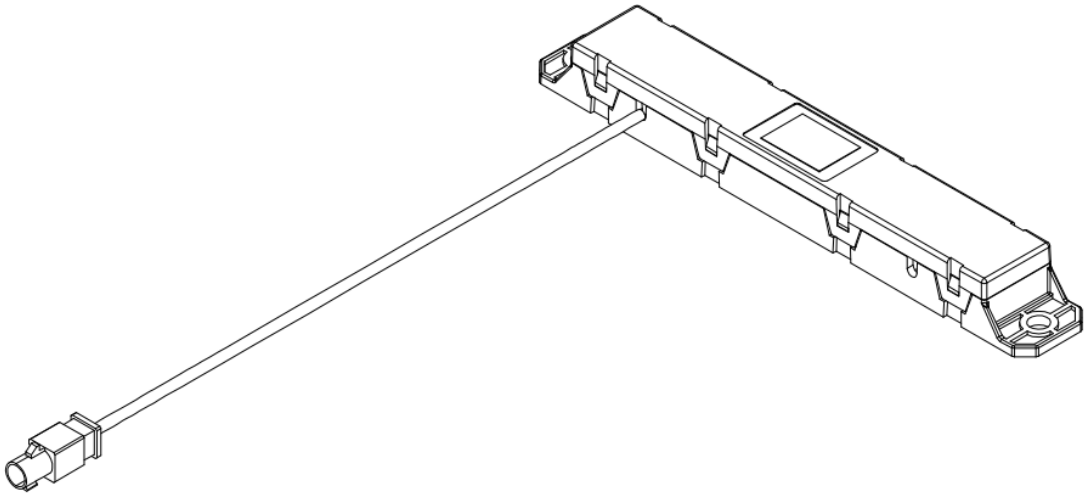
Alfa Romeo 952/949

Bluetooth Antenna



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Version History

Version	Revision date	Changes
1.0	September 09 2022	First Release date

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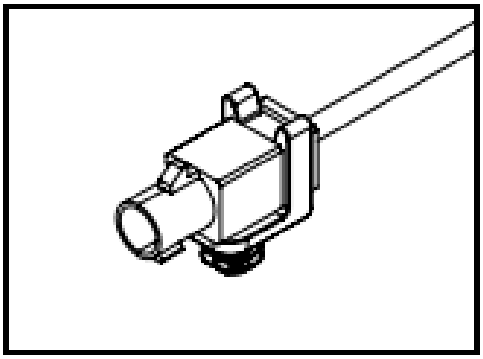
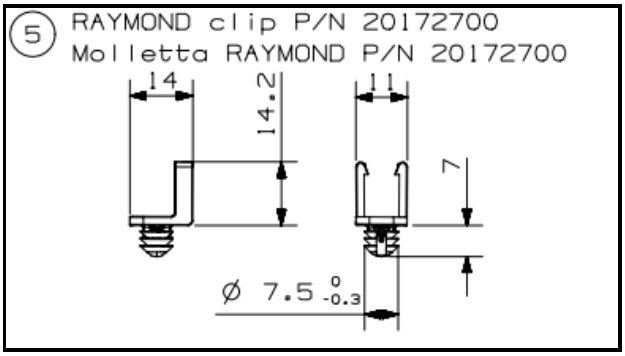
1 Introduction

In this report measurements of Alfa Romeo 952/949 Bluetooth Antenna will be presented.
The following partnumbers are involved:

Item	Customer P/N (ASK P/N)	Sample Status (ASK)
Instrument Panel BT Antenna for 952	00505348590 (83850100)	Standard Production
Instrument Panel BT Antenna for 949	00505477120 (83853900)	Standard Production

The two partnumbers share the same parts, the difference consist just in the presence of a Raymond Clip on the Fakra connector of the 949 version.
For this reason only one partnumber (00505348590 - 83850100) was characterized.





