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PROPOSAL FOR MODIFIED VERSION OF WLAN-A0033

PREPARED BY

POYNTING ANTENNAS

FOR

CSIR MERAKA INSTITUTE

CONFIDENTIAL

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Document History

Date	Issue	Author	Section(s) changed
6 Aug 08	1.0	C. Vale	Creation



1. Introduction

CSIR Meraka Institute (hereinafter also referred to as 'the client') has approached Poynting Antennas (Pty) Ltd. (hereinafter also referred to as 'Poynting') with a requirement for a modification of the existing WLAN-A0033 product for a mesh node application.

Poynting is able to provide a proposal for the provision of the requested item via the OEM/ODM development division, which can provide solutions tailored to client-specific needs very rapidly with close consultation with the client.

This document serves to outline the proposed solution and includes such aspects as pricing, delivery timescales, target specifications and visual appearance.

Poynting Antennas thanks CSIR Meraka Institute for the opportunity to provide this proposal.



2. Target client specifications

This section details antenna specifications provided by the client to date. Note that some items may be marked as 'not applicable' or 'not specified' by the client. Where this is the case, Poynting R&D will fill in suggested values for these items, if needed, for the proposed solution presented later.

Note that the proposed solution is equipped with three antennas, one internal 5GHz directional panel antenna, one external 2.45 GHz omni and one external 5 GHz omni antenna. The specification listed below is that requested by the client. This may differ from that proposed in section 3 of this document.

2.1. Electrical specifications (for internal panel antenna)

Operating frequency	5.1-5.85	GHz
Gain (min) (vert polarisation)	18	dBi
Gain (max) (vert polarisation)	20	dBi
VSWR (max)	< 2.0	
Polarisation	Vertical	
-3dB beamwidth in E-plane	11 ±1	degrees
-3dB beamwidth in H-plane	16 ±1	degrees
Sidelobe level	Not specified	
Cross polarisation level	Not specified	
Front-to-back ratio	> 20	dB
Squint tolerance	Not specified	
Nominal impedance	50	ohm
Power handling	10	W
DC short at RF connector	Yes	
Connector	Bulkhead-mounted SMA female provided on back plate of antenna.	
Pigtail cable type	N/A	



2.2. Electrical specifications (for 2.45 GHz Omni)

Operating frequency	2.4-2.5	GHz
Gain (min) (vert polarisation)	7.5	dBi
Gain (max) (vert polarisation)	8.5	dBi
VSWR (max)	< 2.0	
Polarisation	Vertical	
-3dB beamwidth in E-plane	12 ±1	degrees
-3dB beamwidth in H-plane	360	degrees
Sidelobe level	Not specified	
Cross polarisation level	Not specified	
Front-to-back ratio	N/A	
Squint tolerance	Not specified	
Nominal impedance	50	ohm
Power handling	10	W
DC short at RF connector	No	
Connector	Bulkhead-mounted SMA female	
Pigtail cable type	N/A	

2.3. Electrical specifications (for 5 GHz Omni)

Operating frequency	5.4-5.9	GHz
Gain (min) (vert polarisation)	8	dBi
Gain (max) (vert polarisation)	11	dBi
VSWR (max)	< 2.0	
Polarisation	Vertical	
-3dB beamwidth in E-plane	10 ±1	degrees
-3dB beamwidth in H-plane	360	degrees
Sidelobe level	Not specified	
Cross polarisation level	Not specified	
Front-to-back ratio	N/A	
Squint tolerance	Not specified	
Nominal impedance	50	ohm
Power handling	10	W
DC short at RF connector	No	
Connector	Bulkhead-mounted SMA female	
Pigtail cable type	N/A	



2.4. Mechanical specifications

Antenna type	Combined, panel, omnis
Outdoor/indoor or internal	Outdoor
Radome/enclosure type	Antennas to fit to plastic enclosure. All radomes are UV-protected plastic.
Max deployed dimensions	Not specified
Max unit packaged dimensions	Not specified
Mounting/mechanical interface	Mast mounting bracket
Pigtail length	0 mm
Labelling	Separate polarisation, and identity labels for each antenna. Manufacturer labels on back of enclosure. Manufacturer branded sticker on front cover.
Max Deployed/Packaged weight	Not specified/Not specified

