SECTION - C

TECHNICAL SPECIFICATIONS OF STORES AND DRAWINGS.

<u>Technical Specifications of Supply of W-Band Trans-Receiver Subsystem alongwith</u> <u>Mandatory Spares i.e. 2 Nos. of Mixer and 1 No. of IF LNA and all required standard</u> <u>accessories – 1 System</u>

"W-band Trans-receiver subsystem"

A. Introduction / Application

- IPR requires a millimetre wave (W-band) trans-receiver subsystem that shall be used for density fluctuation measurements in tokamak plasma.
- The W-band trans-receiver subsystem shall have an operating frequency of 90 GHz and an output power of +15 dBm and their associated power supplies and peripheral subassemblies.

B. Specifications for the subsystem

Sr. No.	Parameter	Specification
1)	Transmitter Frequency (GHz)	90
2)	Transmitter Power (dBm)	+15
2)	Receiver Frequency (GHz)	90 ± δ
- 3)	δ (Any fixed frequency within, MHz)	100 to 600
4)	Phi (deg)	0 to 180 ° or better
5)	Antenna gain (dB)	23 or better
6)	Low noise amplifier gain (dB)	≥ 20
7)	Low noise amplifier Noise figure (dB)	6 or better
8)	Continuous Variable attenuation / Gain control (dB)	≥ 30
9)	Band pass filter centre frequency (MHz)	600
10)	Receiver Noise Figure (Without RF LNA, dB)	9 or better
11)	Output signal (I/Q)	1 Vpp @ 50ohm
12)	IQ Frequency (Any fixed frequency within)	≥100 KHz
13)	Output Connectors at the IQ detector	SMA (F) / BNC
14)	Warranty/Guaranty	1 year (min)
		1 MIXER -2 * (Qty : 02 No's)
15)	Mandatory Spares	2 IF LNA * (Qty : 01 No's)
		*Ref. to circuit Layout attached.
16)	Standard Accessories	Vendor should quote for all the accessories i.e., microwave/RF components, inter-connecting waveguides and cables required for system assembly, operation, testing and maintenance.
17)	Enclosure	The complete system should be enclosed in a 19" rack mountable metal enclosure with provision for connecting a grounding cable so as to avoid interference to the system from external noise sources.

