8. Factory Test and Calibration

	Factory Test Requirements
1	When running production secure firmware only, USB load of the factory application is permitted.
2	Factory commands shall be input through the serial debug interface that is routed via the designated HDMI port.
3	Results data can be output through this interface and/or displayed on the screen.
4	Before execution the factory application on the USB stick shall be authenticated by the device firmware.
5	The factory application is built in conjunction with the product application, and shall contain the secure hash value of the factory app.
6	The product application shall only run the factory app if the computed hash and embedded hash values match.
7	Universal factory menu access shall be via legacy IR codes defined as MENU followed by 4210 for all ODMs.
8	Universal factory menu access shall be via legacy IR codes defined as MENU followed by LEFT, DOWN, BACK, CC or STAR key (replaced CC key on BT remotes).

8.1 Factory Calibration

The goal of factory calibration is to produce TVs with acceptable dE results with the minimum amount of time spent performing calibration. VIZIO will not spec the calibration equipment to be used, VIZIO defines the required tolerance as follows.

	Factory Calibration Requirements	Description
1	2 point white balance	
2		Grayscale tolerances shall be defined by maximum delta error between adjacent points (gray levels) and the maximum absolute delta error.
3		The tolerance between adjacent points shall be used to guarantee that there's no perceivable difference between levels.
4		The absolute tolerance shall guarantee that there's minimal difference between TVs. The absolute tolerance shall be the larger of the two because it's less important for two side by side TVs to have exactly the same white point.
5		It's very important that the white point shall correctly tracks on a given TV over its range of luminance.
6		To minimize the amount of time spent performing production line calibration, accurate "panel lot" based calibration shall be employed. A panel lot should by definition only include panels with very similar characteristics.
7		TVs in a given lot shall be able to share the same calibration data with minimal on the line individual adjustment.
8	11 point white balance (5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100).	11 point white balance may be allowed for some smaller skus.
9	20 point white balance (5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100).	P/MX Series ONLY 20 point white balance shall be required for P series skus instead of 11 point white balance.
10	The equipment used is required to be periodically referenced to a meter that is kept properly calibrated.	This allows VIZIO to stand behind the calibration reports.

8.2 Debug/Factory Interface

The debug/factory interface shall be made available through the side HDMI port. It must do no harm to any device connected to that port and it must be compatible with ARC, MHL, CEC, etc. -- i.e., it shouldn't break any TV related HDMI functionality.

	Requirements	PIN	Debug/Factory Interface
1	General	HDMI Pin 14 (Reserved - HEC)	As function control
2	General	HDMI Pin 15 (I2C SCL)	As alternate TV serial RX (3.3V signaling, 115200 BAUD, 8, 1, N, no flow control)
3	General	HDMI Pin 16 (I2C SDA)	As alternate TV serial TX (3.3V signaling, 115200 BAUD, 8, 1, N, no flow control)
4	General	HDMI Pin 17 (DDC/CEC/HEC Ground)	As ground
5	Minimum for common debug interface	PIN 14	No Connect or greater than -9V and less than +9V
6	Minimum for common debug interface	PIN 15	HDMI SCL (Normal HDMI functionality)
7	Minimum for common debug interface	PIN 16	HDMI SDA (Normal HDMI functionality)
8	Suggested functions	PIN 14	-9 to -15 volt input control voltage
9	Suggested functions	PIN 15	TV Factory RX
10	Suggested functions	PIN 16	TV Factory TX
11	Optional 4th function (e.g. TCON programming)	PIN 14	-15 to -20 volt input control voltage
12	Optional 4th function	PIN 15	Optional Factory function
13	Optional 4th function	PIN 16	Optional Factory function

8.2.1 USB Debug

The Factory programming interface may also be implemented using USB. This should be transparent to the VIZIO requirement. The SmartCast system shall be able to write out console logs and other debug information to the USB port when a USB thumb drive. A full description of this functionality can be found in the developer and debug information.

8.3 TV Unpaired Bluetooth Remote

	Requirements	Notes
1	Reset to Factory Settings does NOT unpair Bluetooth remote, factory command/menu must be used. The BT API including the BT_unpair command must be used.	After reset to factory settings, BT pairing automatically repairs with the remote.