2.5. Materials specifications

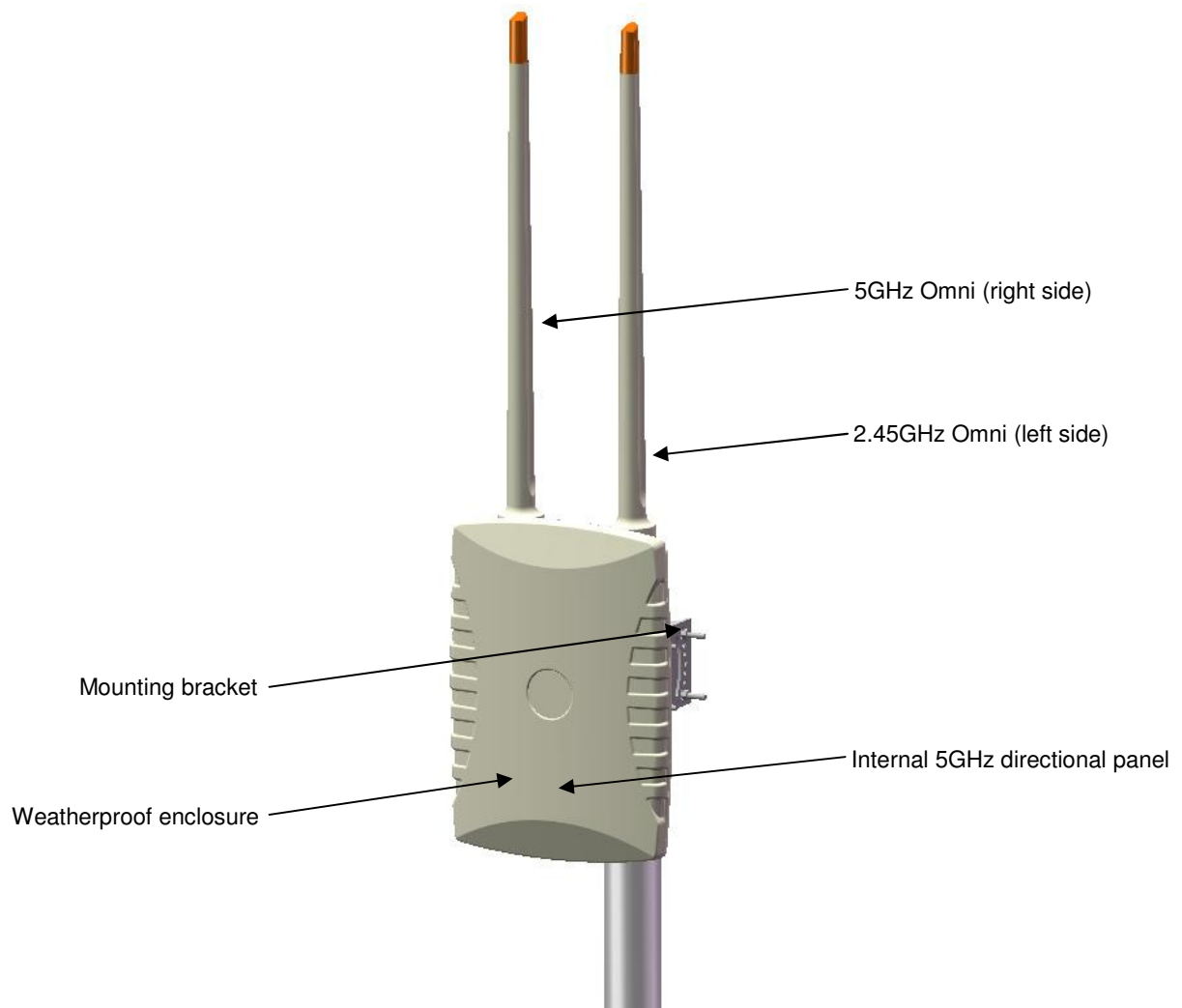
RoHS compliance	Full
Packaging material	Not specified

2.6. Environmental specifications

Vibration and shock	Not specified
Temperature operation/storage	-20 to +70 / -20 to +70 degrees
Water tightness	IP65
Wind loading	Operational at < 160 kph Survival at < 220 kph
Ice loading	Not specified



