

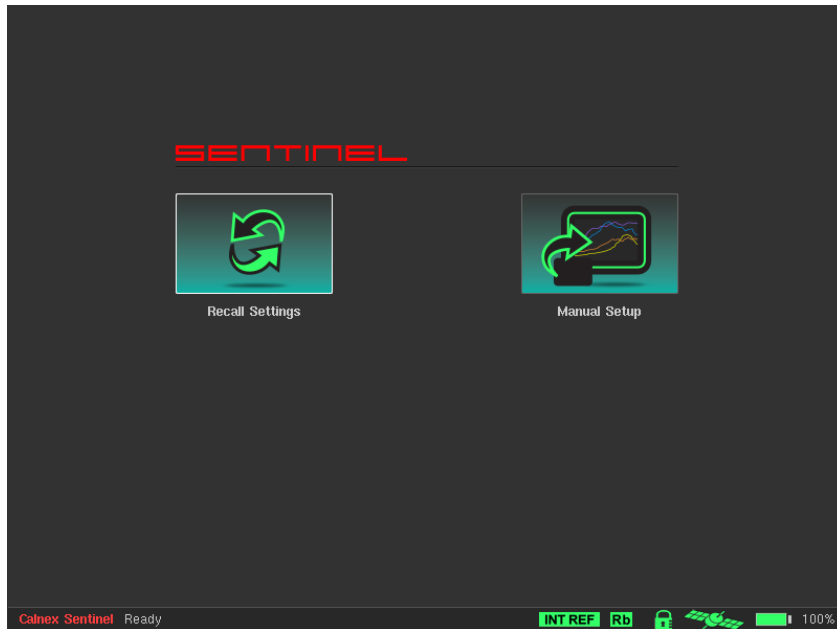


GETTING STARTED GUIDE

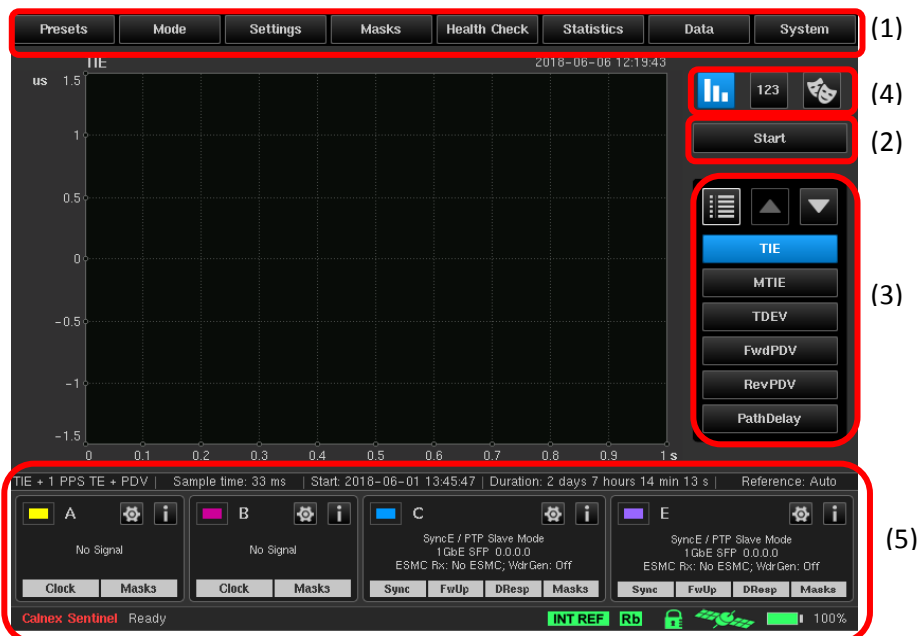
ITU-T G.8265.1 Measurement

Initial Power Up

Upon initial power on of Sentinel, the following screen appears. The **Recall Settings** option allows previously saved configuration files to be re-loaded, automatically setting up Sentinel to the state defined in the preset file and move to the main operating screen. Selecting the **Manual Setup** option moves directly to the main operating Screen.



Main Screen



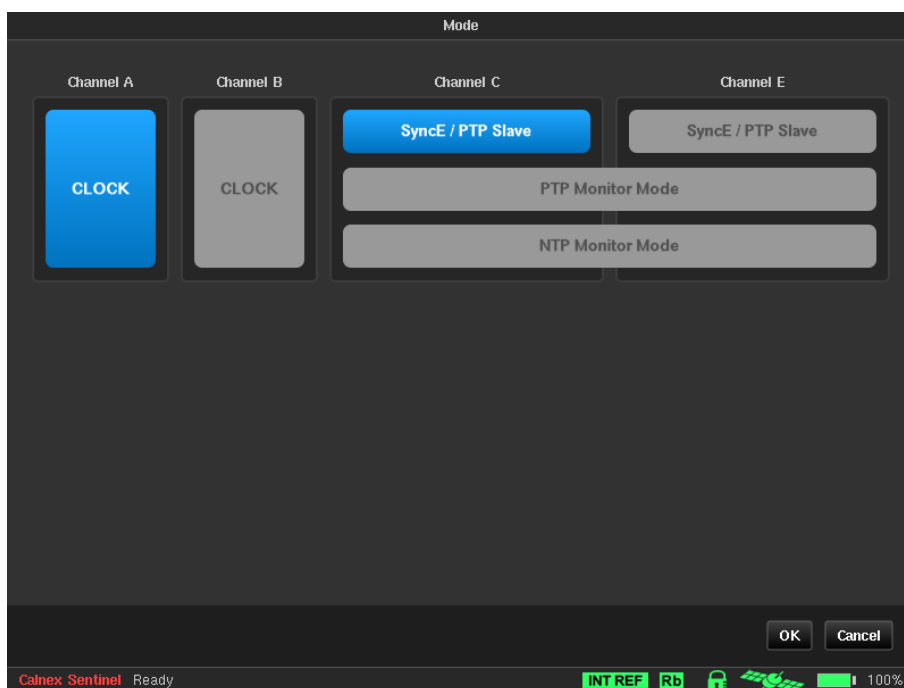
The main screen contains controls to allow simple, ordered configuration (1) and operation (2) of Sentinel. Navigation buttons allow movement between each measurement result graph (3) and change the mode of viewing results (4). The status of the measurement sub system is shown in widgets and icons at the bottom of the screen (5).