2 Requirements

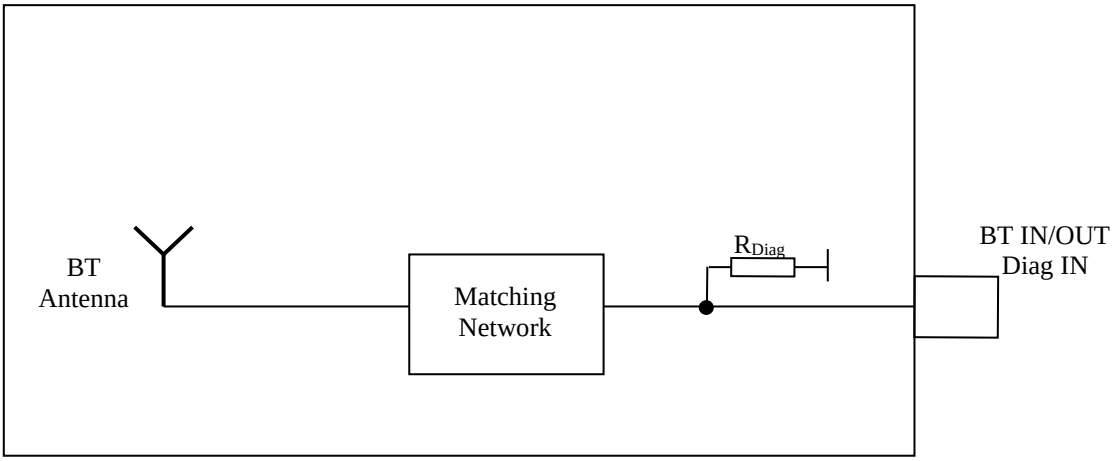
Requirements in accordance with:

- *CTS_BT-WiFi Antennas_20140506_ASK-20140909.docx*
- *pf13010 Rev A BT-WiFi.pdf*

Bluethoot Requirements							
Item	**Ref §**	**Min.**	**Typ.**	**Max.**	**Unit**	**Remarks / Notes**	**Sample Status**
Frequency Band		2.4		2.5	GHz		Ok
Output Diagnostic Impedance		41	51	61	kOhm		Ok
Antenna Impedance			50		Ohm		Ok
VSWR				3:1			Ok
Polarization			Linear				Ok
Azimuth Coverage		0		360	Deg		Ok
Elevation Coverage		0		90	Deg		Ok
Antenna Efficiency		50			%	Defined for WiFi-BT partnumber. Antenna mounted on dielectric surface	Ok
		-3			dB		
WiFi-BT Decoupling		30			dB	Isolation defined for WiFi-BT partnumber	*NA*
				-30	dB	S21 parameter defined for WiFi-BT partnumber	

Note:
the antenna has been designed in order to satisfy VSWR and Isolation when installed on dielectric (Plastic) or conductive (Metal) surfaces.

3 Antenna Block Diagram



4 Laboratory Measurements

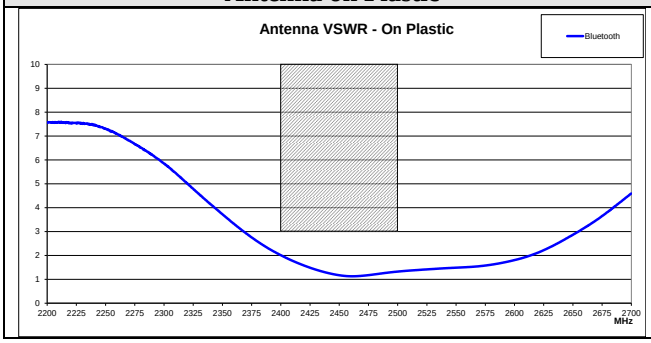
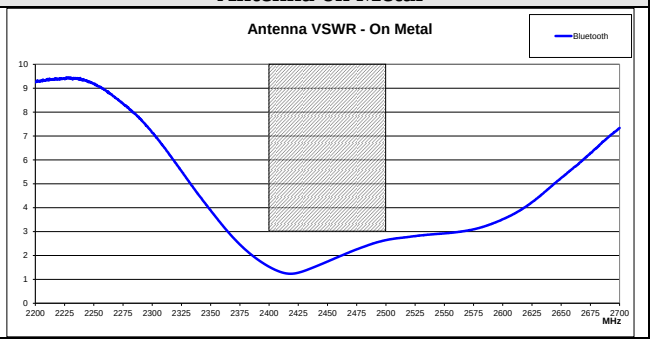
4.1 Diagnostic Resistance

