Smart Antenna for Tektronix USB Spectrum Analyzers
Alaris DF-A0047 Handheld Direction Finding Antenna (Offered by Tektronix)

- 3 user-selected bands

- Internal preamp can be used or bypassed

- Rotating trigger-switch to control operating bands, preamp on/off and transmit bearing

- Horizontal or vertical polarization

- Operating temperature from -30 to +55 °C

- IP56 ingress protection

- Weighs 1.8 kg

- Includes armrest extension brace for easier handling in the field

Tektronix offers the Alaris DF-A0047 direction finding antenna for use in interference hunting applications with our USB spectrum analyzers and SignalVu-PC Map application software. The DF-A0047 contains multiple antennas and a user-selectable preamplifier to cover a broad range of interference frequencies and levels. Powered via USB, the DF-A0047 includes an integrated compass that transmits angle information to the SignalVu PC Map application for automatic creation of lines of bearing on the map.

Key specifications

- Frequency range: 20 - 8500 MHz

- 9 kHz-20 MHz extension module available

Combined with a Tektronix USB spectrum analyzer, the Alaris DF-A0047 direction finding antenna makes interference hunting easy. Lines of bearing are automatically transmitted from the antenna to SignalVu-PC Map software, enabling fast triangulation on interference sources.

Specifications

All specifications are guaranteed unless noted otherwise. All specifications apply to all models unless noted otherwise.

Antenna

Antenna type	Combined loop / log-periodic dipole array
Frequency range	9 kHz - 20 MHz (DF-A0047-01)
	20 - 500 MHz
	500 - 8500 MHz
Nominal input impedance	50 Ω
VSWR	<3.5:1, typical
Antenna gain	Variable with frequency (< 600 MHz) 6 dBi (> 600 MHz)
Amplifier	Low noise, 8-18 dB gain, switched in/out
Power supply	5 V @ 200 mA maximum, via USB
Interface	USB 2.0
User inputs	Band selection by means of a rotary switch
	Active/passive selection by means of a push button
	Transmit angle information by releasing a push button
Angle detection	Digital compass, integrated with antenna
Mechanical	Form factor: Handheld
Dimensions	543 mm x 320 mm x 60 mm
Weight	1.8 kg

Environmental

Operating temperature range:	-30 ℃ to +55 ℃
Storage temperature range:	-30 ℃ to +71 ℃
Ingress protection:	IP56

Ordering information

Regional availability

The Alaris DF-A0047 is not available from Tektronix in China, Japan, South Korea, Australia, New Zealand Russia, Belarus, or Kazakhstan.

DF-A0047 direction finding antenna

Item	Description
DF-A0047	Directional antenna, 20 - 8500 MHz, with electronic compass and preamp
DF-A0047-01	Frequency range extension for DF-A0047 directional antenna, 9 kHz - 20 MHz
DF-A0047-C1	DF-A0047 antenna and DF-A0047-01 extension
016-2107-00	Transit case for DF-A0047 and DF-A0047-01

Warranty

One-year warranty. All service provided by Alaris Antennas. Contact support@alaris.co.za for service.

Handheld Direction Finding Antenna

20 MHz – 8.5 GHz (optional 9 kHz)
Product Code: DF-A0047

VERSION: 1.9

SPECIFICATIONS:

Product code:	
DF-A0047	20 – 8500 MHz
DF-A0047-01	9 kHz – 20 MHz (extension module)
DF-A0047-02	Carrycase only
DF-A0047-10	DF-A0047 in colour red
Electrical:	
Antenna type	Combined loop / LPDA
Frequency range	
Band A:	9 kHz – 20 MHz (DF-A0047-01)
Band B:	20 – 500 MHz
Band C:	500 – 8500 MHz
Nominal input impedance	50 Ω
VSWR	< 3.5:1 typical
Polarisation	Adjustable, vertical or horizontal
Antenna gain	Variable with frequency (< 600 MHz) 6 dBi (> 600 MHz)
Amplifier	Low noise 8 – 18 dB, switched in/out
Power supply	5 V @ 200 mA maximum, via USB
Control connection	USB
User inputs	Band selection by means of a rotary switch Active/passive selection by means of a push button
Angle detection	Digital compass, integrated with antenna
Mechanical:	
Form factor	Handheld
Dimensions (l x w x d)	543 mm x 320 mm x 60 mm
Mass, excluding carry case	1.8 kg
Supplied parts	Antenna, RF cable, USB cable.
Optional parts	Carrycase and Band A extension
Environmental: designed to meet the following specifications	
Operating temperature range	-30 ºC to +55 ºC
Storage temperature	-30 ºC to +71 ºC
Ingress protection	IP56
MTBF	> 50,000 h

PRODUCT DESCRIPTION:

The DF-A0047 is a handheld wideband antenna for direction finding and transmitter hunting in the 20 to 8500 MHz band.

It combines several antennas in a neat housing, and some integrated electronics to make it more effective when used in conjunction with signal analysers.

A single RF output is provided, with internal switching selecting the appropriate antenna, and choosing to connect or bypass the pre-amplifier.

The amplifier is a low-noise wideband amplifier that enhances system sensitivity in active mode. In passive mode, the amplifier is bypassed so that the antenna can be used in the presence of strong signals.

The DF-A0047-01 is an extension module for 9 kHz to 20 MHz which is available as an option. It is a loop antenna with a diameter of 300 mm.

The DF-A0047-02 is a neat and robust carrycase for the DF-A0047.

ELECTRICAL FEATURES:
- Digital compass gives precise bearing to source
- Very wideband performance in a practical size
- Horizontal and vertical polarisation
- Passive antenna if amplifier is switched off
- Excellent radiation patterns