Measurement Setup

Manual configuration of Sentinel is simply a process of working through the tabs on the main screen as detailed below.



The mode screen allows the Sentinel measurement subsystem to be configured as required by the type of testing being performed. In this example Sentinel is performing a G.8265.1 frequency measurement and requires a clock channel to measure the recovered clock from the DUT and an Ethernet connection to an output from the edge router. This Ethernet connection will be used to communicate with the PTP GM and can additionally perform a TIE measurement on the SyncE recovered clock. Here clock channel A is chosen to measure a 10MHz input and Packet card C for the PTP connection. Sentinel can also be configured to run in monitor mode through this screen.

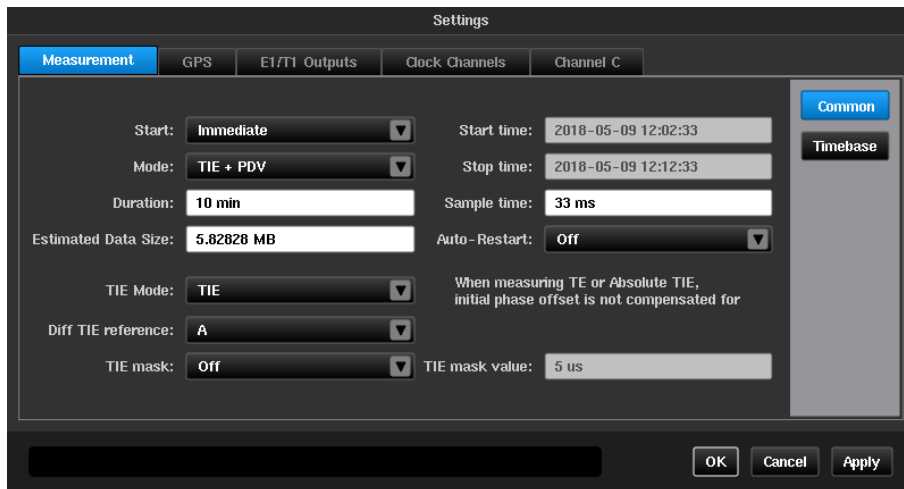


Disabling unused channels simplifies configuration and result viewing by removing these channels from the configuration and results screens.



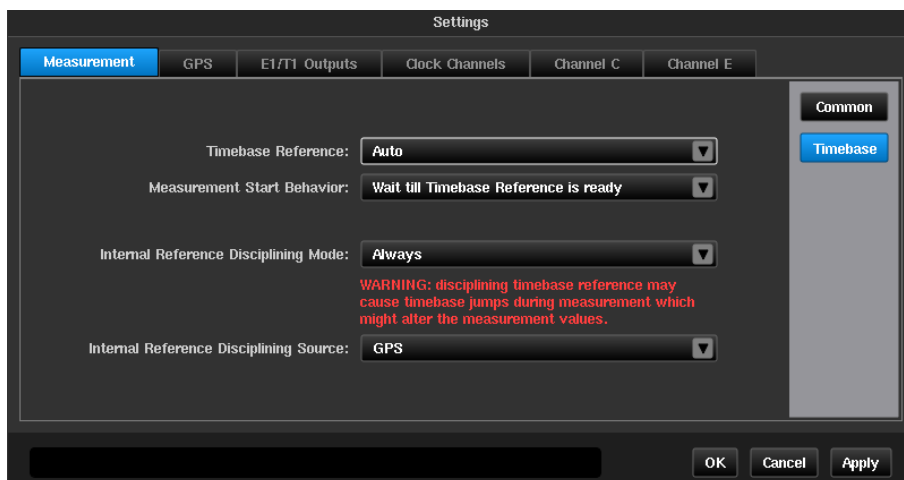
The settings screen contains tabs to configure all of the relevant measurement subsystems selected through the mode screen.

The measurement common screen allows the measurement duration and type to be defined.



The measurement can be started immediately or deferred to a specific **Start time** and optionally stopped at a specific **Stop time**. The **Sample time** for TIE measurements can be set in the range 5ms to 6.5535s. For a G.8265.1 measurement the **Mode** must be set to **TIE + PDV** and the **TIE mode** set to **TIE**. The **Diff TIE reference** is set to the internal Rb **1 PPS Ref**. The **TIE mask** is unused in this case and should be set to **Off**.