The measured values are as follow

Item	Resistance [kOhm]
BT Antenna	50.8

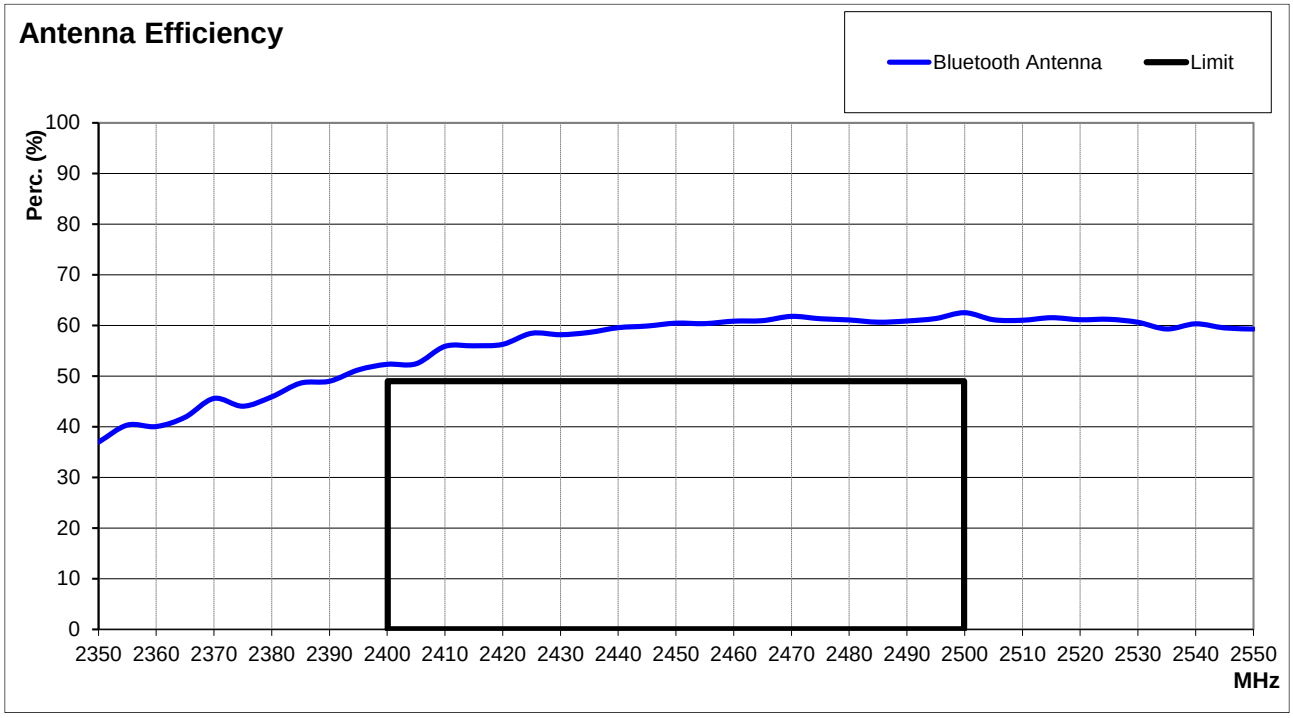
4.2 VSWR

The antenna VSWR is as follow

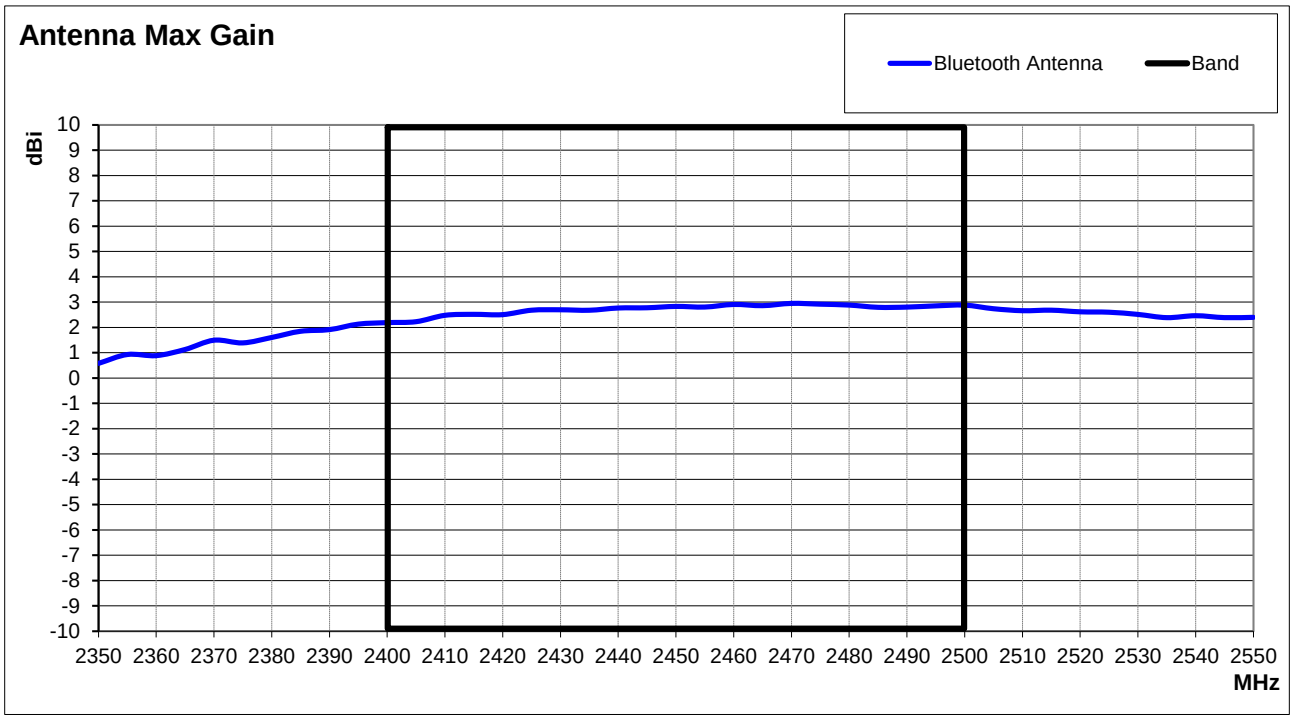
Antenna on Plastic	Antenna on Metal
	

5 Radiation Measurements

5.1 Bluetooth Antenna – Efficiency



5.2 Bluetooth Antenna – Peak Gain



6 Conclusions

The antenna fulfils the requirements

Appendix A – Measurements Setup

A1 Laboratory

A1.1 Diagnostic Resistance

The diagnostic resistance is measured between antenna FAKRA connector's core and shield

