



Flir - Scout Pro

Antenna characterization

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Revision History

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Table of Contents

1	TABLE OF FIGURES.....	3
2	TABLE OF TABLES	4
3	ACRONYMS, ABBREVIATIONS AND DEFINITIONS	5
4	INTRODUCTION	6
5	ANTENNA MEASUREMENTS.....	7
5.1	ANTENNA MATCHING CIRCUIT	7
5.2	VOLTAGE STANDING WAVE RATIO.....	8
5.3	ANTENNA EFFICIENCY.....	8
5.4	RADIATION PATTERNS	10
5.4.1	2.4GHz	11
5.4.2	5GHz.....	13
5.5	ANTENNA PEAK GAIN	15
6	SUMMARY.....	16
A.	ANTENNA MEASUREMENT SYSTEM.....	17



1 Table of Figures

Figure 4-1 Flir Scout Pro thermal camera.	6
Figure 5-1 Antenna matching circuit for the Flir Scout Pro thermal camera.	7
Figure 5-2 VSWR Flir Scout Pro Wi-Fi antenna.....	8
Figure 5-3 Measurement plane definitions.....	10
Figure 5-4 Satimo SG-23 6 GHz Stargate Antenna Test Chamber.....	10
Figure 5-5 2,4GHz radiation patterns Flir Scout Pro Wi-Fi antenna.	11
Figure 5-6 3D radiation pattern @2440MHz for the Flir Scout Pro Wi-Fi antenna. Maximum antenna peak gain is found to be in a cut that is not covered by the three planes XY, XZ and YZ.	12
Figure 5-7 5GHz radiation patterns Flir Scout Pro Wi-Fi antenna.....	13
Figure 5-8 3D radiation pattern @5400MHz for the Flir Scout Pro Wi-Fi antenna. Maximum antenna peak gain is found to be in a cut that is not covered by the three planes XY, XZ and YZ.	14



2 Table of Tables

Table 1. Acronyms 5

Table 2 Antenna matching components and corresponding part numbers..... 7

Table 3 Antenna efficiency for the Flir Scout Pro Wi-Fi antenna..... 9

Table 4 Antenna peak gain for the Flir Scout Pro Wi-Fi antenna..... 15

Table 6-1 List of equipment in antenna measurement system.17



3 Acronyms, Abbreviations and Definitions

Table 1. Acronyms

Acronym	Description
WSI	Wireless System Integration

4 Introduction

This paper presents antenna measurements for the *FLIR- Scout Pro* thermal camera. The *FLIR- Scout Pro* camera is equipped with an internal dual band Wi-Fi antenna supporting the 2,4GHz and 5GHz frequency bands.



Figure 4-1 Flir Scout Pro thermal camera.

5 Antenna measurements

The Wi-Fi antenna is verified in terms of *Voltage Standing Wave Ratio (VSWR)*, *antenna efficiency* and *radiation patterns*.

5.1 Antenna matching circuit

The topology of the antenna matching circuit and its component values are shown in Figure 5-1 and Table 2.

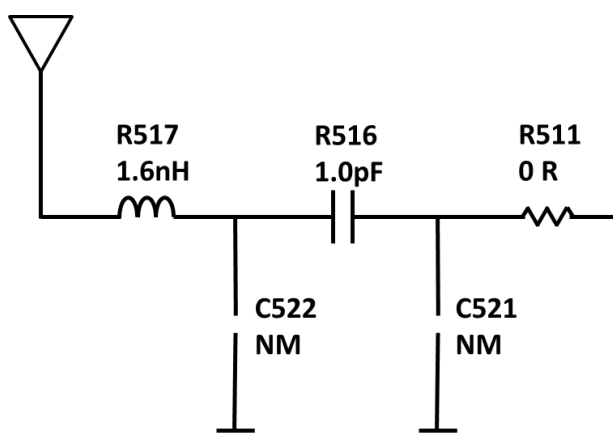


Figure 5-1 Antenna matching circuit for the Flir Scout Pro thermal camera.