18)	Indicators	The instrument subsystem (its assemblies) should be self-contained and incorporate		
	DOWED SUDDIJES	indicators of status output signals		
<u>POWER SUPPLIES</u>				
10)	The complete subsystem must operate on	230 VAC		
19)	No other power supplies must be required	to operate the subsystem i.e. All the necessary		
	DC power supplies required for the operation	tion of all the active components of the system like		
	Documentos, Ampliner, LNAS, Multipliers, C	Quartz oscillators etc. must be included.		
	DOCUMENTS REQUIRED along with the sub system:			
	• Complete specifications of the Oscillators	iplete specifications of the Oscillators, Crystal oscillator, amplifiers, multipliers,		
20)	attenuators, balanced mixer, SSB mixer, IQ mixer, LNAs etc. along with all the original			
,	datasneets should be provided.			
	• The vendor should provide the "Detaile	ed Installation Guide and Operational Manual"		
	along with the product.			
C. 8	Schedule			
1. \	Vendor should submit the design/drawing details w	within 1 month from PO received.		
2. 1	PR will give the comments/acceptance of the drawi	ng within 15 days after receiving it from the		
V	vendor.			
3. F	After the acceptance of drawing from IPR, vendor ca	in start the labrication.		
4. 1	The delivery of the system should be within 8 month	hs from the date of approval of drawing.		
D. I	Pre-despatch tests (before despatch for appr	oval)		
1. 1	The vendor has to submit the following test reports	s to IPR once they complete the work of system		
a	assembly, integration and characterization. Base	d on these test reports, IPR shall issue a		
Ċ	lispatch clearance letter.			
2. 1	The report has to have the following tests			
Sr.	Parameter	Specification		
NO.				
No. 1	System Output Frequencies			
No. 1	System Output Frequencies a) Source 1	90 GHz		
NO. 1	System Output Frequencies a) Source 1 b) Source 2	90 GHz 90±δ GHz		
NO. 1	 System Output Frequencies a) Source 1 b) Source 2 c) δ (Any fixed frequency within) 	90 GHz 90±δ GHz 100 to 600 MHz		
No. 1 2	System Output Frequencies a) Source 1 b) Source 2 c) δ (Any fixed frequency within) System Output Power	90 GHz 90±δ GHz 100 to 600 MHz		
No. 1 2	 System Output Frequencies a) Source 1 b) Source 2 c) δ (Any fixed frequency within) System Output Power a) Source 1 	90 GHz 90±δ GHz 100 to 600 MHz + 15 dBm		
No. 1 2	 System Output Frequencies a) Source 1 b) Source 2 c) δ (Any fixed frequency within) System Output Power a) Source 1 b) Source 2 	90 GHz 90±δ GHz 100 to 600 MHz + 15 dBm + 15 dBm		
No. 1 2 E.	System Output Frequencies a) Source 1 b) Source 2 c) δ (Any fixed frequency within) System Output Power a) Source 1 b) Source 2 Acceptance tests at IPR.	90 GHz 90±δ GHz 100 to 600 MHz + 15 dBm + 15 dBm		
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No. 1 2 E. <i>A</i> Sr. No. 1	System Output Frequencies a) Source 1 b) Source 2 c) δ (Any fixed frequency within) System Output Power a) Source 1 b) Source 2 Acceptance tests at IPR. I. IPR representative shall perform the followin mentioned below: Parameter System Output Frequencies a) Source 1 b) Source 2 	g measurements to verify the specifications as 90 GHz 90±δ GHz 100 to 600 MHz + 15 dBm + 15 dBm g measurements to verify the specifications as 90 GHz 90 Hz 90±δ GHz		
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No. 1 2 E. <i>A</i> Sr. No. 1 2	System Output Frequencies a) Source 1 b) Source 2 c) δ (Any fixed frequency within) System Output Power a) Source 1 b) Source 2 Acceptance tests at IPR. 1. IPR representative shall perform the followin mentioned below: Parameter System Output Frequencies a) Source 1 b) Source 2 c) δ (Any fixed frequency within) System Output Power a) Source 1 b) Source 2 c) δ (Any fixed frequency within) System Output Power a) Source 1 b) Source 2 c) Source 2 c) System Shall be accepted only after above m	g measurements to verify the specifications as 90 GHz 90±δ GHz 100 to 600 MHz + 15 dBm + 15 dBm g measurements to verify the specifications as 90 GHz 90±δ GHz 100 to 600 MHz + 15 dBm + 15 dBm + 15 dBm entioned specifications are met.		
No. 1 2 E. A Sr. No. 1 2 () Wat	System Output Frequencies a) Source 1 b) Source 2 c) δ (Any fixed frequency within) System Output Power a) Source 1 b) Source 2 Acceptance tests at IPR. 1. IPR representative shall perform the followin mentioned below: Parameter System Output Frequencies a) Source 1 b) Source 2 c) δ (Any fixed frequency within) System Output Power a) Source 1 b) Source 2 c) δ (Any fixed frequency within) System Output Power a) Source 1 b) Source 2 c) System shall be accepted only after above m	90 GHz 90±δ GHz 100 to 600 MHz + 15 dBm + 15 dBm g measurements to verify the specifications as Specification 90 GHz 90 GHz 90 GHz 90 GHz 90 to 600 MHz + 15 dBm entioned specifications are met.		
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No. 1 2 E. A Sr. No. 1 2 () Wa: • Minim d) Peee	System Output Frequencies a) Source 1 b) Source 2 c) δ (Any fixed frequency within) System Output Power a) Source 1 b) Source 2 Acceptance tests at IPR. 1. IPR representative shall perform the followin mentioned below: Parameter System Output Frequencies a) Source 1 b) Source 2 c) δ (Any fixed frequency within) System Output Power a) Source 1 b) Source 2 c) δ (Any fixed frequency within) System Output Power a) Source 1 b) Source 2 2. System shall be accepted only after above m rranty num one year from the date of acceptance.	g measurements to verify the specifications as 90 GHz 100 to 600 MHz + 15 dBm + 15 dBm g measurements to verify the specifications as 90 GHz 90±8 GHz 100 to 600 MHz + 15 dBm + 15 dBm + 15 dBm entioned specifications are met.		
No. 1 2 E. A Sr. No. 1 2 c) Wat • Minim d) Pac	System Output Frequencies a) Source 1 b) Source 2 c) δ (Any fixed frequency within) System Output Power a) Source 1 b) Source 2 Acceptance tests at IPR. 1. IPR representative shall perform the followin mentioned below: Parameter System Output Frequencies a) Source 1 b) Source 2 c) δ (Any fixed frequency within) System Output Power a) Source 2 c) δ (Any fixed frequency within) System Output Power a) Source 2 2. System shall be accepted only after above m rranty num one year from the date of acceptance. Sing Instruction:	g measurements to verify the specifications as 90 GHz 100 to 600 MHz + 15 dBm + 15 dBm g measurements to verify the specifications as 90 GHz 90 ± 8 GHz 100 to 600 MHz + 15 dBm + 15 dBm + 15 dBm entioned specifications are met.		



*Note:

- 1- δ = 100 to 600 MHz(fixed), ϕ = 0 to 180 ° or better
- 2- The source could be free running oscillators/ DRO or PLDRO's with multiplier units etc.
- 3- The IF LNA, BPF and variable attenuator or VGA specifications shall depend on the parameters of the chosen RF circuit.
- 4. If mixer1 takes the signals before multiplication then the IF1 must be multiplied accordingly in order to drive the IQ detector.