3. Proposal 1: Modified WLAN-A0033



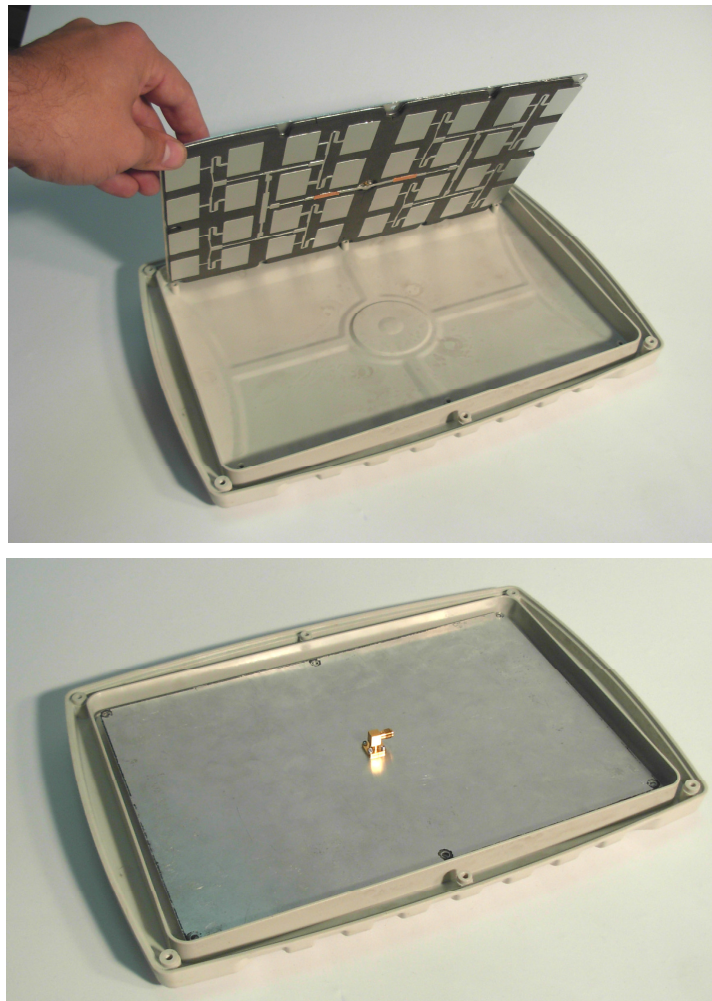
Front view (rendered image)

3.1. Overview

The proposed solution addresses the requirements of the client by substituting one of the 2.45 GHz omni antennas with a 5 GHz omni antenna. In addition, we propose to add some enhancements to the product that have now become possible.

First, it is proposed to enhance the internal directional antenna with a broader band, higher gain antenna. This antenna is also now constructed on a metal ground plane which allows more space in the enclosure. The figure overleaf shows the internal appearance of the enclosure using the new antenna plate. It is suggested that the client inspect this figure to ensure that existing electronics and equipment can still fit in the provided space. If not, please instruct to revert to original antenna plate.

Second, the 5GHz and 2GHz omnis are to be equipped with DC shorts across the RF connections to help protect against lightning induced surges and static build-up if this has not been implemented in the radios.



Finally, the units will be equipped with a new, higher strength cast mounting bracket, which is suitable for mast mounting. The new bracket allows all the functionality of the previous version, but has added strength and stiffness.

Find accompanying this proposal for interest, the brochures for the following products on which are based the antenna specifications.

WLAN-A0042 used for the internal antenna

OMNI-A0093 used for the 2.45 GHz omni

OMNI-A0064 used for the 5 GHz omni

The units will be bulk packaged in protective packaging for shipping to the client.



3.2. Proposed specifications

Kindly take note of any modifications in the specifications listed below from those stated in section 2. Any specifications which are changed are highlighted in orange.