Table 2 Antenna matching components and corresponding part numbers.

Designator	Value	Manufacture	Part number
R517	1.6nH	Murata	LQG15HS1N5S02
R516	1.0pF	Murata	GRM1555C1H1R0CA01
R511	0R		
C521	NM	N/A	N/A
C522	NM	N/A	N/A

5.2 Voltage Standing Wave Ratio

Voltage Standing Wave Ratio (VSWR) is a measure of how well an antenna is impedance matched to the system impedance. A VSWR of one means a perfect match where all the available power is delivered to the antenna and an infinite VSWR means a short or an open circuit where all the energy is reflected.

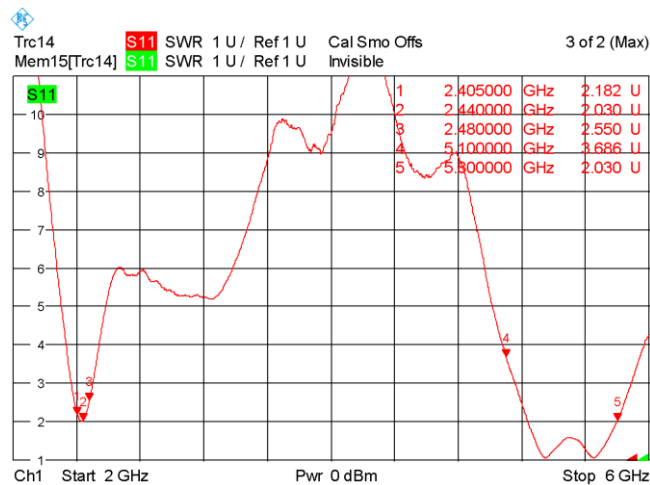


Figure 5-2 VSWR Flir Scout Pro Wi-Fi antenna

5.3 Antenna efficiency

The antenna efficiency measurements are carried out in a Satimo SG-23 6 GHz Stargate Antenna Test Chamber. The antenna efficiency, ε_T , is the ratio of the power delivered at the 50Ω antenna interface, P_t , relative to the power radiated from the antenna, $P_{radiated}$.

$$\varepsilon_T = \frac{P_{radiated}}{P_t}$$

The antenna system efficiency can be expressed in dB or %, where 100% corresponds to 0dB.



Table 3 Antenna efficiency for the Flir Scout Pro Wi-Fi antenna

Frequency MHz]	Efficiency	
	[%]	(dB]
2400	30	-5,2
2410	30	-5,2
2420	31	-5,0
2430	32	-5,0
2440	33	-4,8
2450	31	-5,1
2460	31	-5,1
2470	30	-5,2
2480	31	-5,1
5100	15	-8,2
5150	20	-7,0
5200	24	-6,1
5250	31	-5,1
5300	37	-4,3
5350	43	-3,7
5400	43	-3,7
5450	42	-3,8
5500	41	-3,9
5550	46	-3,4
5600	41	-3,9
5650	42	-3,7
5700	41	-3,8
5750	40	-4,0
5800	28	-5,5

5.4 Radiation patterns

The antenna radiation pattern measurements are carried out in a Satimo SG-23 6 GHz Stargate Antenna Test Chamber. Radiation patterns are presented for three measurement planes: XY-, XZ- and YZ-planes as well as a 3D pattern visualising the radiation pattern around the DUT.

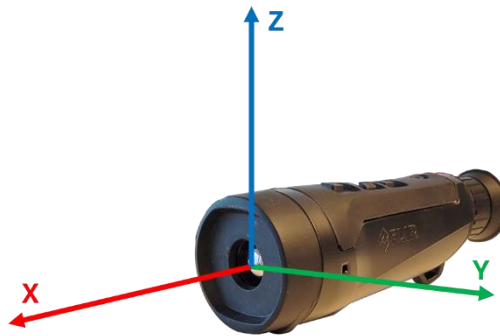


Figure 5-3 Measurement plane definitions.