Sentinel has an internal Rb oscillator and for phase measurements it requires disciplining prior to the measurement taking place. The measurement timebase screen allows configuration of the reference used for the measurement.

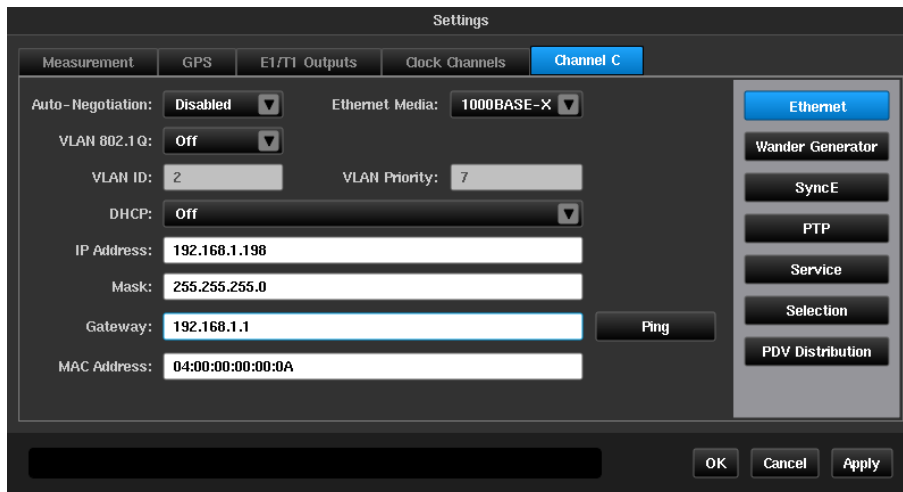


Timebase Reference can be set to **Auto**, **Internal** or **External**. If an external 10MHz reference is supplied and Auto or External is selected then this will be used rather than the internal Rb oscillator. The measurement can be deferred until the timebase reference is ready, aborted if it is not ready or started even if the timebase is not ready through the **Measurement Start Behavior** setting. As the G.8275.1 DUT is likely to be referenced to GPS this should be selected as the **Internal Reference Disciplining Source**. If the last disciplining was less than 1 week ago, Sentinel should be disciplined for at least 6 hours, otherwise Sentinel should be disciplined for at least 12 hours.

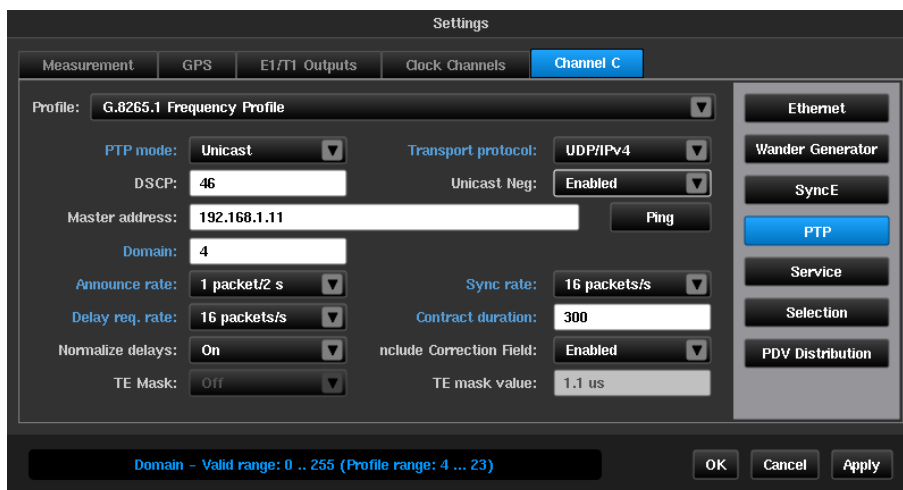
Disciplining can be suspended during a measurement or completely by setting the **Internal Reference Disciplining Mode** to **Never** or **Not during measurement**. Sentinel will only discipline if the disciplining source selected is producing a valid disciplining output and Internal Reference Disciplining Mode can be left to **Always** even if the source is not available. If the source is re-connected during a measurement then there may be a phase shift in the timebase reference.

The channel used for the PTP connection was selected on the mode screen and a **Channel x** tab will be present for each PTP connection chosen: in this case only Channel C was enabled.

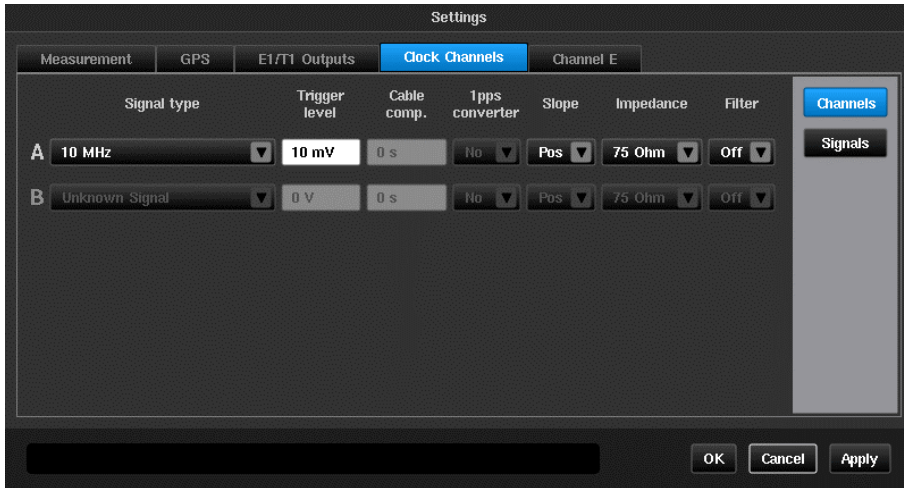
The Ethernet screen allows the physical media and link transport properties to be selected. G.8265.1 specifies IP unicast as the transport and the IP parameters must be correctly initialised as specified by the edge router parameters. Even if a gateway is not used, the **Gateway** field must be on the same subnet as the **IP Address**.



