



Flir – K1870

Antenna characterization

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Revision History

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3 Acronyms, Abbreviations and Definitions

Table 1. Acronyms

Acronym	Description
WSI	Wireless System Integration

4 Introduction

This paper presents antenna measurements for the *FLIR- K1870* thermal camera. The *FLIR- K1870* camera is equipped with an internal dual band Wi-Fi antenna supporting the 2,4GHz and 5GHz frequency bands.

The DUT used in measurements has been prepared by FLIR.



Figure 4-1 Flir K1870 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 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.

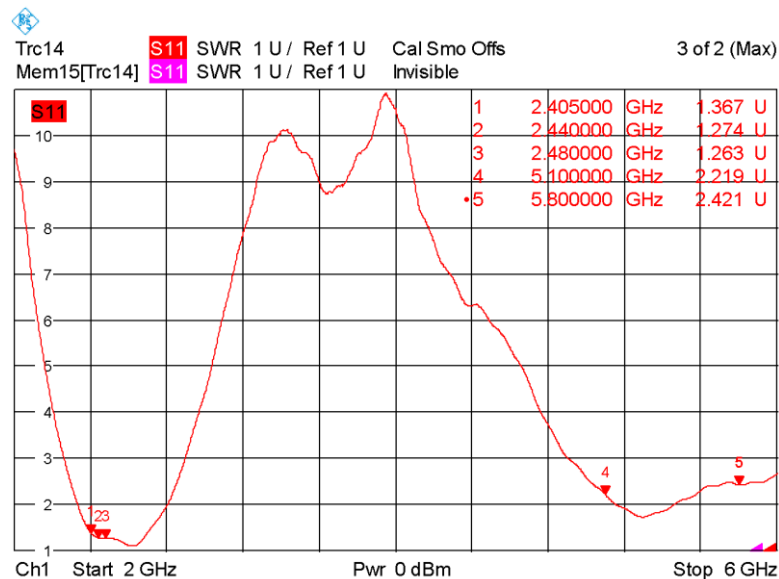


Figure 5-1 VSWR Flir K1870 Wi-Fi antenna

5.2 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 2 Antenna efficiency for the Flir K1870 Wi-Fi antenna

Frequency [MHz]	Efficiency	
	[%]	[dB]
2400	33	-4,8
2420	33	-4,8
2440	33	-4,8
2460	32	-5,0
2483	37	-4,4
5125	61	-2,2
5175	65	-1,9
5225	70	-1,6
5275	68	-1,7
5325	68	-1,7
5375	66	-1,8
5425	66	-1,8
5475	66	-1,8
5525	64	-1,9
5575	61	-2,1
5625	65	-1,9
5675	71	-1,5
5725	81	-0,9
5775	77	-1,1
5800	71	-1,5

5.3 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 5-2 Measurement plane definitions.