Figure 5-4 Satimo SG-23 6 GHz Stargate Antenna Test Chamber

5.4.1 2.4GHz

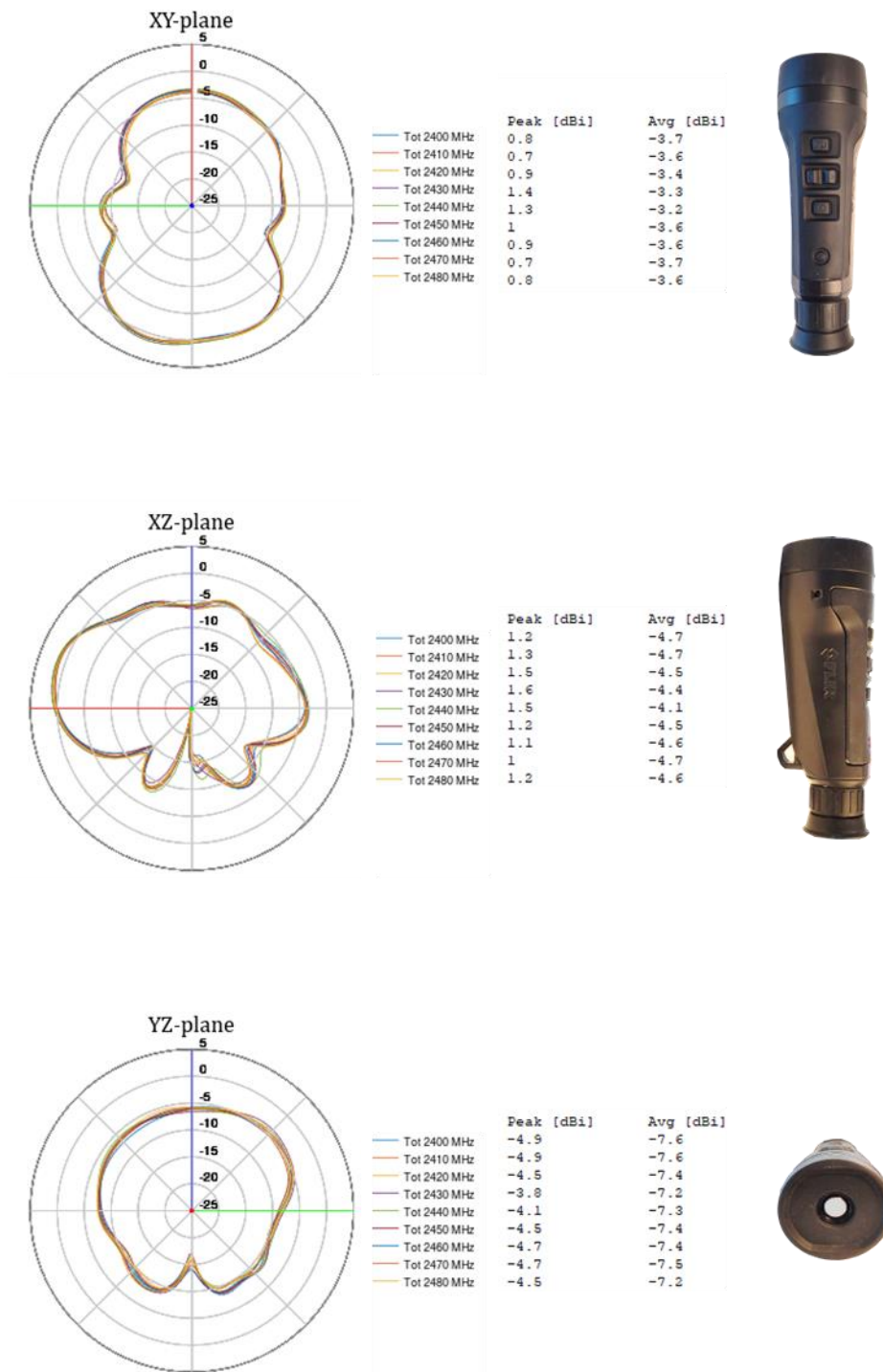


Figure 5-5 2,4GHz radiation patterns Flir Scout Pro Wi-Fi antenna.