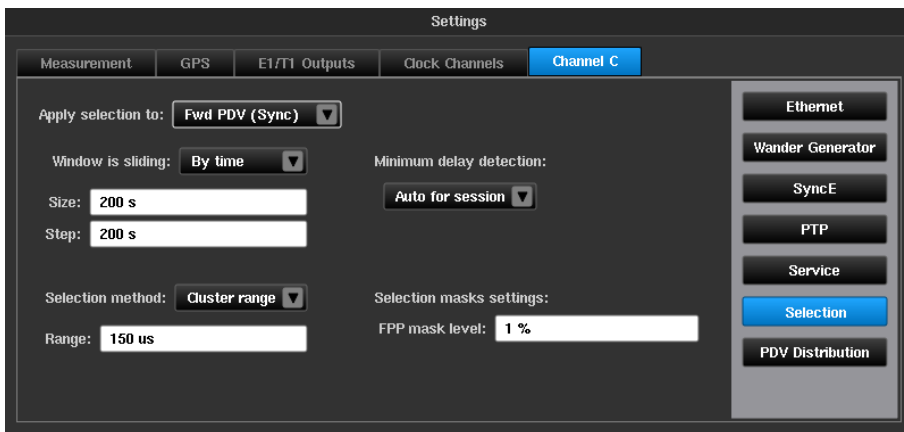
The PTP screen allows configuration of the PTP profile. Selecting **G.8265.1 Frequency Profile** sets up all the relevant fields with the default values specified in the ITU-T G.8265.1 profile. Fields with blue text are defined in the ITU-T specification, other fields are set to enable 2Way TE measurements. Context sensitive help is shown when specific fields are selected. For example, the **Domain** can be set to a value between 4 and 23 and still be compliant to the G.8265.1 profile.



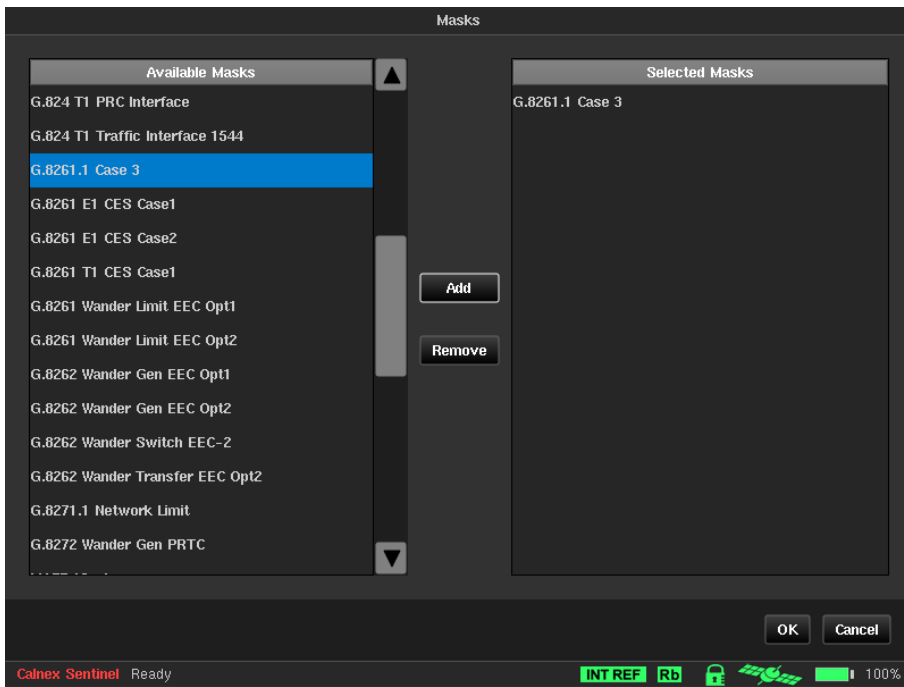
The clock channels screen allows information to be entered about the clock of the DUT, i.e. the **Signal Type**, **Trigger level**, **Slope**, **Input Impedance** and **Filter** to be used. These values are normally automatically populated when a Signal Check is run. (See later.)



ITU-T specifies a Floor Packet Percentage (FPP) metric for PDV on the forward flow. This is set up through the **Selection** page. **Apply selection to** should be set to **Fwd PDV (Sync)**. The window should be sliding by **Time** with a **Size** of 200s and **Step** of 200s. The **Selection method** should be **Cluster range** with a **Range** of 150us and the **FPP mask level** should be 1%.