Figure 5-3 Satimo SG-23 6 GHz Stargate Antenna Test Chamber

5.3.1 2.4GHz

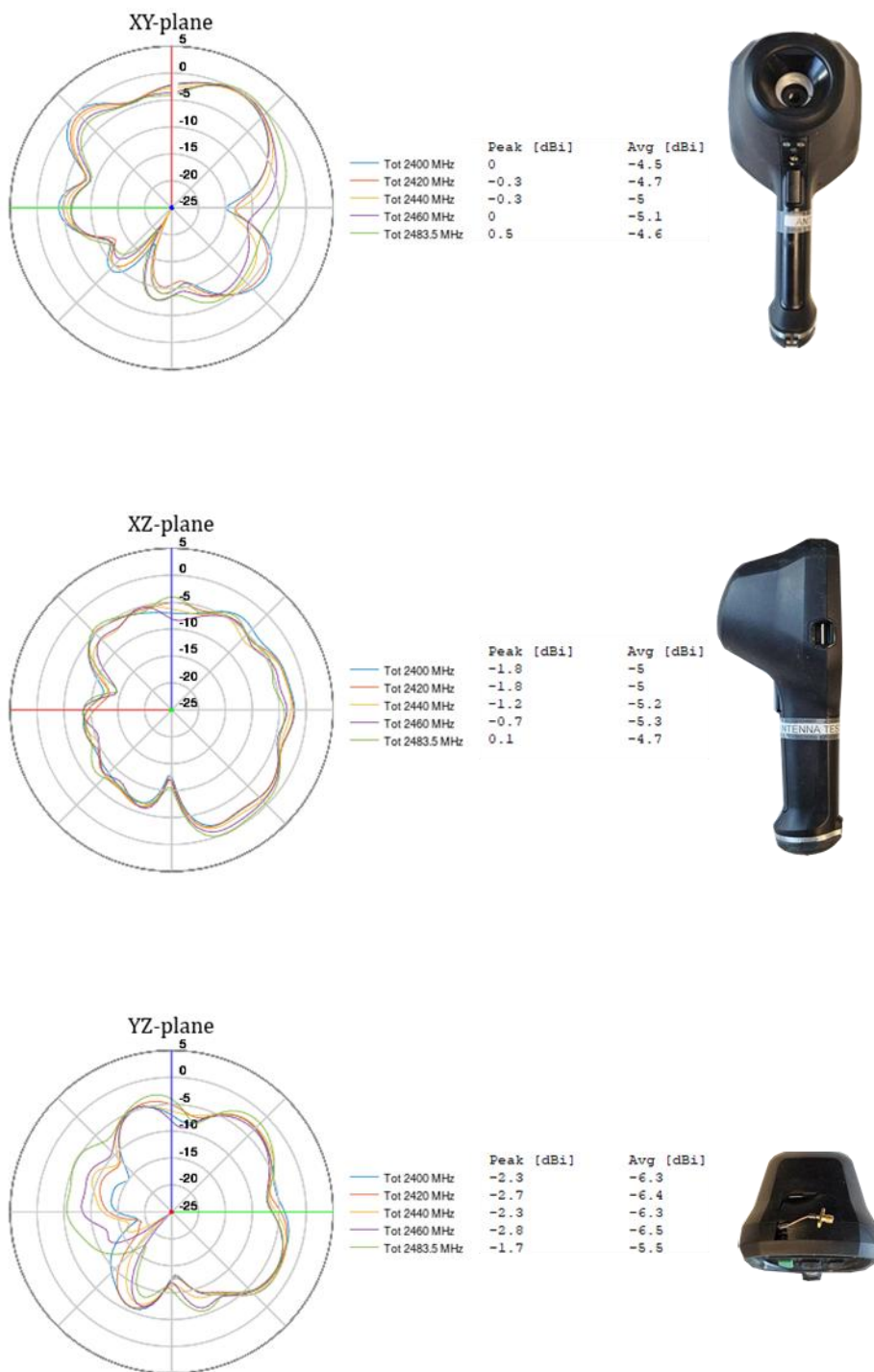


Figure 5-4 2,4GHz radiation patterns Flir K1870 Wi-Fi antenna.