MECHANICAL FEATURES:
- Small, light and easily operated by a single person
- Robust construction

sales@alaris.co.za
www.alarisantennas.com

GAIN THE ADVANTAGE

Handheld Direction Finding Antenna

20 MHz – 8.5 GHz (9 kHz optional)

Product Code: DF-A0047

VERSION: 1.9

Gain:

sales@alaris.co.za
www.alarisantennas.com

Alaris Antennas has a policy of continuous improvement and
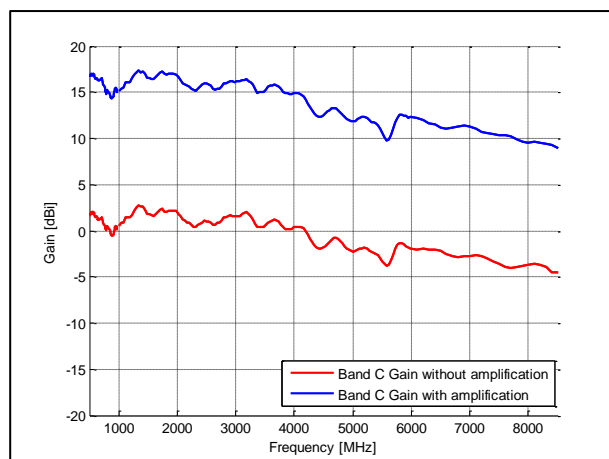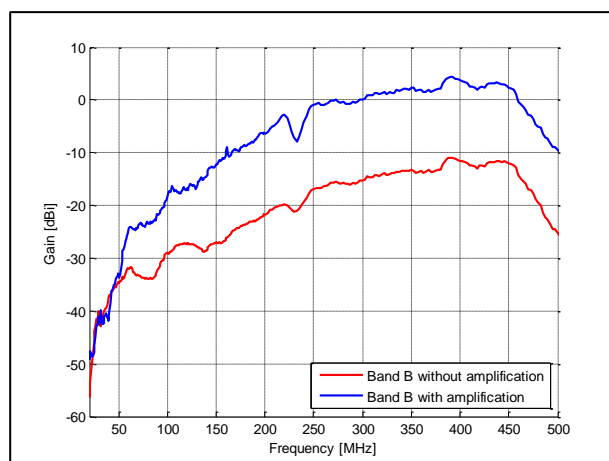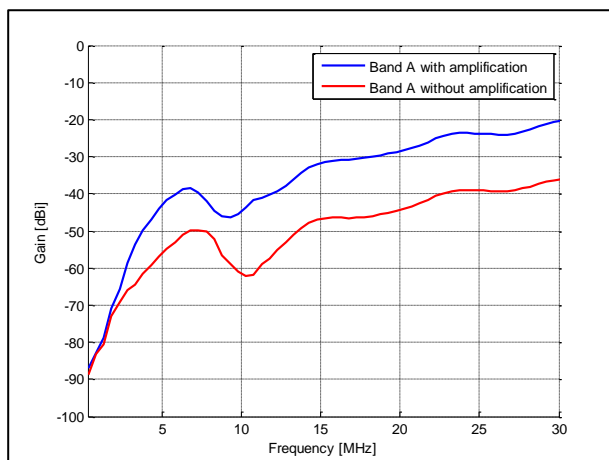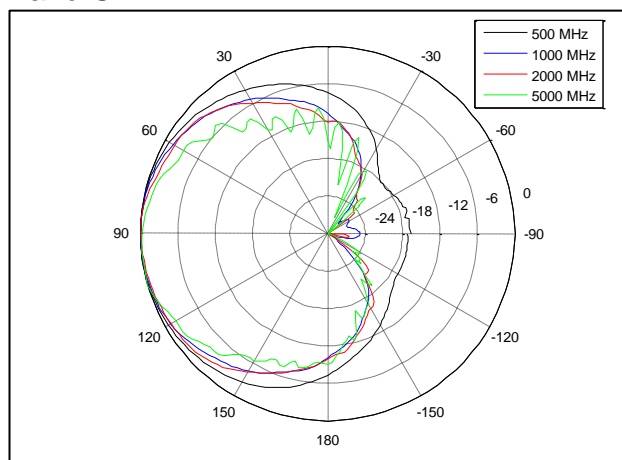hence specifications may change without notice

GAIN THE
ADVANTAGE

Handheld Direction Finding Antenna

20 MHz – 8.5 GHz (9 kHz optional)

Product Code: DF-A0047

VERSION: 1.9

Radiation patterns (dB – normalised)
H-plane:
Band B:
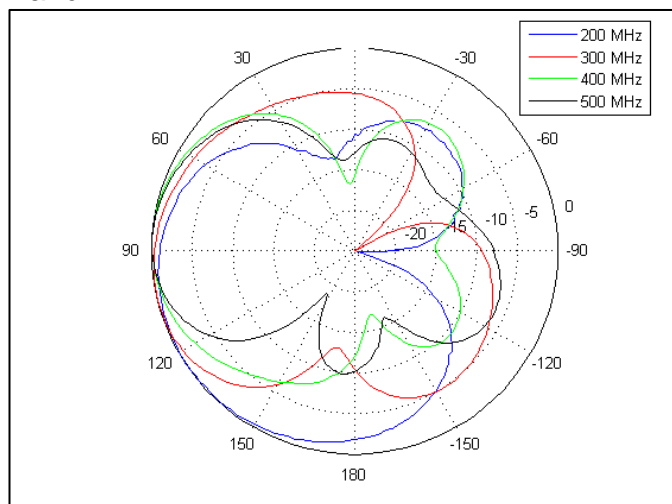
Band C:
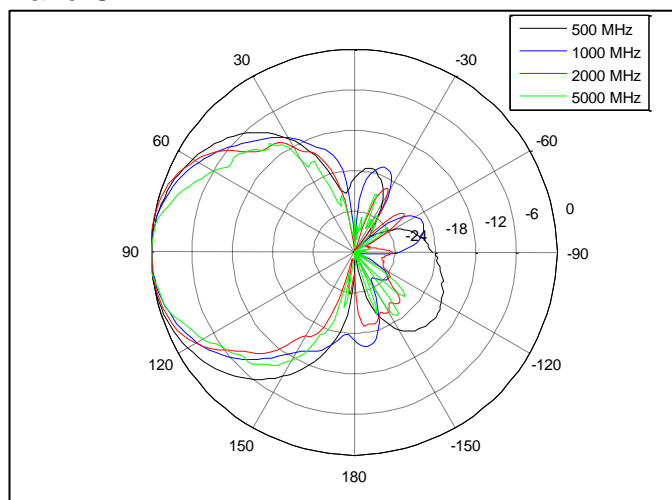
sales@alaris.co.za
www.alarisantennas.com

Alaris Antennas has a policy of continuous improvement and
hence specifications may change without notice

GAIN THE
ADVANTAGE

Handheld Direction Finding Antenna

20 MHz – 8.5 GHz (9 kHz optional)

Product Code: DF-A0047

VERSION: 1.9

E-plane:

Band A:
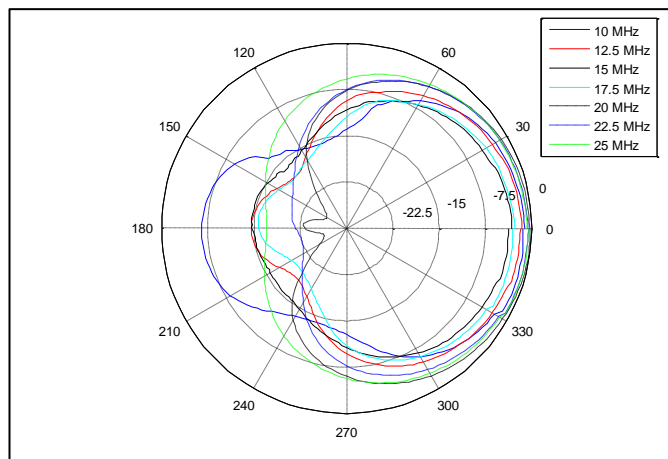
Band B:
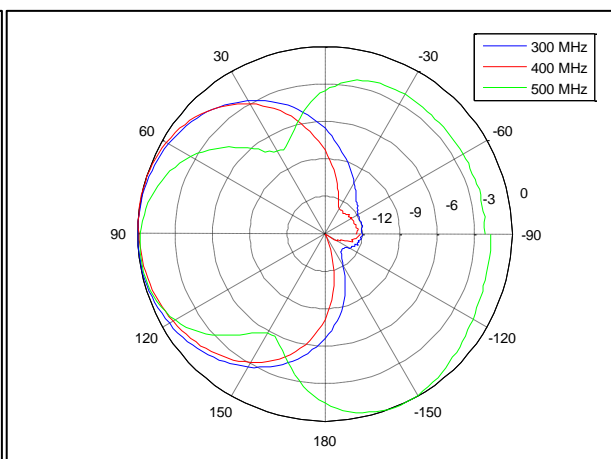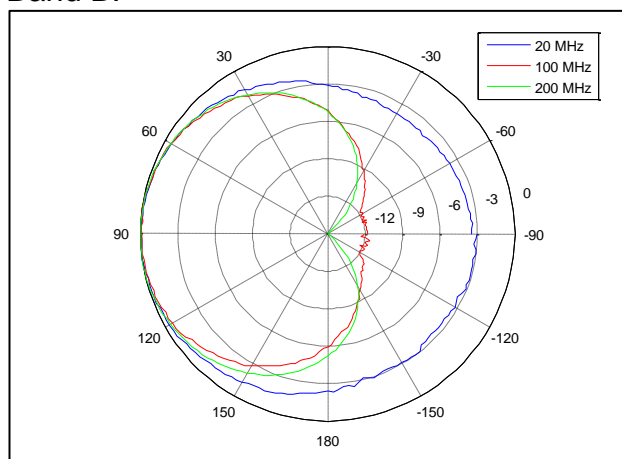
Band C:

sales@alaris.co.za
www.alarisantennas.com

Alaris Antennas has a policy of continuous improvement and
hence specifications may change without notice

GAIN THE
ADVANTAGE

	ALARIS ANTENNAS (PTY) LTD	Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

TECHNICAL REFERENCE MANUAL

DF-A0047 & DF-A0047-10

ALARIS ANTENNAS (PTY) LTD		Creation Date	2013-01-11	Version
ECP No	2654	Revision Date	2015-09-29	3.2

TABLE OF CONTENTS

TABLE OF FIGURES

	ALARIS ANTENNAS (PTY) LTD	Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

TABLE OF TABLES

	ALARIS ANTENNAS (PTY) LTD		Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

APPROVAL SHEET

NAME	DESIGNATION	SIGN	DATE
N Badenhorst	Senior Electronic Engineer		
M van Vuuren	Industrialisation Manager		
F Havenga	QA Manager		

DOCUMENT HISTORY

SECTION	PAGES	DATE	VERSION	AUTHOR
All	All	20/11/2012	1.0	R Prigge
All	All	27/03/2015	3.0	M van Vuuren
Template	All	2015/07/15	3.1	F. Havenga
All	All	2015/09/29	3.2	N Badenhorst

	ALARIS ANTENNAS (PTY) LTD	Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

1. INTRODUCTION

The DF-A0047 is a handheld wideband antenna for direction finding and transmitter hunting operating from 20 MHz to 8.5 GHz. This band can be extended down to 9 kHz with the optional DF-A0047-01 add-on.

The antenna combines several antennas in a neat and compact housing, with an internal switch selecting the appropriate antenna as well as choosing to connect or bypass the pre-amplifier. A single RF output is provided.

The amplifier is a low-noise wideband amplifier that enhances system sensitivity in active mode. In passive mode, the amplifier is bypassed so that the antenna can be used in the presence of strong signals.

The switch is powered via USB and is controlled via the push / turn button at the front of the grip. The control allows the user to select the appropriate band and to select active or bypass mode. An internal controller transmits a compass heading via the USB cable to the test computer.

Figure 1: The DF-A0047

	ALARIS ANTENNAS (PTY) LTD	Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

2. COMPONENTS

2.1. DF-A0047/-10:

Components included in the shipment are:

- 1 – DF-A0047/-10 antenna
- 1 – Armrest
- 1 – Carry band
- 1 – Docking bracket with compass
- 1 – Cable loom, RF and USB (CAB-A107)
- 1 – Technical reference manual (this document)
- 1 – Completed ATP form.

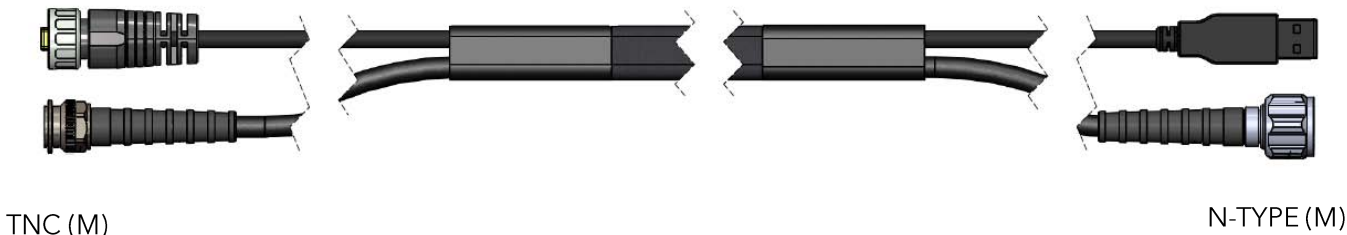TNC (M)   N-TYPE (M)

Figure 2: CAB-A107

2.2. DF-A0047-01 (OPTIONAL):

Components included in the shipment are:

- 2 – Removable Band A extension modules

Figure 3: DF-A0047-01

	ALARIS ANTENNAS (PTY) LTD	Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

2.3. DF-A0047-02 (OPTIONAL):

Components included in the shipment are:

- 1 – Carry case

2.4. DF-A0047-C1 (OPTIONAL):

Components included in the shipment are:

- DF-A0047
- DF-A0047-01

Technical Reference Manual (TRM) for DF-A0047 & DF-A0047-10

![ALARIS ANTENNAS logo]	ALARIS ANTENNAS (PTY) LTD		Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

3. INSTALLATION INSTRUCTIONS

3.1. POWER AND CONTROL CONNECTIONS

Power and control signals to the DF-A0047 are provided via the USB interface.