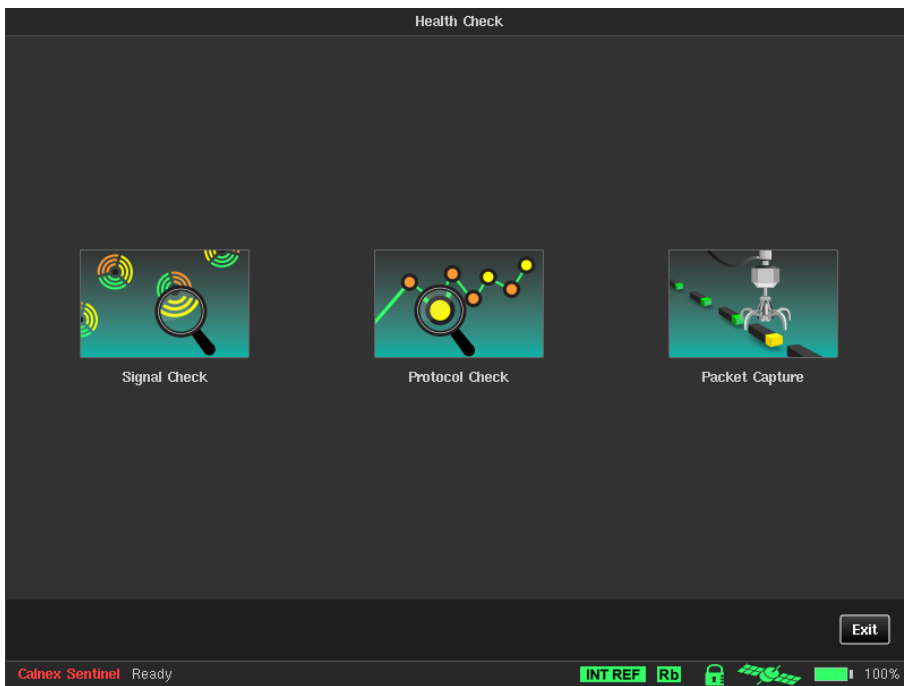


The masks screen allows selection of standard masks to be applied to MTIE and TDEV graphs. ITU-T G.8261.1 defines a mask for MTIE of any recovered clock and this can be found by scrolling through the **Available Masks** and pressing the **Add** button when **G.8261.1 Case 3** is highlighted.



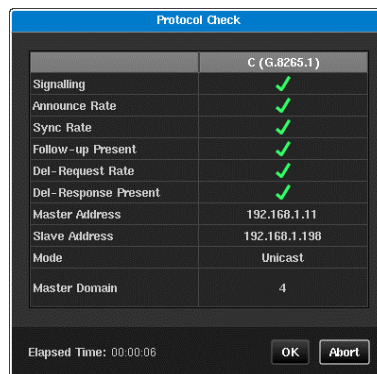
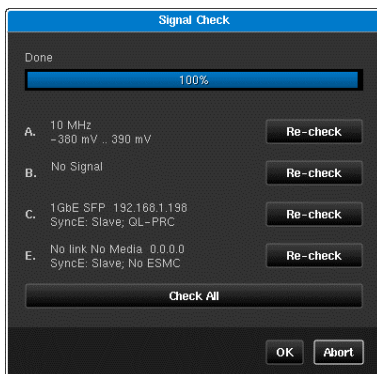
Running a Measurement

Prior to running a measurement the measurement subsystem and PTP connection should be checked for correct configuration using the health check screen.



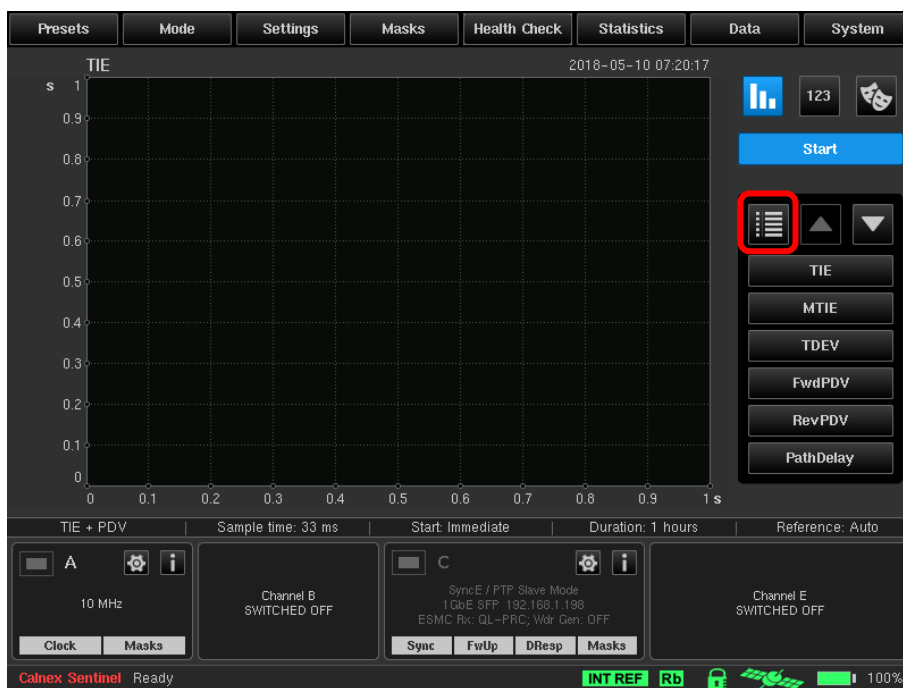
Running **Signal Check** will detect all clocks and Ethernet links connected to Sentinel and set up the measurement subsystem. If a signal check is not performed then TIE measurements may display erroneous data.

