



WISM RF Instrumentation Purchase Request

Submitted: June 13, 2012

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by

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I. Introduction

Herein this document is a purchase request for RF devices to develop the WISM (Wideband Instrument for Snow Measurement) radiometer payload. An itemized parts list, the lead-time, and the estimated costs are presented in section II. The device block diagrams and their respective requirements are presented in Section III. Finally, section IV consists of the best factors comparison.

II. Itemized Parts List, Lead Time and Estimated Cost

Table 1 provides a complete list of the items to be procured and their estimated cost. For each device listed, a quantity of two Ku-band units and one Ka-band unit will be purchased. For enhancement of engineering design it is highly recommended that these items be procured from the same vendor. The lead-time should be less than 75 days after receipt of order (ARO) for all items. Vendors who can meet the purchase requirements, as outlined in this document will be given high consideration for this contract.

Table 1. Complete list of parts to be procured.

Item	Description	Quantity	Lead Time (Days)	Estimated Cost (\$)
Item 1.	Ku Band Direct Detection Receiver	2	[REDACTED]	[REDACTED]
Item 2.	Ka Band Direct Detection Receiver	1	[REDACTED]	[REDACTED]
Item 3.	Aluminum Mounting Plate (.25") for Ku Band Receiver	2	[REDACTED]	[REDACTED]
Item 4.	Aluminum Mounting Plate (.25") for Ka Band Receiver	1	[REDACTED]	[REDACTED]
Item 5.	Ku Band Cross Coupler	2	[REDACTED]	[REDACTED]
Item 6.	Ka Band Cross Coupler	1	[REDACTED]	[REDACTED]
Item 7.	Ku Band Noise Source	2	[REDACTED]	[REDACTED]
Item 8.	Ka Band Noise Source	1	[REDACTED]	[REDACTED]
Estimated Total				[REDACTED]

III. Devices to be Procured and Requirements

a. Item 1 and Item 2: The Direct Detection Receivers (DDR)

Figure 1 and Figure 2 respectively, provide functional block diagrams of Item 1 and Item 2 the Ku- and Ka-band direct detection receivers (DDR). Both designs consist of a 20 dB isolator at the input, thereafter a 20 to 25 dB cross guide coupler with an integrated tuneable noise source, low noise RF amplifier with a gain of +60 dB, a second 20 dB isolator, 5-pol bandpass filter



with 35 dB out-of-band rejection, 20 dB pre-detection isolator and detector. The system gain is approximately 60 dB, achieving ± 1.5 dB flatness, with an input noise figure of 3.0 dB for the Ku band receiver, and 3.5 dB for the Ka band receiver. Table 2 provides a detailed list of the specifications for both receivers.

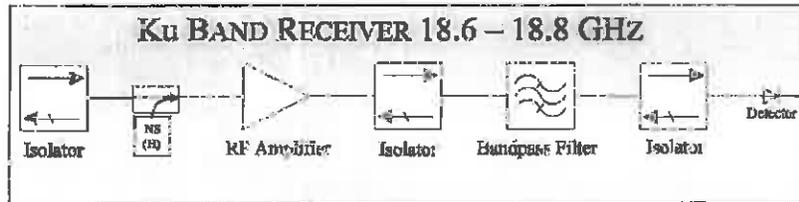


Figure 1. Item 1: Ku band direct detection receiver.

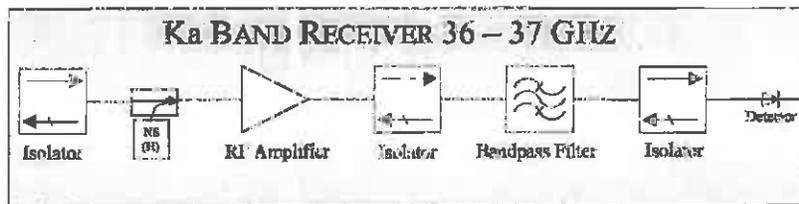


Figure 2. Item 2: Ka band direct detection receiver.

Table 2. Specifications of direct detection receivers.

Specification	Ka Band DDR	Ku Band DDR
Center Frequency	37.5 GHz	18.7 GHz
Frequency Range	36 - 37 GHz	18.6 - 18.8 GHz
Noise Figure	≤ 3.5 dB	≤ 3 dB
System Gain	~ 60 dB	~ 60 dB
Gain Flatness	± 1.5 dB	± 1.5 dB
Damage Threshold	≥ -45 dBm	≥ -45 dBm
Noise Source	> 20 dB ENR ≈ 150 K tuning range	> 20 dB ENR ≈ 150 K tuning range
Connector Type	WR-28	Coax-K and WR42
Lead Time	≤ 75 days ARO	≤ 75 days ARO

b. Item 3 and Item 4: The Mounting Brackets

The direct detection receivers should be mounted on aluminium mounting brackets .25" thick.



c. Item 5 and Item 6: The Cross Guide Couplers

The Ku and Ka band cross guide couplers will be used to couple the noise sources (see Section III.d) into the system. These devices should achieve 20 dB coupling with low insertion loss, i.e. $\leq .5$ dB.



Figure 3. 20 dB cross guide coupler.

d. Item 7 and Item 8: The Noise Sources

The minimum ENR of the Ku and Ka band noise sources is, $ENR \geq 20$ dB. The output noise temperature of the devices must be tuneable via bias and mechanical tuning screw. They should have roughly a 50% additive noise, which equates to a dynamic temperature range of approximately 150 K.

IV. Factors and Subfactors of Best Value Comparison

a. Delivery Date

- i. The delivery date of all parts is not to exceed 75 days after receipt of the order
- ii. NASA must have availability of supplier's diagnosis for repair/rework with 1 week's turnaround of diagnosis for 1 year after delivery

b. Past Performance

The vendor must demonstrate evidence of relevant experience with delivery time included Post Delivery Support

c. Quality

- i. What flight (space or air) environments has your product flown in?
- ii. A brief description of fabrication facilities and third party vendors, if any, for key devices required in assembly.
- iii. Description of test and verification plan including, for example, planned temperature range that the product will be tested over?