Figure 4: USB & RF Connector

3.2. RF CONNECTIONS

The antenna has a single TNC female RF out connector on the side of the antenna. The allowable frequency coverage of the bands is given in Table 1 for reference.

Table 1: Frequency bands of the DF-A0047

BAND	MINIMUM FREQUENCY	MAXIMUM FREQUENCY
A (DF-A0047-01)	9 kHz	20 MHz
B	20 MHz	500 MHz
C	500 MHz	8500 MHz

Technical Reference Manual (TRM) for DF-A0047 & DF-A0047-10

	ALARIS ANTENNAS (PTY) LTD		Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

3.3.   ADJUSTING POLARIZATION

The antenna is adjustable for vertical and horizontal polarization at the swivel point between the grip and the head section. To swivel the antenna, hold the grip in one hand and the back of the radome in the other, press the radome toward the grip and swivel it by 90° and release to lock it into position

Figure 5: Horizontally polarized (Band B, C)

Figure 6: Vertically polarized (Band B, C)

Technical Reference Manual (TRM) for DF-A0047 & DF-A0047-10

	ALARIS ANTENNAS (PTY) LTD		Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

Figure 7: Vertically polarized (Band A), horizontally polarized (Band B, C)

3.4.   INSTALLING THE DF-A0047-01

When operating the antenna from 9 kHz to 20 MHz the removable DF-A0047-01 modules need to be installed. This is done by locating one half of the loop into the two provided holes The DF-A0047-01 loop is perpendicular to the other bands so the polarisation is reversed when compared to the instructions given in section 3.3 above.
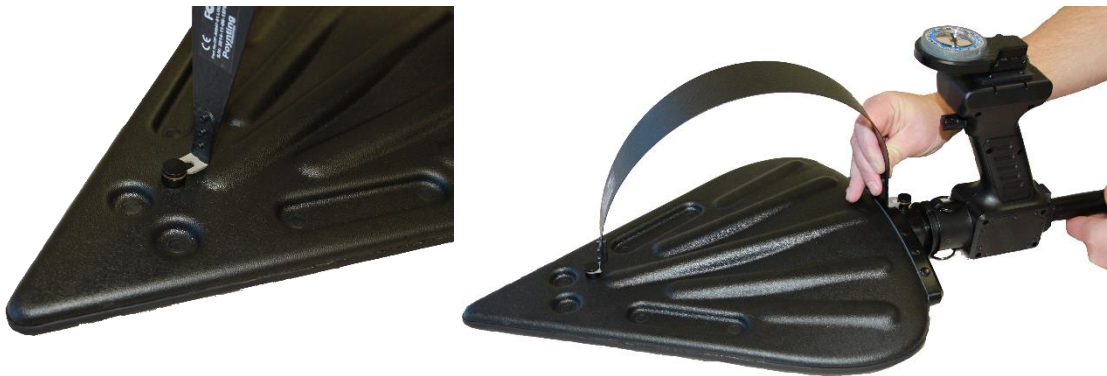
Figure 8: Installing DF-A0047-01

![ALARIS ANTENNAS logo]	ALARIS ANTENNAS (PTY) LTD	Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

3.5.   OPTIONAL MOUNTING

ARM REST

Figure 9: DF-A0047-03 Armrest Mount

Figure 10: DF-A0047-13 Tri-Pod Mount

	ALARIS ANTENNAS (PTY) LTD		Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

4. OPERATION

4.1. POWER SUPPLY

The antenna operates at a voltage level of 5V which must be supplied through USB.

4.2. DATA FORMAT

Table 2: Communication data format settings.

PARAMETER	VALUE	TOLERANCE	UNITS
Interface Type	Serial *		
Data Rate	115200	±1%	bps
Data Bits	8		
Parity	None		
Start Bits	1		
Stop Bits	1		

* FT232RL serial to USB IC from FTDI is used. Driver can be downloaded from www.ftdichip.com

4.3. STATE ON START-UP

On start-up, the switch will be in the state given in Table 3.

Table 3: State on start-up

PARAMETER	SETTING
Passive	Passive (Green LED OFF)
Band	A (Bottom Red LED ON)

ALARIS ANTENNAS (PTY) LTD		Creation Date	2013-01-11	Version
ECP No	2654	Revision Date	2015-09-29	3.2

4.4.   BAND AND MODE SELECTION

The desired frequency band and amplifier mode is selected using the rotary encoder and push button situated on the front of the grip
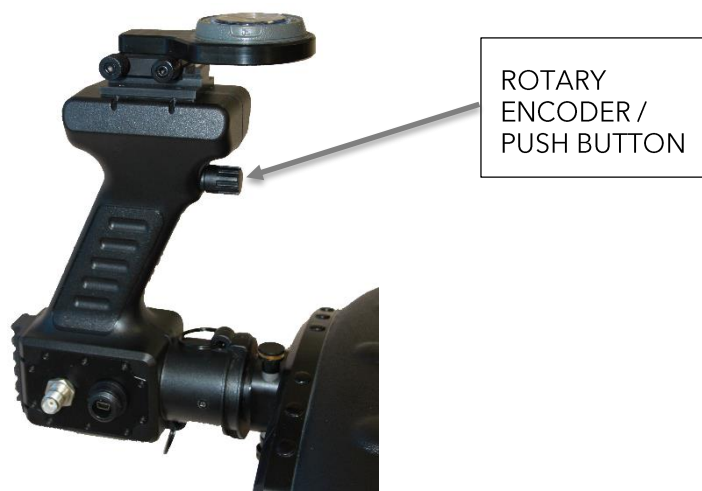