Compliance Sheet

<u>Compliance Statement for Supply of W-Band Trans-Receiver Subsystem alongwith</u> <u>Mandatory Spares i.e. 2 Nos. of Mixer and 1 No. of IF LNA and all required standard</u> accessories – 1 System.

Bidder must submit compliance statement dully filled with exact technical values of each specifications (Not with OK, CONFIRM, COMPLY, ACCEPTABLE) alongwith official seal and signature with their offer.

Sr. No.	Parameter	Specification	Vendor Specification
1	Transmitter Frequency (GHz)	90	
2	Transmitter Power (dBm)	+15	
	Receiver Frequency (GHz)	90 ± δ	
3	δ (Any fixed frequency within, MHz)	100 to 600	
4	Phi (deg)	0 to 180 ° or better	
5	Antenna gain (dB)	23 or better	
6	Low noise amplifier gain (dB)	≥ 20	
7	Low noise amplifier Noise figure (dB)	6 or better	
8	Continuous Variable attenuation / Gain control (dB)	≥ 30	
9	Band pass filter centre frequency (MHz)	600	
10	Receiver Noise Figure (Without RF LNA, dB)	9 or better	
11	Output signal (I/Q)	1 Vpp @ 50ohm	
12	IQ Frequency (Any fixed frequency within)	≥100 KHz	
13	Output Connectors at the IQ detector	SMA (F) / BNC	
14	Warranty/Guaranty	1 year (min)	
15	Mandatory Spares	1. MIXER -2 * (Qty : 02 No's)	
		2. IF LNA * (Qty : 01 No's)	
16	Standard Accessories	*Ref. to circuit Layout attached. Vendor should quote for all the accessories i.e., microwave/RF	
		components, inter-connecting waveguides and cables required for system assembly, operation, testing and maintenance.	

		The complete system should be	
		enclosed in a 19" rack mountable	
17	England	metal enclosure with provision for	
17	Enclosure	connecting a grounding cable so as to	
		avoid interference to the system from	
		external noise sources.	
18	Indicators	The instrument subsystem (its	
		assemblies) should be self-contained	
		and incorporate indicators or status	
		output signals	
19	POWER SUPPLIES	• The complete subsystem must	
		operate on 230 V AC.	
		• No other power supplies must be	
		required to operate the subsystem	
		i.e. All the necessary DC power	
		supplies required for the operation	
		of all the active components of the	
		system like Oscillators, Amplifier,	
		LNAs, Multipliers, Quartz	
		oscillators etc. must be included.	
20	DOCUMENTS REQUIRED (along	Complete specifications of the	
	with the sub system)	Oscillators, Crystal oscillator,	
		amplifiers, multipliers,	
		attenuators, balanced mixer, SSB	
		mixer, IQ mixer, LNAs etc. along	
		with all the original datasheets	
		should be provided.	
		• The vendor should provide the	
		Detailed Installation Guide and	
		Operational Manual" along with the	
0.1		product.	
21	Schedule	1. Vendor should submit the	
		design/drawing details within	
		1 month from PO received.	
		2. IPR will give the	
		drowing within 15 days often	
		receiving it from the vendor	
		3 After the acceptance of	
		drawing from IPR vendor con	
		start the fabrication	
		• The delivery of the system	
		should be within 8 months from	
		the date of approval of drawing.	
22	Pre-despatch tests (before	• The vendor has to submit the	
	despatch for approval)	following test reports to IDR once	
	acspaten for approval	ionowing test reports to in K olice	
1			1

		they complete the work of system	
		assembly, integration and	
		characterization.	
		• Based on these test reports IPR	
		shall issue a dispatch clearance	
		lottor	
		The report has to have the following tests	
6	Denemotor		
No.	Farameter	Specification	
1.	System Output Frequencies		
	a) Source 1	90 GHz	
	b) Source 2	90±δ GHz	
	c) δ (Any fixed frequency	100 to 600 MHz	
	within)		
2.	System Output Power		
	a) Source 1	+ 15 dBm	
	b) Source 2	+ 15 dBm	
23.	Acceptance tests at IPR.	IPR representative shall perform the	
		following measurements to verify the	
		specifications as mentioned below:	
Sr.	Parameter	Specification	
No.			
1	System Output Frequencies		
	a) Source 1	90 GHz	
	b) Source 2		
	c) δ (Any fixed frequency	100 to 600 MHz	
	within)	100 10 000 MHZ	
2	System Output Power		
	a) Source 1	+ 15 dBm	
	b) Source 2	+ 15 dBm	
	System shall be accepted on	y after above mentioned specifications a	are met.
24	Warranty	Minimum <u>one year</u> from the date of	
		acceptance.	
25	Packing Instruction:	Proper packing should be done for	
		the shifting of instrument from	
		vendor/factory site to IPR.	

Authorised Signatory

Official Seal

Date :-