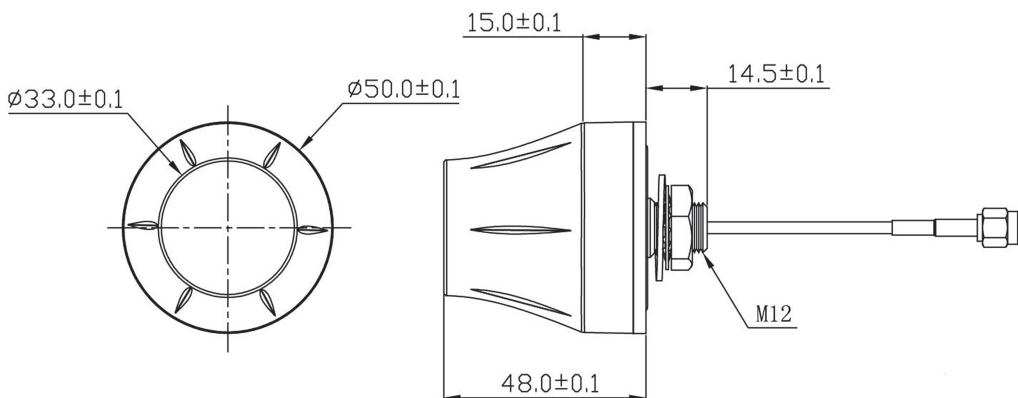


Figure 2.8: AP-133a dimensions. Unit in mm.

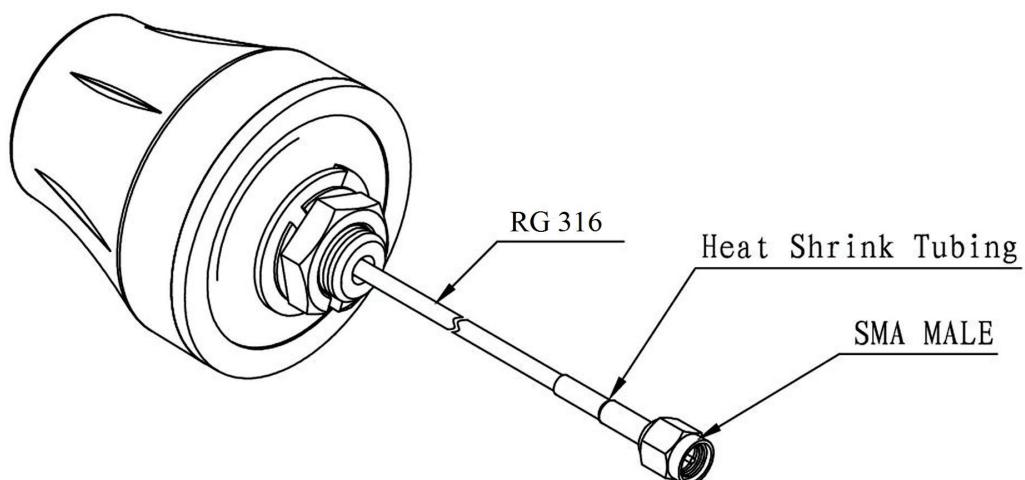


Figure 2.9: AP-133a standard assembly.

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Information

3.1. Integration

In order to achieve best performance Antenna Provider team recommends to follow the below reported recommendations.

If you have questions or comments on that please contact info@antennaprovider.com, the RF/Antenna

team will be glad to support you.

Environment It's highly recommend to avoid placing metal objects, metal enclosure cables on top or beside the antenna.

3.2. Storage

The antenna must be stored in an ambient temperature between 5°C ~40°C with a relative humidity

of 20% ~60%. Avoid storing in direct sunlight and falling of dew.

3.3. Packaging

The antenna is normally shipped in plastic (PE) bag (1pcs/bag), 80pcs placed in a cardboard box of

70 * 32 * 16 cm, with a gross weight of 9.0Kg.

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