3.2.1. Electrical specifications (for internal panel antenna)

Operating frequency	5.15-6.00	GHz
Gain (min) (vert polarisation)	21	dBi
Gain (max) (vert polarisation)	23	dBi
VSWR (max)	< 2.0	
Polarisation	Vertical	
-3dB beamwidth in E-plane	10 ±1	degrees
-3dB beamwidth in H-plane	16 ±1	degrees
Sidelobe level	Not specified	
Cross polarisation level	Not specified	
Front-to-back ratio	> 20	dB
Squint tolerance	Not specified	
Nominal impedance	50	ohm
Power handling	10	W
DC short at RF connector	Yes	
Connector	Bulkhead-mounted RA SMA female provided on back plate of antenna in middle.	
Pigtail cable type	N/A	

3.2.2. Electrical specifications (for 2.45 GHz Omni)

Operating frequency	2.4-2.5	GHz
Gain (min) (vert polarisation)	8.1	dBi
Gain (max) (vert polarisation)	8.5	dBi
VSWR (max)	< 1.5:1	
Polarisation	Vertical	
-3dB beamwidth in E-plane	12.5 ±1	degrees
-3dB beamwidth in H-plane	360	degrees
Sidelobe level	Not specified	
Cross polarisation level	Not specified	



Front-to-back ratio	N/A	
Squint tolerance	Not specified	
Nominal impedance	50	ohm
Power handling	6	W
DC short at RF connector	Yes	
Connector	Bulkhead-mounted SMA female	
Pigtail cable type	N/A	

3.2.3. Electrical specifications (for 5 GHz Omni)

Operating frequency	5.4-5.9	GHz
Gain (min) (vert polarisation)	8	dBi
Gain (max) (vert polarisation)	11	dBi
VSWR (max)	< 2.0	
Polarisation	Vertical	
-3dB beamwidth in E-plane	10 ±1	degrees
-3dB beamwidth in H-plane	360	degrees
Sidelobe level	Not specified	
Cross polarisation level	Not specified	
Front-to-back ratio	N/A	
Squint tolerance	Not specified	
Nominal impedance	50	ohm
Power handling	10	W
DC short at RF connector	Yes	
Connector	Bulkhead-mounted SMA female	
Pigtail cable type	N/A	

3.2.4. Mechanical specifications

Antenna type	Combined, panel, omnis	
Outdoor/indoor or internal	Outdoor	
Radome/enclosure type	Antennas to fit to plastic enclosure. All radomes are UV-protected plastic.	
Max deployed dimensions	900x258x98(+110)	mm (incl bracket)
Max unit packaged dimensions	TBD	



Mounting/mechanical interface	Mast mounting bracket	
Pigtail length	0	mm
Labelling	Separate polarisation, and identity labels for each antenna. Manufacturer labels on back of enclosure. Manufacturer branded sticker on front cover.	
Max Deployed/Packaged weight	TBD	

3.2.5. Materials specifications

RoHS compliance	Full	
Packaging material	Recyclable carton	

3.2.6. Environmental specifications

Vibration and shock	Not specified	
Temperature operation/storage	-20 to +70 / -20 to +70	degrees
Water tightness	IP65	
Wind loading	Operational at < 160	kph
	Survival at < 220	kph
Ice loading	Not specified	

3.3. Timescales

Unless otherwise specified, all timescales apply to readiness ex-works at Poynting Antenna's factory in Johannesburg, South Africa and do therefore not include shipping or courier delivery times.

All timescales apply from the date of order signed by the client and payment of the deposit mentioned in section 3.5.2, and assume best-case response from the client regarding changes and amendments to the design, packaging and order quantities. The project manager assigned to this development at Poynting will provide ongoing project updates either directly or via the appropriate account manager to the client.

- | | |
|--------------------------------|----------------------------|
| 1) 15x Samples (ES) shipped: | 3 weeks from date of order |
| • Samples of final design | |
| 2) Full design freeze: | 5 weeks from date of order |
| 3) Production units available: | 8 weeks from date of order |



3.4. Pricing

Pricing is ex-works Johannesburg, South Africa and includes the cost of bulk packaging, palletising and labelling as required by the client.

Note that due to the small initial order quantity, the per-unit price is weighted to cover some risk carried by Poynting.

Poynting undertakes to grant a discount on the second order (which must be ordered at the stated MOQ). The value of the discount will be such that the additional monies paid in the purchase of the FOQ are effectively refunded at the time of the second purchase. See terms section below.

No NRE is payable.

FOQ: 15 units @ R 3150.00 p/u

Thereafter, unit pricing based on order quantity price breaks

MOQ:	100 units	
Quantity 100-300 units:	R 883.53	p/u
Quantity 301-600 units:	R 761.70	p/u
Quantity 600+ units:	R 687.76	p/u

3.5. Terms

3.5.1. Discount on second order

A discount will be granted on the second order. The amount of the discount will be such that it refunds a portion of the first order purchase to bring the actual per unit price of the first order down to the same level as the per unit price effective for the second order.

