



# THE *SMART* BUYER'S GUIDE TO TEST & MEASUREMENT EQUIPMENT



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## Industry Challenge

Unfortunately many people base their T&M purchasing decision on price, availability and misleading sales information. The following buyer's guide is designed to assist you in selecting and deciding on investment criteria for your T&M (Test & Measurement) Equipment. This information will ensure:

- The right type of test equipment is purchased
- The detailed technical purchasing criteria is developed
- You do not over invest
- The product is selected to adapt to changing technical market requirements (Future Proof)
- Maximise the output the product delivers to your company
- Minimise ongoing maintenance costs

## **Step 1: Product Category Selection**

The three types of T&M product categories are:

1. **Go/No Go testers**
2. **Commissioning testers**
3. **R&D testers**

### 1. Go/No Go

This product group is focused at the lower end of the technology spectrum and is used as a red light /green light validation tool. This test equipment is commercially attractive (Low Cost) and can provide the right levels of value as long as the required functionality is very structured.

#### ➤ **Issues**

- i. Low functionality set
- ii. Provides limited visibility as to what the fault is
- iii. Not suited to service or link commissioning testing
- iv. Result summaries are very basic.

#### ➤ **Benefits**

- v. Used for fast fault validation
- vi. Very easy to use
- vii. Low commercial investment

This product type is generally suited to a **maintenance only** environment to validate network fault conditions.



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## 2. Commissioning

This product group is focused at the lower - middle end of the technology spectrum and is used primarily to commission and fault-find communication services and links. They provide a comprehensive range of testing and monitoring functions to validate, isolate and commission layers 1 to 4. This test equipment is generally more expensive than the Go/No Go test solutions and provides a greater level of functionality that delivers an increased benefit to the business and therefore better ROI (Return On Investment).

### ➤ **Issues**

- i. Medium to high levels of complexity for correct product selection
- ii. Requires a medium level of skill by the operator to obtain maximum benefit.
- iii. Requires the operator to have a medium level of understanding of the associated technologies.
- iv. Larger in size than Go/No Go testers

### ➤ **Benefits**

- v. Faster isolation and resolution of associated activities
- vi. Often have remote control capabilities
- vii. Product automation will ensure minimal testing time
- viii. Comprehensive capabilities to resolve network issues
- ix. More likely to conform to international standards
- x. Preferred industry tool for network issue identification and resolution
- xi. Results can be uploaded to central management systems

Commissioning tools are the most widely purchased equipment on the market today as they provide the greatest levels of flexibility and capability to deliver real value to the owner.

## 3. **R&D**

This product group is focused at the high end of the technology spectrum and is used to emulate and stress test communication networks. This test equipment generally requires significant commercial investment and will also require allocation of funds for ongoing maintenance to ensure equipment currency to international standards.

### ➤ **Issues**

- i. High investment levels
- ii. Complex instruments to operate
- iii. Users must have a high level of understanding across the associated technologies.

### ➤ **Benefits**

- iv. Supreme functionality
- v. Provides high level of benefits during the architectural and scalability phases of network development.
- vi. Easily upgraded and therefore has a long investment life cycle.



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# The 5 Keys to Selecting and Purchasing T&M

## 1. Technology solutions

Many companies select T&M equipment mainly on price and availability ('I need it now'). Few select a product based on researched and validated technical criteria.

- Develop a detailed technical plan that satisfies your customer base.
- Ask your clients what they expect now and in the foreseeable future- This will help position your company as a professional well managed business.

Product selection criteria must include:

- Performance – Fact not fiction.

 **This is the most underestimated element. When put to the test, many products FAIL specifications.**

✓ **Develop a test plan and test all brands in accordance to this plan.**

✓ **Do not deviate!**

- Technology suitability – Combine today's and tomorrow's needs.
- Field suitability – Involve your staff
- Screen ergonomics - How long does it take to learn the interface?
- Test automation – Time is money – Measure this aspect
- Battery life

## 2. Reporting

T&M equipment is used to acquire a result and this is what is important to your customer. The time needed to generate reports is critical. Eg. If you create 100 reports per year and you can reduce the time needed to generate these reports by 40 - 50%, you can improve company efficiency and profitability. Customised report generation can take up to five hours which could equate to 500 man hours per year.

Saving 500 billable hours for the same result should be a very important factor!


**Organisations which do not quantify the time needed to generate reports adversely affect their profitability every day that equipment is operational.**



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Reports should be:

- Exportable in a CSU/Excel/PDF compatible format
- Automatically generated in most circumstances
- Be generated on site in a PDF format
- Include equipment configuration details
- Be provided in soft and/or hard copy
- Automatically upload to your PC / Laptop or be exportable via USB
- Look professional to your client (not a data dump)

Reports should include:

- Instrument used, including serial number
- Test set up and configuration
- Date and time
- Test result summary
- Overlaid on company logo

### 3. Equipment Interface - Ease of Use

Do not underestimate the importance of a software interface.

**After spending tens of thousands of dollars on equipment, prepare to spend MORE dollars on training if your people cannot use it efficiently on an occasional basis.**

Research shows that operators need to use an instrument 5 – 7 times AFTER training to be proficient otherwise you are wasting time and money completing any project. If your staff struggle to obtain test outcomes, you need to ask yourself – is this a training issue or user skill issue?