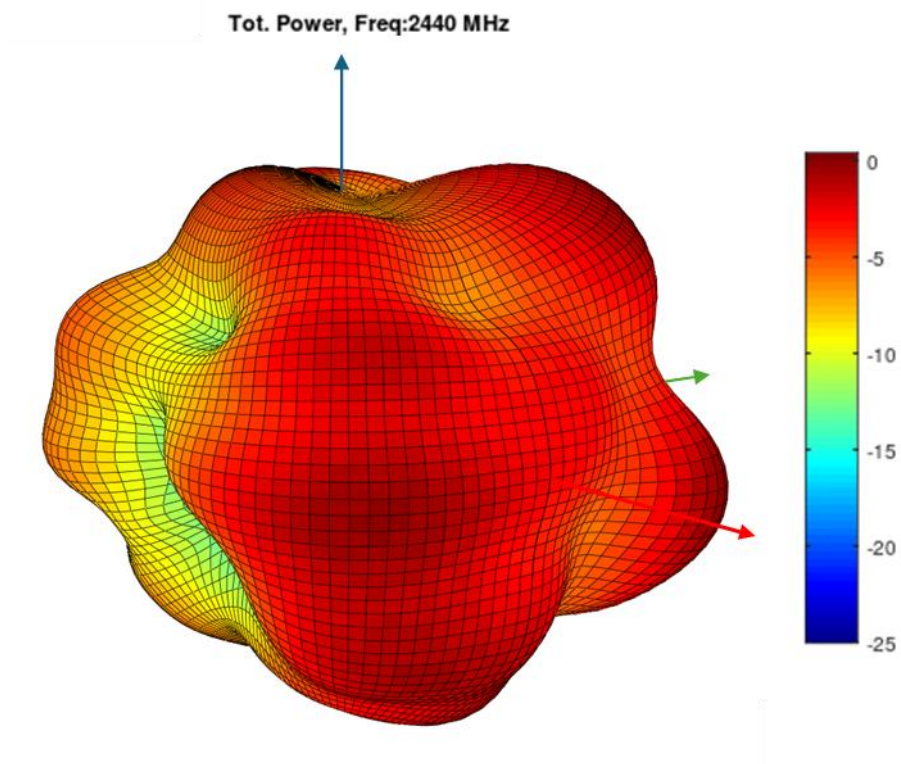


Figure 5-5 3D radiation pattern @2440MHz for the Flir K1870 Wi-Fi antenna. Maximum antenna peak gain is found to be in a cut that is not covered by the three planes XY, XZ and YZ.