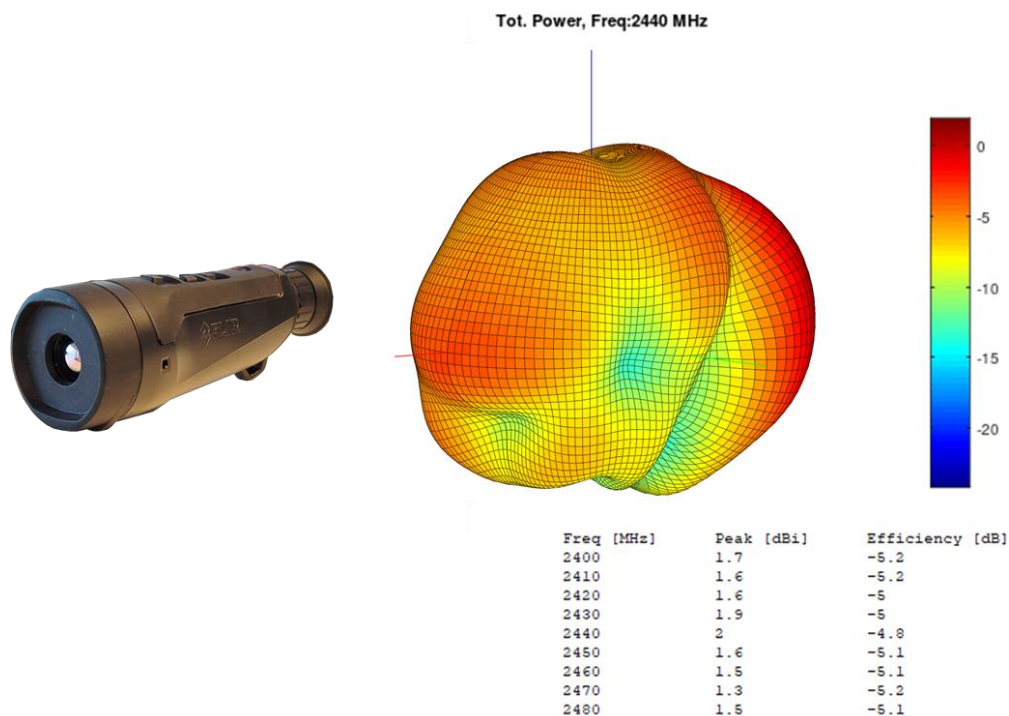


Figure 5-6 3D radiation pattern @2440MHz for the Flir Scout Pro Wi-Fi antenna. Maximum antenna peak gain is found to be in a cut that is not covered by the three planes XY, XZ and YZ.