For this measurement the results should show a 10MHz signal connected to channel A and an Ethernet link on channel C. If this is not the case, check the physical connections then press the **Re-check** button beside the failing channel.



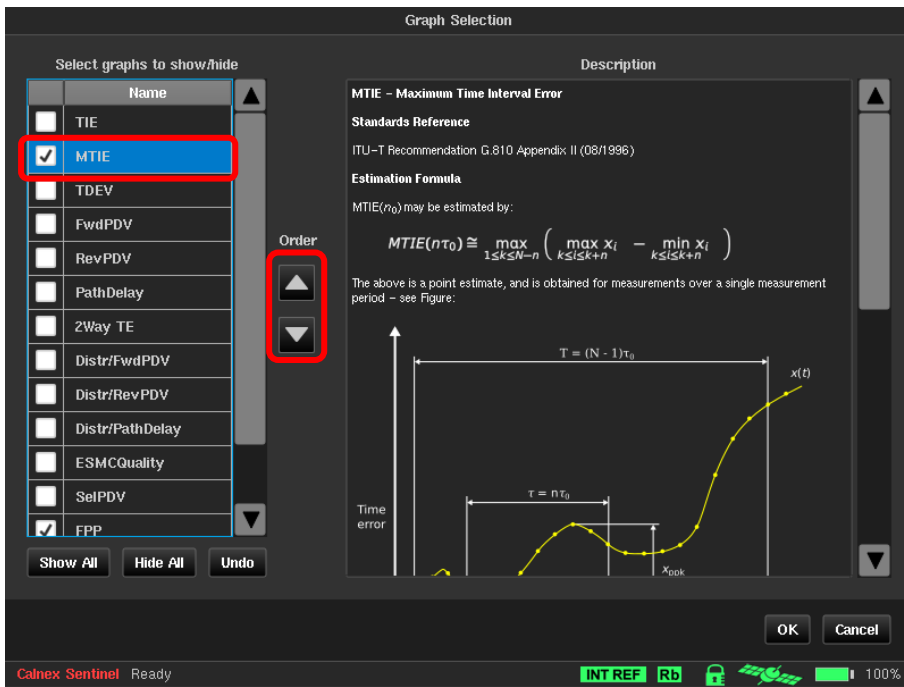
Running protocol check is optional but will verify that Sentinel can communicate with the PTP GM and that the expected message rates are correct.

The measurement can now be run by pressing the **Start** button on the main screen.

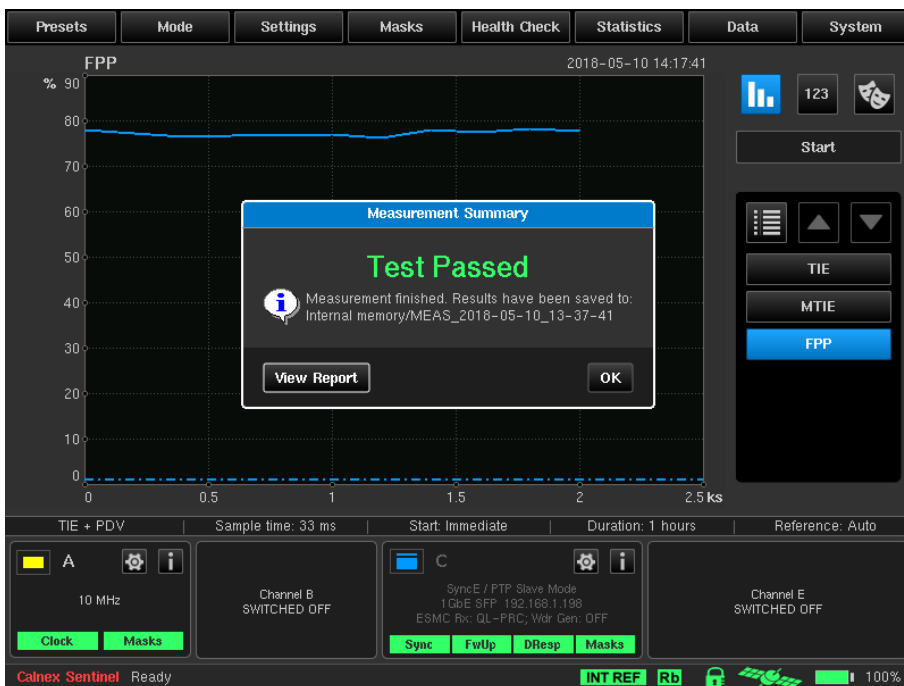


A Hide / Show checkbox and associated measurement description is available for each graph. Graph ordering can be changed by highlighting the graph name and pressing the **Order** arrow buttons.

ITU-T G.8261.1 limits apply to MTIE and FPP. The TIE graph may also be of interest so in this example the TIE, MTIE and FPP are selected.