Figure 11: Rotary Encoder/Push Button position

The desired frequency band is selected by turning the rotary switch either to the left or to the right. The three LED's on the back of the grip indicate which band is currently selected:

- Top   →   Band A (9 kHz – 20 MHz)
- Middle   →   Band B (20 – 500 MHz)
- Bottom   →   Band C (500 – 8500 MHz)

Active (Amplifier ON) and bypass (Amplifier OFF) mode is selected by press and release of the button. The LED on the back of the grip is an indicator of the mode status:

- LED ON   →   Active mode
- LED OFF   →   Bypass mode

Technical Reference Manual (TRM) for DF-A0047 & DF-A0047-10

	ALARIS ANTENNAS (PTY) LTD		Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2
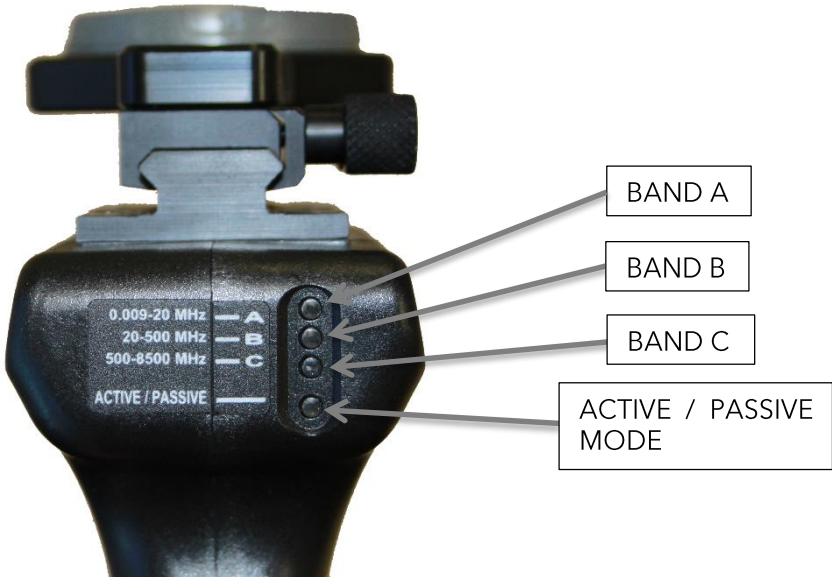
Figure 12: LED positions

4.5.   PRESS AND HOLD

A press and hold of the button for longer than 2 seconds is signalled to the controlling device via serial USB communication. The DF-A0047 sends 'l' (0x6C) after the button is released to signal the press and hold.

4.6.   ELECTRONIC COMPASS

The DF-A0047 has an internal electronic compass; the heading of the compass is transmitted from the antenna via the USB cable. The heading is transmitted using the ASCII standard. See section 5 for changing settings for compass readings.

Technical Reference Manual (TRM) for DF-A0047 & DF-A0047-10

	ALARIS ANTENNAS (PTY) LTD		Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

4.6.1. ELECTRONIC COMPASS CALIBRATION

Figure 13: Electronic Compass Calibration

To calibrate the compass follow this procedure:

1. Disable all compass readings (see sections 5.6.1 and 5.7.1).
2. Hold the antenna still in a position parallel to the floor. The radome head must be turned to the horizontally polarized position.
3. While holding the antenna still in 3D space, send the "Start compass calibration" command (see 5.8.2).
   Continuously updated minimum and maximum x, y and z values will be send from the DF-A0047.
4. Rotate the antenna around the z-axis in a full circle at a constant speed ending at the same point you started. Keep point "O" at the same point in 3D space.
5. Rotate the antenna around the x-axis in a full circle at a constant speed ending at the same point you started. Keep point "O" at the same point in 3D space.
6. Rotate the antenna around the y-axis in a full circle at a constant speed ending at the same point you started. Keep point "O" at the same point in 3D space.
7. While keeping the antenna still and point "O" at the same point in 3D space, send the "Stop compass calibration" command (see 5.8.1).
   This stops the calibration process and stores the calibration values permanently.

NB: During calibration (from sending "Start compass calibration" command until sending "Stop compass calibration" command it is important to hold the bottom of the handle at the same point in 3D space during all rotations (point "O" in Figure 13). The antenna should move as little as possible away from this point.

NB: The external compass must be installed in place during the calibration process if the DF-A0047 will be used with the external compass.

Technical Reference Manual (TRM) for DF-A0047 & DF-A0047-10

	ALARIS ANTENNAS (PTY) LTD	Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

5. COMMUNICATION PROTOCOL

This section describes the communications protocol for serial communication between a controlling device and the DF-A0047.

Table 4: DF-A0047 Commands

Command (char)	Command (hex)	Response	Description
'?'	0x3F	See 5.1	Display command menu
'q'	0x71	See 5.2	Communication test
'a0' 'a1'	0x6130 0x6131	See 5.3	Disable / Enable Band A
'b0' 'b1' 'b2' 'b3'	0x6230 0x6231 0x6232 0x6233	See 5.4	Get current selected band Select band A (9KHz-20MHz) Select band B (20MHz-500MHz) Select band C (500MHz-8500MHz)
'p0' 'p1' 'p2' 'p3' 'p4'	0x7030 0x7031 0x7032 0x7033 0x7034	See 5.5	Get current RF switch state Set RF switch state active 10dB amplifier Set RF switch state passive Set RF switch state -3dB attenuation Set RF switch state -10dB attenuation
'h0' 'h1' 'hf' 'hm' 'hs'	0x6830 0x6831 0x6866 0x686D 0x6873	See 5.6	Deactivate compass reading Activate compass reading Set compass reading speed to fast Set compass reading speed to medium Set compass reading speed to slow
'd0' 'd1'	0x6430 0x6431	See 5.7	Deactivate compass raw data reading Activate compass raw data reading
'c0' 'c1' 'c2' 'c3'	0x6330 0x6331 0x6332 0x6333	See 5.8	Stop compass calibration Start compass calibration Get compass calibration state Reset compass calibration
'o'	0x6F	See 5.9	Read product code
'v'	0x76	See 5.10	Read product serial number
'f'	0x66	See 5.11	Read firmware version
N/A	N/A	See 5.12	Invalid command

Technical Reference Manual (TRM) for DF-A0047 & DF-A0047-10

	ALARIS ANTENNAS (PTY) LTD		Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

5.1.   '?' (0X3F) – DISPLAY COMMAND MENU

The DF-A0047 will respond accordingly on receiving the commands as follows:

5.1.1. Display command menu

- o   Receive: '?' (0x3F)
- o   Respond: Send back entire DF-A0047 command menu.