5.4.2 5GHz

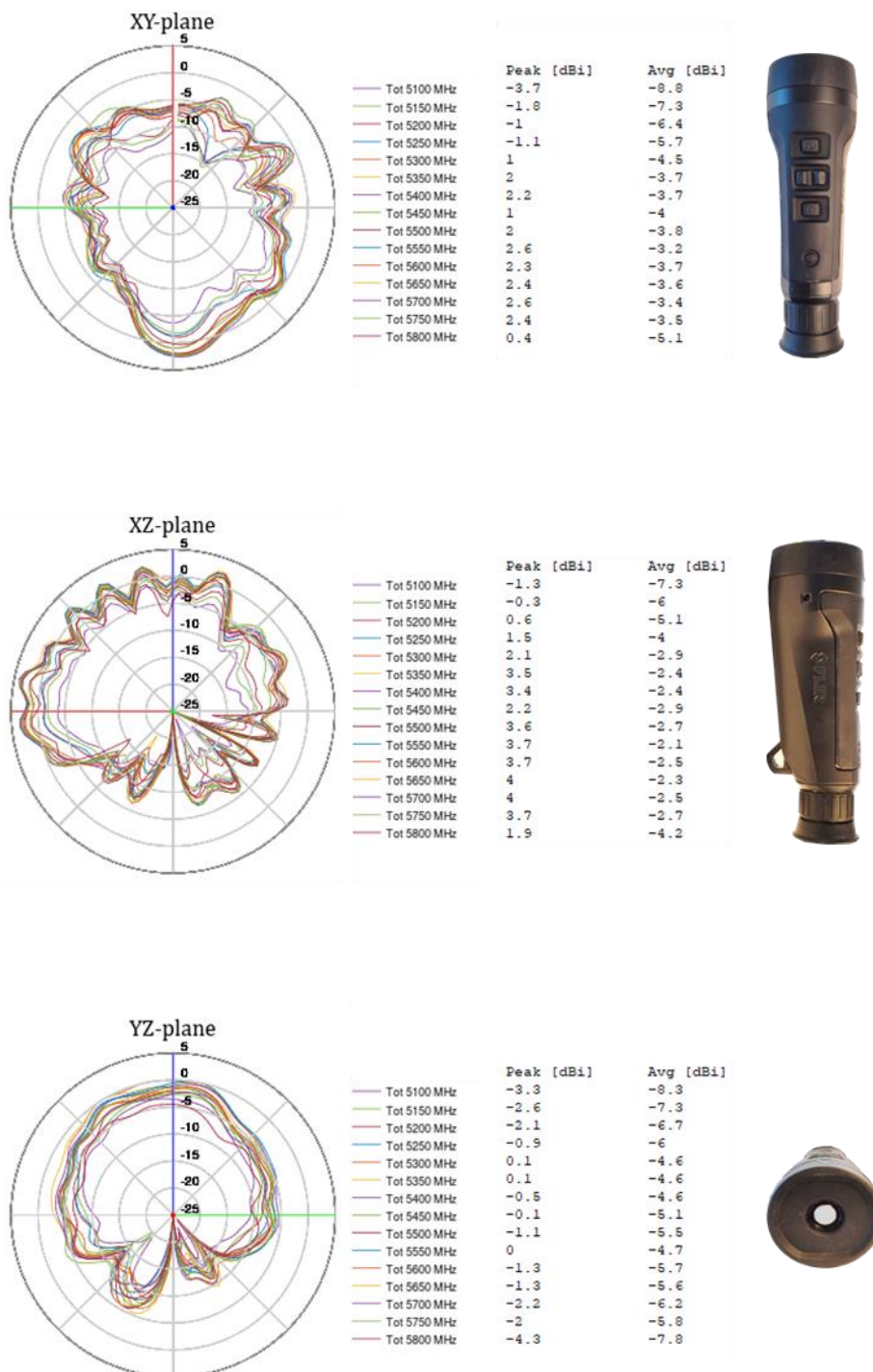


Figure 5-7 5GHz radiation patterns Flir Scout Pro Wi-Fi antenna.