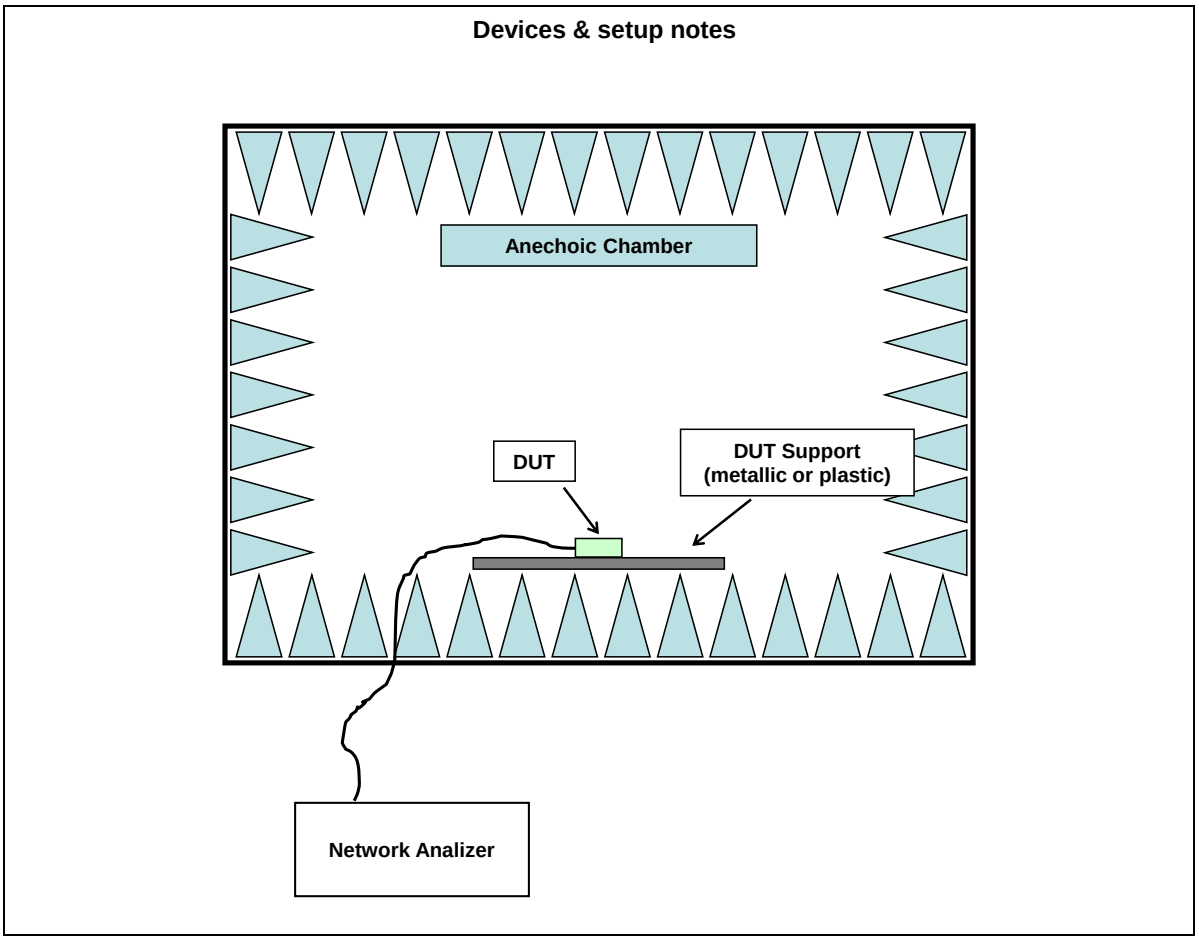
The following equipment is used:

Equipment	Manufacturer	Model (S/N)	Internal Code	Current Calibration	Next Calibration	Certificate Number	
Multimeter	Agilent	34410A (MY47000370)	E307044	23/02/2021	23/02/2023	0104_2021/E_MI	☑

A1.2 S-Parameters and VSWR

Antenna S-Parameters are measured using cable with ferrites and Rosenberger 03K159-K20S3 (or equivalent) SMA-FAKRA adapters.
The calibration does not include eventual AUT cables; if additional fixtures are used, Port Extension is implemented.

Since the antenna operates in the 2.4 GHz band, in order to isolate it from existing devices (eg Access Points, Mobile Phones), the measurement has been done inside an anechoic chamber.