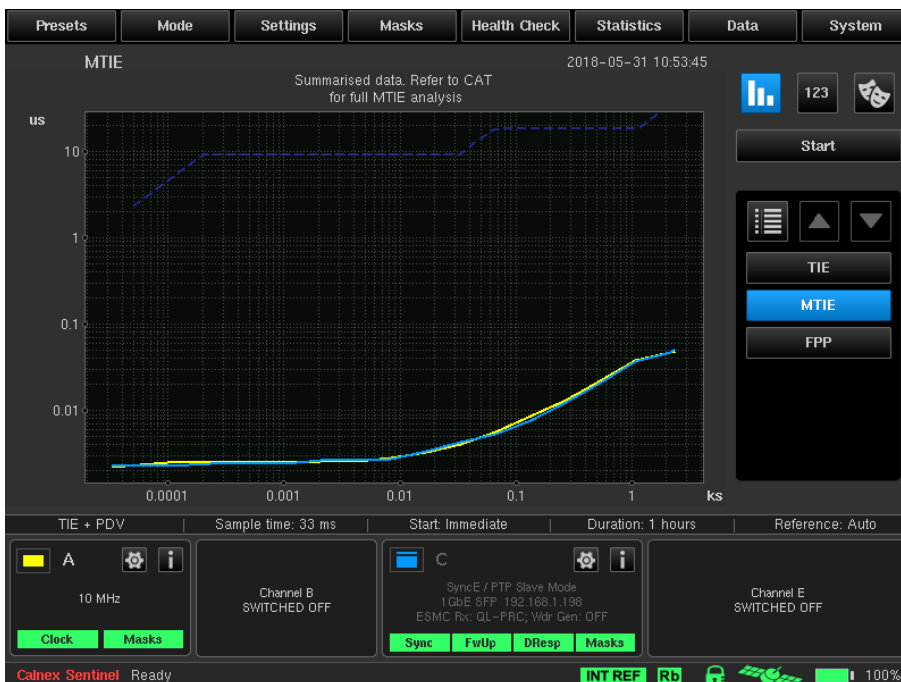
When the test completes a popup box appears giving the overall test Pass / Fail status. A text report file can be viewed by pressing the **View Report** button.



The FPP graph shows the measured percentage of packets within the floor range and the 1% limit. The test passes if all measurements are above the 1% limit.



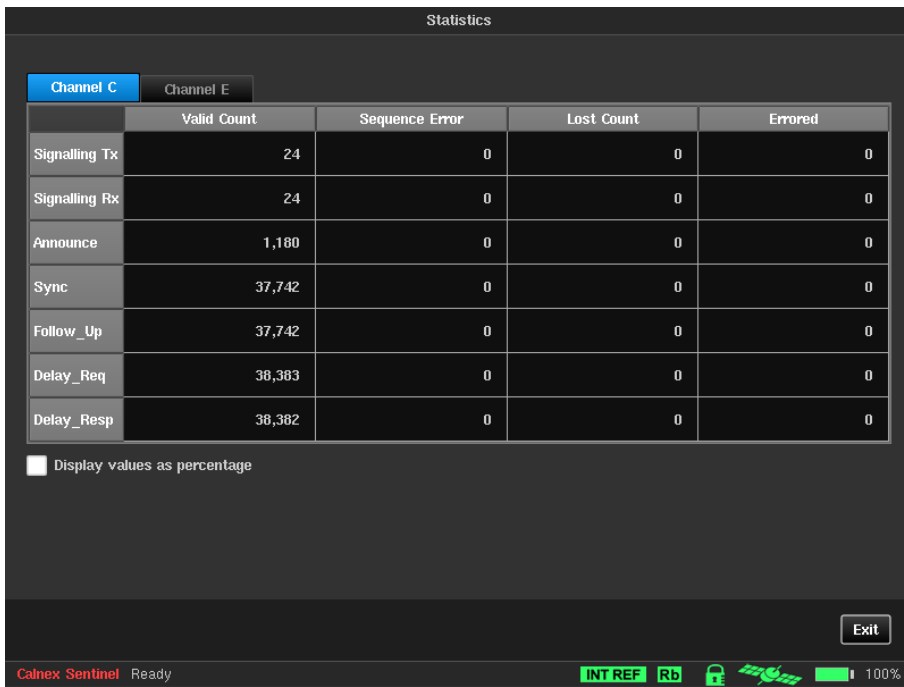
The MTIE measurement of the 10MHz from the DUT and SyncE recovered clock are shown on the MTIE graph along with the ITU-T G.8261.1 Case 3 mask. The test passes if the MTIE values remain below the mask.



The PTP message statistics for the measurement duration can be viewed by pressing the **Statistics** button on the main screen.



This shows totals for Valid packets, packets with PTP Sequence ID errors, Lost packets and Errored packets. The totals can also be displayed as a percentage.



Measurement analysis can be toggled on / off by pressing the **Analysis** button. This displays the mean, standard deviation, initial phase offset and final value of the measurement for the currently displayed graph.

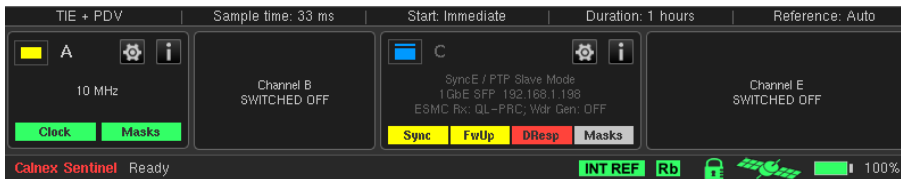


A summary of the Pass / Fail of individual MTIE and FPP masks is available by pressing the **Masks Summary** button on the main screen.



Each populated measurement channel has an associated widget to indicate the status and configuration of the channel and to allow quick access to the channel settings.

Loss of signal LEDs and Mask pass fail results are displayed at the bottom of the widget.