5.2.   'q' (0X71) – COMMUNICATION TEST

The DF-A0047 will respond accordingly on receiving the commands as follows:

5.2.1. Communication test

- o   Receive: 'q' (0x71)
- o   Respond: 'q' (0x71), indicating two way serial communication working.

5.3.   DISABLE / ENABLE BAND A

The DF-A0047 will respond accordingly on receiving the commands as follows:

5.3.1. Disable band A

- o   Receive: 'a0' (0x6130)
- o   Respond: 'a0' (0x6130), indicating band A selection disabled.

5.3.2. Enable band A

- o   Receive: 'a1' (0x6131)
- o   Respond: 'a1' (0x6131), indicating band A selection enabled.

5.4.   GET / SELECT BAND

The DF-A0047 will respond accordingly on receiving the commands as follows:

5.4.1. Get current selected band

- o   Receive: 'b0' (0x6230)
- o   Respond: 'b1' (0x6231), indicating band A currently selected, or
  Respond: 'b2' (0x6232), indicating band B currently selected, or
  Respond: 'b3' (0x6233), indicating band C currently selected.

5.4.2. Select band A (9kHz – 20Mhz)

- o   Receive: 'b1' (0x6231)
- o   Respond: 'b1' (0x6231), indicating band A selected.

5.4.3. Select band B (20MHz – 500Mhz)

- o   Receive: 'b2' (0x6232)
- o   Respond: 'b2' (0x6232), indicating band B selected.

Technical Reference Manual (TRM) for DF-A0047 & DF-A0047-10

	ALARIS ANTENNAS (PTY) LTD		Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

5.4.4. Select band C (500MHz – 8500Mhz)

- o Receive: 'b3' (0x6233)
- o Respond: 'b3' (0x6233), indicating band C selected.

5.5. GET / SET RF SWITCH STATE

The DF-A0047 will respond accordingly on receiving the commands as follows:

5.5.1. Get current RF switch state

- o Receive: 'p0' (0x7030)
- o Respond: 'p1' (0x7031), indicating 10dB amplification state, or
Respond: 'p2' (0x7032), indicating passive state, or
Respond: 'p3' (0x7033), indicating -3dB attenuation state, or
Respond: 'p4' (0x7034), indicating -10dB attenuation state.

5.5.2. Set RF switch state active 10dB amplifier

- o Receive: 'p1' (0x7031)
- o Respond: 'p1' (0x7031), indicating 10dB amplifier state selected.

5.5.3. Set RF switch state passive

- o Receive: 'p2' (0x7032)
- o Respond: 'p2' (0x7032), indicating passive state selected.

5.5.4. Set RF switch state -3dB attenuation

- o Receive: 'p3' (0x7033)
- o Respond: 'p3' (0x7033), indicating -3dB attenuation state selected.

5.5.5. Set RF switch state -10dB attenuation

- o Receive: 'p4' (0x7034)
- o Respond: 'p4' (0x7034), indicating -10dB attenuation state selected.

5.6. ELECTRONIC COMPASS READING

The DF-A0047 will respond accordingly on receiving the commands as follows:

5.6.1. Deactivate compass reading

- o Receive: 'h0' (0x6830)
- o Respond: 'h0' (0x6830), DF-A0047 stops sending compass readings.

5.6.2. Activate compass reading

- o Receive: 'h1' (0x6831)
- o Respond: 'h1' (0x6831), DF-A0047 starts sending compass readings at current set rate.

5.6.3. Set compass reading speed to fast

- o Receive: 'hf' (0x6866)

	ALARIS ANTENNAS (PTY) LTD	Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

o   Respond: 'hf' (0x6866), DF-A0047 start sending compass readings at fast speed.

5.6.4. Set compass reading speed to medium

o   Receive: 'hm' (0x686D)
o   Respond: 'hm' (0x686D), DF-A0047 start sending compass readings at medium speed.

5.6.5. Set compass reading speed to slow

o   Receive: 'hs' (0x6873)
o   Respond: 'hs' (0x6873), DF-A0047 start sending compass readings at slow speed.

5.7.   DEACTIVATE / ACTIVATE ELECTRONIC COMPASS RAW DATA READING

The DF-A0047 will respond accordingly on receiving the commands as follows:

5.7.1. Deactivate compass raw data reading

o   Receive: 'd0' (0x6430)
o   Respond: 'd0' (0x6430), DF-A0047 stops sending compass raw data readings.

5.7.2. Activate compass raw data reading

o   Receive: 'd1' (0x6431)
o   Respond: 'd1' (0x6431), DF-A0047 starts sending compass raw data readings.
     Note: If normal compass readings (see 5.6) are enabled as well, activating compass raw data reading overrides the speed at which readings are send.

5.8.   ELECTRONIC COMPASS CALIBRATION

The DF-A0047 will respond accordingly on receiving the commands as follows:

5.8.1. Stop compass calibration

o   Receive: 'c0' (0x6330)
o   Respond: 'c0' (0x6330), DF-A0047 stops the calibration process and also stores and sends the newly calibrated values.

5.8.2. Start compass calibration

o   Receive: 'c1' (0x6331)
o   Respond: 'c1' (0x6331), DF-A0047 starts the calibration process.

5.8.3. Get compass calibration state

o   Receive: 'c2' (0x6332)
o   Respond: 'c2' (0x6332), DF-A0047 also sends current calibration values.

5.8.4. Reset compass calibration

	ALARIS ANTENNAS (PTY) LTD		Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

- o   Receive: 'c3' (0x6333)
- o   Respond: 'c3' (0x6333), DF-A0047 resets calibration and stores reset values.

See section 4.6.1 for an explanation on how to calibrate the electronic compass.

5.9.   'o' (0x6F) – READ PRODUCT CODE

The DF-A0047 will respond accordingly on receiving the commands as follows:

5.9.1. Read product code

- o   Receive: 'o' (0x6F)
- o   Respond: 'o' (0x6F), DF-A0047 also sends the product code.

5.10.   'v' (0x76) – READ PRODUCT SERIAL NUMBER

The DF-A0047 will respond accordingly on receiving the commands as follows:

5.10.1. Read product serial Number

- o   Receive: 'v' (0x76)
- o   Respond: 'v' (0x76), DF-A0047 also sends the product serial number.