The following equipment is used:

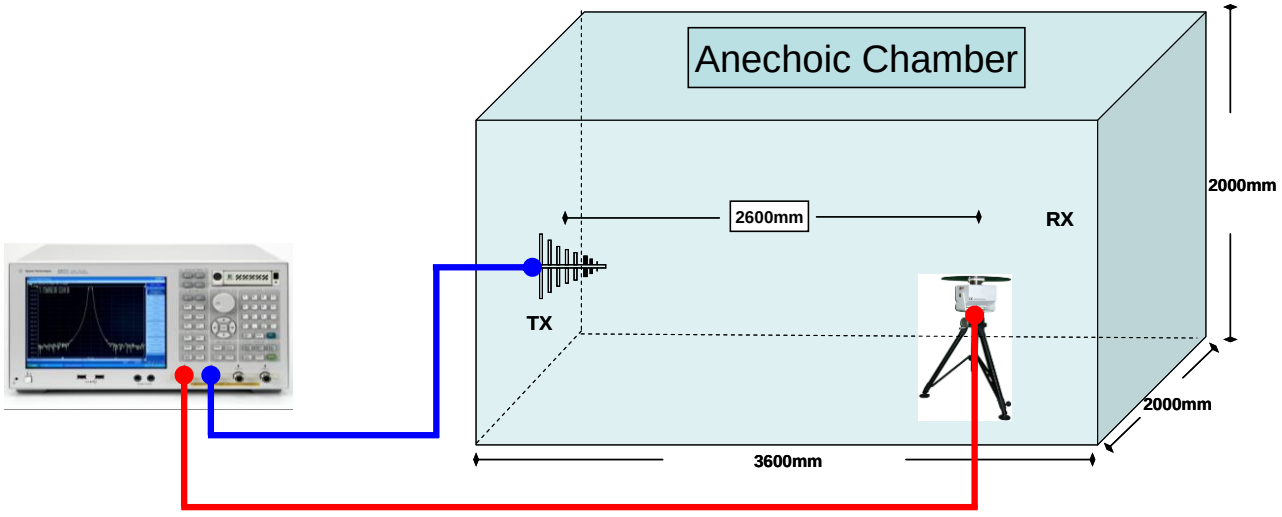
Equipment	Manufacturer	Model (S/N)	Internal Code	Current Calibration	Next Calibration	Certificate Number	
Network Analyzer	Agilent	E5071C (MY46101556)	E307046	23/02/2021	23/02/2024	0097_2021/E_MI	☑

A2 Anechoic Chamber

A2.1 Radiation Measurements

Measurements in ASK Anechoic Chamber are made placing the AUT on a 3D positioner.

A network analyzer is used for making S21 measurement; path losses are compensated and the antenna gain in *dBi* is calculated.

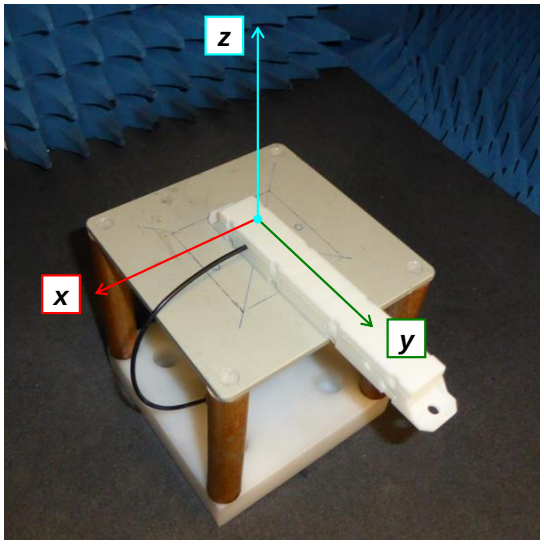


Measurements on 1 meter Groundplane, are done using a rounded edges plate.

In the reference system, Phi = 0 direction identifies the position of Tx Antenna.

If present, other function/antennas are powered and loaded on 50Ohm.

Antenna in reference System



The following equipment is used:

Equipment	Manufacturer	Model (S/N)	Internal Code	Current Calibration	Next Calibration	Certificate Number	
Network Analyzer	Keysight	E5080A (MY55200708)	E307062	21/10/2021	21/10/2023	1034_2021/E_MI	☑

Equipment	Manufacturer	Model (S/N)	Application
Antenna	Schwarzbeck	BBHX9120E/144	Linear and Circular Polarization, 500 to 6100MHz

--- END OF REPORT ---