Solution:


- Conduct detailed product training (ask your supplier for product specific training)
- Conduct specific technology training



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Generally, modern equipment is reasonably easy to use. What challenges most people is the technology behind the task. In many instances, users are either:

- Obtaining incorrect measurements
- Interpreting results incorrectly
- Inputting poor and incorrect parameter/configuration settings, thus producing incorrect results
- Submitting results without checking for validity or accuracy due to a lack of knowledge

**Reports are the permanent interface your customer has with your company –  
POOR REPORTS = POOR REPUTATION**

#### 4. Product MTBF (Mean Time Between Failure)

Product availability is critical to that asset providing value to your business.

Without the equipment, you may not be able to complete key projects that sustain your financial security.

Often companies purchase T&M equipment that can only be serviced overseas.

**Question: If your motor vehicle had to be sent overseas for maintenance, would you have purchased it?**

If you purchase T&M assets based on price and technical capability only, you may find that the equipment is unavailable for 4 – 12 weeks per year due to calibration and repair periods.

A product purchase should be backed by an after sales support guarantee including:

- In-country calibration and calibration adjustment capabilities.  
Many companies offer calibration verification but if it fails the equipment will require further work to be performed by the manufacturer overseas.

This adds cost and delays.


- In-country PCB repair  
Many companies claim to offer repair services but only provide board swaps. This repair approach actually increases repair costs tenfold. In some cases, a simple power supply fault can cost \$12,000. A simple capacitor change costing 4-6 hours + parts would result in a faster turn-around time and significantly lower cost.



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Look at your T&M supplier as a business partner – not a supplier – make them accountable!

- Back up units  
Suppliers should make available a back-up unit when your equipment comes in for service.

BEWARE! Companies offering this as a free service use their sales demonstration equipment when the situation arises. Unfortunately, this means you will NEVER get a back up unit as they will only have one or two products for demonstration in each line.

It is a misleading & undeliverable promise!

Instead, purchase from a company that has a suitable quantity of back up units available at a set and agreed fee. Be prepared to pay about 0.5 - 0.8% per day of your purchase price for a Hot Swap replacement product.

- Performance Guarantees  
When your product goes in for calibration & repair, make sure you obtain a turn around commitment from your supplier. If they commit to five days, you should negotiate to get a back up product for free if the period is greater than their guarantee (excluding unforeseen issues).

More than 80% of equipment is adjusted during the calibration process - similar to the timing of your vehicle pistons in the engine to maximise its useable life – so it is imperative that tuning your T&M equipment is undertaken to maximise the useable life of the product.

#### What is the difference between certification and calibration?

Product verification is only suitable for digital products such as Ethernet products.

Products associated with analogue technologies including optical and RF are inherently variable and it is valuable to ensure that these products are tuned (calibrated).

Products that are not calibrated regularly have a reduced useable life of 30% and/or have a maintenance repair cost four times more than products that are serviced in accordance with the manufacturer's recommendations.

Note: Analogue-based equipment (Optical, Power &/RF)



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## Calculating the True Return of Your Test Equipment

### Total Asset Performance

Asset Productivity (Direct Revenue)

less

Total Purchase price (Amortised value plus cost of finance)

+ Maintenance Costs + Backup Product Costs plus

### Annual Maintenance Programs

All annual maintenance plus backup product cost

(replacement product costs during service)

### Below are two scenarios over five years:

Scenario 1 is based on equipment being serviced by an Australian organisation.

Scenario 2 is based on equipment being serviced by an international organisation.

Item	Scenario 1		Scenario 2	
Annual Depreciation Cost	\$5000 x 5	\$25,000	\$5000 x 5	\$25000
Annual Finance cost for asset	\$2250 x 5	\$11,250	\$2250 x 5	\$11,250
Local maintenance program	\$1595 x 5	\$7,975		



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International maintenance program			\$1595 x 5	\$7,975
Replacement product	\$280 per day x 5 days turn around	\$7,000 (local calibration)	\$280 per day x 35 days turn around	<b>\$49,000 (International calibration)</b>
Total Cost of Ownership over 5 years		<b>\$51,225</b>		<b>\$93,225</b>

*Assumptions:*

- I. International calibration average 35 day turn-around time
- II. Equipment owner must have equipment available 8 x 5

**OUTCOME:**

**If you require your asset to be available on most working days, sending equipment overseas is costly, it adversely affects profitability and is very frustrating!**

**5. Upgradeability**

Modern T&M equipment is designed to provide for future changes in technology via one of the following methods:

- Software upgrade
- New hardware module
- Factory retrofit

**It is very important that your technology plan includes the potential changes to your technical needs and your selected product accommodates these changes.**


- BEWARE the factory retrofit!



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This usually means returning your equipment to the manufacturer and in 4-6 weeks they return an 'upgraded' product. In most cases this means they have given you a new product and you are likely to pay dearly for this exercise.

- All major technology upgrades should be done with consideration of what new products may have been released to market since your original purchase. You may be surprised to find products that are
  - Less expensive
  - More capable
  - Next generation of hardware
  - More efficient to use

## Summary

✚ Develop detailed technology selection criteria backed by comprehensive after sales support programs.

✚ Be careful of those companies that cannot commit to definitive after sales service and support outcomes

✚ Calculate the real benefit each instrument can provide to your organisation and the costs of associated down time.

Celemetrix is an independent company capable of offering a range of advisory services to organisations understanding the importance of correct product selection.

**For further information please call our Professional Services division on 1800 256 838.**



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