5.3.2 5GHz

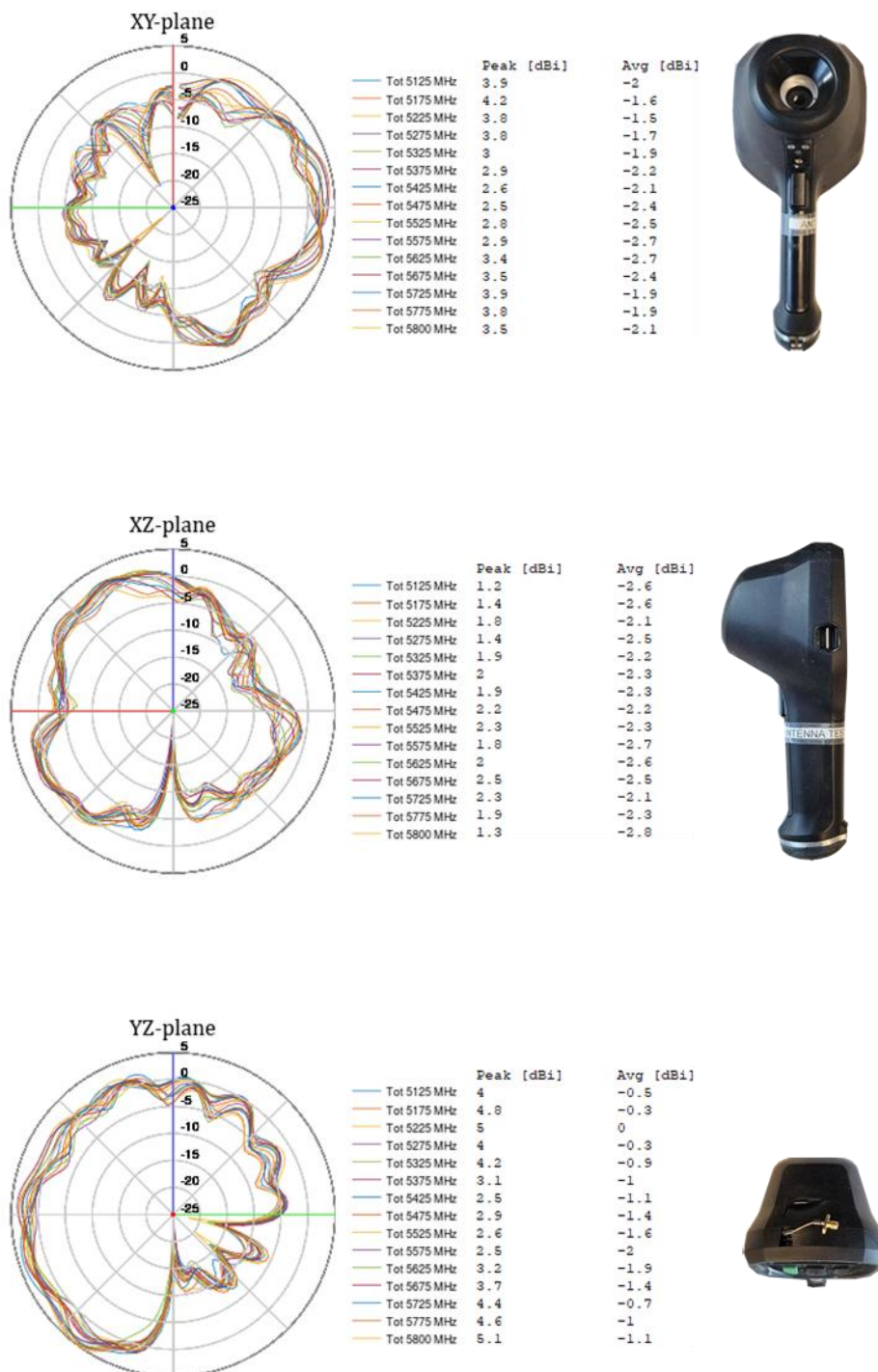


Figure 5-6 5GHz radiation patterns Flir K1870 Wi-Fi antenna.

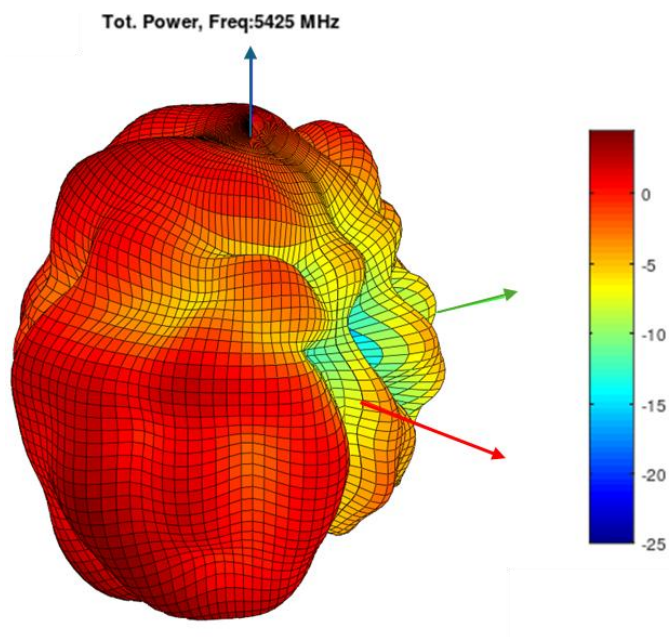


Figure 5-7 3D radiation pattern @5425MHz for the Flir K1870 Wi-Fi antenna. Maximum antenna peak gain is found to be in a cut that is not covered by the three planes XY, XZ and YZ.

5.4 Antenna peak gain

The antenna peak gain is summarized in Table 3.

Table 3 Antenna peak gain for the Flir K1870 Wi-Fi antenna

Frequency [MHz]	Antenna peak gain [dBi]
2400	0,9
2420	0,5
2440	0,4
2460	0,1
2483	0,7
5125	4,1
5175	5,0
5225	5,3
5275	4,6
5325	5,0
5375	5,0
5425	4,5
5475	5,1
5525	4,3
5575	3,9
5625	5,4
5675	5,7
5725	7,3
5775	7,2
5800	6,3

6 Summary

The antenna performance for the *FLIR- K1870* 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: 0.9 dBi

5GHz: 7.3 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