5.11.   'f' (0x66) – READ FIRMWARE VERSION

The DF-A0047 will respond accordingly on receiving the commands as follows:

5.11.1. Read firmware version

- o   Receive: 'f' (0x66)
- o   Respond: 'f' (0x66), DF-A0047 also sends the firmware version.

5.12.   "Invalid command." – INVALID COMMAND

The DF-A0047 will respond accordingly on receiving the commands as follows:

5.12.1. Invalid command

- o   Receive: any invalid command
- o   Respond: "Invalid command."

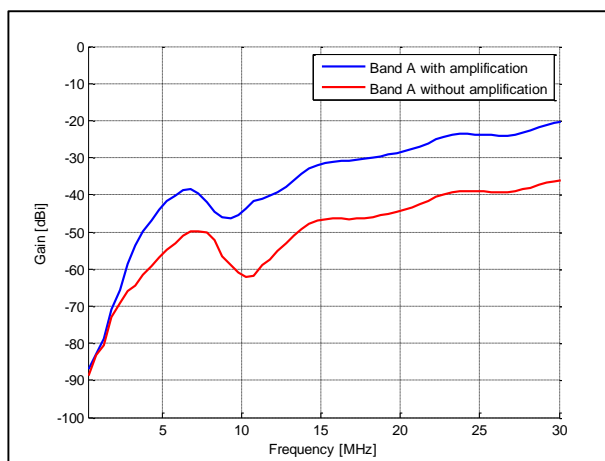Technical Reference Manual (TRM) for DF-A0047 & DF-A0047-10

	ALARIS ANTENNAS (PTY) LTD		Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

6. MECHANICAL AND ENVIRONMENTAL SPECIFICATIONS

Table 5: Mechanical and environmental specifications

PROPERTY	VALUE
Dimensions (Excluding armrest)	588 x 330 x 60 mm
Weight	< 1.8 kg
Operating temperature range	-30 to +55 °C
Ingress protection	IP56

Technical Reference Manual (TRM) for DF-A0047 & DF-A0047-10

	ALARIS ANTENNAS (PTY) LTD	Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

7. ELECTRICAL SPECIFICATIONS

Table 6: Electrical specifications

| PROPERTY	MIN.	TYP.	MAX.	UNIT
Power supply voltage		5		VDC
Current consumption		155	200	mA
Band A Frequency Range (DF-A0047-01)	0.0009		20	MHz
Band B Frequency Range	20		500	MHz
Band C Frequency Range	500		8500	MHz
VSWR at selected antenna input with output terminated			< 4.5:1 typical	
Channel gain from antenna input to output	2		13	dB
Output IP3 Intercept - 100 MHz 1 GHz 2 GHz 3 GHz		34.5 33 31 28		dBm
EIA Data Rate		115200		bps

Figure 14: Band A gain

Technical Reference Manual (TRM) for DF-A0047 & DF-A0047-10

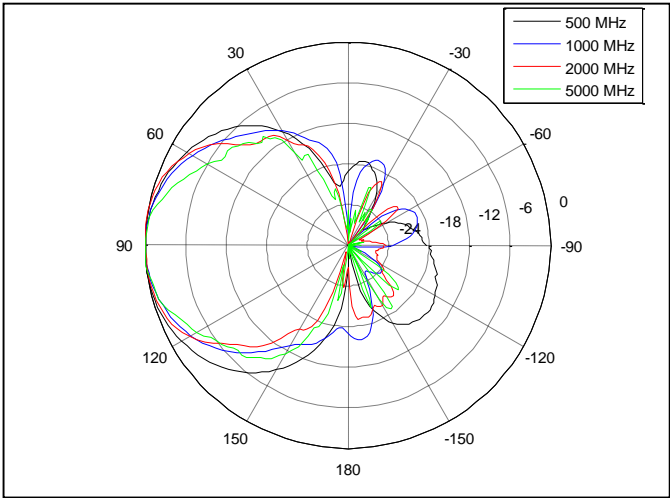|	ALARIS ANTENNAS (PTY) LTD	Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2
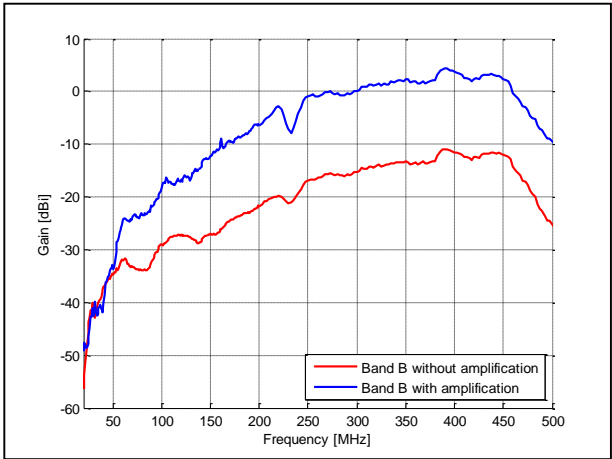
Figure 15: Band B gain
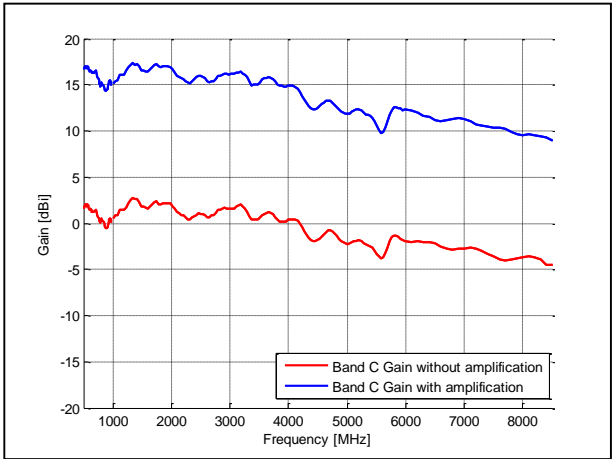
Figure 16: Band C gain

![ALARIS ANTENNAS logo]	ALARIS ANTENNAS (PTY) LTD		Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2
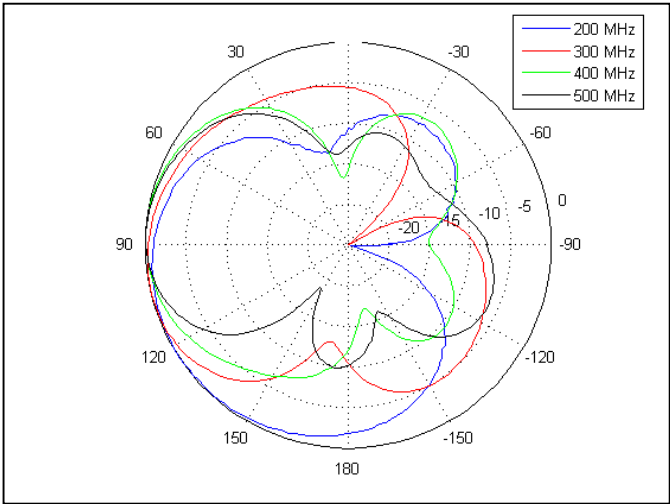
Figure 17: Band B H-plane (normalised, dB)

