

Technical Specifications
for
MeiTY's NavIC Receiver Module RFP

Annexure-1

Technical and Functional Specifications of NavIC+GAGAN/GPS Receiver

A typical NavIC+GPS/GAGAN Receiver chipset/Module will consist of L1, L5 & S-band RF Front-Ends and Baseband Processing for NavIC and GPS/GAGAN Channels. **This module is targeted as cost-effective solution for commercial, strategic & critical infrastructure sector applications.**

Parameter	Specification
GNSS Signal Reception Capability	NavIC : L5 (1176.45 MHz) / L1 (1575.42 MHz) --- See Note* NavIC : S (2492.028 MHz) GPS L-band Civilian Signals ; GAGAN SBAS
Receiver Sensitivity	Better than -139 to -145 dBm (Acquisition on cold-start) Better than -147 dBm (Re-Acquisition) Better than -153 to -160 dBm (Tracking)
No. of Channels	Min. 34 (NavIC & GPS) + (Opt. -2 GAGAN SBAS), Configurable, More No. Of Channels Desirable
Time to First Fix-(TTFF)	<80 Seconds (NavIC-Cold Start open sky) <40 Seconds (GPS-Cold Start open sky) 1-2 Seconds (Hot Start – Momentary Blockage)
Output-1	Serial: PVT in NMEA 0183 or Latest Format @9600 baud Rate (@1Hz-20 Hz update rate desirable)
Output-2	1 PPS Signal (LVTTTL/CMOS)
3D RMS Position Accuracy	~ 5m (1 σ RMS) ; ~3m Desirable
Velocity Accuracy	~ 0.1m/sec. (1 σ RMS)
Timing Accuracy	~ 15 nsec.
Mandatory Features	- On-chip Flash for configuration storage - Firmware upgrade facility through Serial Port - Positioning Modes : Hybrid (Default-NavIC+GPS), NavIC only or GPS Only Modes User Selectable
Receiver Dynamics	515 m/sec. Velocity ; 4g acceleration
Package Size & Form Factor	~500 mm ² , Single Chip or Multi-Chip Module Leadfree, RoHS Compliant Desirable
Power Consumption	~250 mW (Total) ; <150mW desirable
Operating Conditions	-10° C to 85°C; 5%-95% RH

Antenna Support	<ul style="list-style-type: none"> - One/Two RF inputs for the signal - Capable of Supporting both passive and active antenna
Desirable Features	<ul style="list-style-type: none"> - *NavIC : L1 (1575.42 MHz) Signal Reception & Processing Capability - Self-Aided Ephemeris Estimation - Receiver Autonomous Integrity Monitoring (RAIM) - Multipath & Interference Mitigation, Anti-Jamming - Programmable Baud Rate 4800-115.2 Kbps Desirable - Interfaces: RS-232, USB, SPI etc. - NavIC subframe binary (Raw) data Output

***Note: NavIC/India will also have L1 signal Capability from next satellite (IRNSS-1J) onwards**

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Annexure-2

Chipset / Module Acceptance Criteria

ISRO will evaluate the following technical specifications for the Receiver chipset / Module, during acceptance test using NavIC & GPS Signal Simulators and field trials at Ahmedabad and/or Bengaluru with Live satellite signals.

Acceptance Testing (Indicative Parameters)	
I	Basic Performance Features
	<ul style="list-style-type: none"> ● No. of Channels ● GNSS Capability (NavIC, GPS & GaGaN) ● Acquisition and Tracking sensitivities ● TTFF – Cold start, Hot start (Both NavIC & GPS) ● PVT Accuracy – Position, Velocity & time & PVT update Rate ● Firmware upgrade in on-chip Flash ● Positioning Modes : Hybrid, NavIC only or GPS Only ● Power Consumption, Weight and Size ● Active/passive Antenna Support ● Environmental specifications
II	Additional & Innovative Features, if Any
	<ul style="list-style-type: none"> ● Receiver Dynamics (Velocity, Acceleration, Jerk) ● Interfaces Supported (RS-232, RS 422, USB, SPI etc.) ● Programmable Baud Rate ● Multipath mitigation, Interference mitigation, Anti-jamming, Time synch. ● Receiver Autonomous Integrity Monitoring (RAIM) ● NavIC : L1 (1575.42 MHz) Signal Reception & Processing Capability

Notes:

- (a) Whenever ready, Vendor is required to provide 5 (Five) Nos. of Proto-Devices along with Test Boards having associated circuitry mounted on it, for performance evaluation by ISRO.
- (b) Test Boards should have necessary provisions (connectors, test points, turrets etc.) for providing inputs and taking-out Outputs
- (c) ISRO will carry out on its own the acceptance tests using their own NavIC & GPS Signal Simulators and field trials at Ahmedabad and/or Bengaluru with Live satellite signals. Vendor rep. may also be allowed to participate in these testing and trials on request.
- (d) Necessary feedback for modifications in chipset/modules, if any and go-ahead for the final production lot will be provided to vendor after the testing of these 5 test boards.

ANNEXURE - 3

REVISION IN PROPOSED 2nd PHASE RFP WITH RESPECT TO 1st PHASE RFP

1. Bids for remaining 10 Lakh Chips may now be invited not only from Others but also from Startup/ MSMEs. The support amount of 10 Lakh Chips to be divided in the ratio of 5:3:2 to L1:L2:L3 bidders.
2. Bids for remaining 10 Lakh Chips may now be invited from Others & Startup/ MSMEs, with no predetermined volume allocated to them.
3. Bidders shall submit, along with their Bids, an EMD (Earnest Money Deposit) of Rs. 1.00 Crore. The other Clauses in section 4.3 of old RFP remains same including the Clause 4.3(viii).
4. 10 points are earmarked, instead of 5 points, for developing Integrated NavIC and GPS Chipset using an indigenously developed Processor.