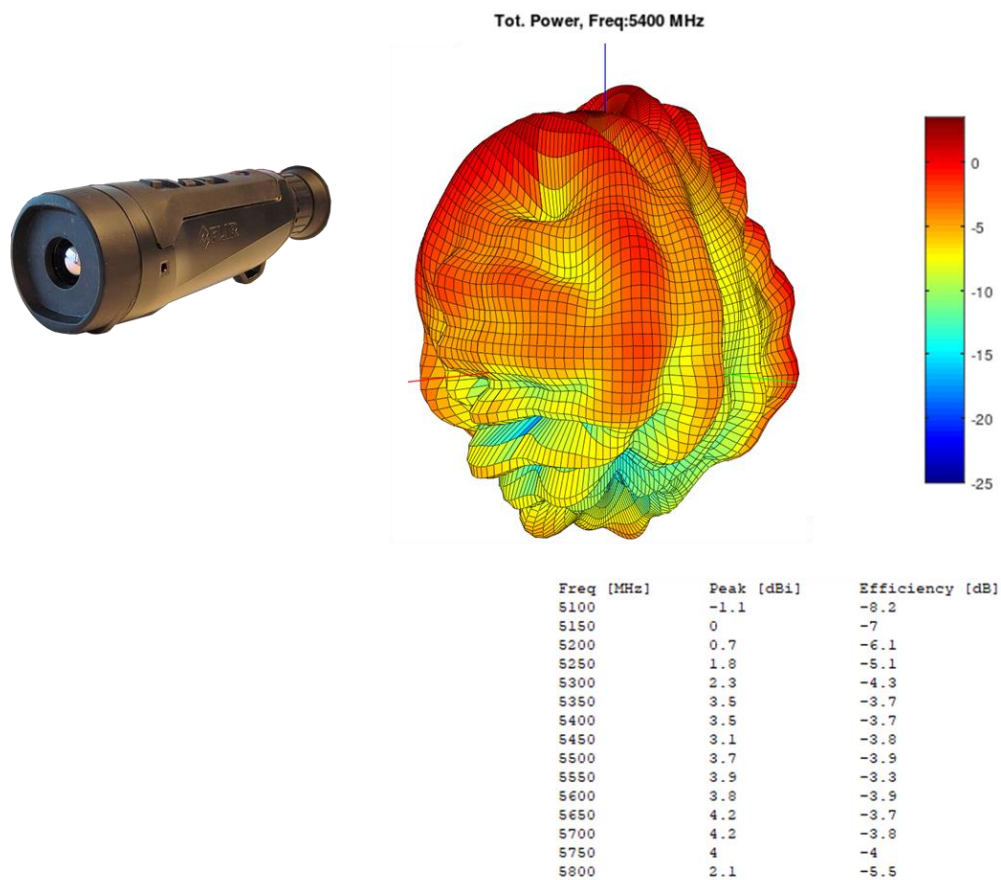


Figure 5-8 3D radiation pattern @5400MHz for the Flir Scout Pro Wi-Fi antenna. Maximum antenna peak gain is found to be in a cut that is not covered by the three planes XY, XZ and YZ.

5.5 Antenna peak gain

The antenna peak gain is summarized in Table 4.

Table 4 Antenna peak gain for the Flir Scout Pro Wi-Fi antenna

Frequency	Antenna peak gain
[MHz]	[dBi]
2400	1,7
2410	1,6
2420	1,6
2430	2,0
2440	2,0
2450	1,6
2460	1,5
2470	1,3
2480	1,5
2490	1,4
2500	1,0
5100	-1,1
5150	0,0
5200	0,7
5250	1,8
5300	2,3
5350	3,6
5400	3,5
5450	3,1
5500	3,7
5550	3,9
5600	3,8
5650	4,2
5700	4,2
5750	4,0
5800	2,1



6 Summary

The antenna performance for the *FLIR- Scout Pro* thermal camera has been characterized. Results for antenna VSWR, antenna efficiency and radiation patterns are presented.

Maximum antenna peak gains the frequency bands 2.4 and 5GHz is measured to be:

2.4GHz: 2.0 dBi

5GHz: 4.2 dBi



A. Antenna measurement system

All radiated measurements were performed using the measurement setup described in this appendix.

Table 6-1 List of equipment in antenna measurement system.

Item	Vendor	Model/Version
3D measurement chamber	Satimo	SG-23
Network Analyzer	Rohde & Schwarz	ZNB-8
Software	MVG	Wave Studio 22.5.6
Last calibration	MVG	2024-09