Figure 18: Band C H-plane (normalised, dB)

Technical Reference Manual (TRM) for DF-A0047 & DF-A0047-10

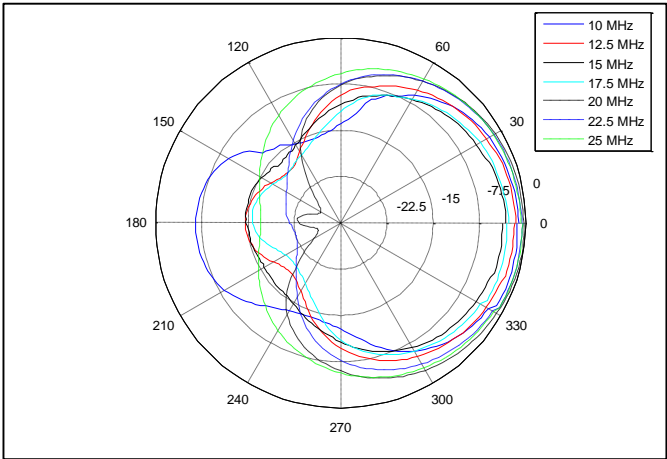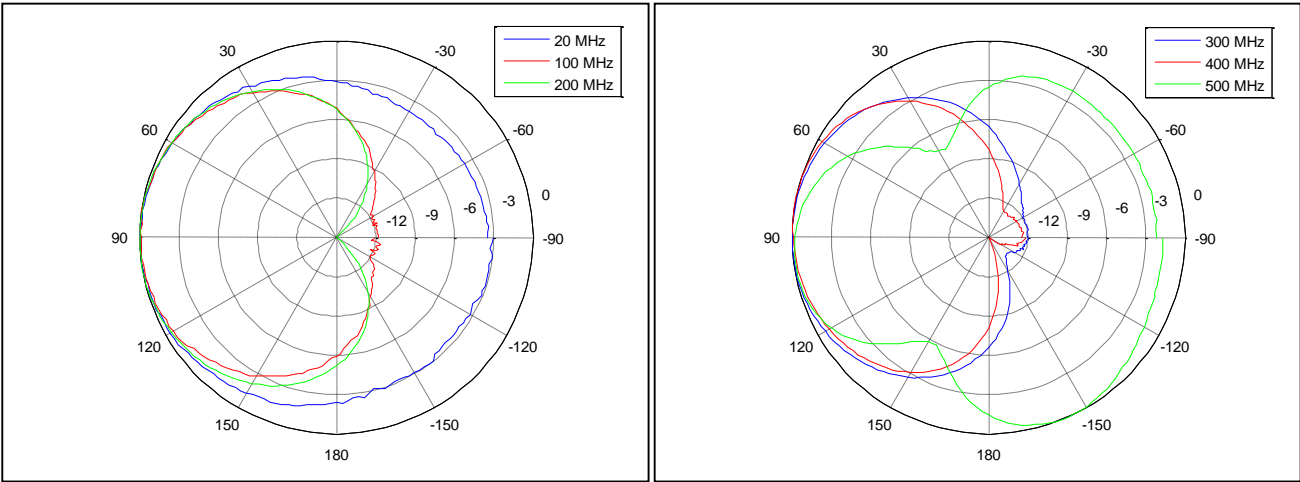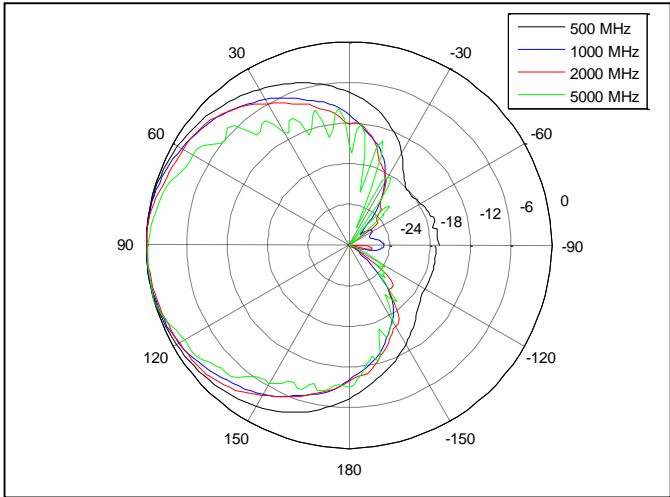|	ALARIS ANTENNAS (PTY) LTD		Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

Figure 19: Band A E-plane (normalised, dB)

Figure 20: Band B E-plane (normalised, dB)

Figure 21: Band C E-plane (normalised, dB)

	ALARIS ANTENNAS (PTY) LTD		Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

8. APPLICATION

Various possible applications exist from which a popular one arising is for "Interference hunting"

As an example assume a radio system consisting of a receiver and multiple transmitters. Another transmitter of which the location is unknown is transmitting signals that are interfering with this system and blocks signals from transmitters in this system from being received by the receiver of the system.

The DF-A0047 can be applied to find the source of interference by using received signal strength together with the electronic compass readings.

	ALARIS ANTENNAS (PTY) LTD	Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

9. RECOMMENDATIONS FOR CARE AND TRANSPORT OPERATION

Cleaning of Antenna:

When cleaning the antenna avoid using alcohol based solvents. Use a soap water mixture to prevent causing damage to the exterior finish of the antenna.

Maintenance of Antenna:

When the antenna is not in use it should be placed in its packaging box/case to prevent damage and scratches.

Transport of Antenna:

When transporting the antenna it should be placed in its packaging box/case to prevent it from bumping and scratching.

Technical Reference Manual (TRM) for DF-A0047 & DF-A0047-10

	ALARIS ANTENNAS (PTY) LTD	Creation Date	2013-01-11	Version
	ECP No	2654	Revision Date	2015-09-29	3.2

10. SUPPORT

For product support contact support@alaris.co.za