3.5.2. Call-off orders

If a quantity of X units is ordered and called off in smaller batches of Y units at a time, the units will be purchased at the quantity Y price and a discount will be given when the order quantity reaches X units, such that the total amount paid over the entire call-off order is equal to the X-quantity price.

3.5.3. Project initiation and kickoff

This is an OEM/ODM development on behalf of the client, where certain items such as electronic design and tooling costs need to be covered before development can proceed. Accordingly, the conditions for project kickoff are listed below.

- 1) This proposal document, once amended (if necessary) to both parties' satisfaction, should be returned to the relevant Poynting Account Manager (contact person) with all pages initialled by a suitable authority at CSIR Meraka Institute. In addition, the final page should be signed to formalise CSIR Meraka Institute's acceptance of the proposal.



Upon receipt of the signed document, CSIR Meraka Institute will be provided with a Poynting product code for the proposed antenna which can be used in all future correspondence, orders etc. to refer to the antenna specifically detailed in this document.

- 2) An order for at least the FOQ listed in section 3.4 above must then be placed for the proposed antenna and,
- 3) a deposit of 50% of the first order value must be paid on order by electronic transfer to Poynting Antennas (Pty) Ltd. The balance is payable before shipping.

3.5.4. Ownership of Intellectual Property and Design

This is an unrestricted development, which implies that should Poynting so desire, the product that results from this development may be marketed and sold to other interested parties without prior consent from CSIR Meraka Institute. In the event, Poynting Antennas (Pty) Ltd undertakes not to sell the product with any branding or labelling specific to CSIR Meraka Institute. In addition, Poynting Antennas (Pty) Ltd undertakes not to disclose to any external party the nature of the business between itself and CSIR Meraka Institute.

All designs, schematics, images concepts, documentation and other relevant items remain the property of Poynting Antennas (Pty) Ltd.

Any attempt to circumvent to supplier (Poynting Antennas (Pty) Ltd) by having the product reverse engineered or duplicated in any fashion at any time, without the prior consent of Poynting Antennas (Pty) Ltd. will result in legal action and blacklisting.

3.5.5. Project failure and implications

The 'project' refers to the combined development, negotiation, procurement and delivery of production units.

Poynting Antennas (Pty) Ltd. shall not be liable for costs incurred by the client due to failure of the project to deliver a viable product within or beyond the projected timescales listed in section 4.3.

Poynting Antennas will refund the deposit mentioned in section 3.5.1 if the project fails due to the inability to conform to the specifications set down in section 3.2.

Poynting will, within reason, accommodate revisions, amendments and changes to the product on behalf of the client so as to achieve the best possible outcome and satisfaction of the client. Where necessary, changes that impact the development cost, and per unit cost of the product will be negotiated and prices and terms amended as necessary.

Poynting will retain the deposit mentioned in section 3.5.1 in full or in part at its discretion if the project fails due to client termination of the project or cancellation of the order.

3.5.6. Branding and packaging

The product is supplied in totality including mounting bracketry, unit and bulk packaging.

CSIR Meraka Institute branding can be applied to the product and packaging, however, this may result in a unit price adjustment in the cases of expensive labelling and packaging.



4. Suggested action and conclusion

This proposal has presented, for consideration, the provision of an antenna for CSIR Meraka Institute's requirements based on a modified version of the current WLAN-A0033 product, and includes the latest enhancements available at the current time.

Action Items:

For CSIR Meraka Institute:

- 1) Consider the proposal contained in this document based on pricing and time scale requirements.
- 2) Revert to Poynting Account Manager (contact person) indicating CSIR Meraka Institute's interest in pursuing the development with Poynting Antennas, and any feedback or amendments to the proposal.

For Poynting:

(None)



5. Project initiation sign-off

The signature below indicates that the proposal has been read, understood and **accepted** by the appropriate authority at CSIR Meraka Institute. Project kick-off occurs with the provision of this signed document to Poynting along with any additional stipulations in section 3.5.2.

Name: _____

Position: _____

Signature: _____

Date: _____