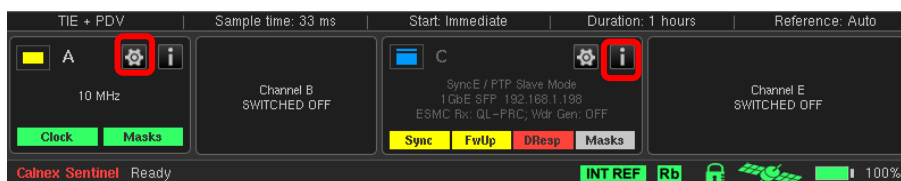
A green LED indicates that the associated clock signal or PTP message is present or that the mask has passed.

A red LED indicates that the associated clock signal or PTP message is absent or that the mask has failed.

A yellow LED indicates that the associated clock signal or PTP message has been absent but is now present again.

A grey LED indicates that the associated PTP message is not relevant (e.g. Follow Up when running in 1 step mode) or the test has not run long enough to validate the mask.

The settings button on a widget will navigate directly to the settings page for that channel.



The **Info** button will display more detailed information on the selected channel.

Channel Information

Clock Channels **Channel C**

General	Active Announce Message	SFP Information
1 GbE SFP	ANNOUNCE: Active	Vendor: JDS UNIPHASE
192.168.1.198	Clock Class: 84	PartNumber: JSMR21S002B01
G.8265.1 Frequency Profile	Clock Accuracy: 33	SerialNumber: F4182515126C
Display: Recovered clock	Time Source: 32	TxPower: -5.5 dBm
SyncE: Slave	UTC Current Offset: 37	RxPower: -4.8 dBm
ESMC: QL-PRC	Scaled Log Variance: 25600	Wavelength: 850 nm
PTP: Pseudo-slave	Priority 1: 128	
PTP Mode: Unicast	Priority 2: 128	
Monitored Domain: 4	Steps Removed: 0	
Transport Protocol: UDP/IPv4	Clock Identity: 00000E0F0E010A0D	
Announce Rate: 0.500 p/s		
Sync Rate: 16 p/s		
Delay Rate: 16 p/s		
Master: 192.168.1.11, Class 84		

OK

Calnex Sentinel Measuring (47 min 36 s remaining) INT REF Rb 100%

Post Measurement Report Generation using CAT

Sentinel provides results for 10MHz / SyncE MTIE and Fwd PDV FPP. To generate a report on full G.8261.1 compliance the results should be loaded into the Calnex Analysis Tool (CAT).

For this particular setup (10MHz connected to channel A and Ethernet on channel C), Sentinel stores the measurement results in the following files:

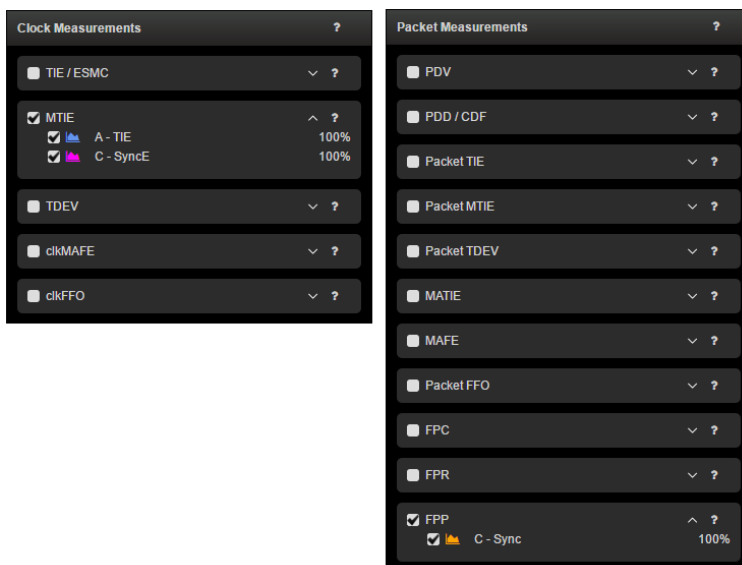
- 10MHz TIE – channelA.dset
- FPP – channelC_FWD_PDV.dset
- SyncE recovered clock TIE – channelC.dset

These files can be retrieved to the local computer through FTP or by copying on to a USB stick. After opening CAT, the relevant .dset files should be dragged and dropped onto the CAT window.

CAT generates a wide range of metrics from the input data and to simplify the report the appropriate G.8261 metrics can be selected by clicking on the **Select Metrics** button on the left hand menu and selecting only the following metrics:

- MTIE
 - A –TIE
 - C - SyncE
- FPP
 - C - Sync

Note: If not measuring SyncE recovered clock, uncheck the **MTIE C – SyncE** option.



Press **View Results**. The relevant results are displayed on three tabs.

The MTIE tab shows the result of the 10MHz and SyncE recovered clock measurement. Selecting the G.8261.1 mask will display the Pass / Fail result.



The FPP tab shows the graphed results and the 1% limit. By default the window, cluster range and limit are set to the G.8261.1 values but these can be changed if required and the results re-calculated.



Simply click on the **Generate Report** button to produce a PDF measurement report.



Calnex Solutions Ltd
Oracle Campus
Linlithgow
West Lothian EH49 7LR
United Kingdom

tel: +44 (0) 1506 671 416
email: info@calnexsol.com

calnexsol.com

© Calnex Solutions Ltd, 2018

This document is subject to change without notice.

June 2018 v1.0