1.3   Measurements in Light to Reveal Precision Accuracy

1.3.1   The Technique of Measurement Recording

1   Create a Tabulated Format – *typical style* as shown below

LASER Beam Intensity	Photo-voltage	Oscilloscope Amplitude	Pulse Frequency	Diameter of Optic Fibre
L_B / cd	V_L / V	a_L / mm	F_L/ Hz	d_F / cm
± 200	± 0.2	± 2.0	± 10	± 0.05
2200	3.6	23.0	940	1.55
2400	3.8	25.0	950	1.60

2   The above values form the Arithmetic Mean of at least 3 Measurements of the same quantity.
3   The at least 3 Measurements should be acquired as 3 independently orientated measurements.
4   All Numerical Result Tables should show the top 3 Table Rows as:-
        4.1   **Parameter Words**
        4.2   **Parameter Symbol / Units - The / indicated "measured in"**
        4.3   **Measurement ± Tolerance Value.**
5   The ± Tolerance Values **Control the Significant Figures** attributed to the Recorded Measurements.
6   Recorded Measurements must Rise / Fall in "**quantized jumps**" controlled by the **± Tolerance Values.**
7   The **± Tolerance Values** are designated by:-
        7.1   **The accuracy of the Measuring Instrument scale.**
        7.2   **The "range" extremes of the 3 (or more) independently orientated measurements.**
        7.3   **An estimate of the accuracy with which the operator claims can be applied to that instrument.**
8   Tolerance Values should involve only a **1, 2,** or a **5** as the Significant Number in the specified Tolerance.
9   The Parameter Symbols should always carry **Subscripts**, to identify that particular Measured Parameter.
10   Since the Parameter Symbol effectively is "divided" by the Units, only **Numbers** appear in the Table Columns.
11   Any Measured Number not fitting the anticipated sequence must be checked carefully – not ignored !
12   All Tabulated Results should be translated to a Graphical Representation, if at all possible.

1.3.2   The Technique of Graphical Representation

1   **The Independent Controlling Parameter** should be designated in the **x-axis** (The Abscissa Axis).
2   The **Dependent Parameter** should be designated in the **y-axis** (The Ordinate Axis).
3   The Parameter, its symbol, and its Units should be shown on each Axis.
4   Each Graphical Point should be shown as a vertical "cross"
5   The actual Graph "line" should be a **smooth curve** – the Laws of Photonics do not change suddenly at the measured points, which **each have an error factor** involved with is location relative to the Graph.
6   **Error Bars** need to be estimated carefully – when shown.